

# TEST RESULT SUMMARY

## FCC Part 15 Subpart C Section 15.247 Industry Canada RSS-210 Issue 7

COMPANY	Destron Fearing 490 Villaume Avenue South S. Paul MN 55075
DESCRIPTION OF EQUIPMENT	Bluetooth transmitter for handheld RFID reader
NAME OF EQUIPMENT	DTR4
MODEL NUMBER(S) TESTED	DTR4
SERIAL NUMBER(S) TESTED	n/a
TEST REPORT NUMBER	WC1004377 Rev A
TEST DATE(S)	19-20 July 2010

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 Section 15.247 "Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz; General requirements." and IC RSS-210 Issue 7 "Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment".

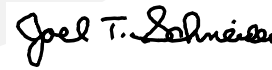
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production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

Date: 15 September 2010

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. WC1004377 Rev A Date of issue: 15 September 2010

Manufacturer Destron Fearing

Address 490 Villaume Avenue  
South St Paul MN 55075

Description of Equipment Bluetooth transmitter for handheld RFID reader

Name of Equipment DTR4

Model No(s) Tested DTR4

Serial No(s) Tested n/a

Test Result  **Compliant**  **Non-compliant**

*TÜV SÜD America 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 SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America 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, NIST, or any agency of the US government.*

*TÜV SÜD America Inc and its professional staff hold government and Professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI..*

**REVISION RECORD**

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	36	29 July 2010	Initial Release
A	36	15 September 2010	Revisions Include: <ul style="list-style-type: none"><li>Page 17: Added statement - Spurious emissions were measured with the EUT tuned to low, mid, and high channels.</li></ul>



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### Sign Explanations:

- not applicable

- applicable

## EMC TEST REGULATIONS

The tests were performed according to the following regulations:

FCC Part 15 Subpart C Section 15.247

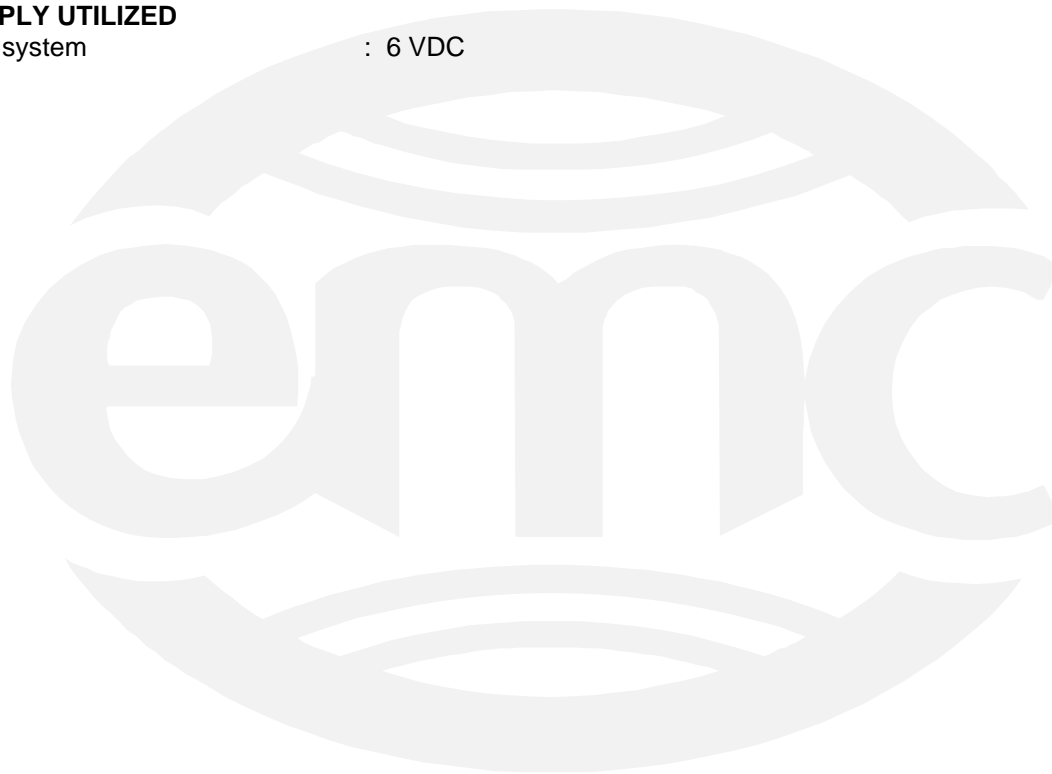
IC RSS-210 Issue 7

## ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 23-27°C
Atmospheric pressure	: 98 kPa
Relative Humidity	: 49-57 %

## POWER SUPPLY UTILIZED

Power supply system : 6 VDC



### Carrier Frequency Separation

FCC 15.247(a)(1), IC RSS-210 A8.1(b)

Measurements made per FCC Public Notice DA 00-705

#### Test summary

The requirements are:  - MET  - NOT MET

Carrier Frequency Separation = 1.0 MHz

#### Test location

- Wild River Lab Large Test Site (Open Area Test Site)
- Wild River Lab Large Test Site - Tech area
- Wild River Lab Small Test Site (Open Area Test Site)

#### Test equipment

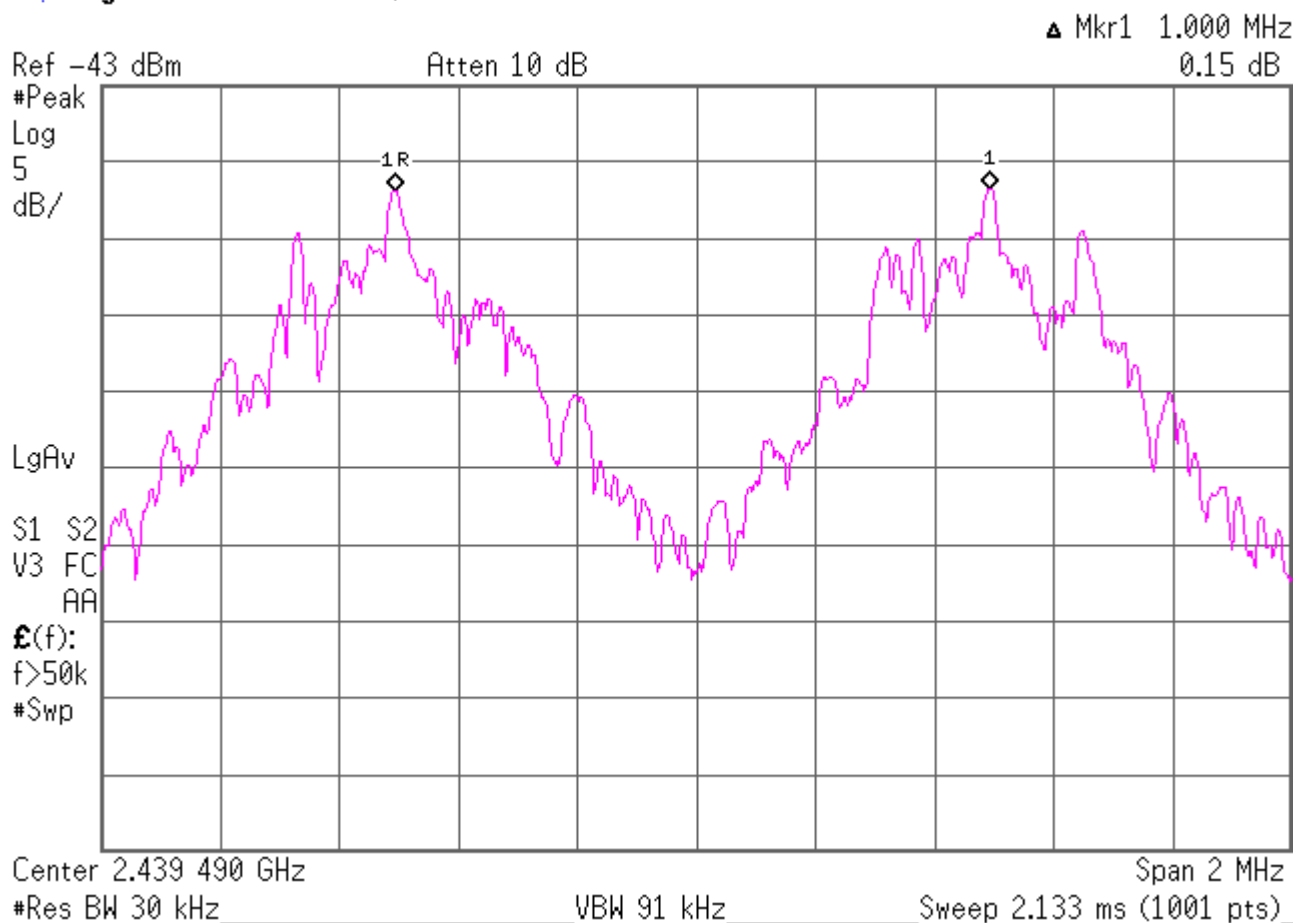
TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10

