MEASUREMENT REPORT

FCC PART15 Subpart C (Section 15.245)

FCC ID:	2APLNCL11
APPLICANT:	SEURA INC
Application Type:	Certification
Product:	Seura Clock
Model No.:	CL.2
Brand Name:	Seura
FCC Classification:	Part 15 Field Disturbance Sensor (FDS)
FCC Rule Part(s):	FCC PART15 Subpart C (Section 15.245)
Test Procedure(s):	ANSI C63.10-2013
Test Date:	June 08 ~ 15, 2018

Reviewed By : (Kevin Guo)

Approved By : (Robin Wu)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1805RSU042-U1	Rev. 01	Initial report	06-15-2018	Valid

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§2.1033 General Information

Applicant:	SEURA INC
Applicant Address:	14 Hachoma Street, Rishon Lezion, 75655, Israel
Manufacturer:	SEURA INC
Manufacturer Address:	Sderot Yahalom 6 Kiryat Gat, Israel
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	893164
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

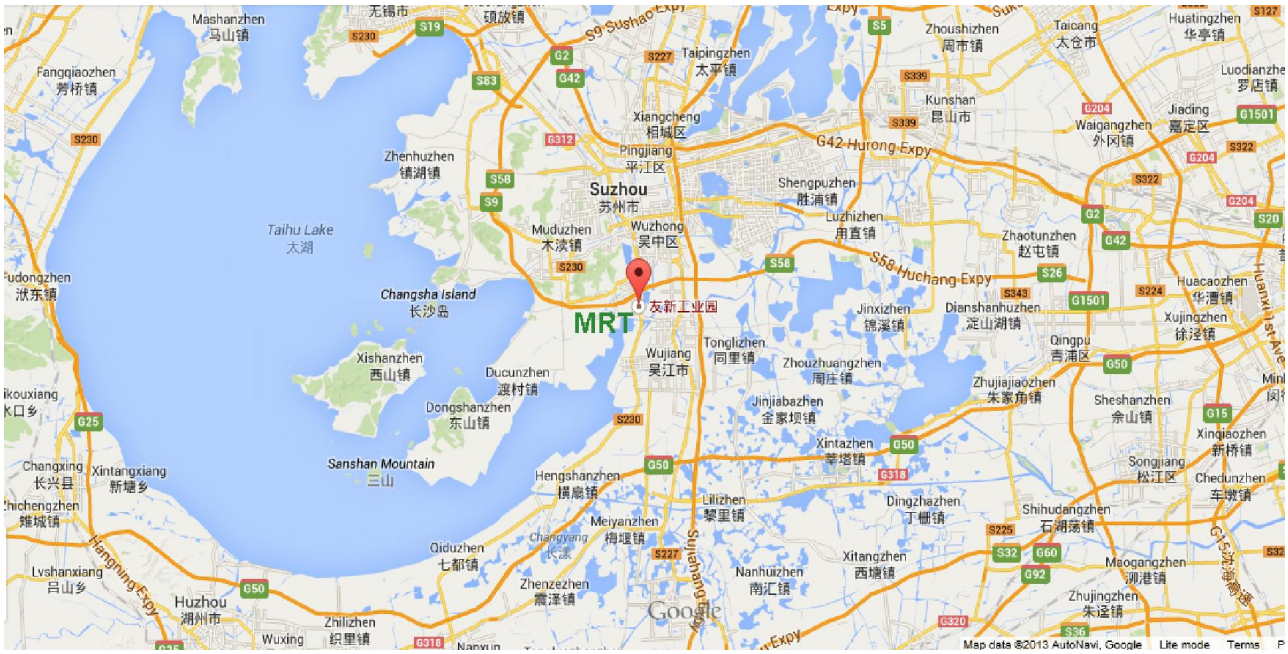
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Seura Clock
Model No.	CL.2
Brand Name	Seura
Transmitting Frequency	10.525GHz
Modulation	CW
Components	
Adapter	M/N: RHD10W120050 INPUT: 100-240V ~ 50/60Hz, 1.5A OUTPUT: 12Vdc, 0.5 A

2.2. Test Mode

Test Mode	Mode 1: Transmit by 10.525GHz

2.3. Description of Test Software

The test utility software used during testing was engineering directive ordered by applicant.

2.4. Duty Cycle

Test Mode	Duty Cycle
10.525GHz	20.5%

10.525GHz	--
	--

2.5. Test Configuration

The device was tested per the guidance of FCC Part 15.245 and ANSI 63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.7. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in FCC Part 15.245 were used in the measurement of the device.

