MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230-3432 • PHONE (410) 354-3300 • FAX (410) 354-3313
33439 WESTERN AVENUE • UNION CITY, CALIFORNIA 94587 • PHONE (510) 489-6300 • FAX (510) 489-6372
3162 BELICK STREET • SANTA CLARA, CA 95054 • PHONE (408) 748-3585 • FAX (510) 489-6372
13501 MCCALLEN PASS • AUSTIN, TEXAS 78753 • PHONE (512) 287-2500 • FAX (512) 287-2513

Radio Frequency Exposure Test Report

47 CFR Part 1, Subpart I, Section 1.1310

Model: Custom Crown S-Pen Vertical Recoiler

MET Report: EMC99782-FCC MPE Rev. 1

Company	InVue
Address	9201 Baybrook Lane
	Charlotte, NC 28277
Report date	November 14, 2018

Benjamin C. Taylor

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Benjamin Taylor
Manager, EMC Wireless Laboratory

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	October 18, 2018	Initial Issue.
1	November 14, 2018	TCB Comments.

1.0 Scope

The Federal Communications Commission (FCC) publishes standards regarding the evaluation of RF exposure hazard of wireless communications devices. An evaluation was performed to InVue, Custom Crown S-Pen Vertical Recoiler, pursuant to the relevant requirements of the 47 CFR Part 1, Subpart I, Section 1.1310.

1.1 Objective

The objective of the manufacturer is to comply with the Federal Communications Commission (FCC) publishes standards referenced above.

1.2 Statement of Compliance

The evaluation of InVue Custom Crown S-Pen Vertical Recoiler in the configuration detailed in this test report, complied with the relevant requirements of 47 CFR Part 1, Subpart I, Section 1.1310. Maintenance of compliance is the responsibility of the manufacturer.

> b) Inductive wireless power transfer applications with supporting field strength results and meeting all of the following requirements are not required to submit a KDB inquiry for devices approved using SDoC or a PAG for equipment approved using certification to address RF exposure compliance. However, the responsible party is required to keep a copy of the test report in accordance with KDB 865664 D02. A copy of the test report is to be submitted with the application if the device is approved using certification.
>
> (1) Power transfer frequency is less than 1 MHz.
>
> (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 this exclusion).
>
> (6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

2.0 Equipment Configuration

2.1 Overview

MET Laboratories, Inc. was contracted by InVue to perform testing on the Custom Crown S-Pen Vertical Recoiler, under InVue purchase order number 57873.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the InVue, Custom Crown S-Pen Vertical Recoiler.

In accordance with §2.955(a) (3), the following data is presented in support of the verification of the InVue, Custom Crown S-Pen Vertical Recoiler. InVue should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the Custom Crown S-Pen Vertical Recoiler has been **permanently** discontinued, as per §2.955(b).

The results obtained relate only to the item(s) tested.

Model(s) Tested:	Custom Crown S-Pen Vertical Recoiler
Model(s) Covered:	Custom Crown S-Pen Vertical Recoiler
FCC ID:	2AFR8F1703A
Primary Power as Tested:	4.5-5.5 VDC
Equipment Emissions Class:	B
Highest Clock Frequency:	N/A
Evaluated by:	Benjamin Taylor
Report Date:	November 14, 2018

Table 1. EUT Overview

2.2 Test Site

All testing was performed at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

MET Laboratories is a ISO/IEC 17025 accredited site by A2LA, #0591.01.

Radiated Emissions measurements were performed in a semi-anechoic chamber. In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

2.3 Equipment Configuration

The EUT was set up as outlined in the customer provided block diagram. All equipment incorporated as part of the EUT is included in the following list.

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Vertical Stylus Holder	F1703	F1703110	N/A	05	A
C	Power Injection Cable	F1703	F1703102	N/A	00	C

Table 2. Equipment Configuration

2.4 Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
B	Power Supply	InVue	PS515-US	B
D	Stylus	Confidential	Confidential	D

Table 3. Support Equipment

2.5 Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded ? (Y/N)	Termination Box ID & Port Name
1	Vin	2 conductor, 24 awg,	1	1	1.020	No	B.Vout
2	Vstylus	2 conductor, 24 awg 1 conductor, 28 awg	1	1	1.020	No	C.Vpass
3	RFout	Wireless, no cables	1	1	N/A	No	D.RFin

Table 4. Ports and Cabling Information

2.6 Modifications

2.6.1 Modifications to the EUT

No modifications were made to the EUT.

2.6.2 Modifications to the Test Standard

No modifications were made to the test standard.

3.0 Limits

The EUT shall comply with the relevant limits for general public exposure specified as basic restrictions or reference levels in the 47 CFR Part 1, Subpart I, Section 1.1310 as below table.

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
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 Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).				

