





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 15.407

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 Cheld/ Assistant Manager Gary Chang / Manage

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Release Record

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

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.601MHz 37.37 (Margin -18.63dB) - QP	Pass
15.407(b) 15.209	Radiated Emissions	[dBuV/m at 3m]: 441.68MHz 28.63 (Margin -17.37dB) - 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.

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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. FR162103AN. The difference is changing components of LPDDR & eMMC.

1.1.1 Specification of the Equipment under Test (EUT)

	RF General Information					
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N⊤x)	Data Rate	
5150-5250 5250-5350	а	5180-5240 5260-5320	36-48 [4] 52-64 [4]	1	6-54 Mbps	
5150-5250 5250-5350	n (HT20)	5180-5240 5260-5320	36-48 [4] 52-64 [4]	1	MCS 0-7	
5150-5250 5250-5350	n (HT40)	5190-5230 5270-5310	38-46 [2] 54-62 [2]	1	MCS 0-7	
5150-5250 5250-5350	ac (VHT20)	5180-5240 5260-5320	36-48 [4] 52-64 [4]	1	MCS 0-9	
5150-5250 5250-5350	ac (VHT40)	5190-5230 5270-5310	38-46 [2] 54-62 [2]	1	MCS 0-9	
5150-5250 5250-5350	ac (VHT80)	5210 5290	42 [1] 58 [1]	1	MCS 0-9	

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

Note 2: 802.11a/n/ac uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM modulation.

1.1.2 Antenna Details

Ant. No.		Typo	Connector	Operating Frequ	encies (MHz) / An	tenna Gain (dBi)
	AIII. NO.	Туре	Connector	2400~2483.5	5150~5250	5250~5350
	1	PIFA	No	-0.23	4.81	4.81

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. Equipment Description						
1	Battery	Brand: KEYENCE Model: DX-BQ3 Rating: 3.8Vdc (11.51Wh) 3030mAh				

1.1.5 Channel List

802.11 a / H	T20 / VHT20	HT40 / VHT40		
Channel	Frequency(MHz)	Channel	Frequency(MHz)	
36	5180	38	5190	
40	5200	46	5230	
44	5220	54	5270	
48	5240	62	5310	
52	5260	VH.	Т80	
56	5280	42	5210	
60	5300	58	5290	
64	5320			

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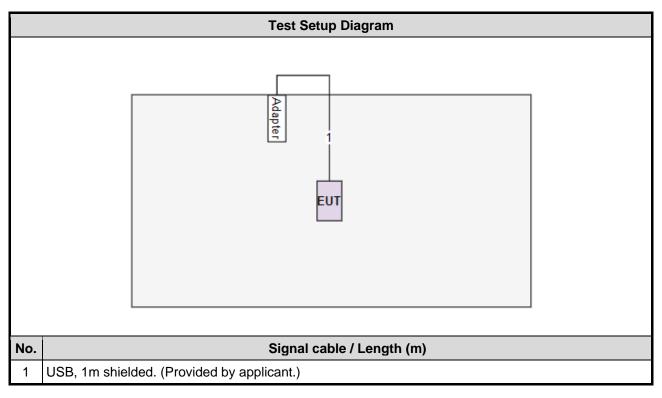


1.2 Local Support Equipment List

	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



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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	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 Interval of instruments listed above is one year.							

Test Item	Radiated Emission	Radiated Emission					
Test Site	966 chamber1 / (03Cl	966 chamber1 / (03CH01-WS)					
Tested Date	Jul. 15, 2023	Jul. 15, 2023					
Instrument	Brand	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-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		
Note: Calibration Inter	Note: Calibration Interval of instruments listed above is one year.						

