

FCC DoC TEST REPORT

for

Industrial IoT Gateway

**MODEL: SX51-G; CS-SX51-G; WOP-1000G; WOP-1000CK; WOP-1000CA;
MG51; GW51; tBox; tBox-100; tBox-101; SX01; SX21; SX31; SX51-51;
SX51-31; SX51-21; SX51-11**

Test Report Number:
T180314D03-F

Issued to:

Cermate Technologies Inc.

**7F-1, No.168, Lien Cheng Rd., Chung-Ho District,
New Taipei City, Taiwan 235**

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: March 19, 2018



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 22, 2017	Initial Issue	ALL	Panny Chou
01	March 19, 2018	Add Models	ALL	Panny Chou

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1 TEST RESULT CERTIFICATION

Product:	Industrial IoT Gateway
Model:	SX51-G; CS-SX51-G; WOP-1000G; WOP-1000CK; WOP-1000CA; MG51; GW51; tBox; tBox-100; tBox-101; SX01; SX21; SX31; SX51-51; SX51-31; SX51-21; SX51-11
Brand:	Cermate
Applicant:	Cermate Technologies Inc. 7F-1, No.168, Lien Cheng Rd., Chung-Ho District, New Taipei City, Taiwan 235
Manufacturer:	Cermate Technologies Inc. 7F-1, No.168, Lien Cheng Rd., Chung-Ho District, New Taipei City, Taiwan 235
Tested:	September 18, 2017

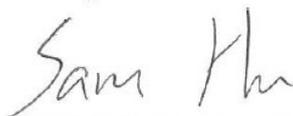
EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B, ICES-003 Issue 6-2016 ANSI C63.4-2014	Conducted (Power Port)	PASS	Meet Class A limit
	Radiated	PASS	Meet Class A limit

- 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	Industrial IoT Gateway
Brand Name	Cermate
Model	SX51-G; CS-SX51-G; WOP-1000G; WOP-1000CK; WOP-1000CA; MG51; GW51; tBox; tBox-100; tBox-101; SX01; SX21; SX31; SX51-51; SX51-31; SX51-21; SX51-11
Applicant	Cermate Technologies Inc.
Housing material	Metal Case
Identify Number	T170914D01
Received Date	September 14, 2017
EUT Power Rating	24VDC

Model Differences

Model Name	Difference	Tested (Check)
SX51-G	Original	<input checked="" type="checkbox"/>
CS-SX51-G; WOP-1000G; WOP-1000CK; WOP-1000CA; MG51; GW51; tBox; tBox-100; tBox-101; SX01; SX21; SX31	For marketing purpose only.	<input type="checkbox"/>
SX51-51	The PCB is using the same piece, but there is a difference in the communication port (com port is in DSUB-9)	COM port (DB9) X 5 <input type="checkbox"/>
SX51-31		COM port (DB9) X 3 <input type="checkbox"/>
SX51-21		COM port (DB9) X 2 <input type="checkbox"/>
SX51-11		COM port (DB9) X 1 <input type="checkbox"/>

I/O PORT (Model: SX51-G)

I/O PORT TYPES	Q'TY	TESTED WITH
1. USB Port	2	2
2. LAN Port	1	1
3. COM1/COM2/COM3 Port	1	1
4. COM4/COM5 Port	1	1

I/O PORT (Model: SX51-11)

I/O PORT TYPES	Q'TY	TESTED WITH
1. USB Port	2	2
2. LAN Port	1	1
3. COM1 Port	1	1

Note: Client consigns only one model sample to test (Model Number: SX51-G).

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 Power Mode
2	DC Power 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. Press the start menu, select executive and type ping 172.21.250.198 -t (EUT), ping 172.21.250.1 -t (Server NB).

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	Motherboard	SBSH01-16	Cermate
2	CPU (300MHz)	NUC972DF62Y	Nuvoton

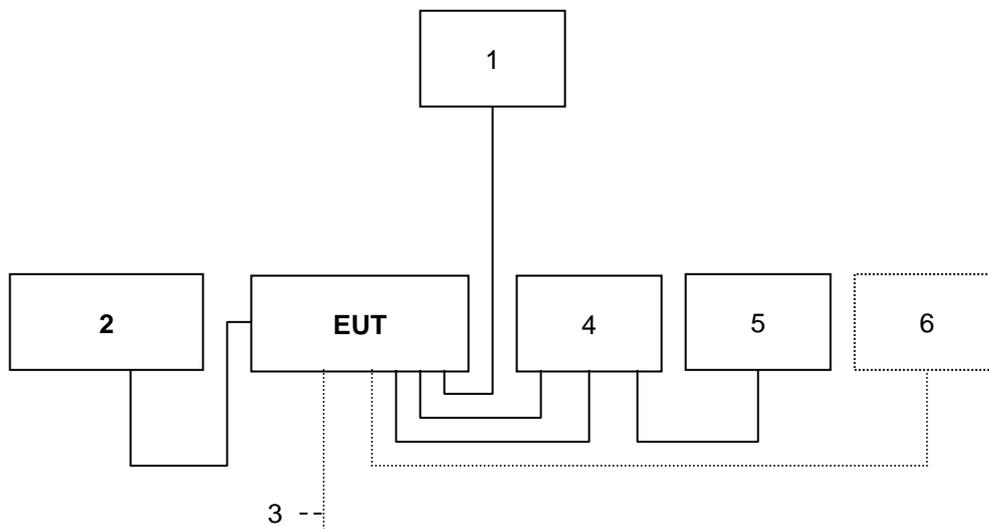
Peripherals Devices:

No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Brand Name	Data Cable	Power Cord
1	USB Mouse	M-U0026	N/A	DOC BSMI: T41126	Logitech	Shielded, 1.8m	N/A
2	Power Supply	DPS-02A-D24	N/A	N/A	Cermate	Unshielded, 1.8m	Unshielded, 1.8m
3	USB Cable	N/A	N/A	N/A	N/A	Shielded, 1.8m	N/A
4	LCD Touch Control Panel	PK2070	N/A	N/A	Cermate	COM1/2/3: Unshielded, 1.8m COM4/5: Unshielded, 3.0m	Unshielded, 1.8m
5	Power Supply	DPS-02A-D24	N/A	N/A	Cermate	Unshielded, 1.8m	Unshielded, 1.8m
6	Server NB	XPS13	7R0S3G2	BSMI ID: R31199	DELL	Unshielded, 20m	Unshielded, 1.8m

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	± 1.07
Radiated emissions	30MHz ~ 1000MHz	± 4.82
	1000MHz ~ 18000MHz	± 4.03
	18000MHz ~ 40000MHz	± 3.23

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	01/08/2018
EMI Test Receiver	R&S	ESCI	100234	05/19/2018
LISN	Schwarzbeck	NSLK 8127	8127382	05/21/2018
LISN(EUT)	Schwarzbeck	NSLK 8127	8127691	05/21/2018
Pulse Limiter	R&S	ESH3-Z2	100374	01/08/2018
Thermo-Hygro Meter	Wisewind	201A	No. 05	05/23/2018
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)

