

**Shing Hing Industrial Limited**

Application  
For  
Certification

**FCC ID: 2AFZWGPAUBA001**

**PAUBA**

**Model: PAU001**

**Brand name: PAUBA**

**2.4GHz Transceiver**

**Report No.: 170927006SZN-001**

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-16]

Prepared and Checked by:

Approved by:

Sign on file

Damon Wang  
Engineer

---

Kidd Yang  
Senior Project Engineer  
Date: October 24, 2017

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results referenced from this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
- For Terms And Conditions of the services, it can be provided upon request.
- The evaluation data of the report will be kept for 3 years from the date of issuance.

TRF no.: FCC 15C\_Tx\_c

## LIST OF EXHIBITS

### *INTRODUCTION*

<i>EXHIBIT 1:</i>	Summary of Tests
<i>EXHIBIT 2:</i>	General Description
<i>EXHIBIT 3:</i>	System Test Configuration
<i>EXHIBIT 4:</i>	Measurement Results
<i>EXHIBIT 5:</i>	Equipment Photographs
<i>EXHIBIT 6:</i>	Product Labeling
<i>EXHIBIT 7:</i>	Technical Specifications
<i>EXHIBIT 8:</i>	Instruction Manual
<i>EXHIBIT 9:</i>	Miscellaneous Information
<i>EXHIBIT 10:</i>	Test Equipment List

---

## INTERTEK TESTING SERVICES

---

### MEASUREMENT/TECHNICAL REPORT

**Shing Hing Industrial Limited - MODEL: PAU001**

**PAUBA**

**FCC ID: 2AFZWGPAUBA001**

This report concerns (check one)    Original Grant ☒ Class II Change ☐

Equipment Type: DTS - Part 15 Digital Transmission Systems (Bluetooth LE portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?    Yes ☐    No ☒

If yes, defer until :   
date

Company Name agrees to notify the Commission by:   
date

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37?    Yes ☐    No ☒

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-16 Edition] provision.

Report prepared by:

Damon Wang  
Intertek Testing Services Shenzhen Ltd. Longhua Branch  
1F/2F, Building B, QiaoAn Scientific Technology Park,  
Shangkeng Community, Guanhu Subdistrict, Longhua  
District, Shenzhen, P.R. China  
Tel / Fax: 86-755-8601 6288/86-755-8601 6751

# INTERTEK TESTING SERVICES

## Table of Contents

1.0	<b><u>Summary of Test results</u></b> .....	2
2.0	<b><u>General Description</u></b> .....	4
2.1	Product Description .....	4
2.2	Related Submittal(s) Grants .....	4
2.3	Test Methodology.....	4
2.4	Test Facility .....	4
3.0	<b><u>System Test Configuration</u></b> .....	6
3.1	Justification.....	6
3.2	EUT Exercising Software.....	6
3.3	Special Accessories .....	6
3.4	Measurement Uncertainty .....	7
3.5	Equipment Modification.....	7
3.6	Support Equipment List and Description.....	7
4.0	<b><u>Measurement Results</u></b> .....	9
4.1	Maximum Conducted Output Power at Antenna Terminals .....	9
4.2	Minimum 6 dB RF Bandwidth.....	10
4.3	Maximum Power Density Reading .....	13
4.4	Out of Band Conducted Emissions.....	16
4.5	Out of Band Radiated Emissions .....	23
4.6	Transmitter Radiated Emissions in Restricted Bands.....	24
4.7	Field Strength Calculation.....	25
4.7.1	Radiated Emission Configuration Photograph.....	26
4.7.2	Radiated Emission .....	26
4.7.3	Transmitter Spurious Emissions (Radiated) .....	28
4.8	Radiated Emissions from Digital Section of Transceiver .....	32
4.9	Transmitter Duty Cycle Calculation and Measurements .....	33
5.0	<b><u>Equipment Photographs</u></b> .....	35
6.0	<b><u>Product Labelling</u></b> .....	37
7.0	<b><u>Technical Specifications</u></b> .....	39
8.0	<b><u>Instruction Manual</u></b> .....	41
9.0	<b><u>Confidentiality Request</u></b> .....	43
10.0	<b><u>Discussion of Pulse Desensitization</u></b> .....	45
11.0	<b><u>Test Equipment List</u></b> .....	47

---

## INTERTEK TESTING SERVICES

---

### List of attached file

Exhibit Type	File Description	Filename
Cover Letter	Letter of Agency	agency.pdf
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf

# **INTERTEK TESTING SERVICES**

---

## **EXHIBIT 1**

### **SUMMARY OF TEST RESULTS**

---

## INTERTEK TESTING SERVICES

---

### 1.0 Summary of Test

**Shing Hing Industrial Limited - MODEL: PAU001**

**FCC ID: 2AFZWGPAUBA001**

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

Notes: The EUT uses Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 2**

### **GENERAL DESCRIPTION**



---

## INTERTEK TESTING SERVICES

---

### 2.0 General Description

#### 2.1 Product Description

The equipment under test (EUT) is a PAUBA with Bluetooth function operating in 2402-2480MHz. The EUT is powered by DC 3.7V lithium battery which can be charged by USB port. The USB port is only use for charging purpose. In charging mode Bluetooth doesn't work. For more detail information pls. refer to the user manual.

Bluetooth Version: 4.0 BLE Mode

Type of Modulation: GFSK.

Antenna Type: Integral Antenna.

Antenna Gain: 2.0 dBi

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

#### 2.2 Related Submittal(s) Grants

This is an application for certification of transceiver for the PAUBA which has Bluetooth function(Bluetooth low energy mode), and for the other function was tested and demonstrated in report 170927006SZN-002.

