

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: A Versatile Multi-Function Terminal

Brand Name: unitech

Model Name: MT380-A6WE0G

Model Difference: N/A

FCC ID: HLEMT38HID01

Report No.: ER/2008/70047

Issue Date: Feb. 20, 2009

FCC Rule Part: §15.209

Prepared for unitech electronics co., ltd.
8Fl., No. 118, Lane 235, Pao-Chiao Rd.,
Hsin-Tien City, Taipei Hsien, Taiwan 231,
R.O.C.

Prepared by SGS Taiwan Ltd.
Electronics & Communication Laboratory
No. 134, Wu Kung Rd., Wuku Industrial Zone,
Taipei County, Taiwan

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VERIFICATION OF COMPLIANCE

Applicant: unitech electronics co., ltd.
8Fl., No. 118, Lane 235, Pao-Chiao Rd., Hsin-Tien City, Taipei Hsien,
Taiwan 231, R.O.C.

Product Description: A Versatile Multi-Function Terminal

FCC ID Number: HLEMT38HID01

Brand Name: unitech

Model No.: MT380-A6WE0G

Model Difference: N/A

File Number: ER/2008/70047

Date of test: Jul. 30, 2008 ~ Nov. 05, 2008

Date of EUT Received: Jul. 30, 2008

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.209.

The test results of this report relate only to the tested sample identified in this report.

Test By:**Date:**

Feb. 20, 2009

Bondi Lu / Engineer**Prepared By:****Date:**

Feb. 20, 2009

Eva Kao / Asst. Supervisor**Approved By****Date:**

Feb. 20, 2009

Vincent Su / Manager

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Version

| Version No. | Date | Description |
|-------------|---------------|------------------------------|
| 00 | Feb. 20, 2009 | Initial creation of document |
| | | |
| | | |

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1. GENERAL INFORMATION

1.1. Product Description

| | | |
|------------------|--|------------------------|
| Product Name | A Versatile Multi-Function Terminal | |
| Brand Name | unitech | |
| Model Name | MT380-A6WE0G | |
| Model Difference | N/A | |
| Power Supply | 3.7 Vdc by Li-ion battery or 12dc by AC/DC power adapter | |
| | Battery: | P/N: 602579G |
| | Adapter: | Model: SYS1308-2412-WZ |

WLAN:

| | |
|------------------------|--|
| Frequency Range: | 2412 – 2462 MHz |
| Channel number: | 11 channels |
| Max. Output Power: | 802.11 b: 15.33 dBm (Peak) 802.11 g: 15.72dBm (Peak) |
| Modulation Technology: | DSSS, OFDM |
| Modulation type: | CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM |
| Transition Rate: | 802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps |
| Antenna Designation: | PIFA Antenna / 0.33dBi. |
| Type of Emission | 16M5M5D |

The EUT is compliance with IEEE 802.11 b/g Standard.

RFID:

| | |
|---------------------|---|
| Operating Frequency | 125kHz |
| Transmit Power | < 105dBuV/m at 3m. |
| Number of Channels | 1 |
| Operating Mode | Point-to-Point |
| Antenna Type | A permanent fixed antenna, which is built-In, designed as an indispensable part of the EUT. |
| Module Type | Manchester |

The EUT is compliance with RFID Standard.

This report applies for RFID.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **HLEMT38HID01** filing to comply with Section 15.209 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 & 10 meters) and FCC Registration Number: 94644.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. System Test Configuration

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed and continuous which was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

2.4. Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

| Frequency range MHz | Limits dB (uV) | |
|--|-------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |
| Note 1. The lower limit shall apply at the transition frequencies 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. | | |

(2) Radiated Emission

- (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:
- (b) In the emission table above, the tighter limit applies at the band edges.
- (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

| Frequency (MHz) | Field strength $\mu\text{V/m}$ | Distance (m) | Field strength at 3m $\text{dB}\mu\text{V/m}$ |
|-----------------|--------------------------------|--------------|---|
| 0.009-0.490 | 2400/F(KHz) | 300 | |
| 0.490-1.705 | 24000/F(KHz) | 30 | |
| 1.705-30 | 30 | 30 | 69.54 |
| 30-88 | 100 | 3 | 40 |
| 88-216 | 150 | 3 | 43.5 |
| 216-960 | 200 | 3 | 46 |
| Above 960 | 500 | 3 | 54 |

