

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.207

FCC Part 15 Subpart C Section 15.209

IC RSS-210 Issue 7

IC RSS-Gen Issue 2

MANUFACTURER	Grace 2051 Waukegan Road Deerfield IL 60015
PRODUCT NAME	Reveleris Flash Instrument
MODEL TESTED	Reveleris System
DESCRIPTION	Flash Chromatography Instrument (with 13.56 MHz RFID)
TEST REPORT NUMBER	WC809029.3 Rev A
TEST DATE(S)	15 December 2008 – 27 January 2009

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Sections 15.207 "*Conducted Limits*" and 15.209 "*Radiated emission limits; general requirements*" and IC RSS-210 Issue 7 "*Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment*" and IC RSS-Gen "*General Requirements and Information for the Certification of Radiocommunication Equipment*".

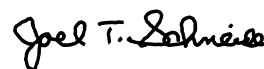
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production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

Date: 03 April 2009

Location: Taylors Falls MN
USA



Greg S Jakubowski
Senior EMC Technician



Joel T Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No. WC809029.3 Rev A Date of issue: 03 April 2009

Product Name Reveleris Flash Instrument

Model / Serial No. Tested Reveleris System / Beta 7

Description Flash Chromatography Instrument (with 13.56 MHz RFID)

Manufacturer Grace
2051 Waukegan Road
Deerfield IL 60015

Test Result ☒ Positive ☐ Negative

Total pages including Appendices 38

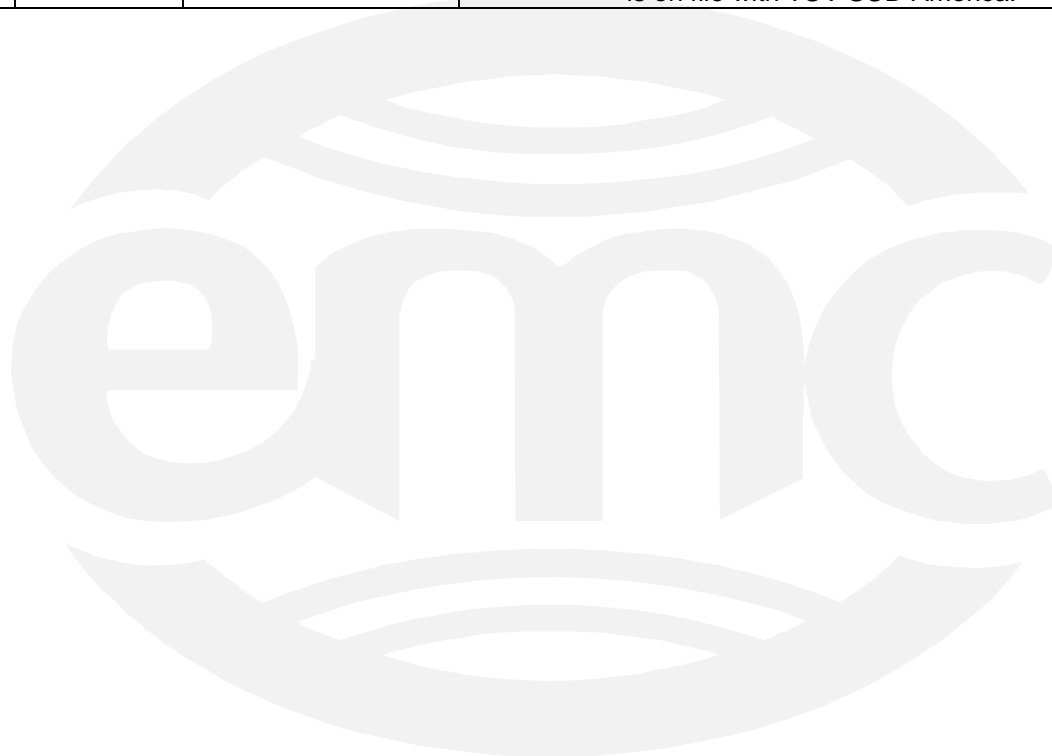
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REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	38	24 February 2009	Initial Release
A	38	03 April 2009	Revisions Include: <ul style="list-style-type: none">■ TRS and Page 1: Correcting model from Reveleris to Reveleris System. At the time of test, the EUT was identified as Model Number Reveleris. Notification of a change in equipment identification to Model Number Reveleris System was received from the manufacturer and is on file with TÜV SÜD America.



DIRECTORY

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EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C Section 15.207 Paragraph (a)

FCC Part 15 Subpart C Section 15.209 Paragraphs (a), (c), (f)

IC RSS-210 Issue 7 Section 2.6

IC RSS-Gen Issue 2 Sections 4.6.1, 7.2.2

ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 20-23°C
Atmospheric pressure	: 99-100kPa
Relative Humidity	: 17-25%

POWER SUPPLY UTILIZED

Power supply system : 120V / 60Hz

TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

SIGN EXPLANATIONS

- ☐ - not applicable
- ☒ - applicable

General field strength limits 0.009 – 30 MHz

FCC 15.209(a), FCC 15.209(c), IC RSS-210 2.6

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 8.2.2

Maximum field strength of the fundamental is 22.9 dB μ V/m* or 14 μ V/m at 30 meters at 13.56 MHz

Minimum margin of compliance of the fundamental is 6.6 dB

Maximum field strength of spurious emissions is -36.0 dB μ V/m* or 0.016 μ V/m at 30 meters at 27.12 MHz

Minimum margin of compliance of the spurious emission is 65.5 dB

No unwanted emissions exceed the level of the fundamental

*Extrapolated levels using a 40 dB/decade falloff as indicated by the measurements.

Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

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

Test distance

☒ - 0.3 meters

☒ - 1.0 meters

☒ - 3 meters

☒ - 10 meters

Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02517	HFH2-Z2	Polarad	Loop Antenna	879285/036	17-Jun-09
WRLE02534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	20-Mar-09

Test limit

Frequency (MHz)	Field strength μ V/m	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30	30	30

At the 13.56 MHz fundamental, the limit is 30 μ V/m or 29.5 dB μ V/m at 30 meters

Test data

See following page

Radiated Emissions < 30 MHz per FCC 15.209

Test Report #:	<u>WC809029</u>	Test area:	<u>LTS</u>
Customer:	<u>Grace</u>	Date:	<u>16 Dec 08</u>
EUT Description:	<u>Flash Chromatography Instrument</u>	Temperature:	<u>20 C</u>
EUT Model:	<u>Revelaris</u>	Air pressure:	<u>100 kPa</u>
EUT Serial:	<u>Beta 7</u>	Relative humidity:	<u>25 %</u>
Notes:	<u>nf = noise floor, Tx on continuous, no emissions in standby mode, no Rx mode extrapolated using 40 dB / decade</u>		

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Tested by: Greg Jakubowski
print


sign

Radiated Emissions 30 - 1000 MHz

FCC 15.209(c), FCC 15.209(f), IC RSS-210 2.6

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 8.3

Original emission measurements include host unit and transmitter. With transmitter turned off and host unit on, in idle mode, emissions remain unchanged. No significant emissions related to the transmitter detected.

