Product Name: Set-Top Box

Model No.： MAG500A

FCC ID： 2AUIR-IM010CXXX1

RF Exposure Evaluation

1.1 RF Exposure Compliance Requirement

1.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	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

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4* Pi * R\ 2)$

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

Pd id the limit of MPE, 1 mW/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.

1.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

1.1.3 EUT RF Exposure Evaluation

Antenna Gain: BLE/BT:0dBi; 2.4GWIFI:2.69dBi; 5G WIFI:3.11dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0(BLE/BT),1.86(2.4G WIFI) and 2.05(5G WIFI) in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

BLE:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Middle	2442	5.205	3.31513	0.00066	1.0	PASS

EDR:8DPSK(worst case)

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Middle	2441	5.899	3.88956	0.00077	1.0	PASS

2.4G WIFI: 802.11n20(worst case)

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
lowest	2412	15.199	33.10549	0.01224	1.0	PASS

5G WIFI:802.11ac20(worst case)

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
highest	5240	15.709	37.23060	0.01516	1.0	PASS

Note: Refer to report No. BLA-EMC-202108-A07/02/03/04/05 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation Requirement