

FCC RADIO TEST REPORT

FCC ID: 2AWNGLKX21ECCRBD

Product : 21.5 inch Capacitive Touch Monitor

Trade Name : N/A

Model Name : LKX21ECCRBD-ILC

Additional Model : N/A

Report No. : UNIA21080225ER-61

Prepared for

Faytech Tech.Co., Ltd.

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Prepared by

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TEST RESULT CERTIFICATION

Applicant.....: Faytech Tech.Co., Ltd.

Address: Flr 3, Bld D, Phase 2, Hongmen Industry Park, No.399,
Jihua Road, Shuijing, District Longgang, Shenzhen, China

Manufacturer.....: Sichuan faytech Tech.Co., Ltd.

Address: 1.No.29 attached to No. 3, Guo Jun Avenue, Suining
economic and Technological Development Zone, Sichuan

Product description

Product Name.....: 21.5 inch Capacitive Touch Monitor

Trade Mark: N/A

Model Name: LKX21ECCRB-ILC

Test Methods.....: FCC Rules and Regulations Part 15 Subpart C Section 15.225,
ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date (s) of performance of tests.....: Aug. 02, 2021 ~ Sep. 02, 2021

Date of Issue: Sep. 26, 2021

Test Result.....: Pass

kahn.yang

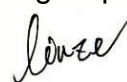
Prepared by:

Kahn yang/Editor



Reviewer:

Sky dong/Supervisor



Approved & Authorized Signer:

Liuze/Manager

Table of Contents	Page
1 TEST SUMMARY	4
2 GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 CARRIER FREQUENCY OF CHANNELS	7
2.3 TEST MODE	7
2.4 TEST SETUP	7
2.5 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	8
2.6 MEASUREMENT INSTRUMENTS LIST	9
3 CONDUCTED EMISSION	10
3.1 TEST LIMIT	10
3.2 TEST SETUP	10
3.3 TEST PROCEDURE	11
3.4 TEST RESULT	11
4 RADIATED EMISSION	12
4.1 TEST LIMIT	12
4.2 TEST SETUP	13
4.3 TEST PROCEDURE	14
4.4 TEST RESULT	14
5 OCCUPIED BANDWIDTH	18
5.1 TEST SETUP	18
5.2 TEST PROCEDURE	18
5.3 TEST RESULT	18
6 FREQUENCY STABILITY	19
6.1 TEST SETUP	19
6.2 TEST PROCEDURE	19
6.3 TEST RESULT	19
7 ANTENNA REQUIREMENT	20
8 PHOTO OF TEST	21
8.1 RADIATED EMISSION	21
8.2 CONDUCTED EMISSION	22

1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

ITEM	STANGARD	RESULT
CONDUCTED EMISSION	FCC Part 15.207	N/A
RADIATED EMISSION	FCC Part 15.209/15.225	COMPLIANT
FREQUENCY STABILITY	FCC Part 15.225	COMPLIANT
OCCUPIED BANDWIDTH	FCC Part 15.215	COMPLIANT
ANTENNA REQUIREMENT	FCC Part 15.203	COMPLIANT

1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.
Address : 2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

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

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 21947

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 150kHz	2.96	
		150kHz ~ 30MHz	2.44	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
UNI	ANSI	9kHz ~ 30MHz	2.50	
		30MHz ~ 1000MHz	4.80	
		Above 1000MHz	4.13	

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	21.5 inch Capacitive Touch Monitor
Trade Mark:	N/A
Main Model:	LKX21ECCRB-ILC
Additional Model:	N/A
Model Difference:	N/A
FCC ID:	2AWNGLKX21ECCRB
Operation Frequency:	13.56MHz
Number of Channels:	1CH
Modulation Type:	FSK
Antenna Type:	Coil Antenna
Antenna Gain:	0dBi
Battery:	N/A
Adapter:	N/A
Power Source:	DC 12V from battery

2.2 CARRIER FREQUENCY OF CHANNELS

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	13.56						

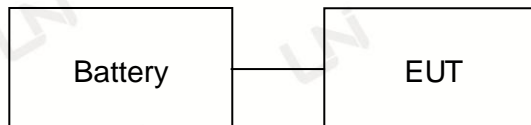
2.3 TEST MODE

The EUT was programmed to be in transmitting mode.

Channel List	
Test Channel	Test Frequency (MHz)
01	13.56

2.4 TEST SETUP

Operation of EUT during Radiation testing:



2.5 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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.

