

UMD Technology

WABI 007

October 02, 2003

Report No. UMDT0002

Report Prepared By:



1-888-EMI-CERT

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Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Issue Date: October 02, 2003

UMD Technology

Model: WABI 007

Emissions		Pass	Fail
Description			
FCC 15.249 Field Strength of Fundamental:2003 Radiated Emissions		<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC 15.249 Field Strength of Spurious Emissions:2003 Radiated Emissions		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product

See the Modifications section of this report

Test Facility

- The measurement facility used to collect the data is located at:
Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066 Fax: 844-3826
This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Don Facticeau, IS Manager

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: The Open Area Test Sites, and conducted measurement facilities, have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files.

TCB: Northwest EMC has been accredited by ANSI to ISO/IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



NVLAP: Accreditation has been granted to Northwest EMC, Inc. to perform the Electromagnetic Compatibility (EMC) tests described in the Scope of Accreditation. Assessment performed to ISO/IEC 17025. Certificate Number: 200629-0, Certificate Number: 200630-0.



Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body. (NVLAP)



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0302C



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



Industry Canada: Accredited by Industry Canada for performance of radiated measurements. Our open area test sites comply with RSS 212, Issue 1 (Provisional).



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Nos. - Evergreen: C-1071 and R-1025, Trails End: C-694 and R-677, Sultan: C-905, R-871 and R-1172, North Sioux City C-1246, R-1185 and R-1217)



BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No. SL2-IN-E-1017.



CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement



GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



	NVLAP	FCC	NIST	TUV PS	TUV Rheinland	Nemko	Technology International	Industry Canada	BSMI	VCCI	GOST	NATA
IEC 61000-4-2	✓			✓	✓	✓	✓					
IEC 61000-4-3	✓			✓	✓	✓	✓					
IEC 61000-4-4	✓			✓	✓	✓	✓					
IEC 61000-4-5	✓			✓	✓	✓	✓					
IEC 61000-4-6	✓			✓	✓	✓	✓					
IEC 61000-4-8	✓			✓	✓	✓	✓					
IEC 61000-4-11	✓			✓	✓	✓	✓					
IEC 61000-3-2	✓			✓	✓	✓	✓					
IEC 61000-3-3	✓			✓	✓	✓	✓					
AS/NZS 3548	✓											✓
CNS 13438	✓								✓			
ISO/IEC17025	✓			✓	✓	✓	✓		✓			
Radiated Emissions	✓			✓	✓	✓	✓	✓	✓	✓	✓	
Conducted Emissions	✓			✓	✓	✓	✓	✓	✓	✓	✓	
OATS Sites	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
Hillsboro 5-Meter Chamber (EV01)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
TCB for Licensed Transmitters		✓										
TCB for un-Licensed Transmitters		✓										
Cab for R&TTE			✓									
CAB for EMC			✓									

This chart represents only a partial NVLAP Scope, please reference <http://ts.nist.gov/ts/htdocs/210/214/214.htm> for the full NVLAP Scope of Accreditation

What is measurement uncertainty?

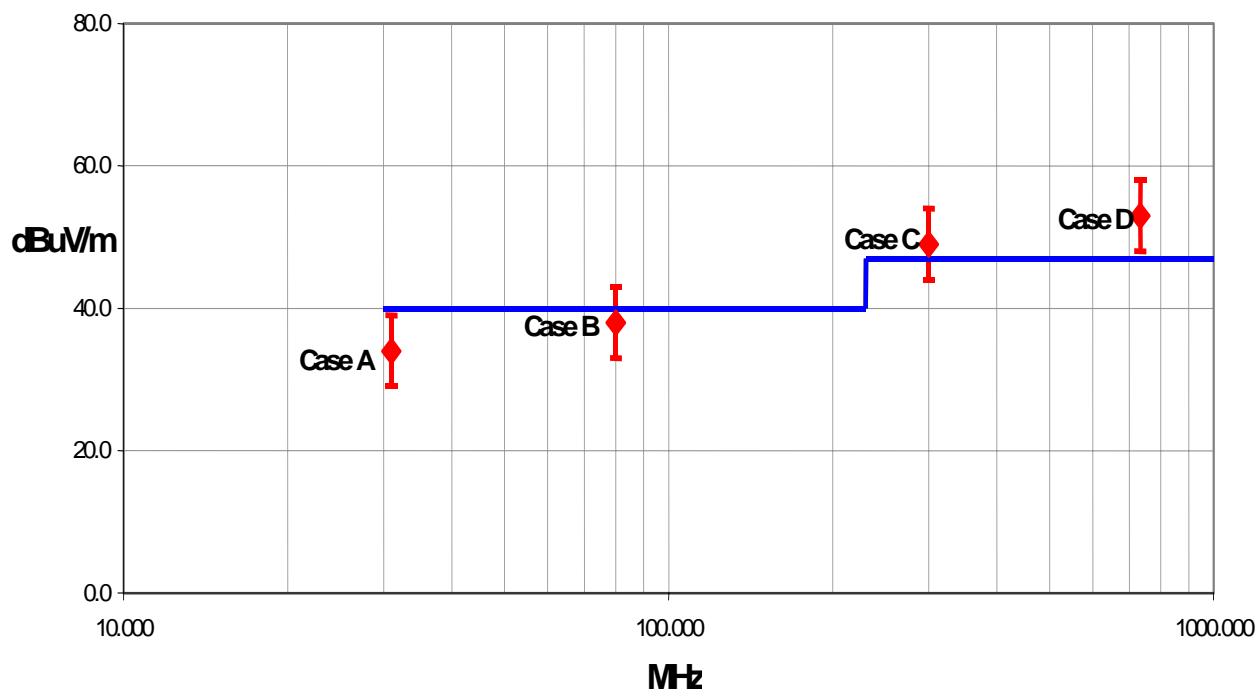
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and – measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz		Value (dB)							
Test Distance	Probability Distribution	Biconical Antenna		Log Periodic Antenna		Dipole Antenna		3m	10m
		3m	10m	3m	10m	3m	10m		
Combined standard uncertainty $u_c(y)$	normal	+ 1.86 - 1.88	+ 1.82 - 1.87	+ 2.23 - 1.41	+ 1.29 - 1.26	+ 1.31 - 1.27	+ 1.25 - 1.25		
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)	+ 3.72 - 3.77	+ 3.64 - 3.73	+ 4.46 - 2.81	+ 2.59 - 2.52	+ 2.61 - 2.55	+ 2.49 - 2.49		

