



Emissions Test Report

EUT Name: TranspondIT Electric

EUT Model: MS8EM915V10

FCC Title 47, Part 15, Subpart B and EMC Directive 89/336/EEC

Prepared for:

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Report/Issue Date: 10 October 2002

Report Number: 5032ADV

Statement of Compliance

Manufacturer: Advanced Technology RAMAR, Ltd.
P.O. Box 110127
Research Triangle Park, NC 27709
919-991-9924
Requester / Applicant: Don Watts
Name of Equipment: TranspondIT Electric
Model No. MS8EM915V100
Type of Equipment: RF Transmitter for Household Electric Meter
Class of Equipment: Class B
Application of Regulations: FCC Title 47, Part 15, Subpart B and EMC Directive 89/336/EEC
Test Dates: 12 September 2002 to 17 September 2002

Guidance Documents:

Emissions: FCC 47 CFR Part 15, EN55022: 1998

Test Methods:

Emissions: EN55022:1998, ANSI C63.4:1992

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by Flextronics Compliance Laboratories, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.



Steve O'Steen
Operations Manager
NVLAP Signatory

10 October 2002

Date

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1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15, Subpart B and EMC Directive 89/336/EEC based on the results of testing performed on 12 September 2002 through 17 September 2002 on the *TranspondIT Electric* Model No. *MS8EM915V100* manufactured by Advanced Technology RAMAR, Ltd.. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Emission	Test Method(s)	Test Parameters	Result
Radiated Emissions	47 CFR 15, EN55022:1998, ANSI C63.4:1992	9 KHz to 10000 MHz, Class B	compliant
Conducted Emissions	47 CFR 15, EN55022:1998, ANSI C63.4:1992	150 kHz to 30 MHz, Class B	compliant

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

No modifications were found to be necessary in order to achieve compliance.

2 Emissions

2.1 Radiated Emissions

Testing was performed in accordance with 47 CFR 15, EN55022:1998, ANSI C63.4:1992. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

2.1.1 Test Methodology

2.1.1.1 Preliminary Test

2.1.1.2 Final Test

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

2.1.1.3 Deviations

There were no deviations from this test methodology.

2.1.2 Test Results

Section 2.1.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

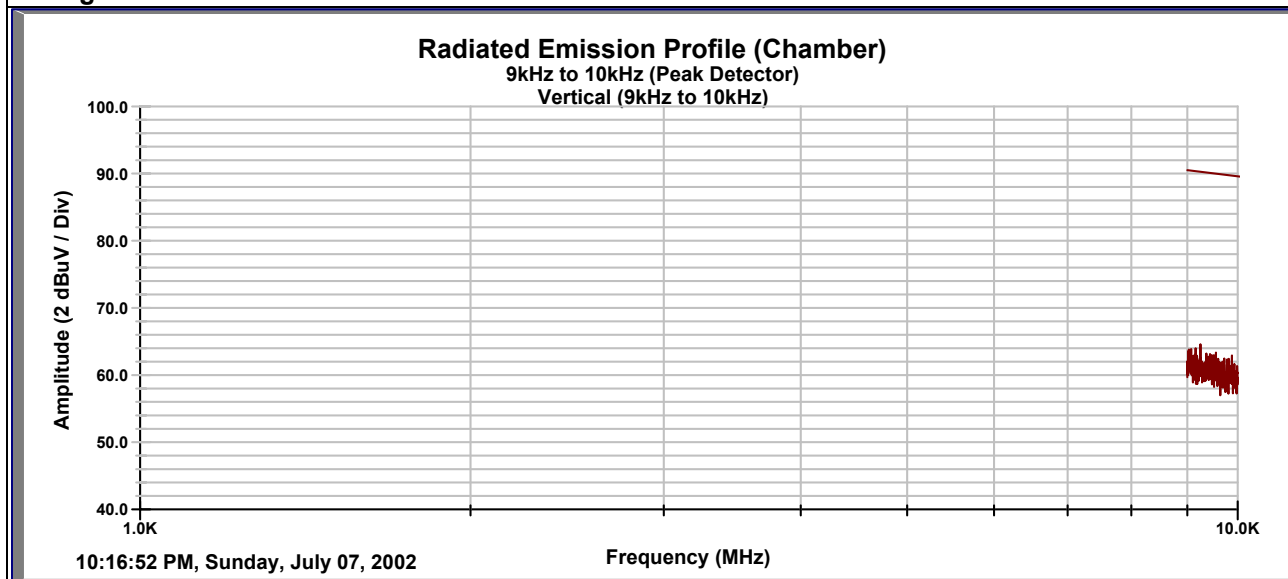
2.1.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions

