# PCTEST Engineering Laboratory, Inc.

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## CERTIFICATE OF COMPLIANCE

**Olympus Optical Co., Ltd.**
**2951 Ichikawa-cho, Hachioji-shi**
**Tokyo, 192-8507, Japan**
**Attn: Toshio Kijima, Manager Quality Assurance**

**Dates of Tests: July 29-30, 2002**
**Test Report S/N: 15.220730407.CDJ**
**Test Site: PCTEST Lab, Columbia MD**

| | |
|---|---|
| **FCC ID** | **CDJPPT8846LA4137** |
| **APPLICANT** | **Olympus Optical Co., Ltd.** |

| | |
|---|---|
| **FCC Rule Part(s):** | **§ 15.247; ANSI C-63.4 (1992)** |
| **Classification:** | **Spread Spectrum Transceiver (DSSS)** |
| **Max Output Power:** | **0.100W Conducted** |
| **Method/System:** | **Direct Sequence System (DSSS)** |
| **Equipment Type:** | **Handheld PC** |
| **Frequency Range:** | **2412 – 2462 MHz** |
| **Model No(s).:** | **PPT8846** |

**This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C-63-4.**

**I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.**

*PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.*

Randy Ortanez
President

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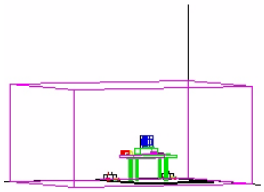
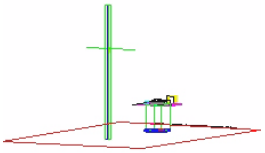
# MEASUREMENT REPORT



*Scope - Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.*



***§2983(a) General Information***

| | |
|---|---|
| **Applicant Name:** | **Olympus Optical Co., Ltd.** |
| **Address:** | **2951 Ichikawa-cho, Hachioji-shi**<br>**Tokyo, 192-8507, Japan** |
| **Attention:** | **Attn: Toshio Kijima, Manager Quality Assurance** |

- FCC ID: **CDJPPT8846LA4137**
- Class: Spread Spectrum Transceiver (DSS)
- Type: Handheld PC
- Freq. Range: 2412 – 2462 MHz
- Method/System: Direct Sequence System (DSS)
- Model No(s): **PPT8846**
- Max. RF Output Power: 0.100W Conducted
- Rule Part(s): § 15.247
- Dates of Tests: July 29-30, 2002
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 15.220730407.CDJ

*NOTE: The receiver portion was tested and complies with Part 15B under the verification procedure.*

# INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-1992) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum Systems" were used in the measurement of **OLYPMUS Handheld PC.**

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

## PCTEST Location

The map at right shows the location of the PCTEST Lab, its proximity to the FCC Lab, the Columbia vicinity area, the Baltimore-Washington International (BWI) airport, and the city of Baltimore, and the Washington, D.C. area. (see Figure1).

