

# **Exhibit O: Peak Power Spectral Density**

**FCC ID: HN2WN-5MP01**

**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

**Data Rates Investigated:**

Lowest, Middle, and Highest: Lowest data rate produced the highest PPSD.

**Output Power Setting(s) Investigated:**

Maximum

**Power Input Settings Investigated:**

120 V, 60 Hz

**Software\Firmware Applied During Test**

Exercise software	AP Monitor	Version	V5.37
Description			
A notebook PC controls the radio through a serial port connection on the WA21 access point. Hyper Terminal running in Windows 98 address the AP monitor commands for setting the transmit channel and data rate.			

**Equipment Modifications**

No EMI suppression devices were added or modified. The EUT was tested as delivered.

**EUT and Peripherals**

Description	Manufacturer	Model/Part Number	Serial Number
EUT – 802.11(a) radio module installed in WA21 Access Point	Intermec	WN-5MP01	002-032
Laptop PC	Panasonic	CF-35	7KHSA02247

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial cable	Yes	1.5	No	Access Point	Laptop
AC power	No	1.9	No	Access Point	AC mains
AC power	No	1.8	No	Laptop	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	Hewlett Packard	HP8593E	AAP	05/03/2002	12 mo

## Test Description

**Requirement:** Per 47 CFR 15.407(a)(1)-(2), the maximum peak power spectral density must not exceed the following limits:

For the 5.15 to 5.25 GHz band, the peak power spectral density shall not exceed 4 dBm/MHz.

For the 5.25 to 5.35 GHz band, the peak power spectral density shall not exceed 11 dBm/MHz.

For both bands, if the antenna gain is greater than 6 dBi, the output must be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Configuration:** The peak power spectral density was measured with the EUT set to low, medium, and high transmit frequencies; at the worst case data rate (investigations showed that the lowest data rate produced the highest PPSD). The EUT was transmitting at its maximum output power.

Per the workshop notes provided by Joe Dichoso of the FCC during the TCB training February 2002, the measurement was made in the following manner: using a direct connection between the RF output of the EUT and a spectrum analyzer, the RBW was set to 1 MHz and the VBW was set greater than the RBW. The peak power spectral density (PPSD) was determined to be the highest level found across the emission in any 1 MHz band after 100 sweeps of video averaging.

Completed by:



**NORTHWEST EMC EMISSIONS DATA SHEET** Rev BETA 01/30/01

EUT: WN-SMP01		Work Order: INMC0024	
Serial Number: 002-032		Date: 08/26/02	
Customer: Intermec Corporation		Temperature: 24 degrees C	
Attendees: None		Humidity: 40% RH	
Customer Ref. No.: N/A	Tested by: Greg Kiemel	Power: 120 V, 60 Hz	
		Job Site: EV06	

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.407(a)(1)	Year: Most Current	Method: ANSI C63.4	Year: 1992

**SAMPLE CALCULATIONS**

Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)

**COMMENTS**

Tested in WA21 Access Point. Maximum antenna gain in this band is 5 dBi

**EUT OPERATING MODES**

Modulated with worst case data rate (lowest) at maximum output power.

**DEVIATIONS FROM TEST STANDARD**

None

**REQUIREMENTS**

For the 5.15 to 5.25 GHz band, the peak power spectral density shall not exceed 4 dBm / MHz. The deFacto EIRP requirement is 10 dBm/MHz.

