

Awarepoint Corporation

T3x Tag Device

Report No. AWAR0010

Report Prepared By



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

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Last Date of Test: October 5, 2011
Awarepoint Corporation
Model: T3x Tag Device

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Occupied Bandwidth	FCC 15.247:2011	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2011	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2011	ANSI C63.10:2009	Pass
Power Spectral Density	FCC 15.247:2011	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2011	ANSI C63.10:2009	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.
41 Tesla Ave.
Irvine, CA 92618

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 #2834B-1).

Approved By:

Tim O'Shea, Operations Manager



NVLAP Lab Code: 200676-0

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.



Accreditations and Authorizations

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 National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. 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.

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, Brooklyn Park: 2834E-1*)

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.

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).



Accreditations and Authorizations

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, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

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).

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, Brooklyn Park: US0175)*

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

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

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



Northwest EMC Locations



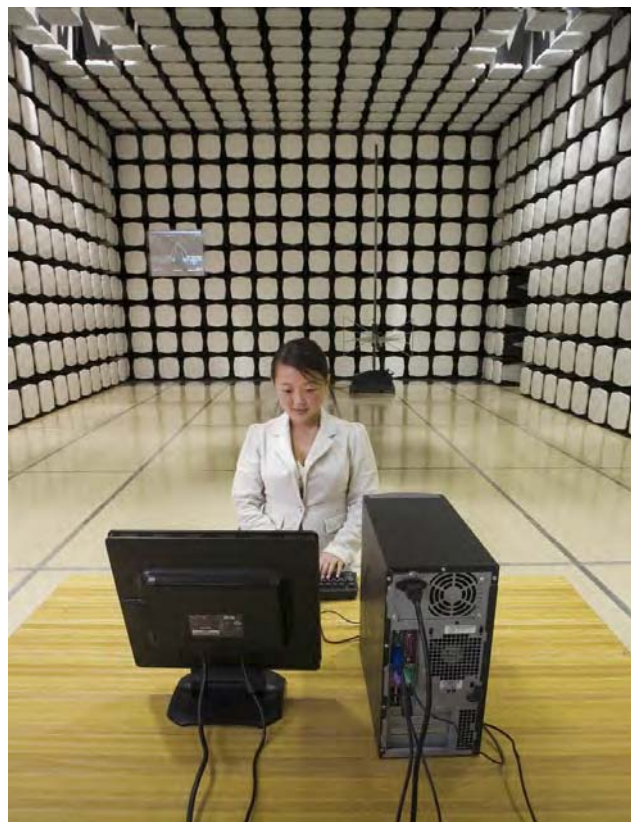
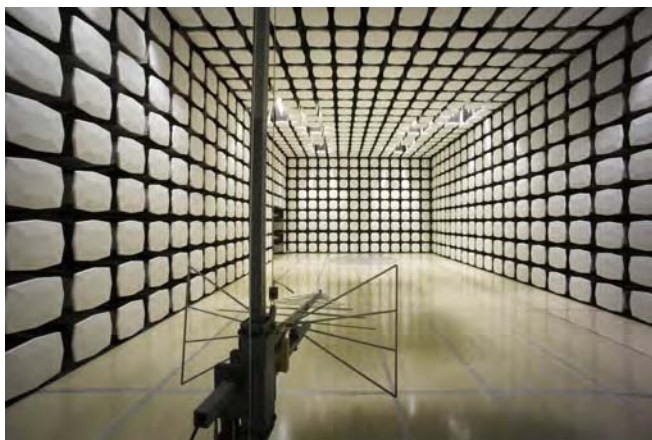
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

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:	Awarepoint Corporation
Address:	600 W. Broadway Suite 250
City, State, Zip:	San Diego, CA 92101
Test Requested By:	John Taylor
Model:	T3x Tag Device
First Date of Test:	February 2, 2011
Last Date of Test:	October 5, 2011
Receipt Date of Samples:	February 2, 2011
Equipment Design Stage:	Production
Equipment Condition:	No Damage

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

Tag device that contains a 2.4 GHz DTS radio and a 125 kHz inductive radio.

Testing Objective:

To demonstrate compliance of the DTS radio to FCC 15.247 requirements.

CONFIGURATION 1 AWAR0010**Software/Firmware Running during test**

Description	Version
Smart RF Studio 7	1.3.2

EUT

Description	Manufacturer	Model/Part Number	Serial Number
T3x Tag Device	Awarepoint Corporation	700000100	None

Remote Equipment Outside of Test Setup Boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Dell	Latitude D630	FFF1NH1

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	No	1.8m	No	EUT	Laptop
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	2/2/2011	Band Edge Compliance	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	2/2/2011	Spurious Radiated 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.
3	2/24/2011	Spurious Conducted 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.
4	9/30/2011	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.
5	9/30/2011	Output 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.
6	9/30/2011	Spurious Radiated 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.
7	10/5/2011	Occupied Bandwidth	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	E4446A	AAY	1/11/2011	12

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 occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made in a radiated configuration in a semi-anechoic chamber with the fundamental of the carrier full maximized for its highest radiated power. The EUT was transmitting at its maximum data rate with the typical modulation and a test duty cycle.

EUT:	T3x Tag Device	Work Order:	AWAR0010
Serial Number:	P23590092	Date:	10/05/11
Customer:	Awarepoint Corporation	Temperature:	24.32°C
Attendees:	None	Humidity:	40.25% RH
Project:	None	Barometric Pres.:	1012.2 mBar
Tested by:	Jaemi Suh	Power:	Battery
		Job Site:	OC10

TEST SPECIFICATIONS

Test Method

FCC 15.247:2011

ANSI C63.10:2009

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

Configuration #

1

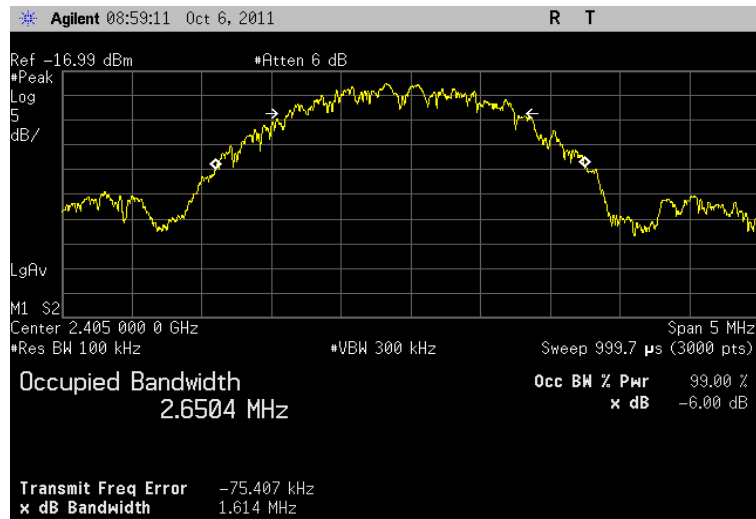
Signature



	Value	Limit	Result
Low	1.614 MHz	≥ 500 kHz	Pass
Mid	1.635 MHz	≥ 500 kHz	Pass
High	1.614 MHz	≥ 500 kHz	Pass

