FCC C2PC Test Report

FCC ID	:	**RF41539B**
Equipment	:	**Handheld Terminal**
Model No.	:	**DX-A600**
Brand Name	:	**KEYENCE**
Applicant	:	**KEYENCE CORPORATION**
Address	:	**1-3-14 HIGASHI-NAKAJIMA, HIGASHI-YODOGAWA-KU, OSAKA, JAPAN**
Standard	:	**47 CFR FCC Part 27**
Received Date	:	**Sep. 26, 2023**
Tested Date	:	**Oct. 02, 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 Chen / Assistant Manager	**Gary Chang / Manager**

Table of Contents

1 GENERAL DESCRIPTION 5

1.1 Information 5
1.2 Local Support Equipment List 7
1.3 Test Setup Chart 7
1.4 The Equipment List 8
1.5 Test Standards 8
1.6 Reference Guidance 8
1.7 Deviation from Test Standard and Measurement Procedure 8
1.8 Measurement Uncertainty 9

2 TEST CONFIGURATION 10

2.1 Testing Condition and Location Information 10
2.2 Testing Facility 10
2.3 The Worst Test Modes and Channel Details 10

3 TEST RESULTS 11

3.1 Radiated Emissions 11

4 TEST LABORATORY INFORMATION 13

APPENDIX A TEST RESULTS FOR RADIATED EMISSIONS

Release Record

Report No.	Version	Description	Issued Date
FG162104-02P27-1	Rev. 01	Initial issue	Nov. 02, 2023

Summary of Test Results

FCC Rules	Description of Test	Measured	Result
2.1053 / 27.53(m)(4)(6)	Radiated Emissions	Meet the requirement of limit	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.

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. FG162104-01P27-1. The modification is concerned with following items:

- ✧ Added components and change specification of resistor for HAC, T-coil function
- ✧ PCB re-layout for above change.

Therefore, radiated emission below 1GHz test was performed.

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	LTE Band 41: 2496 MHz ~ 2690 MHz
Modulation Type	QPSK, 16QAM (Uplink)

1.1.2 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	PIFA	2.09	No	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Supply Voltage	3.8Vdc		
Operational Voltage	☒ Vnom (3.8 V)	☒ Vmax (3.99 V)	☒ Vmin (3.61 V)
Operational Climatic	☒ Tnom (20°C)	☒ Tmax (50°C)	☒ Tmin (-30°C)

1.1.4 Accessories

Accessories		
No.	**Equipment**	**Description**
1	Battery	Brand: KEYENCE Model: DX-BQ6 Rating: 3.8Vdc (23.02Wh) 6060mAh

1.1.5 Operating Channel List

Channel Bandwidth (MHz)	Channel	Frequency (MHz)
5	39675	2498.5
5	40620	2593.0
5	41565	2687.5
10	39700	2501.0
10	40620	2593.0
10	41540	2685.0
15	39725	2503.5
15	40620	2593.0
15	41515	2682.5
20	39750	2506.0
20	40620	2593.0
20	41490	2680.0

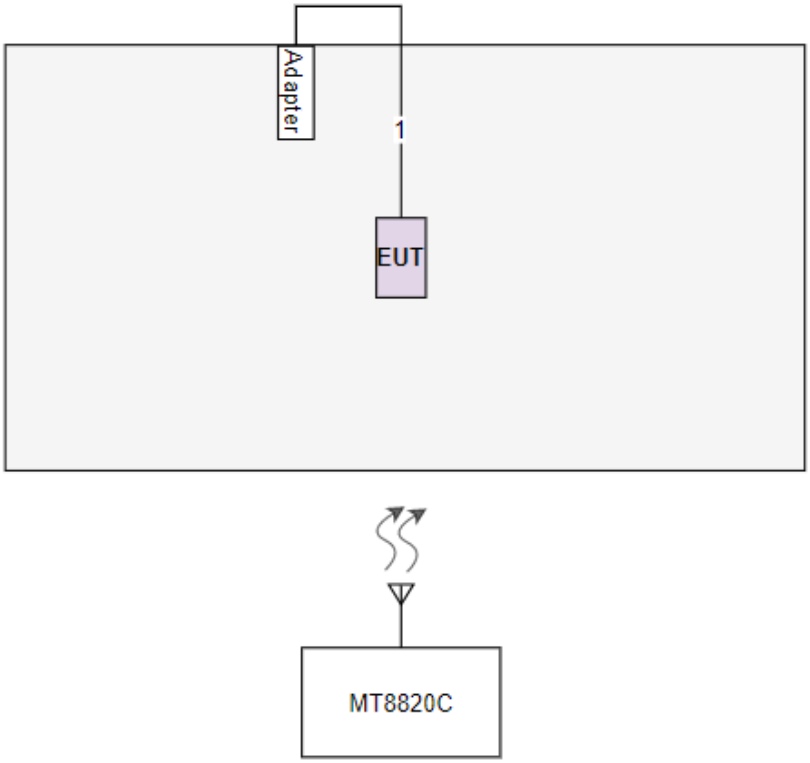
1.2 Local Support Equipment List

Support Equipment List					
No.	**Equipment**	**Brand**	**Model**	**FCC ID**	**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

Test Setup Diagram



No.	Signal cable / Length (m)
1	USB, 1m shielded. (Provided by applicant.)

