EXHIBIT 3

Report Of Measurement
Includes sample calculations, block diagrams, photographs
of test configurations and properly signed and dated report.

FCC ID: G9BIS87

TÜV PRODUCT SERVICE

TEST RESULT SUMMARY

FCC PART 15 SUBPART C
Section 15.245

MANUFACTURER'S NAME	B. E. A. Inc
NAME OF EQUIPMENT	Digital Microwave Sensor
MODEL NUMBER	**IS-87**
MANUFACTURER'S ADDRESS	300 S Main Street Pittsburgh PA 15215
TEST REPORT NUMBER	W8198
TEST DATE	31 May & 23 July 1998

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15.

Date: 23 July 1998

Location: Taylors Falls MN USA

R. M. Johnson
Test Engineer

J. T. Schneider
Site Manager

Not Transferable

TÜV PRODUCT SERVICE

EMC EMISSION - TEST REPORT

Test Report File No. : **W211819801** Date of issue: 23 July 1998

Model / Serial No. : **IS-87 /**

Product Type : Digital Microwave Sensor

Applicant : B. E. A. Inc

Manufacturer : B. E. A. Inc

License holder : B. E. A. Inc

Address : 300 S Main Street

: Pittsburgh PA 15215

Test Result : ■ **Positive** ☐ **Negative**

Test Project Number Reference(s) : **W8198**

Total pages including Appendices 25

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 Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. 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 INC 19035 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 612 638 0297 Fax: 612 638 0298 Rev.No 1.0

DIRECTORY - EMISSIONS

TÜV PRODUCT SERVICE INC 19035 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 612 638 0297 Fax: 612 638 0298 Rev.No 1.0

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 50081-1 / 1991		
☐ - EN 55011 / 1991	☐ - Group 1 ☐ - Class A	☐ - Group 2 ☐ - Class B
☐ - EN 55013 / 1990		
☐ - EN 55014 / 1987	☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices	
☐ - EN 55014 / A2:1990		
☐ - EN 55014 / 1993	☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices	
☐ - EN 55015 / 1987		
☐ - EN 55015 / A1:1990		
☐ - EN 55015 / 1993		
☐ - EN 55022 / 1987	☐ - Class A	☐ - Class B
☐ - EN 55022 / 1994	☐ - Class A	☐ - Class B
☐ - BS		
☐ - VCCI	☐ - Class A	☐ - Class B
■ - FCC Part 15 Subpart C Section 15.245		
☐ - AS 3548 (1992)	☐ - Class A	☐ - Class B
☐ - CISPR 11 (1990)	☐ - Group 1 ☐ - Class A	☐ - Group 2 ☐ - Class B
☐ - CISPR 22 (1993)	☐ - Class A	☐ - Class B

Environmental conditions in the lab:

	Actual
Temperature:	: 25 °C
Relative Humidity	: 30 %
Atmospheric pressure	: 98.6 kPa
Power supply system	: 12 & 24 V

Sign Explanations:

☐ - not applicable
■ - applicable

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

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

☐ - **Test not applicable**

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
■ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

Test equipment used :

Model Number	Manufacturer	Description	Serial Number	Cal Date
3825/2	EMCO	50 Ω LISN	8812-1437	5-98
ESHS-20	Rohde & Schwarz	EMI Receiver	837055/003	3-98

Use of the calibrated equipment on this list ensures traceability to national and international standards.

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

☐ - 3 meters
☐ - 30 meters

■ - **Test not applicable**

Test equipment used :

Model Number	Manufacturer	Description	Serial Number	Cal Date

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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**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

■ - 3 meters
☐ - 10 meters
☐ - 30 meters

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number	Cal Date
■ -	3146	Electro-Mechanics (EMCO)	Log Periodic Antenna	9103-3075	7-97
■ -	3108	Electro-Mechanics (EMCO)	Biconical Antenna	2118	7-97
■ -	8566B	Hewlett-Packard	Spectrum Analyzer	2221A01596	4-98
■ -	85662A	Hewlett-Packard	Analyzer Display	2152A03640	4-98
■ -	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	4-98
■ -	ZHL-1042J	Mini-Circuits	Preamplifier	H072294-11	4-98

Use of the calibrated equipment on this list ensures traceability to national and international standards.

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

■ - **Test not applicable**

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

Test equipment used :

Model Number	Manufacturer	Description	Serial Number	Cal Date

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 100 GHz were performed in a horizontal and vertical polarization at the following test location :

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

at a test distance of:

☐ - 1 meters
■ - 3 meters
☐ - 10 meters

☐ **- Test not applicable**

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number	Cal Date
■ -	3115	Electro-Mechanics (EMCO)	Horn Antenna	9001-3275	8-97
■ -	8566B	Hewlett-Packard	Spectrum Analyzer	2221A01596	4-98
■ -	85662A	Hewlett-Packard	Analyzer Display	2152A03640	4-98
■ -	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	4-98
■ -	ZHL-1042J	Mini-Circuits	Preamplifier	H072294-11	4-98
■ -	AWT-18037	Avantek	Preamplifier	1001-9226	4-98
■ -	AFT-8434	Avantek	Preamplifier	9112 Z221	4-98
■ -	11975A	Hewlett-Packard	Amplifier	2738A01200	2-98
■ -	11970K	Hewlett-Packard	Harmonic Mixer	2332A01170	2-96
■ -	11970A	Hewlett-Packard	Harmonic Mixer	2332A01861	2-96
■ -	3116	Electro-Mechanics (EMCO)	Horn Antenna	2005	9-97
■ -	19-7025	Aerowave	Horn Antenna		7-97
■ -	15-7025	Aerowave	Horn Antenna		7-97
■ -	10-7025	Aerowave	Horn Antenna		7-97
■ -	11970U	Hewlett-Packard	Harmonic Mixer	3003A01395	10-96
■ -	11970V	Hewlett-Packard	Harmonic Mixer	2521A01172	7-97
■ -	11970W	Hewlett-Packard	Harmonic Mixer	2521A01336	8-97

Use of the calibrated equipment on this list ensures traceability to national and international standards.

Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal Operating Mode

■ - Transmitter on.

