

TIMCO ENGINEERING INC.

849 NW State Road 45
Newberry, Florida 32669
<http://www.timcoengr.com>
888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: 916.50 MHz TRANSCEIVER MODULE

FCC ID: TE6-DM2100A

Applicant:

**RF MONOLITHICS, INC.
4441 SIGMA ROAD
DALLAS TX 75244**

Date Receipt: 6/24/2005

Date Tested: 6/24/2005

**APPLICANT: RF MONOLITHICS, INC.
FCC ID: TE6-DM2100A
REPORT #: R\RF MONOLITHICS TE6\1373AUT5\1373AUT5TestReport.doc**

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EXHIBIT INCLUDED:

COVER LETTER
REQUEST FOR CONFIDENTIALITY LETTER
BLOCK DIAGRAM
SCHEMATIC
USERS MANUAL
LABEL SAMPLE
LABEL LOCATION
PHOTOGRAPHS
OPERATIONAL DESCRIPTION
TEST SET UP PHOTOGRPAHS

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MODULAR REQUIREMENTS

1. The modular transmitter must have its own RF shielding.
All of the transceiver RF portions are in a hermetically sealed case on the top surface of the module.
2. The modular transmitter must have buffered modulation data inputs.
The transmitter has a modulated buffer amplifier for data transmission. See the operational description exhibit.
3. The modular transmitter must have its own power supply regulation.
The schematic for this unit shows on-board regulators.
4. The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c).
The module is being certified with three antennas

400-1595-001 - 916.5 MHz $\frac{1}{4}$ Wavelength Insulated Wire Antenna
500-1141-001 - 916.5 MHz Helical Wire Antenna
500-1142-001 - 916.5 MHz $\frac{1}{4}$ Wavelength Antenna-coax assembly with Reverse Pin "FCC" SMA connector.

When the 500-1142-001 antenna-coax assembly is used, a matching reverse pin SMA connector is installed on the DM2100 before the unit is shipped to a retail customer.

The 400-1595-001 and 500-1141-001 are installed by soldering them to the antenna eyelet before the unit is shipped to a retail customer.

5. The modular transmitter must be tested in a stand-alone configuration.
The DM2100 was tested stand alone with each antenna. See the test setup photographs.
6. The modular transmitter must be labeled with its own FCC ID number.
The FCC ID Label Sample and Label Location are included in the exhibits.

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MODULAR REQUIREMENTS CONTD.

7. The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter.
The DM2100 meets all of the requirements per FCC Rules Part 15.249 and data is included in the report.

8. The modular transmitter must comply with any applicable RF exposure requirements.
The unit is of such low power it meets all RF Exposure requirements.

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EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/27/04	3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/12/06
Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
Biconnical Antenna	Eaton	94455-1	1096	CAL 8/17/04	8/17/06
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Blue Tower RF Preselector	HP	85685A	2620A00294	CAL 4/27/04	4/27/06
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/04	8/27/06
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Log-Periodic Antenna	Eaton	96005	1243	CAL 5/8/03	5/8/05

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TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. The UUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 using a HEWLETT PACKARD spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the UUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 74.3oF with a humidity of 69%.

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The UUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. Spurious emissions greater than 20 dB below the limit are not reported. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-2003 with the EUT 40 cm from the vertical ground wall.

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APPLICANT: RF MONOLITHICS, INC.

FCC ID: TE6-DM2100A

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.249, 15.209

REQUIREMENTS:

FIELD STRENGTH	FIELD STRENGTH	S15.209
of Fundamental: 902-928 MHZ 2.4-2.4835 GHz 94 dBuV/m @3m	of Harmonics 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz 54 dBuV/m @3m	40 dBuV/m @3M 43.5 46 54dBuV/m
		ABOVE 960 MHz

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

TEST RESULTS: This unit DOES meet the FCC requirements.

