

**Electromagnetic Emission**  
**FCC MEASUREMENT REPORT**  

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**CERTIFICATION OF COMPLIANCE**  
**FCC Part 15 Certification Measurement**

**PRODUCT** : Internet Phone  
**MODEL/TYPE NO** : DotPhone3000  
**FCC ID** : QC6DotPhone3000  
**APPLICANT** : Ntel Technology Co., Ltd.  
604. SK Twin Tech Tower, B dong,  
345-9 Gasan-Dong, Geumcheon-gu, Seoul, Korea  
Attn. : Yun, Kye Seog / I BIZ Department of Ioam Leader  
**FCC CLASSIFICATION** : Part 15 Class B Computing Device Peripheral (JBP)  
**FCC RULE PART(S)** : FCC Part 15 Subpart B  
**FCC PROCEDURE** : Certification  
**TRADE NAME** : Ntel Technology Co., Ltd.  
**TEST REPORT No.** : E02.0411.FCC.213N  
**DATES OF TEST** : April 8 ~ 10, 2002  
**DATES OF ISSUE** : April 11, 2002  
**TEST LAB.** : ETL Inc (FCC Registration Number : 95422)  
#584 Sangwhal-ri, Kanam-myon, Yoju-kun,  
Kyounggi-do, 469-880, Korea  
Tel : (031) 885-0072 Fax : (031) 885-0074

This Internet Phone, Model DotPhone3000 has been tested in accordance with the measurement procedures specified in ANSI C63.4-1992 at the ETL/EMC Test Laboratory and has been shown to be complied with the electromagnetic radiated emission limits specified in FCC Rule Part15 Subpart B.

I attest to the accuracy of data. All measurement herein performed by me or made under my supervision and 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.

The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.



Name : Yo Han, Park

Title : Chief Engineer

**E-RAE Testing Laboratory Inc.**

#584 Sangwhal-ri, Kanam-myon, Yoju-kun,  
Kyounggi-do, 469-880, Korea

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## FCC MEASUREMENT REPORT

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

### General Information

**Applicant Name** : Ntel Technology Co., Ltd.

**Address** : 604. SK Twin Tech Tower, B dong,  
345-9 Gasan-Dong, Geumcheon-gu,  
Seoul, Korea

**Attention** : Yun, Kye Seog / I BIZ Department of Ioam Leader

- **EUT Type** : Internet Phone
- **Model Number** : DotPhone3000
- **FCC Identifier** : QC6DotPhone3000
- **S/N** : N/A
- **Modulation** : N/A
- **FCC Rule Part(s)** : Part 15 Subpart B
- **Test Procedure** : ANSI C63.4-1992
- **FCC Classification** : Part 15 Class B Computing Device Peripheral(JBP)
- **Dates of Tests** : April 08 ~ 10, 2002
- **Place of Tests** : ETL Inc  
EMC Testing Lab (FCC Registration Number : 95422)  
584, Sangwhal-Ri, Kanam-Myun, Yoju-Kun,  
Kyounggi-Do, 469-880, Korea  
Tel : (031) 885-0072 Fax : (031) 885-0074
- **Test Report No.** : E02.0411.FCC.213N

## 1. INTRODUCTION

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The measurement test for radiated and conducted emission test were conducted at the open area test site of E-RAE Testing Laboratory Inc. facility located at 584, Sangwhal-ri, Ganam-myun, Yaju-kun, Kyonggi-do, Korea. The site is constructed in conformance with the requirements of the ANSI C63.4-1992 and CISPR Publication 16. The ETL has site descriptions on file with the FCC for 3 and 10 meter site configurations. Detailed description of test facility was found to be in compliance with the requirements of Section 2.948 FCC Rules according to the ANSI C63.4-1992 and registered to the Federal Communications Commission (Registration Number : 95422 ).