Limit Table:

| Frequency kHz | Distance m | Limit at 300m $\text{dB}\mu\text{V/m}$ | Limit at 30m $\text{dB}\mu\text{V/m}$ | Distance Factor dB | Limit $\text{dB}\mu\text{V/m}$ at 3m |
|---------------|------------|--|---------------------------------------|--------------------|--------------------------------------|
| 125 | 300 | 25.67 | --- | 80 | 105.67 |
| 250 | 300 | 19.65 | --- | 80 | 99.65 |
| 375 | 300 | 16.12 | --- | 80 | 96.12 |
| 500 | 30 | --- | 33.62 | 40 | 73.62 |
| 625 | 30 | --- | 31.69 | 40 | 71.69 |
| 750 | 30 | --- | 30.10 | 40 | 70.10 |
| 875 | 30 | --- | 28.76 | 40 | 68.76 |
| 1000 | 30 | --- | 27.60 | 40 | 67.60 |
| 1125 | 30 | --- | 26.58 | 40 | 66.58 |
| 1250 | 30 | --- | 25.67 | 40 | 65.67 |

Limit Calculation and transfer to 1m test distance:

If the frequency between 9 – 490KHz,

$$\text{Limit} = 20\log(2400/f(\text{KHz}) + 40\log(300/1)$$

If the frequency between 490 KHz – 1.705MHz

$$\text{Limit} = 20\log(24000/f(\text{KHz}) + 40\log(30/1)$$

2.5. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

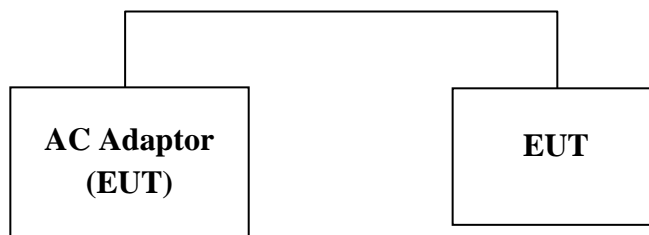


Table 2-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/ Type No. | FCC ID | Series No. | Data Cable | Power Cord |
|------|-----------|-----------|--------------------|--------|------------|------------|------------|
| 1. | N/A | | | | | | |

3. Summary of Test Results

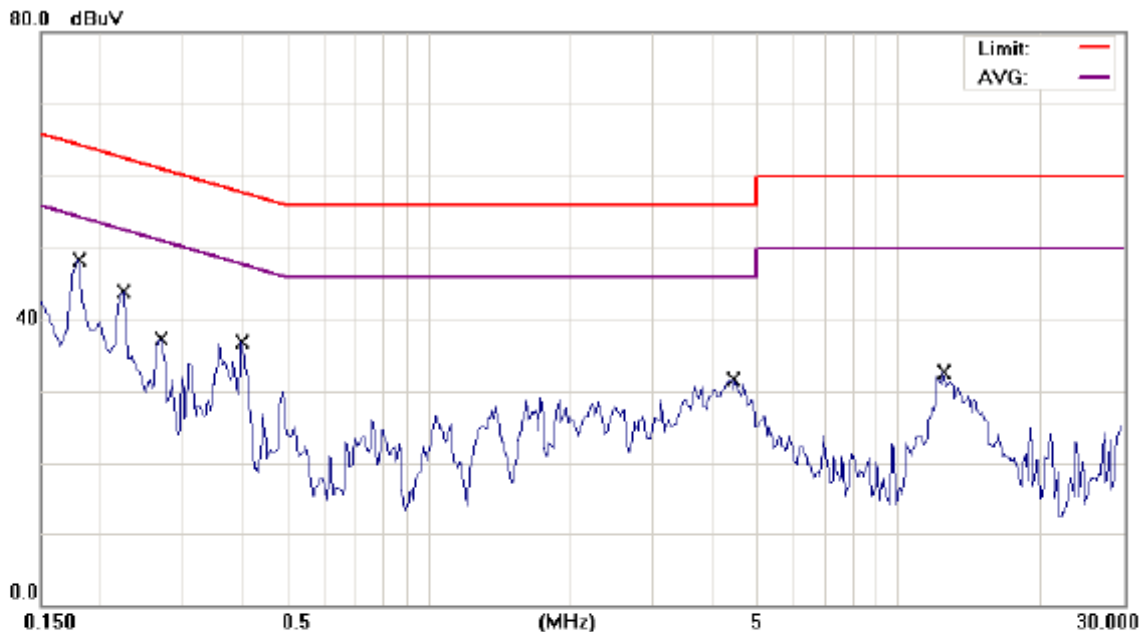
| FCC Rules | Description Of Test | Result |
|-----------|---------------------|-----------|
| §15.207 | Conducted Emission | N/A |
| §15.209 | Radiated Emission | Compliant |

