

FCC

Test Report

| | |
|--------------|------------------------------|
| Product Name | Wireless Trio Racer/Receiver |
| Model No. | 31620031100(AK12W) |
| FCC ID. | FSUGG000J |

| | |
|-----------|--|
| Applicant | KYE SYSTEMS CORP. |
| Address | No. 492, Sec. 5, Chung Hsin Rd., San Chung, Taipei Hsien, 24160, Taiwan, R.O.C. |

| | |
|-----------------|----------------------|
| Date of Receipt | Jun. 06, 2009 |
| Issued Date | Jul. 16, 2009 |
| Report No. | 096124R-RFUSP06V01-A |
| Report Version | V1.0 |

The Test Results relate only to the samples tested.

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Test Report Certification

Issued Date: Jul. 16, 2009

Report No.: 096124R-RFUSP06V01-A



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| Applicant | KYE SYSTEMS CORP. | |
| Address | No. 492, Sec. 5, Chung Hsin Rd., San Chung, Taipei Hsien, 24160, Taiwan, R.O.C. | |
| Manufacturer | KYE SYSTEMS CORP. | |
| Model No. | 31620031100(AK12W) | |
| FCC ID. | FSUGG000J | |
| EUT Rated Voltage | DC 5V(Power by USB) | |
| EUT Test Voltage | DC 5V(Power by USB) | |
| Trade Name | Genius | |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2008 ANSI C63.4: 2003 |  <small>NVLAP Lab Code: 200533-0</small> |
| Test Result | Complied | |

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Approved By : Vincent Lin
 (Manager / Vincent Lin)

Testing Laboratory
0914

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1. GENERAL INFORMATION

1.1. EUT Description

| | |
|--------------------|-----------------------------------|
| Product Name | Wireless Trio Racer/Receiver |
| Trade Name | Genius |
| Model No. | 31620031100(AK12W) |
| FCC ID. | FSUGG000J |
| Frequency Range | 2408 – 2476MHz |
| Channel Number | 16 |
| Type of Modulation | FHSS |
| Antenna Type | Printed on PCB |
| Channel Control | Auto |
| Antenna Gain | Refer to the table “Antenna List” |

Antenna List

| No. | Manufacturer | Part No. | Peak Gain |
|-----|--------------|----------|-------------------------|
| 1 | Genius | N/A | -2.41dBi for 2.4835 GHz |

Frequency of Each Channel:

| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|
| Channel 01: | 2408 MHz | Channel 02: | 2410 MHz | Channel 03: | 2418 MHz | Channel 04: | 2428 MHz |
| Channel 05: | 2432 MHz | Channel 06: | 2436 MHz | Channel 07: | 2442 MHz | Channel 08: | 2444 MHz |
| Channel 09: | 2448 MHz | Channel 10: | 2452 MHz | Channel 11: | 2460 MHz | Channel 12: | 2462 MHz |
| Channel 13: | 2466 MHz | Channel 14: | 2472 MHz | Channel 15: | 2474 MHz | Channel 16: | 2476 MHz |

Note:

1. This device is an USB Dongle with a built-in 2.4GHz transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of FHSS transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is USB Dongle with built-in 2.4GHz FHSS transceiver. The number of the channels is 16 in 2408-2476MHz. The device adapts the frequency hopping spread spectrum modulation.

The antenna is Printed on PCB.

The device can transmit signal to associate Joystick and receive signal form Joystick.

Another information please refer to users manual.

| | |
|-----------|---------------------|
| Test Mode | Mode 1: Transmitter |
|-----------|---------------------|

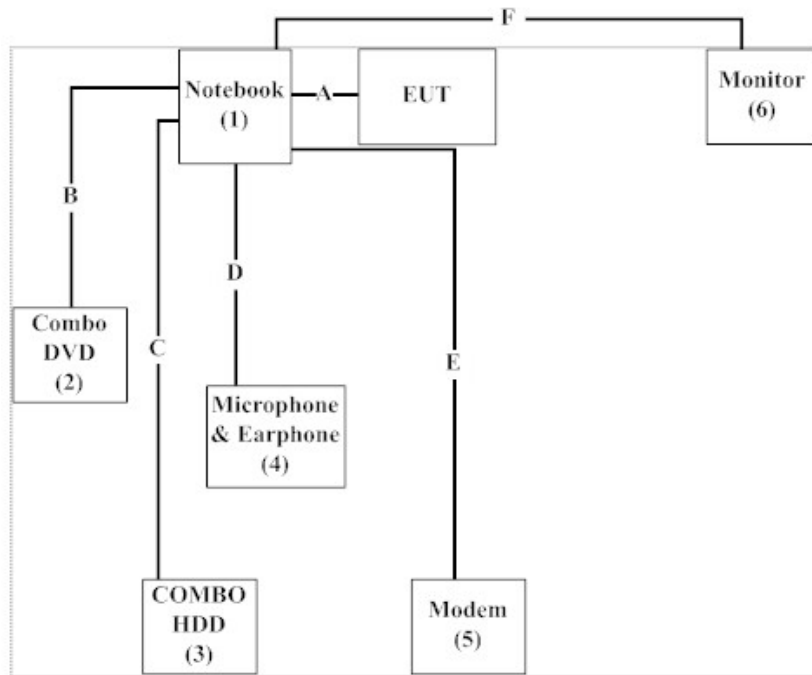
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

| | Product | Manufacturer | Model No. | Serial No. | Power Cord |
|-----|-----------------------|--------------|-----------|------------------------------|------------|
| (1) | Notebook PC | DELL | PPT | N/A | R33002 |
| (2) | Combo DVD | DELL | PD01S | N/A | N/A |
| (3) | COMBO HDD | TeraSys | F12-UF | A0100215-64b0006 | DOC |
| (4) | Microphone & Earphone | PCHOME | N/A | N/A | N/A |
| (5) | Modem | ACEEX | DM-1414 | 0102027556 | IFAXDM1414 |
| (6) | Monitor | Dell | 2407WFPb | CN-0FC255-46633-6 7T-04HS | DOC |

| | Signal Cable Type | Signal cable Description |
|---|-----------------------------|---|
| A | USB Cable | Non-Shielded, 0.3m, with one ferrite core bonded. |
| B | Combo DVD Cable | Non-Shielded, 0.3m |
| C | 1394 Cable | Non-Shielded, 1.2m |
| D | Microphone & Earphone Cable | Non-Shielded, 2m |
| E | RS-232 Cable | Non-Shielded, 1.2m |
| F | 19" VGA Cable | Shielded, 1.8m, with two ferrite cores bonded. |

1.4. Configuration of Tested System



1.5. EUT Exercise Software

| | |
|---|--|
| 1 | Setup the EUT and display as shown on 1.4 |
| 2 | Installs the USB Power Cable. |
| 3 | The EUT will continuously transmit the radio signal. |

1.6. Test Facility

Ambient conditions in the laboratory:

| Items | Required (IEC 68-1) | Actual |
|----------------------------|---------------------|----------|
| Temperature (°C) | 15-35 | 20-35 |
| Humidity (%RH) | 25-75 | 30-65 |
| Barometric pressure (mbar) | 860-1060 | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site: <http://tw.quietek.com/modules/myalbum/>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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 Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
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FCC Accreditation Number: TW1014



2. Conducted Emission

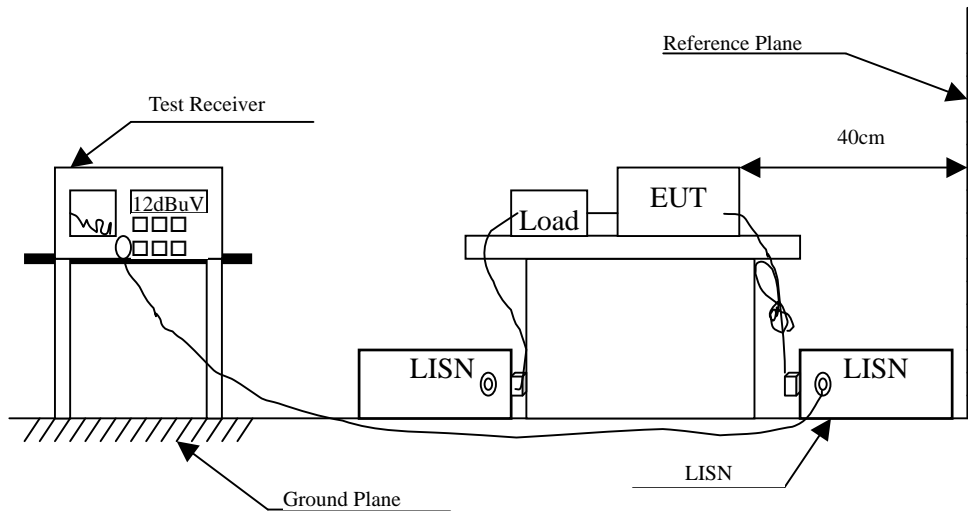
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

| Item | Instrument | Manufacturer | Type No./Serial No | Last Cal. | Remark |
|------|--------------------|--------------|--------------------|------------|-------------|
| 1 | Test Receiver | R & S | ESCS 30/825442/014 | Feb., 2009 | |
| 2 | L.I.S.N. | R & S | ESH3-Z5/825562/002 | Feb., 2009 | EUT |
| 3 | L.I.S.N. | R & S | ENV4200/848411/010 | Feb., 2009 | Peripherals |
| 4 | Pulse Limiter | R & S | ESH3-Z2/100410 | July, 2009 | |
| 5 | No.1 Shielded Room | | | N/A | |

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

| FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit | | |
|--|--------|-------|
| Frequency MHz | Limits | |
| | QP | AV |
| 0.15 - 0.50 | 66-56 | 56-46 |
| 0.50-5.0 | 56 | 46 |
| 5.0 - 30 | 60 | 50 |