The measurement procedure described in American National Standard for Method of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C.63.4-1992) was used in determining radiated and conducted emissions from the Ntel Technology Co., Ltd. Internet Phone Model : DotPhone3000.

## 2. PRODUCT INFORMATION

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### 2.1 Equipment Description

The Equipment Under Test(EUT) is the Ntel Technology Co., Ltd. Internet Phone Model : DotPhone3000.  
Please refer to Users manual

### 2.2 General Specification

|  |  |
|--|--|
| - Chassis Type                                 | Plastic Cover                            |
| - List of Each OSC. Or<br>X-Tal. Freq.(>=1MHz) | X-TAL:12 MHz                             |
| - Chipset Brand & Part No.                     | Motorola: MC14LC5480DW                   |
|  | National: MC244A                         |
|  | tjnet: TIGER 560                         |
| - Number of Layers                             | 2-Layer                                  |
| - I/O Cable(s)                                 | Unshielded                               |
| - Keyboard                                     | PAD – 15Key                              |
| - Physical Interface                           | USB Specification 1.1 compliant          |
| - Operating OS                                 | Windows 98, 98SE, 98ME, Windows 2000 PRO |
| - Operating HDD Capacity                       | Above 10Mbyte                            |
| - Operating Memory Capacity                    | Above 32Mbyte                            |
| - Power  | 5V 250mA from USB Port of PC             |

### 3. DESCRIPTION OF TESTS

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#### 3.1 Conducted Emission Measurement

Conducted emissions measurements were made in accordance with § 12.2 in ANSI C63.4-1992. "measurement of Information Technology Equipment". The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50 /50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within a bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- Procedure of Test

The line-conducted facility is located inside a shielded room 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. Two EMCO 3825/2 LISNs are bonded to the shielded room. The EUT is powered from the EMCO LISN and the support equipment is powered from the another EMCO LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner  $\phi$  1.2cm. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and these supply lines will be connected to the EMCO LISN. Non-inductive bundling to a 1m length shortened all interconnecting cables more than 1m. 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 R3261A Spectrum Analyzer to determine the frequency producing the max. emission from the EUT. The frequency producing the max level was reexamined using to set Quasi-peak mode dy manual, after scanned by automatic Peak mode from 0.15 to 30MHz. The bandwidth of the Spectrum Analyzer was set to 9KHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission.

### **3. DESCRIPTION OF TESTS**

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#### **3.2 Radiated Emission Measurement**

Radiated emission measurements were in accordance with § 12.2 in ANSI C63.4-1992 "Measurement of Information Technology Equipment ". The measurements were performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Quasi-peak" within a bandwidth of 120KHz.

- Procedure of Test

Preliminary measurements were made at 10 meter using broadband antennas, and spectrum analyzer to determined the frequency producing the max. emission in shielded room. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 1000MHz using SchwarzBeck Log-Bicon antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made open site at 10-meters. The test equipment was placed on a wooden turn-table. 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 by manual. The detector function was set to CISPR Quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each 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 max. emission. Each emission was maximized by: varying the mode of operation to the EUT and/or support equipment and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Photographs of the worst-case emission test setup can be seen in Appendix B.

## 4. TEST CONDITION

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### 4.1 Test Configuration

The device was configured for testing in a typical fashion (as a customer would normally use it). During the tests, the EUT and the supported equipments were installed to meet FCC requirement and operated in a manner which tends to maximize its emission level in a typical application.

#### Radiated Emission Test

Preliminary radiated emission tests were conducted using the procedure in ANSI C63.4/1992 Clause 8.3.1.1 to determine the worst operating condition. Final radiated emission tests were conducted at 3meter open field test site.

To complete the test configuration required by the FCC, the EUT was tested in all three orthogonal planes. All testing was performed at AC/DC Adaptor.

### 4.2 EUT operation

Internet phone of EUT was connected to USB port of PC.

During the test executed communication between EUT and PC.

