RF Exposure Evaluation Declaration

Product Name	:	Smart Home Hub
Model No.	:	Z315, Z313, Z312, Z311
FCC ID	:	XVGZ31X

Applicant	:	Amino Communications Ltd
Address	:	Buckingway Business Park, Anderson Road, Swavesey, Cambridge CB24 4UQ, Cambridge UK

Date of Receipt	:	Nov. 25, 2014
Issued Date	:	Apr. 25, 2015
Report No.	:	14B0556R-RF-US-P20V01
Report Version	:	V2.2

Test Report Certification

Issued Date : Apr. 25, 2015
Report No. : 14B0556R-RF-US-P20V01

QuieTek

Product Name	:	Smart Home Hub
Applicant	:	Amino Communications Ltd
Address	:	Buckingway Business Park, Anderson Road, Swavesey, Cambridge CB24 4UQ, Cambridge UK
Manufacturer	:	Amino Communications Ltd
Address	:	Buckingway Business Park, Anderson Road, Swavesey, Cambridge CB24 4UQ, Cambridge UK
Model No.	:	Z315, Z313, Z312, Z311
FCC ID	:	XVGZ31X
EUT Voltage	:	DC: 5V
Brand Name	:	Amino
Applicable Standard	:	KDB 447498D01V05V02 FCC Part1.1310(b) RSS-102: Issue 5, March, 2015
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; IC Lab Code: 4075B

Documented By	:	Alice Ni
Reviewed By	:	Dream Cao
Approved By	:	Jeff Chen

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:

Taiwan R.O.C.	**:**	**BSMI, NCC, TAF**
Germany	**:**	**TUV Rheinland**
Norway	**:**	**Nemko, DNV**
USA	**:**	**FCC**
Japan	**:**	**VCCI**
China	**:**	**CNAS**

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 :
No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

LinKou Testing Laboratory :
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 : service@quietek.com

Suzhou 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

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
14B0556R-RF-US-P20V01	V1.0	Initial Issued Report	Feb. 11, 2015
14B0556R-RF-US-P20V01	V2.0	Add simultaneous transmission MPE	Mar. 12, 2015
14B0556R-RF-US-P20V01	V2.1	Add EIRP power of each mode	Apr. 24, 2015
14B0556R-RF-US-P20V01	V2.2	Modified the EIRP power.	Apr. 25, 2015

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/cm2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4*pi*r2)

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

Pd id the limit of MPE, 1 mW/cm2 . 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℃and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product	:	Smart Home Hub
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

For Zigbee

Antenna Gain:

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.5dBi for 2.4GHz in logarithm scale.

Frequency Band (MHz)	Maximum Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
2405~2480 MHz	5.8210	0.001636

For WIFI

Antenna Gain:

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.7dBi for 2.4GHz and 3.06dBi for 5.8GHz in logarithm scale.

Frequency Band (MHz)	Maximum Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)
2412~2462 MHz	360	0.105933
5745~5825 MHz	420	0.169036

Exposure Simultaneous Evaluation

2.4GHz WIFI Power Density (mW/cm2)	Zigbee Power Density (mW/cm2)	∑ Power Density (mW/cm2)
0.105933	0.001636	0.107569
5.8GHz WIFI Power Density (mW/cm2)	Zigbee Power Density (mW/cm2)	∑ Power Density (mW/cm2)
0.169036	0.001636	0.170672

Note1: According to KDB 447498D01v05r02, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.
The total power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm2. So simultaneous transmission MPE test exclusion apply.

The End