

FCC TEST REPORT
for
Shenzhen Loyal Electronics Co., Ltd.

Keyboard
Model No.: KG8004

Prepared for : Shenzhen Loyal Electronics Co., Ltd.
Address : 8F, Bldg. A, Huayuan Technology Park, Fenghuang Industrial
Zone, Fuyong, Bao'an, Shenzhen

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Report Number : 201110674F
Date of Test : Oct. 12~17, 2011
Date of Report : Oct. 18, 2011

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APPENDIX I (Photos of EUT) (3 Pages)

TEST REPORT

Applicant : Shenzhen Loyal Electronics Co., Ltd.
 Manufacturer : Shenzhen Loyal Electronics Co., Ltd.
 EUT : Keyboard
 Model No. : KG8004
 Serial No. : N.A.
 Rating : 3.0V \pm , 15mA max.
 Trade Mark : N.A.

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.249 & 15.209

The device described above is tested by Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek Compliance Laboratory Limited

Date of Test : Oct. 12~17, 2011

Rock zeng

Prepared by : (Engineer / Rock Zeng)

Coco Xiang

Reviewer : (Project Manager / Coco Xiang)

Henry Yang

Approved & Authorized Signer : (Manager / Henry Yang)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

| | |
|-----------------------|---|
| EUT | : Keyboard |
| Model Number | : KG8004 |
| Test Power Supply | : DC 3 V |
| Frequency | : 2410~2473MHz |
| Channels | : 2410~2473MHz (A total of 64 channels with channel spacing of 1MHz. Under normal working condition, choose 20 channels of 64 randomly) |
| Antenna Specification | : Printed Antenna:1dBi |
| Applicant Address | : Shenzhen Loyal Electronics Co., Ltd. : 8F, Bldg. A, Huayuan Technology Park, Fenghuang Industrial Zone, Fuyong, Bao'an, Shenzhen |
| Manufacturer Address | : Shenzhen Loyal Electronics Co., Ltd. : No.31, Furong Road, Gushu Village, Xixiang Town, Bao'an District, Shenzhen |
| Date of receiver | : Oct. 11, 2011 |
| Date of Test | : Oct. 12~17, 2011 |

1.2. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS - LAB Code: L3503

Anbotek Compliance Laboratory Limited., Laboratory has been assessed and in compliance with CNAS/CL01: 2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

FCC-Registration No.: 752021

Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 752021, August 20, 2010.

IC-Registration No.: 8058A-1

Anbotek Compliance Laboratory Limited., EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration 8058A-1, August 30, 2010.

Test Location

All Emissions tests were performed at
Anbotek Compliance Laboratory Limited. at 1/F, 1 /Building, SEC Industrial Park,
No. 4 Qianhai Road, Nanshan District, Shenzhen, 518054, China