**RESULTS** Peak Power Density (EIRP)

Pass -0.9 dBm / MHz

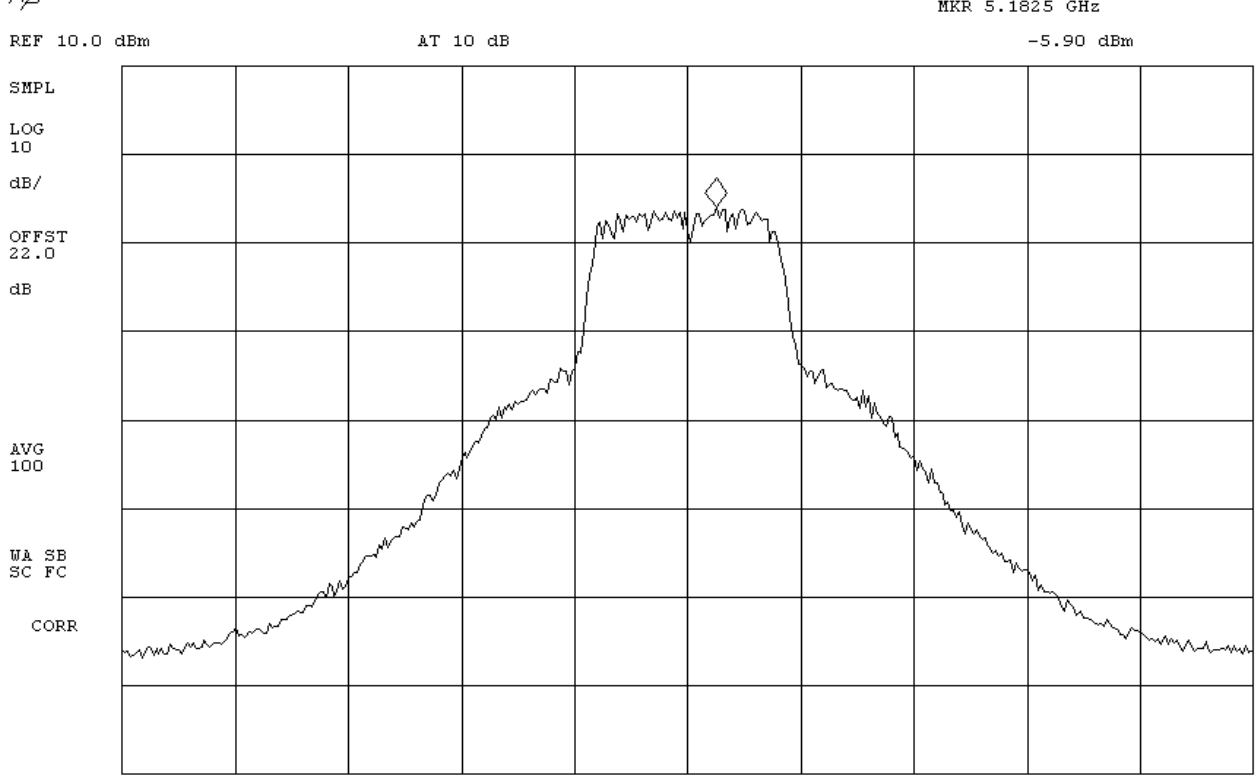
**SIGNATURE**

Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**

**Peak Power Spectral Density - Low Channel - 5.15 to 5.25 GHz Band**

18:39:35 AUG 26, 2002



**NORTHWEST EMC EMISSIONS DATA SHEET** Rev BETA 01/30/01

EUT: WN-SMP01		Work Order: INMC0024	
Serial Number: 002-032		Date: 08/26/02	
Customer: Intermec Corporation		Temperature: 24 degrees C	
Attendees: None		Humidity: 40% RH	
Customer Ref. No.: N/A	Tested by: Greg Kiemel	Power: 120 V, 60 Hz	
		Job Site: EV06	

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.407(a)(1)	Year: Most Current	Method: ANSI C63.4	Year: 1992

**SAMPLE CALCULATIONS**  
 Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)

**COMMENTS**

Tested in WA21 Access Point  
**EUT OPERATING MODES**

Tested in WA21 Access Point. Maximum antenna gain in this band is 5 dBi  
**DEVIATIONS FROM TEST STANDARD**