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

2.4. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Wireless Trio Racer/Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (2442MHz)

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV | Margin dB | Limit dBuV |
|-------------------|-------------------------|--------------------------|------------------------------|--------------|---------------|
| LINE 1 | | | | | |
| Quasi-Peak | | | | | |
| 0.177 | 9.730 | 33.510 | 43.239 | -21.990 | 65.229 |
| 0.212 | 9.698 | 32.010 | 41.708 | -22.521 | 64.229 |
| 0.349 | 9.650 | 33.180 | 42.830 | -17.484 | 60.314 |
| 0.459 | 9.640 | 27.050 | 36.690 | -20.481 | 57.171 |
| 0.588 | 9.637 | 28.080 | 37.717 | -18.283 | 56.000 |
| 1.103 | 9.670 | 21.470 | 31.140 | -24.860 | 56.000 |
| Average | | | | | |
| 0.177 | 9.730 | 20.620 | 30.349 | -24.880 | 55.229 |
| 0.212 | 9.698 | 21.100 | 30.798 | -23.431 | 54.229 |
| 0.349 | 9.650 | 17.020 | 26.670 | -23.644 | 50.314 |
| 0.459 | 9.640 | 14.220 | 23.860 | -23.311 | 47.171 |
| 0.588 | 9.637 | 15.900 | 25.537 | -20.463 | 46.000 |
| 1.103 | 9.670 | 8.390 | 18.060 | -27.940 | 46.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Wireless Trio Racer/Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter (2442MHz)

| Frequency | Correct | Reading | Measurement | Margin | Limit |
|-------------------|---------|---------|-------------|---------|--------|
| MHz | Factor | Level | Level | dB | dBuV |
| | dB | dBuV | dBuV | | |
| LINE 2 | | | | | |
| Quasi-Peak | | | | | |
| 0.177 | 9.736 | 34.840 | 44.576 | -20.653 | 65.229 |
| 0.267 | 9.675 | 30.190 | 39.865 | -22.792 | 62.657 |
| 0.361 | 9.653 | 33.050 | 42.703 | -17.268 | 59.971 |
| 0.709 | 9.650 | 26.110 | 35.760 | -20.240 | 56.000 |
| 1.252 | 9.670 | 19.620 | 29.290 | -26.710 | 56.000 |
| 5.338 | 9.700 | 29.380 | 39.080 | -20.920 | 60.000 |
| Average | | | | | |
| 0.177 | 9.736 | 21.360 | 31.096 | -24.133 | 55.229 |
| 0.267 | 9.675 | 13.020 | 22.695 | -29.962 | 52.657 |
| 0.361 | 9.653 | 16.760 | 26.413 | -23.558 | 49.971 |
| 0.709 | 9.650 | 18.200 | 27.850 | -18.150 | 46.000 |
| 1.252 | 9.670 | 6.960 | 16.630 | -29.370 | 46.000 |
| 5.338 | 9.700 | 18.200 | 27.900 | -22.100 | 50.000 |

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

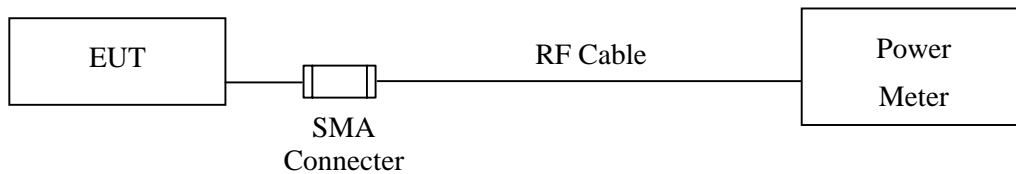
3.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|----------------|--------------|----------------------|-----------|
| X Power Meter | Anritsu | ML2495A/6K00003357 | May, 2009 |
| X Power Sensor | Anritsu | MA2491A/034457 | May, 2009 |

Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : Wireless Trio Racer/Receiver
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

| Channel No. | Frequency (MHz) | Measurement | Required Limit | Result |
|-------------|-----------------|-------------|----------------------|--------|
| Channel 01 | 2408.00 | 1.44 dBm | 0.125 Watt= 20.9 dBm | Pass |
| Channel 07 | 2442.00 | 1.34 dBm | 0.125 Watt= 20.9 dBm | Pass |
| Channel 16 | 2476.00 | 1.42 dBm | 0.125 Watt= 20.9 dBm | Pass |

4. Radiated Emission

4.1. Test Equipment

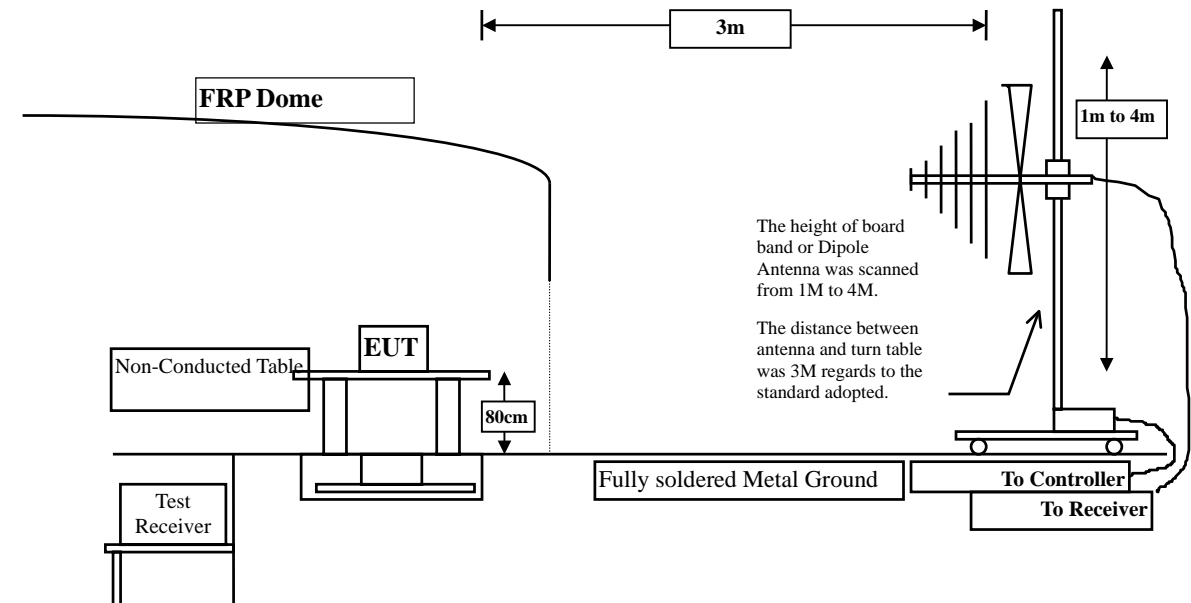
The following test equipments are used during the radiated emission test:

| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|------------|---------------------|-----------------|-----------------------|------------|
| ☒ Site # 3 | X Bilog Antenna | Schaffner Chase | CBL6112B/2673 | Sep., 2008 |
| | X Pre-Amplifier | HP | 8447D/2944A09549 | Sep., 2008 |
| | X Test Receiver | R & S | ESCS 30/ 825442/018 | Sep., 2008 |
| | X Spectrum Analyzer | HP | E4407B / US39440758 | May, 2009 |
| | X Coaxial Cable | QuieTek | QTK-CABLE/ CAB5 | Feb., 2009 |
| | X Controller | QuieTek | QTK-CONTROLLER/ CTRL3 | N/A |
| | X Coaxial Switch | Anritsu | MP59B/6200265729 | N/A |

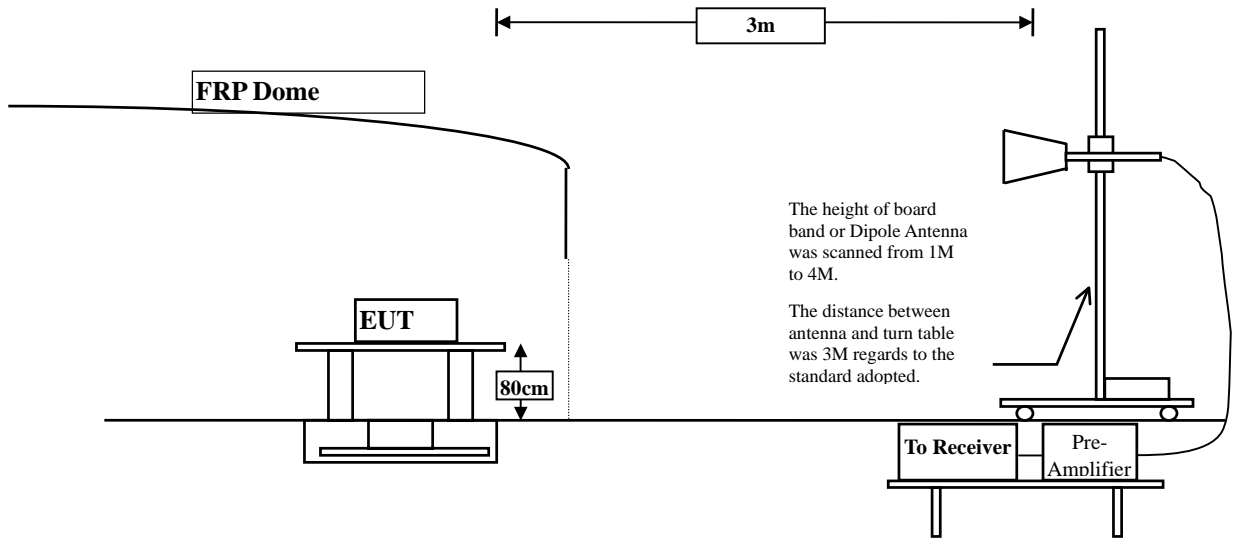
- Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup

Below 1GHz



Above 1GHz



4.3. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

| FCC Part 15 Subpart C Paragraph 15.209 Limits | | |
|---|----------|-----------|
| Frequency MHz | uV/m @3m | dBuV/m@3m |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

- Remarks:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Wireless Trio Racer/Receiver
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2408MHz)

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|--------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| Peak Detector: | | | | | |
| 4816.000 | 9.593 | 39.000 | 48.593 | -25.407 | 74.000 |
| 7224.000 | 14.373 | 35.550 | 49.922 | -24.078 | 74.000 |
| 9632.000 | 19.758 | 33.500 | 53.259 | -20.741 | 74.000 |
| Average Detector: | | | | | |
| -- | | | | | |
| Vertical | | | | | |
| Peak Detector: | | | | | |
| 4816.000 | 8.395 | 36.370 | 44.765 | -29.235 | 74.000 |
| 7224.000 | 15.428 | 34.530 | 49.957 | -24.043 | 74.000 |
| 9632.000 | 18.967 | 33.340 | 52.308 | -21.692 | 74.000 |
| Average Detector: | | | | | |
| -- | | | | | |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Trio Racer/Receiver
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2442MHz)

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|--------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| Peak Detector: | | | | | |
| 4884.000 | 3.066 | 41.290 | 44.355 | -29.645 | 74.000 |
| 7326.000 | 7.214 | 41.490 | 48.703 | -25.297 | 74.000 |
| 9768.000 | 13.385 | 40.280 | 53.666 | -20.334 | 74.000 |
| Average Detector: | | | | | |
| -- | | | | | |
| Vertical | | | | | |
| Peak Detector: | | | | | |
| 4884.000 | 3.617 | 45.080 | 48.697 | -25.303 | 74.000 |
| 7326.000 | 8.000 | 41.200 | 49.200 | -24.800 | 74.000 |
| 9768.000 | 13.417 | 40.170 | 53.588 | -20.412 | 74.000 |
| Average Detector: | | | | | |
| -- | | | | | |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Trio Racer/Receiver
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2476MHz)

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|--------------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| Peak Detector: | | | | | |
| 4952.000 | 9.430 | 36.260 | 45.690 | -28.310 | 74.000 |
| 7428.000 | 14.964 | 34.550 | 49.514 | -24.486 | 74.000 |
| 9904.000 | 19.777 | 33.400 | 53.177 | -20.823 | 74.000 |
| Average Detector: | | | | | |
| -- | | | | | |
| Vertical | | | | | |
| Peak Detector: | | | | | |
| 4952.000 | 9.650 | 36.880 | 46.530 | -27.470 | 74.000 |
| 7428.000 | 15.353 | 34.480 | 49.833 | -24.167 | 74.000 |
| 9904.000 | 18.929 | 33.940 | 52.869 | -21.131 | 74.000 |

Average Detector:

--

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Wireless Trio Racer/Receiver
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2442MHz)

| Frequency MHz | Correct Factor dB | Reading Level dBuV | Measurement Level dBuV/m | Margin dB | Limit dBuV/m |
|-------------------|-------------------------|--------------------------|--------------------------------|--------------|-----------------|
| Horizontal | | | | | |
| 258.920 | -5.458 | 28.017 | 22.559 | -23.441 | 46.000 |
| 381.140 | -1.606 | 26.779 | 25.173 | -20.827 | 46.000 |
| 509.180 | 0.744 | 27.058 | 27.802 | -18.198 | 46.000 |
| 604.240 | 4.254 | 25.818 | 30.073 | -15.927 | 46.000 |
| 854.500 | 6.234 | 27.022 | 33.256 | -12.744 | 46.000 |
| 986.420 | 7.284 | 27.510 | 34.794 | -19.206 | 54.000 |
| Vertical | | | | | |
| 381.140 | -2.176 | 26.779 | 24.603 | -21.397 | 46.000 |
| 509.180 | -0.666 | 27.058 | 26.392 | -19.608 | 46.000 |
| 691.540 | 1.975 | 26.098 | 28.073 | -17.927 | 46.000 |
| 825.400 | 3.125 | 26.739 | 29.863 | -16.137 | 46.000 |
| 920.460 | 5.040 | 26.830 | 31.870 | -14.130 | 46.000 |
| 965.080 | 7.397 | 26.653 | 34.050 | -19.950 | 54.000 |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

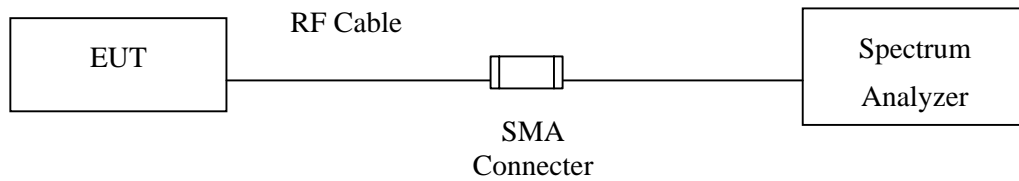
5. RF Antenna Conducted Test

5.1. Test Equipment

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| X Spectrum Analyzer | Agilent | N9010A / MY48030495 | Jun, 2008 |

Note: 1. All equipments are calibrated every one year.
 2. The test instruments Marked “X” are used to measure the final test results.

