

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
Hsin Chu Laboratory

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**FCC Registration /
Designation Number:** 723255 / TW2022

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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

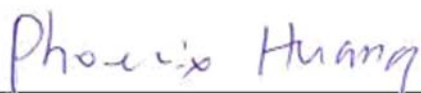
Standards: FCC Part 2 (Section 2.1091)

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 :


Phoenix Huang / Specialist

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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