

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:

Single

Operating Modes Investigated:

Foward Link (DSSS mode)

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	MSAssist	Version	V4.3.1
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
2.4 GHz RFID Reader (EUT)	IDmicro	IDM4120R	32695
EUT Power Supply	Power General	CPA3-40-5290	none
Notebook PC	Hewlett Packard	HP Pavilion	TW02602673
Notebook Power Supply	EDAC	EA1060B	none

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	PA	2.0	PA	EUT Power Supply	AC Mains
DC Power	PA	2.0	PA	EUT Power Supply	2.4 GHz RFID Reader (EUT)
AC Power	PA	2.0	PA	Notebook Power Supply	AC Mains
DC Power	PA	2.0	PA	Notebook Power Supply	Notebook PC
Serial	Yes	1.6	No	Notebook PC	2.4 GHz RFID Reader (EUT)
Serial	Yes	1.6	No	2.4 GHz RFID Reader (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	Tektronix	2784	AAO	02/26/2003	24 mo

Test Description

Requirement: Per 47 CFR 15.247(e), the peak power spectral density conducted from the antenna port of a direct sequence transmitter must not be greater than +8 dBm in any 3 kHz band during any time interval of continuous transmission.

Configuration: The peak power spectral density measurements were measured with the EUT set to its only transmit frequency in DSSS mode. 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 using direct sequence modulation. Per the procedure outlined in FCC 97-114, the spectrum analyzer was used as follows:

The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = $(SPAN/3 \text{ kHz})$). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 34.8 dB for correction to 3 kHz."

Completed by:

EMISSIONS DATA SHEET

Rev BETA
01/30/01

EUT: 2.4 GHz RFID Reader			Work Order: IDMI0005		
Serial Number: 32695			Date: 11/04/04		
Customer: Idmicro, INC.			Temperature: 68		
Attendees: Tom Kearns		Tested by: Greg Kiemel	Humidity: 40%		
Customer Ref. No.: N/A		Power: 120VAC/60Hz	Job Site: EV06		

TEST SPECIFICATIONS

Specification: 47 CFR 15.247(e)	Year: 2004	Method: FCC 97-114, ANSI C63.4	Year: 2003
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SAMPLE CALCULATIONS

Meter reading on spectrum analyzer is internally compensated for cable loss and external attenuation

Power Spectral Density per 3kHz bandwidth = Power Spectral Density per 1 Hz bandwidth + Bandwidth Correction Factor.

Bandwidth Correction Factor = $10 \cdot \log(3\text{kHz}/1\text{Hz}) = 34.8 \text{ dB}$

COMMENTS

EUT OPERATING MODES

Forward link (DSSS mode)

DEVIATIONS FROM TEST STANDARD

None

REQUIREMENTS

Maximum peak power spectral density conducted from a DSSS transmitter does not exceed 8 dBm in any 3 kHz band

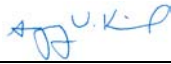
RESULTS

AMPLITUDE

Pass

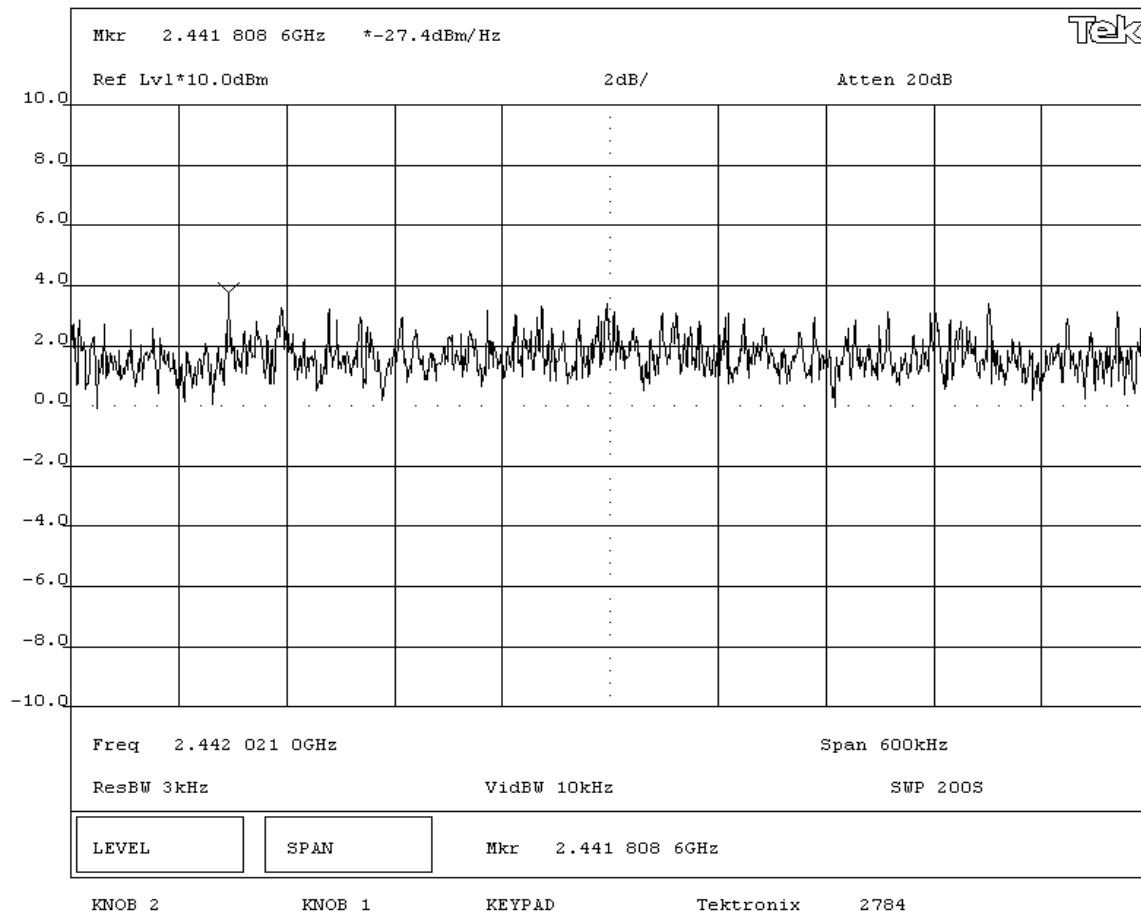
Power Spectral Density = 7.4 dBm / 3kHz

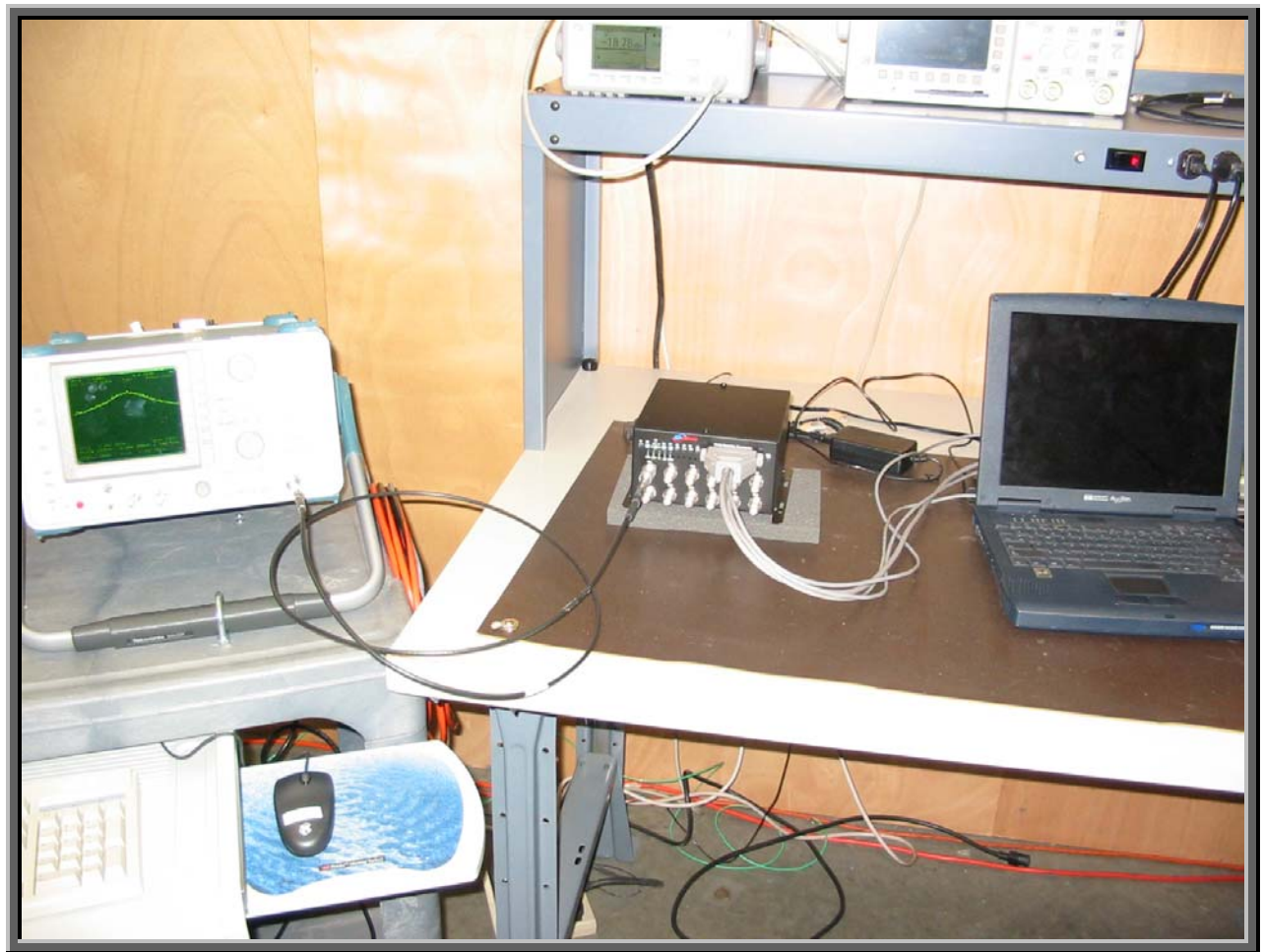
SIGNATURE

Tested By: 

DESCRIPTION OF TEST

Power Spectral Density





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:

Return Link (No Hop, FHSS)
Forward Link (DSSS)

Antennas Investigated:

Patch Antenna (8.5 dBi)

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Frequency Range Investigated

Start Frequency	30 MHz	Stop Frequency	26.5 GHz
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Software\Firmware Applied During Test

Exercise software	MSAssist	Version	V4.3.1
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
2.4 GHz RFID Reader (EUT)	IDmicro	IDM4120R	32695
EUT Power Supply	Power General	CPA3-40-5290	none
Notebook PC	Hewlett Packard	HP Pavilion	TW02602673
Notebook Power Supply	EDAC	EA1060B	none
Patch Antenna (8.5 dBi)	ARC Wireless Solutions	AAI-00091	none

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	PA	2.0	PA	EUT Power Supply	AC Mains
DC Power	PA	2.0	PA	EUT Power Supply	2.4 GHz RFID Reader (EUT)
AC Power	PA	2.0	PA	Notebook Power Supply	AC Mains
DC Power	PA	2.0	PA	Notebook Power Supply	Notebook PC
Serial	Yes	1.6	No	Notebook PC	2.4 GHz RFID Reader (EUT)
Serial	Yes	1.6	No	2.4 GHz RFID Reader (EUT)	Unterminated
7 Pieces of RG142 Coax	Yes	3.0	No	2.4 GHz RFID Reader (EUT)	Unterminated
4 pieces of RF142 Coax	Yes	1.2	No	2.4 GHz RFID Reader (EUT)	Unterminated
1 Piece of RG142 Coax	Yes	0.5	No	2.4 GHz RFID Reader (EUT)	Patch Antenna (8.5 dBi)
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	12/23/2003	13 mo
Antenna, Biconilog	EMCO	3141	AXE	12/03/2003	24 mo
Pre-Amplifier	Amplifier Research	LN1000A	APS	02/05/2004	13 mo
Antenna, Horn	EMCO	3115	AHC	09/07/2004	12 mo
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APJ	01/05/2004	13 mo
Antenna, Horn	EMCO	3160-08	AHK	NCR	NA
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/08/2003	15 mo
High Pass Filter	Micro-Tronics	HPM50111	HFO	04/13/2004	13 mo
Spectrum Analyzer	Tektronix	2784	AAO	02/26/2003	24 mo

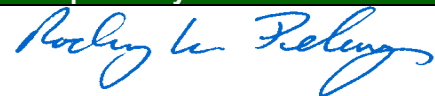
Test Description

Requirement: The field strength of any spurious emissions or modulation products that fall in a restricted band, as defined in 47 CFR 15.205, is measured. The peak level must comply with the limits specified in 47 CFR 15.35(b). The average level (taken with a 10Hz VBW) must comply with the limits specified in 15.209.

Configuration: The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). 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
<i>Measurements were made using the bandwidths and detectors specified. No video filter was used.</i>			

Completed by:



NORTHWEST

REV
d4.4
10/22/2004

EMC

RADIATED EMISSIONS DATA SHEET

EUT: 2.4GHz RFID Reader

Serial Number: 32695

Customer: Idmicro, INC.

Attendees: Tom Kearns

Cust. Ref. No.:

Tested by: Holly Ashkannejhad

Work Order: IDMI0005

Date: 11/02/04

Temperature: 70

Humidity: 48%

Barometric Pressure: 30.05

Job Site: EV01

Power: 120VAC/60Hz

TEST SPECIFICATIONS

Specification: FCC 15.247(d) Spurious Radiated Emissions

Method: ANSI C63.4

Year: 2004

Year: 2003

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

Tx1. Conductive foam and screen on outside of box over fan. All chassis screws in.

EUT OPERATING MODES

Return Link (no hop mode, FHSS) High channel

DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS

Run #

Pass

4

Other

Holly Ashkannejhad

Tested By:

dBuV/m

80.0

70.0

60.0

50.0

40.0

30.0

20.0

10.0

0.0

3000.000

4000.000

5000.000

6000.000

7000.000

8000.000

9000.000

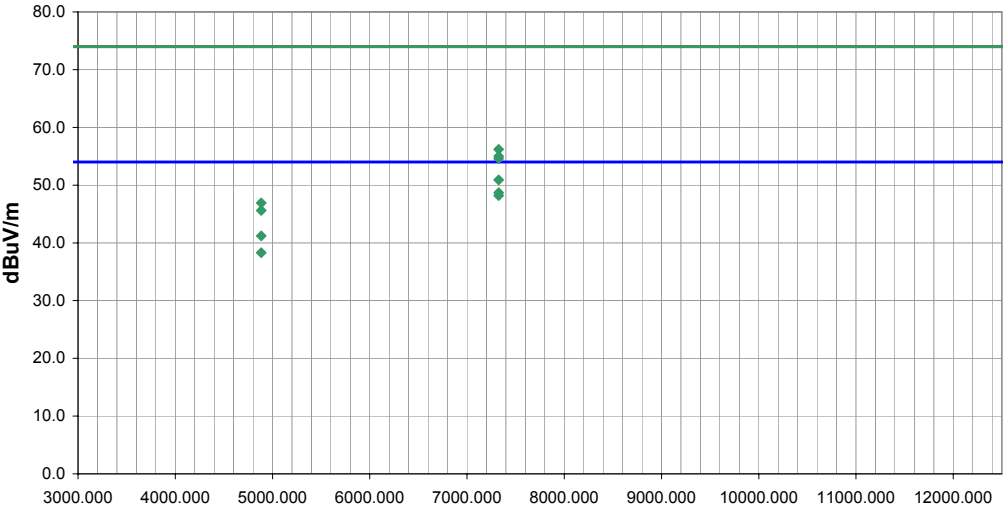
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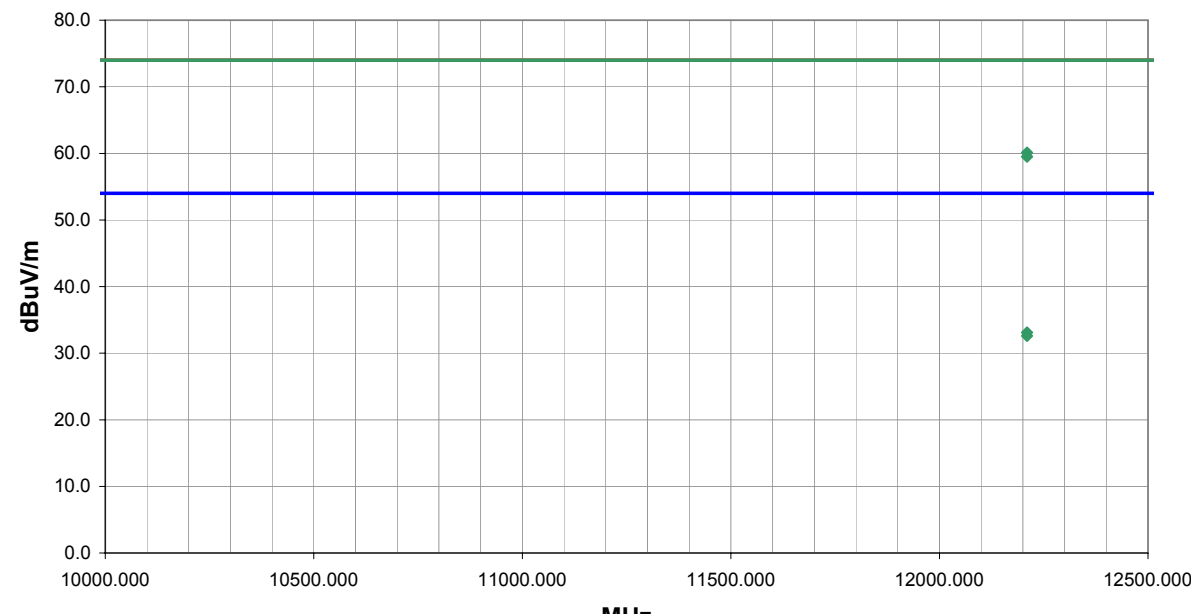
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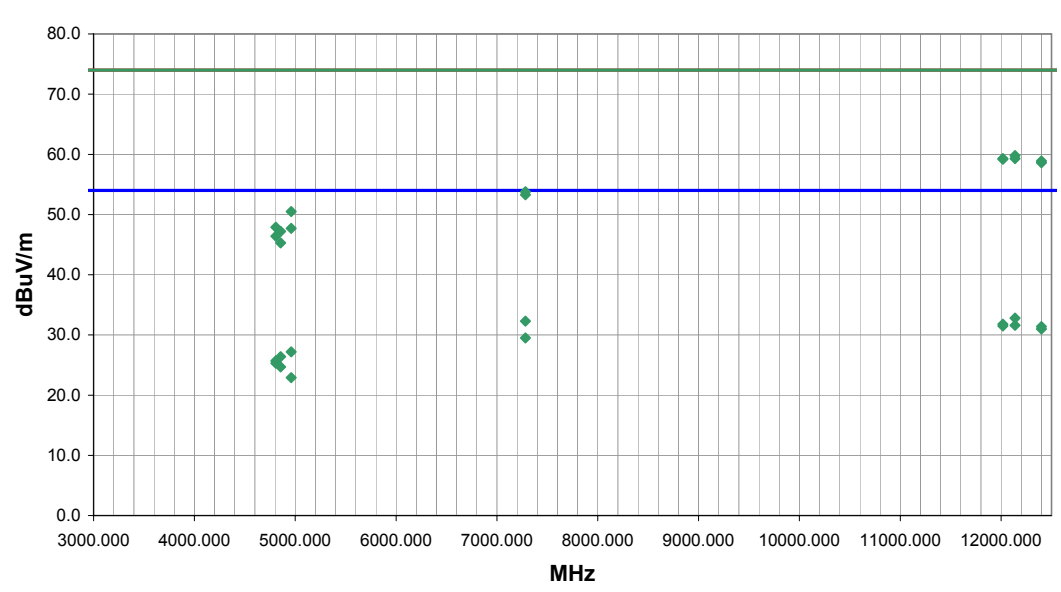
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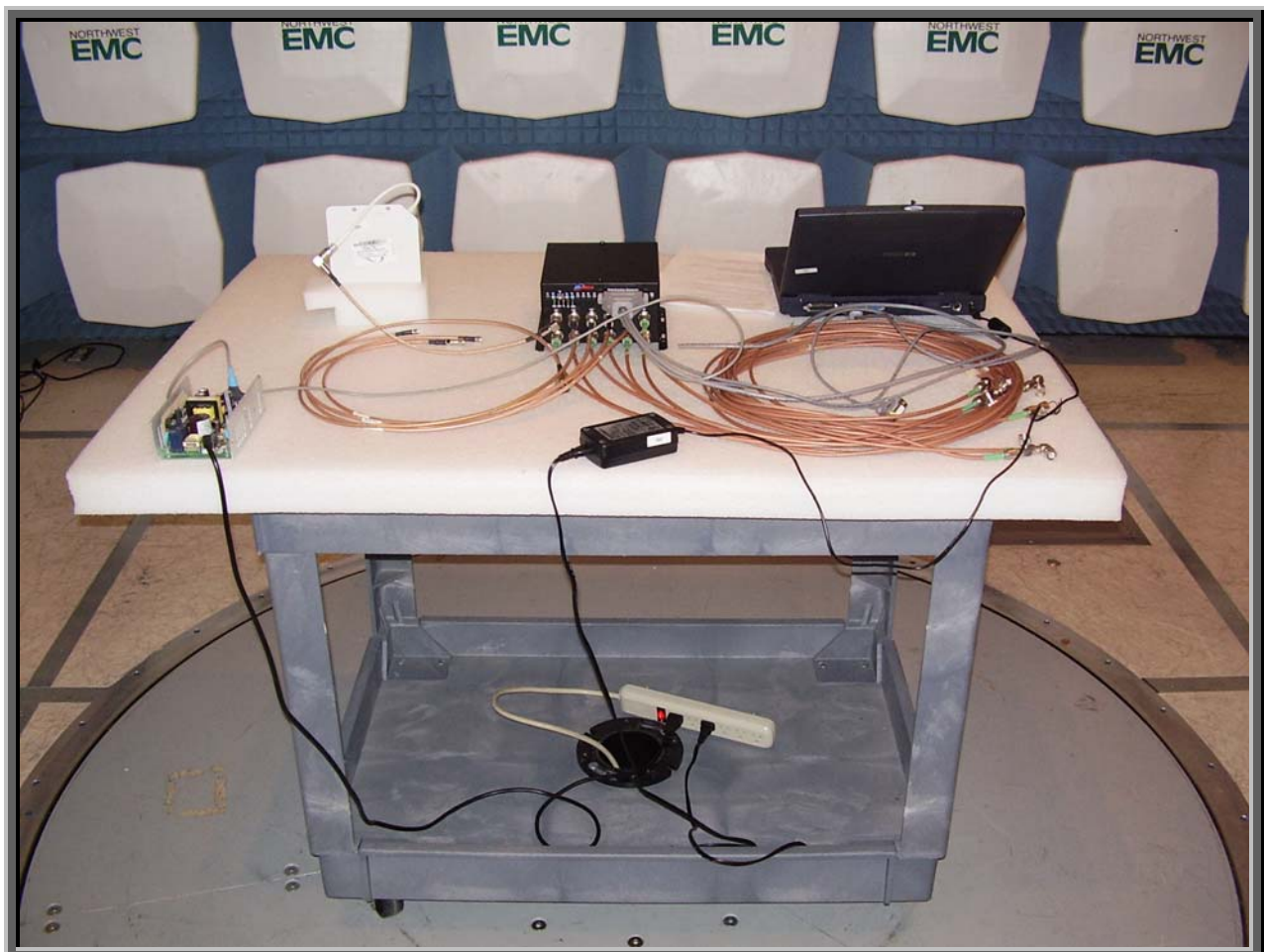
MHz

