

RF Exposure Report

Report No.: SA191104C18

FCC ID: 2ACTO-APX320X

Test Model: APX 320X

Received Date: Nov. 04, 2019

Test Date: Dec. 12, 2019 ~ Jan. 13, 2020

Issued Date: Apr. 01, 2020

Applicant: Sophos Ltd

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
SA191104C18	Original release	Apr. 01, 2020

1 Certificate of Conformity

Product: Sophos Access Point

Brand: Sophos

Test Model: APX 320X

Sample Status: Engineering sample

Applicant: Sophos Ltd

Test Date: Dec. 12, 2019 ~ Jan. 13, 2020

Standards: FCC Part 2 (Section 2.1093)
IEEE C95.1-1992

References Test Guidance: KDB 447498 D01 General RF Exposure Guidance v06

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 RF characteristics under the conditions specified in this report.

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Approved by : Bruce Chen, **Date:** Apr. 01, 2020
Bruce Chen / Senior Project Engineer

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				
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; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

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

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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 28cm 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)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Dipole antenna					
CDD Mode					
WLAN 2412~2462	27.60	6.21	28	0.244	1
WLAN 5180~5240	21.47	8.11	28	0.092	1
WLAN 5260~5320	23.44	8.01	28	0.142	1
WLAN 5500~5700	22.64	8.71	28	0.139	1
WLAN 5745~5825	22.98	9.01	28	0.160	1
Beamforming Mode					
WLAN 2412~2462	26.51	6.21	28	0.190	1
WLAN 5180~5240	18.43	8.11	28	0.046	1
WLAN 5260~5320	21.94	8.01	28	0.100	1
WLAN 5500~5700	21.16	8.71	28	0.099	1
WLAN 5745~5825	22.98	9.01	28	0.160	1
BT LE 2402~2480	8.45	5.2	28	0.002	1
Directional antenna					
CDD Mode					
WLAN 2412~2462	23.96	15.01	28	0.801	1
WLAN 5180~5240	8.42	13.56	28	0.016	1
WLAN 5260~5320	17.12	14.21	28	0.138	1
WLAN 5500~5700	16.92	14.51	28	0.141	1
WLAN 5745~5825	22.79	14.51	28	0.545	1
Beamforming Mode					
WLAN 2412~2462	20.96	15.01	28	0.401	1
WLAN 5180~5240	5.37	13.56	28	0.008	1
WLAN 5260~5320	14.12	14.21	28	0.069	1
WLAN 5500~5700	13.92	14.51	28	0.071	1
WLAN 5745~5825	19.79	14.51	28	0.273	1
BT LE 2402~2480	8.45	5.2	28	0.002	1
Sector antenna					
CDD Mode					
WLAN 2412~2462	23.96	14.41	28	0.697	1
WLAN 5180~5240	8.42	15.58	28	0.025	1
WLAN 5260~5320	17.12	15.71	28	0.195	1
WLAN 5500~5700	16.92	16.01	28	0.199	1
WLAN 5745~5825	22.79	16.11	28	0.788	1
Beamforming Mode					
WLAN 2412~2462	20.96	14.41	28	0.350	1
WLAN 5180~5240	5.37	15.58	28	0.013	1
WLAN 5260~5320	14.12	15.71	28	0.098	1
WLAN 5500~5700	13.92	16.01	28	0.100	1
WLAN 5745~5825	19.79	16.11	28	0.395	1
BT LE 2402~2480	8.45	5.2	28	0.002	1

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

WLAN 2.4GHz:

Dipole antenna: Directional gain = $3.20\text{dBi} + 10\log(2) = 6.21\text{dBi}$

Directional antenna: Directional gain = $12\text{dBi} + 10\log(2) = 15.01\text{dBi}$

Sector antenna: Directional gain = $11.4\text{dBi} + 10\log(2) = 14.41\text{dBi}$

WLAN 5.0GHz:

Dipole antenna:

For 5180~5240MHz: Directional Gain = $5.1\text{dBi} + 10\log(2) = 8.11\text{dBi}$

For 5260~5320MHz: Directional Gain = $5.0\text{dBi} + 10\log(2) = 8.01\text{dBi}$

For 5500~5700MHz: Directional Gain = $5.7\text{dBi} + 10\log(2) = 8.71\text{dBi}$

For 5745~5825MHz: Directional Gain = $6.0\text{dBi} + 10\log(2) = 9.01\text{dBi}$

Directional antenna:

For 5180~5240MHz: Directional Gain = $10.55\text{dBi} + 10\log(2) = 13.56\text{dBi}$

For 5260~5320MHz: Directional Gain = $11.2\text{dBi} + 10\log(2) = 14.21\text{dBi}$

For 5500~5700MHz: Directional Gain = $11.5\text{dBi} + 10\log(2) = 14.51\text{dBi}$

For 5745~5825MHz: Directional Gain = $11.5\text{dBi} + 10\log(2) = 14.51\text{dBi}$

Sector antenna:

For 5180~5240MHz: Directional Gain = $12.57\text{dBi} + 10\log(2) = 15.58\text{dBi}$

For 5260~5320MHz: Directional Gain = $12.7\text{dBi} + 10\log(2) = 15.71\text{dBi}$

For 5500~5700MHz: Directional Gain = $13.0\text{dBi} + 10\log(2) = 16.01\text{dBi}$

For 5745~5825MHz: Directional Gain = $13.1\text{dBi} + 10\log(2) = 16.11\text{dBi}$

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

BT LE+ WLAN 2.4GHz + WLAN 5GHz(5180~5240MHz & 5260~5320MHz)

$= 0.002 / 1 + 0.801 / 1 + 0.195 / 1 = 0.998$

BT LE+ WLAN 5GHz(5180~5240MHz & 5260~5320MHz) + WLAN 5GHz(5500~5700MHz & 5745~5825MHz)

$= 0.002 / 1 + 0.195 / 1 + 0.788 / 1 = 0.985$

Therefore the maximum calculations of above situations are less than the "1" limit.

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