RF Exposure Evaluation

Test report
On Behalf of
AiRISTA Flow, Inc.
For
Wi-Fi/BLE Gateway

Model No. : G3

FCC ID: TA7-G3

Prepared for : **AiRISTA Flow, Inc.**
913 Ridgebrook Rd., Suite 110, Sparks, MD, 21152, USA

Prepared By : **Shenzhen HUAK Testing Technology Co., Ltd.**
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

Date of Test: **Jun. 20, 2020 ~ Feb. 22, 2021**

Date of Report: **Feb. 22, 2021**

1 General Description of EUT

Equipment	Wi-Fi/BLE Gateway
Model Name	G3
Serial No.	N/A
Trade Mark:	AiRISTA FLOW
FCC ID	TA7-G3
Hardware Version:	V1.2
Software Version:	V2.58
BLE	
Operation frequency:	2402MHz ~ 2480MHz
Channel separation:	2MHz
Data rate	1Mbit/s
Channel number:	40
Modulation Technology:	GFSK
Antenna Type:	Chip Antenna
Antenna Gain:	0dBi
2.4GWIFI	
Operation frequency	802.11b/g/n 20: 2412~2462 MHz
Number of Channels	802.11b/g/n20: 11CH
Modulation Type	CCK/DSSS/OFDM
Antenna type:	Chip Antenna
Antenna gain:	0dBi

2 RF Exposure Compliance Requirement

2.1 Standard Requirement

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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				
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 Friis

Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R 2) Where

Pd = power density in mW/cm2
Pout = 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

Pd id the limit of MPE . 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.

3 EUT RF Exposure

Antenna Gain: 0Bi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is in linear scale. Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

For BLE:

BLE-1Mbit/s						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	1.844	1±1	2	1.585	0.491	3.0
Middle (2440MHz)	1.526	1±1	2	1.585	0.495	
Highest (2480MHz)	1.241	1±1	2	1.585	0.499	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: HK2007211844-2E

For 2.4GWIFI

802.11b mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	16.802	16±1	17	50.119
Middle(2437MHz)	15.736	15±1	16	39.811
Highest(2462MHz)	13.558	13±1	14	25.119

802.11g mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	15.266	16±1	17	50.119
Middle(2437MHz)	15.566	15±1	16	39.811
Highest(2462MHz)	12.235	13±1	14	25.119

802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2412MHz)	15.554	16±1	17	50.119
Middle(2437MHz)	15.019	15±1	16	39.811
Highest(2462MHz)	12.126	13±1	14	25.119

Worst case: 802.11g mode Lowest (2462MHz)
Using the maximum value of the test report

Maximum tune-up Power (mW)	**Antenna Gain (dBi)**	**Power Density at R =20m (mW/cm2)**	**Limit**	**Result**
50.119	0	0.00997	**1**	PASS

Remark: The Max Conducted Peak Output Power data refer to report Report No.: HK2007211844-1E
Value : Pd = (Pout*G)/(4* Pi * R^2)=(50.119 *1)/(4*3.1416*20*20)= 0.00997mW/cm2