



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15C TEST REPORT

For

Gouldin Technologies, LLC

2150 Chenault Dr., Carrollton, Texas 75006 United States

FCC ID: 2AOQ7-WXL

Report Type: Original Report	Product Type: Watchman
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Report Number:	<u>RXM200522051-00D</u>
Report Date:	<u>2020-07-21</u>
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Gouldin Technologies, LLC
Tested Model	WXL-P
Series Model	WXL-S
Model Difference	See declaration letter
Product Type	Watchman
Power Supply	DC 12V
RF Function	SRD
Operating Band/Frequency	125 kHz
Antenna Type	Loop antenna
Antenna Gain	0.0 dBi

**All measurement and test data in this report was gathered from production sample serial number: 20200522051. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-05-22)*

Objective

This report is prepared on behalf of *Gouldin Technologies, LLC* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.215 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS Submittal with FCC ID: 2AOQ7-WXL

FCC Part 15.247 DSS Submittal with FCC ID: 2AOQ7-WXL

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 emissions measurement was performed at Bay Area Compliance Laboratories 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
Radiated emission	9kHz~30MHz	3.19dB
	30MHz~1GHz	6.11dB
Temperature		1.0°C
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) and 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

Description of Test Configuration

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

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

No Exercise Software was used.

Support Equipment List and Details

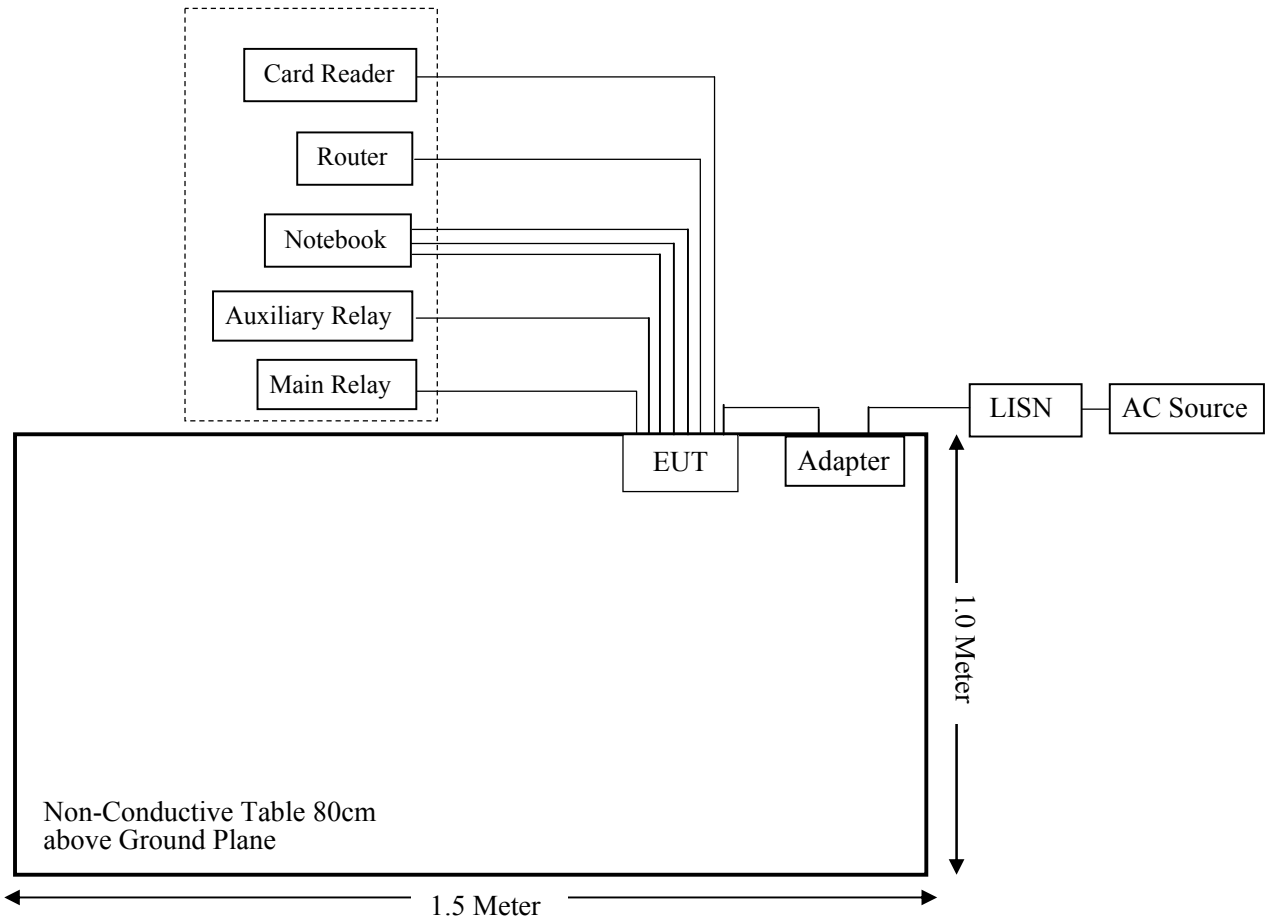
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152
Chenyang	Adapter	CYSE24-120200C	/
TP-LINK	Router	TL-WDR5620	1188431022424
/	Card Reader	/	/
Schneider Electric	Main Relay	RXM2LB2BD	/
Schneider Electric	Auxiliary Relay	/	/
/	SD Card	/	/

