



**FCC Certification Test Report**  
**for**  
**Communications International, Inc.**  
**FCC ID: SA8MARKII-CII-DMD**

**August 20, 2004**

Prepared for:

**Communications International, Inc.**  
**44500 US 1**  
**Vero Beach, FL 32967**

Prepared By:

**Washington Laboratories, Ltd.**  
**7560 Lindbergh Drive**  
**Gaithersburg, Maryland 20879**



# **FCC Certification Test Program**

## **FCC Certification Test Report for the Communications International, Inc. Mark II Power Amplifier Upgrade Kit SA8MARKII-CII-DMD**

**August 20, 2004**

WLL JOB# 8188

Prepared by: Michael Violette  
President

Reviewed by: Greg Snyder  
Chief EMC Engineer

## **Abstract**

This report has been prepared on behalf of Communications International, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for a Power Amplifier under Part 90 of the FCC Rules and Regulations. This Federal Communications Commission (FCC) Certification Test Report documents the test configuration and test results for a Communications International, Inc. Mark II Power Amplifier.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The Communications International, Inc. Mark II Power Amplifier Upgrade Kit complies with the limits for a Power Amplifier device under Part 90 of the FCC Rules and Regulations.

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## **1 Introduction**

### **1.1 Compliance Statement**

The Communications International, Inc. Mark II Power Amplifier Upgrade Kit complies with the limits for a Power Amplifier device under Part 90 of the FCC Rules and Regulations.

### **1.2 Test Scope**

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 2001 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

### **1.3 Contract Information**

Customer: Communications International, Inc.  
44500 US 1  
Vero Beach, FL 32967

Quotation Number: 61385

### **1.4 Test Dates**

Testing was performed on June 20 and June 21, 2004

### **1.5 Test and Support Personnel**

Washington Laboratories, LTD James Ritter

## Abbreviations

A	Ampere
Ac	alternating current
AM	Amplitude Modulation
Amps	Amperes
b/s	bits per second
BW	Bandwidth
CE	Conducted Emission
cm	centimeter
CW	Continuous Wave
dB	decibel
dc	direct current
EMI	Electromagnetic Interference
EUT	Equipment Under Test
FM	Frequency Modulation
G	giga - prefix for $10^9$ multiplier
Hz	Hertz
IF	Intermediate Frequency
k	kilo - prefix for $10^3$ multiplier
M	Mega - prefix for $10^6$ multiplier
m	Meter
$\mu$	micro - prefix for $10^{-6}$ multiplier
NB	Narrowband
LISN	Line Impedance Stabilization Network
RE	Radiated Emissions
RF	Radio Frequency
rms	root-mean-square
SN	Serial Number
S/A	Spectrum Analyzer
V	Volt

## 2 Equipment Under Test

### 2.1 EUT Identification & Description

The Communications International, Inc. Mark II Power Amplifier Upgrade Kit is a 110W RF power amplifier that is to be used in the MASTRIII Base Stations manufactured by M/A-COM (FCC ID: OWDTR-329-A2). The PA is a replacement amplifier that is being introduced in this line of Land Mobile Base Stations.

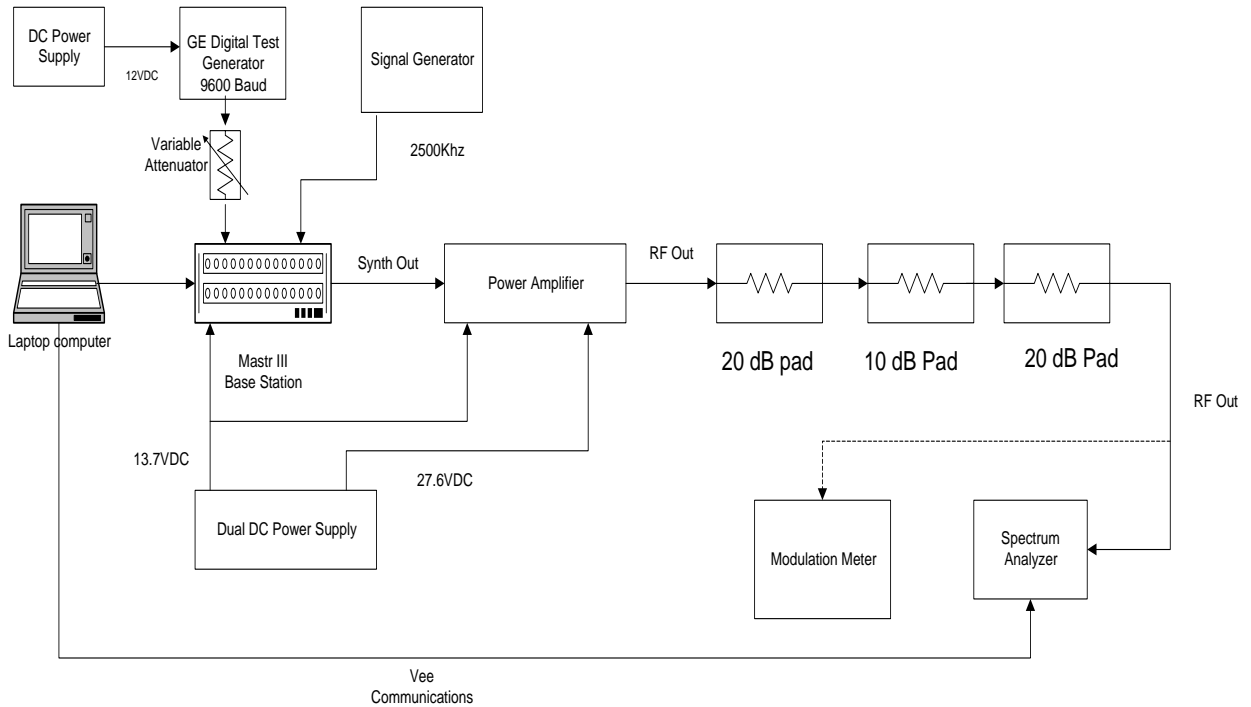
**Table 1. Device Summary**

ITEM	DESCRIPTION
Manufacturer:	Communications International, Inc.
FCC ID Number	SA8MARKII-CII-DMD
EUT Name:	Power Amplifier Upgrade Kit
Model:	Mark II
FCC Rule Parts:	§90
Frequency Range:	851-870 MHz
Maximum Output Power:	110W
Modulation:	Based on source
Necessary Bandwidth:	N/A
Keying:	N/A
Type of Information:	N/A
Number of Channels:	N/A
Power Output Level	Set by MASTRIII Base Station
Antenna Type	Connector
Frequency Tolerance:	N/A
Emission Type(s):	F3E, F1D, F1E, F2D, F2B
Interface Cables:	None
Power Source & Voltage:	27VDC

### 2.2 Test Configuration

The Mark II was configured with a MASTRIII chassis, which supplied the excitation signal. A drawing of the test configuration is shown in the following figure.





### 2.3 Testing Algorithm

The Mark II was operated continuously by providing a modulated signal from the MASTRIII basestation to the power amplifier.

Three frequencies were tested:

- 851 MHz
- 860 MHz
- 870 MHz

The power amplifier was tested using two Analog and Digital modulations provided by the MASTRIII base station.

Worst-case emission levels are provided in the test results data.

### 2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

## 2.5 Measurements

### 2.5.1 References

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

## 2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is  $\pm 2.3$  dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty =  $0.5 (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$  dB.

### 3 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

**Table 2: Test Equipment List**

Site 2 List:

Manufacturer	Model/Type	Function	Identification	Cal. Due
HP	8568B	Spectrum Analyzer	2634A02888	7/07/04
HP	85650A	Quasi-Peak Adapter	3303A01786	7/08/04
HP	Spectrum Analyzer	HP 8593A	3009A00739	6/25/04
HP	8449B	Microwave Preamp	3008A00385	9/29/05
HP	83640B	Signal Generator	Rental	7/31/04
HP	8563A	Spectrum Analyzer	63	9/29/05
ARA	LPB-2520	BiconiLog Antenna	1044	6/20/04
ARA	DRG118/A	Microwave Horn Antenna	1236	4/17/04
HP	85685A	RF Preselector	3221A01395	7/07/04
EMCO	3110B	Biconical Antenna	9808-1078	6/20/04
EMCO	3146A	Log Periodic Antenna	8912-1129	6/20/04
HP	438A	Power Meter	3048U02786	3/10/05
HP	8481B	Power Sensor	331BA06133	4/15/05

## 4 Test Results

### 4.1 RF Power Output: (FCC Part §2.1046)

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer. The analyzer offset was adjusted to compensate for the attenuator and other losses in the system.

CW Power was measured and the results are provided in the following table.

**Table 3. RF Power Output**

Frequency	Level	Level (Watts)
Low Channel: 851MHz	50.48 dBm	111.7
Mid Channel: 860MHz	50.50 dBm	112.2
High Channel: 870MHz	50.45 dBm	110.9

### 4.2 Modulation Characteristics: (FCC Part §2.1047); Audio Frequency Response

Not applicable for an amplifier.

### 4.3 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer.

At full modulation, the occupied bandwidth was measured at the -20dBc levels for each of the frequencies measured.

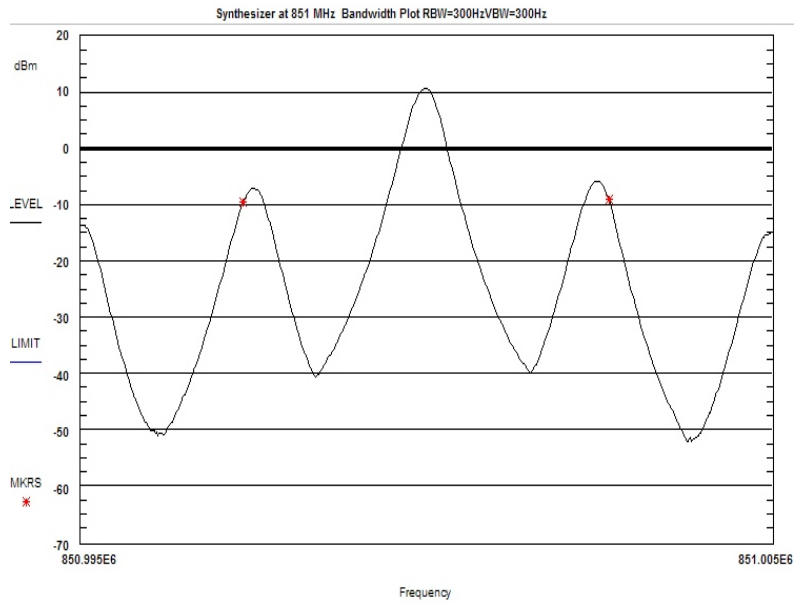
Digital modulation was provided by a 9600 BAUD digital test generator while analog modulation was provided via an audio generator set at 2500Hz. These inputs were supplied to the MASTR III Basestation for covering the emission designations of F1D, F1E, F2D, F2B, and F3E.

Table 4 provides a summary of the Occupied Bandwidth Results. Data are provided in Figure 1 through Figure 6.

**Table 4. Occupied Bandwidth Results**

<b>Frequency</b>	<b>Occupied Bandwidth kHz</b>
<b>ANALOG MODULATION</b>	
Low Channel: 851MHz	5.3
Mid Channel: 860MHz	5.3
High Channel: 870MHz	5.3
<b>DIGITAL MODULATION</b>	
Low Channel: 851MHz	12.2
Mid Channel: 860MHz	19.9
High Channel: 870MHz	11.6

**Amplifier Input:**

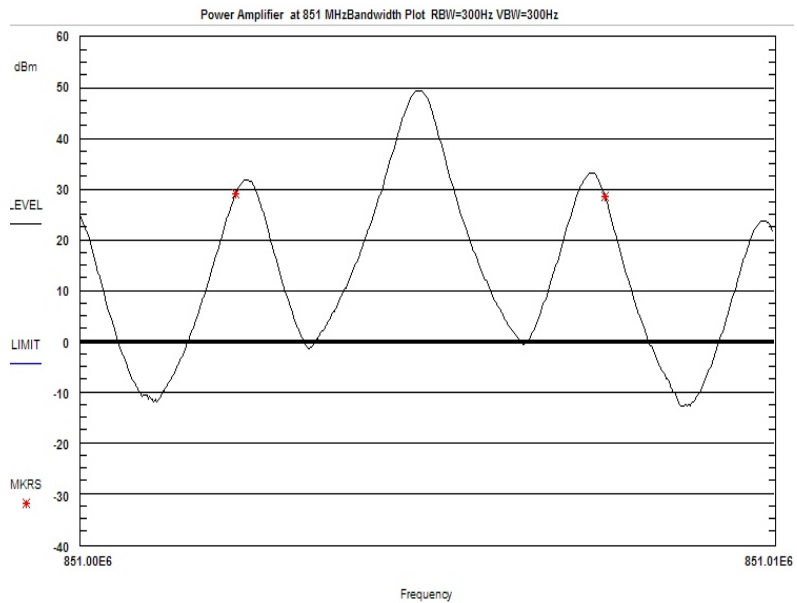


Communications International JOB: 8188 ; C:\wll\Comm\final\CMM8188\_Synth\_851MHz\_BW; 22/Jun/2004 08:56:53; James Ritter

DELTA = 0.00528337 MHz

F1 = 851.002MHz @ -8.989000000000001; F2 = 850.997 MHz @ -8.927

**Amplifier Output:**



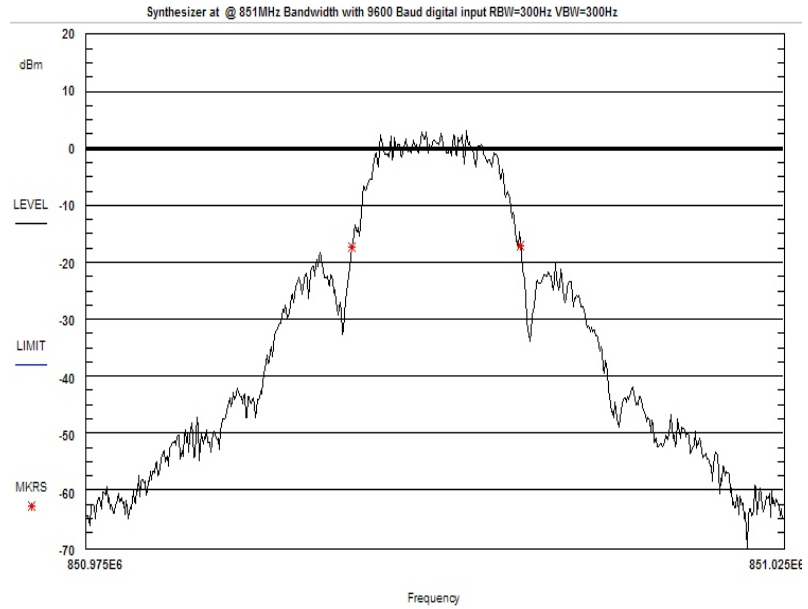
Communications International JOB: 8188 ; C:\wll\Comm\final\CMM8188\_851MHz\_BW; 21/Jun/2004 10:09:49; James Ritter

DELTA = 0.00532141 MHz

F1 = 851.003MHz @ 28.74; F2 = 850.997 MHz @ 29.22

**Figure 1. Occupied Bandwidth: 851 MHz Analog Modulation, F3E**

**Amplifier Input:**

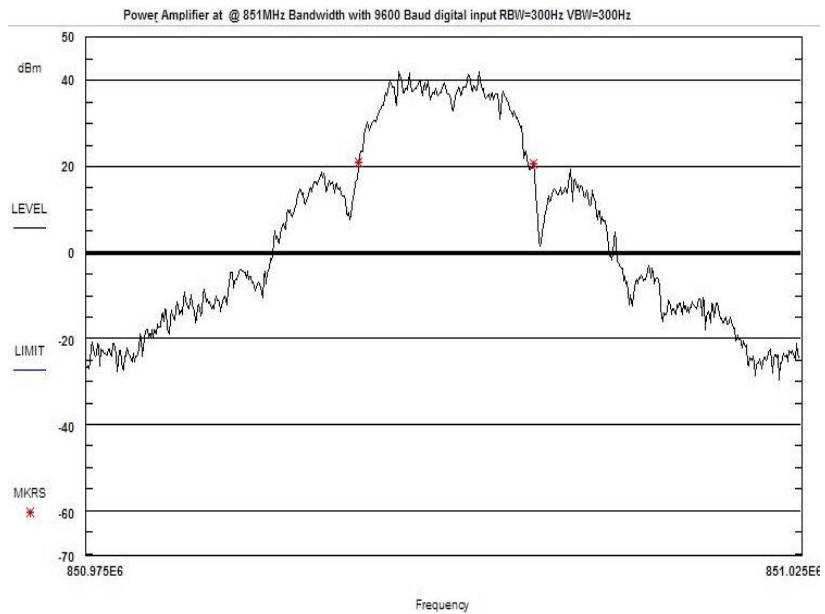


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_851MHz\_digital\_Synth\_BW; 24/Jun/2004 17:13:04; James Ritter

