TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15.249
TEST REPORT

For

Hangzhou Meari Technology Co., Ltd.

No.91, Chutian Road, Xixing Block, Binjiang, Hangzhou, 310051 China

FCC ID: 2AG7C-BELL1S

Report Type:	**Product Type:**
Original Report	Wireless DoorBell

Test Engineer:	Lee Li
Report Number:	RSHA200519002-00C
Report Date:	2020-07-30
Reviewed By:	Oscar Ye EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Hangzhou Meari Technology Co., Ltd.
Tested Model:	Bell 1S
Series Model:	Bell 1S_DC
Model Difference:	See Declaration letter
Product Type:	Wireless DoorBell
Power Supply:	DC 3.6V*2 from battery or DC 5V from adapter or AC 12-24V
RF Function:	SRD
Operating Band/Frequency:	915 MHz
Channel Number:	1
Antenna Type:	Monopole antenna
Maximum Antenna Gain:	3.0 dBi

Adapter Information:
Model: TPA-46B050100UU
Input: AC 100-240V, 50/60Hz, 0.2A
Output: 5.0V, 1000mA

**All measurement and test data in this report was gathered from production sample serial number: 20200519002. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-05-19)*

Objective

This type approval report is prepared on behalf of *Hangzhou Meari Technology Co., Ltd.* in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commission 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 15.249 rules.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS Submittal with FCC ID: 2AG7C-BELL1S

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
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
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) 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

Justification

Channel list:

Channel	Frequency (MHz)
1	915

EUT Exercise Software

The EUT was tested in the engineering mode.

Support Equipment List and Details

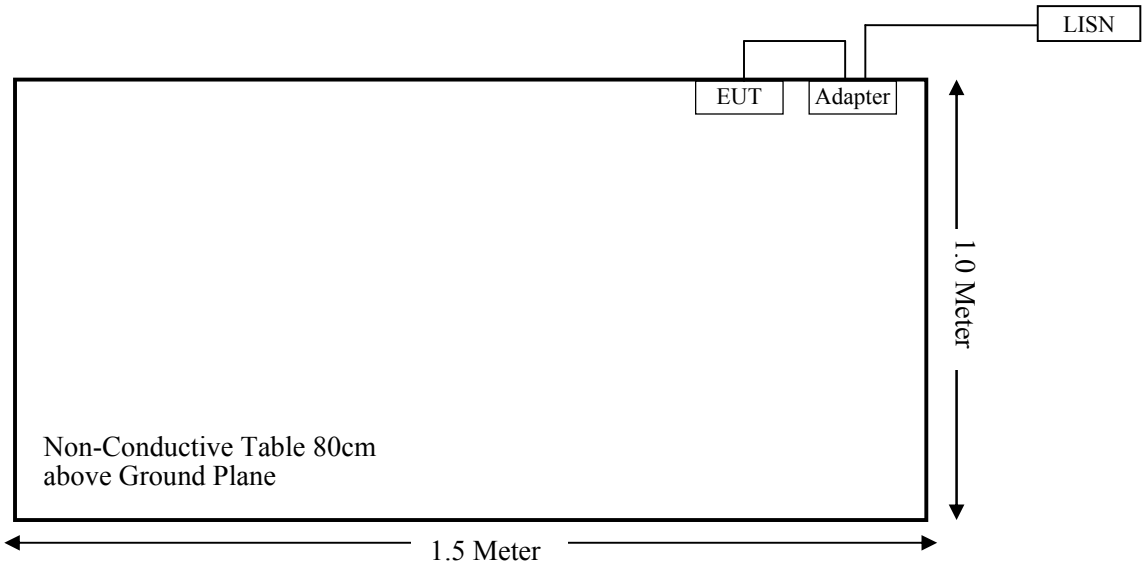
Manufacturer	Description	Model	Serial Number
MaCable	Adapter 1	MKAC-66-243000M	/

External I/O Cable

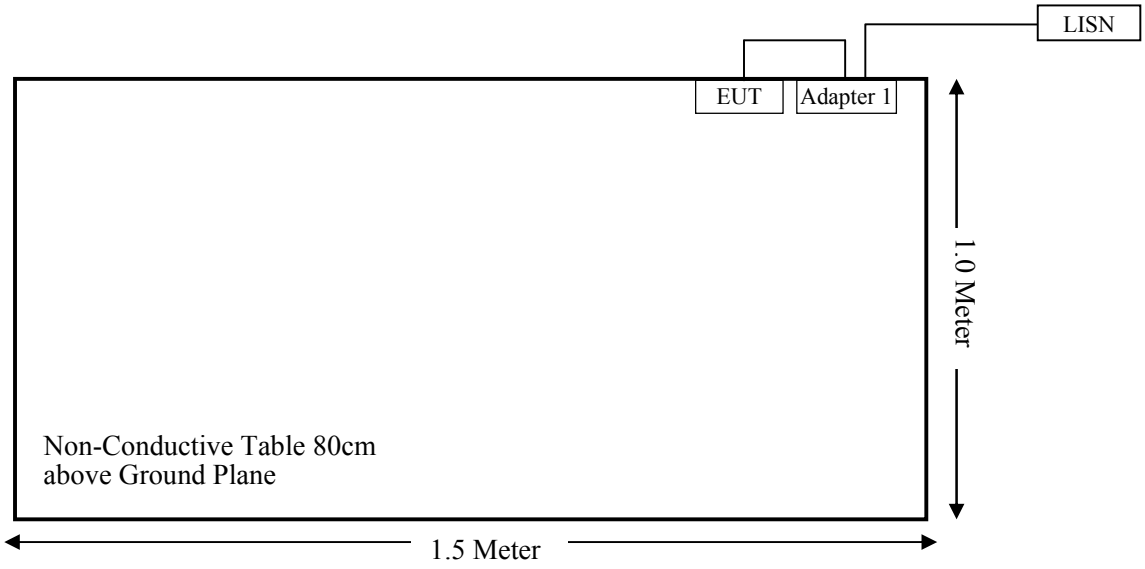
Cable Description	Length(m)	From Port	To
Power Cable	1.0	EUT	Adapter
Power Cable	1.0	Adapter	LISN/AC source
Power Cable	1.0	EUT	Adapter 1
Power Cable	1.0	Adapter 1	LISN/AC source

