



1250 Peterson Dr., Wheeling, IL 60090

Company: Telezygology, Inc.  
Model Tested: 8101CF  
Report Number: 15158

FCC Rules and Regulations / Intentional Radiators

General Requirements

Part 15, Subpart B, Section 15.207 & 15.209

**THE FOLLOWING MEETS THE ABOVE TEST SPECIFICATION**

Formal Name: TZ RFID Plus Wiegand Translator Module

Kind of Equipment: Security and Access control.

Frequency Range: 125 kHz

Test Configuration: It can operate both as a stand-alone device or as a network device. (Tested at 120 vac, 60 Hz)

Model Number(s): 8101CF

Model(s) Tested: 8101CF

Serial Number(s): N/A

Date of Tests: February 26 & 27, 2009

Test Conducted For:  
Telezygology, Inc.  
520 W. Erie Street  
Chicago, Illinois 60654

**NOTICE:** "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

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### SIGNATURE PAGE

Report By:

Aronom C. Rowe  
Test Engineer  
EMC-001375-NE

Reviewed By:

William Stumpf  
OATS Manager

Approved By:

Brian Mattson  
General Manager



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United States Department of Commerce  
National Institute of Standards and Technology



## Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP CODE: 100276-0

D.L.S. Electronic Systems, Inc.  
Wheeling, IL

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,  
listed on the Scope of Accreditation, for*

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality  
management system (refer to joint ISO/IAC-IAF Communique dated 18 June 2005).*



2008-10-01 through 2009-09-30  
Effective dates

Dale S. Bruce  
For the National Institute of Standards and Technology



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## 1.0 SUMMARY OF TEST REPORT

It was found that the TZ RFID Plus Wiegand Translator Module, Model Number(s) 8101CF, **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.207 & 15.209, general requirements for Intentional Radiators.

## 2.0 INTRODUCTION

On February 26 & 27, 2009, a series of radio frequency interference measurements was performed on TZ RFID Plus Wiegand Translator Module, Model Number(s) 8101CF, Serial Number: N/A. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at <http://www.dlsemc.com/certificate>. Our facilities are registered with the FCC, Industry Canada, and VCCI.

### **Main Test Facility:**

D.L.S. Electronic Systems, Inc.  
1250 Peterson Drive  
Wheeling, Illinois 60090

### **O.A.T.S. Test Facility:**

D.L.S. Electronic Systems, Inc.  
166 S. Carter Street  
Genoa City, Wisconsin 53128  
FCC Registration Number: 334127

## 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.33, 15.207, 15.209 for Intentional Radiators (general requirements) that operate in the frequency range 9 kHz to 960 MHz and above.



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#### 4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the ANSI C63.4-2003, Annex H. The conducted tests were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-2003, Annex H.

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6 and 8.



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## 5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions.

Below 1000 MHz, final data was taken using the ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



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## 6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in ANSI C63.4-2003.



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## 7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

### 7.1 Description:

The TZ RFID Plus Wiegand Translator connects to a TZ network and provides access control by Radio Frequency Identification and by interpreting a Wiegand data stream from third party security modules, including RFID readers, magnetic card readers, and fingerprint scanners. It can operate both as a stand-alone device that controls a small group of fasteners, or as a network device that transmits information, like access attempts, to the rest of the network.

### 7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 88.9mm x Width: 63.5mm x Height: 25.4mm

### 7.3 LINE FILTER USED:

N/A

### 7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A

Clock Frequencies:

125 kHz

### 7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. PC Board

PN: 112009-01\_A



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**8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:**  
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

RFID with 125 kHz transceiver.

**9.0 PHOTO INFORMATION AND TEST SET-UP**

Item 0 TZ RFID Plus Wiegand Translator Module  
Model Number: 8101CF Serial Number: N/A

Item 1 Phihong Switching Power Supply  
Model Number: PSM11R-120; Serial Number: Q04264

