

Intermec Technologies Corporation

Galileo Modular Radio (TI) Model RC11

Report No. INMC0546

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

© 2009 Northwest EMC, Inc

EMC Test Report

Certificate of Test
Last Date of Test: August 11, 2009
Intermec Technologies Corporation
Model: Galileo Modular Radio (TI)

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Unwanted Emissions	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Transmit Power	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Power Spectral Density	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Emission Bandwidth	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Peak Excursion of the Modulation Envelope	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
AC Powerline Conducted Emissions	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Frequency Stability	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass
Transmission Pulse Duration	FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002	Pass

Modifications made to the product

See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.; 22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834D-1).

Approved By:



Don Facticeau, IS Manager



NVLAP Lab Code: 200630-0

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		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, 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. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



NVLAP LAB CODE 200629-0
 NVLAP LAB CODE 200630-0
 NVLAP LAB CODE 200676-0
 NVLAP LAB CODE 200761-0

Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2*)



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.



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).



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



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 Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294.*)



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 (US0017). License No.SL2-IN-E-1017.



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



KCC: Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157*)



SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



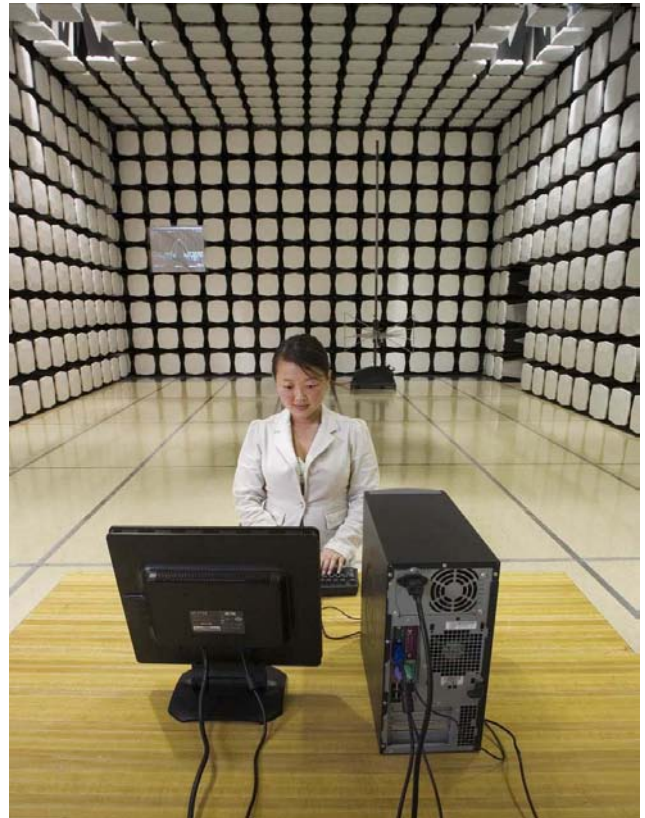
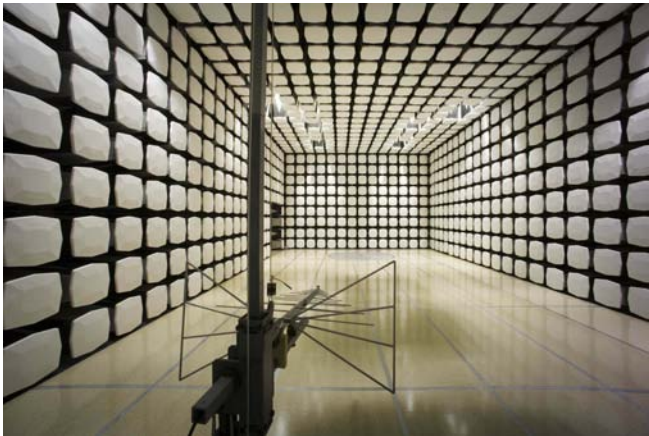
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	6001 36th Avenue West
City, State, Zip:	Everett, WA 98203-1264
Test Requested By:	Wayne Rieger
Model:	Galileo Modular Radio (TI) Model RC11
First Date of Test:	July 29, 2009
Last Date of Test:	August 10, 2009
Receipt Date of Samples:	July 16, 2009
Equipment Design Stage:	Preproduction
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

One combination 802.11a/b/g - Bluetooth radio module

Testing Objective:

Seeking to demonstrate compliance under FCC 15.407 for operation in the 5.2 band (no DFS)

CONFIGURATION 1 INMC0546**Software/Firmware Running during test**

Description	Version
Radio Scope (802.11)	1.0

EUT

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Combined 802.11bg and Bluetooth radio module	Intermec Technologies Corporation	Galileo Modular Radio	00-21-e8-70-09-c4

Peripherals in test setup boundary

Description	Manufacturer	Model/Part Number	Serial Number
Power Supply	Intermec Technologies Corporation	3-304029-Q1	01669

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Remote PC	Dell	Latitude D600	SAC 2

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC power	No	2.3m	No	AC Mains	Power Supply
DC power	PA	2.3m	PA	Power Supply	Test Module
USB	No	5.0m	No	EUT	Remote PC
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 6 INMC0546**Software/Firmware Running during test**

Description	Version
Radio Scope (802.11)	1.0
HCI Tester (Bluetooth)	2.3.1.0

EUT

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Combined 802.11bg and Bluetooth radio module	Intermec Technologies Corporation	Galileo Modular Radio	00-21-e8-70-09-c4
Whip Antenna	Laird	MAF94367	None

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Remote PC	Dell	Latitude D600	SAC 2
Power Supply	Intermec Technologies Corporation	3-304029-01	690490

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC power	No	2.3m	No	AC Mains	Power Supply
USB	No	5.0m	No	EUT	Remote PC
DC power	PA	3.5m	PA	Power Supply	EUT - Combined 802.11bg and Bluetooth radio module
Antenna	Yes	0.6m	No	EUT - Combined 802.11bg and Bluetooth radio module	Whip Antenna

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

CONFIGURATION 8 INMC0546**Software/Firmware Running during test**

Description	Version
Radio Scope (802.11)	1.0
HCI Tester (Bluetooth)	2.3.1.0

EUT

Description	Manufacturer	Model/Part Number	Serial Number
EUT - Combined 802.11bg and Bluetooth radio module	Intermec Technologies Corporation	Galileo Modular Radio	00-21-e8-70-09-c4
Whip Antenna	Laird	MAF94367	None

Peripherals in test setup boundary

Description	Manufacturer	Model/Part Number	Serial Number
Power Supply	Topward Electric Instruments Co., LTD.	TPS-2000	946425

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Remote PC	Dell	Latitude D600	SAC 2

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Antenna	Yes	0.6m	No	EUT - Combined 802.11bg and Bluetooth radio module	Whip Antenna
DC power	No	1.8m	No	EUT - Combined 802.11bg and Bluetooth radio module	Power Supply
AC power	No	1.8m	No	Power Supply	AC Mains
USB	Yes	3.0m	No	EUT - Combined 802.11bg and Bluetooth radio module	Remote PC

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

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	7/29/2009	Emission Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	7/30/2009	Peak Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	7/31/2009	Peak Transmit Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	7/31/2009	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	7/31/2009	Peak Excursion of the Modulation Envelope	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	7/31/09	Transmission Pulse Duration	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	8/10/2009	Unwanted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
8	8/11/2009	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The lowest, a medium, and the highest data rates were measured if available. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum analyzer settings were as follows:

- Span = approximately 1.5 to 2 times the emission bandwidth, centered on the transmit channel.
- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process where an exact match of 1% may not be achieved. The largest value of RBW that came close to 1% of the emission bandwidth was used.
- A peak detector was used.

The marker-delta function was then used to measure 26 dB emission bandwidth

EMC

EMISSION BANDWIDTH

EUT: Galileo modular radio (T1)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 07/29/09
Customer: Intermec Technologies Corporation	Temperature: 24.0°C
Attendees: None	Humidity: 46%
Project: None	Barometric Pres.: 29.76 in
Tested by: Rod Peloquin	Power: 120VAC/60Hz
	Job Site: EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

COMMENTS

EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.

DEVIATIONS FROM TEST STANDARD

No deviations

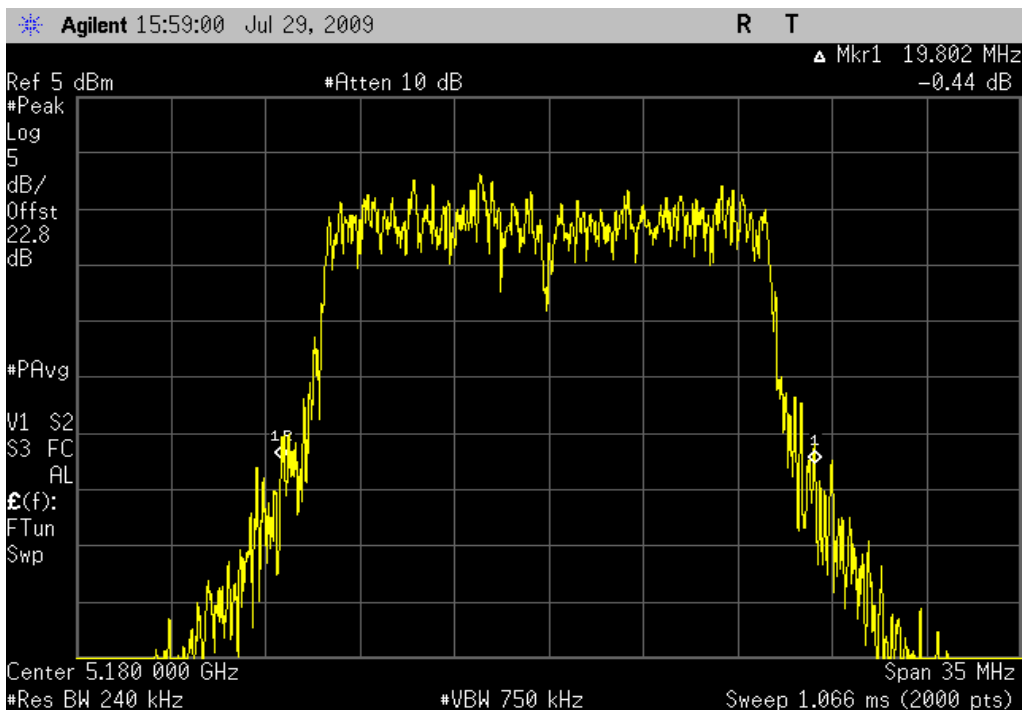
Configuration #	1	<i>Rod Peloquin</i> Signature
------------------------	---	----------------------------------

		Value	Limit	Results
802.11(a) 6 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	19.802 MHz	N/A	N/A
	Channel 48, High Channel	19.977 MHz	N/A	N/A
802.11(a) 36 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	19.890 MHz	N/A	N/A
	Channel 48, High Channel	19.680 MHz	N/A	N/A
802.11(a) 54 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	20.275 MHz	N/A	N/A
	Channel 48, High Channel	18.909 MHz	N/A	N/A

EMISSION BANDWIDTH

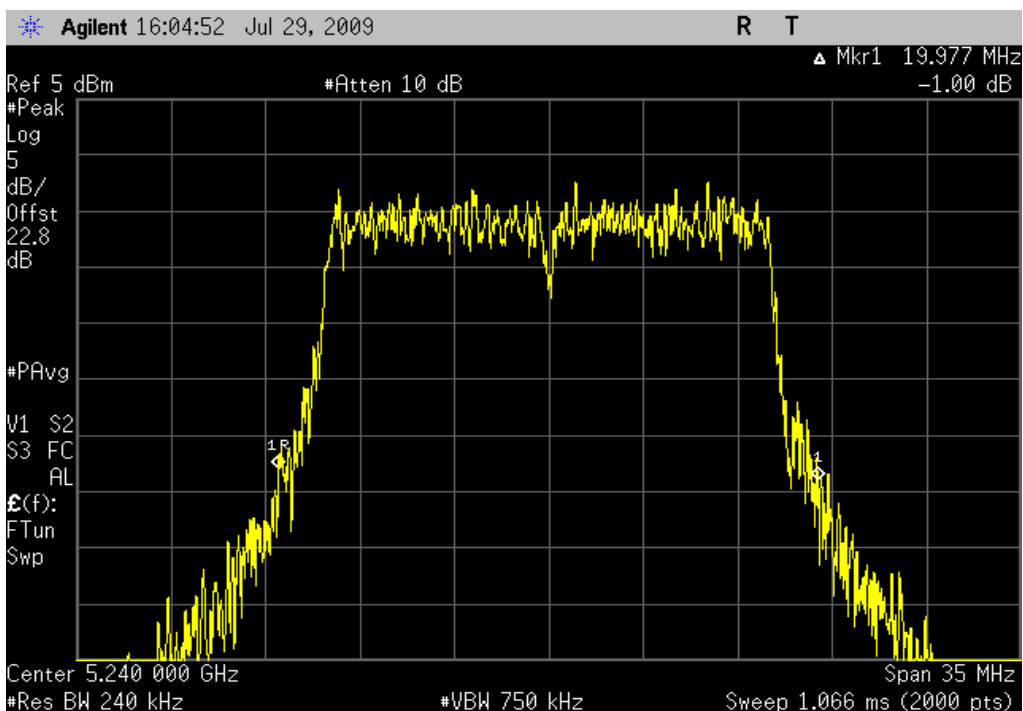
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: N/A	Value: 19.802 MHz	Limit: N/A
--------------------	--------------------------	-------------------



802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: N/A	Value: 19.977 MHz	Limit: N/A
--------------------	--------------------------	-------------------



