Measurement/Technical Report

General Information

Applicant:	Intermec Corporation
Address:	6001 36th Avenue West
City, State, Zip	Everett, WA 98203-9280
Test Requested By:	Carl Turk
Model:	SB555 Radio in 700C
FCC ID:	HN2SB555
First Date of Test:	August 21, 2003
Last Date of Test:	August 21, 2003
Receipt Date of Samples:	August 21, 2003
Job Number	INMC00102

Scope

Regulatory Authority	Federal Communications Commission
Approval Type	Certification
Equipment Type	Part 24 Licensed Body Worn Transmitter
Rule Parts	47 CFR 22.917(e), 24.238(a)
Rule Exemptions	None
Related Submittals or Grants	None

Report Information

Prepared By	Vicki Albertson, Technical Report and Documentation Manager Northwest EMC, Inc.
Signature	
Issued By	Northwest EMC, Inc. 22975 NW Evergreen Parkway, Suite 400 Hillsboro, Oregon 97124 Ph. (503) 844-4066 Fax (503) 844-3826
Report Number	INMC0102
Date Issued	August 25, 2003

Test Facility

The measurement facility used to collect the radiated and conducted data is located at

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124
(503) 844-4066
Fax: 844-3826

This site has been fully described in a report filed with the FCC (Federal Communications Commission), and accepted by the FCC in a letter maintained in our files.

Laboratory Accreditation

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

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:
Cellular Mode
PCS Mode

Antennas Investigated:
PSTGO-1900SCI
PSTGO-900 / 1900SCI

Data Rates Investigated:
Maximum

Power Input Settings Investigated:
120 VAC, 60 Hz.

Software\Firmware Applied During Test			
Exercise software	Sierra FCC_SMART	Version	v0.47
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
Antenna	Mobile Mark	PSTGO-1900SCI	N/A
Antenna	Mobile Mark	PSTGO-900 / 1900SCI	N/A
Host Device	Intermec	700C	08200300372
EUT-Radio	Sierra Wireless	SB555	63020FB8
AC Power Adapter	ELPAC Power Systems	FW1812	009605

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	1.65	No	AC Power Adapter	AC Mains
DC Leads	PA	1.9	PA	Host Device	AC Adapter

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

Measurement Equipment

Description	Manufacturer	Model	Identifier	Last Cal	Interval
Spectrum Analyzer	Hewlett-Packard	8566B	AAL	01/07/2003	12 mo
Spectrum Analyzer Display	Hewlett Packard	85662A	AALD	01/07/2003	12 mo
Antenna, Biconilog	EMCO	3141	AXE	12/31/2001	36 mo
Antenna, Horn	EMCO	3115	AHC	08/12/2002	15 mo
Antenna, Dipole	Compliance Design	A100	ADB	12/26/2002	36 mo
Antenna, Horn	EMCO	3115	AHF	03/18/2003	12 mo
Signal Generator	Hewlett Packard	8341B	TGN	12/20/2002	12 mo
Power Meter	Hewlett Packard	E4418A	SPA	06/21/2002	24 mo

Test Description

Requirement: Per 2.1043, the peak power of the modulated carrier was measured. The applicable limits are 22.913(a) for the cellular band, and 24.232(b) for the PCS band.

Per 22.913(a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Per 24.232(b), Mobile/portable stations are limited to 2 Watts e.i.r.p. peak power.

Configuration: Spectrum analyzer, signal generator, and linearly polarized antennas were used to measure the fundamental emissions. The orientation of the EUT was varied in 3 orthogonal axes to maximize the level of emissions. The EUT was configured to transmit at the highest output at low, mid, and high channels. The EUT was tested with each antenna. Only one antenna can be used at a time.

