# Peak Output Power (Conducted)

| | |
|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room |
| Date | 2010/12/27 |
| Temperature / Humidity | 25deg.C. , 35% |
| Engineer | Akio Hayashi |
| Mode | Tx, |

**BDR (DH5)**

| Ch | Freq. | P/M (PK) Reading | Cable Loss | Atten. Loss | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| Low | 2402.0 | -5.15 | 1.29 | 0.00 | -3.86 | 0.41 | 20.97 | 125 | 24.83 |
| Mid | 2441.0 | -4.75 | 1.30 | 0.00 | -3.45 | 0.45 | 20.97 | 125 | 24.42 |
| High | 2480.0 | -5.50 | 1.31 | 0.00 | -4.19 | 0.38 | 20.97 | 125 | 25.16 |

**EDR (2-DH5)**

| Ch | Freq. | P/M (PK) Reading | Cable Loss | Atten. Loss | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| Low | 2402.0 | -5.30 | 1.29 | 0.00 | -4.01 | 0.40 | 20.97 | 125 | 24.98 |
| Mid | 2441.0 | -4.75 | 1.30 | 0.00 | -3.45 | 0.45 | 20.97 | 125 | 24.42 |
| High | 2480.0 | -5.69 | 1.31 | 0.00 | -4.38 | 0.36 | 20.97 | 125 | 25.35 |

**EDR (3-DH5)**

| Ch | Freq. | P/M (PK) Reading | Cable Loss | Atten. Loss | Result | | Limit | | Margin |
|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBm] | [dB] | [dB] | [dBm] | [mW] | [dBm] | [mW] | [dB] |
| Low | 2402.0 | -5.34 | 1.29 | 0.00 | -4.05 | 0.39 | 20.97 | 125 | 25.02 |
| Mid | 2441.0 | -4.89 | 1.30 | 0.00 | -3.59 | 0.44 | 20.97 | 125 | 24.56 |
| High | 2480.0 | -5.68 | 1.31 | 0.00 | -4.37 | 0.37 | 20.97 | 125 | 25.34 |

Sample Calculation:
Result = Reading + Cable Loss + Atten. Loss
* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.
*The test result is rounded off to one or two decimal places, so some differences might be observed.

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2402 MHz | |
| | Bluetooth, DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 280.52 | QP | 21.9 | 18.4 | 8.3 | 32.0 | 16.6 | 46.0 | 29.4 | 150 | 0 | |
| Hori. | 838.68 | QP | 22.4 | 20.4 | 10.5 | 31.4 | 21.9 | 46.0 | 24.1 | 150 | 0 | |
| Hori. | 2390.00 | PK | 47.3 | 27.5 | 13.3 | 40.2 | 47.9 | 73.9 | 26.0 | 100 | 301 | |
| Hori. | 2400.00 | PK | 61.1 | 27.5 | 13.3 | 40.2 | 61.7 | 73.9 | 12.2 | 115 | 301 | |
| Hori. | 4804.00 | PK | 47.9 | 31.5 | 5.6 | 40.1 | 44.9 | 73.9 | 29.0 | 100 | 0 | |
| Hori. | 7206.00 | PK | 47.6 | 36.4 | 6.8 | 38.3 | 52.5 | 73.9 | 21.4 | 100 | 0 | |
| Hori. | 9608.00 | PK | 45.7 | 37.9 | 8.0 | 37.3 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Hori. | 12010.00 | PK | 46.1 | 39.4 | 9.2 | 38.4 | 56.3 | 73.9 | 17.6 | 100 | 0 | |
| Hori. | 2390.00 | AV | 34.5 | 27.5 | 13.3 | 40.2 | 35.1 | 53.9 | 18.8 | 100 | 301 | VBW=270Hz |
| Hori. | 2400.00 | AV | 37.9 | 27.5 | 13.3 | 40.2 | 38.5 | 53.9 | 15.4 | 115 | 301 | VBW=270Hz |
| Hori. | 4804.00 | AV | 34.3 | 31.5 | 5.6 | 40.1 | 31.3 | 53.9 | 22.6 | 100 | 0 | VBW=270Hz |
| Hori. | 7206.00 | AV | 35.1 | 36.4 | 6.8 | 38.3 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9608.00 | AV | 33.4 | 37.9 | 8.0 | 37.3 | 42.0 | 53.9 | 11.9 | 100 | 0 | VBW=270Hz |
| Hori. | 12010.00 | AV | 34.1 | 39.4 | 9.2 | 38.4 | 44.3 | 53.9 | 9.6 | 100 | 0 | VBW=270Hz |
| Vert. | 280.52 | QP | 21.9 | 18.4 | 8.3 | 32.0 | 16.6 | 46.0 | 29.4 | 100 | 0 | |
| Vert. | 838.68 | QP | 22.4 | 20.4 | 10.5 | 31.4 | 21.9 | 46.0 | 24.1 | 100 | 0 | |
| Vert. | 2390.00 | PK | 46.7 | 27.5 | 13.3 | 40.2 | 47.3 | 73.9 | 26.6 | 100 | 91 | |
| Vert. | 2400.00 | PK | 60.2 | 27.5 | 13.3 | 40.2 | 60.8 | 73.9 | 13.1 | 100 | 91 | |
| Vert. | 4804.00 | PK | 46.2 | 31.5 | 5.6 | 40.1 | 43.2 | 73.9 | 30.7 | 100 | 0 | |
| Vert. | 7206.00 | PK | 47.4 | 36.4 | 6.8 | 38.3 | 52.3 | 73.9 | 21.6 | 100 | 0 | |
| Vert. | 9608.00 | PK | 45.5 | 37.9 | 8.0 | 37.3 | 54.1 | 73.9 | 19.8 | 100 | 0 | |
| Vert. | 12010.00 | PK | 46.0 | 39.4 | 9.2 | 38.4 | 56.2 | 73.9 | 17.7 | 100 | 0 | |
| Vert. | 2390.00 | AV | 35.5 | 27.5 | 13.3 | 40.2 | 36.1 | 53.9 | 17.8 | 100 | 91 | VBW=270Hz |
| Vert. | 2400.00 | AV | 37.2 | 27.5 | 13.3 | 40.2 | 37.8 | 53.9 | 16.1 | 100 | 91 | VBW=270Hz |
| Vert. | 4804.00 | AV | 34.3 | 31.5 | 5.6 | 40.1 | 31.3 | 53.9 | 22.6 | 100 | 0 | VBW=270Hz |
| Vert. | 7206.00 | AV | 35.1 | 36.4 | 6.8 | 38.3 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Vert. | 9608.00 | AV | 33.4 | 37.9 | 8.0 | 37.3 | 42.0 | 53.9 | 11.9 | 100 | 0 | VBW=270Hz |
| Vert. | 12010.00 | AV | 34.1 | 39.4 | 9.2 | 38.4 | 44.3 | 53.9 | 9.6 | 100 | 0 | VBW=270Hz |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2441 MHz | |
| | Bluetooth, DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 280.52 | QP | 22.1 | 18.4 | 8.3 | 32.0 | 16.8 | 46.0 | 29.2 | 150 | 0 | |
| Hori. | 838.68 | QP | 22.1 | 20.4 | 10.5 | 31.4 | 21.6 | 46.0 | 24.4 | 150 | 0 | |
| Hori. | 4882.00 | PK | 46.5 | 31.7 | 5.7 | 40.0 | 43.9 | 73.9 | 30.0 | 100 | 0 | |
| Hori. | 7323.00 | PK | 48.3 | 36.7 | 6.9 | 38.5 | 53.4 | 73.9 | 20.5 | 100 | 0 | |
| Hori. | 9764.00 | PK | 45.8 | 38.2 | 8.0 | 37.4 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Hori. | 12205.00 | PK | 46.0 | 39.2 | 9.2 | 38.1 | 56.3 | 73.9 | 17.6 | 100 | 0 | |
| Hori. | 4882.00 | AV | 34.2 | 31.7 | 5.7 | 40.0 | 31.6 | 53.9 | 22.3 | 100 | 0 | VBW=270Hz |
| Hori. | 7323.00 | AV | 34.9 | 36.7 | 6.9 | 38.5 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9764.00 | AV | 33.5 | 38.2 | 8.0 | 37.4 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW=270Hz |
| Hori. | 12205.00 | AV | 34.1 | 39.2 | 9.2 | 38.1 | 44.4 | 53.9 | 9.5 | 100 | 0 | VBW=270Hz |
| Vert. | 280.52 | QP | 22.1 | 18.4 | 8.3 | 32.0 | 16.8 | 46.0 | 29.2 | 100 | 0 | |
| Vert. | 838.68 | QP | 22.5 | 20.4 | 10.5 | 31.4 | 22.0 | 46.0 | 24.0 | 100 | 0 | |
| Vert. | 4882.00 | PK | 46.7 | 31.7 | 5.7 | 40.0 | 44.1 | 73.9 | 29.8 | 100 | 0 | |
| Vert. | 7323.00 | PK | 47.3 | 36.7 | 6.9 | 38.5 | 52.4 | 73.9 | 21.5 | 100 | 0 | |
| Vert. | 9764.00 | PK | 46.2 | 38.2 | 8.0 | 37.4 | 55.0 | 73.9 | 18.9 | 100 | 0 | |
| Vert. | 12205.00 | PK | 46.8 | 39.2 | 9.2 | 38.1 | 57.1 | 73.9 | 16.8 | 100 | 0 | |
| Vert. | 4882.00 | AV | 34.3 | 31.7 | 5.7 | 40.0 | 31.7 | 53.9 | 22.2 | 100 | 0 | VBW=270Hz |
| Vert. | 7323.00 | AV | 34.9 | 36.7 | 6.9 | 38.5 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Vert. | 9764.00 | AV | 33.5 | 38.2 | 8.0 | 37.4 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW=270Hz |
| Vert. | 12205.00 | AV | 34.1 | 39.2 | 9.2 | 38.1 | 44.4 | 53.9 | 9.5 | 100 | 0 | VBW=270Hz |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2480 MHz | |
| | Bluetooth, DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 280.52 | QP | 21.6 | 18.4 | 8.3 | 32.0 | 16.3 | 46.0 | 29.7 | 150 | 0 | |
| Hori. | 838.68 | QP | 22.2 | 20.4 | 10.5 | 31.4 | 21.7 | 46.0 | 24.3 | 150 | 0 | |
| Hori. | 2483.50 | PK | 47.1 | 27.6 | 13.3 | 40.1 | 47.9 | 73.9 | 26.0 | 115 | 0 | |
| Hori. | 4960.00 | PK | 46.5 | 31.9 | 5.7 | 40.0 | 44.1 | 73.9 | 29.8 | 100 | 0 | |
| Hori. | 7440.00 | PK | 47.5 | 36.9 | 6.9 | 38.7 | 52.6 | 73.9 | 21.3 | 100 | 0 | |
| Hori. | 9920.00 | PK | 45.2 | 38.4 | 8.1 | 37.5 | 54.2 | 73.9 | 19.7 | 100 | 0 | |
| Hori. | 12400.00 | PK | 46.4 | 39.1 | 9.3 | 37.9 | 56.9 | 73.9 | 17.0 | 100 | 0 | |
| Hori. | 2483.50 | AV | 34.9 | 27.6 | 13.3 | 40.1 | 35.7 | 53.9 | 18.2 | 115 | 0 | VBW=270Hz |
| Hori. | 4960.00 | AV | 34.5 | 31.9 | 5.7 | 40.0 | 32.1 | 53.9 | 21.8 | 100 | 0 | VBW=270Hz |
| Hori. | 7440.00 | AV | 34.9 | 36.9 | 6.9 | 38.7 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9920.00 | AV | 33.3 | 38.4 | 8.1 | 37.5 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW=270Hz |
| Hori. | 12400.00 | AV | 33.6 | 39.1 | 9.3 | 37.9 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW=270Hz |
| Vert. | 280.52 | QP | 21.7 | 18.4 | 8.3 | 32.0 | 16.4 | 46.0 | 29.6 | 100 | 0 | |
| Vert. | 838.68 | QP | 22.1 | 20.4 | 10.5 | 31.4 | 21.6 | 46.0 | 24.4 | 100 | 0 | |
| Vert. | 2483.50 | PK | 46.4 | 27.6 | 13.3 | 40.1 | 47.2 | 73.9 | 26.7 | 100 | 88 | |
| Vert. | 4960.00 | PK | 47.5 | 31.9 | 5.7 | 40.0 | 45.1 | 73.9 | 28.8 | 100 | 0 | |
| Vert. | 7440.00 | PK | 47.5 | 36.9 | 6.9 | 38.7 | 52.6 | 73.9 | 21.3 | 100 | 0 | |
| Vert. | 9920.00 | PK | 45.7 | 38.4 | 8.1 | 37.5 | 54.7 | 73.9 | 19.2 | 100 | 0 | |
| Vert. | 12400.00 | PK | 46.6 | 39.1 | 9.3 | 37.9 | 57.1 | 73.9 | 16.8 | 100 | 0 | |
| Vert. | 2483.50 | AV | 34.7 | 27.6 | 13.3 | 40.1 | 35.5 | 53.9 | 18.4 | 100 | 88 | VBW=270Hz |
| Vert. | 4960.00 | AV | 34.4 | 31.9 | 5.7 | 40.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | VBW=270Hz |
| Vert. | 7440.00 | AV | 35.0 | 36.9 | 6.9 | 38.7 | 40.1 | 53.9 | 13.8 | 100 | 0 | VBW=270Hz |
| Vert. | 9920.00 | AV | 33.4 | 38.4 | 8.1 | 37.5 | 42.4 | 53.9 | 11.5 | 100 | 0 | VBW=270Hz |
| Vert. | 12400.00 | AV | 33.8 | 39.1 | 9.3 | 37.9 | 44.3 | 53.9 | 9.6 | 100 | 0 | VBW=270Hz |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2402 MHz | |
| | Bluetooth, 3-DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 200 | 0 | |
| Hori. | 960.00 | QP | 22.8 | 21.3 | 10.9 | 30.5 | 24.5 | 46.0 | 21.5 | 150 | 0 | |
| Hori. | 2390.00 | PK | 46.6 | 27.5 | 13.3 | 40.2 | 47.2 | 73.9 | 26.7 | 118 | 183 | |
| Hori. | 2400.00 | PK | 59.7 | 27.5 | 13.3 | 40.2 | 60.3 | 73.9 | 13.6 | 118 | 183 | |
| Hori. | 4804.00 | PK | 46.4 | 31.5 | 5.6 | 40.1 | 43.4 | 73.9 | 30.5 | 100 | 0 | |
| Hori. | 7206.00 | PK | 47.3 | 36.4 | 6.8 | 38.3 | 52.2 | 73.9 | 21.7 | 100 | 0 | |
| Hori. | 9608.00 | PK | 45.9 | 37.9 | 8.0 | 37.3 | 54.5 | 73.9 | 19.4 | 100 | 0 | |
| Hori. | 12010.00 | PK | 46.1 | 39.4 | 9.2 | 38.4 | 56.3 | 73.9 | 17.6 | 100 | 0 | |
| Hori. | 2390.00 | AV | 34.5 | 27.5 | 13.3 | 40.2 | 35.1 | 53.9 | 18.8 | 118 | 183 | VBW=270Hz |
| Hori. | 2400.00 | AV | 38.5 | 27.5 | 13.3 | 40.2 | 39.1 | 53.9 | 14.8 | 118 | 183 | VBW=270Hz |
| Hori. | 4804.00 | AV | 34.4 | 31.5 | 5.6 | 40.1 | 31.4 | 53.9 | 22.5 | 100 | 0 | VBW=270Hz |
| Hori. | 7206.00 | AV | 35.1 | 36.4 | 6.8 | 38.3 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9608.00 | AV | 33.4 | 37.9 | 8.0 | 37.3 | 42.0 | 53.9 | 11.9 | 100 | 0 | VBW=270Hz |
| Hori. | 12010.00 | AV | 34.0 | 39.4 | 9.2 | 38.4 | 44.2 | 53.9 | 9.7 | 100 | 0 | VBW=270Hz |
| Vert. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 100 | 0 | |
| Vert. | 960.00 | QP | 22.8 | 21.3 | 10.9 | 30.5 | 24.5 | 46.0 | 21.5 | 100 | 0 | |
| Vert. | 2390.00 | PK | 46.1 | 27.5 | 13.3 | 40.2 | 46.7 | 73.9 | 27.2 | 100 | 325 | |
| Vert. | 2400.00 | PK | 57.2 | 27.5 | 13.3 | 40.2 | 57.8 | 73.9 | 16.1 | 100 | 325 | |
| Vert. | 4804.00 | PK | 46.9 | 31.5 | 5.6 | 40.1 | 43.9 | 73.9 | 30.0 | 100 | 0 | |
| Vert. | 7206.00 | PK | 48.4 | 36.4 | 6.8 | 38.3 | 53.3 | 73.9 | 20.6 | 100 | 0 | |
| Vert. | 9608.00 | PK | 45.2 | 37.9 | 8.0 | 37.3 | 53.8 | 73.9 | 20.1 | 100 | 0 | |
| Vert. | 12010.00 | PK | 46.5 | 39.4 | 9.2 | 38.4 | 56.7 | 73.9 | 17.2 | 100 | 0 | |
| Vert. | 2390.00 | AV | 34.2 | 27.5 | 13.3 | 40.2 | 34.8 | 53.9 | 19.1 | 100 | 325 | VBW=270Hz |
| Vert. | 2400.00 | AV | 36.9 | 27.5 | 13.3 | 40.2 | 37.5 | 53.9 | 16.4 | 100 | 325 | VBW=270Hz |
| Vert. | 4804.00 | AV | 34.3 | 31.5 | 5.6 | 40.1 | 31.3 | 53.9 | 22.6 | 100 | 0 | VBW=270Hz |
| Vert. | 7206.00 | AV | 35.0 | 36.4 | 6.8 | 38.3 | 39.9 | 53.9 | 14.0 | 100 | 0 | VBW=270Hz |
| Vert. | 9608.00 | AV | 33.3 | 37.9 | 8.0 | 37.3 | 41.9 | 53.9 | 12.0 | 100 | 0 | VBW=270Hz |
| Vert. | 12010.00 | AV | 33.5 | 39.4 | 9.2 | 38.4 | 43.7 | 53.9 | 10.2 | 100 | 0 | VBW=270Hz |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

