

October 12, 2010

Z.T.S. International Industrial Co., Ltd  
12BC, Jinrun Building, Chegongmiao, Shennan Road,  
Shenzhen, China

Dear Guocai Wu :

Enclosed you will find your file copy of a Part 15 Certification (FCC ID: YROQ970).

For your reference, TCB will normally take another 5 days for reviewing the report.  
Approval will then be granted when no query is sorted.

Please contact me if you have any questions regarding the enclosed material.

Sincerely,



Shawn Xing  
Assistant Manager

Enclosure

**Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch**  
6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China

Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751 Website: [www.china.intertek-etlsemko.com](http://www.china.intertek-etlsemko.com)

**Z.T.S. International Industrial Co., Ltd**

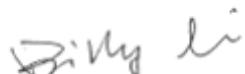
Application  
For  
Certification  
**(FCC ID: YROQ970)**

MOBILE PHONE

Model: Q970

2.4GHz Transceiver

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 [10-1-09]



SZ10090282-1

Billy Li

October 12, 2010

- 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\_TXa  
FCC ID: YROQ970

**Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch**  
6F, D Block, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China

Tel: (86 755) 8601 6288 Fax: (86 755) 8601 6751 Website: [www.china.intertek-etalsemko.com](http://www.china.intertek-etalsemko.com)

# INTERTEK TESTING SERVICES

---

---

## LIST OF EXHIBITS

### *INTRODUCTION*

<i>EXHIBIT 1:</i>	General Description
<i>EXHIBIT 2:</i>	System Test Configuration
<i>EXHIBIT 3:</i>	Emission Results
<i>EXHIBIT 4:</i>	Equipment Photographs
<i>EXHIBIT 5:</i>	Product Labelling
<i>EXHIBIT 6:</i>	Technical Specifications
<i>EXHIBIT 7:</i>	Instruction Manual
<i>EXHIBIT 8:</i>	Miscellaneous Information
<i>EXHIBIT 9:</i>	Test Equipment List

# INTERTEK TESTING SERVICES

---

## MEASUREMENT/TECHNICAL REPORT

**Z.T.S. International Industrial Co., Ltd - Model: Q970**  
**FCC ID: YROQ970**

**October 12, 2010**

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

Equipment Type: DXX - Part 15 Low Power Communication Device Transmitter

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 [10-1-09 Edition] provision.

Report prepared by:

Shawn Xing  
Intertek Testing Services Shenzhen Ltd.  
Kejiyuan Branch  
6F, Block D, Huahan Building, Langshan Road,  
Nanshan District, Shenzhen, P. R. China  
Phone: (86 755) 8601 6288  
Fax: (86 755) 8601 6751

# INTERTEK TESTING SERVICES

---

---

## Table of Contents

<b>1.0 General Description</b> .....	2
1.1 Product Description .....	2
1.2 Related Submittal(s) Grants .....	2
1.3 Test Methodology .....	3
1.4 Test Facility .....	3
<b>2.0 System Test Configuration</b> .....	5
2.1 Justification .....	5
2.2 EUT Exercising Software .....	5
2.3 Special Accessories .....	5
2.4 Equipment Modification .....	5
2.5 Measurement Uncertainty .....	6
2.6 Support Equipment List and Description .....	6
<b>3.0 Emission Results</b> .....	8
3.1 Radiated Test Results .....	9
3.1.1 Field Strength Calculation .....	9
3.1.2 Radiated Emission Configuration Photograph .....	10
3.1.3 Radiated Emissions .....	10
3.1.4 Transmitter Spurious Emissions (Radiated) .....	12
3.2 Conducted Emission at Mains Terminal .....	16
3.2.1 Conducted Emissions Configuration Photograph .....	16
3.2.2 Conducted Emissions .....	16
<b>4.0 Equipment Photographs</b> .....	20
<b>5.0 Product Labelling</b> .....	22
<b>6.0 Technical Specifications</b> .....	24
<b>7.0 Instruction Manual</b> .....	26
<b>8.0 Miscellaneous Information</b> .....	28
8.1 Bandedge Plot .....	29
8.2 Discussion of Pulse Desensitization .....	31
8.3 Calculation of Average Factor .....	32
8.4 Emissions Test Procedures .....	33
<b>9.0 Test Equipment List</b> .....	36