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EUT Name	TranspondIT Electric	Date	7 July 2002
EUT Model	MS8EM915V10	Temp / Hum in	70 Deg. F / 35% RH
EUT Serial	TXA	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq	120 VAC / 60 Hz
Dist/Ant Used	3M/6511	Performed by	Eugene Moses
Configuration	Installed in meter		



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

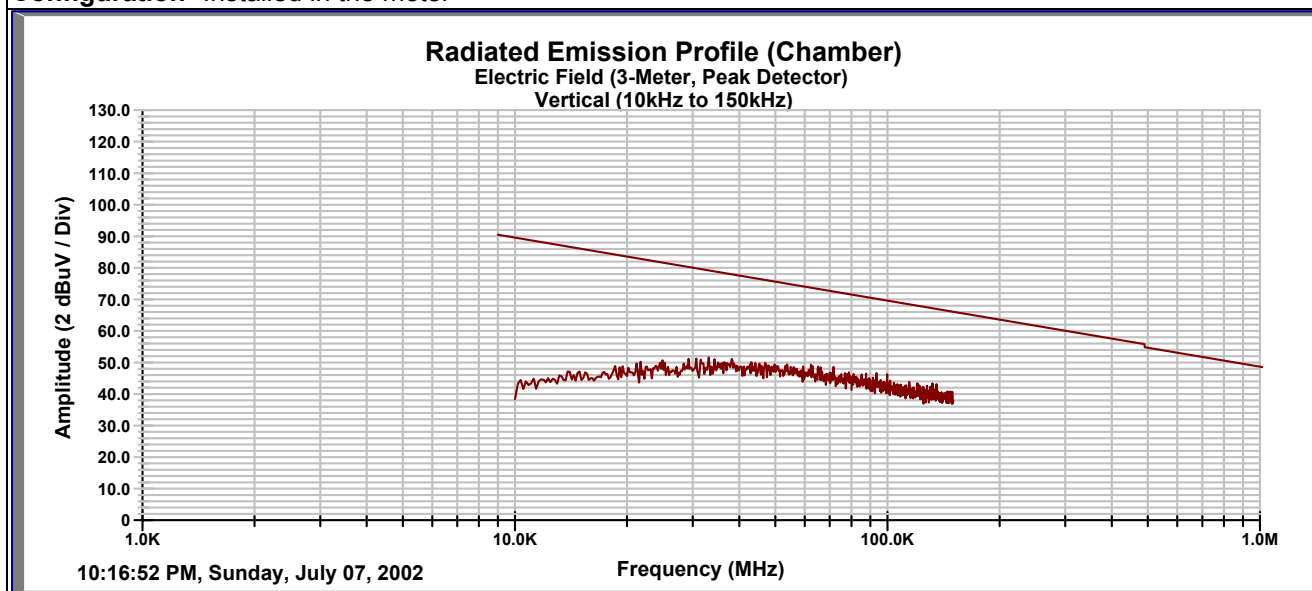
Notes:

SOP 1 Radiated Emissions

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EUT Name TranspondIT Electric
EUT Model MS8EM915V10
EUT Serial TXA
Standard FCC 47 CFR Part 15
Dist/Ant Used 3M/6511
Configuration Installed in the meter

Date 7 July 2002
Temp / Hum in 70 Deg. F / 35% RH
Temp / Hum out N/A
Line AC / Freq 120 VAC / 60 Hz
Performed by Eugene Moses



