



Shenzhen Huaxia Testing Technology Co., Ltd

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640

Fax: +86-755-26648637

Website: www.cqa-cert.com

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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:	☐ Mobile ☒ Portable ☐ 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:	☐ Mobile ☒ Portable ☐ 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 ≤ 50 mm are determined by:

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

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

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 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 ***