Configuration of the device under test:

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

■ - See Product Information Form in Appendix B - beginning on Page B3

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

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

■ - unshielded power cable

■ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

Emission Test Results:

Conducted emissions 10/150 kHz - 30 MHz

The requirements are ■ - MET ☐ - NOT MET

Minimum limit margin 17 dB at 28.1 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Checked on line side of 24 VAC and 12 VAC transformers.

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are ■ - MET ☐ - NOT MET

Minimum limit margin for fundamental >10 dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Interference Power at the mains and interface cables 30 MHz - 300 MHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Equivalent Radiated emissions 1 GHz - 100 GHz

The requirements are ■ - MET ☐ - NOT MET

Minimum limit margin 11 dB at 24.12 GHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Peak analyzer reading of 708 mV/m (117 dBuV/m), limit is 2500 mV/m (128 dBuV/m).

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DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

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

Testing Start Date: 31 May 1998

Testing End Date: 23 July 1998

- TÜV PRODUCT SERVICE INC -

Joel T. Schneider
J. T. Schneider
Site Manager

Tested By:
R. M. Johnson & J. T. Schneider

TÜV PRODUCT SERVICE INC 19035 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 612 638 0297 Fax: 612 638 0298 Rev.No 1.0

FCC ID: G9BIS87

Appendix A

Test Data Sheets

and

Test Setup Drawing(s)

TÜV PRODUCT SERVICE INC 19035 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 612 638 0297 Fax: 612 638 0298 Rev.No 1.0

