

FCC REPORT

Applicant: Shenzhen Junlan Electronic Ltd

Address of Applicant: District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China

Equipment Under Test (EUT)

Product Name: BLUETOOTH TOWER SPEAKER

Model No.: ITB123B, TSB-9824, ITSB-200, TSB-14146

Trade Mark: ILIVE

FCC ID: OKUITB123B

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.249:2012

Date of sample receipt: April 01, 2013

Date of Test: April 02-08, 2013

Date of report issued: April 08, 2013

Test Result : PASS *

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

Authorized Signature:

A circular logo for GTS Global Testing Services Co., Ltd. is stamped in blue ink. The logo contains the text 'GTS', 'GLOBAL TESTING', and 'SERVICE CO., LTD.' around the perimeter. A handwritten signature in black ink is written over the logo.

Robinson Lo

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."

3 Contents

| | Page |
|---|------|
| 1 COVER PAGE..... | 1 |
| 2 VERSION | 2 |
| 3 CONTENTS | 3 |
| 4 TEST SUMMARY | 4 |
| 5 GENERAL INFORMATION..... | 5 |
| 5.1 CLIENT INFORMATION | 5 |
| 5.2 GENERAL DESCRIPTION OF EUT | 5 |
| 5.3 TEST MODE | 7 |
| 5.4 DESCRIPTION OF SUPPORT UNITS | 7 |
| 5.5 TEST FACILITY..... | 7 |
| 5.6 TEST LOCATION | 7 |
| 5.7 OTHER INFORMATION REQUESTED BY THE CUSTOMER..... | 7 |
| 6 TEST INSTRUMENTS LIST | 8 |
| 7 TEST RESULTS AND MEASUREMENT DATA..... | 9 |
| 7.1 ANTENNA REQUIREMENT:..... | 9 |
| 7.2 CONDUCTED EMISSIONS | 10 |
| 7.3 RADIATED EMISSION METHOD | 13 |
| 7.3.1 <i>Field Strength of The Fundamental Signal</i> | 15 |
| 7.3.2 <i>Spurious emissions</i> | 16 |
| 7.3.3 <i>Bandedge emissions</i> | 20 |
| 7.4 20dB OCCUPY BANDWIDTH | 21 |
| 8 TEST SETUP PHOTO | 23 |
| 9 EUT CONSTRUCTIONAL DETAILS | 25 |

4 Test Summary

| Test Item | Section in CFR 47 | Result |
|--|-----------------------|--------|
| Antenna requirement | 15.203 | Pass |
| AC Power Line Conducted Emission | 15.207 | Pass |
| Field strength of the fundamental signal | 15.249 (a) | Pass |
| Spurious emissions | 15.249 (a) (d)/15.209 | Pass |
| Band edge | 15.249 (d)/15.205 | Pass |
| 20dB Occupied Bandwidth | 15.215 (c) | Pass |

Pass: The EUT complies with the essential requirements in the standard.

N/A: not applicable.

5 General Information

5.1 Client Information

| | |
|--------------------------|---|
| Applicant: | Shenzhen Junlan Electronic Ltd |
| Address of Applicant: | District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China |
| Manufacturer: | Shenzhen Junlan Electronic Ltd |
| Address of Manufacturer: | District 2 type A plant in the second layer 1-4, NO.2 Industrial Fuyuan Tangwei Fuyong Baoan Shenzhen China |

5.2 General Description of EUT

| | |
|----------------------|--|
| Product Name: | BLUETOOTH TOWER SPEAKER |
| Model No.: | ITB123B, TSB-9824, ITSB-200, TSB-14146 |
| Test Model No.: | ITB123B |
| Remark: | TSB-9824, ITSB-200, TSB-14146 and ITB123B are identical in the same interior structure, electrical circuits, components and appearance. The only difference is the model name for the marketing requirement. |
| Operation Frequency: | 2402MHz~2480MHz |
| Channel numbers: | 79 |
| Channel separation: | 1MHz |
| Modulation type: | GFSK, Pi/4QPSK, 8DPSK |
| Antenna Type: | Integral |
| Antenna gain: | 2dBi |
| Power supply: | AC 120V/60Hz |

| Operation Frequency each of channel | | | | | | | |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2402MHz | 21 | 2422MHz | 41 | 2442MHz | 61 | 2462MHz |
| 2 | 2403MHz | 22 | 2423MHz | 42 | 2443MHz | 62 | 2463MHz |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 19 | 2420MHz | 39 | 2440MHz | 59 | 2460MHz | 79 | 2480MHz |
| 20 | 2421MHz | 40 | 2441MHz | 60 | 2461MHz | | |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel | Frequency |
|---------------------|-----------|
| The lowest channel | 2402MHz |
| The middle channel | 2441MHz |
| The Highest channel | 2480MHz |

5.3 Test mode

| | |
|--|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode. |
| <i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i> | |

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:

| Axis | X | Y | Z |
|------------------------|-------|-------|-------|
| Field Strength(dBuV/m) | 90.56 | 94.21 | 92.84 |

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the "worst case" and "worst setup":
Y axis (see the test setup photo)

5.4 Description of Support Units

N/A

5.5 Test Facility

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

- **CNAS —Registration No.: CNAS L5775**

CNAS has accredited Global United Technology Services Co., Ltd. To ISO/IEC 17025 General Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 600491, July 20, 2010.

