

Report No.: T180817D07-F

Page: 1 / 32
Rev.: 00

FCC TEST REPORT

for

LCD Touch Control Panel

MODEL: PK2070-40; PK2070; WK2070; PT2070; eT2070; GT2070;
xPT2070; KT2070; MMPT2070; FC2070; FT2070; FV2070; OP2070;
MT2070; NT2070; XT2070; TU2070; LT2070; THM2070A; ASK-2070;
VT82070; PL2070; GL2070; KL2070; xPL2070; FL2070; ML2070; NL2070;
XL2070; THM2070B; eK2070; GK2070; xPK2070; KK2070; MMPK2070;
FK2070; MK2070; NK2070; XK2070; KU2070; LK2070; KHM2070A;
VK82070; KHM2070B; TK2070; IW407; VK2070; LUI2070; WOP-1070W;
WOP-2070W; iPK2070B; IW407B; XA207; XA206; XK306; XK307; XT306;
XT307; WT2070; HK2070; HT2070; VK2070; VT2070; EZ2070;
DAK-5070B; DAK-5070C; H1-N2-07S; H1-N2-07P; CPK2070; CPT2070;
IPK2070; IPT2070; IPK2070B; IHM70K2; IHM70K2BE; IHM70K2E;
IHM70T2E; HMI-ECO-070; PMT2070; PMK2070; AS45TFT0702;
AS45TFT0703; AS46TFT0708

Issued to:

Cermate Technologies Inc.**7F-1, No. 168, Liancheng Rd., Zhonghe Dist.,
New Taipei City, 23553, TAIWAN, R.O.C.**

Issued by:

Compliance Certification Services Inc.**Xindian Lab.****No.163-1, Jhongsheng Rd., Xindian Dist.,
New Taipei City, 23151 Taiwan.****TEL: 886-2-22170894****FAX: 886-2-22171029****Issued Date: October 5, 2018**

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Report No.: T180817D07-F

Page: 2 / 32
Rev.: 00

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	October 5, 2018	Initial Issue	ALL	Lucy Hsu



Report No.: T180817D07-F

Page: 3 / 32
Rev.: 00

TABLE OF CONTENTS

1	TEST RESULT CERTIFICATION.....	4
2	EUT DESCRIPTION.....	5
3	TEST METHODOLOGY.....	6
3.1.	DECISION OF FINAL TEST MODE.....	6
3.2.	EUT SYSTEM OPERATION	6
4	SETUP OF EQUIPMENT UNDER TEST	7
4.1.	DESCRIPTION OF SUPPORT UNITS	7
4.2.	CONFIGURATION OF SYSTEM UNDER TEST	7
5	FACILITIES AND ACCREDITATIONS	8
5.1.	FACILITIES	8
5.2.	ACCREDITATIONS.....	8
5.3.	MEASUREMENT UNCERTAINTY.....	8
6	CONDUCTED EMISSION MEASUREMENT	9
6.1.	LIMITS OF CONDUCTED EMISSION MEASUREMENT	9
6.2.	TEST INSTRUMENTS	9
6.3.	TEST PROCEDURES	10
6.4.	TEST SETUP	11
6.5.	DATA SAMPLE	11
6.6.	TEST RESULTS.....	12
7	RADIATED EMISSION MEASUREMENT	16
7.1.	LIMITS OF RADIATED EMISSION MEASUREMENT	16
7.2.	TEST INSTRUMENTS	18
7.3.	TEST PROCEDURES	19
7.4.	TEST SETUP	20
7.5.	DATA SAMPLE	21
7.6.	TEST RESULTS.....	22
8	PHOTOGRAPHS OF THE TEST CONFIGURATION	28
APPENDIX 1 - PHOTOGRAPHS OF EUT		A1-1

1 TEST RESULT CERTIFICATION

Product: LCD Touch Control Panel

Model: PK2070-40; PK2070; WK2070; PT2070; eT2070; GT2070; xPT2070; KT2070; MMPT2070; FC2070; FT2070; FV2070; OP2070; MT2070; NT2070; XT2070; TU2070; LT2070; THM2070A; ASK-2070; VT82070; PL2070; GL2070; KL2070; xPL2070; FL2070; ML2070; NL2070; XL2070; THM2070B; eK2070; GK2070; xPK2070; KK2070; MMPK2070; FK2070; MK2070; NK2070; XK2070; KU2070; LK2070; KHM2070A; VK82070; KHM2070B; TK2070; IW407; VK2070; LUI2070; WOP-1070W; WOP-2070W; iPK2070B; IW407B; XA207; XA206; XK306; XK307; XT306; XT307; WT2070; HK2070; HT2070; VK2070; VT2070; EZ2070; DAK-5070B; DAK-5070C; H1-N2-07S; H1-N2-07P; CPK2070; CPT2070; IPK2070; IPT2070; IPK2070B; IHM70K2; IHM70K2BE; IHM70K2E; IHM70T2E; HMI-ECO-070; PMT2070; PMK2070; AS45TFT0702; AS45TFT0703; AS46TFT0708

Brand: Cermate

Applicant: Cermate Technologies Inc.
7F-1, No. 168, Liancheng Rd., Zhonghe Dist.,
New Taipei City, 23553, TAIWAN, R.O.C.

Manufacturer: Cermate Technologies Inc.
7F-1, No. 168, Liancheng Rd., Zhonghe Dist.,
New Taipei City, 23553, TAIWAN, R.O.C.

Tested: August 22, 2018

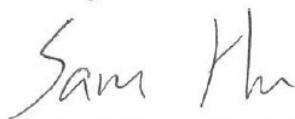
EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B, ICES-003 Issue 6-2016 ANSI C63.4-2014	Conducted (Power Port)	PASS	Meet Class A limit
	Radiated	PASS	Meet Class A limit

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.
2. The information of measurement uncertainty is available upon the customer's request.

Deviation from Applicable Standard
None

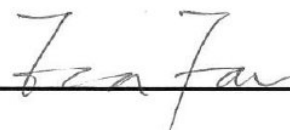
The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:



Sam Hu
Assistant Manager

Reviewed by:



Eva Fan
Supervisor of report document dept.

2 EUT DESCRIPTION

Product	LCD Touch Control Panel
Brand Name	Cermate
Model	PK2070-40
Applicant	Cermate Technologies Inc.
Housing material	Plastic
Identify Number	T180817D07
Received Date	August 17, 2018
EUT Power Rating	24VDC from DC Power Supply

Model Difference

Model Name	Difference	Tested (Check)
PK2070-40	Original	<input checked="" type="checkbox"/>
PK2070; WK2070; PT2070; eT2070; GT2070; xPT2070; KT2070; MMPT2070; FC2070; FT2070; FV2070; OP2070; MT2070; NT2070; XT2070; TU2070; LT2070; THM2070A; ASK-2070; VT82070; PL2070; GL2070; KL2070; xPL2070; FL2070; ML2070; NL2070; XL2070; THM2070B; eK2070; GK2070; xPK2070; KK2070; MMPK2070; FK2070; MK2070; NK2070; XK2070; KU2070; LK2070; KHM2070A; VK82070; KHM2070B; TK2070; IW407; VK2070; LUI2070; WOP-1070W; WOP-2070W; iPK2070B; IW407B; XA207; XA206; XK306; XK307; XT306; XT307; WT2070; HK2070; HT2070; VK2070; VT2070; EZ2070; DAK-5070B; DAK-5070C; H1-N2-07S; H1-N2-07P; CPK2070; CPT2070; IPK2070; IPT2070; IPK2070B; IHM70K2; IHM70K2BE; IHM70K2E; IHM70T2E; HMI-ECO-070; PMT2070; PMK2070; AS45TFT0702; AS45TFT0703; AS46TFT0708	For marketing purpose only	<input type="checkbox"/>

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
1. COM Port	1	1
2. USB Port	2	2
3. Micro SD Card Slot	1	1

Note: Client consigns only one model sample to test (Model Number: PK2070-40).

3 TEST METHODOLOGY

3.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the below additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration/ modes are as the following:

Conduction Modes:

1	AC Mode
2	DC Mode

Radiation Mode:

1	Normal Mode
	Normal Mode / 1-18GHz

Worst:

Conduction: Mode 2

Radiation: Mode 1

3.2. EUT SYSTEM OPERATION

1. All peripherals connect EUT to test.
2. Run Emctest.exe to activate all peripherals and display “H” pattern on monitor screen.

