# FCC Test Report

| Product Name | LVL50 Wireless Stereo Headset for XBO |
|--------------|---------------------------------------|
| Model No     | 048-025R                              |
| FCC ID.      | X5B-048025R                           |

| Applicant | Performance Designed Products, LLC                       |
|-----------|--|
| Address   | 14144 Ventura Blvd., Suite 200 Sherman Oaks, CA91423 USA |

| Date of Receipt | Oct. 02, 2018       |
|-----------------|---------------------|
| Issue Date      | Oct. 24, 2018       |
| Report No.      | 18A0025R-RFUSP25V00 |
| Report Version  | V1.0                |



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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## Test Report

Issue Date: Oct. 24, 2018 Report No.: 18A0025R-RFUSP25V00



| Product Name        | LVL50 Wireless Stereo Headset for XBO                    |  |  |
|---------------------|--|--|--|
| Applicant           | Performance Designed Products, LLC                       |  |  |
| Address             | 14144 Ventura Blvd., Suite 200 Sherman Oaks, CA91423 USA |  |  |
| Manufacturer        | Performance Designed Products, LLC                       |  |  |
| Model No.           | 048-025R   |  |  |
| EUT Rated Voltage   | DC 5V (Power by USB) or DC 3.7V (Power by Battery)       |  |  |
| EUT Test Voltage    | DC 5V (Power by USB)                                     |  |  |
| Trade Name          | PDP  |  |  |
| Applicable Standard | FCC CFR Title 47 Part 15 Subpart C: 2017                 |  |  |
|                     | ANSI C63.4: 2014, ANSI C63.10: 2013                      |  |  |
|                     | KDB 558074 D01 DTS Meas Guidance v05                     |  |  |
| Test Result         | Complied   |  |  |
| Documented By       | Jessie Ciou  |  |  |
|                     | (Adm. Assistant / Jessie Ciou)                           |  |  |
| Tested By           | Boris HSU  |  |  |
|                     | (Assistant Engineer / Boris Hsu)                         |  |  |
| Approved By         | Hund   |  |  |
|                     | ( Director / Vincent Lin )                               |  |  |



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## 1. GENERAL INFORMATION

#### **1.1. EUT Description**

| Product Name       | LVL50 Wireless Stereo Headset for XBO |  |  |
|--------------------|---------------------------------------|--|--|
| Trade Name         | PDP                                   |  |  |
| Model No.          | 048-025R                              |  |  |
| FCC ID.            | X5B-048025R                           |  |  |
| Frequency Range    | 2405.35 – 2477.35MHz                  |  |  |
| Channel Control    | Auto                                  |  |  |
| Channel Separation | 2MHz                                  |  |  |
| Antenna Gain       | Refer to the table "Antenna List"     |  |  |
| Channel Number     | 37                                    |  |  |
| Type of Modulation | Pi/4 DQPSK                            |  |  |
| Antenna Type       | Printed on PCB                        |  |  |
| USB Cable          | Non-Shielded, 2.0m                    |  |  |

#### Antenna List

| No. | Manufacturer | Part No.         | Antenna Type   | Peak Gain           |
|-----|--------------|------------------|----------------|---------------------|
| 1   | TATUNG       | 051-044R (Ant 1) | Printed on PCB | 5.48dBi for 2.4 GHz |
|     |              | 051-044R (Ant 2) |                |                     |

Note: The antenna of EUT is conform to FCC 15.203



Center Frequency of Each Channel:

| Channel     | Frequency   | Channel     | Frequency   | Channel     | Frequency   | Channel     | Frequency   |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Channel 1:  | 2405.35 MHz | Channel 11: | 2425.35 MHz | Channel 21: | 2445.35 MHz | Channel 31: | 2465.35 MHz |
| Channel 2:  | 2407.35 MHz | Channel 12: | 2427.35 MHz | Channel 22: | 2447.35 MHz | Channel 32: | 2467.35 MHz |
| Channel 3:  | 2409.35 MHz | Channel 13: | 2429.35 MHz | Channel 23: | 2449.35 MHz | Channel 33: | 2469.35 MHz |
| Channel 4:  | 2411.35 MHz | Channel 14: | 2431.35 MHz | Channel 24: | 2451.35 MHz | Channel 34: | 2471.35 MHz |
| Channel 5:  | 2413.35 MHz | Channel 15: | 2433.35 MHz | Channel 25: | 2453.35 MHz | Channel 35: | 2473.35 MHz |
| Channel 6:  | 2415.35 MHz | Channel 16: | 2435.35 MHz | Channel 26: | 2455.35 MHz | Channel 36: | 2475.35 MHz |
| Channel 7:  | 2417.35 MHz | Channel 17: | 2437.35 MHz | Channel 27: | 2457.35 MHz | Channel 37: | 2477.35 MHz |
| Channel 8:  | 2419.35 MHz | Channel 18: | 2439.35 MHz | Channel 28: | 2459.35 MHz |             |             |
| Channel 9:  | 2421.35 MHz | Channel 19: | 2441.35 MHz | Channel 29: | 2461.35 MHz |             |             |
| Channel 10: | 2423.35 MHz | Channel 20: | 2443.35 MHz | Channel 30: | 2463.35 MHz |             |             |

Note:

- 1. The EUT is an LVL50 Wireless Stereo Headset for XBO with a built-in 2.4GHz transceiver.
- 2. Device contains a diversity function, only worst case is shown in the report.
- 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.
- 5. The EUT is using two the same SISO antennas(Ant1&Ant2) and only the worst case(Ant1) is shown in the report.
- 6. These tests are conducted on a sample for the purpose of demonstrating compliance of 2.4GHz transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices

Test Mode:

Mode 1: Transmit

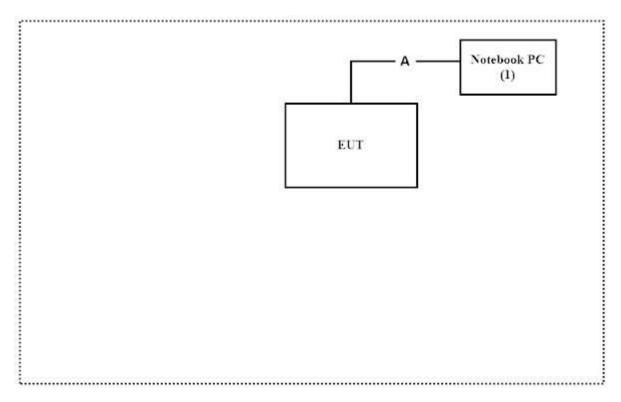
#### **1.2.** Tested System Details

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         | Latitude E5440 | HG26TZ1    | Non-Shielded, 0.8m |

| Sigr | nal Cable Type | Signal cable Description |
|------|----------------|--------------------------|
| А    | USB Cable      | Non-Shielded, 1.7m       |

#### **1.3.** Configuration of Tested System



#### **1.4. EUT Exercise Software**

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute "Avnrea Continue Power (v2018.5.18.1)" on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (5) Verify that the EUT works properly.