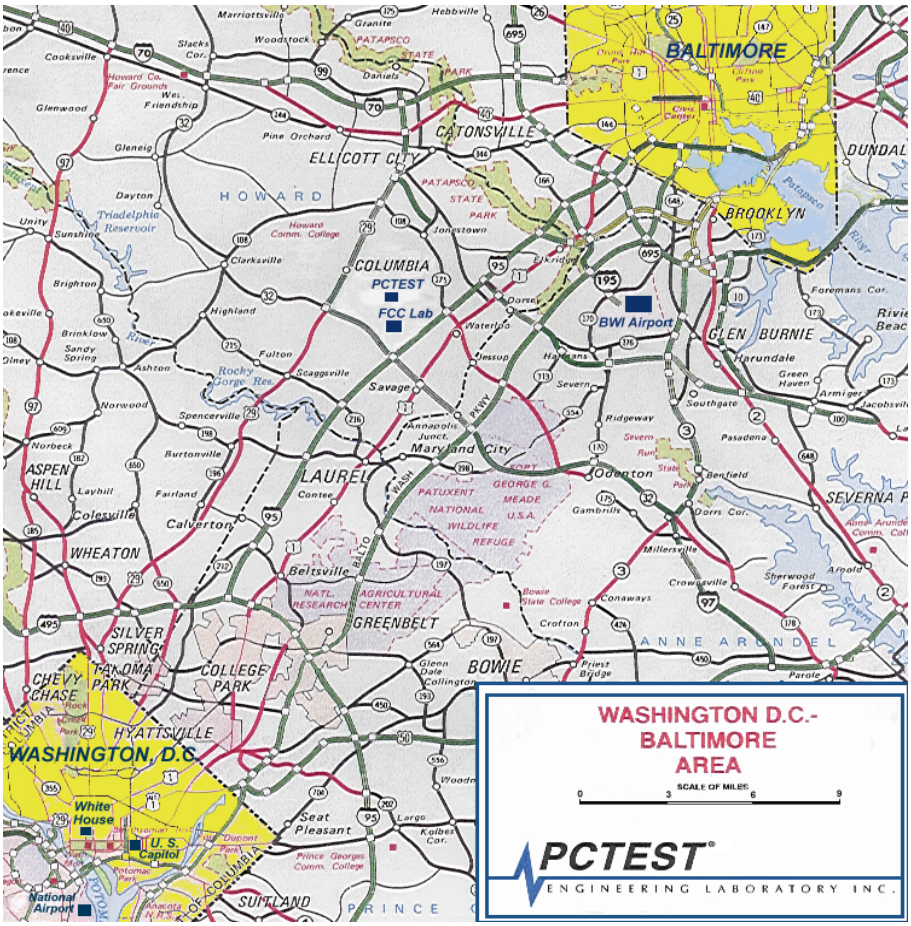



**Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.**

# PRODUCT INFORMATION

## Equipment Description:

The Equipment under test (EUT) is the **OLYMPUS Handheld PC** using spread spectrum direct sequence and time division duplex techniques.

| | |
|---|---|
| Frequency Range: | 2412 – 2462 MHz |
| Channels: | 11 |
| Channel Separation: | 3.0 MHz |
| Antenna: | omni-directional antenna |
| Spread Spectrum Method: | Direct Sequence (DBPSK modulation) |
| Max RF Output Power: | 100 W |
| Port/Connector(s): | RJ-45 |

| CH | Rx/Tx Freq. (MHz) | CH | Rx/Tx Freq. (MHz) |
|---|---|---|---|
| 1 | 2412.0 | 7 | 2442.0 |
| 2 | 2417.0 | 8 | 2447.0 |
| 3 | 2422.0 | 9 | 2452.0 |
| 4 | 2427.0 | 10 | 2457.0 |
| 5 | 2432.0 | 11 | 2462.0 |
| 6 | 2437.0 | | |

# Description of Tests

## Conducted Emissions

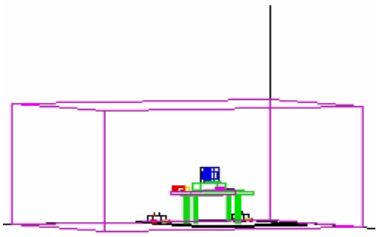


**Figure 4. Shielded Enclosure Line-Conducted Test Facility**

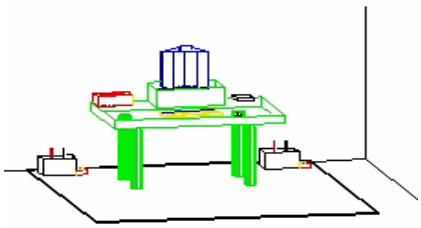


**Figure 2. Line Conducted Emission Test Set-Up**

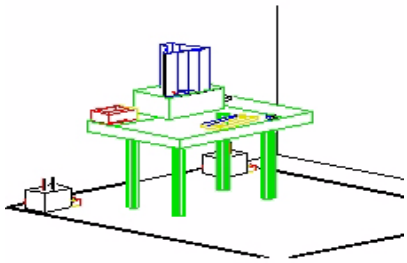


**Figure 3. Wooden Table & Bonded LISNs**

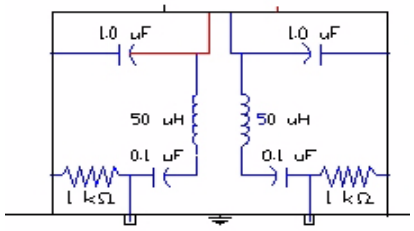



**Figure 5. LISN Schematic Diagram**

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure. It is manufactured by Ray Proof Series 81 (see Figure 2). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m. x 1.5m. wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room (see Figure 3). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see Figure 4). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filters (100dB 14kHz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Solar LISN. LISN schematic diagram is shown in Figure 5. All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 450kHz to 30MHz with 20 msec. sweep time. The frequency producing the maximum level was reexamined using EMI/ Field Intensity Meter and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Appendix C. Each EME reported was calibrated using the HP8640B signal generator.

# Description of Tests (Continued)

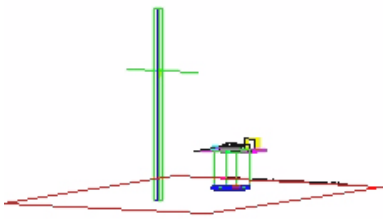


Figure 6. 3-Meter Test Site

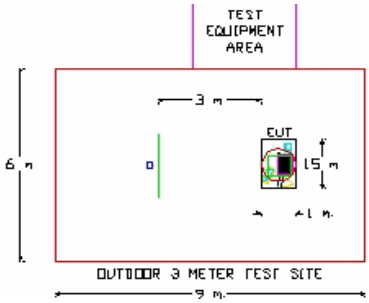



Figure 7. Dimensions of Outdoor Test Site

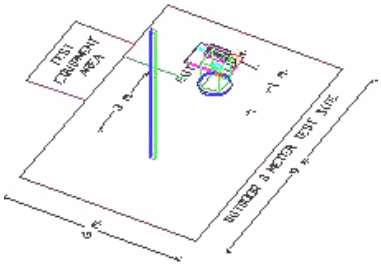


Figure 8. Turntable and System Setup

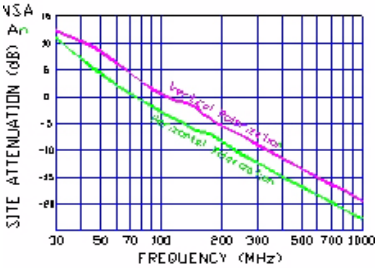



Figure 9. Normalized Site Attenuation Curves (H&V)

