



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15.223

TEST REPORT

For

HANGZHOU CENTURY CO., LTD

1418-48# Moganshan Road, Hangzhou Zhejiang, P.R.China

FCC ID: N6KCA3000L

Report Type: Original Report	Product Type: FCC Quarzo Classic
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Report Number:	RSHF200903002-00A
Report Date:	2020-10-22
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	HANGZHOU CENTURY CO., LTD
Tested Model	CA3000L
Product Type	FCC Quarzo Classic
Power Supply	DC 24V from adapter
RF Function	SRD
Operating Band/Frequency	8.2 MHz
Antenna Type	Loop antenna
*Maximum Antenna Gain	0.0 dBi

Adapter information:

Model: SK05T-2400200W2

Input: AC 100-240V, 50/60Hz, 1.5A MAX

Output: DC 24V, 2A

Note: The Maximum Antenna Gain was declared by the manufacturer.

**All measurement and test data in this report was gathered from production sample serial number: 20200903002
(Assigned by the BACL. The EUT supplied by the applicant was received on 2020-09-03)*

Objective

This Type approval report is prepared on behalf of *HANGZHOU CENTURY CO., LTD* in accordance with Part 2- Subpart J, and Part 15-Subparts A and C of the Federal Communication Commission's rules.

The objective is to determine the Compliance of the EUT with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and 15.223.

Related Submittal(s)/Grant(s)

No related submittal/grant.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Lab Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
RF conducted test with spectrum		0.9dB
Radiated emission	9kHz~30MHz	6.07dB
	30MHz~1GHz	6.11dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01), the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

The EUT is tested in the engineering mode.

Equipment Modifications

No modification on the EUT.

Support Equipment List and Details

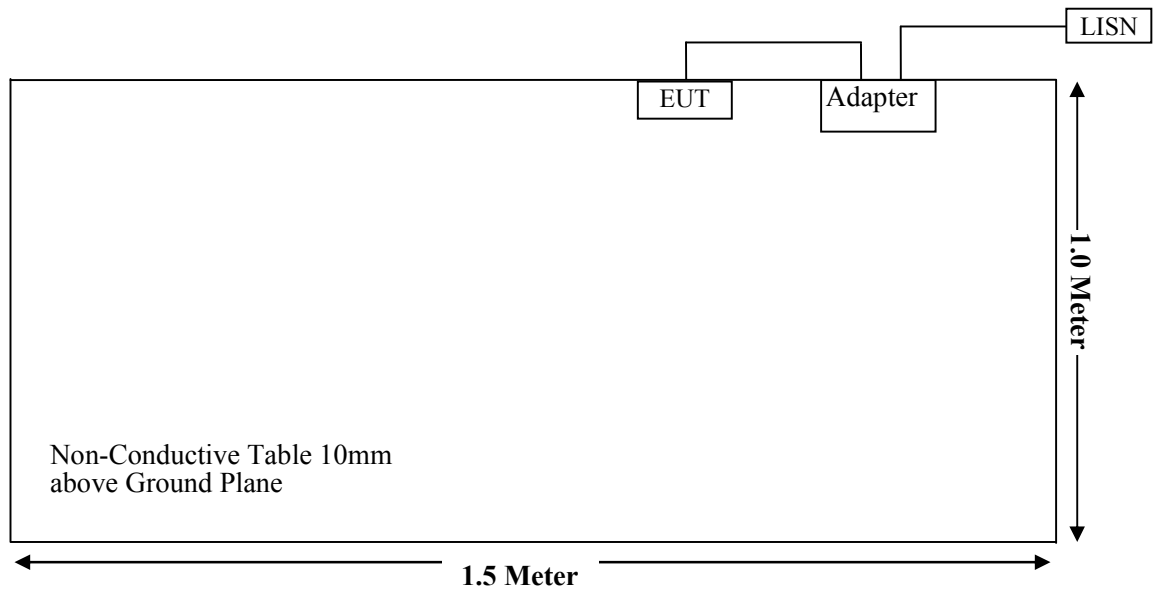
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

