

TEST RESULT SUMMARY

FCC Part 15 Subpart C Section 15.231 Industry Canada RSS-210 Issue 7 Section A1.1

MANUFACTURER'S NAME	Micro-Trak Systems Incorporated
MANUFACTURER'S ADDRESS	111 East LeRay Avenue Eagle Lake MN 56024
NAME OF EQUIPMENT	MT-WT – Wireless Transmitter
MODEL NUMBER(S) TESTED	MT-WT
TEST REPORT NUMBER	WC802450
TEST DATE(S)	03 April - 01 May 2008

The device under test was modified so that the transmitter remains on continuously for the purpose of measuring transmitter characteristics.

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable portions of the electromagnetic compatibility requirements of FCC Part 15 Subpart C Section 15.231 "Periodic operation in the band 40.66–40.70 MHz and above 70 MHz" and Industry Canada RSS-210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

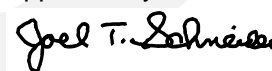
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production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

Date: 02 May 2008

Tested by:



Approved by:



Location: Taylors Falls MN
USA

Greg Jakubowski
Senior EMC Technician

Joel T Schneider
Senior EMC Engineer

Not Transferable

EMC TEST REPORT

Test Report No. WC802450 Date of issue: 02 May 2008

Model / Serial No(s) Tested MT-WT / ---

Product Type MT-WT – Wireless Transmitter

Manufacturer Micro-Trak Systems Incorporated

Address 111 East LeRay Avenue
Eagle Lake MN 56024

Test Result ☒ **Positive** ☐ **Negative**

Total pages including Appendices 29

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
	29	02 May 2008	Initial Release



TEST REPORT CONTENTS

	Page(s)
Revision Record	2
Directory	3
Test Regulations, Environmental conditions, Power supply	4
Test Information:	
Momentary operation, FCC 15.231[a], RSS-210 A1.1.1	5
Radiated emissions - fundamental, FCC 15.231[b], RSS-210 A1.1.2	6 - 11
Radiated emissions - spurious, FCC 15.231[b], RSS-210 A1.1.2	12 - 11
Bandwidth, FCC 15.321[c], RSS-210 A1.1.3	14 - 15
Equipment Under Test Information	16
General Remarks and Summary	17
Test-setups (Photos)	18 - 19
Appendix A	
Constructional Data Form & Block Diagram	20 - 27
Appendix B	
Measurement protocol	28 - 29

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are accurate. The reader is cautioned that there is some measurement variability due to the tolerances of the test equipment that can contribute to a nominal product measurement uncertainty. Furthermore, component differences and manufacturing process variability of production units similar to that tested may result in additional product uncertainty. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests.

TEST EQUIPMENT

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

EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C Section 15.231
IC RSS-210 Issue 7

ENVIRONMENTAL CONDITIONS IN THE LAB

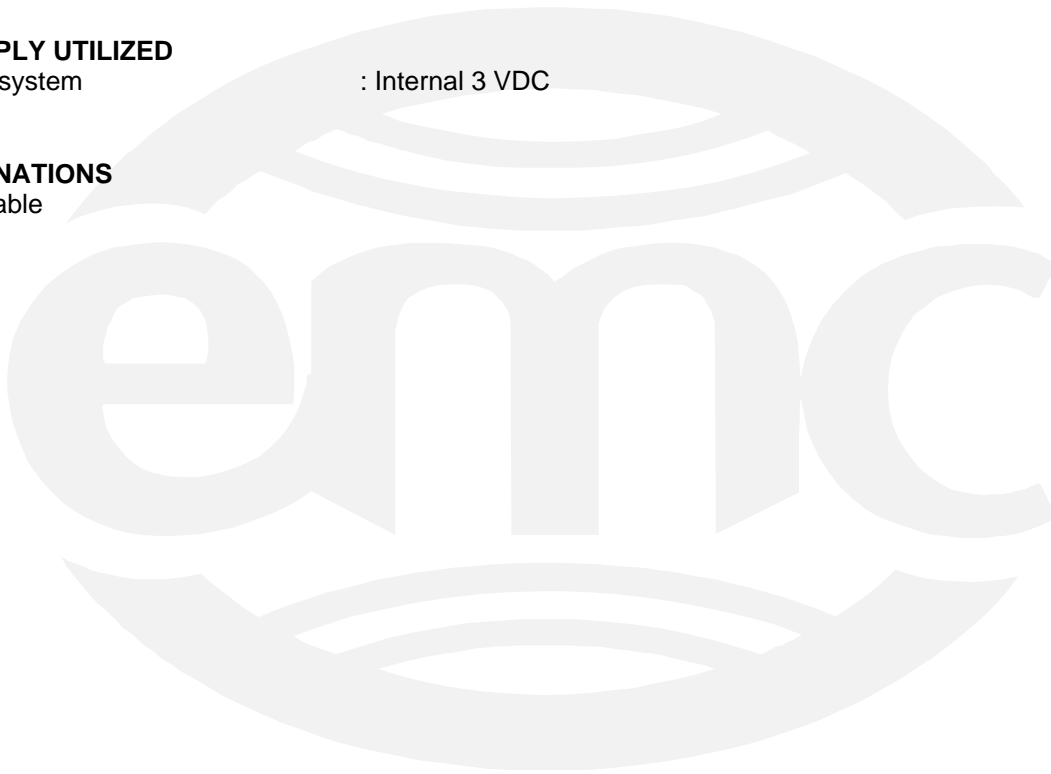
	<u>Actual</u>
Temperature:	: 21 °C
Relative Humidity	: 21 %
Atmospheric pressure	: 99.0 kPa

