

SAR Exclusion Report

FCC Rule Part : CFR §2.1093

Standards : IEEE Std 1528:2013, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02,
KDB 447498 D04 Interim General RF Exposure Guidance v01

Report No. : SFBHAA-WTW-P23080666

Applicant : AISIN CORPORATION

Address : 2-1, Asahi-machi, Kariya, Aichi, 448-8650 JAPAN

Product Name : Vehicle-mounted equipment that performs overall control of vehicle information display, video
and audio playback, etc.

Brand Name : AISIN

FCC ID : 2BBFJC58U0

Model No. : C58U0

Sample Received Date : Mar. 01, 2024

Date of Evaluation : Nov. 04, 2024

Lab Address : No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location : No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, Taiwan

FCC Accredited No. : TW0003

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch – Lin Kou Laboratories**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

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Release Control Record

Issue No.	Reason for Change	Date Issued
SFBHAA-WTW-P23080666	Initial release	Jan. 06, 2025

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1. Test Reference Guidance

FCC Rule Part : CFR §2.1093

Measurement procedure : IEEE Std 1528:2013, KDB 865664 D01 v01r04, KDB 865664 D02 v01r02,
KDB 447498 D04 Interim General RF Exposure Guidance v01

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2. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported SAR _{10g} (W/kg)
NII	5.8G WLAN	Not Required
DTS	Bluetooth	Not Required

Note:

1. The SAR limit (**Head & Body: SAR_{1g} 1.6 W/kg**) for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

Test Reference Guidance: FCC-19-126

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3. Description of Equipment Under Test

EUT Type	Vehicle-mounted equipment that performs overall control of vehicle information display, video and audio playback, etc.
Brand Name	AISIN
FCC ID	2BBFJC58U0
Model Name	C58U0
Tx Frequency Bands (Unit: MHz)	WLAN : 5745 Bluetooth : 2402 ~ 2480
Uplink Modulations	802.11 n/ac : OFDM Bluetooth : GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Type	PCB Antenna (Peak Antenna Gain: 1.90 dBi for BT, -1.50 dBi for WLAN)
EUT Stage	Production Prototype

Note:

1. The model consists of the following series with identical hardware.

Model	Series	Hardware Variations	Bluetooth (Ver. 5.0 w/o BLE)	WLAN 5GHz (W58)	GNSS(GPS/ GLONASS/ Galileo)	AM	FM
C58U0	series 1	V-R01	✓	n/ac HT/VHT20 (149ch)	✓	✓ (9kHz)	✓
	series 2		✓	n/ac HT/VHT20 (149ch)	✓	✓ (10kHz) *2	✓

*2-AM frequency range and step frequency different.

4. SAR Measurement Evaluation

4.1 Maximum Output Power

The maximum conducted power (Unit: dBm) including tune-up tolerance is shown as below.

Bluetooth			
Mode	Channel	Frequency (MHz)	Ant 0 Max. Tune-up
BT-GFSK	0	2402	1.5
	39	2441	1.5
	78	2480	1.5
BT-8DPSK	0	2402	1.5
	39	2441	1.5
	78	2480	1.5

WLAN 5.8GHz			
Mode	Channel	Frequency (MHz)	SISO Ant 0 Max. Tune-up
802.11n HT20	149	5745	14.0
802.11ac VHT20	149	5745	14.0

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4.2 SAR Testing Exclusions

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following formula.

1. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequency from 0.3 GHz to 6 GHz (inclusive).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

<SAR Exemption Analysis>

Mode	Higher of Max. Power or ERP			Min. Distance to human extremity		
	Frequency (MHz)	Tune up (dBm)	Tune up (mW)	Distance (mm)	Exclusion (mW)	Result
W58: 802.11n/ac CH149	5745	14	25.12	15	34.33	No
BT	2480	1.5	1.41	15	55.07	No

Note:

1. When the device output power is less than the power threshold shown in above table, the SAR testing exclusion is applied.
2. Units for d are cm and units for f are GHz.

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<Estimated SAR Calculation>

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR was estimated according to following formula to result in substantially conservative SAR values to determine simultaneous transmission SAR test exclusion. Head/Body for 1.6W/Kg & Extremity for 4.0W/Kg.

$$SAR_{est} = 1.6 \cdot P_{ant} / P_{th} [W/kg].$$

The frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm. If the minimum test separation distance is < 5 mm, a distance of 5 mm is used for estimated SAR calculation.

Mode / Band	Frequency (GHz)	Max. Tune-up Power (dBm)	Test Position	Separation Distance (mm)	Estimated SAR (W/kg)
W58: 802.11n/ac CH149	5.745	14	Extremity	15	2.93
BT	2.48	1.5	Extremity	15	0.102

Note:

1. The separation distance is determined from the outer housing of the EUT to the user.
2. When standalone SAR testing is not required, an estimated SAR can be applied to determine simultaneous transmission SAR test exclusion.

<SAR Summation Analysis>

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR_{1g} 1.6 W/kg/ SAR_{10g} 4.0 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg/ SAR_{10g} 4.0 W/kg), SAR test exclusion is determined by the SPLSR.

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR Analysis
1	W58: 802.11n/ac CH149 + BT	Extremity	Closest Position to extremity	2.93	0.102	3.302	Σ SAR < 4.0, Not required

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

No.	Conditions (SAR1 + SAR2)	Exposure Condition	Test Position	Max. TER1	Max. TER2	TER Summation	TER Analysis
1	W58: 802.11n/ac CH149 + BT	Extremity	Closest Position to extremity	0.732	0.026	0.758	Σ SAR < 1.0, Not required

Summary:

Since the SAR testing for all device orientations apply SAR test exclusion per KDB 447498, SAR testing for this device is not required.

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5. Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The road map of all our labs can be found in our web site also.

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