#### Test Limit

900 kHz (20 dB bandwidth) minimum

#### Test data

Agilent 09:20:49 Jul 20, 2010



### Number of Hopping Frequencies

FCC 15.247(a)(1)(iii), IC RSS-210 A8.1(d)

Measurements made per FCC Public Notice DA 00-705

#### Test summary

The requirements are:  - MET  - NOT MET

Number of hopping frequencies = 79

#### Test location

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

- Wild River Lab Large Test Site - Tech area

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

#### Test equipment

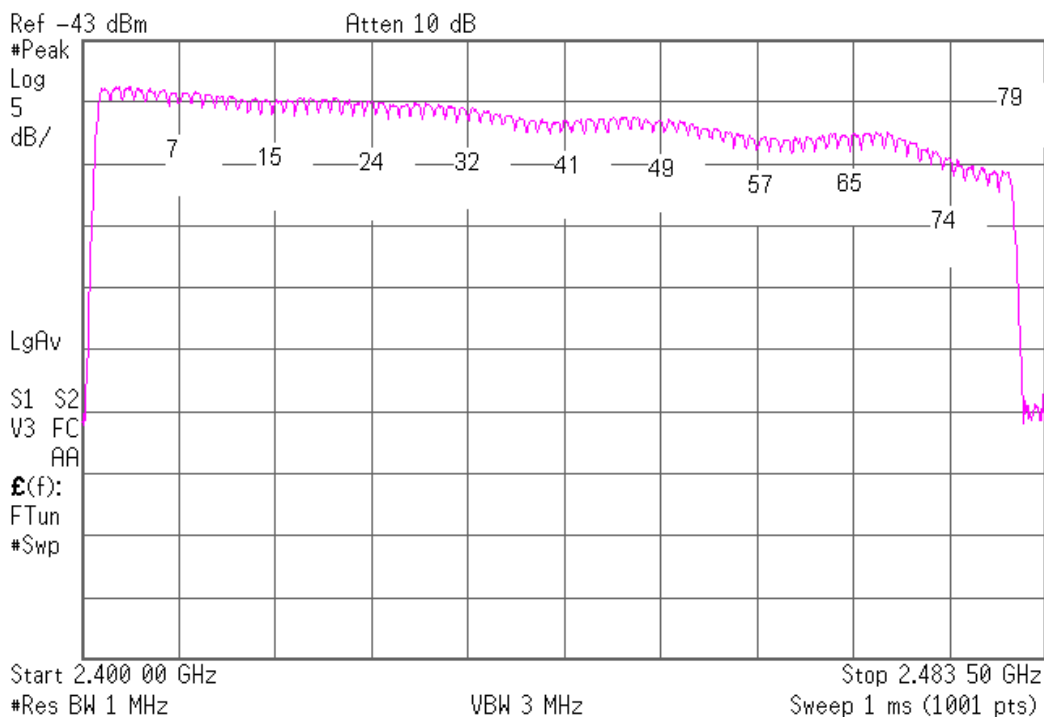
TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	11-Aug-10

#### Test limit

At least 15 channels

#### Test data

\* Agilent 09:26:37 Jul 20, 2010



## Time of Occupancy

FCC 15.247(a)(1)(iii), IC RSS-210 A8.1(d)

Measurements made per FCC Public Notice DA 00-705

### Test summary

The requirements are:  - MET  - NOT MET

Time of occupancy = 0.143 seconds

Given:

445.6 microsecond pulse occur every 98.4 milliseconds.

321.1 pulses within a 31.6 second time period (400 msec x 79 channels)

### Test location

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

- Wild River Lab Large Test Site - Tech area

- 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	11-Aug-10

Cal Code B = Calibration verification performed internally.