TEST DATA - with $\frac{1}{4}$ WAVE ANTENNA - P/NO. 400-1595-001:

Tuned Frequency	Emission Frequency	Meter Reading	Ant. Polarity	Coax Loss	Correction Factor	Field Strength	Margin dB
MHz	MHz	dBuV		dB	dB	dBuV/m	
916.6	916.60	59.1	H	4.29	23.70	87.09	6.91
916.6	916.60	64.6	V	4.29	23.26	92.15	1.85
916.6	1,833.20	14.0	V	1.62	30.40	46.02	7.98
916.6	1,833.20	14.1	H	1.62	30.40	46.12	7.88
916.6	2,750.00	5.7	V	2.00	33.00	40.70	13.30

TEST DATA - WITH $\frac{1}{4}$ WAVE ANTENNA - COAX ASSEMBLY - P/NO. 500-1142-001:

Tuned Frequency	Emission Frequency	Meter Reading	Ant. Polarity	Coax Loss	Correction Factor	Field Strength	Margin dB
MHz	MHz	dBuV		dB	dB	dBuV/m	
916.6	916.60	57.9	H	4.29	23.70	85.89	8.11
916.6	916.60	62.6	V	4.29	23.26	90.15	3.85
916.6	1,833.20	12.9	V	1.62	30.40	44.92	9.08
916.6	1,833.20	16.1	H	1.62	30.40	48.12	5.88
916.6	2,749.80	4.2	V	2.00	33.00	39.20	14.80

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APPLICANT: RF MONOLITHICS, INC.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.249, 15.209

REQUIREMENTS:

FIELD STRENGTH	FIELD STRENGTH	S15.209		
of Fundamental: 902-928 MHz 2.4-2.4835 GHz 94 dBuV/m @3m	of Harmonics 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz 54 dBuV/m @3m	30 - 88 MHz	40 dBuV/m @3M	
		88 - 216 MHz	43.5	
		216 - 960 MHz	46	
		ABOVE 960 MHz	54dBuV/m	

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

TEST DATA - WITH HELICAL ANTENNA - P/NO. 500-1141-001:

Tuned Frequency	Emission Frequency	Meter Reading	Ant. Polarity	Coax Loss	Correction Factor	Field Strength	Margin dB
MHz	MHz	dBuV		dB	dB	dBuV/m	
916.6	916.60	61.5	H	4.29	23.70	89.49	4.51
916.6	916.60	64.0	V	4.29	23.26	91.55	2.45
916.6	1,833.20	12.9	H	1.62	30.40	44.92	9.08
916.6	1,833.20	13.9	V	1.62	30.40	45.92	8.08

TEST PROCEDURE: ANSI STANDARD C63.4-2003 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Pre-selector, a Hewlett Packard Model 85650A Quasi-Peak adapter, and an appropriate antenna. The bandwidth of spectrum analyzer was 100 kHz with an appropriate sweep speed. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The spectrum was searched to at least the tenth (10) harmonic of the fundamental.

PERFORMED BY: JOSEPH SCOGLIO

DATE: 6/24/2005

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NAME OF TEST: OCCUPIED BANDWIDTH

RULES PART NO.: 15.249

REQUIREMENTS: The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.209.

THE FOLLOWING PLOT REPRESENTS THE EMISSIONS TAKEN FOR THIS DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was printed. The vertical scale is set to -10 dBm per division. The horizontal scale is set to 20 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

