



MPE TEST REPORT

No. ECIT-2013-0030-MPE

For

Client : D-Link Corporation

Production : HSPA+ module

Model Name : DWM-800A

Hardware Version: 1.0

Software Version: 1.0

FCC ID: KA2WM800AA1

Issued date: 2013-4-17

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

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1. Test Laboratory

1.1. Testing Location

Company Name: ECIT Shanghai, East China Institute of Telecommunications
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1.2. Project data

Project Leader: Liu Jianquan
Testing Start Date: Apr 17, 2013
Testing End Date: Apr 17, 2013

1.3. Signature

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2. Client Information

2.1. Applicant Information

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2.2. Manufacturer Information

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

| | |
|---------------------|---------------------------|
| EUT Description | HSPA+ module |
| Model name | DWM-800A |
| UMTS Frequency Band | WCDMA BandII; WCDMA BandV |
| GSM Frequency Band | GSM835/GSM1900 |
| Antenna Type | External Antenna |

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version: |
|---------|-----------------------|------------|-------------|
| S1 | IMEI: 355413050010541 | 1.0 | 1.0 |

*EUT ID: is used to identify the test sample in the lab internally.

Note: the EUT has no earphone.

3.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN | Manufacturer |
|--------|-------------|-------|-----|--------------|
| AE1 | Battery | N/A | N/A | N/A |
| AE2 | Headset | N/A | N/A | N/A |

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

The limits standard is based on the Council Recommendation 1999/519/EC.

FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1,2011

Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices, Oct 1,2011

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

| Frequency Range [MHz] | Electric Field Strength [V/m] | Magnetic Field Strength [A/m] | Power Density (S) [mW/cm ²] | Averaging Times E ² , H ² or S [minutes] |
|-----------------------|-------------------------------|-------------------------------|---|--|
| 0.3 – 3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0 – 30 | 1824/f | 4.89/f | (900/f)* | 6 |
| 30 – 300 | 61.4 | 0.163 | 1.0 | 6 |
| 300 – 1500 | -- | -- | F/300 | 6 |
| 1500 - 100000 | -- | -- | 5 | 6 |

Limits for General Population / Uncontrolled Exposure

| Frequency Range [MHz] | Electric Field Strength [V/m] | Magnetic Field Strength [A/m] | Power Density (S) [mW/cm ²] | Averaging Times E ² , H ² or S [minutes] |
|-----------------------|-------------------------------|-------------------------------|---|--|
| 0.3 – 1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34 – 30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30 – 300 | 27.5 | 0.073 | 0.2 | 30 |
| 300 – 1500 | -- | -- | F/1500 | 30 |
| 1500 - 100000 | -- | -- | 1.0 | 30 |

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for Occupational /Controlled Exposure are applicable.

5. Test Results

5.1. Conducted PF Power Output

Table 5.1: The Conducted Power For GSM

| GSM 835MHZ | Conducted Power (dBm) | | |
|----------------|----------------------------|---------------------------|----------------------------|
| | Channel 128 (824.2MHz) | Channel 190 (836.6MHz) | Channel 251 (848.8MHz) |
| | 32.0 | 31.9 | 31.8 |
| GSM 1900MHZ | Conducted Power (dBm) | | |
| | Channel 512 (1850.2MHz) | Channel 661 (1880MHz) | Channel 810 (1909.8MHz) |
| | 28.3 | 27.9 | 27.8 |

Table 5.2: The conducted Power for WCDMA

| Item | FDDII Conducted Power(dBm) | | |
|---------------|----------------------------|--------------------|---------------------|
| | 9262 (1852.4MHz) | 9400 (1880MHz) | 9537 (1907.6MHz) |
| WCDMA Band II | 25.4 | 23.5 | 23.9 |
| Item | FDDV Conducted Power(dBm) | | |
| | 4133 (826.4MHz) | 4175 (836.6MHz) | 4232 (846.6MHz) |
| WCDMA Band V | 25.6 | 24.9 | 25.5 |

5.2. Calculation Information

From the antenna specifications provided by the applicant, the antenna gain is -0.71 dBi in GSM 835MHz/WCDMA band V and 2.92 dBi in GSM 1900MHz/WCDMA band II.

So for conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC OET Bulletin 65 Supplement C and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

5.3. Result of GSM835

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824.2 – 848.8 MHz; as per the original test report the highest power is GSM835, Low channel 128. The maximum conducted power is 32.0 dBm . The maximum gain is -0.71dBi.The

resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP}=32.0+(-0.71)=31.29 \text{ dBm}=1345.86 \text{ mW}$$

$$\text{Power Density}=\text{EIRP} \times \text{Duty Cycle} / (4\pi R^2) = 1345.86 \times 8.3 / (4 \times \pi \times 20^2) = 2.22 \text{ mW/cm}^2$$

Where Duty Cycle is 8.3 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824.2 / 300 = 2.75 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.4. Result of GSM1900

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850.2 – 1909.8 MHz; as per the original test report the highest power is GSM1900, Low channel 512. The maximum conducted power is 28.3 dBm. The maximum gain is 2.92 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP}=28.3+2.92=31.22 \text{ dBm}=1324.34 \text{ mW}$$

$$\text{Power Density}=\text{EIRP} \times \text{Duty Cycle} / (4\pi R^2) = 1324.34 \times 8.3 / (4 \times \pi \times 20^2) = 2.187 \text{ mW/cm}^2$$

Where Duty Cycle is 8.3 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1850.2 / 300 = 6.167 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.5. Result of WCDMA Band II

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1852.4 – 1907.8 MHz; as per the original test report the highest power is WCDMA Band II, Low channel. The maximum conducted power is 25.4 dBm. The maximum gain is 2.92 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP}=25.4+2.92=28.32 \text{ dBm}=679.20 \text{ mW}$$

$$\text{Power Density}=\text{EIRP} \times \text{Duty Cycle} / (4\pi R^2) = 679.20 \times 1 / (4 \times \pi \times 20^2) = 0.135 \text{ mW/cm}^2$$

Where Duty Cycle is 1 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1852.4/300 = 6.174 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.6. Result of WCDMA Band V

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 826.4 – 846.6 MHz; as per the original test report the highest power is WCDMA Band V, Low channel. The maximum conducted power is 25.6 dBm . The maximum gain is -0.71 dBi. The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{EIRP} = 25.6 + (-0.71) = 24.89 \text{ dBm} = 308.32 \text{ mW}$$

$$\text{Power Density} = \text{EIRP} \times \text{Duty Cycle} / (4\pi R^2) = 308.32 \times 1 / (4 \times \pi \times 20^2) = 0.061 \text{ mW/cm}^2$$

Where Duty Cycle is 1 and R is 20cm.

The MPE limit for Occupational/Controlled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 826.4/300 = 2.75 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

Note: $\pi=3.1416$

So the product is under the MPE limits. All is pass.

*****END OF REPORT*****