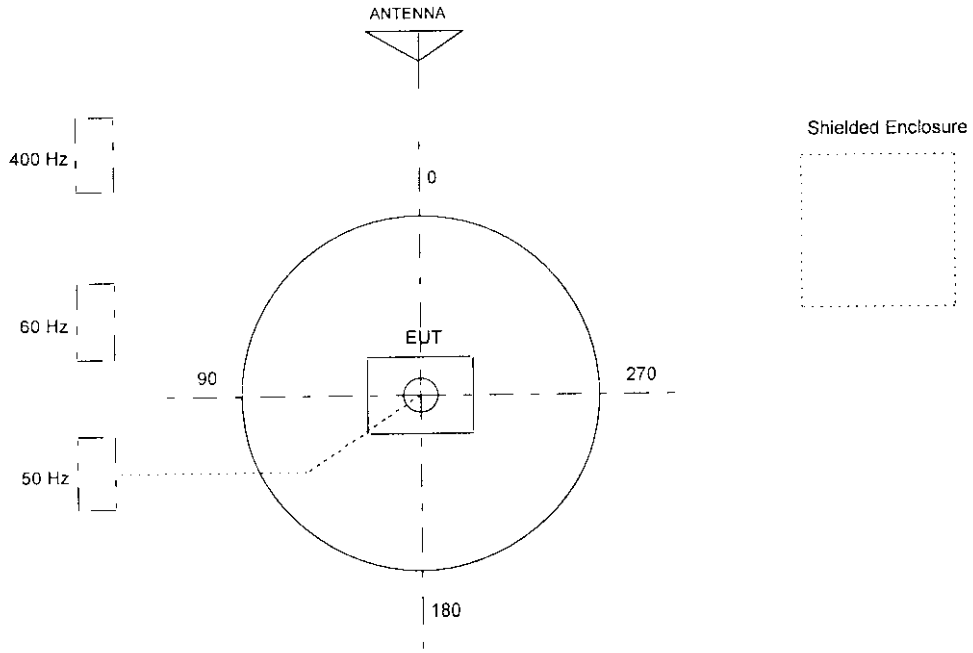
PRODUCT SERVICE

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



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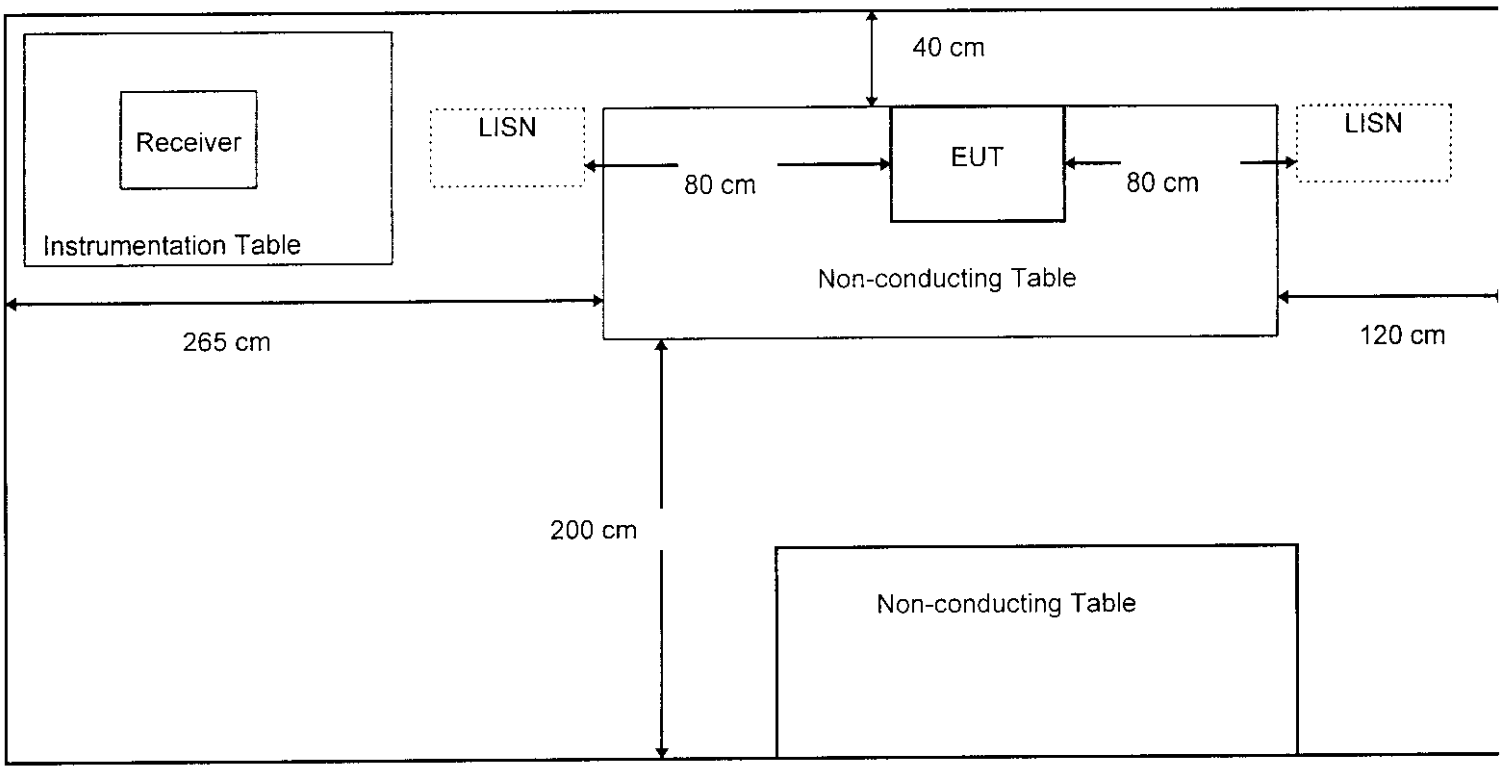
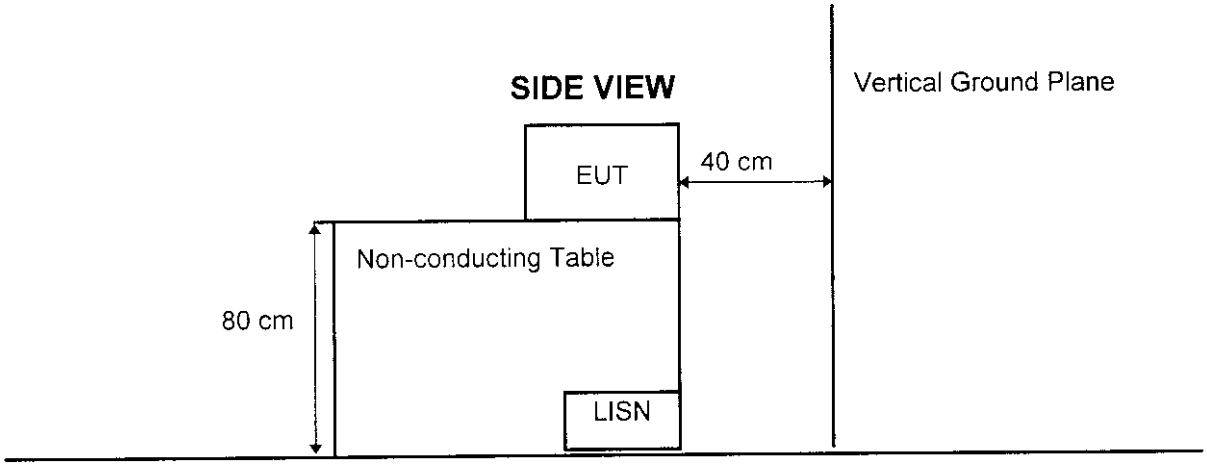
TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Screen Room

TOP VIEW



SIDE VIEW



Other Measurements:
2 meters from top of EUT to ceiling
80 cm from closest part of EUT to the LISN

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T U V P R O D U C T S E R V I C E

RADIATED EMISSIONS

Large Test Site
3 Meter Antenna Distance
Equipment Under Test:
BEA IS-87 DIGITAL MICROWAVE
SENSOR - SPURIOUS SCAN
Notes:

Report W8198 Run 1
Date 05/31/98 Page 1
Engineer _____
Tech: JTS _____
Requester _____

Frequency MHz	Level dBuV	Factor dB	Cable dB	Final dBuV/m	Az deg	Polar\ Height	Delta FCC B	Delta
40.2	8.27	13.2	.6	22.1	--	--	-17.9	
36.2	10.54	13.7	.6	24.8	--	--	-15.2	
72.35	8.68	9.1	.8	18.6	--	--	-21.4	
58.3	10.79	10.5	.8	22.1	--	--	-17.9	
76.05	7.99	8.9	.8	17.8	--	--	-22.2	
82.05	5.64	8.5	.9	15.1	--	--	-24.9	
110.05	7.25	10.8	1	19	--	--	-24.5	
112.55	5.63	11.2	1	17.7	--	--	-25.8	

0 DEGREES, VERTICAL POLARIZATION, 1 METER HIGH.

76, 82 AND 110 MHZ ARE AMBIENTS.

90 DEGREES, VERTICAL POLARIZATION, 1 METER HIGH.

NO HIGHER VALUE WHEN MAXIMIZED 36.2 MHZ.

0 DEGREES, HORIZONTAL POLARIZATION, 1 METER HIGH.

NO OTHER EMISSIONS.

