

# TEST RESULT SUMMARY

**EUROPEAN STANDARD EN 55022: 1998**

**AS/NZS 3548**

**VCCI V-3/99.05**

**FCC PART 15 SUBPART B**

**Class A Limit**

MANUFACTURER'S NAME	Digi International
NAME OF EQUIPMENT	<b>Digi One SP Coldfire</b>
MODEL NUMBER	<b>55001037-01 Rev 02</b>
MANUFACTURER'S ADDRESS	11001 Bren Road East Minnetonka MN 55343
TEST REPORT NUMBER	NC203834
TEST DATE	22 July 2002

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, VCCI V-3/99.05, AS/NZS 3548 and European Standard EN 55022.

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, VCCI V-3/99.05, AS/NZS 3548 and European Standard EN 55022: "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment".

Date: 05 August 2002



Location: Taylors Falls MN  
USA

J. C. Sausen  
Test Engineer

T. K. Swanson  
Test Technician

Not Transferable

# EMC EMISSION - TEST REPORT

Test Report File No. : **NC203834** Date of issue: 05 August 2002

Model / Serial No. : 55001037-01 Rev 02 / 1

Product Type : Digi One SP Coldfire

Applicant : Digi International

Manufacturer : Digi International

License holder : Digi International

Address : 11001 Bren Road East

: Minnetonka MN 55343

Test Result :  **Positive**  **Negative**

Test Project Number :  
Reference(s) : NC203834

Total pages including  
Appendices : 32

*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.*

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*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 / 1998<br>w/Amendment A1:1999 | <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"/> - EN 55015 / A1:1990                     |   |                                    |
| <input type="checkbox"/> - EN 55015 / 1993                        |   |                                    |
| <input type="checkbox"/> - EN 55022 / 1987                        | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input checked="" type="checkbox"/> - EN 55022 / 1998             | <input checked="" type="checkbox"/> - Class A               | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - BS                                     |   |                                    |
| <input checked="" type="checkbox"/> - VCCI                        | <input checked="" type="checkbox"/> - Class A               | <input type="checkbox"/> - Class B |
| <input checked="" type="checkbox"/> - FCC                         | <input checked="" type="checkbox"/> - Class A               | <input type="checkbox"/> - Class B |
| <input checked="" type="checkbox"/> - AS 3548 (1992)              | <input checked="" 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 checked="" type="checkbox"/> - CISPR 22 (1993)             | <input checked="" type="checkbox"/> - Class A               | <input type="checkbox"/> - Class B |

**Environmental conditions in the lab:**

	<u>Actual</u>
Temperature	: 21 - 22 °C
Relative Humidity	: 50 - 60 %
Atmospheric pressure	: 99.2 – 99.9 kPa
Power supply system	: 50/60 Hz – 230/120 VAC – 1 Phase

**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 :**

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	2416	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1437	10-25-02
■ -	2534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	8-22-02

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

**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
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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) – NSA measurements made 7-02, due 7-03.
- Oakwood Lab (Open Area Test Site)

at a test distance of :

- 3 meters
- 10 meters
- 30 meters

Test equipment used :

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	2830	ZHL-1042J	Mini-Circuits	Preamplifier	H081396-16	3-15-03
■ -	3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	2-14-03
■	2686	8568B	Hewlett-Packard	Spectrum Analyzer (Unit B)	2049A01305	1-30-03
■	2674	85662A	Hewlett-Packard	Analyzer Display (Unit B)	2050A02007	1-30-03
■	2680	85650A	Hewlett-Packard	Quasi-Peak Adapter (Unit B)	2043A00343	1-30-03

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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

## Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

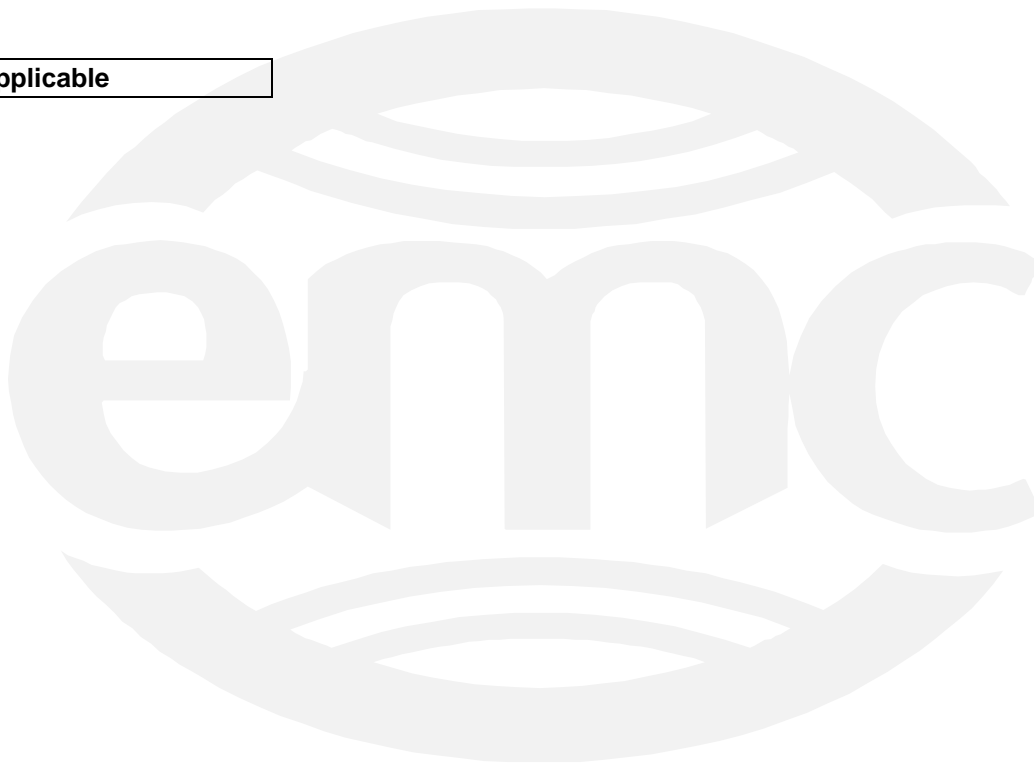
The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 18 GHz were performed in a horizontal and vertical polarization at the following test location :

- 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





**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
- "ROM loaded FCC program – outputs "H" on serial port and Ethernet packets"

**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 B2

**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 margin of compliance \_\_\_\_\_ 19 dB at \_\_\_\_\_ 29.83 MHz

Maximum margin of non-compliance \_\_\_\_\_ dB at \_\_\_\_\_ MHz

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

\_\_\_\_\_

#### 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 margin of compliance \_\_\_\_\_ 2 dB at \_\_\_\_\_ 66.02 MHz

Maximum margin of non-compliance \_\_\_\_\_ 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 - 18 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:**