Note: Test program is self-repeating throughout the test.

4 SETUP OF EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

EUT Devices:

No.	Equipment	Model No.	Brand Name
1	Mother Board	070H01-64_V1.4	Cermate
2	CPU (300MHz)	NUC972DF62Y	NUVOTON
3	Memory (Built-in DDR2 64MByte)	N/A	Cermate
4	Storage (NAND FLASH 128MByte)	N/A	Cermate

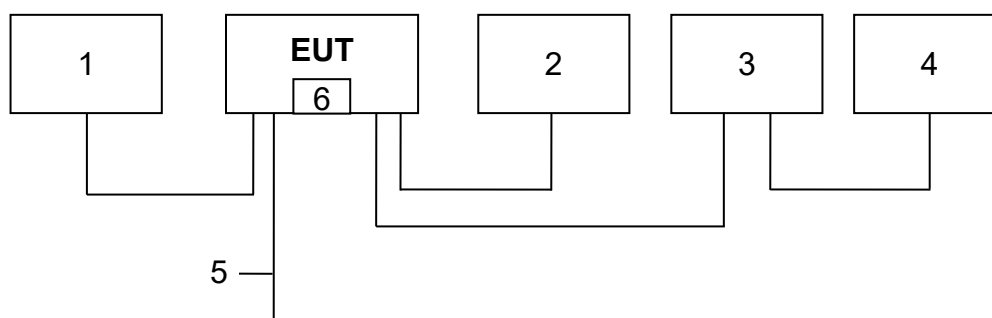
Peripherals Devices:

No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Brand Name	Data Cable	Power Cord
1	DC Power Supply	NES-35-24	N/A	DOC BSMI: D33100	MEAN WELL	Unshielded, 1.8m	Unshielded, 1.8m
2	USB HDD	HD-EG5	N/A	DOC BSMI: D33021	SONY	Shielded, 0.6m	N/A
3	Power	DPS-02A-D24	N/A	N/A	Cermate	Shielded, 2.4m	Unshielded, 1.5m
4	DC Power Supply	SE-100-24	N/A	DOC BSMI: D33100	MEAN WELL	Unshielded, 1.8m	Unshielded, 1.8m
5	USB Cable	N/A	N/A	N/A	N/A	Shielded, 1.8m	N/A
6	Micro SD Card	N/A	N/A	N/A	PQI	N/A	N/A

Note:

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.2. CONFIGURATION OF SYSTEM UNDER TEST



5 FACILITIES AND ACCREDITATIONS

5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at CCSrf Taiwan Xindian Lab. at No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, 23151 Taiwan.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF
USA	A2LA

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Japan	VCCI
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

5.3. 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	Frequency	Uncertainty
Conducted emissions	0.15MHz ~ 30MHz	± 2.8
Radiated emissions	30MHz ~ 1000MHz	± 5.3
	1000MHz ~ 18000MHz	± 4.7
	18000MHz ~ 40000MHz	± 4.1

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22: 2005, clause 11, Measurement Uncertainty) determining compliance with the limits shall be based on the results of the compliance measurement. Consequently the measured emissions being less than the maximum allowed emission result in this being a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is based on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

6 CONDUCTED EMISSION MEASUREMENT

6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE:

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

6.2. TEST INSTRUMENTS

Conducted Emission room # B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
BNC Cable	EMCI	CFD300-NL	BNC#B4	01/07/2019
EMI Test Receiver	R&S	ESCI	100234	05/15/2019
LISN	Schwarzbeck	NSLK 8127	8127382	05/14/2019
LISN(EUT)	Schwarzbeck	NSLK 8127	8127691	05/14/2019
Pulse Limiter	R&S	ESH3-Z2	100374	01/07/2019
Thermo-Hygro Meter	Wisewind	201A	No. 05	10/01/2018
Test S/W	EZ-EMC			

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

6.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

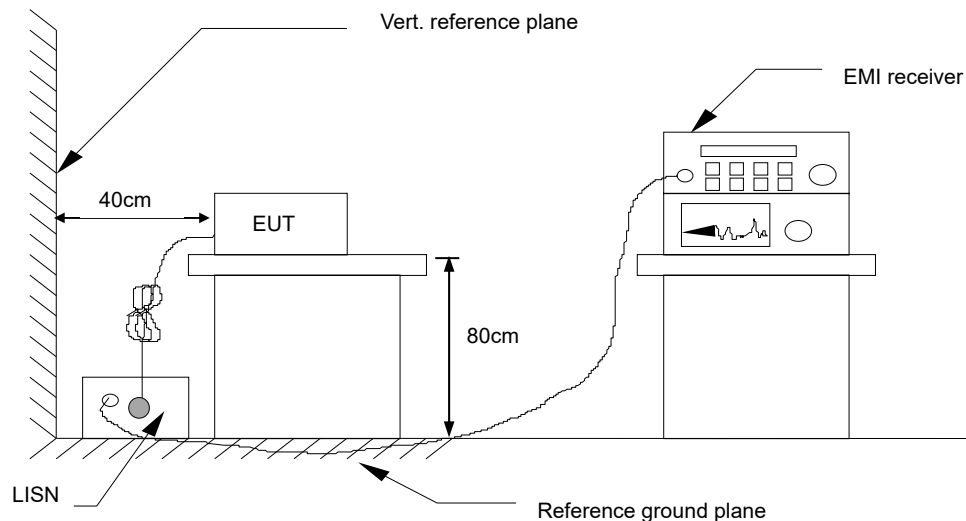
Procedure of Preliminary Test

- The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed by AC main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
- All support equipment power by from a second LISN.
- The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

6.4. TEST SETUP



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

6.5. DATA SAMPLE

Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
x.xx	42.95	0.55	43.50	73	-29.50	Q	L1

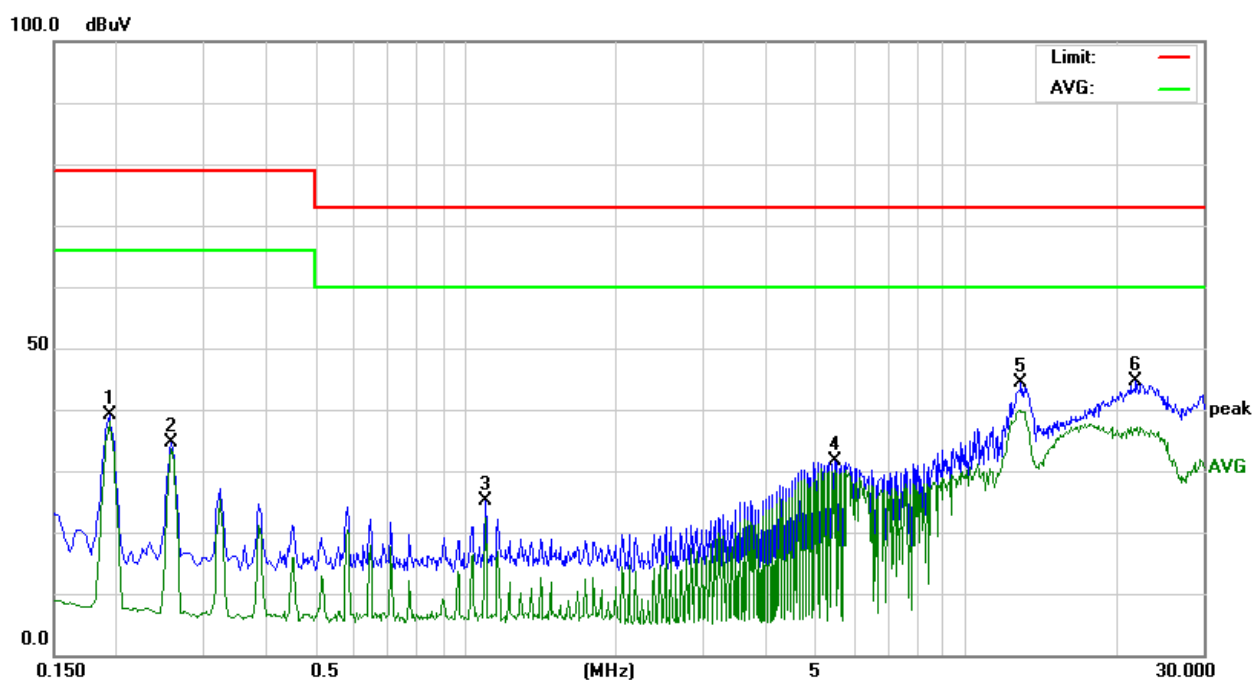
Freq. = Emission frequency in MHz
 Reading = Uncorrected Analyzer/Receiver reading
 Factor = Insertion loss of LISN + Cable Loss + Pulse Limit
 Result = Reading + Factor
 Limit = Limit stated in standard
 Margin = Reading in reference to limit
 P = Peak Reading
 Q = Quasi-peak Reading
 A = Average Reading
 L1 = Hot side
 L2 = Neutral side

