1. RF Exposure Requirements

1.1 General Information

Client Information

Applicant:	Benq Corporation
Address of applicant:	16 Jihu Road, Neihu, Taipei 114, Taiwan
Manufacturer:	DONGGUAN FENGSHUO ELECTRONICS COMPANY LIMITED
Address of manufacturer:	No.15 FuMin Road, Zhenxinwei Park, Tangxia Town, Dongguan City, China

General Description of EUT:

Product Name:	USB receiver
Trade Name	BenQ
Model No.:	IR-1000R
Adding Model(s):	/
Rated Voltage:	USB Port:DC5V
Software Version:	V0.5
Hardware Version:	220705
FCC ID:	JVPIR-1000R
Equipment Type:	Portable device

Technical Characteristics of EUT:
Bluetooth

Bluetooth Version:	V4.2 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	-5.84dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	-1.21dBi

1.2 RF Exposure Exemption

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:

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

Where

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

and

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

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	$0.0128\,R^2 f$
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	-5.84	-5.0	-1.21	100	-6.21

Frequency	Option	Min. Distance	Max. Output Power		Exposure Limit	Ratio	Result
(MHz)		(cm)	(dBm)	(mW)	(mW)		Pass/Fail
2402	A	0.5	-5.0	0.316	1.0	--	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, Pth(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	Ratio 1	Ratio 2	Simultaneous Ratio	Limit	Result
					Pass/Fail
--	--	--	--	--	--

Result: Pass