**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: 22 July 2002

Testing End Date: 22 July 2002

- TÜV PRODUCT SERVICE INC -

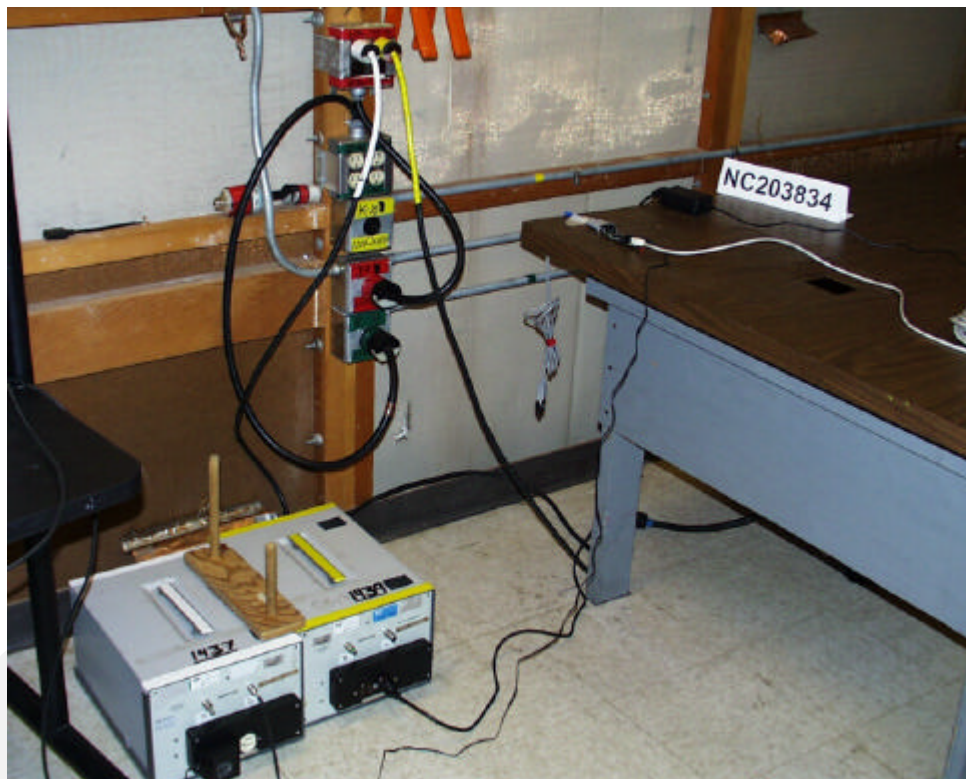
*Thomas K. Swanson*

T. K. Swanson  
Test Technician

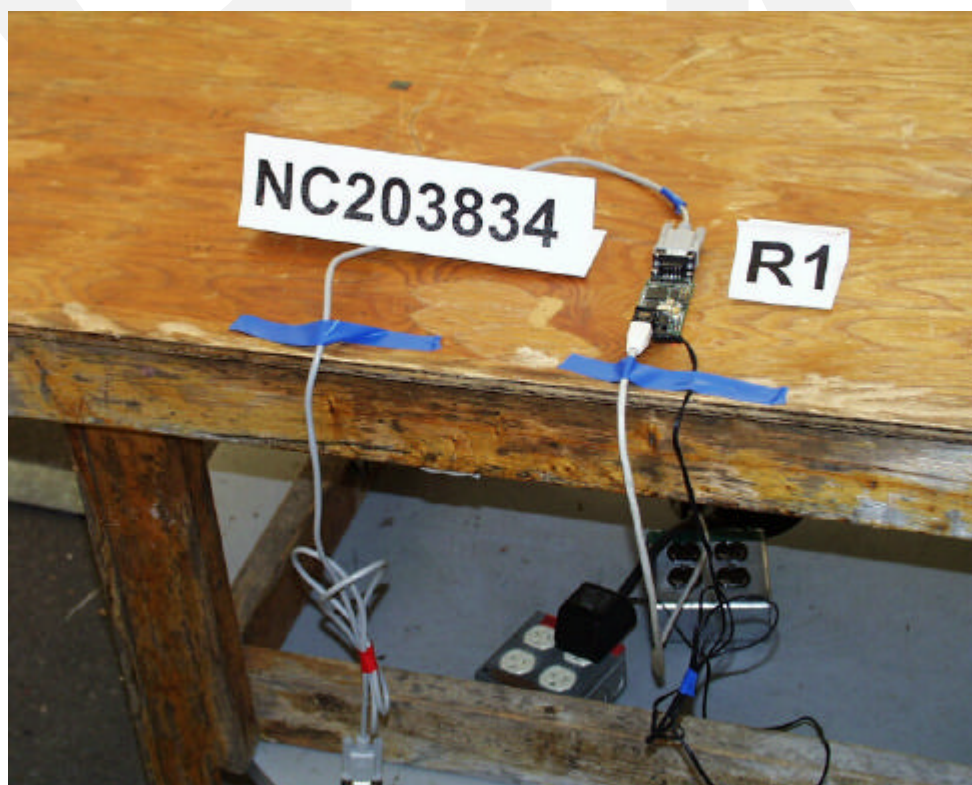
*J. C. Sausen*

Tested By:  
J. C. Sausen

Test-setup photo(s):  
Conducted emission 10/150 kHz - 30 MHz

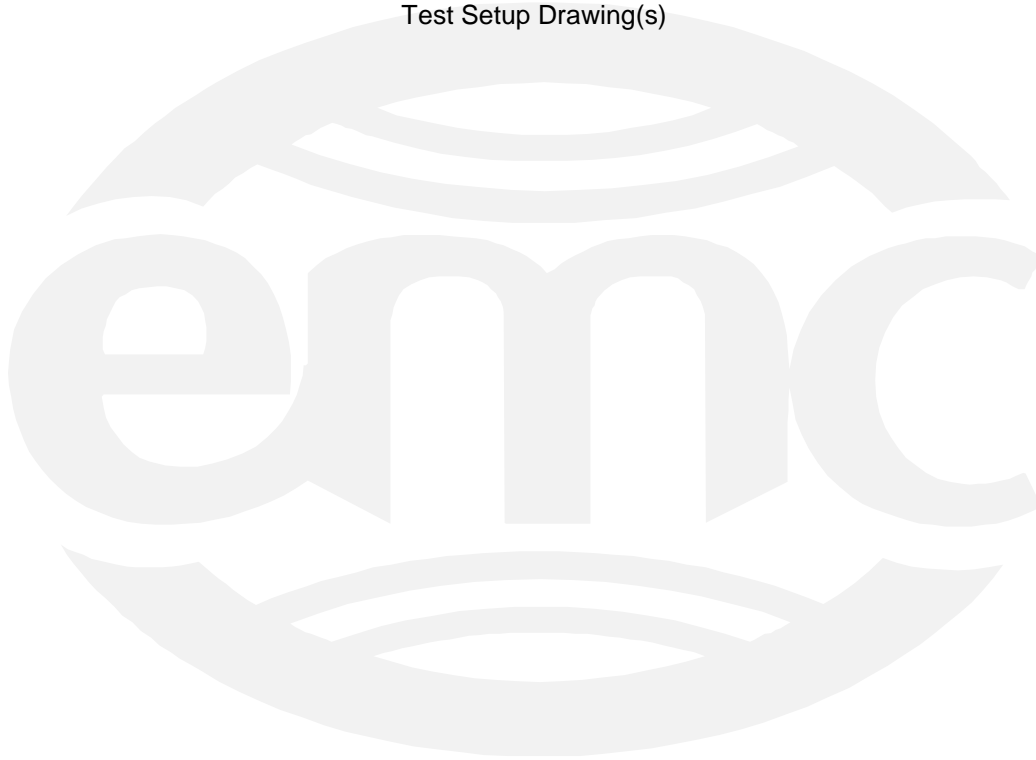


Test-setup photo(s):  
Radiated emission 30 MHz - 1000 MHz



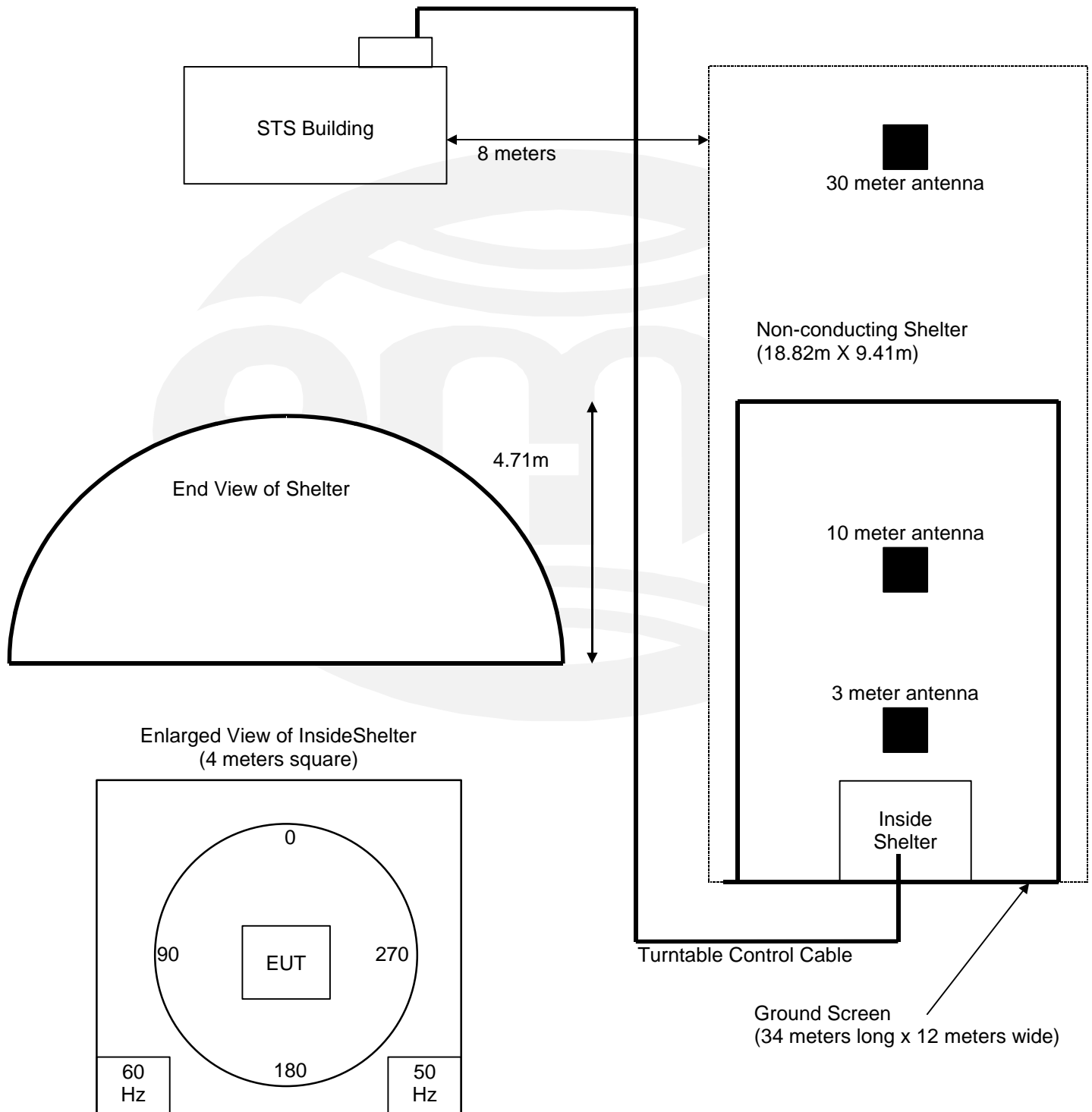
## Appendix A

Test Data Sheets  
and  
Test Setup Drawing(s)