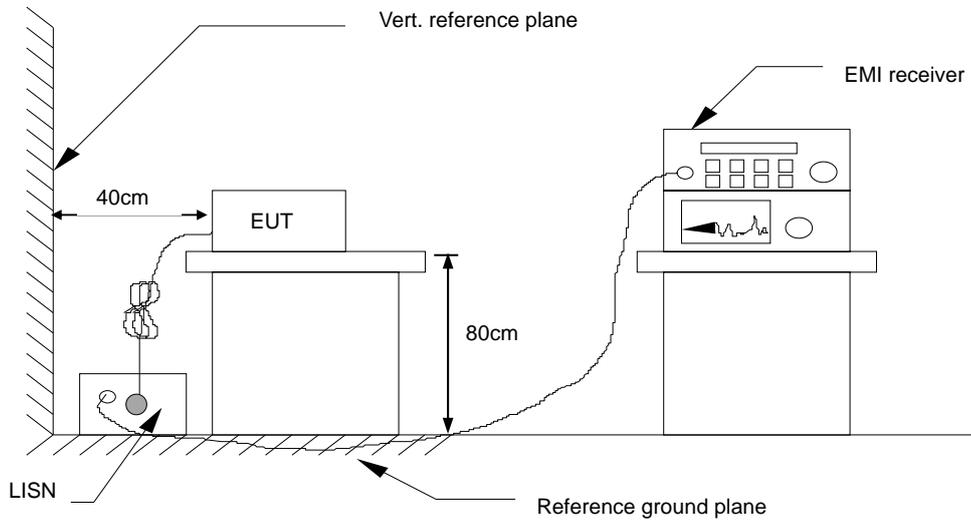
Procedure of Preliminary Test

- 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 120VAC/60Hz 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

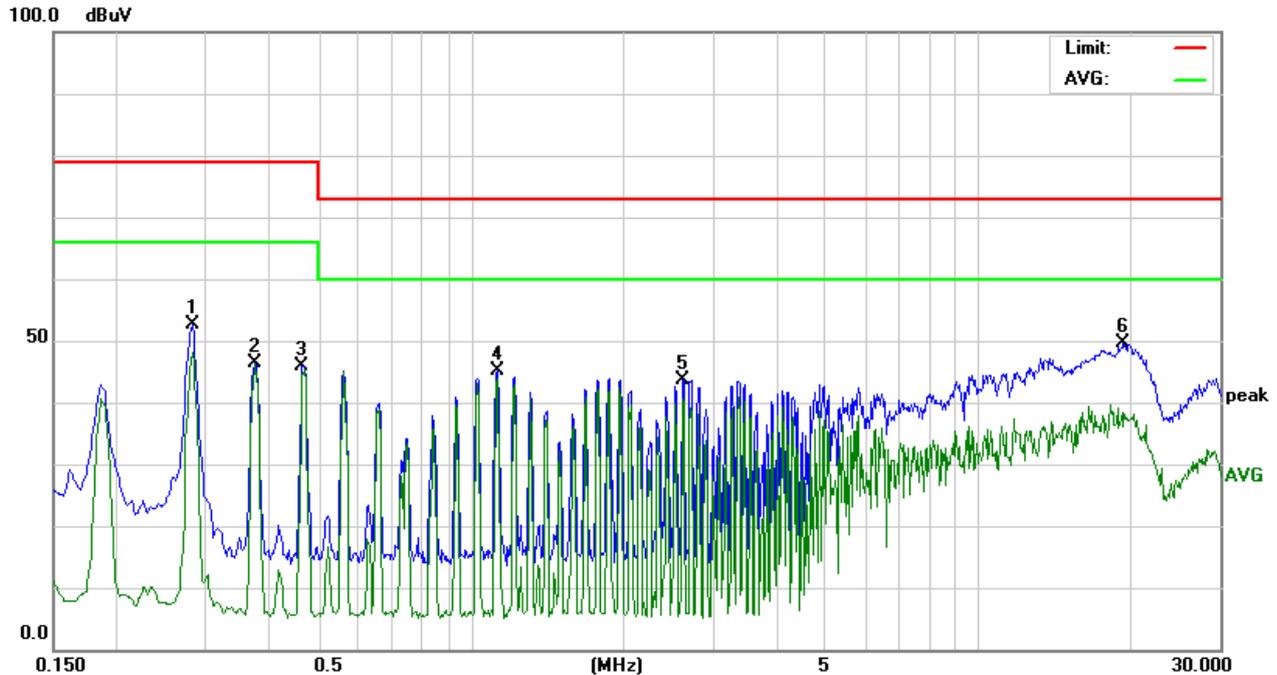
- Freq. = Emission frequency in MHz
- Reading = Uncorrected Analyzer/Receiver reading
- Factor = Insertion loss of LISN + Cable Loss + Pulse Limit
- Result = Reading + Factor
- Limit = Limit stated in standard
- Margin = Reading in reference to limit
- P = Peak Reading
- Q = Quasi-peak Reading
- A =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

Calculation Formula

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

6.6. TEST RESULTS

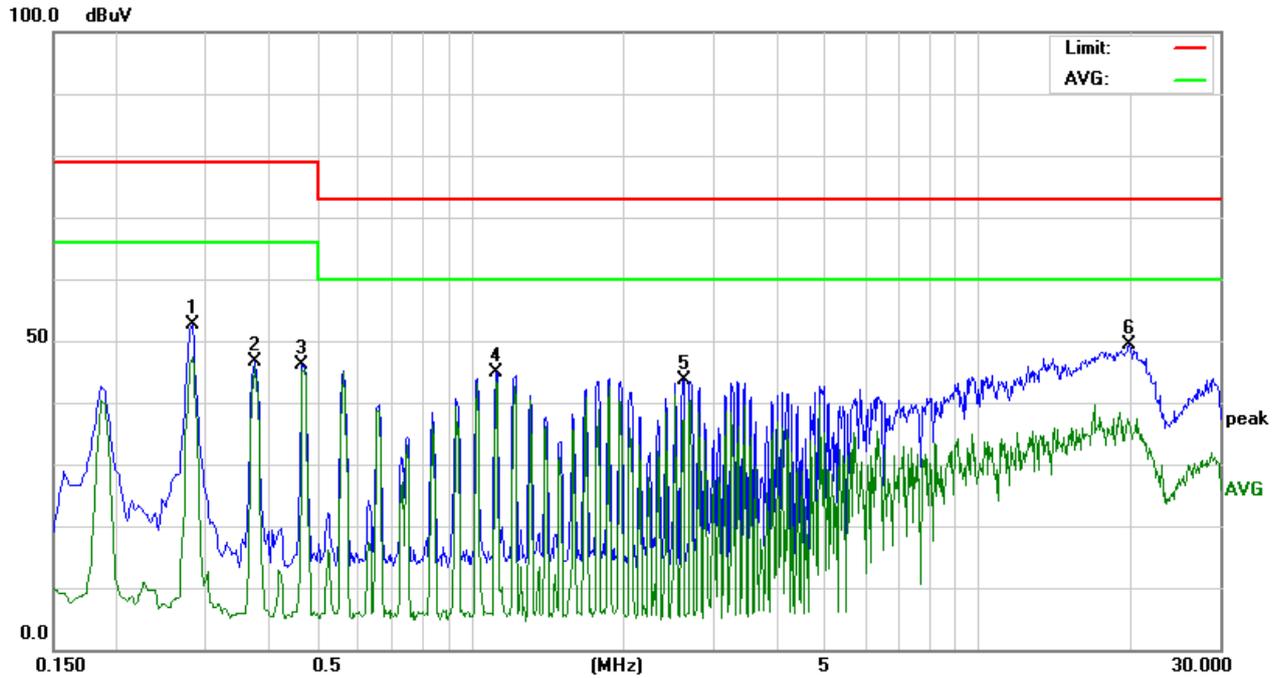
Model No.	SX51-G	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 62% RH	Test Mode	Mode 1
Tested by	David Cheng	Phase	L1
Standard	FCC CLASS A		



