

TEST RESULT SUMMARY

FCC PART 2.1053

MANUFACTURER'S NAME	ADC, Inc.
NAME OF EQUIPMENT	Digivance Long Range Coverage Solution (SMR Dual TX/RX System) – Transports RF Between a Remote Antenna and a Customer Provided Base Station
MODEL NUMBER	DGVL-202120SYS
MANUFACTURER'S ADDRESS	P. O. Box 1101 Minneapolis MN 55440-1101
TEST REPORT NUMBER	NC201557
TEST DATE	26 March 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 2.1053.

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 2.1053.

Date: 16 May 2002




Location: Taylors Falls MN
USA

R. M. Johnson
Test Technician

T. K. Swanson
EMC Technical Writer

Not Transferable

EMC EMISSION - TEST REPORT

Test Report File No. : **NC201557** Date of issue: 16 May 2002Model / Serial No. : **DGVL-202120SYS /**Product Type : Digivance Long Range Coverage Solution (SMR Dual TX/RX System) – Transports RF Between a Remote Antenna and a Customer Provided Base StationApplicant : ADC, Inc.Manufacturer : ADC, Inc.License holder : ADC, Inc.Address : P. O. Box 1101: Minneapolis MN 55440-1101Test Result : **Positive** **Negative**Test Project Number Reference(s) : **NC201557**Total pages including Appendices : **30**

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"/> - 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 type="checkbox"/> - EN 55022 / 1994 | <input type="checkbox"/> - Class A | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - BS | | |
| <input type="checkbox"/> - VCCI | <input type="checkbox"/> - Class A | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - FCC Part 15 Subpart B | <input type="checkbox"/> - Class A | <input type="checkbox"/> - Class B |
| <input checked="" type="checkbox"/> - FCC Part 2.1053 | | |
| <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:	: 21 °C
Relative Humidity	: 7 %
Atmospheric pressure	: 98.6 kPa
Power supply system	: 115 VAC / 60 Hz / 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

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* 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)

at a test distance of :

- 3 meters
- 30 meters

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) – NSA measurements made 7-01, due 7-02
- 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 :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
<input checked="" type="checkbox"/> - 3202	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	9-24-02
<input checked="" type="checkbox"/> - 3926	11867A	Hewlett-Packard	Limiter	02442	3-18-03
<input checked="" type="checkbox"/> - 2665	ZHL-1042J	Mini-Circuits	Preamplifier	32296	9-12-02
<input checked="" type="checkbox"/> - 2690	8566B	Hewlett-Packard	Spectrum Analyzer (Unit F)	2430A00930	11-19-02
<input checked="" type="checkbox"/> - 2678	85662A	Hewlett-Packard	Analyzer Display (Unit F)	2403A08134	11-19-02
<input checked="" type="checkbox"/> - 2684	85650A	Hewlett-Packard	Quasi-Peak Adapter (Unit F)	2521A01006	11-19-02
<input checked="" type="checkbox"/> -	UHAP-10dB	Schwarzbeck	Dipole Antenna 300-1000	164	N/A
<input checked="" type="checkbox"/> - 3010	6769B	Wiltron	Signal Generator		5-10-02

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

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz – 8.6 GHz were performed 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)
- Wild River Lab Screen Room

at a test distance of:

- 1 meters
- 3 meters
- 10 meters

Test equipment used :

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	3202	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	9-24-02
■ -	3926	11867A	Hewlett-Packard	Limiter	02442	3-18-03
■ -	2665	ZHL-1042J	Mini-Circuits	Preamplifier	32296	9-12-02
■ -	2690	8566B	Hewlett-Packard	Spectrum Analyzer (Unit F)	2430A00930	11-19-02
■ -	2678	85662A	Hewlett-Packard	Analyzer Display (Unit F)	2403A08134	11-19-02
■ -	2684	85650A	Hewlett-Packard	Quasi-Peak Adapter (Unit F)	2521A01006	11-19-02
■ -	2478	AWT-18037	Avantek	Preamplifier 8-18 GHz	1001-9226	3-18-03
■ -	2477	AFT-8434	Avantek	Preamplifier 4-8 GHz	2613A92801	3-18-03
■ -	2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	10-20-02

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

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
- Max composite in and out.