## INTERTEK TESTING SERVICES

---

---

### List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
Test Report	Bandedge Plot	bandedge.pdf
Test Report	20dB BW Plot	bw.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
Cover Letter	Letter of Agency	agency.pdf
Justification Letter	Label Justification Letter	justification.pdf

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 1**

**GENERAL DESCRIPTION**

# INTERTEK TESTING SERVICES

---

## 1.0 General Description

### 1.1 Product Description

The equipment under test (EUT) is a Two-SIM-Card Mobile Phone. It supports GSM 850, GSM 900MHz, GSM 1800MHz and GSM 1900 four bands with GPRS function. At the same time, it with the Bluetooth function and Data transfer function. The EUT is powered by 3.7V rechargeable battery and it can be charged via USB cable by PC or by Input: A.C. 100-240V, 50/60Hz 0.1A, Output: D.C. 5V, 500mA adapter. The EUT is equipped with ports which can be connecting to the ancillary equipments such as AC adapter, USB adapter cable and headphone supplied by the manufacture.

Antenna Type: Integral antenna

Modulation Type: GFSK,  $\pi/4$  –DQPSK and 8-DPSK

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

### 1.2 Related Submittal(s) Grants

This is an application for certification of a transceiver for the Mobile Phone Bluetooth part, and there is no corresponding unit for certification.

## INTERTEK TESTING SERVICES

---

### 1.3 Test Methodology

Both AC mains line-conducted and Radiated emission measurement was performed according to the procedures in ANSI C63.4 (2003). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. 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.

### 1.4 Test Facility

The Semi-Anechoic chamber and shielding room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC.

**EXHIBIT 2**

**SYSTEM TEST CONFIGURATION**

## INTERTEK TESTING SERVICES

---

### 2.0 System Test Configuration

#### 2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2003).

The EUT was powered by a 3.7V fully charged lithium battery during the testing.

All packets DH1, DH3 & DH5 mode in all modulation type GFSK,  $\pi/4$  –DQPSK and 8-DPSK were tested, and only the worst data was reported in this report.

Simultaneous transmission was investigated and no new emissions were found.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The rear of unit shall be flushed with the rear of the table.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

#### 2.2 EUT Exercising Software

There was no special software to exercise the device.

#### 2.3 Special Accessories

No special accessories used.

#### 2.4 Equipment Modification

Any modifications installed previous to testing by Z.T.S. International Industrial Co., Ltd will be incorporated in each production model sold / leased in the United States.

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

## INTERTEK TESTING SERVICES

---

### 2.5 Measurement Uncertainty

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

### 2.6 Support Equipment List and Description

Description	Manufacturer	Model No.
Adapter	G-TIDE	Model: CN-02B5-500 Input: A.C. 100-240V, 50/60Hz, 0.1A, Output: D.C. 5V, 500mA
Earphone	G-TIDE	120cm

All the items listed under section 2.0 of this report are

*Confirmed by:*

*Shawn Xing*  
Assistant Manager  
Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch  
Agent for Z.T.S. International Industrial Co., Ltd



\_\_\_\_\_  
Signature

October 12, 2010

\_\_\_\_\_  
Date

**EXHIBIT 3**

**EMISSION RESULTS**

## INTERTEK TESTING SERVICES

---

### 3.0 Emission Results

Data is included 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.

# INTERTEK TESTING SERVICES

---

## 3.1 **Radiated Test Results**

A sample calculation, configuration photographs and data tables of the emissions are included.

### 3.1.1 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.

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

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

AV = Average Factor 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:

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

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, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB $\mu$ V/m. This value in dB $\mu$ V/m was converted to its corresponding level in  $\mu$ V/m.

