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TEST REPORT

FCC PART 15 SUBPART C

Report Reference No. : CTL2206071044-WF02

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Product Name : Smart Desk Lamp

Model/Type reference : DL2202

List Model(s)..... : N/A

Trade Mark..... : VOCOLinc

FCC ID..... : 2AXT8-DL2202

Applicant's name : Felion Technologies Company Limited.

Address of applicant : 304,3/F, Fuxing Office Building, No.6 Binglang Road, Fubao Community, Futian District, Shenzhen, China

Test Firm..... : Shenzhen CTL Testing Technology Co., Ltd.

Address of Test Firm : Floor 1-A, Baisha Technology Park, No.3011, Shaheji Road, Nanshan District, Shenzhen, China 518055

Test specification..... :

Standard : FCC Rules Part 15.207,15.209, 15.215(c)
ANSI C63.10-2013

TRF Originator : Shenzhen CTL Testing Technology Co., Ltd.

Master TRF..... : Dated 2011-01

Date of receipt of test item : June 07, 2022

Date of sampling..... : June 07, 2022

Date of Test Date..... : June 07, 2022- July 27, 2022

Date of Issue : July 28, 2022

Result..... : Pass

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TEST REPORT

Test Report No.:	CTL2206071044-WF02	July 28, 2022
		Date of issue

Equipment under Test : Smart Desk Lamp

Sample No. CTL220607104-4-S001(Normal sample)
CTL220607104-4-S002(Engineer sample)

Model /Type : DL2202

Listed Models : N/A

Applicant : **Felion Technologies Company Limited.**

Address : 304,3/F, Fuxing Office Building, No.6 Binglang Road,
Fubao Community, Futian District, Shenzhen, China

Manufacturer : **Felion Technologies Company Limited.**

Address : 304,3/F, Fuxing Office Building, No.6 Binglang Road,
Fubao Community, Futian District, Shenzhen, China

Test result	Pass *
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* In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

**** Modified History ****

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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

[FCC Rules Part 15.207, 15.209, 15.215\(c\)](#)

[ANSI C63.10: 2013](#): American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

Test Item	Test Standards	Test Result
Electric Field Radiated Emissions	FCC Part 15 C (Section15.209)	PASS
20dB Bandwidth/99% Bandwidth	FCC Part 15 C (Section15.215(c))	PASS
Conducted Emissions	FCC Part 15 C (Section15.207)	PASS
Antenna Requirement	FCC Part 15 C (Section15.203)	PASS

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

FCC-Registration No.: 399832 Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

1.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	± 0.57 dB	(1)
Transmitter power Radiated	± 2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	± 2.20 dB	(1)
Occupied Bandwidth	± 0.01 ppm	(1)
Radiated Emission 30~1000MHz	± 4.10 dB	(1)
Radiated Emission Above 1GHz	± 4.32 dB	(1)
Conducted Disturbance 0.15~30MHz	± 3.20 dB	(1)

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

2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Smart Desk Lamp
Model/Type reference:	DL2202
Power supply:	DC 12V from adapter
Adapter information:	Model: XY24SE-120200VQ-UW Input:100-240V~50/60Hz 0.5A Max. Output:12V---2.0A
Hardware version:	LB-PD-2686
Software version:	1.137.2
Wireless Charger:	
Operation frequency:	118KHz-205KHz
Modulation type:	ASK
Rated power:	10W
Antenna type:	Coil antenna

Note1: For more details, please refer to the user's manual of the EUT.

2.3. Description of the test mode

Equipment under test was operated during the measurement under the following conditions:

☒ Charging and communication mode

Test Modes:		
Mode 1	AC/DC Adapter+ EUT + Wireless charger tester (Load 10W)	Record
Mode 2	AC/DC Adapter + EUT + Wireless charger tester (Load 7.5W)	Pre-tested
Mode 3	AC/DC Adapter+ EUT + Wireless charger tester (Load 5W)	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

2.4. Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Wireless charger tester	/	SW-MK-89898	Full Protocol Wireless Chager Tester, 5W / 7.5W / 10W / 15W four gear switchable	CE/FCC	laboratory
/	/	/	/	/	/
/	/	/	/	/	/

