



FCC 47 CFR PART 15 SUBPART C 15.247

TEST REPORT

FOR

Product Name: Wireless Bluetooth Keyboard

Model : APL-202BT, ike-202BT

Trade Name: Ezkey Corp.

Issued to

Ezkey Corp.

15-7, No.258, Lian Cheng Rd., Chung Ho City, Taipei Hsien, R.O.C. (235)

Issued by

Global Certification Corp.

| | | |
|----------------------|------------------------------|---|
| EMI Test Site | Sansia Lab | No. 34-3, Zihhe Rd., Sansia Township, Taipei County 237, Taiwan (R.O.C.) |
| EMS Test Site | Sijhih Office and Lab | No. 146, Sec. 2, Siangjhang Rd., Sijhih City, Taipei County 221, Taiwan (R.O.C.) |

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APPENDIX

PHOTOS OF EUT



1. GENERAL INFORMATION

Applicant : Ezkey Corp.

Address : 15-7, No.258, Lian Cheng Rd., Chung Ho City, Taipei Hsien, R.O.C.
(235)

Manufacturer : ShenZhen Eytech Electronic Co., LTD

Address : No.3 Gui Hua Rd., Wen Zai Keng Industrial Zone, Tang Xia Yong
Village, Song Gang Town, Bao An District, Shen Zhen City, Guang
Dong, China

EUT : Wireless Bluetooth Keyboard

Model Name : APL-202BT,ike-202BT

Model Differences : The difference among series model shown above is the program. The
model, APL-202BT, is the testing sample, and the final test data are
shown on this test report

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI C63.4-2003. The said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

FCC part 15 subpart C

Receipt Date : 10/01/2010

Final Test Date : 10/22/2010

Taipei, Taiwan

(Place)

Oct. 22, 2010

(Date)

Alex Chou / Manager

(Signature)

Designation Number: TW1030



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT Name : Wireless Bluetooth Keyboard
Model Number : APL-202BT
FCC ID : MWI2010BT01
Input Voltage : 3.3 Vdc
Power From ☒Inside ☐Outside
☐Adaptor ☒BATTERY ☐Power Supply ☐DC Power Source ☐Support Unit PC
Operate Frequency : Refer to the channel list as described below
Number of Channels : 79
Channel spacing : ☐N/A ☒1 MHz
Modulation Type : FHSS(GFSK)
Antenna Type : ☐integral antenna: ☒PCB Printing ☐a dedicated antenna
Antenna gain : 2.78dBi

| Channels | Frequencies (MHz) | Channels | Frequencies (MHz) |
|----------|-------------------|----------|-------------------|
| 0 | 2402 | 40 | 2442 |
| 1 | 2403 | 41 | 2443 |
| 2 | 2404 | 42 | 2444 |
| 3 | 2405 | 43 | 2445 |
| 4 | 2406 | 44 | 2446 |
| 5 | 2407 | 45 | 2447 |
| 6 | 2408 | 46 | 2448 |
| 7 | 2409 | 47 | 2449 |
| 8 | 2410 | 48 | 2450 |
| 9 | 2411 | 49 | 2451 |
| 10 | 2412 | 50 | 2452 |
| 11 | 2413 | 51 | 2453 |
| 12 | 2414 | 52 | 2454 |
| 13 | 2415 | 53 | 2455 |
| 14 | 2416 | 54 | 2456 |
| 15 | 2417 | 55 | 2457 |
| 16 | 2418 | 56 | 2458 |
| 17 | 2419 | 57 | 2459 |
| 18 | 2420 | 58 | 2460 |
| 19 | 2421 | 59 | 2461 |
| 20 | 2422 | 60 | 2462 |
| 21 | 2423 | 61 | 2463 |
| 22 | 2424 | 62 | 2464 |
| 23 | 2425 | 63 | 2465 |



| | | | |
|----|------|----|------|
| 24 | 2426 | 64 | 2466 |
| 25 | 2427 | 65 | 2467 |
| 26 | 2428 | 66 | 2468 |
| 27 | 2429 | 67 | 2469 |
| 28 | 2430 | 68 | 2470 |
| 29 | 2431 | 69 | 2471 |
| 30 | 2432 | 70 | 2472 |
| 31 | 2433 | 71 | 2473 |
| 32 | 2434 | 72 | 2474 |
| 33 | 2435 | 73 | 2475 |
| 34 | 2436 | 74 | 2476 |
| 35 | 2437 | 75 | 2477 |
| 36 | 2438 | 76 | 2478 |
| 37 | 2439 | 77 | 2479 |
| 38 | 2440 | 78 | 2480 |
| 39 | 2441 | | |

1.3 LIST OF MEASUREMENTS AND EXAMINATIONS

| FCC Rule | Description of Test | Result |
|--------------|--|--------|
| 15.203 | Antenna Requirement | Pass |
| 15.207 | Conducted Emission | N/A |
| 15.209 | Radiated Emission | Pass |
| 15.247(a)(1) | Channel Carrier Frequencies Separation | Pass |
| 15.247(a)(1) | 20dB Bandwidth Measurement | Pass |
| 15.247(a)(1) | Dwell Time | Pass |
| 15.247(b) | Number of Hopping Channels | Pass |
| 15.247(b) | Peak Output Power Measurement Data | Pass |
| 15.247(b) | Band Edges Measurement Data | Pass |



2. TEST METHODOLOGY

All testing as described bellowed were performed in accordance with ANSI C63.4:2003 and FCC CFR 47 Part 15 Subpart C.

2.1 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on a wood table, which is at 0.8 m above ground plane acceding to clause 15.207 and requirements of ANSI C63.4:2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

Radiated Emissions

The EUT is a placed on a turn table, which is 0.8 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

2.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| 10.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | () |
| 13.36 - 13.41 | | | |

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6



(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

2.3 DESCRIPTION OF TEST MODES

The EUT was tested under following modes:

Modes:

- 1. Continuous transmitting**

Channels:

- 1. 2.402GHz** (Lowest Channel)
- 2. 2.441GHz** (Middle Channel)
- 3. 2.480GHz** (Highest Channel)



2.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

| OUTSIDE SUPPORT EQUIPMENT | | | | | | | |
|---------------------------|-----------|----------------|-------------------|--------------------|------------|------------|--------------------|
| No. | Equipment | Model | Serial No. | FCC ID/ BSMI ID | Trade name | Data Cable | Power Cord |
| 1. | NB | CNU8111FS B | Presario B1200 | N/A | COMPAQ | N/A | Unshielded 1.8m |

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.