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

- The antenna of the Radio Controller is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The device complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATA

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2018/06/20
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2018/06/20
Temperature/Humidity Meter	testo	608-H1	MRTSUE06404	1 year	2018/08/14
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emission - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2018/09/13
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2018/08/18
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2018/11/20
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2019/04/20
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/11/17
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Broad Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2018/10/21
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2018/12/14
Micro-Wave Antenna	MI-WWAVE	261U-25	MRTSUE06273	1 year	2018/12/26
Waveguide Harmonic Mixer	Keysight	M1970V	MRTSUE06271	1 year	2018/12/26
Amplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/13
Hygrothermograph	Testo	608-H1	MRTSUE06403	1 year	2018/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2019/05/08

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 40GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Company Name: **SEURA INC**

FCC ID: **2APLNCL11**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.215(c)	Occupied Bandwidth	N/A	Radiated	Pass	Section 7.2
15.245(b)	Field strength of fundamental	Refer to Section 7.3.1		Pass	Section 7.3
15.245(b) 15.209	Field strength of harmonics	Refer to Section 7.4.1		Pass	Section 7.4
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.5

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

7.2. 99% Bandwidth Measurement

7.2.1. Test Limit

N/A

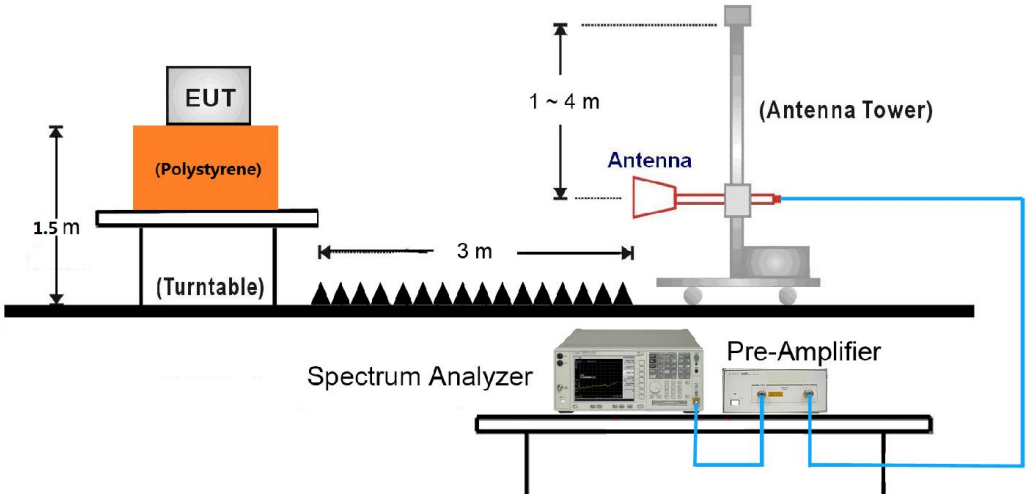
7.2.2. Test Procedure used

ANSI C63.10 Section 6.9

7.2.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 99% bandwidth measurement. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% to 5% of the OBW.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.

7.2.4. Test Setup



7.2.5. Test Result

Frequency (GHz)	99% Bandwidth (KHz)
10.525	1320.9

99% Occupied Bandwidth	
10.525GHz	--
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7.3. Field strength of fundamental

7.3.1.Standard Applicable

According to §15.245(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902 - 928	500	1.6
2435 - 2465	500	1.6
5785 - 5815	500	1.6
10500 - 10550	2500	25.0
24075 - 24175	2500	25.0
Note 1: Field strength limits are specified at a distance of 3 meters. Note 2: The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.		

7.3.2.Test Procedure used

ANSI C63.10 Section 6.6

7.3.3.Test Procedure

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

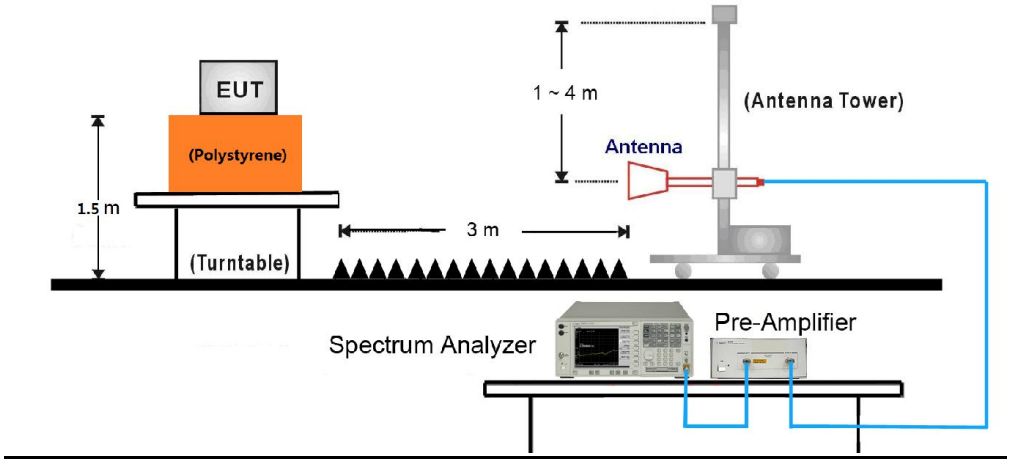
Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