24.12 GHz - 83 dBμV (peak spectrum analyzer level) + 44 dB (antenna factor) = 127 dBμV/m (2230 mV/m) at 1 meter distance

24.12 GHz - 73 dBμV + 44 dB = 117 dBμV/m (708 mV/m) at 3 meter distance - (limit = 2500 mV/m per 15.245)

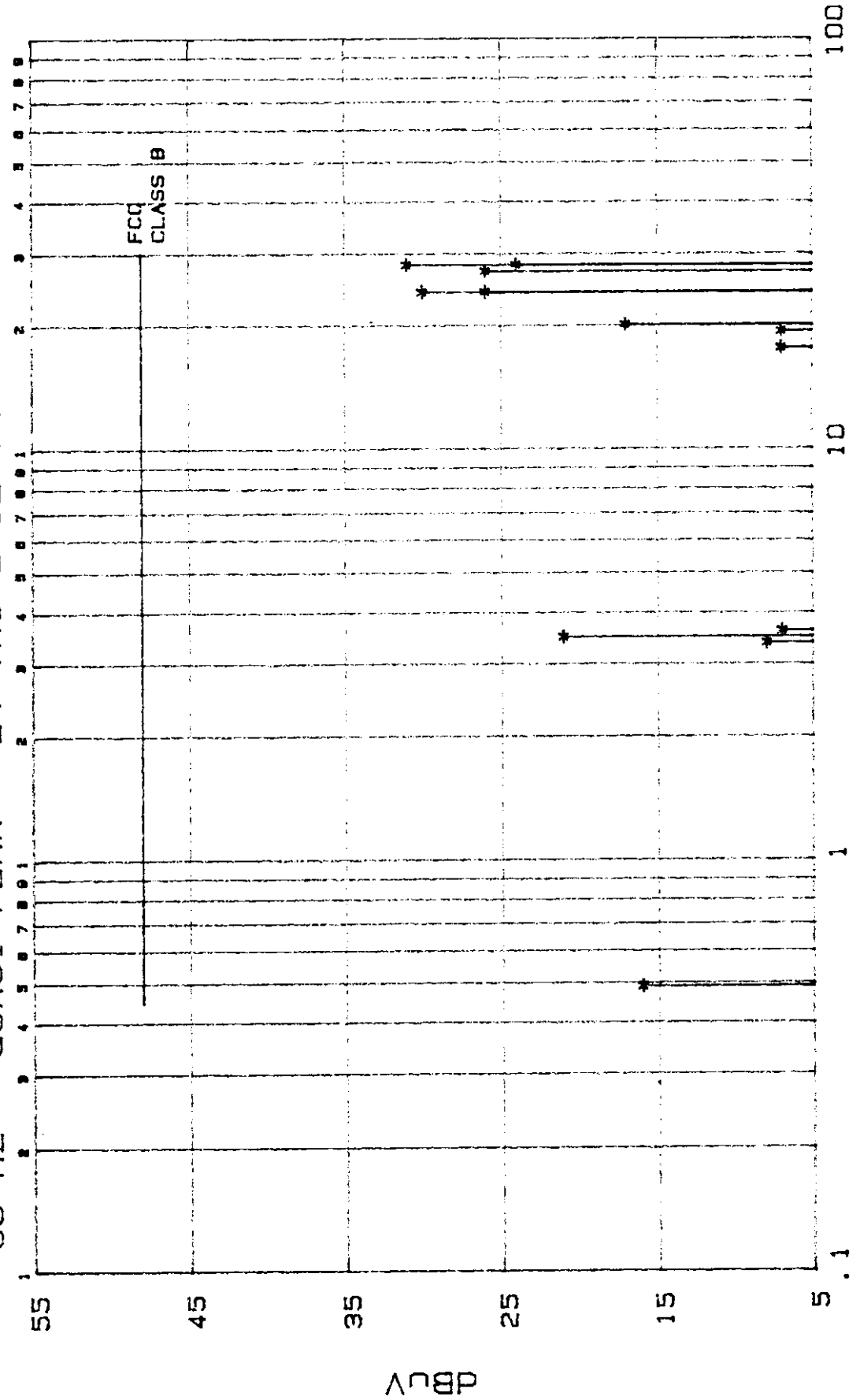
No harmonics detected above analyzer noise level, adequate to measure less than 25mV/m.

Levels measured at 12V and 24V input power (no difference).

FIGURE _____

REPORT #W8198
RUN 1

TUV PS
NARROWBAND CONDUCTED EMISSIONS DATE 07-23-98
BEA INC IS-87 DIGITAL MICROWAVE SENSOR
60 HZ - QUASI-PEAK - 24 VAC & 12 VAC TRANSFORMERS



A

TUV PS

Figure ____

NARROWBAND CONDUCTED EMISSIONS
BEA INC IS-87 DIGITAL MICROWAVE SENSOR
60 HZ - QUASI-PEAK - 24 VAC & 12 VAC TRANSFORMERS

Report W8198 Run 1
Date: 07-23-98 Page 1
Engineer
Tech

Measurement Summary

Frequency (MHz)	Amplitude (dBuV)	DELTA FCC CLASS B
0.4900	16	-32
3.3700	8	-40
3.4900	21	-27
3.6100	7	-41
17.6000	7	-41
19.3300	7	-41
20.1000	17	-31
24.1100	30	-18
24.1200	26	-22
27.1300	26	-22
28.1300	31	-17
28.1400	24	-24

Minimum Passing Margin for FCC CLASS B is 17 dB at 28.1 MHz

File W8198 Run 1

Form

TÜV PRODUCT SERVICE IQ

Conducted Emissions

TEST REPORT # N8198 REQUIREMENT FCC-B

DATE 7/23/98 LISN 1437

PRODUCT ID: BEA INC. (IS-87 DIGITAL MICROWAVE SENSOR) RECEIVER ESHS-20

24 VAC TRANSFORMER / 12 VAC TRANSFORMER SHEET 1 OF 1

TEST FREQ (MHz)	Condition 1 (dBuV) Neutral	Condition 1 (dBuV) Line Side	Condition 2 (dBuV) Neutral	Condition 2 (dBuV) Line Side	Condition 3 (dBuV) Neutral	Condition 3 (dBuV) Line Side	REMARKS
.490	16	15					
3.37	7	8					
3.615	6	7					
17.6	7	7					
19.335	7	6					
24.12	26	25					
28.14	24	24					
3.49			18	21			
20.10			17	17			
24.115			30	29			
27.13			26	25			
28.135			31.3	30			

Condition1 Q.P. (24 VAC / 60Hz)

Condition2 Q.P. (12 VAC / 60Hz)

Condition3

Tested By [signature] Results (Pass / Fail)

TÜV Product Service
1775 Old Hwy 8
New Brighton, MN 55112
Telephone: (612)-631-2487