Block Diagram of Test Setup

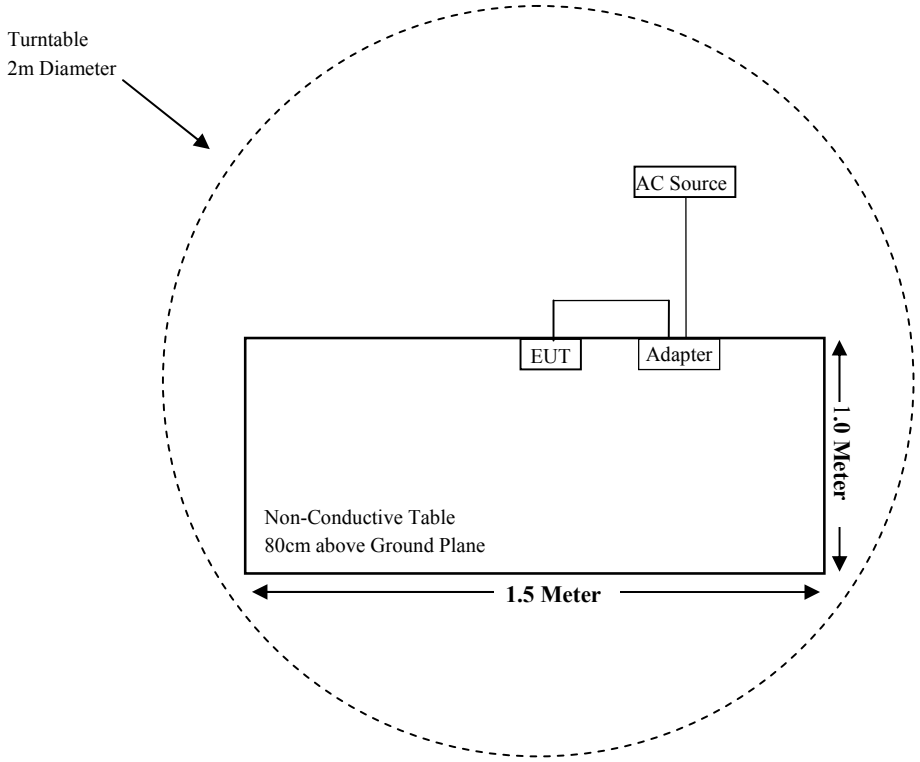
For Conducted Emissions – Power by adapter:



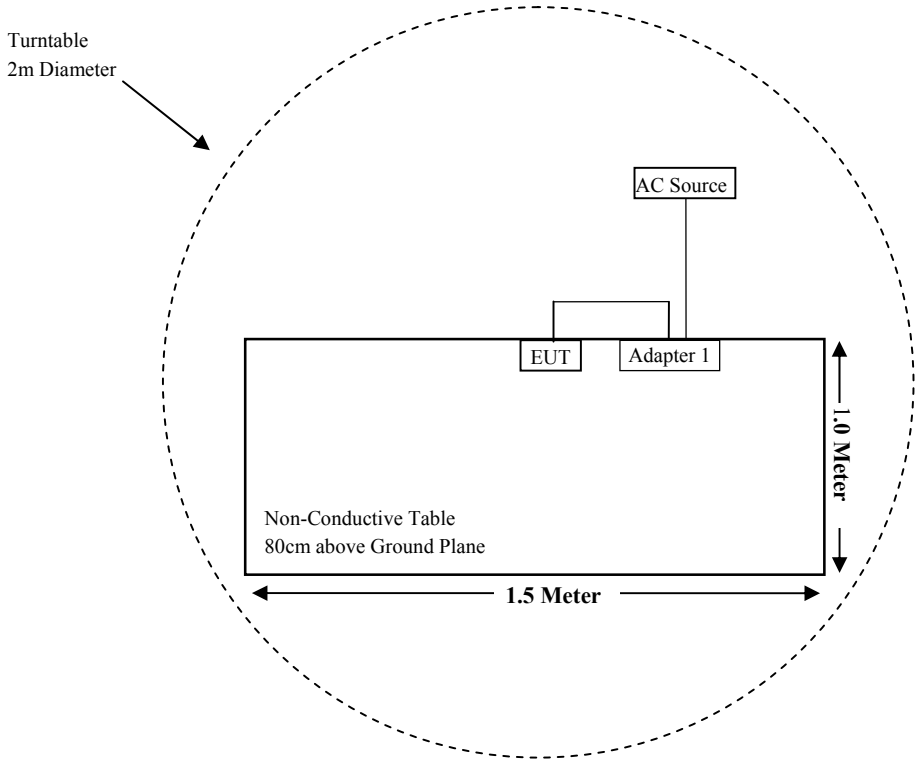
For Conducted Emissions – Power by AC 24V:



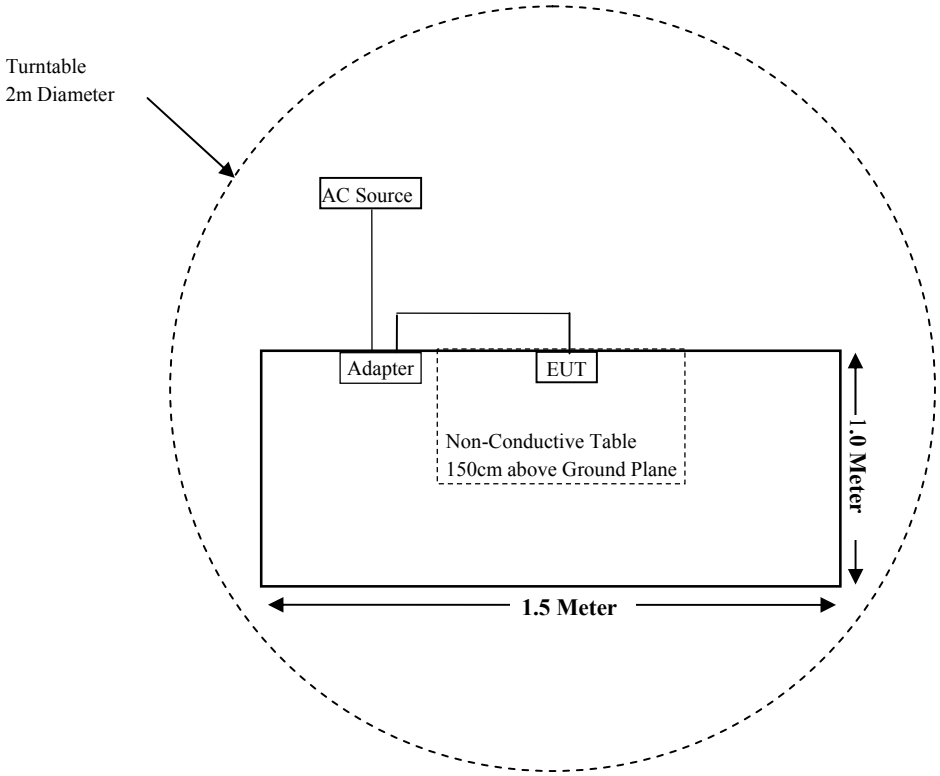
For Radiated Emissions(Below 1GHz) – Power by adapter::



For Radiated Emissions(Below 1GHz) – Power by AC 24V::



For Radiated Emissions(Above 1GHz):



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, §15.249	Radiated Emissions& Out of Band Emission	Compliant
§15.215 (c)	20 dB 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 Instrunent	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-TRONICS	Band Reject Filter	BRC50722	G013	2019-08-05	2020-08-04
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
Radiated Emission Test（Chamber 2#）					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2020-07-15	2023-07-14
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-12-12	2020-12-11
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	834115/007	2019-11-30	2020-11-29
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2019-11-30	2020-11-29
Audix	Test Software	e3	V9	/	/
Narda	Attenuator/6dB	10690812-2	26850-6	2020-01-10	2021-01-09
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

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

Antenna Connector Construction

The EUT has a Monopole antenna for SRD and the antenna gain is 3.0 dBi, the antenna was permanently attached to the EUT, fulfill the requirement of this section, please refer to the EUT photos.

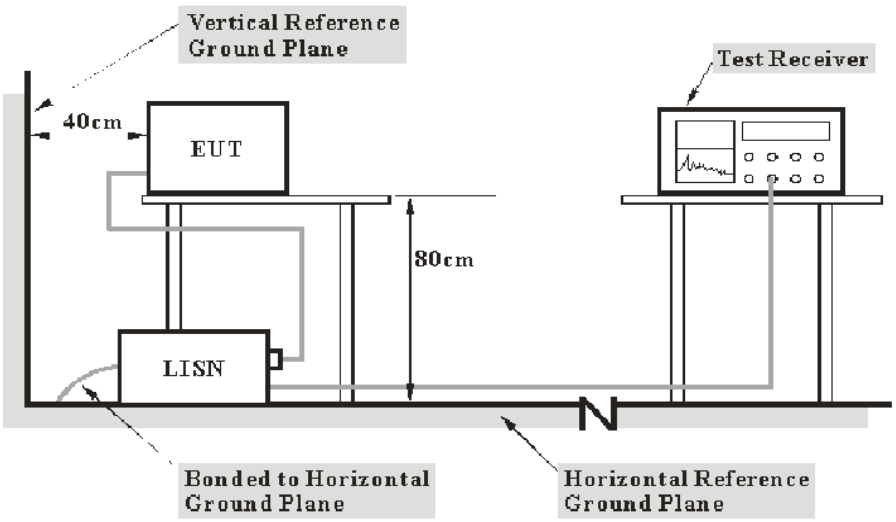
Result: Compliant.

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 measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

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

ANSI C63.10-2013 clause 6.2

During the conducted emission test, the adapter/adapter 1 was connected to the outlet of the LISN.

