



Certification Test Report

CFR 47 FCC Part 15, Subpart C Section
15.247

Industry Canada RSS 210, Issue 7

Energy Aware Technology Inc.
PowerPortal PPH1-H

FCC ID # W72-PTSMIHP1
IC # 8253A-PTSMIHP1
Project Code CG-1281

(Report CG-1281-RA-1-1)
Revision: 1

July 24, 2009

Prepared for: Energy Aware Technology Inc.

Author: Deniz Demirci
Senior Wireless / EMC Technologist

Approved by: Nick Kobrosly
Director of Canadian Operations

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Report Summary

| | |
|---------------------------------|---|
| Test Facility: | National Technical Systems, Canada Product Integrity Laboratory 5151-47 th Street, N.E. Calgary Alberta T3J 3R2 |
| Accreditation Numbers: | 0214.22 Electrical 0214.23 Mechanical Accredited by A2LA The American Association for Laboratory Accreditation CLIENTS SERVED: All interested parties FIELDS OF TESTING: Electrical/Electronic, Mechanical/Physical ACCREDITATION DATE:: May 14, 2009 VALID TO: December 31, 2009 |
| Applicant: | Energy Aware Technology Inc. 604-134 Abbott Street Vancouver, BC. V6B 2K4 Tel: 604-638-7763 www.energy-aware.com |
| Customer Representative: | Name: Lauren Kulokas Title: Vice President, Operations Phone #: (604) 282-7698 Email Address: lauren.kulokas@energy-aware.com |

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Test Summary

| Appendix | Test/Requirement Description | Deviations* from: | | | Pass / Fail | Applicable FCC Rule Parts | Applicable Industry Canada Rule Parts |
|----------|---|-------------------|------------|---------------|-------------|------------------------------|---------------------------------------|
| | | Base Standard | Test Basis | NTS Procedure | | | |
| A | Power line Conducted Emission | No | No | No | Pass | FCC Subpart C 15.207 (a) | RSS-Gen Issue 2 7.2.2 |
| B | 6 dB Bandwidth | No | No | No | Pass | FCC Subpart C 15.247 (a) (2) | RSS 210 Issue 7 A8.2 (a) |
| C | Occupied Bandwidth (99% emission bandwidth) | No | No | No | N/A | N/A | RSS-Gen Issue 2 4.6.1 |
| D | Peak Power Output | No | No | No | Pass | FCC Subpart C 15.247 (b) (3) | RSS 210 Issue 7 A8.4 (4) |
| E | Power Spectral Density | No | No | No | Pass | FCC Subpart C 15.247 (e) | RSS 210 Issue 7 A8.2 (b) |
| F | Duty Cycle Correction Factor | No | No | No | N/A | FCC Subpart C 15.35 (c) | RSS-Gen Issue 2 4.5 |
| G | Conducted Spurious Emissions | No | No | No | Pass | FCC Subpart C 15.247 (d) | RSS 210 Issue 7 A8.5 |
| H | Conducted Spurious Emissions Band Edge | No | No | No | Pass | FCC Subpart C 15.247 (d) | RSS 210 Issue 7 A8.5 |
| I | Radiated Spurious Emissions Band Edge | No | No | No | Pass | FCC Subpart C 15.247, 15.205 | RSS 210 Issue 7 2.6, A8.5 |
| J | Radiated Spurious Emissions (TX and RX) | No | No | No | Pass | FCC Subpart C 15.247, 15.205 | RSS 210 Issue 7 2.6, A8.5 |

Test Result: The product presented for testing complied with test requirements as shown above.

Prepared By: _____
James MacKay
Compliance Specialist
On behalf of
Deniz Demirci
Senior Wireless / EMC Technologist

Reviewed By: _____
Glen Moore
Wireless / EMC Manager

Approved By: _____
Alex Mathews
Quality Management Representative

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Register of revisions

| Revision | Date | Description of Revisions |
|----------|---------------|--------------------------|
| 1 | July 24, 2009 | Final release |

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to describe the tests applied by NTS Canada to demonstrate compliance of the PowerPortal PPH1-H from Energy Aware Technology Inc. to FCC Part 15 Subpart C section 15.247 for DTS transmitter and the equivalent sections of Industry Canada's RSS 210, Issue 7

2.0 EUT DESCRIPTION

2.1 CONFIGURATION

| | Name | Model | Revision | Serial Number |
|--|---|---------------|----------|---------------|
| EUT | Power Portal | PPH1-H | N/A | N/A |
| Power Supply | 5Vdc PS | S003HU0500050 | N/A | N/A |
| Device Classification | Mobile | | | |
| Antenna | Integral antenna. Peak gain = -0.6 dBi | | | |
| Modulation | 0-QPSK | | | |
| EUT Size with Enclosure (H x W x D) (in mm) | 110 x 80 x 30 | | | |
| EUT Weight (in grams) | 300 | | | |
| Channels/Frequency Range | 16 channels, 2405 MHz -2480 MHz | | | |
| Functional Description | <p>The PowerPortal is an in-home display designed to help the utilities industry meet their need for increased communication and feedback to their customers.</p> <p>The PowerPortal receives real time electricity consumption data wirelessly from a residential smart meter using the Zigbee Smart Energy Profile. Information displayed by the PowerPortal includes:</p> <ul style="list-style-type: none"> • Current electricity use in \$ or kWh • Accumulated use in \$ or kWh • Text messages or alerts from the service provider <p>The PowerPortal features include:</p> <ul style="list-style-type: none"> • Large font LCD with clear, uncluttered menus • Rechargeable NiMH battery with wall charger • 3 color LED lights used to indicate TOU periods, upcoming Demand Response Events or Critical Peak Pricing • Display symbols indicating current signal strength and battery life | | | |

2.1.1 EUT POWERS

| | |
|------------------------|---|
| Voltage | AA Type battery powered and/or 5Vdc 500mA switch mode power supply powered (120Vac 60Hz) |
| Number of Feeds | 2 |

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2.2 EUT CABLES

| Quantity | Model/Type | Routing | | Shielded / Unshielded | Description | Cable Length (m) |
|----------|-------------------|--------------|-----|--------------------------|-------------|------------------------|
| | | From | To | | | |
| 1 | DC Power Cable | Power Supply | EUT | Unshielded | Power Cable | 1.9 |

2.3 MODE OF OPERATION DURING TESTS

The PowerPortal PPH1-H was tested while in Continuous Transmit and Receive modes. The EUT was tuned to a low, middle, and high channel to perform power, occupied bandwidth and spurious/harmonic tests. For AC conducted emissions the device was prescanned to determine the worst case test mode, final results are reported in this mode. While transmitting the EUT was setup to operate at the intended maximum power output (5 dBm conducted) available to the end user.

For all test cases pre-scans were completed in all modes to determine worst case levels.

3.0 SUPPORT EQUIPMENT

3.1 CONFIGURATION

Ember and InSight Desktop Beta 2.0 software used for configuring the device
No support equipment or peripherals are used with this equipment during the tests

3.2 TEST BED/PERIPHERAL CABLES

NA

4.0 TEST ENVIRONMENT

4.1 NORMAL TEST CONDITIONS

Temperature: 20 – 23 °C
Relative Humidity: 28 – 35 %
Atmospheric pressure: 883 – 890 mbar
Nominal test voltage: 120 VAC 60Hz

The values are the limits registered during the test period.

APPENDICES

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APPENDIX A: POWER LINE CONDUCTED EMISSION**A.1. Base Standard & Test Basis**

| | |
|----------------------|--|
| Base Standard | FCC PART 15.207 (a) RSS-Gen Issue 2 7.2.2 |
| Test Basis | ANSI C63.4-2003 |
| Test Method | SOP-CAG- EMC-02 |


A.2. Specifications

| Frequency MHz | Limit | |
|------------------|--------------------------|-----------------------|
| | Quasi-Peak dB μ V | Average dB μ V |
| 0.150 – 0.500 | 66 to 56 ¹ | 56 to 46 ¹ |
| 0.500 – 5.00 | 56 | 46 |
| 5.00 – 30.00 | 60 | 50 |

Note 1: decrease with the logarithm of the frequency**A.3. Test Procedure**

ANSI C63.4-2003. The EUT was pre tested in all modes including low, mid and high channel with the worst case test results being reported.

A.4. Test Results



Product Integrity
Laboratory V2.5

Project Number: CG-1281
Model: PowerPortal
Comments: Conf06: 120 VAC 60 Hz, Unit with enclosure, CH18 (12), Txpowermode = 0 1 (Normal Ext PA 18 dBm), Txstream (random characters with 100 % duty cycle)

Tester: James MacKay
Test ID: CE02tc-10m-1269

Standard:
FCC15_B

| Voltage/Line | Frequency (MHz) | Measurement Detector | Measured Value (dBµV) | Correction Factors (dB) | Emission Level (dBµV) | Limit Type | Limit (dBµV) | Margin (dB) |
|------------------|-----------------|----------------------|-----------------------|-------------------------|-----------------------|------------|--------------|-------------|
| AC 120V Line1A | 0.1522 | QP | 45.42 | 12.39 | 57.81 | QP | 65.88 | 8.07 |
| AC 120V Line1A | 0.1573 | QP | 45.32 | 12.29 | 57.61 | QP | 65.61 | 8.00 |
| AC 120V Line1A | 0.1585 | QP | 44.68 | 12.27 | 56.95 | QP | 65.54 | 8.59 |
| AC 120V NeutralA | 0.1538 | QP | 44.35 | 12.29 | 56.64 | QP | 65.79 | 9.15 |
| AC 120V NeutralA | 0.1586 | QP | 44.05 | 12.20 | 56.25 | QP | 65.54 | 9.29 |
| AC 120V NeutralA | 0.1571 | QP | 44.17 | 12.22 | 56.39 | QP | 65.62 | 9.23 |
| AC 120V Line1A | 0.1525 | AV | 12.08 | 12.39 | 24.47 | AV | 55.86 | 31.39 |
| AC 120V Line1A | 0.1529 | AV | 12.08 | 12.38 | 24.46 | AV | 55.84 | 31.38 |
| AC 120V Line1A | 0.1588 | AV | 10.81 | 12.27 | 23.08 | AV | 55.53 | 32.45 |
| AC 120V NeutralA | 0.1551 | AV | 11.19 | 12.26 | 23.45 | AV | 55.72 | 32.27 |
| AC 120V NeutralA | 0.1565 | AV | 11.80 | 12.24 | 24.04 | AV | 55.65 | 31.61 |
| AC 120V NeutralA | 0.1578 | AV | 12.05 | 12.21 | 24.26 | AV | 55.58 | 31.32 |

The highest emission measured was 45.32 dB μ V with average detector at 157.3 kHz. It has an 8.00 dB margin to the FCC Part 15.207 and RSS-Gen Issue 2 7.2.2 limits.

A.5. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: James MacKay
Function: Compliance Specialist

A.6. Test date July 20, 2009

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Figure 1 Conducted Emission 120 VAC Line 150 kHz – 30 MHz Quasi-peak Detector

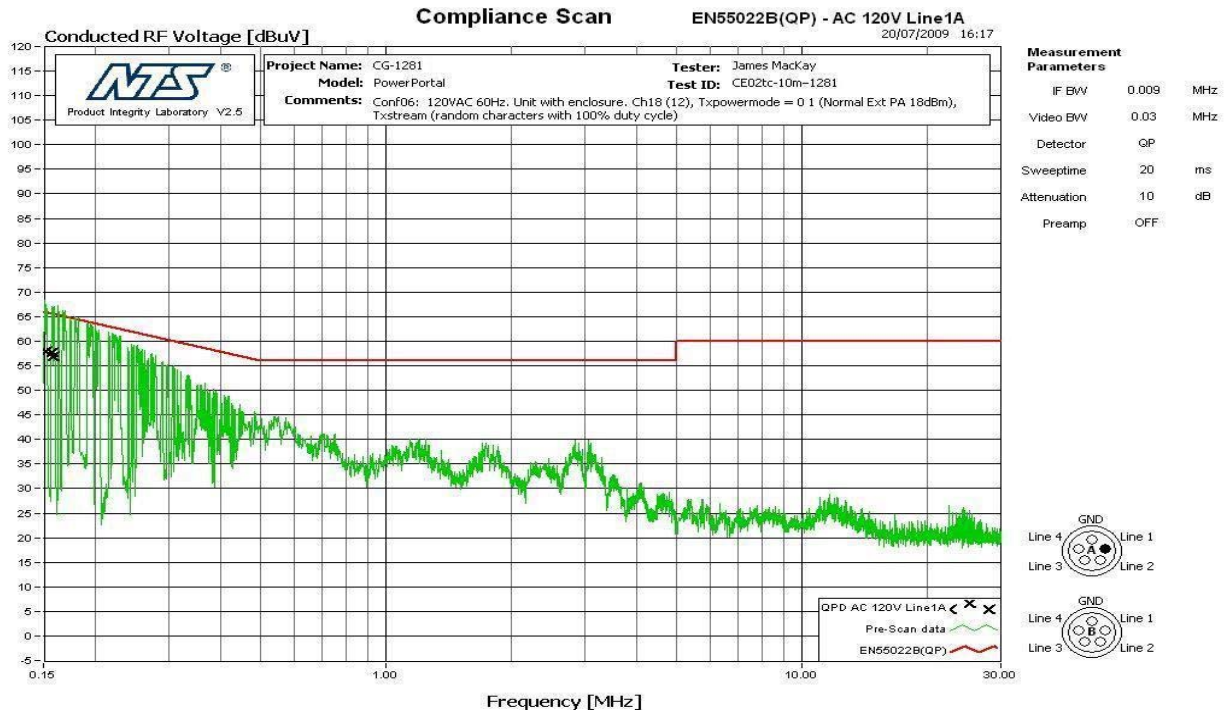
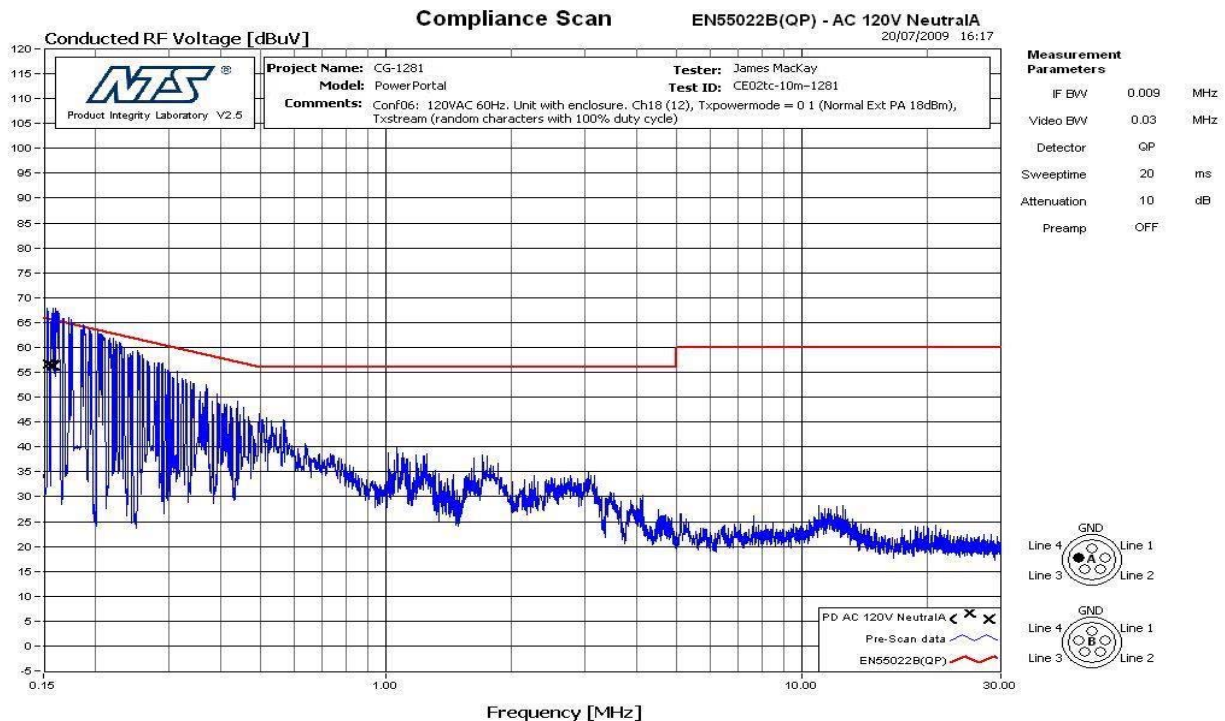