EMCOND.DOC
Author: D.S. Carlso
Releasec
Page 1 of

TUV PRODUCT SERVICE
CONDUCTED EMISSIONS

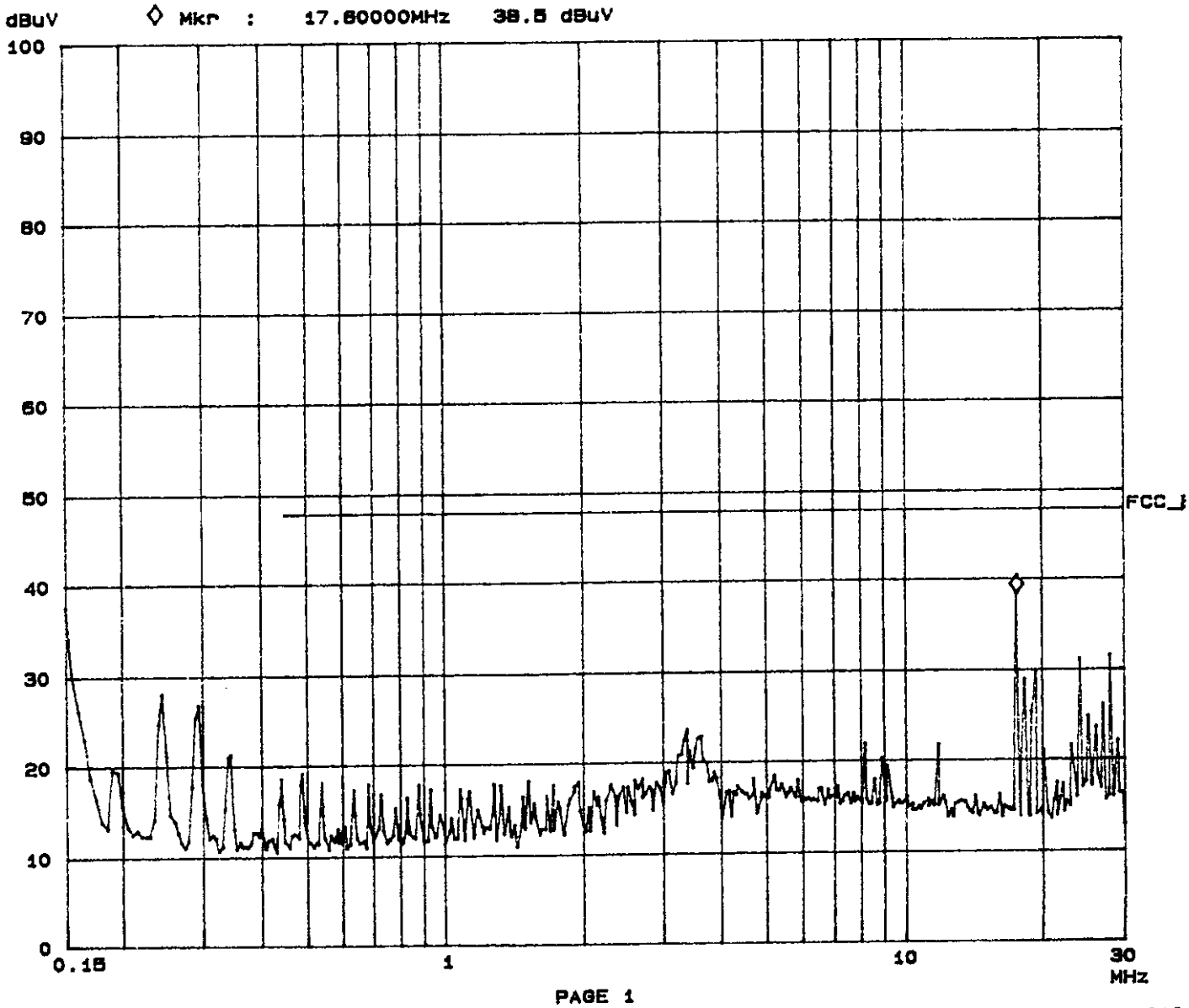
23. Jul 98 13:23

EUT: IS-87 DIGITAL MICROWAVE SENSOR
Manuf: BEA INCORPORATED
Op Cond: NORMAL
Operator: RMJ
Test Spec: FCC-B
Comment: 60HZ / 24VAC
07-23-98

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK	10ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	150k	30M	Limiter