None  
**REQUIREMENTS**

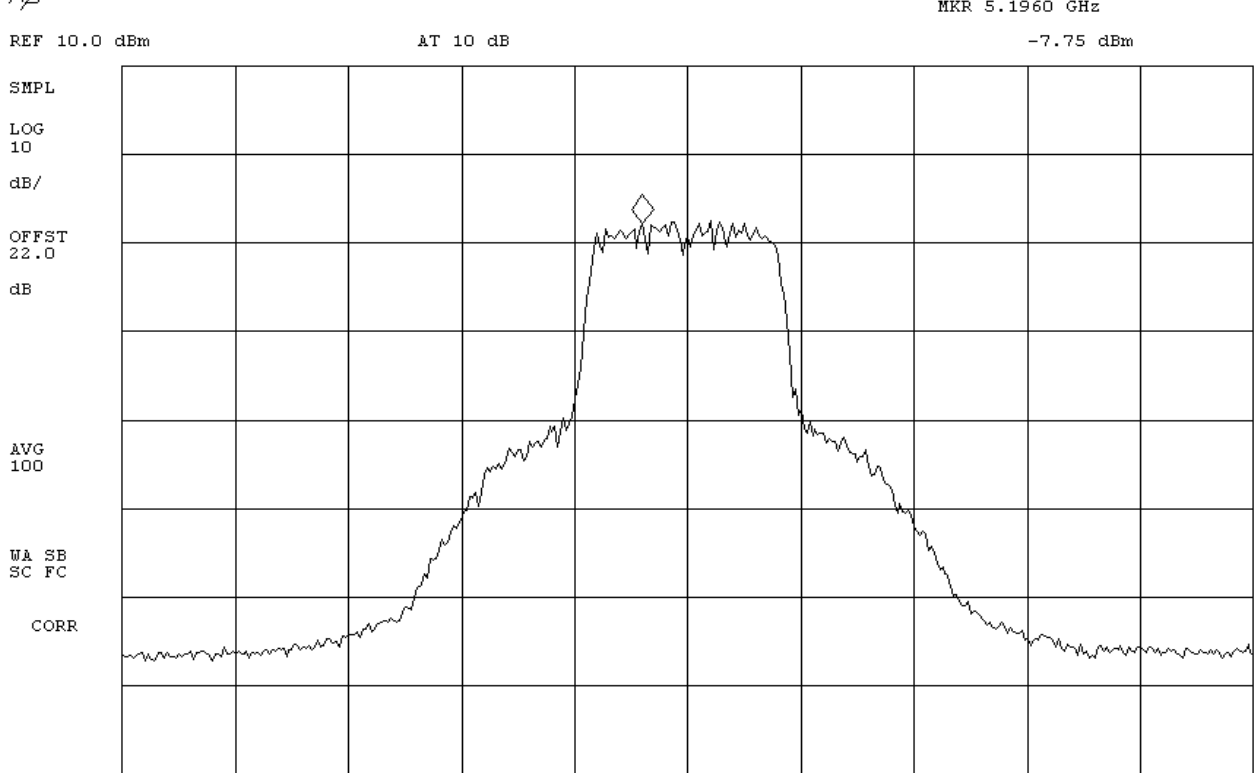
For the 5.15 to 5.25 GHz band, the peak power spectral density shall not exceed 4 dBm / MHz. The deFacto EIRP requirement is 10 dBm/MHz.

<b>RESULTS</b>	Peak Power Density (EIRP)
Pass	-2.75 dBm / MHz

**SIGNATURE**  
 Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**  
**Peak Power Spectral Density - Mid Channel - 5.15 to 5.25 GHz Band**

18:42:18 AUG 26, 2002



No us  
 Me:

**NORTHWEST EMC EMISSIONS DATA SHEET** Rev BETA 01/30/01

EUT: WN-5MP01		Work Order: INMC0024
Serial Number: 002-032		Date: 08/26/02
Customer: Intermec Corporation		Temperature: 24 degrees C
Attendees: None	Tested by: Greg Kiemel	Humidity: 40% RH
Customer Ref. No.: N/A	Power: 120 V, 60 Hz	Job Site: EV06

<b>TEST SPECIFICATIONS</b>			
Specification: 47 CFR 15.407(a)(1)	Year: Most Current	Method: ANSI C63.4	Year: 1992

**SAMPLE CALCULATIONS**  
 Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)

**COMMENTS**

Tested in WA21 Access Point

**EUT OPERATING MODES**

Tested in WA21 Access Point. Maximum antenna gain in this band is 5 dBi

**DEVIATIONS FROM TEST STANDARD**

None

**REQUIREMENTS**

For the 5.15 to 5.25 GHz band, the peak power spectral density shall not exceed 4 dBm / MHz. The deFacto EIRP requirement is 10 dBm/MHz.

