

# TEST REPORT

## FCC Part 15 Subpart C Section 15.209

### IC RSS-210 Issue 8

### IC RSS-Gen Issue 3

MANUFACTURER'S NAME	Danfoss Power Solutions (US) Company 3500 Annapolis Lane N Plymouth MN 55447
PRODUCT DESCRIPTION	Wireless multi-sonic distance sensor used for asphalt paving/milling machine applications
PRODUCT NAME	WMSS1000
MODEL NUMBER(S) TESTED	WMSS1000 (P/N 11135819)
SERIAL NUMBER(S) TESTED	70106560V015B
TEST REPORT NUMBER	NC1308683.1
TEST DATE(S)	18-19 September 2013

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 15.209 "Radiated emission limits; general requirements" and Industry Canada RSS-210 Issue 8 "Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment" and Industry Canada RSS-Gen Issue 3 "General Requirements and Information for the Certification of Radio Apparatus".

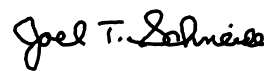
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production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

Date: 15 October 2013

Location: Taylors Falls MN  
USA



Greg S Jakubowski  
EMC Test Engineer



Joel T Schneider  
Senior EMC Engineer

Not Transferable

# EMC TEST REPORT

Test Report No. NC1308683.1 Date of issue: 15 October 2013

Product Description Wireless multi-sonic distance sensor used for asphalt paving/milling machine applications

Product Name WMSS1000

Model(s) Tested WMSS1000 (P/N 11135819)

Serial No(s) Tested 70106560V015B

Manufacturer Danfoss Power Solutions (US) Company  
3500 Annapolis Lane N  
Plymouth MN 55447

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

*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. TÜV SÜD America's Wild River Lab maintains A2LA accreditation to ISO/IEC 17025 for the specific tests listed in A2LA Certificate #2955.12 as an Electrical Testing Laboratory.*

*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
	27	15 October 2013	Initial Release



## DIRECTORY

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## EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C §15.209

IC RSS-210 Issue 8

IC RSS-Gen Issue 3

## ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 19°C
Atmospheric pressure	: 98kPa
Relative Humidity	: 62%

## POWER SUPPLY UTILIZED

Power supply system : 110VAC / 60Hz – 1 phase and 3.3 VDC

## TEST EQUIPMENT

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

## 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. 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 2.5, RSS-Gen 7.2.5

### Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.2.2.

Maximum field strength of the fundamental is -14.28 dB $\mu$ V/m or 0.193  $\mu$ V/m at 30 meters at 13.56 MHz.

No spurious emissions were detected.

No unwanted emissions exceed the level of the fundamental.

### Test location

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

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

### Test distance

☒ - 1 meters

☐ - 3 meters

☐ - 10 meter

### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE02418	6502	Electro-Mechanics (EMCO)	Loop Antenna	2215	16-Aug-14
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	837055/003	15-Jul-14
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code B

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

### Test limit

Frequency (MHz)	Field strength $\mu$ 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

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

### Test Data

See following page

## List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
Scanning 9 kHz - 30 MHz						
Compared fundamental level at 13.56 MHz						
DUT rotated 360 degrees through 3 orthogonal axis						
Highest level with front of DUT & trace antenna parallel with loop						
1m						
13.56 MHz	34.72 Qp	0.25 / 10.75 / 0.0 / 0.0	45.72	V / 1.00 / 0	n/a	n/a
No other significant emissions detected						
3m						
13.56 MHz level is in the noise floor at 3m						
Same levels with DUT at 0.8 or 1.5m high						
Same levels with AC-DC adapter, 110V/60Hz						
FCC 15.209 limit = 29.5 dBuV/m @ 30m						
Extrapolated level at 30m using 40dB/decade roll off = $45.72 - 60 = -14.28$ dBuV/m						

Radiated emissions in the frequency range of 10 kHz to 30 MHz, including the fundamental transmit signal, are measured using a receiver capable of quasi-peak/average/peak measurements and a magnetic loop antenna. The transmitter and loop antenna are 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. Measurements between 150 kHz and 30 MHz are made with a 9 kHz resolution bandwidth. Measurements between 9 kHz and 150 kHz are made with a 200 Hz resolution bandwidth.

## Radiated Emissions 30 - 1000 MHz

### FCC 15.209(c), FCC 15.209(f), IC RSS-210 2.5, RSS-Gen 7.2.5

#### Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.3.

Maximum spurious emission is 31.85 dB $\mu$ V/m (39.1  $\mu$ V/m) at 3 meters at 152.225 MHz.