5.2. Test Setup



5.3. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

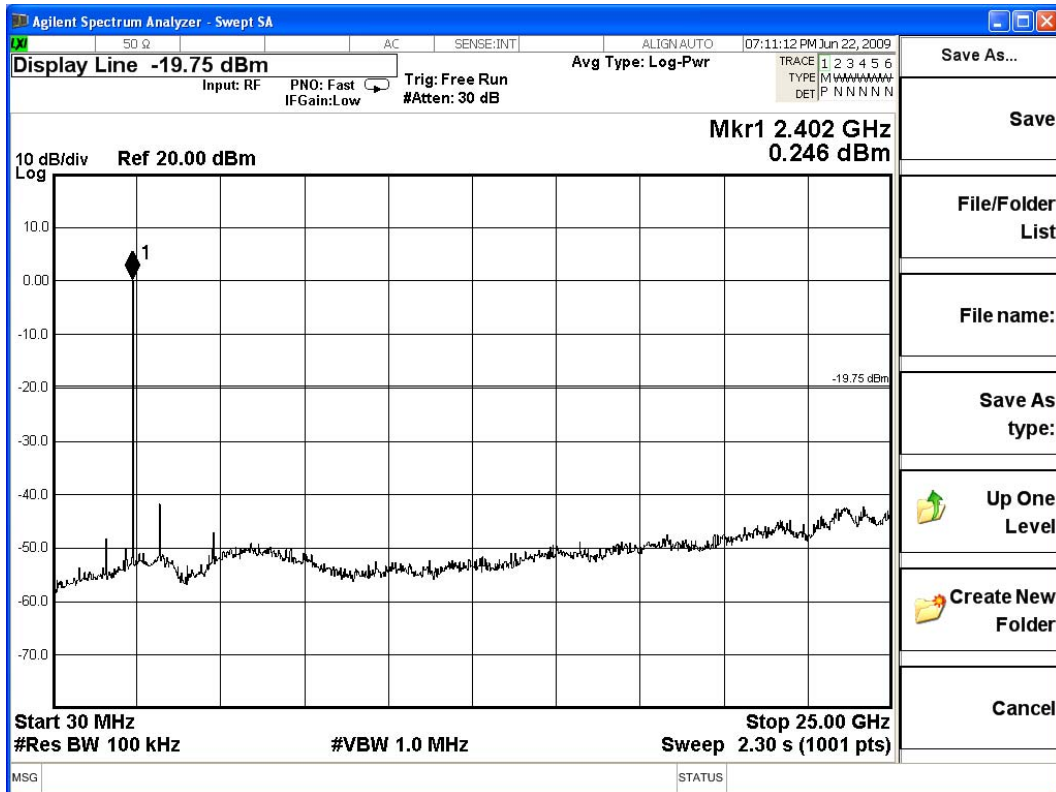
5.5. Uncertainty

± 150Hz

5.6. Test Result of RF Antenna Conducted Test

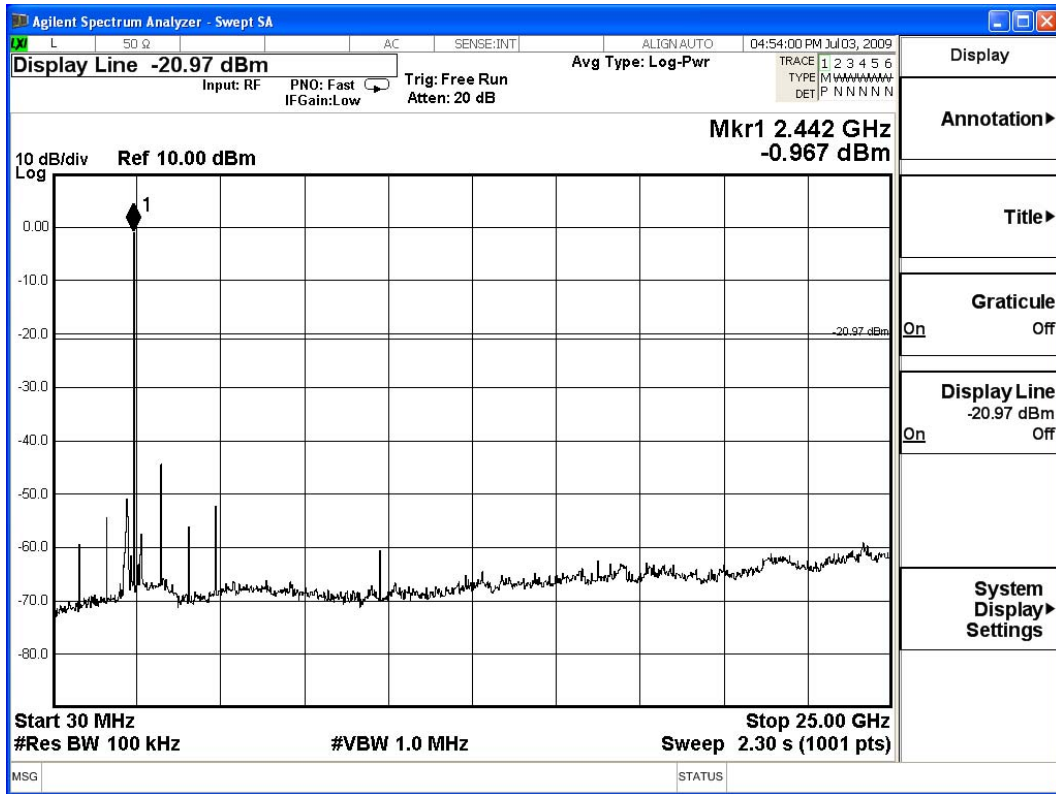
Product : Wireless Trio Racer/Receiver
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Figure Channel 01: 30MHz-25GHz



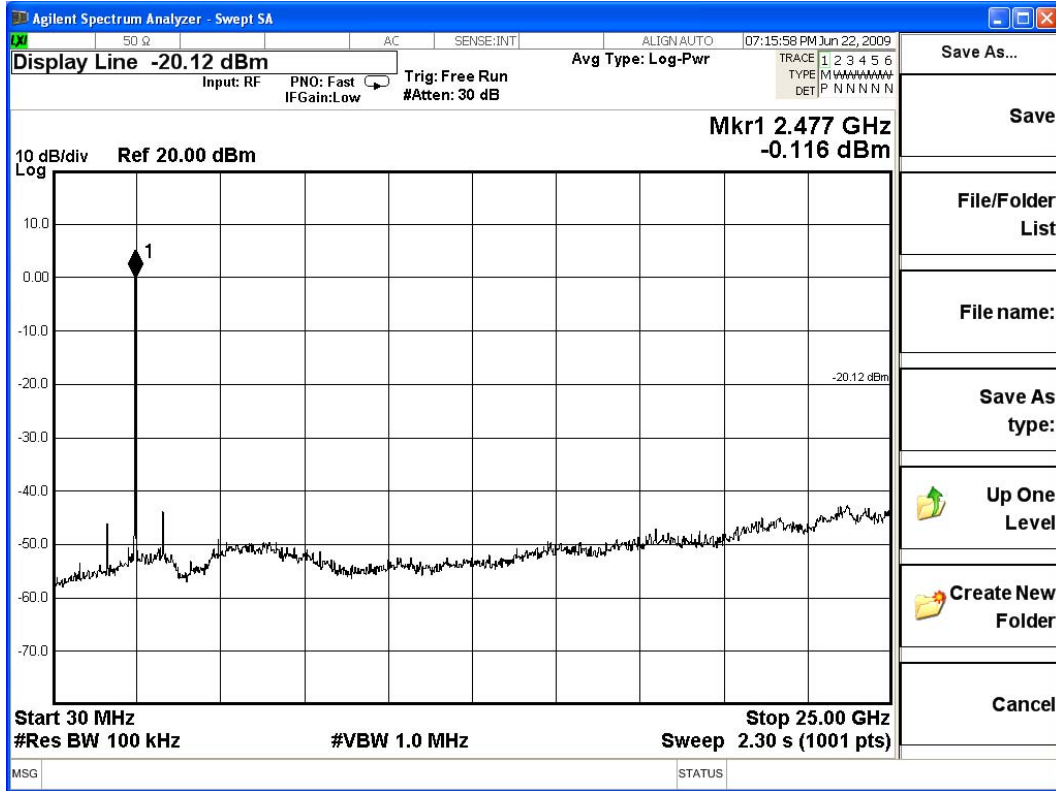
Product : Wireless Trio Racer/Receiver
 Test Item : RF Antenna Conducted Test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Figure Channel 07: 30MHz-25GHz



Product : Wireless Trio Racer/Receiver
Test Item : RF Antenna Conducted Test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter

Figure Channel 16: 30MHz-25GHz



6. Band Edge

6.1. Test Equipment

The following test equipments are used during the band edge tests:

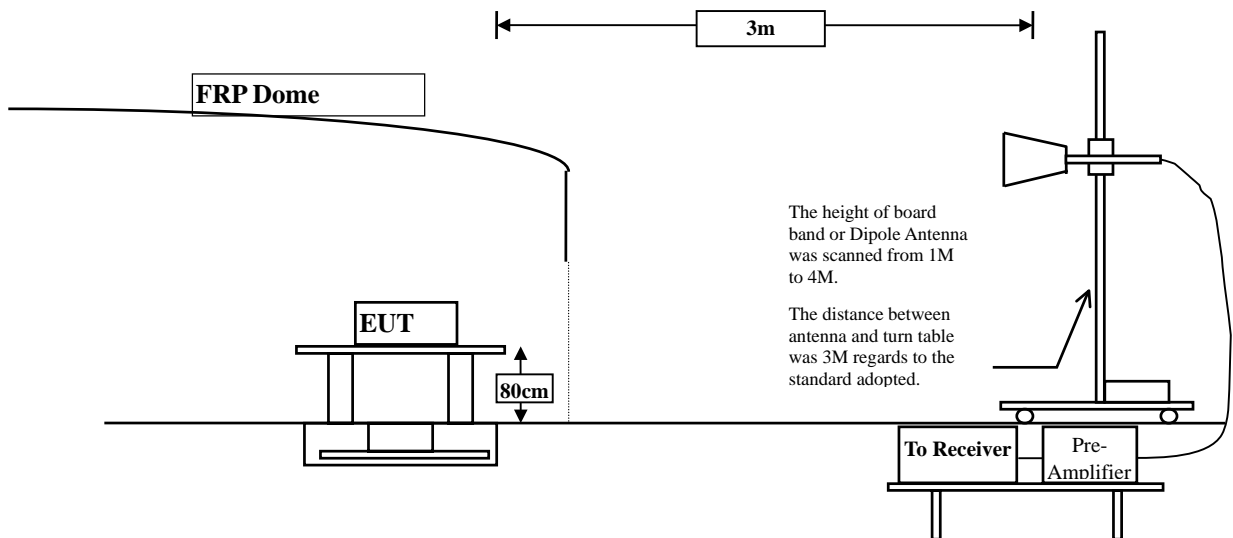
| Test Site | Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|------------|---------------------|-----------------|-----------------------|------------|
| ☒ Site # 3 | X Bilog Antenna | Schaffner Chase | CBL6112B/2673 | Sep., 2008 |
| | X Pre-Amplifier | HP | 8447D/2944A09549 | Sep., 2008 |
| | X Test Receiver | R & S | ESCS 30/ 825442/018 | Sep., 2008 |
| | X Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |
| | X Coaxial Cable | Quietek | QTK-CABLE/ CAB5 | Feb., 2009 |
| | X Controller | Quietek | QTK-CONTROLLER/ CTRL3 | N/A |
| | X Coaxial Switch | Anritsu | MP59B/6200265729 | N/A |

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

6.2. Test Setup

RF Radiated Measurement:

Above 1GHz



6.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

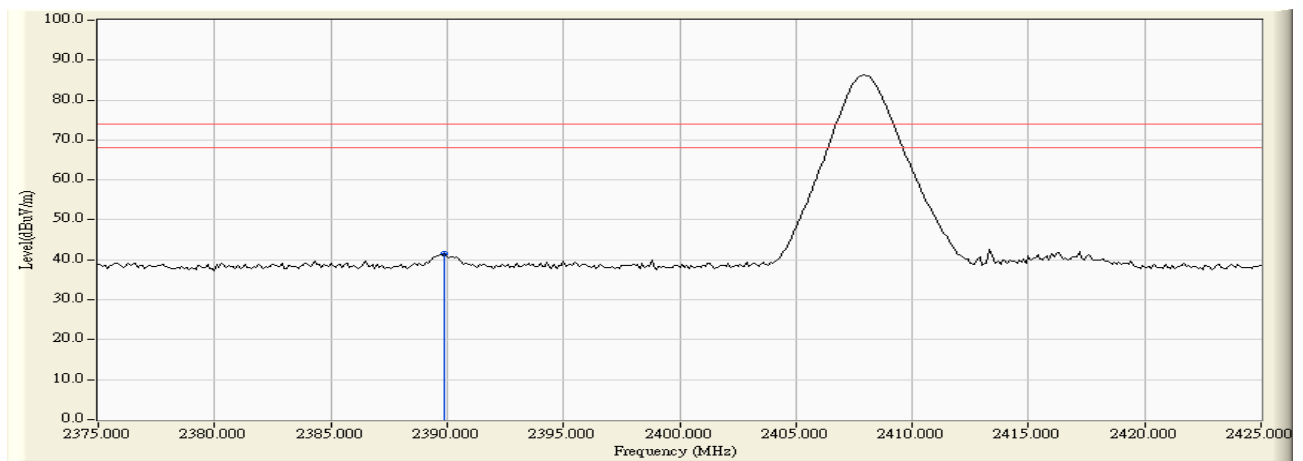
6.6. Test Result of Band Edge

Product : Wireless Trio Racer/Receiver
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|--------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 00 (Peak) | 2389.900 | 2.937 | 38.671 | 41.608 | 74.00 | 54.00 | Pass |
| 00 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 01: Horizontal (Peak)