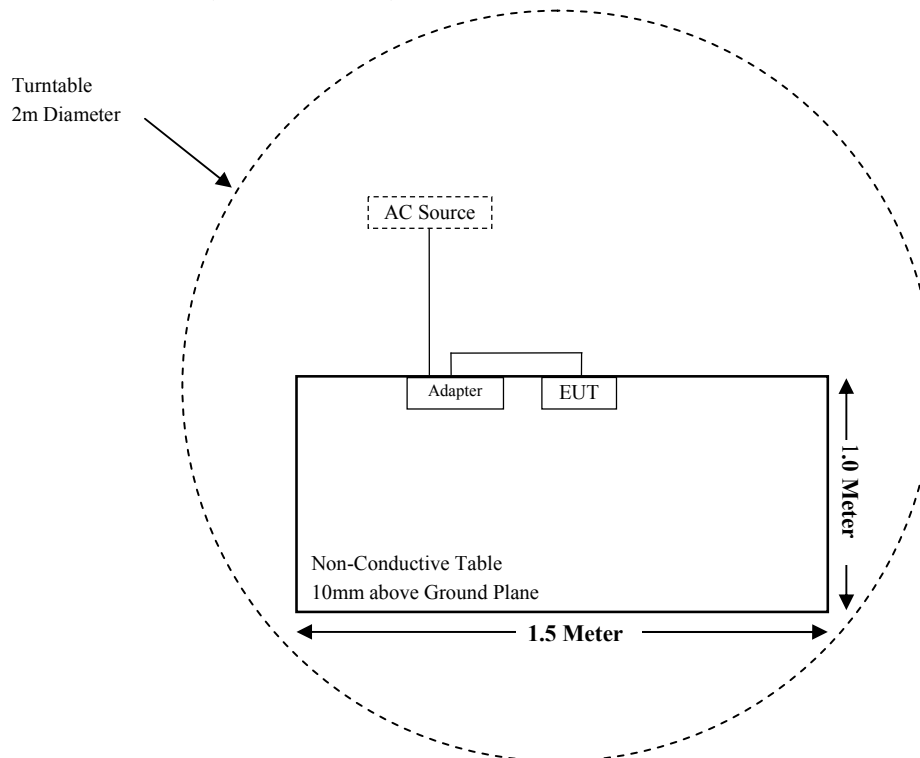
Cable Description	Length (m)	From Port	To
Power Cable	1.0	EUT	Adapter
Power Cable	1.0	Adapter	AC Source

Block Diagram of Test Setup

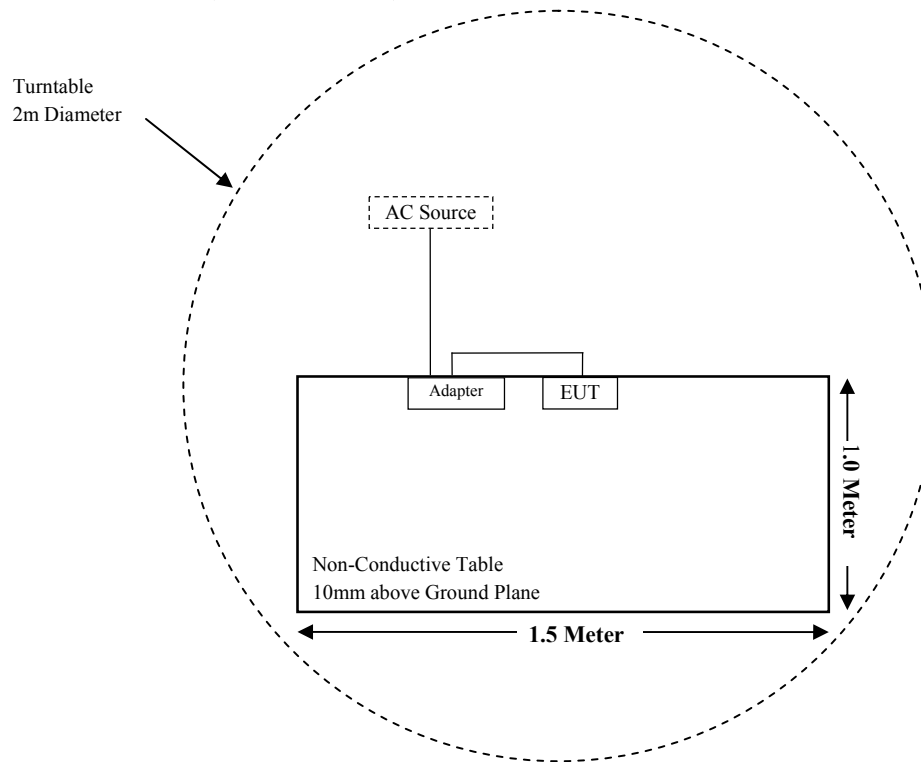
For Conducted Emissions:



For Radiated Emissions (Below 30 MHz):



For Radiated Emissions (Above 30 MHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.223 §15.209 §15.205	Radiated Emission Test	Compliant
§15.223(a)	6dB Emission Bandwidth Testing	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2017-12-26	2020-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
ETS-LINDGREN	Loop Antenna	6512	00108100	2019-04-25	2022-04-24
Rohde & Schwarz	Auto test Software	e3	V9	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2020-08-05	2021-08-04
Rohde & Schwarz	LISN	ENV216	3560655016	2019-11-30	2020-11-29
Audix	Test Software	e3	V9	/	/
Rohde & Schwarz	Pulse limiter	ESH3-Z2	357.8810.52	2020-08-10	2021-08-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2020-08-15	2021-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connected Construction

The EUT has a Loop antenna and antenna gain is 0.0 dBi, which was permanently attached, fulfill the requirement of this section, please refer to the EUT photos.

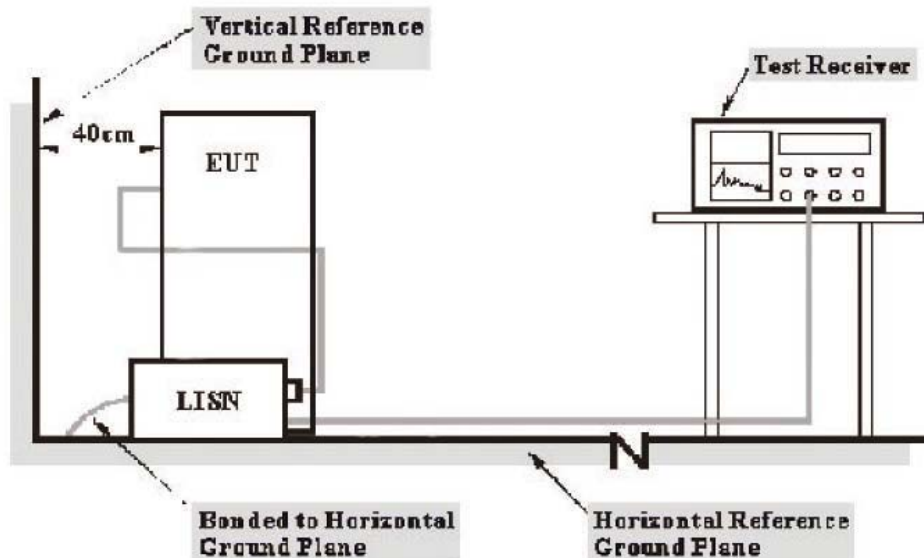
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Factor (dB)} = \text{LISN VDF (dB)} + \text{Cable Loss (dB)} + \text{Transient Limiter Attenuation (dB)}$$

The “**Over Limit**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over Limit of 7 dB means the emission is 7 dB above the limit. The equation for over limit calculation is as follows:

$$\text{Over Limit (dB)} = \text{Read level (dB}\mu\text{V)} + \text{Factor (dB)} - \text{Limit (dB}\mu\text{V)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