#### 2.3 Test Methodology

Radiated emission measurement was performed according to the procedures in ANSI C63.10 (2013) and KDB 558074 D01 v04. Radiated emission measurement was performed in semi-anechoic chamber. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

#### 2.4 Test Facility

The Semi-anechoic chamber used to collect the radiated data is **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 1F/2F, Building B, QiaoAn Scientific Technology Park, Shangkeng Community, Guanhu Subdistrict, Longhua District, Shenzhen, P.R. China. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

**EXHIBIT 3**  
**SYSTEM TEST CONFIGURATION**

---

## INTERTEK TESTING SERVICES

---

### 3.0 **System Test Configuration**

#### 3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by a fully Rechargeable battery (DC 3.7V, 60mAh) during the test. Only the worst data was reported in this report.

For maximizing emissions, the EUT was rotated through 360°, the EUT was placed on the styrene turntable with 0.8m up to 1GHz and 1.5 m above 1GHz. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

The unit was operated standalone and placed in the centre of the turntable.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

#### 3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during testing was designed to exercise the various system components in a manner similar to a typical use.

#### 3.3 Special Accessories

N/A

---

## INTERTEK TESTING SERVICES

---

### 3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

### 3.5 Equipment Modification

Any modifications installed previous to testing by Shing Hing Industrial Limited will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

### 3.6 Support Equipment List and Description

This product was tested in the following configuration:

Description	Manufacturer	Model No.
iPod (Provided by Intertek)	Apple	A1367

## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 4**

### **MEASUREMENT RESULTS**

---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.0 **Measurement Results**

#### 4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

[x] The antenna power of the EUT was connected to the input of a broadband peak RF power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm).

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2402	-5.75	0.266
Middle Channel: 2440	-6.37	0.231
High Channel: 2480	-6.98	0.200

Cable loss: 0.5 dB    External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max. output level = -5.75dBm

EUT max. E.I.R.P level = -5.75dBm + 2.0dBi = -3.75dBm

For RF Exposure, the information is saved with filename: analysis report.pdf.

---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was set to 100 KHz according to FCC KDB 558074 D01 v04. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

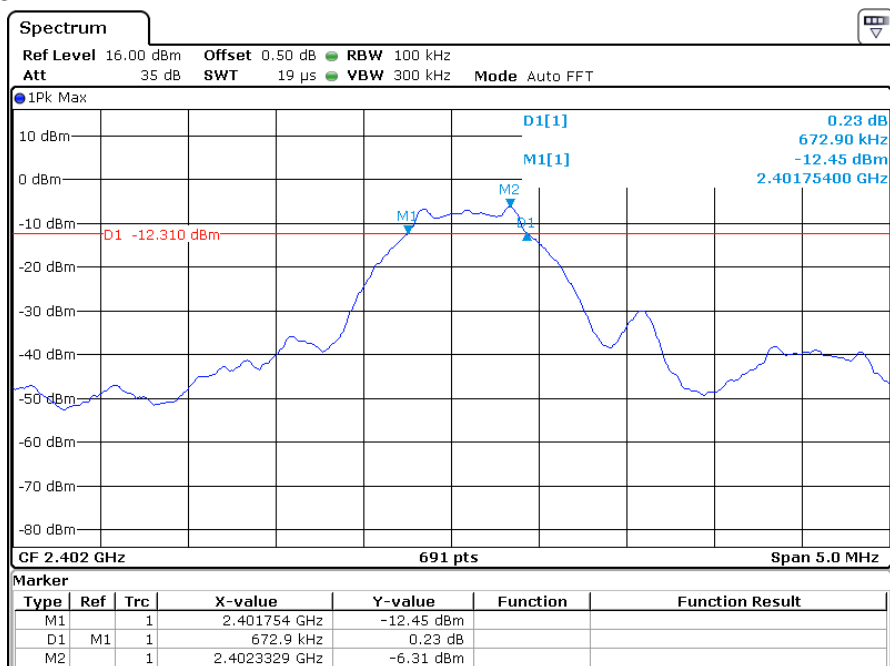
Limit: The 6 dB Bandwidth is at least 500 kHz.

Frequency (MHz)	6 dB Bandwidth (KHz)
2402	672.9
2440	680.2
2480	672.9

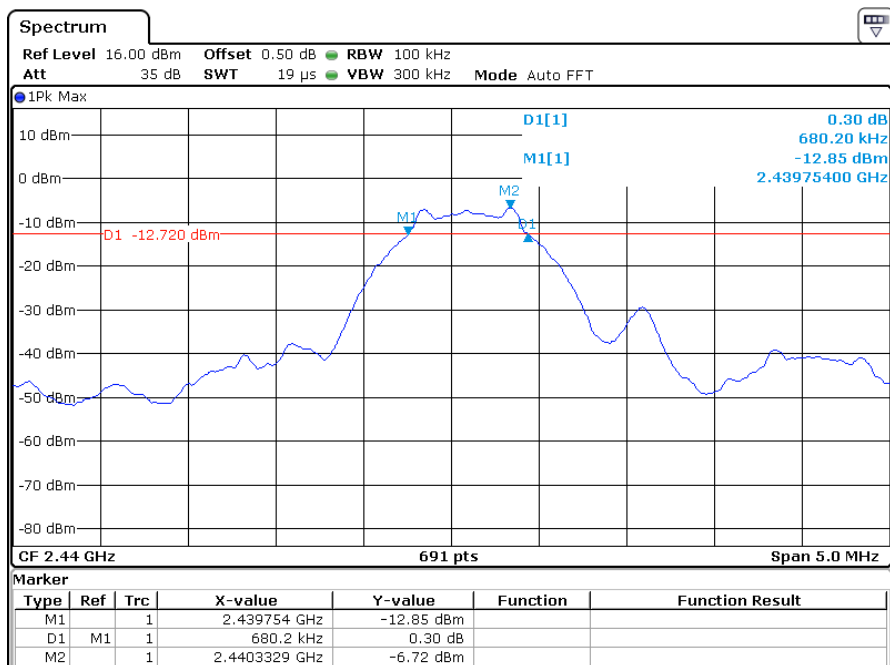
The test plots are attached as below.

