Enclosure 1

General Atomics-Electronic Systems Inc. Report 25402-011-V1A-HARA-00266-001 General Atomics HARA,

"RM-1000 EMC Test Report, TVA (Non-Prop)"

dated November 11, 1999

Non-Proprietary

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

25402-011-V1A-HARA-00266-001
General Atomics HARA
RM-1000 EMC Test Report, TVA (Non-Prop)

DOCUMENT CLASSIFICATION CHANGE

[redacted]

BECHTEL POWER CORPORATION | Job Number: 25402

SUPPLIER DOCUMENT REVIEW STATUS

STATUS CODE:

1 ☐ Work may proceed.
1C ☐ Work may proceed. Editorial comments need only be incorporated if revised for other purposes.
2 ☐ Revise and resubmit. Work may proceed subject to incorporation of changes indicated.
3 ☐ Rejected. Revise and resubmit.
4 ☒ Review not required. Work may proceed.

PO 77469-77448

Permission to proceed does not constitute acceptance or approval of design details, calculations, analysis, test methods, or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with contractual obligations.

Reviewed by	Arch	Civil	CS	Elect	Mech	MET	PD	Constr	Startup	STE
	N/A	N/A	JT 10/12/12	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Status By: Joe Temples Joe T. Temples DATE 10/12/12

SHEET	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
REV																												
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
REV																												

SORRENTO ELECTRONICS

DRAWN J.MEISNER	DATE 11-11-99	
CHECKED		
ENGR John Meisner / ENGR REV K. Wong	11-11-99 / 11-11-99	RM-1000 EMC TEST REPORT, TVA
PROJ MGR J.D. Wellman	11-11-99	
MFG ENGR ———	———	SIZE A · FSCM NO. 58307 · DRAWING NO. 04038800 · REV —
QUAL MGR C.M. Miller	11-11-99	RELEASE Approved 11/11/99 · SHEET 1 OF 218
ENGR MGR ———	———	DRAWING LEVEL 2

DWG NO. 04038800 REV —

SE-0009 3/97

RM-1000 EMC TESTING

1. Introduction

This report describes the Electromagnetic Compatibility (EMC) testing specified by Sorrento Electronics (SE) for the RM-1000 radiation monitoring equipment supplied to Tennessee Valley Authority (TVA). Testing reported here was conducted at TÜV Product Services in San Diego, and included requirements for RM-1000 monitor systems of several SE projects. Two series of tests reported here are applicable to the TVA project to replace SE's original supply of analog RP ratemeters with RM-1000 modules.

The first test series was completed from November 4 through November 12, 1997, performed by TÜV's EMC Engineer, [redacted] The second test series took place from November 24 and 25, 1998, performed by TÜV's EMC Engineer, Dave Marshall. Walter Wong, of Sorrento Electronics, was the project engineer for both test series to verify the operational status of the Equipment Under Test (EUT) and maintain the engineering log during testing.

The first test series was the initial effort for the RM-1000 EMC evaluation and was applicable to a process monitor channel, with an RM-1000 and a scintillator detector. The second test series was the primary RM-1000 system test in accordance with the SE EMC Test Plan approved by TVA. This second test included low- and high-range area monitor channels and auxiliary equipment for output devices.

BUSINESS SENSTIVE

2. Purpose of EMC Tests

The purpose of the electromagnetic compatibility (EMC) tests was to measure levels of conducted and radiated interference emitted from the EUT and to determine its immunity to external electromagnetic signals and fields. The test results were compared with the specified limits, which were designed to accommodate sets of EMC requirements of several projects. The focus of this report is for compatibility to the specific TVA contract requirements.

The first test series was intended to reveal any unacceptable susceptibility and/or emissions in the RM-1000/detector electronics only. Therefore, this test did not require an entire RM-1000 system. Because the tested RD-33 detector included a preamplifier common to all applicable process detectors, the testing was primarily intended to verify adequate EMC compliance of this component. The RM-1000 detector processing electronics are identical for all process monitors. Once the detector performance was successfully verified in the first test, the second series of area monitor testing is then adequate to prove compliance for the scintillation, process channel as well. Therefore, the second series of testing, with both [redacted] verified EMC compliance of all process and area monitors.

BUSINESS SENSTIVE

The remainder of this report will address the second series of testing only. Appendix A includes the TÜV Test Report for the first series of testing.

3. Equipment Description

BUSINESS SENSTIVE

The equipment tested in the second test series was a two-channel RM-1000 monitor system, including a [redacted] Cabling to and from the RM-1000s was [redacted] through the module multi-pin connectors, with an external [redacted] surrounding all the wires and cables.

For purposes of the TVA RM-1000 project requirements, all of the components tested have applicability, except the [redacted] The [redacted] apply to TVA channels originally using [redacted]. Otherwise, all the components apply to the TVA channels originally using [redacted]

Sorrento Electronics (SE) drawing 04509000, System Installation Configuration, RFI/EMI Test, RM-1000, Rev –, was modified to Rev A to reflect the actual configuration tested, which includes modifications required to pass specific tests.

4. Reference Documents

TVA Standards:

SS E18.14.01 Standard Specification, Electromagnetic Interference (EMI) Testing Requirements for Electronic Devices, Revision 3

IEC Standards:

IEC 1000-4-2 (1995)	Electrostatic Discharge
IEC 1000-4-3 (1995)	Radiated RF Fields [ENV50140 1993]
IEC 1000-4-4 (1995)	Electrical Fast Transmits/Burst
IEC 1000-4-5 (1995)	Surge Transients
IEC 1000-4-6 (1996)	Conducted RF Disturbance [ENV50141 1993]
IEC 1000-4-11 (1994)	Voltage Dips, Interruptions and Variations

EPRI Standards:

EPRI TR-102323 Final Report, Sept. 1994, Guidelines for Electromagnetic Interference Testing in Power Plants

EN Standards:

EN 55011, Class A (1991) Conducted and Radiated Emissions [EN 50081-2 1995]

MIL Standards:

MIL-STD-461D (1993)

CS-101	Conducted Susceptibility, Power Leads
CE-102	Conducted Emissions, Power Leads

Test Reports (Appendixes to this report):

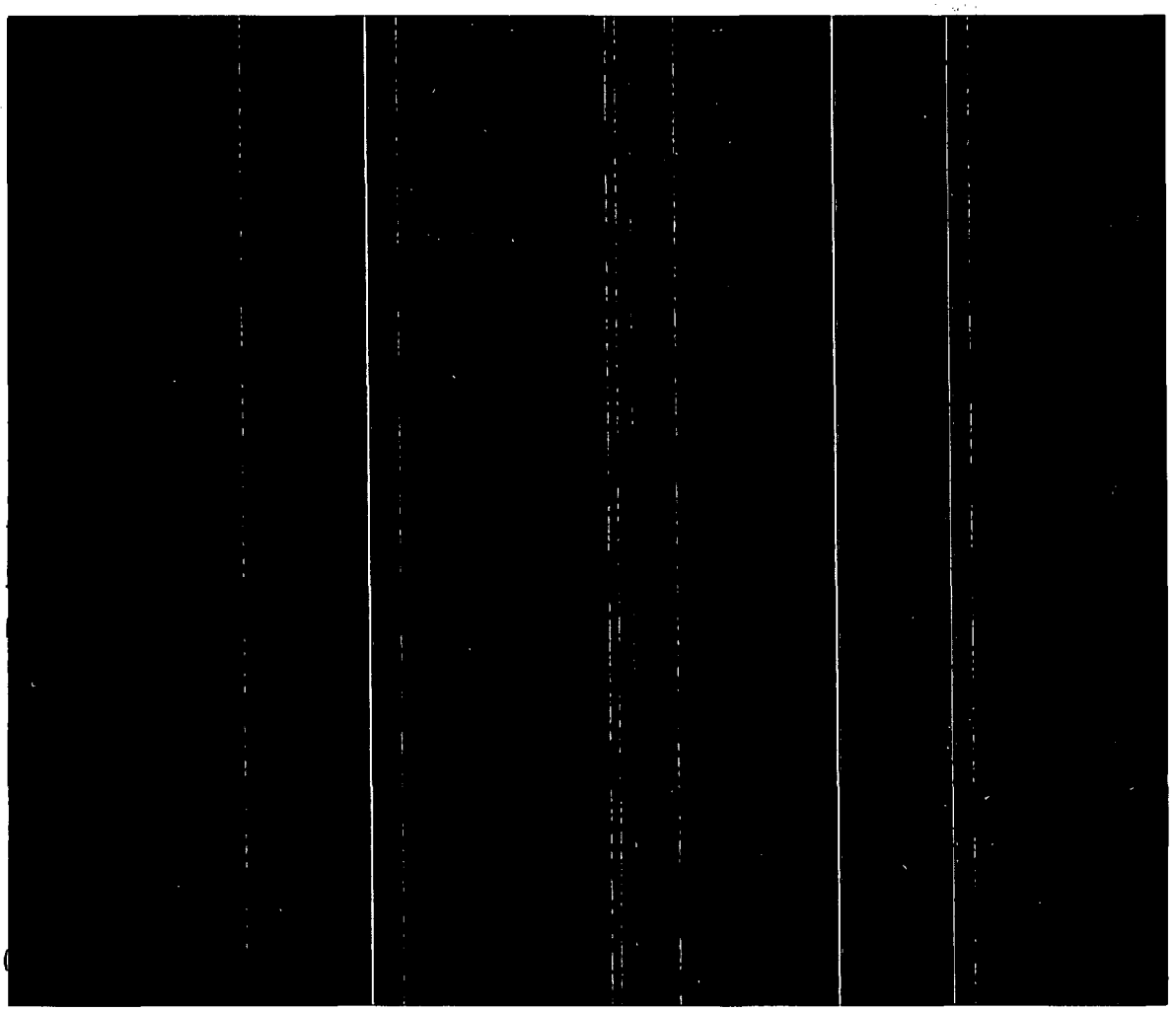
TÜV Report No. S7439-03 (13Nov1997)	RM-1000 Radiation Monitor, Single Channel
TÜV Report No. S8569-02 (11Dec1998)	RM-1000 Radiation Monitor, Two Channel

SE Documents:

04509000, Rev A	System Installation Configuration, RFI/EMI Test, RM-1000
04509005, Rev A	Test Procedure, RM-1000 EMC Emission and Susceptibility
ECO-17656	Engineering Change Order, RM-1000 Product Improvement For EMC

6. Test Configuration

BUSINESS SENSTIVE



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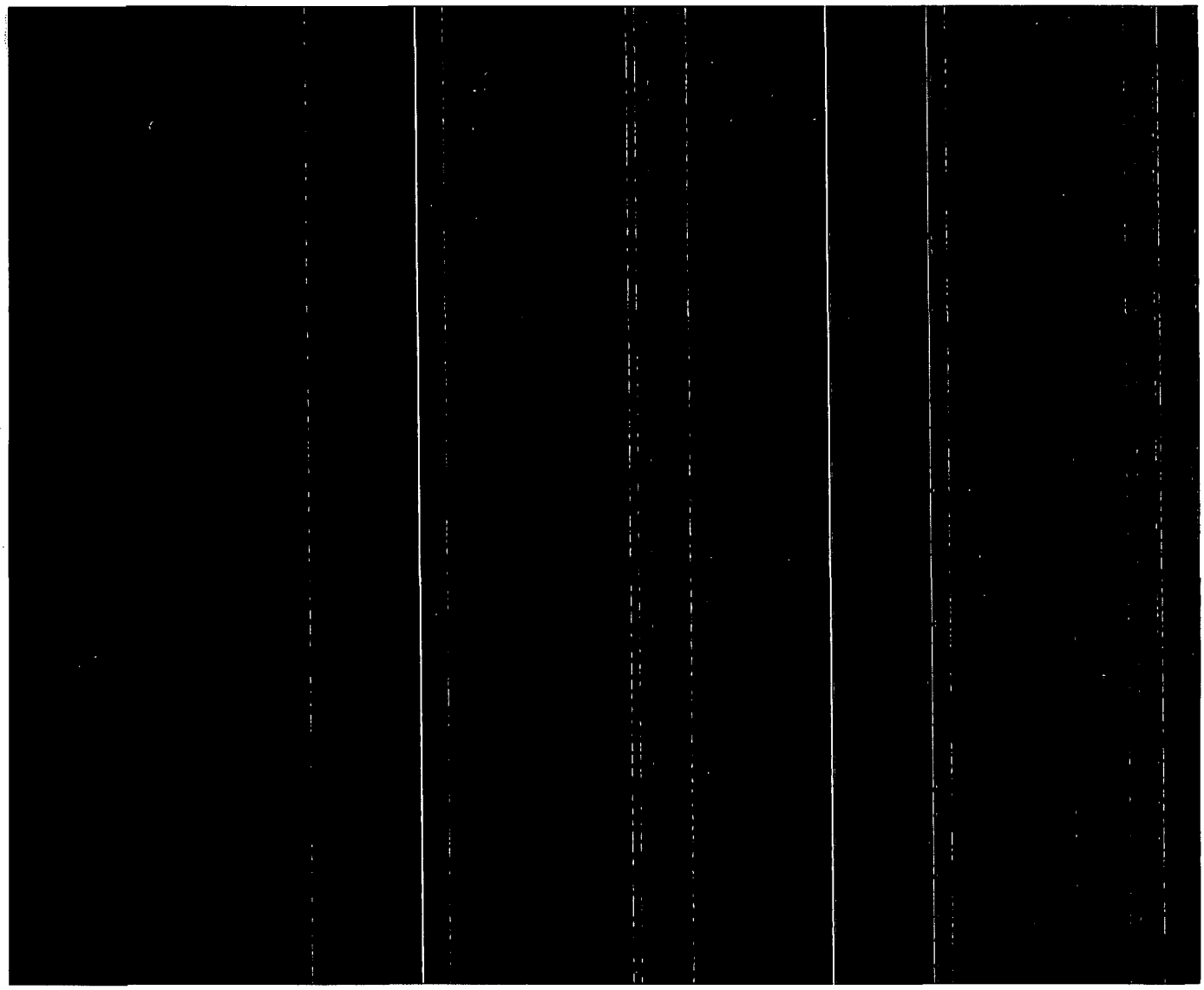


Figure 1. RM-1000 EMC Test Configuration

BUSINESS SENSTIVE

The following table provides a description for each EUT input/output (I/O) cable designation.

I/O Cable Designation	I/O Cable Description
[redacted]	[redacted]

All EUT I/O cables were tested for noise susceptibility [redacted] These cables were run [redacted]

7. Monitoring of EUT

BUSINESS SENSTIVE

A [redacted] the operation of the EUT during immunity tests. [redacted] the RM-1000 analog outputs and trips.

8. Operational Mode

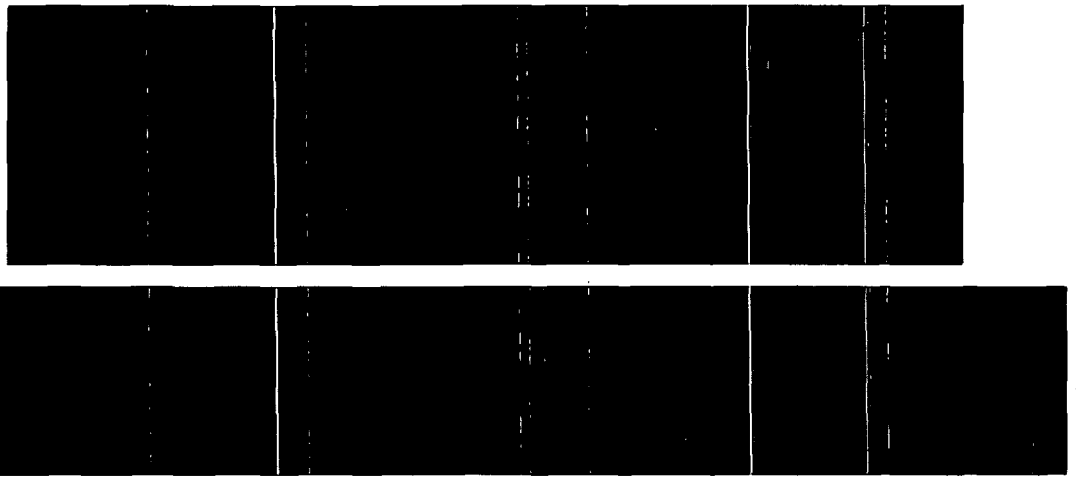
Pre-test and post-test verification of the monitor system was performed to ensure proper operation and to establish baseline data.

The monitor equipment was placed in its normal operational condition prior to EMC testing.

9. System Modifications

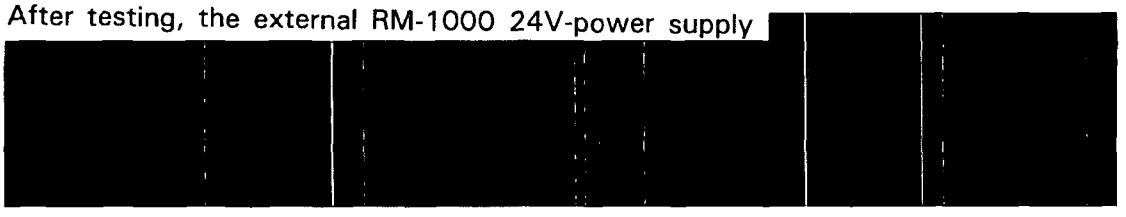
BUSINESS SENSTIVE

1. Following the tests, the RM-1000 design was modified to provide enhanced EMC performance as follows



2. SE Drawing, 04509000 shows the final test configuration including the location of [redacted] to pass specific immunity and emissions testing.

3. After testing, the external RM-1000 24V-power supply [redacted]



10. Emission Criteria

The acceptance criteria for the EUT was to demonstrate compliance with the applicable conducted and radiated RF emission limits specified in Table 1.

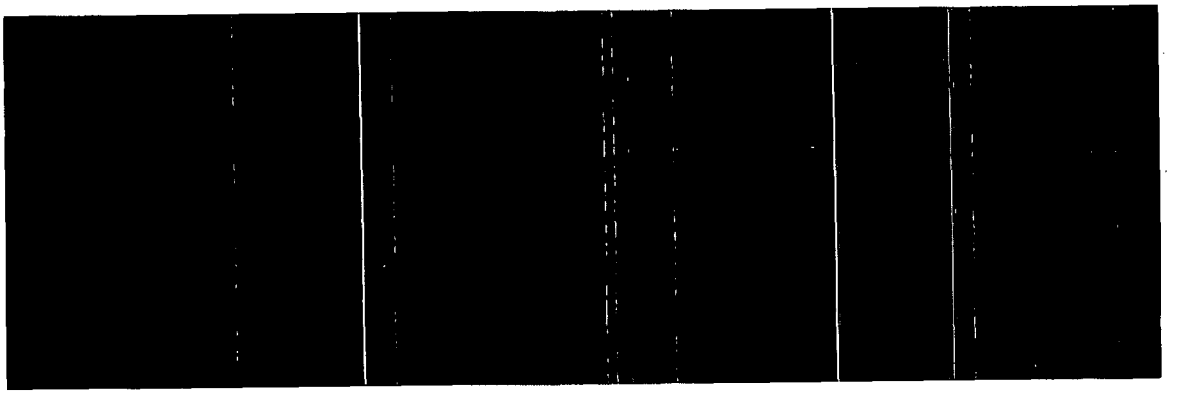
11. Immunity Criteria

BUSINESS SENSTIVE

1. Equipment shall not malfunction and shall not have undesired response, degraded performance or permanent damage when subjected to the immunity tests. A malfunction shall be determined to be a loss of safety function, which is the ability to detect an increase in radiation levels, and an undesired response is a false indication of excessive radiation levels.

2. There shall be no High [redacted], Alert Alarms ([redacted]) or Failure Alarm generated when the system is subjected to the immunity test transients. Additionally, these alarms shall be maintained during immunity testing when they existed prior to the test.

3. There shall be no variation in the Activity Level (cpm or Amps), as determined from the analog output signals, [redacted] when the system is subjected to the immunity tests. Based on the baseline data collected (see section 12), the following tabulated pass/fail criteria were applied to the [redacted] readings obtained during immunity testing.



4. Failure of fuses or surge limiting protective devices during the surge immunity test will not be deemed a failure of the EUT.

5. At the conclusion of all testing, the EUT must successfully pass a complete functional test.

12. Test Summary

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1. Tables 2 and 3 provide the test result summaries for the Scintillation detector and [redacted] channels.

2. Appendix A provides the TÜV EMC Test Report for the Single Channel [redacted] Detector) monitor. Appendix B provides the TÜV EMC Test Report for the Dual Channel Monitor Assembly [redacted].

3. Radiated Emission (EN 55011, Class A) Testing:

[redacted]

4. Conducted Emissions (MIL-STD-461D, CE-102) Tests:

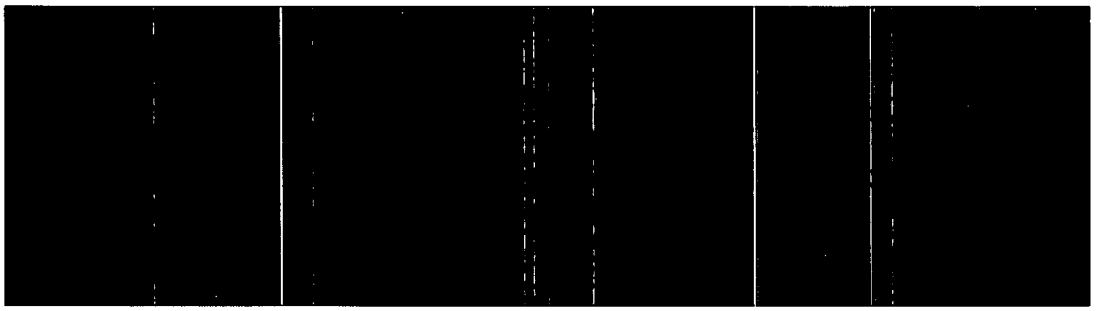
[redacted]

[1] this cable is inside the RM-1000 modules.

5. Immunity Testing (General):

Baseline data was collected prior to EMC testing. The results are as follows:

BUSINESS SENSITIVE



Immunity test pass/fail criteria were applied to these nominal values.

Immunity transients were NOT injected onto the [redacted] cable for the [redacted] module. This module is not part of the EUT.

The [redacted] module was visually monitored during all tests except the Radiated Field Immunity test (IEC 1000-4-3) to verify that the circuitry driving these signals were not upset. Local Indicator meter and alarm trips followed the EUT operation.

6. Radiated Field Immunity (IEC 1000-4-3) Testing:

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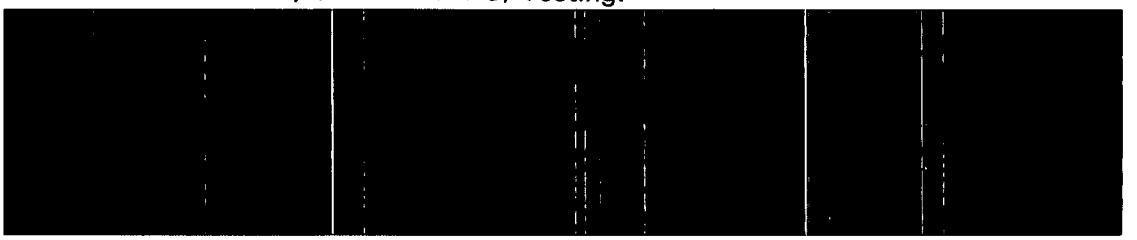

7. HF (High Frequency) Conducted Immunity (IEC 1000-4-6) Testing:

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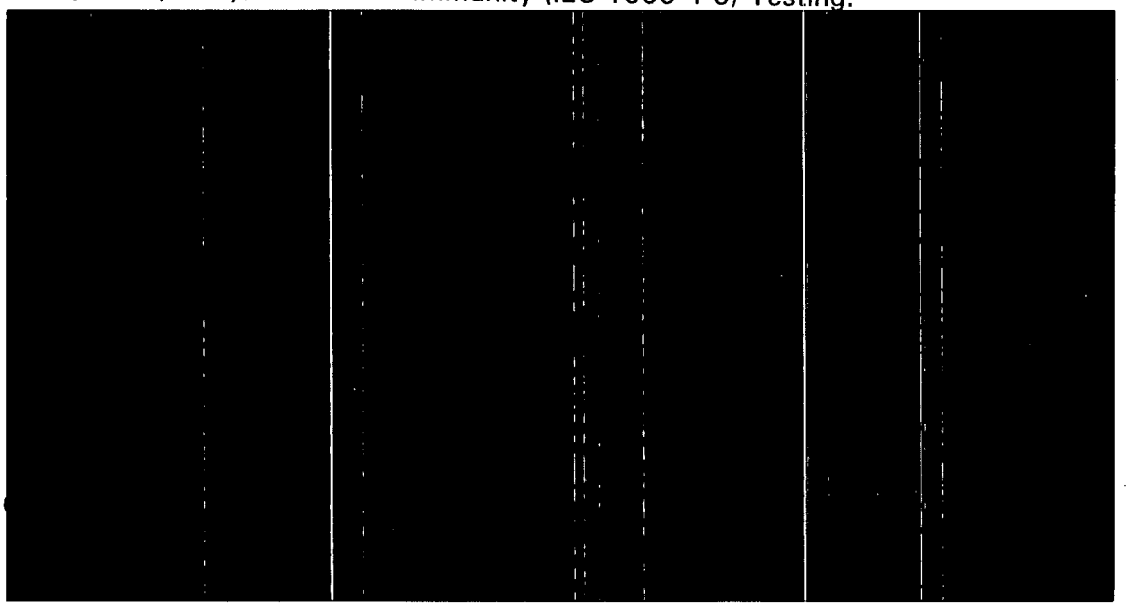

8. LF (Low Frequency) Conducted Immunity (MIL-STD-461D, CS-101) Testing:

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These tests did not require additional mitigation measures for any cables to pass at [redacted] In fact, the test was passed at [redacted] also.

9. Electrical Fast Transient (EFT) Immunity (IEC 1000-4-4) Testing:

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AC Cables: [redacted]

I/O Cables: [redacted]

10. Electrostatic Discharge Immunity (IEC 1000-4-2) Testing:

[redacted]

11. Surge Immunity (IEC 1000-4-5) Testing:

BUSINESS SENSTIVE

[redacted]

12. Voltage Dips, Interruptions and Variations Immunity (IEC 1000-4-11) Testing:

[redacted]

13. Conclusion

The RM-1000 monitor system successfully passed all of EMC immunity testing and emission requirements after the modifications cited in Section 8 were implemented.

Table 1 EMC TEST PLAN FOR TVA RM-1000s

TEST TYPE	TEST STANDARD	FREQUENCY RANGE	TEST LEVEL/LIMIT	ANTENNA DISTANCE	ANTENNA TYPE
HF Radiated RF Susceptibility	IEC 1000-4-3 (IEC 801-3)	27 MHz to 80 MHz 80 MHz to 1000 MHz	10 V/meter	3 meters	Biconical Log-periodic
LF Conducted RF Susceptibility	MIL-STD-461D, CS-101	30 Hz to 150 kHz	6.3 V RMS	Not Applicable	Not Applicable
HF Conducted RF Susceptibility	IEC 1000-4-6 (IEC 801-6)	150 kHz to 400 MHz	10 V (emf)	Not Applicable	Not Applicable
Surge Susceptibility	IEC 1000-4-5 (IEC 801-5)	NA	$\pm$ 3 kV (open circuit voltage)	Not Applicable	Not Applicable
EFT Susceptibility	IEC 1000-4-4 (IEC 801-4)	NA	Power leads: $\pm$ 4 kV Data/control leads: $\pm$ 2 kV	Not Applicable	Not Applicable
Electrostatic Discharge Susceptibility	IEC 1000-4-2 (IEC 801-2)	NA	Contact discharge: $\pm$ 4 kV Air discharge: $\pm$ 8 kV	Not Applicable	Not Applicable
Radiated RF Emissions	CENELEC EN 55011, Group 1, Class A	30 MHz to 230 MHz 230 MHz to 1 GHz	30 dBμV/meter 37 dBμV/meter	30 meter 30 meter	Biconical Log-periodic
Conducted RF Emissions	MIL-STD-461D, CE-102	10 kHz to 500 kHz 500 kHz to 400 MHz	100 dBμV 66 dBμV	Not Applicable	Not Applicable

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Table 2 EMC TEST RESULTS FOR RM-1000 SYSTEMS (SCINTILLATION DETECTOR)

TEST PARAMETER	STANDARD	FREQUENCY RANGE	TEST LEVEL/LIMIT	ANTENNA DISTANCE	ANTENNA TYPE	TEST RESULTS
HF Radiated RF Susceptibility	IEC 1000-4-3	80 MHz to 1000 MHz	10 V/meter	3 meters	Biconical Log-periodic	[redacted]
LF Conducted RF Susceptibility	MIL-STD-461D CS-101	30 Hz to 150 kHz	6.3 V RMS	NA	NA	
HF Conducted RF Susceptibility	IEC 1000-4-6	150 kHz to 80 MHz	10 V (emf)	NA	NA	
Surge Susceptibility	IEC 1000-4-5	NA	± 3 kV (open circuit voltage)	NA	NA	
EFT Susceptibility	IEC 1000-4-4	NA	Power leads: ± 4 kV Data/control leads: ± 2 kV	NA	NA	
Electrostatic Discharge Susceptibility	IEC 1000-4-2	NA	Contact discharge: ± 4 kV Air discharge: ± 8 kV	NA	NA	
Radiated RF Emissions	CENELEC EN 55011, Group 1, Class A	30 MHz to 230 MHz 230 MHz to 1 GHz	30 dBμV/meter 37 dBμV/meter	30 meter 30 meter	Biconical Log-periodic	
Conducted RF Emissions	MIL-STD-461D CE-102	10 kHz to 500 kHz 500 kHz to 400 MHz (1)	100 dBμV 66 dBμV	NA	NA	

Notes:
1) Ac line impedance stabilization network is only calibrated out to 100 MHz.

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Table 3 EMC TEST RESULTS FOR RM-1000 SYSTEMS (ION CHAMBER & GMT DETECTORS)

TEST PARAMETER	STANDARD	FREQUENCY RANGE	TEST LEVEL/LIMIT	ANTENNA DISTANCE	ANTENNA TYPE	TEST RESULTS
HF Radiated RF Susceptibility	IEC 1000-4-3	80 MHz to 1000 MHz	10 V/meter	3 meters	Biconical Log-periodic	
LF Conducted RF Susceptibility	MIL-STD-461D CS-101	30 Hz to 150 kHz	6.3 V RMS	NA	NA	
HF Conducted RF Susceptibility	IEC 1000-4-6	150 kHz to 80 MHz	10 V (emf)	NA	NA	
Surge Susceptibility	IEC 1000-4-5	NA	± 3 kV (open circuit voltage)	NA	NA	
EFT Susceptibility	IEC 1000-4-4	NA	Power leads: ± 4 kV Data/control leads: ± 2 kV	NA	NA	
Electrostatic Discharge Susceptibility	IEC 1000-4-2	NA	Contact discharge: ± 4 kV Air discharge: ± 8 kV	NA	NA	
Radiated RF Emissions	CENELEC EN 55011, Group 1, Class A	30 MHz to 230 MHz 230 MHz to 1 GHz	30 dBμV/meter 37 dBμV/meter	30 meter 30 meter	Biconical Log-periodic	
Conducted RF Emissions	MIL-STD-461D CE-102	10 kHz to 500 kHz 500 kHz to 400 MHz (1)	100 dBμV 66 dBμV	NA	NA	

Notes:
1) Ac line impedance stabilization network is only calibrated out to 100 MHz.

APPENDIX A

TÜV Test Report

S7439-03

13Nov1997

RM-1000 Radiation Monitor
Single Channel

Report No. S7439-03

TÜV PRODUCT SERVICE

EMC - TEST REPORT

SORRENTO ELECTRONICS TEST STANDARDS*

BUSINESS SENSITIVE

Test Report File No. : **S7439-03** Date of Issue: 13 November 1997

Model / Serial No. : **RM-1000 /** [redacted]

Product Type : Radiation Monitor, Single Channel

Applicant : SORRENTO ELECTRONICS

Manufacturer : SORRENTO ELECTRONICS

License holder : SORRENTO ELECTRONICS

Address : 10240 Flanders Court

: San Diego, CA 92121

Test Result : [redacted]

Test Project Number References : **S101743901-03**

Total pages - Test Report : 18

(*) All tests performed per Sorrento Electronics' Test Standards (see Appendix E.)
(**) See General Remarks for modification(s) to EUT and explanation.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

TÜV PRODUCT SERVICE

DIRECTORY - IMMUNITY
Test Report

Technical Documentation

Appendices

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Report No. S7439-03

IMMUNITY TEST REGULATIONS :

The immunity tests were performed according to the following regulations :

☐ - DIN VDE 0843 Part 2 / 9.1987
☐ - DIN VDE 0843 Part 3 / 2.1988
☐ - DIN VDE 0843 Part 4 / 4.1987
☐ - DIN VDE 0847 Part 2 / 9.1987 E
☐ - DIN VDE 0847 Part 4 / 1.1987 E
☐ - DIN VDE 0750 Part 1-3 / 3.1992 E
☐ - DIN VDE 0872 Part 20 / 8.1989

☐ - EN 50082-1 / 1992
☐ - EN 50082-2 / 1995
☐ - EN 55104 / 1995
☐ - EN 60601-1-2 / 1993

■ - IEC 1000-4-2 / 1995*
■ - IEC 1000-4-3 / 1995*
■ - IEC 1000-4-4 / 1995*
■ - IEC 1000-4-5 / 1995*
■ - IEC 1000-4-6 / 1995*
☐ - IEC 1000-4-8 / 1993
☐ - IEC 1000-4-11 / 1994

■ - MIL-STD-461D (CS101)*
■ - MIL-STD-461D (CE102)*

☐ - ENV 50140 / 1993
☐ - ENV 50141 / 1993
☐ - ENV 50204

■ - EN 55011 / 1991*	■ - Group 1 ■ - Class A	☐ - Group 2 ☐ - Class B
■ - CISPR 11 (1990)*	■ - Group 1 ■ - Class A	☐ - Group 2 ☐ - Class B

(*) All tests performed per Sorrento Electronics' Test Standards (see Appendix E).

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Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 22-24 °C
Relative Humidity:	: 43-46 %
Atmospheric Pressure:	: 996-100.8 kPa

Power Supply Utilized:

Power supply system : [redacted]

Symbol Definitions:

■ - Applicable
☐ - Not Applicable

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Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* events was performed in the following location at the San Diego Testing Facility :

☐ - Test not applicable

☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
■ - SR-1, Shielded Room, 12' x 24' x 10', Metal, Compact Anechoic Chamber

Test Equipment Used :

[redacted]

Test Specification:

Discharge Voltage (Air):

Discharge Voltage (Contact):

Discharge Impedance:

Discharge Repetition Rate:

Number of Discharges:

Kind of Discharges:

Polarity:

Location of Discharge:

[redacted]

☐ -

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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD), continued

Result :

[redacted]

Remarks: [redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

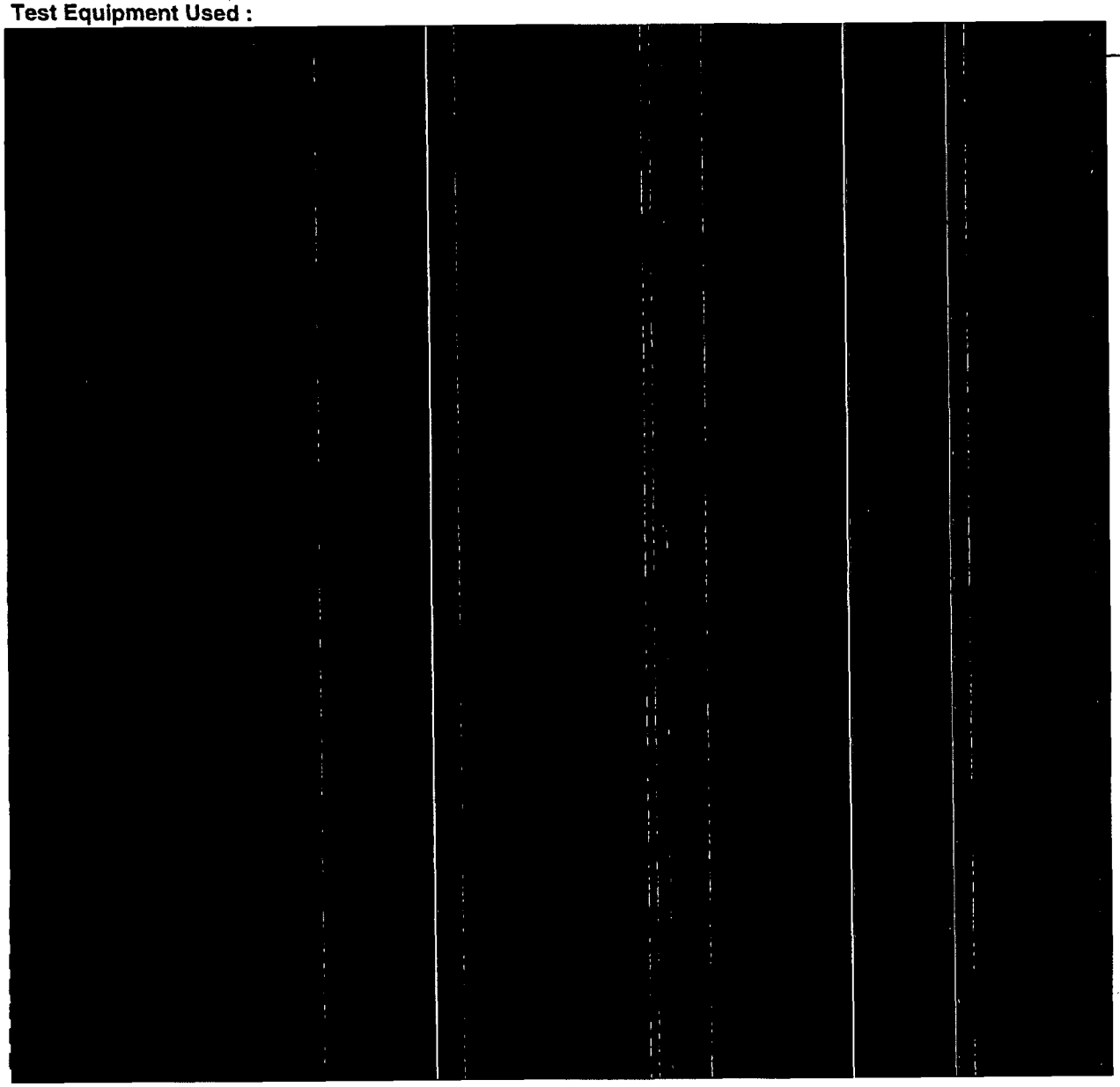
Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS

The immunity against *RADIATED ELECTROMAGNETIC FIELDS* exposure was performed in the following location at the San Diego Testing Facility:

☐ **- Test not applicable**

■ - SR-1, Shielded Room, 12' x 24' x 10', Metal, Compact Anechoic Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber

Test Equipment Used :



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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS, continued

Test Equipment Used (continued):

[redacted]

Test Specification:
Frequency Range:

Field Strength:

Distance Antenna - EUT:

Modulation:

Step:

Polarization of Antenna:

Test Specification:
Frequency Range:

Field Strength:

Distance Antenna - EUT:

Modulation:

Polarization of Antenna:

[redacted]

Result :

[redacted]

Remarks: [redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: FAST TRANSIENTS (BURST)

The immunity against *FAST TRANSIENTS (BURST)* events was performed in the following test location at the San Diego Testing Facility:

☐ - Test not applicable

☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
■ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:

Pulse Amplitude - AC Power Port:

Pulse Amplitude - DC Power Port:

Pulse Amplitude - Signal/Data Non control Port:

Pulse Amplitude - Process: Measurement & Control Port

Burst Frequency:

Time of Coupling:

Coupling Method:

Polarity:

[redacted]

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Report No. S7439-03

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Immunity Test Conditions: FAST TRANSIENTS (BURST), continued

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

[redacted]

Result :

[redacted]

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Report No. S7439-03
BUSINESS SENSITIVE

Immunity Test Conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* events was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

■ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
■ - TR-4, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber

Test Equipment Used :

[redacted]

Test Specification:

Pulse Amplitude - AC Power Port: (Common Mode)

Source Impedance: (Common Mode)

Pulse Amplitude - AC Power Port: (Differential Mode)

Source Impedance: (Differential Mode)

Pulse Amplitude - DC Power Port:

Pulse Amplitude - Signal/Data Non control Port:

Pulse Amplitude - Process: Measurement & Control Port

Source Impedance:

[redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: SURGE TRANSIENTS, continued

Test Specification (continued):

Number of Surges: [redacted]

Angle:

Repetition Rate:

Polarity:

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

Result: [redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

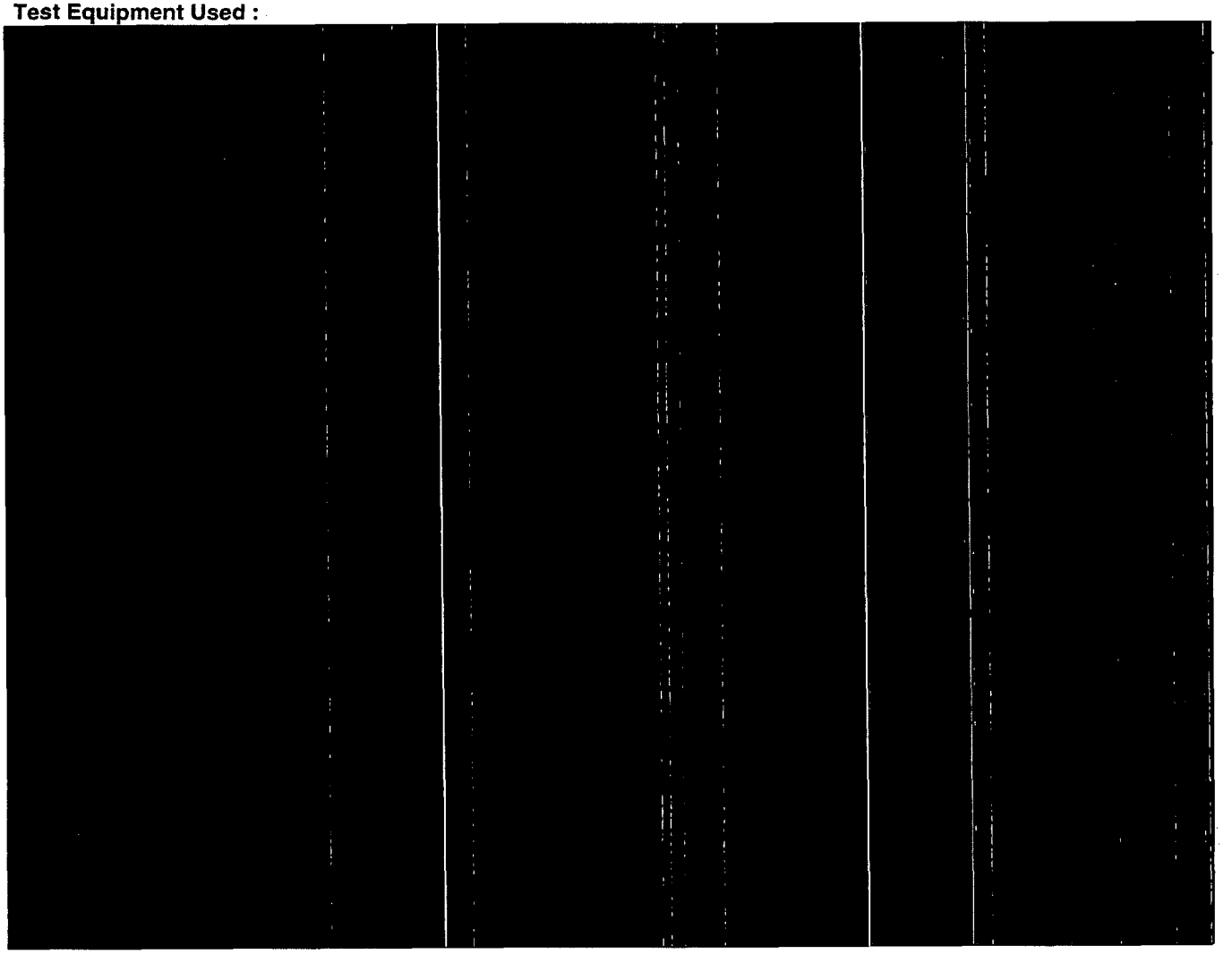
Immunity Test Conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* events, induced by radio frequency fields above 9 kHz, was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :



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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: CONDUCTED DISTURBANCE (continued):

Test Equipment Used (continued):

[redacted]

Test Specification:
Frequency Range:

Voltage Level (EMF):

Modulation:

Step:

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

[redacted]

Result :

[redacted]

Remarks:

[redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field) EN 55011, Group 1, Class A

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - **Test not applicable**

☐ - Roof (Small Open Area Test Site)
■ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of :

[redacted]

Test Equipment Used :

[redacted]

Result :

[redacted]

Remarks: [redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage) EN 55011, Group 1, Class A

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - **Test not applicable**

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

[redacted]

Result :

[redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Conditions: CE102 - Conducted Emissions, Power Lines, 0.01 - 100 MHz

The *Conducted Emissions, Power Lines* test was performed in the following location at the San Diego Testing Facility :

☐ - **Test not applicable**

☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:

Frequency: [redacted]

Band:

LISN:

Result :

[redacted]

Remarks: [redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

Immunity Test Conditions: CONDUCTED SUSCEPTIBILITY, Power Leads, 30 Hz - 150 kHz (CS101)

The *CONDUCTED SUSCEPTIBILITY test* was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:
Frequency Range: [redacted]

Vrms:

Injected Voltage Vrms:

Injection Location:

Result : [redacted]

Remarks: [redacted]

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Report No. S7439-03

TÜV PRODUCT SERVICE

Equipment Under Test (EUT) Test Operation Mode - Immunity Tests :

The equipment under test was operated under the following conditions during immunity testing :

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

☐ - Practice Operation

■ - Normal Operating Mode

☐ - _____

Configuration of the equipment under test:

☐ - See Constructional Data Form in Appendix B - Page B2

■ - See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS. No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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Report No. S7439-03

BUSINESS SENSITIVE

GENERAL REMARKS:

(*) All tests performed per Sorrento Electronics' Test Standards (see Appendix E).