Configuration of the device under test:

- See Constructional Data Form in Appendix B - Pages 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 – FCC Part 15 Subpart B

The requirements are - MET - NOT MET

Minimum margin of compliance _____ dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

Radiated emissions (electric field) 30 MHz - 1000 MHz – FCC Part 15 Subpart B

The requirements are - MET - NOT MET

Minimum margin of compliance _____ dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

Equivalent Radiated emissions 1 GHz - 27 GHz – FCC Part 15 Subpart B

The requirements are - MET - NOT MET

Minimum margin of compliance _____ dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: No emissions detected.

Radiated emissions (electric field) 30 MHz - 1000 MHz – FCC Part 2.1053

The requirements are - MET - NOT MET

Minimum margin of compliance _____ 9 dB at _____ 425.98 MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: 77 dBuV/m at 425.98 MHz was measured to be -22 dBm with substitution method, compared to -13 dBm requirement. All other levels were lower.

Radiated emissions (electric field) 1 GHz – 8.6 GHz – FCC Part 2.1053

The requirements are - MET - NOT MET

Minimum margin of compliance _____ >10 dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: _____

DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

Testing was performed under 2 project numbers – NC201192 and NC201557.

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.

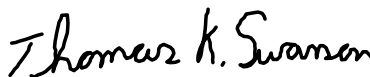
Testing Start Date: 26 March 2002

Testing End Date: 26 March 2002

- TÜV PRODUCT SERVICE INC -



Tested By:
R. M. Johnson



T. K. Swanson
EMC Technical Writer

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

Not Applicable



Test-setup photo(s):
Radiated emission 30 MHz - 8600 MHz

See Test Setup Exhibit



Appendix A

Test Data Sheets
and
Test Setup Drawing(s)



TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

See Test Setup Exhibit



Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 1 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
31.99	53.5 Qp	0.6 / 20.4 / 28.0	46.5	V / 1.0 / 0.0	N/A	N/A
38.93	52.1 Qp	0.7 / 17.5 / 27.8	42.5	V / 1.0 / 0.0	N/A	N/A
45.52	58.2 Qp	0.8 / 15.5 / 27.8	46.7	V / 1.0 / 0.0	N/A	N/A
57.18	56.6 Qp	0.8 / 12.7 / 27.9	42.2	V / 1.0 / 0.0	N/A	N/A
67.78	56.2 Qp	0.9 / 9.9 / 27.8	39.3	V / 1.0 / 0.0	N/A	N/A
71.00	55.4 Qp	0.9 / 9.2 / 27.8	37.7	V / 1.0 / 0.0	N/A	N/A
79.45	61.6 Qp	1.0 / 7.6 / 27.9	42.3	V / 1.0 / 0.0	N/A	N/A
97.56	57.1 Qp	1.1 / 8.9 / 27.9	39.2	V / 1.0 / 0.0	N/A	N/A
153.25	62.1 Qp	1.4 / 9.5 / 27.9	45.1	V / 1.0 / 0.0	N/A	N/A
191.52	55.6 Qp	1.6 / 10.7 / 27.9	40.0	V / 1.0 / 0.0	N/A	N/A
283.98	53.5 Qp	1.9 / 12.5 / 27.8	40.1	V / 1.0 / 0.0	N/A	N/A
354.98	42.4 Qp	2.1 / 15.2 / 27.6	32.1	V / 1.0 / 0.0	N/A	N/A
379.68	42.5 Qp	2.2 / 15.7 / 27.7	32.7	V / 1.0 / 0.0	N/A	N/A
425.98	72.9 Qp	2.4 / 16.9 / 27.7	64.5	V / 1.0 / 0.0	N/A	N/A
496.97	53.8 Qp	2.6 / 17.3 / 27.6	46.2	V / 1.0 / 0.0	N/A	N/A
567.97	42.9 Qp	2.8 / 18.6 / 27.5	36.8	V / 1.0 / 0.0	N/A	N/A
638.98	50.2 Qp	3.0 / 19.7 / 27.6	45.4	V / 1.0 / 0.0	N/A	N/A
709.98	51.9 Qp	3.2 / 20.4 / 27.4	48.0	V / 1.0 / 0.0	N/A	N/A
780.98	35.1 Qp	3.3 / 21.8 / 27.4	32.7	V / 1.0 / 0.0	N/A	N/A
830.38	36.8 Qp	3.5 / 21.8 / 27.3	34.7	V / 1.0 / 0.0	N/A	N/A
922.97	42.5 Qp	3.7 / 23.1 / 27.2	42.1	V / 1.0 / 0.0	N/A	N/A
993.97	52.6 Qp	4.0 / 23.6 / 27.2	52.9	V / 1.0 / 0.0	N/A	N/A
1064.97	44.2 Av	4.0 / 23.1 / 27.2	44.1	V / 1.0 / 0.0	N/A	N/A
1135.98	35.9 Av	4.3 / 23.9 / 27.2	36.9	V / 1.0 / 0.0	N/A	N/A
1206.97	40.2 Av	4.5 / 24.4 / 27.2	41.9	V / 1.0 / 0.0	N/A	N/A
1277.97	38.5 Av	4.5 / 25.1 / 27.5	40.5	V / 1.0 / 0.0	N/A	N/A

