

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: Certification Ordinance Article 2-1-19-3
Report No.: RJBEMI-WTW-P21070045A-1
Product: Electronic Display Device
Brand: Rakuten kobo
Model No.: N778
Received Date: 2024/1/19
Test Date: 2024/2/6
Issued Date: 2024/3/6

Applicant: NETRONIX, INC.
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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory
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Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Approved by: _____

May Chen / Manager

Date: _____

2024/3/6

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Prepared by : Phoenix Huang / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RJBEMI-WTW-P21070045A-1	Original release.	2024/3/6



1 Certificate

- Product:** Electronic Display Device
- Brand:** Rakuten kobo
- Test Model:** N778
- Sample Status:** Engineering sample
- Applicant:** NETRONIX, INC.
- Test Date:** 2024/2/6
- Standard:** Certification Ordinance Article 2-1-19-3
- Measurement procedure:** Measurement was conducted by the temporary test method which TELEC submitted to the Minister for Internal Affairs and Communications based on the Ordinance Concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Article 88, Paragraph 2

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

Certification Ordinance Article 2-1-19-3		
Clause	Test Item	Result
OR: Article 7. Annex 3.29	Spurious Emissions	Pass
OR: Article 49-20	Antenna Specifications	Pass
OR: Article 24.2	Spurious Emissions of Receiver	Pass
OR: Article 49-20	Housing Requirements	Pass (Refer to Note 1)

Notes:

1. The relative information refer section 3.1 of this report.
2. OR: Ordinance Regulating Radio Equipment
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
4. This report is prepared for supplementary report.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in ETSI TR 100 028-1 and ETSI TR 100 028-2:

Parameter	Uncertainty (±)
Occupied Bandwidth	1050.00 Hz
Spurious Emissions	2.5 dB
Output power density	1.2 dB
Adjacent Channel Leakage Power	2.5 dB
Out of band radiated power	2.5 dB
Frequency Tolerance	960 Hz
Burst Length	2.2 ms

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Electronic Display Device
Brand	Rakuten kobo
Test Model	N778
Test Software Version	Tera Term paste N778_Wifi SOP command
Status of EUT	Engineering sample
Power Supply Rating	3.7 Vdc from battery or 5 Vdc from USB interface
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433.3 Mbps
Operating Frequency	5.18 GHz ~ 5.24 GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80):1
Cable Supplied	USB Cable x1 (Shielded, 1.0m)
Housing Requirements	The housing consists of two parts and the plastic enclosure was assembled with glue and covered by rubbers, separating the two parts was only possible by means of brute force.

Note:

- This is a supplementary report of Report No.: RJBEMI-WTW-P21070045-1. The differences between them are as below information:
 - ◆ Add 2nd source LDO (Low-dropout Linear regulator).
- According to above conditions, therefore only the TX/RX Spurious Emissions (below 1 GHz) test items need to be performed. And all data were verified to meet the requirements.
- Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	Bluetooth
2	WLAN 5GHz	Bluetooth

- The eMMC provided to the EUT, please refer to the following table:

No.	Model	Remark
1	EMMC32G-TX29-GA8A	1 st source eMMC
2	MKEMF032GZ1E-C	2 nd source eMMC

Note: From the above eMMCs, the worst case was found in **No. 1**. Therefore only the test data of the mode was recorded in this report.

- The EUT could be supplied with a rechargeable battery as the following table:

Brand Name	Model No.	Spec.
Guangdong Pow-Tech New Power	PT158098	3.7 Vdc, 1200 mAh, 4.44 Wh

- For input voltage of EUT, the worse case was found at the voltage 5 Vdc condition. Therefore only the test data of the mode was recorded in this report individually.

- The LDO provided to the EUT, please refer to the following table:

Original		
No.	Brand	Model
1	STCOMPONENT	ST6205B33FG
Newly		
2	TOPCHIP	TC50B33BDN

- The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Brand	Model No.	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
INPAQ	ACM3-3216-P1-CC-S	0.6	2.4~2.4835	Chip Antenna	None
		2	5.15~5.85		

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a SISO function:

5 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

3. Antenna Pattern:

Please refer to the attached file (Antenna pattern).