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)
0.2819	42.66	9.99	52.65	79.00	-26.35	P	L1
0.3740	36.51	9.99	46.50	79.00	-32.50	P	L1
0.4660	35.86	10.01	45.87	79.00	-33.13	P	L1
1.1260	35.03	10.08	45.11	73.00	-27.89	P	L1
2.6180	33.52	10.19	43.71	73.00	-29.29	P	L1
19.3620	38.90	10.63	49.53	73.00	-23.47	P	L1

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

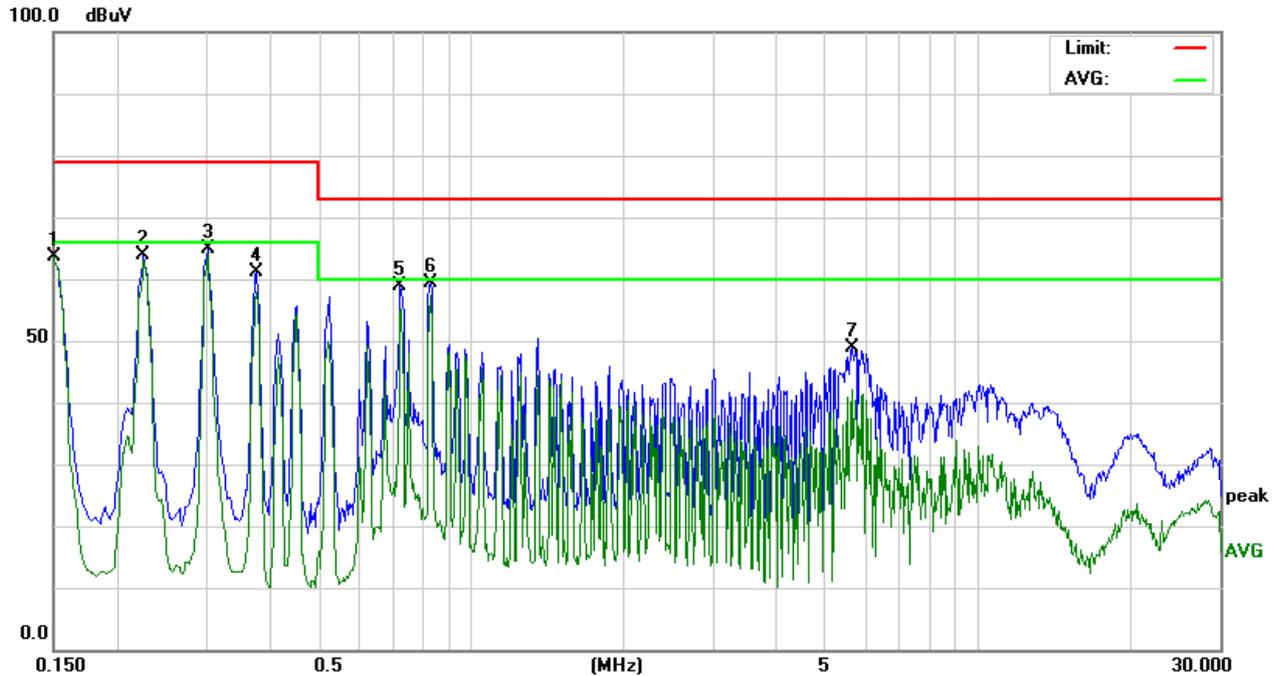
Model No.	SX51-G	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 62% RH	Test Mode	Mode 1
Tested by	David Cheng	Phase	L2
Standard	FCC CLASS A		



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)
0.2819	42.66	9.97	52.63	79.00	-26.37	P	L2
0.3740	36.60	9.97	46.57	79.00	-32.43	P	L2
0.4660	36.16	9.99	46.15	79.00	-32.85	P	L2
1.1220	34.93	10.06	44.99	73.00	-28.01	P	L2
2.6260	33.36	10.18	43.54	73.00	-29.46	P	L2
19.8460	38.70	10.61	49.31	73.00	-23.69	P	L2

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

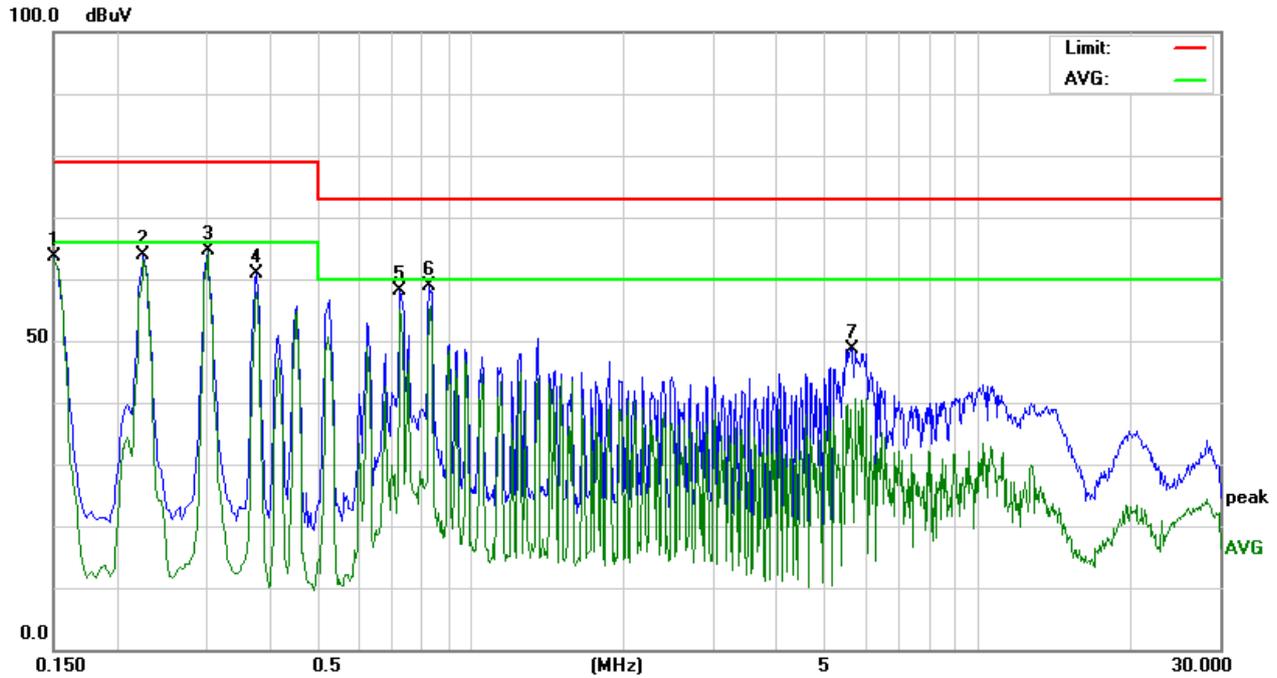
Model No.	SX51-G	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 62% RH	Test Mode	Mode 2 / Worst
Tested by	David Cheng	Phase	L1
Standard	FCC CLASS A		



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)
0.1500	53.67	9.96	63.63	79.00	-15.37	P	L1
0.2260	53.78	9.98	63.76	79.00	-15.24	P	L1
0.3020	54.84	9.99	64.83	79.00	-14.17	P	L1
0.3780	51.08	9.99	61.07	79.00	-17.93	P	L1
0.7260	48.77	10.05	58.82	73.00	-14.18	P	L1
0.8340	49.31	10.05	59.36	73.00	-13.64	P	L1
5.6300	38.53	10.28	48.81	73.00	-24.19	P	L1