2.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	3560.6550.12	2022/05/06	2023/05/05
LISN	R&S	ESH2-Z5	860014/010	2022/05/06	2023/05/05
Double Cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2020/04/07	2023/04/06
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Horn Antenna	Ocean Microwave	OBH100400	26999002	2019/11/28	2022/11/27
EMI Test Receiver	R&S	ESCI	1166.5950.03	2022/05/06	2023/05/05
Spectrum Analyzer	Agilent	N9020	US46220290	2022/05/07	2023/05/06
Spectrum Analyzer	RS	FSP	1164.4391.38	2022/05/07	2023/05/06
Controller	EM Electronics	EM 1000	060859	2022/05/20	2023/05/19
Amplifier	Agilent	8449B	3008A02306	2022/05/07	2023/05/06
Amplifier	Agilent	8447D	2944A10176	2022/05/06	2023/05/05
Amplifier	Brief&Smart	LNA-4018	2104197	2022/05/07	2023/05/06
Temperature/Humidity Meter	Ji Yu	MC501	/	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130004	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130006	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY54510008	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55060003	2022/05/07	2023/05/06
High-Pass Filter	micro-tranics	HPM50108	G174	2022/05/07	2023/05/06
High-Pass Filter	micro-tranics	HPM50111	G142	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2022/05/07	2023/05/06
Coaxial Cables	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	2022/05/07	2023/05/06
RF Cable	Megalon	RF-A303	N/A	2022/05/07	2023/05/06
Test Software					
Name of Software			Version		
TST-PASS			1.0.5		
EZ_EMC(Below 1GHz)			V1.1.4.2		
EZ_EMC(above 1GHz)			V1.1.4.2		

The calibration interval was one year

2.6. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

3.1. Conducted Emissions Test

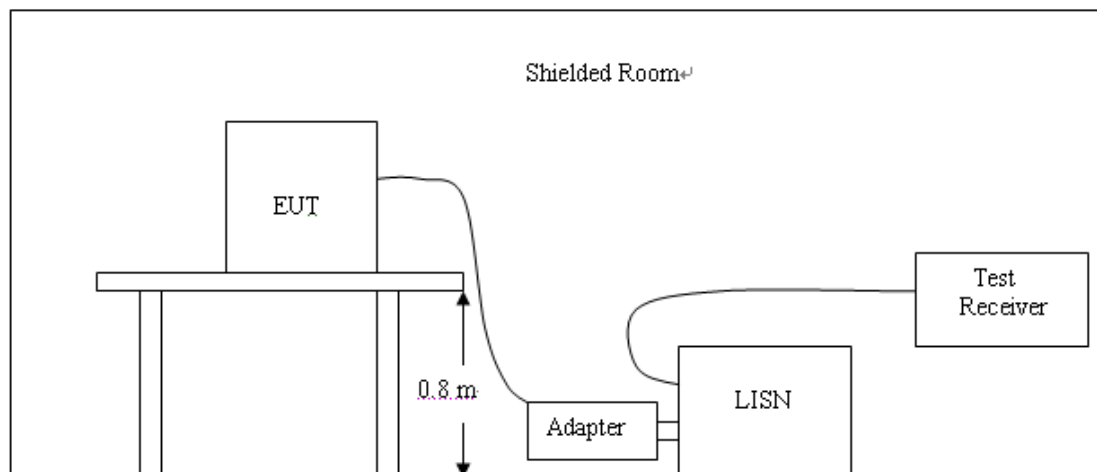
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

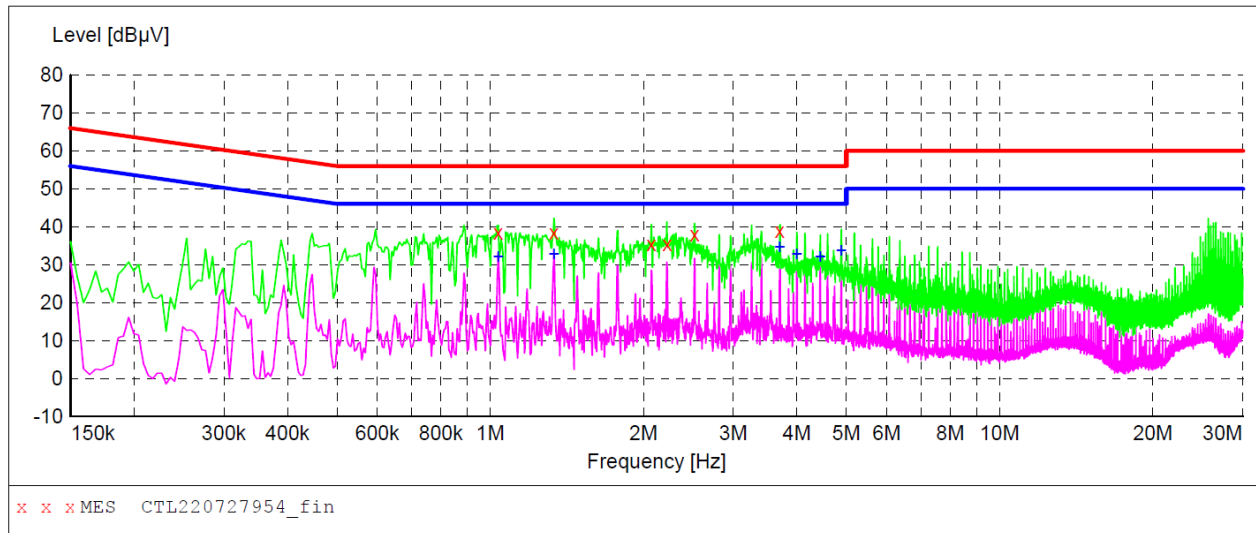
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS

- Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:
- All test modes described in section 2.3 has been tested, only the worst result of Mode 1 is recorded.