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

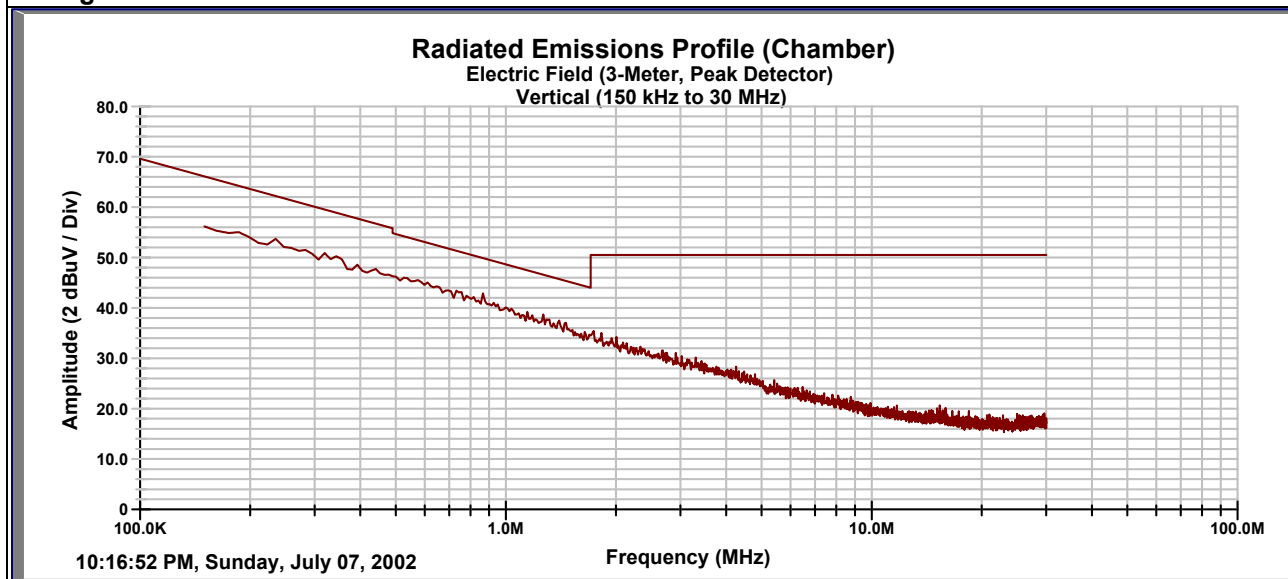
Notes:

SOP 1 Radiated Emissions

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EUT Name TranspondIT Electric
EUT Model MS8EM915V10
EUT Serial TXA
Standard FCC 47 CFR Part 15
Dist/Ant Used 3M/6502
Configuration Installed in the meter

Date 7 July 2002
Temp / Hum in 70 Deg. F / 35% RH
Temp / Hum out N/A
Line AC / Freq 120 VAC / 60 Hz
Performed by Eugene Moses



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

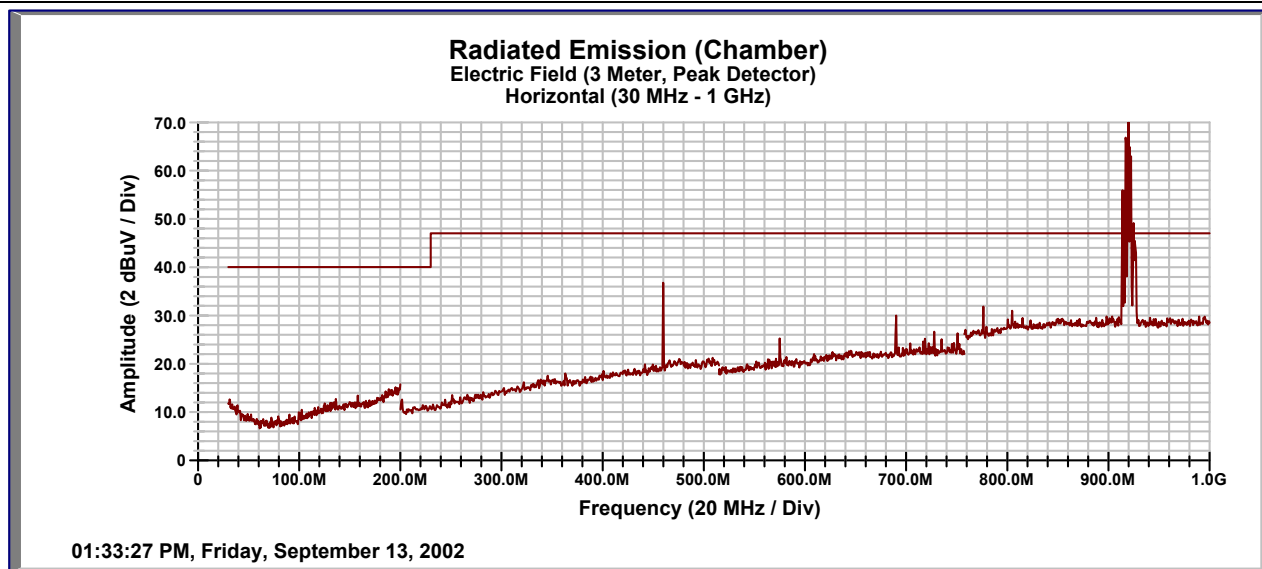
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