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

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

Corrected 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:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + 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:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Results Summary

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

Test Data

Environmental Conditions

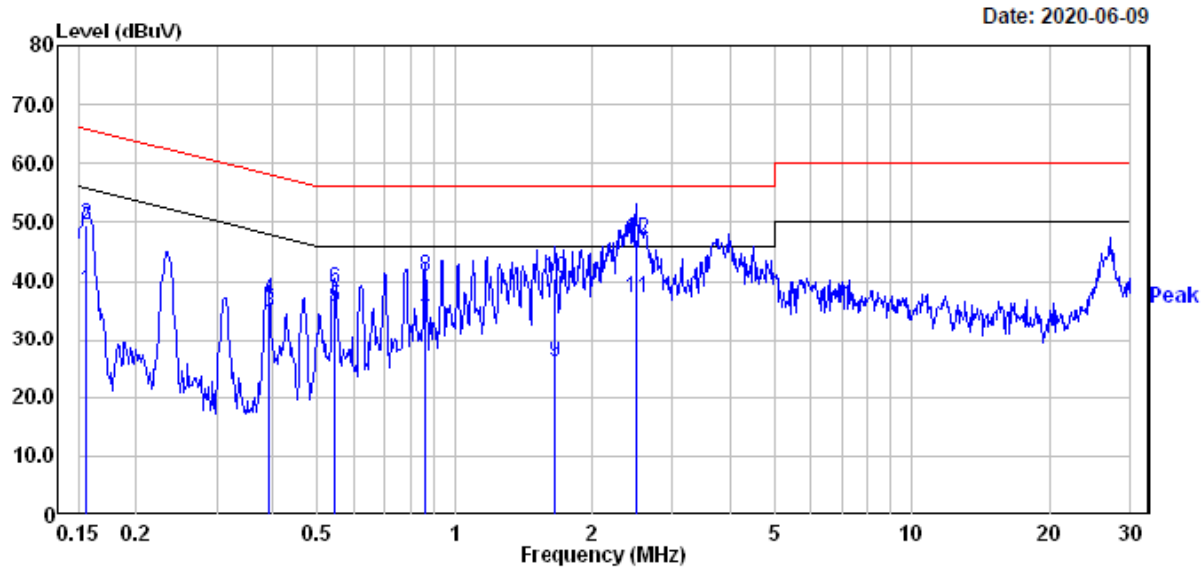
Temperature:	24.3-25.2 ℃
Relative Humidity:	45-50 %
ATM Pressure:	101.3-102.3 kPa

The testing was performed by Lee Li from 2020-06-09 to 2020-07-20.

EUT operation mode: Transmitting

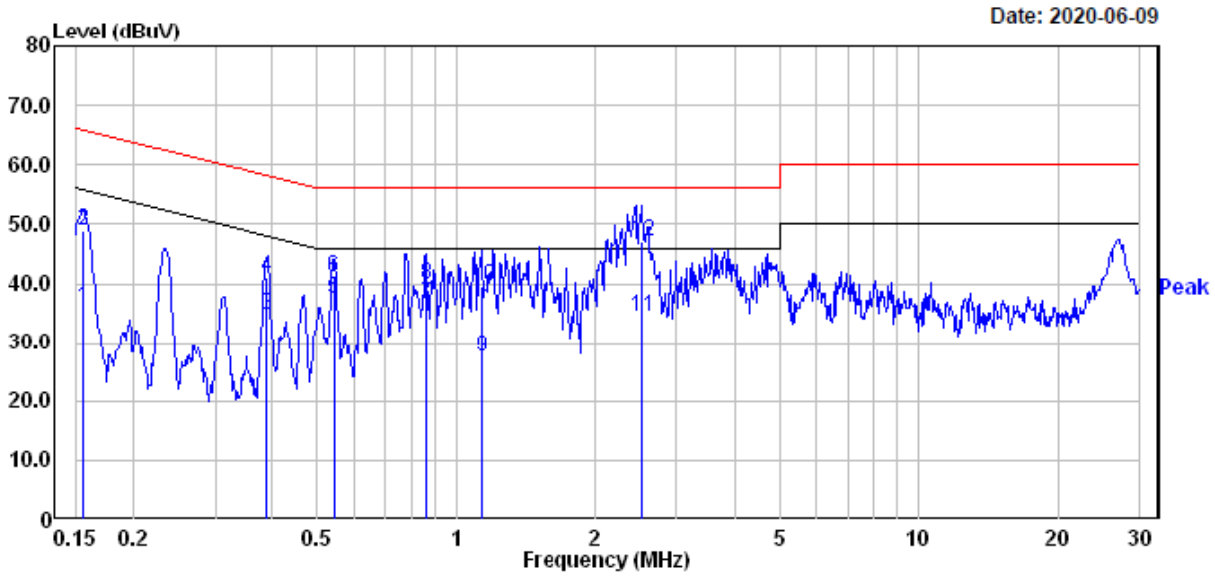
Power by adapter:

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	18.60	19.82	38.42	55.69	-17.27	Average
2	0.156	29.70	19.82	49.52	65.69	-16.17	QP
3	0.391	15.10	19.75	34.85	48.03	-13.18	Average
4	0.391	17.20	19.75	36.95	58.03	-21.08	QP
5	0.546	16.00	19.75	35.75	46.00	-10.25	Average
6	0.546	18.80	19.75	38.55	56.00	-17.45	QP
7	0.857	13.41	19.71	33.12	46.00	-12.88	Average
8	0.857	21.01	19.71	40.72	56.00	-15.28	QP
9	1.662	6.10	19.84	25.94	46.00	-20.06	Average
10	1.662	20.60	19.84	40.44	56.00	-15.56	QP
11	2.500	17.60	19.48	37.08	46.00	-8.92	Average
12	2.500	27.70	19.48	47.18	56.00	-8.82	QP