#### 1.5. Test Facility

Ambient conditions in the laboratory:

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 20-35    |
| Humidity (%RH)             | 25-75               | 50-65    |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

http://www.dekra.com.tw/english/about/certificates.aspx?bval=5

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <u>http://www.dekra.com.tw/index\_en.aspx</u>

| Site Description: | Accredited by TAF<br>Accredited Number: 3023  |
|-------------------|---|
| Site Name:        | DEKRA Testing and Certification Co., Ltd      |
| Site Address:     | No.5-22, Ruishukeng, Linkou Dist., New Taipei |

ess: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C. TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : <u>info.tw@dekra.com</u>

FCC Accreditation Number: TW3023



#### **1.6.** List of Test Equipment

#### For Conducted measurements /CB3/SR8

|   | Equipment             | Manufacturer | Model No. | Serial No.   | Cali. Date | Due. Date  |
|---|-----------------------|--------------|-----------|--------------|------------|------------|
|   | Temperature Chamber   | WIT GROUP    | TH-1S-B   | EQ-201-00146 | 2018/02/12 | 2019/02/11 |
| Х | Spectrum Analyzer     | Agilent      | N9010A    | MY53470892   | 2018/09/27 | 2019/09/26 |
| Х | Peak Power Analyzer   | Keysight     | 8990B     | MY51000410   | 2018/08/01 | 2019/07/31 |
| Х | Wideband Power Sensor | Keysight     | N1923A    | MY56080003   | 2018/07/25 | 2019/07/24 |
| Х | Wideband Power Sensor | Keysight     | N1923A    | MY56080004   | 2018/07/25 | 2019/07/24 |
| Х | EMI Test Receiver     | R&S          | ESCS 30   | 100369       | 2017/11/07 | 2018/11/06 |
| Х | LISN                  | R&S          | ESH3-Z5   | 836679/017   | 2018/02/09 | 2019/02/08 |
| Х | LISN                  | R&S          | ENV216    | 100097       | 2018/02/09 | 2019/02/08 |
| Х | Coaxial Cable         | DEKRA        | RG 400    | LC018-RG     | 2018/06/21 | 2019/06/20 |

#### For Radiated measurements /Site3/CB8

|   | Equipment         | Manufacturer    | Model No.   | Serial No.          | Cali. Date | Due. Date  |
|---|-------------------|-----------------|-------------|---------------------|------------|------------|
| Х | Spectrum Analyzer | R&S             | FSP40       | 100170              | 2018/03/12 | 2019/03/11 |
| Х | Loop Antenna      | Teseq           | HLA6121     | 37133               | 2017/10/13 | 2019/10/12 |
| Х | Bilog Antenna     | Schaffner Chase | CBL6112B    | 2707                | 2018/06/24 | 2019/06/23 |
| Х | Coaxial Cable     | DEKRA           | RG 214      | LC003-RG            | 2018/06/14 | 2019/06/13 |
| X | Pre-Amplifier     | Jet-Power       | JPA-10M1G33 | 170101000330<br>010 | 2018/06/14 | 2019/06/13 |
| Х | Horn Antenna      | ETS-Lindgren    | 3117        | 00135205            | 2018/05/03 | 2019/05/02 |
| Х | Horn Antenna      | SCHWARZBECK     | 9120D       | 576                 | 2017/11/30 | 2018/11/29 |
| Х | Pre-Amplifier     | EMCI            | EMC012630SE | 980210              | 2018/04/10 | 2019/04/09 |
| Х | Horn Antenna      | Com-Power       | AH-840      | 101043              | 2018/01/09 | 2019/01/08 |
| Х | Amplifier + Cable | EMCI            | EMC184045SE | 980370              | 2018/03/21 | 2019/03/20 |
| Х | Filter            | MICRO-TRONICS   | BRM50702    | G270                | 2018/08/06 | 2019/08/05 |
| Х | Filter            | MICRO-TRONICS   | BRM50716    | G196                | 2018/08/06 | 2019/08/05 |

Note:

1. All equipments are calibrated every one year.

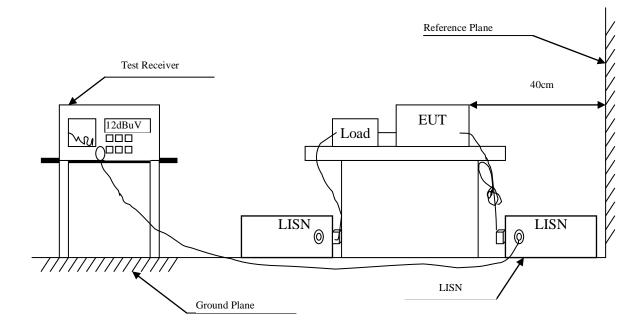
2. The test instruments marked with "X" are used to measure the final test results.

3. Test Software version :QuieTek EMI 2.0 V2.1.113.



#### 2. Conducted Emission

## 2.1. Test Setup





#### 2.2. Limits

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

#### 2.3. Test Procedure

The EUT and simulators 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 refers 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 of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

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

#### 2.4. Uncertainty

 $\pm 2.26 \text{ dB}$ 

#### 2.5. Test Result of Conducted Emission

| Product    | : | LVL50 Wireless Stereo Headset for XBO |
|------------|---|---------------------------------------|
| Test Item  | : | Conducted Emission Test               |
| Power Line | : | Line 1                                |
| Test Date  | : | 2018/10/09                            |
| Test Mode  | : | Mode 1: Transmit                      |

| Frequency  | Correct | Reading | Measurement | Margin  | Limit  |
|------------|---------|---------|-------------|---------|--------|
|            | Factor  | Level   | Level       |         |        |
| MHz        | dB      | dBuV    | dBuV        | dB      | dBuV   |
| Line 1     |         |         |             |         |        |
| Quasi-Peak |         |         |             |         |        |
| 0.166      | 9.744   | 34.840  | 44.584      | -20.959 | 65.543 |
| 0.181      | 9.740   | 31.960  | 41.700      | -23.414 | 65.114 |
| 0.502      | 9.750   | 31.660  | 41.410      | -14.590 | 56.000 |
| 1.248      | 9.791   | 13.480  | 23.271      | -32.729 | 56.000 |
| 3.615      | 9.882   | 17.640  | 27.522      | -28.478 | 56.000 |
| 9.349      | 10.050  | 18.560  | 28.610      | -31.390 | 60.000 |
|            |         |         |             |         |        |
| Average    |         |         |             |         |        |
| 0.166      | 9.744   | 22.120  | 31.864      | -23.679 | 55.543 |
| 0.181      | 9.740   | 20.990  | 30.730      | -24.384 | 55.114 |
| 0.502      | 9.750   | 23.560  | 33.310      | -12.690 | 46.000 |
| 1.248      | 9.791   | 6.130   | 15.921      | -30.079 | 46.000 |
| 3.615      | 9.882   | 8.570   | 18.452      | -27.548 | 46.000 |
| 9.349      | 10.050  | 11.800  | 21.850      | -28.150 | 50.000 |