SUMMARY:

Test	Result
Electrostatics Discharge (EN 61000-4-2)	[redacted]
Radiated Electromagnetic Fields (EN 61000-4-3)	
Fast Transients (Burst) (EN 61000-4-4)	
Surge Transients (EN 61000-4-5)	
Conducted Disturbance (EN 61000-4-6)	
RF Radiated Emissions (EN 55011)	
RF Conducted Emissions (EN 55011)	
RF Conducted Emissions (CE102)	
RF Conducted Susceptibility (CS101)	

All tests according to the regulations cited on page 3 were

■ - Performed*

☐ - **Not** Performed

The Equipment Under Test

[redacted]

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. There may be some degree or level of measurement uncertainty. As EN 45001 does not allow recommendations to be included in the test report, the reader is encouraged to request a copy of the TÜV policy concerning pass or fail judgment with respect to possible measurement uncertainties.

Equipment Received Date: 04 November 1997

Testing Start Date: 04 November 1997

Testing End Date: 12 November 1997

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer: [redacted]

(EMC Test Engineer)

Responsible Engineer: [redacted]

(Senior EMC Engineer)

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Report No. S7439-03

TÜV PRODUCT SERVICE

Technical Documentation

Test Data Sheets

and

Test Setup Drawing(s)

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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

ESD IMMUNITY (Test Point Map)

Test Report #: S7439 Test Area: IR 2

Test Method EN61000-4-2 Date: 5 Nov 97

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: RADIATION MONITOR

NOTES:

Temperature 23 °C

Air Pressure: 100.5 kPa

Relative Humidity: 44 %

[redacted]

Tested By: [redacted] Print Signature [redacted]

Reviewed b[redacted] Print Signature [redacted]

ESDMAP.DOC Rev 03.97

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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

ESD IMMUNITY

Test Report #: S7439 Test Area: TR2

Test Method EN 61000-4-2 Date: 5 Nov 97 / 12 Nov 97

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: RADIATION MONITOR SN AKT 013

NOTES: [redacted]

Temperature: 23 °C

Air Pressure: 1005 kPa

Relative Humidity: 44 %

[redacted]

Tested by: [redacted]

Reviewed [redacted]

Printed Signature

(*) Indirect (**) Direct

ESDC.DOC Rev 05.97

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Report No. S7439-03

BUSINESS SENSITIVE

ESD IMMUNITY

Test Report #: S7439
Test Area: TR2
Test Method EN 61000-4-2
Date: 12 NOV 97
EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:
EUT Model #: RM-1000
EUT Description: Radiation Monitor Single Channel
NOTES:
Temperature: 24 °C
Air Pressure: 996 kPa
Relative Humidity: 43 %

[redacted]

Tested by: [redacted]

Reviewed by: [redacted]
Printed Signature

(*) Indirect (**) Direct

ESDC.DOC Rev 05.97

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BUSINESS SENSITIVE

RADIATED IMMUNITY

TÜV PRODUCT SERVICE

Test Report #: 57439 Test Area: S/R 1

Test Method: IEC 1000-4-3 Date: 4 Nov 97

EUT Model #: RM-1000 EUT POWER: ☐ 230 Vac/50 Hz ☑ 120 Vac/60 Hz ☐ Other:

EUT Description: Radiation Monitor, Single Channel Temperature: 23 °C

NOTES: [redacted] Air Pressure: 1 ϕϕ. 7 kPa

Relative Humidity: 38 %

FACE DEFINITION TOP VIEW

1

2 FRONT 3

4

[redacted]

Tested by: [redacted]

Reviewed by: [redacted]

Printed Signature

RADIMU.DOC Rev 05.97

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TÜV PRODUCT SERVICE

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

EFT/BURST IMMUNITY

Test Report #: S7439 Test Area: SR4

Test Method IEC 1000-4-4 Date: 6 NOV 97/12 NOV 97

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: RAdiation Monitor, Single Channel

NOTES: [redacted]

Temperature 22 °C

Air Pressure: 1006 kPa

Relative Humidity: 46 %

[redacted]

Tested By: [redacted]

Reviewed [redacted]

Printed Signature

EFT.DOC Rev 03.97

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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

SURGE IMMUNITY

Test Report #: S7439 Test Area: TR-3

Test Method: IEC 1000-4-5 Date: 6 Nov 97

EUT Model #: RM-1000 EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: RADIATION MONITOR, SINGLE CHANNEL

NOTES:

Temperature: 23 °C

Air Pressure: 100.4 kPa

Relative Humidity: 45 %

[redacted]

Tested By: [redacted]

Reviewed by: [redacted] Printed Signature

SURG.DOC Rev 03.97

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Report No. S7439-03

BUSINESS SENSITIVE

SURGE IMMUNITY

Test Report #: S7439
Test Area: TR-1
Test Method: IEC 1000-4-5
Date: 12 Nov 97
EUT POWER: ☐ 230 Vac/50 Hz ☒ 120 Vac/60 Hz ☐ Other:
EUT Model #: RM-1000
EUT Description: Radiation Monitor, Single Channel
Temperature: 23 °C
Air Pressure: 996 kPa
Relative Humidity: 43 %
NOTES:

[redacted]

Tested By:

Reviewed by: Printed Signature

SURG.DOC Rev 03.97

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BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

CONDUCTED RF IMMUNITY

Test Report #: S7439 Test Area: 8/R3

Test Method: IEC 1000-4-6 Date: 7 NOV 97

EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Model #: RM-1000 Temperature 23 °C

EUT Description: Radiation Monitor, Sagle Channel Air Pressure: 100.9 kPa

NOTES: Relative Humidity: 45 %

1 of 5

[redacted]

Tested By: [redacted]

Reviewed [redacted]

Printed Signature

COND.DOC Rev 03.97

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TÜV PRODUCT SERVICE

BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

CONDUCTED RF IMMUNITY

Test Report #: S7439 Test Area: S/R 3

Test Method: IEC 1000-4-6 Date: 7 Nov 97

EUT Model #: RM-1000 EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: Radiation Monitor, Eagle Channel

NOTES:

Temperature: 23 °C

Air Pressure: 100.8 kPa

Relative Humidity: 45 %

[redacted]

2 of 5

[redacted]

Tested By: [redacted]

Reviewed by: [redacted]

Printed Signature

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TÜV PRODUCT SERVICE

BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

CONDUCTED RF IMMUNITY

Test Report #: S7439 Test Area: S/R 3

Test Method: IEC 1000-4-6 Date: 7 Nov 97

EUT Model #: RM-1000 EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: Radiation Monitor, Single Channel Temperature: 23 °C

NOTES: Air Pressure: 100.2 kPa

Relative Humidity: 45 %

[redacted]

3 of 5

Tested By: [redacted]

Reviewed by: [redacted]

Printed Signature

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BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

CONDUCTED RF IMMUNITY

Test Report #: S7439 Test Area: S/R 3

Test Method: IEC 1000-4-6 Date: 7 Nov 97

EUT Model #: RM-1000 EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: Radiation Monitor, Single Channel Temperature: 23 °C

NOTES: Air Pressure: 100.6 kPa

Relative Humidity: 44 %

4 of 5

[redacted]

Tested By: [redacted]

Reviewed by: [redacted]

Printed Signature

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BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

CONDUCTED RF IMMUNITY

Test Report #: S7439 Test Area: 3/83

Test Method: IEC 1000-4-6 Date: 7 NOV 97

EUT Model #: RM-1000 EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: Radiation Monitor, Single Channel Temperature: 23 °C

NOTES: Air Pressure: 100.6 kPa

Relative Humidity: 44 %

5 of 5

[redacted]

Tested By: [redacted]
Printed Signature

Reviewed by: _____ _____
Printed Signature

COND.DOC Rev 03.97

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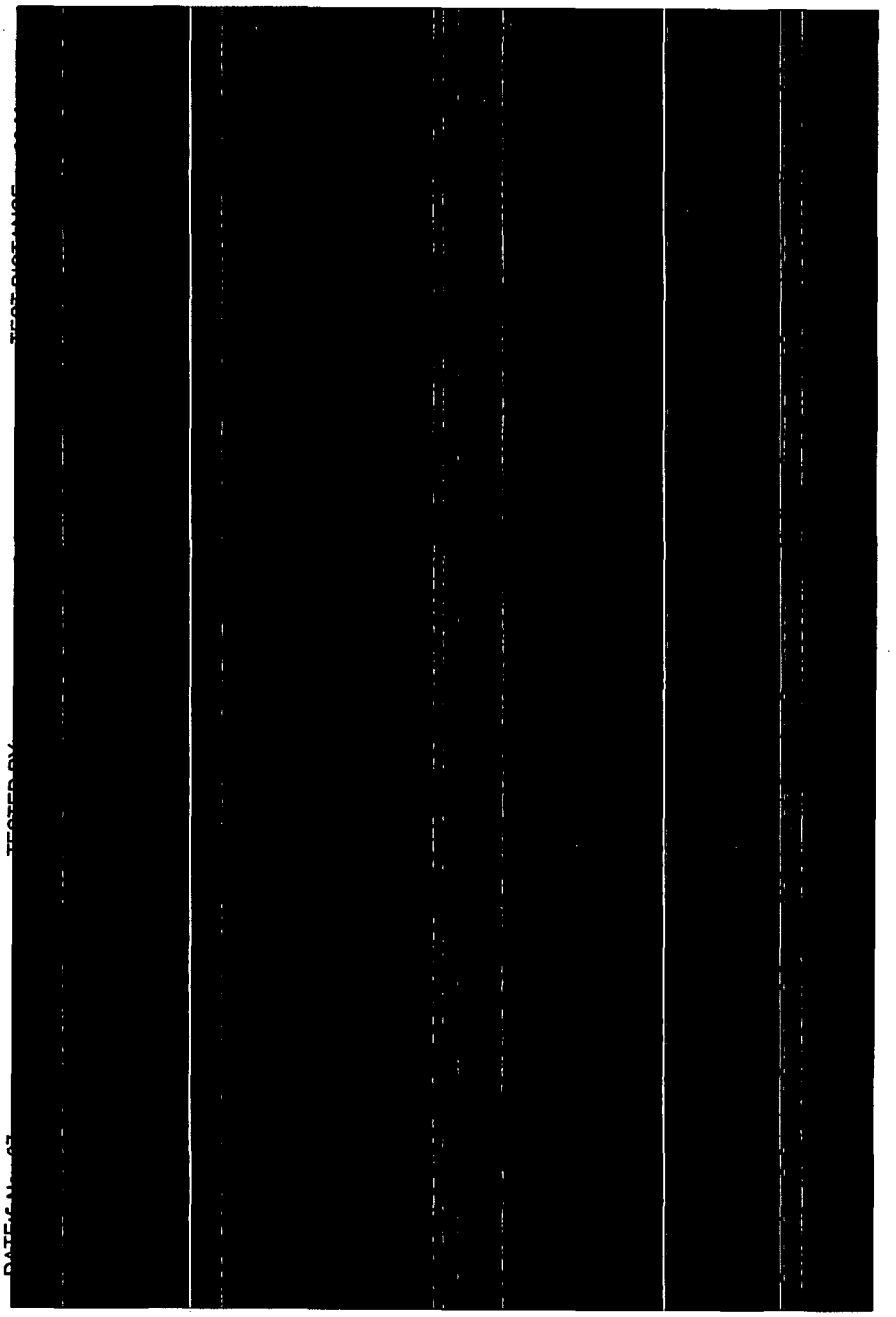
TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE



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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

REPORT No: S7439 SPEC: EN 55011-A

CUSTOMER: Sorrento Electronics Inc. TEST DIST: [redacted]

E U T: RM-1000 Radiation Monitor TEST SITE: 1

EUT MODE: Normal BICONICAL: 451

DATE: 5-Nov-97 TESTED BY: [redacted] LOG PERIODIC: 242

NOTES: [redacted] RCVR: 427

[redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service
POWERLINE CONDUCTED RFI

EUT: RM-1000 Radiation Monitor
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A Group 1
Comment: [redacted]

Date: 05. Nov 97 09:04

[redacted]

Final Measurement: [redacted]

[redacted]

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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service
POWERLINE CONDUCTED RFI

EUT: RM-1000 Radiation Monitor
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A Group 1
Comment: [redacted]

Date: 05. Nov 97 09:04

Final Measurement Results:

[redacted]

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Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service
POWERLINE CONDUCTED RFI

EUT: RM-1000 Radiation Monitor
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A Group 1
Comment: [redacted]

Date: 05. Nov 97 08:52

[redacted]

Final Measurement: [redacted]

[redacted]

PAGE 1

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TÜV PRODUCT SERVICE

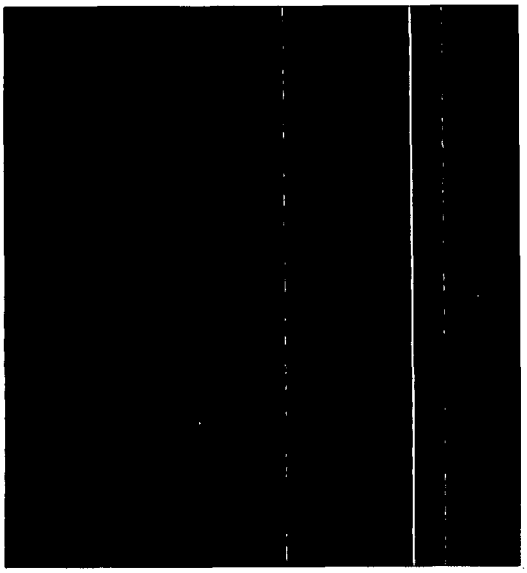
Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service
POWERLINE CONDUCTED RFI

EUT:	RM-1000 Radiation Monitor
Manuf:	Sorrento Electronics
Op Cond:	Normal
Operator:	[redacted]
Test Spec:	EN 55011 Class A Group 1
Comment:	[redacted]
Date:	05. Nov 97 08:52

Final Measurement Results:



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Report No. S7439-03

BUSINESS SENSITIVE

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======================================================
TUV Product Service              12 Nov 1997  08:53:52
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 4. MIL-STD 461D CE102/LISN
    4.3  MIL-STD 461D CE102/lisn
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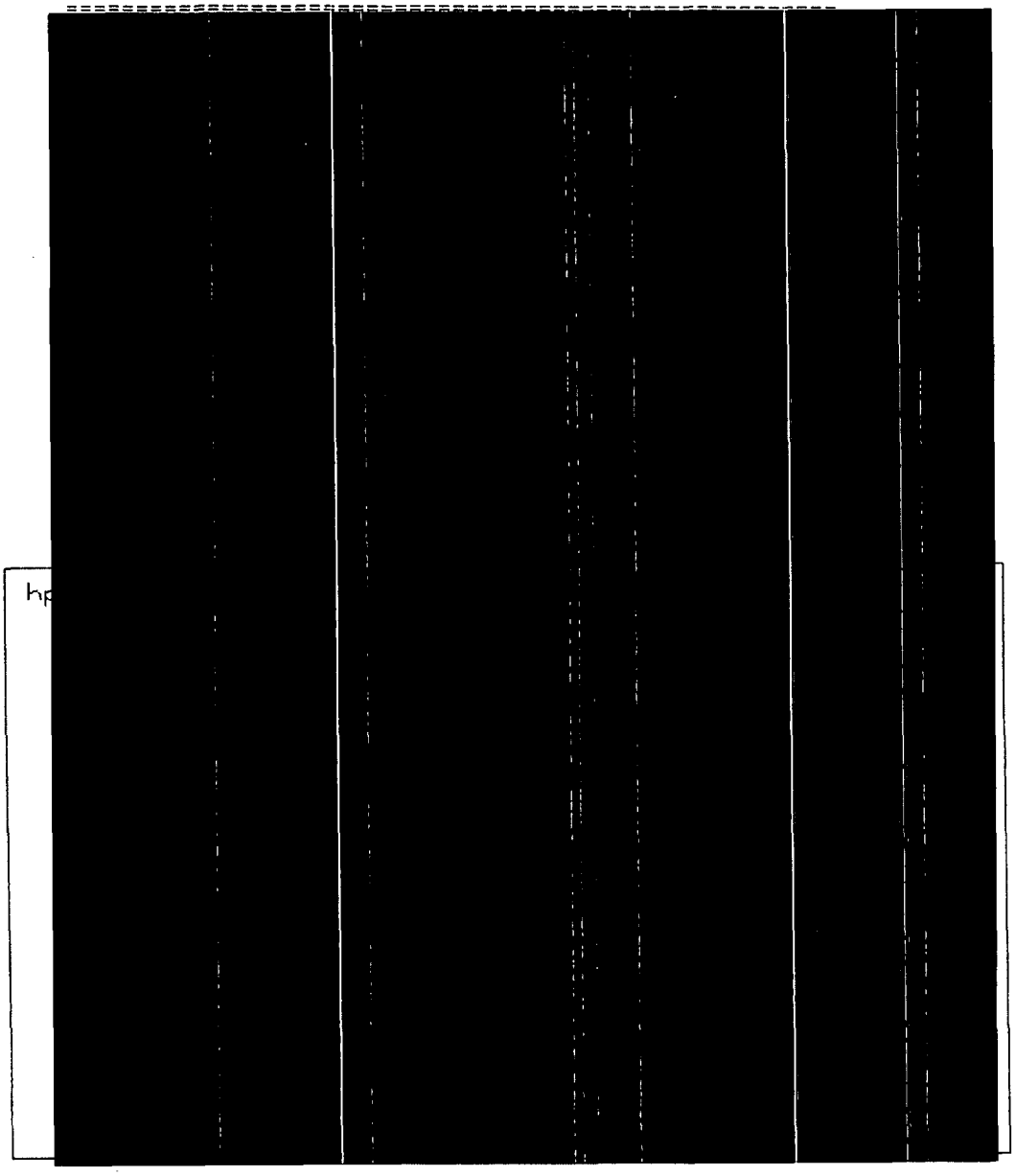

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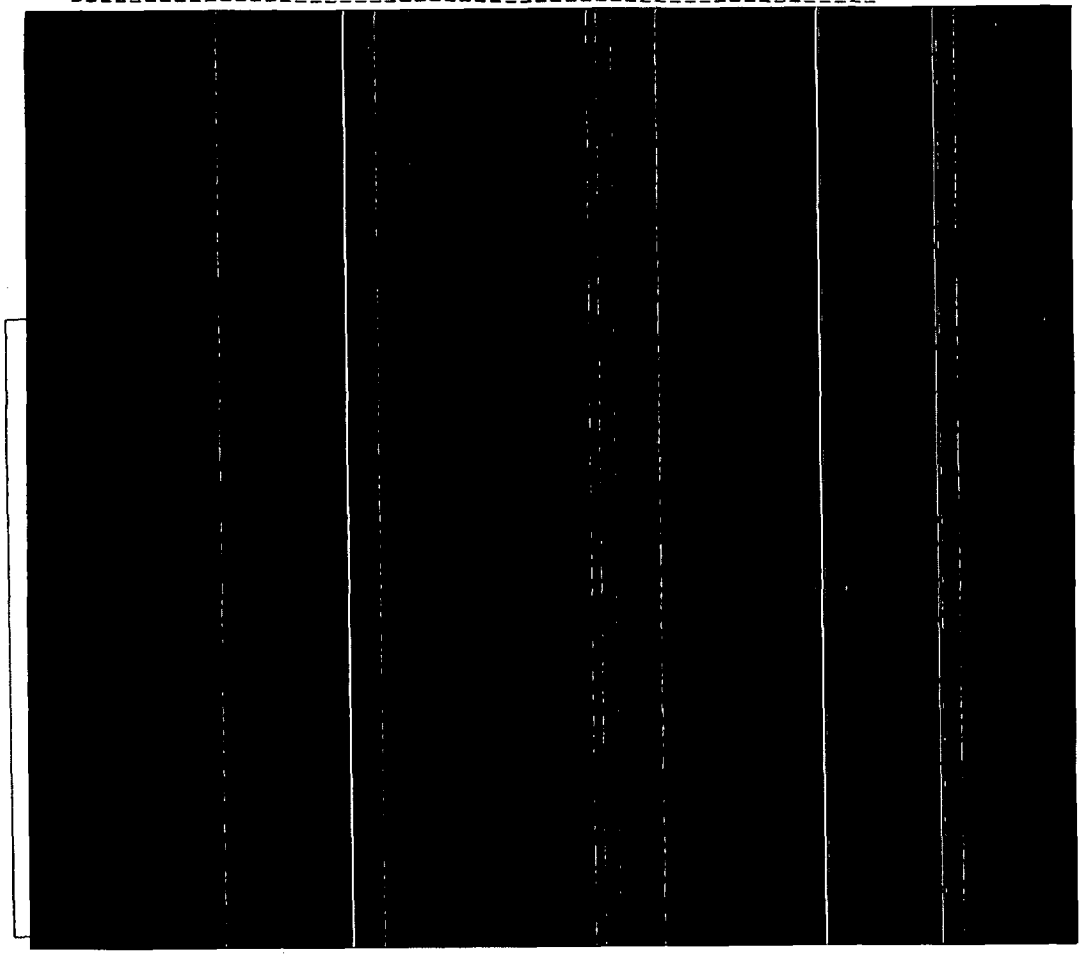
TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service 12 Nov 1997 14:14:26



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TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

TUV Product Service 12 Nov 1997 14:31:40

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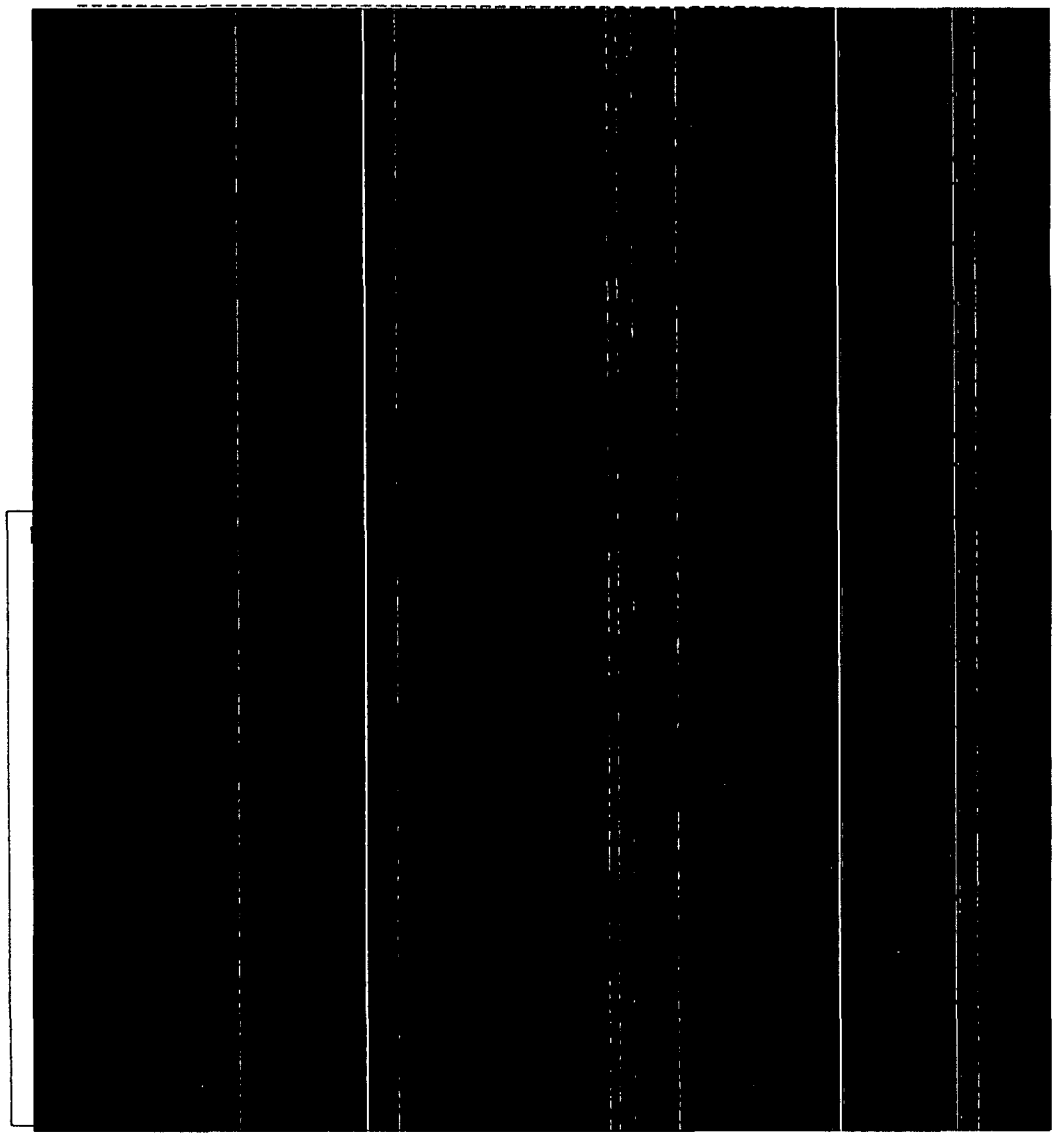
Report No. S7439-03

PRODUCT SERVICE

BUSINESS SENSITIVE

TUV Product Service 12 Nov 1997 09:38:34

4. MIL-STD 461D CE102/LISN
4.3 MIL-STD 461D CE102/lisn



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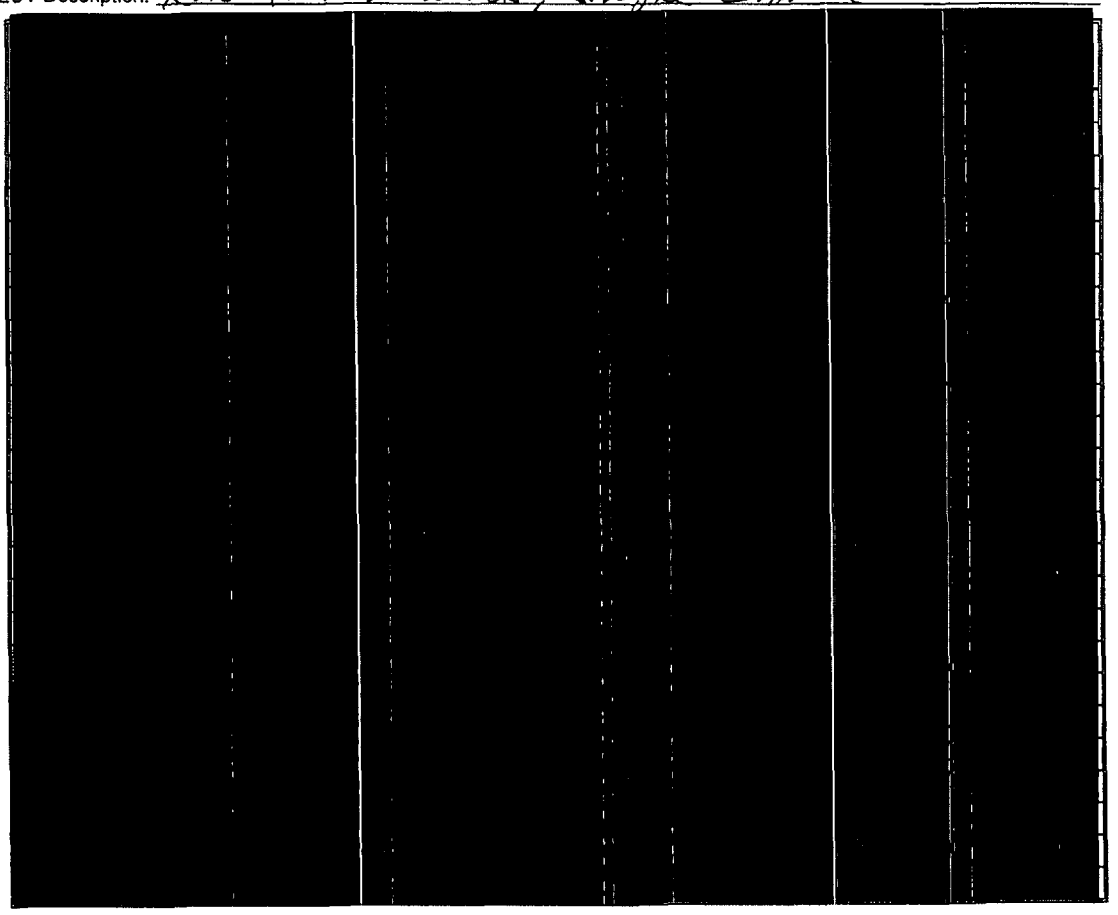
Report No. S7439-03

BUSINESS SENSITIVE

MIL-STD-461D

CS101 Conducted Susceptibility, 120 Hz - 50 kHz

Client: SORRENTO
Test Report #: S7439 Test Area: 9/C3 Date: 11 NOV 1997
EUT Model #: RM-1000 EUT Power: ☒ 120 Vac/400 ☐ 28 Vdc ☐ Other: _____
EUT Description: Radiation Monitor, Single Channel



NOTES: 1. [redacted]
2.

Tested by: [redacted]
Reviewed by:
Printed Signature

CS01.DOC Rev 11.97

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

BUSINESS SENSITIVE

MIL-STD-461D

CS101 Conducted Susceptibility, 120 Hz - 50 kHz

Client: SORRENTO
Test Report #: S7439 Test Area: 3/R3 Date: 11 Nov 1997
EUT Model #: RM-1000 EUT Power: ☒ 120 Vac/400 ☐ 28 Vdc ☐ Other: _____
EUT Description: Radiation Monitor, Single Channel

[redacted]

NOTES: 1. [redacted]
2. _____

Tested by: [redacted]
Reviewed by
Printed Signature

CS01.DOC Rev 11.97

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration Reference for ESD, Tabletop Unit

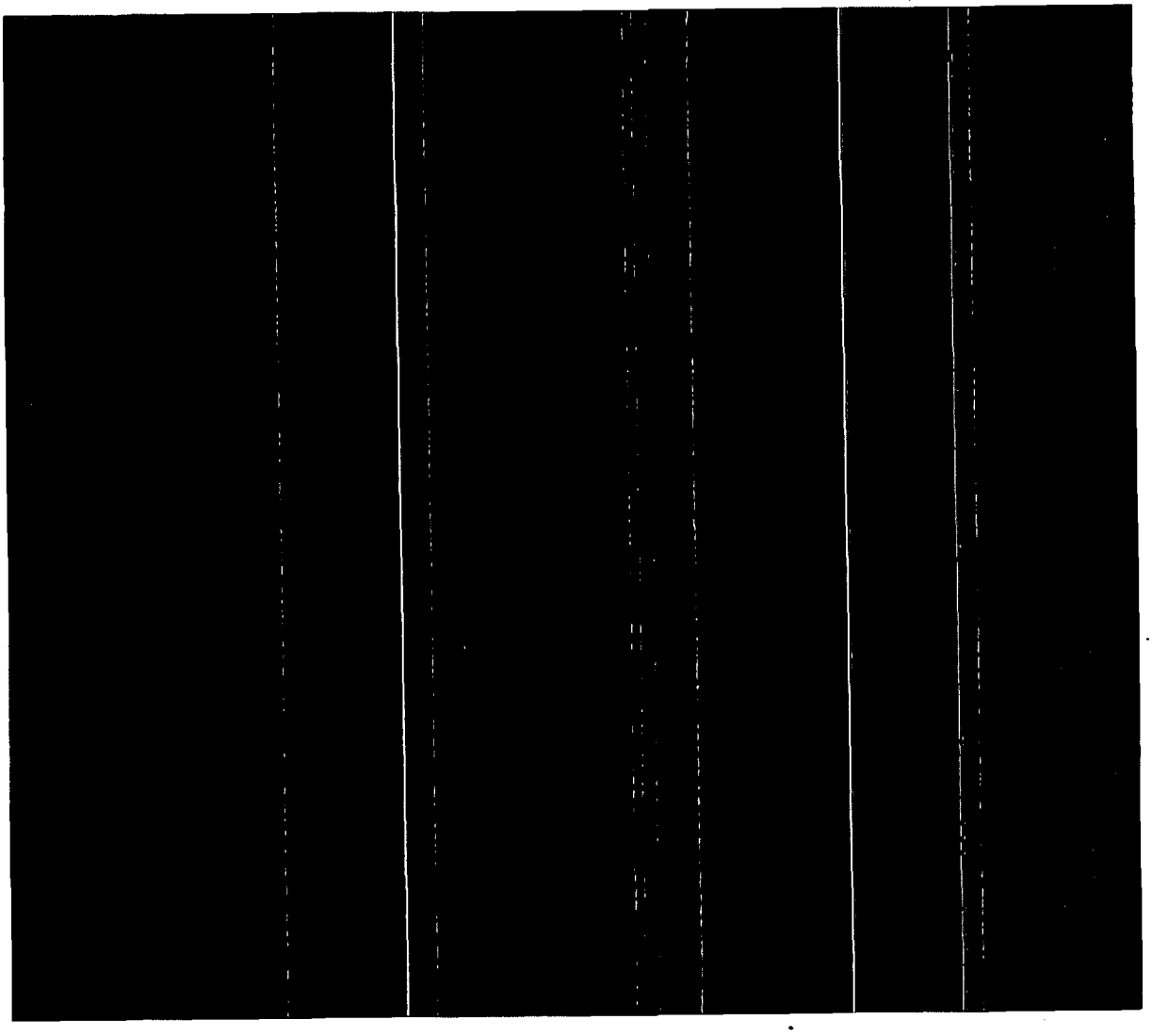
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration for Radiated E-Fields Immunity



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration for Electrical Fast Transient/Burst Immunity

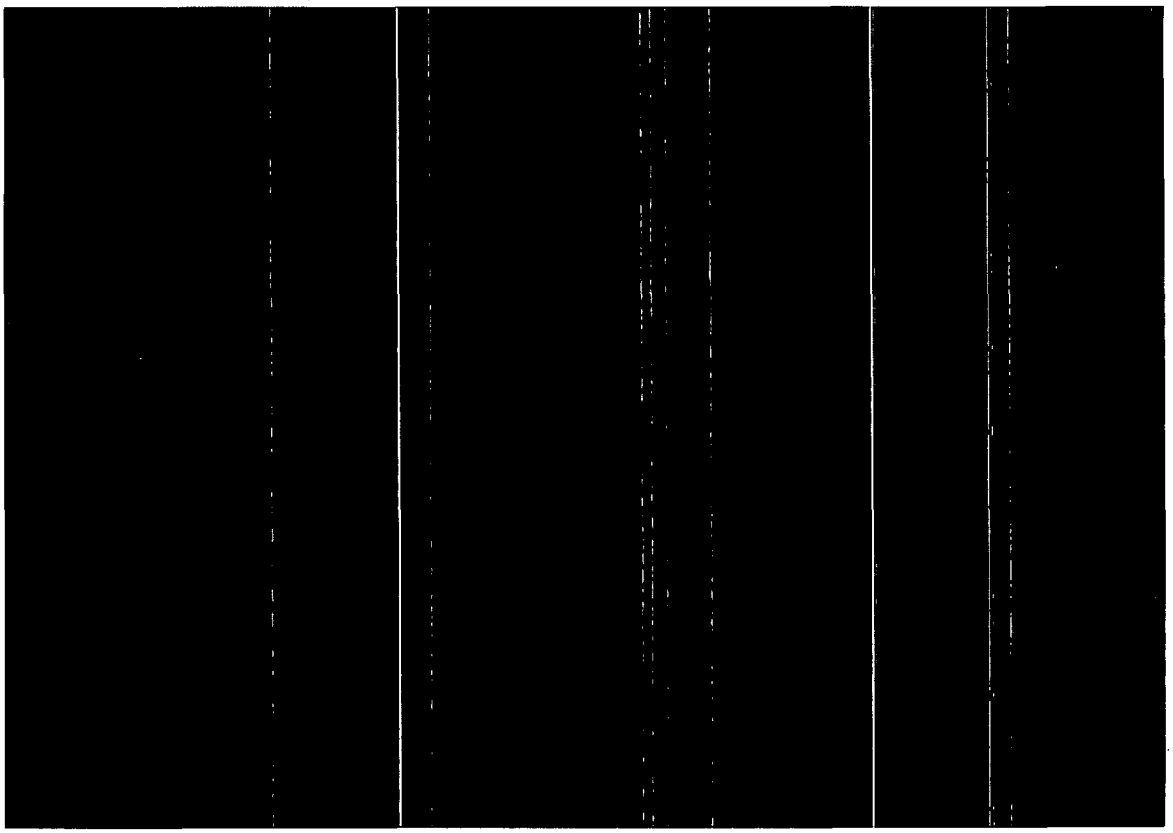
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Equipment Connections for Electrical Fast Transient/Burst Injection - Power Leads



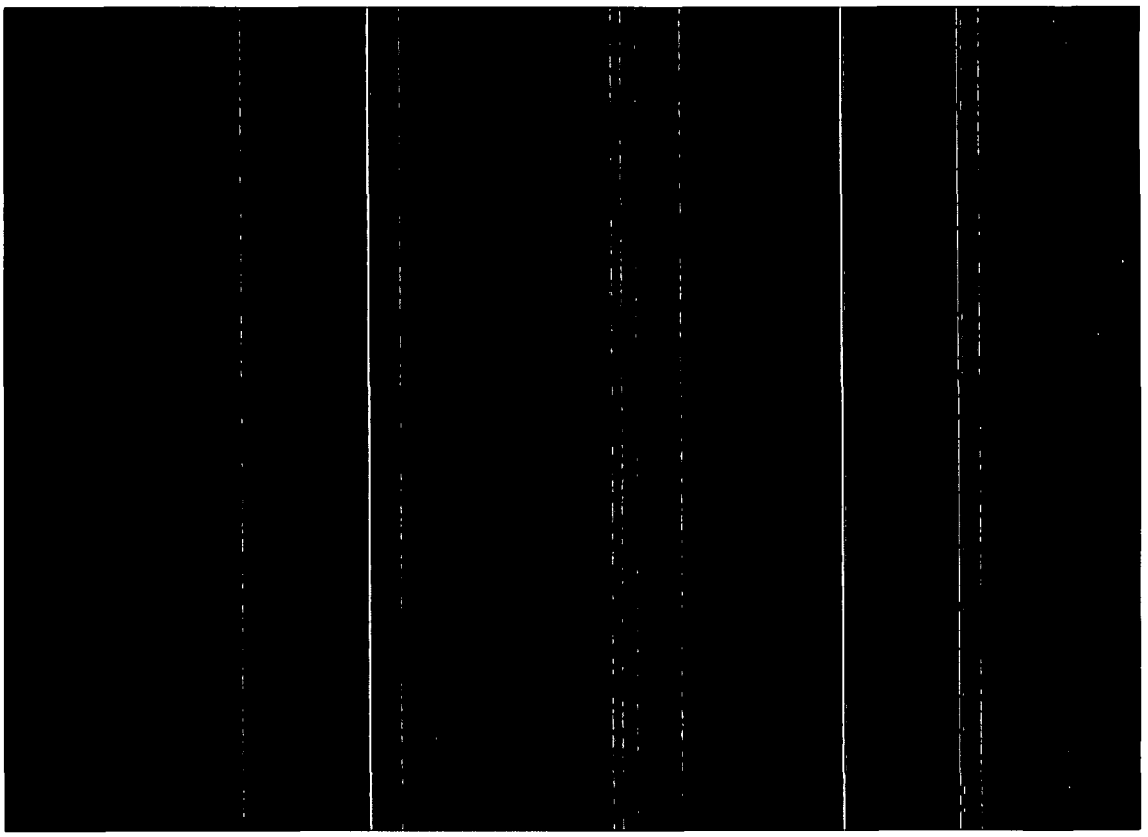
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Equipment Connections for Electrical Fast Transient/Burst Injection - Cables



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration for Surge Immunity

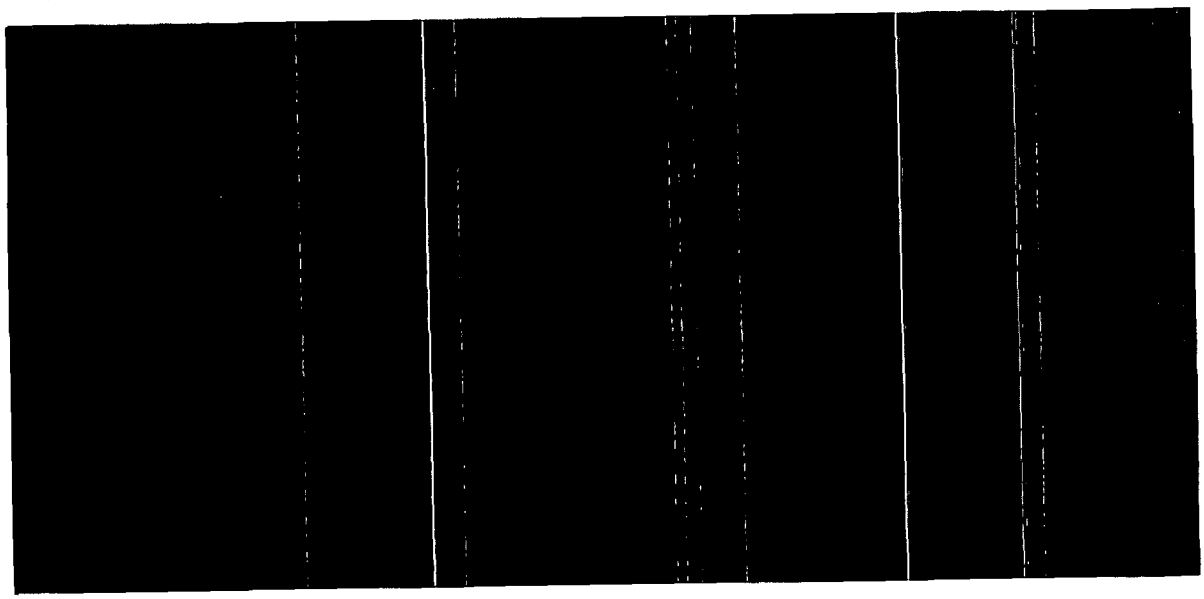
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration for Immunity to Conducted Disturbances

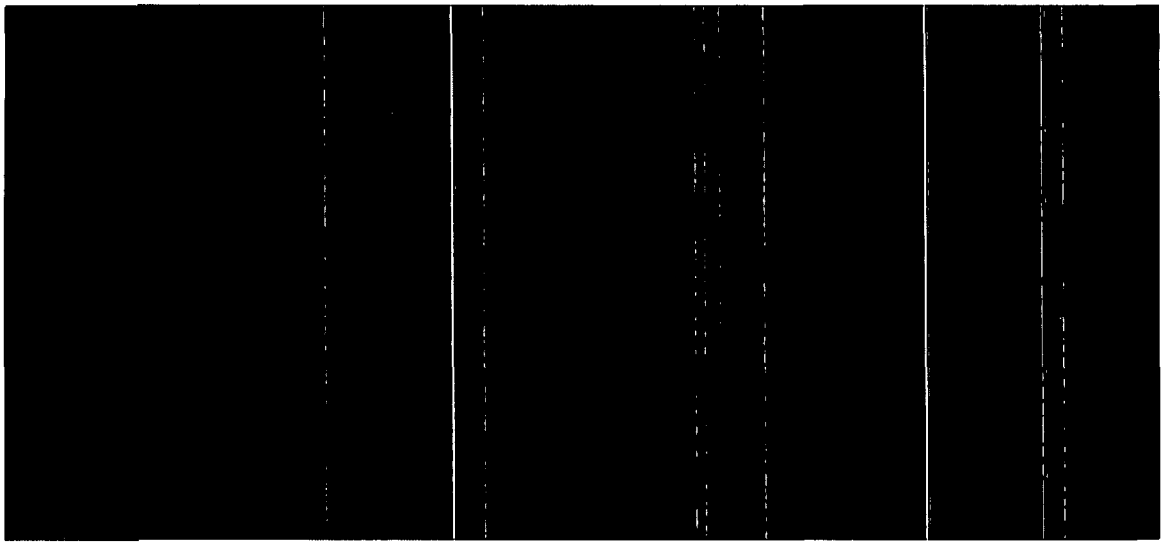


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

BUSINESS SENSITIVE

Test Configuration for Immunity to Conducted Disturbances

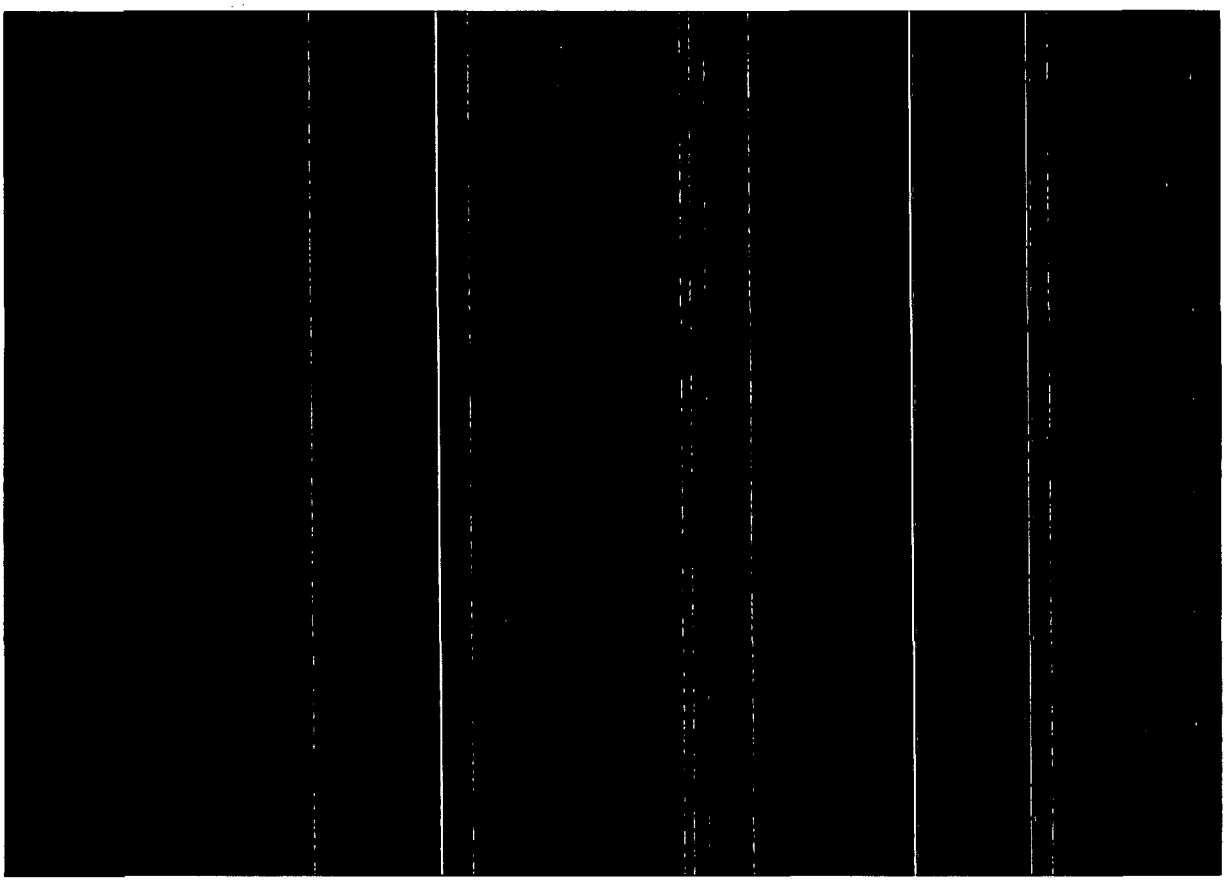


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

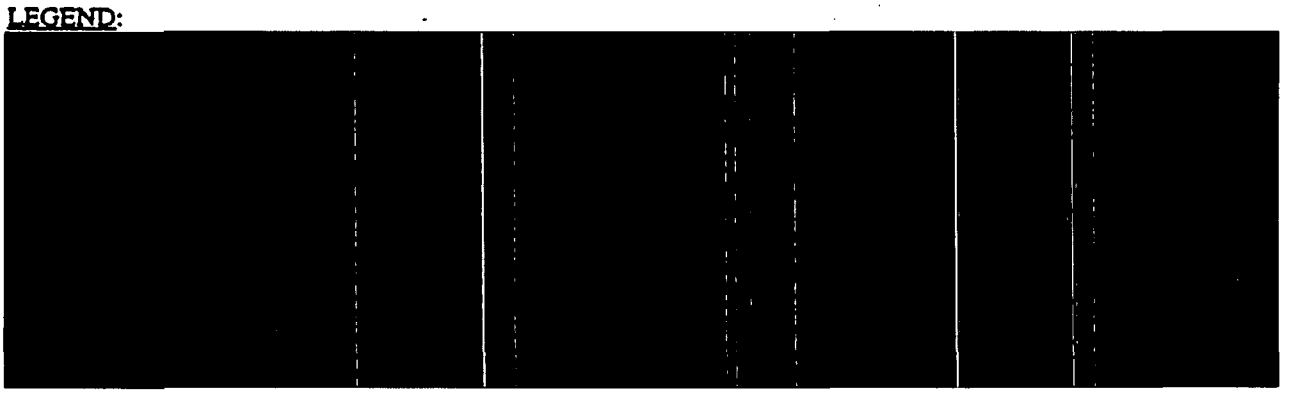
Report No. S7439-03

BUSINESS SENSTIVE

Radiated Emission Test Setup, 30 to 1,000 MHz



LEGEND:

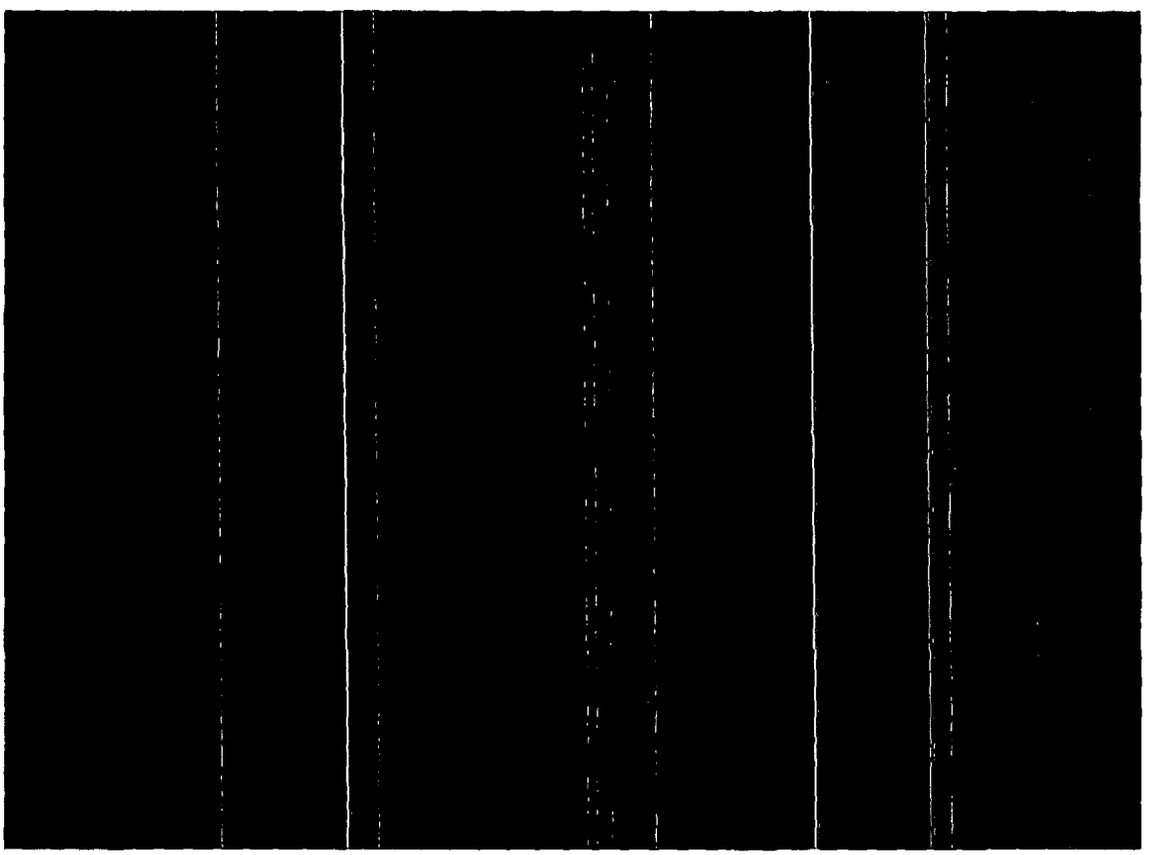


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

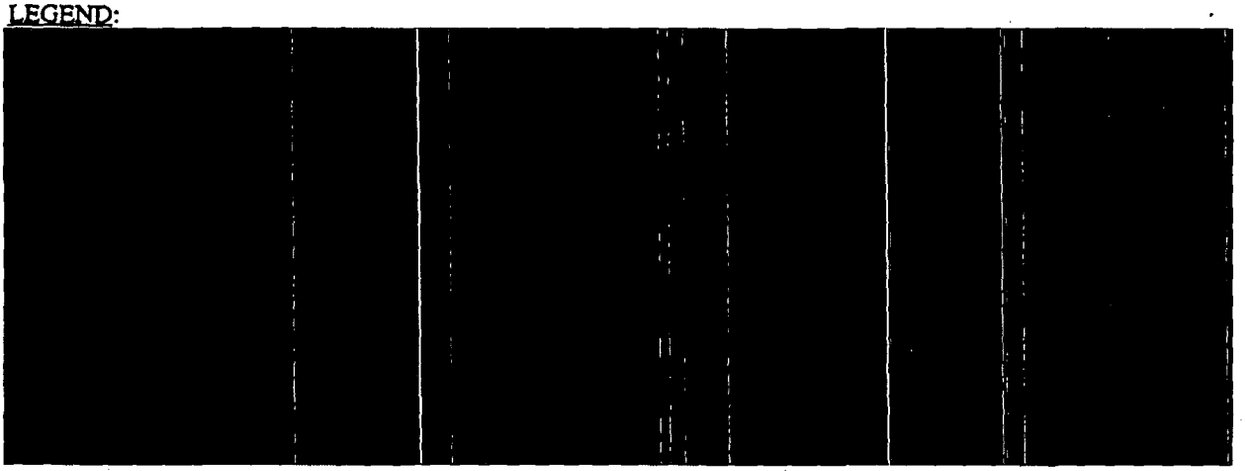
Report No. S7439-03

BUSINESS SENSITIVE

Conducted Emission Test Setup, 0.15 TO 30 MHz



LEGEND:

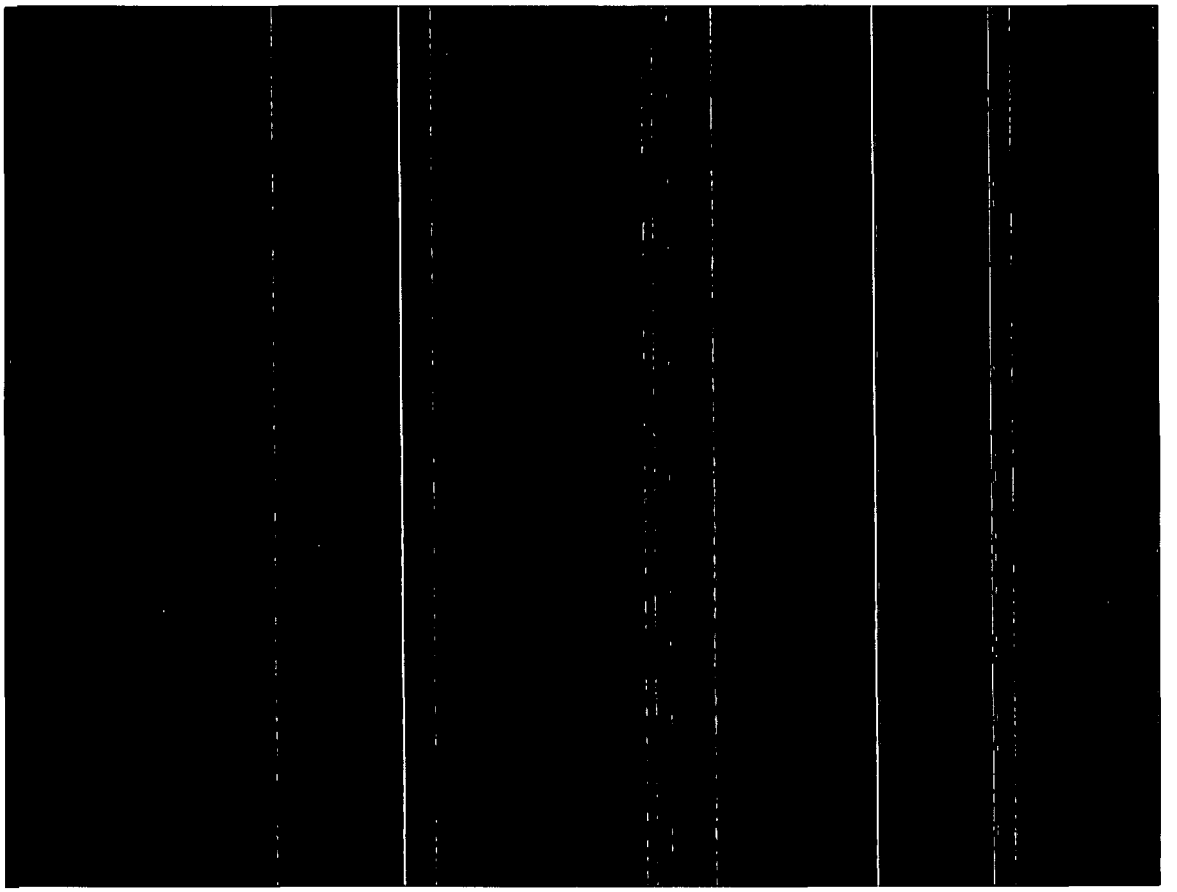


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE



CE102 TEST SETUP

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

Appendix A

Photographs

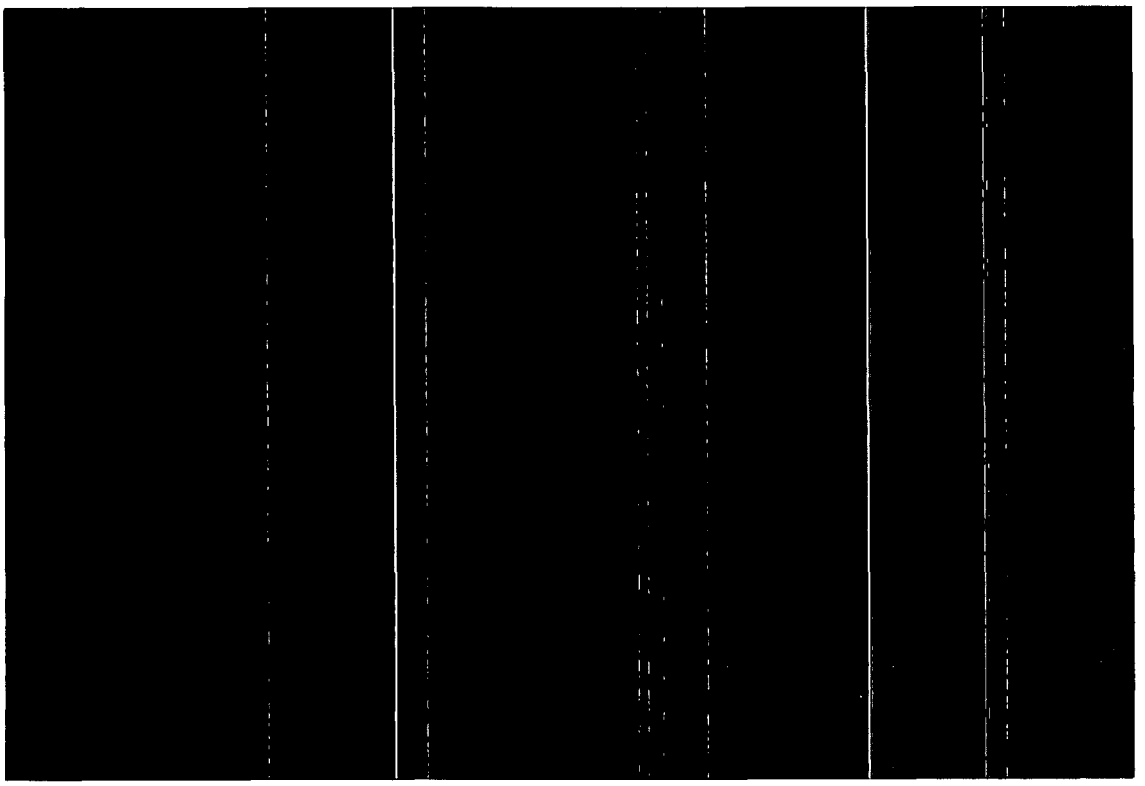
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Electrostatic Discharge (ESD)
IEC 1000-4-2/EN 61000-4-2

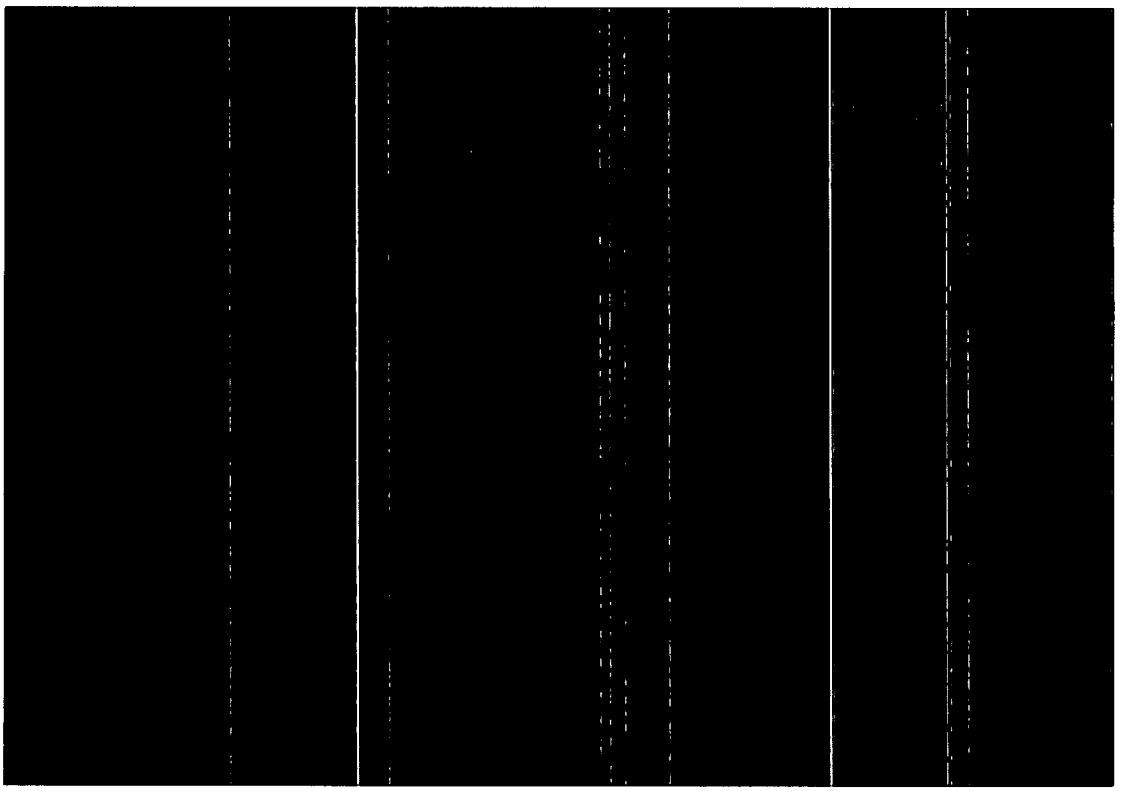


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Electrostatic Discharge (ESD)
IEC 1000-4-2/EN 61000-4-2



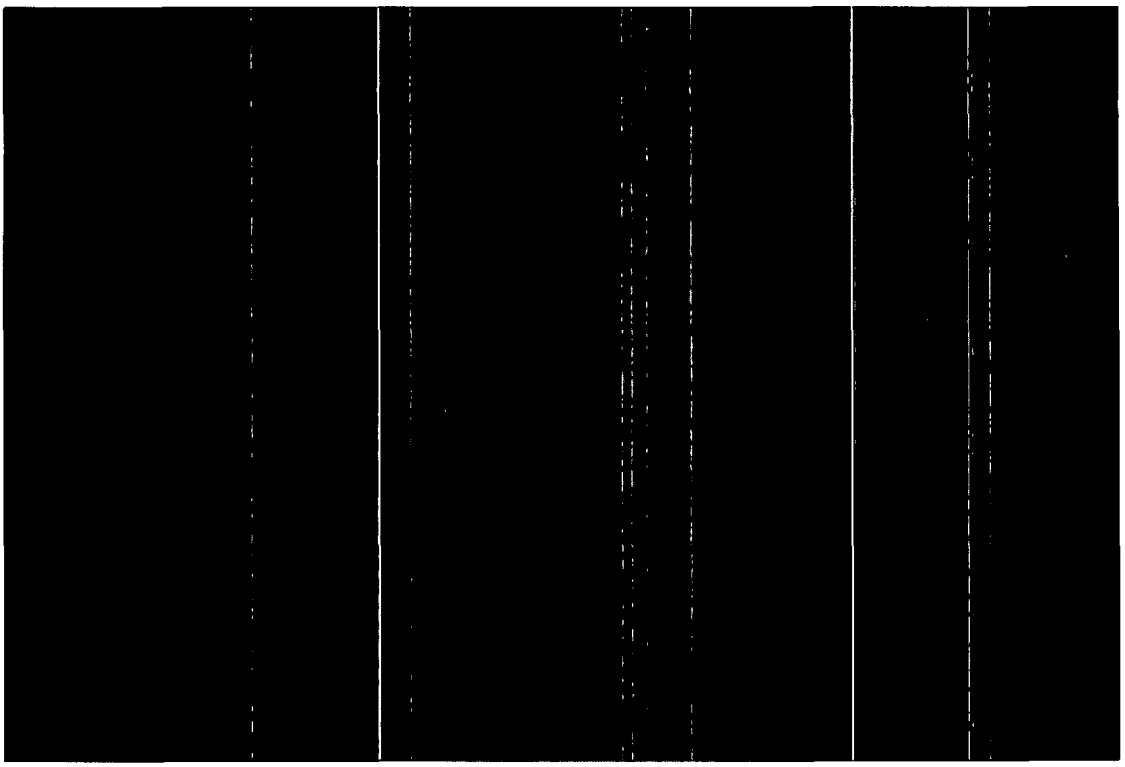
TÜV PRODUCT SERVICE. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Electromagnetic Field
IEC 1000-4-3/ENV 50140



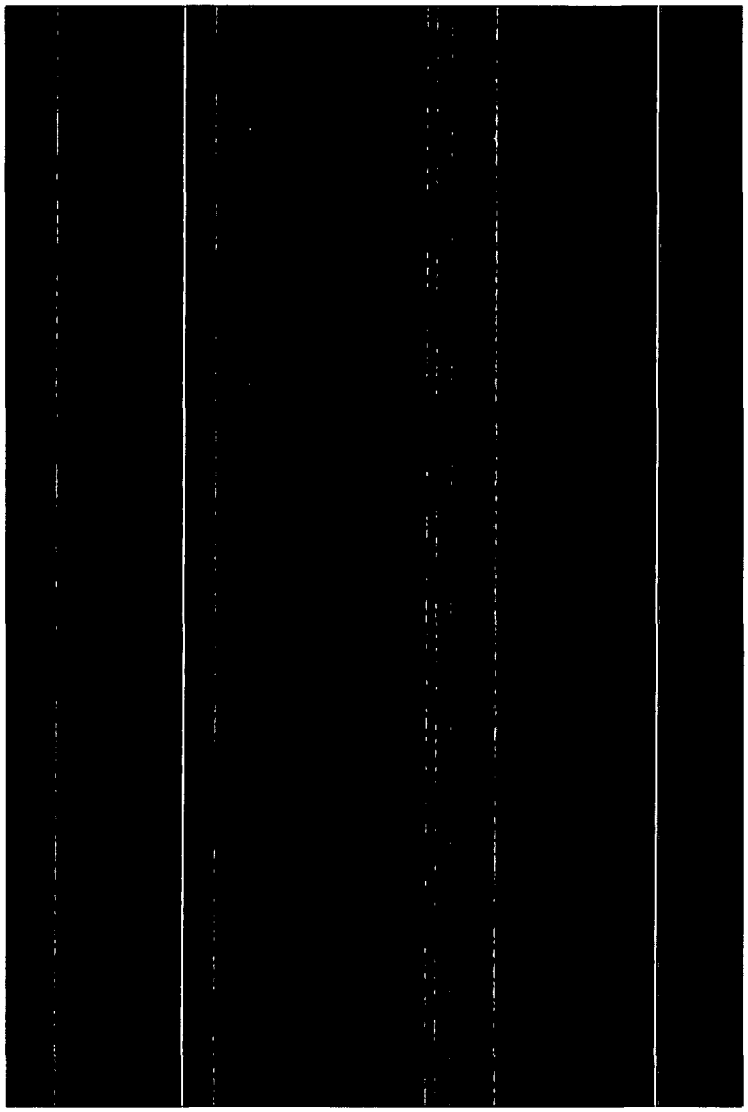
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Electromagnetic Field
IEC 1000-4-3/ENV 50140



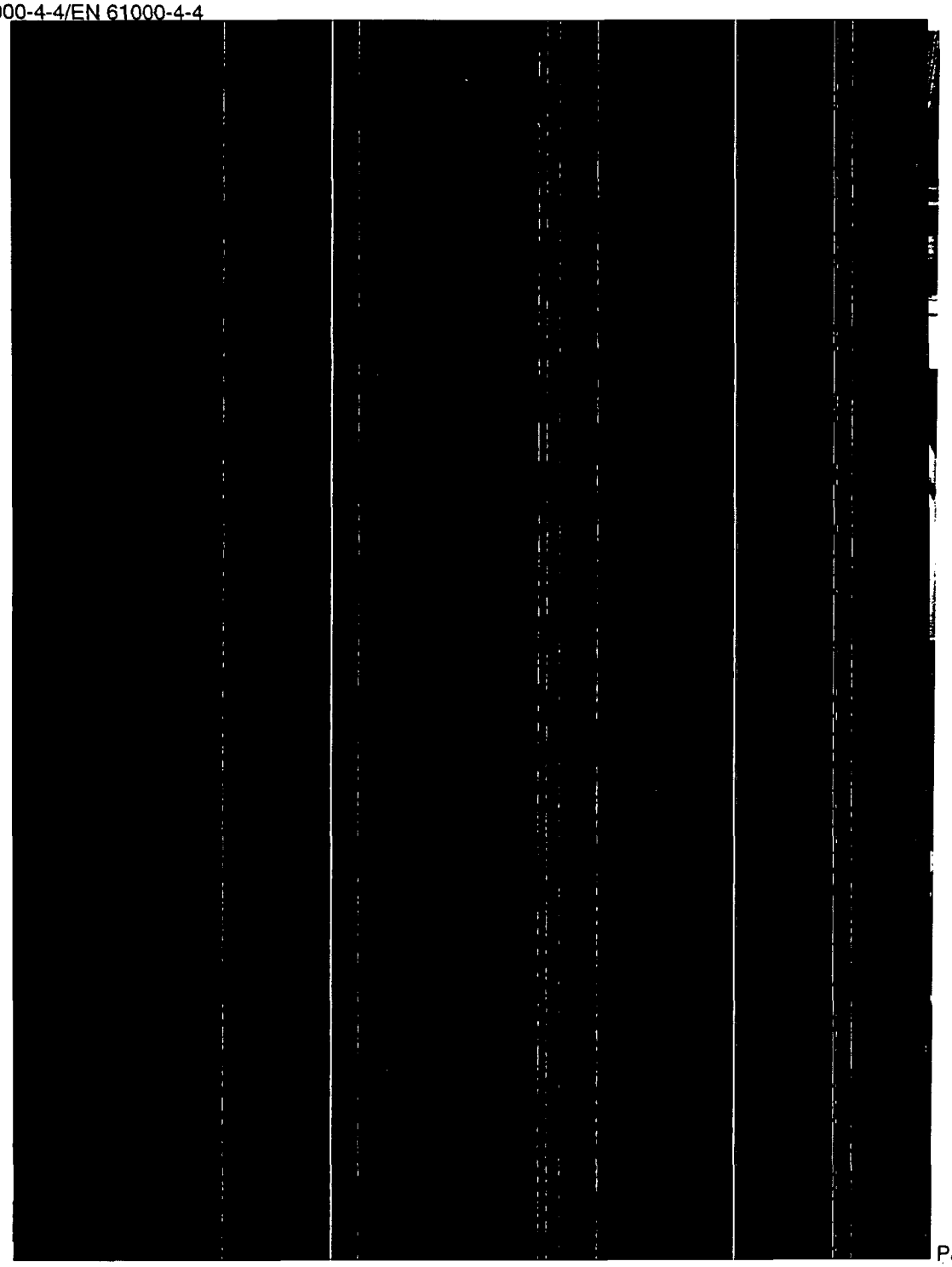
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Fast transients (BURST)
IEC 1000-4-4/EN 61000-4-4



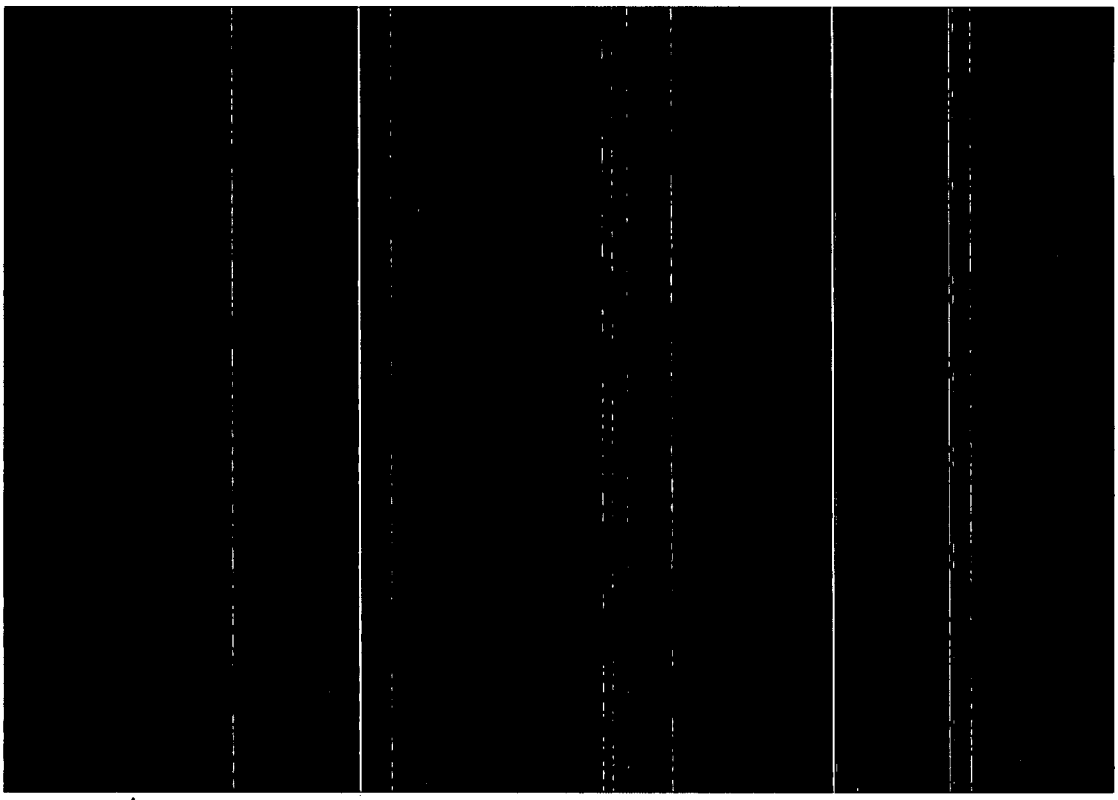
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
SURGE Transients
IEC 1000-4-5



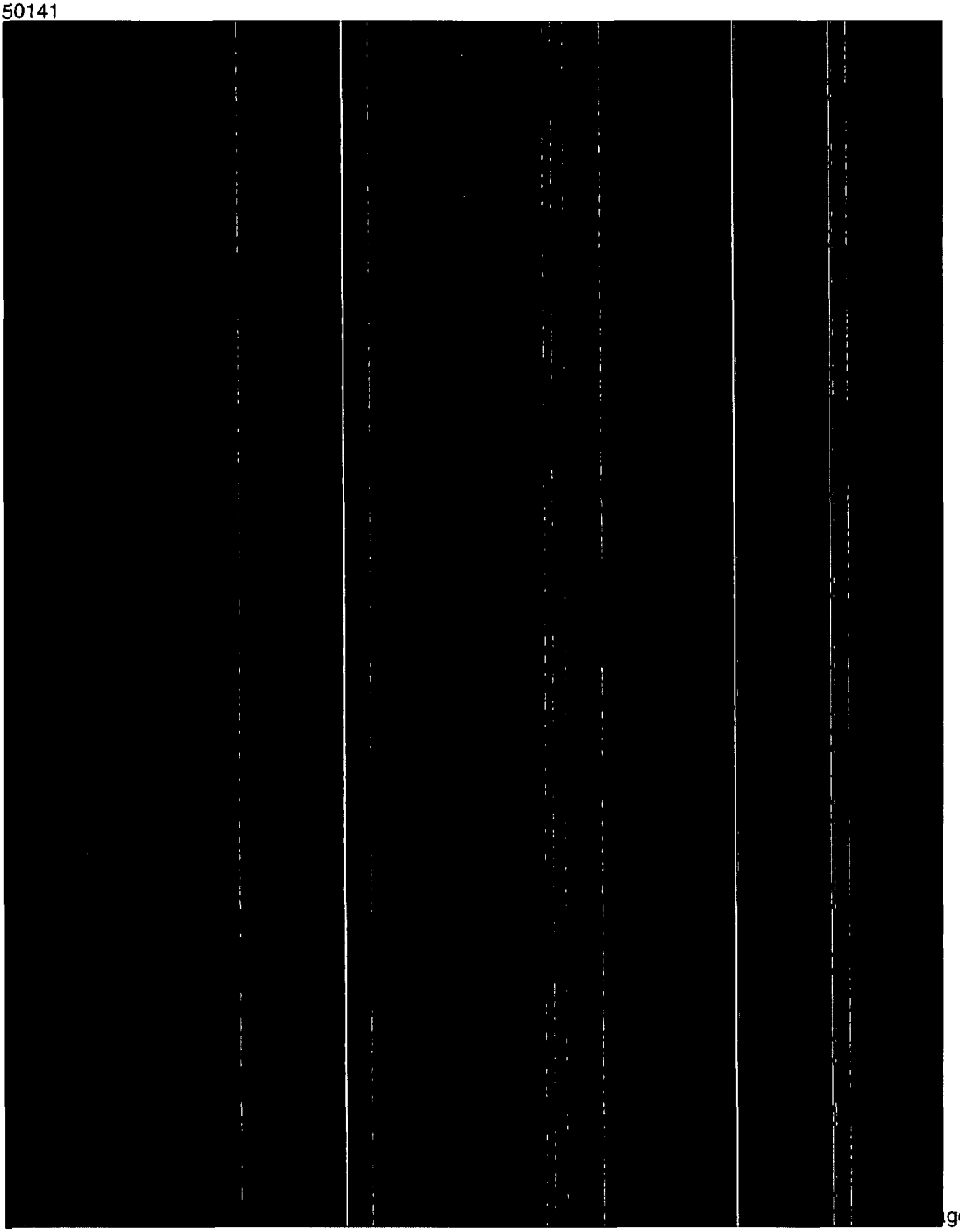
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Disturbance
ENV 50141



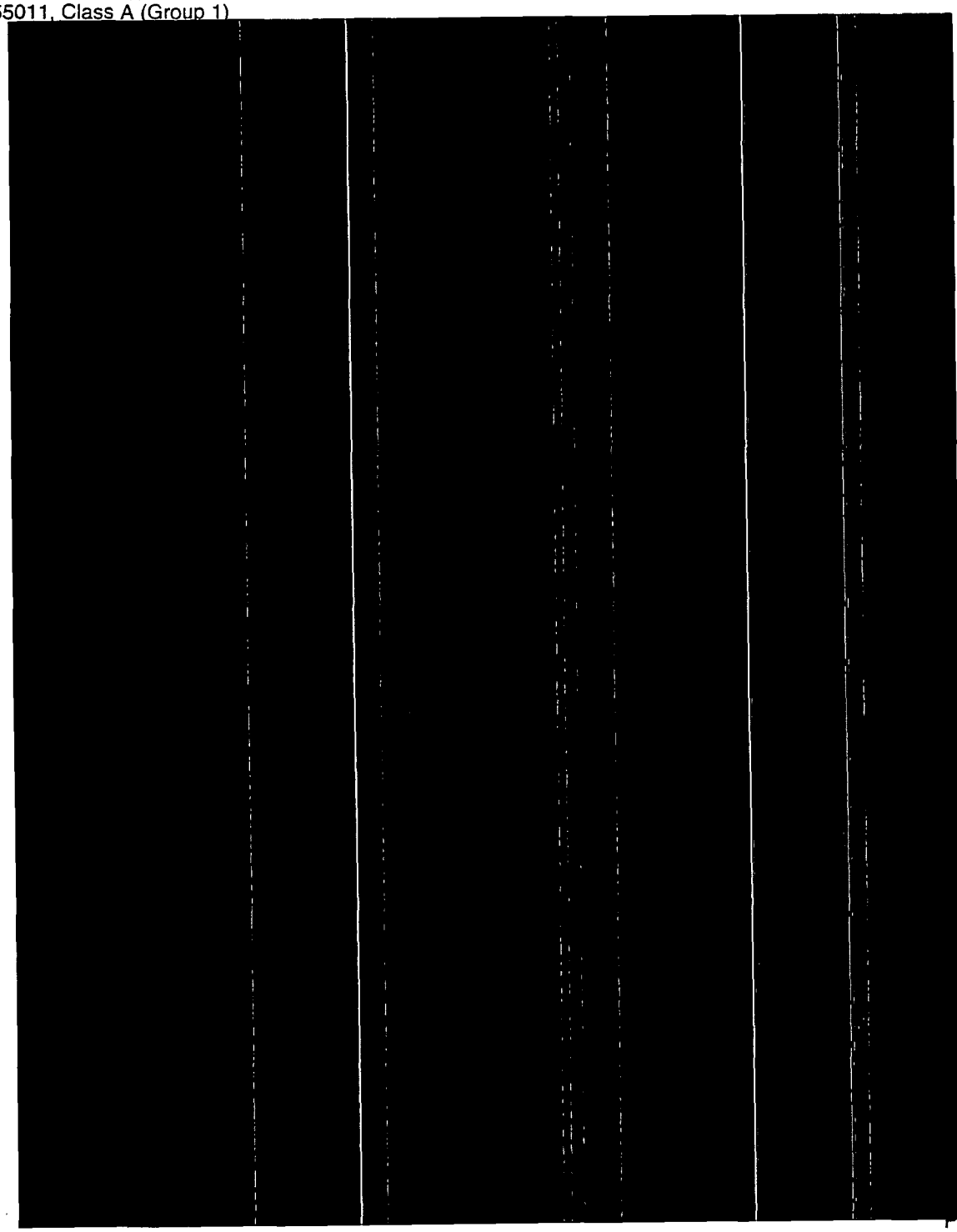
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Emissions
EN 55011, Class A (Group 1)



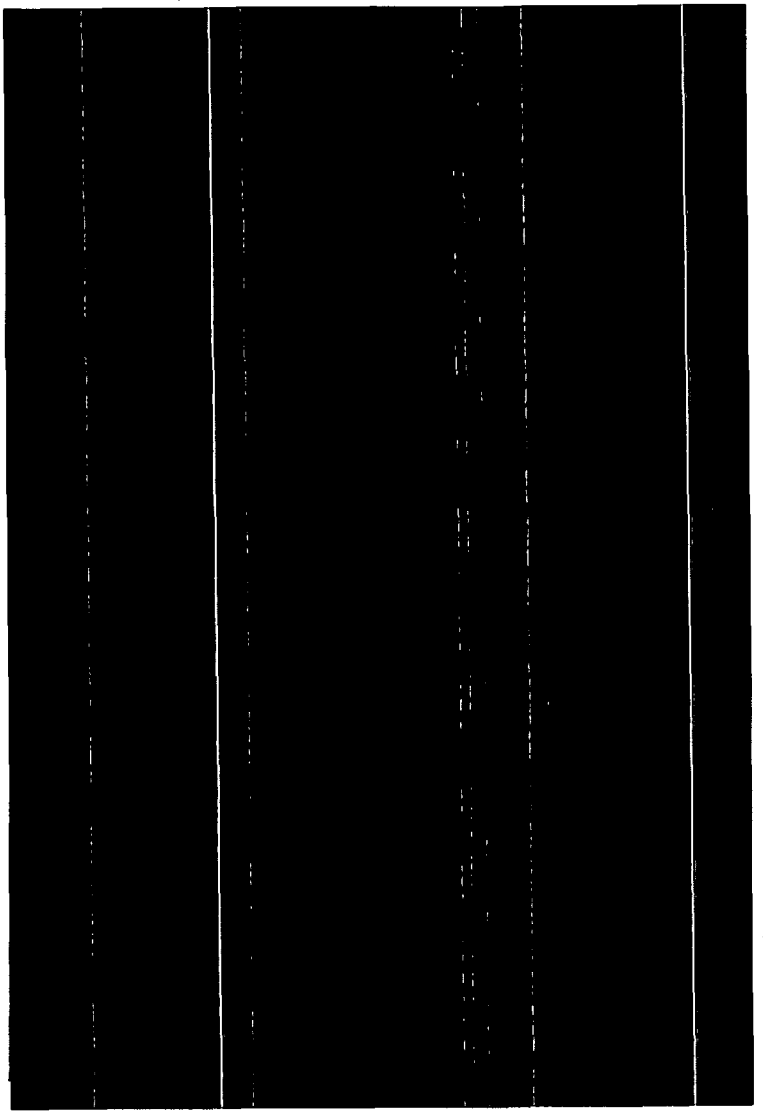
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Emissions
EN 55011, Class A (Group 1)



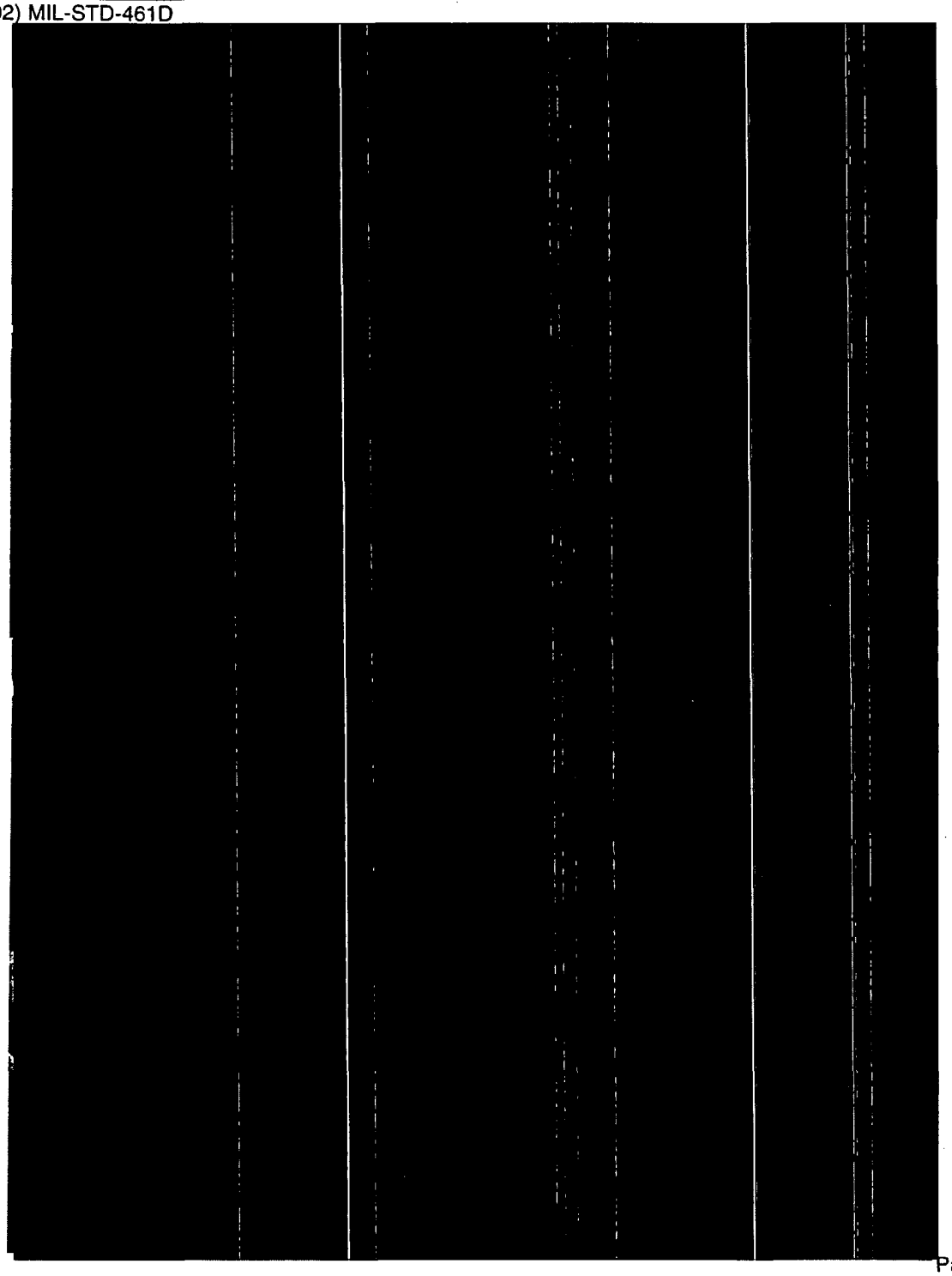
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
RF Conducted Emissions
(CE102) MIL-STD-461D



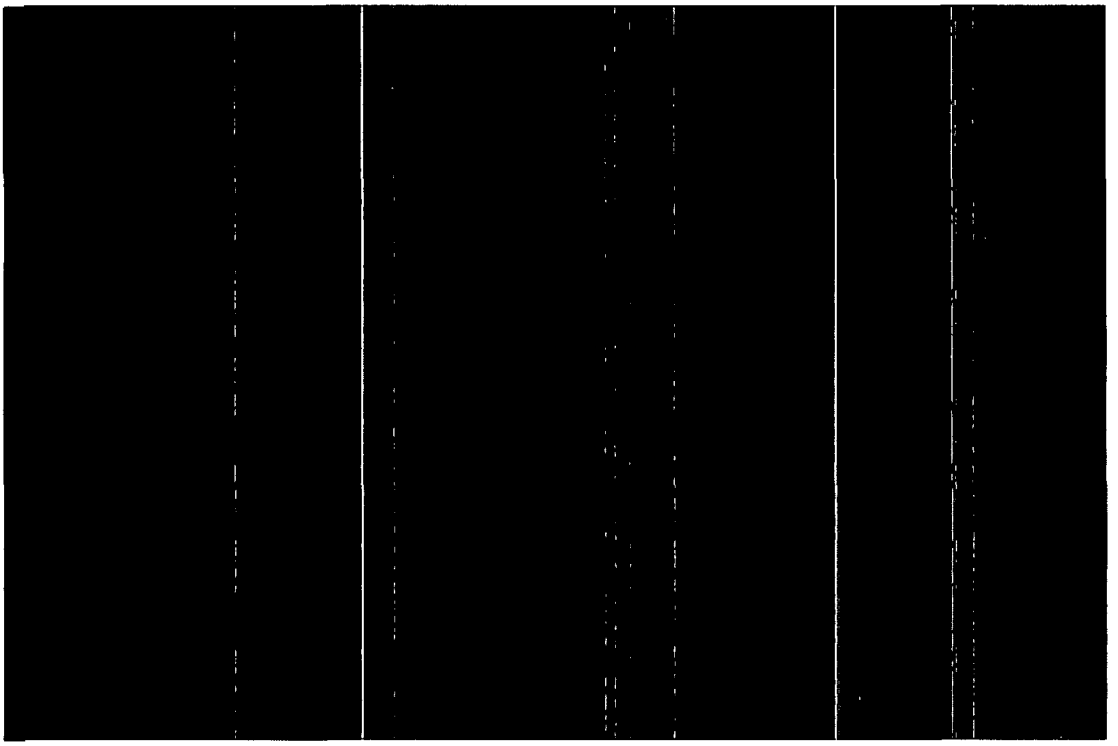
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego. CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

Photograph of Test Setup:
RF Conducted Susceptibility
(CS101) MIL-STD-461D



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

TÜV PRODUCT SERVICE

Appendix B

Product Information Form(s)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE

CUSTOMER INFORMATION	
COMPANY NAME:	SORRENTO ELECTRONICS
COMPANY ADDRESS:	10240 Flanders Court
	San Diego, CA 92121
PHONE NUMBER:	619 457 8954
FAX NUMBER:	619 453 4675
CUSTOMER CONTACT:	Walter Wong
PRODUCT DESCRIPTION	
NAME, MODEL, SERIAL # OF EUT:	Radiation Monitor, Single Channel, Model RM-1000, S/N MKT 012
DESCRIPTION OF EUT:	RM-1000 module assembly, detector assembly with interconnecting cable and power supply.