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL220727954_fin"**

7/27/2022 8:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.036500	38.40	10.2	56	17.6	QP	L1	GND
1.333500	38.30	10.2	56	17.7	QP	L1	GND
2.071500	35.40	10.3	56	20.6	QP	L1	GND
2.224500	35.30	10.3	56	20.7	QP	L1	GND
2.517000	37.90	10.3	56	18.1	QP	L1	GND
3.700500	38.80	10.3	56	17.2	QP	L1	GND

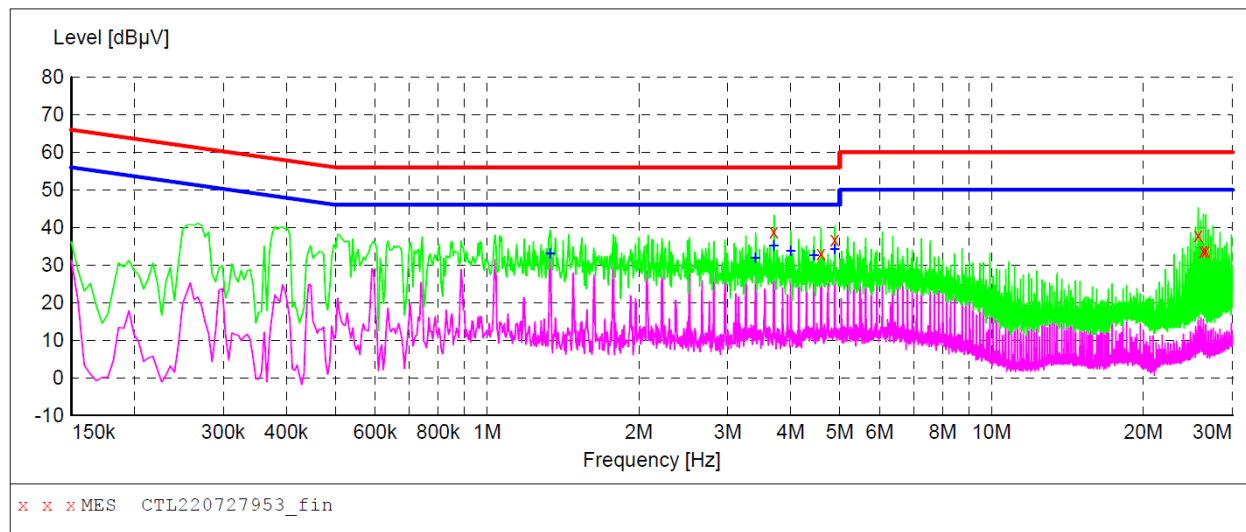
MEASUREMENT RESULT: "CTL220727954_fin2"

7/27/2022 8:30PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.036500	32.10	10.2	46	13.9	AV	L1	GND
1.333500	32.70	10.2	46	13.3	AV	L1	GND
3.700500	34.70	10.3	46	11.3	AV	L1	GND
3.997500	32.80	10.3	46	13.2	AV	L1	GND
4.443000	32.00	10.3	46	14.0	AV	L1	GND
4.888500	33.60	10.4	46	12.4	AV	L1	GND

SCAN TABLE: "Voltage (9K-30M) FIN"

Short Description: 150K-30M Voltage

**MEASUREMENT RESULT: "CTL220727953_fin"**

7/27/2022 8:27PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
3.700500	38.80	10.3	56	17.2	QP	N	GND
4.587000	33.00	10.3	56	23.0	QP	N	GND
4.884000	36.80	10.4	56	19.2	QP	N	GND
25.669500	37.90	11.5	60	22.1	QP	N	GND
26.250000	33.60	11.6	60	26.4	QP	N	GND
26.551500	33.60	11.6	60	26.4	QP	N	GND

MEASUREMENT RESULT: "CTL220727953_fin2"

7/27/2022 8:27PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.333500	33.10	10.2	46	12.9	AV	N	GND
3.403500	31.80	10.3	46	14.2	AV	N	GND
3.700500	35.10	10.3	46	10.9	AV	N	GND
3.997500	33.60	10.3	46	12.4	AV	N	GND
4.443000	32.60	10.3	46	13.4	AV	N	GND
4.888500	34.10	10.4	46	11.9	AV	N	GND

