





# **FCC C2PC Test Report**

FCC ID : RF41539C

**Equipment**: Handheld Terminal

Model No. : DX-A400

Brand Name : KEYENCE

Applicant : KEYENCE CORPORATION

Address : 1-3-14 HIGASHI-NAKAJIMA,

HIGASHI-YODOGAWA-KU, OSAKA, JAPAN

Standard : 47 CFR FCC Part 15.247

Received Date : Jul. 06, 2023

Tested Date : Jul. 15 ~ Jul. 18, 2023

We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: Approved by:

Along Chely/ Assistant Manager

Gary Chang / Manager

Report No.: FR162103-02AD Page: 1 of 18
Report Version: Rev. 01



## **Table of Contents**

1	GENERAL DESCRIPTION	5
1.1	Information	5
1.2	Local Support Equipment List	
1.3	Test Setup Chart	
1.4	The Equipment List	
1.5	Test Standards	
1.6	Reference Guidance	9
1.7	Deviation from Test Standard and Measurement Procedure	9
1.8	Measurement Uncertainty	g
2	TEST CONFIGURATION	10
2.1	Testing Facility	10
2.2	The Worst Test Modes and Channel Details	10
3	TRANSMITTER TEST RESULTS	11
3.1	Conducted Emissions	11
3.2	Unwanted Emissions into Restricted Frequency Bands	14
4	TEST LABORATORY INFORMATION	18



## **Release Record**

Report No.	Version	Description	Issued Date
FR162103-02AD	Rev. 01	Initial issue	Aug. 10, 2023

Report No.: FR162103-02AD Page: 3 of 18



## **Summary of Test Results**

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.582MHz 37.72 (Margin -18.28dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 215.27MHz 26.53 (Margin -16.97dB) - PK	Pass

#### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### **Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Report No.: FR162103-02AD Page: 4 of 18



## 1 General Description

### 1.1 Information

This is a Class II Permissive Change report (C2PC).

This report is issued as a supplementary report to original ICC report no. FR162103AD. The difference is changing components of LPDDR & eMMC.

### 1.1.1 Specification of the Equipment under Test (EUT)

RF General Information							
Frequency Range (MHz)  Bluetooth Ch. Frequency Channel Number Data Rate							
2400-2483.5	BR	2402-2480	0-78 [79]	1 Mbps			
2400-2483.5	EDR	2402-2480	0-78 [79]	2 Mbps			
2400-2483.5	EDR	2402-2480	0-78 [79]	3 Mbps			

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

Note 2: Bluetooth BR uses a GFSK.

Note 3: Bluetooth EDR uses a combination of  $\pi/4$ -DQPSK and 8DPSK.

#### 1.1.2 Antenna Details

Ant. No.	Туре	Connector	Gain (dBi)	Remarks
1	PIFA	No	-0.23	

### 1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.8Vdc
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#### 1.1.4 Accessories

	Accessories					
No.	No. Equipment Description					
1	Battery	Brand: KEYENCE Model: DX-BQ3 Rating: 3.8Vdc (11.51Wh) 3030mAh				

Report No.: FR162103-02AD Page: 5 of 18



## 1.1.5 Channel List

	Frequency band (MHz)				2400~	2483.5	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

Report No.: FR162103-02AD Page: 6 of 18

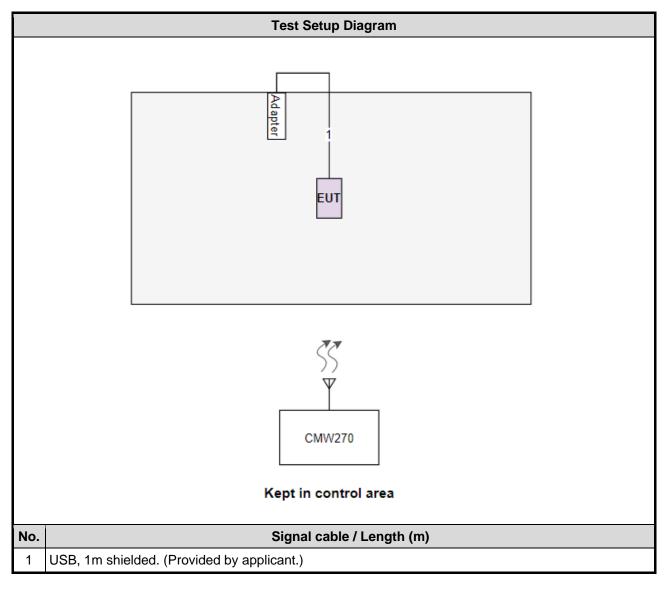


## 1.2 Local Support Equipment List

	Support Equipment List						
No. Equipment Brand Model FCC ID Remarks					Remarks		
1	Adapter	PHIHONG	PSA10F-050Q		Provided by applicant. Input: 100-240V~ 50/60Hz, 0.35A Output: 5.0V=2.0A, 10.0W		

Note: Adapter is used for charging only.