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

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

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

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

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

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

## INTERTEK TESTING SERVICES

---

### 3.1.2 Radiated Emission Configuration Photograph

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

### 3.1.3 Radiated Emissions

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  
857.410 MHz

Judgement: Passed by 13.5 dB

#### ***TEST PERSONNEL:***



---

*Signature*

Billy Li, Compliance Engineer  
Typed/Printed Name

October 12, 2010

*Date*

# INTERTEK TESTING SERVICES

---

Applicant: Z.T.S. International Industrial Co., Ltd

Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

Table 1

## Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Horizontal	30.970	24.5	20.0	18.8	23.3	40.0	-16.7
Horizontal	31.940	24.6	20.0	18.2	22.8	40.0	-17.2
Horizontal	857.410	25.1	20.0	27.4	32.5	46.0	-13.5
Vertical	31.940	24.7	20.0	18.2	22.9	40.0	-17.1
Vertical	34.850	26.1	20.0	14.8	20.9	40.0	-19.1
Vertical	52.310	27.0	20.0	8.9	15.9	40.0	-24.1

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

---

### 3.1.4 Transmitter Spurious Emissions (Radiated)

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  
4804.00 MHz

Judgement: Passed by 0.8 dB

**TEST PERSONNEL:**



---

*Signature*

Billy Li, Compliance Engineer

*Typed/Printed Name*

---

October 12, 2010

*Date*

# INTERTEK TESTING SERVICES

---

Applicant: Z.T.S. International Industrial Co., Ltd

Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

Table 2

## Radiated Emissions

(2402MHz)

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)
Vertical	2402.000	94.5	36.7	28.5	86.3	114.0	-27.7
Vertical	4804.000	81.4	36.7	28.5	73.2	74.0	-0.8
Vertical	7206.000	57.9	36.1	33.1	54.9	74.0	-19.1
Vertical	9608.000	53.7	36.2	37.8	55.3	74.0	-18.7

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Vertical	2402.000	94.5	36.7	28.5	30.1	56.2	94.0	-37.8
Vertical	4804.000	81.4	36.7	28.5	30.1	43.1	54.0	-10.9
Vertical	7206.000	57.9	36.1	33.1	30.1	24.8	54.0	-29.2
Vertical	9608.000	53.7	36.2	37.8	30.1	25.2	54.0	-28.8

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic 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 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. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

---

TRF No.: FCC 15C\_Tx  
FCC ID: YROQ970

## INTERTEK TESTING SERVICES

---

Applicant: Z.T.S. International Industrial Co., Ltd Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

Table 3

### Radiated Emissions

(2441MHz)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Vertical	2441.000	93.8	36.7	28.5	85.6	114.0	-28.4
Vertical	4882.000	80.8	36.7	28.5	72.6	74.0	-1.4
Vertical	7323.000	57.7	36.1	33.3	54.9	74.0	-19.1
Vertical	9764.000	52.7	36.3	37.9	54.3	74.0	-19.7

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Vertical	2441.000	93.8	36.7	28.5	30.1	55.5	94.0	-38.5
Vertical	4882.000	80.8	36.7	28.5	30.1	42.5	54.0	-11.5
Vertical	7323.000	57.7	36.1	33.3	30.1	24.8	54.0	-29.2
Vertical	9764.000	52.7	36.3	37.9	30.1	24.2	54.0	-29.8

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic 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 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. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

---

TRF No.: FCC 15C\_TXa  
FCC ID: YROQ970

# INTERTEK TESTING SERVICES

---

Applicant: Z.T.S. International Industrial Co., Ltd

Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging

Table 4

## Radiated Emissions

(2480MHz)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Vertical	2480.000	94.7	36.7	28.6	86.6	114.0	-27.4
Vertical	4960.000	78.0	36.7	28.6	69.9	74.0	-4.1
Vertical	7440.000	69.6	36.1	33.4	66.9	74.0	-7.1
Vertical	9920.000	53.7	36.3	38.2	55.6	74.0	-18.4

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (-dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
Vertical	2480.000	94.7	36.7	28.6	30.1	56.5	94.0	-37.5
Vertical	4960.000	78.0	36.7	28.6	30.1	39.8	54.0	-14.2
Vertical	7440.000	69.6	36.1	33.4	30.1	36.8	54.0	-17.2
Vertical	9920.000	53.7	36.3	38.2	30.1	25.5	54.0	-28.5

Notes: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meter. Harmonic 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 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. Horn antenna is used for the emission over 1000MHz.