3. TEST AND MEASUREMENT EQUIPMENT

3.1 CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

3.2 EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

| Instrument | Manufacturer | Model No. | Serial No. | Calibration Due Date | Note |
|------------------------------|--------------|-----------------|------------|----------------------|------|
| EMC Test Receiver | R&S | ESCI | 100438 | Apr 29, 2011 | |
| Bilog Antenna | SUNOL | JB1 | A052204 | Nov 06, 2010 | |
| Turn table | EMCO | 2080 | 9508-1805 | N/A | |
| Controller | EMCO | 2090 | 9804-1328 | N/A | |
| Amplifier | G.W | GAP-801 | EF150001 | Jul.18, 2011 | |
| Amplifier | Schwarzbeck | BBV 9718 | 9718-008 | Aug. 10, 2011 | |
| Spectrum Analyzer | NEX1 | Ns-265 | 5044006 | Aug .07, 2011 | |
| RF Cable | BELDEN | RG-8/U | 28M-002 | Nov.02, 2010 | |
| RF Cable | Huber Suhner | SUCOFLEX 104 | 293864/4 | Nov.13, 2010 | |
| Thermo-Hygro meter | WISEWIND | 4-IN-1 | 050100378 | Apr. 08, 2011 | |
| Loop Antenna | TESEO | HLA6120 | 26349 | Sep.11, 2011 | |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 9120D-491 | Aug. 05, 2011 | |
| Wideband Peak Power Meter | Anritsu | ML2495A | 0841006 | Oct.03, 2011 | |



| | | | | | |
|-------------------|---------|--------|------------|--------------|-----------------------------------|
| Spectrum Analyzer | Agilent | E4408B | MY45107753 | Jun.24, 2011 | A Test Lab Technology Corp. |
| Bluetoooh TESTER | R&S | CBT | N/A | N/A | A Test Lab Technology Corp. |

※ Calibration interval of instruments listed above is one year



4. ANTENNA REQUIREMENTS

4.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247(b), if transmitting antennas of direction gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

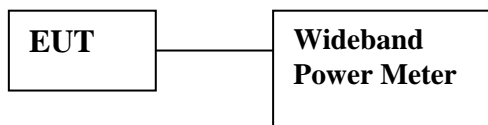
4.2 ANTENNA CONSTRUCTION AND DIRECTIONAL GAIN

Antenna type: PCB Antenna
Antenna Gain: 2.78dBi



5. PEAK OUTPUT POWER

5.1 TEST SETUP



5.2 LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to § 15.247(b)(3) , for systems using digital modulation in the bands of 902 – 928 MHz , 2400 – 2483.5 MHz: 1 Watt.
2. According to § 15.247(b)(4) , the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used , the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) , (b)(2) , and (b)(3) of this section , as appropriate , by the amount in dB that directional gain of the antenna exceeds 6 dBi.

5.3 TEST PROCEDURE

1. Peak power is measured using the wideband power meter.
2. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

5.4 TEST RESULT: PASSED

5.5 TEST DATA:

| Channel No. | Frequency (MHz) | Measurement Level (dbm) | Required Limit (dbm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 0 | 2402 | -2.36 | < 30 dbm | PASS |
| 39 | 2441 | -2.64 | < 30 dbm | PASS |
| 78 | 2480 | -2.66 | < 30 dbm | PASS |



6. AVERAGE POWER

6.1 TEST SETUP



6.2 LIMIT

None ; for reporting purposes only.

6.3 TEST PROCEDURE

The transmitter output is connected to the Power Meter . The Power Meter is set to the average power detection.

6.4 TEST RESULT: PASSED

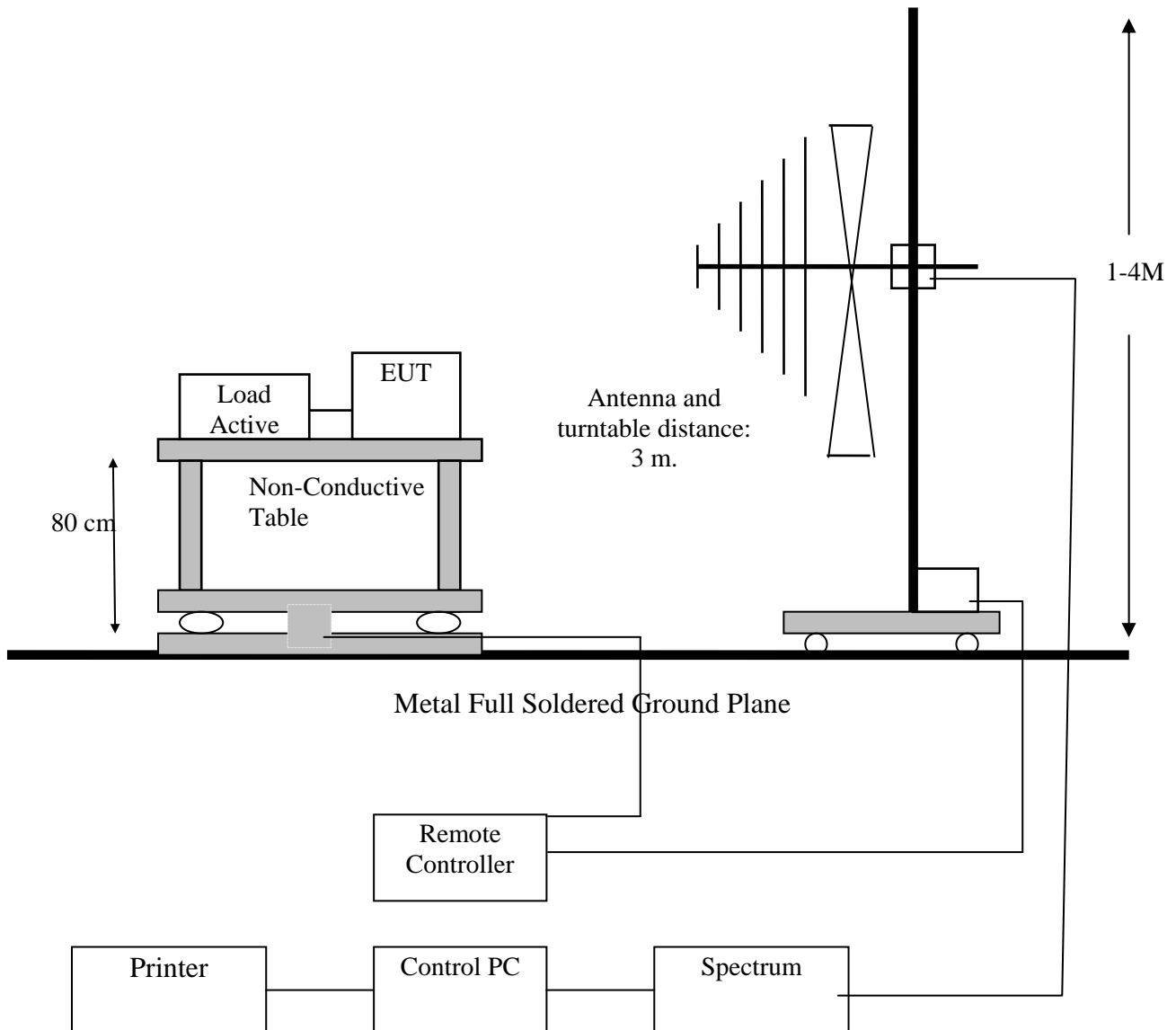


6.5 TEST DATA:

| Channel No. | Frequency (MHz) | Measurement Level (dbm) | Required Limit (dbm) | Result |
|-------------|-----------------|-------------------------|----------------------|--------|
| 0 | 2402 | -0.89 | < 30 dbm | PASS |
| 39 | 2441 | -0.69 | < 30 dbm | PASS |
| 78 | 2480 | -0.64 | < 30 dbm | PASS |

7. BAND EDGE

7.1 TEST SETUP





7.2 LIMIT

Restricted Bands:

| MHz | MHz | MHz | GHz |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2690 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | (²) |
| 13.36 - 13.41 | | | |

Operation within the bands:

902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

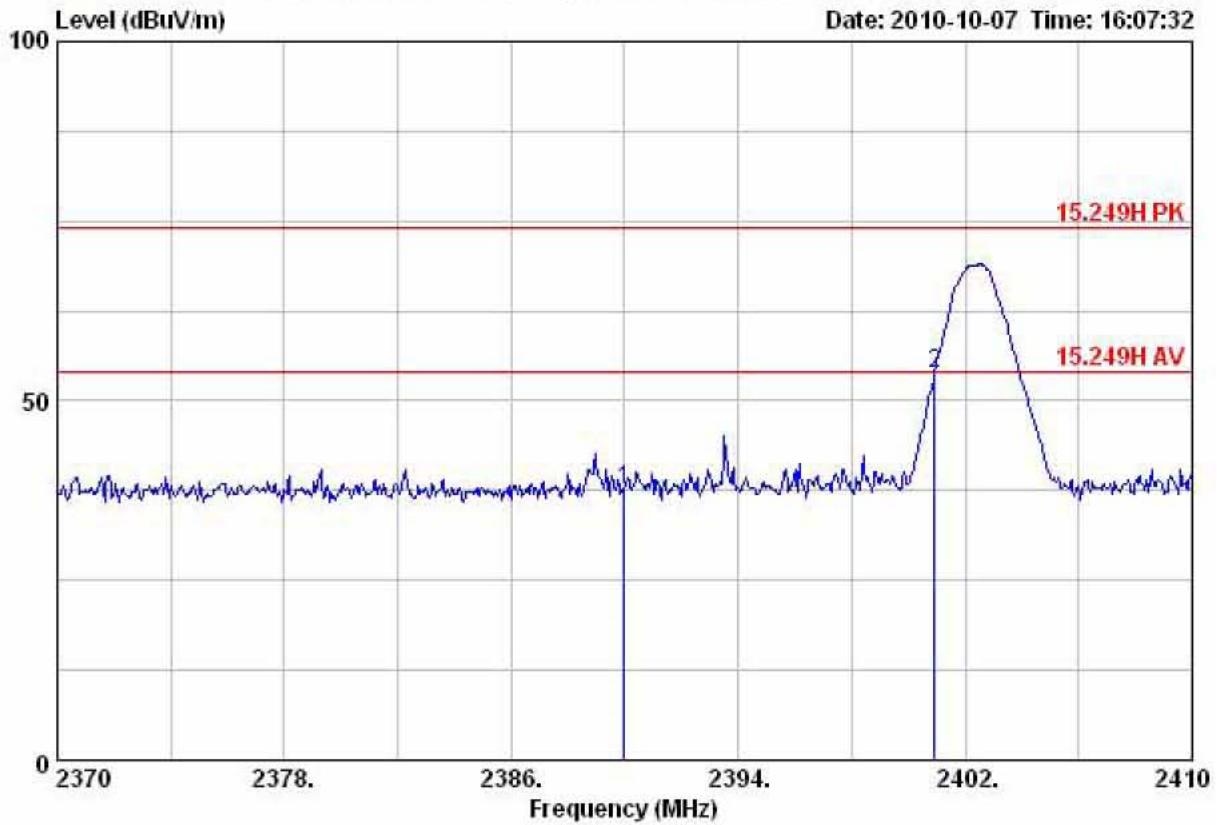
| Frequency (Hz) | Field Strength (μ V/m at 3-meter) | Field Strength (dB μ V/m at 3-meter) |
|----------------|---|---|
| 1.705-30 | 30 (at 30-meter) | 69.54 |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

7.3 RESULT: PASSED



7.4 TEST DATA:

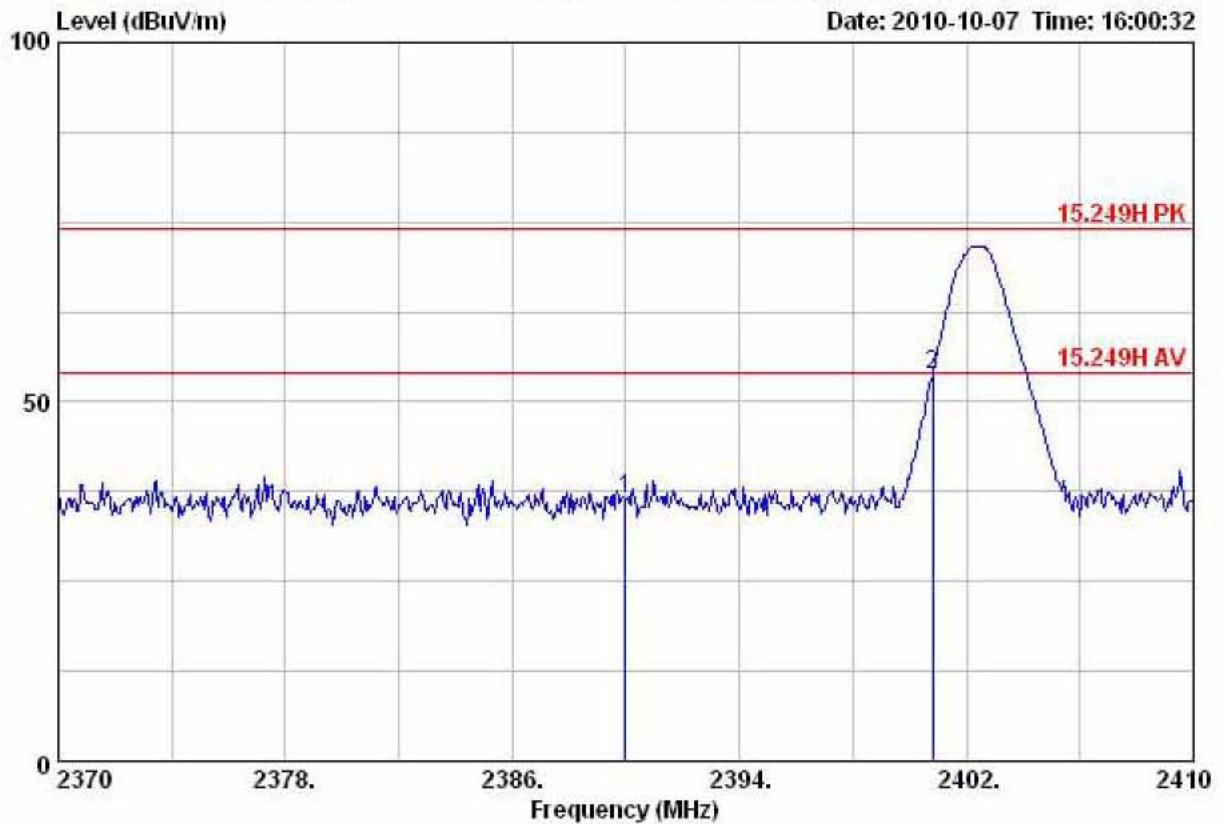
Lowest Channel- Horizontal



| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 2390.00 | 44.22 | -6.54 | 37.68 | 74.00 | -36.32 | Peak |
| 2 | 2400.92 | 60.33 | -6.46 | 53.87 | 74.00 | -20.13 | Peak |



