Maximum Permissible Exposure Evaluation

FCC ID: 2A34Z-DDP-400

1. Client Information

Applicant	:	Qingdao Meijia Instrument Co., Ltd
Address	:	No. 303 Songyun Road Industrial Park Zhangjialou Town Huangdao District Qingdao, China
Manufacturer	:	Qingdao Meijia Instrument Co., Ltd
Address	:	No. 303 Songyun Road Industrial Park Zhangjialou Town Huangdao District Qingdao, China

2. General Description of EUT

EUT Name	:	DIGITAL PIANO	
Model(s) No.	:	DDP-400, MS-21	
Product Description	:	Operation Frequency:	Bluetooth V5.1(BDR+EDR): 2402~2480 MHz Bluetooth 5.1(BLE): 2402MHz~2480MHz
		Number of Channel:	Bluetooth 5.1(BDR+EDR): 79 channels Bluetooth 5.1(BLE): 40 channels
		Antenna Gain:	2dBi PCB Antenna
		Modulation Type:	GFSK, π/4-DQPSK, 8-DPSK for BT GFSK for BLE
		Bit Rate of Transmitter:	GFSK(1Mbps) π/4-DQPSK(2Mbps) 8-DPSK(3Mbps)
Power Supply	:	Input:100-240Vac,50~60Hz, 1.5A Max Output: 15V⎓2A	
Software Version	:	V6.00	
Hardware Version	:	V4.01	
Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.			

Note: More test information about the EUT please refer the RF Test Report.

MPE Calculations for BT

1. **Antenna Gain:**
   Dipole Antenna:2.0dBi.

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

3. **Exposure Evaluation:**
   Equation from page 18 of OET Bulletin 65, Edition 97-01
   $S=(PG)/4\pi R^2$
   Where
   S: power density
   P: power input to the antenna
   G: power gain of the antenna in the direction of interest relative to an isotropic radiator.
   R: distance to the center of radiation of the antenna

4. **Test Result:**

Worst Maximum MPE Result								
Mode	N_{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm^2) [S]
BT(GFSK)	1	2402	0.984	1±1	2	2.0	20	0.0005
		2441	0.236	0±1	1	2.0	20	0.0004
		2480	-0.132	0±1	1	2.0	20	0.0004
BT(π /4-DQPSK)	1	2402	1.911	1±1	2	2.0	20	0.0005
		2441	1.577	1±1	2	2.0	20	0.0005
		2480	1.255	1±1	2	2.0	20	0.0005
BT(8DPSK)	1	2402	2.779	2±1	3	2.0	20	0.0006
		2441	2.118	2±1	3	2.0	20	0.0006
		2480	1.661	1±1	2	2.0	20	0.0005
BLE (GFSK 1Mbps)	1	2402	5.945	5±1	6	2.0	20	0.0013
		2442	5.397	5±1	6	2.0	20	0.0013
		2480	4.119	4±1	5	2.0	20	0.0010
BLE (GFSK 2Mbps)	1	2402	5.95	6±1	7	2.0	20	0.0016
		2442	5.447	5±1	6	2.0	20	0.0013
		2480	4.135	4±1	5	2.0	20	0.0010

Note:
(1) N_{TX}= Number of Transmit Antennas
(2) RF Output power specifies that Maximum Conducted Peak Output Power.

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/cm^2)
300-1,500	F/1500
1,500-100,000	1.0

For BT&BLE:2402~2480 MHz

MPE limit S: 1mW/ cm^2

The MPE is calculated as **0.0013 *mW / cm² < limit 1mW / cm²***. So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b).

The RF Exposure Information page from the manual is included here for reference.

Note

For a more detailed features description, please refer to the RF Test Report.

6. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----END OF REPORT-----