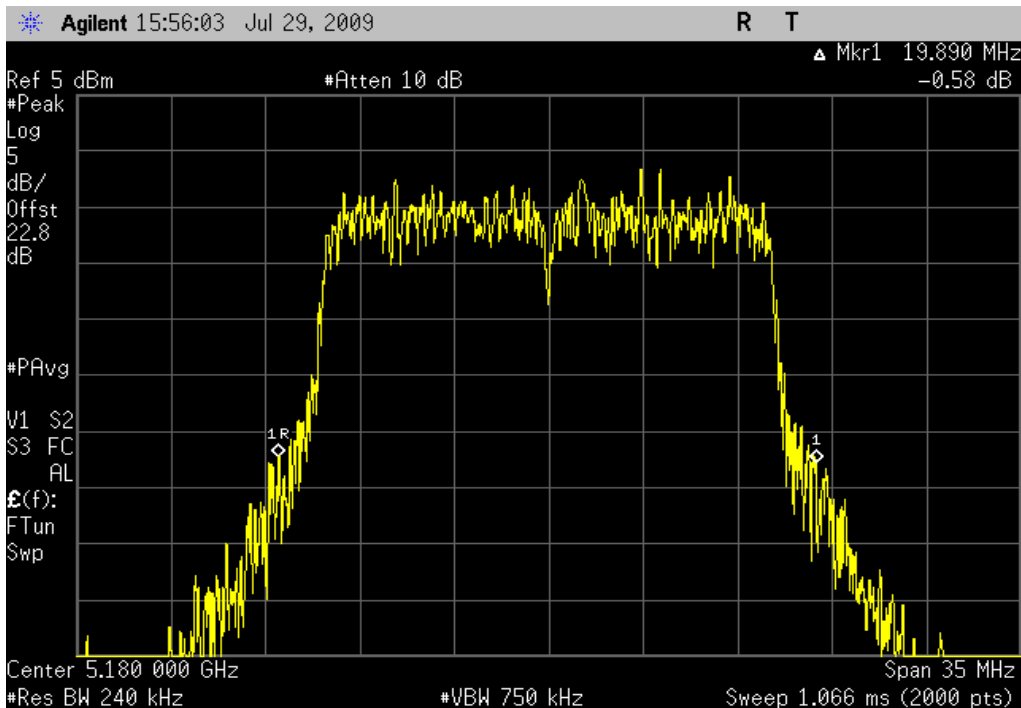
EMISSION BANDWIDTH

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: N/A

Value: 19.890 MHz

Limit: N/A

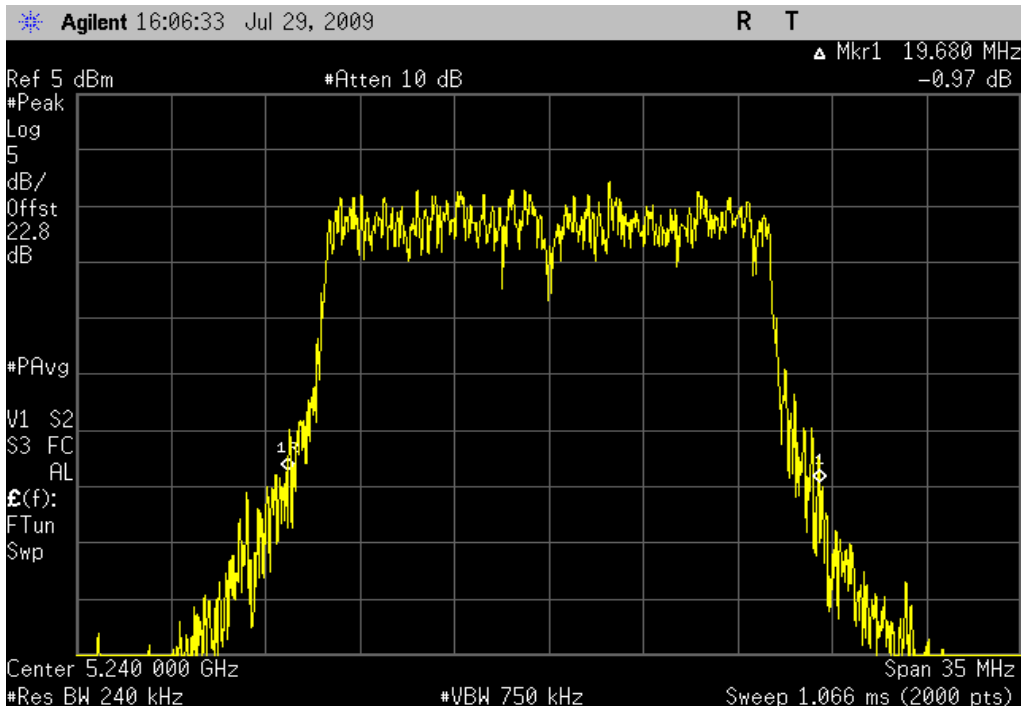


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: N/A

Value: 19.680 MHz

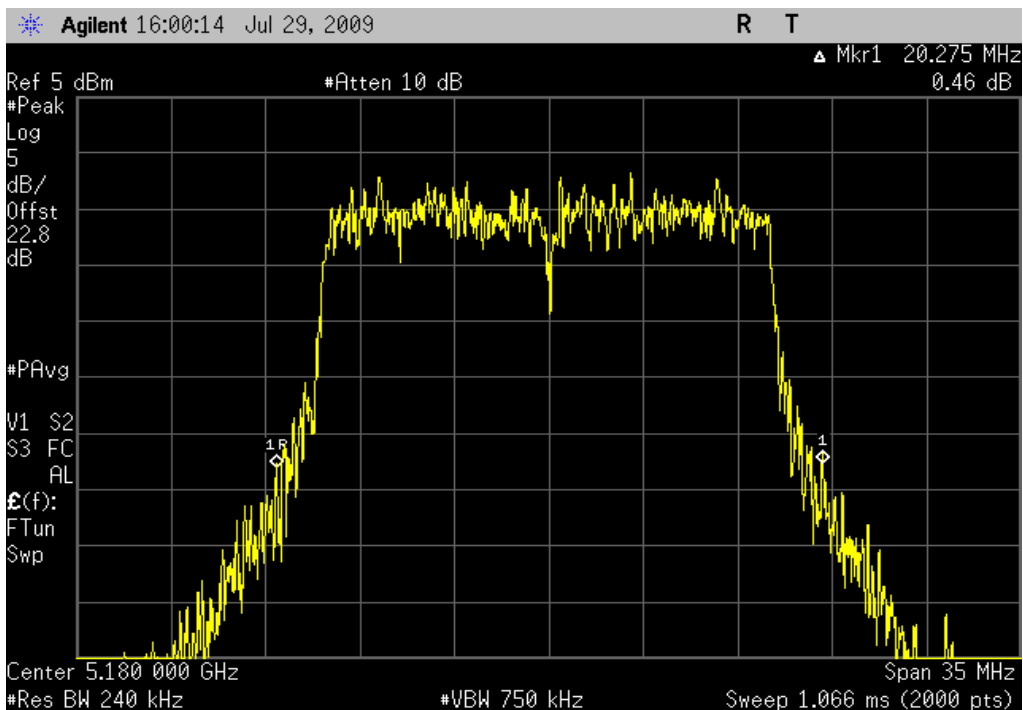
Limit: N/A



EMISSION BANDWIDTH

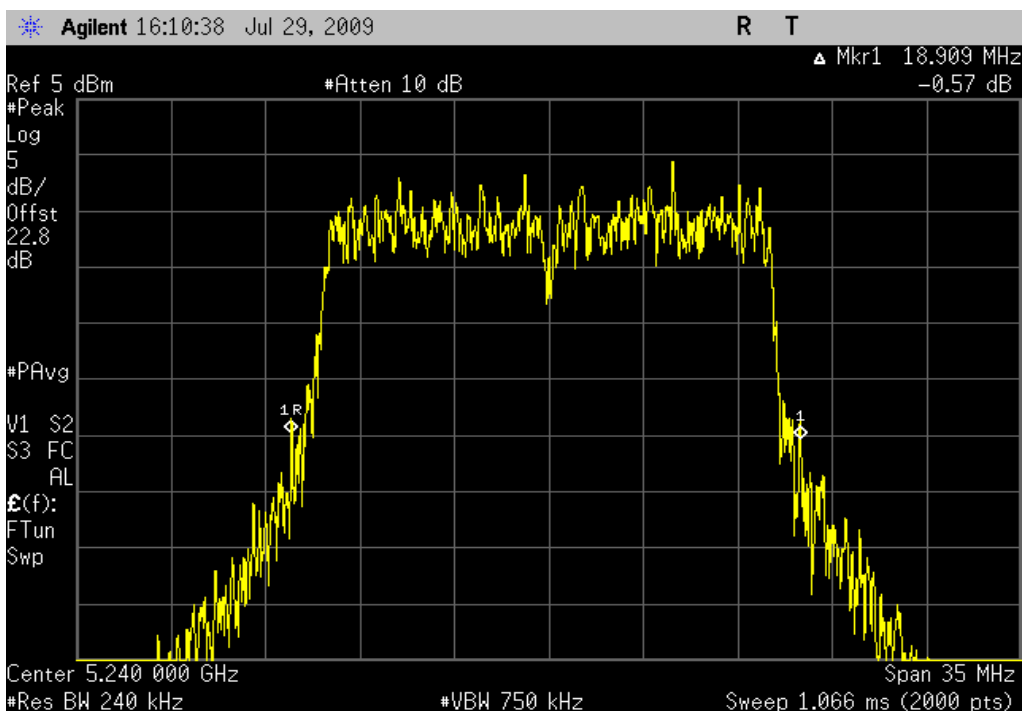
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: N/A **Value:** 20.275 MHz **Limit:** N/A



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: N/A **Value:** 18.909 MHz **Limit:** N/A





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13
Power Meter	Gigatronics	8651A	SPM	12/10/2008	13
Power Sensor	Gigatronics	80701A	SPL	12/10/2008	13
Signal Generator	Agilent	E8257D	TGX	12/10/2008	13

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Peak Transmit Power. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain. This data found elsewhere in this test report.

Method #3 found in FCC Public Notice DA02-2138 was used because the analyzer sweep time was greater than T for the lowest pulse duration of all operating modes and the Emission Bandwidth was greater than the largest RBW on the analyzer.

The spectrum analyzer settings were as follows:

- The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
- The RBW = 1 MHz, VBW \geq 1/T
- Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.
- Power was integrated across "B", by using the channel power function of the analyzer.

EMC

PEAK TRANSMIT POWER

EUT: Galileo modular radio (T1)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 07/31/09
Customer: Intermec Technologies Corporation	Temperature: 24.0°C
Attendees: None	Humidity: 46%
Project: None	Barometric Pres.: 29.98 in
Tested by: Rod Peloquin	Power: 120VAC/60Hz
	Job Site: EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

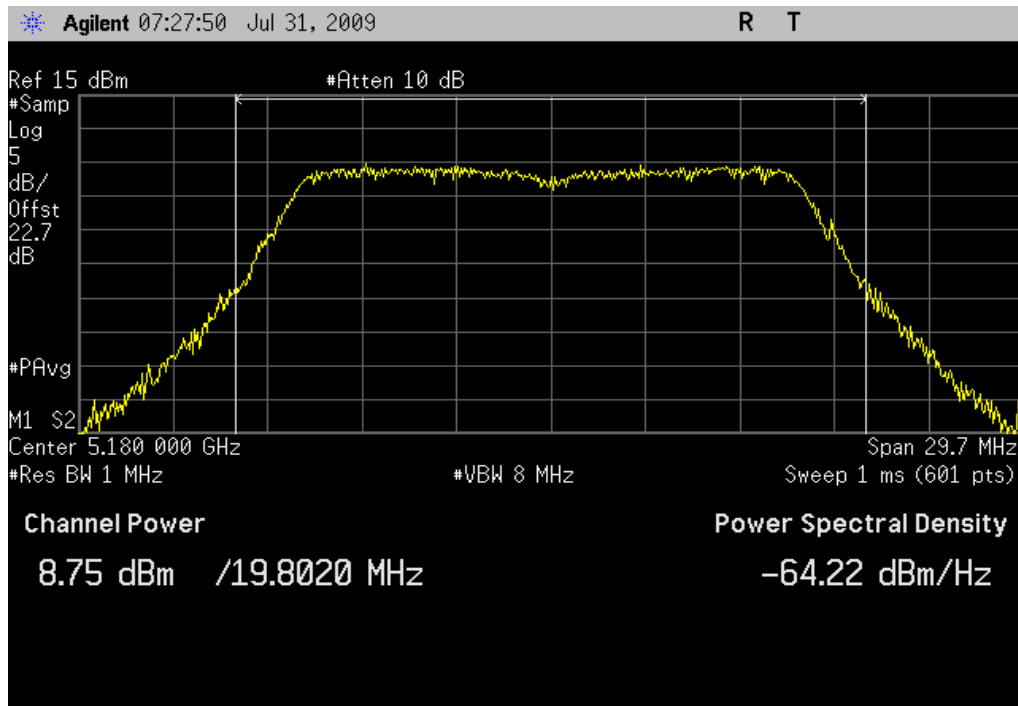
COMMENTS
EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.

DEVIATIONS FROM TEST STANDARD
No Deviations

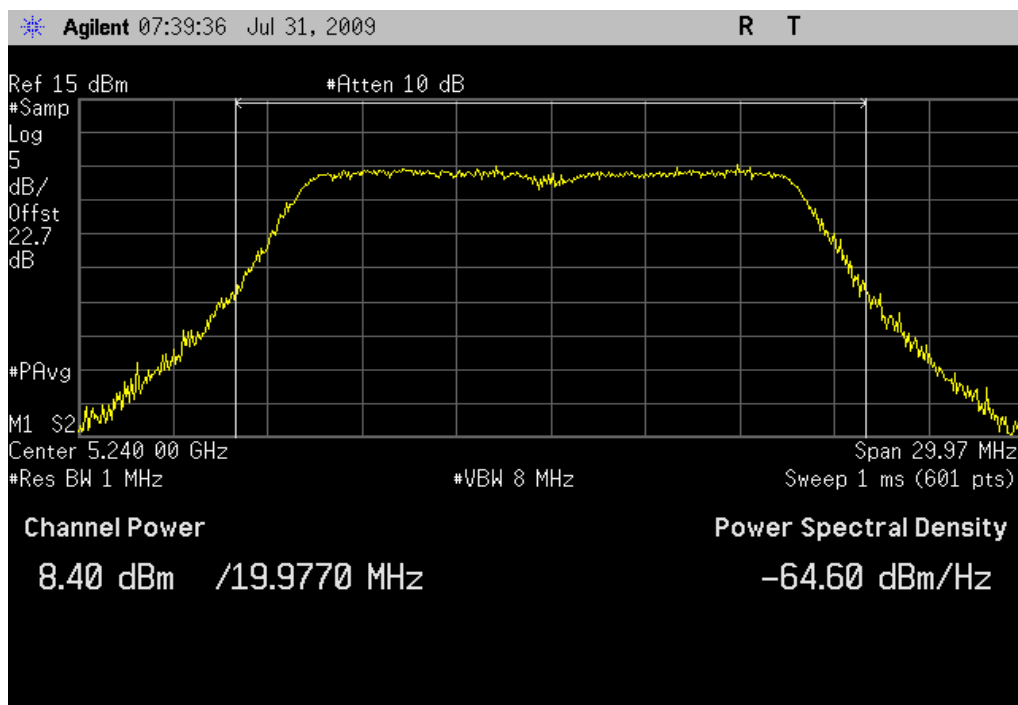
Configuration #	1	<i>Rod Peloquin</i> Signature
------------------------	---	----------------------------------

		Value	Limit	Results
802.11(a) 6 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	8.75 dBm	17 dBm	Pass
	Channel 48, High Channel	8.40 dBm	17 dBm	Pass
802.11(a) 36 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	8.45 dBm	17 dBm	Pass
	Channel 48, High Channel	8.19 dBm	17 dBm	Pass
802.11(a) 54 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	8.50 dBm	17 dBm	Pass
	Channel 48, High Channel	8.05 dBm	17 dBm	Pass

802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: Pass**Value:** 8.75 dBm**Limit:** 17 dBm

802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

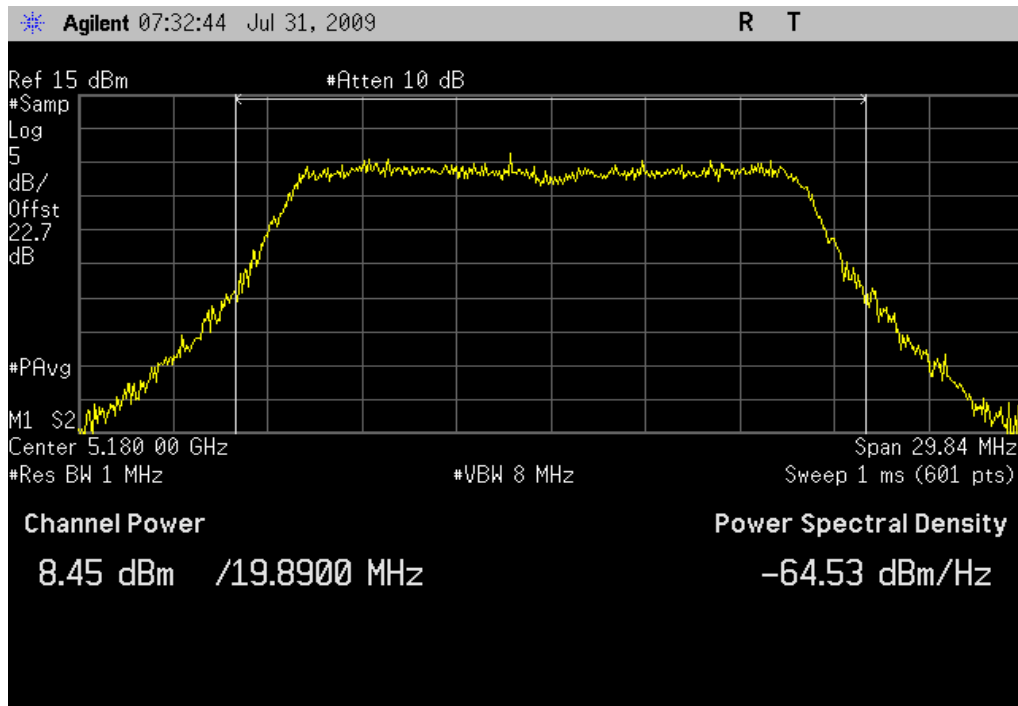
Result: Pass**Value:** 8.40 dBm**Limit:** 17 dBm

