



# H.B. Compliance Solutions

## RF Exposure Evaluation Report

For the

**PROPEL Orthodontics, LLC**

**VPro+ Model ASM-20023**

September 6, 2018

**Prepared for:**

PROPEL Orthodontics, LLC

394 South Abbott Ave.,

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**Prepared By:**

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**Reviewed By:**

A handwritten signature in black ink, appearing to read 'Hoosamuddin Bandukwala'.

Hoosamuddin Bandukwala



Cert # ATL-0062-E

## 1. Equipment Overview

<b>Product Name:</b>	VPro+
<b>Model(s) Tested:</b>	ASM-20023
<b>FCC ID:</b>	2AP6HASM0023
<b>Supply Voltage Input:</b>	Primary Power: 120VAC
<b>Frequency Range:</b>	0.156 MHz
<b>No. of Channels:</b>	1
<b>Type(s) of Modulation:</b>	Sinewave
<b>Range of Operation Power:</b>	2.69x10 <sup>-11</sup> Watts (Radiated)
<b>Emission Designator:</b>	N/A
<b>Channel Spacing(s)</b>	None
<b>Test Item:</b>	Pre-Production
<b>Type of Equipment:</b>	Fixed
<b>Antenna Requirement (§15.203) :</b>	Type of Antenna: Integral Loop Gain of Antenna: 0dBi
<b>Environmental Test Conditions:</b>	Temperature: 15-35°C Humidity: 30-60% Barometric Pressure: 860-1060 mbar
<b>Modification to the EUT:</b>	None
<b>Evaluated By:</b>	Staff at H.B Compliance Solutions
<b>Test Date(s):</b>	07/31/2018

## 2. Applicable Standard

According to §1.1307 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 §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter. RF exposure is calculated according to KDB680106 D01v03: RF Exposure Wireless Charging.

RSS-102 – Radio Frequency (RF) Exposure Compliance of Radiocommunications Apparatus

SPR-002 – Supplementary Procedure for Assessing Compliance with RSS-102 Nerve Stimulation Exposure Limits

## 3. Test Limits

Evaluated against exposure limits: General Use  X  or Controlled Use     

### Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposure</b>				
0.3–3.0 .....	614	1.63	* 100	6
3.0–30 .....	1842/f	4.89/f	* 900/f <sup>2</sup>	6
30–300 .....	61.4	0.163	1.0	6
300–1,500 .....	.....	.....	f/300	6
1,500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	* 100	30
1.34–30 .....	824/f	2.19/f	* 180/f <sup>2</sup>	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

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in the above table. (Use 300kHz limits for 150kHz)

#### 4. RF Exposure Requirements

This device and the test results is in compliance with item 5 of FCC KDB 680106 D01v03 below and can be excluded from submitting an RF exposure evaluation

1. Power transfer frequency is less than 1MHz
2. Output power from each primary coil is less than or equal to 15 watts
3. The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.
4. Client device is placed directly in contact with the transmitter
5. Mobile exposure conditions only (portable exposure conditions are not covered by the exclusion)
6. The aggregate H-field strengths at 15cm surrounding the device and 20cm above the top surface from all simultaneous coils are demonstrated to be less than 50% of the MPE Limit.