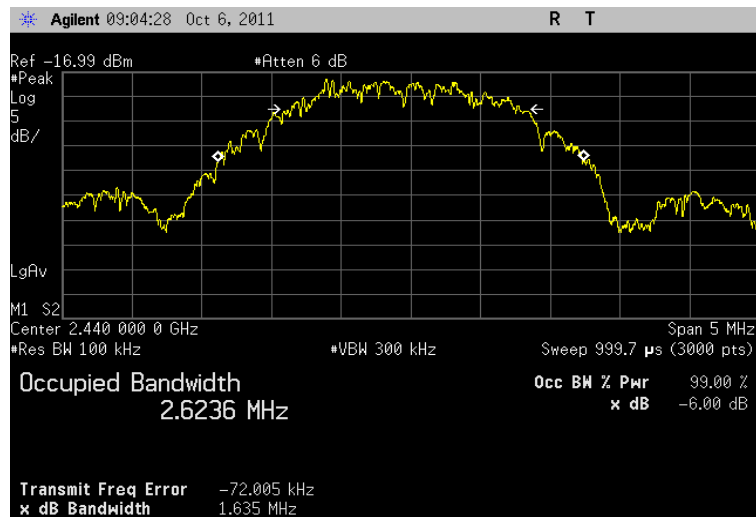
Low

Limit	Result
1.614 MHz	≥ 500 kHz Pass



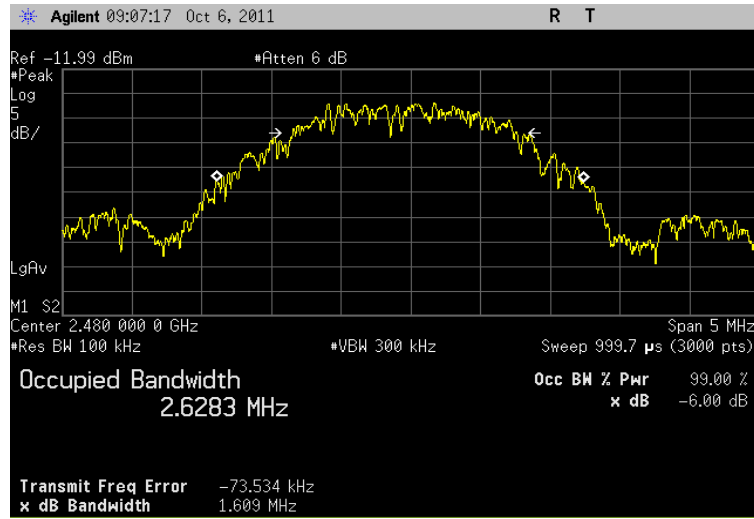
Mid

Limit	Result
1.635 MHz	≥ 500 kHz Pass



High

	Limit	Result				
1.609 MHz	≥ 500 kHz	Pass				



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

2405, 2440, 2475 MHz

CONFIGURATIONS INVESTIGATED

1 - Basic Configuration

FREQUENCY RANGE INVESTIGATED

Start Frequency	2400 MHz	Stop Frequency	2483.5 MHz
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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Antenna, Horn	EMCO	3115	AHB	3/8/2011	24 mo
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/10/2011	12 mo
Spectrum Analyzer	Agilent	E4446A	AAY	1/11/2011	12 mo

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 peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The radiated power was measured using a spectrum analyzer and horn antenna in a semi-anechoic chamber. The resolution bandwidth was set to 3 MHz and the video bandwidth was set to 8 MHz. A peak detector was used. The EUT was transmitting at its maximum data rate. The level of fundamental emission was maximized by rotating the turntable and moving the measurement antenna from 1 – 4 meters in height.

The field strength measurement was converted to effective radiated power (EIRP) using the Friis transmission equation. A simplified version is found in ANSI C63.10:2009, Equation 5.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

EUT:	T3x Tag Device	Work Order:	AWAR0010
Serial Number:	P23590092	Date:	09/30/11
Customer:	Awarepoint Corporation	Temperature:	22.7C
Attendees:	None	Humidity:	51%
Project:	None	Barometric Pres.:	1015mb
Tested by:	Johnny Candelas	Power:	5VDC
		Job Site:	OC10

TEST SPECIFICATIONS

FCC 15.247:2011

Test Method

ANSI C63.10:2009

TEST PARAMETERS

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


worse case position EUT at Z-Axis (standing)

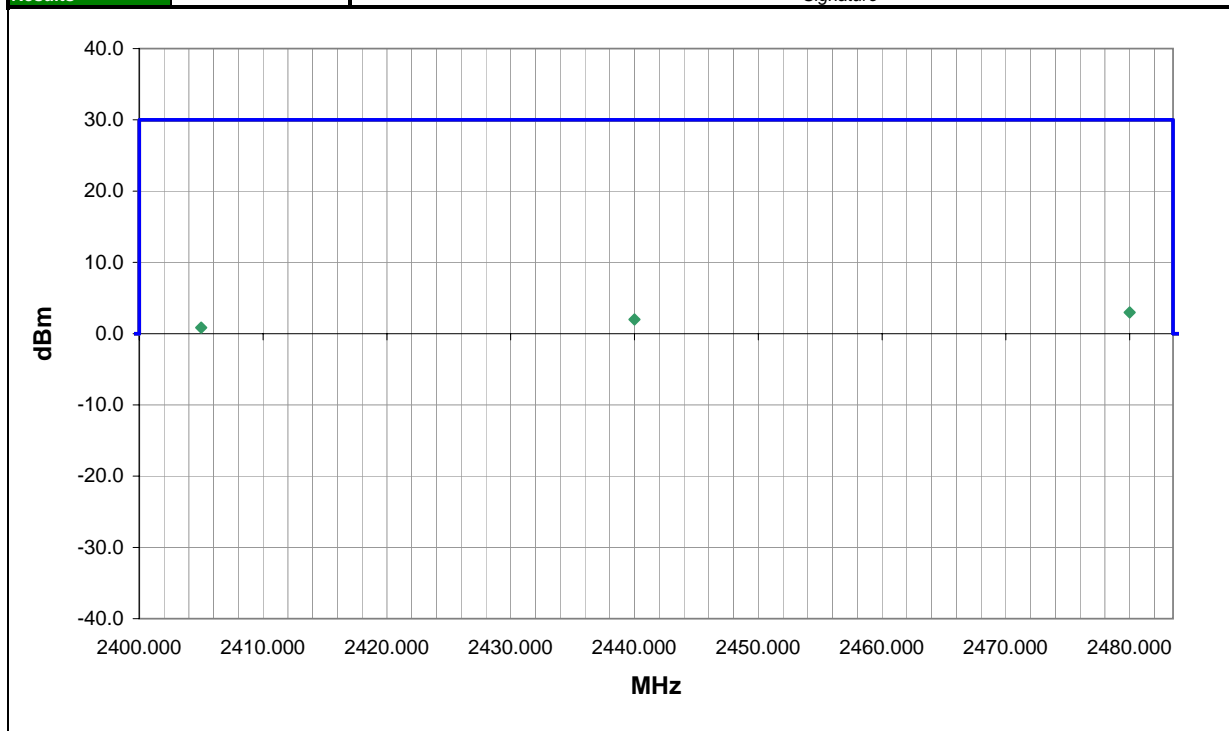
EUT OPERATING MODES

Continuous Transmit, Transmitting at 2404MHz, 2440MHz, 2480MHz. Channel 11, 18, & 26

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1	Signature 
Configuration #	1	
Results	Pass	



Freq (MHz)			Azimuth (degrees)	Height (meters)		Polarity	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)
2480.000			187.0	1.0		Vert	PK	1.98E-03	3.0	30.0	-27.0
2440.000			190.0	1.1		Vert	PK	1.58E-03	2.0	30.0	-28.0
2405.000			189.0	1.7		Vert	PK	1.21E-03	0.8	30.0	-29.2

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	E4446A	AAY	1/11/2011	12

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.