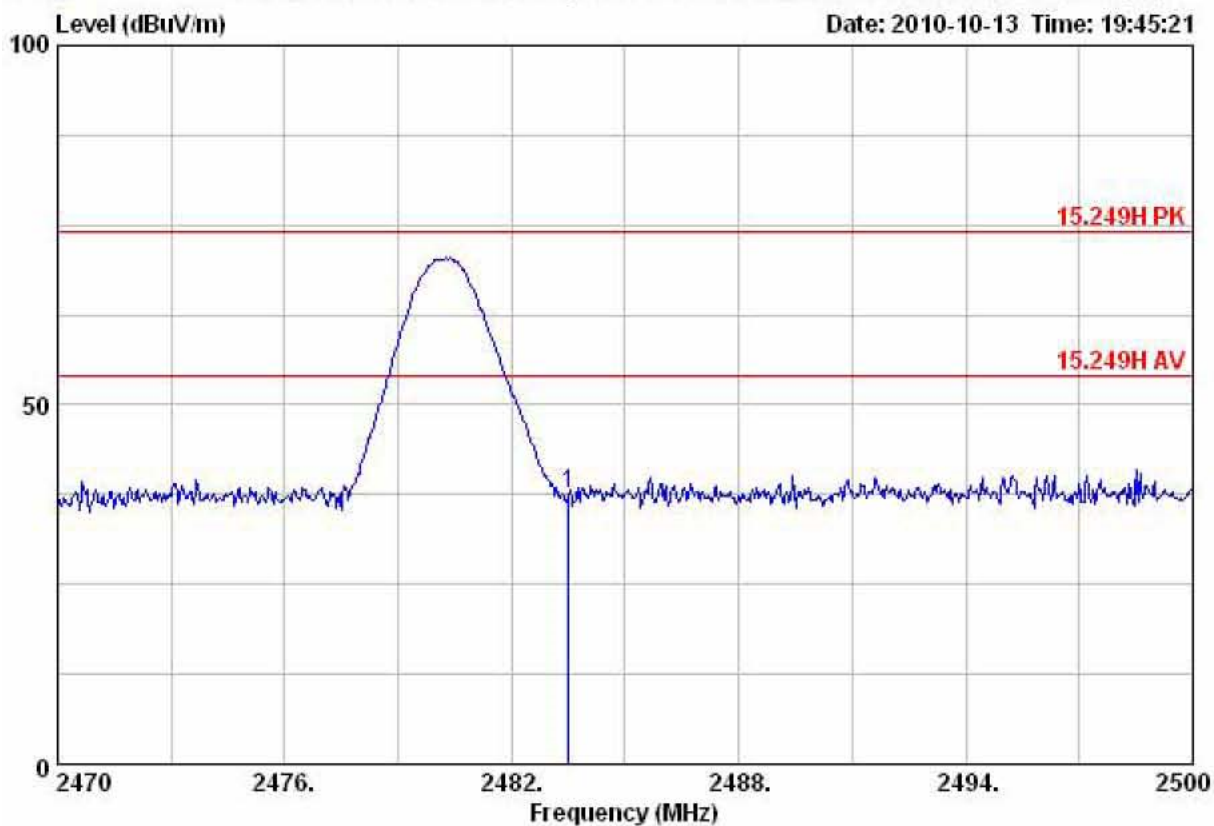
Lowest Channel-Vertical



| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 2390.00 | 42.97 | -6.54 | 36.43 | 74.00 | -37.57 | Peak |
| 2 | 2400.80 | 60.28 | -6.46 | 53.82 | 74.00 | -20.18 | Peak |



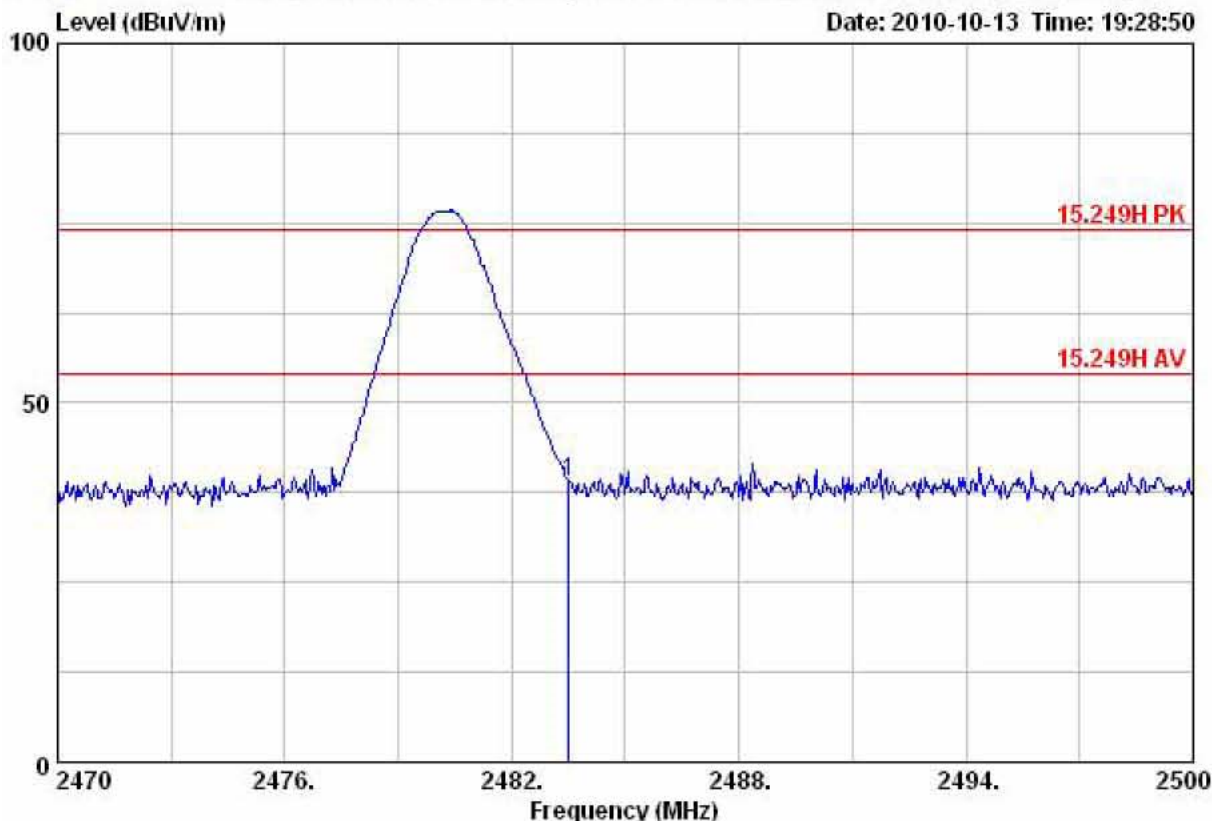
Highest Channel- Horizontal



| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 2483.50 | 43.30 | -5.74 | 37.56 | 74.00 | -36.44 | Peak |



Highest Channel- Vertical



| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---------|------------|--------|--------|------------|------------|--------|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | |
| 1 | 2483.50 | 44.83 | -5.74 | 39.09 | 74.00 | -34.91 | Peak |

Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements above 1000 MHz, Peak detector setting: use a 1 MHz RBW, a 3 MHz VBW.
5. Measurements above 1000 MHz, Average detector setting: 1 MHz RBW with 10 Hz VBW.
6. Peak detector measurement data will represent the worst case results.



8. 20DB BANDWIDTH

8.1 TEST LIMIT

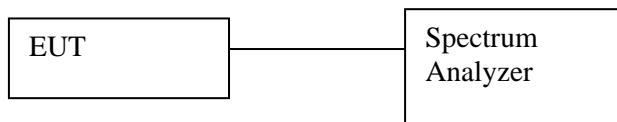
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 Mw.