- **Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

5.6 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

5.7 Other Information Requested by the Customer

None.

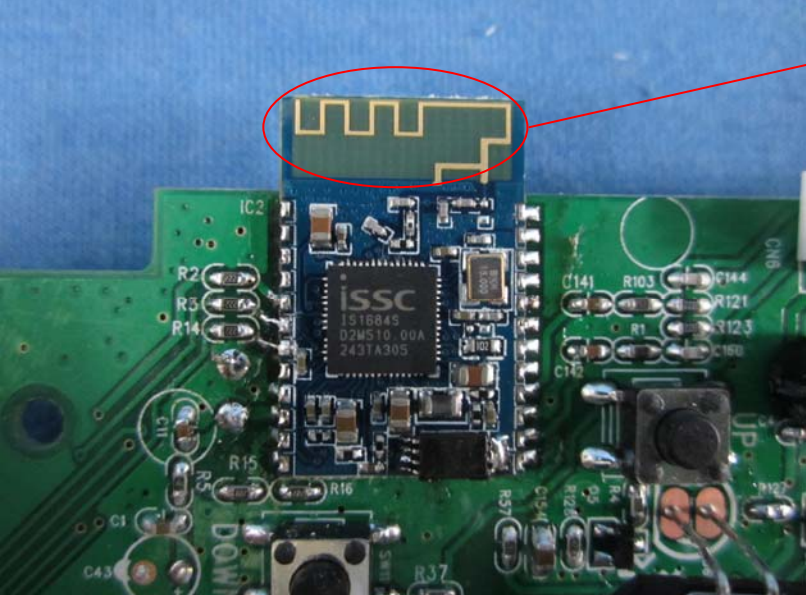
6 Test Instruments list

| Radiated Emission: | | | | | | |
|--------------------|-------------------------------|--------------------------------|-----------------------------|---------------|---------------------|-------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | Mar. 29 2013 | Mar. 28 2014 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS533 | Dec. 6, 2012 | Dec. 5 2013 |
| 4 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | Jul. 03 2012 | Jul. 02 2013 |
| 5 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | Feb. 24 2013 | Feb. 23 2014 |
| 6 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | 9120D-829 | GTS208 | June 29 2012 | June 28 2013 |
| 7 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | Mar. 29 2013 | Mar. 28 2014 |
| 8 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 9 | Coaxial Cable | GTS | N/A | GTS213 | Mar. 30 2013 | Mar. 29 2013 |
| 10 | Coaxial Cable | GTS | N/A | GTS211 | Mar. 30 2013 | Mar. 29 2013 |
| 11 | Coaxial cable | GTS | N/A | GTS210 | Mar. 30 2013 | Mar. 29 2013 |
| 12 | Coaxial Cable | GTS | N/A | GTS212 | Mar. 30 2013 | Mar. 29 2013 |
| 13 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | Jul. 03 2012 | Jul. 02 2013 |
| 14 | Amplifier(2GHz-20GHz) | HP | 8349B | GTS206 | Jul. 03 2012 | Jul. 02 2013 |
| 15 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June 29 2012 | June 28 2013 |
| 16 | Band filter | Amindeon | 82346 | GTS219 | Mar. 30 2013 | Mar. 29 2013 |

| Conducted Emission: | | | | | | |
|---------------------|-------------------|--------------------------------|----------------------|---------------|---------------------|-------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
| 1 | Shielding Room | ZhongYu Electron | 7.0(L)x3.0(W)x3.0(H) | GTS264 | Sep. 08 2011 | Sep. 07 2013 |
| 2 | EMI Test Receiver | Rohde & Schwarz | ESCS30 | GTS223 | Jul. 03 2012 | Jul. 02 2013 |
| 3 | 10dB Pulse Limita | Rohde & Schwarz | N/A | GTS224 | Jul. 03 2012 | Jul. 02 2013 |
| 4 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | Jul. 03 2012 | Jul. 02 2013 |
| 5 | LISN | SCHWARZBECK MESS-ELEKTRONIK | NSLK 8127 | GTS226 | Jul. 03 2012 | Jul. 02 2013 |
| 6 | Coaxial Cable | GTS | N/A | GTS227 | Jul. 03 2012 | Jul. 02 2013 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |

7 Test results and Measurement Data

7.1 Antenna requirement:

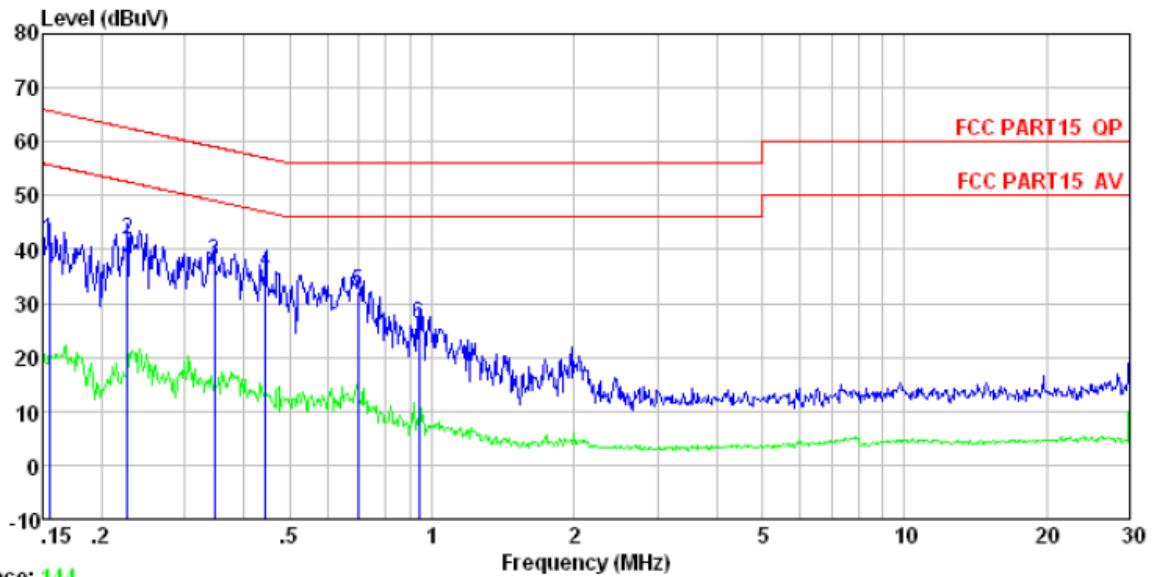
| | |
|---|-----------------------------|
| Standard requirement: | FCC Part15 C Section 15.203 |
| <p>15.203 requirement:</p> <p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p> | |
| <p>E.U.T Antenna:</p> | |
| <p><i>The antenna is Integral antenna, the best case gain of the antenna is 2dBi</i></p>  | |

7.2 Conducted Emissions

| Test Requirement: | FCC Part15 C Section 15.207 | | | | | | | | | | | | | | |
|-----------------------|--|-----------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|
| Test Method: | ANSI C63.4:2003 | | | | | | | | | | | | | | |
| Test Frequency Range: | 150KHz to 30MHz | | | | | | | | | | | | | | |
| Class / Severity: | Class B | | | | | | | | | | | | | | |
| Receiver setup: | RBW=9KHz, VBW=30KHz, Sweep time=auto | | | | | | | | | | | | | | |
| Limit: | <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p> | Frequency range (MHz) | Limit (dBuV) | | Quasi-peak | Average | 0.15-0.5 | 66 to 56* | 56 to 46* | 0.5-5 | 56 | 46 | 5-30 | 60 | 50 |
| Frequency range (MHz) | Limit (dBuV) | | | | | | | | | | | | | | |
| | Quasi-peak | Average | | | | | | | | | | | | | |
| 0.15-0.5 | 66 to 56* | 56 to 46* | | | | | | | | | | | | | |
| 0.5-5 | 56 | 46 | | | | | | | | | | | | | |
| 5-30 | 60 | 50 | | | | | | | | | | | | | |
| Test setup: | <p><i>Remark</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p> | | | | | | | | | | | | | | |
| Test procedure: | <ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. 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). 3. 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 of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement. | | | | | | | | | | | | | | |
| Test Instruments: | Refer to section 6.0 for details | | | | | | | | | | | | | | |
| Test mode: | Refer to section 5.3 for details | | | | | | | | | | | | | | |
| Test results: | Pass | | | | | | | | | | | | | | |

Measurement data:

Line:

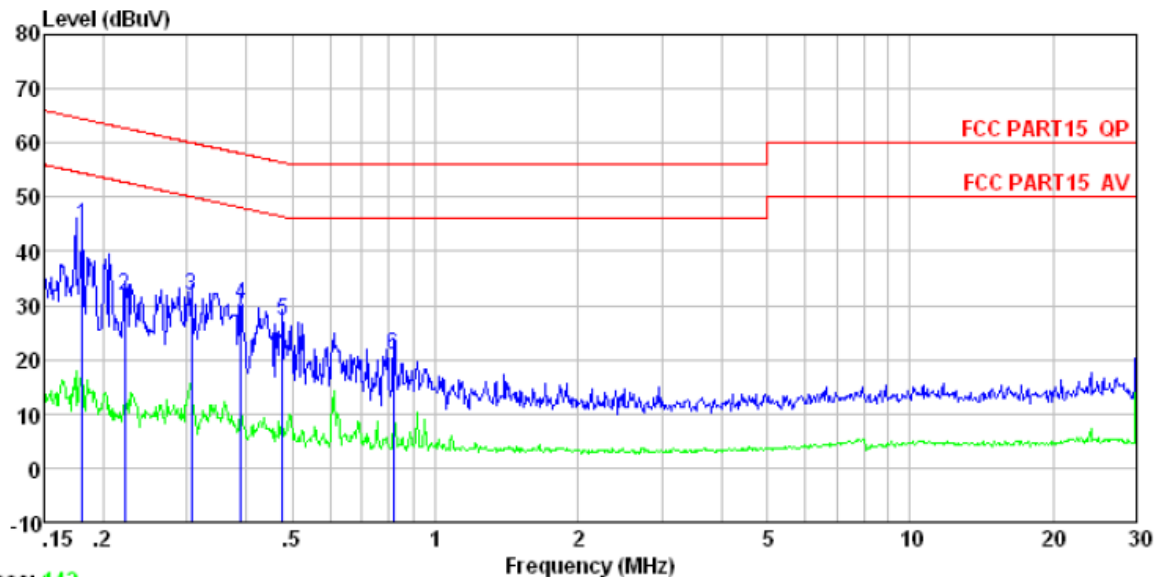


Trace: 144

Condition : FCC PART15 QP LISN-2012 LINE
 Job No. : 381RF
 Test Mode : Bluetooth mode
 Test Engineer: Jim

| | Freq | Read Level | LISN Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|-------|------------|-------------|------------|-------|------------|------------|--------|
| | MHz | dBuV | dB | dB | dBuV | dBuV | dB | |
| 1 | 0.155 | 41.84 | -0.26 | 0.10 | 41.68 | 65.74 | -24.06 | QP |
| 2 | 0.227 | 41.80 | -0.23 | 0.10 | 41.67 | 62.57 | -20.90 | QP |
| 3 | 0.346 | 37.87 | -0.22 | 0.10 | 37.75 | 59.05 | -21.30 | QP |
| 4 | 0.444 | 35.98 | -0.21 | 0.10 | 35.87 | 56.98 | -21.11 | QP |
| 5 | 0.697 | 32.34 | -0.20 | 0.10 | 32.24 | 56.00 | -23.76 | QP |
| 6 | 0.938 | 26.33 | -0.21 | 0.10 | 26.22 | 56.00 | -29.78 | QP |

Neutral:



Trace: 142

Condition : FCC PART15 QP LISN-2012 NEUTRAL
 Job No. : 381RF
 Test Mode : Bluetooth mode
 Test Engineer: Jim

| | Freq | Read Level | LISN Factor | Cable Loss | Limit Line | Over Limit | Remark |
|---|-------|------------|-------------|------------|------------|------------|--------|
| | MHz | dBuV | dB | dB | dBuV | dB | |
| 1 | 0.181 | 44.73 | -0.09 | 0.10 | 64.46 | -19.72 | QP |
| 2 | 0.222 | 31.96 | -0.09 | 0.10 | 62.74 | -30.77 | QP |
| 3 | 0.307 | 31.97 | -0.09 | 0.10 | 60.06 | -28.08 | QP |
| 4 | 0.389 | 30.26 | -0.08 | 0.10 | 58.08 | -27.80 | QP |
| 5 | 0.476 | 27.18 | -0.08 | 0.10 | 56.41 | -29.21 | QP |
| 6 | 0.817 | 20.88 | -0.08 | 0.10 | 56.00 | -35.10 | QP |

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Radiated Emission Method

| | | | | | |
|--|--|--------------------|--------|------------------|------------------|
| Test Requirement: | FCC Part15 C Section 15.209 | | | | |
| Test Method: | ANSI C63.4:2003 | | | | |
| Test Frequency Range: | 30MHz to 25GHz | | | | |
| Test site: | Measurement Distance: 3m | | | | |
| Receiver setup: | Frequency | Detector | RBW | VBW | Remark |
| | 30MHz-1GHz | Quasi-peak | 120KHz | 300KHz | Quasi-peak Value |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | | Peak | 1MHz | 10Hz | Average Value |
| Limit: (Field strength of the fundamental signal) | Frequency | Limit (dBuV/m @3m) | | Remark | |
| | 2400MHz-2483.5MHz | 94.00 | | Average Value | |
| | | 114.00 | | Peak Value | |
| Limit: (Spurious Emissions) | Frequency | Limit (dBuV/m @3m) | | Remark | |
| | 30MHz-88MHz | 40.00 | | Quasi-peak Value | |
| | 88MHz-216MHz | 43.50 | | Quasi-peak Value | |
| | 216MHz-960MHz | 46.00 | | Quasi-peak Value | |
| | 960MHz-1GHz | 54.00 | | Quasi-peak Value | |
| | Above 1GHz | 54.00 | | Average Value | |
| | | 74.00 | | Peak Value | |
| Limit: (band edge) | 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 Section 15.209, whichever is the lesser attenuation. | | | | |
| Test setup: | <p>Below 1GHz</p> <p>Above 1GHz</p> | | | | |