**TEST SETUP FOR EMISSIONS TESTING**

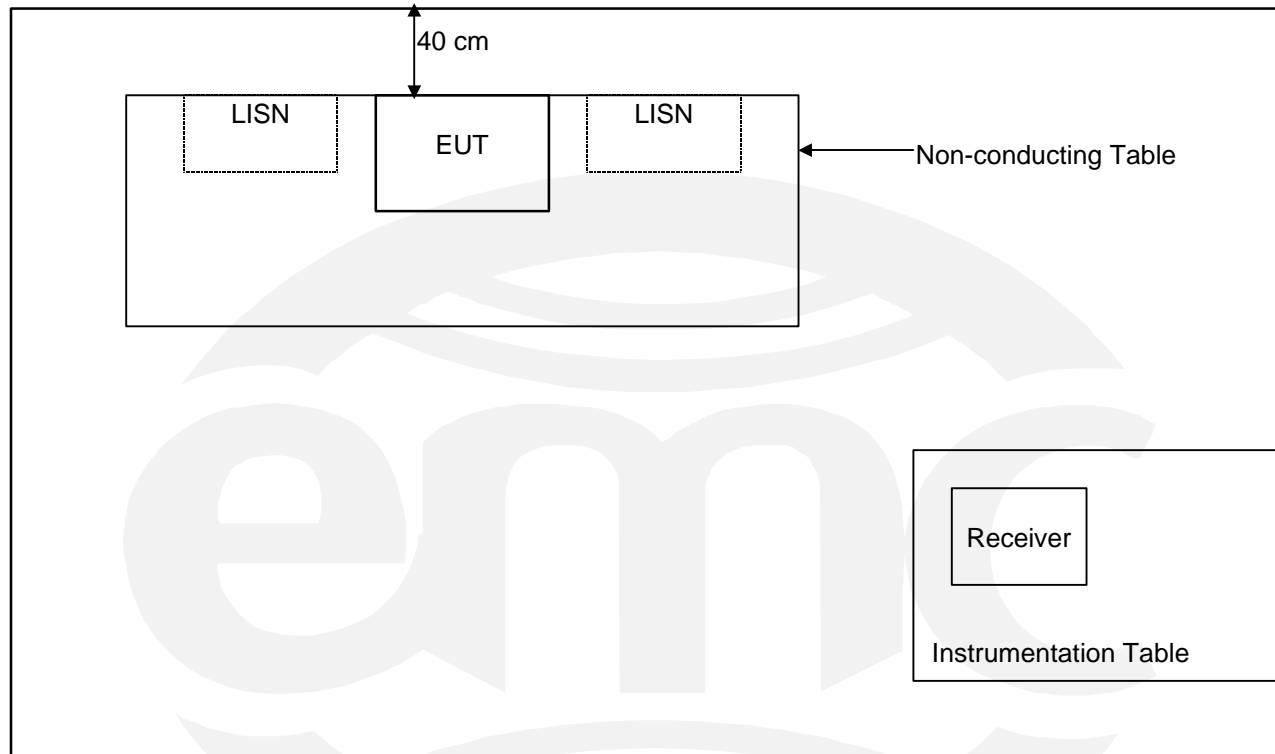
WILD RIVER LAB  
Small Test Site (STS)



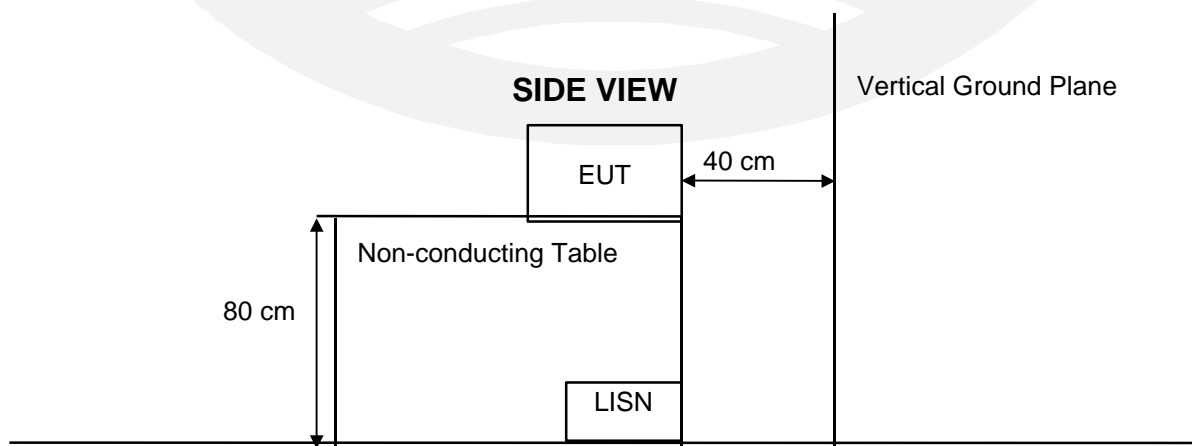
**TEST SETUP FOR EMISSIONS TESTING**

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



# Conducted Electromagnetic Emissions



Test Report #: 3834 Run 1 Test Area: SCREEN ROOM  
 Test Method: EN55022 Test Date: 22-Jul-2002  
 EUT Model #: \_\_\_\_\_ EUT Power: 60 Hz / 110 VAC  
 EUT Serial #: \_\_\_\_\_ Temperature: 21 °C  
 Manufacturer: Digi International Relative Humidity: 50 %  
 EUT Description: \_\_\_\_\_ Air Pressure: 99.9 kPa  
 Notes: \_\_\_\_\_ Page: 1 of 2

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
29.24	35.0 Qp	0.5 / 0.3 / 0.0	35.8	Neutral	-37.2	N/A
29.24	31.5 Av	0.5 / 0.3 / 0.0	32.3	Neutral	N/A	-27.7
24.90	29.0 Qp	0.4 / 0.2 / 0.0	29.6	Neutral	-43.4	N/A
24.90	23.6 Av	0.4 / 0.2 / 0.0	24.2	Neutral	N/A	-35.8
11.33	23.3 Qp	0.3 / 0.1 / 0.0	23.6	Neutral	-49.4	N/A
11.33	18.7 Av	0.3 / 0.1 / 0.0	19.0	Neutral	N/A	-41.0
1.99	30.2 Qp	0.0 / 0.0 / 0.0	30.2	Neutral	-42.8	N/A
1.99	28.9 Av	0.0 / 0.0 / 0.0	28.9	Neutral	N/A	-31.1
0.312	30.7 Qp	0.0 / 0.0 / 0.0	30.8	Neutral	-48.2	N/A
0.312	30.3 Av	0.0 / 0.0 / 0.0	30.4	Neutral	N/A	-35.6
0.150	28.1 Qp	0.0 / 0.1 / 0.0	28.2	Neutral	-50.8	N/A
0.150	0.1 Av	0.0 / 0.1 / 0.0	0.2	Neutral	N/A	-65.8
0.150	28.3 Qp	0.0 / 0.1 / 0.0	28.4	Neutral	-50.6	N/A
0.150	-6.0 Av	0.0 / 0.1 / 0.0	-5.9	Neutral	N/A	-71.9
0.312	30.2 Qp	0.0 / 0.0 / 0.0	30.3	Neutral	-48.7	N/A
0.312	29.7 Av	0.0 / 0.0 / 0.0	29.8	Neutral	N/A	-36.2
1.99	27.8 Qp	0.0 / 0.0 / 0.0	27.8	Neutral	-45.2	N/A
1.99	24.8 Av	0.0 / 0.0 / 0.0	24.8	Neutral	N/A	-35.2
11.33	15.2 Qp	0.3 / 0.1 / 0.0	15.5	Neutral	-57.5	N/A
11.33	11.6 Av	0.3 / 0.1 / 0.0	11.9	Neutral	N/A	-48.1
24.90	26.3 Qp	0.4 / 0.2 / 0.0	26.9	Neutral	-46.1	N/A
24.90	23.4 Av	0.4 / 0.2 / 0.0	24.0	Neutral	N/A	-36.0
29.24	26.8 Qp	0.5 / 0.3 / 0.0	27.6	Neutral	-45.4	N/A
29.24	23.7 Av	0.5 / 0.3 / 0.0	24.5	Neutral	N/A	-35.5

