# FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003 TEST REPORT

For

**Z-Wave USB Dongle** 

**Model: WD6000** 

**Trade Name: GOOD WAY** 

**Issued for** 

**GOOD WAY TECHNOLOGY CO., LTD.** 

3F, No. 135, Lane 235, Pau Chiao Rd., Hsin-Tien City, Taipei Hsien, Taiwan, R.O.C.

Issued by

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# **Revision History**

| Rev. | Issue Date | Revisions     | Effect Page | Revised By  |
|------|------------|---------------|-------------|-------------|
| 00   | 11/17/2010 | Initial Issue | All Page 24 | Winnie Chen |
|      |            |               |             |             |
|      |            |               |             |             |
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|      |            |               |             |             |

Report No.: T101027203-RP1

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# 1. TEST REPORT CERTIFICATION

**Applicant**: GOOD WAY TECHNOLOGY CO., LTD.

Address : 3F, No. 135, Lane 235, Pau Chiao Rd., Hsin-Tien City,

Taipei Hsien, Taiwan, R.O.C.

**Equipment Under Test:** Z-Wave USB Dongle

Ux Chiu

Model : WD6000

Trade Name : GOOD WAY

**Tested Date** : October 27 ~ November 16, 2010

| APPLICABLE STANDARD                          |             |  |  |
|--|-------------|--|--|
| Standard                                     | Test Result |  |  |
| FCC Part 15 Subpart C AND<br>ANSI C63.4:2003 | PASS        |  |  |

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Alex Chiu Director Gundam Lin

Reviewed by:

Team Leader

# 2. EUT DESCRIPTION

# 2.1 DESCRIPTION OF EUT & POWER

| Product Name       | Z-Wave USB Dongle                                   |
|--------------------|---|
| Model Number       | WD6000  |
| Received Date      | October 27, 2010                                    |
| Frequency Range    | 908.42MHz   |
| Transmit Power     | 94.92 dBµV/m  |
| Channel Number     | 1 Channel   |
| Transmit Data Rate | 9.6 kbps, 40 kbps                                   |
| Type of Modulation | ASK   |
| Antenna Type       | PCB Antenna, Antenna Gain -3.10 dBi                 |
| Power Source       | 5.0VDC (From Notebook PC, Powered From Host Device) |
| I/O Port           | USB port × 1  |

- 1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
- 2. For more details, please refer to the User's manual of the EUT.
- 3. This submittal(s) (test report) is intended for FCC ID: SW8WD6000 filing to comply with Section 15.207, 15.209 and 15.249 of the FCC Part 15, Subpart C Rules.

# 3. DESCRIPTION OF TEST MODES

The EUT (WD6000) had been tested under operating condition.

There are three channels have been tested as following:

| Channel | Frequency (MHz) |  |
|---------|-----------------|--|
| 1       | 908.42          |  |

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only, and powerline conducted emission below 30MHz, which worst case was in normal link mode.

# 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2003 and FCC CFR 47, 15.207, 15.209 and 15.249.

# 5. FACILITIES AND ACCREDITATION

#### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village, Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

# 5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Taiwan BSMI USA FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, http:///www.ccsrf.com

#### **5.3 MEASUREMENT UNCERTAINTY**

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

| UNCERTAINTY   |
|---------------|
| ./ 2.0267     |
| +/- 3.9267    |
| ./ 2.6900     |
| +/- 3.6899    |
| +/- 3.6878    |
| +/- 3.0070    |
| +/- 3.0885    |
| +/- 3.0663    |
| . / . 2. 2000 |
| +/- 3.2000    |
| +/- 1.7468    |
|               |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than  $U_{\text{CISPR}}$  which is 3.6dB and 5.2dB respectively. CCS values (called  $U_{\text{Lab}}$  in CISPR 16-4-2) is less than  $U_{\text{CISPR}}$  as shown in the table above. Therefore, MU need not be considered for compliance.

# 6. SETUP OF EQUIPMENT UNDER TEST

# **SUPPORT EQUIPMENT**

| No. | Product       | Manufacturer | Model No.              | Serial No.                   | FCC ID    |
|-----|---------------|--------------|------------------------|------------------------------|-----------|
| 1   | Notebook PC   | DELL         | INSPIRON<br>640m PP19L | CN-0MG532-70166-7<br>1G-03EC | DoC       |
| 2   | Notebook PC   | HP           | ProBook<br>4421s       | CNF03242PM                   | DoC       |
| 3   | Power monitor | GOOD WAY     | TD1030                 |                              | SW8TD1030 |

#### **SETUP DIAGRAM FOR TESTS**

EUT & peripherals setup diagram is shown in appendix setup photos.

