



**RADIATION SCIENCES INC.**

**TEST REPORT RSI-2104E**  
**ELECTROMAGNETIC EMISSION EVALUATION**  
**PER**  
**FCC PART 15 - CLASS B**  
**OF THE**  
**TACTICAL TECHNOLOGIES, INC.**  
**MODEL IP9CIT20 "CITATION" RECEIVER**  
**29 AUGUST 2000**

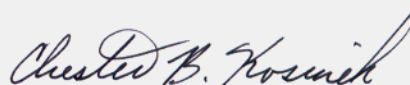
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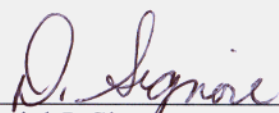
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**ADMINISTRATIVE DATA**

**PURPOSE OF TEST:**

To evaluate the ElectroMagnetic (EME) characteristics of the Equipment Under Test with respect to Part 15 of the Federal Communications Commission (FCC) Rules for Class "B" Information Technology Equipment (ITE).

**SCOPE OF TEST:**

Measurement of radiated and conducted emissions.

**EQUIPMENT UNDER TEST (EUT):**

Model Number: **IP9CIT20 "Citation" Receiver**  
Serial Number: 0020

**CONTRACT:**

Purchase Order Number: TBD

**TEST PERIOD:**

24 August 2000

**TEST FACILITY:**

**Radiation Sciences Incorporated (RSI)**, EMC Test Laboratory, located at 3131 Detwiler Road, Harleysville, Pennsylvania 19438.

**TEST PERSONNEL AND COORDINATORS:**

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**SUMMARY OF TEST RESULTS**

The **Tactical Technologies Model IP9CIT20 "Citation" Receiver**, configured as described herein, **FULLY COMPLIES WITH THE REQUIREMENTS SET FORTH IN FCC PART 15 FOR CLASS "B" INFORMATION TECHNOLOGY EQUIPMENT (ITE).**



## **1.0 INTRODUCTION**

This document is a report of tests to determine the ElectroMagnetic Interference (EMI) characteristics of the **Citation Receiver**, manufactured by **Tactical Technologies, Inc.**

The purpose of the tests was to evaluate the EMI characteristics of the test sample with respect to FCC Part 15 for Class "B" Information Technology Equipment (ITE).

Test setups and procedures are described in **RSI's Test Procedure 4963E** (see Appendix A) and test results are summarized herein on graphs.

All test procedures used meet the requirements of the Office of the American National Standards Institute Procedures C63-4: "Methods of Measurement of Radiated-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz", dated 17 July 1992.



## **2.0 DESCRIPTION OF THE TEST SAMPLE:**

The **Tactical Technologies Model IP9CIT20 Citation Receiver** is a portable receiver for Model IP9CST703 Transmitters.

### **2.1 Test Setup**

The **Citation Receiver** test sample was tested for radiated emissions at 3 meters. The antenna was raised up and down.

Prior to formal test, receiver was scanned for emissions in a shield room.

Section 3 contains a list of the test equipment utilized.

**3.0 TEST INSTRUMENTATION**

<u>RSI INV #</u>	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>MODEL #</u>	<u>SERIAL #</u>	<u>LAST CAL DATE</u>	<u>CAL DUE DATE</u>	<u>C Y C L E</u>	<u>T Y P E</u>
31	SPEC ANALYZER	ADVANTEST	R3271	J003583	6/21/2000	6/21/2001	12	C
32	SPEC. ANALY.	H.P.	8568B	2841A04457	4/27/2000	4/27/2001	12	C
33	SPEC. ANALY.	H.P.	85662A	2848A17406	4/27/2000	4/27/2001	12	C
73	ANTENNA	STODDART	94455-1	6	11/30/1999	11/30/2000	12	V
83	ANTENNA	EMCO	3146	1554	12/1/1999	12/1/2000	12	V
391	RECEIVER	R & S	ESVP	861744/015	4/18/2000	4/18/2001	12	C



