FCC Maximum Permissible RF Exposure (MPE) Estimation Report

In accordance with the requirements of

FCC 47 CFR Part 2(2.1091), ANSI/IEEE C95.1-1992 and

KDB 447498 D01

Product Name：	Wifiwall
Trademark：	N/A
Model Name：	Wifiwall 5GHZ Dome
Family Model：	Wifiwall 5GHZ Traveller
Report No.：	S19102502305005
FCC ID：	2ASILWIFIWALL5

Prepared for

Wifi wall Ltd

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TEST RESULT CERTIFICATION

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Product description

Product name	:	Wifiwall
Trademark	:	N/A
Model and/or type reference	:	Wifiwall 5GHZ Dome
Family Model	:	Wifiwall 5GHZ Traveller
Standards	:	FCC 47 CFR Part 1(1.1310) FCC 47 CFR Part 2(2.1091) ANSI/IEEE C95.1-1992 KDB 447498 D01

This device described above has been tested by Shenzhen NTEK. Testing has shown that this device is capable of compliance with MPE specified in FCC 47 CFR Part 2(2.1091) and ANSI/IEEE C95.1-1992. The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Date of Test

Date (s) of performance of tests	:	14 Nov. 2019 ~ 19 Dec. 2019
Date of Issue	:	19 Dec. 2019
Test Result	:	**Pass**

Prepared By (Test Engineer) : Cheng Jiawen

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Approved By (Lab Manager) : Sam. Chen

(Sam Chen)

※ ※ Revision History ※ ※

REV.	DESCRIPTION	ISSUED DATE	REMARK
Rev.1.0	Initial Test Report Release	Dec 19, 2019	Cheng Jiawen

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1 General Information

1.1 RF Exposure Requirements

1.1.1 RF Exposure Limits

Table - Limits For Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	6
1,500-100,000			5	6
(B) 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
300-1,500			f/1500	30
1,500-100,000			1.0	30
f = frequency in MHz * = Plane-wave equivalent power density				

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P_t * G_t}{4 * \pi * R^2}$$

Where:

S = Power density (mW/cm^2)
P_t = Conducted output power (dBm)
G_t = numeric gain of the antenna in the direction of interest relative to an isotropic radiator (dBi)
R= distance to the centre of radiation of the antenna (cm)
EIRP = $P_t * G_t$

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

1.1.2 Additional Description

An estimation of MPE in this application for product is used to ensure if it complies to the rules of the standard in the regulation list above.
Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.
Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.
We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC's MPE limits for field strength and power density are given in 47CFR 1.1310(Table below).These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

1.2 EUT Description

Device Information			
Product Name	Wifiwall		
Trade Name	N/A		
Model Name	Wifiwall 5GHZ Dome		
Family Model	Wifiwall 5GHZ Traveller		
FCC ID	2ASILWIFIWALL5		
Device Phase	Identical Prototype		
Exposure Category	General population / Uncontrolled environment		
Antenna Type	Wifiwall 5GHZ Dome: External Antenna Wifiwall 5GHZ Traveller: FPCB Antenna		
Antenna Gain	Wifiwall 5GHZ Dome: 5dBi Wifiwall 5GHZ Traveller: 3dBi		
Device Operating Configurations			
Supporting Mode(s)	WLAN 2.4G/5.2G/5.8G		
Test Modulation	WLAN(DSSS/OFDM)		
Operating Frequency Range(s)	Band	Tx (MHz)	Rx (MHz)
	BT	2402-2480	
	WLAN 2.4G	2412-2462	
	WLAN 5.2G	5180-5240	
	WLAN 5.8G	5745-5825	

1.3 Test specification(s)

FCC 47 CFR Part 1(1.1310)
FCC 47 CFR Part 2(2.1091)
ANSI/IEEE C95.1-1992
KDB 447498 D01 General RF Exposure Guidance

1.4 Ambient Condition

Ambient temperature	20°C – 24°C
Relative Humidity	30% – 70%

2 RF Output Power

BR+EDR

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant 1	7.02	30	Pass
NVNT	1-DH5	2441	Ant 1	7.18	30	Pass
NVNT	1-DH5	2480	Ant 1	7.22	30	Pass
NVNT	2-DH5	2402	Ant 1	6.49	20.97	Pass
NVNT	2-DH5	2441	Ant 1	6.51	20.97	Pass
NVNT	2-DH5	2480	Ant 1	6.07	20.97	Pass
NVNT	3-DH5	2402	Ant 1	6.49	20.97	Pass
NVNT	3-DH5	2441	Ant 1	6.52	20.97	Pass
NVNT	3-DH5	2480	Ant 1	6.20	20.97	Pass

