MPE Report

Applicant	:	AcSiP Technology Corporation
Product Name	:	Wi-Fi 6 (1x1) 802.11a/b/g/n/ac/ax + BT5.2 Combo IoT Module
Trade Name	:	AcSiP
Model Number	:	AI7933CLD
Applicable Standard	:	47 CFR § 2.1091
Received Date	:	Jul. 08, 2022
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Issued by

Approved By : Kris Pan

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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

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3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Revisions	Revised By
00	Aug. 04, 2022	Initial Issue	Emma Chao

Content

1. General Information

1.1 Reference Applicable Standard

Standard	Description	Version
IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992
47 CFR Part §2.1091	Radiofrequency radiation exposure evaluation: mobile devices.	-
47 CFR Part §1.1310	Radiofrequency radiation exposure limits.	-

2. Description of Equipment under Test (EUT)

Applicant	AcSiP Technology Corporation 9F, No. 242, Bo'ai St., Shulin Dist 23805 New Taipei Taiwan
Product Name	Wi-Fi 6 (1x1) 802.11a/b/g/n/ac/ax + BT5.2 Combo IoT Module
Trade Name	AcSiP
Model Number	AI7933CLD
FCC ID	2ADWC-AI7933CLD
Frequency Range	WLAN 2.4 GHz Band：2412 - 2462 MHz WLAN 5.2 GHz Band：5180 - 5240 MHz WLAN 5.8 GHz Band：5745 - 5825 MHz Bluetooth：2402 - 2480 MHz
Supported Modulations	WLAN 2.4 GHz : 802.11b/g/n/ax HT20 / HE20
	WLAN 5 GHz : 802.11a/n/ac/ax HT20 / VHT20 / HE20

Note:

The above information of DUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description**.**

Antenna Information					
Antenna No.	Band	Freq. (Min)	Freq. (Max)	Type	Max. Gain (dBi)
Antenna-1	Bluetooth	2402	2480	PCB Dipole Antenna	1.94
	2.4 GHz	2412	2462		1.94
	5.2 GHz	5150	5250		4.99
	5.8 GHz	5725	5850		4.75
Antenna-2	Bluetooth	2402	2480	FPC Dipole Antenna	2.76
	2.4 GHz	2412	2462		2.76
	5.2 GHz	5150	5250		3.49
	5.8 GHz	5725	5850		4.36

3. RF Exposure Limit

For devices that operate at larger distances from persons, where there are minimal RF coupling interactions between a device and the user or nearby persons, RF exposure compliance using maximum permissible exposure (MPE) limits is applied. The limits for MPE is listed as below:

Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time$\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824 / f	2.19 / f	($180 / f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	F / 1,500	30
1,500-100,000	-	-	1.0	30
Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time$\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1,842 / f	4.89 / f	($900 / f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1,500	-	-	F / 300	6
1,500-100,000	-	-	5	6

