

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart B, Class A
ANSI C63.4-2014
ANSI C63.4a-2017

Report No.: FDBDBO-WTW-P24040523

Product: QEC

Brand: ICOP

Model No.: R

Series Model: QEC-RXXMPXS-X (X=0~9, A~Z, (,),/, - or Blank)

Received Date: 2024/4/24

Test Date: 2024/4/29 ~ 2024/4/30

Issued Date: 2024/7/4

Applicant: ICOP TECHNOLOGY INC.

Address: NO.15,Wugong 5th Rd., Xinzhuang Dist., New Taipei City 24890, Taiwan (R.O.C.)


Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

FCC Registration /
Designation Number: 418586 / TW1078

Approved by:


Jim Hsiang / Associate Technical Manager

, Date:

2024/7/4

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Prepared by : Annie Chang / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
FDBDBO-WTW-P24040523	Original release.	2024/7/4

1 Certificate

Product: QEC

Brand: iCOP

Test Model: R

Series Model: QEC-RXXMPXS-X (X=0~9, A~Z, (,),/, - or Blank)

Sample Status: Engineering sample

Applicant: ICOP TECHNOLOGY INC.

Test Date: 2024/4/29 ~ 2024/4/30

Standard: 47 CFR FCC Part 15, Subpart B, Class A
ANSI C63.4–2014
ANSI C63.4a–2017

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 EMC characteristics under the conditions specified in this report.

2 Summary of Test Results

The test items that the EUT need to perform in accordance with its interfaces, evaluated functions, are as follows:

Standard / Clause	Test Item	Result	Remark
FCC Part 15.107	Conducted Emissions from Power Ports	Pass	Minimum passing Class A margin is -3.98 dB at 0.27121 MHz
FCC Part 15.109	Radiated Emissions up to 1 GHz	Pass	Minimum passing Class A margin is -3.71 dB at 165.15 MHz

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted Emissions from Power Ports	9 kHz ~ 30 MHz	2.9 dB	3.4 dB (U_{CISPR})
Radiated Emissions up to 1 GHz	30 MHz ~ 1 GHz	3m : 5.62 dB 10m : 4.26 dB	6.3 dB (U_{CISPR})

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 Description of EUT

Product	QEC
Brand	iCOP
Test Model	R
Series Model	QEC-RXXMPXS-X (X=0~9, A~Z, (,),/, - or Blank)
Model Difference	Marketing Differentiation
Sample Status	Engineering sample
Power Supply Rating	DC 24V, 0.3A

3.2 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 200 kHz, provided by ICOP TECHNOLOGY INC., for detailed internal source, please refer to the manufacturer's specifications.

3.3 Features of EUT

The tests reported herein were performed according to the method specified by ICOP TECHNOLOGY INC., for detailed feature description, please refer to the manufacturer's specifications or user's manual.

Please refer to appendix of the report if the applicant has provided additional descriptions of the EUT.