Radiated Emissions > 1 GHz		Value (dB)			
	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29 - 1.25		+ 1.38 - 1.35	
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k=2)		+ 2.57 - 2.51	+ 2.76 - 2.70	

Conducted Emissions		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.48
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.97

Radiated Immunity		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.11

Conducted Immunity		
	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $uc(y)$	normal	1.05
Expanded uncertainty U (level of confidence $\approx 95\%$)	normal (k = 2)	2.10

Legend		
$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties		
U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $uc(y)$ yields a confidence level of only 68%.		

**California****Orange County Facility**

41 Tesla Ave.
Irvine, CA 92618
(888) 364-2378
FAX (503) 844-3826

**Oregon****Evergreen Facility**

22975 NW Evergreen Pkwy.,
Suite 400
Hillsboro, OR 97124
(503) 844-4066
FAX (503) 844-3826

**Oregon****Trails End Facility**

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735

**South Dakota****North Sioux City Facility**

745 N. Derby Lane
P.O. Box 217
North Sioux City, SD 57049
(605) 232-5267
FAX (605) 232-3873

**Washington****Sultan Facility**

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

Company Name:	UMD Technology
Address:	14945 SW Sequoia Pkwy, #100
City, State, Zip:	Portland, OR 97224
Test Requested By:	Brian Denheyer
Model:	WABI 007
First Date of Test:	September 30, 2003
Last Date of Test:	October 1, 2003
Receipt Date of Samples:	September 30, 2003
Equipment Design Stage:	Pre-Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	80 kHz, 4 MHz, 12 MHz
I/O Ports:	Serial for Debug / Test only.

Functional Description of the EUT (Equipment Under Test):

902 - 928 MHz FSK Transceiver

Client Justification for EUT Selection:

The product is an engineering sample, representative of the final product.

Client Justification for Test Selection

These Tests satisfy the requirements for FCC certification.

Other Information:

Client has other information to provide. See product info. document.

Equipment modifications				
Item #	Test	Date	Modification	Note
1	Field Strength of Fundamental	09-30-2003	The highest channel to be used was reduced to 927.106 MHz (channel 37).	Modified from delivered configuration.
2	Band Edge (spurious radiated)	09-30-2003	The lowest channel to be used was increased to 903.096 MHz (channel 1)	This modification is in addition to previous modifications.
3	Field Strength of Spurious Emissions	09-30-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low
Mid
High

Operating Modes Investigated:

Typical

Antennas Investigated:

Integral

Data Rates Investigated:

Maximum in PRBS

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	App3_09_16_ReleaseToShasta
Description			
The system was tested using special software developed to test all functions of the device during the test.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	UMD Technology	WABI 007	018

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Cable Harness	PA	0.3	PA	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	01/07/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo

Test Description

Requirement: The field strength of the fundamental emission shall comply with the limits, as defined in 47 CFR 15.249. Field strength limits are specified at a distance of 3 meters.

Configuration: The antennas to be used with the EUT were tested. The EUT was transmitting and/or receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992).

Completed by:



NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

REV
d14.00
08/12/2003

EUT: WABI 007	Work Order: UMDT0002
Serial Number: 018	Date: 09/30/03
Customer: UMD Technology	Temperature: 73
Attendees: Chuck Pulham	Humidity: 43%
Cust. Ref. No.:	Barometric Pressure 30.07
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC 15.249	Year: 2003
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Modulated PRBS

DEVIATIONS FROM TEST STANDARD

No deviations.