Test Engineer: Billy Li

---

TRF No.: FCC 15C\_TXa

FCC ID: YROQ970

## INTERTEK TESTING SERVICES

---

### 3.2 Conducted Emission at Mains Terminal

#### 3.2.1 Conducted Emissions Configuration Photograph

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

#### 3.2.2 Conducted Emissions

Worst Case Line-Conducted Configuration  
at  
0.902 MHz & 0.402 MHz

Judgement: Passed by 8.8 dB margin

#### **TEST PERSONNEL:**



---

*Signature*

Billy Li, Compliance Engineer  
Typed/Printed Name

October 12, 2010

Date

# INTERTEK TESTING SERVICES

Applicant: Z.T.S. International Industrial Co., Ltd

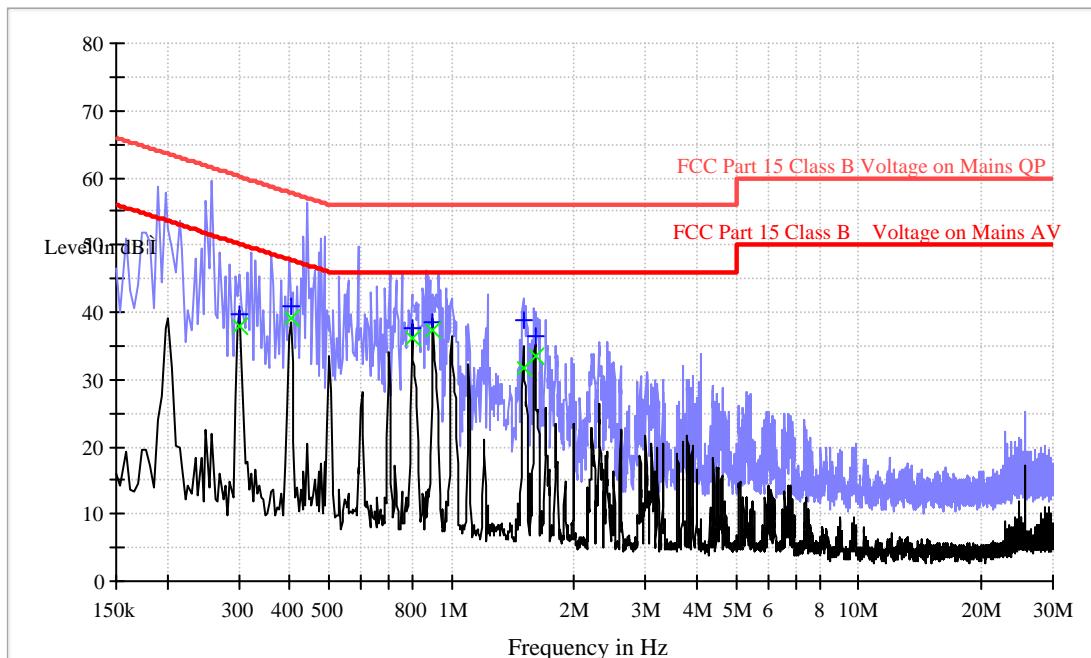
Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging (2441MHz)

## Conducted Emission Test - FCC



## Result Table-QP

Frequency (MHz)	QuasiPeak (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.302000	39.7	L1	9.6	20.5	60.2
0.402000	40.9	L1	9.6	16.9	57.8
0.802000	37.5	L1	9.7	18.5	56.0
0.902000	38.5	L1	9.7	17.5	56.0
1.498000	38.7	L1	9.7	17.3	56.0
1.602000	36.4	L1	9.7	19.6	56.0

## Result Table-AV

Frequency (MHz)	CAverage (dB μV)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.302000	38.1	L1	9.6	12.1	50.2
0.402000	39.0	L1	9.6	8.8	47.8
0.802000	36.3	L1	9.7	9.7	46.0
0.902000	37.2	L1	9.7	8.8	46.0
1.498000	31.6	L1	9.7	14.4	46.0
1.602000	33.4	L1	9.7	12.6	46.0