Calculation Formula

Margin (dB) = Result (dBuV) – Limit (dBuV)

6.6. TEST RESULTS

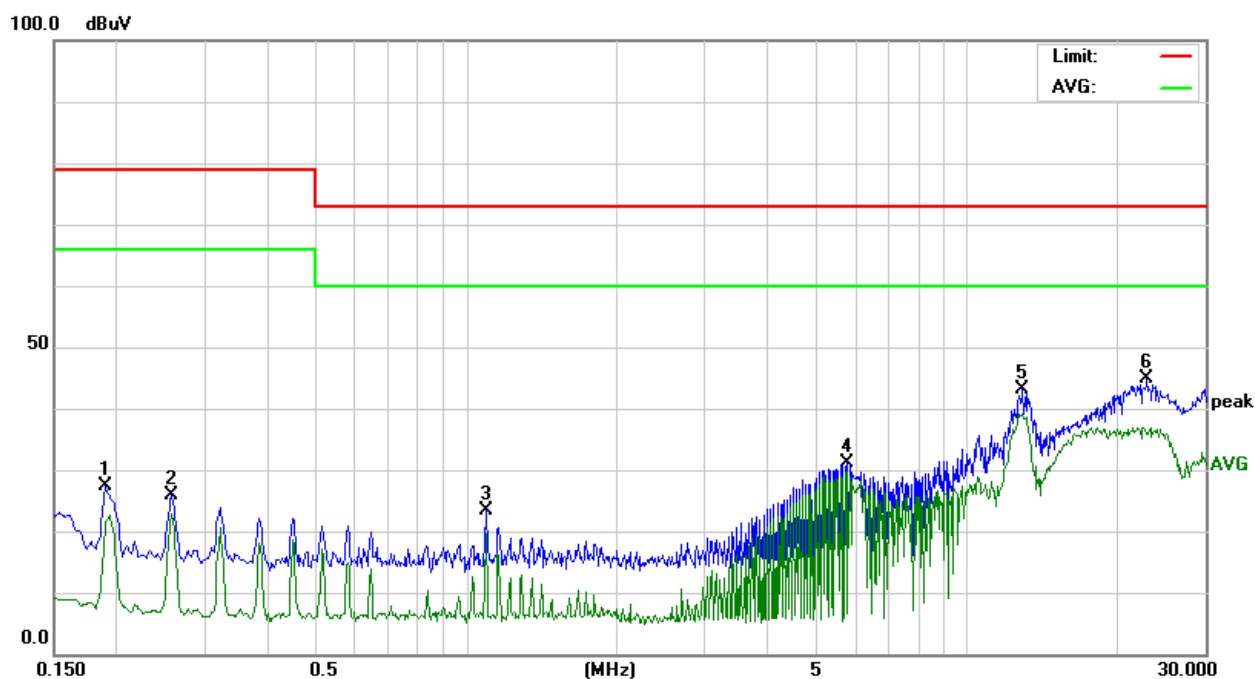
Model No.	PK2070-40	6dB Bandwidth	9 kHz
Environmental Conditions	24°C, 44% RH	Test Mode	Mode 1
Tested by	Bonny Tsai	Phase	L1
Standard	FCC CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1940	29.31	9.88	39.19	79.00	-39.81	P	L1
0.2580	24.69	9.87	34.56	79.00	-44.44	P	L1
1.0980	15.18	9.94	25.12	73.00	-47.88	P	L1
5.4779	21.49	10.21	31.70	73.00	-41.30	P	L1
12.9539	33.84	10.51	44.35	73.00	-28.65	P	L1
22.0459	33.86	10.82	44.68	73.00	-28.32	P	L1

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

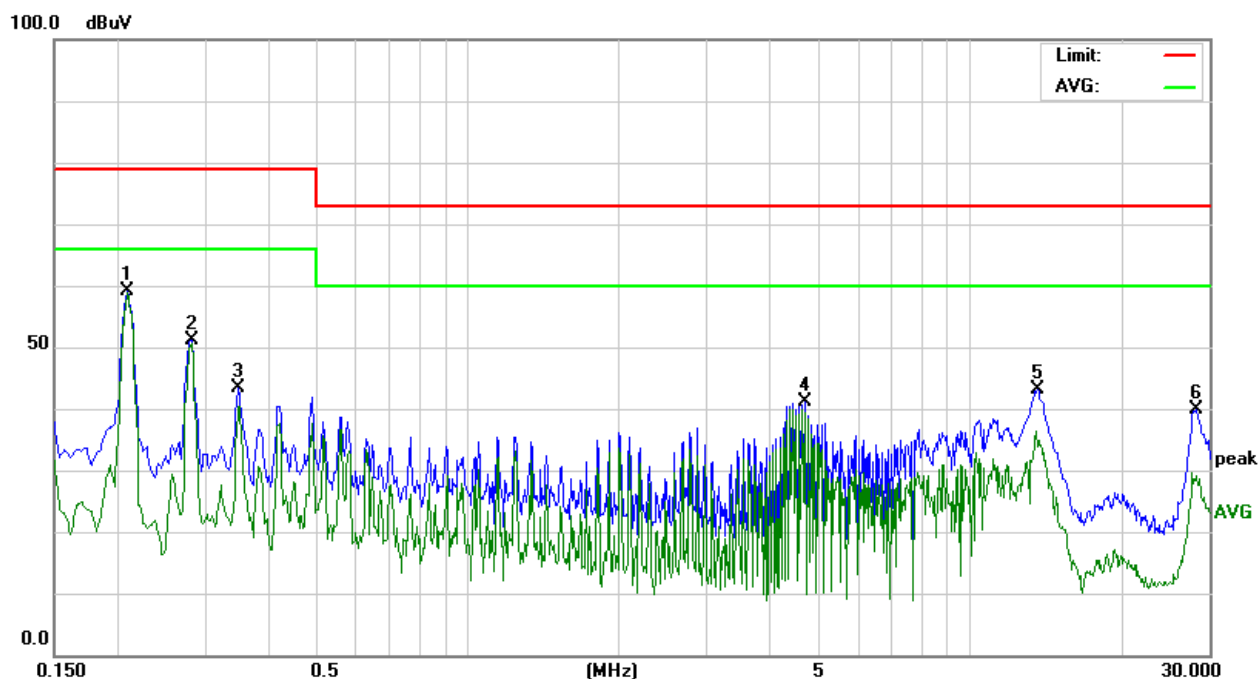
Model No.	PK2070-40	6dB Bandwidth	9 kHz
Environmental Conditions	24°C, 44% RH	Test Mode	Mode 1
Tested by	Bonny Tsai	Phase	L2
Standard	FCC CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1900	17.57	9.89	27.46	79.00	-51.54	P	L2
0.2580	16.06	9.88	25.94	79.00	-53.06	P	L2
1.0940	13.36	9.94	23.30	73.00	-49.70	P	L2
5.7979	20.92	10.23	31.15	73.00	-41.85	P	L2
12.9499	32.53	10.53	43.06	73.00	-29.94	P	L2
22.9380	33.91	10.85	44.76	73.00	-28.24	P	L2