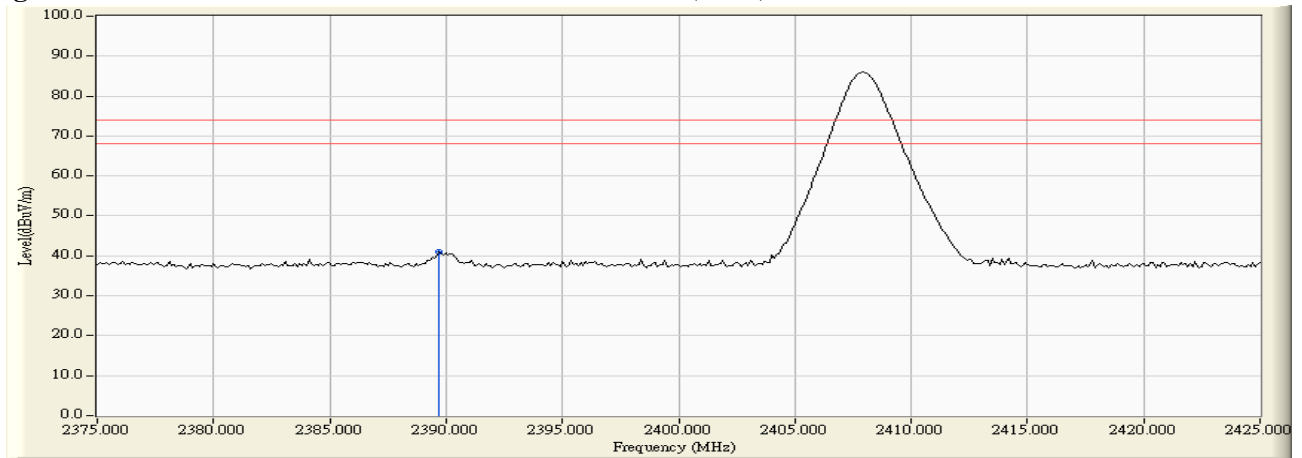
Note: RBW=1MHz, VBW=3MHz, Sweep=500ms

Product : Wireless Trio Racer/Receiver
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Vertical):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|--------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 00 (Peak) | 2389.700 | 1.930 | 39.112 | 41.042 | 74.00 | 54.00 | Pass |
| 00 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 01: Vertical (Peak)



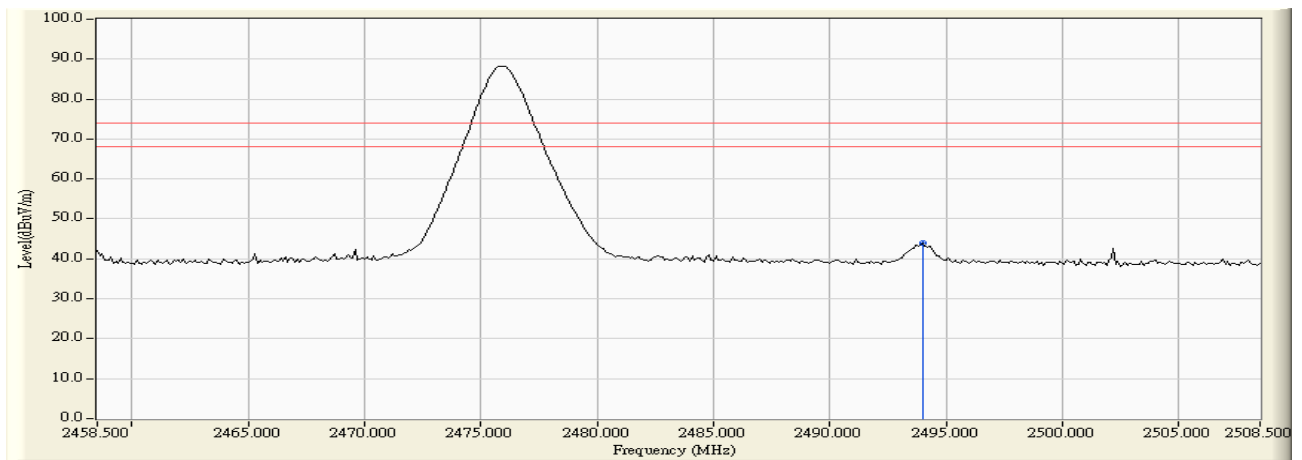
Note: RBW=1MHz, VBW=3MHz, Sweep=500ms

Product : Wireless Trio Racer/Receiver
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Horizontal):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|--------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 78 (Peak) | 2494.000 | 3.076 | 40.862 | 43.938 | 74.00 | 54.00 | Pass |
| 78 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 16: Horizontal (Peak)



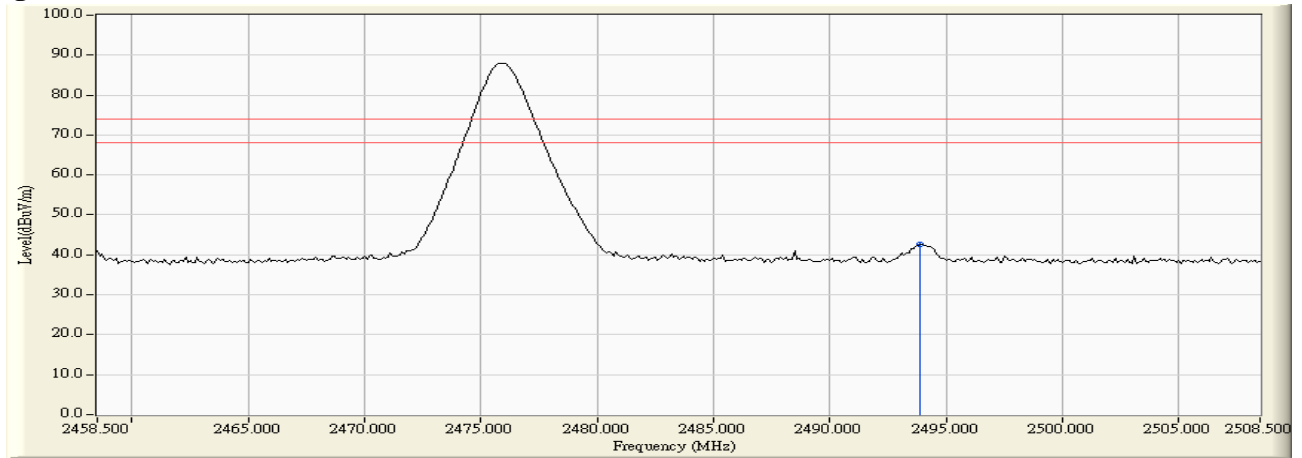
Note: RBW=1MHz, VBW=3MHz, Sweep=500ms

Product : Wireless Trio Racer/Receiver
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

RF Radiated Measurement (Vertical):

| Channel No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Emission Level (dBuV/m) | Peak Limit (dBuV/m) | Average Limit (dBuV/m) | Result |
|--------------|-----------------|---------------------|----------------------|-------------------------|---------------------|------------------------|--------|
| 78 (Peak) | 2493.900 | 2.619 | 39.898 | 42.517 | 74.00 | 54.00 | Pass |
| 78 (Average) | -- | -- | -- | -- | 74.00 | 54.00 | Pass |

Figure Channel 16: Vertical (Peak)



Note: RBW=1MHz, VBW=3MHz, Sweep=500ms

7. Channel Number

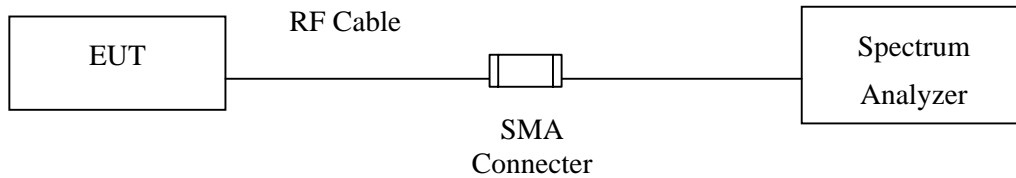
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| Spectrum Analyzer | R & S | FSP40 / 100170 | Nov, 2008 |
| X Spectrum Analyzer | Agilent | N9010A / MY48030495 | Jun, 2009 |
| Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 15 hopping frequencies.