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 2 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
1490.97	36.5 Av	5.1 / 27.1 / 27.3	41.4	V / 1.0 / 0.0	N/A	N/A
1561.97	37.5 Av	5.2 / 27.2 / 27.4	42.4	V / 1.0 / 0.0	N/A	N/A
1955.80	32.6 Av	6.7 / 28.7 / 26.8	41.3	V / 1.0 / 0.0	N/A	N/A
57.79	55.0 Qp	0.8 / 12.5 / 27.9	40.5	V / 1.0 / 0.0	N/A	N/A
152.92	63.1 Qp	1.4 / 9.5 / 27.9	46.1	V / 1.0 / 0.0	N/A	N/A
141.98	76.0 Qp	1.3 / 9.3 / 27.9	58.7	V / 1.0 / 0.0	N/A	N/A
191.73	58.8 Qp	1.6 / 10.7 / 27.9	43.3	V / 1.0 / 0.0	N/A	N/A
57.18	59.2 Qp	0.8 / 12.7 / 27.9	44.8	V / 1.0 / 90.0	N/A	N/A
57.79	56.5 Qp	0.8 / 12.5 / 27.9	41.9	V / 1.0 / 90.0	N/A	N/A
67.78	57.1 Qp	0.9 / 10.0 / 27.8	40.2	V / 1.0 / 90.0	N/A	N/A
97.56	58.4 Qp	1.1 / 8.9 / 27.9	40.5	V / 1.0 / 90.0	N/A	N/A
283.98	56.7 Qp	1.9 / 12.5 / 27.8	43.3	V / 1.0 / 90.0	N/A	N/A
425.98	74.2 Qp	2.4 / 16.9 / 27.7	65.8	V / 1.0 / 90.0	N/A	N/A
496.97	55.3 Qp	2.6 / 17.3 / 27.6	47.7	V / 1.0 / 90.0	N/A	N/A
638.98	51.6 Qp	3.0 / 19.7 / 27.6	46.8	V / 1.0 / 90.0	N/A	N/A
709.98	54.1 Qp	3.2 / 20.4 / 27.4	50.3	V / 1.0 / 90.0	N/A	N/A
830.38	39.6 Qp	3.5 / 21.8 / 27.3	37.5	V / 1.0 / 90.0	N/A	N/A
79.45	63.0 Qp	1.0 / 7.6 / 27.9	43.7	V / 1.0 / 180.0	N/A	N/A
354.98	45.5 Qp	2.1 / 15.2 / 27.6	35.2	V / 1.0 / 180.0	N/A	N/A
379.68	45.3 Qp	2.2 / 15.7 / 27.7	35.5	V / 1.0 / 180.0	N/A	N/A
709.98	54.8 Qp	3.2 / 20.4 / 27.4	50.9	V / 1.0 / 180.0	N/A	N/A
780.98	38.4 Qp	3.3 / 21.8 / 27.4	36.1	V / 1.0 / 180.0	N/A	N/A
830.38	48.1 Qp	3.5 / 21.8 / 27.3	46.1	V / 1.0 / 180.0	N/A	N/A
922.97	46.1 Qp	3.7 / 23.1 / 27.2	45.7	V / 1.0 / 180.0	N/A	N/A