Item 2 TZ Cloudlink  
Model Number: 7105CL; Serial Number 004

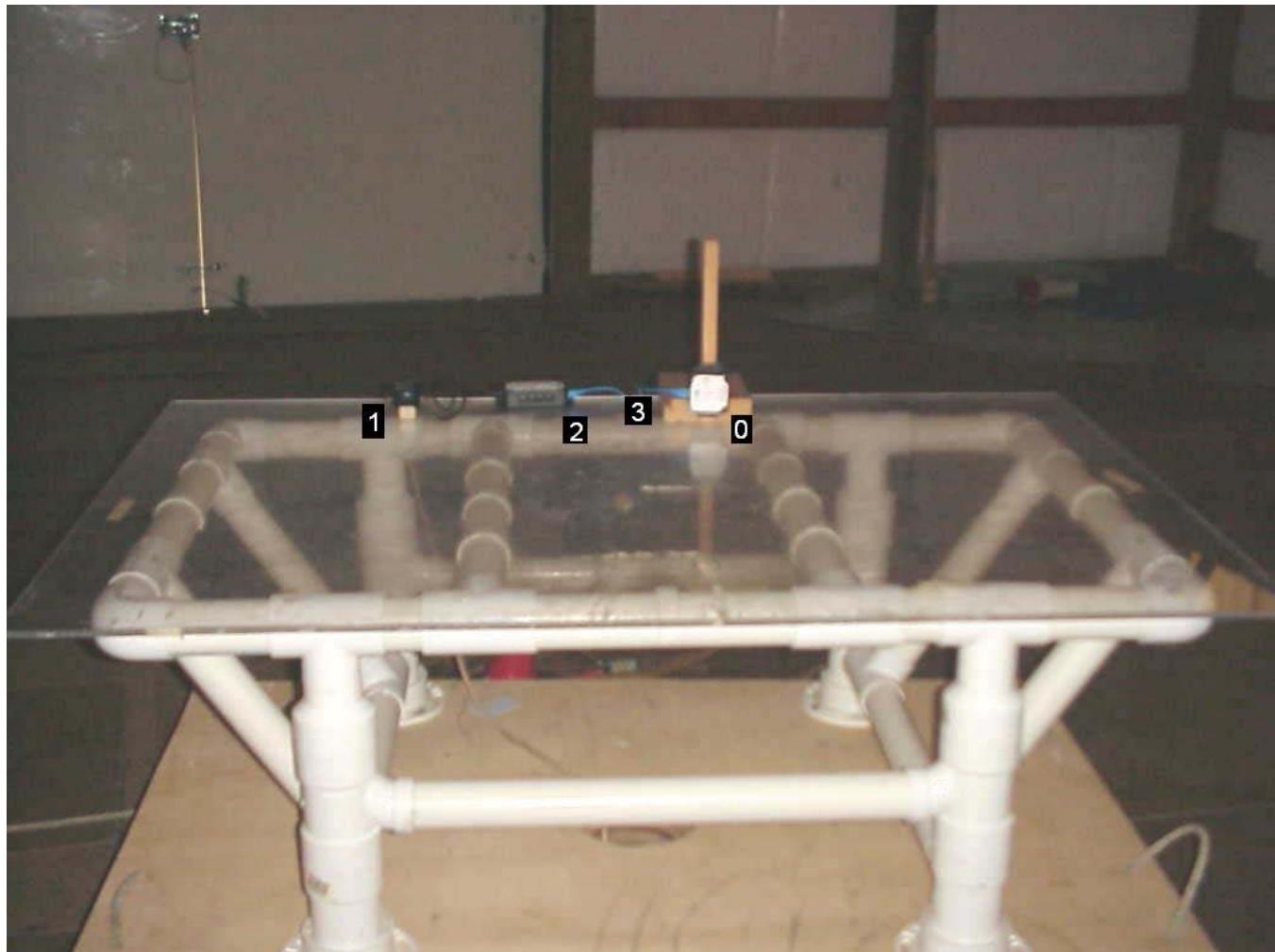
Item 3 Intra-system CAT 5 Ethernet cable. 1m



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## 10.0 RADIATED PHOTOS TAKEN DURING TESTING