8.2 TEST LIMIT

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100KHz.
- c. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

8.3 TEST SETUP LAYOUT



8.4 TEST RESULT AND DTA

| Channel | Frequency (MHz) | 20dB Bandwidth (KHz) |
|---------|-----------------|----------------------|
| 00 | 2402 | 992KHz |
| 39 | 2441 | 984 KHz |
| 78 | 2480 | 984KHz |



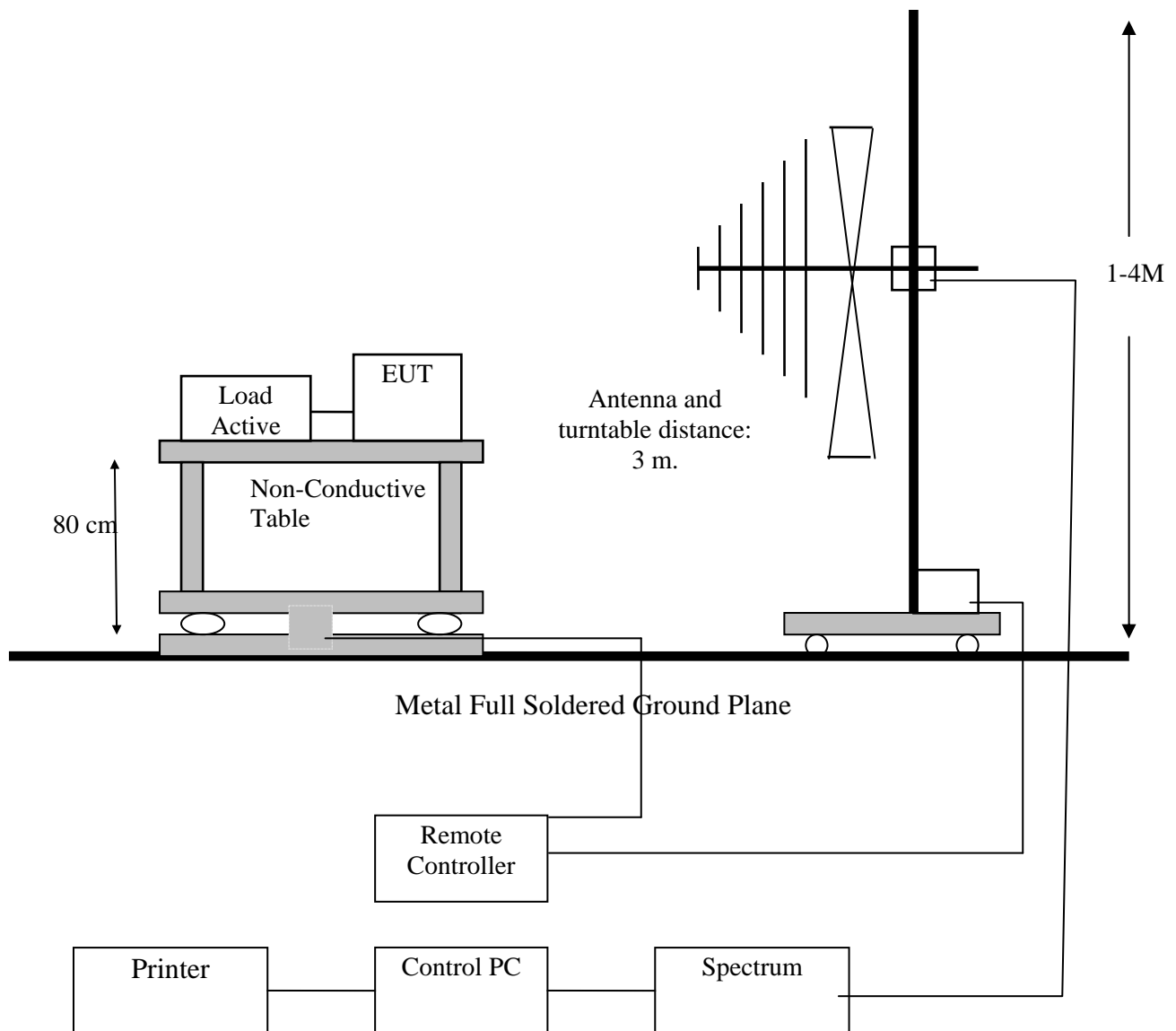
8.5 TEST DATA:





9. RADIATED EMISSION

9.1 TEST SETUP





9.2 LIMIT

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209 as below.

| Frequency (MHz) | Field Strength (mV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 1.705-30 | 30 | 30 |
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500* | 3 |

**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.

| Frequency (Hz) | Field Strength (μ V/m at 3-meter) | Field Strength (dB μ V/m at 3-meter) |
|----------------|---|---|
| 1.705-30 | 30 (at 30-meter) | 69.54 |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |



9.3 TEST PROCEDURE

1. The EUT was placed on a turntable, which was 0.8m above ground plane.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT was set at 3m away from the receiving antenna, which was varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was maximized by changing the polarization of receiving antenna, both horizontal and vertical.
6. Repeated above procedures until the measurements for all frequencies are completed.

9.4 RESULT: PASSED

9.5 TEST DATA:

All frequencies not described in this test report and within the range of the general radiated emission limits are not detectable significantly. The table as below is representing worst emissions found.

Highest Channel (worst emissions found)

Horizontal

| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 71.72 | 46.37 | -17.90 | 28.47 | 40.00 | Peak |
| 257.52 | 42.60 | -12.06 | 30.54 | 46.00 | Peak |
| 322.23 | 40.59 | -9.65 | 30.94 | 46.00 | Peak |
| 387.70 | 40.67 | -7.92 | 32.75 | 46.00 | Peak |
| 611.34 | 36.26 | -2.27 | 33.99 | 46.00 | Peak |
| 811.84 | 33.37 | 1.58 | 34.95 | 46.00 | Peak |
| 4804.00 | 42.60 | 0.94 | 43.54 | 74.00 | Peak |
| 7206.00 | 40.06 | 7.28 | 47.34 | 74.00 | Peak |
| 9608.00 | 38.70 | 10.49 | 49.19 | 74.00 | Peak |



Vertical

| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 60.27 | 44.22 | -18.57 | 25.65 | 40.00 | Peak |
| 263.36 | 41.14 | -11.52 | 29.62 | 46.00 | Peak |
| 324.88 | 14.07 | -9.57 | 31.50 | 46.00 | Peak |
| 377.33 | 39.78 | -8.18 | 31.60 | 46.00 | Peak |
| 601.08 | 36.61 | -2.48 | 34.13 | 46.00 | Peak |
| 911.06 | 33.42 | 4.00 | 37.42 | 46.00 | Peak |
| 4804.00 | 42.25 | 0.94 | 43.19 | 74.00 | Peak |
| 7206.00 | 40.85 | 7.28 | 48.13 | 74.00 | Peak |
| 9608.00 | 39.70 | 10.49 | 50.19 | 74.00 | Peak |

Middle Channel

Horizontal

| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 61.74 | 45.92 | -18.45 | 27.47 | 40.00 | Peak |
| 261.52 | 42.26 | -11.72 | 30.54 | 46.00 | Peak |
| 322.23 | 42.59 | -9.65 | 32.94 | 46.00 | Peak |
| 366.74 | 42.21 | -8.46 | 32.75 | 46.00 | Peak |
| 611.34 | 37.26 | -2.27 | 34.99 | 46.00 | Peak |
| 800.18 | 35.64 | 1.31 | 36.95 | 46.00 | Peak |
| 4896.00 | 41.40 | 1.02 | 42.42 | 74.00 | Peak |
| 7344.00 | 40.31 | 8.28 | 48.59 | 74.00 | Peak |
| 9792.00 | 40.71 | 10.83 | 51.54 | 74.00 | Peak |