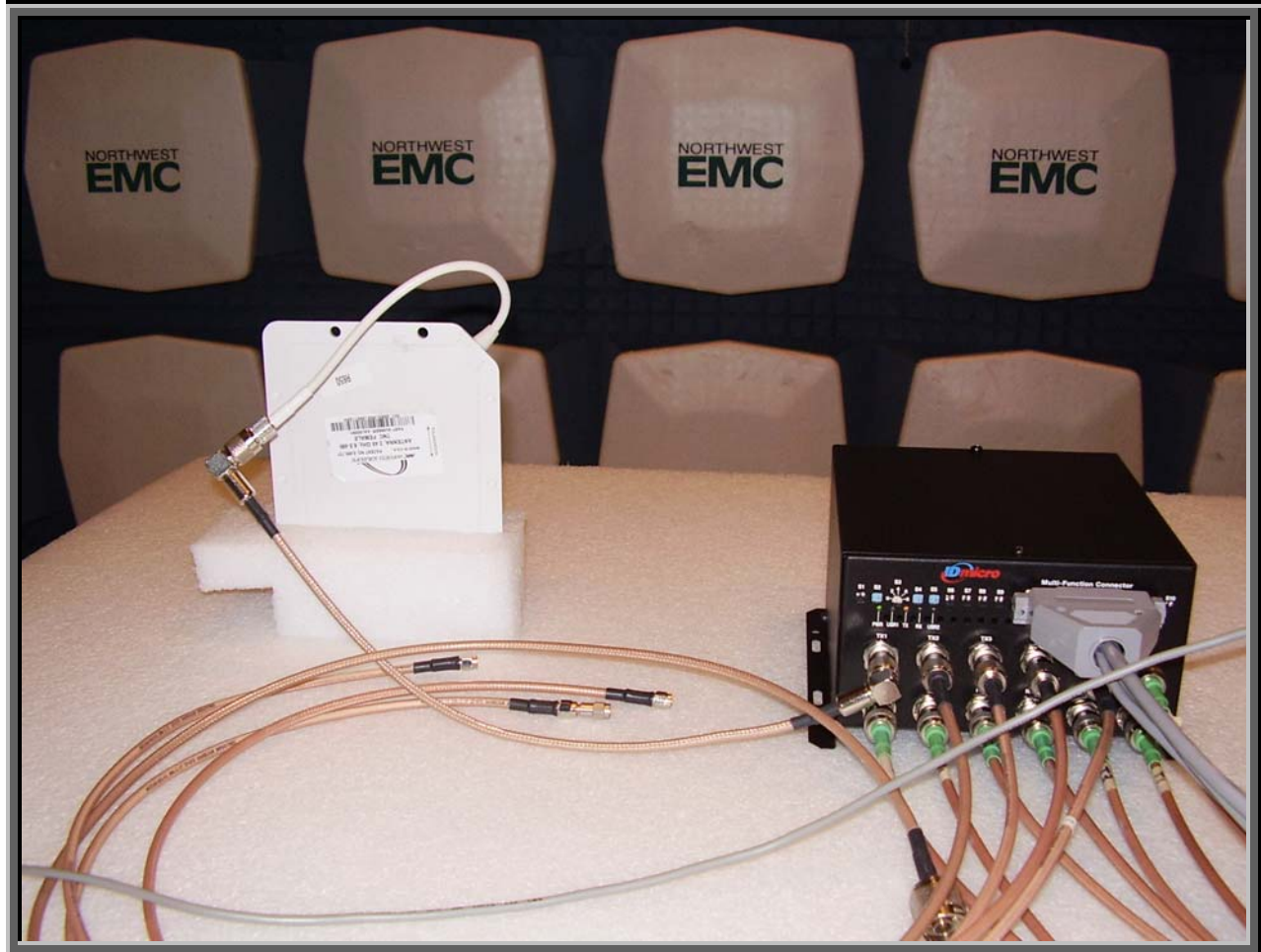
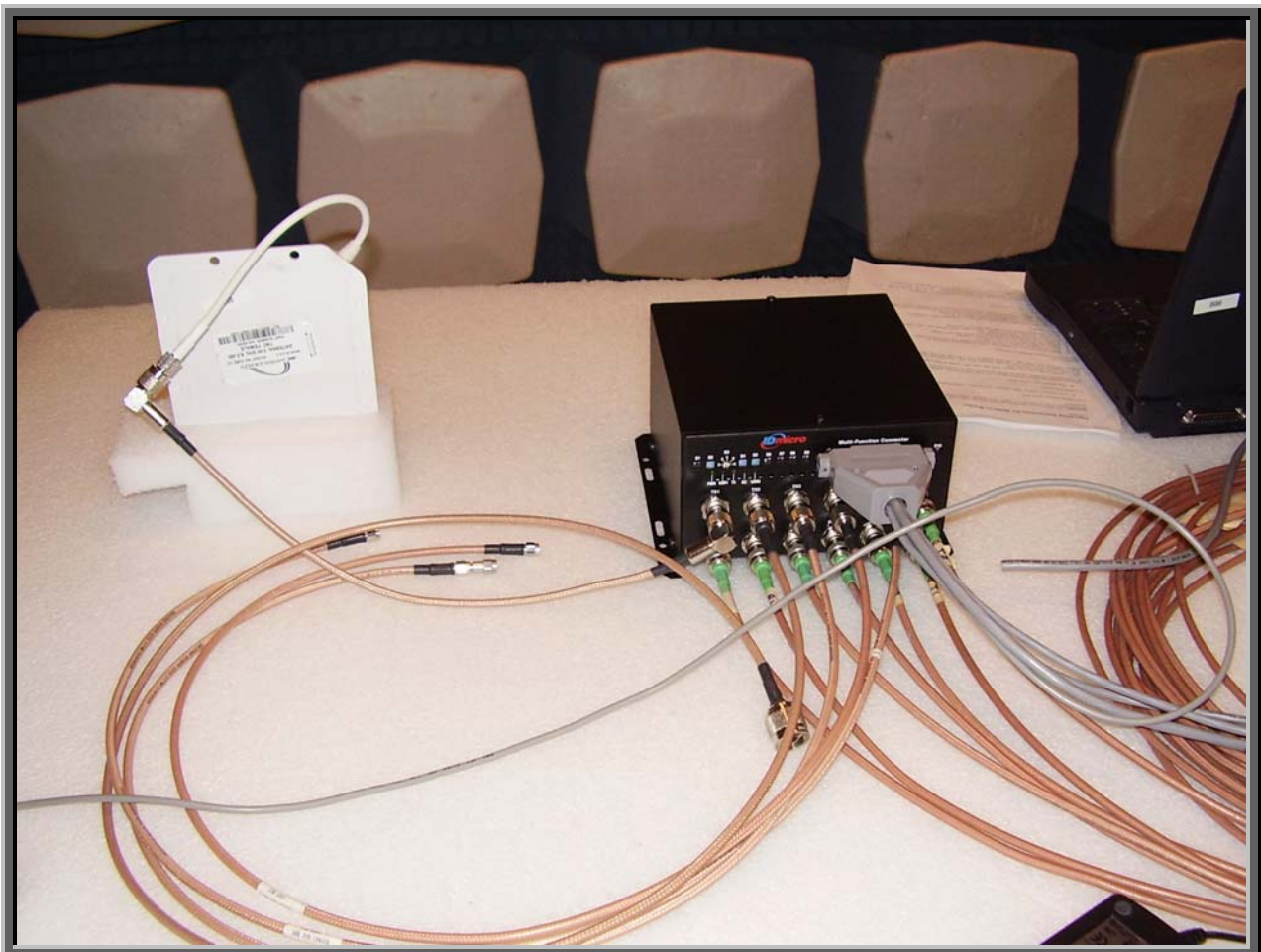
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7440.061	42.7	11.1	234.0	1.1	3.0	0.0	H-Horn	AV	0.0	53.8	54.0	-0.2
7440.061	38.5	11.1	230.0	1.1	3.0	0.0	V-Horn	AV	0.0	49.6	54.0	-4.4
7440.061	46.6	11.1	234.0	1.1	3.0	0.0	H-Horn	PK	0.0	57.7	74.0	-16.3
7440.061	44.1	11.1	230.0	1.1	3.0	0.0	V-Horn	PK	0.0	55.2	74.0	-18.8