Item	Equipment	Mfr/Brand	Model/Type No.	Note
E-1	21.5 inch Capacitive Touch Monitor	N/A	LKX21ECCRBBD-ILC	EUT
E-2	Battery	N/A	12V	AE

Item	Shielded Type	Ferrite Core	Length	Note

Note:

1. The support equipment was authorized by Declaration of Confirmation.
2. For detachable type I/O cable should be specified the length in cm in 『Length』 column.
3. “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
Conduction Emissions Measurement					
1	Conducted Emission Test Software	EZ-EMC	Ver.CCS-3A1-CE	N/A	N/A
2	AMN	Schwarzbeck	NNLK8121	8121370	2021.10.12
3	AAN	TESEQ	T8-Cat6	38888	2021.10.12
4	Pulse Limiter	CYBRTEK	EM5010	E115010056	2022.05.17
5	EMI Test Receiver	Rohde&Schwarz	ESCI	101210	2021.10.12
Radiated Emissions Measurement					
1	Radiated Emission Test Software	EZ-EMC	Ver.CCS-03A1	N/A	N/A
2	Horn Antenna	Sunol	DRH-118	A101415	2021.10.18
3	Broadband Hybrid Antenna	Sunol	JB1	A090215	2022.03.01
4	PREAMP	HP	8449B	3008A00160	2021.10.18
5	PREAMP	HP	8447D	2944A07999	2022.05.17
6	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2021.10.12
7	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2021.10.12
8	Signal Generator	Agilent	E4421B	MY4335105	2021.11.11
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2021.10.12
10	MXA Signal Analyzer	Keysight	N9020A	MY51110104	2021.10.12
11	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2022.05.17
12	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2022.05.17
13	RF power divider	Anritsu	K241B	992289	2021.10.12
14	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2021.10.12
15	Active Loop Antenna	Com-Power	AL-130R	10160009	2022.05.17
16	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2022.05.17
17	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2022.05.17
18	Horn Antenna	A-INFOMW	LB-180400-KF	J211060660	2021.11.04
19	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2022.05.17
20	Signal Generator	Agilent	N5183A	MY47420153	2022.05.17
21	Spectrum Analyzer	Rohde&Schwarz	FSP 40	100501	2022.05.17
22	Power Meter	KEYSIGHT	N1911A	MY50520168	2022.05.17
23	Frequency Meter	VICTOR	VC2000	997406086	2022.05.17
24	DC Power Source	HYELEC	HY5020E	055161818	2022.05.17

3 CONDUCTED EMISSION

3.1 TEST LIMIT

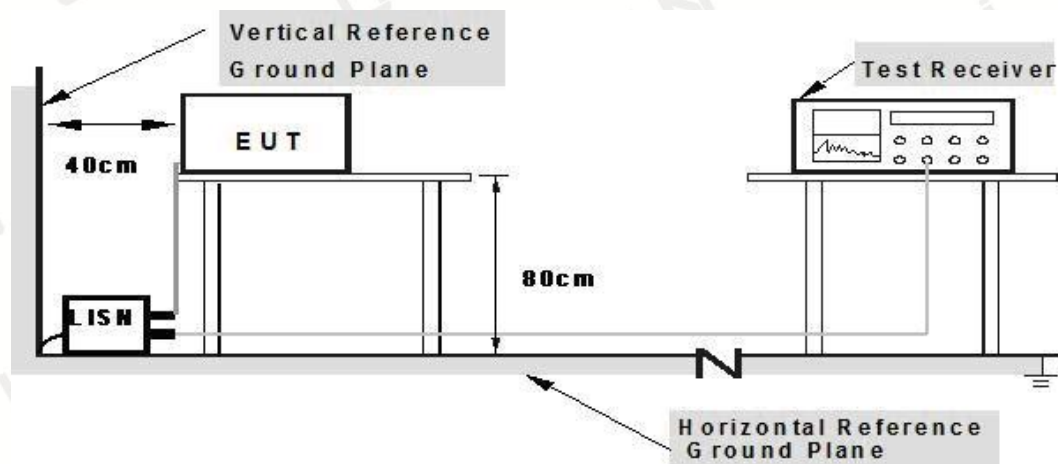
For unintentional device, according to § 15.207(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.3 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 placed on a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's 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.

3.4 TEST RESULT

N/A

Remark: EUT is powered by DC 12V from battery.

