



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: 9513

1250 Peterson Dr., Wheeling, IL 60090

TEST SPECIFICATION:

**FCC "Rules and Regulations", Part 15, Subpart C**  
Sections 15.225, 15.209 & 15.207

**Intentional Radiators**

Operation within the frequency range 13.553 MHz to 13.567 MHz

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: Zebra R402 RFID Desktop Printer

Kind of Equipment: On Demand Thermal Bar Code Printer with RFID capabilities

Test Configuration: Parallel (Centronics) cable to Dell Laptop

Transmitter FCC ID: I28RFID-R402-2

Model Number: R402

Serial Number: NA

Dates of Test: February 11, 13 & 15, 2002

Test Conducted For: Zebra Technologies Corporation  
333 Corporate Woods Parkway  
Vernon Hills, Illinois 60061-3109

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Company: Zebra Technologies Corporation  
Model Tested: R402  
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SIGNATURE PAGE

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General Manager

Company Official:

Zebra Technologies Corporation



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**NVLAP Certificate of Accreditation available upon request.**



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## 1.0 SUMMARY OF TEST REPORT

It was found that the Zebra R402 RFID Desktop Printer, Model Number: R402, S/N: NA meets the radio interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.225, 15.209 and 15.207 for Intentional Radiators operating in the 13.553 MHz to 13.567 MHz Frequency Band. It should be noted that the amount of margin was only .8 dB at 108.48 MHz, radiated. The normal tolerance of the test equipment is  $\pm 3$  dB. Due to this tolerance and the variation in normal production, a margin of at least 6 dB is recommended. With only a .8 dB in margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar test equipment, it could be found to not meet the above requirement. This report contains the following number of pages.

Text: 51 pages

## 2.0 INTRODUCTION

On February 11, 13 & 15, 2002, a series of radio frequency interference measurements were performed on Zebra R402 RFID Desktop Printer. The tests were performed according to the procedures of FCC as stated in the "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-1992 (Revision of ANSI C63.4-1988), by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

## 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.225, 15.209 and 15.207 for Intentional Radiators operating in the 13.553 MHz to 13.567 MHz Frequency Band.

## 4.0 TEST SET-UP

All conducted emission tests were performed in a shield enclosure or lab at D.L.S. electronic Systems, Inc. The conducted tests were performed with the test item placed on a non-conductive table located in the Test Room. The power line supplied was connected to a dual line impedance stabilization network located on the floor, a ground plane. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-1992, Section 4, (Figure2). The only ground supplied to the unit was through the third wire of the standard power cord when supplied. All radiated emission tests were performed at D.L.S. Electronic Systems, Inc. The radiated tests were made with the test item placed on a non-conductive turntable located in the Test Room with the receive antenna placed three meters from the device under test. The equipment under test was set up according to ANSI C63.4-1992, Section 8, (Figures 9c and 9d).



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## 5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data was automatically plotted using the Peak or CISPR Detector Functions. This information was then used to determine the frequencies of maximum emissions. Manual measurements were performed on these frequencies using a peak detector function of the Receiver with the bandwidths specified by the FCC.

The final data was taken using the fixed tuned receiver. Plots were made using the Peak Detector, with manual measurements made on the frequencies of interest, using the Peak, CISPR, and Average Detector Functions of the receiver. When average measurements were made using the fixed tuned receiver, the average was taken of a linear IF signal as specified by FCC and ANSI C63.4-1992.

The fundamental frequency was measured using the Average Detector and the CISPR Detector was used for measuring the Harmonics as stated in Section 15.209. From 10 kHz to 30 MHz a bandwidth of 9 kHz was used and from 30 MHz to 1000 MHz a bandwidth of 120 kHz was used to ensure proper measurement of the narrowband signal.

A list of the equipment used can be found in Table 1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

## 6.0 CONDUCTED EMISSION MEASUREMENTS

The conducted emissions were measured over the frequency range from .45 MHz to 30 MHz in accordance with the power line measurements, as specified in ANSI C63.4-1992. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high and low sides were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators cannot exceed 250 uV (47.96 dBuV) at any frequency between 450 kHz and 30 MHz, as stated in Section 15.207a.

### NOTE:

All test measurements were made at a screen room temperature of **68°F** at **29%** relative humidity.



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**“ CONDUCTED DATA AND CHARTS  
TAKEN DURING TESTING”**

**PART 15.207**



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**FCC Part 15 Class B  
Voltage Mains Test**

EUT: R402 RFID Printer  
Manufacturer: Zebra  
Operating Condition: 68 Deg. F, 29 % R.H.  
Test Site: Screenroom (OF)  
Operator: Craig Brandt  
Test Specification: 120 VAC, 60 Hz  
Comment: Line 1  
Start of Test: 2/15/02 / 2:27:43PM

**SCAN TABLE: "FCC ClassB Voltage"**

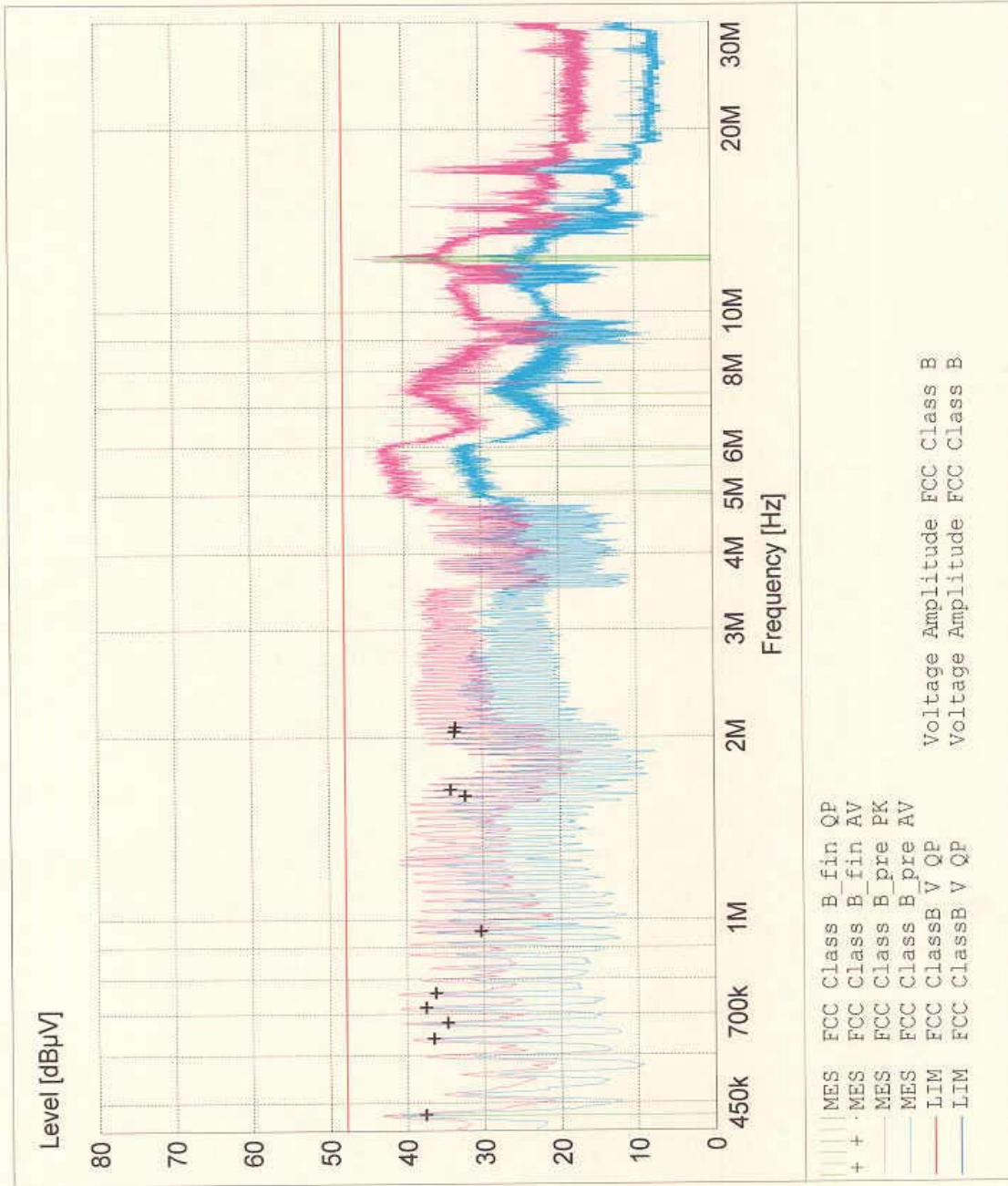
Short Description:	FCC Class B Voltage
Start	Detector
Stop	Meas.
Frequency	Time
30.0 MHz	10.0 ms
4.0 kHz	9 kHz
MaxPeak	LISN 971612
Average	
	Transducer

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**MEASUREMENT RESULT: "FCC Class B\_fin QP"**

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
2/15/02 2:31PM						
0.478000	43.20	9.9	48	4.7	1	---
5.066000	35.90	10.4	48	12.0	1	---
5.590000	39.50	10.4	48	8.4	1	---
5.938000	39.80	10.5	48	8.1	1	---
7.354000	34.90	10.5	48	13.0	1	---
12.170000	42.20	10.7	48	5.7	1	---
12.210000	41.60	10.7	48	6.3	1	---
12.286000	45.00	10.7	48	2.9	1	---
12.366000	41.40	10.7	48	6.5	1	---
12.402000	42.80	10.7	48	5.1	1	---