# INTERTEK TESTING SERVICES

## Low Channel



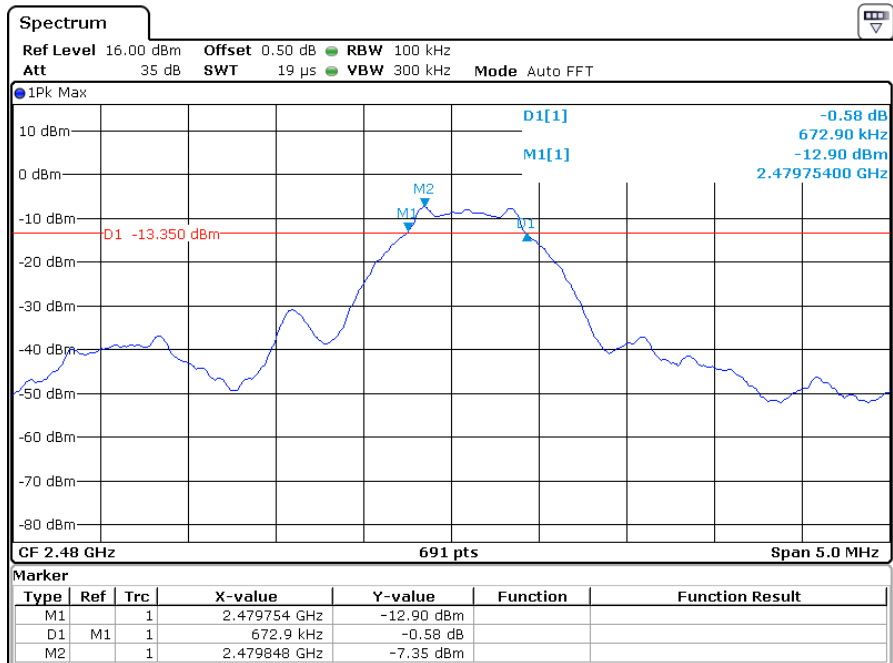
## Middle Channel





# INTERTEK TESTING SERVICES

## High Channel



---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 D01 v04.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

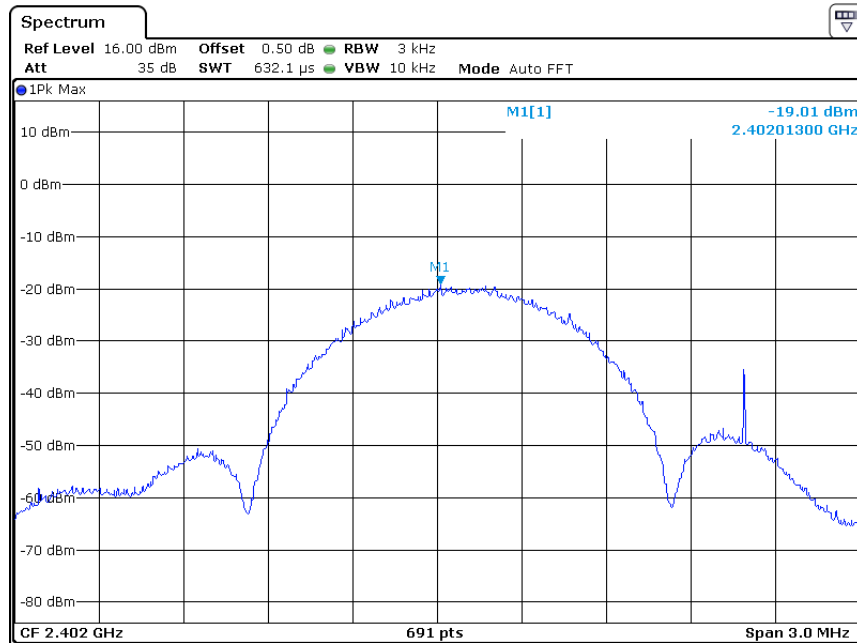
Limit: The Power Density does not exceed 8dBm/ 3 kHz.

Frequency (MHz)	Power Density with RBW 3KHz
2402	-19.01
2440	-22.03
2480	-24.25

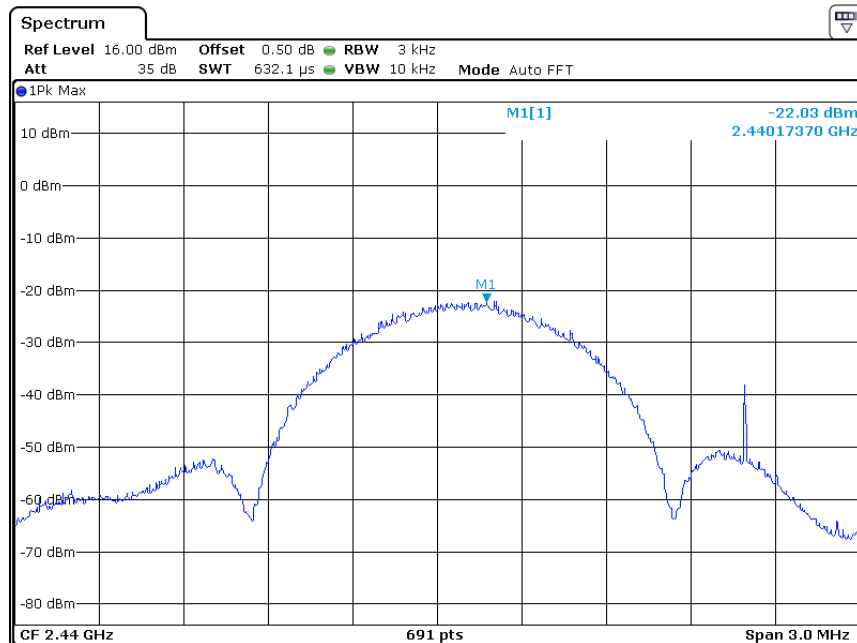
The test plots are attached as below.