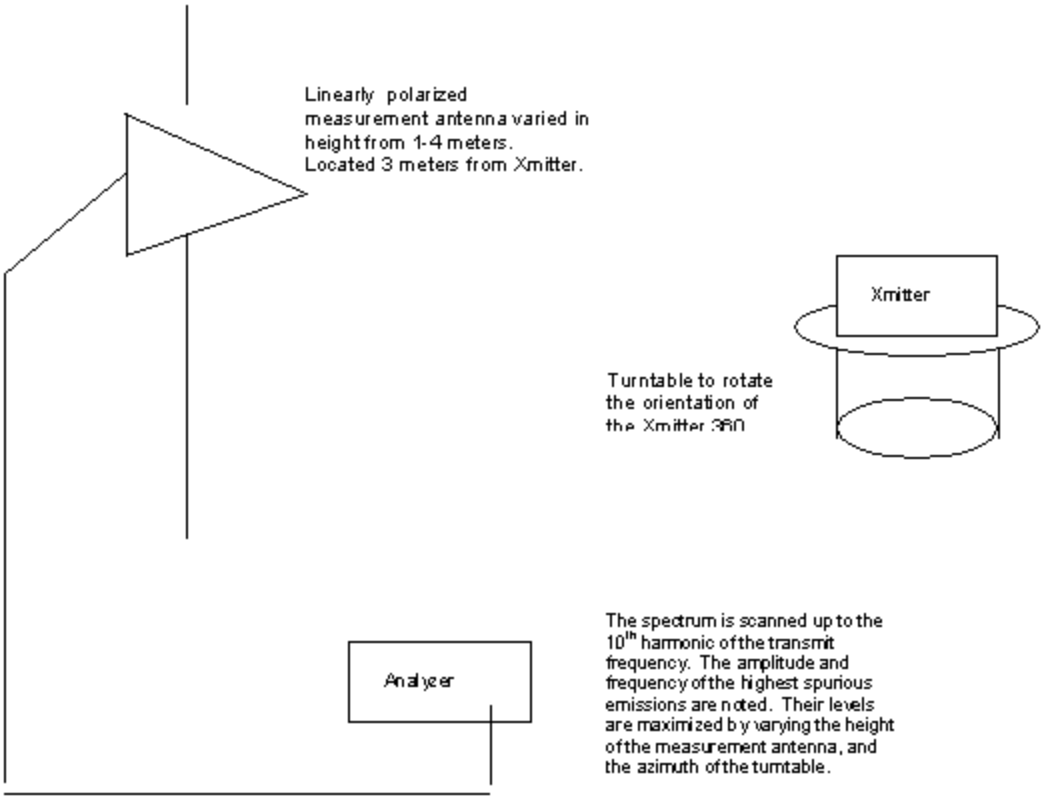
The substitution method as described in TIA/EIA-603 Section 2.2.12 was used.

Test Methodology: For licensed transmitters, the FCC references TIA/EIA-603 as the measurement procedure standard. TIA/EIA-603 Section 2.2.12 describes a method for measuring radiated emissions that utilizes an antenna substitution method:

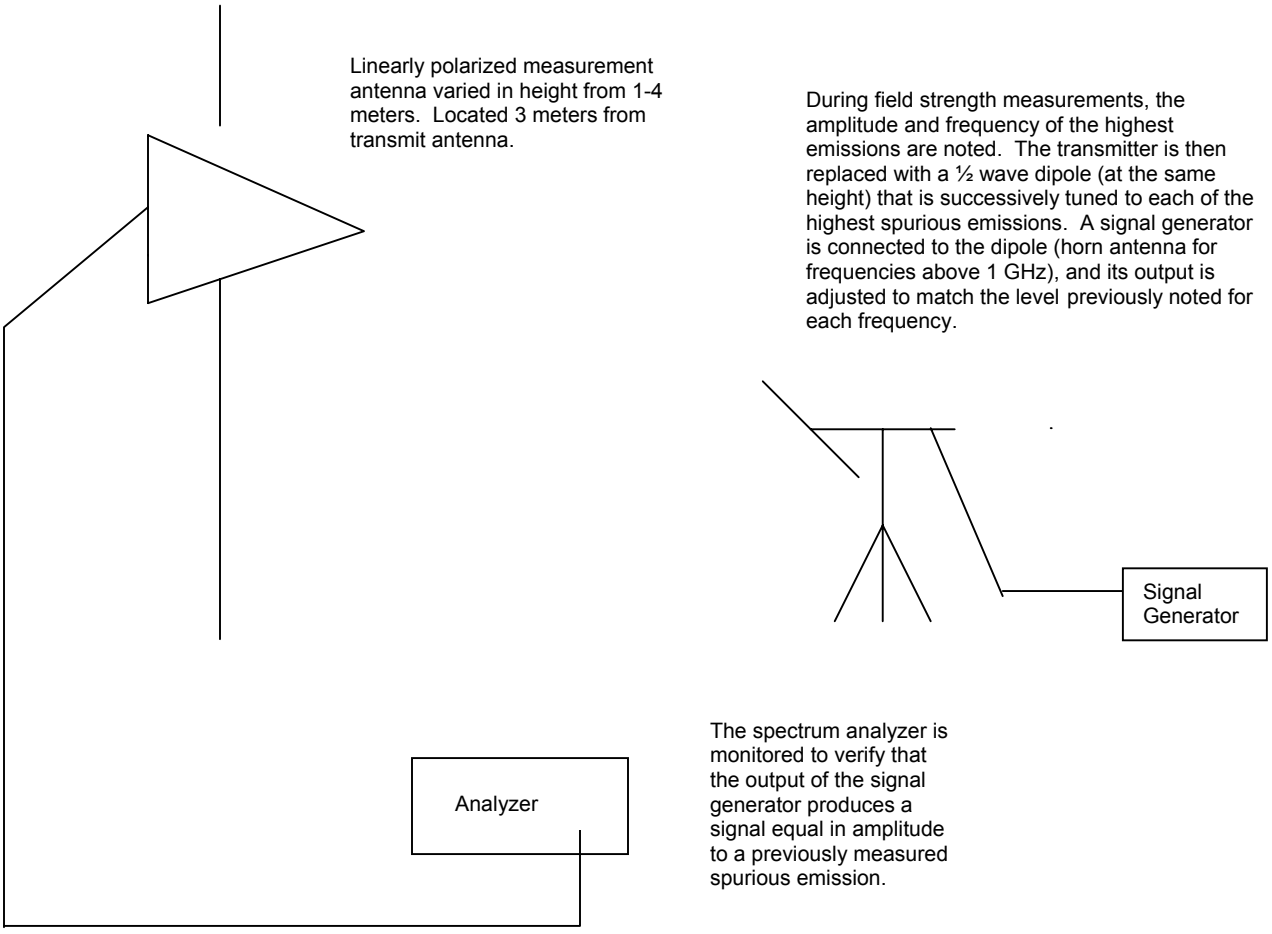
At an approved test site, the transmitter is place on a remotely controlled turntable, and the measurement antenna is placed 3 meters from the transmitter. The turntable azimuth is varied to maximize the level of emissions. The height of the measurement antenna is also varied from 1 to 4 meters. The amplitude and frequency of the highest emissions are noted. The transmitter is then replaced with a ½ wave dipole that is successively tuned to each of the highest emissions. A signal generator is connected to the dipole (horn antenna for frequencies above 1 GHz), and its output is adjusted to match the level previously noted for each frequency. The output of the signal generator is recorded, and by factoring in the cable loss to the dipole antenna and its gain; the power (ERP or e.i.r.p) is determined for each radiated emission.