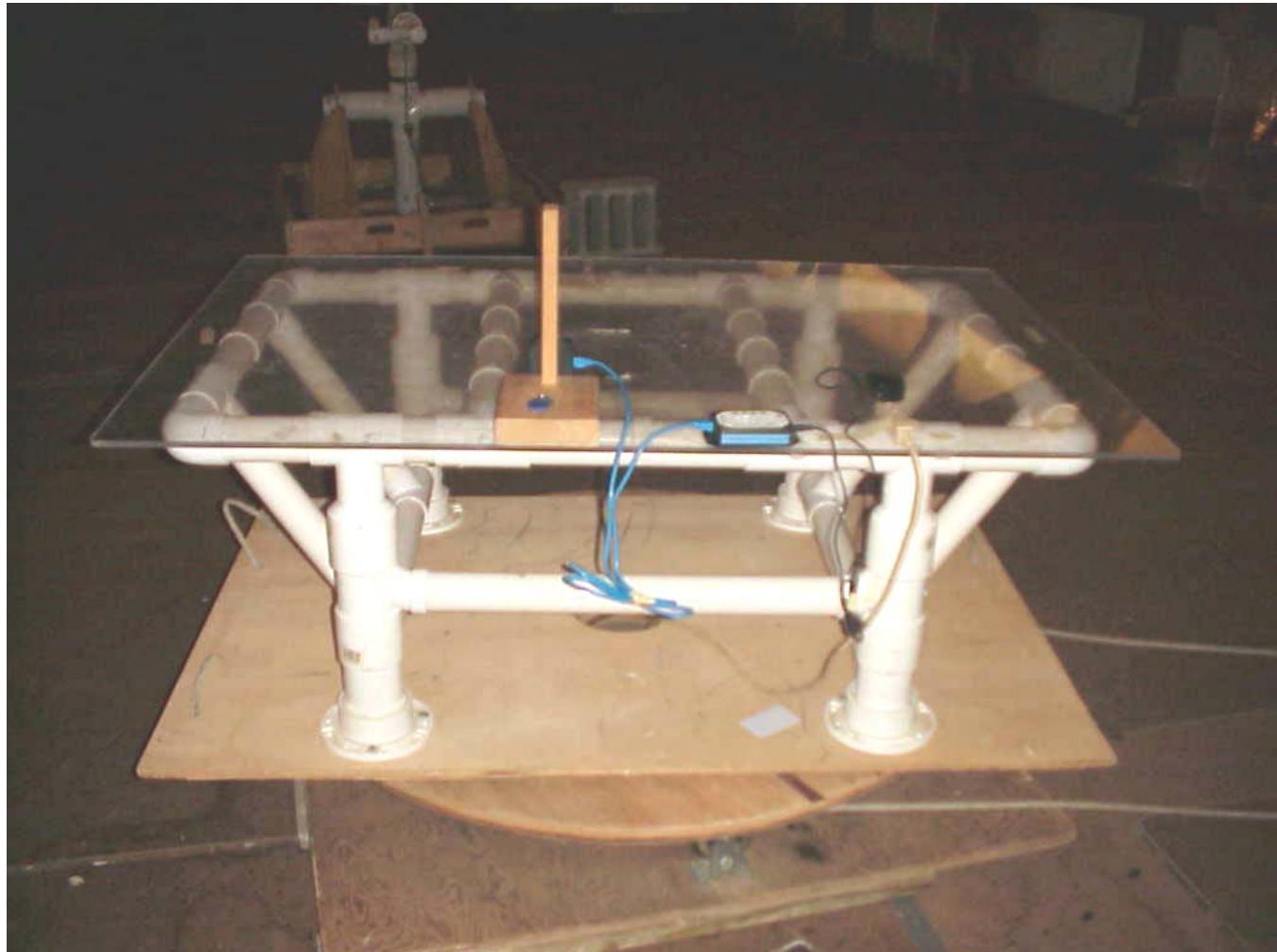
TZ RFID RADIATED FRONT



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#### 10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



