1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant:	Iridium Satellite LLC
Address of applicant:	1750 Tysons Boulevard, Suite 1400, McLean, VA 22102, USA
Manufacturer:	Beam Communications
Address of manufacturer:	Unit5, 8 Anzed Court, Mulgrave, Victoria, Australia, 3710

General Description of EUT:

Product Name:	Iridium GO! exec
Trade Name:	Iridium
Model No.:	9765
Adding Model(s):	/
Rated Voltage:	Battery: 10.8V, 52.92Wh
Power Adapter Model:	Model:TYPE-C60IC Input:AC100-240v, 50/60Hz, 1.3A Output:DC5.0V,3A/9.0V,3A/12.0V,3A/15.0V,3A/20.0V,3A 60W
FCC ID:	Q639765
Equipment Type:	Fixed

Technical Characteristics of EUT:

Wi-Fi (2.4GHz)

Support Standards:	802.11b, 802.11g, 802.11n
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20)
RF Output Power:	17.87dBm (Conducted)
Type of Modulation:	CCK, OFDM, QPSK, BPSK, 16QAM, 64QAM
Quantity of Channels:	11 for 802.11b/g/n(HT20)
Channel Separation:	5MHz
Type of Antenna:	Chip Antenna
Antenna Gain:	1.5dBi

Bluetooth

Bluetooth Version:	V5.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	5.42dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	Chip Antenna
Antenna Gain:	1.5dBi

Iridium

Frequency Range:	1616.5-1625.833MHz
RF Output Power:	40dBm
Type of Modulation:	QPSK
Type of Antenna:	Integral Antenna
Antenna Gain:	2.6dBi

1.2 RF Exposure Exemption

According to §1.1307(b)(3) and 447498 D04 Interim General RF Exposure Guidance v01, 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.

Option A: FCC Rule Part 1.1307 (b)(3)(i)(A):The available maximum time-averaged power is no more than 1mW, regardless of separation distance.

Option B: FCC Rule Part 1.1307 (b)(3)(i)(B): The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. P_{th} is given by:

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\ cm}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\ cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\ cm}\sqrt{f}}\right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20\ cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Option C: FCC Rule Part 1.1307 (b)(3)(i)(C): The minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2
1.34-30	3,450 R^2/f^2
30-300	3.83 R^2
300-1,500	0.0128 R^2f
1,500-100,000	19.2R^2

For Multiple RF sources: FCC Rule Part 1.1307(b)(3)(ii):

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required).

(B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}\leq 1$$

1.3 Calculated Result

Radio Access Technology	Min. Frequency	Max. Output Power	Max. Tune-Up Output Power	Antenna Gain	Duty Cycle	Tune-Up EIRP
	(MHz)	(dBm)	(dBm)	(dBi)	(%)	(dBm)
Bluetooth	2402	5.42	6.0	1.5	100	7.50
Wi-Fi (2.4GHz)	2412	17.87	18.0	1.5	100	19.50
Iridium	1616.5	40	40.0	2.6	9.2	32.24

Frequency	Option	Min. Distance	Tune-Up ERP		Exposure Limit	Ratio	Result
(MHz)		(cm)	(dBm)	(mW)	(mW)		Pass/Fail
2402	B	20	5.35	3.43	3060.000	0.01	Pass
2412	B	20	17.35	54.33	3060.000	0.02	Pass
1616.5	B	20	30.09	1020.44	3060.000	0.33	Pass

Note: 1. ERP=EIRP-2.15dB; EIRP= Output Power + Antenna gain

2. Option A, B and C refers as clause 1.2.

3. For option B, P_{th}(mW) convert to Exposure Limit(mW); For option C, ERP(W) convert to Exposure Limit(mW).

4. Ratio= Tune-Up ERP(mW)/ Exposure Limit (mW)

Mode for Simultaneous Multi-band Transmission:

Radio Access Technology	Iridium Ratio	Wi-Fi Ratio	Bluetooth Ratio	Simultaneous Ratio	Limit	Result Pass/Fail
Iridium +Wi-Fi	0.33	0.02	--	0.35	1	Pass
Iridium+Bluetooth	0.33	--	0.01	0.34	1	Pass

Note: Wi-Fi and Bluetooth are used the same Antenna, not support simultaneous transmission.

Result: Pass