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: Pass

Value: 8.45 dBm

Limit: 17 dBm

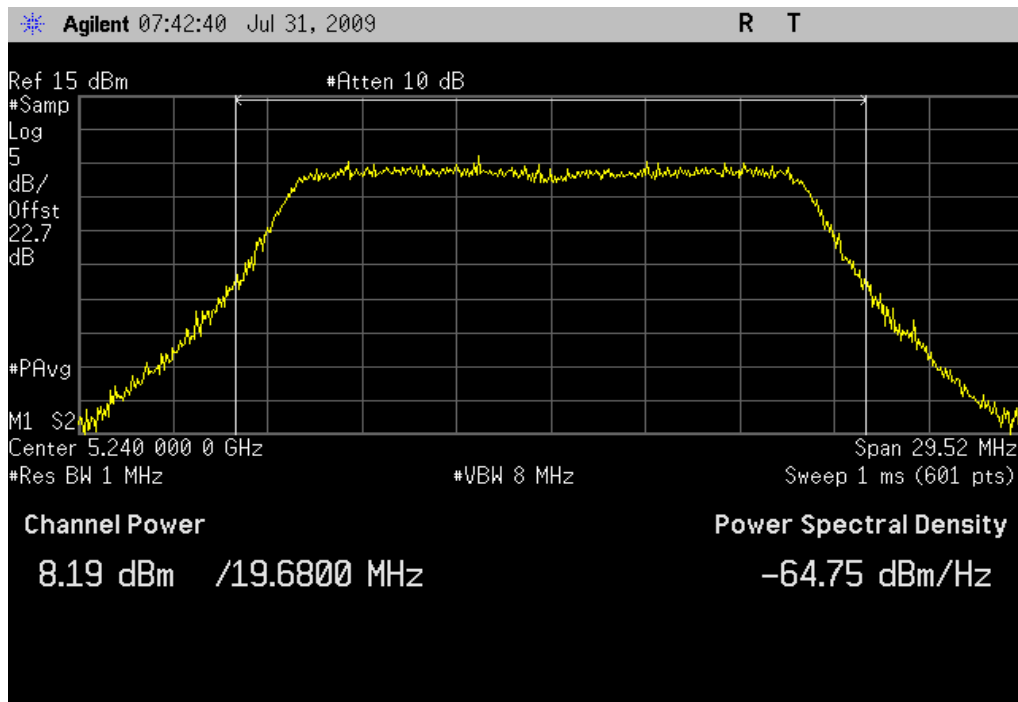


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass

Value: 8.19 dBm

Limit: 17 dBm

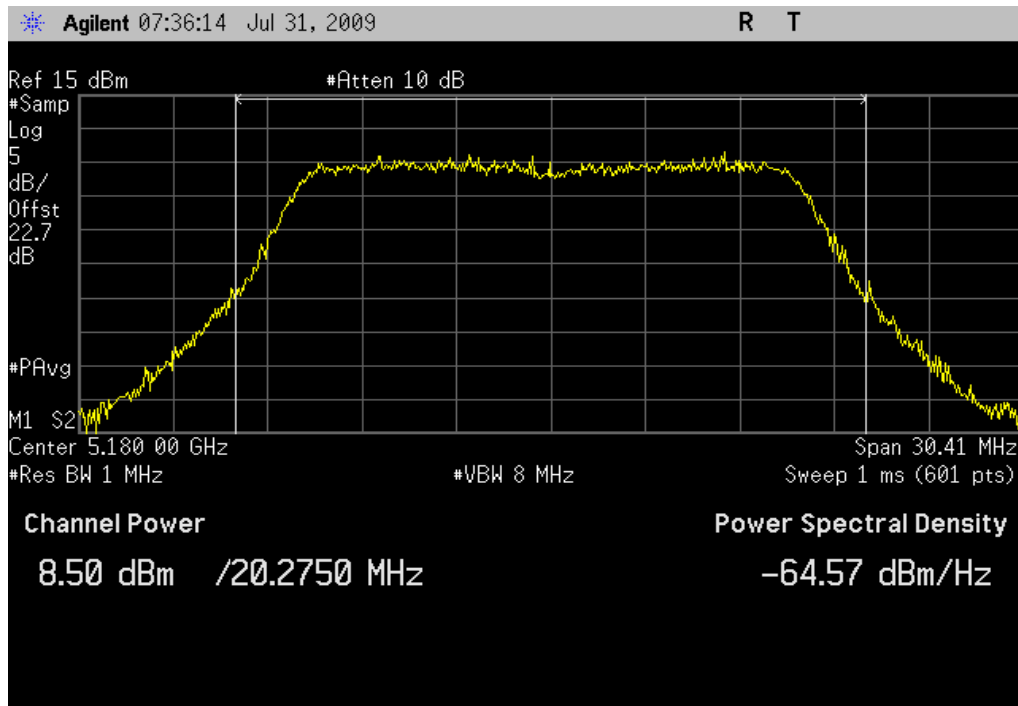


802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: Pass

Value: 8.50 dBm

Limit: 17 dBm

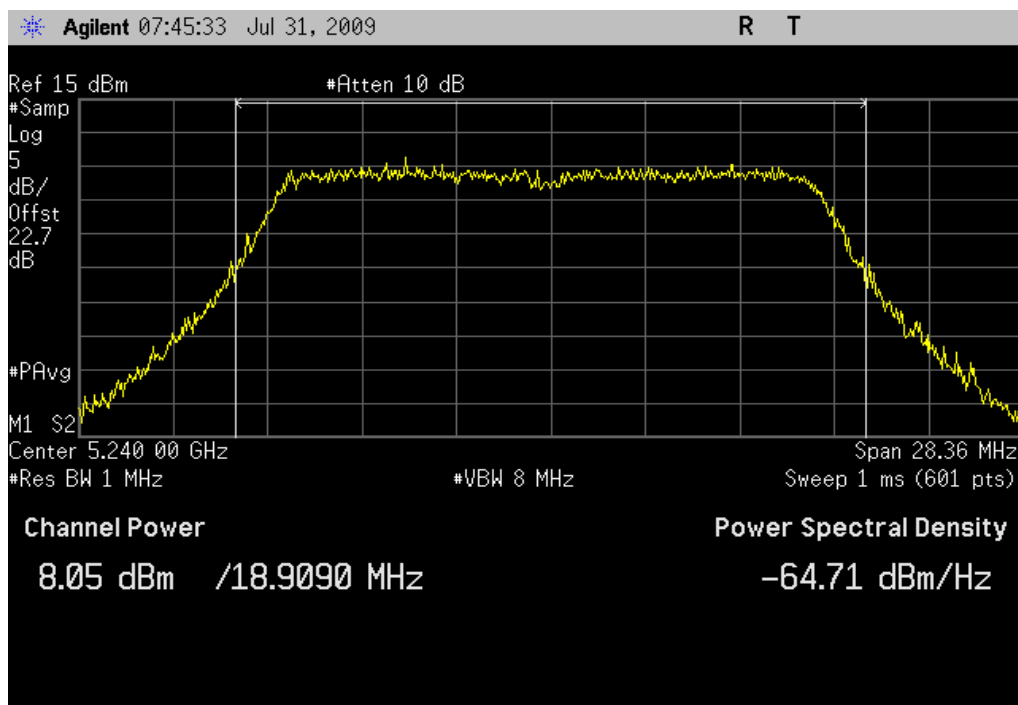


802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass

Value: 8.05 dBm

Limit: 17 dBm





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13
Power Meter	Gigatronics	8651A	SPM	12/10/2008	13
Power Sensor	Gigatronics	80701A	SPL	12/10/2008	13
Signal Generator	Agilent	E8257D	TGX	12/10/2008	13

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The lowest data rate was measured as it provided the highest output power. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak power spectral density, the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring peak power spectral density. The method of measuring the emission bandwidth and transmission pulse duration and the associated data are found elsewhere in this test report.

Method #2 found in FCC Public Notice DA02-2138 was used because the analyzer sweep time was less than or equal to T for the 6 Mbps mode, which was the only mode tested due to having the highest output power of all modes.

The spectrum analyzer settings were as follows:

- The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
- RBW = 1 MHz, VBW >= 3 MHz because the emission bandwidth (B) is greater than 1 MHz
- Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.
- Trace average 100 traces in power averaging mode (not video averaging).

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 power averaging (not video averaging).

EMC

PEAK POWER SPECTRAL DENSITY

EUT:	Galileo modular radio (T1)	Work Order:	INMC0546
Serial Number:	00-21-e8-70-09-c4	Date:	07/31/09
Customer:	Intermec Technologies Corporation	Temperature:	24.0°C
Attendees:	None	Humidity:	46%
Project:	None	Barometric Pres.:	29.76 in
Tested by:	Rod Peloquin	Power:	120VAC/60Hz
		Job Site:	EV06

TEST SPECIFICATIONS		Test Method	
FCC 15.407:2009		ANSI C63.4:2003 DA 02-2138:2002	

COMMENTS

EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.

DEVIATIONS FROM TEST STANDARD

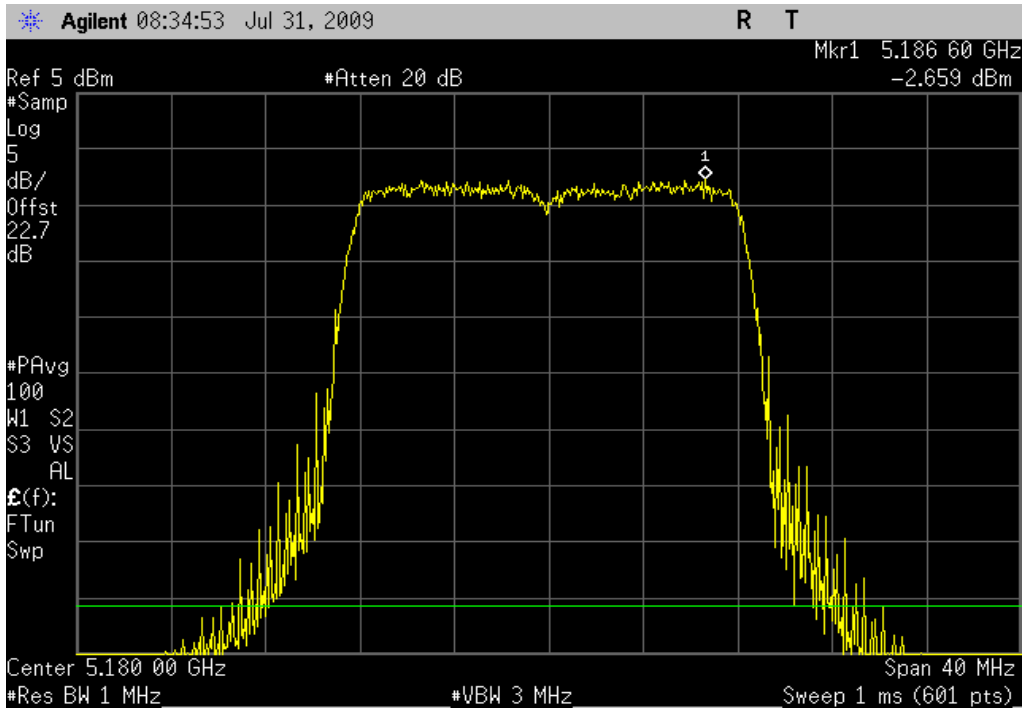
No Deviations

Configuration #	1	<i>Rod L. Peloquin</i> Signature
------------------------	---	-------------------------------------

		Value	Limit	Results
802.11(a) 6 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	-2.7 dBm	4 dBm	Pass
	Channel 48, High Channel	-2.6 dBm	4 dBm	Pass

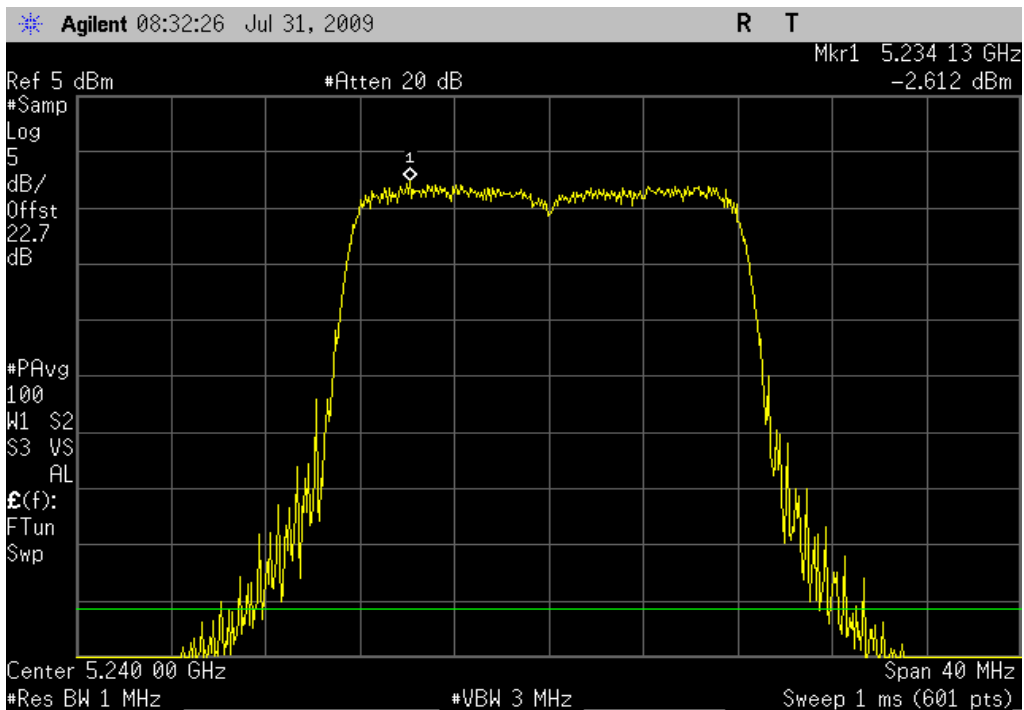
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

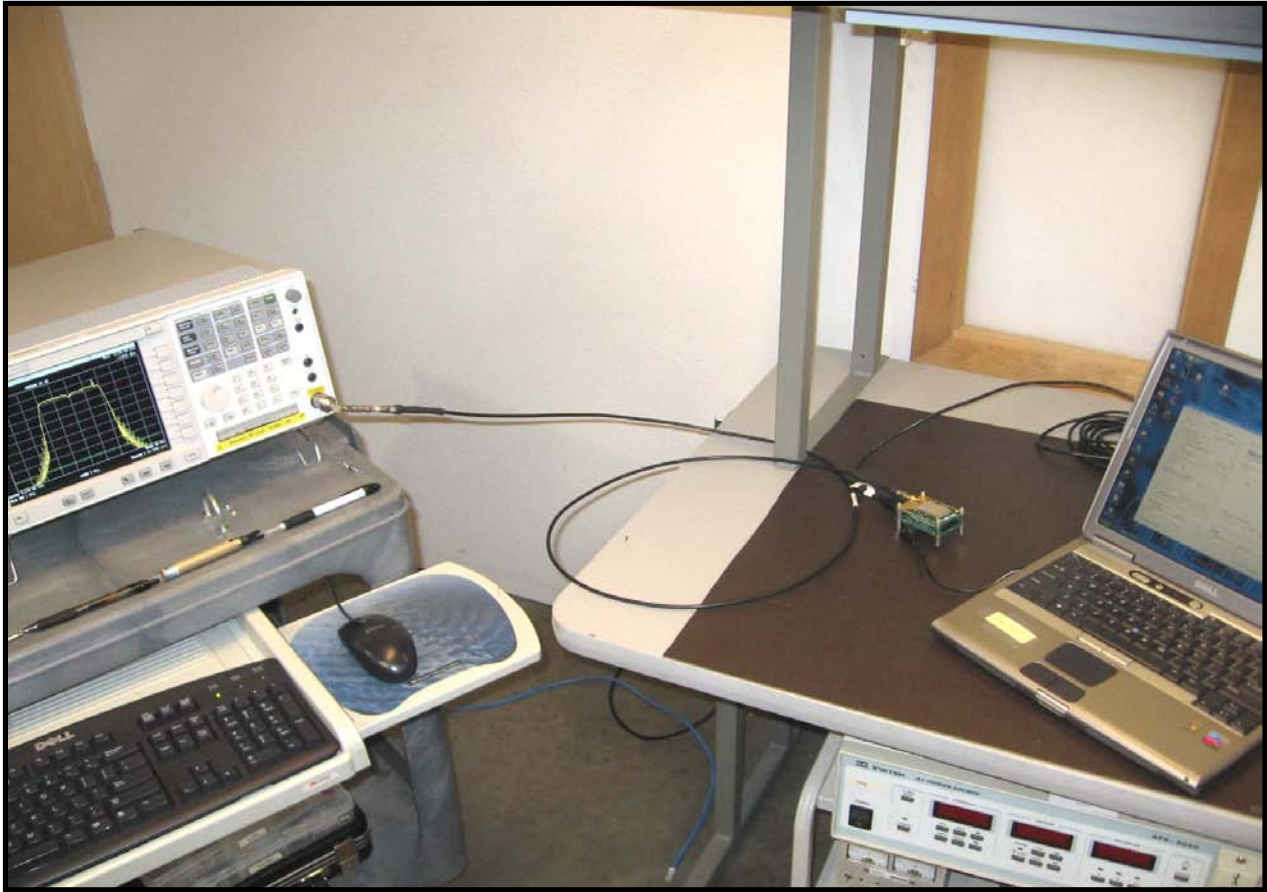
Result: Pass **Value:** -2.7 dBm **Limit:** 4 dBm



802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass **Value:** -2.6 dBm **Limit:** 4 dBm





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13
Power Meter	Gigatronics	8651A	SPM	12/10/2008	13
Power Sensor	Gigatronics	80701A	SPL	12/10/2008	13
Signal Generator	Agilent	E8257D	TGX	12/10/2008	13

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The lowest, a medium, and the highest data rates were measured. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

The spectrum analyzer settings were as follows:

- Span set to encompass the entire emission bandwidth (B), centered on the transmit channel.
- Using the marker delta function, the largest difference between the following two traces was measured:
 - 1st Trace: RBW = 1 MHz, VBW >= 3 MHz with peak detector and max-hold settings.
 - 2nd Trace: Use same settings as were used for peak conducted transmit power. The sample detector was used as well as the VBW being matched to that used on the peak conducted transmit power.

EMC

Peak Excursion of the Modulation Envelope

EUT: Galileo modular radio (T1)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 07/31/09
Customer: Intermec Technologies Corporation	Temperature: 24.0°C
Attendees: None	Humidity: 46%
Project: None	Barometric Pres.: 29.76 in
Tested by: Rod Peloquin	Power: 120VAC/60Hz
	Job Site: EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

COMMENTS

EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.