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

Model No.	SX51-G	6dB Bandwidth	9 kHz
Environmental Conditions	22°C, 62% RH	Test Mode	Mode 2 / Worst
Tested by	David Cheng	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)
0.1500	53.68	9.94	63.62	79.00	-15.38	P	L2
0.2260	54.02	9.96	63.98	79.00	-15.02	P	L2
0.3020	54.70	9.97	64.67	79.00	-14.33	P	L2
0.3780	50.99	9.97	60.96	79.00	-18.04	P	L2
0.7260	48.17	10.03	58.20	73.00	-14.80	P	L2
0.8300	48.90	10.03	58.93	73.00	-14.07	P	L2
5.6620	38.45	10.26	48.71	73.00	-24.29	P	L2

Note: 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 **L2** corresponding to the close-in distance **d2** by applying the following relation: **L2 = L1 (d1/d2)**, where **L1** is the specified limit in microvolts per metre (**uV/m**) at the distance **d1 (10m)**, **L2** is the new limit for distance **d2 (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	06/27/2018
Cable	EMEC	CFD400NL-LW	N-Type#H11	08/17/2018
EMI Test Receiver	R&S	ESCI	101340	03/28/2018
Pre-Amplifier	HP	8447D	1937A01554	09/29/2017
Thermo-Hygro Meter	Wisewind	201A	No. 03	06/04/2018
Test S/W	EZ-EMC			
Above 1GHz Used				
Horn Antenna	ETS	3117	00139062	10/12/2017
Horn Antenna	EMCO	3115	00022256	08/09/2018
K-Type Cable	Rosnol	K1K50-UP0264-K1k50-1000	170803-1	08/22/2018
Microflex Cable	Rosnol	N1K50-EW0630-N1k50-7000	170803-1	08/22/2018
Pre-Amplifier	Com-Power	PAM-118A	551041	06/27/2018
Signal Analyzer	R&S	FSV40	101269	04/23/2018
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

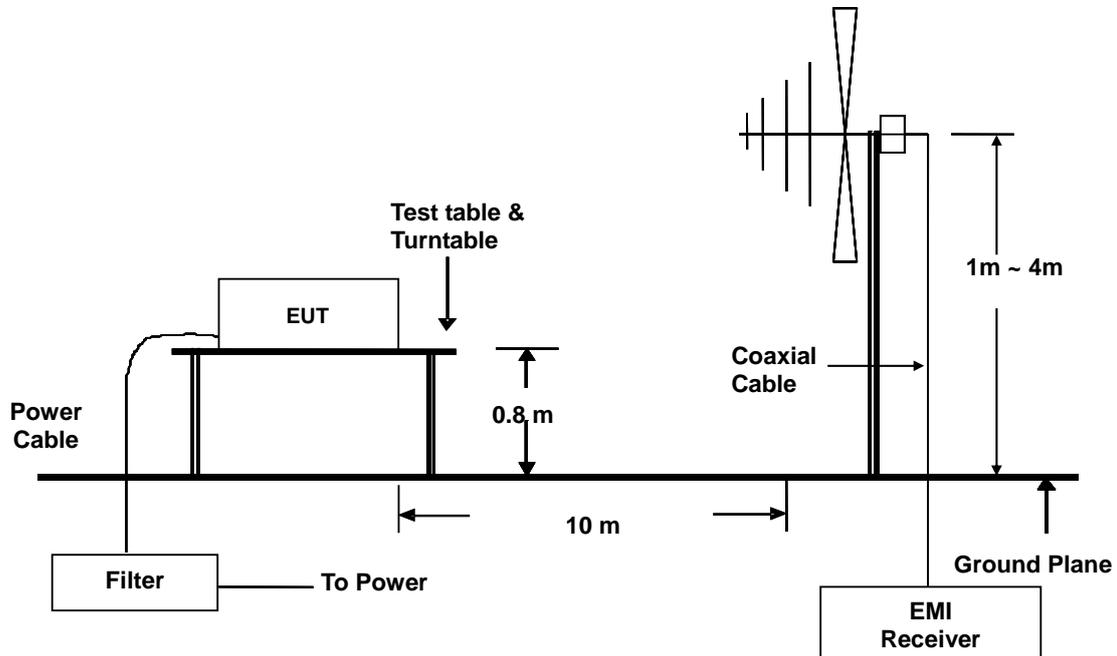
- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground 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 120VAC/60Hz 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

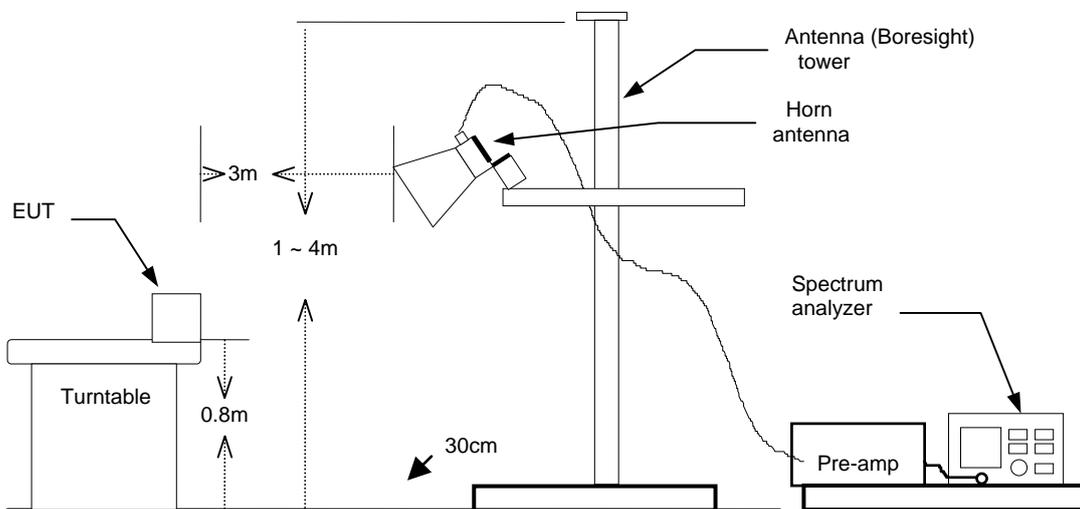
- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the 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

