

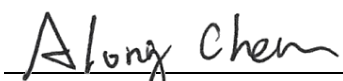
FCC C2PC Test Report

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 22 Subpart H
Received Date : Jul. 06, 2023
Tested Date : Jul. 15 ~ Jul. 17, 2023

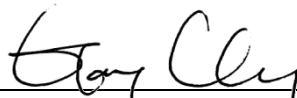
We, International Certification Corporation, would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It shall not be reproduced except in full without the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

Reviewed by:

Approved by:



Along Chen / Assistant Manager



Gary Chang / Manager

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APPENDIX A TEST RESULTS FOR RADIATED EMISSIONS

Release Record

Report No.	Version	Description	Issued Date
FG162103-02P22	Rev. 01	Initial issue	Aug. 10, 2023

Summary of Test Results

FCC Rules	Test Items	Measured	Result
2.1053 / 22.917(a)	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. FG162103P22. The difference is changing components of LPDDR & eMMC.

1.1.1 Specification of the Equipment under Test (EUT)

Operating Frequency	WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 5: 824 MHz ~ 849 MHz
Modulation	WCDMA AMR / RMC / HSDPA / HSUPA: BPSK (Uplink) LTE: QPSK, 16QAM (Uplink)

1.1.2 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector	Remark
1	PIFA	-2.89	No	---

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	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-BQ3 Rating: 3.8Vdc (11.51Wh) 3030mAh

1.1.5 Operating Channel List

WCDMA Band V		
Channel Location	Channel	Frequency (MHz)
Low	4132	826.4
Middle	4182	836.4
High	4233	846.6

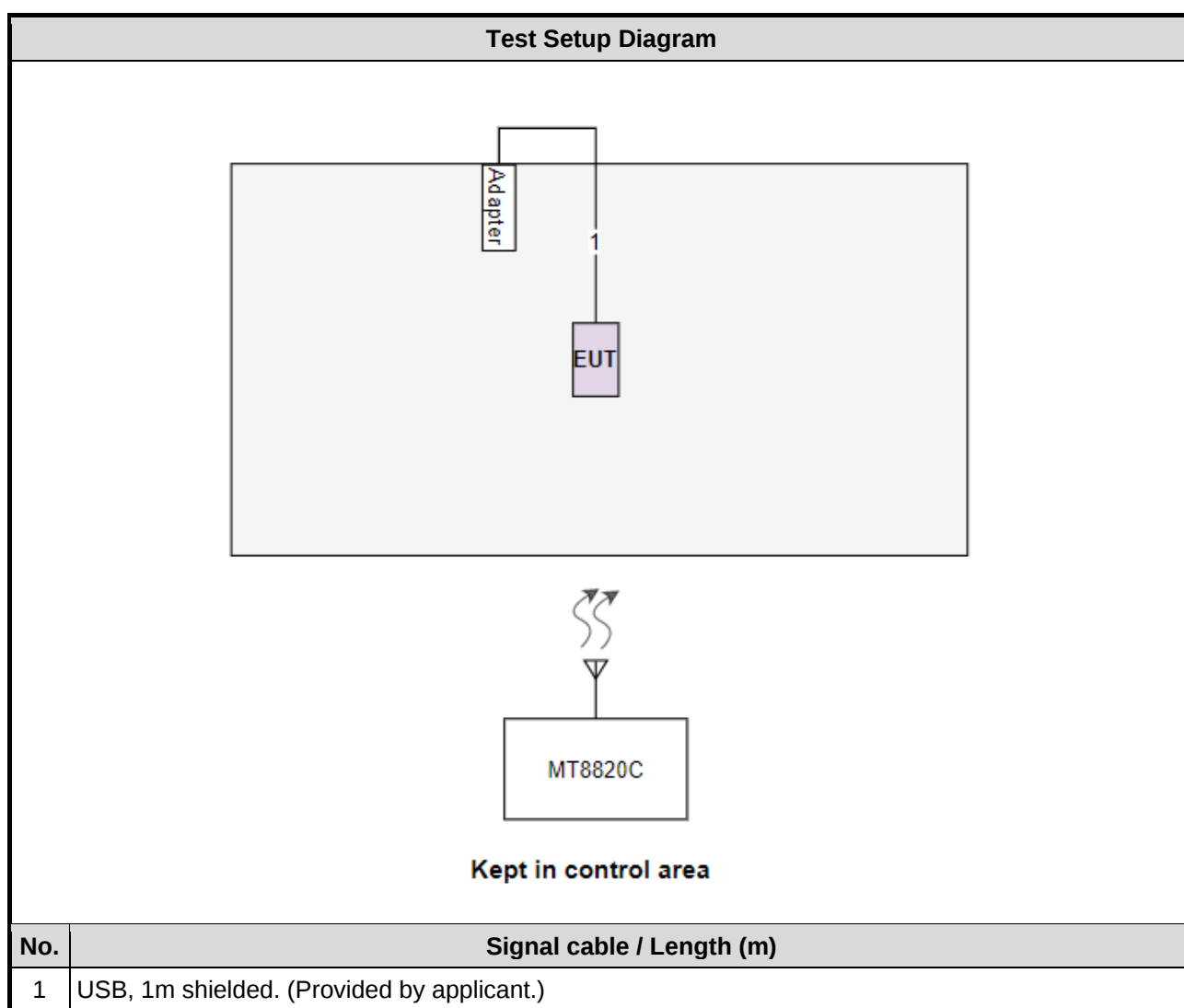
LTE Band 5		
Channel Bandwidths (MHz)	Channel	Frequency (MHz)
1.4	20407	824.7
1.4	20525	836.5
1.4	20643	848.3
3	20415	825.5
3	20525	836.5
3	20635	847.5
5	20425	826.5
5	20525	836.5
5	20625	846.5
10	20450	829.0
10	20525	836.5
10	20600	844.0

