

FCC

EMC

TEST REPORT

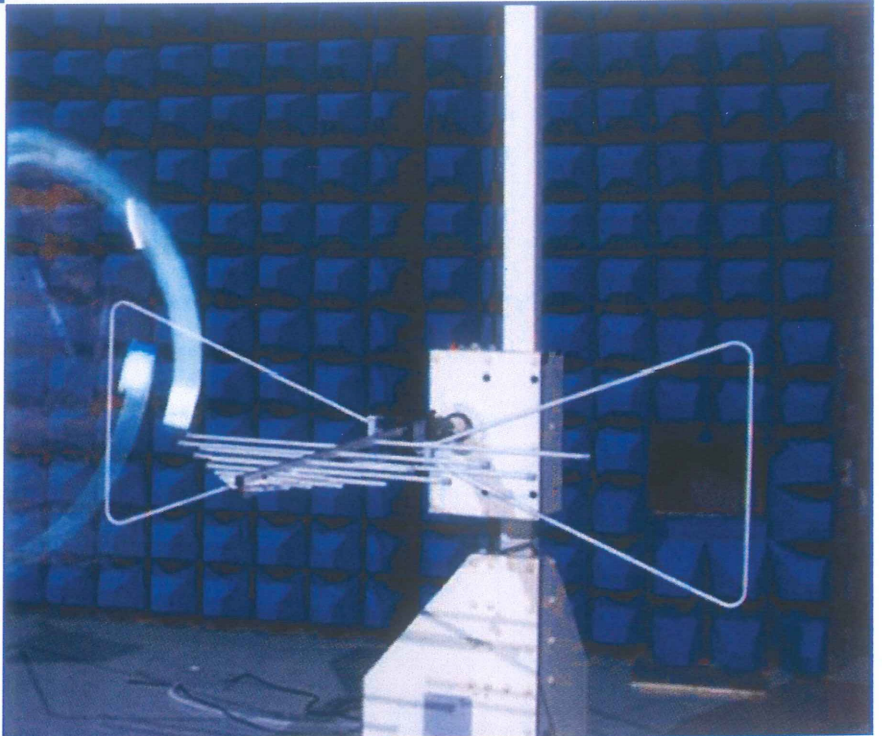
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
**Heavy duty/Medium duty/Light duty Vehicle
Communication Interface**

ISSUED TO
Launch Tech Co., Ltd

Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang,
Shenzhen, China



Tested by: *Zhang Yanqing*
Zhang Yanqing
(Engineer)

Date: *Mar. 21, 2017*

Approved by: *Wei Yanquan*
Wei Yanquan
(Chief Engineer)

Date: *Mar. 21, 2017*



Report No.: BL-SZ1720087-401
EUT Name: Heavy duty / Medium duty /
Light duty Vehicle Communication Interface

Model Name: HD
Brand Name: LAUNCH
Test Standard: 47 CFR Part 15 Subpart B
FCC ID: XUJHDIII

Test Conclusion: Pass
Test Date: Mar. 07, 2017 ~ Mar. 14, 2017
Date of Issue: Mar. 21, 2017

NOTE: This test report can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. BALUN Laboratory. Any objections should be raised within thirty days from the date of issue. To validate the report, please visit BALUN website.

Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Mar. 21, 2017</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Identification of the Testing Laboratory	4
1.2	Identification of the Responsible Testing Location	4
1.3	Laboratory Condition	4
1.4	Announce	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	Factory Information	5
2.4	General Description for Equipment under Test (EUT)	5
2.5	Ancillary Equipment	6
2.6	Technical Information	6
3	SUMMARY OF TEST RESULTS	7
3.1	Test Standards	7
3.2	Verdict	7
3.3	Test Uncertainty	7
4	GENERAL TEST CONFIGURATIONS	8
4.1	Test Environments	8
4.2	Test Equipment List	8
4.3	Test Enclosure list	9
4.4	Test Configurations	10
4.5	Test Setups	11
4.6	Test Conditions	13
5	TEST ITEMS	14
5.1	Emission Tests	14
ANNEX A	TEST RESULTS	16