## Radiated Emissions

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using biconical antenna and from 200 to 1000 MHz using log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts™ Dipole antennas or horn antenna (see Figure 6). The test equipment was placed on a wooden and plastic bench situated on a 1.5 x 2 meter area adjacent to the measurement area (see Figure 7). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1 MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 8). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Appendix C. Each EME reported was calibrated using the HP8640B signal generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 9.

# § 15.205 Restricted Bands

Special attention is made for the EUT's harmonic and spurious radiated emission in the restricted bands of operation. The EUT was tested from 9kHz and up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurements was used using RBW 1 MHz – VBW 10Hz and linearly polarized horn antennas. In addition, peak measurements were taken to ensure that the peak levels are not more than 20dB above the average limit. All out of band emissions, other than those created by the spreading sequence, data sequence, and the carrier modulation must not exceed the limits show in Table 2 per 15.209.

| Frequency (MHz) | F/S (UV/m) | Meas. Dist. (Meters) |
|---|---|---|
| 0.009-0.490 | 2400/F (kHz) | 300 |
| 0.490-1.705 | 24000/F (kHz) | 30 |
| 1.705-30.00 | 30 | 30 |
| 30.0-88.0 | 100 | 3 |
| 88.0-216.0 | 150 | 3 |
| 216.0-960.0 | 200 | 3 |
| Above 960 | 500 | 3 |

Tab. 2. Radiated Emission Limits Per 15.209

## Test Equipment

| | |
|---|---|
| **HP 8566B** | **Spectrum Analyzer 100Hz-22HGHz** |
| **HP83017A** | **Microwave Analyzer 40dB Gain (0.5 – 26.5 GHz)** |
| **HP 3784A** | **Digital Transmission Analyzer** |
| **EMCO 3115** | **Horn Antenna (1 – 18GHz)** |
| **HP 8495A** | **20dB Attenuator (DC-40GHz) 0-70dB** |
| **HP 8493B** | **10dB Attenuator** |
| **MicroCoax Cables** | **Low Loss Microwave Cables (1-26.5 GHz)** |
| **CDI Dipoles** | **Dipole Antennas (30 – 1000 MHz)** |

# § 15.203 Antenna Requirement

An intentional radiator antenna shall be designed to ensure that no antenna other that that furnished by the applicant can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

The OLYMPUS PPT8846 unit complies with the requirement of §15.203. The antenna is a **permanently attached omni-directional antenna.**

**CONCLUSION**

There are no provisions for connection to an external antenna. The unit meets the Antenna Requirements of §15.203.

# §15.247(a)(2) – Direct Sequence Bandwidth

| | |
|---|---|
| Res. Bandwidth = | 100 kHz (7dB/div) |
| Vid. BW = | 100 kHz |
| Span = | 30 MHz |
| Ref. Level | - 40 dBm |
| Sweep | 10ms |

(see attached spectrum plots)

| FREQ (MHz) | Channel | 6dB Bandwidth (MHz) |
|---|---|---|
| 2412 | 1 | 9.98 |
| 2437 | 6 | 10.05 |
| 2462 | 11 | 9.68 |

Table 3. 6dB Bandwidth measurements

Minimum Standard – The transmitter shall have a minimum 6dB bandwidth of 500Hz (0.5 MHz).

These are conducted measurements.

**REMARKS:**

**PASS**

# §15.247(b) Maximum Peak Output Power

Minimum Standard – The maximum peak output power of the transmitter shall not exceed 1 watt. Radiated power measurements were teaken at 3 meters with a power meter.

Max. Power Peak + Atten = dBm ⇒ Watts

| FREQ (MHz) | Channel | Power Output (dBm) | Power Output (mW) |
|---|---|---|---|
| 2412 | 1 | 20.0 | 100 |
| 2437 | 6 | 20.0 | 100 |
| 2462 | 11 | 20.0 | 100 |

Table 4. Output Power Measurements

Minimum Standard – The transmitter peak output power of the transmitter shall not exceed 1 watt. These are conducted measurements.

**REMARKS:**

**PASS**

# §15.247(c) Power Density

Minimum Standard – The transmitted power density averaged over any 1 second interval shall not be greater than 8dBm in any 3kHz bandwidth within these bands.

| | |
|---|---|
| Res. Bandwidth = | 3 kHz (10dB/div) |
| Vid. BW = | 3 kHz |
| Span = | 300 kHz (3.0 MHz) |
| Ref. Level | - 50dBm |
| Sweep | 1000 sec |

Peak + Atten = dBm ⇒ (Limit < 8dBm)

| FREQ (MHz) | Channel | Power Density (dBm) |
|---|---|---|
| 2412 | 1 | - 8.7 |
| 2437 | 6 | - 11.0 |
| 2462 | 11 | - 8.9 |

Table 5. Output Power Density Data.

