

TEST REPORT

of

FCC Part 15 Subpart B&C §15.249

Equipment Under Test : Wireless Voip Dongle
Model Name : WV-D701
Serial No. : N/A
Applicant : Semilink Inc.
Manufacturer : Semilink Inc.
Date of Test(s) : 2008-06-13 ~ 2008-06-23
Date of Issue : 2008-07-17

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2008-07-17

Geoffrey Do

Approved By



Date

2008-07-17

Jim Kim

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1. General information

1.1 Testing laboratory

SGS Testing Korea Co., Ltd.
Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040
www.electrolab.kr.sgs.com
Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371

1.2 Details of applicant

Applicant : Semilink Inc.
Address : #417 dosan Venture Digm 126-1, Pyeogchon-dong, Dongan-gu, Anyang-si,
Gyeonggi-do, Korea 431-070
Contact Person : Caley Kim
Phone No. : +82 +31 440 9330
Fax No. : +82 +31 440 9331

1.3. Description of EUT

| | |
|----------------------|--------------------------|
| Kind of Product | Wireless Voip Dongle |
| Model Name | WV-D701 |
| Serial Number | N/A |
| Power Supply | 5 V |
| Frequency Range | 2402 ~ 2478 MHz |
| Modulation Technique | GFSK |
| Number of Channels | 77 |
| Operating Conditions | -10 ~ 50 |
| Antenna Type | Fixed Type (Helical Ant) |
| Antenna Gain | 1.974 dBi |

1.4 Details of modification

-N/A

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1.5. Test equipment list

| Equipment | Manufacturer | Model | Cal Due. |
|--------------------------|----------------|------------------------------|---------------|
| Signal Generator | Agilent | E4438C | May 09, 2009 |
| Spectrum Analyzer | H.P. | 8565E | Dec. 31, 2008 |
| Preamplifier | H.P. | 8447F | Sep. 17, 2008 |
| Preamplifier | Agilent | 8449B | May 09, 2009 |
| Test Receiver | R&S | ESVS10 | Mar. 21, 2009 |
| Ultra Broadband Antenna | R&S | HL562 | Oct. 02, 2009 |
| Horn Antenna | R&S | HF 906 | Nov. 13, 2009 |
| Two-Line V-Network | R&S | NNB 41 | Sep. 17, 2008 |
| Test Receiver | R&S | ESHS10 | Sep. 04, 2008 |
| 3m Full Anechoic Chamber | SY Corporation | L W H (9.6 m 6.4 m 6.4 m) | Oct. 11, 2008 |

1.6. Support equipment

| Equipment | Manufacturer | Type | S/N |
|-------------|--------------|------|----------|
| Notebook PC | LG IBM | 2366 | 99-LZLR2 |

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1.7. Summary of test results

The EUT has been tested according to the following specifications:

| Applied Standard : FCC Part15, Subpart B&C | | |
|---|--|----------|
| Standard Section | Test Item | Result |
| 15.107(a) | Conducted power line test | Complied |
| 15.209(a) 15.249(a) 15.249(d) 15.205 | Fundamental, Spurious emission and edge band radiated emission | Complied |

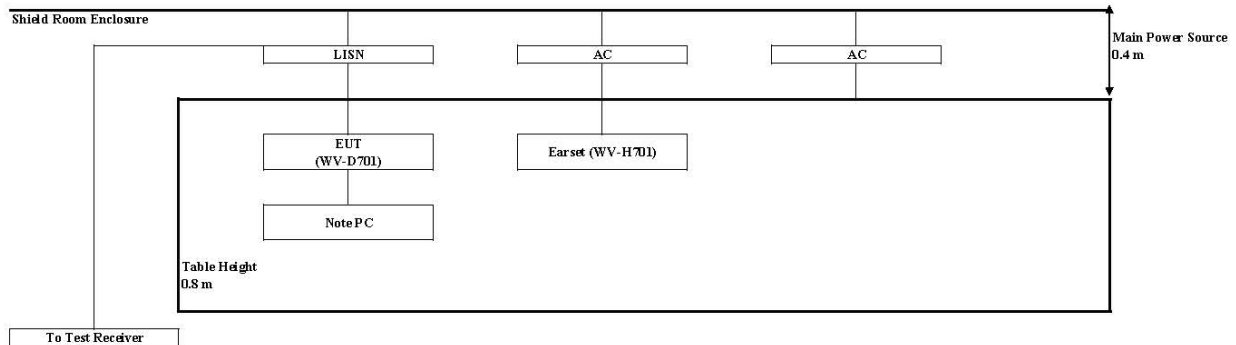
1.8. Test report revision

| Revision | Report number | Description |
|----------|----------------------|---------------------------------|
| 0 | F690501/RF-RTL002176 | Initial |
| 1 | F690501/RF-RTL002197 | Add : Conducted power line test |

