

# Awarepoint Corporation

## T3E

Report No. AWAR0013

Report Prepared By



[www.nwemc.com](http://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 14, 2011**  
**Awarepoint Corporation**  
**Model: T3E**

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:**

Don Facteau, IS 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

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## 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.

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## 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.

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## 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*)

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## 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.

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## 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).

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# Accreditations and Authorizations

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## 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-3265, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

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## 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).

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## 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

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## 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)*

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## 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.

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## SCOPE

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

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



## Northwest EMC Locations



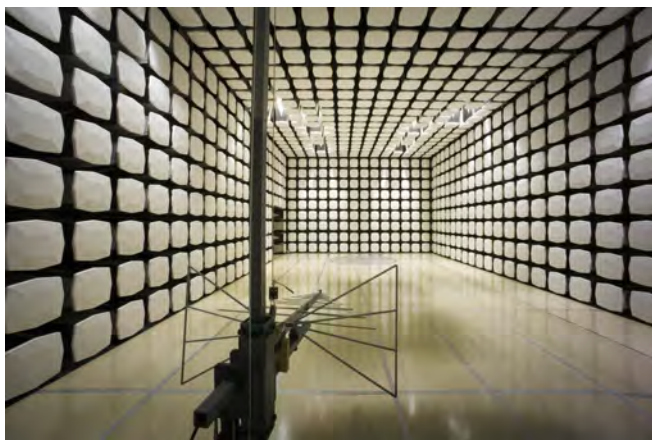
Oregon  
Labs EV01-EV12  
22975 NW Evergreen Pkwy  
Suite 400  
Hillsboro, OR 97124  
(503) 844-4066

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 339<sup>th</sup> 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**

<b>Company Name:</b>	Awarepoint Corporation
<b>Address:</b>	600 W. Broadway Suite 250
<b>City, State, Zip:</b>	San Diego, CA 92101
<b>Test Requested By:</b>	John Taylor
<b>Model:</b>	T3E
<b>First Date of Test:</b>	October 7, 2011
<b>Last Date of Test:</b>	October 14, 2011
<b>Receipt Date of Samples:</b>	October 5, 2011
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

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

Radio module that operates at 2.4 GHz ISM (802.15.4).

**Testing Objective:**

To demonstrate compliance to FCC 15.247 requirements.

**CONFIGURATION 1 AWAR0013****Software/Firmware Running during test**

Description	Version
Smart RF Studio 7	N/A

**EUT**

Description	Manufacturer	Model/Part Number	Serial Number
2.4 GHz ISM radio	Awarepoint Corporation	T3E	1700001500

**Peripherals in test setup boundary**

Description	Manufacturer	Model/Part Number	Serial Number
Host Laptop	Dell	Latitude D630	33583998997
AC/DC Power Supply	Dell	DA90PS0-00	CN-0XD757-48661-619-0BJJ

**Cables**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB Cable	Yes	1.2m	No	T3E	Host Laptop
DC Cable	Yes	2.0m	Yes	Host Laptop	AC/DC Power Supply
AC Cable	No	1.0m	No	AC/DC Power Supply	AC Mains

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	10/7/2011	Occupied 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	10/9/2011	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.
3	10/10/2011	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.
4	10/14/2011	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	10/14/2011	Band Edge Compliance	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
Near Field Probe	EMCO	7405	IPI	NCR	0
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 using a near field probe between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

**EMC****Occupied Bandwidth**

<b>EUT:</b>	T3E		<b>Work Order:</b>	AWAR0013
<b>Serial Number:</b>	1700001500		<b>Date:</b>	10/07/11
<b>Customer:</b>	Awarepoint Corporation		<b>Temperature:</b>	24.32°C
<b>Attendees:</b>	None		<b>Humidity:</b>	40.25% RH
<b>Project:</b>	None		<b>Barometric Pres.:</b>	1012.2 mBar
<b>Tested by:</b>	Mark Baytan	<b>Power:</b>	Battery	<b>Job Site:</b> OC10
<b>TEST SPECIFICATIONS</b>		<b>TEST METHOD</b>		
FCC 15.247:2011		ANSI C63.10:2009		
<b>COMMENTS</b>				
None				
<b>DEVIATIONS FROM TEST STANDARD</b>				
None				
<b>Configuration #</b>	1	<i>Signature</i> 		
		<b>Value</b>	<b>Limit</b>	<b>Result</b>