3.3 Channel List

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210 MHz



3.4 Power Setting

Channel	802.11a
36	57

3.5 Test Mode Applicability and Tested Channel Detail

Test Conditions	Voltage (Vdc)
V_{normal}	5
$V_{max. (+10\%)}$	5.5
$V_{min. (-10\%)}$	4.5

Pre-Scan:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	Test condition is presented in the report as above according to original test report.

Following channel(s) was (were) selected for the final test as listed below:

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Spurious Emissions	802.11a	36	BPSK	6Mb/s
Spurious Emissions of Receiver	20MHz System	36	-	-

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Spurious Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until	Calibration Authority	Calibration Method
DC Power Supply GOOD WILL INSTRUMENT CO. LTD	GPC-3030D	E847076	Note 2	Note 2	BV CPS E&E	(d)
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17	ETC	(c)
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A	N/A	N/A
True RMS Clamp Meter FLUKE	325	31130711WS	2023/6/8	2024/6/7	ETC	(c)

Notes:

- Calibration method:
 - Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) Japan Calibration Service System.
 - Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration conducted by using other equipment that listed above from a) to c).
- The power supply no evaluation calibrated, which used the RMS clamp meter to verify before each testing.
- The test was performed in Oven room 2.
- Tested Date: 2024/2/6

4.2 Spurious Emissions of Receiver

Refer to section 4.1 to get information of the instruments.

5 Limits of Test Items

5.1 Spurious Emissions

W52 bands: 20 MHz System

Frequencies	Limit
OBW : 18 MHz or Less	
30.0 to 1000.0 MHz	$\leq 0.25 \text{ uW}/100 \text{ kHz}$
1000.0 to 5142.0 MHz	$\leq 2.5 \text{ uW}/\text{MHz}$
5142.0 to 5150.0 MHz	$\leq 15.0 \text{ uW}/\text{MHz}$
5250.0 to 5251.0 MHz	$\leq 10.0^{1-(f-9)} \text{ mW}/\text{MHz}$
5251.0 to 5260.0 MHz	$\leq 10.0^{-1-(8/90)(f-11)} \text{ mW}/\text{MHz}$
5260.0 to 5266.7 MHz	$\leq 10.0^{-1.8-(6/50)(f-20)} \text{ mW}/\text{MHz}$
5266.7 to 26000.0 MHz	$\leq 2.5 \text{ uW}/\text{MHz}$
OBW : 18 ~ 20 MHz	
30.0 to 1000.0 MHz	$\leq 0.25 \text{ uW}/100 \text{ kHz}$
1000.0 to 5142.0 MHz	$\leq 2.5 \text{ uW}/\text{MHz}$
5142.0 to 5150.0 MHz	$\leq 15.0 \text{ uW}/\text{MHz}$
5250.0 to 5250.2 MHz	$\leq 10.0^{-1-(8/3)(f-9.75)} \text{ mW}/\text{MHz}$
5250.2 to 5251.0 MHz	$\leq 10.0^{1-(f-9)} \text{ mW}/\text{MHz}$
5251.0 to 5260.0 MHz	$\leq 10.0^{-1-(8/90)(f-11)} \text{ mW}/\text{MHz}$
5260.0 to 5266.7 MHz	$\leq 10.0^{-1.8-(6/50)(f-20)} \text{ mW}/\text{MHz}$
5266.7 to 26000.0 MHz	$\leq 2.5 \text{ uW}/\text{MHz}$

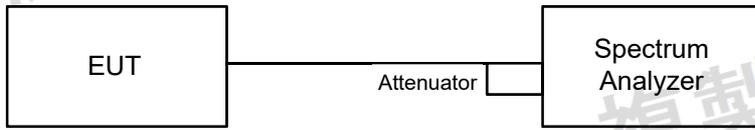
Note: The limit value is defined by the E.I.R.P.