### Test limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

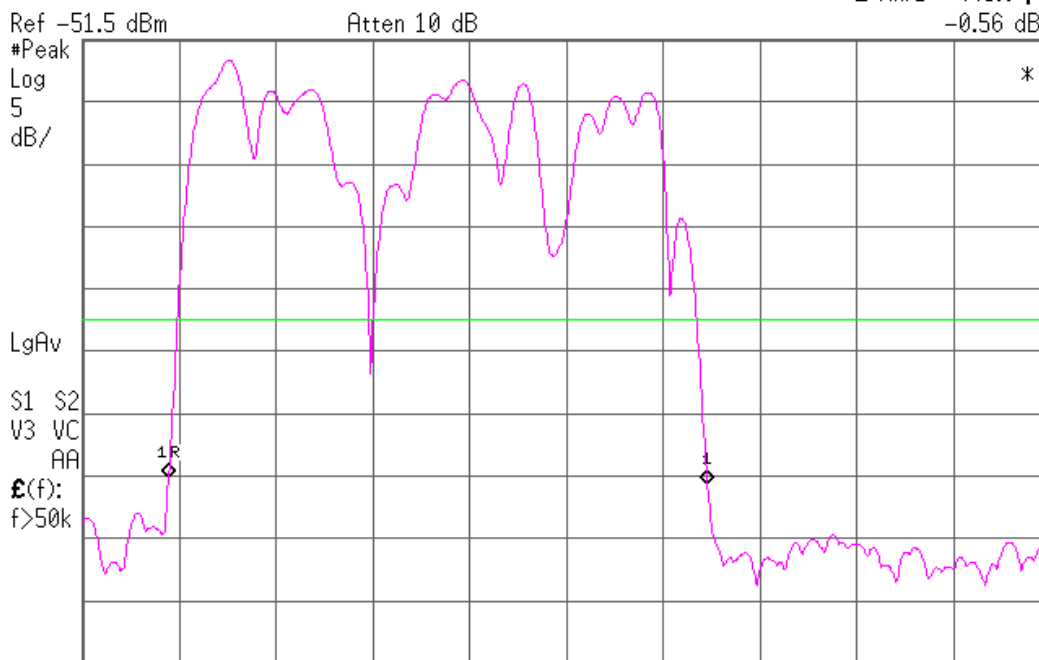
### Test data

See following pages



Agilent 09:47:13 Jul 20, 2010

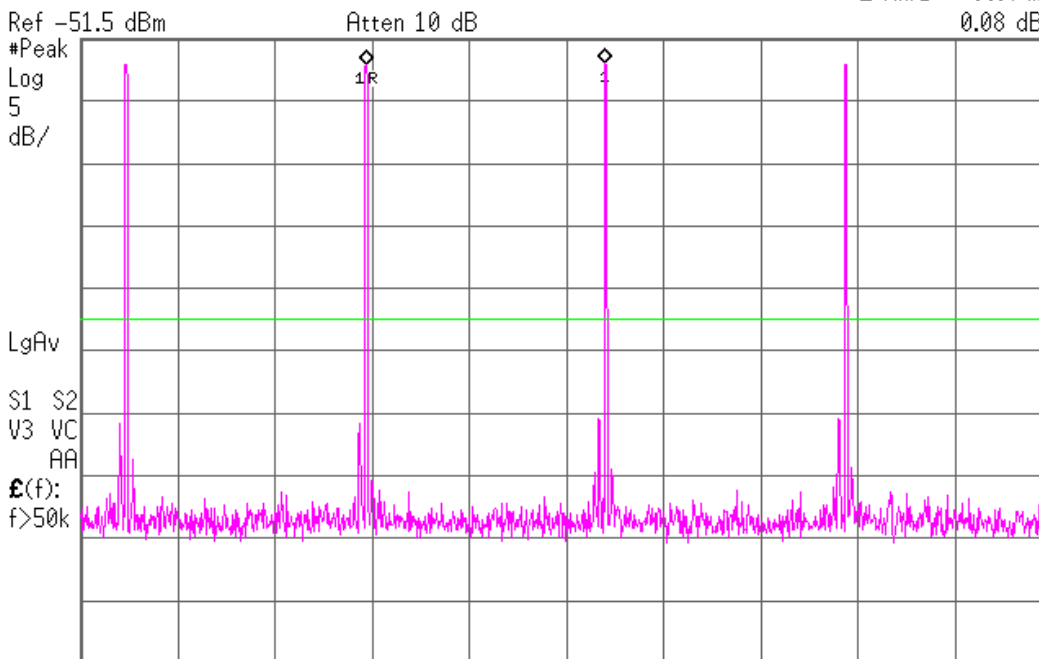
Mkr1 445.6  $\mu$ s  
-0.56 dB



Ref -51.5 dBm Atten 10 dB  
#Peak Log 5 dB/ LgAv  
S1 S2 V3 VC AA  
£(f): f>50k  
Center 2.441 000 0 GHz Res BW 30 kHz VBW 91 kHz Span 0 Hz Sweep 800  $\mu$ s (1001 pts)

Agilent 09:51:31 Jul 20, 2010

Mkr1 98.4 ms  
0.08 dB



Ref -51.5 dBm Atten 10 dB  
#Peak Log 5 dB/ LgAv  
S1 S2 V3 VC AA  
£(f): f>50k  
Center 2.441 000 0 GHz Res BW 30 kHz VBW 91 kHz Span 0 Hz Sweep 400 ms (1001 pts)



America

## 20 dB Bandwidth

FCC 15.247(a), IC RSS-210 A8.1

Measurements made per FCC Public Notice DA 00-705

### Test summary

The requirements are:  - MET  - NOT MET

The 20 dB bandwidth ranges from 870-900 kHz

### Test location

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

- Wild River Lab Large Test Site - Tech area

- 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	11-Aug-10

Cal Code B = Calibration verification performed internally.

