RF Exposure Evaluation Report

1 RF EXPOSURE

Product Name: Projector

Model No.: P50, P50+, H95S, H01, H02, H03, H04, H05, H06, H07, H08, H09, H26, H30, H35, H40, H45, Y01, Y02, Y03, Y04, Y05, Y06, Y07, Y08, Y09, Y26, Y30, Y35, Y40, Y45, HY26, HY30, HY35, HY40, HY45, HY50, HY200, HY350, HY400, HY450, S01, S02, S03, S04, S05, S06, S07, S08,S09, S26, S30,S35, S40, S45,M01, M02, M03, M04, M05, M06, M07, M08, M09, M26, M30, M35, M400, M450

FCC ID: 2BLCL-P50

2. RF Exposure Evaluation

FCC KDB447498 D01 General RF Exposure Guidance v06: Mobile and Portable Device, RF Exposure, Equipment Authorization Procedures.

FCC CFR 47 part1 1.1310: Radiofrequency radiation exposure limits.

FCC CFR 47 part2 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.

2.1 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 to § 1.1310(e)(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)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3−3.0	614	1.63	*(100)	≤6
3.0−30	1842/f	4.89/f	*(900/f^2)	<6
30−300	61.4	0.163	1.0	<6
300−1,500			f/300	<6
1,500−100,000			5	<6

(ii) 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
300−1,500			f/1500	<30
1,500−100,000			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 . 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.

2.2 EUT RF EXPOSURE EVALUATION

BT/WIFI ANT: 1.88dBi; 5GWIFI ANT:5.2G:1.94dBi/5.8G:2.02dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

The Max Conducted Peak Output Power data refer to report DACE240819004RF001 & DACE240819004RF002 & DACE240819004RF003 & DACE240819004RF004

BT/BLE worst mode and channel:						
Test channel (MHz)	PK Power (dBm)	Maximum tune-up Power (dbm)	Maximum tune-up Power (dbm)	Maximum tune-up Power (mW)	Calculated value (mW/cm2)	Limit (mW/cm2)
DH5-2480	6.25	6.0±1	7.0	5.012	0.0015	1.0
BLE-2480	6.33	6.0±1	7.0	5.012	0.0015	1.0

Remark: Pd = (Pout*G)/(4* Pi * R^2)=(5.0122*1542)/(4*3.1415*20*20)=0.0015 , G=10$^{gain/10}$ =1.542

WIFI worst mode and channel:						
Test channel (MHz)	PK Power (dBm)	Maximum tune-up Power (dbm)	Max.MIMO tune-up Power(dbm)	Max.MIMO tune-up Power(mW)	Calculated value (mW/cm2)	Limit (mW/cm2)
802.11b -2412MHz	20.88	21±1	22.0	158.489	0.0486	1.0
802.11b –2437MHz	21.50	21±1	22.0	158.489	0.0486	1.0
802.11b –2462MHz	21.12	21±1	22.0	158.489	0.0486	1.0
802.11a-5200MHz	10.05	10±1	11	12.589	0.0039	1.0
802.11a-5825MHz	11.12	12±1	13	19.953	0.0063	1.0

Remark:2.4G-- Pd = (Pout*G)/(4* Pi * R^2)=(158.489*1.5417)/(4*3.14159*20*20)=0.0486, G=10$^{gain/10}$ =1.5417

5.2G--Pd = (Pout*G)/(4* Pi * R^2)=(12.589*1.563)/(4*3.14159*20*20)=0.0039, G=10$^{gain/10}$ =1.563

5.8G--Pd = (Pout*G)/(4* Pi * R^2)=(19.953*1.592)/(4*3.14159*20*20)=0.0063, G=10$^{gain/10}$ =1.592

RF Exposure Evaluation simultaneous transmission operations:

According to 865664D02 2.2 d) 1):

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits :

Simultaneous transmission mode	The sum of the ratios	SUM	Limit
BT+2.4GWIFI+5GWIFI	0.0015+0.0486+0.063	≈0.113	1.0
Conclusion: 0.113 < 1.0, So there is no sar requirement			

NOTE: EUT BT & wifi module is more than 20cm away from the human body.

Conclusion:

the sum of the ratios is less than the limit value of 1.0, so there is no sar requirement.