A.1 Radiated Emission 16

A.2 Conducted Emission 20

ANNEX B TEST SETUP PHOTOS 22

ANNEX C EUT EXTERNAL PHOTOS 22

ANNEX D EUT INTERNAL PHOTOS 22

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	<p>The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1.</p> <p>The laboratory has been listed by US Federal Communications Commission to perform electromagnetic emission measurements. The recognition numbers of test site are 832625.</p> <p>The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.</p>
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C~25°C
Ambient Relative Humidity	45% - 55%
Ambient Pressure	100 kPa - 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v6.3.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Launch Tech Co., Ltd
Address	Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang, Shenzhen, China

2.2 Manufacturer Information

Manufacturer	Launch Tech Co., Ltd
Address	Launch Industrial Park, North of Wuhe Rd., Banxuegang, Longgang, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Heavy duty/Medium duty/Light duty Vehicle Communication Interface
Model Name Under Test	HD
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A
The Highest Speed of Processor	N/A
Network and Wireless connectivity	Bluetooth

2.5 Ancillary Equipment

Ancillary Equipment 1	Adapter	
	Brand Name	LAUNCH
	Model No.	PSY120300
	Serial No.	N/A
	Rated Input	100-240 V ~, 50/60 Hz, 0.8 A
	Rated Output	12.0 V =, 3.0 A

2.6 Technical Information

Note: Not Application.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-15 Edition)	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Result
1	Radiated Emission	15.109	Pass	Annex A .1
2	Conducted Emission, AC Ports	15.107	Pass	Annex A .2

3.3 Test Uncertainty

The following measurement 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.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.23 dB
Radiated emissions (30 MHz-1 GHz)	4.30 dB
Radiated emissions (1 GHz-18 GHz)	4.81 dB
Radiated emissions (18 GHz-40 GHz)	5.71 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C~26°C	AC 120 V/60 Hz	50%-55%	100 to 102 kPa

4.2 Test Equipment List

Radiated Emission Test For Frequency Below 1 GHz						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04	<input checked="" type="checkbox"/>
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-977	2016.07.19	2018.07.18	<input checked="" type="checkbox"/>
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21	<input type="checkbox"/>
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2016.08.09	2018.08.08	<input checked="" type="checkbox"/>

Radiated Emission Test For Frequency Above 1 GHz						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2016.09.09	2017.09.08	<input checked="" type="checkbox"/>
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21	<input type="checkbox"/>
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21	<input checked="" type="checkbox"/>
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20	<input checked="" type="checkbox"/>

Conducted disturbance Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04	<input checked="" type="checkbox"/>
LISN	SCHWARZBECK	NSLK 8127	8127-687	2016.07.05	2017.07.04	<input checked="" type="checkbox"/>
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A	<input checked="" type="checkbox"/>