3.2. Radiated Emissions

Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

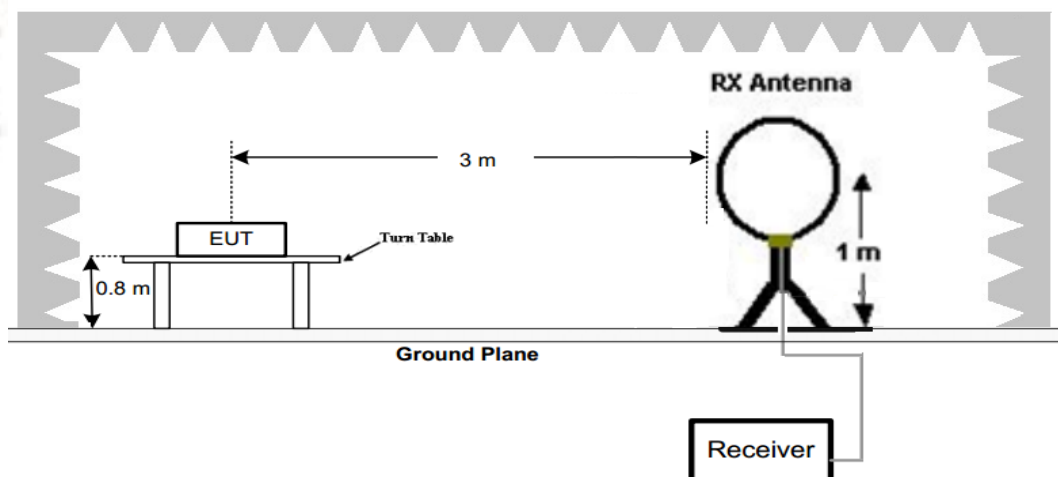
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

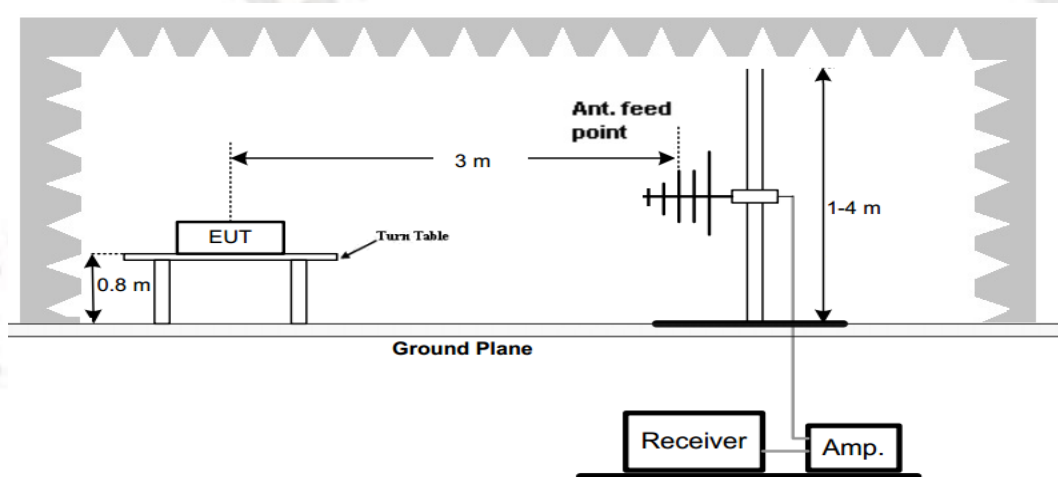
Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 1000MHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3