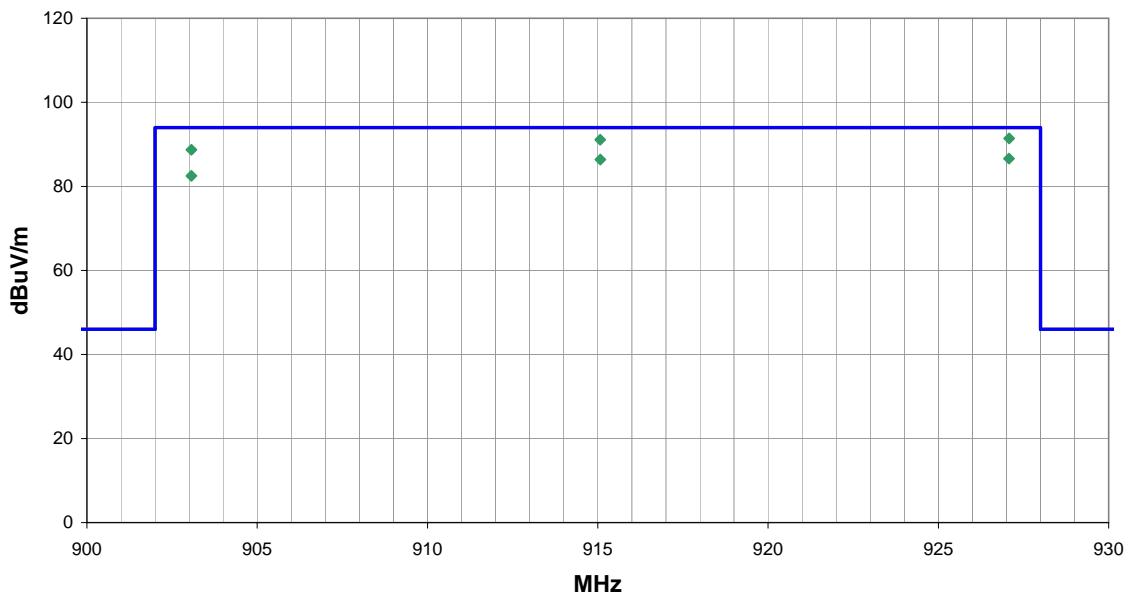
RESULTS

Pass	Run #
	2 & 6

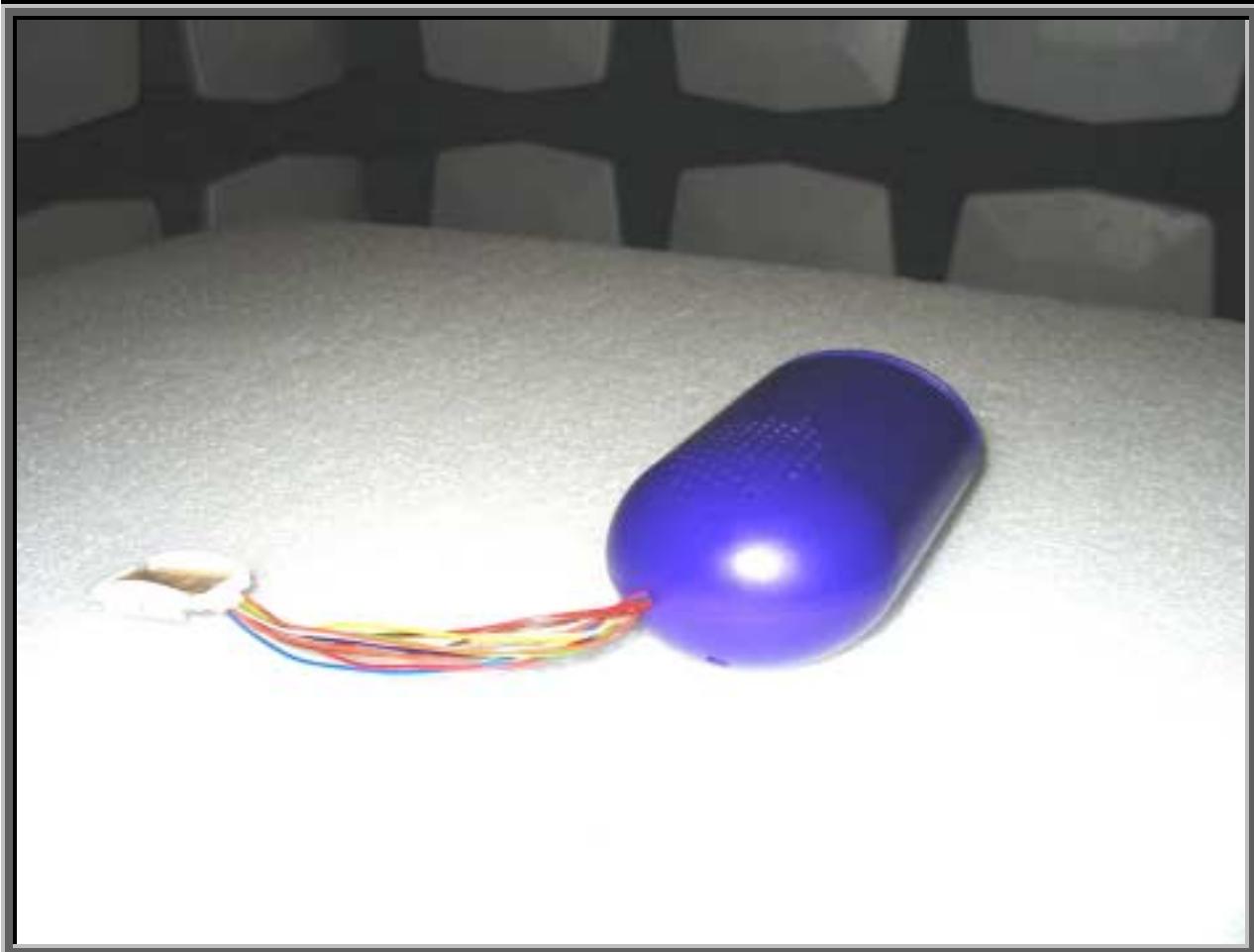
Other

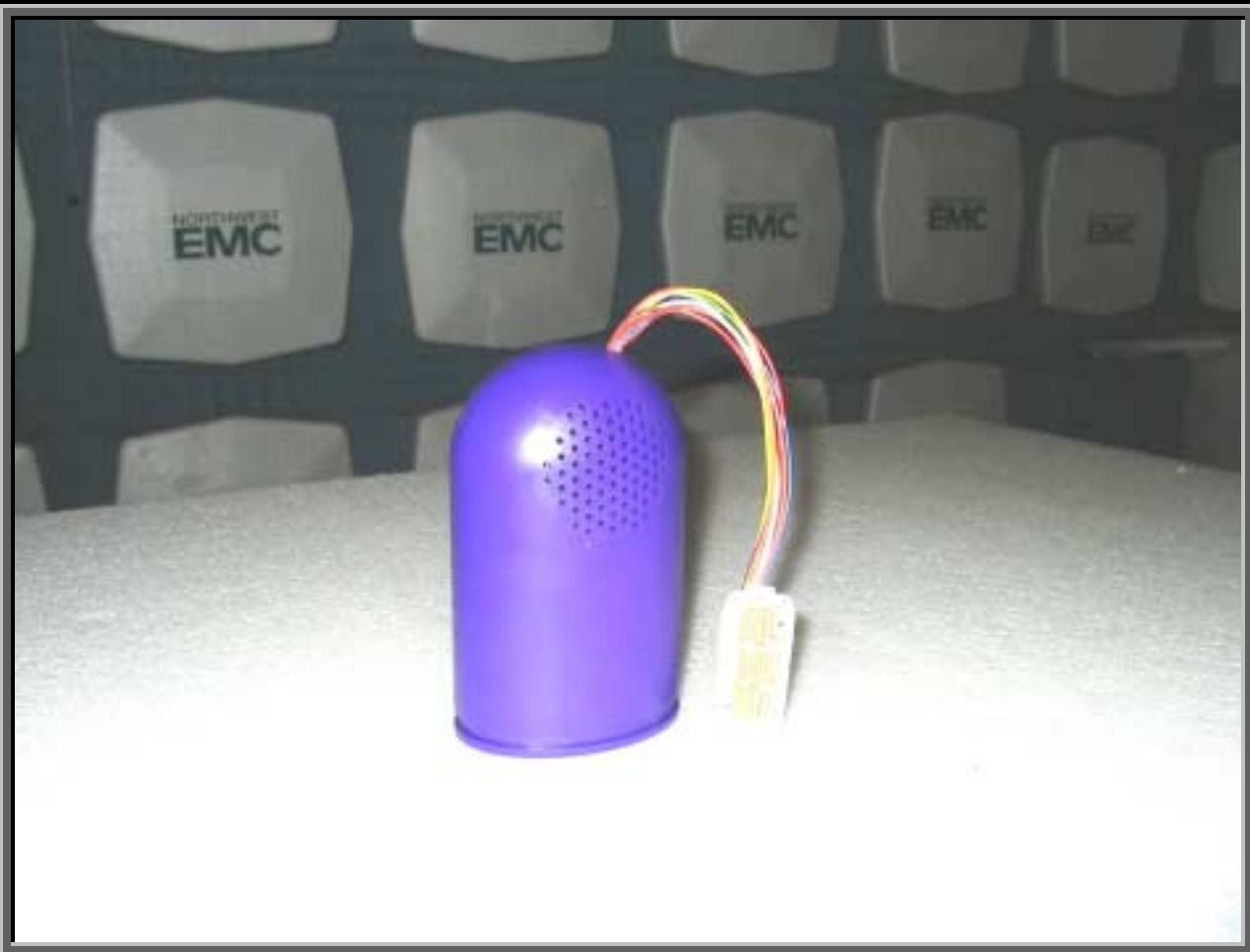
Rod Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
927.078	58.8	32.6	308.0	1.0	3.0	0.0	H-Bilog	QP	0.0	91.4	94.0	-2.6	high channel, EUT horizontal
915.069	58.6	32.5	130.0	1.0	3.0	0.0	H-Bilog	QP	0.0	91.1	94.0	-2.9	mid channel, EUT vertical
927.075	54.0	32.6	291.0	1.1	3.0	0.0	V-Bilog	QP	0.0	86.6	94.0	-7.4	high channel, EUT vertical
915.073	53.9	32.5	288.0	1.1	3.0	0.0	V-Bilog	QP	0.0	86.4	94.0	-7.6	mid channel, EUT vertical
903.066	56.3	32.4	10.0	1.6	3.0	0.0	H-Bilog	QP	0.0	88.7	94.0	-5.3	low channel, EUT horizontal
903.069	50.1	32.4	326.0	1.1	3.0	0.0	V-Bilog	QP	0.0	82.5	94.0	-11.5	low channel, EUT vertical





Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low

Mid

High

Operating Modes Investigated:

Typical

Antennas Investigated:

Integral

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	10 GHz
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Software\Firmware Applied During Test

Exercise software	Special Test Software	Version	App3_09_16_ReleaseToShasta
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Description

The system was tested using special software developed to test all functions of the device during the test.

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
EUT	UMD Technology	WABI 007	018

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Cable Harness	PA	0.3	PA	EUT	Unterminated

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	01/06/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/06/2003	12 mo
Antenna, Horn	EMCO	3115	AHC	09/18/2003	12 mo
High Pass Filter	Hewlett-Packard	84300-80037	HFE	05/01/2003	12 mo

Test Description

Requirement: The field strength of harmonics and spurious radiated emissions shall comply with the limits as defined in 47 CFR 15.249. Field strength limits are specified at a distance of 3 meters. 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 Sec. 15.209, whichever is the lesser attenuation. As shown in Sec. 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified in Sec. 15.249 by more than 20 dB under any condition of modulation.

Configuration: The antennas to be used with the EUT were tested. The EUT was transmitting and receiving while set at the lowest channel, a middle channel, and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

Bandwidths Used for Measurements

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 – 0.15	1.0	0.2	0.2
0.15 – 30.0	10.0	9.0	9.0
30.0 – 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

Completed by:



EUT: WABI 007	Work Order: UMDT0002
Serial Number: 018	Date: 09/30/03
Customer: UMD Technology	Temperature: 73
Attendees: Chuck Pulham	Humidity: 43%
Cust. Ref. No.:	Barometric Pressure 30.07
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC 15.249	Year: 2003
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

High channel, Modulated PRBS

DEVIATIONS FROM TEST STANDARD

No deviations.