PAGE 1

TUV PRODUCT SERVICE
CONDUCTED EMISSIONS

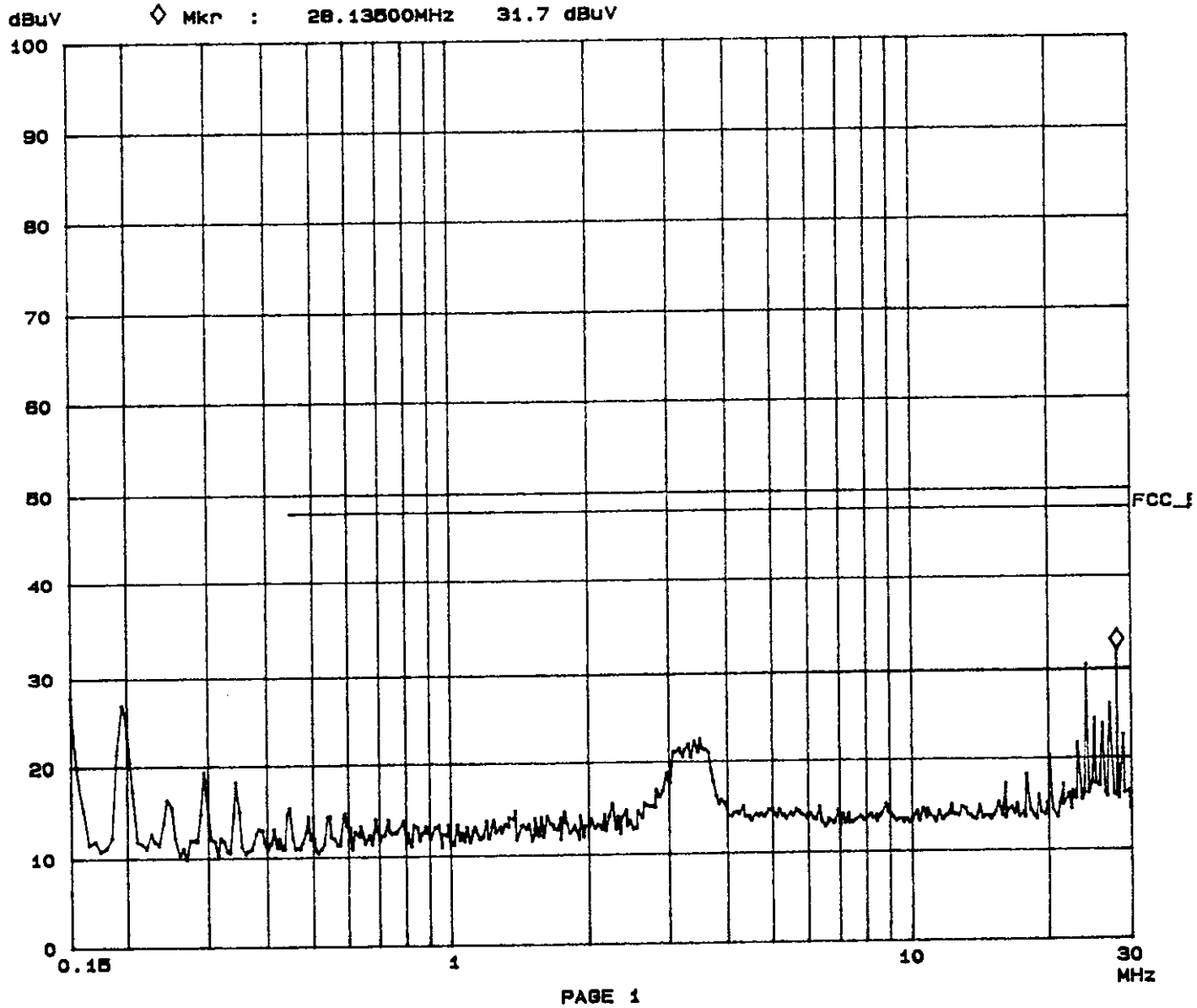
23. Jul 98 13:35

EUT: IS-87 DIGITAL MICROWAVE SENSOR
Manuf: BEA INCORPORATED
Op Cond: NORMAL
Operator: RMJ
Test Spec: FCC-B
Comment: 60HZ / 12VAC
07-23-98

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
150k	30M	5k	10k	PK	10ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	150k	30M	Limiter



PAGE 1

PRODUCT SERVICE

Appendix B

Constructional Data Form

and

Product Information Form(s)

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TÜV PRODUCT SERVICE

Constructional Data Form

Not Applicable

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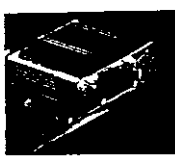
BEA

We open up New Horizons



USER GUIDE FOR THE IS-87 DIGITAL

FCC ID: G9BIS87

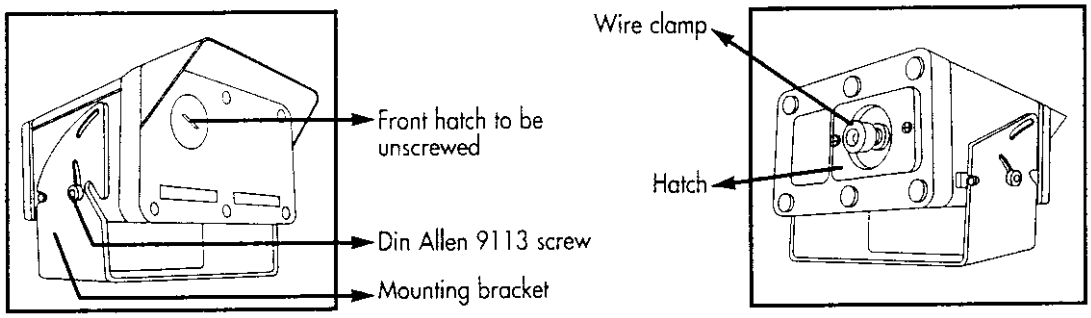
MOTION SENSOR FOR INDUSTRIAL DOORS

TECHNICAL CHARACTERISTICS

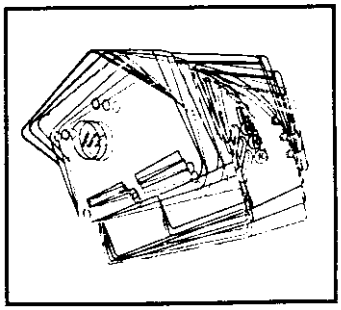
Technology	:	microwave and microprocessor
Radiated frequency	:	24.125 Ghz (24.200 Ghz in UK)
Protection index	:	IP65
Output power	:	5mW
Mounting height for		
IS-87 DIGITAL	:	3 to 6 m
IS-87 XL DIGITAL	:	2 to 3 m
Tilt angle	:	15° to 45°
Detection zone for IS-87 DIGITAL at 5m (height)		
• adjustment vehicles	:	max. 4 m (W) x 6 m (D)
• adjustment pedestrians	:	max. 3 m (W) x 5 m (D)

Mains frequency	:	50 to 60 Hz
Power consumption	:	< 4W (VA)
Housing colour	:	black
Output	:	relay with switchover contact (voltage free)
• relay contact ratings (max. voltage)	:	60 V DC /125 V AC
• relay contact ratings (max. current)	:	1 A (resistive)
• max. switching power	:	30 W (DC) / 60 VA (AC
Output hold time	:	0.5 s to 13 s (adjustable)
Adjustments		
• sensitivity, hold time (by potentiometer)		
• function configuration (by DipSwitches)		
• dimensions and position of the sensing field (mechanically)		
Temperature range	:	-30°C to + 60°C
Immunity	:	electromagnetic compatibility (CEN) according to 89/336/EEC and 92/31/EEC
Dimensions	:	135 mm (W) x 70 mm (H) x 160 mm (D)
Weight	:	0.7 kg
Material	:	Anodised Aluminium, ABS

