

# RF Exposure Evaluation Declaration

Product Name : IP-STB  
Model No. : 2400X  
FCC ID : TC22400X  
IC : 5959A-2400X

Applicant : Roku Inc.  
Address : 12980 Saratoga Ave, Suite D Saratoga, CA 95070

Date of Receipt : 01/09/2011  
Issued Date : 07/09/2011  
Report No. : 119S001R-RF-US  
Report Version : V1.0

This report was based on Quietek report No: 116S062R

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.

This report must not be used to claim product endorsement by TAF, NVLAP, NIST or any agency of the Government.

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# Test Report Certification

Issued Date : 07/09/2011

Report No. : 119S001R-RF-US



Product Name : IP-STB  
 Applicant : Roku Inc.  
 Address : 12980 Saratoga Ave, Suite D Saratoga, CA 95070  
 Manufacturer : Ambit MircoSystems(Shanghai) LTD.  
 Address : 1925, Nanle Road, Songjiang Export Processing Zone,  
 Shanghai, China 201613  
 Model No. : 2400X  
 FCC ID : TC22400X  
 IC : 5959A-2400X  
 EUT Voltage : 100-240Vac +/-10%  
 Trade Name : Roku  
 Applicable Standard : FCC OET 65  
 Test Result : Complied  
 Performed Location : Suzhou EMC Laboratory  
 No.99 Hongye Rd., Suzhou Industrial Park Loufeng  
 Hi-Tech Development Zone., Suzhou, China  
 TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098  
 FCC Registration Number: 800392

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## Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

<b>Taiwan R.O.C.</b>	<b>: BSMI, NCC, TAF</b>
<b>Germany</b>	<b>: TUV Rheinland</b>
<b>Norway</b>	<b>: Nemko, DNV</b>
<b>USA</b>	<b>: FCC, NVLAP</b>
<b>Japan</b>	<b>: VCCI</b>

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site : <http://www.quietek.com/tw/ctg/cts/accreditations.htm>  
 The address and introduction of Quietek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>  
 If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

### HsinChu Testing Laboratory :

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### LinKou Testing Laboratory :

No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen, Lin-Kou Shiang, Taipei, Taiwan, R.O.C.  
 TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : [service@quietek.com](mailto:service@quietek.com)



### Suzhou (China) Testing Laboratory :

No. 99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou,China.  
 TEL : +86-512-6251-5088 / FAX : +86-512-6251-5098 E-Mail : [service@quietek.com](mailto:service@quietek.com)



**1. RF Exposure Evaluation**

**1.1. 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 Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (Minutes)
<b>(A) Limits for Occupational/ Control Exposures</b>				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
<b>(B) Limits for General Population/ Uncontrolled Exposures</b>				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

**Friis Formula**

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

Where

Pd = power density in mW/cm<sup>2</sup>

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

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. 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.

## 1.2. 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: 18°C and 78% RH.

## 1.3. Test Result of RF Exposure Evaluation

Product	:	IP-STB
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

### Antenna Gain:

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi.

Max EIRP= Conducted Output Power + Antenna Gain = 22.75dBm= 0.18836W < 5W

(Max Conducted Output Power = 20.75dBm , Antenna Gain = 2dBi)

### Output Power into Antenna & RF Exposure Evaluation Distance:

Test Mode	Frequency Band (MHz)	Maximum Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
802.11 b/g/n(20MHz)	2412~2462	118.8502	0.037474