

RF Exposure Evaluation Declaration

Product Name: PIQS Virtual Touch Projector

Model No. : TT

FCC ID : 2ALH2-PFAT100

Applicant : PIQS Technology(Shenzhen) Limited.

Address : West,6F Buiding 1, No.35 CuiJing Road, Pingshan New
District, Shenzhen City, Guangdong, China.

Date of Receipt : 03-02-2017

Test Date : 03-03-2017~04-16-2017

Issued Date : 04-19-2017

Report No. : UL71220170302FCC/IC002-4

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 of the equipment and evaluated measurement uncertainty herein.

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Manufacturer : PIQS Technology(Shenzhen) Limited.

Address : West,6F Buiding 1,No.35 CuiJing Road,Pingshan New District,Shenzhen City,Guangdong,China.

Model No. : TT

EUT Voltage : MIN:16V, NOR:19V, MAX: 23V

Brand Name : PIQS

FCC ID : 2ALH2-PFAT100

Applicable Standard : FCC's Rules (47 C.F.R. §1.1310 and 2.1091)

Test Result : Complied

Performed Location : Unilab (Shanghai) Co.,Ltd.

FCC 2.948 register number is 714465

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Reviewed by :



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Approved by :



(SupervisorEngineer: Eva Wang)

1. EUT Description

Product Name:	PIQS Virtual Touch Projector
Model Name:	TT
Hardware Version:	M3_T826_ARM_V3
Software Version:	TTCN20170224V001
RF Exposure Environment:	Uncontrolled
Bluetooth V3.1	
Frequency Range:	2402MHz~2480MHz
Carrier Frequency of Each Channel	2402+N*1MHz(N=0~78)
Type of Modulation:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Channel Number:	79
Antenna Type:	Internal
Antenna Peak Gain:	2dBi
Bluetooth V4.0	
Frequency Range:	2402MHz~2480MHz
Type of Modulation:	GFSK
Channel Number:	40
Antenna Type:	Internal
Antenna Peak Gain:	2dBi
WIFI	
Frequency Range:	2412MHz~2472MHz 5150MHz~5350MHz 5725MHz~5850MHz
Type of Modulation:	BPSK/QPSK/16QAM/64QAM
Channel Separation:	5MHz
Antenna Type:	Internal
Antenna Peak Gain:	2dBi
Component	
AC Adapter:	Input: AC 100-240V 50/60Hz 1.5A
	Output: DC 19V 3.42A

2. RF Exposure Evaluation

2.1 Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric FieldStrength (V/m)	Magnetic FieldStrength (A/m)	Power Density (mW/cm ²)	Reference Period (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/ <i>f</i>	4.89/ <i>f</i>	*900/ <i>f</i> ²	6
30-300	61.4	0.163	1.0	6
300-1,500	-	-	<i>f</i> /300	6
1,500-100,000	-	-	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/ <i>f</i>	2.19/ <i>f</i>	*180/ <i>f</i> ²	30
30-300	27.5	0.073	0.2	30
300-1,500	-	-	<i>f</i> /1500	30
1,500-100,000	-	-	1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

RF Field Strength Limits for Controlled Use Devices (Controlled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10	170	180	-	Instantaneous*
1-10	-	1.6/ <i>f</i>	-	6**
1.29-10	193/ <i>f</i> ^{0.5}	-	-	6**
10-20	61.4	0.163	10	6
20-48	129.8/ <i>f</i> ^{0.25}	0.3444/ <i>f</i> ^{0.25}	44.72/ <i>f</i> ^{0.5}	6
48-100	49.33	0.1309	6.455	6
100-6000	15.60 <i>f</i> ^{0.25}	0.04138 <i>f</i> ^{0.25}	0.6455 <i>f</i> ^{0.5}	6
6000-15000	137	0.364	50	6
15000-150000	137	0.364	50	616000/ <i>f</i> ^{1.2}
150000-300000	0.354 <i>f</i> ^{0.5}	9.40 x 10 ⁻⁴ <i>f</i> ^{0.5}	3.33 x 10 ⁻⁴ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.
 *Based on nerve stimulation (NS).
 ** Based on specific absorption rate (SAR).

Friis Formula

Friis transmission formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Find the limit of MPE, 1 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 22°C and 53%RH.

2.3. Test Result of RF Exposure Evaluation

This device is evaluated by mobile device with general population/uncontrolled exposure condition. For this device, the calculation is using the most conservative values, and the results are as follows:

Test Mode	Antenna Gain (dBi)	Maximum Output Power (dBm)	EIRP (dBm)	Peak EIRP (mW)	Calculated RF Exposure at $d = 20\text{cm}$ (mW/cm^2)	FCC MPE Limit (mW/cm^2)
BT 3.1	2.0	9.8	11.8	15.1	0.0030	1.00
BT 4.0	2.0	8.3	10.3	10.7	0.0021	1.00
WiFi 2.4G	2.0	12.9	14.9	30.9	0.0062	1.00
WiFi 5G	2.0	11.4	13.4	21.9	0.0044	1.00
WiFi 5.8G	2.0	11.3	13.3	21.4	0.0043	1.00
Duty cycle = 100%						

This device can pass RF exposure limit.

---END OF THE REPORT---