7.3.4.Test Setup



7.3.5.Test Results

Product	Seura Clock/CL 1.1	Temperature	23°C
Test Engineer	Vincent Yu	Relative Humidity	54%
Test Site	AC1	Test Date	2018/06/08

Frequency (GHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
10.525	78.1	17.6	95.7	148	-52.3	Peak	Horizontal
10.525	77.6	17.6	95.2	128	-32.8	Average	Horizontal
10.525	85.7	17.6	103.3	148	-44.7	Peak	Vertical
10.525	85.1	17.6	102.7	128	-25.3	Average	Vertical

Note: Peak Limit (dBuV/m) = Average Limit (dBuV/m) + 20dB.

7.4. Field strength of harmonics

7.4.1.Standard Applicable

According to §15.245(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902 - 928	500	1.6
2435 - 2465	500	1.6
5785 - 5815	500	1.6
10500 - 10550	2500	25.0
24075 - 24175	2500	25.0

Note 1: Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in § 15.209. Harmonic emissions in the restricted bands at and above 17.7GHz shall not exceed the following field strength limits:

(i) For the second and third harmonics of field disturbance sensors operating in the 24075-24175 MHz band and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.

(ii) For all other field disturbance sensors, 7.5 mV/m.

(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands, other than the second and third harmonics from devices operating in the 24075-24175 MHz band, fully comply with the limits given in § 15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

Note 2: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Note 3: Field strength limits are specified at a distance of 3 meters.

Note 4: The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42-16.423	399.9 - 410	4.5-5.15
[1] 0.495 - 0.505	16.69475-16.69525	608 - 614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960 - 1240	7.25-7.75
4.125-4.128	25.5 -25.67	1300 - 1427	8.25 - 8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660 - 1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123 - 138	2200 - 2300	14.47-14.5
8.291-8.294	149.9-150.05	2310–2390	15.35-16.2
8.362-8.366	156.52475-156.525	2483.5 - 2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690 - 2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260 - 3267	23.6-24.0
12.29-12.293	167.72-173.2	3332 - 3339	31.2-31.8
12.51975-12.52025	240 - 285	3345.8 - 3358	36.43-36.5
12.57675-12.57725	322-335.4	3600 - 4400	([2])
13.36-13.41	--	--	--

7.4.2.Test Procedure used

ANSI C63.10 Section 6.6

7.4.3.Test Procedure

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Table 1 - RBW as a function of frequency

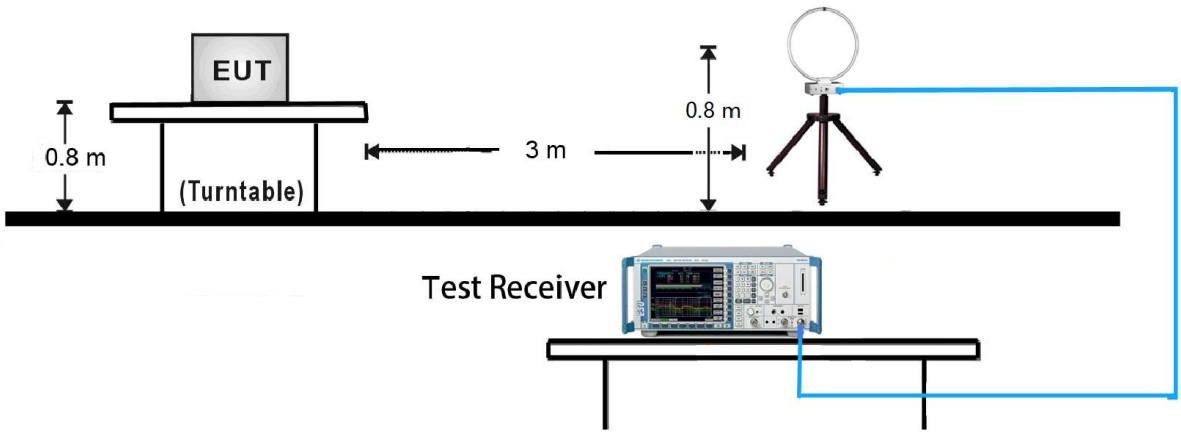
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

