

INTERMEC Technologies Corporation

802MIG2

August 20, 2003

Report No. INMC0086

Report Prepared By:



1-888-EMI-CERT

© 2003 Northwest EMC, Inc

Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Issue Date: August 20, 2003
INTERMEC Technologies Corporation
Model : 802MIG2

Emissions

Description	Pass	Fail
FCC Part 15.247:2003, Occupied Bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.247:2003, Output Power	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.247:2003, Band Edge Compliance	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.247:2003, Spurious Conducted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.247:2003, Spurious Radiated Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.247:2003, Power Spectral Density	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FCC Part 15.207:2003 AC Powerline Conducted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Modifications made to the product

- See the modifications page of the 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 Facteau, 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.

A2LA: 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: 1936-01, Certificate Number: 1936-02, Certificate Number 1936-03



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. (A2LA)



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 RSP 100, Issue 7, section 3.3.



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



	A2LA	FCC	NIST	TUV PS	TUV Rheinland	Nemko	Technology International	Industry Canada	BSMI	VCCI	GOST	NATA
IEC 1000-4-2	✓			✓	✓	✓	✓					
IEC 1000-4-3	✓			✓	✓	✓	✓					
IEC 1000-4-4	✓			✓	✓	✓	✓					
IEC 1000-4-5	✓			✓	✓	✓	✓					
IEC 1000-4-6	✓			✓	✓	✓	✓					
IEC 1000-4-8	✓			✓	✓	✓	✓					
IEC 1000-4-11	✓			✓	✓	✓	✓					
IEC 1000-3-2	✓			✓	✓	✓	✓					
IEC 1000-3-3	✓			✓	✓	✓	✓					
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 A2LA Scope, please reference <http://www.a2la2.net/scopepdf/1936-01.pdf> for the full A2LA Scope of Accreditation

What is measurement uncertainty?

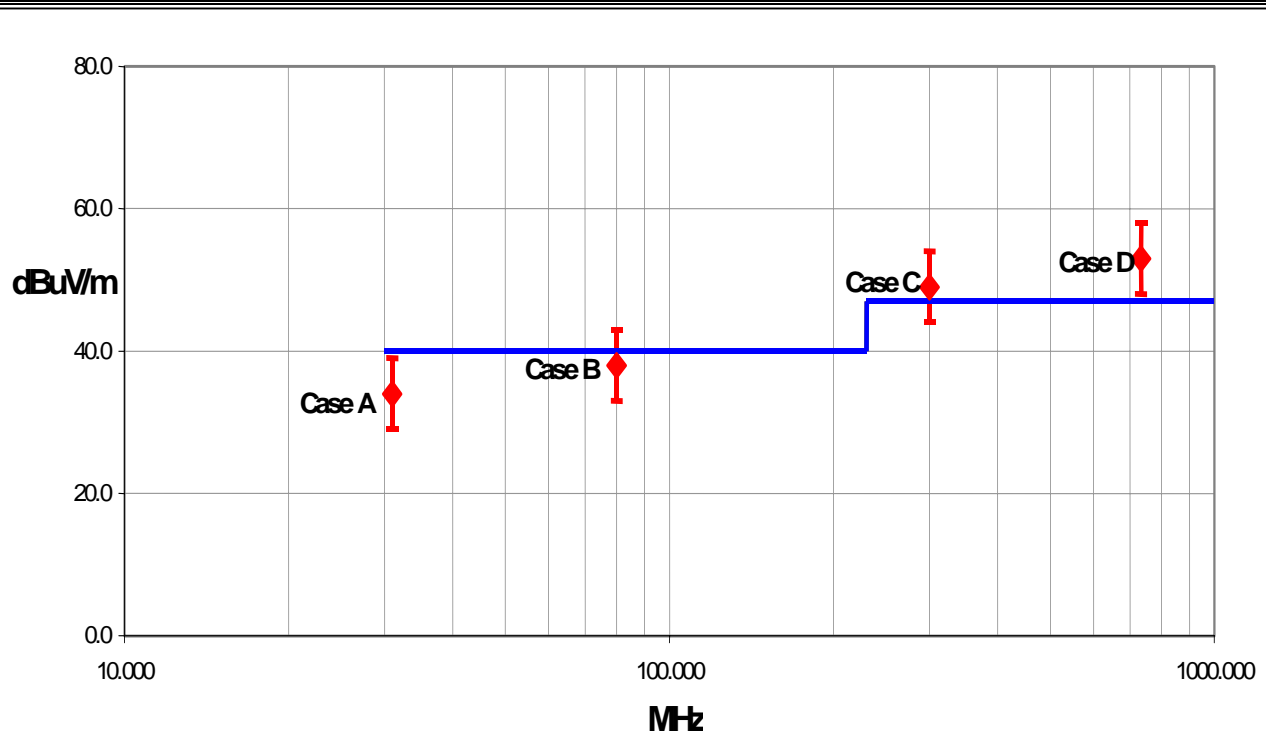
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following 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
Combined standard uncertainty $u_c(y)$	normal	+ 1.86	+ 1.82	+ 2.23	+ 1.29	+ 1.31	+ 1.25
		- 1.88	- 1.87	- 1.41	- 1.26	- 1.27	- 1.25
Expanded uncertainty U (level of confidence ≈ 95%)	normal (k=2)	+ 3.72	+ 3.64	+ 4.46	+ 2.59	+ 2.61	+ 2.49
		- 3.77	- 3.73	- 2.81	- 2.52	- 2.55	- 2.49

Radiated Emissions > 1 GHz

Value (dB)

Test Distance	Probability Distribution	Without High Pass Filter		With High Pass Filter	
		3m	10m	3m	10m
Combined standard uncertainty $u_c(y)$	normal	+ 1.29	+ 1.38	- 1.25	- 1.35
		- 1.25	- 1.35	- 2.51	- 2.70
Expanded uncertainty U (level of confidence ≈ 95%)	normal (k=2)	+ 2.57	+ 2.76	- 2.51	- 2.70
		- 2.51	- 2.70	- 2.51	- 2.70

Conducted Emissions

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.48
Expanded uncertainty U (level of confidence ≈ 95 %)	normal (k = 2)	2.97

Radiated Immunity

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence ≈ 95 %)	normal (k = 2)	2.11

Conducted Immunity

	Probability Distribution	Value (+/- dB)
Combined standard uncertainty $u_c(y)$	normal	1.05
Expanded uncertainty U (level of confidence ≈ 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, $u_c(y)$ 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:	Intermec Technologies Corporation
Address:	6001 36th Avenue West
City, State, Zip:	Everett, WA 98203-9280
Test Requested By:	Cheryl White
Model:	802MIG2 Radio
First Date of Test:	06-25-2003
Last Date of Test:	07-28-2003
Receipt Date of Samples:	06-25-2003
Equipment Design Stage:	Production
Equipment Condition:	No visual damage.

Information Provided by the Party Requesting the Test

Clocks/Oscillators:	Not provided at time of testing.
Ports:	DC Power input jumper, Receive antenna, Transmit antenna

Functional Description of the EUT (Equipment Under Test):

802.11(g) and 802.11(b) radio module

Client Justification for EUT Selection:

Not Provided

Client Justification for Test Selection

These tests satisfy the requirements for modular approval of a FCC 15.247 mobile transmitter.

Equipment modifications				
Item #	Test	Date	Modification	Note
1	Occupied Bandwidth	06-25-2003	No EMI suppression devices were added or modified during this test.	Same configuration as received from client.
2	Band Edge Compliance	06-25-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
3	Spurious Conducted Emissions	06-25-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
4	Power Spectral Density	06-26-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
5	Spurious Radiated Emissions	07-13-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
6	AC Powerline Conducted Emissions	07-17-2003	No EMI suppression devices were added or modified during this test.	Same configuration as in previous test.
7	Output Power	07-28-2003	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:

High

Mid

Low

Operating Modes Investigated:

802.11(b)

802.11(g)

Data Rates Investigated:

6 Mbit

11 Mbit

36 Mbit

54 Mbit

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software	FccTest.exe	Version	1/1/1601
-------------------	-------------	---------	----------

Description

The system was tested using special software developed to test all functions of the device during the test. The software allowed the selection of transmit channel and data rate. These were varied to produce the highest level of emissions. The OS of the host device was Ver. 0.00.00.0072

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Mini-PCI to CardBus Extender	TDK	Rev. 2	ICMB-68FYGC-0M03
802.11(b) and 802.11(g) radio	Intermec Technologies Corporation	802MIG2	C1
Laptop	Dell	PPL	0009321C-12800-8B6-0901
Power Adapter 1	Dell	PA-2	85391
Power Adapter 2	CUI Stack	DX-57AAT	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.6	Yes	Laptop	Power Adapter 1
AC Power	No	1.6	No	Power Adapter 1	AC Mains
DC Leads	PA	1.8	No	802.11(b) and 802.11(g) radio	Power Adapter 2
AC Power	PA	1.4	PA	Power Adapter 2	AC Mains

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	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(a)(2), the 6 dB bandwidth of a DTS channel must be at least 500kHz. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate.

Completed by:



EMISSIONS DATA SHEET

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Job Site: EV06
Tested by: Greg Kiemel	Power: DC from Host Unit

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate, 802.11(b) modulation scheme

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

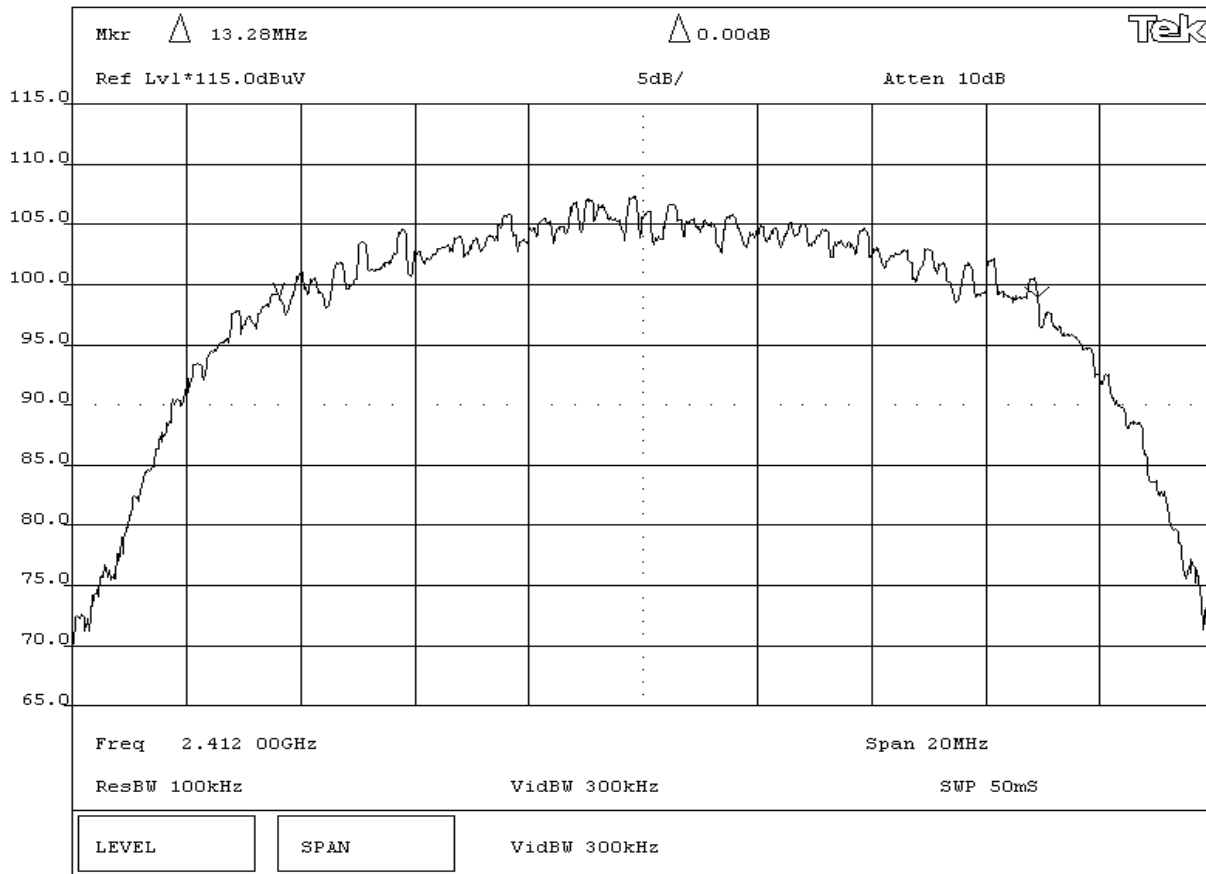
Pass BANDWIDTH 13.28 MHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - Low Channel