### Test limit

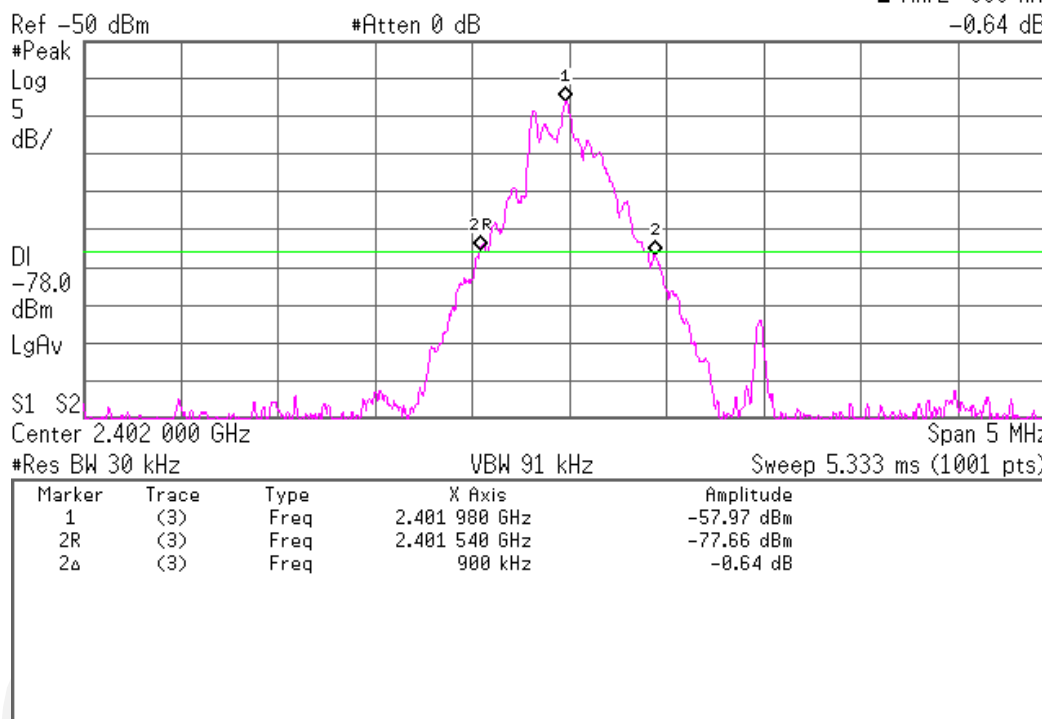
No limit specified

### Test data

See following pages

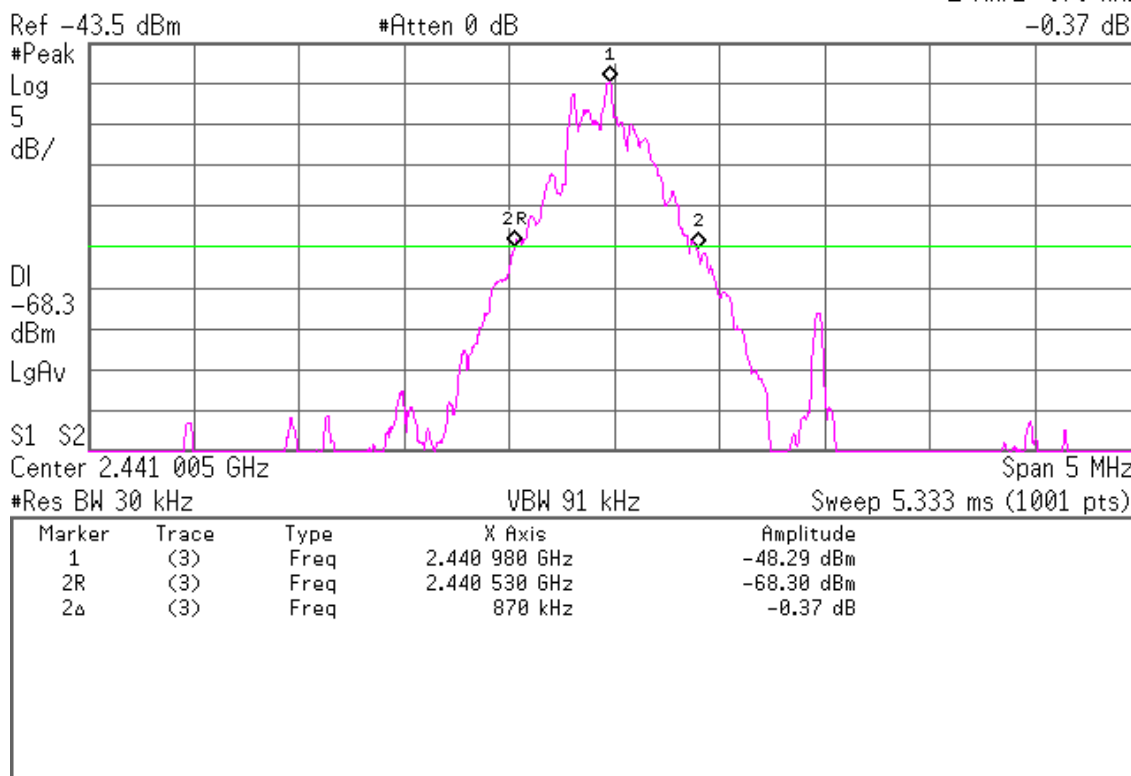
Agilent 11:59:06 Jul 19, 2010

Mkr2 900 kHz  
-0.64 dB



Agilent 10:43:05 Jul 19, 2010

Mkr2 870 kHz  
-0.37 dB

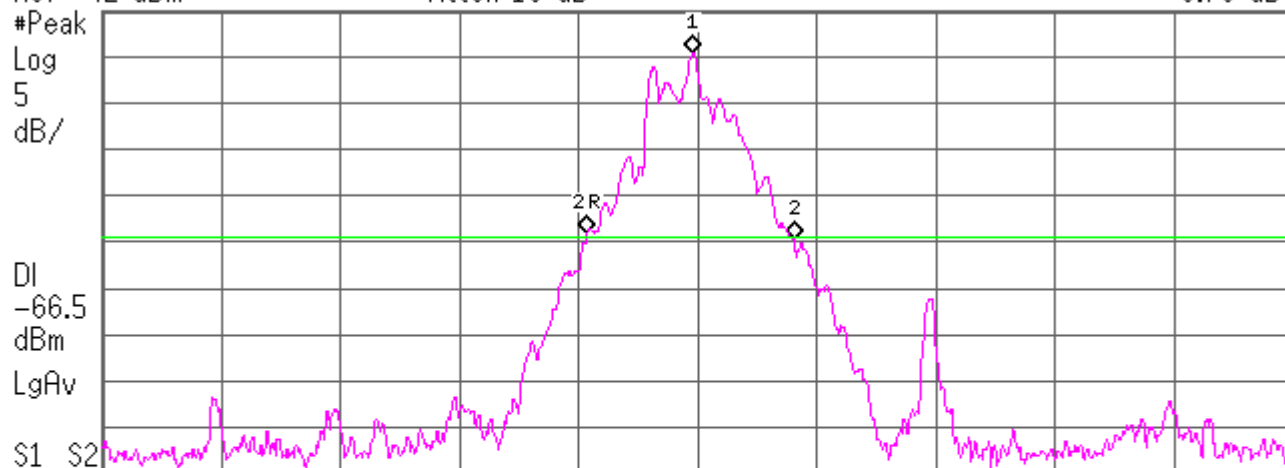


Agilent 09:11:16 Jul 20, 2010

▲ Mkr2 870 kHz  
-0.70 dB

Ref -42 dBm

Atten 10 dB



Center 2.480 000 GHz

Span 5 MHz

#Res BW 30 kHz

VBW 91 kHz

Sweep 5.333 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(3)	Freq	2.479 980 GHz	-46.53 dBm
2R	(3)	Freq	2.479 535 GHz	-66.00 dBm
2▲	(3)	Freq	870 kHz	-0.70 dB

## Maximum peak output power

FCC 15.247(b)(1), IC RSS-210 A8.4 (2)

Measurements made per FCC Public Notice DA 00-705

### Test summary

The requirements are:  - MET  - NOT MET

The maximum output power is 2.5 mW

### Test location

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

- Wild River Lab Large Test Site - Tech area

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

### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	25-Mar-11
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	25-Mar-11
WRLE02075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	18-Jan-11

### Test limit

1 watt

### Test data

See following pages

E is the measured maximum fundamental field strength in V/m, utilizing a RBW  $\geq$  the 20 dB bandwidth of the emission, VBW > RBW, peak detector function.

G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

$$P = \frac{(E \cdot d)^2}{30G} = (.066 \cdot 3)^2 / 30 \cdot (-2.8 \text{ dBi, or } 0.524 \text{ numerical gain}) = 2.5 \text{ mW}$$



America

### List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
Max pk power						
mid channel						
Device lying on its back						
maximized						
2.44 GHz	89.65 Pk	5.07 / 28.28 / 29.2 / 0.0	93.79	V / 1.11 / 27		n/a
device on its side						
2.44 GHz	86.8 Pk	5.07 / 28.28 / 29.2 / 0.0	90.94	V / 1.82 / 35		n/a
Device upright						
2.44 GHz	89.7 Pk	5.07 / 28.28 / 29.2 / 0.0	93.84	H / 1.30 / 13		n/a
Upright = worst case. Remaining measurements in this orientation						
low channel						
2.402 GHz	92.4 Pk	5.02 / 28.17 / 29.16 / 0.0	96.43	H / 1.00 / 64		n/a
high channel						
2.48 GHz	89.5 Pk	5.11 / 28.39 / 29.25 / 0.0	93.75	H / 1.20 / 9		n/a



## Radiated Band Edge Compliance Measurement

FCC 15.247(d), RSS-210 A8.5

Measurements made per FCC Public Notice DA 00-705

### Test summary

The requirements are:  - MET  - NOT MET

### Test location

- Wild River Lab Large Test Site (Open Area Test Site)
- Wild River Lab Large Test Site - Tech area
- Wild River Lab Small Test Site (Open Area Test Site)

### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	25-Mar-11
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	25-Mar-11
WRLE02075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	18-Jan-11
WRLE10527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 28-Sep-10

Cal Code B = Calibration verification performed internally.

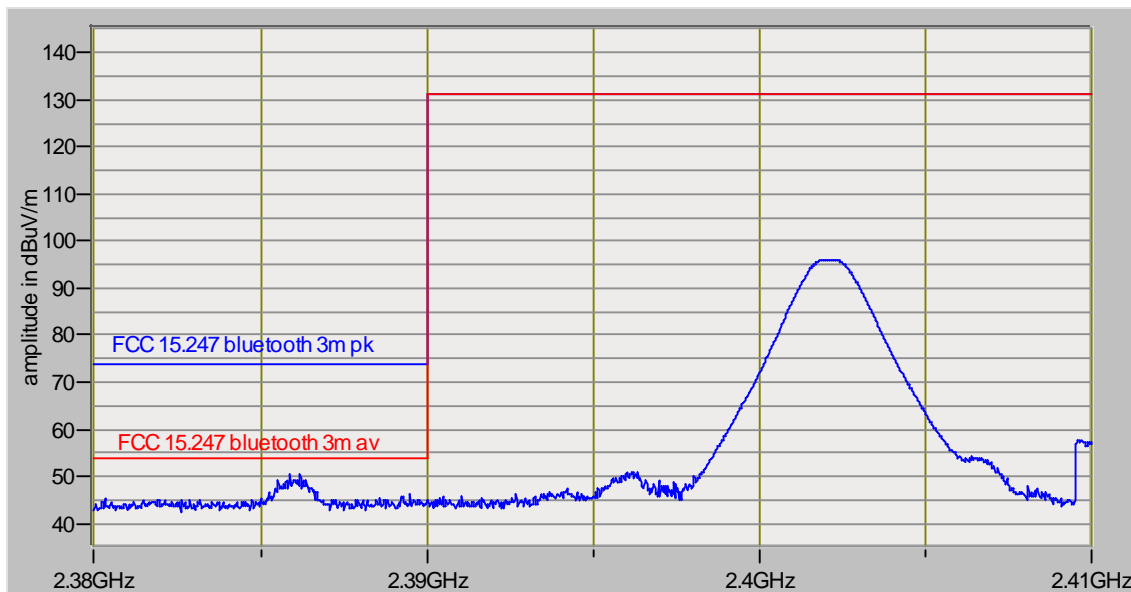
### Test limit (in restricted bands)

Frequency (MHz)	Field strength ( $\mu\text{V}/\text{meter}$ )	Field strength ( $\text{dB}\mu\text{V}/\text{meter}$ )
< 2390 MHz or > 2483.5MHz	500 – AV	54.0
	5000 – PK	74.0

### Test data

See following pages.