Figure 2 Conducted Emission 120 VAC Return 150 kHz – 30 MHz Quasi-peak Detector



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Figure 3 Conducted Emission 120 VAC Line 150 kHz – 30 MHz Average Detector

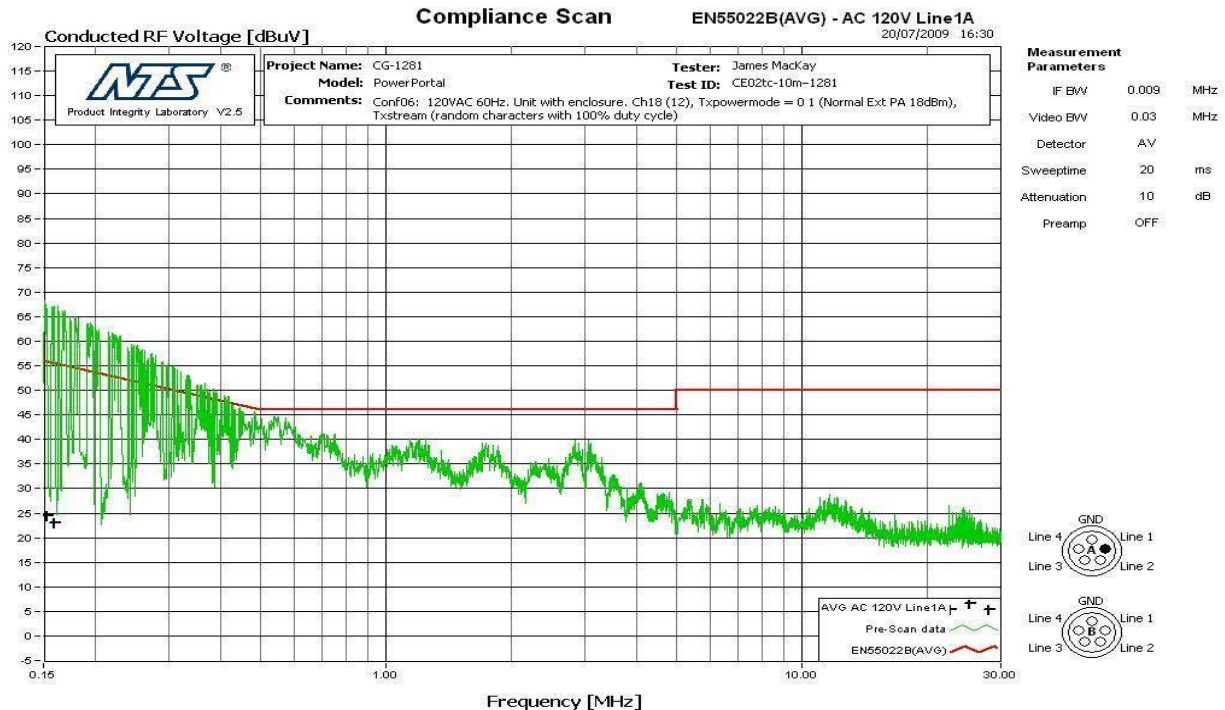
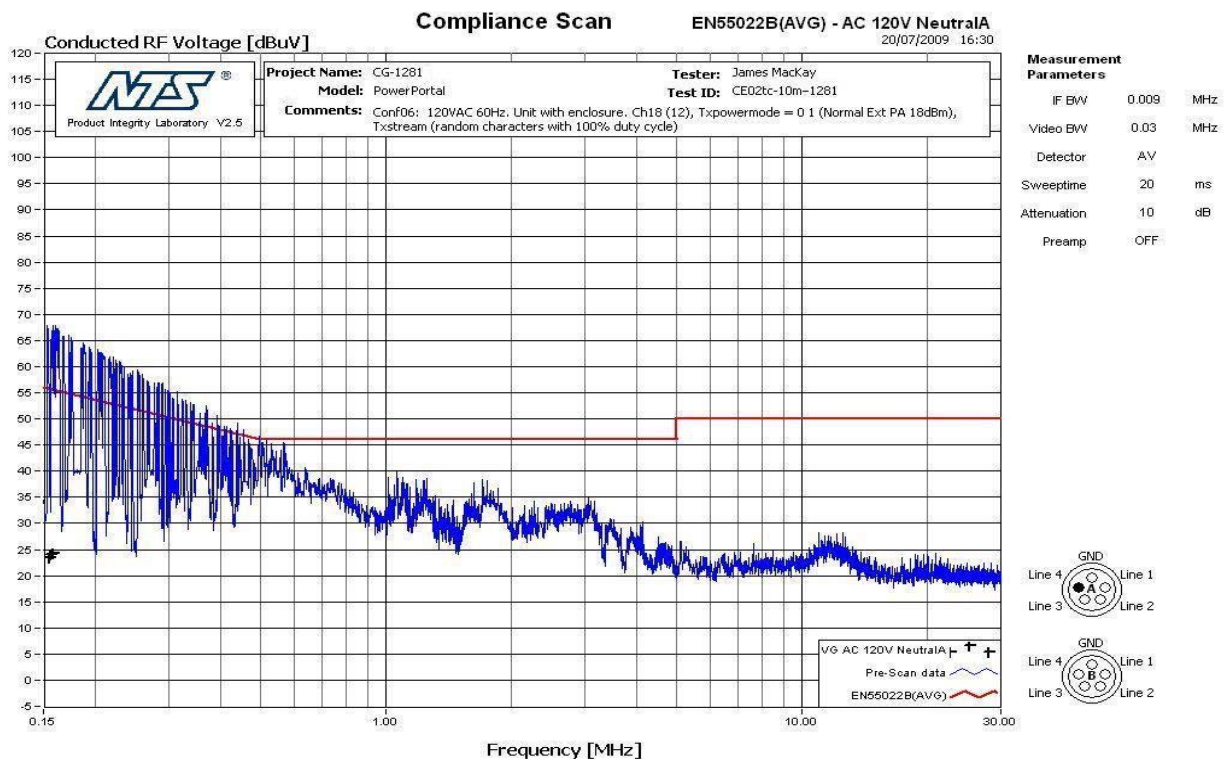


Figure 4 Conducted Emission 120 VAC Return 150 kHz – 30 MHz Average Detector



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APPENDIX B: 6 DB BANDWIDTH

B.1. Base Standard & Test Basis

| | |
|----------------------|---|
| Base Standard | FCC PART 15.247 (a) (2) RSS 210 Issue 7 A8.2 (a) |
| Test Basis | FCC Publication 558074 RSS-Gen Issue 2 4.6.2 |
| Test Method | FCC Publication 558074 RSS 210 Issue 7 A8.2 (a) |

B.2. Specifications

15.247 2) Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

B.3. Deviations

| Deviation Number | Time & Date | Description and Justification of Deviation | Deviation Reference | | | Approval |
|------------------|-------------|--|---------------------|------------|---------------|----------|
| | | | Base Standard | Test Basis | NTS Procedure | |
| None | | | | | | |

B.4. Test Procedure

FCC Publication 558074.

B.5. Test Results

The EUT is in compliance with the requirement as specified above

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) |
|---------|-----------------|----------------------|
| 11 | 2405 | 1.603 |
| 18 | 2440 | 1.623 |
| 26 | 2480 | 1.743 |

All final reported values are corrected values.

B.6. Operating Mode During Test

The PowerPortal PPH1-H was tuned to a low, middle and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode).

B.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Lixin Wang
Function: EMC Technologist

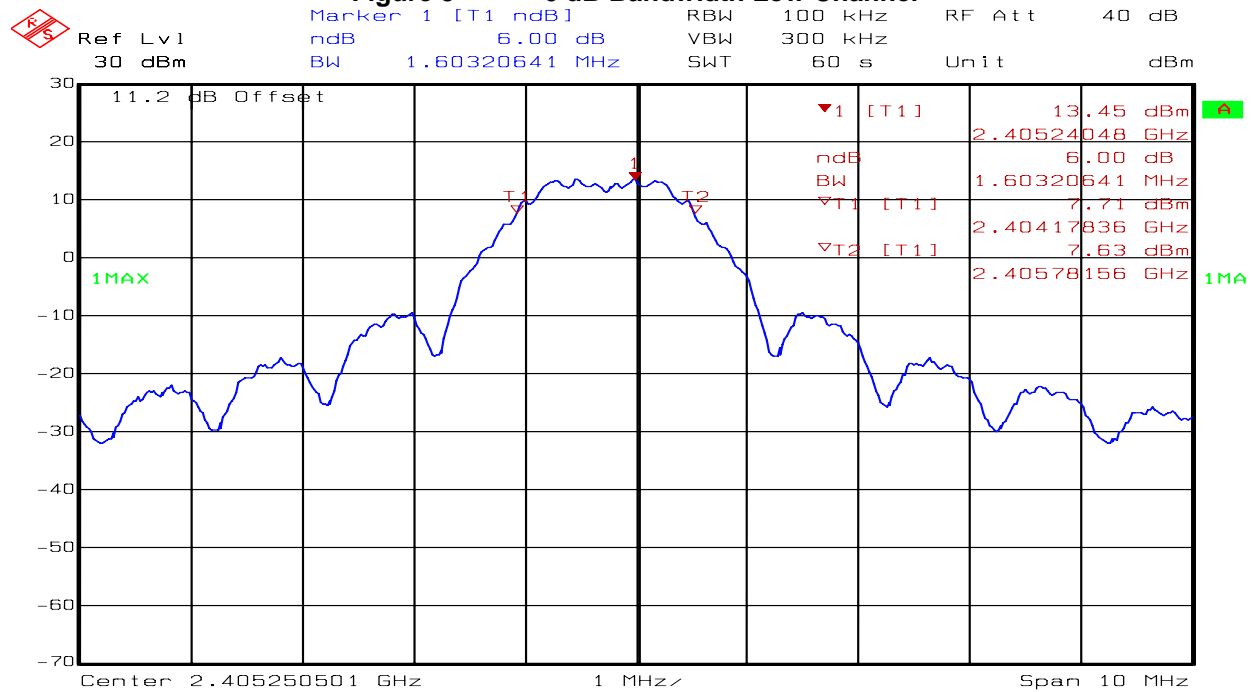
B.8. Test date

July 14, 2009

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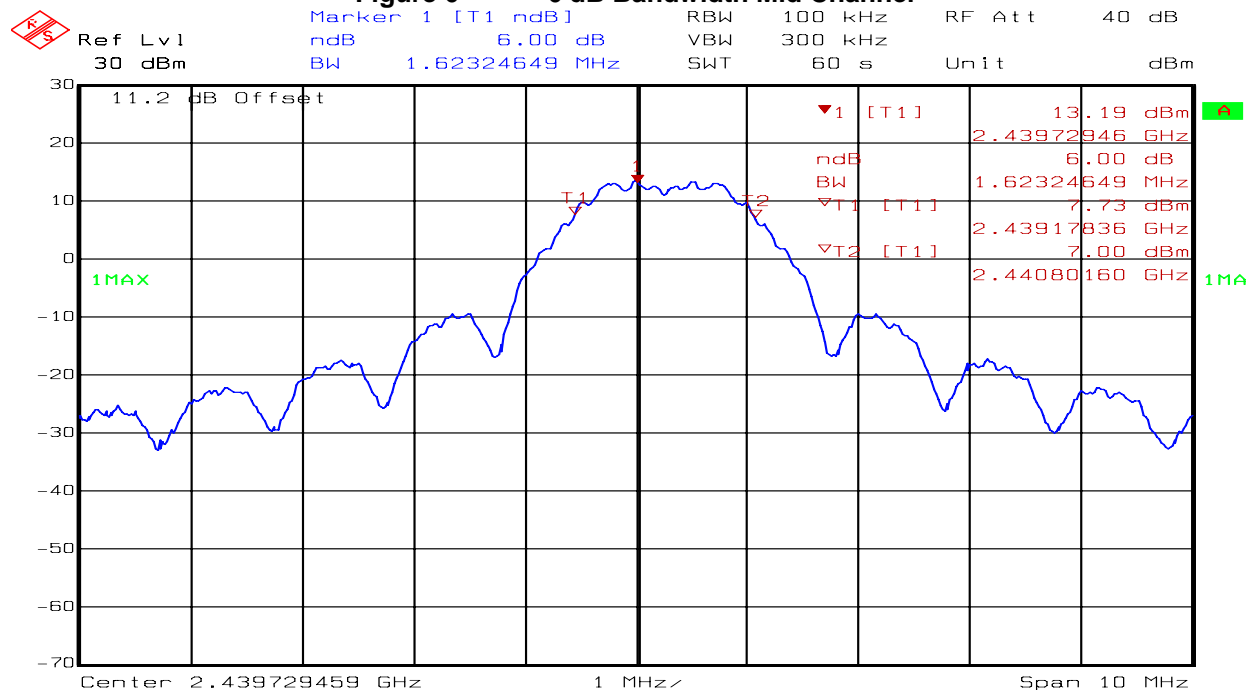
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Figure 5 6 dB Bandwidth Low Channel



Title: CG-1281 Energy Aware PowerTab Display
Comment A: Ch 11, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:37:07

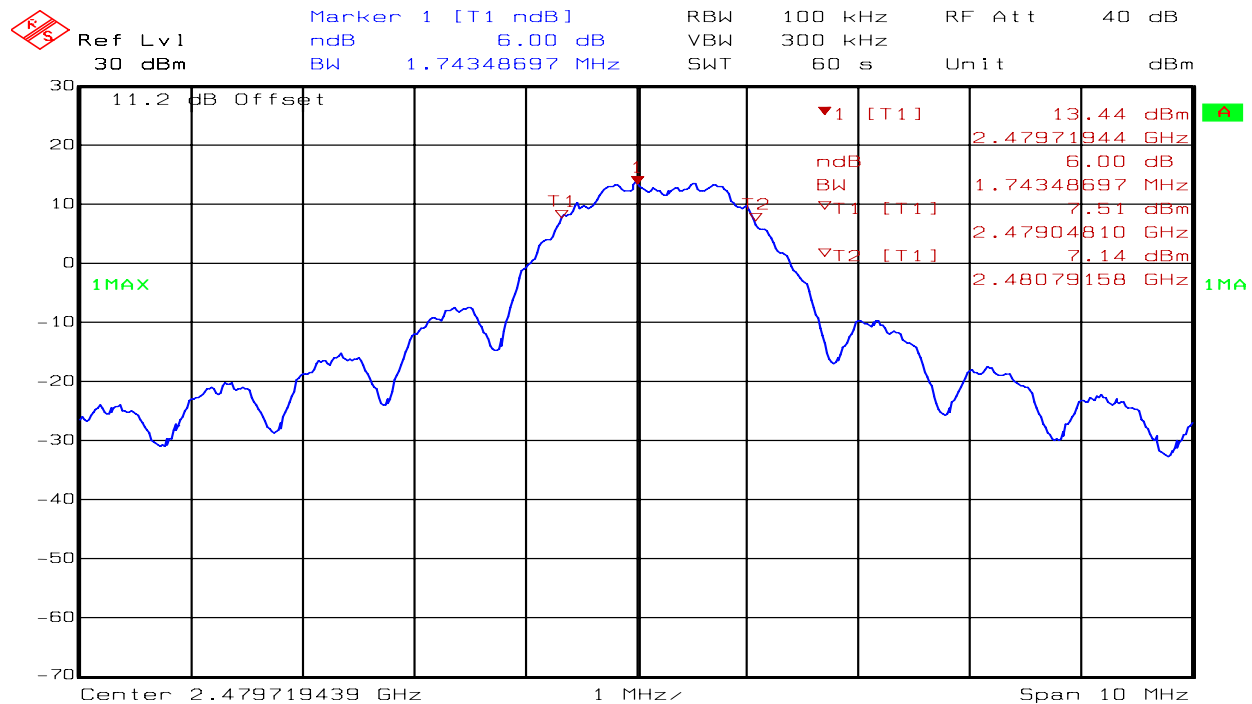
Figure 6 6 dB Bandwidth Mid Channel



Title: CG-1281 Energy Aware PowerTab Display
Comment A: Ch 18, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:42:38

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Figure 7 6 dB Bandwidth High Channel



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 26,Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:49:55

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APPENDIX C: OCCUPIED BANDWIDTH

C.1. Base Standard & Test Basis

| | |
|----------------------|-----------------------|
| Base Standard | RSS-Gen Issue 2 4.6.1 |
| Test Basis | RSS-Gen Issue 2 4.6.1 |
| Test Method | RSS-Gen Issue 2 4.6.1 |

C.2. Specifications

4.6.1 When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

C.3. Test Procedure

RSS-Gen Issue 2

C.4. Test Results

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) |
|---------|-----------------|--------------------------|
| 11 | 2405 | 2.405 |
| 18 | 2440 | 2.445 |
| 26 | 2480 | 2.505 |

All final reported values are corrected values

C.5. Operating Mode During Test

The PowerPortal PPH1-H was tuned to a low, middle and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode).