Tested by: J. C. Sausen

\_\_\_\_\_  
Printed

\_\_\_\_\_  
Signature

Reviewed by: TKS

\_\_\_\_\_  
Printed

\_\_\_\_\_  
Signature

# Conducted Electromagnetic Emissions



Test Report #: 3834 Run 1 Test Area: SCREEN ROOM  
 Test Method: EN55022 Test Date: 22-Jul-2002  
 EUT Model #: \_\_\_\_\_ EUT Power: 60 Hz / 110 VAC  
 EUT Serial #: \_\_\_\_\_ Temperature: 21 °C  
 Manufacturer: Digi International Relative Humidity: 50 %  
 EUT Description: \_\_\_\_\_ Air Pressure: 99.9 kPa  
 Notes: \_\_\_\_\_ Page: 2 of 2  
 \_\_\_\_\_  
 \_\_\_\_\_

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
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***** MEASUREMENT SUMMARY *****						
29.24	31.5 Av	0.5 / 0.3 / 0.0	32.3	Neutral	N/A	-27.7
1.99	28.9 Av	0.0 / 0.0 / 0.0	28.9	Neutral	N/A	-31.1
0.312	30.3 Av	0.0 / 0.0 / 0.0	30.4	Neutral	N/A	-35.6
24.90	23.6 Av	0.4 / 0.2 / 0.0	24.2	Neutral	N/A	-35.8
11.33	18.7 Av	0.3 / 0.1 / 0.0	19.0	Neutral	N/A	-41.0
0.150	28.3 Qp	0.0 / 0.1 / 0.0	28.4	Neutral	-50.6	N/A

Tested by: J. C. Sausen

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Printed

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Signature

Reviewed by: TKS

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Printed

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Signature

# Conducted Electromagnetic Emissions



Test Report #: 3834 Run 2 Test Area: SCREEN ROOM  
 Test Method: EN55022 Test Date: 25-Jul-2002  
 EUT Model #: 55001037-01. Digi One SP Coldfire EUT Power: 50 Hz / 230 VAC  
 EUT Serial #: \_\_\_\_\_ Temperature: 21 °C  
 Manufacturer: Digi International Relative Humidity: 50 %  
 EUT Description: \_\_\_\_\_ Air Pressure: 992 kPa  
 Notes: \_\_\_\_\_ Page: 1 of 2

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
50 Hz / 230 VAC						
0.150	28.3 Qp	0.0 / 0.1 / 0.0	28.4	Neutral	-50.6	N/A
0.150	-5.2 Av	0.0 / 0.1 / 0.0	-5.1	Neutral	N/A	-71.1
0.570	20.5 Qp	0.0 / 0.0 / 0.0	20.6	Neutral	-52.4	N/A
0.570	-2.7 Av	0.0 / 0.0 / 0.0	-2.6	Neutral	N/A	-62.6
3.63	38.0 Qp	0.2 / 0.0 / 0.0	38.2	Neutral	-34.8	N/A
3.63	36.8 Av	0.2 / 0.0 / 0.0	37.0	Neutral	N/A	-23.0
11.51	35.0 Qp	0.2 / 0.1 / 0.0	35.3	Neutral	-37.7	N/A
11.51	34.2 Av	0.2 / 0.1 / 0.0	34.5	Neutral	N/A	-25.5
25.25	39.3 Qp	0.4 / 0.2 / 0.0	39.9	Neutral	-33.1	N/A
25.25	36.9 Av	0.4 / 0.2 / 0.0	37.5	Neutral	N/A	-22.5
29.83	41.1 Qp	0.5 / 0.3 / 0.0	41.9	Neutral	-31.1	N/A
29.83	39.6 Av	0.5 / 0.3 / 0.0	40.4	Neutral	N/A	-19.6
0.150	24.7 Qp	0.0 / 0.1 / 0.0	24.8	Line 1	-54.2	N/A
0.150	-5.5 Av	0.0 / 0.1 / 0.0	-5.4	Line 1	N/A	-71.4
0.570	19.9 Qp	0.0 / 0.0 / 0.0	20.0	Line 1	-53.0	N/A
0.570	-7.7 Av	0.0 / 0.0 / 0.0	-7.6	Line 1	N/A	-67.6
3.63	34.7 Qp	0.2 / 0.0 / 0.0	34.9	Line 1	-38.1	N/A
3.63	33.4 Av	0.2 / 0.0 / 0.0	33.6	Line 1	N/A	-26.4
11.51	34.0 Qp	0.2 / 0.1 / 0.0	34.3	Line 1	-38.7	N/A
11.51	32.7 Av	0.2 / 0.1 / 0.0	33.0	Line 1	N/A	-27.0
25.25	37.4 Qp	0.4 / 0.2 / 0.0	38.0	Line 1	-35.0	N/A
25.25	36.3 Av	0.4 / 0.2 / 0.0	36.9	Line 1	N/A	-23.1
29.83	41.1 Qp	0.5 / 0.3 / 0.0	41.9	Line 1	-31.1	N/A
29.83	39.4 Av	0.5 / 0.3 / 0.0	40.2	Line 1	N/A	-19.8
End of data.						

Tested by: J. C. Sausen

\_\_\_\_\_  
Printed

\_\_\_\_\_  
Signature

Reviewed by: TKS

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Printed

\_\_\_\_\_  
Signature

# Conducted Electromagnetic Emissions



Test Report #: 3834 Run 2 Test Area: SCREEN ROOM  
 Test Method: EN55022 Test Date: 25-Jul-2002  
 EUT Model #: 55001037-01. Digi One SP Coldfire EUT Power: 50 Hz / 230 VAC  
 EUT Serial #: \_\_\_\_\_ Temperature: 21 °C  
 Manufacturer: Digi International Relative Humidity: 50 %  
 EUT Description: \_\_\_\_\_ Air Pressure: 992 kPa  
 Notes: \_\_\_\_\_ Page: 2 of 2  
 \_\_\_\_\_  
 \_\_\_\_\_

FREQ (MHz)	LEVEL (dBuV)	CABLE / LISN / ATTEN (dB)	FINAL (dBuV)	TEST POINT	DELTA1 EN55022 A QP	DELTA2 EN55022 A Avg
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***** MEASUREMENT SUMMARY *****						
29.83	39.6 Av	0.5 / 0.3 / 0.0	40.4	Neutral	N/A	-19.6
25.25	36.9 Av	0.4 / 0.2 / 0.0	37.5	Neutral	N/A	-22.5
3.63	36.8 Av	0.2 / 0.0 / 0.0	37.0	Neutral	N/A	-23.0
11.51	34.2 Av	0.2 / 0.1 / 0.0	34.5	Neutral	N/A	-25.5
0.150	28.3 Qp	0.0 / 0.1 / 0.0	28.4	Neutral	-50.6	N/A
0.570	20.5 Qp	0.0 / 0.0 / 0.0	20.6	Neutral	-52.4	N/A

