166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators
Section 15.247
Operation within the bands 902 - 928 MHz,
2400 - 2483.5 MHz, 5725 - 5875 MHz,
and 24.0 - 24.25 GHz.

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name:	MeshConnect ZICM357SP0-1 Zigbee Module
Kind of Equipment:	802.15.4 Wireless Module
Frequency Range:	2405-2480 MHz
Test Configuration:	DC powered transceiver module
Model Number(s):	ZICM357SP0-1
Model(s) Tested:	ZICM357SP0 Rev X1a (prototype) - nicknamed Gemini P0X1A on data sheets
Serial Number(s):	Radiated and DC line conducted: EMC1 RF Conducted: EMC3
Date of Tests:	March 26 through March 29, 2012
Test Conducted For:	California Eastern Laboratories 4590 Patrick Henry Drive Santa Clara, CA 95054-1817, USA

NOTICE: "This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Description of Test Sample" page listed inside of this report.

166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

SIGNATURE PAGE

Report By:

Craig Brandt
Test Engineer

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Table of Contents

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique daied January 2009).

2011-10-01 through 2012-09-30
Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

1.0 Summary of Test Report

It was determined that the California Eastern Laboratories MeshConnect ZICM357SP0-1 Zigbee Module, Model ZICM357SP0-1, complies with the requirements of CFR 47 Part 15 Subpart C Section 15.247.

Subpart C Section 15.247 Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
15.247(a)(2)	6 dB Emission Bandwidth	558074 D01 DTS Meas Guidance v01	1	Yes
15.247(b)(3)	Fundamental Emission Output Power	558074 D01 DTS Meas Guidance v01	1	Yes
15.247(e)	Maximum Power Spectral Density	558074 D01 DTS Meas Guidance v01	1	Yes
15.247(d)	Maximum Unwanted Emission Levels	558074 D01 DTS Meas Guidance v01	1	Yes
15.247(d) 15.205(a) 15.209(a)	Unwanted Emissions into Restricted Frequency Bands – Radiated	558074 D01 DTS Meas Guidance v01	2	Yes
15.247(d)	Band-Edge Measurements – Conducted	558074 D01 DTS Meas Guidance v01	1	Yes
15.247(d) 15.205(a) 15.209(a)	Band-Edge Measurements - Radiated	558074 D01 DTS Meas Guidance v01 & ANSI C63.10-2009	2	Yes
15.35(c)	Duty Cycle	Calculated	4	N/A
15.207	DC Power-Line Conducted Emissions	ANSI C63.10-2009	3	Yes

Note 1: RF conducted measurement.
Note 2: Radiated emission measurement.
Note 3: DC power line conducted measurement.
Note 4: Informative

2.0 Introduction

In March, 2012 the MeshConnect ZICM357SP0-1 Zigbee Module, Model ZICM357SP0-1, as provided from California Eastern Laboratories was tested to the requirements of CFR 47 Part 15 Subpart C Section 15.247. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.

3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Wisconsin Test Facility:
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

4.0 Description of Test Sample

Description:

The Test sample consists of an 802.15.4 specification compliant transciever mounted on an FR4 substrate which includes and integrated Printed circuit board antenna and shield covering the RF circuitry. Firmware was included which allowed different modes of operation to be set as the default state so that when DC power was applied, the unit would operate in that default state to facilitate testing of the DUT.

Type of Equipment / Frequency Range:

Mobile / 2405-2480 MHz

Physical Dimensions of Equipment Under Test:

1 inch x 1 inch

4.0 Description of Test Sample (continued)

Power Source:

3.6 VDC (Lab DC bench power supply used for testing)

Internal Frequencies:

24 MHz

Transmit / Receive Frequencies Used For Test Purpose:

Low channel: 2405 MHz, Middle channel: 2445 MHz, High channel: 2480 MHz

Type of Modulation(s) / Antenna Type:

Offset QPSK / PCB Trace Antenna

Description of Circuit Board(s) / Part Number:

Host Board	0000-01-04-00-0000, Rev X2
DUT	0011-00-04-00-005, Rev X1a

5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

D.L.S. Wisconsin - G1

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/11	7/12
Preamp	Ciao	CA118-4010	101	1GHz-18GHz	2/12	2/13
Horn Antenna	Com-Power	AH-118	071127	1-18GHz	4/10	4/12
Filter- High-Pass	Q-Microwave	100462	1	4.2GHz-18GHz	5/11	5/12
Horn Antenna	EMCO	3115	6204	1-18GHz	6/11	6/13
Signal Generator	Rhode & Schwarz	SMR40	100092	1-40 GHz	2/12	2/13
Preamp	Miteq	AMF-8B-180265-40-10P-H/S	438727	18GHz-26GHz	8/11	8/12
Horn Antenna	EMCO	3116	2549	18 – 40GHz	8/10	8/12
High Pass Filter	Planar	CL22500-9000-CD-SS	PF1229/0728	15-40 GHz	8/11	8/12
20 dB attenuator	Aeroflex/weinschel	75A-20-12	1071	DC – 40 GHz	6/11	6/12
DC Power Supply	Hewlet Packard	6200B	6J4327	N/A	N/A	N/A
Multimeter	Fluke	77	43390985	N/A	8/11	8/12

D.L.S. Wisconsin – OATS 2

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	4/11	4/12
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	1/12	1/13
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	9/10	9/12
Antenna	EMCO	3146	1205	200 MHz – 1 GHz	9/10	9/12
Low Pass Filter	Mini-Circuits	VLFX-1125	RUU92600920	DC-1125 MHz	8/11	8/12

5.0 Test Equipment - continued

D.L.S. Wisconsin – Screen Room

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Dates	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/11	7/12
LISN	Solar	9252-50-R-24-BNC	961019	9 kHz – 30 MHz	6/11	6/12
Filter- High-Pass	SOLAR	7930-120	090702	120 kHz – 30 MHz	1/12	1/13
Limiter	Electro-Metrics	EM-7600	706	9 kHz – 30 MHz	1/12	1/13
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	7/11	7/12

6.0 Test Arrangements

Radiated Emissions Measurement Arrangement:

All radiated emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to FCC KDB 558074 D01 DTS Meas Guidance v01, ANSI C63.4-2009 and ANSI C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

RF Conducted Emissions Measurement Arrangement:

All RF conducted emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to FCC KDB 558074 D01 DTS Meas Guidance v01, ANSI C63.4-2009 and ANSI C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up.

7.0 Test Conditions

Normal Test Conditions:

Temperature and Humidity:

68°F at 49% RH

Supply Voltage:

3.6 VDC

8.0 Modifications Made To EUT For Compliance

The output power setting on channel 26 was changed from 8 to 0 to meet the radiated band-edge requirement at the 2.4835 GHz restricted band edge.

9.0 Additional Descriptions

The EUT was connected to the measuring equipment through a temporary SMA connector, soldered in place of the antenna, for RF conducted measurements.

The EUT was powered with an external DC bench supply.

The EUT was tested stand-alone for Single Modular Approval.

The EUT was programmed to transmit continuously at Low, Mid, and High channels.

The EUT was rotated through 3 orthoganal axis to find worst-case.

10.0 Results

Measurements were performed in accordance with FCC KDB 558074 D01 DTS Meas Guidance v01, ANSI C63.4-2009 and ANSI C63.10-2009. Graphical and tabular data can be found in Appendix B at the end of this report.

11.0 Conclusion

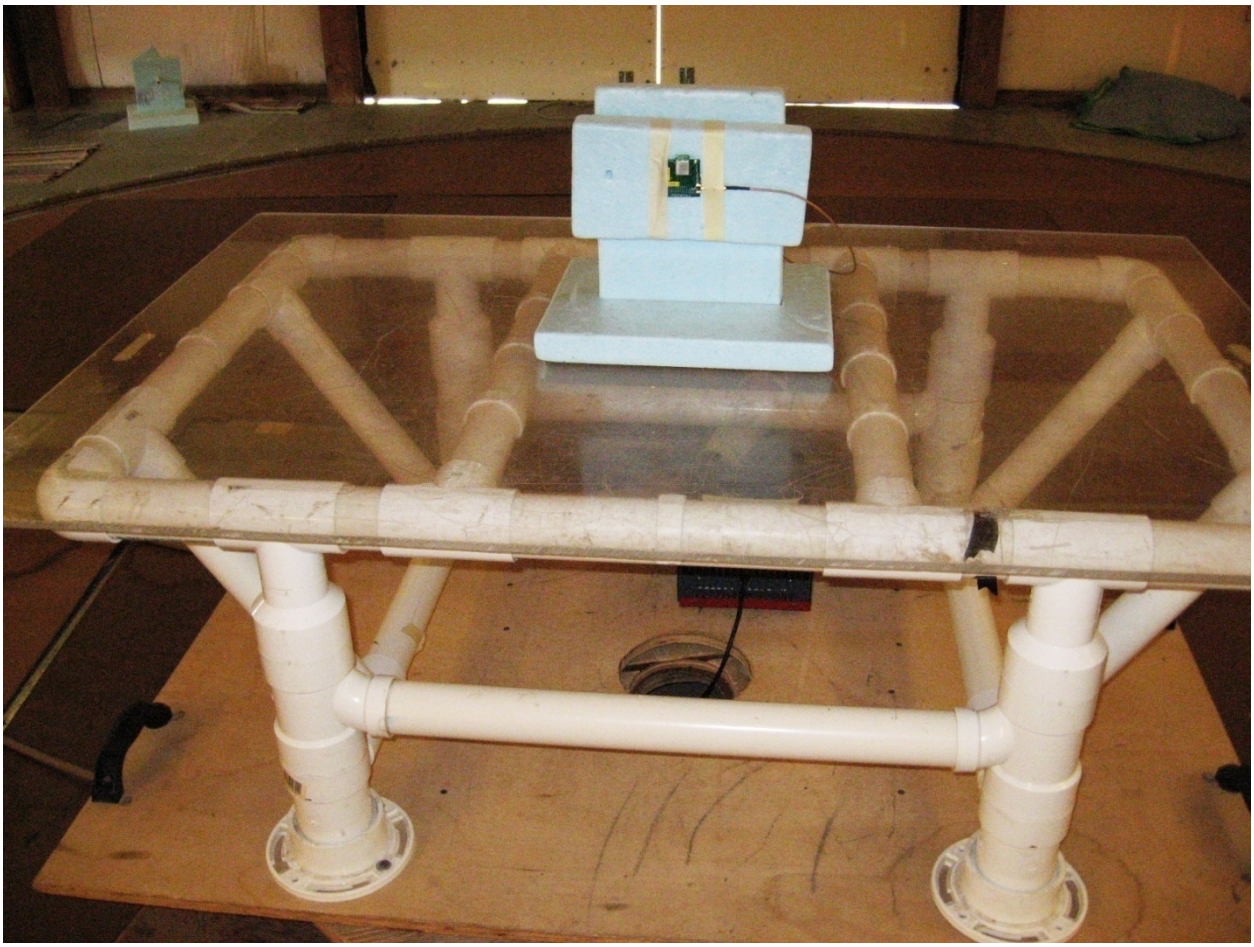
The MeshConnect ZICM357SP0-1 Zigbee Module, Model ZICM357SP0-1, as provided from California Eastern Laboratories, tested in March, 2012 **meets** the requirements of CFR 47 Part 15 Subpart C Section 15.247.

Appendix A – Test Photos

Photo Information and Test Setup:

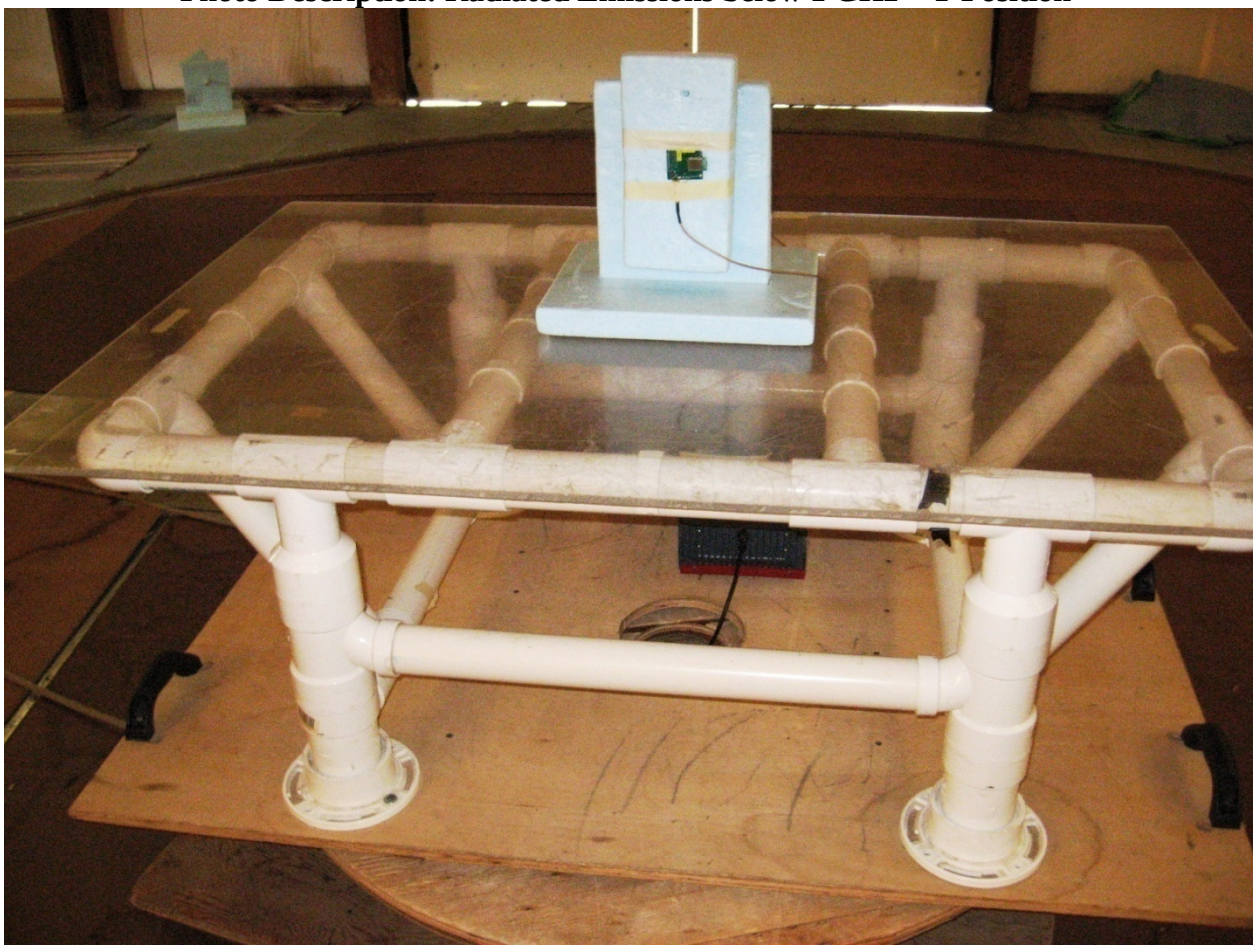
Item0: MeshConnect ZICM357SP0-1 Zigbee Module, Model ZICM357SP0-1
Item1: DC Power cable (coax) to DC bench supply, 1 meter long with metal SMA connector.