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate, 802.11(b) modulation scheme

DEVIATIONS FROM TEST STANDARD

None


REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

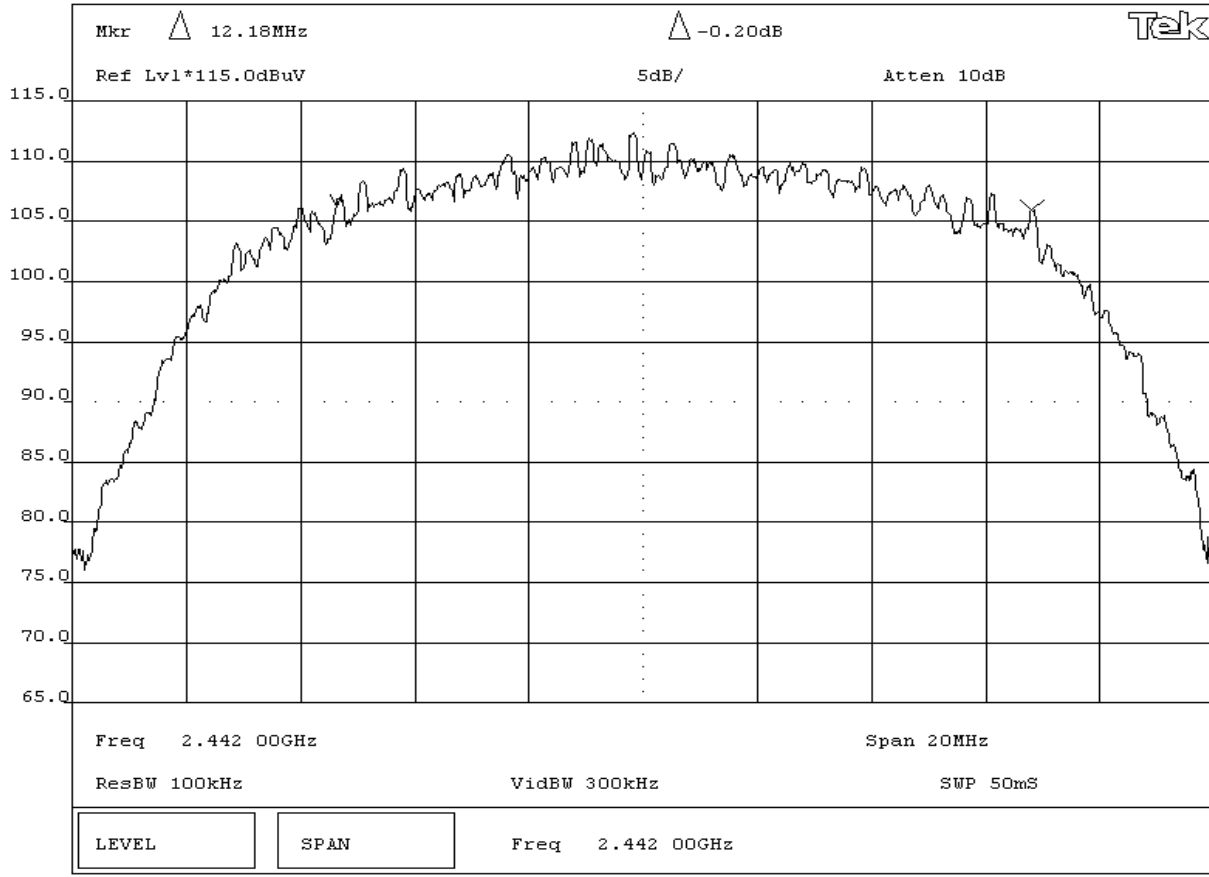
Pass BANDWIDTH 12.18 MHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel



EMISSIONS DATA SHEET

EUT:	802MIG2	Work Order:	INMC0086
Serial Number:	C1	Date:	06/25/03
Customer:	Intermec Corporation	Temperature:	77 degrees F
Attendees:	C.D. White	Humidity:	38% RH
Customer Ref. No.:	N/A	Tested by:	Greg Kiemel
		Power:	DC from Host Unit
		Job Site:	EV06

Specification:	47 CFR 15.247(a)(2)	Year:	Most Current	Method:	FCC 97-114, ANSI C63.4	Year:	1992
----------------	---------------------	-------	--------------	---------	------------------------	-------	------

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate, 802.11(b) modulation scheme

DEVIATIONS FROM TEST STANDARD

None


REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS BANDWIDTH

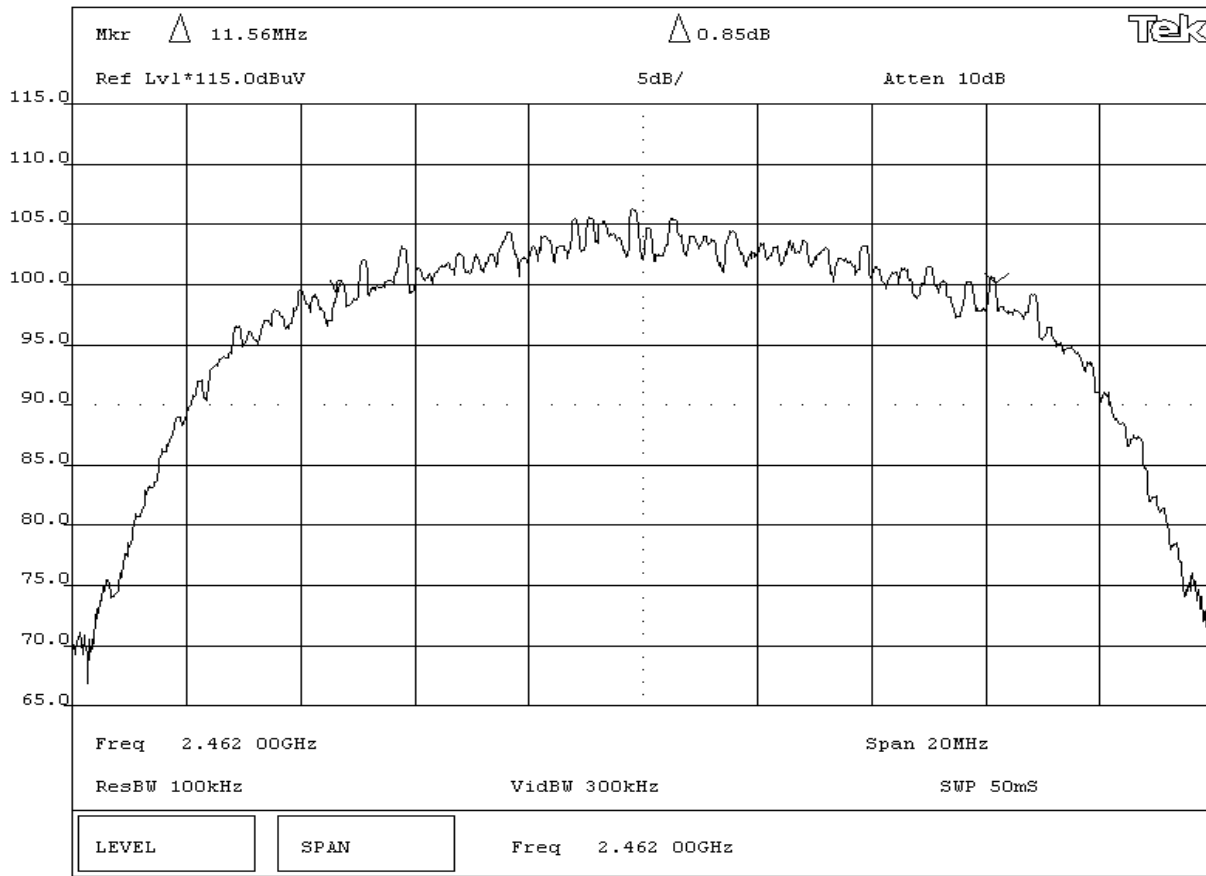
Pass 11.56 MHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - High Channel



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Job Site: EV06
Tested by: Greg Kiemel	Power: DC from Host Unit

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS BANDWIDTH

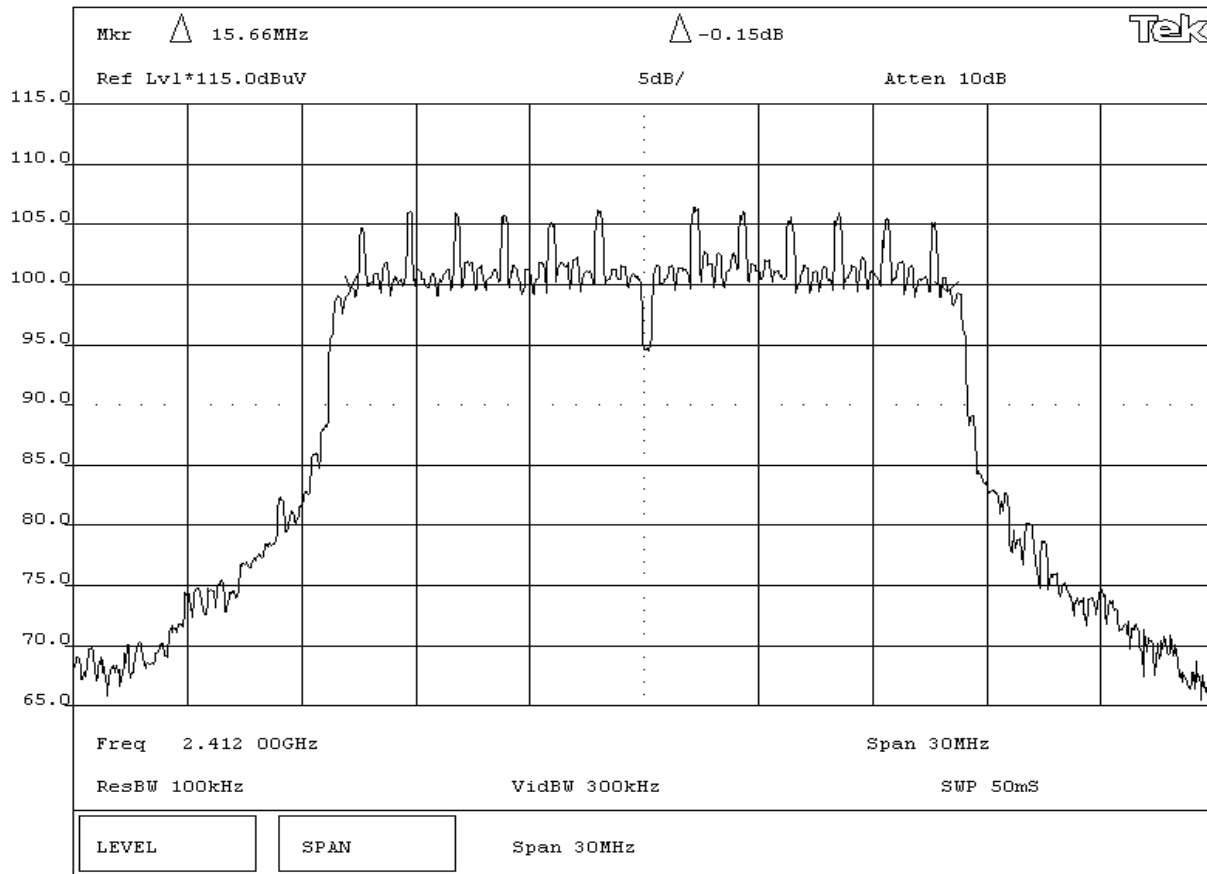
Pass 15.66 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST

Occupied Bandwidth - Low Channel - 6 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Job Site: EV06
Tested by: Greg Kiemel	Power: DC from Host Unit

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

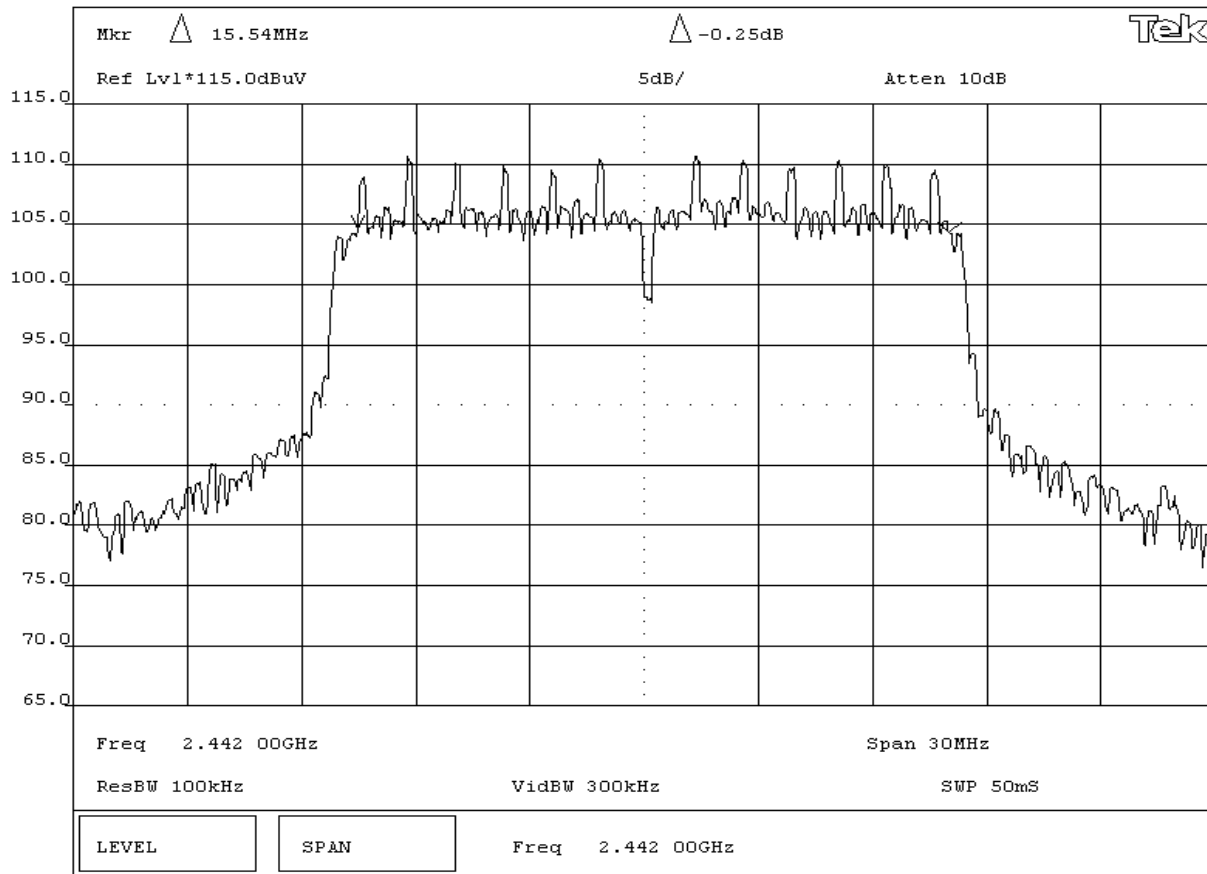
Pass BANDWIDTH 15.54 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel - 6 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD
None

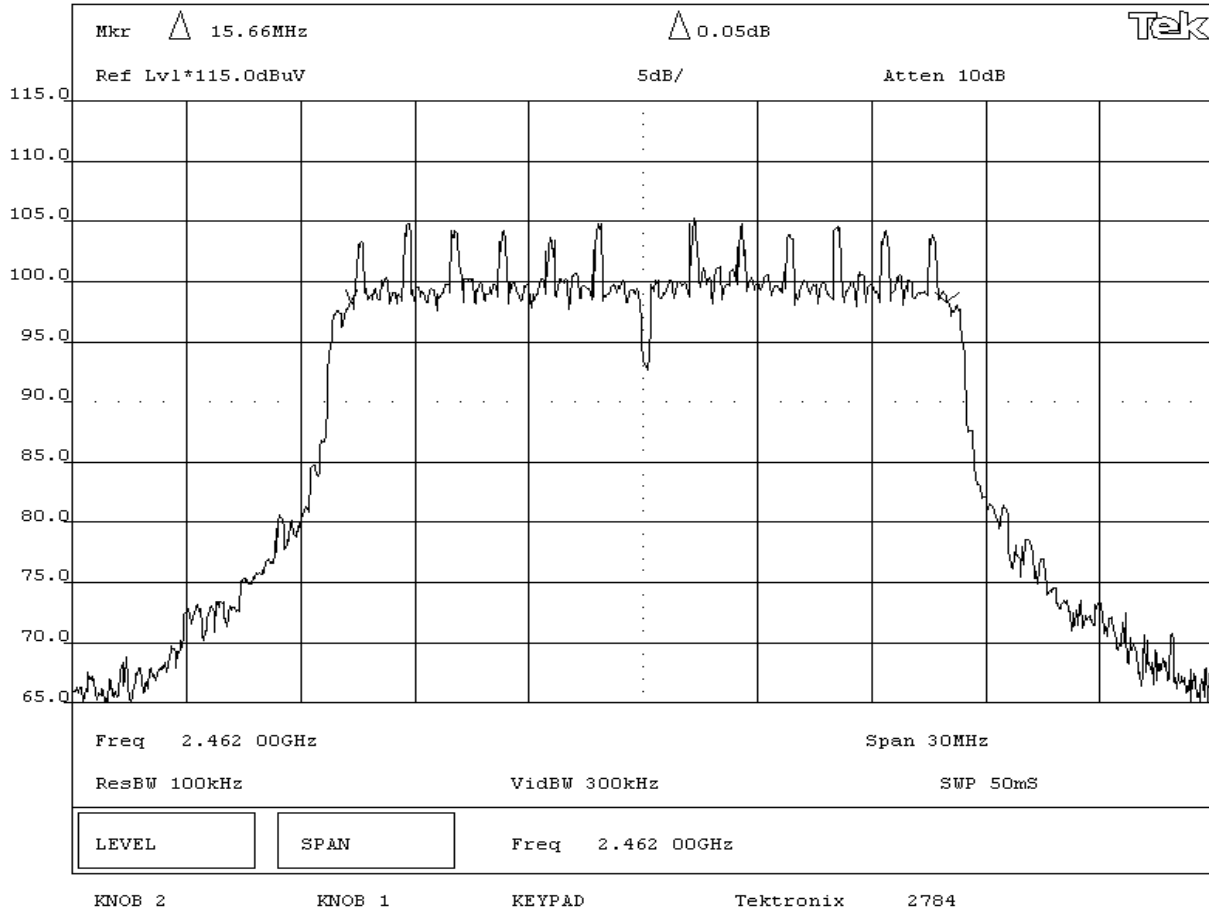
REQUIREMENTS
The minimum 6dB bandwidth is 500KHz

RESULTS	BANDWIDTH
Pass	15.66 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST
Occupied Bandwidth - High Channel - 6 Mbit



EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Job Site: EV06
Tested by: Greg Kiemel	Power: DC from Host Unit

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

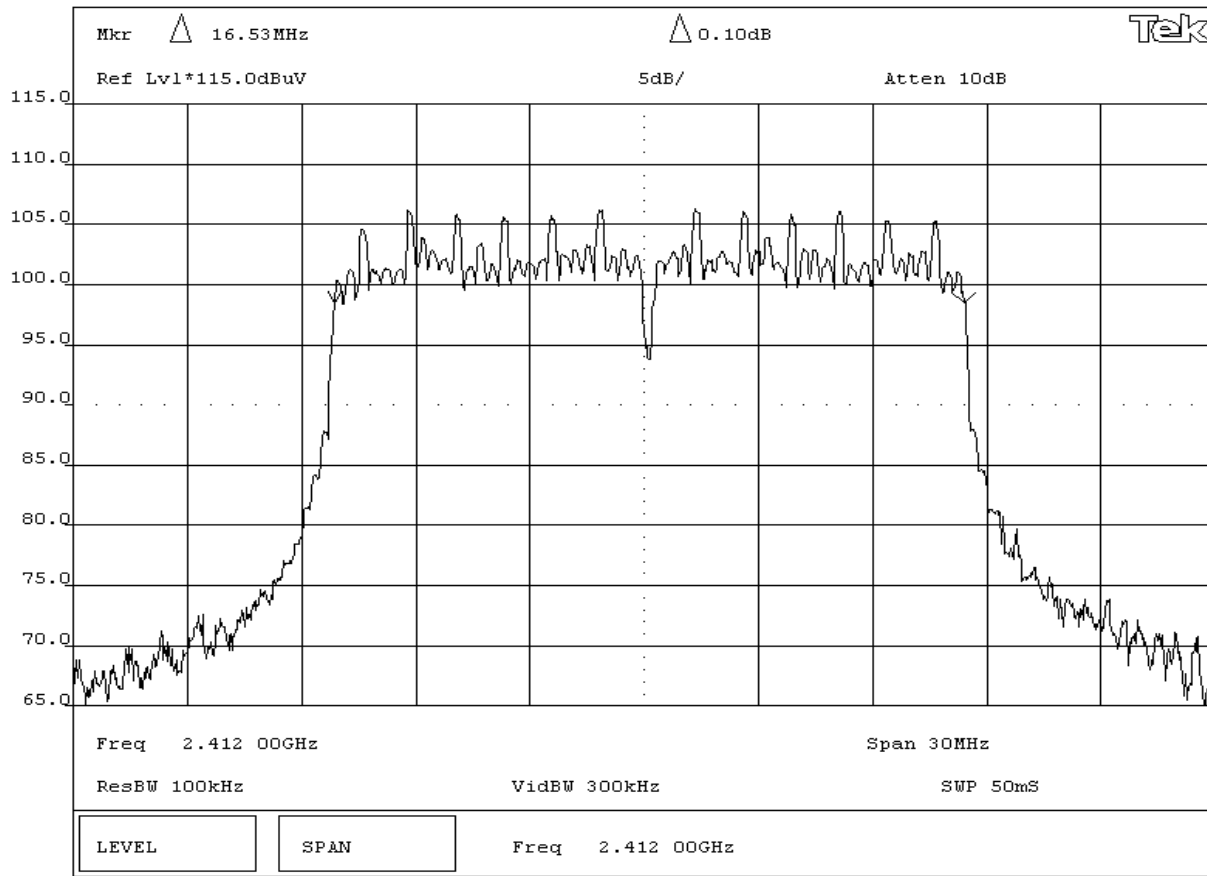
Pass BANDWIDTH 16.53 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST

Occupied Bandwidth - Low Channel - 36 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None


REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

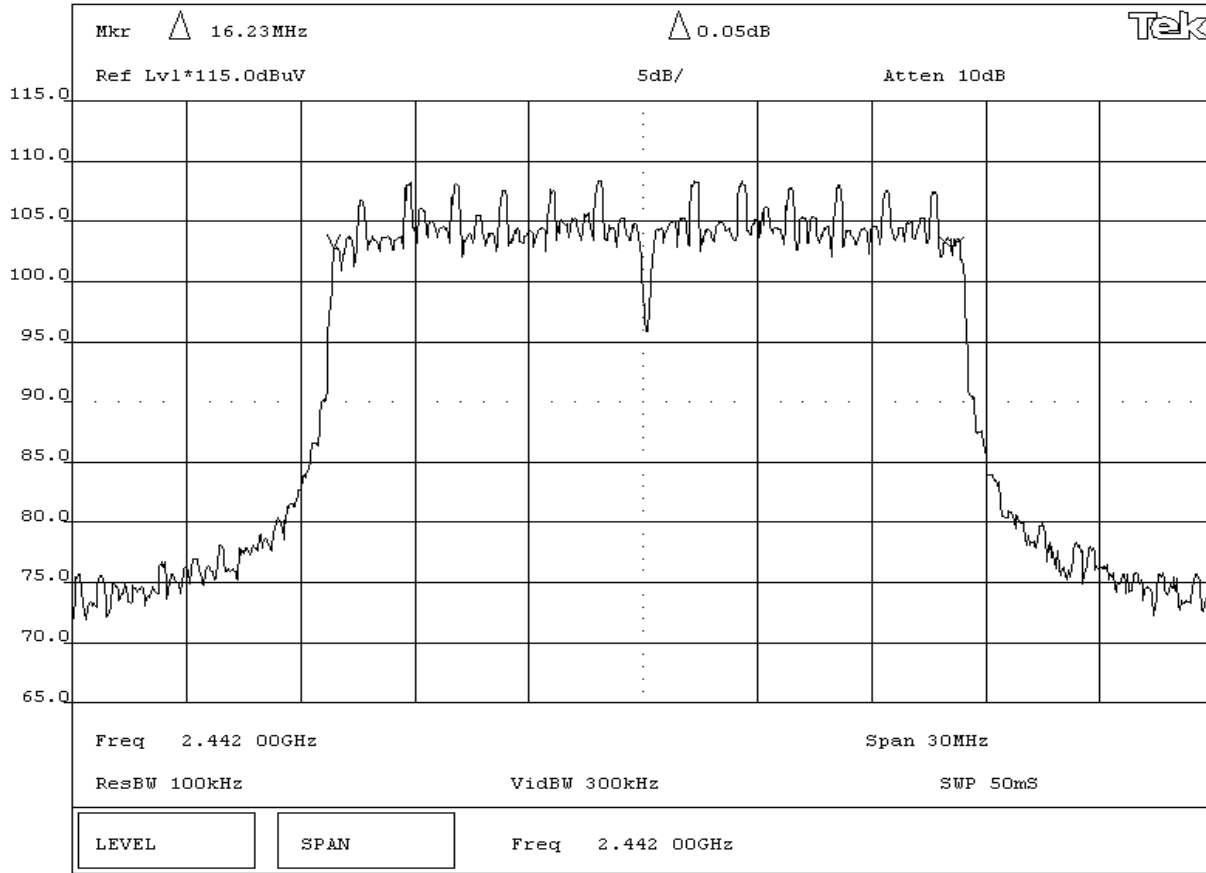
Pass BANDWIDTH 16.23 MHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel - 36 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

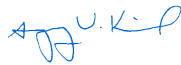
REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS

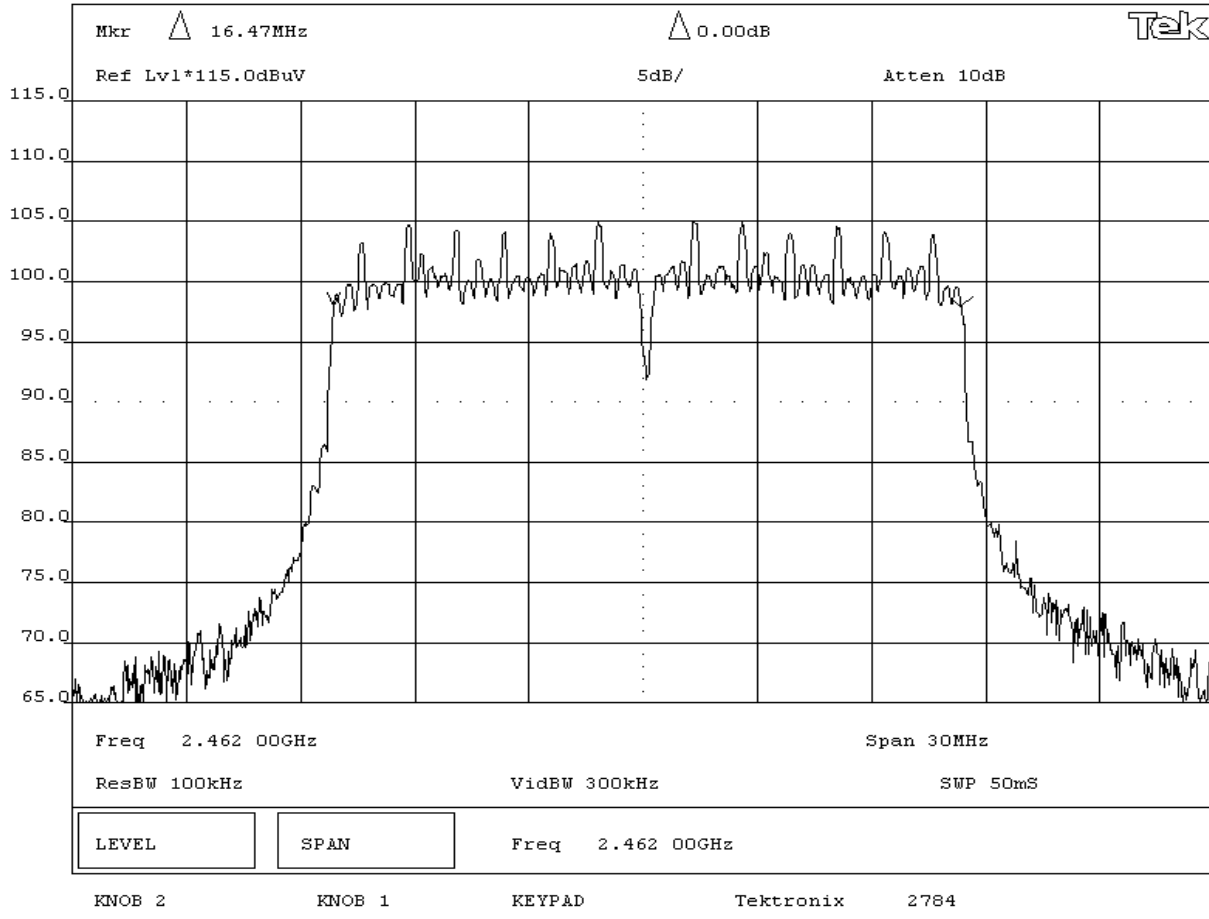
Pass	BANDWIDTH 16.47 MHz
------	-------------------------------

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - High Channel - 36 Mbit



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: DC from Host Unit
	Humidity: 38% RH
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None


REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS BANDWIDTH

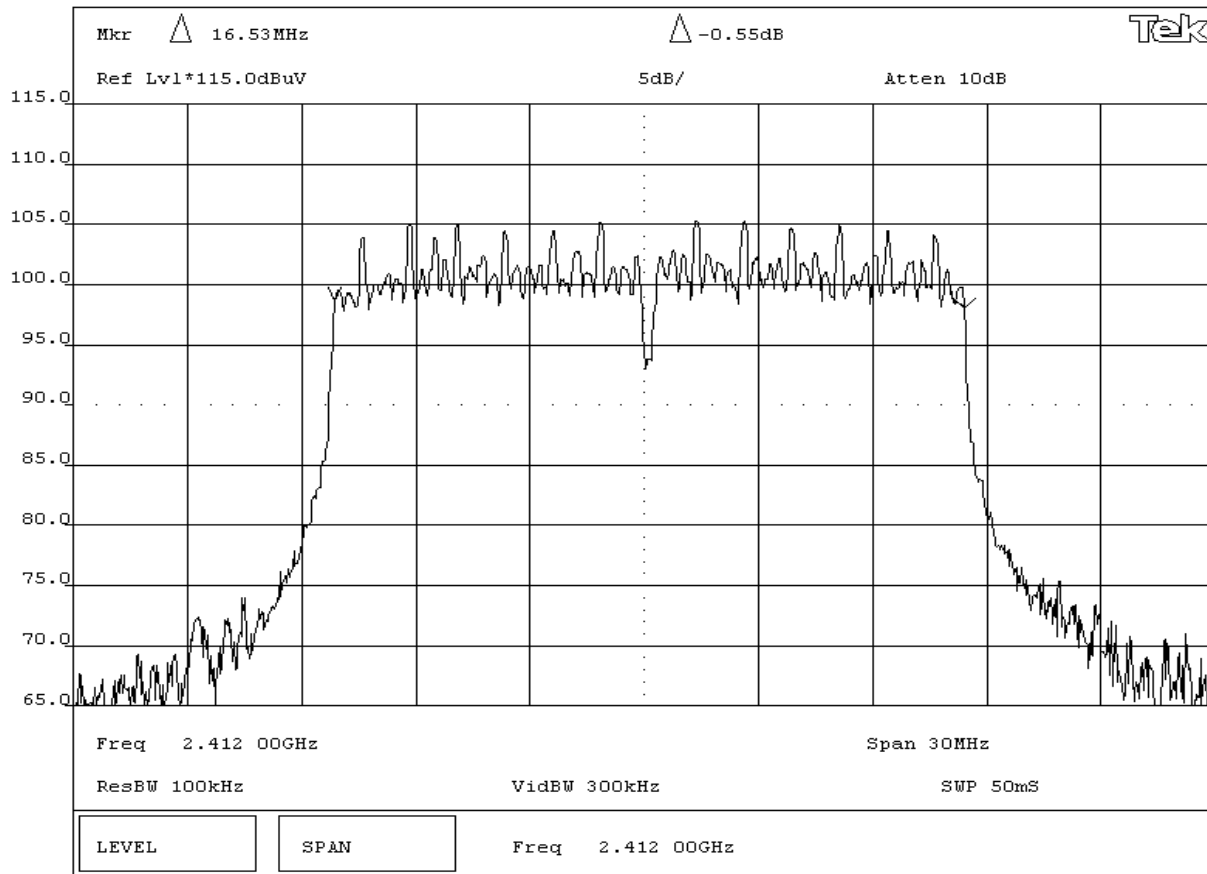
Pass 16.53 MHz

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Occupied Bandwidth - Low Channel - 54 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