Environmental Conditions

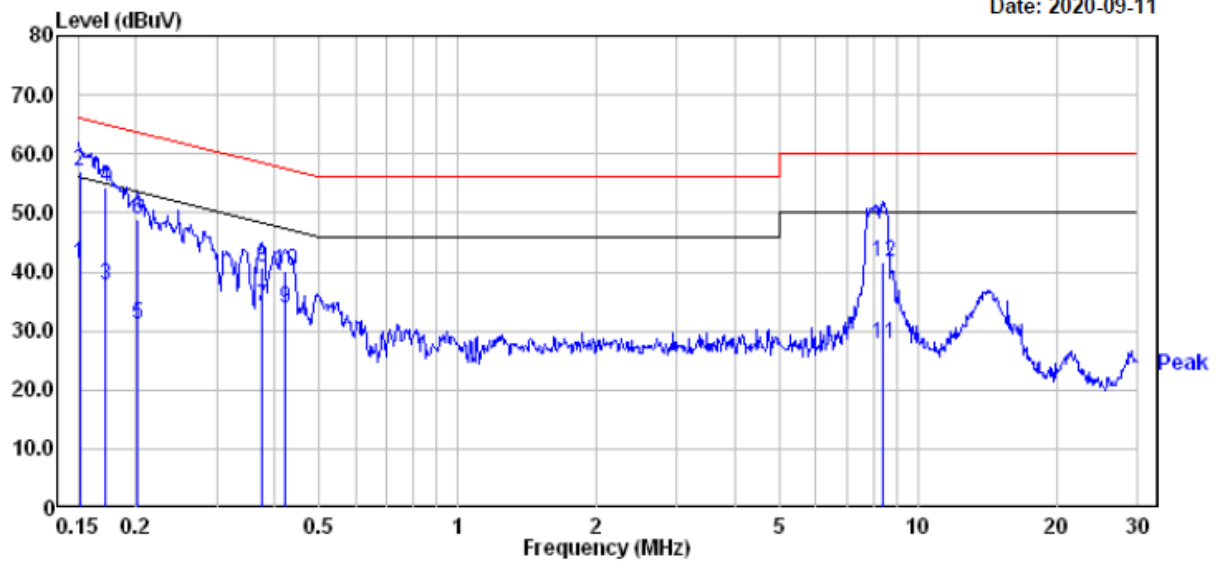
Temperature:	23.7 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by CK Huang on 2020-09-11.

