



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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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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Tactical Technologies, Inc.

Jeff Olsen



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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)**.



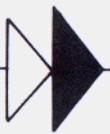
1.0 INTRODUCTION

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**

RSI INV #	DESCRIPTION	MANUFACTURER	MODEL #	SERIAL #	LAST CAL DATE	CAL DUE DATE	C Y C L E	T Y P E
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

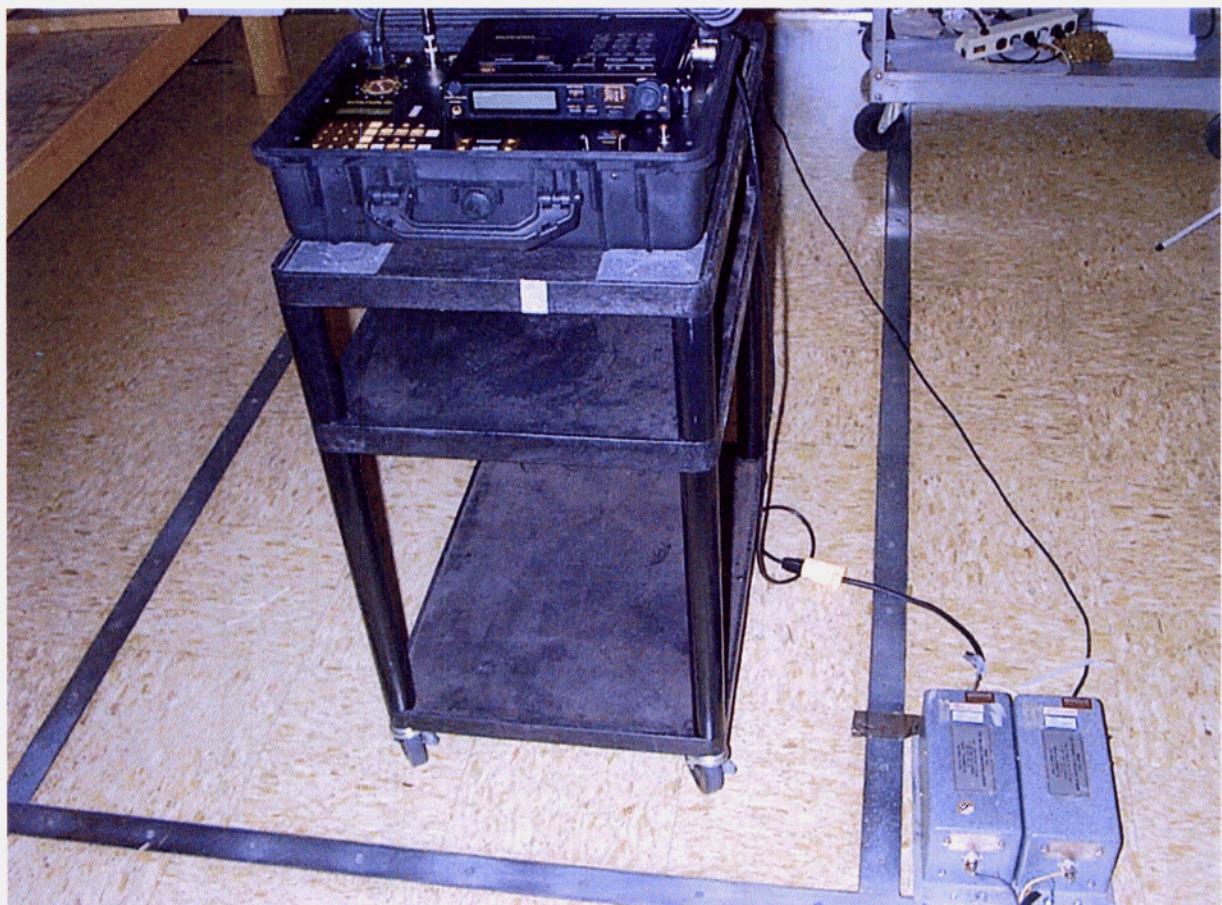
4.1 Conducted Power Line Measurements, Paragraph 15.107