#### Test location

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

#### Test distance

10 meters

#### Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	30-May-14
WRLE03295	85662A	Hewlett-Packard	Analyzer Display	2349A06144	22-Apr-14
WRLE02689	8566B	Hewlett-Packard	Spectrum Analyzer	2416A00321	22-Apr-14
NBLE02683	85650A	Hewlett-Packard	Quasi-peak Adapter	2430A00495	30-May-14
WRLE02670	8447D	Hewlett-Packard	Preamplifier	2443A03954	Code B 11-Jan-14
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code Y

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

#### Limit

Frequency (MHz)	Field strength ( $\mu$ V/m)	Field strength (dB $\mu$ V/m)	Measurement distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

The emission limits shown in the above tables are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§ 15.250, 15.252, 15.255, and 15.509–15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. 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 a 120 kHz / 6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz RBW/VBW / 6 dB bandwidth and peak detection, 1 MHz RBW/ 10 Hz VBW for average detection. Table top equipment is placed on a non-conductive support 80 cm 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 is rotated 360 degrees. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB / decade (inverse linear-distance for field strength measurements).

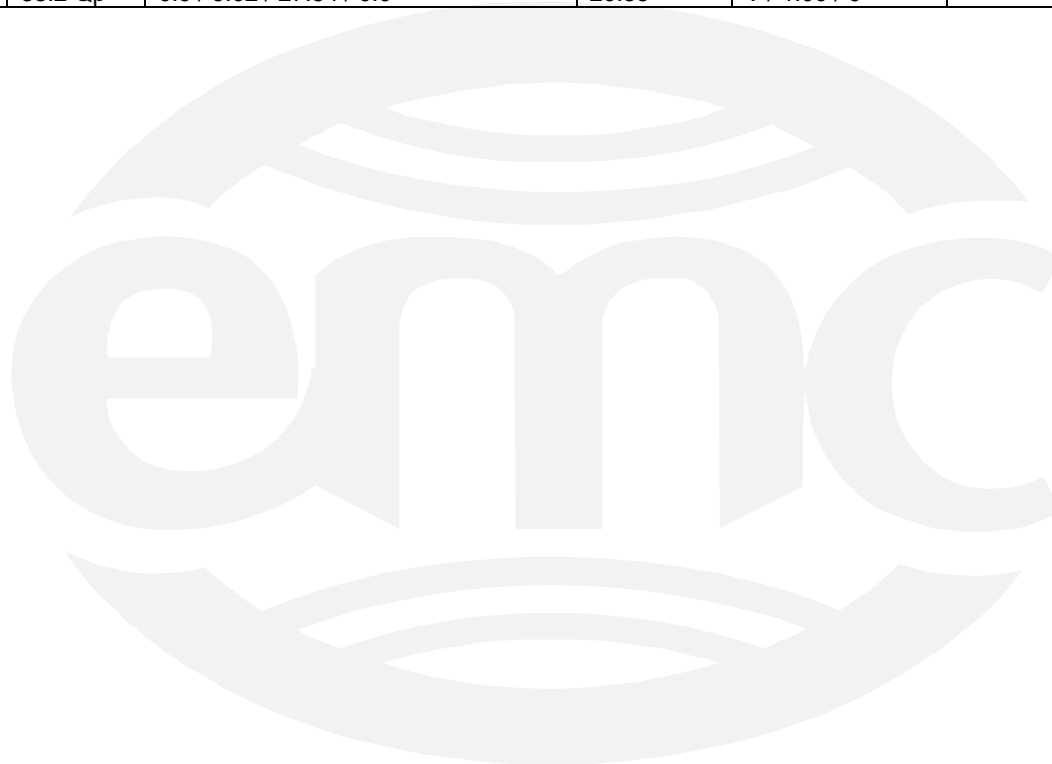
#### Test data

See next page.