Vertical

| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 53.51 | 44.56 | -17.91 | 26.62 | 40.00 | Peak |
| 251.36 | 41.11 | -12.49 | 28.62 | 46.00 | Peak |
| 324.88 | 41.07 | -9.57 | 31.50 | 46.00 | Peak |
| 375.31 | 40.83 | -8.23 | 32.60 | 46.00 | Peak |
| 666.08 | 37.37 | -1.24 | 36.13 | 46.00 | Peak |
| 921.16 | 33.11 | 4.31 | 37.42 | 46.00 | Peak |
| 4896.00 | 42.44 | 1.02 | 43.46 | 74.00 | Peak |
| 7344.00 | 40.31 | 8.28 | 48.59 | 74.00 | Peak |
| 9792.00 | 41.55 | 10.83 | 52.38 | 74.00 | Peak |

Lowest Channel

Horizontal

| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 70.74 | 42.36 | -17.89 | 24.47 | 40.00 | Peak |
| 239.52 | 40.33 | -12.79 | 27.54 | 46.00 | Peak |
| 321.00 | 37.63 | -9.69 | 27.94 | 46.00 | Peak |
| 361.74 | 38.33 | -8.58 | 29.75 | 46.00 | Peak |
| 633.34 | 39.81 | -1.82 | 37.99 | 46.00 | Peak |
| 800.18 | 39.64 | 1.31 | 40.95 | 46.00 | Peak |
| 4960.00 | 44.91 | 1.07 | 45.95 | 74.00 | Peak |
| 7440.00 | 39.29 | 8.97 | 48.26 | 74.00 | Peak |
| 9920.00 | 39.61 | 11.05 | 50.66 | 74.00 | Peak |



Vertical

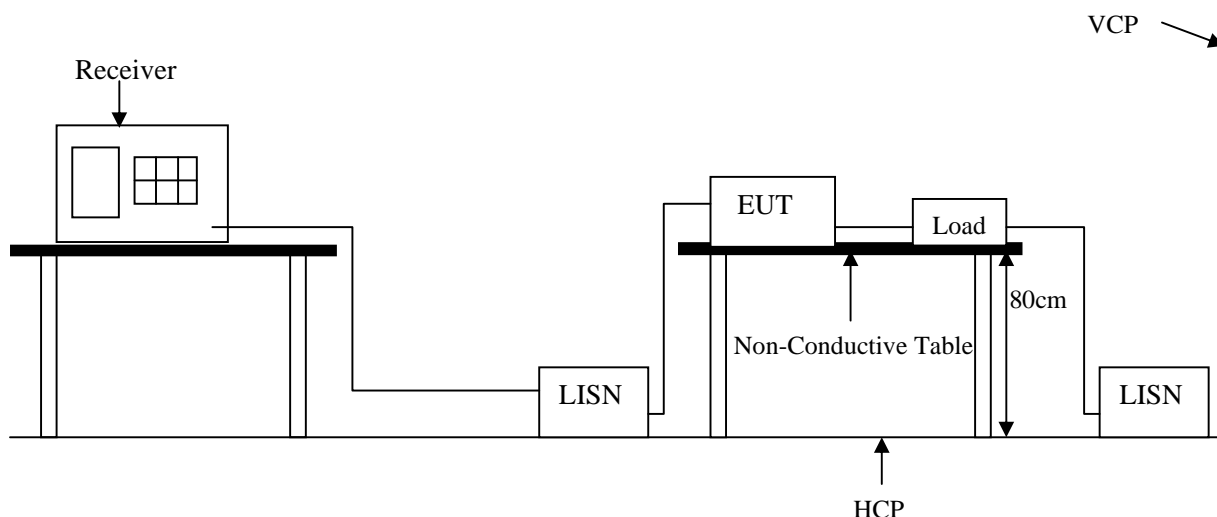
| Frequency (MHz) | Reading (dBuV) | Correction factor(dB) | Spurious Emissions (dBuV/m) | Limit (dBuV/m) | Remark |
|-----------------|----------------|-----------------------|-----------------------------|----------------|--------|
| 51.34 | 45.34 | -17.69 | 27.65 | 40.00 | Peak |
| 249.22 | 41.23 | -12.61 | 28.62 | 46.00 | Peak |
| 324.88 | 41.07 | -9.57 | 31.50 | 46.00 | Peak |
| 373.38 | 40.88 | -8.28 | 32.60 | 46.00 | Peak |
| 674.08 | 39.24 | -1.11 | 38.13 | 46.00 | Peak |
| 833.16 | 39.36 | 2.06 | 41.42 | 46.00 | Peak |
| 4960.00 | 42.08 | 1.07 | 43.15 | 74.00 | Peak |
| 7440.00 | 40.43 | 8.97 | 49.40 | 74.00 | Peak |
| 9920.00 | 40.04 | 11.05 | 51.09 | 74.00 | Peak |

Note:

1. Emission level = Reading level + Correction factor
2. Correction factor : Antenna factor, Cable loss, PreAmp, etc.
3. All emissions as described above were determining by rotating the EUT through three orthogonal axes to maximizing the emissions if the EUT belongs to hand-held or body-worn devices.
4. Measurements from 9 kHz to 150 kHz, Peak detector setting: 100 Hz RBW
5. Measurements from 150 kHz to 30MHz, Peak detector setting: 10 kHz RBW
6. Measurements from 30 MHz to 1000 MHz, Peak detector setting: 100 kHz RBW
7. Measurements from 9 kHz to 150 kHz, CISPR Quasi-Peak detector: 200 Hz RBW
8. Measurements from 150 kHz to 30MHz, CISPR Quasi-Peak detector: 9 kHz RBW
9. Measurements from 30 MHz to 1000 MHz, CISPR Quasi-Peak detector: 120 kHz RBW
10. Peak detector measurement data will represent the worst case results.

10. CONDUCTED EMISSIONS

10.1 TEST SETUP



10.2 LIMIT

| Frequency range (MHz) | CLASS A | | CLASS B | |
|-----------------------|-----------|----------------|--------------|----------------|
| | QP dB(uV) | Average dB(uV) | QP dB(uV) | Average dB(uV) |
| 0.15-0.5 | 79 dBuV | 66 dBuV | 66 - 56 dBuV | 56 - 46 dBuV |
| 0.5-5.0 | 73 dBuV | 60 dBuV | 56 dBuV | 46 dBuV |
| 5.0-30.0 | 73 dBuV | 60 dBuV | 60 dBuV | 50 dBuV |

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

10.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μ H coupling impedance with 50 ohm termination. (Please refer to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55022 regulations: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz.

10.4 TEST SPECIFICATION

According to PART15.207



10.5 RESULT: NOT AVAILABLE, BECAUSE EUT IS POWERED BY BATTERY.

10.6 TEST DATA: N/A



11. SPURIOUS EMISSIONS (CHANNEL CARRIER FREQUENCIES SEPARATION)

11.1 CONDUCTED MEASUREMENT

11.2 TEST SETUP



11.3 LIMIT

According to § 15.247(d) , in any 100 kHz bandwidth outside the frequency bands 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 , provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands , as defined in § 15.205(a) , must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

11.4 TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 13 GHz to 26GHz range for IEEE 802.11b/g.

11.5 TEST RESULTS: PASSED



11.6 TEST DATA:

Modulation Standard: GFSK (1Mbps)

| Channel | Frequency (MHz) | Channel Separation |
|---------|-----------------|--------------------|
| 00 | 2402 | 996KHz |
| 39 | 2441 | 1.000 |
| 78 | 2480 | 1.000 |