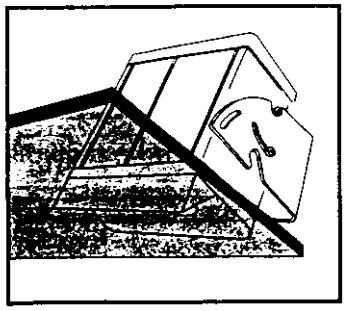
DESCRIPTION OF THE SENSOR



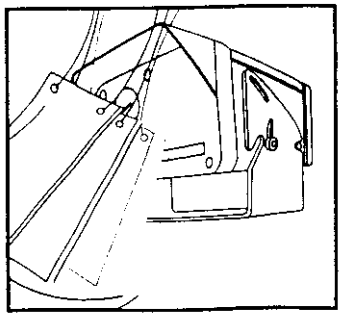
INSTALLATION TIPS



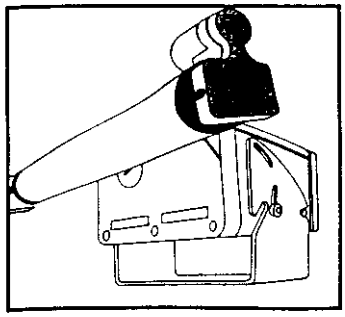
• The sensor must be fixed steadily and must not vibrate



• The sensor must not be placed behind a panel or any kind of material



• No object which could move or vibrate must be present within the sensing field



• No neon light within its sensing field

Appendix C

MEASUREMENT PROTOCOL FOR FCC

GENERAL INFORMATION

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit. Conducted and radiated emission testing is performed according to the procedures in ANSI C.63.4-1992.

To convert between dBμV and μV, the following conversions apply:

dBμV = 20(log μV)

μV = Inverse log(dBμV/20)

RADIATED EMISSIONS

The final level, expressed in dBμV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBμV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has the FCC limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment B. The amplifier gain is automatically accounted for by using an analyzer offset.

Example:

Frequency (MHz)	Level (dBμV)	+	Factor & Cable (dB)	=	Final (dBμV/m)	-	FCC B Limit (dBμV/m)	=	Delta FCC B (dB)
32.21	13.9	+	16.3	=	30.2	-	40.0	=	-9.8

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DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 60 Hz power interface of the EUT are measured in the frequency range of 450 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. Intentional radiators are rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

Revised: September 4, 1995
Revision: C

IS87A STEREO P/N:41.3662

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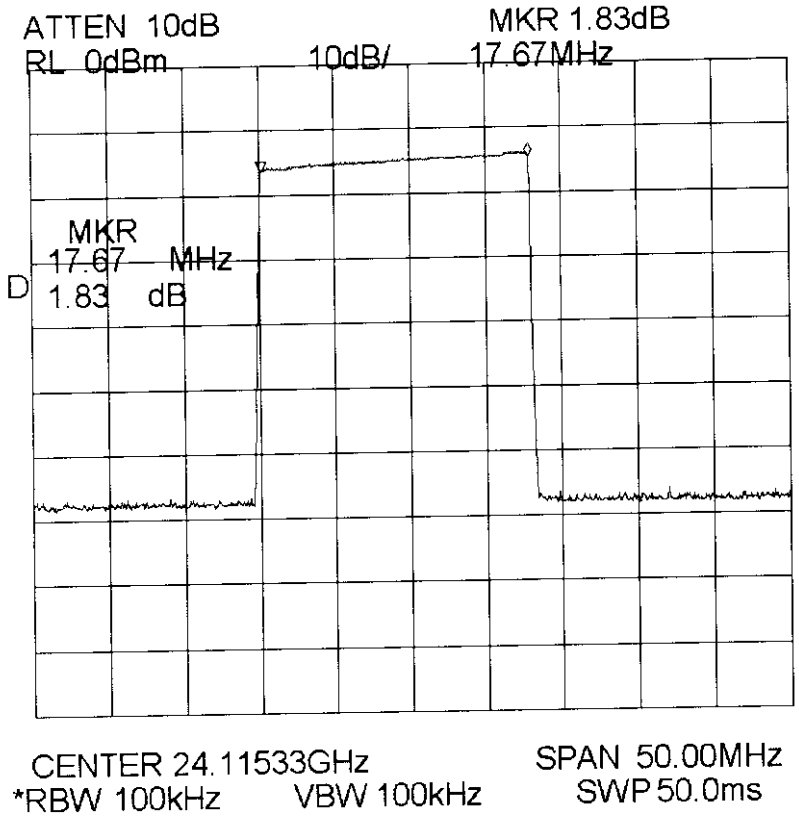
Item	Quantity	Reference	Part	NIVEAU-POSITION
1	1	R15	1R5.	41.3172
~~2~~	~~1~~	~~R11~~	~~10K.~~	~~41.2230~~
~~3~~	~~1~~	~~R14~~	~~330K.~~	~~41.3300~~
4	4	R9,R10,R12,R13	1K"	41.3773
5	4	R2,R3,R4,R6	10K"	41.3797
6	2	R7,R8	1M-2%"	41.3897
7	2	R1,R5	1M5"	41.3849
8	6	C1,C2,C3,C4,C5,C8	2U2-10TA	41.2239
9	1	U1	LM324D	41.1396
10	6	TP1,TP2,TP3,TP4,TP5,TP6	TP	no component
11	2	ADJ1,ADJ2	1M/HP4MM	41.3656
12	4	C9,C10,C11,C12	1N"	41.3682
13	2	C6,C7	220P"	41.4108
14	1	P1	PINS A SOUDER*	NO COMPONENT
15	1	CEL1	CEL24GHZ	NO COMPONENT

3. Frequency Drift with Temperature.



V = 24V T = -25°C to +60°C

ΔF=17MHz

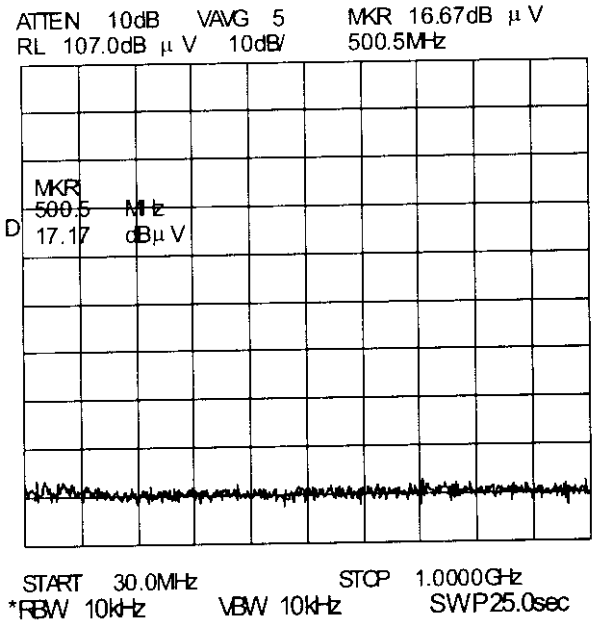
By transceiver manufacturer specification, the frequency drift is lower than 650 kHz/°C.