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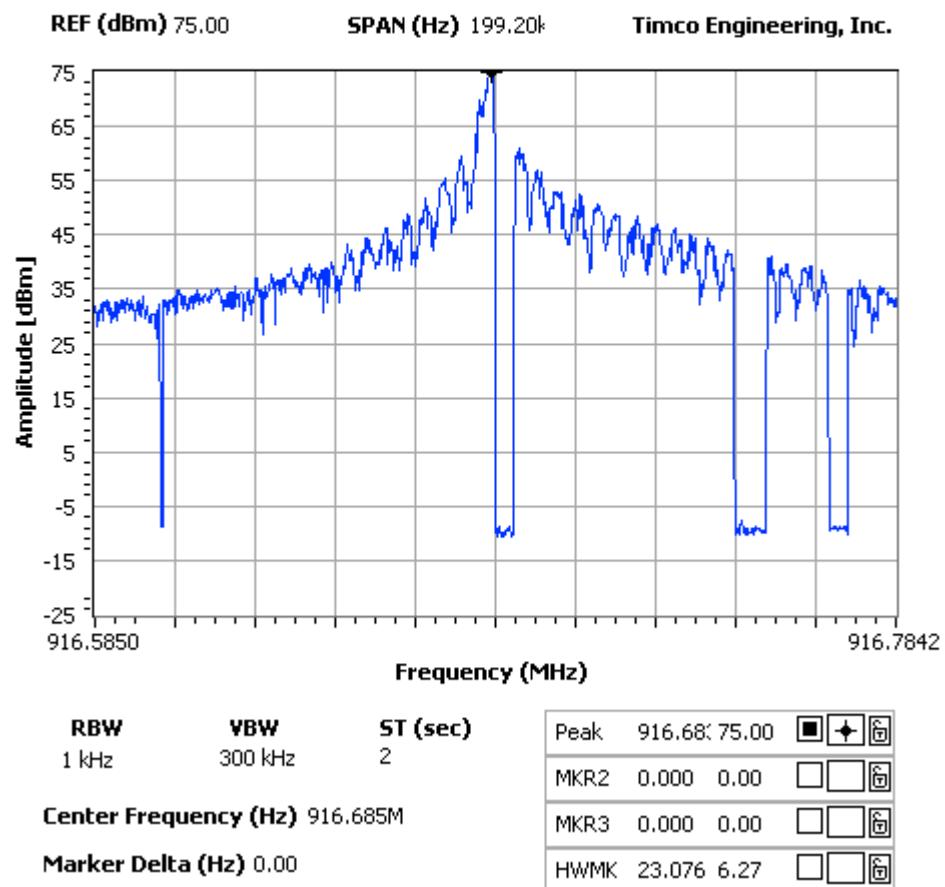
APPLICANT: RF MONOLITHICS, INC.

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NAME OF TEST: OCCUPIED BANDWIDTH

NOTES:

1373cut5 occupied bandwidth



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APPLICANT: RF MONOLITHICS, INC.

FCC ID: TE6-DM2100A

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.107

REQUIREMENTS:	QUASI-PEAK	AVERAGE
.15 - 0.5 MHz	66-56 dBuV	56-46 dBuV
0.5 - 5.0	56	46
5.0 - 30.	60	50

TEST PROCEDURE: ANSI STANDARD C63.4-2003. The spectrum was scanned from .15 to 30 MHz.

TEST DATA:

THE PLOTS ON THE NEXT PAGE REPRESENT THE EMISSIONS READ FOR POWERLINE CONDUCTED FOR THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

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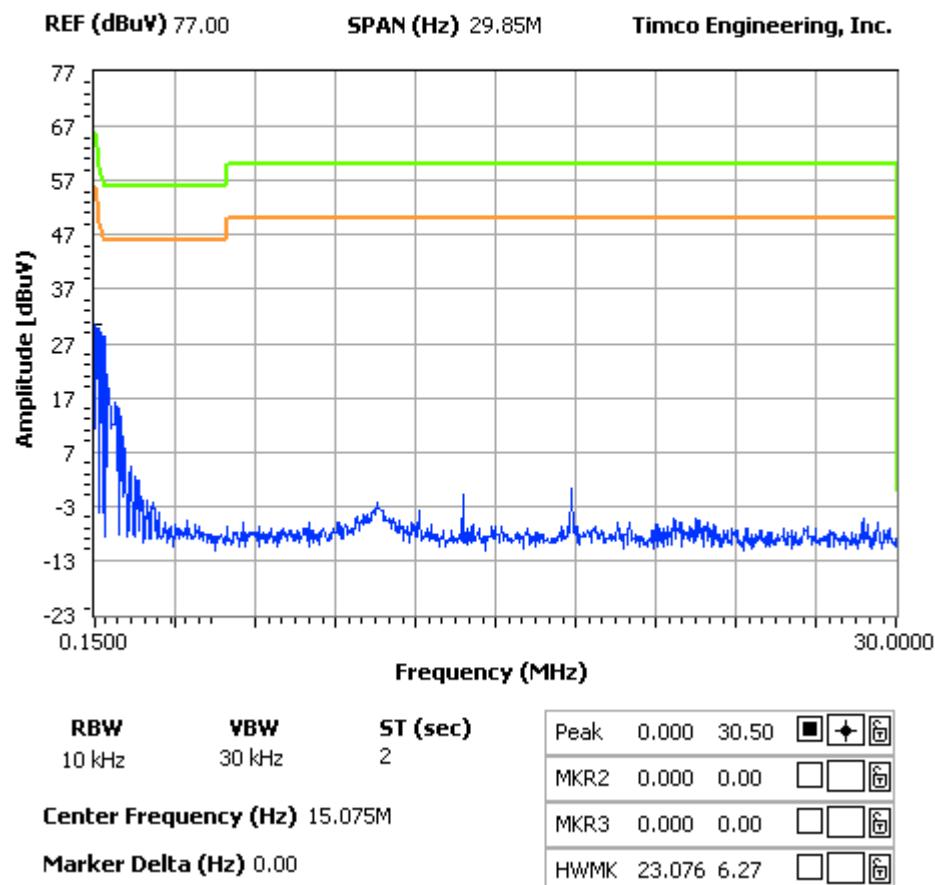
FCC ID: TE6-DM2100A