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



1.4 The Equipment List

Test Item	Radiated Emission				
Test Site	966 chamber 1 / (03CH01-WS)				
Tested Date	Jul. 15 ~ Jul. 17, 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	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- 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 22 Subpart H
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 $\leq$ 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	26°C / 63%	Sean Yu

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

2.2 Testing Facility

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

2.3 The Worst Test Modes and Channel Details

WCDMA Band V		
Test item	Mode	Test channel
Radiated Emissions ≤ 1GHz	WCDMA Band V	4233
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.		

LTE Band 5			
Test item	Channel Bandwidths	Modulation	Test channel
Radiated Emission ≤ 1GHz	1.4 MHz	QPSK	20407
	3 MHz	QPSK	20415
	5 MHz	QPSK	20425
	10 MHz	QPSK	20525
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

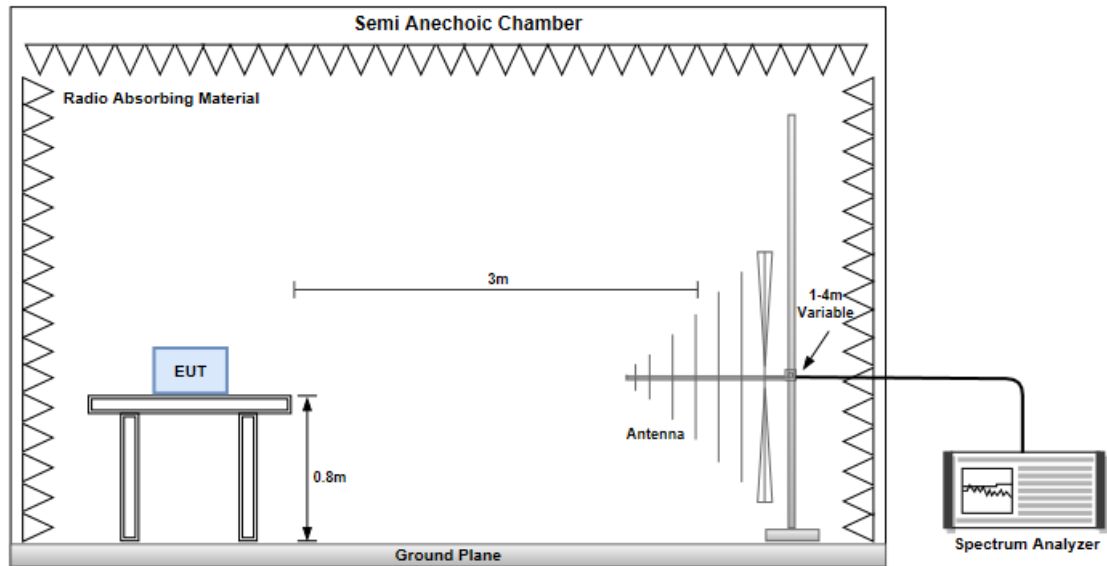
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB equal to -13dBm.

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 and 4 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. ERP can be calculated by below formula:
$$E.R.P = E.I.R.P - 2.15dB.$$

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

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

==END==

Test Result of Radiated Emissions below 1GHz (WCDMA Band V)

Mode	Mode: 3G WCDMA RMC, Band:5, Channel:4233						
Frequency (MHz)	Antenna Polarity	E.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
33.88	H	-70.62	-13	-57.62	-73.8	-52.41	-16.06
98.64	H	-79.53	-13	-66.53	-73.42	-74.9	-2.48
135.93	H	-76.36	-13	-63.36	-73.79	-70.86	-3.35
189.62	H	-74.6	-13	-61.6	-71.51	-73.55	1.1
233.42	H	-71.96	-13	-58.96	-69.82	-72.5	2.69
312.02	H	-75.32	-13	-62.32	-74.03	-76.27	3.1
33.88	V	-63.02	-13	-50.02	-60.38	-44.81	-16.06
46.52	V	-71.59	-13	-58.59	-69.68	-54.89	-14.55
91.25	V	-69.67	-13	-56.67	-68.54	-65.12	-2.4
140.26	V	-72.48	-13	-59.48	-75.06	-66.92	-3.41
161.28	V	-72.16	-13	-59.16	-75.6	-67.16	-2.85
211.49	V	-73.47	-13	-60.47	-72.79	-73.91	2.59