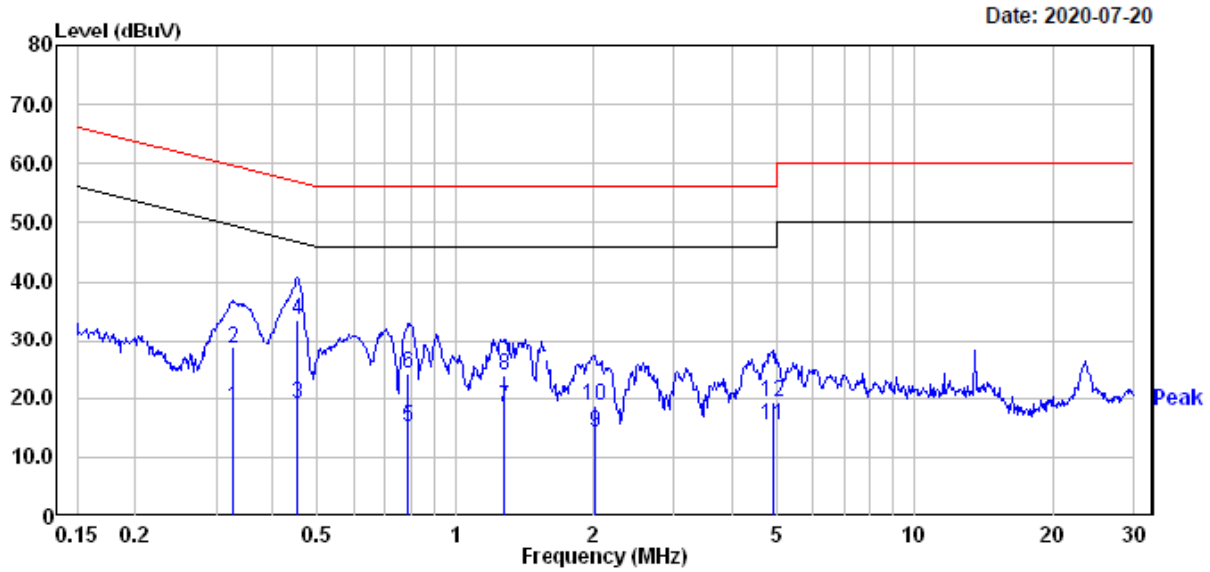
AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	16.20	19.82	36.02	55.69	-19.67	Average
2	0.156	29.10	19.82	48.92	65.69	-16.77	QP
3	0.389	15.10	19.75	34.85	48.08	-13.23	Average
4	0.389	21.30	19.75	41.05	58.08	-17.03	QP
5	0.544	17.60	19.75	37.35	46.00	-8.65	Average
6	0.544	21.20	19.75	40.95	56.00	-15.05	QP
7	0.857	16.81	19.71	36.52	46.00	-9.48	Average
8	0.857	20.01	19.71	39.72	56.00	-16.28	QP
9	1.129	7.60	19.81	27.41	46.00	-18.59	Average
10	1.129	19.60	19.81	39.41	56.00	-16.59	QP
11	2.527	14.99	19.48	34.47	46.00	-11.53	Average
12	2.527	27.69	19.48	47.17	56.00	-8.83	QP

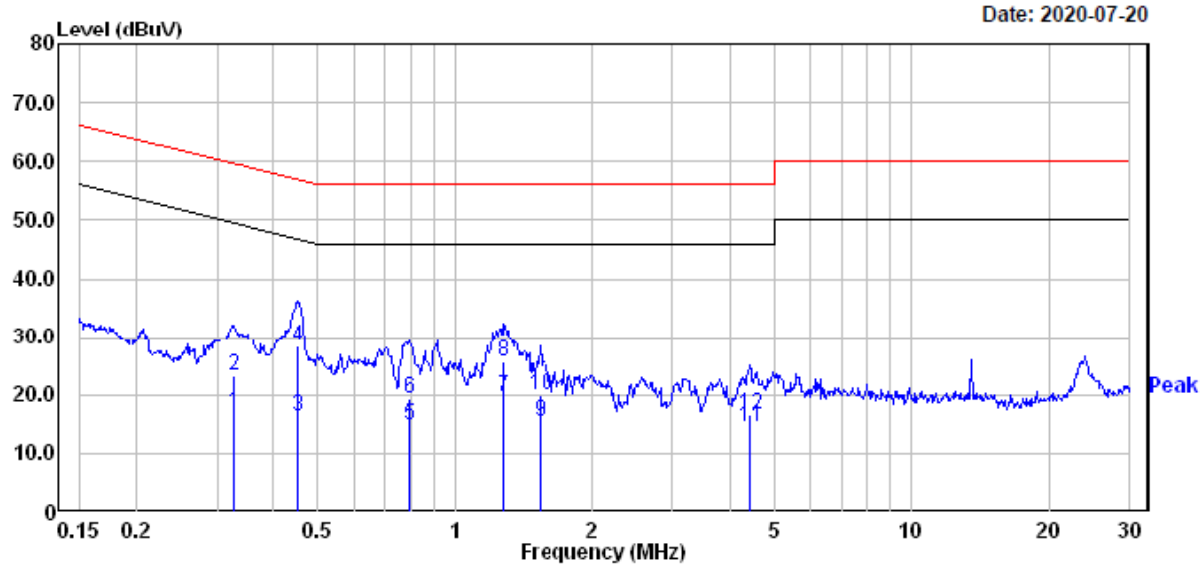
Power by AC 24V:

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.325	-1.40	19.82	18.42	49.57	-31.15	Average
2	0.325	9.00	19.82	28.82	59.57	-30.75	QP
3	0.452	-0.70	19.75	19.05	46.85	-27.80	Average
4	0.452	13.90	19.75	33.65	56.85	-23.20	QP
5	0.788	-4.50	19.71	15.21	46.00	-30.79	Average
6	0.788	4.40	19.71	24.11	56.00	-31.89	QP
7	1.276	-1.40	19.82	18.42	46.00	-27.58	Average
8	1.276	3.90	19.82	23.72	56.00	-32.28	QP
9	2.012	-5.70	19.82	14.12	46.00	-31.88	Average
10	2.012	-1.10	19.82	18.72	56.00	-37.28	QP
11	4.900	-4.00	19.49	15.49	46.00	-30.51	Average
12	4.900	-0.20	19.49	19.29	56.00	-36.71	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.325	-2.90	19.82	16.92	49.57	-32.65	Average
2	0.325	3.50	19.82	23.32	59.57	-36.25	QP
3	0.452	-3.30	19.75	16.45	46.85	-30.40	Average
4	0.452	8.70	19.75	28.45	56.85	-28.40	QP
5	0.792	-4.89	19.70	14.81	46.00	-31.19	Average
6	0.792	-0.39	19.70	19.31	56.00	-36.69	QP
7	1.276	-0.30	19.82	19.52	46.00	-26.48	Average
8	1.276	5.70	19.82	25.52	56.00	-30.48	QP
9	1.535	-4.41	19.85	15.44	46.00	-30.56	Average
10	1.535	0.19	19.85	20.04	56.00	-35.96	QP
11	4.430	-4.89	19.47	14.58	46.00	-31.42	Average
12	4.430	-2.79	19.47	16.68	56.00	-39.32	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§15.205, §15.209&§15.249- RADIATED EMISSIONS & OUT OF BAND EMISSION

Applicable Standard

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

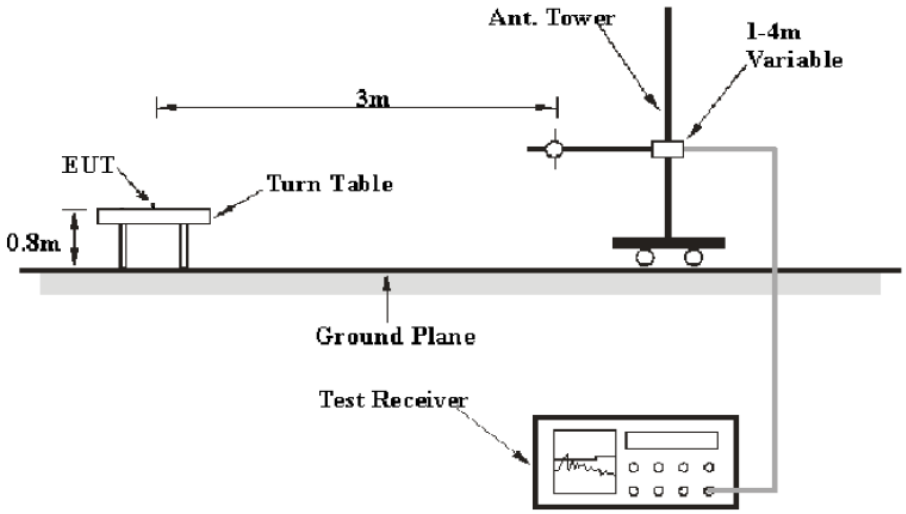
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24GHz-24.25GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

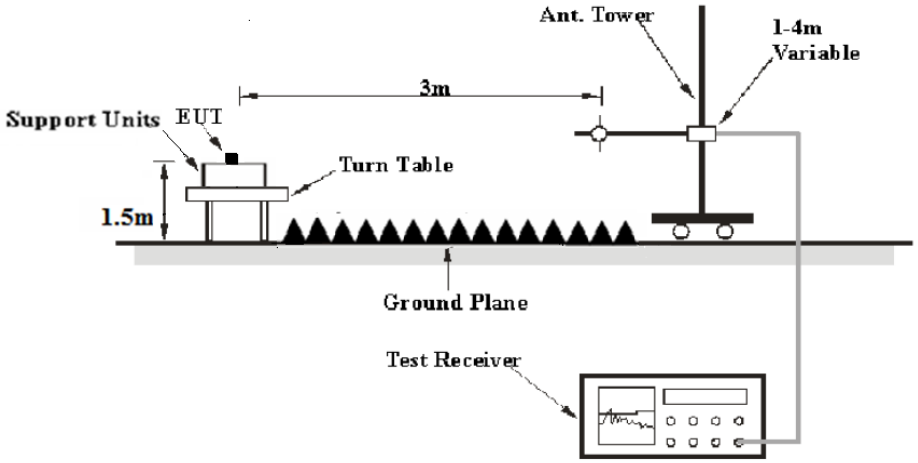
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission and out of band 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 15.209/15.205 and FCC 15.249 limits.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

Test Equipment Setup

The system was investigated from 30 MHz to 10 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	PK
	1MHz	3 MHz	/	Ave

Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

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 (dBμV/m) = Meter Reading (dBμV) + 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 (dBμV/m) - Corrected Amplitude (dBμV/m)

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 &15.205 & 15.249.