**MEASUREMENT RESULT: "FCC Class B\_fin AV"**

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
2/15/02 2:31PM						
0.478000	37.60	9.9	48	10.3	1	---
0.638000	36.50	10.0	48	11.4	1	---
0.678000	34.70	10.0	48	13.2	1	---
0.718000	37.50	10.0	48	10.9	1	---
0.758000	36.20	10.0	48	11.7	1	---
0.958000	30.30	10.0	48	17.6	1	---
1.598000	32.30	10.1	48	15.6	1	---
1.638000	34.20	10.1	48	13.7	1	---
2.038000	33.60	10.2	48	14.3	1	---
2.074000	33.50	10.2	48	14.4	1	---

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**FCC Part 15 Class B  
Voltage Mains Test**

EUT: R402 RFID Printer  
Manufacturer: Zebra  
Operating Condition: 68 deg. F, 29 % R.H.  
Test Site: Screenroom (OE)  
Operator: Craig Brandt  
Test Specification: 120 VAC, 60 Hz  
Comment: Line 2  
Start of Test: 2/15/02 / 2:16:17PM

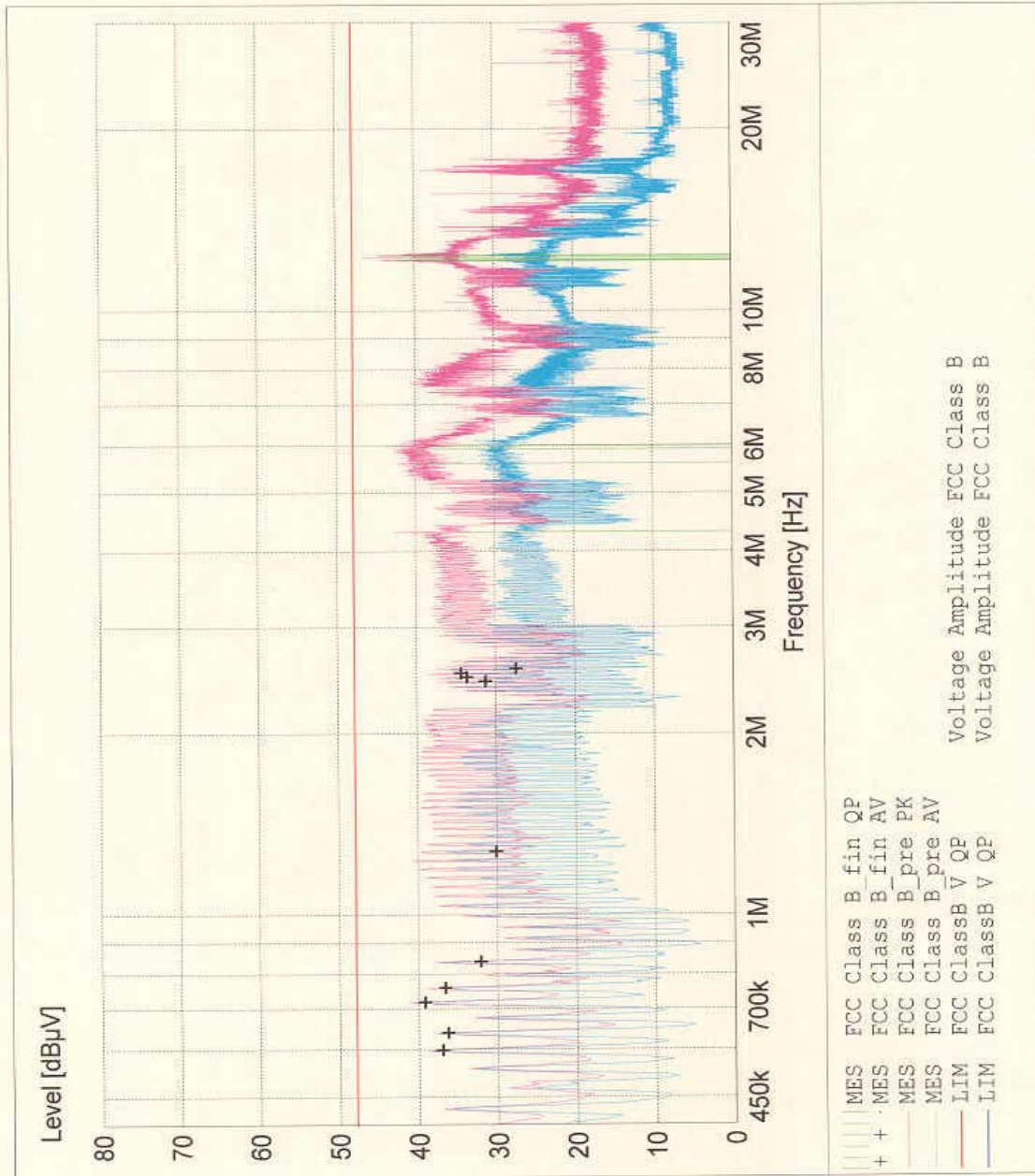
**SCAN TABLE: "FCC ClassB Voltage"**

Short Description:	FCC Class B Voltage	Transducer
Start Stop	Detector Meas.	IF
Frequency 450.0 kHz	Time 10.0 ms	Bandw. 9 kHz
Step Width 4.0 kHz	MaxPeak Average	LISN 971612

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**MEASUREMENT RESULT: "FCC Class B\_fin QF"**

2/15/02 2:23PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
4.318000	34.70	10.4	48	13.2	1	---
5.614000	39.00	10.4	48	8.9	1	---
5.930000	39.00	10.5	48	8.9	1	---
6.014000	38.60	10.5	48	9.3	1	---
12.130000	39.00	10.7	48	8.9	1	---
12.170000	42.20	10.7	48	5.7	1	---
12.210000	41.60	10.7	48	6.3	1	---
12.286000	44.90	10.7	48	3.0	1	---
12.366000	40.40	10.7	48	7.5	1	---
12.402000	42.20	10.7	48	5.7	1	---

**MEASUREMENT RESULT: "FCC Class B\_fin AV"**

2/15/02 2:23PM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.598000	37.00	10.0	48	10.9	1	---
0.638000	36.30	10.0	48	11.6	1	---
0.718000	39.20	10.0	48	8.7	1	---
0.758000	36.60	10.0	48	11.3	1	---
0.838000	32.10	10.0	48	15.8	1	---
1.274000	30.10	10.1	48	17.8	1	---
2.434000	31.30	10.3	48	16.6	1	---
2.474000	33.60	10.3	48	14.3	1	---
2.514000	34.40	10.3	48	13.5	1	---
2.554000	27.40	10.3	48	20.5	1	---

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## 7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Zebra R402 RFID Desktop Printer, Model Number: R402, are shown in tabulated and graph form.

Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 9 kHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the Zebra R402 RFID Desktop Printer were made up to 1000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 13.56 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or 1000 MHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made at an open field test site, located at Genoa City, Wisconsin, FCC file number 31040/SIT, to determine the actual radiation levels.

All signals in the frequency range of 9 kHz to 30 MHz were measured with a low frequency Loop Antenna as a pickup device. From 30 to 200 MHz, a Biconical Antenna or tuned dipoles were used and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. Tests were made in both the horizontal and vertical planes of polarization with the Loop (rotated 360° around its vertical axis), Biconical and Log Periodic. The table was rotated to find the maximum emissions.

When the equipment is out of limit at 3 meters, and the signals from the equipment at 30 meters cannot be recorded due to the background, a representative sample of these frequencies were re-measured at various distances such as 4, 5, 6, 8, 15 meters and the greatest distance that can be measured to demonstrate graphically that the emissions are dropping off and will be under the limit at the specified distance. All signals were then recorded. The allowed levels for Intentional Radiators in the 13.553 MHz to 13.567 MHz band shall not exceed 10,000 uV measured at 30 meters. The field strength of any emissions appearing outside of this band shall not exceed the radiated emissions limits shown in Section 15.209.

### NOTE:

All radiated emissions measurements were made at a test room temperature of 70°F at 24% relative humidity.