## 1.3 Test Setup Chart



Report No.: FR162103-02AD Page: 7 of 18



## 1.4 The Equipment List

Test Item	Conducted Emission							
Test Site	Conduction room 1 / (CO01-WS)							
Tested Date	Jul. 18, 2023	Jul. 18, 2023						
Instrument	Brand	Model No.	Serial No.	Calibration Date	Calibration Until			
Receiver	R&S	ESR3	101658	Feb. 17, 2023	Feb. 16, 2024			
LISN	R&S	ENV216	101579	May 09, 2023	May 08, 2024			
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127667	Jan .03, 2023	Jan .02, 2024			
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Oct. 17, 2022	Oct. 16, 2023			
50 ohm terminal (Support Unit)	NA	50	01	Jun. 14, 2023	Jun. 13, 2024			
Measurement Software	AUDIX	e3	6.120210k	NA	NA			
Note: Calibration Inter	rval of instruments liste	d above is one year.						

Test Item	Radiated Emission								
Test Site	966 chamber1 / (03Cl	966 chamber1 / (03CH01-WS)							
Tested Date	Jul. 15, 2023								
Instrument	Brand Model No. Serial No. Calibration Date Calibration								
Receiver	R&S	ESR3	101657	Mar. 03, 2023	Mar. 02, 2024				
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 01, 2022	Oct. 31, 2023				
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Aug. 03, 2022	Aug. 02, 2023				
Preamplifier	EMC	EMC02325	980225	Jun. 28, 2023	Jun. 27, 2024				
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 04, 2022	Oct. 03, 2023				
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 04, 2022	Oct. 03, 2023				
LF cable 11M	EMC	EMCCFD400-NW-N W-11000	200801	Oct. 04, 2022	Oct. 03, 2023				
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 04, 2022	Oct. 03, 2023				
Measurement Software	AUDIX	e3	6.120210g	NA	NA				
Wireless connectivity tester	R&S	CMW270	100856	Nov. 16, 2022	Nov. 15, 2023				
Note: Calibration Inter	rval of instruments liste	d above is one year.							

Report No.: FR162103-02AD Page: 8 of 18



### 1.5 Test Standards

47 CFR FCC Part 15.247 ANSI C63.10-2013

### 1.6 Reference Guidance

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

## 1.7 Deviation from Test Standard and Measurement Procedure

None

## 1.8 Measurement Uncertainty

The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)).

Measurement Uncertainty				
Parameters	Uncertainty			
AC conducted emission	±2.92 dB			
Radiated emission ≤ 1GHz	±3.41 dB			

Report No.: FR162103-02AD Page: 9 of 18



## 2 Test Configuration

## 2.1 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	CO01-WS, 03CH01-WS
Address of Test Site	No.3-1, Lane 6, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

FCC Designation No.: TW2732FCC site registration No.: 181692

➤ ISED#: 10807A

➤ CAB identifier: TW2732

### 2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate (Mbps)	Test Configuration
Conducted Emissions Radiated Emissions ≤ 1GHz	GFSK	2480	1Mbps	

#### NOTE:

Report No.: FR162103-02AD Page: 10 of 18

<sup>1.</sup> The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.



## 3 Transmitter Test Results

### 3.1 Conducted Emissions

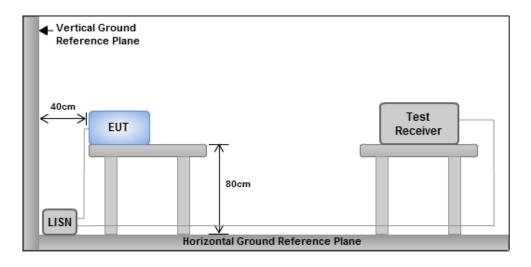
#### 3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit					
Frequency Emission (MHz)	Quasi-Peak	Average			
0.15-0.5	66 - 56 *	56 - 46 *			
0.5-5	56	46			
5-30	60	50			
Note 1: * Decreases with the logarithm of the frequency.					