4.3 Test Enclosure list

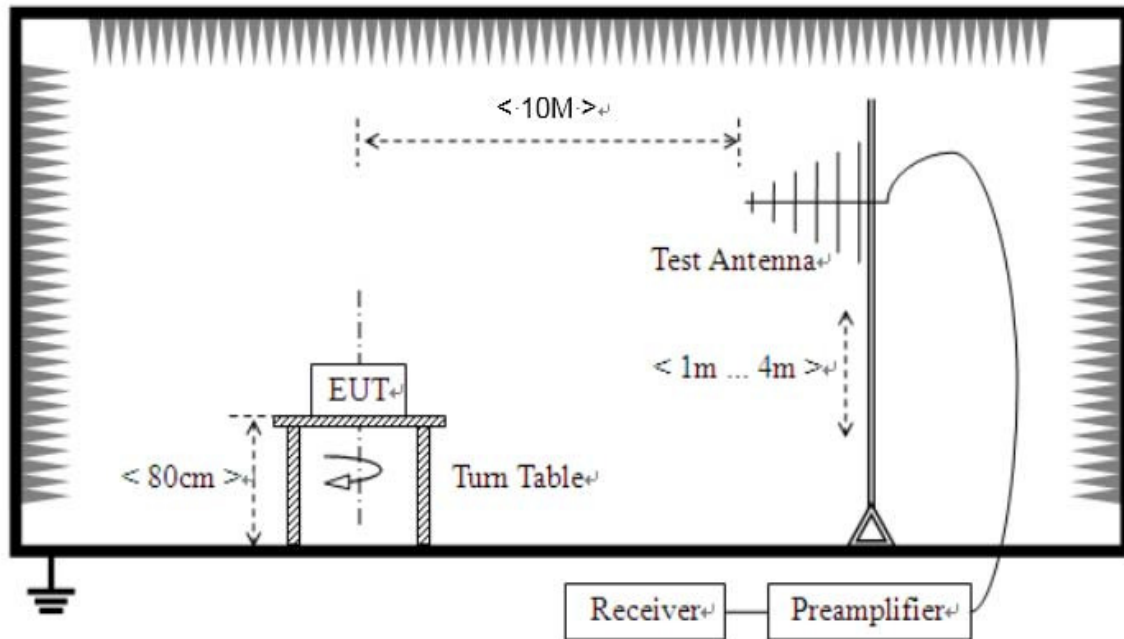
Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	Dell	015K3N	N/A	N/A	Special Handled	<input type="checkbox"/>
Laptop	Apple	A1465	N/A	N/A	N/A	<input type="checkbox"/>
Printer	HP	DESKJET 1000	N/A	N/A	N/A	<input type="checkbox"/>
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	<input type="checkbox"/>
Mouse	Logitech	M100	N/A	N/A	N/A	<input type="checkbox"/>
USB disk	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
TF Card	Kingston	N/A	N/A	N/A	N/A	<input type="checkbox"/>
VGA Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
HDMI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
DVI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
Coaxial video cable	N/A	N/A	N/A	2.0 m	Shielded with core	<input type="checkbox"/>
iPhone	Apple	A1586	N/A	N/A	N/A	<input type="checkbox"/>
Phone	MI	M4	N/A	N/A	N/A	<input type="checkbox"/>
Bluetooth Earphone	SAMSUNG	Gear Circle	N/A	N/A	N/A	<input type="checkbox"/>
GPS/GLONASS Vector signal generator	R&S	N5172B EXG	N/A	N/A	N/A	<input type="checkbox"/>
WIFI Router	TP-LINK	TL-WDR7500	N/A	N/A	N/A	<input type="checkbox"/>
Earphone	N/A	OPPO	N/A	1.1 m	N/A	<input type="checkbox"/>
Car Battery	Camel	55530	N/A	N/A	12 V/55 Ah	<input type="checkbox"/>
Artificial load	N/A	N/A	N/A	N/A	2.5 Ω/100 W	<input type="checkbox"/>
Artificial load	N/A	N/A	N/A	N/A	5 Ω/100 W	<input type="checkbox"/>
Electronic Load	ITECH	IT8511	N/A	N/A	N/A	<input type="checkbox"/>
USB Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input checked="" type="checkbox"/>
DC Power Supply	ITECH	IT6863A	600014010687 210006	N/A	N/A	<input type="checkbox"/>
LCD Monitor	SAMSUNG	UA32C4000P	N/A	N/A	N/A	<input type="checkbox"/>
LCD Monitor	Dell	U241HB	N/A	N/A	N/A	<input type="checkbox"/>
RJ45 Cable	N/A	N/A	N/A	1.5 m	Shielded with core	<input type="checkbox"/>
Simulator	WALTEK	DS301	N/A	N/A	N/A	<input checked="" type="checkbox"/>
Table PC	LAUNCH	X-431 PRO3 V2.0	985190009500	N/A	N/A	<input checked="" type="checkbox"/>

4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	<u>The Bluetooth connect Simulator Test Mode</u> EUT + Adapter + Simulator + BT Link + Table PC
TC02	<u>The USB connect Simulator Test Mode</u> EUT + Adapter + Simulator + USB Cable + Table PC