3.4 Operating Modes of EUT and Determination of Worst Case Operating Mode

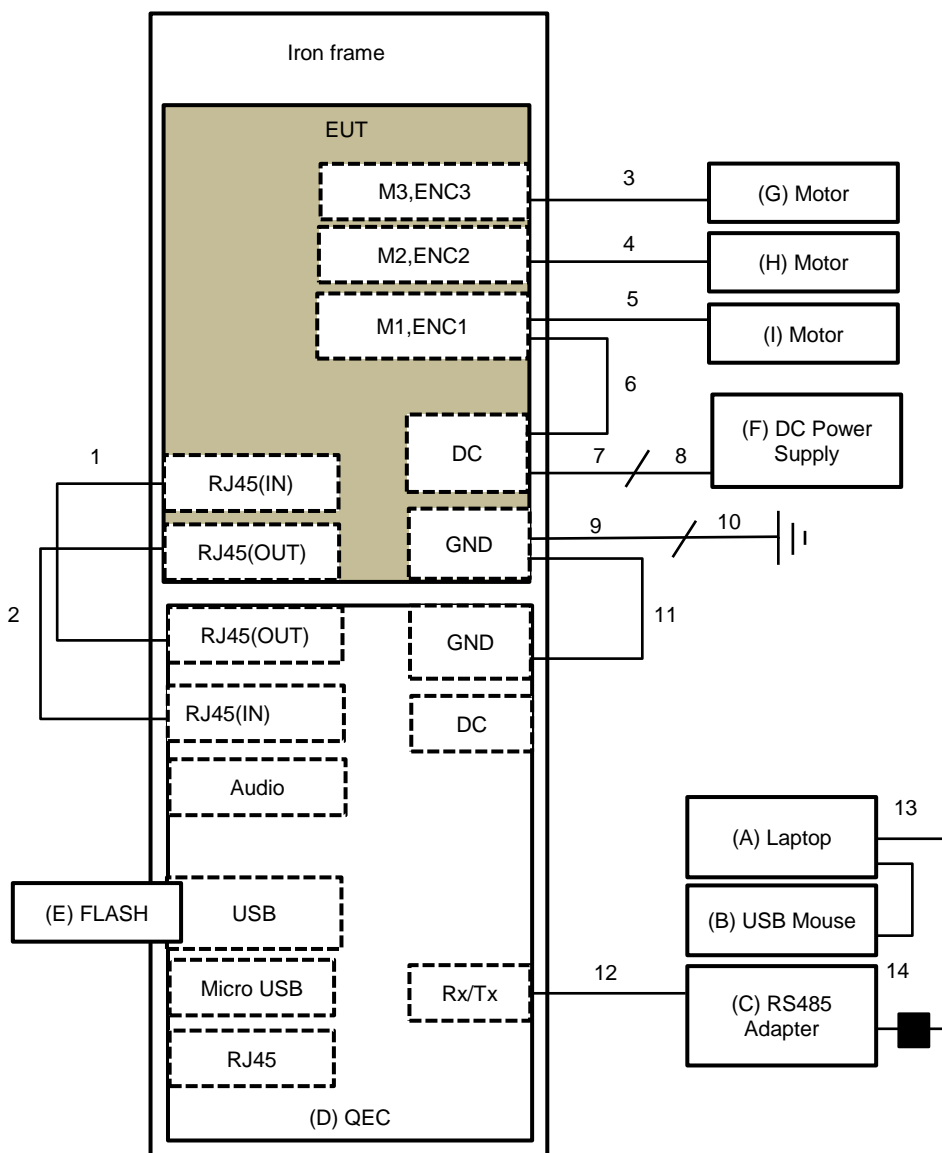
Test modes are presented in the report as below.

Test Condition	
Mode	Conducted Emissions from Power Ports
A	operating mode, Lan link + Input Power(24 Vdc)
Mode	Radiated Emissions up to 1 GHz
A	operating mode, Lan link + Input Power(24 Vdc)

3.5 Test Program Used and Operation Descriptions

- Turned on the power of all equipment.
- Laptop sent and received message to/ from EUT via controller devices.
- The motor operation via EUT.
- Laptop sent (H) messages to panel. Then they displayed messages on their screens simultaneously.
- Steps b-d were repeated.

3.6 Connection Diagram of EUT and Peripheral Devices



3.7 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Lenovo	TP00050A	N/A	N/A	Supplied by applicant
B	USB Mouse	DELL	MOCZUL	CN-049TWY- PRC00-77B-007R	N/A	Provided by Lab
C	RS485 Adapter	SOYAL	AR-321CM	N/A	N/A	Supplied by applicant
D	QEC	QEC	QEC-M-01	N/A	N/A	Supplied by applicant
E	FLASH	HP	V222W	N/A	N/A	Supplied by applicant
F	DC Power Supply	HILA	DP-6010	2216AP041904059	N/A	Provided by Lab
G	Motor	N/A	N/A	N/A	N/A	Supplied by applicant
H	Motor	N/A	N/A	N/A	N/A	Supplied by applicant
I	Motor	N/A	N/A	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	Cat. 5e	1	0.1	N	0	Supplied by applicant
2	Cat. 5e	1	0.1	N	0	Supplied by applicant
3	Data + Power	1	1	N	0	Supplied by applicant
4	Data + Power	1	1	N	0	Supplied by applicant
5	Data + Power	1	1	N	0	Supplied by applicant
6	Power	1	0.1	N	0	Supplied by applicant
7	Power	1	0.3	N	0	Supplied by applicant
8	Power	1	1	N	0	Provided by Lab
9	GND (PE)	1	0.3	N	0	Supplied by applicant
10	GND (PE)	1	1.5	N	0	Provided by Lab
11	GND (PE)	1	0.1	N	0	Supplied by applicant
12	Data	1	0.6	N	0	Supplied by applicant
13	USB	1	0.8	Y	1	Supplied by applicant
14	USB	1	1.8	Y	0	Supplied by applicant