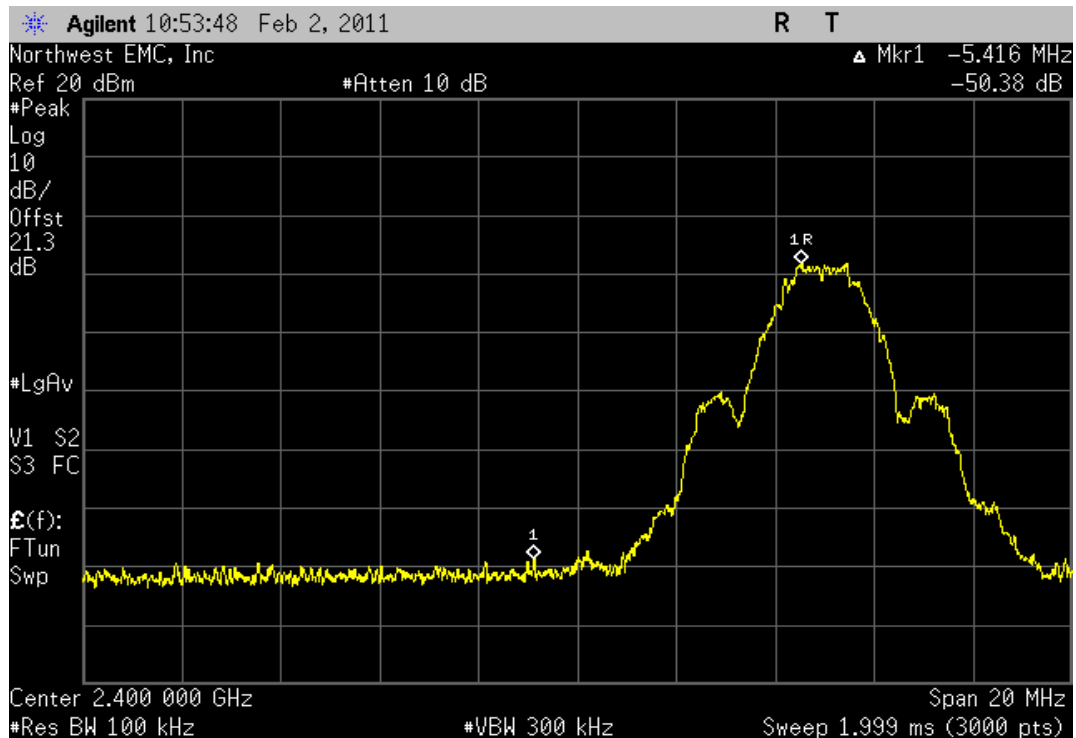
TEST DESCRIPTION

The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies. The channels closest to the band edges were selected. 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 highest data rate.

NORTHWEST		EMC		Band Edge Compliance		XMit 2011.01.21 PsaTx 2011.02.01	
EUT: T3x Tag Device				Work Order: AWAR0010			
Serial Number: None				Date: 02/02/11			
Customer: Awarepoint Corporation				Temperature: 24.32°C			
Attendees: None				Humidity: 40%			
Project: None				Barometric Pres.: 1012.2			
Tested by: Jaemi Suh		Power: Battery		Job Site: OC10			
TEST SPECIFICATIONS				Test Method			
FCC 15.245:2011				ANSI C63.10:2009			
COMMENTS							
None							
DEVIATIONS FROM TEST STANDARD							
No Deviations							
Configuration #		1		Signature 			
		Value		Limit		Result	
Low		-50.38 dBc		≤ -20 dB		Pass	
High		-52.31 dBc		≤ -20 dB		Pass	

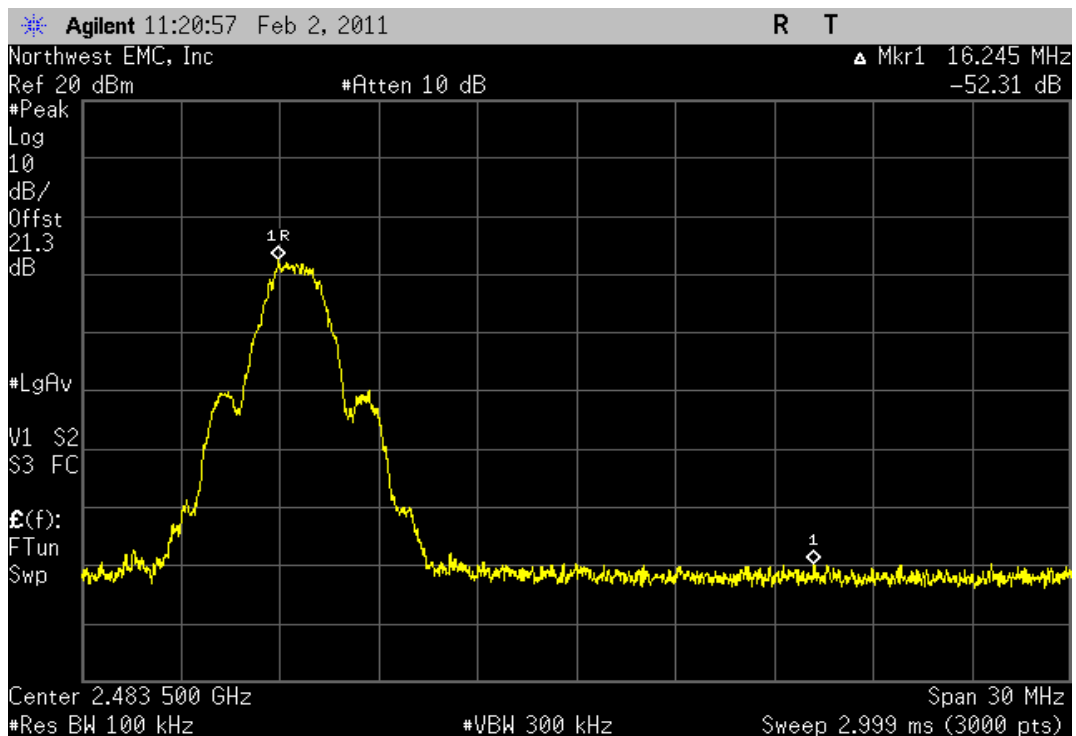
Low

Value	Limit	Result				
-50.38 dBc	≤ -20 dB	Pass				



High

Value	Limit	Result				
-52.31 dBc	≤ -20 dB	Pass				



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
Antenna, Horn	EMCO	3115	AHB	3/8/2011	24 mo
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/10/2011	12 mo
Spectrum Analyzer	Agilent	E4446A	AAY	1/11/2011	12 mo

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 peak power spectral density was measured with the EUT set to low, medium, and high transmit frequencies. The radiated power spectral density was measured using a spectrum analyzer and horn antenna in a semi-anechoic chamber. The EUT was transmitting at its maximum data rate for each modulation type available. The level of fundamental emission was maximized by rotating the turntable and moving the measurement antenna from 1 – 4 meters in height. Per the procedure outlined in ANSI C63.10:2009, 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 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. 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 35 dB for correction to 3 kHz."