Test location

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

Test distance

- ☒ - 3 meters
☐ - 10 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03995	EM-6917B	Electro-Metrics	Biconicalog Periodic	151	23-Apr-09
WRLE03847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B 12-May-09
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	31-Mar-09
WRLE08052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	27-Mar-09
WRLE08051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	27-Mar-09

Cal Code B = Calibration verification performed internally.

Test limits

Transmitter

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength ($\text{dB}\mu\text{V}/\text{m}$)	Measurement distance (m)
30 - 88	100	40	3
88 - 135.6	150	43.5	3

Incorporated digital device

Frequency (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength ($\text{dB}\mu\text{V}/\text{m}$)	Measurement distance (m)
30 - 88	90	39	10
88 - 216	150	43.5	10
216 - 960	210	46.4	10
Above 960	300	49.5	10

Test data

See following pages

RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS

EUT Model #: Revelaris Date: 12/16/2008

EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C

Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa

Customer: Grace Rel. Humidity: 25.0 %

EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

Page: 1 of 6

List of measurements for run #: 7

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 to 135.6MHz then class A 3m	DELTA2 EN 300 330 Tx @3m
72.673 MHz	49.3 Qp	0.84 / 8.61 / 29.68 / 0.0	29.08	V / 1.00 / 0	-20.92	-12.12
97.897 MHz	51.4 Qp	0.9 / 8.8 / 29.61 / 0.0	31.5	V / 1.00 / 0	-18.5	-9.7
112.843 MHz	50.6 Qp	0.9 / 9.32 / 29.7 / 0.0	31.12	V / 1.00 / 0	-12.38	-10.08
114.673 MHz	49.25 Qp	0.9 / 9.39 / 29.7 / 0.0	29.84	V / 1.00 / 0	-13.66	-11.36
129.013 MHz	41.45 Qp	0.9 / 8.49 / 29.7 / 0.0	21.14	V / 1.00 / 0	-22.36	-38.06
166.076 MHz	54.7 Qp	0.9 / 8.79 / 29.8 / 0.0	34.59	V / 1.00 / 0	-15.41	-24.61
192.02 MHz	48.85 Qp	0.9 / 10.76 / 29.8 / 0.0	30.71	V / 1.00 / 0	-19.29	-10.49
223.07 MHz	43.85 Qp	0.9 / 11.13 / 29.8 / 0.0	26.08	V / 1.00 / 0	-23.92	-15.12
240.036 MHz	48.95 Qp	0.9 / 11.73 / 29.7 / 0.0	31.88	V / 1.00 / 0	-25.12	-27.32
320.04 MHz	45.65 Qp	1.37 / 13.78 / 29.91 / 0.0	30.88	V / 1.00 / 0	-26.12	-28.32
332.046 MHz	48.15 Qp	1.44 / 14.15 / 29.97 / 0.0	33.77	V / 1.00 / 0	-23.23	-25.43
360.006 MHz	50.05 Qp	1.6 / 14.8 / 30.0 / 0.0	36.45	V / 1.00 / 0	-20.55	-22.75
400.639 MHz	43.8 Qp	1.6 / 15.79 / 30.0 / 0.0	31.19	V / 1.00 / 0	-25.81	-28.01
432.031 MHz	47.35 Qp	1.6 / 16.26 / 30.0 / 0.0	35.21	V / 1.00 / 0	-21.79	-23.99
480.067 MHz	44.5 Qp	1.6 / 16.8 / 30.2 / 0.0	32.7	V / 1.00 / 0	-24.3	-8.5
555.973 MHz	39.75 Qp	1.83 / 18.26 / 30.19 / 0.0	29.65	V / 1.00 / 0	-27.35	-11.55
960.08 MHz	42.7 Qp	2.82 / 22.93 / 29.7 / 0.0	38.75	V / 1.00 / 0	-18.25	-20.45
816.095 MHz	39.0 Qp	2.53 / 21.89 / 30.04 / 0.0	33.39	V / 1.00 / 0	-23.61	-7.81
701.117 MHz	41.45 Qp	2.26 / 20.32 / 30.15 / 0.0	33.87	V / 1.00 / 0	-23.13	-7.33
624.094 MHz	42.95 Qp	2.03 / 19.55 / 30.18 / 0.0	34.35	V / 1.00 / 0	-22.65	-6.85
97.897 MHz	52.05 Qp	0.9 / 8.8 / 29.61 / 0.0	32.15	V / 1.00 / 90	-17.85	-9.05
166.076 MHz	55.2 Qp	0.9 / 8.79 / 29.8 / 0.0	35.09	V / 1.00 / 90	-14.91	-24.11
223.07 MHz	46.3 Qp	0.9 / 11.13 / 29.8 / 0.0	28.53	V / 1.00 / 90	-21.47	-12.67
240.036 MHz	52.55 Qp	0.9 / 11.73 / 29.7 / 0.0	35.48	V / 1.00 / 90	-21.52	-23.72
701.117 MHz	43.65 Qp	2.26 / 20.32 / 30.15 / 0.0	36.07	V / 1.00 / 90	-20.93	-5.13

Tested by: Greg Jakubowski

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Reviewed by: Joel T Schneider

by:

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RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS
EUT Model #: Revelaris Date: 12/16/2008
EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C
Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa
Customer: Grace Rel. Humidity: 25.0 %

EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

Page: 2 of 6

List of measurements for run #: 7

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 to 135.6MHz then class A 3m	DELTA2 EN 300 330 Tx @3m
129.013 MHz	44.45 Qp	0.9 / 8.49 / 29.7 / 0.0	24.14	V / 1.00 / 180	-19.36	-35.06
166.076 MHz	56.25 Qp	0.9 / 8.79 / 29.8 / 0.0	36.14	V / 1.00 / 180	-13.86	-23.06
320.04 MHz	48.3 Qp	1.37 / 13.78 / 29.91 / 0.0	33.53	V / 1.00 / 180	-23.47	-25.67
332.046 MHz	50.05 Qp	1.44 / 14.15 / 29.97 / 0.0	35.67	V / 1.00 / 180	-21.33	-23.53
400.639 MHz	47.25 Qp	1.6 / 15.79 / 30.0 / 0.0	34.64	V / 1.00 / 180	-22.36	-24.56
555.973 MHz	44.3 Qp	1.83 / 18.26 / 30.19 / 0.0	34.2	V / 1.00 / 180	-22.8	-7.0
360.006 MHz	54.6 Qp	1.6 / 14.8 / 30.0 / 0.0	41.0	V / 1.00 / 270	-16.0	-18.2
816.095 MHz	39.7 Qp	2.53 / 21.89 / 30.04 / 0.0	34.09	V / 1.00 / 270	-22.91	-7.11
192.02 MHz	55.95 Qp	0.9 / 10.76 / 29.8 / 0.0	37.81	H / 2.00 / 270	-12.19	-3.39
223.07 MHz	49.8 Qp	0.9 / 11.13 / 29.8 / 0.0	32.03	H / 2.00 / 270	-17.97	-9.17
432.031 MHz	48.9 Qp	1.6 / 16.26 / 30.0 / 0.0	36.76	H / 2.00 / 270	-20.24	-22.44
223.07 MHz	50.9 Qp	0.9 / 11.13 / 29.8 / 0.0	33.13	H / 1.00 / 270	-16.87	-8.07
320.04 MHz	50.15 Qp	1.37 / 13.78 / 29.91 / 0.0	35.38	H / 1.00 / 270	-21.62	-23.82
400.639 MHz	49.15 Qp	1.6 / 15.79 / 30.0 / 0.0	36.54	H / 1.00 / 270	-20.46	-22.66
332.046 MHz	51.5 Qp	1.44 / 14.15 / 29.97 / 0.0	37.12	H / 1.00 / 180	-19.88	-22.08
400.639 MHz	52.9 Qp	1.6 / 15.79 / 30.0 / 0.0	40.29	H / 1.00 / 0	-16.71	-18.91
Maximized						
701.105 MHz	45.86 Qp	2.26 / 20.32 / 30.15 / 0.0	38.28	V / 1.00 / 74	-18.72	-2.92
192.02 MHz	58.86 Qp	0.9 / 10.76 / 29.8 / 0.0	40.72	V / 1.45 / 74	-9.28	-0.48