POWER SUPPLY UTILIZED

Power supply system : Internal 3 VDC

SIGN EXPLANATIONS

- ☐ - not applicable
- ☒ - applicable



Momentary operation

FCC 15.231(a), RSS-210 A1.1.1

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Transmit signal is present only while a button is depressed and stops immediately upon release.

Manufacturer's declaration

The transmitter initiates the transmission of a control signal used in remote switches

The transmitter does not transmit continuous voice or video information or radio control information for toys

The transmitter employs manual switches which automatically deactivate within 5 seconds of being released

The transmitter does not produce periodic transmissions at regular predetermined intervals

The transmitter does not employ radio control purposes during emergencies involving fire, security, and safety of life

Test location

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

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

☒ - Wild River Lab Large Test Site tech area

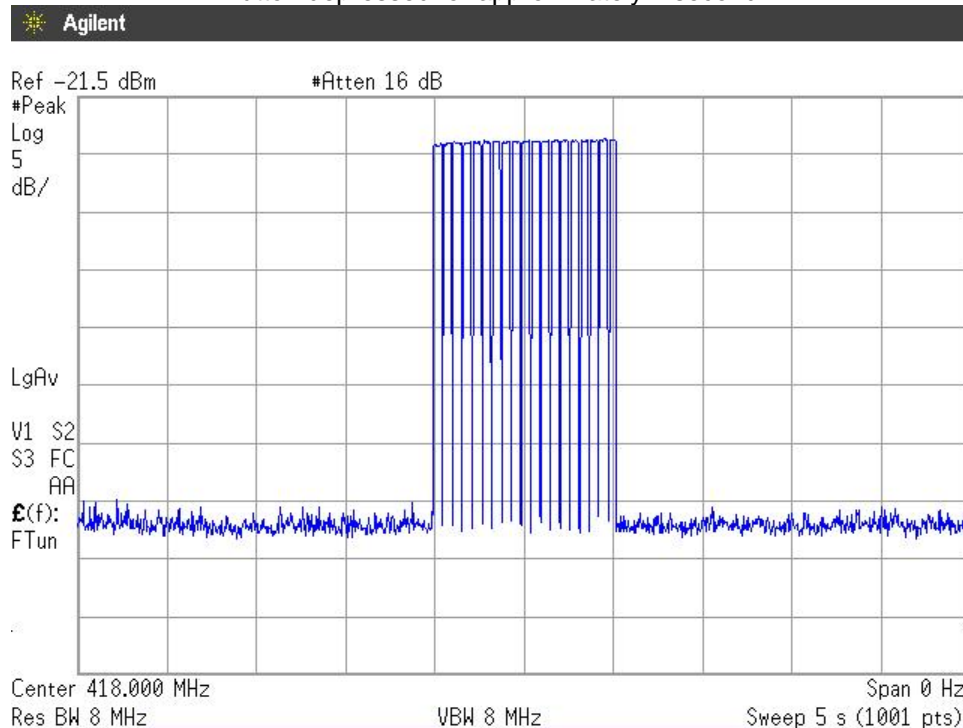
Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	19-Dec-08
WRLE01564	7405-901	EMCO	Near field probe	na	Code Y

