

**EXHIBIT 3**

**Report Of Measurement**

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

# TEST RESULT SUMMARY

## FCC PART 15 SUBPART C Section 15.209

MANUFACTURER'S NAME

Destron-Fearing Corp

NAME OF EQUIPMENT

Transmitter for Portable Transceiver

MODEL NUMBER

2001F

MANUFACTURER'S ADDRESS

490 Villaume Avenue  
South St Paul MN 55075-2445

TEST REPORT NUMBER

W9069

TEST DATE

28 January 1999

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: 09 February 1999

Location: Taylors Falls MN  
USA  
R. M. Johnson  
Test Technician  
J.T. Schneider  
Site Manager

Not Transferable

# EMC EMISSION - TEST REPORT

 Test Report File No. : **WC1G906901** Date of issue: 09 February 1999

 Model / Serial No. : **2001F / s/n 0001**

Product Type : Transmitter for Portable Transceiver

Applicant : Destron-Fearing Corp

Manufacturer : Destron-Fearing Corp

License holder : Destron-Fearing Corp

Address : 490 Villaume Avenue

: South St Paul MN 55075-2445

 Test Result :  Positive  Negative

 Test Project Number : **W9069**  
 Reference(s)

 Total pages including Appendices : **22**

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

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**EMISSIONS TEST REGULATIONS :**

**The emissions tests were performed according to following regulations:**

<input type="checkbox"/> - EN 50081-1 / 1991	<input type="checkbox"/> - Group 1	<input type="checkbox"/> - Group 2
<input type="checkbox"/> - EN 55011 / 1991	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55013 / 1990	<input type="checkbox"/> - Household appliances and similar	
<input type="checkbox"/> - EN 55014 / 1987	<input type="checkbox"/> - Portable tools	
	<input type="checkbox"/> - Semiconductor devices	
<input type="checkbox"/> - EN 55014 / A2:1990	<input type="checkbox"/> - Household appliances and similar	
<input type="checkbox"/> - EN 55014 / 1993	<input type="checkbox"/> - Portable tools	
	<input type="checkbox"/> - Semiconductor devices	
<input type="checkbox"/> - EN 55015 / 1987	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55015 / A1:1990	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55015 / 1993		
<input type="checkbox"/> - EN 55022 / 1987	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55022 / 1994	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - BS	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - VCCI		
<input checked="" type="checkbox"/> - FCC Part 15 Subpart C Section 15.209	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - AS 3548 (1992)	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - CISPR 11 (1990)	<input type="checkbox"/> - Group 1	<input type="checkbox"/> - Group 2
	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - CISPR 22 (1993)	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B

**Environmental conditions in the lab:**

	<u>Actual</u>
Temperature	: 16 °C
Relative Humidity	: 28 %
Atmospheric pressure	: 99.0 kPa
Power supply system	: 12 VDC

**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
--------------	--------------	-------------	---------------	----------

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
- 10 meters
- 30 meters

- Test not applicable

### Test equipment used :

Model Number	Manufacturer	Description	Serial Number	Cal Date
■ - HFH2-Z2	Polarad	Loop Antenna	879285/036	9-98
■ - ESH-3	Rohde & Schwarz	EMI Receiver	892473/004	5-98

## 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
--------------	--------------	-------------	---------------	----------

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
--------------	--------------	-------------	---------------	----------

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 : \_\_\_\_\_

- 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

\_\_\_\_\_ dB at \_\_\_\_\_ MHz

Maximum limit exceeding

\_\_\_\_\_ dB at \_\_\_\_\_ MHz

Remarks: \_\_\_\_\_

**Radiated emissions (magnetic field) 10 kHz - 30 MHz**

The requirements are

 - MET       - NOT MET

Minimum limit margin for fundamental

\_\_\_\_\_ 0 dB at \_\_\_\_\_ 134.2 kHz

Minimum limit margin for spurious

\_\_\_\_\_ 6 dB at \_\_\_\_\_ 671.0 kHz

Remarks: The level at 134.2 kHz is 25 dBuV/m (17.7 uV/m) at a distance of 300 meters based on the measured extrapolation factor of 51 dB/decade. A level of 127 dBuV/m was measured at a 3 meter distance, and a level of 76 dBuV/m was measured at a 30 meter distance (127-76=51). The limit is 2400/134.2, or 25 dBuV/m (17.8 uV/m) at 300 meters.