External I/O Cable

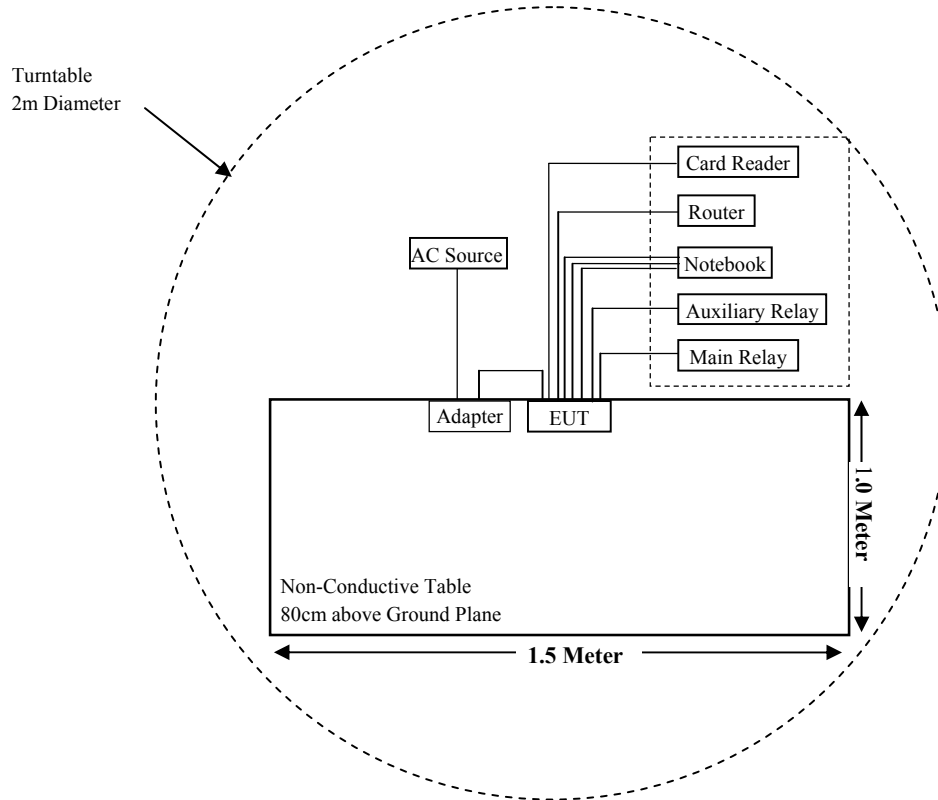
Cable Description	Length (m)	From Port	To
USB Cable	5	EUT	Notebook
RJ45 Cable	5	EUT	Notebook
HDMI Cable	5	EUT	Notebook
RJ45 Cable	5	EUT	Router
Data Cable	5	EUT	Card Reader
Signal Cable	5	EUT	Main Relay
Signal Cable	5	EUT	Auxiliary Relay
Power Cable	1	EUT	Adapter
Power Cable	1	Adapter	LISN/AC source

Block Diagram of Test Setup

For Conducted Emissions:



For Radiated Emissions (Below 30 MHz & 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
§15.205, §15.209	Spurious Emissions	Compliant
§15.215 (c)	20dB Emission Bandwidth	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test(Chamber 1#)					
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	2019-08-14	2020-08-13
ETS-LINDGREN	Loop Antenna	6512	00108100	2019-04-25	2022-04-24
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-08-05	2020-08-04
Rohde & Schwarz	LISN	ENV216	101115	2019-12-14	2020-12-13
Audix	Test Software	e3	V9	/	/
Rohde & Schwarz	Pulse limiter	ESH3-Z2	357.8810.52	2019-08-10	2020-08-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2019-08-15	2020-08-14

* **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 Connector 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.