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2. Conducted power line test

2.1. Test setup



2.2. Limit

According to §15.107(a) 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 uH/50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted limit (dBμV) | |
|-----------------------------|------------------------|---------|
| | Quasi-peak | Average |
| 0.15 – 0.50 | 66-56* | 56-46* |
| 0.50 – 5.00 | 56 | 46 |
| 5.00 – 30.0 | 60 | 50 |

* Decreases with the logarithm of the frequency.

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2.3. Test procedure

The test procedure is performed in a 6.5m × 3.6m × 3.6m (L×W×H) shielded room. The EUT along with its peripherals were placed on a 1.0m(W)× 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 excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

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2.4. Test result

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : 22
Relative humidity : 46 %
Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth 9 kHz

| Freq. (MHz) | Level(dBuV) | | Line | Limit(dBuV) | | Margin(dB) | |
|----------------|-------------|---------|------|-------------|---------|------------|---------|
| | Q-Peak | Average | | Q-Peak | Average | Q-Peak | Average |
| 0.17 | 35.60 | 28.20 | H | 64.82 | 54.82 | 29.22 | 26.62 |
| 0.20 | 35.40 | 17.10 | H | 63.61 | 53.61 | 28.21 | 36.51 |
| 0.26 | 35.00 | 30.50 | H | 61.37 | 51.37 | 26.37 | 20.87 |
| 1.48 | 35.20 | 29.60 | H | 56.00 | 46.00 | 20.80 | 16.40 |
| 27.58 | 33.20 | 26.70 | H | 60.00 | 50.00 | 26.80 | 23.30 |
| 29.22 | 31.50 | 24.90 | H | 60.00 | 50.00 | 28.50 | 25.10 |
| 0.17 | 37.40 | 36.10 | N | 64.86 | 54.86 | 27.46 | 18.76 |
| 0.26 | 35.00 | 32.10 | N | 61.40 | 51.40 | 26.40 | 19.30 |
| 4.00 | 29.50 | 24.00 | N | 56.00 | 46.00 | 26.50 | 22.00 |
| 24.95 | 32.00 | 25.20 | N | 60.00 | 50.00 | 28.00 | 24.80 |
| 26.45 | 32.70 | 26.20 | N | 60.00 | 50.00 | 27.30 | 23.80 |
| 27.22 | 32.20 | 26.10 | N | 60.00 | 50.00 | 27.80 | 23.90 |

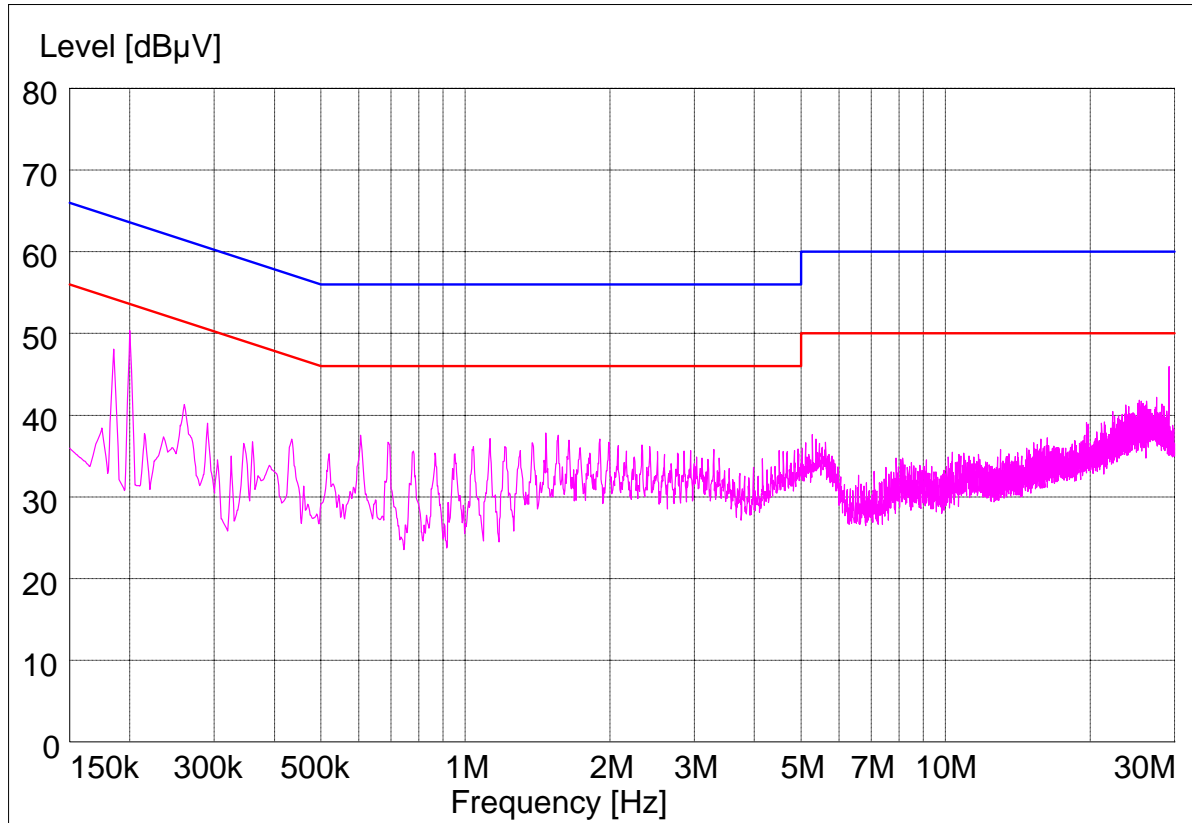
Note ;