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RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS
EUT Model #: Revelaris Date: 12/16/2008
EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C
Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa
Customer: Grace Rel. Humidity: 25.0 %

EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

Page: 3 of 6

List of measurements for run #: 7

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 to 135.6MHz then class A 3m	DELTA2 EN 300 330 Tx @3m
Transmitter turned off, host unit still on, idle						
All emissions remain so they are not related to the RFID transmitter						
No significant emissions related to the transmitter detected						
End transmitter scan 30 - 1000 MHz						

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RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS

EUT Model #: Revelaris Date: 12/16/2008

EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C

Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa

Customer: Grace Rel. Humidity: 25.0 %

EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

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Measurement summary for limit1: FCC 15.209 to 135.6MHz then class A 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 to 135.6MHz then class A 3m
192.02 MHz	58.86 Qp	0.9 / 10.76 / 29.8 / 0.0	40.72	V / 1.45 / 74	-9.28
112.843 MHz	50.6 Qp	0.9 / 9.32 / 29.7 / 0.0	31.12	V / 1.00 / 0	-12.38
114.673 MHz	49.25 Qp	0.9 / 9.39 / 29.7 / 0.0	29.84	V / 1.00 / 0	-13.66
166.076 MHz	56.25 Qp	0.9 / 8.79 / 29.8 / 0.0	36.14	V / 1.00 / 180	-13.86
360.006 MHz	54.6 Qp	1.6 / 14.8 / 30.0 / 0.0	41.0	V / 1.00 / 270	-16.0
400.639 MHz	52.9 Qp	1.6 / 15.79 / 30.0 / 0.0	40.29	H / 1.00 / 0	-16.71
223.07 MHz	50.9 Qp	0.9 / 11.13 / 29.8 / 0.0	33.13	H / 1.00 / 270	-16.87
97.897 MHz	52.05 Qp	0.9 / 8.8 / 29.61 / 0.0	32.15	V / 1.00 / 90	-17.85
960.08 MHz	42.7 Qp	2.82 / 22.93 / 29.7 / 0.0	38.75	V / 1.00 / 0	-18.25
701.105 MHz	45.86 Qp	2.26 / 20.32 / 30.15 / 0.0	38.28	V / 1.00 / 74	-18.72
129.013 MHz	44.45 Qp	0.9 / 8.49 / 29.7 / 0.0	24.14	V / 1.00 / 180	-19.36
332.046 MHz	51.5 Qp	1.44 / 14.15 / 29.97 / 0.0	37.12	H / 1.00 / 180	-19.88
432.031 MHz	48.9 Qp	1.6 / 16.26 / 30.0 / 0.0	36.76	H / 2.00 / 270	-20.24
72.673 MHz	49.3 Qp	0.84 / 8.61 / 29.68 / 0.0	29.08	V / 1.00 / 0	-20.92
240.036 MHz	52.55 Qp	0.9 / 11.73 / 29.7 / 0.0	35.48	V / 1.00 / 90	-21.52
320.04 MHz	50.15 Qp	1.37 / 13.78 / 29.91 / 0.0	35.38	H / 1.00 / 270	-21.62
624.094 MHz	42.95 Qp	2.03 / 19.55 / 30.18 / 0.0	34.35	V / 1.00 / 0	-22.65
555.973 MHz	44.3 Qp	1.83 / 18.26 / 30.19 / 0.0	34.2	V / 1.00 / 180	-22.8
816.095 MHz	39.7 Qp	2.53 / 21.89 / 30.04 / 0.0	34.09	V / 1.00 / 270	-22.91
480.067 MHz	44.5 Qp	1.6 / 16.8 / 30.2 / 0.0	32.7	V / 1.00 / 0	-24.3

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by:

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RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS

EUT Model #: Revelaris Date: 12/16/2008

EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C

Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa

Customer: Grace Rel. Humidity: 25.0 %

EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

Page: 5 of 6

Measurement summary for limit2: EN 300 330 Tx @3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 EN 300 330 Tx @3m
192.02 MHz	58.86 Qp	0.9 / 10.76 / 29.8 / 0.0	40.72	V / 1.45 / 74	-0.48
701.105 MHz	45.86 Qp	2.26 / 20.32 / 30.15 / 0.0	38.28	V / 1.00 / 74	-2.92
624.094 MHz	42.95 Qp	2.03 / 19.55 / 30.18 / 0.0	34.35	V / 1.00 / 0	-6.85
555.973 MHz	44.3 Qp	1.83 / 18.26 / 30.19 / 0.0	34.2	V / 1.00 / 180	-7.0
816.095 MHz	39.7 Qp	2.53 / 21.89 / 30.04 / 0.0	34.09	V / 1.00 / 270	-7.11
223.07 MHz	50.9 Qp	0.9 / 11.13 / 29.8 / 0.0	33.13	H / 1.00 / 270	-8.07
480.067 MHz	44.5 Qp	1.6 / 16.8 / 30.2 / 0.0	32.7	V / 1.00 / 0	-8.5
97.897 MHz	52.05 Qp	0.9 / 8.8 / 29.61 / 0.0	32.15	V / 1.00 / 90	-9.05
112.843 MHz	50.6 Qp	0.9 / 9.32 / 29.7 / 0.0	31.12	V / 1.00 / 0	-10.08
114.673 MHz	49.25 Qp	0.9 / 9.39 / 29.7 / 0.0	29.84	V / 1.00 / 0	-11.36
72.673 MHz	49.3 Qp	0.84 / 8.61 / 29.68 / 0.0	29.08	V / 1.00 / 0	-12.12
360.006 MHz	54.6 Qp	1.6 / 14.8 / 30.0 / 0.0	41.0	V / 1.00 / 270	-18.2
400.639 MHz	52.9 Qp	1.6 / 15.79 / 30.0 / 0.0	40.29	H / 1.00 / 0	-18.91
960.08 MHz	42.7 Qp	2.82 / 22.93 / 29.7 / 0.0	38.75	V / 1.00 / 0	-20.45
332.046 MHz	51.5 Qp	1.44 / 14.15 / 29.97 / 0.0	37.12	H / 1.00 / 180	-22.08
432.031 MHz	48.9 Qp	1.6 / 16.26 / 30.0 / 0.0	36.76	H / 2.00 / 270	-22.44
166.076 MHz	56.25 Qp	0.9 / 8.79 / 29.8 / 0.0	36.14	V / 1.00 / 180	-23.06
240.036 MHz	52.55 Qp	0.9 / 11.73 / 29.7 / 0.0	35.48	V / 1.00 / 90	-23.72
320.04 MHz	50.15 Qp	1.37 / 13.78 / 29.91 / 0.0	35.38	H / 1.00 / 270	-23.82
129.013 MHz	44.45 Qp	0.9 / 8.49 / 29.7 / 0.0	24.14	V / 1.00 / 180	-35.06