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 3 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
1277.97	42.3 Av	4.5 / 25.1 / 27.5	44.4	V / 1.0 / 180.0	N/A	N/A
1955.80	34.5 Av	6.7 / 28.7 / 26.8	43.1	V / 1.0 / 180.0	N/A	N/A
38.93	53.5 Qp	0.7 / 17.5 / 27.8	43.9	V / 1.0 / 270.0	N/A	N/A
71.00	56.1 Qp	0.9 / 9.2 / 27.8	38.4	V / 1.0 / 270.0	N/A	N/A
97.56	60.1 Qp	1.1 / 8.9 / 27.9	42.2	V / 1.0 / 270.0	N/A	N/A
354.98	48.2 Qp	2.1 / 15.2 / 27.6	38.0	V / 1.0 / 270.0	N/A	N/A
567.97	47.1 Qp	2.8 / 18.6 / 27.5	41.1	V / 1.0 / 270.0	N/A	N/A
MAXIMIZED.						
425.98	79.2 Qp	2.4 / 16.9 / 27.7	70.7	V / 1.0 / 121.0	N/A	N/A
MAXED ANTENNA AND ROTATED EUT 360 DEGREES.						
79.45	68.2 Qp	1.0 / 7.6 / 27.9	48.9	H / 3.0 / 0.0	N/A	N/A
283.98	59.3 Qp	1.9 / 12.5 / 27.8	45.9	H / 1.0 / 0.0	N/A	N/A
425.98	68.0 Qp	2.4 / 16.9 / 27.7	59.6	H / 1.0 / 0.0	N/A	N/A
1064.97	49.4 Av	4.0 / 23.1 / 27.2	49.3	H / 1.0 / 0.0	N/A	N/A
1490.97	39.3 Av	5.1 / 27.1 / 27.3	44.2	H / 1.0 / 0.0	N/A	N/A
141.98	76.4 Qp	1.3 / 9.3 / 27.9	59.0	H / 1.0 / 90.0	N/A	N/A
191.73	59.5 Qp	1.6 / 10.7 / 27.9	43.9	H / 1.0 / 90.0	N/A	N/A
283.98	60.5 Qp	1.9 / 12.5 / 27.8	47.1	H / 1.0 / 90.0	N/A	N/A
425.98	85.7 Qp	2.4 / 16.9 / 27.7	77.3	H / 1.0 / 90.0	N/A	N/A

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 4 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
567.97	50.3 Qp	2.8 / 18.6 / 27.5	44.3	H / 1.0 / 90.0	N/A	N/A
709.98	62.0 Qp	3.2 / 20.4 / 27.4	58.1	H / 1.0 / 90.0	N/A	N/A
780.98	47.3 Qp	3.3 / 21.8 / 27.4	45.0	H / 1.0 / 90.0	N/A	N/A
830.41	42.7 Qp	3.5 / 21.8 / 27.3	40.7	H / 1.0 / 90.0	N/A	N/A
922.97	49.2 Qp	3.7 / 23.1 / 27.2	48.8	H / 1.0 / 90.0	N/A	N/A
141.98	77.1 Qp	1.3 / 9.3 / 27.9	59.8	H / 3.0 / 90.0	N/A	N/A
1206.97	43.6 Av	4.5 / 24.4 / 27.2	45.4	H / 3.0 / 90.0	N/A	N/A
1277.97	43.8 Av	4.5 / 25.1 / 27.5	45.9	H / 1.0 / 180.0	N/A	N/A
141.98	77.7 Qp	1.3 / 9.3 / 27.9	60.3	H / 1.0 / 270.0	N/A	N/A
283.98	64.6 Qp	1.9 / 12.5 / 27.8	51.2	H / 1.0 / 270.0	N/A	N/A
638.98	55.6 Qp	3.0 / 19.7 / 27.6	50.8	H / 1.0 / 270.0	N/A	N/A
141.98	78.5 Qp	1.3 / 9.3 / 27.9	61.2	H / 3.0 / 270.0	N/A	N/A
MAXIMIZED.						
141.98	81.0 Qp	1.3 / 9.3 / 27.9	63.7	H / 1.4 / 239.0	N/A	N/A
283.98	66.2 Qp	1.9 / 12.5 / 27.8	52.8	H / 1.0 / 250.0	N/A	N/A
2413.97	32.9 Av	7.1 / 30.5 / 26.8	43.7	V / 1.0 / 0.0	N/A	N/A
2697.96	32.1 Av	7.4 / 31.1 / 27.0	43.7	V / 1.0 / 0.0	N/A	N/A
2573.98	31.8 Av	7.2 / 30.8 / 27.0	42.9	V / 1.0 / 0.0	N/A	N/A
3431.99	31.5 Av	8.8 / 32.7 / 26.4	46.5	V / 1.0 / 0.0	N/A	N/A