Line (H) : Hot
Line (N) : Neutral

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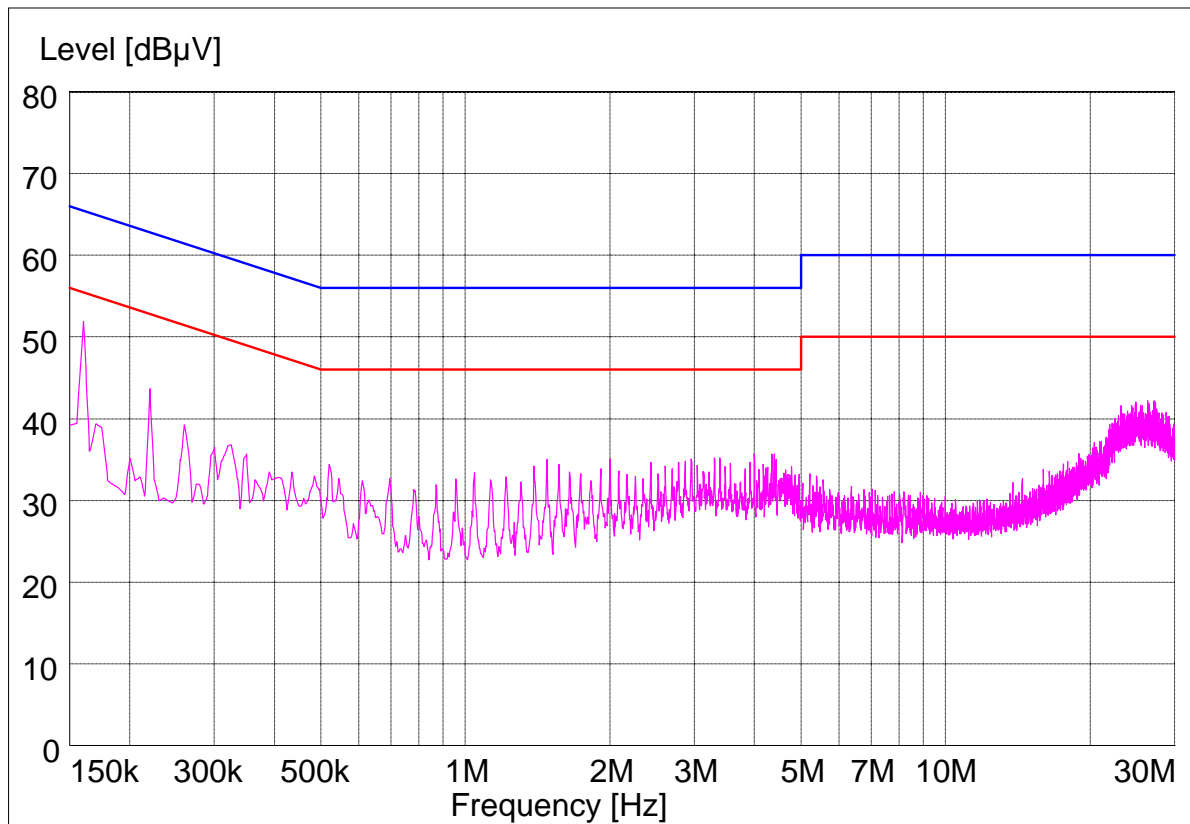
Plot of conducted power line