Tested by: Greg Jakubowski

Printed

Signature

Reviewed by: Joel T Schneider

by:

Printed

Signature

RADIATED EMISSIONS



Test Report #: WC809029 Run 7 Test Area: LTS
EUT Model #: Revelaris Date: 12/16/2008
EUT Serial #: Beta 7 EUT Power: 110V / 60Hz Temperature: 21.0 °C
Test Method: FCC 15.209 / EN 300 330 Air Pressure: 100.0 kPa
Customer: Grace Rel. Humidity: 25.0 %

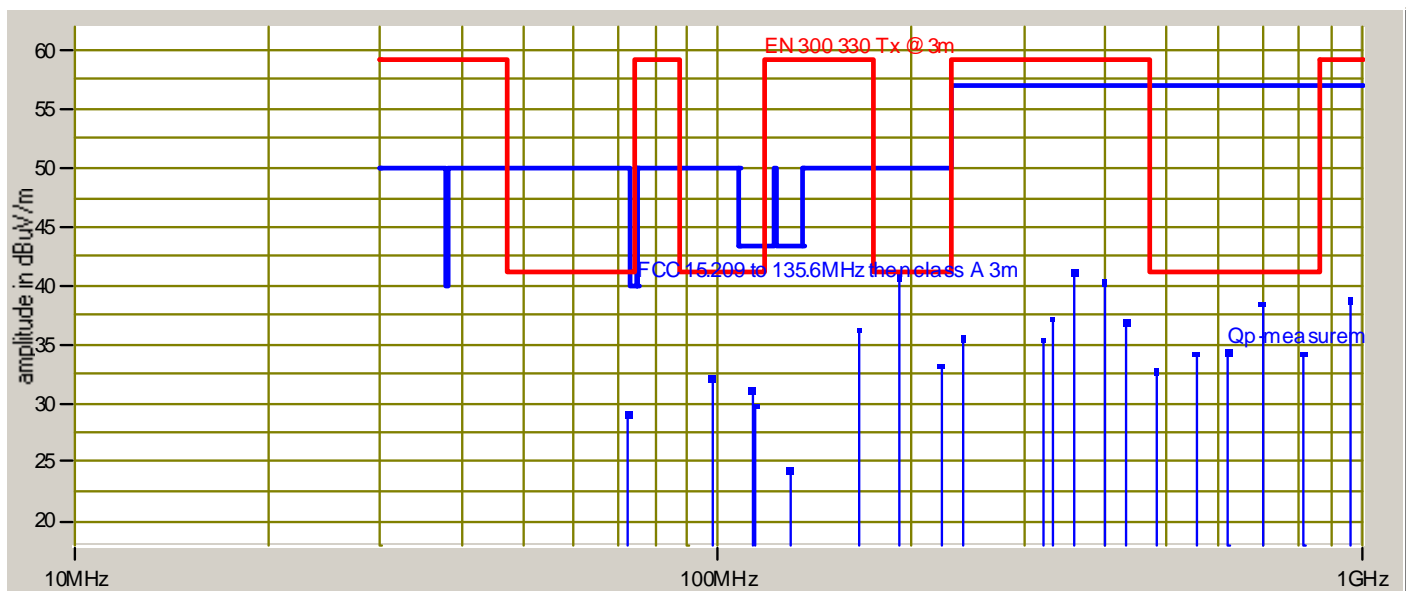
EUT Description: Flash Chromatography Instrument with 13.56 MHz RFID

Notes: Tx on continuous. No standby or receive mode

Data File Name: 9029.dat

Page: 6 of 6

Graph:



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Printed

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Reviewed by: Joel T Schneider
Printed

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Occupied bandwidth

RSS-Gen 4.6.1

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Test was performed in accordance with the article "The Measurement of Occupied Bandwidth" by Industry Canada's certification bureau.

Occupied bandwidth = 3.1 kHz

Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

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

Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	14-Nov-09
	7405-901	EMCO	Near field probe	na	Code Y