### Measurement summary for limit1: FCC-B <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
152.225 MHz	49.06 Qp	1.06 / 9.2 / 27.47 / 0.0	31.85	V / 1.00 / 107	-11.65
48.156 MHz	40.1 Qp	0.51 / 14.05 / 27.7 / 0.0	26.96	V / 1.00 / 180	-13.04
35.176 MHz	35.55 Qp	0.44 / 18.51 / 27.73 / 0.0	26.77	V / 1.00 / 270	-13.23
52.026 MHz	40.6 Qp	0.53 / 13.09 / 27.69 / 0.0	26.53	V / 1.00 / 180	-13.47
49.506 MHz	39.55 Qp	0.51 / 13.68 / 27.7 / 0.0	26.05	V / 1.00 / 180	-13.95
493.656 MHz	39.11 Qp	2.16 / 17.2 / 27.27 / 0.0	31.2	V / 1.00 / 197	-14.8
69.18 MHz	42.45 Qp	0.62 / 9.16 / 27.65 / 0.0	24.58	V / 1.00 / 270	-15.42
85.71 MHz	43.1 Qp	0.71 / 7.2 / 27.62 / 0.0	23.39	V / 1.00 / 90	-16.61
414.192 MHz	34.85 Qp	1.93 / 16.18 / 27.21 / 0.0	25.75	H / 3.00 / 0	-20.25
189.575 MHz	38.65 Qp	1.27 / 10.56 / 27.39 / 0.0	23.09	V / 1.00 / 0	-20.41
122.345 MHz	38.2 Qp	0.9 / 9.02 / 27.54 / 0.0	20.59	V / 1.00 / 0	-22.91



## 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 = 5.7 k Hz

### 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
WRLE02418	6502	Electro-Mechanics (EMCO)	Loop Antenna	2215	16-Aug-14
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	20-May-14
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code Y

