RF Exposure Evaluation Declaration

FCC ID:	X3ZWFMOD1
APPLICANT:	Amp'ed RF Technology, Inc.
Application Type:	Certification
Product:	Wi-Fi & BLE combo module
Model No.:	ART6212
Brand Name:	ART
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	FCC CFR 47 §2.1091
Test Date:	October 10, 2016 ~ June 14, 2017

Reviewed By : Kevin Guo
(Kevin Guo)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1710WSU01001	Rev. 01	Initial Report	01-11-2018	Invalid
1710WSU01001	Rev. 02	Add antenna description	04-16-2018	Valid

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name:	Wi-Fi & BLE combo module
Model No.:	ART6212
Brand Name:	ART
Work Voltage	DC 3.6V
Bluetooth Specification	
Frequency Range:	2402 ~ 2480MHz
Bluetooth Version:	V4.1
Modulation Type:	GFSK
Antenna Type:	PCB
Antenna Gain:	3 dBi
Wi-Fi Specification	
Frequency Range	**2.4GHz:** For 802.11b/g/n-HT20: 2412 ~ 2462 MHz **5GHz:** For 802.11a/n-HT20-VHT20: 5180~5240MHz, 5745~5825MHz
Type of Modulation	802.11b: DSSS 802.11a/g/n: OFDM
Antenna Type:	Chip
Antenna Gain:	0.5 dBi for 2.4GHz 2 dBi for 5GHz

1.2. Description of Avilable Antenna

Antenna Specification				
Model Name	**Type**	**Frequency Band**	**Connector**	**Max. Peak Gain**
AT3216-B2R7HAA	Surface Mount	2.4G WiFi	Solder	0.2 dBi
AT3216-B5R5HAA	Surface Mount	5G WiFi	Solder	2 dBi
479501011	PCB Trace	Bluetooth	U.FL	3 dBi

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: 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 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	6
1500-100,000	--	--	1	30

Formula as follows:

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
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 is the limit of MPE, 1mW/cm². 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.

2.2. Test Result of RF Exposure Evaluation

Product	Wi-Fi & BLE combo module
Test Item	RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.0dBi for Bluetooth, 0.5dBi for 2.4G Wi-Fi and 2.0dBi for 5G Wi-Fi band in logarithm scale.

For 802.11a/b/g/n(HT-20) and BLE:

Test Mode	Frequency Band (MHz)	Maximum Output Power (dBm)	Power Density at r = 20 cm (mW/cm^2)	FCC Limit (mW/cm^2)
BLE	2402 ~ 2480	1.36	0.0005	1
802.11b/g/n(HT-20)	2412 ~ 2462	15.96	0.0088	1
802.11a/n(HT-20)	5180 ~ 5240	18.34	0.0215	1
802.11a/n(HT-20)	5745 ~ 5825	15.81	0.0120	1

CONCULISON:

Therefore, the Max Power Density at r (20 cm) = 0.0051mW/cm^2 < 1mW/cm^2.

So the EUT complies with the FCC requirement.

The End