4.0 Evaluation

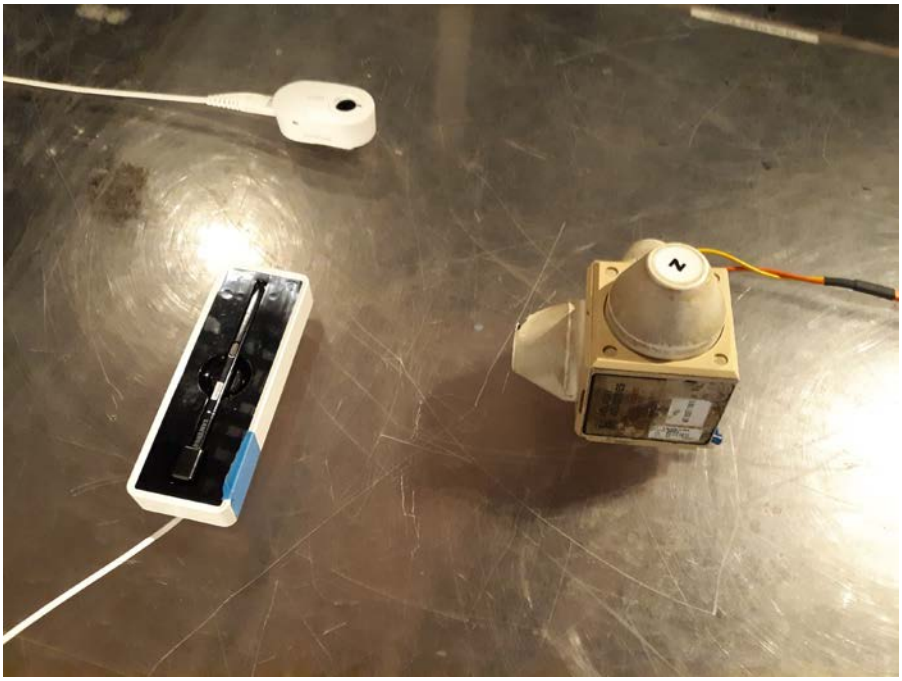
Environmental Conditions	
Ambient Temperature (°C)	22.1
Relative Humidity (%)	42

4.1 Results

The device was tested at a 10 cm distance.

Frequency of Operation	Mode of Operation	Electric Field	50% MPE Limit (V/m)	Result
530 kHz	Charging	2.990 V/m	307	Pass
	Not Charging	1.430 V/m	307	Pass

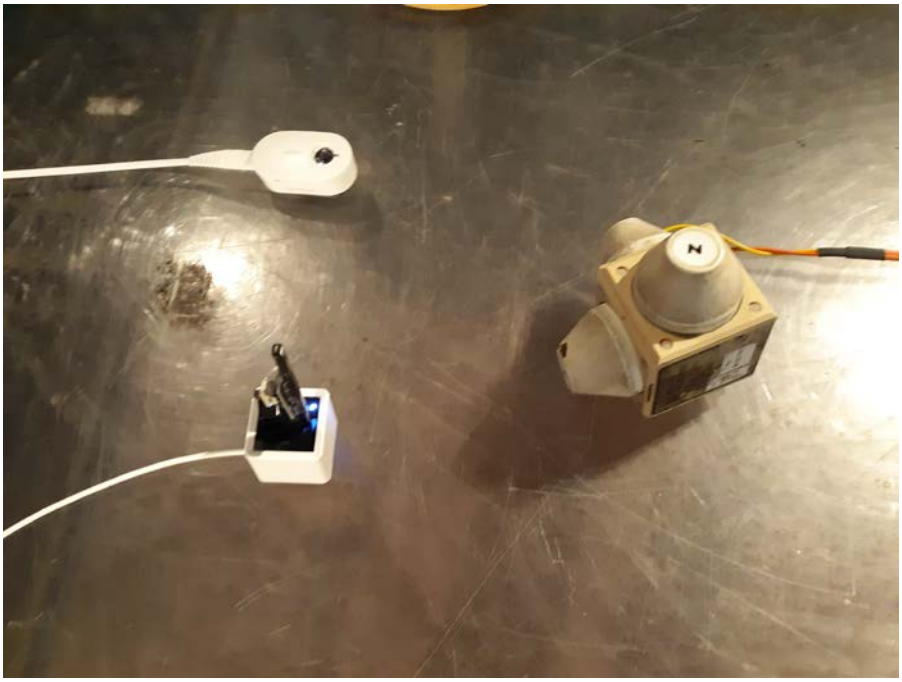
Frequency of Operation	Mode of Operation	Magnetic Field	50% MPE Limit (A/m)	Result
530 kHz	Charging	0.019 A/m	0.815	Pass
	Not Charging	0.011 A/m	0.815	Pass



Photograph 1. MPE, Horizontal Unit E Field

Photograph 2. MPE, Horizontal Unit H Field

Photograph 3. MPE, Vertical H Field



Photograph 4. MPE, Vertical Unit E Field

5.0 Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Test Name: MPE Evaluation				**Test Date(s):** Aug 10, 2018	
MET/EF Asset #	**Nomenclature**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1T4784	Isotropic Electric Field Probe	Holaday Industries	HI-4422	08/29/2017	02/28/2019
EF 00998	Wideband Exposure Level Tester	Narda	F-0318	08/2018	08/2019
1.T4148	Shield Room #2 Semi-Anechoic	Rantec	20	NA	NA

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