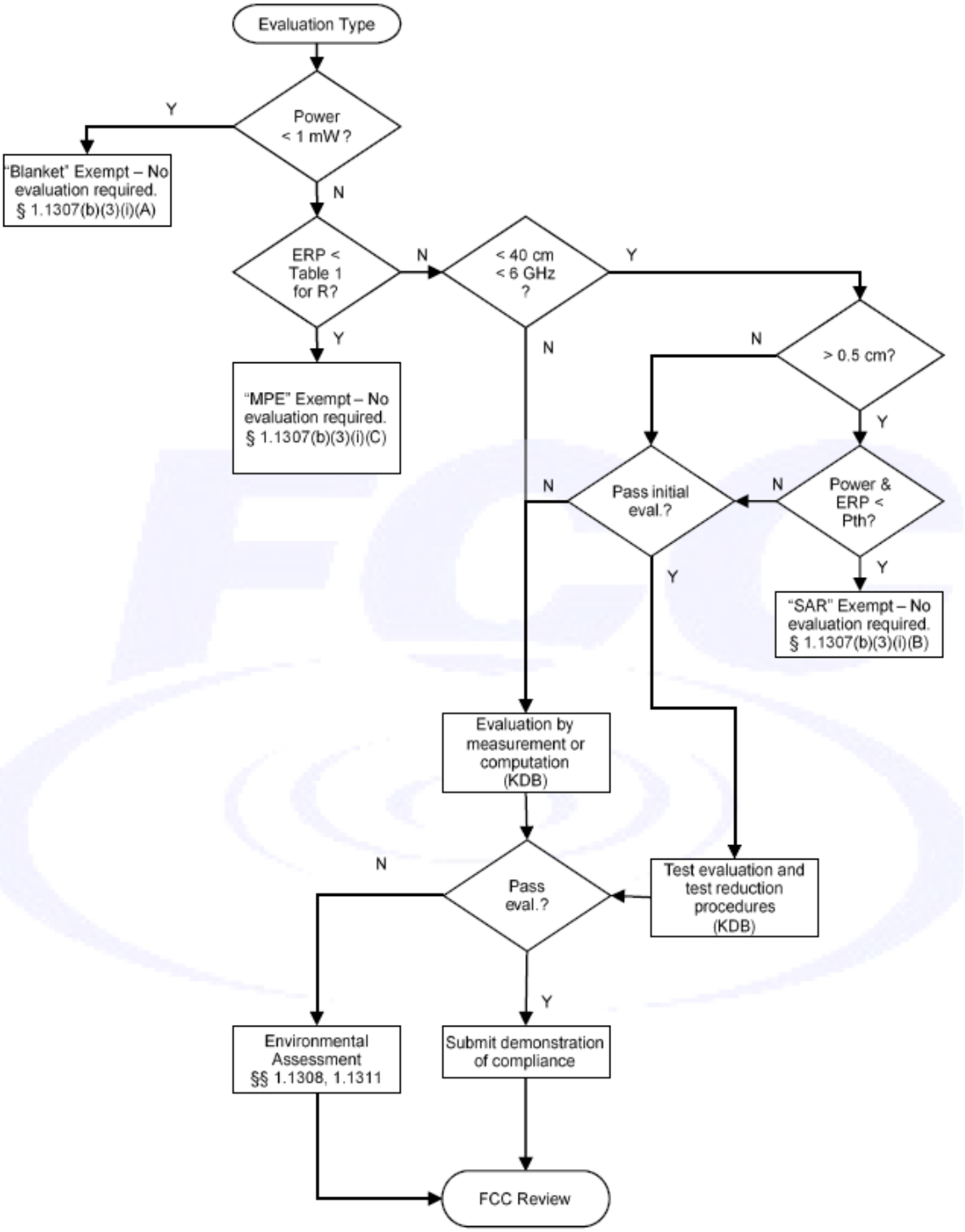
f = frequency in MHz. * = Plane-wave equivalent power density.

4. RF Exposure Assessment

4.1 Exemption Evaluation

Exemption evaluation was performed according to the appendix A and B in KDB447498 D04.

The General Sequence for Determination of Procedure demonstrated in Figure A.1 of KDB447498 D04 was applied.



4.2 Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons.”

Exposure evaluation
$$S_{eirp} = \frac{EIRP}{4\pi d^2} = \frac{PG}{4\pi d^2}\left(W/m^2\right)$$ Where S: is the input power (W); G: is the antenna gain; d : is the distance between antennas and evaluation point (m).

5. Maximum Tune-up Power

Operate Band	Frequency (MHz)	ANT 0
Bluetooth	2402 - 2480	16.00
2.4 GHz	2412 - 2462	25.00
5.2 GHz	5180 - 5240	21.00
5.8 GHz	5745 - 5825	20.50

6. Result

Band	Frequency (MHz)	Distance (cm) [R]	Tune-up Power (dBm) [P]	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle (mW) [P]x[G]	Power Density (mW/cm^2) [S]	Standalone Limit (mW/cm^2)	Antenna
Bluetooth	2402 - 2480	20.0	16.00	2.76	1.89	1	75.24	0.01	1.00	ANT 0
2.4 GHz	2412 - 2462	20.0	25.00	2.76	1.89	1	597.67	0.12	1.00	ANT 0
5.2 GHz	5180 - 5240	20.0	21.00	4.99	3.16	1	397.82	0.08	1.00	ANT 0
5.8 GHz	5745 - 5825	20.0	20.50	4.75	2.99	1	335.48	0.07	1.00	ANT 0

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. The maximum power and gain were applied to evaluate MPE.
3. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).
4. The MPE results are evaluated by lowest data rate for WLAN.
5. The device operating IEEE 802.11 a/b/g/n/ac/ax mode is 1TX.

Simultaneous Transmitting:

WLAN 2.4G + WLAN5G + Bluetooth

Total MPE : 0.21 mW/cm^2	TER : 0.21

7. Conclusion

The result shows that this device is compliance with the exposure limits in 47 CFR §1.1310.

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