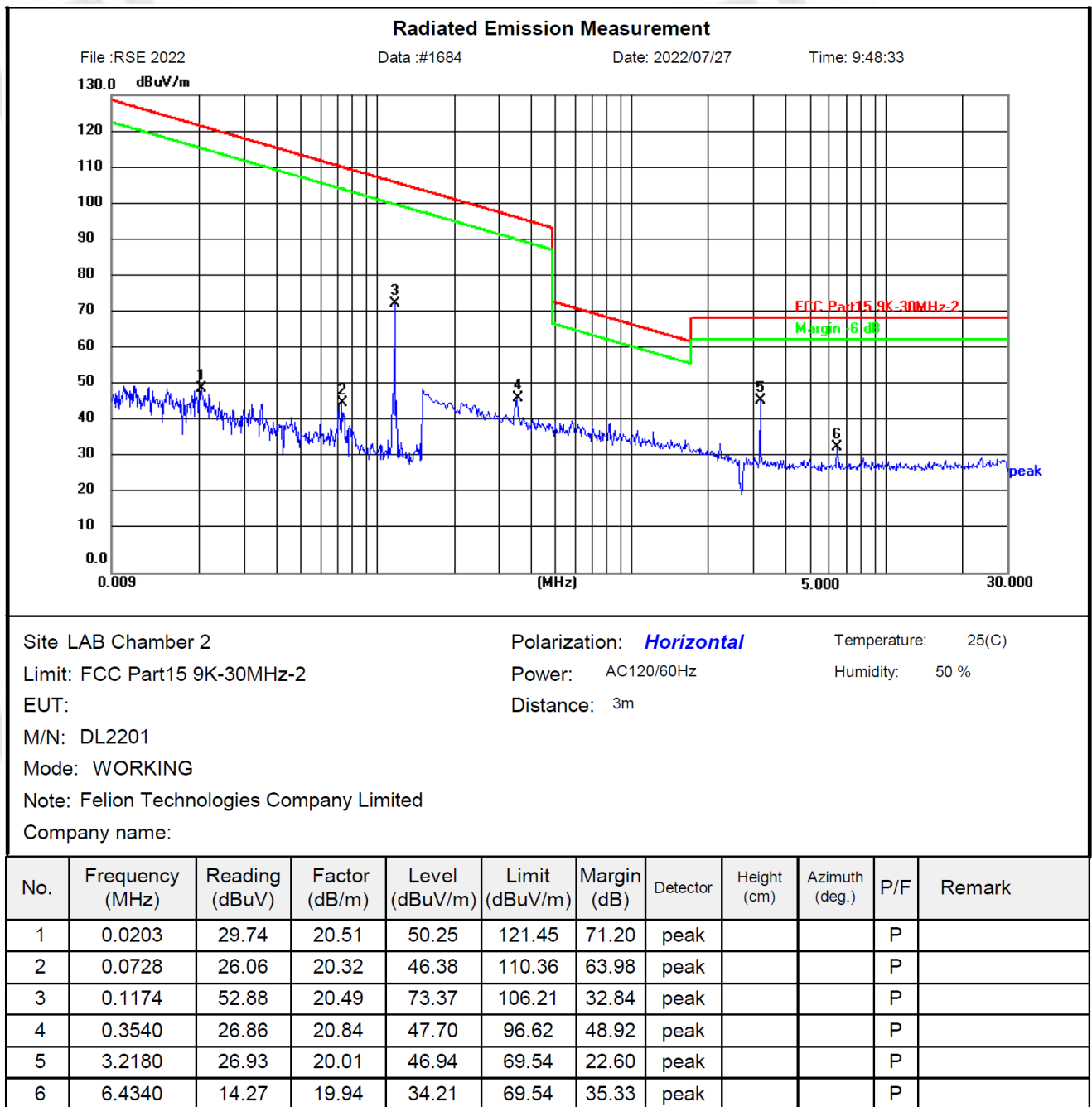
7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP

Test Results

Remark: All test modes described in section 2.3 has been tested, only the worst result of Mode 1 is recorded as below:

For 9KHz-30MHz



For 30MHz-1GHz

Horizontal

Radiated Emission Measurement

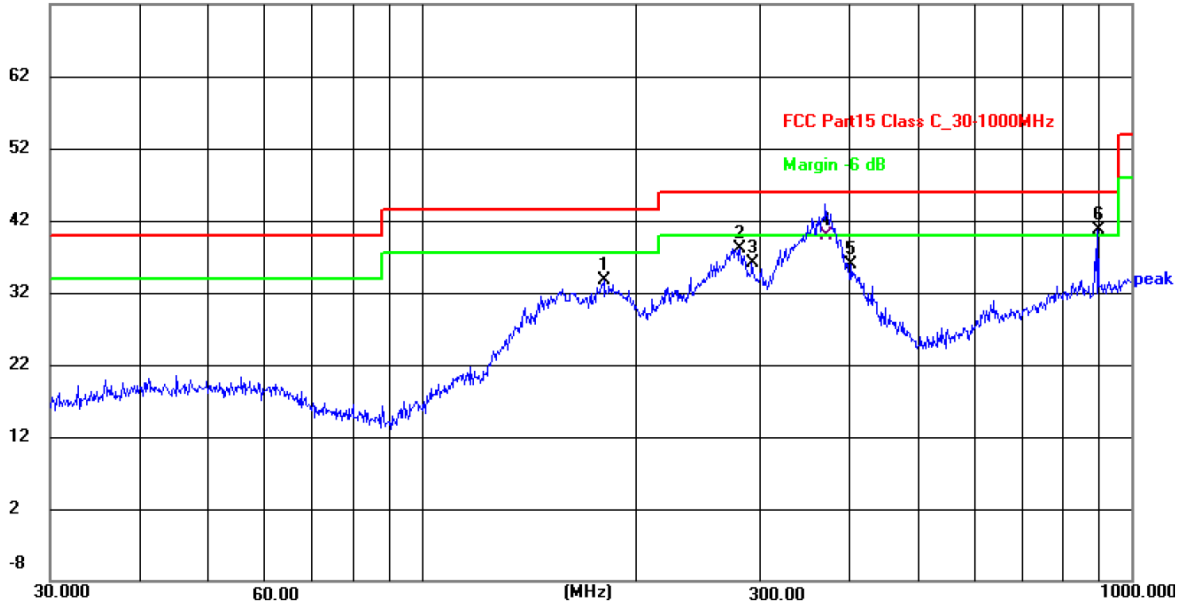
File : RF

Data : #3161

Date: 2022/07/27

Time: 20:45:15

72.0 dBuV/m



Site LAB Chamber 2

Polarization: **Horizontal**

Temperature: 25(C)