Tested by: RMJ

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Reviewed by: TKS

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Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 5 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
2697.96	33.5 Av	7.4 / 31.1 / 27.0	45.1	V / 1.0 / 180.0	N/A	N/A
END OF SCAN 30MHZ - 8.6GHZ.						
425.95MHZ (HIGHEST SPURIOUS LEVEL)						
SIG GEN LEVEL (-13.5dBm) - CABLE LOSS (1.4dBm) - ANTENNA FACTOR (8dBm) = (-22.9dBm)						

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Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 6 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
---------------	-----------------	--	-----------------	-----------------------------	---------------	---------------

***** MEASUREMENT SUMMARY *****						
31.99	53.5 Qp	0.6 / 20.4 / 28.0	46.5	V / 1.0 / 0.0	N/A	N/A
38.93	53.5 Qp	0.7 / 17.5 / 27.8	43.9	V / 1.0 / 270.0	N/A	N/A
45.52	58.2 Qp	0.8 / 15.5 / 27.8	46.7	V / 1.0 / 0.0	N/A	N/A
57.18	59.2 Qp	0.8 / 12.7 / 27.9	44.8	V / 1.0 / 90.0	N/A	N/A
57.79	56.5 Qp	0.8 / 12.5 / 27.9	41.9	V / 1.0 / 90.0	N/A	N/A
67.78	57.1 Qp	0.9 / 10.0 / 27.8	40.2	V / 1.0 / 90.0	N/A	N/A
71.00	56.1 Qp	0.9 / 9.2 / 27.8	38.4	V / 1.0 / 270.0	N/A	N/A
79.45	68.2 Qp	1.0 / 7.6 / 27.9	48.9	H / 3.0 / 0.0	N/A	N/A
97.56	60.1 Qp	1.1 / 8.9 / 27.9	42.2	V / 1.0 / 270.0	N/A	N/A
141.98	81.0 Qp	1.3 / 9.3 / 27.9	63.7	H / 1.4 / 239.0	N/A	N/A
152.92	63.1 Qp	1.4 / 9.5 / 27.9	46.1	V / 1.0 / 0.0	N/A	N/A
153.25	62.1 Qp	1.4 / 9.5 / 27.9	45.1	V / 1.0 / 0.0	N/A	N/A
191.52	55.6 Qp	1.6 / 10.7 / 27.9	40.0	V / 1.0 / 0.0	N/A	N/A
191.73	59.5 Qp	1.6 / 10.7 / 27.9	43.9	H / 1.0 / 90.0	N/A	N/A
283.98	66.2 Qp	1.9 / 12.5 / 27.8	52.8	H / 1.0 / 250.0	N/A	N/A
354.98	48.2 Qp	2.1 / 15.2 / 27.6	38.0	V / 1.0 / 270.0	N/A	N/A
379.68	45.3 Qp	2.2 / 15.7 / 27.7	35.5	V / 1.0 / 180.0	N/A	N/A
425.98	85.7 Qp	2.4 / 16.9 / 27.7	77.3	H / 1.0 / 90.0	N/A	N/A
496.97	55.3 Qp	2.6 / 17.3 / 27.6	47.7	V / 1.0 / 90.0	N/A	N/A
567.97	50.3 Qp	2.8 / 18.6 / 27.5	44.3	H / 1.0 / 90.0	N/A	N/A
638.98	55.6 Qp	3.0 / 19.7 / 27.6	50.8	H / 1.0 / 270.0	N/A	N/A
709.98	62.0 Qp	3.2 / 20.4 / 27.4	58.1	H / 1.0 / 90.0	N/A	N/A
780.98	47.3 Qp	3.3 / 21.8 / 27.4	45.0	H / 1.0 / 90.0	N/A	N/A
830.38	48.1 Qp	3.5 / 21.8 / 27.3	46.1	V / 1.0 / 180.0	N/A	N/A