Test Setup Diagram

Test Setup for Field Strength Measurements



Test Setup for Power Measurements Utilizing the Antenna Substitution Method



Completed by:

NORTHWEST EMC

Effective Radiated Power

REV df4.00 08/12/2003

EUT:	SB555 Radio			Work Order:	INMC0102
Serial Number:	Unknown			Date:	08/21/03
Customer:	INTERMEC Technologies Corporation			Temperature:	75
Attendees:	N/A			Humidity:	39%
Cust. Ref. No.:				Barometric Pressure	29.94
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 22.913(a)	Year:	2002
Method:	TIA/EIA-603	Year:	1998

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

SB555 radio in 700C host system with PSTGO-900 / 1900SCI antenna

EUT OPERATING MODES

transmitting

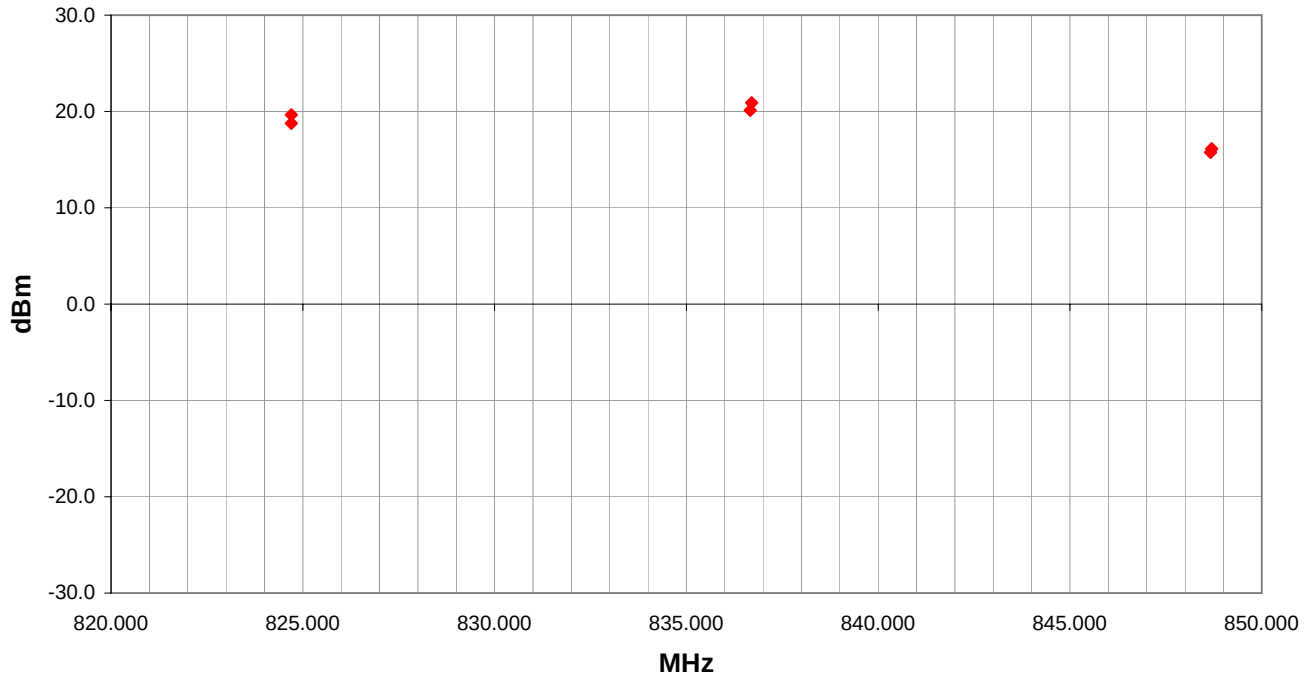
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	2

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)		ERP (Watts)
836.700			200.0	1.0			H-Bilog	PK		20.9		0.075
824.700			191.0	1.1			H-Bilog	PK		19.6		0.056
836.665			196.0	1.2			V-Bilog	PK		20.1		0.063
824.700			199.0	1.2			V-Bilog	PK		18.8		0.046
848.693			198.0	1.0			H-Bilog	PK		16.1		0.025
848.666			175.0	1.2			V-Bilog	PK		15.8		0.023

NORTHWEST EMC

Effective Radiated Power

REV df4.00 08/12/2003

EUT:	SB555 Radio			Work Order:	INMC0102
Serial Number:	Unknown			Date:	08/21/03
Customer:	INTERMEC Technologies Corporation			Temperature:	75
Attendees:	N/A			Humidity:	39%
Cust. Ref. No.:				Barometric Pressure	29.94
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24.232(b)	Year:	2002
Method:	TIA/EIA-603	Year:	1998