DEVIATIONS FROM TEST STANDARD

No Deviations

Configuration #	1	<i>Rod Peloquin</i> Signature
------------------------	---	----------------------------------

		Value	Limit	Results
802.11(a) 6 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	-1.8 dBm	≤ 13 dBm	Pass
	Channel 48, High Channel	-0.4 dBm	≤ 13 dBm	Pass
802.11(a) 36 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	-0.5 dBm	≤ 13 dBm	Pass
	Channel 48, High Channel	-0.9 dBm	≤ 13 dBm	Pass
802.11(a) 54 Mbps	5150 - 5250 MHz Band			
	Channel 36, Low Channel	-1.2 dBm	≤ 13 dBm	Pass
	Channel 48, High Channel	-1.1 dBm	≤ 13 dBm	Pass

Peak Excursion of the Modulation Envelope

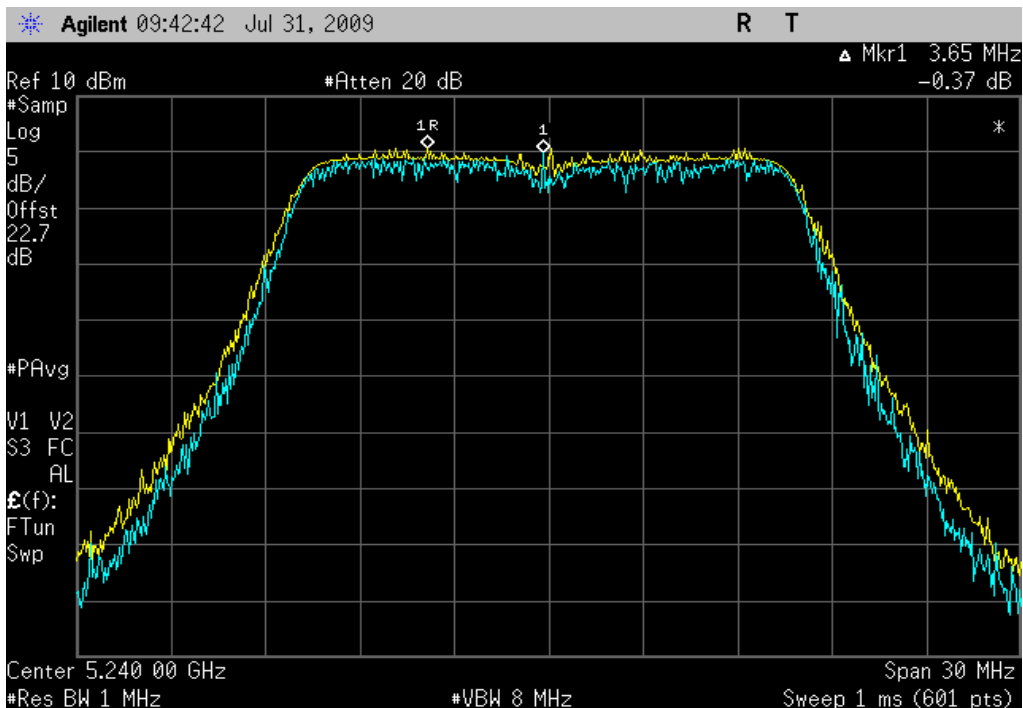
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: Pass **Value:** -1.8 dBm **Limit:** ≤ 13 dBm



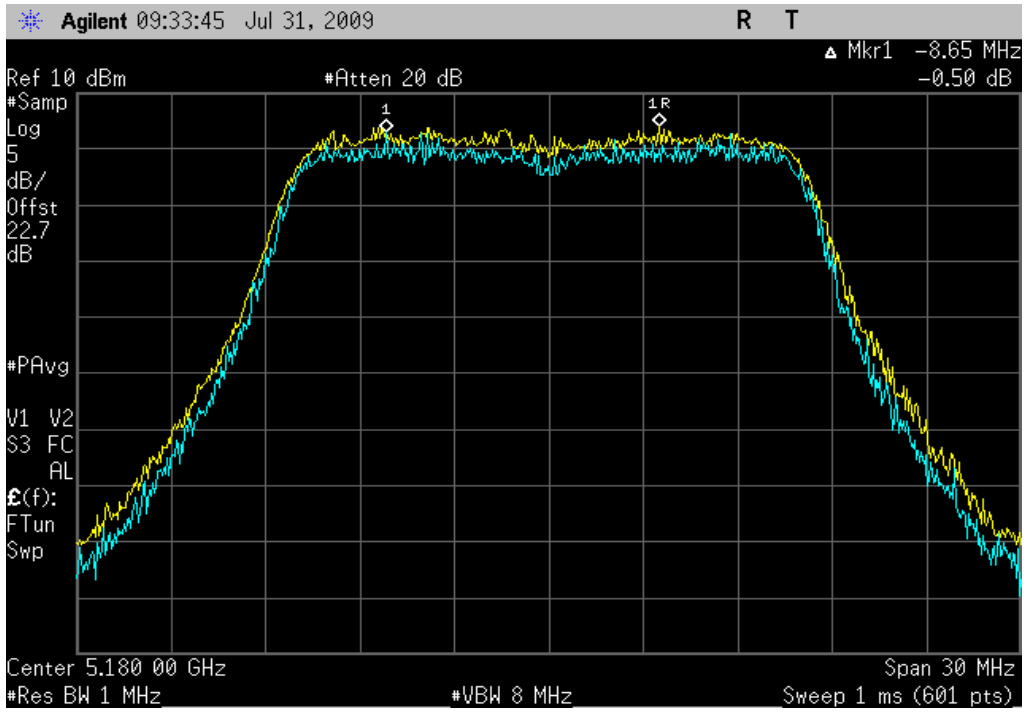
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass **Value:** -0.4 dBm **Limit:** ≤ 13 dBm



802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Result: Pass **Value:** -0.5 dBm **Limit:** ≤ 13 dBm



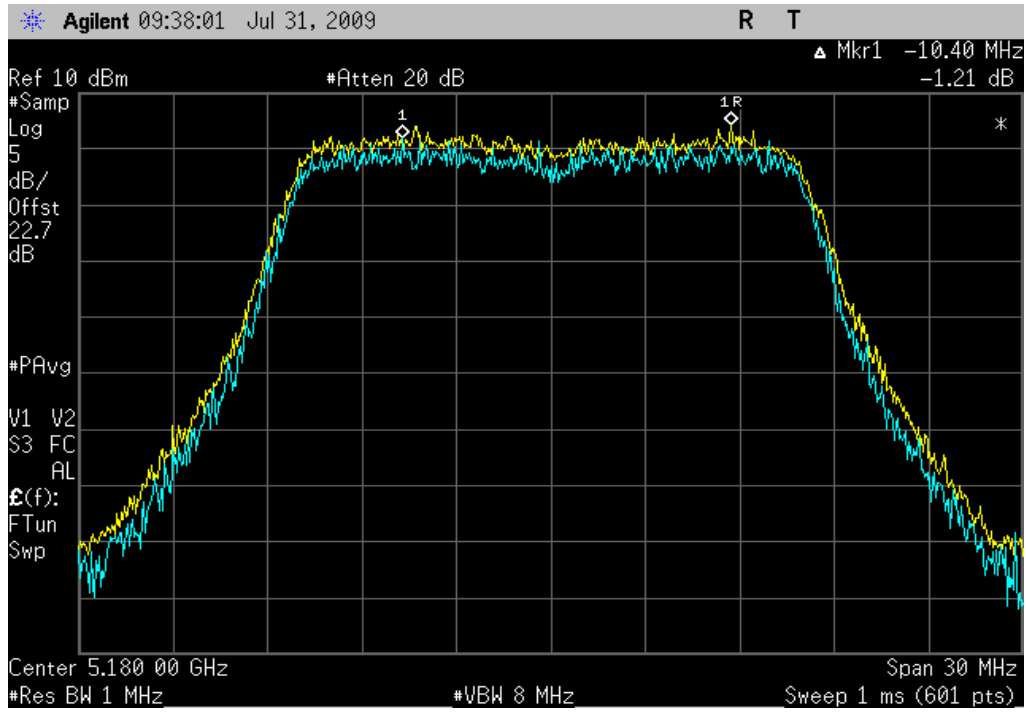
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass **Value:** -0.9 dBm **Limit:** ≤ 13 dBm



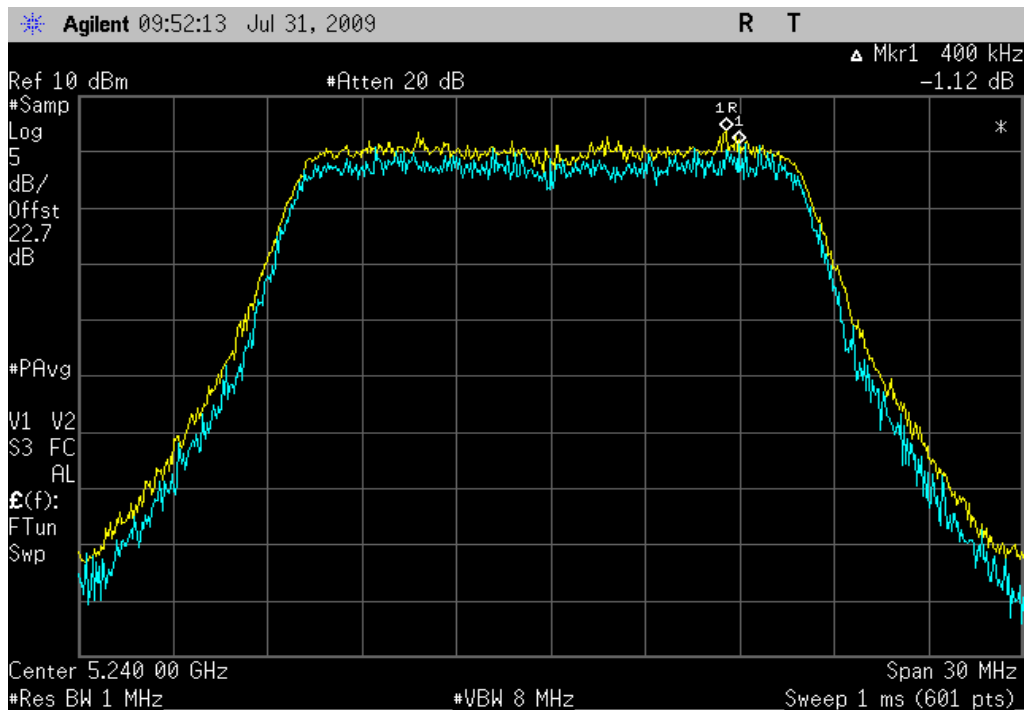
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

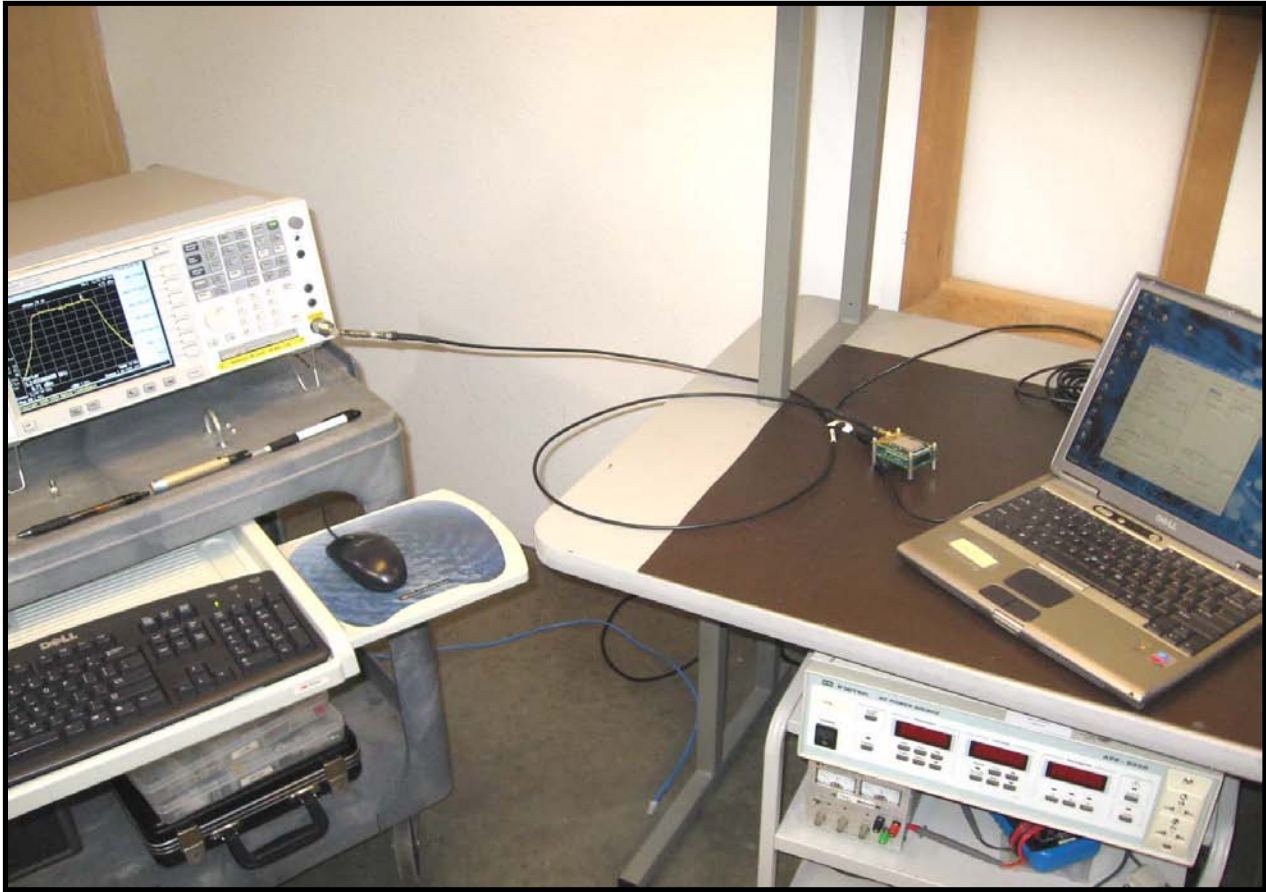
Result: Pass **Value:** -1.2 dBm **Limit:** ≤ 13 dBm



802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

Result: Pass **Value:** -1.1 dBm **Limit:** ≤ 13 dBm





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Continuous Tx 802.11a @ 6, 36, 54 Mbps in the 5.2 GHz band

POWER SETTINGS INVESTIGATED

120VAC/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency	30MHz	Stop Frequency	40GHz
-----------------	-------	----------------	-------

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
26-40GHz Cable		TTBJ141-KMKM-72	EVX	7/30/2008	13
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVN	7/30/2008	13
Antenna, Horn	ETS	3160-10	AIC	NCR	0
EV01 Cables		18-26GHz Standard Gain Horn Cable	EVD	12/2/2008	13
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	12/2/2008	13
Antenna, Horn	ETS	3160-09	AHG	NCR	0
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	7/10/2009	13
Antenna, Horn	ETS	3160-08	AHV	NCR	0
EV01 Cables		Standard Gain Horns Cables	EVF	11/13/2008	13
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	7/10/2009	13
Antenna, Horn	ETS	3160-07	AHU	NCR	0
High Pass Filter	Micro-Tronics	HPM50111	HFO	7/10/2009	13
EV01 Cables		Double Ridge Horn Cables	EVB	7/10/2009	13
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/10/2009	13
Antenna, Horn	EMCO	3115	AHC	8/12/2008	24
Spectrum Analyzer	Agilent	E4446A	AAY	12/11/2008	13
EV01 Cables		Bilog Cables	EVA	7/10/2009	13
Pre-Amplifier	Miteq	AM-1616-1000	AOL	7/10/2009	13
Antenna, Biconilog	EMCO	3141	AXE	1/15/2008	24

MEASUREMENT BANDWIDTHS

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

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

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

TEST DESCRIPTION

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 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.

Unwanted Emissions

EMC

EUT: Galileo modular radio (T1)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 08/08/09
Customer: Intermec Technologies Corporation	Temperature: 24.8 °C
Attendees: None	Humidity: 41%
Project: None	Barometric Pres.: 1022.3mb
Tested by: Dan Haas	Power: 120VAC/60Hz
	Job Site: EV01

TEST SPECIFICATIONS

FCC 15.407:2009	Test Method
	ANSI C63.4:2003 DA 02-2138:2002

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
-----------------------	-------	-------------------	---

COMMENTS

Laird MAF 94367 Dipole LP

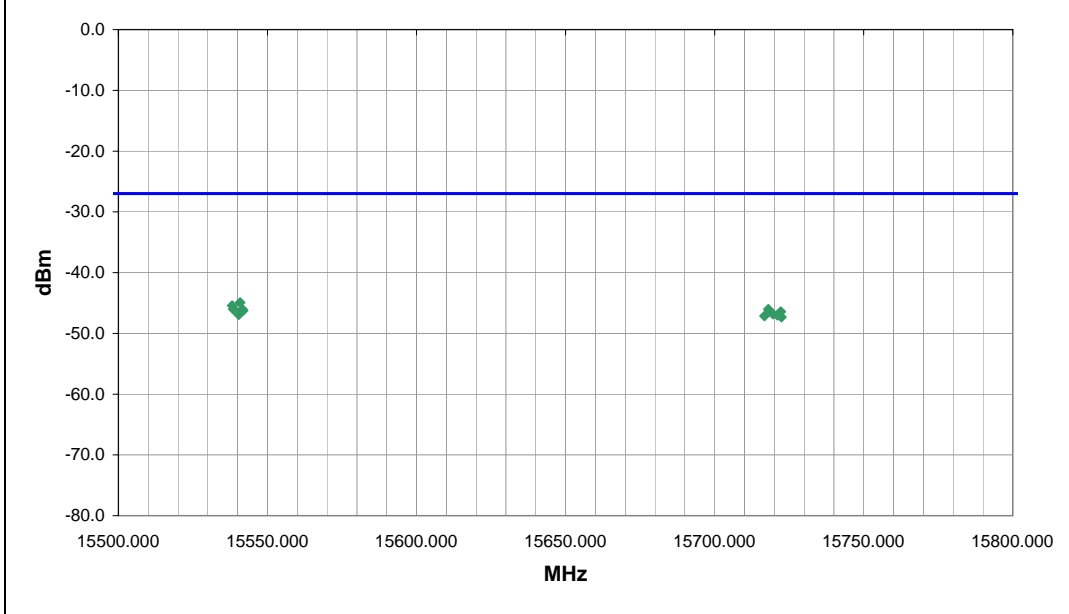
EUT OPERATING MODES

Continuous Tx 802.11(a)

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	24	Signature 
Configuration #	6	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
15540.860	135.0	1.0	H-Horn	PK	3.21E-08	-44.9	-27.0	-17.9	Channel 36, 36Mbps
15538.180	116.0	1.0	H-Horn	PK	2.86E-08	-45.4	-27.0	-18.4	Channel 36, 54Mbps
15538.520	177.0	1.0	V-Horn	PK	2.50E-08	-46.0	-27.0	-19.0	Channel 36, 6Mbps
15541.610	203.0	1.0	V-Horn	PK	2.50E-08	-46.0	-27.0	-19.0	Channel 36, 36Mbps
15717.990	57.0	1.0	V-Horn	PK	2.50E-08	-46.0	-27.0	-19.0	Channel 48, 54Mbps
15541.870	98.0	1.0	H-Horn	PK	2.38E-08	-46.2	-27.0	-19.2	Channel 36, 6Mbps
15722.180	326.0	1.0	V-Horn	PK	2.28E-08	-46.4	-27.0	-19.4	Channel 48, 6Mbps
15719.560	343.0	1.0	V-Horn	PK	2.08E-08	-46.8	-27.0	-19.8	Channel 48, 36Mbps

EUT: Galileo modular radio (TI)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 08/10/09
Customer: Intermec Technologies Corporation	Temperature: 24 °C
Attendees: None	Humidity: 43%
Project: None	Barometric Pres.: 1019.3mb
Tested by: Jennifer Herrett	Power: 120VAC/60Hz
	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

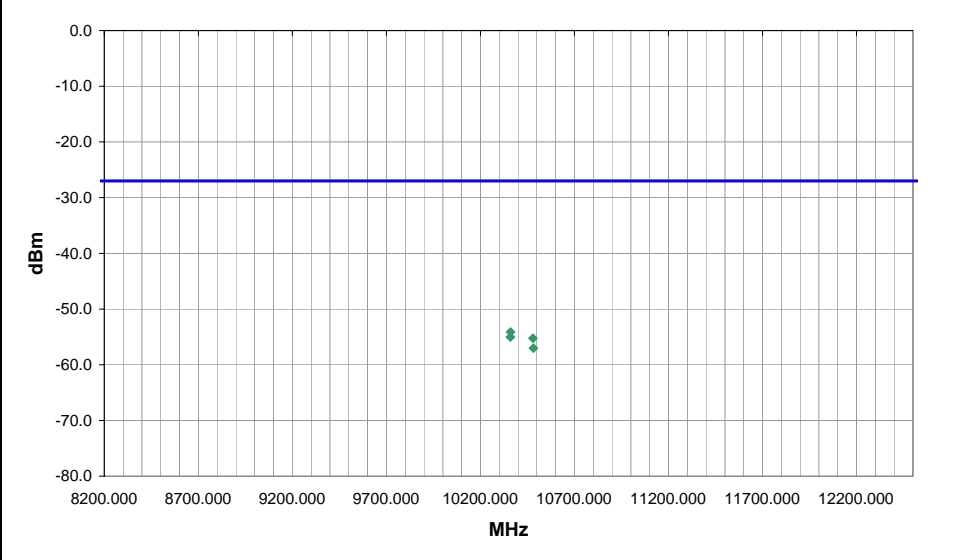
TEST PARAMETERS	
Antenna Height(s) (m) 1 - 4	Test Distance (m) 3

COMMENTS
Laird MAF 94367 Dipole LP

EUT OPERATING MODES
Continuous Tx 802.11(a)

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	26	 Signature
Configuration #	6	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10359.900	166.0	1.0	H-Horn	PK	3.86E-09	-54.1	-27.0	-27.1	EUT on side. B1 Channel 36, 6Mbps.
10359.730	19.0	1.0	V-Horn	PK	3.14E-09	-55.0	-27.0	-28.0	EUT vertical. B1 Channel 36, 6Mbps.
10479.710	86.0	1.0	H-Horn	PK	3.00E-09	-55.2	-27.0	-28.2	EUT on side. B1 Channel 48, 6Mbps.
10481.890	17.0	1.0	V-Horn	PK	1.98E-09	-57.0	-27.0	-30.0	EUT vertical. B1 Channel 48, 6Mbps.