**UL Japan, Inc.**
**Shonan EMC Lab.**
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2441 MHz | |
| | Bluetooth, 3-DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 200 | 0 | |
| Hori. | 960.00 | QP | 22.8 | 21.3 | 10.9 | 30.5 | 24.5 | 46.0 | 21.5 | 150 | 0 | |
| Hori. | 4882.00 | PK | 47.6 | 31.7 | 5.7 | 40.0 | 45.0 | 73.9 | 28.9 | 100 | 0 | |
| Hori. | 7323.00 | PK | 47.1 | 36.7 | 6.9 | 38.5 | 52.2 | 73.9 | 21.7 | 100 | 0 | |
| Hori. | 9764.00 | PK | 45.3 | 38.2 | 8.0 | 37.4 | 54.1 | 73.9 | 19.8 | 100 | 0 | |
| Hori. | 12205.00 | PK | 46.8 | 39.2 | 9.2 | 38.1 | 57.1 | 73.9 | 16.8 | 100 | 0 | |
| Hori. | 4882.00 | AV | 34.3 | 31.7 | 5.7 | 40.0 | 31.7 | 53.9 | 22.2 | 100 | 0 | VBW=270Hz |
| Hori. | 7323.00 | AV | 34.9 | 36.7 | 6.9 | 38.5 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9764.00 | AV | 33.5 | 38.2 | 8.0 | 37.4 | 42.3 | 53.9 | 11.6 | 100 | 0 | VBW=270Hz |
| Hori. | 12205.00 | AV | 34.1 | 39.2 | 9.2 | 38.1 | 44.4 | 53.9 | 9.5 | 100 | 0 | VBW=270Hz |
| Vert. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 100 | 0 | |
| Vert. | 960.00 | QP | 22.8 | 21.3 | 10.9 | 30.5 | 24.5 | 46.0 | 21.5 | 100 | 0 | |
| Vert. | 4882.00 | PK | 46.2 | 31.7 | 5.7 | 40.0 | 43.6 | 73.9 | 30.3 | 100 | 0 | |
| Vert. | 7323.00 | PK | 47.7 | 36.7 | 6.9 | 38.5 | 52.8 | 73.9 | 21.1 | 100 | 0 | |
| Vert. | 9764.00 | PK | 45.8 | 38.2 | 8.0 | 37.4 | 54.6 | 73.9 | 19.3 | 100 | 0 | |
| Vert. | 12205.00 | PK | 46.3 | 39.2 | 9.2 | 38.1 | 56.6 | 73.9 | 17.3 | 100 | 0 | |
| Vert. | 4882.00 | AV | 34.3 | 31.7 | 5.7 | 40.0 | 31.7 | 53.9 | 22.2 | 100 | 0 | VBW=270Hz |
| Vert. | 7323.00 | AV | 34.8 | 36.7 | 6.9 | 38.5 | 39.9 | 53.9 | 14.0 | 100 | 0 | VBW=270Hz |
| Vert. | 9764.00 | AV | 33.4 | 38.2 | 8.0 | 37.4 | 42.2 | 53.9 | 11.7 | 100 | 0 | VBW=270Hz |
| Vert. | 12205.00 | AV | 34.2 | 39.2 | 9.2 | 38.1 | 44.5 | 53.9 | 9.4 | 100 | 0 | VBW=270Hz |

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

# Radiated Emission

| | | |
|---|---|---|
| Test place | UL Japan, Inc. Shonan EMC Lab. | |
| | No.3 Semi Anechoic Chamber | No.3 Semi Anechoic Chamber |
| Date | 2011/1/28 | 2011/1/31 |
| Temperature / Humidity | 21deg.C. , 28% | 20deg.C. , 29% |
| Engineer | Yasumasa Owaki | Hikaru Shirasawa |
| | (1-2.8GHz) | (30M-1GHz, 2.8-26GHz) |
| Mode | Tx, 2480 MHz | |
| | Bluetooth, 3-DH5, | |