Limit: FCC Part15 Class C_30-1000MHz

Power: AC120/60Hz

Humidity: 50 %

EUT: /

Distance: 3m

M/N: DL2201

Mode: WORKING

Note: Felion Technologies Company Limited

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	180.6488	21.68	11.96	33.64	43.50	9.86	peak	100	292	P	
2	281.0074	24.05	14.06	38.11	46.00	7.89	peak	100	252	P	
3	292.0583	21.84	14.22	36.06	46.00	9.94	peak	100	252	P	
4	371.4629	23.55	16.39	39.94	46.00	6.06	QP	100	360	P	
5	403.2500	18.09	17.76	35.85	46.00	10.15	peak	100	316	P	
6	896.9965	14.37	26.27	40.64	46.00	5.36	peak	100	357	P	

Vertical

Radiated Emission Measurement

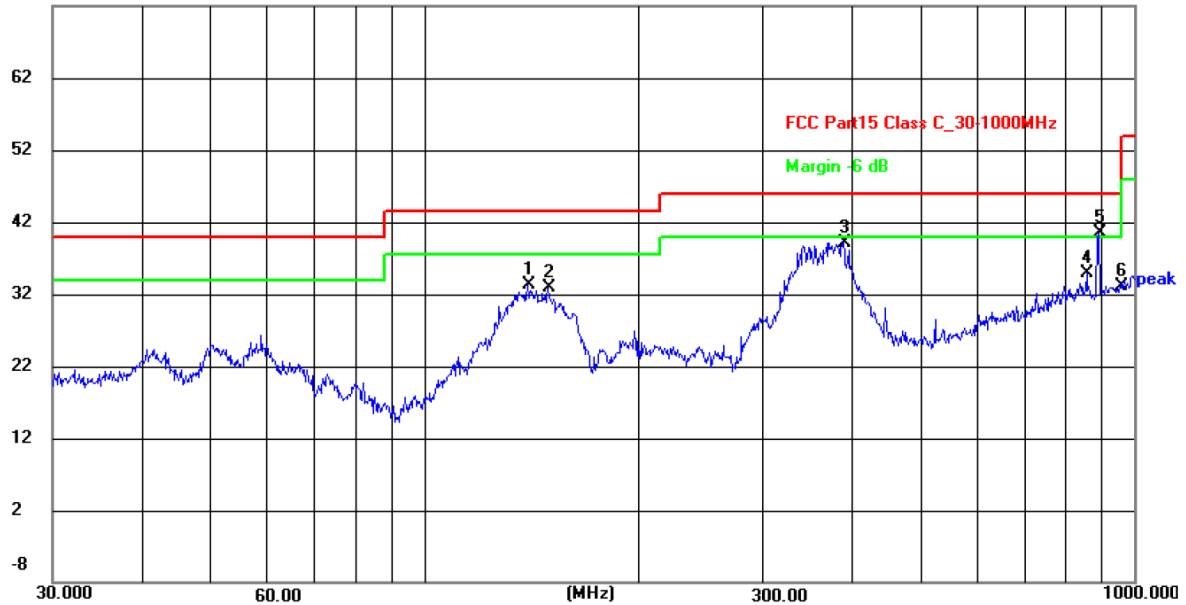
File :RF

Data :#3162

Date: 2022/07/27

Time: 20:46:19

72.0 dBuV/m



Site LAB Chamber 2

Polarization: **Vertical**

Temperature: 25(C)

Limit: FCC Part15 Class C_30-1000MHz

Power: AC120/60Hz

Humidity: 50 %

EUT: /

Distance: 3m

M/N: DL2201

Mode: WORKING

Note: Felion Technologies Company Limited

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	139.8508	19.65	13.75	33.40	43.50	10.10	peak	100	37	P	
2	149.9451	19.06	13.79	32.85	43.50	10.65	peak	100	52	P	
3	389.3549	22.13	17.07	39.20	46.00	6.80	peak	100	343	P	
4	857.0247	8.77	26.11	34.88	46.00	11.12	peak	100	319	P	
5	890.7278	14.49	26.09	40.58	46.00	5.42	peak	100	311	P	
6	955.4381	6.37	26.82	33.19	46.00	12.81	peak	100	4	P	

Remark: Level(dBuV/m)=Reading(dBuV)+Factor(dB/m)

Margin= Level(dBuV/m)-Limit(dBuV/m)

3.3. 20dB Bandwidth

Limit

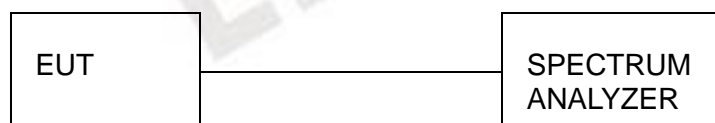
The 20dB bandwidth shall be less than 80% of the permitted frequency band.

Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30 KHz RBW and 100 KHz VBW.

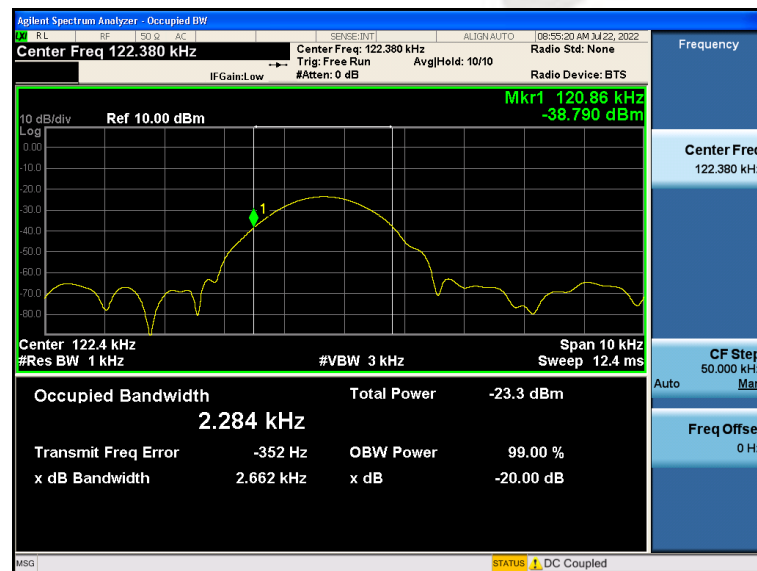
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

Test Configuration



Test Results

Mode	Freq (KHz)	20dB Bandwidth (KHz)	99% OBW (KHz)	Conclusion
Tx Mode	122.38	2.662	2.284	PASS



3.4. Antenna Requirement

Standard Applicable

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Information

The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.