Tested by: J. C. Sausen

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Reviewed by: TKS

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Signature

# Radiated Electromagnetic Emissions



Test Report #:	<b>3834 Run 01</b>	Test Area:	STS 10 M
Test Method:	EN55022	Test Date:	22-Jul-2002
EUT Model #:	55001037-01. Digi one SP Coldfire.	EUT Power:	9 to 30 VDC from 110 VAC / 60 Hz wall transformer.
EUT Serial #:	1, rev 2	Temperature:	22 °C
Manufacturer:	Digi International	Relative Humidity:	60 %
EUT Description:	10 / 100 Wthernet to single serial port terminal adapter.	Air Pressure:	99.9 kPa
Notes:		Page:	1 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
100 base T mode:						
66.02	45.5 Qp	1.5 / 9.4 / 27.7	28.7	V / 1.0 / 0.0	-11.3	-1.3
132.01	37.1 Qp	2.1 / 7.5 / 27.8	19.1	V / 1.0 / 0.0	-20.9	-10.9
198.01	49.1 Qp	2.7 / 10.0 / 27.9	33.9	V / 1.0 / 0.0	-6.1	3.9 *
231.01	31.2 Qp	2.9 / 10.3 / 27.9	16.6	V / 1.0 / 0.0	-30.4	-20.4
264.01	36.8 Qp	3.1 / 11.6 / 27.9	23.7	V / 1.0 / 0.0	-23.3	-13.3
297.01	29.9 Qp	3.3 / 11.9 / 28.1	17.0	V / 1.0 / 0.0	-30.0	-20.0
330.01	34.2 Qp	3.5 / 13.1 / 28.1	22.9	V / 1.0 / 0.0	-24.1	-14.1
396.01	43.1 Qp	3.9 / 15.5 / 28.0	34.5	V / 1.0 / 0.0	-12.5	-2.5
462.01	30.8 Qp	4.3 / 16.8 / 28.0	23.8	V / 1.0 / 0.0	-23.2	-13.2
528.01	29.9 Qp	4.6 / 18.4 / 28.1	24.8	V / 1.0 / 0.0	-22.2	-12.2
594.01	32.0 Qp	5.0 / 19.0 / 28.2	27.8	V / 1.0 / 0.0	-19.2	-9.2
660.01	28.8 Qp	5.3 / 18.6 / 28.1	24.5	V / 1.0 / 0.0	-22.5	-12.5
75.00	40.2 Qp	1.6 / 7.5 / 27.7	21.7	V / 1.0 / 0.0	-18.3	-8.3
100.00	35.9 Qp	1.9 / 8.4 / 27.8	18.3	V / 1.0 / 0.0	-21.7	-11.7
125.00	35.4 Qp	2.1 / 7.7 / 27.8	17.4	V / 1.0 / 0.0	-22.6	-12.6
150.00	33.3 Qp	2.3 / 8.6 / 27.7	16.5	V / 1.0 / 0.0	-23.5	-13.5
162.50	37.1 Qp	2.5 / 8.2 / 27.7	20.0	V / 1.0 / 0.0	-20.0	-10.0
187.50	31.8 Qp	2.6 / 9.5 / 27.8	16.1	V / 1.0 / 0.0	-23.9	-13.9
200.00	37.9 Qp	2.7 / 10.0 / 27.9	22.7	V / 1.0 / 0.0	-17.3	-7.3
250.00	42.1 Qp	3.0 / 11.2 / 27.9	28.5	V / 1.0 / 0.0	-18.5	-8.5
325.01	33.8 Qp	3.5 / 13.2 / 28.1	22.4	V / 1.0 / 0.0	-24.6	-14.6
350.01	31.1 Qp	3.7 / 14.5 / 28.0	21.3	V / 1.0 / 0.0	-25.7	-15.7
375.01	37.1 Qp	3.8 / 14.9 / 28.0	27.8	V / 1.0 / 0.0	-19.2	-9.2
400.01	31.2 Qp	3.9 / 15.6 / 28.0	22.6	V / 1.0 / 0.0	-24.4	-14.4
425.01	30.3 Qp	4.1 / 16.2 / 28.0	22.6	V / 1.0 / 0.0	-24.4	-14.4
450.01	28.8 Qp	4.2 / 15.8 / 28.0	20.7	V / 1.0 / 0.0	-26.3	-16.3

Tested by:           J. C. Sausen            
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Reviewed by:           T. K. Swanson            
Printed

*Thomas K. Swanson*  
Signature

# Radiated Electromagnetic Emissions



Test Report #:	<b>3834 Run 01</b>	Test Area:	STS 10 M
Test Method:	EN55022	Test Date:	22-Jul-2002
EUT Model #:	55001037-01. Digi one SP Coldfire.	EUT Power:	9 to 30 VDC from 110 VAC / 60 Hz wall transformer.
EUT Serial #:	1, rev 2	Temperature:	22 °C
Manufacturer:	Digi International	Relative Humidity:	60 %
EUT Description:	10 / 100 Wthernet to single serial port terminal adapter.	Air Pressure:	99.9 kPa
Notes:		Page:	2 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
475.03	28.6 Qp	4.3 / 17.2 / 28.1	22.1	V / 1.0 / 0.0	-24.9	-14.9
500.03	29.6 Qp	4.5 / 17.2 / 28.1	23.2	V / 1.0 / 0.0	-23.8	-13.8
200 MHz maxed:						
200.01	37.8 Qp	2.7 / 10.0 / 27.9	22.6	V / 1.1 / 5.0	-17.4	-7.4
66.02	53.4 Qp	1.5 / 9.4 / 27.7	36.6	V / 1.0 / 90.0	-3.4	6.6 *
132.01	44.7 Qp	2.1 / 7.5 / 27.8	26.6	V / 1.0 / 90.0	-13.4	-3.4
150.00	31.9 Qp	2.3 / 8.6 / 27.7	15.2	V / 1.0 / 90.0	-24.8	-14.8
162.50	37.3 Qp	2.5 / 8.2 / 27.7	20.3	V / 1.0 / 90.0	-19.7	-9.7
330.01	41.5 Qp	3.5 / 13.1 / 28.1	30.1	V / 1.0 / 90.0	-16.9	-6.9
396.01	45.9 Qp	3.9 / 15.5 / 28.0	37.3	V / 1.0 / 90.0	-9.7	0.3 *
400.01	34.5 Qp	3.9 / 15.6 / 28.0	25.9	V / 1.0 / 90.0	-21.1	-11.1
425.01	35.9 Qp	4.1 / 16.2 / 28.0	28.2	V / 1.0 / 90.0	-18.8	-8.8
450.01	32.4 Qp	4.2 / 15.8 / 28.0	24.3	V / 1.0 / 90.0	-22.7	-12.7
462.01	35.7 Qp	4.3 / 16.8 / 28.0	28.7	V / 1.0 / 90.0	-18.3	-8.3
475.03	33.9 Qp	4.3 / 17.2 / 28.1	27.4	V / 1.0 / 90.0	-19.6	-9.6
500.03	31.2 Qp	4.5 / 17.2 / 28.1	24.8	V / 1.0 / 90.0	-22.2	-12.2
528.01	30.3 Qp	4.6 / 18.4 / 28.1	25.3	V / 1.0 / 90.0	-21.7	-11.7
594.01	33.9 Qp	5.0 / 19.0 / 28.2	29.6	V / 1.0 / 90.0	-17.4	-7.4
660.01	29.9 Qp	5.3 / 18.6 / 28.1	25.6	V / 1.0 / 90.0	-21.4	-11.4
660.01	29.9 Qp	5.3 / 18.6 / 28.1	25.7	V / 1.0 / 90.0	-21.3	-11.3
660.01	29.8 Qp	5.3 / 18.6 / 28.1	25.5	V / 1.0 / 90.0	-21.5	-11.5
924.01	28.9 Qp	6.3 / 22.0 / 27.6	29.6	V / 1.0 / 90.0	-17.4	-7.4
66 MHz maxed:						
66.02	53.9 Qp	1.5 / 9.4 / 27.7	37.1	V / 1.4 / 95.0	-2.9	7.1 *
375.01	37.8 Qp	3.8 / 14.9 / 28.0	28.4	V / 1.4 / 95.0	-18.6	-8.6
528.01	31.0 Qp	4.6 / 18.4 / 28.1	26.0	V / 1.4 / 95.0	-21.0	-11.0

Tested by: J. C. Sausen  
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Reviewed by: T. K. Swanson  
Printed