The minimum 6dB bandwidth is 500KHz

RESULTS BANDWIDTH

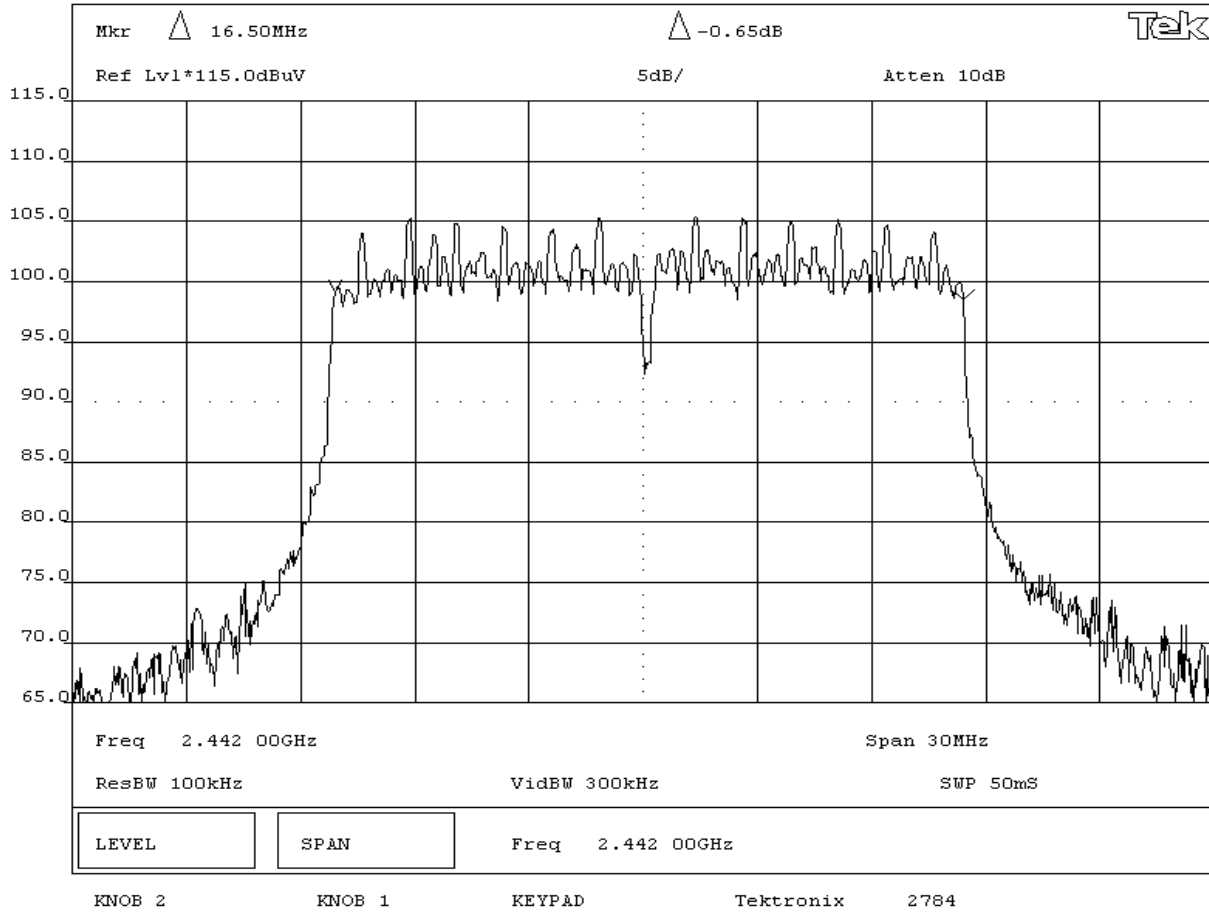
Pass 16.5 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST

Occupied Bandwidth - Mid Channel - 54 Mbit



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Job Site: EV06
Tested by: Greg Kiemel	Power: DC from Host Unit

Specification: 47 CFR 15.247(a)(2)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992
------------------------------------	--------------------	--------------------------------	------------

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD
None

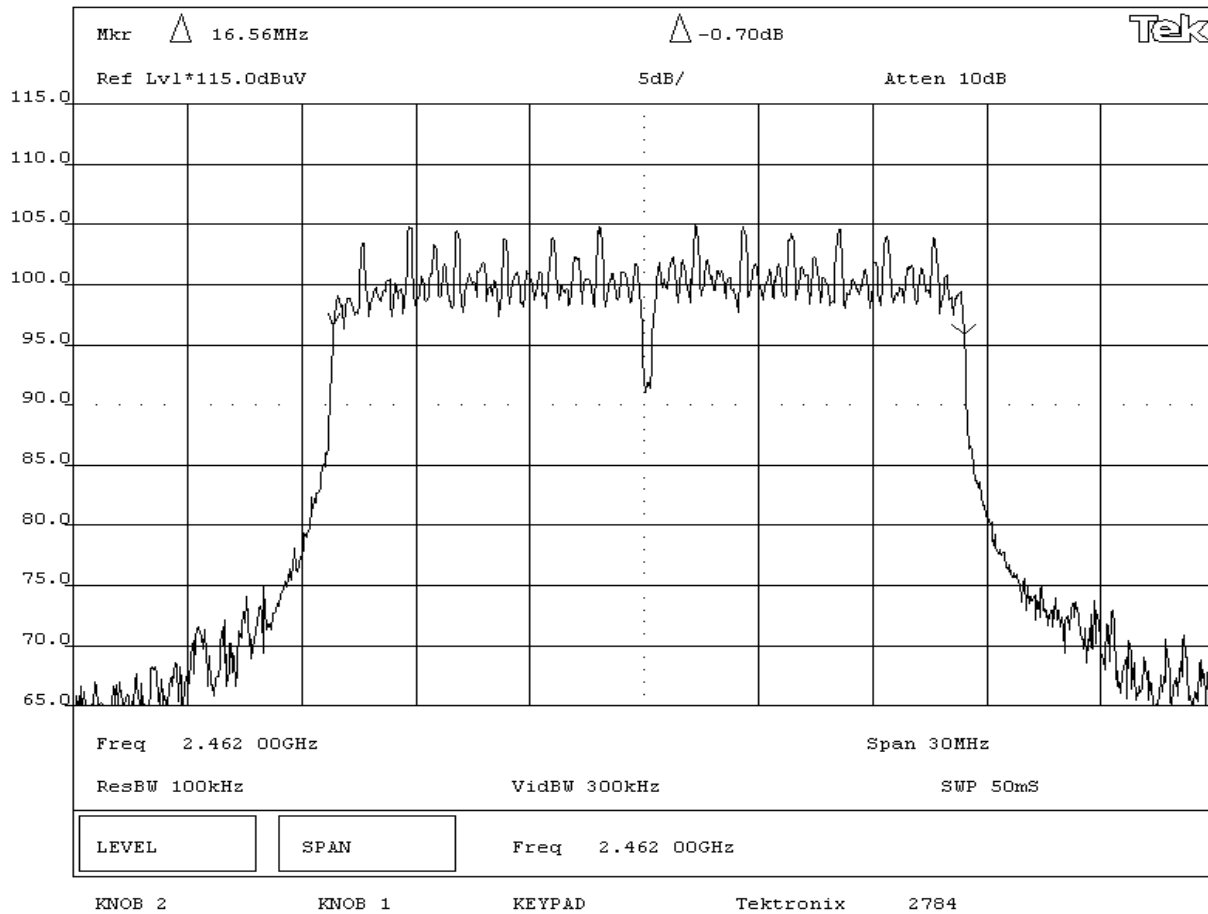
REQUIREMENTS
The minimum 6dB bandwidth is 500KHz

RESULTS	BANDWIDTH
Pass	16.56 MHz

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST
Occupied Bandwidth - High Channel - 54 Mbit



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:

High

Mid

Low

Operating Modes Investigated:

802.11(b)

802.11(g)

Data Rates Investigated:

6Mbit

11Mbit

36Mbit

54Mbit

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz

Software\Firmware Applied During Test

Exercise software	Intersil Engineering Tools, Continuous Transmit - Receive	Version	1.4.1
Description			
The system was tested using special software developed to test all functions of the device during the test, including transmit or receive channels, modulation type, and data rate.			

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Mini-PCI to CardBus Extender	TDK	Rev. 2	ICMB-68FYGC-0M03
802.11(b) and 802.11(g) radio	Intermec Technologies Corporation	802MIG2	C1
Laptop	Dell	PPL	0009321C-12800-8B6-0901
Power Adapter 2	CUI Stack	DX-57AAT	N/A
Power Adapter 1	Dell	PA-2	85391

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.6	Yes	Laptop	Power Adapter 1
AC Power	No	1.6	No	Power Adapter 1	AC Mains
DC Leads	PA	1.8	No	802.11(b) and 802.11(g) radio	Power Adapter 2
AC Power	PA	1.4	PA	Power Adapter 2	AC Mains

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
Power Meter	Hewlett Packard	E4418A	SPA	06/21/2002	24 mo
Power Sensor	Hewlett-Packard	8481H	SPB	06/21/2002	24 mo
Oscilloscope	Tektronix	TDS3052	TOE	07/08/2003	12 mo
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	NA
Signal Generator	Hewlett Packard	8341B	TGN	12/20/2002	12 mo

Test Description

Requirement: Per 47 CFR 15.247(b)(3), the maximum peak output power must not exceed 1 Watt.

Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The EUT was transmitting at its maximum data rate and maximum output power.

The measurement was made using a direct connection between the RF output of the EUT and a RF detector diode. The DC output of the diode was measured with the oscilloscope. The signal generator, tuned to the transmit frequency, was then substituted for the EUT. The CW output of the signal generator was adjusted until the DC output of the RF detector diode match the level produced when connected to the EUT. To further reduce measurement error, the power meter and sensor were then used to measure the output power level of the signal generator.

De Facto EIRP Limit: Per 47 CFR 15.247 (4), the EUT meets the de facto EIRP limit of +36dBm.

Completed by:



EUT:	802MIG2	Work Order:	INMC0086
Serial Number:	C1	Date:	07/28/03
Customer:	Intermec Corporation	Temperature:	75 degrees F
Attendees:	none	Tested by:	Greg Kiemel
Customer Ref. No.:	N/A	Power:	DC from Host Unit
		Humidity:	37% RH
		Job Site:	EV06

TEST SPECIFICATIONS			
Specification:	47 CFR 15.247(b)(3)	Year:	Most Current
Method:	FCC 97-114, ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS			

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum output power at the data rate and modulation schemes noted below.