4. Description of test modes

The EUT has been tested under continuous operating condition. The Frequency 125kHz was chosen for testing.

AC POWER LINE CONDUCTED EMISSION TEST DATA

| | | | | | |
|-----------------|-----------|-----------|------|------------|---------------|
| Operation Mode: | RFID Mode | | | Test Date: | Feb. 04, 2009 |
| Temperature: | 23 °C | Humidity: | 62 % | Test By: | Bondi |



Site SGS CONDUCTED #1

Limit: CISPR22 Class B Conduction(QP)

EUT: Integrated IP Based Door Terminal

M/N: MT380-A6WE0G

Note: RFID Operation

Phase: L1

Power: AC 120V/60Hz

Distance:

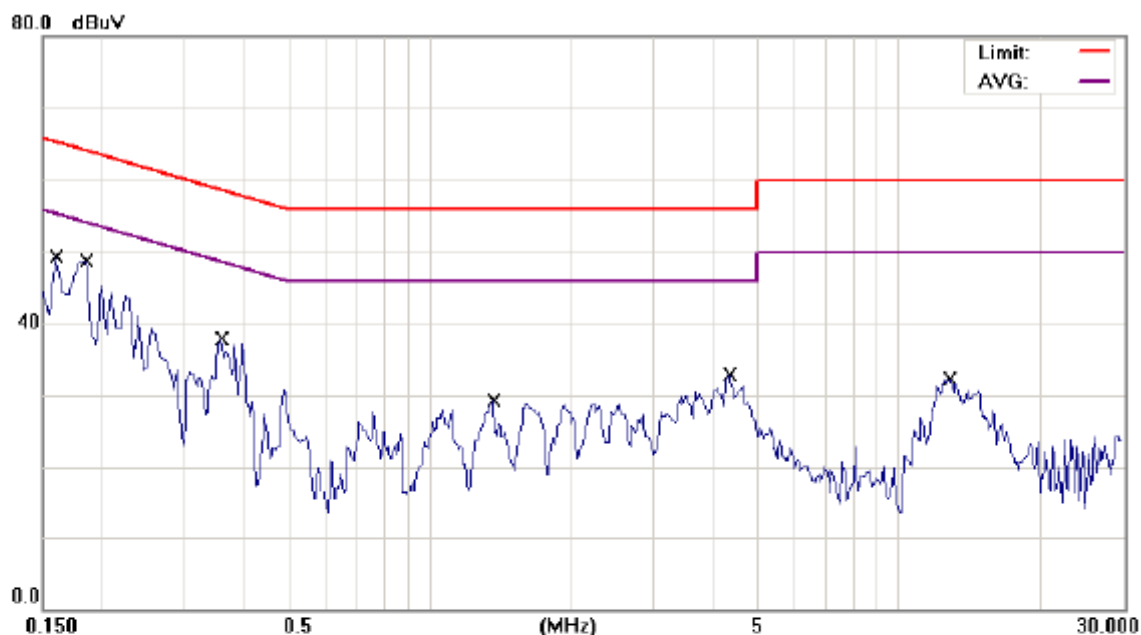
Temperature: 23 °C

Humidity: 62 %

Air Pressure: hpa

| No. | Mk. | Freq. MHz | Reading Level dBuV | Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|--------------|--------------------------|---------------|------------|----------|---------|
| 1 | * | 0.1800 | 48.07 | 0.14 | 48.21 | 64.49 | -16.28 | QP | |
| 2 | | 0.2250 | 43.83 | 0.12 | 43.95 | 62.63 | -18.68 | QP | |
| 3 | | 0.2700 | 37.27 | 0.11 | 37.38 | 61.12 | -23.74 | QP | |
| 4 | | 0.4000 | 36.88 | 0.08 | 36.96 | 57.85 | -20.89 | QP | |