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1.5 Test Standards

47 CFR FCC Part 15.407 ANSI C63.10-2013

1.6 Reference Guidance

FCC KDB 412172 D01 Determining ERP and EIRP v01r01 FCC KDB 789033 D02 General UNII Test Procedures New Rules 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	
AC conducted emission	±2.92 dB	
Radiated emission ≤ 1GHz	±3.41 dB	

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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	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	VHT40	5310	MCS 0	
Radiated Emissions ≤1GHz	VHT40	5310	MCS 0	

NOTE:

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^{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 Transmitter Test Results

3.1 Conducted Emissions

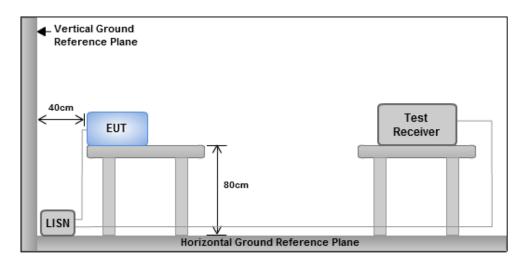
3.1.1 Limit of Conducted Emissions

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 Ω 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



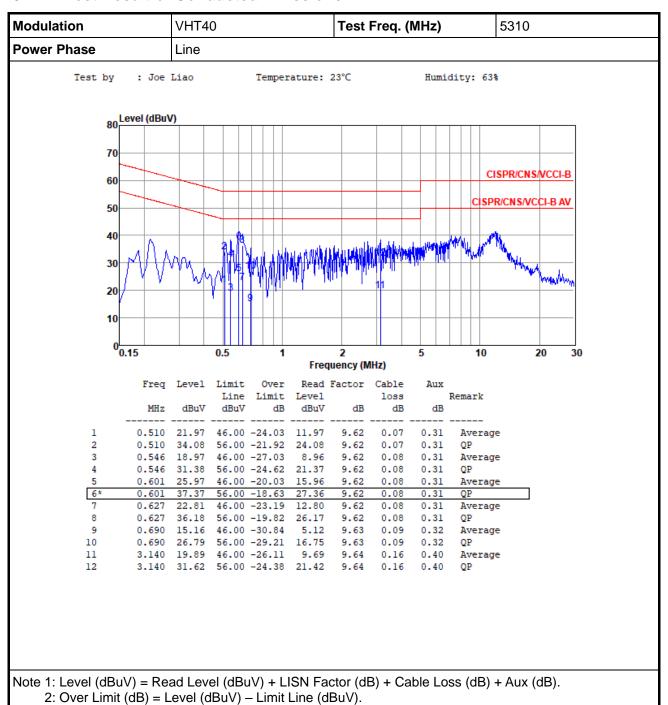
Note: 1. Support units were connected to second LISN.

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

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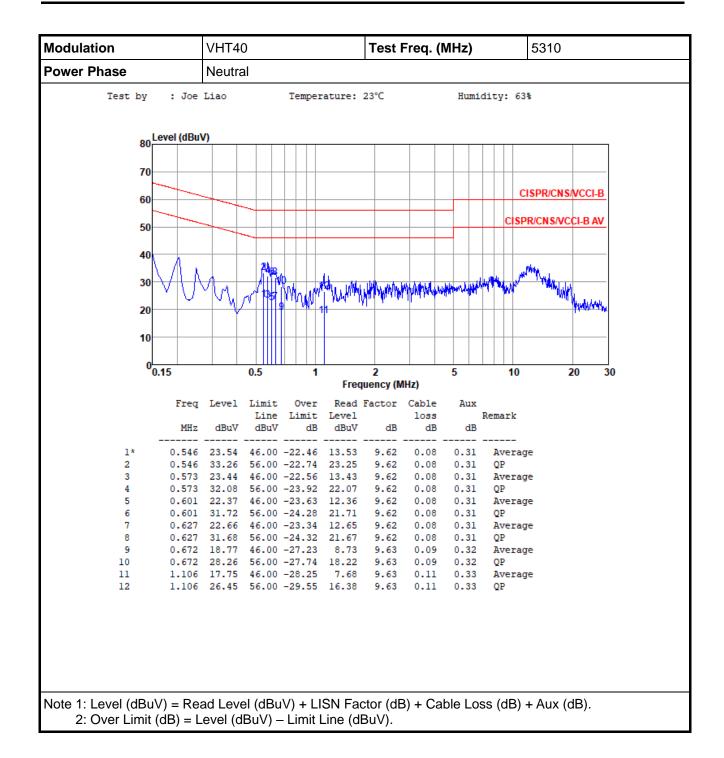


3.1.4 Test Result of Conducted Emissions



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3.2 Transmitter Radiated and Band Edge Emissions

3.2.1 Limit of Transmitter Radiated and Band Edge Emissions

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 **Note 2**:

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.