DELTA = 0.0121554 MHz

F1 = 851.000MHz @ -17.05; F2 = 850.994 MHz @ -17.18

**Amplifier Output:**



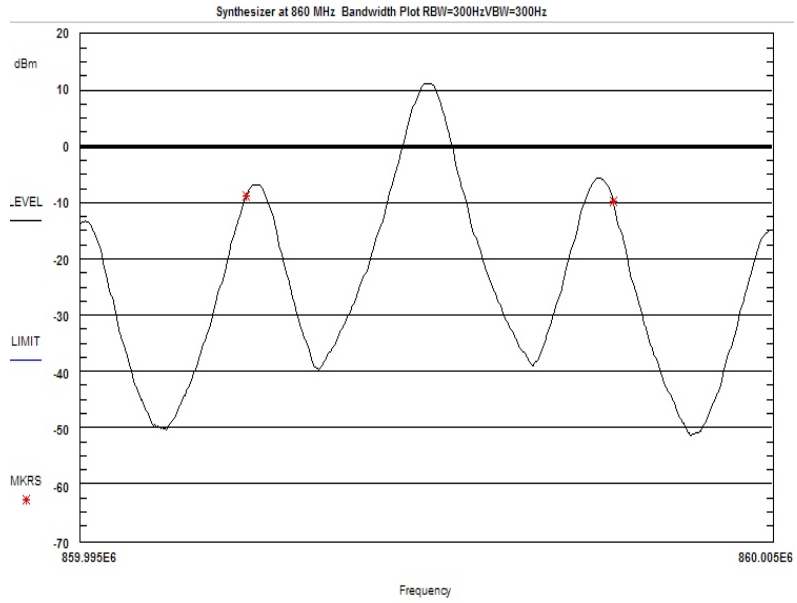
Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_851MHz\_digital\_BW; 24/Jun/2004 17:23:27; James Ritter

DELTA = 0.0122089 MHz

F1 = 851.000MHz @ 20.83; F2 = 850.994 MHz @ 21.28

**Figure 2. Occupied Bandwidth 851 MHz Digital Modulation, F1D, F1E, F2D, F2B**

**Amplifier Input:**

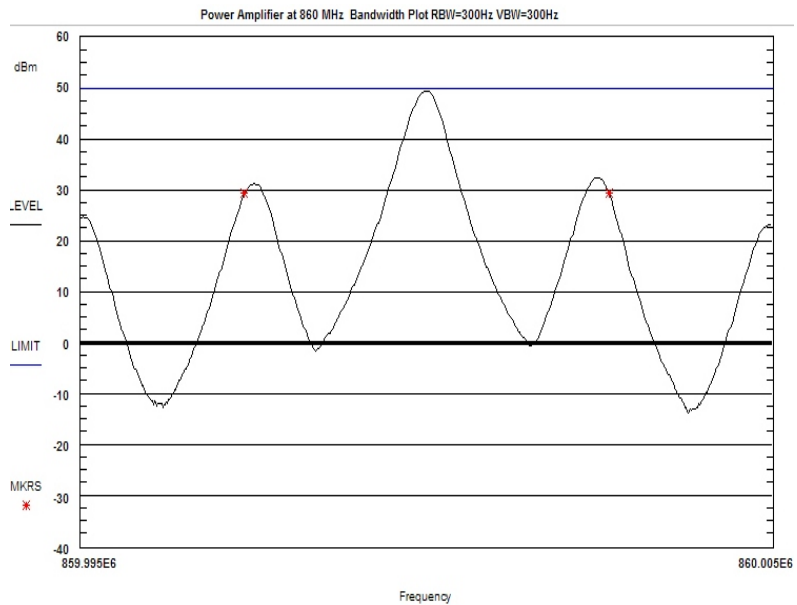


Communications International JOB: 8188 ; C:\wll\Comm\Final\CMM8188\_Synth\_860MHz\_BW; 22/Jun/2004 09:36:53; James Ritter

DELTA = 0.0052995 MHz

F1 = 860.002MHz @ -9.630000000000001; F2 = 859.997 MHz @ -8.654

**Amplifier Output:**



Communications International JOB: 8188 ; C:\wll\Comm\Final\CMM8188\_860MHz\_BW; 22/Jun/2004 10:41:09; James Ritter

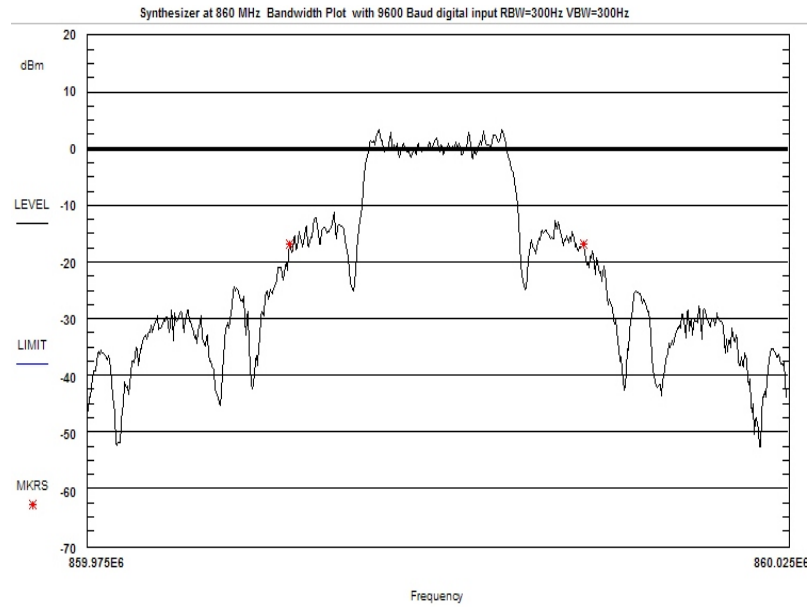
DELTA = 0.00527443 MHz

F1 = 860.003MHz @ 29.38; F2 = 859.997 MHz @ 29.38

**Figure 3. Occupied Bandwidth 860 MHz Analog Modulation, F3E**



**Amplifier Input:**

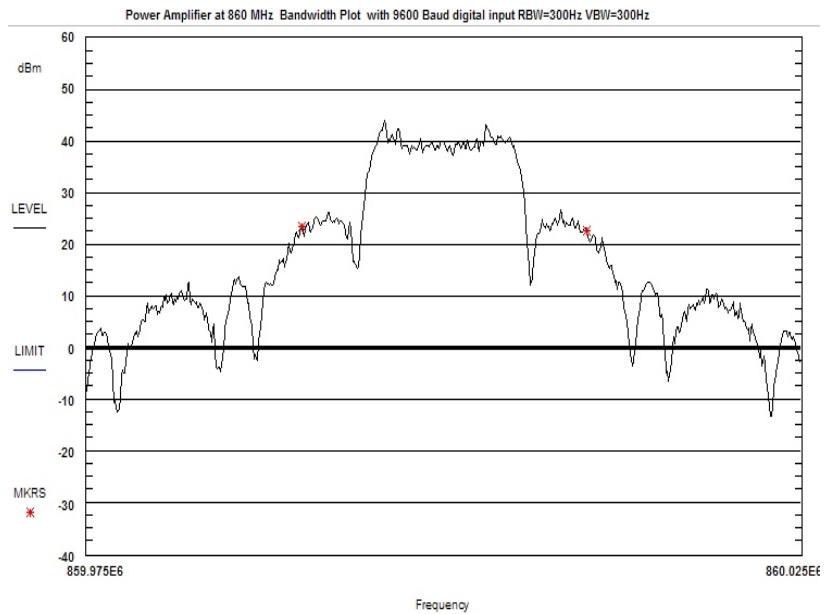


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digita\_Synth\_BW; 24/Jun/2004 11:38:12; James Ritter

DELTA = 0.020981 MHz

F1 = 860.01MHz @ -16.62; F2 = 859.989 MHz @ -16.64

**Amplifier Output:**



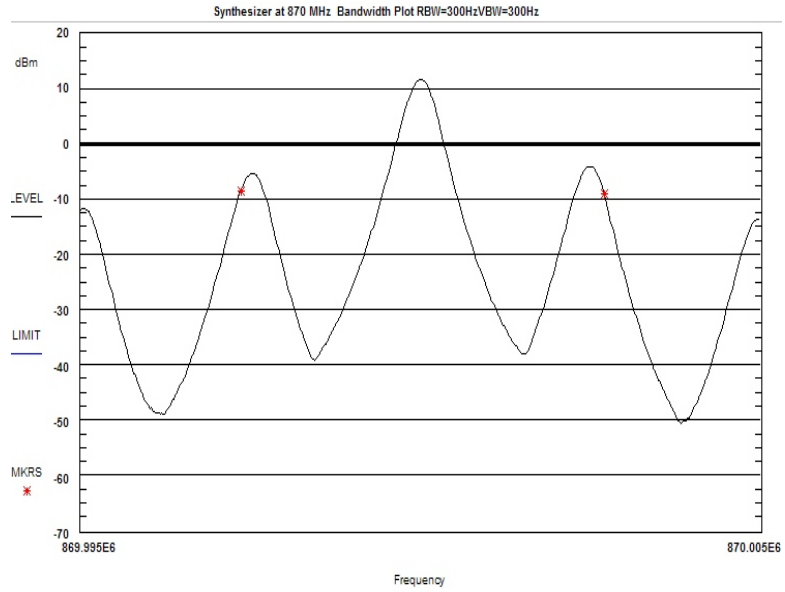
Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digital\_BW; 24/Jun/2004 11:29:03; James Ritter

DELTA = 0.0199234 MHz

F1 = 860.01MHz @ 22.65; F2 = 859.99 MHz @ 23.59

**Figure 4. Occupied Bandwidth 860 MHz Digital Modulation F1D, F1E, F2D, F2B**

**Amplifier Input:**

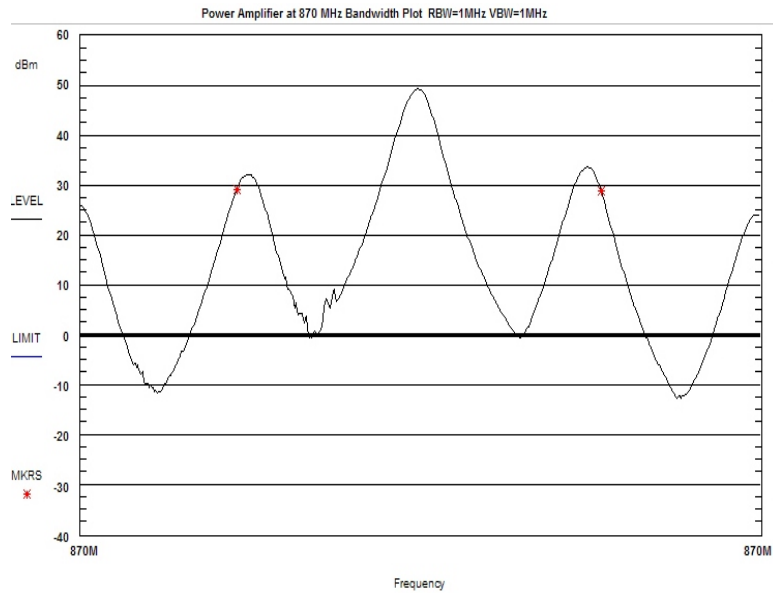


Communications International JOB: 8188 ; C:\wll\Comm\final\CMM8188\_Synth\_870MHz\_BW; 22/Jun/2004 09:13:30; James Ritter

DELTA = 0.005345399999999999 MHz

F1 = 870.002MHz @ -8.927; F2 = 869.997 MHz @ -8.368

**Amplifier Output:**



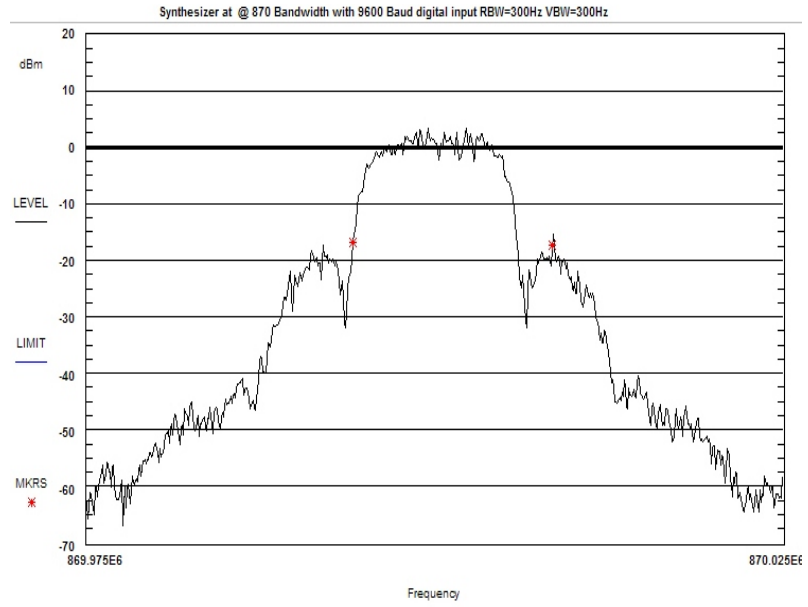
Communications International JOB: 8188 ; C:\wll\Comm\final\CCM8188\_870MHz\_BW; 18/Jun/2004 14:44:26; James Ritter

DELTA = 0.00535887 MHz

F1 = 870.003MHz @ 28.97; F2 = 869.997 MHz @ 29.1

**Figure 5. Occupied Bandwidth 870 MHz Analog Modulation, F3E**

**Amplifier Input:**

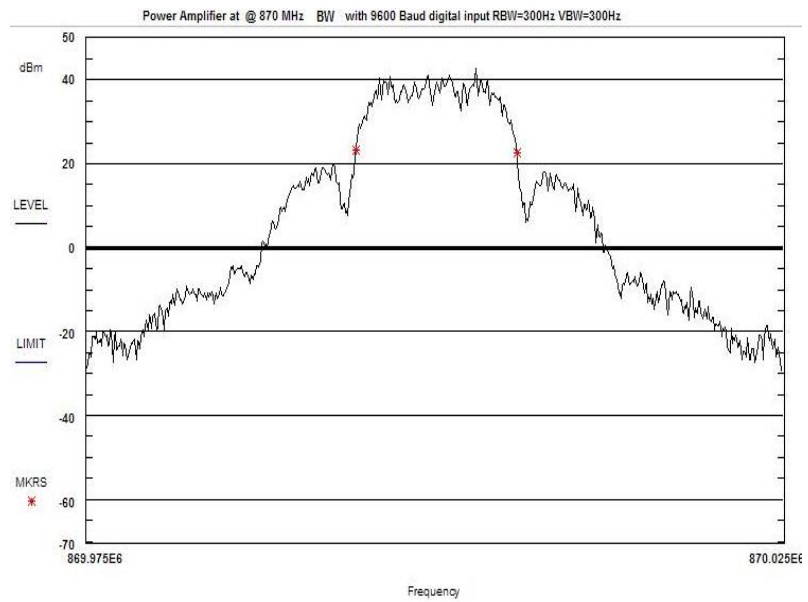


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_Synth\_BW; 24/Jun/2004 16:47:15; James Ritter

DELTA = 0.0143552 MHz

F1 = 870.008MHz @ -17.3; F2 = 869.994 MHz @ -16.66

**Amplifier Output:**



Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_BW; 24/Jun/2004 16:28:27; James Ritter

DELTA = 0.0115764 MHz

F1 = 870.006MHz @ 22.6; F2 = 869.994 MHz @ 23.43

**Figure 6. Occupied Bandwidth 870 MHz Digital Modulation F1D, F1E, F2D, F2B**

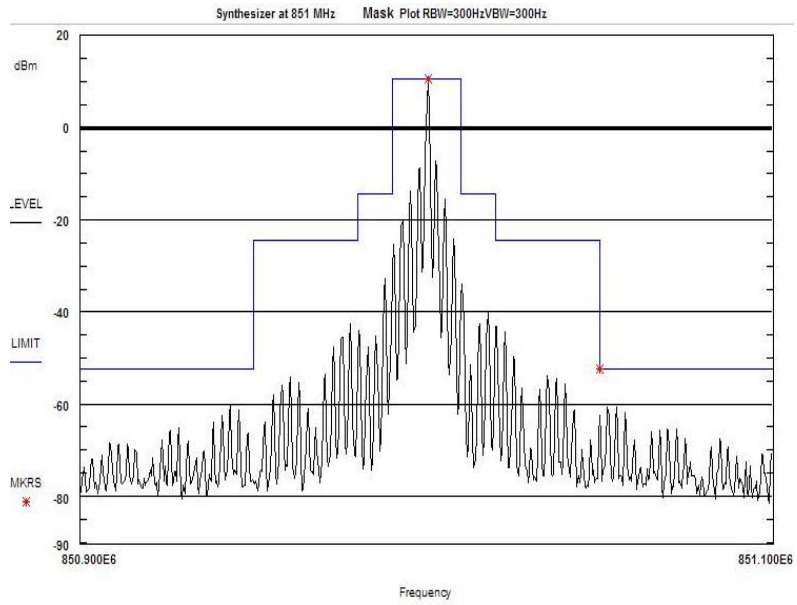
#### **4.4 Spurious Emissions at Antenna Terminals (FCC Part §2.1051)**

The EUT must comply with requirements for spurious emissions at antenna terminals. The limits are shown in the following table.

For spurious emissions, bandreject and/or high pass filters were installed to suppress the carrier to assure that measuring instrumentation would remain linear and that dynamic range requirements were met.

For analog modulation Mask B of 90.210 was used. Mask G was used for the digital modulation. Plots are included for both the input to and the output of the power amplifier.