**RESULTS**

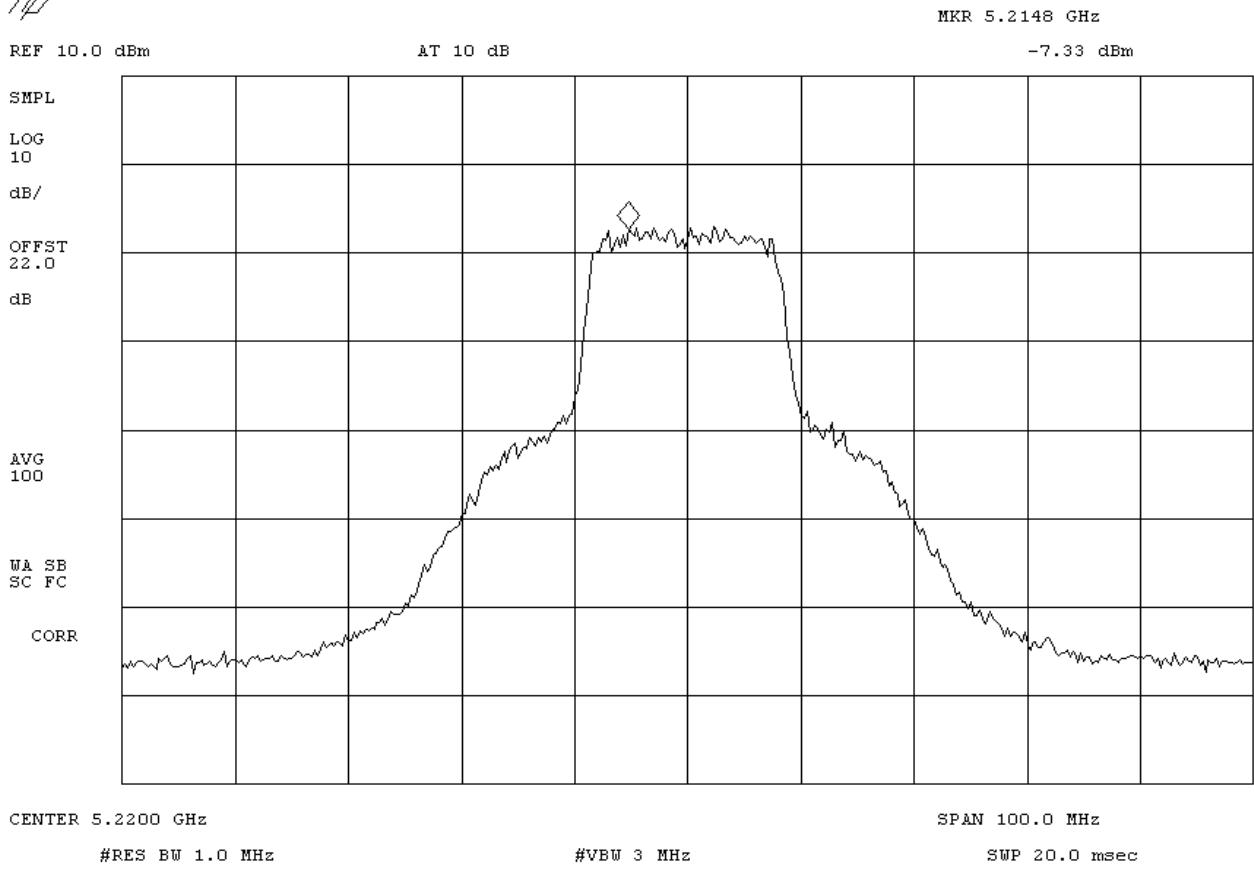
Pass Peak Power Density (EIRP)  
-2.33 dBm / MHz

**SIGNATURE**


Tested By: *Greg Kiemel*

**DESCRIPTION OF TEST**  
**Peak Power Spectral Density - High Channel - 5.15 to 5.25 GHz Band**

18:44:46 AUG 26, 2002  
*hp*



No us  
Me:

NORTHWEST EMC		EMISSIONS DATA SHEET		Rev BETA 01/30/01	
EUT: WN-SMP01			Work Order: INMC0024		
Serial Number: 002-032			Date: 08/26/02		
Customer: Intermec Corporation			Temperature: 24 degrees C		
Attendees: None		Tested by: Greg Kiemel		Humidity: 40% RH	
Customer Ref. No.: N/A		Power: 120 V, 60 Hz		Job Site: EV06	
TEST SPECIFICATIONS					
Specification: 47 CFR 15.407(a)(2)		Year: Most Current	Method: ANSI C63.4		Year: 1992
SAMPLE CALCULATIONS					
Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)					
COMMENTS					
Tested in WA21 Access Point. Maximum antenna gain (less the minimum cable loss) in this band is 12 dBi					
EUT OPERATING MODES					
Modulated with worst case data rate (lowest) at maximum output power.					
DEVIATIONS FROM TEST STANDARD					
None					
REQUIREMENTS					
For the 5.25 to 5.35 GHz band, the peak power spectral density shall not exceed 11 dBm / MHz. The deFacto EIRP requirement is 17 dBm/MHz.					
RESULTS					
Pass			Peak Power Density (EIRP) 4.71 dBm / MHz		
SIGNATURE					
 Tested By: _____					
DESCRIPTION OF TEST					
Peak Power Spectral Density - Low Channel - 5.25 to 5.35 GHz Band					