Components of EUT

Description	Model Number	Serial Number	SE ID Number
Module Assembly	RM-1000	MKT 012	04505101-001
Detector Assembly	RD25-03	N/A	02810033-003
Power Supply	S-25-24	C97740368	50015631-001
Cable Assembly	N/A	N/A	50000837-001

OPERATING MODE(S):	[redacted]
EUT CONFIGURATIONS:	
FREQUENCY/AC/DC VOLTAGE: PHASES (ø)/CURRENT (amps): OSCILLATOR FREQUENCIES:	
DESCRIPTION: MANUFACTURER, MODEL #, S/N # SWITCHING FREQUENCY: POWERLINE FILTER: MODEL #: DESCRIPTION OF ENCLOSURE: CRITICAL EMI COMPONENTS:	

INTERFACING AND/OR SIMULATORS PERIPHERAL EQUIPMENT:

[redacted]

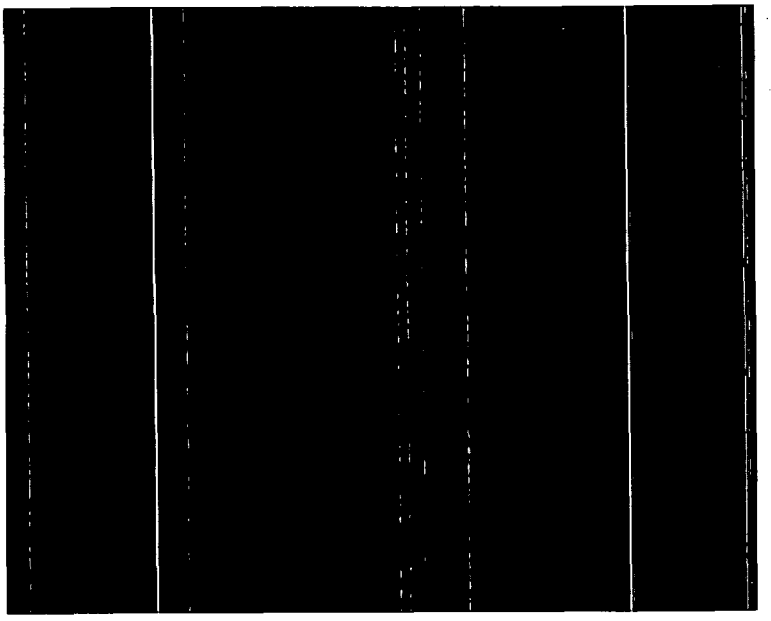
BLOCK DIAGRAM:	See page B3.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S7439-03

BUSINESS SENSITIVE



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Appendix C

Change History

Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S7439-03

Appendix D

Testing Facilities

Certificates of Approval

VCCI (3), NVLAP, EN 45001

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

VCCI

CERTIFICATE

Facility: Enclosure No. 1
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-211
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

CERTIFICATE

Facility: Enclosure No. 2
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

CERTIFICATE

Facility: Carroll Canyon Site
(Radiation 3, 10, 30meter site)

Company : TÜV Product Service Inc.

Address : 7562 Trade Street, San Diego,
CA 92121 U. S. A.

This is to certify that the folloving measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No. : R-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inte
Information Technology Equi

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
FCC

December 31, 1997
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 100268-0

NVLAP-01C (11-95)

TÜV
PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

December 19, 1996

[redacted]
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility & Telecommunications, FCC is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1997, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business-oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jon Crickenberger, Sr. Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Building 820, Room 282, Gaithersburg, MD 20899-0001; (301) 975-4016.

Sincerely,

[redacted]
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV
PRODUCT SERVICE

National Institute of Standards and Technology NVLAP® National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

Page: 1 of 1

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100268-0

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
[redacted]

NVLAP Code	*Designation / Description*
International Special Committee on Radio Interference (CISPR) Methods	
12/CIS22	IEC/CISPR 22:1993: Limits and methods of measurement of radio disturbance characteristics of information technology equipment
Federal Communications Commission (FCC) Methods	
12/F01	FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a	Conducted Emissions, Power Lines, 450 KHz to 30 MHz
12/F01b	Radiated Emissions

December 31, 1997
Effective through

[redacted]
For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
MIL-STD-462

December 31, 1997

Effective through

[redacted]

For the National Institute of Standards and Technology

NVLAP Lab Code: 100268-0

NVLAP-01C (11-95)

TÜV PRODUCT SERVICE

TÜV
PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

December 19, 1996

[redacted]
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility, MIL-STD-462 is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1997, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business-oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jon Crickenberger, Sr. Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Building 820, Room 282, Gaithersburg, MD 20899-0001; (301) 975-4016.

Sincerely,

[redacted]
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV
PRODUCT SERVICE

National Institute of Standards and Technology NVLAP® National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
San Diego, CA 92121
[redacted]

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
Conducted Emissions:	
12/A01	MIL-STD-462 Method CE01
12/A04	MIL-STD-462 Method CE02
12/A06	MIL-STD-462 Method CE03
12/A08	MIL-STD-462 Method CE04
12/A10	MIL-STD-462 Method CE06
12/A12	MIL-STD-462 Method CE07
Conducted Susceptibility:	
12/B01	MIL-STD-462 Method CS01
12/B02	MIL-STD-462 Method CS02
12/B04	MIL-STD-462 Method CS03/CS04/CS05/CS08

December 31, 1997
Effective through

[redacted]
For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
12/B05	MIL-STD-462 Method CS06
12/B06	MIL-STD-462 Method CS07
12/B07	MIL-STD-462 Method CS09
Radiated Emissions:	
12/D01	MIL-STD-462 Method RE01
12/D02	MIL-STD-462 Method RE02
12/D03	MIL-STD-462 Method RE03
Radiated Susceptibility:	
12/E01	MIL-STD-462 Method RS01
12/E02	MIL-STD-462 Method RS02
12/E03	MIL-STD-462 Method RS03 (Consult laboratory for field strengths available)
12/E04	MIL-STD-462 Method RS03 employing RADHAZ procedures for high level testing (Consult laboratory for field strengths available)

December 31, 1997

Effective through

[redacted]

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

July 10, 1996

IN REPLY REFER TO
31040/SIT
1300F2

TUV Product Service
10040 Mesa Rim Road
San Diego, CA 92121-2912

[redacted]

Re: Measurement facility located at Carroll Canyon, Site No. 2
(3 and 10 meters)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,

[redacted]

Electronics Engineer
Customer Service Branch

Enclosure:
PAL PN

TÜV
PRODUCT SERVICE

COMMERCE
MINISTRY OF COMMERCE
Te Manatū Tauhokohoko

ENG 3/9
AJD

1 May 1997

TUV Product Service Inc
1775 Old Highway 8
Suite 104
New Brighton
MN 55112-1891
UNITED STATES OF AMERICA

[redacted]

Dear Sir

LABORATORY APPROVAL

Thank you for your submission of 11 April regarding the approval of your testing laboratories at New Brighton, Boulder and San Diego to the Ministry of Commerce's laboratory approval criteria. Thank you for your interest in this matter.

I am pleased to advise that your submission has been successful and these laboratories have been added to the list of Ministry-approved laboratories. Your approved status is valid until 1 April 1999. Renewal of your approval at this time will require further demonstration of your compliance with the approval criteria. You will be advised of the requirements of renewal prior to the expiry date of your approval.

If you have any further questions on this matter please do not hesitate to contact me.

Yours faithfully

[redacted]
Senior Technical Officer(Regulatory)

COMMUNICATIONS DIVISION - RADIO OPERATIONS
Ensuring New Zealand has the best possible communications environment
Head Office, Ministry of Commerce Building, 33 Bowen Street, P.O. Box 2847, Wellington, New Zealand. Telephone (04) 472 0030. Fax (04) 473 2489

TÜV
PRODUCT SERVICE

CERTIFICATE FOR LISTING
A97/TH/0098

TUV PRODUCT SERVICE
(SAN DIEGO)

is an AUSTEL listed test house having satisfied NATA's (or its Associates with which it has a MoU or MRA for mutual recognition of test houses) requirements for testing to the following standards:

AS/NZS 3548 Limits and methods of measurement of radio disturbance characteristics of information technology equipment

[redacted]
General Manager
Technical Branch

Date 11 February 1997

This certificate is valid as long as the accreditation is maintained with NATA or its Associate.

AUSTEL
AUSTRALIAN TELECOMMUNICATIONS AUTHORITY

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

BUSINESS SENSITIVE

CERTIFICATE

TÜV PRODUCT SERVICE

CERTIFICATE OF COMPLIANCE OF THE QUALITY SYSTEM WITH REQUIREMENTS MENTIONED BELOW

TÜV PRODUCT SERVICE GmbH certifies that

TÜV PRODUCT SERVICE Inc., USA

in the facilities

Test Laboratories
10040 Mesa Rim Road, San Diego CA 92121

for the following areas:

Services for EMC and Product Safety Testing

has established and is operating a quality system which meets the requirement(s) of the internal quality management system of TÜV PRODUCT SERVICE GmbH which is based on EN 45001:05/90.

Munich, 18 May, 1995

TÜV PRODUCT SERVICE GmbH

For the Executive Committee of TÜV PRODUCT SERVICE

[redacted]

TÜV PRODUCT SERVICE GmbH, Ridlerstrasse 31, 80339 Munich, Germany

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

TAIWAN

Bureau of Commodity Inspection and Quarantine (BCIQ)

EMC Laboratory Accreditation Number

SL2-IN-E-25T

最速件

經濟部商品檢驗局（函）　附件如文　中華民國捌拾陸年拾月拾肆日　檢台(八十六)二字第 [illegible] 號

受文者：新加坡商台德產品驗證顧問股份有限公司台灣分公司

行文單位：正本：新加坡商台德產品驗證顧問股份有限公司台灣分公司

副本：本局第二組（二份）、資訊室、秘書室（秘四科）、檢驗處、各分局（無附件）

主旨：有關　貴公司代理美國本土『TUV PRODUCT SERVICE, INC.』電磁相容檢測實驗室申請本局電磁相容檢測領域認可案，經初步審查所附技術文件尚可接受，同意授與臨時認可如說明，請　查照。

說明：

一、復　貴公司八十六年七月十五日未列字號申請書。

二、核備登錄範圍如下：

實驗室名稱：TUV PRODUCT SERVICE, INC. SAN DIEGO, CA

實驗室地址：10040 Mesa Rim Road San Diego CA 92121 USA

認可代號	認可產品類別	報告簽署人
SL2-IN-E-25T	(II) 資訊設備 (CNS-13438)	JOHN G. SMITH

聯絡單位：新加坡商台德產品驗證顧問股份有限公司台灣分公司（盧嘉弘）

地址：台北縣三重市重新路五段609巷4號5樓

電話：（02）999-3950

三、本臨時認可文件有效期限自即日起至八十七年六月三十日止，期間內本局將安排人員實地評鑑，關於必備文件「中文品質手冊（Quality Manual in Chinese）」准寬限至文到三個月內送達本局，並請提供試驗室與附近國際機場之位置簡圖，以利安排評鑑業務。

四、本臨時認可資格，僅限受理美國本土廠商之商品電磁相容委託測試案件。

五、上開已認可領域如有變更事項，請於變更日起二週內函送相關資料至本局核辦。

六、檢送「商品電磁相容型式試驗報告」格式乙份，請自行印製使用。

局長 [illegible]

依照分層負責規定授權簽發並代行

Report No. S7439-03

Appendix E

Supplemental Information

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TEST PARAMETER	STANDARD	FREQUENCY RANGE	TEST LEVEL/LIMIT	ANTENNA DISTANCE	ANTENNA TYPE	REMARKS
HF Radiated RF Susceptibility	IEC 1000-4-3 (IEC 801-3)	27 MHz to 80 MHz 80 MHz to 1000 MHz	10 V/meter	3 meters	Biconical Log-periodic	[redacted]
LF Conducted RF Susceptibility	MIL-STD-461D CS-101	30 Hz to 150 KHz	6.3 V rms	NA	NA	
HF Conducted RF Susceptibility	IEC 1000-4-6 (IEC 801-6)	150 KHz to 400 MHz	10 V (emf)	NA	NA	
Surge Susceptibility	IEC 1000-4-5 (IEC 801-5)	NA	± 3 KV (open circuit voltage)	NA	NA	
EFT Susceptibility	IEC 1000-4-4 (IEC 801-4)	NA	Power leads: ± 4 KV; Data/ctrl leads: ± 2 KV	NA	NA	
ESD Susceptibility	IEC 1000-4-2 (IEC 801-2)	NA	Contact discharge: ± 4 KV; Air discharge: ± 8 KV	NA	NA	
Radiated RF Emissions	CENELEC EN 55011, Group 1, Class A	30 MHz to 230 MHz 230 MHz to 1 GHz	30 dBμV/meter 37 dBμV/meter	30 meter 30 meter	Biconical Log-periodic	
Conducted RF Emissions	MIL-STD-461D CE-102	10 KHz to 500 KHz 500 Khz to 400 MHz*	100 dBμV 66 dBμV	NA	NA	

* Test Plan deviation Stopped at 100 MHz

CE EN 55011 GROUP 1, CLASS A 150 KHz - 30 MHz TVA RM-1000 EMC TEST STANDARDS

W. Wong
11/10/97

APPENDIX B

TÜV Test Report

S8569-02

11Dec1998

RM-1000 Radiation Monitor
Two Channel

Report No. S8569-02

TÜV PRODUCT SERVICE

BUSINESS SENSITIVE

EMC - TEST REPORT

EUROPEAN STANDARDS* EN 61000-4-2: 1995; EN 61000-4-3: 1995; EN 61000-4-4: 1995; EN 61000-4-5: 1995; ENV 50141: 1993; EN 61000-4-8: 1994; EN 61000-4-11: 1994; EN 55011;
UNITED STATES STANDARD* MIL-STD-461D: 1993, CS101 and CE102

Test Report File No.	: **S8569-02**	Date of Issue: 11 December 1998
Model / Serial No.	: **RM-1000 Radiation Monitor, Two Channel / ----**	
Product Type	: RM-100 Radiation Monitor, Two Channel	
Applicant	: SORRENTO ELECTRONICS	
Manufacturer	: SORRENTO ELECTRONICS	
License holder	: SORRENTO ELECTRONICS	
Address	: 10240 Flanders Court	
	: San Diego, CA 92121	
Test Result	: [redacted]	
Test Project Number References	**S8569-02**	
Total pages - Test Report	: 23	

(*) All tests performed per customer Test Procedure, Drawing No. 04509005.

TÜV Product Service, Inc. is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV Product Service, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service, Inc. issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service, Inc. and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

TÜV PRODUCT SERVICE

DIRECTORY - IMMUNITY
Test Report

Technical Documentation

Appendices

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

Supplemental Information

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TEST REGULATIONS :

The immunity and emissions tests were performed according to the following regulations :

■ - EN 61000-4-2 / 1995*
■ - EN 61000-4-3 / 1995*
■ - EN 61000-4-4 / 1995*
■ - EN 61000-4-5 / 1995*
■ - EN 61000-4-8 / 1994*
■ - EN 61000-4-11 / 1994*
■ - EN 55011, Class A*

■ - ENV 50141 / 1993*

■ - MIL-STD-461D: 1993
  ■ - CS101*
  ■ - CE102*

(*) All tests performed per customer Test Procedure, Drawing No. 04509005.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

BUSINESS SENSITIVE

Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 21-24 °C
Relative Humidity:	: 17-50 %
Atmospheric Pressure:	: 100.7-101.9 kPa

Power Supply Utilized:

Power supply system [redacted]

Symbol Definitions:

■ - Applicable
☐ - Not Applicable

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* events was performed in the following location at the San Diego Testing Facility :

☐ - **Test not applicable**

■ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:

Discharge Voltage (Air):

Discharge Voltage (Contact):

Discharge Impedance:

Discharge Repetition Rate:

Number of Discharges:

Kind of Discharges:

Polarity:

Location of Discharge:

[redacted]

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD), continued

Result :

[redacted]

Remarks: [redacted]

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS

The immunity against *RADIATED ELECTROMAGNETIC FIELDS* exposure was performed in the following location at the San Diego Testing Facility:

☐ **- Test not applicable**

☐ - SR-1, Shielded Room, 12' x 24' x 10', Metal, Compact Anechoic Chamber
■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber

Test Equipment Used :

[redacted]

Test Specification:

Frequency Range: [redacted]

Field Strength:

Distance Antenna - EUT:

Modulation:

Step:

Polarization of Antenna:

Result : [redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: FAST TRANSIENTS (BURST)

The Immunity against *FAST TRANSIENTS (BURST)* events was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

☐ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:

Pulse Amplitude - AC Power Port:

Pulse Amplitude - DC Power Port:

Pulse Amplitude - Signal/Data Non control Port:

Pulse Amplitude - Process: Measurement & Control Port

Burst Frequency:

Time of Coupling:

Coupling Method:

Polarity:

[redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: FAST TRANSIENTS (BURST), continued

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
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status of lines:
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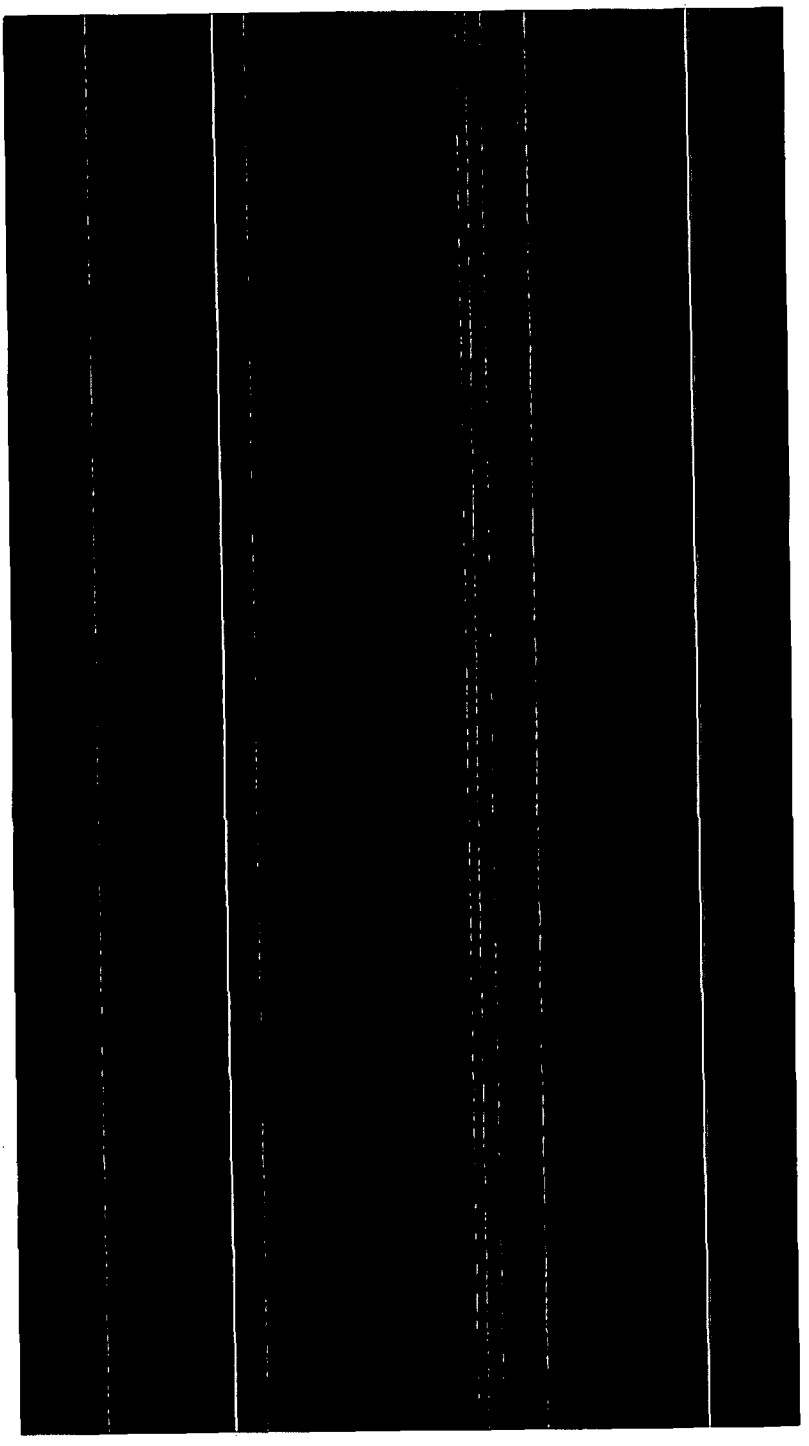

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: FAST TRANSIENTS (BURST), continued

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

[redacted]

Result :

[redacted]

Remarks: [redacted]

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* events was performed in the following test location at the San Diego Testing Facility:

☐ - Test not applicable

■ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-4, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber

Test Equipment Used :

[redacted]

Test Specification:

Pulse Amplitude - AC Power Port: (Common Mode)

Source Impedance: (Common Mode)

Pulse Amplitude - AC Power Port: (Differential Mode)

Source Impedance: (Differential Mode)

Pulse Amplitude - DC Power Port:

Pulse Amplitude - Signal/Data Non control Port:

Pulse Amplitude - Process: Measurement & Control Port

Source Impedance:

[redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: SURGE TRANSIENTS, continued

Test Specification (continued):

Number of Surges: [redacted]

Angle:

Repetition Rate:

Polarity:

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

Result: [redacted]

Remarks: [redacted]

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Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: CONDUCTED SUSCEPTIBILITY, Power Leads (CS101)

The *CONDUCTED SUSCEPTIBILITY test* was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber

Test Equipment Used :

Model #	Prop #	Manufacturer	Description	Serial #
[redacted]				

Test Specification:

Frequency Range: [redacted]

Test Level (dBµV):

Injected Voltage dBµV:

Injection Location:

Result : [redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

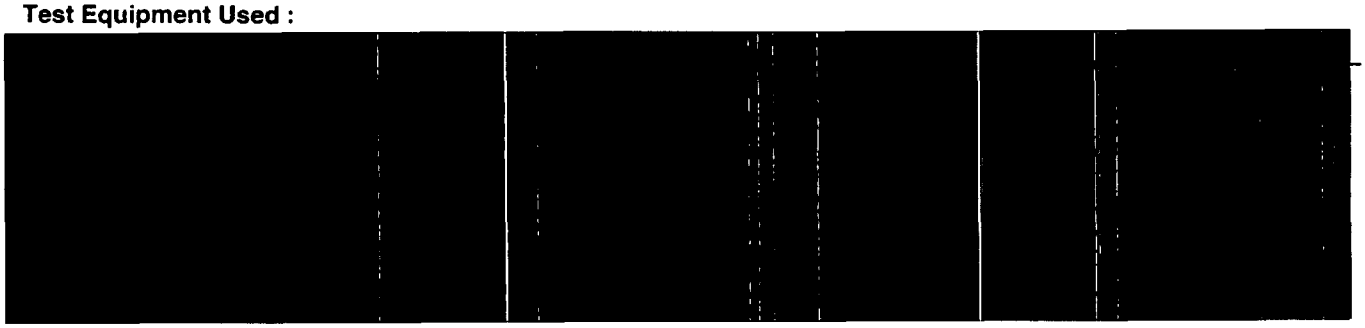
Immunity Test Conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* events, induced by radio frequency fields above 9 kHz, was performed in the following test location at the San Diego Testing Facility:

☐ - Test not applicable

☐ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :



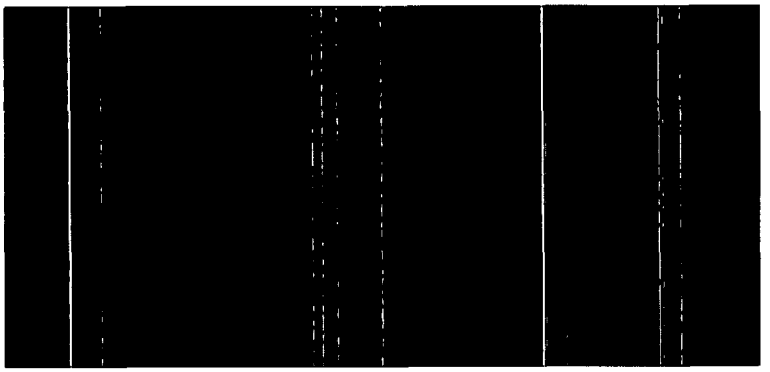
Test Specification:

Frequency Range:

Voltage Level (EMF):

Modulation:

Step:



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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: CONDUCTED DISTURBANCE (continued)

Location of Coupling:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

name of lines:
type of lines:
status of lines:
kind of transmission:
length of lines:

[redacted]

Result :

[redacted]

Remarks: [redacted]

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: POWER FREQUENCY MAGNETIC FIELD

The immunity against *RF FREQUENCY MAGNETIC FIELD* exposure, induced by radio frequency fields above 9 kHz, was performed in the following test location at the San Diego Testing Facility:

☐ - **Test not applicable**

■ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-2, Shielded Room, 12' x 24' x 10', Copper Screen Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 18', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ -

Test Equipment Used :

[redacted]

Test Specification:

Frequency Range:

Field level (EMF):

Short Field (1-3 sec):

Duration:

Axis of Orientation:

[redacted]

Result :

[redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Immunity Test Conditions: VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

The immunity against *VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS* events, induced by radio frequency fields above 9 kHz, was performed in the following test location at the San Diego Testing Facility:

☐ - Test not applicable

■ - TR-1, Test Room
☐ - TR-2, Non-Shielded Room, 10' x 19' x 9'
☐ - TR-3, Non-Shielded Room, 10' x 19' x 9'
☐ - SR-2, Shielded Room, 12' x 24' x 10', Copper Screen Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ -

Test Equipment Used :

[redacted]

Test Specification:

Nominal Mains Voltage (V_{NOM}):

Level of Reduction (dip):

Duration:

Phase Angle:

[redacted]

Result :

[redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - **Test not applicable**

☐ - Roof (Small Open Area Test Site)
■ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of :

[redacted]

Test Equipment Used :

[redacted]

Result :

[redacted]

Remarks: [redacted]

[redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - **Test not applicable**

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

[redacted]

Result :

[redacted]

Remarks: [redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Conditions: CE102 - Conducted Emissions, Power Leads

The *Conducted Emissions, Power Lines* test was performed in the following location at the San Diego Testing Facility :

☐ - **Test not applicable**

■ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber

Test Equipment Used :

[redacted]

Test Specification:

Frequency: [redacted]

Ground Bonding:

Current Probe:

Load:

Result : [redacted]

Remarks: [redacted]

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Equipment Under Test (EUT) Test Operation Mode - Immunity Tests :

The equipment under test was operated under the following conditions during immunity testing :

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

☐ - Practice Operation

■ - Normal Operating Mode

☐ - _____

Configuration of the equipment under test:

☐ - See Constructional Data Form in Appendix B - Page B2

■ - See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS. No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

GENERAL REMARKS:

(*) All tests performed per customer test procedure [redacted]

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.*

☐ - **Does not** fulfill the general approval requirements cited on page 3.

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. There may be some degree or level of measurement uncertainty. As EN 45001 does not allow recommendations to be included in the test report, the reader is encouraged to request a copy of the TÜV policy concerning pass or fail judgment with respect to possible measurement uncertainties.

Equipment Received Date: 24 November 1998

Testing Start Date: 24 November 1998

Testing End Date: 25 November 1998

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer: [redacted] (EMC Engineer)

Responsible Test Engineer: _____ (EMC Test Engineer)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

Technical Documentation

Test Data Sheets

and

Test Setup Drawing(s)

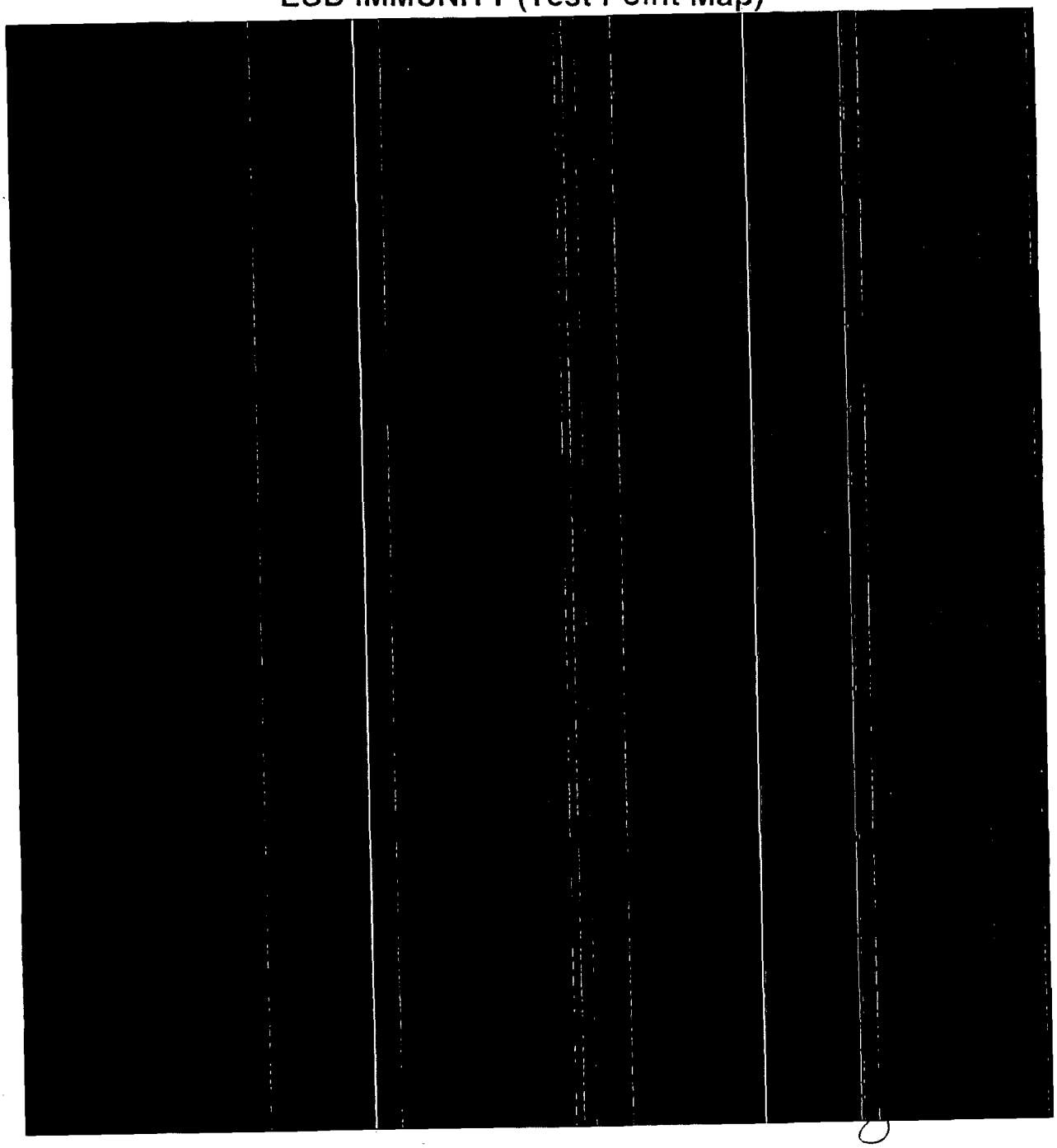
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

ESD IMMUNITY (Test Point Map)



ESDMAP.DOC Rev. 03.97

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

ESD IMMUNITY

Test Report #: S-8569 Test Area: TR-1

Test Method EN 61000-4-2 Date: 09 DEC 96

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM 1000

EUT Description: 2 CH Radiation Monitor

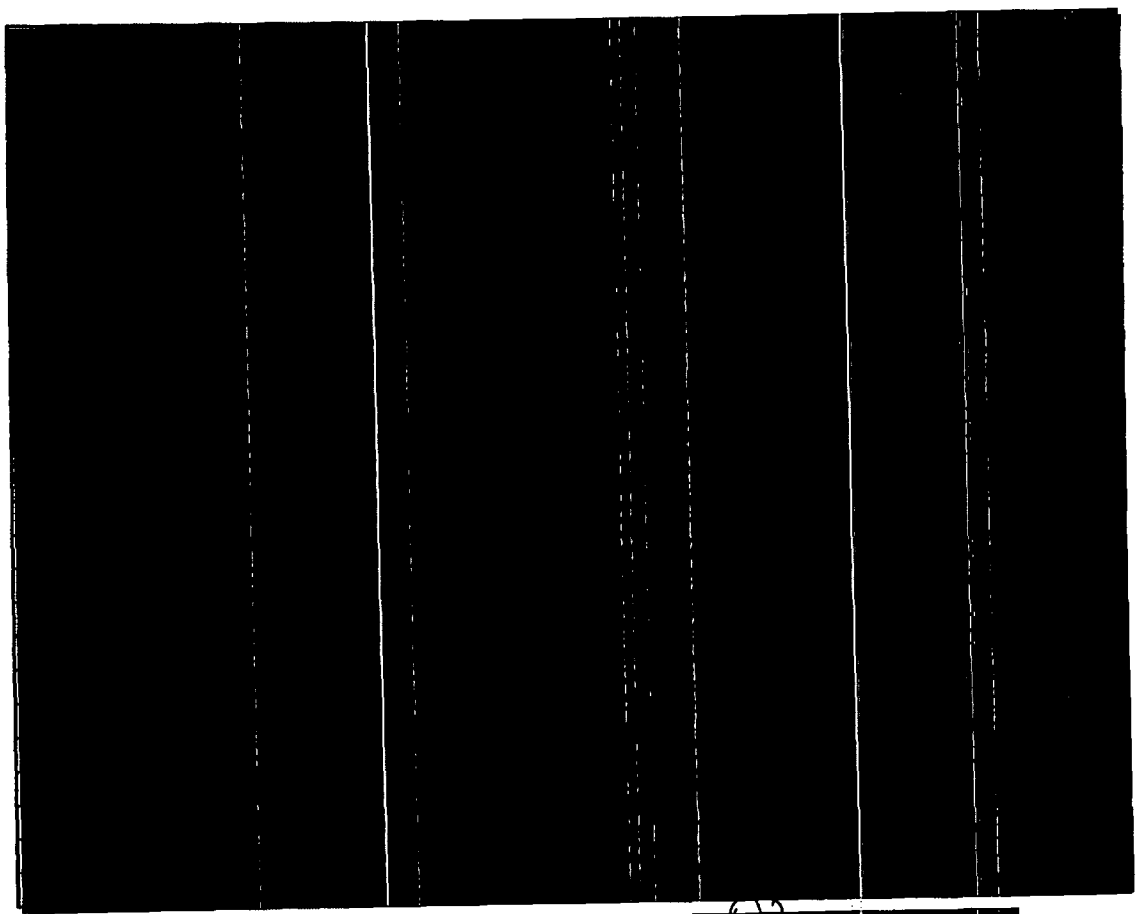
NOTES:

TÜV PRODUCT SERVICE

Temperature: 21 °C

Air Pressure: 1012 kPa

Relative Humidity: 31 %



Tested by: [redacted]

Reviewed by: [redacted]
Printed Signature

(*) Indirect (**) Contact

ESDC.DOC Rev 08.96

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BUSINESS SENSITIVE

RADIATED IMMUNITY

TÜV PRODUCT SERVICE

Test Report #: S-8569 Test Area: SR-5

Test Method: EN61000-4-3 Radiated Immunity Date: 30 NOV 98

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM 1000

EUT Description: 2 CH RADIATION Monitor

NOTES:

Temperature: 22 °C

Air Pressure: 101.0 kPa

Relative Humidity: 44 %

FACE DEFINITION TOP VIEW

1
2 FRONT 3
4

[redacted]

Tested by: [redacted]

Reviewed: [redacted]

Printed Signature

RADIMU.DOC Rev 05.97

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TÜV PRODUCT SERVICE

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

EFT/BURST IMMUNITY

Test Report #: S-8569 Test Area: SR-5

Test Method EN 61000-4-4 Date: 03, 04 DEC 98

Tested per customer test procedure. EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz

EUT Model #: RM 1000 ☐ Other:

EUT Description: 2 CH Radiation Monitor

NOTES:

TÜV PRODUCT SERVICE

Temperature: 23 °C

Air Pressure: 100.7 kPa

Relative Humidity: 46 %

[redacted]

Tested By: [redacted]

Reviewed by: [redacted]
Printed Signature

EFT.DOC Rev 03.97

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

SURGE IMMUNITY

Test Report #: S-8569 Test Area: TR-1

Test Method EN 61000-4-5 Date: 09 Dec 98

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: 2 CH Radiation Monitor

NOTES: SH 1 OF 2

TÜV PRODUCT SERVICE

Temperature 22 °C

Air Pressure: 101.2 kPa

Relative Humidity: 26 %

[redacted]

Tested By: [redacted]

Reviewed by [redacted]
Printed Signature

SURG.DOC Rev 03.97

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

SURGE IMMUNITY

Test Report #: S-8569 Test Area: 7R-1

Test Method EN 61000-4-5 Date: 09 Dec 96

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: 2cH Radiation

NOTES: 3u 2 y 2

TÜV PRODUCT SERVICE

Temperature 22 °C

Air Pressure: 101.2 kPa

Relative Humidity: 26 %

[redacted]

Tested By: [redacted]

Reviewed by: [redacted]
Printed Signature

SURG.DOC Rev 03.97

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

BUSINESS SENSITIVE

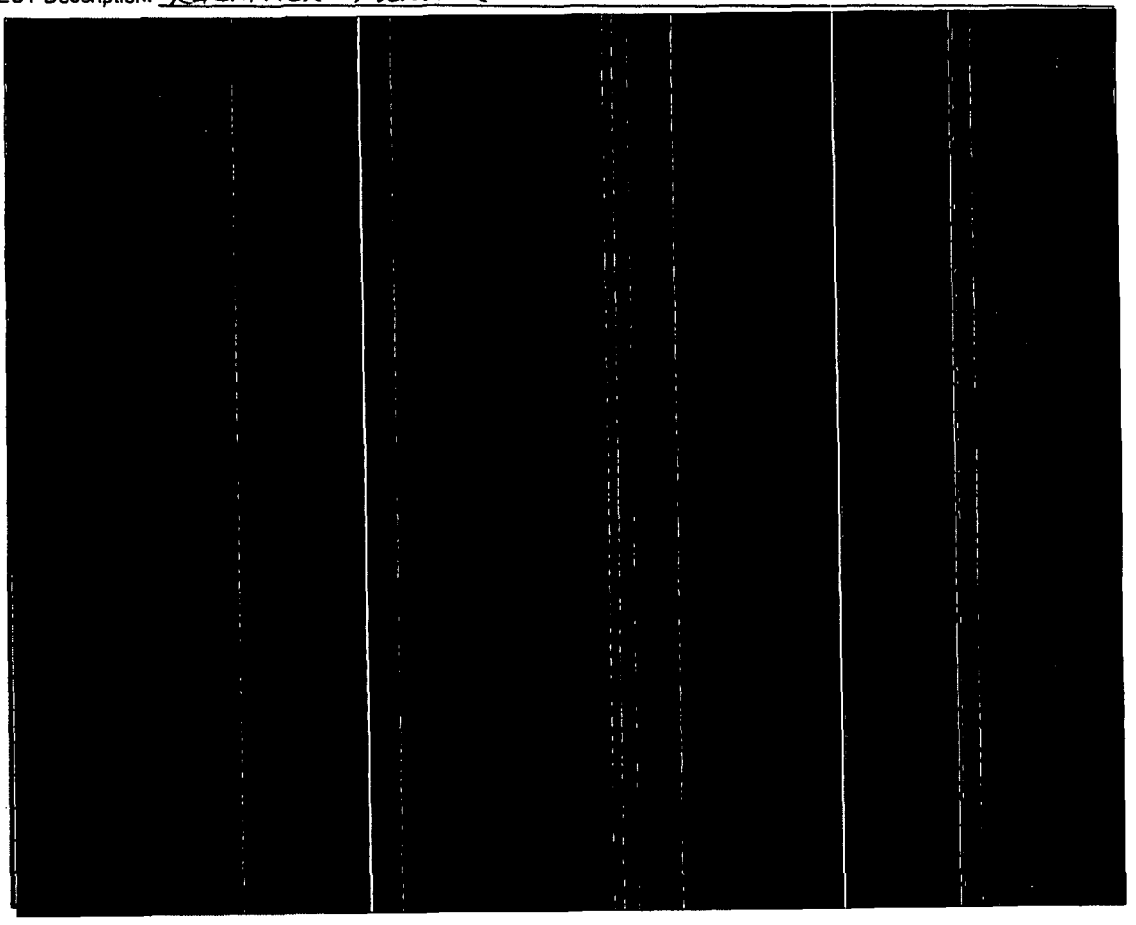
MIL-STD-461D

CS101 Conducted Susceptibility

Test Report #: S-8569 Test Area: SR-5 Date: 03 Dec 98

EUT Model #: RM 1000 EUT Power: ☐ 120 Vac/400 ☐ 28 Vdc ☑ Other: 230V 50Hz

EUT Description: Radiation Monitor Tested per customer test procedure.



NOTES: 1. _____
2. _____

Tested by: _____

Witnessed: by _____

Printed Signature

CS01.DOC Rev 12.98

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

CONDUCTED RF IMMUNITY

Test Report #: S-8569 Test Area: SR-5

Test Method ENV 50141 :93 Date: 03 DEC 98

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM-1000

EUT Description: RADIATION MONITOR

NOTES: TEST LEVEL 3.0 V_{EMF}

Temperature 24 °C

Air Pressure: 101.9 kPa

Relative Humidity: 50 %

TEST FREQ	TEST	MODULATION	CDN	INJECTION	DIRECT	COMPLIES
[redacted]						

Tested By: [redacted]

Reviewed by: [redacted]
Printed Signature

COND.DOC Rev 03.97

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

MAGNETIC FIELD IMMUNITY

Test Report #: S-8569 Test Area: TR1

Test Method EN 61000-4-8 Date: 09 DEC 98

Tested per customer test procedure. EUT POWER: ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Model #: RM 1000 Temperature: 23 °C

EUT Description: Radiation Monitor 2 CH Air Pressure: 101.1 kPa

NOTES: Relative Humidity: 19 %

TÜV PRODUCT SERVICE

[redacted]

Tested By: [redacted]

Reviewed by: [redacted]

Printed Signature

[redacted]

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

VOLTAGE DIPS & SHORT INTERRUPTIONS

TÜV PRODUCT SERVICE

Test Report #: S-8569 Test Area: TR-1

Test Method EN 61000-4-11 Date: 09 DEC 96

Tested per customer test procedure.

