

MPE REPORT

FCC

APPLICANT

Safetrust Inc

MODEL NAME

SA510

FCC ID

2ANI5SA510

REPORT NUMBER

HA220420-SFT-002-R26

TEST REPORT

Date of Issue
August 17, 2022

Test Site
Hyundai C-Tech, Inc. dba HCT America, Inc.
1726 Ringwood Ave, San Jose, CA 95131, USA

Applicant	Safetrust Inc
Applicant Address	8116 Mill Creek Rd, Fremont, CA 94539, U.S.A.
FCC ID	2ANI5SA510
Model Name	SA510
EUT Type	IoT Sensor
FCC Classification	Digital Transmission System (DTS) Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	Part 1 (§1.1310), Part 2 (§2.1091)
Test Procedure	KDB 447498 D01 v06

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was in accordance with the procedures specified in §2.947. The results in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

Yongsoo Park

Test Engineer

Reviewed By

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Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA220420-SFT-002-R26	August 17, 2022	Initial Issue

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1. EUT DESCRIPTION

Model	SA510	
EUT Type	IoT Sensor	
RF Specification	WIFI 5 GHz (U-NII 3) : 802.11a/n(HT20/40)/ ac(VHT20/40/80) Bluetooth LE MCU (1Mbps) Bluetooth LE MESH (1Mbps) RFID (LF/HF)	
Transmitter Chain	WIFI 5 GHz : SISO Bluetooth LE : SISO (BLE MCU and BLE MESH transmit simultaneously)	
Antenna Specification	WIFI 5 GHz	6.2 dBi (Peak Gain)
	BLE 1M (MCU)	2.0 dBi (Peak Gain)
	BLE 1M (MESH)	2.0 dBi (Peak Gain)
Operating Environment	Indoor and outdoor	
Operating Temperature	-20 °C ~ 50 °C	

Note(s) :

According to the comparative measurement data in the Evaluation Report, all measurement data from the reference FCC ID below were reused for this report.

FCC ID : 2ANI5SA530

2. INTRODUCTION

2.1. LIMIT

The limit for Maximum Permissible Exposure (MPE), specified in FCC Rule Part §1.1310 listed in the table below, shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation specified in §1.1310 (b)

Frequency Range (MHz)	E- Field Strength (V/m)	H- Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
(A) Limits for Occupational / Controlled Exposure				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842 / 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
(B) Limits for General Population / Uncontrolled Exposure				
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 – 1,500	-	-	f / 1500	30
1,500 – 100,000	-	-	1.0	30

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

2.2. MAXIMUM PERMISSIBLE EXPOSURE PREDICTION

Prediction of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S : Power density (mW/cm²)

P : Output power to antenna (mW)

G : Antenna gain in linear scale

R : Distance between the center of radiator and observation point (cm)

3. RESULT

3.1. MPE Calculation

Bluetooth LE (MCU)				
Frequency (MHz)	2402 - 2480	MHz		
MPE Limit (mW/cm ²)	1	mW/cm ²		
Distance (R)	20	Cm		
Output Power (P)	1	dBm	1.26	mW
Antenna Gain (G)	2	dBi	1.58	-
Power density (S) at distance 20 cm	0.000397	mW/cm ²	at 20 cm separation distance	

Bluetooth LE (MESH)				
Frequency (MHz)	2402 - 2480	MHz		
MPE Limit (mW/cm ²)	1	mW/cm ²		
Distance (R)	20	Cm		
Output Power (P)	1	dBm	1.26	mW
Antenna Gain (G)	2	dBi	1.58	-
Power density (S) at distance 20 cm	0.000397	mW/cm ²	at 20 cm separation distance	

WIFI 5 GHz (U-NII 3)				
Frequency (MHz)	5745 - 5825	MHz		
MPE Limit (mW/cm ²)	1	mW/cm ²		
Distance (R)	20	Cm		
Output Power (P)	10	dBm	10.00	mW
Antenna Gain (G)	6.2	dBi	4.17	-
Power density (S) at distance 20 cm	0.008293	mW/cm ²	at 20 cm separation distance	

Note :

1. Output power (P) e.i.r.p is included tune-up tolerance.

3.2. SUMMARY OF RESULTS

Mode	Frequency Range (MHz)	Ant Gain (dBi)	MPE Calculation (mW/cm ²)	MPE Ratio (PD/MPE Limit)
Bluetooth LE MCU	2402 – 2480	2.0	0.000397	0.000397
Bluetooth LE MESH	2402 – 2480	2.0	0.000397	0.000397
WIFI 5 GHz (U-NII 3)	5745 – 5825	6.2	0.008293	0.008293

Both BLE (MCU) and BLE (MESH) transmit simultaneously, but not with WIFI 5 GHz, which is used for firmware update. Therefore, the worst-case RF exposure is at WIFI 5 GHz single transmitting mode.

Sample Calculation

MPE (WIFI 5GHz) at 20cm distance = $0.008293/1.0 < 1.0$

END OF TEST REPORT