Low

1.612 MHz

≥ 500 kHz

Pass

Mid

1.613 MHz

≥ 500 kHz

Pass

High

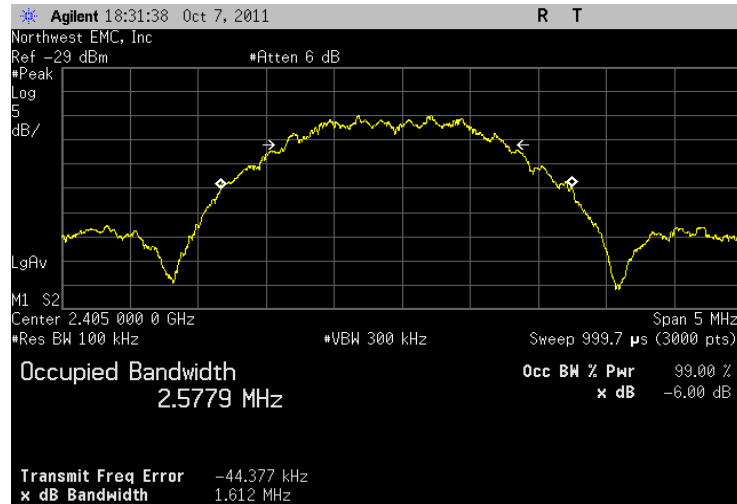
1.608 MHz

≥ 500 kHz

Pass

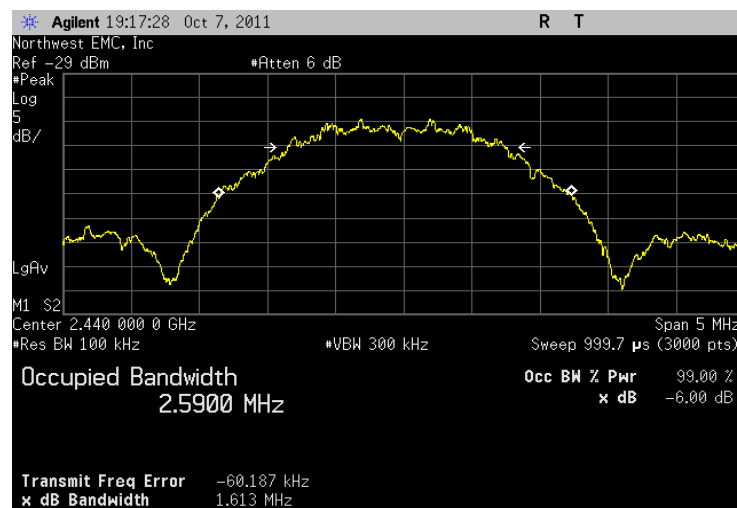
## Low

Limit		Result	
1.612 MHz	≥ 500 kHz	Pass	



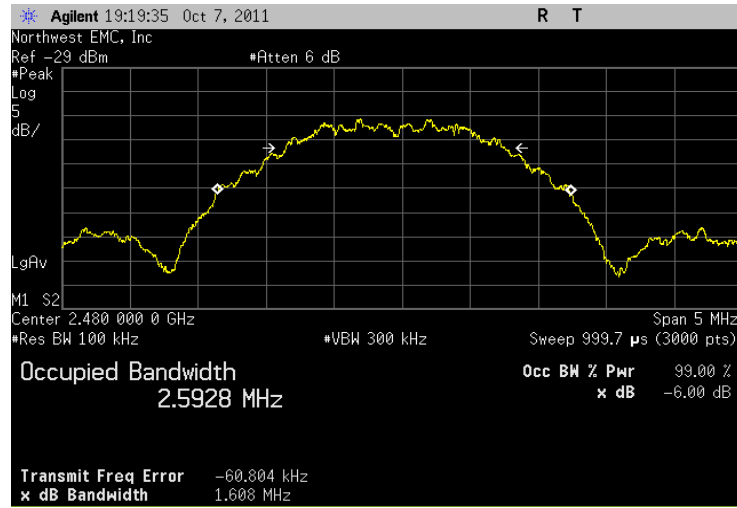
## Mid

Limit		Result	
1.613 MHz	≥ 500 kHz	Pass	



High

Limit		Result	
1.608 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

AWAR0013 - 1

#### AXIS OF EUT INVESTIGATED

X-Axis (EUT flat)

Y-Axis (EUT on side)

Z-Axis (EUT standing up)

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

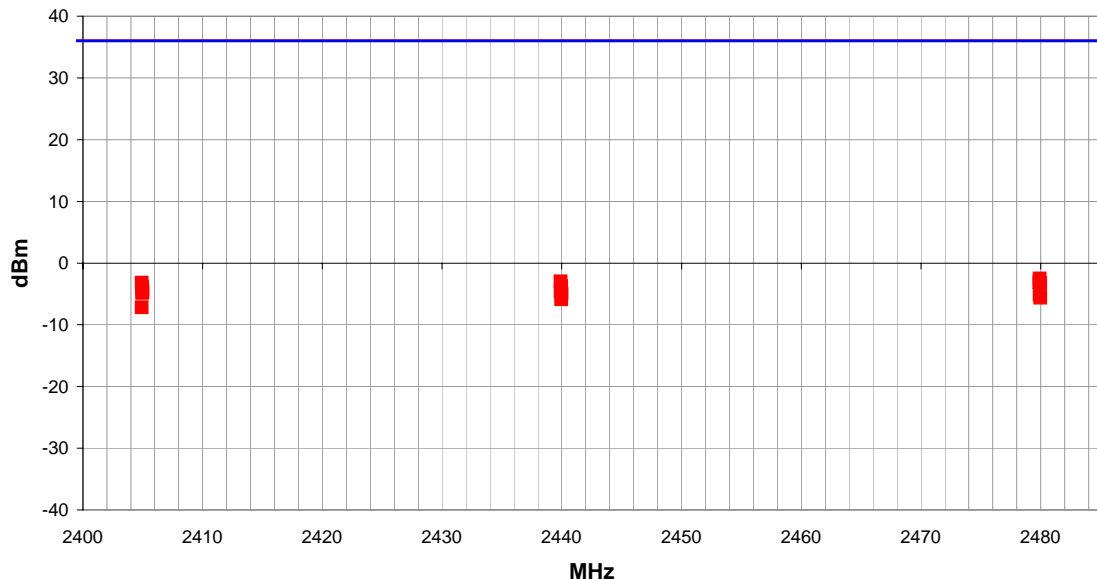
De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

**EMC****Output Power**

<b>Work Order:</b>	AWAR0013	<b>Date:</b>	10/09/11	
<b>Project:</b>	None	<b>Temperature:</b>	24.42	
<b>Job Site:</b>	OC10	<b>Humidity:</b>	54.12	
<b>Serial Number:</b>	1700001500	<b>Barometric Pres.:</b>	1016	
<b>Tested by:</b> Jaemi Suh				
<b>EUT:</b>	T3E			
<b>Configuration:</b>	1			
<b>Customer:</b>	Awarepoint Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, and 2.480GHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	EUT at Z-Axis (Standing Up)			

**Test Specifications**  
FCC 15.247:2010**Test Method**  
ANSI C63.10:2009

Run #	1	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)			Antenna Height (meters)	Azimuth (degrees)			Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
2479.920			2.9	277.0			Horz	PK	5.59E-04	-2.5	36.0	-38.5	X-Axis
2439.907			1.0	253.0			Horz	PK	5.00E-04	-3.0	36.0	-39.0	X-Axis
2479.907			2.9	295.0			Horz	PK	4.87E-04	-3.1	36.0	-39.1	Y-Axis
2404.931			1.3	141.0			Horz	PK	4.83E-04	-3.2	36.0	-39.2	Y-Axis
2479.967			1.1	184.0			Vert	PK	4.76E-04	-3.2	36.0	-39.2	Z-Axis
2479.960			1.0	275.0			Vert	PK	4.54E-04	-3.4	36.0	-39.4	Y-Axis
2439.940			2.6	43.0			Horz	PK	4.26E-04	-3.7	36.0	-39.7	Z-Axis
2404.957			1.0	255.0			Horz	PK	4.11E-04	-3.9	36.0	-39.9	X-Axis
2439.960			1.0	198.0			Vert	PK	4.07E-04	-3.9	36.0	-39.9	Y-Axis
2404.971			1.0	254.0			Vert	PK	3.75E-04	-4.3	36.0	-40.3	X-Axis
2439.920			1.5	25.0			Vert	PK	3.46E-04	-4.6	36.0	-40.6	Z-Axis
2404.971			1.8	11.0			Vert	PK	3.34E-04	-4.8	36.0	-40.8	Z-Axis
2404.971			1.4	212.0			Vert	PK	3.26E-04	-4.9	36.0	-40.9	Y-Axis
2439.980			1.8	102.0			Horz	PK	3.16E-04	-5.0	36.0	-41.0	Y-Axis
2479.920			1.8	268.0			Horz	PK	3.07E-04	-5.1	36.0	-41.1	Z-Axis
2479.967			1.0	0.0			Vert	PK	2.74E-04	-5.6	36.0	-41.6	X-Axis
2439.960			1.0	83.0			Vert	PK	2.57E-04	-5.9	36.0	-41.9	X-Axis
2404.931			1.4	123.0			Horz	PK	1.92E-04	-7.2	36.0	-43.2	Z-Axis

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
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/10/2011	12
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**

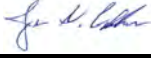
The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The measurement was made using a radiated measurement. The EUT was transmitting at the maximum data rate available.