| Polarity | Frequency [MHz] | Detector | Reading [dBuV] | Ant.Fac. [dB/m] | Loss [dB] | Gain [dB] | Result [dBuV/m] | Limit [dBuV/m] | Margin [dB] | Height [cm] | Angle [deg.] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hori. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 200 | 0 | |
| Hori. | 960.00 | QP | 22.8 | 21.3 | 10.9 | 30.5 | 24.5 | 46.0 | 21.5 | 150 | 0 | |
| Hori. | 2483.50 | PK | 46.7 | 27.6 | 13.3 | 40.1 | 47.5 | 73.9 | 26.4 | 113 | 172 | |
| Hori. | 4960.00 | PK | 46.7 | 31.9 | 5.7 | 40.0 | 44.3 | 73.9 | 29.6 | 100 | 0 | |
| Hori. | 7440.00 | PK | 46.9 | 36.9 | 6.9 | 38.7 | 52.0 | 73.9 | 21.9 | 100 | 0 | |
| Hori. | 9920.00 | PK | 45.9 | 38.4 | 8.1 | 37.5 | 54.9 | 73.9 | 19.0 | 100 | 0 | |
| Hori. | 12400.00 | PK | 46.0 | 39.1 | 9.3 | 37.9 | 56.5 | 73.9 | 17.4 | 100 | 0 | |
| Hori. | 2483.50 | AV | 34.9 | 27.6 | 13.3 | 40.1 | 35.7 | 53.9 | 18.2 | 113 | 172 | VBW=270Hz |
| Hori. | 4960.00 | AV | 34.4 | 31.9 | 5.7 | 40.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | VBW=270Hz |
| Hori. | 7440.00 | AV | 34.9 | 36.9 | 6.9 | 38.7 | 40.0 | 53.9 | 13.9 | 100 | 0 | VBW=270Hz |
| Hori. | 9920.00 | AV | 33.2 | 38.4 | 8.1 | 37.5 | 42.2 | 53.9 | 11.7 | 100 | 0 | VBW=270Hz |
| Hori. | 12400.00 | AV | 33.6 | 39.1 | 9.3 | 37.9 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW=270Hz |
| Vert. | 293.51 | QP | 22.1 | 18.9 | 8.4 | 32.0 | 17.4 | 46.0 | 28.6 | 100 | 0 | |
| Vert. | 960.00 | QP | 22.7 | 21.3 | 10.9 | 30.5 | 24.4 | 46.0 | 21.6 | 100 | 0 | |
| Vert. | 2483.50 | PK | 47.3 | 27.6 | 13.3 | 40.1 | 48.1 | 73.9 | 25.8 | 100 | 87 | |
| Vert. | 4960.00 | PK | 46.9 | 31.9 | 5.7 | 40.0 | 44.5 | 73.9 | 29.4 | 100 | 0 | |
| Vert. | 7440.00 | PK | 47.0 | 36.9 | 6.9 | 38.7 | 52.1 | 73.9 | 21.8 | 100 | 0 | |
| Vert. | 9920.00 | PK | 45.3 | 38.4 | 8.1 | 37.5 | 54.3 | 73.9 | 19.6 | 100 | 0 | |
| Vert. | 12400.00 | PK | 46.8 | 39.1 | 9.3 | 37.9 | 57.3 | 73.9 | 16.6 | 100 | 0 | |
| Vert. | 2483.50 | AV | 34.7 | 27.6 | 13.3 | 40.1 | 35.5 | 53.9 | 18.4 | 100 | 87 | VBW=270Hz |
| Vert. | 4960.00 | AV | 34.4 | 31.9 | 5.7 | 40.0 | 32.0 | 53.9 | 21.9 | 100 | 0 | VBW=270Hz |
| Vert. | 7440.00 | AV | 35.0 | 36.9 | 6.9 | 38.7 | 40.1 | 53.9 | 13.8 | 100 | 0 | VBW=270Hz |
| Vert. | 9920.00 | AV | 33.2 | 38.4 | 8.1 | 37.5 | 42.2 | 53.9 | 11.7 | 100 | 0 | VBW=270Hz |
| Vert. | 12400.00 | AV | 33.6 | 39.1 | 9.3 | 37.9 | 44.1 | 53.9 | 9.8 | 100 | 0 | VBW=270Hz |

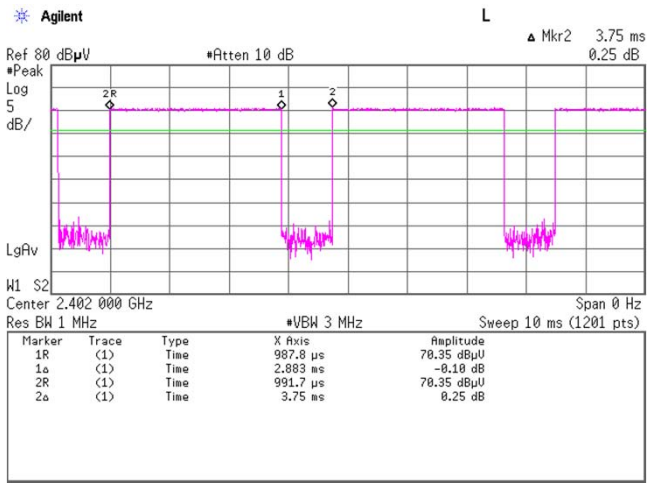
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

# Spurious emission (Radiated)

DH5,

VBW (AV) Calculation

| | |
|---|---|
| **VBW: 1/x = 266Hz<270Hz**<br>**x: (Tx on+Tx off) =3.75ms** | |
|  | |
| | |
| | |

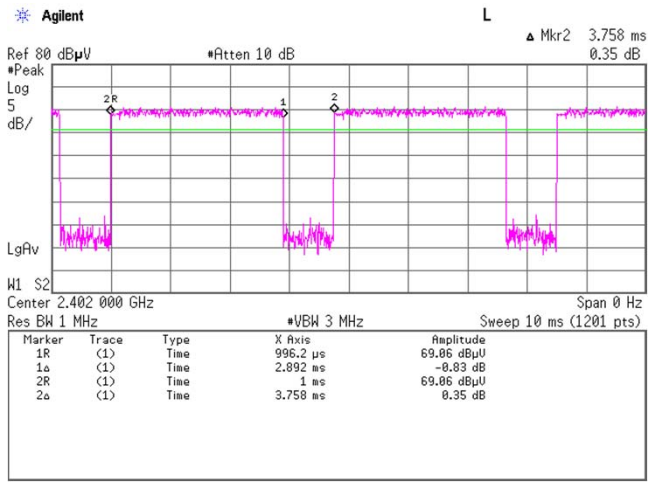
**UL Japan, Inc.**
**Shonan EMC Lab.**

**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Radiated)

3-DH5,

VBW (AV) Calculation

| VBW: 1/x = 266Hz<270Hz<br>x: (Tx on+Tx off) =3.758ms | |
|---|---|
|  | |
| | |
| | |

**UL Japan, Inc.**
**Shonan EMC Lab.**

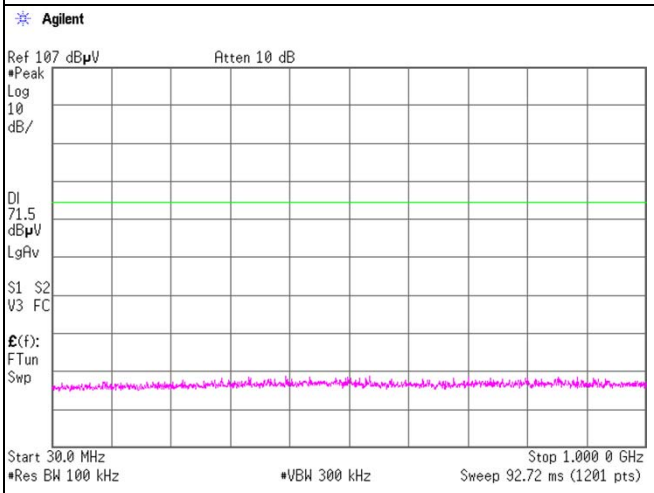
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