Minimum Standard – The transmitter power density average over and 1 second interval shall not be greater than 8dBm in any 3 kHz BW within these bands. These are conducted measurements.

**REMARKS:**

**PASS**

# RADIATED Measurements (Fundamental & Harmonics)

## A. Transmitter Portion

Operating Frequency: 2412 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 1

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2412 | - 23.2 | 32.7 | V | Peak | 670656 | 116.5 | n/a |
| 4824 | - 102.5 | 40.4 | V | Peak | 175.59 | 44.9 | 9.1 |
| 7236 | - 107.5 | 47.4 | V | Peak | 221.82 | 46.9 | 69.6 |
| 9648 | - 126.7 | 50.3 | V | Peak | 33.8844 | 30.6 | 14.3 |
| 12060 | < - 135 | | | | | | |

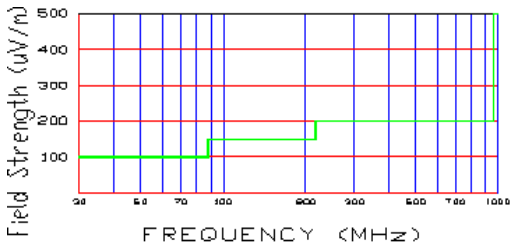



Figure 10. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## B. Transmitter Portion

Operating Frequency: 2437 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 6

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2437 | - 23.3 | 32.8 | V | Peak | 670656 | 116.5 | n/a |
| 4874 | - 102.5 | 40.5 | V | Peak | 177.828 | 45.0 | 9.0 |
| 7311 | - 108.4 | 48.0 | V | Peak | 213.796 | 46.6 | 7.4 |
| 9748 | - 125.8 | 50.3 | V | Peak | 37.5837 | 31.5 | 22.5 |
| 12185 | < - 135 | | | | | | |

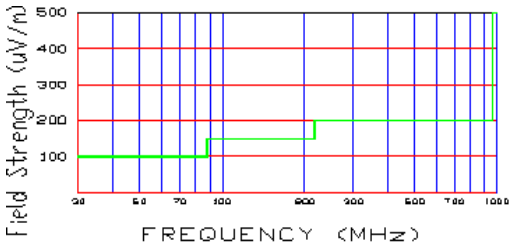



Figure 11. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## C. Transmitter Portion

Operating Frequency: 2462 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2462 | - 23.4 | 32.9 | V | Peak | 670811 | 116.5 | n/a |
| 4924 | - 100.7 | 40.7 | V | Peak | 223.872 | 47.0 | 7.0 |
| 7386 | - 109.6 | 48.2 | V | Peak | 190.546 | 45.6 | 8.4 |
| 9848 | - 126.4 | 50.4 | V | Peak | 35.4813 | 31.0 | 23.0 |
| 12310 | < - 135 | | | | | | |

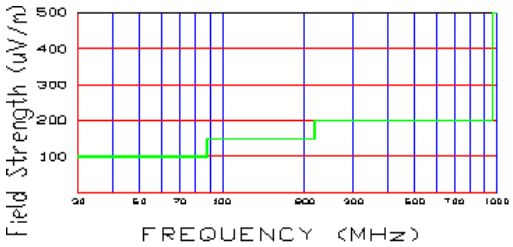



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2412 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 1

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2412 | - 23.2 | 32.7 | V | Peak | 670656 | 116.5 | n/a |
| 4824 | - 100.2 | 40.4 | V | Peak | 228.823 | 47.2 | 6.8 |
| 7236 | - 106.0 | 47.4 | V | Peak | 263.633 | 48.4 | 68.1 |
| 9648 | - 126.5 | 50.3 | V | Peak | 34.6737 | 30.8 | 16.4 |
| 12060 | < - 135 | | | | | | |

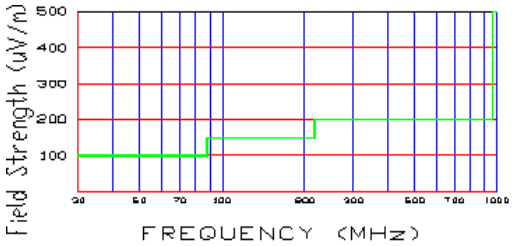



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2437 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 6

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2437 | - 23.3 | 32.8 | V | Peak | 6710656 | 116.5 | n/a |
| 4874 | - 100.3 | 40.5 | V | Peak | 229.087 | 47.2 | 6.8 |
| 7311 | - 107.8 | 48.0 | V | Peak | 229.087 | 47.2 | 6.8 |
| 9748 | - 125.8 | 50.3 | V | Peak | 37.5837 | 31.5 | 22.5 |
| 12185 | < - 135 | | | | | | |