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



| Product    | : LVL50 Wireless Stereo Headset for XBO |          |             |         |        |  |  |
|------------|---|----------|-------------|---------|--------|--|--|
| Test Item  | : Conducted Emission Test               |          |             |         |        |  |  |
| Power Line | : Line 2                                |          |             |         |        |  |  |
| Test Date  | : 2018/10                               | /09      |             |         |        |  |  |
| Test Mode  | : Mode 1:                               | Transmit |             |         |        |  |  |
|            |   |          |             |         |        |  |  |
| Frequency  | Correct                                 | Reading  | Measurement | Margin  | Limit  |  |  |
|            | Factor                                  | Level    | Level       |         |        |  |  |
| MHz        | dB                                      | dBuV     | dBuV        | dB      | dBuV   |  |  |
| Line 2     |   |          |             |         |        |  |  |
| Quasi-Peak |   |          |             |         |        |  |  |
| 0.162      | 9.736                                   | 35.520   | 45.256      | -20.401 | 65.657 |  |  |
| 0.275      | 9.741                                   | 23.920   | 33.661      | -28.768 | 62.429 |  |  |
| 0.513      | 9.741                                   | 28.540   | 38.281      | -17.719 | 56.000 |  |  |
| 1.244      | 9.781                                   | 15.460   | 25.241      | -30.759 | 56.000 |  |  |
| 3.798      | 9.876                                   | 19.560   | 29.436      | -26.564 | 56.000 |  |  |
| 25.228     | 10.464                                  | 12.660   | 23.124      | -36.876 | 60.000 |  |  |
|            |   |          |             |         |        |  |  |
| Average    |   |          |             |         |        |  |  |
| 0.162      | 9.736                                   | 21.240   | 30.976      | -24.681 | 55.657 |  |  |
| 0.275      | 9.741                                   | 16.270   | 26.011      | -26.418 | 52.429 |  |  |
| 0.513      | 9.741                                   | 21.180   | 30.921      | -15.079 | 46.000 |  |  |
| 1.244      | 9.781                                   | 9.510    | 19.291      | -26.709 | 46.000 |  |  |
| 3.798      | 9.876                                   | 8.890    | 18.766      | -27.234 | 46.000 |  |  |
| 25.228     | 10.464                                  | 11.420   | 21.884      | -28.116 | 50.000 |  |  |

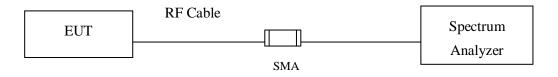
- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor



#### 3. Peak Power Output

#### 3.1. Test Setup

Conducted Measurement



#### 3.2. Limits

The maximum peak power shall be less 1 Watt.

#### **3.3.** Test Procedure

The EUT was tested according to DTS test procedure of KDB 558074 section 8.3.1.3 PKPM1 Peak-reading power meter method for compliance to FCC 47CFR 15.247 requirements.

#### 3.4. Uncertainty

 $\pm 1.19 \text{ dB}$ 

## 3.5. Test Result of Peak Power Output

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Peak Power Output Data                |
| Test Site | : | No.3 OATS                             |
| Test Date | : | 2018/10/08                            |
| Test Mode | : | Mode 1: Transmit                      |

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(dBm) | Required Limit<br>(dBm) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 01          | 2405.35            |                            | . ,                     | Dese   |
| 01          | 2405.55            | 4.51                       | <30dBm                  | Pass   |
| 19          | 2441.35            | 4.21                       | <30dBm                  | Pass   |
| 37          | 2477.35            | 3.73                       | <30dBm                  | Pass   |

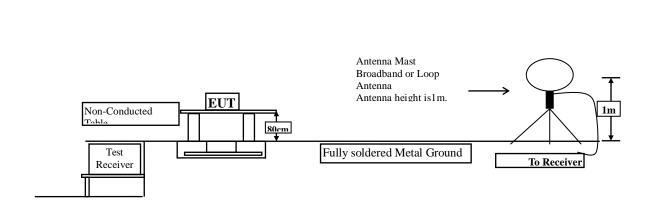
Note: Measurement Level =Reading value on power meter + cable loss



#### 4. Radiated Emission

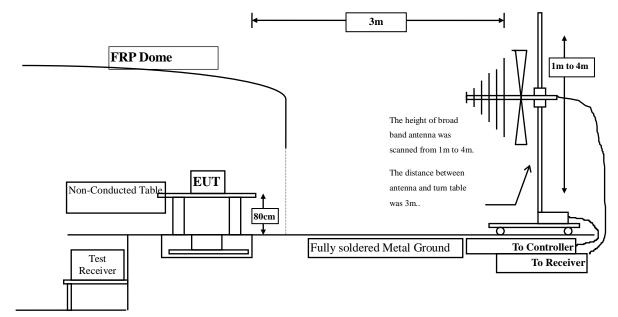
### 4.1. Test Setup

Radiated Emission Under 30MHz

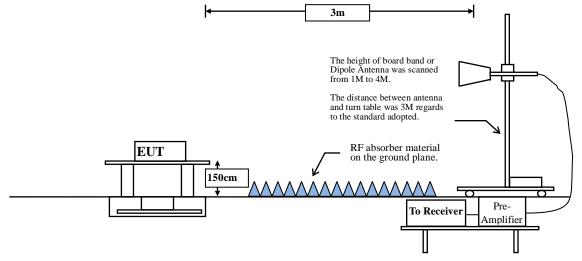


3m

Radiated Emission Below 1GHz



#### Radiated Emission Above 1GHz



#### 4.2. 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(a) Limits |          |           |  |  |  |
|--|----------|-----------|--|--|--|
| Frequency<br>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: E field strength (dBuV/m) =  $20 \log E$  field strength (uV/m)

#### 4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 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 between 1 meter and 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 C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~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 in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

#### **RBW and VBW Parameter setting:**

According to KDB 558074 section 8.3.2.1 Peak power measurement procedure RBW = as specified in Table 1.

VBW  $\geq$  3 x RBW.

| Table 1 — KD W as a function of frequency |             |  |  |  |
|---|-------------|--|--|--|
| Frequency                                 | RBW         |  |  |  |
| 9-150 kHz                                 | 200-300 Hz  |  |  |  |
| 0.15-30 MHz                               | 9-10 kHz    |  |  |  |
| 30-1000 MHz                               | 100-120 kHz |  |  |  |
| > 1000 MHz                                | 1 MHz       |  |  |  |

Table 1 — RBW as a function of frequency

According to KDB 558074 section 8.3.2.1 Average power measurement procedure RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\ge$  98 %

VBW  $\geq$  1/T, when duty cycle < 98 %

( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

| 2.4GHz band | Duty Cycle | Т    | 1/T  | VBW  |
|-------------|------------|------|------|------|
|             | (%)        | (ms) | (Hz) | (Hz) |
| Pi/4 DQPSK  | 100        |      |      | 10   |

Note: Duty Cycle Refer to Section 9

#### 4.4. Uncertainty

- ± 4.08 dB above 1GHz
- $\pm$  4.22 dB below 1GHz

#### 4.5. Test Result of Radiated Emission

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Harmonic Radiated Emission Data       |
| Test Site | : | No.3 OATS                             |
| Test Date | : | 2018/10/12                            |
| Test Mode | : | Mode 1: Transmit (2405.35MHz)         |

| Frequency      | Correct | Reading | Measurement | Margin  | Limit  |
|----------------|---------|---------|-------------|---------|--------|
|                | Factor  | Level   | Level       |         |        |
| MHz            | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| Horizontal     |         |         |             |         |        |
| Peak Detector: |         |         |             |         |        |
| 4810.700       | 2.526   | 43.159  | 45.686      | -28.314 | 74.000 |
| 7216.050       | 9.399   | 39.645  | 49.044      | -24.956 | 74.000 |
| 9621.400       | 10.269  | 38.583  | 48.852      | -25.148 | 74.000 |
| Vertical       |         |         |             |         |        |
| Peak Detector: |         |         |             |         |        |
| 4810.700       | 2.922   | 41.378  | 44.301      | -29.699 | 74.000 |
| 7216.050       | 9.884   | 38.134  | 48.018      | -25.982 | 74.000 |
| 9621.400       | 10.750  | 38.528  | 49.278      | -24.722 | 74.000 |
|                |         |         |             |         |        |

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report..