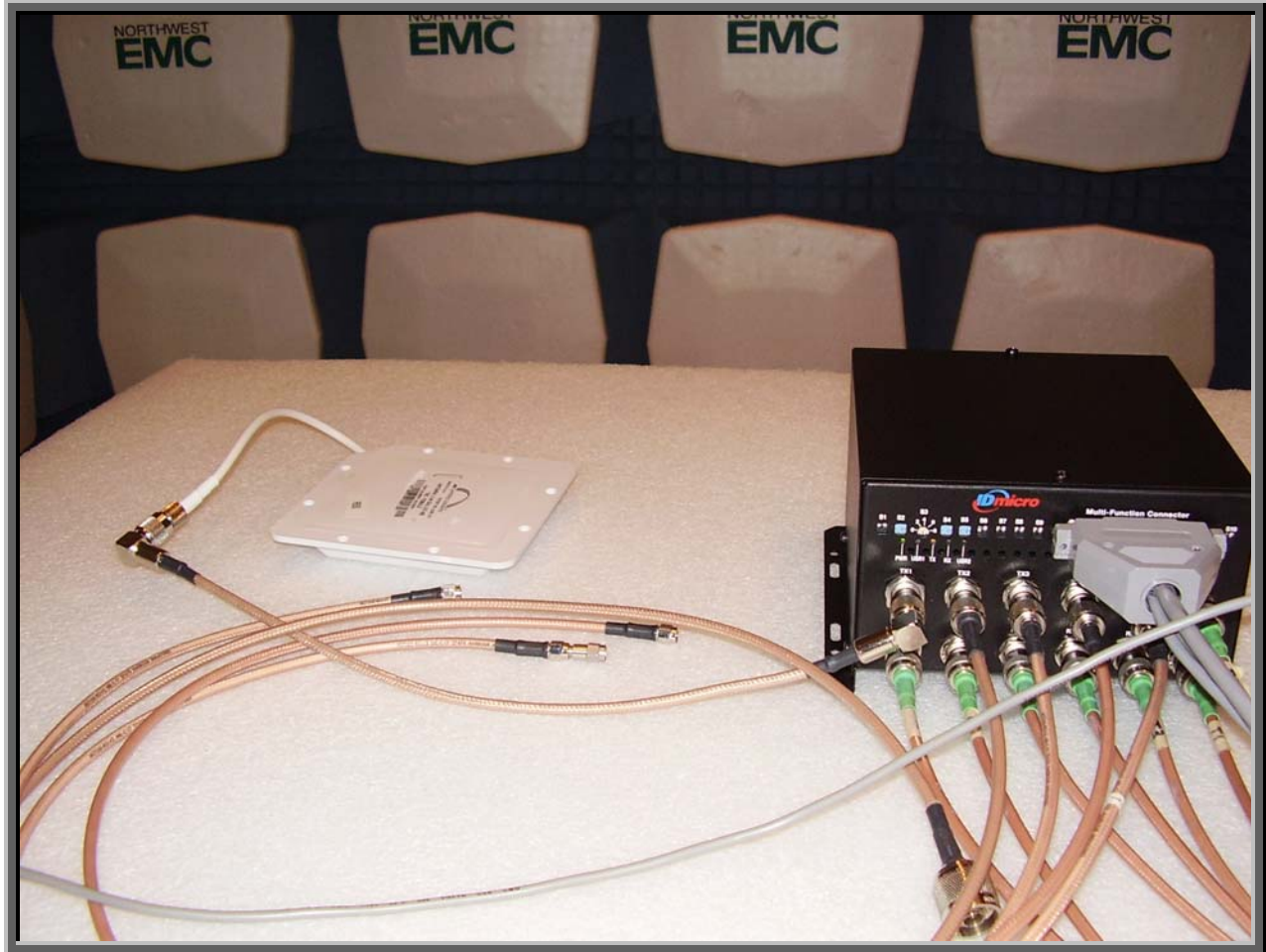
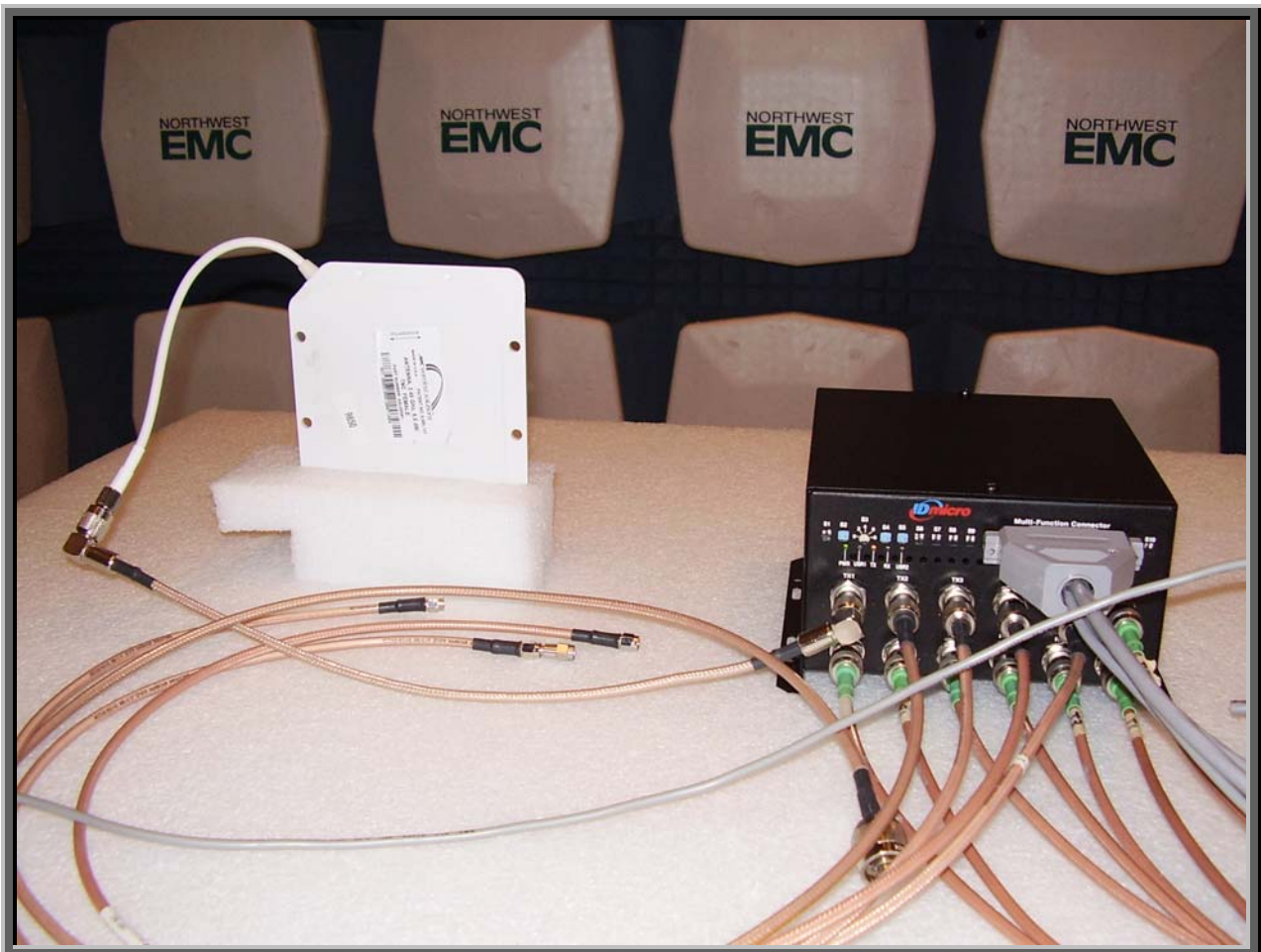
NORTHWEST EMC		RADIATED EMISSIONS DATA SHEET		REV d14.4 10/22/2004								
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005										
Serial Number: 32695		Date: 11/02/04										
Customer: Idmicro, INC.		Temperature: 70										
Attendees: Tom Kearns		Humidity: 48%										
Cust. Ref. No.:		Barometric Pressure: 30.05										
Tested by: Holly Ashkannejhad		Power: 120VAC/60Hz		Job Site: EV01								
TEST SPECIFICATIONS												
Specification: FCC 15.247(d) Spurious Radiated Emissions				Year: 2004								
Method: ANSI C63.4				Year: 2003								
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												
Tx1. Screen and conductive foam on outside of box over fan.												
EUT OPERATING MODES												
Forward link (DSSS)												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
RESULTS				Run #								
Pass				5								
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)
7326.000	40.4	10.5	232.0	1.8	3.0	0.0	H-Horn	AV	0.0	50.9	54.0	-3.1
7326.000	38.2	10.5	40.0	1.5	3.0	0.0	V-Horn	AV	0.0	48.7	54.0	-5.3
7326.000	37.7	10.5	42.0	1.5	3.0	0.0	V-Horn	AV	0.0	48.2	54.0	-5.8
4884.000	37.6	3.6	348.0	1.3	3.0	0.0	V-Horn	AV	0.0	41.2	54.0	-12.8
4884.000	34.7	3.6	237.0	1.0	3.0	0.0	H-Horn	AV	0.0	38.3	54.0	-15.7
7326.000	45.7	10.5	232.0	1.8	3.0	0.0	H-Horn	PK	0.0	56.2	74.0	-17.8
7326.000	44.5	10.5	42.0	1.5	3.0	0.0	V-Horn	PK	0.0	55.0	74.0	-19.0
7326.000	44.1	10.5	40.0	1.5	3.0	0.0	V-Horn	PK	0.0	54.6	74.0	-19.4
4884.000	43.3	3.6	348.0	1.3	3.0	0.0	V-Horn	PK	0.0	46.9	74.0	-27.1
4884.000	42.0	3.6	237.0	1.0	3.0	0.0	H-Horn	PK	0.0	45.6	74.0	-28.4

