

RF EXPOSURE REPORT

FCC

APPLICANT

Safetrust Inc

MODEL NAME

SA350

FCC ID

2ANI5SA350

REPORT NUMBER

HA200512-SFT-001-R08

TEST REPORT

Date of Issue
October 28, 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	2ANI5SA350
Model Name	SA350
EUT Type	SABRE RELAY
FCC Classification	Digital Transmission System (DTS)
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



Steve In

Test Engineer

Reviewed By



Sunwoo Kim

Technical Manager

REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION
HA200512-SFT-001-R08	October 28, 2022	Initial Issue

TABLE OF CONTENTS

1. EUT DESCRIPTION	4
2. INTRODUCTION.....	5
2.1. LIMIT	5
2.2. MAXIMUM PERMISSIBLE EXPOSURE PREDICTION	5
3. RESULT	6
3.1. MPE Calculation	6
3.2. SUMMARY OF RESULTS	7

1. EUT DESCRIPTION

Base Model	SA350	
EUT Type	SABRE RELAY	
Power Supply	7 – 25 V d.c.	
RF Specification	WIFI 2.4 GHz	IEEE 802.11b/g/n (HT20/40) : ESP32
	BLE (MCU)	1 Mbps : nRF52840
	BLE (MESH)	1 Mbps : nRF52832
Transmitter Chain	WIFI 2.4 GHz : SISO Bluetooth LE : SISO	
Antenna Specification ¹⁾	WIFI 2.4 GHz	2.0 dBi (Peak Gain)
	BLE (MCU)	2.0 dBi (Peak Gain)
	BLE (MESH)	2.0 dBi (Peak Gain)
Operating Environment	Indoor and outdoor	
Operating Temperature	-35 °C ~ 65 °C	

Note :

1. Antenna information is based on the document provided.

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)	2440	MHz		
MPE Limit (mW/cm ²)	1.0	mW/cm ²		
Distance (R)	20.0	Cm		
Output Power (P)	2.00	dBm	1.58	mW
Antenna Gain (G)	2.00	dBi	1.58	-
Power density (S) at distance 20 cm	0.000500	mW/cm ²	at 20 cm separation distance	

Bluetooth LE (MESH)				
Frequency (MHz)	2480	MHz		
MPE Limit (mW/cm ²)	1.0	mW/cm ²		
Distance (R)	20.0	Cm		
Output Power (P)	2.00	dBm	1.58	mW
Antenna Gain (G)	2.00	dBi	1.58	-
Power density (S) at distance 20 cm	0.000500	mW/cm ²	at 20 cm separation distance	

WIFI 2.4 GHz				
Frequency (MHz)	2412	MHz		
MPE Limit (mW/cm ²)	1.0	mW/cm ²		
Distance (R)	20.0	Cm		
Output Power (P)	7.00	dBm	5.01	mW
Antenna Gain (G)	2.00	dBi	1.58	-
Power density (S) at distance 20 cm	0.001580	mW/cm ²	at 20 cm separation distance	

Note :

1. Output power(P) includes the tune-up tolerance.

3.2. SUMMARY OF RESULTS

Mode	Frequency Range (MHz)	Ant Gain (dBi)	Power Density (mW/cm ²)	MPE Ratio (PD/MPE Limit)
BLE	2402 – 2480	2.0	0.000500	0.000500
BLE	2402 – 2480	2.0	0.000500	0.000500
WIFI 2.4 GHz	2412 – 2462	2.0	0.001580	0.001580

The worst-case configuration is for all three transmitters, BLE (MCU), BLE (MESH), and WIFI 2.4 GHz, transmitting simultaneously.

TOTAL MPE (20cm distance) = $0.000500/1.0 + 0.000500/1.0 + 0.001580/1.0 = \mathbf{0.002580} < 1.0$

END OF TEST REPORT