# INTERTEK TESTING SERVICES

## Low Channel

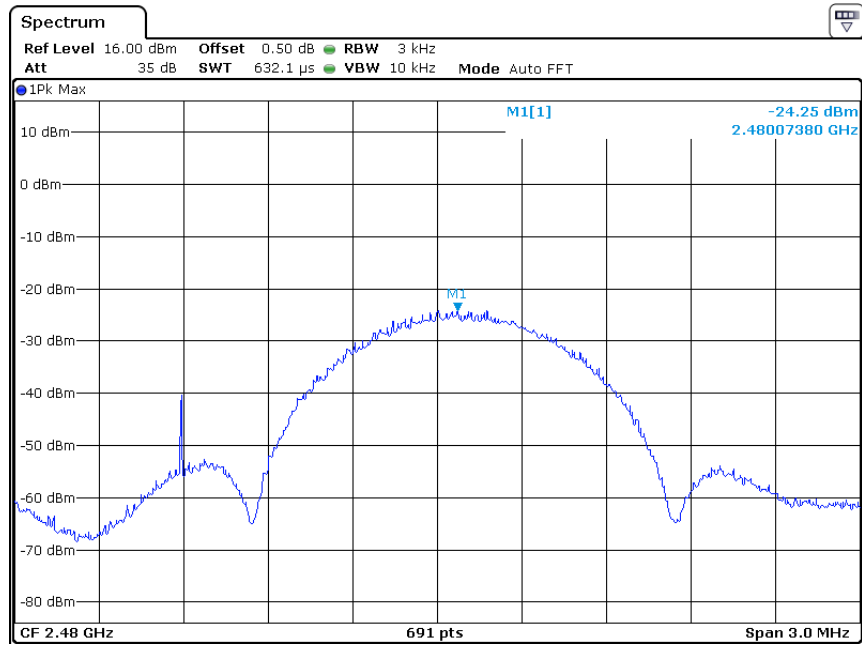


## Middle Channel



## INTERTEK TESTING SERVICES

### High Channel



## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the EUT passband, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20dB below that of the maximum in-band 100 kHz emission, or else shall meet the general limits for radiated emissions at frequencies outside the passband, whichever results in lower attenuation. The Measurement Procedure was set according to the FCC KDB 558074 D01 v04.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

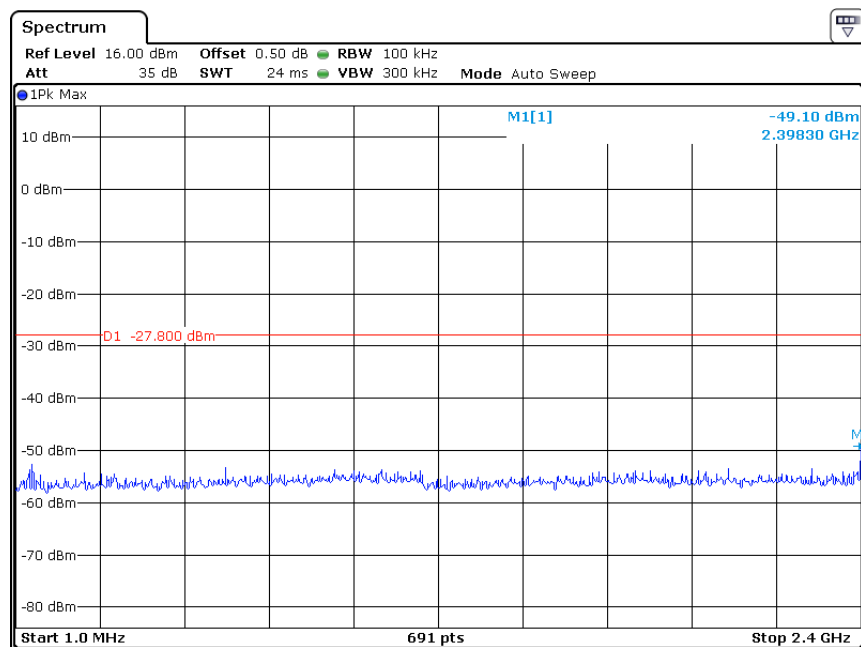
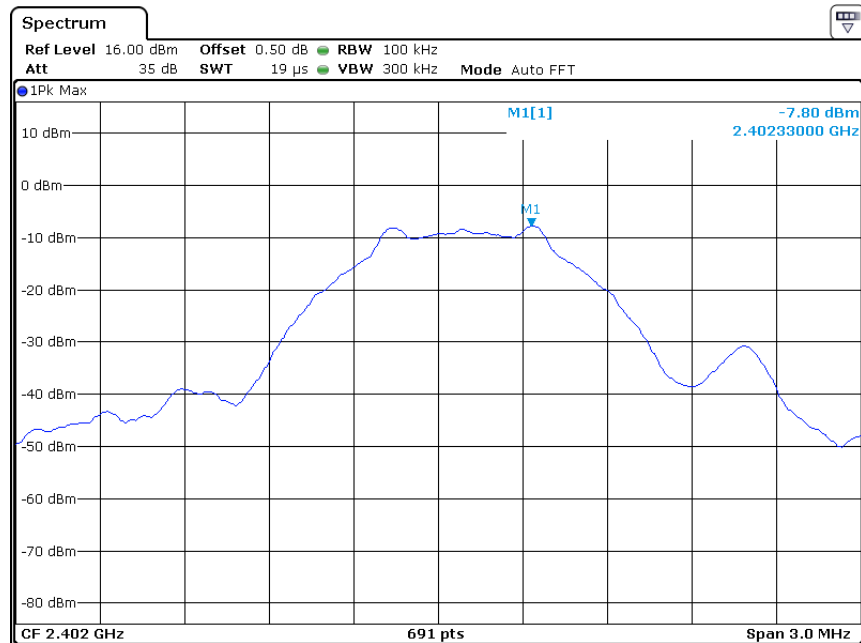
Refer to the attached test plot for out of band conducted emissions data.