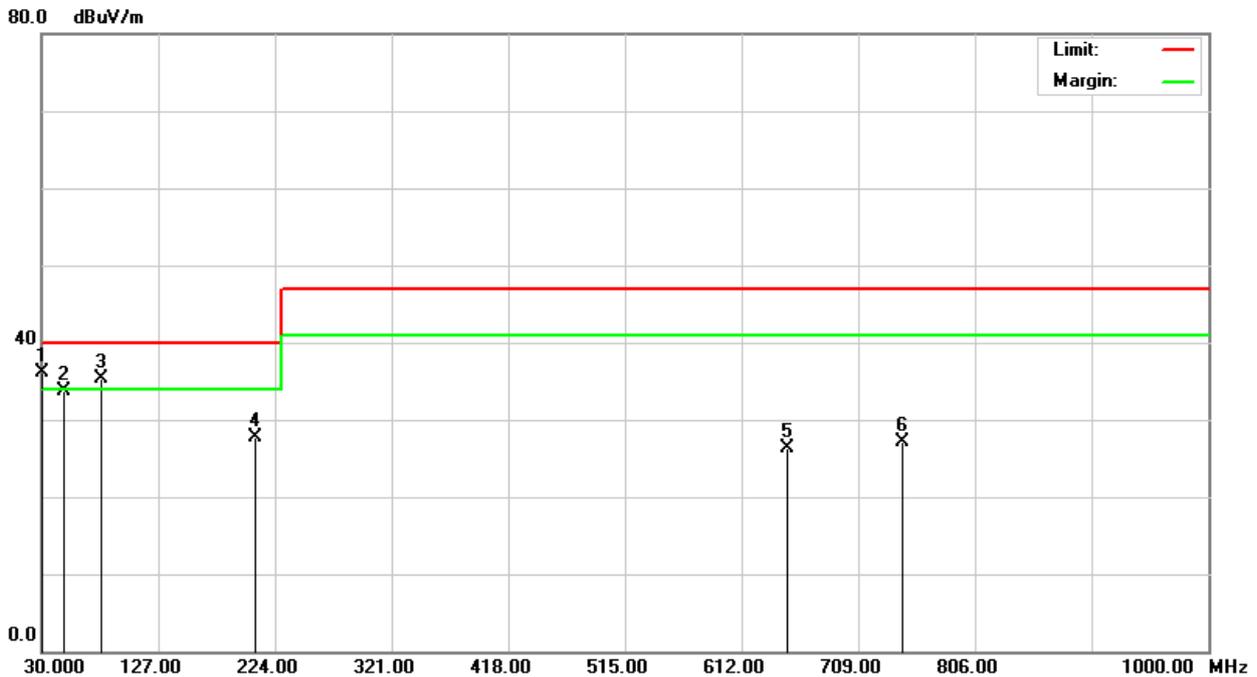
Calculation Formula

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

7.6. TEST RESULTS

Below 1GHz

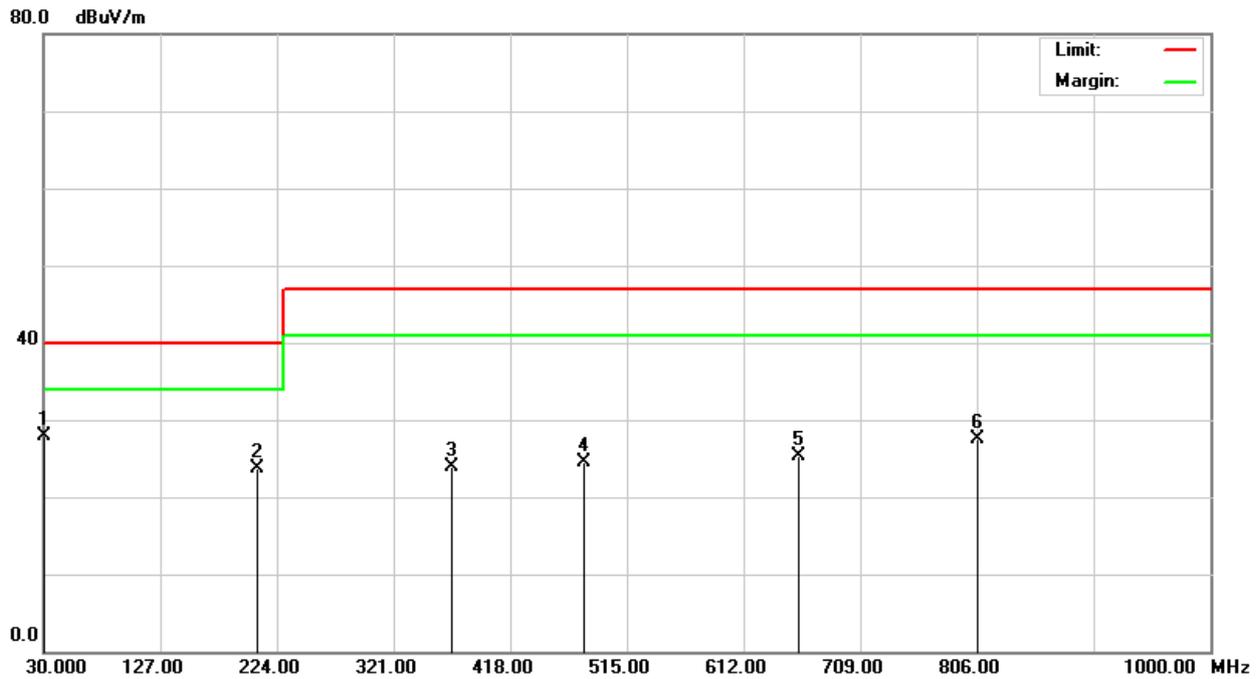
Model No.	SX51-G	Test Mode	Mode 1
Environmental Conditions	29°C, 65% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS A W/ CISPR 22 CLASS A LIMIT		



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)
30.2500	38.90	-2.80	36.10	40.00	-3.90	100	198	Q	V
48.1200	45.30	-11.57	33.73	40.00	-6.27	100	231	Q	V
79.1600	48.90	-13.69	35.21	40.00	-4.79	100	78	Q	V
207.4500	38.10	-10.44	27.66	40.00	-12.34	100	154	Q	V
649.8700	25.10	1.28	26.38	47.00	-20.62	400	223	Q	V
746.0500	24.80	2.33	27.13	47.00	-19.87	400	99	Q	V

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.
2. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	SX51-G	Test Mode	Mode 1
Environmental Conditions	29°C, 65% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	David Cheng
Standard	FCC CLASS A W/ CISPR 22 CLASS A LIMIT		