**Amplifier Input:**

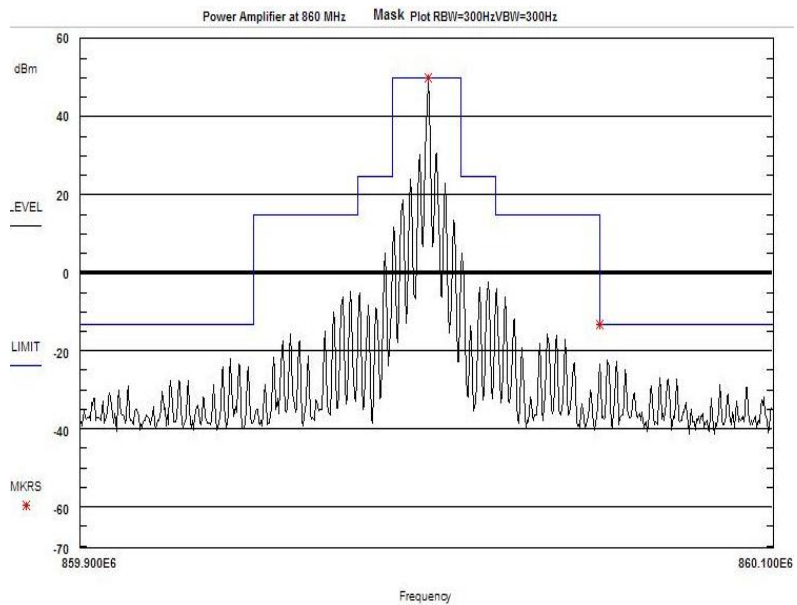


Communications International JOB: 8188 ; C:\wll\Comm\Final\CMM8188\_Synth\_851MHz\_Mask; 22/Jun/2004 09:02:49; James Ritter

DELTA = 0.0495601 MHz

F1 = 851MHz @ 10.7; F2 = 851.05 MHz @ -52.3

**Amplifier Output:**

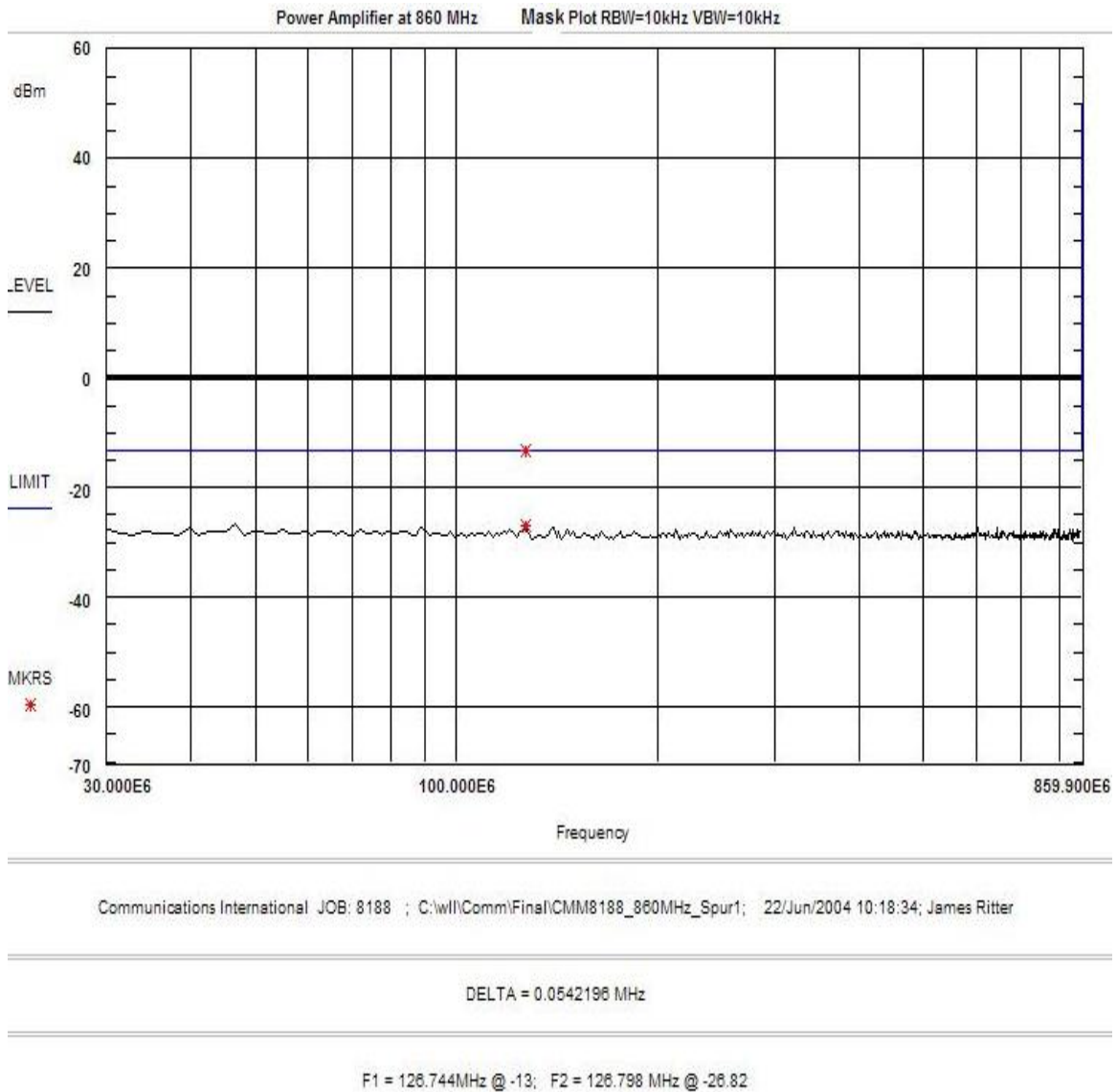


Communications International JOB: 8188 ; C:\wll\Comm\Final\CMM8188\_860MHz\_Mask; 22/Jun/2004 10:12:21; James Ritter

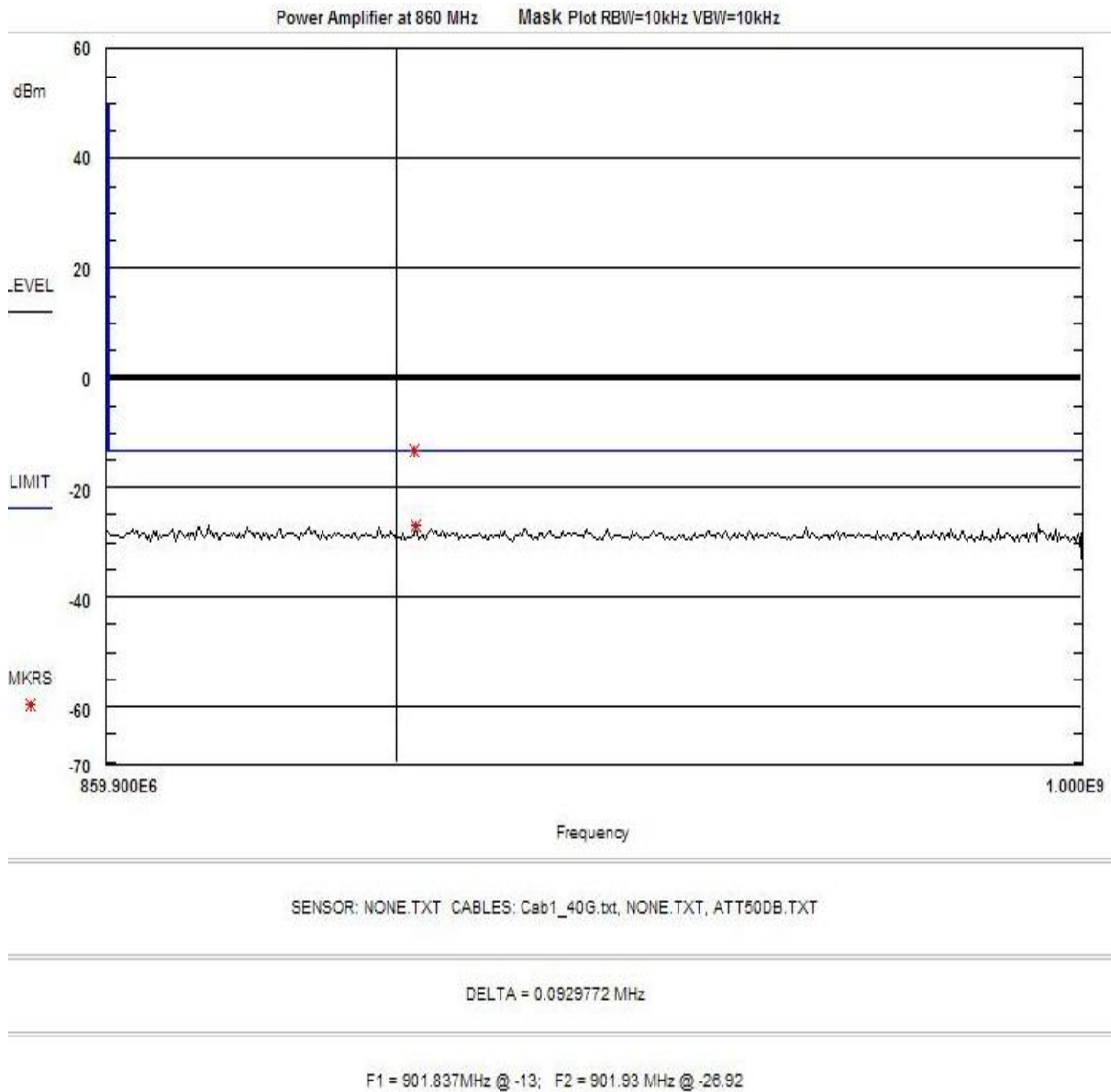
DELTA = 0.04956 MHz

F1 = 860MHz @ 50; F2 = 860.05 MHz @ -13

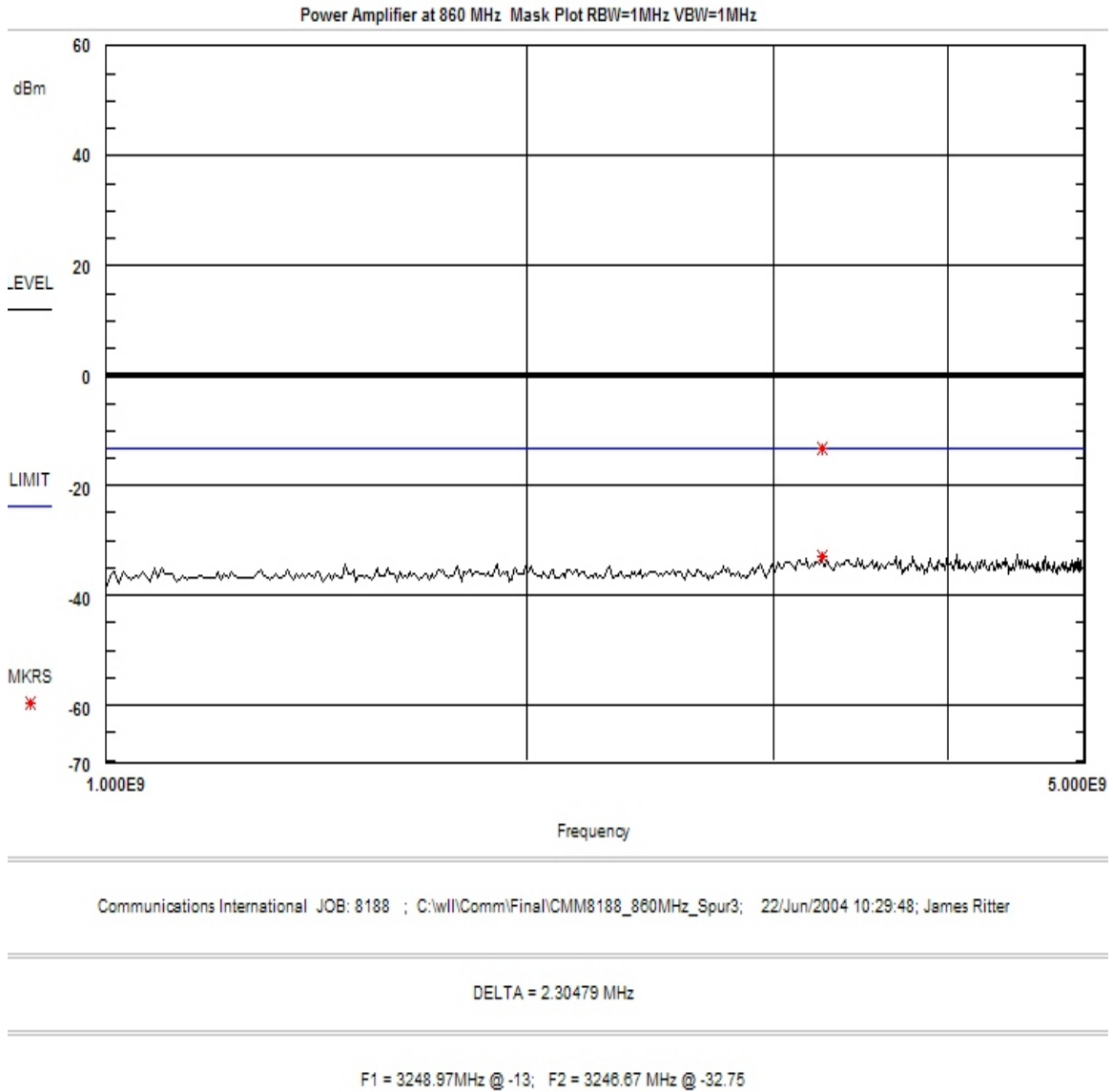
**Figure 7. Mask, 851 MHz Analog Modulation, F3E**



**Figure 8. Conducted Spurious Emissions, 851 MHz Analog Modulation, F3E**

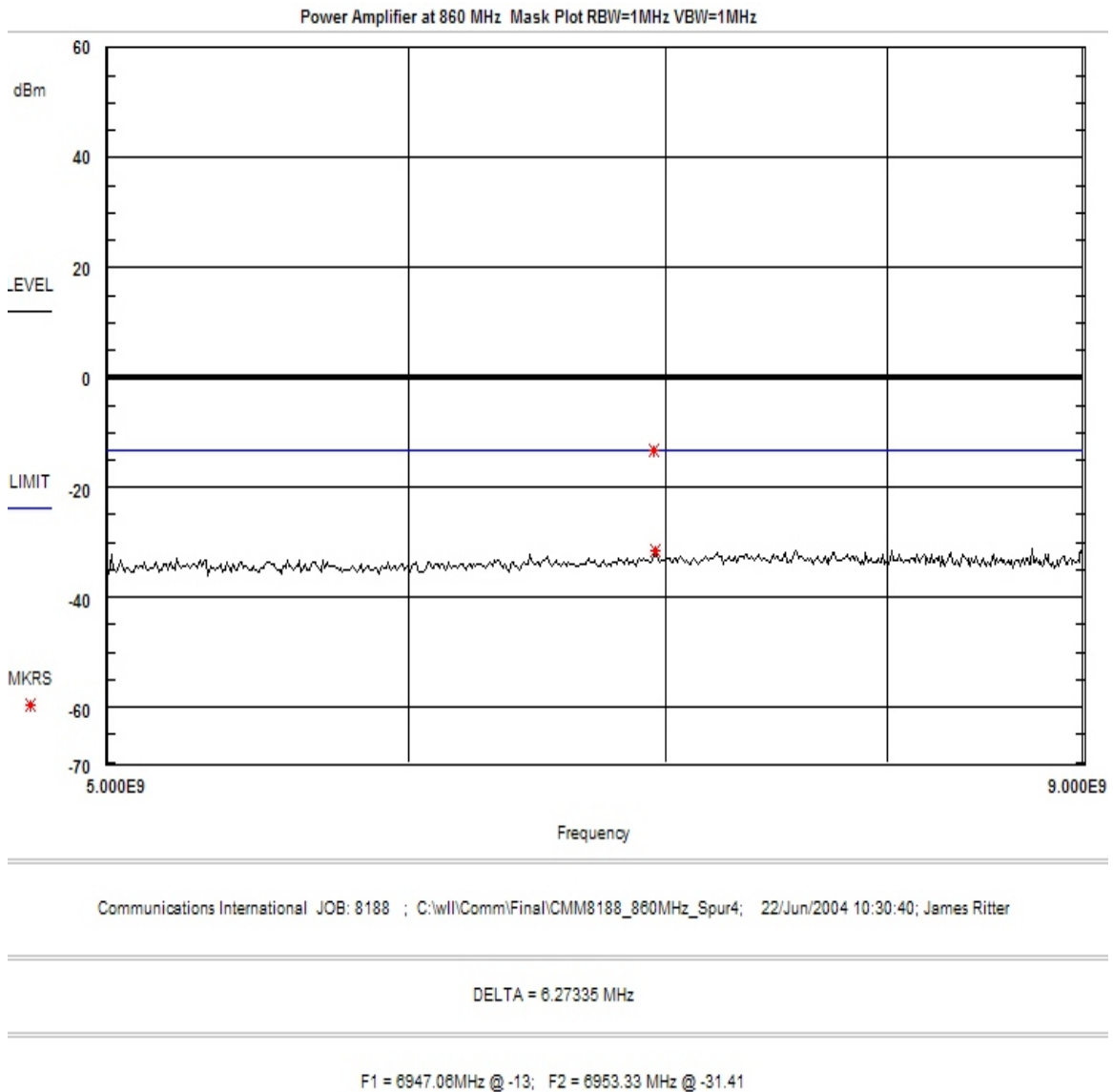


**Figure 9. Conducted Spurious Emissions, 851 MHz Analog Modulation, F3E**



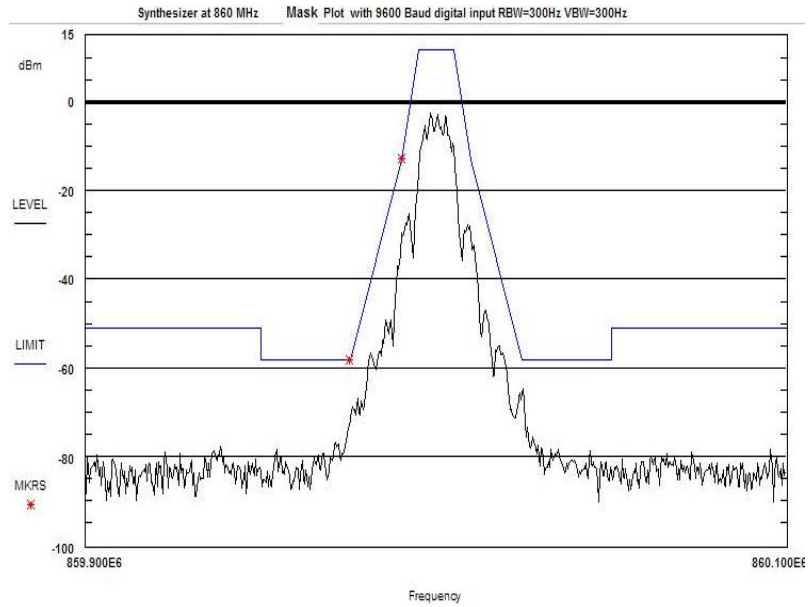
**Figure 10. Conducted Spurious Emissions, 851 MHz Analog Modulation, F3E**