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 Conducted Emissions from Power Ports

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance LYNICS	0900510	E1-01-305	2024/2/6	2025/2/5
		E1-011285	2023/9/21	2024/9/20
		E1-011286	2023/9/21	2024/9/20
Coupling / Decoupling Network TESEQ	CDN A201A	44601	2023/12/14	2024/12/13
EMI Test Receiver R&S	ESCS 30	100276	2024/4/24	2025/4/23
	ESR3	102413	2024/1/29	2025/1/28
Fixed Attenuator EMEC	EM-ATT30002602NN	N/A	2024/3/22	2025/3/21
Fixed Attenuator STI	STI02-2200-10	NO.3	2023/10/20	2024/10/19
High Voltage Probe Schwarzbeck	TK9420	00982	2023/12/11	2024/12/10
LISN R&S	ENV216	101196	2023/5/22	2024/5/21
		101197	2023/7/12	2024/7/11
	ESH3-Z5	100220	2023/11/22	2024/11/21
LISN Schwarzbeck	NNLK 8121	8121-731	2023/6/9	2024/6/8
		8121-00759	2023/8/21	2024/8/20
		8121-808	2023/5/2	2024/5/1
	NNLK 8129	8129229	2023/6/27	2024/6/26
RF Coaxial Cable PEWC	5D-FB	Cable-CO3-01	2023/9/13	2024/9/12
Software BVADT	Cond_V7.4.1.0	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou Conduction 3.
2. The VCCI Site Registration No. C-10274.
3. Tested Date: 2024/4/29

4.2 Radiated Emissions up to 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
ADT. Tower	AT100	0205	N/A	N/A
ADT. Turn Table	TT100	0205	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-303	2023/10/17	2024/10/16
Coupling / Decoupling Network Schwarzbeck	CDNE-M2	00097	2023/5/25	2024/5/24
	CDNE-M3	00091	2023/5/25	2024/5/24
EMI Test Receiver R&S	ESCS 30	100292	2023/9/7	2024/9/6
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ST2-01	2023/10/20	2024/10/19
MXE EMI Receiver Agilent	N9038A	MY50010158	2023/10/11	2024/10/10
Preamplifier Agilent	8447D	2944A11062	2024/2/7	2025/2/6
Preamplifier HP	8447D	2944A08313	2024/2/7	2025/2/6
RF Coaxial Cable Pacific	8D-FB	Cable-ST2-01	2023/11/7	2024/11/6
Software BVADT	Radiated_V8.8.09	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou Open Site2 , The test site validated date: 2023/7/15 (NSA)
2. The VCCI Site Registration No. R-10237.
3. Tested Date: 2024/4/30

5 Limits of Test Items

5.1 Conducted Emissions from Power Ports

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Radiated Emissions up to 1 GHz

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

Radiated Emissions Limits at 10 meters (dBµV/m)				
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	39.1	29.5	40	30
88-216	43.5	33.1		
216-230	46.4	35.6		
230-960			47	37
960-1000	49.5	43.5		

Radiated Emissions Limits at 3 meters (dBμV/m)				
Frequencies (MHz)	FCC 15B, Class A	FCC 15B, Class B	CISPR 22, Class A	CISPR 22, Class B
30-88	49.5	40.0	50.5	40.5
88-216	54.0	43.5		
216-230	56.9	46.0		
230-960				
960-1000	60.0	54.0	57.5	47.5