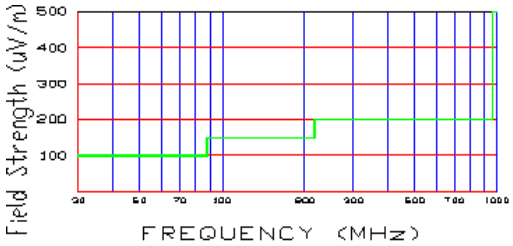



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2462 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2462 | - 23.4 | 32.9 | V | Peak | 670811 | 116.5 | n/a |
| 4924 | - 99.9 | 40.7 | V | Peak | 245.471 | 47.8 | 6.2 |
| 7386 | - 108.0 | 48.2 | V | Peak | 229.087 | 47.2 | 6.8 |
| 9848 | - 125.9 | 50.4 | V | Peak | 37.5837 | 31.5 | 22.5 |
| 12310 | < - 135 | | | | | | |

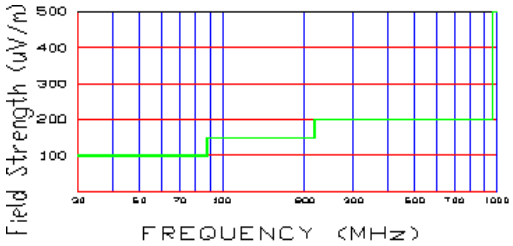



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2412 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 1

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2412 | - 23.1 | 32.7 | V | Peak | 670656 | 116.5 | n/a |
| 4824 | - 102.1 | 40.4 | V | Peak | 183.865 | 45.3 | 8.7 |
| 7236 | - 107.2 | 47.4 | V | Peak | 229.615 | 47.2 | 69.3 |
| 9648 | - 126.9 | 503 | V | Peak | 33.1131 | 30.4 | 14.9 |
| 12060 | < - 135 | | | | | | |

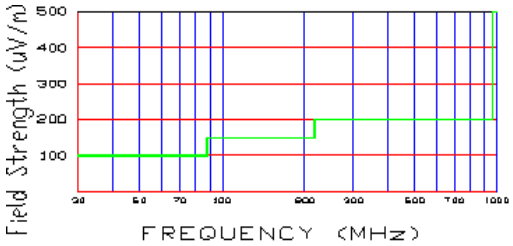



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2437 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 6

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2437 | - 23.3 | 32.8 | V | Peak | 670656 | 116.5 | n/a |
| 4874 | - 102.3 | 40.5 | V | Peak | 181.97 | 45.2 | 8.8 |
| 7311 | - 108.0 | 48.0 | V | Peak | 223.872 | 47.0 | 7.0 |
| 9748 | - 125.9 | 50.3 | V | Peak | 37.1535 | 31.4 | 22.6 |
| 12185 | < - 135 | | | | | | |

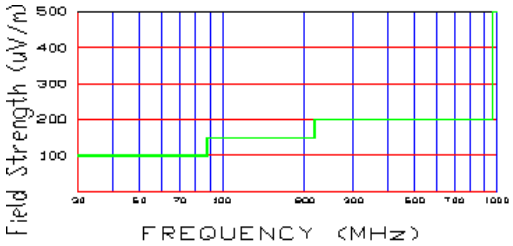



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2462 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2462 | - 23.4 | 32.9 | V | Peak | 670811 | 116.5 | n/a |
| 4924 | - 100.5 | 40.7 | V | Peak | 229.087 | 47.2 | 6.8 |
| 7386 | - 109.1 | 48.2 | V | Peak | 201.837 | 46.1 | 7.9 |
| 9848 | - 126.0 | 50.4 | V | Peak | 37.1535 | 31.4 | 22.6 |
| 12310 | < - 135 | | | | | | |

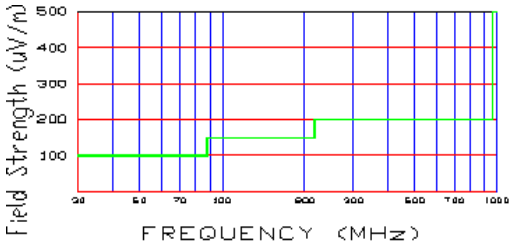



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2412 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 1

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2412 | - 23.2 | 32.7 | V | Peak | 670656 | 116.5 | n/a |
| 4824 | - 99.8 | 40.4 | V | Peak | 239.607 | 47.6 | 6.4 |
| 7236 | - 104.7 | 47.4 | V | Peak | 306.196 | 49.4 | 66.8 |
| 9648 | - 126.0 | 50.3 | V | Peak | 36.7282 | 31.3 | 16.3 |
| 12060 | < - 135 | | | | | | |

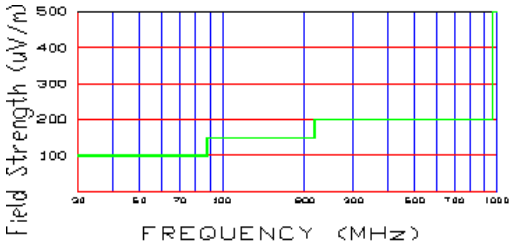



Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

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**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

