

RF Exposure Evaluation

FCC ID: 2ABES-KR2109

1. Client Information

Applicant : Pathway Innovations and Technologies, Inc.
Address : 9985 Pacific Heights Blvd., Suite 100 San Diego, CA 92121, USA
Manufacturer : ShenZhen KerunVisual Technology Co., LTD.
Address : Unit A, F/11, Bldg.1, Senyang Electronic Technology Park, Tianliao Community, Guangming High Tech Zone, Guangming New District, Shenzhen, China 518132

2. General Description of EUT

EUT Name	:	Ultra10
Models No.	:	KR2109,Ultra9,Ultra10,Ultra11,Ultra12,Ultra13,Ultra15,Ultra16
Model Difference	:	All these models are in the same PCB, layout and electrical circuit, the only difference is model No.
Product Description	:	Operation Frequency: 2.4G: 802.11b/g/n(HT20): 2412MHz~2462MHz Bluetooth 4.1(BLE): 2402MHz~2480MHz 5G: U-NII-1: 5180MHz~5240MHz
		Modulation Type: 802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM, 64QAM) 802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM) BLE: GFSK
Power Supply	:	AC Adapter(JHD-AP045U-PD-CS502): Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 5V, 3A/9V-3A/12V-3A/15V-3A/20V-2.25A DC 3.8V by 12000mAh Li-ion battery.
Software Version	:	Android 7.1.2
Hardware Version	:	V0.7
Connecting I/O Port(S)	:	Please refer to the User's Manual
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.

Note: More test information about the EUT please refer the RF Test Report.

SAR Test Exclusion Calculations

1. FCC: According to KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

(1) Clause 4.3: General SAR test reduction and exclusion guidance

Sub clause 4.31: Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance ≤ 5 mm are determined by:

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{(\text{GHz})}}]}{\leq 3.0 \text{ for 1-g SAR}}$$

$$\frac{[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation, mm})] * [\sqrt{f_{(\text{GHz})}}]}{\leq 7.5.0 \text{ for 10-g SAR}}$$

2. Calculation:

Test separation: 5mm						
2.4G WiFi Mode(802.11b)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.412	8.12	8±0.5	8.5	7.079	2.199	3.0
2.437	8.08	8±0.5	8.5	7.079	2.210	3.0
2.462	8.14	8±0.5	8.5	7.079	2.222	3.0
2.4G WiFi Mode(802.11g)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.412	7.89	8±0.5	8.5	7.079	2.199	3.0
2.437	7.96	8±0.5	8.5	7.079	2.210	3.0
2.462	7.78	8±0.5	8.5	7.079	2.222	3.0
2.4G WiFi Mode(802.11n(HT20))						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.412	7.85	8±0.5	8.5	7.079	2.199	3.0
2.437	7.84	8±0.5	8.5	7.079	2.210	3.0
2.462	7.83	8±0.5	8.5	7.079	2.222	3.0

Test separation: 5mm						
BLE Mode (GFSK)						
Frequency (GHz)	Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
2.402	-0.977	-1±1	0	1	0.310	3.0
2.442	-1.225	-1±1	0	1	0.313	3.0
2.480	-1.575	-1±1	0	1	0.315	3.0

Test separation: 5mm						
5G WiFi						
Mode	Worst Conducted Power (dBm)	Turn-up Power Tolerance (dB)	Max power of tune up tolerance (dbm)	Max power of tune up tolerance (mw)	Calculation Value	Threshold Value
U-NII-1 (5180MHz)	6.98	6.5±0.5	7	5.012	2.281	3.0

Test separation: 5mm		
The worst RF Exposure Evaluation		
Worst Calculation Value	Total Calculation Value	Threshold Value
5G WiFi Mode		
2.281	2.281	3.0

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v06.

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