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

Test limit

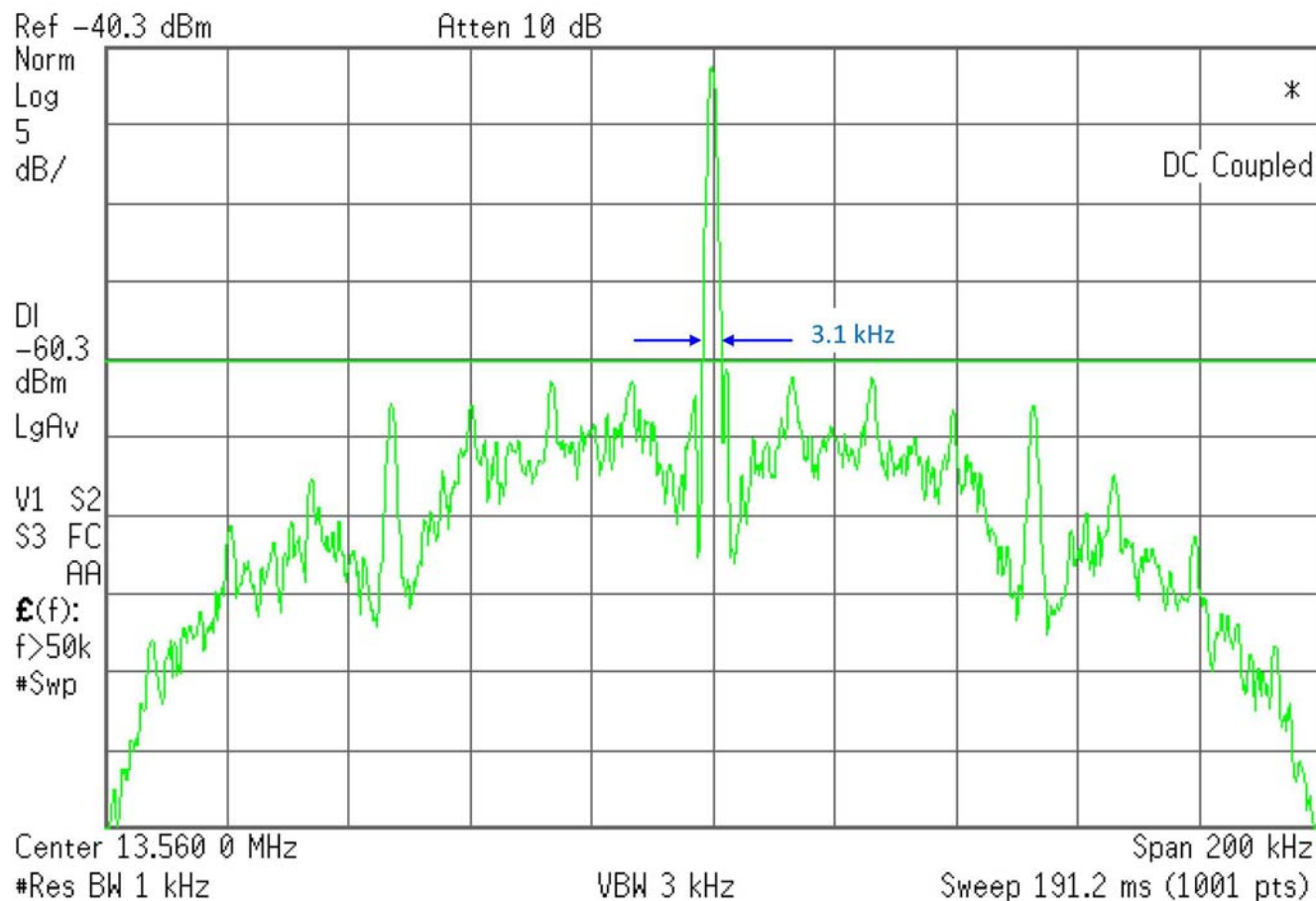
No limit specified

Test data

See following page

99% Occupied bandwidth

 Agilent



Conducted Emissions - AC Power Lines

FCC 15.207(a), IC RSS-Gen 7.2.2

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2003, clause 7.2

Minimum margin of compliance is 3.82 dB at 215.0 kHz

Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

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

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02417	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1439	Code B 25-Feb-09
WRLE02534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	20-Mar-09

Cal Code B = Calibration verification performed internally.

Test limits, dB μ V

Frequency (MHz)	Quasi Peak	Average
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

*Decreases with the logarithm of the frequency

Test data

See following pages

CONDUCTED EMISSIONS



Test Report #: WC809029 Run 6 Test Area: LTS

EUT Model #: Revelaris Date: 12/15/2008

EUT Serial #: Beta 7 EUT Power: 120VAC / 60Hz Temperature: 23.0 °C

Test Method: FCC 15.207 Air Pressure: 99.0 kPa

Customer: Grace Rel. Humidity: 18.0 %

EUT Description: Flash Chromatography Instrument

Notes: Transmitter Running All the time.

Data File Name: 9029 15.207 revs run 6.dat

Page: 1 of 5

List of measurements for run #: 6

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 EN55011 B Grp1 Qp	DELTA2 EN55011 B Grp1 Avg
Start of conducted scan on AC Mains.						
195.0 kHz	33.93 Qp	0.13 / 0.14 / 0.0 / 0.0	34.2	L1	-29.62	n/a
215.0 kHz	35.13 Qp	0.13 / 0.11 / 0.0 / 0.0	35.38	L1	-27.63	n/a
410.0 kHz	42.61 Qp	0.18 / 0.1 / 0.0 / 0.0	42.89	L1	-14.76	n/a
715.0 kHz	49.37 Qp	0.22 / 0.19 / 0.0 / 0.0	49.78	L1	-6.22	n/a
815.0 kHz	56.75 Qp	0.23 / 0.2 / 0.0 / 0.0	57.18	L1	1.18	n/a
1.53 MHz	38.35 Qp	0.3 / 0.1 / 0.0 / 0.0	38.75	L1	-17.25	n/a
2.575 MHz	39.83 Qp	0.39 / 0.1 / 0.0 / 0.0	40.32	L1	-15.68	n/a
4.1 MHz	37.37 Qp	0.5 / 0.1 / 0.0 / 0.0	37.97	L1	-18.03	n/a
13.56 MHz	41.03 Qp	0.87 / 0.48 / 0.0 / 0.0	42.38	L1	-17.62	n/a
21.72 MHz	35.75 Qp	1.13 / 0.89 / 0.0 / 0.0	37.76	L1	-22.24	n/a
27.12 MHz	31.43 Qp	1.25 / 0.95 / 0.0 / 0.0	33.63	L1	-26.37	n/a
195.0 kHz	29.71 Av	0.13 / 0.14 / 0.0 / 0.0	29.98	L1	n/a	-23.84
215.0 kHz	33.28 Av	0.13 / 0.11 / 0.0 / 0.0	33.53	L1	n/a	-19.48
410.0 kHz	38.53 Av	0.18 / 0.1 / 0.0 / 0.0	38.81	L1	n/a	-8.84
715.0 kHz	46.84 Av	0.22 / 0.19 / 0.0 / 0.0	47.25	L1	n/a	1.25
815.0 kHz	55.81 Av	0.23 / 0.2 / 0.0 / 0.0	56.24	L1	n/a	10.24
1.53 MHz	30.14 Av	0.3 / 0.1 / 0.0 / 0.0	30.54	L1	n/a	-15.46
2.575 MHz	30.0 Av	0.39 / 0.1 / 0.0 / 0.0	30.49	L1	n/a	-15.51
4.1 MHz	26.96 Av	0.5 / 0.1 / 0.0 / 0.0	27.56	L1	n/a	-18.44
13.56 MHz	40.09 Av	0.87 / 0.48 / 0.0 / 0.0	41.44	L1	n/a	-8.56
21.72 MHz	24.98 Av	1.13 / 0.89 / 0.0 / 0.0	26.99	L1	n/a	-23.01
27.12 MHz	26.39 Av	1.25 / 0.95 / 0.0 / 0.0	28.59	L1	n/a	-21.41
195.0 kHz	47.53 Qp	0.13 / 0.14 / 0.0 / 0.0	47.8	N	-16.02	n/a
215.0 kHz	49.43 Qp	0.13 / 0.11 / 0.0 / 0.0	49.68	N	-13.33	n/a
410.0 kHz	27.31 Qp	0.18 / 0.1 / 0.0 / 0.0	27.59	N	-30.06	n/a

Tested by: Derek J Lilla
Printed

Derek Lilla
Signature

Reviewed by: Joel T Schneider
Printed

Joel T. Schneider
Signature

CONDUCTED EMISSIONS



Test Report #: WC809029 Run 6 Test Area: LTS
EUT Model #: Revelaris Date: 12/15/2008
EUT Serial #: Beta 7 EUT Power: 120VAC / 60Hz Temperature: 23.0 °C
Test Method: FCC 15.207 Air Pressure: 99.0 kPa
Customer: Grace Rel. Humidity: 18.0 %

EUT Description: Flash Chromatography Instrument

Notes: Transmitter Running All the time.