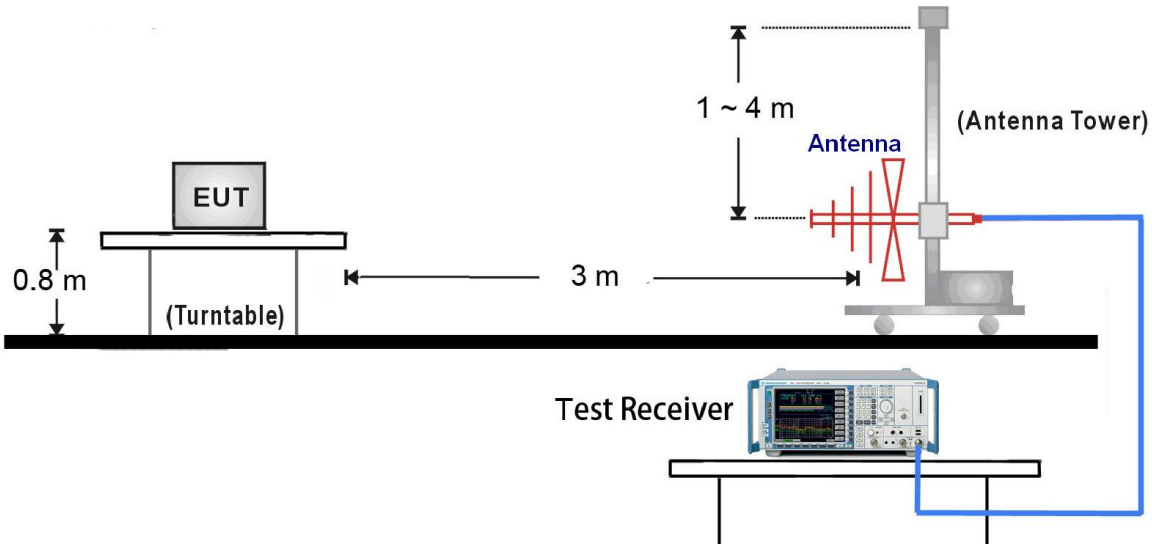
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

7.4.4.Test Setup

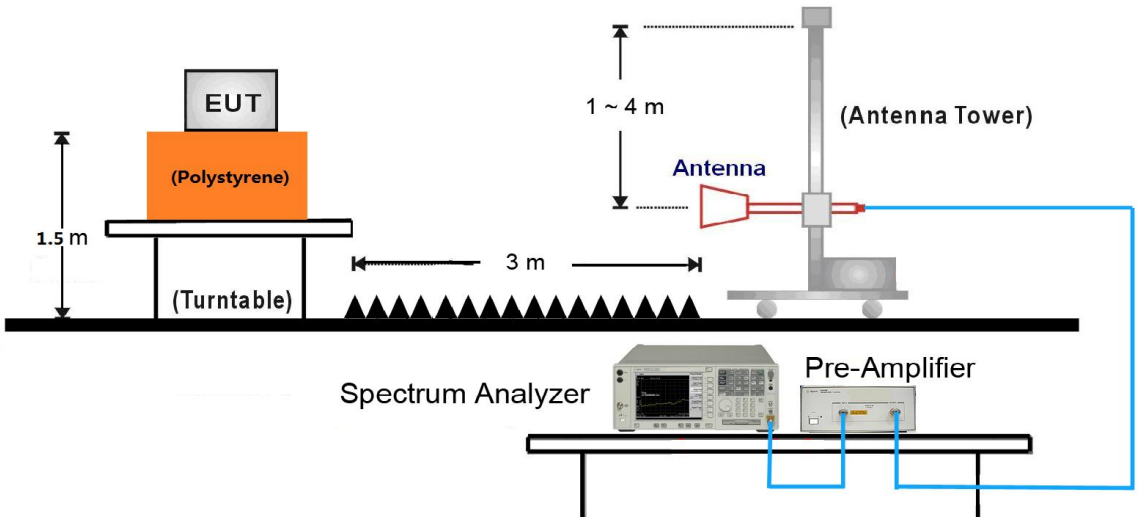
9kHz ~ 30MHz Test Setup:



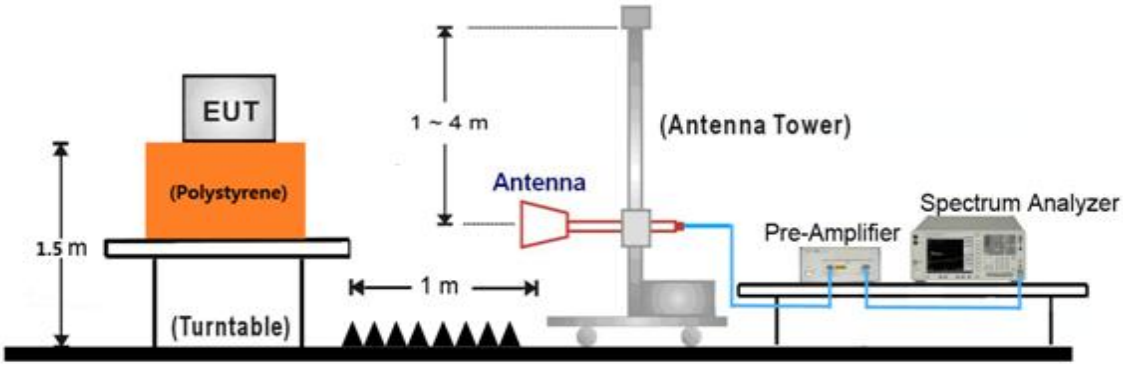
30MHz ~ 1GHz Test Setup:



1GHz ~ 18GHz Test Setup:



18GHz ~60GHz Test Setup:



7.4.5.Test Result

Product	Seura Clock/CL 1.1	Temperature	26°C
Test Engineer	Vincent Yu	Relative Humidity	56%
Test Site	AC1	Test Date	2018/06/12
Test Mode:	Transmit at channel 10.525GHz		
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	2564.0	53.8	-0.6	53.2	74.0	-20.8	Peak	Horizontal
	2564.0	40.6	-0.6	40.0	54.0	-14.0	Average	Horizontal
	7919.0	39.2	13.4	52.6	74.0	-21.4	Peak	Horizontal
	7919.0	26.5	13.4	39.9	54.0	-14.1	Average	Horizontal
	2589.5	54.2	-0.4	53.8	74.0	-20.2	Peak	Vertical
	2589.5	40.7	-0.4	40.3	54.0	-13.7	Average	Vertical
	7927.5	39.6	13.5	53.1	74.0	-20.9	Peak	Vertical
	7927.5	25.1	13.5	38.6	54.0	-15.4	Average	Vertical
*	21033.9	67.7	5.6	73.3	108.0	-34.7	Peak	Horizontal
*	21036.0	67.4	5.6	73.0	88.0	-15.0	Average	Horizontal
*	31550.7	58.5	10.8	69.3	108.0	-38.7	Peak	Horizontal
*	31552.0	58.2	10.8	69.0	88.0	-19.0	Average	Horizontal
*	21036.0	77.4	5.6	83.0	108.0	-25.0	Peak	Vertical
*	21033.9	76.3	5.6	81.9	88.0	-6.1	Average	Vertical
*	31552.0	71.5	10.8	82.3	108.0	-25.7	Peak	Vertical
*	31550.9	70.2	10.8	81.0	88.0	-7.0	Average	Vertical

Note 1: "*" is Harmonic emissions in the restricted bands, its limit is 25.0 mV/m.

Note 2: AV Limit (dBuV/m at 3m) = {20*log[(25/1000)] + 120}dBuV/m = 88.0 dBuV/m

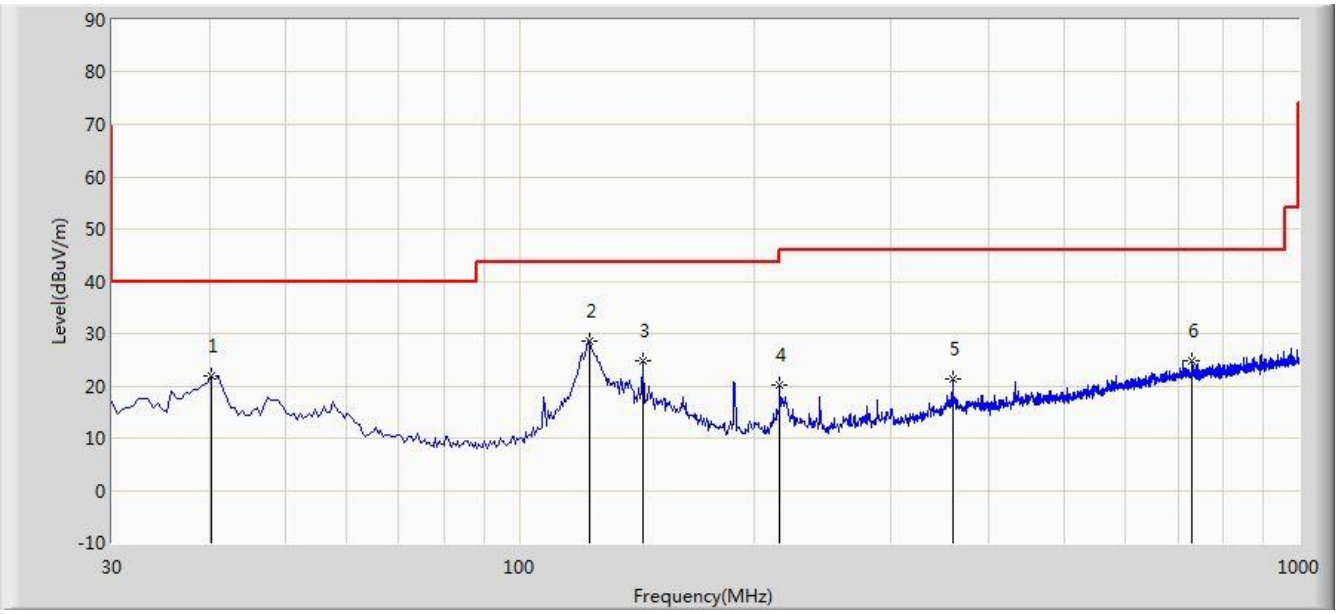
PK Limit (dBuV/m at 3m) = AV Limit (dBuV/m at 3m) + 20dB = 108.0 dBuV/m