Radiated Emissions below 1 GHz – X Position



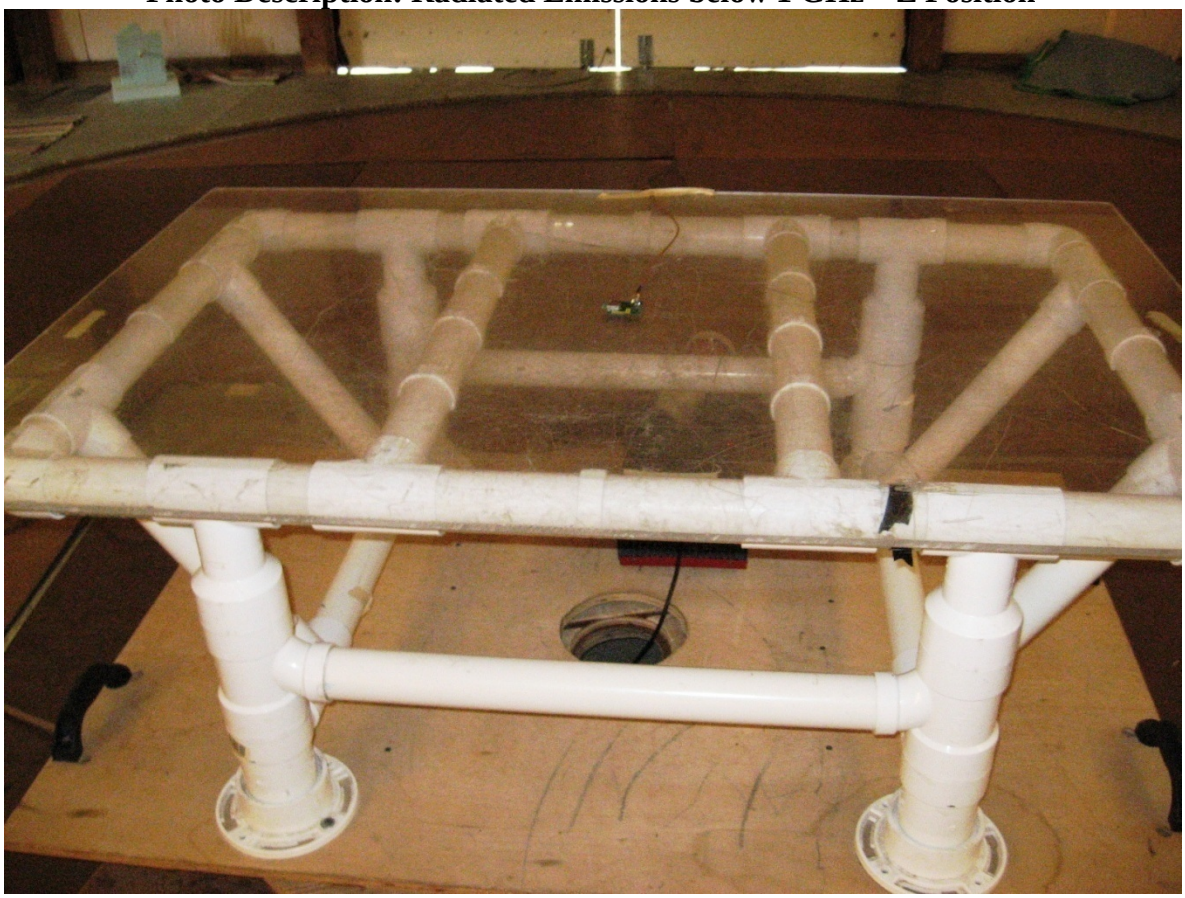
Appendix A

Photo Description: Radiated Emissions below 1 GHz – Y Position



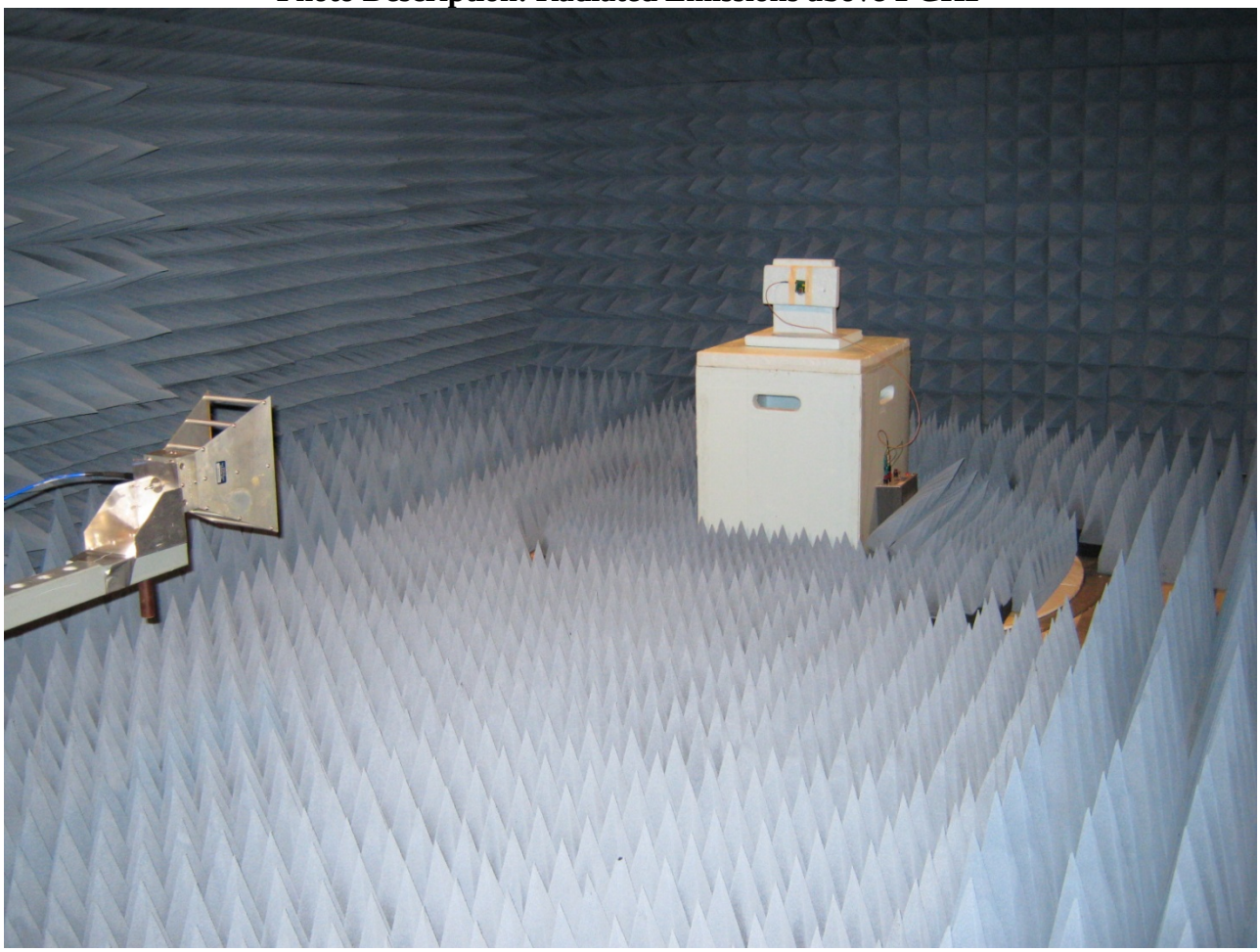
Appendix A

Photo Description: Radiated Emissions below 1 GHz – Z Position



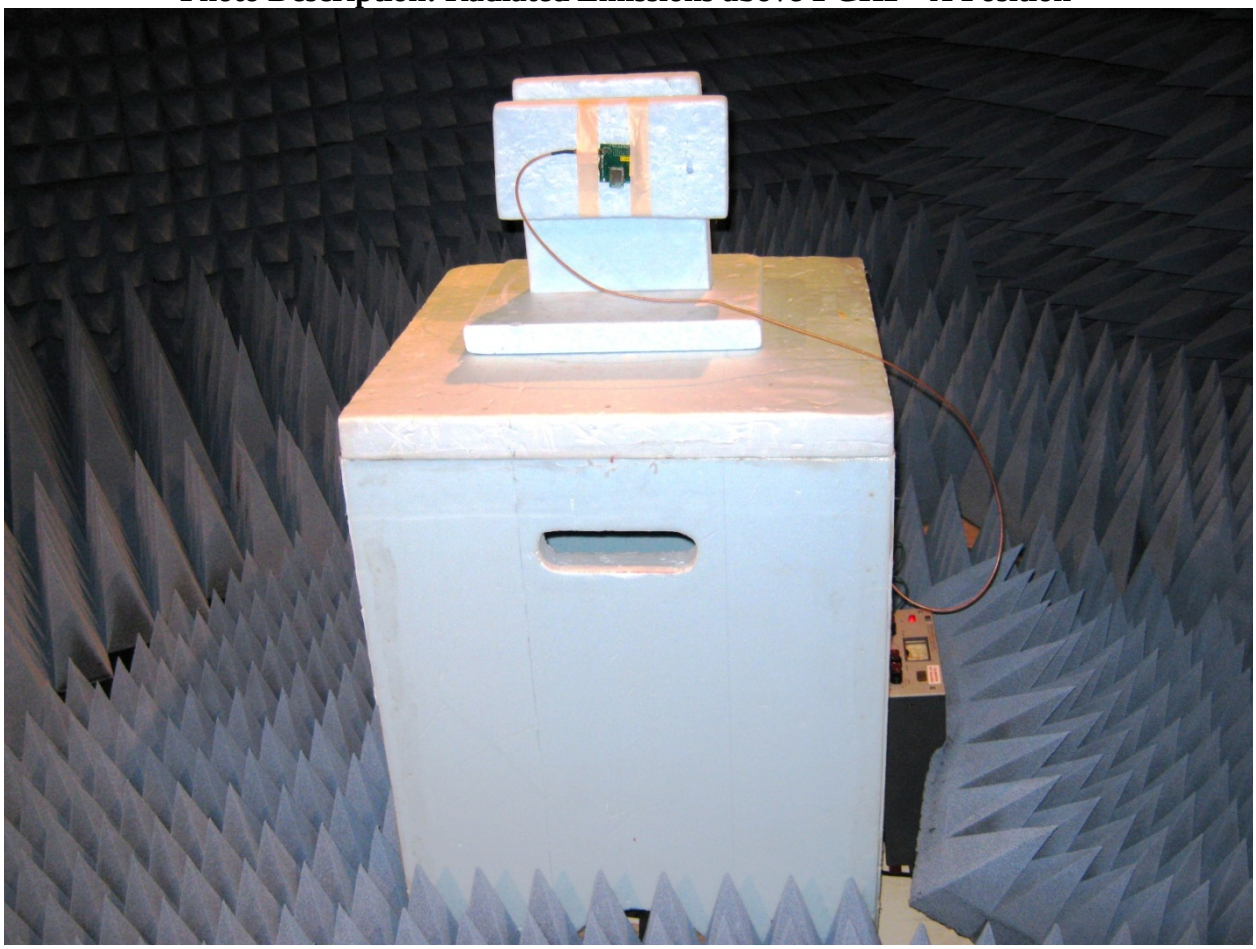
Appendix A

Photo Description: Radiated Emissions above 1 GHz



Appendix A

Photo Description: Radiated Emissions above 1 GHz – X Position



Appendix A

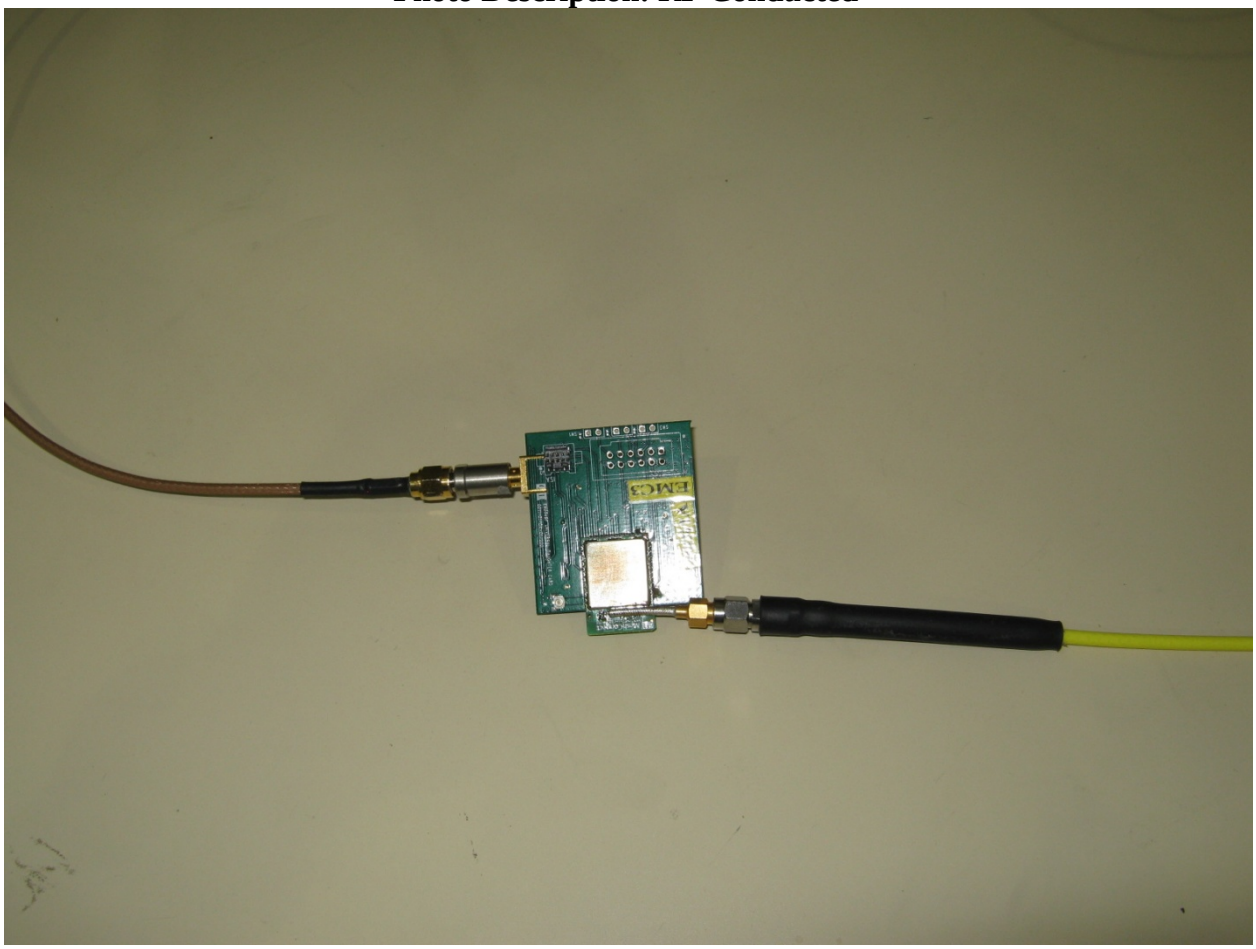
Photo Description: Radiated Emissions above 1 GHz – Y Position

Appendix A

Photo Description: Radiated Emissions above 1 GHz – Z Position

Appendix A

Photo Description: RF Conducted



Appendix A

Photo Description: DC Line Conducted – Front

Appendix A

Photo Description: DC Line Conducted – Back

Appendix B – Measurement Data

1.0 6 dB Emission Bandwidth

Rule Part:

Section 15.247(a)(2)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Emission Bandwidth (EBW), Section 5.1
EBW Measurement Procedure, Section 5.1.1

Limit:

6 dB bandwidth shall be at least 500 kHz

Results:

Compliant
Maximum 6 dB bandwidth: **1.84 MHz**

Notes:

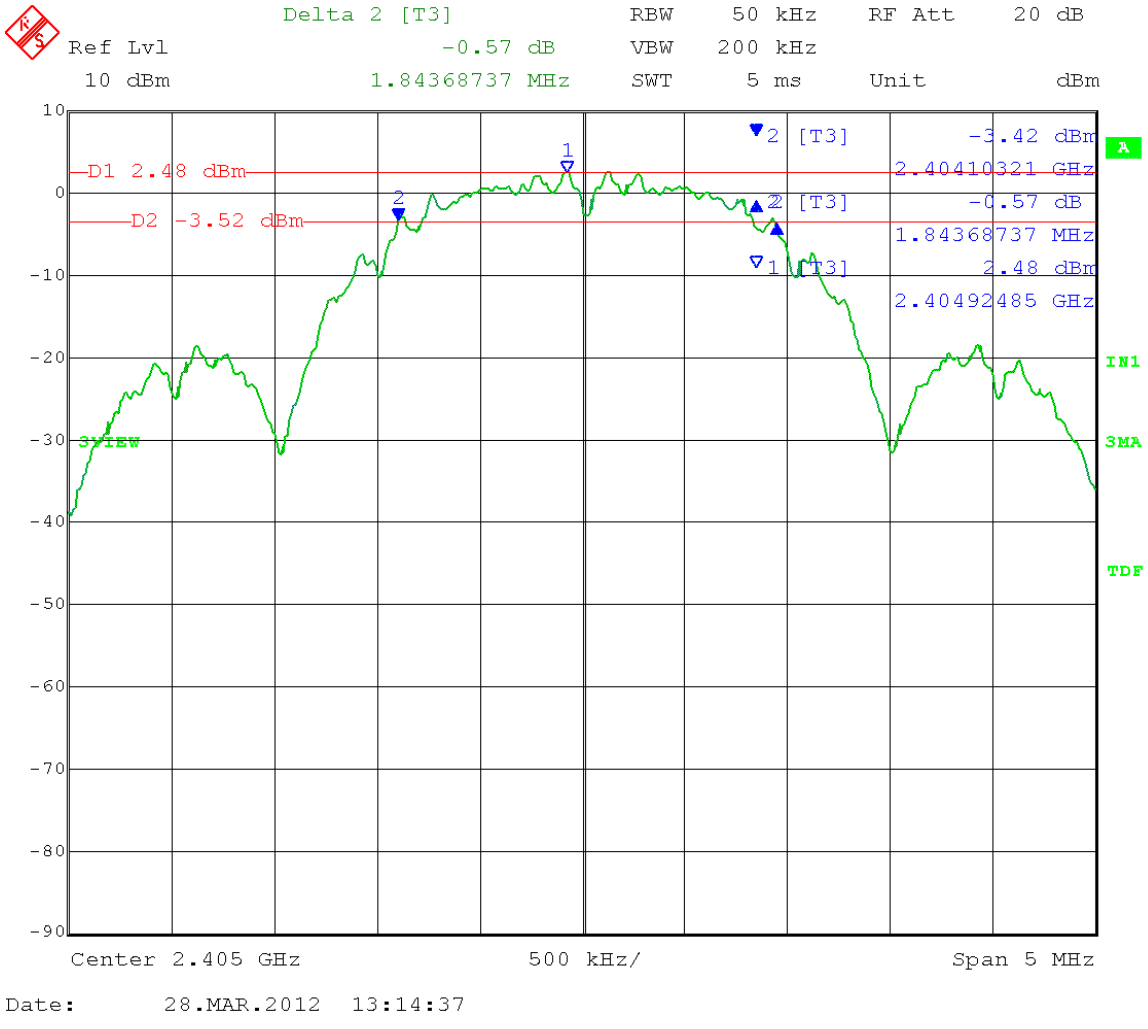
This was an RF conducted measurement. The EUT was connected to the measuring equipment through an SMA connector soldered in place of the antenna. Cable loss and attenuation was accounted for in the transducer factors set in the analyzer.
The EUT was powered through a cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Emission Bandwidth (6 dB) - Conducted
Operator: Craig B

Comment: RBW = 1-5% of EBW
VBW ≥ 3 x RBW
Detector = Peak
Sweep = auto couple

Comment: Low Channel: Frequency – 2.405 GHz
Output power setting 8

6 dB Emission Bandwidth = 1.84 MHz



166 South Carter, Genoa City, WI 53128

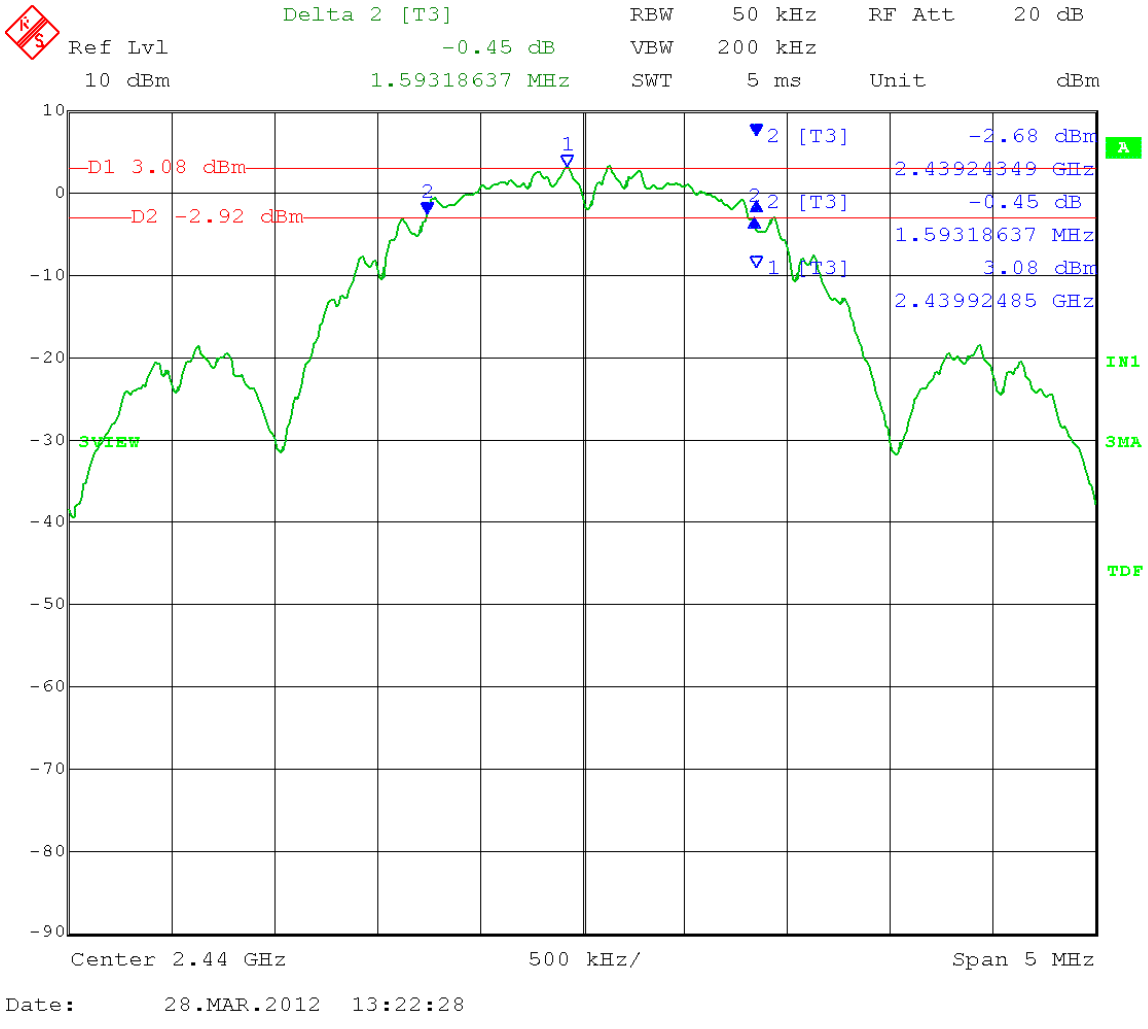
Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Emission Bandwidth (6 dB) - Conducted
Operator: Craig B

Comment: RBW = 1-5% of EBW
VBW ≥ 3 x RBW
Detector = Peak
Sweep = auto couple

Comment: Middle Channel: Frequency – 2.440 GHz
Output power setting 8

6 dB Emission Bandwidth = 1.59 MHz

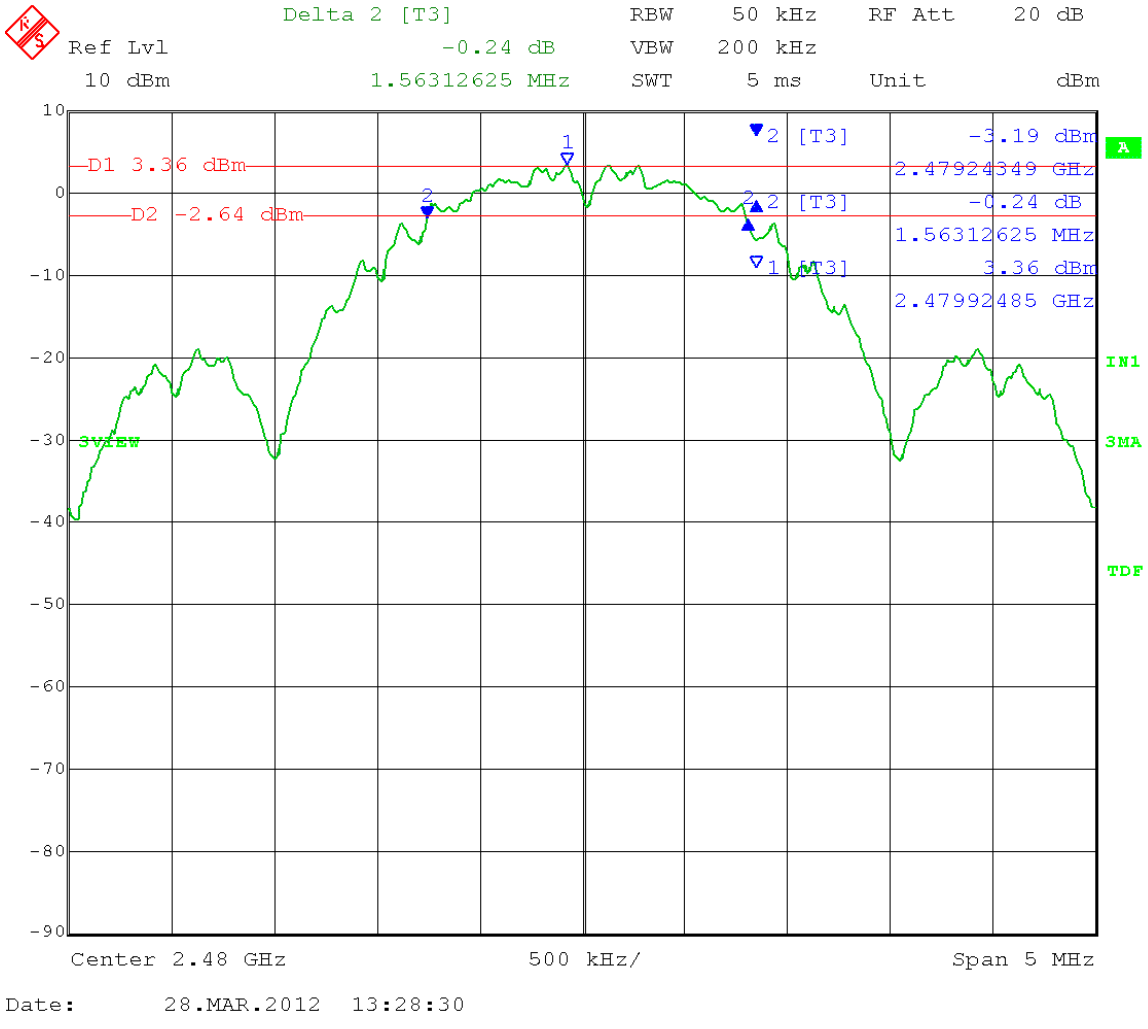


Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Emission Bandwidth (6 dB) - Conducted
Operator: Craig B

Comment: RBW = 1-5% of EBW
VBW ≥ 3 x RBW
Detector = Peak
Sweep = auto couple

Comment: High Channel: Frequency – 2.480 GHz
Output power setting 8

6 dB Emission Bandwidth = 1.56 MHz



Appendix B

2.0 Fundamental Emission Output Power

Rule Part:

15.247(b)(3)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Maximum Peak Conducted Output Power Level, Section 5.2.1
Measurement Procedure PK1, Section 5.2.1.1

Limit:

The maximum peak conducted output power is 1 watt (30 dBm).