Signature

# Radiated Electromagnetic Emissions



Test Report #: **3834 Run 01** Test Area: STS 10 M  
 Test Method: EN55022 Test Date: 22-Jul-2002  
 EUT Model #: 55001037-01. Digi one SP Coldfire. EUT Power: 9 to 30 VDC from 110 VAC / 60 Hz wall transformer.  
 EUT Serial #: 1, rev 2 Temperature: 22 °C  
 Manufacturer: Digi International Relative Humidity: 60 %  
 EUT Description: 10 / 100 Wthernet to single serial port terminal adapter. Air Pressure: 99.9 kPa  
 Notes: Page: 3 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
198 MHz maxed:						
198.01	48.7 Qp	2.7 / 10.0 / 27.9	33.5	V / 1.2 / 0.0	-6.5	3.5 *
75.00	40.4 Qp	1.6 / 7.5 / 27.7	21.8	V / 1.2 / 0.0	-18.2	-8.2
125.00	35.8 Qp	2.1 / 7.7 / 27.8	17.8	V / 1.2 / 0.0	-22.2	-12.2
264.01	37.9 Qp	3.1 / 11.6 / 27.9	24.8	V / 1.2 / 0.0	-22.2	-12.2
594.01	34.9 Qp	5.0 / 19.0 / 28.2	30.6	V / 1.2 / 0.0	-16.4	-6.4
110.80	37.1 Qp	2.0 / 8.6 / 27.8	19.9	V / 1.2 / 0.0	-20.1	-10.1
111.62	39.5 Qp	2.0 / 8.6 / 27.8	22.2	V / 1.2 / 0.0	-17.8	-7.8
112.26	37.4 Qp	2.0 / 8.6 / 27.8	20.2	V / 1.2 / 0.0	-19.8	-9.8
112.84	38.7 Qp	2.0 / 8.5 / 27.8	21.4	V / 1.2 / 0.0	-18.6	-8.6
113.09	38.1 Qp	2.0 / 8.5 / 27.8	20.9	V / 1.2 / 0.0	-19.1	-9.1
528.01	33.4 Qp	4.6 / 18.4 / 28.1	28.3	H / 2.0 / 0.0	-18.7	-8.7
450.01	34.1 Qp	4.2 / 15.8 / 28.0	26.1	H / 2.0 / 270.0	-20.9	-10.9
500.03	32.8 Qp	4.5 / 17.2 / 28.1	26.4	H / 2.0 / 270.0	-20.6	-10.6
528.01	40.3 Qp	4.6 / 18.4 / 28.1	35.3	H / 2.0 / 270.0	-11.7	-1.7
528.01	42.0 Qp	4.6 / 18.4 / 28.1	37.0	H / 1.8 / 270.0	-10.0	0.0 *
660.01	34.1 Qp	5.3 / 18.6 / 28.1	29.9	H / 1.8 / 270.0	-17.1	-7.1
924.01	30.2 Qp	6.3 / 22.0 / 27.6	31.0	H / 1.8 / 270.0	-16.0	-6.0
500.03	34.1 Qp	4.5 / 17.2 / 28.1	27.7	H / 1.8 / 270.0	-19.3	-9.3
594.01	40.5 Qp	5.0 / 19.0 / 28.2	36.2	H / 1.8 / 180.0	-10.8	-0.8
594.01	41.5 Qp	5.0 / 19.0 / 28.2	37.2	H / 1.9 / 180.0	-9.8	0.2 *
396.01	48.0 Qp	3.9 / 15.5 / 28.0	39.4	H / 1.9 / 90.0	-7.6	2.4 *
400.01	35.6 Qp	3.9 / 15.6 / 28.0	27.1	H / 1.9 / 90.0	-19.9	-9.9
462.01	36.0 Qp	4.3 / 16.8 / 28.0	29.0	H / 1.9 / 90.0	-18.0	-8.0
475.03	39.1 Qp	4.3 / 17.2 / 28.1	32.6	H / 1.9 / 90.0	-14.4	-4.4
500.03	36.8 Qp	4.5 / 17.2 / 28.1	30.3	H / 1.9 / 90.0	-16.7	-6.7

Tested by: J. C. Sausen  
Printed

*J C Sausen*  
Signature

Reviewed by: T. K. Swanson  
Printed

*Thomas K. Swanson*  
Signature

# Radiated Electromagnetic Emissions



Test Report #:	<b>3834 Run 01</b>	Test Area:	STS 10 M
Test Method:	EN55022	Test Date:	22-Jul-2002
EUT Model #:	55001037-01. Digi one SP Coldfire.	EUT Power:	9 to 30 VDC from 110 VAC / 60 Hz wall transformer.
EUT Serial #:	1, rev 2	Temperature:	22 °C
Manufacturer:	Digi International	Relative Humidity:	60 %
EUT Description:	10 / 100 Wthernet to single serial port terminal adapter.	Air Pressure:	99.9 kPa
Notes:		Page:	4 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
528.01	44.7 Qp	4.6 / 18.4 / 28.1	39.7	H / 1.9 / 90.0	-7.3	2.7 *
660.01	40.8 Qp	5.3 / 18.6 / 28.1	36.5	H / 1.9 / 90.0	-10.5	-0.5
528 MHz maxed:						
528.01	46.8 Qp	4.6 / 18.4 / 28.1	41.7	H / 2.0 / 110.0	-5.3	4.7 *
400.01	36.4 Qp	3.9 / 15.6 / 28.0	27.8	H / 2.0 / 110.0	-19.2	-9.2
450.01	36.4 Qp	4.2 / 15.8 / 28.0	28.4	H / 2.0 / 110.0	-18.6	-8.6
10 baseT mode:						
66.02	50.6 Qp	1.5 / 9.4 / 27.7	33.8	V / 1.0 / 0.0	-6.2	3.8 *
75.00	30.1 Qp	1.6 / 7.5 / 27.7	11.5	V / 1.0 / 0.0	-28.5	-18.5
100.00	41.2 Qp	1.9 / 8.4 / 27.8	23.7	V / 1.0 / 0.0	-16.3	-6.3
110.80	27.2 Qp	2.0 / 8.6 / 27.8	10.0	V / 1.0 / 0.0	-30.0	-20.0
111.62	26.9 Qp	2.0 / 8.6 / 27.8	9.6	V / 1.0 / 0.0	-30.4	-20.4
112.26	26.9 Qp	2.0 / 8.6 / 27.8	9.7	V / 1.0 / 0.0	-30.3	-20.3
132.01	36.9 Qp	2.1 / 7.5 / 27.8	18.8	V / 1.0 / 0.0	-21.2	-11.2
162.50	36.4 Qp	2.5 / 8.2 / 27.7	19.3	V / 1.0 / 0.0	-20.7	-10.7
198.01	48.3 Qp	2.7 / 10.0 / 27.9	33.1	V / 1.0 / 0.0	-6.9	3.1 *
200.00	30.8 Qp	2.7 / 10.0 / 27.9	15.6	V / 1.0 / 0.0	-24.4	-14.4
231.01	31.4 Qp	2.9 / 10.3 / 27.9	16.7	V / 1.0 / 0.0	-30.3	-20.3
250.00	38.4 Qp	3.0 / 11.2 / 27.9	24.8	V / 1.0 / 0.0	-22.2	-12.2
264.01	37.3 Qp	3.1 / 11.6 / 27.9	24.2	V / 1.0 / 0.0	-22.8	-12.8
330.01	36.6 Qp	3.5 / 13.1 / 28.1	25.3	V / 1.0 / 0.0	-21.7	-11.7
396.01	41.8 Qp	3.9 / 15.5 / 28.0	33.2	V / 1.0 / 0.0	-13.8	-3.8
450.01	26.2 Qp	4.2 / 15.8 / 28.0	18.2	V / 1.0 / 0.0	-28.8	-18.8
500.03	28.9 Qp	4.5 / 17.2 / 28.1	22.5	V / 1.0 / 0.0	-24.5	-14.5
594.01	31.4 Qp	5.0 / 19.0 / 28.2	27.1	V / 1.0 / 0.0	-19.9	-9.9

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Reviewed by: T. K. Swanson  
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Signature



# Radiated Electromagnetic Emissions



Test Report #: **3834 Run 01** Test Area: STS 10 M  
 Test Method: EN55022 Test Date: 22-Jul-2002  
 EUT Model #: 55001037-01. Digi one SP Coldfire. EUT Power: 9 to 30 VDC from 110 VAC / 60 Hz wall transformer.  
 EUT Serial #: 1, rev 2 Temperature: 22 °C  
 Manufacturer: Digi International Relative Humidity: 60 %  
 EUT Description: 10 / 100 Wthernet to single serial port terminal adapter. Air Pressure: 99.9 kPa  
 Notes: \_\_\_\_\_ Page: 5 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
100.00	42.1 Qp	1.9 / 8.4 / 27.8	24.6	V / 1.0 / 90.0	-15.4	-5.4
132.01	44.2 Qp	2.1 / 7.5 / 27.8	26.2	V / 1.0 / 90.0	-13.8	-3.8
162.50	36.8 Qp	2.5 / 8.2 / 27.7	19.8	V / 1.0 / 90.0	-20.2	-10.2
250.00	35.3 Qp	3.0 / 11.2 / 27.9	21.7	V / 1.0 / 90.0	-25.3	-15.3
264.01	36.5 Qp	3.1 / 11.6 / 27.9	23.4	V / 1.0 / 90.0	-23.6	-13.6
330.01	40.8 Qp	3.5 / 13.1 / 28.1	29.4	V / 1.0 / 90.0	-17.6	-7.6
396.01	45.4 Qp	3.9 / 15.5 / 28.0	36.8	V / 1.0 / 90.0	-10.2	-0.2
924.01	28.9 Qp	6.3 / 22.0 / 27.6	29.7	V / 1.0 / 90.0	-17.3	-7.3
100.00	41.6 Qp	1.9 / 8.4 / 27.8	24.1	V / 1.0 / 180.0	-15.9	-5.9
264.01	39.6 Qp	3.1 / 11.6 / 27.9	26.4	V / 1.0 / 180.0	-20.6	-10.6
66 MHz maxed:						
66.02	52.8 Qp	1.5 / 9.4 / 27.7	36.0	V / 1.0 / 270.0	-4.0	6.0 *
100.00	42.1 Qp	1.9 / 8.4 / 27.8	24.6	V / 1.0 / 270.0	-15.4	-5.4
132.01	45.2 Qp	2.1 / 7.5 / 27.8	27.1	V / 1.0 / 270.0	-12.9	-2.9
330.01	40.8 Qp	3.5 / 13.1 / 28.1	29.4	V / 1.0 / 270.0	-17.6	-7.6
330.01	40.6 Qp	3.5 / 13.1 / 28.1	29.2	H / 2.0 / 90.0	-17.8	-7.8
396.01	48.6 Qp	3.9 / 15.5 / 28.0	40.0	H / 2.0 / 90.0	-7.0	3.0 *
462.01	36.9 Qp	4.3 / 16.8 / 28.0	29.9	H / 2.0 / 90.0	-17.1	-7.1
660.01	40.5 Qp	5.3 / 18.6 / 28.1	36.2	H / 2.0 / 90.0	-10.8	-0.8
No further significant EUT emissions detected 30 MHz to 1000 MHz, vert and hor ant.						