The field strength measurement of power spectral density was converted to effective radiated power spectral density (dBm/3kHz) (EIRP) using the Friis transmission equation. A simplified version is found in ANSI C63.10:2009, Equation 6.

EMC

POWER SPECTRAL DENSITY

EUT:	T3x Tag Device	Work Order:	AWAR0010
Serial Number:	P23590092	Date:	09/30/11
Customer:	Awarepoint Corporation	Temperature:	22.7C
Attendees:	None	Humidity:	51%
Project:	None	Barometric Pres.:	1015mb
Tested by:	Johnny Candelas	Power:	Battery
		Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

worse case position EUT at Z-Axis (standing), 2405, 2440, 2475 MHz

DEVIATIONS FROM TEST STANDARD

No Deviations

Configuration #	1	Signature 
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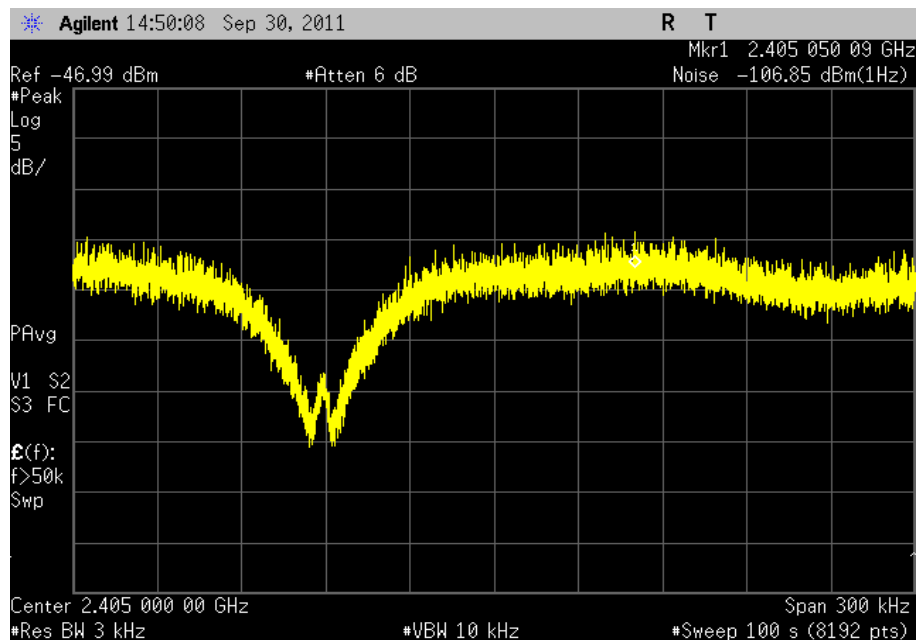
	Value	Limit	Results
Low Channel	-26.0 dBm/3kHz, EIRP	<= 8 dBm/3kHz	Pass
Mid Channel	-24.8 dBm/3kHz, EIRP	<= 8 dBm/3kHz	Pass
High Channel	-24.6 dBm/3kHz, EIRP	<= 8 dBm/3kHz	Pass

POWER SPECTRAL DENSITY

Low Channel

Result: Pass **Value:** -26.0 dBm/3kHz, EIRP **Limit:** <= 8 dBm/3kHz

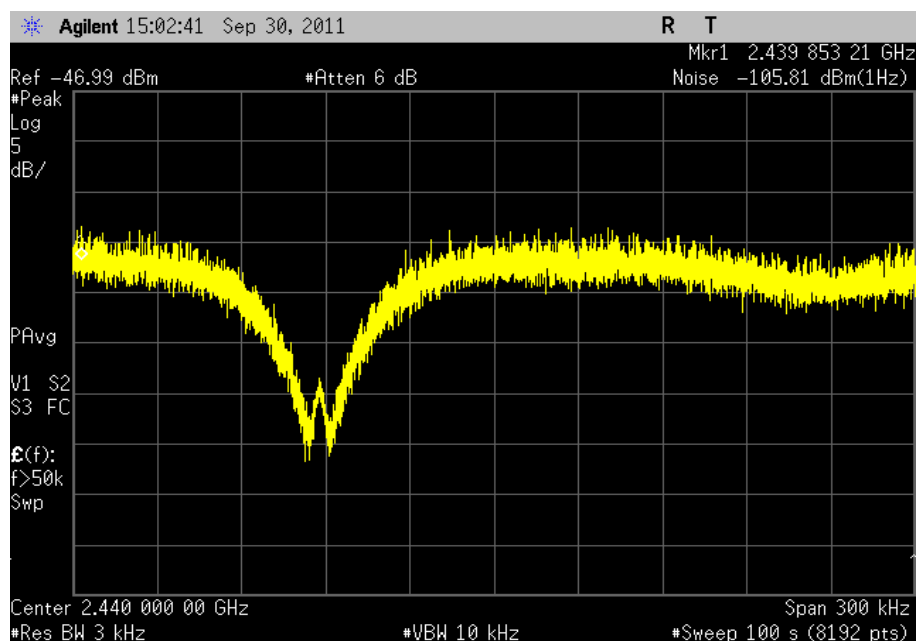
Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-106.85	-71.85	34.1	-37.75	-26.0



Mid Channel

Result: Pass **Value:** -24.8 dBm/3kHz, EIRP **Limit:** <= 8 dBm/3kHz

Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-105.81	-70.81	34.2	-36.61	-24.8