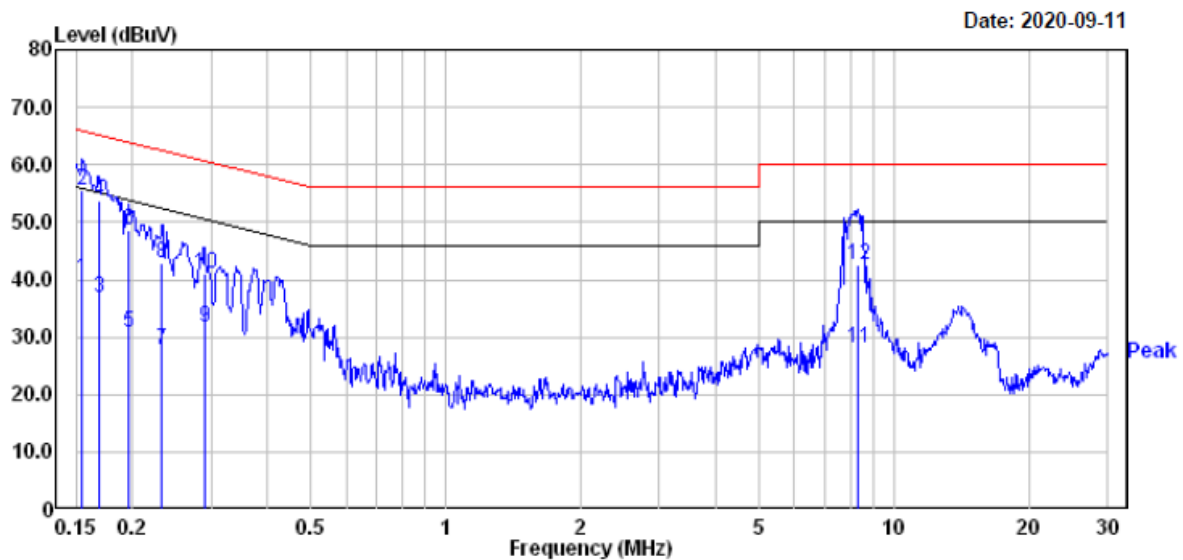
EUT operation mode: Transmitting

AC 120V/60 Hz, Line

Date: 2020-09-11



		Read			Limit	Over	
	Freq	Level	Factor	Level	Line	Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	21.60	19.82	41.42	55.96	-14.54	Average
2	0.151	37.20	19.82	57.02	65.96	-8.94	QP
3	0.171	17.90	19.83	37.73	54.90	-17.17	Average
4	0.171	34.50	19.83	54.33	64.90	-10.57	QP
5	0.202	11.40	19.82	31.22	53.54	-22.32	Average
6	0.202	29.20	19.82	49.02	63.54	-14.52	QP
7	0.375	14.30	19.77	34.07	48.39	-14.32	Average
8	0.375	20.90	19.77	40.67	58.39	-17.72	QP
9	0.421	14.10	19.74	33.84	47.42	-13.58	Average
10	0.421	20.40	19.74	40.14	57.42	-17.28	QP
11	8.367	8.30	19.54	27.84	50.00	-22.16	Average
12	8.367	22.20	19.54	41.74	60.00	-18.26	QP

AC 120V/60 Hz, Neutral

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.155	20.40	19.82	40.22	55.74	-15.52	Average
2	0.155	35.80	19.82	55.62	65.74	-10.12	QP
3	0.169	17.00	19.83	36.83	55.03	-18.20	Average
4	0.169	34.00	19.83	53.83	65.03	-11.20	QP
5	0.197	11.10	19.82	30.92	53.76	-22.84	Average
6	0.197	28.80	19.82	48.62	63.76	-15.14	QP
7	0.233	7.90	19.82	27.72	52.35	-24.63	Average
8	0.233	23.10	19.82	42.92	62.35	-19.43	QP
9	0.289	11.80	19.82	31.62	50.54	-18.92	Average
10	0.289	21.10	19.82	40.92	60.54	-19.62	QP
11	8.323	8.50	19.53	28.03	50.00	-21.97	Average
12	8.323	23.10	19.53	42.63	60.00	-17.37	QP

Note:

- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
 2) Over Limit (dB) = Read level (dBuV) + Factor (dB) - Limit (dBuV)

FCC§15.223, §15.205 & §15.209 - RADIATED EMISSIONS TEST

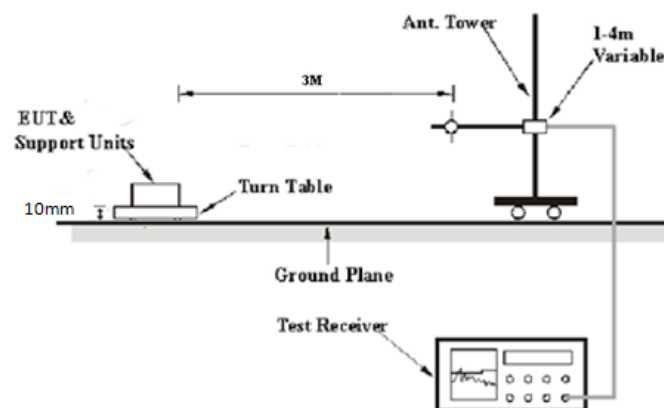
Applicable Standard

As per FCC Part 15.223

(a) The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35(b) for limiting peak emissions apply.

(b) The field strength of emissions outside of the band 1.705-10.0 MHz shall not exceed the general radiated emission limits in §15.209.

EUT Setup



The radiated emission tests were performed in the 3-meter chamber a test site, using the setup accordance with the ANSI C63.10. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated up to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	/	QP
150 kHz – 30 MHz	9 kHz	30 kHz	/	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dB μ V /m) = Meter Reading (dB μ V) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dB μ V/m) – Corrected Amplitude (dB μ V /m)

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209, 15.205, 15.223.