| | |
|--------------------------|---|
| | <p>The diagram illustrates the test setup. An EUT (Equipment Under Test) is placed on a turn table that is 0.8m above the ground. The turn table is rotated 360 degrees. The EUT is positioned 3m away from the antenna tower. The antenna tower is a variable-height structure with a horn antenna mounted on top. The antenna height is varied from 1m to 4m above the ground. The antenna is connected to a spectrum analyzer via an amplifier. The spectrum analyzer is used to measure the field strength of the EUT.</p> |
| <p>Test Procedure:</p> | <ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| <p>Test Instruments:</p> | <p>Refer to section 6.0 for details</p> |
| <p>Test mode:</p> | <p>Refer to section 5.3 for details</p> |
| <p>Test results:</p> | <p>Pass</p> |

Measurement data:

7.3.1 Field Strength of The Fundamental Signal

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2402.00 | 90.15 | 27.58 | 5.39 | 30.18 | 92.94 | 114.00 | -21.06 | Horizontal |
| 2402.00 | 88.04 | 27.58 | 5.39 | 30.18 | 90.83 | 114.00 | -23.17 | Vertical |
| 2441.00 | 88.86 | 27.55 | 5.43 | 30.06 | 91.78 | 114.00 | -22.22 | Horizontal |
| 2441.00 | 87.18 | 27.55 | 5.43 | 30.06 | 90.10 | 114.00 | -23.90 | Vertical |
| 2480.00 | 91.15 | 27.52 | 5.47 | 29.93 | 94.21 | 114.00 | -19.79 | Horizontal |
| 2480.00 | 88.30 | 27.52 | 5.47 | 29.93 | 91.36 | 114.00 | -22.64 | Vertical |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2402.00 | 79.80 | 27.58 | 5.39 | 30.18 | 82.59 | 94.00 | -11.41 | Horizontal |
| 2402.00 | 77.64 | 27.58 | 5.39 | 30.18 | 80.43 | 94.00 | -13.57 | Vertical |
| 2441.00 | 78.28 | 27.55 | 5.43 | 30.06 | 81.20 | 94.00 | -12.80 | Horizontal |
| 2441.00 | 75.39 | 27.55 | 5.43 | 30.06 | 78.31 | 94.00 | -15.69 | Vertical |
| 2480.00 | 80.79 | 27.52 | 5.47 | 29.93 | 83.85 | 94.00 | -10.15 | Horizontal |
| 2480.00 | 77.94 | 27.52 | 5.47 | 29.93 | 81.00 | 94.00 | -13.00 | Vertical |

According to the follow transmitter output power (P_t) formula:

$$P_t = (E \times d)^2 / (30 \times g_t)$$

P_t =transmitter output power in watts

g_t =numeric gain of the transmitting antenna (unitless)

E=electric field strength in V/m

d= measurement distance in meters (m).

According to the above test data, $E_{max} = 94.21 \text{ dBuV/m} = 0.0513 \text{ V/m}$, $d = 3 \text{ m}$, $g_t = 1.58$

$$P_t = (E \times d)^2 / (30 \times g_t) = (0.0513 \times 3)^2 / (30 \times 1.58) = 0.0005 \text{ W}$$

7.3.2 Spurious emissions

■ Below 1GHz

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 40.70 | 39.63 | 16.58 | 0.67 | 32.05 | 24.83 | 40.00 | -15.17 | Vertical |
| 52.58 | 38.90 | 16.23 | 0.79 | 31.95 | 23.97 | 40.00 | -16.03 | Vertical |
| 96.10 | 38.46 | 15.99 | 1.16 | 31.75 | 23.86 | 43.50 | -19.64 | Vertical |
| 216.02 | 40.04 | 14.12 | 1.93 | 32.15 | 23.94 | 46.00 | -22.06 | Vertical |
| 326.74 | 39.97 | 16.28 | 2.50 | 32.09 | 26.66 | 46.00 | -19.34 | Vertical |
| 528.25 | 39.00 | 19.20 | 3.43 | 31.41 | 30.22 | 46.00 | -15.78 | Vertical |
| 47.66 | 39.47 | 16.50 | 0.75 | 31.98 | 24.74 | 40.00 | -15.26 | Horizontal |
| 99.53 | 39.30 | 16.13 | 1.19 | 31.76 | 24.86 | 43.50 | -18.64 | Horizontal |
| 216.02 | 38.90 | 14.12 | 1.93 | 32.15 | 22.80 | 46.00 | -23.20 | Horizontal |
| 354.18 | 39.28 | 16.35 | 2.64 | 32.02 | 26.25 | 46.00 | -19.75 | Horizontal |
| 590.97 | 38.61 | 20.29 | 3.69 | 31.09 | 31.50 | 46.00 | -14.50 | Horizontal |
| 739.66 | 39.66 | 22.29 | 4.24 | 31.25 | 34.94 | 46.00 | -11.06 | Horizontal |