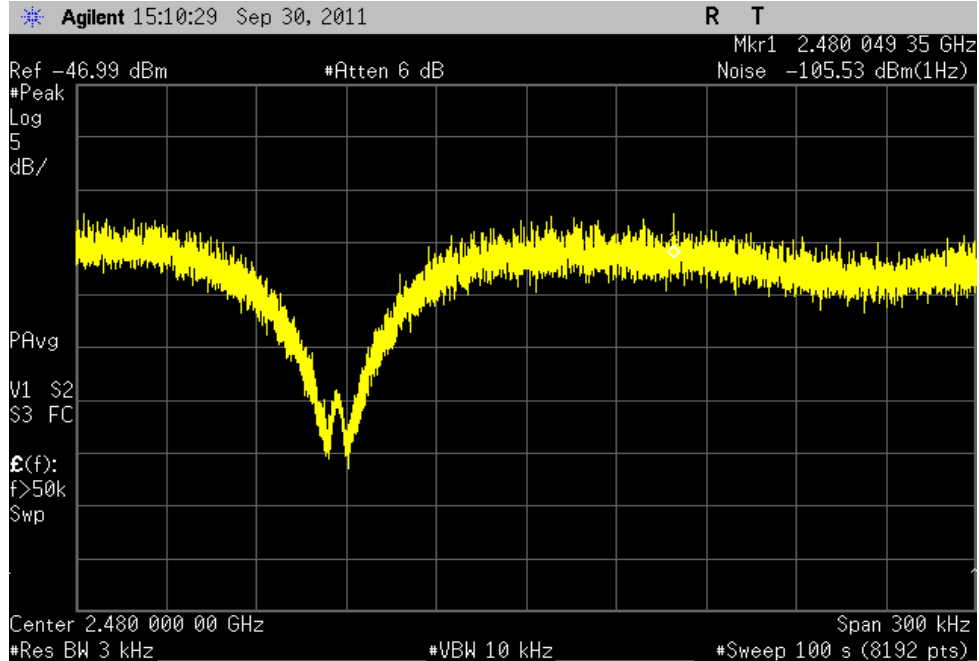
High Channel

Result: Pass

Value: -24.6 dBm/3kHz, EIRP

Limit: <= 8 dBm/3kHz

Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-105.53	-70.53	34.2	-36.33	-24.6



EMC SPURIOUS RADIATED EMISSIONS

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting at 2480 MHz
Transmitting at 2440 MHz
Transmitting at 2405 MHz

AXIS INVESTIGATED

X-Axis
Y-Axis
Z-Axis

POWER SETTINGS INVESTIGATED

5VDC

CONFIGURATIONS INVESTIGATED

1 - Basic Configuration

FREQUENCY RANGE INVESTIGATED

Start Frequency 30 MHz Stop Frequency 26 GHz

CLOCKS AND OSCILLATORS

None Provided

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
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	4/29/2011	12 mo
Antenna, Horn	EMCO	3160-09	AHN	NCR	0 mo
OC floating Cable	N/A	18-26GHz RE Cables	OCK	4/29/2011	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOF	11/17/2010	12 mo
Antenna, Horn	ETS	3160-08	AHT	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOE	11/17/2010	12 mo
Antenna, Horn	ETS	3160-07	AHR	NCR	0 mo
OC 10 Cables	N/A	12-18GHz RE Cables	OCO	6/24/2011	12 mo
Pre-Amplifier	Miteq	AMF-4D-010120-30-10P-1	AOP	6/24/2011	12 mo
Antenna, Horn	EMCO	3115	AHB	3/8/2011	24 mo
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/10/2011	12 mo
Antenna, Biconilog	EMCO	3142	AXB	3/28/2011	12 mo
OC10 Cables	N/A	10kHz-1GHz RE Cables	OCH	6/24/2011	12 mo
Pre-Amplifier	Miteq	AM-1064-9079	AOO	6/28/2011	12 mo
Spectrum Analyzer	Agilent	E4446A	AAY	1/11/2011	12 mo

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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation

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 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 axes, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

All radiated emissions were measured. The emissions that fell in the restricted bands of 15.205 were measured to the 15.209 limits and all other emissions were compared to the -20 dBc limit of 15.247(d).

EUT: T3x Tag Device				Work Order: AWAR0010	
Serial Number: None				Date: 02/02/11	
Customer: Awarepoint Corporation				Temperature: 24.32 C	
Attendees: None				Humidity: 40.25% RH	
Project: None				Barometric Pres.: 1012.2 mBar	
Tested by: Jaemi Suh			Power: Battery	Job Site: OC10	

