

## RF Exposure Report

**Report No.:** SA170714C04

**FCC ID:** ZQAH17

**Test Model:** A0078

**Received Date:** July 14, 2017

**Test Date:** Aug. 14, 2017

**Issued Date:** Sep. 08, 2017

**Applicant:** Nest Labs, Inc.

**Address:** 3400 Hillview Ave. Palo Alto California, United States 94304

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

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Taiwan R.O.C.

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### Release Control Record

Issue No.	Description	Date Issued
SA170714C04	Original release.	Sep. 08, 2017

## 1 Certificate of Conformity

**Product:** Nest Connect

**Brand:** nest

**Test Model:** A0078

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Nest Labs, Inc.

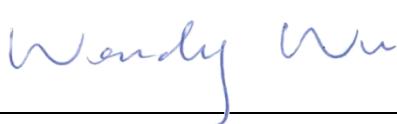
**Test Date:** Aug. 14, 2017

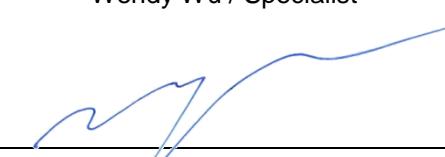
**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :   
Wendy Wu / Specialist , Date: Sep. 08, 2017

Approved by :   
May Chen / Manager , Date: Sep. 08, 2017

## 2 RF Exposure

### 2.1 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)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; \*Plane-wave equivalent power density

### 2.2 MPE Calculation Formula

$$Pd = (Pout * G) / (4 * \pi * r^2)$$

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

### 2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user.

So, this device is classified as **Mobile Device**.

## 2.4 Antenna Gain

The antennas provided to the EUT, please refer to the following table:

<b>2.4GHz</b>				
Antenna No.	Antenna Gain (dBi)	Frequency range(GHz)	Antenna Type	Connector Type
1	0.63	2.4~2.4835 (Low)	PIFA Antenna	NA
	0.63	2.4~2.4835 (Mid)		NA
	0.66	2.4~2.4835 (High)		NA
<b>Bluetooth</b>				
Antenna No.	Antenna Gain (dBi)	Frequency range(GHz)	Antenna Type	Connector Type
1	0.63	2.4~2.4835 (Low)	PIFA Antenna	NA
	0.63	2.4~2.4835 (Mid)		NA
	0.66	2.4~2.4835 (High)		NA
<b>15.4</b>				
Antenna No.	Antenna Gain (dBi)	Frequency range(GHz)	Antenna Type	Connector Type
1	0.7	2.4~2.4835 (Low)	PIFA Antenna	NA
	0.49	2.4~2.4835 (Mid)		NA
	0.1	2.4~2.4835 (High)		NA

## 2.5 Calculation Result

### For WLAN:

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412-2462	22	158.489	0.66	20	0.03671	1

### For BT-LE:

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2402-2480	0	1	0.66	20	0.00023	1

### For 15.4:

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Directional Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2405-2475	23	199.526	0.7	20	0.04664	1

**NOTE:** This power include tune-up tolerance range that specified in A0078 Tune Up power table.

### Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz} + 15.4 = 0.03671 / 1 + 0.04664 / 1 = 0.08335$$

$$\text{Bluetooth} + 15.4 = 0.00023 / 1 + 0.04664 / 1 = 0.004687$$

**Therefore the maximum calculations of above situations are less than the "1" limit.**

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