EUT: Galileo modular radio (TI)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 08/10/09
Customer: Intermec Technologies Corporation	Temperature: 24 °C
Attendees: None	Humidity: 43%
Project: None	Barometric Pres.: 1019.3mb
Tested by: Jennifer Herrett	Power: 120VAC/60Hz
	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

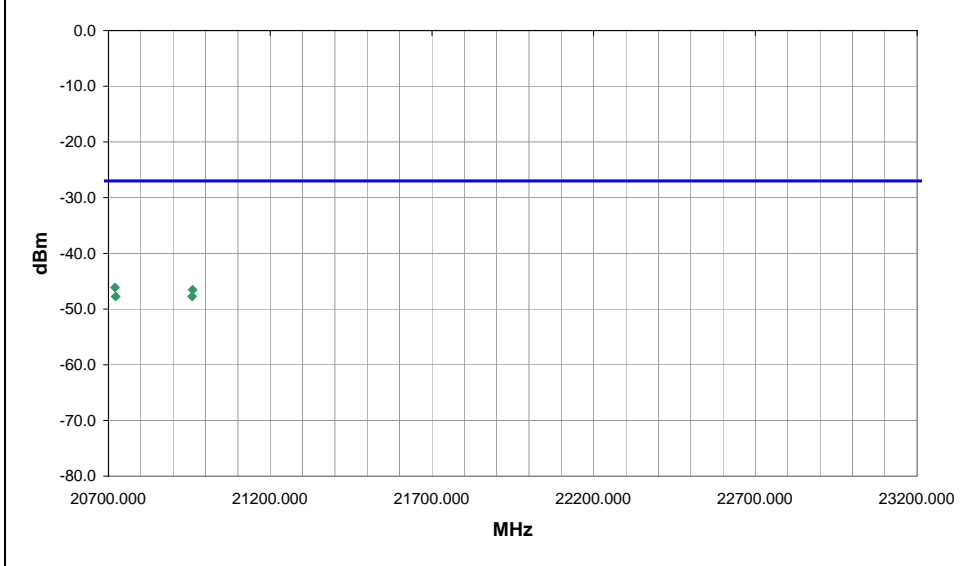
TEST PARAMETERS	
Antenna Height(s) (m) 1 - 4	Test Distance (m) 3

COMMENTS
Laird MAF 94367 Dipole LP

EUT OPERATING MODES
Continuous Tx 802.11(a)

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	27	 Signature
Configuration #	6	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
20720.170	336.0	1.0	V-High Horr	PK	2.44E-08	-46.1	-27.0	-19.1	EUT vertical. B1 Channel 36, 6Mbps.
20960.430	-1.0	1.0	H-High Horr	PK	2.22E-08	-46.5	-27.0	-19.5	EUT on side. B1 Channel 48, 6Mbps.
20958.540	-1.0	1.0	V-High Horr	PK	1.69E-08	-47.7	-27.0	-20.7	EUT vertical. B1 Channel 48, 6Mbps.
20722.450	-1.0	1.0	H-High Horr	PK	1.69E-08	-47.7	-27.0	-20.7	EUT on side. B1 Channel 36, 6Mbps.

EUT: Galileo modular radio (TI)		Work Order: INMC0546
Serial Number: 00-21-e8-70-09-cf		Date: 08/10/09
Customer: Intermec Technologies Corporation		Temperature: 24.7 °C
Attendees: None		Humidity: 46%
Project: None		Barometric Pres.: 1018.3mb
Tested by: Dan Haas	Power: 120VAC/60Hz	Job Site: EV01

TEST SPECIFICATIONS	Test Method
FCC 15.407:2009	ANSI C63.4:2003 DA 02-2138:2002

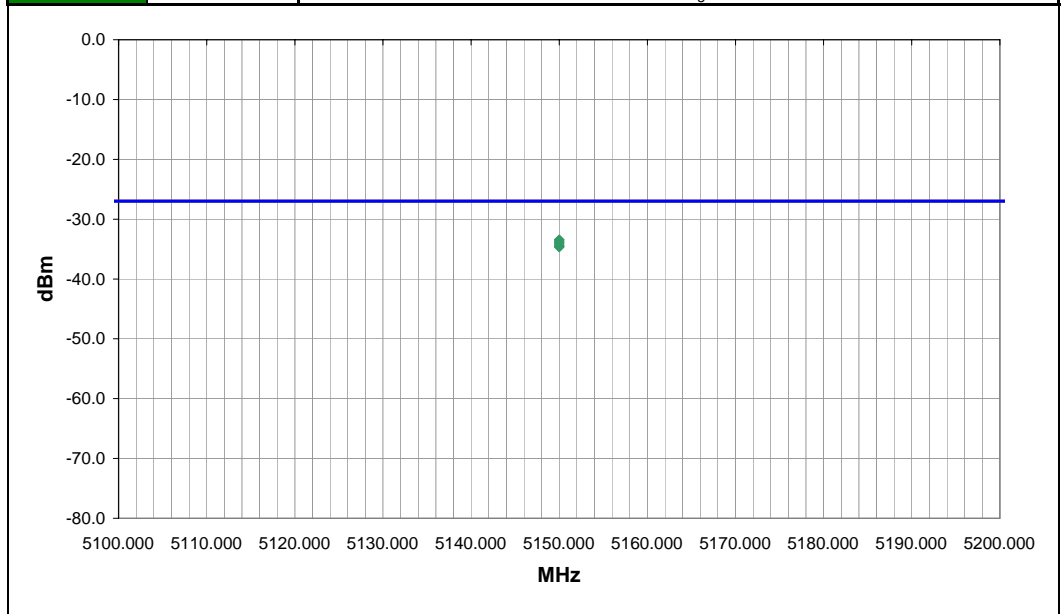
TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	1

COMMENTS
Laird MAF 94367 Dipole LP

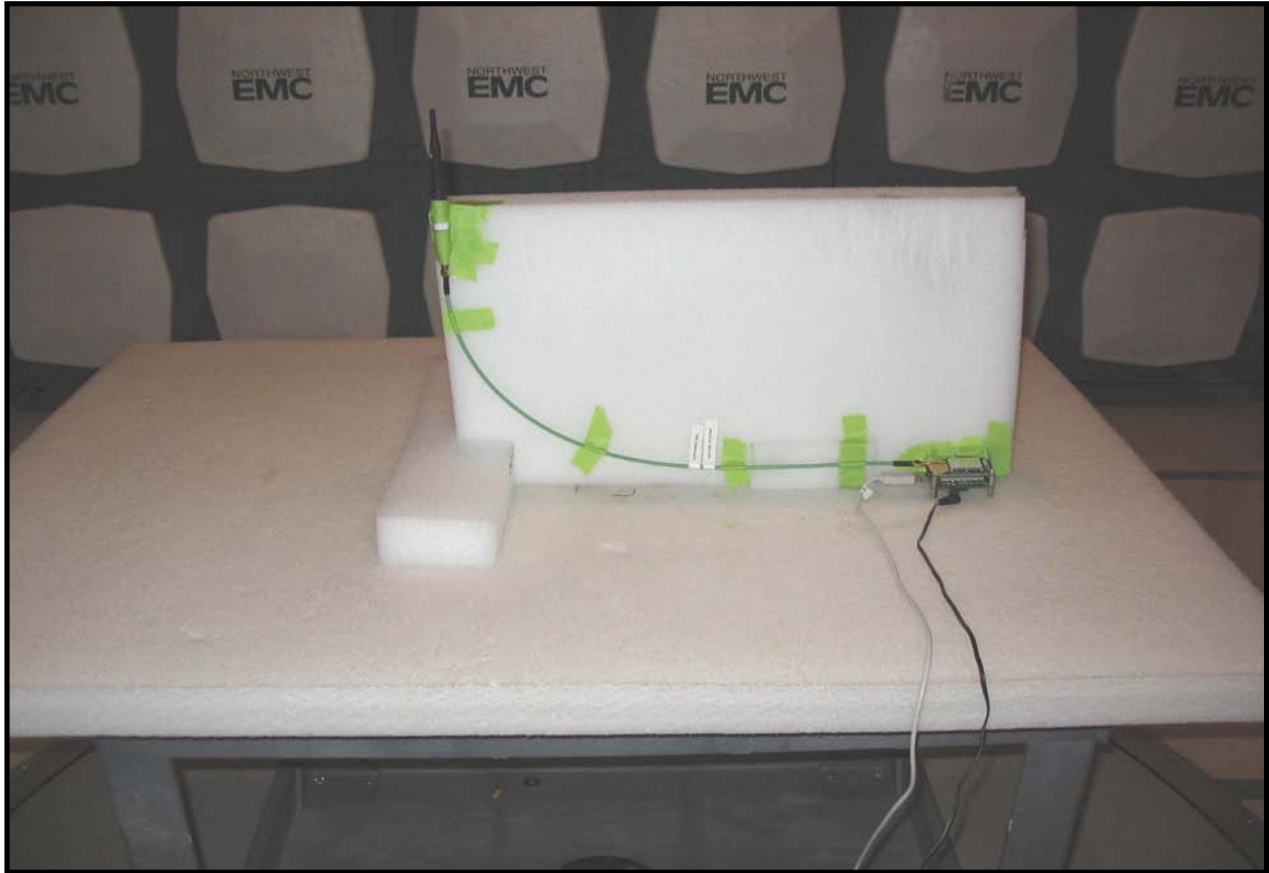
EUT OPERATING MODES
Continuous Tx 802.11(a), channel 36

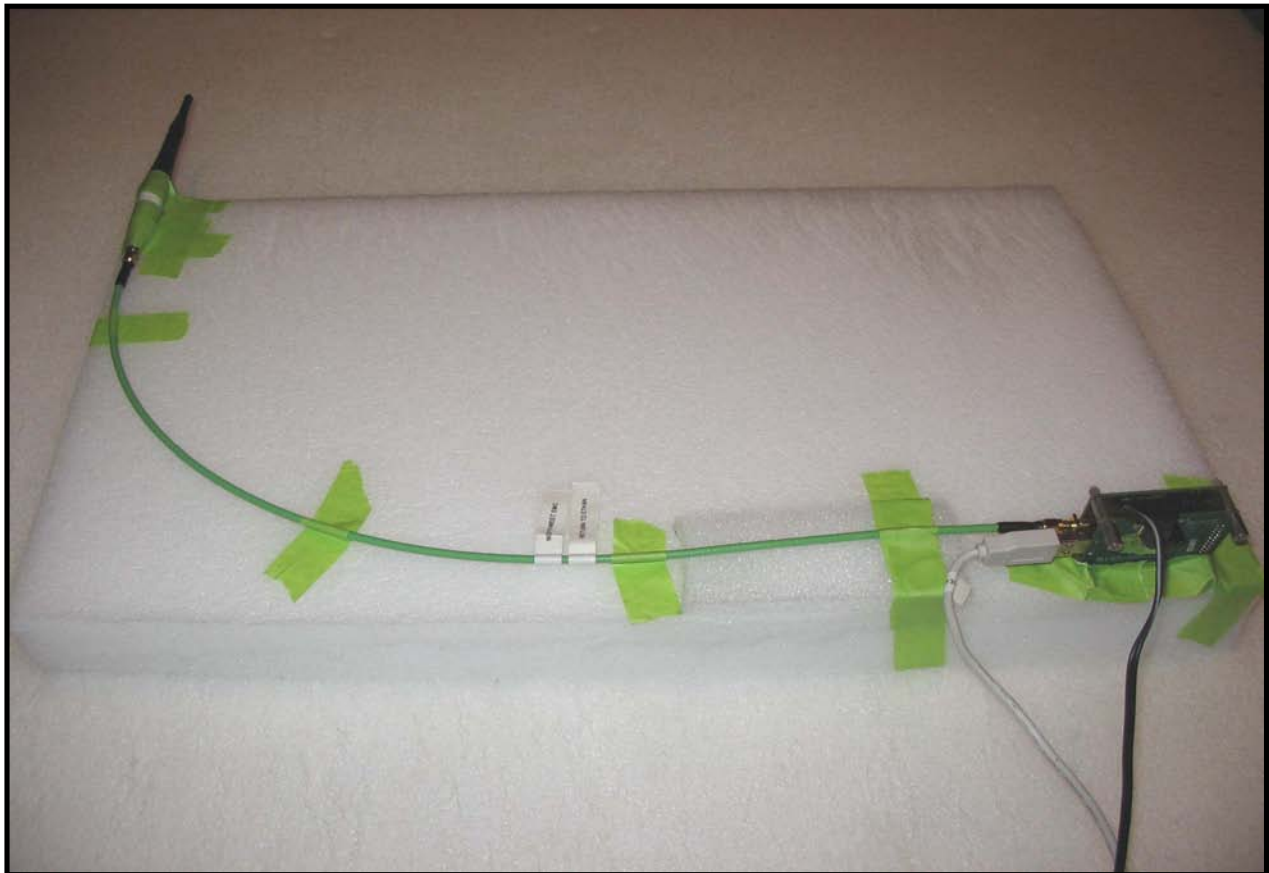
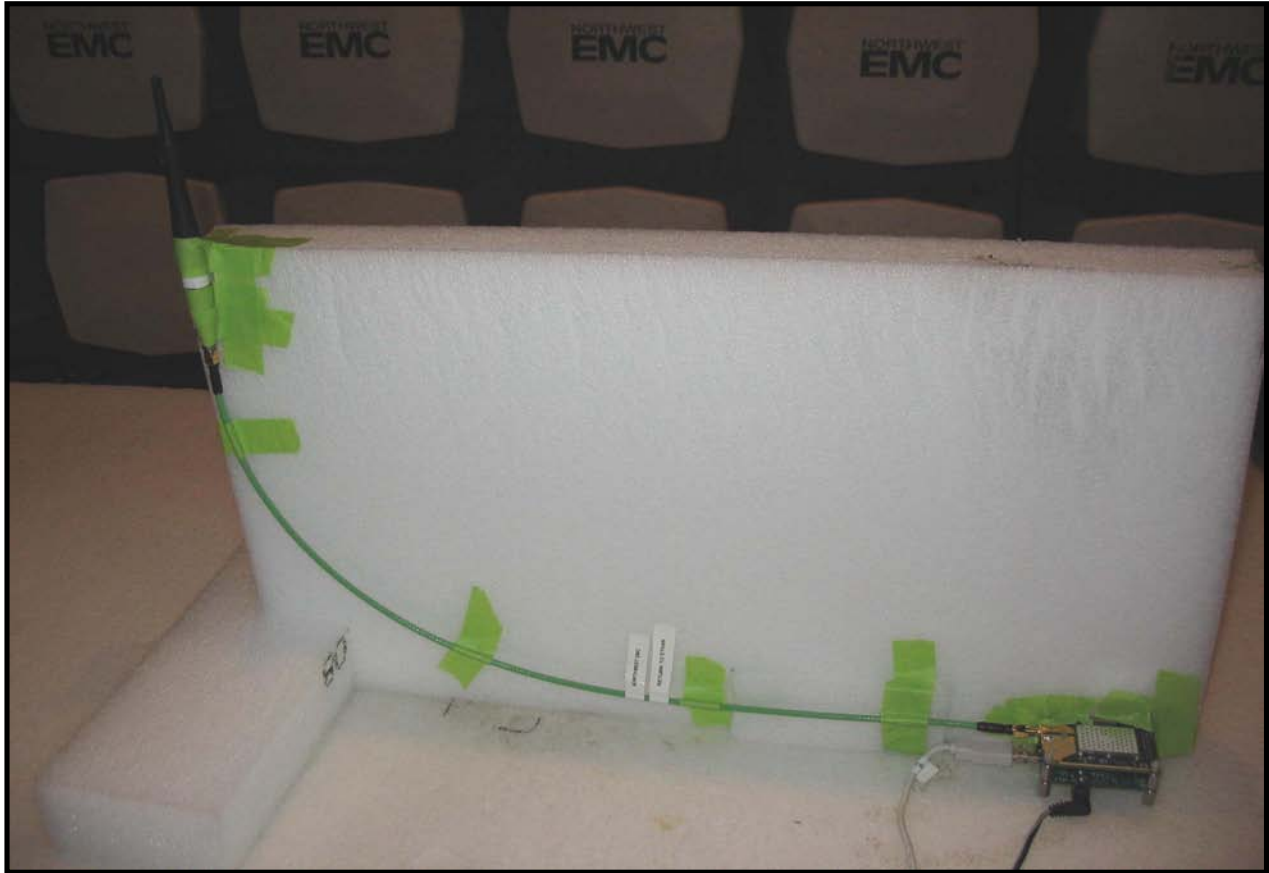
DEVIATIONS FROM TEST STANDARD
No deviations.