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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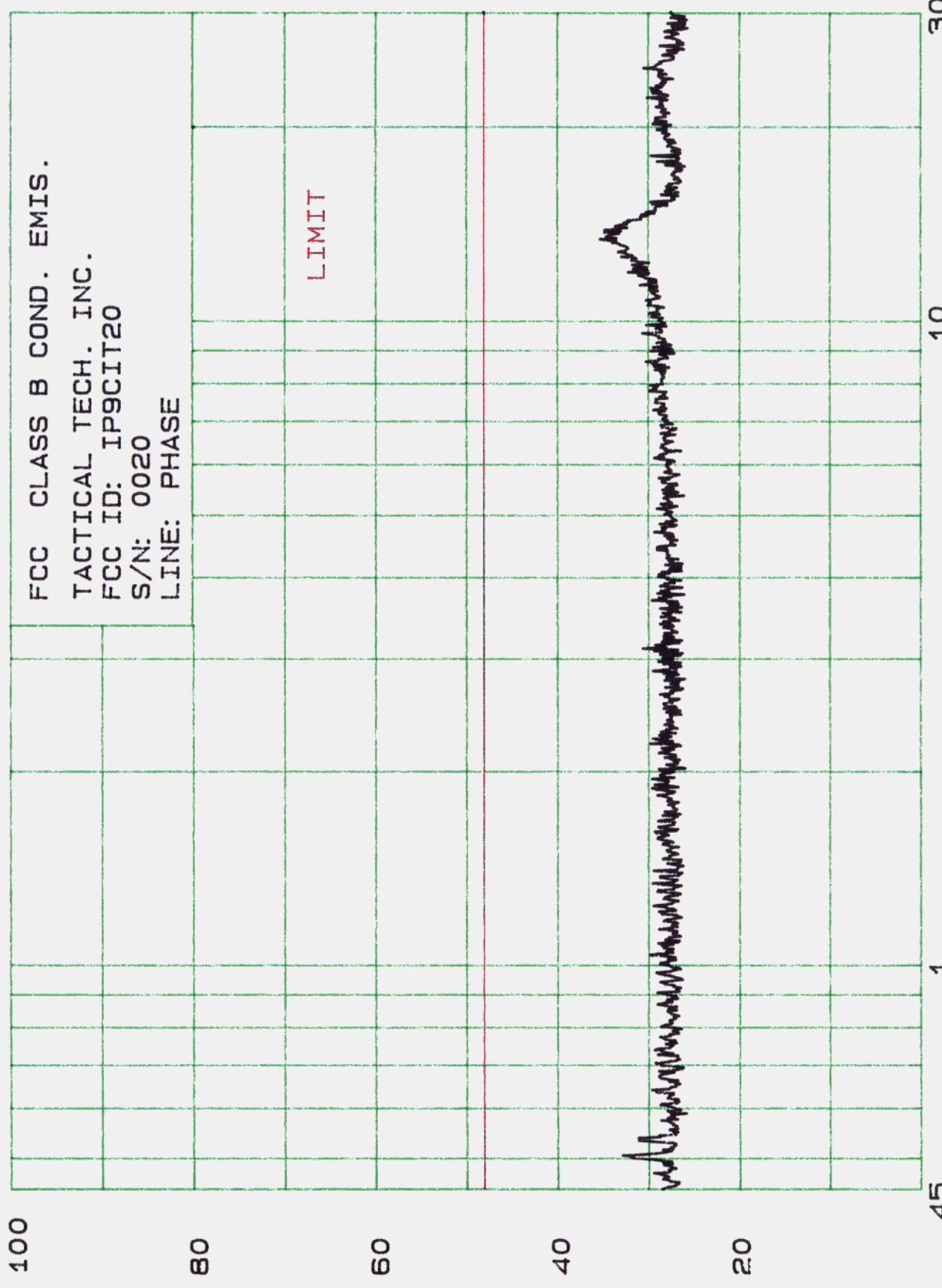