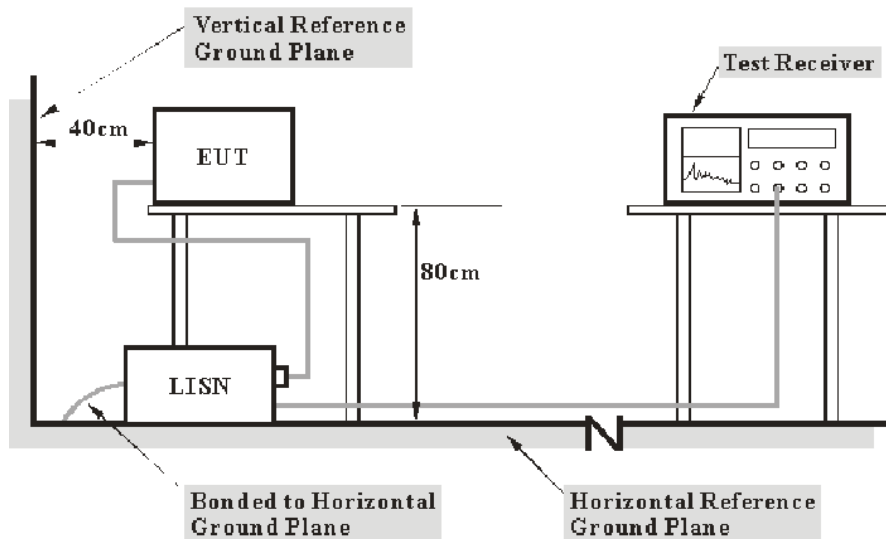
Result: Compliant

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.

All data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The Corrected 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, a margin of 7 dB means the emission is 7 dB above the limit. The equation for margin 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

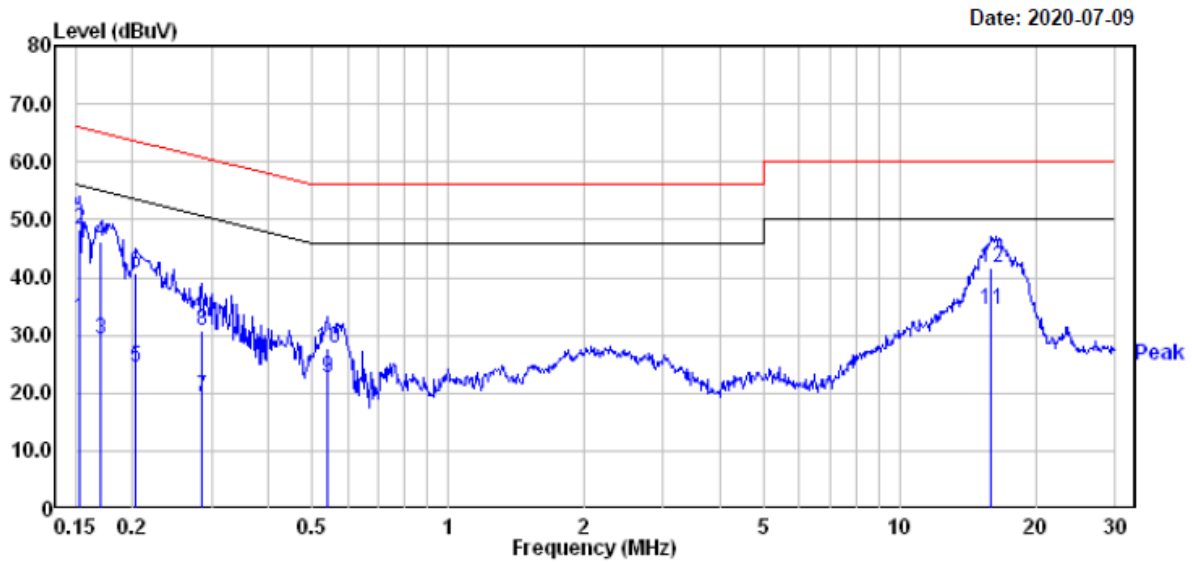
Environmental Conditions

Temperature:	24.7 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by CK Huang on 2020-07-09.