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Harmonic Radiated Emission Data       |
| Test Site | : | No.3 OATS                             |
| Test Date | : | 2018/10/12                            |
| Test Mode | : | Mode 1: Transmit (2441.35MHz)         |

| Frequency             | Correct | Reading | Measurement | Margin  | Limit  |
|-----------------------|---------|---------|-------------|---------|--------|
|                       | Factor  | Level   | Level       |         |        |
| MHz                   | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| Horizontal            |         |         |             |         |        |
| <b>Peak Detector:</b> |         |         |             |         |        |
| 4882.700              | 2.021   | 41.121  | 43.142      | -30.858 | 74.000 |
| 7324.050              | 9.783   | 39.541  | 49.324      | -24.676 | 74.000 |
| 9765.400              | 9.687   | 38.613  | 48.300      | -25.700 | 74.000 |
| Vertical              |         |         |             |         |        |
| Peak Detector:        |         |         |             |         |        |
| 4882.700              | 2.484   | 40.969  | 43.453      | -30.547 | 74.000 |
| 7324.050              | 10.399  | 38.559  | 48.958      | -25.042 | 74.000 |
| 9765.400              | 10.320  | 39.747  | 50.067      | -23.933 | 74.000 |

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report..

| Product        | : LVL50 V | : LVL50 Wireless Stereo Headset for XBO |             |         |        |  |
|----------------|-----------|---|-------------|---------|--------|--|
| Test Item      | : Harmon  | ic Radiated Emiss                       | sion Data   |         |        |  |
| Test Site      | : No.3 OA | ATS                                     |             |         |        |  |
| Test Date      | : 2018/10 | /12                                     |             |         |        |  |
| Test Mode      | : Mode 1: | Transmit (2477.3                        | 35MHz)      |         |        |  |
| Frequency      | Correct   | Reading                                 | Measurement | Margin  | Limit  |  |
|                | Factor    | Level                                   | Level       |         |        |  |
| MHz            | dB        | dBuV                                    | dBuV/m      | dB      | dBuV/m |  |
| Horizontal     |           |   |             |         |        |  |
| Peak Detector: |           |   |             |         |        |  |
| 4954.700       | 2.529     | 41.837                                  | 44.367      | -29.633 | 74.000 |  |
| 7432.050       | 10.524    | 39.486                                  | 50.010      | -23.990 | 74.000 |  |
| 9909.400       | 10.189    | 41.019                                  | 51.208      | -22.792 | 74.000 |  |
|                |           |   |             |         |        |  |
| Vertical       |           |   |             |         |        |  |
| Peak Detector: |           |   |             |         |        |  |
| 4954.000       | 3.305     | 44.205                                  | 47.510      | -26.490 | 74.000 |  |
| 7432.050       | 11.221    | 37.992                                  | 49.213      | -24.787 | 74.000 |  |
| 9909.400       | 11.240    | 39.164                                  | 50.404      | -23.596 | 74.000 |  |
|                |           |   |             |         |        |  |

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report..

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | General Radiated Emission Data        |
| Test Site | : | No.3 OATS                             |
| Test Date | : | 2018/10/15                            |
| Test Mode | : | Mode 1: Transmit (2441.35MHz)         |

| Frequency  | Correct | Reading | Measurement | Margin  | Limit  |
|------------|---------|---------|-------------|---------|--------|
|            | Factor  | Level   | Level       |         |        |
| MHz        | dB      | dBuV    | dBuV/m      | dB      | dBuV/m |
| Horizontal |         |         |             |         |        |
| 254.070    | -5.524  | 41.659  | 36.135      | -9.865  | 46.000 |
| 351.070    | -1.296  | 33.356  | 32.060      | -13.940 | 46.000 |
| 491.720    | 1.521   | 35.215  | 36.736      | -9.264  | 46.000 |
| 559.620    | 2.147   | 32.768  | 34.915      | -11.085 | 46.000 |
| 773.020    | 5.145   | 27.485  | 32.630      | -13.370 | 46.000 |
| 839.950    | 6.032   | 31.434  | 37.466      | -8.534  | 46.000 |
|            |         |         |             |         |        |
| Vertical   |         |         |             |         |        |
| 175.500    | -1.842  | 34.975  | 33.133      | -10.367 | 43.500 |

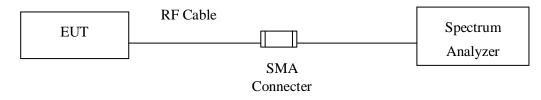
| 175.500 | -1.842 | 34.975 | 33.133 | -10.367 | 43.500 |
|---------|--------|--------|--------|---------|--------|
| 341.370 | -1.116 | 28.046 | 26.930 | -19.070 | 46.000 |
| 499.480 | -0.199 | 28.437 | 28.237 | -17.763 | 46.000 |
| 608.120 | 2.175  | 24.680 | 26.855 | -19.145 | 46.000 |
| 680.870 | 1.416  | 24.997 | 26.414 | -19.586 | 46.000 |
| 833.160 | 1.716  | 33.244 | 34.960 | -11.040 | 46.000 |
|         |        |        |        |         |        |

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 4. The average measurement was not performed when the peak measured data under the limit of average detection.
- 5. The emission levels of other frequencies are very lower than the limit and not show in test report..

#### 5. **RF Antenna Conducted Test**

#### 5.1. Test Setup

#### **RF** antenna Conducted Measurement:



#### 5.2. 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.

#### 5.3. Test Procedure

Tested according to DTS test procedure of KDB558074 section 8.5 DTS emissions in non-restricted frequency bands for compliance to FCC 47CFR 15.247 requirements

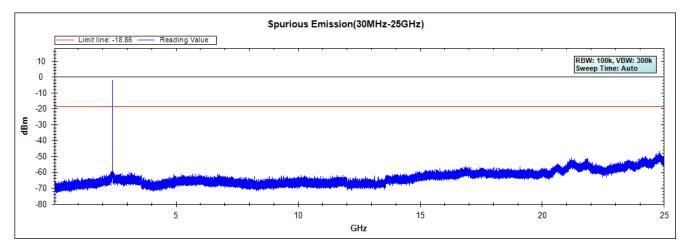
#### 5.4. Uncertainty

The measurement uncertainty Conducted is defined as  $\pm$  1.20dB

#### 5.5. Test Result of RF antenna conducted test

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | RF antenna conducted test             |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit                      |

#### Channel 01 (2405.35MHz) 30M-25GHz

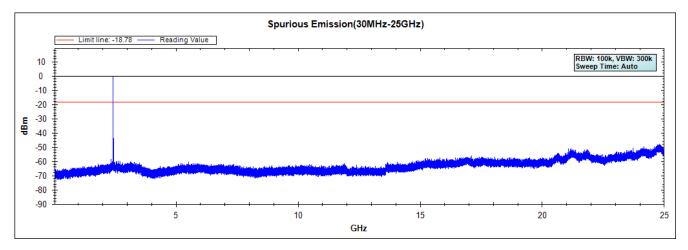


Note: The above test pattern is synthesized by multiple of the frequency range.



| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | RF antenna conducted test             |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit                      |

#### Channel 19 (2441.35MHz) 30M-25GHz

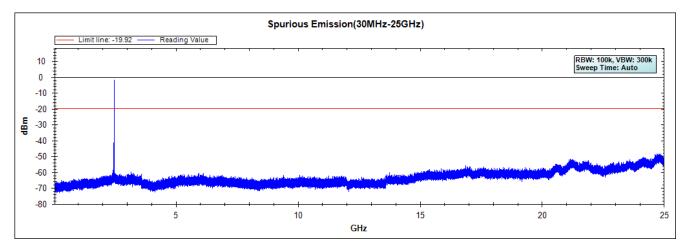


Note: The above test pattern is synthesized by multiple of the frequency range.



| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | RF antenna conducted test             |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit                      |

#### Channel 37 (2477.35MHz) 30M-25GHz



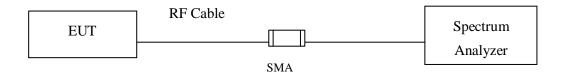
Note: The above test pattern is synthesized by multiple of the frequency range.