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# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2437 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 6

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2437 | - 23.3 | 32.8 | V | Peak | 670656 | 116.5 | n/a |
| 4874 | - 99.9 | 40.5 | V | Peak | 239.883 | 47.6 | 6.4 |
| 7311 | - 107.5 | 48.0 | V | Peak | 237.137 | 47.5 | 6.5 |
| 9748 | - 125.5 | 50.3 | V | Peak | 38.9045 | 31.8 | 22.2 |
| 12185 | < - 135 | | | | | | |

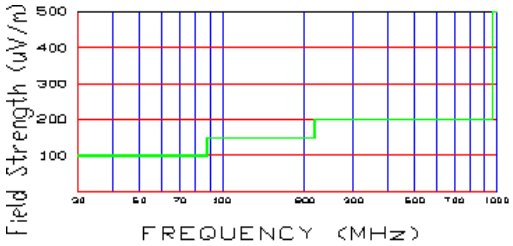


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

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**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Fundamental & Harmonics) (CONT.)

## D. Transmitter Portion

Operating Frequency: 2462 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2462 | - 23.4 | 32.9 | V | Peak | 670811 | 116.5 | n/a |
| 4924 | - 99.4 | 40.7 | V | Peak | 260.016 | 48.3 | 5.7 |
| 7386 | - 107.7 | 48.2 | V | Peak | 237.137 | 47.5 | 6.5 |
| 9848 | - 125.7 | 50.4 | V | Peak | 38.4592 | 31.7 | 22.3 |
| 12310 | < - 135 | | | | | | |

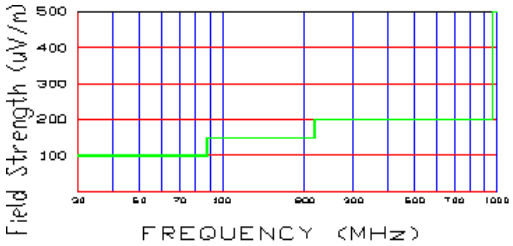


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

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**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Restricted Band)

## Transmitter Portion

Operating Frequency: 2462 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2483.9 | - 94.0 | 33.0 | V | Peak | 199.526 | 46.0 | 8.0 |
| 2284.0 | - 97.1 | 33.0 | V | Peak | 139.637 | 42.9 | 11.1 |
| 2484.7 | - 94.0 | 33.1 | V | Peak | 201.837 | 46.1 | 11.1 |
| 2485.0 | - 90.8 | 33.1 | V | Peak | 291.743 | 49.3 | 4.7 |
| 2491.2 | - 97.1 | 33.2 | V | Peak | 142.889 | 43.1 | 10.9 |
| 2492.1 | - 95.0 | 33.2 | V | Peak | 181.97 | 45.2 | 8.8 |

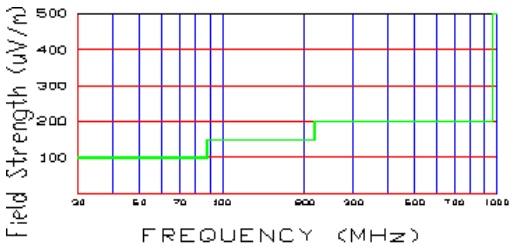


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Restricted Band)

## Transmitter Portion

Operating Frequency: 2462 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2483.8 | - 95.0 | 33.0 | V | Peak | 177.828 | 45.0 | 9.0 |
| 2483.9 | - 98.3 | 33.0 | V | Peak | 121.619 | 41.7 | 12.3 |
| 2484.6 | - 96.3 | 33.1 | V | Peak | 154.882 | 43.8 | 12.3 |
| 2485.0 | - 93.0 | 33.1 | V | Peak | 4.5E+11 | 233.1 | - 179.1 |
| 2491.3 | - 98.7 | 33.2 | V | Peak | 118.85 | 41.5 | 12.5 |
| 2492.1 | - 96.9 | 33.2 | V | Peak | 146.218 | 43.3 | 10.7 |

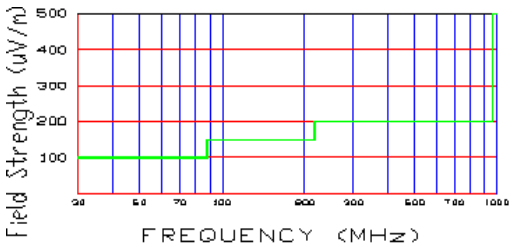


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Restricted Band)