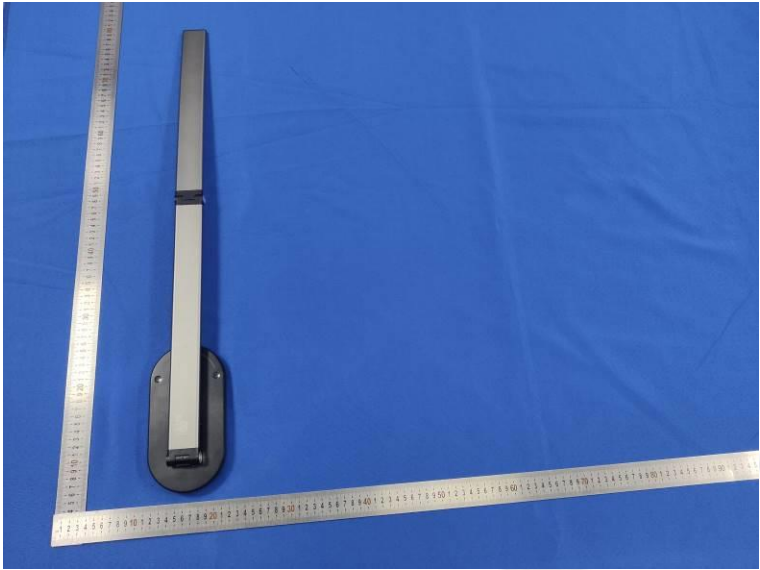
4. Test Setup Photos of the EUT



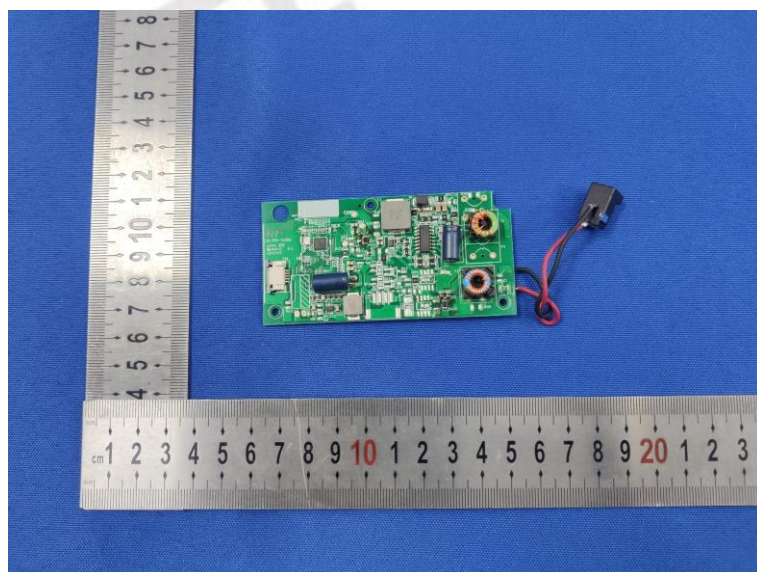
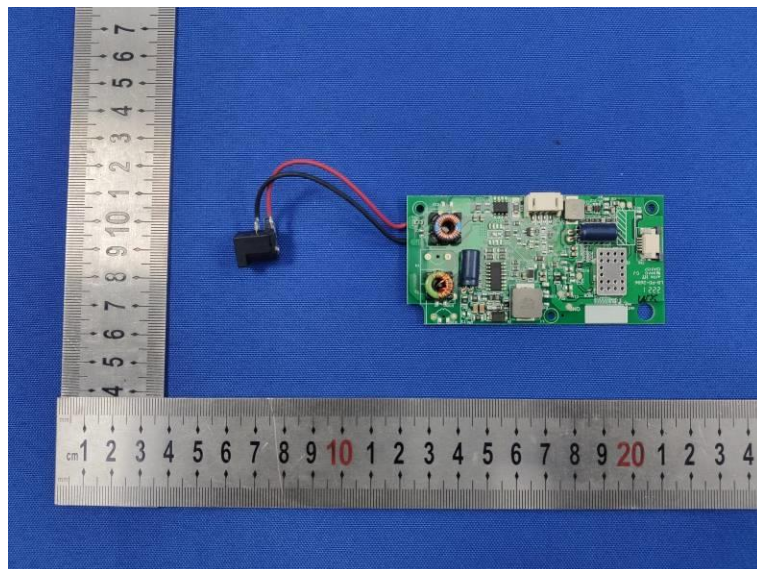
5. Photos of the EUT

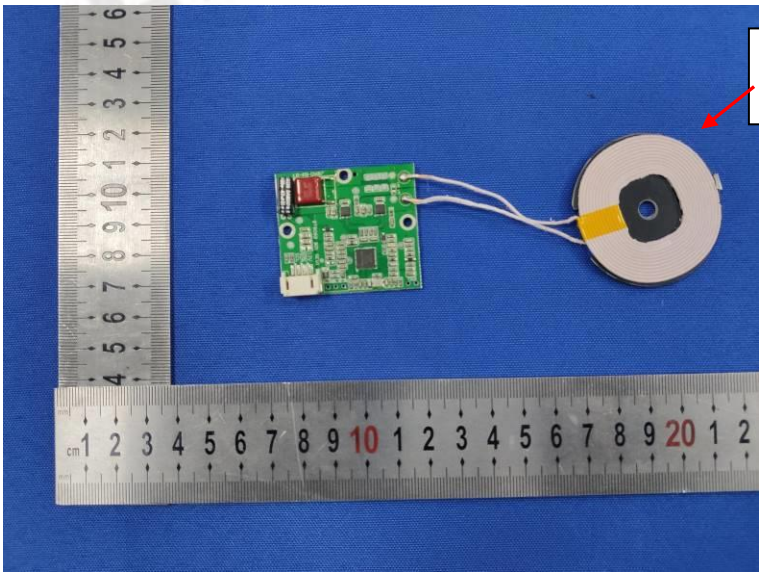
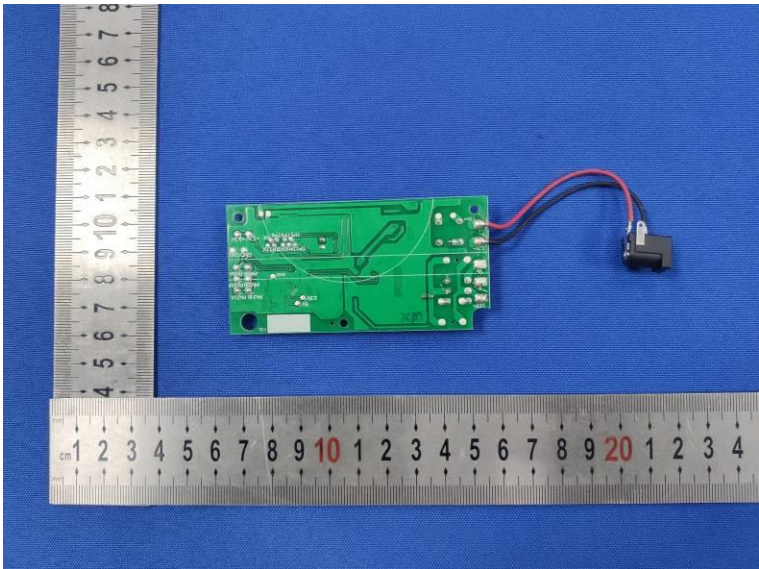
External Photos of EUT







Internal Photos of EUT



Wireless Charge antenna