Data File Name: 9029 15.207 revs run 6.dat

Page: 2 of 5

List of measurements for run #: 6

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 EN55011 B Grp1 Qp	DELTA2 EN55011 B Grp1 Avg
715.0 kHz	48.89 Qp	0.22 / 0.19 / 0.0 / 0.0	49.3	N	-6.7	n/a
815.0 kHz	36.31 Qp	0.23 / 0.2 / 0.0 / 0.0	36.74	N	-19.26	n/a
1.53 MHz	47.95 Qp	0.3 / 0.1 / 0.0 / 0.0	48.35	N	-7.65	n/a
2.575 MHz	44.69 Qp	0.39 / 0.1 / 0.0 / 0.0	45.18	N	-10.82	n/a
4.1 MHz	38.37 Qp	0.5 / 0.1 / 0.0 / 0.0	38.97	N	-17.03	n/a
13.56 MHz	40.23 Qp	0.87 / 0.48 / 0.0 / 0.0	41.58	N	-18.42	n/a
21.72 MHz	18.89 Qp	1.13 / 0.89 / 0.0 / 0.0	20.9	N	-39.1	n/a
27.12 MHz	21.67 Qp	1.25 / 0.95 / 0.0 / 0.0	23.87	N	-36.13	n/a
195.0 kHz	46.92 Av	0.13 / 0.14 / 0.0 / 0.0	47.19	N	n/a	-6.63
215.0 kHz	48.94 Av	0.13 / 0.11 / 0.0 / 0.0	49.19	N	n/a	-3.82
410.0 kHz	26.7 Av	0.18 / 0.1 / 0.0 / 0.0	26.98	N	n/a	-20.67
715.0 kHz	42.92 Av	0.22 / 0.19 / 0.0 / 0.0	43.33	N	n/a	-2.67
815.0 kHz	35.65 Av	0.23 / 0.2 / 0.0 / 0.0	36.08	N	n/a	-9.92
1.53 MHz	40.18 Av	0.3 / 0.1 / 0.0 / 0.0	40.58	N	n/a	-5.42
2.575 MHz	38.69 Av	0.39 / 0.1 / 0.0 / 0.0	39.18	N	n/a	-6.82
4.1 MHz	26.44 Av	0.5 / 0.1 / 0.0 / 0.0	27.04	N	n/a	-18.96
13.56 MHz	39.96 Av	0.87 / 0.48 / 0.0 / 0.0	41.31	N	n/a	-8.69
21.72 MHz	12.03 Av	1.13 / 0.89 / 0.0 / 0.0	14.04	N	n/a	-35.96
27.12 MHz	16.33 Av	1.25 / 0.95 / 0.0 / 0.0	18.53	N	n/a	-31.47

End of conducted scan.

715kHz and 815kHz are still there when transmitter is shut off.

Removed from measurement summary and graph

Tested by: Derek J Lilla
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Derek Lilla

Signature

Reviewed by: Joel T Schneider
Printed

Joel T. Schneider

Signature

CONDUCTED EMISSIONS



Test Report #: WC809029 Run 6 Test Area: LTS
EUT Model #: Revelaris Date: 12/15/2008
EUT Serial #: Beta 7 EUT Power: 120VAC / 60Hz Temperature: 23.0 °C
Test Method: FCC 15.207 Air Pressure: 99.0 kPa
Customer: Grace Rel. Humidity: 18.0 %

EUT Description: Flash Chromatography Instrument

Notes: Transmitter Running All the time.

Data File Name: 9029 15.207 revs run 6.dat

Page: 3 of 5

Measurement summary for limit1: EN55011 B Grp1 Qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 EN55011 B Grp1 Qp
1.53 MHz	47.95 Qp	0.3 / 0.1 / 0.0 / 0.0	48.35	N	-7.65
2.575 MHz	44.69 Qp	0.39 / 0.1 / 0.0 / 0.0	45.18	N	-10.82
215.0 kHz	49.43 Qp	0.13 / 0.11 / 0.0 / 0.0	49.68	N	-13.33
410.0 kHz	42.61 Qp	0.18 / 0.1 / 0.0 / 0.0	42.89	L1	-14.76
195.0 kHz	47.53 Qp	0.13 / 0.14 / 0.0 / 0.0	47.8	N	-16.02
4.1 MHz	38.37 Qp	0.5 / 0.1 / 0.0 / 0.0	38.97	N	-17.03
13.56 MHz	41.03 Qp	0.87 / 0.48 / 0.0 / 0.0	42.38	L1	-17.62
21.72 MHz	35.75 Qp	1.13 / 0.89 / 0.0 / 0.0	37.76	L1	-22.24
27.12 MHz	31.43 Qp	1.25 / 0.95 / 0.0 / 0.0	33.63	L1	-26.37

Tested by: Derek J Lilla
Printed

Derek Lilla

Signature

Reviewed by: Joel T Schneider
Printed

Joel T. Schneider

Signature

CONDUCTED EMISSIONS



Test Report #: WC809029 Run 6 Test Area: LTS

EUT Model #: Revelaris Date: 12/15/2008

EUT Serial #: Beta 7 EUT Power: 120VAC / 60Hz Temperature: 23.0 °C

Test Method: FCC 15.207 Air Pressure: 99.0 kPa

Customer: Grace Rel. Humidity: 18.0 %

EUT Description: Flash Chromatography Instrument

Notes: Transmitter Running All the time.

Data File Name: 9029 15.207 revs run 6.dat Page: 4 of 5

Measurement summary for limit2: EN55011 B Grp1 Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA2 EN55011 B Grp1 Avg
215.0 kHz	48.94 Av	0.13 / 0.11 / 0.0 / 0.0	49.19	N	-3.82
1.53 MHz	40.18 Av	0.3 / 0.1 / 0.0 / 0.0	40.58	N	-5.42
195.0 kHz	46.92 Av	0.13 / 0.14 / 0.0 / 0.0	47.19	N	-6.63
2.575 MHz	38.69 Av	0.39 / 0.1 / 0.0 / 0.0	39.18	N	-6.82
13.56 MHz	40.09 Av	0.87 / 0.48 / 0.0 / 0.0	41.44	L1	-8.56
410.0 kHz	38.53 Av	0.18 / 0.1 / 0.0 / 0.0	38.81	L1	-8.84
4.1 MHz	26.96 Av	0.5 / 0.1 / 0.0 / 0.0	27.56	L1	-18.44
27.12 MHz	26.39 Av	1.25 / 0.95 / 0.0 / 0.0	28.59	L1	-21.41
21.72 MHz	24.98 Av	1.13 / 0.89 / 0.0 / 0.0	26.99	L1	-23.01

Tested by: Derek J Lilla
Printed

Derek Lilla
Signature

Reviewed by: Joel T Schneider
Printed

Joel T. Schneider
Signature

CONDUCTED EMISSIONS



Test Report #: WC809029 Run 6 Test Area: LTS
EUT Model #: Revelaris Date: 12/15/2008
EUT Serial #: Beta 7 EUT Power: 120VAC / 60Hz Temperature: 23.0 °C
Test Method: FCC 15.207 Air Pressure: 99.0 kPa
Customer: Grace Rel. Humidity: 18.0 %