Test Data

Environmental Conditions

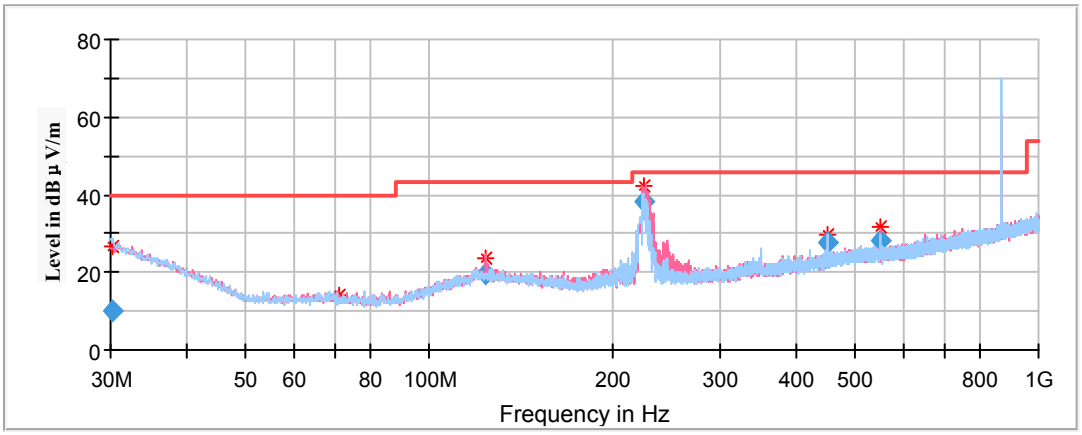
Temperature:	24.2~25.5 ℃
Relative Humidity:	49-50 %
ATM Pressure:	100.7-101.5 kPa

The testing was performed by Lee Li from 2020-07-10 to 2020-07-17.

Test Mode: Transmitting

Spurious Emission Test:

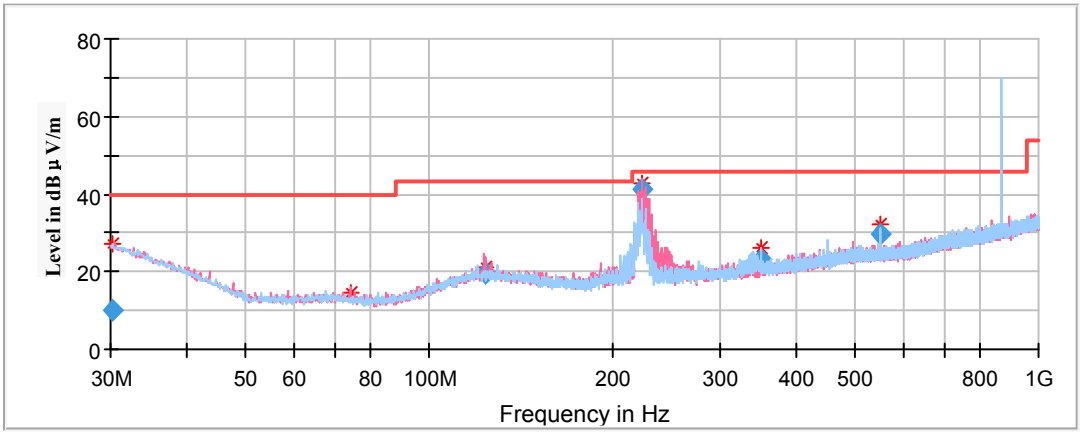
30 MHz - 1 GHz (Power by adapter)
(Pre-scan in the X,Y and Z axes of orientation, the worst case in Y-axis of orientation was recorded.)



Frequency (MHz)	Corrected Amplitude MaxPeak (dBµV/m)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polar (H/V)				
30.120629	10.21	200.0	H	203.0	-4.5	40.00	29.79
70.936750	-2.35	200.0	V	300.0	-17.8	40.00	42.35
124.166100	19.44	100.0	V	245.0	-11.8	43.50	24.06
225.780200	38.48	100.0	V	155.0	-12.7	46.00	7.52
450.012100	27.58	100.0	H	135.0	-7.4	46.00	18.42
550.031650	28.42	100.0	V	192.0	-5.8	46.00	17.58

30 MHz - 1 GHz (Power by AC 24V)

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



Frequency (MHz)	Corrected Amplitude MaxPeak (dBµV/m)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
		Height (cm)	Polar (H/V)				
30.157969	10.20	100.0	V	46.0	-4.5	40.00	29.80
74.513600	-3.64	200.0	V	194.0	-17.9	40.00	43.64
123.769850	19.69	100.0	V	179.0	-11.8	43.50	23.81
223.749400	41.04	100.0	V	174.0	-12.7	46.00	4.96
350.058000	22.93	100.0	H	150.0	-9.8	46.00	23.07
550.022050	29.64	200.0	H	251.0	-5.8	46.00	16.36