■ Above 1GHz

| | |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4804.00 | 36.63 | 31.78 | 8.60 | 24.17 | 52.84 | 74.00 | -21.16 | Vertical |
| 7206.00 | 35.96 | 36.15 | 11.65 | 26.39 | 57.37 | 74.00 | -16.63 | Vertical |
| 9608.00 | 34.40 | 38.01 | 14.14 | 25.45 | 61.10 | 74.00 | -12.90 | Vertical |
| 12010.00 | * | | | | | 74.00 | | Vertical |
| 14412.00 | * | | | | | 74.00 | | Vertical |
| 4804.00 | 32.58 | 31.78 | 8.60 | 24.17 | 48.79 | 74.00 | -25.21 | Horizontal |
| 7206.00 | 33.65 | 36.15 | 11.65 | 26.39 | 55.06 | 74.00 | -18.94 | Horizontal |
| 9608.00 | 30.95 | 38.01 | 14.14 | 25.45 | 57.65 | 74.00 | -16.35 | Horizontal |
| 12010.00 | * | | | | | 74.00 | | Horizontal |
| 14412.00 | * | | | | | 74.00 | | Horizontal |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4804.00 | 25.20 | 31.78 | 8.60 | 24.17 | 41.41 | 54.00 | -12.59 | Vertical |
| 7206.00 | 24.41 | 36.15 | 11.65 | 26.39 | 45.82 | 54.00 | -8.18 | Vertical |
| 9608.00 | 24.50 | 38.01 | 14.14 | 25.45 | 51.20 | 54.00 | -2.80 | Vertical |
| 12010.00 | * | | | | | 54.00 | | Vertical |
| 14412.00 | * | | | | | 54.00 | | Vertical |
| 4804.00 | 20.97 | 31.78 | 8.60 | 24.17 | 37.18 | 54.00 | -16.82 | Horizontal |
| 7206.00 | 21.20 | 36.15 | 11.65 | 26.39 | 42.61 | 54.00 | -11.39 | Horizontal |
| 9608.00 | 21.37 | 38.01 | 14.14 | 25.45 | 48.07 | 54.00 | -5.93 | Horizontal |
| 12010.00 | * | | | | | 54.00 | | Horizontal |
| 14412.00 | * | | | | | 54.00 | | Horizontal |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “*”, means this data is the too weak instrument of signal is unable to test.

| | |
|---------------|----------------|
| Test channel: | Middle channel |
|---------------|----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4882.00 | 37.08 | 31.85 | 8.66 | 24.10 | 53.49 | 74.00 | -20.51 | Vertical |
| 7323.00 | 37.14 | 36.37 | 11.72 | 26.71 | 58.52 | 74.00 | -15.48 | Vertical |
| 9764.00 | 33.82 | 38.35 | 14.25 | 25.36 | 61.06 | 74.00 | -12.94 | Vertical |
| 12205.00 | * | | | | | 74.00 | | Vertical |
| 14646.00 | * | | | | | 74.00 | | Vertical |
| 4882.00 | 33.22 | 31.85 | 8.66 | 24.10 | 49.63 | 74.00 | -24.37 | Horizontal |
| 7323.00 | 32.75 | 36.37 | 11.72 | 26.71 | 54.13 | 74.00 | -19.87 | Horizontal |
| 9764.00 | 29.97 | 38.35 | 14.25 | 25.36 | 57.21 | 74.00 | -16.79 | Horizontal |
| 12205.00 | * | | | | | 74.00 | | Horizontal |
| 14646.00 | * | | | | | 74.00 | | Horizontal |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4882.00 | 25.65 | 31.85 | 8.66 | 24.10 | 42.06 | 54.00 | -11.94 | Vertical |
| 7323.00 | 24.48 | 36.37 | 11.72 | 26.71 | 45.86 | 54.00 | -8.14 | Vertical |
| 9764.00 | 23.38 | 37.21 | 14.25 | 25.36 | 49.48 | 54.00 | -4.52 | Vertical |
| 12205.00 | * | | | | | 54.00 | | Vertical |
| 14646.00 | * | | | | | 54.00 | | Vertical |
| 4882.00 | 21.61 | 31.85 | 8.66 | 24.10 | 38.02 | 54.00 | -15.98 | Horizontal |
| 7323.00 | 21.27 | 36.37 | 11.72 | 26.71 | 42.65 | 54.00 | -11.35 | Horizontal |
| 9764.00 | 20.67 | 38.35 | 14.25 | 25.36 | 47.91 | 54.00 | -6.09 | Horizontal |
| 12205.00 | * | | | | | 54.00 | | Horizontal |
| 14646.00 | * | | | | | 54.00 | | Horizontal |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “*”, means this data is the too weak instrument of signal is unable to test.