TRF No.: FCC 15C\_TXa

FCC ID: YROQ970

# INTERTEK TESTING SERVICES

Applicant: Z.T.S. International Industrial Co., Ltd

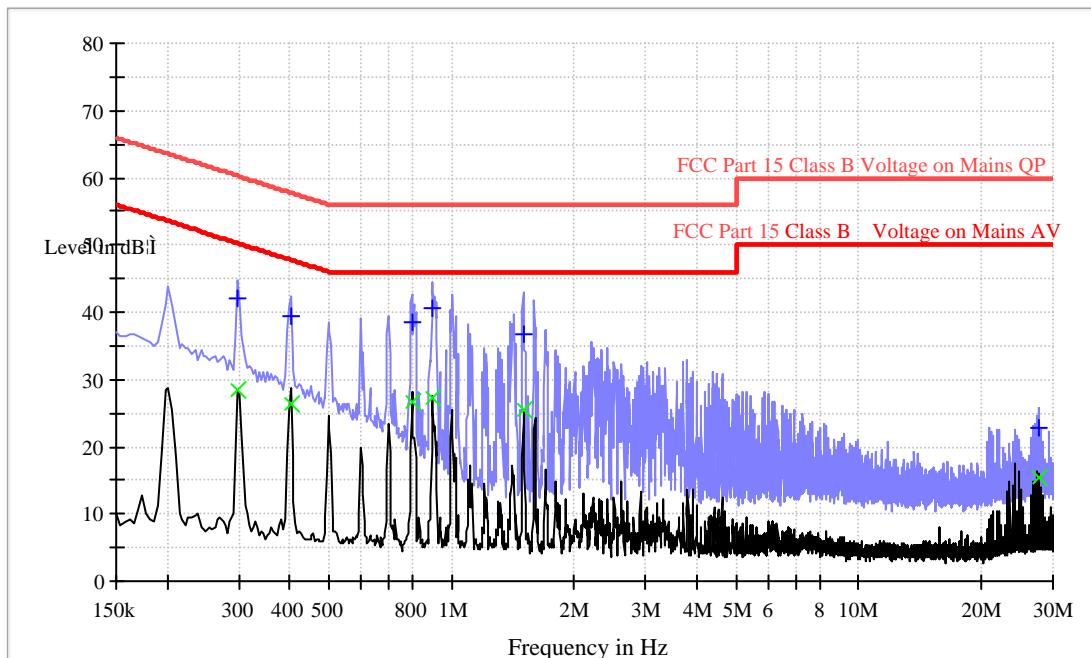
Date of Test: October 12, 2010

Model: Q970

Sample: 1/1

Worst Case Operating Mode: Transmit with charging (2441MHz)

## Conducted Emission Test - FCC



## Result Table-QP

Frequency (MHz)	QuasiPeak (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.298000	42.2	N	9.6	18.1	60.3
0.402000	39.4	N	9.6	18.4	57.8
0.802000	38.4	N	9.6	17.6	56.0
0.898000	40.5	N	9.6	15.5	56.0
1.502000	36.8	N	9.7	19.2	56.0
27.674000	22.9	N	10.3	37.1	60.0

## Result Table-AV

Frequency (MHz)	Average (dB µ V)	Line	Corr. (dB)	Margin (dB)	Limit (dB µ V)
0.298000	28.4	N	9.6	21.9	50.3
0.402000	26.4	N	9.6	21.4	47.8
0.802000	26.8	N	9.6	19.2	46.0
0.898000	27.4	N	9.6	18.6	46.0
1.502000	25.5	N	9.7	20.5	46.0
27.674000	15.4	N	10.3	34.6	50.0

TRF No.: FCC 15C\_TXa

FCC ID: YROQ970

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 4**

**EQUIPMENT PHOTOGRAPHS**

## INTERTEK TESTING SERVICES

---

---

### 4.0 Equipment Photographs

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

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 5**

**PRODUCT LABELLING**

## INTERTEK TESTING SERVICES

---

---

### 5.0 Product Labelling

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

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 6**

**TECHNICAL SPECIFICATIONS**

## INTERTEK TESTING SERVICES

---

---

### 6.0 Technical Specifications

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

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 7**

**INSTRUCTION MANUAL**

## INTERTEK TESTING SERVICES

---

---

### 7.0 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 8**

**MISCELLANEOUS INFORMATION**

## INTERTEK TESTING SERVICES

---

---

### 8.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

## INTERTEK TESTING SERVICES

---

### 8.1 Bandedge Plot

For electronic filing, the plot shows the fundamental emission when modulated is saved with filename: be.pdf. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfil the requirement of 15.249(d).