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

SB555 radio in 700C host system with PSTGO-900 / 1900SCI antenna

EUT OPERATING MODES

transmitting

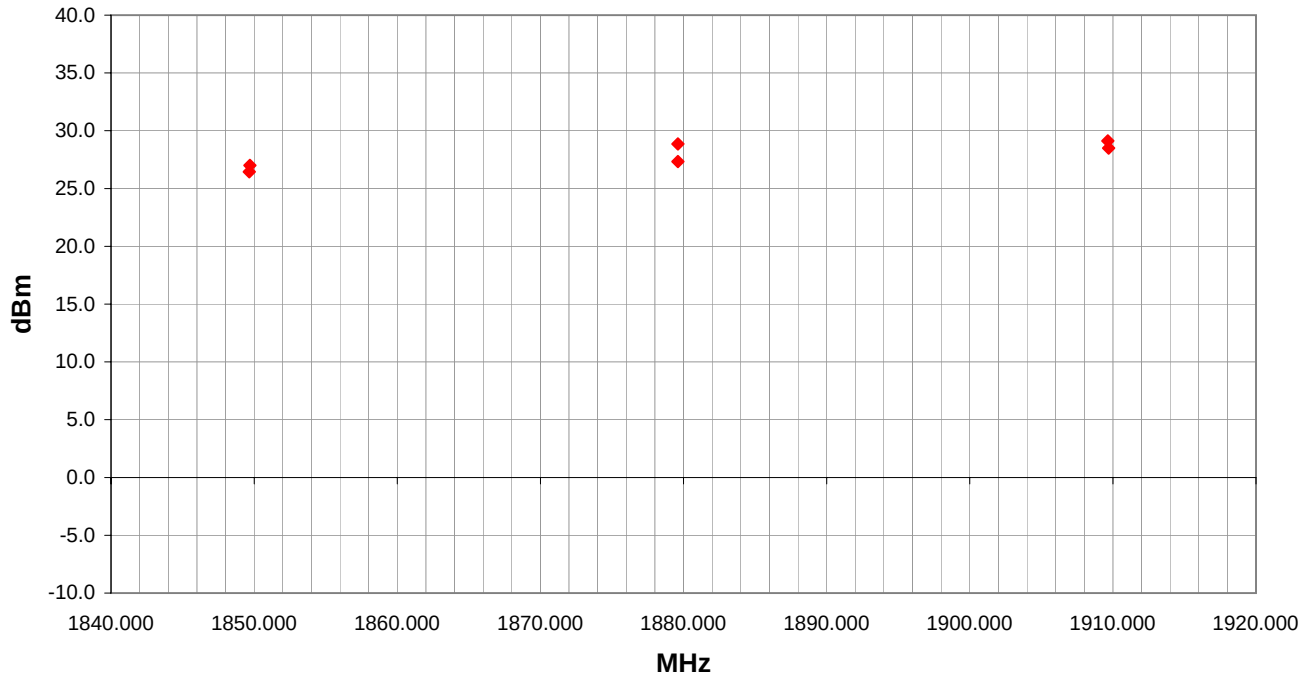
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	4

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)		EIRP (Watts)
1909.700			191.0	1.1			H-Horn	PK		28.5		0.708
1879.614			195.0	1.5			H-Horn	PK		27.3		0.541
1909.652			275.0	1.0			V-Horn	PK		29.1		0.816
1849.661			238.0	1.1			H-Horn	PK		26.5		0.442
1879.614			345.0	1.6			V-Horn	PK		28.9		0.769
1849.700			301.0	1.3			V-Horn	PK		27.0		0.502

NORTHWEST EMC

Effective Radiated Power

REV df4.00 08/12/2003

EUT:	SB555 Radio			Work Order:	INMC0102
Serial Number:	Unknown			Date:	08/21/03
Customer:	INTERMEC Technologies Corporation			Temperature:	75
Attendees:	N/A			Humidity:	39%
Cust. Ref. No.:				Barometric Pressure	29.94
Tested by:	Rod Peloquin	Power:	120VAC/60Hz	Job Site:	EV01

