

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.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Table of Contents

Release Control Record	3
1 Certificate of Conformity.....	4
2 RF Exposure.....	5
2.1 Limits For Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	6
2.5 Calculation Result	7

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 :



Date:

Sep. 08, 2017

Wendy Wu / Specialist

Approved by :



Date:

Sep. 08, 2017

May Chen / Manager

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 ²)	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 ²)*	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

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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:

2.4GHz				
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
Bluetooth				
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
15.4				
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 ²)	Limit (mW/cm ²)
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 ²)	Limit (mW/cm ²)
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 ²)	Limit (mW/cm ²)
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

WLAN 2.4GHz + 15.4 = $0.03671 / 1 + 0.04664 / 1 = 0.08335$

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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