## Transmitter Portion

Operating Frequency: 2462 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2484.0 | - 95.0 | 33.0 | V | Peak | 177.828 | 45.0 | 9.0 |
| 2484.0 | - 98.9 | 33.0 | V | Peak | 113.501 | 41.1 | 12.9 |
| 2484.4 | - 97.3 | 33.1 | V | Peak | 138.038 | 42.8 | 12.9 |
| 2485.0 | - 93.7 | 33.1 | V | Peak | 208.93 | 46.4 | 7.6 |
| 2491.1 | - 98.0 | 33.2 | V | Peak | 128.825 | 42.2 | 11.8 |
| 2492.0 | - 97.3 | 33.2 | V | Peak | 139.637 | 42.9 | 11.1 |

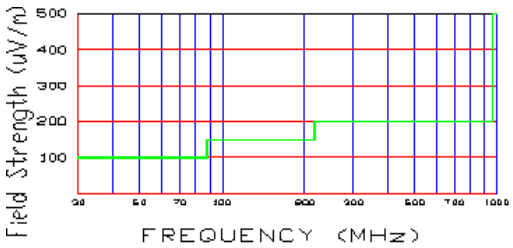


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Restricted Band)

## Transmitter Portion

Operating Frequency: 2462 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

| FREQ. (MHz) | Level* (dBm) | AFCL (dB) | POL (H/V) | DET QP/AVG | F/S (µV/m) | F/S (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| 2483.9 | - 96.2 | 33.0 | V | Peak | 154.882 | 43.8 | 10.2 |
| 2484.0 | - 99.5 | 33.0 | V | Peak | 105.925 | 40.5 | 13.5 |
| 2484.5 | - 97.3 | 33.1 | V | Peak | 138.038 | 42.8 | 1.35 |
| 2485.0 | - 94.0 | 33.1 | V | Peak | 201.837 | 46.1 | 7.9 |
| 2491.0 | - 99.7 | 33.2 | V | Peak | 105.925 | 40.5 | 13.5 |
| 2492.1 | - 98.0 | 33.2 | V | Peak | 128.825 | 42.2 | 11.8 |

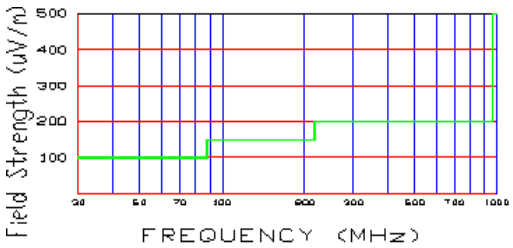


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)**

**2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz**

**3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz**

**4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.**

**5. The antenna is manipulated through typical positions, polarity and length during the tests.**

**6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.**

**7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.**

**8. < - 135 are below the analyzer floor level.**

# RADIATED Measurements (Spurious)

## Transmitter Portion

Operating Frequency: 2412 - 2462 MHz

Distance of Measurements: 3 meters

Channels: 1, 6, 11

| FREQ. (MHz) | Level* (dBm) | AFCL** (dB) | POL (H/V) | Height (m) | Azimuth (° angle) | F/S (µV/m) | Margin*** (dB) |
|---|---|---|---|---|---|---|---|
| 156.4 | - 86.8 | 14.1 | H | 2.7 | 195 | 51.3 | - 9.3 |
| 331.7 | - 91.6 | 21.7 | V | 2.3 | 210 | 71.6 | - 8.9 |
| 520.6 | - 97.1 | 26.5 | H | 1.8 | 180 | 66.1 | - 9.6 |
| 617.3 | - 100.2 | 28.5 | V | 1.9 | 275 | 58.3 | - 10.7 |
| 658.2 | - 100.5 | 29.2 | V | 1.8 | 250 | 61.0 | - 10.3 |
| 711.8 | - 101.0 | 30.1 | H | 1.6 | 185 | 63.9 | - 9.9 |
| 835.2 | - 103.5 | 31.8 | H | 1.5 | 180 | 57.6 | - 10.8 |

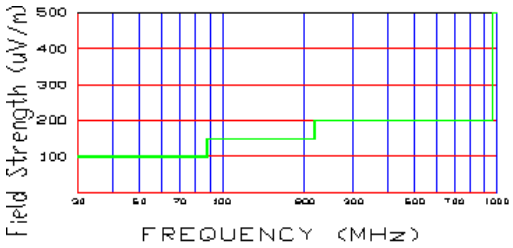


Figure 13. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

**NOTES:**

**1.All emissions were investigated and the worst case emissions are reported**

**2. For hand-held devices, the EUT is rotated through three orthogonal axis to determine which configuration produces the maximum emissions**