Tracking # 5032ADV Page 4 of 7

EUT Name	TranspondIT Electric	Date	13 September 2002
EUT Model	MS8EM915V10	Temp / Hum in	73 Deg. F / 35% RH
EUT Serial	TXA	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq	230 VAC / 60 Hz
Dist/Ant Used	3M/3110B, SAS-516, TDS-200/535-4	Performed by	Eugene Moses
Configuration	Installed in the meter		



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Measurement made with SAS-516 antenna. Peak value.										
919.90	H	1	26	60.80	0.00	4.27	23.60	88.67	94.00	-5.33
Measurement made with TDS-200/535-4 dipole. Peak value.										
919.90	H	1	26	60.80	0.00	4.27	23.60	88.67	94.00	-5.33
Measurement made with SAS-516. Quasi-Peak Value.										
460.00	H	1.98	350	19.00	0.00	3.01	17.90	39.91	47.00	-7.09
689.90	H	1	270	7.87	0.00	3.68	21.10	32.66	47.00	-14.34
776.10	H	1	213	3.55	0.00	3.91	21.36	28.81	47.00	-18.19

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor \pm Uncertainty

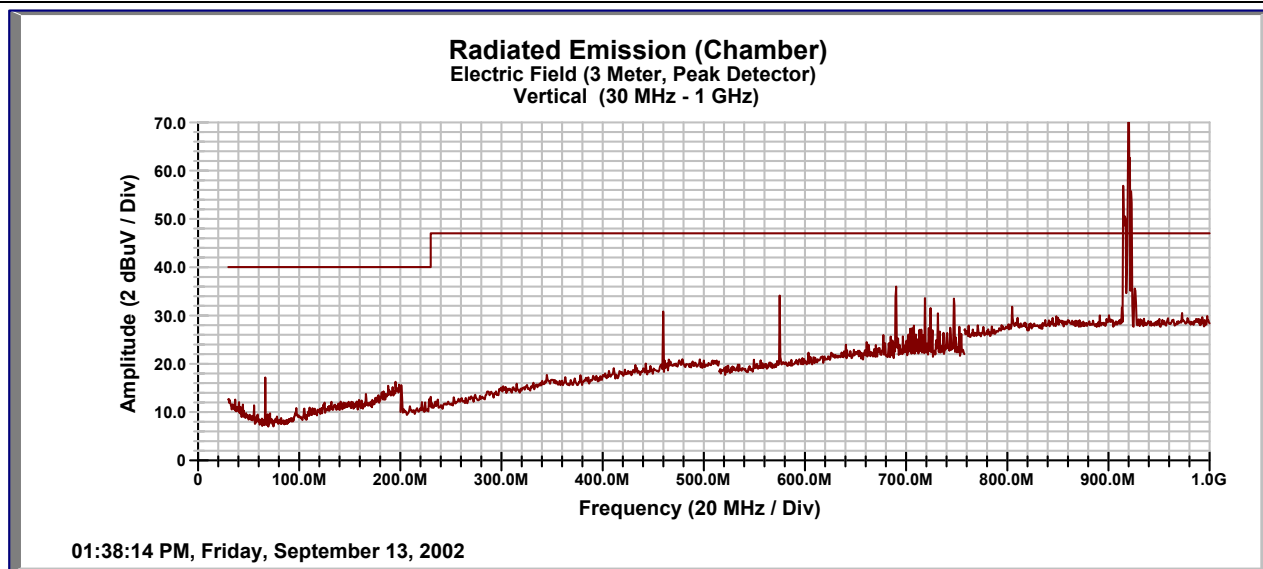
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