# **EUT OPERATING CONDITION**

#### **RF Mode**

- 1. Set up all computers like the setup diagram.
- 2. Power on all equipments.
  - TX Mode: Frequency:908.42MHz
- 3. All of the function are under run.
- 4. Start test.

#### **Normal Mode**

- 1. Setup whole system for test as shown on diagram.
- 2. Power on all equipments.
- 3. EUT through the wireless connection AC outlet (Power monitor).
- 4. All of the function are under run.
- 5. Start test.

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# 7. FCC PART 15.249 REQUIREMENTS

#### 7.1 RADIATED EMISSION

#### **LIMITS**

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, 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       |
| <sup>1</sup> 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 -<br>156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9            | 2655 - 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 - 3338   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 -335.4               | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              |                          |                 |                  |

#### Remark:

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

<sup>1.</sup>  $^{1}$  Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. 2.  $^{2}$  Above 38.6

(3) According to § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

| Frequency<br>(MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------|-----------------------------------|-------------------------------|
| 0.009 - 0.490      | 2400/F(KHz)                       | 300                           |
| 0.490 - 1.705      | 24000/F(KHz)                      | 30                            |
| 1.705 - 30.0       | 30                                | 30                            |
| 30 - 88            | 100 **                            | 3                             |
| 88 - 216           | 150 **                            | 3                             |
| 216 - 960          | 200 **                            | 3                             |
| Above 960          | 500                               | 3                             |

**Remark:** \*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

- (4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.
- (5) According to § 15.249 (a) Except as provided in paragraph (b) of this section, the field strength of emission from intentional radiators operated within these frequency bands shall comply with the following:

| Frequency<br>(MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|--------------------|-----------------------------------|-------------------------------|
| 902 - 928          | 50                                | 500                           |
| 2400 - 2483.5      | 50                                | 500                           |
| 5725 - 5875        | 50                                | 500                           |
| 24000 - 24250      | 250                               | 2500                          |

# **TEST EQUIPMENT**

# 966Chamber\_A

| Name of Equipment Manufacture   |                 | Model              | Serial Number | Calibration<br>Due |
|---------------------------------|-----------------|--------------------|---------------|--------------------|
| Spectrum Analyzer Agilent       |                 | E4446A             | MY43360132    | 06/20/2011         |
| EMI Test Receiver               | ROHDE & SCHWARZ | ESCI               | 100221        | 05/03/2011         |
| Bilog Antenna                   | SCHWARZBECK     | VULB               | 9168-249      | 10/04/2011         |
| Double-Ridged<br>Waveguide Horn | ETS LINDGREN    | 3117               | 00078732      | 07/05/2011         |
| Pre-Amplifier                   | Agilent         | 8449B              | 3008A01471    | 08/02/2011         |
| Pre-Amplifier                   | HP              | 8447F              | 2944A03748    | 09/23/2011         |
| RF Coaxial Cable                | HUBER-SUHNER    | SUCOFLEX<br>104PEA | SN31347       | 07/21/2011         |
| RF Coaxial Cable                | HUBER-SUHNER    | SUCOFLEX<br>104PEA | SN31350       | 07/21/2011         |
| RF Coaxial Cable                | HUBER-SUHNER    | SUCOFLEX<br>104PEA | SN31355       | 07/21/2011         |
| LOOP Antenna                    | EMCO            | 6502               | 8905-2356     | 06/09/2011         |
| Notch Filters Band<br>Reject    | Micro-Tronics   | BRM05702-01        | 009           | N.C.R              |

Remark: 1. Each piece of equipment is scheduled for calibration once a year.