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

Test data

Button depressed for approximately 1 second



Radiated emissions - fundamental

FCC 15.231(b), RSS-210 A1.1.2

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

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

Fundamental transmit frequency = 418 MHz

Maximum average field strength = 3958 $\mu\text{V/m}$ or 71.95 dB $\mu\text{V/m}$ at 3 meters

Minimum margin of compliance = 8.25 dB

Maximum peak field strength = 9226 $\mu\text{V/m}$ or 79.3 dB $\mu\text{V/m}$ at 3 meters

Minimum margin of compliance = 20.9 dB

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
WREL03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	10-May-08
WRLE03847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	16-May-08
WRLE03295	85662A	Hewlett-Packard	Analyzer Display	2349A06144	16-May-08
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	31-Mar-09

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

Test limit

Average; 10333 $\mu\text{V/m}$ or 80.2 dB $\mu\text{V/m}$ at 3 meters

Peak; 103 mV/m or 100.2 dB $\mu\text{V/m}$ at 3 meters

Test data

See following pages

RADIATED EMISSIONS



Test Report #: WC802450 Run 1 Test Area: LTS

EUT Model #: MT-WT Date: 4/3/2008

EUT Serial #: na EUT Power: 3 VDC Temperature: 21.0 °C

Test Method: FCC 15.231 Air Pressure: 99.0 kPa

Customer: Micro-Trak Systems, Inc. Rel. Humidity: 21.0 %

EUT Description: Wireless Transmitter

Notes:

Data File Name: 2450.dat

Page: 1 of 5

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 15.231 418MHz Tx Avg	DELTA2 15.231 418MHz Tx Pk
The device is a manually operated remote control. The transmit signal does not control a toy or include voice / video information and is active only when depressing a button and stops immediately upon release.						
EUT upright, maximized						
418.006 MHz	60.55 Pk	2.39 / 16.36 / 0.0 / 0.0	79.3	V / 1.20 / 232	n/a	-20.9
418.006 MHz	53.2 Av	2.39 / 16.36 / 0.0 / 0.0	71.95	V / 1.20 / 232	-8.25	n/a
EUT on its back, maximized						
418.006 MHz	59.15 Pk	2.39 / 16.36 / 0.0 / 0.0	77.9	H / 1.00 / 103	n/a	-22.3
418.006 MHz	51.5 Av	2.39 / 16.36 / 0.0 / 0.0	70.25	H / 1.00 / 103	-9.95	n/a
EUT on its side, maximized						
417.943 MHz	59.85 Pk	2.38 / 16.36 / 0.0 / 0.0	78.59	H / 1.00 / 86	n/a	-21.61
418.006 MHz	52.3 Av	2.39 / 16.36 / 0.0 / 0.0	71.05	H / 1.00 / 86	-9.15	n/a
EUT upright						
Maximized						
836.006 MHz	46.6 Pk	3.38 / 22.35 / 29.8 / 0.0	42.53	V / 1.28 / 181	n/a	-37.67
836.006 MHz	34.6 Av	3.38 / 22.35 / 29.8 / 0.0	30.53	V / 1.28 / 181	-29.67	n/a
End scan 30 - 1000 MHz						
Begin scan 1 - 5 GHz						
Maximized						
1.254 GHz	58.6 Pk	4.48 / 25.3 / 42.12 / 0.0	46.26	V / 1.00 / 176	-13.94*	-33.94

Tested by: Greg Jakubowski
Printed

Signature

Reviewed by: Joel T Schneider
Printed

Signature

RADIATED EMISSIONS



Test Report #: WC802450 Run 1 Test Area: LTS
EUT Model #: MT-WT Date: 4/3/2008
EUT Serial #: na EUT Power: 3 VDC Temperature: 21.0 °C
Test Method: FCC 15.231 Air Pressure: 99.0 kPa
Customer: Micro-Trak Systems, Inc. Rel. Humidity: 21.0 %
EUT Description: Wireless Transmitter