Results:

Compliant
Maximum peak conducted output power: **6.62 mW (8.21 dBm)**

Notes:

This was an RF conducted measurement. The EUT was connected to the measuring equipment through an SMA connector soldered in place of the antenna. Cable loss and attenuation was accounted for in the transducer factors set in the analyzer.
The EUT was powered through a cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

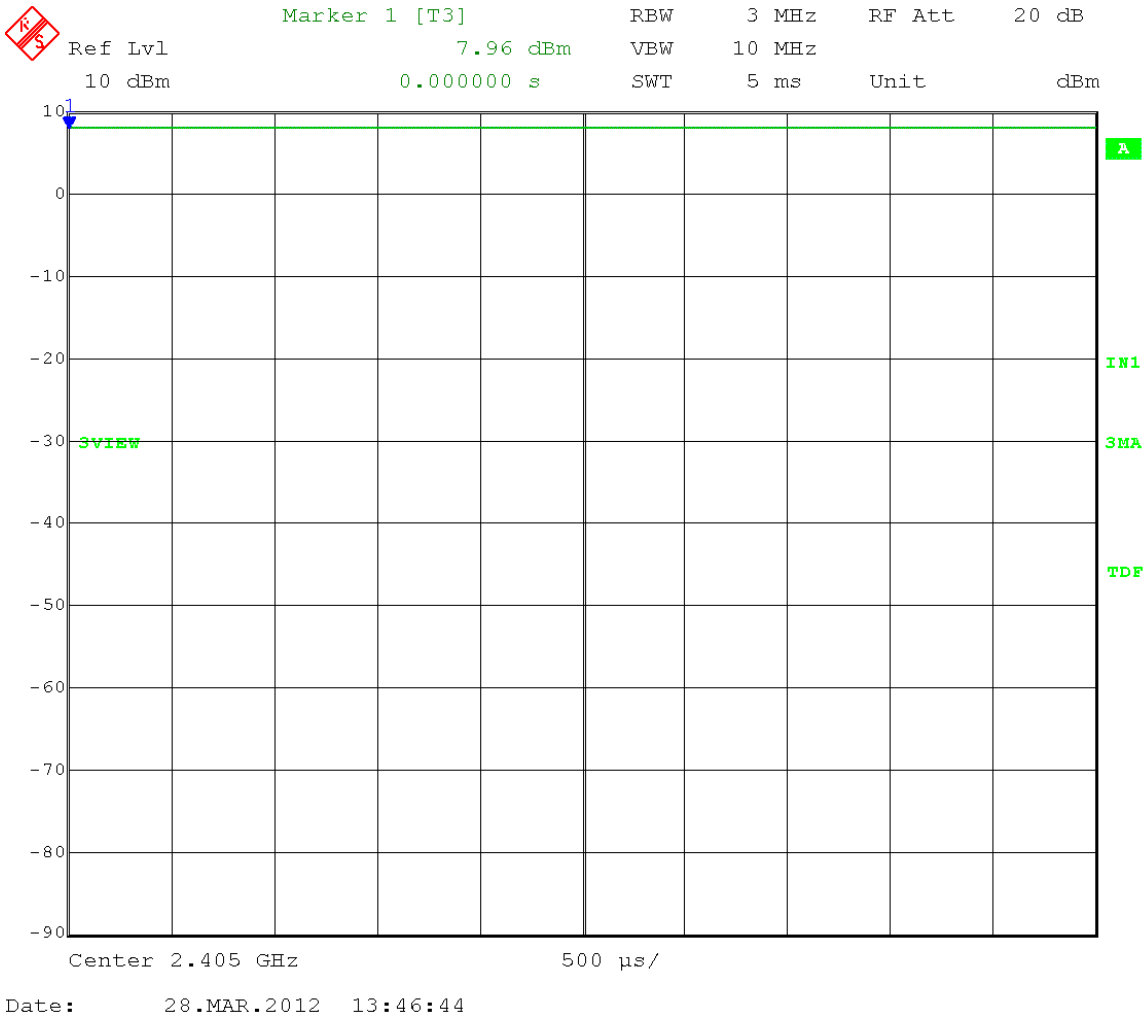
The High channel (channel 26) power setting was reduced from 8 to 0 to meet the radiated upper band-edge requirement at the 2.4835 GHz restricted frequency band edge.

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Fundamental Emission Output Power - Conducted
Operator: Craig B

Comment: RBW ≥ EBW
VBW ≥ 3 x RBW
Span = zero
Sweep = auto couple
Detector = Peak
Trace = max hold

Comment: Low Channel: Frequency – 2.405 GHz
Output power setting 8

Fundamental Emission Output Power = 7.96 dBm = **6.25 mW**

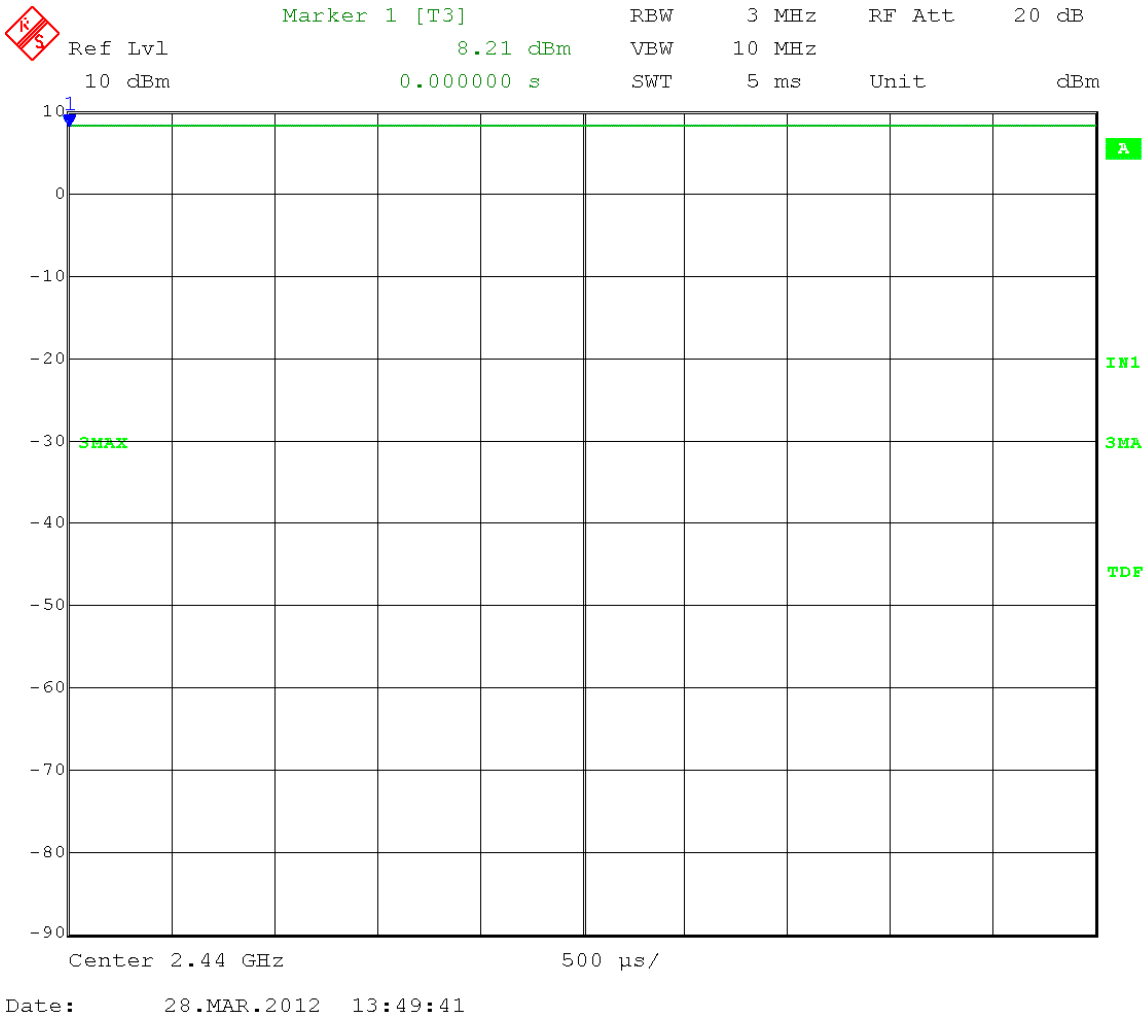


Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Fundamental Emission Output Power - Conducted
Operator: Craig B

Comment: RBW ≥ EBW
VBW ≥ 3 x RBW
Span = zero
Sweep = auto couple
Detector = Peak
Trace = max hold

Comment: Middle Channel: Frequency – 2.440 GHz
Output power setting 8

Fundamental Emission Output Power = 8.21 dBm = **6.62 mW**

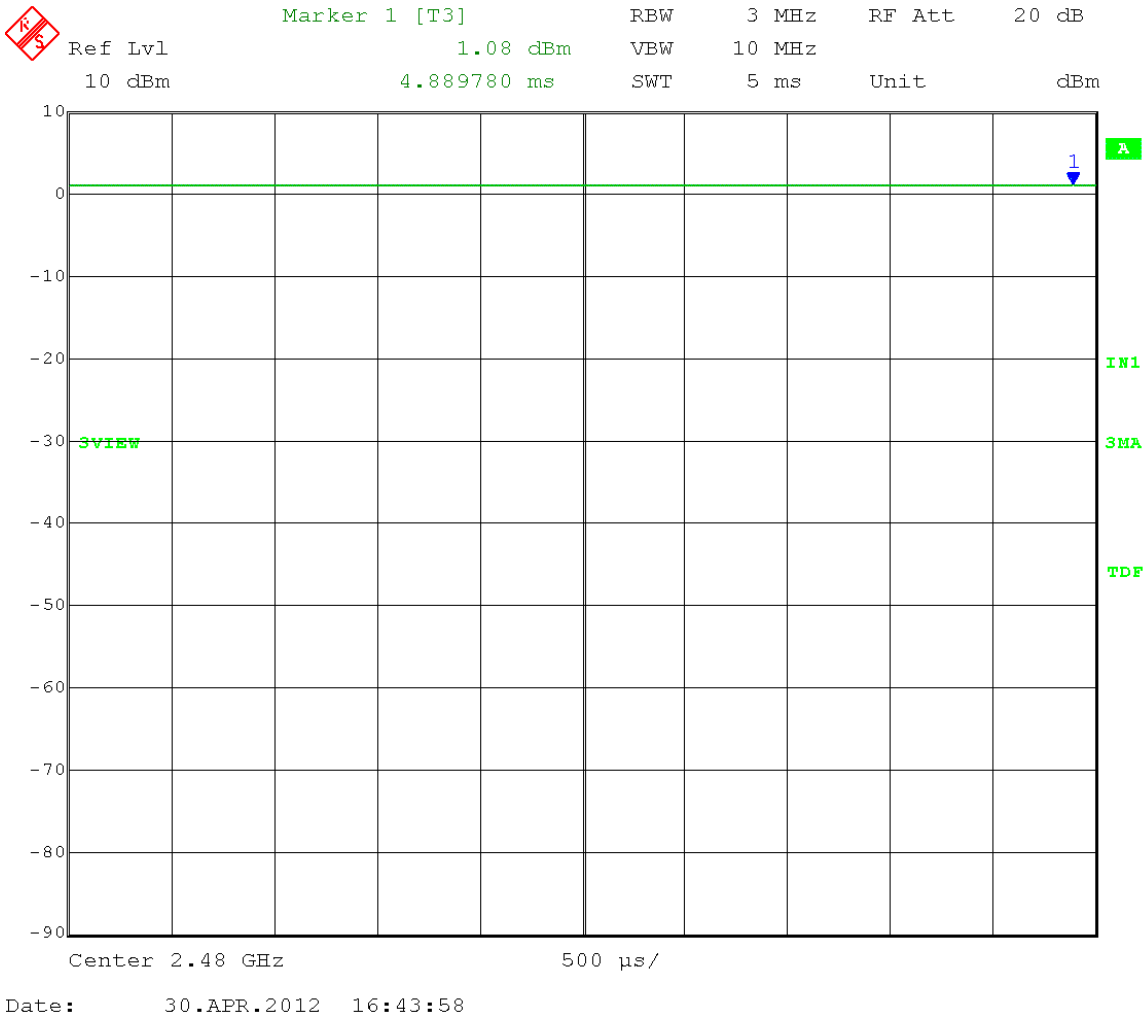


Test Date: 04-30-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Fundamental Emission Output Power - Conducted
Operator: Craig B

Comment: RBW ≥ EBW
VBW ≥ 3 x RBW
Span = zero
Sweep = auto couple
Detector = Peak
Trace = max hold

Comment: High Channel: Frequency – 2.480 GHz
Output power setting 0

Fundamental Emission Output Power = 1.08 dBm = **1.28 mW**

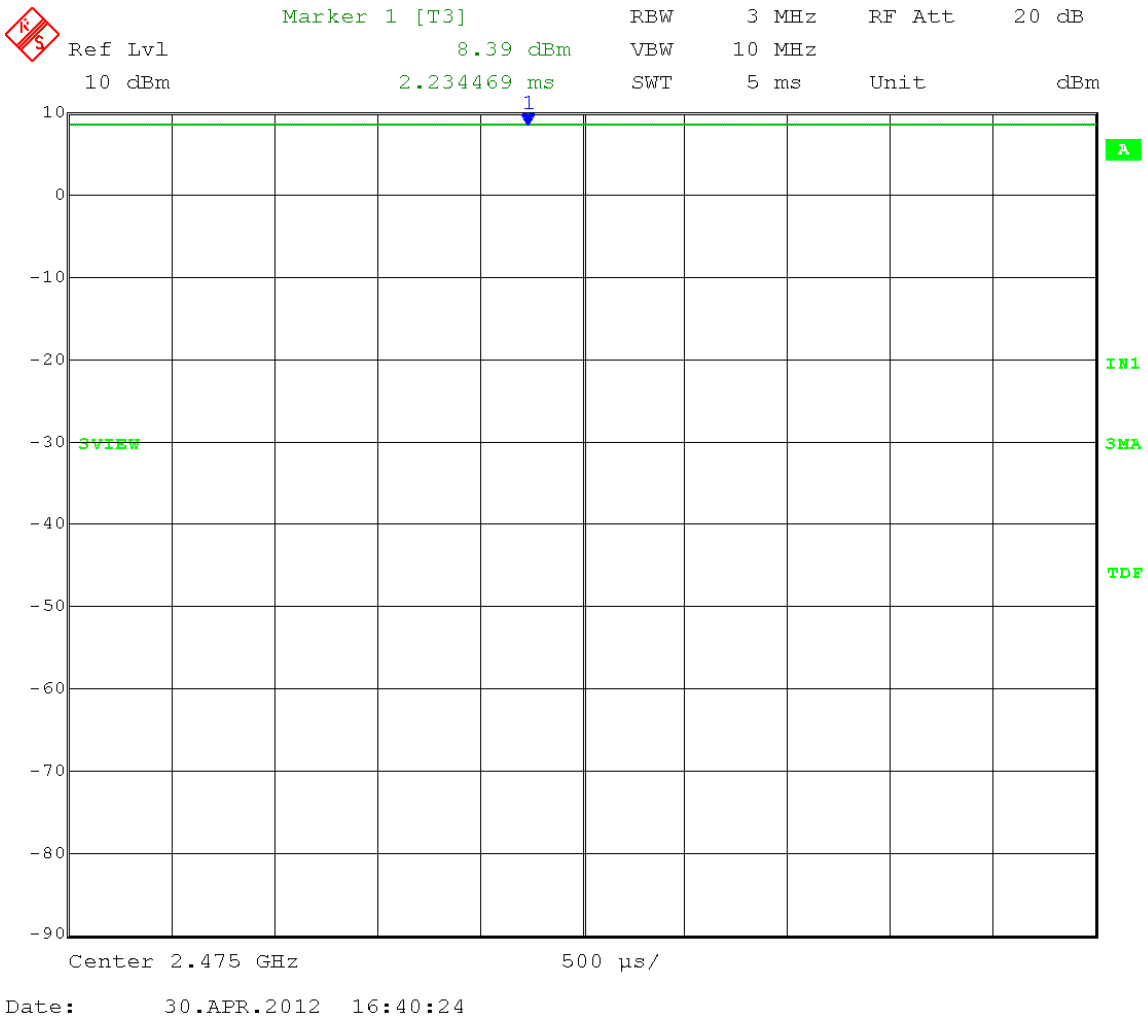


Test Date: 04-30-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Fundamental Emission Output Power - Conducted
Operator: Craig B

Comment: RBW ≥ EBW
VBW ≥ 3 x RBW
Span = zero
Sweep = auto couple
Detector = Peak
Trace = max hold

Comment: Next-to-High Channel: Frequency – 2.475 GHz
Output power setting 8

Fundamental Emission Output Power = 8.39 dBm = **6.90 mW**



Appendix B

3.0 Maximum Power Spectral Density (PSD)

Rule Part:

15.247(e)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Maximum Power Spectral Density Level in the Fundamental Emission, Section 5.3
Measurement Procedure PKPSD, Section 5.3.1

Limit:

8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission.

Results:

Compliant
Maximum conducted power spectral density (PSD): **-10.33 dBm**

Notes:

This was an RF conducted measurement. The EUT was connected to the measuring equipment through an SMA connector soldered in place of the antenna. Cable loss and attenuation was accounted for in the transducer factors set in the analyzer.
The EUT was powered through a cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

The High channel (channel 26) power setting was reduced from 8 to 0 to meet the radiated upper band-edge requirement at the 2.4835 GHz restricted frequency band edge.

166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

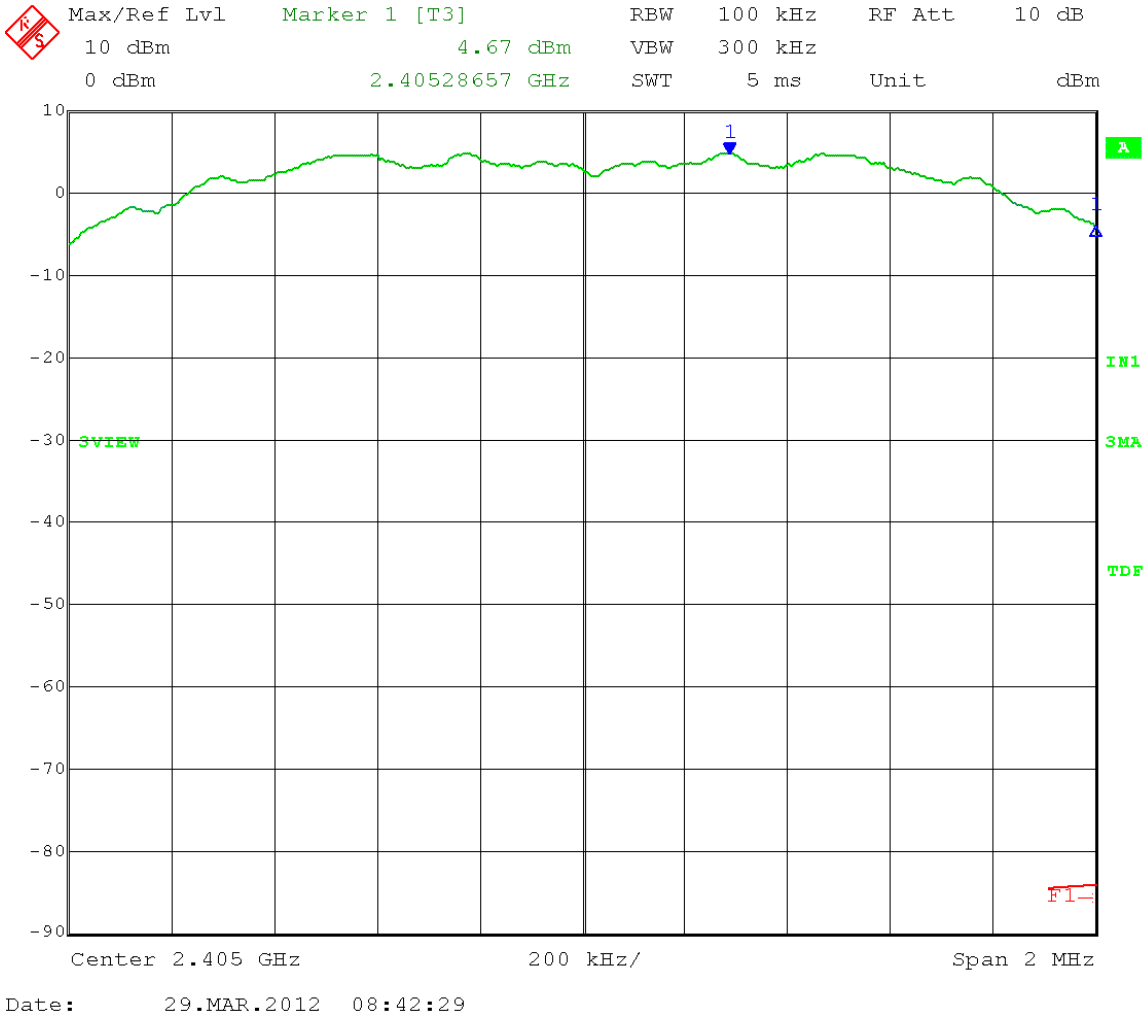
Test Date:	03-29-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Maximum Power Spectral Density - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel: Frequency – 2.405 GHz
Output power setting 8

Limit: 8 dBm

Power Level in 3 kHz bandwidth = 4.67 dBm + (10log (3 kHz/100 kHz)
= 4.67 dBm + (-15.2 dB) = **-10.53 dBm**

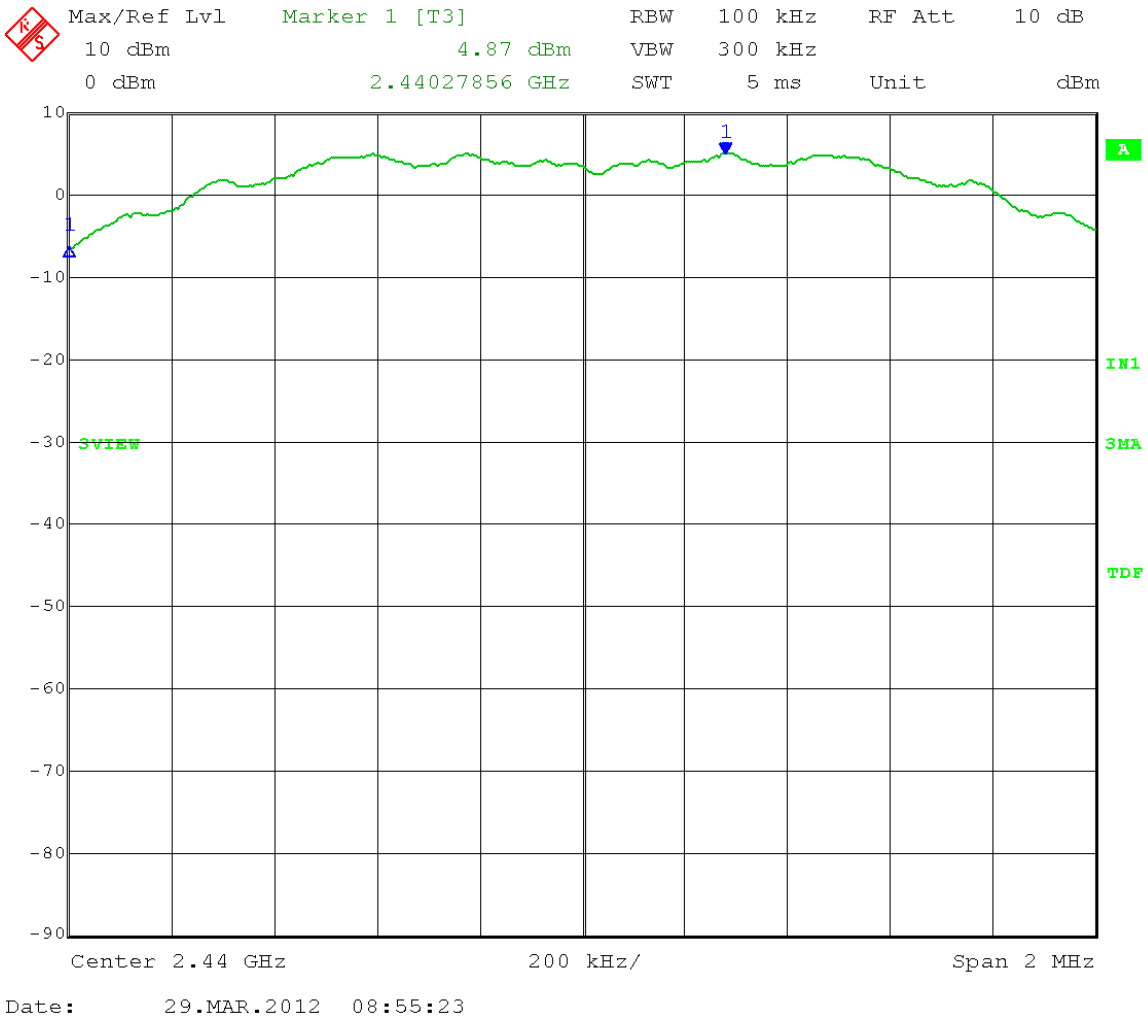


Test Date: 03-29-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Power Spectral Density - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