TEST SPECIFICATIONS

Specification:	FCC Part 24E	Year:	2002
Method:	TIA/EIA-603	Year:	1998

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

SB555 radio in 700C host system with PSTGO-1900SCI antenna

EUT OPERATING MODES

transmitting

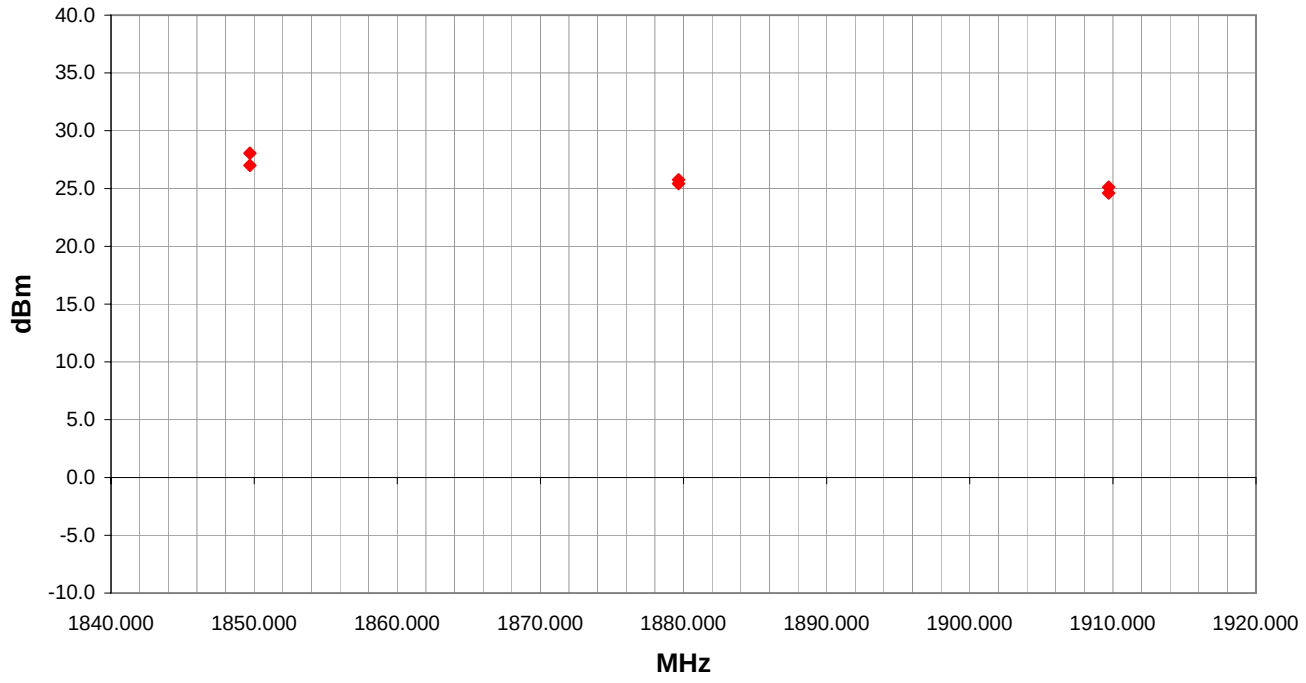
DEVIATIONS FROM TEST STANDARD

No deviations.