The spectrum was scanned across each band edge from at least 10 MHz below the band edge to 10 MHz above the band edge.

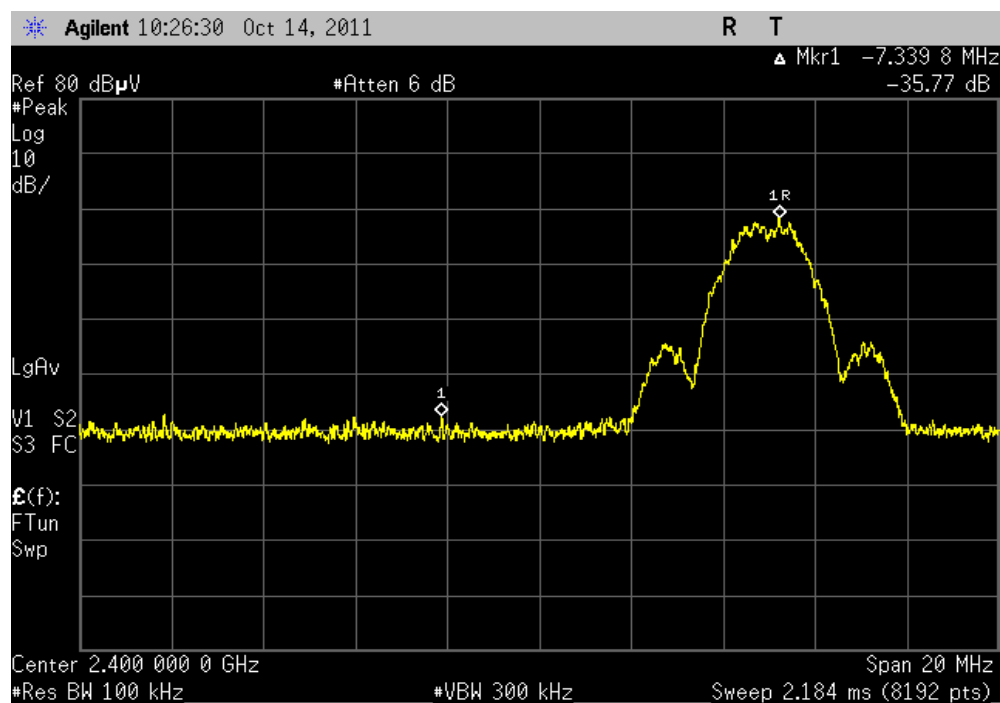


## EMC

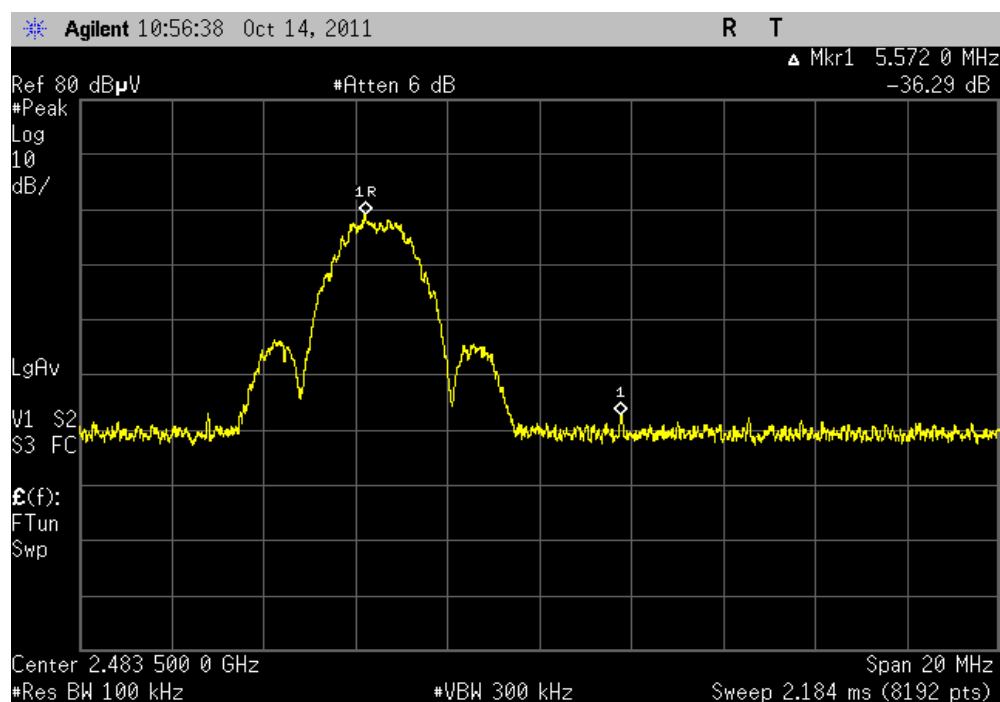
## Band Edge Compliance

EUT: T3E		Work Order: AWAR0013	
Serial Number: 1700001500		Date: 10/14/11	
Customer: Awarepoint Corporation		Temperature: 24.32°C	
Attendees: None		Humidity: 40%	
Project: None		Barometric Pres.: 1012.2	
Tested by: Johnny Candelas		Power: Battery	Job Site: OC10
TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	
COMMENTS			
Z-Axis (Standing up)			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature 	
		Value	Limit
Low 2405MHz		-35.77dB	>=20dB
High 2480MHz		-36.29dB	>=20dB
			Results
			Pass
			Pass

Low 2405MHz		
Result: Pass	Value: -35.77dB	Limit: >=20dB



High 2480MHz		
Result: Pass	Value: -36.29dB	Limit: >=20dB



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
OC10 Cables	N/A	1-8GHz RE Cables	OCJ	6/10/2011	12
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 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:

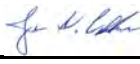
The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span 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: T3E		Work Order: AWAR0013	
Serial Number: 1700001500		Date: 10/14/11	
Customer: Awarepoint Corporation		Temperature: 24.32°C	
Attendees: None		Humidity: 40%	
Project: None		Barometric Pres.: 1012.2	
Tested by: Johnny Candelas		Power: Battery	Job Site: OC10
TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	
COMMENTS			
Z-Axis (Standing up)			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	1	Signature 	
		Value	Limit Results
Low Channel		-24.9 dBm/3kHz, EIRP	<= 8 dBm/3kHz Pass
Mid Channel		-25.0 dBm/3kHz, EIRP	<= 8 dBm/3kHz Pass
High Channel		-24.9 dBm/3kHz, EIRP	<= 8 dBm/3kHz Pass

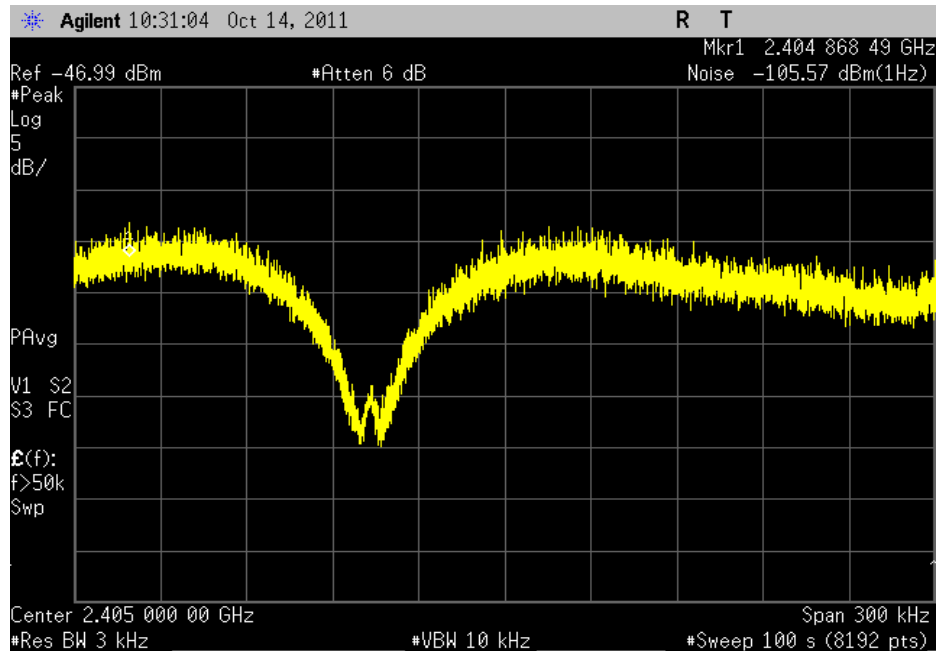
## EMC

## Power Spectral Density

## Low Channel

**Result:** Pass **Value:** -24.9 dBm/3kHz, EIRP **Limit:** <= 8 dBm/3kHz

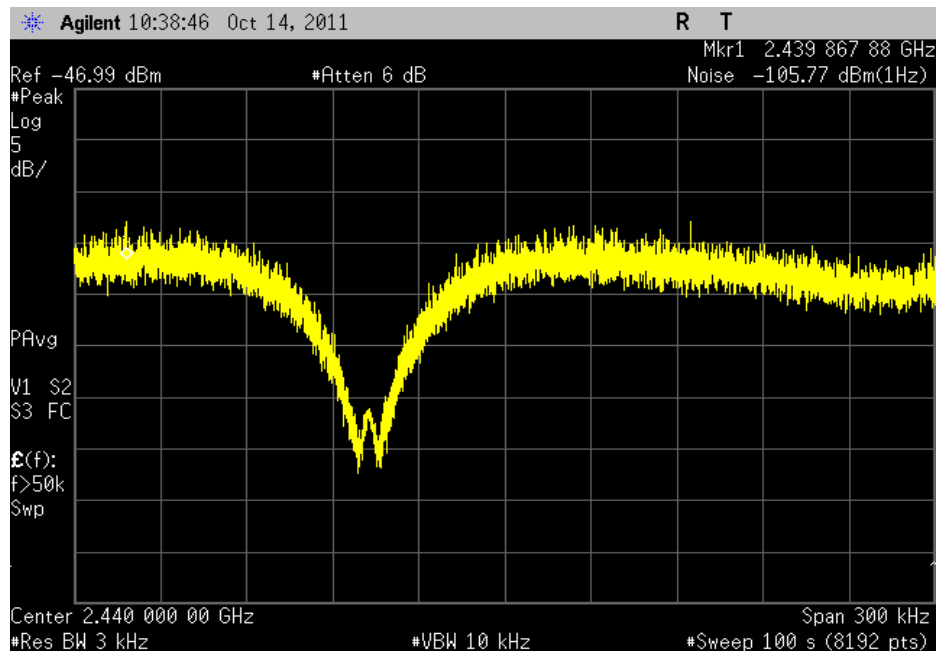
Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-105.57	-70.57	33.9	-36.67	-24.9



## Mid Channel

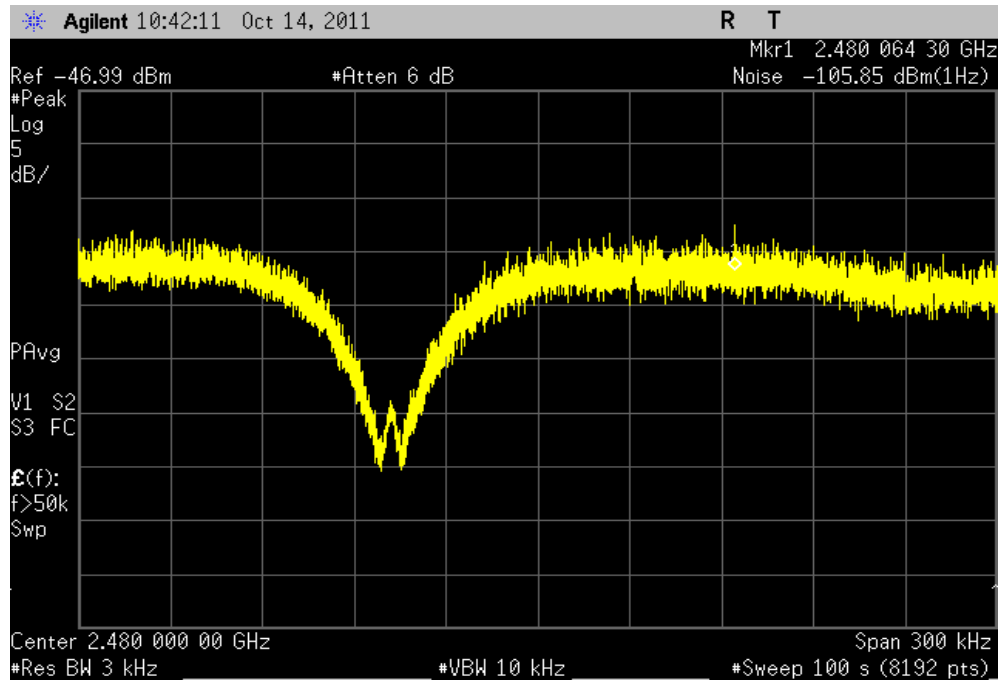
**Result:** Pass **Value:** -25.0 dBm/3kHz, EIRP **Limit:** <= 8 dBm/3kHz

Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-105.77	-70.77	34	-36.77	-25.0



High Channel			
<b>Result:</b> Pass	<b>Value:</b> -24.9 dBm/3kHz, EIRP	<b>Limit:</b> <= 8 dBm/3kHz	

Meter Reading (dBm/Hz)	Meter Reading (dBm/3kHz)	Factor (dB)	Field Strength PSD (dBm/3kHz/meter)	PSD EIRP (dBm/3kHz) (EIRP)
-105.85	-70.85	34.2	-36.65	-24.9



**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**

Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)

**POWER SETTINGS INVESTIGATED**

Battery

**CONFIGURATIONS INVESTIGATED**

AWAR0013 - 1

**FREQUENCY RANGE INVESTIGATED**

Start Frequency	30 MHz	Stop Frequency	26000 MHz
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**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
OC10 Cables	N/A	10kHz-1GHz RE Cables	OCH	6/24/2011	12 mo
Antenna, Horn	EMCO	3115	AHB	3/8/2011	24 mo
Antenna, Biconilog	EMCO	3142	AXB	3/28/2011	12 mo
Pre-Amplifier	Miteq	AM-1064-9079	AOO	6/28/2011	12 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 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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth 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 highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). 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).

# EMC

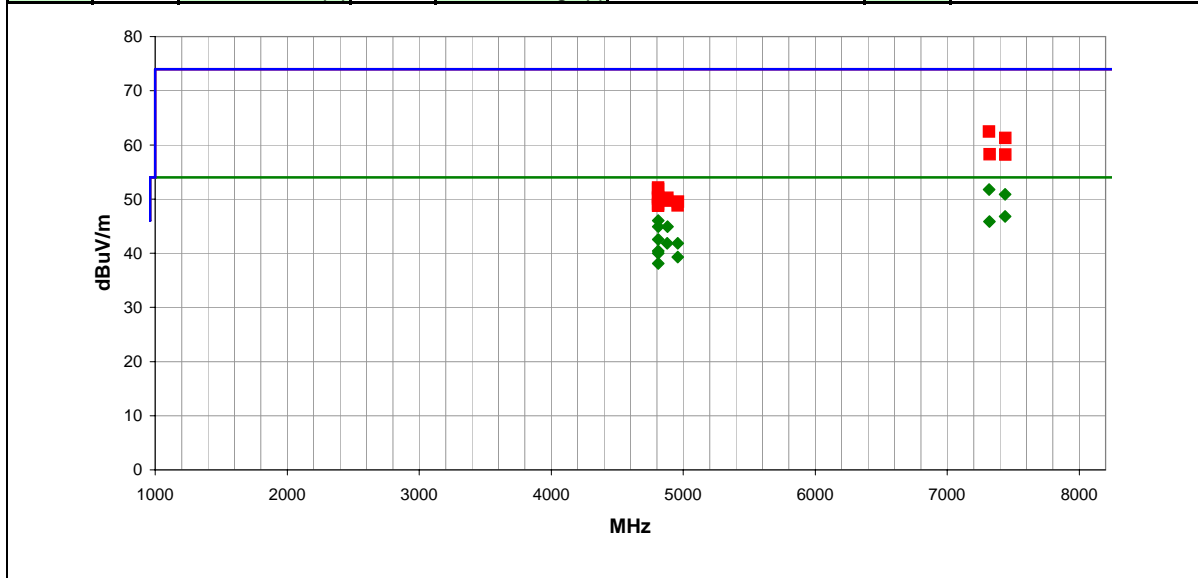
## Spurious Radiated Emissions

PSA-ESCI 2011.07.26  
PSA-ESCI Version 2011.06.23

<b>Work Order:</b>	AWAR0013	<b>Date:</b>	10/10/11	
<b>Project:</b>	None	<b>Temperature:</b>	23.14 °C	
<b>Job Site:</b>	OC10	<b>Humidity:</b>	43.68% RH	
<b>Serial Number:</b>	1700001500	<b>Barometric Pres.:</b>	1011 mbar	<b>Tested by:</b> Mark Baytan
<b>EUT:</b>	T3E			
<b>Configuration:</b>	1			
<b>Customer:</b>	Awarepoint Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	None			

<b>Test Specifications</b> FCC 15.247:2011	<b>Test Method</b> ANSI C63.10:2009
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<b>Run #</b>	7	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1-4m	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7318.715	35.1	16.7	1.0	57.0	3.0	0.0	Vert	AV	0.0	51.8	54.0	-2.2	Y-Axis
7438.643	34.3	16.6	1.0	57.0	3.0	0.0	Vert	AV	0.0	50.9	54.0	-3.1	Y-Axis
7438.496	30.2	16.6	1.0	138.0	3.0	0.0	Horz	AV	0.0	46.8	54.0	-7.2	Y-Axis
4809.945	36.5	9.5	1.1	20.0	3.0	0.0	Horz	AV	0.0	46.0	54.0	-8.0	Y-Axis
7321.130	29.2	16.7	1.0	144.0	3.0	0.0	Horz	AV	0.0	45.9	54.0	-8.1	Y-Axis
4809.911	35.4	9.5	1.2	173.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	Y-Axis
4881.870	35.1	9.8	1.0	196.0	3.0	0.0	Vert	AV	0.0	44.9	54.0	-9.1	Y-Axis
4809.925	33.0	9.5	0.0	164.0	3.0	0.0	Horz	AV	0.0	42.5	54.0	-11.5	Z-Axis
7318.347	45.8	16.7	1.0	57.0	3.0	0.0	Vert	PK	0.0	62.5	74.0	-11.5	Y-Axis
4959.875	31.6	10.2	1.0	199.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	Y-Axis
4879.939	32.0	9.8	1.2	199.0	3.0	0.0	Horz	AV	0.0	41.8	54.0	-12.2	Y-Axis
7441.315	44.7	16.6	1.0	57.0	3.0	0.0	Vert	PK	0.0	61.3	74.0	-12.7	Y-Axis
4809.951	30.9	9.5	1.2	176.0	3.0	0.0	Vert	AV	0.0	40.4	54.0	-13.6	Z-Axis
4809.938	30.5	9.5	1.2	121.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0	X-Axis
4959.905	29.1	10.2	1.0	186.0	3.0	0.0	Vert	AV	0.0	39.3	54.0	-14.7	Y-Axis
7321.619	41.6	16.7	1.0	144.0	3.0	0.0	Horz	PK	0.0	58.3	74.0	-15.7	Y-Axis
7441.172	41.6	16.6	1.0	138.0	3.0	0.0	Horz	PK	0.0	58.2	74.0	-15.8	Y-Axis
4809.938	28.6	9.5	1.2	136.0	3.0	0.0	Vert	AV	0.0	38.1	54.0	-15.9	X-Axis
4809.785	42.6	9.5	1.1	20.0	3.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	Y-Axis
4809.885	42.3	9.5	1.2	173.0	3.0	0.0	Vert	PK	0.0	51.8	74.0	-22.2	Y-Axis
4809.725	40.8	9.5	0.0	164.0	3.0	0.0	Horz	PK	0.0	50.3	74.0	-23.7	Z-Axis
4880.126	40.4	9.8	1.0	196.0	3.0	0.0	Vert	PK	0.0	50.2	74.0	-23.8	Y-Axis
4809.925	40.5	9.5	1.2	176.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	Z-Axis
4879.893	39.9	9.8	1.2	199.0	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	Y-Axis
4960.027	39.3	10.2	1.0	199.0	3.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	Y-Axis
4810.238	39.5	9.5	1.2	121.0	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	X-Axis
4959.667	38.6	10.2	1.0	186.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	Y-Axis
4810.025	39.2	9.5	1.2	136.0	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	X-Axis