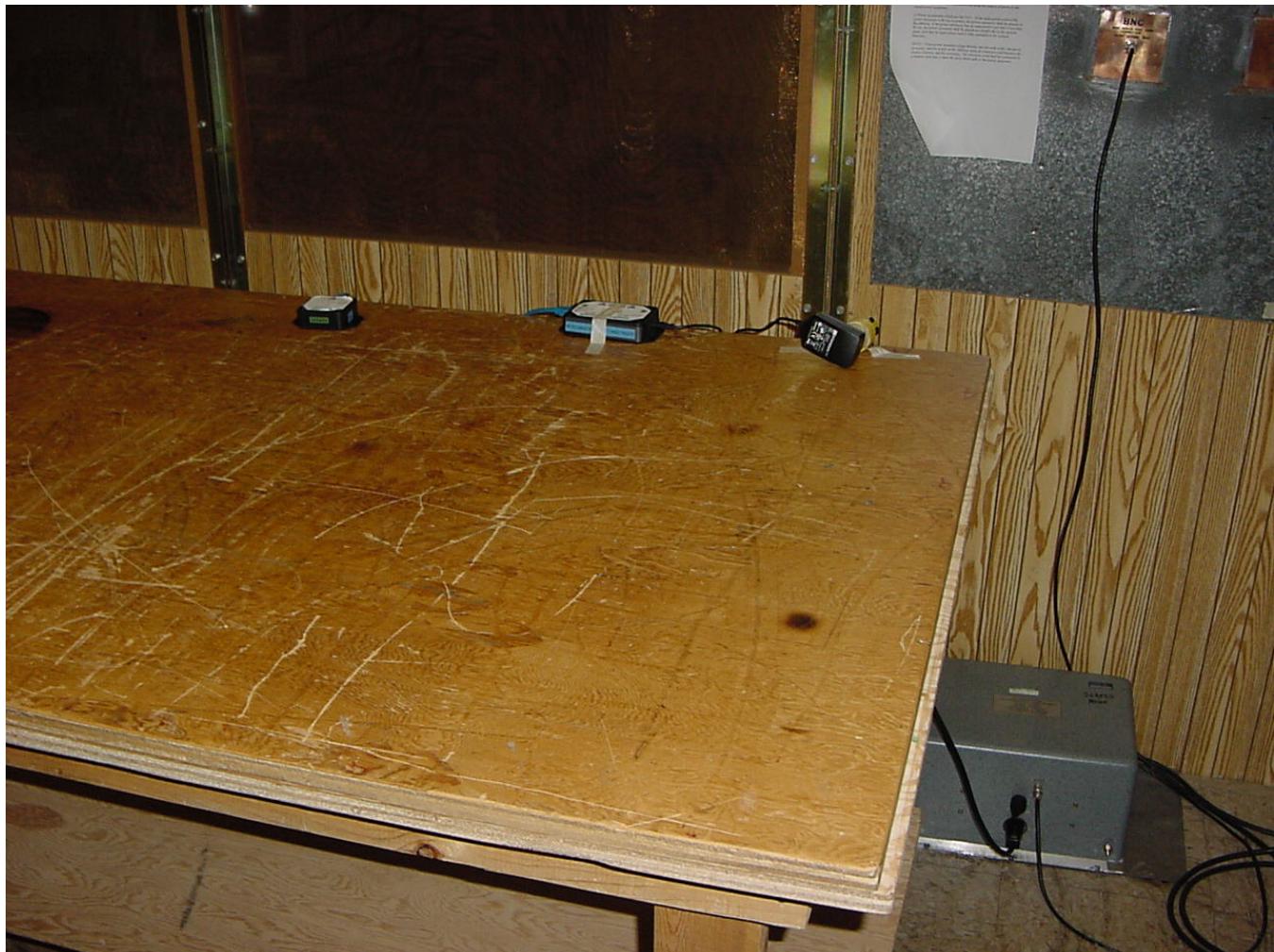
TZ RFID RADIATED BACK



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## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING



TZ RFID AC LINE CONDUCTED FRONT



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#### 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



**TZ RFID AC LINE CONDUCTED BACK**



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## 11.0 RESULTS OF TESTS

The radio interference emission charts can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report.

## 12.0 CONCLUSION

It was found that the TZ RFID Plus Wiegand Translator Module, Model Number(s) 8101CF **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.207 & 15.209, general requirements for Intentional Radiators.



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	12/09
LISN	Solar	9252-50-R-24-BNC	961019	10 kHz – 30 MHz	7/09
Filter- High-Pass	SOLAR	7930-10	921541	12 kHz	1/10
Limiter	Electro-Metrics	EM-7600	706	10 kHz – 30 MHz	1/10
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	3/09
Antenna	EMCO	6502	2038	9 kHz – 30 MHz	8/09
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	3/09
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	1/10
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	4/10
Antenna	EMCO	3146	1205	200 MHz – 1 GHz	4/10

