Maximum Permissible Exposure Evaluation

FCC ID: 2BDM8-D11PLUS

Original Grant

Report No.	:	TBR-C-202507-0040-3
Applicant	:	ShenZhen KY Intelligent Digital Co., Ltd
Equipment Under Test (EUT)		
EUT Name	:	smart glass
Model No.	:	D11 PLUS
Series Model No.	:	Please refer to page 4
Brand Name	:	----
Sample ID	:	HC-C-202507-0040-01-1# & HC-C-202507-0040-01-2#
Receipt Date	:	2025-07-15
Test Date	:	2025-07-15 to 2025-08-11
Issue Date	:	2025-08-11
Standards	:	FCC Part 2.1093
Test Method	:	KDB 447498 D01 General RF Exposure Guidance v06
Conclusions	:	**PASS**
		In the configuration tested, the EUT complied with the standards specified above.

Test By	:	Gold.zhang	Gold Zhang
Reviewed By	:	Emily	Emily Tang
Approved By	:	IVAN SU	Ivan Su

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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CONTENTS

Revision History

Report No.	Version	Description	Issued Date
TBR-C-202507-0040-3	Rev.01	Initial issue of report	2025-08-11

1. General Information about EUT

1.1 Client Information

Applicant	:	ShenZhen KY Intelligent Digital Co., Ltd
Address	:	B1 Building 5th floor XuJingChang Industry zoom, Fuhai road, Baoan, SZ.518126, China
Manufacturer	:	ShenZhen KY Intelligent Digital Co., Ltd
Address	:	B1 Building 5th floor XuJingChang Industry zoom, Fuhai road, Baoan, SZ.518126, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	smart glass	
Models No.	:	D11 PLUS, D11, D12, D12 PLUS, D13, D13 PLUS, D14, D14 PLUS, D15, D15 PLUS, D16, D16 PLUS, D17, D17 PLUS, D18, D18 PLUS, D19, D19 PLUS, D20, D20 PLUS, D21, D21 PLUS, D22, D22 PLUS, D23, D23 PLUS, D24, D24 PLUS, D25, D25 PLUS, D26, D26 PLUS, D27, D27 PLUS, D28, D28 PLUS, D29, D29 PLUS, D30, D30 PLUS	
Model Different	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is different customers, different model name.	
Product Description	:	Operation Frequency:	Bluetooth V5.4 (BR+EDR): 2402MHz~2480MHz
		Modulation Type:	Bluetooth: GFSK, Pi/4-DQPSK, 8-DPSK
		Antenna Gain:	2.67dBi Ceramic Antenna
Power Rating	:	Input: DC 5V	
Li-ion Polymer Battery	:	3.7V by 115mAh Rechargeable Li-ion battery	
Software Version	:	----	
Hardware Version	:	V0.1	
Remark: The above antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.			

2. Measurement Uncertainty

The reported uncertainty of measurement y±U，where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2，providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB
RF Power-Conducted	Level Accuracy: Above 1000MHz	±0.95 dB
Power Spectral Density-Conducted	Level Accuracy: Above 1000MHz	±3dB
Occupied Bandwidth	Level Accuracy: 30MHz to 1000 MHz Above 1000MHz	±3.8%
Unwanted Emission-Conducted	Level Accuracy: 30MHz to 1000 MHz Above 1000MHz	±2.72 dB
Temperature	/	±0.6℃
Humidity	/	±4%
Supply voltages	/	±2%
Time	/	±4%

3. Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025：2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.

4. SAR Test Exclusion Calculations

4.1 FCC: According to KDB 447498 D01 v06 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies v06.

(1) Clause 4.3: General SAR test reduction and exclusion guidance
Sub clause 4.31: Standalone SAR test exclusion considerations

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6GHz at test separation distance≤5 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤3.0 for 1-g SAR

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation, mm)]*[$\sqrt{f_{(GHz)}}$] ≤7.5.0 for 10-g SAR

4.2 Summary simultaneous transmission for SAR Exclusion

The SAR exemption limits outlined in clause 4.3.2(b) of KDB 447498 have been derived based on an approximate SAR value of 0.4 W/kg using half-wave dipole antennas Footnote 1. As such, when simultaneous transmitter SAR evaluations include transmitters that have been exempt from routine SAR evaluation, the SAR must be estimating based on the ratio between the maximum tune-up tolerance limit of the transmitter that has been exempt and the exemption limit at the specific distance and frequency for that transmitter. This ratio must be multiplied by 0.4 W/kg (2.0 W/kg for controlled use and 1.0 W/kg for limb worn devices) in order to calculate the estimated SAR level.

The estimate SAR value is calculated based the following equation:

(maximum power level including tune-up tolerance for transmitter A / maximum power level of exemption at the same frequency and distance) * 0.4W/kg

1) $[(max.\ power\ of\ channel,\ including\ tune\text{-}up\ tolerance,\ mW)\ /\ (min.\ test\ separation\ distance,\ mm)]\cdot[\sqrt{f_{(GHz)}}/x]$ W/kg, for *test separation distances* ≤ 50 mm;
   where $x = 7.5$ for 1-g SAR and $x = 18.75$ for 10-g SAR.
2) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distance* is > 50 mm.[37]

The [∑ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [∑ of MPE ratios] is ≤ 1.0.
The SAR to peak location separation ratios of all simultaneously transmitting antenna pairs operating in portable device exposure conditions are all ≤ 0.04, and the [∑ of MPE ratios] is ≤ 1.0.

4.3 Calculation:

Left:

Test separation: 5mm						
Bluetooth Mode (GFSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	4.903	5±1	6	3.981	1.234	**3.0**
2.441	4.865	5±1	6	3.981	1.244	**3.0**
2.480	4.54	5±1	6	3.981	1.254	**3.0**
Bluetooth Mode (Pi/4-DQPSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	5.595	6±1	7	5.012	1.554	**3.0**
2.441	5.607	6±1	7	5.012	1.566	**3.0**
2.480	5.205	5±1	6	3.981	1.254	**3.0**
Bluetooth Mode (8-DPSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	6.131	6±1	7	5.012	1.554	**3.0**
2.441	6.04	6±1	7	5.012	1.566	**3.0**
2.480	5.835	6±1	7	5.012	1.579	**3.0**

Right:

Test separation: 5mm						
Bluetooth Mode (GFSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	3.025	3±1	4	2.512	0.779	**3.0**
2.441	4.46	4±1	5	3.162	0.988	**3.0**
2.480	3.348	3±1	4	2.512	0.791	**3.0**
Bluetooth Mode (Pi/4-DQPSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	4.008	4±1	5	3.162	0.980	**3.0**
2.441	4.944	5±1	6	3.981	1.244	**3.0**
2.480	4.769	5±1	6	3.981	1.254	**3.0**
Bluetooth Mode (8-DPSK)						
Frequency (GHz)	**Conducted Power (dBm)**	**Turn-up Power Tolerance (dB)**	**Max power of tune up tolerance (dBm)**	**Max power of tune up tolerance (mw)**	**Calculation Value**	**Threshold Value**
2.402	4.822	5±1	6	3.981	1.234	**3.0**
2.441	5.485	5±1	6	3.981	1.244	**3.0**
2.480	5.478	5±1	6	3.981	1.254	**3.0**

Summary simultaneous transmission results

Simultaneous Transmission for SAR Exclusion

The sample support simultaneous firing from both sides, they need consider simultaneous transmission; ∑ of the highest measured or estimated SAR-Left + SAR-Right = 1.579/7.5+1.254/7.5 =0.378< 1.6;

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 D01 v06.

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