



RADIO EXPOSURE TEST REPORT

FCC ID : 2ABLK-GS4227W
Equipment : GigaSpire BLAST
Brand Name : Calix
Model Name : u6xw GS4227W
Applicant : Calix Inc.
1035 N. McDowell Blvd. Petaluma, CA94954 U.S.A.
Manufacturer : Calix Inc.
1035 N. McDowell Blvd. Petaluma, CA94954 U.S.A.
Standard : 47 CFR Part 2.1091

The product was received on Jun. 30, 2021, and testing was started from Jun. 30, 2021 and completed on Oct. 28, 2021. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.



Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
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History of this test report

Report No.	Version	Description	Issued Date
FA150310-01	01	Initial issue of report	Nov. 25, 2021



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5180-5240 5260-5320 5500-5700 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)



1.2 Antenna Information

Ant.	Port		Brand	Model Name	Type	Connector	Gain (dBi)	Remark
	2.4GHz	5GHz						
1	-	3	Hong Bo	290-50251	PCB	I-Pex	Note1	5G U-NII 1, U-NII 2A,U-NII 2C, U-NII 3
2	-	4	Hong Bo	290-50251	PCB	I-Pex		5G U-NII 1, U-NII 2A,U-NII 2C, U-NII 3
3	1	1	Hong Bo	290-50249	PCB	I-Pex		2.4G+5G U-NII 1, U-NII 2A,U-NII 2C, U-NII 3
4	2	2	Hong Bo	290-50250	PCB	I-Pex		2.4G+5G U-NII 1, U-NII 2A,U-NII 2C, U-NII 3

Note1:

Ant.	Gain (dBi)				
	2.4GHz	5GHz U-NII 1	5GHz U-NII 2A	5GHz U-NII 2C	5GHz U-NII 3
1	-	3.91	3.91	3.83	3.90
2	-	3.94	3.92	3.92	3.96
3	3.97	3.97	3.92	3.92	3.96
4	3.94	3.97	3.97	3.92	3.82
Directional Gain (dBi) (4T1S)	-	4.42	5.77	6.93	6.39
Directional Gain (dBi) (4T2S)	-	3.97	4.52	5.19	5.46
Directional Gain (dBi) (SDM 4T4S)	-	1.97	1.93	3.09	3.27

Note2: The above information was declared by manufacturer.

WLAN 2.4GHz: Maximum Directional Gain following KDB662911 D01

WLAN 5GHz: Maximum Directional Gain is measured which follows the procedure of KDB 662911 D03.

The antenna report is provided in the operational description for this application.

For WLAN 2.4GHz function, 802.11 b/g/n/VHT/ax mode (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For WLAN 5GHz UNII 1~3 function, 802.11a/n/ac/ax mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.



1.3 Accessories

No.	Equipment Name	Brand Name	Model Name	Rating
1	Adapter	Ktec	KSA-42D-120300VU	Input:100-240V~50/60Hz, 1.2A Output:12V, 3.0A

1.4 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA150310

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding Band 2 and Band 3 (5250~5350 MHz, 5470~5725 MHz) for this device. 2. Adding 80+80MHz mode	Maximum Permissible Exposure.
3. Adding Extender mode 4. Changing the voice layout and removing common mode choke of power.	After evaluating, it doesn't affect the test result.

Note: Maximum Permissible Exposure of 2.4GHz and 5GHz Band 1, 4 are based on original test report



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 27 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;D1D	6.97	28.66	35.63	0.36	35.99	3.97192	27	0.43357	1.00000
5.2G;D1D	4.42	29.96	34.38	0.50	34.88	3.07610	27	0.33579	1.00000
5.3G;D1D	5.77	23.96	29.73	0.26	29.99	0.99770	27	0.10891	1.00000
5.6G;D1D	6.93	22.52	29.45	0.50	29.95	0.98855	27	0.10791	1.00000
5.8G;D1D	6.39	29.32	35.71	0.28	35.99	3.97192	27	0.43357	1.00000

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;D1D	6.97	28.66	35.63	0.36	35.99	3.97192	27	0.43357	1.00000	0.43357
5.8G;D1D	6.39	29.32	35.71	0.28	35.99	3.97192	27	0.43357	1.00000	0.43357
									Sum Ratio	0.86714
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

—————THE END—————