EUT POWER:
☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz
☐ Other:

EUT Model #: RM 1000

EUT Description: 2 CH Radiation Monitor

NOTES:

Temperature 23 °C

Air Pressure: 101.1 kPa

Relative Humidity: 17 %

[redacted]

Tested by: [redacted]

Reviewed by [redacted]
Printed Signature

VOLT.DOC Rev 06.97

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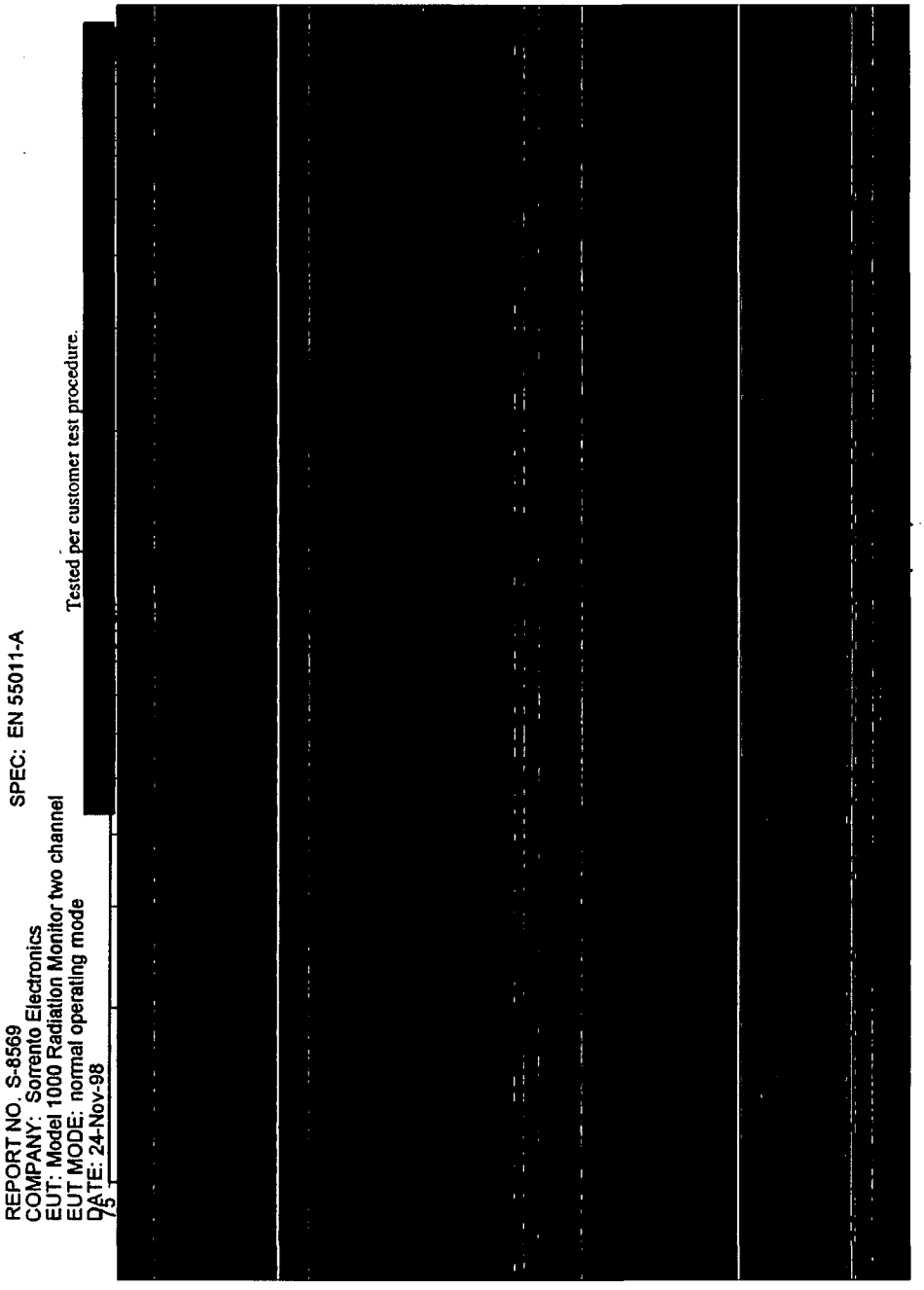
Report No. S8569-02

BUSINESS SENSITIVE



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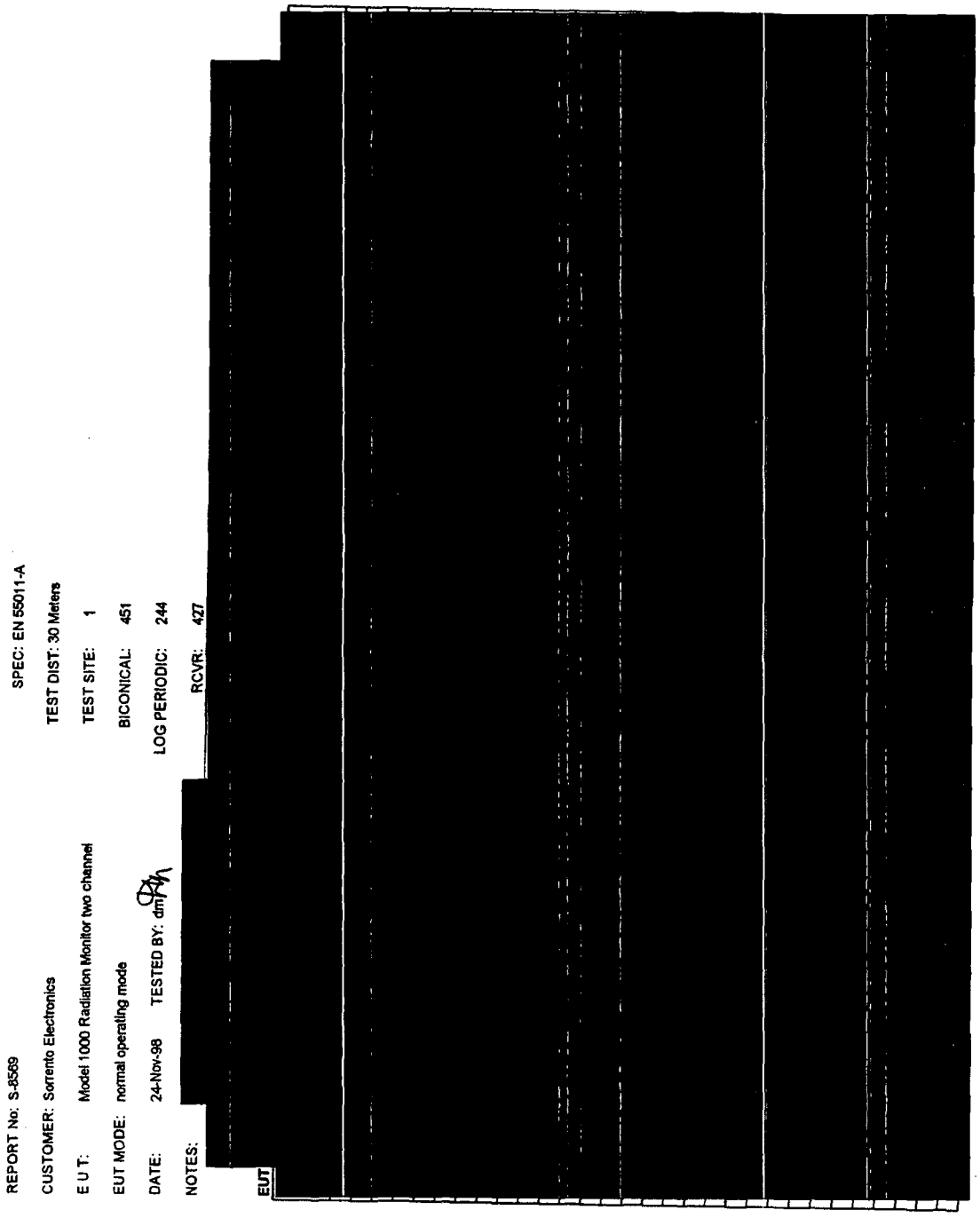
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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TÜV PRODUCT SERVICE

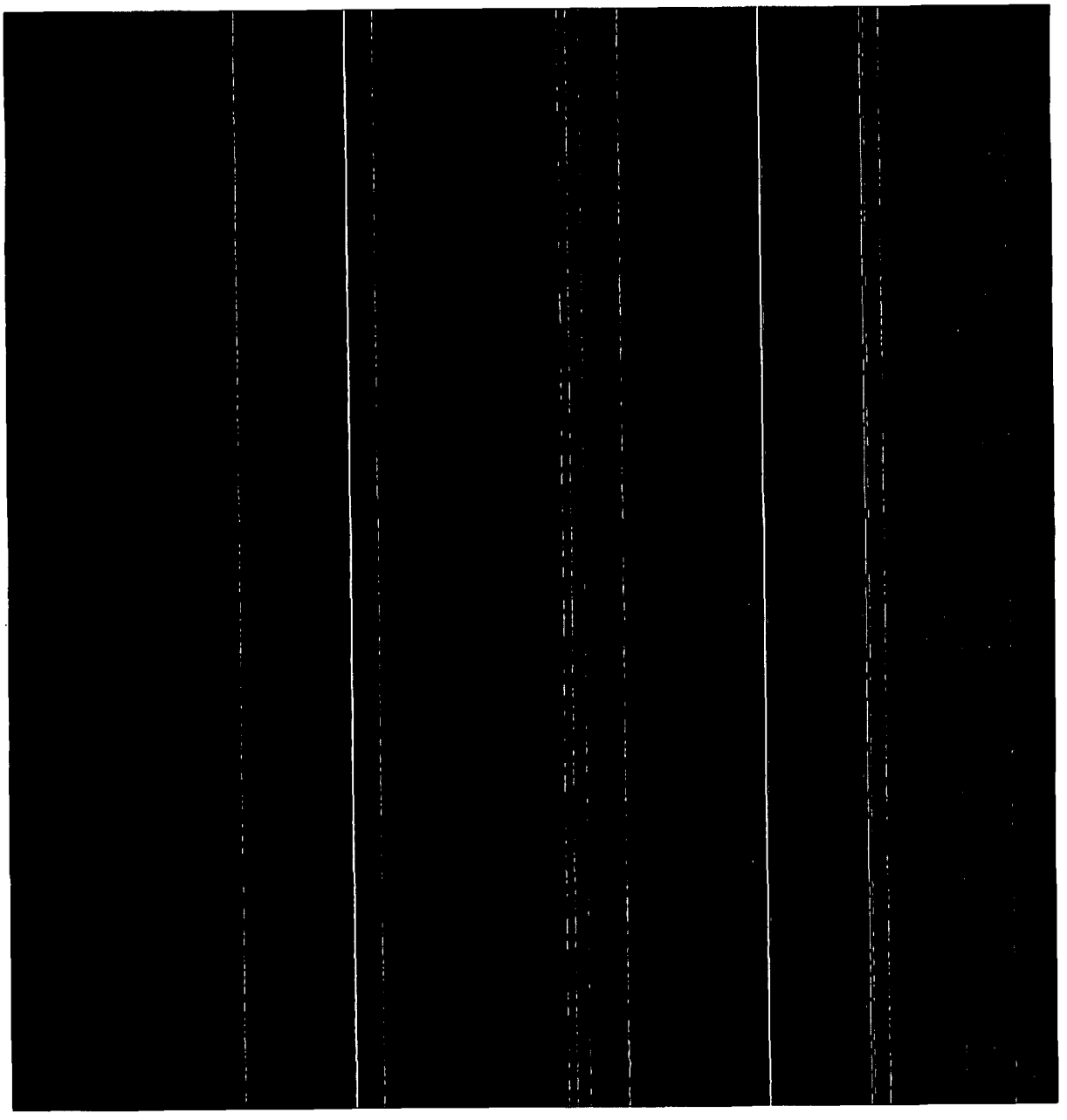
Report No. S8569-02

BUSINESS SENSITIVE

TUV Product Service
Powerline Conducted RFI

EUT: Model RM 1000 Radiation Monitor, 2 chanl
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A
Comment: [redacted]

Date: 25. Nov 98 09:29



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TÜV PRODUCT SERVICE

Report No. S8569-02 BUSINESS SENSITIVE

TUV Product Service
Powerline Conducted RFI

EUT: Model RM 1000 Radiation Monitor, 2 chanl
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A
Comment: [redacted]

Date: 25. Nov 98 09:29

Final Measurement Results:

[redacted]

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

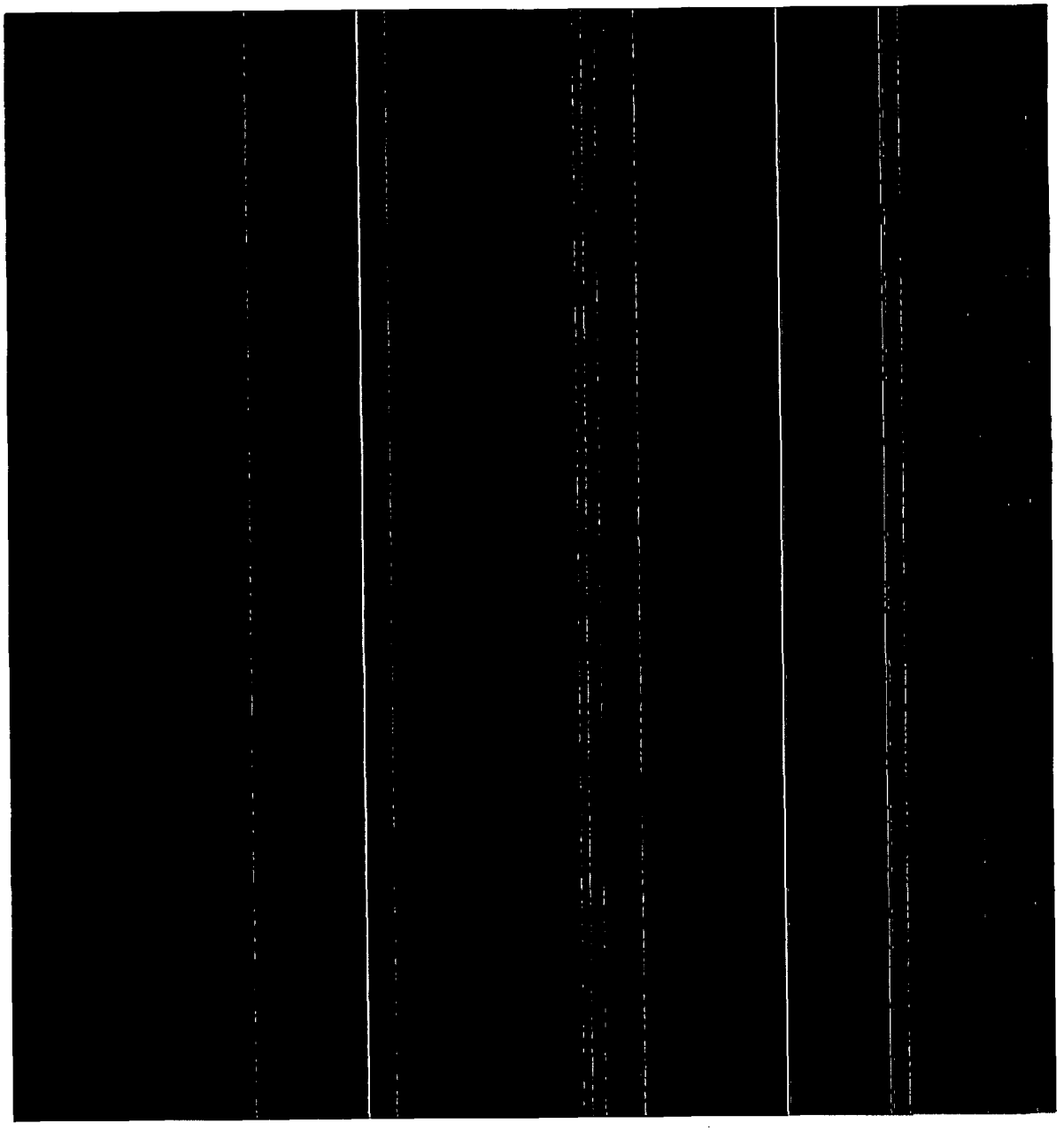
TÜV PRODUCT SERVICE

Report No. S8569-02 BUSINESS SENSITIVE

TUV Product Service
Powerline Conducted RFI

EUT: Model RM 1000 Radiation Monitor, 2 chanl
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A
Comment: [redacted]

Date: 25. Nov 98 09:36



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Report No. S8569-02 BUSINESS SENSITIVE

TUV Product Service
Powerline Conducted RFI

EUT: Model RM 1000 Radiation Monitor, 2 chanl
Manuf: Sorrento Electronics
Op Cond: Normal
Operator: [redacted]
Test Spec: EN 55011 Class A
Comment: [redacted]

Date: 25. Nov 98 09:36

Final Measurement Results:

[redacted]

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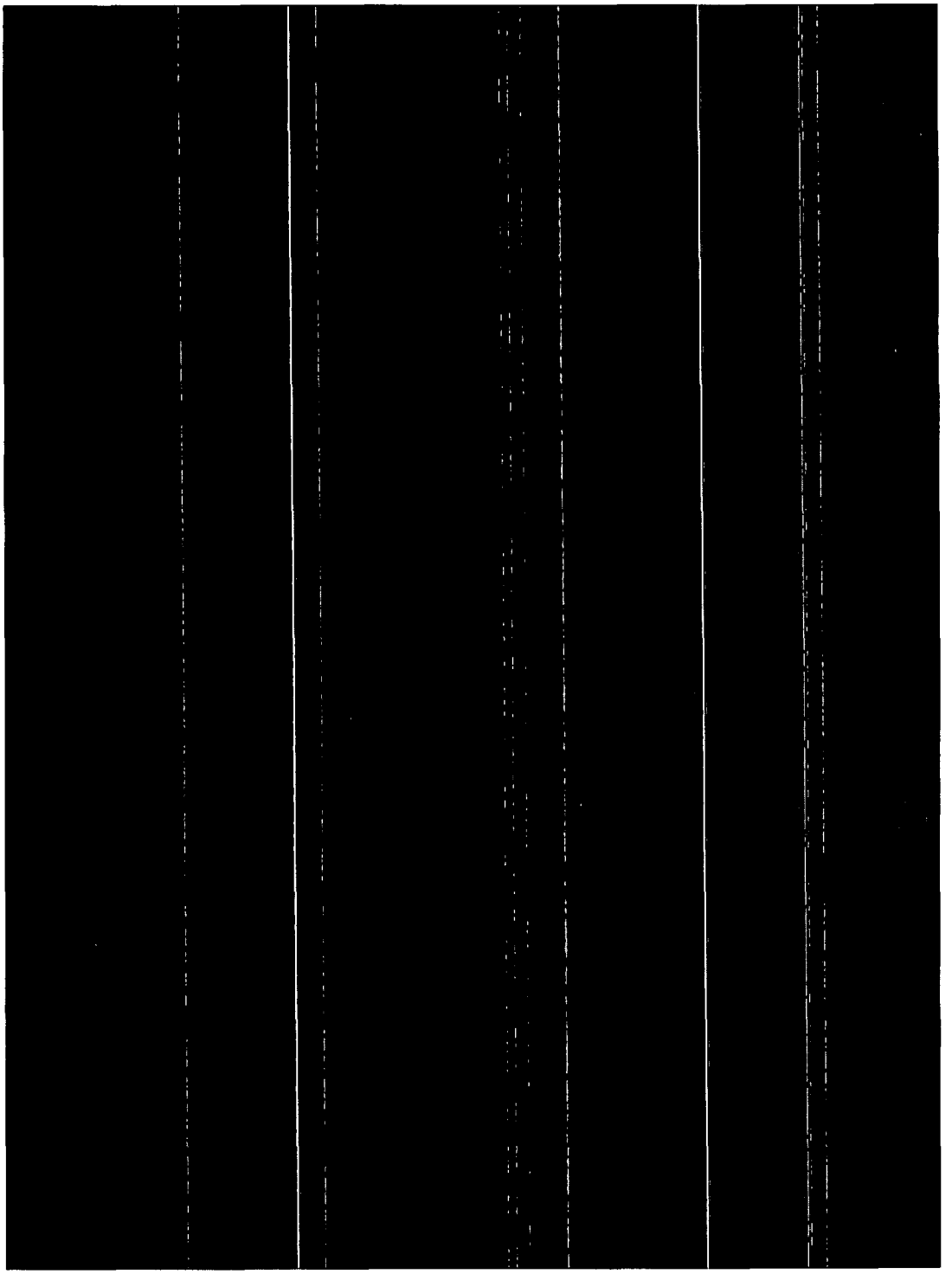
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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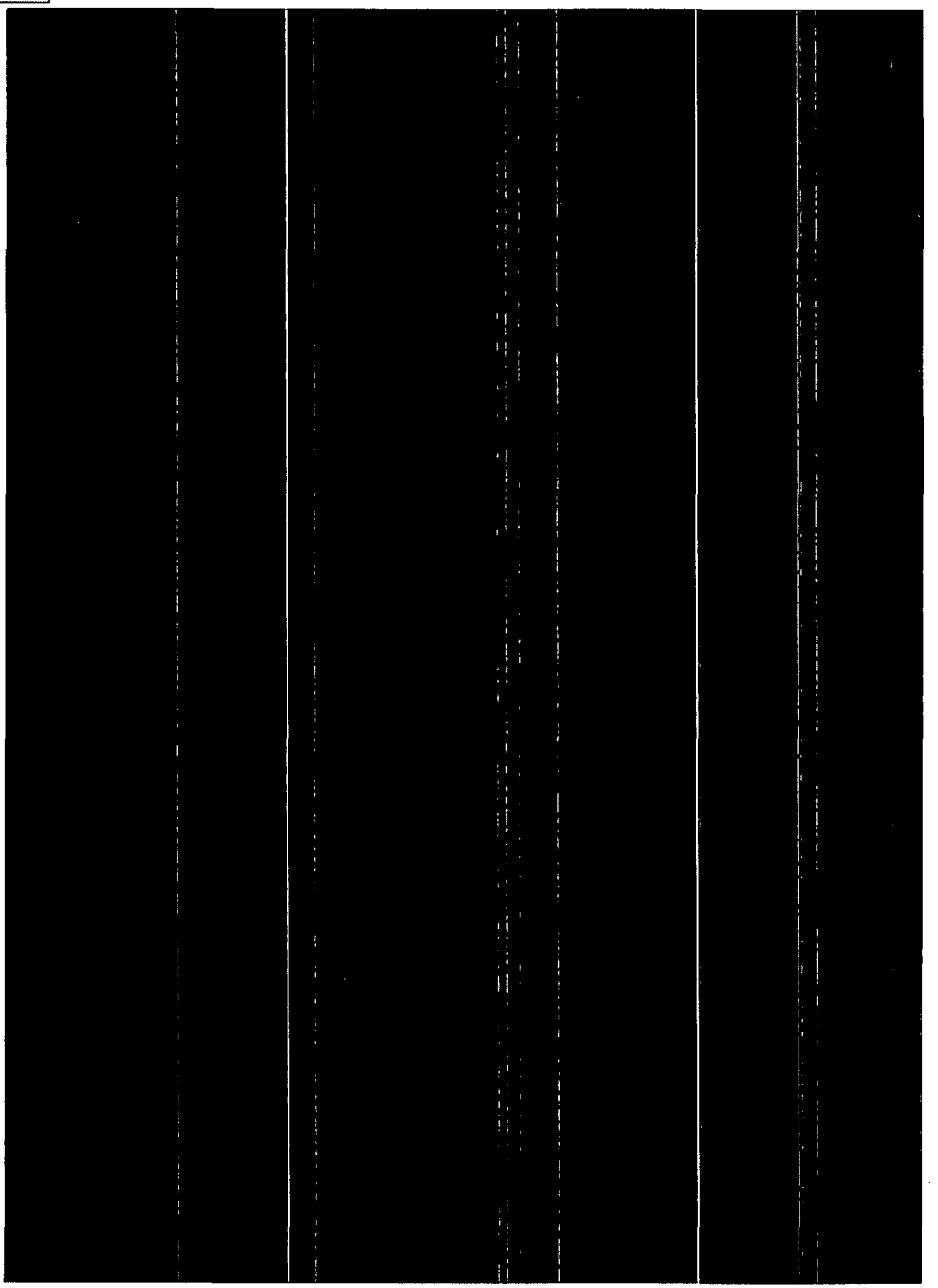
Report No. S8569-02

BUSINESS SENSITIVE



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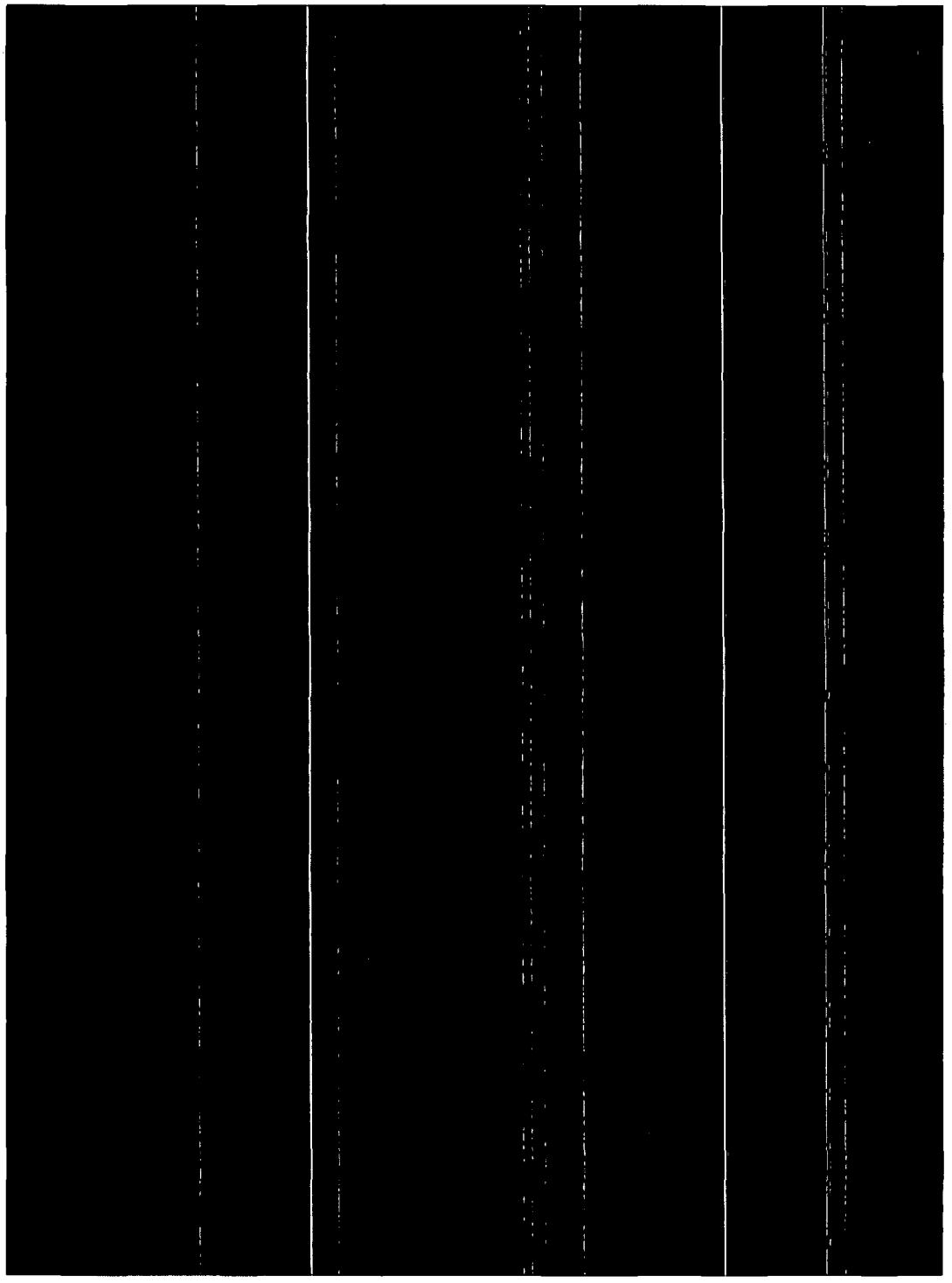
Report No. S8569-02

BUSINESS SENSITIVE



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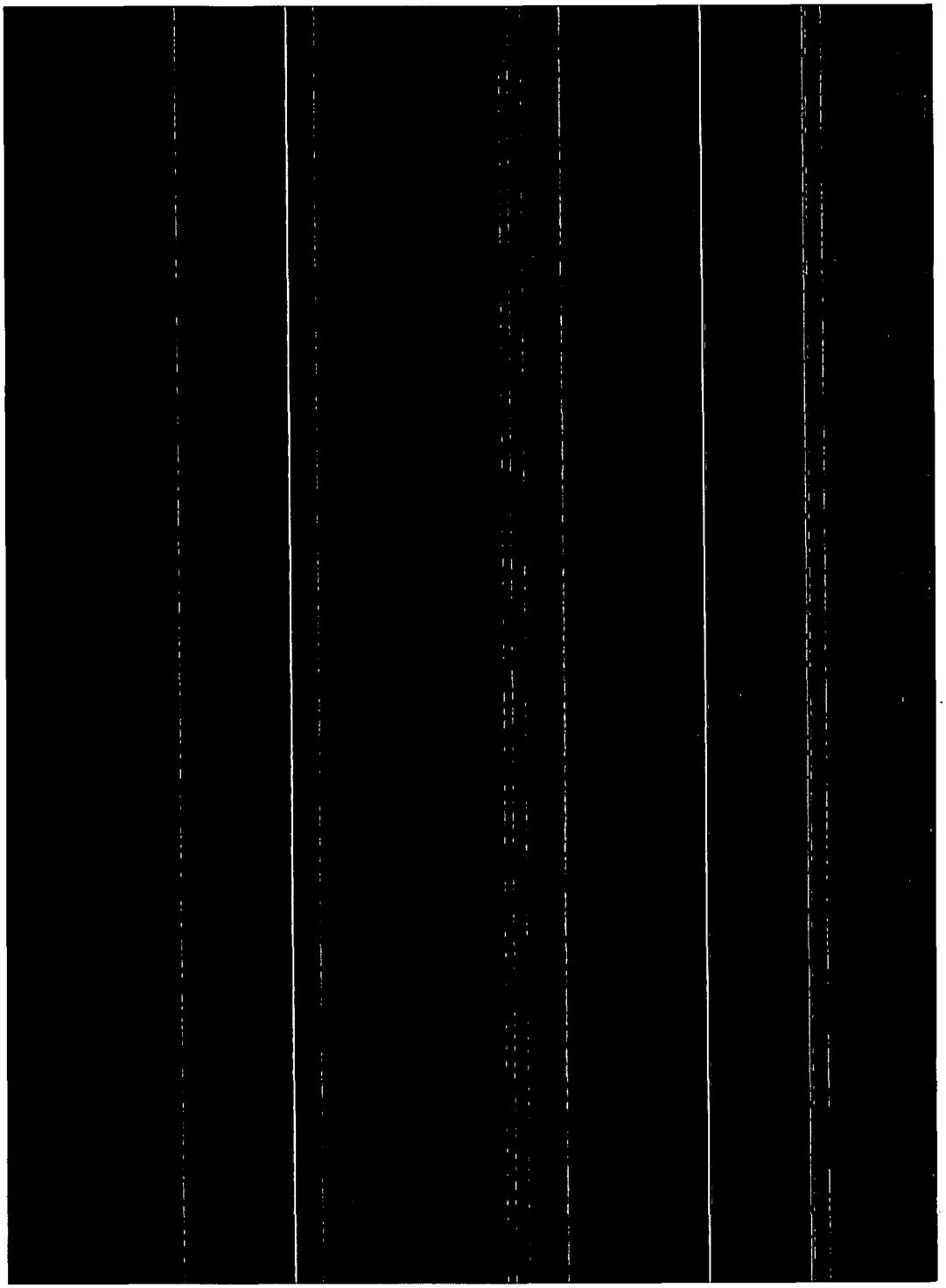
Report No. S8569-02

BUSINESS SENSITIVE



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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Configuration Reference for ESD, Floor-Standing Unit

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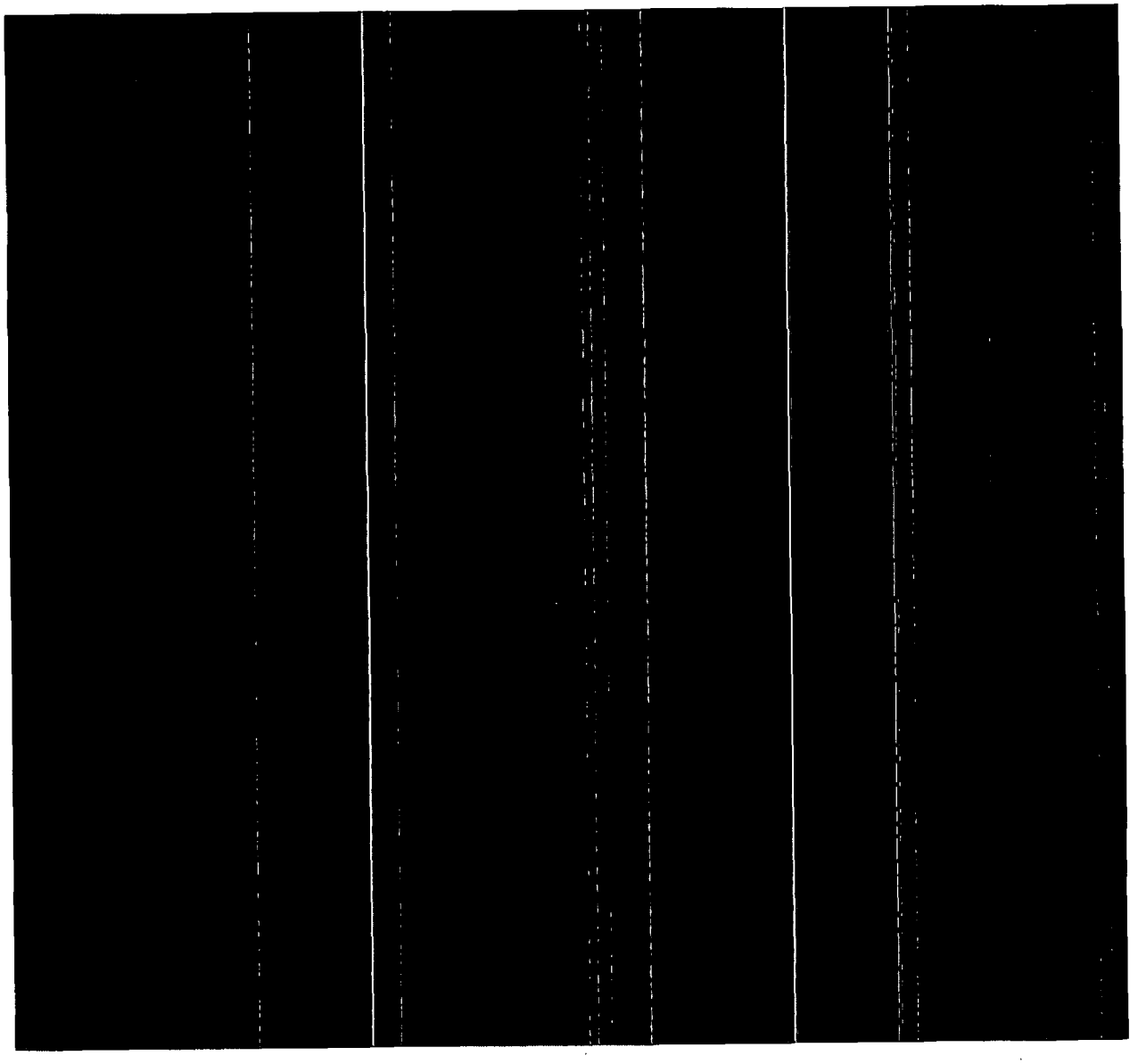
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Configuration for Radiated E-Fields Immunity



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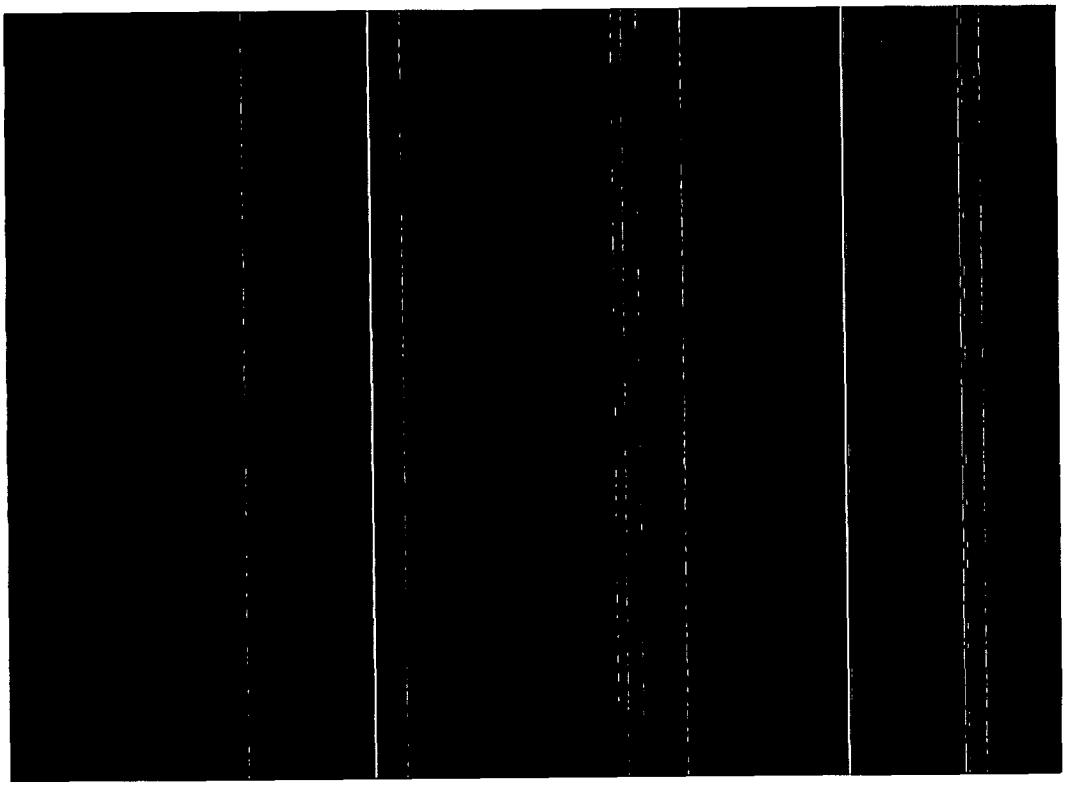
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Configuration for Electrical Fast Transient/Burst Immunity



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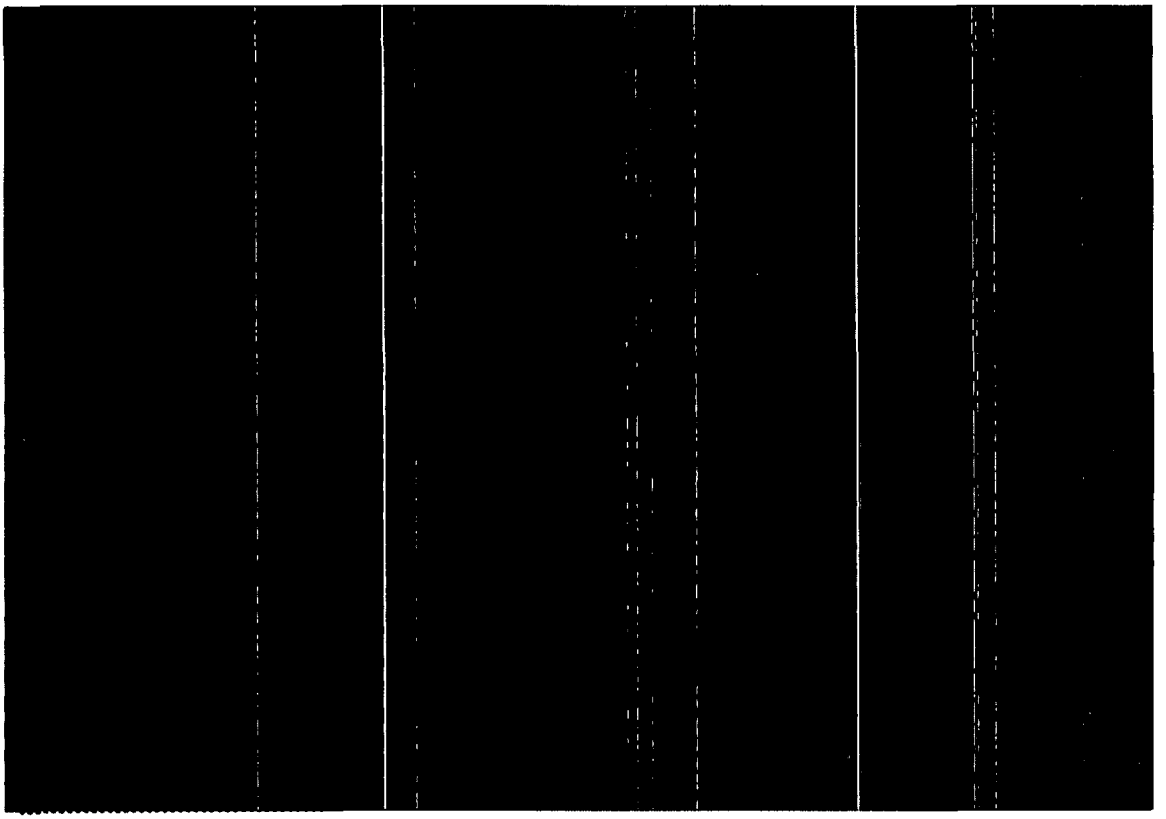
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Equipment Connections for Electrical Fast Transient/Burst Injection - Power Leads



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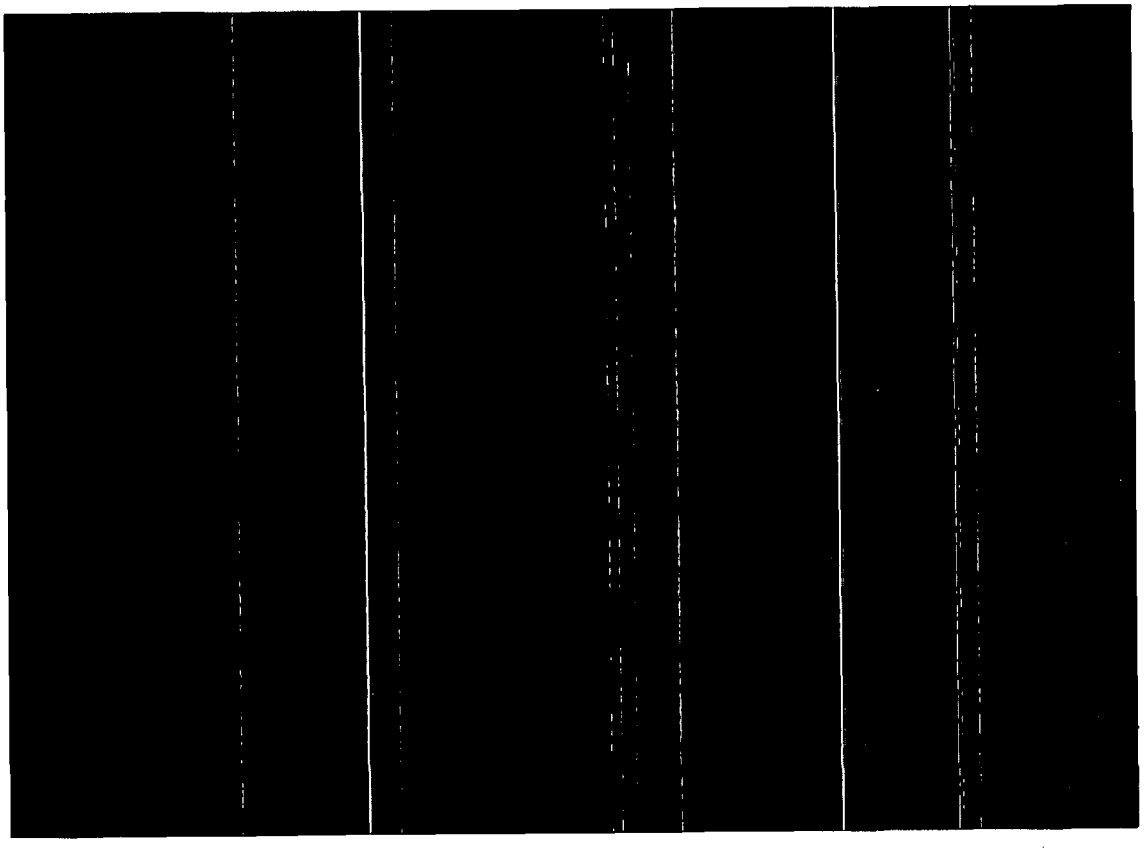
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Equipment Connections for Electrical Fast Transient/Burst Injection - Cables



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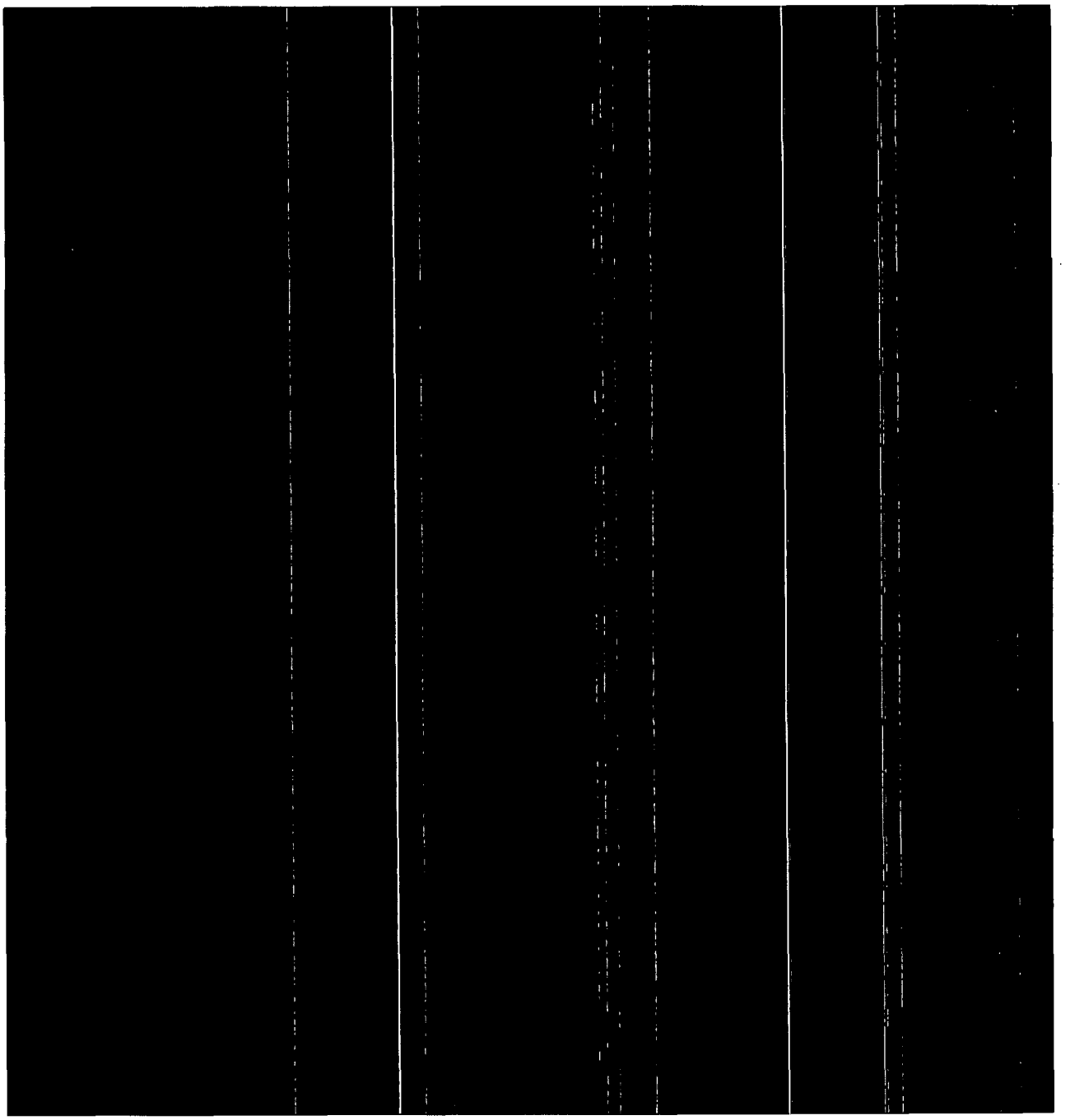
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Test Configuration for Surge Immunity