4 RADIATED EMISSION

4.1 TEST LIMIT

FCC Part15 C Section 15.225

Frequency (MHz)	Limit (uV/m @30m)	Limit (dBuV/m @3m)	Detector
13.110-13.410	106	80.5	QP
13.410-13.553	334	90.5	QP
13.553-13.567	15848	124.0	QP
13.567-13.7110	224	90.5	QP
13.710-14.010	106	80.5	QP

Note: RF Voltage (dBuV) = 20 log RF Voltage (uV)
Limit (dBuV/m @3m) = 20log(Limit (uV/m @30m)) + 40

For unintentional device, according to § 15.209(a), except for Class B digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	Quasi-peak	300
0.490MHz-1.705MHz	24000/F (kHz)	-	Quasi-peak	30
1.705MHz-30MHz	30	-	Quasi-peak	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3
		74.0	Peak	3

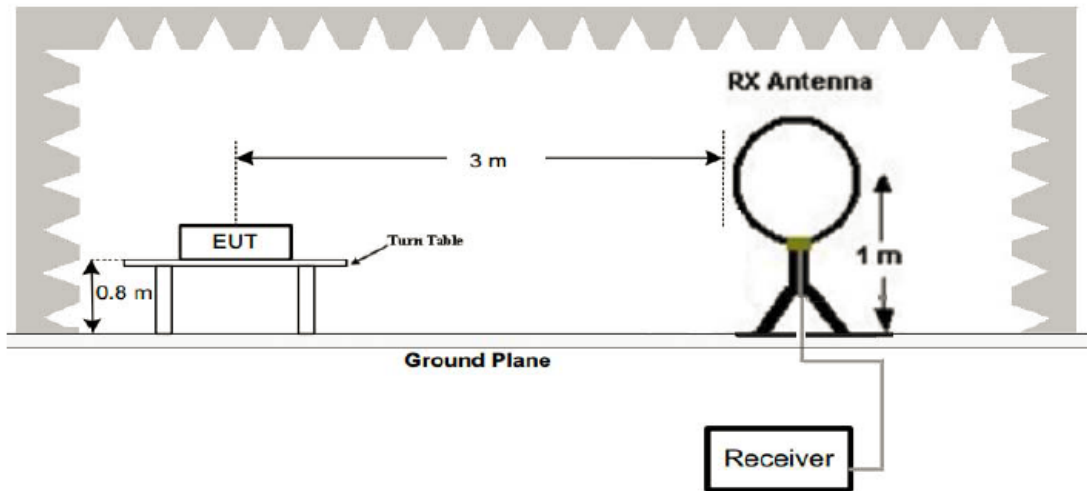
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

Limit: (Field strength of the fundamental signal)

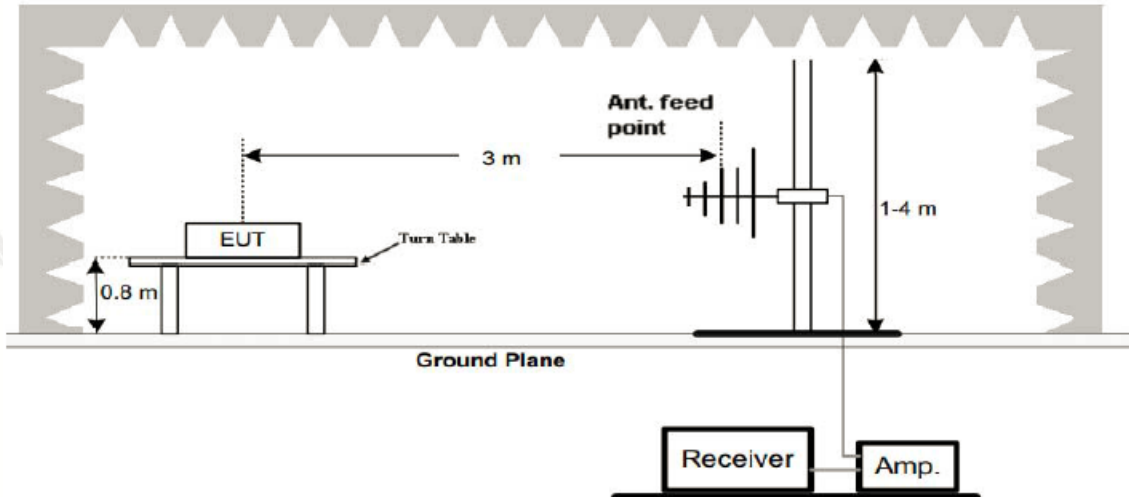
Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

