

RF Exposure Report

(Spot Check)

Report No.: SA180611E01D

FCC ID: 2ABLK-GS2020

Original FCC ID: 2ABLK-GS2026

Test Model: GS2020E

Received Date: Oct. 30, 2018

Test Date: Dec. 03 to 10, 2018

Issued Date: Mar. 19, 2019

Applicant: Calix Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022

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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 | 5 |
| 2.5 Calculation Result | 6 |

Release Control Record

| Issue No. | Description | Date Issued |
|--------------|-------------------|---------------|
| SA180611E01D | Original release. | Mar. 19, 2019 |

1 Certificate of Conformity

Product: GigaSpire

Brand: Calix

Test Model: GS2020E

Sample Status: MASS-PRODUCTION

Applicant: Calix Inc.

Test Date: Dec. 03 to 10, 2018

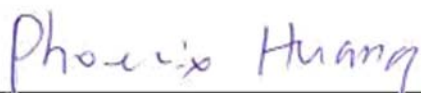
Standards: FCC Part 2 (Section 2.1091)

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 :


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Date:

Mar. 19, 2019

Approved by :


May Chen / Manager

Date:

Mar. 19, 2019

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 27cm away from the body of the user.
So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

| Frequency range (GHz) | Directional Antenna Gain (dBi) | Antenna Type | Antenna Connector |
|-----------------------|--------------------------------|--------------|-------------------|
| 2.4 ~ 2.4835 | 7.41 | Dipole | i-pex(MHF) |
| 5.18 ~ 5.24 | 9.7 | | |
| 5.26 ~ 5.32 | 9.9 | | |
| 5.50 ~ 5.70 | 9.83 | | |
| 5.745 ~ 5.825 | 10.27 | | |

Note: More detailed information, please refer to operating description.

2.5 Calculation Result

| Operation Mode | Evaluation Frequency (MHz) | Max Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|---------------------|----------------------------|----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| WLAN 2.4GHz | 2437 | 773.819 | 7.41 | 27 | 0.46527 | 1 |
| WLAN 5GHz (UNII-1) | 5240 | 419.096 | 9.70 | 27 | 0.42695 | 1 |
| WLAN 5GHz (UNII-2A) | 5270 | 99.27 | 9.90 | 27 | 0.10590 | 1 |
| WLAN 5GHz (UNII-2C) | 5530 | 103.136 | 9.83 | 27 | 0.11980 | 1 |
| WLAN 5GHz (UNII-3) | 5785 | 366.45 | 10.27 | 27 | 0.42567 | 1 |

Note:

2.4GHz: Directional gain = 7.41dBi

5GHz:

UNII-1: Directional gain = 9.70dBi

UNII-2A: Directional gain = 9.90dBi

UNII-2C: Directional gain = 9.83dBi

UNII-3: Directional gain = 10.27dBi

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

$WLAN\ 2.4GHz + WLAN\ 5GHz = 0.46527 / 1 + 0.42695 / 1 = 0.89222$

Therefore the maximum calculations of above situations are less than the “1” limit.

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