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# RF Exposure Evaluation Report

**Report No.:** CQASZ20220200198E-03  
**Applicant:** Avantronics Limited  
**Address of Applicant:** The 4th Floor, Yuepeng Building, No.1019 Jiabin Rd, Luohu District, Shenzhen  
**Equipment Under Test (EUT):**  
**EUT Name:** Avantree Roadtrip  
**Model No.:** BTCK-12, BTCK-12-BLK, BTCK-12-BLU, BTCK-12-TTN, BTCK-12-GRY, BTCK-12P, BTCK-12S, BTCK-12B  
**Test Model No.:** BTCK-12  
**Brand Name:** Avantree  
**FCC ID:** WJ5-BTCK-12  
**Standards:** 47 CFR Part 1.1307  
47 CFR Part 2.1093  
KDB447498D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2022-02-16  
**Date of Test:** 2022-02-16 to 2022-03-01  
**Date of Issue:** 2022-03-11  
**Test Result:** **PASS\***

\*In the configuration tested, the EUT complied with the standards specified above.

**Tested By:** Lewis Zhou

( Lewis Zhou )

**Reviewed By:** Rock Huang

( Rock Huang )

**Approved By:** Jack Ai

( Jack Ai )



## 1 Version

### Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20220200198E-03	Rev.01	Initial report	2022-03-11

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### 3 General Information

#### 3.1 Client Information

Applicant:	Avantronics Limited
Address of Applicant:	The 4th Floor, Yuepeng Building, No.1019 Jiabin Rd, Luohu District, Shenzhen
Manufacturer:	Avantronics Limited
Address of Manufacturer:	The 4th Floor, Yuepeng Building, No.1019 Jiabin Rd, Luohu District, Shenzhen
Factory:	Avantronics Limited
Address of Factory:	The 4th Floor, Yuepeng Building, No.1019 Jiabin Rd, Luohu District, Shenzhen

#### 3.2 General Description of EUT

Product Name:	Avantree Roadtrip
Model No.:	BTCK-12, BTCK-12-BLK, BTCK-12-BLU, BTCK-12-TTN, BTCK-12-GRY, BTCK-12P, BTCK-12S, BTCK-12B
Test Model No.:	BTCK-12
Trade Mark:	Avantree
Software Version:	CK1220211109V0
Hardware Version:	PCB_CK12V5.3
Power Supply:	Li-ion battery: DC 3.7V 1120mAh, Charge by DC 5V for adapter

#### 3.3 General Description of BLE

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK
Transfer Rate:	1Mbps
Number of Channel:	40
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Type:	Chip antenna
Antenna Gain:	4.85dBi

#### 3.4 General Description of BT

Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Transfer Rate:	1Mbps/2Mbps/3Mbps
Number of Channel:	79
Product Type:	<input type="checkbox"/> Mobile <input checked="" type="checkbox"/> Portable <input type="checkbox"/> Fix Location
Antenna Type:	Chip antenna
Antenna Gain:	4.85dBi

Note:

Model No.: BTCK-12, BTCK-12-BLK, BTCK-12-BLU, BTCK-12-TTN, BTCK-12-GRY, BTCK-12P, BTCK-12S, BTCK-12B.

Only the model BTCK-12 was tested, the circuit design, layout, components used and internal wiring are all the same, except for the color difference.

## 4 SAR Evaluation

### 4.1 RF Exposure Compliance Requirement

#### 4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

##### 4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

#### 4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$$\left[ \frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 for 1-g SAR and  $\leq 7.5$  for 10-g extremity SAR, where

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation<sup>17</sup>

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm is applied to determine SAR test exclusion

### 4.1.3 EUT RF Exposure

#### 1) For BLE

##### Measurement Data

GFSK mode (1Mbps)				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.35	0.5±1	1.5	1.413
Middle(2440MHz)	0.73	0.5±1	1.5	1.413
Highest(2480MHz)	1.42	1.5±1	2.5	1.778

Worst case: GFSK mode (2Mbps)						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune- up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	0.35	0.5±1	1.5	1.413	0.438	3.0
Middle (2440MHz)	0.73	0.5±1	1.5	1.413	0.441	
Highest (2480MHz)	1.42	1.5±1	2.5	1.778	0.560	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20220200198E-01 BT can not simultaneous transmitting at same time.

2) For BT

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	0.81	0.5±1	1.5	1.413
Middle(2441MHz)	0.98	1.0±1	2.0	1.585
Highest(2480MHz)	1.73	2.0±1	3.0	1.995
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-1.89	-1.5±1	-0.5	0.891
Middle(2441MHz)	-0.98	-1.0±1	0	1.000
Highest(2480MHz)	-0.12	0±1	1.0	1.259
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.66	-0.5±1	0.5	1.122
Middle(2441MHz)	-0.66	-0.5±1	0.5	1.122
Highest(2480MHz)	0.37	0.5±1	1.5	1.413

Worst case: GFSK mode						
Channel	Maximum Peak Conducted Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power		Calculated value	Exclusion threshold
			(dBm)	(mW)		
Lowest (2402MHz)	0.81	0.5±1	1.5	1.413	0.438	3.0
Middle (2441MHz)	0.98	1.0±1	2.0	1.585	0.495	
Highest (2480MHz)	1.73	2.0±1	3.0	1.995	0.628	
Conclusion: the calculated value ≤3.0, SAR is exempted.						

Remark: The Max Conducted Peak Output Power data refer to report Report No.: CQASZ20220200198E-02 BLE can not simultaneous transmitting at same time.

\*\*\* END OF REPORT \*\*\*