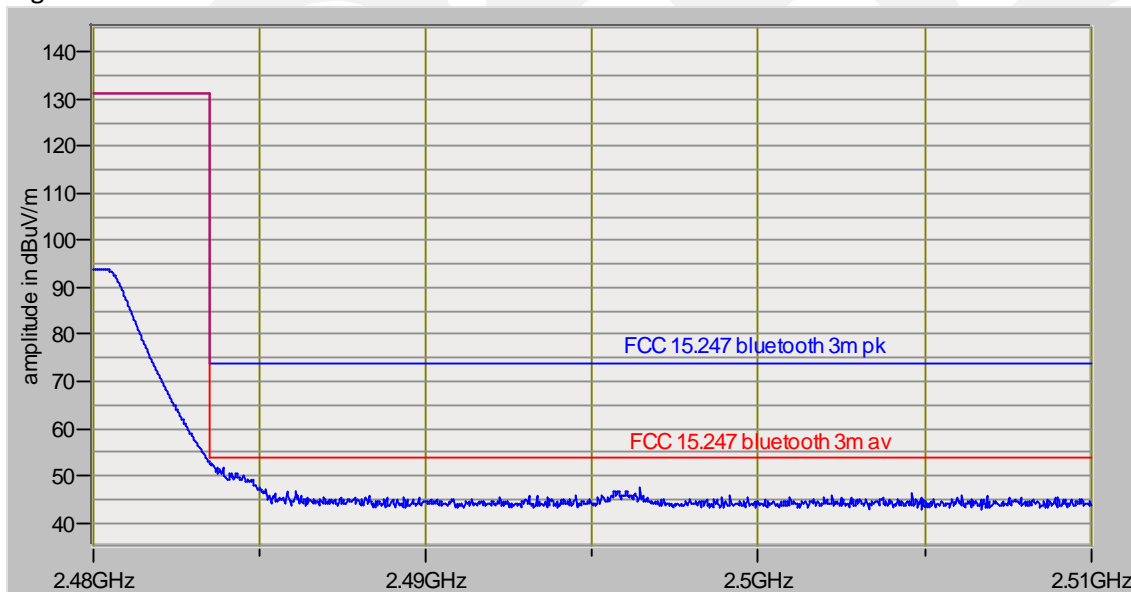
Low channel



RBW 1 MHz

VBW 1 MHz

High channel

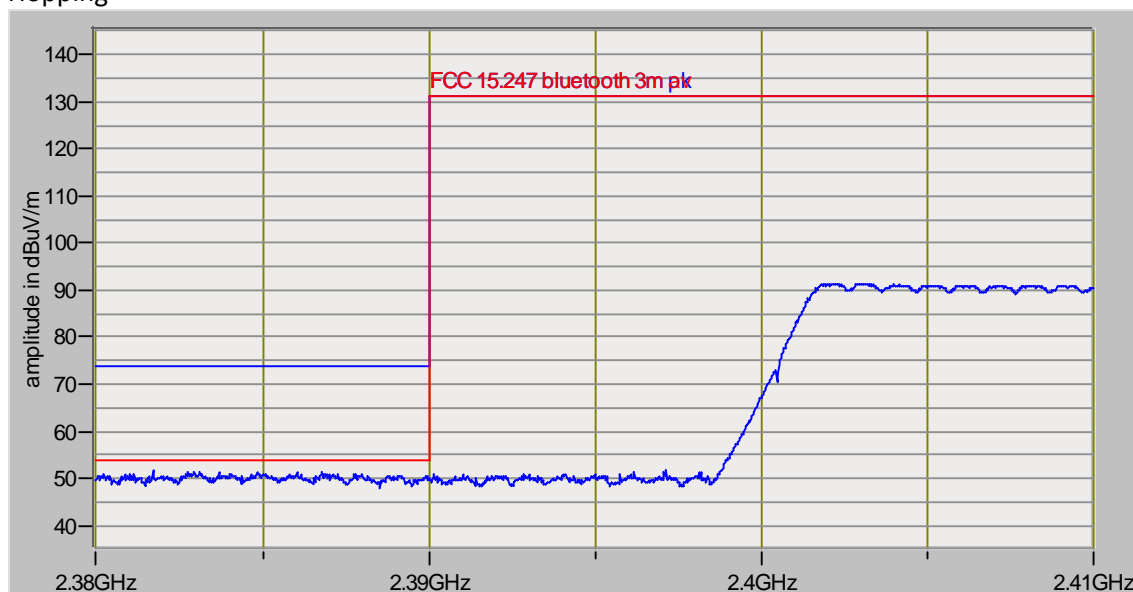


RBW 1 MHz

VBW 1 MHz

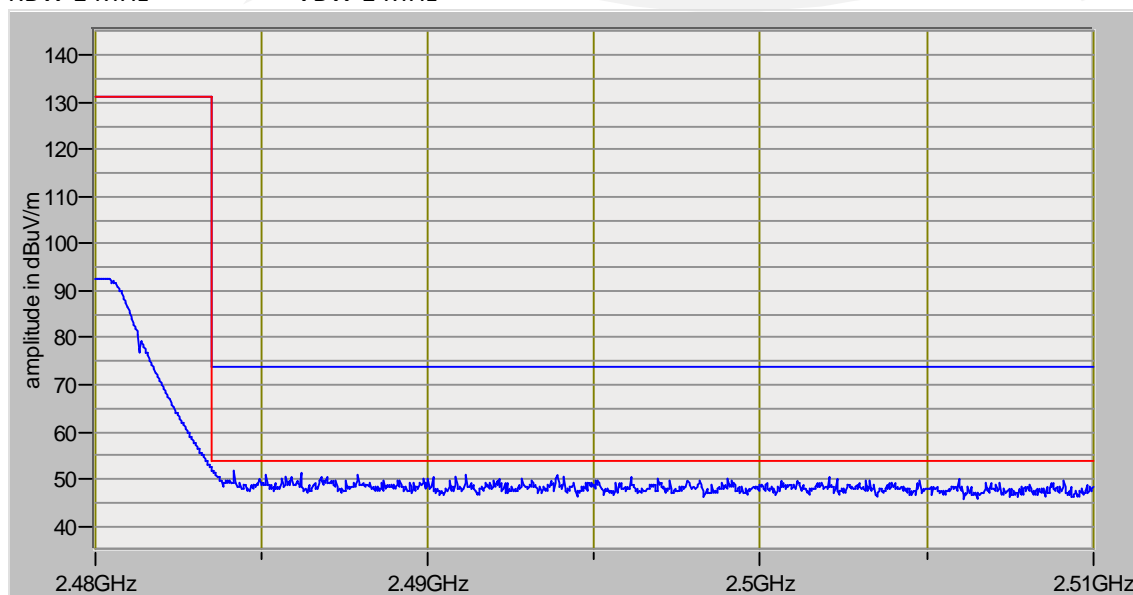


### Hopping



RBW 1 MHz

VBW 1 MHz



RBW 1 MHz

VBW 1 MHz

## Spurious emissions - Radiated

FCC 15.247(d), IC RSS-210 A8.5

Measurements made per FCC Public Notice DA 00-705

Spurious emissions were measured with the EUT tuned to low, mid, and high channels

### Test summary

The requirements are:  - MET  - NOT MET

Test was performed in accordance with ANSI C63.4 2003, clause 8.3

Minimum margin of compliance is 6 dB at 112 MHz

### Test location

- Wild River Lab Large Test Site (Open Area Test Site)
- Wild River Lab Large Test Site - Tech area
- 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
WRLE03204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	22-Mar-11
OWLE02682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	03-Feb-11
WRLE02673	85662A	Hewlett-Packard	Analyzer Display	2152A03687	25-Mar-11
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	25-Mar-11
WRLE10616	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	QA0746005	Code B 23-Oct-10
WRLE02075	3115	EMCO	Ridge Guide Ant. 1-18 GHz	9001-3275	18-Jan-11
WRLE10527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 28-Sep-10
WRLE10435	E4440A	Agilent	Spectrum Analyzer	MY42510439	28 Jul 10

Cal Code B = Calibration verification performed internally.

### Test limit (in restricted bands)

Frequency (MHz)	Field strength (μV/meter)	Field strength (dBμV/meter)
30 - 88	100 – QP	40.0
88 - 216	150 – QP	43.5
216 - 960	200 – QP	46.0
960-1000	500 – QP	54.0
>1000	500 – AV	54.0
	5000 – PK	74.0

### Test data

See following pages.