# Spurious emission (Conducted)

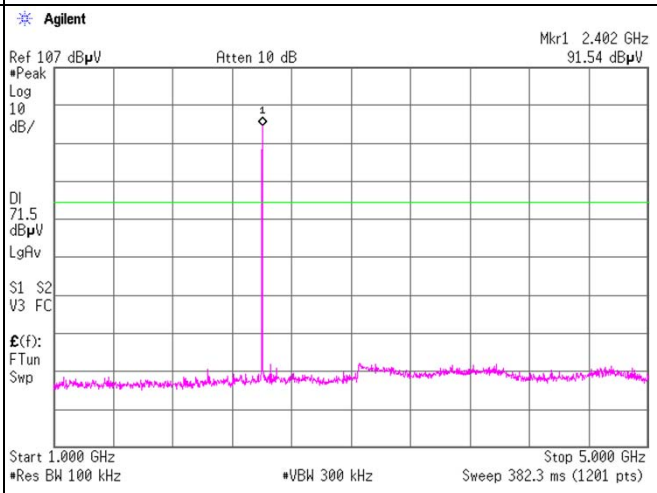
DH5,

Tx, 2402MHz

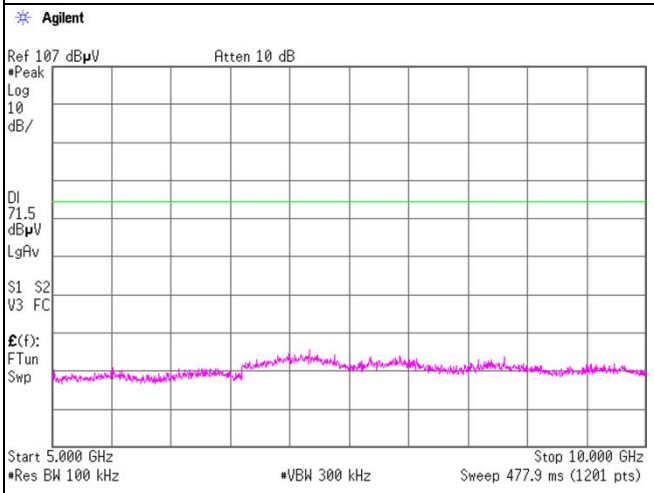
## 30MHz - 1GHz



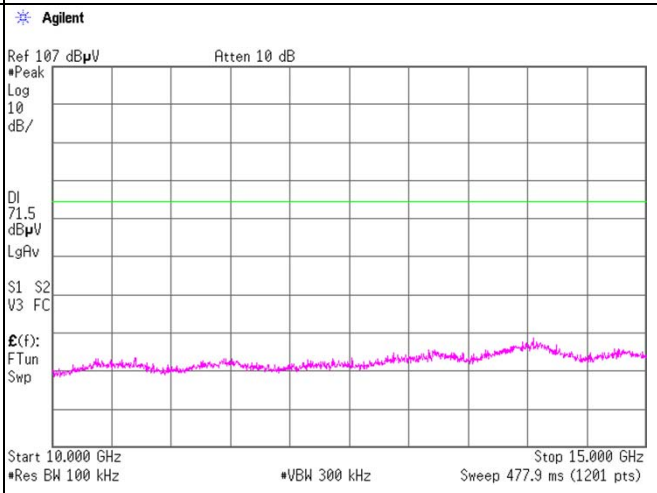

## 1GHz - 5GHz



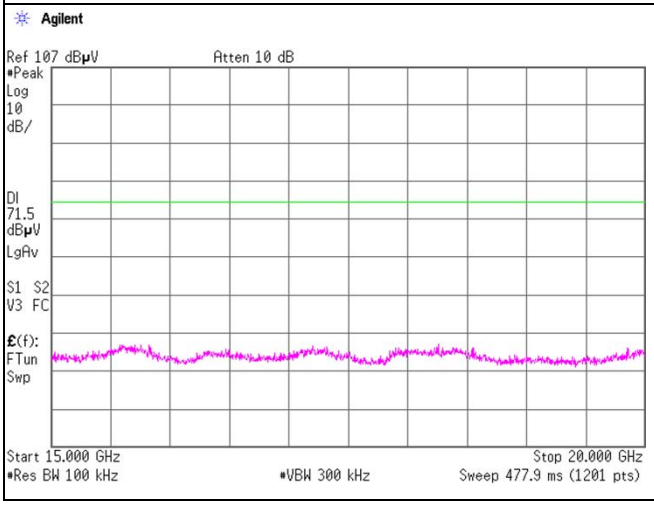

## 5GHz - 10GHz



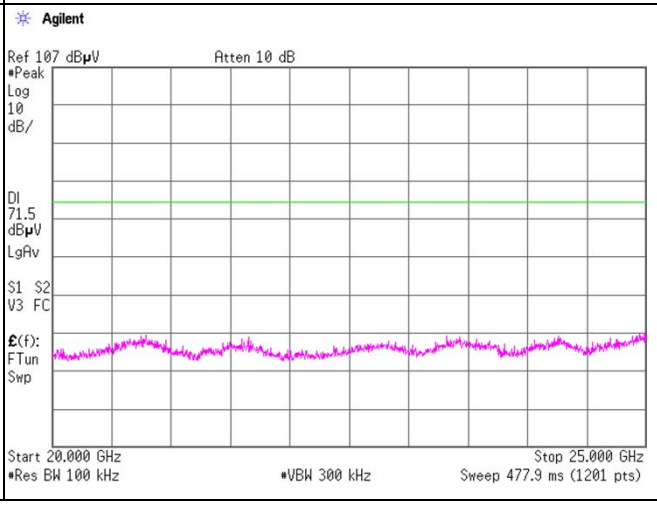

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

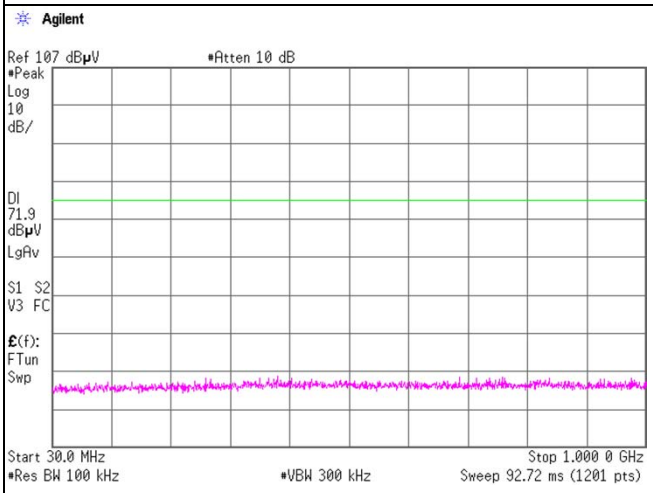
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

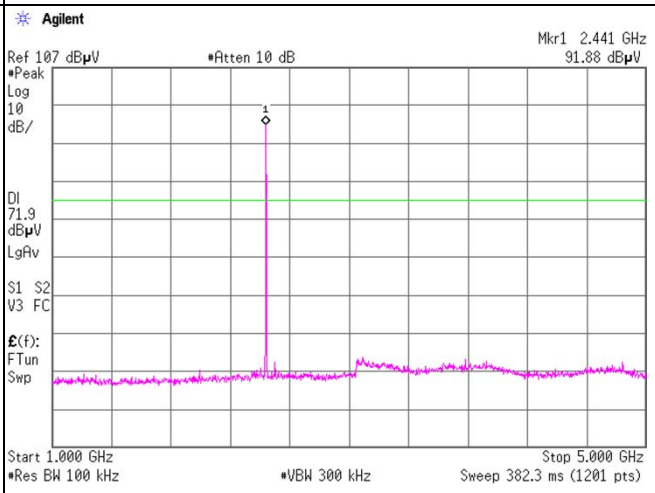
DH5,

Tx, 2441MHz

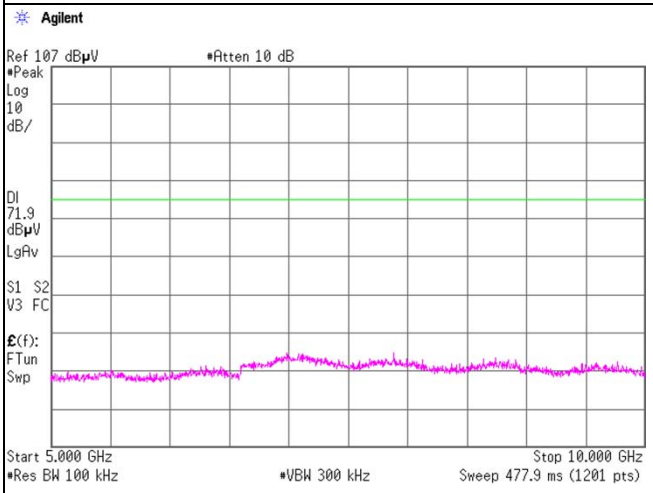
## 30MHz - 1GHz



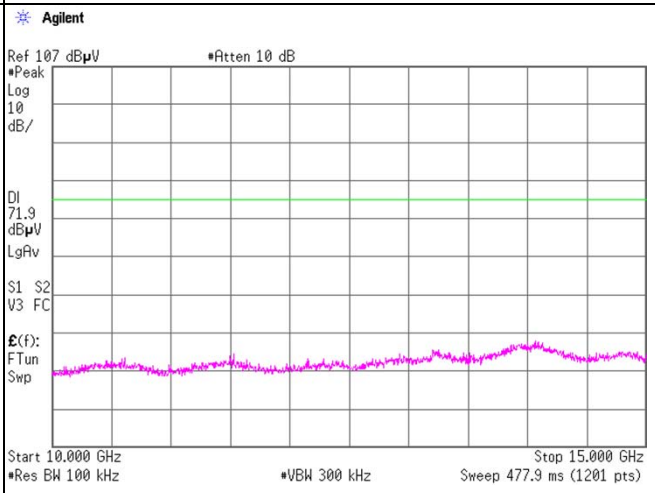

## 1GHz - 5GHz



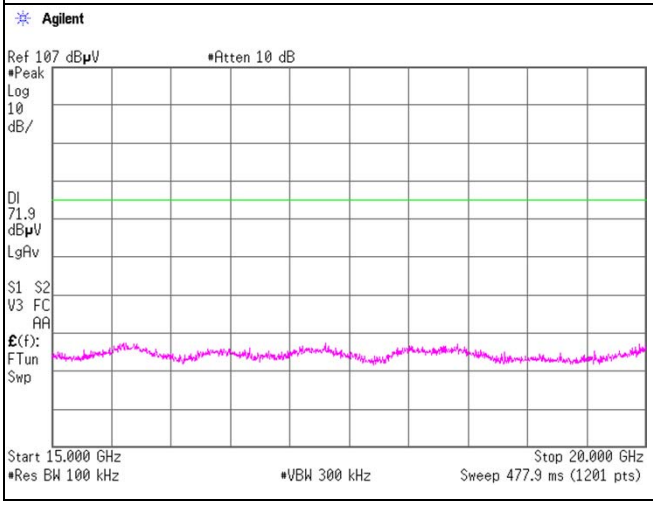

## 5GHz - 10GHz



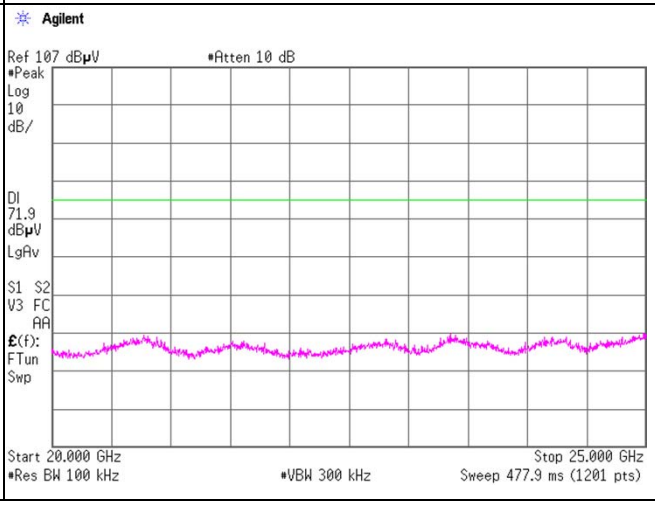

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

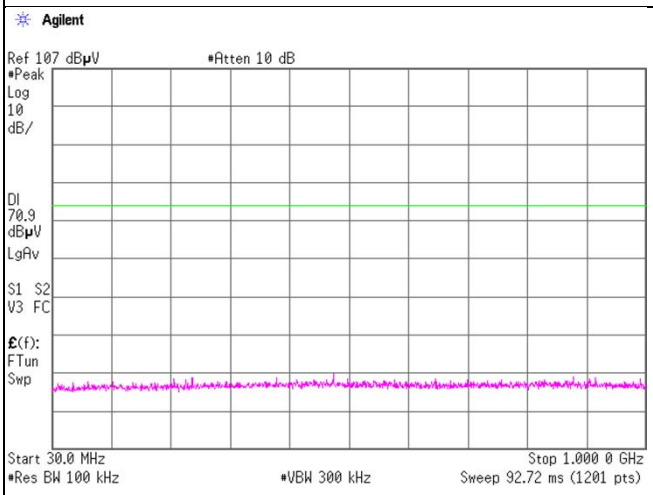
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