Middle Channel: Frequency – 2.440 GHz
Output power setting 8
Limit: 8 dBm

Power Level in 3 kHz bandwidth = 4.87 dBm + (10log (3 kHz/100 kHz)
= 4.87 dBm + (-15.2 dB) = **-10.33 dBm**



166 South Carter, Genoa City, WI 53128

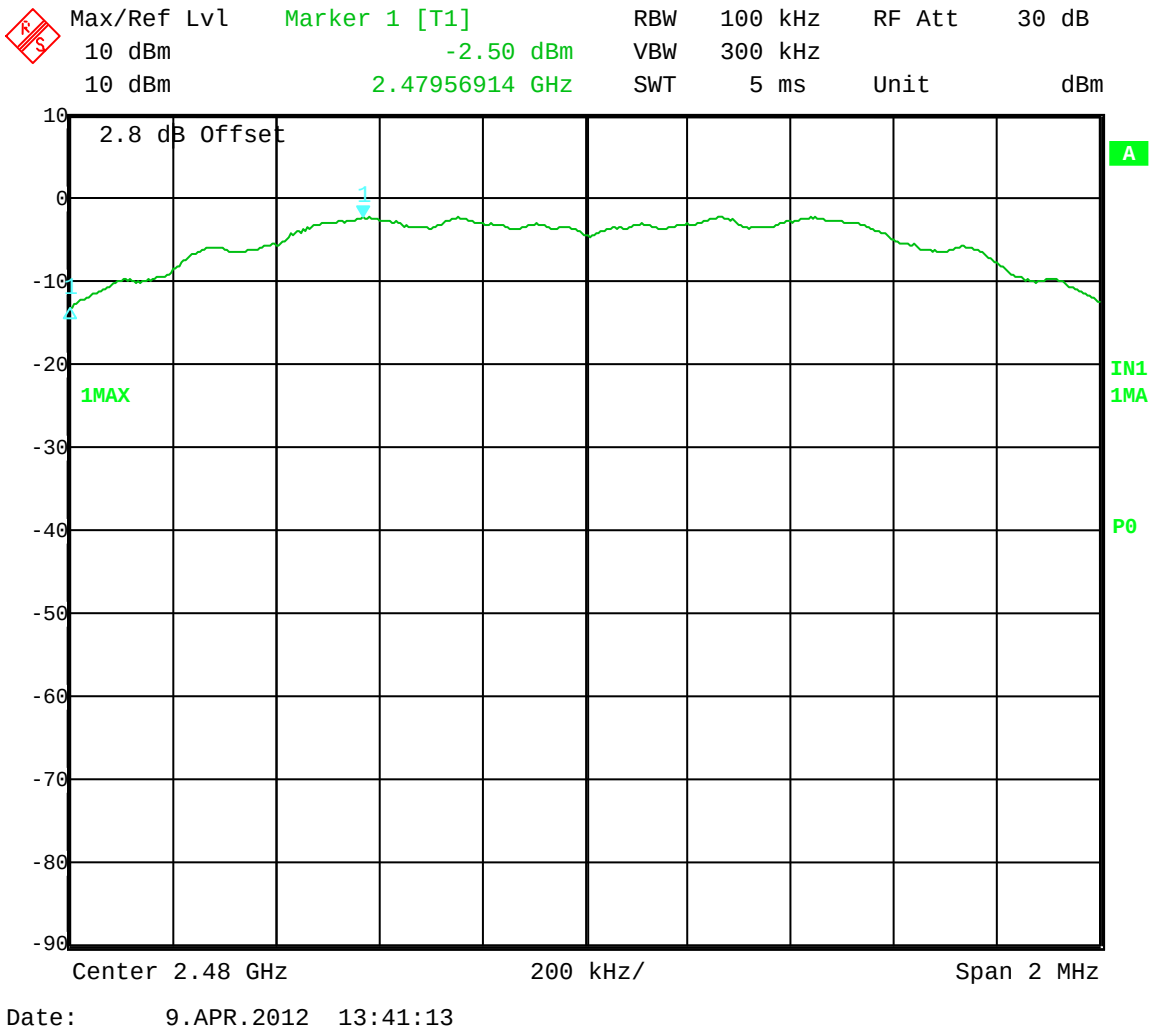
Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 04-09-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Power Spectral Density - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel: Frequency – 2.480 GHz
Output power setting 0
Limit: 8 dBm

Power Level in 3 kHz bandwidth = -2.5 dBm + (10log (3 kHz/100 kHz)
= -2.5 dBm + (-15.2dB) = **-17.7 dBm**



Appendix B

4.0 Maximum Unwanted Emission Levels

Rule Part:

15.247(d)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Unwanted Emissions into Non-Restricted Frequency Bands, Section 5.4.1
Measurement Procedure – Reference Level, Section 5.4.1.1
Measurement Procedure – Unwanted Emissions, Section 5.4.1.2

Limit:

The peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Results:

Compliant

Notes:

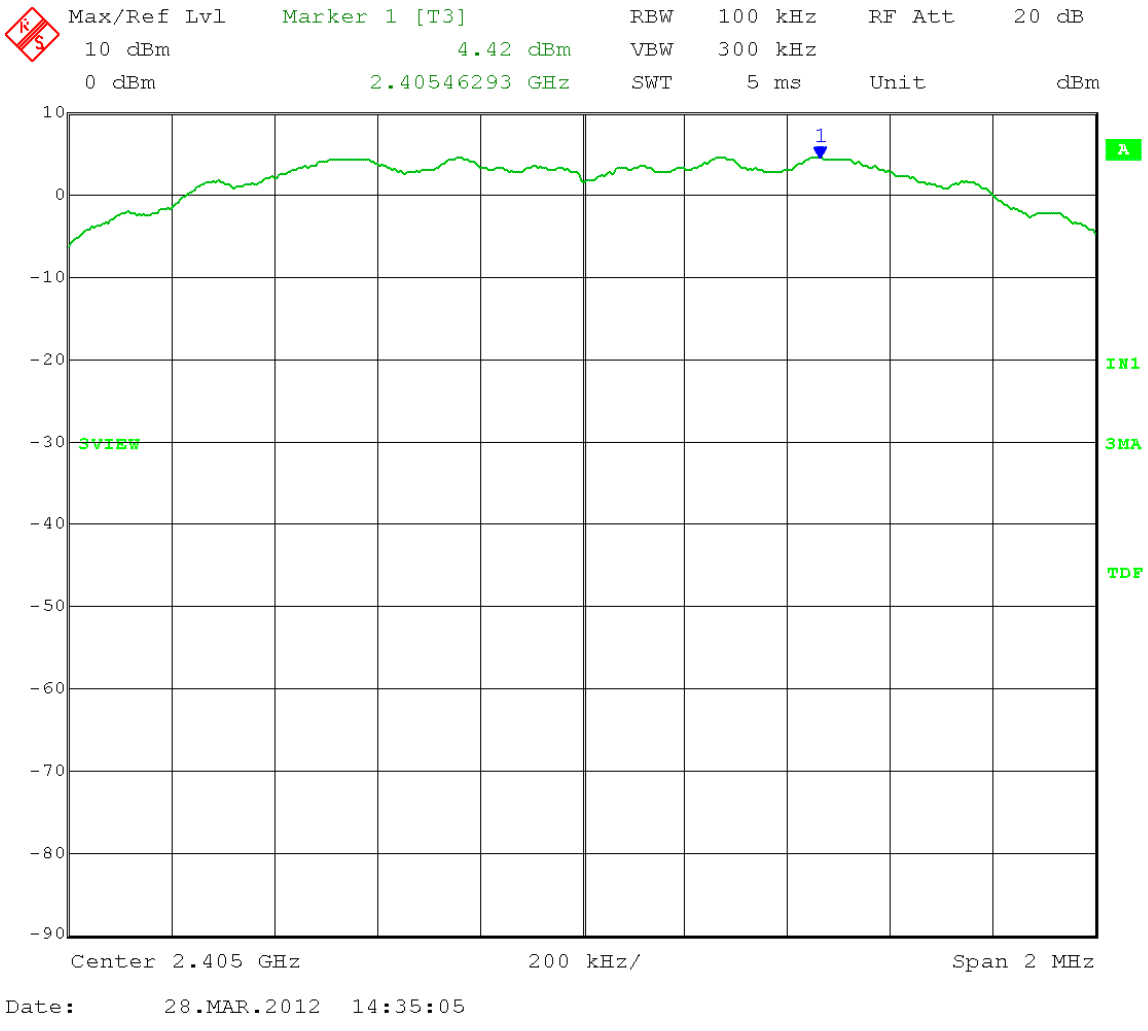
This was an RF conducted measurement. The EUT was connected to the measuring equipment through an SMA connector soldered in place of the antenna. Cable loss and attenuation was accounted for in the transducer factors set in the analyzer.
The EUT was powered through a cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

The High channel (channel 26) power setting was reduced from 8 to 0 to meet the radiated upper band-edge requirement at the 2.4835 GHz restricted frequency band edge.

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

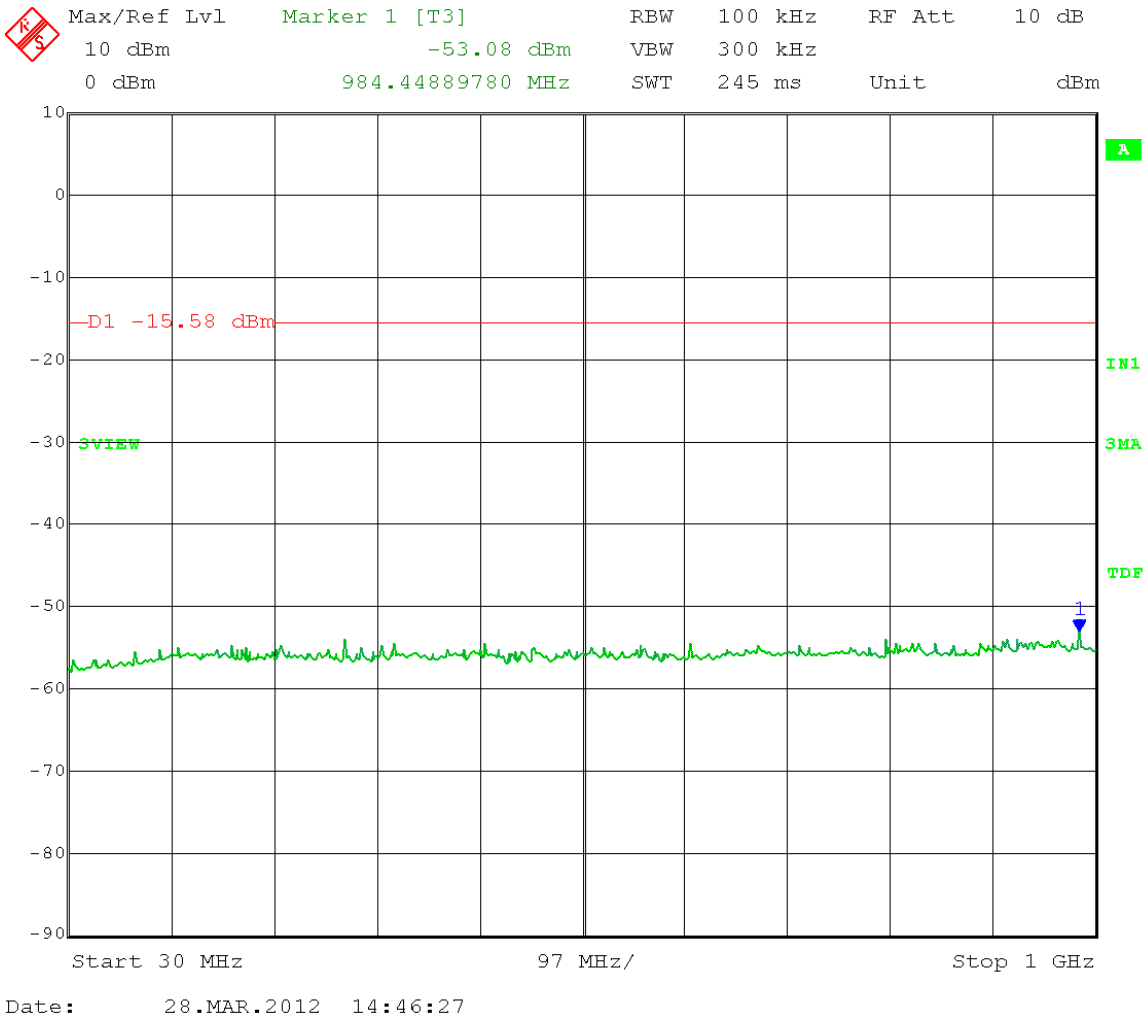
Low Channel Transmit = 2.405 GHz
Output power setting 8
Reference Level measurement
Limit = 4.42 dBm – 20 dB = -15.58 dBm



Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 2.405 GHz
Output power setting 8
Frequency Range: 30 – 1000 MHz
Limit = 4.42 dBm – 20 dB = -15.58 dBm



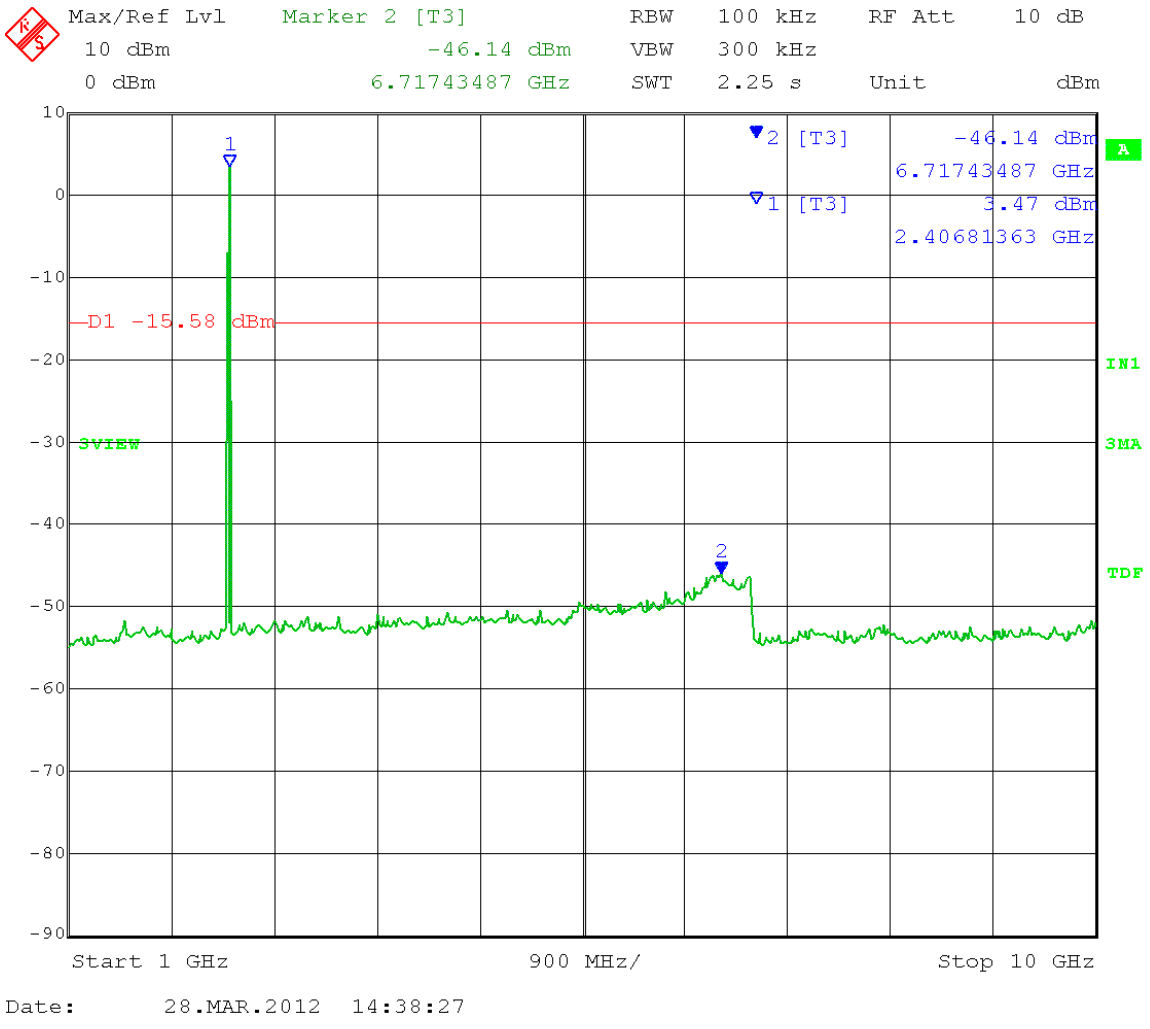
DLS ELECTRONIC SYSTEMS, INC.
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

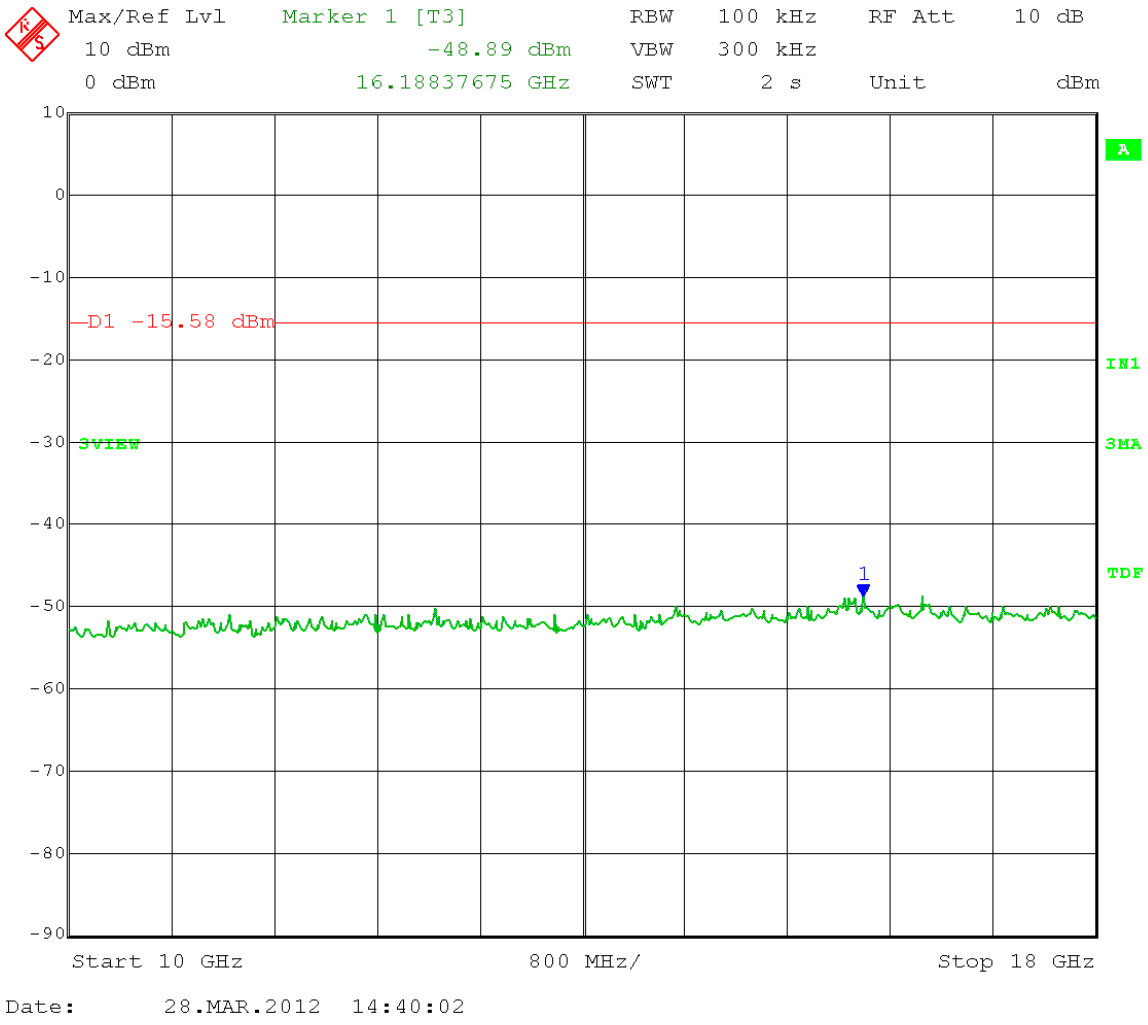
Low Channel Transmit = 2.405 GHz
Output power setting 8
Frequency Range: 1 – 10 GHz
Limit = 4.42 dBm – 20 dB = -15.58 dBm



Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 2.405 GHz
Output power setting 8
Frequency Range: 10 – 18 GHz
Limit = 4.42 dBm – 20 dB = -15.58 dBm