Tested by: J. C. Sausen  
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Reviewed by: T. K. Swanson  
 Printed

  
 Signature

# Radiated Electromagnetic Emissions



Test Report #:	<b>3834 Run 01</b>	Test Area:	STS 10 M
Test Method:	EN55022	Test Date:	22-Jul-2002
EUT Model #:	55001037-01. Digi one SP Coldfire.	EUT Power:	9 to 30 VDC from 110 VAC / 60 Hz wall transformer.
EUT Serial #:	1, rev 2	Temperature:	22 °C
Manufacturer:	Digi International	Relative Humidity:	60 %
EUT Description:	10 / 100 Wthernet to single serial port terminal adapter.	Air Pressure:	99.9 kPa
Notes:		Page:	6 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
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***** MEASUREMENT SUMMARY *****						
66.02	53.9 Qp	1.5 / 9.4 / 27.7	37.1	V / 1.4 / 95.0	-2.9	7.1 *
528.01	46.8 Qp	4.6 / 18.4 / 28.1	41.7	H / 2.0 / 110.0	-5.3	4.7 *
198.01	49.1 Qp	2.7 / 10.0 / 27.9	33.9	V / 1.0 / 0.0	-6.1	3.9 *
396.01	48.6 Qp	3.9 / 15.5 / 28.0	40.0	H / 2.0 / 90.0	-7.0	3.0 *
594.01	41.5 Qp	5.0 / 19.0 / 28.2	37.2	H / 1.9 / 180.0	-9.8	0.2 *
660.01	40.8 Qp	5.3 / 18.6 / 28.1	36.5	H / 1.9 / 90.0	-10.5	-0.5
132.01	45.2 Qp	2.1 / 7.5 / 27.8	27.1	V / 1.0 / 270.0	-12.9	-2.9
475.03	39.1 Qp	4.3 / 17.2 / 28.1	32.6	H / 1.9 / 90.0	-14.4	-4.4
100.00	42.1 Qp	1.9 / 8.4 / 27.8	24.6	V / 1.0 / 270.0	-15.4	-5.4
924.01	30.2 Qp	6.3 / 22.0 / 27.6	31.0	H / 1.8 / 270.0	-16.0	-6.0
500.03	36.8 Qp	4.5 / 17.2 / 28.1	30.3	H / 1.9 / 90.0	-16.7	-6.7
330.01	41.5 Qp	3.5 / 13.1 / 28.1	30.1	V / 1.0 / 90.0	-16.9	-6.9
462.01	36.9 Qp	4.3 / 16.8 / 28.0	29.9	H / 2.0 / 90.0	-17.1	-7.1
200.00	37.9 Qp	2.7 / 10.0 / 27.9	22.7	V / 1.0 / 0.0	-17.3	-7.3
111.62	39.5 Qp	2.0 / 8.6 / 27.8	22.2	V / 1.2 / 0.0	-17.8	-7.8
75.00	40.4 Qp	1.6 / 7.5 / 27.7	21.8	V / 1.2 / 0.0	-18.2	-8.2
250.00	42.1 Qp	3.0 / 11.2 / 27.9	28.5	V / 1.0 / 0.0	-18.5	-8.5
112.84	38.7 Qp	2.0 / 8.5 / 27.8	21.4	V / 1.2 / 0.0	-18.6	-8.6
375.01	37.8 Qp	3.8 / 14.9 / 28.0	28.4	V / 1.4 / 95.0	-18.6	-8.6
450.01	36.4 Qp	4.2 / 15.8 / 28.0	28.4	H / 2.0 / 110.0	-18.6	-8.6
425.01	35.9 Qp	4.1 / 16.2 / 28.0	28.2	V / 1.0 / 90.0	-18.8	-8.8
113.09	38.1 Qp	2.0 / 8.5 / 27.8	20.9	V / 1.2 / 0.0	-19.1	-9.1
400.01	36.4 Qp	3.9 / 15.6 / 28.0	27.8	H / 2.0 / 110.0	-19.2	-9.2
162.50	37.3 Qp	2.5 / 8.2 / 27.7	20.3	V / 1.0 / 90.0	-19.7	-9.7
112.26	37.4 Qp	2.0 / 8.6 / 27.8	20.2	V / 1.2 / 0.0	-19.8	-9.8
110.80	37.1 Qp	2.0 / 8.6 / 27.8	19.9	V / 1.2 / 0.0	-20.1	-10.1

Tested by:           J. C. Sausen            
Printed

Signature

Reviewed by:           T. K. Swanson            
Printed

Signature

# Radiated Electromagnetic Emissions



Test Report #:	<b>3834 Run 01</b>	Test Area:	STS 10 M
Test Method:	EN55022	Test Date:	22-Jul-2002
EUT Model #:	55001037-01. Digi one SP Coldfire.	EUT Power:	9 to 30 VDC from 110 VAC / 60 Hz wall transformer.
EUT Serial #:	1, rev 2	Temperature:	22 °C
Manufacturer:	Digi International	Relative Humidity:	60 %
EUT Description:	10 / 100 Wthernet to single serial port terminal adapter.	Air Pressure:	99.9 kPa
Notes:		Page:	7 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m) (DEG)	DELTA1 EN55022 A	DELTA2 EN55022 B
264.01	39.6 Qp	3.1 / 11.6 / 27.9	26.4	V / 1.0 / 180.0	-20.6	-10.6
125.00	35.8 Qp	2.1 / 7.7 / 27.8	17.8	V / 1.2 / 0.0	-22.2	-12.2
150.00	33.3 Qp	2.3 / 8.6 / 27.7	16.5	V / 1.0 / 0.0	-23.5	-13.5
187.50	31.8 Qp	2.6 / 9.5 / 27.8	16.1	V / 1.0 / 0.0	-23.9	-13.9
325.01	33.8 Qp	3.5 / 13.2 / 28.1	22.4	V / 1.0 / 0.0	-24.6	-14.6
350.01	31.1 Qp	3.7 / 14.5 / 28.0	21.3	V / 1.0 / 0.0	-25.7	-15.7
297.01	29.9 Qp	3.3 / 11.9 / 28.1	17.0	V / 1.0 / 0.0	-30.0	-20.0
231.01	31.4 Qp	2.9 / 10.3 / 27.9	16.7	V / 1.0 / 0.0	-30.3	-20.3