EUT operation mode: Transmitting

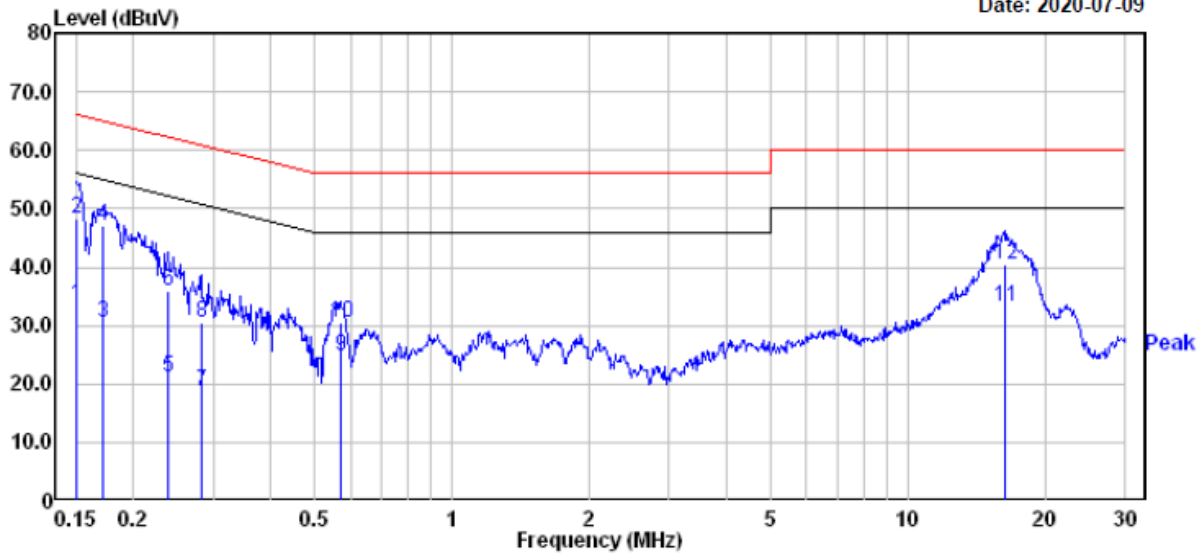
AC 120V/60 Hz, Line



	Read Freq	Read Level	Factor	Limit Level	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB
1	0.153	13.20	19.82	33.02	55.82	-22.80 Average
2	0.153	28.50	19.82	48.32	65.82	-17.50 QP
3	0.170	9.50	19.83	29.33	54.94	-25.61 Average
4	0.170	26.50	19.83	46.33	64.94	-18.61 QP
5	0.204	4.70	19.82	24.52	53.45	-28.93 Average
6	0.204	20.80	19.82	40.62	63.45	-22.83 QP
7	0.285	-0.40	19.82	19.42	50.68	-31.26 Average
8	0.285	11.10	19.82	30.92	60.68	-29.76 QP
9	0.541	2.91	19.75	22.66	46.00	-23.34 Average
10	0.541	7.91	19.75	27.66	56.00	-28.34 QP
11	15.970	14.80	19.70	34.50	50.00	-15.50 Average
12	15.970	22.10	19.70	41.80	60.00	-18.20 QP

AC 120V/60 Hz, Neutral

Date: 2020-07-09



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.150	13.70	19.82	33.52	56.00	-22.48	Average
2	0.150	28.50	19.82	48.32	66.00	-17.68	QP
3	0.171	10.60	19.83	30.43	54.90	-24.47	Average
4	0.171	27.30	19.83	47.13	64.90	-17.77	QP
5	0.239	1.40	19.82	21.22	52.13	-30.91	Average
6	0.239	16.00	19.82	35.82	62.13	-26.31	QP
7	0.282	-1.10	19.82	18.72	50.76	-32.04	Average
8	0.282	10.70	19.82	30.52	60.76	-30.24	QP
9	0.570	4.90	19.75	24.65	46.00	-21.35	Average
10	0.570	10.70	19.75	30.45	56.00	-25.55	QP
11	16.312	13.50	19.72	33.22	50.00	-16.78	Average
12	16.312	20.70	19.72	40.42	60.00	-19.58	QP

Note:

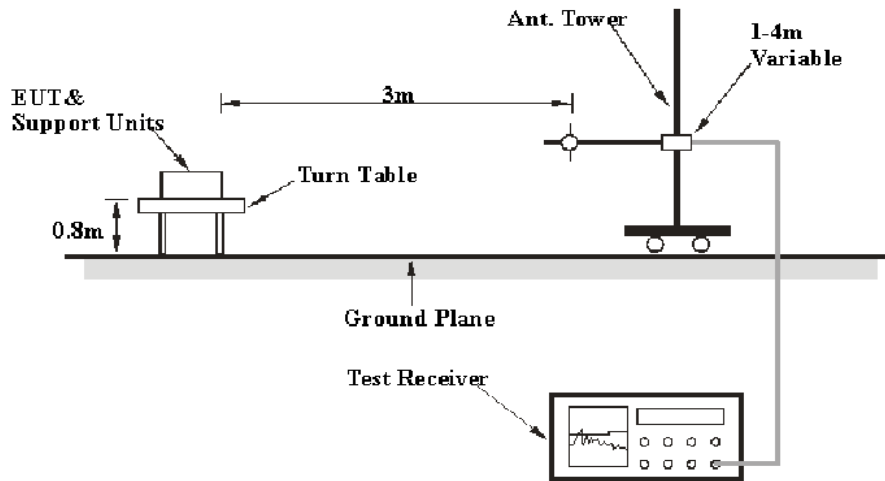
- 1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
- 2) Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

FCC §15.209 & §15.205 - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.209; §15.205;

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 1 GHz.

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

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

Note: For the frequency bands 9-90 kHz and 110-490 kHz, the test was based on average detector.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

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:

$$\text{Corrected Amplitude (dB}\mu\text{V /m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

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:

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Corrected Amplitude (dB}\mu\text{V /m)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205 and 15.209.

Test Data

Environmental Conditions

Temperature:	25.1 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by CK Huang on 2020-07-09.

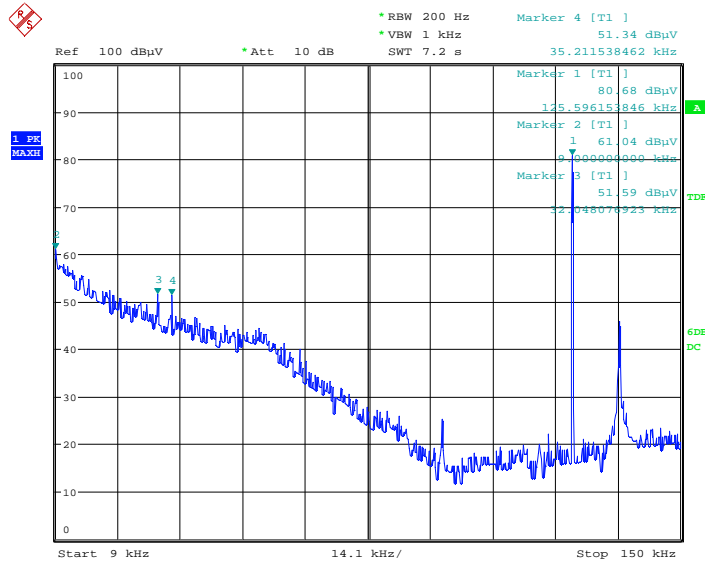
Test mode: Transmitting

Model: WXL-P

9 kHz-30 MHz:

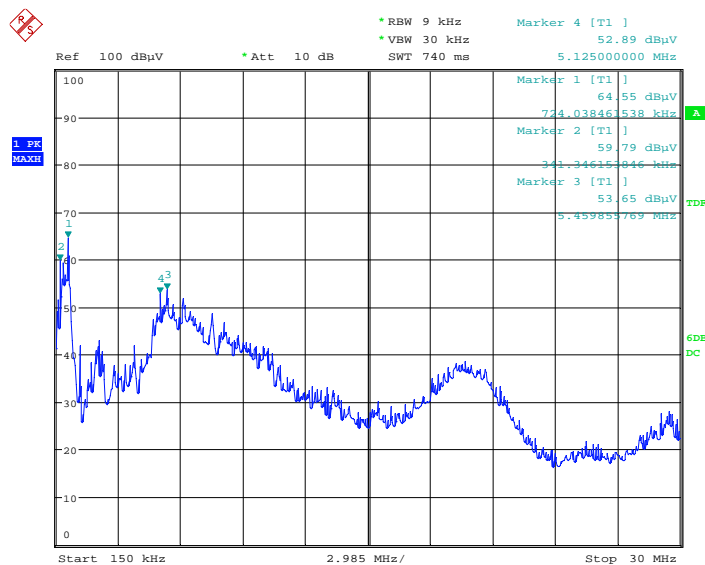
(Pre-scan in the X, Y and Z axes of orientation, the worst case in X-axis of orientation was recorded)