4.2 TEST SETUP

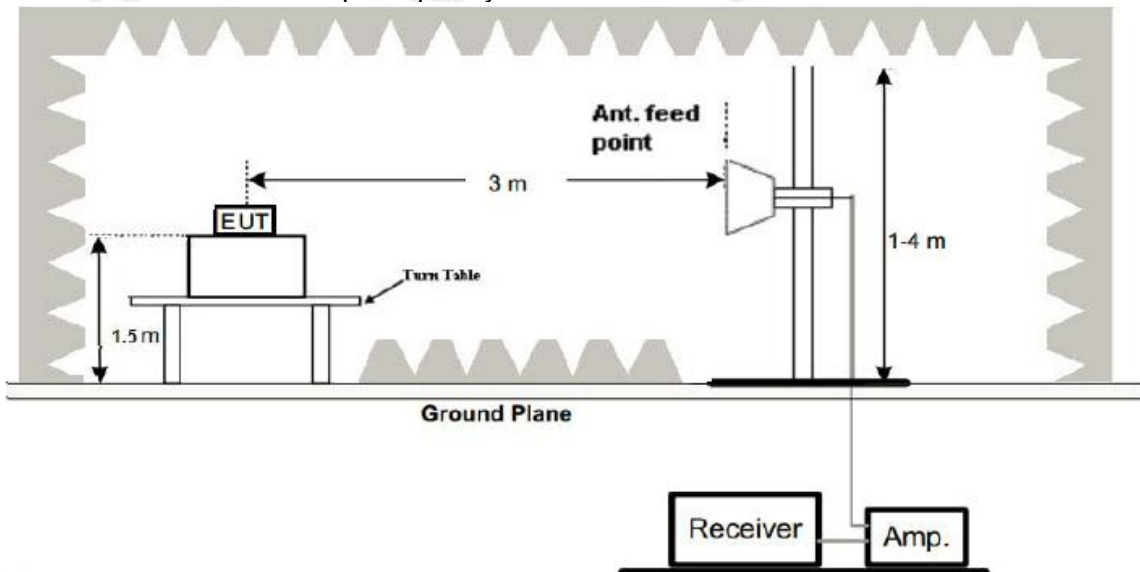
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 TEST PROCEDURE

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane.
And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9kHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 TEST RESULT

PASS

Remark:

1. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.
2. Radiated emission test from 9kHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9kHz to 30MHz and not recorded in this report.

Field Strength of Fundamental:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBuV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
13.5600	84.11	-6.29	77.82	124	46.18	PK
13.2700	43.07	-6.28	36.79	80.51	43.72	QP
13.4400	56.95	-6.25	50.70	90.47	39.77	QP
13.6200	51.80	-6.23	45.57	90.47	44.90	QP
13.8500	46.66	-6.26	40.40	80.51	40.11	QP

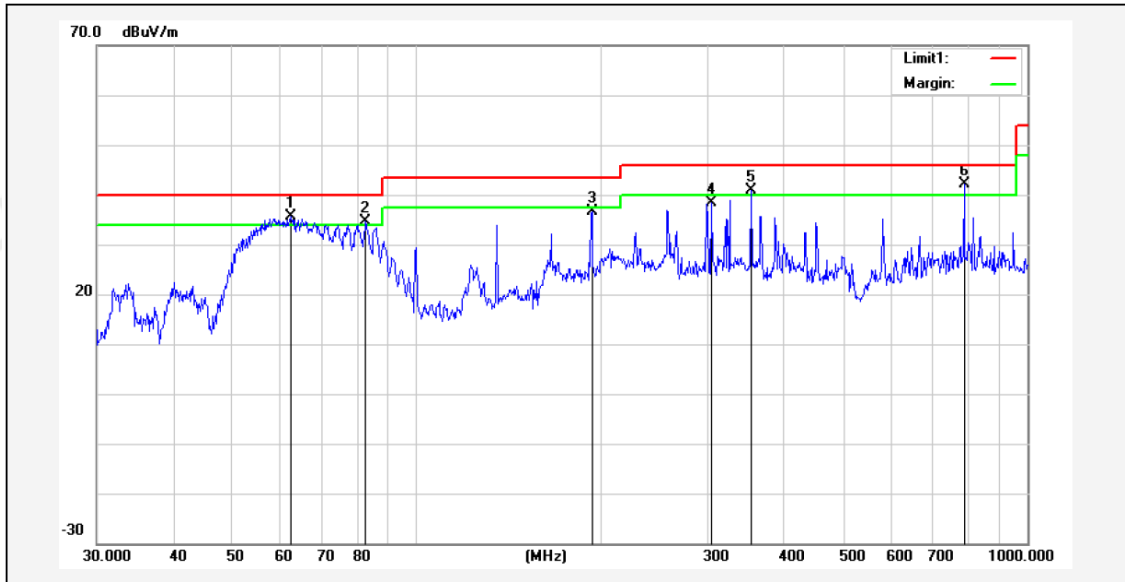
Harmonics and Spurious Emissions:

Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Below 1GHz Test Results:

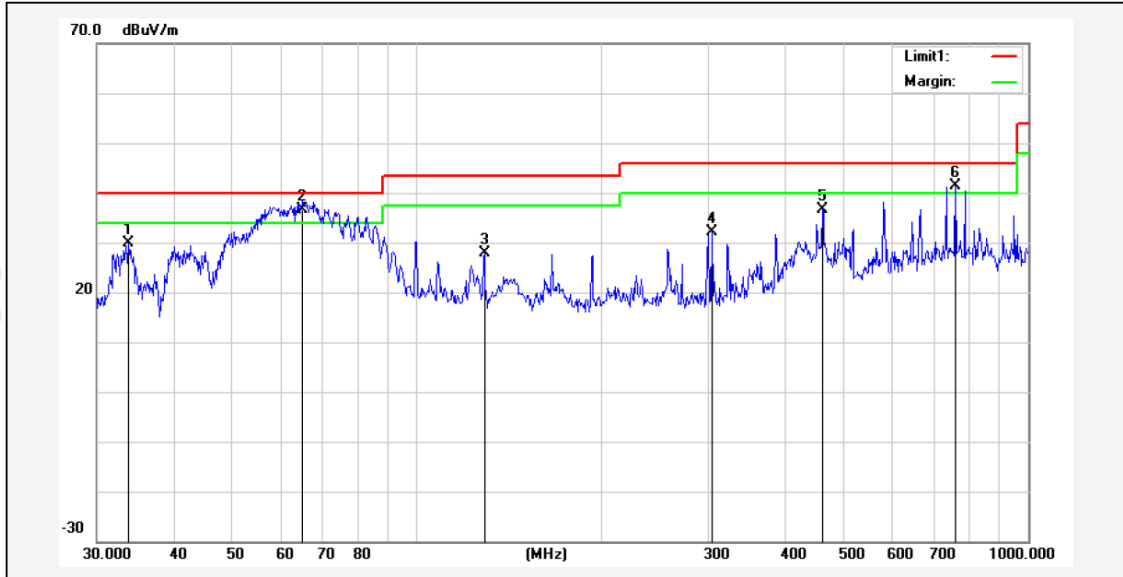
Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 17, 2021	Pressure:	1010hPa
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	Transmitting mode		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1!	62.4314	56.48	-20.87	35.61	40.00	-4.39	60	100	peak
2!	82.6482	55.25	-20.61	34.64	40.00	-5.36	90	100	peak
3	193.7728	52.89	-16.23	36.66	43.50	-6.84	120	100	peak
4	304.6100	51.64	-13.15	38.49	46.00	-7.51	150	100	peak
5!	352.9434	53.03	-12.09	40.94	46.00	-5.06	180	100	peak
6*	787.8513	46.87	-4.73	42.14	46.00	-3.86	200	100	peak

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Temperature:	24°C	Relative Humidity:	48%
Test Date:	Aug. 17, 2021	Pressure:	1010hPa
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	Transmitting mode		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	33.7986	44.93	-15.12	29.81	40.00	-10.19	80	100	peak
2*	65.1145	57.35	-20.72	36.63	40.00	-3.37	120	100	QP
3	129.0146	43.04	-15.22	27.82	43.50	-15.68	160	100	peak
4	303.5437	45.23	-13.14	32.09	46.00	-13.91	200	100	peak
5	460.7271	46.18	-9.59	36.59	46.00	-9.41	220	100	peak
6!	760.7036	46.65	-5.30	41.35	46.00	-4.65	250	100	peak