#### 966Chamber\_B

| Name of Equipment                  | e of Equipment Manufacture |                              | Serial Number | Calibration<br>Due |
|------------------------------------|----------------------------|------------------------------|---------------|--------------------|
| Spectrum Analyzer                  | Agilent                    | E4407B                       | US41443108    | 08/12/2011         |
| EMI Test Receiver                  | ROHDE & SCHWARZ            | ESCI                         | 100221        | 05/03/2011         |
| Broadband Hybrid<br>Bi-Log Antenna | Sunol Sciences             | JB1                          | A100209-4     | 10/07/2011         |
| Broad-Band Horn<br>Antenna         | SCHWARZBECK                | BBHA 9120 D                  | 9120D-778     | 09/06/2011         |
| Double-Ridged<br>Waveguide Horn    | ETS-LINDGREN               | 3117                         | 00078733      | 12/17/2010         |
| Pre-Amplifier                      | Miteq                      | AM-1652-3000                 | 1490937       | 10/10/2011         |
| Pre-Amplifier                      | Miteq                      | AFS44-001026<br>50-42-10P-44 | 1494026       | 10/10/2011         |
| RF Coaxial Cable                   | HUBER-SUHNER               | SUCOFLEX<br>104PEA           | SN31346       | 10/07/2011         |
| RF Coaxial Cable                   | HUBER-SUHNER               | SUCOFLEX<br>104PEA           | SN33957       | 10/07/2011         |
| RF Coaxial Cable                   | HUBER-SUHNER               | SUCOFLEX<br>104PEA           | SN33958       | 10/07/2011         |
| Notch Filters Band<br>Reject       | Micro-Tronics              | BRM05702-01                  | 026           | N.C.R              |

Remark: 1. Each piece of equipment is scheduled for calibration once a year.

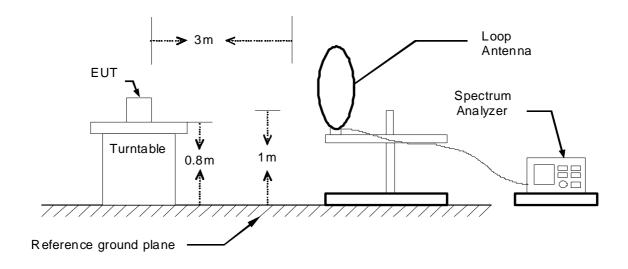
<sup>2.</sup> N.C.R = No Calibration Request.

<sup>2.</sup> N.C.R = No Calibration Request.

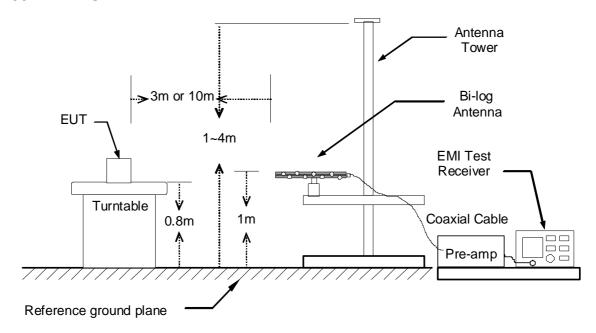
# **TEST SETUP**

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

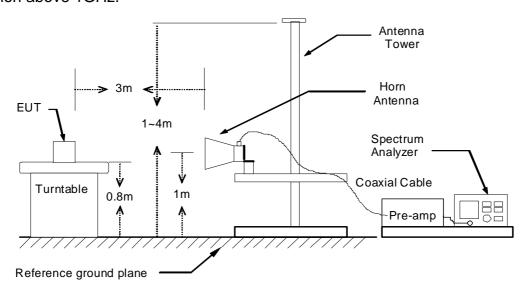
9kHz ~ 30MHz



#### 30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



#### **TEST PROCEDURE**

- 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
- 3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

#### **TEST RESULTS**

#### Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

#### Below 1 GHz (30MHz ~ 1GHz)

| Product Name | Z-Wave USB Dongle             | Test By         | Albert Lai |
|--------------|-------------------------------|-----------------|------------|
| Model        | WD6000                        | Test Date       | 2010/11/16 |
| Test Mode    | Normal operating (worst-case) | TEMP & Humidity | 23°C, 56%  |