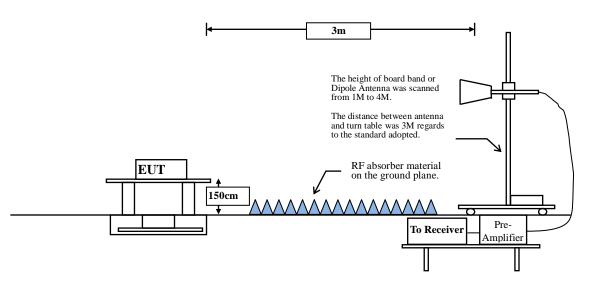
#### 6. Band Edge

6.1. Test Setup

#### **RF** Conducted Measurement



#### **RF Radiated Measurement:**



#### 6.2. 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. 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)).

#### 6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 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 C63.10:2013 on radiated measurement.

#### **RBW and VBW Parameter setting:**

According to KDB 558074 section 8.3.2.1. Peak power measurement procedure RBW = as specified in Table 1.

VBW  $\ge$  3 x RBW.

| Table 1 — RBW as a function of frequency | Table | 1 — RE | BW as a | function | of frequency |
|--|-------|--------|---------|----------|--------------|
|--|-------|--------|---------|----------|--------------|

| Frequency   | RBW         |
|-------------|-------------|
| 9-150 kHz   | 200-300 Hz  |
| 0.15-30 MHz | 9-10 kHz    |
| 30-1000 MHz | 100-120 kHz |
| > 1000 MHz  | 1 MHz       |

According to KDB 558074 section 8.3.2.1. Average power measurement procedure RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\ge$  98 %

VBW  $\geq 1/T$ , when duty cycle < 98 %

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

| 2.4GHz band | Duty Cycle | Т    | 1/T  | VBW  |
|-------------|------------|------|------|------|
|             | (%)        | (ms) | (Hz) | (Hz) |
| Pi/4 DQPSK  | 100        |      |      | 10   |

Note: Duty Cycle Refer to Section 9



## 6.4. Uncertainty

- ± 4.08 dB above 1GHz
- ± 4.22 dB below 1GHz



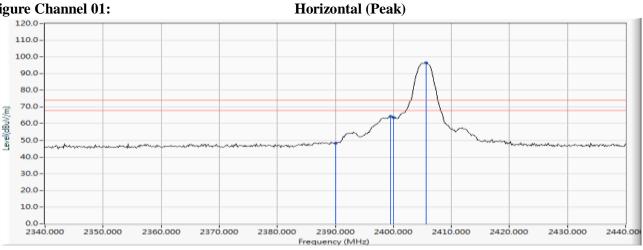
#### 6.5. **Test Result of Band Edge**

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Band Edge Data                        |
| Test Site | : | No.3 OATS                             |
| Test date | : | 2018/10/09                            |
| Test Mode | : | Mode 1: Transmit (2405.35MHz)         |

#### **RF Radiated Measurement (Horizontal):**

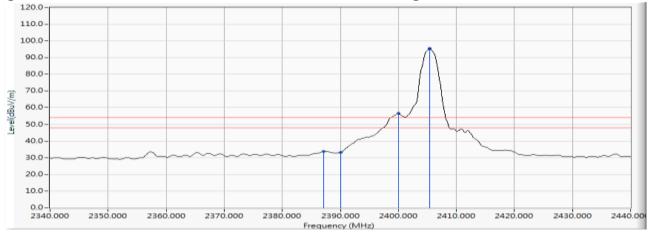
| Channel No.  | Frequency |       | 0      | Emission Level |          | U        | Result |
|--------------|-----------|-------|--------|----------------|----------|----------|--------|
|              | (MHz)     | (dB)  | (dBuV) | (dBuV/m)       | (dBuV/m) | (dBuV/m) |        |
| 01 (Peak)    | 2390.000  | 6.474 | 41.654 | 48.129         | 74.00    | 54.00    | Pass   |
| 01 (Peak)    | 2399.565  | 6.526 | 57.766 | 64.292         | 74.00    | 54.00    | Pass   |
| 01 (Peak)    | 2400.000  | 6.528 | 57.028 | 63.556         |          |          | Pass   |
| 01 (Peak)    | 2405.652  | 6.562 | 89.911 | 96.474         |          |          |        |
| 01 (Average) | 2387.101  | 6.462 | 27.298 | 33.760         | 74.00    | 54.00    | Pass   |
| 01 (Average) | 2390.000  | 6.474 | 26.728 | 33.203         | 74.00    | 54.00    | Pass   |
| 01 (Average) | 2400.000  | 6.528 | 50.079 | 56.607         |          |          | Pass   |
| 01 (Average) | 2405.362  | 6.561 | 89.035 | 95.596         |          |          |        |





#### **Figure Channel 01:**

#### Horizontal (Average)



- All readings above 1GHz are performed with peak and/or average measurements as necessary. 1.
- Measurement Level = Reading Level + Correct Factor. 2.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.



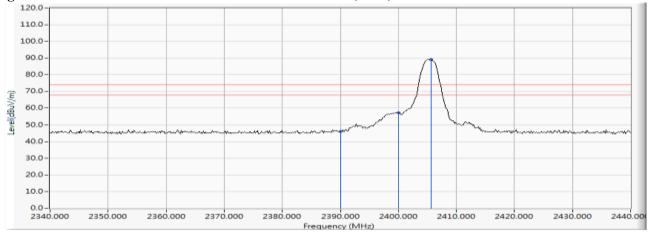
| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Band Edge Data                        |
| Test Site | : | No.3 OATS                             |
| Test date | : | 2018/10/09                            |
| Test Mode | : | Mode 1: Transmit (2405.35MHz)         |

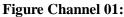
#### **RF Radiated Measurement (Vertical):**

| Channel No.  | Frequency<br>(MHz) | Correct Factor<br>(dB) | Reading Level<br>(dBuV) | Emission Level<br>(dBuV/m) | Peak Limit<br>(dBuV/m) | Average Limit<br>(dBuV/m) | Result |
|--------------|--------------------|------------------------|-------------------------|----------------------------|------------------------|---------------------------|--------|
| 01 (Peak)    | 2390.000           | 5.880                  | 40.050                  | 45.931                     | 74.00                  | 54.00                     | Pass   |
| 01 (Peak)    | 2400.000           | 5.879                  | 51.414                  | 57.293                     | 74.00                  | 54.00                     | Pass   |
| 01 (Peak)    | 2405.652           | 5.893                  | 83.287                  | 89.181                     |                        |                           | Pass   |
| 01 (Average) | 2390.000           | 5.880                  | 24.151                  | 30.032                     | 74.00                  | 54.00                     | Pass   |
| 01 (Average) | 2400.000           | 5.879                  | 43.448                  | 49.327                     |                        |                           | Pass   |
| 01 (Average) | 2405.362           | 5.893                  | 82.400                  | 88.293                     |                        |                           |        |

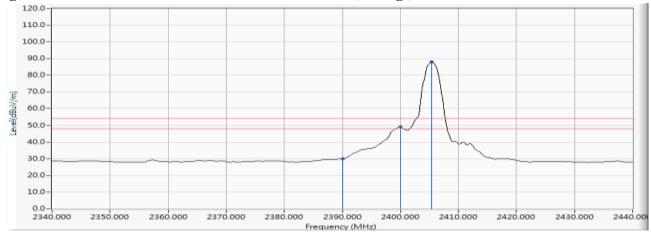


Vertical (Peak)





Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.