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

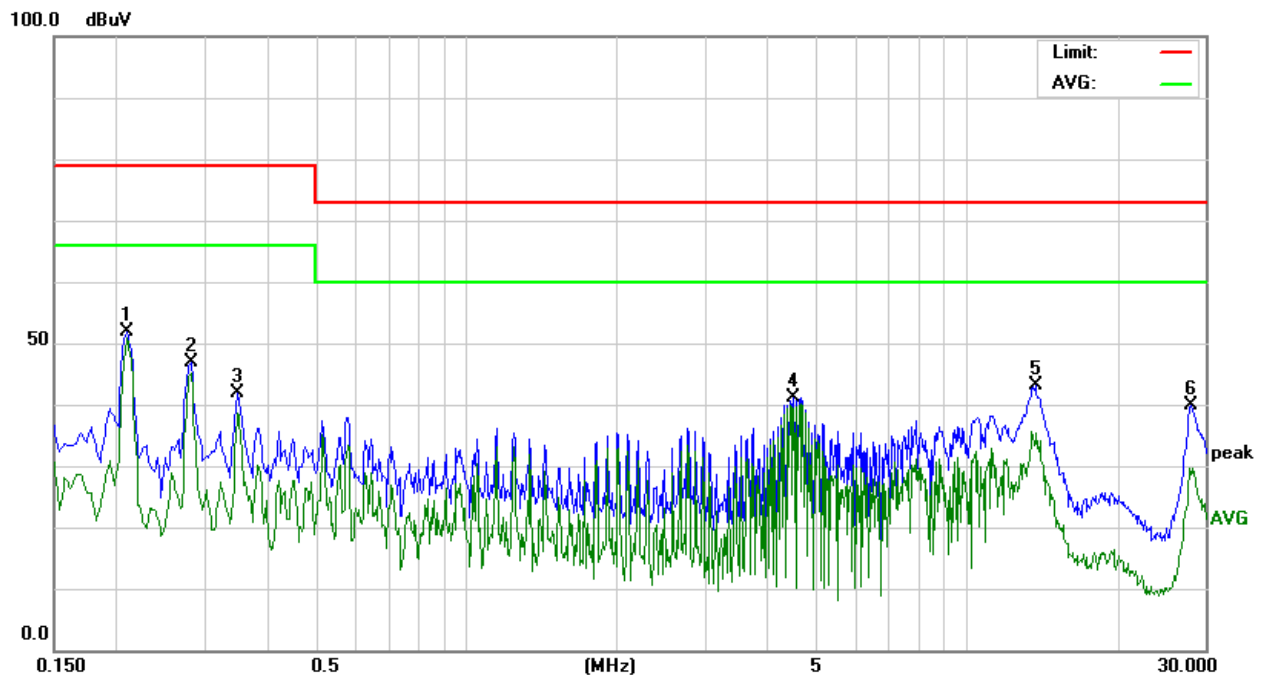
Model No.	PK2070-40	6dB Bandwidth	9 kHz
Environmental Conditions	24°C, 44% RH	Test Mode	Mode 2 / Worst
Tested by	Bonny Tsai	Phase	L1
Standard	FCC CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.2100	49.31	9.87	59.18	79.00	-19.82	P	L1
0.2819	41.35	9.87	51.22	79.00	-27.78	P	L1
0.3500	33.38	9.90	43.28	79.00	-35.72	P	L1
4.7059	31.00	10.17	41.17	73.00	-31.83	P	L1
13.6859	32.65	10.54	43.19	73.00	-29.81	P	L1
28.3380	28.73	11.03	39.76	73.00	-33.24	P	L1

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Model No.	PK2070-40	6dB Bandwidth	9 kHz
Environmental Conditions	24°C, 44% RH	Test Mode	Mode 2 / Worst
Tested by	Bonny Tsai	Phase	L2
Standard	FCC CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.2100	41.95	9.88	51.83	79.00	-27.17	P	L2
0.2819	37.05	9.88	46.93	79.00	-32.07	P	L2
0.3500	31.86	9.90	41.76	79.00	-37.24	P	L2
4.5219	30.91	10.17	41.08	73.00	-31.92	P	L2
13.6979	32.47	10.56	43.03	73.00	-29.97	P	L2
28.0620	28.84	11.03	39.87	73.00	-33.13	P	L2

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

7 RADIATED EMISSION MEASUREMENT

7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

Below 1GHz (for digital device)

FREQUENCY (MHz)	dBuV/m (At 10m)	
	Class A	Class B
30 ~ 230	40	30
230 ~ 1000	47	37

Limit tables for non-digital device:

Class A Radiated Emission limit at 10m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	90	39
88 - 216	150	43.5
216 - 960	210	46.4
Above 960	300	49.5

Class B Radiated Emission limit at 3m (for others)

Frequency (MHz)	Field Strength Limit (uV/m)Q.P.	Field Strength Limit (dBuV/m)Q.P.
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Above 1GHz(for all device)

Frequency (MHz)	Class A (dBuV/m) (At 10m)		Class B (dBuV/m) (At 3m)	
	Average	Peak	Average	Peak
Above 1000	49.5	69.5	54	74

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

(3) The measurement above 1GHz is at close-in distances 3m, and determine the limit L_2 corresponding to the close-in distance d_2 by applying the following relation: $L_2 = L_1 (d_1/d_2)$, where L_1 is the specified limit in microvolts per metre (uV/m) at the distance d_1 (10m), L_2 is the new limit for distance d_2 (3m).

So the new Class A limit above 1GHz at 3m is as following table:

Frequency (MHz)	Class A (dBuV/m) (At 3m)	
	Average	Peak
Above 1000	60	80

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5 th harmonic of the highest frequency or 40GHz, whichever is lower

7.2. TEST INSTRUMENTS

Open Area Test Site # H				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Bilog Antenna	Teseq	CBL 6112D	36995	06/25/2019
Cable	EMEC	CFD400NL-LW	N-Type#H11	08/15/2019
EMI Test Receiver	R&S	ESCI	101340	03/26/2019
Pre-Amplifier	HP	8447D	1937A01554	09/28/2018
Thermo-Hygro Meter	Wisewind	201A	No. 03	05/27/2019
Test S/W	EZ-EMC			
Above 1GHz Used				
Horn Antenna	ETS	3117	139062	09/24/2018
K-Type Cable x 1m (1-40GHz)	Rosnol	K1K50-UP0264- K1k50-1M	160215-1	12/03/2018
Microflex Cable x 7m (1-18GHz)	Rosnol	A1K50-EW0630- A1k50-700CM	SD-R028	12/03/2018
Pre-Amplifier	HP	8449B	3008A01266	12/03/2018
Signal Analyzer	Agilent	N9010A	MY53440125	01/08/2019
Thermo-Hygro Meter	Wisewind	N/A	SD-R027	10/01/2018
Test S/W	EZ-EMC			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

7.3. TEST PROCEDURES (please refer to measurement standard or CCS SOP PA-031)

Procedure of Preliminary Test

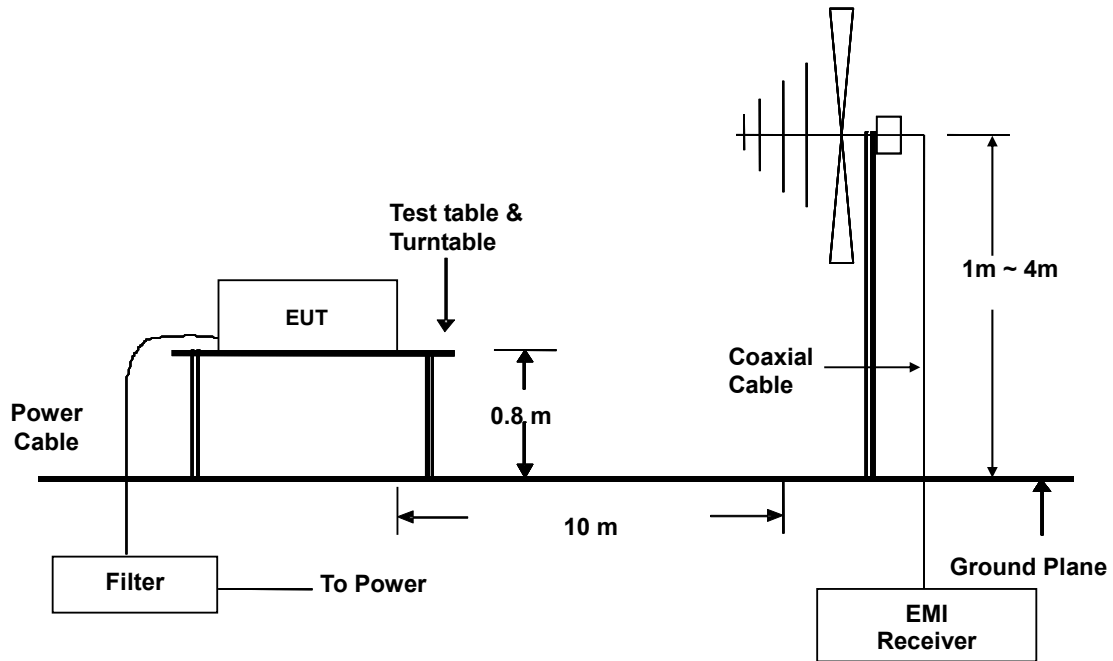
- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