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak conducted output power does not exceed 1 Watt

RESULTS

Pass	AMPLITUDE
	11.6 mW

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Output Power - Low, Mid, & High Channels

Data Rate = 6 Mbit, 802.11(g)

Frequency (MHz)	Power (mW)
2412	6.8
2442	7.2
2462	7.5

Data Rate = 11 Mbit, 802.11(b)

Frequency (MHz)	Power (mW)
2412	9.1
2442	10.6
2462	11.6

Data Rate = 36 Mbit, 802.11(g)

Frequency (MHz)	Power (mW)
2412	2.6
2442	3.3
2462	3.5

Data Rate = 54 Mbit, 802.11(g)

Frequency (MHz)	Power (mW)
2412	1.8
2442	2.0
2462	2.1

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:

High

Low

Operating Modes Investigated:

802.11(b)

802.11(g)

Data Rates Investigated:

6 Mbit

11 Mbit

36 Mbit

54 Mbit

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

Battery

Software\Firmware Applied During Test

Exercise software

FccTest.exe

Version

1/1/1601

Description

The system was tested using special software developed to test all functions of the device during the test. The software allowed the selection of transmit channel and data rate. These were varied to produce the highest level of emissions. The OS of the host device was Ver. 0.00.00.0072

EUT and Peripherals

Description	Manufacturer	Model/Part Number	Serial Number
Mini-PCI to CardBus Extender	TDK	Rev. 2	ICMB-68FYGC-0M03
802.11(b) and 802.11(g) radio	Intermec Technologies Corporation	802MIG2	C1
Laptop	Dell	PPL	0009321C-12800-8B6-0901
Power Adapter 1	Dell	PA-2	85391
Power Adapter 2	CUI Stack	DX-57AAT	N/A

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Leads	PA	1.6	Yes	Laptop	Power Adapter 1
AC Power	No	1.6	No	Power Adapter 1	AC Mains
DC Leads	PA	1.8	No	802.11(b) and 802.11(g) radio	Power Adapter 2
AC Power	PA	1.4	PA	Power Adapter 2	AC Mains

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	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(c), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 25 MHz below the band edge to 25 MHz above the band edge.

Completed by:

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2		Work Order: INMC0086
Serial Number: C1		Date: 06/25/03
Customer: Intermec Corporation		Temperature: 77 degrees F
Attendees: C.D. White	Tested by: Greg Kiemel	Humidity: 38% RH
Customer Ref. No.: N/A	Power: DC from Host Unit	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at maximum data rate, 802.11(b) modulation scheme

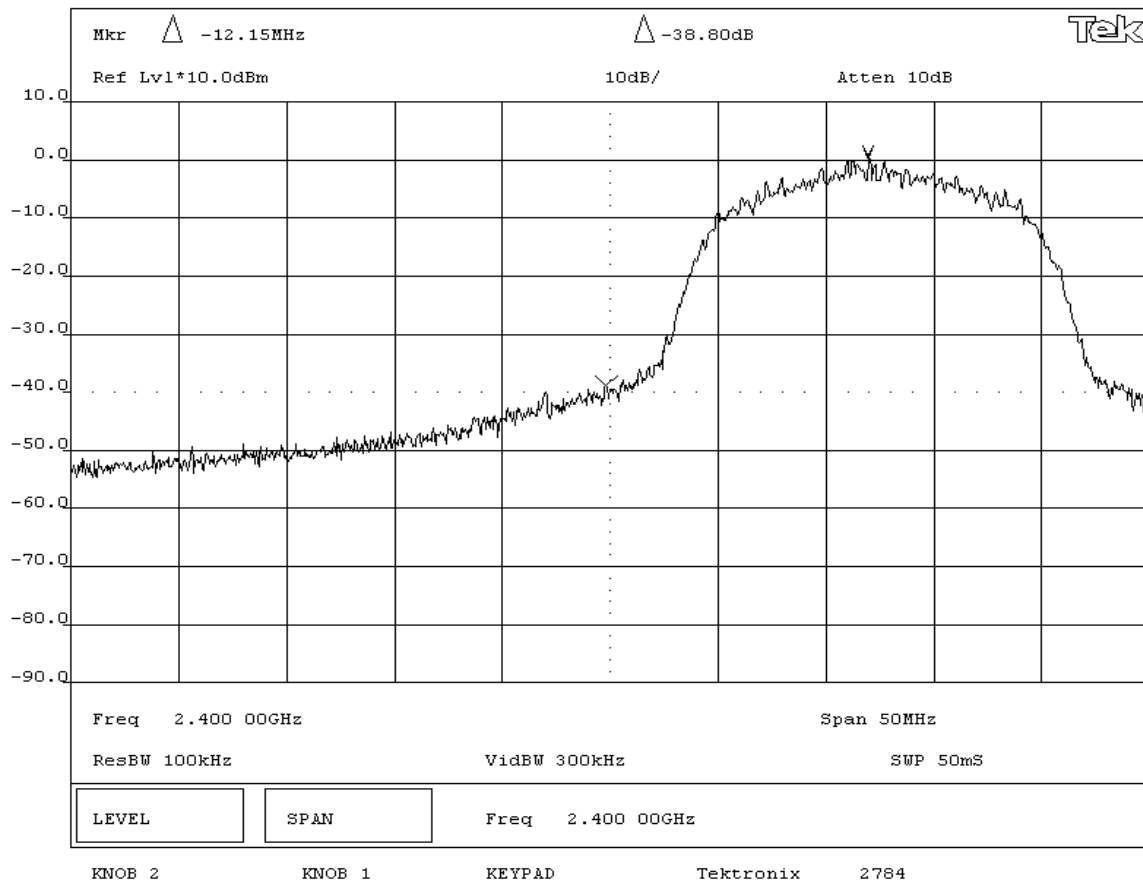
DEVIATIONS FROM TEST STANDARD
None

REQUIREMENTS
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS
Pass -38.8 dB

SIGNATURE
Tested By: *Greg Kiemel*

DESCRIPTION OF TEST
Band Edge Compliance - Low Channel - 11 Mbit



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	802MIG2	Work Order:	INMC0086
Serial Number:	C1	Date:	06/25/03
Customer:	Intermec Corporation	Temperature:	77 degrees F
Attendees:	C.D. White	Humidity:	38% RH
Customer Ref. No.:	N/A	Tested by:	Greg Kiemel
		Power:	DC from Host Unit
		Job Site:	EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at maximum data rate, 802.11(b) modulation scheme

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental


RESULTS

Pass

AMPLITUDE

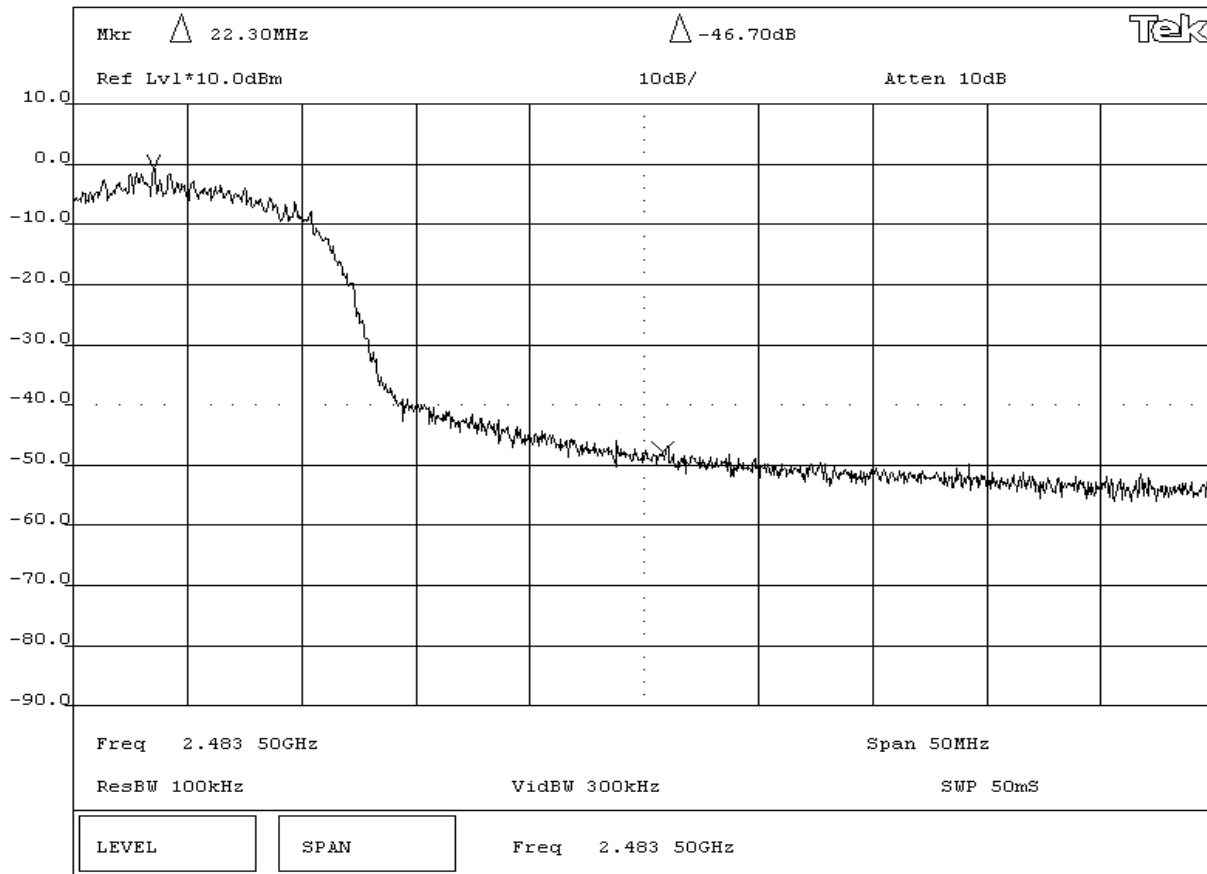
-46.7 dB

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Band Edge Compliance - High Channel - 11 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2		Work Order: INMC0086	
Serial Number: C1		Date: 06/25/03	
Customer: Intermec Corporation		Temperature: 77 degrees F	
Attendees: C.D. White	Tested by: Greg Kiemel	Humidity: 38% RH	
Customer Ref. No.: N/A	Power: DC from Host Unit	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD
None