Tested by:           J. C. Sausen            
Printed

*J C Sausen*  

Signature

Reviewed by:           T. K. Swanson            
Printed

*Thomas K. Swanson*  

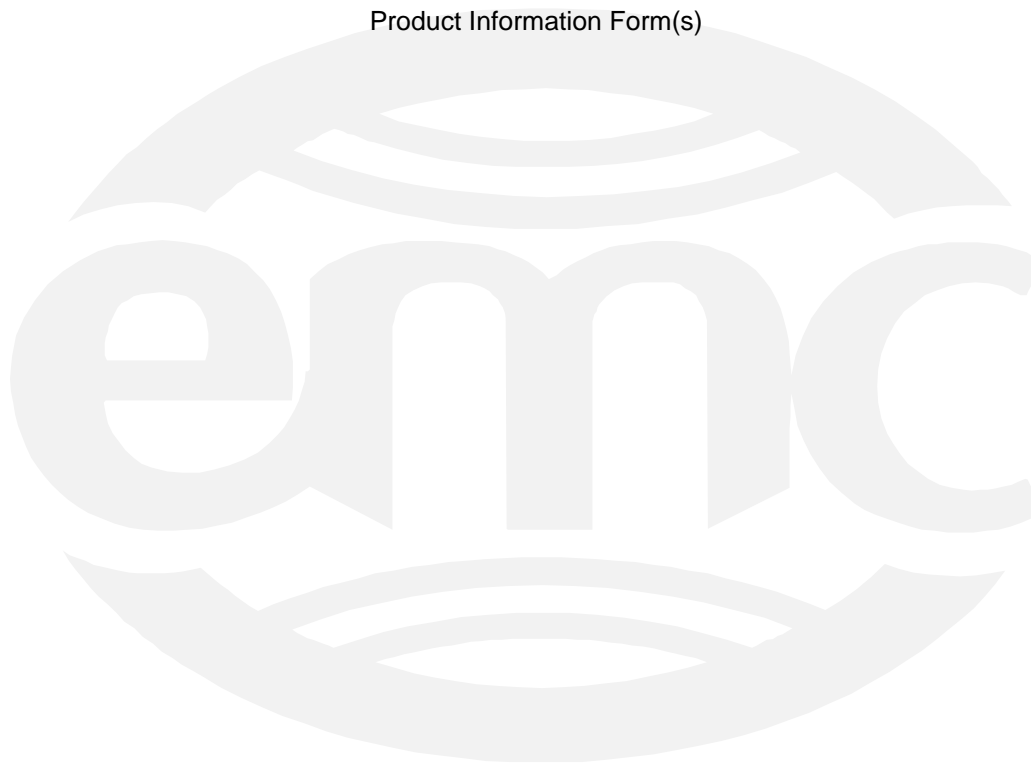
Signature

## Appendix B

Constructional Data Form(s)

and/or

Product Information Form(s)





# EMC TEST - PRODUCT INFORMATION FORM

**Company Address:** 11001 Bren Road East  
Minnetonka, MN 55343  
Ph: (952) 912-3444 Fax: (952) 912-4955

**Digi Engineering Contact:** Bill Kumpf **Phone:** 952-912-3183

**Digi Homologation Contact:** Nick Melnic **Phone:** 952-912-3444

**Equipment Under Test:** Digi one SP Coldfire

**Model Number:** 50000792-01 **Rev:** 02

**(do not use 30m p/n)**

**Serial Number:** 1

**Test Laboratory:** TUV TF **Test Date:** 07/22/02

<b>Type of Test:</b>	<input type="checkbox"/> Development	<input checked="" type="checkbox"/> EN55022:1998/FCC Class B Emissions
	<input type="checkbox"/> Initial Design Verification	<input type="checkbox"/> EN55022:1998/FCC Class A Emissions
	<input checked="" type="checkbox"/> Design Change	<input type="checkbox"/> Korea No. 1996-18 (based on CISPR 22)
	<input type="checkbox"/> Production Sample (Audit Test)	<input type="checkbox"/> Taiwan CNS 13438:1997
	<input type="checkbox"/> Other	<input type="checkbox"/> EN55024:1998 IT & Telecom Immunity
		<input type="checkbox"/> EN61000-3-2,3 Supply Harmonics/Flicker
	<b>EMC – Wireless (Intentional)</b>	<b>EMC – Wireless (Unintentional)</b>
	<input type="checkbox"/> ETS 300 328 (Europe)	<input type="checkbox"/> ETS 300 826 (Europe)
	<input type="checkbox"/> FCC Part 15.247, 15.249 / RSS 139, 210	<input type="checkbox"/> FCC Part 15, Class B / ICES 003, Class B
	<input type="checkbox"/> ARIB T66 (RCR STD-33) - Japan	<input type="checkbox"/> VCCI, Class B - Japan

**Documentation Requested:**  EN55022:1998 Test Report (FCC Style)  Austel EMC Report  
 International EMC Report  FCC Test Report  
 VCCI Test Report  EN55024:1998 Test Report  
 Taiwan CNS 13438:1997 Test Report  Korea No. 1996-18 Test Report  
 EN61000-3-2, 3:1995  Test Results Summary

**Equipment Description:** 10/100 Ethernet to single serial port terminal adapter

**Design Changes Made (if applicable):** Initial certification

**Oscillator Frequencies:** 25MHz, 66MHz

Power Interface	AC Power Cable		DC Power Cable	
	<input type="checkbox"/> Hardwired <input type="checkbox"/> Shielded <input type="checkbox"/> Attached Frequency: <u>60</u> Hz Voltage: <u>120</u> V Current: <u>.1</u> A # of Phases: _____	<input type="checkbox"/> Flexible <input type="checkbox"/> Unshielded <input type="checkbox"/> Removable Gauge _____ AWG Length _____ Ft.	<input type="checkbox"/> Hardwired <input type="checkbox"/> Shielded <input type="checkbox"/> Attached <input type="checkbox"/> Flexible <input type="checkbox"/> Unshielded <input checked="" type="checkbox"/> Removable Gauge <u>20</u> AWG Length <u>6</u> Ft.	

**Power Line Filter: Manufacturer: Model Number:**  
 \_\_\_\_\_

**Power Supply:**

Description: 120VAC to 12DC transformer/rectifier  
 \_\_\_\_\_

Manufacturer: POTRAN  
 \_\_\_\_\_

Model Number: WD411200500

Switching Frequency: N/A

**If a Ferrite Bead is used on the AC line cord, give location on cable:**

N/A

**If a Ferrite Bead is used on the DC line cord, give location on cable:**

N/A

**Housing or Cabinet Type:** Plastic  Metallized  Metal  Other   
 Host Board Only, Housed in PC

**Cabinet Shielding Provision :** N/A

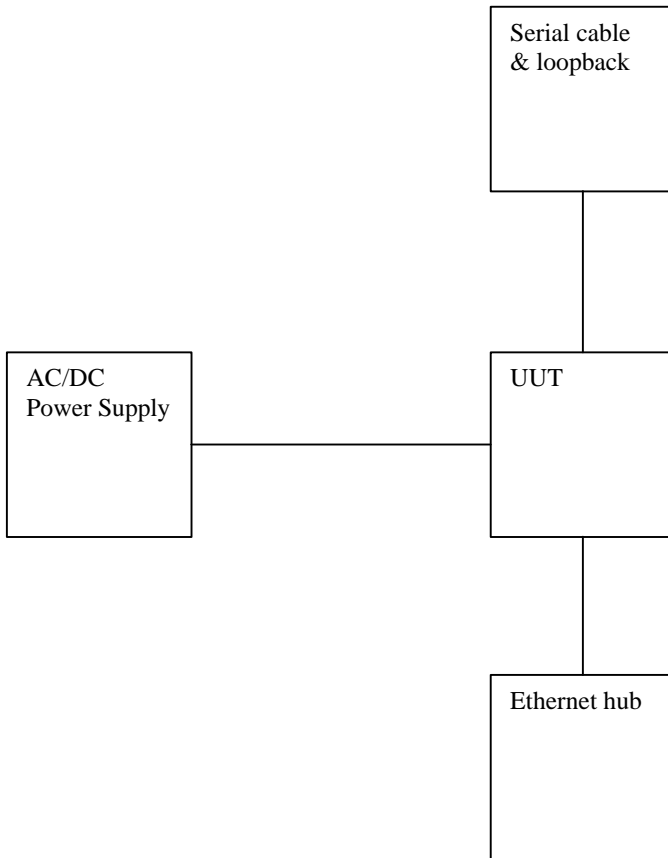
**Interfacing Equipment or Simulators**

Description	Model Number	Serial Number	FCC ID#
Ethernet hub	Digi ts8		

**I/O Cables**

Function	Length	Quantity	Location	Type	Shield Termination
Ethernet	30'	1		cat 5	
Serial	6'	1		shielded, 9 conductor	connector shell

**Block Diagram:**



**Software and/or Operating Modes:**

ROM loaded Fcc program -- outputs "H" on serial port and Ethernet packets

**Further Notes:**

## Appendix C

# MEASUREMENT PROTOCOL

## GENERAL INFORMATION

### Test Methodology

Radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the CISPR 22 Limits.

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

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

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

## 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), adding the antenna correction factor and cable loss factor (Factor dB) to it, then subtracting the preamp gain. This result then has the CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dB $\mu$ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dB $\mu$ V/m)	POL/HGT/AZ (m) (deg)	DELTA1 EN 55022 A
60.80	42.5Qp	+ 1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9



## 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 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 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  $\Omega$ /50  $\mu$ H (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, 10 or 30 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.