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



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# APPENDIX A

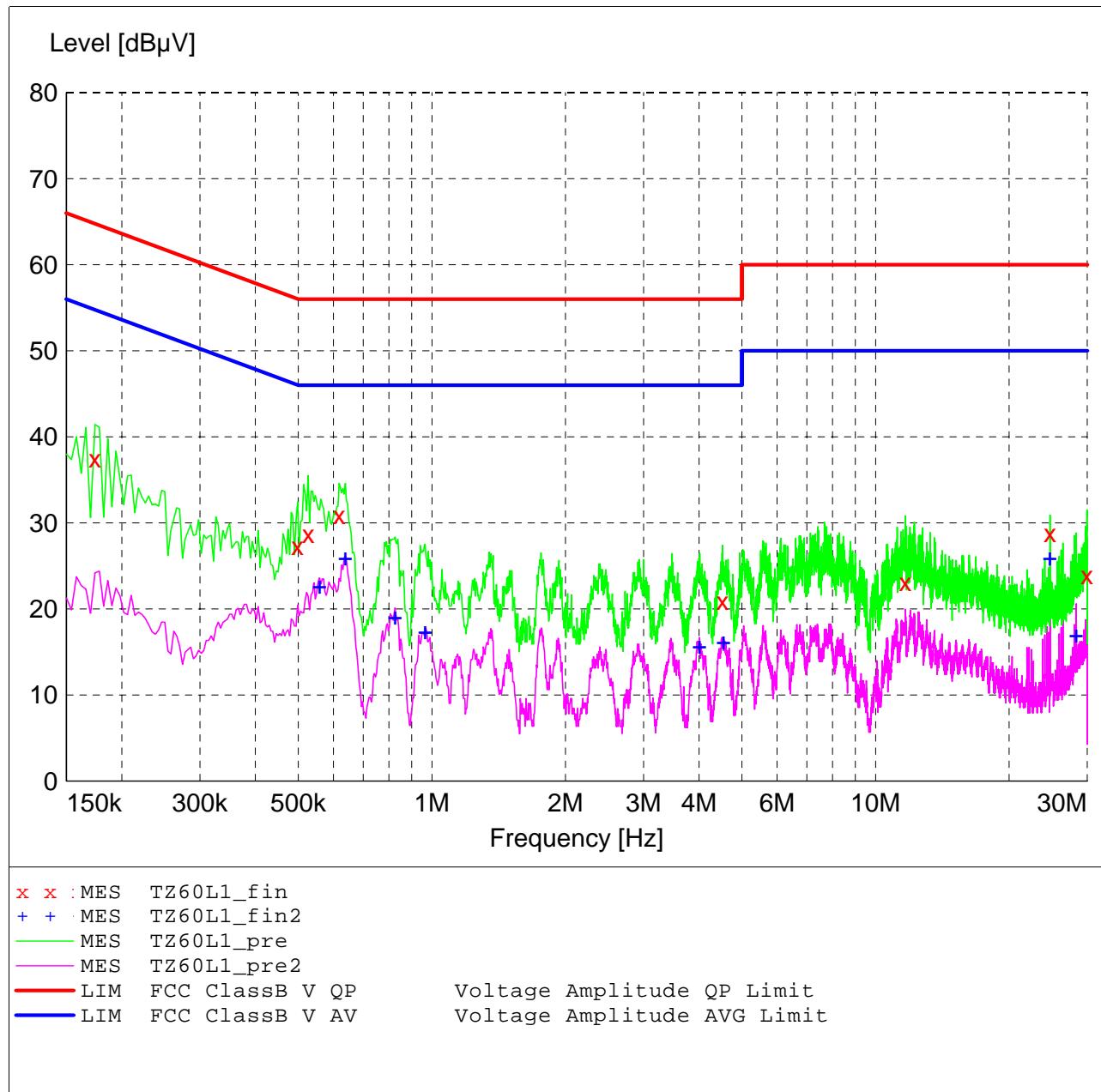
## AC POWER LINE CONDUCTED DATA AND CHARTS TAKEN DURING TESTING

**Voltage Mains Test**

EUT: TZ RFID Plus Wiegand Translator 8101CF  
 Manufacturer: Telezygology  
 Operating Condition: 70 deg. F, 25% R.H.  
 Test Site: DLS O.F. Site 1 (Screenroom)  
 Operator: Adam A  
 Test Specification: 120 V 60 Hz  
 Comment: Line 1  
 Date: 02-27-2009

**SCAN TABLE: "Line Cond Scrn RmFin"**

Short Description:		Line Conducted Emissions				
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	2.0 s	9 kHz	LISN DLS#128 CISPR AV



**MEASUREMENT RESULT: "TZ60L1\_fin"**

2/27/2009 9:04AM

Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.174000	37.50	13.4	65	27.3	QP	---	---
0.498000	27.30	11.5	56	28.7	QP	---	---
0.526000	28.70	11.5	56	27.3	QP	---	---
0.618000	30.90	11.4	56	25.1	QP	---	---
4.518000	20.90	10.9	56	35.1	QP	---	---
11.670000	23.10	11.4	60	36.9	QP	---	---
24.738000	28.80	12.0	60	31.2	QP	---	---
29.966000	23.90	12.3	60	36.1	QP	---	---