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# **RADIATED DATA AND CHARTS**

## **TAKEN FOR FUNDAMENTAL**

## **EMISSION MEASUREMENTS**

### **PART 15.225**



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FCC 15.225

**Field Strength of Fundamental**

EUT: R402 RFID Printer (Type 2 Antenna)  
Manufacturer: Zebra  
Operating Condition: 70degF; 24%R.H.  
Test Site: Site 3  
Operator: Jason Lauer  
Test Specification: 120 VAC, 60 Hz  
Comment:  
Date: 02/11/2002

**TEXT: "Site 3 LowH 10M"**

Short Description: Test Set-up 10kHz to 30MHz H  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/006  
Antennas --- Electro-Metrics ALR-25 SN: 557

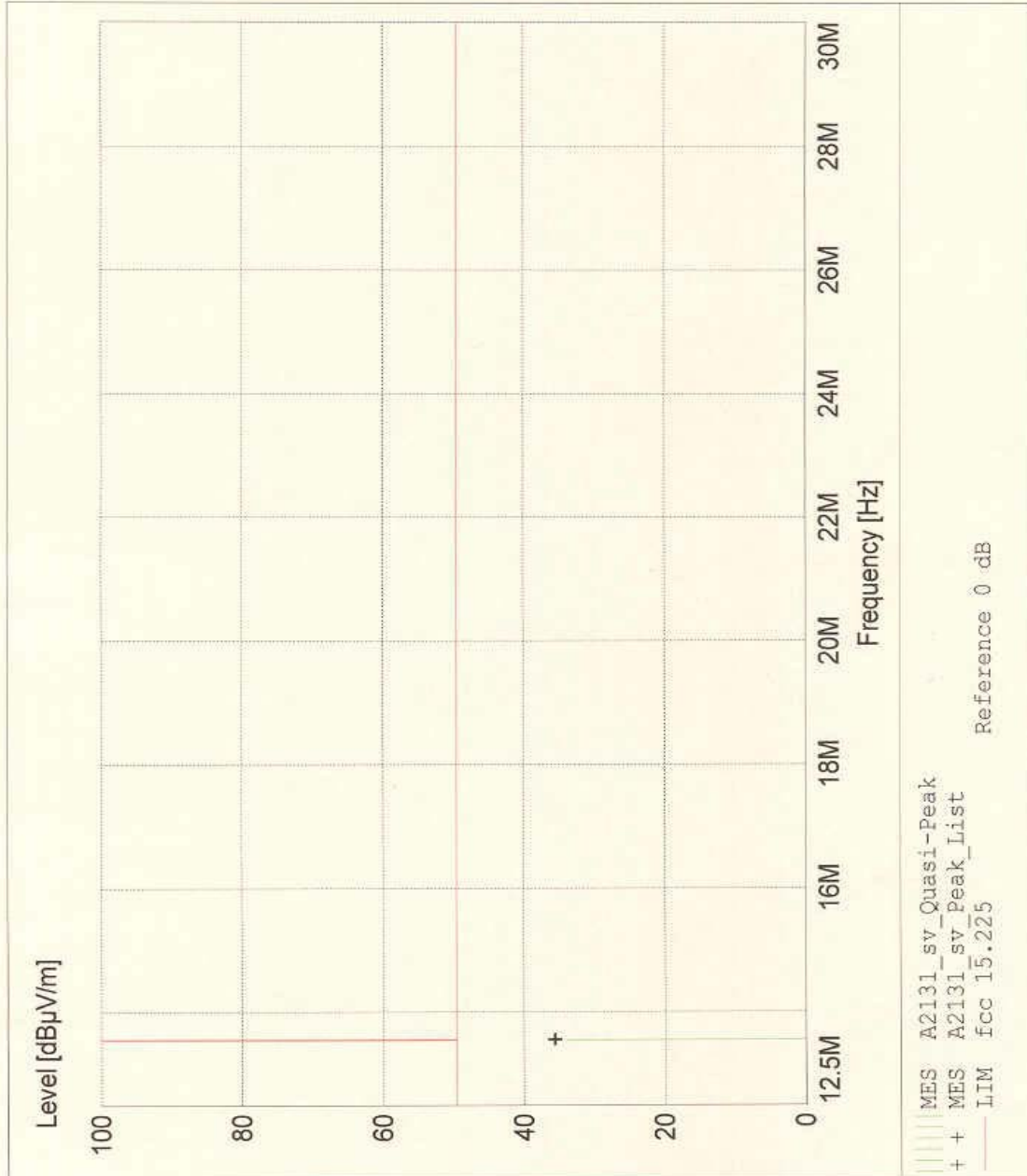
TEST SET-UP: Eut Measured at 10 Meters with H-FIELD Antenna

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**MEASUREMENT RESULT: "A2131\_sv\_Final"**

2/11/02	1:47PM	Frequency	13.560000	MHz	Level	-3.29	dBµV/m	Antenna	Factor	36.15	dBµV/m	System	Loss	1.0	dB	Total	Level	33.9	dBµV/m	Limit	Margin	66.1	dBµV/m	Height	Ant.	1.00	m	Angle	0	deg	Final	Detector	QUASI-PEAK	Comment	Fundamental
---------	--------	-----------	-----------	-----	-------	-------	--------	---------	--------	-------	--------	--------	------	-----	----	-------	-------	------	--------	-------	--------	------	--------	--------	------	------	---	-------	---	-----	-------	----------	------------	---------	-------------

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## **RADIATED DATA AND CHARTS**

## **TAKEN FOR FIELD STRENGTH**

## **SPURIOUS EMISSION MEASUREMENTS**

### **PART 15.209**



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**EN 55022 Class B**

**Electric Field Strength**

EUT: R402 RFID Printer  
Manufacturer: Zebra Technologies  
Operating Condition: 70degF; 24%R.H.  
Test Site: Site 3  
Operator: Jason Lauer  
Test Specification: 230 V; 50 Hz  
Comment:  
Date: 02/11/2002

**TEXT: "Site 3 MidV 10M"**

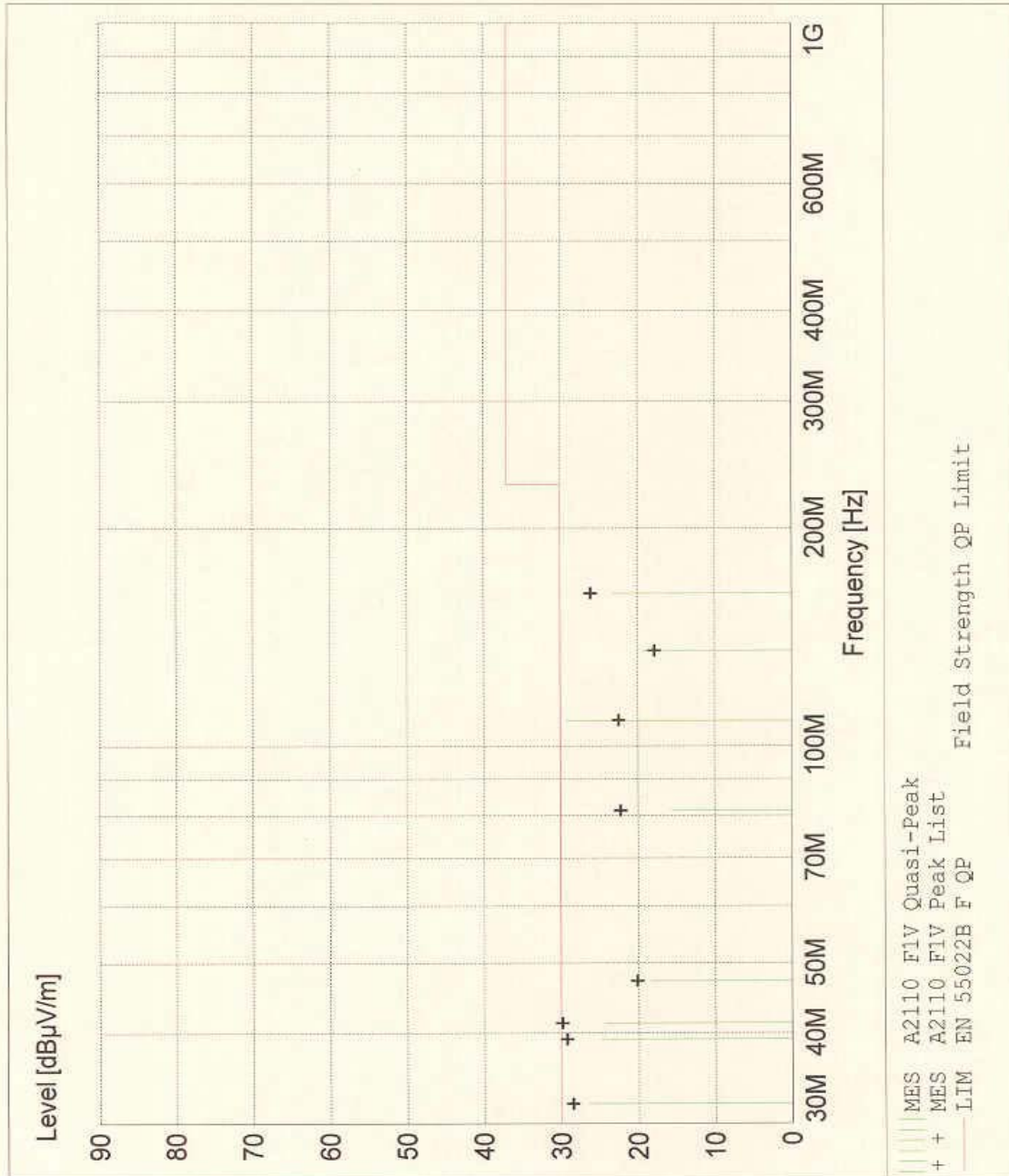
Short Description: Test Set-up Vert30-1000MHz  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837608/006  
Antennas ---  
Biconical -- EMCO 3104C SN: 9701-4785  
Log Periodic -- EMCO 3146 SN: 9702-4895  
Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 10 Meters with VERTICAL Antenna Polarisation

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**MEASUREMENT RESULT: "A2110\_F1V\_Final"**

2/11/02 11:07AM

Frequency MHz	Level dBuV/m	Antenna Factor dBuV/m	System Loss dB	Total Level dBuV/m	Limit dBuV/m	Margin dBuV/m	Height Ant. m	Angle deg	Final Detector	Comment
108.480000	39.14	12.52	-22.4	29.2	30.0	0.8	1.00	0	QUASI-PEAK	None
31.920000	38.86	11.44	-23.8	26.5	30.0	3.5	1.00	270	QUASI-PEAK	None
39.200000	37.05	11.39	-23.6	24.8	30.0	5.2	1.00	180	QUASI-PEAK	None
41.240000	36.44	11.42	-23.6	24.3	30.0	5.7	1.00	0	QUASI-PEAK	None
162.720000	31.44	13.57	-21.8	23.2	30.0	6.8	1.00	200	QUASI-PEAK	None
135.610000	29.29	12.16	-22.1	19.3	30.0	10.7	1.00	0	QUASI-PEAK	None
47.290000	30.30	11.50	-23.4	18.4	30.0	11.6	1.00	0	QUASI-PEAK	None
81.370000	31.44	7.06	-22.8	15.7	30.0	14.3	1.00	0	QUASI-PEAK	None