Note 3: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Radiated Emission below 1GHz:

Site: AC1	Time: 2018/06/08 - 22:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Vincent Yu
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: Seura Clock/CL 1.1	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 10.525GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			40.185	20.991	6.384	-19.009	40.000	14.607	PK
2		*	123.120	27.602	14.176	-15.898	43.500	13.427	PK
3			143.975	23.788	8.922	-19.712	43.500	14.866	PK
4			215.755	19.288	7.539	-24.212	43.500	11.749	PK
5			359.800	20.249	4.484	-23.751	46.000	15.765	PK
6			728.885	23.850	1.343	-22.150	46.000	22.508	PK

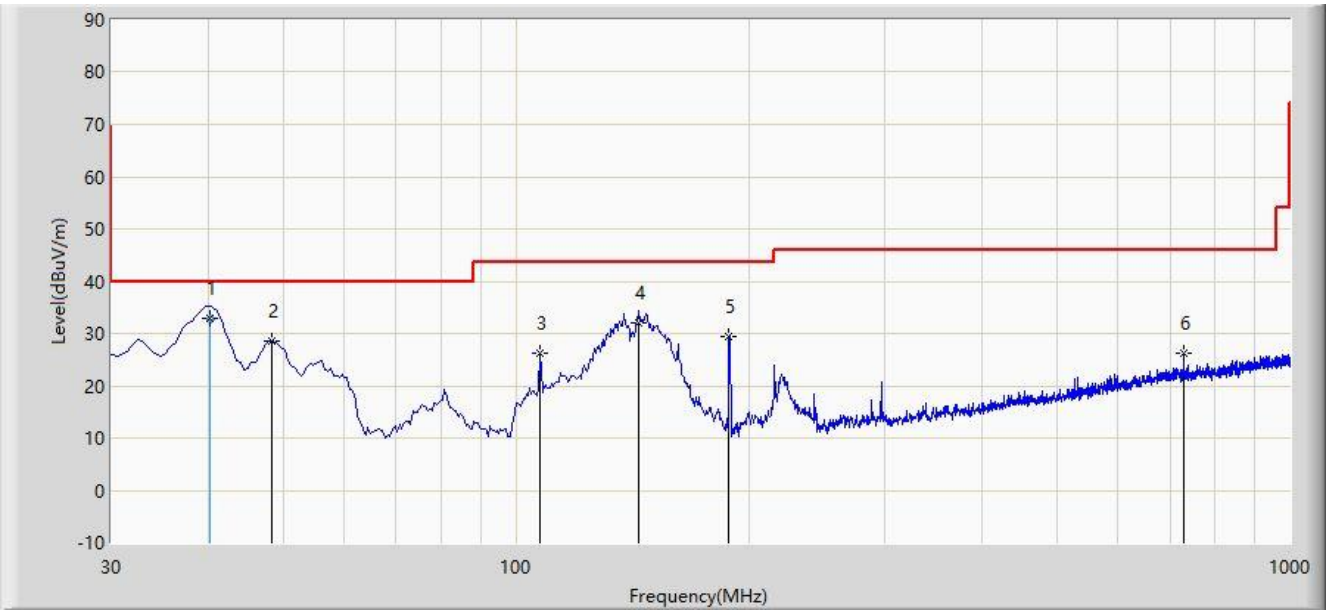
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: If the emission level of the EUT in peak mode was 10dB lower than the limit specified, peak value of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

Note 3: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 40GHz ~ 60GHz), therefore no data appear in the report.

Site: AC1	Time: 2018/06/08 - 22:43
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: Seura Clock	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 10.525GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	40.185	32.853	18.246	-7.147	40.000	14.607	QP
2			48.430	28.553	14.335	-11.447	40.000	14.218	PK
3			107.600	26.313	14.468	-17.187	43.500	11.845	PK
4			143.975	31.964	17.098	-11.536	43.500	14.866	PK
5			188.595	29.462	17.562	-14.038	43.500	11.900	PK
6			728.885	26.128	3.621	-19.872	46.000	22.508	PK

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: If the emission level of the EUT in peak mode was 10dB lower than the limit specified, peak value of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

Note 3: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 40GHz ~ 60GHz), therefore no data appear in the report.