9kHz-150kHz (PK)



Date: 9.JUL.2020 17:24:05

150kHz-30MHz (PK)



Date: 9.JUL.2020 17:21:02

9kHz-490kHz:

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (kHz)	Corrected Amplitude (dBµV/m) @3m			Limit (dBµV/m) @3m	Limit (dBµV/m) @300m	Margin (dB)
9	61.04	PK	57.00	128.52	48.52	67.48
32.04	51.59	PK	46.62	117.49	37.49	65.90
35.21	51.34	PK	45.71	116.67	36.67	65.33
125	80.68	PK	50.55	105.67	25.67	24.99
340	59.79	PK	19.54	96.97	16.97	37.18

Note: The average emissions which fall into frequencies 9-90 kHz, 110-490 kHz was not recorded, because the peak emissions are below the average limit.

490kHz-30MHz:

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m			Limit (dBµV/m) @3m	Limit (dBµV/m) @30m	Margin (dB)
0.72	62.55	PK	18.36	70.46	30.46	7.91
5.12	52.89	PK	7.01	69.54	29.54	16.65
5.45	53.65	PK	3.48	69.54	29.54	15.89

Note:

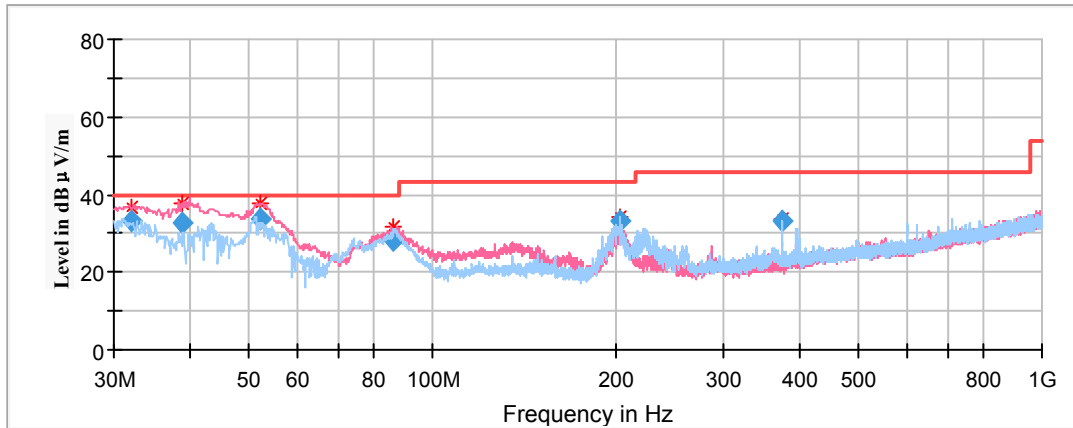
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

30MHz-1GHz

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



Frequency (MHz)	Corrected Amplitude (dB μV/m)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
		Height (cm)	Polar (H/V)				
32.119400	33.15	100.0	V	45.0	-5.8	40.00	6.85
38.775500	32.77	100.0	V	19.0	-10.3	40.00	7.23
52.133350	33.91	100.0	V	335.0	-18.1	40.00	6.09
86.189350	27.93	100.0	V	242.0	-18.0	40.00	12.07
203.523750	33.03	100.0	H	26.0	-12.8	43.50	10.47
375.011450	33.13	200.0	H	8.0	-9.2	46.00	12.87

Note:

Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)

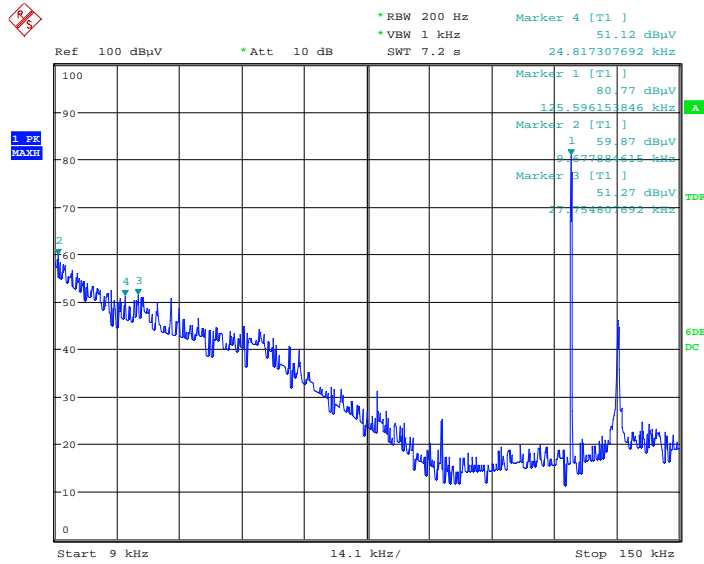
Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