**Measurement summary for limit1: FCC 15.247 spurs <1GHz 3m (Qp)**

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.247 spurs <1GHz 3m
112.0 MHz	56.89 Qp	0.95 / 9.14 / 29.62 / 0.01	37.37	H / 2.15 / 255	-6.13
128.016 MHz	52.4 Qp	1.01 / 8.42 / 29.6 / 0.01	32.24	V / 1.00 / 0	-11.26
331.789 MHz	44.35 Qp	1.7 / 14.14 / 29.48 / 0.02	30.72	V / 1.00 / 0	-15.28
405.511 MHz	39.5 Qp	1.91 / 15.87 / 29.41 / 0.02	27.9	V / 1.00 / 270	-18.1
258.061 MHz	43.45 Qp	1.47 / 12.3 / 29.53 / 0.01	27.71	V / 2.00 / 270	-18.29
243.313 MHz	43.05 Qp	1.43 / 11.76 / 29.59 / 0.01	26.66	V / 2.00 / 270	-19.34
324.421 MHz	40.4 Qp	1.67 / 13.91 / 29.47 / 0.02	26.53	V / 1.00 / 0	-19.47

**Measurement summary for limit1: FCC 15.209 >1GHz 3m av (Av)**

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.209 >1GHz 3m av
2.518 GHz	40.09 Av	5.15 / 28.5 / 29.29 / 0.0	44.45	V / 1.26 / 104	-9.55

**Measurement summary for limit2: FCC 15.209 >1GHz 3m pk (Pk)**

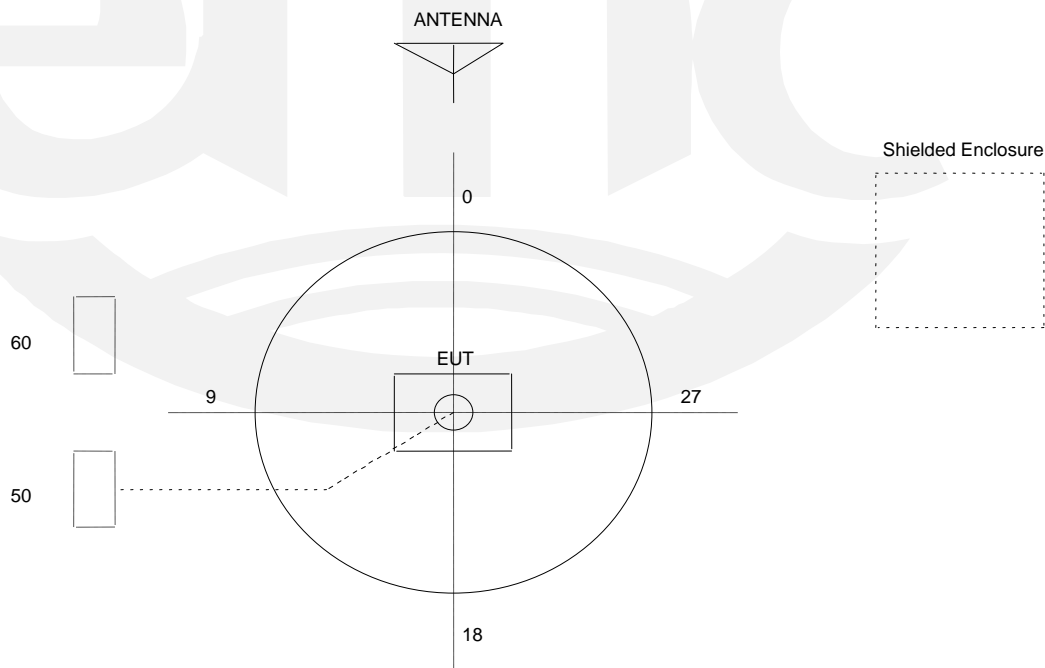
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.209 >1GHz 3m pk
2.518 GHz	54.2 Pk	5.15 / 28.5 / 29.29 / 0.0	58.56	V / 1.26 / 104	-15.44

## TEST SETUP FOR EMISSIONS TESTING

### WILD RIVER LAB Large Test Site

Notes:

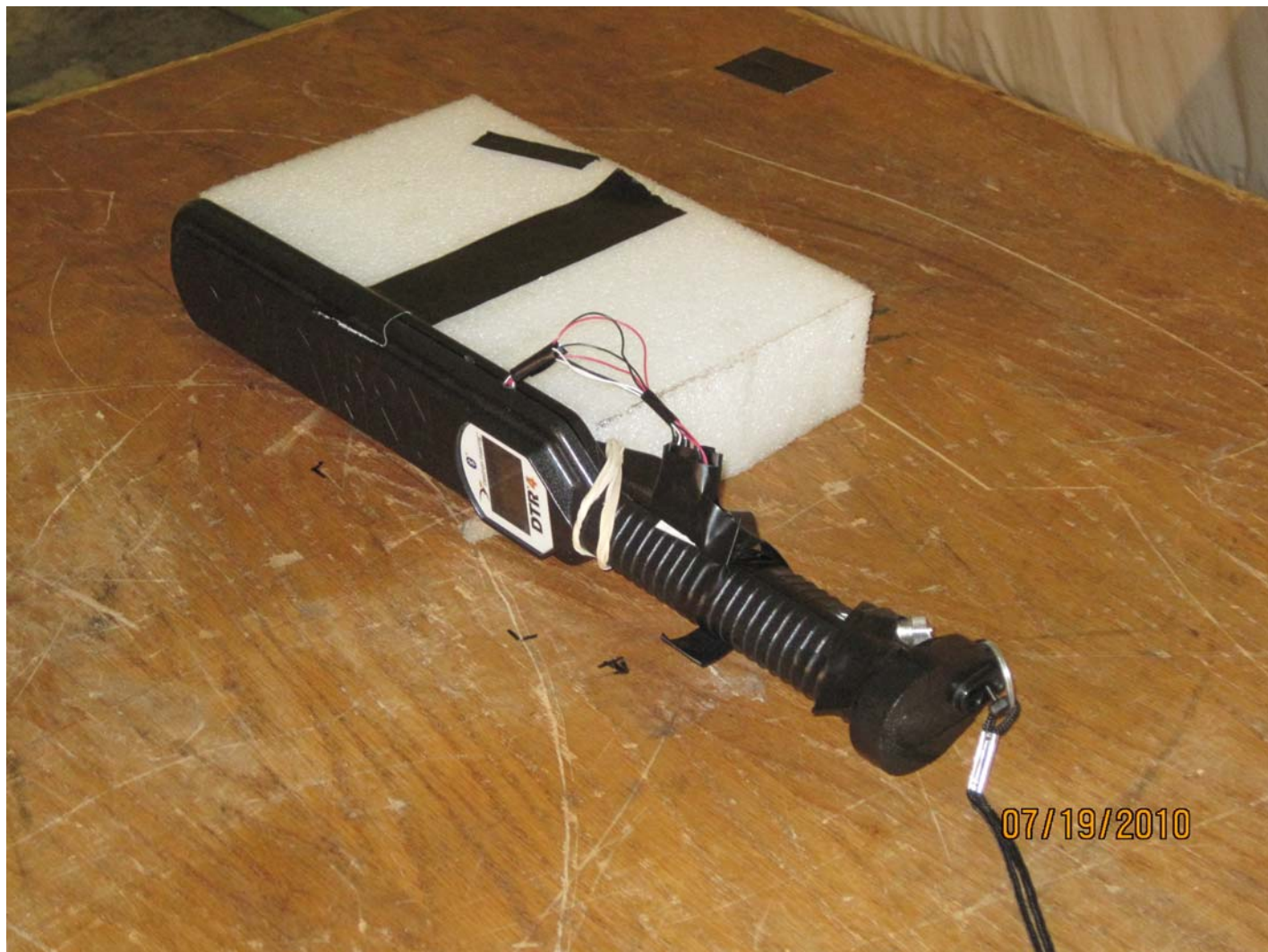
1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz and 60 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3 and 10 meters from the center of the turntable.
4. The circle is either a 6.7 meter or 1.2 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