C.6. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

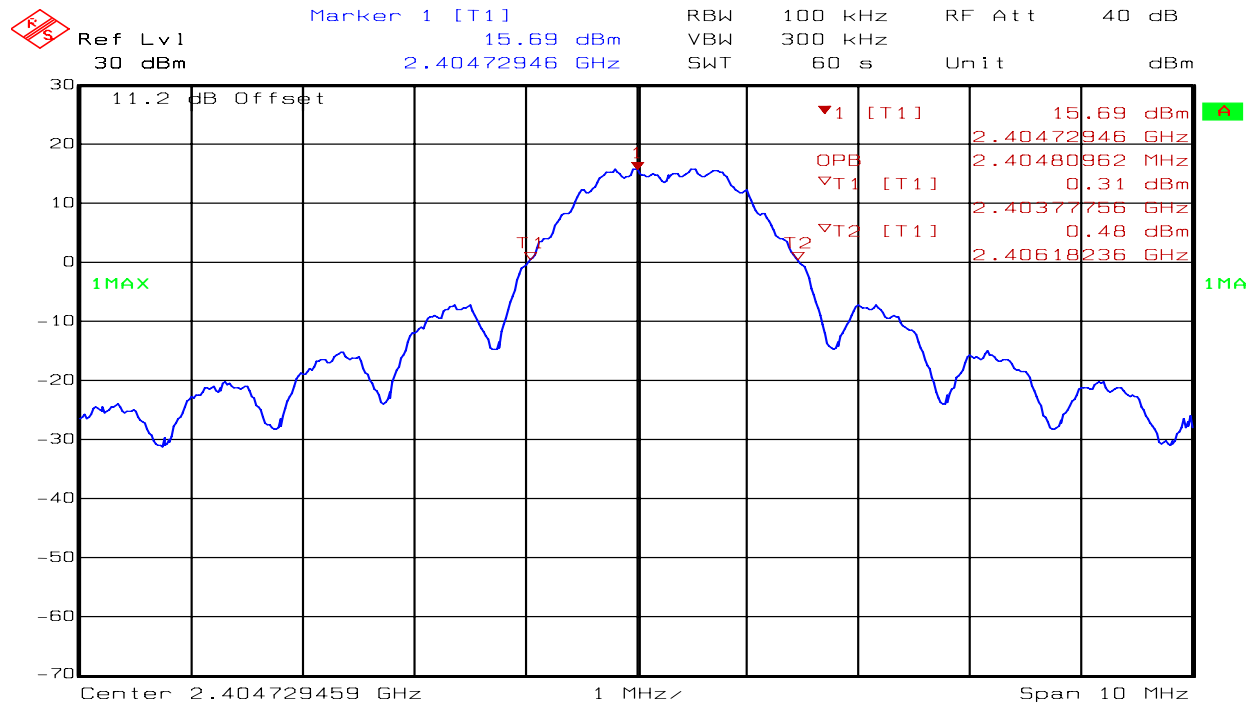
Name: Lixin Wang
Function: EMC Technologist

C.7. Test date

July 14, 2009

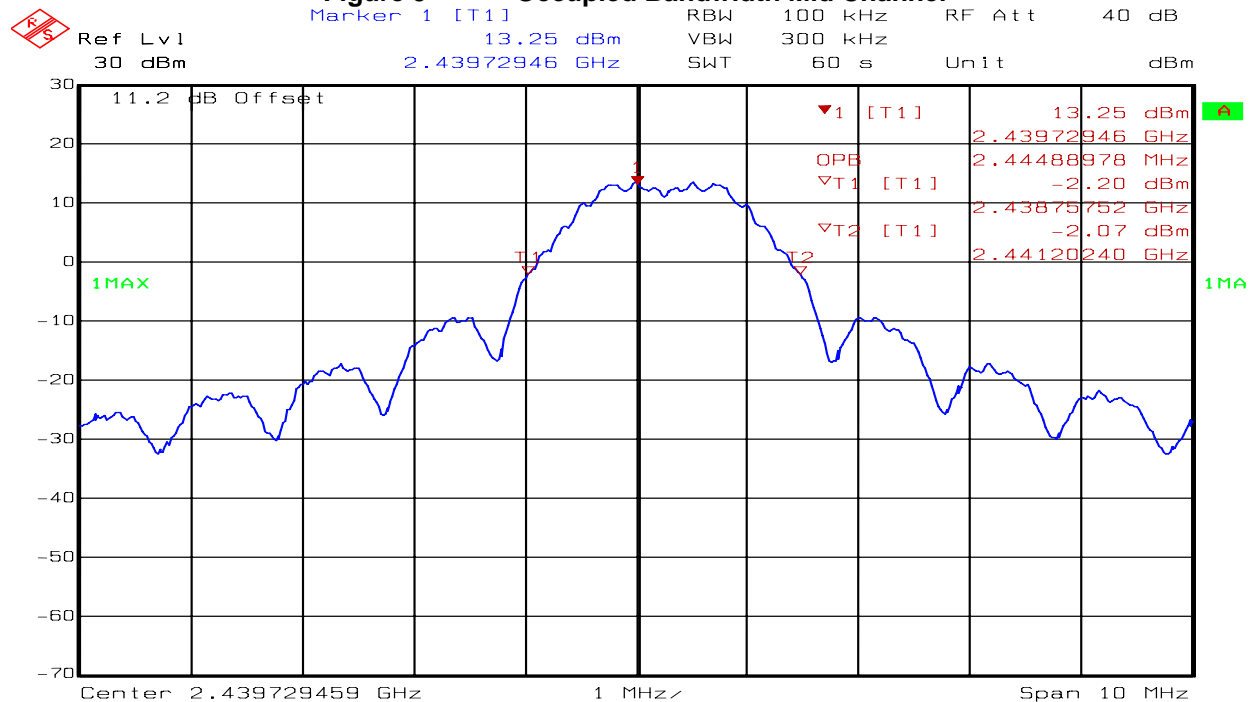
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Figure 8 Occupied Bandwidth Low Channel



Title: CG-1281 Energy Aware PowerTab Display
Comment A: Ch 11, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 11:07:39

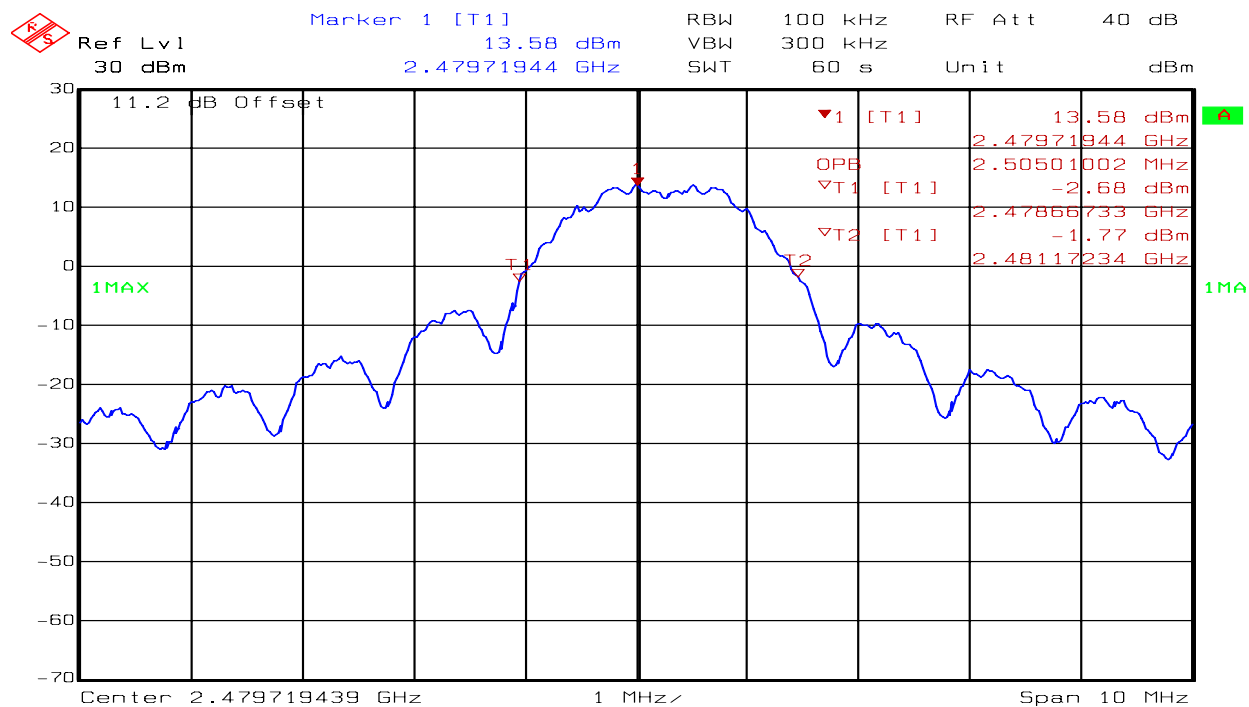
Figure 9 Occupied Bandwidth Mid Channel



Title: CG-1281 Energy Aware PowerTab Display
Comment A: Ch 18, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 11:02:31

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Figure 10 Occupied Bandwidth High Channel



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 26, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:53:01

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APPENDIX D: PEAK POWER OUTPUT

D.1. Base Standard & Test Basis

| | |
|----------------------|---|
| Base Standard | FCC 15.247 RSS 210 Issue 7 A8.4 (4) |
| Test Basis | FCC 15.247 as per FCC Publication 558074 RSS-Gen Issue 2 4.8 |
| Test Method | FCC Publication 558074 and RSS-Gen Issue 2 4.8 |

D.2. Specifications

The maximum peak output power shall not exceed 30 dBm in the 2400 MHz- 2483.5 MHz band

D.3. Test Procedure

FCC Publication 558074 and RSS-Gen Issue 2 4.8

D.4. Operating Mode During Test

The PowerPortal PPH1-H was tuned to a low, middle and high channel in continuous transmit mode at maximum rated RF output power (in power boost mode).

D.5. Test Results

Compliant – The maximum peak power was 18.77 dBm as measured conducted at the RF output port

D.6. Test Data Summary

| Channel | Frequency (MHz) | Peak RF power (dBm) |
|---------|-----------------|---------------------|
| 11 | 2404.29 | 18.77 |
| 18 | 2439.64 | 18.77 |
| 26 | 2479.32 | 18.77 |

All final reported values are corrected values

D.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

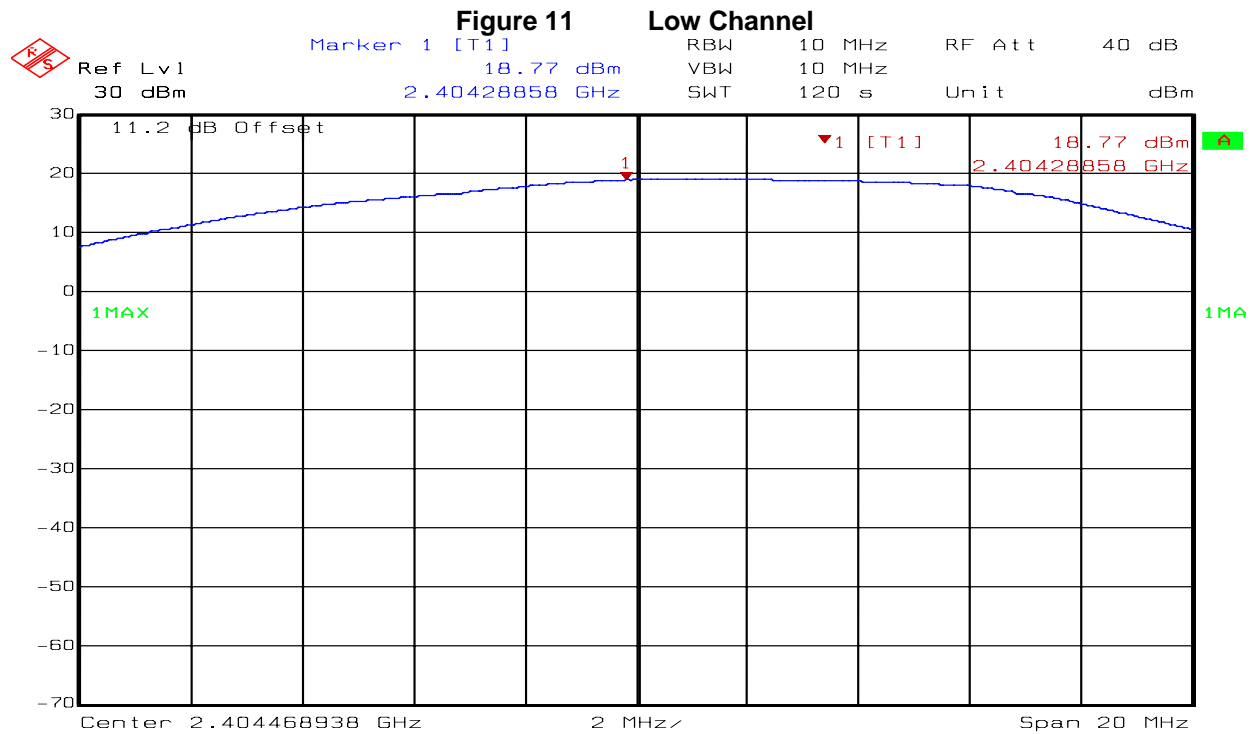
Name: Lixin Wang
Function: EMC Technologist