5.2 Spurious Emissions of Receiver

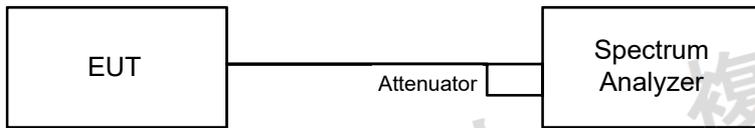
Frequencies	Limit
Below 1 GHz	$\leq 4 \text{ nW}$
Above 1 GHz	$\leq 20 \text{ nW}$

6 Test Arrangements

6.1 Spurious Emissions



6.2 Spurious Emissions of Receiver



7 Test Results of Test Item

7.1 Spurious Emissions

Environmental Conditions:	23°C, 67% RH	Tested By:	Katina Lu
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W52

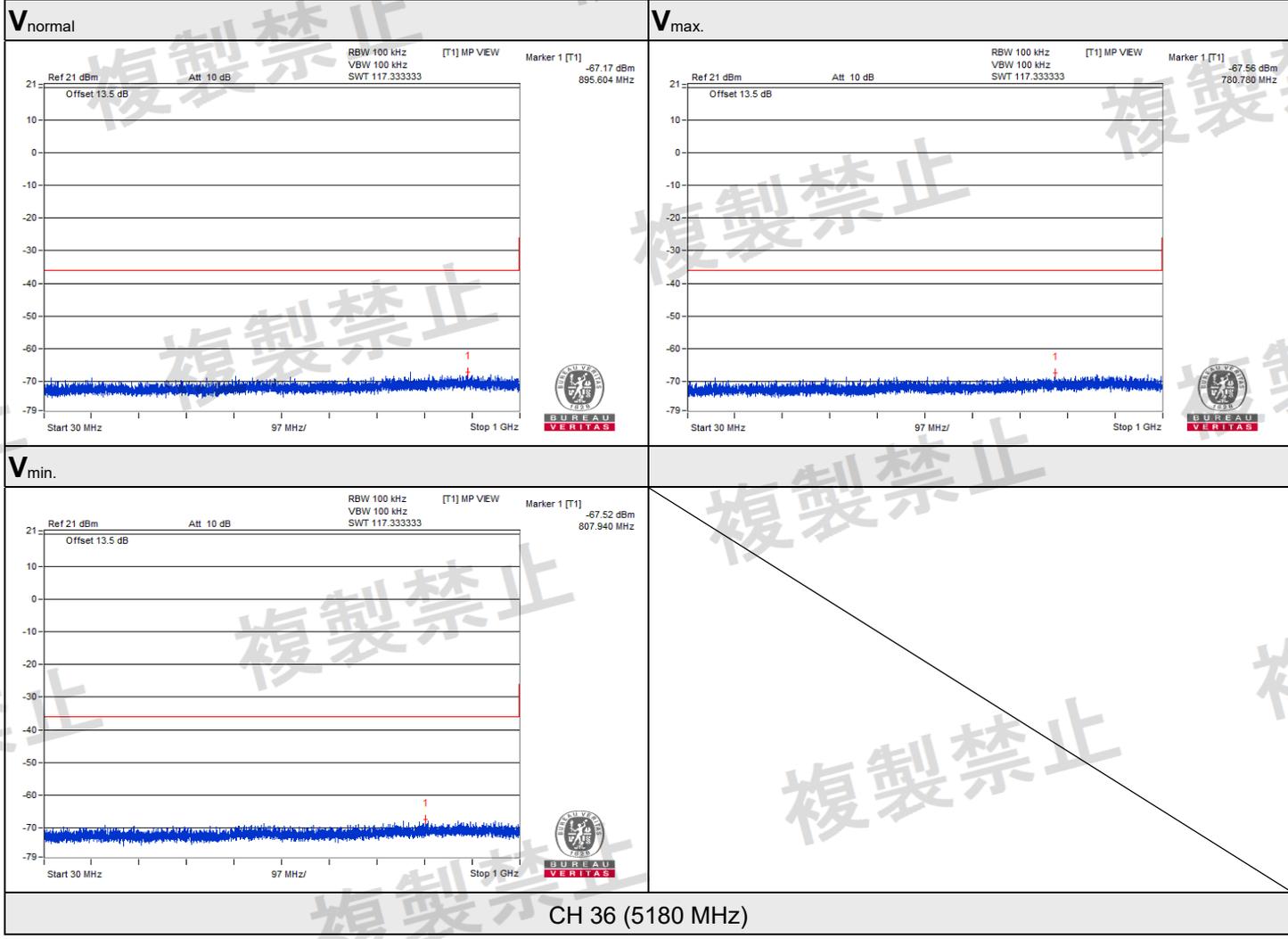
TEST CHANNEL		CH 36 (5180 MHz)			
TEST CONDITION	FREQUENCY RANGE (MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE	LIMIT	RESULT
V _{normal}	30.0 to 1000.0	895.604	0.000192 μ W/100kHz	0.25 μ W/100kHz	PASS
V _{max.}	30.0 to 1000.0	780.780	0.000175 μ W/100kHz	0.25 μ W/100kHz	PASS
V _{min.}	30.0 to 1000.0	807.940	0.000177 μ W/100kHz	0.25 μ W/100kHz	PASS