Test Data

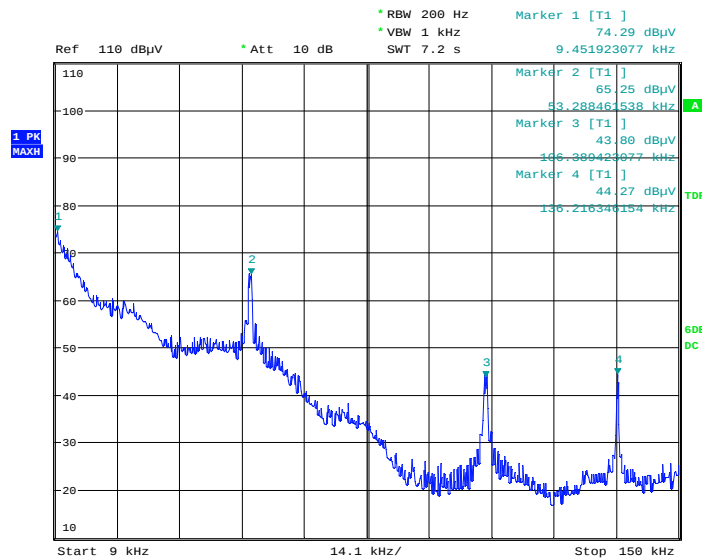
Environmental Conditions

Temperature:	24.2~25.1 °C
Relative Humidity:	48~50 %
ATM Pressure:	101.1~101.3 kPa

The testing was performed by CK Huang from 2020-10-10 to 2020-10-16.

Test mode: Transmitting

1) 9 kHz~150 kHz:

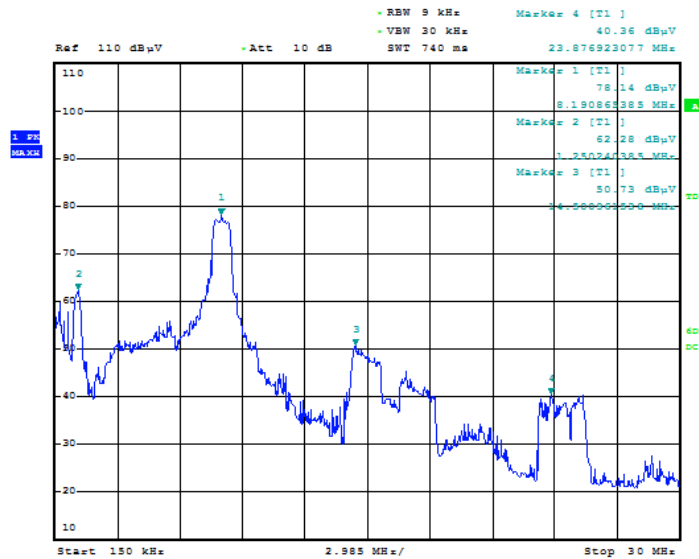


Date: 16.OCT.2020 18:21:34

Frequency (kHz)	Corrected Amplitude (dBμV/m)@3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.223/15.209	
				Limit (dBμV/m) @3m	Margin (dB)
9.45	74.29	PK	56.71	128.09	53.80
20.56	60.95	PK	49.84	121.34	60.39
53.28	65.25	PK	42.53	113.07	47.82
75.97	38.67	PK	46.25	109.99	71.32
106.38	43.80	PK	50.28	107.06	63.26
136.21	44.27	PK	50.70	104.92	60.65

Note: If the spurious emissions maximized peak measured value complies with the average limit, it is unnecessary to perform an Average measurement.

2) 150 kHz~30 MHz:



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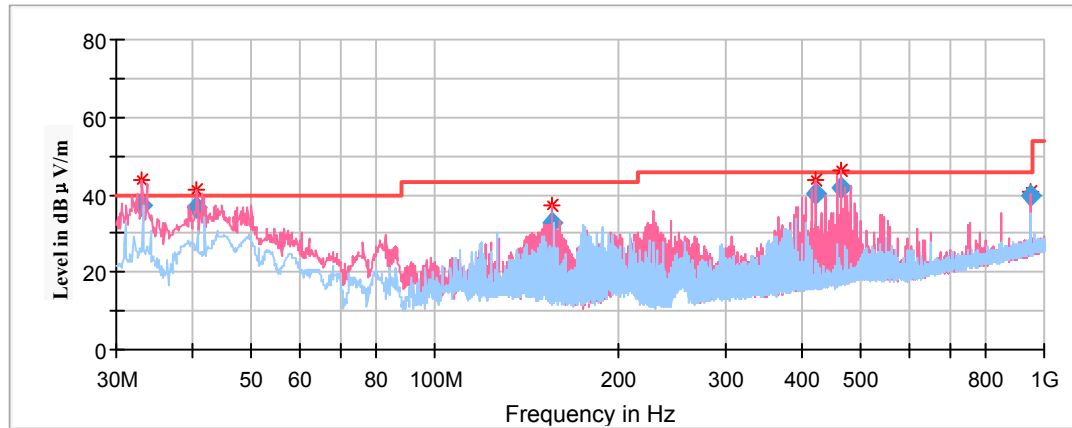
Frequency (MHz)	Corrected Amplitude (dBμV/m)@3m	Detector PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.223/15.209	
				Limit (dBμV/m) @3m	Margin (dB)
1.25	62.28	PK	16.72	65.66	3.38
5.22	56.07	PK	8.05	80.00	23.93
8.20	78.14	PK	6.32	80.00	1.86
14.50	50.73	PK	6.04	69.54	18.81
16.71	45.96	PK	5.86	69.54	23.58
23.87	40.36	PK	5.52	69.54	29.18