D.8. Test date

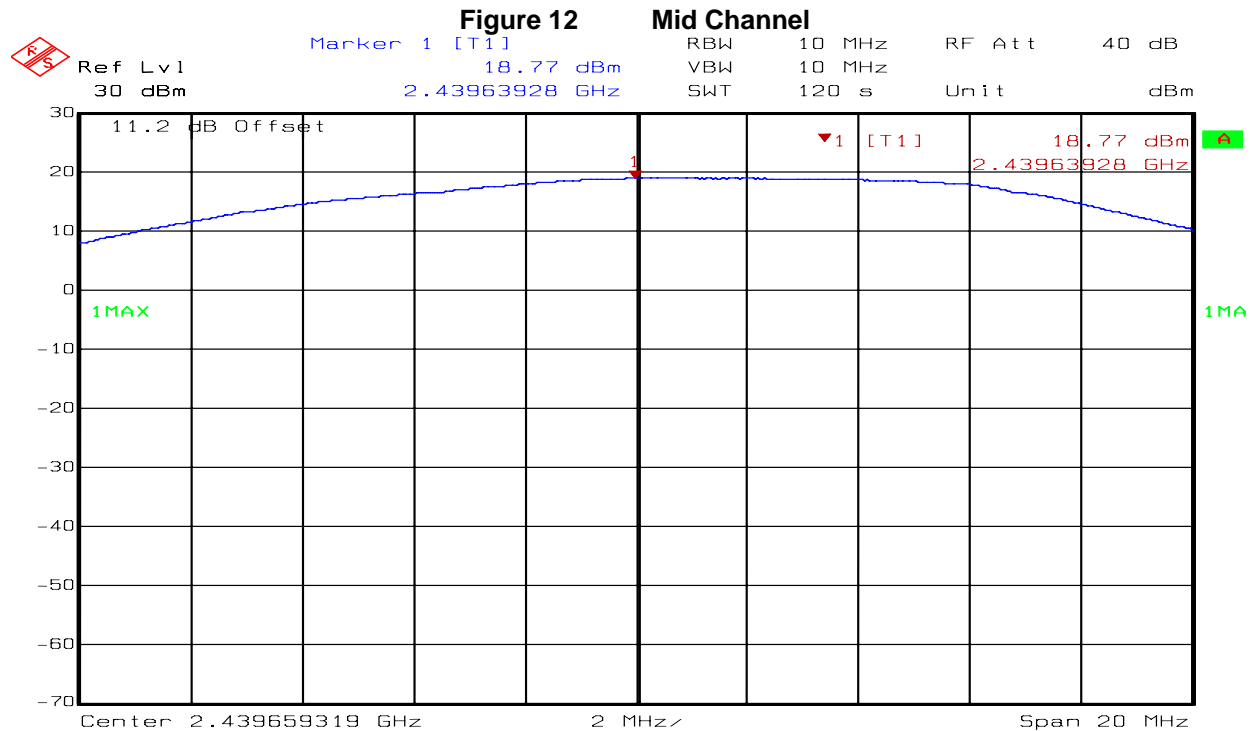
July 14, 2009

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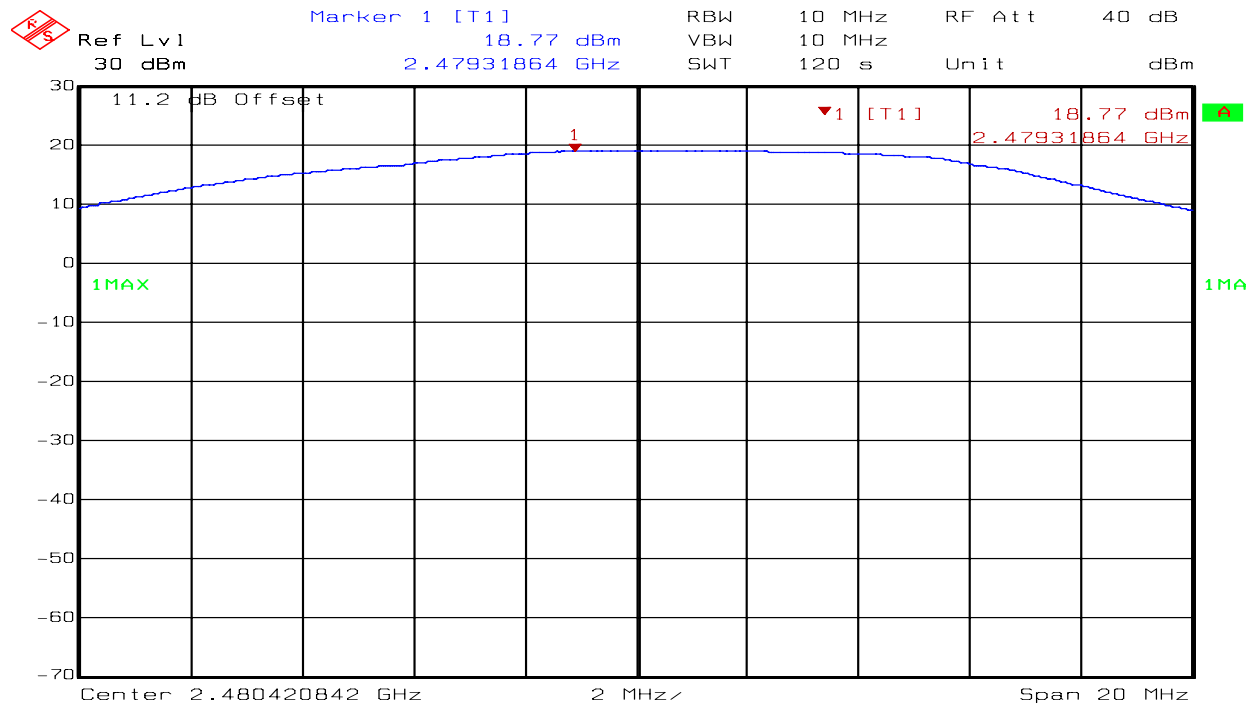
Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 11, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:31:20



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 18, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:26:22

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Figure 13 High Channel



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 26, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 10:00:56

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APPENDIX E: POWER SPECTRAL DENSITY

E.1. Base Standard & Test Basis

| | |
|----------------------|--|
| Base Standard | FCC 15.247 (e) RSS 210 Issue 7 A8.2 (b) |
| Test Basis | FCC 15.247 as per FCC Publication 558074 RSS 210 Issue 7 A8.2 (b) |
| Test Method | FCC Publication 558074 and RSS 210 Issue 7 A8.2 (b) |

E.2. Specifications

15.247 e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

E.3. Test Procedure

FCC Publication 558074

E.4. Operating Mode During Test

The PowerPortal PPH1-H was tuned to the low, middle and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode).

E.5. Test Results

Compliant. The maximum measured power spectral density was 2.66 dBm

E.6. Test Data Summary

| Channel | Frequency (MHz) | PSD (dBm) |
|---------|-----------------|-----------|
| 11 | 2405.07 | 2.66 |
| 18 | 2440.08 | 1.90 |
| 26 | 2480.07 | 2.47 |

All final reported values are corrected values

E.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Lixin Wang
Function: EMC Technologist

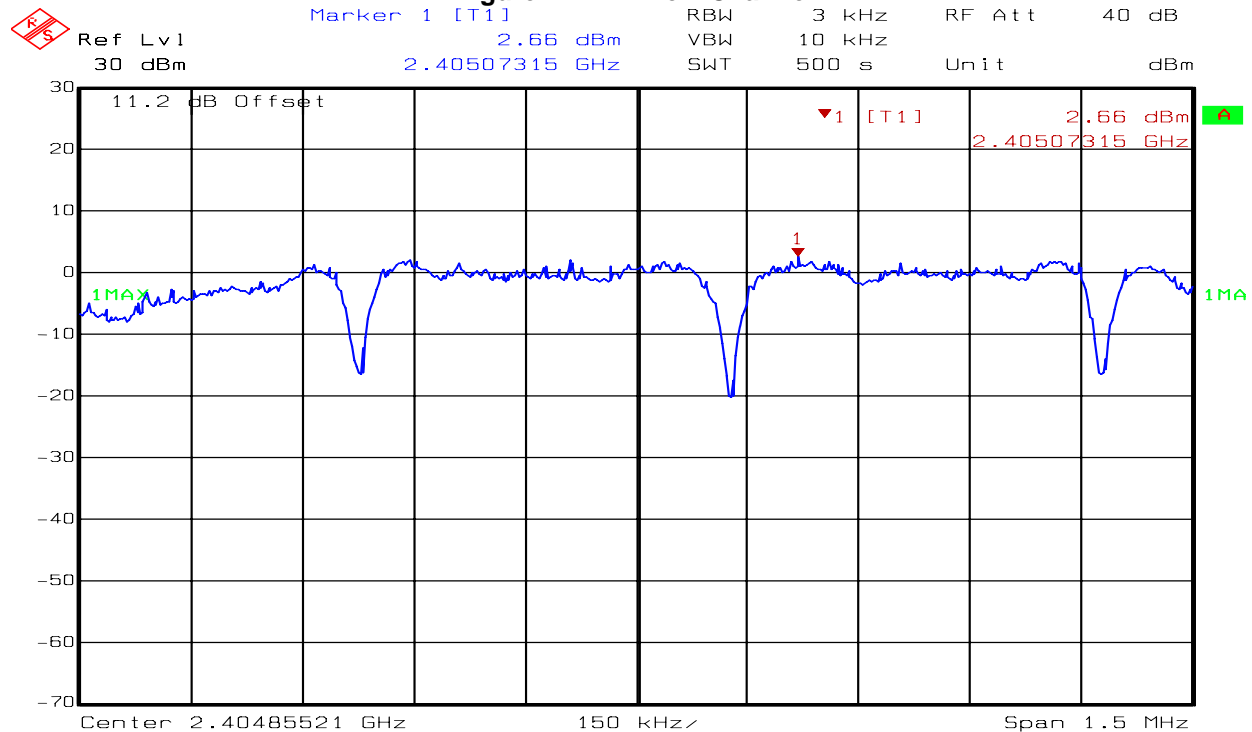
E.8. Test date

July 14, 2009

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

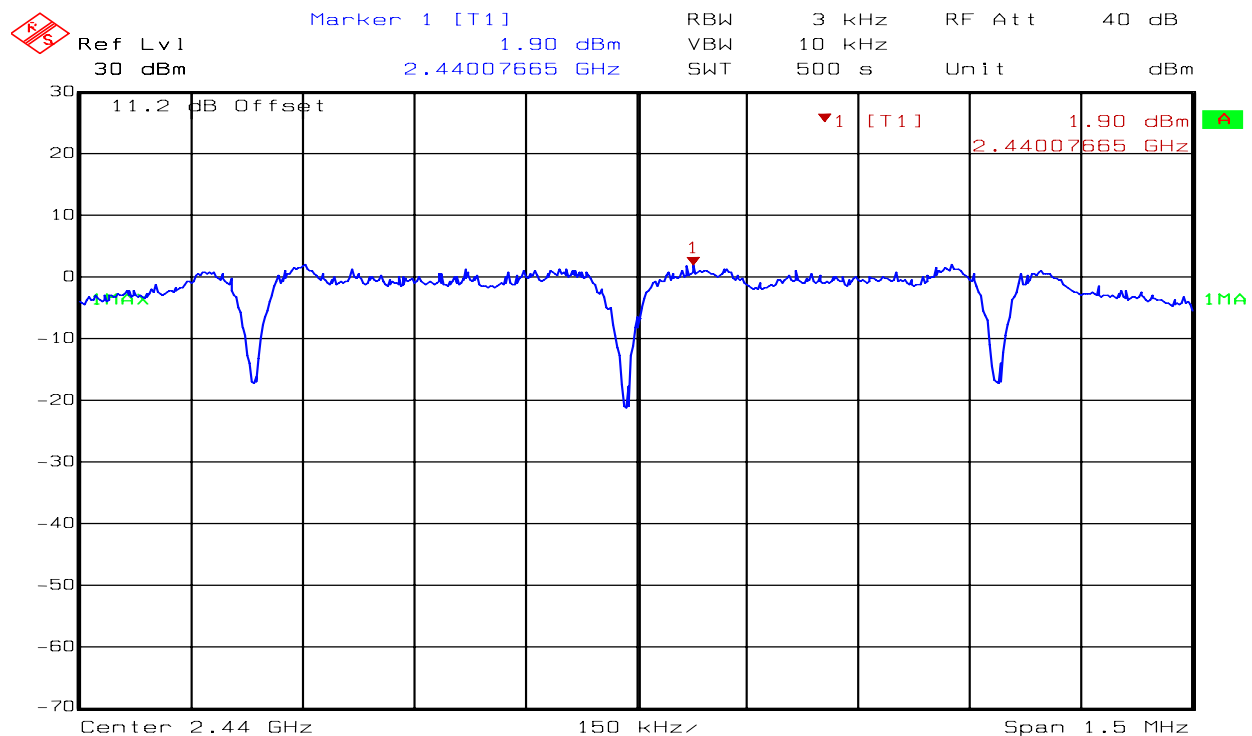
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 14 Low Channel



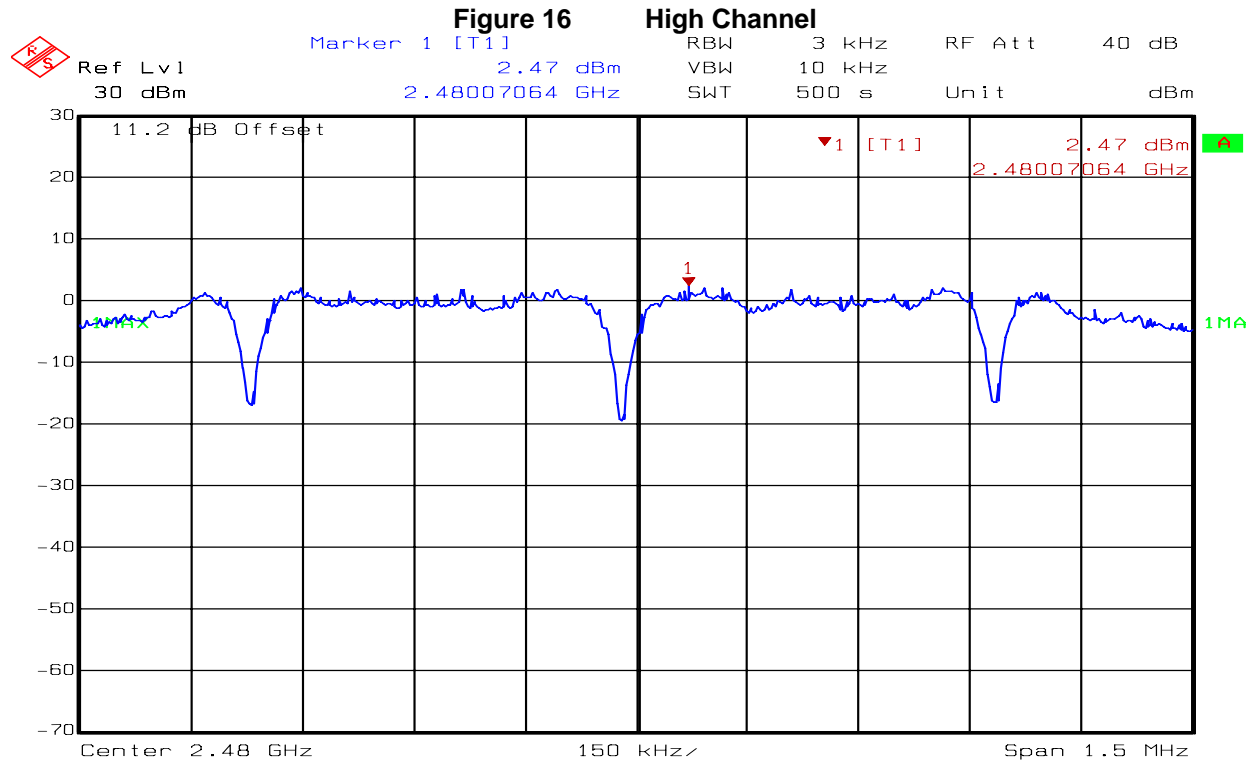
Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 11, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 11:22:47

Figure 15 Mid Channel



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 18, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 11:35:29

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 26, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 11:46:48

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX F: DUTY CYCLE CORRECTION FACTOR

F.1. Base Standard & Test Basis

| | |
|----------------------|--|
| Base Standard | FCC 15.35 (c) RSS-Gen Issue 2 4.5 |
| Test Basis | FCC 15.35 (c) as per FCC Publication 558074 RSS-Gen Issue 2 4.5 |
| Test Method | Zero span |

F.2. Specifications

15.35 (c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

F.3. Deviations

| Deviation Number | Time & Date | Description and Justification of Deviation | Deviation Reference | | | Approval |
|------------------|-------------|--|---------------------|------------|---------------|----------|
| | | | Base Standard | Test Basis | NTS Procedure | |
| none | | | | | | |

F.4. Test Procedure

As per FCC 15.35 with analyzer in Zero span mode.

F.5. Operating Mode During Test

The PowerPortal PPH1-H was tuned to channel 11 and set to continuous transmit mode at maximum rated RF output power ((in power normal level with external PA mode).