NOTE: 1. The spectrum plots are attached on the following pages.



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7.2 Spurious Emissions of Receiver

Environmental Conditions:	23°C, 67% RH	Tested By:	Katina Lu
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20 MHz System:

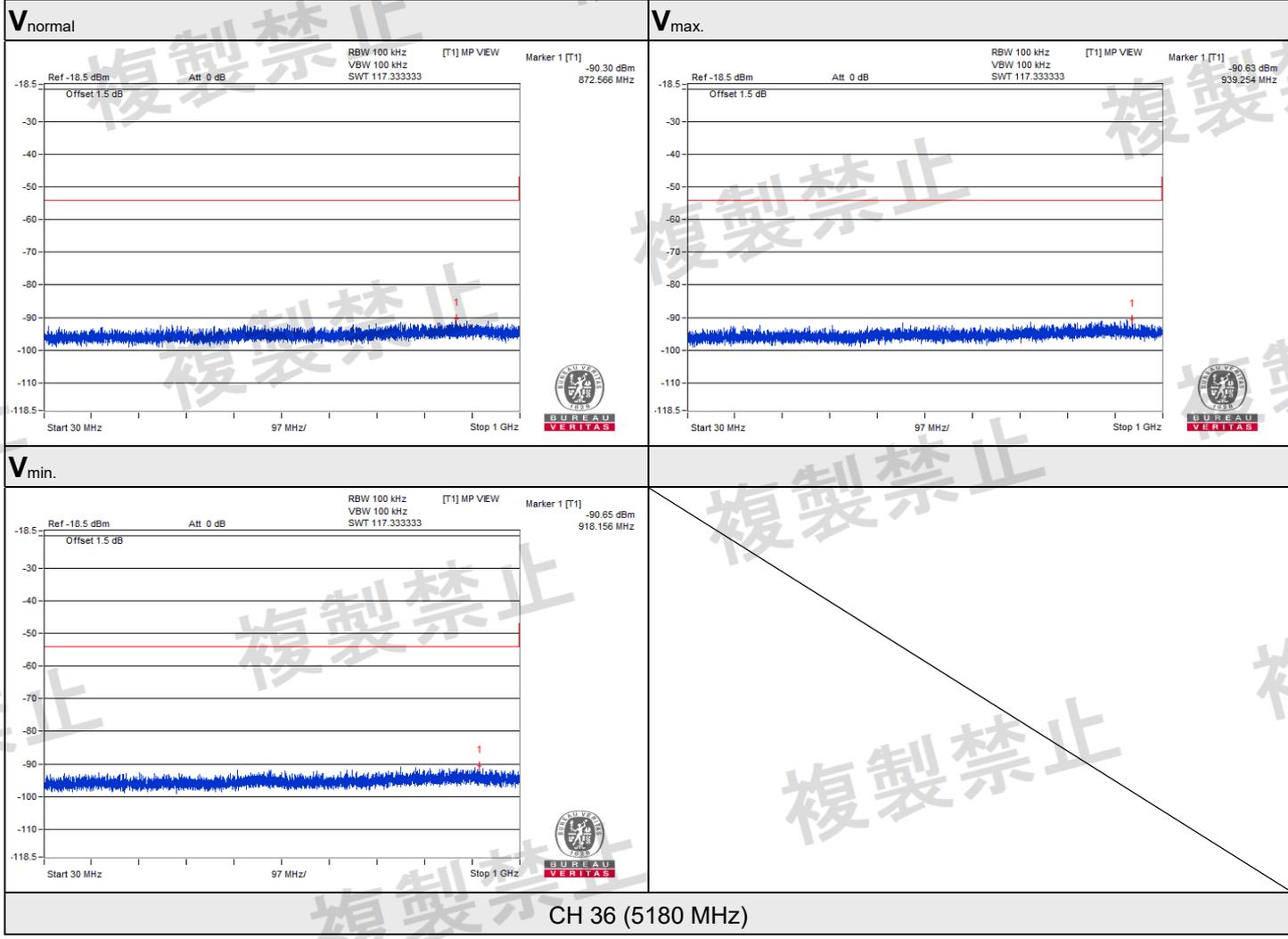
TEST CHANNEL		CH 36 (5180 MHz)			
TEST CONDITION	FREQUENCY RANGE(MHz)	FREQUENCY (MHz)	MEASUREMENT VALUE(nW)	LIMIT (nW)	RESULT
V _{normal}	30.0 to 1000.0	872.566	0.000933	4	PASS
V _{max.}	30.0 to 1000.0	939.254	0.000865	4	PASS
V _{min.}	30.0 to 1000.0	918.156	0.000861	4	PASS