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

### Test limit

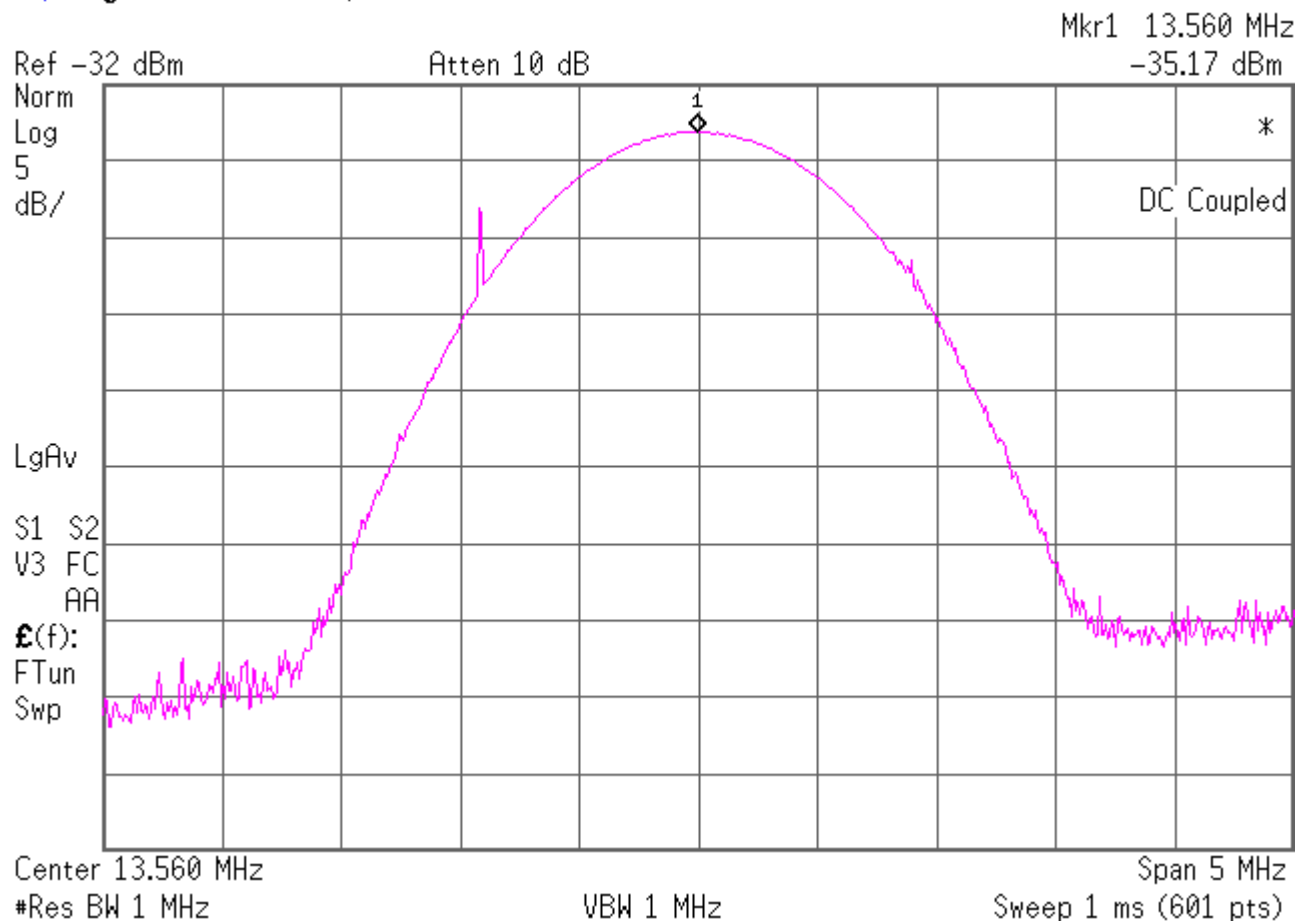
Not specified

### Test data

See following pages

99% Occupied bandwidth  
1 of 2

Agilent 14:27:23 Sep 19, 2013



99% Occupied bandwidth  
2 of 2

Agilent 14:34:46 Sep 19, 2013

▲ Mkr1 5.7 kHz  
-0.39 dB

Ref -35.2 dBm

Atten 10 dB

Norm  
Log  
5  
dB/

DC Coupled

DI  
-55.2  
dBm  
LgAv

S1 S2  
V3 FC  
AA

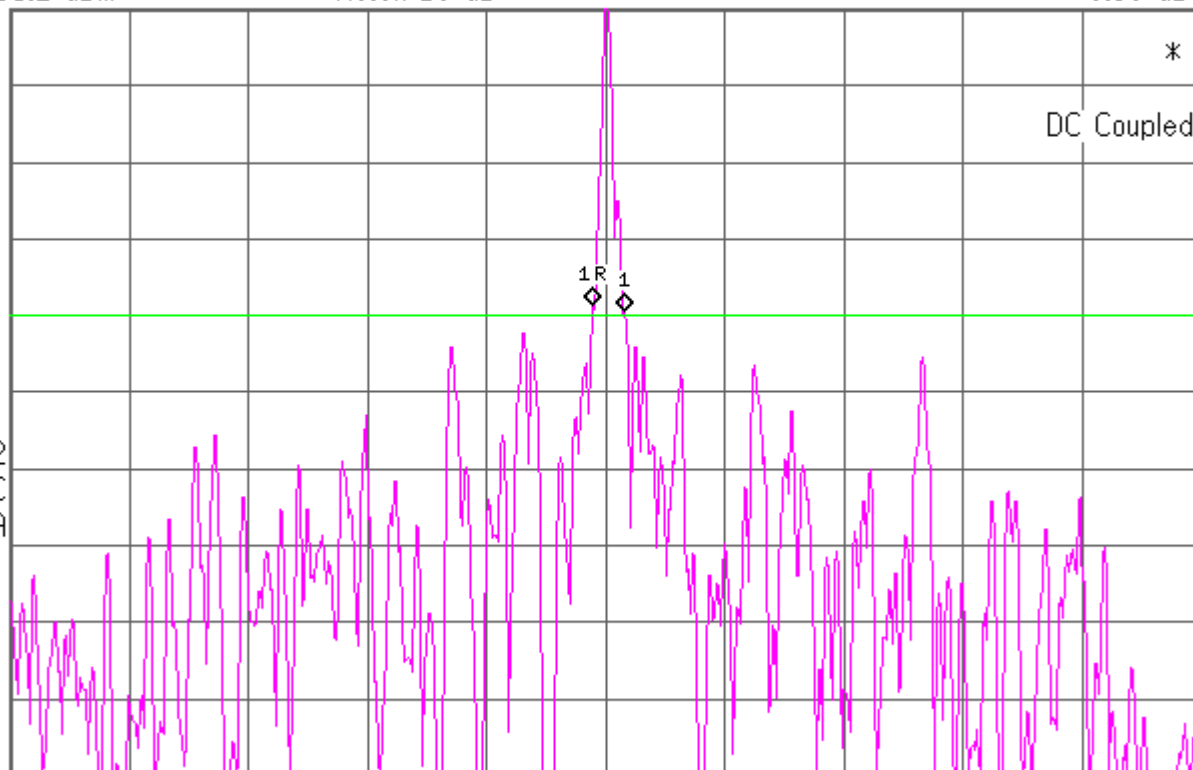
£(f):  
f>50k  
Swp

Center 13.560 0 MHz

#Res BW 1 kHz

VBW 1 kHz

Span 200 kHz  
Sweep 241.2 ms (601 pts)