| 5 | | 4.4400 | 31.61 | 0.16 | 31.77 | 56.00 | -24.23 | QP | |
| 6 | | 12.4800 | 32.34 | 0.42 | 32.76 | 60.00 | -27.24 | QP | |

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Site SGS CONDUCTED #1

Phase: N

Temperature: 23 °C

Limit: CISPR22 Class B Conduction(QP)

Power: AC 120V/60Hz

Humidity: 62 %

EUT: Integrated IP Based Door Terminal

Distance:

Air Pressure: hpa

M/N: MT380-A6WE0G

Note: RFID Operation

| No. | Mk. | Freq. MHz | Reading Level dBuV | Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Comment |
|-----|-----|--------------|--------------------------|--------------|--------------------------|---------------|------------|----------|---------|
| 1 | | 0.1600 | 49.18 | 0.18 | 49.36 | 65.46 | -16.10 | QP | |
| 2 | * | 0.1850 | 48.55 | 0.16 | 48.71 | 64.26 | -15.55 | QP | |
| 3 | | 0.3600 | 37.82 | 0.12 | 37.94 | 58.73 | -20.79 | QP | |
| 4 | | 1.3700 | 29.10 | 0.13 | 29.23 | 56.00 | -26.77 | QP | |
| 5 | | 4.3500 | 32.72 | 0.17 | 32.89 | 56.00 | -23.11 | QP | |
| 6 | | 12.9000 | 31.81 | 0.43 | 32.24 | 60.00 | -27.76 | QP | |

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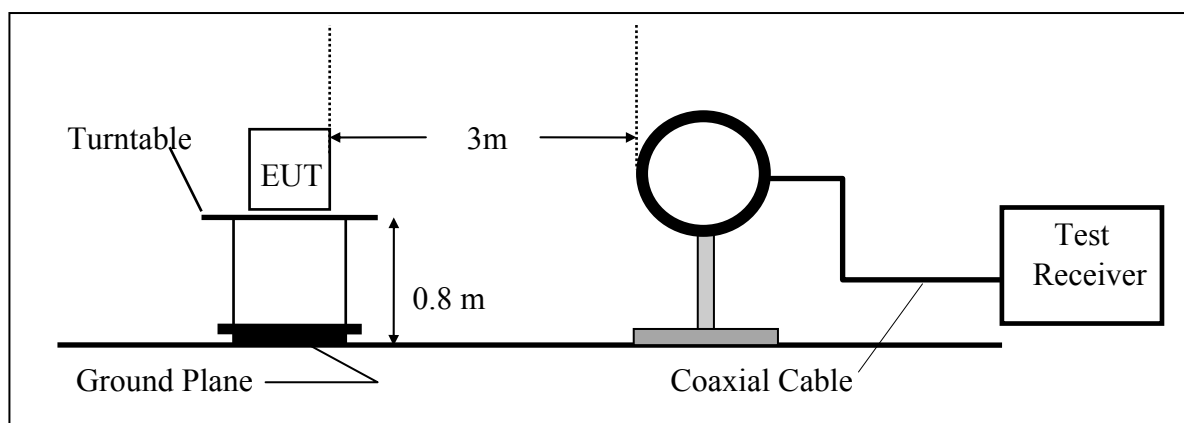
6. Radiated Emission Test

