RF EXPOSURE EVALUATION

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)

FCC ID: 2AO5F-7000NPLAY

EUT Specification

EUT	**Network Player**
Frequency band (Operating)	☒WLAN: 2.412GHz ~ 2.462GHz ☒RLAN: 5.18GHz ~ 5.32GHz ☐RLAN: 5.50GHz ~ 5.70GHz ☐RLAN: 5.745GHz ~ 5825GHz ☐Others: BLE: 2402-2480MHz
Device category	☐Portable (<20cm separation) ☒Mobile (>20cm separation) ☐Others ___
Exposure classification	☐Occupational/Controlled exposure (S = 5mW/cm2) ☒General Population/Uncontrolled exposure (S=1mW/cm2)
Antenna diversity	☐Single antenna ☒Multiple antennas ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Max. output power	WiFi 2.4G ANT1: 18.12dBm (0.0649W) WiFi 2.4G ANT2: 18.35 dBm (0.0684W) WiFi 5.2G ANT1: 14.54 dBm (0.0284W) WiFi 5.2G ANT2: 14.52 dBm (0.0283W) WiFi 5.3G ANT1: 16.94 dBm (0.0494W) WiFi 5.3G ANT2: 17.09 dBm (0.0512W)
Antenna gain (Max)	WiFi 2.4G ANT1: 3.53dBi WiFi 2.4G ANT2: 3.53dBi WiFi 5G ANT1: 3.71dBi WiFi 5G ANT2: 3.71dBi
Evaluation applied	☒MPE Evaluation ☐SAR Evaluation

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
(A) Limits for Occupational/Control Exposures				
300-1500	**--**	**--**	**F/300**	**6**
1500-100000	**--**	**--**	**5**	**6**
(B) Limits for General Population/Uncontrol Exposures				
300-1500	**--**	**--**	**F/1500**	**6**
1500-100000	**--**	**--**	**1**	**30**

Friis transmission formula: Pd=(Pout*G)\(4*pi*R2)

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 the limit of MPE, 1mW/cm2. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

Operating Mode	Measured Power	Tune up tolerance	Max. Tune up Power	Antenna Gain	Power density at 20cm	Power density Limits (mW/cm^2)
	(dBm)	(dBm)	(dBm)	(dBi)	(mW/cm^2)	
WiFi 2.4G ANT1	18.12	18.12 ±1	19.12	3.53	0.0366	1
WiFi 2.4G ANT2	18.35	18.35 ±1	19.35	3.53	0.0386	1
WiFi 5.2G ANT1	14.54	14.54 ±1	15.54	3.71	0.0167	1
WiFi 5.2G ANT2	14.52	14.52 ±1	15.52	3.71	0.0167	1
WiFi 5.3G ANT1	16.94	16.94 ±1	17.94	3.71	0.0291	1
WiFi 5.3G ANT2	17.09	17.09 ±1	18.09	3.71	0.0301	1

The WiFi 2.4G ANT1 and WiFi 5.2G ANT2 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WiFi2.4\ ANT1}/S_{limit\text{-}WiFi2.4\ ANT1}+ S_{WiFi5.2\ ANT2}/S_{limit\text{-}WiFi5.2\ ANT2}$
$=0.0366/1+0.0167/1$
$=0.0533$
< 1.0

The WiFi 2.4G ANT1 and WiFi 5.3G ANT2 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WiFi2.4\ ANT1}/S_{limit\text{-}WiFi2.4\ ANT1}+ S_{WiFi5.3\ ANT2}/S_{limit\text{-}WiFi5.3\ ANT2}$

=0.0366/1+0.0301/1

=0.0667

< 1.0

The WiFi 2.4G ANT2 and WiFi 5.2G ANT1 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WiFi2.4\ ANT2}/S_{limit\text{-}WiFi2.4\ ANT2}+ S_{WiFi5.2\ ANT1}/S_{limit\text{-}WiFi5.2\ ANT1}$

=0.0386/1+0.0167/1

=0.0553

< 1.0

The WiFi 2.4G ANT2 and WiFi 5.3G ANT1 can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WiFi2.4\ ANT2}/S_{limit\text{-}WiFi2.4\ ANT2}+ S_{WiFi5.3\ ANT1}/S_{limit\text{-}WiFi5.3\ ANT1}$

=0.0386/1+0.0291/1

=0.0677

< 1.0

Worst case for MIMO:

The WiFi 2.4G:

20.48dBm

111.69* 2.25/5026=0.05< 1.0

The WiFi 5G:

20dBm

100*2.35/5026=0.047< 1.0