RF Exposure Statement: 50101920 002

Client:	**MIWA LOCK CO.,LTD.** 3-1-12, Shiba, Minato-ku, Tokyo 105-8510, JAPAN
Test item:	**Hotel Card Lock System**
Identification:	**ALVBP**

FCC Requirement

According to KDB 447498 D01 v06, SAR evaluation specified in FCC 2.1093 is not required for portable equipment if the transmitter power is below the following threshold for 100MHz to 6GHz:

Highest Frequency of Transmitter Tunable Range F [GHz]	Min. Test Separation Distance D [mm]	1-g SAR Test Exclusion Threshold (3.0 × D / √F) + X [mW]	10-g SAR Test Exclusion Threshold (7.5 × D / √F) + X [mW]
2.480	5	9.525	23.813

Note: X = 0 for D (in mm) ≤ 50mm:
X = (D – 50mm) × (1000 × F/150) for D (in mm) > 50mm and F (in GHz) in the range 0.1 to 1.5GHz
X = (D – 50mm) × 10 for D (in mm) > 50mm and F (in GHz) in the range 1.5 to 6GHz

In additions, SAR evaluation specified in FCC 2.1093 is not required for portable equipment if the transmitter power is below the following threshold for below 100MHz:

Highest Frequency of Transmitter Tunable Range F [MHz]	Min. Test Separation Distance D [mm]	1-g SAR Test Exclusion Threshold (See Note) [mW]	10-g SAR Test Exclusion Threshold (See Note) [mW]
13.56	5	443 (*1)	1107 (*2)

Note: The thresholds are calculated as follows, based on section 4.3.1 a), b) and c) of the KDB Publication 447498 D01 v06:
(*1) (3.0 × 50mm / √0.1GHz) × [1+Log(100MHz/F)] / 2 = 474.3 × [1+Log(100/13.56)] / 2 = 443mW
(*2) (7.5 × 50mm / √0.1GHz) × [1+Log(100MHz/F)] / 2 = 1185.8 × [1+Log(100/13.56)] / 2 = 1107mW

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ISED Requirement

According to RSS-102 (Issue 5), clause 2.5.1, no SAR evaluation is required if the transmitter has a minimum separation distance to the user less than or equal to 20cm and has an output power (both conducted and e.i.r.p.) below the following threshold:

Equipment Use	Transmitter Frequency Range	Separation Distance [mm]	SAR Evaluation Exemption limit [mW]
General Public Use	≤ 300MHz	5	71
	2402 – 2480GHz	5	4

Measurement Result

1) 13.56MHz RFID Transmitter

The maximum measured E-field strength of the fundamental and its antenna gain, EIRP and conducted RF output power from the transmitter are estimated in the following table:

Measured E-Field Strength E		Meas. Distance R	Calculated EIRP		Antenna Gain G_t	Estimated Transmitter Output Power P_t	
[dBuV/m]	[V/m]	[m]	[mW]	[dBm]	[dBi]	[dBm]	[mW]
46.6	2.14×10^{-4}	3.0	1.374×10^{-5}	-48.62	-49.6	+0.98	1.253

Note:

The EIRP is calculated in conjunction with the next formula:

$EIRP = (E \times R)^2/30 = (2.14 \times 10^{-4} \times 3.0)^2 / 30 = 1.374 \times 10^{-8}$ [W] = **1.374×10^{-5} [mW]**

The Transmitter Output Power Pt is calculated in conjunction with the next formula:

$P_t = EIRP - G_t = -48.62 – (-49.6) = +0.98$ [dBm] = **1.253 [mW]**

2) 2.4GHz BLE (**B**luetooth **L**ow **E**nergy) Transmitter

According to the module test report, measured maximum conducted RF output power is 1mW. As its antenna gain is -0.6dBi, conducted RF output power is considered as the worst case for this evaluation.

3) Simultaneous transmission considerations

Unlicensed Transmitter	Cond. Output Power P_t	EIRP	FCC	ISED
			1-g SAR Test Exclusion Threshold	Exemption limits for routine evaluation
	[mW]	[mW]	[mW]	[mW]
RFID	1.253	0.00001374	443	71
BLE	1.000	0.87096359	9.525	**4**
Summation	**2.253**	0.87097733	-/-	-/-

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Conclusion

This device is classified as a portable device by the customer.

Since the device incorporates two transmitters (RFID and BLE) which operate simultaneously, the worst total output power corresponding to simultaneous operation was evaluated. As a result, the device complies with the FCC and ISED RF exposure requirements, since the summation (**i.e. 2.253mW**) is less than the most severe threshold of **4mW** at the highest possible transmitter conducted power.

Refer to the test report 50101920 001 for more details with regard to the test data. And also refer to application FCC ID: VPYLBZY for details on the RF exposure assessment that has been performed on the BLE module (Model ZS Murata Manufacturing Co., Ltd.).