## Conducted Emissions - AC Power Lines

### FCC 15.207(a), 15.107(b), IC RSS-Gen 7.2.4

#### 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 17.1 dB at 375 kHz – quasi-peak

Minimum margin of compliance is 11.1 dB at 375.0 kHz – average

#### Test location

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

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

#### Test equipment used:

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE10944	FCC-LISN-50-25-2-10	Fischer Custom Comm	LISN	120308	24-Jun-14
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	837055/003	15-Jul-14
WRLE10863	N/A	TÜV SÜD America Inc	Test Companion Software Version 3.4.71	N/A	Code Y

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

#### Test limits, dB $\mu$ V – Class B

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

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 (9 kHz resolution bandwidth) and quasi-peak/average detection, and a Line Impedance Stabilization Network (LISN), with 50  $\Omega$ /50  $\mu$ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions.

#### Test data

See following pages

### Measurement summary for limit1: 15.207 qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 15.207 qp
375.0 kHz	41.27 Qp	0.13 / -0.18 / 0.0 / 0.0	41.22	L1	-17.17
270.0 kHz	43.65 Qp	0.12 / -0.21 / 0.0 / 0.0	43.56	L1	-17.56
2.88 MHz	32.19 Qp	0.33 / 0.0 / 0.0 / 0.0	32.52	L1	-23.48
955.0 kHz	31.23 Qp	0.18 / -0.01 / 0.0 / 0.0	31.39	L1	-24.61
575.0 kHz	30.65 Qp	0.15 / -0.13 / 0.0 / 0.0	30.67	N	-25.33
1.66 MHz	28.85 Qp	0.23 / 0.0 / 0.0 / 0.0	29.08	L1	-26.92
185.0 kHz	36.71 Qp	0.11 / -0.24 / 0.0 / 0.0	36.58	L1	-27.67
12.94 MHz	28.99 Qp	0.92 / 0.01 / 0.0 / 0.0	29.92	L1	-30.08
150.0 kHz	35.29 Qp	0.11 / -0.25 / 0.0 / 0.0	35.15	L1	-30.85
13.56 MHz	26.89 Qp	0.94 / 0.02 / 0.0 / 0.0	27.85	L1	-32.15
15.62 MHz	20.83 Qp	1.02 / 0.03 / 0.0 / 0.0	21.87	L1	-38.13
30.0 MHz	7.39 Qp	1.4 / 0.1 / 0.0 / 0.0	8.89	N	-51.11

### Measurement summary for limit2: 15.207 av (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA2 15.207 av
375.0 kHz	37.27 Av	0.13 / -0.18 / 0.0 / 0.0	37.22	L1	-11.17
270.0 kHz	37.34 Av	0.12 / -0.21 / 0.0 / 0.0	37.25	L1	-13.87
955.0 kHz	27.06 Av	0.18 / -0.01 / 0.0 / 0.0	27.22	L1	-18.78
575.0 kHz	25.11 Av	0.15 / -0.13 / 0.0 / 0.0	25.13	N	-20.87
12.94 MHz	26.6 Av	0.92 / 0.01 / 0.0 / 0.0	27.53	L1	-22.47
2.88 MHz	23.16 Av	0.33 / 0.0 / 0.0 / 0.0	23.49	L1	-22.51
1.66 MHz	23.0 Av	0.23 / 0.0 / 0.0 / 0.0	23.23	L1	-22.77
13.56 MHz	23.23 Av	0.94 / 0.02 / 0.0 / 0.0	24.19	L1	-25.81
185.0 kHz	27.16 Av	0.11 / -0.24 / 0.0 / 0.0	27.03	N	-27.22
150.0 kHz	24.19 Av	0.11 / -0.25 / 0.0 / 0.0	24.05	N	-31.95
15.62 MHz	16.0 Av	1.02 / 0.03 / 0.0 / 0.0	17.04	L1	-32.96
30.0 MHz	1.79 Av	1.4 / 0.1 / 0.0 / 0.0	3.29	N	-46.71

### **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

### **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:

None

### 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: 18 September 2013

Condition of EUT: Normal

Testing Start Date: 18 September 2013

Testing End Date: 19 September 2013

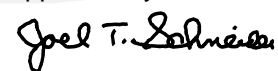
## TÜV SÜD AMERICA INC

Tested by:



Greg S Jakubowski  
EMC Test Engineer

Approved by:



Joel T Schneider  
Senior EMC Engineer



## Appendix A

### 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: Danfoss Power Solutions (US) Company  
Address: 3500 Annapolis Ln N  
Plymouth, MN 55447  
Contact: Jack Zeng Position: Sr. Engineer  
Phone: 763-509-2009 Fax: N/A  
E-mail Address: jzeng@danfoss.com