1.3. Measurement Uncertainty

Radiation Uncertainty : Ur = 4.3dB

Conduction Uncertainty : Uc = 3.4dB

2. MEASURING DEVICE AND TEST EQUIPMENT

| Equipment | Manufacturer | Model # | Serial # | Data of Cal. | Due Data |
|---|----------------------|---------|------------|--------------|--------------|
| EMI Test Receiver | Rohde & Schwarz | ESCI | 100119 | Mar.03, 2011 | Mar.02, 2012 |
| EMI Test Receiver | Rohde & Schwarz | ESIB26 | 100249 | Sep.22, 2011 | Sep.21, 2012 |
| EMI Test Software | SHURPLE | ESK1 | N/A | N/A | N/A |
| Spectrum Analyzer | Agilent | E7405A | MY45114970 | Jun.21, 2011 | Jun.20, 2012 |
| Signal Generator | Rohde & Schwarz | SMR27 | 100124 | Jul.06, 2010 | Jul.05, 2012 |
| Signal Generator | Rohde & Schwarz | SML03 | 102319 | Aug.01, 2010 | Aug.01, 2012 |
| AC Power Source | Sepcial power system | YF650 | N/A | N/A | N/A |
| Absorbing Clamp | Rohde & Schwarz | MDS21 | 100218 | Apr.30, 2010 | Apr.29, 2012 |
| Power Meter | Rohde & Schwarz | NRVD | 101287 | Jul.19, 2011 | Jul.18, 2012 |
| Coaxial Cable | N/A | N/A | N/A | May.31, 2011 | May.30, 2012 |
| Coaxial Cable | N/A | N/A | N/A | May.31, 2011 | May.30, 2012 |
| Coaxial Cable | N/A | N/A | N/A | May.31, 2011 | May.30, 2012 |
| Universal radio Communication tester | Rohde & Schwarz | CMU200 | 101724 | Sep.08, 2011 | Sep.07, 2012 |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | N/A | N/A | N/A |
| BiConilog Antenna | ETS-LINDGREN | 3142C | 00042670 | Mar.03, 2011 | Mar.02, 2012 |
| BiConilog Antenna | ETS-LINDGREN | 3142C | 00042673 | Mar.03, 2011 | Mar.02, 2012 |
| Double-ridged Waveguide horn | ETS-LINDGREN | 3117 | 00035926 | Dec.30, 2009 | Dec.29, 2011 |
| Double-ridged Waveguide horn | ETS-LINDGREN | 3117 | 00041545 | Dec.30, 2009 | Dec.29, 2011 |
| Pre-amplifier | CD | PAM0203 | 804203 | Jun.21, 2011 | Jun.20, 2012 |
| RF Switch | CD | RSU-M3 | 706543 | Jun.21, 2011 | Jun.20, 2012 |
| Thermo-/Hygrometer | N/A | TH01 | N/A | May.03, 2011 | May.02, 2012 |
| Shielding Room | Zhong Yu Electronic | N/A | N/A | N/A | N/A |
| 3m Semi-Anechoic Chamber | Zhong Yu Electronic | N/A | N/A | Apr.28, 2010 | Apr.27, 2012 |

3. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2009 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.4-2009 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation. When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

4. Radiation Interference

4.1. Requirements (15.249, 15.209):

| FIELD STRENGTH of Fundamental: 902-928 MHZ 2.4-2.4835 GHz 94 dB μ V/m @3m | FIELD STRENGTH of Harmonics 54 dB μ V/m @3m | S15.209 30 - 88 MHz 88 - 216 MHz 216 - 960 MHz ABOVE 960 MHz | 40 dBuV/m @3M 43.5 46 54dBuV/m |
|---|---|--|---|
|---|---|--|---|

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

4.2 Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9*6*6 Chamber.

The test results are listed in Section 4.3.

4.3 Test Results

PASS.

Please refer the following pages.

FCC ID: Z5X8004TX

Data:

| Horizontal CH Low(2410MHz) | | | | | | | | |
|-------------------------------|-------|--------|--------|------------|--------------|--------------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dB μ V/m | dB μ V/m | Limit | |
| | dB | dB/m | dB | dB μ V | | | dB | |
| 420.58 | 1.6 | 13.28 | 21.90 | 46.63 | 39.61 | 46.00 | -6.39 | QP |
| 935.54 | 1.65 | 13.45 | 11.31 | 36.07 | 39.86 | 46.00 | -6.14 | QP |
| 2410.00 | 2.20 | 31.26 | 35.36 | 88.10 | 86.20 | 114.0 | -27.80 | Peak |
| 2410.00 | 2.20 | 31.26 | 35.36 | 85.50 | 83.60 | 94.0 | -10.40 | AV |
| 4820.08 | 2.63 | 35.11 | 34.73 | 36.55 | 39.56 | 74.0 | -34.44 | Peak |
| 4820.08 | 2.63 | 35.11 | 34.73 | 33.87 | 36.88 | 54.0 | -17.14 | AV |
| 7230.03 | 3.11 | 36.20 | 35.15 | 36.37 | 40.53 | 74.0 | -33.69 | Peak |
| 7230.03 | 3.11 | 36.20 | 35.15 | 33.26 | 37.42 | 54.0 | -16.58 | AV |
| 9640.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12050.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14460.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 16870.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19280.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 21690.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24100.00 | --- | --- | --- | --- | --- | --- | --- | --- |