The level at 671.0 kHz is 65 dBuV/m (1778 uV/m) at a distance of 3 meters. This would be 6 dB below the limit using the standard 40 dB/decade extrapolation factor (17 dB below the limit using the 51 dB/decade measured for the fundamental). The limit is 24000/670, or 31 dBuV/m (35.7 uV/m) at 30 meters, 71 dBuV/m (3548 uV/m) at 3 meters.

**Radiated emissions (electric field) 30 MHz - 1000 MHz**

The requirements are

 - MET       - NOT MET

Minimum limit margin for fundamental

\_\_\_\_\_ dB at \_\_\_\_\_ MHz

Minimum limit margin for spurious

\_\_\_\_\_ 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 - 3.14 GHz**

The requirements are

 - MET       - NOT MET

Minimum limit margin

\_\_\_\_\_ dB at \_\_\_\_\_ MHz

Maximum limit exceeding

\_\_\_\_\_ dB at \_\_\_\_\_ MHz

Remarks: \_\_\_\_\_

**DEVIATIONS FROM STANDARD:**

None.

**GENERAL REMARKS:**

The digital device portion of the equipment under test was tested and found to be compliant with the FCC Part 15 Subpart B Class A requirements (Test Report #W9069.1).

**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: 28 January 1999

Testing End Date: 28 January 1999

- TÜV PRODUCT SERVICE INC -

Joel T. Schneider

J. T. Schneider  
Site Manager

  
Tested By:  
R. M. Johnson

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FCC ID: C5S2001F

Test-setup photo(s):