**Figure 11. Conducted Spurious Emissions, 851 MHz Analog Modulation, F3E**

**Amplifier Input:**

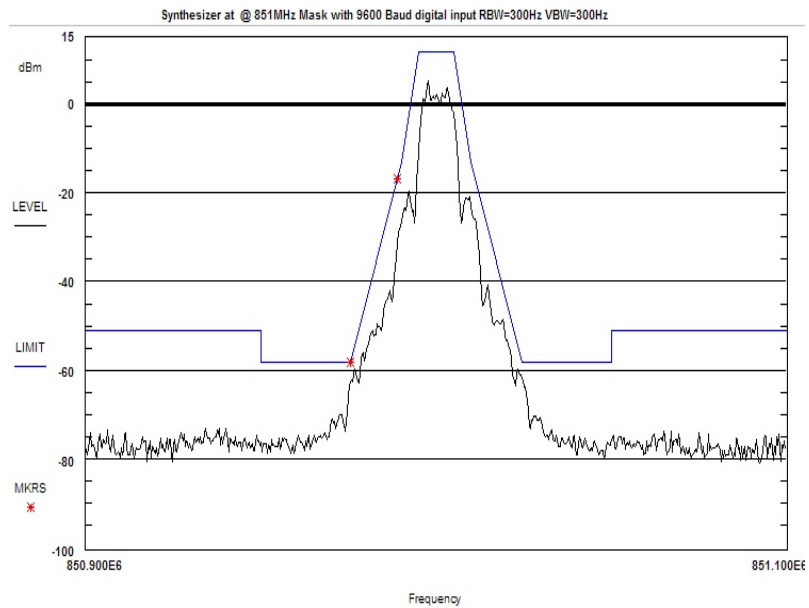


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digital\_Synth\_Mask; 24/Jun/2004 15:39:53; James Ritter

DELTA = 0.0149819 MHz

F1 = 859.975MHz @ -58; F2 = 859.99 MHz @ -12.87

**Amplifier Output:**

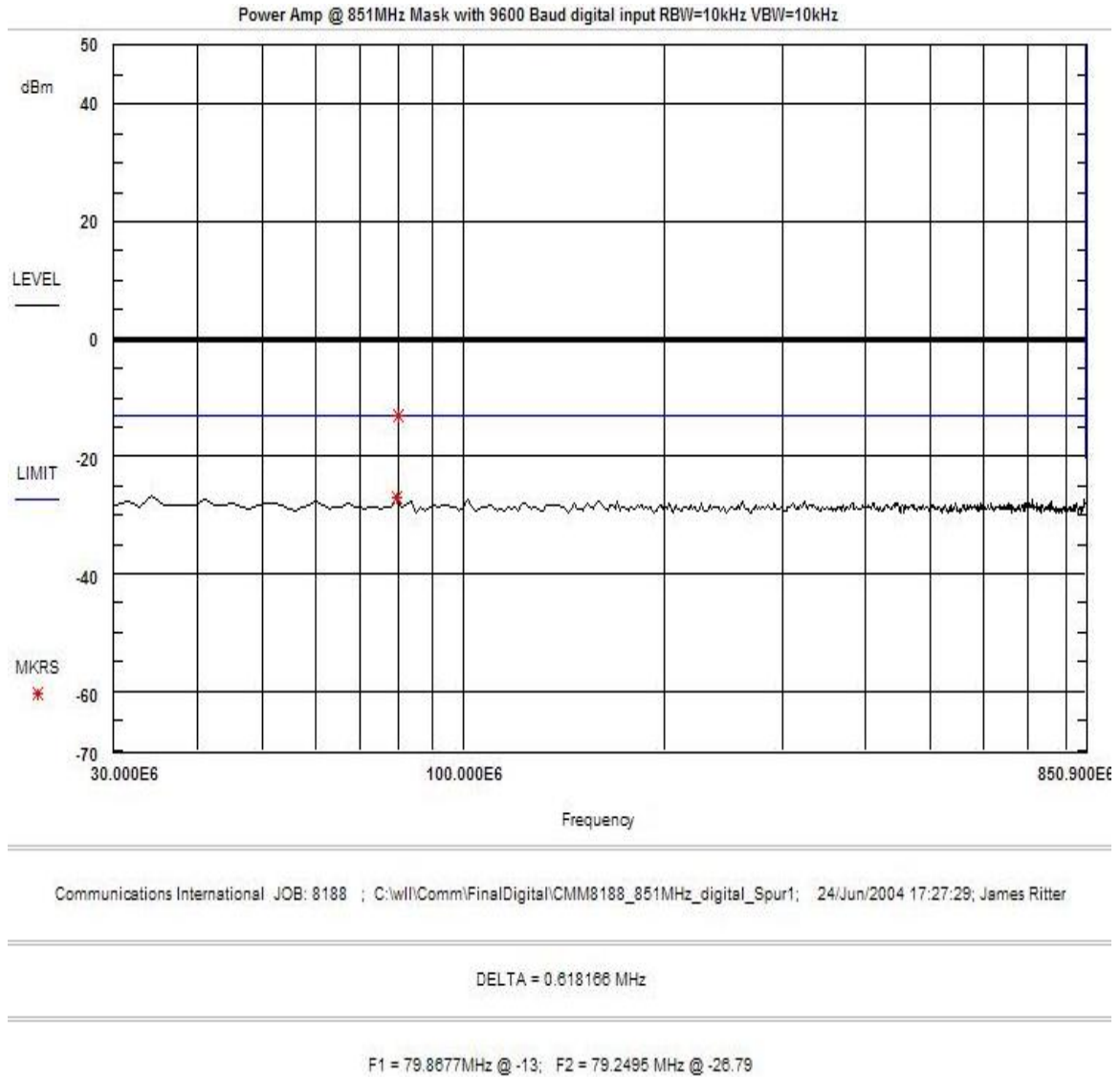


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_851MHz\_digital\_Synth\_Mask; 24/Jun/2004 17:10:15; James Ritter

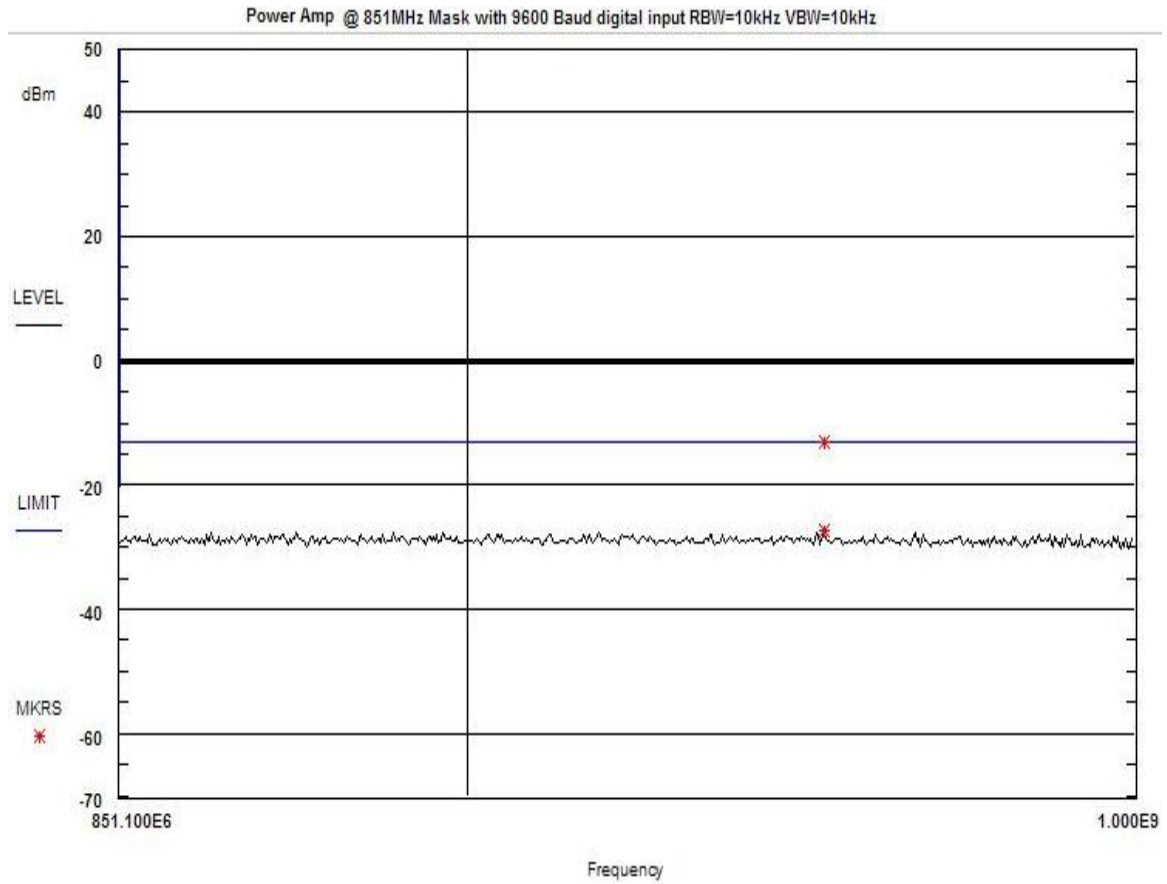
DELTA = 0.0133128 MHz

F1 = 850.989MHz @ -16.75; F2 = 850.975 MHz @ -58

**Figure 12. Mask, 851 MHz Digital Modulation F1D, F1E, F2D, F2B**



**Figure 13. Conducted Spurious Emissions, 851 MHz Digital Modulation F1D, F1E, F2D, F2B**

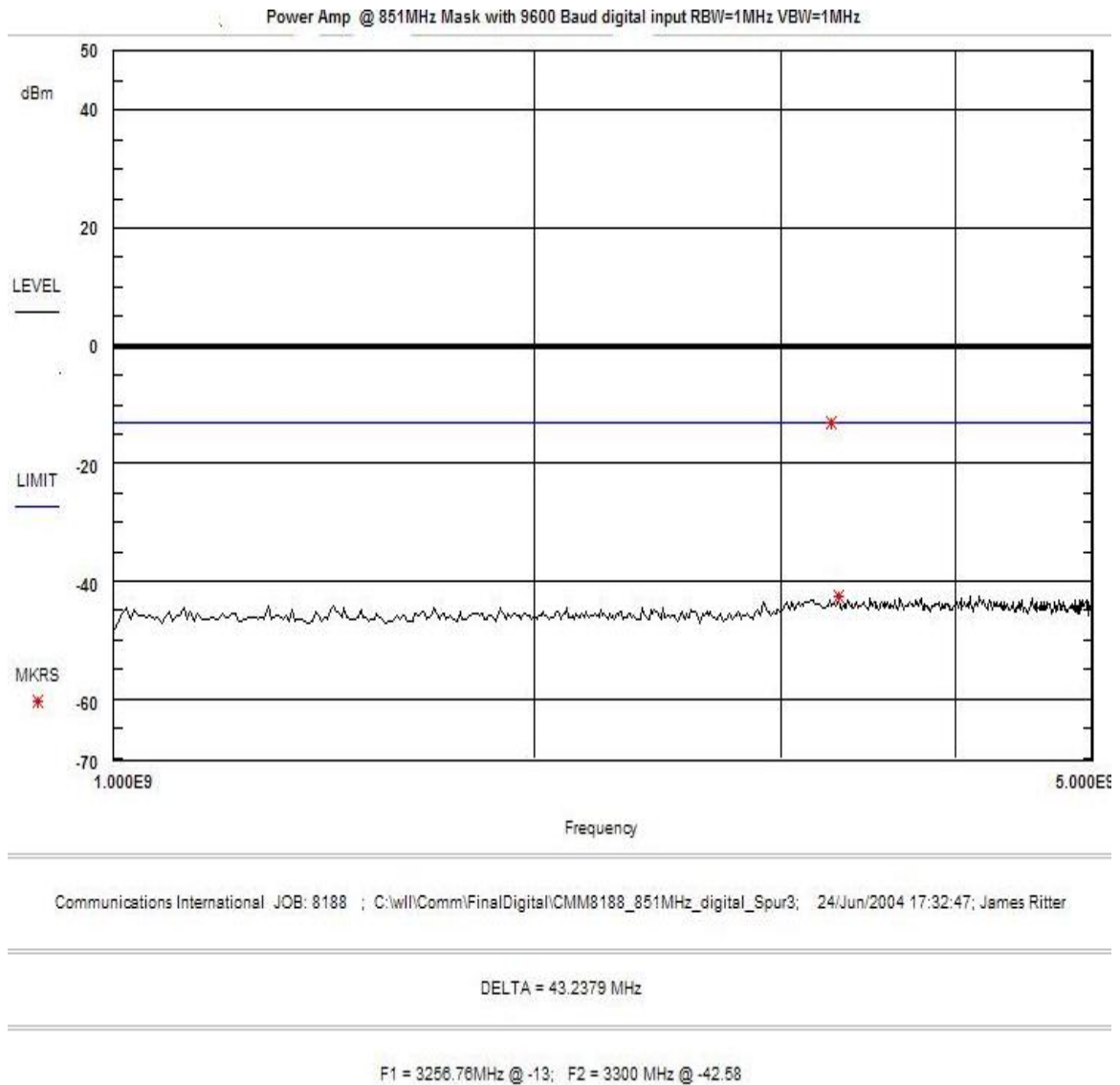


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_851MHz\_digital\_Spur2; 24/Jun/2004 17:29:40; James Ritter

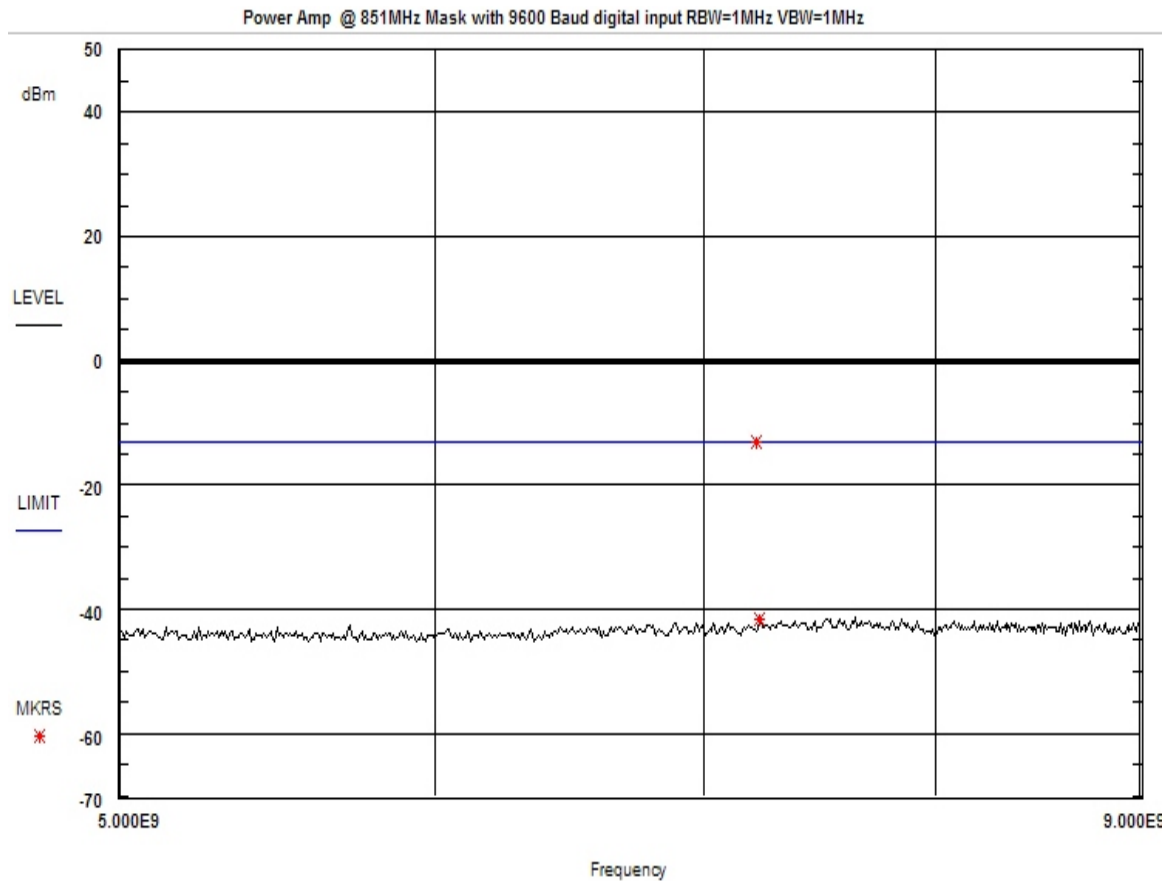
DELTA = 0.00404878 MHz

F1 = 951.778MHz @ -13; F2 = 951.782 MHz @ -27.2

**Figure 14. Conducted Spurious Emissions, 851 MHz Digital Modulation F1D, F1E, F2D, F2B**



**Figure 15. Conducted Spurious Emissions, 851 MHz Digital Modulation F1D, F1E, F2D, F2B**



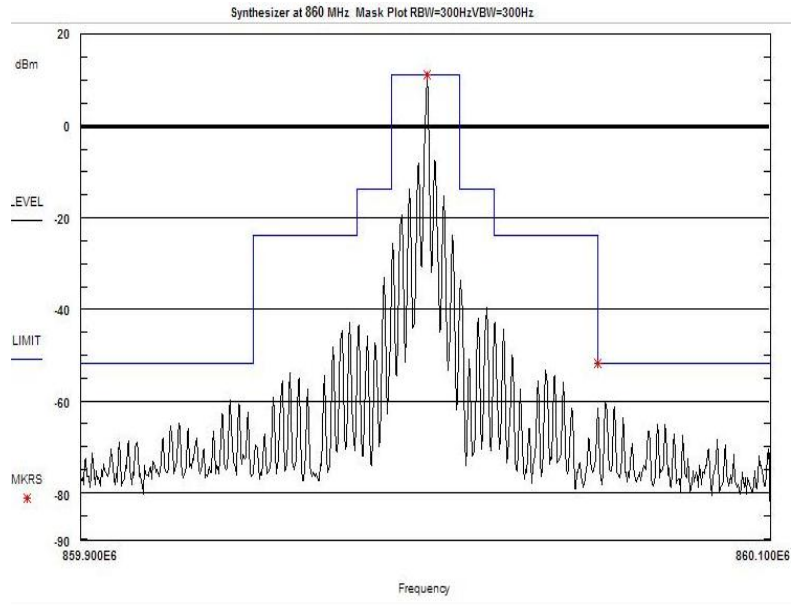
Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_851MHz\_digital\_Spur4; 24/Jun/2004 17:34:25; James Ritter