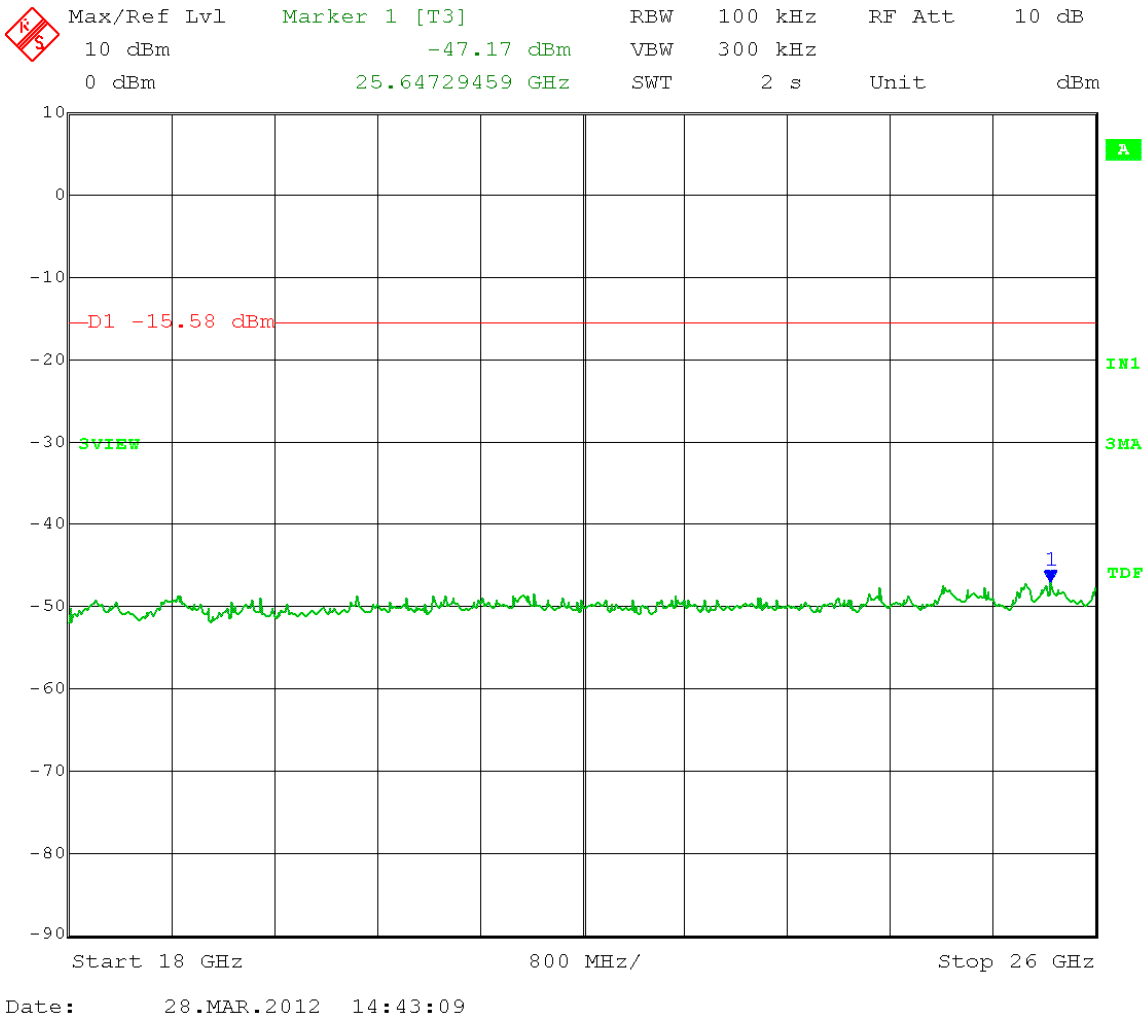
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

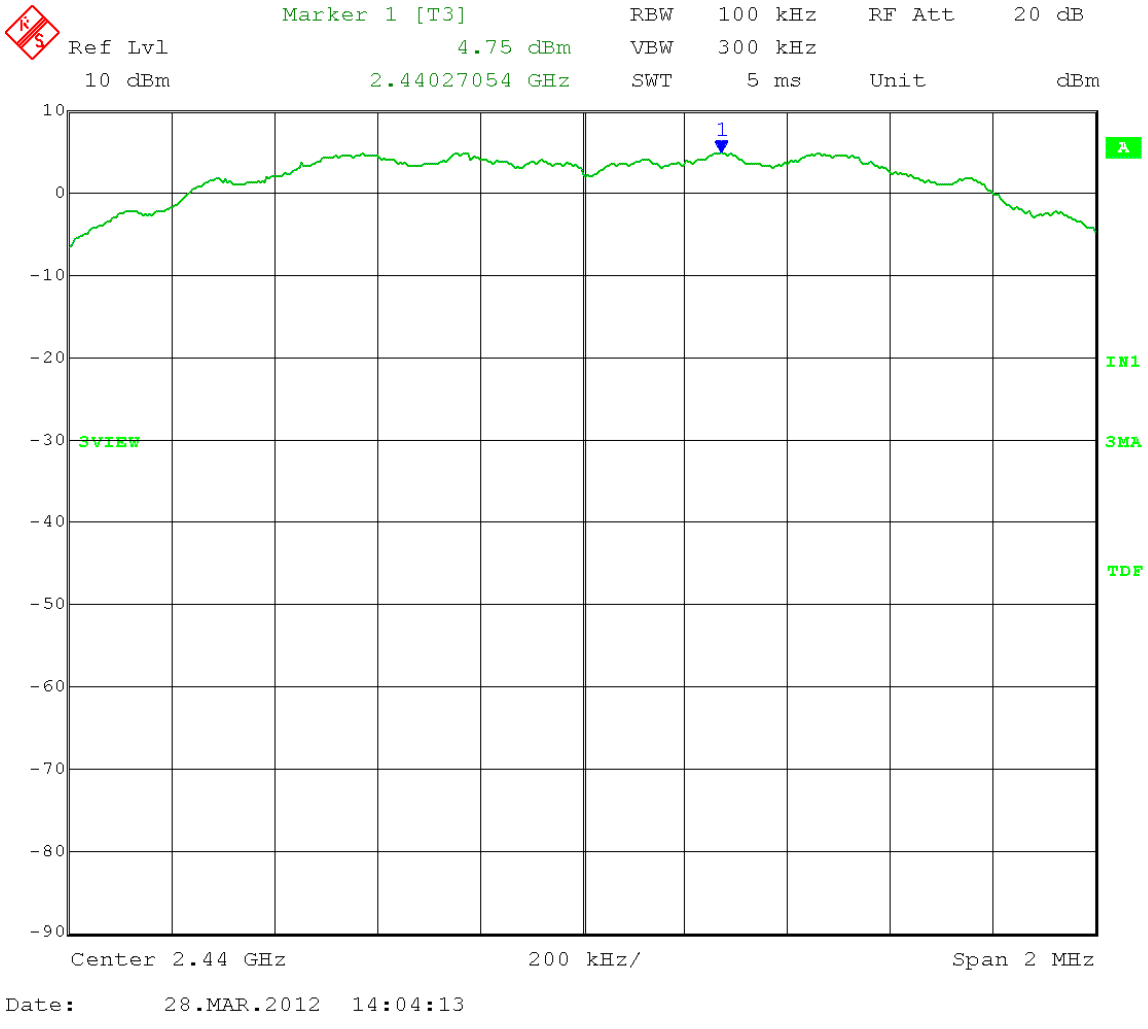
Low Channel Transmit = 2.405 GHz
Output power setting 8
Frequency Range: 18 – 26 GHz
Limit = 4.42 dBm – 20 dB = -15.58 dBm



Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

Middle Channel Transmit = 2.440 GHz
Output power setting 8
Reference Level measurement
Limit = 4.75 dBm – 20 dB = -15.25 dBm



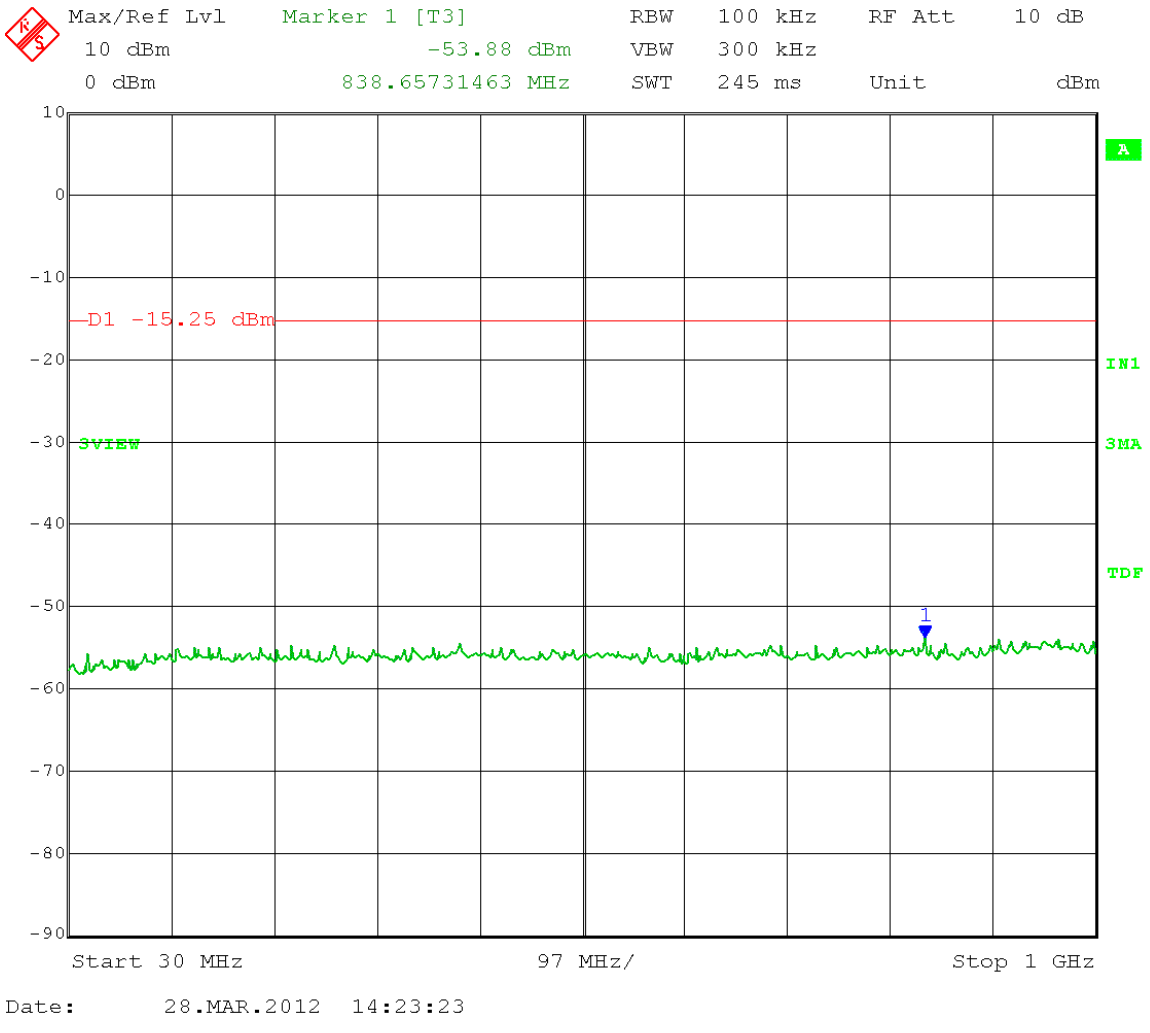
DLS ELECTRONIC SYSTEMS, INC.
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Middle Channel Transmit = 2.440 GHz
Output power setting 8
Frequency Range: 30 – 1000 MHz
Limit = 4.75 dBm – 20 dB = -15.25 dBm



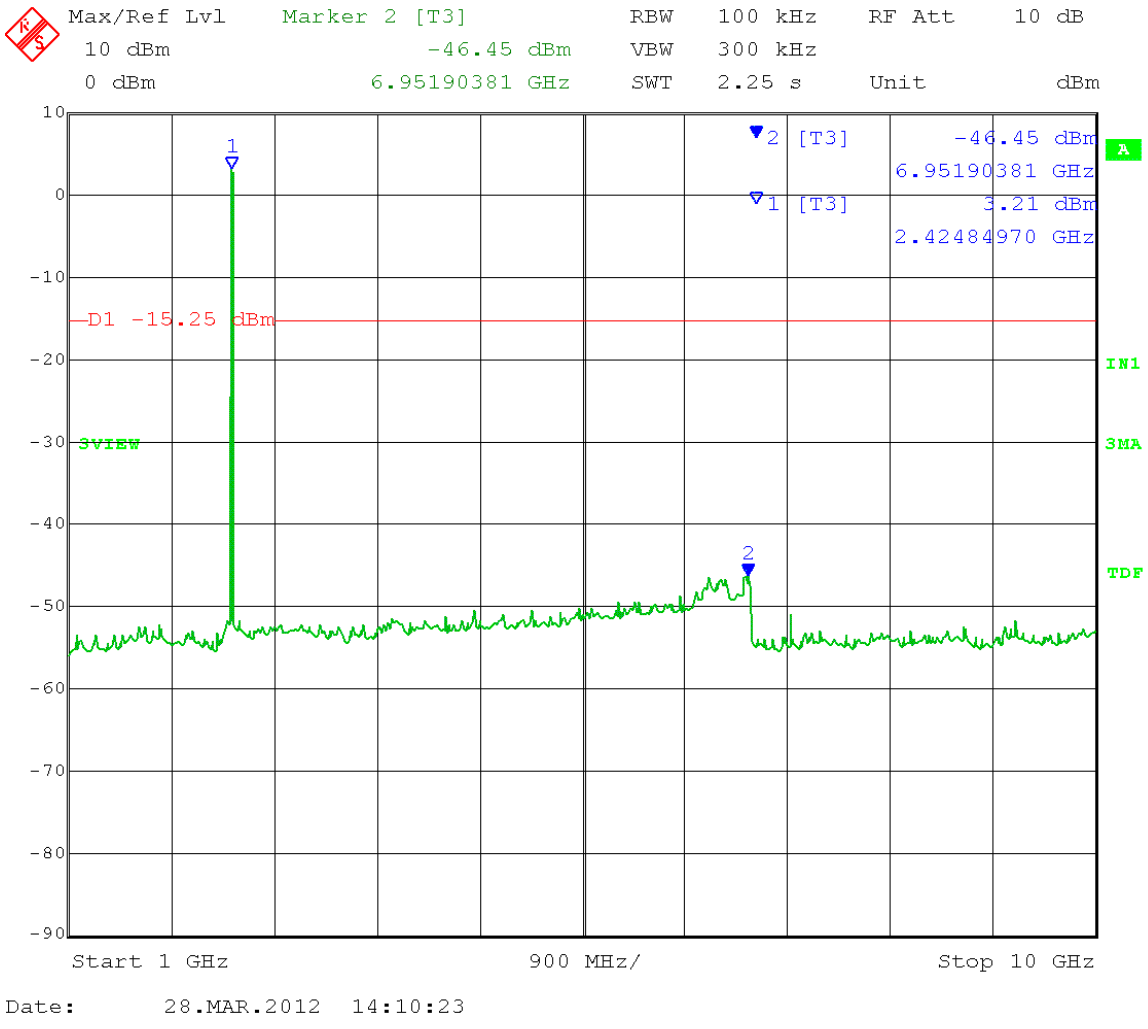
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

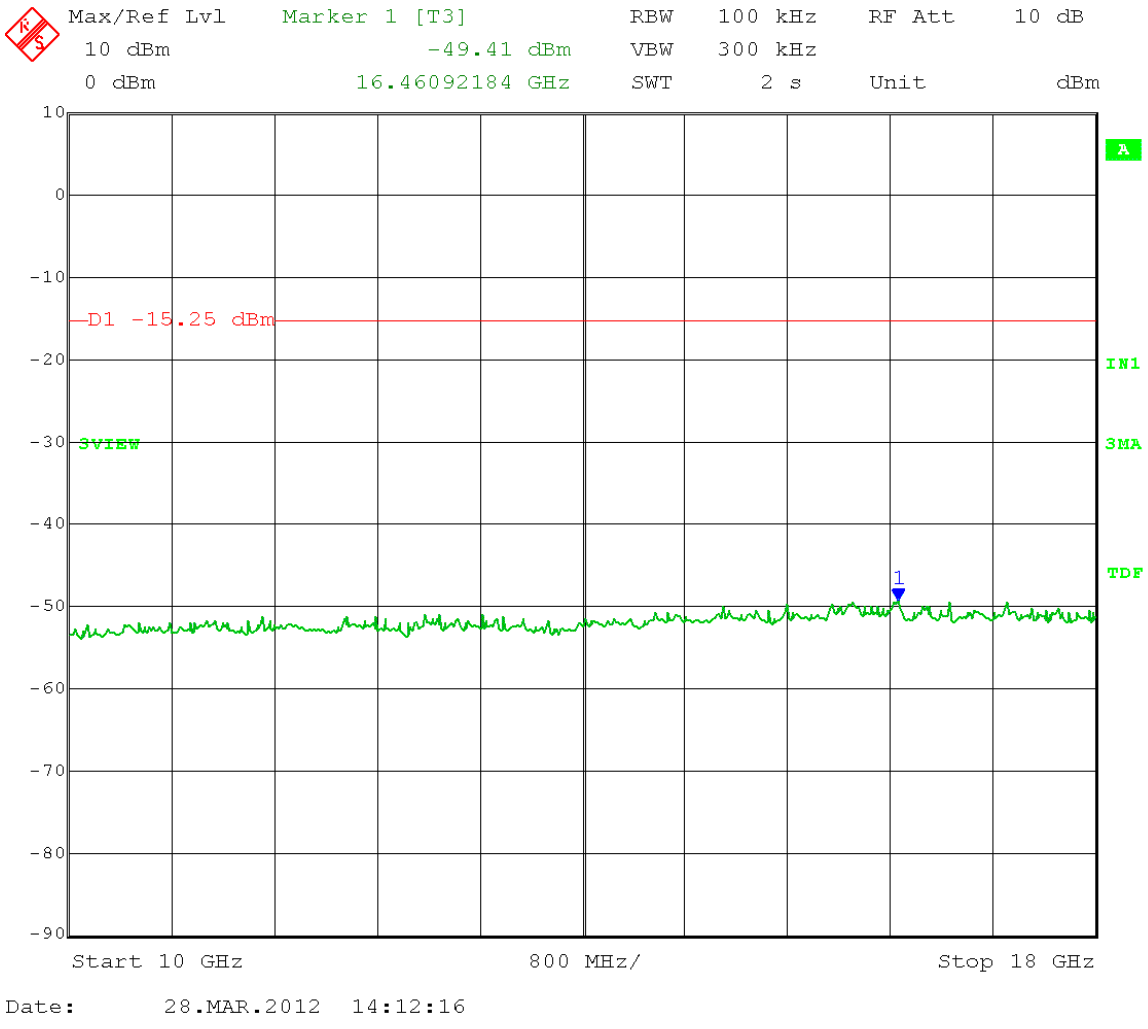
Middle Channel Transmit = 2.440 GHz
Output power setting 8
Frequency Range: 1 – 10 GHz
Limit = 4.75 dBm – 20 dB = -15.25 dBm



Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Middle Channel Transmit = 2.440 GHz
Output power setting 8
Frequency Range: 10 – 18 GHz
Limit = 4.75 dBm – 20 dB = -15.25 dBm



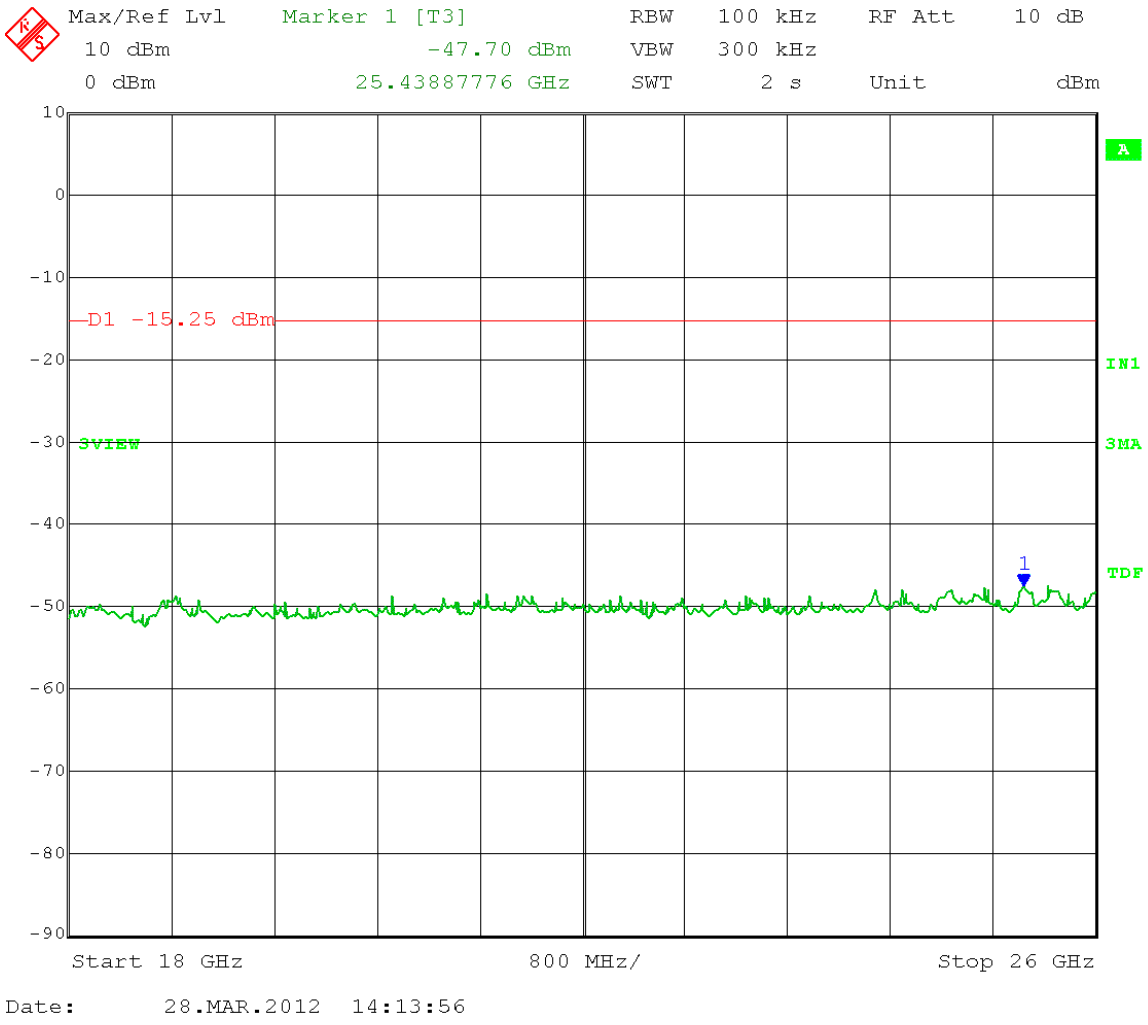
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Middle Channel Transmit = 2.440 GHz
Output power setting 8
Frequency Range: 18 – 26 GHz
Limit = 4.75 dBm – 20 dB = -15.25 dBm