NOTE: ERP = S.G power value + correction factor – 2.15

Test Result of Radiated Emissions below 1GHz (LTE Band 5)

Mode	LTE Band 5, QPSK, CB:1.4 MHz, 1 RB, Channel: 20407						
Frequency (MHz)	Antenna Polarity	E.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
33.88	H	-70.92	-13	-57.92	-74.1	-52.71	-16.06
98.64	H	-79.8	-13	-66.8	-73.69	-75.17	-2.48
136.48	H	-76.28	-13	-63.28	-73.9	-70.77	-3.36
216.3	H	-76.83	-13	-63.83	-71.06	-77.29	2.61
231.26	H	-71.69	-13	-58.69	-69.47	-72.22	2.68
312.24	H	-76.69	-13	-63.69	-75.41	-77.64	3.1
33.88	V	-62.64	-13	-49.64	-60	-44.43	-16.06
46.57	V	-71.92	-13	-58.92	-70.01	-55.23	-14.54
91.23	V	-69.64	-13	-56.64	-68.51	-65.08	-2.41
140.47	V	-72.78	-13	-59.78	-75.36	-67.22	-3.41
159.86	V	-73.48	-13	-60.48	-75.95	-68.3	-3.03
211.66	V	-73.78	-13	-60.78	-73.09	-74.22	2.59

Mode	LTE Band 5, QPSK, CB:3 MHz, 1 RB, Channel: 20415						
Frequency (MHz)	Antenna Polarity	E.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
33.88	H	-70.6	-13	-57.6	-73.78	-52.39	-16.06
98.83	H	-79.67	-13	-66.67	-73.52	-75.03	-2.49
136.47	H	-76.41	-13	-63.41	-73.92	-70.9	-3.36
216.52	H	-72.97	-13	-59.97	-70.21	-73.43	2.61
231.41	H	-73.18	-13	-60.18	-70.97	-73.71	2.68
312.26	H	-74.62	-13	-61.62	-73.34	-75.57	3.1
33.88	V	-62.89	-13	-49.89	-60.25	-44.68	-16.06
46.58	V	-72.38	-13	-59.38	-70.47	-55.69	-14.54
91.64	V	-69.73	-13	-56.73	-68.59	-65.18	-2.4
104.75	V	-72.41	-13	-59.41	-74.99	-66.85	-3.41
159.58	V	-73.49	-13	-60.49	-75.96	-68.3	-3.04
211.48	V	-72.69	-13	-59.69	-72.01	-73.13	2.59

NOTE: ERP = S.G power value + correction factor - 2.15

Mode	LTE Band 5, QPSK, CB:5 MHz, 1 RB, Channel: 20425						
Frequency (MHz)	Antenna Polarity	E.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
33.88	H	-70.63	-13	-57.63	-73.81	-52.42	-16.06
49.56	H	-74.48	-13	-61.48	-76.3	-58.23	-14.1
148.54	H	-74.34	-13	-61.34	-72.15	-68.94	-3.25
208.64	H	-74.48	-13	-61.48	-71.43	-74.91	2.58
248.64	H	-74.26	-13	-61.26	-72.67	-74.86	2.75
341.62	H	-75.33	-13	-62.33	-74.77	-76.62	3.44
33.88	V	-62.83	-13	-49.83	-60.19	-44.62	-16.06
49.54	V	-67.92	-13	-54.92	-65.85	-51.67	-14.1
90.72	V	-70.71	-13	-57.71	-69.6	-66.14	-2.42
120.23	V	-69.62	-13	-56.62	-70.24	-64.38	-3.09
151.18	V	-72.51	-13	-59.51	-75.03	-67.16	-3.2
213.26	V	-72.62	-13	-59.62	-71.87	-73.07	2.6

Mode	LTE Band 5, QPSK, CB:10 MHz, 1 RB, Channel: 20525						
Frequency (MHz)	Antenna Polarity	E.R.P (dBm)	Limit (dBm)	Margin (dB)	S.A Reading (dBm)	S.G Power Value (dBm)	Correction Factor (dB)
33.88	H	-70.32	-13	-57.32	-73.5	-52.11	-16.06
98.83	H	-79.64	-13	-66.64	-73.49	-75	-2.49
137.62	H	-75.33	-13	-62.33	-73.01	-69.8	-3.38
214.66	H	-72.18	-13	-59.18	-69.35	-72.63	2.6
231.56	H	-74.1	-13	-61.1	-71.89	-74.63	2.68
313.64	H	-75.6	-13	-62.6	-74.35	-76.57	3.12
33.88	V	-62.43	-13	-49.43	-59.79	-44.22	-16.06
46.77	V	-72.38	-13	-59.38	-70.46	-55.72	-14.51
91.64	V	-69.63	-13	-56.63	-68.49	-65.08	-2.4
142.33	V	-73.32	-13	-60.32	-75.88	-67.8	-3.37
167.63	V	-72.39	-13	-59.39	-74.67	-68.28	-1.96
214.03	V	-72.43	-13	-59.43	-71.64	-72.88	2.6

NOTE: ERP = S.G power value + correction factor - 2.15