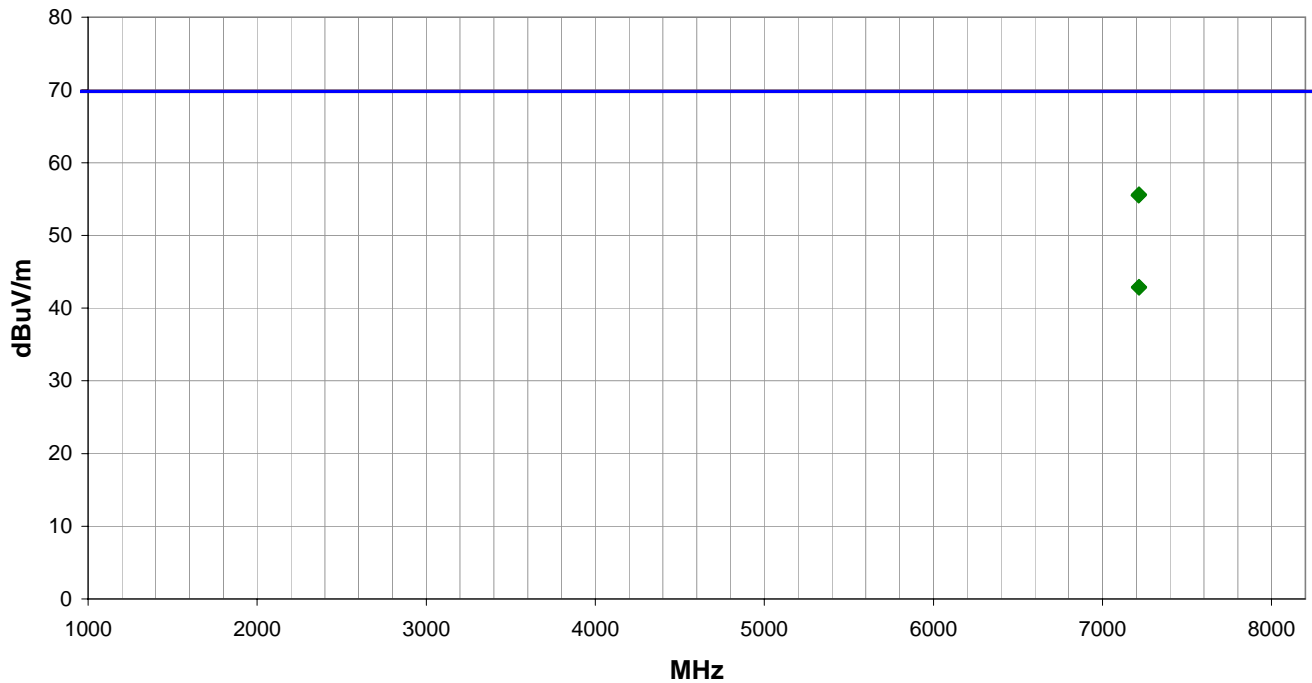


## Spurious Radiated Emissions

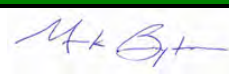
<b>Work Order:</b>	AWAR0013	<b>Date:</b>	10/10/11	
<b>Project:</b>	None	<b>Temperature:</b>	23.14 °C	
<b>Job Site:</b>	OC10	<b>Humidity:</b>	43.68% RH	
<b>Serial Number:</b>	1700001500	<b>Barometric Pres.:</b>	1011 mbar	<b>Tested by:</b> Mark Baytan
<b>EUT:</b>	T3E			
<b>Configuration:</b>	1			
<b>Customer:</b>	Awarepoint Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 89.8 dBuV/m - 20dB=69.8dBuV/m			

<b>Test Specifications</b> FCC 15.247:2011	<b>Test Method</b> ANSI C63.10:2009
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<b>Run #</b>	7	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1-4m	<b>Results</b>	Pass
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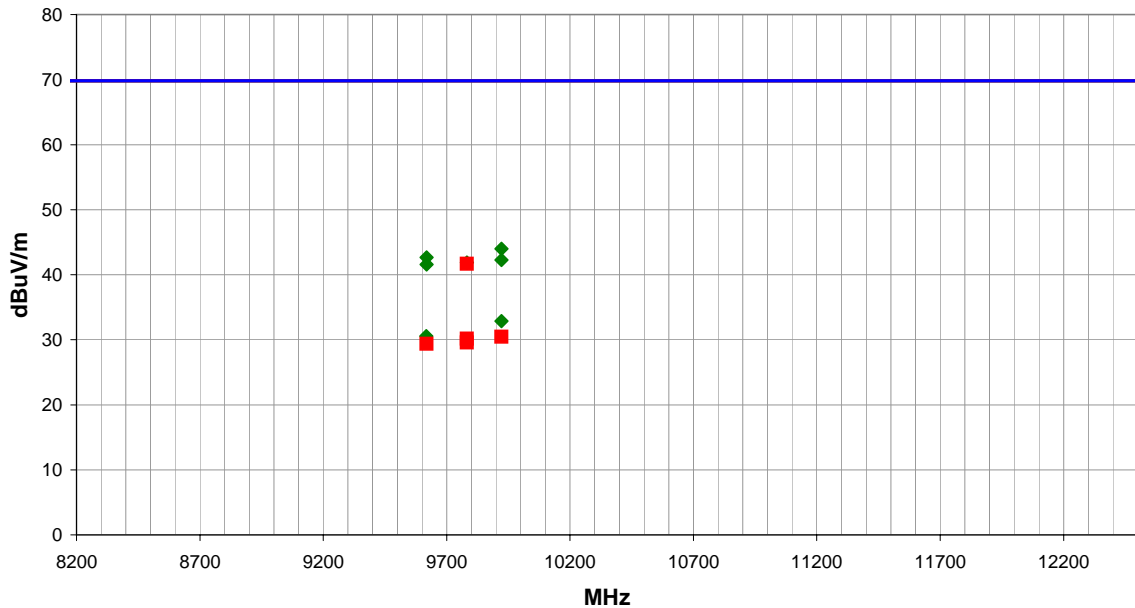