F.6. Test Results

Duty cycle correction factor = $20 \times \log(0.651/25.583) = -31.88 \text{ dB}$
Therefore the maximum allowable Duty cycle correction factor of -20 dB can be applied

F.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

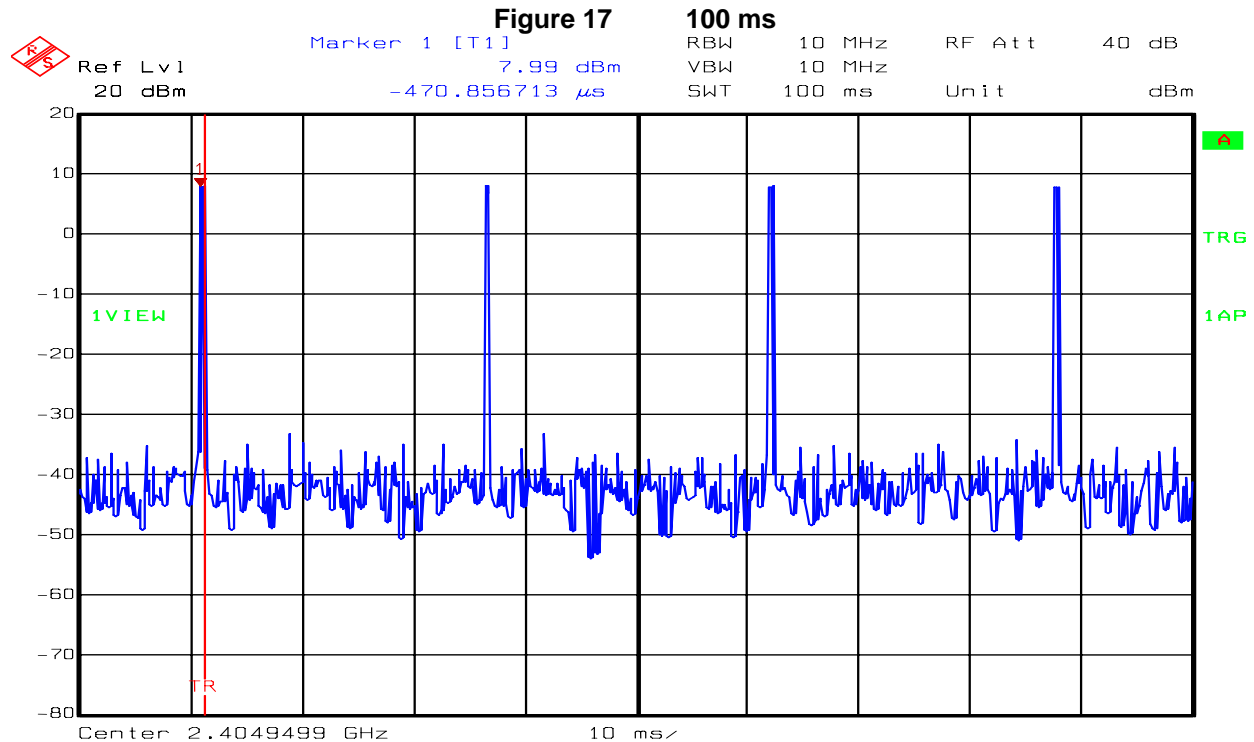
Name: Lixin Wang
Function: EMC Technologist

F.8. Test date

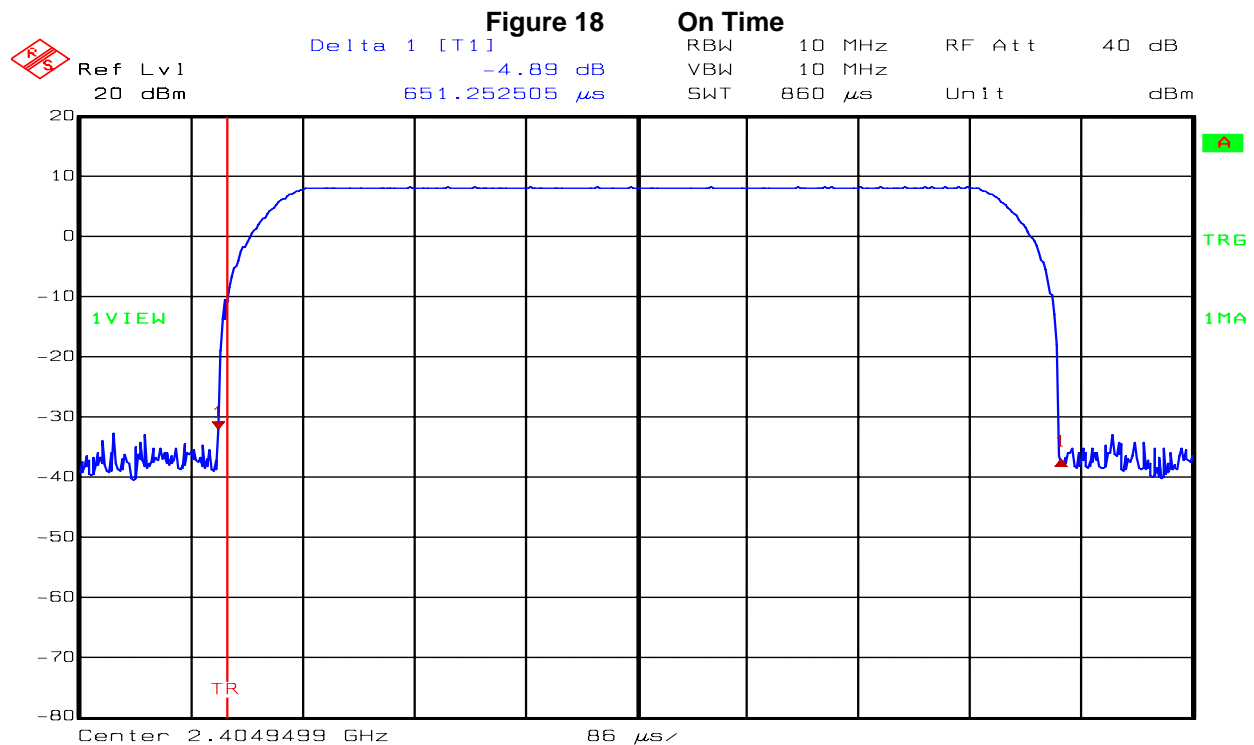
July 15, 2009

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970



Title: CG-1281 Energy Aware Powerlab
Comment A: Ch 11, Tx packets 25500 us apart, Txpower Normal level with
Ext PA.
Date: 15.JUL.2009 7:59:59

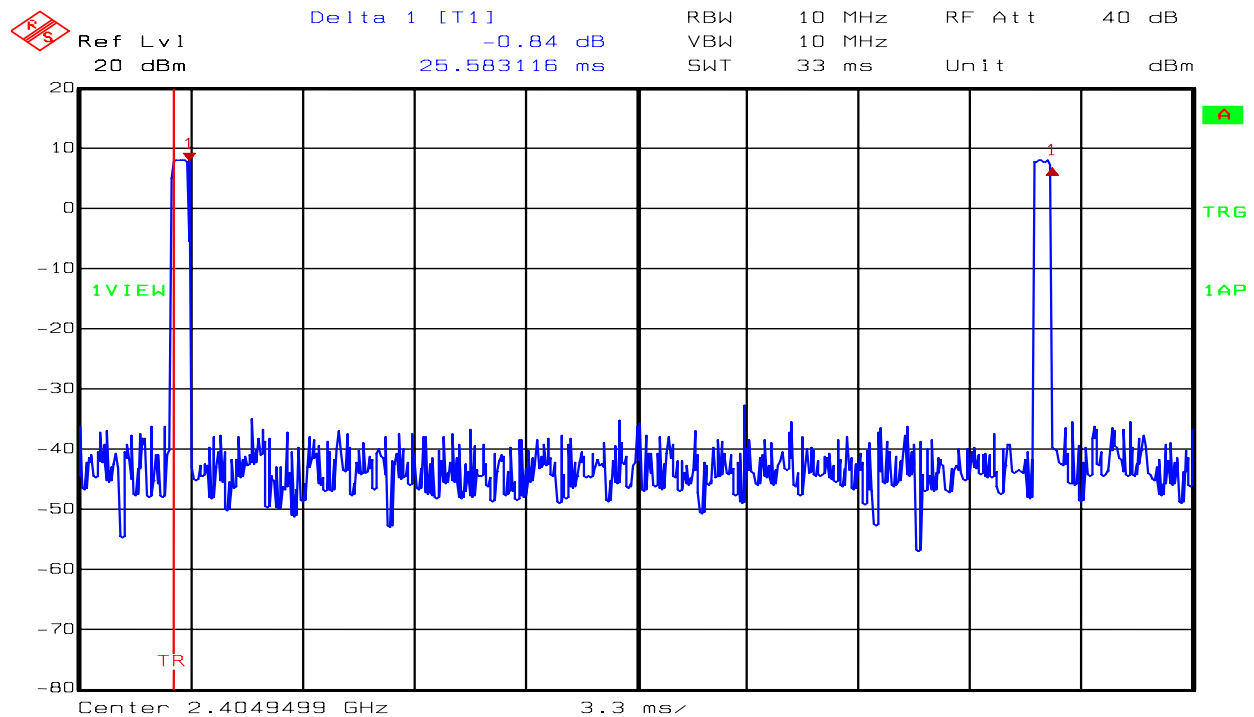


Title: CG-1281 Energy Aware Powerlab
Comment A: Ch 11, Tx packets 25500 us apart, Txpower Normal level with
Ext PA.
Date: 15.JUL.2009 8:05:46

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 19 Period



Title: CG-1281 Energy Aware Powertab
Comment A: Ch 11, Tx packets 25500 us apart, Txpower Normal level with
Ext PA.
Date: 15.JUL.2009 8:11:28

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

APPENDIX G: CONDUCTED SPURIOUS EMISSIONS (TX)

G.1. Base Standard & Test Basis

| | |
|-----------------------|--|
| Base Standards | FCC CFR Title 47 – Telecommunications, Chapter I Part 15.247 (d) RSS-210 Issue 7 A8.5 |
| Test Basis | RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5 |
| Test Method | RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5 |

G.2. Specifications

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

G.3. Test Procedure

FCC Publication 558074

G.4. Operating Mode During Test

The PowerPortal PPH1-H was tuned to a low, middle and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode).

G.5. Test Results Summary

Compliant.

| TX Channel | Worst Case Spurious Frequency (MHz) | Emission Level (dBc) |
|------------|-------------------------------------|----------------------|
| 11 | 4818.06 | -59.02 |
| 18 | 4870.10 | -61.89 |
| 26 | 4922.14 | -62.42 |

TX mode: The worst case spurious emission was 59.12 dB below the carrier at Channel 11.

All final reported values are corrected values

G.6. Tested By

This testing was conducted in accordance with the ISO 17025: 2005 scope of accreditation, table 1; Quality Manual.

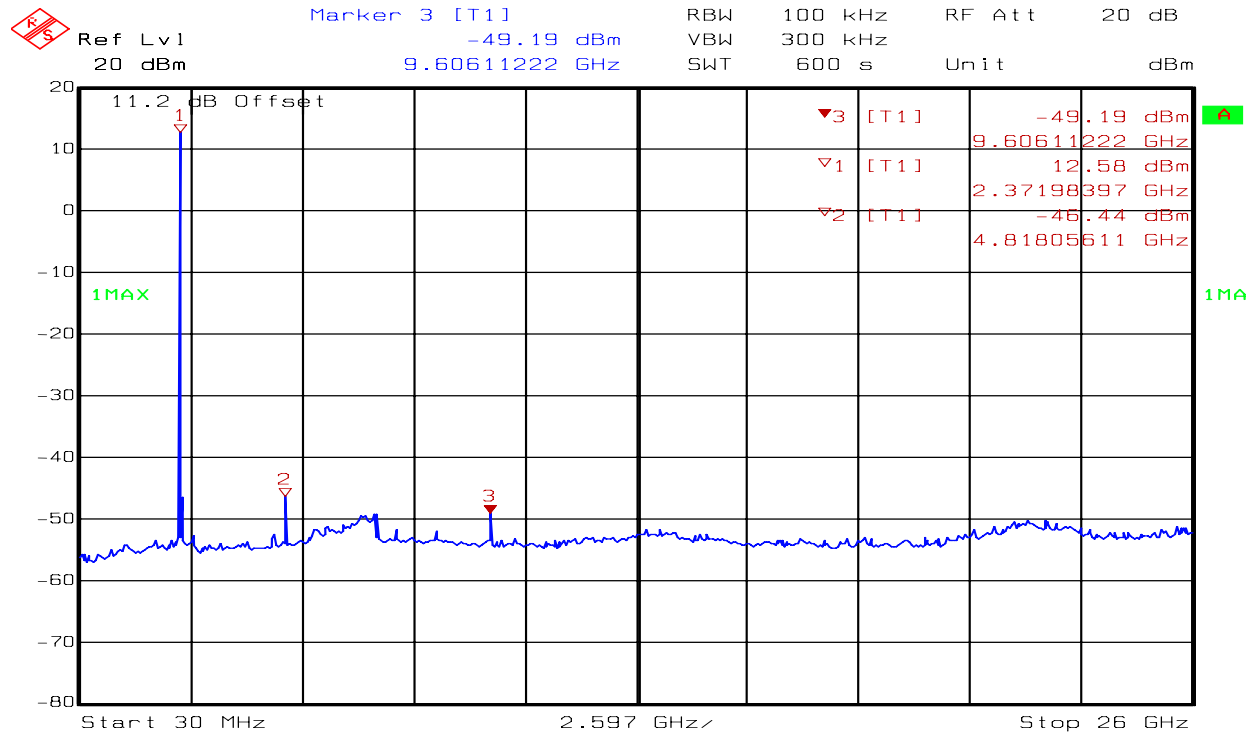
Name: Lixin Wang
Function: EMC Technologist

G.7. Test date

July 14, 2009

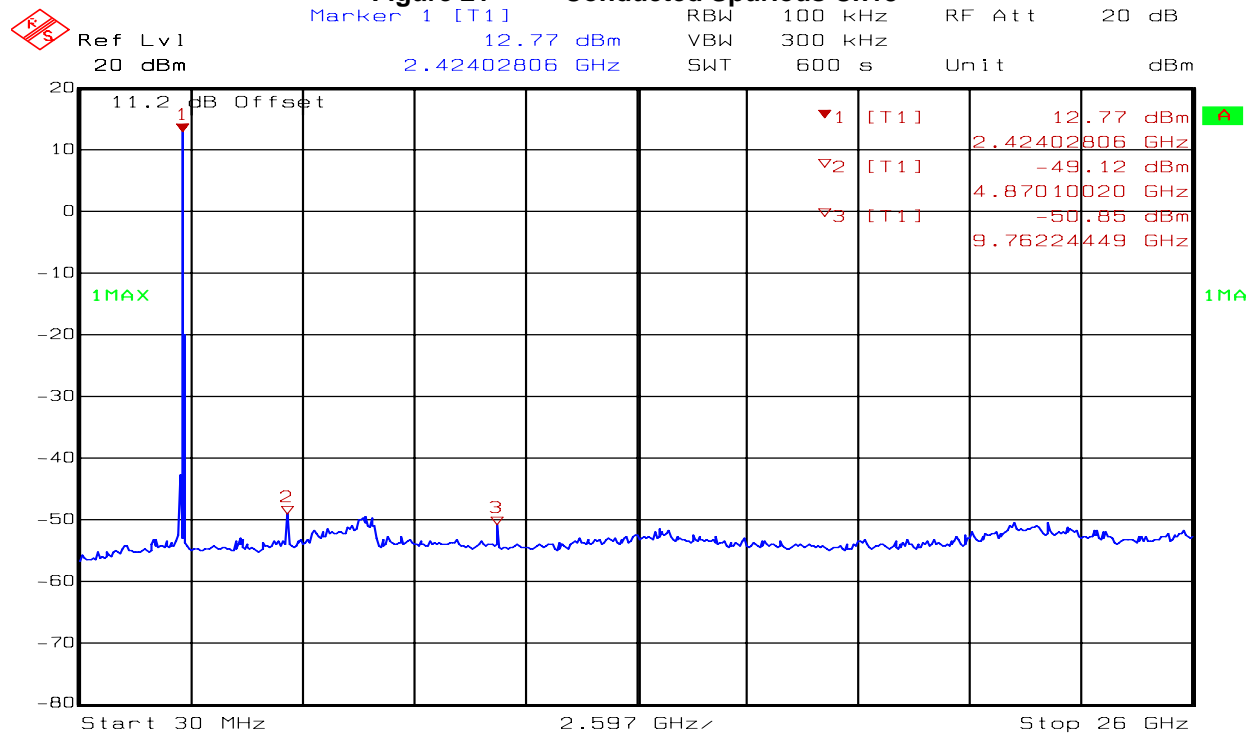
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 20 Conducted Spurious Ch11



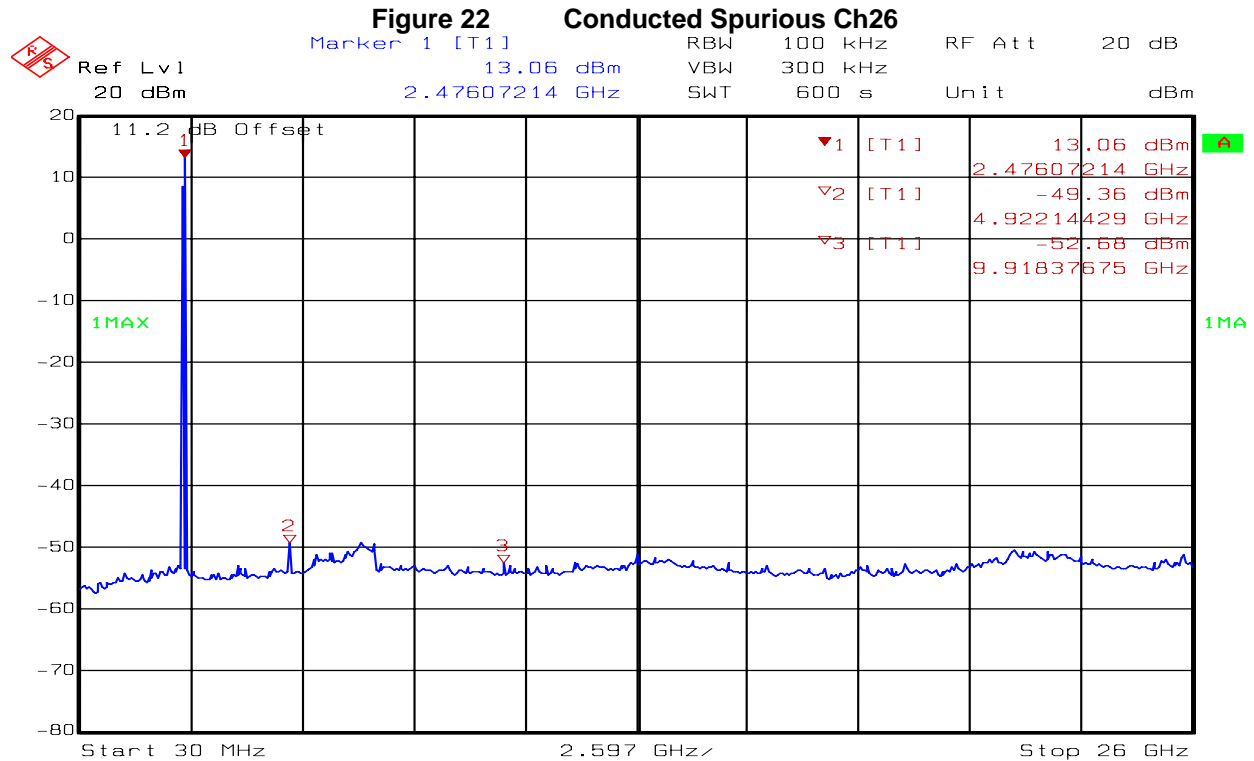
Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 11,Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 13:42:59

Figure 21 Conducted Spurious Ch18



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 18,Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 12:48:36

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.