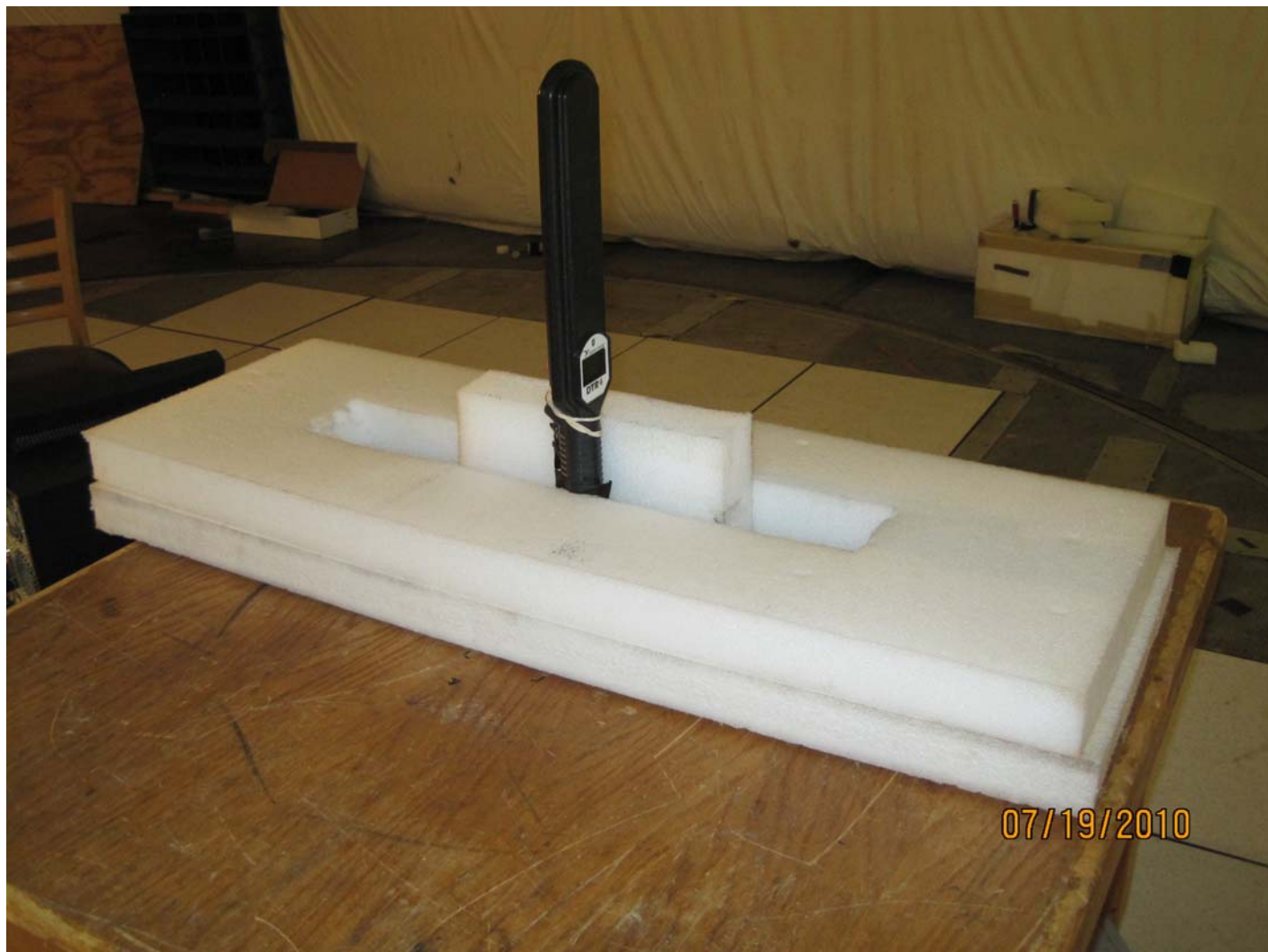
Test-setup photo(s):  
Radiated emissions



Test-setup photo(s):  
Radiated emissions



Test-setup photo(s):  
Radiated emissions



Test-setup photo(s):  
Radiated emissions





### **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
- Transmit frequency locked at low, mid or high channel as needed
- Both unmodulated & modulated as needed

### **Configuration of the device under test:**

- See Appendix A and test setup photo(s)
- See Product Information Form(s) in Appendix B

**DEVIATIONS FROM STANDARD:**

None.

**GENERAL REMARKS:**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:**

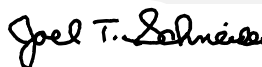
The requirements according to the technical regulations are

- 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: 19 July 2010Condition of EUT: NormalTesting Start Date: 19 July 2010Testing End Date: 20 July 2010**TÜV SÜD AMERICA INC**

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Greg S Jakubowski  
Senior EMC Technician



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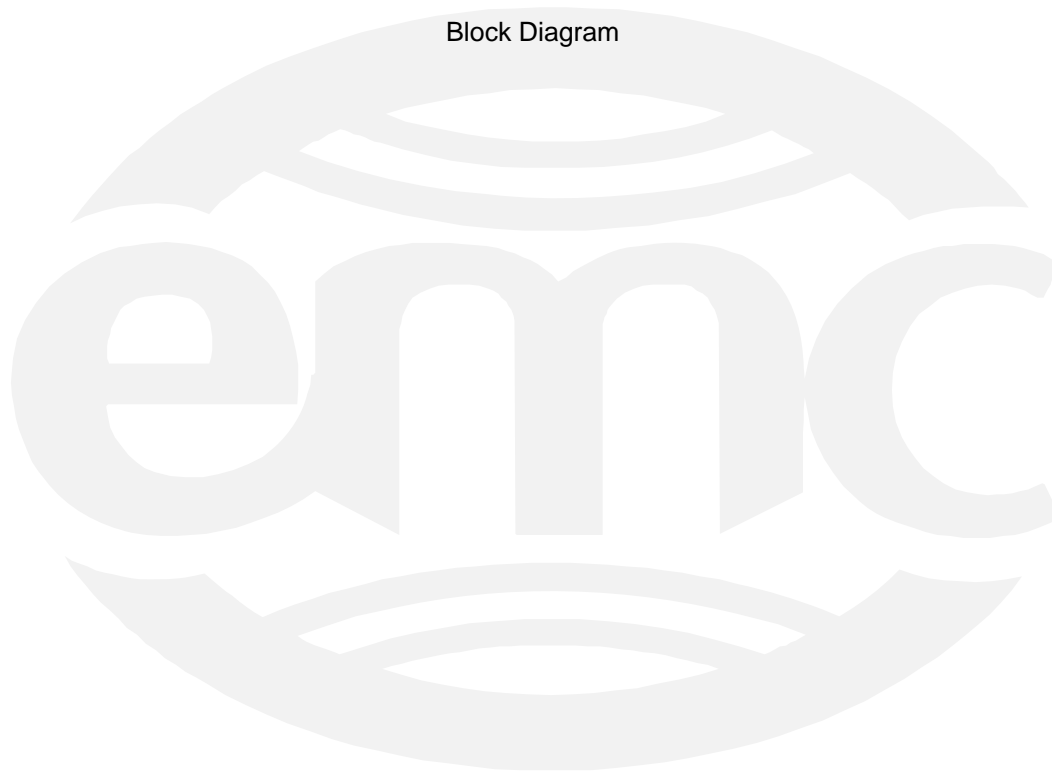
Joel T Schneider  
Senior EMC Engineer

## Appendix A

Constructional Data Form

and

Block Diagram





## 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: Destron Fearing  
 Address: 490 Villaume Ave.  
South St. Paul MN  
55075  
 Contact: Daniel Johnson Position: Product Engineer  
 Phone: 651-552-6586 Fax: 651-455-0413  
 E-mail Address: DJohnson@DestronFearing.com