TEST SPECIFICATIONS

FCC 15.247:2011

Test Method

ANSI C63.10:2009

TEST PARAMETERS

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

COMMENTS

None

EUT OPERATING MODES

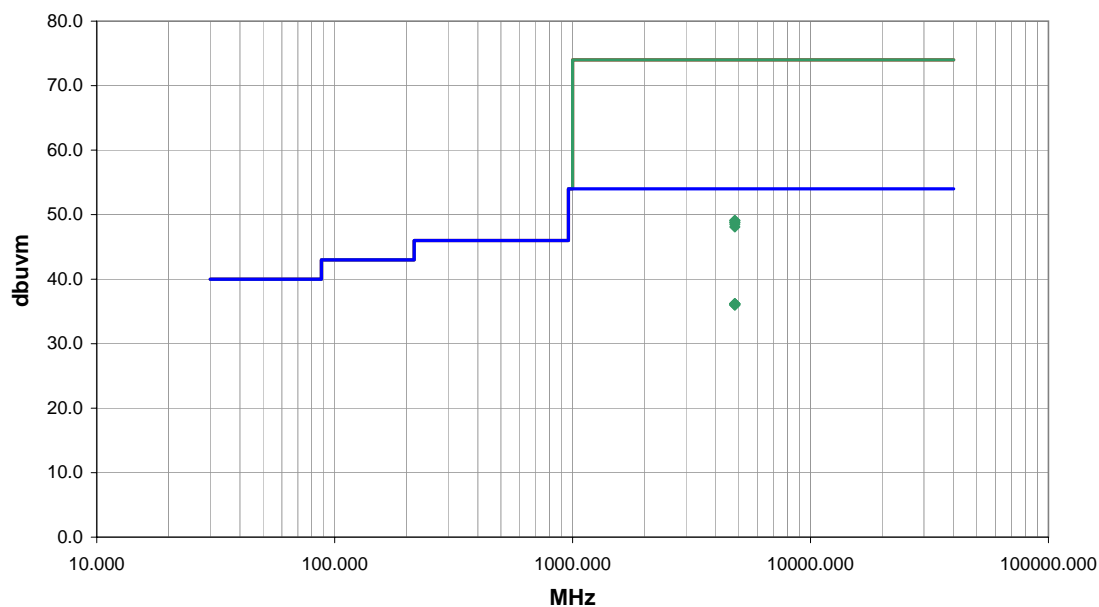
Transmitting at 2405 MHz

DEVIATIONS FROM TEST STANDARD


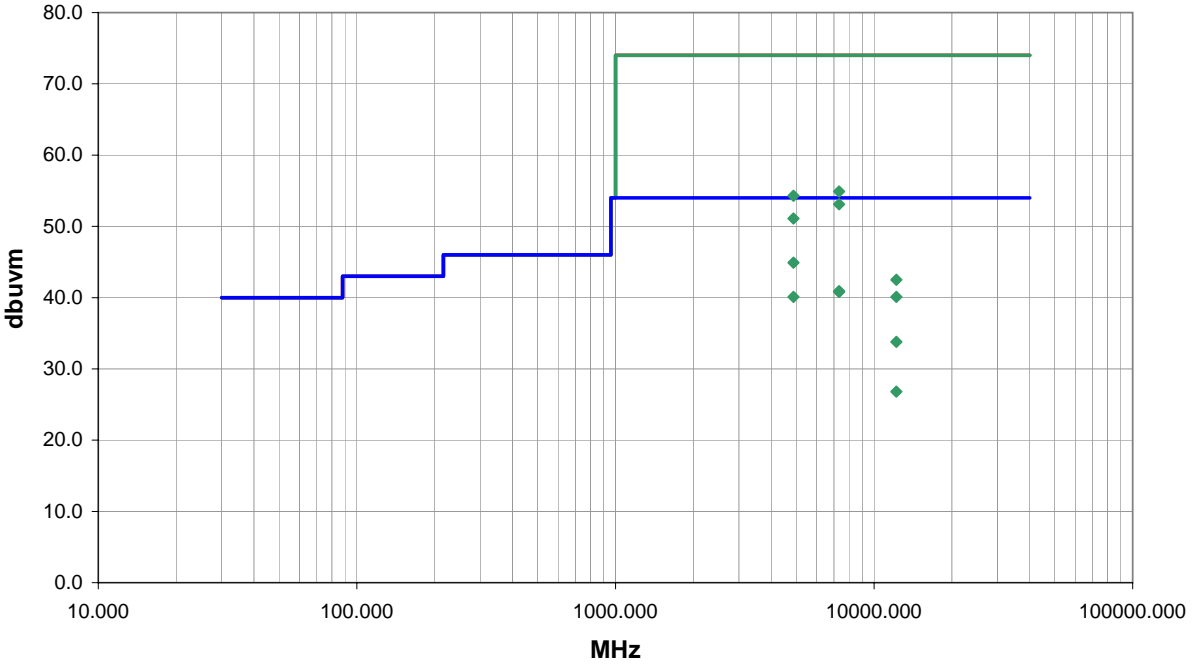
No deviations.