Name: DCP01830.JPG

FIGURE 1

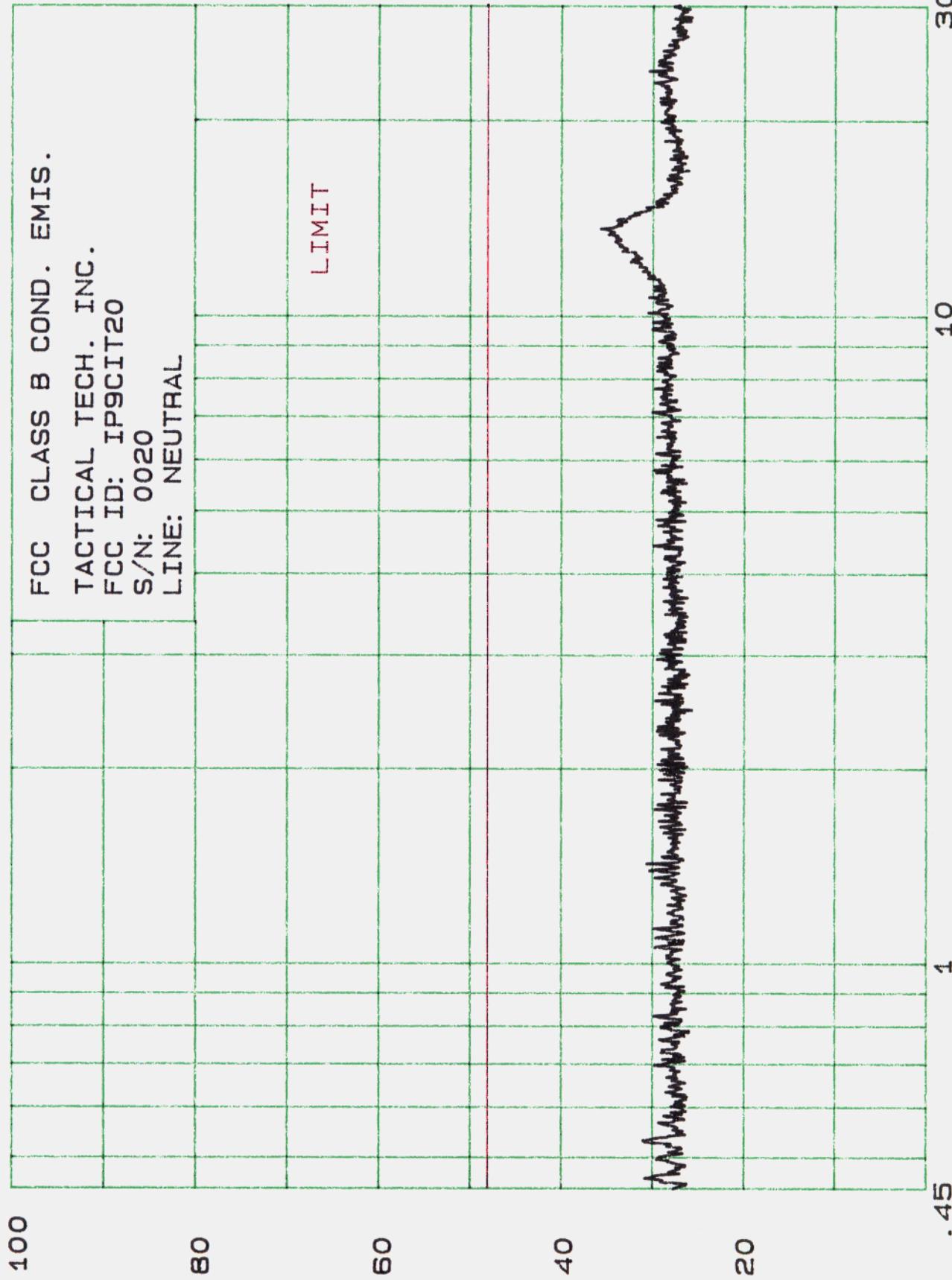
RADIATION SCIENCES INC.
EMISSION LEVEL [dB_{UV}]

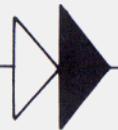
24 Aug 2000 09:47:22



RADIATION SCIENCES INC.
EMISSION LEVEL [dB_{UV}]

24 Aug 2000 09:56:50





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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Name: DCP01805.JPG

FIGURE 4



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▲ VERTICAL
○ HORIZONTAL
— LIMIT