Model: WXL-S

9 kHz-30 MHz:

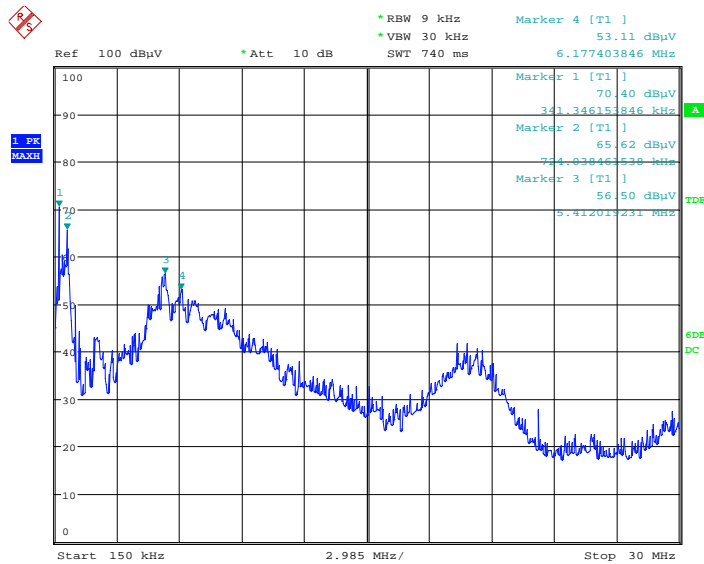
(Pre-scan in the X, Y and Z axes of orientation, the worst case in X-axis of orientation was recorded)

9kHz-150kHz (PK)



Date: 9.JUL.2020 17:25:16

150kHz-30MHz (PK)



Date: 9.JUL.2020 17:07:11

9kHz-490kHz:

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (kHz)	Corrected Amplitude (dBµV/m) @3m			Limit (dBµV/m) @3m	Limit (dBµV/m) @300m	Margin (dB)
9.67	59.87	PK	56.57	127.90	47.90	68.03
24.81	51.12	PK	48.65	119.71	39.71	68.59
27.75	51.27	PK	47.83	118.74	38.74	67.47
125	80.77	PK	50.55	105.67	25.67	24.90
341	70.40	PK	19.54	96.95	16.95	26.55

Note:

1. The average emissions which fall into frequencies 9-90 kHz, 110-490 kHz was not recorded, because the peak emissions are below the average limit.

490kHz-30MHz:

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (MHz)	Corrected Amplitude (dBµV/m) @3m			Limit (dBµV/m) @3m	Limit (dBµV/m) @30m	Margin (dB)
0.72	65.62	PK	18.36	70.46	30.46	4.84
5.41	56.50	PK	3.91	69.54	29.54	13.04
6.17	53.11	PK	7.01	69.54	29.54	16.43

Note:

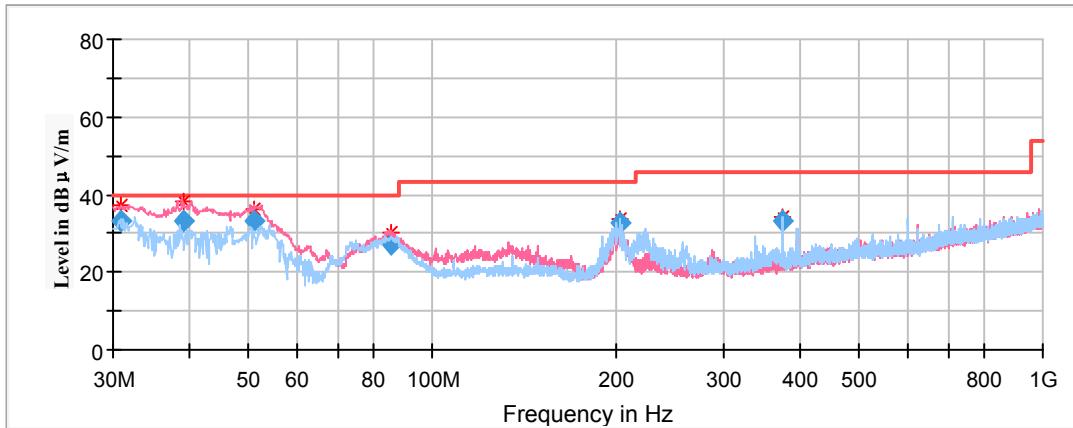
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV/m)