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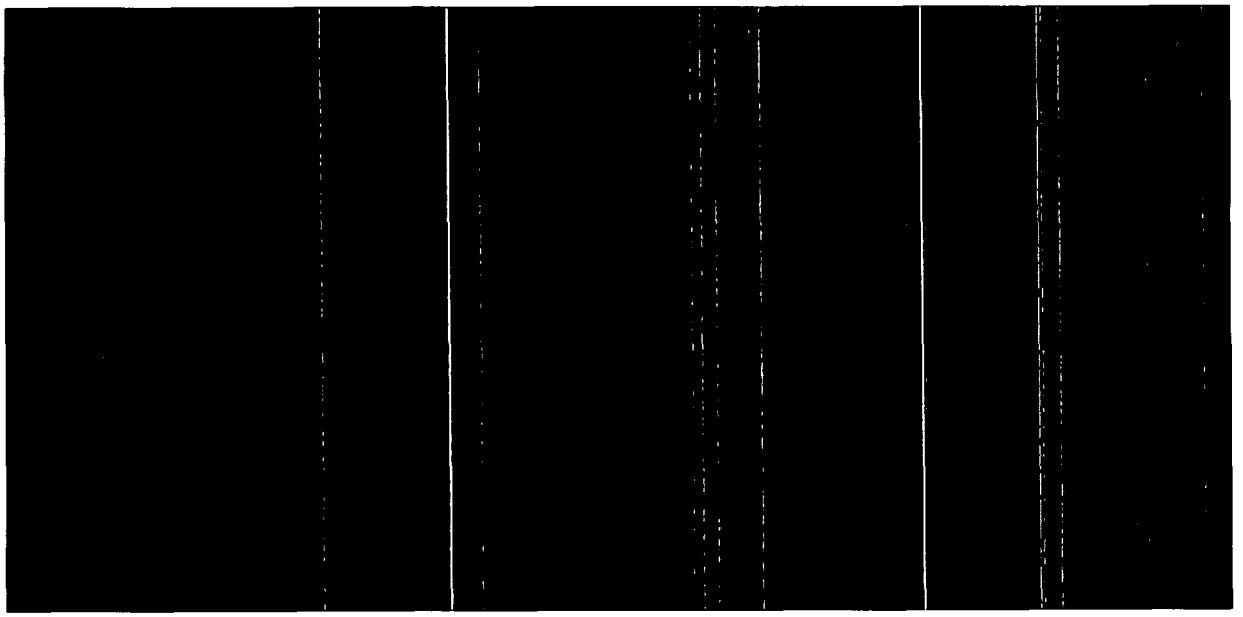
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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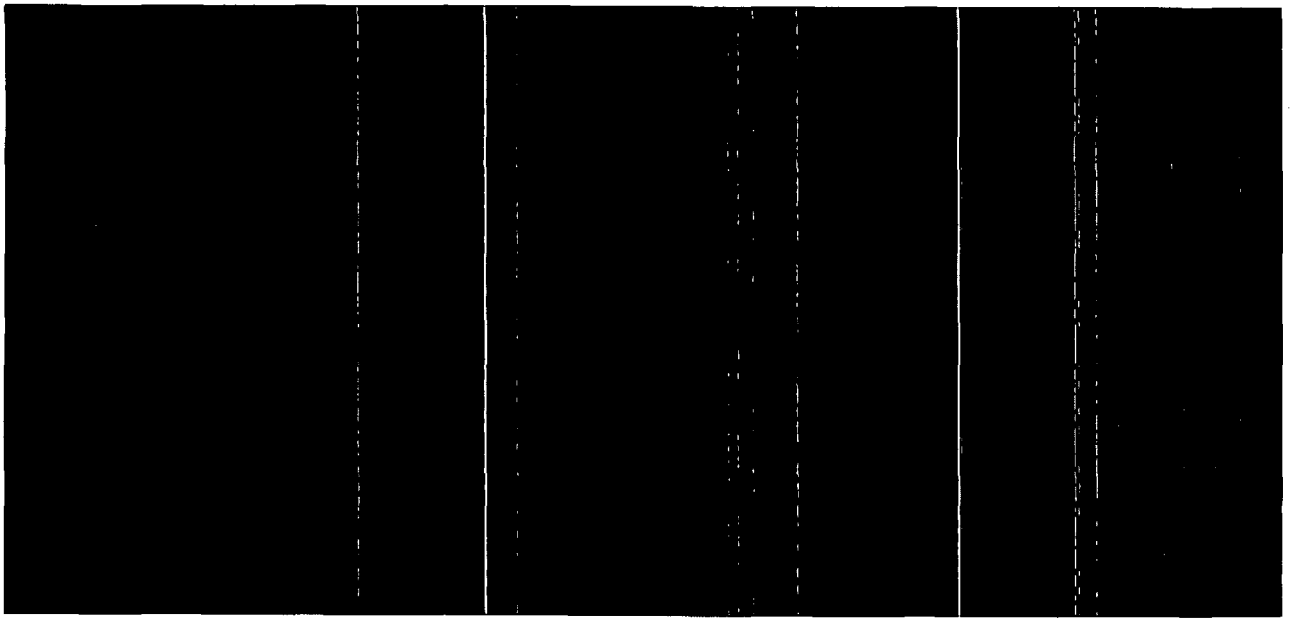
Report No. S8569-02

BUSINESS SENSITIVE

TÜV PRODUCT SERVICE

Test Configuration for Immunity to Conducted Disturbances

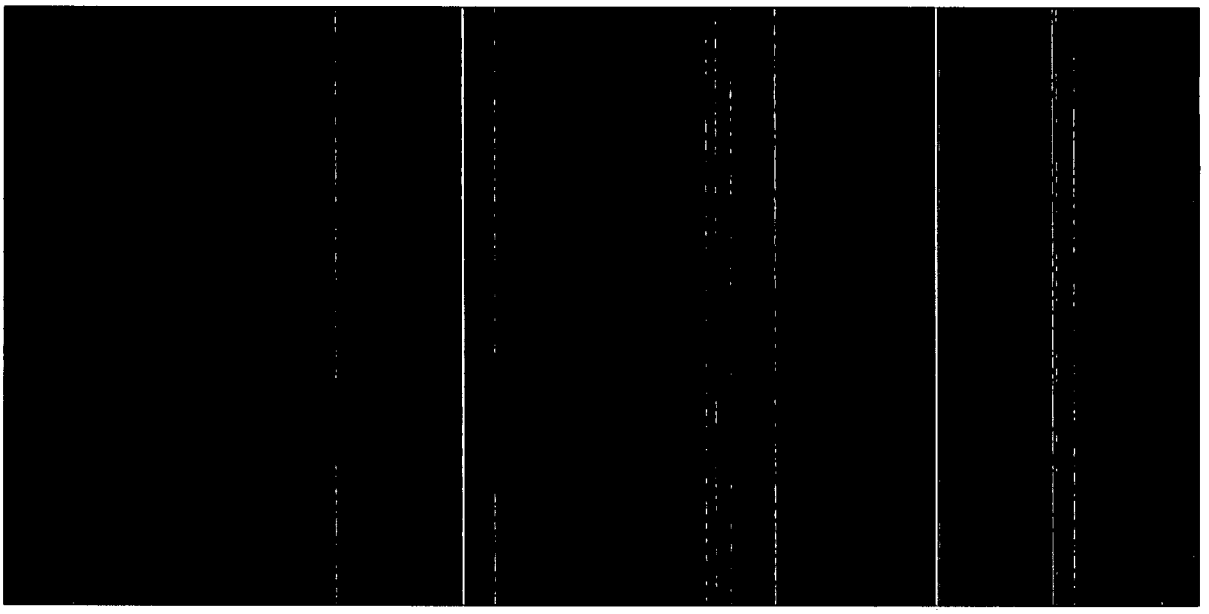


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

BUSINESS SENSITIVE

Test Configuration for Immunity to Conducted Disturbances

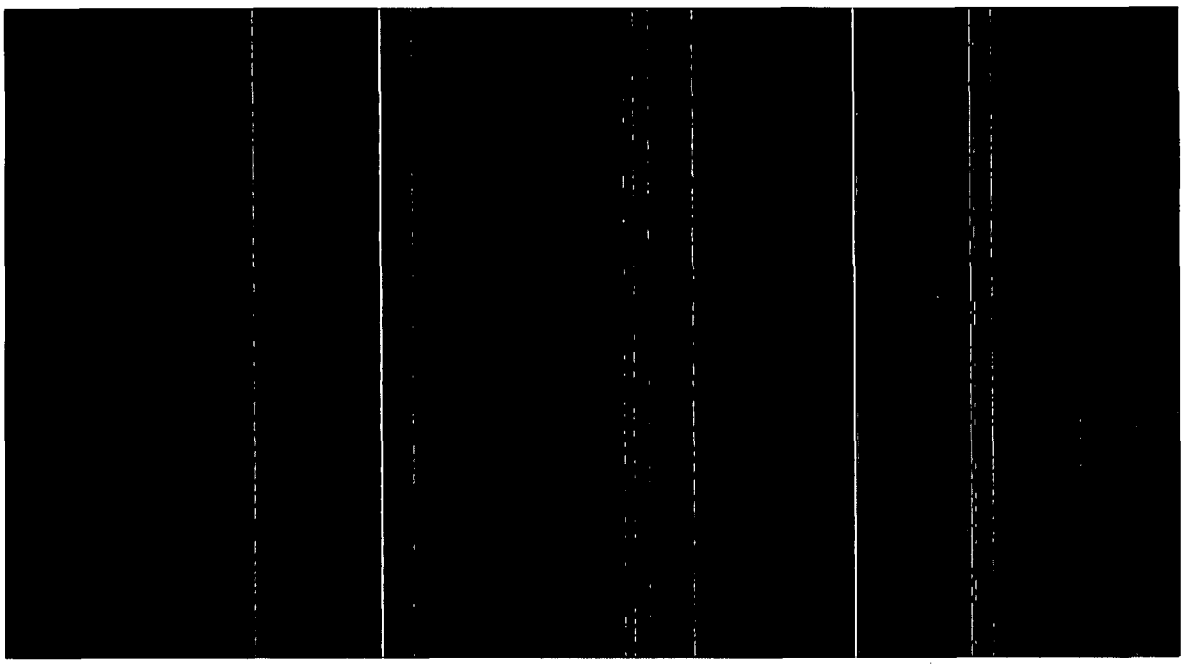


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

BUSINESS SENSITIVE

Test Setup for Voltage Dips, Interruptions and Variations Immunity



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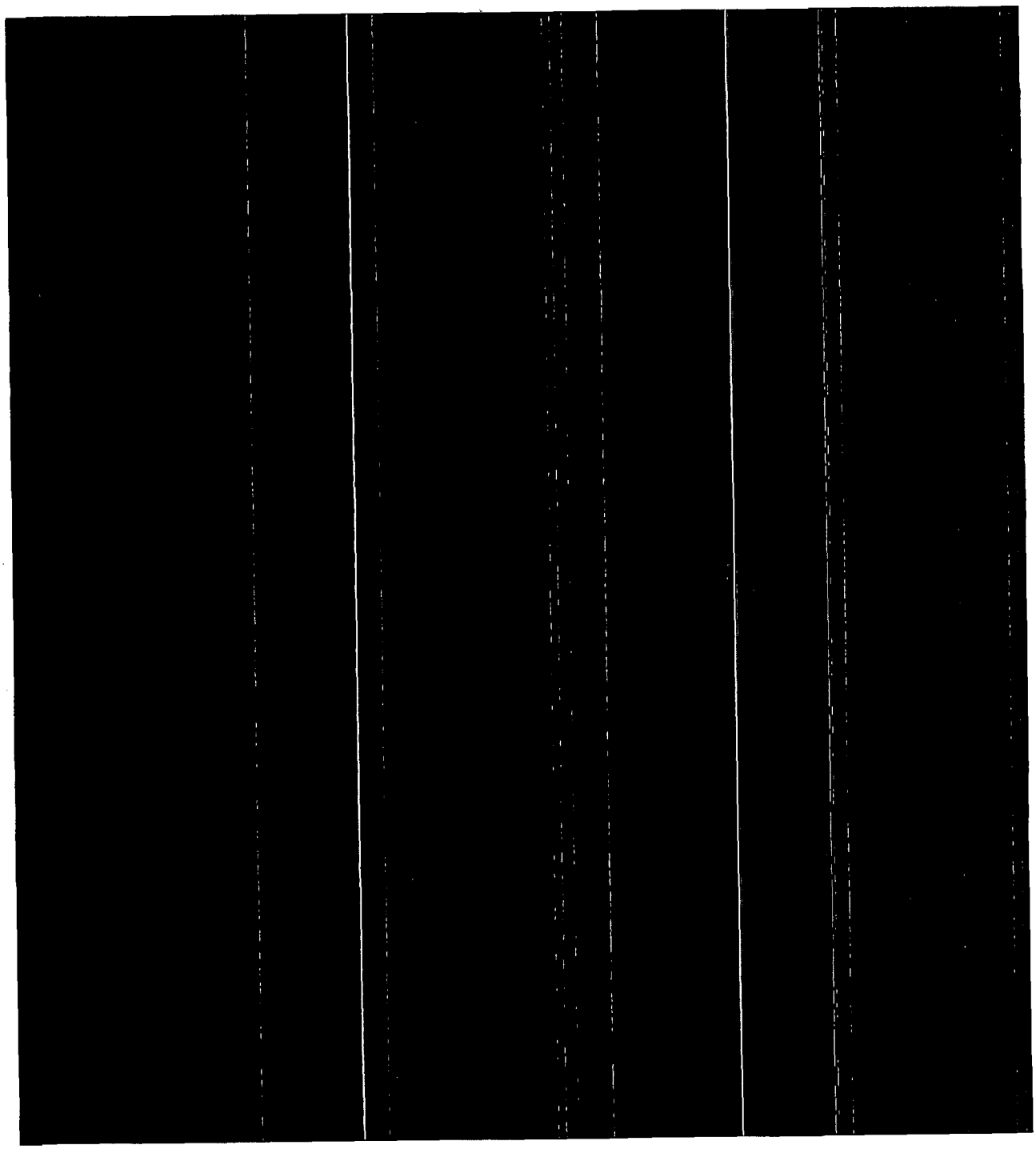
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Radiated Emission Test Setup, 30 to 1,000 MHz



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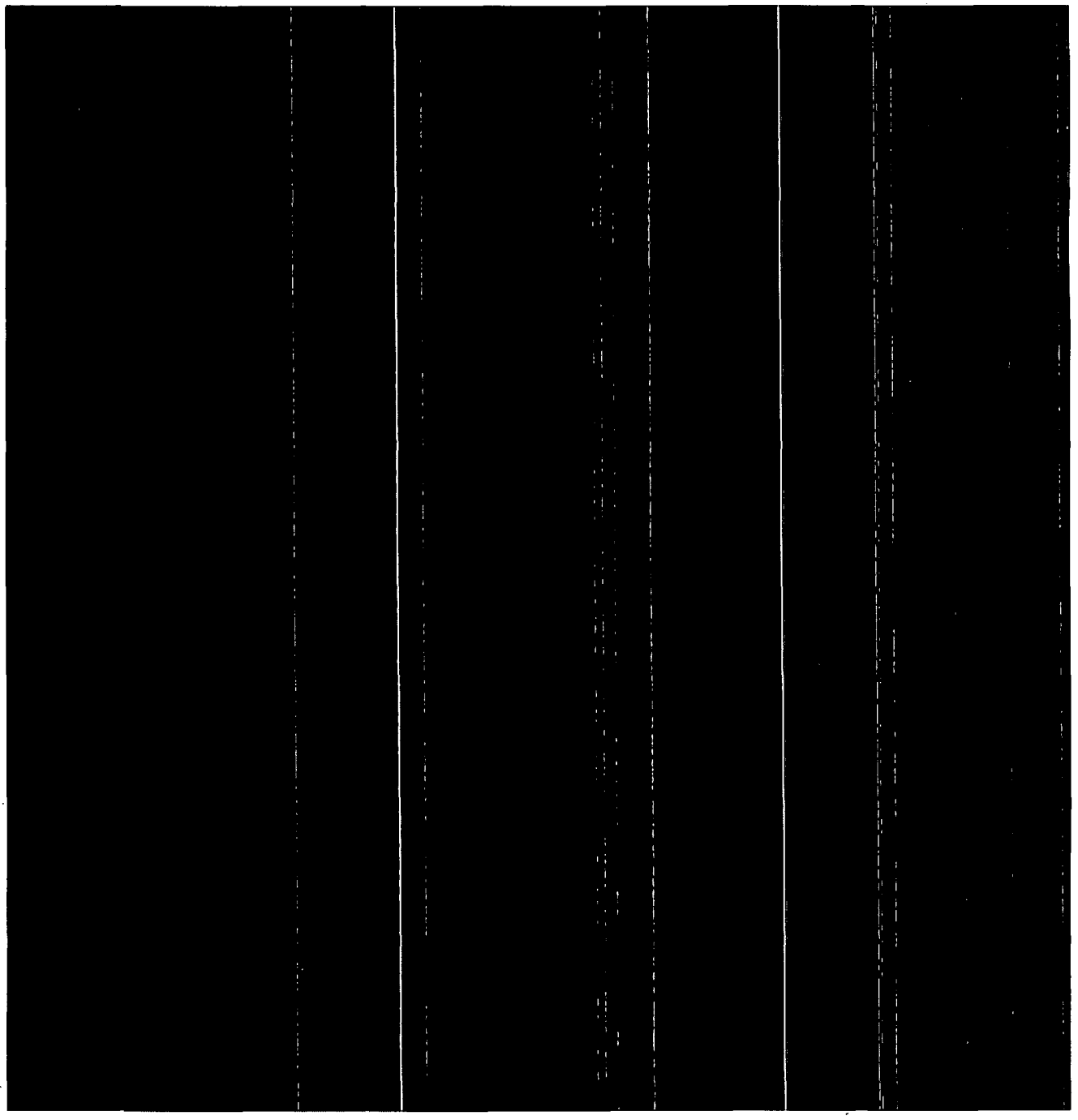
Report No. S8569-02

BUSINESS SENSITIVE

Conducted Emission Test Setup, 0.15 to 30 MHz



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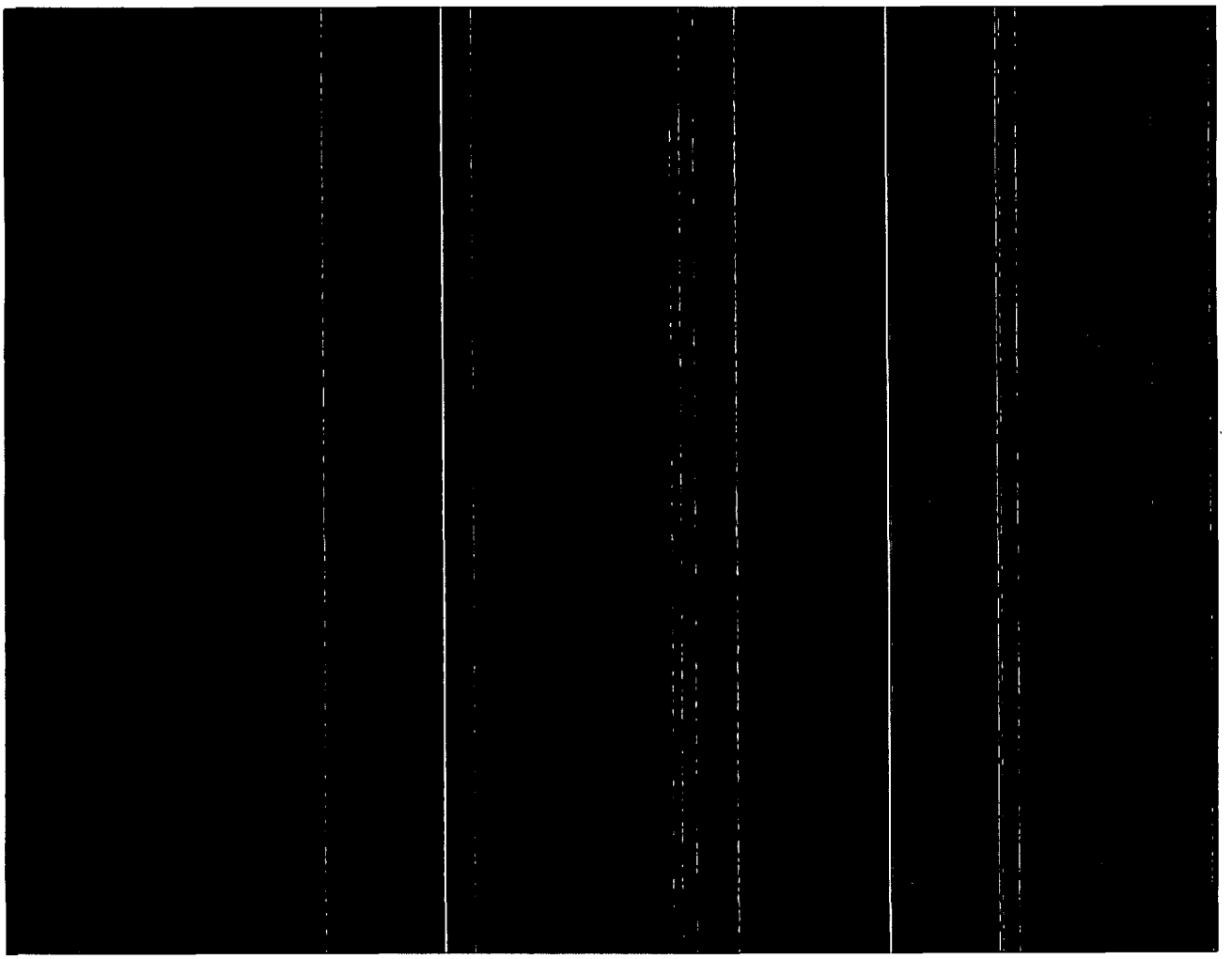
Report No. S8569-02

BUSINESS SENSITIVE



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Report No. S8569-02

Appendix A

Photographs

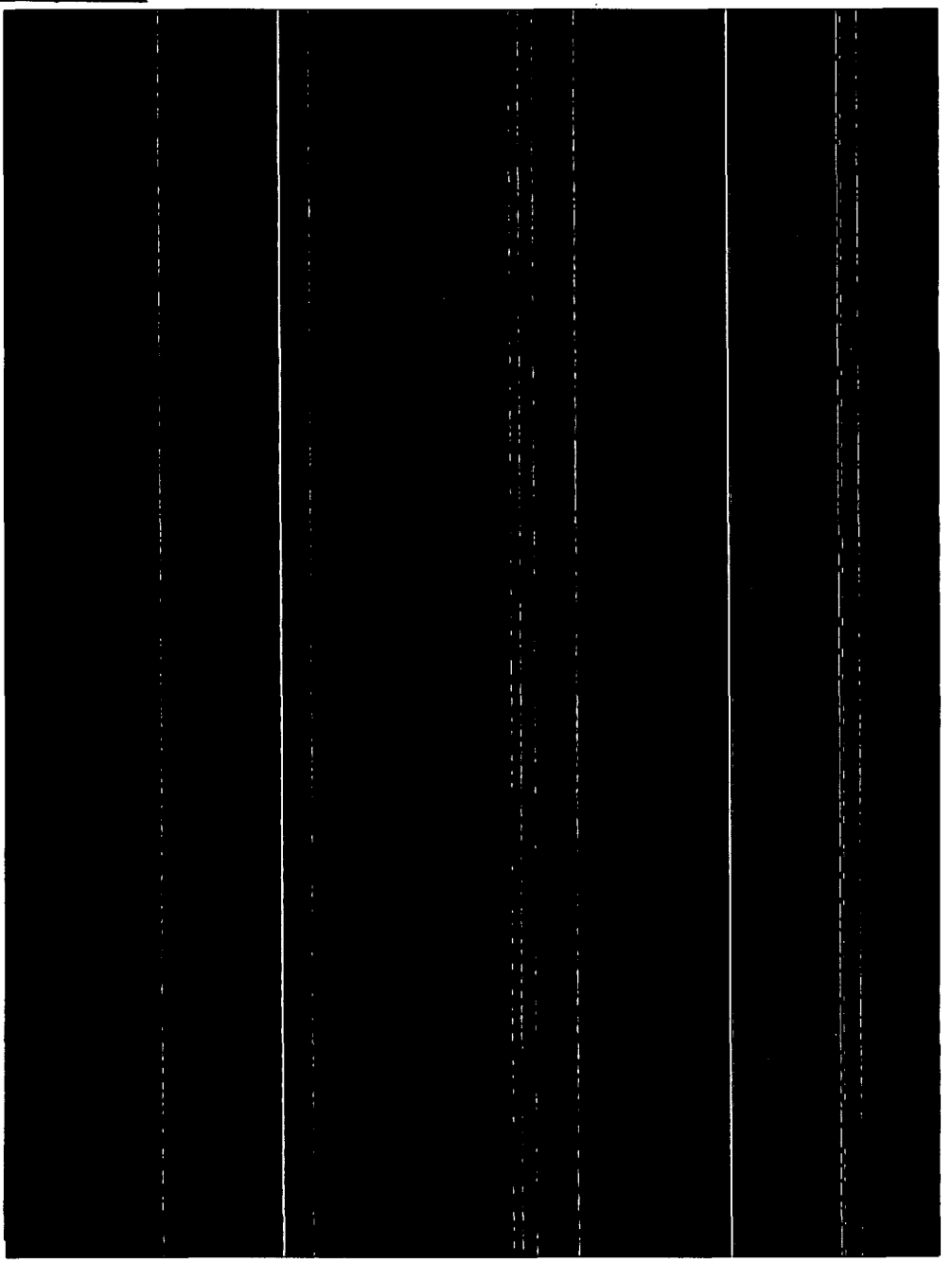
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Electrostatic Discharge (ESD)
EN 61000-4-2



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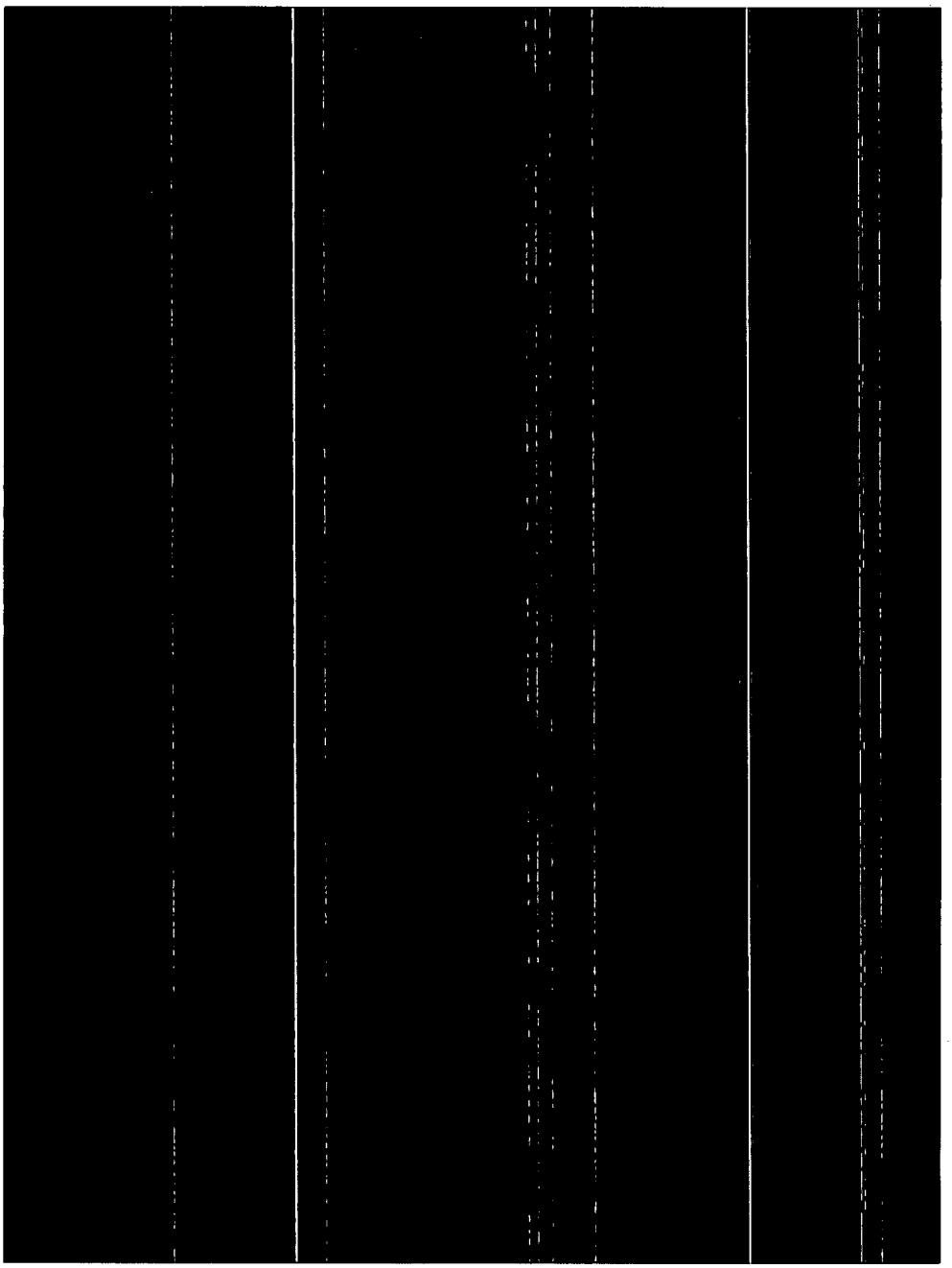
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Electrostatic Discharge (ESD)
EN 61000-4-2



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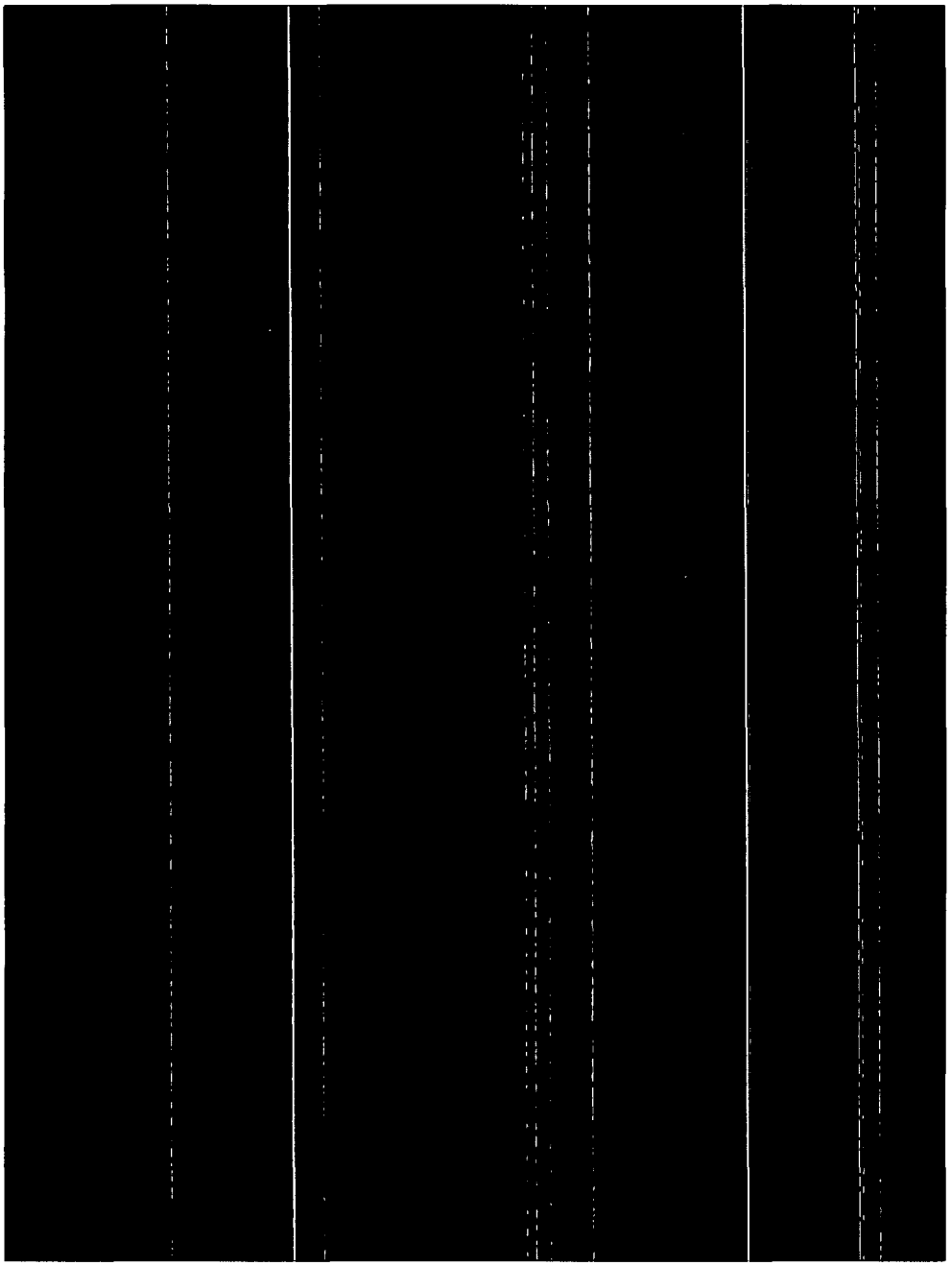
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Electrostatic Discharge (ESD)
EN 61000-4-2



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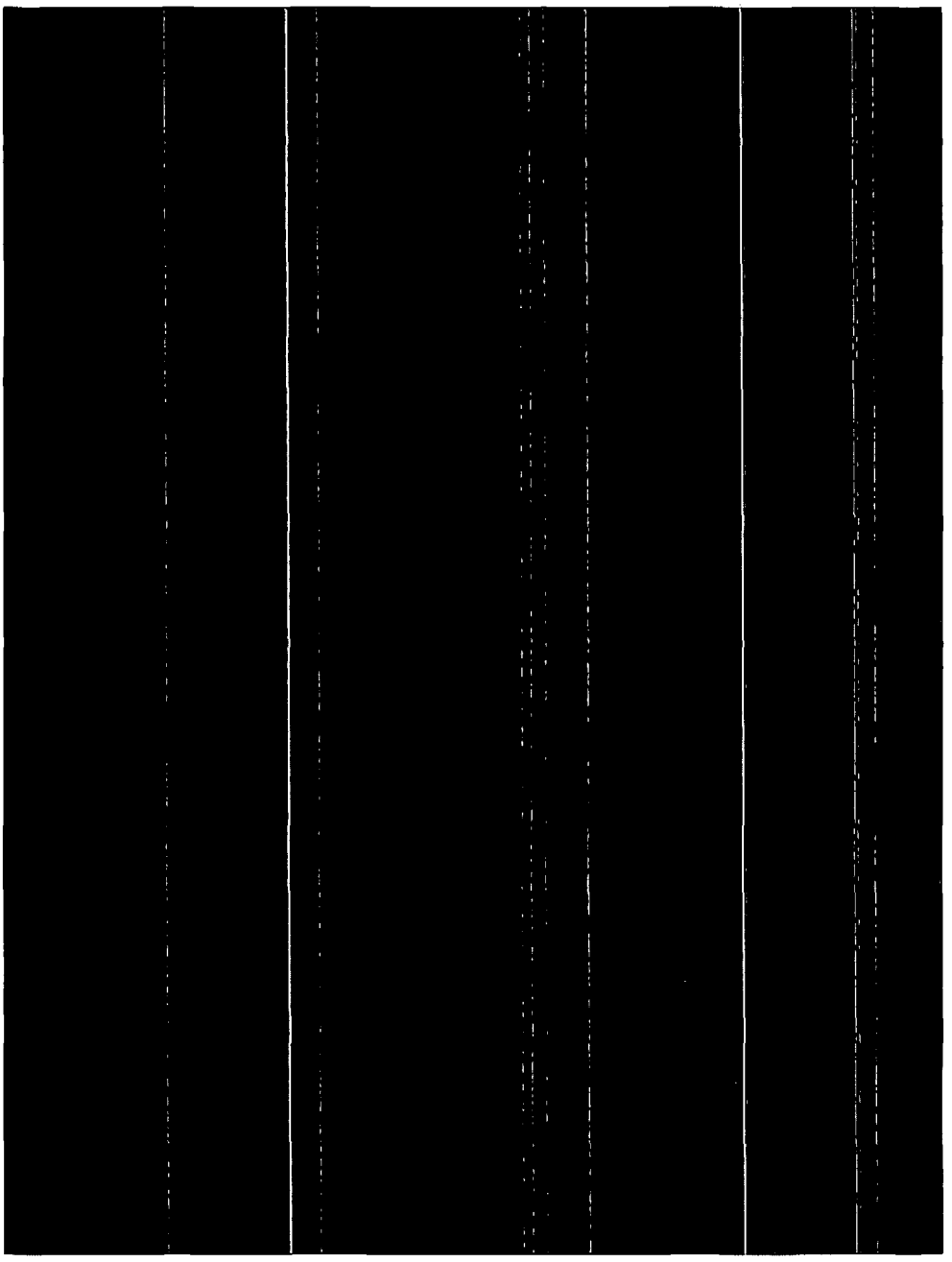
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Electromagnetic Field
EN 61000-4-3



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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Electromagnetic Field
EN 61000-4-3

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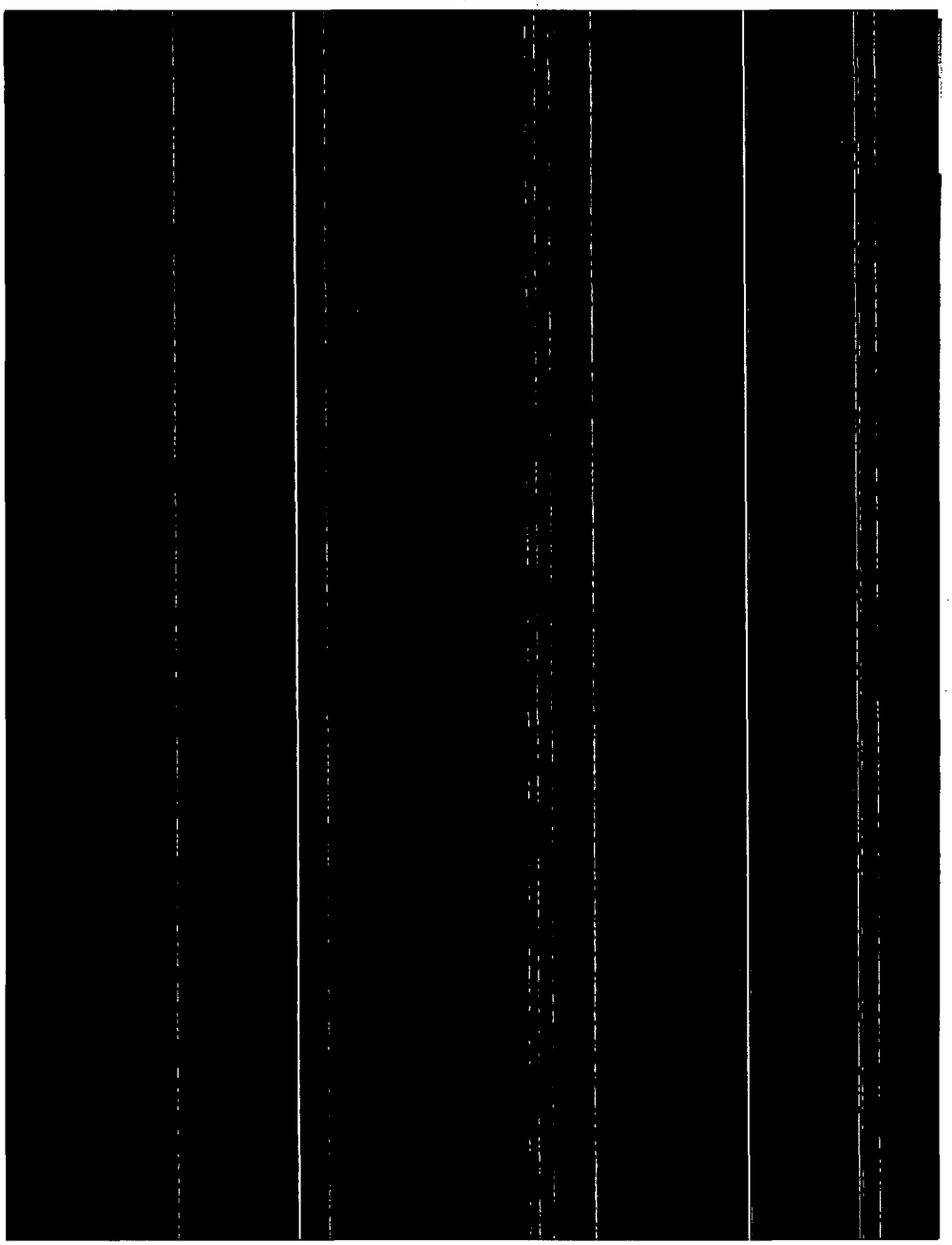
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Fast transients (BURST)
EN 61000-4-4



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Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Fast transients (BURST)
EN 61000-4-4

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
SURGE Transients
EN 61000-4-5

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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Susceptibility
CS101

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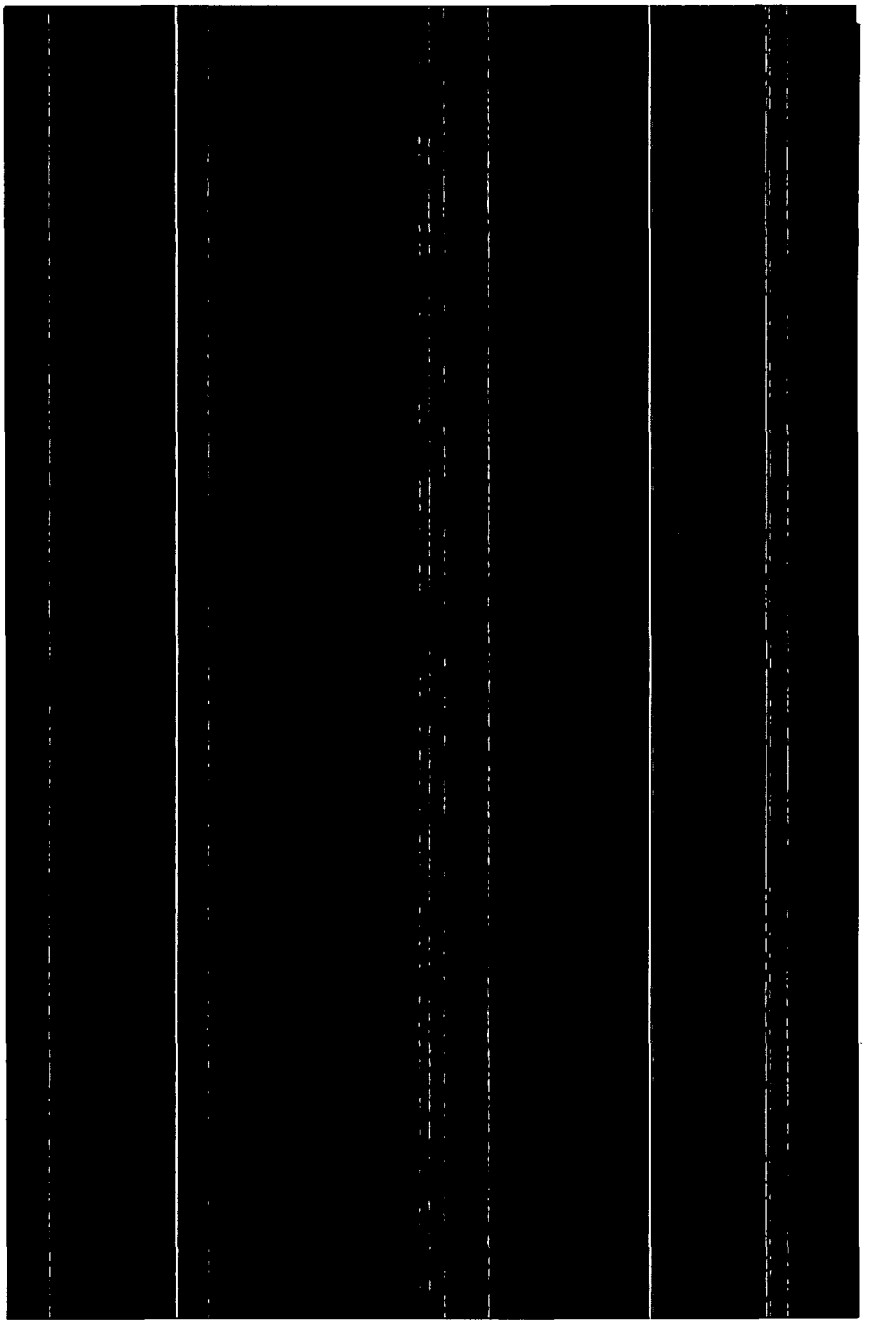
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Disturbance
ENV 50141