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**EN 55022 Class B**

**Electric Field Strength**

EUT: R402 RFID Printer  
Manufacturer: Zebra Technologies  
Operating Condition: 70degF; 24&R.H.  
Test Site: Site 3  
Operator: Jason Lauer  
Test Specification: 230 V; 50 Hz  
Comment:  
Date: 02/11/2002

**TEXT: "Site 3 MidH 10M"**

Short Description: Test Set-up Herz30-1000MHz  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

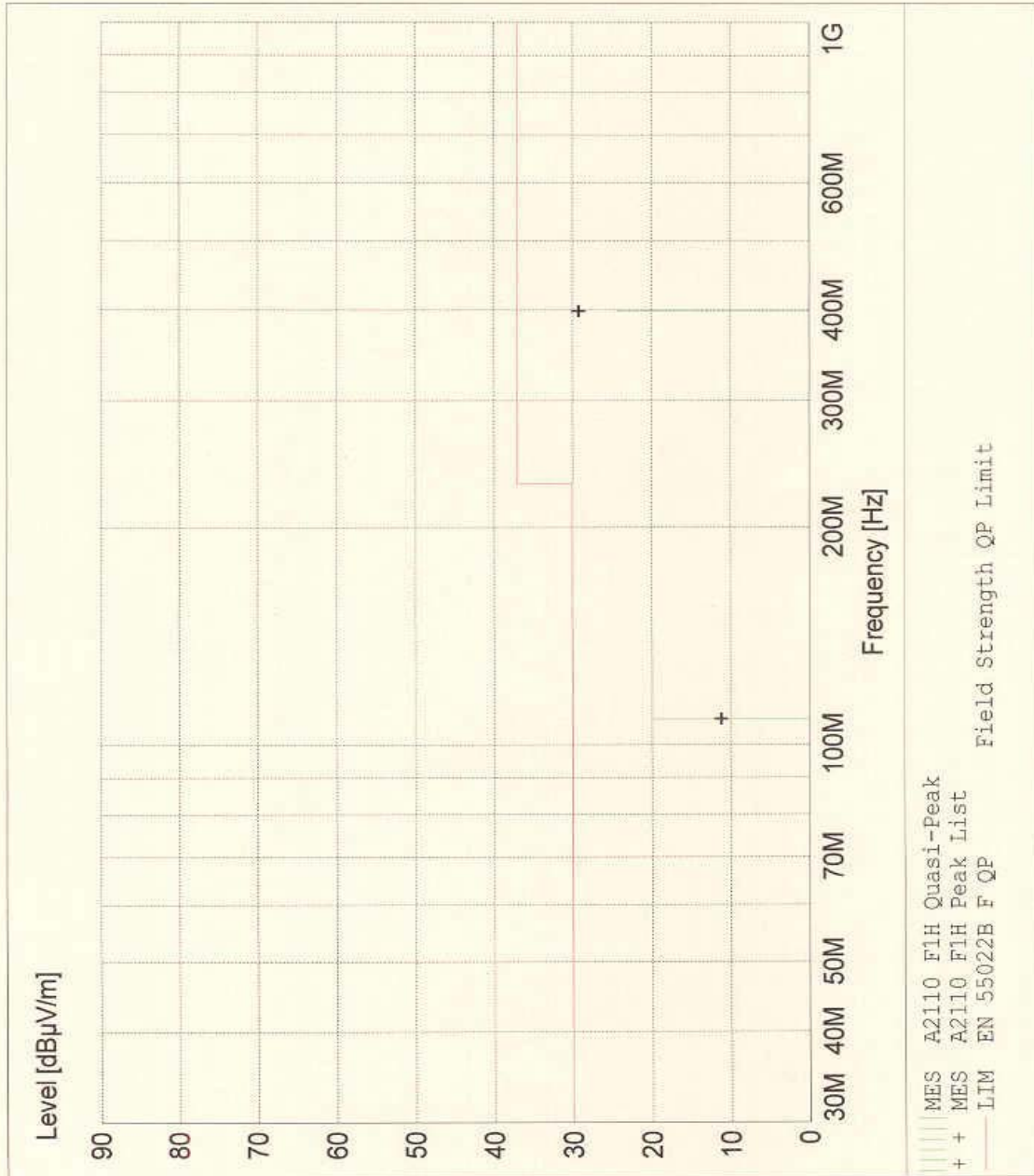
Antennas: ---  
Biconical -- EMCO 3104C SN: 9701-4785  
Log Periodic -- EMCO 3146 SN: 9702-4895  
Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 10 Meters with HORIZONTAL Antenna Polarisation

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**MEASUREMENT RESULT: "A2110\_FIH\_Final"**

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBuV/m	Factor	Loss	Level	dBuV/m	dBuV/m	Ant.	Angle	Detector	
		dBuV/m	dB	dBuV/m			m	deg		
108.470000	29.69	12.52	-22.4	19.8	30.0	10.2	3.00	90	QUASI-PEAK	None
398.820000	28.29	16.02	-20.1	24.2	37.0	12.8	4.00	180	QUASI-PEAK	None

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8.0 FREQUENCY STABILITY - PART 2.1055a (**Temperature**)

The frequency stability was measured from -30° to +50° centigrade at intervals of 10° centigrade throughout the range. Prior to each frequency measurement, the equipment was left alone for a sufficient period of time (approximately 30 minutes or more) to allow the components of the Zebra R402 RFID Desktop Printer oscillator circuitry to stabilize. The following information was taken:

**FREQUENCY STABILITY FOR TEMPERATURE VARIATION IN MHz:**

-20°	13.56037055
-10°	13.560435
0°	13.5604994
+10°	13.5606672
+20°	13.5604028
+30°	13.5603383
+40°	13.5603383
+50°	13.5603061

**Worst Case Variance:**

**226 Hz**

As stated in Part 74, Section 74.861 e-4 the Frequency Tolerance and Margin for this range are as follows:

**Ambient Frequency:** = **13560370.55 MHz**

**Frequency Tolerance:** = **0.0001**

13560370.55 \* 0.0001 = **1356.04 Hz**

**This is well within the specified limits.**



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## **GRAPHS TAKEN FOR FREQUENCY**