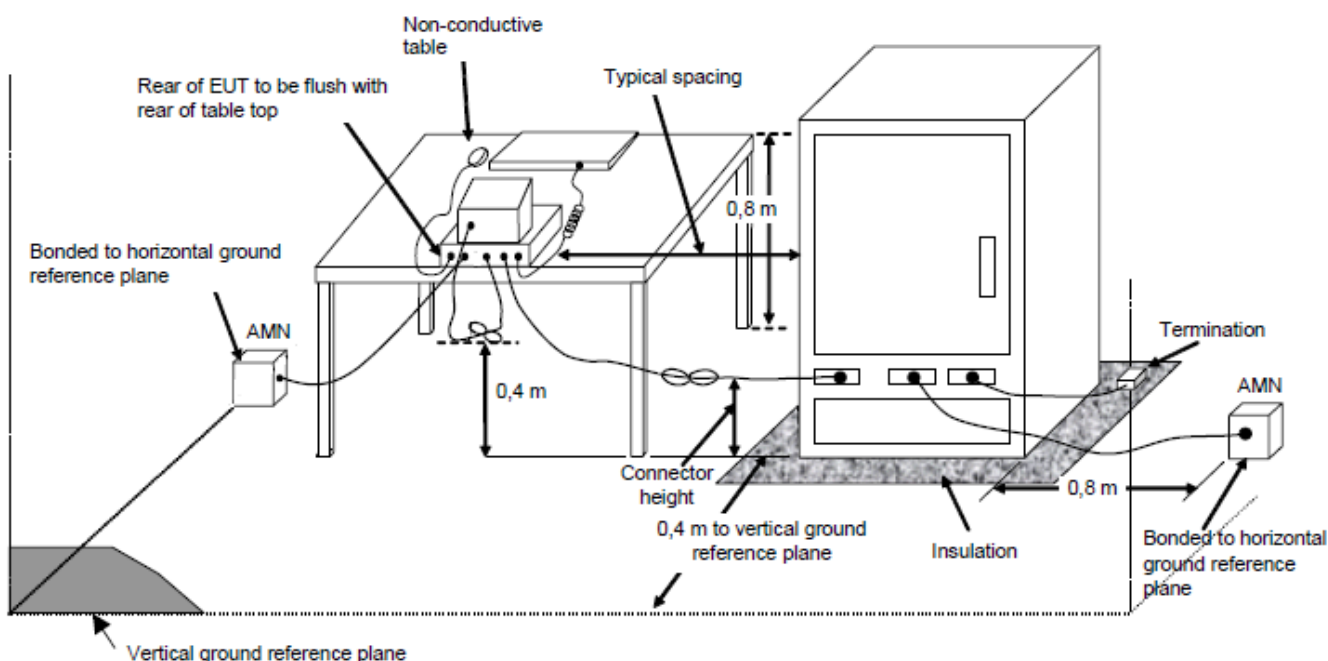
Notes: 1. The lower limit shall apply at the transition frequencies.

6 Test Arrangements

6.1 Conducted Emissions from Power Ports

- a. For the table-top EUT is placed on a 0.8 meter insulation table; for the floor standing EUT shall be insulated (by insulation of 12 mm) from the horizontal reference ground plane. The EUT is placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units are connected to the power mains through another LISN. They provide coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