#### 3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V/60Hz

#### 3.1.3 Test Setup



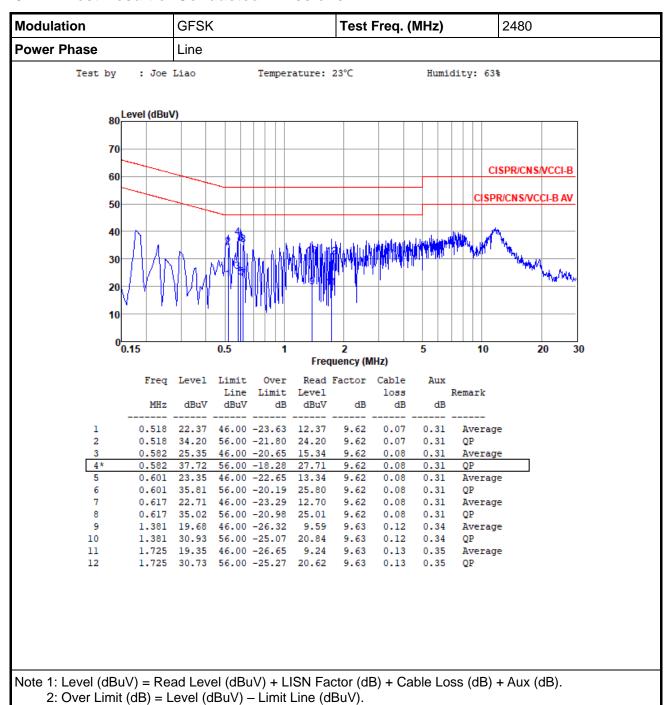
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

Report No.: FR162103-02AD Page: 11 of 18

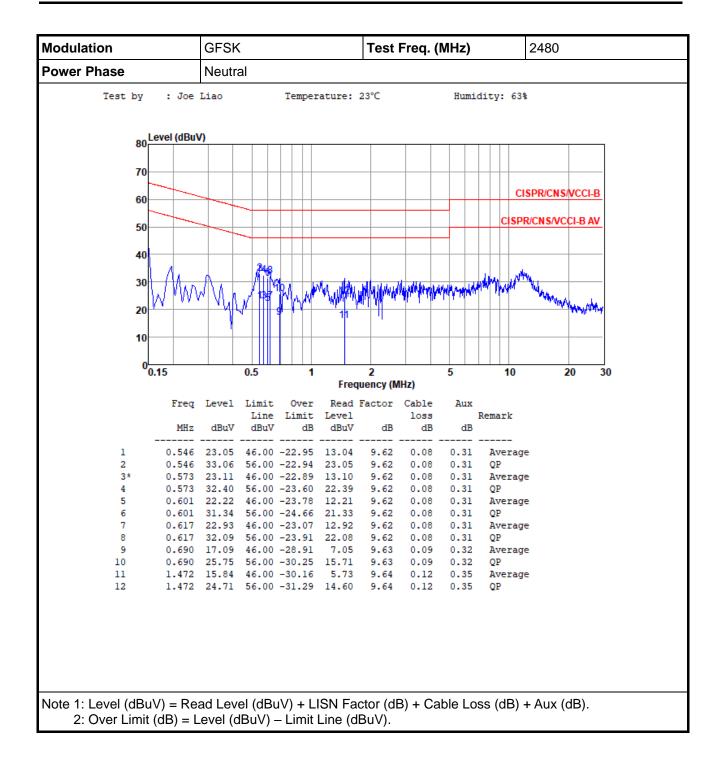


#### 3.1.4 Test Result of Conducted Emissions



Report No.: FR162103-02AD Page: 12 of 18





Report No.: FR162103-02AD Page: 13 of 18



## 3.2 Unwanted Emissions into Restricted Frequency Bands

### 3.2.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit							
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)				
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300				
0.490~1.705	24000/F(kHz)	33.8 - 23	30				
1.705~30.0	30	29	30				
30~88	100	40	3				
88~216	150	43.5	3				
216~960	200	46	3				
Above 960	500	54	3				

#### Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

Report No.: FR162103-02AD Page: 14 of 18



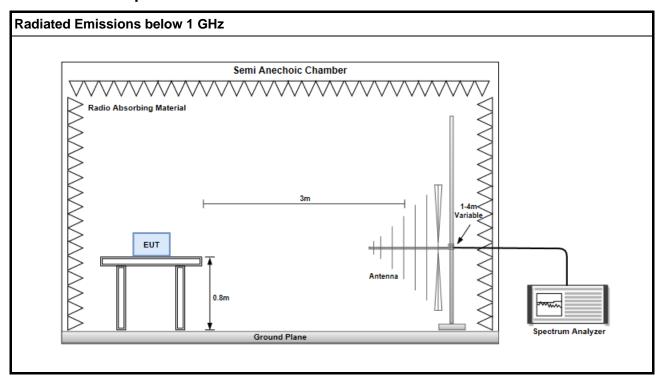
#### 3.2.2 Test Procedures

- 1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane.
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

#### Note:

1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.

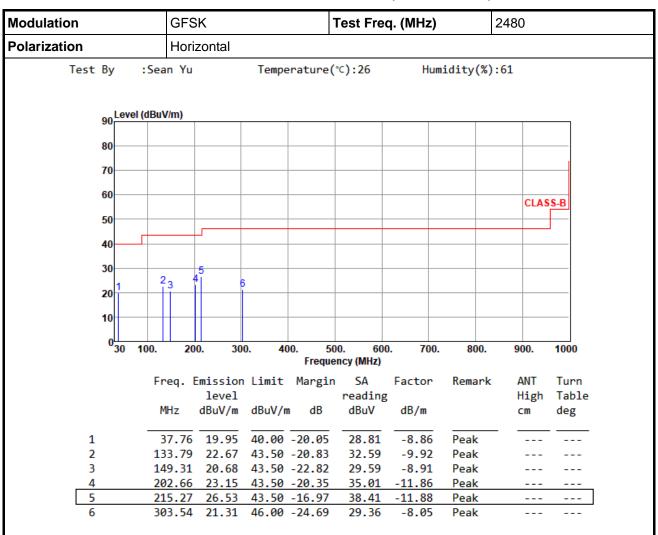
### 3.2.3 Test Setup



Report No.: FR162103-02AD Page: 15 of 18



### 3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor\* (dB/m)

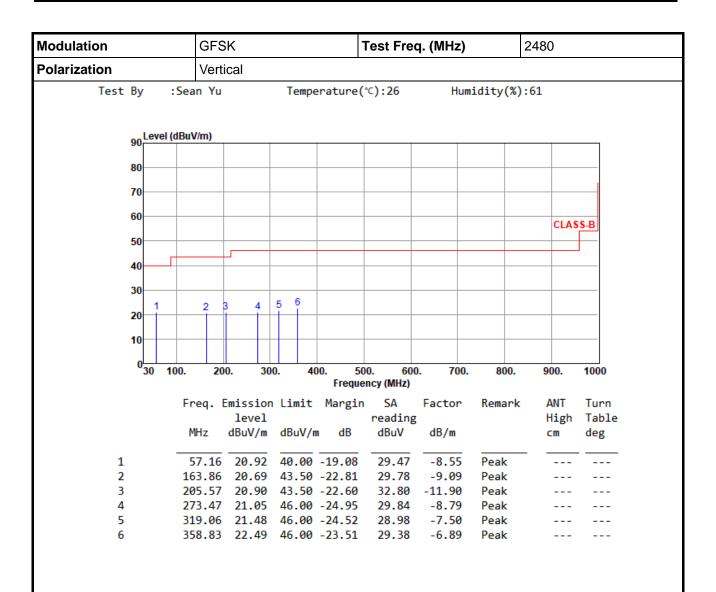
\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Report No.: FR162103-02AD Page: 16 of 18





Note 1: Emission Level (dBuV/m) = SA Reading (dBuV) + Factor\* (dB/m)

\*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

Report No.: FR162103-02AD Page: 17 of 18



## 4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corporation (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website <a href="http://www.icertifi.com.tw">http://www.icertifi.com.tw</a>.

#### Linkou

Tel: 886-2-2601-1640 No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)

#### Kwei Shan

Tel: 886-3-271-8666
No.3-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)
No.2-1, Lane 6, Wen San 3rd
St., Kwei Shan Dist., Tao Yuan
City 33381, Taiwan (R.O.C.)

#### Kwei Shan Site II

Tel: 886-3-271-8640 No.14-1, Lane 19, Wen San 3rd St., Kwei Shan Dist., Tao Yuan City 33381, Taiwan (R.O.C.)

If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0345

Email: ICC Service@icertifi.com.tw

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Report No.: FR162103-02AD Page: 18 of 18