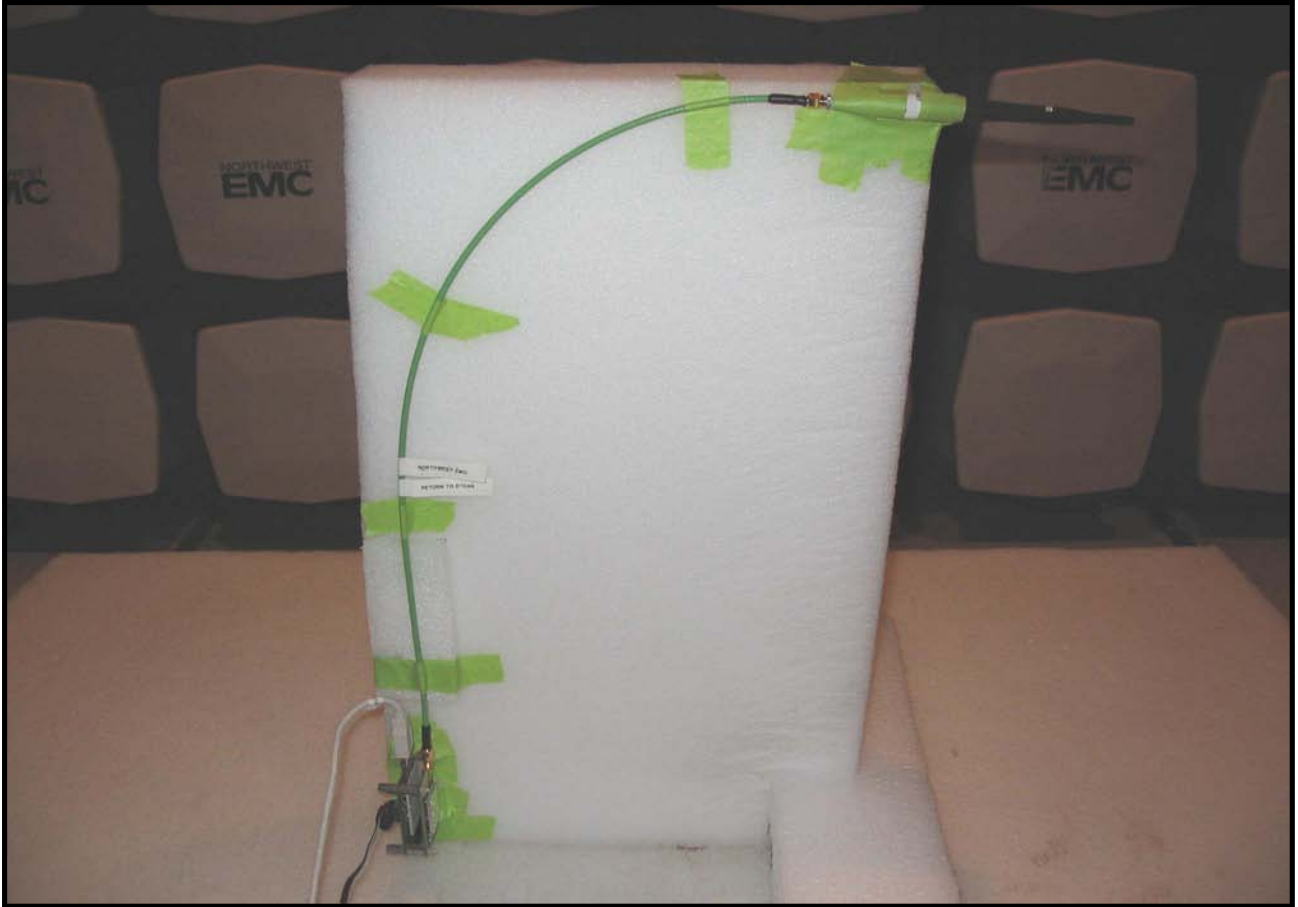
Run #	28	 Signature
Configuration #	6	
Results	Pass	



Freq (MHz)	Azimuth (degrees)	Height (meters)	Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
5150.000	260.0	1.0	V-Horn	PK	4.50E-07	-33.5	-27.0	-6.5	EUT vertical, 6Mbps.
5150.000	244.0	1.1	V-Horn	PK	4.50E-07	-33.5	-27.0	-6.5	EUT horizontal, 36Mbps.
5150.000	2.0	1.3	H-Horn	PK	4.29E-07	-33.7	-27.0	-6.7	EUT vertical, 6Mbps.
5150.000	228.0	1.1	V-Horn	PK	4.10E-07	-33.9	-27.0	-6.9	EUT horizontal, 54Mbps.
5150.000	346.0	1.2	V-Horn	PK	4.01E-07	-34.0	-27.0	-7.0	EUT on side, 6Mbps.
5150.000	94.0	1.1	H-Horn	PK	3.83E-07	-34.2	-27.0	-7.2	EUT horizontal, 54Mbps.
5150.000	88.0	1.1	H-Horn	PK	3.57E-07	-34.5	-27.0	-7.5	EUT horizontal, 6Mbps.
5150.000	257.0	1.2	H-Horn	PK	3.57E-07	-34.5	-27.0	-7.5	EUT on side, 6Mbps.
5150.000	85.0	1.1	H-Horn	PK	3.49E-07	-34.6	-27.0	-7.6	EUT horizontal, 36Mbps.
5150.000	295.0	1.1	V-Horn	PK	3.41E-07	-34.7	-27.0	-7.7	EUT horizontal, 6Mbps.







Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13
Multimeter	Tektronix	DMM912	MMH	12/10/2008	13
DC Power Supply	Topward	TPS-2000	TPD	NCR	0
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	7/23/2008	24
Chamber Temp. & Humidity Controller	ESZ / Eurotherm	Dimension II	TBC	7/23/2008	24

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

Variation of Supply Voltage

The primary supply voltage was varied over the range specified by the client. Per the client, the chip only works over this voltage range; it will shut off if the voltage is outside the specified range.


Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT. Measurements were made at the mid channel of each band to determine frequency stability. If the frequency variation is less than 100 ppm, the EUT will meet the requirement of 15.407(g), that the emissions are maintained within the band of operation.

EMC

FREQUENCY STABILITY

EUT:	Galileo modular radio (T1)	Work Order:	INMC0546
Serial Number:	00-21-e8-70-09-c4	Date:	07/31/09
Customer:	Intermec Technologies Corporation	Temperature:	24.0°C
Attendees:	None	Humidity:	46%
Project:	None	Barometric Pres.:	29.76 in
Tested by:	Rod Peloquin	Power:	3.3 VDC nominal
		Job Site:	EV06 & EV09
TEST SPECIFICATIONS		Test Method	
FCC 15.407:2009		ANSI C63.4:2003 DA 02-2138:2002	
COMMENTS			
EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.			
DEVIATIONS FROM TEST STANDARD			
No deviations			
Configuration #	1	Signature 	
		Value	Limit
			Results

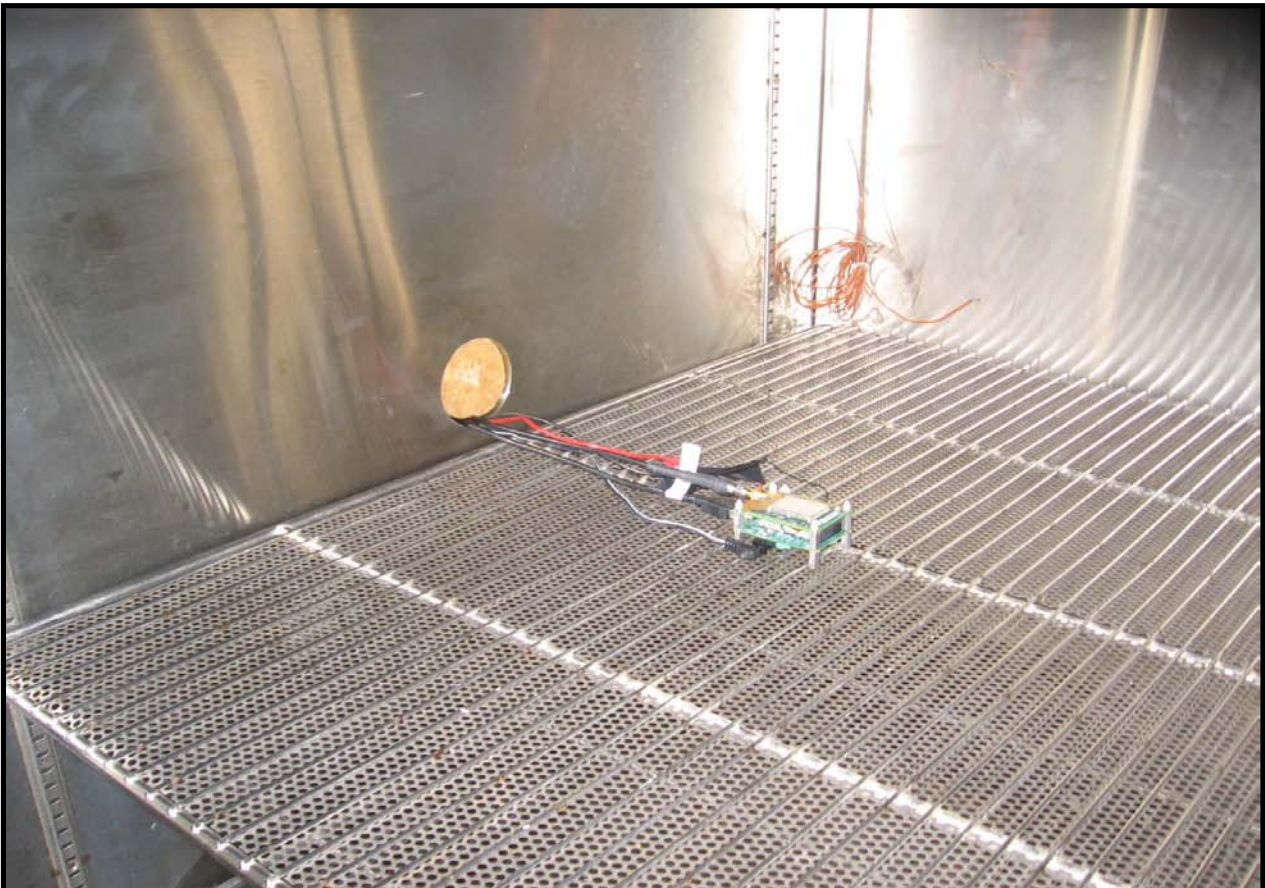
FREQUENCY STABILITY

Frequency Stability with Variation of DC Voltage (Ambient Temperature = 20° C)

Voltage (VDC)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
3.8 (115%)	5200.000000	5199.953321	8.98	n/a
3.3 (100%)	5200.000000	5199.953541	8.93	n/a
2.8 (85%)	5200.000000	5199.953771	8.89	n/a

Frequency Stability with Variation of Ambient Temperature (Primary Supply = 3.7 VDC)

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
50	5200.000000	5199.971204	5.54	n/a
40	5200.000000	5199.959260	7.83	n/a
30	5200.000000	5199.954809	8.69	n/a
20	5200.000000	5199.953541	8.93	n/a
10	5200.000000	5199.956688	8.33	n/a
0	5200.000000	5199.959841	7.72	n/a
-10	5200.000000	5199.959863	7.72	n/a
-20	5200.000000	5199.953071	9.02	n/a
-30	5200.000000	5199.933387	12.81	n/a



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting 802.11(a), B1 Channel 48, 6Mbps.

Transmitting 802.11(a), B1 Channel 36, 6Mbps.

POWER SETTINGS INVESTIGATED

5VDC (120V/60Hz)

CONFIGURATIONS INVESTIGATED

INMC0546 - 8

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Receiver	Rohde & Schwarz	ESCI	ARH	8/28/2008	24 mo
EV07 Cables		Conducted Cables	EVG	6/1/2009	13 mo
High Pass Filter	TTE	H97-100K-50-720B	HFX	5/27/2009	13 mo
Attenuator	Coaxicom	66702 2910-20	ATO	7/21/2009	13 mo
LISN	Solar	9252-50-R-24-BNC	LIR	2/4/2009	13 mo

MEASUREMENT BANDWIDTHS

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

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

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of 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 C63.4-2003.

EMC

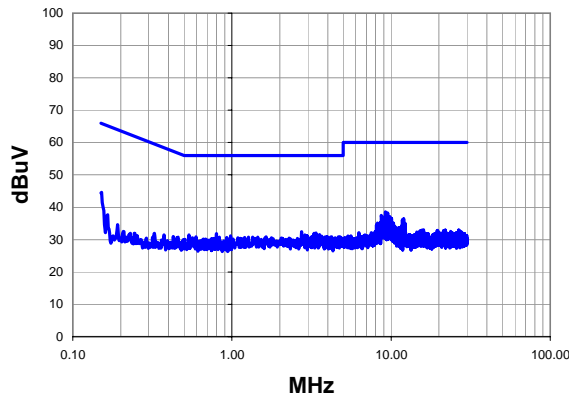
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	INMC0546	Date:	08/11/09	<i>Jennifer Herrett</i>
Project:	None	Temperature:	25°C	
Job Site:	EV07	Humidity:	49	
Serial Number:	00-21-e8-70-09-c4	Barometric Pres.:	1017.5mb	
EUT:	Galileo modular radio (TI)			
Configuration:	8 - AC Powerline Conducted Emissions with Laird MAF94367 Whip Antenna			
Customer:	Intermec Technologies Corporation			
Attendees:	None			
EUT Power:	5VDC (120V/60Hz)			
Operating Mode:	Transmitting 802.11(a), B1 Channel 36, 6Mbps.			
Deviations:	No deviations.			
Comments:	Laird MAF94367 Whip Antenna.			

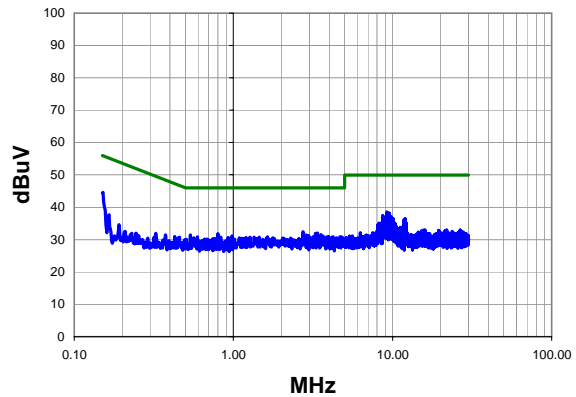
Test Specifications	Class B	Test Method
FCC 15.207:2009		ANSI C63.4:2003

Run #	13	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	---------	--------------------------	----	----------------	------

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.152	23.0	21.6	44.6	65.9	-21.3
9.230	18.1	20.5	38.6	60.0	-21.4
9.530	17.7	20.5	38.2	60.0	-21.8
9.470	17.0	20.5	37.5	60.0	-22.5
8.690	17.0	20.5	37.5	60.0	-22.5
9.590	16.6	20.5	37.1	60.0	-22.9
9.830	16.5	20.5	37.0	60.0	-23.0
9.410	16.5	20.5	37.0	60.0	-23.0
9.180	16.5	20.5	37.0	60.0	-23.0
9.060	16.5	20.5	37.0	60.0	-23.0
10.050	16.0	20.5	36.5	60.0	-23.5
9.770	16.0	20.5	36.5	60.0	-23.5
8.930	15.9	20.5	36.4	60.0	-23.6
2.736	12.0	20.4	32.4	56.0	-23.6
12.000	15.8	20.6	36.4	60.0	-23.6
11.900	15.6	20.6	36.2	60.0	-23.8
11.800	15.5	20.6	36.1	60.0	-23.9
3.376	11.7	20.3	32.0	56.0	-24.0
8.810	15.5	20.5	36.0	60.0	-24.0
3.280	11.6	20.4	32.0	56.0	-24.0

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.152	23.0	21.6	44.6	55.9	-11.3
9.230	18.1	20.5	38.6	50.0	-11.4
9.530	17.7	20.5	38.2	50.0	-11.8
9.470	17.0	20.5	37.5	50.0	-12.5
8.690	17.0	20.5	37.5	50.0	-12.5
9.590	16.6	20.5	37.1	50.0	-12.9
9.830	16.5	20.5	37.0	50.0	-13.0
9.410	16.5	20.5	37.0	50.0	-13.0
9.180	16.5	20.5	37.0	50.0	-13.0
9.060	16.5	20.5	37.0	50.0	-13.0
10.050	16.0	20.5	36.5	50.0	-13.5
9.770	16.0	20.5	36.5	50.0	-13.5
8.930	15.9	20.5	36.4	50.0	-13.6
2.736	12.0	20.4	32.4	46.0	-13.6
12.000	15.8	20.6	36.4	50.0	-13.6
11.900	15.6	20.6	36.2	50.0	-13.8
11.800	15.5	20.6	36.1	50.0	-13.9
3.376	11.7	20.3	32.0	46.0	-14.0
8.810	15.5	20.5	36.0	50.0	-14.0
3.280	11.6	20.4	32.0	46.0	-14.0

EMC

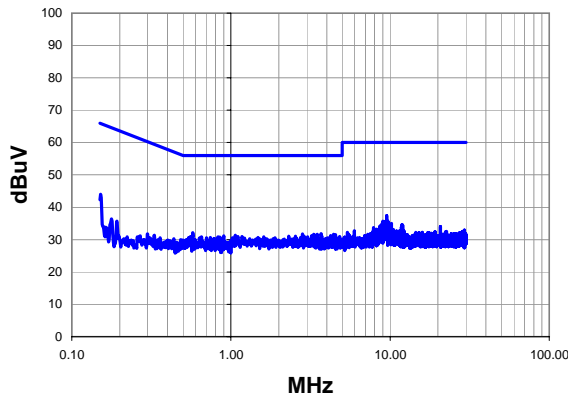
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	INMC0546	Date:	08/11/09	<i>Jennifer Herrett</i>
Project:	None	Temperature:	25°C	
Job Site:	EV07	Humidity:	49	
Serial Number:	00-21-e8-70-09-c4	Barometric Pres.:	1017.5mb	
EUT:	Galileo modular radio (TI)			
Configuration:	8 - AC Powerline Conducted Emissions with Laird MAF94367 Whip Antenna			
Customer:	Intermec Technologies Corporation			
Attendees:	None			
EUT Power:	5VDC (120V/60Hz)			
Operating Mode:	Transmitting 802.11(a), B1 Channel 36, 6Mbps.			
Deviations:	No deviations.			
Comments:	Laird MAF94367 Whip Antenna.			