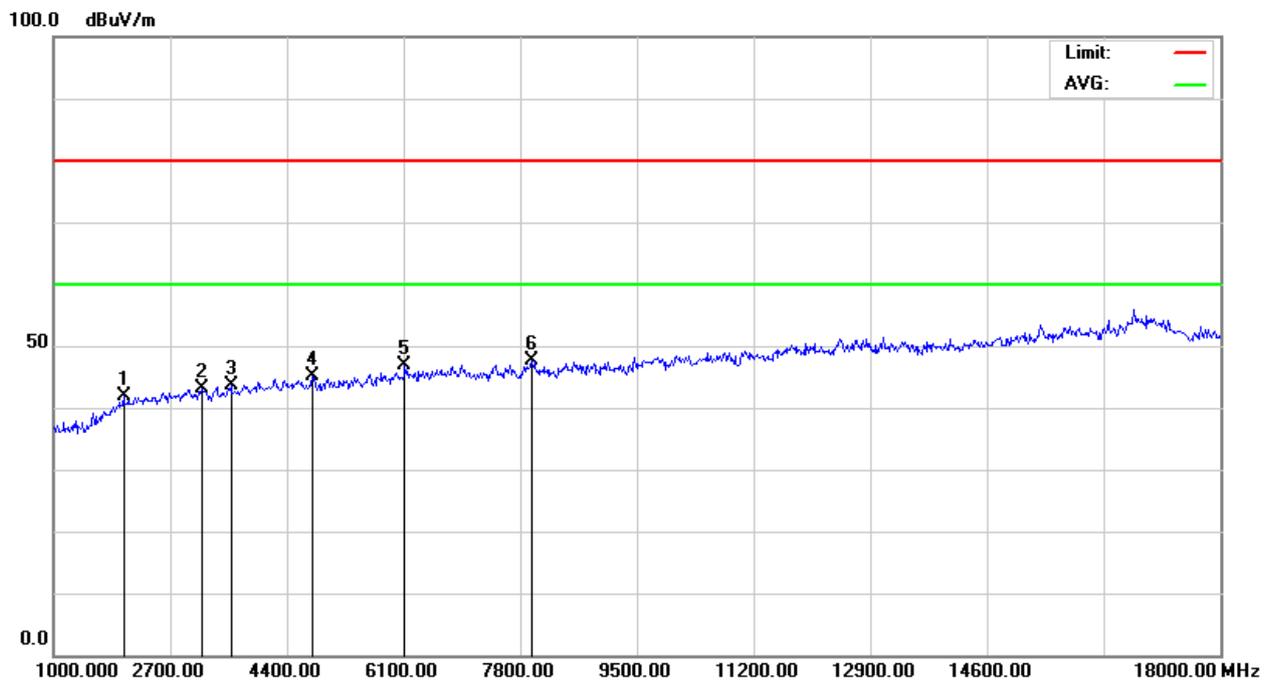


Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
30.9100	30.90	-3.07	27.83	40.00	-12.17	400	311	Q	H
207.1900	34.20	-10.44	23.76	40.00	-16.24	400	28	Q	H
369.2300	28.30	-4.40	23.90	47.00	-23.10	400	352	Q	H
480.0200	25.80	-1.31	24.49	47.00	-22.51	100	228	Q	H
657.5800	24.10	1.28	25.38	47.00	-21.62	100	178	Q	H
807.2100	24.89	2.55	27.44	47.00	-19.56	100	211	Q	H

Note: 1. 30MHz to 1000MHz test is Applicable CISPR 22 standard.
2. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

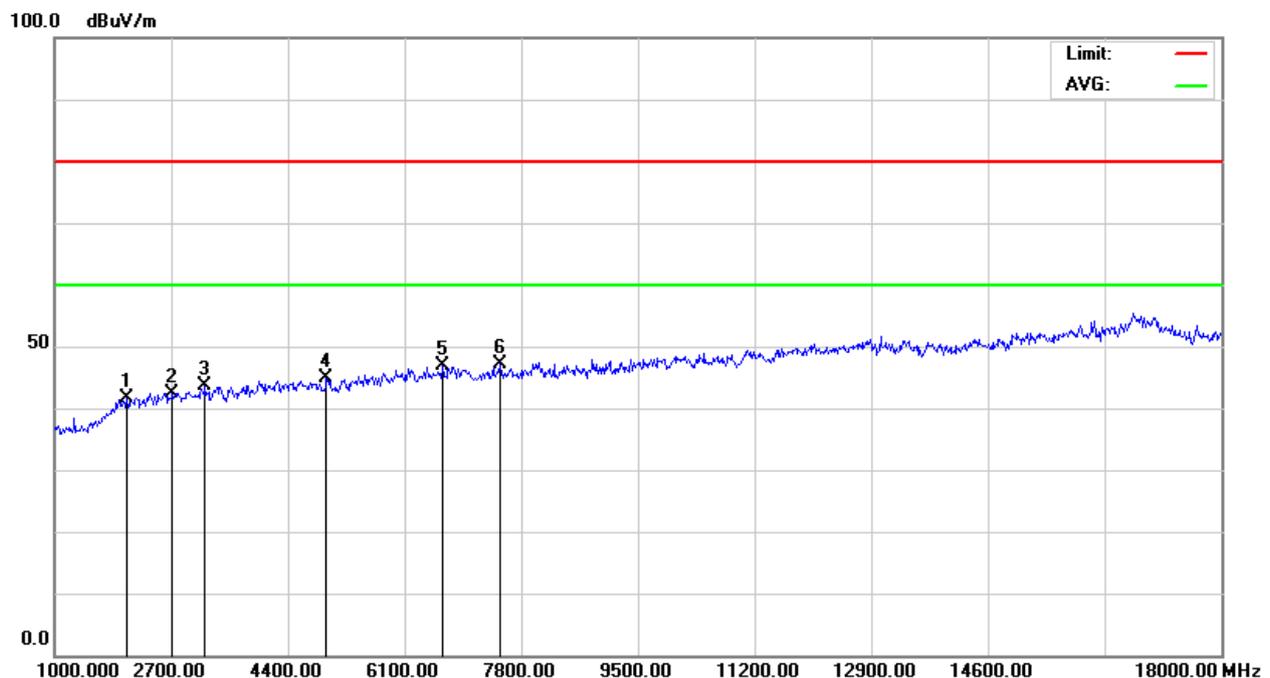
Model No.	SX51-G	Test Mode	Mode 1
Environmental Conditions	25°C, 61% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical	Antenna Distance	3m
Highest frequency generated or used	300MHz	Upper frequency	18000MHz
Detector Function	Peak and average.	Tested by	David Cheng
Standard	FCC CLASS A		



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)
2020.000	46.85	-4.95	41.90	80.00	-38.10	P	V
3159.000	47.39	-4.21	43.18	80.00	-36.82	P	V
3584.000	47.57	-4.02	43.55	80.00	-36.45	P	V
4774.000	47.46	-2.28	45.18	80.00	-34.82	P	V
6117.000	46.99	-0.13	46.86	80.00	-33.14	P	V
7970.000	47.23	0.43	47.66	80.00	-32.34	P	V

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

Model No.	SX51-G	Test Mode	Mode 1
Environmental Conditions	25°C, 61% 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	David Cheng
Standard	FCC CLASS A		

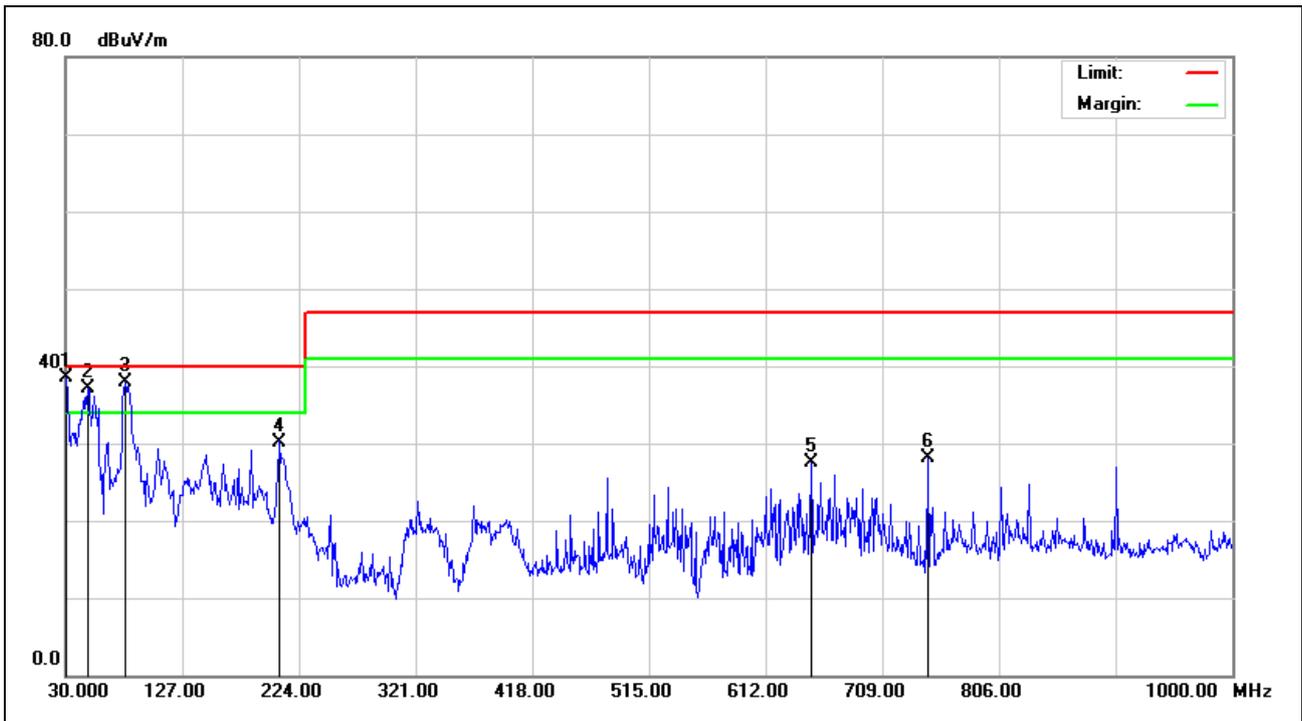


Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
2054.000	46.50	-4.93	41.57	80.00	-38.43	P	H
2717.000	46.90	-4.42	42.48	80.00	-37.52	P	H
3193.000	47.74	-4.20	43.54	80.00	-36.46	P	H
4961.000	47.01	-2.14	44.87	80.00	-35.13	P	H
6661.000	46.40	0.39	46.79	80.00	-33.21	P	H
7494.000	46.94	0.30	47.24	80.00	-32.76	P	H

