Produkte Products



Client: MWA 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:   Mighest Frequency of Transmitter Tunable Min. Test Separation Distance D (mm) ≤ S0mm: Exclusion Threshold (3.0 × D / VF) + X (mW) 10-g SAR Test Exclusion Threshold (7.5 × D / VF) + X (mW)   × 10 - 50mm) × (1000 × F/150) for D (in mm) ≤ 50mm: X = (D - 50mm) × (1000 × F/150) 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 1.5GH X = (D - 50mm) × 10   Note: X = (D - 50mm) × (1000 × F/150) 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:   Mighest Frequency of Transmitter power is below the following threshold (See Note) D(mM) (mW) 10.9 GAR Test Exclusion Threshold (See Note) D(mM) (mW)   13.06 5 43 (*1) 10 or 9 SAR Test Exclusion Threshold (See Note) D(mM)   Mage Min. Test Separation D(M) (See Note) D(M) (MHz) 10.0 or 9 SAR Test Exclusion Threshold (See Note) D(mM)   Mighest frequency of Transmiter power is below	RF Exposure Stat	ement: 50101	1920 002	Seite 1 von 3 Page 1 of 3			
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 Min. Test Separation Distance D [mm] 1-g SAR Test Exclusion Threshold (3.0 × D / vF) + X 10-g SAR Test Exclusion Threshold (7.5 × D / vF) + X   VI F[GHz] [mW] [mW] [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 1.5GH to 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 D [mm] 1-g SAR Test Exclusion Threshold (See Note) [mW] 10-g SAR Test Exclusion Threshold (See Note)   I Highest Frequency of Transmitter Tunable Range D [mm] Min. Test Separation Distance D [mM] 1-g SAR Test Exclusion Threshold (See Note)   I [MHz] Min. Test Separation Distance D [mM] 1-g SAR Test Exclusion Threshold (See Note) 10-g SAR Test Exclusion Threshold (See Note)   I [Min. 13.56 443 (*1) 1107 (*2)							
FCC RequirementAccording 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 	Test item: Hotel Card Lock System						
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 D [mm]1-g SAR Test Ecclusion Threshold ( $3.0 \times D / \sqrt{F} + X$ [mW]10-g SAR Test Exclusion Threshold ( $7.5 \times D / \sqrt{F} + X$ [mW]2.48059.52523.813Note: X = (D - 50mm) × (1000 × F/150) X = (D - 50mm) × 10for D (in mm) ≤ 50mm: for D (in mm) > 50mm and F (in GHz) in the range 0.1 to 1.5GHzIn additions, Range equipment if the transmitter power is below the following threshold for D (in mm) > 50mm and F (in GHz) in the range 1.5 to 6GHzIn additions, SAR evaluation specified in FCC 2.1093 is not required for portable equipment if the transmitter power is below the following threshold (See Note) [mW]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]Highest Frequency of Transmitter Tunable Range F [MHz]Min. Test Separation D [mm]13.565443 (*1)11.07 (*2)Note:The thresholds are calculated as follows, based on section 4.3.1 a), b) and c) of the KDB Publication (47498 D01 v06: (*1) (3.0 x 50mm / $\sqrt{0.1GHz}$ ) x [1+Log(100MHz/F)] / 2 = 474.3 x [1+Log(100/13.56)] / 2 = 443mW	Identification:	ALVBP					
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 D [mm]1-g SAR Test Exclusion Threshold ( $3.0 \times D / \sqrt{F}$ ) + X [mW]10-g SAR Test Exclusion Threshold ( $7.5 \times D / \sqrt{F}$ ) + X [mW]2.48059.52523.813Note:X = 0 x = (D - 50mm) × (1000 × F/150) x = (D - 50mm) × 10for D (in mm) ≤ 50mm: for D (in mm) > 50mm and F (in GHz) in the range 0.1 to 1.5GH for D (in mm) > 50mm and F (in GHz) in the range 1.5 to 6GHzIn additions, SAR evaluation specified in FCC 2.1093 is not required for portable equipment if the transmitter power is below the following threshold D [mm]1-g SAR Test Exclusion Threshold for D elow 100MHz:Highest Frequency of Transmitter Tunable Range F [MHz]Min. Test Separation D [mm]1-g SAR Test Exclusion Threshold (See Note) [mW]13.565443 (*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 / $\sqrt{0.1 GHz}$ ) × [1+Log(100MHz/F)] / 2 = 474.3 × [1+Log(100/13.56)] / 2 = 443mW	FCC Requirement						
Transmitter Tunable Range F [GHz]IMIN. Test Separation D [mm]Exclusion Threshold $(3.0 \times D / \sqrt{F}) + X$ [mW]Exclusion Threshold $(7.5 \times D / \sqrt{F}) + X$ [mW]2.48059.52523.813Note:X = 0 (D = 50mm) × (1000 × F/150) X = (D - 50mm) × 10for D (in mm) ≤ 50mm: for D (in mm) > 50mm and F (in GHz) in the range 0.1 to 1.5GH for D (in mm) > 50mm and F (in GHz) in the range 1.5 to 6GHzIn additions, SAR evaluation specified in FCC 2.1093 is not required for portable equipment if the transmitter power is below the following threshold (See Note) D [mm]10g SAR Test Exclusion Threshold (See Note) [mW]Highest Frequency of Transmitter Tunable Range F [MHz]Min. Test Separation D [mm]1-g SAR Test Exclusion Threshold (See Note) [mW]13.565443 (*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 / $\sqrt{0.1 GHz}$ ) x [1+Log(100/Hz/F)] / 2 = 474.3 x [1+Log(100/13.56)] / 2 = 443mW	required for portable e		•				
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X = $(D - 50mm) \times (1000 \times F/150)$ X = $(D - 50mm) \times 10$ for D (in mm) > 50mm and F (in GHz) in the range 0.1 to 1.5GH for D (in mm) > 50mm and F (in GHz) in the range 1.5 to 6GHzIn 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]13.565443 (*1)1107 (*2)Note:The thresholds are calculated as follows, based on section 4.3.1 a), b) and c) of the KDB Publication (47498 D01 v06: 	2.480	5	9.525	23.813			
Image: P_[MH2]   Image:	equipment if the transmitter power is below the following threshold for below 100MHz:Highest Frequency of Transmitter TunableMin. Test Separation Distance1-g SAR Test Exclusion Threshold10-g SAR Test Exclusion ThresholdBangeMin. Test Separation Distance(See Note)(See Note)						
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Produkte Products

# RF Exposure Statement:50101920 002

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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	
General Public Ose	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	Calculate	d EIRP	Antenna Gain Gt	Transn	timated nitter Output ower P <sub>t</sub>
[dBuV/m]	[V/m]	[m]	[mW]	[dBm]	[dBi]	[dBm]	[mW]
46.6	2.14 ×10 <sup>-4</sup>	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 =  $(E \times R)^2/30 = (2.14 \times 10^{-4} \times 3.0)^2 / 30 = 1.374 \times 10^{-8} [W] = 1.374 \times 10^{-5} [mW]$ 

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 (Bluetooth Low Energy) 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

ĺ				FCC	ISED
	Unlicensed Transmitter	Cond. Output Power P <sub>t</sub>	EIRP	1-g SAR Test Exclusion Threshold	Exemption limits for routine evaluation
ĺ		[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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Produkte Products



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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.).