**3. The EUT is supplied with the minimal AC voltage or/and a new/fully recharged battery.**

**4. The EUT was tested up to the 10th harmonic (9.3 GHz) and no significant emission was found.**

# TEST EQUIPMENT

| Type | Model | Cal. Due Date | S/N |
|---|---|---|---|
| Microwave Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 12/05/02 | 3638A08713 |
| Microwave Spectrum Analyzer | HP 8566B (100Hz-22GHz) | 04/17/03 | 2542A11898 |
| Spectrum Analyzer/Tracking Gen. | HP 8591A (9kHz-1.8GHz) | 06/02/03 | 3144A02458 |
| Spectrum Analyzer | HP 8591A (9kHz-1.8GHz) | 10/15/02 | 3108A02053 |
| Spectrum Analyzer | HP 8594A (9kHz-2.9GHz) | 11/02/02 | 3051A00187 |
| Signal Generator* | HP 8640B (500Hz-1GHz) | 06/02/03 | 2232A19558 |
| Signal Generator* | HP 8640B (500Hz-1GHz) | 06/02/03 | 1851A09816 |
| Signal Generator* | Rohde & Schwarz (0.1-1000MHz) | 09/11/02 | 894215/012 |
| Ailtech/Eaton Receiver | NM 37/57A-SL (30-1000MHz) | 04/12/03 | 0792-03271 |
| Ailtech/Eaton Receiver | NM 37/57A (30-1000MHz) | 03/11/03 | 0805-03334 |
| Ailtech/Eaton Receiver | NM 17/27A (0.1-32MHz) | 09/17/02 | 0608-03241 |
| Quasi-Peak Adapter | HP 85650A | 08/09/02 | 2043A00301 |
| Ailtech/Eaton Adapter | CCA-7 CISPR/ANSI QP Adapter | 03/11/03 | 0194-04082 |
| RG58 Coax Test Cable | No. 167 | | n/a |
| Harmonic/Flicker Test System | HP 6841A (IEC 555-2/3) | | 3531A00115 |
| Broadband Amplifier (2) | HP 8447D | | 1145A00470, 1937A03348 |
| Broadband Amplifier | HP 8447F | | 2443A03784 |
| Transient Limiter | HP 11947A (9kHz-200MHz) | | 2820A00300 |
| Horn Antenna | EMCO Model 3115 (1-18GHz) | | 9704-5182 |
| Horn Antenna | EMCO Model 3115 (1-18GHz) | | 9205-3874 |
| Horn Antenna | EMCO Model 3116 (18-40GHz) | | 9203-2178 |
| Biconical Antenna (4) | Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design | | 1295, 1332, 0355 |
| Log-Spiral Antenna (3) | Ailtech/Eaton 93490-1 | | 0608, 1103, 1104 |
| Roberts Dipoles | Compliance Design (1 set) A100 | | 5118 |
| Ailtech Dipoles | DM-105A (1 set) | | 33448-111 |
| EMCO LISN (2) | 3816/2 | | 1077, 1079 |
| EMCO LISN | 3725/2 | | 2009 |
| Microwave Preamplifier 40dB Gain | HP 83017A (0.5-26.5GHz) | | 3123A00181 |
| Microwave Cables | MicroCoax (1.0-26.5GHz) | | |
| Ailtech/Eaton Receiver | NM37/57A-SL | | 0792-03271 |
| Spectrum Analyzer | HP 8591A | | 3034A01395 |
| Modulation Analyzer | HP 8901A | | 2432A03467 |
| NTSC Pattern Generator | Leader 408 | | 0377433 |
| Noise Figure Meter | HP 8970B | | 3106A02189 |
| Noise Figure Meter | Ailtech 7510 | | TE31700 |
| Noise Generator | Ailtech 7010 | | 1473 |
| Microwave Survey Meter | Holaday Model 1501 (2.450GHz) | | 80931 |
| Digital Thermometer | Extech Instruments 421305 | | 426966 |
| Attenuator | HP 8495A (0-70dB) DC-4GHz | | |
| Bi-Directional Coax Coupler | Narda 3020A (50-1000MHz) | | |
| Shielded Screen Room | RF Lindgren Model 26-2/2-0 | | 6710 (PCT270) |
| Shielded Semi-Anechoic Chamber | Ray Proof Model S81 | | R2437 (PCT278) |
| Environmental Chamber | Associated Systems Model 1025 (Temperature/Humidity) | | PCT285 |

* Calibration traceable to the National Institute of Standards and Technology (NIST).

# SAMPLE CALCULATIONS

1. The EIRP for channel 6 (2437 MHz) was measured at a 3 meter distance on our OATS. The turn table and antenna mast were adjusted to obtain the highest reading on a receiver spectrum analyzer with RBW and VBW set at 3MHz each. A horn antenna driven by a signal generator was substituted in place of the EUT and adjusted to match the –23.3 dBm receiver spectrum analyzer reading. (The horn antenna used during terminals of the substituted horn was 11.3 dBm. This value was corrected by adding the 8.7dBi gain of the horn to yield 20 dBm for EIRP.

2. To measure the spectral density of channel 6 the same procedure that was used in item #2 was followed but the VBW and RBW wre set at 3kHz each and the sweep time was set at 1000 seconds. The power at the antenna terminals of the substituted horn was –13.1 dBm. This value was corrected by adding the 8.7 dBi gain of the horn to yield –4.4 dBm.

   * NOTE * For 6dB BW > 3MHz a peak power meter is used instead of a receive spectrum analyzer to measure EIRP.

# Conclusion

The data collected shows that the **OLYMPUS Handheld PC FCC ID: CDJPPT8846LA4137** complies with Part 15C of the FCC Rules.