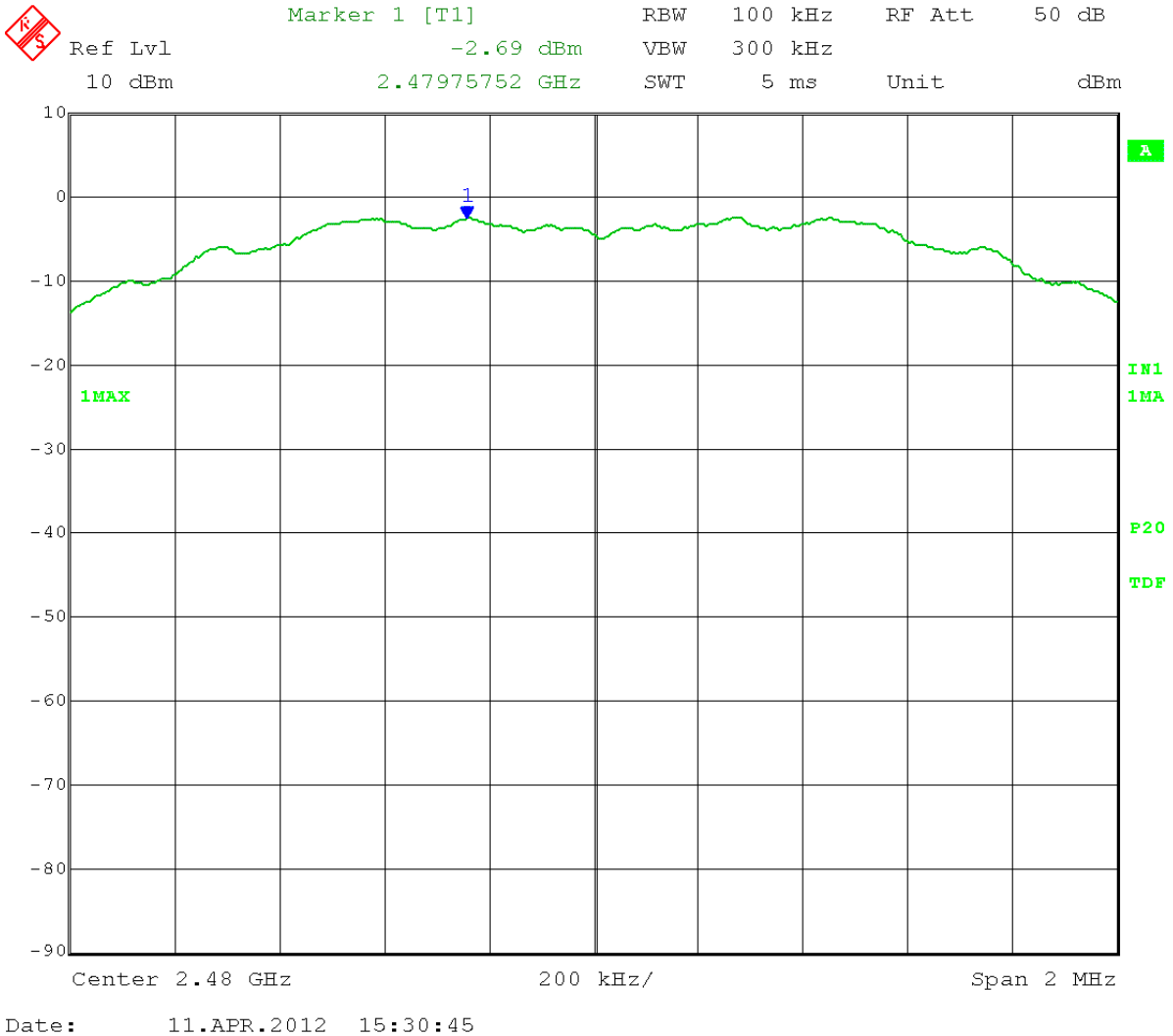
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 04-10-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Span = 5-30% greater than EBW
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 2.480 GHz
Output power setting 0
Reference Level measurement
Limit = -2.7 dBm – 20 dB = -22.7 dBm



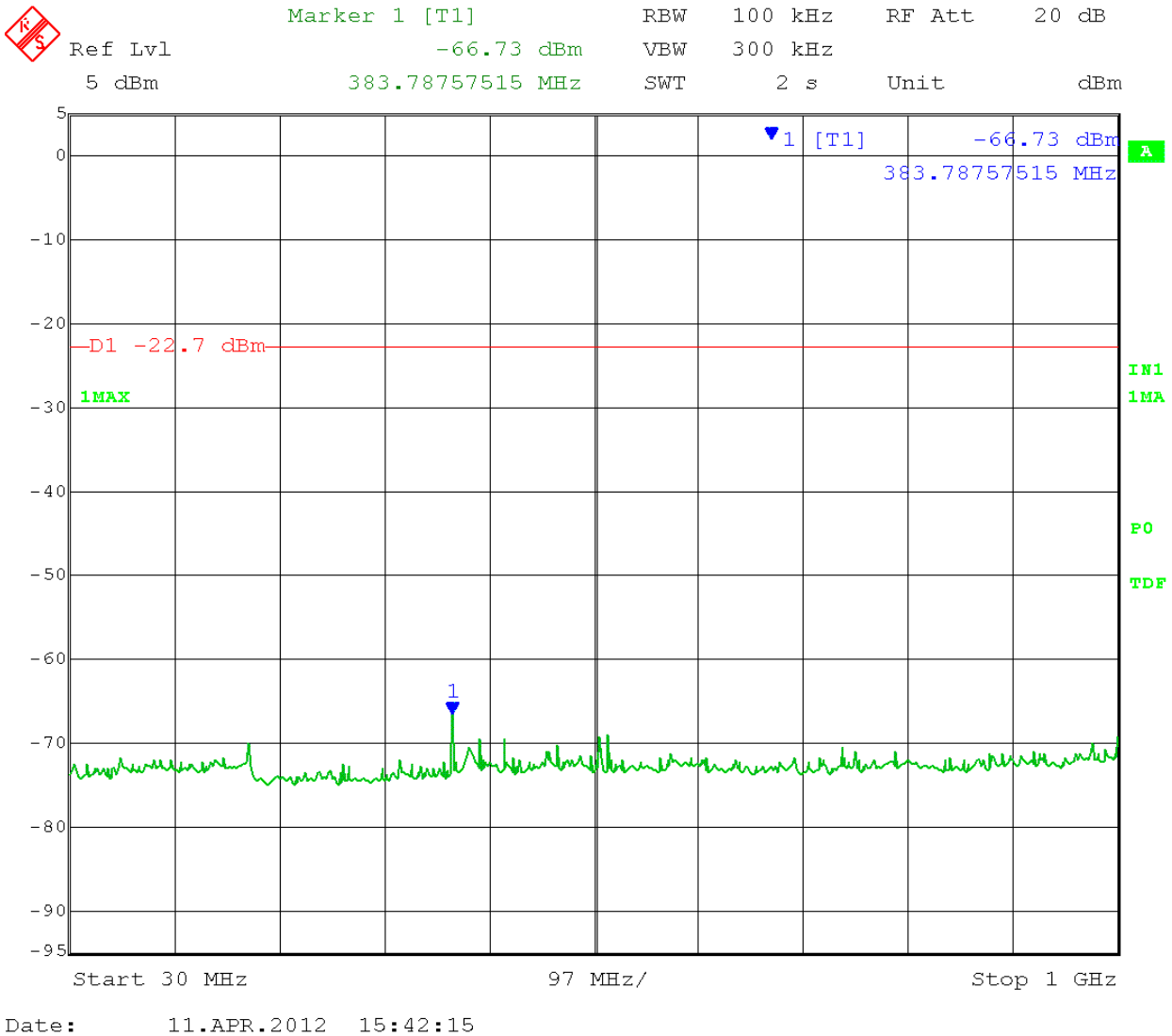
166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

Test Date:	04-10-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Maximum Unwanted Emission Levels - Conducted
Operator:	Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 2.480 GHz
Output power setting 0
Frequency Range: 30 – 1000 MHz
Limit = -2.7 dBm – 20 dB = -22.7dBm



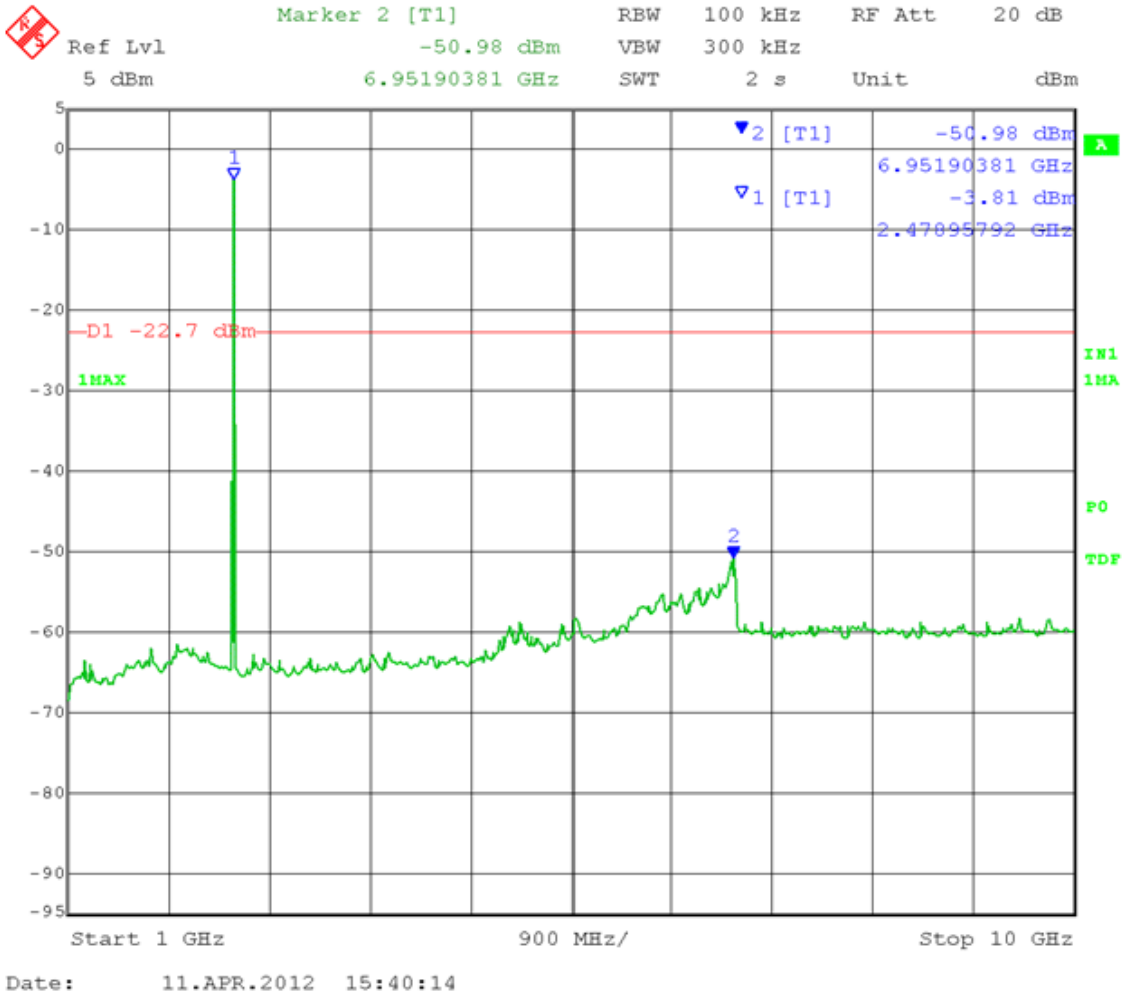
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 04-10-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 2.480 GHz
Output power setting 0
Frequency Range: 1 – 10 GHz
Limit = -2.7 dBm – 20 dB = -20.7 dBm



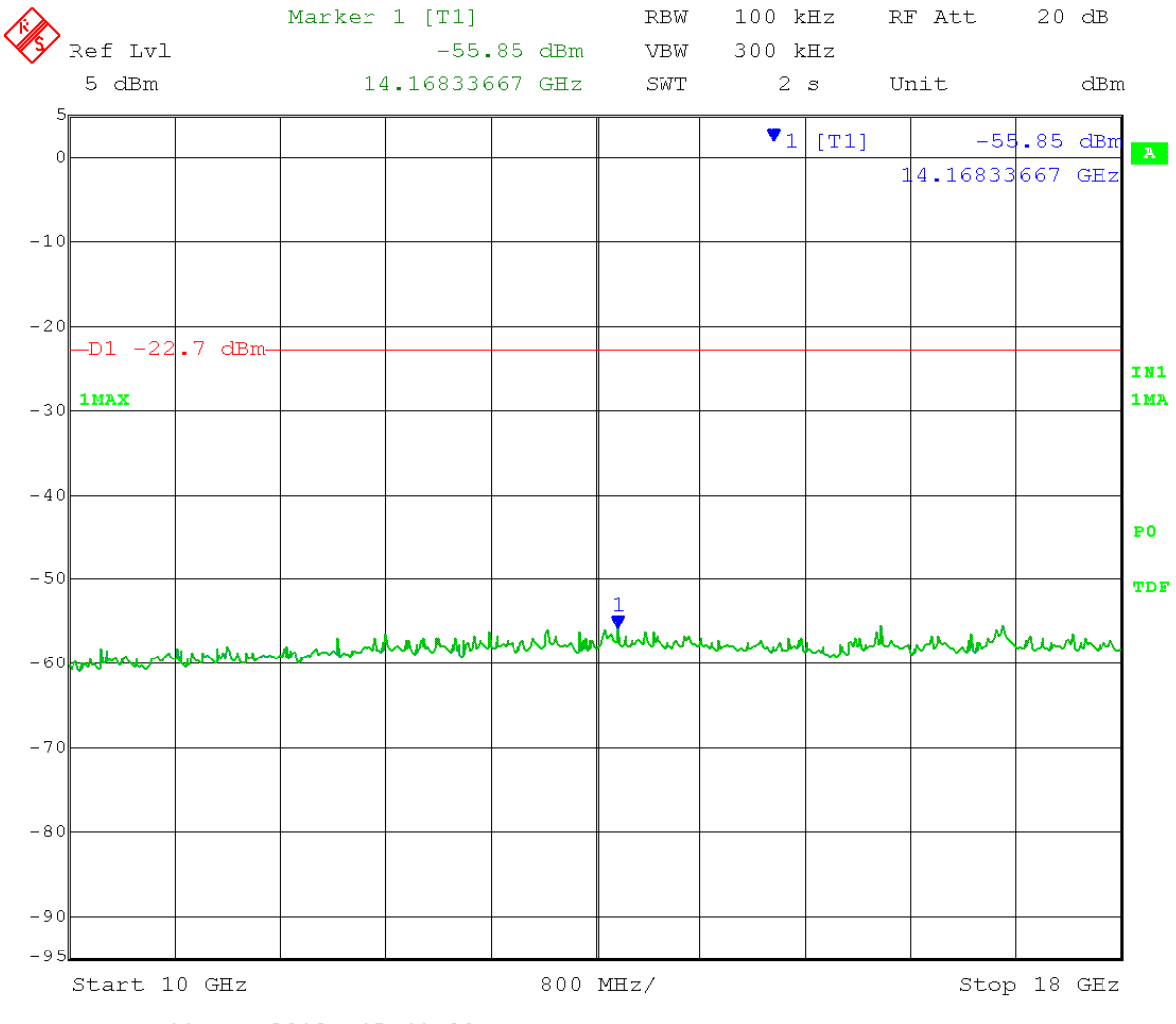
166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Test Date: 04-10-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

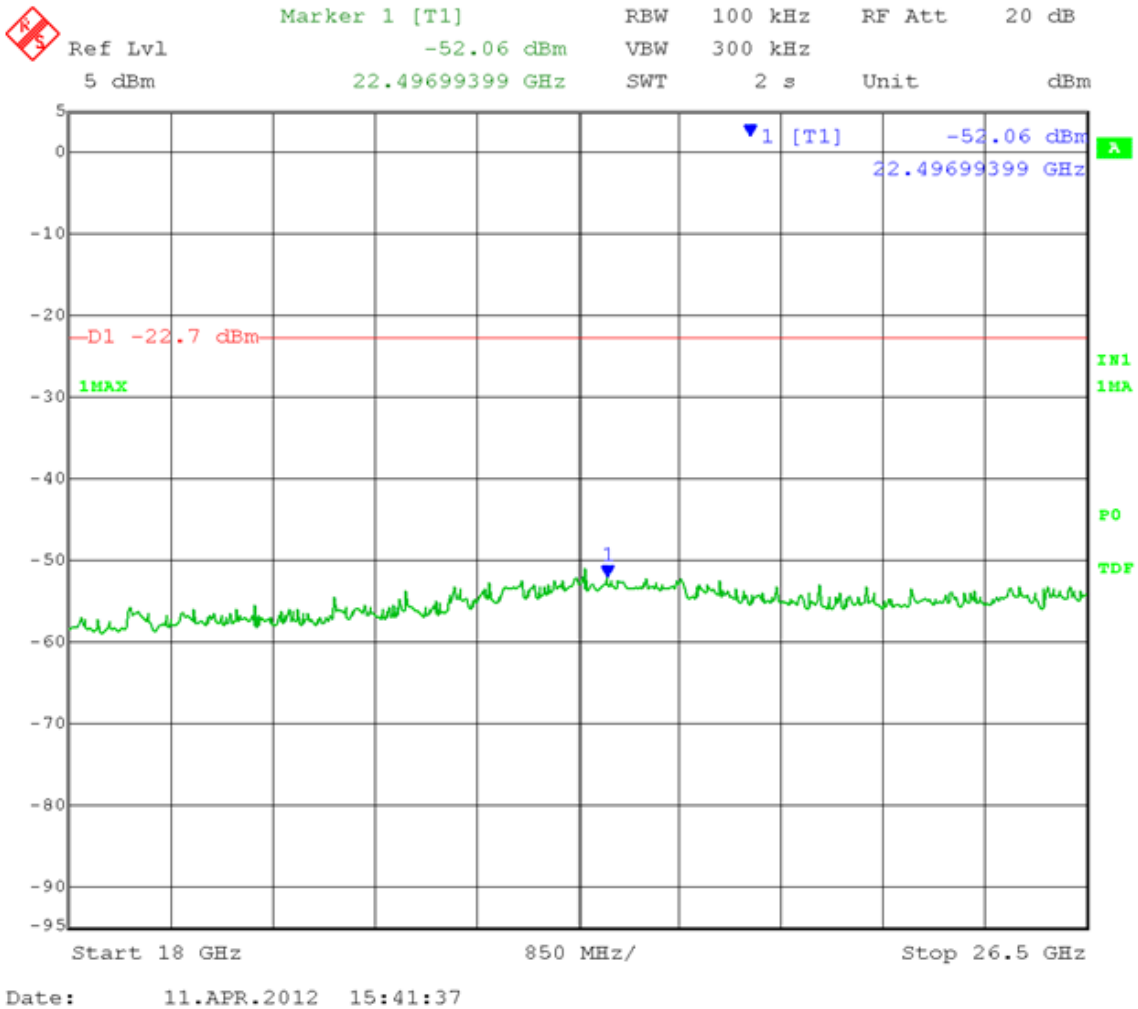
High Channel Transmit = 2.480 GHz
Output power setting 0
Frequency Range: 10 – 18 GHz
Limit = -2.7 dBm – 20 dB = -22.7dBm



Test Date: 04-10-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Maximum Unwanted Emission Levels - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 2.480 GHz
Output power setting 0
Frequency Range: 18 – 26 GHz
Limit = -2.7 dBm – 20 dB = -22.7dBm



Appendix B

5.0 Unwanted Emissions into Restricted Frequency Bands – Radiated

Rule Part:

15.247(d), 15.205(5), 15.209(a)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Unwanted Emissions into Restricted Frequency Bands, Section 5.4.2
Measurement Procedure – ANSI C63.10-2009

Limits:

15.209(a)

Results:

Compliant

Notes:

This was a radiated measurement. The EUT was transmitting from its integrated PCB trace antenna. The EUT was powered through a serial interface cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance 1 GHz to 18 GHz
Tested at a 1 Meter Distance 18 GHz to 26 GHz

EUT: Gemini P0X1A
Manufacturer: California Eastern Laboratories
Operating Condition: 68 deg F; 49% R.H.
Test Site: Site G1
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: IEEE 802.15.4; Continuous transmit mode; Output power setting 8
Date: 03-26-2012
Notes: **(1)** Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
(2) Average measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = CISPR Average.
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 11 (2.405 GHz):

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.810	Average	Vert	44.26	32.93	-37.4	39.8	not used	39.8	54	14.2	Res. Band
4.810	Max Peak	Vert	54.14	32.93	-37.4	49.7	---	49.7	74	24.3	Res. Band
4.810	Average	Horz	45.89	32.93	-37.4	41.4	not used	41.4	54	12.6	Res. Band
4.810	Max Peak	Horz	55.11	32.93	-37.4	50.6	---	50.6	74	23.4	Res. Band

166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance 1 GHz to 18 GHz
Tested at a 1 Meter Distance 18 GHz to 26 GHz

EUT: Gemini P0X1A
Manufacturer: California Eastern Laboratories
Operating Condition: 68 deg F; 49% R.H.
Test Site: Site G1
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: IEEE 802.15.4; Continuous transmit mode; Output power setting 8
Date: 03-26-2012
Notes: **(1)** Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
(2) Average measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = CISPR Average.
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 18 (2.440 GHz):

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.880	Average	Vert	41.63	32.93	-37.9	36.7	not used	36.7	54	17.3	Res. Band
4.880	Max Peak	Vert	52.66	32.93	-37.9	47.7	---	47.7	74	26.3	Res. Band
4.880	Average	Horz	41.08	32.93	-37.9	36.1	not used	36.1	54	17.9	Res. Band
4.880	Max Peak	Horz	52.15	32.93	-37.9	47.2	---	47.2	74	26.8	Res. Band
7.320	Average	Vert	39.87	37.31	-30.9	46.3	not used	46.3	54	7.7	Res. Band
7.320	Max Peak	Vert	50.90	37.31	-30.9	57.3	---	57.3	74	16.7	Res. Band
7.320	Average	Horz	38.24	37.31	-30.9	44.6	not used	44.6	54	9.4	Res. Band
7.320	Max Peak	Horz	50.41	37.31	-30.9	56.8	---	56.8	74	17.2	Res. Band
12.200	Average	Vert	36.23	40.52	-34.7	42.0	not used	42.0	54	12.0	Res. Band
12.200	Max Peak	Vert	48.83	40.52	-34.7	54.6	---	54.6	74	19.4	Res. Band
12.200	Average	Horz	36.37	40.52	-34.7	42.2	not used	42.2	54	11.8	Res. Band
12.200	Max Peak	Horz	49.34	40.52	-34.7	55.1	---	55.1	74	18.9	Res. Band

166 South Carter, Genoa City, WI 53128

Company: California Eastern Laboratories
Model Tested: ZICM357SP0-1
Report Number: 17753
DLS Project: 5129

Radiated Spurious Emissions in Restricted Bands

Tested at a 3 Meter Distance 1 GHz to 18 GHz
Tested at a 1 Meter Distance 18 GHz to 26 GHz

EUT: Gemini P0X1A
Manufacturer: California Eastern Laboratories
Operating Condition: 68 deg F; 49% R.H.
Test Site: Site G1
Operator: Craig B
Test Specification: FCC Part 15.247(d) and FCC Part 15.205
Comment: IEEE 802.15.4; Continuous transmit mode; Output power setting 8
Date: 03-26-2012
Notes: **(1)** Peak measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
(2) Average measurements were taken with RBW = 1 MHz, VBW = 3 MHz, Detector = CISPR Average.
(3) All other restricted band emissions at least 20 dB under the limit.

