

RF Exposure Report

Report No.: SA151230E03B

FCC ID: 2AHBN-AP41

Test Model: AP41

Series Model: AP41E

Received Date: Dec. 23, 2015

Test Date: Dec. 24, 2015 ~ Jan. 21, 2016

Mar. 12 ~ Apr. 27, 2016

Issued Date: May 11, 2016

Applicant: Mist Systems, Inc.

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Release Control Record

Issue No.	Description	Date Issued
SA151230E03B	Original release.	May 11, 2016

1 Certificate of Conformity

Product: Premium Wi-Fi & BLE Array AP

Brand: Mist

Test Model: AP41

Series Model: AP41E

Sample Status: Engineering sample

Applicant: Mist Systems, Inc.

Test Date: Dec. 24, 2015 ~ Jan. 21, 2016

Mar. 12 ~ Apr. 27, 2016

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 (October 23, 2015)

IEEE C95.1

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 :  , **Date:** May 11, 2016
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Approved by :  , **Date:** May 11, 2016
Ken Liu / Senior Manager

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				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$$Pd = (P_{out} * G) / (4 * \pi * r^2)$$

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 31cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	TX Function	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Radio 1						
EUT with internal antenna						
2412-2462	1TX	22.65	3.06	31	0.031	1
	2TX	25.45	6.37	31	0.126	1
	3TX	27.07	8.13	31	0.274	1
	4TX	28.38	9.43	31	0.500	1
5180-5240	1TX	25.14	3.85	31	0.066	1
	2TX	27.26	7.19	31	0.231	1
	3TX	26.27	8.73	31	0.262	1
	4TX	25.84	9.96	31	0.315	1
5745-5825	1TX	23.32	4.18	31	0.047	1
	2TX	25.95	7.10	31	0.167	1
	3TX	27.27	8.94	31	0.346	1
	4TX	28.22	10.19	31	0.574	1
EUT with external antenna						
2412-2462	1TX	22.65	4	31	0.038	1
	2TX	25.45	7.01	31	0.146	1
	3TX	27.07	8.77	31	0.318	1
	4TX	28.38	10.02	31	0.573	1
5180-5240	1TX	25.14	6	31	0.108	1
	2TX	27.26	9.01	31	0.351	1
	3TX	26.27	10.77	31	0.419	1
	4TX	25.84	12.02	31	0.506	1
5745-5825	1TX	23.32	6	31	0.071	1
	2TX	25.95	9.01	31	0.259	1
	3TX	27.27	10.77	31	0.527	1
	4TX	28.22	12.02	31	0.875	1

*Because the EUT was changing software to decrease power, the power of EUT with internal antenna was different from the original report.

Frequency Band (MHz)	TX Function	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Radio 2						
2412-2462	1TX	13.49	3.61	31	0.004	1
5180-5240	1TX	24.17	3.59	31	0.049	1
5745-5825	1TX	23.88	4.29	31	0.054	1
Radio 3						
BT EDR	-	10.90	11.05	31	0.013	1
BT LE	-	6.13	11.05	31	0.004	1

Note:

WLAN:

EUT with internal antenna

2412-2462MHz:

2TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 6.37\text{dBi}$

3TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 8.13\text{dBi}$

4TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 9.43\text{dBi}$

5180-5240MHz:

2TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 7.19\text{dBi}$

3TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 8.73\text{dBi}$

4TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 9.96\text{dBi}$

5745-5825MHz:

2TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 7.10\text{dBi}$

3TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 8.94\text{dBi}$

4TX: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/N] = 10.19\text{dBi}$

EUT with external antenna

2412-2462MHz:

2TX: Directional gain = 4 dBi + $10 \log(2) = 7.01\text{dBi}$

3TX: Directional gain = 4 dBi + $10 \log(3) = 8.77\text{dBi}$

4TX: Directional gain = 4 dBi + $10 \log(4) = 10.02\text{dBi}$

5180-5240MHz, 5745-5825MHz:

2TX: Directional gain = 6 dBi + $10 \log(2) = 9.01\text{dBi}$

3TX: Directional gain = 6 dBi + $10 \log(3) = 10.77\text{dBi}$

4TX: Directional gain = 6 dBi + $10 \log(4) = 12.02\text{dBi}$

BT EDR/BT LE: Directional gain = 5.03dBi + $10 \log(4) = 11.05\text{dBi}$

	MAX POWER (dBm)			TOTAL POWER (dBm)	POWER LIMIT (dBm)
	Radio 1: WLAN	Radio 2: WLAN	Radio 3: BT		
2.4GHz	28.38	13.49	10.90	28.59	30
5GHz: U-NII-1	27.26	24.17	-	28.99	30
5GHz: U-NII-3	28.22	23.88	-	29.58	30

CONCLUSION:

Both of the WLAN 2.4G & WLAN 5G & BT can transmit simultaneously, the formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Radio 1: 2.4G + Radio 2: 5G + Radio 3: BT = $0.573 + 0.054 + 0.013 = 0.640$

Radio 1: 5G + Radio 2: 5G + Radio 3: BT = $0.875 + 0.054 + 0.013 = 0.942$

Radio 1: 5G + Radio 2: 2.4G + Radio 3: BT = $0.875 + 0.004 + 0.013 = 0.892$

Radio 1: 2.4G + Radio 2: 2.4G + Radio 3: BT = $0.573 + 0.004 + 0.013 = 0.590$

Therefore, the maximum calculation of this situation is 0.942, which is less than the "1" limit.

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