The test plots showed all spurious emission and up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

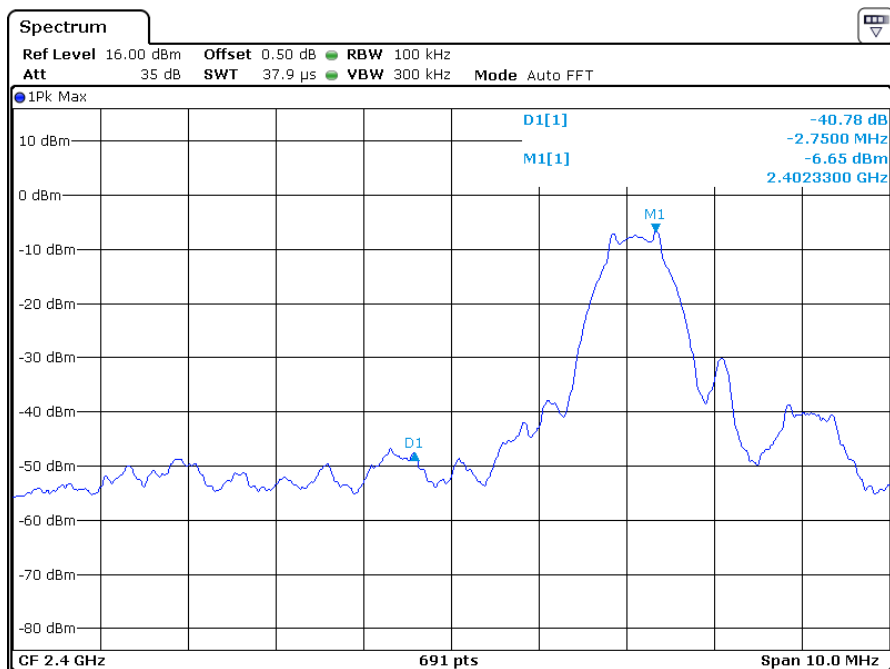
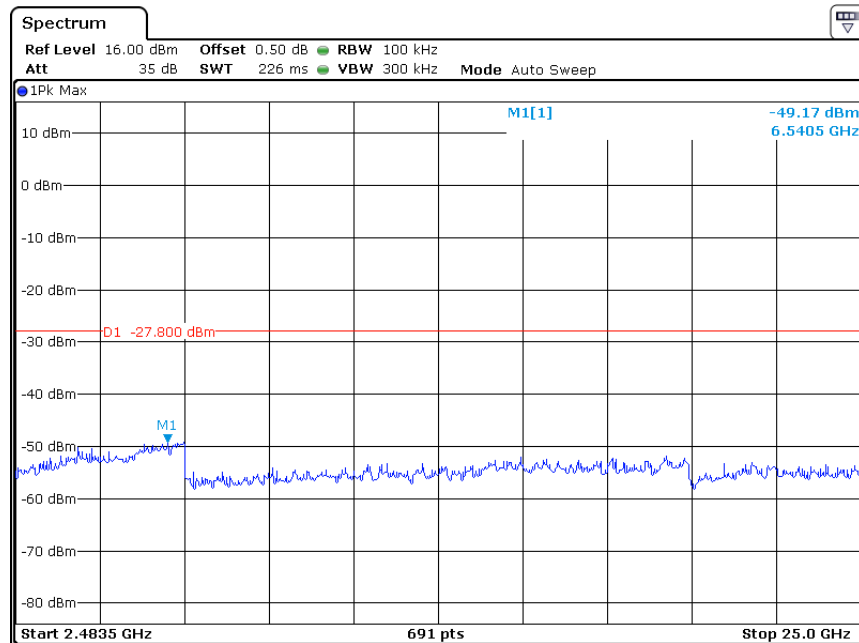
The test plots are attached as below.