| CH Middle(2442MHz) | | | | | | | | |
|--------------------|-------|--------|--------|------------|--------------|--------------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dB μ V/m | dB μ V/m | Limit | |
| | dB | dB/m | dB | dB μ V | | | dB | |
| 319.93 | 1.61 | 13.30 | 32.40 | 47.97 | 30.48 | 46.00 | -15.52 | QP |
| 2442.01 | 2.19 | 31.25 | 35.88 | 88.00 | 85.56 | 114.0 | -28.44 | Peak |
| 2442.01 | 2.19 | 31.25 | 35.88 | 85.00 | 82.56 | 94.0 | -11.44 | AV |
| 4884.12 | 2.60 | 35.11 | 34.72 | 38.03 | 41.02 | 74.0 | -32.98 | Peak |
| 4884.12 | 2.60 | 35.11 | 34.72 | 35.33 | 38.32 | 54.0 | -15.68 | AV |
| 7326.25 | 3.07 | 36.19 | 35.15 | 34.48 | 38.59 | 74.0 | -35.41 | Peak |
| 7326.25 | 3.07 | 36.19 | 35.15 | 31.39 | 35.50 | 54.0 | -18.50 | AV |
| 9768.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12210.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14652.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 17094.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19536.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 21978.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24420.00 | --- | --- | --- | --- | --- | --- | --- | --- |

FCC ID: Z5X8004TX

| CH High(2473MHz) | | | | | | | | |
|------------------|-------|--------|--------|------------|--------------|--------------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dB μ V/m | dB μ V/m | Limit | |
| | dB | dB/m | dB | dB μ V | | | dB | |
| 318.88 | 1.59 | 13.30 | 33.37 | 50.08 | 31.60 | 46.00 | -14.40 | QP |
| 2473.00 | 2.21 | 31.28 | 36.00 | 87.66 | 85.15 | 114.0 | -28.85 | Peak |
| 2473.00 | 2.21 | 31.28 | 36.00 | 84.96 | 82.45 | 94.0 | -11.55 | AV |
| 4946.10 | 2.65 | 35.03 | 34.76 | 37.54 | 40.46 | 74.0 | -33.54 | Peak |
| 4946.10 | 2.65 | 35.03 | 34.76 | 34.50 | 37.42 | 54.0 | -16.58 | AV |
| 7419.02 | 3.10 | 36.17 | 35.20 | 34.58 | 38.65 | 74.0 | -35.35 | Peak |
| 7419.02 | 3.10 | 36.17 | 35.20 | 31.60 | 35.67 | 54.0 | -18.33 | AV |
| 9892.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12365.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14838.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 17311.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19784.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 22257.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24730.00 | --- | --- | --- | --- | --- | --- | --- | --- |

| Vertical CH Low(2410MHz) | | | | | | | | |
|-----------------------------|-------|--------|--------|------------|--------------|--------------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dB μ V/m | dB μ V/m | Limit | |
| | dB | dB/m | dB | dB μ V | | | dB | |
| 139.85 | 1.50 | 12.40 | 41.20 | 49.61 | 22.31 | 43.50 | -21.19 | QP |
| 2410.02 | 2.17 | 31.23 | 36.00 | 88.09 | 85.49 | 114.0 | -28.51 | Peak |
| 2410.02 | 2.17 | 31.23 | 36.00 | 85.40 | 82.80 | 94.0 | -11.20 | AV |
| 4820.10 | 2.50 | 35.11 | 34.66 | 36.78 | 39.73 | 74.0 | -34.27 | Peak |
| 4820.10 | 2.50 | 35.11 | 34.66 | 33.98 | 36.93 | 54.0 | -17.07 | AV |
| 7207.93 | 3.03 | 36.14 | 35.07 | 34.52 | 38.62 | 74.0 | -33.38 | Peak |
| 7207.93 | 3.03 | 36.14 | 35.07 | 31.56 | 35.66 | 54.0 | -18.34 | AV |
| 9608.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12010.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14412.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 16814.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19216.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 21618.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24020.00 | --- | --- | --- | --- | --- | --- | --- | --- |