**MEASUREMENT RESULT: "TZ60L1\_fin2"**

2/27/2009 9:04AM

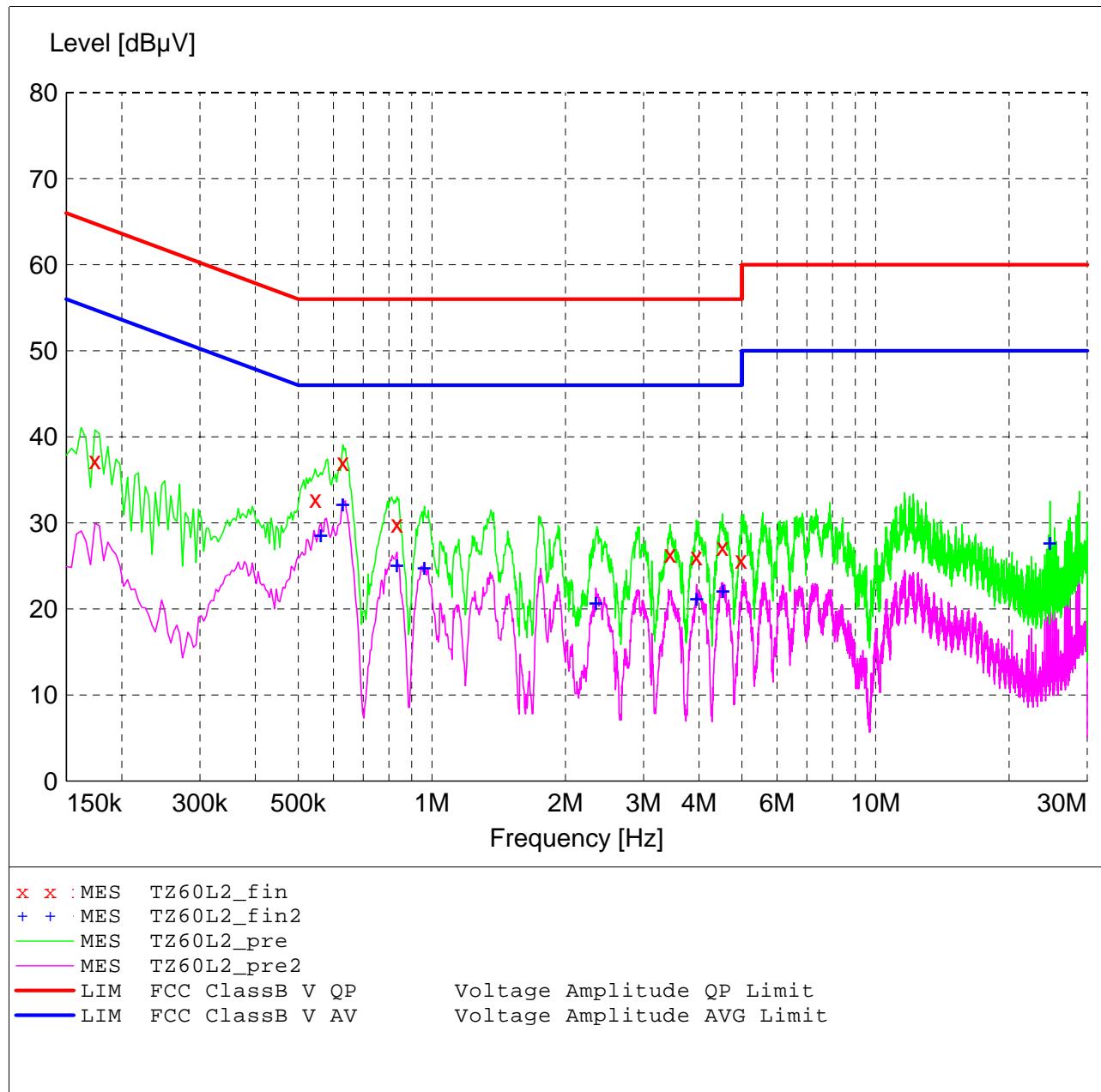
Frequency MHz	Level dB $\mu$ V	Transd dB	Limit dB $\mu$ V	Margin dB	Detector	Line	PE
0.558000	22.70	11.5	46	23.3	CAV	---	---
0.638000	26.00	11.4	46	20.0	CAV	---	---
0.826000	19.10	11.2	46	26.9	CAV	---	---
0.966000	17.40	11.1	46	28.6	CAV	---	---
4.010000	15.70	10.9	46	30.3	CAV	---	---
4.542000	16.20	10.9	46	29.8	CAV	---	---
24.738000	26.00	12.0	50	24.0	CAV	---	---
28.334000	17.00	12.2	50	33.0	CAV	---	---

**Voltage Mains Test**

EUT: TZ RFID Plus Wiegand Translator 8101CF  
 Manufacturer: Telezygology  
 Operating Condition: 70 deg. F, 25% R.H.  
 Test Site: DLS O.F. Site 1 (Screenroom)  
 Operator: Adam A  
 Test Specification: 120 V 60 Hz  
 Comment: Line 2  
 Date: 02-27-2009

**SCAN TABLE: "Line Cond Scrn RmFin"**

Short Description: Line Conducted Emissions  
 Start Frequency: 150.0 kHz Stop Frequency: 30.0 MHz Step Width: 4.0 kHz  
 Detector: QuasiPeak Meas. Time: 2.0 s IF: 9 kHz Transducer: LISN DLS#128  
 CISPR AV