Test mode : (Hot)



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Test mode : (Neutral)

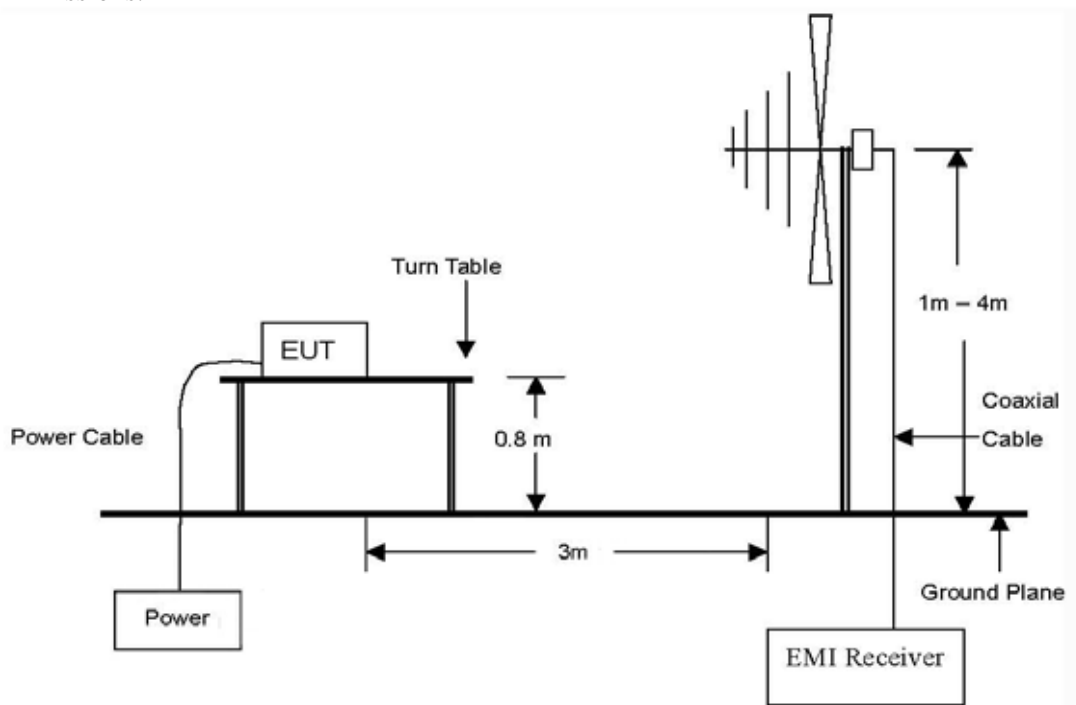


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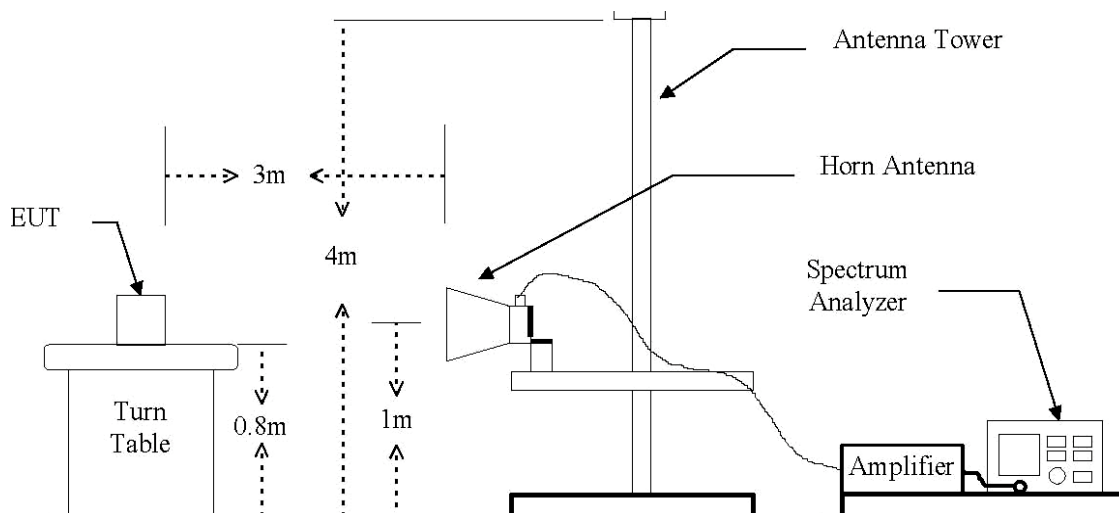
3. Fundamental, Spurious emission and edge band radiated emission

3.1. Test setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 24 GHz Emissions.



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3.2. Test procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic Chamber The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission above 1 GHz, the EUT was set 3 meter 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. 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.