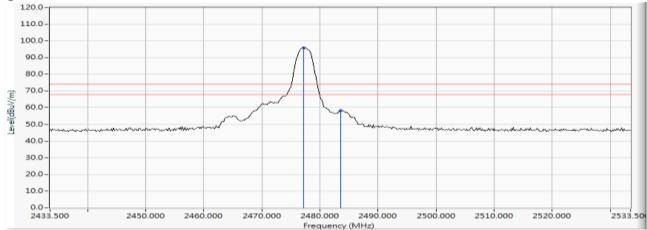
| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Band Edge Data                        |
| Test Site | : | No.3 OATS                             |
| Test date | : | 2018/10/09                            |
| Test Mode | : | Mode 1: Transmit (2477.35MHz)         |

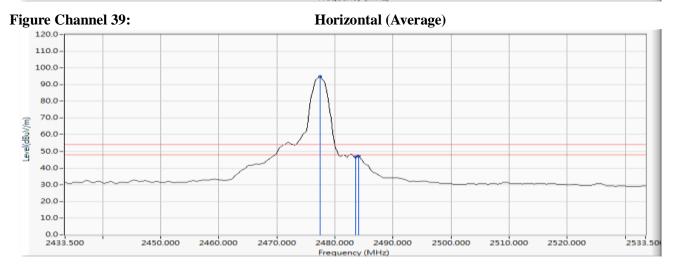
#### **RF** Radiated Measurement (Horizontal):

| Channel No.  | 1 2      | Correct Factor | U U    | Emission Level |          | U U      | Result |
|--------------|----------|----------------|--------|----------------|----------|----------|--------|
|              | (MHz)    | (dB)           | (dBuV) | (dBuV/m)       | (dBuV/m) | (dBuV/m) |        |
| 39 (Peak)    | 2477.123 | 7.065          | 88.670 | 95.735         |          |          |        |
| 39 (Peak)    | 2483.500 | 7.110          | 51.112 | 58.222         | 74.00    | 54.00    | Pass   |
| 39 (Average) | 2477.413 | 7.067          | 87.804 | 94.871         |          |          |        |
| 39 (Average) | 2483.500 | 7.110          | 39.476 | 46.586         | 74.00    | 54.00    | Pass   |
| 39 (Average) | 2484.080 | 7.114          | 40.250 | 47.364         | 74.00    | 54.00    | Pass   |

#### Figure Channel 39:

#### Horizontal (Peak)





- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.



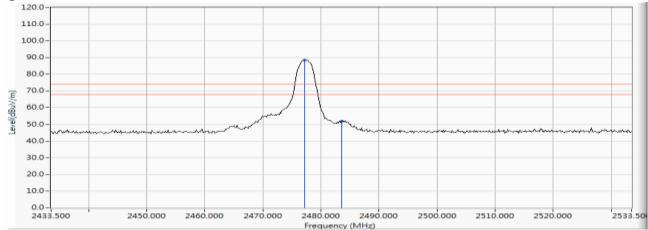
| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Band Edge Data                        |
| Test Site | : | No.3 OATS                             |
| Test date | : | 2018/10/09                            |
| Test Mode | : | Mode 1: Transmit (2477.35MHz)         |

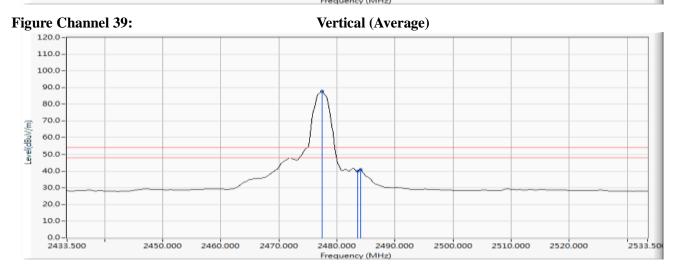
#### **RF** Radiated Measurement (Vertical):

| Channel No.  | Frequency<br>(MHz) | Correct Factor<br>(dB) | Reading Level<br>(dBuV) | Emission Level<br>(dBuV/m) | Peak Limit<br>(dBuV/m) | Average Limit<br>(dBuV/m) | Result |
|--------------|--------------------|------------------------|-------------------------|----------------------------|------------------------|---------------------------|--------|
| 39 (Peak)    | 2477.123           | 6.323                  | 82.260                  | 88.583                     |                        |                           |        |
| 39 (Peak)    | 2483.500           | 6.363                  | 45.443                  | 51.806                     | 74.00                  | 54.00                     | Pass   |
| 39 (Average) | 2477.413           | 6.325                  | 81.408                  | 87.733                     |                        |                           |        |
| 39 (Average) | 2483.500           | 6.363                  | 33.513                  | 39.876                     | 74.00                  | 54.00                     | Pass   |
| 39 (Average) | 2484.080           | 6.367                  | 34.424                  | 40.791                     | 74.00                  | 54.00                     | Pass   |

#### Figure Channel 39:

#### Vertical (Peak)



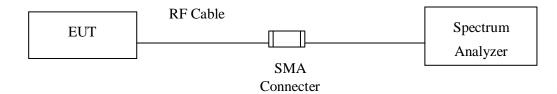


- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Measurement Level = Reading Level + Correct Factor.
- 3. The average measurement was not performed when the peak measured data under the limit of average detection.



## 7. Occupied Bandwidth

### 7.1. Test Setup



#### 7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

#### 7.3. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 1-5% of the emission bandwidth, VBW $\geq$ 3\*RBW

## 7.4. Uncertainty

 $\pm 283Hz$ 

## 7.5. Test Result of Occupied Bandwidth

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Occupied Bandwidth Data               |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit (2405.35MHz)         |

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(kHz) | Required Limit<br>(kHz) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 01          | 2405.35            | 1710                       | >500                    | Pass   |

## Figure Channel 01:

| 10 @ W                       |  |                                    | ans  | 1001000                            | 10               |                               | im Antrijow - S           | Spectre |       |                              |
|------------------------------|--|------------------------------------|------|------------------------------------|------------------|-------------------------------|---------------------------|---------|-------|------------------------------|
| Frequency                    | 03:25:58 PM Oct 06, 2018<br>TRACE 1 2 3 4 5 6<br>TIPE M WWWWW<br>DET P N N N N N | Type: Log-Pwr                      | n    | Trig: Free Ru                      | Hz<br>NO: Wide G | 50000 GH                      | q 2.4053                  | Fre     |       | Cer                          |
| Auto Tun                     | 2 2.404 50 GHz<br>-5.60 dBm  | Mkr2                               |      | #Atten: 20 dB                      | Gain:Low         | 1F1<br>).5 dB                 | tef Offset 0<br>Ref 10.50 |         | B/div |                              |
| Center Fre<br>2.405350000 GH | -5.15 abr  |                                    |      | \$ <sup>2</sup>                    |                  |                               |                           |         | E     | .og<br>.sco<br>9.50          |
| Start Fre<br>2.400350000 GH  | m  | -                                  |      |                                    |                  | <sup>1</sup>                  | ~~                        | -       | -     | 19.6<br>29.5<br>39.5<br>49.5 |
| Stop Fre<br>2.410350000 GH   |  |                                    |      |                                    |                  |                               |                           |         | ⊢     | 59.5<br>69.5<br>79.5         |
| 1.000000 MH                  | Span 10.00 MHz<br>000 ms (1001 pts)  | 105350 GHz<br>100 kHz #VBW 300 kHz |      |                                    |                  |                               | nter<br>s B               | Re      |       |                              |
| Freq Offs                    | NUNCTIONNALIE -  |                                    | UKSI | 0.85 dBm<br>-5.50 dBm<br>-5.50 dBm | 50 GHz           | 2,405 7<br>2,404 5<br>2,406 2 |                           |         | NNN   | 1 2 3 4 5 6                  |
|                              |  |                                    |      |                                    |                  |                               |                           |         |       | 7<br>8<br>9<br>10<br>11      |
|                              | 2  | STATUS                             |      |                                    |                  |                               |                           |         |       | 56                           |



| Test Item | : | Occupied Bandwidth Data |
|-----------|---|-------------------------|
|-----------|---|-------------------------|

| Test Site : N | lo.3 OATS |
|---------------|-----------|
|---------------|-----------|