6.1. Measurement Procedure

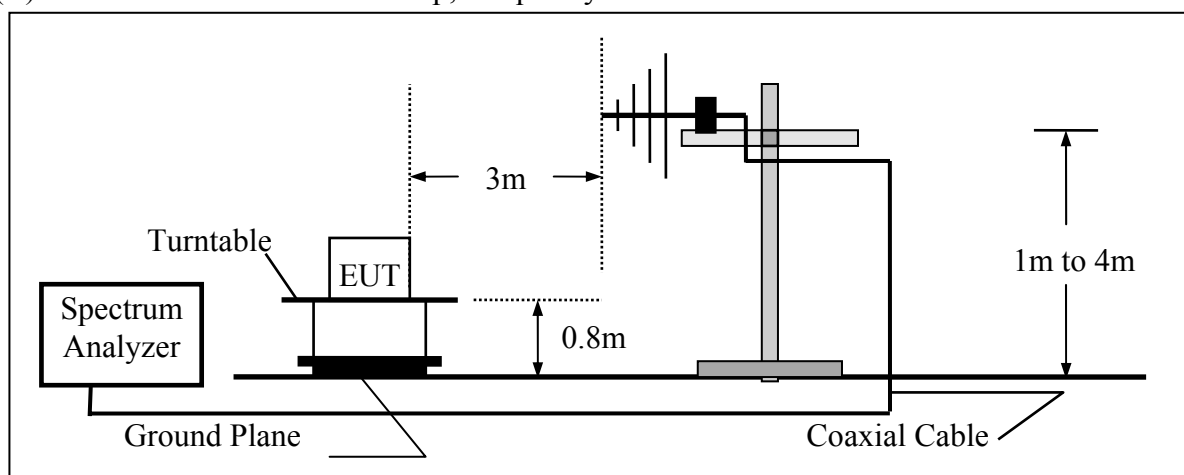
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

6.2. Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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6.3. Measurement Equipment Used:

| 966 Chamber | | | | | |
|-------------------|--------------|---------------------|---------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Spectrum Analyzer | R&S | FSP 40 | 100034 | 02/22/2008 | 02/21/2009 |
| Bilog Antenna | SCHWAZBECK | VULB9160 | 9160-3136 | 11/15/2008 | 11/14/2009 |
| Loop antenna | MESSTEC | FLA30 | 03/10086 | 06/06/2007 | 06/05/2009 |
| Pre-Amplifier | Agilent | 8447D | 1937A02834 | 11/30/2008 | 11/29/2009 |
| Pre-Amplifier | Agilent | 8449B | 3008A01973 | 01/05/2009 | 01/04/2010 |
| Turn Table | HD | DT420 | N/A | N.C.R | N.C.R |
| Antenna Tower | HD | MA240-N | 240/657 | N.C.R | N.C.R |
| Controller | HD | HD100 | N/A | N.C.R | N.C.R |
| Low Loss Cable | HUBER+SUHNER | SUCOFLEX 104PEA-10M | 10m | 01/05/2009 | 01/04/2010 |
| Low Loss Cable | HUBER+SUHNER | SUCOFLEX 104PEA-3M | 3m | 01/05/2009 | 01/04/2010 |

6.4. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

| | | |
|-------|------------------------|--|
| Where | FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| | RA = Reading Amplitude | AG = Amplifier Gain |
| | AF = Antenna Factor | |

6.5. Measurement Result

Operation Mode: Transmitting Mode
 Fundamental Frequency: 125 KHz
 Temperature : 25 °C
 Humidity : 65 %

