

Maximum Permissible Exposure Evaluation

FCC ID: 2ANBD-201

1. Client Information

Applicant : Brightswitch, Inc
Address : 2437 Twin Knolls Dr., # 1, Bend, Oregon, USA 97701
Manufacturer : Brightswitch, Inc
Address : 2437 Twin Knolls Dr., # 1, Bend, Oregon, USA 97701

2. General Description of EUT

EUT Name	:	Brightswitch 201	
Models No.	:	201	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth V4.0: 2402~2480 MHz
		RF Output Power:	802.11b: 16.76dBm 802.11g: 15.75dBm 802.11n (HT20): 15.26dBm Bluetooth: 1.493dBm(GFSK)
		Antenna Gain:	2dBi PFC Antenna
Power Supply	:	DC Voltage supplied by AC/DC Adapter	
Power Rating	:	AD/DC Adapter Model(201) Input: AC 120V/60Hz Output: 5V/1.5A	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Note: More information about the RF function, please refer the RF test reports.			

MPE Calculations for WIFI

1. Antenna Gain:

PFC Antenna: 2dBi.

2. EUT Operation Condition:

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

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna

4. Test Result:

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
802.11b	1	2412	16.45	16±1	17	2	20	0.0158
		2437	16.41	16±1	17	2	20	0.0158
		2462	16.76	16±1	17	2	20	0.0158
802.11g	1	2412	15.75	15±1	16	2	20	0.0126
		2437	15.64	15±1	16	2	20	0.0126
		2462	15.42	15±1	16	2	20	0.0126
802.11n (HT20)	1	2412	15.12	15±1	16	2	20	0.0126
		2437	15.26	15±1	16	2	20	0.0126
		2462	15.19	15±1	16	2	20	0.0126

Note:
 (1) N_{TX}= Number of Transmit Antennas
 (2) RF Output power specifies that Maximum Conducted Peak Output Power.

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
Bluetooth Mode (GFSK)	1	2402	1.493	0.5±1	1.5	2	20	0.0005
		2441	1.152	0.5±1	1.5	2	20	0.0005
		2480	0.389	0.5±1	1.5	2	20	0.0005
Bluetooth Mode (π/4-DQPSK)	1	2402	0.348	0±1	1	2	20	0.0004
		2441	0.157	0±1	1	2	20	0.0004
		2480	-0.517	0±1	1	2	20	0.0004
Bluetooth Mode (8-DPSK)	1	2402	0.436	0±1	1	2	20	0.0004
		2441	0.267	0±1	1	2	20	0.0004
		2480	-0.445	0±1	1	2	20	0.0004

Note:
 (3) N_{TX}= Number of Transmit Antennas
 (4) RF Output power specifies that Maximum Conducted Peak Output Power.

Test separation:20mm			
The worst RF Exposure Evaluation			
Worst Calculation Value		Total Calculation Value	Threshold Value
WiFi Mode	Bluetooth Mode		
0.0158	0.0005	0.0163	1mW

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For 802.11b/g/n (2412~2462 MHz)

Bluetooth Mode (GFSK, π/4-DQPSK, 8-DPSK)

MPE limit S: 1mW/ cm²

The MPE is calculated as 0.0163mW / cm² < limit 1mW / cm². So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

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