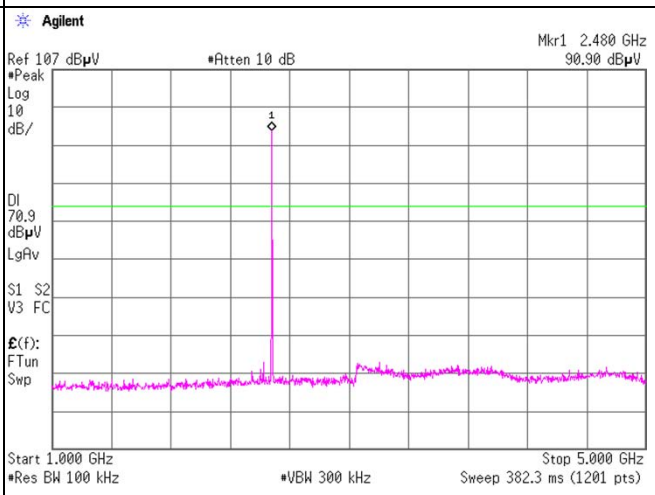
DH5,

Tx, 2480MHz

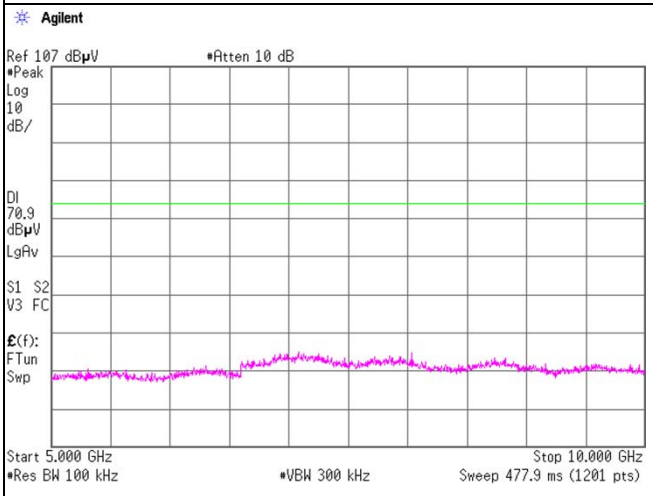
## 30MHz - 1GHz



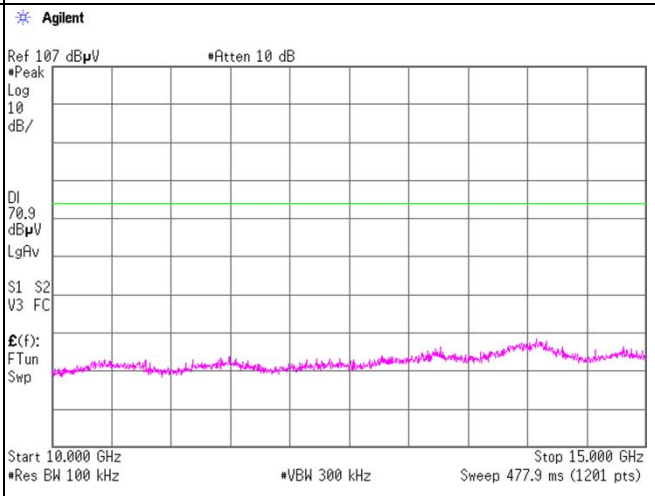

## 1GHz - 5GHz



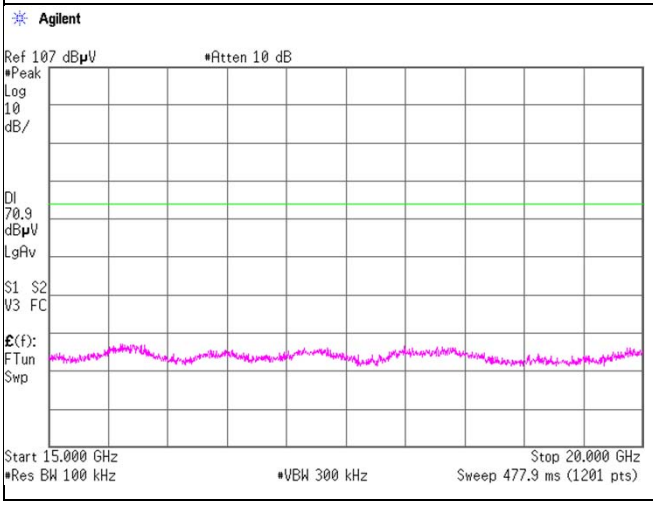

## 5GHz - 10GHz



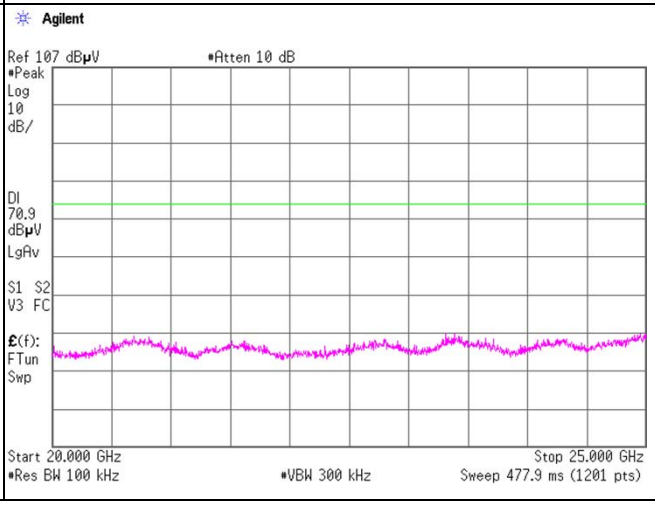

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

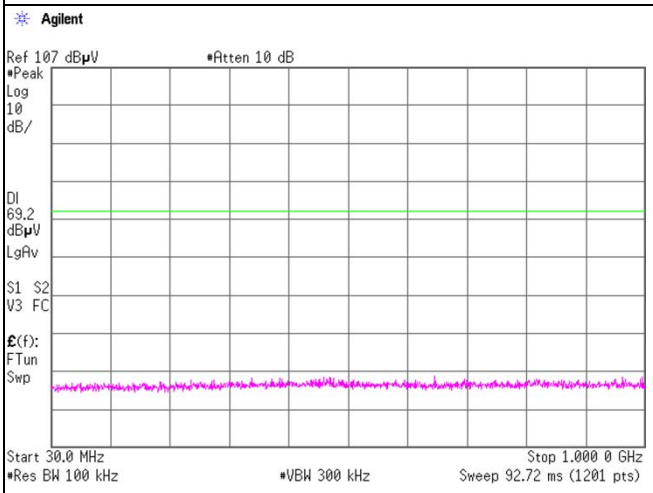
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

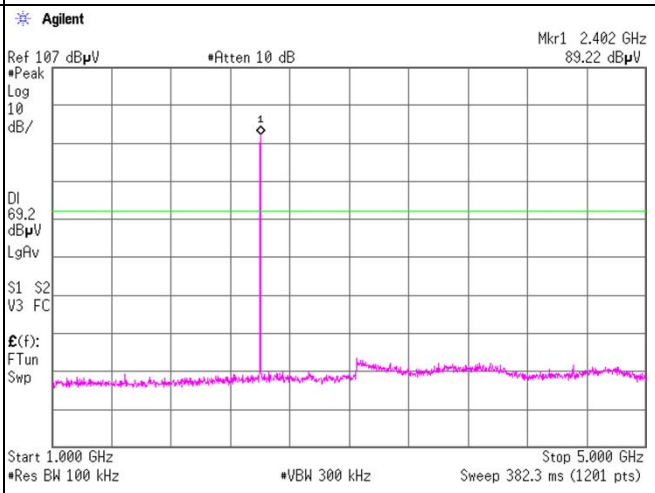
3-DH5,

Tx, 2402MHz

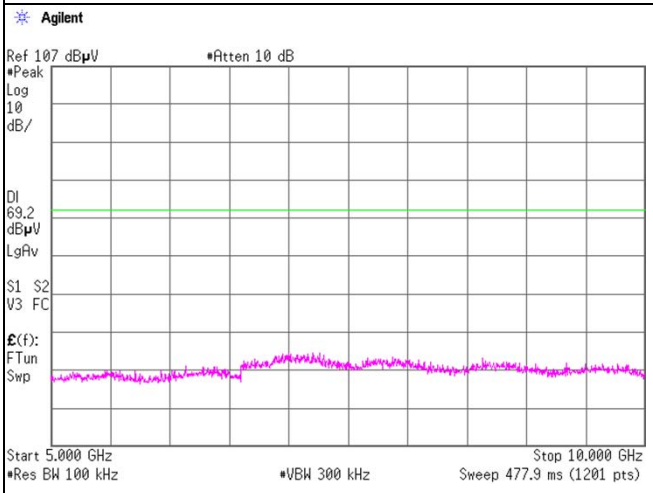
## 30MHz - 1GHz



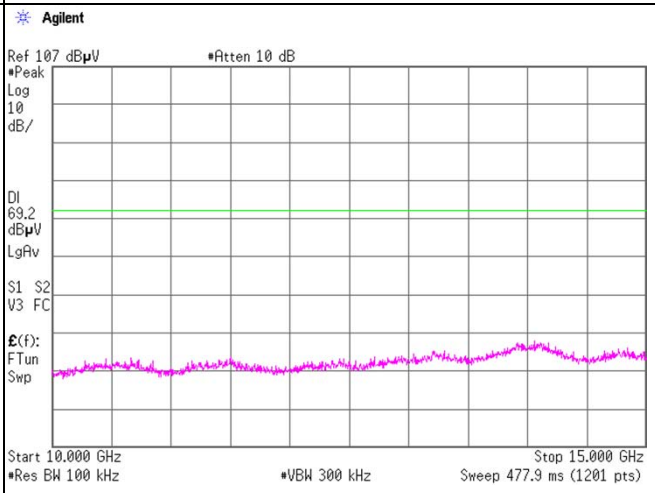

## 1GHz - 5GHz



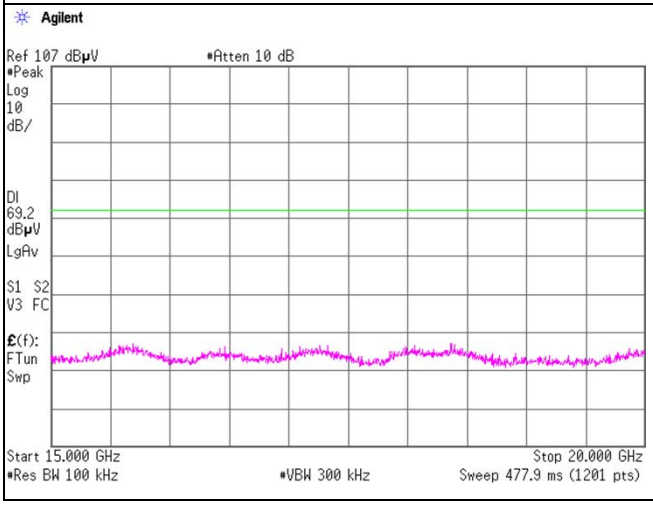

## 5GHz - 10GHz



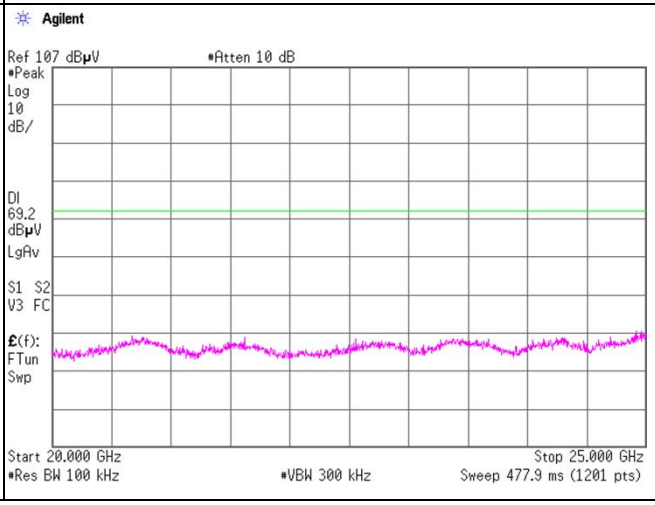

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

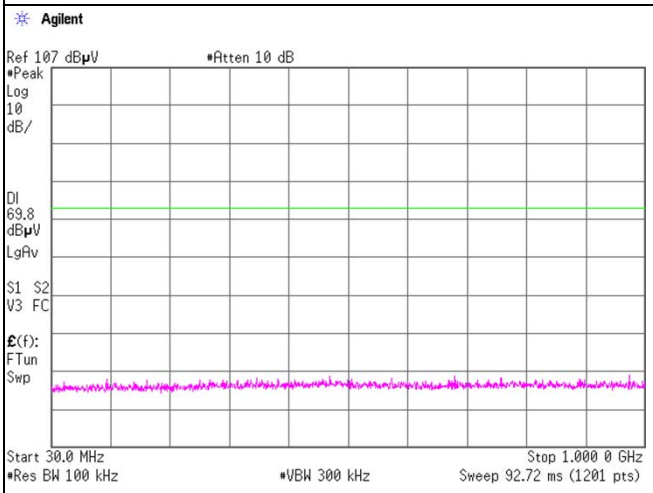
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