DELTA = 13.3425 MHz

F1 = 7213.32MHz @ -13; F2 = 7226.67 MHz @ -41.55

**Figure 16. Conducted Spurious Emissions, 851 MHz Digital Modulation F1D, F1E, F2D, F2B**

**Amplifier Input:**

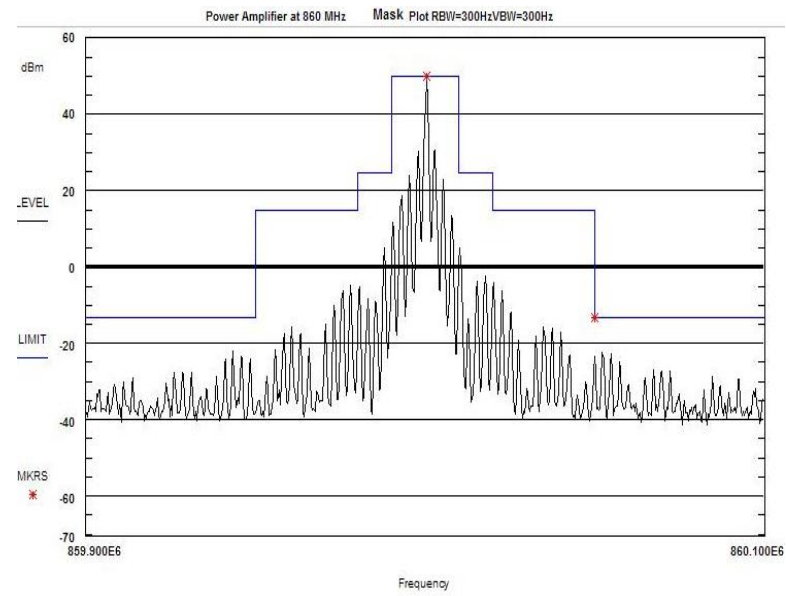


AMP: NONE.TXT ATTENUATOR: ATT10DBPD.txt OTHER:ATT60B.TXT

DELTA = 0.04963 MHz

F1 = 860MHz @ 11.4; F2 = 860.05 MHz @ -51.6

**Amplifier Output:**

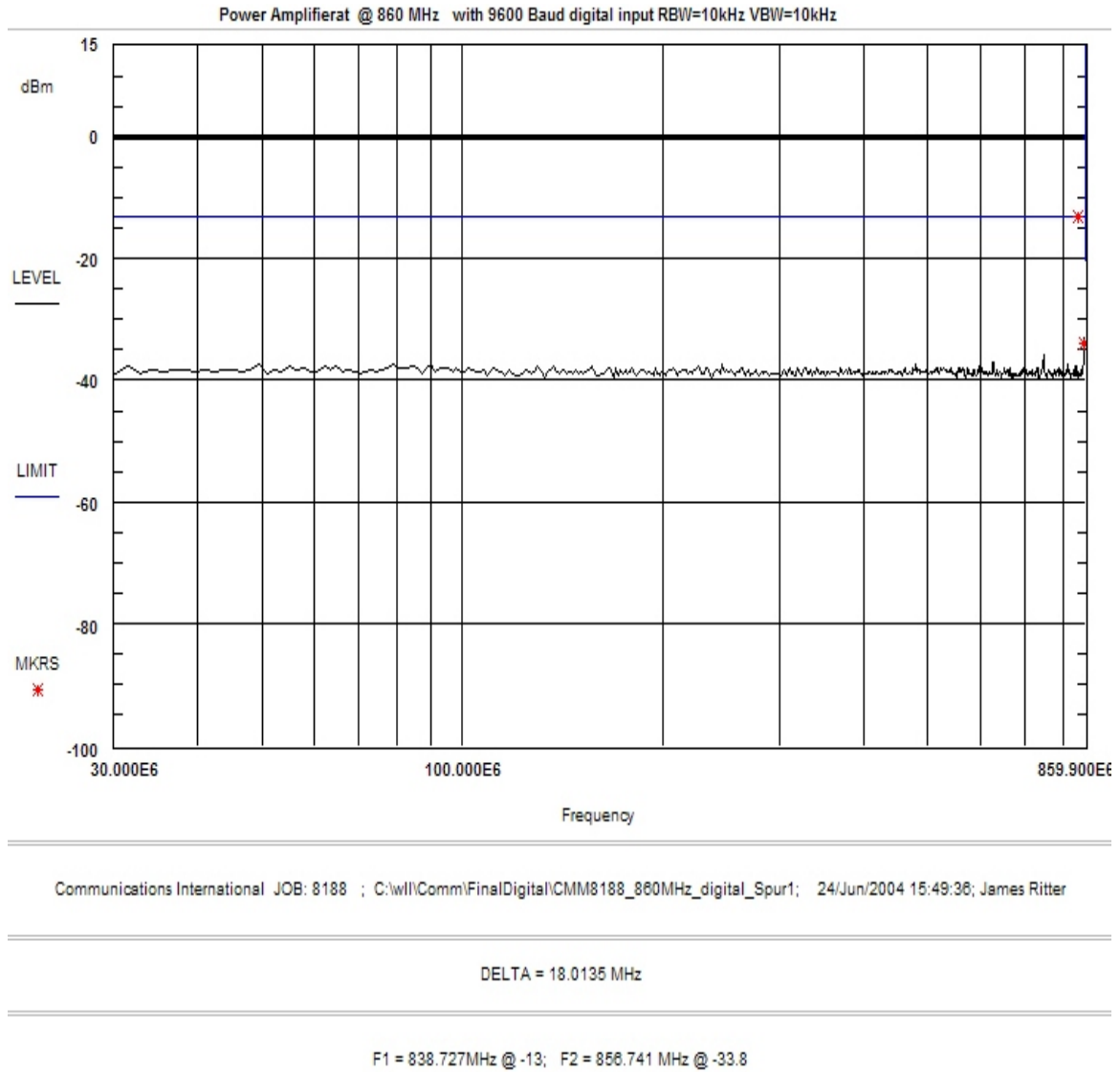


Communications International JOB: 8188 ; C:\wll\Comm\Final\CMM8188\_860MHz\_Mask; 22/Jun/2004 10:12:21; James Ritter

DELTA = 0.04956 MHz

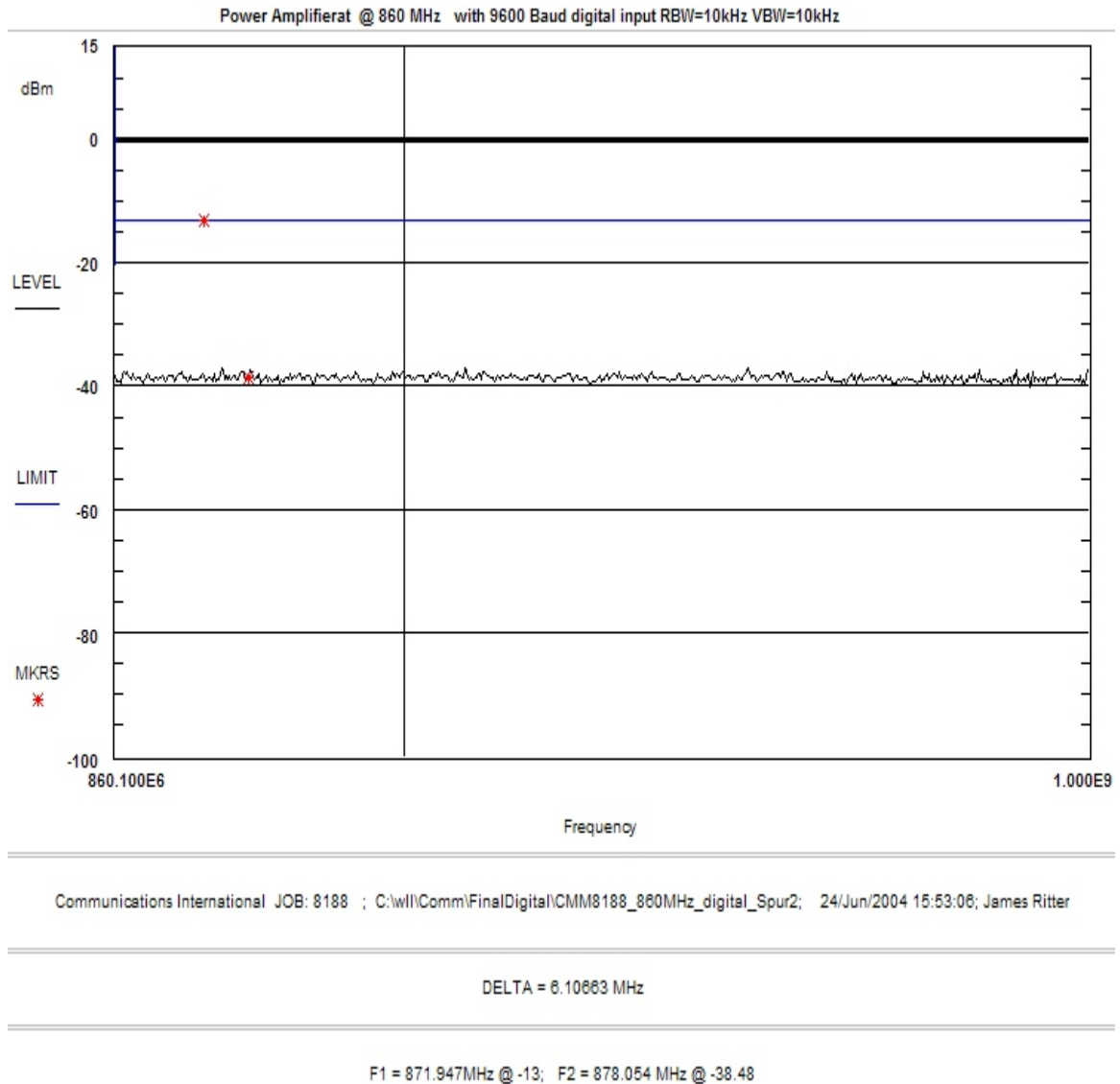
F1 = 860MHz @ 50; F2 = 860.05 MHz @ -13

**Figure 17. Mask, 860 MHz Analog Modulation, F3E**

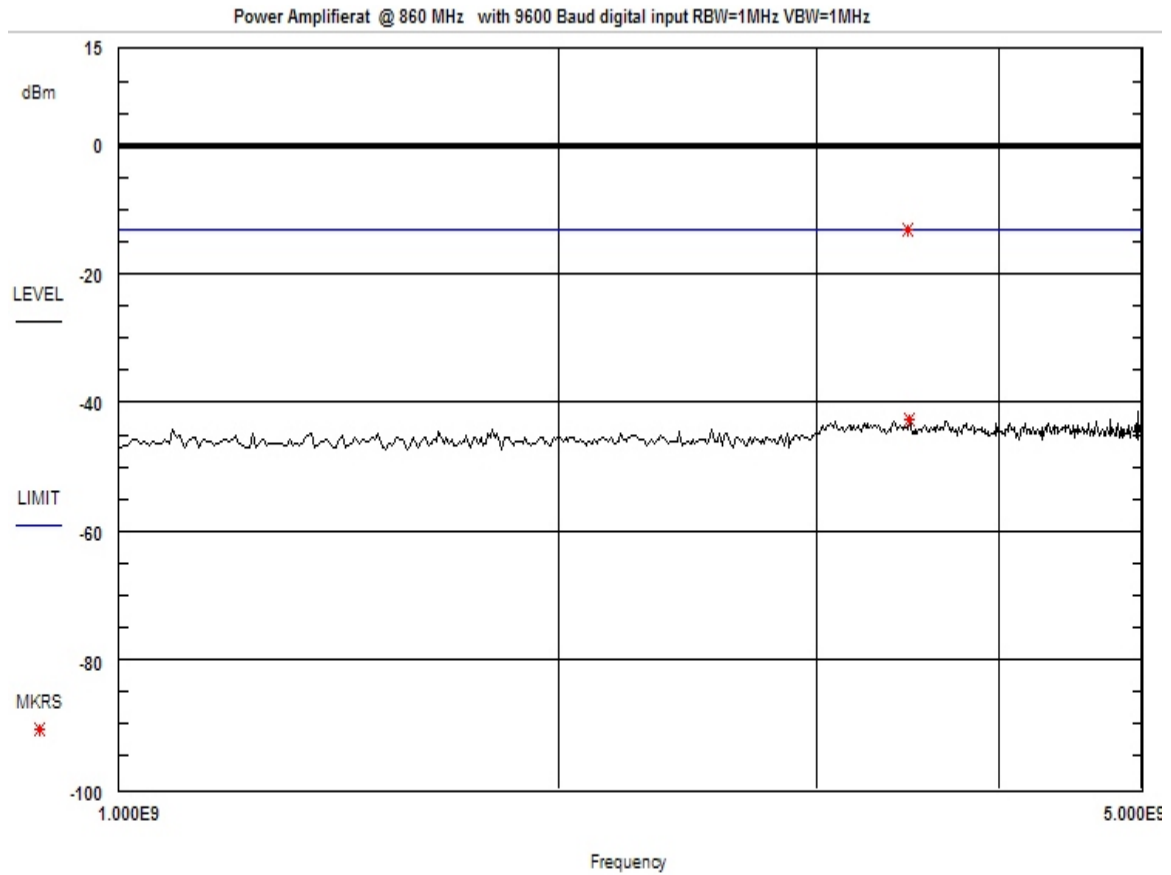


**Figure 18. Conducted Spurious Emissions, 860 MHz Analog Modulation,F3E**





**Figure 19. Conducted Spurious Emissions, 860 MHz Analog Modulation, F3E**

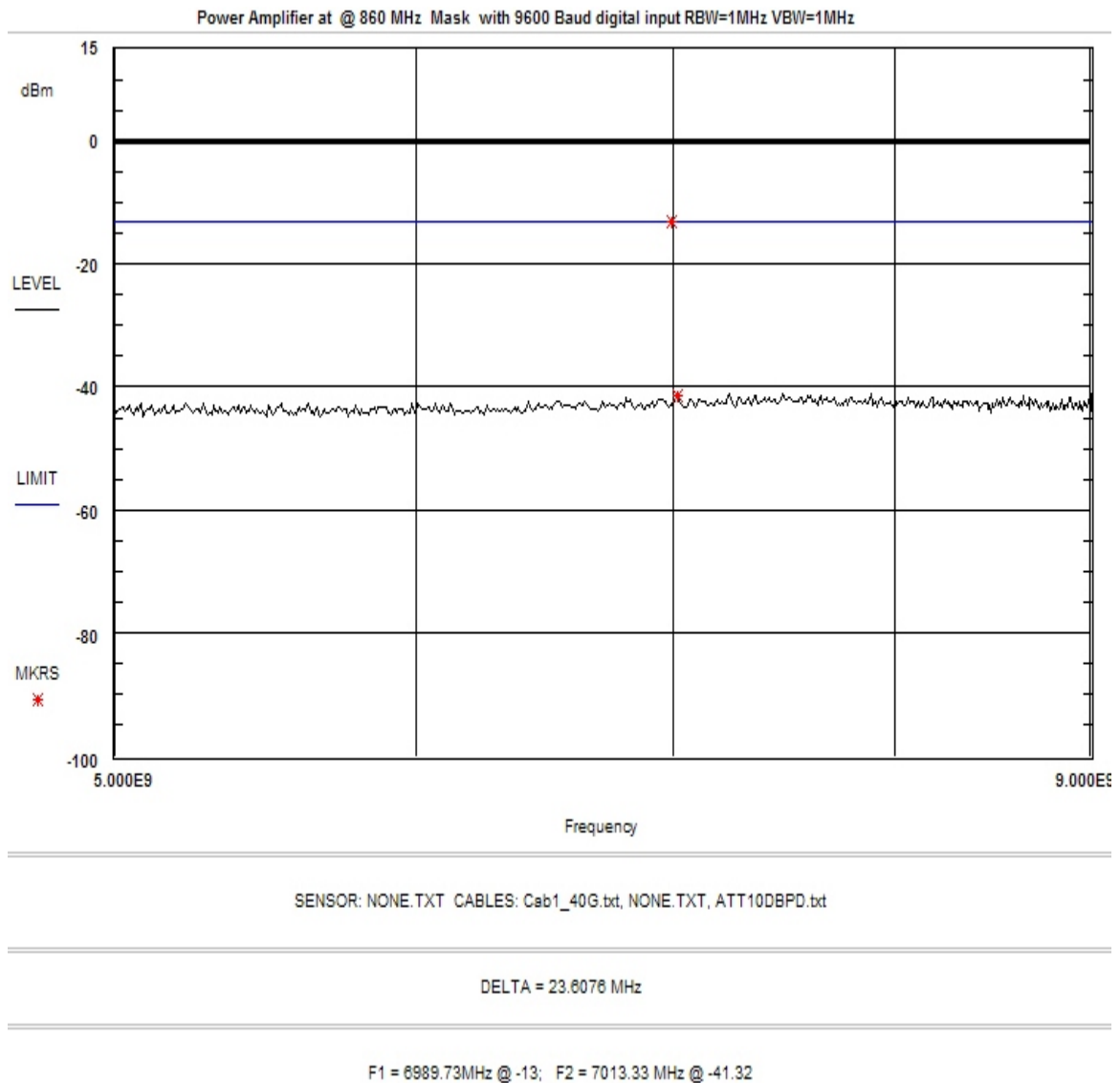


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digital\_Spur3; 24/Jun/2004 15:56:24; James Ritter