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Radiated Electromagnetic Emissions



Test Report #: 201192 Run 03 Test Area: LTS 3m
 Test Method: N/A Test Date: 26-Mar-2002
 EUT Model #: DIGIVANCE LRCS / SMR DUAL TRANSMIT (TX) EUT Power: 30 VDC/110 VAC
 EUT Serial #: _____ Temperature: 21 °C
 Manufacturer: ADC Relative Humidity: 7 %
 EUT Description: HOST/STM Air Pressure: 98.6 kPa
 Notes: _____ Page: 7 of 7

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 N/A	DELTA2 N/A
***** MEASUREMENT SUMMARY *****						
922.97	49.2 Qp	3.7 / 23.1 / 27.2	48.8	H / 1.0 / 90.0	N/A	N/A
993.97	52.6 Qp	4.0 / 23.6 / 27.2	52.9	V / 1.0 / 0.0	N/A	N/A
1064.97	49.4 Av	4.0 / 23.1 / 27.2	49.3	H / 1.0 / 0.0	N/A	N/A
1135.98	35.9 Av	4.3 / 23.9 / 27.2	36.9	V / 1.0 / 0.0	N/A	N/A
1206.97	43.6 Av	4.5 / 24.4 / 27.2	45.4	H / 3.0 / 90.0	N/A	N/A
1277.97	43.8 Av	4.5 / 25.1 / 27.5	45.9	H / 1.0 / 180.0	N/A	N/A
1490.97	39.3 Av	5.1 / 27.1 / 27.3	44.2	H / 1.0 / 0.0	N/A	N/A
1561.97	37.5 Av	5.2 / 27.2 / 27.4	42.4	V / 1.0 / 0.0	N/A	N/A
1955.80	34.5 Av	6.7 / 28.7 / 26.8	43.1	V / 1.0 / 180.0	N/A	N/A
2413.97	32.9 Av	7.1 / 30.5 / 26.8	43.7	V / 1.0 / 0.0	N/A	N/A
2573.98	31.8 Av	7.2 / 30.8 / 27.0	42.9	V / 1.0 / 0.0	N/A	N/A
2697.96	33.5 Av	7.4 / 31.1 / 27.0	45.1	V / 1.0 / 180.0	N/A	N/A
3431.99	31.5 Av	8.8 / 32.7 / 26.4	46.5	V / 1.0 / 0.0	N/A	N/A

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Appendix B

Constructional Data Form



EMC Test Plan and Constructional Data Form



PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- NOTE: This information will be input into your test report as shown below.
 Press the F1 key at any time to get HELP for the current field selected.

Company: ADC Inc.
 Address: P.O. Box 1101
Minneapolis, MN 55440-1101
 Contact: Mark F. Miska Position: Compliance Engineer
 Phone: 952-917-0326 Fax: 952-917-3244
 E-mail Address: mark_miska@adc.com

General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description: Transports RF between a remote antenna and a customer provided base station.
 EUT Name: Digivance Long Range Coverage Solution (SMR Dual TX / RX) System
 Model No.: DGVL-202120SYS Serial No.: _____
 Product Options: Transmit / Receive Diversity
 Configurations to be tested: Full SMR Version with Diversity option

Test Objective

- | | |
|---|---|
| <input type="checkbox"/> EMC Directive 89/336/EEC (EMC)
Std: _____ | <input checked="" type="checkbox"/> FCC: Class <input type="checkbox"/> A <input type="checkbox"/> B Part <u>90</u> |
| <input type="checkbox"/> Machinery Directive 89/392/EEC (EMC)
Std: _____ | <input type="checkbox"/> VCCI: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Medical Device Directive 93/42/EEC (EMC)
Std: _____ | <input type="checkbox"/> BCIQ: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Vehicle Directive 72/245/EEC (EMC)
Std: _____ | <input type="checkbox"/> Canada: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> FDA Reviewers Guidance for Premarket
Notification Submissions (EMC) | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| | <input type="checkbox"/> Other: _____ |

TÜV Product Service Certification Requested

- | | |
|--|---|
| <input type="checkbox"/> Attestation of Conformity (AoC) | <input type="checkbox"/> International EMC Mark (IEM) |
| <input type="checkbox"/> Certificate of Conformity (CoC) | <input type="checkbox"/> Compliance Document |
| Protection Class (N/A for vehicles) | <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III |
- (Press F1 when field is selected to show additional information on Protection Class.)