Conducted emission 10/150 kHz - 30 MHz

Not Applicable

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FCC ID: C5S2001F

## Appendix A

Test Data Sheets

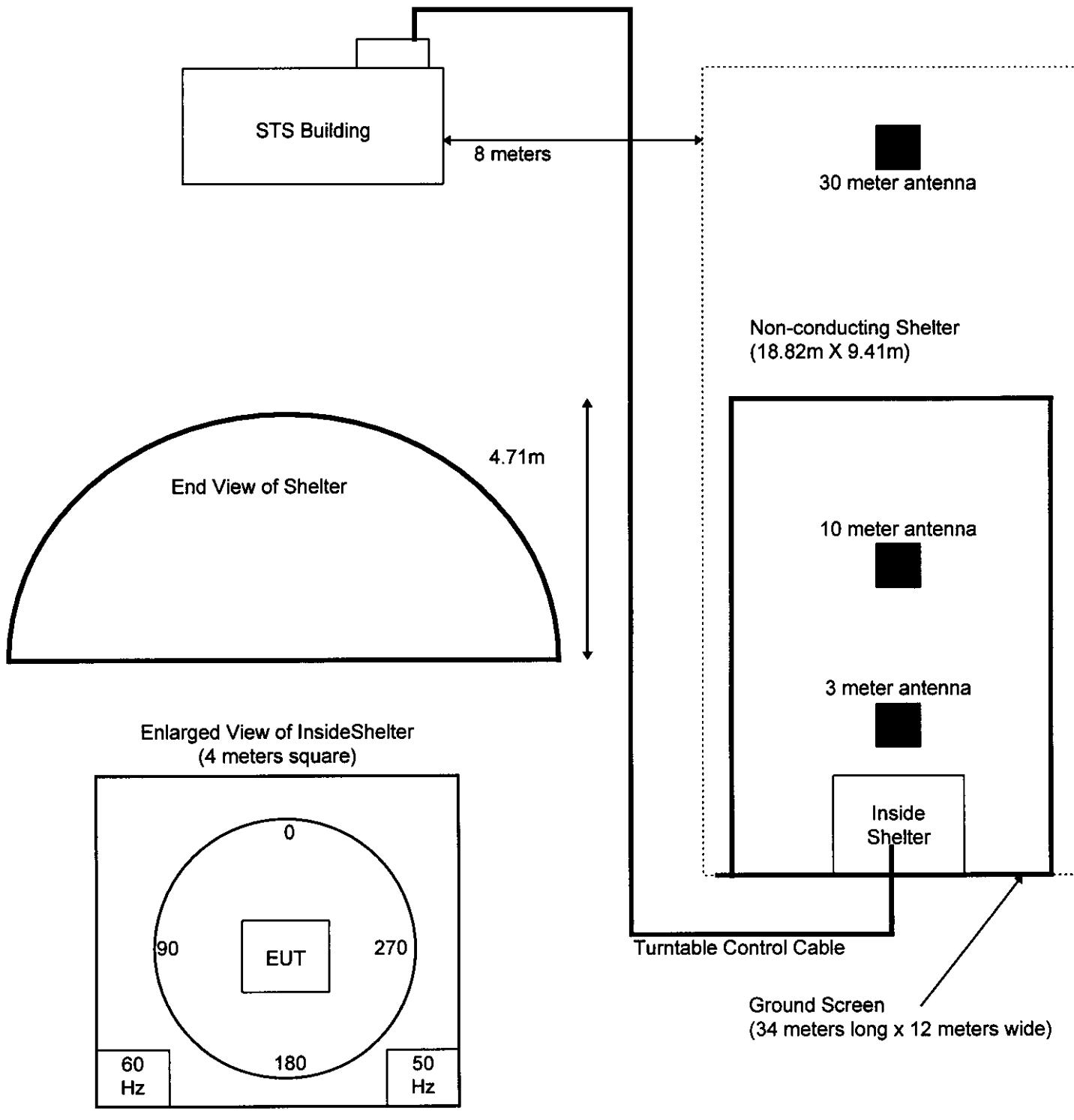
and

Test Setup Drawing(s)

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**TEST SETUP FOR EMISSIONS TESTING**

WILD RIVER LAB  
Small Test Site (STS)



File No. WC1G906901, Page A2 of A4

**T U V P R O D U C T S E R V I C E**
**RADIATED EMISSIONS**
**Small Test Site**
**3/10/30 Meter Antenna Distance**
**Equipment Under Test:**
**DESTRON-FEARING**
**2001F TRANSMITTER**
**Notes:**
**Report W9069 Run 2**
**Date 01-28-99 Page 1**
**Engineer**
**Tech: RMJ**
**Requester**

Frequency	Level	Factor	Cable	Q-Peak	Ave	ANTENNA	Limit
MHz	dBuV	dB	dB	dBuV/m	dBuV/m	DISTANCE	dBuV/m
.1342	107	20	0	127	127	3 M	
.1342	83	20	0	103	103	10 M	
.1342	56	20	0	76	76	30 M	

USING 3 METER MEASUREMENT AND 30 METER MEASUREMENT TO DERIVE EXTRAPOLATION  
 FACTOR TO OBTAIN 300 METER LEVEL,  $127 - 76 = 51$  DB/DECade

.1342 25 300 M 25

FOR THE HARMONICS/SPURIOUS 40 DB/DECade WILL BE USED SINCE MOST LEVELS COULD  
 ONLY BE MEASURED AT A 3 METER ANTENNA DISTANCE