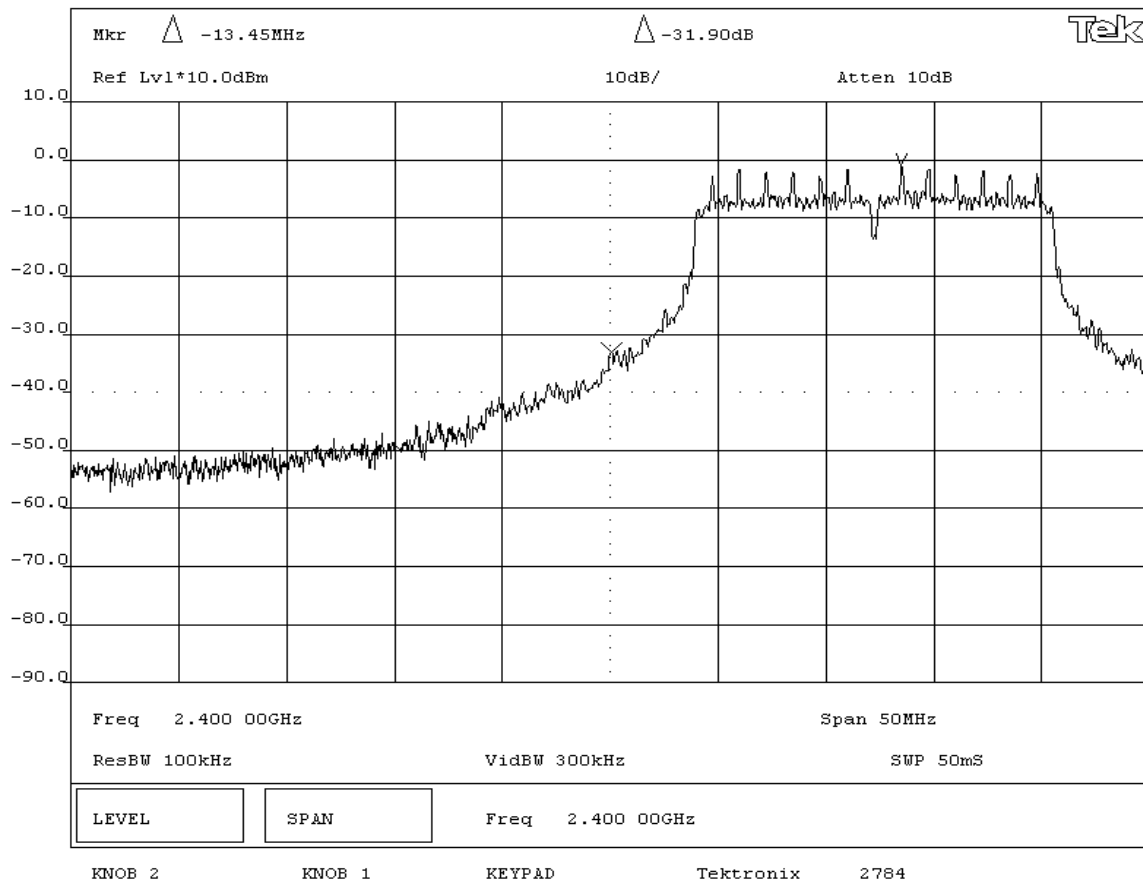
REQUIREMENTS
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	AMPLITUDE
Pass	-31.9 dB

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST
Band Edge Compliance - Low Channel - 6 Mbit



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	802MIG2	Work Order:	INMC0086
Serial Number:	C1	Date:	06/25/03
Customer:	Intermec Corporation	Temperature:	77 degrees F
Attendees:	C.D. White	Tested by:	Greg Kiemel
Customer Ref. No.:	N/A	Power:	DC from Host Unit
		Humidity:	38% RH
		Job Site:	EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES

Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD

None

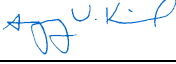
REQUIREMENTS

Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	AMPLITUDE
---------	-----------

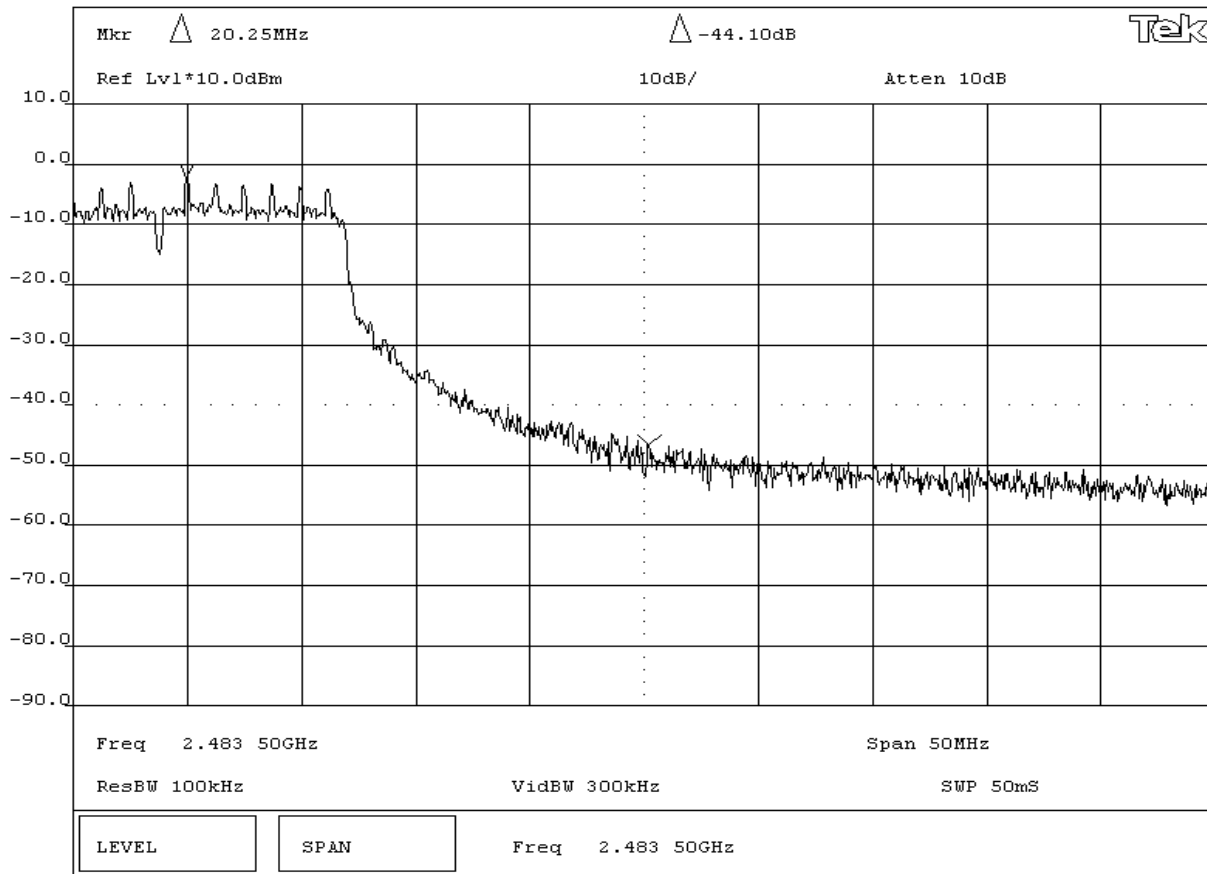
Pass	-44.1 dB
------	----------

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Band Edge Compliance - High Channel - 6 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2		Work Order: INMC0086	
Serial Number: C1		Date: 06/25/03	
Customer: Intermec Corporation		Temperature: 77 degrees F	
Attendees: C.D. White	Tested by: Greg Kiemel	Humidity: 38% RH	
Customer Ref. No.: N/A	Power: DC from Host Unit	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD
None

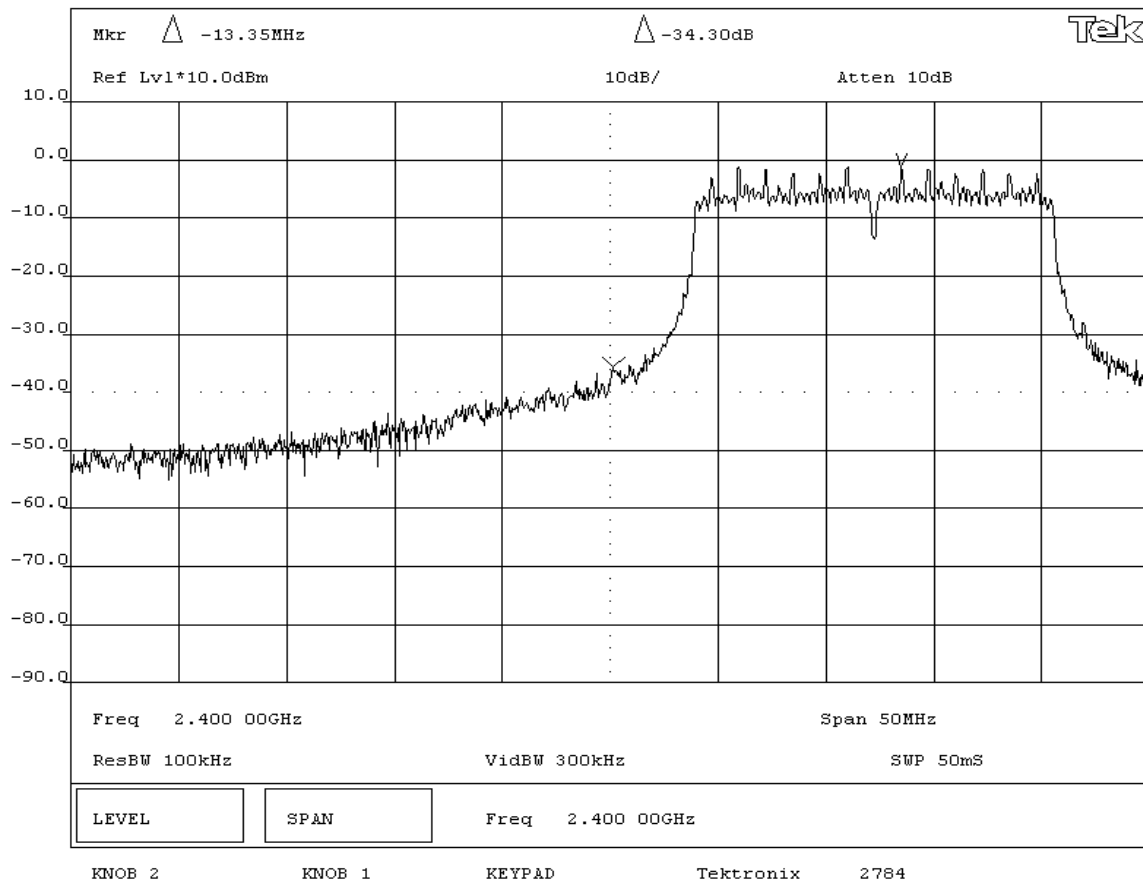
REQUIREMENTS
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	AMPLITUDE
Pass	-34.3 dB

SIGNATURE

Tested By: *Greg Kiemel*

DESCRIPTION OF TEST
Band Edge Compliance - Low Channel - 36 Mbit



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT:	802MIG2	Work Order:	INMC0086
Serial Number:	C1	Date:	06/25/03
Customer:	Intermec Corporation	Temperature:	77 degrees F
Attendees:	C.D. White	Humidity:	38% RH
Customer Ref. No.:	N/A	Tested by:	Greg Kiemel
		Power:	DC from Host Unit
		Job Site:	EV06

TEST SPECIFICATIONS			
Specification:	47 CFR 15.247(c)	Year:	Most Current
Method:	FCC 97-114, ANSI C63.4	Year:	1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.