1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 1 / (03CH01-WS)				
Tested Date	Oct. 02, 2023				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**Calibration Date**	**Calibration Until**
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	Jul. 31, 2023	Jul. 30, 2024
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-NW-11000	200801	Oct. 04, 2022	Oct. 03, 2023
LF cable 1M	EMC	EMCCFD400-NM-NM-1000	160502	Oct. 04, 2022	Oct. 03, 2023
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Radio Communication Analyzer	Anritsu	MT8820C	6201240341	Oct. 31, 2022	Oct. 30, 2023
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

47 CFR FCC Part 27
ANSI C63.26-2015

1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01
FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
FCC KDB 971168 D02 Misc Rev Approv License Devices v02r01

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**
Radiated emission ≤ 1GHz	±3.41 dB

2 Test Configuration

2.1 Testing Condition and Location Information

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH01-WS	25°C / 63%	Paul Lin

- FCC Designation No.: TW2732
- FCC site registration No.: 181692
- ISED#: 10807A
- CAB identifier: TW2732

2.2 Testing Facility

Test Laboratory	International Certification Corporation
Test Site	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.)

2.3 The Worst Test Modes and Channel Details

Test item	Channel Bandwidth	Modulation	Test channel
Radiated Emission ≤ 1GHz	20 MHz	QPSK	40740

NOTE:

1. 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 Test Results

3.1 Radiated Emissions

3.1.1 Limit of Radiated Emissions

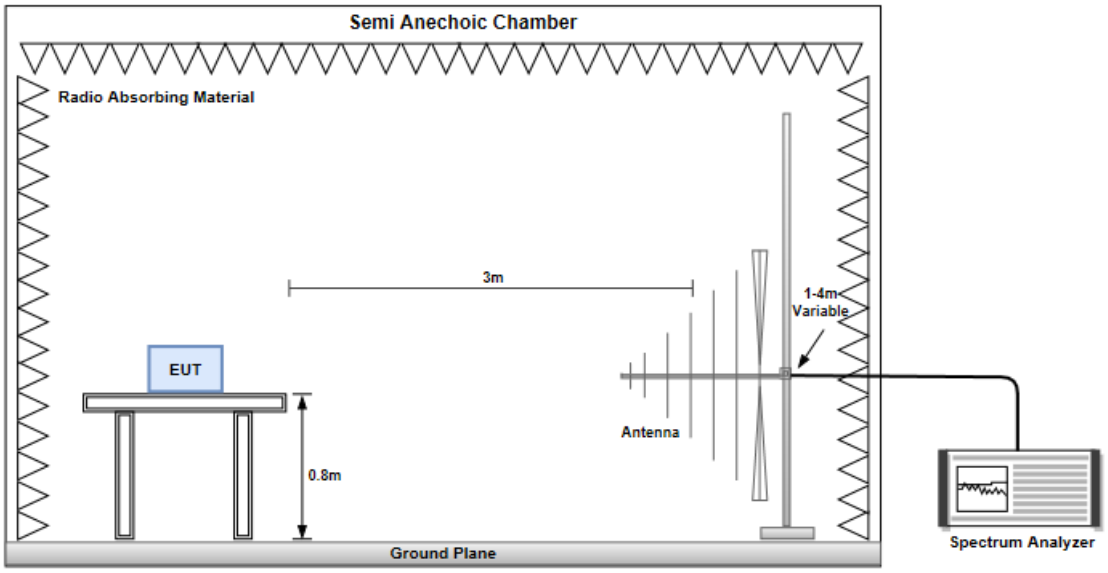
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB equal to -13 dBm.

3.1.2 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. 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 and4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.
4. After finding the max radiated emission, substitution method will be used for getting effective radiated power. EUT will be removed and substitution antenna will be placed at same position. Signal generator will output CW signal to substitution antenna through a RF cable. Rotate turntable and move antenna to find maximum radiated emission. Adjust output power of signal generator to let the maximum radiated emission is same as step 3. Record the output power level.
5. E.I.R.P = output power of step 4 + gain of substitution antenna – cable loss of RF cable.

3.1.3 Test Setup

Radiated Emissions below 1 GHz



3.1.4 Test Result of Radiated Emissions

Refer to Appendix A.

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 http://www.icertifi.com.tw.

Linkou	**Kwei Shan**	**Kwei Shan Site II**
Tel: 886-2-2601-1640	Tel: 886-3-271-8666	Tel: 886-3-271-8640
No.30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan (R.O.C.)	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.)	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

==END==

Test Result of Radiated Emissions below 1GHz

Mode	LTE Band 41, QPSK, CB:20 MHz, 1 RB, Channel: 40740						
Frequency (MHz)	**Antenna Polarity**	**E.I.R.P (dBm)**	**Limit (dBm)**	**Margin (dB)**	**S.A Reading (dBm)**	**S.G Power Value (dBm)**	**Correction Factor (dB)**
36.79	H	-70.64	-25	-45.64	-75.83	-55.1	-15.54
93.05	H	-65.79	-25	-40.79	-62.31	-63.42	-2.37
134.76	H	-75.28	-25	-50.28	-74.69	-71.95	-3.33
224	H	-73.91	-25	-48.91	-73.57	-76.56	2.65
347.19	H	-73.49	-25	-48.49	-75.21	-77	3.51
408.3	H	-74.49	-25	-49.49	-76.74	-77.89	3.4
34.85	V	-65.96	-25	-40.96	-65.49	-50.14	-15.82
93.05	V	-66.08	-25	-41.08	-67.06	-63.71	-2.37
117.3	V	-67.59	-25	-42.59	-70.04	-64.57	-3.02
150.28	V	-67.53	-25	-42.53	-72.2	-64.31	-3.22
332.64	V	-73.38	-25	-48.38	-76.18	-76.72	3.34
406.36	V	-71.65	-25	-46.65	-75.58	-75.05	3.4

NOTE: EIRP = S.G power value + correction factor