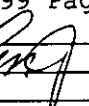
.2684	43	20	0	63	63	3 M	99
.4026	49	20	0	69	69	3 M	95
.5368	29	20	0	49	--	3 M	73
.671	45	20	0	65	--	3 M	71
.8052	17	20	0	37	--	3 M	69
.9394	32	20	0	52	--	3 M	68
1.074	20	20	0	40	--	3 M	67
1.208	26	20	0	46	--	3 M	66
1.342	21	20	0	41	--	3 M	65
1.476	25	20	0	45	--	3 M	64
1.745	21	20	0	41	--	3 M	69
2.013	20	20	0	40	--	3 M	69
2.684	23	20	0	43	--	3 M	69
2.818	23	20	0	43	--	3 M	69
2.952	33	20	0	53	--	3 M	69
3.086	21	20	0	41	--	3 M	69

ALL LEVELS ARE MAXIMUM - NO OTHER SIGNALS DETECTED 9 KHZ TO 30 MHz

**T U V P R O D U C T S E R V I C E**
**RADIATED EMISSIONS**

Large Test Site  
 3/10/30 Meter Antenna Distance  
 Equipment Under Test:  
 DESTRON-FEARING  
 2001F TRANSMITTER  
 Notes:

Figure \_\_\_\_\_

Report W9069 Run 2  
 Date 01-28-99 Page 2  
 Engineer \_\_\_\_\_  
 Tech: RMJ   
 Requester \_\_\_\_\_

**Measurement Summary**

Frequency MHz	Final dBuV/m	Final uV/m	Azimuth deg	ANTENNA DISTANCE	Delta FCC 15.209	Delta
.1342	25	17.78	--	300 M	-0	
.2684	63	1412	--	3 M	-36	
.4026	69	2818	--	3 M	-26	
.5368	49	281.8	--	3 M	24	
.671	65	1778	--	3 M	-6	
.8052	37	70.79	--	3 M	-32	
.9394	52	398.1	--	3 M	-16	
1.074	40	100	--	3 M	-27	
1.208	46	199.5	--	3 M	-20	
1.342	41	112.2	--	3 M	-24	
1.476	45	177.8	--	3 M	-19	
1.745	41	112.2	--	3 M	-28	
2.013	40	100	--	3 M	-29	
2.684	43	141.2	--	3 M	-26	
2.818	43	141.2	--	3 M	-26	
2.952	53	446.6	--	3 M	-16	
3.086	41	112.2	--	3 M	-28	

FCC ID: C5S2001F

**Appendix B**

**Constructional Data Form**

**and**

**Product Information Form(s)**

File No. WC1G906901, Page B1 of B4

FCC ID: C5S2001F

Constructional Data Form

Not Applicable

File No. WC1G906901, Page B2 of B4

# PRODUCT INFORMATION FORM

**NOTE: It is required to complete both 1) a Product Information Form for each unit under test and 2) a Constructional Data Form for each system tested as outlined in the enclosed instructions.**

**\* Please show the exact spelling [including spacing, capitalization, etc] as you want shown on the After Test Documentation.**

*Company Name	DESTRON-FEARING CORPORATION		
*Company Address	490 VILLAUME AVE. SOUTH SAINT PAUL, MINNESOTA 55075-2445		
Customer Representatives	SEAN CASEY		
*Equipment Description	2001F PORTABLE TRANSCEIVER		
*Model Number	2001F	*Serial Number	0001
Type of Test	<input type="checkbox"/> Development <input checked="" type="checkbox"/> Initial Design Verification <input type="checkbox"/> Design Change (Please describe exact changes below) <input type="checkbox"/> Production Sample (Audit Test) <input type="checkbox"/>		
Changes Made	ADDED STEWARD FERRITE NUMBER 28A2025-0A0 TO THE ANTENNA CABLE AT THE TRANSCEIVER		
Oscillator Frequencies			
Power Interface			
Frequency	134.2 KHZ	Power Supply	POW. SUPPLY/CHARGER
Voltage	12 VDC	Description	AVT
# of Phases	1	Manufacturer	CUSTOM
Current	2.2 AMPS PK.-PK.	Model Number	N/A, LINEAR
Power Cable			
<input type="checkbox"/> Hardwired <input checked="" type="checkbox"/> Shielded <input type="checkbox"/> Attached	<input checked="" type="checkbox"/> Flexible <input type="checkbox"/> Unshielded <input checked="" type="checkbox"/> Removable		
Power Line Filter			
Manufacturer	Model Number		
NONE			