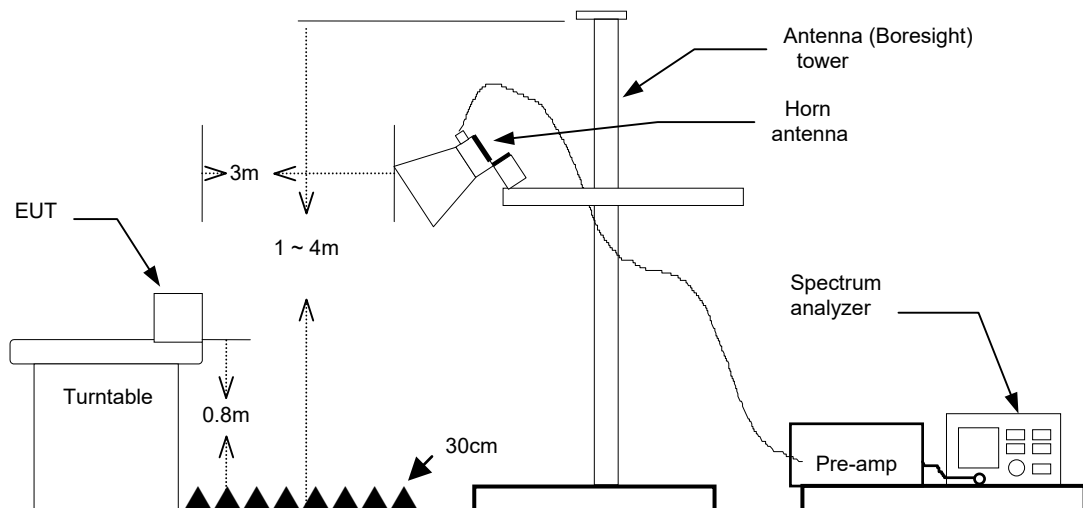
- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. Below 1GHz the Q.P. reading and above 1GHz the Peak and Average reading are presented.
- The test data of the worst-case condition(s) was recorded.

7.4. TEST SETUP

Below 1GHz



Above 1GHz



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

7.5. DATA SAMPLE

Below 1GHz

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/Q)	Pol. (H/V)
x.xx	14.0	12.2	26.2	40	-13.8	Q	H

Above 1GHz

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
x.xx	42.95	0.55	43.50	60	-16.50	A	H

Freq. = Emission frequency in MHz
 Reading = Uncorrected Analyzer/Receiver reading
 Factor = Antenna Factor + Cable Loss - Amplifier Gain
 Result = Reading + Factor
 Limit = Limit stated in standard
 Margin = Reading in reference to limit
 P = Peak Reading
 Q = Quasi-peak Reading
 A = Average Reading
 H = Antenna Polarization: Horizontal
 V = Antenna Polarization: Vertical

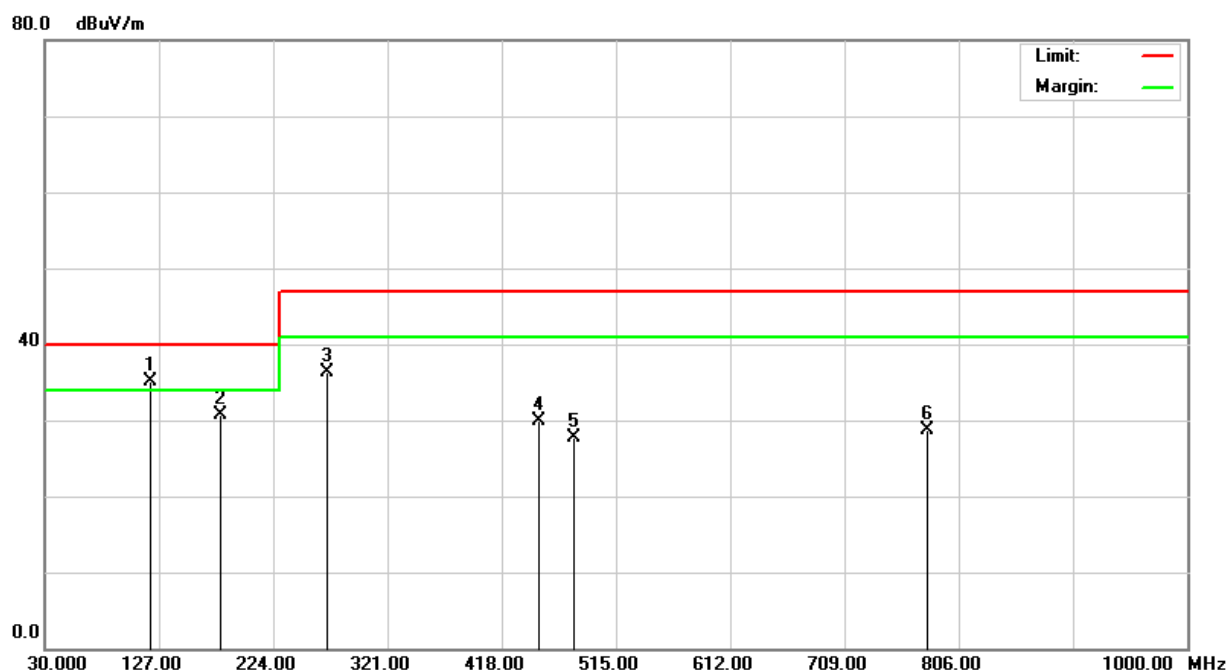
Calculation Formula

Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

7.6. TEST RESULTS

Below 1GHz

Model No.	PK2070-40	Test Mode	Mode 1
Environmental Conditions	28°C, 60% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Bonny Tsai
Standard	FCC CLASS A W/ CISPR 22 CLASS A LIMIT		

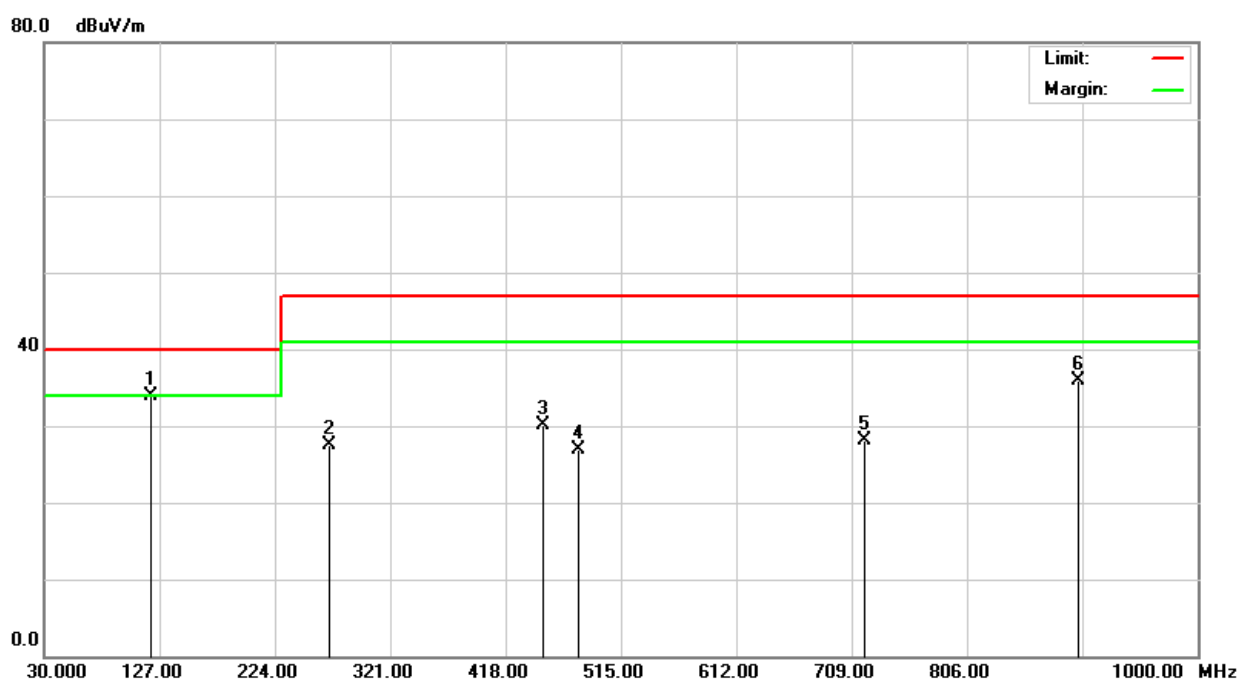


Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
120.0000	43.00	-7.83	35.17	40.00	-4.83	100	154	Q	V
180.0000	41.71	-11.05	30.66	40.00	-9.34	100	17	Q	V
270.0000	43.00	-6.75	36.25	47.00	-10.75	100	240	Q	V
450.0000	31.90	-2.02	29.88	47.00	-17.12	400	225	Q	V
480.0060	29.50	-1.76	27.74	47.00	-19.26	400	150	Q	V
780.0100	26.50	2.17	28.67	47.00	-18.33	400	174	Q	V

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.

2. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	PK2070-40	Test Mode	Mode 1
Environmental Conditions	28°C, 60% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Bonny Tsai
Standard	FCC CLASS A W/ CISPR 22 CLASS A LIMIT		



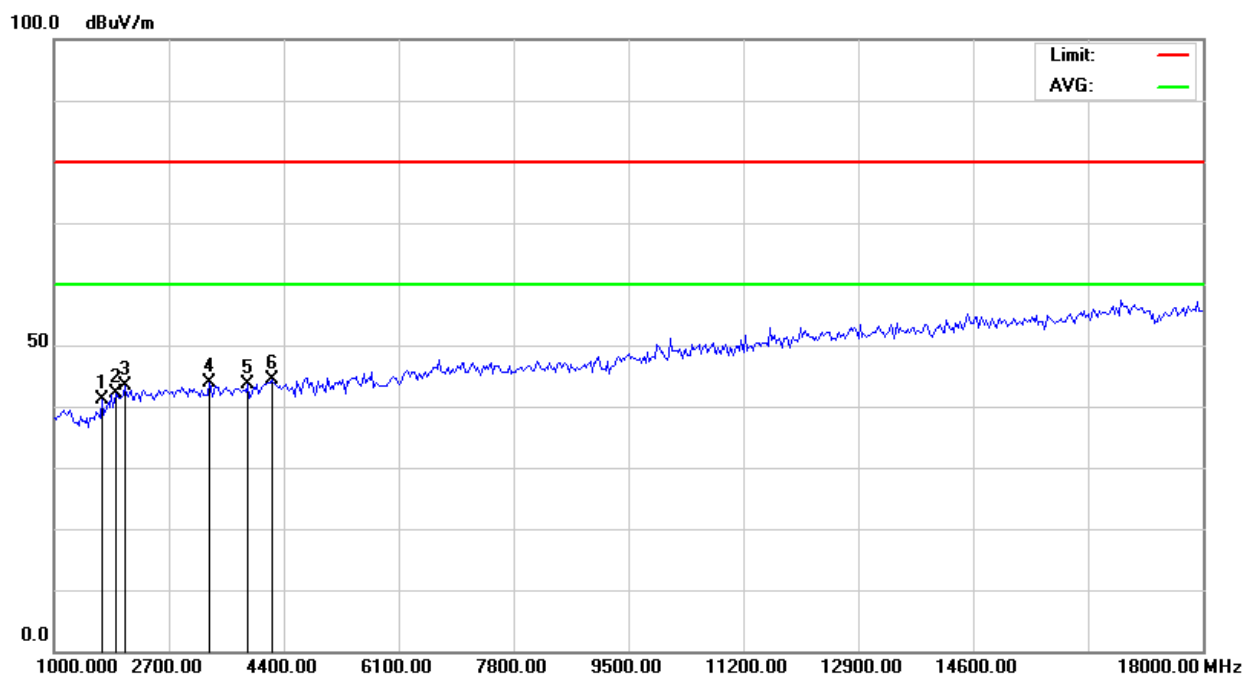
Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
120.0020	41.80	-7.83	33.97	40.00	-6.03	400	177	Q	H
270.0000	34.30	-6.75	27.55	47.00	-19.45	400	310	Q	H
450.0200	32.20	-2.02	30.18	47.00	-16.82	100	240	Q	H
480.0060	28.70	-1.76	26.94	47.00	-20.06	100	67	Q	H
720.0040	26.90	1.26	28.16	47.00	-18.84	100	211	Q	H
899.9900	32.50	3.35	35.85	47.00	-11.15	100	206	Q	H

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.

2. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

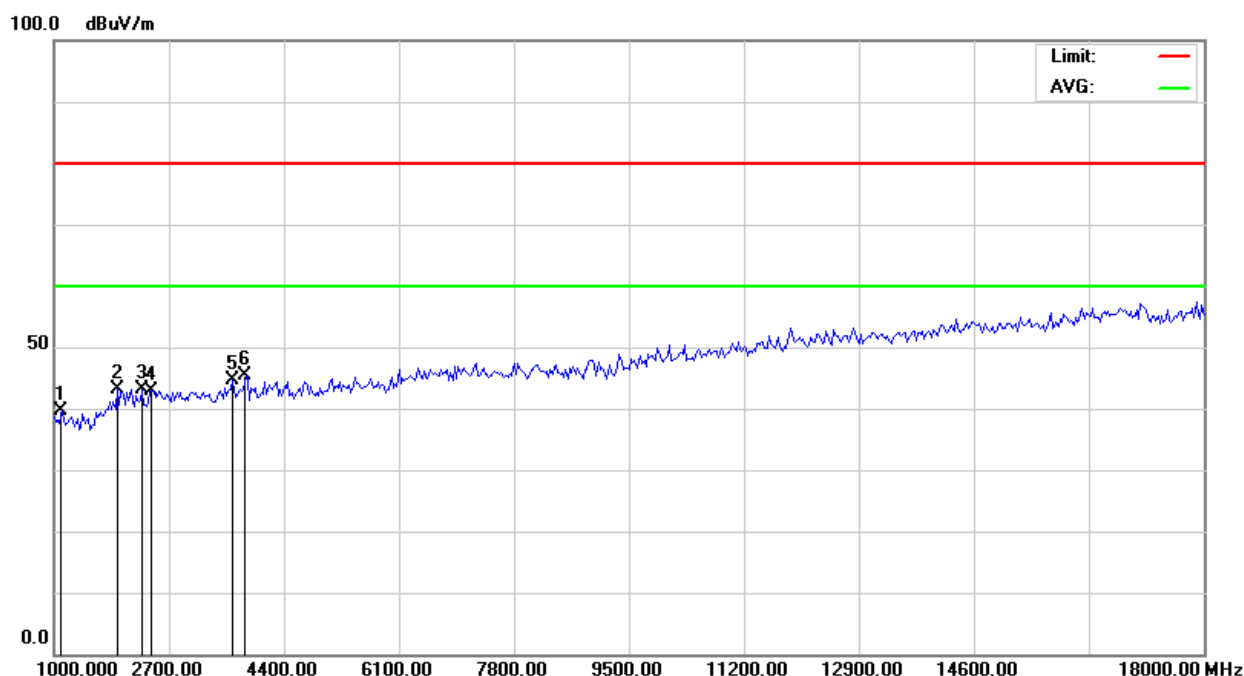
Model No.	PK2070-40	Test Mode	Mode 1
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical	Antenna Distance	3m
Highest frequency generated or used	300MHz	Upper frequency	18000MHz
Detector Function	Peak and average.	Tested by	Bonny Tsai
Standard	FCC CLASS A		



Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1708.333	46.37	-5.20	41.17	80.00	-38.83	P	V
1906.667	45.29	-3.20	42.09	80.00	-37.91	P	V
2048.333	45.49	-2.23	43.26	80.00	-36.74	P	V
3295.000	44.94	-1.06	43.88	80.00	-36.12	P	V
3861.667	43.98	-0.25	43.73	80.00	-36.27	P	V
4230.000	44.01	0.40	44.41	80.00	-35.59	P	V

Note: 1. P= Peak Reading; A= Average Reading.