### 4.3 Support Equipment Used

Following peripheral devices and interface cables were connected during the measurement:

#### EUT- Internet Phone

|                   |                                |
|-------------------|--------------------------------|
| FCC ID            | : QC6DotPhone3000              |
| Model Name        | : DotPhone3000                 |
| Serial No.        | : N/A                          |
| Manufacturer      | : Ntel Technology Co., Ltd.    |
| Power Supply Type | : 5V 250mA From USB Port of PC |
| Power Cord        | : N/A                          |
| Data Cable        | : Shielded, 1m                 |

#### Support Unit 1-Persnal computer(DELL)

|                   |                                  |
|-------------------|----------------------------------|
| FCC ID            | : N/A(DoC)                       |
| Model Name        | : MMP                            |
| Serial No.        | : SK1W31S                        |
| Manufacturer      | : DELL                           |
| Power Supply Type | : Switching                      |
| Power Cord        | : Non-shielded, Detachable: 1.2m |
| Data Cable        | : Shielded, Detachable:1.5m      |

#### Support Unit 2-Keybaord (DELL)

|                   |                  |
|-------------------|------------------|
| FCC ID            | : N/A(DoC)       |
| Model Name        | : SK-8000        |
| Serial No.        | : 2965           |
| Manufacturer      | : DELL           |
| Power Supply Type | : N/A            |
| Power Cord        | : N/A            |
| Data Cable        | : Shielded, 1.5m |





**Support Unit 3-Mouse(LOGITECH)**

FCC ID : DZL211029  
Model Name : M-S34  
Serial No. : LZC01002314  
Manufacturer : LOGITECH  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : None-Shielded, 1.2m

**Support Unit 4- EAR- MIC(JETECH)**

FCC ID : N/A  
Model Name : NCD-4JV  
Serial No. : N/A  
Manufacturer : DAWA  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, 1.5m

**Support Unit 6- Serial Mouse(PETRA)**

FCC ID : JKGMUS5S01  
Model Name : MUS5S  
Serial No. : E183027  
Manufacturer : PETRA  
Power Supply Type : N/A  
Power Cord : N/A  
Data Cable : Shielded, 1.2m

**Support Unit 7- Printer(H.P)**

FCC ID : B94C2164X  
Model Name : C4562B  
Serial No. : TH9411434G  
Manufacturer : H.P  
Power Supply Type : DC 24V From Adaptor  
Power Cord : Non-Shield, 1.5m  
Data Cable : Shielded, 1.5m

**Support Unit 4- Monitor(E-RAE)**

FCC ID : OIOELM-150  
Model Name : ELM-150A  
Serial No. : N/A  
Manufacturer : E-RAE Electronics Industry Co., Ltd.  
Power Supply Type : DC12V From Adaptor  
Power Cord : Non-shielded, Detachable: 1.2m  
Data Cable : Shielded 15pin D-sub, 1.5m

## 5. TEST RESULTS

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### 5.1 Summary of Test Results

The measurement results were obtained with the EUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum emission of the EUT are reported.

| FCC Rule Parts | Measurement Required           | Result             |
|----------------|--------------------------------|--------------------|
| 15.107(e)      | Conducted Emission Measurement | Passed by -10.70dB |
| 15.109(e)      | Radiated Emissions Measurement | Passed by -3.80dB  |

The data collected shows that the **Ntel Technology Co., Ltd. Internet Phone DotPhone3000** complies with technical requirements of above rules part 15.107(e) and 15.109(e) Class B Limits.

The equipment is not modified anything, mechanical or circuits to improve EMI status during a measurement.

No EMI suppression device(s) was added and/or modified during testing.