## **Cabinet Shielding Provision**

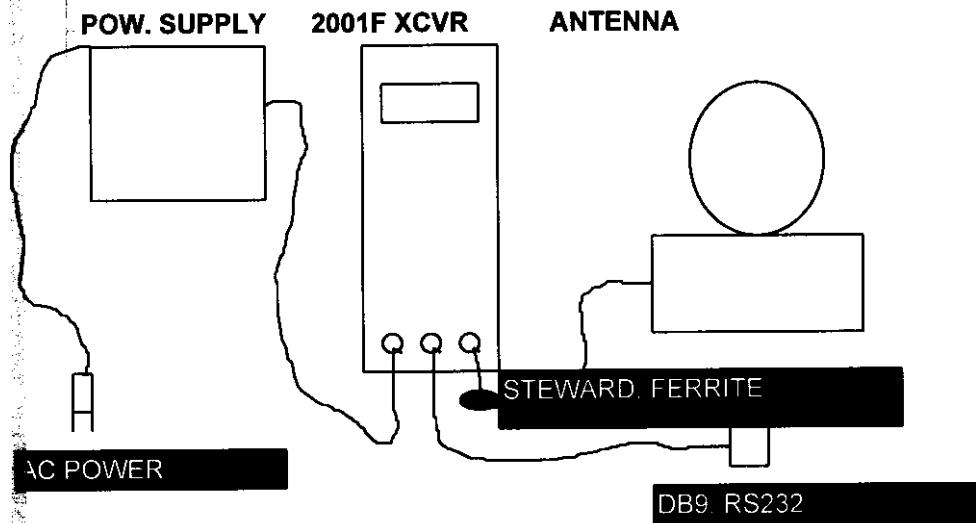
### **Software and/or Operating Modes**

## **Interfacing Equipment or Simulators**

## I/O Cables

Function	Length (meters)	Shielded	Analog/Digital	Active During Test
232 CABLE	3	Y	A	Y
ANTENNA CABLE	2	Y	A	Y
		Y N	A D	Y N
		Y N	A D	Y N
		Y N	A D	Y N
		Y N	A D	Y N

## Block Diagram



## Appendix C

# MEASUREMENT PROTOCOL

## 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  $\pm 4.5$  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 its 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 dB $\mu$ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit.

To convert between dB $\mu$ V and  $\mu$ V, the following conversions apply:

$$\begin{aligned} \text{dB}\mu\text{V} &= 20(\log \mu\text{V}) \\ \mu\text{V} &= \text{Inverse log}(\text{dB}\mu\text{V}/20) \end{aligned}$$

## RADIATED EMISSIONS

The final level, expressed in dB $\mu$ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB $\mu$ V) 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 (dB $\mu$ V)	+	Factor & Cable (dB)	=	Final (dB $\mu$ V/m)	-	FCC B Limit (dB $\mu$ V/m)	=	Delta FCC B (dB)
32.21	13.9	+	16.3	=	30.2	-	40.0	=	-9.8

**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 .009 to 30 MHz using a receiver, which has CISPR characteristic bandwidth and quasi-peak/average 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, 10 and 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is positioned with its plane vertical/horizontal, and rotated about its vertical/horizontal axis for maximum response at each azimuth about the EUT. The center of the loop is 1 meter above the ground plane. Intentional radiators are rotated through three orthogonal axes to determine the attitude that maximizes the emissions.