Title: CG-1281 Energy Aware Powertab Display
Comment A: Ch 26, Txpower Normal level Ext PA mode, 100% duty cycle.
Date: 14.JUL.2009 13:09:48

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX H: CONDUCTED SPURIOUS EMISSIONS BAND EDGE

H.1. Base Standard & Test Basis

| | |
|-----------------------|--|
| Base Standards | FCC CFR Title 47 – Telecommunications, Chapter I Part 15.247 (d) RSS-210 Issue 7 A8.5 |
| Test Basis | RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5 |
| Test Method | RF conducted as per FCC Publication 558074 RSS-210 Issue 7 A8.5 |

H.2. Specifications

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

H.3. Test Procedure

FCC Publication 558074

H.4. Operating Mode During Test

The PowerPortal PPH1-H was tuned to the low and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode).

H.5. Test Results

Compliant.

| Channel/Measurement | Frequency (MHz) | Emission Level (dBc) |
|----------------------|-----------------|----------------------|
| 11 (Lower band edge) | 2400.00 | -41.79 |
| 26 (Upper band edge) | 2483.90 | -37.12 |

Worst case spurious emission was 37.12 dB below the carrier at Channel 26

All final reported values are corrected values

H.6. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Lixin Wang
Function: EMC Technologist

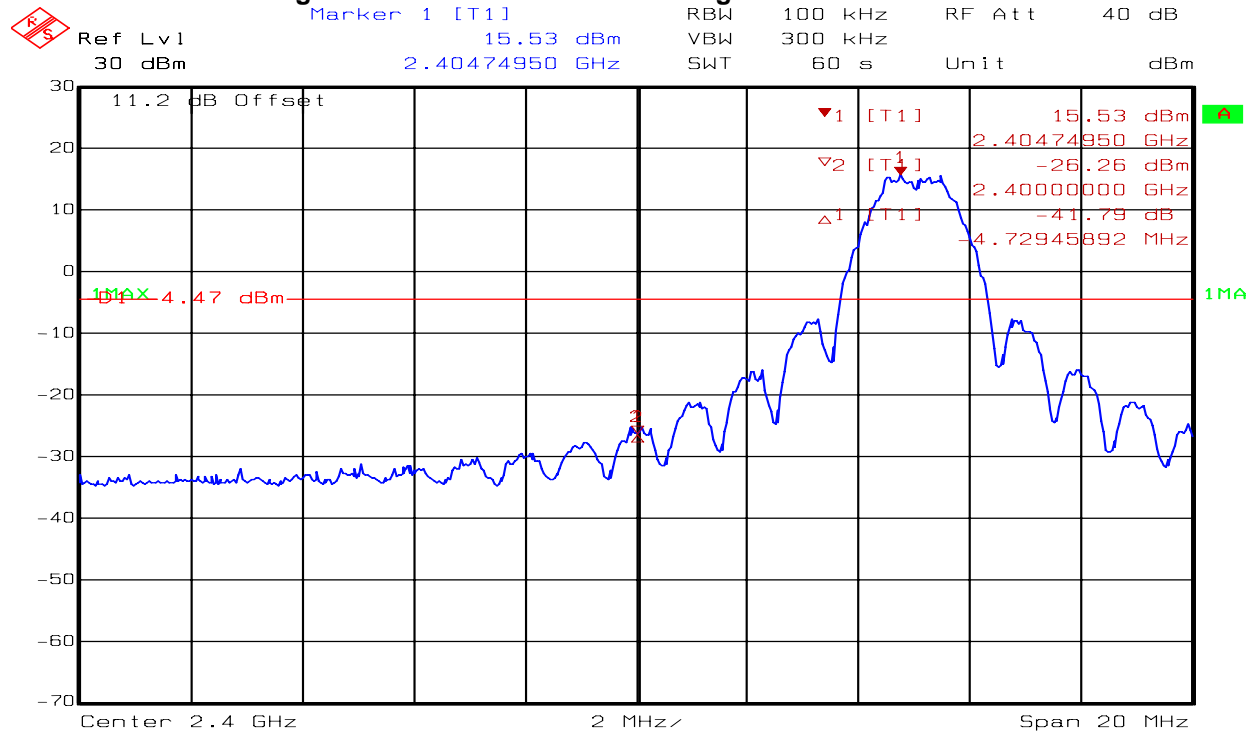
H.7. Test date

July 15, 2009

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

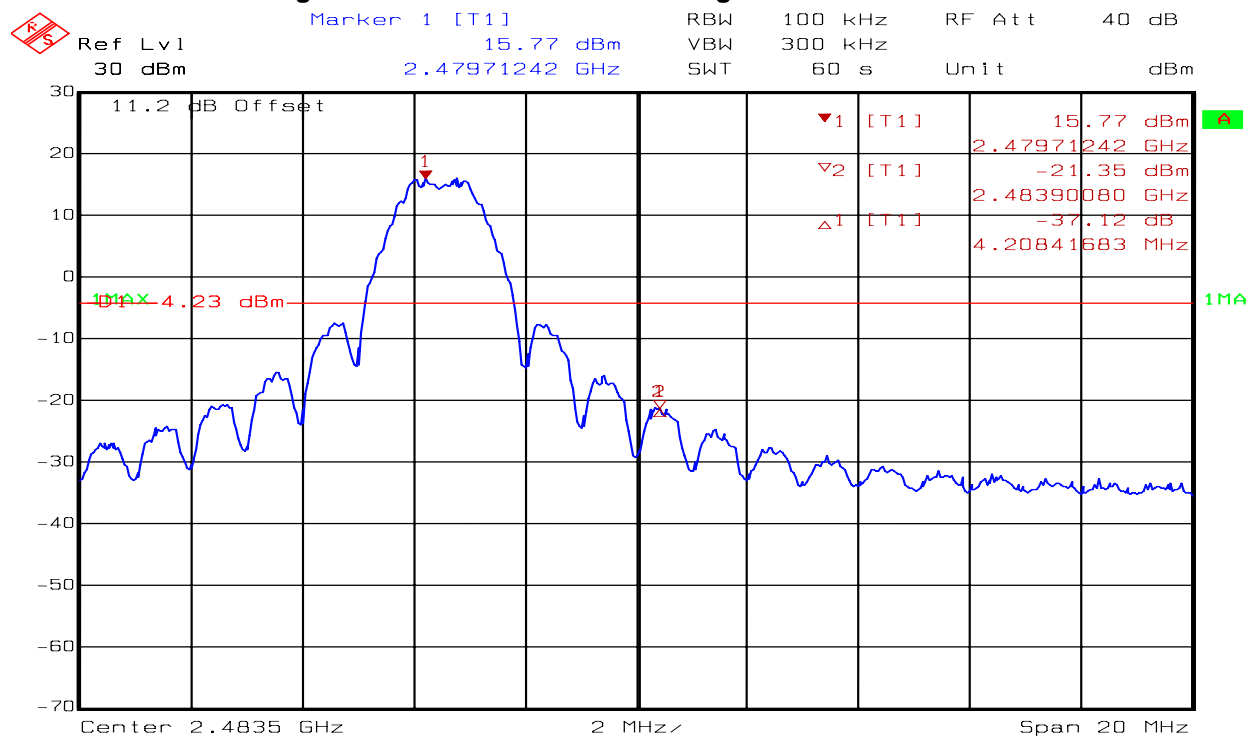
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 23 Conducted Band edge Measurement Ch11



Title: CG-1281 Energy Aware PowerTab
Comment A: Ch 11, Txpower Normal level with Ext PA, 100% duty cycle.
Date: 15.JUL.2009 8:40:47

Figure 24 Conducted Band edge Measurement Ch26



Title: CG-1281 Energy Aware PowerTab
Comment A: Ch 26, Txpower Normal level with Ext PA, 100% duty cycle.
Date: 15.JUL.2009 8:29:22

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX I: RADIATED SPURIOUS EMISSIONS BAND EDGE

I.1. Base Standard & Test Basis

| | |
|----------------------|---|
| Base Standard | FCC CFR Title 47 – Telecommunications, Chapter I Part 15.209 – Radio Frequency Devices, Part 15.205 – Restricted bands of operation RSS 210 Issue 7 A8.5 |
| Test Basis | ANSI C63.4-2003 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, |
| Test Method | NTS Radiated Emissions Test Method SOP-CAG-EMC-02 and FCC Publication 558074 FCC Publication 913591 |

I.2. Specifications: FCC 15.205 and RSS 210 Issue 7 2.2 Restricted bands of operation.

| MHz | MHz | MHz | GHz |
|--------------------------|---------------------|---------------|-------------|
| 0.090–0.110 | 16.42–16.423 | 399.9–410 | 4.5–5.15 |
| ¹ 0.495–0.505 | 16.69475–16.69525 | 608–614 | 5.35–5.46 |
| 2.1735–2.1905 | 16.80425–16.80475 | 960–1240 | 7.25–7.75 |
| 4.125–4.128 | 25.5–25.67 | 1300–1427 | 8.025–8.5 |
| 4.17725–4.17775 | 37.5–38.25 | 1435–1626.5 | 9.0–9.2 |
| 4.20725–4.20775 | 73–74.6 | 1645.5–1646.5 | 9.3–9.5 |
| 6.215–6.218 | 74.8–75.2 | 1660–1710 | 10.6–12.7 |
| 6.26775–6.26825 | 108–121.94 | 1718.8–1722.2 | 13.25–13.4 |
| 6.31175–6.31225 | 123–138 | 2200–2300 | 14.47–14.5 |
| 8.291–8.294 | 149.9–150.05 | 2310–2390 | 15.35–16.2 |
| 8.362–8.366 | 156.52475–156.52525 | 2483.5–2500 | 17.7–21.4 |
| 8.37625–8.38675 | 156.7–156.9 | 2690–2900 | 22.01–23.12 |
| 8.41425–8.41475 | 162.0125–167.17 | 3260–3267 | 23.6–24.0 |
| 12.29–12.293 | 167.72–173.2 | 3332–3339 | 31.2–31.8 |
| 12.51975–12.52025 | 240–285 | 3345.8–3358 | 36.43–36.5 |
| 12.57675–12.57725 | 322–335.4 | 3600–4400 | N/A |
| 13.36–13.41 | N/A | N/A | N/A |

(b) The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

I.3. Test Procedure

RF radiated measurement at 3 meters distance.

FCC Publication 558074:

558074 (c) (2) Radiated emission test: Applies to harmonics/spurs that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement.

For measurements above 1 GHz, set RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, and then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

FCC Publication 913591:

In making radiated band edge measurements, there can be a problem obtaining meaningful data since a measurement instrument that is tuned to a band edge frequency may also capture some in-band signals when using the resolution bandwidth (RBW) as specified by measurement procedure ANSI C63.4-1992, unless precautions are followed. The following technique may be used for determining band edge compliance in an effort to ensure that the proper precautions are followed.

STEP 1 - Perform an in-band field strength measurement of the fundamental emission using the RBW and detector function for the frequency being measured, as required by C63.4 and FCC Rules.

Repeat the measurement with an average detector (i.e., 1 MHz RBW with 10 Hz VBW).

STEP 2 - Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band edge emission under investigation. Set the analyzer RBW to 1% of the total span (but never less than 30 kHz) with a video bandwidth equal to or greater than the RBW. Record the peak levels of the fundamental emission and the relevant band edge emission (i.e., run several sweeps in peak hold mode). Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band edge emission. This is not a field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.

STEP 3 - Subtract the delta measured in step (2) from the field strengths measured in step (1). The resultant field strengths (CISPR QP, average, or peak, as appropriate) are then used to determine band edge compliance as required by Section 15.205.

STEP 4 - The above delta measurement technique may be used for measuring emissions that are up to two standard bandwidths away from the band edge, where a standard bandwidth is the bandwidth specified by C63.4 for the frequency being measured. For example, for band edge measurements in the restricted band that begins at 2483.5 MHz, C63.4 specifies a measurement bandwidth of at least 1 MHz. Therefore you may use the delta technique for measuring emissions up to 2 MHz removed from the band edge. Radiated emissions that are removed by more than two standard bandwidths must be measured in the conventional manner.

I.4. Operating Mode During Test

The PowerPortal PPH1-H was tuned to the low and high channel in continuous transmit mode at maximum rated RF output power (in power normal level with external PA mode)

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

I.5. Test Results

Compliant

| Channel | Frequency (MHz) | Detector | Carrier Emission Level (dBμV/m) | Band Edge Emission Level (dBμV/m) | Duty cycle Correction Factor (dB) | Marker Delta (dBc) | Band Edge Corrected Value (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|---------|-----------------|----------|---------------------------------|-----------------------------------|-----------------------------------|--------------------|------------------------------------|----------------|-------------|
| 11 | 2390.00 | PK | 110.38 | 62.93 | N/A | -53.43 | 56.95 | 73.98 | 17.03 |
| 11 | 2390.00 | AV | 107.59 | 49.30 | -20 | N/A | 29.30 | 53.98 | 24.62 |
| 26 | 2483.50 | PK | 109.30 | 80.39 | N/A | -36.06 | 73.24 | 73.98 | 0.74 |
| 26 | 2483.50 | AV | 99.60 | 69.66 | -20 | N/A | 49.66 | 53.98 | 4.32 |

Maximum peak measurement was 80.39 dBμV/m at 2483.50 MHz. Carrier Emission Level was 109.30 dBμV/m; Marker Delta Measurement with 30 kHz RBW was -36.06 dBc. Corrected value of the emission on 2483.5 MHz was 73.24 dBμV/m. It has 0.74 dB margin to the 15.209 limits.