BLE

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant 1	6.99	30	Pass
NVNT	BLE	2440	Ant 1	7.06	30	Pass
NVNT	BLE	2480	Ant 1	6.85	30	Pass

2.4Gwifi

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11b	2412	Ant 1	15.64	30	Pass
NVNT	802.11b	2437	Ant 1	16.21	30	Pass
NVNT	802.11b	2462	Ant 1	16.59	30	Pass
NVNT	802.11g	2412	Ant 1	14.53	30	Pass
NVNT	802.11g	2437	Ant 1	15.09	30	Pass
NVNT	802.11g	2462	Ant 1	15.79	30	Pass
NVNT	802.11n(HT20)	2412	Ant 1	14.9	30	Pass
NVNT	802.11n(HT20)	2437	Ant 1	15.31	30	Pass
NVNT	802.11n(HT20)	2462	Ant 1	15.97	30	Pass

5.2G wifi

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5180	Ant 1	9.75	0	9.75	24	Pass
NVNT	802.11a	5200	Ant 1	9.57	0	9.57	24	Pass
NVNT	802.11a	5240	Ant 1	9.98	0	9.98	24	Pass
NVNT	802.11ac20	5180	Ant 1	8.88	0	8.88	24	Pass
NVNT	802.11ac20	5200	Ant 1	9.23	0	9.23	24	Pass
NVNT	802.11ac20	5240	Ant 1	9.53	0	9.53	24	Pass
NVNT	802.11ac40	5190	Ant 1	9.19	0	9.19	24	Pass
NVNT	802.11ac40	5230	Ant 1	9.66	0	9.66	24	Pass
NVNT	802.11ac80	5210	Ant 1	9	0	9	24	Pass
NVNT	802.11n(HT20)	5180	Ant 1	9.45	0	9.45	24	Pass
NVNT	802.11n(HT20)	5200	Ant 1	9.21	0	9.21	24	Pass
NVNT	802.11n(HT20)	5240	Ant 1	9.53	0	9.53	24	Pass
NVNT	802.11n(HT40)	5190	Ant 1	8.91	0	8.91	24	Pass
NVNT	802.11n(HT40)	5230	Ant 1	9.66	0	9.66	24	Pass

5.8G wifi

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVNT	802.11a	5745	Ant 1	9.49	0	9.49	30	Pass
NVNT	802.11a	5785	Ant 1	10.42	0	10.42	30	Pass
NVNT	802.11a	5825	Ant 1	10.62	0	10.62	30	Pass
NVNT	802.11ac20	5745	Ant 1	9.54	0	9.54	30	Pass
NVNT	802.11ac20	5785	Ant 1	9.91	0	9.91	30	Pass
NVNT	802.11ac20	5825	Ant 1	10.46	0	10.46	30	Pass
NVNT	802.11ac40	5755	Ant 1	9.48	0	9.48	30	Pass
NVNT	802.11ac40	5795	Ant 1	10.1	0	10.1	30	Pass
NVNT	802.11ac80	5775	Ant 1	9.35	0	9.35	30	Pass
NVNT	802.11n(HT20)	5745	Ant 1	9.58	0	9.58	30	Pass
NVNT	802.11n(HT20)	5785	Ant 1	9.71	0	9.71	30	Pass
NVNT	802.11n(HT20)	5825	Ant 1	10.41	0	10.41	30	Pass
NVNT	802.11n(HT40)	5755	Ant 1	9.53	0	9.53	30	Pass
NVNT	802.11n(HT40)	5795	Ant 1	10.08	0	10.08	30	Pass

3 RF Exposure Evaluation

3.1 Operation in BT

BDR+EDR

Antenna	Maximum output power (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm^2)	MPE Limit (mW/cm^2)	Conclusion
Ant 1	7.22	5	12.22	16.67	20	0.0033	1	Pass

BLE

Antenna	Maximum output power (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm^2)	MPE Limit (mW/cm^2)	Conclusion
Ant 1	7.06	5	12.06	16.07	20	0.0032	1	Pass

3.2 Operation in WLAN 2.4G

Antenna	Maximum output power (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm^2)	MPE Limit (mW/cm^2)	Conclusion
Ant 1	16.59	5	21.59	144.21	20	0.0287	1	Pass

3.3 Operation in WLAN 5G

Antenna	Maximum output power (dBm)	Gain (dBi)	EIRP (dBm)	EIRP (mW)	R(cm)	S (mW/cm^2)	MPE Limit (mW/cm^2)	Conclusion
Ant 1	10.62	5	15.62	36.48	20	0.0073	1	Pass

This product does not support the requirements under multiple sources.

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