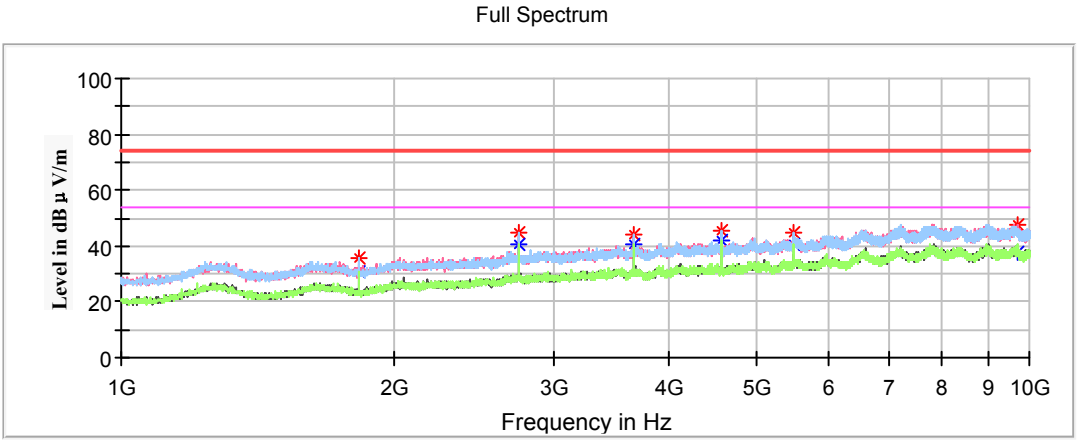
Note:
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
Corrected Amplitude (dBµV/m) = Corrected Factor (dB/m) + Reading (dBµV)
Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

1 GHz - 10 GHz

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

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)

Frequency: 915 MHz



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV/m)	Average (dBµV/m)	Height (cm)	Polar (H/V)				
1830.000000	---	30.79	200.0	H	359.0	-15.1	54.00	23.21
1830.000000	35.62	---	200.0	H	359.0	-15.1	74.00	38.38
2745.000000	---	40.80	200.0	H	48.0	-11.3	54.00	13.20
2745.000000	45.06	---	200.0	H	48.0	-11.3	74.00	28.94
3659.500000	44.22	---	150.0	V	159.0	-8.2	74.00	29.78
3659.500000	---	40.77	150.0	V	159.0	-8.2	54.00	13.23
4574.800000	45.62	---	150.0	H	358.0	-6.1	74.00	28.38
4574.800000	---	42.28	150.0	H	358.0	-6.1	54.00	11.72
5490.100000	---	40.33	200.0	H	9.0	-3.9	54.00	13.67
5490.100000	44.83	---	200.0	H	9.0	-3.9	74.00	29.17
9710.200000	---	37.79	150.0	H	187.0	2.0	54.00	16.21
9710.200000	47.32	---	150.0	H	187.0	2.0	74.00	26.68

Fundamental Test & Restricted Bands Emissions Test:

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

Note:
1. 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)

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Detector (PK/QP/Ave.)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
			Height (cm)	Polar (H/V)				
Channel Frequency: 915 MHz								
902.00	35.26	QP	200	H	73.0	0.2	46	10.74
902.00	34.52	QP	150	V	45.0	0.2	46	11.48
915.00	90.88	QP	100	H	134.0	0.5	94	3.12
915.00	89.75	QP	100	V	89.0	0.5	94	4.25
928.00	34.86	QP	200	H	114.0	1.3	46	11.14
928.00	33.49	QP	200	V	183.0	1.3	46	12.51

FCC §15.215(c) – 20 dB BANDWIDTH TESTING

Applicable Standard

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.

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 on the test table without connection to measurement instrument. Turn on the EUT. 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 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

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

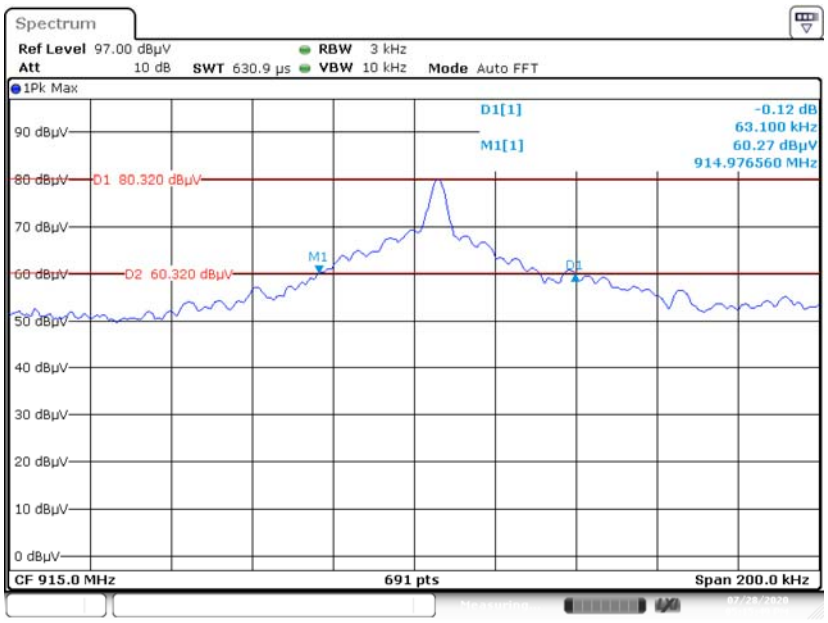
The testing was performed by Lee Li on 2020-07-28.

Test Result: Compliant.

Test Mode: Transmitting

Frequency (MHz)	20 dB Bandwidth (kHz)
915	63.100

Frequency: 915 MHz



Date: 28.JUL.2020 17:15:50

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.

5: This report cannot be reproduced except in full, without prior written approval of the Company.

6: This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

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