Lowest Channel





Middle Channel



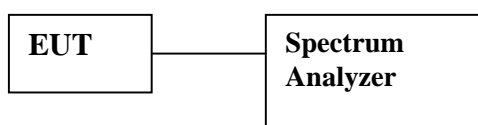
Highest Channel





12. DWELL TIME ON EACH CHANNEL

12.1 TEST SETUP



12.2 TEST LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

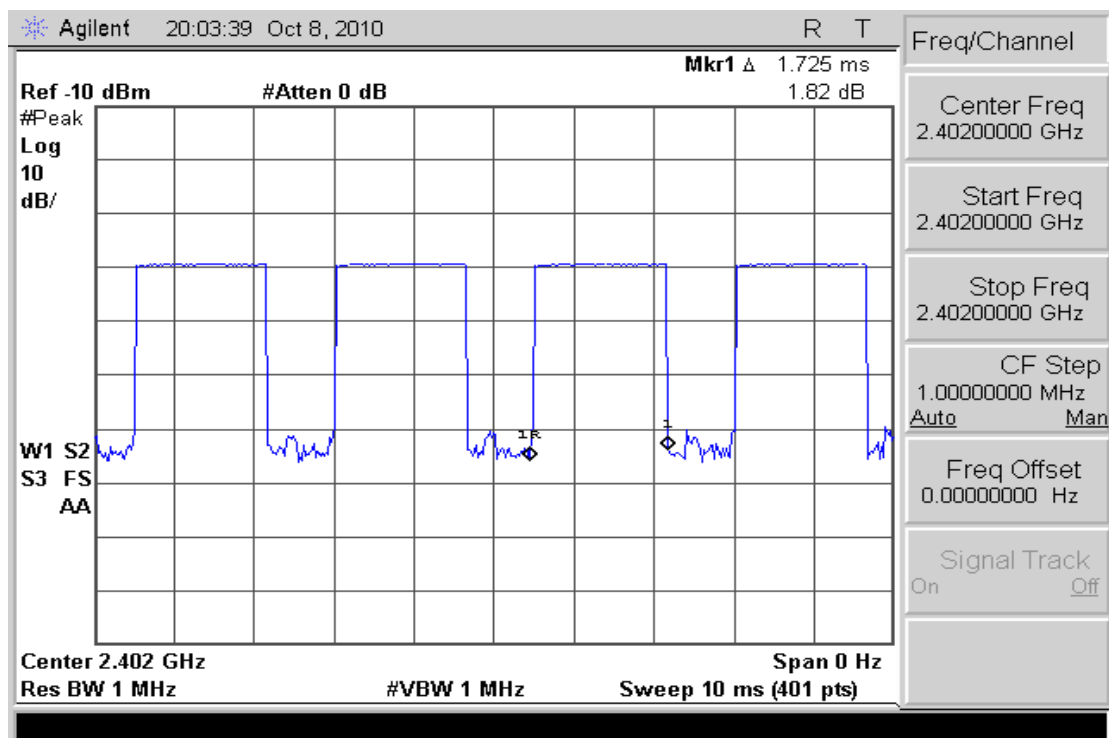
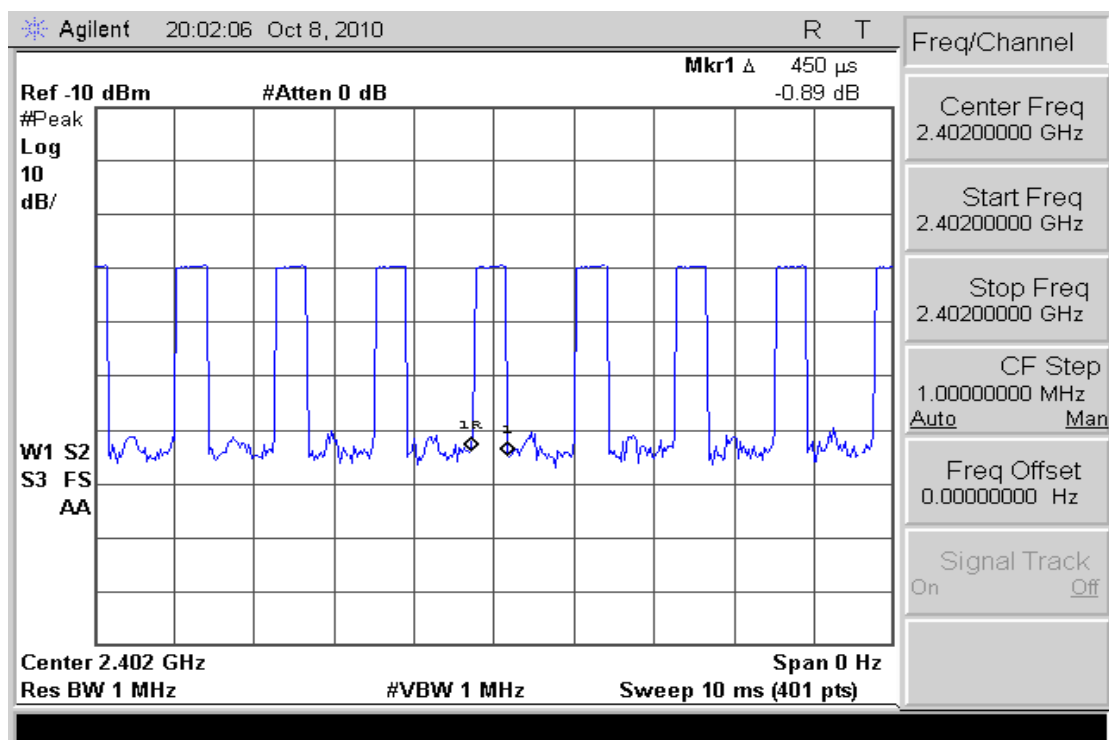
12.3 TEST PROCEDURES

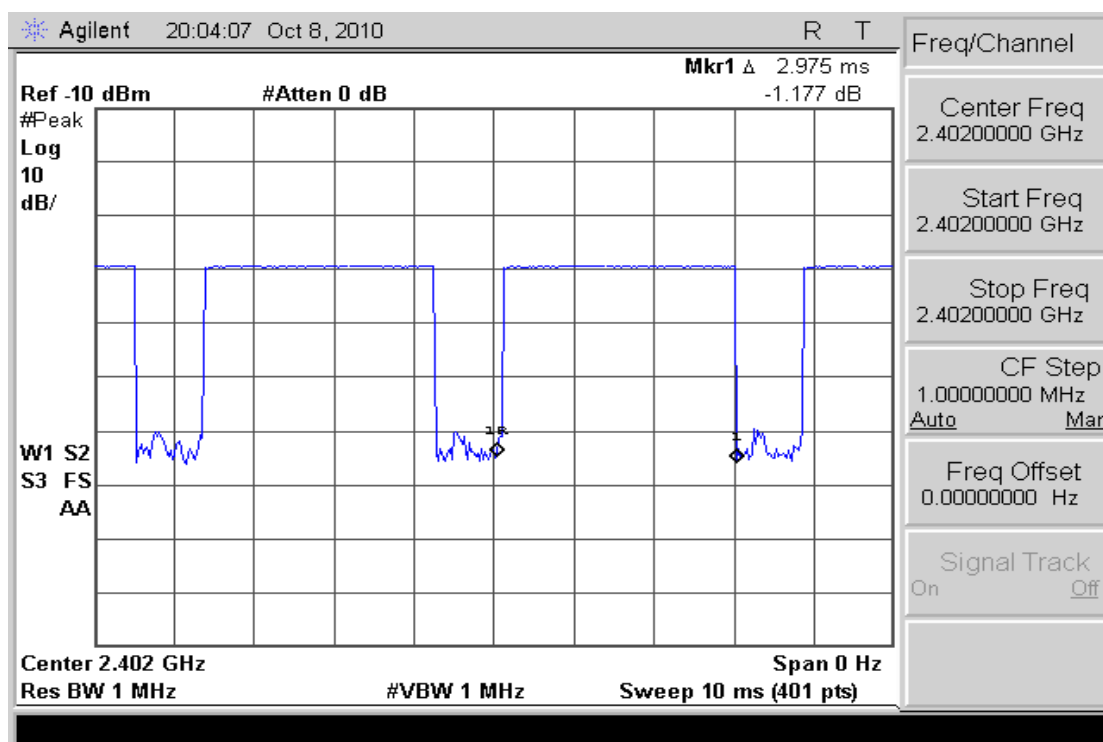
- 1) The transmitter output was connected to the spectrum analyzer.
- 2) Adjust the center frequency to measure frequency, then set zero span mode.
- 3) Set RBW of spectrum analyzer to 1000 KHz and VBW to 1000 KHz.
- 4) Measure the time duration of one transmission on the measured frequency.