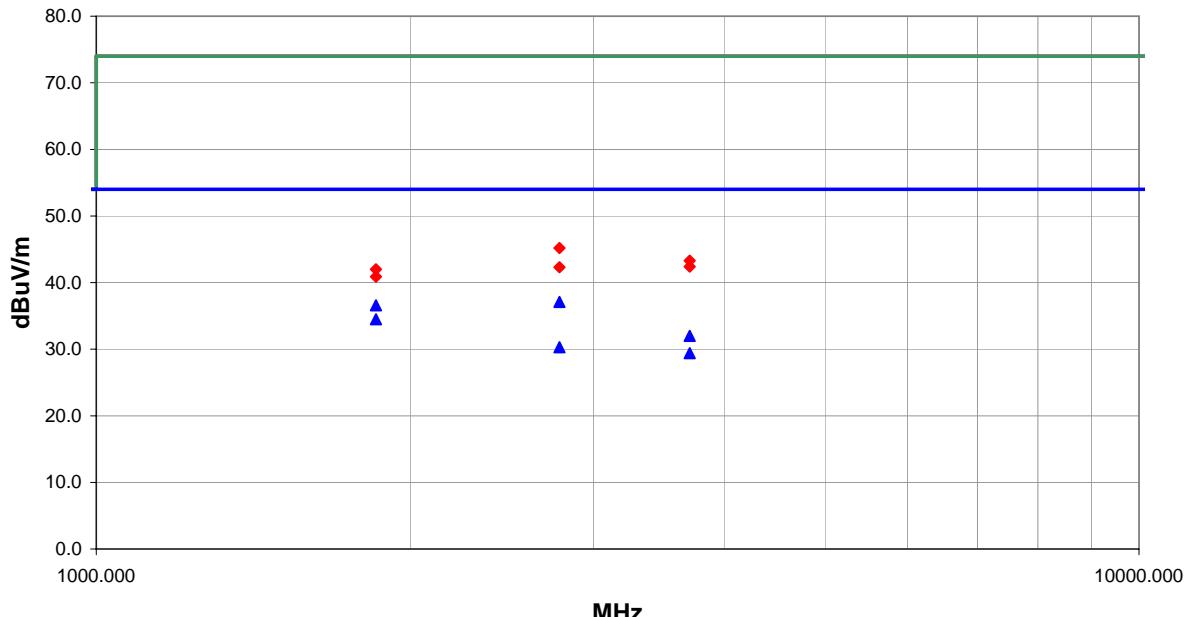
RESULTS

Pass	Run #
	8

Other

Rod Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2781.318	37.1	0.0	336.0	1.0	3.0	0.0	V-Horn	AV	0.0	37.1	54.0	-16.9
1854.212	40.7	-4.1	20.0	1.4	3.0	0.0	H-Horn	AV	0.0	36.6	54.0	-17.4
1854.212	38.6	-4.1	360.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.5	54.0	-19.5
3708.424	29.9	2.1	52.0	2.1	3.0	0.0	H-Horn	AV	0.0	32.0	54.0	-22.0
2781.318	30.3	0.0	347.0	1.0	3.0	0.0	H-Horn	AV	0.0	30.3	54.0	-23.7
3708.424	27.3	2.1	123.0	1.0	3.0	0.0	V-Horn	AV	0.0	29.4	54.0	-24.6
2781.318	45.2	0.0	336.0	1.0	3.0	0.0	V-Horn	PK	0.0	45.2	74.0	-28.8
3708.424	41.2	2.1	52.0	2.1	3.0	0.0	H-Horn	PK	0.0	43.3	74.0	-30.7
3708.424	40.3	2.1	123.0	1.0	3.0	0.0	V-Horn	PK	0.0	42.4	74.0	-31.6
2781.318	42.3	0.0	347.0	1.0	3.0	0.0	H-Horn	PK	0.0	42.3	74.0	-31.7
1854.212	46.1	-4.1	20.0	1.4	3.0	0.0	H-Horn	PK	0.0	42.0	74.0	-32.0
1854.212	45.0	-4.1	360.0	1.0	3.0	0.0	V-Horn	PK	0.0	40.9	74.0	-33.1

EUT: WABI 007	Work Order: UMDT0002
Serial Number: 018	Date: 09/30/03
Customer: UMD Technology	Temperature: 73
Attendees: Chuck Pulham	Humidity: 43%
Cust. Ref. No.:	Barometric Pressure 30.07
Tested by: Rod Peloquin	Job Site: EV01

TEST SPECIFICATIONS

Specification: FCC 15.249	Year: 2003
Method: ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

Mid channel, Modulated PRBS

DEVIATIONS FROM TEST STANDARD

No deviations.

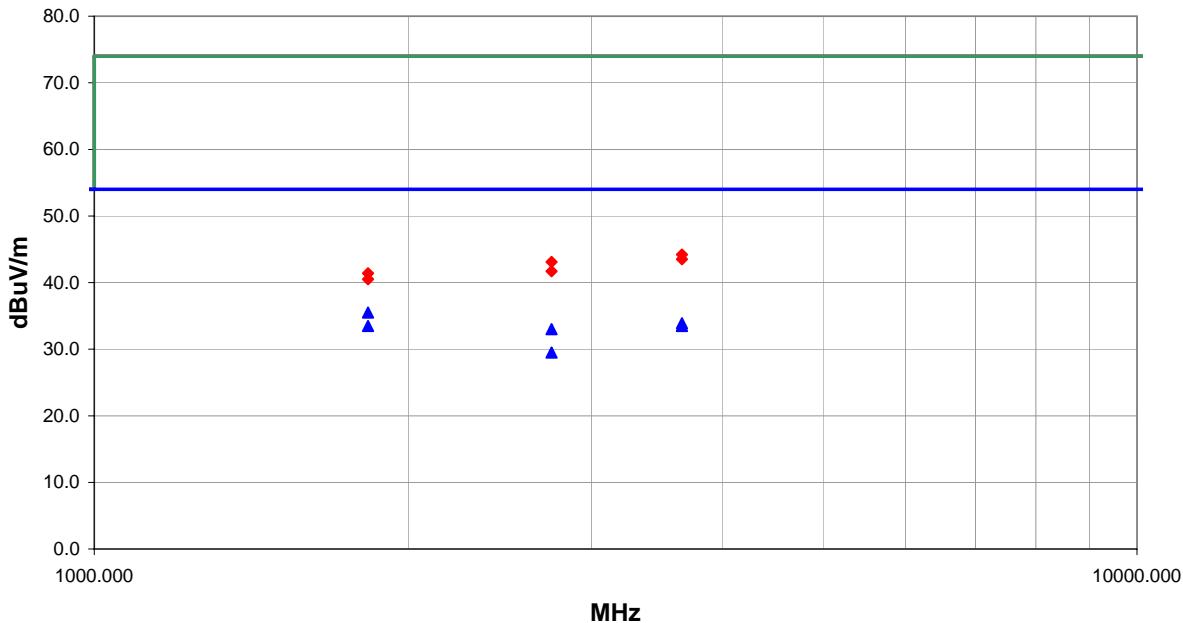
RESULTS

Pass	Run #
	10

Other



Tested By:



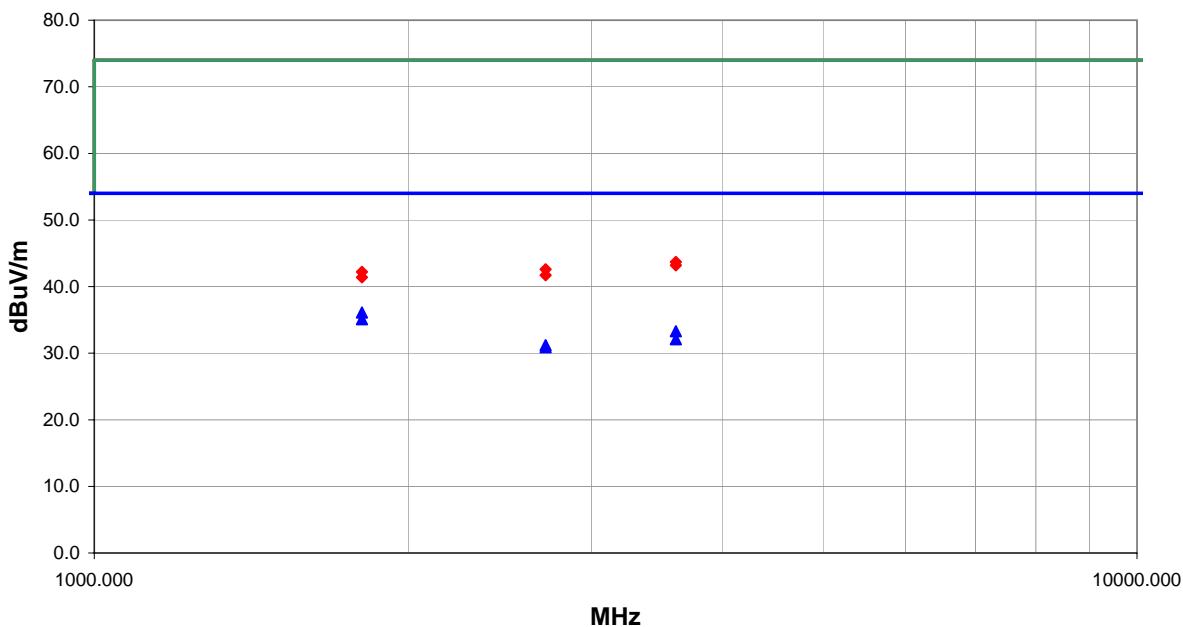
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1830.288	39.7	-4.2	23.0	1.4	3.0	0.0	H-Horn	AV	0.0	35.5	54.0	-18.5
3660.456	32.0	1.9	301.0	1.1	3.0	0.0	H-Horn	AV	0.0	33.9	54.0	-20.1
1830.288	37.7	-4.2	21.0	1.0	3.0	0.0	V-Horn	AV	0.0	33.5	54.0	-20.5
3660.456	31.6	1.9	356.0	1.5	3.0	0.0	V-Horn	AV	0.0	33.5	54.0	-20.5
2745.342	33.2	-0.2	342.0	1.1	3.0	0.0	V-Horn	AV	0.0	33.0	54.0	-21.0
2745.342	29.7	-0.2	7.0	1.0	3.0	0.0	H-Horn	AV	0.0	29.5	54.0	-24.5
3660.456	42.3	1.9	301.0	1.1	3.0	0.0	H-Horn	PK	0.0	44.2	74.0	-29.8
3660.456	41.6	1.9	356.0	1.5	3.0	0.0	V-Horn	PK	0.0	43.5	74.0	-30.5
2745.342	43.3	-0.2	342.0	1.1	3.0	0.0	V-Horn	PK	0.0	43.1	74.0	-30.9
2745.342	41.9	-0.2	7.0	1.0	3.0	0.0	H-Horn	PK	0.0	41.7	74.0	-32.3
1830.210	45.6	-4.2	23.0	1.4	3.0	0.0	H-Horn	PK	0.0	41.4	74.0	-32.6
1830.180	44.7	-4.2	21.0	1.0	3.0	0.0	V-Horn	PK	0.0	40.5	74.0	-33.5

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

REV
df4.00
08/12/2003

EUT: WABI 007	Work Order: UMDT0002	
Serial Number: 018	Date: 09/30/03	
Customer: UMD Technology	Temperature: 73	
Attendees: Chuck Pulham	Humidity: 43%	
Cust. Ref. No.:	Barometric Pressure: 30.07	
Tested by: Rod Peloquin	Power: Battery	Job Site: EV01
TEST SPECIFICATIONS		
Specification: FCC 15.249	Year: 2003	
Method: ANSI C63.4	Year: 1992	
SAMPLE CALCULATIONS		
Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation		
Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator		
COMMENTS		
EUT OPERATING MODES		
Low channel, Modulated PRBS		
DEVIATIONS FROM TEST STANDARD		
No deviations.		
RESULTS		
Pass	Run #	12
Other	 Tested By:	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
1806.192	40.5	-4.4	26.0	1.4	3.0	0.0	H-Horn	AV	0.0	36.1	54.0	-17.9
1806.192	39.5	-4.4	201.0	1.0	3.0	0.0	V-Horn	AV	0.0	35.1	54.0	-18.9
3612.384	31.6	1.7	149.0	1.1	3.0	0.0	V-Horn	AV	0.0	33.3	54.0	-20.7
3612.384	30.4	1.7	150.0	1.1	3.0	0.0	H-Horn	AV	0.0	32.1	54.0	-21.9
2709.288	31.5	-0.3	164.0	1.0	3.0	0.0	V-Horn	AV	0.0	31.2	54.0	-22.8
2709.288	31.2	-0.3	212.0	1.0	3.0	0.0	H-Horn	AV	0.0	30.9	54.0	-23.1
3612.384	42.0	1.7	149.0	1.1	3.0	0.0	V-Horn	PK	0.0	43.7	74.0	-30.3
3612.384	41.5	1.7	150.0	1.1	3.0	0.0	H-Horn	PK	0.0	43.2	74.0	-30.8
2709.187	42.9	-0.3	164.0	1.0	3.0	0.0	V-Horn	PK	0.0	42.6	74.0	-31.4
1806.192	46.6	-4.4	26.0	1.4	3.0	0.0	H-Horn	PK	0.0	42.2	74.0	-31.8
2709.288	42.0	-0.3	212.0	1.0	3.0	0.0	H-Horn	PK	0.0	41.7	74.0	-32.3
1806.126	45.8	-4.4	201.0	1.0	3.0	0.0	V-Horn	PK	0.0	41.4	74.0	-32.6