I.6. Sample Calculations

Part 15.209 Average Limit: $500 \mu\text{V/m} @ 3\text{m} = 20 \cdot \log(500) = 53.98 \text{ dB}\mu\text{V/m}$, Peak limit = 73.98 dBμV/m

Band Edge Emission Level or Carrier Emission Level (dBμV/m) = Measured level (dBμV) + Receive antenna factor (dB) + Receive cable loss (dB) – LNA gain (dB)

Peak Band Edge Corrected value (dBμV/m) = Carrier emission level (dBμV/m) – Marker Delta factor (dB)

Average Band Edge Corrected value (dBμV/m) = Band Edge Emission Level (dBμV/m) - Duty cycle correction factor (dB)

Note:

Marker Delta Method was used for Peak measurements per FCC Publication 913591

Duty Cycle Correction Factor was used for Average measurements per FCC Publication 558074

I.7. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

Name: Lixin Wang
Function: EMC Technologist

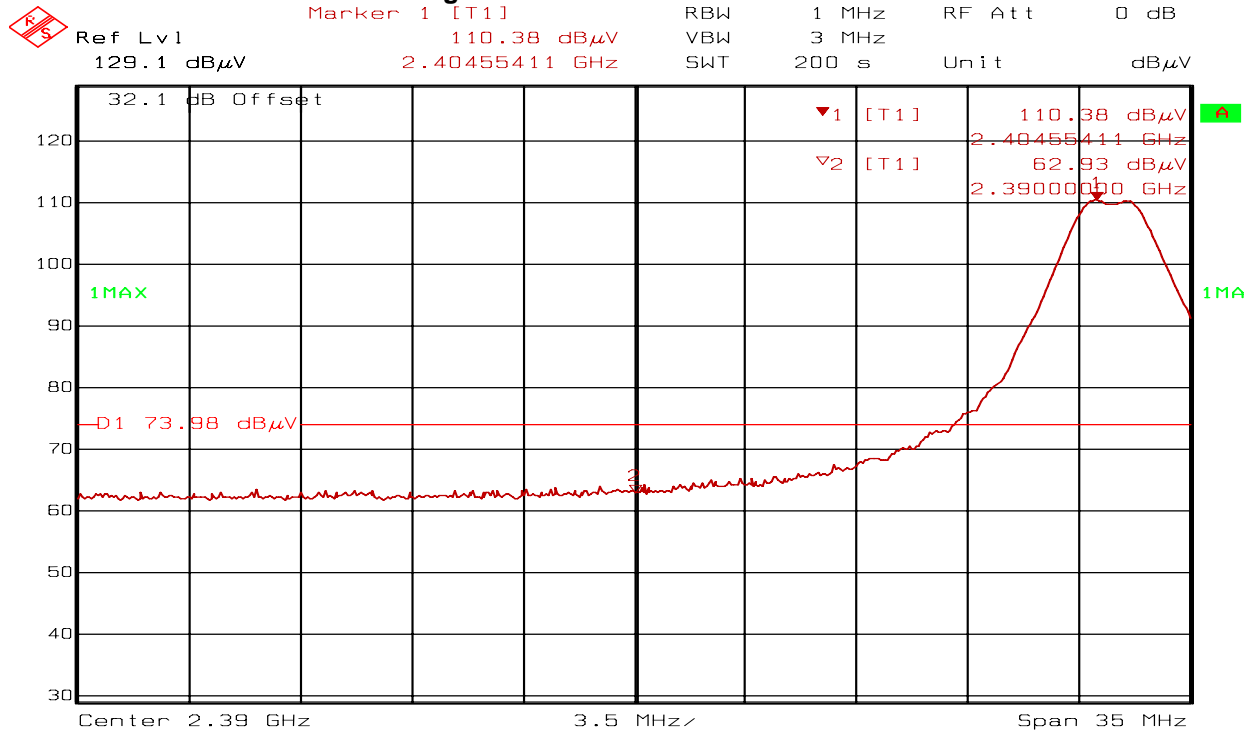
I.8. Test date

June 24, 2009

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

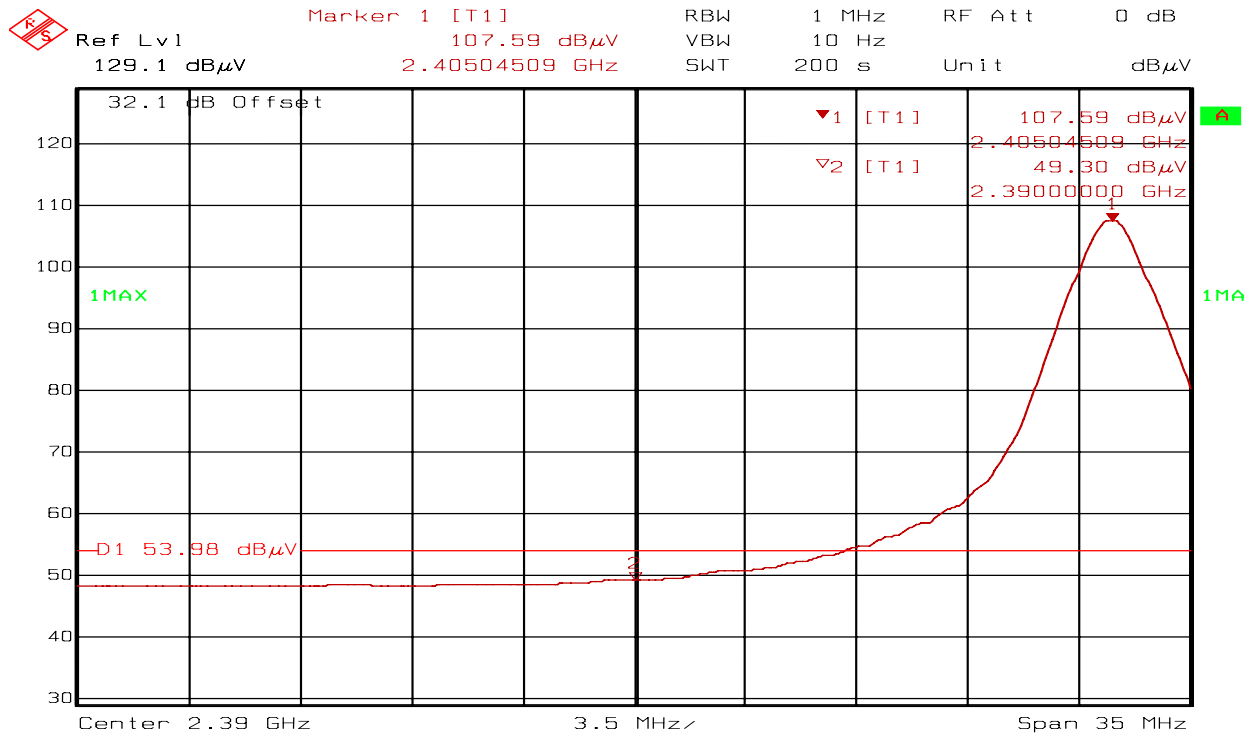
NTS Product Integrity Laboratory, 5151-47th Street N.E. Tel: 403-568-6605, Fax: 403-568-6970

Figure 25 Low Channel Peak



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch11, Tx power Normal Ext PA, with 100% duty cycle.
Date: 24.JUN.2009 21:53:18

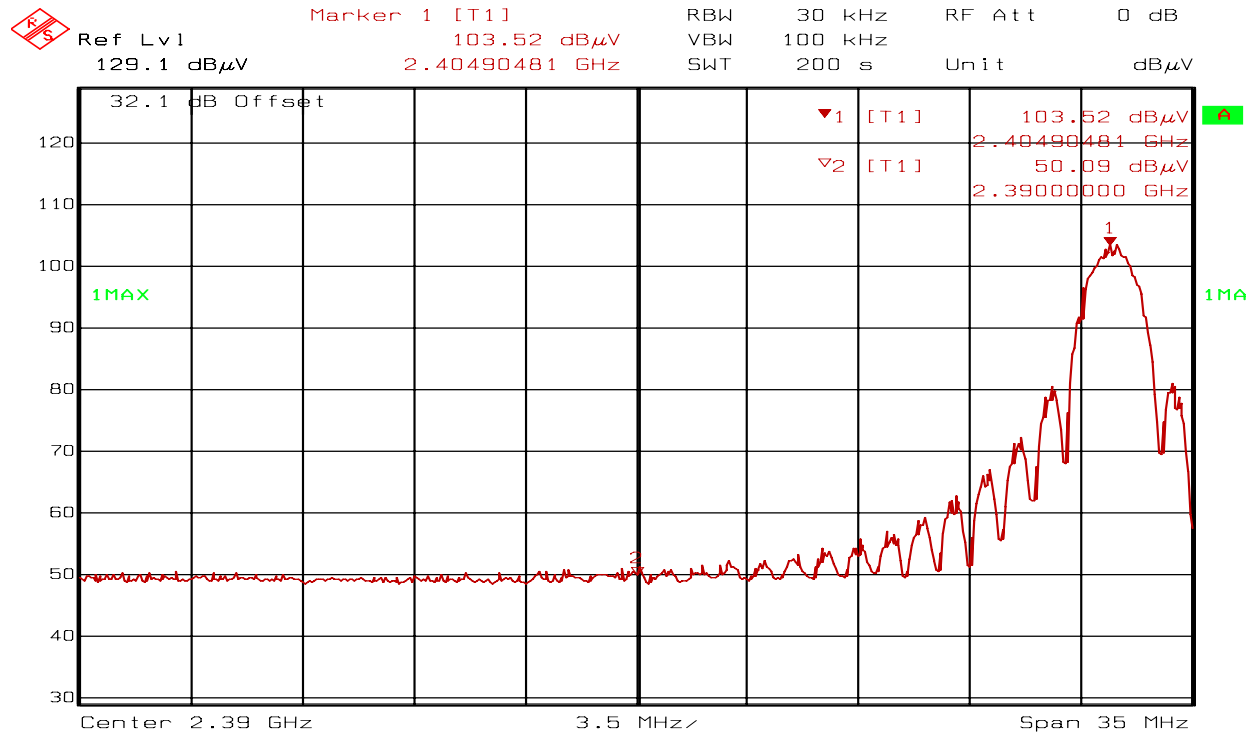
Figure 26 Low Channel Video Average



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch11, Tx power Normal Ext PA, with 100% duty cycle.
Date: 24.JUN.2009 21:58:53

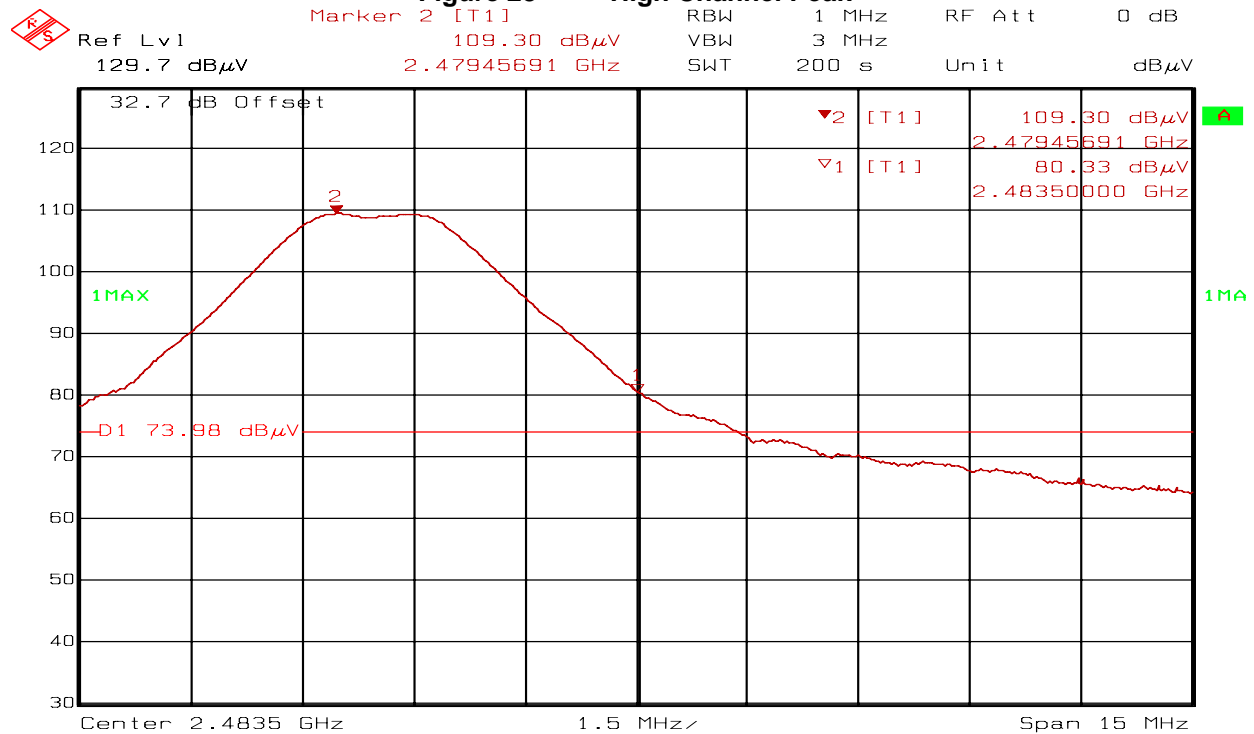
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 27 Low Channel Marker Delta



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch11, Tx power Normal Ext PA, with 100% duty cycle.
Date: 24.JUN.2009 22:04:01

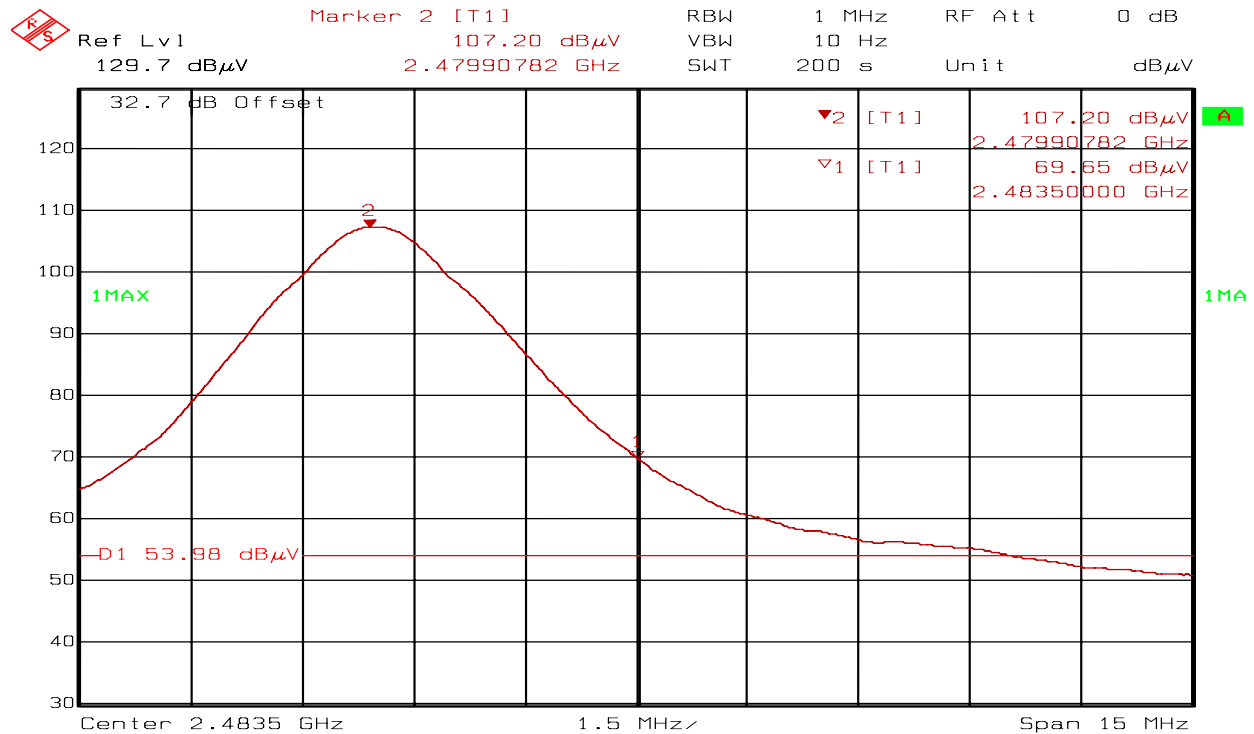
Figure 28 High Channel Peak



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch 26, Tx power normal Ext PA 18 dBm with 100% duty cycle.
Date: 24.JUN.2009 22:56:26