DELTA = 8.950200000000001 MHz

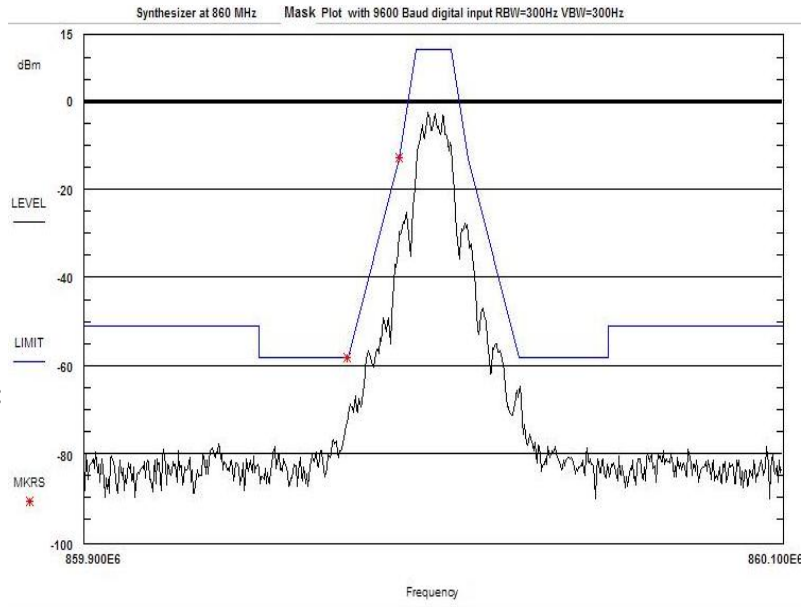
F1 = 3457.72MHz @ -13; F2 = 3466.67 MHz @ -42.42

**Figure 20. Conducted Spurious Emissions, 860 MHz Analog Modulation, F3E**



**Figure 21. Conducted Spurious Emissions, 860 MHz Analog Modulation, F3E**

**Amplifier Input:**

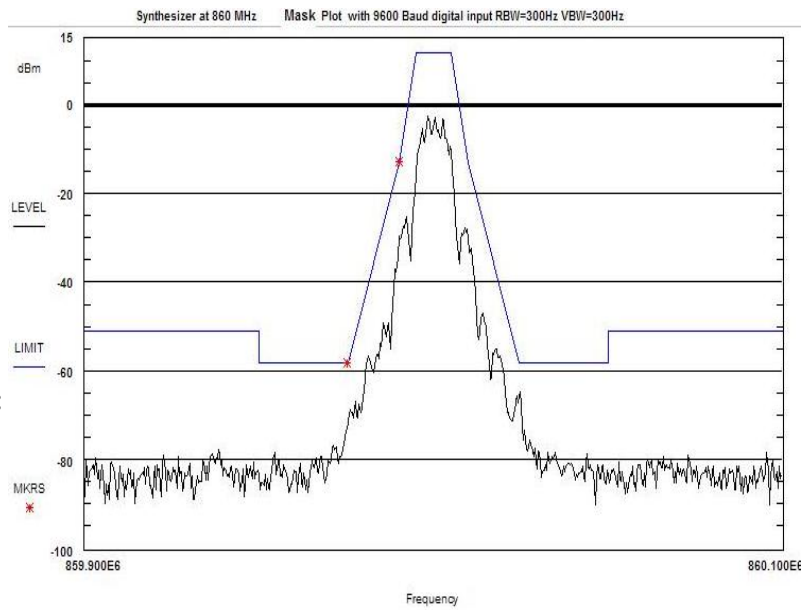


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digita\_Synth\_Mask; 24/Jun/2004 15:39:53; James Ritter

DELTA = 0.0148819 MHz

F1 = 859.975MHz @ -58; F2 = 859.99 MHz @ -12.67

**Amplifier Output:**

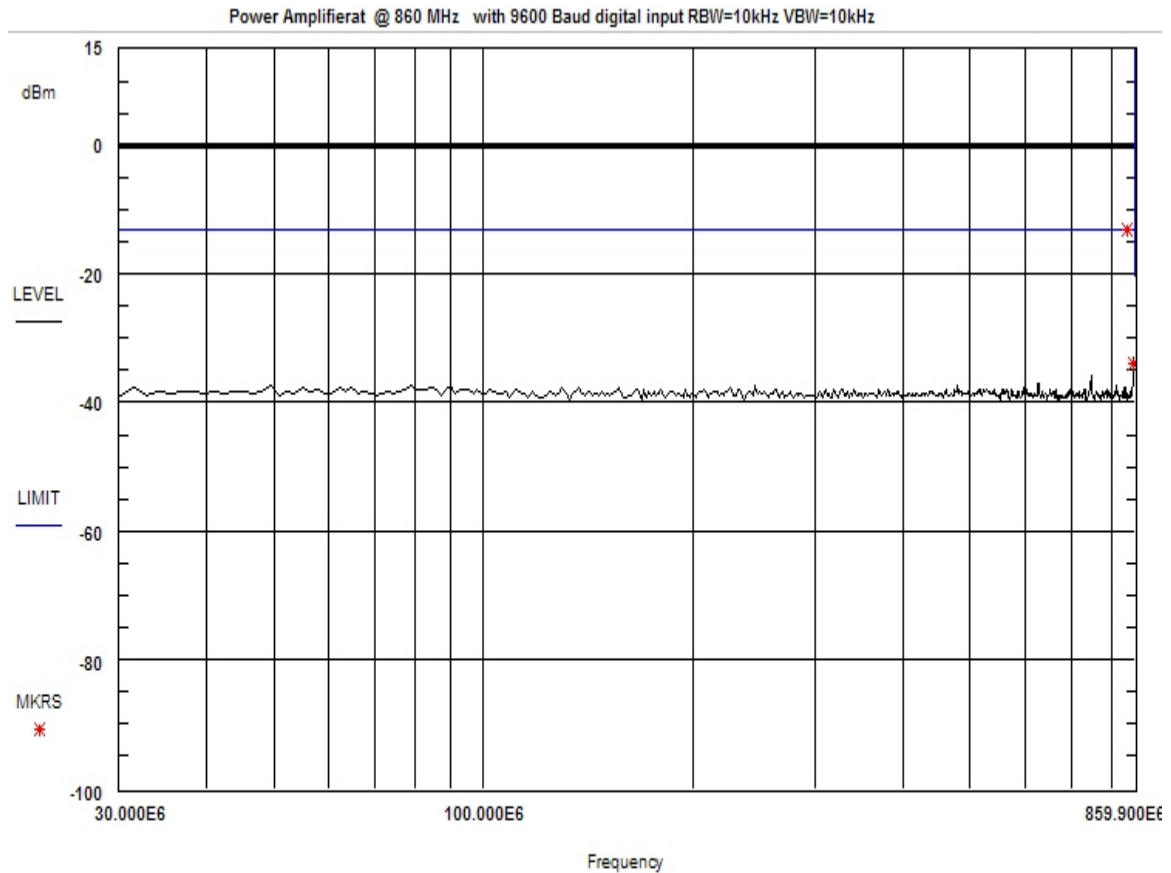


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digita\_Synth\_Mask; 24/Jun/2004 15:39:53; James Ritter

DELTA = 0.0148819 MHz

F1 = 859.975MHz @ -58; F2 = 859.99 MHz @ -12.67

**Figure 22. Mask, 860 MHz Digital Modulation F1D, F1E, F2D, F2B**

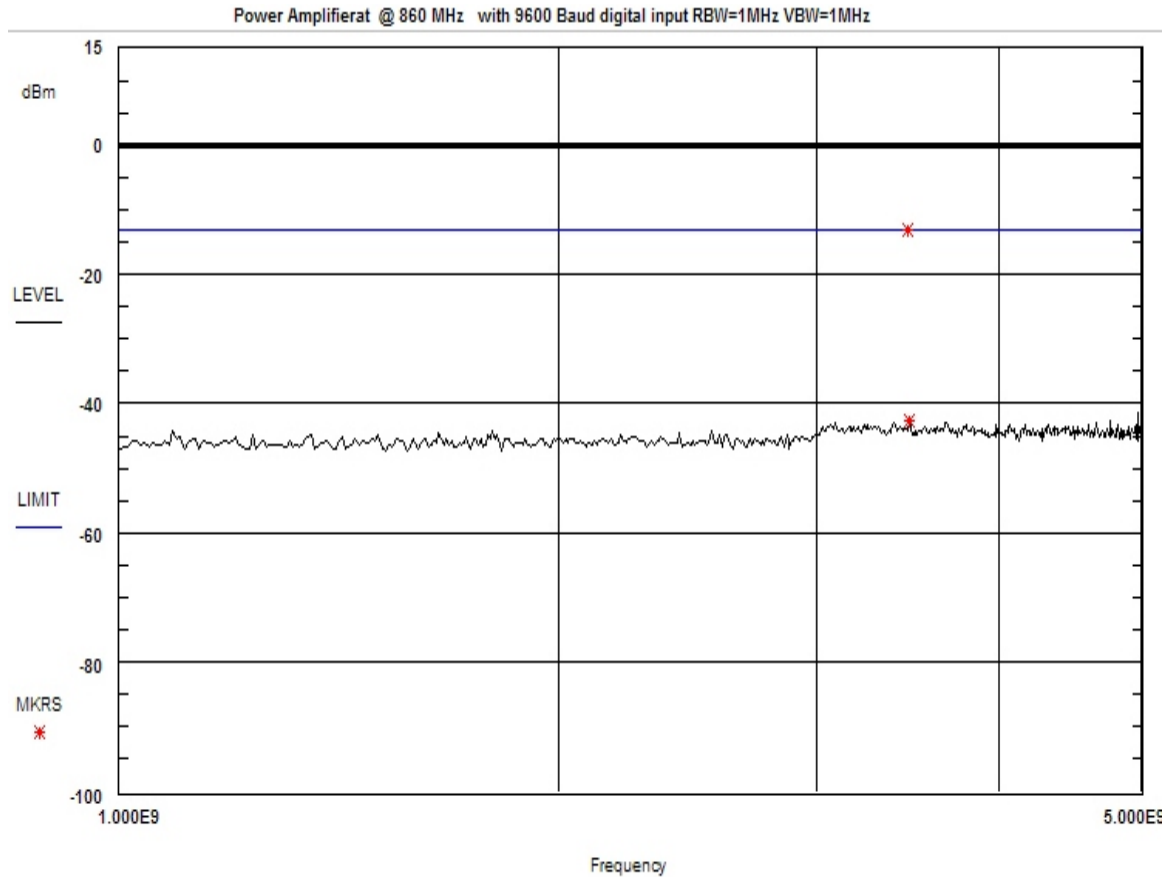


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digital\_Spur1; 24/Jun/2004 15:49:36; James Ritter

DELTA = 18.0135 MHz

F1 = 838.727MHz @ -13; F2 = 856.741 MHz @ -33.8

**Figure 23. Conducted Spurious Emissions, 860 MHz Digital Modulation F1D, F1E, F2D, F2B**

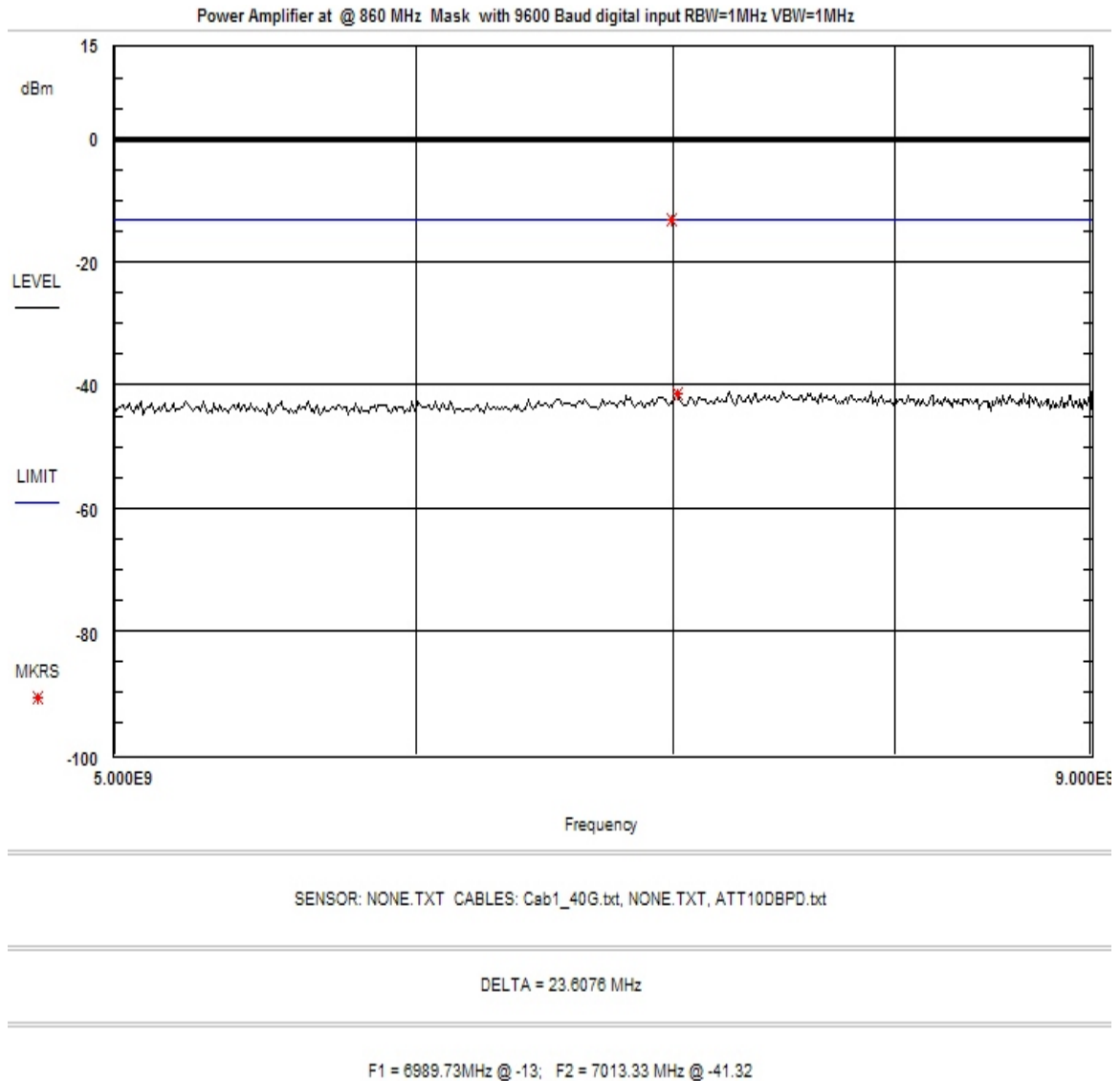


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_860MHz\_digital\_Spur3; 24/Jun/2004 15:56:24; James Ritter

DELTA = 8.950200000000001 MHz

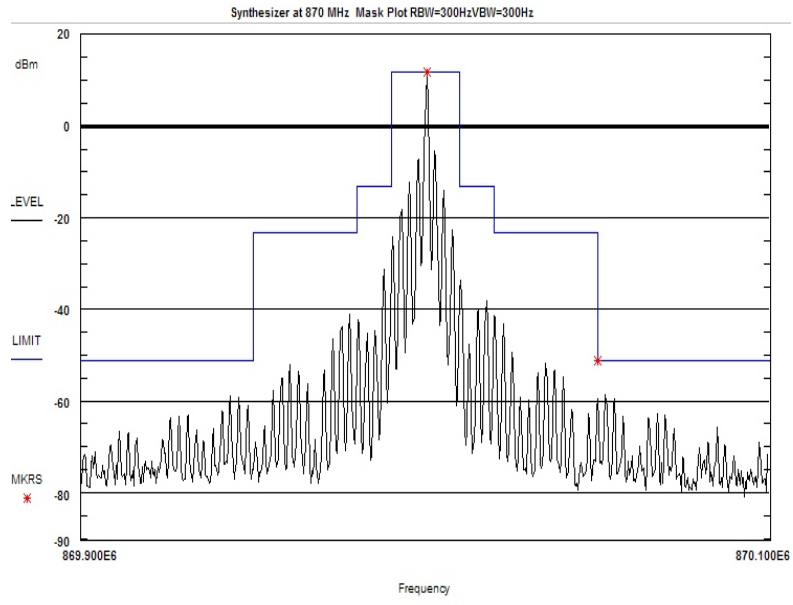
F1 = 3457.72MHz @ -13; F2 = 3486.67 MHz @ -42.42