Test Mode : Mode 1: Transmit (2441.35MHz)

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(kHz) | Required Limit<br>(kHz) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 19          | 2441.35            | 1600                       | >500                    | Pass   |

## Figure Channel 19:

|                                  |   |               | 1076 | 8                               | 100      |                                  | utativom - Swe        |                 |        |                                  |
|----------------------------------|---|---------------|------|---------------------------------|----------|----------------------------------|-----------------------|-----------------|--------|----------------------------------|
| Frequency                        | 03:28:48 PM Oct 08, 2018<br>THACE 1 2 3 4 5 6<br>TYPE M WWWWWW<br>DET P N N N N N | Type: Log-Pwr | un   | Trig: Free                      | O: Wide  | 0000 GH                          | 2.44135               | req 2           |        | Cen                              |
| Auto Tune                        | 2 2.440 57 GHz<br>-4.89 dBm   | Mkr2          | В    | #Atten: 20                      | Sain:Low | IFG<br>dB                        | Offset 0.5<br>10.50 d |                 | B/div  |                                  |
| Center Fre<br>2.441350000 GH     | 410.00  |               | 1    | <b>\$</b> <sup>2</sup>          |          |                                  |                       |                 |        | Log<br>9.900<br>-9.50            |
| Start Fre<br>2.436350000 GH      |   | -92           |      |                                 |          |                                  | and the second        |                 |        | -19.5<br>-29.5<br>-39.5<br>-49.5 |
| Stop Fre<br>2.446350000 GH       |   |               |      |                                 |          |                                  |                       |                 |        | 69.5<br>69.5<br>79.5             |
| CF Ste<br>1.000000 MH<br>Auto Ma | Span 10.00 MHz<br>000 ms (1001 pts)   | ep (#Swp) 1.  | FUNC | 300 kHz                         | #VBV     | ×                                |                       | .4413:<br>/ 100 | s BW   | Re                               |
| Freq Offse<br>0 H                |   |               | i l  | 1.40 dB<br>-4.89 dB<br>-4.62 dB | 7 GHz    | 2.441 44<br>2.440 57<br>2.442 17 |                       | 1               | N<br>N | 123466                           |
|                                  |   |               |      | H                               |          |                                  |                       |                 |        | 7<br>8<br>9<br>10<br>11          |
|                                  | 1.000   | STATUS        |      | 10                              |          |                                  |                       |                 |        | isG                              |



| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Occupied Bandwidth Data               |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit (2477.35MHz)         |

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(kHz) | Required Limit<br>(kHz) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 37          | 2477.35            | 1630                       | >500                    | Pass   |

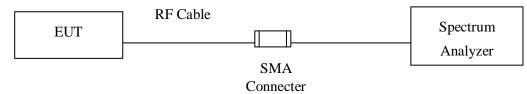
## Figure Channel 37:

|   |   | in the later     | 16   | 101103                                     |                                     |           | rum Analyzer     | nt lipecto |      |                              |
|---|---|------------------|------|--|-------------------------------------|-----------|------------------|------------|------|------------------------------|
| Frequency                               | 03:31:48 PM Oct 08, 2018<br>TRACE 1 2 3 4 5 6<br>TYPE MWWWWW<br>DET P NNNNN                   | vg Type: Log-Pwr | 10   | Trig: Free Ri                              | GHz<br>PNO: Wide C                  | 7350000 G |                  | r Fre      |      | Cen                          |
| Auto Tun                                | Ref Offset 0.5 dB Det  P NNNN N<br>Ref Offset 0.5 dB Mkr2 2.476 57 GHz<br>-5.73 dBm -5.73 dBm |                  |      |  |                                     |           |                  |            |      |                              |
| Center Fre<br>2.477350000 GH            | -5.00 atom  |                  | -0   | <b>9</b> <sup>2</sup> <u></u> <sup>1</sup> |                                     |           |                  |            |      | .og<br>1.900<br>9.50         |
| Start Fre<br>2.472350000 GH             | ma  | ~                |      |  | ~~~                                 | ~~~       |                  |            | 5    | 19.5<br>29.5<br>39.5<br>49.5 |
| Stop Fre<br>2.482350000 GH              |   |                  |      |  |                                     |           |                  |            |      | 59.5<br>69.5<br>79.5         |
| CF Ste<br>1.000000 Mi<br><u>Auto</u> Mi | Span 10.00 MHz<br>000 ms (1001 pts)   | veep (#Swp) 1.   | TUNC | / 300 kHz                                  | #VB                                 | Hz        | 7350 G<br>00 kHz |            | es B | Re                           |
| Freq Offs<br>01                         |   |                  |      | 0.92 dBm<br>-6.73 dBm<br>-6.36 dBm         | 77 03 GHz<br>76 57 GHz<br>78 20 GHz | 2.476     | 1                |            |      | 123466                       |
|   |   |                  |      | н.   |                                     |           |                  |            |      | 7<br>8<br>9<br>10<br>11      |
|   |   | STATUS           |      |  |                                     |           |                  |            |      | 56                           |



#### 8. **Power Density**

#### 8.1. Test Setup



#### 8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

#### 8.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013, the maximum power spectral density using KDB 558074 section 8.4 PKPSD (peak PSD) method.

#### 8.4. Uncertainty

 $\pm 1.20 \text{ dB}$ 

## 8.5. Test Result of Power Density

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Power Density Data                    |
| Test Site | : | No.3 OATS                             |
| Test Mode | : | Mode 1: Transmit(2405.35MHz)          |

| Channel No. | Frequency<br>(MHz) | Measure Level<br>(dBm) | Limit<br>(dBm) | Result |
|-------------|--------------------|------------------------|----------------|--------|
| 01          | 2405.35            | 1.14                   | < 8dBm         | Pass   |