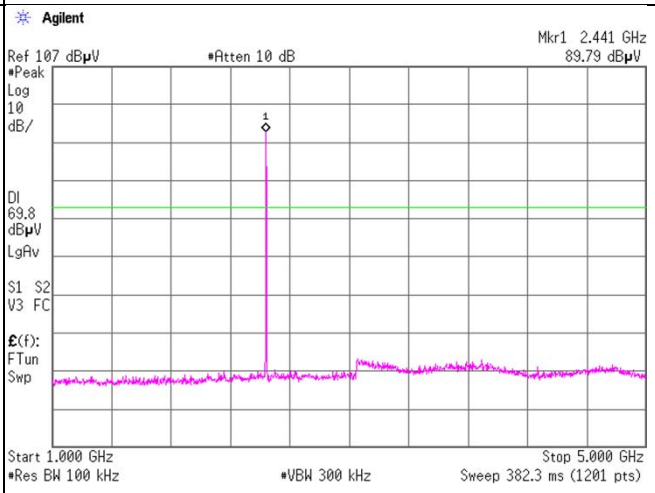
3-DH5,

Tx, 2441MHz

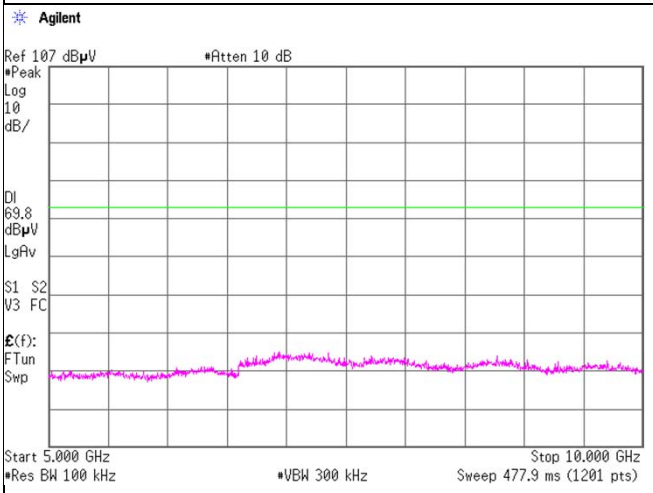
## 30MHz - 1GHz



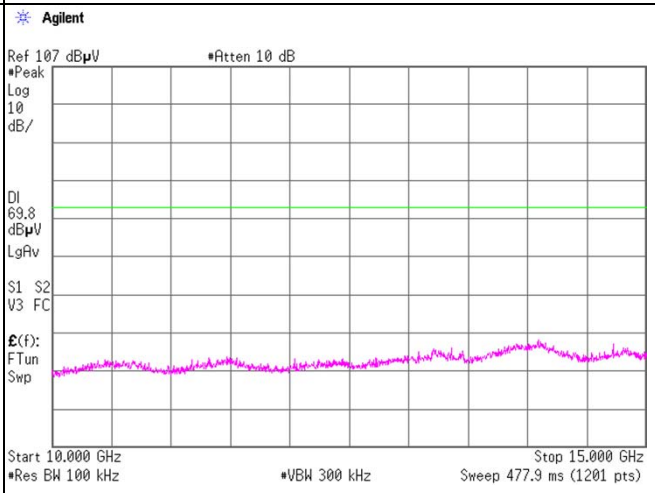

## 1GHz - 5GHz



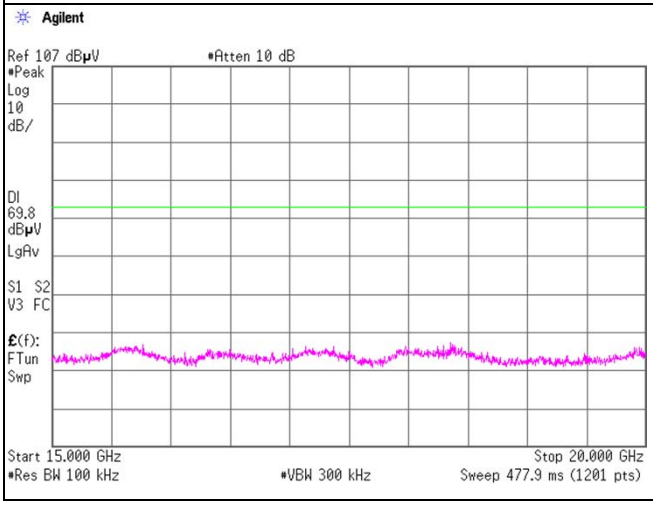

## 5GHz - 10GHz



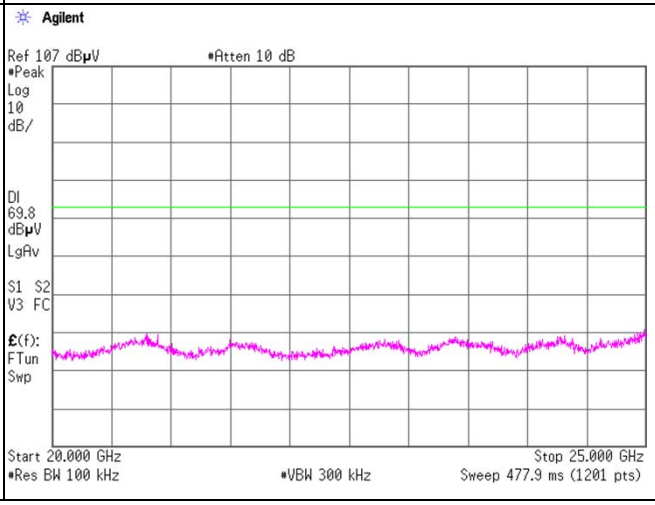

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

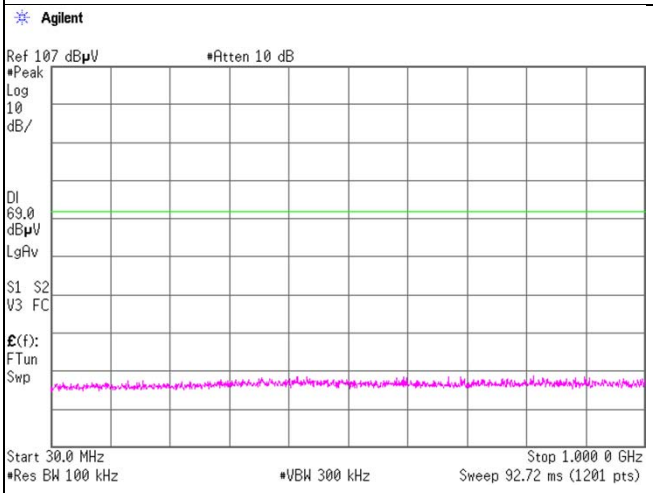
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

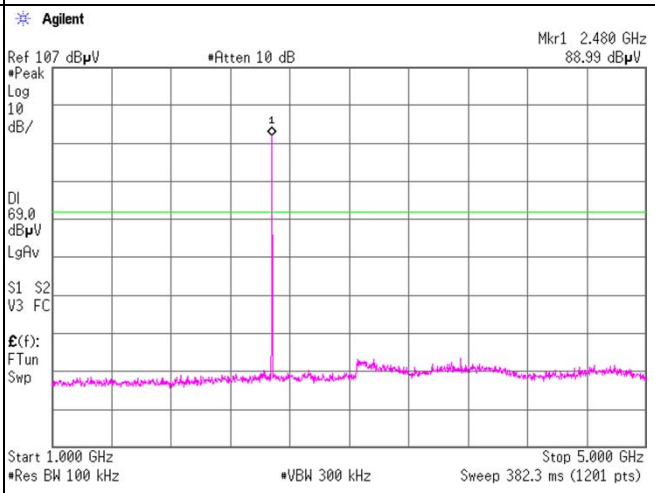
3-DH5,

Tx, 2480MHz

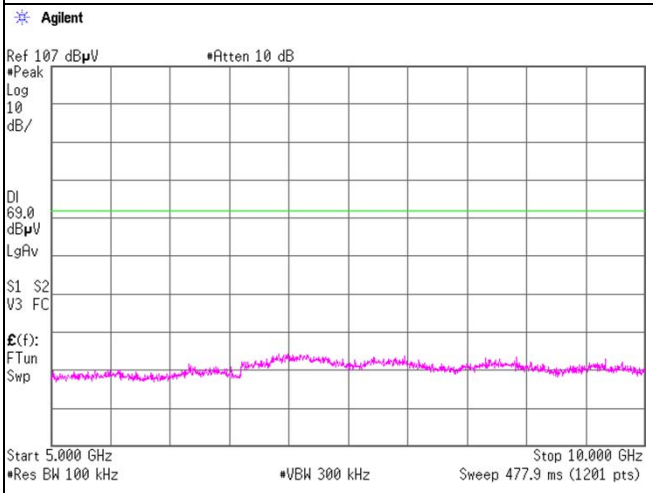
## 30MHz - 1GHz



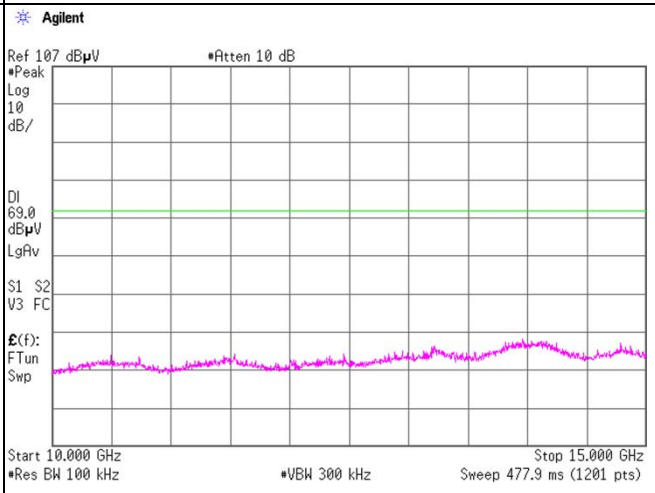

## 1GHz - 5GHz



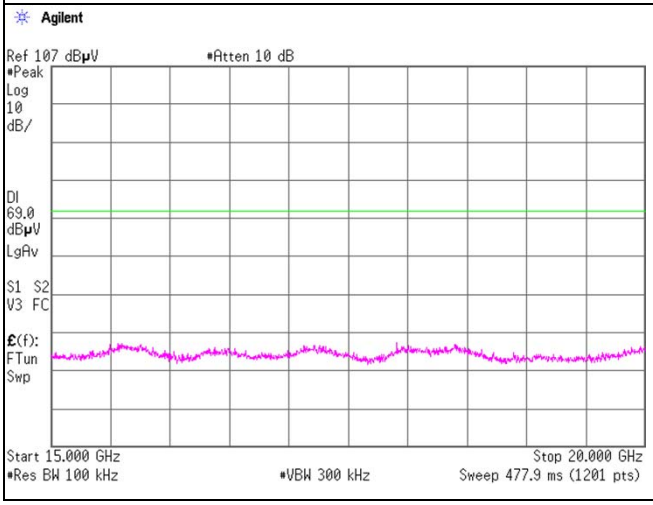

## 5GHz - 10GHz



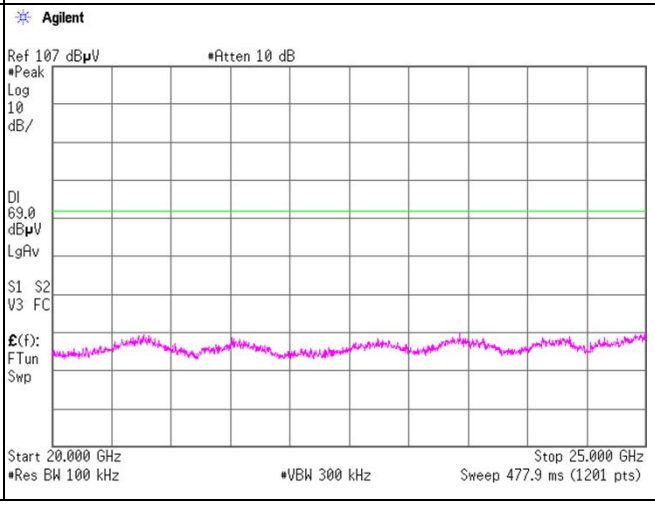

## 10GHz - 15GHz




## 15GHz - 20GHz




## 20GHz - 25GHz




**UL Japan, Inc.**
**Shonan EMC Lab.**

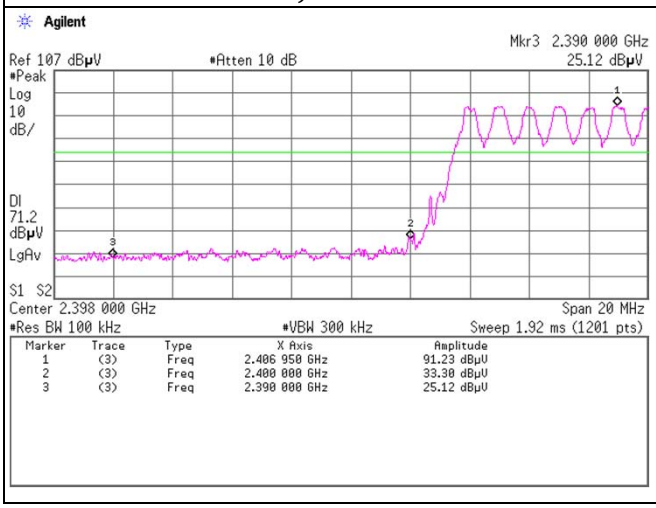
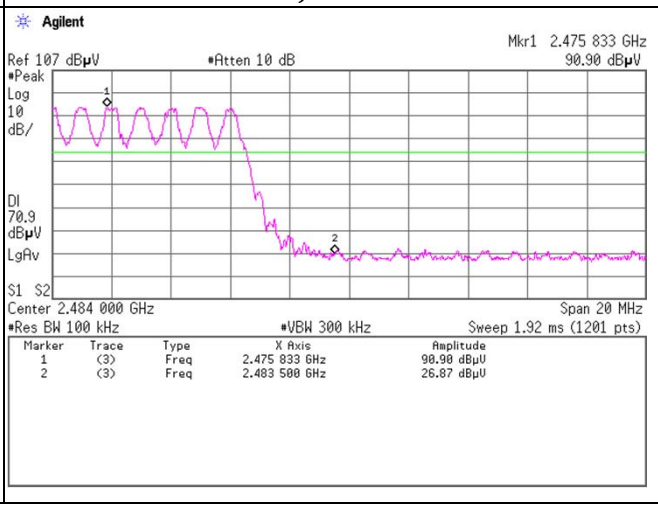
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