Notes: _____

Data File Name: 2450.dat

Page: 2 of 5

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 15.231 418MHz Tx Avg	DELTA2 15.231 418MHz Tx Pk
1.672 GHz	59.25 Pk	5.02 / 25.96 / 42.9 / 0.0	47.33	V / 1.11 / 80	-6.67*	-26.67
2.09 GHz	60.2 Pk	5.64 / 27.81 / 43.42 / 0.0	50.22	V / 1.73 / 79	-9.98*	-29.98
2.508 GHz	49.2 Pk	6.27 / 28.79 / 43.73 / 0.0	40.53	V / 1.73 / 222	-19.67*	-39.67
2.926 GHz	58.4 Pk	6.88 / 29.78 / 43.61 / 0.0	51.44	V / 1.70 / 135	-8.76*	-28.76
3.344 GHz	42.45 Pk	7.45 / 30.76 / 43.73 / 0.0	36.93	V / 1.70 / 135	-23.27*	-43.27

End scan 30 MHz - 5 GHz

* Peak measurement against an average limit

Tested by: Greg Jakubowski
Printed

Signature

Reviewed by: Joel T Schneider
Printed

Signature

RADIATED EMISSIONS



Test Report #: WC802450 Run 1 Test Area: LTS

EUT Model #: MT-WT Date: 4/3/2008

EUT Serial #: na EUT Power: 3 VDC Temperature: 21.0 °C

Test Method: FCC 15.231 Air Pressure: 99.0 kPa

Customer: Micro-Trak Systems, Inc. Rel. Humidity: 21.0 %

EUT Description: Wireless Transmitter

Notes:

Data File Name: 2450.dat

Page: 3 of 5

Measurement summary for limit1: 15.231 418MHz Tx Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 15.231 418MHz Tx Avg
418.006 MHz	53.2 Av	2.39 / 16.36 / 0.0 / 0.0	71.95	V / 1.20 / 232	-8.25
836.006 MHz	34.6 Av	3.38 / 22.35 / 29.8 / 0.0	30.53	V / 1.28 / 181	-29.67
836.006 MHz	46.6 Pk	3.38 / 22.35 / 29.8 / 0.0	42.53	V / 1.28 / 181	-17.67*
1.254 GHz	58.6 Pk	4.48 / 25.3 / 42.12 / 0.0	46.26	V / 1.00 / 176	-13.94*
1.672 GHz	59.25 Pk	5.02 / 25.96 / 42.9 / 0.0	47.33	V / 1.11 / 80	-6.67*
2.09 GHz	60.2 Pk	5.64 / 27.81 / 43.42 / 0.0	50.22	V / 1.73 / 79	-9.98*
2.508 GHz	49.2 Pk	6.27 / 28.79 / 43.73 / 0.0	40.53	V / 1.73 / 222	-19.67*
2.926 GHz	58.4 Pk	6.88 / 29.78 / 43.61 / 0.0	51.44	V / 1.70 / 135	-8.76*
3.344 GHz	42.45 Pk	7.45 / 30.76 / 43.73 / 0.0	36.93	V / 1.70 / 135	-23.27*