| 966 Chamber_B at 3Meter / Horizontal |                   |                                |                    |                   |                |        |
|--------------------------------------|-------------------|--------------------------------|--------------------|-------------------|----------------|--------|
| Frequency<br>(MHz)                   | Reading<br>(dBµV) | Correction<br>Factor<br>(dB/m) | Result<br>(dBµV/m) | Limit<br>(dBµV/m) | Margin<br>(dB) | Remark |
| 38.73                                | 46.14             | -26.19                         | 19.95              | 40.00             | -20.05         | Peak   |
| 189.08                               | 48.59             | -40.53                         | 8.06               | 43.50             | -35.44         | Peak   |
| 275.41                               | 50.21             | -38.13                         | 12.08              | 46.00             | -33.92         | Peak   |
| 480.08                               | 51.20             | -25.83                         | 25.37              | 46.00             | -20.63         | Peak   |
| 719.67                               | 45.72             | -30.07                         | 15.66              | 46.00             | -30.34         | Peak   |
| 804.06                               | 41.89             | -24.33                         | 17.55              | 46.00             | -28.45         | Peak   |
| 960.23                               | 46.23             | -24.78                         | 21.45              | 54.00             | -32.55         | Peak   |
|                                      |                   |                                |                    |                   |                |        |
|                                      |                   | 966 Chamb                      | er_B at 3Met       | er / Vertical     |                |        |
| Frequency<br>(MHz)                   | Reading<br>(dBµV) | Correction<br>Factor<br>(dB/m) | Result<br>(dBµV/m) | Limit<br>(dBµV/m) | Margin<br>(dB) | Remark |
| 48.43                                | 60.88             | -43.09                         | 17.79              | 40.00             | -22.21         | Peak   |
| 60.07                                | 58.05             | -43.79                         | 14.27              | 40.00             | -25.73         | Peak   |
| 90.14                                | 54.67             | -38.44                         | 16.23              | 43.50             | -27.27         | Peak   |
| 191.99                               | 47.51             | -33.27                         | 14.24              | 43.50             | -29.26         | Peak   |
| 306.45                               | 51.81             | -35.71                         | 16.10              | 46.00             | -29.90         | Peak   |
| 455.83                               | 56.36             | -32.74                         | 23.62              | 46.00             | -22.38         | Peak   |

#### Remark:

666.32

960.23

44.76

46.39

- 1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
- 2. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

20.05

22.49

46.00

54.00

-25.95

-31.51

Peak

Peak

- 3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) PreAmp.Gain (dB)
- 4. Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)
- 5. Margin (dB) = Remark result (dBuV/m) Quasi-peak limit (dBuV/m).

-24.71

-23.90

#### **Above 1 GHz**

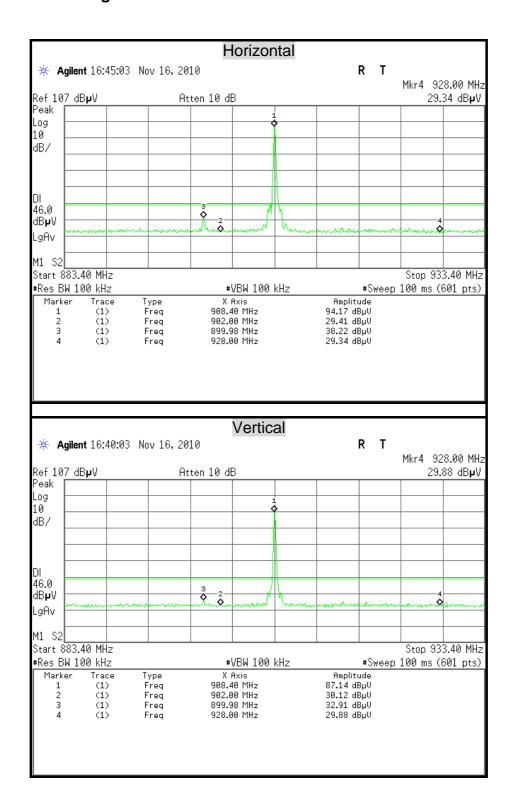
| Product Name | Z-Wave USB Dongle | Test By         | Rueyyan Lin |
|--------------|-------------------|-----------------|-------------|
| Model        | WD6000            | Test Date       | 2010/11/10  |
| Test Mode    | TX Mode           | TEMP & Humidity | 24°C, 52%   |