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

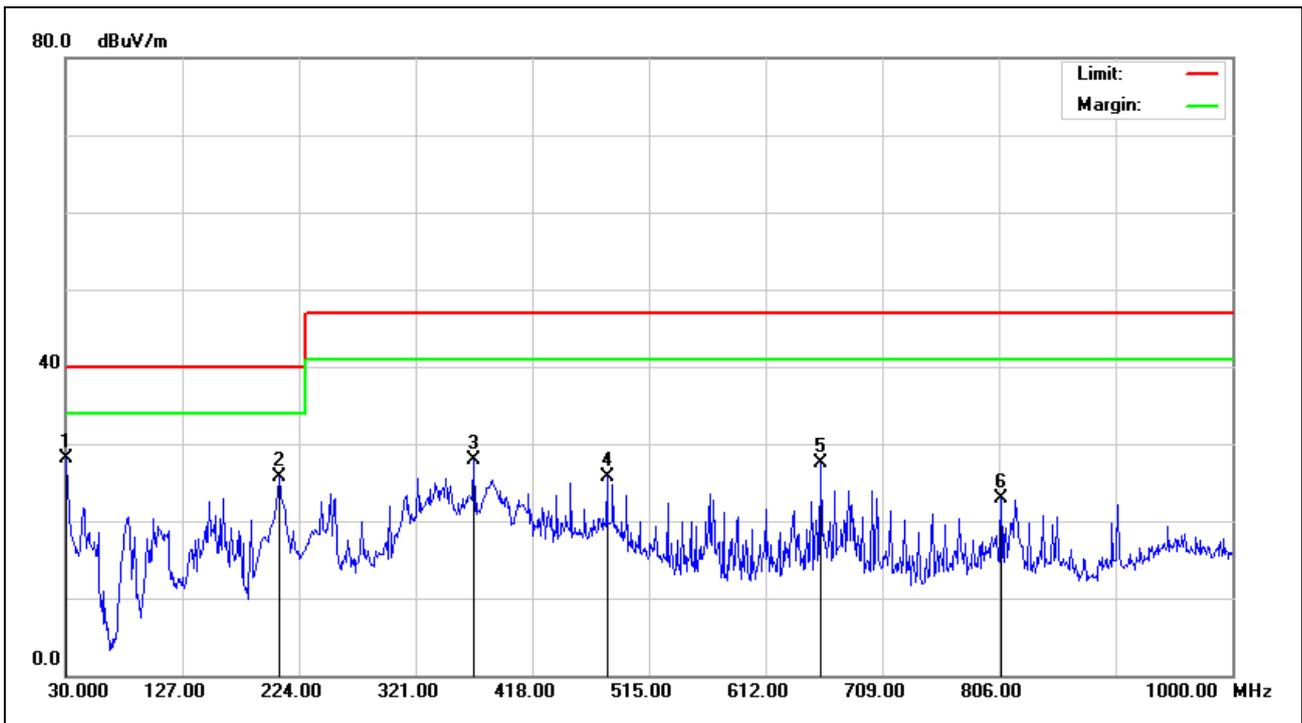
1066 Chamber Test Data

Job No.:	T170914D01	Polarization:	Vertical
Standard:	FCC CLASS A W/ CISPR 22 CLASS A LIMIT	Power Source:	110VAC /60Hz
Test item:	Radiation Test	Date:	2017/9/18
Company:	Cermate Technologies Inc.	Time:	PM 06:51:10
Model:	SX51-G	Temp.()/Hum.(%):	26()/60%
Description:	Normal Mode	Engineer Signature:	David Cheng



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	30.0000	53.55	-15.12	38.43	40.00	-1.57	peak	
2	48.4300	61.28	-24.21	37.07	40.00	-2.93	peak	
3	79.4700	62.65	-24.75	37.90	40.00	-2.10	peak	
4	207.5100	52.42	-22.22	30.20	40.00	-9.80	peak	
5	649.8300	40.48	-13.02	27.46	47.00	-19.54	peak	
6	746.8300	40.87	-12.76	28.11	47.00	-18.89	peak	

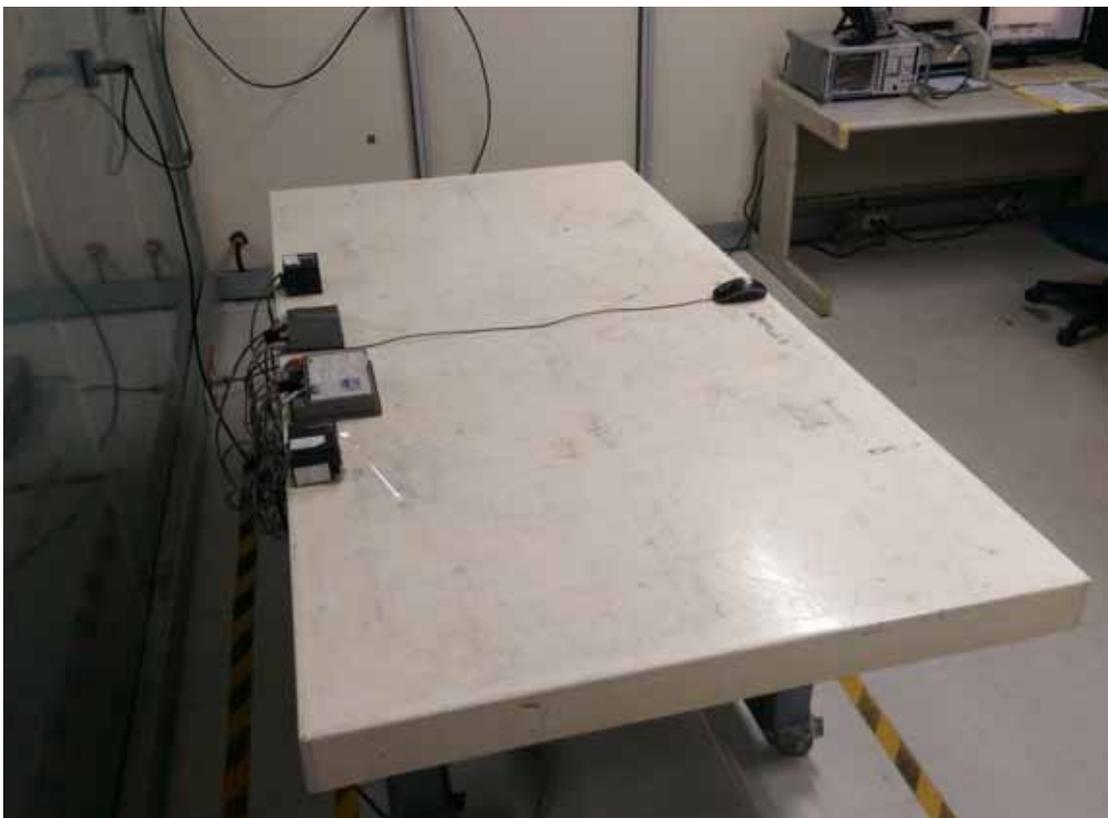
Job No.:	T170914D01	Polarization:	Horizontal
Standard:	FCC CLASS A W/ CISPR 22 CLASS A LIMIT	Power Source:	110VAC /60Hz
Test item:	Radiation Test	Date:	2017/9/18
Company:	Cermate Technologies Inc.	Time:	PM 07:00:48
Model:	SX51-G	Temp.()/Hum.(%):	26()/60%
Description:	Normal Mode	Engineer Signature:	David Cheng