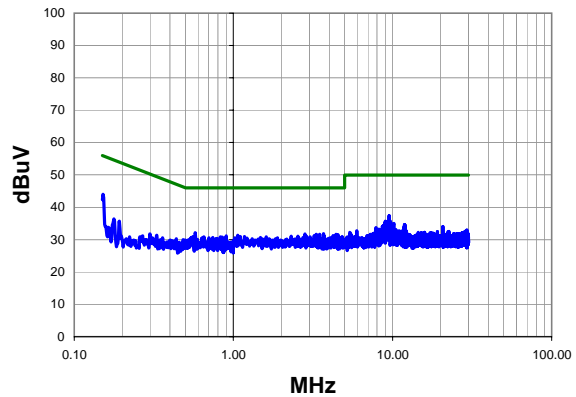
Test Specifications	Class B	Test Method
FCC 15.207:2009		ANSI C63.4:2003

Run #	14	Line:	High Line	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	-----------	--------------------------	----	----------------	------

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.152	22.4	21.6	44.0	65.9	-21.9
9.530	16.9	20.5	37.4	60.0	-22.6
0.577	11.7	20.5	32.2	56.0	-23.8
3.688	11.5	20.3	31.8	56.0	-24.2
9.710	15.2	20.5	35.7	60.0	-24.3
9.000	15.2	20.5	35.7	60.0	-24.3
2.816	11.3	20.4	31.7	56.0	-24.3
4.416	11.3	20.3	31.6	56.0	-24.4
3.312	11.3	20.3	31.6	56.0	-24.4
3.488	11.3	20.3	31.6	56.0	-24.4
9.230	15.1	20.5	35.6	60.0	-24.4
4.544	11.2	20.4	31.6	56.0	-24.5
1.064	11.0	20.4	31.4	56.0	-24.6
9.180	14.8	20.5	35.3	60.0	-24.7
3.392	11.0	20.3	31.3	56.0	-24.7
9.050	14.8	20.5	35.3	60.0	-24.7
3.216	10.9	20.4	31.3	56.0	-24.7
4.224	10.9	20.3	31.2	56.0	-24.8
9.770	14.7	20.5	35.2	60.0	-24.8
9.470	14.7	20.5	35.2	60.0	-24.8

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.152	22.4	21.6	44.0	55.9	-11.9
9.530	16.9	20.5	37.4	50.0	-12.6
0.577	11.7	20.5	32.2	46.0	-13.8
3.688	11.5	20.3	31.8	46.0	-14.2
9.710	15.2	20.5	35.7	50.0	-14.3
9.000	15.2	20.5	35.7	50.0	-14.3
2.816	11.3	20.4	31.7	46.0	-14.3
4.416	11.3	20.3	31.6	46.0	-14.4
3.312	11.3	20.3	31.6	46.0	-14.4
3.488	11.3	20.3	31.6	46.0	-14.4
9.230	15.1	20.5	35.6	50.0	-14.4
4.544	11.2	20.4	31.6	46.0	-14.5
1.064	11.0	20.4	31.4	46.0	-14.6
9.180	14.8	20.5	35.3	50.0	-14.7
3.392	11.0	20.3	31.3	46.0	-14.7
9.050	14.8	20.5	35.3	50.0	-14.7
3.216	10.9	20.4	31.3	46.0	-14.7
4.224	10.9	20.3	31.2	46.0	-14.8
9.770	14.7	20.5	35.2	50.0	-14.8
9.470	14.7	20.5	35.2	50.0	-14.8

EMC

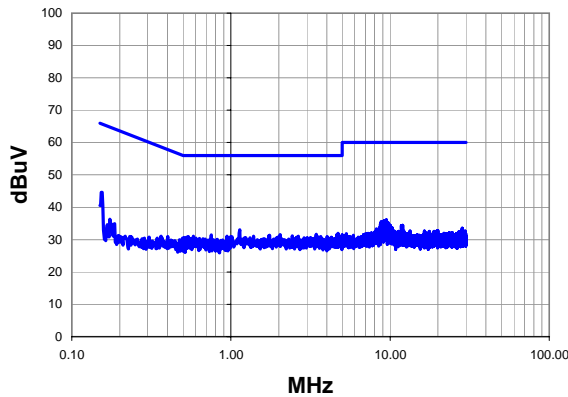
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	INMC0546	Date:	08/11/09	<i>Jennifer Herrett</i> Tested by: Jennifer Herrett
Project:	None	Temperature:	25°C	
Job Site:	EV07	Humidity:	49	
Serial Number:	00-21-e8-70-09-c4	Barometric Pres.:	1017.5mb	
EUT:	Galileo modular radio (TI)			
Configuration:	8 - AC Powerline Conducted Emissions with Laird MAF94367 Whip Antenna			
Customer:	Intermec Technologies Corporation			
Attendees:	None			
EUT Power:	5VDC (120V/60Hz)			
Operating Mode:	Transmitting 802.11(a), B1 Channel 48, 6Mbps.			
Deviations:	No deviations.			
Comments:	Laird MAF94367 Whip Antenna.			

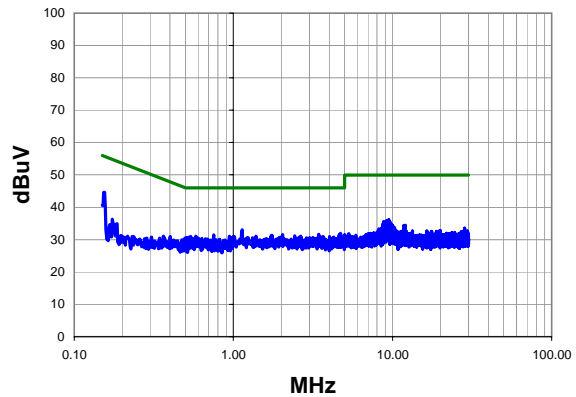
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	15	Line: High Line	Ext. Attenuation: 20	Results	Pass
--------------	----	------------------------	-----------------------------	----------------	------

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.153	23.0	21.6	44.6	65.8	-21.2
1.136	12.6	20.4	33.0	56.0	-23.0
9.470	15.6	20.5	36.1	60.0	-23.9
4.712	11.6	20.4	32.0	56.0	-24.1
9.180	15.3	20.5	35.8	60.0	-24.2
9.530	15.1	20.5	35.6	60.0	-24.4
3.432	11.3	20.3	31.6	56.0	-24.4
8.810	15.1	20.5	35.6	60.0	-24.4
2.040	11.2	20.4	31.6	56.0	-24.4
0.752	11.1	20.4	31.5	56.0	-24.5
4.624	11.1	20.4	31.5	56.0	-24.6
9.290	14.9	20.5	35.4	60.0	-24.6
1.752	11.0	20.4	31.4	56.0	-24.6
9.710	14.8	20.5	35.3	60.0	-24.7
9.350	14.8	20.5	35.3	60.0	-24.7
8.930	14.8	20.5	35.3	60.0	-24.7
2.432	10.7	20.4	31.1	56.0	-24.9
1.384	10.7	20.4	31.1	56.0	-24.9
0.944	10.7	20.4	31.1	56.0	-24.9
0.582	10.6	20.5	31.1	56.0	-24.9

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.153	23.0	21.6	44.6	55.8	-11.2
1.136	12.6	20.4	33.0	46.0	-13.0
9.470	15.6	20.5	36.1	50.0	-13.9
4.712	11.6	20.4	32.0	46.0	-14.1
9.180	15.3	20.5	35.8	50.0	-14.2
9.530	15.1	20.5	35.6	50.0	-14.4
3.432	11.3	20.3	31.6	46.0	-14.4
8.810	15.1	20.5	35.6	50.0	-14.4
2.040	11.2	20.4	31.6	46.0	-14.4
0.752	11.1	20.4	31.5	46.0	-14.5
4.624	11.1	20.4	31.5	46.0	-14.6
9.290	14.9	20.5	35.4	50.0	-14.6
1.752	11.0	20.4	31.4	46.0	-14.6
9.710	14.8	20.5	35.3	50.0	-14.7
9.350	14.8	20.5	35.3	50.0	-14.7
8.930	14.8	20.5	35.3	50.0	-14.7
2.432	10.7	20.4	31.1	46.0	-14.9
1.384	10.7	20.4	31.1	46.0	-14.9
0.944	10.7	20.4	31.1	46.0	-14.9
0.582	10.6	20.5	31.1	46.0	-14.9

EMC

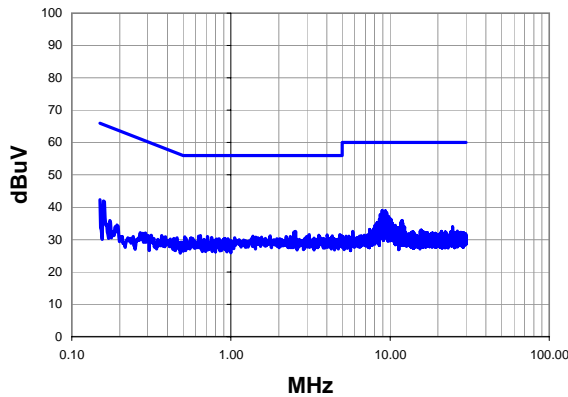
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	INMC0546	Date:	08/11/09	<i>Jennifer Herrett</i>
Project:	None	Temperature:	25°C	
Job Site:	EV07	Humidity:	49	
Serial Number:	00-21-e8-70-09-c4	Barometric Pres.:	1017.5mb	
EUT:	Galileo modular radio (TI)			
Configuration:	8 - AC Powerline Conducted Emissions with Laird MAF94367 Whip Antenna			
Customer:	Intermec Technologies Corporation			
Attendees:	None			
EUT Power:	5VDC (120V/60Hz)			
Operating Mode:	Transmitting 802.11(a), B1 Channel 48, 6Mbps.			
Deviations:	No deviations.			
Comments:	Laird MAF94367 Whip Antenna.			

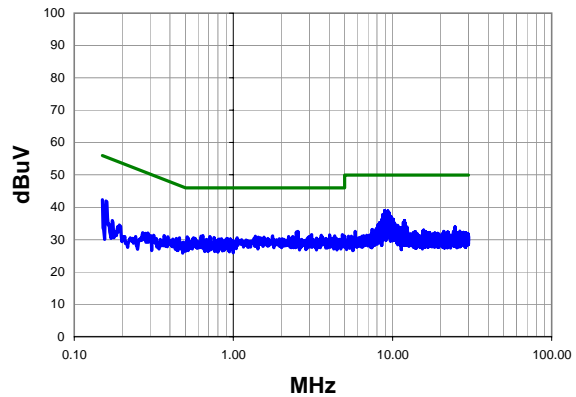
Test Specifications	Class B	Test Method
FCC 15.207:2009		ANSI C63.4:2003

Run #	16	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	---------	--------------------------	----	----------------	------

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit

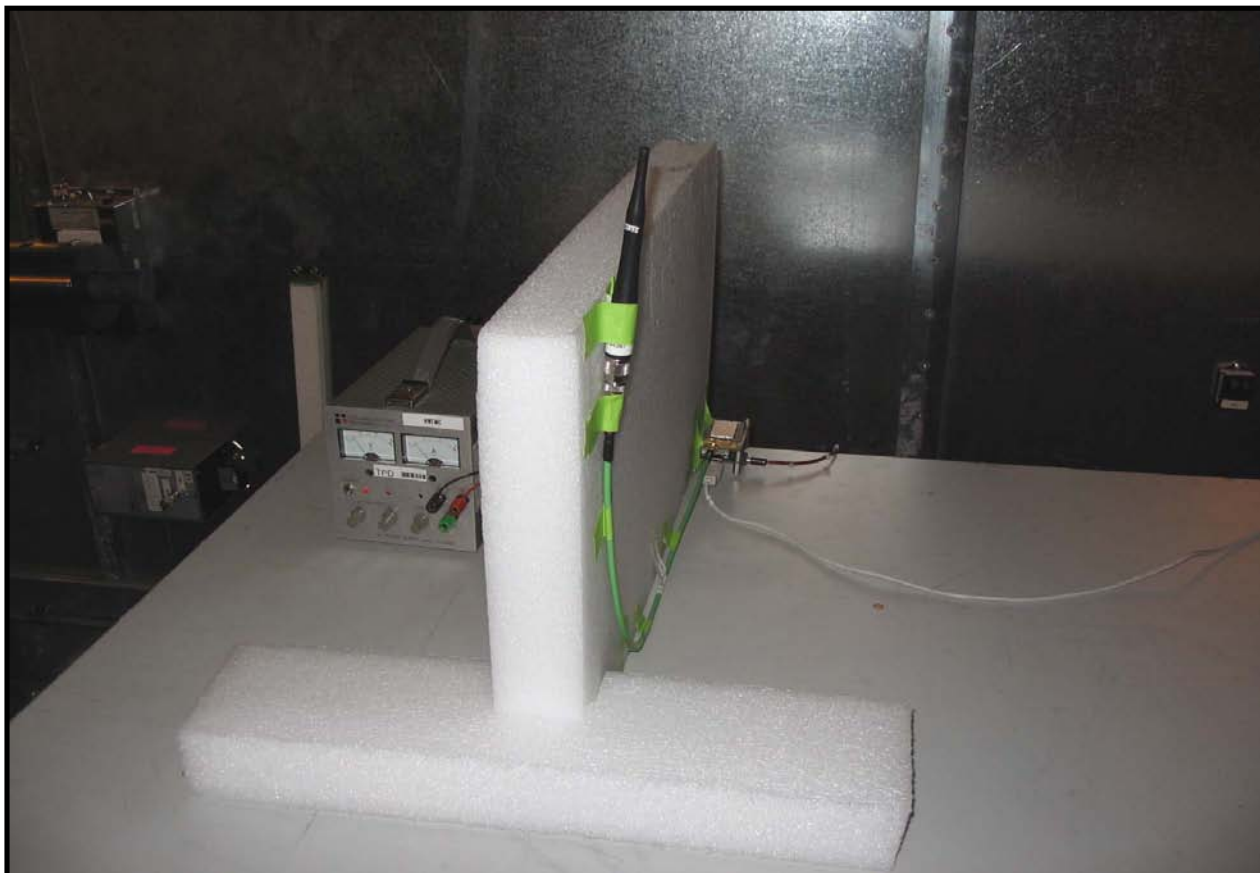
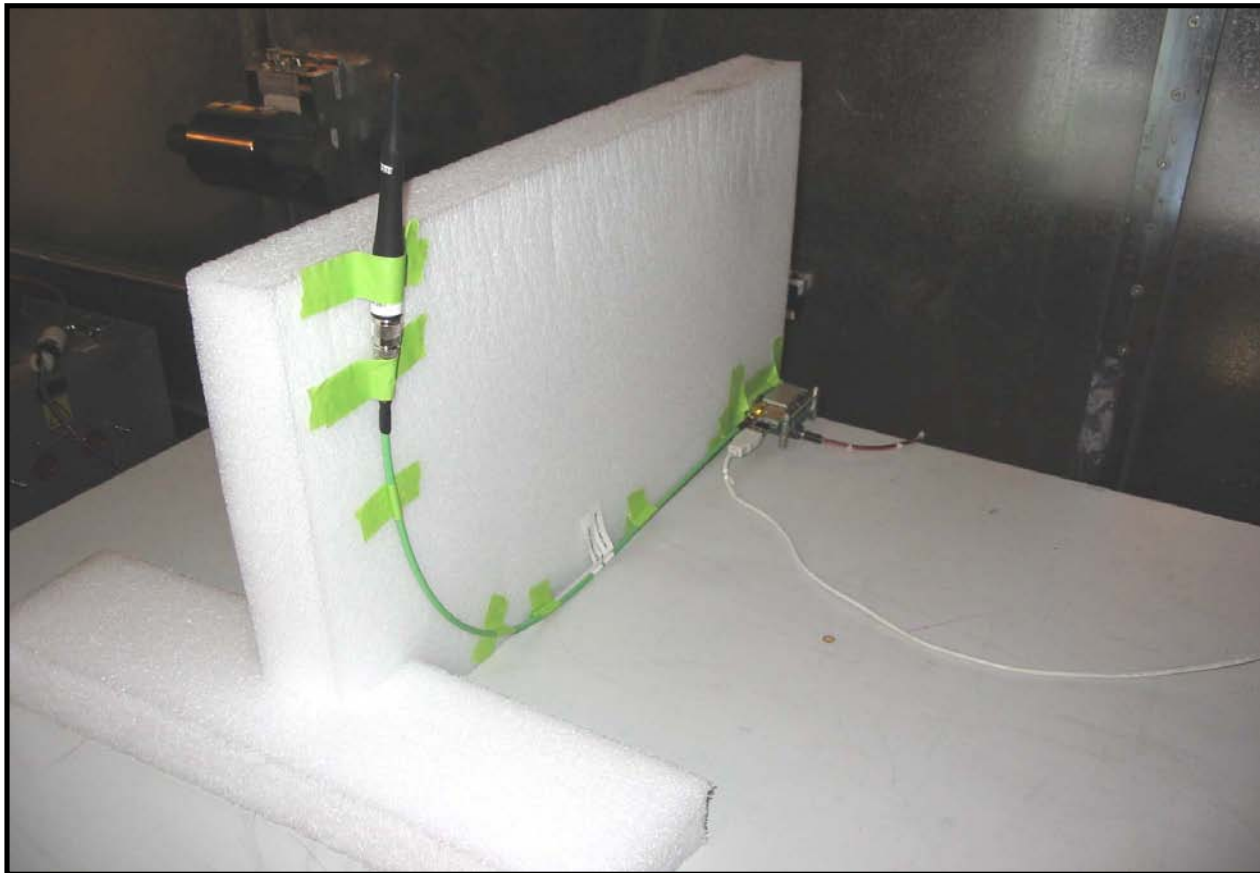