## INTERTEK TESTING SERVICES

Low Channel Reference Level: -7.80dBm

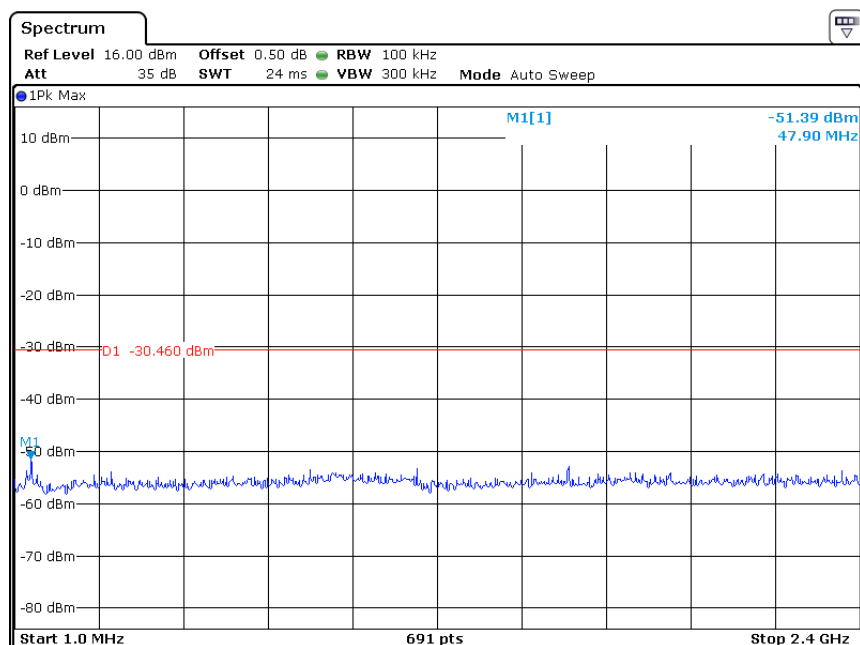
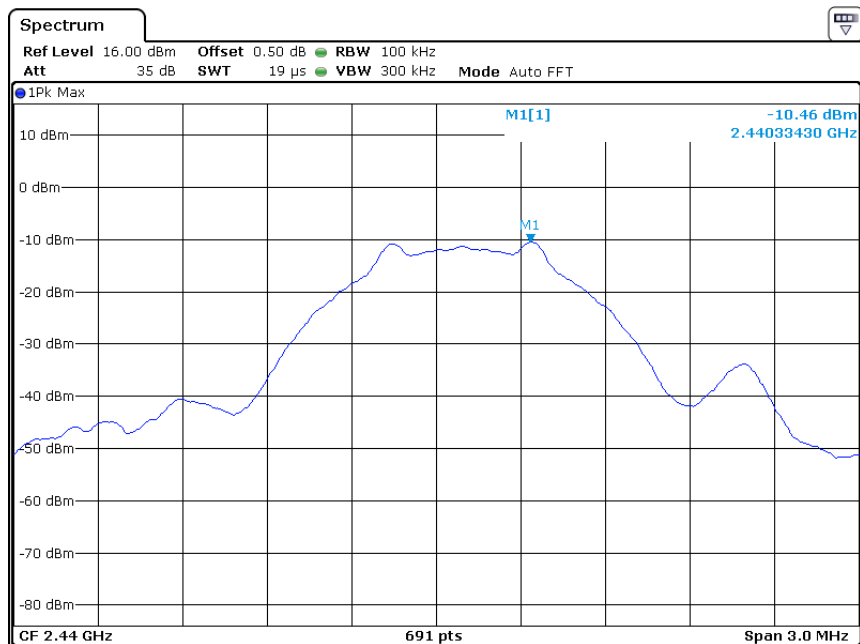