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	30.0000	38.37	-10.31	28.06	40.00	-11.94	peak	
2	207.5100	52.79	-27.08	25.71	40.00	-14.29	peak	
3	369.5000	47.53	-19.60	27.93	47.00	-19.07	peak	
4	480.0800	41.32	-15.65	25.67	47.00	-21.33	peak	
5	657.5900	41.51	-14.08	27.43	47.00	-19.57	peak	
6	807.9400	34.66	-11.85	22.81	47.00	-24.19	peak	

8 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST

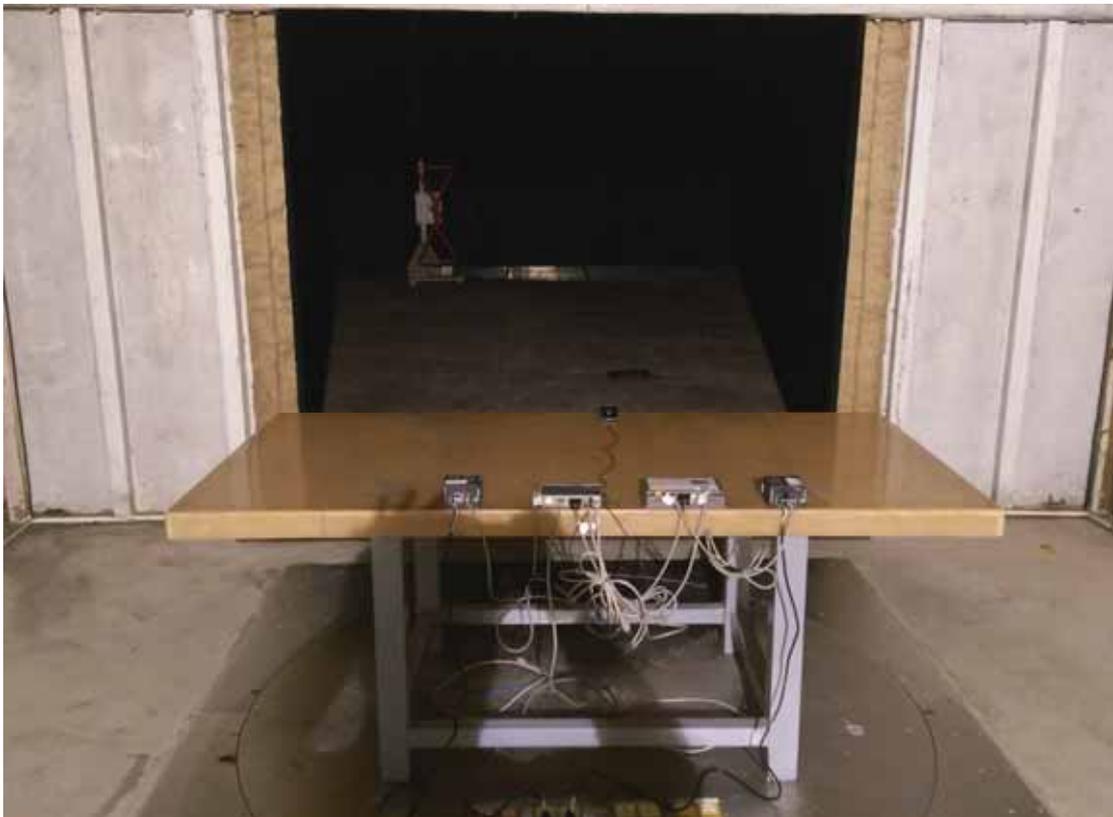
AC Power



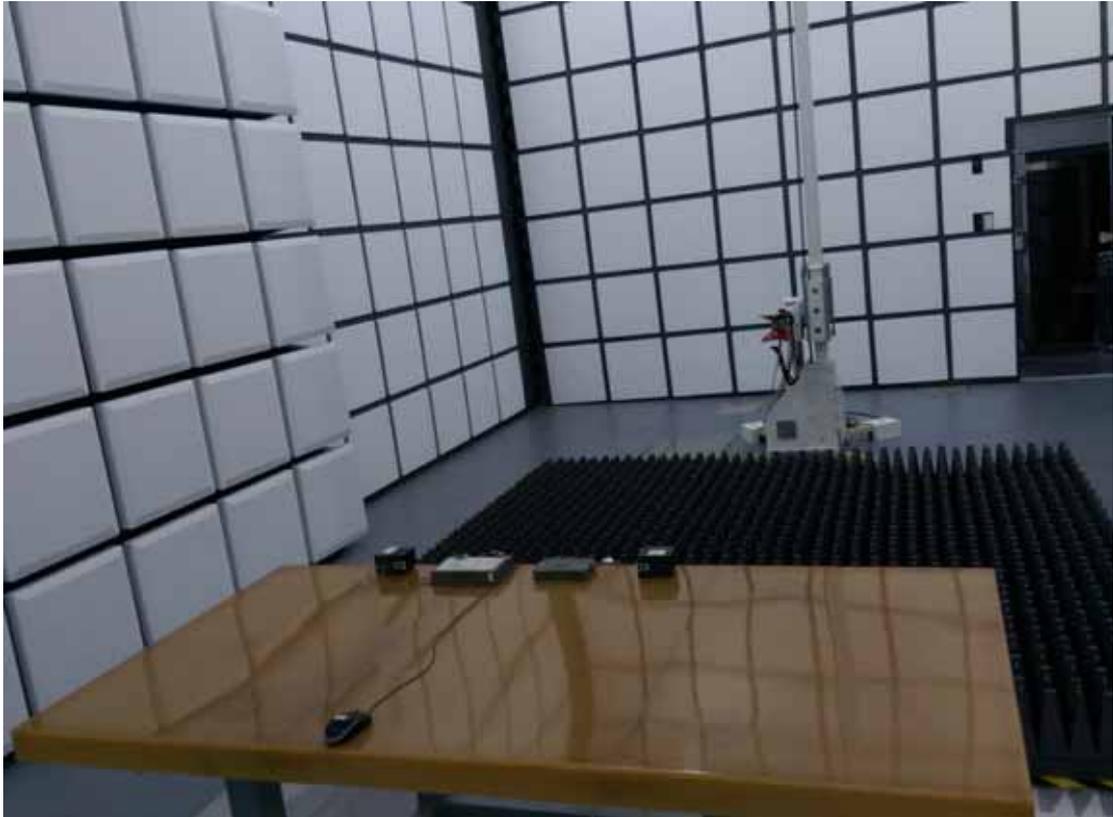
DC Power



RADIATED EMISSION TEST
Below 1GHz



Above 1GHz



1066 CHAMBER TEST