7.5. AC Conducted Emissions Measurement

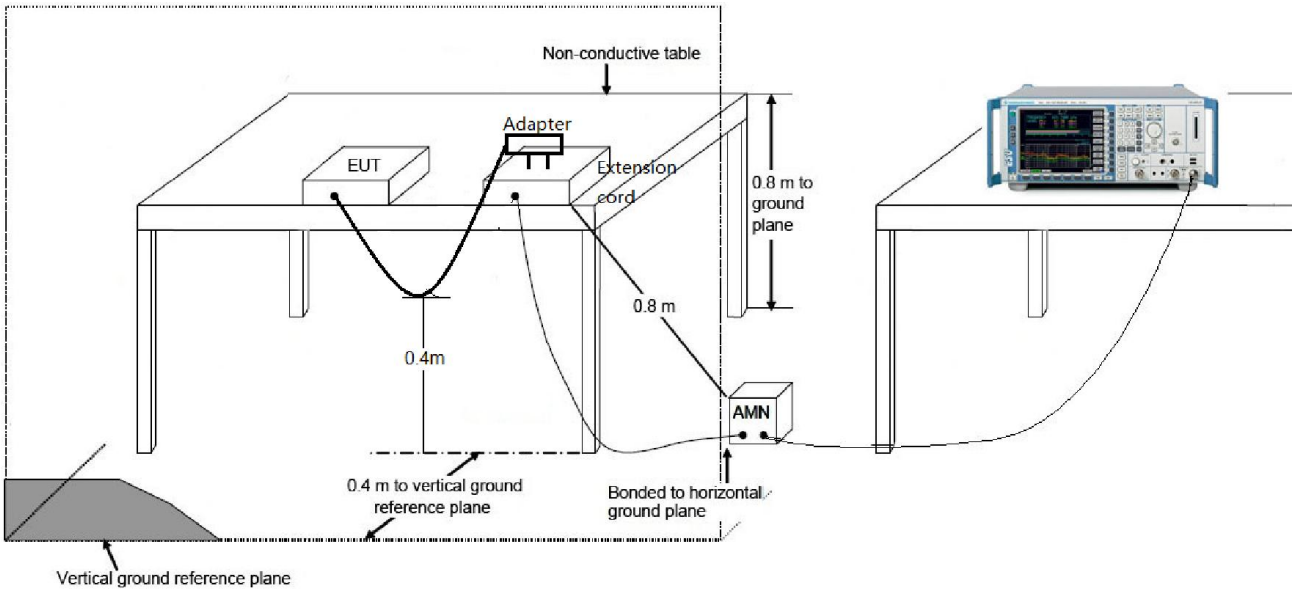
7.5.1.Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

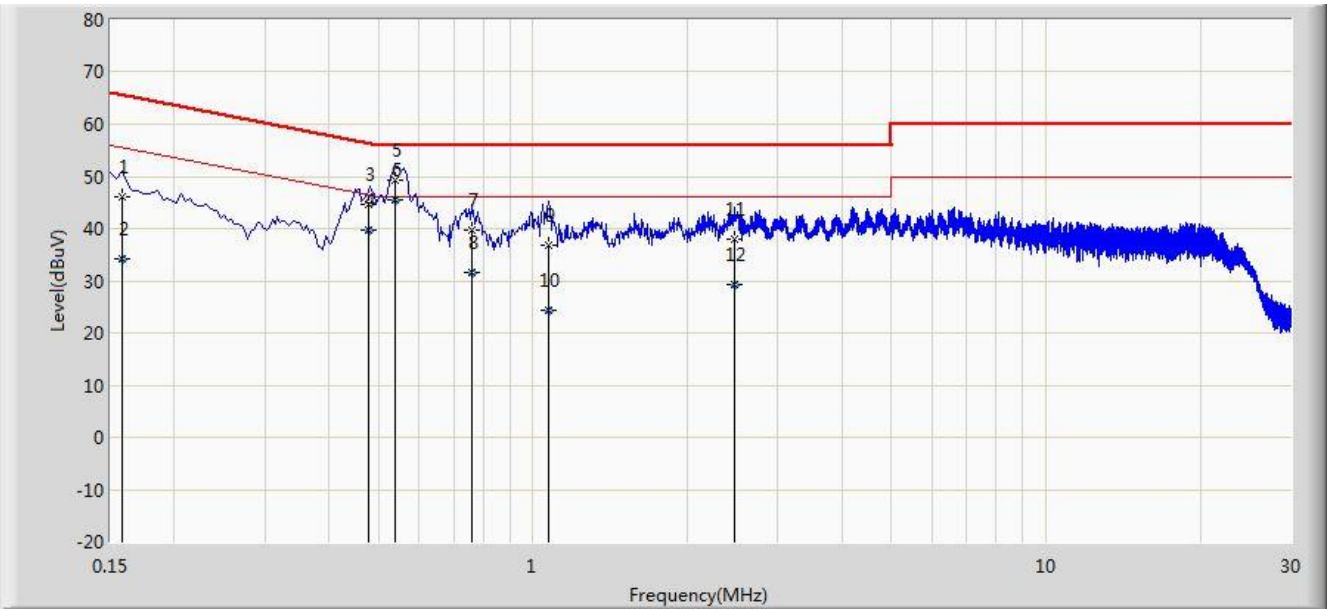
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.5.2.Test Setup



7.5.3.Test Result

Site: SR2	Time: 2018/06/22 - 15:19
Limit: FCC_Part15.107_CE_AC Power_ClassB	Engineer: Jone Zhang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: Seura Clock	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 10.525GHz	