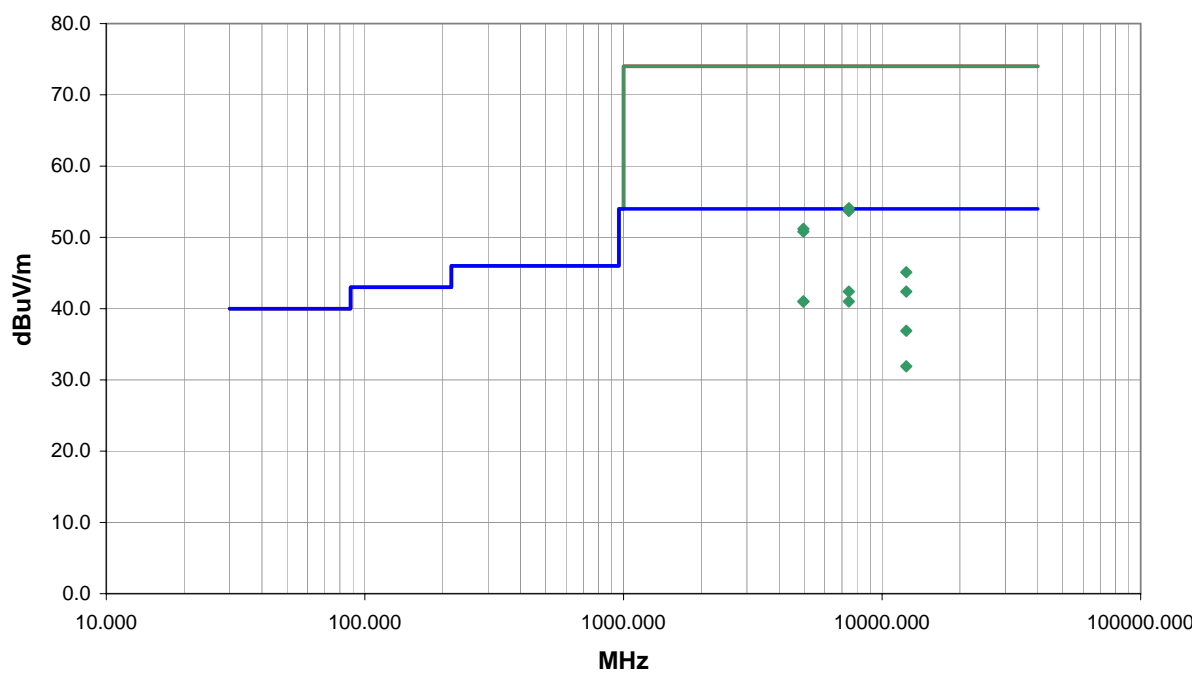
Run #	1
Configuration #	1
Results	Pass


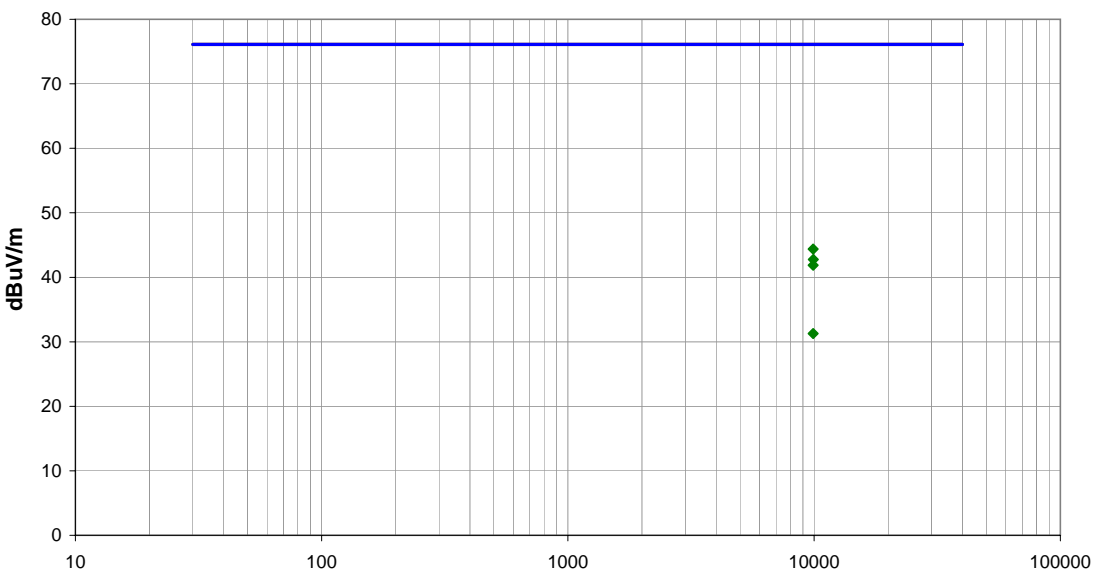
Signature



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dbuv	Spec. Limit dbuv	Compared to Spec. (dB)	Comments
4810.001	24.0	12.2	355.0	2.3	3.0	0.0	V-Horn	AV	0.0	36.2	54.0	-17.8	Y Axis
4810.543	24.0	12.2	19.0	1.8	3.0	0.0	H-Horn	AV	0.0	36.2	54.0	-17.8	Z axis
4810.567	24.0	12.2	356.0	2.3	3.0	0.0	V-Horn	AV	0.0	36.2	54.0	-17.8	Z axis
4810.792	23.9	12.2	179.0	1.0	3.0	0.0	H-Horn	AV	0.0	36.1	54.0	-17.9	Y Axis
4809.173	23.8	12.2	1.0	2.3	3.0	0.0	V-Horn	AV	0.0	36.0	54.0	-18.0	X Axis
4809.972	23.8	12.2	1.0	1.0	3.0	0.0	H-Horn	AV	0.0	36.0	54.0	-18.0	X Axis
4809.527	36.9	12.2	179.0	1.0	3.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9	Y Axis
4809.658	36.9	12.2	19.0	1.8	3.0	0.0	H-Horn	PK	0.0	49.1	74.0	-24.9	Z axis
4810.065	36.6	12.2	1.0	1.0	3.0	0.0	H-Horn	PK	0.0	48.8	74.0	-25.2	X Axis
4810.452	36.6	12.2	356.0	2.3	3.0	0.0	V-Horn	PK	0.0	48.8	74.0	-25.2	Z axis
4810.432	36.3	12.2	355.0	2.3	3.0	0.0	V-Horn	PK	0.0	48.5	74.0	-25.5	Y Axis
4810.423	35.9	12.2	1.0	2.3	3.0	0.0	V-Horn	PK	0.0	48.1	74.0	-25.9	X Axis

NORTHWEST EMC		SPURIOUS RADIATED EMISSIONS DATA SHEET		PSA 2008.07.21 EMI 2010.9.21								
EUT: T3x Tag Device			Work Order: AWAR0010									
Serial Number: None			Date: 02/02/11									
Customer: Awarepoint Corporation			Temperature: 24.32 C									
Attendees: None			Humidity: 40.25% RH									
Project: None			Barometric Pres.: 1012.2 mBar									
Tested by: Jaemi Suh		Power: Battery	Job Site: OC10									
TEST SPECIFICATIONS			Test Method									
FCC 15.247:2011			ANSI C63.10:2009									
TEST PARAMETERS												
Antenna Height(s) (m)		1 - 4		Test Distance (m) 0								
COMMENTS												
Y-Axis												
EUT OPERATING MODES												
Transmitting at 2440 MHz												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
Run #	4		<div style="text-align: right;"> <i>Signature</i>  </div>									
Configuration #	1											
Results	Pass											
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dbuvm	Spec. Limit dbuvm	Compared to Spec. (dB)
4880.648	32.5	12.4	1.0	1.4	0.0	0.0	H-Horn	AV	0.0	44.9	54.0	-9.1
7320.355	25.6	15.3	156.0	1.5	0.0	0.0	H-Horn	AV	0.0	40.9	54.0	-13.1
7320.172	25.5	15.3	35.0	3.5	0.0	0.0	V-Horn	AV	0.0	40.8	54.0	-13.2
4879.753	27.7	12.4	305.0	1.0	0.0	0.0	V-Horn	AV	0.0	40.1	54.0	-13.9
7320.007	39.6	15.3	156.0	1.5	0.0	0.0	H-Horn	PK	0.0	54.9	74.0	-19.1
4880.195	41.9	12.4	1.0	1.4	0.0	0.0	H-Horn	PK	0.0	54.3	74.0	-19.7
12199.720	41.5	-7.7	335.0	1.0	0.0	0.0	V-Horn	AV	0.0	33.8	54.0	-20.2
7319.842	37.8	15.3	35.0	3.5	0.0	0.0	V-Horn	PK	0.0	53.1	74.0	-20.9
4879.854	38.7	12.4	305.0	1.0	0.0	0.0	V-Horn	PK	0.0	51.1	74.0	-22.9
12199.780	34.6	-7.8	355.0	1.0	0.0	0.0	H-Horn	AV	0.0	26.8	54.0	-27.2
12199.870	50.3	-7.8	335.0	1.0	0.0	0.0	V-Horn	PK	0.0	42.5	74.0	-31.5
12200.100	47.9	-7.8	355.0	1.0	0.0	0.0	H-Horn	PK	0.0	40.1	74.0	-33.9

NORTHWEST EMC		SPURIOUS RADIATED EMISSIONS DATA SHEET		PSA 2008.07.21 EMI 2010.9.21								
EUT: T3x Tag Device			Work Order: AWAR0010									
Serial Number: None			Date: 02/02/11									
Customer: Awarepoint Corporation			Temperature: 24.32 C									
Attendees: None			Humidity: 40.25% RH									
Project: None			Barometric Pres.: 1012.2 mBar									
Tested by: Jaemi Suh		Power: Battery	Job Site: OC10									
TEST SPECIFICATIONS			Test Method									
FCC 15.247:2011			ANSI C63.10:2009									
TEST PARAMETERS												
Antenna Height(s) (m)		1 - 4		Test Distance (m) 3								
COMMENTS												
Y-Axis.												
EUT OPERATING MODES												
Transmitting at 2480 MHz												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
Run #	6		<div style="text-align: right;"> <i>Signature</i>  </div>									
Configuration #	1											
Results	Pass											
												
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dbuvm	Spec. Limit dbuvm	Compared to Spec. (dB)
7440.952	27.0	15.4	229.0	1.0	0.0	0.0	H-Horn	AV	0.0	42.4	54.0	-11.6
4959.845	28.4	12.6	156.0	1.3	0.0	0.0	H-Horn	AV	0.0	41.0	54.0	-13.0
4959.870	28.4	12.6	213.0	1.5	0.0	0.0	V-Horn	AV	0.0	41.0	54.0	-13.0
7439.982	25.6	15.4	108.0	1.3	0.0	0.0	V-Horn	AV	0.0	41.0	54.0	-13.0
12399.680	42.8	-5.9	360.0	1.2	0.0	0.0	V-Horn	AV	0.0	36.9	54.0	-17.1
7440.090	38.7	15.4	229.0	1.0	0.0	0.0	H-Horn	PK	0.0	54.1	74.0	-19.9
7439.605	38.3	15.4	108.0	1.3	0.0	0.0	V-Horn	PK	0.0	53.7	74.0	-20.3
12399.760	37.8	-5.9	187.0	1.0	0.0	0.0	H-Horn	AV	0.0	31.9	54.0	-22.1
4959.678	38.6	12.6	213.0	1.5	0.0	0.0	V-Horn	PK	0.0	51.2	74.0	-22.8
4960.135	38.2	12.6	156.0	1.3	0.0	0.0	H-Horn	PK	0.0	50.8	74.0	-23.2
12399.740	51.0	-5.9	360.0	1.2	0.0	0.0	V-Horn	PK	0.0	45.1	74.0	-28.9
12399.830	48.3	-5.9	187.0	1.0	0.0	0.0	H-Horn	PK	0.0	42.4	74.0	-31.6