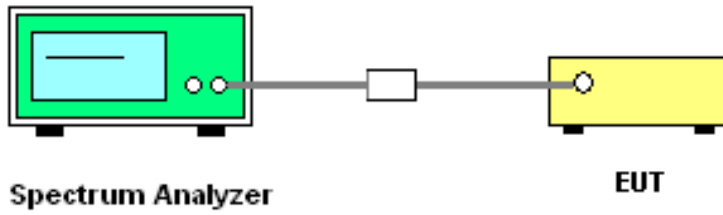
Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Remark:

1. Measuring frequencies from 9 kHz to the 1 GHz, Radiated emission test from 9kHz to 30MHz was verified, and no any emission was found except system noise floor.
2. * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
3. The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120kHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10kHz.

5 OCCUPIED BANDWIDTH

5.1 TEST SETUP

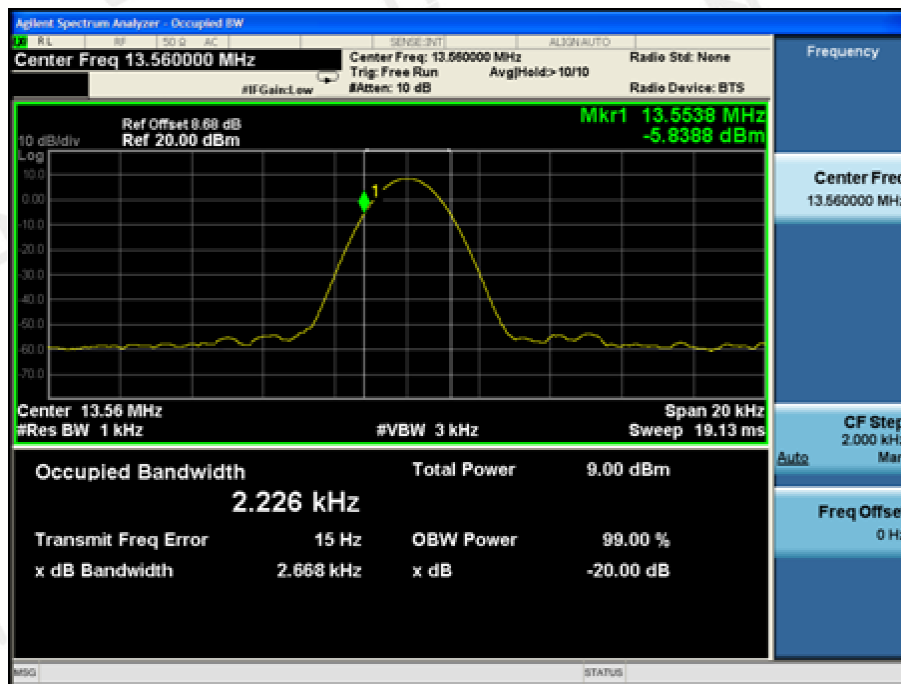


5.2 TEST PROCEDURE

1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; $RBW \geq 1\%$ of the 20 dB bandwidth; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
4. Measure and record the results in the test report.

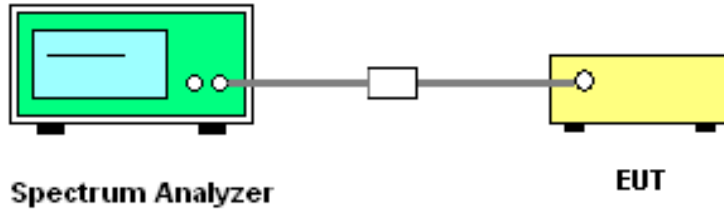
5.3 TEST RESULT

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Result
13.56	2.668	N/A	PASS



6 FREQUENCY STABILITY

6.1 TEST SETUP



6.2 TEST PROCEDURE

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a spectrum analyzer.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
5. Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

6.3 TEST RESULT

Voltage (Vdc)	Temperature (°C)	Frequency (MHz)	Deviation (%)	Limit (%)	Result
12	0	13.560352	0.002596	+/-0.01%	PASS
12	10	13.560207	0.001527		PASS
12	20	13.560256	0.001888		PASS
12	30	13.560309	0.002279		PASS
12	40	13.560224	0.001652		PASS
12	45	13.560304	0.002242		PASS
10.8	20	13.560178	0.001313		PASS
13.2	20	13.560420	0.003097		PASS

