

Maximum Permissible Exposure Evaluation

FCC ID: 2A2TZ-OT65A1KAGC

1. Client Information

Applicant	:	Kontech Electronics Co., Ltd.
Address	:	No.30, Langkou Industrial Park, Dalang Street, Longhua New District, Shenzhen, Guangdong, China
Manufacturer	:	Kontech Electronics Co., Ltd.
Address	:	No.30, Langkou Industrial Park, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

2. General Description of EUT

EUT Name	:	OUTDOOR TV	
Models No.	:	OT65A1KAGC, OT43A1KAGC, OQ43A1KAGC, OT55A1KAGC, OQ55A1KAGC, OT55A1KAGE, OQ55A1KAGE, OQ65A1KAGC, OT65A1KAGE, OQ65A1KAGE, OT75A1KAGC, OQ75A1KAGC, OT75A1KAGE, OQ75A1KAGE, ##**#*##### (# stands for letters A-Z; * stands for numbers 0-9)	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is size and color.	
Sample ID	:	C-202201-0046-1# & C-202201-0046-2#	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth 5.0(BER+EDR): 2402MHz~2480MHz
		Antenna Gain:	Bluetooth: 2.0dBi Internal Antenna 2.4g wifi: Internal antenna, Maximum Gain: 3.0dBi Internal antenna, Maximum Gain: 3.0dBi
Power Rating	:	AC 100-240V, 50/60Hz	
Software Version	:	N/A	
Hardware Version	:	N/A	
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

Method Of Measurement for FCC

1. Max. Antenna Gain:

BT Antenna: 2.0dBi.

2.4G WIFI Antenna: 3.0dBi.

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

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:

$$\sum \text{ of MPE ratios } \leq 1.0$$

4. Test Result:

Bluetooth 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]
GFSK	1	2402	8.83	8±1	9	2.0	20	0.0025
		2441	7.48	7±1	8	2.0	20	0.0019
		2480	9.81	9±1	10	2.0	20	0.0031
π/4-DQPSK	1	2402	8.12	8±1	9	2.0	20	0.0025
		2441	6.81	6±1	7	2.0	20	0.0015
		2480	9.18	9±1	10	2.0	20	0.0031
8-DPSK	1	2402	8.11	8±1	9	2.0	20	0.0025
		2441	6.8	6±1	7	2.0	20	0.0015
		2480	9.17	9±1	10	2.0	20	0.0031

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

BLE 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]
GFSK	1	2402	5.87	5±1	6	2.0	20	0.0012
		2440	5.58	5±1	6	2.0	20	0.0012
		2480	5.36	5±1	6	2.0	20	0.0012

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

2.4G WiFi MPE Result Antenna 1								
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	10.29	10±1	11	3.0	20	0.0049
		2437	8.97	8±1	9	3.0	20	0.0031
		2462	9.26	9±1	10	3.0	20	0.0039
802.11g	1	2412	14.54	14±1	15	3.0	20	0.0125
		2437	14.21	14±1	15	3.0	20	0.0125
		2462	14.49	14±1	15	3.0	20	0.0125
802.11n20	1	2412	14.56	14±1	15	3.0	20	0.0125
		2437	13.40	13±1	14	3.0	20	0.0099
		2462	13.78	13±1	14	3.0	20	0.0099
802.11n40	1	2422	14.42	14±1	15	3.0	20	0.0125
		2437	13.28	13±1	14	3.0	20	0.0099
		2452	13.23	13±1	14	3.0	20	0.0099

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

2.4G WiFi MPE Result Antenna 2								
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	11.44	11±1	12	3.0	20	0.0062
		2437	10.80	10±1	11	3.0	20	0.0049
		2462	11.15	11±1	12	3.0	20	0.0062
802.11g	1	2412	16.00	16±1	17	3.0	20	0.0198
		2437	15.57	15±1	16	3.0	20	0.0158
		2462	15.48	15±1	16	3.0	20	0.0158
802.11n20	1	2412	14.68	14±1	15	3.0	20	0.0125
		2437	14.27	14±1	15	3.0	20	0.0125
		2462	14.48	14±1	15	3.0	20	0.0125
802.11n40	1	2422	14.90	14±1	15	3.0	20	0.0125
		2437	14.47	14±1	15	3.0	20	0.0125
		2452	14.45	14±1	15	3.0	20	0.0125

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

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:2402~2480MHz&2412~2462MHz

MPE limit S: 1mW/ cm²

The MPE is calculated as **0.0198mW / cm² < limit 1mW / cm²**.

Bluetooth and WiFi support Synchronization transmit the

$$\sum MPE_{ratios}=0.0031+0.0125+0.0198=0.0354 < 1$$

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.

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.

Note

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

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