NOTE: 1. The spectrum plots are attached on the following pages.



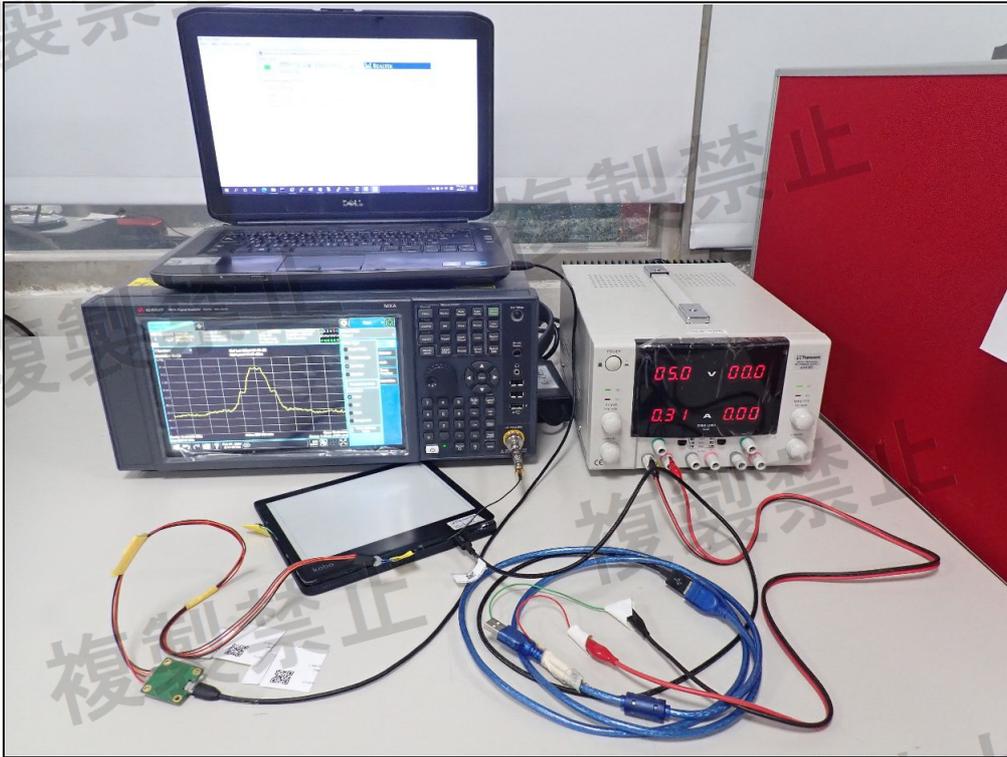
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8 Pictures of Test Arrangements



9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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