Maximum Permissible Exposure Evaluation

FCC ID: 2A7ZM-ILLUMINATOQ4

1. Client Information

Applicant	:	JBU GLOBAL LLC
Address	:	19416 NE 26th AVE, 114B, Miami Florida 33180 United States
Manufacturer	:	SHENZHEN SVR TECHNOLOGY CO., LTD.
Address	:	706B, Haosheng Business Center, 4096 Dongbin Road, Nanshan District, Shenzhen. China.

2. General Description of EUT

EUT Name	:	Illuminato Q4	
Models No.	:	Illuminato Q4	
Model Difference	:	----	
Sample ID	:	RW-C-202209-0005-9-1#& RW-C-202209-0005-9-2#	
Product Description	:	Operation Frequency:	**(BP1048B2):** Bluetooth 5.3(BDR+EDR): 2402MHz~2480MHz **(RTL8723DS):** Bluetooth 4.2(BDR+EDR): 2402MHz~2480MHz Bluetooth 4.2(BLE): 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
Power Rating	:	Adapter (BSG-100W1506000) Input: AC 100-240V~ 50/60Hz 2A Max Output: 15V⎓6A DC 11.1V by 10000mAh Rechargeable Li-ion battery	
Software Version (RTL8723DS)	:	7.1.2	
Hardware Version (RTL8723DS)	:	KP503_141_V1.0	
Software Version (BP1048B2)	:	SVN 2049	
Hardware Version (BP1048B2)	:	RTV53RUU-WH-PJ33-1.1	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the MPE report used the EUT-2(RW-C-202209-0005-9-2#).	

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Method of Measurement for FCC

1. Antenna Gain:

(BP1048B2)

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
Bluetooth	N/A	N/A	PCB	-0.58

(RTL8723DS)

Antenna	Brand	Model Name	Type	Antenna Gain(dBi)
Bluetooth&2.4G WIFI	N/A	N/A	Internal	1.48

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. Simultaneous transmission MPE Considerations

According to KDB447498: All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

This means that:

∑ of MPE ratios ≤ 1.0

5. Standalone MPE Evaluation:

Bluetooth Worst Maximum MPE Result(BP1048B2)								
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]
GFSK	1	2402	1.97	1±1	2	-0.58	20	0.0002
		2441	2.02	2±1	3	-0.58	20	0.0003
		2480	1.65	1±1	2	-0.58	20	0.0002
π /4-DQPSK	1	2402	1.94	1±1	2	-0.58	20	0.0002
		2441	2.01	2±1	3	-0.58	20	0.0003
		2480	1.63	1±1	2	-0.58	20	0.0002
8-DPSK	1	2402	1.92	1±1	2	-0.58	20	0.0002
		2441	2.02	2±1	3	-0.58	20	0.0003
		2480	1.62	1±1	2	-0.58	20	0.0002

Note:
NTX= Number of Transmit Antennas
RF Output power specifies that Maximum Conducted Peak Output Power.

Bluetooth Worst Maximum MPE Result(RTL8723DS)								
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]
GFSK	1	2402	6.40	6±1	7	1.48	20	0.0014
		2441	6.02	6±1	7	1.48	20	0.0014
		2480	5.56	5±1	6	1.48	20	0.0011
π /4-DQPSK	1	2402	7.46	7±1	8	1.48	20	0.0017
		2441	7.19	7±1	8	1.48	20	0.0017
		2480	6.03	6±1	7	1.48	20	0.0014
8-DPSK	1	2402	7.86	7±1	8	1.48	20	0.0017
		2441	7.48	7±1	8	1.48	20	0.0017
		2480	7.08	7±1	8	1.48	20	0.0017
Note: NTX= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

Bluetooth LE Worst Maximum MPE Result(RTL8723DS)								
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]
GFSK (1Mbps)	1	2402	1.11	1±1	2	1.48	20	0.0004
		2440	-0.47	0±1	1	1.48	20	0.0003
		2480	1.08	1±1	2	1.48	20	0.0004
Note: N_{TX}= Number of Transmit Antennas RF Output power specifies that Maximum Conducted Peak Output Power.								

2.4G WiFi Worst Maximum MPE Result(RTL8723DS)								
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	17.70	17±1	18	1.48	20	0.0176
		2437	17.47	17±1	18	1.48	20	0.0176
		2462	17.45	17±1	18	1.48	20	0.0176
802.11g	1	2412	17.40	17±1	18	1.48	20	0.0176
		2437	17.78	17±1	18	1.48	20	0.0176
		2462	18.03	18±1	19	1.48	20	0.0222
802.11n (HT20)	1	2412	14.58	14±1	15	1.48	20	0.0088
		2437	17.37	17±1	18	1.48	20	0.0176
		2462	14.11	14±1	15	1.48	20	0.0088
802.11n (HT40)	1	2422	12.79	12±1	13	1.48	20	0.0055
		2437	17.06	17±1	18	1.48	20	0.0176
		2452	12.41	12±1	13	1.48	20	0.0055

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

Remark:
1. Output power including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.
4. Only the worst power was evaluated for each wireless function

6. 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

7. Summary simultaneous transmission information

The sample supports two antennas for Antenna(BP1048B2) and Antenna(RTL8723DS).
The Antenna(BP1048B2) and Antenna(RTL8723DS) can transmit simultaneous.
The Antenna(BP1048B2) and Antenna(RTL8723DS) with two different Antenna. According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
∑ of MPE ratios ≤ 1.0

8. Summary simultaneous transmission results

Antenna(BP1048B2) + Antenna(RTL8723DS) Maximum Simultaneous transmission MPE Ratios is 0.0003+0.0222=0.0225⩽1.0.

9. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

Note

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

-----END OF REPORT-----