Model No.	PK2070-40	Test Mode	Mode 1
Environmental Conditions	26°C, 60% RH	6dB Bandwidth	1 MHz
Antenna Pole	Horizontal	Antenna Distance	3m
Highest frequency generated or used	300MHz	Upper frequency	18000MHz
Detector Function	Peak and average.	Tested by	Bonny Tsai
Standard	FCC CLASS A		

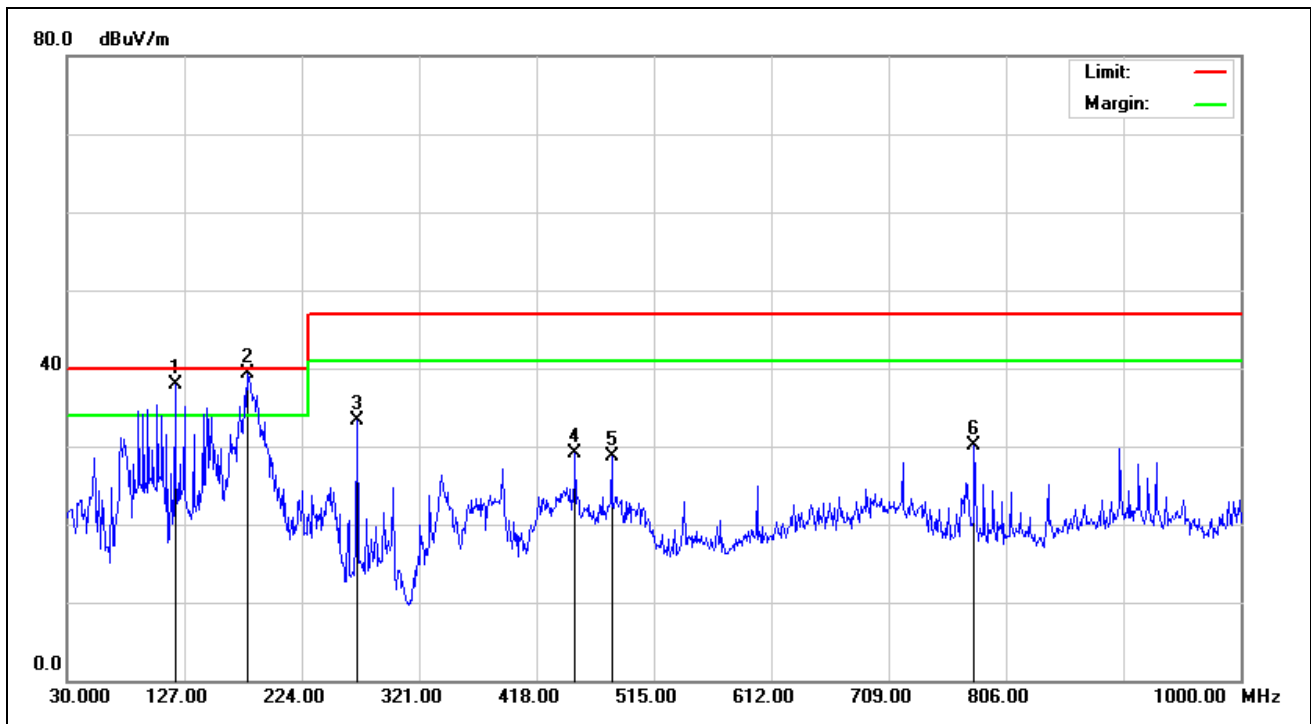


Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1113.333	46.97	-7.37	39.60	80.00	-40.40	P	H
1935.000	46.16	-2.91	43.25	80.00	-36.75	P	H
2303.333	45.30	-2.11	43.19	80.00	-36.81	P	H
2445.000	44.98	-2.04	42.94	80.00	-37.06	P	H
3635.000	45.19	-0.59	44.60	80.00	-35.40	P	H
3833.333	45.59	-0.29	45.30	80.00	-34.70	P	H

Note: 1. P= Peak Reading; A= Average Reading.

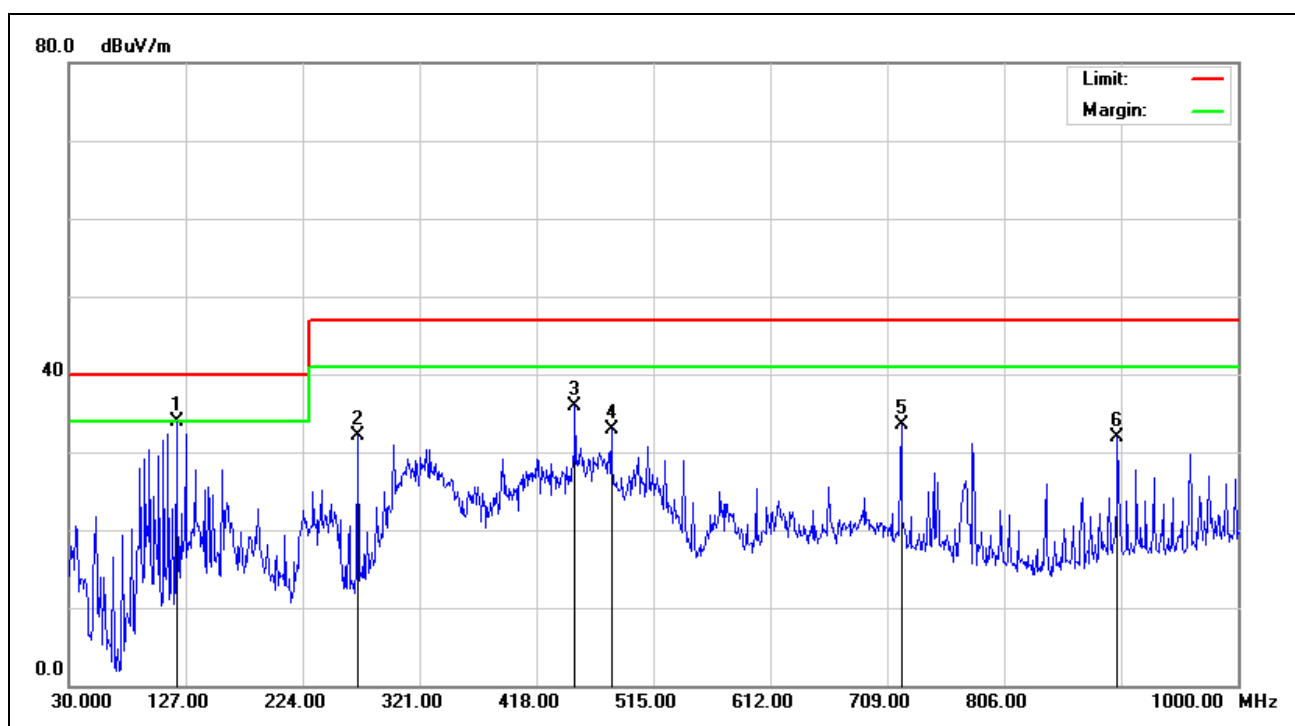
966 Chamber Test Data

Job No.:	T180817D07	Polarization:	Vertical
Standard:	FCC CLASS A W/ CISPR 22 CLASS A LIMIT	Power Source:	24VDC
Test item:	Radiation Test	Date:	2018/08/22
Company:	Cermate Technologies Inc.	Time:	05:30:40
Model:	PK2070-40	Temp.(°C)/Hum.(%):	26(°C)/60%
Description:	Normal Mode	Engineer Signature:	Bonny Tsai



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	119.2400	57.19	-19.29	37.90	40.00	-2.10	peak	
2	179.3800	56.79	-17.44	39.35	40.00	-0.65	peak	
3	269.5900	53.97	-20.75	33.22	47.00	-13.78	peak	
4	450.0100	46.17	-17.04	29.13	47.00	-17.87	peak	
5	480.0800	44.43	-15.66	28.77	47.00	-18.23	peak	
6	779.8099	40.25	-10.17	30.08	47.00	-16.92	peak	

Job No.:	T180626D10	Polarization:	Horizontal
Standard:	FCC CLASS A W/ CISPR 22 CLASS A LIMIT	Power Source:	24VDC
Test item:	Radiation Test	Date:	2018/08/22
Company:	Cermate Technologies Inc.	Time:	05:37:28
Model:	PK2070-40	Temp.(°C)/Hum.(%):	26(°C)/60%
Description:	Normal Mode	Engineer Signature:	Bonny Tsai