| | |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00 | 35.89 | 31.93 | 8.73 | 24.03 | 52.52 | 74.00 | -21.48 | Vertical |
| 7440.00 | 36.16 | 36.59 | 11.79 | 27.03 | 57.51 | 74.00 | -16.49 | Vertical |
| 9920.00 | 31.35 | 38.81 | 14.38 | 25.26 | 59.28 | 74.00 | -14.72 | Vertical |
| 12400.00 | * | | | | | 74.00 | | Vertical |
| 14880.00 | * | | | | | 74.00 | | Vertical |
| 4960.00 | 32.82 | 31.93 | 8.73 | 24.03 | 49.45 | 74.00 | -24.55 | Horizontal |
| 7440.00 | 32.96 | 36.59 | 11.79 | 27.03 | 54.31 | 74.00 | -19.69 | Horizontal |
| 9920.00 | 28.51 | 38.81 | 14.38 | 25.26 | 56.44 | 74.00 | -17.56 | Horizontal |
| 12400.00 | * | | | | | 74.00 | | Horizontal |
| 14880.00 | * | | | | | 74.00 | | Horizontal |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 4960.00 | 24.46 | 31.93 | 8.73 | 24.03 | 41.09 | 54.00 | -12.91 | Vertical |
| 7440.00 | 25.03 | 36.59 | 11.79 | 27.03 | 46.38 | 54.00 | -7.62 | Vertical |
| 9920.00 | 20.60 | 38.81 | 14.38 | 25.26 | 48.53 | 54.00 | -5.47 | Vertical |
| 12400.00 | * | | | | | 54.00 | | Vertical |
| 14880.00 | * | | | | | 54.00 | | Vertical |
| 4960.00 | 21.21 | 31.93 | 8.73 | 24.03 | 37.84 | 54.00 | -16.16 | Horizontal |
| 7440.00 | 21.88 | 36.59 | 11.79 | 27.03 | 43.23 | 54.00 | -10.77 | Horizontal |
| 9920.00 | 19.06 | 38.81 | 14.38 | 25.26 | 46.99 | 54.00 | -7.01 | Horizontal |
| 12400.00 | * | | | | | 54.00 | | Horizontal |
| 14880.00 | * | | | | | 54.00 | | Horizontal |

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “*”, means this data is the too weak instrument of signal is unable to test.

7.3.3 Bandedge emissions

All of the restriction bands were tested, and only the data of worst case was exhibited.

| | |
|---------------|----------------|
| Test channel: | Lowest channel |
|---------------|----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2390.00 | 41.23 | 27.59 | 5.38 | 30.18 | 44.02 | 74.00 | -29.98 | Horizontal |
| 2400.00 | 58.18 | 27.58 | 5.39 | 30.18 | 60.97 | 74.00 | -13.03 | Horizontal |
| 2390.00 | 42.02 | 27.59 | 5.38 | 30.18 | 44.81 | 74.00 | -29.19 | Vertical |
| 2400.00 | 60.55 | 27.58 | 5.39 | 30.18 | 63.34 | 74.00 | -10.66 | Vertical |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2390.00 | 31.58 | 27.59 | 5.38 | 30.18 | 34.37 | 54.00 | -19.63 | Horizontal |
| 2400.00 | 42.99 | 27.58 | 5.39 | 30.18 | 45.78 | 54.00 | -8.22 | Horizontal |
| 2390.00 | 31.43 | 27.59 | 5.38 | 30.18 | 34.22 | 54.00 | -19.78 | Vertical |
| 2400.00 | 44.64 | 27.58 | 5.39 | 30.18 | 47.43 | 54.00 | -6.57 | Vertical |

| | |
|---------------|-----------------|
| Test channel: | Highest channel |
|---------------|-----------------|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50 | 44.24 | 27.53 | 5.47 | 29.93 | 47.31 | 74.00 | -26.69 | Horizontal |
| 2500.00 | 43.64 | 27.55 | 5.49 | 29.93 | 46.75 | 74.00 | -27.25 | Horizontal |
| 2483.50 | 43.58 | 27.53 | 5.47 | 29.93 | 46.65 | 74.00 | -27.35 | Vertical |
| 2500.00 | 42.93 | 27.55 | 5.49 | 29.93 | 46.04 | 74.00 | -27.96 | Vertical |