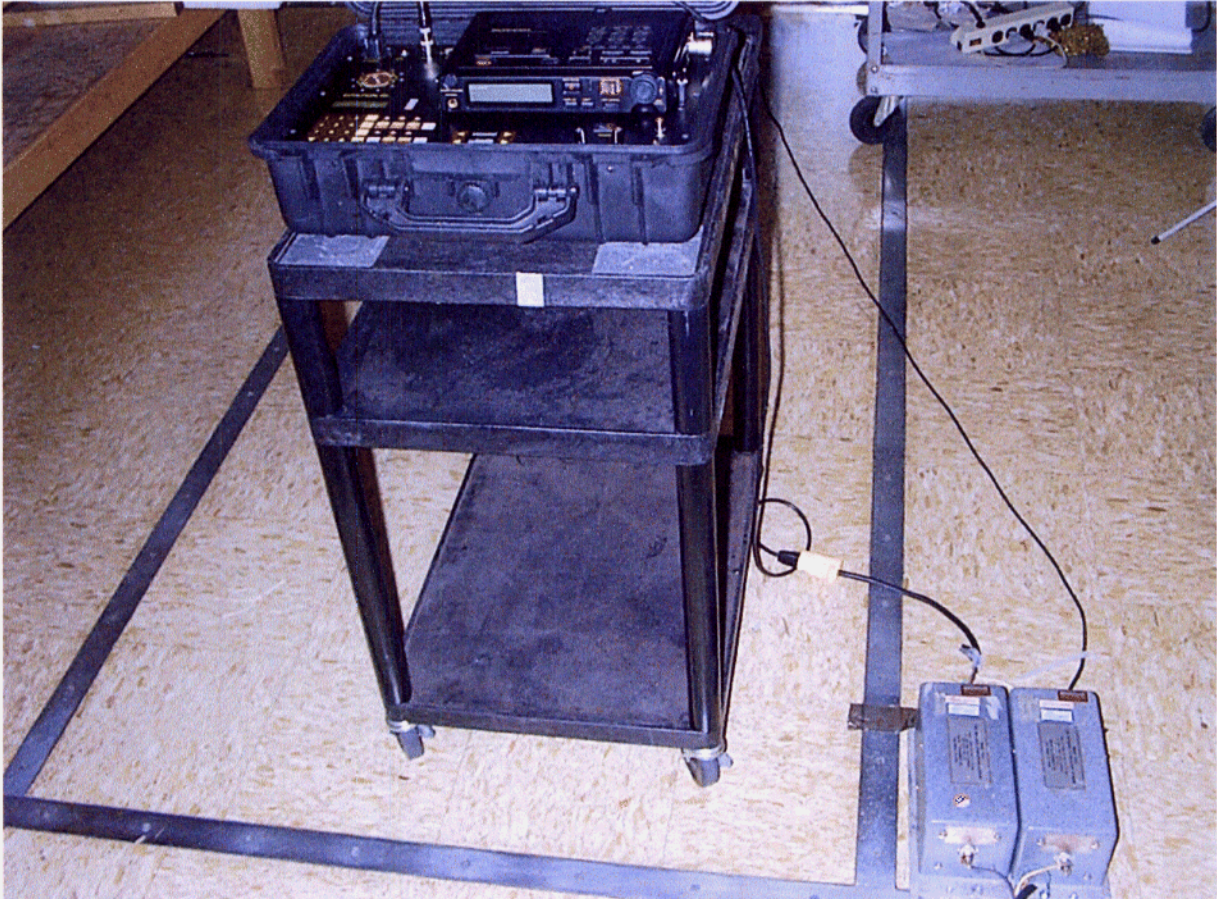
#### **4.0 TEST RESULTS**

##### **4.1 Conducted Power Line Measurements, Paragraph 15.107**

Conducted power line measurements were recorded for the **Model IP9CIT20 Receiver**. A photograph of the conducted emissions test setup is shown in Figure 1. The results of line-to-ground radio noise voltage measurements are shown in Figure 2 and 3. Measurements were conducted on both the phase and neutral lines.