12.4 TEST RESULTS: PASSED



12.5 TEST DATA:







13. NUMBER OF HOPPING CHANNELS

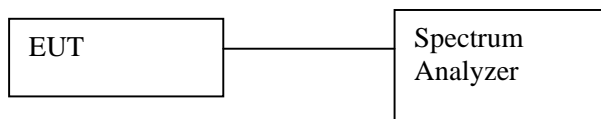
13.1 TEST LIMIT

Frequency hopping systems in the 2400~2483.5MHz band shall use at least 15 channels.

13.2 TEST PROCEDURES

- a. The transmitter output was connected to the spectrum analyzer.
- b. 2. Set RBW of spectrum analyzer to 1000 KHz and VBW to 1000 KHz.
- c. 3. Set the Max Hold function, and then keep the EUT in hopping mode.
Record all the signals from each channel until each one has been record.

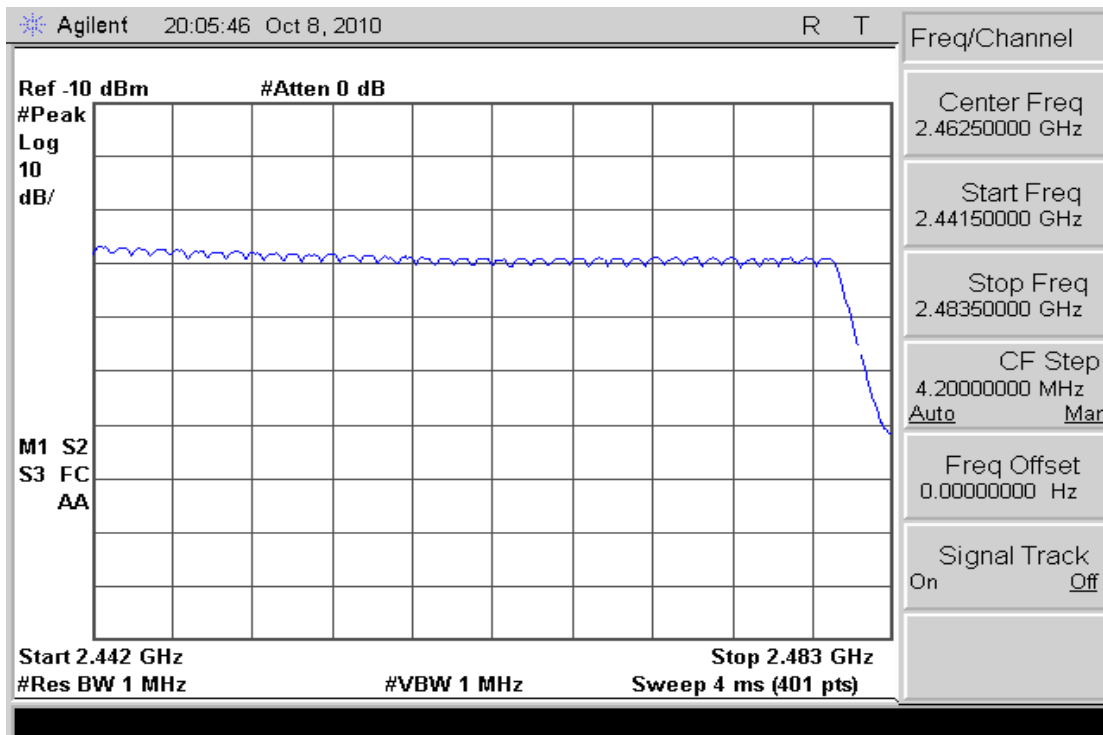
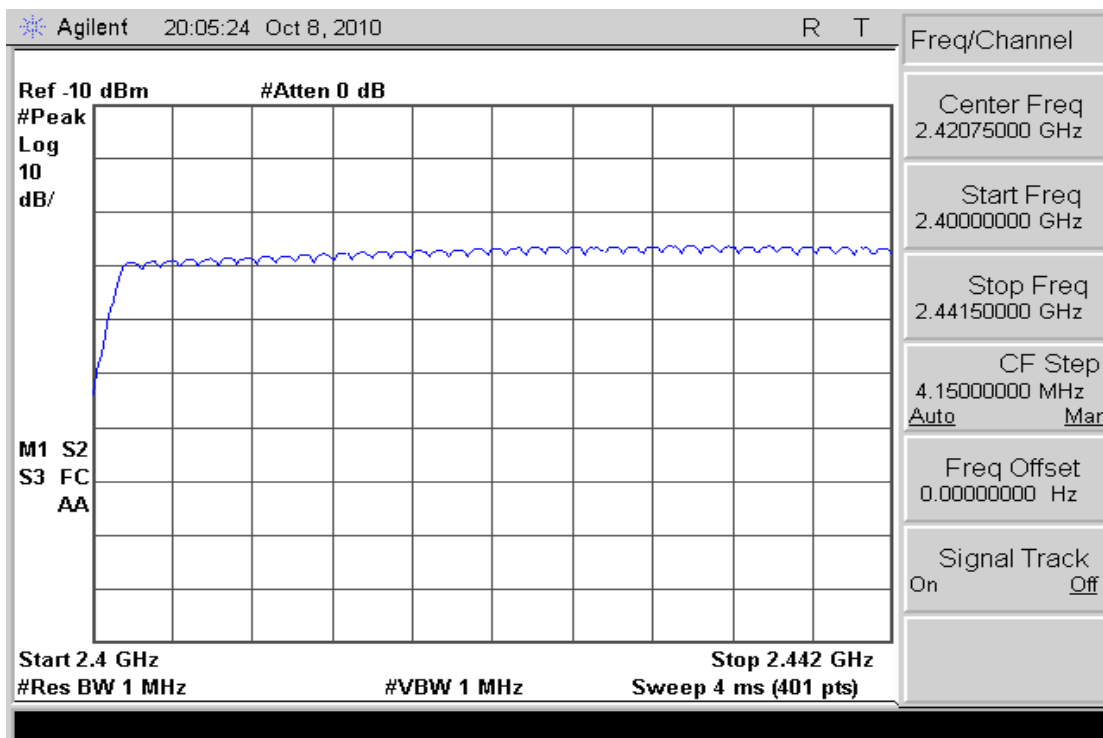
13.3 TEST SETUP LAYOUT



13.4 TEST RESULT AND DATA

Modulation Standard: GFSK (1Mbps)

| | | |
|-----------------------------|----|----------|
| Number of hopping channels: | 79 | channels |
|-----------------------------|----|----------|





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Appendix 1

PHOTOS OF TEST CONFIGURATION



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Report No. : F000102

RADIATED EMISSION TEST



Front View



Rear View