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

NOTES:

1373 ac line conducted line 1

FCC 15.107 Mask Class B



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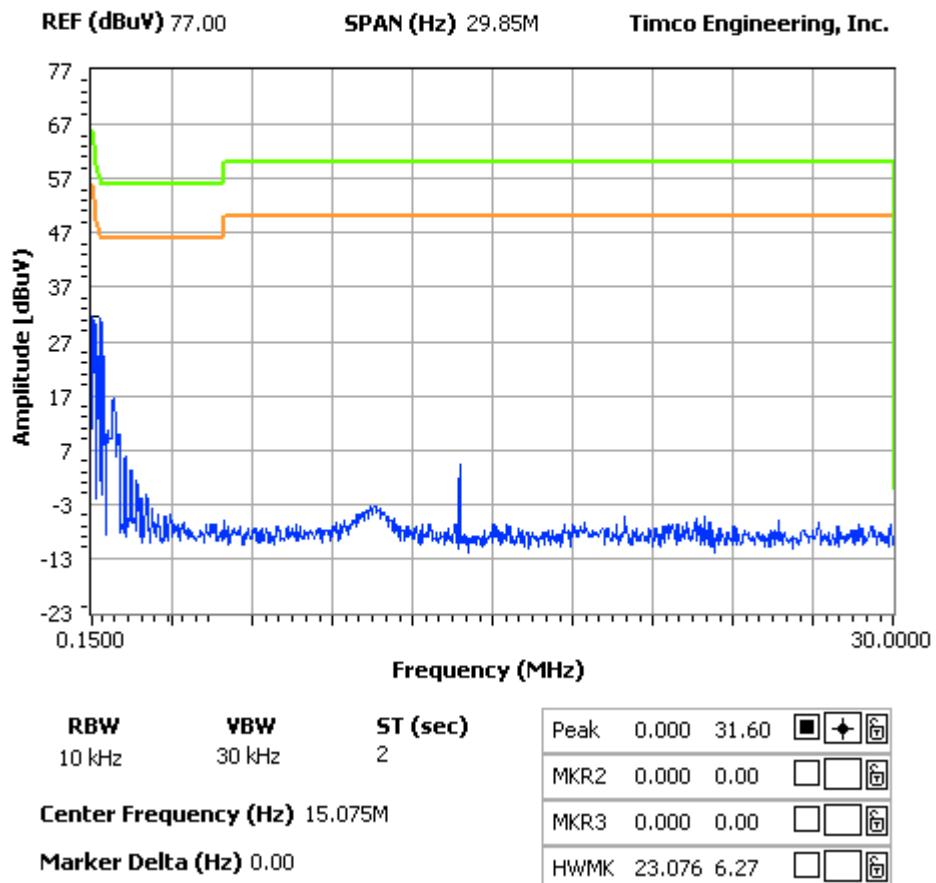
FCC ID: TE6-DM2100A

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

NOTES:

1373cut5 ac line conducted line 2

FCC 15.107 Mask Class B



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