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Report No.: 2401TWD701-U4
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RF Exposure Evaluation

FCC ID	:	Q3N-WR30D
IC	:	5121A-WR30D
APPLICANT	:	CIPHERLAB CO., LTD.
Product:	:	BT Barcode Scanner
Model No.	:	WR30 D
Brand Name:	:	CIPHERLAB
FCC Rule Part(s):	:	Part 2.1093 (Portable)
IC Standard:	:	RSS 102 (issue6)
Received Date	:	January 23, 2024

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Revision History

Report No.	Version	Description	Issue Date	Note
2401TWD701-U4	1.0	Original Report	2024-02-21	

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	BT Barcode Scanner
Model No.	WR30 D
Brand Name	CIPHER LAB
Supports Radios Spec.	WPAN: Bluetooth Dual Mode: V5.0
Accessory	
Power Adapter	MFR: CHANNEL WELL Model No: 2AEA010BC3D Input: AC 100-240V~0.35A, 50-60Hz Output: DC 5V, 2.0A

1.2. Antenna Description

No.	Brand	Part No.	Antenna Type	Peak Gain
1	Amphenol	Ring Scanner BT Antenna	PIFA	-0.15dBi

2. RF Exposure Evaluation

2.1. FCC Limits

According to FCC KDB 447498 D04V01 - SAR-Based Exemption

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula .

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

where

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

and f is in GHz, d is the separation distance (cm), and ERP_{20cm} is per Formula.

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

The example values shown as below are for illustration only.

Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Note: when 10-g extremity SAR applies, SAR test exemption may be considered by applying a factor of 2.5 to the SAR-based exemption thresholds.

2.2. IC Limits

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

Frequency (MHz)	**Exemption Limits (mW)**				
	At separation distance of ≤5 mm	**At separation distance of 10 mm**	**At separation distance of 15 mm**	**At separation distance of 20 mm**	**At separation distance of 25 mm**
≤300	45 mW	116 mW	139 mW	163 mW	189 mW
450	32 mW	71 mW	87 mW	104 mW	124 mW
835	21 mW	32 mW	41 mW	54 mW	72 mW
1900	6 mW	10 mW	18 mW	33 mW	57 mW
2450	3 mW	7 mW	16 mW	32 mW	56 mW
3500	2 mW	6 mW	15 mW	29 mW	50 mW
5800	1 mW	5 mW	13 mW	23 mW	32 mW
Frequency (MHz)	**At separation distance of 30 mm**	**At separation distance of 35 mm**	**At separation distance of 40 mm**	**At separation distance of 45 mm**	**At separation distance of** ≥50 mm
≤300	216 mW	246 mW	280 mW	319 mW	362 mW
450	147 mW	175 mW	208 mW	248 mW	296 mW
835	96 mW	129 mW	172 mW	228 mW	298 mW
1900	92 mW	138 mW	194 mW	257 mW	323 mW
2450	89 mW	128 mW	170 mW	209 mW	245 mW
3500	72 mW	94 mW	114 mW	134 mW	158 mW
5800	41 mW	54 mW	74 mW	102 mW	128 mW

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance.

2.3. Test Result of RF Exposure Evaluation

Mode	Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	Antenna Gain (dBi)	EIRP (mW)	FCC Extremity SAR Test Exclusion Threshold (mW)	IC Extremity SAR Test Exclusion Threshold (mW)
BT / BLE	2402 ~ 2480	5.15	3.27	-0.15	3.16	7.5	7.5

So, this device can complies the SAR test exclusion.

The End