1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	Verge Inc.
Address of applicant:	3401 Grays Ferry Avenue, Bldg 450, Philadelphia PA 19146

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General Description of EUT:

Product Name:	Dual ISM Band Tranceiver Card
Trade Name:	/
Model No.:	VA-A-10049
Adding Model(s):	/
Rated Voltage:	DC3.3V
FCC ID:	2AXWD-VAA10049
Equipment Type:	Mobile or Fixed

Technical Characteristics of EUT:	
SRD (2.4GHz)	
Frequency Range:	2404-2478MHz
RF Output Power:	11.40dBm (Conducted)
Modulation:	OFDM
Type of Antenna:	External Antenna
Antenna Gain:	14dBi
SRD (915MHz)	
Frequency Range:	904-926MHz
RF Output Power:	11.38dBm (Conducted)
Modulation:	OFDM
Type of Antenna:	External Antenna
Antenna Gain:	8dBi

1.2 Standard Applicable

According to §1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

1.3 MPE Calculation Method

$S = (30*P*G) / (377*R^2)$

S = power density (in appropriate units, e.g., mw/cm^2)

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 (in appropriate units, e.g., cm)

1.4 MPE Calculation Result

SRD (2.4GHz)

Maximum Tune-Up output power: 12(dBm)

Maximum peak output power at antenna input terminal: 15.85 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2404 (MHz)

Antenna gain: 14 (dBi)

Directional gain (numeric gain): 25.12

The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm^2)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm^2)

SRD (915MHz)

Maximum Tune-Up output power: 12(dBm)

Maximum peak output power at antenna input terminal: 15.85(mW)

Prediction distance: >20(cm)

Prediction frequency: 904.4 (MHz)

Antenna gain: 8 (dBi)

Directional gain (numeric gain): 6.31

The worst case is power density at prediction frequency at 20cm: 0.0199 (mw/cm^2)

MPE limit for general population exposure at prediction frequency: 0.6029 (mw/cm^2)

Mode for Simultaneous Multi-band Transmission

SRD (2.4GHz) + SRD (915MHz)

The worst case is power density at prediction frequency at 20cm: 0.0792+0.0199=0.0991 (mw/cm^2)

MPE limit for general population exposure at prediction frequency: 0.6029 (mw/cm^2)

Result: Pass