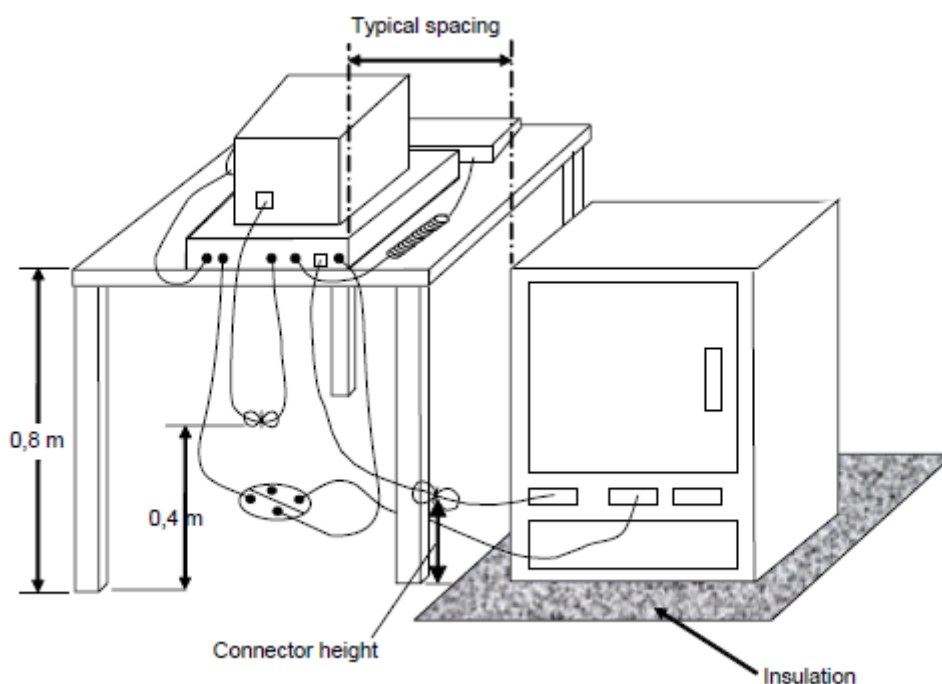


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.2 Radiated Emissions up to 1 GHz

- For the table-top EUT is placed on a 0.8 meter to the top of rotating table; for the floor standing EUT shall be insulated (by insulation of 12 mm) from the horizontal reference ground plane. The rotating table is rotated 360 degrees to determine the position of the highest radiation. If the equipment requires a dedicated ground connection, this shall be provided and bonded to the RGP.
- The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

7 Test Results of Test Item

7.1 Conducted Emissions from Power Ports

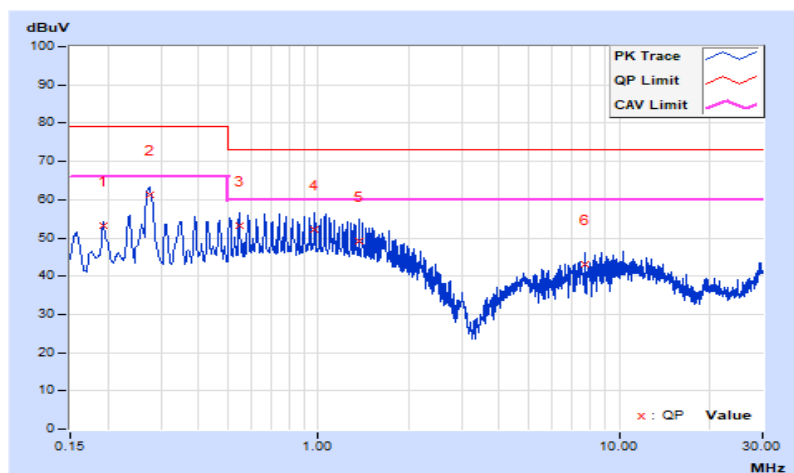
Mode A

Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	24 Vdc	Environmental Conditions	24°C, 82% RH, 1001.5 mbar
Tested by	Abraham Sun		

Phase Of Power : Positive (+)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19302	9.96	43.28	37.66	53.24	47.62	79.00	66.00	-25.76	-18.38
2	0.27481	9.97	51.46	49.22	61.43	59.19	79.00	66.00	-17.57	-6.81
3	0.54693	9.98	43.14	37.70	53.12	47.68	73.00	60.00	-19.88	-12.32
4	0.97714	9.99	42.04	36.60	52.03	46.59	73.00	60.00	-20.97	-13.41
5	1.36824	10.00	39.31	33.67	49.31	43.67	73.00	60.00	-23.69	-16.33
6	7.67121	10.22	32.91	27.65	43.13	37.87	73.00	60.00	-29.87	-22.13