**STABILITY WHEN VARYING THE**

**TEMPERATURE**

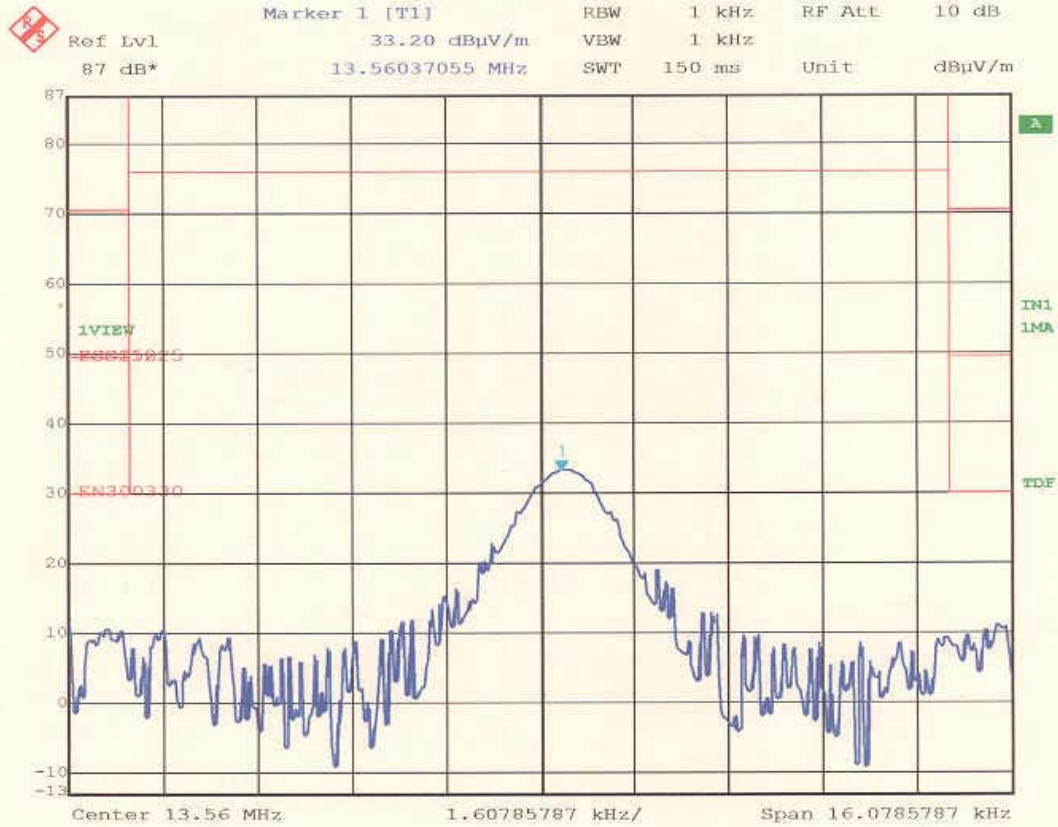
**PART 2.1055A**

**This is well within the specified limits.**



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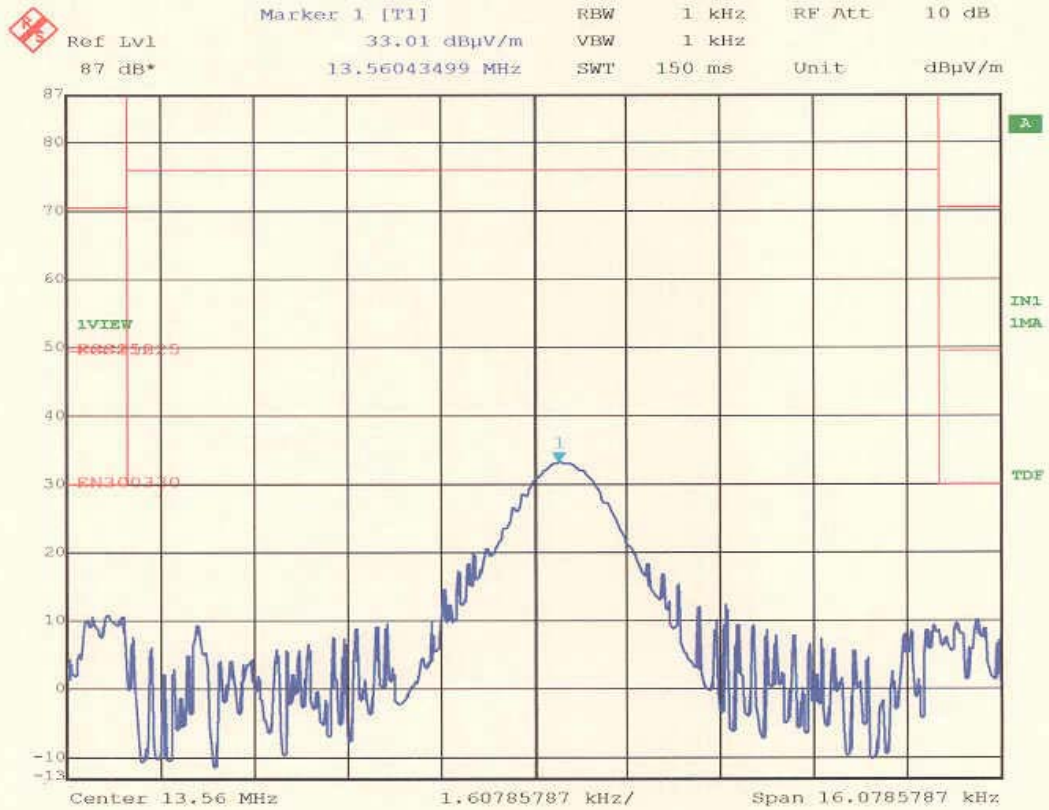
Title: Frequency Stability (Temperature)  
 Comment A: Zebra Model: R402 RFID Printer  
 Temperature = -20 deg. C  
 Date: 13.FEB.2002 13:31:56

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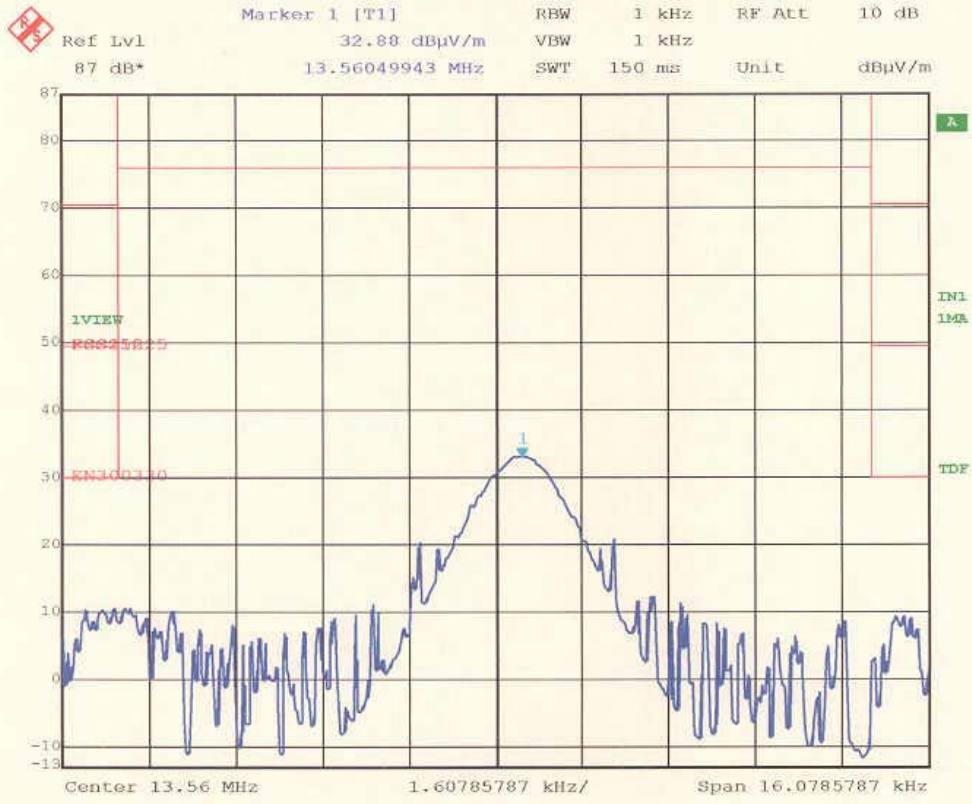
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = -10 deg. C  
Date: 13.FEB.2002 13:02:19

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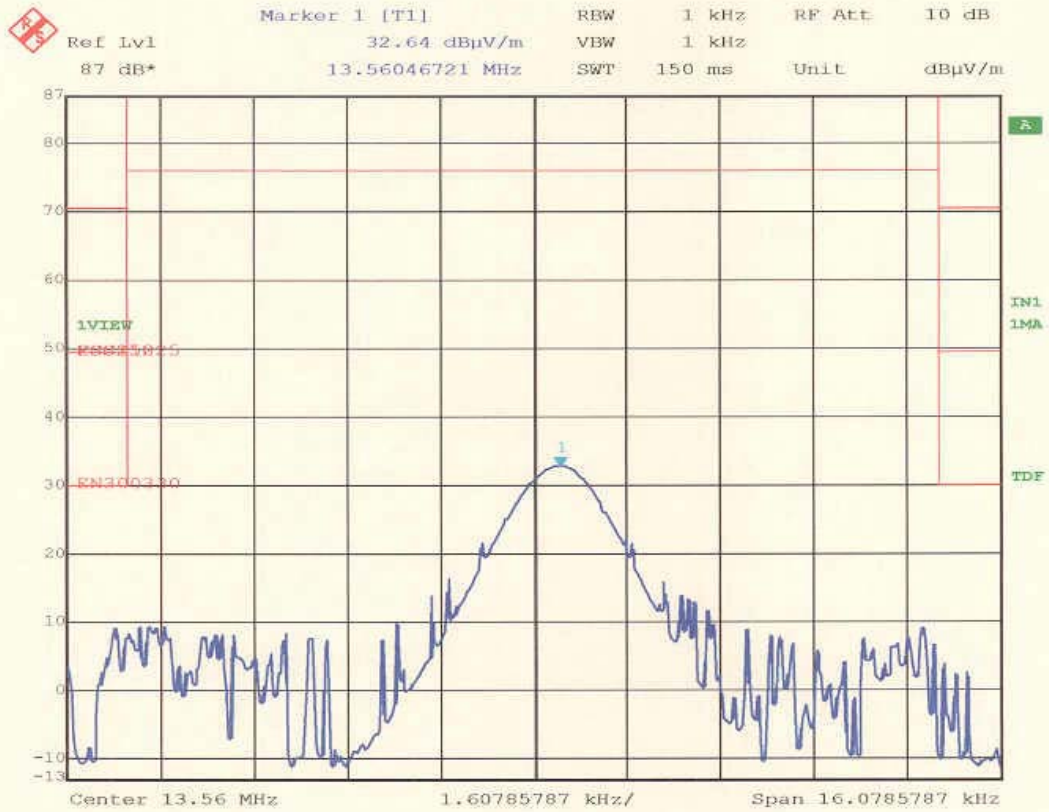
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 0 deg. C  
Date: 13.FEB.2002 12:28:47

