RF Exposure Report

Report No.:	MFBDAS-WTW-P20120218B R1
FCC ID:	2ACTO-7933DMC
Test Model:	XGS 126w (with EM9191)
Series Model:	XGS 136w
Received Date:	Mar. 12, 2022
Date of Evaluation:	Jul. 28, 2022
Issued Date:	Sep. 21, 2022
Applicant:	Sophos Ltd.
Address:	The Pentagon, Abingdon Science Park, Abingdon, OX14 3YP United Kingdom
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
MFBDAS-WTW-P20120218B	Original release	Aug. 12, 2022
MFBDAS-WTW-P20120218B R1	Added simultaneous operation mode	Sep. 21, 2022

1 Certificate of Conformity

Product:	Network appliance
Brand:	SOPHOS
Test Model:	XGS 126w (with EM9191)
Series Model:	XGS 136w
Sample Status:	Production Unit
Applicant:	Sophos Ltd.
Date of Evaluation:	Jul. 28, 2022
Standards:	FCC Part 2 (Section 2.1091)
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.

Prepared by : Pettie Chen , **Date:** Sep. 21, 2022

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Sep. 21, 2022

Jeremy Lin / 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

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

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20 cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Calculation Result of Maximum Conducted Power

WWAN-Optional (WWAN module: Brand: Sierra / Model: EM9191 / FCC ID: N7NEM91)

Band	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 2	1852.4~1907.6	24.5	0.46	20	0.062	1.000
WCDMA Band 4	1712.4~1752.6	24.5	-0.28	20	0.053	1.000
WCDMA Band 5	826.4~846.6	24.5	0.34	20	0.061	0.551
LTE Band 2	1850.7~1909.3	24	0.46	20	0.056	1.000
LTE Band 4	1710.7~1754.3	24	-0.28	20	0.047	1.000
LTE Band 5	824.7~848.3	24	0.34	20	0.054	0.550
LTE Band 7	2502.5~2567.5	24.8	-0.48	20	0.054	1.000
LTE Band 12	699.7~715.3	24	1.47	20	0.070	0.466
LTE Band 13	779.5~784.5	24	-0.19	20	0.048	0.520
LTE Band 14	790.5~795.5	24	0.34	20	0.054	0.527
LTE Band 17	706.5~713.5	24	1.47	20	0.070	0.471
LTE Band 25	1850.7~1914.3	24	0.46	20	0.056	1.000
LTE Band 26	814.7~848.3	24	0.34	20	0.054	0.543
LTE Band 30	2307.5~2312.5	24	-1.02	20	0.040	1.000
LTE Band 38	2572.5~2617.5	24.8	-0.48	20	0.054	1.000
LTE Band 41	2498.5~2687.5	24.8	-0.48	20	0.054	1.000
LTE Band 41 (HPUE)	2498.5~2687.5	26	-1.54	20	0.056	1.000
LTE Band 48	3552.5~3697.5	24.8	-3.35	20	0.028	1.000
LTE Band 66	1710.7~1779.3	24	-0.28	20	0.047	1.000
LTE Band 71	665.5~695.5	24	0.88	20	0.061	0.444
5G NR n2	1852.5~1907.5	24.5	0.46	20	0.062	1.000
5G NR n5	826.5~846.5	24.5	0.34	20	0.061	0.551
5G NR n41	2506.02~2679.99	24.5	-0.48	20	0.050	1.000
5G NR n66	1712.5~1777.5	24.5	-0.28	20	0.053	1.000
5G NR n71	665.5~695.5	24.5	0.88	20	0.069	0.446

Note:

1. LTE Band 42 covered by LTE Band 48 with the same power level, so only chose LTE Band 48 to perform standalone power density calculation.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
3. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

WLAN-on Mainboard (WLAN Module: Brand: Sophos / Module: 7933DMC / FCC ID: 2ACTO-7933DMC)

Frequency Band (MHz)	TX Function	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	1TX	21.11	3.90	20	0.063	1
	3TX	24.03	8.67	20	0.370	1
5180-5240	1TX	21.55	3.70	20	0.067	1
	3TX	26.20	8.47	20	0.583	1
5745-5825	1TX	21.56	4.40	20	0.078	1
	3TX	26.08	9.17	20	0.666	1

Note:
2412-2462MHz Directional gain = 3.9dBi + 10log(3) = 8.67dBi
5180-5240MHz Directional gain = 3.7dBi + 10log(3) = 8.47dBi
5745-5825MHz Directional gain = 4.4dBi + 10log(3) = 9.17dBi

WLAN-Optional (WLAN Module: Brand: Sophos / Module: 7922DMC / FCC ID: 2ACTO-7922DMC)

Frequency Band (MHz)	TX Function	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
2412-2462	1TX	21.26	3.90	20	0.065	1
	2TX	22.63	6.91	20	0.179	1
5180-5240	1TX	21.55	3.70	20	0.067	1
	2TX	24.17	6.71	20	0.244	1
5745-5825	1TX	22.32	4.40	20	0.093	1
	2TX	23.53	7.41	20	0.247	1

Note:
2412-2462MHz Directional gain = 3.9dBi + 10log(2) = 6.91dBi
5180-5240MHz Directional gain = 3.7dBi + 10log(2) = 6.71dBi
5745-5825MHz Directional gain = 4.4dBi + 10log(2) = 7.41dBi

* 2.4GHz & 5GHz technology cannot transmit at same time.

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

WLAN 2.4G (Module: 7933DMC) + WWAN (Module: EM9191) = 0.370 / 1 + 0.069 / 0.446 = 0.524

WLAN 5G (Module: 7933DMC) + WWAN (Module: EM9191) = 0.666 / 1 + 0.069 / 0.446 = 0.820

WLAN 2.4G (Module: 7933DMC) + WLAN 2.4G (Module: 7922DMC) = 0.370 / 1 + 0.179 / 1 = 0.549

WLAN 5G (Module: 7933DMC) + WLAN 5G (Module: 7922DMC) = 0.666 / 1 + 0.247 / 1 = 0.913

*For WLAN power density data, please refer to report no.: SA170731C03.

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

---END---