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## APPENDIX B

### RADIATED DATA

AND

CHARTS TAKEN DURING TESTING

9 kHz – 30 MHz

**Radiated Field Strength**

EUT: TZ RFID Plus Wiegand Translator 8101CF  
Manufacturer: Telezygology  
Operating Condition: 68 deg F; 27% R.H.  
Test Site: DLS O.F. Site 2  
Operator: Adam A  
Test Specification: Operating Continuously  
Comment: 125 kHz Transmit Frequency  
DATE: 02-26-2009

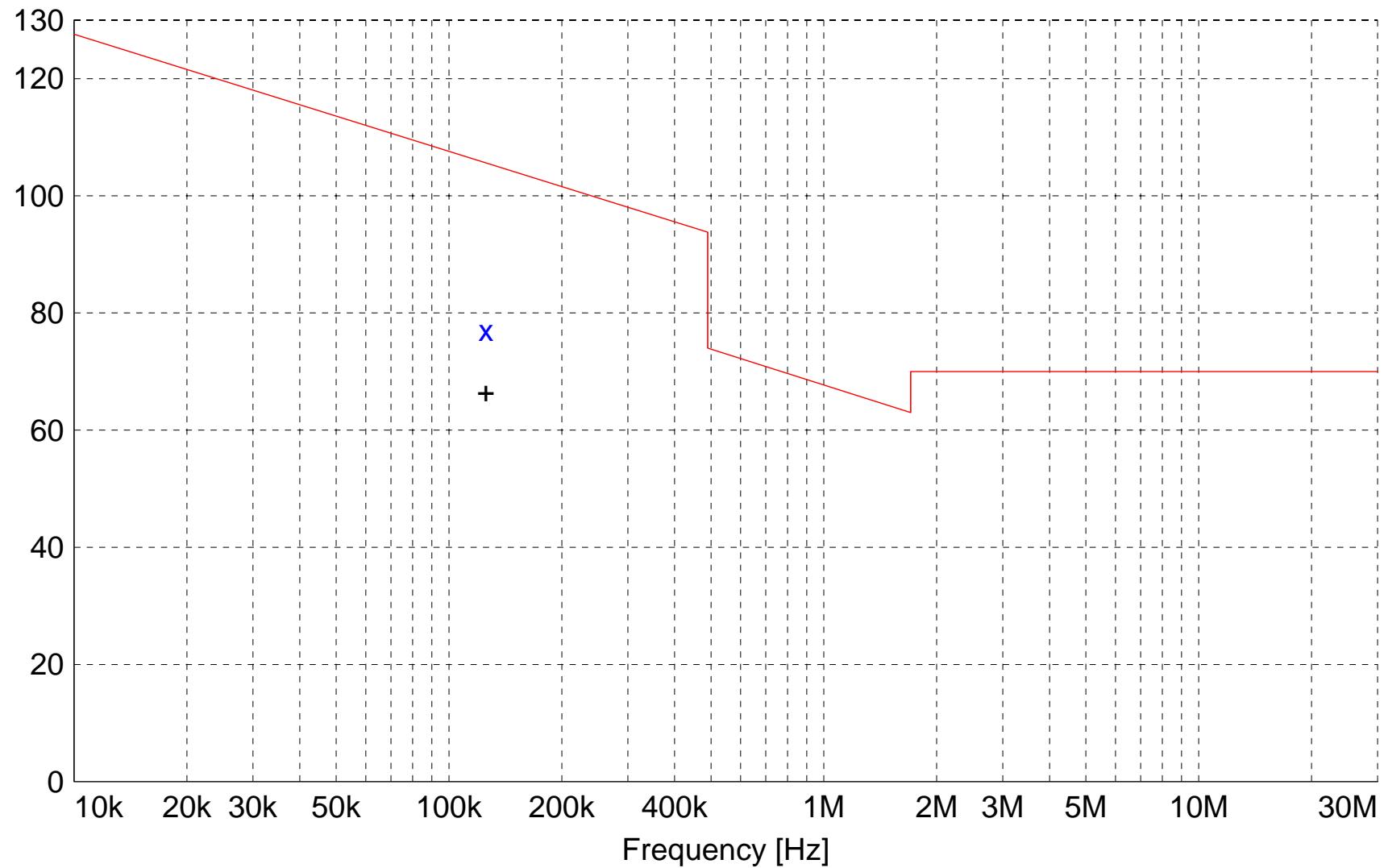
**TEXT: "Site 2 LowH 3M"**

Short Description: Test Set-up 10kHz to 30MHz H  
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/005