Test Date : Oct. 28, 2008
 Test By: Bondi
 Ant. Pol: Vertical/ Horizontal
 Frequency Range: <30MHz

| Freq. (KHz) | Ant.Pol. H/V | Detector Mode (PK/AV/QP) | Reading (dBuV) | Factor (dB) | Actual FS (dBuV/m) | Limit at 3m (dBuV/m) | Safe Margin (dB) | Note |
|----------------|-----------------|--------------------------------|-------------------|----------------|-----------------------|-------------------------|------------------------|------|
| 125.00 | V | Peak | 38.48 | -10.60 | 27.88 | 105.67 | -77.79 | F |
| 250.00 | V | Peak | -- | | 0.00 | 99.65 | | H |
| 375.00 | V | Peak | -- | | 0.00 | 96.12 | | H |
| 500.00 | V | Peak | -- | | 0.00 | 73.62 | | H |
| 625.00 | V | Peak | -- | | 0.00 | 71.69 | | H |
| 750.00 | V | Peak | -- | | 0.00 | 70.10 | | H |
| 875.00 | V | Peak | -- | | 0.00 | 68.76 | | H |
| 1000.00 | V | Peak | -- | | 0.00 | 67.60 | | H |
| 1125.00 | V | Peak | -- | | 0.00 | 66.58 | | H |
| 1250.00 | V | Peak | -- | | 0.00 | 65.67 | | H |
| 125.00 | H | Peak | 41.13 | -10.60 | 30.53 | 105.67 | -75.14 | F |
| 250.00 | H | Peak | -- | | 0.00 | 99.65 | | H |
| 375.00 | H | Peak | -- | | 0.00 | 96.12 | | H |
| 500.00 | H | Peak | -- | | 0.00 | 73.62 | | H |
| 625.00 | H | Peak | -- | | 0.00 | 71.69 | | H |
| 750.00 | H | Peak | -- | | 0.00 | 70.10 | | H |
| 875.00 | H | Peak | -- | | 0.00 | 68.76 | | H |
| 1000.00 | H | Peak | -- | | 0.00 | 67.60 | | H |
| 1125.00 | H | Peak | -- | | 0.00 | 66.58 | | H |
| 1250.00 | H | Peak | -- | | 0.00 | 65.67 | | H |

Remark :

- (1) Measuring frequencies from foundation frequency to 10th Harmonic. °
- (3) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
- (4) 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.
- (5) The IF bandwidth of SPA between 9KHz to 150KHz was 300Hz, 150KHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

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6.6. Measurement Result

Operation Mode: Transmitting Mode
 Fundamental Frequency: 125 KHz
 Temperature : 25 °C
 Humidity : 65 %

Test Date : Oct. 28, 2008
 Test By: Bondi
 Ant. Pol: Vertical/ Horizontal
 Frequency Range: 30MHz-1GHz

| Freq. (MHz) | Ant.Pol. H/V | Detector Mode (PK/QP) | Reading (dBuV) | Factor (dB) | Actual FS (dBuV/m) | Limit3m (dBuV/m) | Safe Margin (dB) |
|----------------|-----------------|-----------------------------|-------------------|----------------|-----------------------|---------------------|---------------------|
| 48.43 | V | Peak | 43.39 | -13.98 | 29.41 | 40.00 | -10.59 |
| 249.22 | V | Peak | 43.84 | -13.88 | 29.96 | 46.00 | -16.04 |
| 400.54 | V | Peak | 41.77 | -9.99 | 31.78 | 46.00 | -14.22 |
| 450.98 | V | Peak | 41.90 | -8.61 | 33.29 | 46.00 | -12.71 |
| 498.51 | V | Peak | 45.72 | -8.50 | 37.22 | 46.00 | -8.78 |
| 703.18 | V | Peak | 43.11 | -4.97 | 38.14 | 46.00 | -7.86 |
| 350.10 | H | Peak | 41.43 | -11.80 | 29.63 | 46.00 | -16.37 |
| 450.98 | H | Peak | 36.87 | -8.61 | 28.26 | 46.00 | -17.74 |
| 498.51 | H | Peak | 39.07 | -8.50 | 30.57 | 46.00 | -15.43 |
| 602.30 | H | Peak | 39.38 | -5.96 | 33.42 | 46.00 | -12.58 |
| 696.39 | H | Peak | 42.19 | -5.05 | 37.14 | 46.00 | -8.86 |

Remark :

- 1 Measuring frequencies from 30 MHz to the 1GHz °
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak/QP detector mode.
- 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.