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RF Exposure Evaluation Report

Report No.: CQASZ20201001281E-02
Applicant: Ruian BoYu Automobile Parts Co., Ltd Pingyang Branch
Address of Applicant: No. 146, Xinbin Road, Haixi Town, Pingyang, Zhejiang
Equipment Under Test (EUT):
EUT Name: Auto Tire Pressure Monitoring System Sensors
Model No.: BY-MLX-26
Brand Name: N/A
FCC ID: 2AX5N-BYMLX26
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2020-11-02
Date of Test: 2020-11-02 to 2020-11-06
Date of Issue: 2020-11-06
Test Result: PASS*

*In the configuration tested, the EUT complied with the standards specified above

Tested By:

Martin Lee

(Martin Lee)

Reviewed By:

Sheek, Luo

(Sheek Luo)

Approved By:

Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20201001281E-02	Rev.01	Initial report	2020-11-06

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3 General Information

3.1 Client Information

Applicant:	Ruian BoYu Automobile Parts Co., Ltd Pingyang Branch
Address of Applicant:	No. 146, Xinbin Road, Haixi Town, Pingyang, Zhejiang
Manufacturer:	Ruian BoYu Automobile Parts Co., Ltd Pingyang Branch
Address of Manufacturer:	No. 146, Xinbin Road, Haixi Town, Pingyang, Zhejiang
Factory:	Ruian BoYu Automobile Parts Co., Ltd Pingyang Branch
Address of Factory:	No. 146, Xinbin Road, Haixi Town, Pingyang, Zhejiang

3.2 General Description of EUT

Product Name:	Auto Tire Pressure Monitoring System Sensors
Model No.:	BY-MLX-26
Trade Mark:	N/A
Hardware Version:	BY_MLX_HW_V1.0
Software Version:	BY_MLX_PG_V1.0
Test sample No:	CQASZ20201001281E#1
Sample Type:	☒ Mobile ☐ Portable ☐ Fix Location
Operation Frequency:	433.92MHz
Channel Numbers:	1
Modulation Type:	FSK
Antenna Type:	Integral antenna
Antenna Gain:	0dBi
Power Supply:	Button battery: DC 3V

Note: Using the new battery for testing.

4 SAR Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Standard Requirement

According to KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

4.1.2 Limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{[\sqrt{f(\text{GHz})}]} \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where} \right.$$

$f(\text{GHz})$ is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation¹⁷

The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

4.1.3 EUT RF Exposure

$$e_{irp} = p_t \times g_t = (E \times d)^2 / 30$$

where:

p_t = transmitter output power in watts,

g_t = numeric gain of the transmitting antenna (unitless),

E = electric field strength in V/m, $10^{((dB\mu V/m)/20)/10^6}$,

d = measurement distance in meters (m)---3m,

$$\text{So } p_t = (E \times d)^2 / 30 / g_t$$

The worst case (refer to report CQASZ20201001281E-01) is below:

Antenna polarization: Horizontal		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	83.84	Peak
433.92	71.40	Average

Antenna polarization: Vertical		
Frequency (MHz)	Level (dBuV/m)	Polarization
433.92	81.79	Peak
433.92	69.35	Average

For 433.92MHz wireless:

Field strength = 83.84dBuV/m @3m

Ant. gain 0dBi; so Ant numeric gain=1.0

$$\text{So } p_t = \{ [10^{(83.84/20)} / 10^6 \times 3]^2 / 30 / 1.0 \} \times 1000 \text{mW} = 0.073 \text{mW}$$

$$\text{So } (0.073 \text{mW} / 5 \text{mm}) \times \sqrt{0.43392 \text{GHz}} = 0.0096,$$

$$0.0096 < 3.0 \text{ for 1-g SAR}$$

So the SAR report is not required.