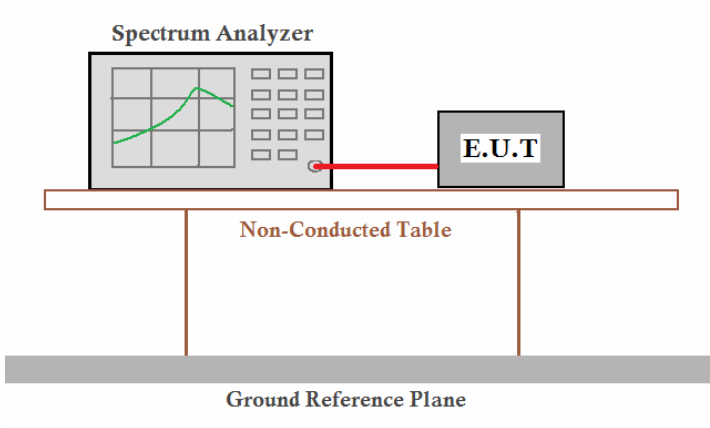
Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 2483.50 | 35.64 | 27.53 | 5.47 | 29.93 | 38.71 | 54.00 | -15.29 | Horizontal |
| 2500.00 | 32.48 | 27.55 | 5.49 | 29.93 | 35.59 | 54.00 | -18.41 | Horizontal |
| 2483.50 | 34.30 | 27.53 | 5.47 | 29.93 | 37.37 | 54.00 | -16.63 | Vertical |
| 2500.00 | 32.52 | 27.55 | 5.49 | 29.93 | 35.63 | 54.00 | -18.37 | Vertical |

Remark:

- Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor

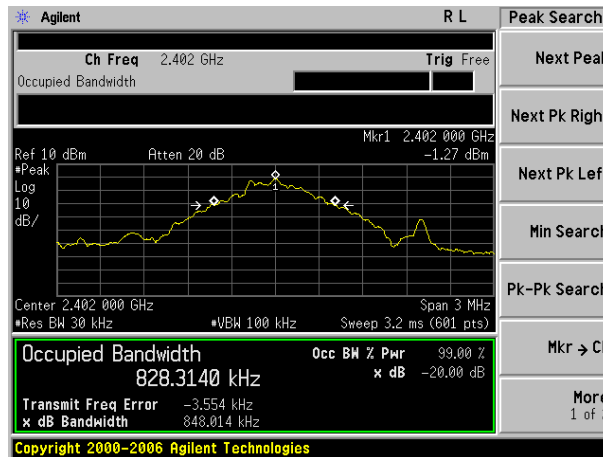
7.4 20dB Occupy Bandwidth

| | |
|-------------------|--|
| Test Requirement: | FCC Part15 C Section 15.249/15.215 |
| Test Method: | ANSI C63.4:2003 |
| Limit: | Operation Frequency range 2400MHz~2483.5MHz |
| Test setup: |  <p>The diagram shows a Spectrum Analyzer on the left and an E.U.T. on the right, connected by a red cable. They are both on a table labeled 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'.</p> |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

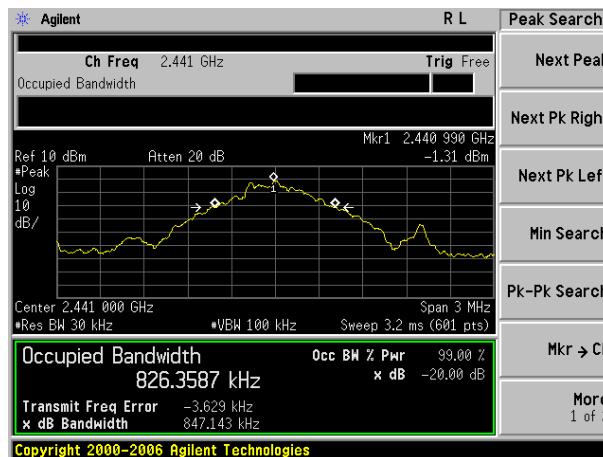
Measurement Data

| Test channel | 20dB bandwidth(MHz) | Result |
|--------------|---------------------|--------|
| Lowest | 0.848 | Pass |
| Middle | 0.847 | Pass |
| Highest | 0.832 | Pass |

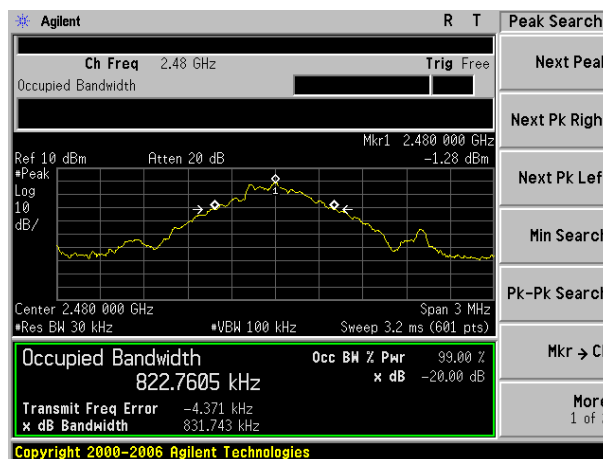
Test plot as follows:



Lowest channel



Middle channel



Highest channel