Note 1: If the spurious emissions maximized peak measured value complies with the average limit, it is unnecessary to perform an Average measurement.

Note 2: The 6dB bandwidth = 975.96kHz > 10%*8.2MHz=820kHz, the field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. So the limit is $20 \cdot \log(100) + 40 = 80 \text{ dB}\mu\text{V/m} @ 3\text{m}$

4) 30 MHz ~1 GHz:

(Pre-scan in the X,Y and Z axes of orientation, the worst case **Y-axis of orientation** was recorded.)



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
33.072525	37.10	100.0	V	32.0	-12.4	40.00	2.90
40.533000	36.63	100.0	V	7.0	-17.0	40.00	3.37
155.243500	32.72	200.0	V	340.0	-18.6	43.50	10.78
422.547350	40.31	100.0	V	164.0	-14.0	46.00	5.69
464.171450	41.88	100.0	V	190.0	-12.9	46.00	4.12
949.996400	39.76	100.0	V	190.0	-4.9	46.00	6.24

§15.223(a) - 6dB EMISSION BANDWIDTH TESTING

Requirement

As per FCC Part 15.223

(a) The field strength of any emission within the band 1.705-10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35(b) for limiting peak emissions apply.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Data**Environmental Conditions**

Temperature:	23.4 °C
Relative Humidity:	49 %
ATM Pressure:	102.3 kPa

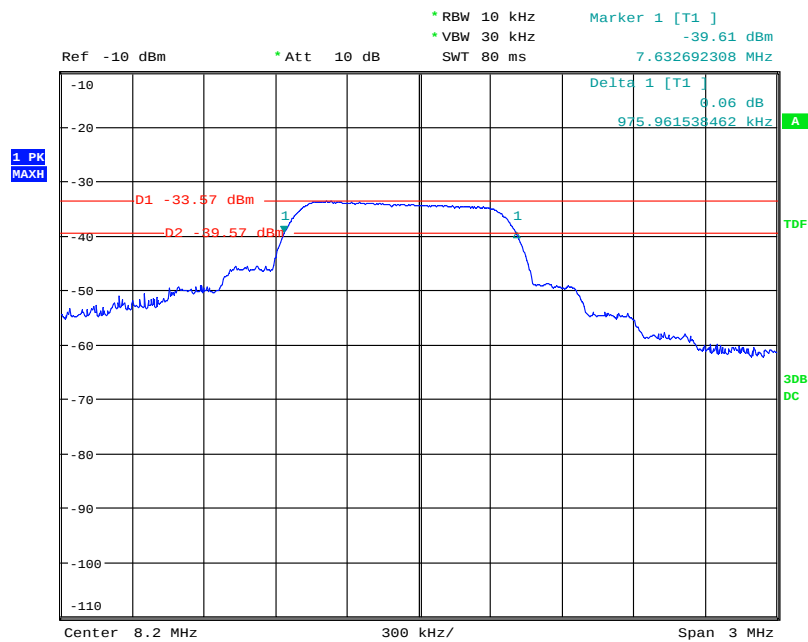
The testing was performed by CK Huang on 2020-10-16.

Test Mode: Transmitting

Test Result: Compliant

Frequency (MHz)	6 dB Bandwidth (kHz)
8.2	975.96

6 dB Emission Bandwidth



Date: 16.OCT.2020 18:15:48

Declarations

- 1: BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.
- 2: Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
- 3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
- 4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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