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EUT Name	TranspondIT Electric	Date	13 September 2002
EUT Model	MS8EM915V10	Temp / Hum in	73 Deg. F / 35% RH
EUT Serial	TXA	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq	230 VAC / 60 Hz
Dist/Ant Used	3M/3110B, SAS-516, TDS-200/535-4	Performed by	Eugene Moses
Configuration	Installed in the meter		

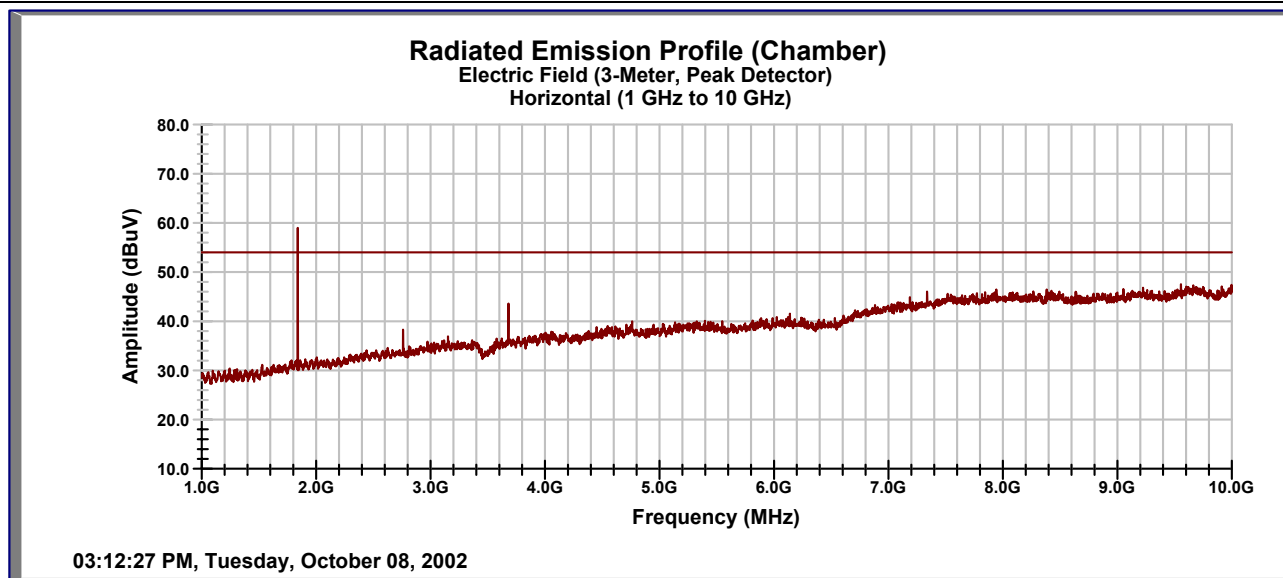


Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Measurement made with SAS-516 antenna. Peak Value.										
920.00	V	1.2	339	62.98	0.00	4.27	22.80	90.05	94.00	-3.95
Measurement made with TDS-200/535-4 dipole. Peak value.										
920.00	V	1.3	343	56.69	0.00	4.27	28.00	88.96	94.00	-5.04
Measurement made with SAS-516. Quasi-peak Value.										
460.00	V	1	50	13.60	0.00	3.01	17.30	33.91	47.00	-13.09
574.90	V	1	69	11.38	0.00	3.37	18.20	32.95	47.00	-14.05
690.00	V	1	345	19.84	0.00	3.68	19.60	43.12	47.00	-3.88
718.70	V	1	156	12.50	0.00	3.77	20.73	37.00	47.00	-10.00
747.40	V	1	218	7.72	0.00	3.83	20.00	31.55	47.00	-15.45
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty										
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence										

SOP 1 Radiated Emissions

Tracking # 5032ADV Page 6 of 7

EUT Name	TranspondIT Electric	Date	8 October 2002
EUT Model	MS8EM915V10	Temp / Hum in	73 Deg. F / 35% RH
EUT Serial	TXA	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq	230 VAC / 60 Hz
Dist/Ant Used	3M/3115-5770	Performed by	Eugene Moses
Configuration	Installed in the meter		