## 5. TEST RESULTS

### 5.2 Conducted Emissions Measurement

|                       |   |
|-----------------------|---|
| EUT                   | Internet Phone / DotPhone3000 (SN:N/A)    |
| Limit apply to        | 15.107(e) : CISPR Pub.22(1997) Class B    |
| Test Date             | April 8, 2002                             |
| Operating Condition   | Communication mode                        |
| Environment Condition | Humidity Level : 40 %RH, Temperature : 19 |
| Result                | Passed by -10.70dB                        |

#### Conducted Emission Test Data

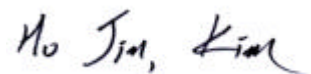
The following table shows the highest levels of conducted emissions on both polarization of live and neutral line.

Detector mode : CISPR Quasi-Peak mode ( 6dB Bandwidth : 9 KHz )

| Frequency<br>[MHz] | Reading<br>[dB $\mu$ V] |         | Phase<br>(*H/**N) | Limit<br>[dB $\mu$ V] |         | Margin<br>[dB] |         |
|--------------------|-------------------------|---------|-------------------|-----------------------|---------|----------------|---------|
|                    | Quasi-peak              | Average |                   | Quasi-peak            | Average | Q.Peak         | Average |
| 0.174              | 51.47                   |         | H                 | 64.76                 | 54.76   | 13.29          |         |
| 0.195              | 50.15                   |         | H                 | 63.82                 | 53.82   | 13.67          |         |
| 0.231              | 42.90                   |         | H                 | 62.41                 | 52.41   | 19.51          |         |
| 0.591              | 39.80                   |         | N                 | 56.00                 | 46.00   | 16.20          |         |
| 1.95               | 45.30                   |         | H                 | 56.00                 | 46.00   | 10.70          |         |
| 6.72               | 38.75                   |         | H                 | 60.00                 | 50.00   | 21.25          |         |
| 12.81              | 41.67                   |         | H                 | 60.00                 | 50.00   | 18.33          |         |
| 20.06              | 36.87                   |         | H                 | 60.00                 | 50.00   | 23.13          |         |
| 23.99              | 33.22                   |         | H                 | 60.00                 | 50.00   | 26.78          |         |
| 28.88              | 35.77                   |         | H                 | 60.00                 | 50.00   | 24.23          |         |

#### NOTES :

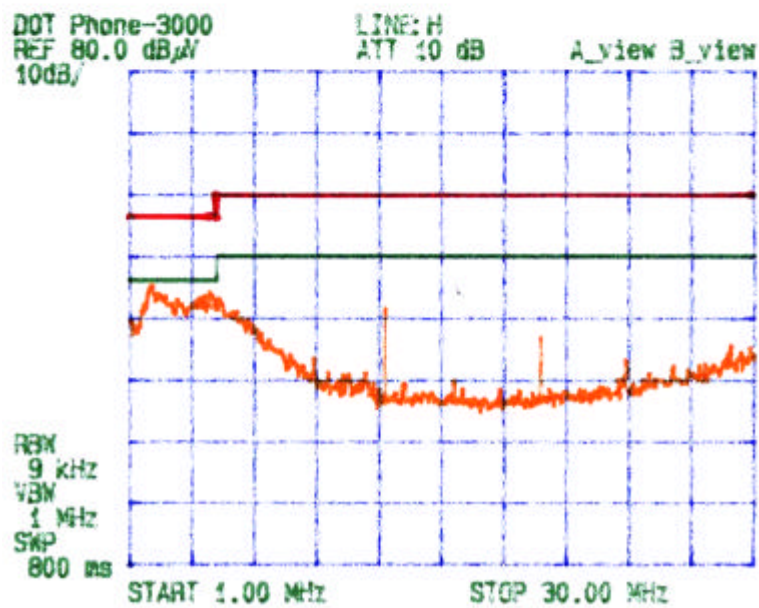
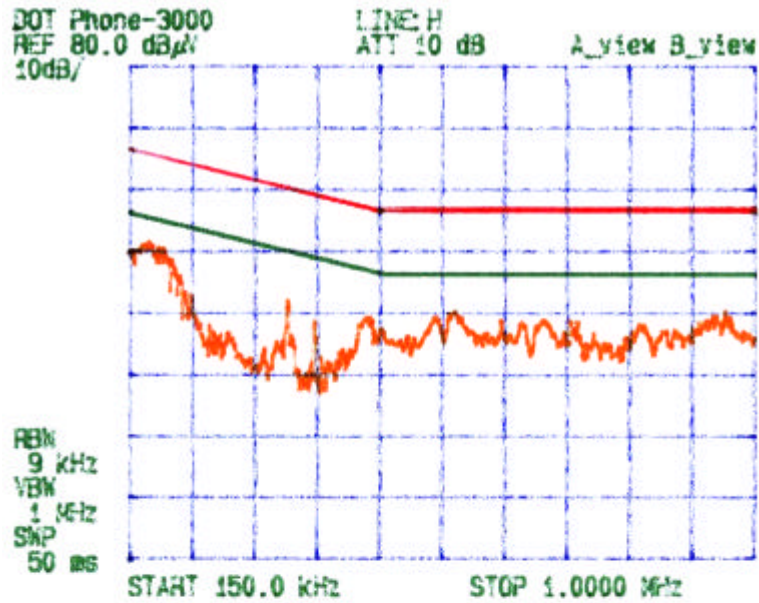
- \* H : HOT Line , \*\*N : Neutral Line
- Margin value = Limit - Reading
- Measurement were performed at the AC/DC Power Inlet in the frequency band of 150kHz ~ 30MHz



