

RF Exposure Evaluation Report

Product : UWB Kbeacon
Trade mark : Kbeacon
Model/Type reference : K7W, C3, C3W
Serial Number : N/A
Report Number : EED32Q80655103
FCC ID : 2AXZL-K7W
Date of Issue : Jul. 30, 2024
Test Standards : 47 CFR Part 1.1307
47 CFR Part 1.1310
47 CFR Part 2.1091
47 CFR Part 2.1093
KDB 447498 D04 Interim General RF Exposure Guidance v01
Test result : PASS

Prepared for:

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1 Version

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3 General Information

3.1 Client Information

Applicant:	KKM Company Limited
Address of Applicant:	3CDE, Building6, Baoneng Science&Technology Park, Qingxiang Rd, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China
Manufacturer:	KKM Company Limited
Address of Manufacturer:	3CDE, Building6, Baoneng Science&Technology Park, Qingxiang Rd, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China
Factory:	KKM Company Limited
Address of Factory:	3CDE, Building6, Baoneng Science&Technology Park, Qingxiang Rd, Longhua Street, Longhua District, Shenzhen City, Guangdong Province, China

3.2 General Description of EUT

Product Name:	UWB Kbeacon
Model No.:	K7W, C3, C3W
Test Model No.:	K7W
Trade mark:	Kbeacon

3.3 Product Specification subjective to this standard

Frequency Range:	BLE: 2402MHz~2480MHz UWB: UWB Channels 5: 6489.6MHz, UWB Channels 9 :7987.2MHz
Modulation Type:	BLE: GFSK UWB: OFDM
Test Power Grade:	Default
Test Software of EUT:	nrfgostudio.exe
Antenna Type:	PCB Antenna
Antenna Gain:	BLE: 2.53dBi; UWB Channels 5: 6489.6MHz: 1.96dBi, UWB Channels 9 :7987.2MHz: 0.52dBi;
Power Supply:	Battery DC 3.0V,850mAh
Sample Received Date:	May 17, 2024
Sample tested Date:	May 25, 2024 to Jul. 06, 2024
Remark:	Company Name and Address shown on Report, the sample(s) and sample Information was/ were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified. Model No.: K7W, C3, C3W Only the model K7W was tested. Their electrical circuit design, layout, components used and internal wiring are identical. Only the case design is different.

3.4 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

3.5 Deviation from Standards

None.

3.6 Abnormalities from Standard Conditions

None.

3.7 Other Information Requested by the Customer

None.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

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). P_{th} is given by Formula

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

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 $ERP_{20 \text{ cm}}$ is per Formula (B.1).

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

For Stand alone:

For Bluetooth LE:

Frequency (MHz)	Max. Conducted Output power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
2402	-0.61	2.53	-2.26	0.594	2.788	0.2130	PASS

For UWB:

Channel	Frequency (MHz)	Max. Calculated Field Strength of fundamental (FSc) (dBuV/m)	EIRP (dBm)	ERP (mW)	Limit (mW)	MPE ratio	Result
5	6489.6	83.21	-12.02	0.0383	1.00	0.0383	PASS
9	7987.2	86.54	-8.69	0.1352	1.00	0.1352	PASS

Note:

- ① EIRP=conducted power+antenna gain;
- ② $ERP = EIRP - 2.15$;
- ③ $EIRP(dBm) = \text{Field strength of the fundamental signal}(dBuV/m@3m) - 95.23$;
- ④ $ERP(mW) = 10^{(ERP(dBm)/10)}$;
- ⑤ The estimation distance is 0.5cm;
- ⑥ The test data please refer to the report of EED32Q80655101 and only the worst case data was recorded in the report.

For Simultaneous Transmission:

As MPE ratio (BLE+UWB Channel 5)=0.2130+0.0383=0.2513 < 1,
As MPE ratio (BLE+UWB Channel 9)=0.2130+0.1352=0.3482 < 1,
it's deemed to fulfil the RF exposure requirement.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CTI, this report can't be reproduced except in full.

*** End of Report ***