NORTHWEST EMC										REV df4.4 10/22/2004			
RADIATED EMISSIONS DATA SHEET													
EUT: 2.4GHz RFID Reader					Work Order: IDMI0005								
Serial Number: 32695					Date: 11/05/04								
Customer: Idmicro, INC.					Temperature: 72								
Attendees: None					Humidity: 32%								
Cust. Ref. No.:					Barometric Pressure: 30.4								
Tested by: Rod Peloquin					Power: 120VAC/60Hz					Job Site: EV01			
TEST SPECIFICATIONS													
Specification: FCC 15.247(d) Spurious Radiated Emissions										Year: 2004			
Method: ANSI C63.4										Year: 2003			
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													
Tx1. Screen and conductive foam on outside of box over fan.													
EUT OPERATING MODES													
Forward link (DSSS Mode)													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
RESULTS													
Pass												Run #	
												6	
Other													
										 Tested By:			
													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	
12210.110	26.7	20.4	94.0	1.3	14.0	0.0	H-Horn	AV	0.0	33.1	54.0	-20.9	
12210.000	26.2	20.4	279.0	1.8	14.0	0.0	V-Horn	AV	0.0	32.6	54.0	-21.4	
12210.000	39.7	20.4	94.0	1.3	0.0	0.0	H-Horn	PK	0.0	60.1	74.0	-13.9	
12210.000	39.1	20.4	279.0	1.8	0.0	0.0	V-Horn	PK	0.0	59.5	74.0	-14.5	

NORTHWEST EMC										RADIATED EMISSIONS DATA SHEET				REV d4.4 10/22/2004	
EUT: 2.4GHz RFID Reader										Work Order: IDMI0005					
Serial Number: 32695										Date: 11/05/04					
Customer: Idmicro, INC.										Temperature: 70					
Attendees: None										Humidity: 48%					
Cust. Ref. No.:										Barometric Pressure: 30.05					
Tested by: Rod Peloquin										Power: 120VAC/60Hz				Job Site: EV01	
TEST SPECIFICATIONS															
Specification: FCC 15.247(d) Spurious Radiated Emissions										Year: 2004					
Method: ANSI C63.4										Year: 2003					
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															
Return link (no hop mode, FHSS)															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
RESULTS												Run #			
Pass												7			
Other															
 Tested By:															
															
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments		
12138.090	26.5	20.3	183.0	1.3	14.0	0.0	H-Horn	AV	0.0	32.8	54.0	-21.2	Mid channel		
7282.876	36.0	10.3	211.0	1.3	14.0	0.0	H-Horn	AV	0.0	32.3	54.0	-21.7	Mid channel		
12018.010	25.7	20.1	51.0	1.3	14.0	0.0	H-Horn	AV	0.0	31.8	54.0	-22.2	Low channel		
12138.090	25.3	20.3	161.0	4.0	14.0	0.0	V-Horn	AV	0.0	31.6	54.0	-22.4	Mid channel		
12018.010	25.4	20.1	22.0	1.7	14.0	0.0	V-Horn	AV	0.0	31.5	54.0	-22.5	Low channel		
12400.100	24.6	20.8	214.0	1.2	14.0	0.0	V-Horn	AV	0.0	31.4	54.0	-22.6	High channel		
12400.100	24.2	20.8	359.0	3.2	14.0	0.0	H-Horn	AV	0.0	31.0	54.0	-23.0	High channel		
7282.840	33.2	10.3	141.0	1.5	14.0	0.0	V-Horn	AV	0.0	29.5	54.0	-24.5	Mid channel		
4959.909	37.6	3.6	139.0	1.1	14.0	0.0	H-Horn	AV	0.0	27.2	54.0	-26.8	High channel		
4855.239	37.0	3.4	145.0	1.2	14.0	0.0	H-Horn	AV	0.0	26.4	54.0	-27.6	Mid channel		
4807.201	36.4	3.3	324.0	1.2	14.0	0.0	V-Horn	AV	0.0	25.7	54.0	-28.3	Low channel		
4807.201	36.0	3.3	142.0	1.1	14.0	0.0	H-Horn	AV	0.0	25.3	54.0	-28.7	Low channel		
4855.239	35.3	3.4	327.0	1.4	14.0	0.0	V-Horn	AV	0.0	24.7	54.0	-29.3	Mid channel		
4960.041	33.3	3.6	246.0	1.2	14.0	0.0	V-Horn	AV	0.0	22.9	54.0	-31.1	High channel		
12138.090	39.5	20.3	183.0	1.3	0.0	0.0	H-Horn	PK	0.0	59.8	74.0	-14.2	Mid channel		
12018.010	39.2	20.1	22.0	1.7	0.0	0.0	V-Horn	PK	0.0	59.3	74.0	-14.7	Low channel		
12138.090	39.0	20.3	161.0	4.0	0.0	0.0	V-Horn	PK	0.0	59.3	74.0	-14.7	Mid channel		
12018.010	39.1	20.1	51.0	1.3	0.0	0.0	H-Horn	PK	0.0	59.2	74.0	-14.8	Low channel		
12400.100	38.1	20.8	359.0	3.2	0.0	0.0	H-Horn	PK	0.0	58.9	74.0	-15.1	High channel		
12400.100	37.8	20.8	214.0	1.2	0.0	0.0	V-Horn	PK	0.0	58.6	74.0	-15.4	High channel		







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:

Return Link (no Hop)
Forward Link (DSSS mode)

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

120 VAC, 60 Hz.

Software\Firmware Applied During Test

Exercise software	MSAssist	Version	V4.3.1
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
2.4 GHz RFID Reader (EUT)	IDmicro	IDM4120R	32695
EUT Power Supply	Power General	CPA3-40-5290	none
Notebook PC	Hewlett Packard	HP Pavilion	TW02602673
Notebook Power Supply	EDAC	EA1060B	none
Patch Antenna (8.5 dBi)	ARC Wireless Solutions	AAI-00091	none

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	PA	2.0	PA	EUT Power Supply	AC Mains
DC Power	PA	2.0	PA	EUT Power Supply	2.4 GHz RFID Reader (EUT)
AC Power	PA	2.0	PA	Notebook Power Supply	AC Mains
DC Power	PA	2.0	PA	Notebook Power Supply	Notebook PC
Serial	Yes	1.6	No	Notebook PC	2.4 GHz RFID Reader (EUT)
Serial	Yes	1.6	No	2.4 GHz RFID Reader (EUT)	Unterminated
7 Pieces of RG142 Coax	Yes	3.0	No	2.4 GHz RFID Reader (EUT)	Unterminated
4 pieces of RF142 Coax	Yes	1.2	No	2.4 GHz RFID Reader (EUT)	Unterminated
1 Piece of RG142 Coax	Yes	0.5	No	2.4 GHz RFID Reader (EUT)	Patch Antenna (8.5 dBi)
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

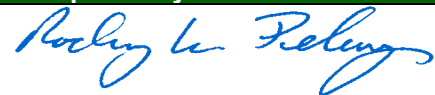
Measurement Equipment					
Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	12/23/2003	13 mo
Quasi-Peak Adapter	Hewlett-Packard	85650A	AQF	12/23/2003	13 mo
LISN	Solar	9252-50-R-24-BNC	LIN	12/16/2003	13 mo
LISN	Solar	9252-50-R-24-BNC	LIO	04/30/2004	12 mo
High Pass Filter	TTE	H97-100k-50-720B	HFC	02/01/2004	13 mo