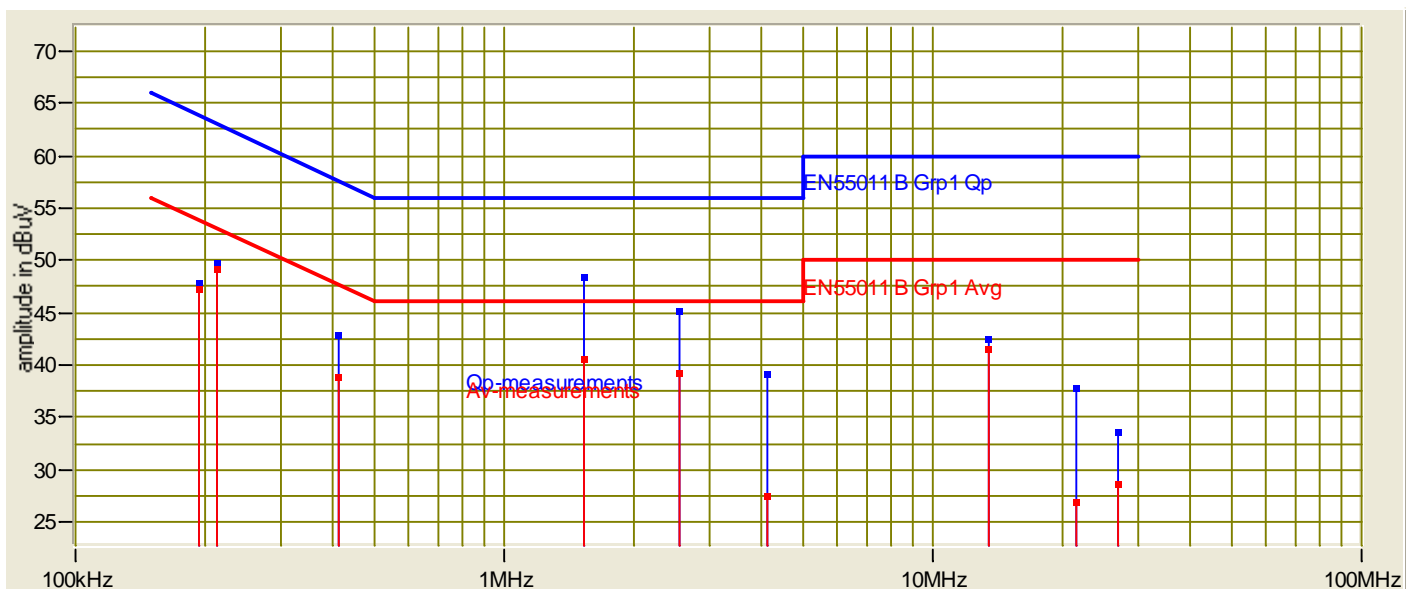
EUT Description: Flash Chromatography Instrument

Notes: Transmitter Running All the time.

Data File Name: 9029 15.207 revs run 6.dat

Page: 5 of 5

Graph:



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Derek Lilla

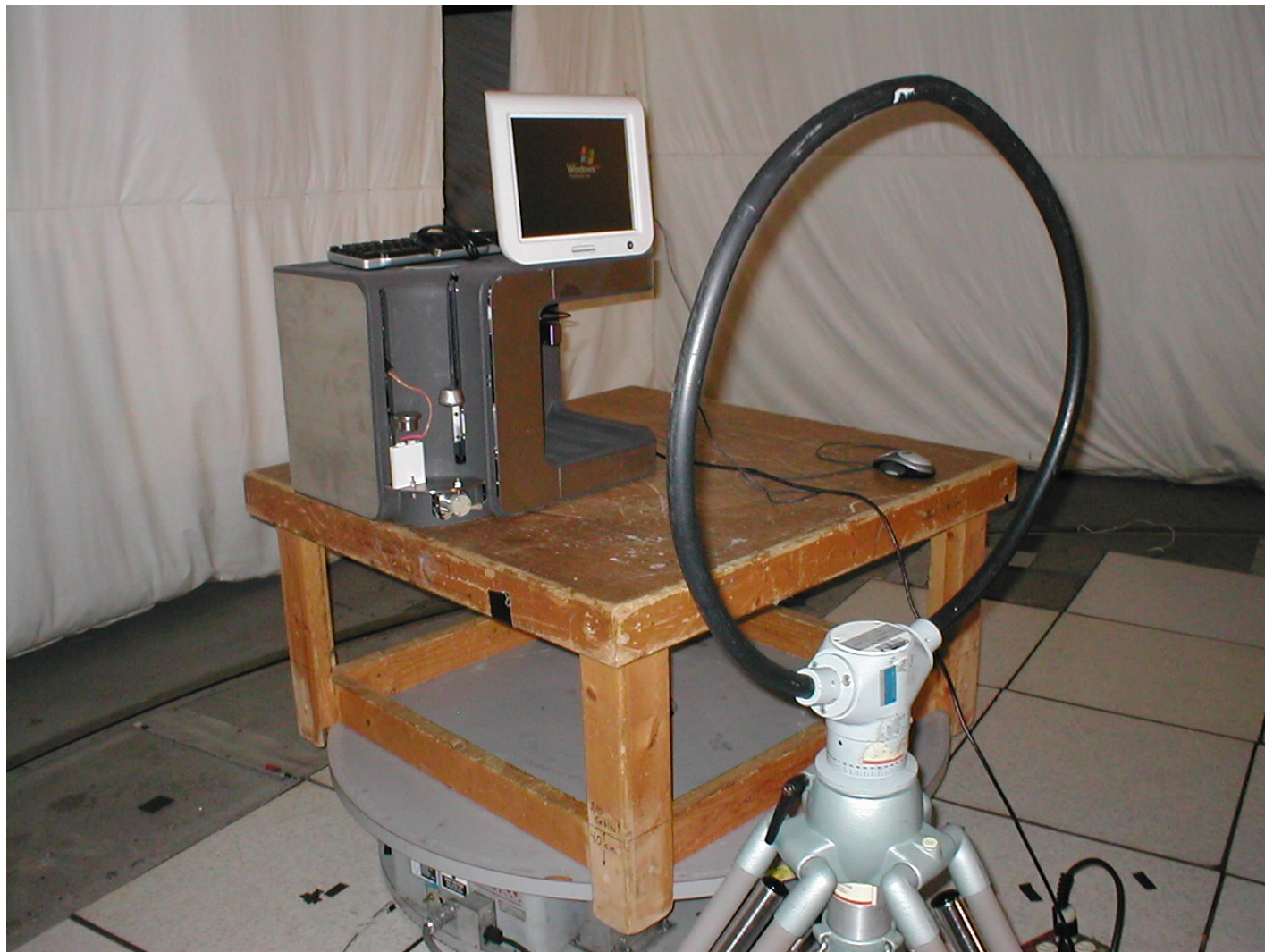
Signature

Reviewed by: Joel T Schneider
Printed

Joel T. Schneider

Signature

Test-setup photo(s):
General Field Strength Limits 0.009 – 30 MHz



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



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



Test-setup photo(s):
Conducted Emissions, AC lines, 150 kHz - 30 MHz



Test-setup photo(s):
Conducted Emissions, AC lines, 150 kHz - 30 MHz



Equipment Under Test (EUT) Test Operation Mode:

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

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☐ - Practice operation
- ☐ - Normal operating mode
- ☒ - See Appendix A

Configuration of the device under test:

- ☒ - See Appendix A and test setup photos
- ☐ - See Product Information Form(s) in Appendix B

DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

At the time of test, the EUT was identified as Model Number Reveleris. Notification of a change in equipment identification to Model Number Reveleris System was received from the manufacturer and is on file with TÜV SÜD America.