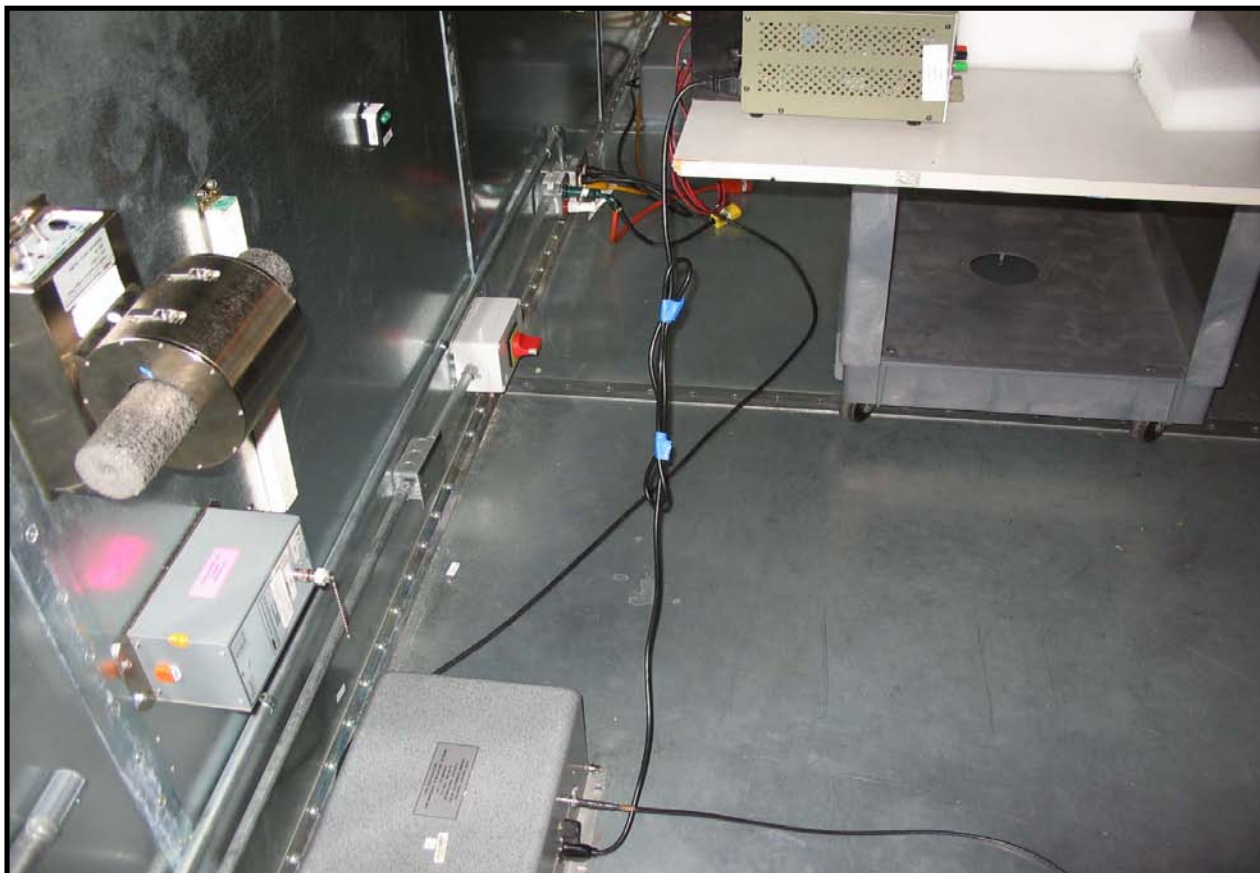
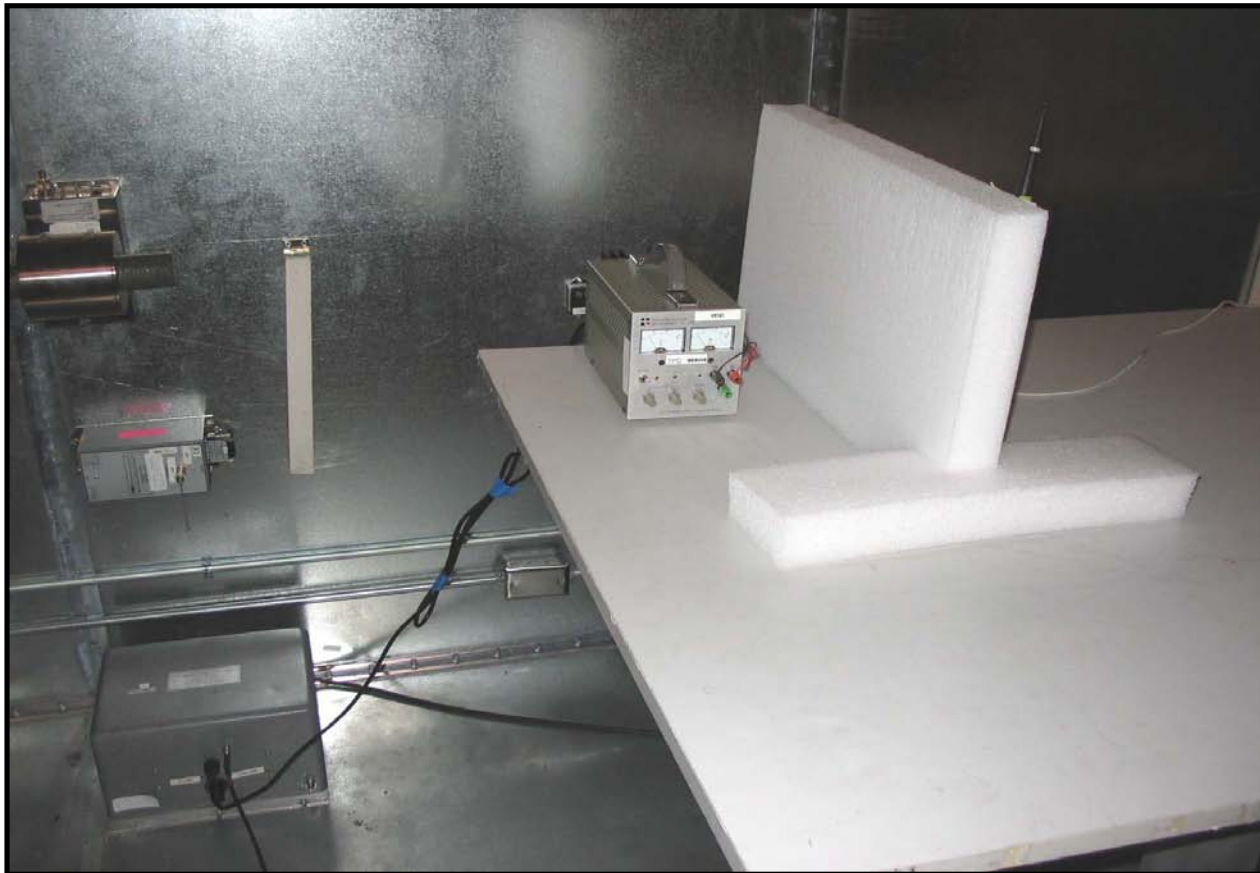
Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
8.930	18.5	20.5	39.0	60.0	-21.0
9.350	18.3	20.5	38.8	60.0	-21.2
9.530	17.8	20.5	38.3	60.0	-21.7
9.410	17.7	20.5	38.2	60.0	-21.8
9.230	17.6	20.5	38.1	60.0	-21.9
8.690	17.3	20.5	37.8	60.0	-22.2
9.770	16.7	20.5	37.2	60.0	-22.8
9.650	16.5	20.5	37.0	60.0	-23.0
8.760	16.5	20.5	37.0	60.0	-23.0
9.590	16.4	20.5	36.9	60.0	-23.1
9.830	16.3	20.5	36.8	60.0	-23.2
8.870	16.1	20.5	36.6	60.0	-23.4
9.110	16.0	20.5	36.5	60.0	-23.5
8.990	16.0	20.5	36.5	60.0	-23.5
2.544	12.1	20.4	32.5	56.0	-23.5
0.159	20.4	21.6	42.0	65.5	-23.6
0.150	20.7	21.7	42.4	66.0	-23.6
10.120	15.8	20.5	36.3	60.0	-23.7
9.470	15.8	20.5	36.3	60.0	-23.7
8.810	15.8	20.5	36.3	60.0	-23.7

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
8.930	18.5	20.5	39.0	50.0	-11.0
9.350	18.3	20.5	38.8	50.0	-11.2
9.530	17.8	20.5	38.3	50.0	-11.7
9.410	17.7	20.5	38.2	50.0	-11.8
9.230	17.6	20.5	38.1	50.0	-11.9
8.690	17.3	20.5	37.8	50.0	-12.2
9.770	16.7	20.5	37.2	50.0	-12.8
9.650	16.5	20.5	37.0	50.0	-13.0
8.760	16.5	20.5	37.0	50.0	-13.0
9.590	16.4	20.5	36.9	50.0	-13.1
9.830	16.3	20.5	36.8	50.0	-13.2
8.870	16.1	20.5	36.6	50.0	-13.4
9.110	16.0	20.5	36.5	50.0	-13.5
8.990	16.0	20.5	36.5	50.0	-13.5
2.544	12.1	20.4	32.5	46.0	-13.5
0.159	20.4	21.6	42.0	55.5	-13.6
0.150	20.7	21.7	42.4	56.0	-13.6
10.120	15.8	20.5	36.3	50.0	-13.7
9.470	15.8	20.5	36.3	50.0	-13.7
8.810	15.8	20.5	36.3	50.0	-13.7





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	7/21/2009	13

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The transmission pulse duration (T) were measured for each of the EUT operating modes. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

EMC

TRANSMISSION PULSE DURATION

EUT: Galileo modular radio (T1)	Work Order: INMC0546
Serial Number: 00-21-e8-70-09-c4	Date: 07/31/09
Customer: Intermec Technologies Corporation	Temperature: 24.0°C
Attendees: None	Humidity: 46%
Project: None	Barometric Pres.: 29.76 in
Tested by: Rod Peloquin	Power: 5VDC
	Job Site: EV06

TEST SPECIFICATIONS		Test Method
FCC 15.407:2009		ANSI C63.4:2003 DA 02-2138:2002

COMMENTS

EEPROM Power settings provided by customer in emails of 7-13-09 and 7-20-09.

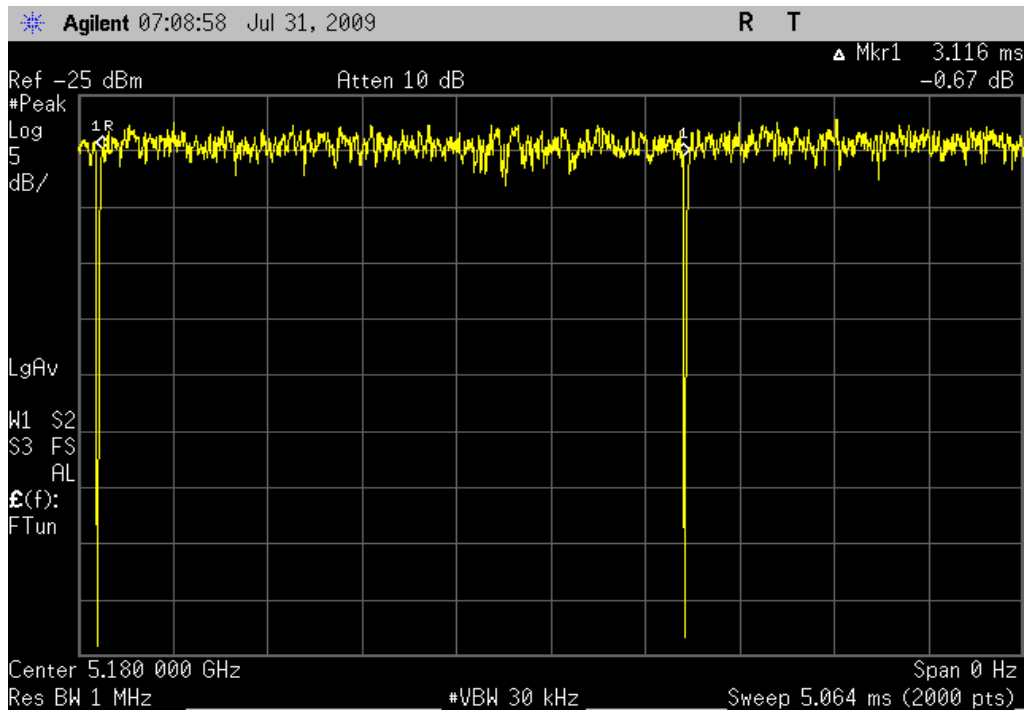
DEVIATIONS FROM TEST STANDARD

No Deviations

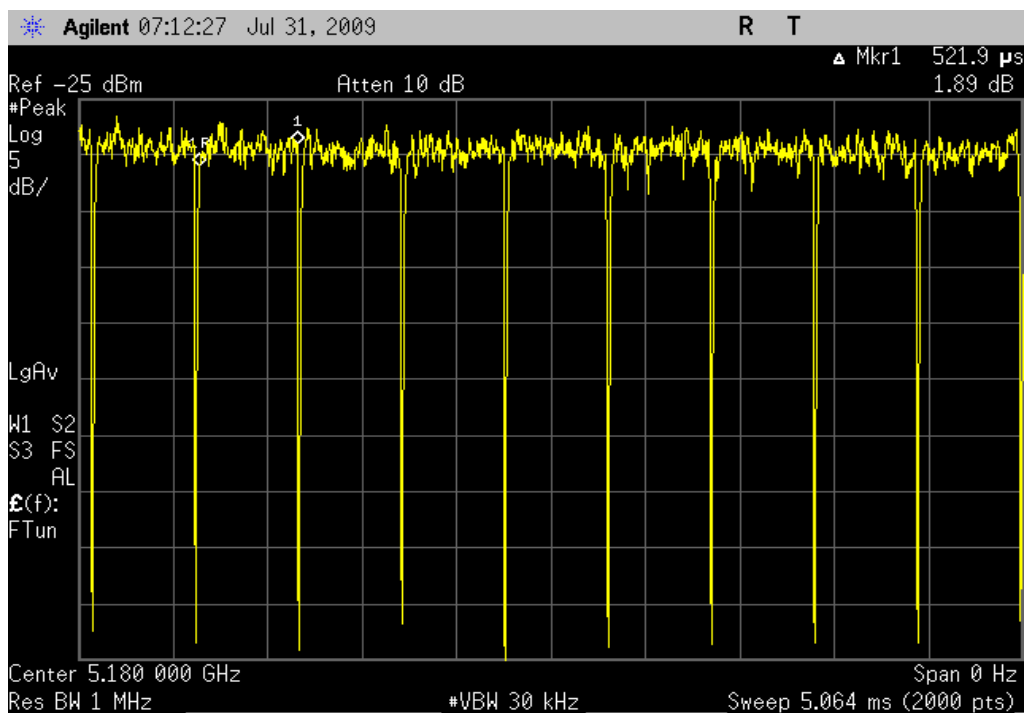
Configuration #	1	Signature 
------------------------	---	---

		Value	Limit	Results
802.11(a) 6 Mbps	Pulse Duration	3.116 ms	N/A	N/A
802.11(a) 36 Mbps	Pulse Duration	0.522 ms	N/A	N/A
802.11(a) 54 Mbps	Pulse Duration	0.347 ms	N/A	N/A

802.11(a) 6 Mbps, Pulse Duration
Result: N/A **Value:** 3.116 ms **Limit:** N/A



802.11(a) 36 Mbps, Pulse Duration
Result: N/A **Value:** 0.522 ms **Limit:** N/A



802.11(a) 54 Mbps, Pulse Duration

Result: N/A

Value: 0.347 ms

Limit: N/A