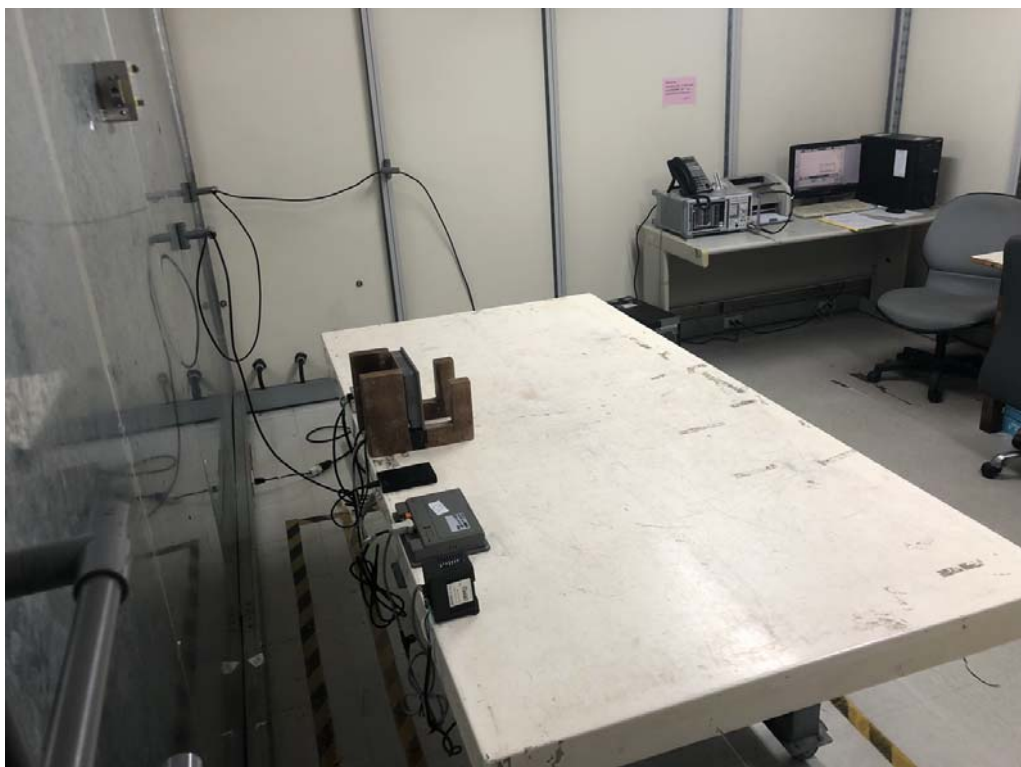


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	119.2400	56.29	-22.33	33.96	40.00	-6.04	peak	
2	269.5900	55.22	-23.06	32.16	47.00	-14.84	peak	
3	450.0100	52.24	-16.33	35.91	47.00	-11.09	peak	
4	480.0800	46.90	-13.91	32.99	47.00	-14.01	peak	
5	720.6400	45.57	-12.14	33.43	47.00	-13.57	peak	
6	900.0900	42.95	-11.06	31.89	47.00	-15.11	peak	

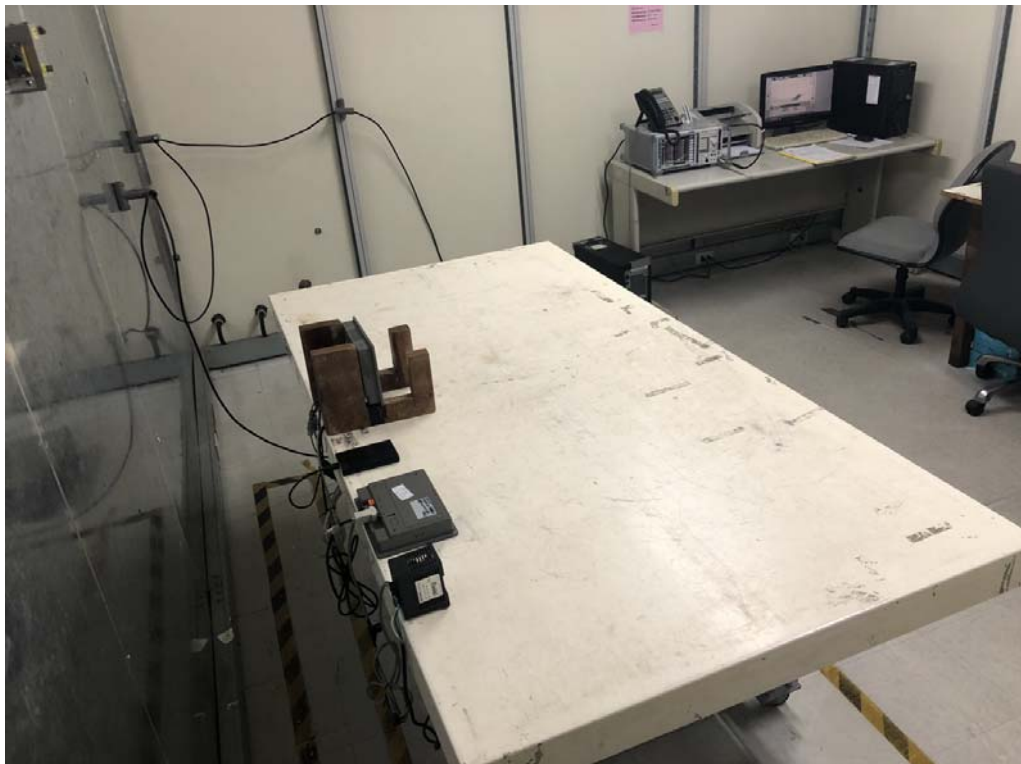
8 PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST

AC Power



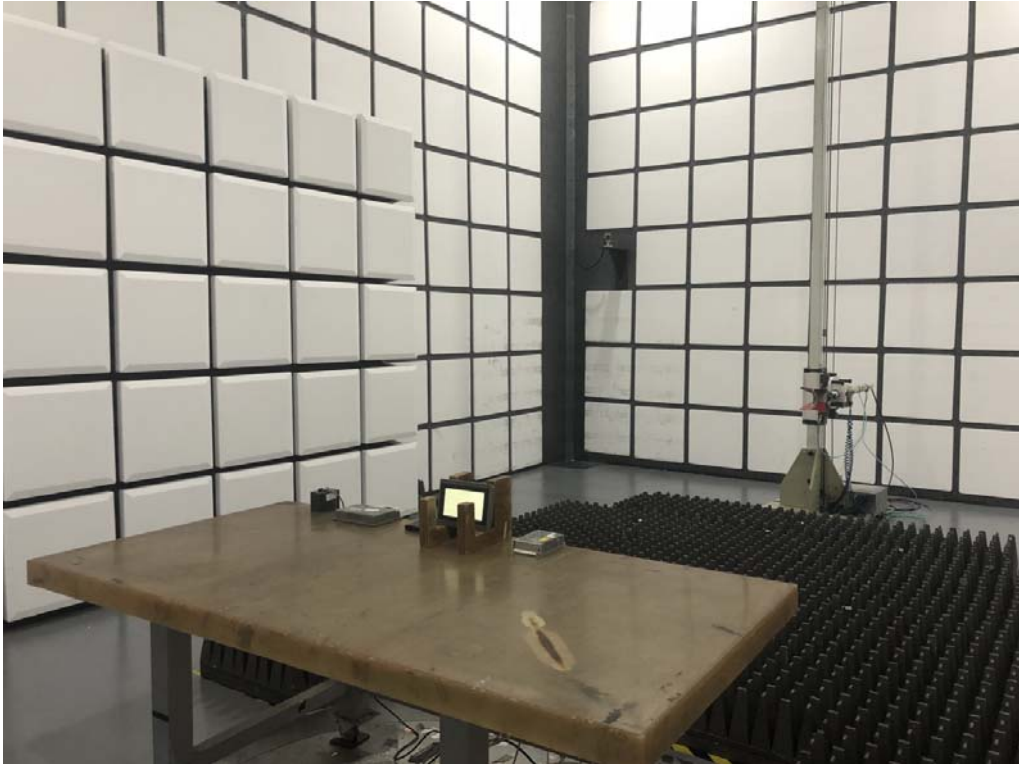
DC Power



RADIATED EMISSION TEST Below 1GHz



Above 1GHz



966 Chamber TEST