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

EUT Description Hand Helod RFID reader  
 EUT Name DTR4  
 Model No.: DTR4 Serial No.: \_\_\_\_\_  
 Product Options: \_\_\_\_\_  
 Configurations to be tested: Bluetooth controled for Test

**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: None  
 Modifications made during test: None

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

- |   |   |
|---|---|
| <input type="checkbox"/> EMC Directive 2004/108/EC (EMC)<br>Std: _____  | <input checked="" type="checkbox"/> FCC: Class <input type="checkbox"/> A <input type="checkbox"/> B Part _____ |
| <input type="checkbox"/> Machinery Directive 89/392/EEC (EMC)<br>Std: _____   | <input type="checkbox"/> VCCI: Class <input type="checkbox"/> A <input type="checkbox"/> B                      |
| <input type="checkbox"/> Medical Device Directive 93/42/EEC (EMC)<br>Std: _____   | <input type="checkbox"/> BSMI: Class <input type="checkbox"/> A <input type="checkbox"/> B (Separate Report)    |
| <input type="checkbox"/> Vehicle Directive: <input type="checkbox"/> 2001/3/EC (EMC) <input type="checkbox"/> 2004/104/EC (EMC) | <input checked="" 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 checked="" type="checkbox"/> Other: <u>EN</u>  |

**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"/> Statement of Compliance (previously CoC)*<br>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 checked="" type="checkbox"/> FCC / TCB Certification   | <input checked="" type="checkbox"/> Industry Canada / FCB Certification                               |
| <input type="checkbox"/> E-Mark Certification   | <input type="checkbox"/> Taiwan Certification   |



## 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 SÜD 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: 19.5 in    Width: 3.0 in    Height: 2.875 in    Weight: 1.6 lbs

### 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: 6 VDC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: \_\_\_\_\_

Current (Amps/phase(max)): \_\_\_\_\_    Current (Amps/phase(nominal)): \_\_\_\_\_

Other \_\_\_\_\_

### Other Special Requirements

### Typical Installation and/or Operating Environment

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

### EUT Power Cable

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



## 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							Type
<b>EXAMPLE:</b> 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"/>
	<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"/>



## EMC Test Plan and Constructional Data Form

**EUT Software.**

Revision Level: Rev 01

Description: Read and Store RFID Tag IDs

**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. Stand alone Battery operation
  
- 2.
  
- 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 #



## 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.

<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>

### Oscillator Frequencies

<i>Manufacturer</i>	<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
	54.295 MHz		X1	U1 Decoder Board
	4.297 MHz	134 KHz	X2	Drive Circuit

### Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
AVT	C3H205210N AU	NA	<input checked="" 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>





## EMC Test Plan and Constructional Data Form

<b>Critical EMI Components (Capacitors, ferrites, etc.)</b>				
<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.

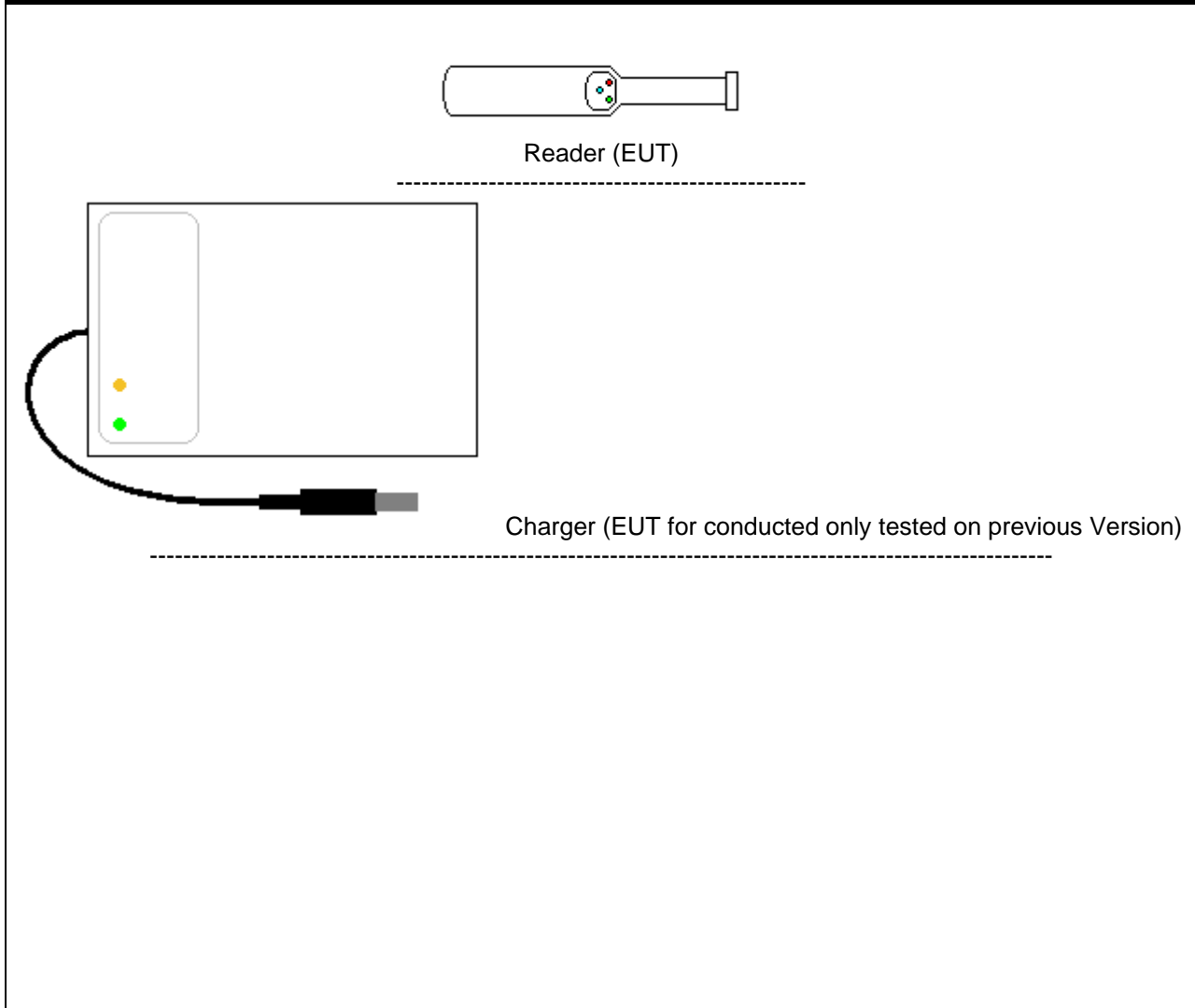
PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

**Authorization (Signature Required if a Third Party Certification is checked on pg 1)**

Daniel Johnson	7/19/2010
_____	_____
Customer authorization to perform tests according to this test plan.	Date
Daniel Johnson	7/19/2010
_____	_____
Test Plan/CDF Prepared By (please print)	Date

# EMC Block Diagram Form

**System Configuration Block Diagram** -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



## Authorization Signatures

Daniel Johnson

03-15-10

Customer authorization to perform tests according to this test plan.

Date

Daniel Johnson

03-15-10

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.

### 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  $\pm 1.8$  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  $\pm 4.8$  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

A coax cable was mounted to the PCB instead of the antenna. Measurements were made by connecting directly to a spectrum analyzer. Coax loss was corrected for by applying a 0.6 dB offset to the analyzer.

### Radiated Emissions

The final level, in  $\text{dB}\mu\text{V}/\text{m}$ , equals 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, 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. Intentional radiators are rotated through 3 orthogonal axes to determine the test position yielding the maximum emission levels.

Example:

FREQ (MHz)	LEVEL ( $\text{dB}\mu\text{V}$ )	CABLE/ANT/PREAMP (dB)	FINAL ( $\text{dB}\mu\text{V}/\text{m}$ )	POL/HGT/AZ (m) (deg)	DELTA1
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

### Radiated Emissions

Radiated emissions in the frequency range of 10k Hz 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. 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.