## 5. Test Limits

Evaluated against exposure limits: General Use  X  or Controlled Use     

### Maximum Permissible Exposure (MPE)

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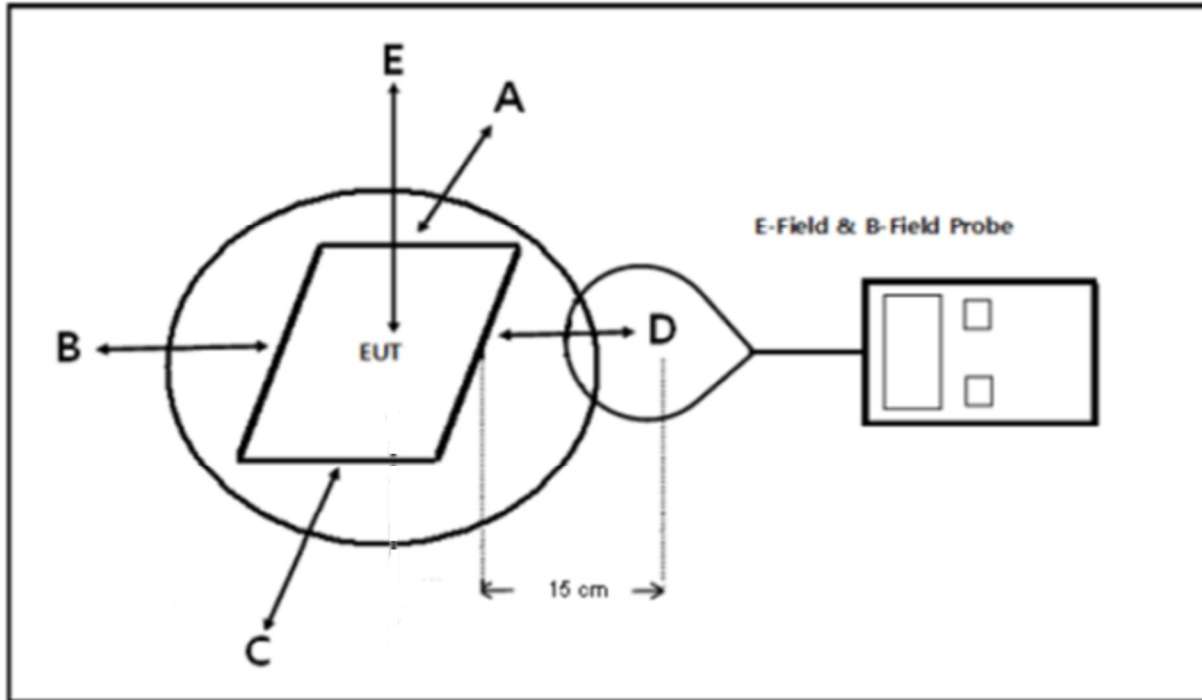
RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules.

The emissions should be within the limits at 300kHz in the above table. (Use 300kHz limits for 150kHz)

### Limb Exposure Limits Relaxation – SPR-002

Exposure Condition	Relaxation Factor	Electric Field (V/m r.m.s)	Magnetic Field (A/m r.m.s)
Whole Body / Torso / Head	1.0	83	90
Leg	1.5	124.5	135
Arm	2.5	207.5	225
Hand/Foot	5.0	415	450

## 6. Measurement Procedure



### Test Setup

1. The RF exposure test was performed in a Shield Room
2. For RF exposure purposes, the E and H field strengths were measured separately with E and H field probes.
3. EUT was placed on a turntable and the measurement probe was placed at distance of 15cm from the center of the probe to the edge of the device.
4. The measurement probe used to search for the highest strength
5. The highest emission level was recorded and compared with the limit for each point (A, B, C, D & E)
6. The EUT were measured according to the KDB 680106d01v03.

## 7. Test Results

Frequency Range (MHz)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Probe Position E (A/m)	FCC Limits (A/m)	IC Limit (A/m)
0.156	0.00366	0.0051	0.00558	0.00319	0.008296	1.63	90

H-Field Strength at 15cm from the edges surrounding the EUT

Frequency Range (MHz)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Probe Position E (V/m)	FCC Limits (V/m)	IC Limit (V/m)
0.156	1.453	1.625	1.830	1.732	1.450	614	83

E-Field Strength at 15cm from the edges surrounding the EUT

Note: The worst-case data were reported.

The field strength limit refers to Part 1.1310 and the test results of exposure is compliant. 50% of the MPE limit (E-Field: 307 V/m; H-field: 0.815A/m)

*Device meets the RF Exposure limits based on the above measurement.*

### Simultaneous Transmission Evaluation

#### Limit

The sum of the ratios of the peak or spatially averaged results to the applicable frequency dependent MPE limits must be <1 at all locations where users and bystanders can be exposed.

#### Calculation

Mode	BLE Power Density/Limit	Inductive Wireless Charging Power Density/Limit	$\Sigma$ (Power Density/Limit) of BLE+Wireless Charger
Bluetooth	0.00223		
Inductive Wireless Charger		0.008883	0.0111

The Bluetooth and Wireless Charger transmitter, the aggregated (power density/limit) is smaller than 1, and the MPE of 2 collocated transmitters is compliant.

## 8. Test Equipment

Equipment	Manufacturer	Model	Serial #	Last Cal Date	Cal Due Date
Electric Field Probe	ETS Lindgren	HI-6105	58758	Oct-24-17	Oct-24-18
RF Screen Room	Lindgren	18-2/2-0	6500	NCR	N/A
Magnetic Field Meter	Combinova	MFM-1000	301	Verified	N/A

**Table – Test Equipment List**

**\*Statement of Traceability:** Test equipment is maintained and calibrated on a regular basis. All calibrations have been performed by a 17025 accredited test facility, traceable to National Institute of Standards and Technology (NIST)

**END OF TEST REPORT**