Band Edge compliance

DH5,

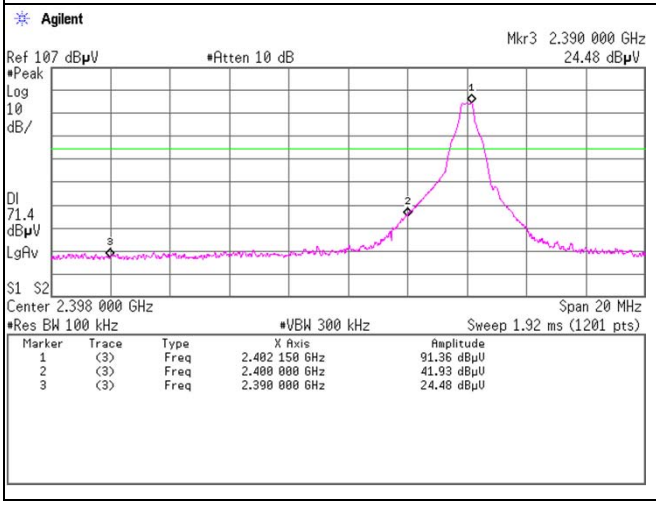
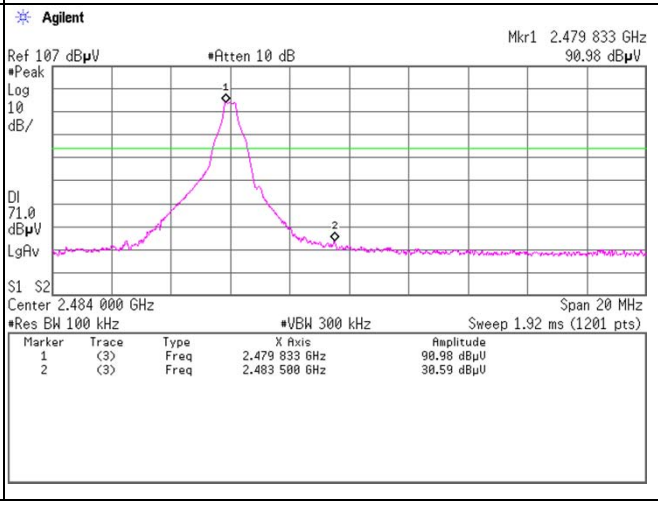
Hopping ON

| Tx, 2402MHz | Tx, 2480MHz |
|---|---|
|  |  |





Hopping OFF

| Tx, 2402MHz | Tx, 2480MHz |
|---|---|
|  |  |





**UL Japan, Inc.**
**Shonan EMC Lab.**

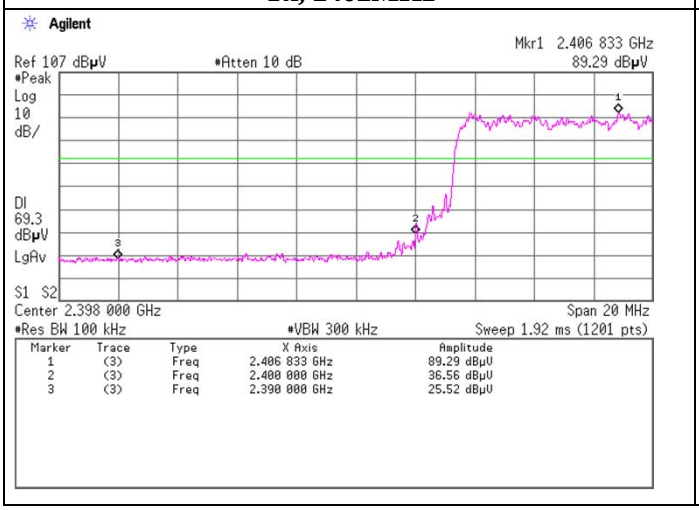
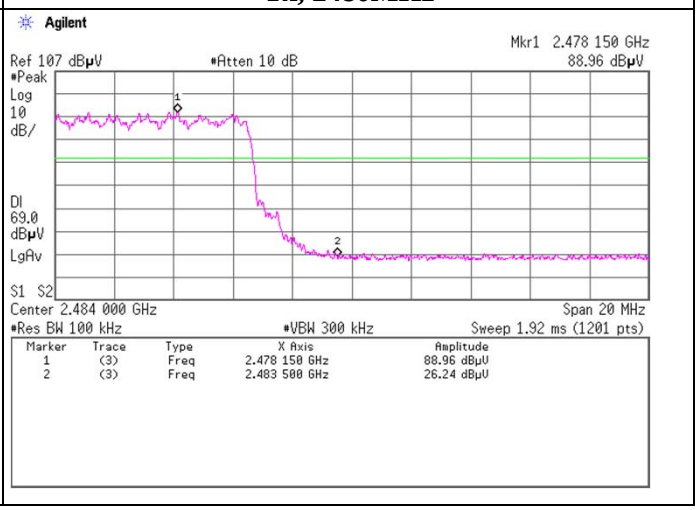
**1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN**
**Telephone : +81 463 50 6400**
**Facsimile : +81 463 50 6401**

# Spurious emission (Conducted)

Band Edge compliance

3-DH5,

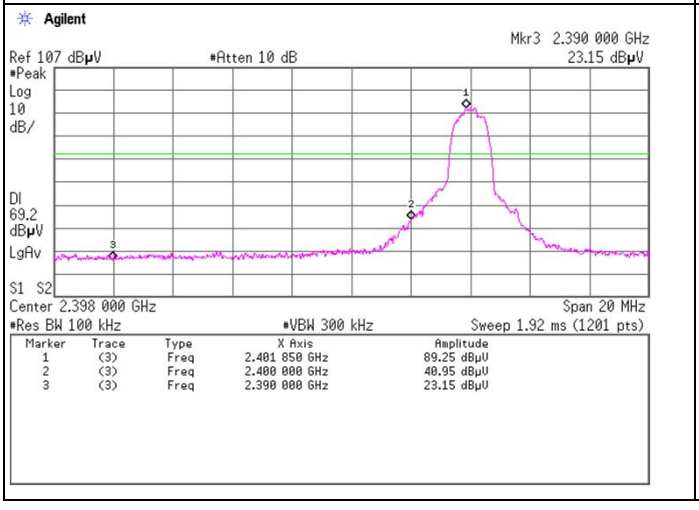
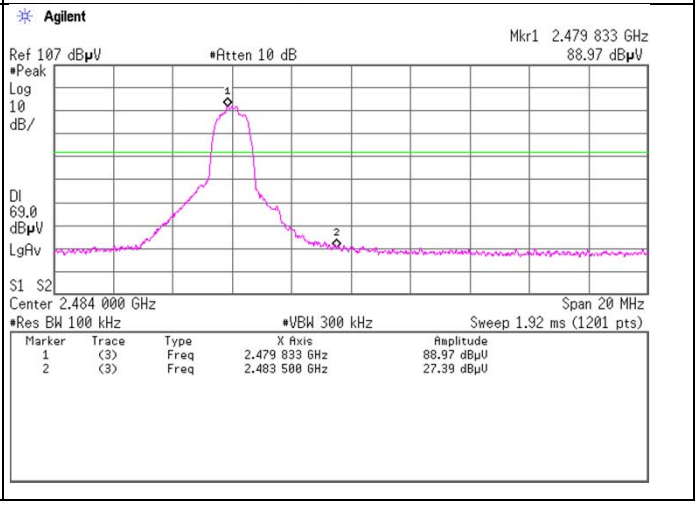
Hopping ON