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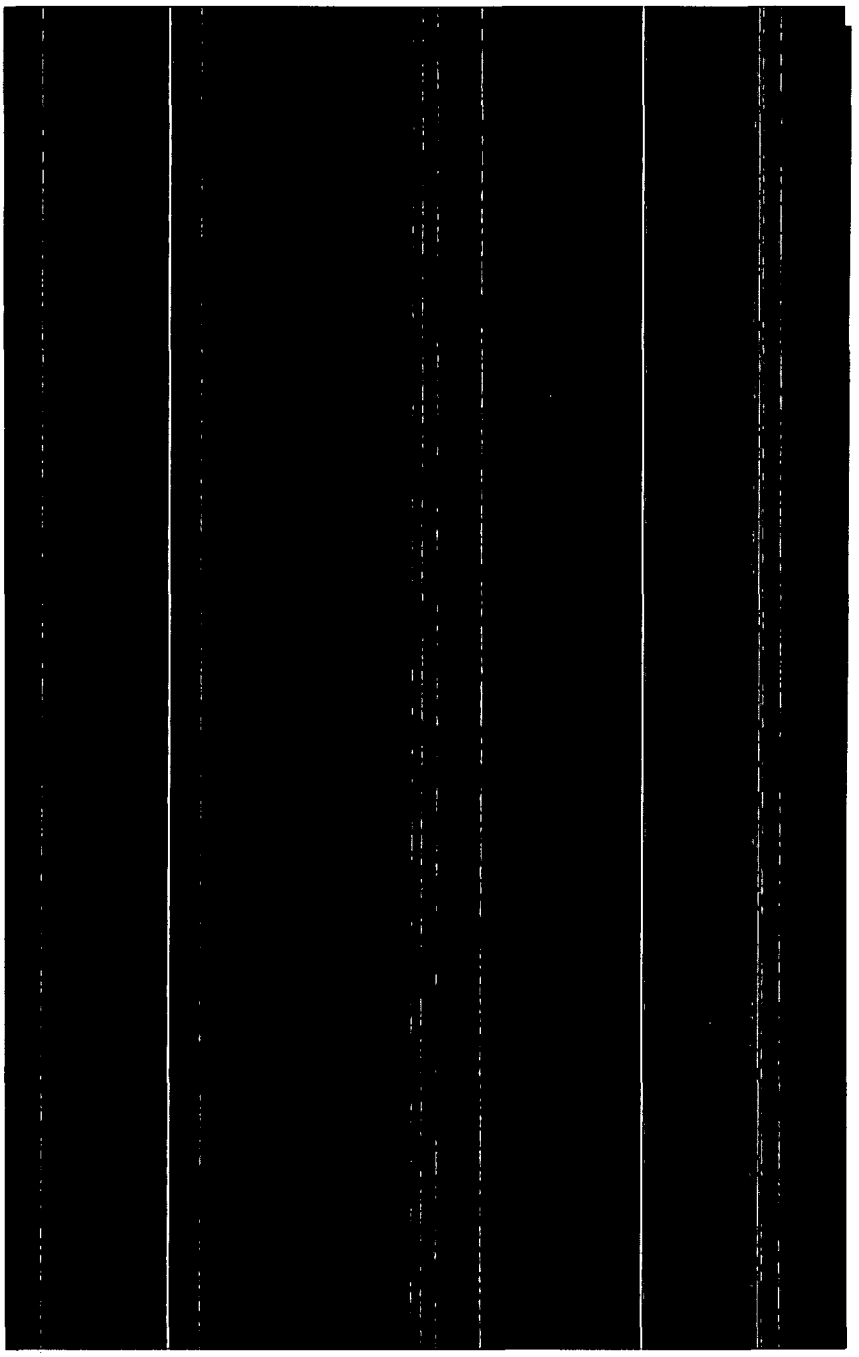
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Disturbance
ENV 50141



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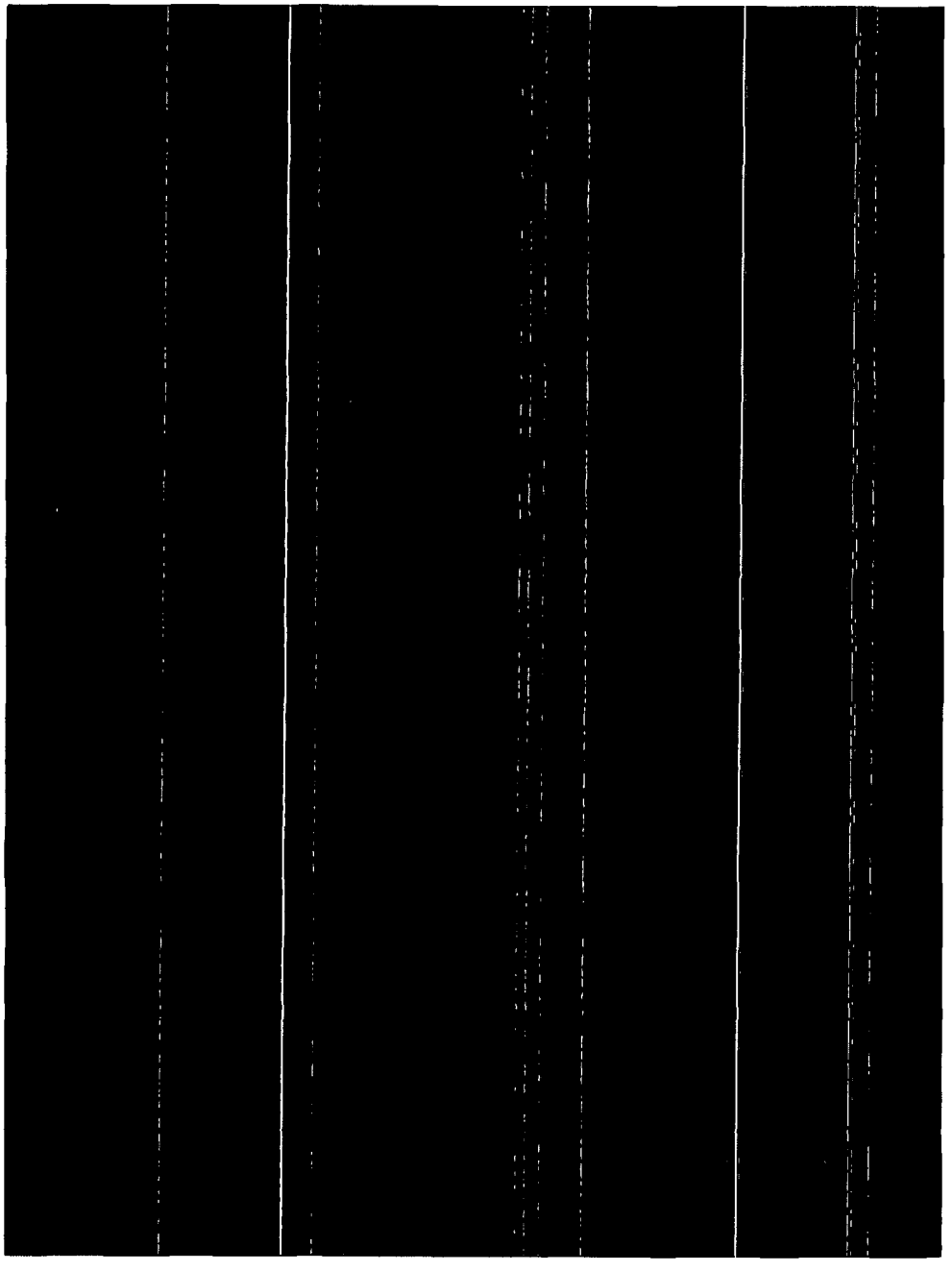
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Magnetic Field
EN 61000-4-8



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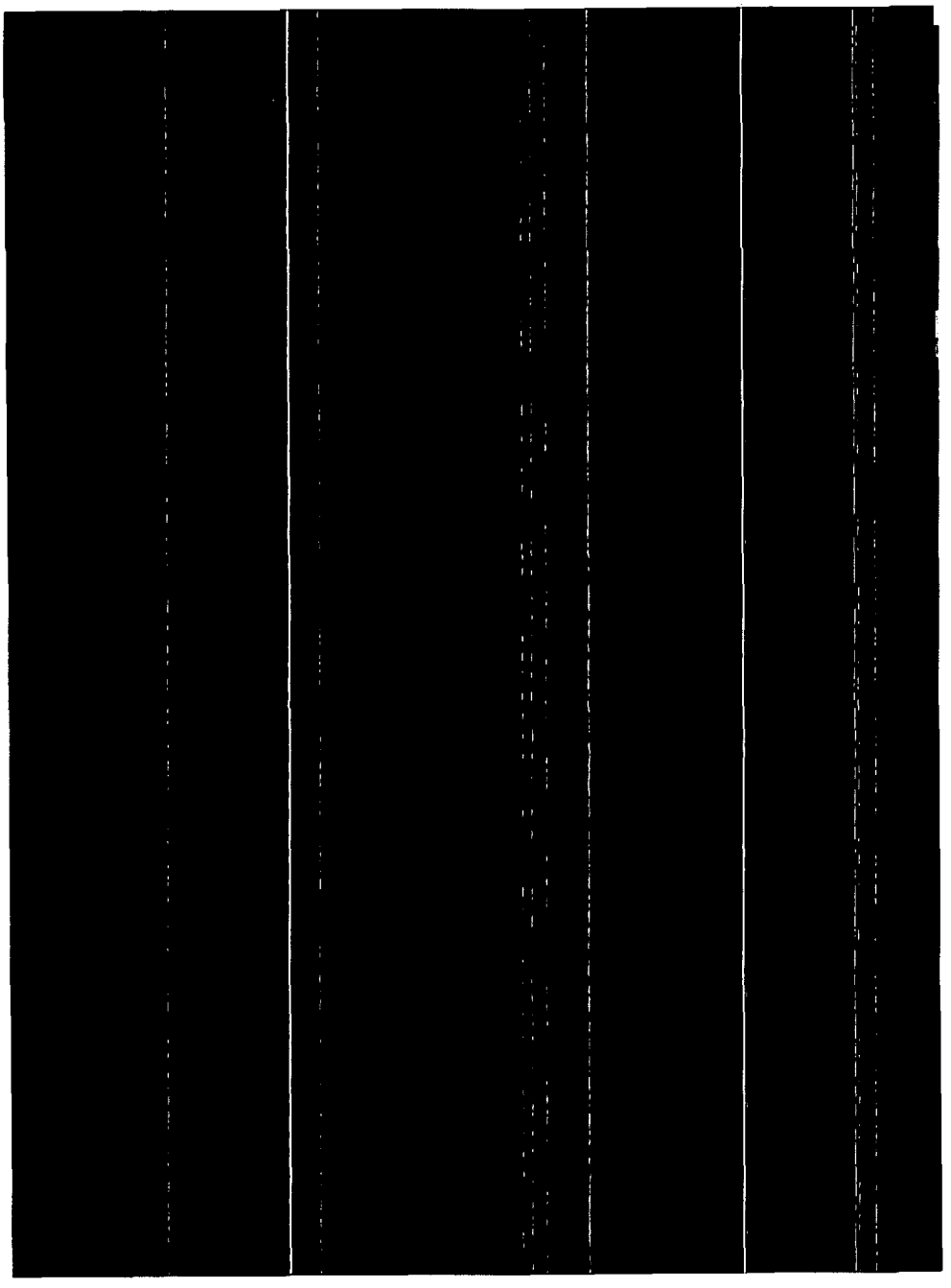
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Voltage Dips
EN 61000-4-11



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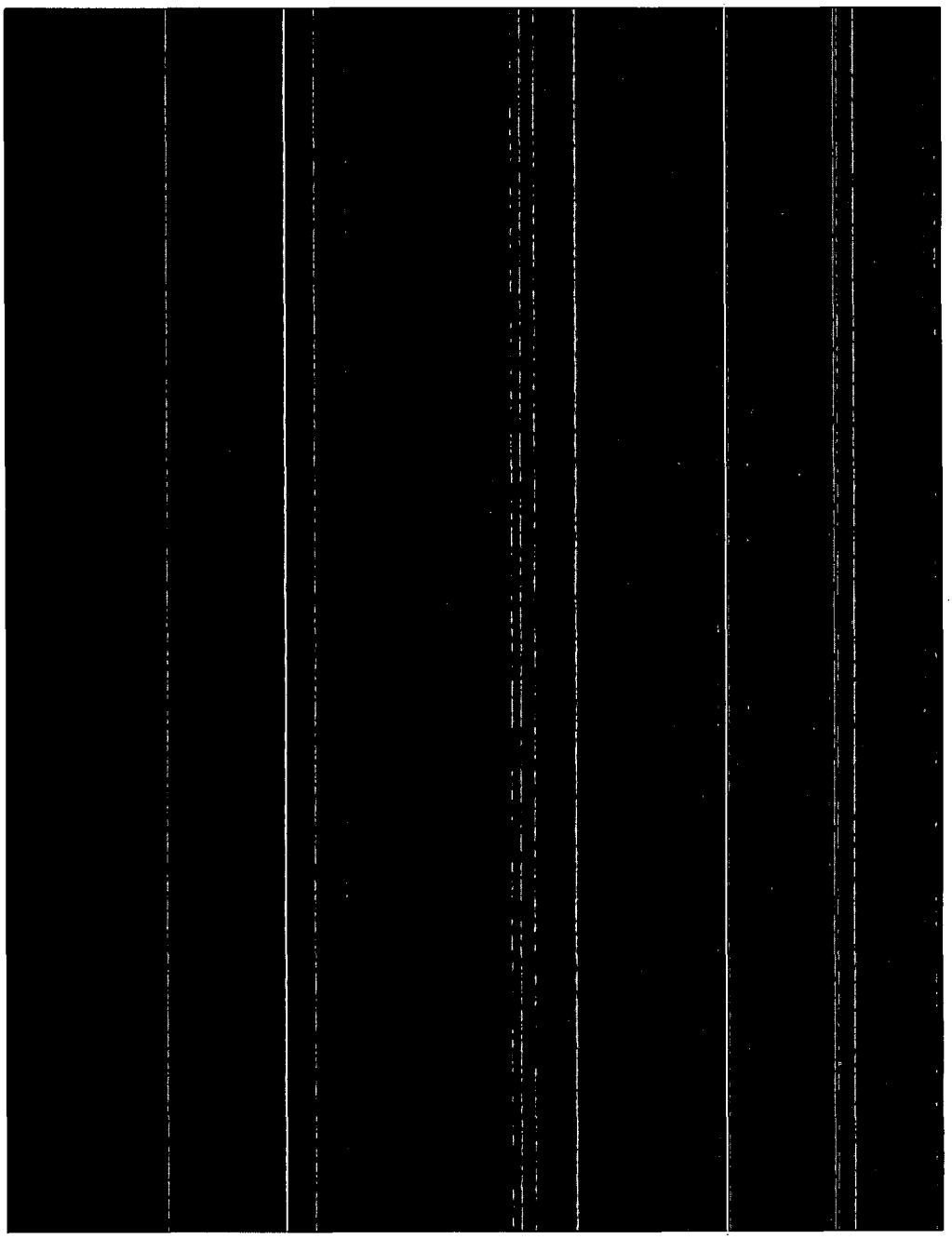
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Emissions
EN 55011



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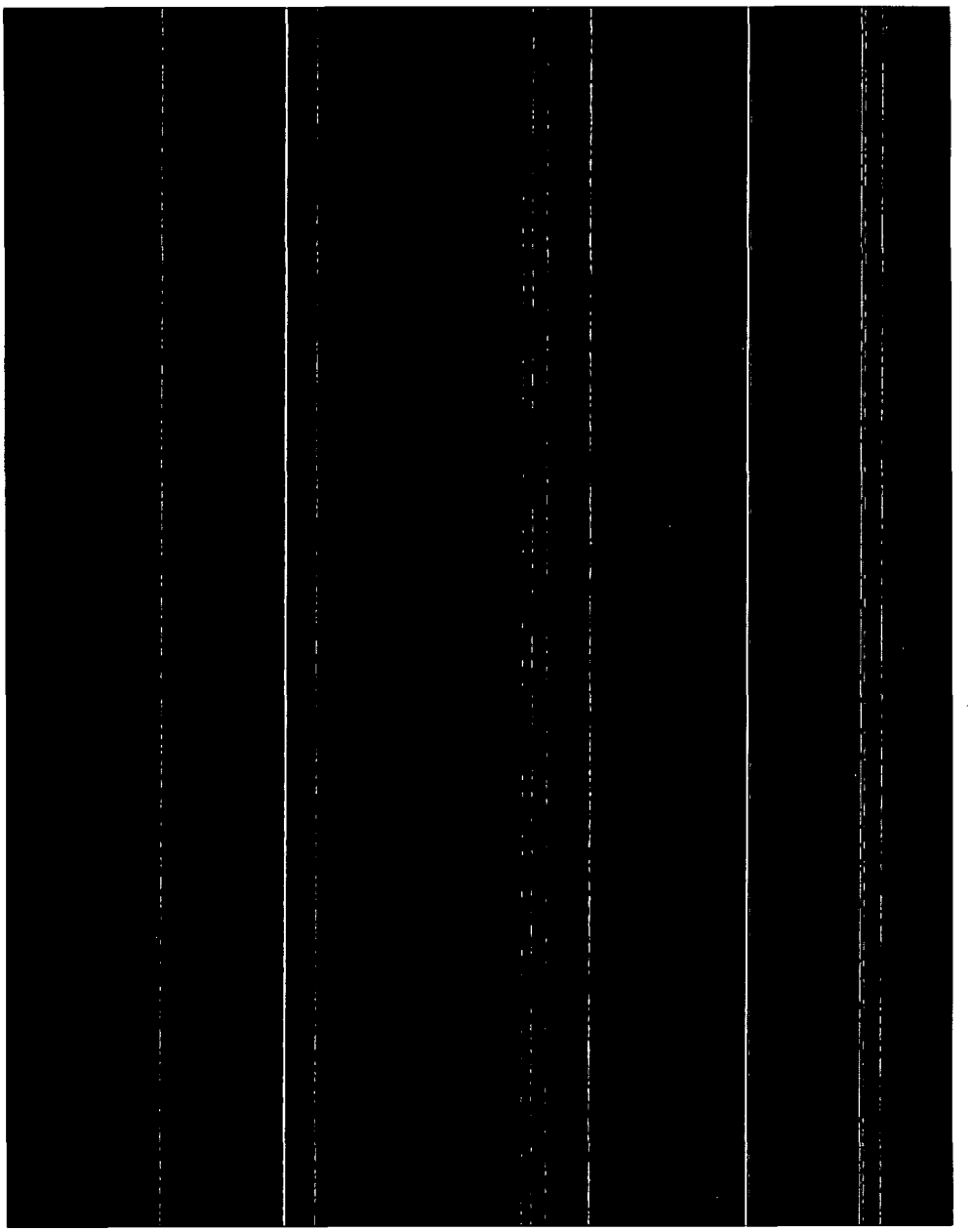
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Radiated Emissions
EN 55011



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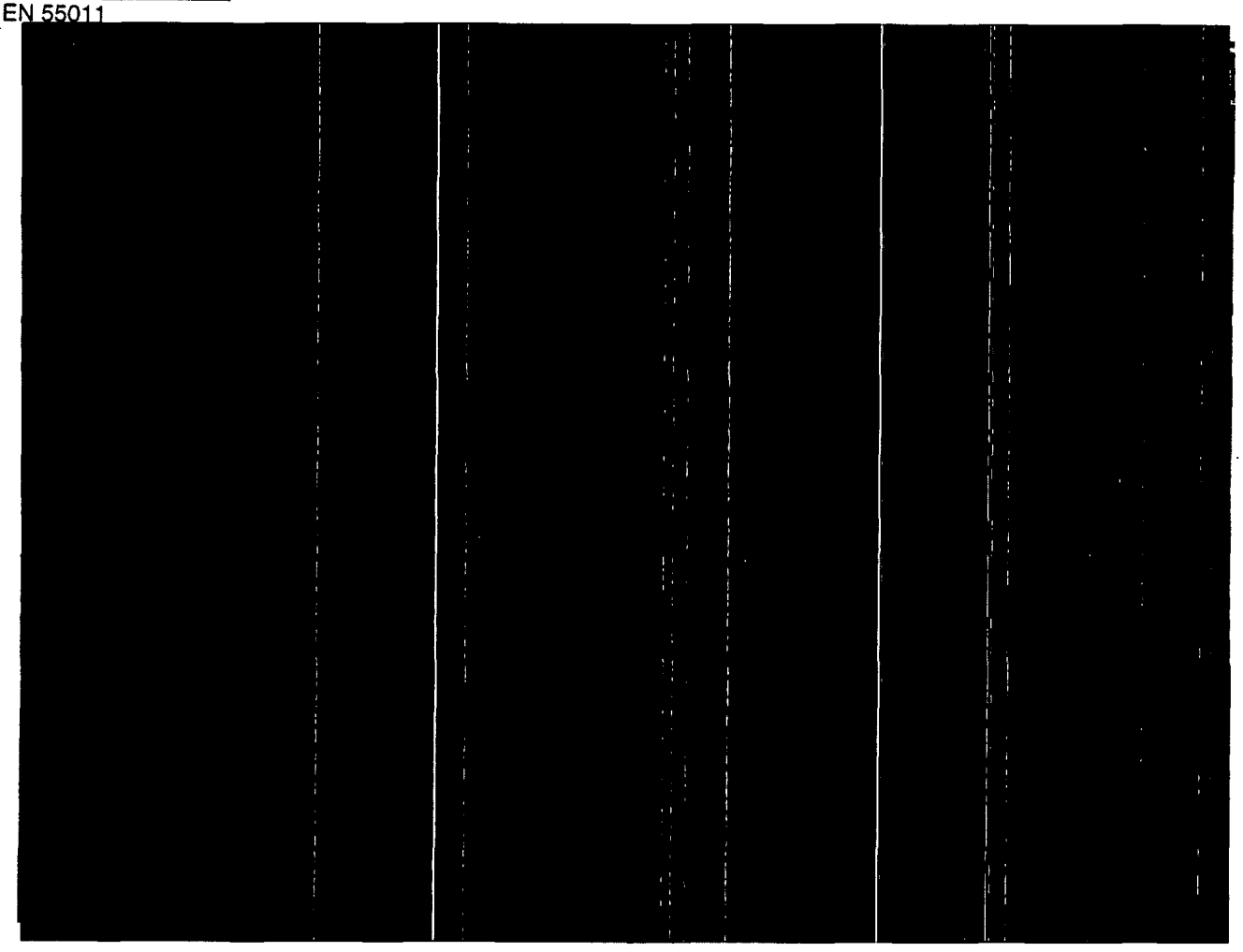
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Emissions
EN 55011



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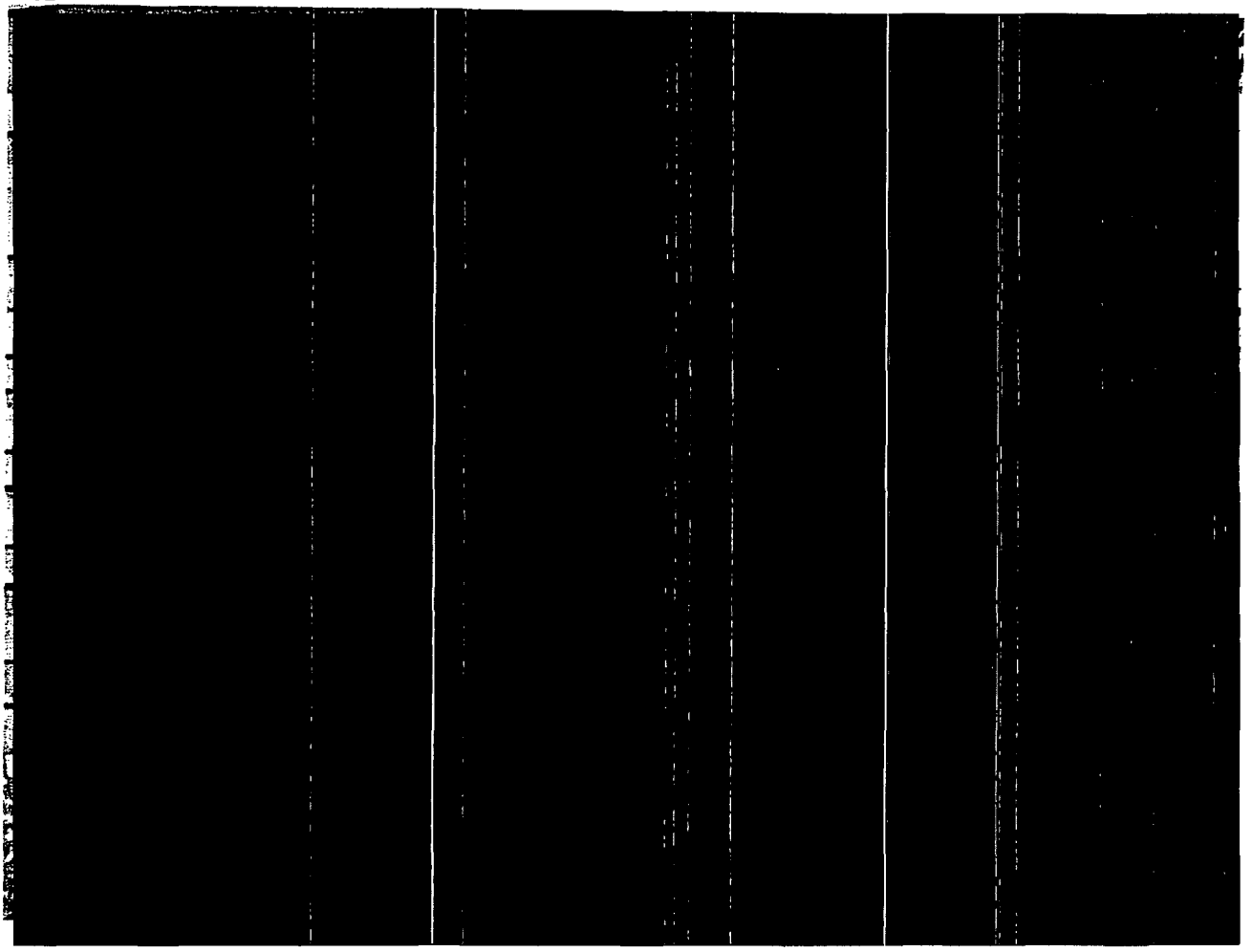
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Emissions, Power Leads
CE102



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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

Photograph of Test Setup:
Conducted Emissions, Power Leads
CE102

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Report No. S8569-02

Appendix B

Product Information Form(s)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

CUSTOMER INFORMATION	
COMPANY NAME:	SORRENTO ELECTRONICS
COMPANY ADDRESS:	10240 Flanders Court
	San Diego, CA 92121
PHONE NUMBER:	619 457 8954 / 8820
FAX NUMBER/E-MAIL ADDRESS:	619 457 8933 / walterwong@gat.com
CUSTOMER CONTACT:	[redacted]
PRODUCT DESCRIPTION	
NAME, MODEL, SERIAL # OF EUT:	RM-1000 Radiation Monitor, Two channel
DESCRIPTION OF EUT:	[redacted]
Components of EUT	
[redacted]	
OPERATING MODE(S):	Equipment will be electrically energized and placed in normal operation. The low range channel monitors its radiation source strength. The high range channel is placed in test mode to provide simulated radiation level for display during test.
[redacted]	

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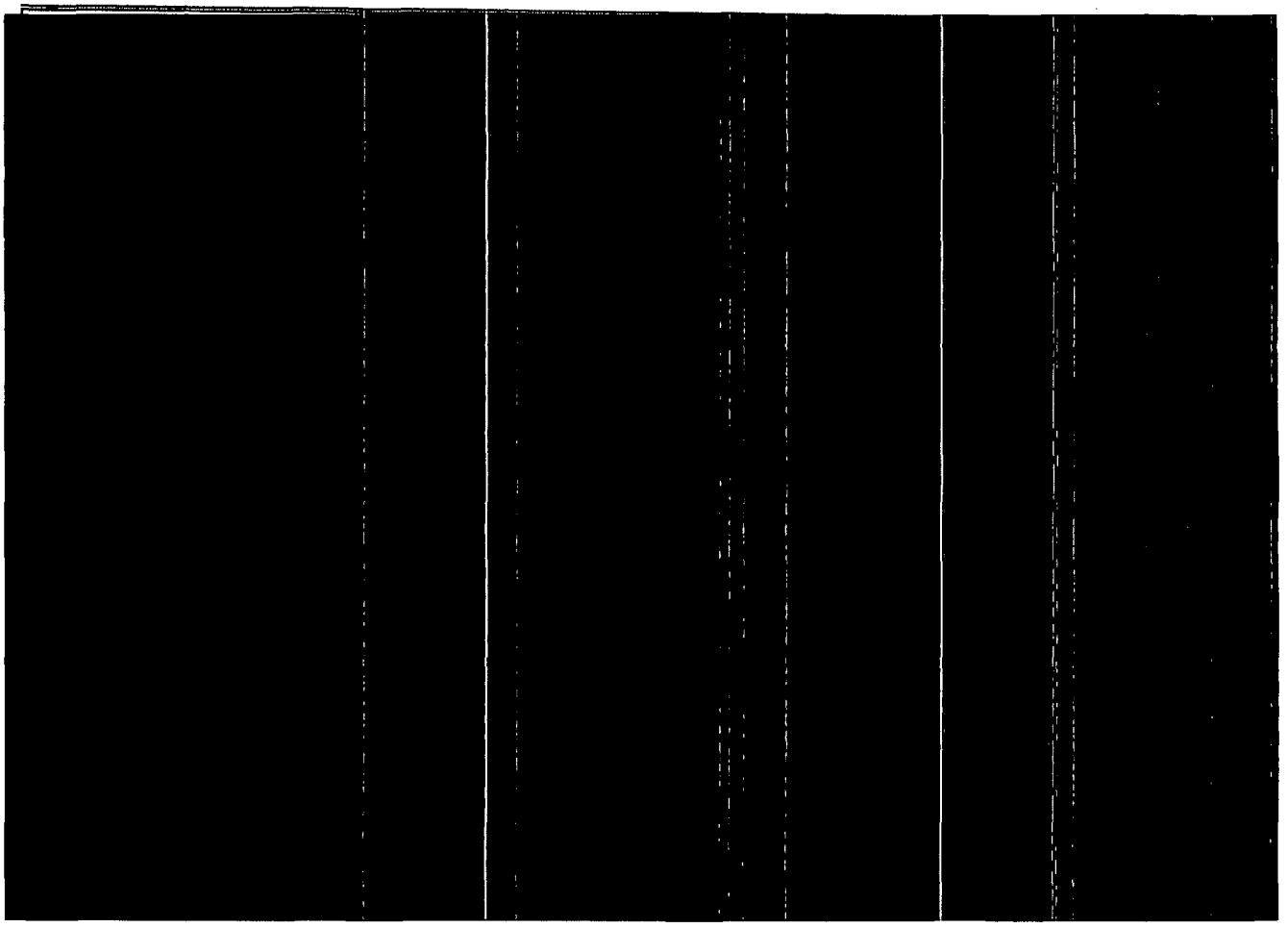
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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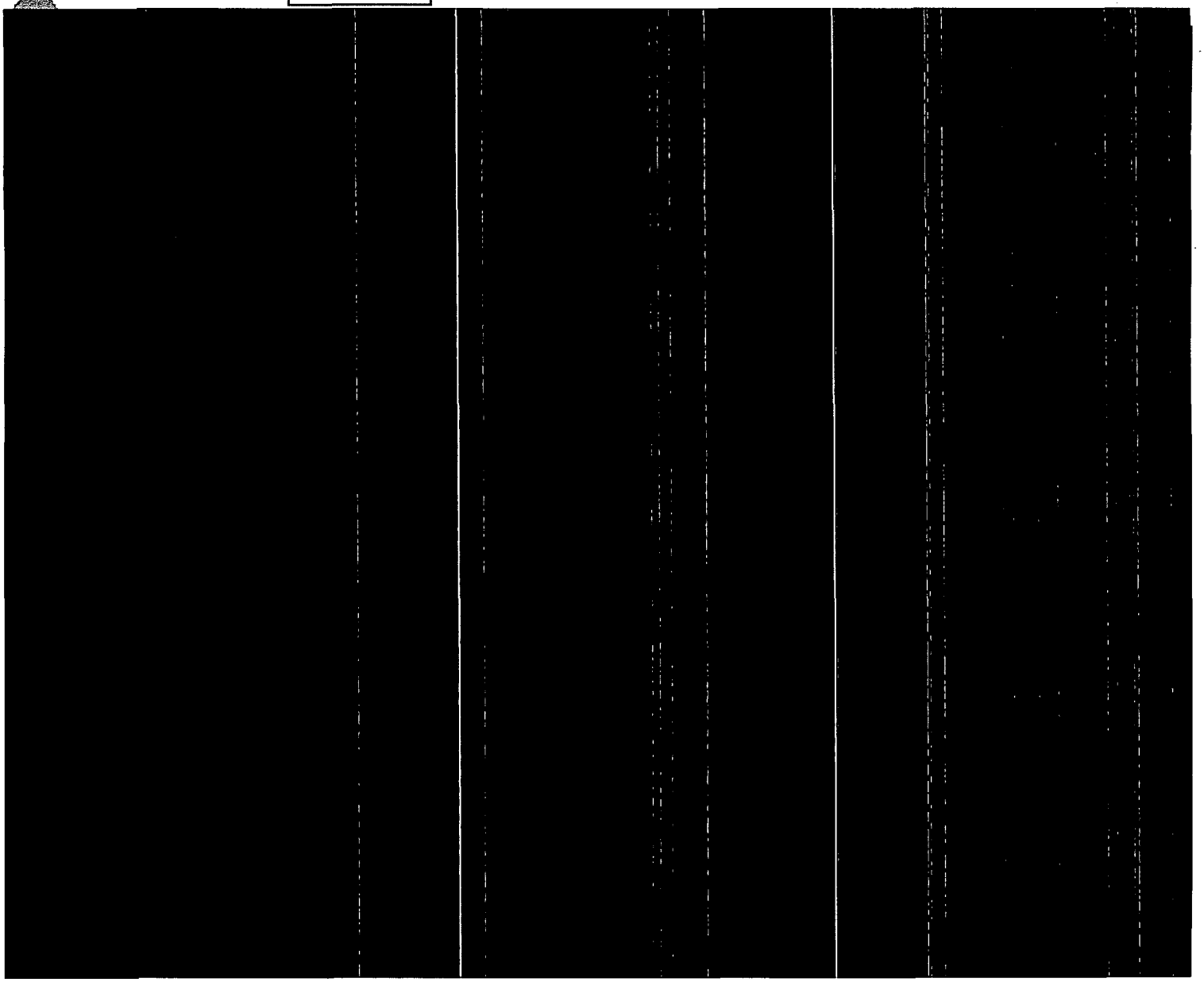
Report No. S8569-02 BUSINESS SENSITIVE

TÜV PRODUCT SERVICE



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Appendix C

Change History

Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Report No. S8569-02

Appendix D

Supplemental Information

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

RADIATED IMMUNITY

Test Report #: S-8569 Test Area: SR-5

Test Method: Radiated Immunity ENV 50140 Date: 01 DEC 98

Tested per customer test procedure. ___ EUT POWER:

EUT Model #: RM 1000 ☒ 230 Vac/50 Hz ☐ 120 Vac/60 Hz ☐ Other:

EUT Description: RADIATION Monitor Temperature 23 °C

Air Pressure: 101.0 kPa

FACE DEFINITION TOP VIEW

1

2 FRONT 3

4

[redacted]

Tested by: [redacted]

Reviewed

Printed Signature

RADIMU.DOC Rev 05.97

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Report No. S8569-02

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

INFORMATION

NOV 2 5 1998

ONLY

[redacted]

DOCUMENT CLASSIFICATION CHANGE

SHEET	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
REV																												
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
REV																												

SORRENTO ELECTRONICS

DRAWN James Tamura	DATE 11-23-98	RM-1000 EMC EMISSION AND SUSCEPTIBILITY TEST PROCEDURE
CHECKED John Ryan	11-24-98	
ENGR James Tamura	11-23-98	
ENGR REV G. Wong	11-23-98	
PROJ MGR R. W. Mauman	11-24-98	
MFG ENGR ———	———	SIZE A; FSCM NO. 58307; DRAWING NO. 04509005; REV —
QUAL MGR C. M. Miller	11-24-98	RELEASE Lorraine 11/25/98; SHEET 1 OF 23
ENGR MGR ———	———	DRAWING LEVEL 3

04509005

SE-0009 3/97

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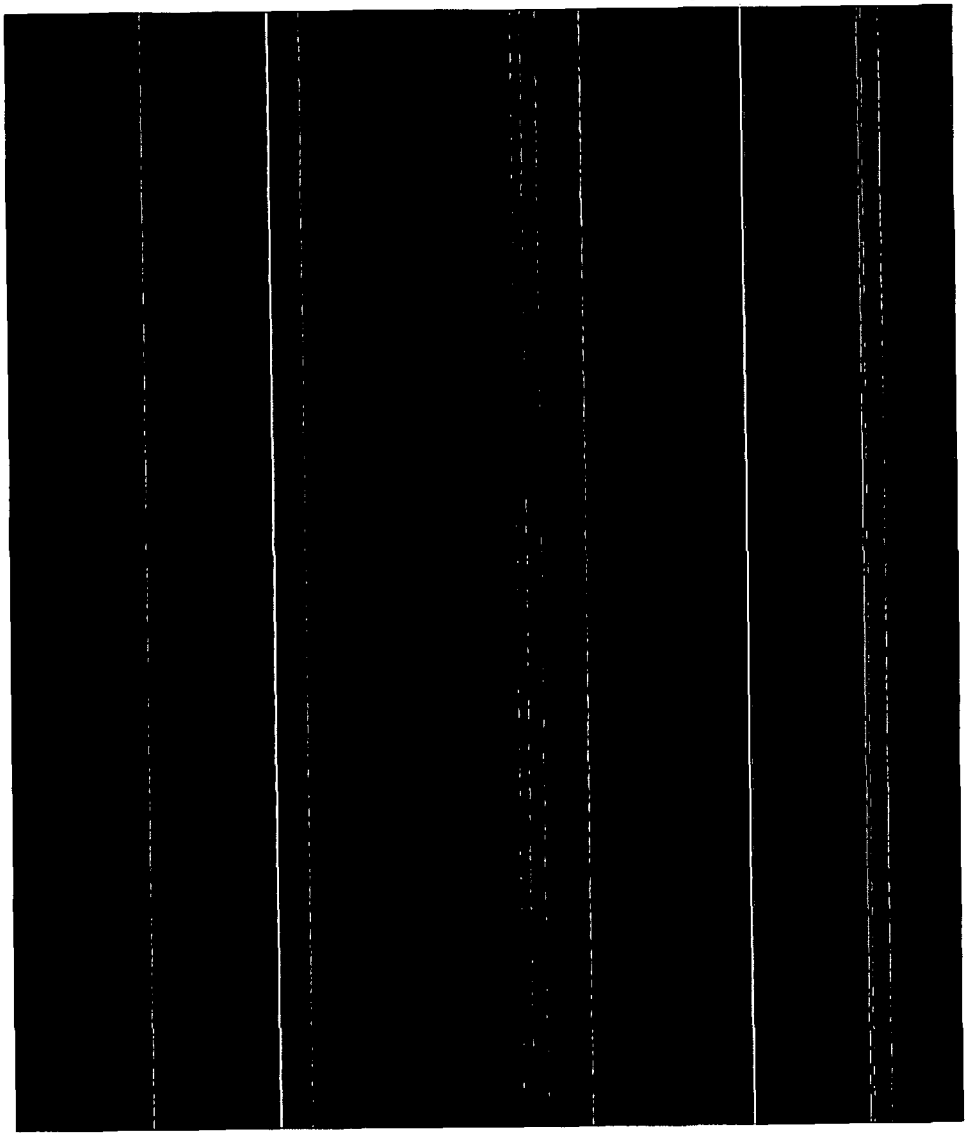
Report No. S8569-02

BUSINESS SENSITIVE



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TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE

[redacted]

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TÜV PRODUCT SERVICE

1 PURPOSE AND SCOPE

This Test Procedure (TP) defines the steps necessary to test the Electromagnetic Compatibility (EMC) of the Sorrento Electronics (SE) RM-1000 Radiation Monitor. The EMC test consists of Electromagnetic Interference and Radio Frequency Interference (EMI/RFI) Emissions and Susceptibility. The TP establishes and the test fulfills the requirements for the TVA/KOLA/BEZNAU RM-1000 EMC test. The TP also establishes and the test fulfills the requirements for testing the Class 1E SE RM-1000 Radiation Monitor to EMC International Standards. The TP includes the SE procedure and references to the Vendor procedure and Test Plan to qualify the Class 1E RM-1000 radiation monitoring processor modules, current to frequency (I/F) converter module and associated equipment, as well as to provide a place for recording such data for future traceability.

2 REFERENCE DOCUMENTS

The EMC standards to which the system will be tested are listed below and are summarized in Table 1 TVA/KOLA/BEZNAU RM-1000 EMC TEST STANDARDS. Note that these are international standards and United States military standards referenced by the EPRI TR-102323-1994 Guidelines for Electromagnetic Interference Testing in Power Plants.

TEST PARAMETER	STANDARDS
Electrostatic Discharge Immunity	EN 61000-4-2 (1995) (IEC 1000-4-2)
Radiated RF Immunity	ENV 50140 (1993) (IEC 1000-4-3)
EFT Immunity	EN 61000-4-4 (1995) (IEC 1000-4-4)
Surge Immunity	EN 61000-4-5 (1995) (IEC 1000-4-5)
LF Conducted RF Immunity	MIL-STD-461D (1993) CS-101
HF Conducted RF Immunity	ENV 50141 (1993) (IEC 1000-4-6)
Magnetic Field Immunity	EN 61000-4-8 (1994) (IEC 1000-4-8)
Voltage Dips, Short Interruptions & Voltage Variations Immunity	EN 61000-4-11 (1994) (IEC 1000-4-11)
Radiated RF Emissions (Commercial)	EN 50081-1 (1992) EN 55022, Class B
Conducted RF Emissions (Commercial)	EN 55022, Class B
Conducted RF Emissions (Industrial)	MIL-STD-461D (1993) CE-102

3 EQUIPMENT TO BE TESTED

The equipment to be tested is:

ITEM	SE Part No.
2 RM-1000 Radiation Monitor Modules: High Range, Low Range	04501000-001
Current to Frequency (I-F) Signal converter	04506150-001
Local Indicator Assembly	03600270-007

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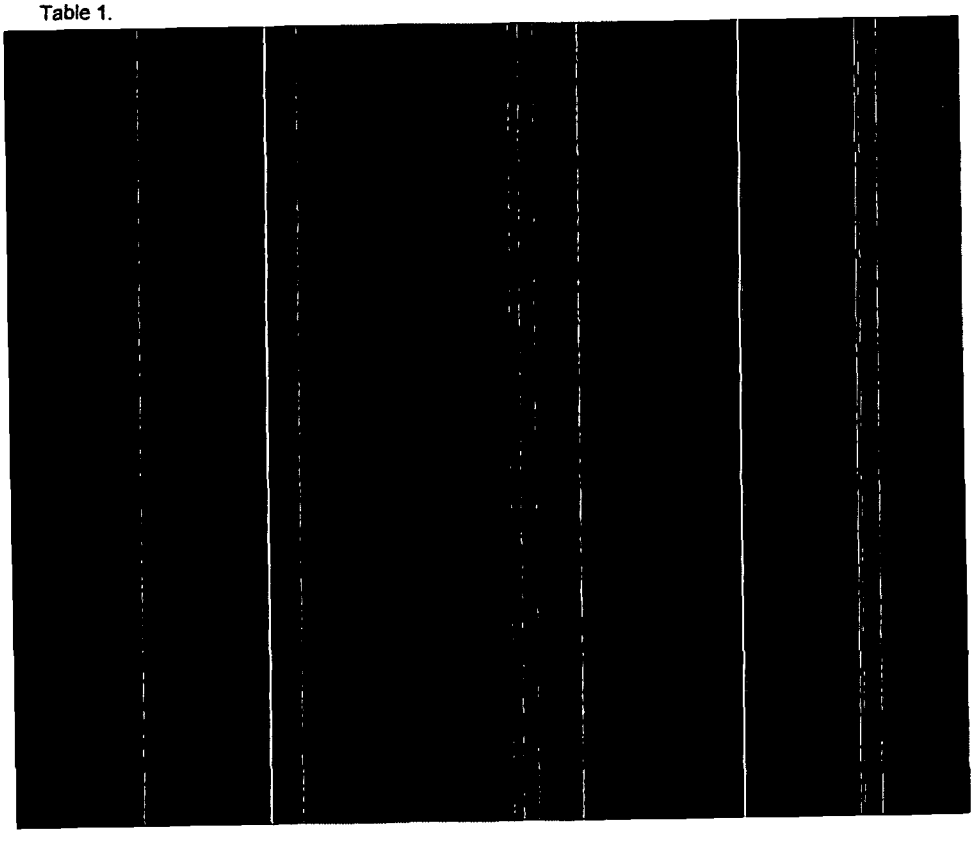
RD-23 Detector Assembly	03602062-001
RD-1 Detector Assembly	02810059-001
5 volt dc Signal Converter Power Supply	04631151-002
2 RM-1000 24 volt dc Power Supplies	04502005-001
Relay Panel	03604634-001
2 Relays 24 volt dc	50005829-001
Relay Power Supply 24 volt dc	04631151-001
Analog Panel	50015725-001
220 volt ac Line filter	50015670-001
Test Equipment Rack containing some of the above items, interconnecting wires/cables and associated components.	
Conduit assembly containing the RD-23 detector high voltage and signal cables.	

