

RF Exposure Evaluation Report

APPLICANT : VINFAST TRADING AND PRODUCTION
JOINT STOCK COMPANY

EQUIPMENT : MULTIMEDIA HEAD UNIT

BRAND NAME : VINFAST

MODEL NAME : VF-EC32U

FCC ID : 2A6HEVF-EC32U

STANDARD : 47 CFR Part 2.1091
FCC KDB 447498 D01 v06

The product evaluation date was started from Oct. 18, 2023 and completed on Oct. 18, 2023. We, Sporton International Inc. (Kunshan), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang

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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA362705	Rev. 01	Initial issue of report.	Nov. 10, 2023



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS	CN1257	314309

Applicant	
Company Name	VINFAST TRADING AND PRODUCTION JOINT STOCK COMPANY
Address	Dinh Vu - Cat Hai Economic Zone, Cat Hai Island, Cat Hai Town, Cat Hai District, Hai Phong City, Vietnam

Manufacturer	
Company Name	VINFAST TRADING AND PRODUCTION JOINT STOCK COMPANY
Address	Dinh Vu - Cat Hai Economic Zone, Cat Hai Island, Cat Hai Town, Cat Hai District, Hai Phong City, Vietnam

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	MULTIMEDIA HEAD UNIT
Brand Name	VINFAST
Model Name	VF-EC32U
FCC ID	2A6HEVF-EC32U
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 824 MHz ~ 849 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+(16QAM uplink is supported) LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
Antenna Gain	GSM850 : 0.7 dBi GSM1900 : 2.1 dBi WCDMA Band II: 2.1 dBi WCDMA Band IV: 3.5 dBi WCDMA Band V: 0.7 dBi LTE Band 2 : 2.1 dBi LTE Band 4 : 3.5 dBi LTE Band 5 : 0.7 dBi LTE Band 7 : -1.7 dBi LTE Band 12 : 1.8 dBi LTE Band 13 : 0.1 dBi Bluetooth: 3.89 dBi WLAN2.4GHz: 3.61 dBi WLAN5.2GHz: 6.35 dBi WLAN5.8GHz: 5.27 dBi
Antenna Type	WWAN: PCB Antenna WLAN/Bluetooth: FPCB Antenna
HW Version	EEP70005507
SW Version	SOW70005570
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were



declared by manufacturer.

3. Maximum RF average output tune up power among production units**<GSM>**

Mode	Burst average power(dBm)	
	GSM 900	GSM 1800
GSM (GMSK, 1 Tx slot)	34.0	30.5
GPRS (GMSK, 1 Tx slot)	34.0	30.5
GPRS (GMSK, 2 Tx slots)	32.5	30.5
GPRS (GMSK, 3 Tx slots)	30.5	29.0
GPRS (GMSK, 4 Tx slots)	30.0	28.0
EDGE (8PSK, 1 Tx slot)	28.0	27.0
EDGE (8PSK, 2 Tx slots)	27.0	24.5
EDGE (8PSK, 3 Tx slots)	25.5	25.0
EDGE (8PSK, 4 Tx slots)	24.5	24.0

<WCDMA>

Mode		Maximum Average power(dBm)
WCDMA	Band II	24.5
	Band IV	24.5
	Band II	24.5

<LTE>

Mode		Maximum Average power(dBm)
LTE	Band 2	24.0
	Band 4	24.5
	Band 5	24.5
	Band 7	24.0
	Band 12	24.0
	Band 13	24.0

**<2.4GHz WLAN >**

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	17.0
	802.11g	14.0
	802.11n-HT20	13.0

<Bluetooth>

Mode		Maximum Average power(dBm)
Bluetooth	BR/EDR	3.0
	LE	1.0

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
5.2GHz	802.11a	11.0
	802.11n-HT20	11.0
	802.11n-HT40	8.0
	802.11ac-VHT20	11.0
	802.11ac-VHT40	8.0
	802.11ac-VHT80	6.0
5.8GHz	802.11a	11.0
	802.11n-HT20	11.0
	802.11n-HT40	9.0
	802.11ac-VHT20	11.0
	802.11ac-VHT40	9.0
	802.11ac-VHT80	8.0