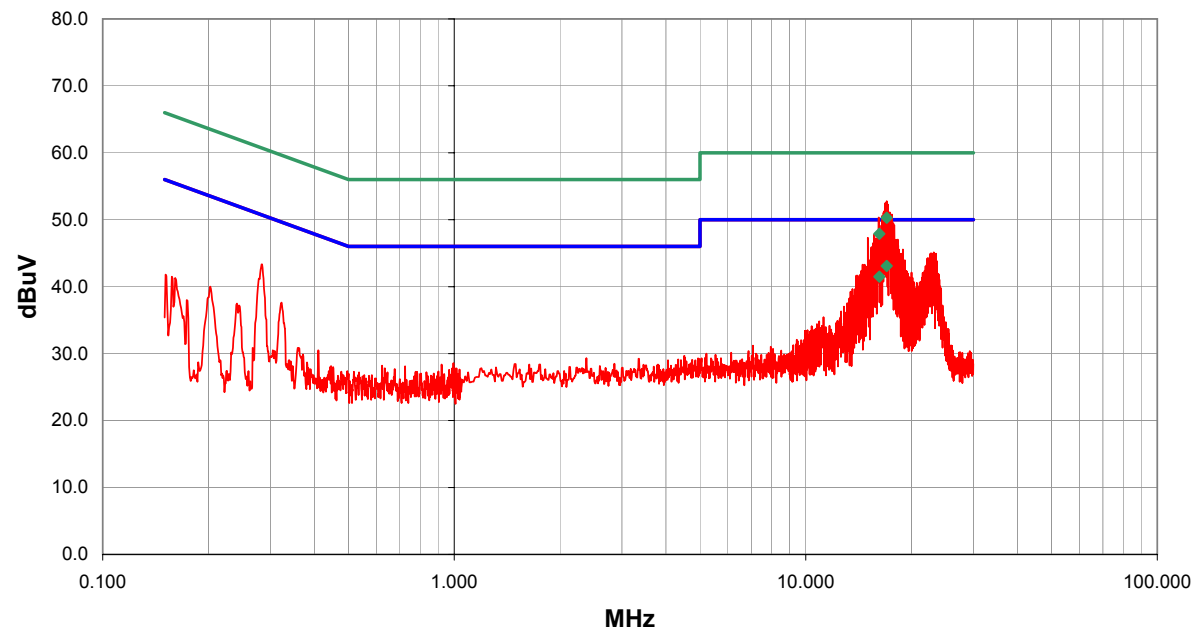
Test Description

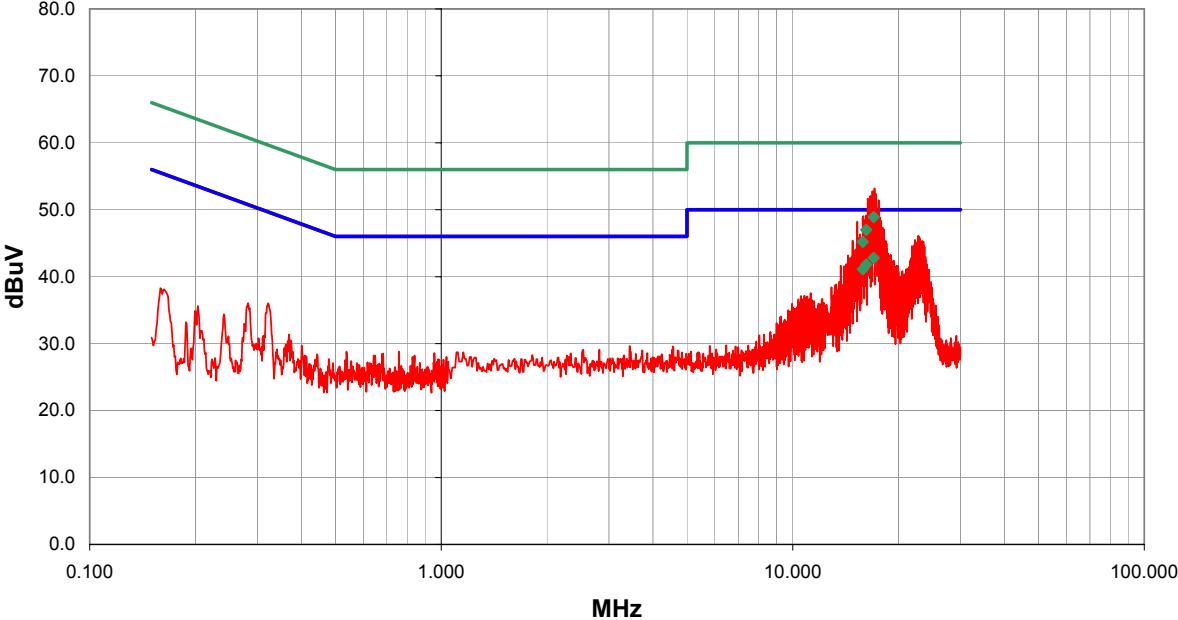
Requirement: Per 47 15.207(d), if the EUT is connected to the AC power line indirectly, obtaining its power from another device that is connected to the AC power line, then it should be tested to demonstrate compliance with the conducted limits of 15.207.

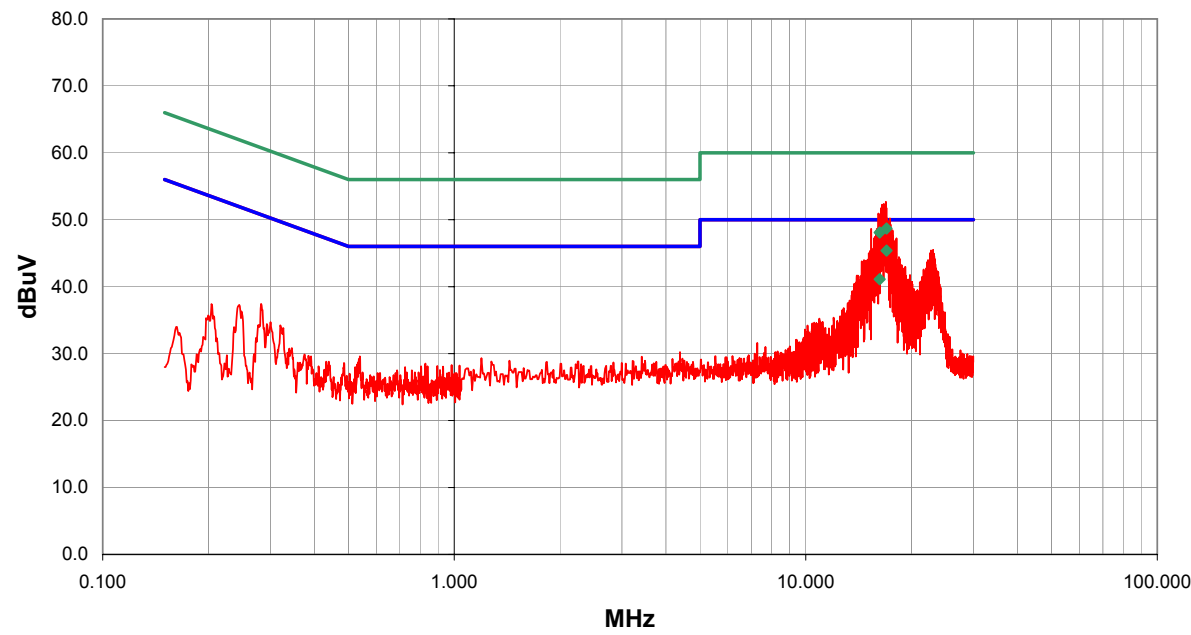
Configuration: The EUT will be powered from a device that could be connected to the AC power line. Therefore, the measurements were made on the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.4-1992.

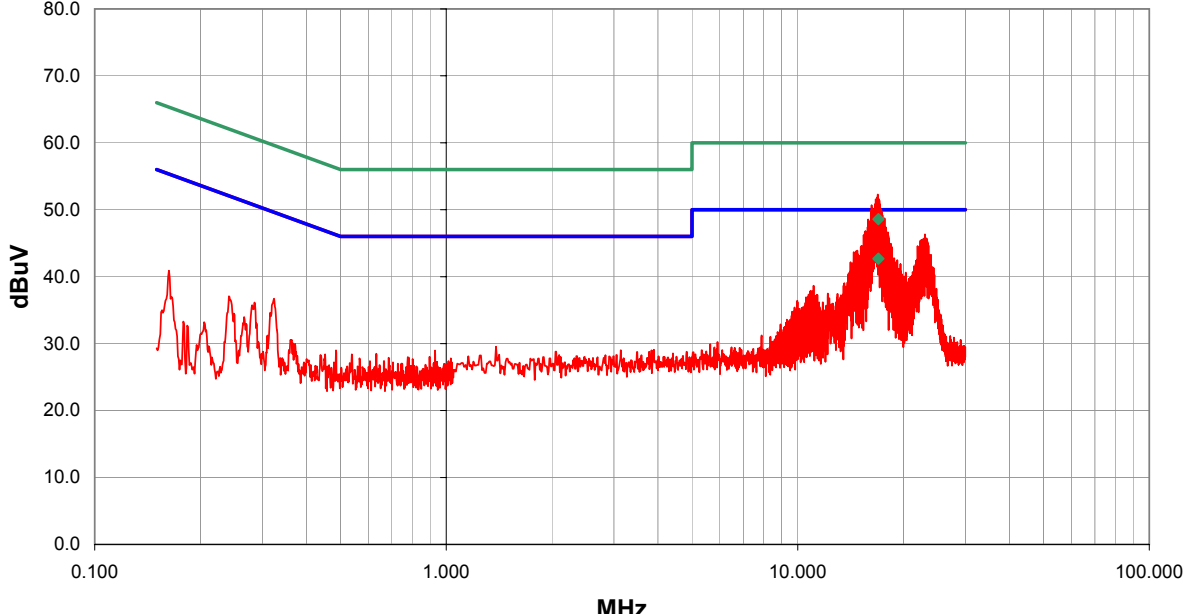
Completed by:

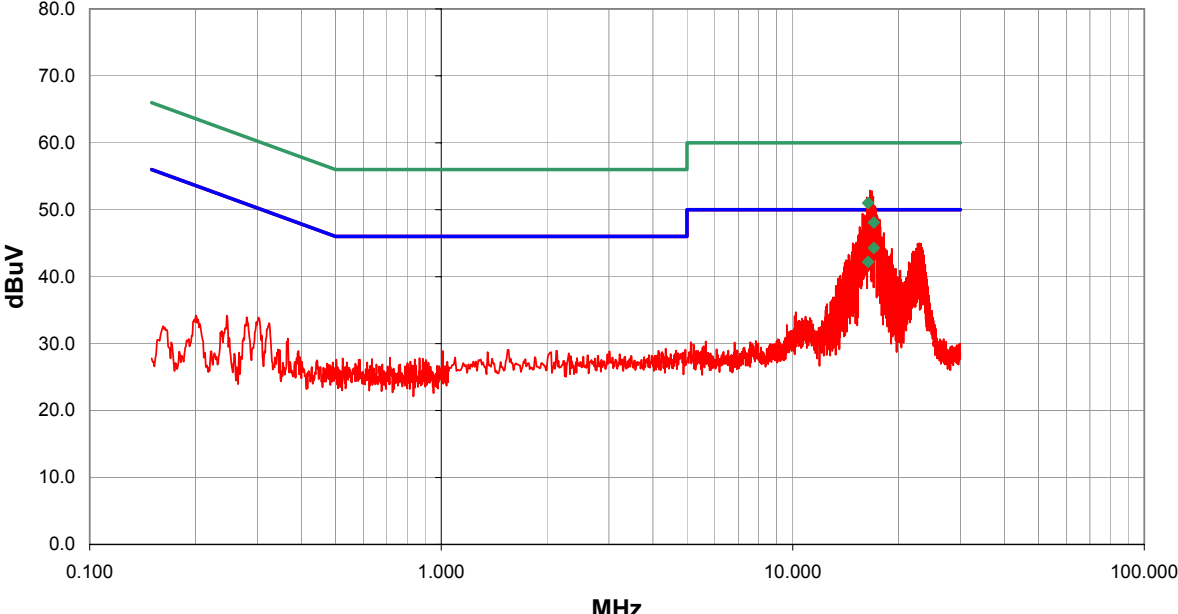


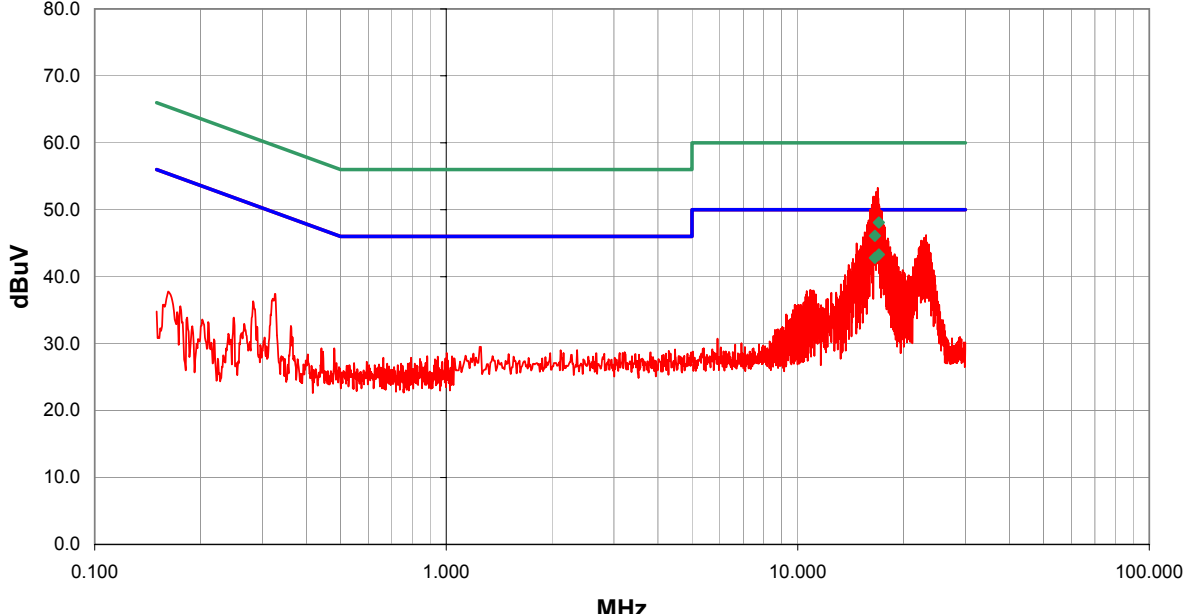
NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV df4.4 10/22/2004				
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005								
Serial Number: 32695		Date: 11/08/04								
Customer: Idmicro, INC.		Temperature: 70								
Attendees: None		Humidity: 48%								
Cust. Ref. No.:		Barometric Pressure: 30.05								
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01						
TEST SPECIFICATIONS										
Specification: FCC 15.207 AC Powerline Conducted Emissions		Year: 2004								
Method: ANSI C63.4		Year: 2003								
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										
Tx1										
EUT OPERATING MODES										
Return Link (no hop mode) Low channel										
DEVIATIONS FROM TEST STANDARD										
No deviations.										
RESULTS										
Pass		Line L1		Run # 1						
Other										
				 Tested By:						
										
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
16.999	21.9			0.0	1.2	20.0	AV	43.1	50.0	-6.9
16.191	20.3			0.0	1.2	20.0	AV	41.5	50.0	-8.5
17.002	29.1			0.0	1.2	20.0	QP	50.3	60.0	-9.7
16.191	26.7			0.0	1.2	20.0	QP	47.9	60.0	-12.1
16.584	28.8			0.0	1.2	20.0		50.0	50.0	0.0
17.388	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
17.736	28.3			0.0	1.2	20.0		49.5	50.0	-0.5
17.448	28.3			0.0	1.2	20.0		49.5	50.0	-0.5
17.856	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
17.688	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
16.416	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
17.628	27.6			0.0	1.2	20.0		48.8	50.0	-1.2
16.536	27.5			0.0	1.2	20.0		48.7	50.0	-1.3
17.808	27.3			0.0	1.2	20.0		48.5	50.0	-1.5
16.296	27.2			0.0	1.2	20.0		48.4	50.0	-1.6
16.368	27.0			0.0	1.2	20.0		48.2	50.0	-1.8
16.188	27.0			0.0	1.1	20.0		48.1	50.0	-1.9
15.672	26.7			0.0	1.1	20.0		47.8	50.0	-2.2
16.248	26.6			0.0	1.1	20.0		47.7	50.0	-2.3

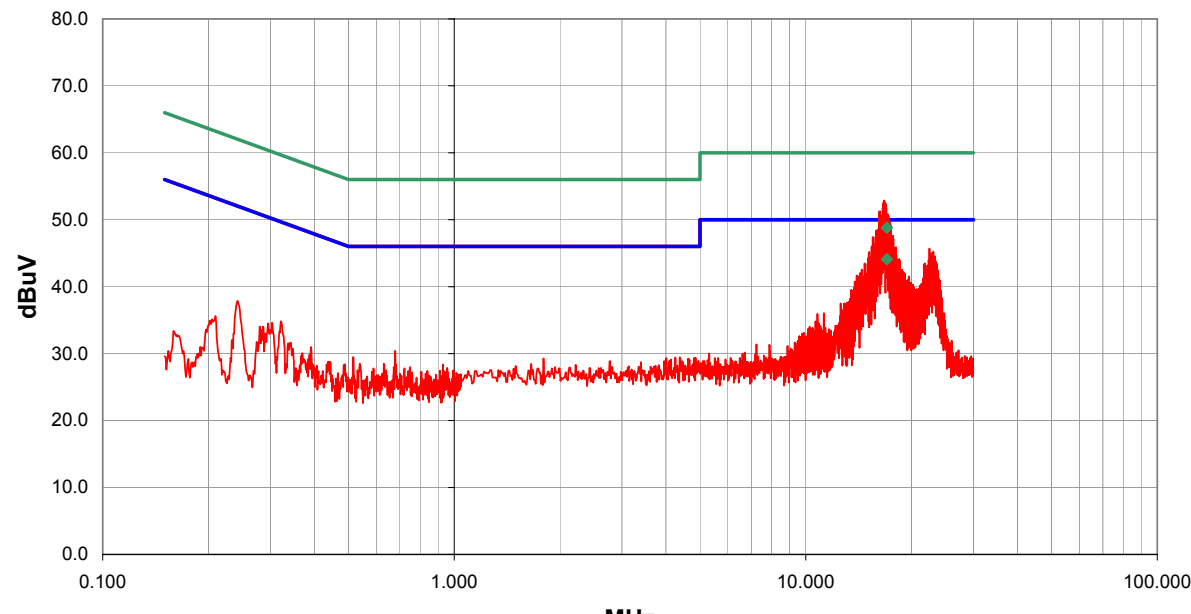
NORTHWEST		CONDUCTED EMISSIONS DATA SHEET				REV df4.4 10/22/2004					
EMC											
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005									
Serial Number: 32695		Date: 11/08/04									
Customer: Idmicro, INC.		Temperature: 70									
Attendees: None		Humidity: 48%									
Cust. Ref. No.:		Barometric Pressure: 30.05									
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004							
Method: ANSI C63.4				Year: 2003							
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											
Tx1											
EUT OPERATING MODES											
Return Link (no hop mode) Low channel											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS											
Pass				Line N		Run # 2					
Other											
				Tested By: 							
											
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
16.989	21.6			0.0	1.2	20.0	AV		42.8	50.0	-7.2
16.178	20.6			0.0	1.2	20.0	AV		41.8	50.0	-8.2
15.832	19.9			0.0	1.2	20.0	AV		41.1	50.0	-8.9
16.989	27.7			0.0	1.2	20.0	QP		48.9	60.0	-11.1
16.178	25.8			0.0	1.2	20.0	QP		47.0	60.0	-13.0
15.833	24.0			0.0	1.2	20.0	QP		45.2	60.0	-14.8
17.616	28.7			0.0	1.2	20.0			49.9	50.0	-0.1
17.328	28.6			0.0	1.2	20.0			49.8	50.0	-0.2
17.400	28.4			0.0	1.2	20.0			49.6	50.0	-0.4
16.692	28.2			0.0	1.2	20.0			49.4	50.0	-0.6
17.520	28.0			0.0	1.2	20.0			49.2	50.0	-0.8
16.176	28.0			0.0	1.1	20.0			49.1	50.0	-0.9
15.876	27.9			0.0	1.1	20.0			49.0	50.0	-1.0
17.664	27.7			0.0	1.2	20.0			48.9	50.0	-1.1
17.436	27.7			0.0	1.2	20.0			48.9	50.0	-1.1
16.536	27.7			0.0	1.2	20.0			48.9	50.0	-1.1
15.816	27.6			0.0	1.1	20.0			48.7	50.0	-1.3
16.404	27.5			0.0	1.2	20.0			48.7	50.0	-1.3
16.296	27.4			0.0	1.2	20.0			48.6	50.0	-1.4

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV d4.4 10/22/2004					
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005									
Serial Number: 32695		Date: 11/08/04									
Customer: Idmicro, INC.		Temperature: 70									
Attendees: None		Humidity: 48%									
Cust. Ref. No.:		Barometric Pressure: 30.05									
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01							
TEST SPECIFICATIONS											
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004							
Method: ANSI C63.4				Year: 2003							
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											
Tx1											
EUT OPERATING MODES											
Return Link (no hop mode) Mid channel											
DEVIATIONS FROM TEST STANDARD											
No deviations.											
RESULTS											
Pass		Line L1		Run # 3							
Other		 Tested By:									
											
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)		Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
16.971	24.2			0.0	1.2	20.0	AV		45.4	50.0	-4.6
16.224	19.9			0.0	1.2	20.0	AV		41.1	50.0	-8.9
16.971	27.5			0.0	1.2	20.0	QP		48.7	60.0	-11.3
16.224	26.9			0.0	1.2	20.0	QP		48.1	60.0	-11.9
16.908	31.5			0.0	1.2	20.0			52.7	50.0	2.7
16.680	31.2			0.0	1.2	20.0			52.4	50.0	2.4
16.488	31.1			0.0	1.2	20.0			52.3	50.0	2.3
16.968	30.6			0.0	1.2	20.0			51.8	50.0	1.8
16.380	30.6			0.0	1.2	20.0			51.8	50.0	1.8
16.560	30.5			0.0	1.2	20.0			51.7	50.0	1.7
16.092	29.8			0.0	1.1	20.0			50.9	50.0	0.9
16.728	29.7			0.0	1.2	20.0			50.9	50.0	0.9
16.440	29.7			0.0	1.2	20.0			50.9	50.0	0.9
16.260	29.7			0.0	1.2	20.0			50.9	50.0	0.9
16.608	29.5			0.0	1.2	20.0			50.7	50.0	0.7
16.800	29.3			0.0	1.2	20.0			50.5	50.0	0.5
16.848	29.2			0.0	1.2	20.0			50.4	50.0	0.4
16.152	29.1			0.0	1.1	20.0			50.2	50.0	0.2
17.352	29.0			0.0	1.2	20.0			50.2	50.0	0.2