* Peak measurement against an average limit

Tested by: Greg Jakubowski

Printed

Signature

Reviewed by: Joel T Schneider

Printed

Signature

RADIATED EMISSIONS



Test Report #: WC802450 Run 1 Test Area: LTS

EUT Model #: MT-WT Date: 4/3/2008

EUT Serial #: na EUT Power: 3 VDC Temperature: 21.0 °C

Test Method: FCC 15.231 Air Pressure: 99.0 kPa

Customer: Micro-Trak Systems, Inc. Rel. Humidity: 21.0 %

EUT Description: Wireless Transmitter

Notes: _____

Data File Name: 2450.dat Page: 4 of 5

Measurement summary for limit2: 15.231 418MHz Tx Pk (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 15.231 418MHz Tx Pk
418.006 MHz	60.55 Pk	2.39 / 16.36 / 0.0 / 0.0	79.3	V / 1.20 / 232	-20.9
1.672 GHz	59.25 Pk	5.02 / 25.96 / 42.9 / 0.0	47.33	V / 1.11 / 80	-26.67
2.926 GHz	58.4 Pk	6.88 / 29.78 / 43.61 / 0.0	51.44	V / 1.70 / 135	-28.76
2.09 GHz	60.2 Pk	5.64 / 27.81 / 43.42 / 0.0	50.22	V / 1.73 / 79	-29.98
1.254 GHz	58.6 Pk	4.48 / 25.3 / 42.12 / 0.0	46.26	V / 1.00 / 176	-33.94
836.006 MHz	46.6 Pk	3.38 / 22.35 / 29.8 / 0.0	42.53	V / 1.28 / 181	-37.67
2.508 GHz	49.2 Pk	6.27 / 28.79 / 43.73 / 0.0	40.53	V / 1.73 / 222	-39.67
3.344 GHz	42.45 Pk	7.45 / 30.76 / 43.73 / 0.0	36.93	V / 1.70 / 135	-43.27

Tested by: Greg Jakubowski
Printed

Signature

Reviewed by: Joel T Schneider
Printed

Signature

RADIATED EMISSIONS



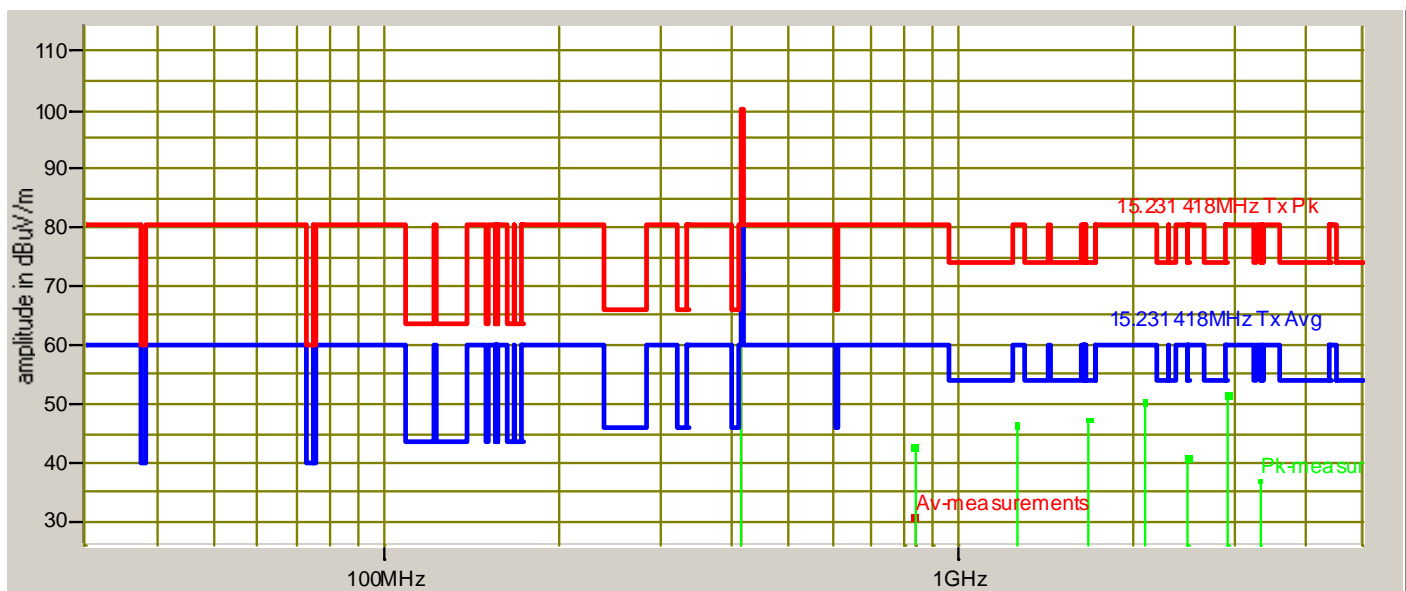
Test Report #: WC802450 Run 1 Test Area: LTS
EUT Model #: MT-WT Date: 4/3/2008
EUT Serial #: na EUT Power: 3 VDC Temperature: 21.0 °C
Test Method: FCC 15.231 Air Pressure: 99.0 kPa
Customer: Micro-Trak Systems, Inc. Rel. Humidity: 21.0 %
EUT Description: Wireless Transmitter

Notes:

Data File Name: 2450.dat

Page: 5 of 5

Graph:



Tested by: Greg Jakubowski
Printed

Signature

Reviewed by: Joel T Schneider
Printed

Signature

Radiated emissions - spurious

FCC 15.231(b), RSS-210 A1.1.2

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

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

Minimum margin of compliance > 6 dB (peak measurement against an average limit)

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
WREL03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	10-May-08
WRLE03229	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2483	07-Jun-08
WRLE03847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B
WRLE010527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B
WRLE03294	8566B	Hewlett-Packard	Spectrum Analyzer	2349A03098	16-May-08
WRLE03295	85662A	Hewlett-Packard	Analyzer Display	2349A06144	16-May-08
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	31-Mar-09

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

Test limit

Within the restricted bands of section 15.205

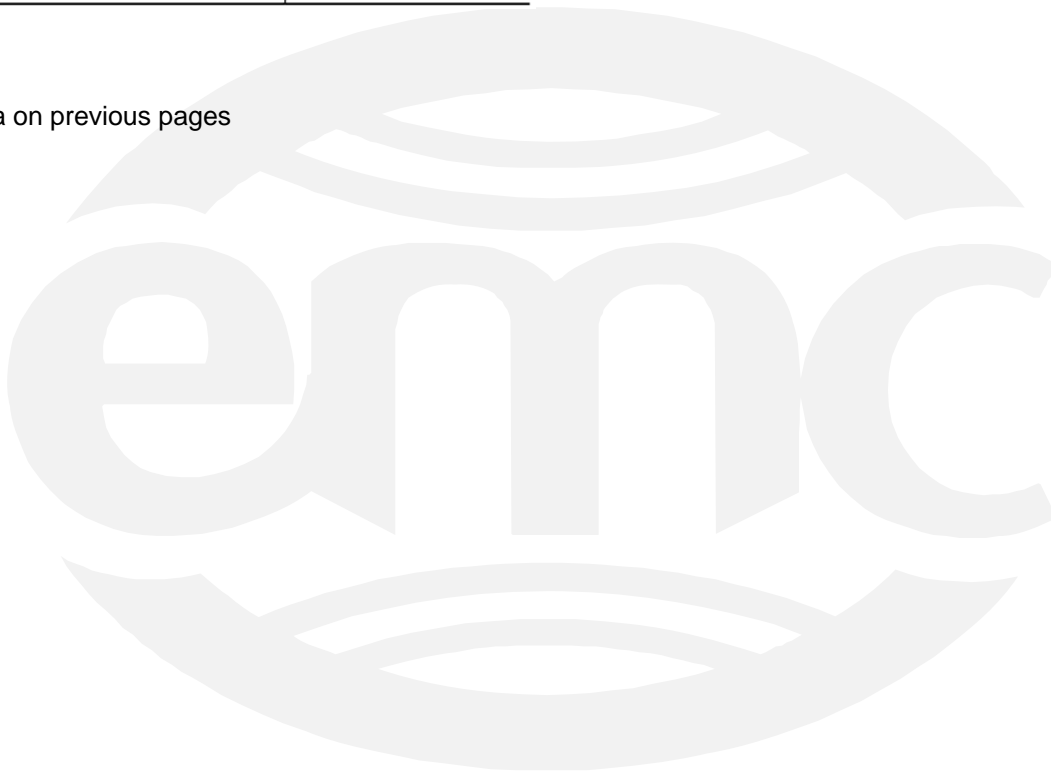
Frequency (MHz)	Field strength (microvolts/meter)	Measure- ment dis- tance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100 **	3
88–216	150 **	3
216–960	200 **	3
Above 960	500	3

In addition to the provisions of 15.205, the field strength of emissions from intentional radiators operated under 15.231 shall not exceed the following

Funda- mental fre- quency (MHz)	Field strength of funda- mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66– 40.70.	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260–470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

Test data

See run 1 data on previous pages



Bandwidth

FCC 15.321[c], RSS-210 A1.1.3

Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Test was performed in accordance with the test procedure of ANSI C63.4 2003, clause 13.1.7

The 20 dB bandwidth = 226 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
WREL03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	10-May-08
WRLE03847	ZHL-1042J	Mini-Circuits	Preamplifier 10 - 3000 MHz	0607	Code B
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	19-Dec-08