7.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

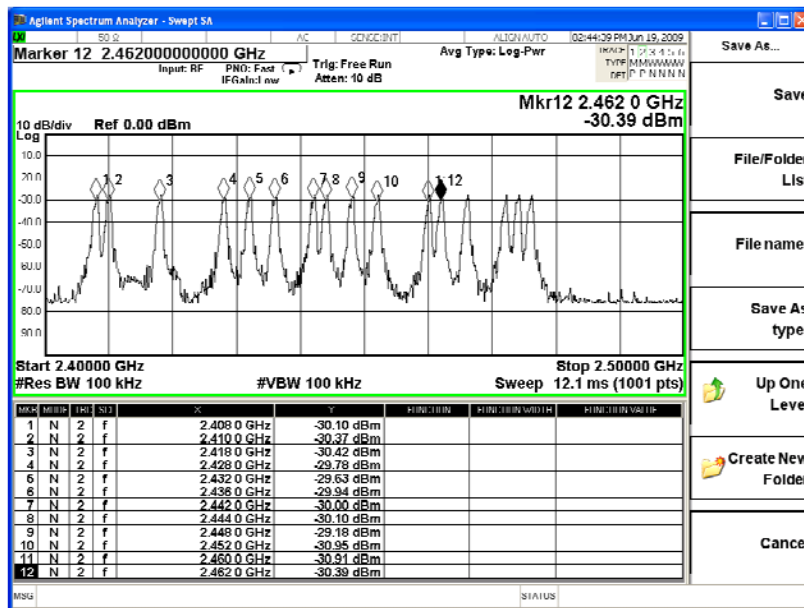
N/A

7.6. Test Result of Channel Number

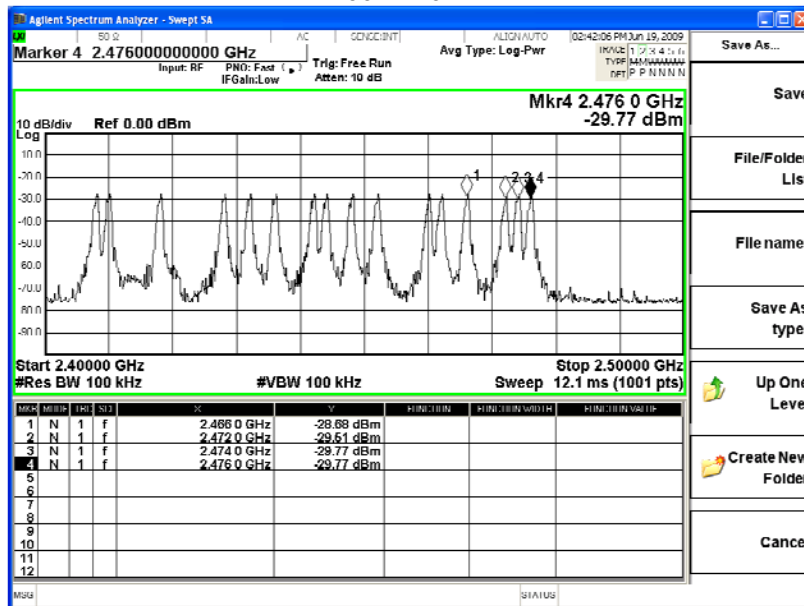
Product : Wireless Trio Racer/Receiver
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

| Frequency Range (MHz) | Measurement (Hopping Channel) | Required Limit (Hopping Channel) | Result |
|-----------------------|-------------------------------|----------------------------------|--------|
| 2408 ~ 2476 | 16 | >15 | Pass |

2408-2462MHz



2466-2476MHz



8. Channel Separation

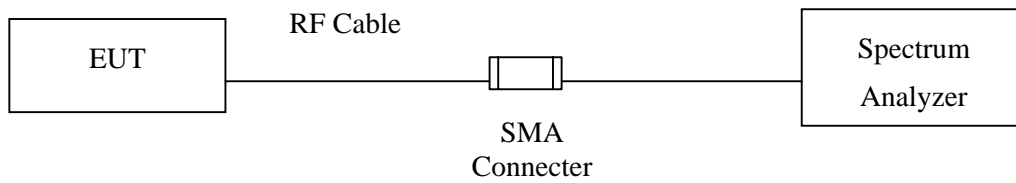
8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. | |
|-----------|-------------------|----------------------|---------------------|-----------|
| | Spectrum Analyzer | R & S | FSP40 / 100170 | Nov, 2008 |
| X | Spectrum Analyzer | Agilent | N9010A / MY48030495 | Jun, 2009 |
| | Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments mark by "X" are used to measure the final test results.

8.2. Test Setup



8.3. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the two – thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

8.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

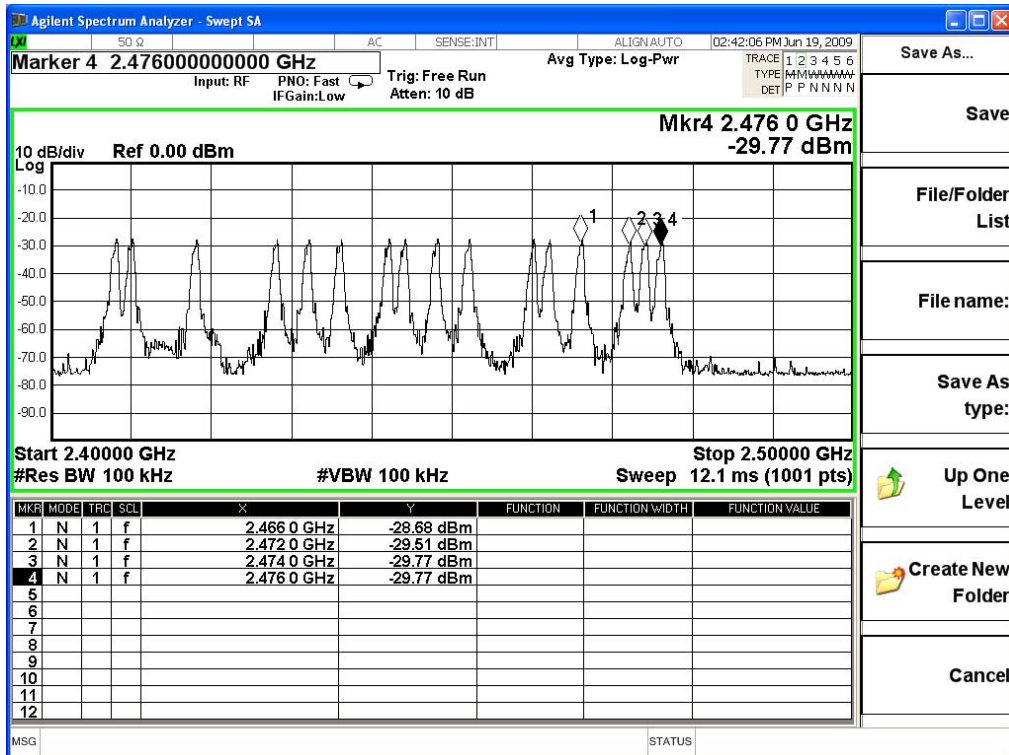
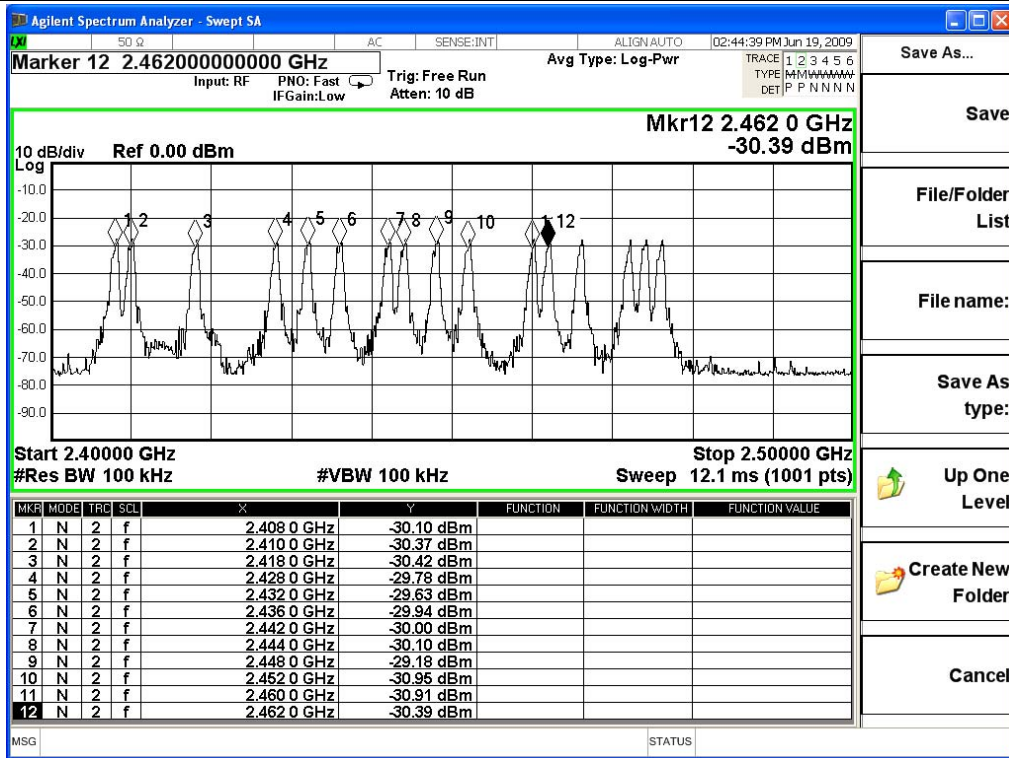
8.5. Uncertainty

± 150Hz

8.6. Test Result of Channel Separation

Product : Wireless Trio Racer/Receiver
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

| Frequency (MHz) | Measurement Level (MHz) | Limit | Limit of (2/3)*20dB Bandwidth (kHz) | Result |
|-----------------|-------------------------|---------|-------------------------------------|--------|
| 2408 to 2410 | 2.00 | >25 kHz | 180.0 | Pass |
| 2410 to 2418 | 2.00 | >25 kHz | 180.0 | Pass |
| 2418 to 2428 | 2.00 | >25 kHz | 180.0 | Pass |
| 2428 to 2432 | 4.00 | >25 kHz | 180.0 | Pass |
| 2432 to 2436 | 4.00 | >25 kHz | 180.0 | Pass |
| 2436 to 2442 | 6.00 | >25 kHz | 180.0 | Pass |
| 2442 to 2444 | 2.00 | >25 kHz | 180.0 | Pass |
| 2444 to 2448 | 4.00 | >25 kHz | 180.0 | Pass |
| 2448 to 2452 | 4.00 | >25 kHz | 180.0 | Pass |
| 2452 to 2460 | 8.00 | >25 kHz | 180.0 | Pass |
| 2460 to 2462 | 2.00 | >25 kHz | 180.0 | Pass |
| 2462 to 2466 | 4.00 | >25 kHz | 180.0 | Pass |
| 2466 to 2472 | 6.00 | >25 kHz | 180.0 | Pass |
| 2472 to 2474 | 2.00 | >25 kHz | 180.0 | Pass |
| 2474 to 2476 | 2.00 | >25 kHz | 180.0 | Pass |



9. Dwell Time

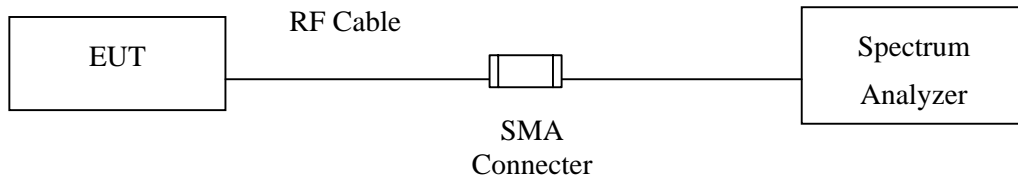
9.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| Spectrum Analyzer | R & S | FSP40 / 100170 | Nov, 2008 |
| X Spectrum Analyzer | Agilent | N9010A / MY48030495 | Jun, 2009 |
| Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |

Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

9.2. Test Setup



9.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 6.4 second period.