## INTERTEK TESTING SERVICES



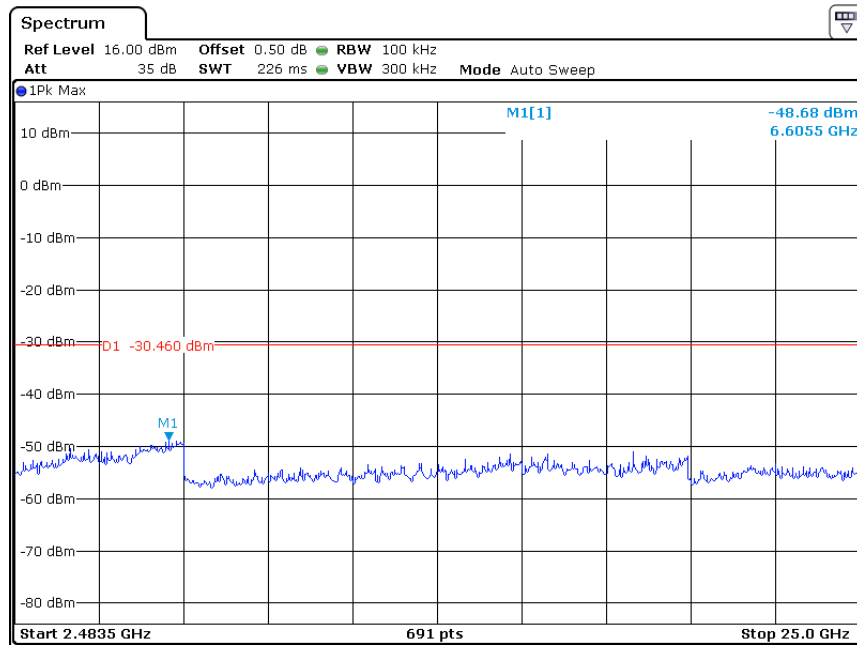
## INTERTEK TESTING SERVICES

Middle Channel Reference Level: -10.46dBm



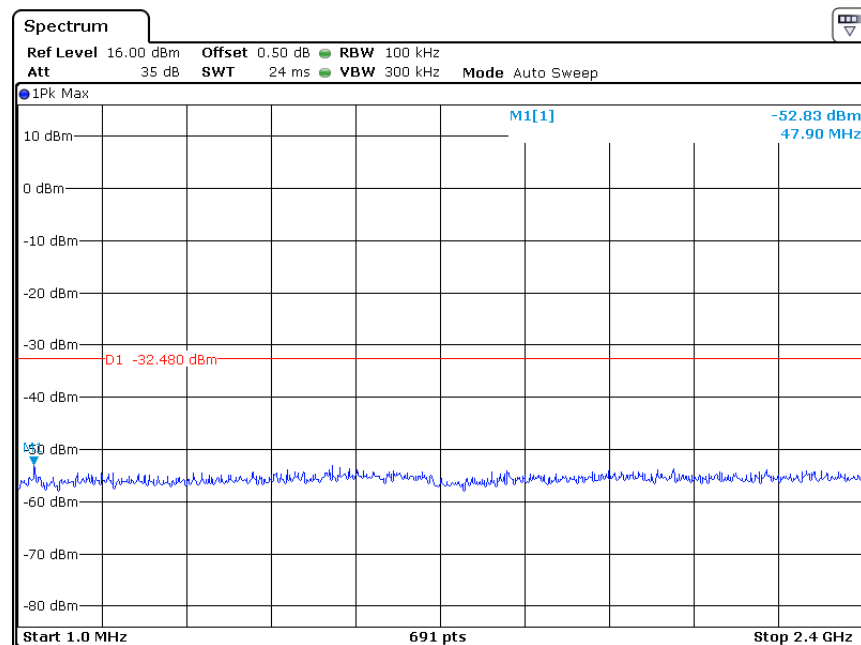
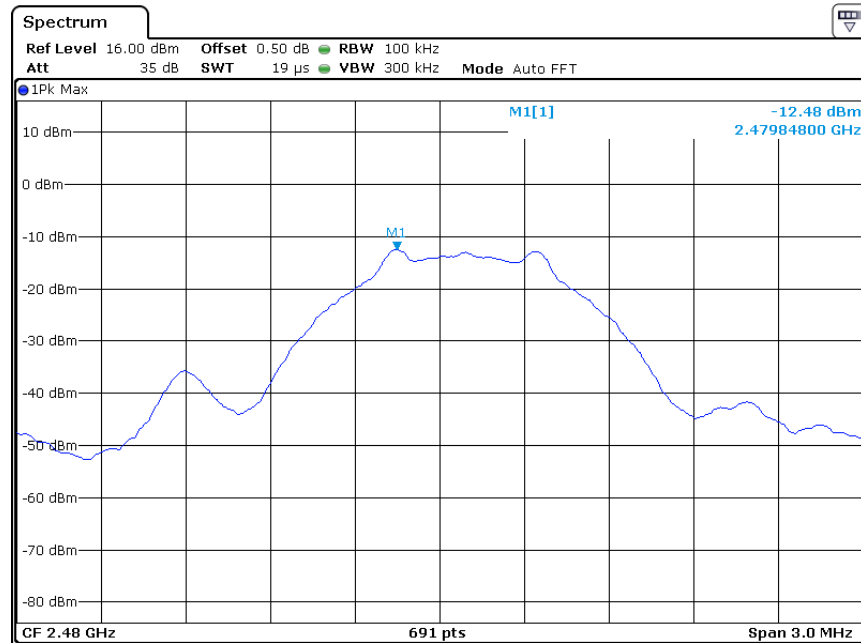


## INTERTEK TESTING SERVICES

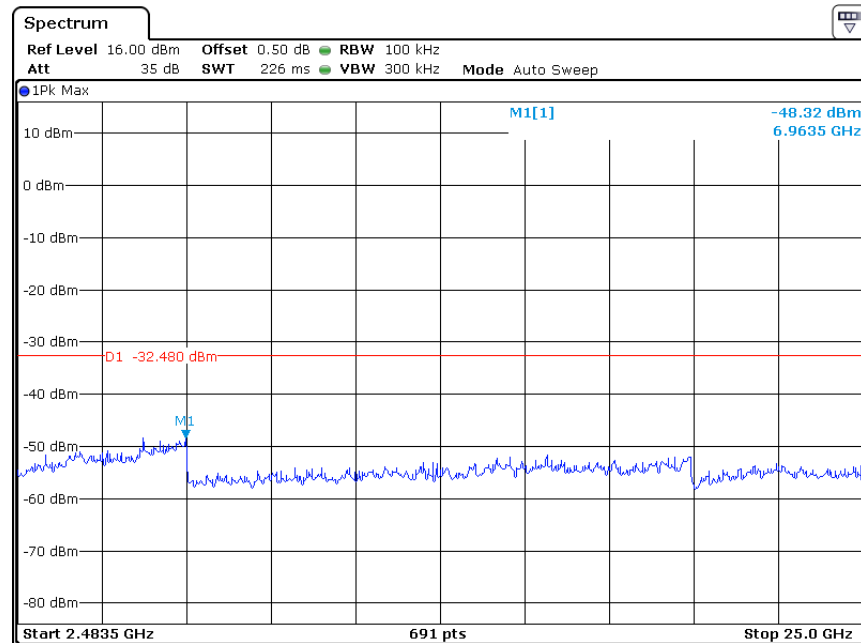


## INTERTEK TESTING SERVICES

High Channel Reference Level: -12.48dBm



## INTERTEK TESTING SERVICES



## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited  
Date of Test: October 18, 2017  
Model: PAU001

### 4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

- ☒ Not required, since all emissions are more than 20dB below fundamental  
☐ See attached data sheet

## **INTERTEK TESTING SERVICES**

---

Applicant: Shing Hing Industrial Limited  
Date of Test: October 18, 2017  
Model: PAU001

### 4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.7 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD$$

Where      FS = Field Strength in dB $\mu$ V/m  
              RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V  
              CF = Cable Attenuation Factor in dB  
              AF = Antenna Factor in dB  
              AG = Amplifier Gain in dB  
              PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD$$

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 42 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(42 \text{ dB}\mu\text{V/m})/20] = 125.9 \mu\text{V/m}$$

## INTERTEK TESTING SERVICES

---

### 4.7.1 Radiated Emission Configuration Photograph

For electronic filing, the worst case radiated emission configuration photograph is saved with filename: radiated photos. pdf.