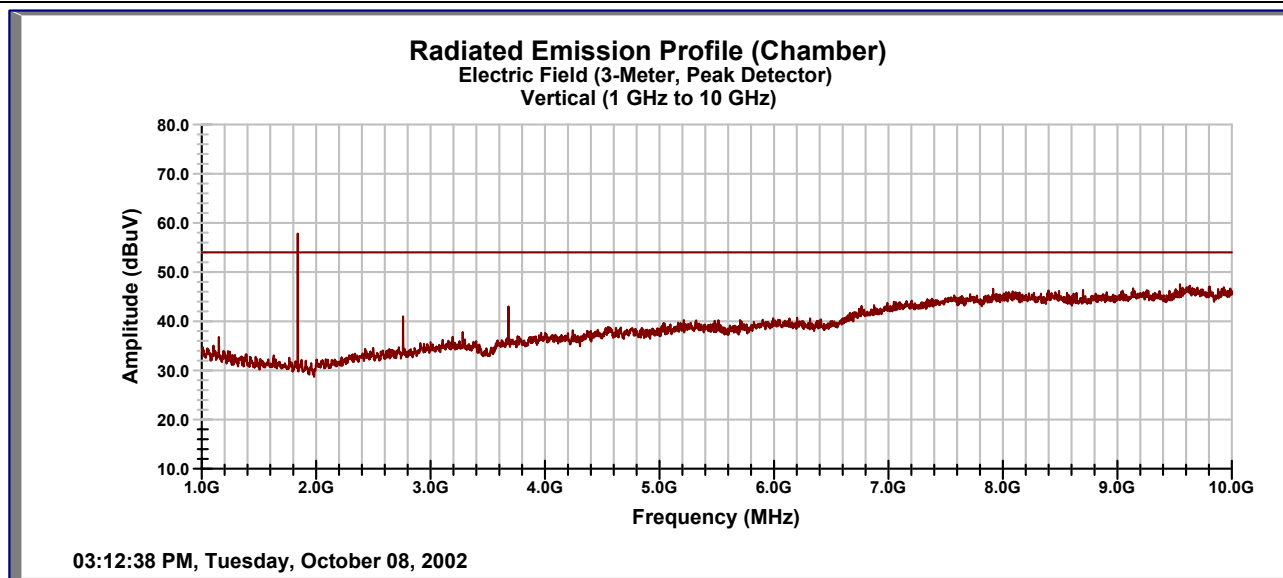
Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
FIM Value is average. 0.3 DB has been added to E-Field value for HPF loss.										
1840.00	H	1.09	59	42.00	36.43	6.50	28.40	40.77	54.00	-13.23
Add 1.1DB to E-Field Value for insertion loss of HPF. Average value.										
7250.00	H	1.09	350	21.00	36.11	14.09	37.50	37.58	54.00	-16.42
Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty										
Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence										

Notes:

SOP 1 Radiated Emissions

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EUT Name	TranspondIT Electric	Date	8 October 2002
EUT Model	MS8EM915V10	Temp / Hum in	73 Deg. F / 35% RH
EUT Serial	TXA	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq	230 VAC / 60 Hz
Dist/Ant Used	3M/3115-5770	Performed by	Eugene Moses
Configuration	Installed in the meter		



Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
Add 0.3 to E-Field Value for HPF loss. Average value.										
1840.00	V	1	11	44.15	36.43	6.50	28.30	42.82	54.00	-11.18
Add 0.3 to E-Field Value for HPF loss. Average value										
3680.00	V	1.13	218	33.51	35.79	9.10	33.48	40.60	54.00	-13.40
Add 0.6 to E-Field Value for HPF loss. Average value.										
9700.00	V	1	350	30.39	36.65	16.54	38.98	49.86	54.00	-4.14

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes:

2.2 Conducted Emissions

Testing was performed in accordance with 47 CFR 15, EN55022:1998, ANSI C63.4:1992. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

2.2.1.1 Deviations.

There were no deviations from this test methodology.