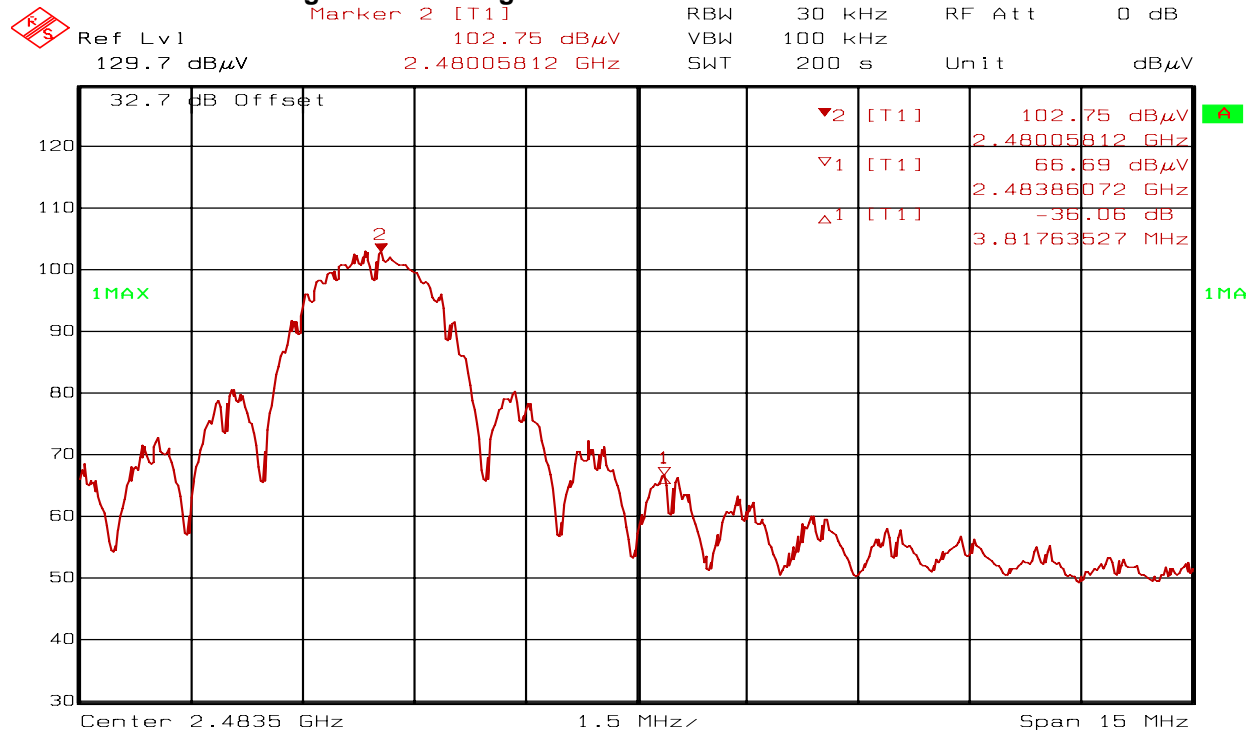
The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

Figure 29 High Channel Video Average



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch 26, Tx power normal Ext PA 18 dBm with 100% duty cycle.
Date: 24.JUN.2009 23:01:44

Figure 30 High Channel Marker Delta Measurement



Title: CG-1269 Energy Aware Powertab Display
Comment A: Ch 26, Tx power normal Ext PA 18 dBm with 100% duty cycle.
Date: 24.JUN.2009 23:13:01

The test results contained in this report refer exclusively to the product(s) presented for testing. The test results do not cover models or products not referred herein. This test report should not be published or duplicated in whole or part without permission from the testing body and the customer.

APPENDIX J: RADIATED SPURIOUS EMISSIONS (TX AND RX)

J.1. Base Standard & Test Basis

| | |
|----------------------|---|
| Base Standard | FCC CFR Title 47 – Telecommunications, Chapter I Part 15.209 – Radio Frequency Devices, Part 15.205 – Restricted bands of operation RSS 210 Issue 7 2.6 and A8.5 |
| Test Basis | ANSI C63.4-2003 Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz, FCC Publication 558074 |
| Test Method | NTS Radiated Emissions Test Method SOP-CAG-EMC-02 and FCC Publication 558074 |

Specifications: FCC 15.205 and RSS 210 Issue 7 2.2 Restricted bands of operation.

(a) Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|--------------------------|---------------------|---------------|-------------|
| 0.090–0.110 | 16.42–16.423 | 399.9–410 | 4.5–5.15 |
| ¹ 0.495–0.505 | 16.69475–16.69525 | 608–614 | 5.35–5.46 |
| 2.1735–2.1905 | 16.80425–16.80475 | 960–1240 | 7.25–7.75 |
| 4.125–4.128 | 25.5–25.67 | 1300–1427 | 8.025–8.5 |
| 4.17725–4.17775 | 37.5–38.25 | 1435–1626.5 | 9.0–9.2 |
| 4.20725–4.20775 | 73–74.6 | 1645.5–1646.5 | 9.3–9.5 |
| 6.215–6.218 | 74.8–75.2 | 1660–1710 | 10.6–12.7 |
| 6.26775–6.26825 | 108–121.94 | 1718.8–1722.2 | 13.25–13.4 |
| 6.31175–6.31225 | 123–138 | 2200–2300 | 14.47–14.5 |
| 8.291–8.294 | 149.9–150.05 | 2310–2390 | 15.35–16.2 |
| 8.362–8.366 | 156.52475–156.52525 | 2483.5–2500 | 17.7–21.4 |
| 8.37625–8.38675 | 156.7–156.9 | 2690–2900 | 22.01–23.12 |
| 8.41425–8.41475 | 162.0125–167.17 | 3260–3267 | 23.6–24.0 |
| 12.29–12.293 | 167.72–173.2 | 3332–3339 | 31.2–31.8 |
| 12.51975–12.52025 | 240–285 | 3345.8–3358 | 36.43–36.5 |
| 12.57675–12.57725 | 322–335.4 | 3600–4400 | N/A |
| 13.36–13.41 | N/A | N/A | N/A |

(b) The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

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J.2. Test Procedure

FCC Publication 558074 (c) (2) Radiated emission test Applies to harmonics/spurs that fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209. A pre-amp (and possibly a high-pass filter) is necessary for this measurement. For measurements above 1 GHz, set RBW = 1 MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, and then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

J.3. Operating Mode During Test

The PowerPortal PPH1-L was tuned to the low and high channel in continuous transmit mode at maximum rated RF output power (in power boost mode) for all TX spurious emissions. For receiver spurious emissions the PowerPortal PPH1-L was tuned to the receive only mode.

J.4. Test Results

J.4.1 Rx mode

| Antenna Polarization | Frequency (MHz) | Detector | Radiated emission level (dB μ V/m) | Limit type | Limit (dB μ V/m) | Margin (dB) |
|----------------------|-----------------|----------|--|------------|----------------------|-------------|
| V-pol | 54.63 | QP | 14.14 | QP | 29.54 | 15.40 |
| V-pol | 115.87 | QP | 21.96 | QP | 33.07 | 11.11 |
| V-pol | 157.58 | QP | 16.04 | QP | 33.07 | 17.03 |

Rx mode emissions were also present in EUT standby mode. Hence these emissions were not related with receiver circuitry

The worst case spurious emission was 21.96 dB μ V/m at 10m distance with quasi-peak detector at 115.87 MHz. It has 11.11 dB margin to the limits

All final reported values are corrected values

J.4.2 TX Mode

| Channel | Antenna Polarization | Frequency (MHz) | Detector | Corrected Radiated emission level (dBμV/m) | Duty Cycle Correction Factor (dB) | Corrected Level (dBμV/m) | Limit type | Limit (dBμV/m) | Margin (dB) |
|---------|----------------------|-----------------|----------|--|-----------------------------------|--------------------------|------------|----------------|-------------|
| 11 | H-pol | 4808.93 | PK | 64.03 | N/A | 64.03 | PK | 73.98 | 9.95 |
| | H-pol | 7213.44 | PK | 64.52 | N/A | 64.52 | PK | 73.98 | 9.46 |
| | H-pol | 12022.44 | PK | 64.23 | N/A | 64.23 | PK | 73.93 | 9.75 |
| | H-pol | 19243.58 | PK | 59.50 | N/A | 59.50 | PK | 73.98 | 14.48 |
| | V-pol | 4808.91 | PK | 64.14 | N/A | 64.14 | PK | 73.98 | 9.84 |
| | V-pol | 7216.23 | PK | 63.34 | N/A | 63.34 | PK | 73.98 | 10.64 |
| | V-pol | 12022.38 | PK | 59.03 | N/A | 59.03 | PK | 73.98 | 14.95 |
| 18 | V-pol | 54.63 | QP | 14.14 | N/A | 14.14 | QP | 29.54 | 15.40 |
| | V-pol | 115.87 | QP | 21.96 | N/A | 21.96 | QP | 33.07 | 11.11 |
| | V-pol | 157.58 | QP | 16.04 | N/A | 16.04 | QP | 33.07 | 17.03 |
| | H-pol | 4880.97 | PK | 64.96 | N/A | 64.96 | PK | 73.98 | 9.02 |
| | H-pol | 7321.39 | PK | 63.67 | N/A | 63.67 | PK | 73.98 | 10.31 |
| | H-pol | 12197.22 | PK | 64.95 | N/A | 64.95 | PK | 73.98 | 9.09 |
| | H-pol | 19515.69 | PK | 58.99 | N/A | 58.99 | PK | 73.98 | 14.99 |
| | V-pol | 4878.95 | PK | 67.78 | N/A | 67.78 | PK | 73.98 | 6.20 |
| | V-pol | 7321.33 | PK | 64.41 | N/A | 64.41 | PK | 73.98 | 9.57 |
| | V-pol | 12197.42 | PK | 60.90 | N/A | 60.90 | PK | 73.98 | 13.08 |
| 26 | H-pol | 4960.89 | PK | 63.92 | N/A | 63.92 | PK | 73.98 | 10.06 |
| | H-pol | 7438.36 | PK | 63.86 | N/A | 63.86 | PK | 73.98 | 10.12 |
| | H-pol | 12402.33 | PK | 62.57 | N/A | 62.57 | PK | 73.98 | 11.41 |
| | H-pol | 19835.73 | PK | 58.77 | N/A | 58.77 | PK | 73.98 | 15.21 |
| | V-pol | 4960.95 | PK | 68.33 | N/A | 68.33 | PK | 73.98 | 5.65 |
| | V-pol | 7438.45 | PK | 63.81 | N/A | 63.81 | PK | 73.98 | 10.17 |
| | V-pol | 12402.27 | PK | 57.77 | N/A | 57.77 | PK | 73.98 | 16.43 |
| 11 | H-pol | 4808.93 | PK | 64.03 | -20 | 44.03 | AV | 53.98 | 9.95 |
| | H-pol | 7213.44 | PK | 64.52 | -20 | 44.52 | AV | 53.98 | 9.46 |
| | H-pol | 12022.44 | PK | 64.23 | -20 | 44.23 | AV | 53.98 | 9.75 |
| | H-pol | 19243.58 | PK | 59.50 | -20 | 39.50 | AV | 53.98 | 14.48 |
| | V-pol | 4808.91 | PK | 64.14 | -20 | 44.14 | AV | 53.98 | 9.84 |
| | V-pol | 7216.23 | PK | 63.34 | -20 | 43.34 | AV | 53.98 | 10.64 |
| | V-pol | 12022.38 | PK | 59.03 | -20 | 39.03 | AV | 53.98 | 14.95 |
| 18 | H-pol | 4880.97 | PK | 64.96 | -20 | 44.96 | AV | 53.98 | 9.02 |
| | H-pol | 7321.39 | PK | 63.67 | -20 | 43.67 | AV | 53.98 | 10.31 |
| | H-pol | 12197.22 | PK | 64.95 | -20 | 44.95 | AV | 53.98 | 9.09 |
| | H-pol | 19515.69 | PK | 58.99 | -20 | 38.99 | AV | 53.98 | 14.99 |
| | V-pol | 4878.95 | PK | 67.78 | -20 | 47.78 | AV | 53.98 | 6.20 |
| | V-pol | 7321.33 | PK | 64.41 | -20 | 44.41 | AV | 53.98 | 9.57 |
| | V-pol | 12197.42 | PK | 60.90 | -20 | 40.90 | AV | 53.98 | 13.08 |
| 26 | H-pol | 4960.89 | PK | 63.92 | -20 | 43.92 | AV | 53.98 | 10.06 |
| | H-pol | 7438.36 | PK | 63.86 | -20 | 43.86 | AV | 53.98 | 10.12 |
| | H-pol | 12402.33 | PK | 62.57 | -20 | 42.57 | AV | 53.98 | 11.41 |
| | V-pol | 4960.95 | PK | 68.33 | -20 | 48.33 | AV | 53.98 | 5.65 |
| | V-pol | 7438.45 | PK | 63.81 | -20 | 43.81 | AV | 53.98 | 10.17 |

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Worst case spurious emission was 68.33 dB μ V/m at 4960.95 MHz vertical polarization in Channel 26. It has 5.65 dB margin to the peak and average limits.

Note:

Plots were not provided in order to reduce file size

J.5. Sample Calculations

Part 15.209

Limit at 55.85 MHz for 10 m = $20 \cdot \log(100) - 20 \cdot \log(3/10) = 29.54$ dB μ V/m

Limit at 115.71 MHz for 10 m = $20 \cdot \log(150) - 20 \cdot \log(3/10) = 33.07$ dB μ V/m

Average Limit for above 960 MHz = $500 \mu\text{V/m} @ 3\text{m} = 20 \cdot \log(500) = 53.98$ dB μ V/m

Peak Limit for above 960 MHz = Average Limit + 20 (dB) = 73.98 dB μ V/m

Total correction factor (dB) = Receive antenna factor (dB) + Receive cable loss (dB) + High pass filter loss (dB) – LNA gain (dB)

Radiated emission level (dB μ V/m) = Measured level (dB μ V) + Total correction factor (dB)

J.6. Tested By

This testing was conducted in accordance with the ISO 17025:2005 scope of accreditation, table 1; Quality Manual.

| | | |
|-----------|------------------|------------------------------------|
| Name: | Lixin Wang | Deniz Demirci |
| Function: | EMC Technologist | Senior EMC / Wireless Technologist |

J.7. Test date

April 7, 2009

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APPENDIX K: TEST EQUIPMENT LIST

| Descriptions | Manufacturer | Type/Model | Serial # | Cal Due | Cal Date |
|--|-----------------|------------|------------------|--------------------|----------|
| Table Top LISN | EMCO | 3825 | CG0367 | 18JAN10 | 18JAN08 |
| Test Receiver | Rohde & Schwarz | ESAI | CG0123 CG0124 | 26FEB10 | 26FEB09 |
| Bilog Antenna | Teseq | CBL 6112D | CG1177 | 10OCT09 | 10OCT07 |
| HPIB Extender | HP | 37204 | CG0181 | N/A | N/A |
| Mast Controller | EMCO | 2090 | CG0179 | N/A | N/A |
| Turntable Controller | EMCO | 2090 | CG0178 | N/A | N/A |
| Digital Barometer / Thermometer | Cole-Parmer | 1870 | CG0728 | 30JUN09 | 19JUN07 |
| Horn Antenna (Rx) 1 GHz – 18 GHz | EMCO | 3115 | CG0368 | 23AUG09 | 23AUG07 |
| Standard Gain Horn (Rx) 18 GHz – 26.5 GHz | EMCO | 3160-09 | CG0075 | N/A ⁽¹⁾ | 27NOV01 |
| High pass filter f >1000 MHz | MicroTronics | HPM14576 | CG0963 | 01DEC10 | 01DEC08 |
| High pass filter f >2800 MHz | MicroTronics | HPM50111 | CG0964 | 01DEC10 | 01DEC08 |
| LNA 1 GHz - 18 GHz | Miteq | JSD00121 | CG0317 | 01DEC10 | 01DEC08 |
| LNA 18 GHz - 26.5 GHz | Miteq | JSD00119 | CG0482 | 02OCT09 | 02OCT07 |
| Spectrum Analyzer 9 kHz – 40 GHz | Rohde & Schwarz | FSEK-20 | CG0118 | 01JUL09 | 01JUL08 |
| Attenuator | Weinschel | 10 dB | 19981 | N/A | N/A |
| RF cable | Sucoflex | 104 | 115776 | 30APR09 | 30APR07 |
| Quiet Box | EMCO | 5302 | 96081203 | N/A | N/A |
| LNA DC Power Supply | Xantrex | LXO 30-2 | CG0493 | N/A | N/A |
| HPIB Extender | HP | 37204 | CG0110 | N/A | N/A |
| Turntable and Mast Controller | EMCO | 2090 | CG0161 | N/A | N/A |

(1): As per manufacturer recommend, this item does not require periodic calibration. Its electromagnetic performance is almost exclusively depended on the physical dimension of the horn. A thorough mechanical check is all that is needed to guarantee the antenna performance.

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END OF DOCUMENT

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