Note :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection and frequency above 1 GHz.
2. 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 1 GHz.

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3.3. Limit

In the section 15.249(a) :

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency | Field strength of fundamental (mV/m) | Field strength of harmonics (uV/m) |
|-----------------------|--------------------------------------|------------------------------------|
| 902 ~ 928 MHz | 50 | 500 |
| 2400 ~ 2483.5 MHz | 50 | 500 |
| 5725 ~ 5875 MHz | 50 | 500 |
| 24.0 ~ 24.25 GHz | 250 | 2500 |

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:

| Fundamental frequency (MHz) | Field strength (uV/m) | Measurement distance (m) |
|-----------------------------|-----------------------|--------------------------|
| 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.

In the above emission table, the tighter limit applies at the band edges.

| Fundamental frequency (MHz) | Field strength (uV/m at 3 meter) | Field strength (dBuV/m at 3 meter) |
|-----------------------------|----------------------------------|------------------------------------|
| 30 ~ 88 | 100 | 40 |
| 88 ~ 216 | 150 | 43.5 |
| 216 ~960 | 200 | 46 |
| Above 960 | 500 | 54 |

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3.4. Test result

Ambient temperature : 22
Relative humidity : 46 %

3.4.1. Below 1 GHz

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|--------------------|----------------|-------------|------|--------------------|------------------|-----------------|----------------|-------------|
| Frequency (MHz) | Reading (dBuV) | Detect Mode | Pol. | AF (dB/m) | Amp Gain+CL (dB) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 63.95 | 54.90 | Q.P. | V | 5.17 | -26.85 | 33.22 | 40.00 | 6.78 |
| 173.08 | 51.60 | Q.P. | H | 7.75 | -25.67 | 33.67 | 43.50 | 9.83 |
| 202.18 | 51.30 | Q.P. | H | 7.49 | -25.46 | 33.34 | 43.50 | 10.16 |
| 898.15 | 40.40 | Q.P. | V | 20.98 | -23.78 | 37.59 | 46.00 | 8.41 |
| Above 900.00 | Not Detected | | | | | | | |

Remark

1. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.
2. All spurious emission at channels are almost the same below 1 GHz, so that the channel was chosen at representative in final test.

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3.4.2. Above 1 GHz

A. Low Channel

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|--------------------|----------------|-------------|------|--------------------|------------------|-----------------|----------------|-------------|
| Frequency (MHz) | Reading (dBuV) | Detect Mode | Pol. | AF (dB/m) | Amp Gain+CL (dB) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 2402.00 | 87.19 | P | H | 28.06 | -28.19 | 87.06 | 114.00 | 26.94 |
| 2390.00* | 36.34 | P | H | 28.05 | -28.19 | 36.20 | 74.00 | 37.80 |
| Above 2410.00 | Not Detected | | | | | | | |

B. Middle Channel

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|--------------------|----------------|-------------|------|--------------------|------------------|-----------------|----------------|-------------|
| Frequency (MHz) | Reading (dBuV) | Detect Mode | Pol. | AF (dB/m) | Amp Gain+CL (dB) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 2440.00 | 87.58 | P | V | 28.12 | -28.17 | 87.53 | 114.00 | 26.47 |
| Above 2450.00 | Not Detected | | | | | | | |

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C. High Channel

| Radiated Emissions | | | Ant | Correction Factors | | Total | Limit | |
|--------------------|----------------|-------------|------|--------------------|------------------|-----------------|----------------|-------------|
| Frequency (MHz) | Reading (dBuV) | Detect Mode | Pol. | AF (dB/m) | Amp Gain+CL (dB) | Actual (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 2478.00 | 86.64 | P | V | 28.17 | -28.14 | 86.67 | 114.00 | 27.33 |
| 2483.50* | 42.51 | P | V | 28.18 | -28.14 | 42.55 | 74.00 | 31.45 |
| Above 2480.00 | Not Detected | | | | | | | |

Remarks ;

1. "*" means the restricted band.
2. To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ and YZ planes.
3. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
4. Radiated emissions measured in frequency above 1000 MHz were made with an instrument using peak/average detector mode.
5. Average test would be performed if the peak result were greater than the average limit.
6. Actual = Reading + AF - Amp Gain + CL

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