## Figure Channel 01:

| 140 100 100                     |   | 111 - 4 A      |       | Station -             | 2010                     | 17                     |           | ctourn Analyzer - Se       |             |
|---------------------------------|---|----------------|-------|-----------------------|--------------------------|------------------------|-----------|----------------------------|-------------|
| Frequency                       | 03:26:20 PM Oct 08, 2018<br>TRACE 1 2 3 4 5 6 | Log-Pwr        |       | ASE INT               | SER                      | H7 1                   | 350000 GI | eq 2.4053                  | RL Center F |
| Auto Tune                       | DET P NNNNN                                   |                |       | e Run<br>0 dB         | Trig: Free<br>#Atten: 20 | NO: Wide 😱<br>Gain:Low | P         | 6q 2.4000                  | Center P    |
|                                 | 405 529 6 GHz<br>1.14 dBm                     | Mkr1 2.4       |       |                       |                          |                        |           | Ref Offset 0.<br>Ref 10.50 | 10 dB/div   |
| Center Fre<br>2.405350000 GH    |   | all the second |       | <b>●</b> <sup>1</sup> |                          | Marine .               |           |                            |             |
| Start Fre<br>2,404067500 GH     |   |                |       |                       |                          |                        |           | A                          | 9 50        |
| Stop Fre<br>2.406632500 GH      |   |                |       |                       |                          |                        |           |                            | 29.5 wet    |
| CF Ste<br>256.500 kH<br>Auto Ma |   |                |       |                       |                          |                        |           |                            | 85          |
| Freq Offse<br>0 H               |   | _              |       |                       |                          |                        |           |                            | 19,5        |
|                                 |   |                |       |                       |                          |                        |           |                            | 79.5        |
|                                 | Span 2.565 MHz<br>000 ms (1001 pts)           | #Swp) 1.0      | Sweep |                       | 300 kHz                  | #VBW                   | z         | 05350 GHz<br>100 kHz       | Center 2./  |
|                                 |   | STATUS         |       |                       |                          |                        |           |                            | #16         |



| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Power Density Data                    |
| Test Site | : | No.3OATS                              |
|           |   |                                       |

Test Mode : Mode 1: Transmit (2441.35MHz)

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(dBm) | Required Limit<br>(dBm) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 19          | 2441.35            | 1.22                       | < 8dBm                  | Pass   |

#### Figure Channel 19:

| R R HF 50 0 AC                               | 17 17 18 18 18 18 18 18 18 18 18 18 18 18 18 |                                |  | 140 100 100                      |
|--|--|--------------------------------|--|----------------------------------|
| Center Freq 2.441350000 (                    | PNO: Wide C Trig: Free Run                   | Auto Auto<br>Avg Type: Log-Pwr | 03:24:08 PM Oct 08, 2618<br>TRACE 1 2 3 4 5 6<br>TiPE N NNNN | Frequency                        |
| Ref Offset 0.5 dB<br>10 dB/div Ref 10.50 dBm | IFGsin:Low #Atten: 20 dB                     | Mkr1 2.                        | 441 090 8 GHz<br>1.22 dBm                                    | Auto Tune                        |
| Log  |  | NTA Subsection Sector Strategy |  | Center Free<br>2.441350000 GH:   |
| 19.5   |  |                                | 1  | Start Free<br>2.440150000 GH:    |
| 29.5   |  |                                |  | Stop Free<br>2.442550000 GH      |
| 49.5   |  |                                |  | CF Stej<br>240.000 kH<br>Auto Ma |
| 69,0   |  |                                |  | Freq Offse<br>0 H                |
| 79.5<br>Center 2,441350 GHz                  |  |                                | Span 2.400 MHz   |                                  |
| #Res BW 100 kHz                              | #VBW 300 kHz                                 | sweep (#swp) 1.                | 000 ms (1001 pts)  |                                  |



| Product : |  | LVL50 Wireless Stereo Headset for XBO |
|-----------|--|---------------------------------------|
|-----------|--|---------------------------------------|

| Test Item | : | Power Density Data |
|-----------|---|--------------------|
|           |   | 5                  |

Test Site : No.3 OATS

Test Mode : Mode 1: Transmit (2477.35MHz)

| Channel No. | Frequency<br>(MHz) | Measurement Level<br>(dBm) | Required Limit<br>(dBm) | Result |
|-------------|--------------------|----------------------------|-------------------------|--------|
| 37          | 2477.35            | 0.07                       | < 8dBm                  | Pass   |

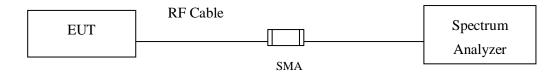
#### Figure Channel 37:

| Keysight Spectrum Analyzer - Swept SA        | 10000000000   | and the second       |   | 100 100 100                      |
|--|---|----------------------|---|----------------------------------|
| RL IF 500 AC<br>Center Freq 2.477350000 GHz  | SERGE INT   | Avg Type: Log-Pwr    | 03:32:09 PM Oct 08, 2018<br>TRACE 1 2 3 4 5 6 | Frequency                        |
| PNO:<br>IFGair                               | Wide Trig: Free Run<br>#Atten: 20 dB  |                      | DET P NNNNN                                   | Auto Tune                        |
| Ref Offset 0.5 dB<br>10 dB/div Ref 10.50 dBm |   | Mkr1 2.              | 477 724 1 GHz<br>0.07 dBm                     | Auto Tune                        |
|  | and a first from the first from the first   |                      |   | Center Free<br>2.477350000 GH    |
| 950  | and and a second state of the s | environ and a second | Vidhan Ing                                    |                                  |
| 19.5   |   |                      | 1   | Start Fred<br>2.476127500 GH:    |
| 29.5   |   |                      | <u> </u>                                      | Stop Free<br>2.478572500 GH      |
| 49 5   |   |                      |   | CF Stej<br>244.500 kH<br>Auto Ma |
| 69.5   |   |                      |   | Freq Offse<br>0 H                |
| 79.5   |   |                      |   |                                  |
| Center 2.477350 GHz<br>#Res BW 100 kHz       | #VBW 300 kHz  | Sweep (#Swp) 1.      | Span 2.445 MHz<br>000 ms (1001 pts)           |                                  |
| 86   |   | STATUS               |   |                                  |



### 9. Duty Cycle

## 9.1. Test Setup



#### 9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

#### 9.3. Uncertainty

± 2.31msec



## 9.4. Test Result of Duty Cycle

| Product   | : | LVL50 Wireless Stereo Headset for XBO |
|-----------|---|---------------------------------------|
| Test Item | : | Duty Cycle                            |
| Test Mode | : | Mode 1: Transmit                      |

Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

#### Results:

| 2.4GHz band | Ton  | Ton + Toff | Duty Cycle | Duty Factor |
|-------------|------|------------|------------|-------------|
|             | (ms) | (ms)       | (%)        | (dB)        |
| Pi/4 DQPSK  |      |            | 100        | 0           |

| RL RF SOD ACT                          | SERGIE INF      | ALEN AUTO         | 63:23:26 PM Oct 08, 2018        | Terl & W                                |
|--|-----------------|-------------------|---------------------------------|---|
| Center Freq 2.477350000 GHz<br>PNO: Fa | Trig: Free Run  | Avg Type: Log-Pwr | TRACE 1 2 3 4 5 6               | Frequency                               |
| IFGainLu<br>IO dB/div Ref 10.00 dBm    | w #Atten: 20 dB |                   | DET P NNNN                      | Auto Tune                               |
|  |                 |                   |                                 | Center Fred<br>2.477350000 GH:          |
| 20.0                                   |                 |                   |                                 | Start Free<br>2.477350000 GH            |
| 40.0                                   |                 |                   |                                 | Stop Fre<br>2.477350000 GH              |
| 50.0                                   |                 |                   |                                 | CF Ste<br>1.000000 MH<br><u>Auto</u> Ma |
| 70.0                                   |                 |                   |                                 | Freq Offse<br>0 H                       |
| 800<br>Center 2.477350000 GHz          |                 |                   | On on C Ha                      |   |
|  | BW 1.0 MHz      | Sweep 1           | Span 0 Hz<br>0.00 ms (1001 pts) |   |



## **10.** EMI Reduction Method During Compliance Testing

No modification was made during testing.