18:47:22 AUG 26, 2002

REF 10.0 dBm

AT 10 dB

MKR 5.2575 GHz

-7.29 dBm

SMPL

LOG 10

dB/

OFFST 22.0

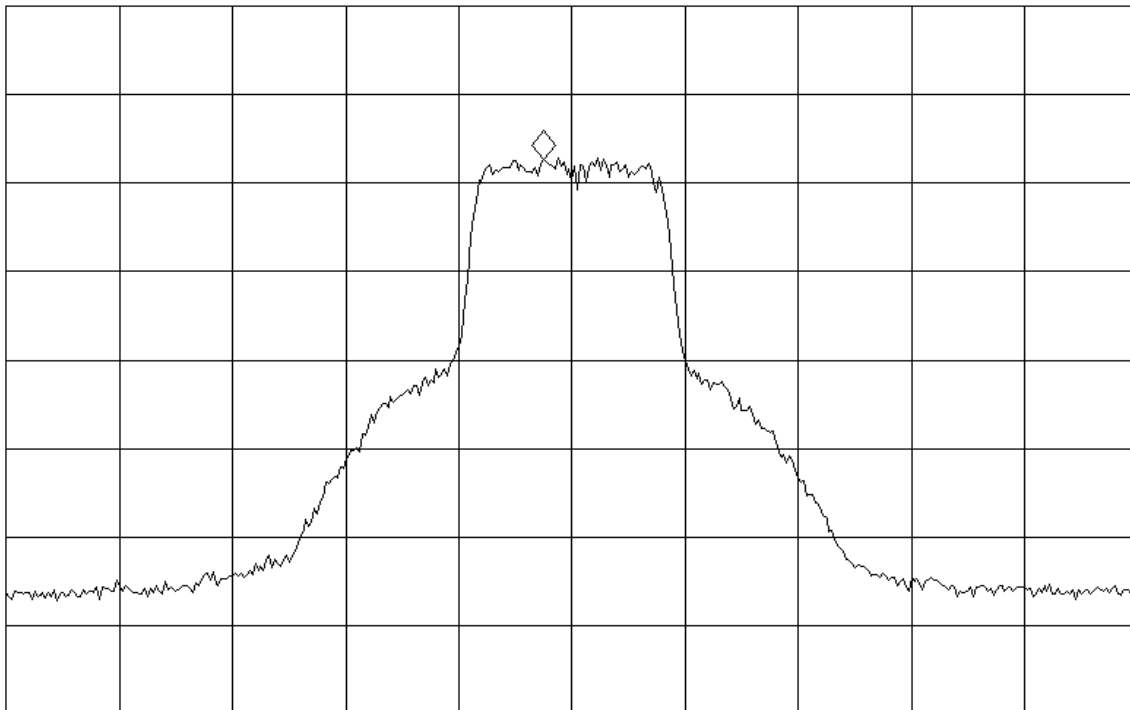
dB

AVG 100

WA SB

SC FC

CORR



CENTER 5.2600 GHz

SPAN 100.0 MHz

#RES BW 1.0 MHz

#VBW 3 MHz

SWP 20.0 msec

No us  
Me:

**NORTHWEST EMC EMISSIONS DATA SHEET** Rev BETA 01/30/01

EUT: WN-SMP01		Work Order: INMC0024
Serial Number: 002-032		Date: 08/26/02
Customer: Intermec Corporation		Temperature: 24 degrees C
Attendees: None	Tested by: Greg Kiemel	Humidity: 40% RH
Customer Ref. No.: N/A	Power: 120 V, 60 Hz	Job Site: EV06

**TEST SPECIFICATIONS**

Specification: 47 CFR 15.407(a)(2)	Year: Most Current	Method: ANSI C63.4	Year: 1992
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**SAMPLE CALCULATIONS**  
 Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)

**COMMENTS**  
 Tested in WA21 Access Point. Maximum antenna gain (less the minimum cable loss) in this band is 12 dBi

**EUT OPERATING MODES**  
 Modulated with worst case data rate (lowest) at maximum output power.

**DEVIATIONS FROM TEST STANDARD**  
 None

**REQUIREMENTS**  
 For the 5.25 to 5.35 GHz band, the peak power spectral density shall not exceed 11 dBm / MHz. The deFacto EIRP requirement is 17 dBm/MHz.