| Tx, 2402MHz | Tx, 2480MHz |
|---|---|
|  |  |





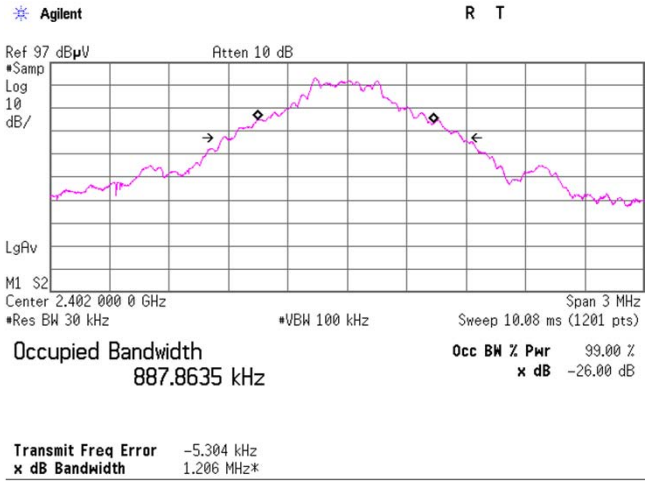
Hopping OFF

| Tx, 2402MHz | Tx, 2480MHz |
|---|---|
|  |  |

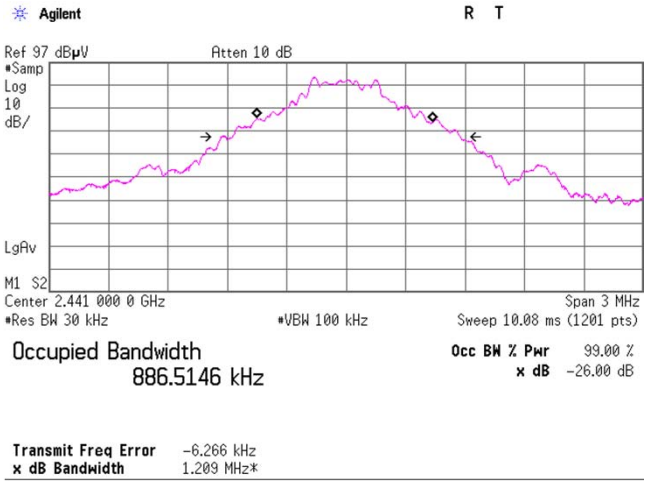
## 99% Occupied Bandwidth

DH5, Hopping Off

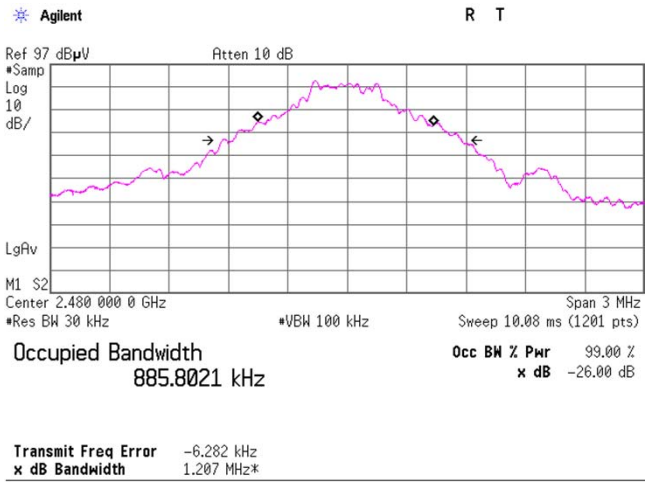
### Tx, 2402MHz



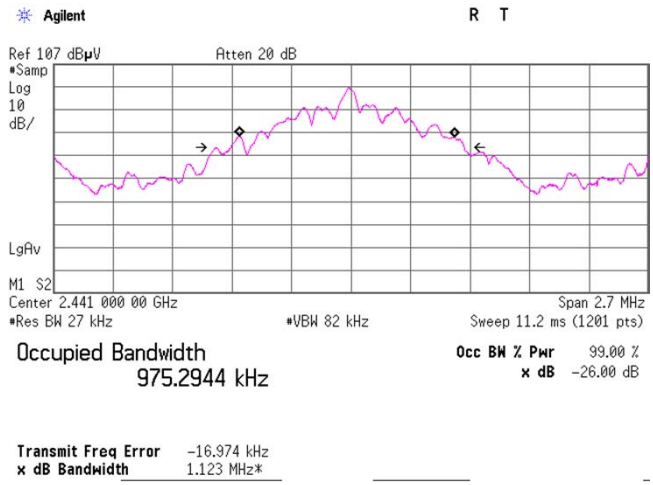

### Tx, 2441MHz




### Tx, 2480MHz

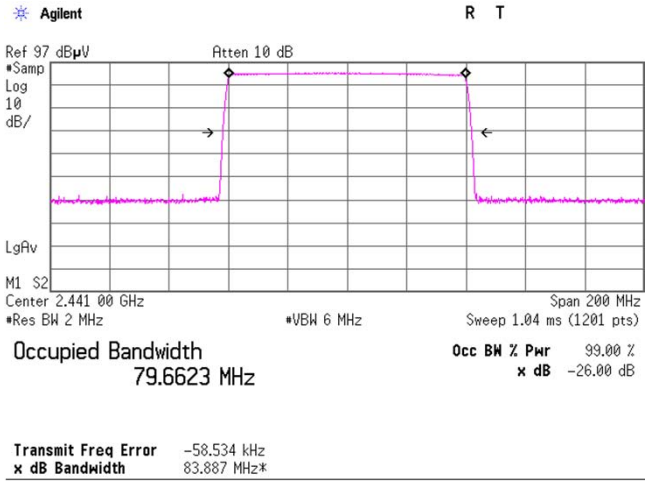



### Inquiry (Mid ch.)




Hopping On

### DH5

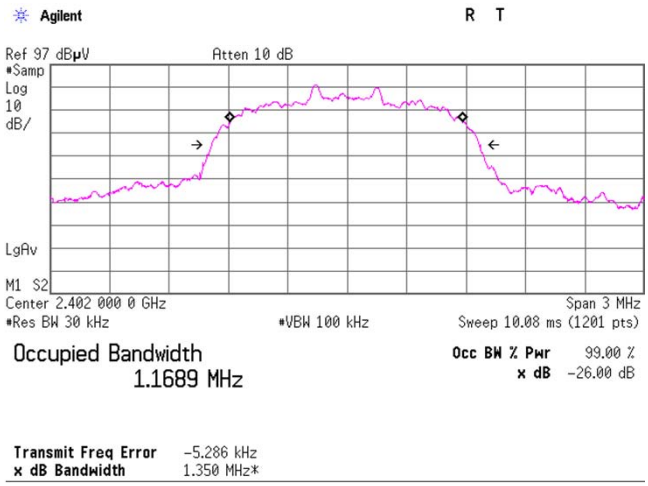



### Inquiry

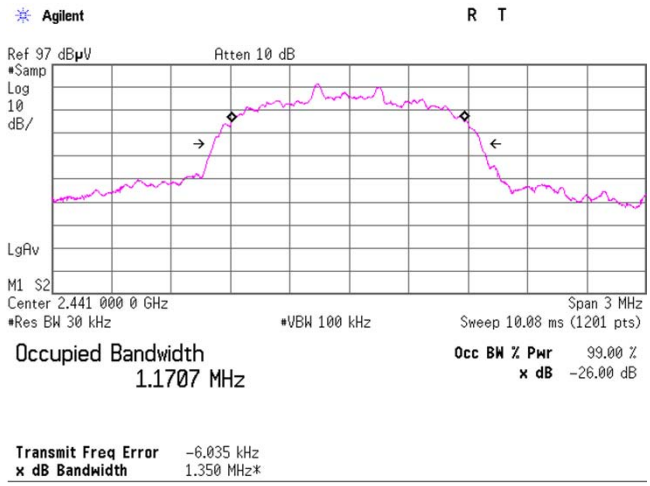
## 99% Occupied Bandwidth

3-DH5, Hopping Off

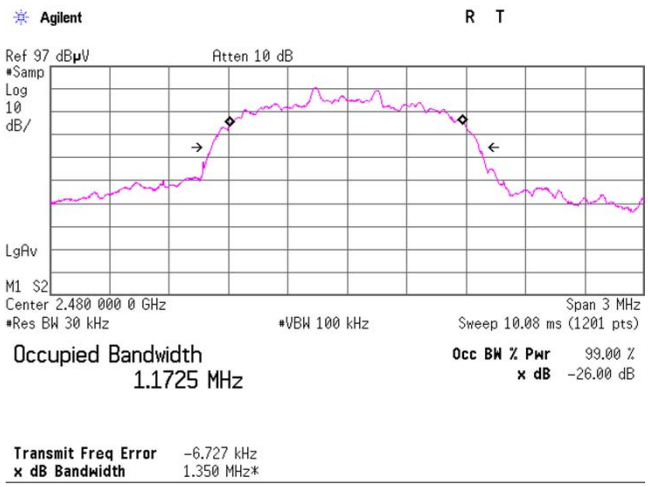
### Tx, 2402MHz




### Tx, 2441MHz

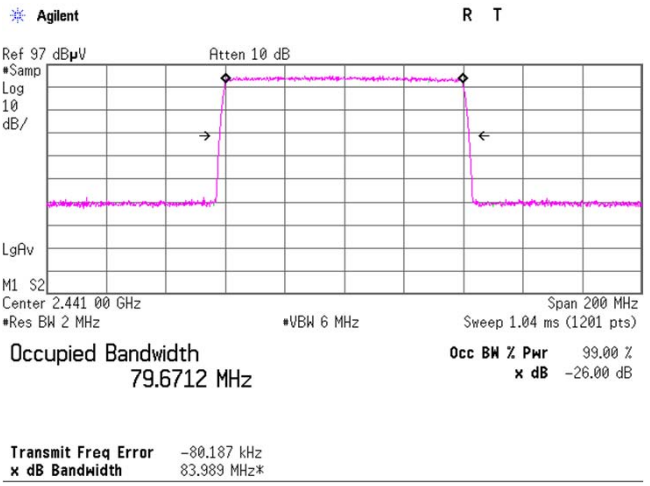



### Tx, 2480MHz




Hopping On

### 3-DH5



## APPENDIX 3
## Test Instruments

**EMI test equipment**

| Control No. | Instrument | Manufacturer | Model No | Serial No | Test Item | Calibration Date * Interval(month) |
|---|---|---|---|---|---|---|
| SSA-03 | Spectrum Analyzer | Agilent | E4448A | MY48250152 | AT | 2010/11/16 * 12 |
| SAT10-06 | Attenuator(above1GHz) | Agilent | 8493C-010 | 74865 | AT | 2010/03/05 * 12 |
| SCC-G14 | Coaxial Cable | Suhner | SUCOFLEX 102 | 31600/2 | AT | 2010/03/09 * 12 |
| SOS-09 | Humidity Indicator | A&D | AD-5681 | 4061484 | AT | 2010/02/17 * 12 |
| SSA-02 | Spectrum Analyzer | Agilent | E4448A | MY48250106 | AT | 2010/06/22 * 12 |
| SPM-06 | Power Meter | Anritsu | ML2495A | 0850009 | AT | 2010/04/01 * 12 |
| SPSS-03 | Power sensor | Anritsu | MA2411B | 0917063 | AT | 2010/04/01 * 12 |
| SCC-C9/C10/SRSE-03 | Coaxial Cable&RF Selector | Suhner/Suhner/TOYO | RG223U/141PE/NS4906 | -/0901-271(RF Selector) | CE | 2010/04/02 * 12 |
| SLS-05 | LISN | Rohde & Schwarz | ENV216 | 100516 | CE | 2010/02/19 * 12 |
| SAT3-06 | Attenuator | JFW | 50HF-003N | - | CE | 2010/02/06 * 12 |
| SOS-06 | Humidity Indicator | A&D | AD-5681 | 4062118 | CE | 2010/02/17 * 12 |
| STR-03 | Test Receiver | Rohde & Schwarz | ESI40 | 100054/040 | CE/RE | 2010/07/21 * 12 |
| SJM-10 | Measure | PROMART | SEN1935 | - | CE/RE | - |
| COTS-SEMI-1 | EMI Software | TSJ | TEPTO-DV | - | CE/RE | - |
| SAF-06 | Pre Amplifier | TOYO Corporation | TPA0118-36 | 1440491 | RE | 2010/03/09 * 12 |
| SCC-G03 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46499/4A | RE | 2010/04/16 * 12 |
| SCC-G23 | Coaxial Cable | Suhner | SUCOFLEX 104 | 297342/4 | RE | 2010/05/27 * 12 |
| SHA-03 | Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-739 | RE | 2010/08/17 * 12 |
| SOS-05 | Humidity Indicator | A&D | AD-5681 | 4062518 | RE | 2010/02/09 * 12 |
| SFL-02 | Highpass Filter | MICRO-TRONICS | HPM50111 | 051 | RE | 2010/12/15 * 12 |
| SAT10-04 | Attenuator(above1GHz) | Agilent | 8493C-010 | 74863 | RE | 2010/12/15 * 12 |
| SHA-04 | Horn Antenna | ETS LINDGREN | 3160-09 | LM3640 | RE | 2010/03/29 * 12 |
| SAF-08 | Pre Amplifier | TOYO Corporation | HAP18-26W | 00000019 | RE | 2010/03/02 * 12 |
| SCC-G17 | Coaxial Cable | Suhner | SUCOFLEX 104A | 46291/4A | RE | 2010/03/02 * 12 |
| SAF-03 | Pre Amplifier | SONOMA | 310N | 290213 | RE | 2010/02/06 * 12 |
| SAT6-03 | Attenuator | JFW | 50HF-006N | - | RE | 2010/02/06 * 12 |
| SBA-03 | Biconical Antenna | Schwarzbeck | BBA9106 | 91032666 | RE | 2010/10/15 * 12 |
| SCC-C1/C2/C3/C4/C5/C10/SRSE-03 | Coaxial Cable&RF Selector | Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO | 8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906 | -/0901-271(RF Selector) | RE | 2010/04/02 * 12 |
| SLA-03 | Logperiodic Antenna | Schwarzbeck | UHALP9108A | UHALP 9108-A 0901 | RE | 2010/10/15 * 12 |
| SAEC-03(NSA) | Semi-Anechoic Chamber | TDK | SAEC-03(NSA) | 3 | RE | 2010/09/13 * 12 |
| | | | | | | |
| | | | | | | |

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with traceable calibrations . Each calibration is traceable to the national or international standards.

Test Item :
- CE: Conducted emission,
- RE: Radiated emission,
- AT: Antenna terminal disturbance voltage