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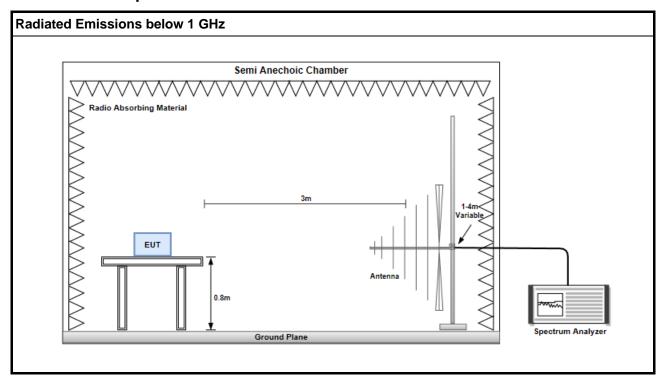
3.2.2 Test Procedures

- 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.

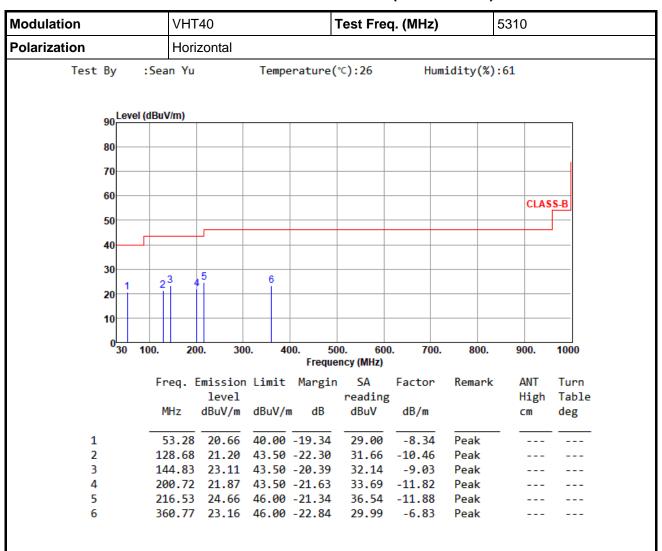
3.2.3 Test Setup



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3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



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

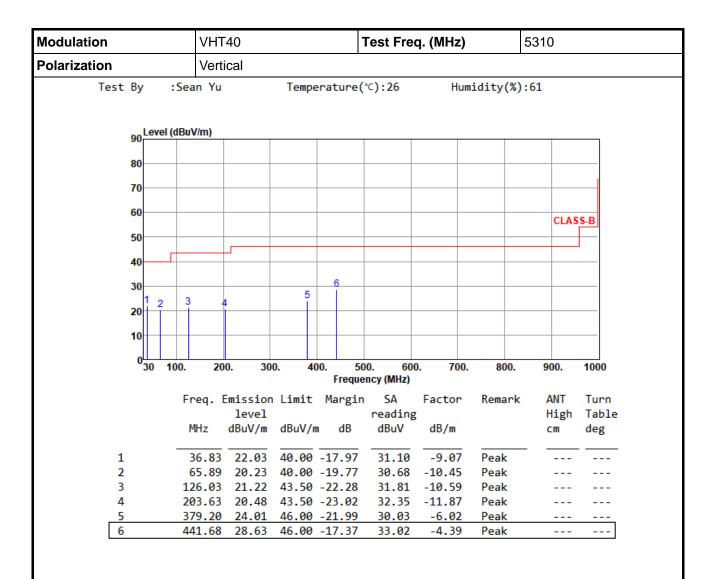
*Factor includes antenna factor , cable loss and amplifier gain

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.

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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.

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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==

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