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
7216.633	39.1	16.5	1.2	76.0	3.0	0.0	Vert	PK	0.0	55.6	69.8	-14.2
7214.713	39.0	16.5	2.4	92.0	3.0	0.0	Horz	PK	0.0	55.5	69.8	-14.3
7216.320	26.4	16.5	1.2	76.0	3.0	0.0	Vert	AV	0.0	42.9	69.8	-26.9
7216.240	26.3	16.5	2.4	92.0	3.0	0.0	Horz	AV	0.0	42.8	69.8	-27.0

Work Order:	AWAR0013	Date:	10/10/11		
Project:	None	Temperature:	23.14 °C		
Job Site:	OC10	Humidity:	43.68% RH		
Serial Number:	1700001500	Barometric Pres.:	1011 mbar		
				Tested by:	Mark Baytan
EUT:	T3E				
Configuration:	1				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)				
Deviations:	None				
Comments:	Outside restricted band measurements. Limit = Lowest Radiated Output power - 20dB= 89.8 dBuV/m - 20dB=69.8dBuV/m				


<b>Test Specifications</b> FCC 15.247:2011	<b>Test Method</b> ANSI C63.10:2009
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<b>Run #</b>	8	<b>Test Distance (m)</b>	3	<b>Antenna Height(s)</b>	1-4m	<b>Results</b>	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
9921.828	52.5	-8.5	1.2	30.0	3.0	0.0	Horz	PK	0.0	44.0	69.8	-25.8
9618.182	51.1	-8.4	1.2	99.0	3.0	0.0	Horz	PK	0.0	42.7	69.8	-27.1
9921.954	50.8	-8.5	1.2	71.0	3.0	0.0	Vert	PK	0.0	42.3	69.8	-27.5
9782.013	50.3	-8.4	1.2	78.0	3.0	0.0	Vert	PK	0.0	41.9	69.8	-27.9
9782.038	50.1	-8.4	1.2	17.0	3.0	0.0	Horz	PK	0.0	41.7	69.8	-28.1
9618.248	50.0	-8.4	1.2	103.0	3.0	0.0	Vert	PK	0.0	41.6	69.8	-28.2
9921.894	41.4	-8.5	1.2	30.0	3.0	0.0	Horz	AV	0.0	32.9	69.8	-36.9
9617.988	39.0	-8.4	1.2	99.0	3.0	0.0	Horz	AV	0.0	30.6	69.8	-39.2
9921.954	39.0	-8.5	1.2	71.0	3.0	0.0	Vert	AV	0.0	30.5	69.8	-39.3
9781.938	38.6	-8.4	1.2	17.0	3.0	0.0	Horz	AV	0.0	30.2	69.8	-39.6
9781.919	38.0	-8.4	1.2	78.0	3.0	0.0	Vert	AV	0.0	29.6	69.8	-40.2
9618.041	37.8	-8.4	1.2	103.0	3.0	0.0	Vert	AV	0.0	29.4	69.8	-40.4

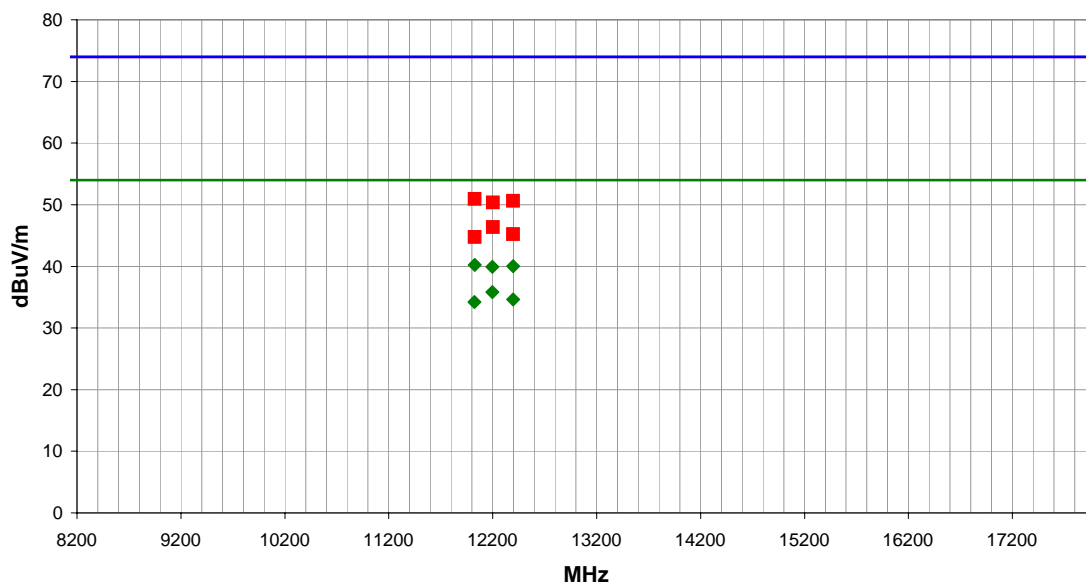
**EMC****Spurious Radiated Emissions**

<b>Work Order:</b>	AWAR0013	<b>Date:</b>	10/10/11	
<b>Project:</b>	None	<b>Temperature:</b>	23.14 °C	
<b>Job Site:</b>	OC10	<b>Humidity:</b>	43.68% RH	
<b>Serial Number:</b>	1700001500	<b>Barometric Pres.:</b>	1011 mbar	
				<b>Tested by:</b> Mark Baytan
<b>EUT:</b>	T3E			
<b>Configuration:</b>	1			
<b>Customer:</b>	Awarepoint Corporation			
<b>Attendees:</b>	None			
<b>EUT Power:</b>	Battery			
<b>Operating Mode:</b>	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)			
<b>Deviations:</b>	None			
<b>Comments:</b>	None			