4. Radiated Radio Interferences.

Three main sources of AC signal could be susceptible to produce spurious radiation They have been identified inside the sensor in order to put more focus on those frequencies and related harmonics :

A. The transmitter frequency is 24.125 GHz.
B. The microprocessor clock frequency is 4 MHz.
C. The DC/DC converter frequency is 50 kHz

It was impossible to perform a real test in free space. Nevertheless, a measurement has been made which uses a GTEM cell followed by a 23 dB amplifier. This gives the following result :

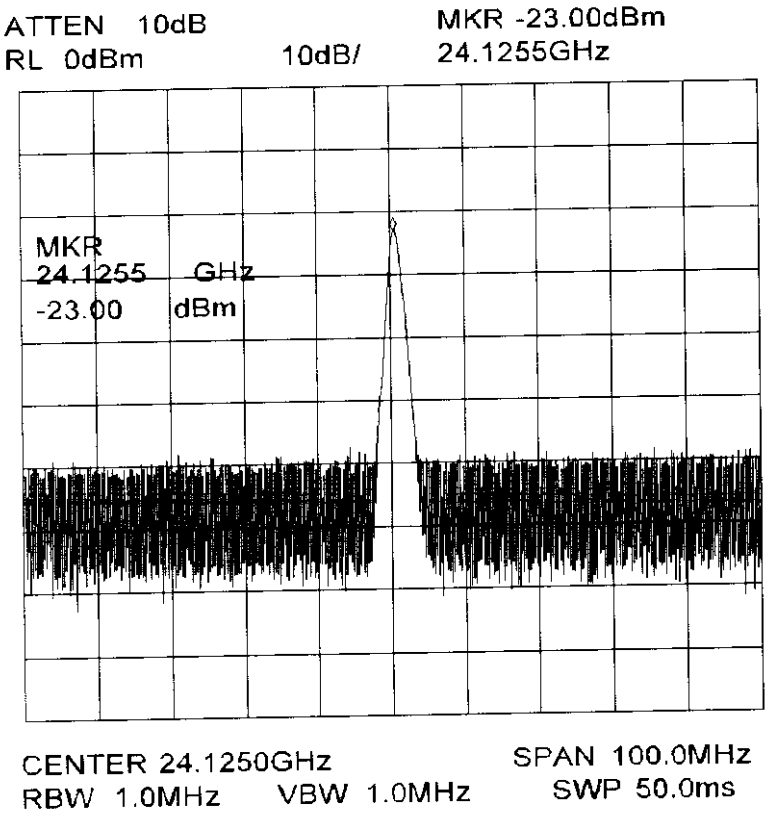


No measurable signal have been detected higher than the noise level which, with the GTEM conversion chart is far lower than the acceptable limits.

A full span at higher frequencies should not show any spurious radiation with respect of the internal circuits and internal frequencies of the sensor.

Transmitter Characteristics Measurements.

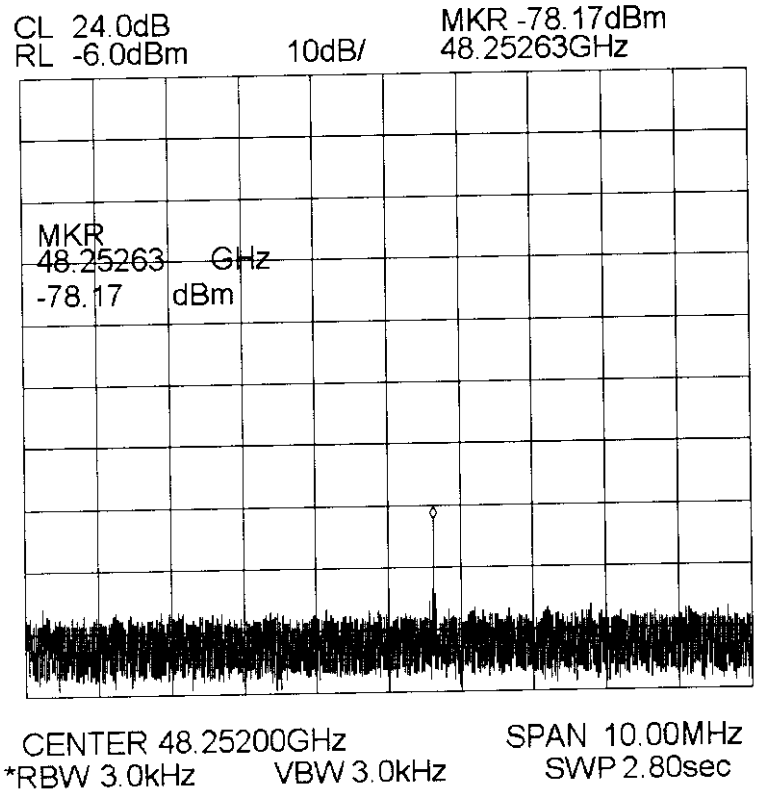
1. Equivalent Isotropic Radiated Power.



Frequency GHz	Received Power dBm	Path Loss dB	Distance m	Rec. Horn Gain dB	P (EIRP) dBm	Limit dBm
24,125	-23.00	60	1	17,0	20.00	<32.7,0

EIRP = Received Power - Receiver Horn Gain + Path loss.

2. Second Harmonic Signal Level.



Frequency GHz	Received Power dBm	Path Loss dB	Distance m	Rec. Horn Gain dB	P (EIRP) dBm	Limit dBm
48.250	-78.17	66	1.0	23.8	-35.97	<-7.3

EIRP = Received Power - Receiver Horn Gain + Path loss.