<b>RESULTS</b>	Peak Power Density (EIRP)
Pass	6.33 dBm / MHz

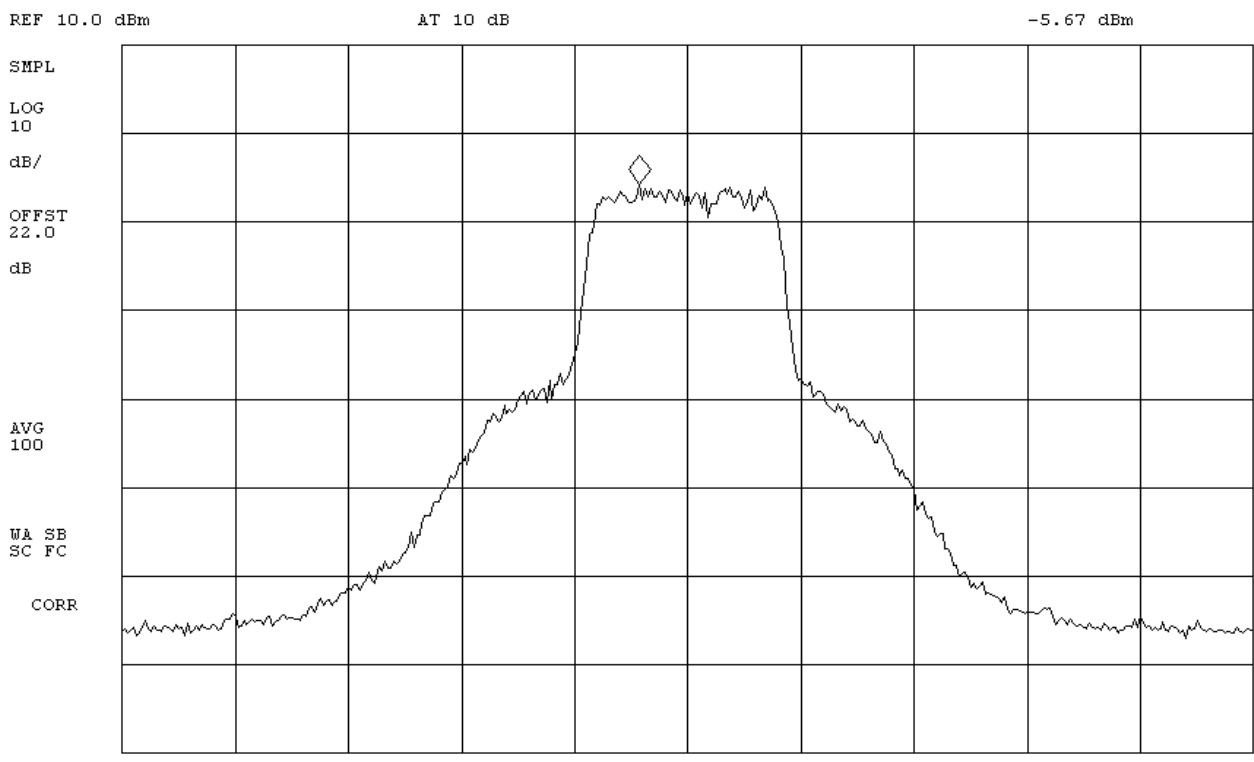
**SIGNATURE**  
 Tested By: 

**DESCRIPTION OF TEST**  
**Peak Power Spectral Density - Mid Channel - 5.25 to 5.35 GHz Band**

18:49:45 AUG 26, 2002

*hp*

MKR 5.2958 GHz



No us  
Me:

CENTER 5.3000 GHz

SPAN 100.0 MHz

#RES BW 1.0 MHz

#VBW 3 MHz

SWP 20.0 msec



NORTHWEST  
**EMC**

# EMISSIONS DATA SHEET

Rev BETA  
01/30/01

EUT: WN-5MP01	Work Order: INMC0024
Serial Number: 002-032	Date: 08/26/02
Customer: Intermec Corporation	Temperature: 24 degrees C
Attendees: None	Tested by: Greg Kiemel
Customer Ref. No.: N/A	Power: 120 V, 60 Hz
	Humidity: 40% RH
	Job Site: EV06