7 ANTENNA REQUIREMENT

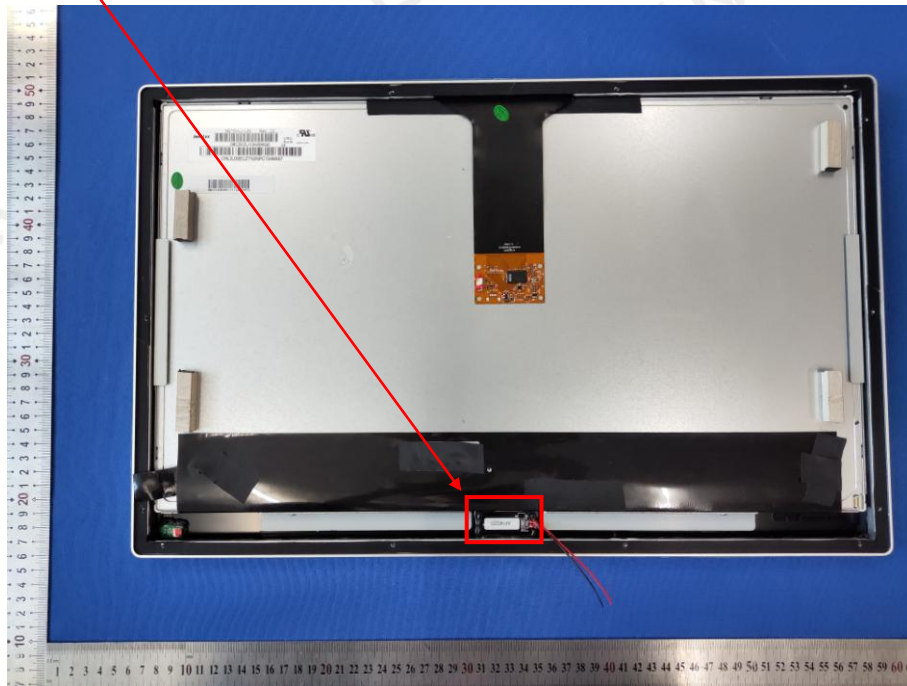
Standard Applicable:

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 Connected Construction

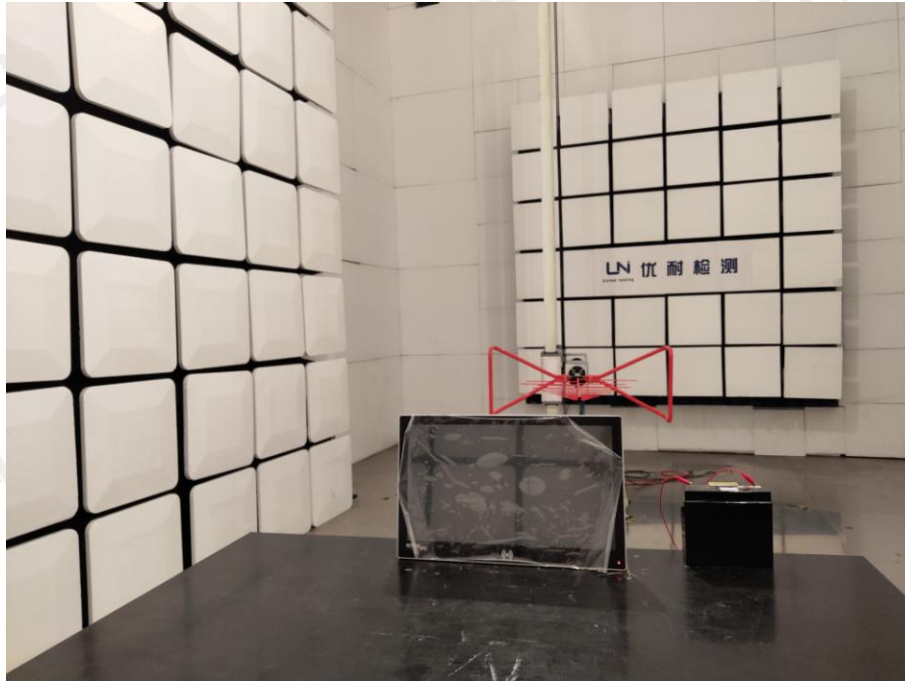
The antenna used in this product is a Coil Antenna, The directional gains of antenna used for transmitting is 0dBi.

ANTENNA:



8 PHOTO OF TEST

8.1 RADIATED EMISSION



8.2 CONDUCTED EMISSION

N/A

End of Report