**ALL LEVELS ARE BELOW THE APPLICABLE LIMITS.**





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**FIGURE 1**

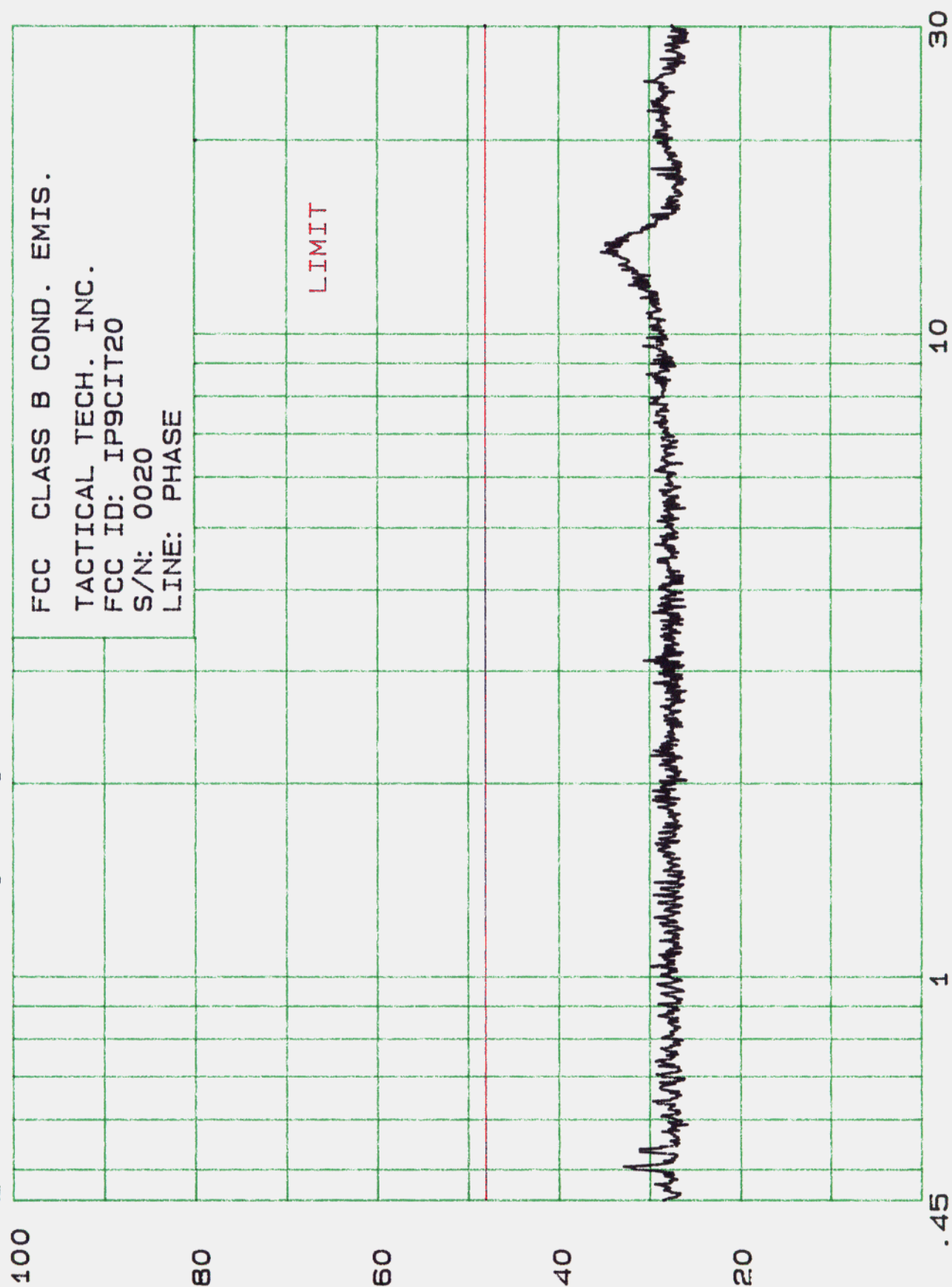


FIGURE 2

FREQUENCY [MHz]

RADIATION SCIENCES INC.  
EMISSION LEVEL [dBuV]