FCC ID: Z5X8004TX

| CH Middle(2442MHz) | | | | | | | | |
|--------------------|-------|--------|--------|-------|--------|--------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dBμV/m | dBμV/m | Limit | |
| | dB | dB/m | dB | dBμV | | | dB | |
| 319.94 | 1.59 | 13.10 | 37.34 | 54.21 | 31.56 | 46.00 | -14.44 | QP |
| 2442.01 | 2.16 | 31.25 | 35.90 | 86.36 | 83.87 | 114.0 | -30.13 | Peak |
| 2442.01 | 2.16 | 31.25 | 35.90 | 83.36 | 80.87 | 94.0 | -13.13 | AV |
| 4884.12 | 2.44 | 35.06 | 34.32 | 38.51 | 41.69 | 74.0 | -32.31 | Peak |
| 4884.12 | 2.44 | 35.06 | 34.32 | 35.62 | 38.80 | 54.0 | -15.20 | AV |
| 7326.25 | 3.01 | 36.13 | 35.10 | 33.79 | 37.83 | 74.0 | -36.17 | Peak |
| 7326.25 | 3.01 | 36.13 | 35.10 | 31.29 | 35.33 | 54.0 | -18.67 | AV |
| 9768.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12210.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14652.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 17094.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19536.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 21978.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24420.00 | --- | --- | --- | --- | --- | --- | --- | --- |

| CH High(2473MHz) | | | | | | | | |
|------------------|-------|--------|--------|-------|--------|--------|--------|--------|
| Frequency | Cable | Ant | Preamp | Read | Level | Limit | Over | Remark |
| MHz | Loss | Factor | Factor | Level | dBμV/m | dBμV/m | Limit | |
| | dB | dB/m | dB | dBμV | | | dB | |
| 96.43 | 1.46 | 12.23 | 30.23 | 41.50 | 24.96 | 43.50 | -18.54 | QP |
| 2473.00 | 2.10 | 31.21 | 35.36 | 85.80 | 83.75 | 114.0 | -30.25 | Peak |
| 2473.00 | 2.10 | 31.21 | 35.36 | 82.89 | 80.84 | 94.0 | -13.25 | AV |
| 4946.10 | 2.33 | 35.06 | 34.77 | 35.09 | 37.71 | 74.0 | -36.29 | Peak |
| 4946.10 | 2.33 | 35.06 | 34.77 | 33.49 | 36.11 | 54.0 | -17.89 | AV |
| 7419.02 | 3.08 | 36.11 | 34.66 | 34.38 | 38.91 | 74.0 | -35.09 | Peak |
| 7419.02 | 3.08 | 36.11 | 34.66 | 31.88 | 36.41 | 54.0 | -17.59 | AV |
| 9892.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 12365.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 14838.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 17311.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 19784.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 22257.00 | --- | --- | --- | --- | --- | --- | --- | --- |
| 24730.00 | --- | --- | --- | --- | --- | --- | --- | --- |

NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

5. Occupied Bandwidth

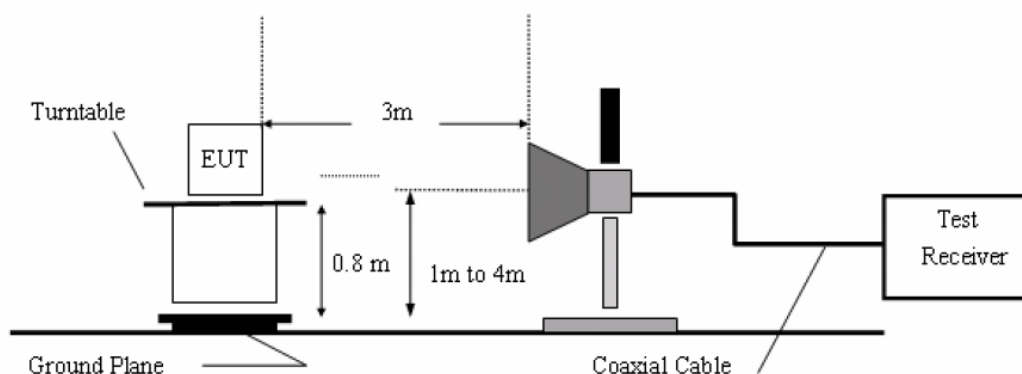
5.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