— LIMIT

FCC RADIATED EMISSIONS CLASS B

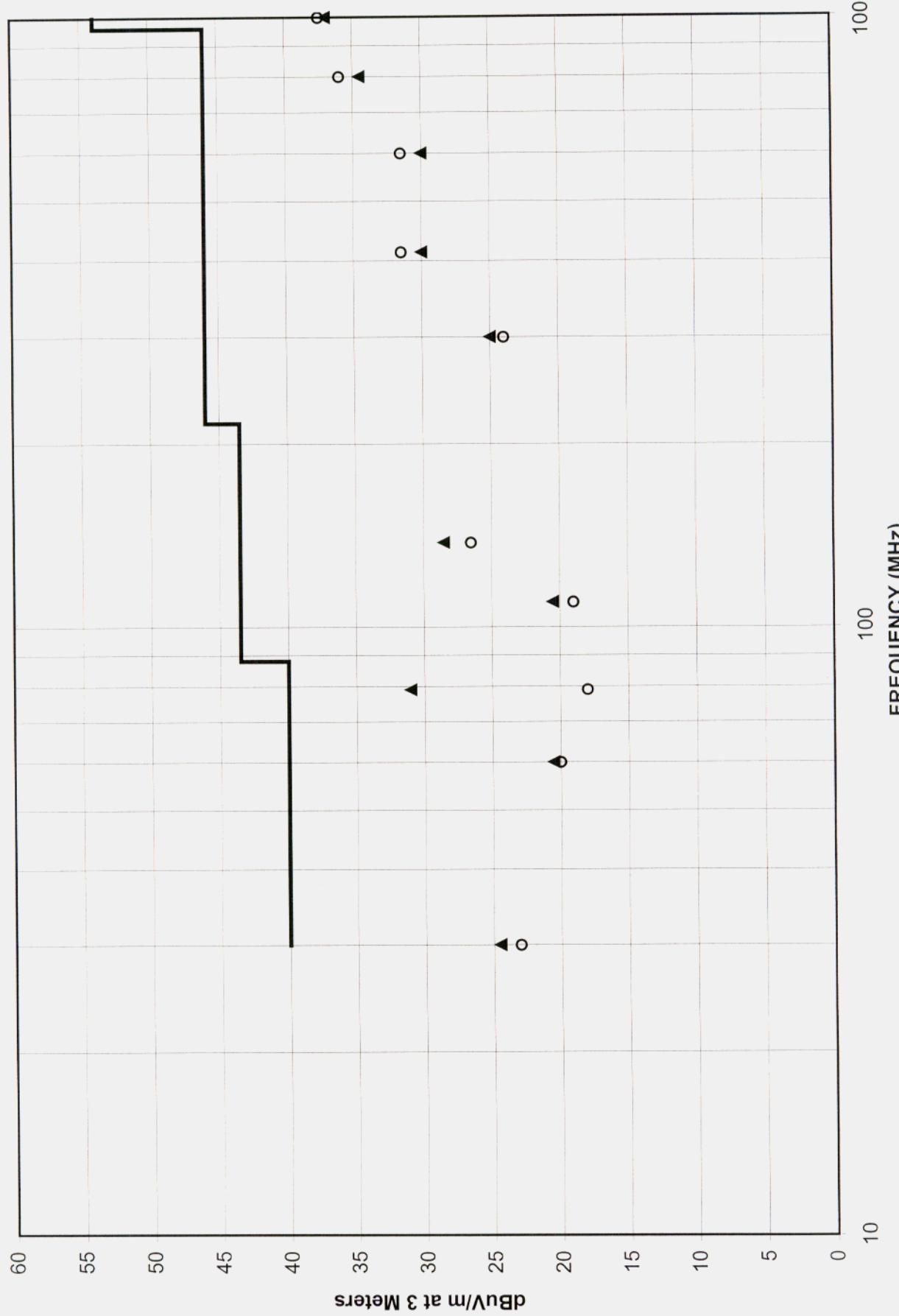


FIGURE 5

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ELECTROMAGNETIC EMISSION TEST



MANUFACTURER: TACTICAL TECH, INC.

MODEL NO. - CITATION IP9CIT20

SERIAL NO. = 0020

MODE -

ADDITIONAL INFORMATION

DATE:

8/24/00

TEST CODE

R.E.

TECHNICIAN

ENGINEER

TEMPERATURE:	RSI EQUIPMENT NUMBERS			TEST SPEC.
HUMIDITY:				FCC PART 15 CLASS B

RADIATED		<input checked="" type="checkbox"/> HORIZ.	<input type="checkbox"/> BB	<input checked="" type="checkbox"/> NB	CONDUCTED	<input type="checkbox"/> BB
DISTANCE: 3 METERS	ANTENNA: BICON, LOG PER.	<input checked="" type="checkbox"/> VERT.	<input type="checkbox"/> H	<input checked="" type="checkbox"/> E	LINE:	<input type="checkbox"/> NB

FREQ. MHz	IND. LEVEL	CORRECTION FACTORS		FINAL LEVEL	ANTENNA HEIGHT	EUT AZIMUTH	REMARKS
		ANT.					
30	dBmV	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. 0.
600		11	20.5	31.5			
800		13	23	36			
1000		12	25.5	37.5			

VERT.							
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.



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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)**.