9.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.5. Uncertainty

± 25msec

9.6. Test Result of Dwell Time

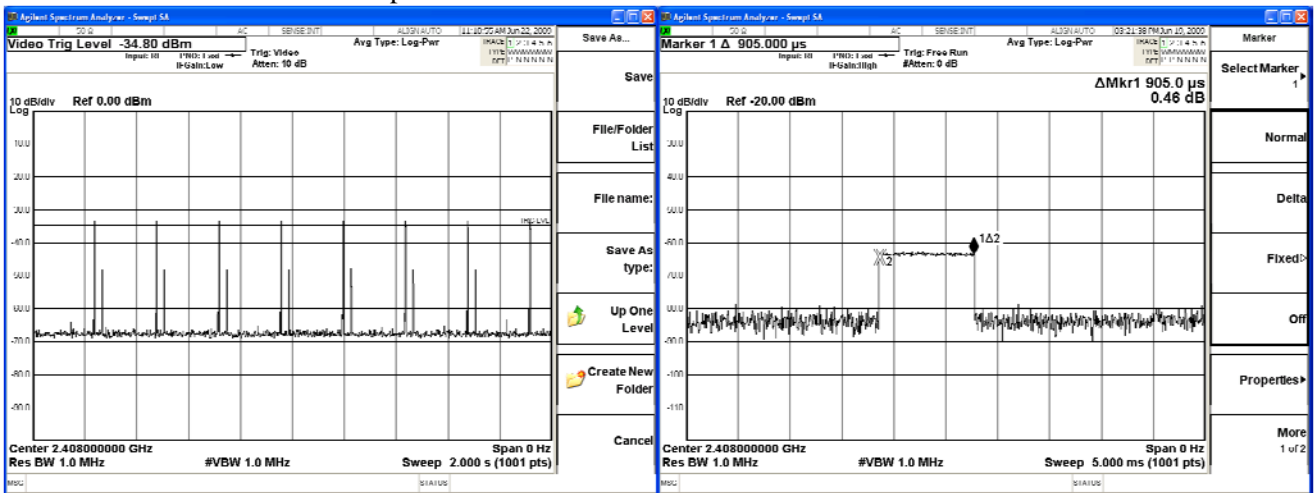
Product : Wireless Trio Racer/Receiver
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

| Channel No. | Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Dwell Time (Sec) | Limit (Sec) | Result |
|-------------|-----------------|-----------------------|-------------------|-----------------|------------------|-------------|--------|
| 01 | 2408 | 0.905 | 8 | 2000 | 0.001 | 0.4 | Pass |

Note: Dwell Time = (((Time slot length * Hopping of Number)/ Sweep time)/16)*(16*0.4)

CH 01 Time Interval between hops

CH 01 Transmission Time

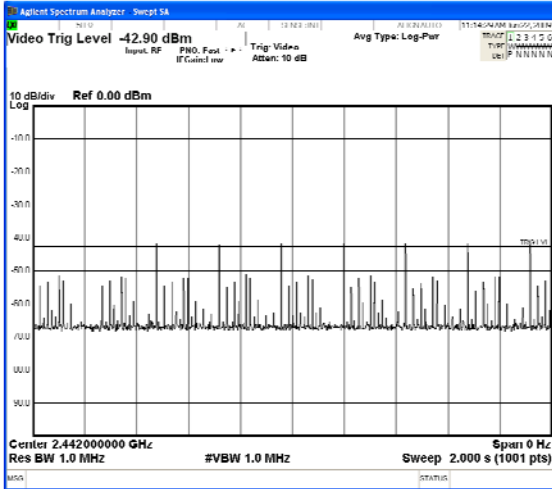


Product : Wireless Trio Racer/Receiver
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

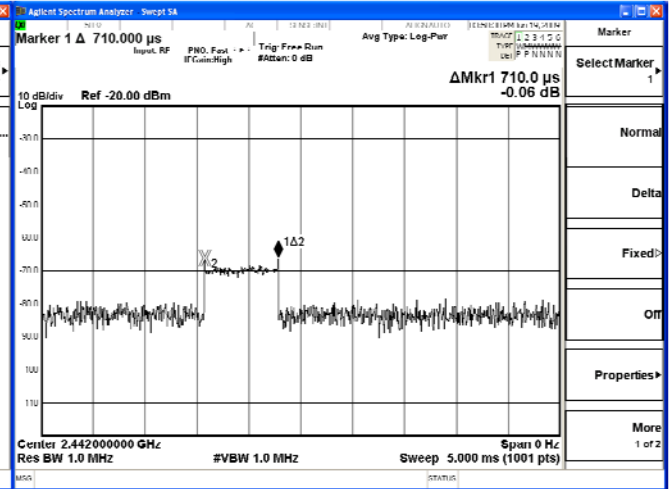
| Channel No. | Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Dwell Time (Sec) | Limit (Sec) | Result |
|-------------|-----------------|-----------------------|-------------------|-----------------|------------------|-------------|--------|
| 07 | 2442 | 0.710 | 8 | 2000 | 0.001 | 0.4 | Pass |

Note: Dwell Time = (((Time slot length * Hopping of Number)/ Sweep time)/16)*(16*0.4)

CH 07 Time Interval between hops



CH 07 Transmission Time

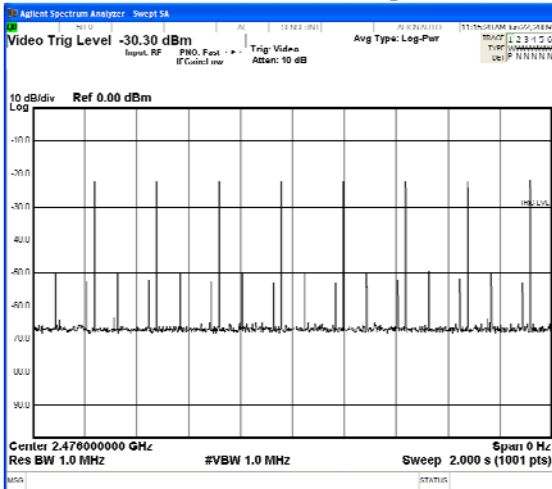


Product : Wireless Trio Racer/Receiver
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

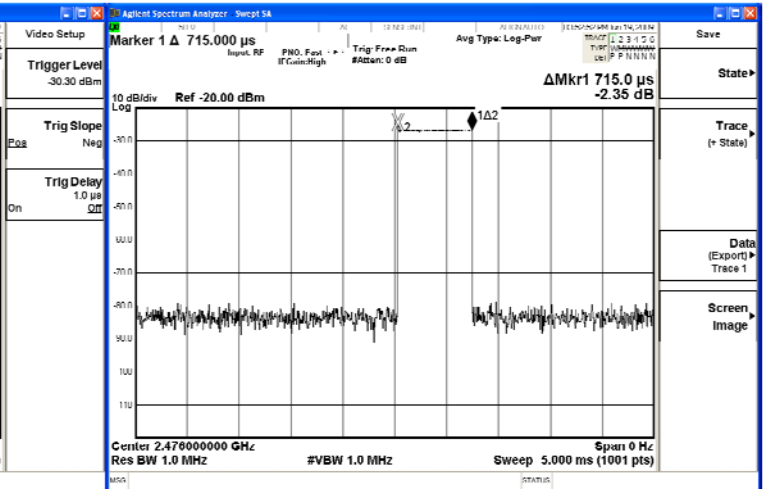
| Channel No. | Frequency (MHz) | Time slot length (ms) | Hopping of Number | Sweep time (ms) | Dwell Time (Sec) | Limit (Sec) | Result |
|-------------|-----------------|-----------------------|-------------------|-----------------|------------------|-------------|--------|
| 16 | 2476 | 0.715 | 8 | 2000 | 0.001 | 0.4 | Pass |

Note: Dwell Time = (((Time slot length * Hopping of Number)/ Sweep time)/16)*(16*0.4)