5.2. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

5.3. Test Configuration:



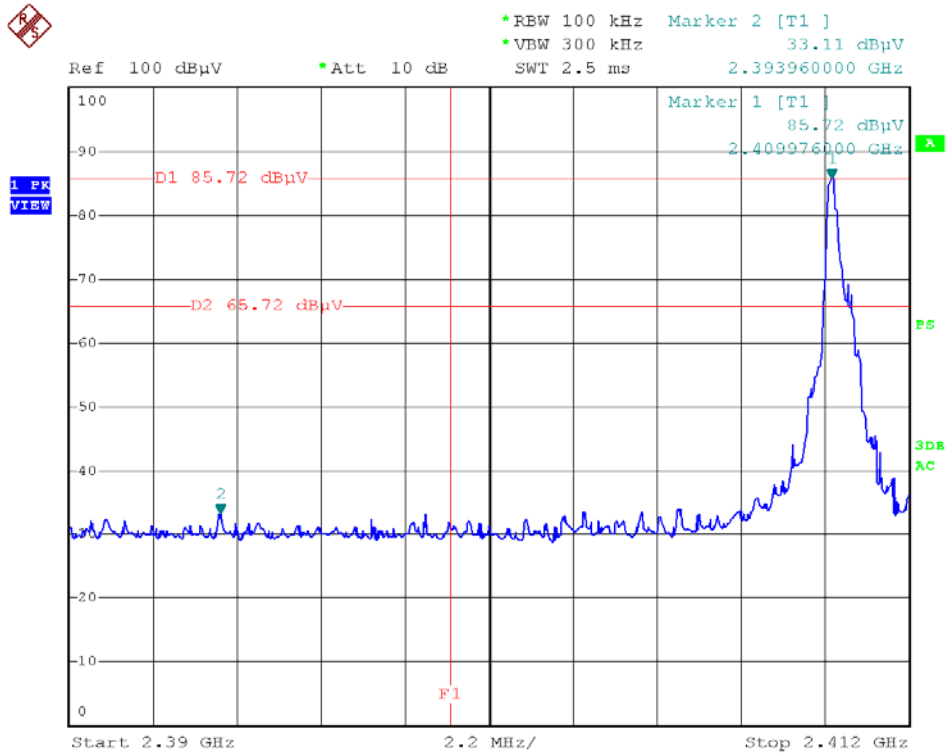
5.4. Test Results

Pass.

Please refer the following plot.

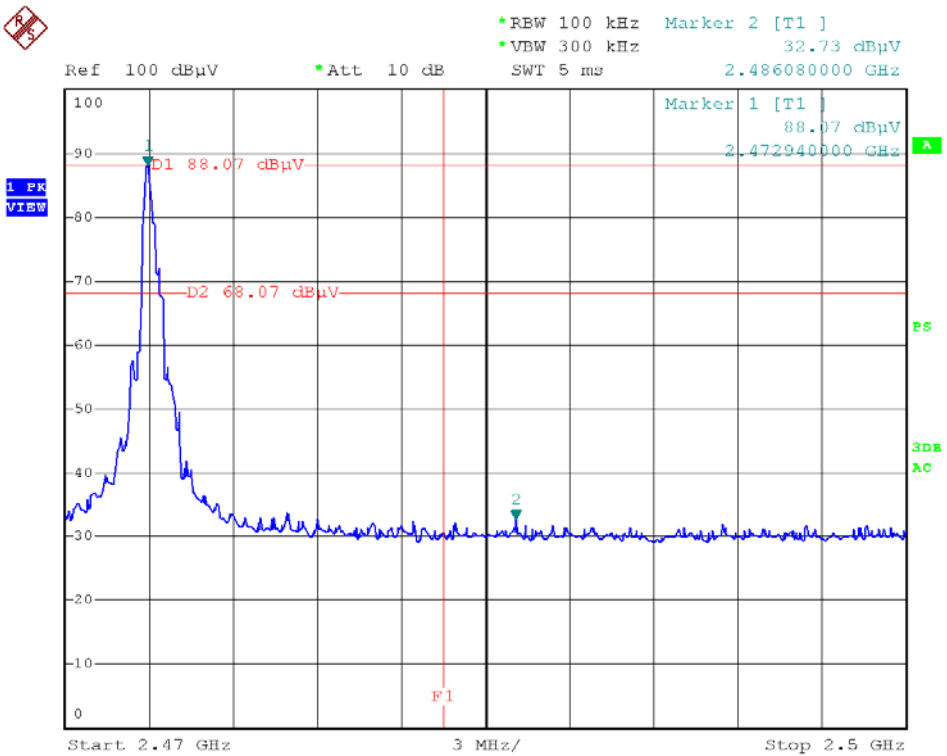
(Note: Marker 2 means the highest value in 2.39GHz~2.4GHz or 2.4835~2.5GHz)

FCC ID: Z5X8004TX



Lower Band

Date: 17.OCT.2011 14:57:06



Upper Band

Date: 17.OCT.2011 15:08:28