RESULTS	Run #
Pass	5

Other

Tested By:



Freq (MHz)			Azimuth (degrees)	Height (meters)			Polarity	Detector		EIRP (dBm)		EIRP (Watts)
1849.700			245.0	1.1			H-Horn	PK		28.1		0.639
1879.652			187.0	1.5			H-Horn	PK		25.4		0.349
1909.700			208.0	1.4			H-Horn	PK		24.6		0.289
1849.700			300.0	1.4			V-Horn	PK		27.0		0.502
1879.652			309.0	1.3			V-Horn	PK		25.8		0.377
1909.700			14.0	1.7			V-Horn	PK		25.1		0.325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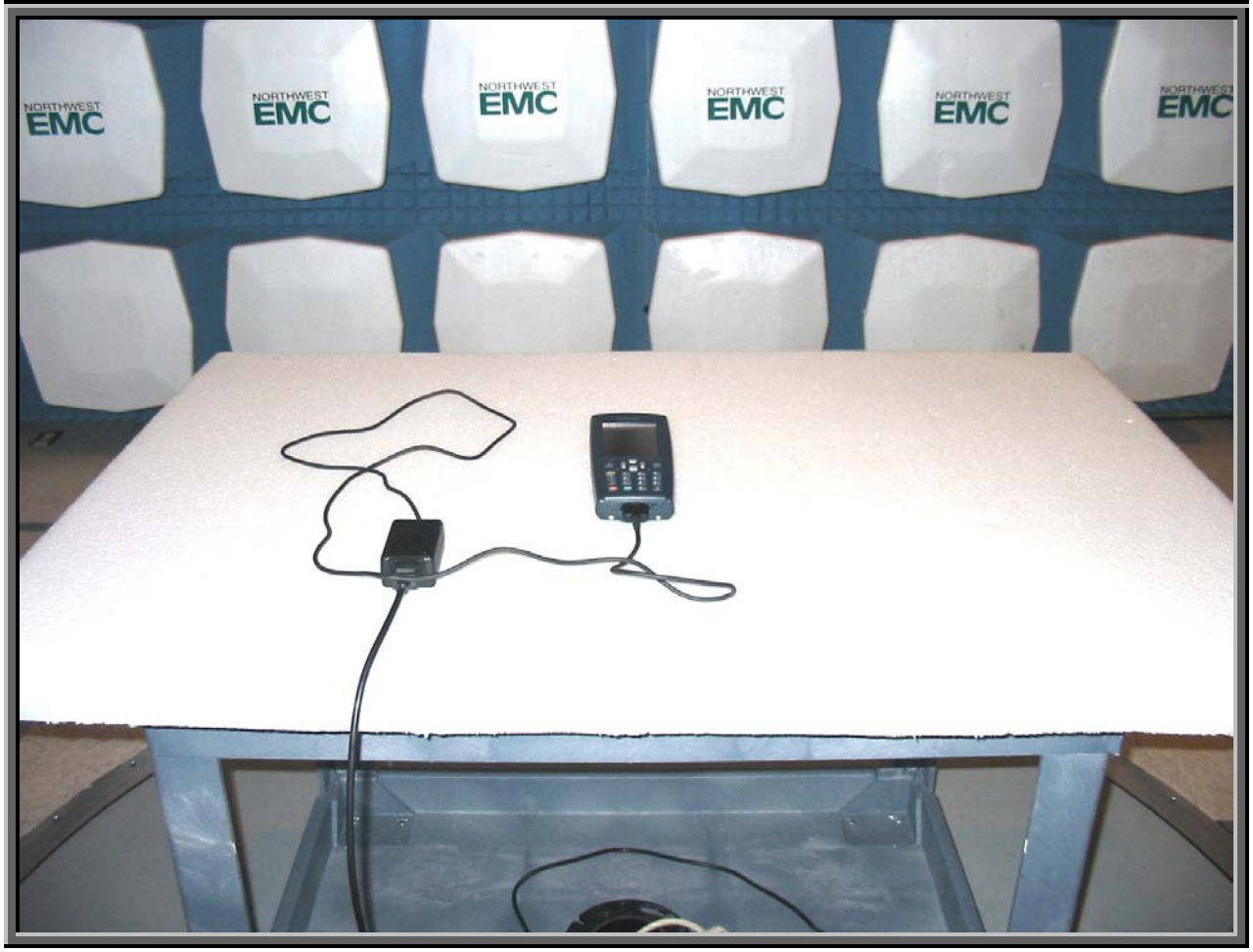
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