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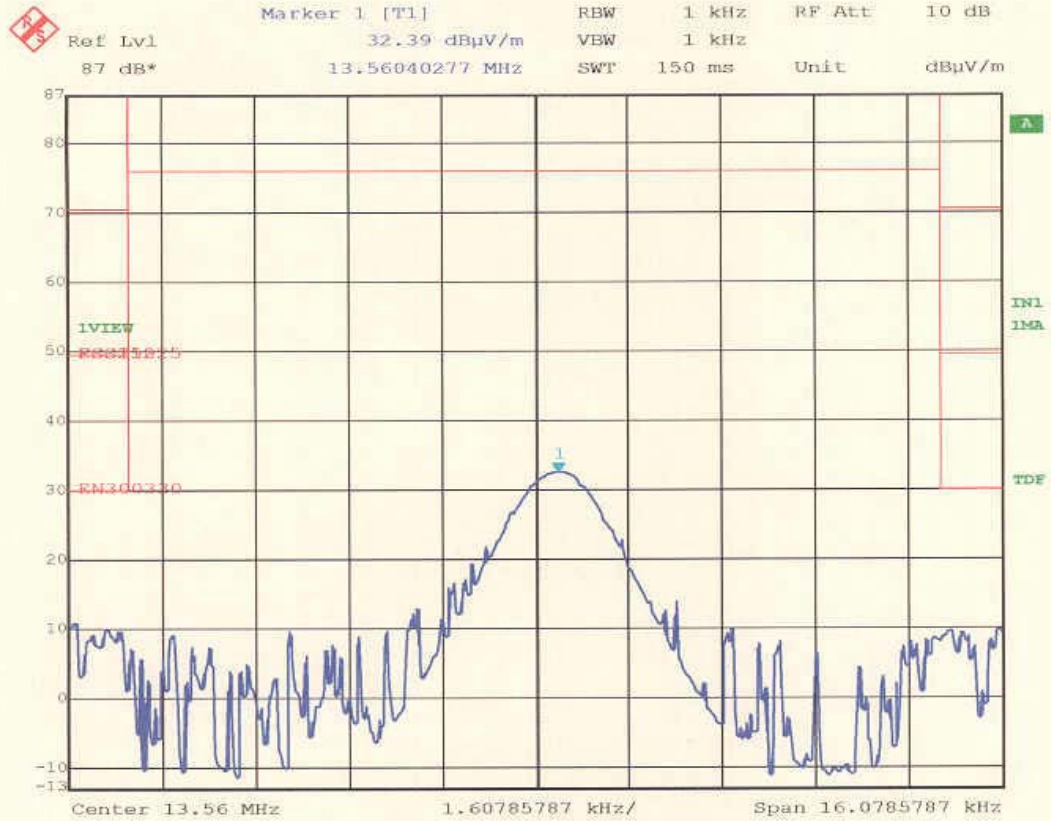
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 10 deg. C  
Date: 13.FEB.2002 11:54:42

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 20 deg. C  
Date: 13.FEB.2002 11:17:00

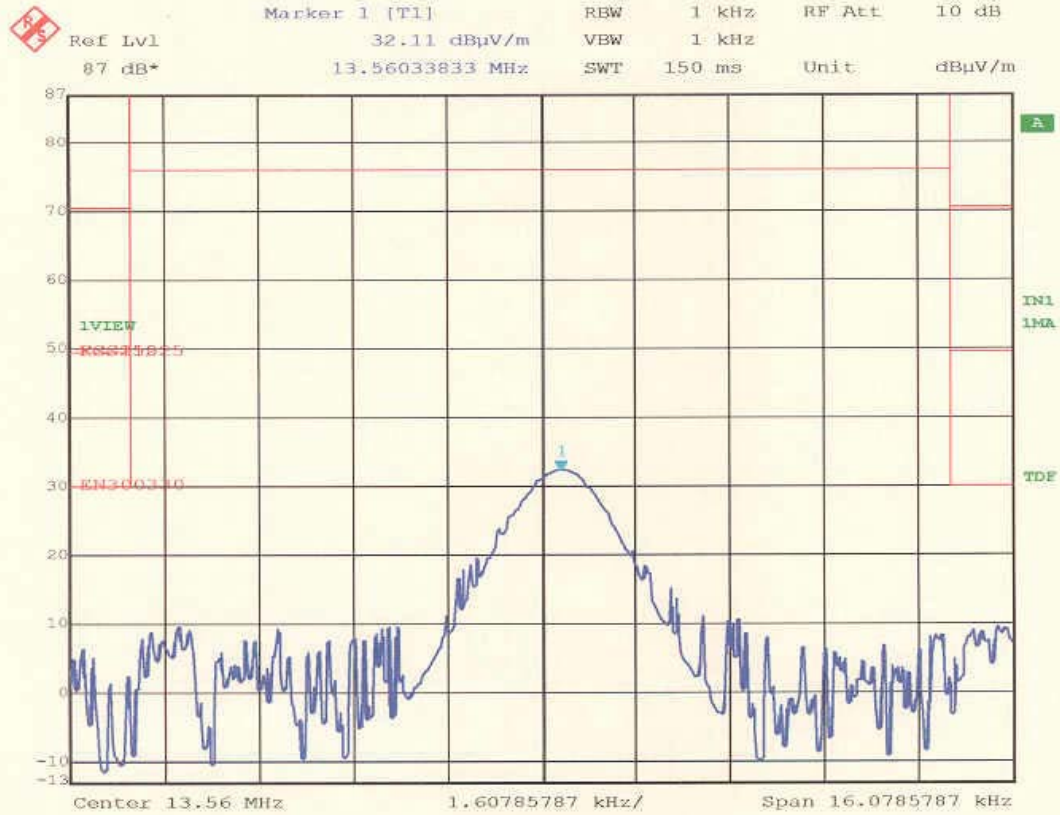
**FINAL**  
Genoa





Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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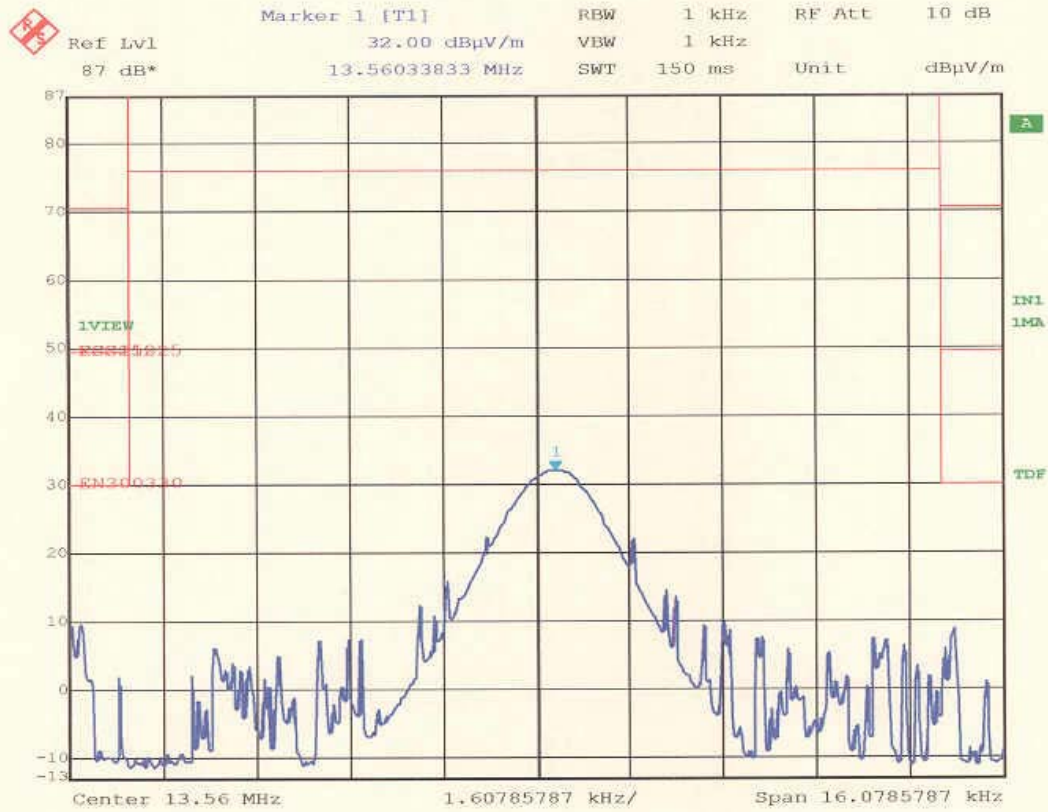
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 30 deg. C  
Date: 13.FEB.2002 10:43:40

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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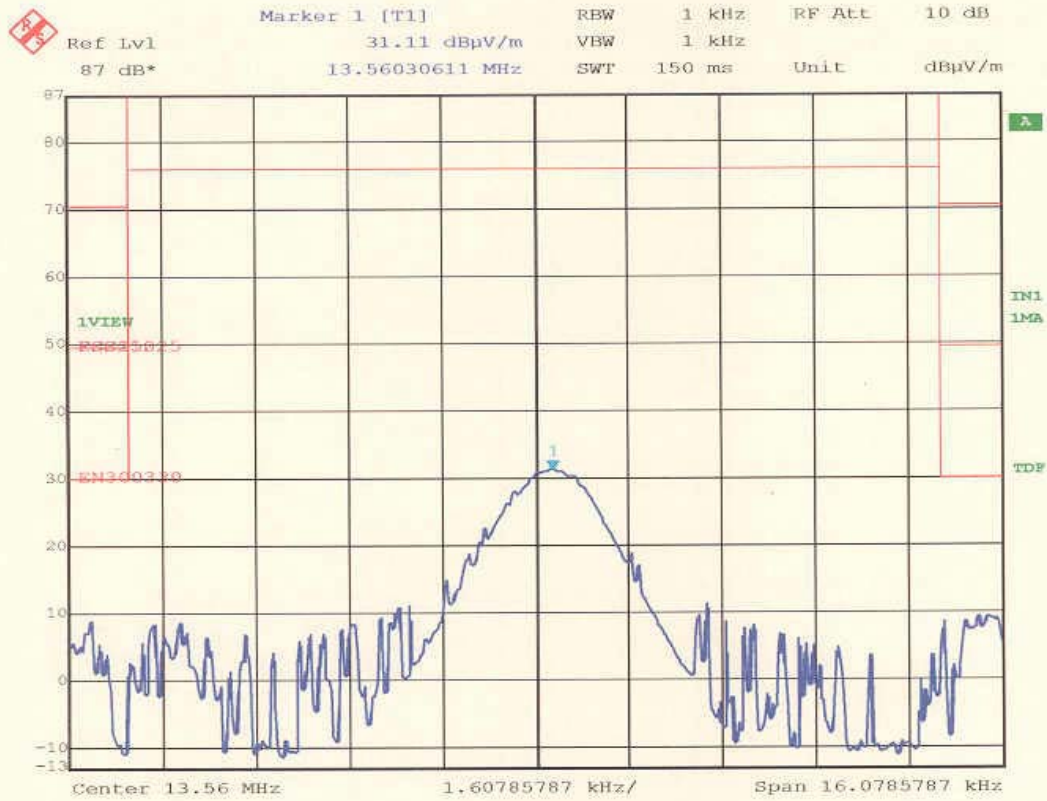
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 40 deg. C  
Date: 13.FEB.2002 10:07:17