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
300-1500			f/300	6
1500-100,000			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
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Average EIRP (mW)	Power Density at 20cm (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit
GSM 850 (1 Tx slot)	824.0	0.70	34.00	34.700	371.535	0.074	0.549	0.135
GPRS 850 (1 Tx slot)	824.0	0.70	34.00	34.700	371.535	0.074	0.549	0.135
GPRS 850 (2 Tx slots)	824.0	0.70	32.50	33.200	524.807	0.104	0.549	0.190
GPRS 850 (3 Tx slots)	824.0	0.70	30.50	31.200	494.311	0.098	0.549	0.179
GPRS 850 (4 Tx slots)	824.0	0.70	30.00	30.700	588.844	0.117	0.549	0.213
EGPRS 850 (1 Tx slot)	824.0	0.70	28.00	28.700	93.325	0.019	0.549	0.034
EGPRS 850 (2 Tx slots)	824.0	0.70	27.00	27.700	147.911	0.029	0.549	0.054
EGPRS 850 (3 Tx slots)	824.0	0.70	25.50	26.200	156.315	0.031	0.549	0.057
EGPRS 850 (4 Tx slots)	824.0	0.70	24.50	25.200	165.959	0.033	0.549	0.060
GSM 1900 (1 Tx slot)	824.0	2.10	30.50	32.600	229.087	0.046	0.549	0.083
GPRS 1900 (1 Tx slot)	824.0	2.10	30.50	32.600	229.087	0.046	0.549	0.083
GPRS 1900 (2 Tx slots)	824.0	2.10	30.50	32.600	457.088	0.091	0.549	0.166
GPRS 1900 (3 Tx slots)	824.0	2.10	29.00	31.100	483.059	0.096	0.549	0.175
GPRS 1900 (4 Tx slots)	824.0	2.10	28.00	30.100	512.861	0.102	0.549	0.186
EGPRS 1900 (1 Tx slot)	824.0	2.10	27.00	29.100	102.329	0.020	0.549	0.037
EGPRS 1900 (2 Tx slots)	824.0	2.10	24.50	26.600	114.815	0.023	0.549	0.042
EGPRS 1900 (3 Tx slots)	824.0	2.10	25.00	27.100	192.309	0.038	0.549	0.070
EGPRS 1900 (4 Tx slots)	824.0	2.10	24.00	26.100	204.174	0.041	0.549	0.074
WCDMA Band 2	1850.0	2.10	24.50	26.600	457.088	0.091	1.000	0.091
WCDMA Band 4	1710.0	3.50	24.50	28.000	630.957	0.126	1.000	0.126
WCDMA Band 5	824.0	0.70	24.50	25.200	331.131	0.066	0.549	0.120
LTE Band 2	1850.0	2.10	24.00	26.100	407.380	0.081	1.000	0.081
LTE Band 4	1710.0	3.50	24.50	28.000	630.957	0.126	1.000	0.126
LTE Band 5	824.0	0.70	24.50	25.200	331.131	0.066	0.549	0.120
LTE Band 7	2500.00	-1.70	24.00	22.300	169.824	0.034	1.000	0.034
LTE Band 12	699.0	1.80	24.00	25.800	380.189	0.076	0.466	0.162
LTE Band 13	777.0	0.10	24.00	24.100	257.040	0.051	0.518	0.099
Bluetooth	2402.0	3.89	3.00	6.890	4.887	0.001	1.000	0.001
2.4GHz WLAN	2412.0	3.61	17.00	20.610	115.080	0.023	1.000	0.023
5.2GHz WLAN	5180.0	6.35	11.00	17.350	54.325	0.011	1.000	0.011
5.8GHz WLAN	5745.0	5.27	11.00	16.270	42.364	0.008	1.000	0.008

Note:

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum power to do MPE analysis.

**5.2. Collocated Power Density Calculation**

WWAN Power Density / Limit	Bluetooth Power Density / Limit	WLAN 2.4GHz Power Density / Limit	Σ (Power Density / Limit) of WWAN + Bluetooth + WLAN2.4GHz
0.213	0.001	0.023	0.237

WWAN Power Density / Limit	Bluetooth Power Density / Limit	WLAN 5GHz Power Density / Limit	Σ (Power Density / Limit) of WWAN + Bluetooth + WLAN 5GHz
0.213	0.001	0.011	0.225

Note:

1. Σ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN 2.4GHz + Bluetooth, WWAN + Bluetooth + WLAN 5GHz.
2. Considering the WWAN module collocation with the WLAN/Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant.

Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----