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

EUT Description Wireless multi-sonic distance sensor used for asphalt paving/milling machine applications  
EUT Name WMSS1000  
Model No.: WMSS1000 (P/N 11135819) Serial No.: TBD  
Product Options: 1  
Configurations to be tested: 2 - RFID operation and AC wall outlet charging

#### 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: N/A  
Modifications made during test: N/A

#### 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)<br>Std: _____                                   | <input checked="" type="checkbox"/> FCC: Class <input type="checkbox"/> A <input checked="" type="checkbox"/> B Part <u>C</u> |
| <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 - 2004/104/EC (EMC)<br><input type="checkbox"/> Other Vehicle Std: _____ | <input checked="" type="checkbox"/> Canada: Class <input type="checkbox"/> A <input type="checkbox"/> B                       |
| <input type="checkbox"/> FDA Reviewers Guidance for Premarket Notification Submissions (EMC)                        | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B                               |
|   | <input type="checkbox"/> Other: _____   |
|   | <input type="checkbox"/> Ag Directive *2009/64/EC (EMC)   |

Form



EMC Test Plan and Constructional Data Form

Third Party Certification (contact TÜV for quote), if applicable (\*Signature on last page required).

<input type="checkbox"/> Attestation of Compliance (AoC)*	<input type="checkbox"/> EMC Certification (used with Octagon Mark)*
<input type="checkbox"/> Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed	
Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III (Press F1 when field is selected to show additional information on Protection Class.)	
<input checked="" type="checkbox"/> FCC / TCB Certification	<input type="checkbox"/> Taiwan Certification
<input checked="" type="checkbox"/> Industry Canada / FCB Certification	<input type="checkbox"/> Korean Certification
<input type="checkbox"/> e-Mark Certification	

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 SUD America should:

- ☒ Call contact listed above, if not available then stop testing. (After hrs phone): 701-269-4594
- ☐ Continue testing to complete test series.
- ☐ Continue testing to define corrective action.
- ☐ Stop testing.

EUT Specifications and Requirements

Small handheld devices      Exact dimensions can be...      ...provided if needed      Weight: \_\_\_\_\_

Length: \_\_\_\_\_ Width: \_\_\_\_\_ Height: \_\_\_\_\_

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: 9-36Vdc and/or 100-240Vac (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: single

Current (Amps/phase(max)): 2 A with 12Vdc in      Current (Amps/phase(nominal)): 300 mA with 12Vdc in

Other lac can be back calculated based on DC values listed above.

Other Special Requirements

RFID only is enabled once for a couple seconds at most shortly after the sensor is powered, so this means that power must be cycled for energizing the RFID circuit. For AC wall outlet EMC testing a charging adapter assembly will be provided.

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)  
Operational is on an asphalt paving/milling machine powered by the machine's 12-24V battery.  
Charging is either on an asphalt paving/milling machine powered by the machine's 12-24V battery or from an AC wall outlet at home, hotel, and/or office.

# Form



## EMC Test Plan and Constructional Data Form

### EUT Power Cable

☐ Permanent OR ☒ Removable

Length (in meters): 1-1.5 meters, CAN must be twisted pair (cabling to be provided by S-D)

☐ Shielded OR ☒ Unshielded  
☐ Not Applicable

### 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						
<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"/>
CAN	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<input type="checkbox"/>	<input checked="" type="checkbox"/>		60 Ohms	Duetsch 12-pin	N/A	1.5	<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"/>

# 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						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>

### EUT Software.

Revision Level: Provided by S-D

Description: Includes component firmware and Labview test code

**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. Operation with Vdc (12-24V) external voltage applied. At power up the RFID circuit will be energized for up to a couple of seconds and then shutdown. This mode is for CE, FCC, and IC radiated emission conformance testing.
2. Charging with Vac external voltage applied. This mode is for testing conducted AC line voltage immunity and emissions.
3. N/A

**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 #
Sensor	11135819	TBD	None yet
Charging Adapter	11135113	TBD	N/A

# 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.

<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>

### 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>

## Form



### EMC Test Plan and Constructional Data Form

#### Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part # or Value	Qty	Component # / Location

**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)

Kevin Bloms

8/19/13

Customer authorization to perform tests  
according to this test plan.

Date

Kevin Bloms

8/19/13

Test Plan/CDF Prepared By (please print)

Date