### TEST SPECIFICATIONS

Specification: 47 CFR 15.407(a)(2)	Year: Most Current	Method: ANSI C63.4	Year: 1992
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### SAMPLE CALCULATIONS

Peak Power Density (EIRP) = Peak Power Density + Maximum antenna gain (dBi)

### COMMENTS

Tested in WA21 Access Point. Maximum antenna gain (less the minimum cable loss) in this band is 12 dBi

### EUT OPERATING MODES

Modulated with worst case data rate (lowest) at maximum output power.

### DEVIATIONS FROM TEST STANDARD

None

### REQUIREMENTS

For the 5.25 to 5.35 GHz band, the peak power spectral density shall not exceed 11 dBm / MHz. The deFacto EIRP requirement is 17 dBm/MHz.

### RESULTS

Peak Power Density (EIRP)

Pass 4.36 dBm / MHz

### SIGNATURE

Tested By: *Greg Kiemel*

### DESCRIPTION OF TEST

**Peak Power Spectral Density - High Channel - 5.25 to 5.35 GHz Band**

18:34:01 AUG 26, 2002

*hp*

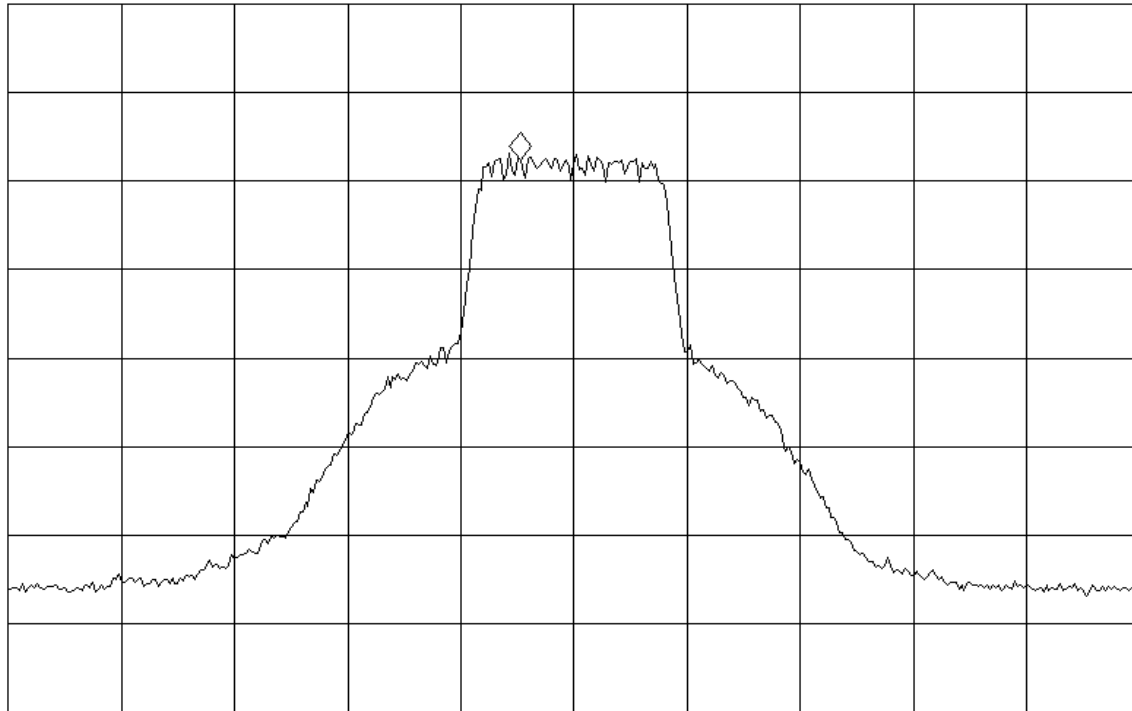
MKR 5.3153 GHz

REF 10.0 dBm

AT 10 dB

-7.64 dBm

SMPL  
LOG  
10  
dB/  
OFFST  
22.0  
dB  
AVG  
100  
WA SB  
SC FC  
CORR



No us  
Me:

CENTER 5.3200 GHz

SPAN 100.0 MHz

#RES BW 1.0 MHz

#VBW 3 MHz

SWP 20.0 msec