NORTHWEST EMC										SPURIOUS RADIATED EMISSIONS DATA SHEET				PSA 2008.07.21 EMI 2010.9.21			
EUT: T3x Tag Device										Work Order: AWAR0010							
Serial Number: P23590092										Date: 09/30/11							
Customer: Awarepoint Corporation										Temperature: 21.74 °C							
Attendees: None										Humidity: 51.15% RH							
Project: None										Barometric Pres.: 1014.7 mbar							
Tested by: Johnny Candelas										Power: Battery		Job Site: OC10					
TEST SPECIFICATIONS										Test Method							
FCC 15.247:2011										ANSI C63.10:2009							
TEST PARAMETERS																	
Antenna Height(s) (m)										1 - 4		Test Distance (m)		3			
COMMENTS																	
Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 96.1 dBuV/m - 20dB=76.1dBuV/m , EUT at Z-Axis (standing)																	
EUT OPERATING MODES																	
Transmitting at 2480 MHz																	
DEVIATIONS FROM TEST STANDARD																	
No deviations.																	
Run #		1		<div style="text-align: right;">  Signature </div>													
Configuration #		1															
Results		Pass															
																	
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)	Comments				
9921.726	51.3	-8.5	1.6	349.0	3.0	0.0	Horz	AV	0.0	42.8	76.1	-33.3					
9917.748	39.8	-8.5	1.2	104.0	3.0	0.0	Vert	AV	0.0	31.3	76.1	-44.8					
9917.906	52.9	-8.5	1.6	349.0	3.0	0.0	Horz	PK	0.0	44.4	76.1	-31.7					
9917.898	50.4	-8.5	1.2	104.0	3.0	0.0	Vert	PK	0.0	41.9	76.1	-34.2					

NORTHWEST EMC										SPURIOUS RADIATED EMISSIONS DATA SHEET				PSA 2008.07.21 EMI 2010.9.21	
EUT: T3x Tag Device										Work Order: AWAR0010					
Serial Number: P23590092										Date: 09/30/11					
Customer: Awarepoint Corporation										Temperature: 21.74 °C					
Attendees: None										Humidity: 51.15% RH					
Project: None										Barometric Pres.: 1014.7 mbar					
Tested by: Johnny Candelas						Power: Battery		Job Site: OC10							
TEST SPECIFICATIONS										Test Method					
FCC 15.247:2011										ANSI C63.10:2009					
TEST PARAMETERS															
Antenna Height(s) (m)						1 - 4		Test Distance (m)		3					
COMMENTS															
Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 96.1 dBuV/m - 20dB=76.1dBuV/m ,EUT at Z-Axis (standing)															
EUT OPERATING MODES															
Transmitting at 2440 MHz															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
Run #		4		<div style="display: flex; justify-content: space-between; align-items: center;"> <div>Signature</div> </div>											
Configuration #		1													
Results		Pass													
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)			
9757.792	41.0	-8.4	1.5	129.0	3.0	0.0	Horz	AV	0.0	32.6	76.1	-43.5			
9761.733	37.4	-8.4	1.2	109.0	3.0	0.0	Vert	AV	0.0	29.0	76.1	-47.1			
9757.817	51.3	-8.4	1.5	129.0	3.0	0.0	Horz	PK	0.0	42.9	76.1	-33.2			
9761.675	49.7	-8.4	1.2	109.0	3.0	0.0	Vert	PK	0.0	41.3	76.1	-34.8			

NORTHWEST		SPURIOUS RADIATED EMISSIONS DATA SHEET				PSA 2008.07.21 EMI 2010.9.21						
EMC												
EUT: T3x Tag Device						Work Order: AWAR0010						
Serial Number: P23590092						Date: 09/30/11						
Customer: Awarepoint Corporation						Temperature: 21.74 °C						
Attendees: None						Humidity: 51.15% RH						
Project: None						Barometric Pres.: 1014.7 mbar						
Tested by: Johnny Candelas				Power: Battery		Job Site: OC10						
TEST SPECIFICATIONS						Test Method						
FCC 15.247:2011						ANSI C63.10:2009						
TEST PARAMETERS												
Antenna Height(s) (m)				1 - 4		Test Distance (m)						
						3						
COMMENTS												
Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 96.1 dBuV/m - 20dB=76.1dBuV/m , EUT at Z-Axis (standing)												
EUT OPERATING MODES												
Transmitting at 2405 MHz												
DEVIATIONS FROM TEST STANDARD												
No deviations.												
Run #		6		<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">Signature</div> </div>								
Configuration #		1										
Results		Pass										
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)
12027.000	39.0	-7.5	1.2	341.0	3.0	0.0	Vert	AV	0.0	31.5	76.1	-44.6
12027.000	37.5	-7.5	1.2	340.0	3.0	0.0	Horz	AV	0.0	30.0	76.1	-46.1
9621.753	37.1	-8.4	1.2	319.0	3.0	0.0	Vert	AV	0.0	28.7	76.1	-47.4
9621.660	35.2	-8.4	1.0	185.0	3.0	0.0	Horz	AV	0.0	26.8	76.1	-49.3
12026.840	49.7	-7.5	1.2	341.0	3.0	0.0	Vert	PK	0.0	42.2	76.1	-33.9
12026.210	48.8	-7.6	1.2	340.0	3.0	0.0	Horz	PK	0.0	41.2	76.1	-34.9
9621.400	48.6	-8.4	1.2	319.0	3.0	0.0	Vert	PK	0.0	40.2	76.1	-35.9
9619.087	47.8	-8.4	1.0	185.0	3.0	0.0	Horz	PK	0.0	39.4	76.1	-36.7

NORTHWEST EMC										SPURIOUS RADIATED EMISSIONS DATA SHEET				PSA 2008.07.21 EMI 2010.9.21	
EUT: T3x Tag Device										Work Order: AWAR0010					
Serial Number: P23590092										Date: 09/30/11					
Customer: Awarepoint Corporation										Temperature: 21.74 °C					
Attendees: None										Humidity: 51.15% RH					
Project: None										Barometric Pres.: 1014.7 mbar					
Tested by: Johnny Candelas					Power: Battery					Job Site: OC10					
TEST SPECIFICATIONS										Test Method					
FCC 15.247:2011										ANSI C63.10:2009					
TEST PARAMETERS															
Antenna Height(s) (m)					1 - 4					Test Distance (m)		3			
COMMENTS															
Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 96.1 dBuV/m - 20dB=76.1dBuV/m , EUT at Z-Axis (standing)															
EUT OPERATING MODES															
Transmitting at 2405 MHz															
DEVIATIONS FROM TEST STANDARD															
No deviations.															
Run #		6		<div style="display: flex; justify-content: space-between; align-items: center;"> <div>Signature</div> </div>											
Configuration #		1													
Results		Pass													
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)			
7216.207	28.3	16.5	1.2	359.0	3.0	0.0	Horz	AV	0.0	44.8	76.1	-31.3			
7216.353	27.1	16.5	2.8	8.0	3.0	0.0	Vert	AV	0.0	43.6	76.1	-32.5			
7216.727	40.5	16.5	1.2	359.0	3.0	0.0	Horz	PK	0.0	57.0	76.1	-19.1			
7215.667	40.2	16.5	2.8	8.0	3.0	0.0	Vert	PK	0.0	56.7	76.1	-19.4			