CH 16 Time Interval between hops



CH 16 Transmission Time



10. Occupied Bandwidth

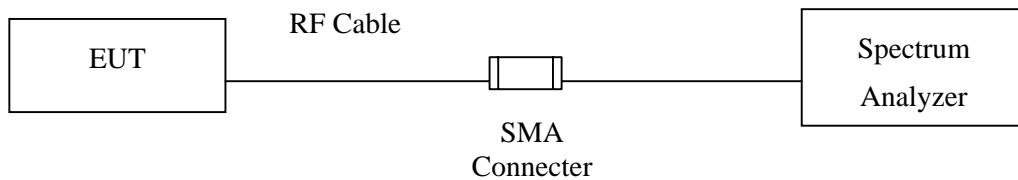
10.1. Test Equipment

The following test equipments are used during the radiated emission tests:

| Equipment | Manufacturer | Model No./Serial No. | Last Cal. |
|---------------------|--------------|----------------------|-----------|
| Spectrum Analyzer | R & S | FSP40 / 100170 | Nov, 2008 |
| X Spectrum Analyzer | Agilent | N9010A / MY48030495 | Jun, 2009 |
| Spectrum Analyzer | Agilent | E4407B / US39440758 | May, 2009 |

Note: 1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

10.2. Test Setup



10.3. Limits

N/A

10.4. Test Procedure

The EUT was setup to ANSI C63.4, 2003; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.5. Uncertainty

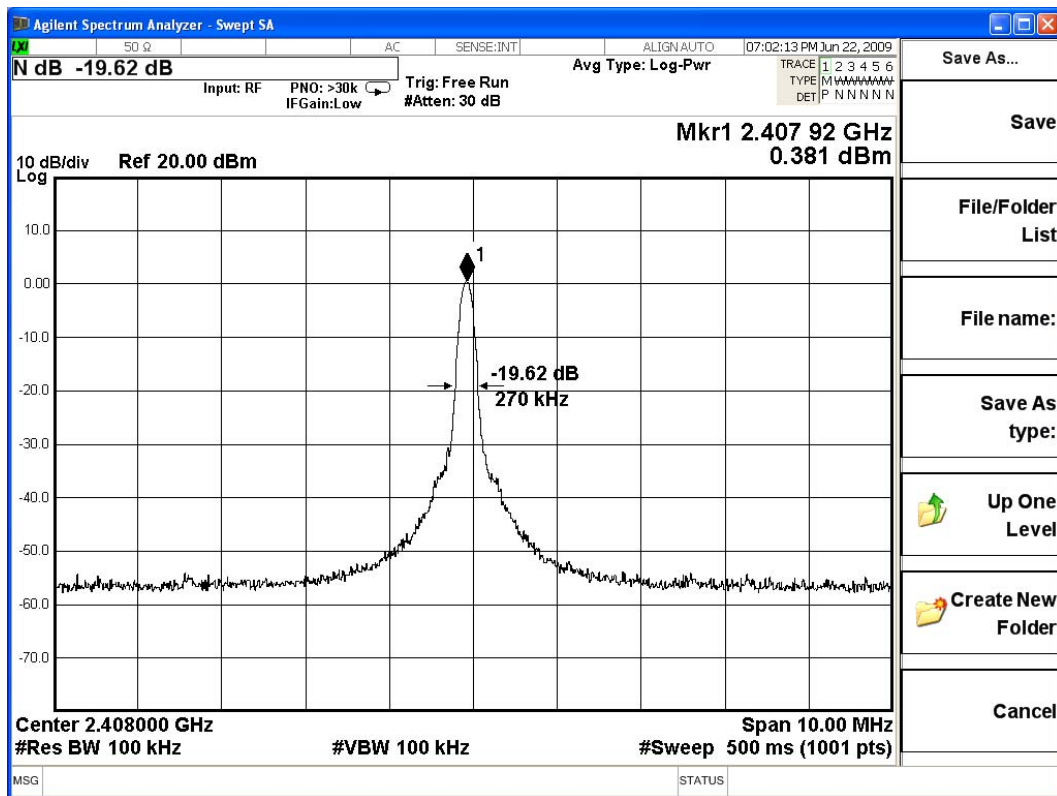
± 150Hz

10.6. Test Result of Occupied Bandwidth

Product : Wireless Trio Racer/Receiver
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2408MHz)

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 01 | 2408 | 270 | -- | NA |

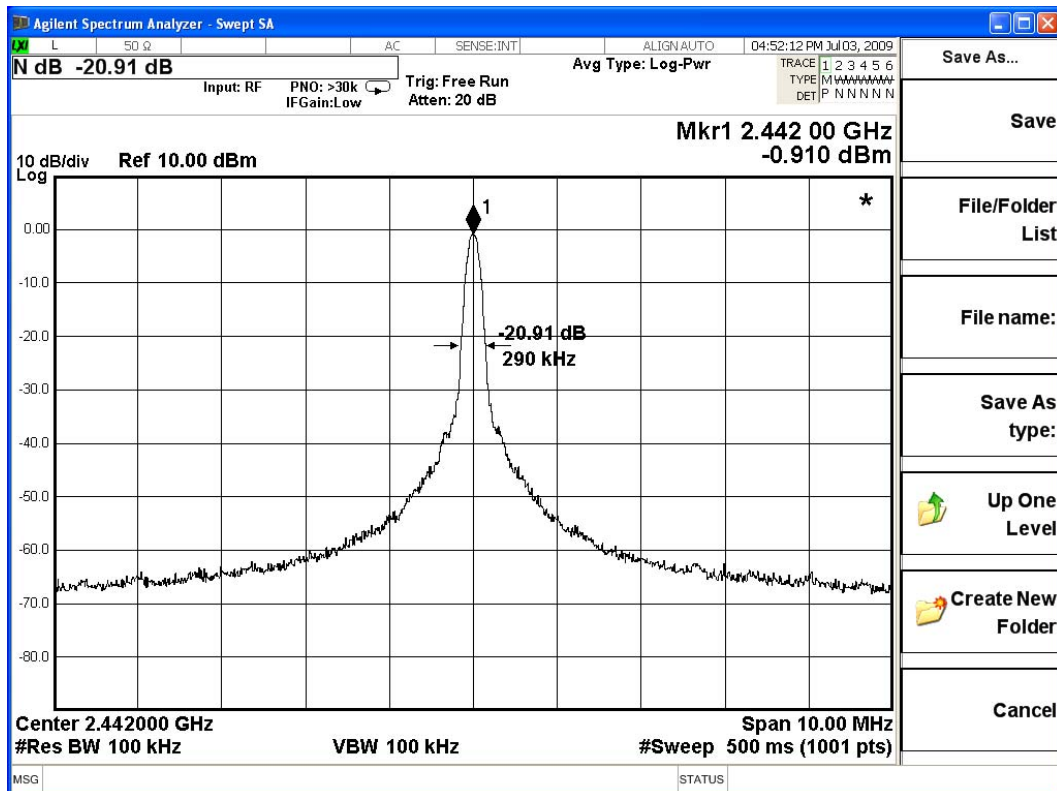
Figure Channel 01:



Product : Wireless Trio Racer/Receiver
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2442MHz)

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 07 | 2442 | 290 | -- | NA |

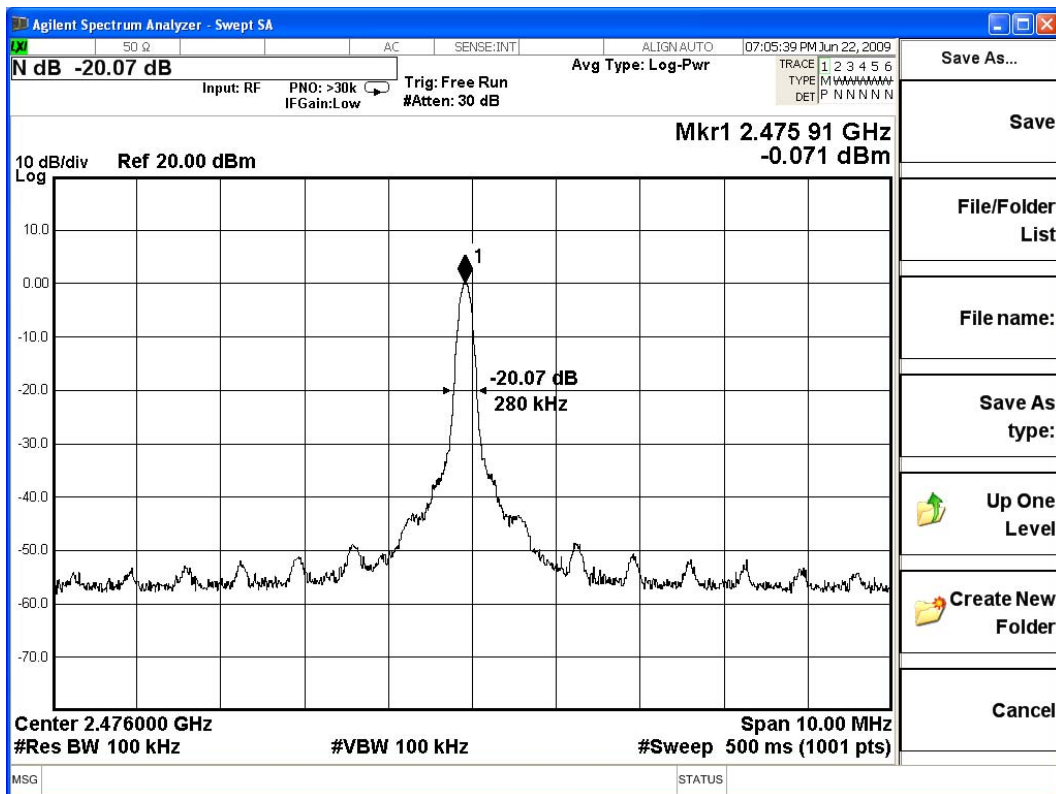
Figure Channel 07:



Product : Wireless Trio Racer/Receiver
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2476MHz)

| Channel No. | Frequency (MHz) | Measurement Level (kHz) | Required Limit (kHz) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 16 | 2476 | 280 | -- | NA |

Figure Channel 16:



11. EMI Reduction Method During Compliance Testing

No modification was made during testing.