Tested by : Ho Jin, Kim  
Test Engineer

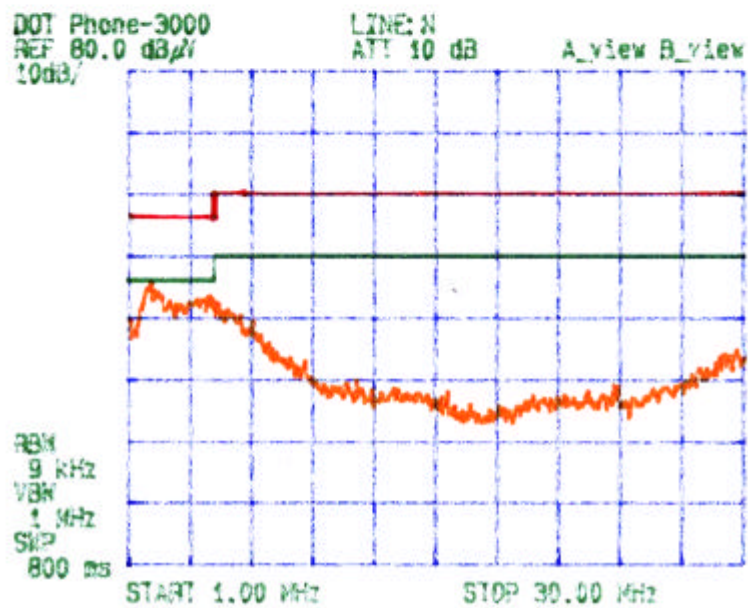
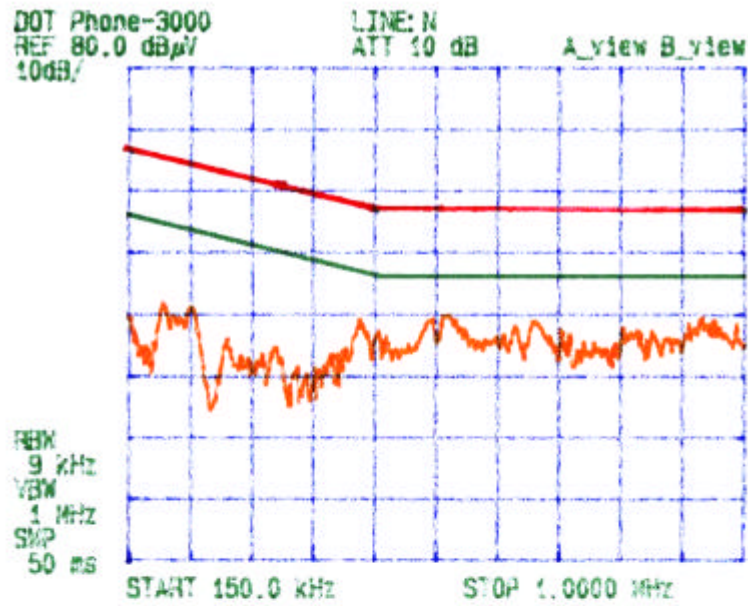
## 5. TEST RESULTS