NORTHWEST
EMC

RADIATED EMISSIONS DATA SHEET

REV
df4.00
08/12/2003

EUT:	WABI 007	Work Order:	UMDT0002
Serial Number:	018	Date:	09/30/03
Customer:	UMD Technology	Temperature:	73
Attendees:	Chuck Pulham	Humidity:	43%
Cust. Ref. No.:		Barometric Pressure:	30.07
Tested by:	Rod Peloquin	Power:	Battery
			Job Site: EV01

TEST SPECIFICATIONS

Specification:	FCC 15.249	Year:	2003
Method:	ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

COMMENTS

EUT OPERATING MODES

High channel, Modulated PRBS

DEVIATIONS FROM TEST STANDARD

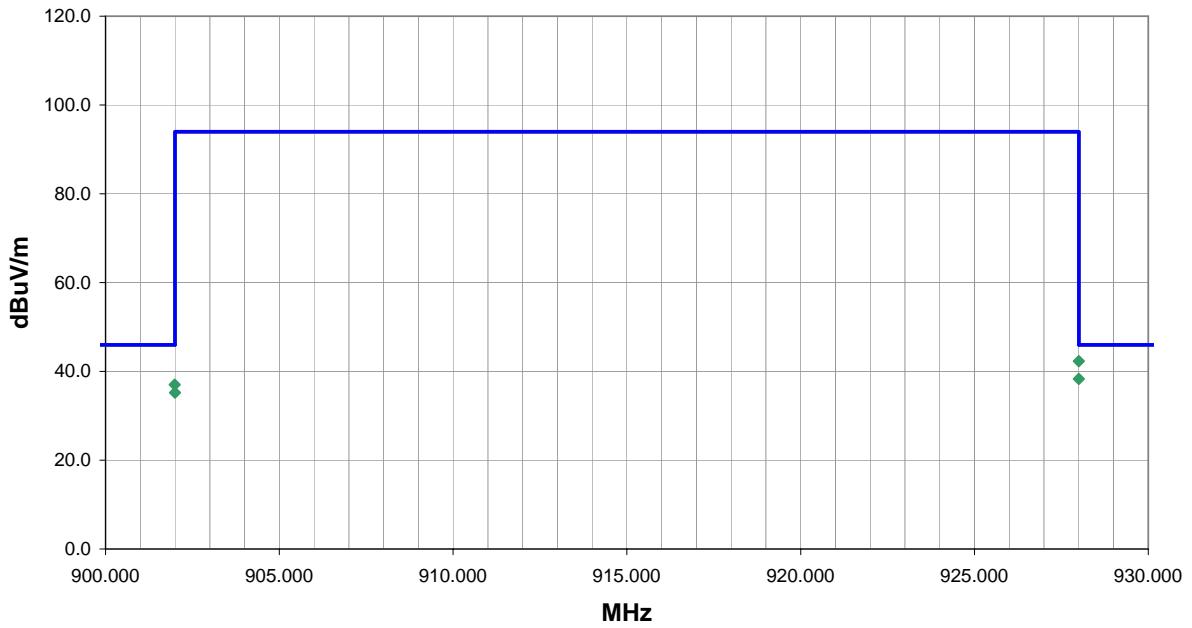
No deviations.

RESULTS	Run #
Pass	4

Other

Rod Peloquin

Tested By:



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
928.001	30.0	2.3	326.0	1.6	3.0	10.0	H-Bilog	QP	0.0	42.3	46.0	-3.7	high channel, EUT hori
928.002	26.0	2.3	256.0	1.7	3.0	10.0	V-Bilog	QP	0.0	38.3	46.0	-7.7	high channel, EUT hori
901.990	25.1	1.9	360.0	1.0	3.0	10.0	H-Bilog	QP	0.0	37.0	46.0	-9.0	low channel, EUT verti
901.999	23.3	1.9	0.0	1.0	3.0	10.0	V-Bilog	QP	0.0	35.2	46.0	-10.8	low channel, EUT verti