2.2.2 Test Results

Section 2.2.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

2.2.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

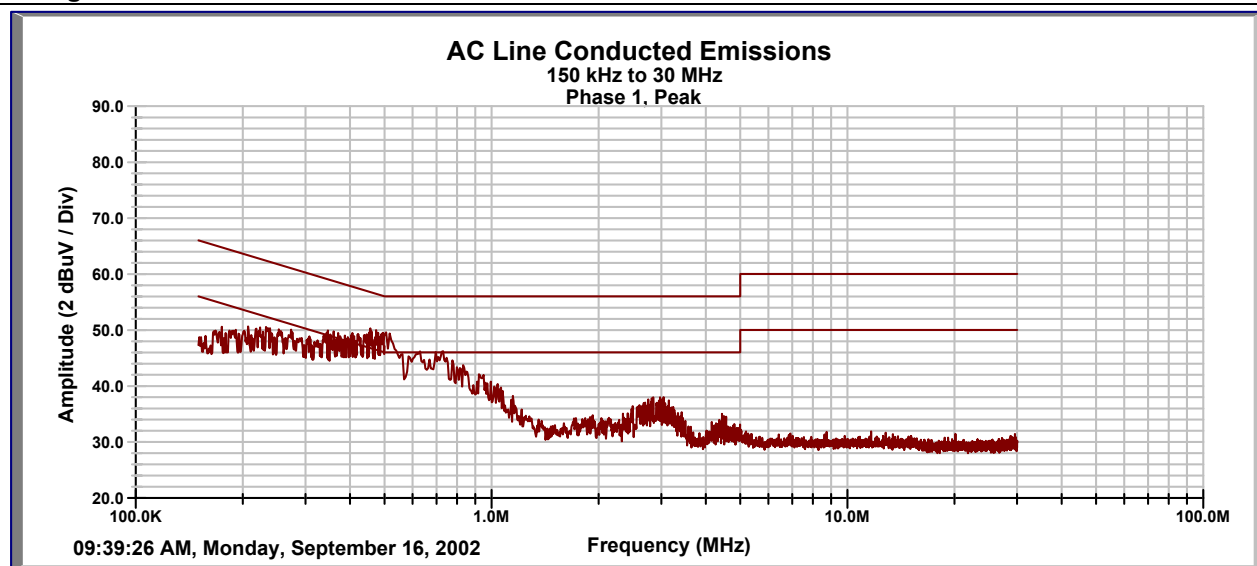
SOP 2 Conducted Emissions

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EUT Name TranspondIT Electric
EUT Model MS8EM915V10
EUT Serial TXA
Standard FCC 47 CFR Part 15
LISNs Used 5, 6

Date 16 September 2002
Temperature 69 Deg. F
Humidity 69% RH
Line AC /Freq 230 VAC / 60 Hz
Performed by Eugene Moses

Configuration Installed in the meter



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN CF (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.236	1	32.50	13.88	0	9.90	62.24	52.24	-15.86	-28.46
0.358	1	31.09	12.97	0	9.90	58.77	48.77	-17.78	-25.90
0.517	1	31.20	14.03	0	9.90	56.00	46.00	-14.90	-22.07
0.695	1	28.79	12.05	0	9.90	56.00	46.00	-17.31	-21.90
3.08	1	18.42	3.86	0	10.00	60.00	50.00	-31.58	-36.14

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit \pm Uncertainty

Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.2\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 2 Conducted Emissions