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

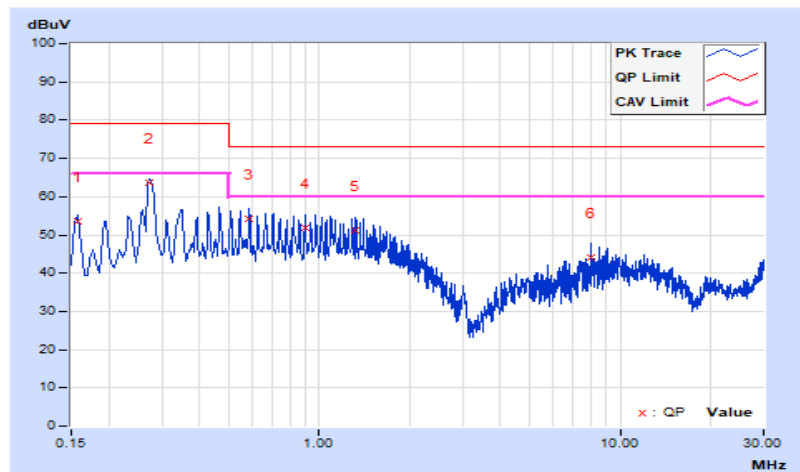


Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	24 Vdc	Environmental Conditions	24°C, 82% RH, 1001.5 mbar
Tested by	Abraham Sun		

Phase Of Power : Negative (-)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.96	43.62	38.65	53.58	48.61	79.00	66.00	-25.42	-17.39
2	0.27121	10.00	53.47	52.02	63.47	62.02	79.00	66.00	-15.53	-3.98
3	0.58604	10.01	44.10	38.43	54.11	48.44	73.00	60.00	-18.89	-11.56
4	0.89892	10.02	41.95	36.15	51.97	46.17	73.00	60.00	-21.03	-13.83
5	1.32496	10.03	41.08	35.96	51.11	45.99	73.00	60.00	-21.89	-14.01
6	8.02320	10.28	33.66	28.30	43.94	38.58	73.00	60.00	-29.06	-21.42

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



7.2 Radiated Emissions up to 1 GHz

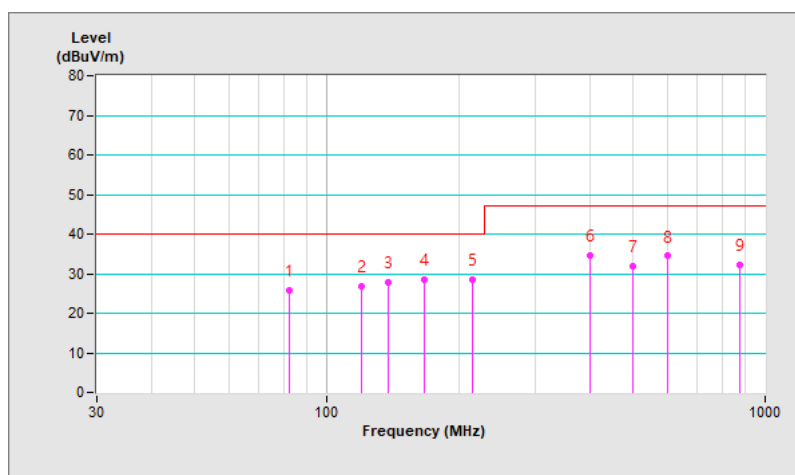
Mode A

Frequency Range	30 MHz ~ 1 GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120 kHz
Input Power	24 Vdc	Environmental Conditions	24°C, 67% RH, 1000 mbar
Tested By	Paul Chen		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	82.32	25.83 QP	40.00	-14.17	4.00 H	244	39.36	-13.53
2	120.01	26.94 QP	40.00	-13.06	4.00 H	135	36.90	-9.96
3	138.30	27.91 QP	40.00	-12.09	4.00 H	99	35.98	-8.07
4	166.66	28.48 QP	40.00	-11.52	4.00 H	261	36.09	-7.61
5	216.00	28.51 QP	40.00	-11.49	4.00 H	306	38.89	-10.38
6	400.00	34.65 QP	47.00	-12.35	3.07 H	335	38.93	-4.28
7	499.98	31.84 QP	47.00	-15.16	1.84 H	327	34.24	-2.40
8	600.00	34.45 QP	47.00	-12.55	1.43 H	221	34.56	-0.11
9	875.00	32.33 QP	47.00	-14.67	1.00 H	176	27.43	4.90

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.

