September 15, 2022

TUV SUD America CB
10 Centennial Drive FL2
Peabody, MA 01960

Attention: Director of Certification

RE: Analysis of RF Exposure per KDB 447498 D01 RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices v06 and RSS-102 Issue 5 March 2015.

FCC ID: ASU-DIRECTORLITE
ISED Certification Number IC: 10052A-DIRECTORLITE

1. General Information:

Applicant:	Savant Systems, Inc.
Environment:	General Population/Uncontrolled Exposure
Exposure Conditions:	Mobile

2. Technical Information:

Minimum Test Separation Distance:	20 cm
Operating Frequency:	2402 MHz to 2480 MHz
Antenna Type:	Wi-Fi Dual-band Stubby Antenna
Antenna Gain:	2.0 dBi
Maximum Transmitter Conducted Power:	4.4 dBm
Maximum Transmitter EIRP:	6.4 dBm

3. Limits:

Limits for General Population/Uncontrolled Exposure (Title 47 Subpart J §2.1091 and KDB 447498 D01 referring to limits under §1.1310)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Electric Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time (minutes)
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*

Limits for Devices Used by the General Public (Uncontrolled Environment (RSS-102 Issue 5 March 2015)

Frequency Range (MHz)	Electric Field Strength (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Reference Period (minutes)
0.003 - 10^{21}	83	90	-	Instantaneous
0.1 - 10	-	0.73/f	-	6**
1.1 - 10	$87/f^{0.5}$	-	-	6**
10 - 20	27.46	0.0728	2	6
20 - 48	$-58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48 - 300	22.06	0.05852	1.291	6
300 - 6000	$3.142\ f^{0.3417}$	$0.008335\ f^{-0.3417}$	$0.02619\ f^{0.6834}$	6
6000 - 15000	61.4	0.163	10	6
15000 - 150000	61.4	0.163	10	$616000/f^{1.2}$
150000 - 300000	$0.158f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

f is frequency in MHz
**Based on nerve stimulation (NS)*
*** Based on specific absorption rate (SAR)*

4. Mobile MPE Calculation Summary using a 20cm separation distance:

Mode	Output Power	Power Density
BLE 5.1	2.75 mW	0.00087 mW/cm^2
Murata BLE	3.357 mW	0.0015 mW/cm^2
Murata WLAN 2.4GHz	75.162 mW	0.0343 mW/cm^2
Murata WLAN 5 GHz	148.252 mW	0.0882 mW/cm^2

Murata figures are from the original filing MPE Exhibit

5. Co-Located Transmitters transmission table:

Transmitter type	Transmitter type that can transmit at the same time
BLE 5.1	BLE
BLE 5.1	WLAN 2.4GHz
BLE 5.1	WLAN 5 GHz

EUT contains FCC ID: VPYLB1ZM and IC: 772C-LB1ZM

6. *Simultaneous Transmission MPE (BLE 5.1 + BLE 5.1 + BLE):*

Transmitter type	MPE (mw/cm^2)	FCC Limit (mW/cm^2)	IC Limit (mW/cm^2)	FCC MPE ratio (MPE/Limit)	ISED MPE ratio (MPE/Limit)
BLE 5.1	0.00087	1.0	0.535	0.00087	0.00162
Murata BLE	0.0015	1.0	0.54689	0.0015	0.00274
Sum of the ratios (should be <1.0)				0.00237	0.00436

7. *Simultaneous Transmission MPE (BLE 5.1 + BLE 5.1 + 2.4GHz WLAN):*

Transmitter type	MPE (mw/cm^2)	FCC Limit (mW/cm^2)	IC Limit (mW/cm^2)	FCC MPE ratio (MPE/Limit)	ISED MPE ratio (MPE/Limit)
BLE 5.1	0.00087	1.0	0.535	0.00087	0.00162
Murata 2.4GHz	0.0343	1.0	0.54039	0.0343	0.06347
Sum of the ratios (should be <1.0)				0.03517	0.06509

8. *Simultaneous Transmission MPE (BLE 5.1 + BLE 5.1 + 5GHz WLAN):*

Transmitter type	MPE (mw/cm^2)	FCC Limit (mW/cm^2)	IC Limit (mW/cm^2)	FCC MPE ratio (MPE/Limit)	ISED MPE ratio (MPE/Limit)
BLE 5.1	0.00087	1.0	0.535	0.00087	0.00162
Murata 5GHz	0.0882	1.0	0.96582	0.0882	0.09132
Sum of the ratios (should be <1.0)				0.08907	0.09294

9. *FCC Mobile MPE Calculation Nordic BLE 5.1 using a 20cm separation distance:*

Using Power Density formula:

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

where: S = power density
P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to isotropic
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	4.40	(dBm)
Maximum peak output power at antenna input terminal:	2.75	(mW)
Antenna gain(typical):	2	(dBi)
Maximum antenna gain:	1.585	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2402	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.535	(mW/cm^2)
Power density at prediction frequency:	0.00087	(mW/cm^2)
Power density at prediction frequency:	0.009	(W/m^2)
Margin of Compliance:	-27.90	(dB)

Calculation Note: ISED calculation only presented as FCC limit at this frequency is less stringent (1.0 mW/cm^2). Margin of compliances are -30.61dB for FCC and -27.90dB for ISED.

Sincerely,

Ferdie S. Custodio
Name
Authorized Signatory
Title: Senior EMC Test Engineer /Wireless Team Lead