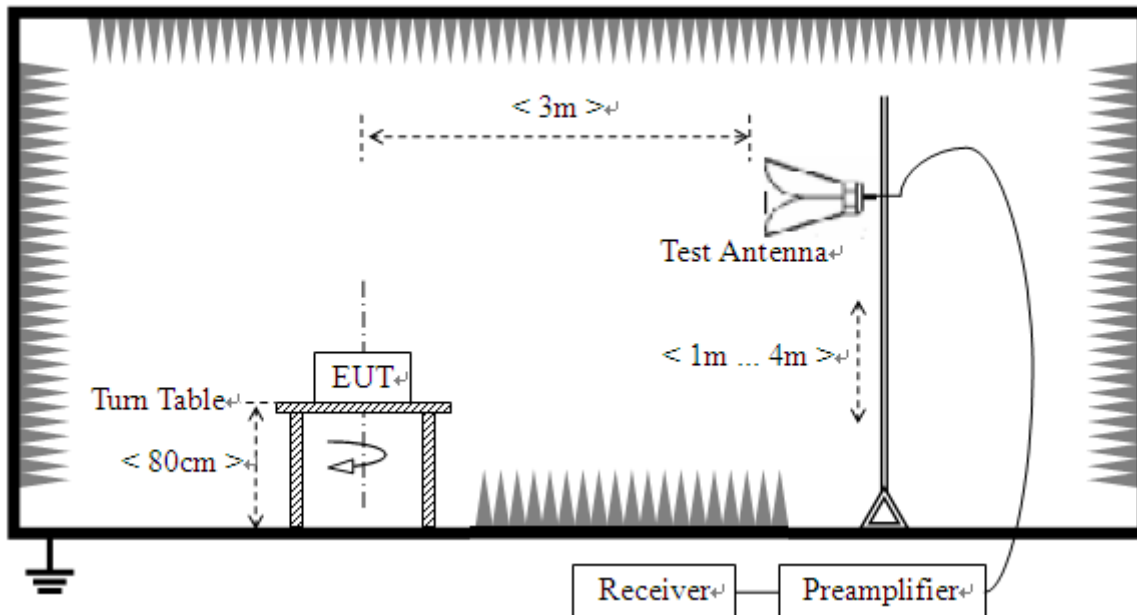
4.5 Test Setups

Test Setup 1



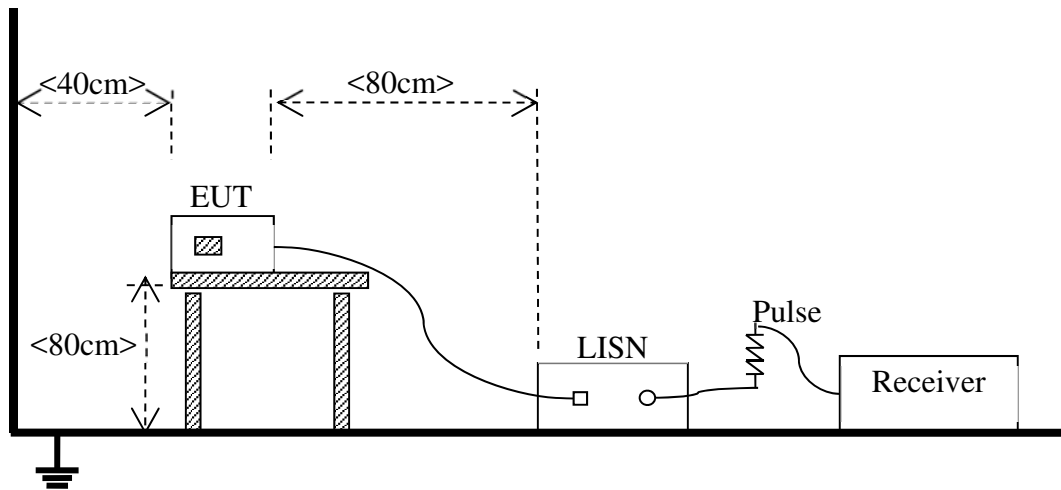
(For Radiated Emission Test (30 MHz-1 GHz))

Test Setup 2



(For Radiated Emission Test (above 1 GHz))

Test Setup 3



(For Conducted Emission, AC Ports Test)

4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1&2
	Test Configuration	TC01~TC02 ^{Note}
Conducted Emission, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 3
	Test Configuration	TC01~TC02 ^{Note}

Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The USB connect Simulator Test Mode is the worst mode in this report.