24 Aug 2000 09:56:50

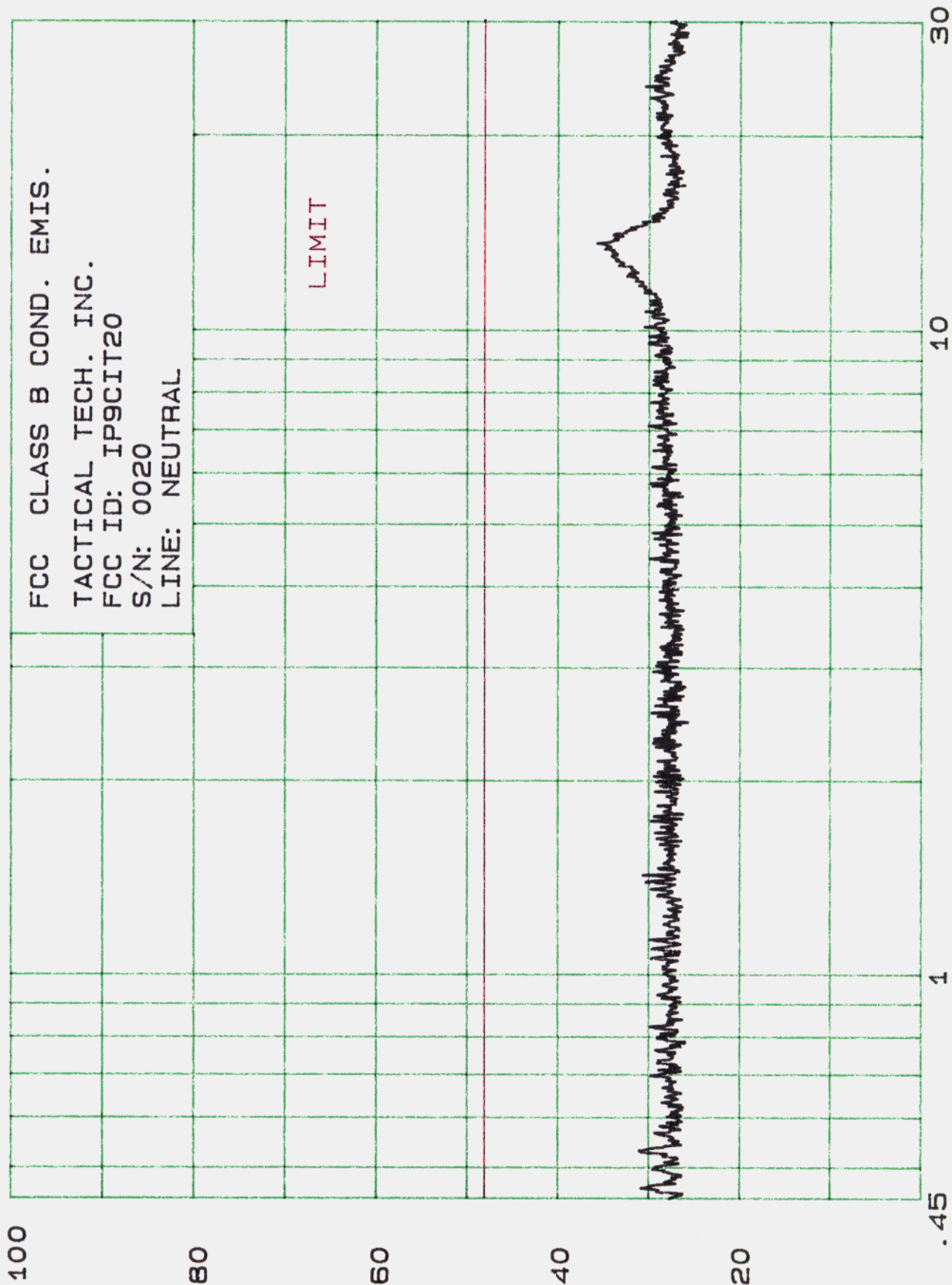


FIGURE 3

FREQUENCY [MHz]





**4.2 Radiated Emission Measurements, Paragraph 15.33, 15.35, 15.109, 15.205  
15.209 and 15.231**

Radiated emission measurements were recorded for the test sample at a distance of 3 meters unless otherwise stated. Figure 4 shown the test setup. The results of field strength measurements are illustrated on graph Figure 5 and data sheet 1, Figure 6. Radiated emissions were measured with the antenna in both the horizontal and vertical polarizations. The antenna was raised 1 to 4 meters in height and the equipment under test (**EUT**) was rotated 360° to maximize the emission.

During radiated emissions testing the **EUT** was scanned from 30MHz to 1000MHz.