**Figure 24. Conducted Spurious Emissions, 860 MHz Digital Modulation F1D, F1E, F2D, F2B**



**Figure 25. Conducted Spurious Emissions, 860 MHz Digital Modulation F1D, F1E, F2D, F2B**

**Amplifier Input:**

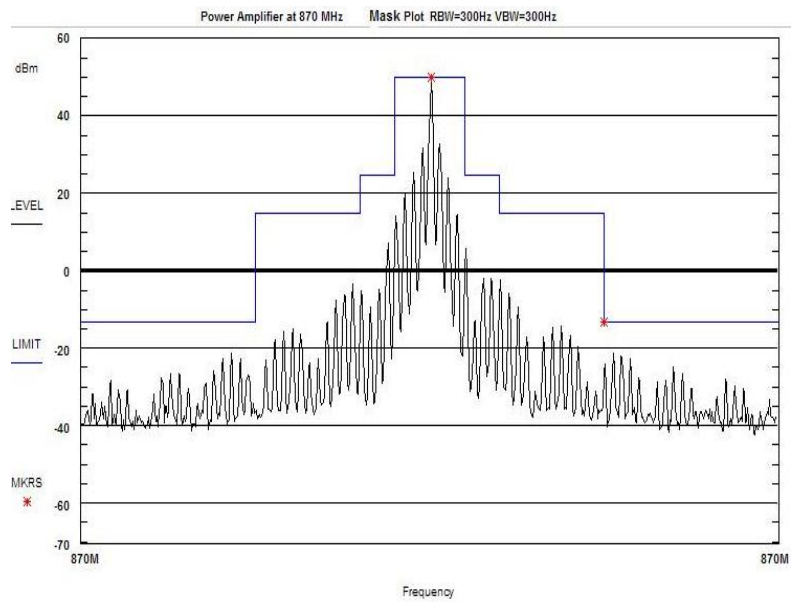


Communications International JOB: 8188 ; C:\wll\Comm\final\CMM8188\_Synth\_870MHz\_Mask; 22/Jun/2004 09:18:19; James Ritter

DELTA = 0.04956 MHz

F1 = 870MHz @ 11.9; F2 = 870.05 MHz @ -51.1

**Amplifier Output:**



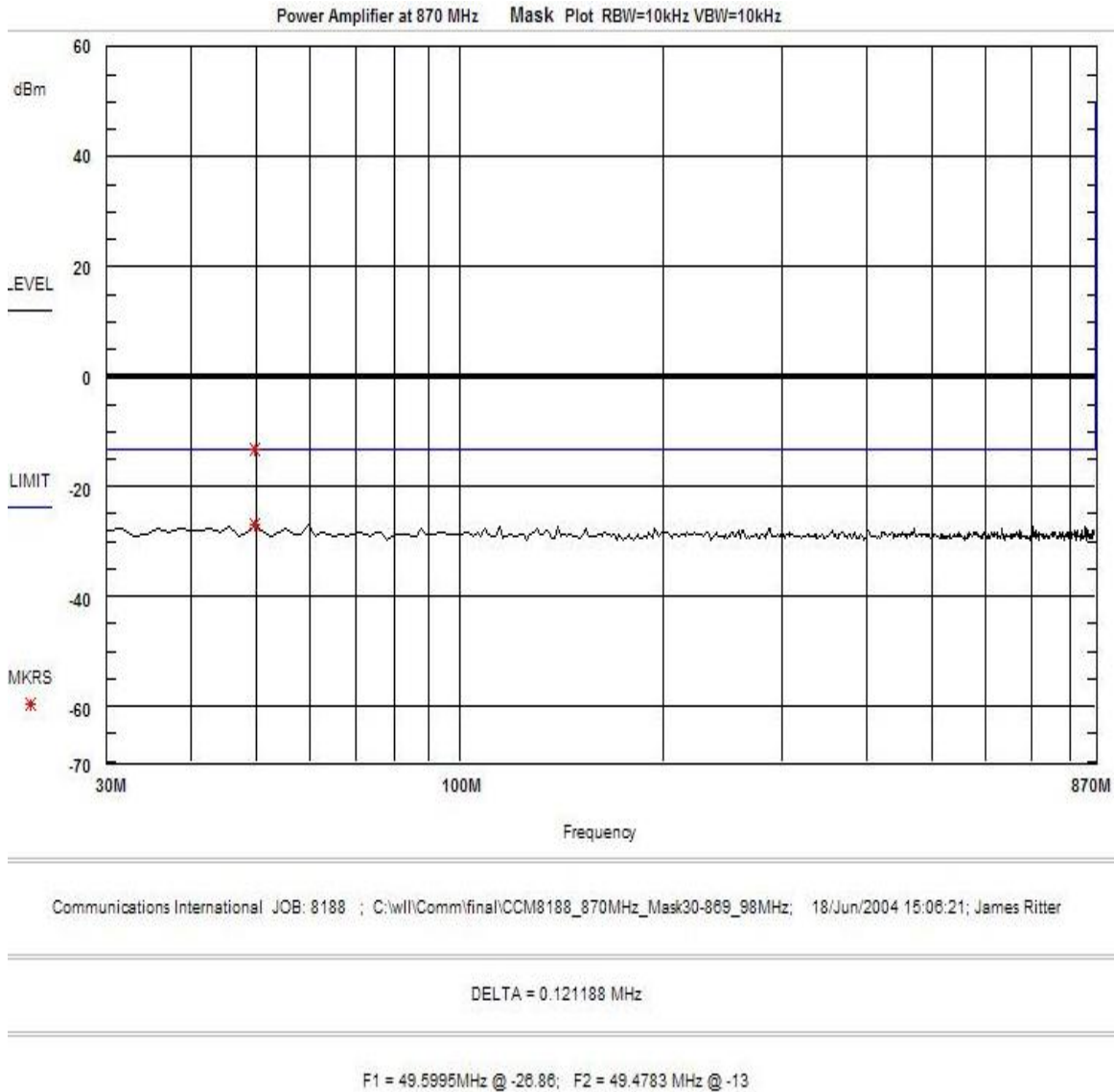
Communications International JOB: 8188 ; C:\wll\Comm\final\CMM8188\_870MHz\_Close in Mask; 18/Jun/2004 14:55:34; James Ritter

DELTA = 0.04983 MHz

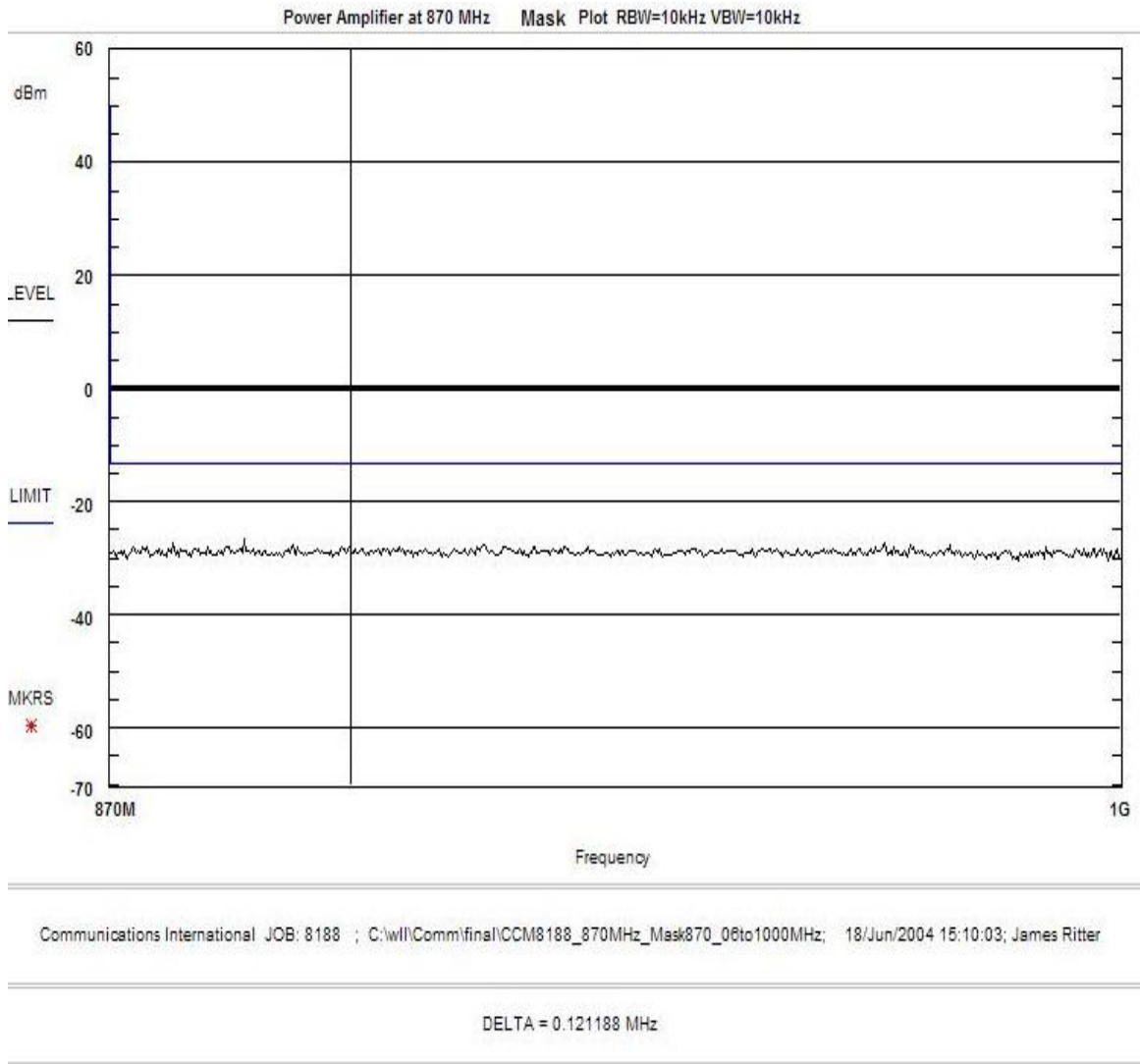
F1 = 870MHz @ 60; F2 = 870.05 MHz @ -13

**Figure 26. Mask, 870 MHz Analog Modulation, F3E**

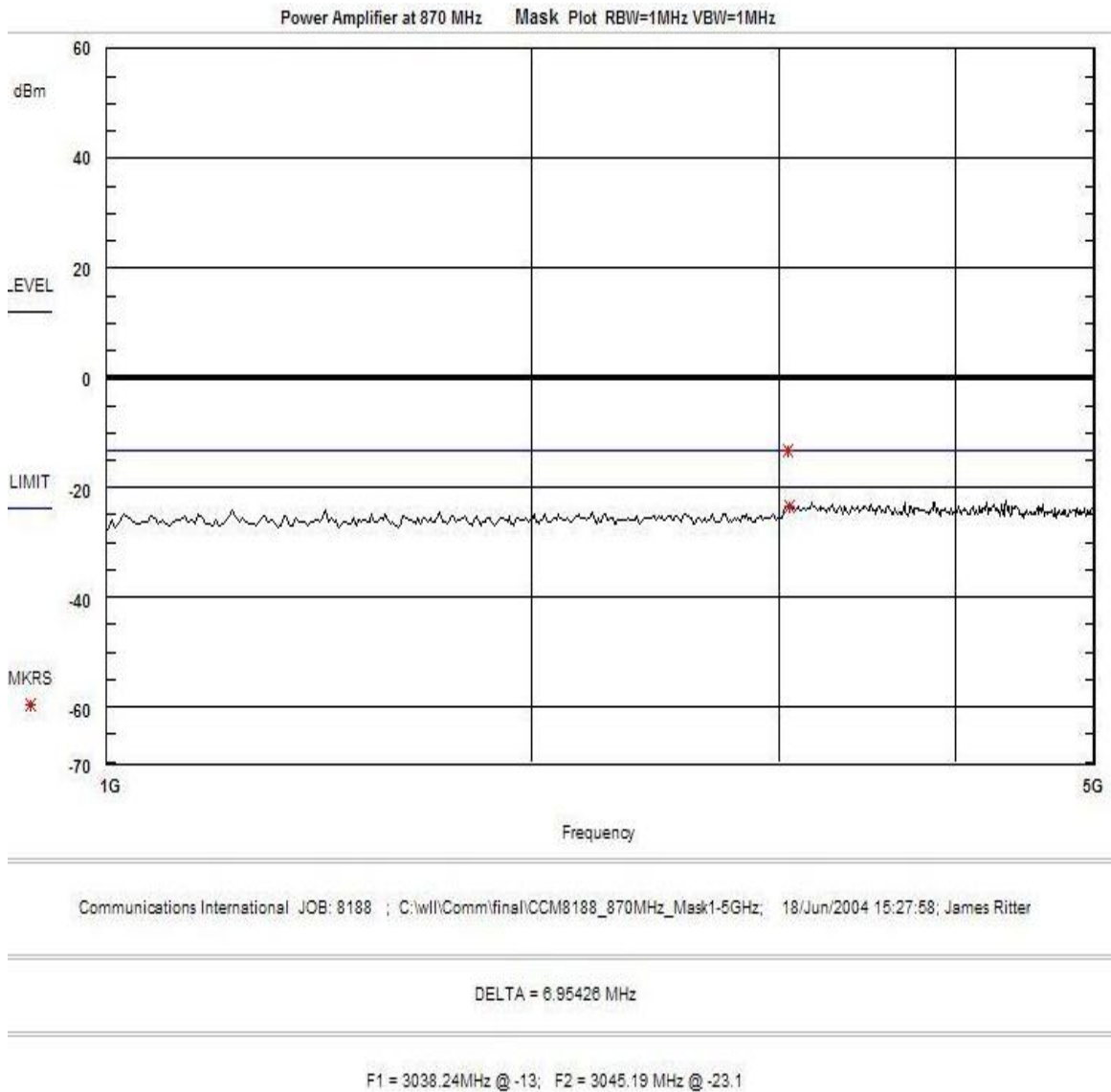




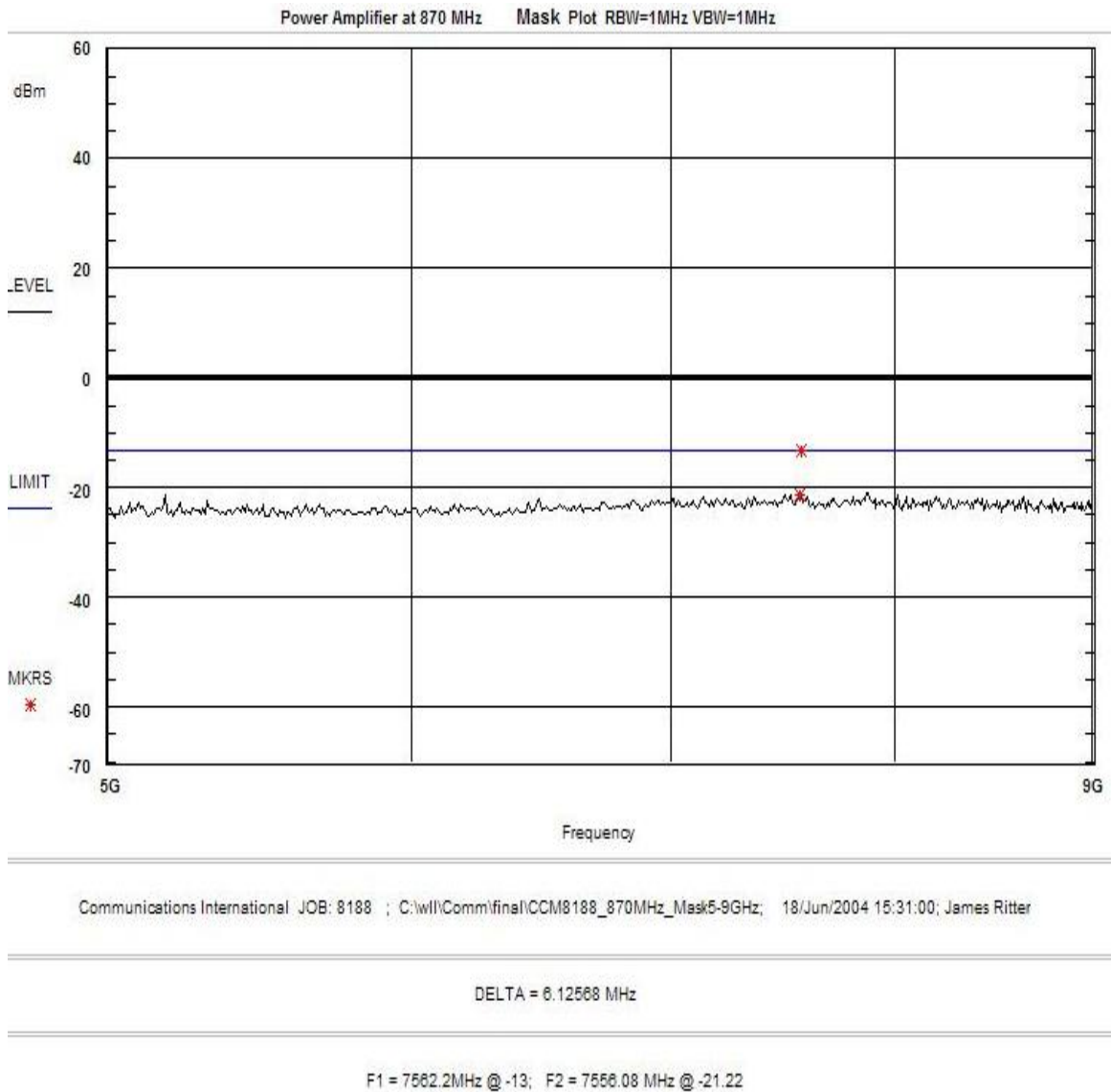
**Figure 27. Conducted Spurious Emissions, 870 MHz Analog Modulation,F3E**