Line Polarity : Hot



## 5. TEST RESULTS

Line Polarity : Neutral



## 5. TEST RESULTS

### 5.3 Out-of-band Radiated Emissions

|                       |   |
|-----------------------|---|
| EUT                   | Internet Phone / DotPhone3000 (SN:N/A)    |
| Limit apply to        | 15.109(e) : CISPR Pub.22(1997) Class B    |
| Test Date             | April 10, 2002                            |
| Operating Condition   | Communication mode                        |
| Environment Condition | Humidity Level : 37 %RH, Temperature : 22 |
| Result                | Passed by - 3.55dB                        |

### Radiated Emission Test Data

The following table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

Detector mode : CISPR Quasi-Peak mode ( 6dB Bandwidth : 120 kHz )

Measurement Distance : 10 meters

| Frequency [MHz] | Reading [dBμV] | Polarization (*H/**V) | Ant. Factor [dB] | Cable Loss [dB] | Emission Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] |
|-----------------|----------------|-----------------------|------------------|-----------------|-------------------------|----------------|-------------|
| 153.98          | 10.27          | H                     | 12.76            | 3.00            | 26.03                   | 30.0           | 3.97        |
| 181.98          | 9.52           | H                     | 10.81            | 3.70            | 24.03                   | 30.0           | 5.97        |
| 205.97          | 12.28          | H                     | 8.82             | 3.90            | 25.00                   | 30.0           | 5.00        |
| 209.97          | 13.73          | H                     | 8.82             | 3.90            | 26.45                   | 30.0           | 3.55        |
| 217.97          | 12.82          | H                     | 9.37             | 4.00            | 26.19                   | 30.0           | 3.81        |
| 266.00          | 10.28          | H                     | 11.34            | 4.30            | 25.92                   | 37.0           | 11.08       |
| 288.00          | 10.59          | H                     | 12.19            | 4.50            | 27.28                   | 37.0           | 9.72        |
| 335.98          | 11.44          | H                     | 13.18            | 4.70            | 29.32                   | 37.0           | 7.68        |
| 384.00          | 11.07          | H                     | 14.32            | 5.30            | 30.69                   | 37.0           | 6.31        |
| 527.90          | 7.73           | H                     | 17.31            | 6.30            | 31.34                   | 37.0           | 5.66        |

#### NOTES :

1. \* H : Horizontal polarization , \*\* V : Vertical polarization
2. Emission Level = Reading + Antenna factor + Cable loss
3. Margin value = Limit - Emission Level
4. All other emissions not reported were more than 25dB below the permitted limit.
5. The EUT was tested in all the three orthogonal planes and the worst case of emissions was vertical axes.