|                    | 966 Chamber_A at 3Meter / Horizontal |                          |                                |                       |       |        |                      |                |        |
|--------------------|--------------------------------------|--------------------------|--------------------------------|-----------------------|-------|--------|----------------------|----------------|--------|
| Frequency<br>(MHz) | Reading-<br>PK<br>(dBuV)             | Reading-<br>AV<br>(dBuV) | Correction<br>Factor<br>(dB/m) | Result-PK<br>(dBuV/m) |       |        | Limit-AV<br>(dBuV/m) | Margin<br>(dB) | Remark |
| * 908.42           | 91.81                                | 89.36                    | 3.11                           | 94.92                 | 92.47 | 114.00 | 94.00                | -1.53          | AVG    |
| 1328.50            | 45.27                                |                          | -3.36                          | 41.91                 |       | 74.00  | 54.00                | -12.09         | Peak   |
| 1823.50            | 43.03                                |                          | 0.04                           | 43.07                 |       | 74.00  | 54.00                | -10.93         | Peak   |
| 2327.50            | 45.24                                |                          | 2.20                           | 47.45                 |       | 74.00  | 54.00                | -6.55          | Peak   |
| 2894.50            | 42.83                                |                          | 3.36                           | 46.18                 |       | 74.00  | 54.00                | -7.82          | Peak   |
| 3610.00            | 41.90                                |                          | 4.11                           | 46.01                 |       | 74.00  | 54.00                | -7.99          | Peak   |
| 4550.50            | 40.89                                |                          | 6.59                           | 47.47                 |       | 74.00  | 54.00                | -6.53          | Peak   |

|                    | 966 Chamber_A at 3Meter / Vertical |                          |                                |                       |       |                      |                      |                |        |
|--------------------|------------------------------------|--------------------------|--------------------------------|-----------------------|-------|----------------------|----------------------|----------------|--------|
| Frequency<br>(MHz) | Reading-<br>PK<br>(dBuV)           | Reading-<br>AV<br>(dBuV) | Correction<br>Factor<br>(dB/m) | Result-PK<br>(dBuV/m) |       | Limit-PK<br>(dBuV/m) | Limit-AV<br>(dBuV/m) | Margin<br>(dB) | Remark |
| * 908.42           | 84.69                              | 82.04                    | 3.11                           | 87.80                 | 85.15 | 114.00               | 94.00                | -8.85          | AVG    |
| 1333.00            | 50.71                              |                          | -3.34                          | 47.37                 |       | 74.00                | 54.00                | -6.63          | Peak   |
| 1499.50            | 48.33                              |                          | -2.66                          | 45.67                 |       | 74.00                | 54.00                | -8.33          | Peak   |
| 2323.00            | 45.08                              |                          | 2.19                           | 47.27                 |       | 74.00                | 54.00                | -6.73          | Peak   |
| 2723.50            | 43.86                              |                          | 3.01                           | 46.87                 |       | 74.00                | 54.00                | -7.13          | Peak   |
| 3241.00            | 41.55                              |                          | 3.69                           | 45.24                 |       | 74.00                | 54.00                | -8.76          | Peak   |
| 3929.50            | 42.03                              |                          | 4.98                           | 47.01                 |       | 74.00                | 54.00                | -6.99          | Peak   |

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Average test would be performed if the peak result were greater than the average limit.
- 3. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 5. 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.
- Result = Reading + Correction Factor Margin = Result - Limit Remark Peak = Result(PK) - Limit(AV) Remark AVG = Result(AV) - Limit(AV)
- 7. (\*) Fundamental

# **Restricted Band Edges**



# 7.2 CONDUCTED EMISSION

#### **LIMITS**

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency Range | Conducted Limit (dBµv) |          |  |  |  |
|-----------------|------------------------|----------|--|--|--|
| (MHz)           | Quasi-peak             | Average  |  |  |  |
| 0.15 - 0.50     | 66 to 56               | 56 to 46 |  |  |  |
| 0.50 - 5.00     | 56                     | 46       |  |  |  |
| 5.00 - 30.0     | 60                     | 50       |  |  |  |