**Figure 28. Conducted Spurious Emissions, 870 MHz Analog Modulation, F3E**

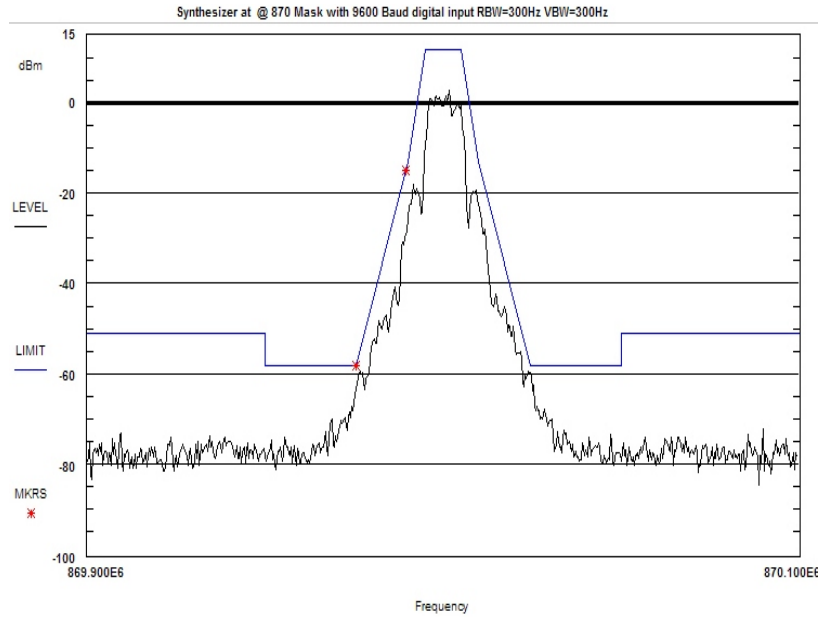


**Figure 29. Conducted Spurious Emissions, 870 MHz Analog Modulation, F3E**



**Figure 30. Conducted Spurious Emissions, 870 MHz Analog Modulation, F3E**

**Amplifier Input:**

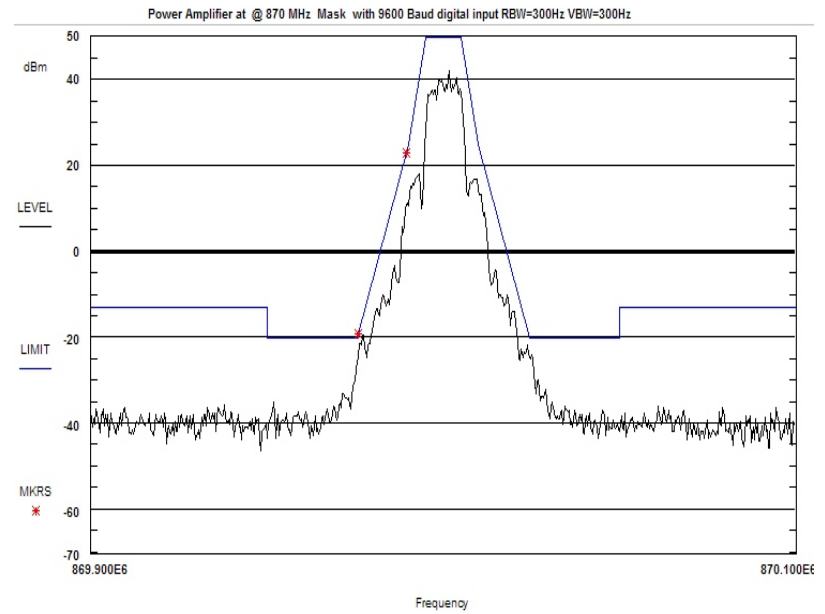


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_Synth\_Mask; 24/Jun/2004 16:52:09; James Ritter

DELTA = 0.0139122 MHz

F1 = 869.989MHz @ -14.75; F2 = 869.978 MHz @ -58

**Amplifier Output:**

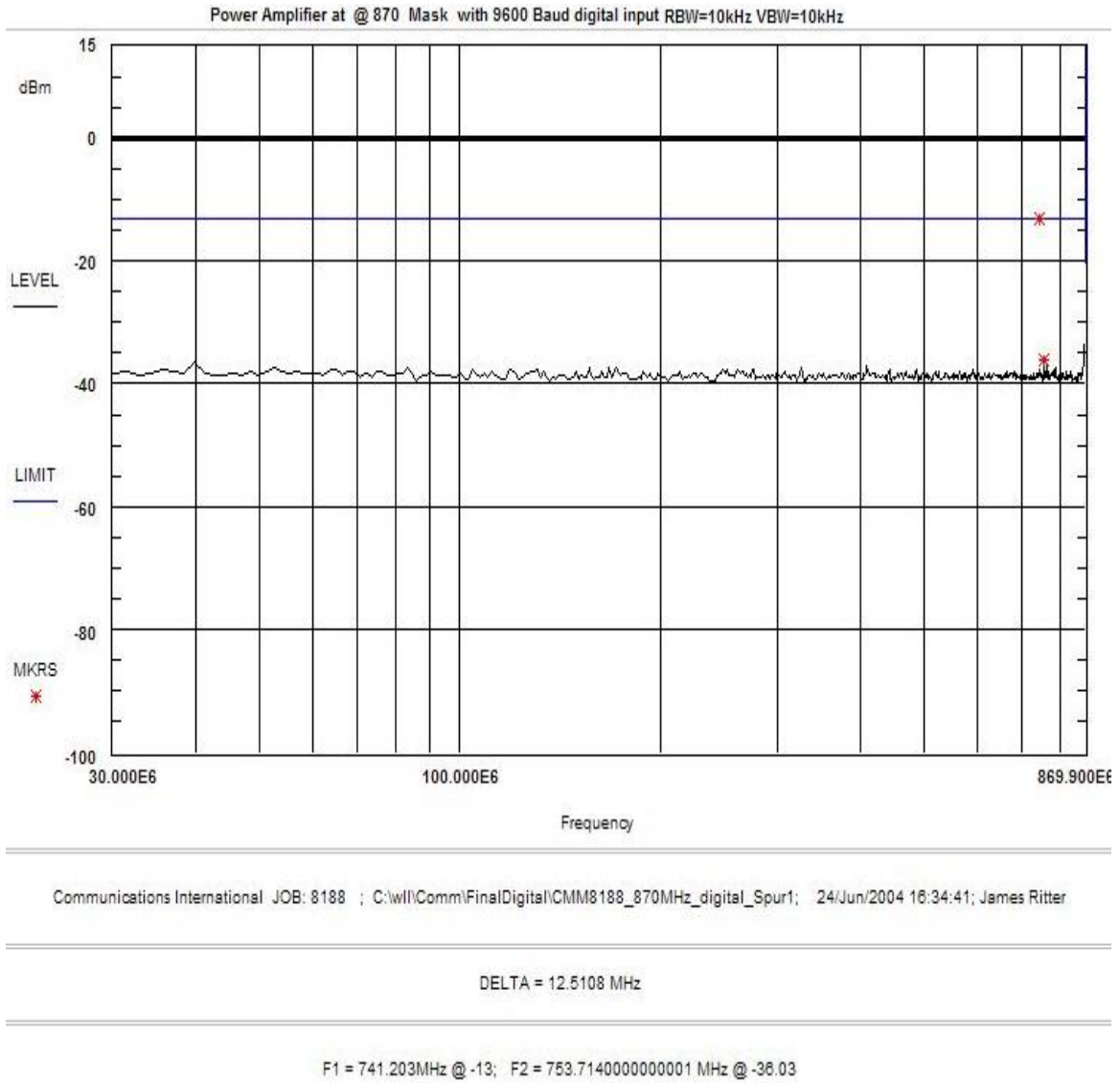


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_Mask; 24/Jun/2004 16:25:46; James Ritter

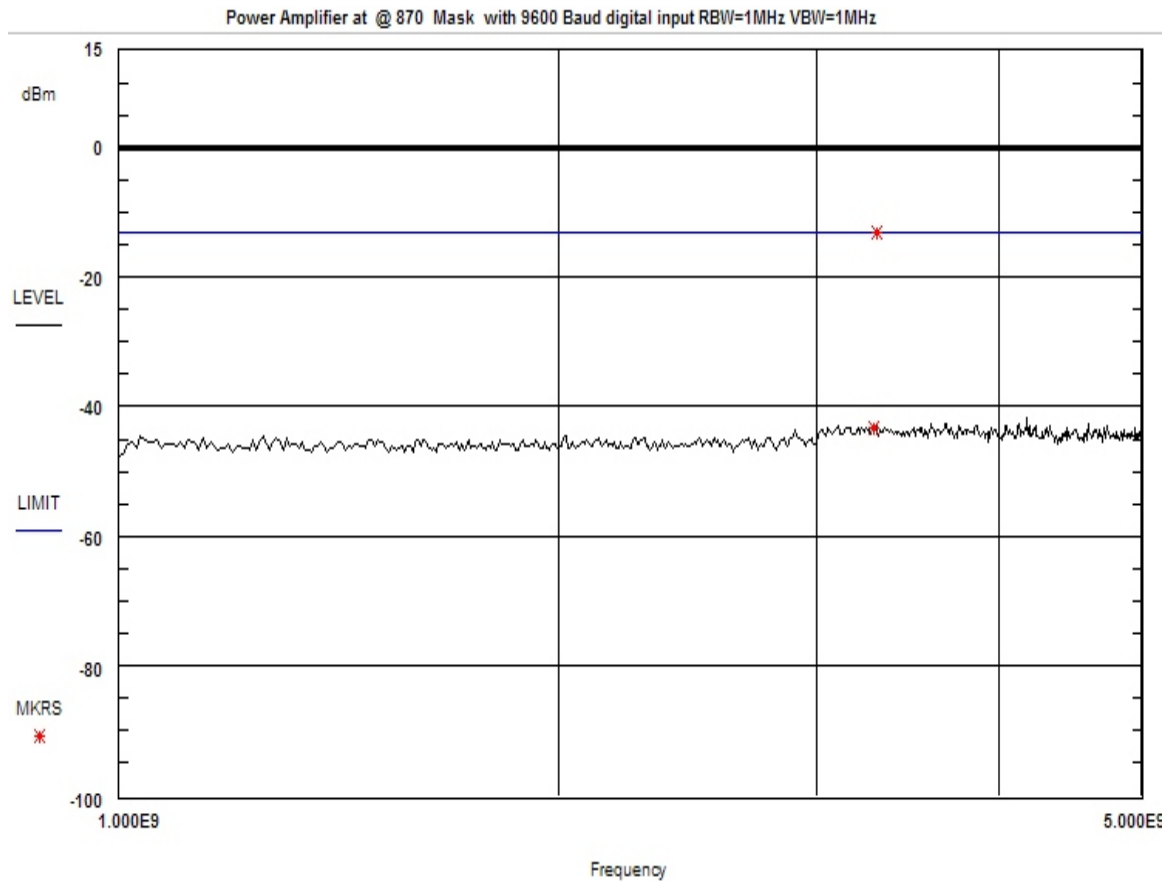
DELTA = 0.0138097 MHz

F1 = 869.989MHz @ 23.1; F2 = 869.978 MHz @ -19.22

**Figure 31. Mask, 870 MHz Digital Modulation F1D, F1E, F2D, F2B**



**Figure 32. Conducted Spurious Emissions, 870 MHz Digital Modulation F1D, F1E, F2D, F2B**

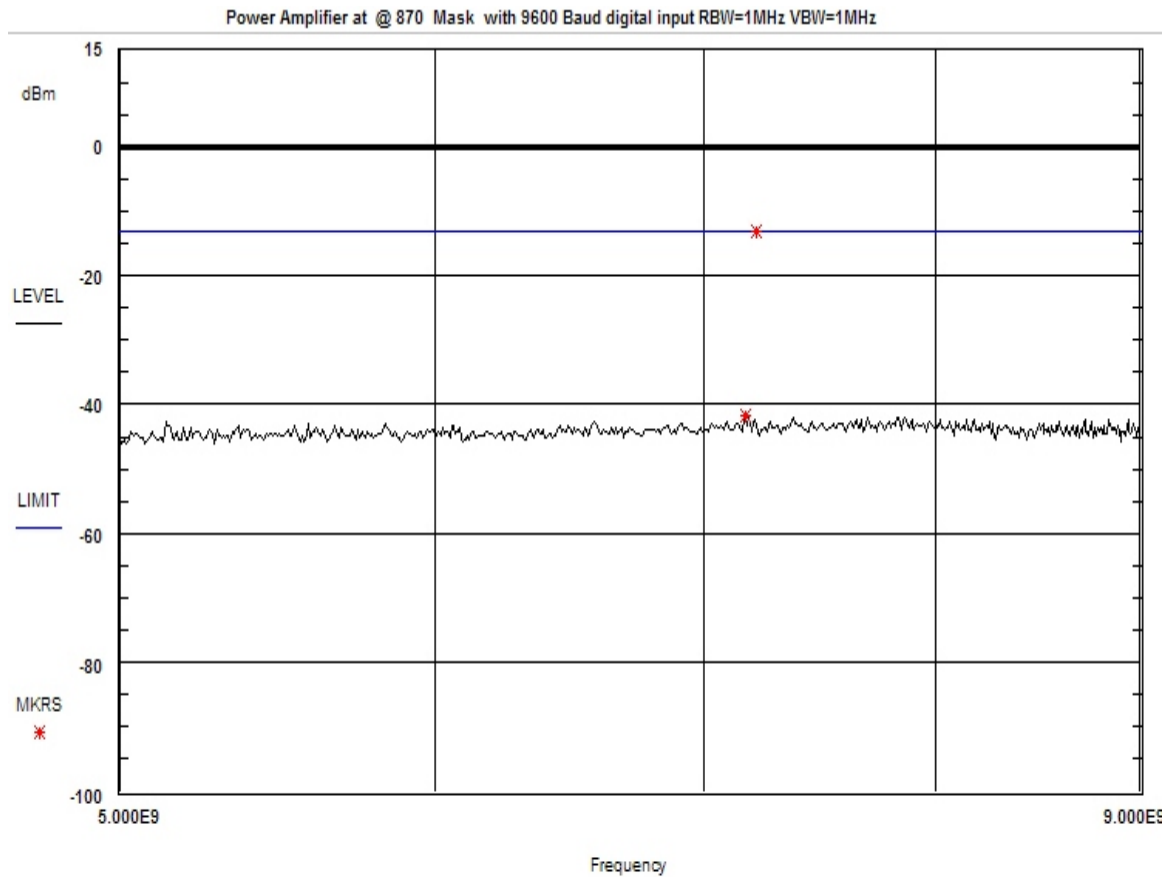


Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_Spur3; 24/Jun/2004 16:38:34; James Ritter

DELTA = 11.1175 MHz

F1 = 3296MHz @ -13; F2 = 3284.88 MHz @ -43.18

**Figure 33. Conducted Spurious Emissions, 870 MHz Digital Modulation F1D, F1E, F2D, F2B**



Communications International JOB: 8188 ; C:\wll\Comm\FinalDigital\CMM8188\_870MHz\_digital\_Spur4; 24/Jun/2004 16:42:38; James Ritter

DELTA = 46.8575 MHz

F1 = 7213.32MHz @ -13; F2 = 7166.67 MHz @ -41.61

**Figure 34. Conducted Spurious Emissions, 870 MHz Digital Modulation F1D, F1E, F2D, F2B**



#### **4.5 Radiated Spurious Emissions: (FCC Part §2.1053)**

The EUT must comply with requirements for radiated spurious emissions according to FCC Part §2.1053.

##### **4.5.1 Test Procedure**

The EUT antenna output was terminated in a 50 ohm load.

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Emissions data were collected and the EIRP values determined using the substitution method.

**Table 5: Radiated Emission Test Data**

CLIENT: Communications International DATE: 6/21/2004  
 TESTER: James Ritter JOB #: 8188  
**EUT Information:** EUT: Mark II Power Amplifier **Test Requirements:** TEST STANDARD: FCC 90  
 CONFIGURATION: 860 MHz TX to Dummy Load DISTANCE: 3m  
 S/N: PA2

Frequency (MHz)	Polarity H/V	Azimuth Degree	Ant. Hght (m)	SA Level (dBμV)	Ant. Gain dBi	Sig. Gen. Level dBm	EIRP Level dBm	Limit (dBm)	Margin dB
49.670	H	145.0	3.0	14.5	-3.8	-38.0	-41.8	-13.0	-28.8
746.420	H	290.0	1.3	22.1	3.9	-42.0	-38.1	-13.0	-25.1
859.993	H	145.0	1.0	75.4	4.7	4.0	8.7	50.0	-41.3
1720.000	H	180.0	1.0	67.7	7.1	-47.6	-40.5	-13.0	-27.5
2580.000	H	0.0	1.0	80.3	8.3	-27.3	-19.0	-13.0	-6.0
3440.000	H	0.0	1.0	75.0	9.8	-28.6	-18.8	-13.0	-5.8
4300.000	H	10.0	1.0	62.8	10.8	-38.3	-27.5	-13.0	-14.5
5160.000	H	0.0	1.0	48.2	11.1	-54.3	-43.2	-13.0	-30.2
6020.000	H	20.0	1.0	54.7	10.8	-47.3	-36.5	-13.0	-23.5
8600.000	H	0.0	1.0	48.7	10.1	-43.0	-32.9	-13.0	-19.9
49.67	V	270.0	1.3	16.7	-3.8	-36.1	-39.9	-13.0	-26.9
746.42	V	260.0	2.3	20.8	3.9	-39.8	-35.9	-13.0	-22.9
859.99	V	270.0	2.1	73.6	4.7	3.1	7.8	50.0	-42.2
1720.000	V	0.0	1.0	74.8	7.1	-38.3	-31.2	-13.0	-18.2
2580.000	V	45.0	1.0	82.2	8.3	-25.6	-17.3	-13.0	-4.3
3440.000	V	0.0	1.0	84.0	9.8	-26.2	-16.4	-13.0	-3.4
4300.000	V	0.0	1.0	63.2	10.8	-42.8	-32.0	-13.0	-19.0
5160.000	V	10.0	1.0	50.7	11.1	-51.6	-40.5	-13.0	-27.5
6020.000	V	0.0	1.0	60.2	10.8	-38.6	-27.8	-13.0	-14.8
8600.000	V	45.0	1.0	54.7	10.1	-42.7	-32.6	-13.0	-19.6

**4.6 Frequency Stability: (FCC Part §2.1055)**

Not applicable to this unit.

**4.7 Transient Frequency Response (Part 90.214)**

Not applicable to this unit.