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV d4.4 10/22/2004				
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005								
Serial Number: 32695		Date: 11/08/04								
Customer: Idmicro, INC.		Temperature: 70								
Attendees: None		Humidity: 48%								
Cust. Ref. No.:		Barometric Pressure: 30.05								
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01						
TEST SPECIFICATIONS										
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004						
Method: ANSI C63.4				Year: 2003						
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										
Tx1										
EUT OPERATING MODES										
Return Link (no hop mode) Mid channel										
DEVIATIONS FROM TEST STANDARD										
No deviations.										
RESULTS										
Pass		Line N		Run # 4						
Other										
				 Tested By:						
										
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
16.968	21.5			0.0	1.2	20.0	AV	42.7	50.0	-7.3
16.968	27.4			0.0	1.2	20.0	QP	48.6	60.0	-11.4
17.304	28.7			0.0	1.2	20.0		49.9	50.0	-0.1
16.512	28.7			0.0	1.2	20.0		49.9	50.0	-0.1
16.152	28.7			0.0	1.1	20.0		49.8	50.0	-0.2
17.244	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
17.364	28.5			0.0	1.2	20.0		49.7	50.0	-0.3
16.560	28.2			0.0	1.2	20.0		49.4	50.0	-0.6
16.440	28.2			0.0	1.2	20.0		49.4	50.0	-0.6
16.320	28.1			0.0	1.2	20.0		49.3	50.0	-0.7
17.424	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
17.664	27.5			0.0	1.2	20.0		48.7	50.0	-1.3
15.864	27.4			0.0	1.1	20.0		48.5	50.0	-1.5
16.092	27.2			0.0	1.1	20.0		48.3	50.0	-1.7
15.912	27.1			0.0	1.1	20.0		48.2	50.0	-1.8
17.544	26.8			0.0	1.2	20.0		48.0	50.0	-2.0
17.592	26.5			0.0	1.2	20.0		47.7	50.0	-2.3
15.804	26.3			0.0	1.1	20.0		47.4	50.0	-2.6
17.760	26.2			0.0	1.2	20.0		47.4	50.0	-2.6

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV df4.4 10/22/2004				
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005								
Serial Number: 32695		Date: 11/08/04								
Customer: Idmicro, INC.		Temperature: 70								
Attendees: None		Humidity: 48%								
Cust. Ref. No.:		Barometric Pressure: 30.05								
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01						
TEST SPECIFICATIONS										
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004						
Method: ANSI C63.4				Year: 2003						
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										
Tx1										
EUT OPERATING MODES										
Return Link (no hop mode) High channel										
DEVIATIONS FROM TEST STANDARD										
No deviations.										
RESULTS										
Pass		Line L1		Run # 5						
Other		 Tested By:								
										
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
17.016	23.1			0.0	1.2	20.0	AV	44.3	50.0	-5.7
16.386	21.0			0.0	1.2	20.0	AV	42.2	50.0	-7.8
16.386	29.8			0.0	1.2	20.0	QP	51.0	60.0	-9.0
17.016	26.9			0.0	1.2	20.0	QP	48.1	60.0	-11.9
17.232	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
16.308	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
15.792	28.3			0.0	1.1	20.0		49.4	50.0	-0.6
17.112	28.1			0.0	1.2	20.0		49.3	50.0	-0.7
15.912	28.1			0.0	1.1	20.0		49.2	50.0	-0.8
17.352	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
16.200	28.0			0.0	1.1	20.0		49.1	50.0	-0.9
17.400	27.9			0.0	1.2	20.0		49.1	50.0	-0.9
16.032	27.7			0.0	1.1	20.0		48.8	50.0	-1.2
15.984	27.7			0.0	1.1	20.0		48.8	50.0	-1.2
17.460	27.5			0.0	1.2	20.0		48.7	50.0	-1.3
16.140	27.4			0.0	1.1	20.0		48.5	50.0	-1.5
17.688	27.3			0.0	1.2	20.0		48.5	50.0	-1.5
16.080	27.2			0.0	1.1	20.0		48.3	50.0	-1.7
15.852	27.2			0.0	1.1	20.0		48.3	50.0	-1.7

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV d4.4 10/22/2004				
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005								
Serial Number: 32695		Date: 11/08/04								
Customer: Idmicro, INC.		Temperature: 70								
Attendees: None		Humidity: 48%								
Cust. Ref. No.:		Barometric Pressure: 30.05								
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01						
TEST SPECIFICATIONS										
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004						
Method: ANSI C63.4				Year: 2003						
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										
Tx1										
EUT OPERATING MODES										
Return Link (no hop mode) High channel										
DEVIATIONS FROM TEST STANDARD										
No deviations.										
RESULTS										
Pass		Line N		Run # 6						
Other										
				 Tested By:						
										
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
17.018	22.1			0.0	1.2	20.0	AV	43.3	50.0	-6.7
16.565	21.6			0.0	1.2	20.0	AV	42.8	50.0	-7.2
17.015	26.9			0.0	1.2	20.0	QP	48.1	60.0	-11.9
16.565	24.9			0.0	1.2	20.0	QP	46.1	60.0	-13.9
17.184	28.7			0.0	1.2	20.0		49.9	50.0	-0.1
16.320	28.7			0.0	1.2	20.0		49.9	50.0	-0.1
16.140	28.7			0.0	1.1	20.0		49.8	50.0	-0.2
17.352	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
17.256	28.4			0.0	1.2	20.0		49.6	50.0	-0.4
17.292	28.2			0.0	1.2	20.0		49.4	50.0	-0.6
17.136	28.0			0.0	1.2	20.0		49.2	50.0	-0.8
15.912	27.3			0.0	1.1	20.0		48.4	50.0	-1.6
15.864	26.9			0.0	1.1	20.0		48.0	50.0	-2.0
17.472	26.7			0.0	1.2	20.0		47.9	50.0	-2.1
15.744	26.6			0.0	1.1	20.0		47.7	50.0	-2.3
17.580	26.5			0.0	1.2	20.0		47.7	50.0	-2.3
17.712	26.2			0.0	1.2	20.0		47.4	50.0	-2.6
17.640	26.0			0.0	1.2	20.0		47.2	50.0	-2.8
17.424	25.8			0.0	1.2	20.0		47.0	50.0	-3.0

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET				REV d4.4 10/22/2004				
EUT: 2.4GHz RFID Reader				Work Order: IDMI0005						
Serial Number: 32695				Date: 11/08/04						
Customer: Idmicro, INC.				Temperature: 70						
Attendees: None				Humidity: 48%						
Cust. Ref. No.:				Barometric Pressure: 30.05						
Tested by: Rod Peloquin		Power: 120VAC/60Hz		Job Site: EV01						
TEST SPECIFICATIONS										
Specification: FCC 15.207 AC Powerline Conducted Emissions				Year: 2004						
Method: ANSI C63.4				Year: 2003						
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										
Tx1										
EUT OPERATING MODES										
Forward Link (DSSS mode)										
DEVIATIONS FROM TEST STANDARD										
No deviations.										
RESULTS										
Pass				Line L1		Run # 7				
Other										
				 Tested By:						
										
Freq (MHz)	Amplitude (dBuV)			Transducer (dB)	Cable (dB)	External Attenuation (dB)	Detector (blank equal peaks [PK] from scan)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
17.018	22.9			0.0	1.2	20.0	AV	44.1	50.0	-5.9
17.018	27.6			0.0	1.2	20.0	QP	48.8	60.0	-11.2
16.368	28.8			0.0	1.2	20.0		50.0	50.0	0.0
17.256	28.6			0.0	1.2	20.0		49.8	50.0	-0.2
16.152	28.5			0.0	1.1	20.0		49.6	50.0	-0.4
17.352	28.4			0.0	1.2	20.0		49.6	50.0	-0.4
16.440	28.3			0.0	1.2	20.0		49.5	50.0	-0.5
17.424	28.1			0.0	1.2	20.0		49.3	50.0	-0.7
17.472	27.9			0.0	1.2	20.0		49.1	50.0	-0.9
17.304	27.8			0.0	1.2	20.0		49.0	50.0	-1.0
16.080	27.4			0.0	1.1	20.0		48.5	50.0	-1.5
15.912	27.3			0.0	1.1	20.0		48.4	50.0	-1.6
15.864	27.2			0.0	1.1	20.0		48.3	50.0	-1.7
16.032	26.9			0.0	1.1	20.0		48.0	50.0	-2.0
17.700	26.4			0.0	1.2	20.0		47.6	50.0	-2.4
17.520	26.4			0.0	1.2	20.0		47.6	50.0	-2.4
17.640	26.3			0.0	1.2	20.0		47.5	50.0	-2.5
15.792	26.3			0.0	1.1	20.0		47.4	50.0	-2.6
15.516	26.3			0.0	1.1	20.0		47.4	50.0	-2.6

NORTHWEST EMC		CONDUCTED EMISSIONS DATA SHEET		REV d4.4 10/22/2004
EUT: 2.4GHz RFID Reader		Work Order: IDMI0005		
Serial Number: 32695		Date: 11/08/04		
Customer: Idmicro, INC.		Temperature: 70		
Attendees: None		Humidity: 48%		
Cust. Ref. No.:		Barometric Pressure: 30.05		
Tested by: Rod Peloquin		Power: 120VAC/60Hz	Job Site: EV01	
TEST SPECIFICATIONS				
Specification: FCC 15.207 AC Powerline Conducted Emissions		Year: 2004		
Method: ANSI C63.4		Year: 2003		
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				
Tx1				
EUT OPERATING MODES				
Forward Link (DSSS mode)				
DEVIATIONS FROM TEST STANDARD				
No deviations.				
RESULTS				
Pass		Line	Run #	
		N	8	
Other				
		 Tested By:		