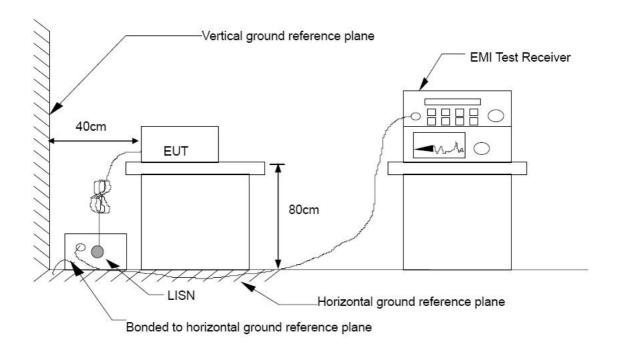
#### **TEST EQUIPMENT**

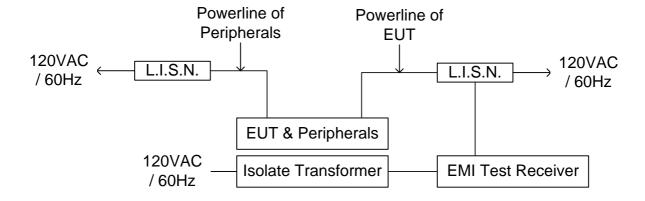
| Name of Equipment    | Manufacturer    | Model        | Serial Number | Calibration<br>Due |
|----------------------|-----------------|--------------|---------------|--------------------|
| L.I.S.N              | SCHWARZBECK     | NSLK 8127    | 8127-465      | 08/08/2011         |
| L.I.S.N              | SCHWARZBECK     | NSLK 8127    | 8127-473      | 03/22/2011         |
| EMI Test Receiver    | ROHDE & SCHWARZ | ESCS 30      | 835418/008    | 10/24/2011         |
| Pulse Limit          | ROHDE & SCHWARZ | ESH3-Z2      | 100117        | 09/17/2011         |
| N Type Coaxial Cable | BELDEN          | 8268 M17/164 | 003           | 07/09/2011         |

**Remark:** Each piece of equipment is scheduled for calibration once a year.

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# **TEST SETUP**





# **TEST PROCEDURE**

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a  $4m \times 3m \times 2.4m$  (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W)  $\times$  1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

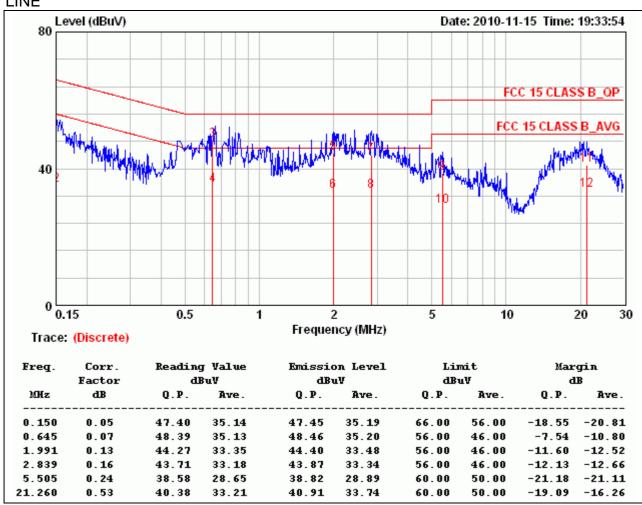
The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

### **TEST RESULTS**

| <b>Product Name</b> | Z-Wave USB Dongle             | Test By         | Rueyyan Lin |  |
|---------------------|-------------------------------|-----------------|-------------|--|
| Model               | WD6000                        | Test Date       | 2010/11/15  |  |
| Test Mode           | Normal operating (worst-case) | TEMP & Humidity | 23.1°C, 53% |  |

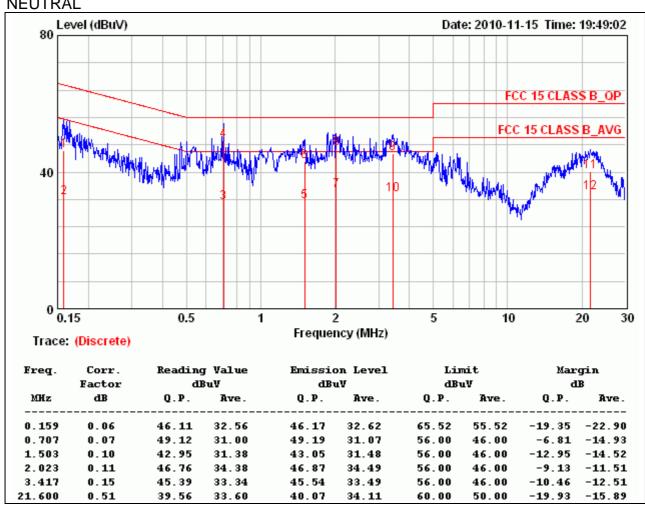
#### LINE



- 1. Correction Factor = Insertion loss + cable loss
- 2. Margin value = Emission level Limit value

| Product Name | Z-Wave USB Dongle             | Test By         | Rueyyan Lin |  |
|--------------|-------------------------------|-----------------|-------------|--|
| Model        | WD6000                        | Test Date       | 2010/11/15  |  |
| Test Mode    | Normal operating (worst-case) | TEMP & Humidity | 23.1°C, 53% |  |

#### **NEUTRAL**



- 1. Correction Factor = Insertion loss + cable loss
- 2. Margin value = Emission level Limit value