Attendance

Test will be: Attended by the customer Unattended by the customer

EMC Test Plan and Constructional Data Form
Failure - Complete this section if testing will not be attended by the customer.

If a failure occurs, TUV Product Service should:

- Call contact listed above, if not available then stop testing. (After hrs phone): _____
 Continue testing to complete test series.
 Continue testing to define corrective action.
 Stop testing.

EUT Specifications and Requirements

 Length: 19 Width: 51" Height: 27 Weight: 62 LB
Power Requirements
Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

 Voltage: 115 VAC (If battery powered, make sure battery life is sufficient to complete testing.)

 # of Phases: 1

 Current (Amps/phase(max)): 2.5 Current (Amps/phase(nominal)): 1.5

Other _____

Other Special Requirements

none

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

Host indoor only with STM and LPA indoor or outdoor. System is typically employed as a Microcell.

EUT Power Cable

- Permanent OR Removable Length (in meters): 1
 Shielded OR Unshielded
 Not Applicable

EMC Test Plan and Constructional Data Form



EUT Interface Ports and Cables												
Interface			Shielding									
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE: RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF "N" type	<input checked="" type="checkbox"/>	<input type="checkbox"/>	8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Braid	Coaxial	N	50 Ohms	>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Specified	N/A	6 Pin Standoff		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Alarm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Specified	N/A	4 Pin Standoff		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Fiber	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	N/A	SC	N/A	>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9 Pin Din	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not Specified	AC Coupled	Din		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Net in	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Specified	N/A	Cat 5		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Battery connection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A	N/A	Standoff		<1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DC power block	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None		Terminal		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
AC power	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	None				<3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
STM to Amp Interconnect	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Varied	Chassis	Special		.3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Net out	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Not Specified	N/A	Cat 5		>3	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: Version 0.00.00.12

Description: Digivance Element Management System (DEMS). System Management and Interface Matching Software.

EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Max composite in and out

- 2.

- 3.

EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

Description	Model #	Serial #	FCC ID #
Host Unit	DGVL-202010HU		
STM	DGVL-202020STM		
Amp	DGVL-202000LPA		
Combiner/Filter	DGVL-200020CFA		
Digivance LRCS SMR Dual Transmit System Model DGVL-202120SYS consist of the HU, STM, and LPA.			

EMC Test Plan and Constructional Data Form

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)			
<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
Signal Generator	HP E4432B	MC22109	
DC Power Supply	HP 6633A	MC21690	

Oscillator Frequencies			
<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>

Power Supply			
<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
ADC			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____
			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____

Power Line Filters		
<i>Manufacturer</i>	<i>Model #</i>	<i>Location in EUT</i>
None		

EMC Test Plan and Constructional Data Form

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	Manufacturer	Part # or Value	Qty	Component # / Location
None				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

None

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization Signatures

Mark D. Moore
 Customer authorization to perform tests according to this test plan.

5-14-02
 Date

 Test Plan/CDF Prepared By (please print)

 Date

 Reviewed by TÜV Product Service Associate

 Date

Appendix C

MEASUREMENT PROTOCOL FOR FCC

GENERAL INFORMATION

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 ± 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 $\text{dB}\mu\text{V}$, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit. Conducted and radiated emission testing is performed according to the procedures in ANSI C.63.4-1992.

To convert between $\text{dB}\mu\text{V}$ and μV , 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 $\text{dB}\mu\text{V}/\text{m}$, is arrived at by taking the reading from the spectrum analyzer (Level $\text{dB}\mu\text{V}$), 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 ($\text{dB}\mu\text{V}$)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL ($\text{dB}\mu\text{V}/\text{m}$)	POL/HGT/AZ (m) (deg)	DELTA1 FCC
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 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 μ 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 8600 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 10 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. The EUT is then replaced with a tuned dipole antenna (below 1 GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the level measured from the EUT. The signal level minus the cable loss from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level.