Tracking # 5032ADV Page 2 of 2

EUT Name TranspondIT Electric

Date 16 September 2002

EUT Model MS8EM915V10

Temperature 69 Deg. F

EUT Serial TXA

Humidity 69% RH

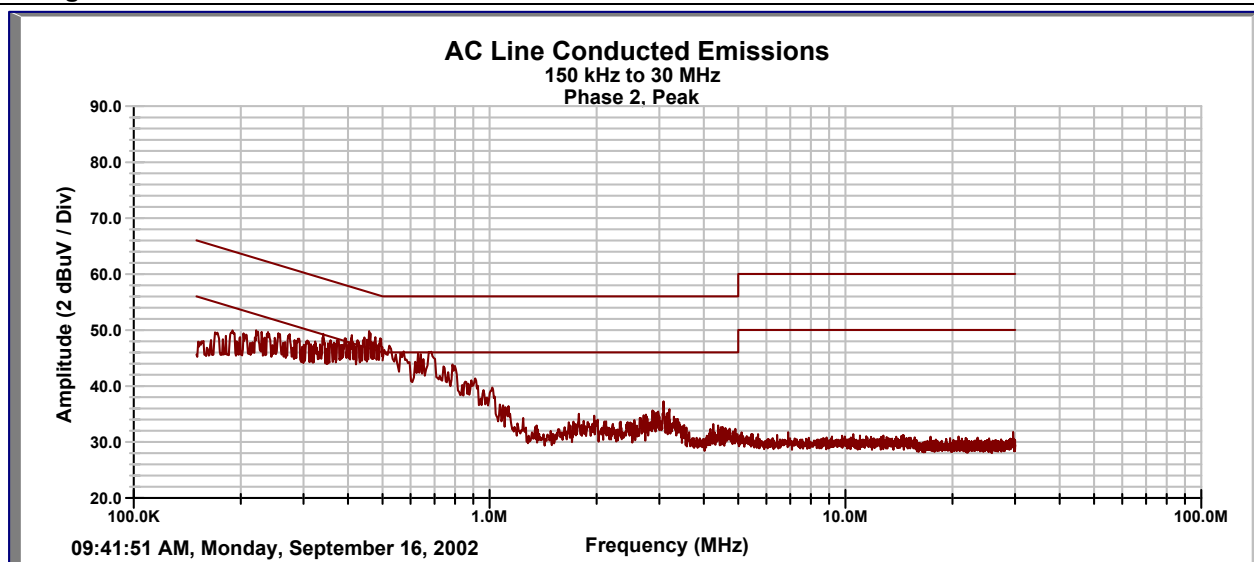
Standard FCC 47 CFR Part 15

Line AC /Freq 230 VAC / 60 Hz

LISNs Used 5, 6

Performed by Eugene Moses

Configuration Installed in the meter



Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN CF (dB)	Quasi Limit (dBuV)	Ave Limit (dBuV)	Quasi Spec Margin (dB)	Ave Spec Margin (dB)
0.193	2	32.91	14.10	0	9.90	63.91	53.91	-21.10	-29.91
0.461	2	32.19	14.00	0	9.90	56.67	46.67	-14.58	-22.77
0.655	2	29.33	11.64	0	9.90	56.00	46.00	-16.77	-24.46
3.05	2	16.57	2.95	0	10.00	60.00	50.00	-33.43	-37.05

Quasi Spec Margin = Quasi FIM + Cable Loss + LISN CF - Quasi Limit \pm Uncertainty

Ave Spec Margin = Ave FIM + Cable Loss + LISN CF - Ave Limit \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.2\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes:

3 Test Equipment Use List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (5 Meter Chamber)					
Amplifier, preamp	Agilent Technologies	8449B	3008A01480	7-Feb-02	7-Feb-03
Ant. Biconical	EMCO	3110B	3367	28-Nov-01	28-Nov-02
Ant. Log Periodic	AH Systems	SAS-516	133	26-Nov-01	26-Nov-02
Antenna Horn	EMCO	3115	5770	18-Nov-01	18-Nov-02
Cable, Coax	Andrew	FSJ1-50A	031	28-Jan-02	28-Jan-03
Cable, Coax	Andrew	FSJ1-50A	034	6-Feb-02	6-Feb-03
Cable, Coax	Andrew	FSJ1-50A	045	29-Jan-02	29-Jan-03
Chamber, Semi-Anechoic	Braden Shielding	5 meter	A67631	26-Mar-02	26-Mar-03
Data Table, EMCWin	Flextronics EMC	EMCWin.dll	002	6-Jan-02	6-Jan-03
Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	5-Aug-02	5-Aug-03

SOP 2 - Conducted Emissions (AC/DC and Signal I/O)					
Cable, Coax	Belden	RG-213	004	28-Jan-02	28-Jan-03
LISN (5) 50mH/50Ω	Solar Electronics	8028-50-TS-24	990441	8-Aug-02	8-Aug-03
LISN (6) 50mH/50Ω	Solar Electronics	8028-50-TS-24	990442	8-Aug-02	8-Aug-03
LISN Selection Box	Flextronics EMC	CFL-9206	1650	23-Aug-02	23-Aug-03
Spectrum Analyzer	Agilent Tec.	E7405A	US39440157	5-Aug-02	5-Aug-03

General Laboratory Equipment					
Meter, Multi	Fluke	79-3	69200606	5-Aug-02	5-Aug-03
Meter, Temp/Humid/Barom	Fisher	02-400	01	21-Aug-02	21-Aug-03

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.