**ALL LEVELS COMPLY WITH APPLICABLE LIMITS.**



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**FIGURE 4**

FCC RADIATED EMISSIONS CLASS B

▲ VERTICAL  
○ HORIZONTAL  
— LIMIT

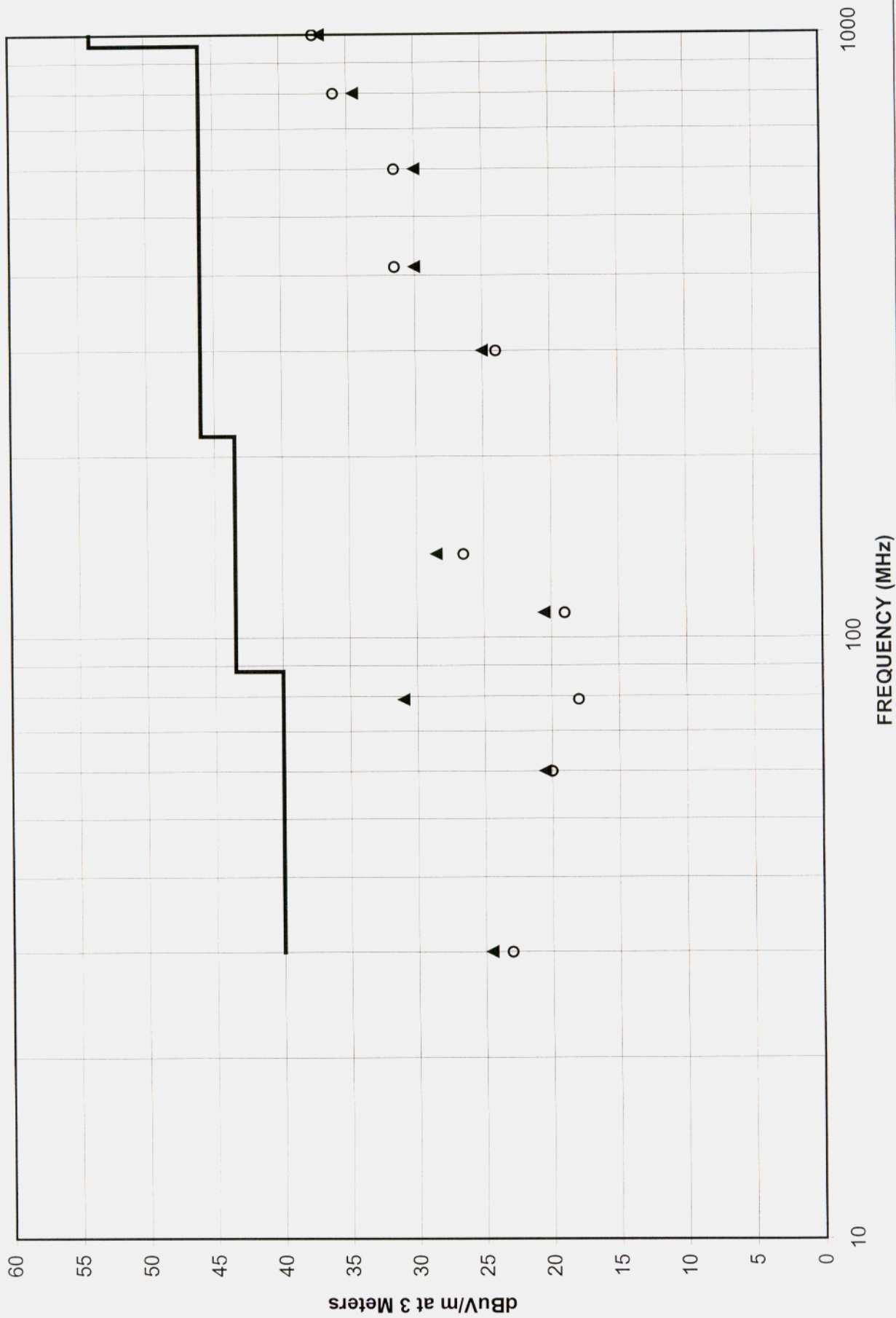


FIGURE 5



# RADIATION SCIENCES INC.

## ELECTROMAGNETIC EMISSION TEST

MANUFACTURER: *Tactical Tech, Inc.*  
 MODEL NO. - *CITATION IP9CIT20*  
 SERIAL NO. - *0020*

ADDITIONAL INFORMATION

DATE: *8/24/00*

TEST CODE

*R.E.*

TECHNICIAN

ENGINEER

*[Signature]*

MODE -

TEMPERATURE:

RSI EQUIPMENT NUMBERS

TEST SPEC.

*FCC PART 15  
CLASS B*

HUMIDITY:

RADIATED

☒ HORIZ.

☐ BB

☒ NB

CONDUCTED

☐ BB

DISTANCE: *3 meters*

☒ VERT.

☐ H

☒ E

LINE:

☐ NB

ANTENNA: *BICON, LOG PER.*

FREQ.	IND. LEVEL	CORRECTION FACTORS		FINAL LEVEL	ANTENNA HEIGHT	EUT AZIMUTH	REMARKS
		ANT.					
MHz	dBm	dB		dBm/meters		degrees	
<u>HORIZ.</u>							
30	10	13		23			
60	10	8		20			
79	9.5	8.5		18			
110	8	11		19			
137.7	12.5	14		26.5	1.0	0	L. Osc
300	8	16		24			
413.1	11	20.5		31.5	1.0	0	3X L.O.
600	11	20.5		31.5			
800	13	23		36			
1000	12	25.5		37.5			
<u>VERT.</u>							
30	12.5	12		24.5			
60	13	7.5		20.5			
79	22	9		31			
110	9	11.5		20.5			
137.7	15.5	13		28.5	1.0	0	L. Osc.



## **5.0 CONCLUSIONS**

The FCC evaluation of the **Technical Technologies Model IP9CIT20, Citation Receiver** indicates that **THE UNIT COMPLIES WITH THE LIMITS SET FORTH IN FCC PART 15 FOR CLASS "B" INFORMATION TECHNOLOGY EQUIPMENT (ITE).**