Antennas --- EMCO Active Loop Model: 6502 SN: 1027

TEST SET-UP: EuT Measured at 3 Meters with H-FIELD Antenna

Level [dB $\mu$ V/m]



**MEASUREMENT RESULT: "ATZ3\_1h1\_Final"**

2/26/2009 9:24AM

Frequency MHz	Level dB $\mu$ V	Antenna Factor	System Loss dB	Total Level dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB	Height Ant. m	EuT Angle deg	Final Detector	Comment
0.125400	66.58	10.40	0.1	77.1	105.6	28.6	1.00	180	AVERAGE	None



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## APPENDIX C

### 20 dB BANDWIDTH GRAPHS

#### PART 15.209

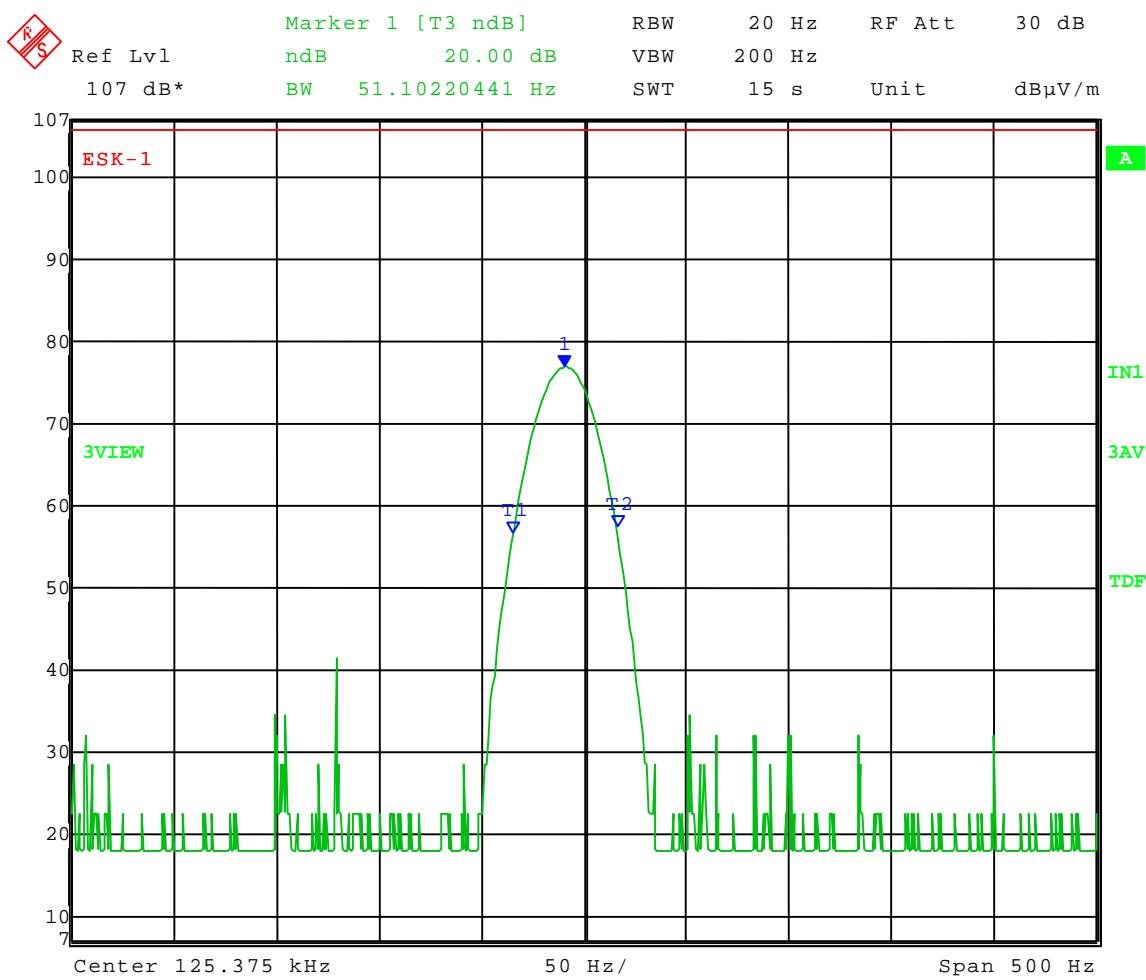


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Test Date: 02-26-2009  
Company: Telezygology  
EUT: TZ RFID Plus Wiegand Translator 8101CF  
Test: 20 dB Bandwidth  
Operator: Adam A  
Comment: Transmit = 125 kHz

20 dB Bandwidth = 51.1 Hz



Date: 26.FEB.2009 12:00:14