30MHz-1GHz

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



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dB μ V/m)	Height (cm)	Polar (H/V)				
30.943700	33.28	100.0	V	86.0	-5.0	40.00	6.72
39.081400	33.13	100.0	V	134.0	-10.6	40.00	6.87
51.218700	33.13	100.0	V	198.0	-18.0	40.00	6.87
85.699550	27.01	100.0	V	272.0	-18.0	40.00	12.99
203.515050	32.67	100.0	H	20.0	-12.8	43.50	10.83
374.979350	33.33	100.0	H	353.0	-9.2	46.00	12.67

Note:

Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

FCC §15.215 (c) - 20dB EMISSION BANDWIDTH TESTING

Requirement

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Procedure

With the EUT's antenna attached, the waveform was received by the test antenna which was connected to the spectrum analyzer, plot the 20 dB bandwidth.

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by CK Huang on 2020-07-16.

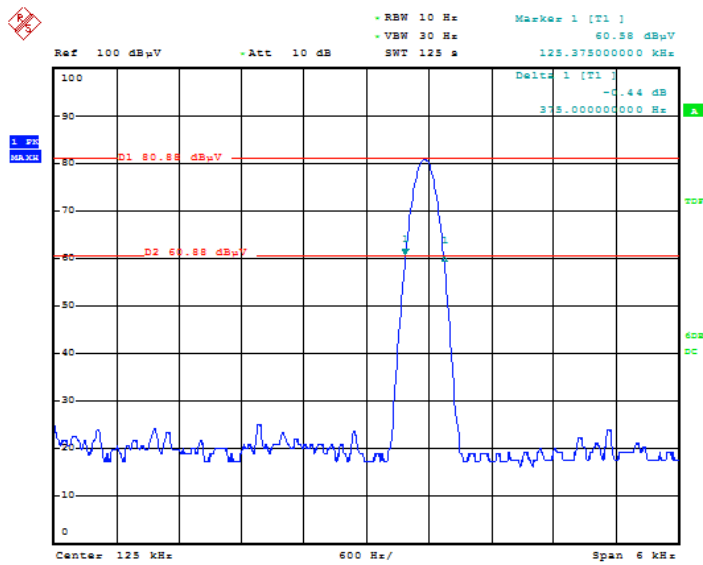
Test Mode: Transmitting

Test Result: Compliant

Model: WXL-P

Frequency (kHz)	20 dB Bandwidth (kHz)
125	0.375

20 dB Emission Bandwidth

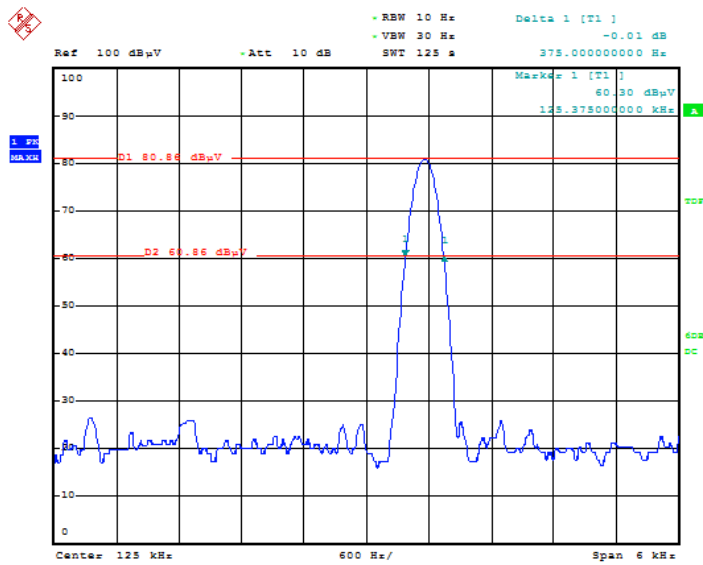


Date: 16.JUL.2020 23:28:32

Model: WXL-S

Frequency (kHz)	20 dB Bandwidth (kHz)
125	0.375

20 dB Emission Bandwidth



Date: 16.JUL.2020 23:18:28

***** END OF REPORT *****