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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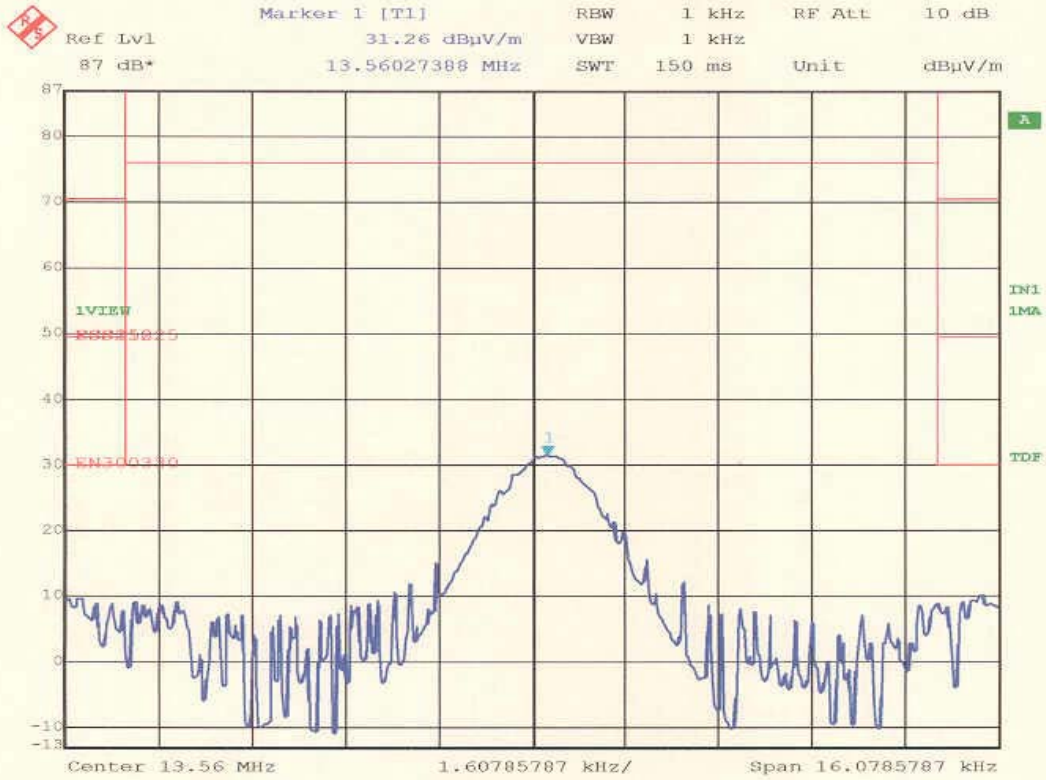
Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 50 deg. C  
Date: 13.FEB.2002 09:33:22

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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Title: Frequency Stability (Temperature)  
Comment A: Zebra Model: R402 RFID Printer  
Temperature = 55 deg. C  
Date: 13.FEB.2002 14:35:01

**FINAL**  
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## 9.0 FREQUENCY STABILITY - PART 2.1055d (Voltage)

The frequency stability of Zebra R402 RFID Desktop Printer was measured by varying the primary supply voltage from 85% to 115% of nominal value for all equipment other than hand carried battery equipment.

### **FREQUENCY STABILITY FOR VOLTAGE VARIATION:**

85%	13.56031
100%	13.56037
115%	13.56034

**This is well within the specified limits.**

### **FREQUENCY STABILITY FOR HAND HELD DEVICES:**

For hand carried, battery powered equipment, the supply voltage was reduced to the battery operating end point specified by the manufacturer. Readings were taken at the reduced end point and with a fresh battery:

#### **Fresh Battery verses Battery end point:**

Frequency #1	<b>0 Hz</b>
Frequency #2	<b>0 Hz</b>
Frequency #3	<b>0 Hz</b>
Frequency #4	<b>0 Hz</b>
Frequency #5	<b>0 Hz</b>
Frequency #6	<b>0 Hz</b>

As stated in Part 74, Section 74.861 e-4 the Frequency Tolerance and Margin for this range are as follows:

**Frequency Tolerance: 0.0001**

**Limit: 1356.04 Hz**

**This is well within the specified limits.**



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## **GRAPHS TAKEN FOR FREQUENCY**