#### Peak Measurement

Bandedge compliance is determined by applying marker-delta method, i.e ( Bandedge Plot).

##### **(i) Lower channel 2402MHz:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

$$\begin{aligned} &= 86.3 \text{dB}\mu\text{v/m} - 35.9 \text{dB} \\ &= 50.4 \text{ dB}\mu\text{v/m} \end{aligned}$$

##### **(ii) Upper channel 2480MHz:**

Peak Resultant field strength = Fundamental emissions (peak value) – delta from the bandedge plot

$$\begin{aligned} &= 86.6 \text{ dB}\mu\text{v/m} - 49.3 \text{ dB} \\ &= 37.3 \text{ dB}\mu\text{v/m} \end{aligned}$$

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dB $\mu$ v/m (Peak Limit) and 54dB $\mu$ v/m (Average Limit).

## INTERTEK TESTING SERVICES

---

### 8.1 Bandedge Plot (cont'd)

Pursuant to FCC part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

Figure 8.1 Bandwidth

## INTERTEK TESTING SERVICES

---

---

### 8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period ( $T_{eff}$ ) is approximately 625 $\mu$ s for Bluetooth. With a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

## INTERTEK TESTING SERVICES

---

### 8.3 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Based on the Bluetooth Specification, transmitter ON time is independent of packet type (DH1, DH3 and DH5) and packet length (single-slot and multi-slot). The maximum transmitter ON time for the Bluetooth is 625 $\mu$ s.

Each TX and RX time slot is 625 $\mu$ s in length. A TDD scheme is used where master and slave alternately transmit. For one period for a pseudo-random hopping through all 79 RF channels, for DH5:

$$\text{Time of 1 hopset (5 TX slots + 1 RX slot)} = 0.625 \text{ ms} \times 6 = 3.75 \text{ ms}$$

$$\text{Time of 1 cycle} = 3.75 \text{ ms} \times 79 = 296.25 \text{ ms}$$

$$\text{Average factor} = 20 \log (3.125 / 100) = -30.1 \text{ dB}$$

## INTERTEK TESTING SERVICES

---

### 8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjust through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

The frequency range scanned is from 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 40 GHz, whichever is lower.

Detector function for conducted emissions is in QP & AV mode and IFBW setting is 9 kHz from the frequency band 150 kHz to 30MHz.

For line-conducted emissions, the range scanned is 150 kHz to 30 MHz.

## INTERTEK TESTING SERVICES

---

### 8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully Normal Link d battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, but those measurements taken at a closer distance are so marked.

---

---

**INTERTEK TESTING SERVICES**

---

**EXHIBIT 9**

**TEST EQUIPMENT LIST**

## INTERTEK TESTING SERVICES

---

### 9.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-03	BiConiLog Antenna	ETS	3142C	00066460	25-Nov-09	25-May-11
SZ185-01	EMI Receiver	R&S	ESCI	100547	08-Mar-10	08-Mar-11
SZ061-08	Horn Antenna	ETS	3115	00092346	15-Mar-10	15-Sep-11
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	18-Mar-10	18-Mar-11
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	18-Mar-10	18-Mar-11
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	09-Jan-10	09-Jan-11
SZ062-02	RF Cable	RADIALL	RG 213U	--	19-Apr-10	19-Oct-10
SZ062-06	RF Cable	RADIALL	0.04-26.5GHz	--	17-Oct-09	17-Oct-10
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	17-Oct-09	17-Oct-10
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	23-Nov-09	23-Nov-10
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	23-Nov-09	23-Nov-10
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	23-Nov-09	23-Nov-10
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Sep-10	16-Sep-13
SZ067-04	Notch Filter	Micro-Tronics	BRM5070 2-02	--	19-Apr-10	19-Oct-10
SZ065-1	Universal Radio Communication Tester	R&S	CMU200	117201	09-May-10	09-May-11