

RF EXPOSURE REPORT

OF

Applicant: Honeywell International Inc.
9680 Old Bailes Road, Fort Mill, SC 29707, USA

Product Name: Vehicle Mount Computer

Brand Name: Honeywell

Model No.: VM3ALON

Model Difference: N/A

Report Number: ER/2020/30061

FCC ID: HD5-VM3ALON

FCC Rule Part Part 2.1091

Issue Date: Mar. 13, 2020

We hereby certify that:

The above equipment was verified by SGS Taiwan Ltd. The evaluation in this report is in compliance with the above rule(s).

The results of this report relate only to the sample identified in this report.

Approved By:

John Teh

Yeh John / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date	Remark
ER/2020/30061	Rev.00	Original.	Mar. 13, 2020	Revised By: Stefanie Yu

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1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)

1.1 General:

Product Name:	Vehicle Mount Computer	
Brand Name:	Honeywell	
Model No.:	VM3AL0N	
Model Difference:	N/A	
Hardware Version:	VM3A_MB	
Software Version:	87.07.00-1218	
Power Supply:	7.2Vdc from Rechargeable Li-polymer Battery or 15Vdc from AC/DC Adapter	
	Battery:	Model No.: OVT270L1R01 Supplier: Totex
	Adapter:	Model No.: GT-46600-6015-T3 Supplier: Globtek

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1.2 Antenna Information:

1.2.1 BT / WLAN 2.4GHz

Antenna Type	Supplier	Main / Aux	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)	MIMO Antenna Gain (dBi)
External Di-pole antenna	LARSEN	Main/Aux	R380500314	2.4GHz	1.60	4.61
	LAIRD	Main/Aux	WTS 2450		2.10	5.11
Internal Printed Antenna	N/A	Main	N/A		3.90	6.62
		Aux	N/A		3.30	

1.2.2 WLAN 5GHz

Antenna Type	Supplier	Antenna Part No.	Main / Aux	Note	Operating Frequency (MHz)	Ant 1	Ant 2	Ant 3	Ant 4	Ant 5	Ant 6
						Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)	Peak Gain (dBi)
Dipole	Laird	WTS 2450	Main	Ant 1	5150.0 ~ 5250.0	2.60	2.60	5.00	5.00	4.90	5.30
			Aux	Ant 2	5250.0 ~ 5350.0	2.60	2.60	5.00	5.00	5.60	4.70
Dipole	LARSEN	R380500314	Main	Ant 3	5470.0 ~ 5725.0	2.60	2.60	5.00	5.00	3.10	3.70
			Aux	Ant 4	5725.0 ~ 5850.0	3.40	3.40	5.00	5.00	3.60	3.90
Printed	N/A	N/A	Main	Ant 5							
			Aux	Ant 6							

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1.3 Rated Power

1.3.1 Bluetooth / WLAN 2.4GHz

Mode	Freq. Range (MHz)	Channels	Modulation Technology	Max Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
BR+EDR	2402-2480	79	GFSK + π / 4DQPSK + 8DPSK	7.45	3.90	11.35	
BLE	2402-2480	40	GFSK	2.35		6.25	
802.11b/g/n_HT20	2412-2462	11	DSSS & OFDM	26.8	6.62	33.42	V
802.11 n_HT40				26.63		33.25	
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM					

1.3.2 WLAN 5GHz:

802.11	Freq. Range (MHz)	Modulation Technology	Max. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Worst Case
a	5150~5250	OFDM	13.34	5.30	18.64	
	5250~5350		20.30	5.60	25.90	V
	5470~5725		20.74	5.00	25.74	
	5725~5850		20.28	5.00	25.28	
n HT20 ac VHT20	5150~5250		14.06	5.30	19.36	
	5250~5350		20.16	5.60	25.76	
	5470~5725		20.62	5.00	25.62	
	5725~5850		20.22	5.00	25.22	
n HT40 ac VHT40	5150~5250		13.36	5.30	18.66	
	5250~5350		20.02	5.60	25.62	
	5470~5725		20.12	5.00	25.12	
	5725~5850		20.51	5.00	25.51	
ac VHT80	5150~5250		13.37	5.30	18.67	
	5250~5350		9.34	5.60	14.94	
	5470~5725		20.52	5.00	25.52	
	5725~5850		18.76	5.00	23.76	

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2 FCC MAXIMUM PERMISSIBLE EXPOSURE (MPE)

2.1 FCC Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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
1500-15000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equipment power density

Prediction of MPE limit at a given distance

$$S = PG / 4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

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2.2 Power Density Calculation (Worst Case)

FCC Standalone MPE

Operation Mode	Evaluation Frequency (MHz)	Operation Distance (cm)	Max. output Power (dBm)	Antenna Gain (dBi)	Max. output Power EIRP (mW)	Power Density (PD) (mW/cm ²)	Limit (mW/cm ²)	Pass / Fail	Power Density / Limit	Collocated MPE
BT	2437.00	20	7.45	3.90	13.65	0.003	1.000	Pass	0.003	V
WLAN 2.4G	2437.00	20	26.8	6.62	2197.86	0.437	1.000	Pass	0.437	
WLAN 5G	5260.00	20	20.3	8.17	703.07	0.140	1.000	Pass	0.140	V

Operation Mode	Evaluation Frequency (MHz)	Field strength (dBuA/m)	Field strength (FS) (A/m)	Limit (A/m)	Power Density / Limit
NFC	13.56	18.22	0.0000081	0.1615044	0.00005

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band.

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2.3 Collocated Power Density Calculation

FCC Collocated MPE			
Max BT PD / Limit	Max WLAN PD / Limit	Max NFC PD/Limit	Σ (Power Density / Limit) of BT+ WLAN+NFC
0.003	0.437	0.00005	0.437

Note:

1. Σ (E- Field Strength / Limit): This is a summation of [(E- Field Strength for each transmitter/antenna included in the simultaneous transmission) / (corresponding MPE limit)].
2. Considering the collocated transmitters, the aggregated (E- Field Strength /limit) is smaller than 1, and MPE of collocated transmitters is compliant

~ End of Report ~

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