4 ELECTROMAGNETIC EMISSIONS AND SUSCEPTIBILITY REQUIREMENTS

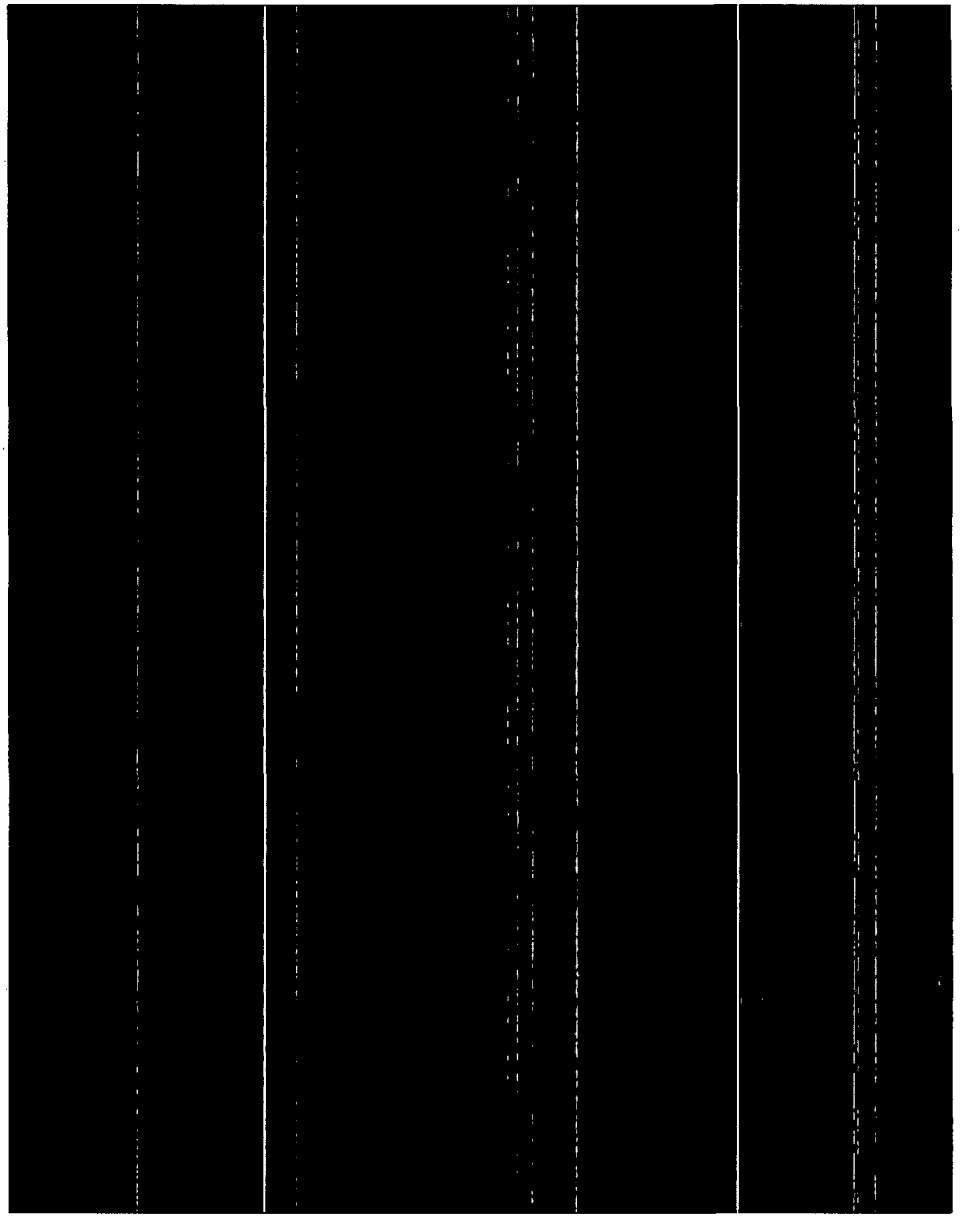
The Equipment Under Test (EUT) shall be subjected to the conducted and radiated susceptibility standards listed in Section 2 of this Test Procedure. These requirements are summarized in Table 1.



TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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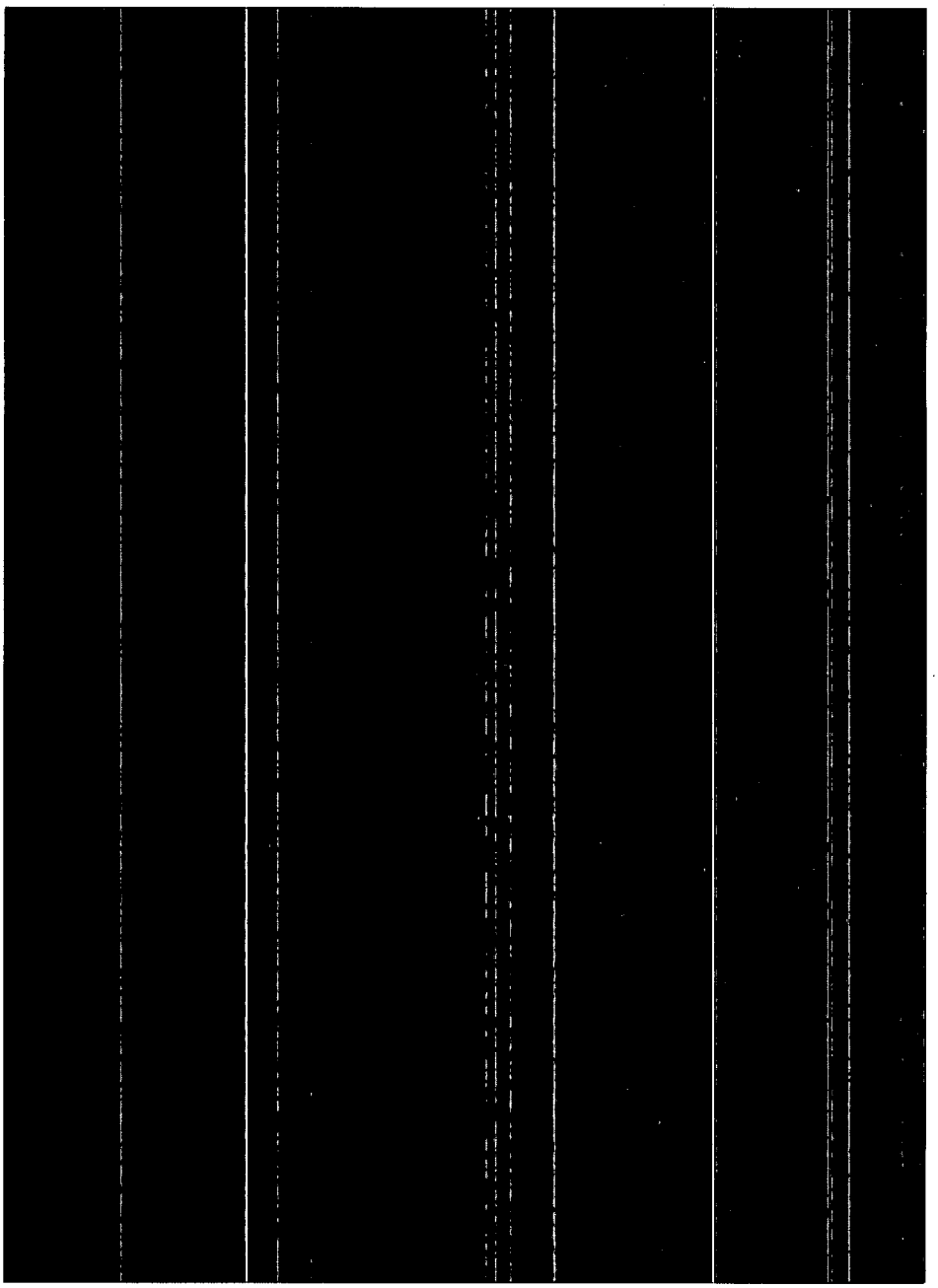
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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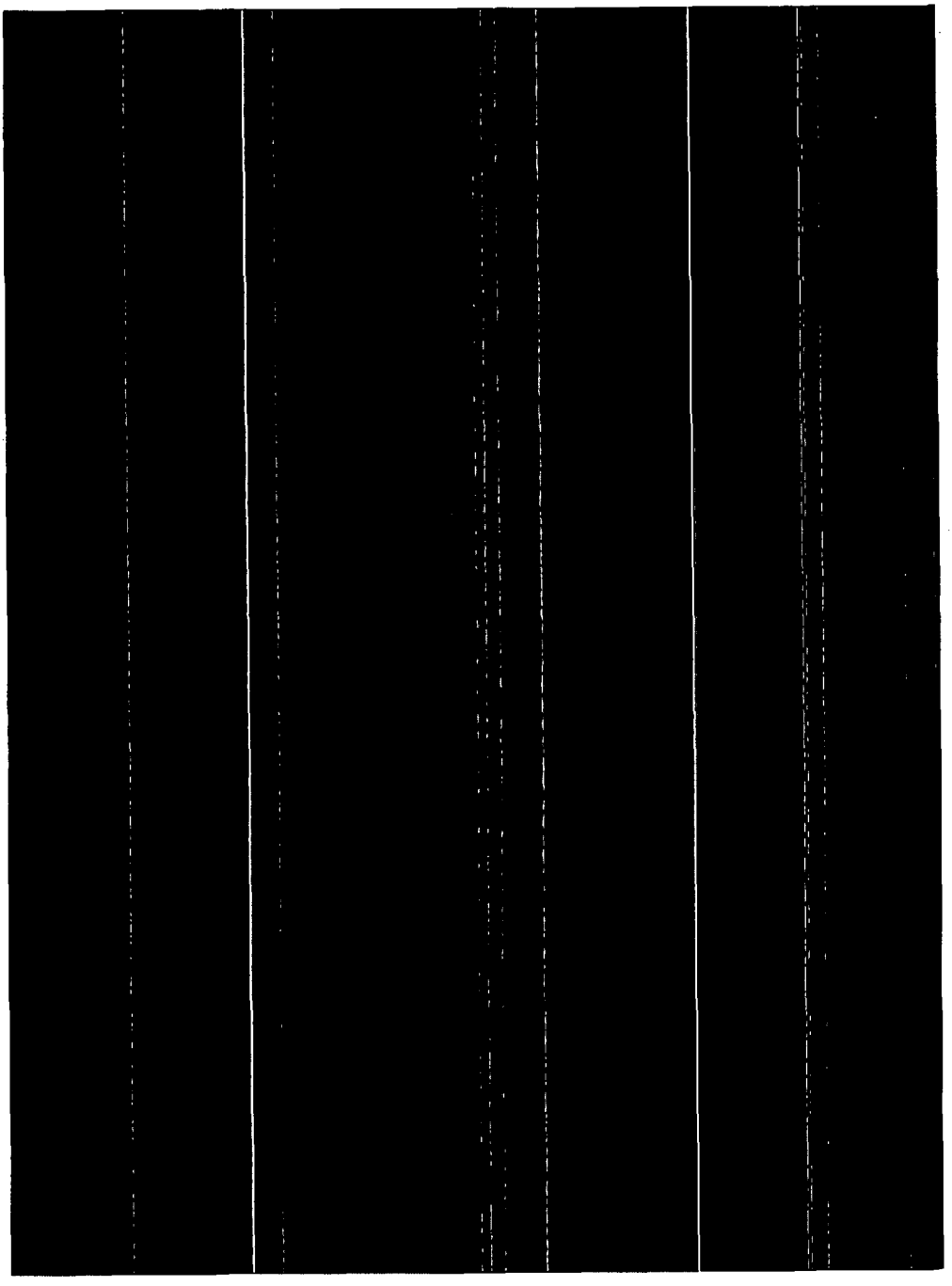
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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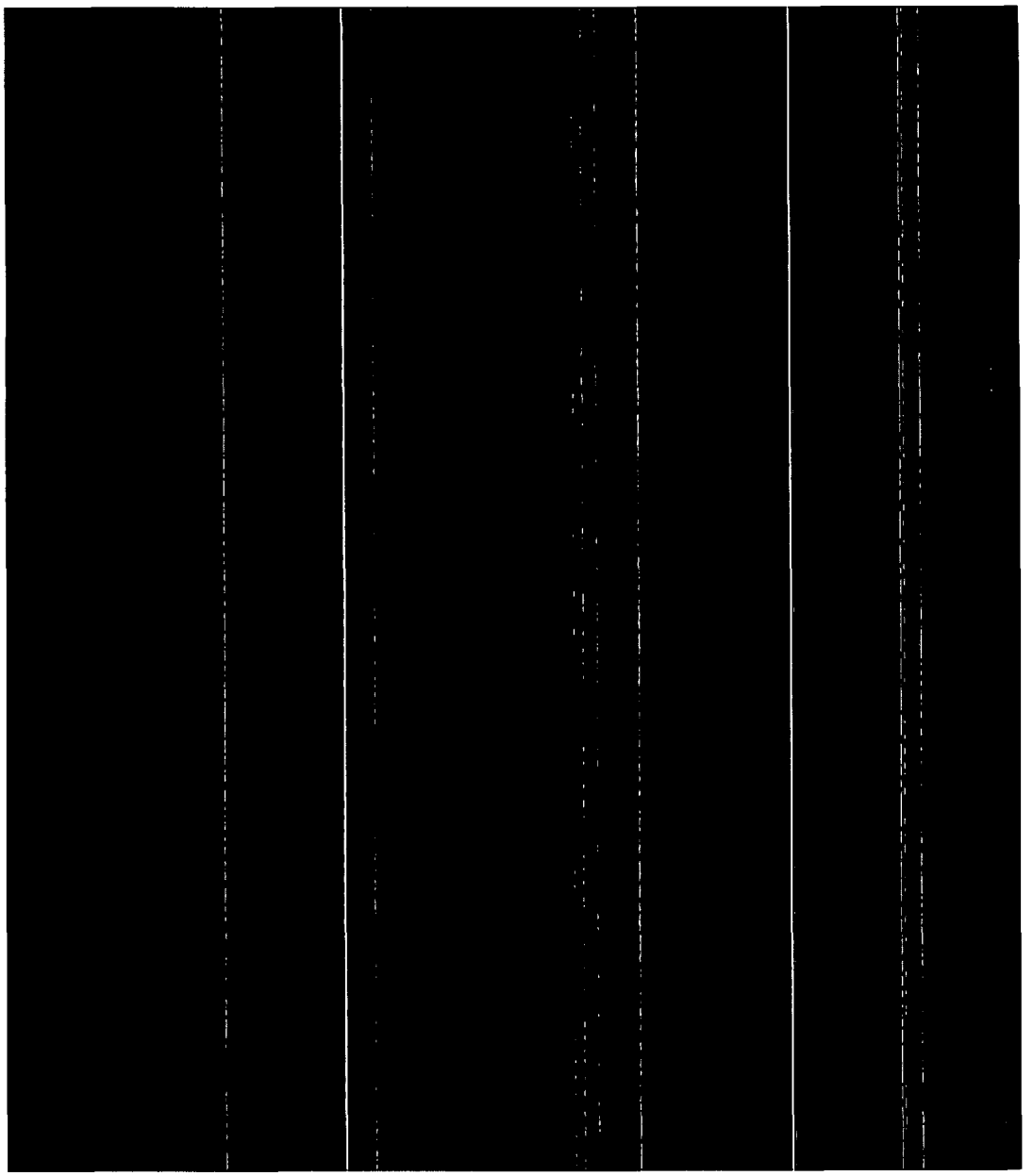
TÜV PRODUCT SERVICE

Report No. S8569-02

BUSINESS SENSITIVE



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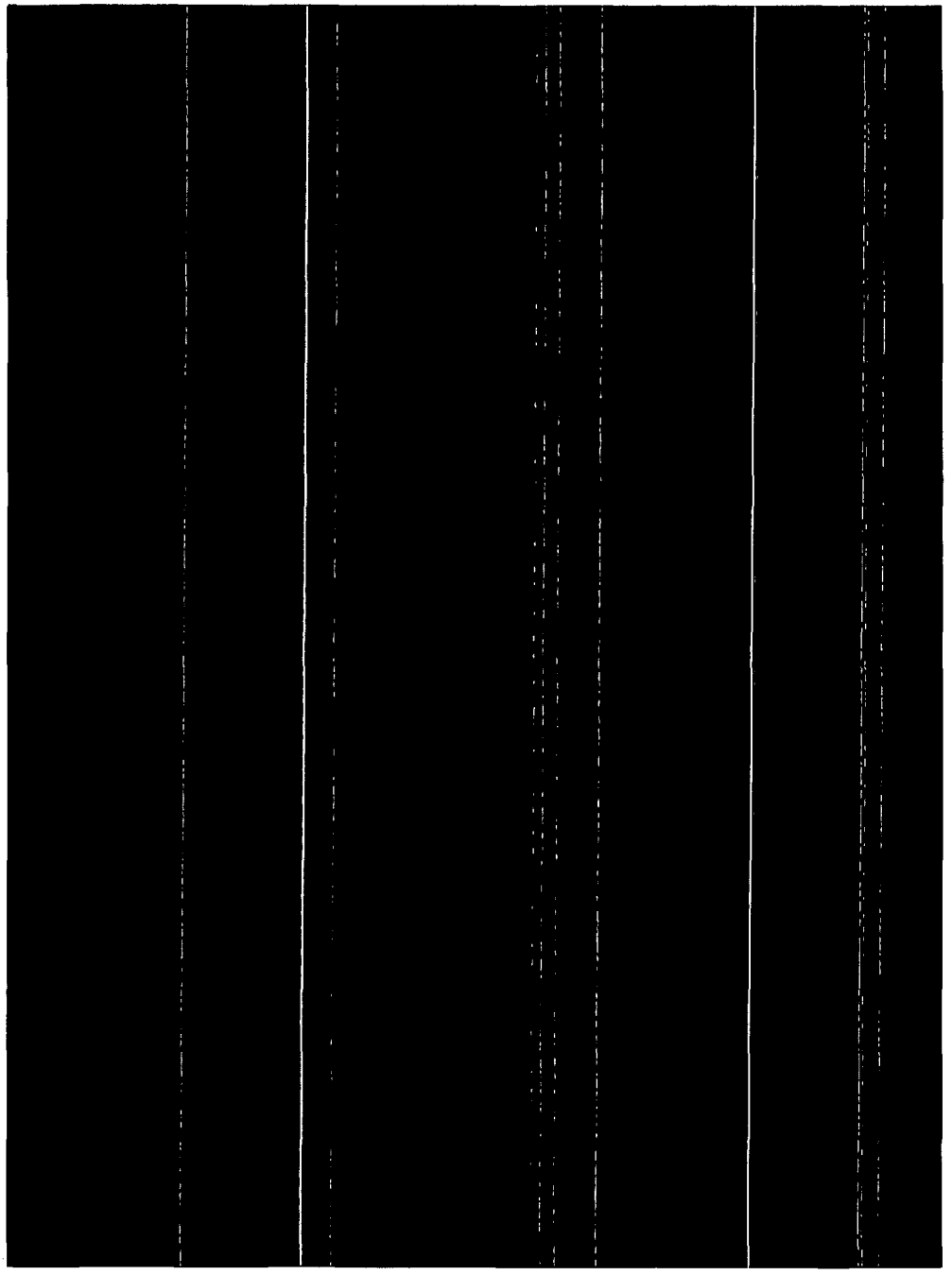

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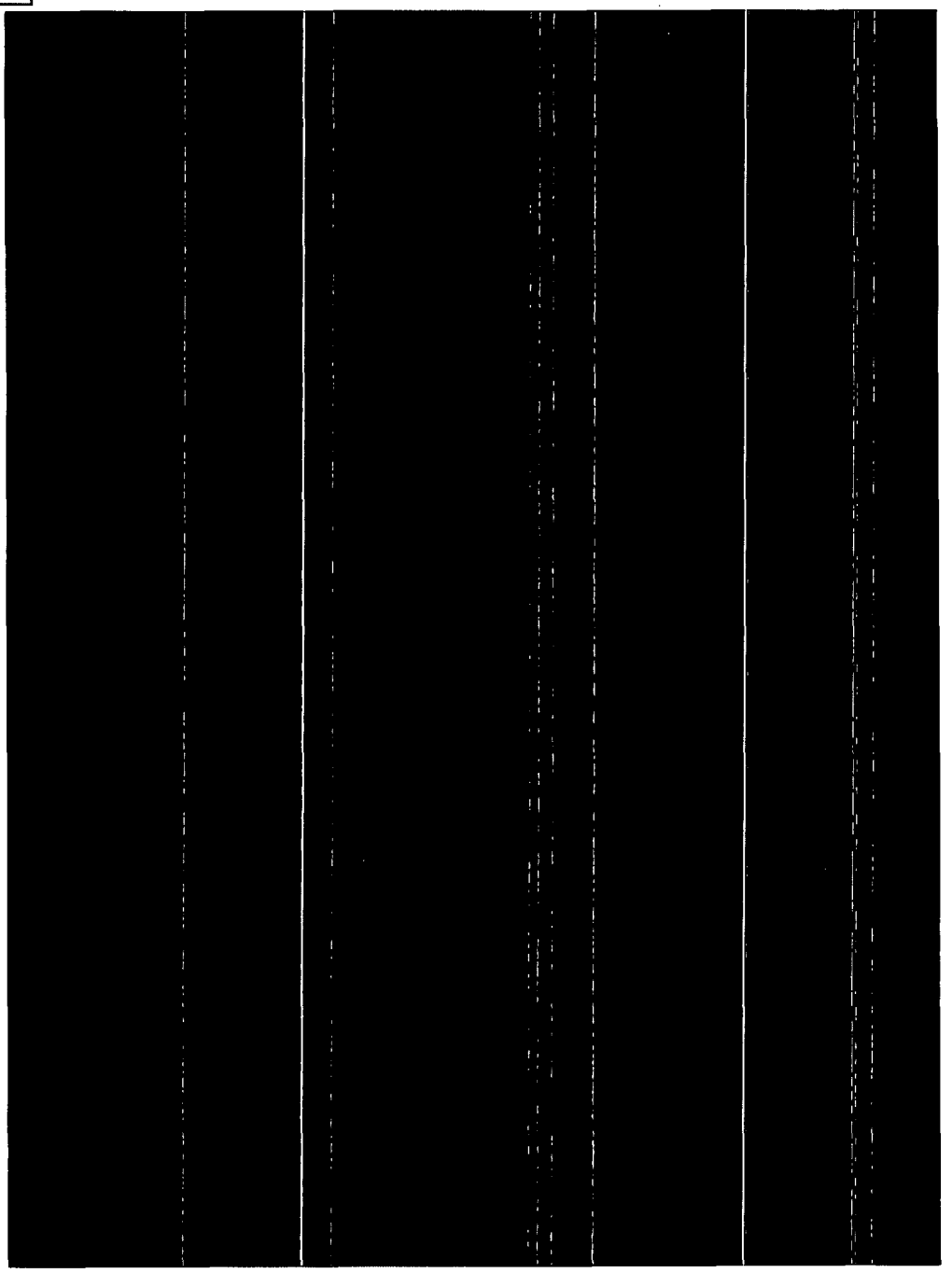

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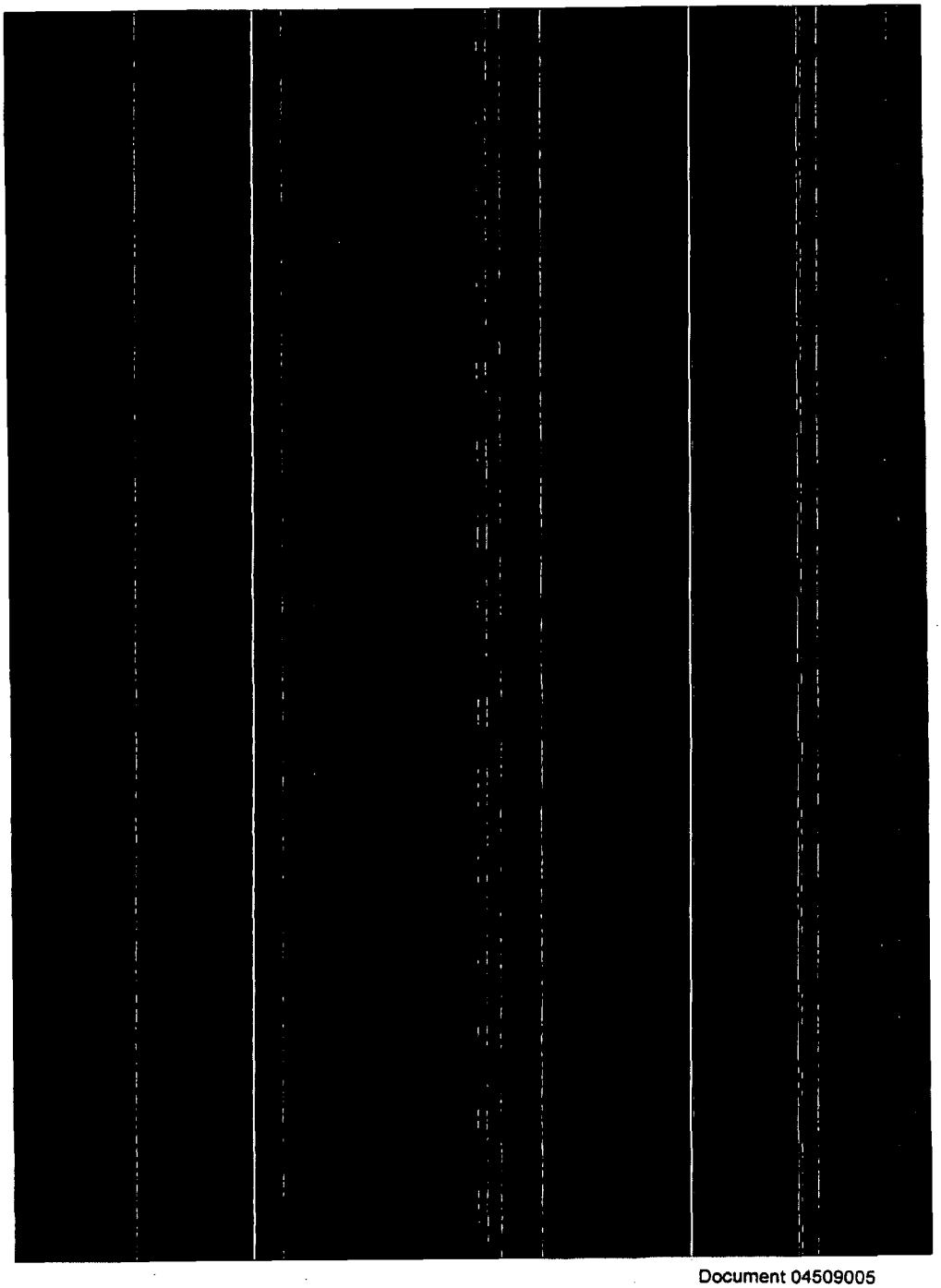

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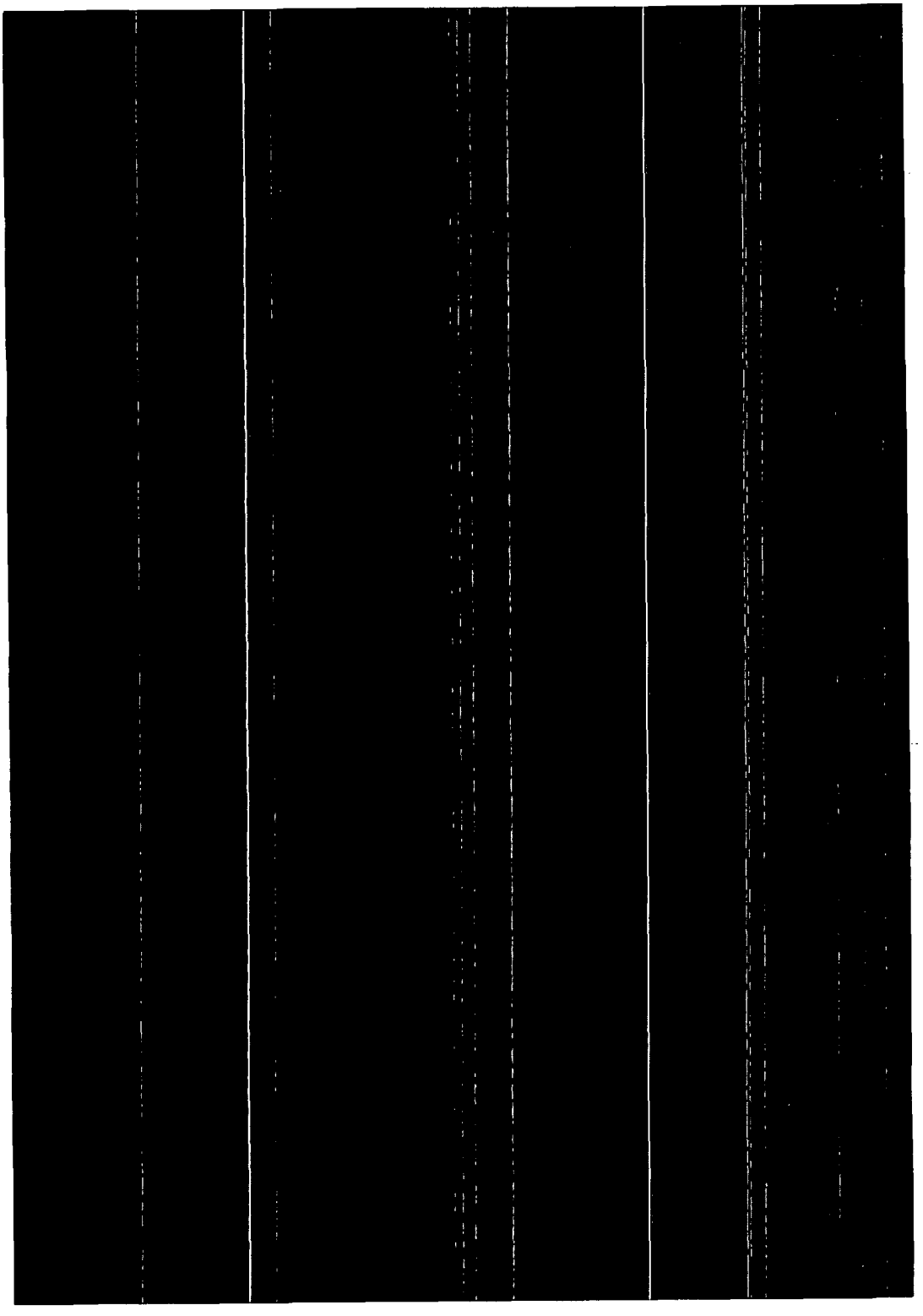

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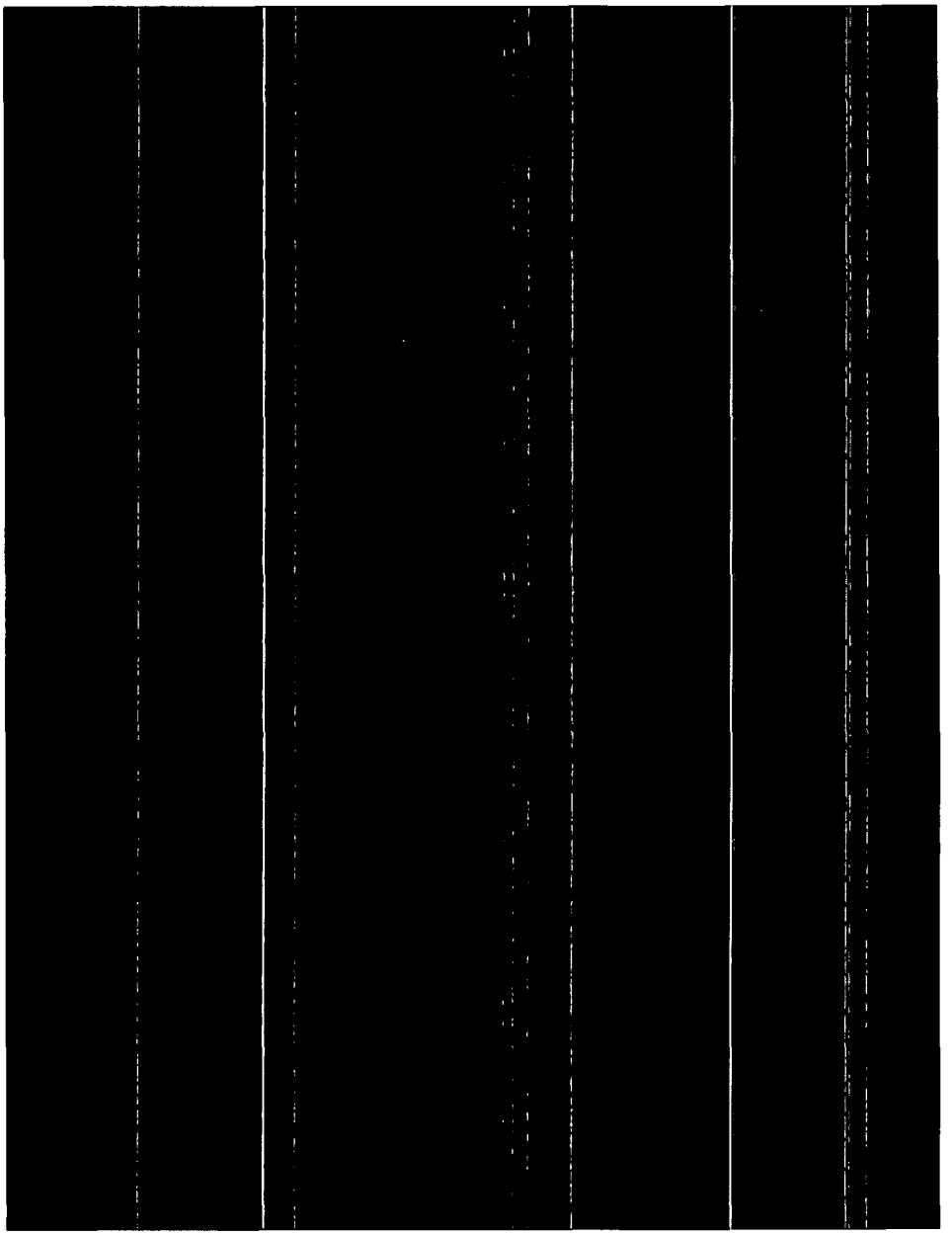

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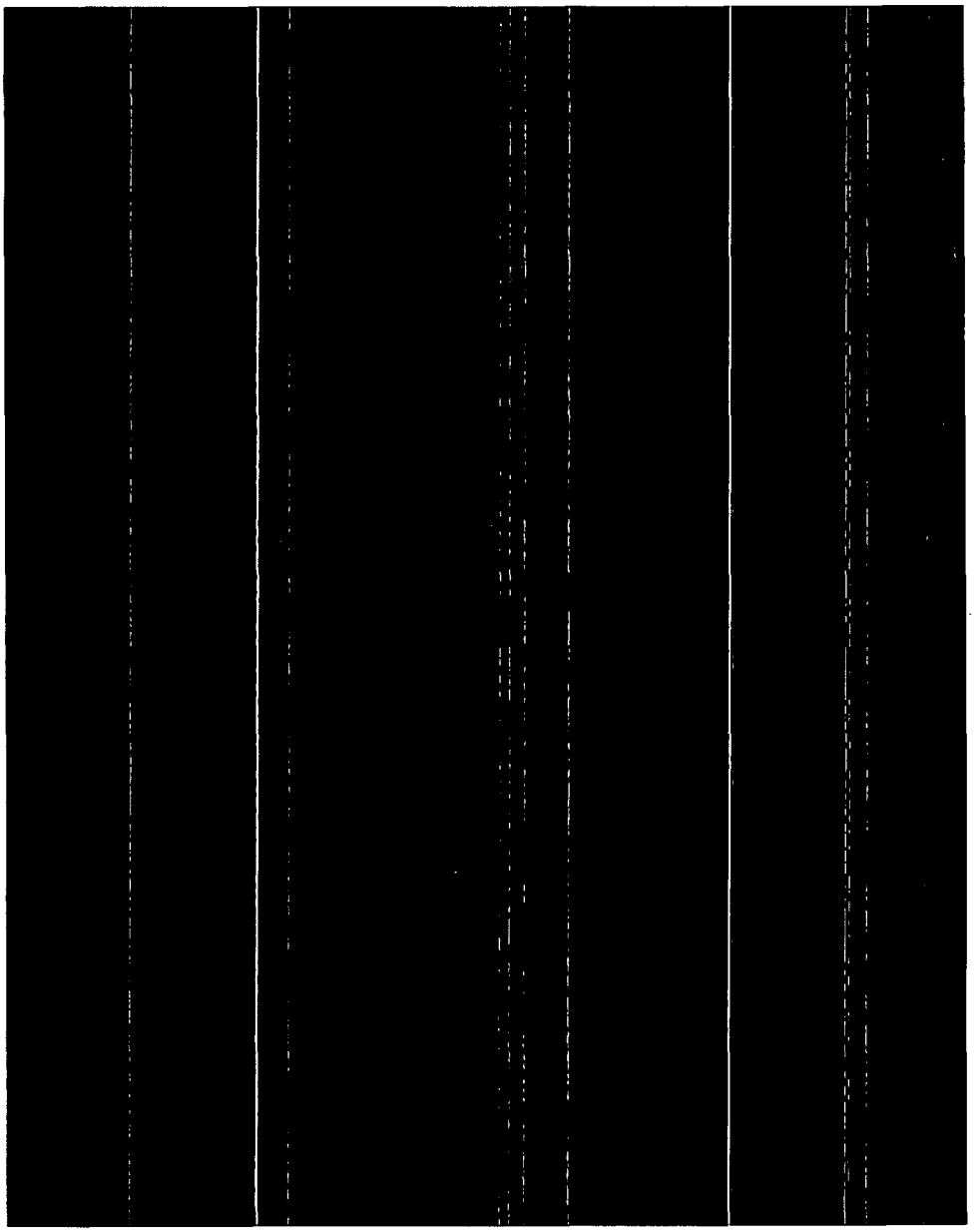

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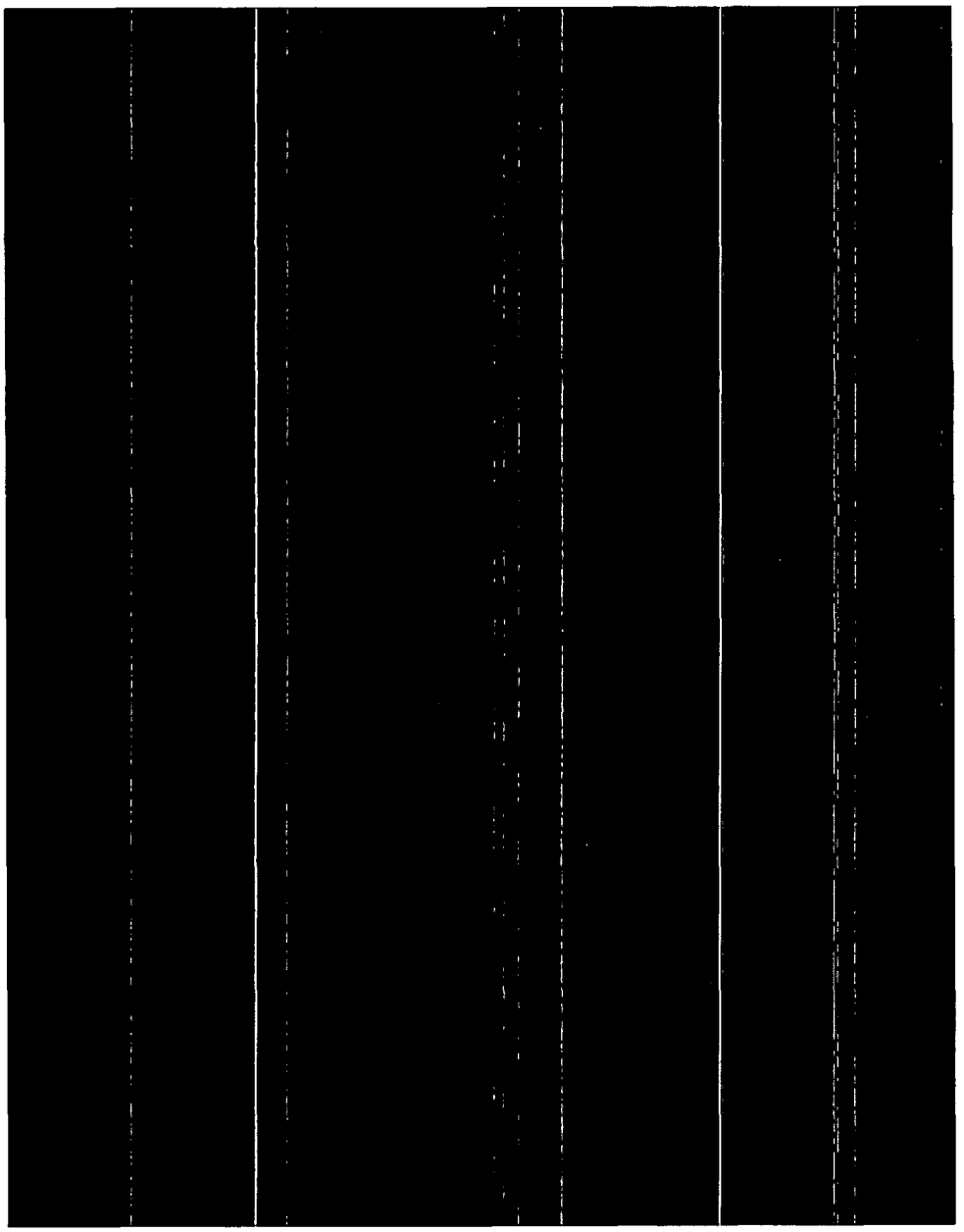

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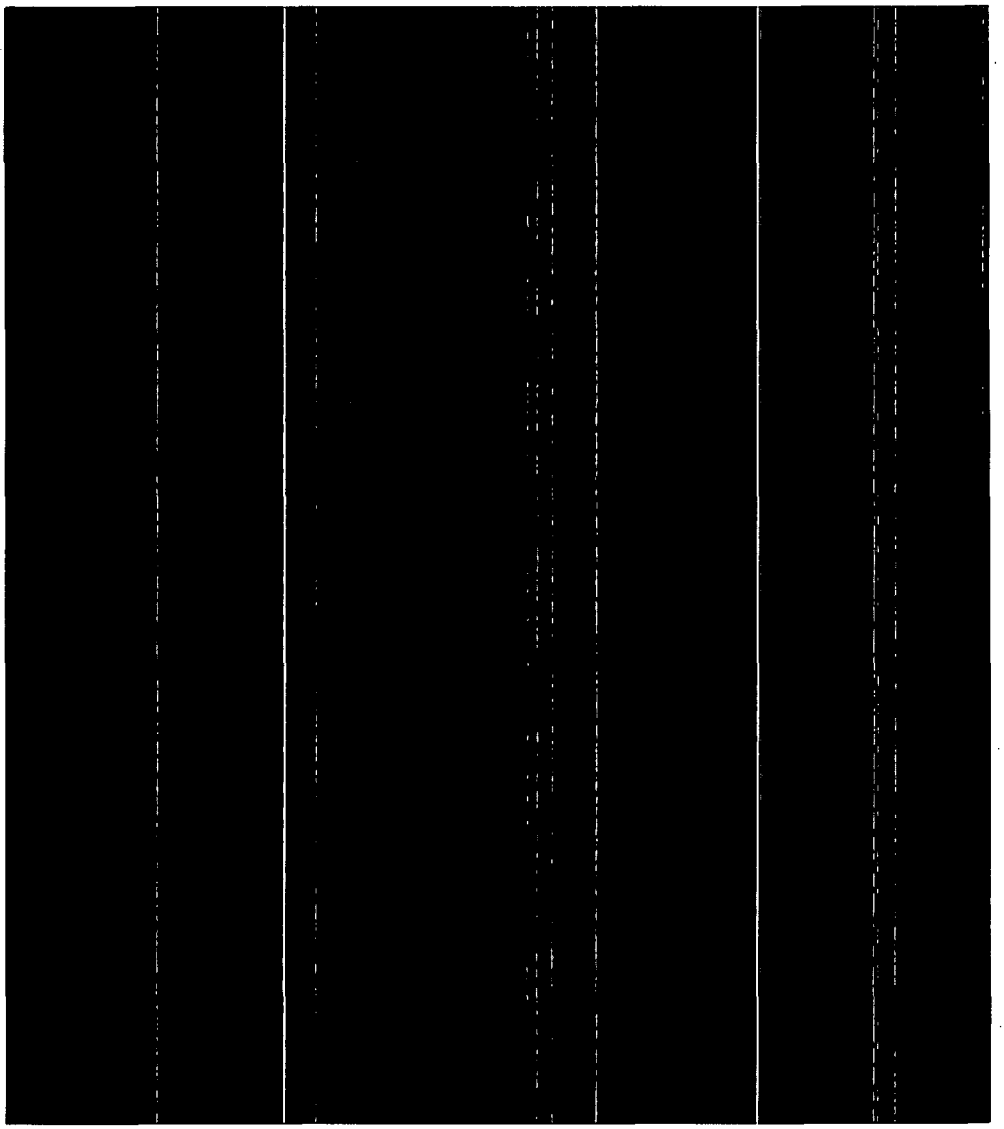

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Appendix A MISCELLANEOUS INFORMATION

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Appendix B PRE EMC FUNCTIONAL TEST

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Appendix C ABBREVIATED EMC FUNCTIONAL TEST

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Appendix D POST EMC FUNCTIONAL TEST

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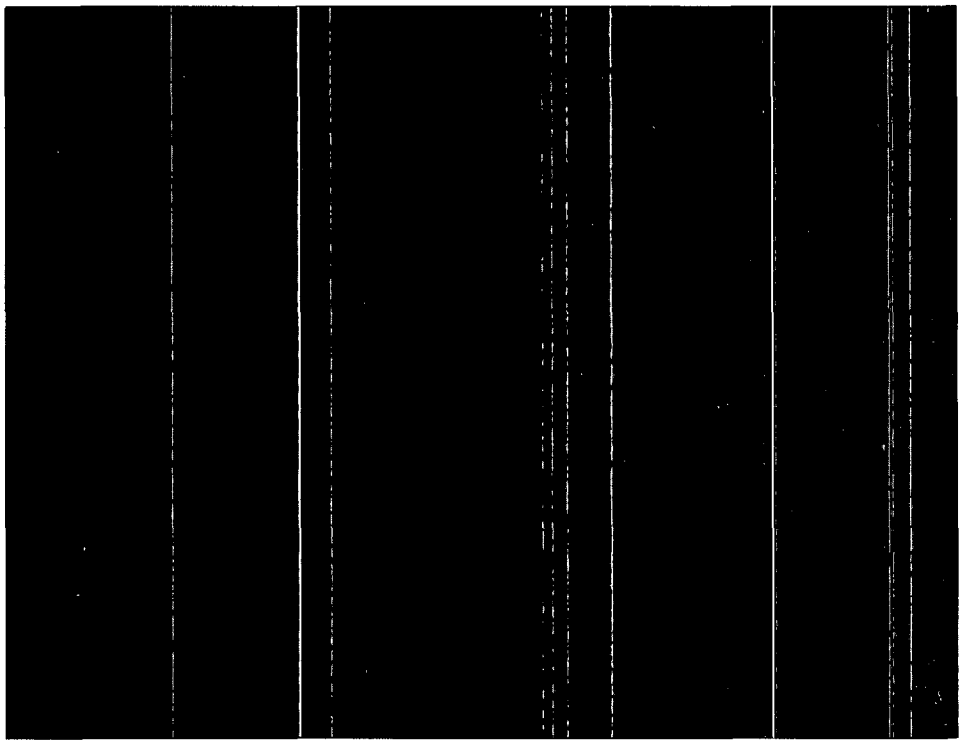

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