MPE Calculation

Applicant:	Shenzhen Hua Xin Information Technology Co., Ltd.
Address:	Area B, 2nd Floor, Building B, Youxinda Industrial Park, Gongming St, Guangming New District, 518132 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Product:	Robotic Vacuum Cleaner
FCC ID:	2AMYQ-20170822500
Model No.:	V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR, HX-V3000LB, HX-V3000LL, HX-V3000LG, HX-V3000LW, HX-V3000LR, HX-V3010LB, HX-V3010LL,HX-V3010LG,HX-V3010LW,HX-V3010LR All modes have same technical construction including circuit diagram, PCB Layout, components and component layout, all electrical construction and mechanical construction except color of appearance and the V300S, V300HLB, V300ZLG, V300YLW, V300RLR, V301HLB, V301BLL, V301ZLG, V301YLW, V301RLR, V302HLB, V302BLL, V302ZLG, V302YLW, V302RLR have Hand Vacuum Cleaner but the other models without Hand Vacuum Cleaner. So the MPE evaluation was only applied on V300S, other models were deemed to fulfil the requirement without the further test.
Reference RF report #	68.910.17.020.01

According to subpart 15.247(i)and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	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;

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

Calculated Formulary:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:
For Robotic Vacuum Cleaner

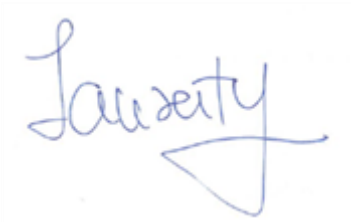
Maximum peak output power at antenna input terminal (dBm):	14.88
Maximum peak output power at antenna input terminal (mW):	30.0
Prediction distance (cm):	20
Antenna Gain, typical (dBi):	2
Maximum Antenna Gain (numeric):	1.58
The worst case is power density at predication frequency at 20 cm (mW/cm2):	0.023
MPE limit for general population exposure at prediction frequency (mW/cm2):	1.0

0.009(mW/cm2) < 1 (mW/cm2)

Result: Compliant

TUV SUD China, Shenzhen Branch

Reviewed by: Prepared by:



Laurent Yuan/EMC Project Manager
Date: 2017-08-25

Dawi Xu/EMC Project Engineer
Date:2017-08-25