Channel 26 (2.480 GHz):

Frequency (GHz)	Measurement Type	Ant. Pol.	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Total Level (dBuV/m)	Duty Cycle Correction (dB)	Final Corrected (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
4.960	Average	Vert	39.49	33.16	-37.5	35.2	not used	35.2	54	18.8	Res. Band
4.960	Max Peak	Vert	51.52	33.16	-37.5	47.2	---	47.2	74	26.8	Res. Band
4.960	Average	Horz	39.44	33.16	-37.5	35.1	not used	35.1	54	18.9	Res. Band
4.960	Max Peak	Horz	51.15	33.16	-37.5	46.8	---	46.8	74	27.2	Res. Band
7.440	Average	Vert	37.42	37.22	-31.8	42.9	not used	42.9	54	11.1	Res. Band
7.440	Max Peak	Vert	49.77	37.22	-31.8	55.2	---	55.2	74	18.8	Res. Band
7.440	Average	Horz	36.23	37.22	-31.8	41.7	not used	41.7	54	12.3	Res. Band
7.440	Max Peak	Horz	48.55	37.22	-31.8	54.0	---	54.0	74	20.0	Res. Band

Appendix B

6.0 Band-Edge Measurements – RF Conducted

Rule Part:

15.247(d)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Measurement Procedure – Reference Level, Section 5.4.1.1
Measurement Procedure – Unwanted Emissions, Section 5.4.1.2
Band-Edge Measurements, Section 5.4.2.2.4

Limit:

The peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Results:

Compliant

Notes:

This was an RF conducted measurement. The EUT was connected to the measuring equipment through an SMA connector soldered in place of the antenna. Cable loss and attenuation was accounted for in the transducer factors set in the analyzer.
The EUT was powered through a cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

The High channel (channel 26) power setting was reduced from 8 to 0 to meet the radiated upper band-edge requirement at the 2.4835 GHz restricted frequency band edge.

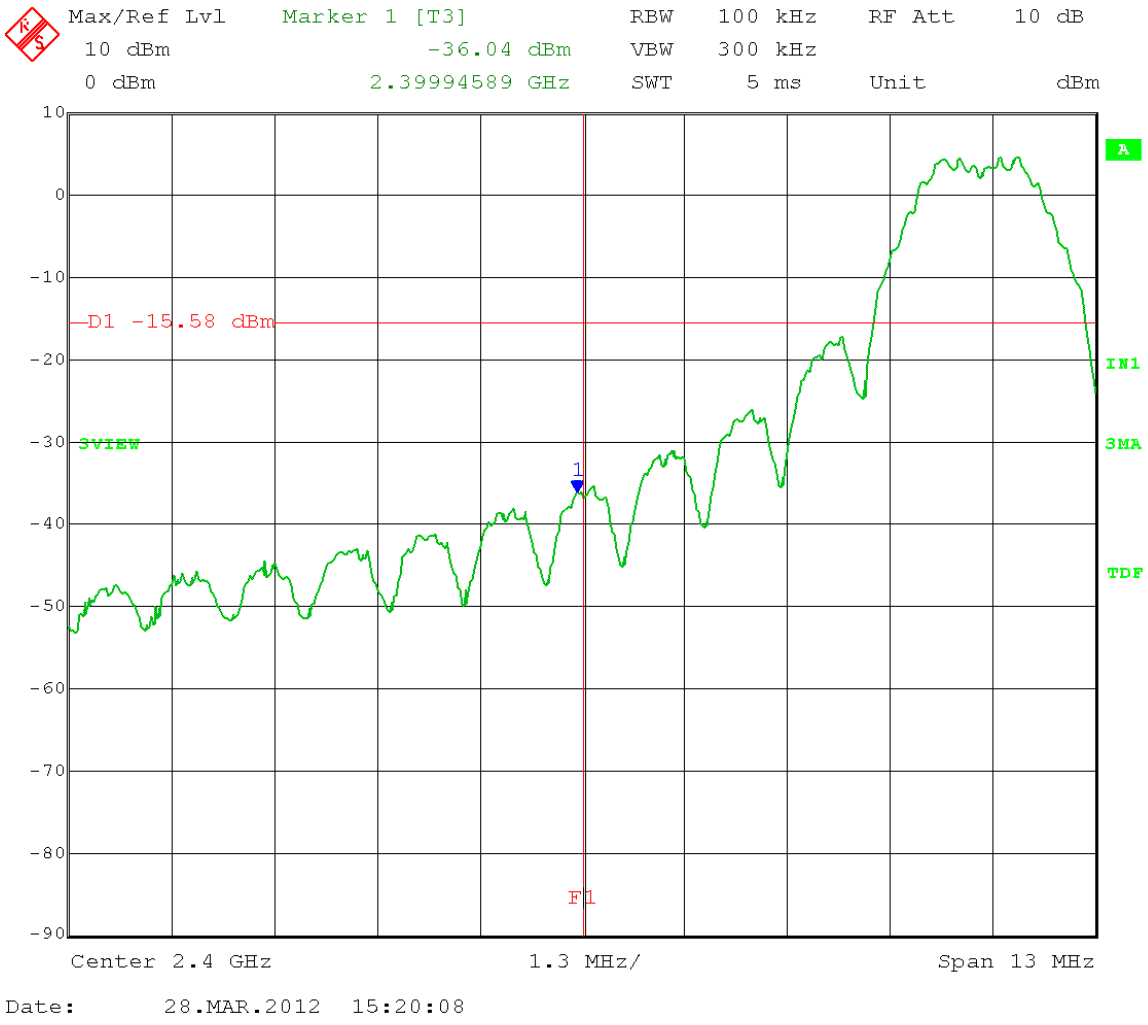
Testing was also performed on channel 25 to show that the output power setting for this channel does not need to be lowered to meet the band-edge requirements.

Test Date: 03-28-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Band-Edge Measurements - Conducted
Operator: Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Low Channel Transmit = 2.405 GHz
Output power setting 8
Limit = 4.42 dBm – 20 dB = -15.58 dBm (Band-Edge > 20 dB Below Peak In-Band Emission)

Band-Edge Frequency = 2.4 GHz

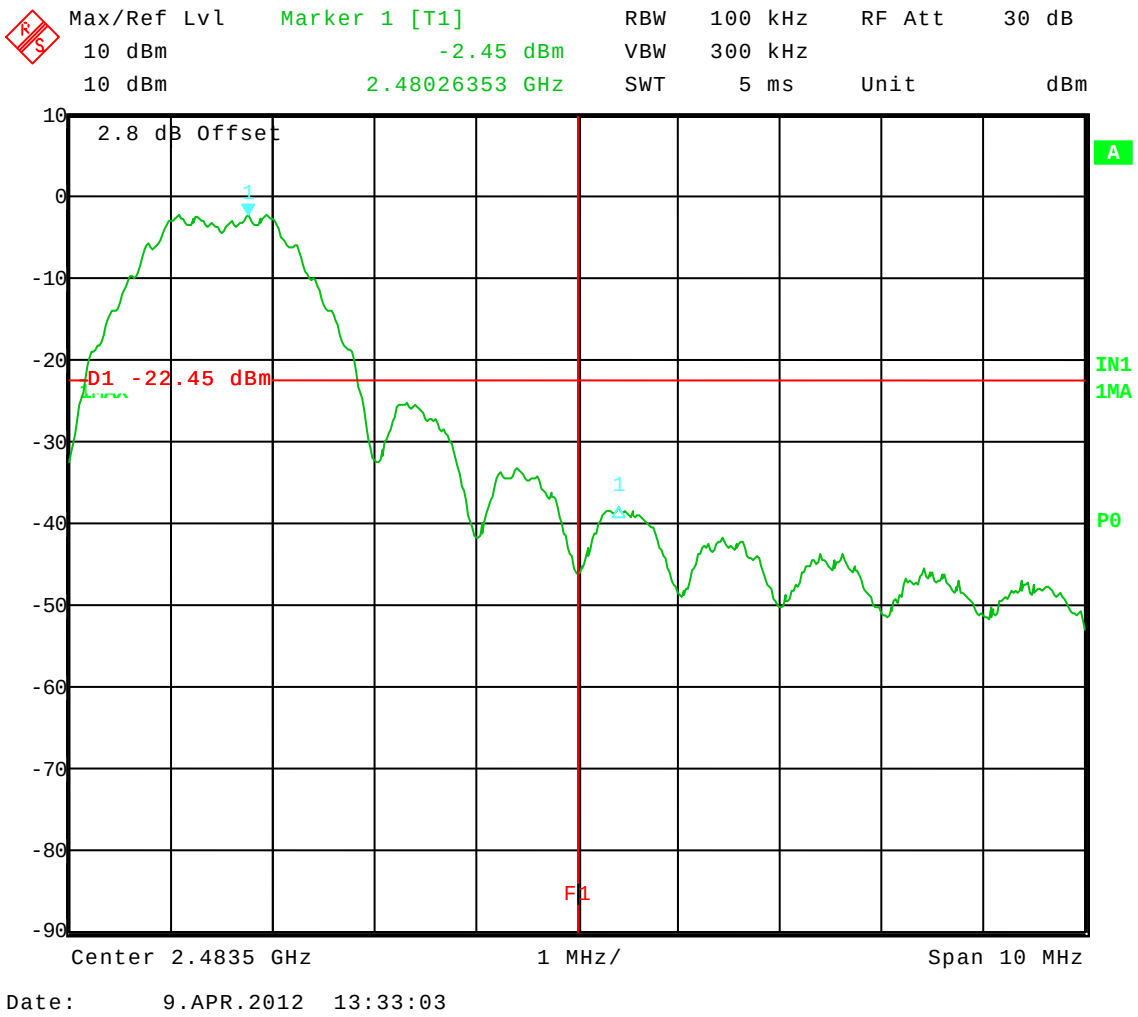


Test Date: 04-09-2012
Company: California Eastern Laboratories
EUT: Gemini P0X1A
Test: Band-Edge Measurements - Conducted
Operator: Cooper L.

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

High Channel Transmit = 2.480 GHz
Output power setting 0
Limit = -2.45dBm – 20 dB = -22.45 dBm (Band-Edge > 20 dB Below Peak In-Band Emission)

Band-Edge Frequency = 2.4835 GHz



166 South Carter, Genoa City, WI 53128

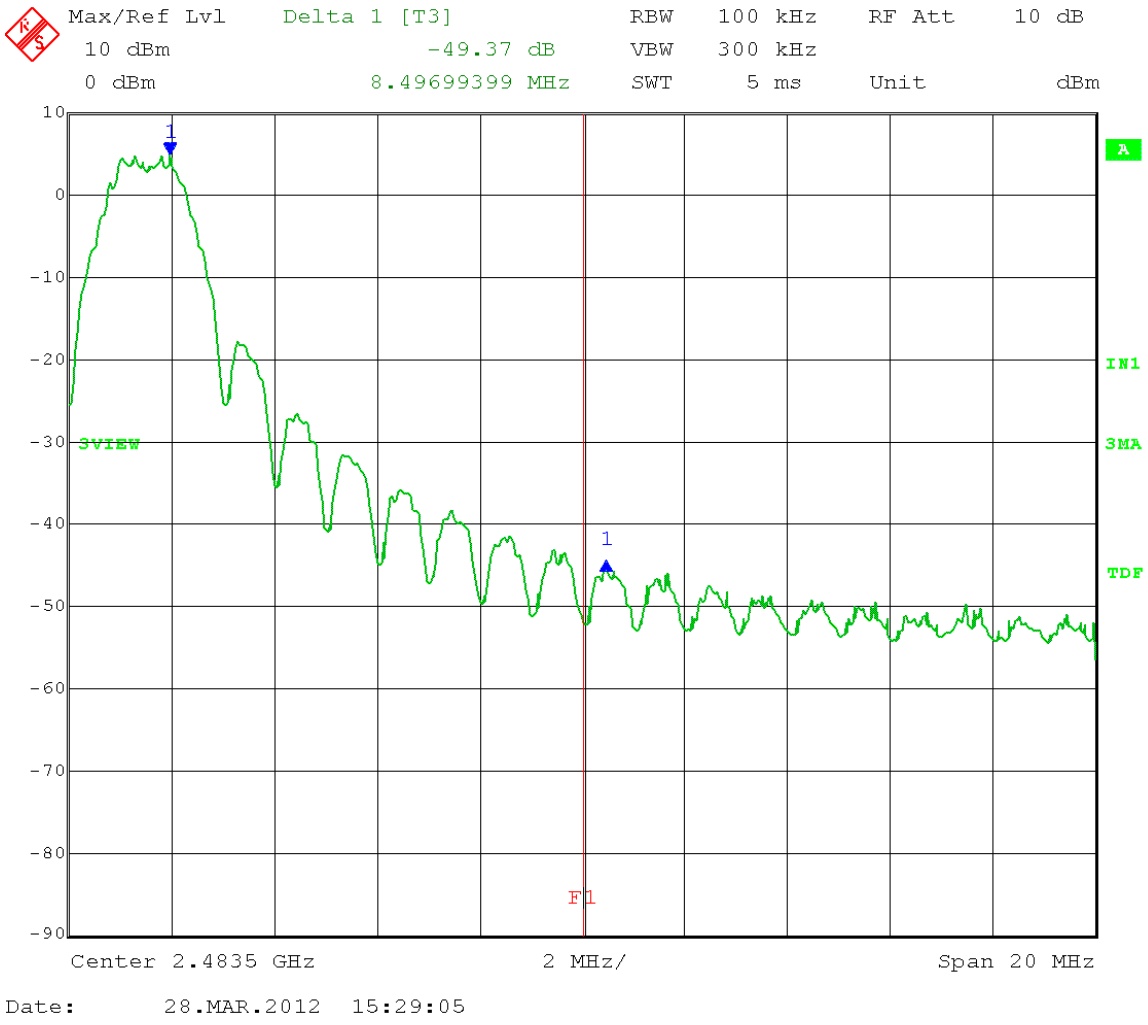
Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

Test Date:	03-28-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Band-Edge Measurements - Conducted
Operator:	Craig B

Comment: RBW = 100 kHz
VBW ≥ 300 kHz
Detector = Peak
Sweep = auto couple
Trace = max hold

Channel 25 Transmit = 2.475 GHz
Output power setting 8
Limit: Band-Edge > 20 dB Below Peak In-Band Emission

Band-Edge Frequency = 2.4835 GHz



Appendix B

7.0 Band-Edge Measurements – Radiated

Rule Part:

15.247(d)

Test Procedure:

558074 D01 DTS Meas Guidance v01, 01/18/2012
Unwanted Emissions into Restricted Frequency Bands, Section 5.4.2
Measurement Procedure – ANSI C63.10-2009
Marker-Delta Method – ANSI C63.10:2009, Section 6.9.3

Limit:

15.209(a)

Results:

Compliant

Notes:

This was a radiated measurement. The EUT was transmitting from its integrated PCB trace antenna. The EUT was powered through a serial interface cable that was connected to the bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation on the low, middle, and high channels of the operating band.

The High channel (channel 26) power setting was reduced from 8 to 0 to meet the radiated upper band-edge requirement at the 2.4835 GHz restricted frequency band edge.

Testing was also performed on channel 25 to show that the output power setting for this channel does not need to be lowered to meet the band-edge requirements.

166 South Carter, Genoa City, WI 53128

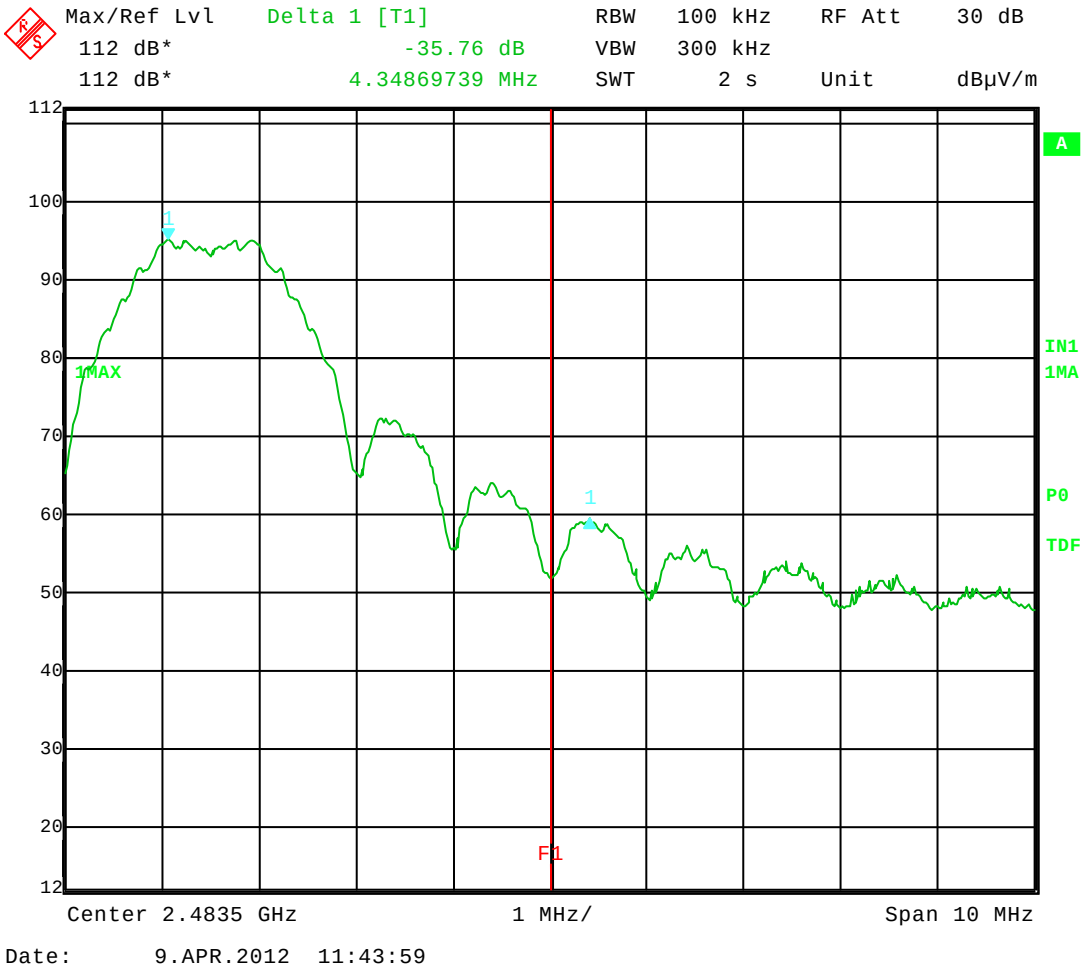
Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

Test Date:	04-09-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Upper Band-Edge Radiated – Marker Delta Method
Rule part:	FCC Part 15.247(d) and FCC Part 205
Operator:	Cooper L.
Comment:	High Channel: Frequency – 2.480 GHz
	Power setting 0

Because the upper band-edge coincides with a restricted band, band-edge compliance for the upper band-edge was determined using the radiated mark-delta method as outlined in ANSI C63.10:2009 Section 6.9.3. The radiated field strength of the fundamental emission was first determined and then the mark-delta method was used to determine the field strength of the band-edge emissions.

Power setting reduced from 8 dBm to 0 dBm.