### 4.7.2 Radiated Emissions- FCC section 15.209

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission

at 52.310 MHz

Judgement: Passed by 9.4 dB

### **TEST PERSONNEL:**

*Sign on file*

Damon Wang, Engineer

*Typed/Printed Name*

October 18, 2017

*Date*

---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

Worst Case Operating Mode: BT Link

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	30.970	30.7	20.0	10.7	21.4	40.0	-18.6
Horizontal	51.340	20.6	20.0	15.0	15.6	40.0	-24.4
Horizontal	160.465	16.3	20.0	18.5	14.8	43.5	-28.7
Vertical	30.970	34.9	20.0	11.1	26.0	40.0	-14.0
Vertical	37.760	34.9	20.0	11.3	26.2	40.0	-13.8
Vertical	52.310	25.3	20.0	25.3	30.6	40.0	-9.4

- NOTES:
1. Quasi-Peak detector is used except for others stated.
  2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. All emissions are below the QP limit.



## INTERTEK TESTING SERVICES

---

### 4.7.3 Transmitter Spurious Emissions (Radiated) - FCC section 15.209

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Worst Case Radiated Emission

at 4804.000 MHz

Judgement: Passed by 7.5 dB

#### **TEST PERSONNEL:**

*Sign on file*

Damon Wang, Engineer  
*Typed/Printed Name*

October 18, 2017  
*Date*

---

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

Mode: TX-Channel 2402MHz

### Radiated Emissions 2402MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4804.000	56.7	36.1	34.2	54.8	74.0	-19.2
Horizontal	*2388.300	64.3	36.7	28.4	56.0	74.0	-18.0

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	*4804.000	48.4	36.1	34.2	46.5	54.0	-7.5
Horizontal	*2388.300	51.0	36.7	28.4	42.7	54.0	-11.3

- NOTES:
1. Peak detector is used for the emission measurement (RBW=1MHz, VBW=3MHz for Peak data; RBW=1MHz, VBW=10Hz for Average data).
  2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

## INTERTEK TESTING SERVICES

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

Mode: TX-Channel 2440MHz

### Radiated Emissions

Channel: 2440MHz

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	*4880.000	56.0	36.1	34.6	54.5	74.0	-19.5
Horizontal	*7320.000	54.2	35.6	37.1	55.7	74.0	-18.3

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	*4880.000	47.8	36.1	34.6	46.3	54.0	-7.7
Horizontal	*7320.000	41.1	35.6	37.1	42.6	54.0	-11.4

- NOTES:
1. Peak detector is used for the emission measurement (RBW=1MHz, VBW=3MHz for Peak data; RBW=1MHz, VBW=10Hz for Average data).
  2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

## INTERTEK TESTING SERVICES

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

Mode: TX-Channel 2480MHz

### Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	*4960.000	55.3	36.1	34.6	53.8	74.0	-20.2
Horizontal	*7440.000	56.0	35.6	37.2	57.6	74.0	-16.4

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	4960.000	45.6	36.1	34.6	44.1	54.0	-9.9
Horizontal	*7440.000	40.9	35.6	37.2	42.5	54.0	-11.5

NOTES: 1. Peak detector is used for the emission measurement (RBW=1MHz, VBW=3MHz for Peak data; RBW=1MHz, VBW=10Hz for Average data).

- All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
- Negative value in the margin column shows emission below limit.
- Horn antenna used for the emission over 1000MHz.
- \* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited  
Date of Test: October 18, 2017  
Model: PAU001

### 4.8 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

- ☐ Not required - No digital part
- ☐ Test results are attached
- ☒ Included in the separated report.

## INTERTEK TESTING SERVICES

---

Applicant: Shing Hing Industrial Limited

Date of Test: October 18, 2017

Model: PAU001

### 4.9 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 5**

### **EQUIPMENT PHOTOGRAPHS**

## INTERTEK TESTING SERVICES

---

### 5.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.pdf.



## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 6**

### **PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

---

### 6.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and location is saved with filename: label.pdf.

**EXHIBIT 7**  
**TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

---

### 7.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

# **INTERTEK TESTING SERVICES**

---

## **EXHIBIT 8**

### **INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

---

### 8.0 Instruction Manual

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

---

## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 9**

### **CONFIDENTIALITY REQUEST**

## INTERTEK TESTING SERVICES

---

### 9.0 **Confidentiality Request**

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.



## **INTERTEK TESTING SERVICES**

---

### **EXHIBIT 10**

### **MISCELLANEOUS INFORMATION**

## INTERTEK TESTING SERVICES

---

### 10.0 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

**EXHIBIT 11**

**TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

### 11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	20-Sep-2017	20-Sep-2018
SZ185-01	EMI Receiver	R&S	ESCI	100547	09-Feb-2017	09-Feb-2018
SZ061-08	Horn Antenna	ETS	3115	00092346	20-Sep-2017	20-Sep-2018
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	26-May-2017	26-May-2018
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	01-Jun-2017	01-Jun-2018
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	07-Jul-2017	07-Jul-2018
SZ181-04	Preamplifier	Agilent	8449B	3008A0247 4	09-Feb-2017	09-Feb-2018
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Jan-2017	16-Jan-2019
SZ062-02	RF Cable	RADIAL	RG 213U	--	16-Jun-2017	16-Jun-2018
SZ062-05	RF Cable	RADIAL	0.04-26.5GHz	--	16-Jun-2017	16-Jun-2018
SZ062-12	RF Cable	RADIAL	0.04-26.5GHz	--	16-Jun-2017	16-Jun-2018
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	14-Jun-2017	14-Jun-2018