



## RF Exposure Evaluation Declaration

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**FCC ID:** 2ABLK-804MESH

**APPLICANT:** Calix Inc.

**Product:** 804Mesh Dual Wi-Fi

**Model No.:** 804MESH

**Brand Name:** Calix

**FCC Classification:** Digital Transmission System (DTS)  
Unlicensed National Information Infrastructure (UNII)

**Test Procedure(s):** KDB 447498 D01v06

Reviewed By : Sunny Sun  
(Sunny Sun)

Approved By : Marlinchen  
(Marlin Chen)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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## Revision History

Report No.	Version	Description	Issue Date	Note
1709RSU00403	Rev. 01	Initial Report	10-18-2017	Valid

## 1. PRODUCT INFORMATION

### 1.1. Equipment Description

Product Name:	804Mesh Dual Wi-Fi
Model No.:	804MESH
Brand Name:	Calix
Wi-Fi Specification:	802.11a/b/g/n/ac
Frequency Range	<b><u>2.4GHz:</u></b> For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz <b><u>5GHz:</u></b> For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5775MHz
Type of Modulation	802.11b: DSSS 802.11g/a/n/ac: OFDM
Modulation Technology	CCK, DQPSK, DBPSK for DSSS 16QAM, 64QAM, 256QAM, QPSK, BPSK for OFDM

## 1.2. Antenna Description

Antenna Type	Frequency Band (GHz)	T <sub>x</sub> Paths	Directional Gain (dBi)	
			Non Beam Forming Mode	CDD & Beam-Forming Mode
PCB Antenna	2.4	2	1.40	--
	5.2	4	--	8.90
	5.8	4	--	9.00

Note:

- Transmit at 2.4GHz support two antennas, and support four antennas at 5GHz transmit.
- The EUT working on Beam Forming mode at 802.11n/ac, and working on CDD mode at 802.11a.
- Correlated signals include, but are not limited to, signals transmitted in any of the following modes:
  - Any transmit Beam Forming mode, whether fixed or adaptive (e.g., phased array modes, closed loop MIMO modes, Transmitter Adaptive Antenna modes, Maximum Ratio Transmission (MRT) modes, and Statistical Eigen Beam Forming (EBF) modes).
- Unequal antenna gains, with equal transmit powers. For antenna gains given by  $G_1, G_2, \dots, G_N$  dBi
  - transmit signals are correlated, then
  - Directional gain =  $10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}]$  dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

## 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 Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	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

Calculation Formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1mW/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.

## 2.2. Test Result of RF Exposure Evaluation

Product	804Mesh Dual Wi-Fi
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Maximum EIRP (dBm)	Safety Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit of Power Density (mW/cm <sup>2</sup> )
802.11b/g/n-HT20/ n-HT40	2412 ~ 2462	25.57	20	0.0717	1
802.11a/n-HT20/ n-H40/ac-VHT20 ac-VHT40/ac-VHT80	5150 ~ 5250, 5725 ~ 5850	35.92	20	0.7776	1

## 2.3. Summary of Test Result

The maximum calculations of above situations

Configuration	The formula of calculated the MPE (mW/cm <sup>2</sup> )	Calculation Power Density (mW/cm <sup>2</sup> )	Limit	Result
2.4GHz + 5GHz	0.0717 + 0.7776	0.8493	1	Pass

The wireless device described within this report has been shown to be capable of compliance with basic restrictions related to human exposure to electromagnetic fields for General public. The calculations shown in this report were made in accordance the procedures specified in the applied test specifications. The safety distance is 20cm.

The End