## **STABILITY WHEN VARYING THE**

## **PRIMARY SUPPLY VOLTAGE**

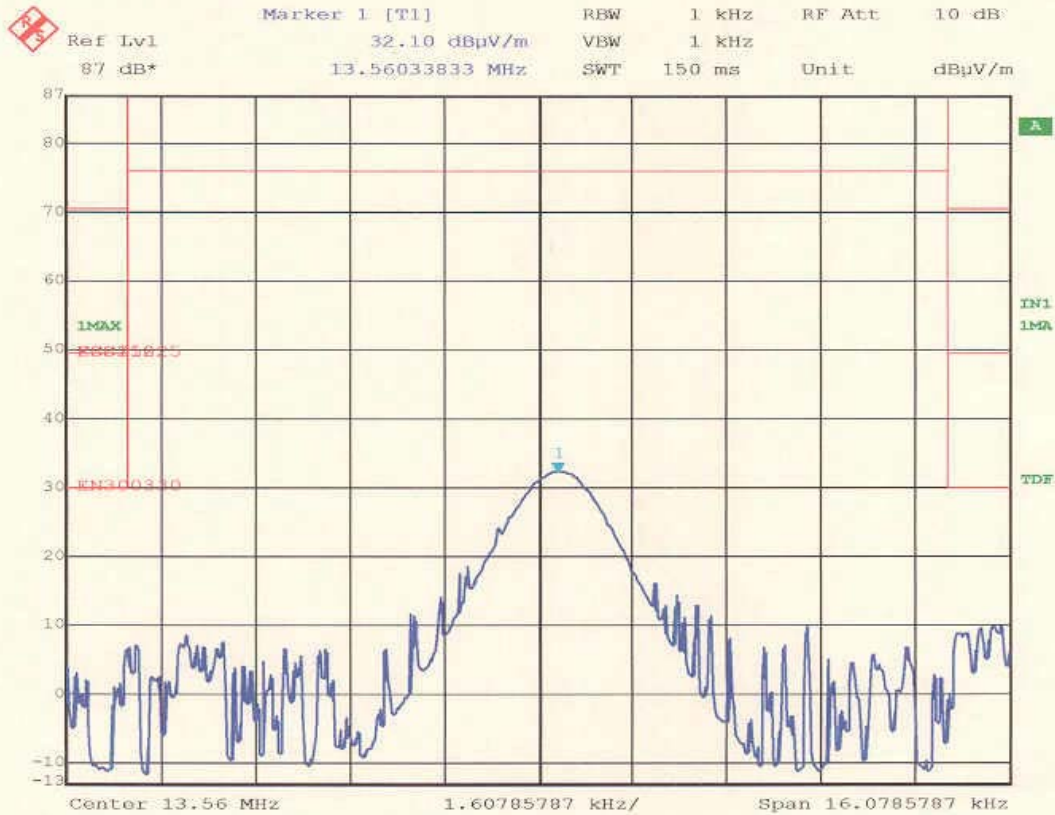
### **PART 2.1055d**

**This is well within the specified limits.**



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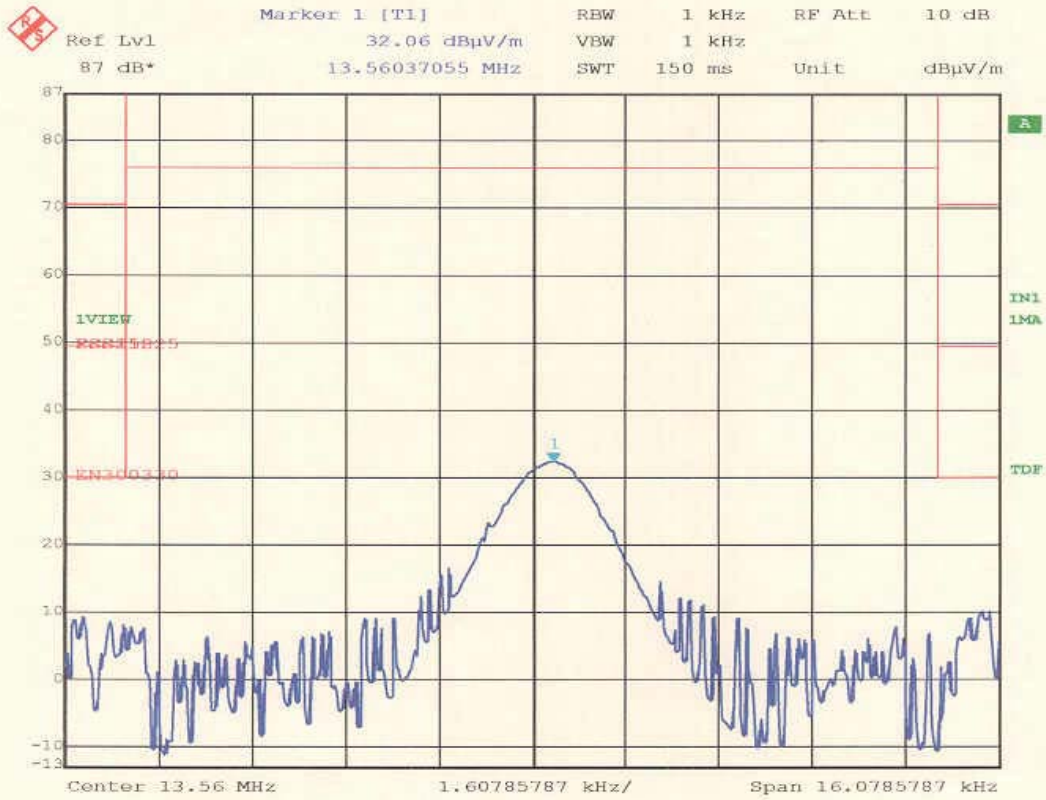
Title: Frequency Stability (Voltage)  
Comment A: Zebra Model: R402 RFID Printer  
Voltage = 138 V AC  
Date: 13.FEB.2002 15:17:05

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
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Title: Frequency Stability (Voltage)  
Comment A: Zebra Model: R402 RFID Printer  
Voltage = 120 V AC  
Date: 13.FEB.2002 15:09:00

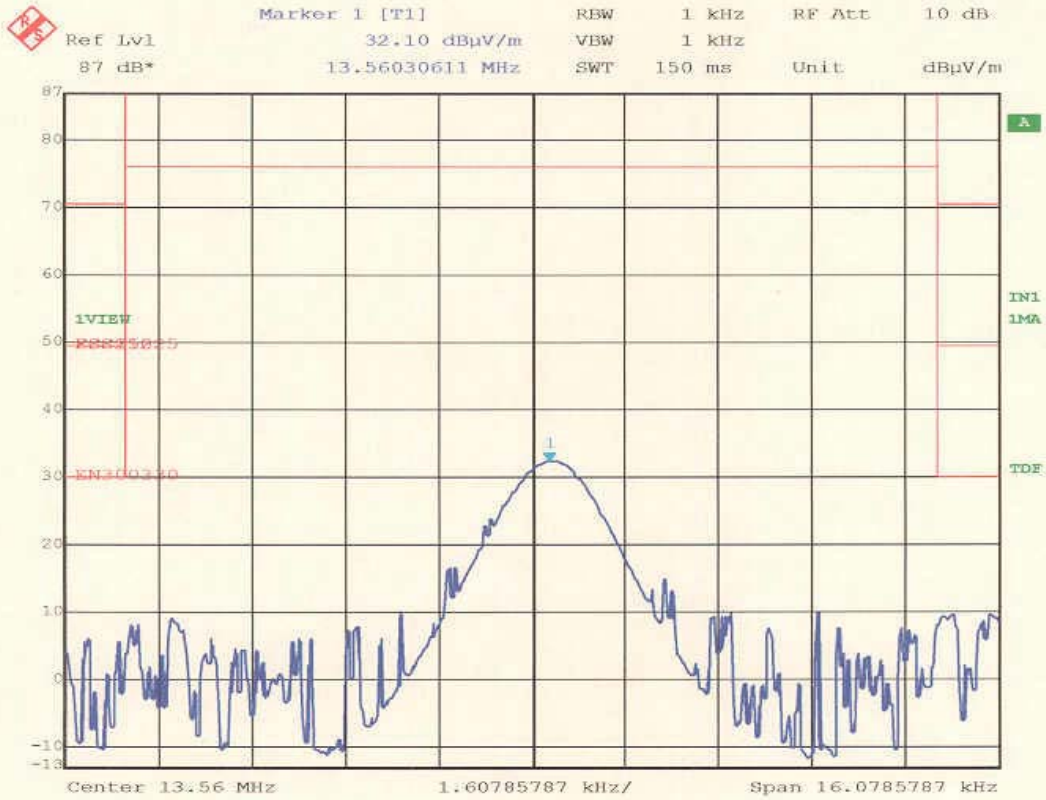
**FINAL**  
Genoa





Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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Title: Frequency Stability (Voltage)  
Comment A: Zebra Model: R402 RFID Printer  
Voltage = 102 V AC  
Date: 13.FEB.2002 15:13:07

**FINAL**  
Genoa



Company: Zebra Technologies Corporation  
Model Tested: R402  
Report Number: «REPORT\_NO\_EMISSIONS»

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## 10.0 PHOTO INFORMATION AND TEST SET-UP

The test set-up can be seen on the accompanying photo page.

- Item 0 Zebra R402 RFID Desktop Printer  
FCC ID#: I28RFID-R402-2 SN: NA
- Item 1 Hitek Power Corporation Power Supply  
Model No: Power Adapter Plus 120 SN: 010097869
- Item 2 Shielded Parallel Port Cable with Medal Shells. 50'
- Item 3
- Item 4
- Item 5
- Item 6
- Item 7
- Item 8
- Item 9
- Item 10

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### 11.0 RADIATED PHOTOS TAKEN DURING TESTING



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## 11.0 RADIATED PHOTOS TAKEN DURING TESTING





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## 12.0 CONDUCTED PHOTOS TAKEN DURING TESTING.



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12.0 CONDUCTED PHOTOS TAKEN DURING TESTING.





Company: Zebra Technologies Corporation  
Model Tested: R402  
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### 13.0 CHANGE INFORMATION

The following changes were implemented during the testing and must be incorporated into the production units to ensure compliance.

Change 1. There were no changes made at D.L.S. Electronic Systems, Inc.

Change 2.

Change 3.

Change 4.

Change 5.



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13.0 CHANGE INFORMATION (CON'T)

Change 6.

Change 7.

Change 8.

Change 9.

Change 10.

The responsibility of implementing the changes listed in this report is accepted or I certify that no changes were made

by \_\_\_\_\_  
Signature Title

for \_\_\_\_\_  
Company Name Date





Company: Zebra Technologies Corporation  
Model Tested: R402  
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#### 14.0 RESULTS OF TESTS

The emission test results can be seen on pages at the end of this report. Data sheets indicating the open field radiated measurements can also be found with this report. Those points on the radiated charts shown with a yellow mark are background frequencies that were verified during the test.

#### 15.0 CONCLUSION

It was found that the Zebra R402 RFID Desktop Printer, Model Number: R402, S/N NA **“meets”** the radio interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.225, 15.209 and 15.207 for Intentional Radiators operating in the **13.553 to 13.567 MHz Frequency Band**. It should be noted that the amount of margin was only .8 dB at 108.48 MHz, radiated. The normal tolerance of the test equipment is  $\pm 3$  dB. Due to this tolerance and the variation in normal production, a margin of at least 6 dB is recommended. With only a .8 dB in margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar test equipment, it could be found to not meet the above requirement. This test report relates only to the items tested.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Spectrum Analyzer	Hewlett/Packard	8566B	2240A 002041	100 Hz – 22 GHz	12/02
Quasi-Peak Adapter	Hewlett/Packard	85650A	2043A 00121	10 kHz – 1 GHz	12/02
Spectrum Analyzer	Hewlett/Packard	8566B	2421A 00452	100 Hz – 22 GHz	2/02
Quasi-Peak Adapter	Hewlett/Packard	85650A	2043A 00450	10 kHz – 1 GHz	2/02
Spectrum Analyzer	Hewlett/Packard	8591A	3009A 00700	9 kHz – 1.8 GHz	3/02
Receiver	Electrometrics	EMC-30	44168	10 kHz – 1 GHz	10/02
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	01/03
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	02/03
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	01/03
Antenna	EMCO	3104C	0005- 4891	20 MHz – 200 MHz	02/03
Antenna	Electrometrics	LPA-25	1114	200 MHz – 1 GHz	04/02
Antenna	EMCO	3104C	0005- 4892	20 MHz – 200 MHz	04/02

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	04/02
Antenna	EMCO	3104C	9701-4785	20 MHz – 200 MHz	02/03
Antenna	EMCO	3146	9702-4895	200 MHz – 1 GHz	04/02
Antenna	EMCO	3115	2479	1 GHz – 18 GHz	03/02
Antenna	EMCO	3115	9903-5731	1 GHz – 18 GHz	03/02
Antenna	Rohde & Schwarz	HUF-Z1	829381-001	20 MHz – 1 GHz	02/03
Antenna	Rohde & Schwarz	HUF-Z1	829381-005	20 MHz – 1 GHz	08/02
LISN	Solar	8012-50-R-24-BNC	8305116	10 MHz – 30 MHz	08/02
LISN	Solar	8012-50-R-24-BNC	814548	10 MHz – 30 MHz	08/02
LISN	Solar	9252-50-R-24-BNC	961019	10 MHz – 30 MHz	12/02
LISN	Solar	9252-50-R-24-BNC	971612	10 MHz – 30 MHz	11/02
LISN	Solar	9252-50-R-24-BNC	92710620 Hz – 40 GHz	10 MHz – 30 MHz	06/02

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.