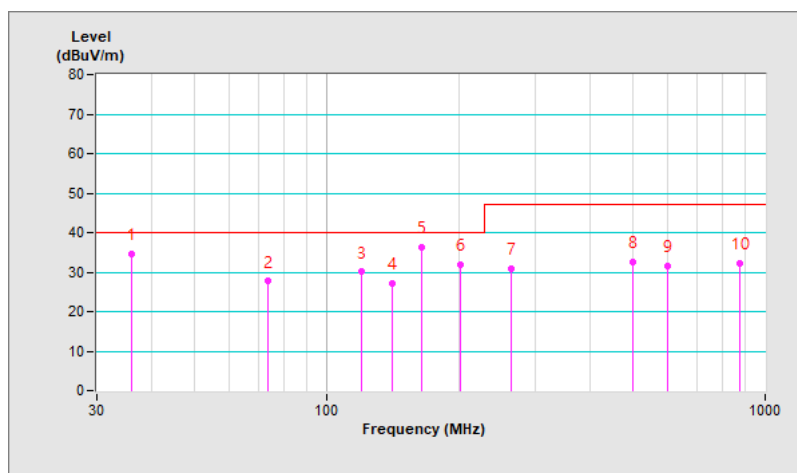


Frequency Range	30 MHz ~ 1 GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120 kHz
Input Power	24 Vdc	Environmental Conditions	24°C, 67% RH, 1000 mbar
Tested By	Paul Chen		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.97	34.59 QP	40.00	-5.41	1.15 V	91	50.04	-15.45
2	73.39	27.63 QP	40.00	-12.37	1.62 V	342	39.02	-11.39
3	120.00	30.02 QP	40.00	-9.98	1.00 V	252	39.98	-9.96
4	140.90	27.04 QP	40.00	-12.96	1.00 V	168	35.03	-7.99
5	165.15	36.29 QP	40.00	-3.71	1.00 V	232	43.89	-7.60
6	201.50	32.03 QP	40.00	-7.97	1.00 V	233	42.82	-10.79
7	263.75	30.93 QP	47.00	-16.07	1.00 V	170	38.31	-7.38
8	499.99	32.54 QP	47.00	-14.46	1.00 V	129	34.94	-2.40
9	599.96	31.52 QP	47.00	-15.48	3.21 V	325	31.63	-0.11
10	875.00	32.35 QP	47.00	-14.65	2.29 V	150	27.45	4.90

Remarks:

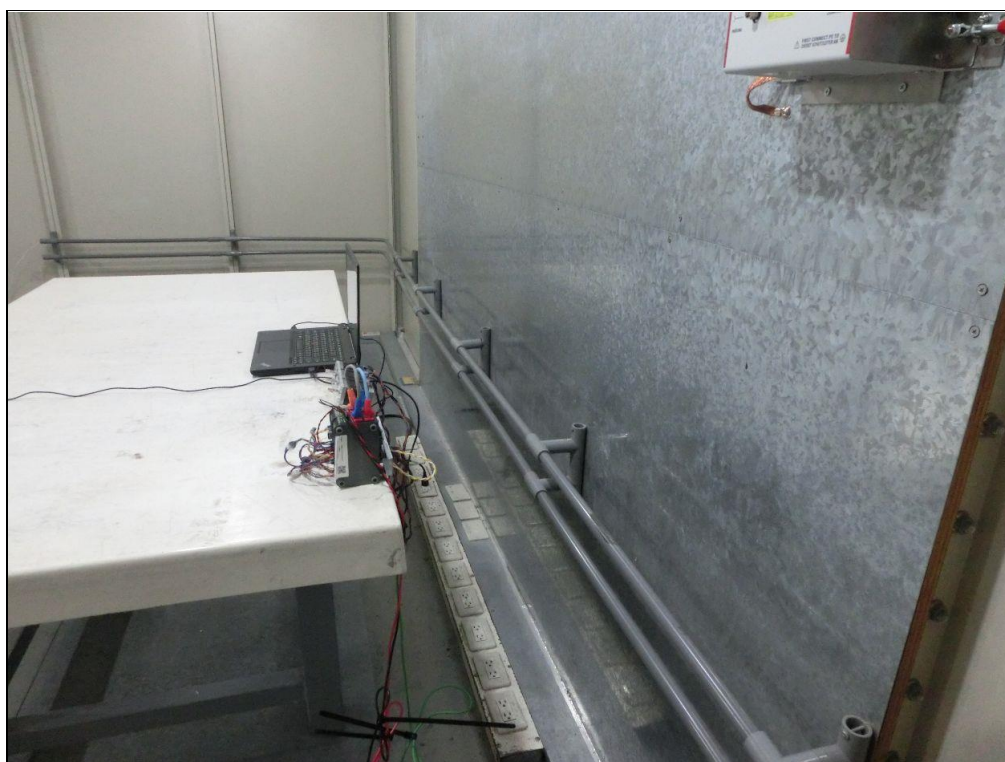
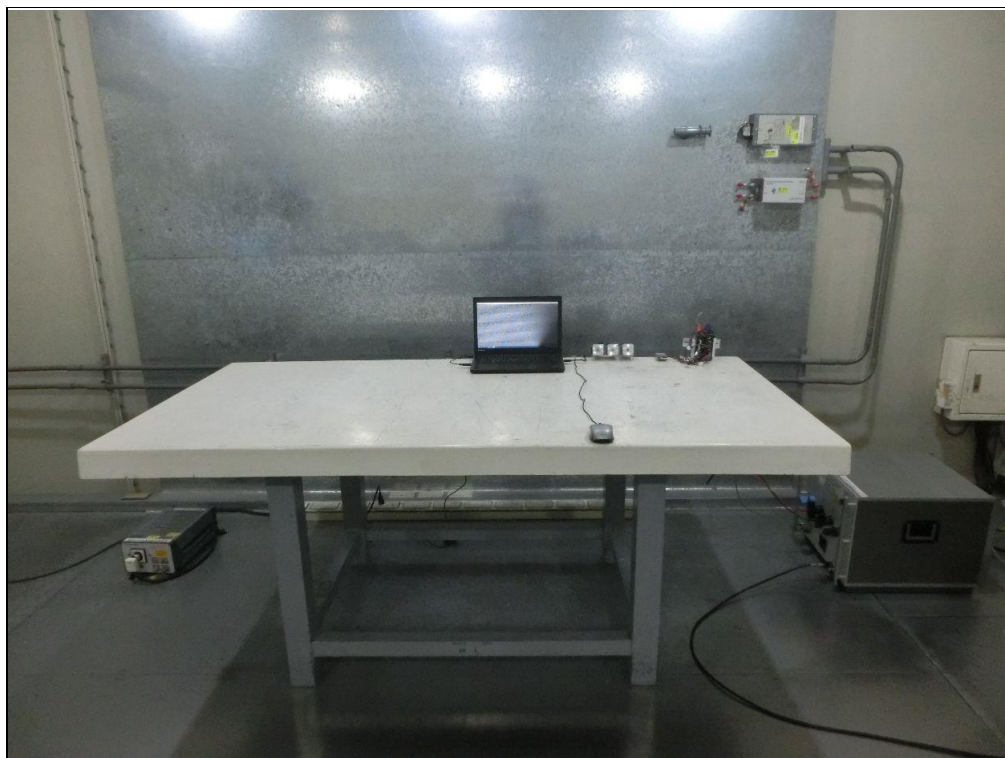
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
– Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.



8 Pictures of Test Arrangements

8.1 Conducted Emissions from Power Ports

Mode A



8.2 Radiated Emissions up to 1 GHz

Mode A



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:

Lin Kou EMC/RF Lab

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Fax: 886-2-26051924

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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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