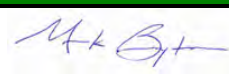
**Test Specifications**  
FCC 15.247:2011

**Test Method**  
ANSI C63.10:2009

Run #	9	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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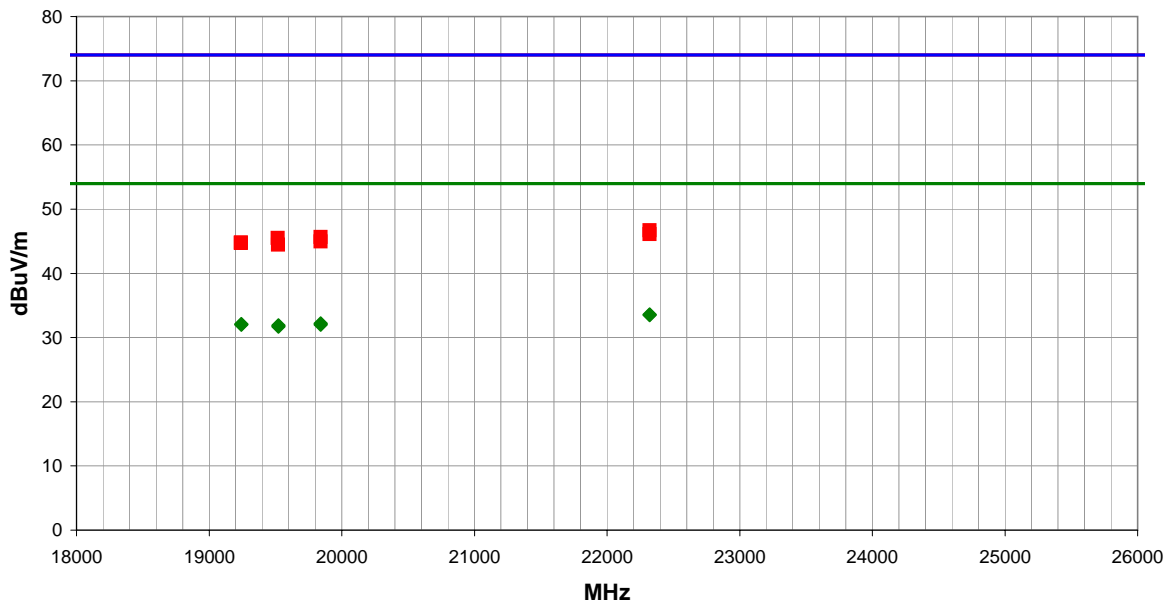


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
12027.140	47.8	-7.5	1.0	109.0	3.0	0.0	Horz	AV	0.0	40.3	54.0	-13.7
12397.440	45.7	-5.7	1.0	25.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0
12197.500	46.6	-6.7	1.0	29.0	3.0	0.0	Horz	AV	0.0	39.9	54.0	-14.1
12197.500	42.5	-6.7	1.0	130.0	3.0	0.0	Vert	AV	0.0	35.8	54.0	-18.2
12397.380	40.3	-5.7	1.0	130.0	3.0	0.0	Vert	AV	0.0	34.6	54.0	-19.4
12022.500	41.8	-7.6	1.0	130.0	3.0	0.0	Vert	AV	0.0	34.2	54.0	-19.8
12027.030	58.5	-7.5	1.0	109.0	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0
12397.320	56.3	-5.7	1.0	25.0	3.0	0.0	Horz	PK	0.0	50.6	74.0	-23.4
12202.300	57.0	-6.7	1.0	29.0	3.0	0.0	Horz	PK	0.0	50.3	74.0	-23.7
12202.150	53.0	-6.7	1.0	130.0	3.0	0.0	Vert	PK	0.0	46.3	74.0	-27.7
12397.170	50.9	-5.7	1.0	130.0	3.0	0.0	Vert	PK	0.0	45.2	74.0	-28.8
12027.330	52.3	-7.5	1.0	130.0	3.0	0.0	Vert	PK	0.0	44.8	74.0	-29.2

Work Order:	AWAR0013	Date:	10/10/11		
Project:	None	Temperature:	23.14 °C		
Job Site:	OC10	Humidity:	43.68% RH		
Serial Number:	1700001500	Barometric Pres.:	1011 mbar		
				Tested by:	Mark Baytan
EUT:	T3E				
Configuration:	1				
Customer:	Awarepoint Corporation				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	Continuous Transmit - Low, Mid, and High Channels (2.405GHz, 2.440GHz, 2.480GHz)				
Deviations:	None				
Comments:	None				

Test Specifications FCC 15.247:2011	Test Method ANSI C63.10:2009
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Run #	12	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
22321.560	31.1	2.5	1.0	359.0	3.0	0.0	Horz	AV	0.0	33.6	54.0	-20.4
22321.770	31.0	2.5	1.0	359.0	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5
19841.730	31.8	0.4	1.0	359.0	3.0	0.0	Horz	AV	0.0	32.2	54.0	-21.8
19241.950	32.2	-0.1	1.0	0.0	3.0	0.0	Horz	AV	0.0	32.1	54.0	-21.9
19241.990	32.1	-0.1	1.0	212.0	3.0	0.0	Vert	AV	0.0	32.0	54.0	-22.0
19841.770	31.6	0.4	1.0	359.0	3.0	0.0	Vert	AV	0.0	32.0	54.0	-22.0
19521.910	31.7	0.2	1.0	360.0	3.0	0.0	Vert	AV	0.0	31.9	54.0	-22.1
19521.540	31.5	0.2	1.0	360.0	3.0	0.0	Horz	AV	0.0	31.7	54.0	-22.3
22321.700	44.2	2.5	1.0	359.0	3.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3
22321.550	43.6	2.5	1.0	359.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9
19841.280	45.3	0.4	1.0	359.0	3.0	0.0	Vert	PK	0.0	45.7	74.0	-28.3
19518.470	45.3	0.2	1.0	360.0	3.0	0.0	Vert	PK	0.0	45.5	74.0	-28.5
19840.090	44.6	0.4	1.0	359.0	3.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0
19239.670	44.9	-0.1	1.0	212.0	3.0	0.0	Vert	PK	0.0	44.8	74.0	-29.2
19240.240	44.8	-0.1	1.0	0.0	3.0	0.0	Horz	PK	0.0	44.7	74.0	-29.3
19519.020	44.3	0.2	1.0	360.0	3.0	0.0	Horz	PK	0.0	44.5	74.0	-29.5