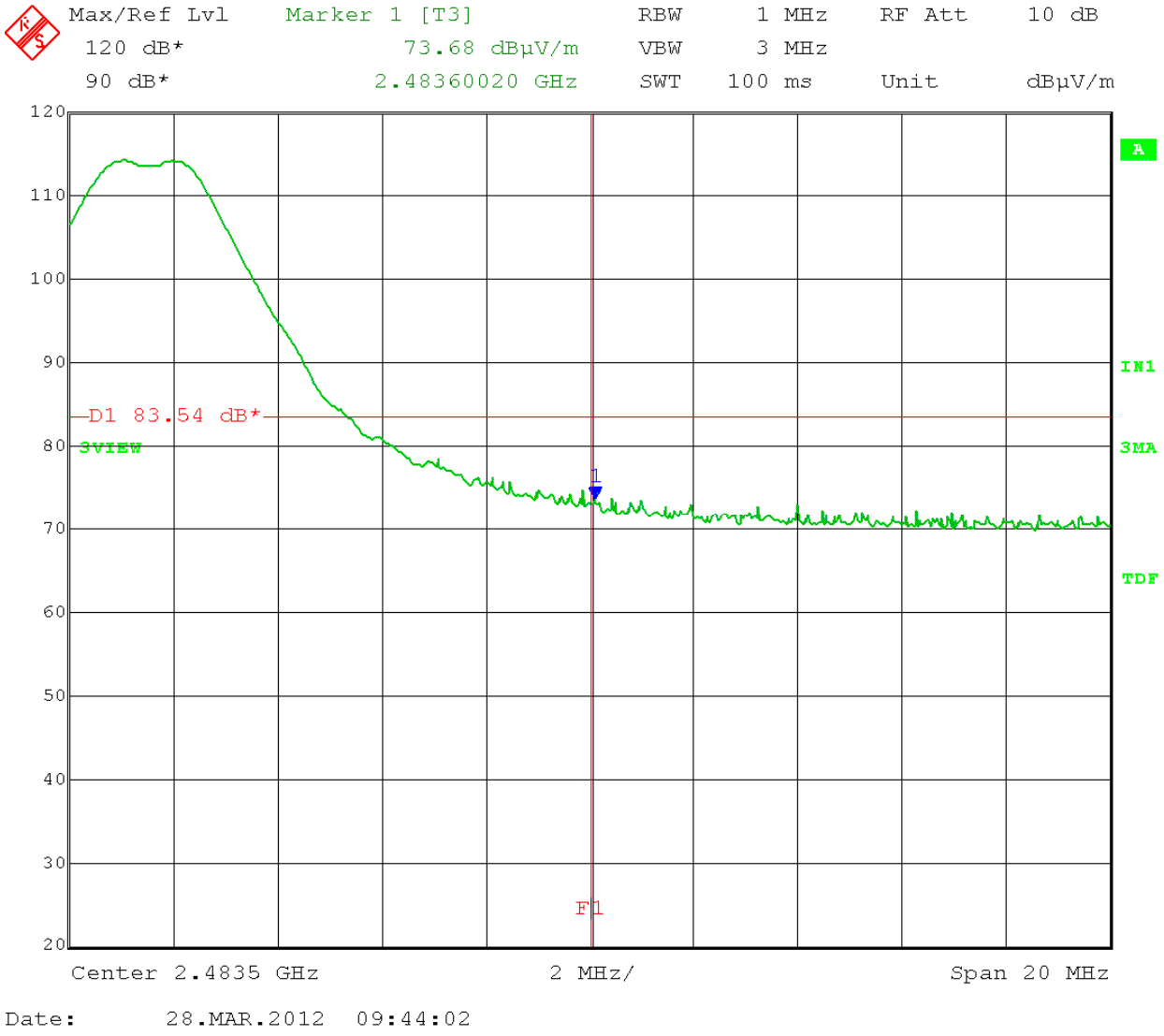
Frequency (MHz)	Antenna Polarity (H/V)	Fundamental Field Strength (dBµV/m)	Duty Cycle Correction (dB)	Delta-Marker (dB)	Band-Edge Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2480 (Peak)	V	98.4	N/A	35.8	62.6	74	11.4
2480 (Avg)	V	92.5	3.6	35.8	53.1	54	0.9



166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

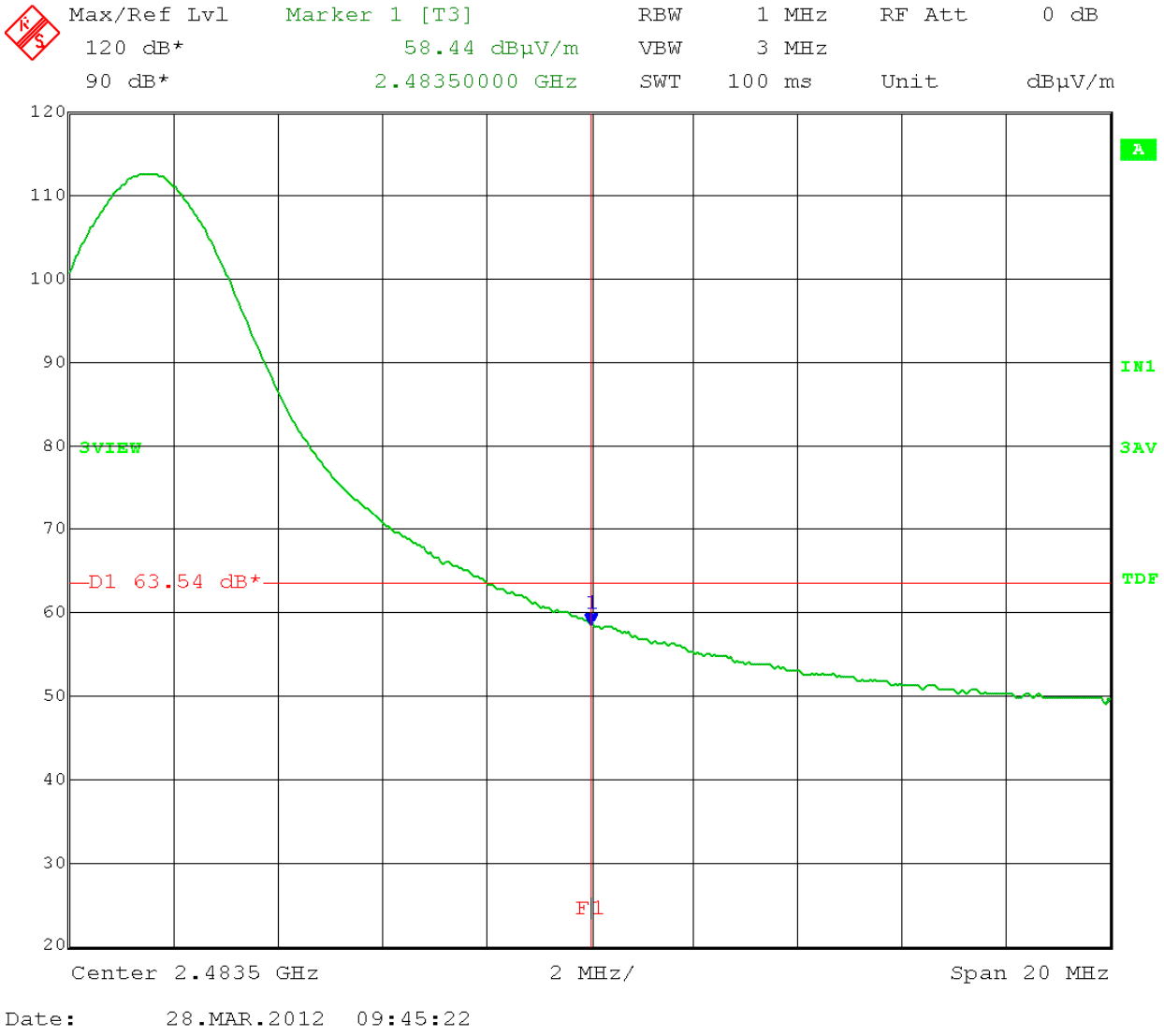
Test Date:	03-28-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Upper Band-Edge - Radiated
Rule part:	FCC Part 15.247(d) and FCC Part 205
Operator:	Craig B
Comment:	Channel 25: Frequency – 2.475 GHz
	Power setting 8 dBm
	Vertical polarization
	Detector: Peak
	Test distance: 1 meter
	Limit 83.54 dBµV/m



166 South Carter, Genoa City, WI 53128

Company:	California Eastern Laboratories
Model Tested:	ZICM357SP0-1
Report Number:	17753
DLS Project:	5129

Test Date:	03-28-2012
Company:	California Eastern Laboratories
EUT:	Gemini P0X1A
Test:	Upper Band-Edge - Radiated
Rule part:	FCC Part 15.247(d) and FCC Part 205
Operator:	Craig B
Comment:	Channel 25: Frequency – 2.475 GHz
	Power setting 8 dBm
	Vertical polarization
	Detector: Average
	Test distance: 1 meter
	Limit 63.54 dBµV/m



Appendix B

8.0 Duty Cycle

Rule Part:

15.35(c)

Limit:

N/A

Results:

Duty Cycle Correction Factor: 3.6 dB

Sample Equation(s):

Next page

Notes:

Worst case Duty Cycle was provided by the manufacturer. It was calculated based on theoretical Zigbee/ MAC performance. See attached documentation.

Transmit Power Duty Cycle

IEEE 802.15.4-2003 2.4 GHz PHY Constants

Data Rate	250000	bits / sec
	31250	bytes / sec
Symbols/byte	2	sym / bytes
Symbol Timing	62500	sym / sec
	0.000016	sec / sym
Byte Timing	0.000032	sec / byte

PHY PSDU	6	bytes	4 Pramble, SPD, Length
Max Length	127	bytes	
Total Packet Length	133	bytes	
Maximum Time TX PKT	0.004256	sec	

Long Frame Scenario:

1) TX Frame — Assume Frame is Data Frame
2) Wait for ACK
3) RX ACK
4) CPU Processing of ACK
5) Wait for Backoff
6) Repeat 1)

MAC-Level Calculation (Long Frame)

Long Frame	127	bytes	
ACK Frame	5	bytes	
tack	12	sym	
Backoff Period	20	sym	
Maximum Backoff	7		Random between 0 and 7
Backoff Required	2		
Backoff Time	70	sym	Average at 3.5

Transmit Time	
Total TX Time (sec)	0.004256

(Long Frame + PHY Header) * seconds/byte

NOT Transmit time (RX or Idle)		
Wait for ACK (tack)	0.000192	
RX Time (ACK)	0.000352	
Backoff Time (tbo)	0.00112	(Backoff Time * Backoff Period)
CPU Processing (tcpu)	0.0002	(0.2ms average on EM2xx running EmberZNet)
CCA Assessment (tcca)	0.000128	(averaged over 8 symbols in RX Mode)
Turn Around Time (RX to TX)	0.000192	(After CCA, Radio turns over to TX in 12 symbols)
Total Off Time (sec)	0.002184	

Total Time (ttotal)	0.00644	Time for one complete packet including non-transmit time.
Number of RX / TX cycles in 100ms	15.5279503	

Worse Case (100ms window)

TX Frame 15.5 times	0.065968	seconds
RX or IDLE 15.5 Times	0.033852	seconds
Sum	0.09982	seconds

MAC TX Duty Cycle (On /total)	66.09%		Represents theoretical ZigBee / MAC performance
	3.59768496	dB	(This number used for FCC compliance testing.)

Appendix B

9.0 Measurement Data - Line Conducted Emissions

Rule Part:

15.207

Test Procedure:

ANSI C63.10-2009

Limit:

15.207(a)

Results:

Compliant

Notes:

This was power line conducted measurement. Since a representative external power supply was not available at the time of test, measurements were made on the DC power input to the EUT.

The EUT was powered through a cable that was connected to a Line Impedance Stabilization Network, which was powered from a DC bench supply set to 3.6 VDC. The EUT was set to transmit continuously at its maximum power, with a modulating signal representative of the worst-case signal encountered in a real system operation.

FCC Part 15 Class B

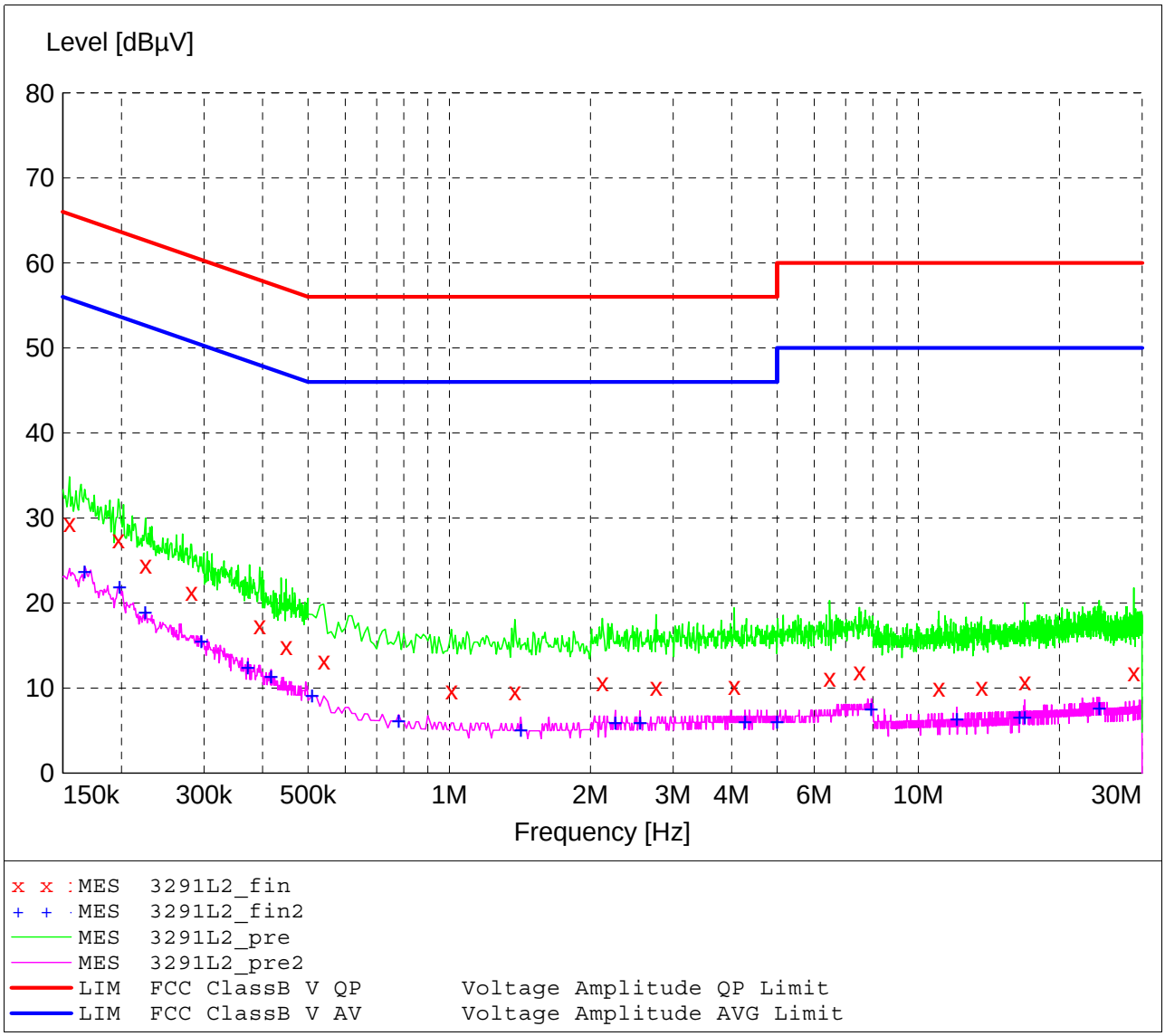
Voltage Mains Test

EUT:	Gemini P0X1A
Manufacturer:	California Eastern Laboratories
Operating Condition:	70 deg. F, 33% R.H.
Test Site:	DLS O.F. Screen Room
Operator:	Craig B
Test Specification:	3.6 Volts DC
Comment:	Line NEG
	Date: 03-29-2012

SCAN TABLE: "Line Cond SR Final"

Short Description: Line Conducted Emissions

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "3291L2_fin"

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Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.155000	29.40	13.5	66	36.3	QP
0.197000	27.50	12.7	64	36.2	QP
0.225000	24.50	12.4	63	38.1	QP
0.282000	21.30	11.9	61	39.5	QP
0.394000	17.40	11.4	58	40.6	QP
0.449000	14.90	11.2	57	42.0	QP
0.540000	13.20	11.1	56	42.8	QP
1.010000	9.70	10.7	56	46.3	QP
1.380000	9.60	10.6	56	46.4	QP
2.120000	10.70	10.7	56	45.3	QP
2.760000	10.10	10.6	56	45.9	QP
4.050000	10.20	10.7	56	45.8	QP
6.470000	11.20	10.7	60	48.8	QP
7.490000	12.00	10.7	60	48.0	QP
11.060000	10.00	11.0	60	50.0	QP
13.640000	10.10	11.1	60	49.9	QP
16.865000	10.80	11.3	60	49.2	QP
28.805000	11.80	11.8	60	48.2	QP

MEASUREMENT RESULT: "3291L2_fin2"

3/29/2012 1:43PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.167000	23.70	13.2	55	31.4	CAV
0.198000	21.90	12.7	54	31.8	CAV
0.225000	18.90	12.4	53	33.7	CAV
0.296000	15.50	11.8	50	34.9	CAV
0.372000	12.40	11.5	49	36.1	CAV
0.417000	11.30	11.3	48	36.2	CAV
0.510000	9.10	11.2	46	36.9	CAV
0.780000	6.10	10.9	46	39.9	CAV
1.420000	5.00	10.6	46	41.0	CAV
2.260000	5.90	10.7	46	40.1	CAV
2.550000	5.90	10.6	46	40.1	CAV
4.270000	6.00	10.7	46	40.0	CAV
5.000000	6.00	10.7	46	40.0	CAV
7.940000	7.50	10.8	50	42.5	CAV
12.080000	6.30	11.0	50	43.7	CAV
16.445000	6.50	11.2	50	43.5	CAV
16.865000	6.50	11.3	50	43.5	CAV
24.335000	7.60	11.6	50	42.4	CAV

FCC Part 15 Class B

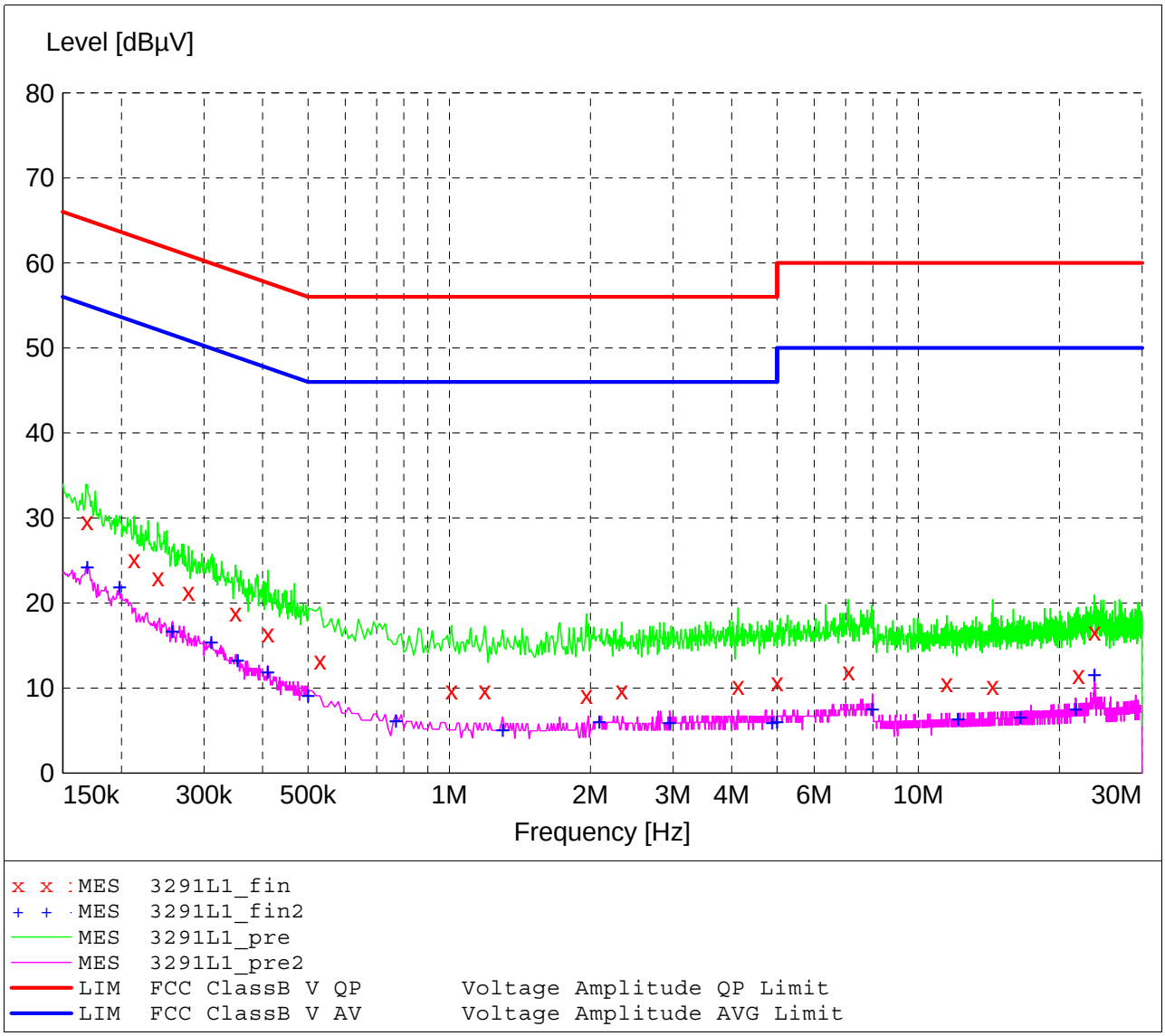
Voltage Mains Test

EUT:	Gemini P0X1A
Manufacturer:	California Eastern Laboratories
Operating Condition:	70 deg. F, 33% R.H.
Test Site:	DLS O.F. Screen Room
Operator:	Craig B
Test Specification:	3.6 Volts DC
Comment:	Line POS
	Date: 03-29-2012

SCAN TABLE: "Line Cond SR Final"

Short Description: Line Conducted Emissions

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak CISPR AV	2.0 s	9 kHz	LISN DLS#128



MEASUREMENT RESULT: "3291L1_fin"

3/29/2012 1:38PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.169000	29.60	13.1	65	35.4	QP
0.213000	25.20	12.5	63	37.9	QP
0.239000	23.00	12.2	62	39.1	QP
0.278000	21.30	11.9	61	39.6	QP
0.350000	18.90	11.6	59	40.1	QP
0.411000	16.40	11.3	58	41.2	QP
0.530000	13.20	11.1	56	42.8	QP
1.010000	9.70	10.7	56	46.3	QP
1.190000	9.70	10.6	56	46.3	QP
1.960000	9.20	10.7	56	46.8	QP
2.330000	9.70	10.7	56	46.3	QP
4.130000	10.20	10.7	56	45.8	QP
5.000000	10.70	10.7	56	45.3	QP
7.100000	12.00	10.7	60	48.0	QP
11.495000	10.60	11.0	60	49.4	QP
14.405000	10.20	11.2	60	49.8	QP
21.935000	11.50	11.5	60	48.5	QP
23.750000	16.60	11.5	60	43.4	QP

MEASUREMENT RESULT: "3291L1_fin2"

3/29/2012 1:38PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector
0.169000	24.20	13.1	55	30.8	CAV
0.198000	21.80	12.7	54	31.9	CAV
0.257000	16.60	12.0	52	34.9	CAV
0.311000	15.40	11.7	50	34.5	CAV
0.354000	13.20	11.5	49	35.7	CAV
0.410000	11.80	11.3	48	35.8	CAV
0.500000	9.10	11.2	46	36.9	CAV
0.770000	6.10	10.9	46	39.9	CAV
1.300000	5.00	10.6	46	41.0	CAV
2.090000	6.00	10.7	46	40.0	CAV
2.950000	5.90	10.6	46	40.1	CAV
4.880000	5.90	10.7	46	40.1	CAV
5.000000	6.00	10.7	46	40.0	CAV
7.985000	7.50	10.8	50	42.5	CAV
12.155000	6.30	11.0	50	43.7	CAV
16.505000	6.50	11.2	50	43.5	CAV
21.680000	7.50	11.4	50	42.5	CAV
23.750000	11.50	11.5	50	38.5	CAV

END OF REPORT

Revision #	Date	Comments	By
1.0	04-03-2012	Preliminary Release	CB/JS
1.1	04-12-2012	Inserted corrected charts due to duty cycle correction factor.	JS
1.2	05-01-2012	Added page 29 for next-to-high channel power measurement	JS