Test limit

No wider than 0.25% of the center frequency or 1.045 MHz

Test data

See following pages

20 dB bandwidth

Agilent 10:25:08 Apr 3, 2008

▲ Mkr2 226 kHz
0.04 dB

Ref 62.99 dB μ V

Atten 10 dB

#Peak
Log
5
dB/

DI
40.1
dB μ V
LgAv

V1 S2

Center 418.006 MHz

Span 1 MHz

#Res BW 30 kHz

#VBW 100 kHz

Sweep 1.067 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	418.005 MHz	60.15 dB μ V
2R	(1)	Freq	417.866 MHz	40.15 dB μ V
2Δ	(1)	Freq	226 kHz	0.04 dB

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
- ☒ - Normal with continuous transmission

Configuration of the device under test:

- ☒ - See Constructional Data Form in Appendix A
- ☐ - See Product Information Form(s) in Appendix A

The following peripheral devices and interface cables were connected during the measurement:

- | | |
|---|----------------|
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - unshielded power cable | |
| <input type="checkbox"/> - unshielded cables | |
| <input type="checkbox"/> - shielded cables | MPS.No.: _____ |
| <input type="checkbox"/> - customer specific cables | |
| <input type="checkbox"/> - _____ | |
| <input type="checkbox"/> - _____ | |

GENERAL REMARKS:

The device under test was modified so that the transmitter remains on continuously for the purpose of measuring transmitter characteristics.

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

EUT Received Date: 03 April 2008

Condition of EUT: Normal

Testing Start Date: 03 April 2008

Testing End Date: 01 May 2008

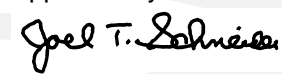
TÜV SÜD AMERICA INC

Tested by:



Greg Jakubowski
Senior EMC Technician

Approved by:



Joel T Schneider
Senior EMC Engineer

Test-setup photo(s):
Radiated emissions



Test-setup photo(s):
Radiated emissions



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: Micro-Trak Systems, Inc.
 Address: 111 E. LeRay Ave.
Eagle lake, MN 56024
 Contact: Tim Smith Position: Engineering Tech.
 Phone: 507-257-3600 Fax: 507-257-3001
 E-mail Address: tsmith@micro-trak.com

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

EUT Description Wireless Transmitter
 EUT Name MT-WT
 Model No.: _____ Serial No.: _____
 Product Options: N/A
 Configurations to be tested: Standard

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 type="checkbox"/> EMC Directive 2004/108/EC (EMC)
Std: _____ | <input checked="" type="checkbox"/> FCC: Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B Part <u>15</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"/> 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 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 checked="" type="checkbox"/> FCC / TCB Certification | <input 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: 1.5" Width: 2.5" Height: .5" Weight: 4oz.

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: 3VDC (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.)

Tractor or Vehicle cab

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
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"/>
	<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"/>	<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:

Description:

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. Continuous transmit
- 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>
Linx Tech.	418MHz			Carrier

Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
			<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>

**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 ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

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

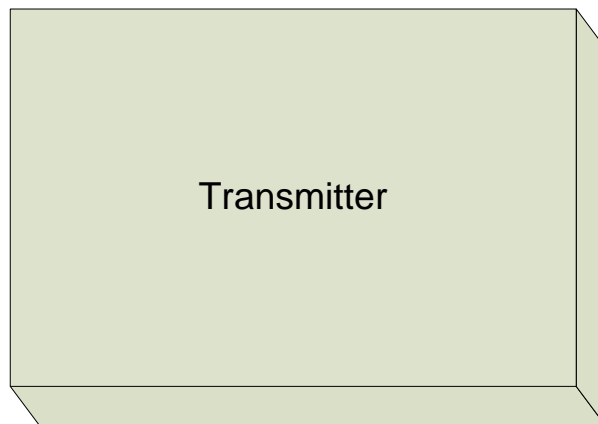
Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

MT-WT Wireless Transmitter



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 ± 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. Intentional radiators are rotated through 3 orthogonal axes to determine the test position yielding the maximum emission levels.

Example:

FREQ (MHz)	LEVEL (dB μ V)	CABLE/ANT/PREAMP			FINAL (dB μ V/m)	POL/HGT/AZ			DELTA1
		(dB)	(dB/m)	(dB)		(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.