Modifications required to pass:

- ☒ None
- ☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

- ☒ None
- ☐ As indicated in the Test Plan

SUMMARY:

The requirements according to the technical regulations are

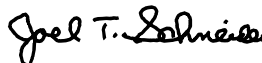
- ☒ - met and the device under test does fulfill the general approval requirements.
- ☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

EUT Received Date: 15 December 2008
Condition of EUT: Normal
Testing Start Date: 15 December 2008
Testing End Date: 27 January 2009

TÜV SÜD AMERICA INC



Greg S Jakubowski
Senior EMC Technician



Joel T Schneider
Senior EMC Engineer

Appendix A

EMC Test Plan and Constructional Data Form



Form



EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
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: Grace
Address: 2051 Waukegan Road
Deerfield
IL 60015
Contact: Raaidah Saari-Nordhaus Position: R&D Manager
Phone: 847-948-8600 ext 1322 Fax: 847-948-1078
E-mail Address: raaidah.saari-nordhaus@grace.com

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

EUT Description Flash Chromatography Instrument
EUT Name Reveleris Flash Instrument
Model No.: _____ Serial No.: Beta 001
Product Options: none
Configurations to be tested: A complete integrated unit

Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)

Modifications since last test: _____
Modifications made during test: _____

Test Objective(s): Please indicate the tests to be performed, entering the applicable standard(s) where noted.

- | | |
|---|---|
| <input checked="" type="checkbox"/> EMC Directive 2004/108/EC (EMC)
Std: <u>EN61326</u> | <input type="checkbox"/> FCC: Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B Part _____ |
| <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"/> BSMI: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Vehicle Directive: <input type="checkbox"/> 2001/3/EC (EMC) <input type="checkbox"/> 2004/104/EC (EMC) | <input type="checkbox"/> Canada: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> Other Vehicle Std: _____ | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B |
| <input type="checkbox"/> FDA Reviewers Guidance for Premarket Notification Submissions (EMC) | <input type="checkbox"/> Other: _____ |

Third Party Certification, if applicable (*Signature on Page 6 Required)

- | | |
|--|---|
| <input type="checkbox"/> Attestation of Conformity (AoC)* | <input type="checkbox"/> EMC Certification (used with Octagon Mark)* |
| <input type="checkbox"/> Certificate of Conformity (CoC)*
Protection Class (N/A for vehicles) | <input type="checkbox"/> Compliance Document* |
| (Press F1 when field is selected to show additional information on Protection Class.) | <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III |
| <input type="checkbox"/> FCC / TCB Certification | <input type="checkbox"/> Industry Canada / FCB Certification |
| <input type="checkbox"/> E-Mark Certification | <input type="checkbox"/> Taiwan Certification |

Form



EMC Test Plan and Constructional Data Form

Attendance

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

Failure - Complete this section if testing will not be attended by the customer.

If a failure occurs, TÜV America 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: _____ Width: _____ Height: _____ Weight: 79lb.

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: 120/230 VAC (If battery powered, make sure battery life is sufficient to complete testing.)
50/60Hz

of Phases: 1

Current (Amps/phase(max)): 10A Current (Amps/phase(nominal)): not measured yet
(theoretical)

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Chemical Lab environment, inside of a Fume hood.

EUT Power Cable

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

Form



EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables

Type	Analog	Digital	During Test		Qty	Shielding		Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
			Active	Passive		Yes	No						
EXAMPLE:													
RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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"/>
Ethernet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>			RJ-45		3	<input checked="" type="checkbox"/> <input type="checkbox"/>
USB	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	X		USB	90	1	<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"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/> <input type="checkbox"/>

Form



EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: Dec 2 2008

Description: Grace system software

Equipment Under Test (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. Using manual control screen, all check boxes are checked with the following values as well.
2nd Solvent Mix = 50
Solvent Flow Rate = 100
Vial Fill Volume = 1
Other fields left at defaults
2. server.exe.config file needs to have "RoadRunner.Server.TestDrivers.DebugAdapter" added in the debug drivers key
- 3.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT.

For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
CF Card (Solid State Hard drive)			
Power supply			
SOM			

Form



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)
This information is required for FCC & Taiwan testing.

Description	Model #	Serial #	FCC ID #
Dell D830 Laptop	D830	CN-0HN338- 48643-7A9-0875	E2K4965AGNM

Oscillator Frequencies

Manufacturer	Frequency	Derived Frequency	Component # / Location	Description of Use
CTS	50M	50M	Y1, Main board	FPGA Clock
Citizen	10M	40M	Y1, Fraction collector	Fraction collector clock
Citizen	24M	24M	Y2, LCD Board	LCD USB Hub
Citizen	7.68M	7.68M	Y1, Preamp board	Preamp Micro
Citizen	13.56M	13.56M	Y1, RFID boards	RFID comm, 3 per system

Power Supply

Manufacturer	Model #	Serial #	Type
Lambda	NV722HLL		<input checked="" type="checkbox"/> Switched-mode: (Frequency) <u>Not listed</u> <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

Manufacturer	Model #	Location in EUT
Schurter	KM00.1105.11	Power entry module
CorCom	6VS1	Internal, in front of Heater board

Form

**EMC Test Plan and Constructional Data Form****Critical EMI Components (Capacitors, ferrites, etc.)**

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>

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

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization Signatures (Signature Required for Certifications checked on pg 1)

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

Appendix B

Measurement Protocol



MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Emissions testing is performed according to the procedures in ANSI C63.4-2003 & the article "The Measurement of Occupied Bandwidth" by Industry Canada's certification bureau

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ± 1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ± 4.8 dB. The equipment comprising the test systems is calibrated on an annual basis.

Justification

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

Conducted Emissions

The final level, in dB μ V, equals the EMI receiver level plus the cable loss and LISN factor.

Radiated Emissions

The final level, in dB μ V/m, equals the reading from the spectrum analyzer (Level dB μ V), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the 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 μ V)	CABLE/ANT/PREAMP			FINAL	POL/HGT/AZ			DELTA1
		(dB)	(dB/m)	(dB)	(dB μ V/m)	(m)	(deg)		
60.80	42.5Qp +	1.2	+ 10.9	- 25.5 =	29.1	V	1.0	0.0	-10.9

Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

DETAILS OF TEST PROCEDURES

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 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.

Radiated Emissions

Radiated emissions in the frequency range of 9kHz to 30 MHz, including the fundamental transmit signal, are measured using a receiver capable of quasi-peak and average measurements and a magnetic loop antenna. The transmitter is rotated through 3 orthogonal axes in order to determine the maximum emission levels. If the signal cannot be measured at the specified limit distance, measurements are recorded at multiple distances nearer to the device and the final level mathematically extrapolated. 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. 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.