DEVIATIONS FROM TEST STANDARD
None

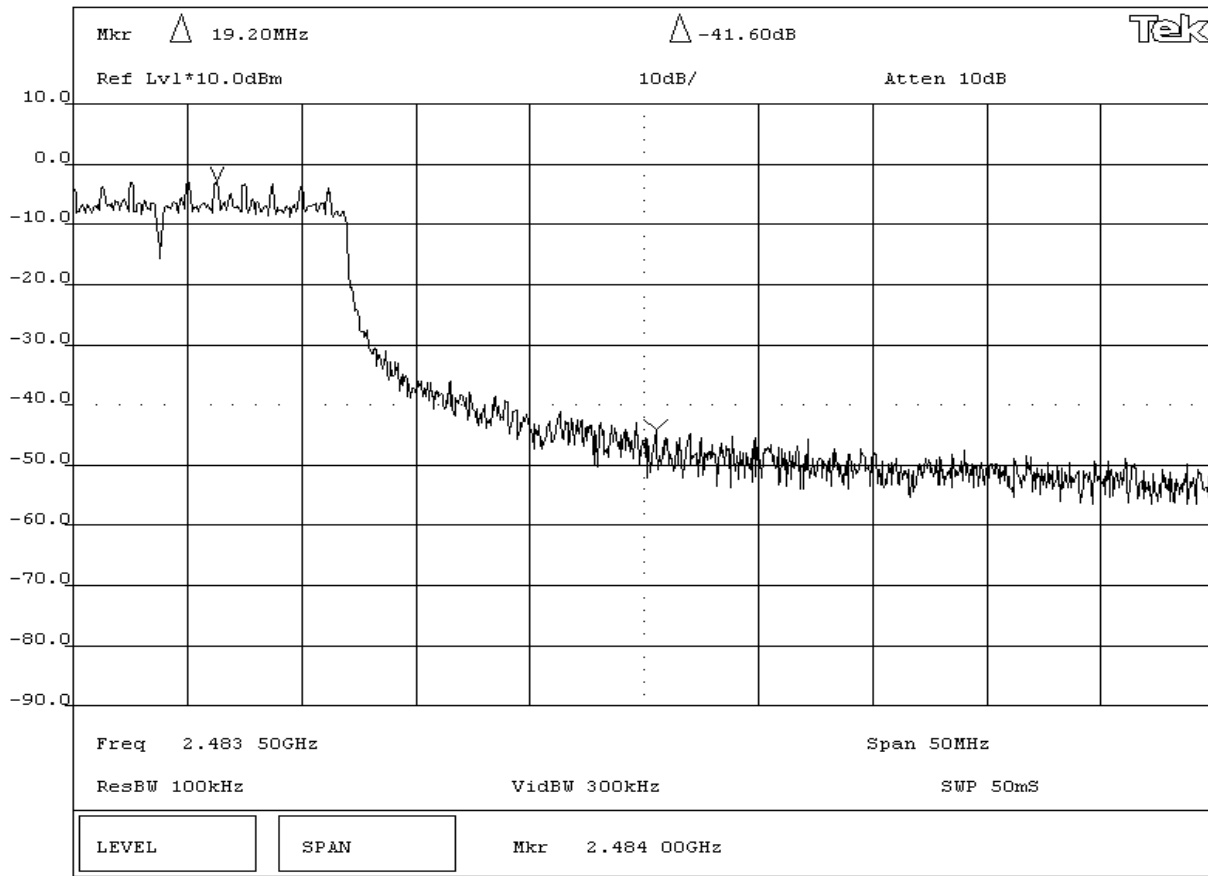
REQUIREMENTS
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

RESULTS	AMPLITUDE
Pass	-41.6 dB

SIGNATURE

Tested By: 

DESCRIPTION OF TEST
Band Edge Compliance - High Channel - 36 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784

EUT: 802MIG2		Work Order: INMC0086	
Serial Number: C1		Date: 06/25/03	
Customer: Intermec Corporation		Temperature: 77 degrees F	
Attendees: C.D. White	Tested by: Greg Kiemel	Humidity: 38% RH	
Customer Ref. No.: N/A	Power: DC from Host Unit	Job Site: EV06	

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS			


COMMENTS			

EUT OPERATING MODES			
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.			

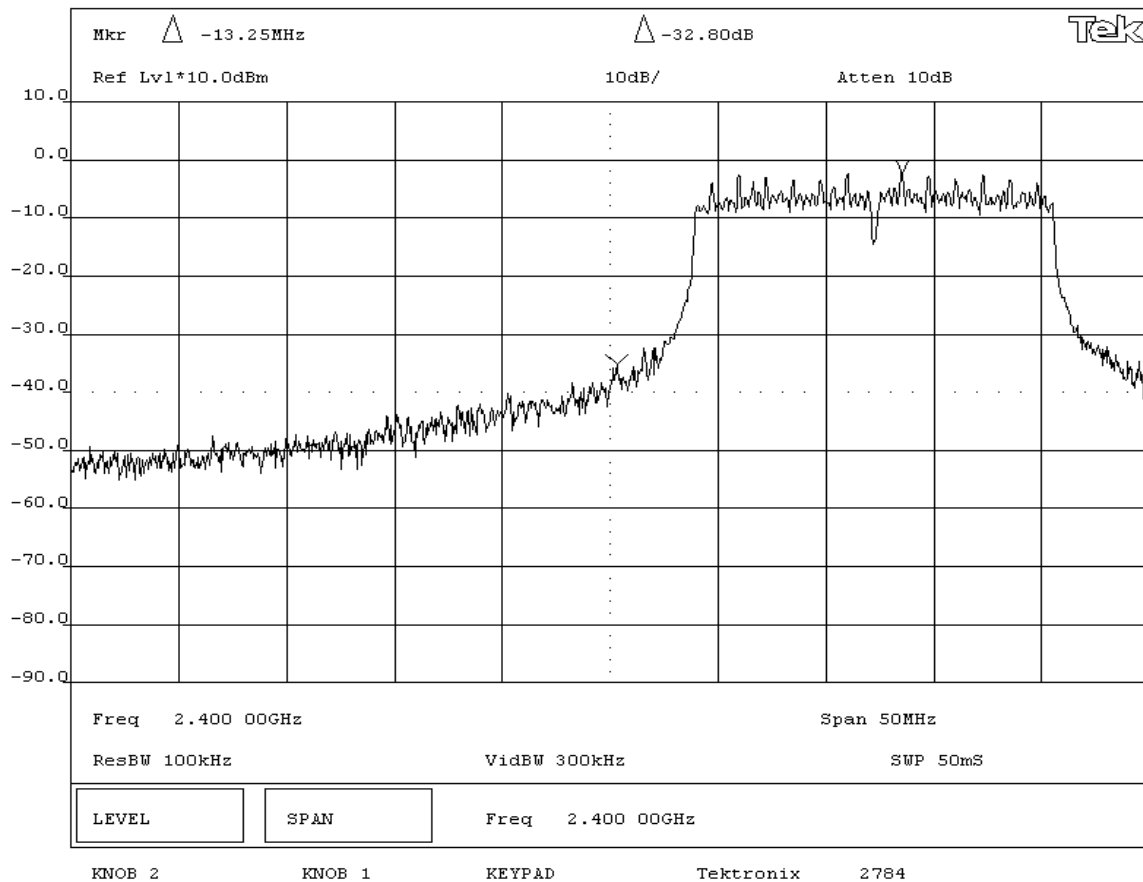
DEVIATIONS FROM TEST STANDARD			
None			

REQUIREMENTS			
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental			

RESULTS		AMPLITUDE	
Pass		-32.8 dB	

SIGNATURE			
			
Tested By: _____			

DESCRIPTION OF TEST			
Band Edge Compliance - Low Channel - 54 Mbit			



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 802MIG2	Work Order: INMC0086
Serial Number: C1	Date: 06/25/03
Customer: Intermec Corporation	Temperature: 77 degrees F
Attendees: C.D. White	Humidity: 38% RH
Customer Ref. No.: N/A	Tested by: Greg Kiemel
	Power: DC from Host Unit
	Job Site: EV06

TEST SPECIFICATIONS			
Specification: 47 CFR 15.247(c)	Year: Most Current	Method: FCC 97-114, ANSI C63.4	Year: 1992

SAMPLE CALCULATIONS

COMMENTS

EUT OPERATING MODES
Modulated by PRBS at indicated data rate, 802.11(g) modulation scheme.


DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS
Maximum level of any spurious emission at the edge of the authorized band is 20 dB down from the fundamental

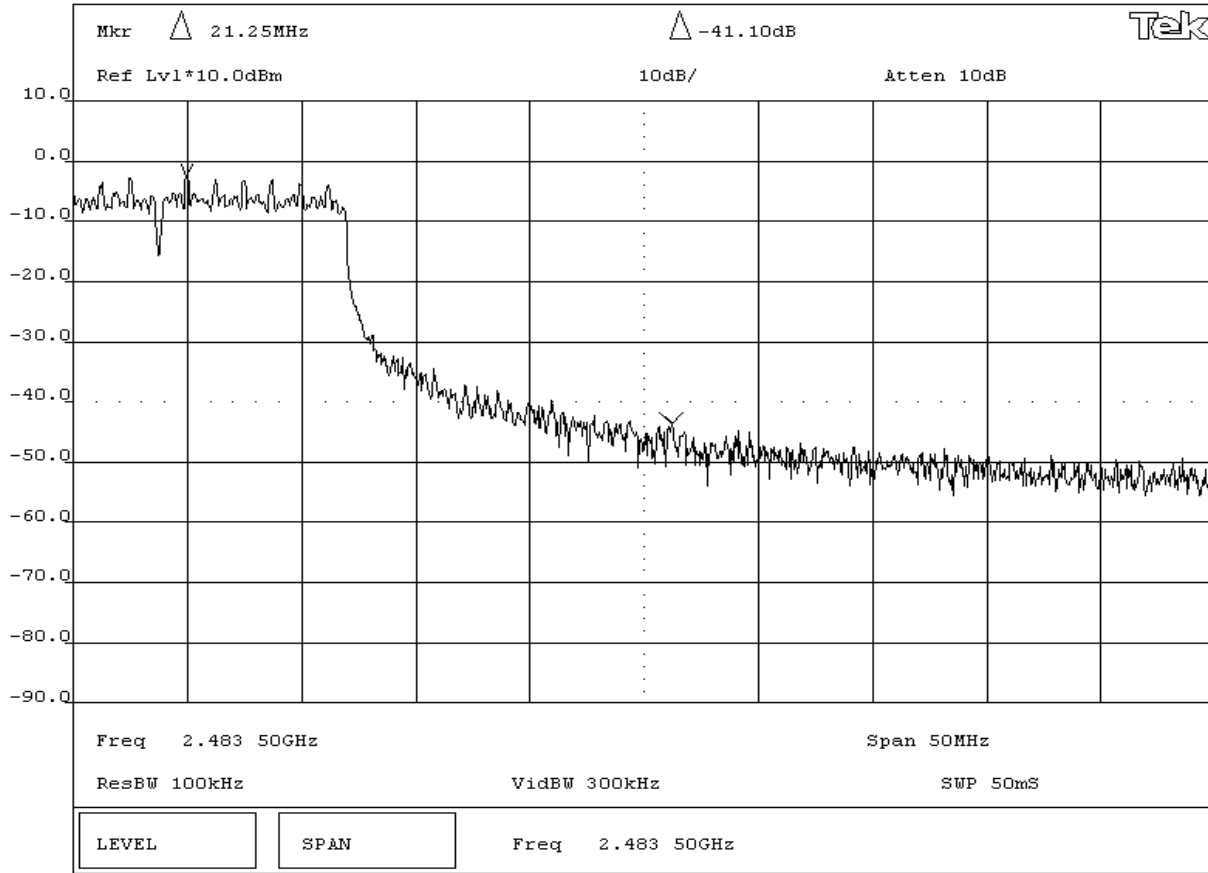
RESULTS	AMPLITUDE
Pass	-41.1 dB

SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Band Edge Compliance - High Channel - 54 Mbit



Knob 2

Knob 1

Keypad

Tektronix

2784