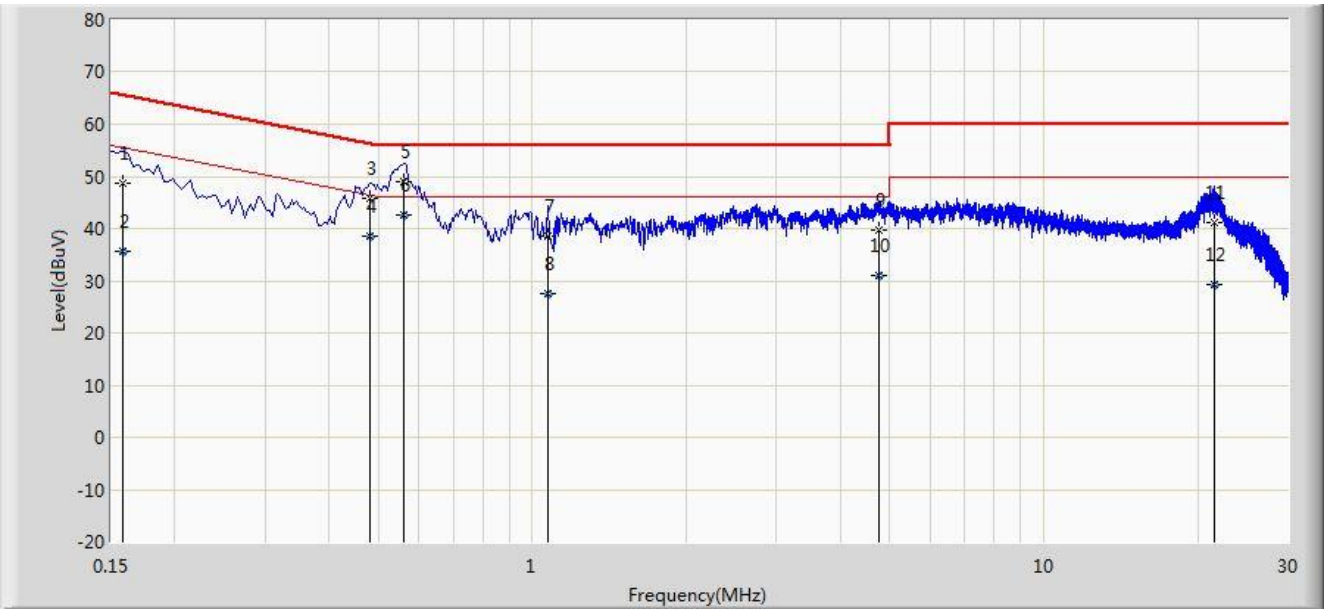


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.158	46.214	35.903	-19.355	65.568	10.311	QP
2			0.158	34.275	23.964	-21.293	55.568	10.311	AV
3			0.478	44.576	34.427	-11.798	56.374	10.149	QP
4			0.478	39.755	29.607	-6.619	46.374	10.149	AV
5			0.538	49.147	39.000	-6.853	56.000	10.147	QP
6		*	0.538	45.547	35.400	-0.453	46.000	10.147	AV
7			0.758	39.697	29.664	-16.303	56.000	10.033	QP
8			0.758	31.645	21.612	-14.355	46.000	10.033	AV
9			1.074	36.767	26.862	-19.233	56.000	9.906	QP
10			1.074	24.307	14.401	-21.693	46.000	9.906	AV
11			2.470	37.907	28.049	-18.093	56.000	9.858	QP
12			2.470	29.262	19.404	-16.738	46.000	9.858	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: SR2	Time: 2018/06/22 - 15:13
Limit: FCC_Part15.107_CE_AC Power_ClassB	Engineer: Jone Zhang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: Seura Clock	Power: AC 120V/60Hz
Test Mode: Transmit at Channel 10.525GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.158	48.590	38.300	-16.979	65.568	10.290	QP
2			0.158	35.590	25.300	-19.979	55.568	10.290	AV
3			0.482	45.773	35.600	-10.531	56.305	10.173	QP
4			0.482	38.473	28.300	-7.831	46.305	10.173	AV
5			0.562	48.952	38.800	-7.048	56.000	10.152	QP
6		*	0.562	42.652	32.500	-3.348	46.000	10.152	AV
7			1.074	38.460	28.554	-17.540	56.000	9.906	QP
8			1.074	27.564	17.658	-18.436	46.000	9.906	AV
9			4.750	39.627	29.600	-16.373	56.000	10.026	QP
10			4.750	31.132	21.106	-14.868	46.000	10.026	AV
11			21.478	41.083	30.873	-18.917	60.000	10.211	QP
12			21.478	29.174	18.964	-20.826	50.000	10.211	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

8. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with FCC Part 15.245 of the FCC Rules.

The End