*Ho Jin, Kim*

Tested by : Ho Jin, Kim  
Test Engineer

## 6. SAMPLE CALCULATION

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### Sample Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor.  
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

$$dB(\mu V/m) = 20 \log_{10} (\mu V / m) : \text{Equation 1}$$

$$dB\mu V = dBm + 107 : \text{Equation 2}$$

#### Example 1 : @ 1.95MHz

|                    |   |                       |   |         |
|--------------------|---|-----------------------|---|---------|
| Class B Limit      | = | 630.9 $\mu V$         | = | 56 dBuV |
| Reading            | = | 45.30 dBuV            |   |         |
| Convert to $\mu V$ | = | 184.07 $\mu V$        |   |         |
| Margin             | = | 45.30 - 56.00         | = | -10.70  |
|                    | = | -10.70 dB below Limit |   |         |

#### Example 2 : @ 209.97 MHz

|                             |   |                      |   |             |
|-----------------------------|---|----------------------|---|-------------|
| Class B Limit               | = | 31.62 $\mu V$        | = | 30.0 dBuV/m |
| Reading                     | = | 13.73 dBuV           |   |             |
| Antenna Factor + Cable Loss | = | 12.72 dB             |   |             |
| Total                       | = | 26.45 dBuV/m         |   |             |
| Margin                      | = | 26.45 - 30.0         | = | -3.55       |
|                             | = | -3.55 dB below Limit |   |             |

## 7. TEST EQUIPMENT LIST

### List of Test Equipments Used for Measurements

| Test Equipment                      |                        | Model      | Mfg.         | Serial No.  | Cal. Due Date |
|-------------------------------------|------------------------|------------|--------------|-------------|---------------|
| <input checked="" type="checkbox"/> | Spectrum Analyzer      | R3261A     | Advantest    | 21720033    | 02-10-26      |
| <input type="checkbox"/>            | Spectrum Analyzer      | ESA-L1500A | H.P          | US37360920  | 02-10-20      |
| <input checked="" type="checkbox"/> | Receiver               | ESVS 10    | R & S        | 835165/001  | 03-04-06      |
| <input checked="" type="checkbox"/> | Preamplifier           | HP8447D    | HP           | 2944A07626  | 03-01-10      |
| <input type="checkbox"/>            | Preamplifier           | HP 8347A   | HP           | 2834A00544  | 02-05-23      |
| <input checked="" type="checkbox"/> | LISN                   | 3825/2     | EMCO         | 9006-1669   | 02-12-27      |
| <input checked="" type="checkbox"/> | LISN                   | 3825/2     | EMCO         | 9208-1995   | 02-12-27      |
| <input checked="" type="checkbox"/> | TriLog Antenna         | VULB9160   | Schwarz Beck | 3082        | 03-05-08      |
| <input type="checkbox"/>            | LogBicon               | VULB9165   | Schwarz Beck | 2023        | 03-05-08      |
| <input checked="" type="checkbox"/> | Dipole Antenna         | VHAP       | Schwarz Beck | 964         | 03-05-03      |
| <input checked="" type="checkbox"/> | Dipole Antenna         | VHAP       | Schwarz Beck | 965         | 03-05-03      |
| <input checked="" type="checkbox"/> | Dipole Antenna         | UHAP       | Schwarz Beck | 949         | 03-05-03      |
| <input checked="" type="checkbox"/> | Dipole Antenna         | UHAP       | Schwarz Beck | 950         | 03-05-03      |
| <input type="checkbox"/>            | Double Ridged Horn     | 3115       | EMCO         | 9809-2334   | 02-09-20      |
| <input checked="" type="checkbox"/> | Turn-Table             | DETT-03    | Daeil EMC    | -           | N/A           |
| <input checked="" type="checkbox"/> | Antenna Master         | DEAM-03    | Daeil EMC    | -           | N/A           |
| <input type="checkbox"/>            | Plotter                | 7440A      | H.P          | 2725A 75722 | N/A           |
| <input checked="" type="checkbox"/> | Chamber                | DTEC01     | DAETONG      | -           | N/A           |
| <input type="checkbox"/>            | Impedance Matching Pad | 6001.01.A  | SUNNER       | 3252        | 02-09-22      |
| <input checked="" type="checkbox"/> | Thermo Hygrograph      | 3-3122     | ISUZU        | 3312201     | 02-12-20      |
| <input type="checkbox"/>            | BaroMeter              | -          | Regulus      | -           | -             |