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class B (at 3 m)		Class A (at 10 m)	
	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)
30 - 88	100	40	90	39
88 - 216	150	43.5	150	43.5
216 - 960	200	46	210	46.4
Above 960	500	54	300	49.5

NOTE:

- 1) Field Strength (dB $\mu\text{V/m}$) = $20 \cdot \log$ [Field Strength ($\mu\text{V/m}$)].
- 2) In the emission tables above, the tighter limit applies at the band edges.

5.1.1.2 Test Setup

Refer to 4.5 section (test setups1 to test setups2) for radiated emission test, the photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.1.4 Test Result

Please refer to ANNEX A.1.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

Frequency range (MHz)	Class A	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

5.1.2.2 Test Setup

Refer to 4.5 section test (test setup 3) for conducted emission, the photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.1.2.4 Test Result

Please refer to ANNEX A.2.

ANNEX A TEST RESULTS

A.1 Radiated Emission

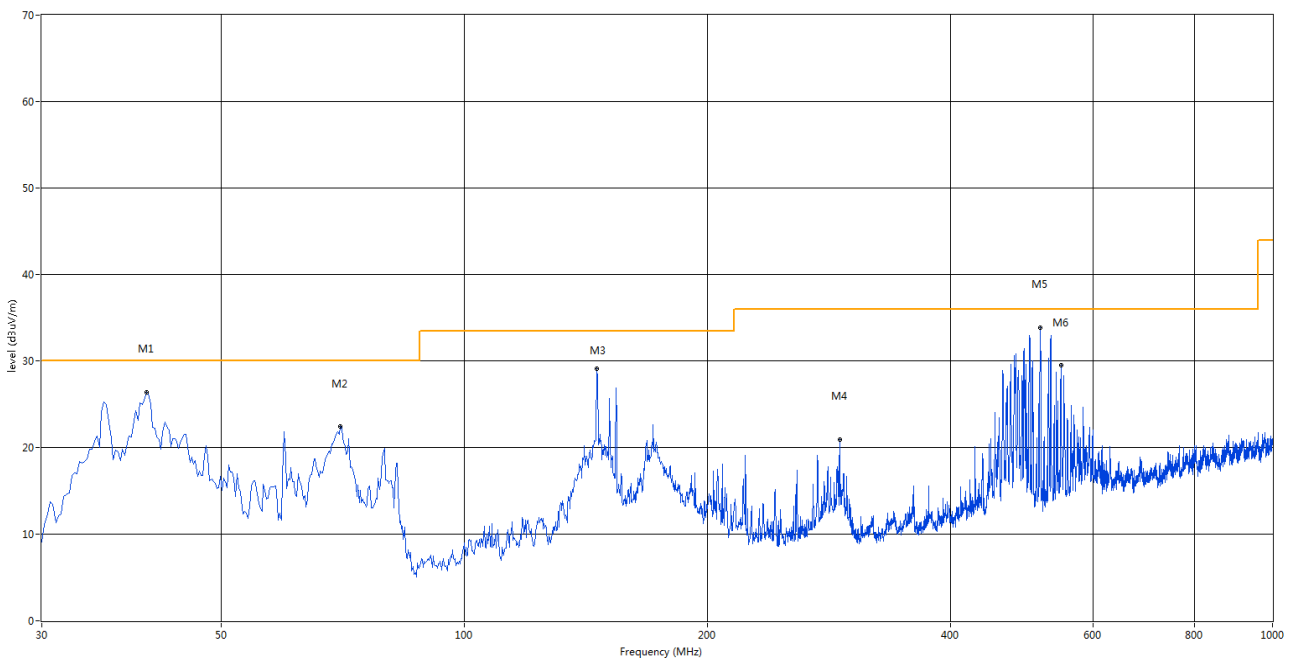
Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Test Data and Plots

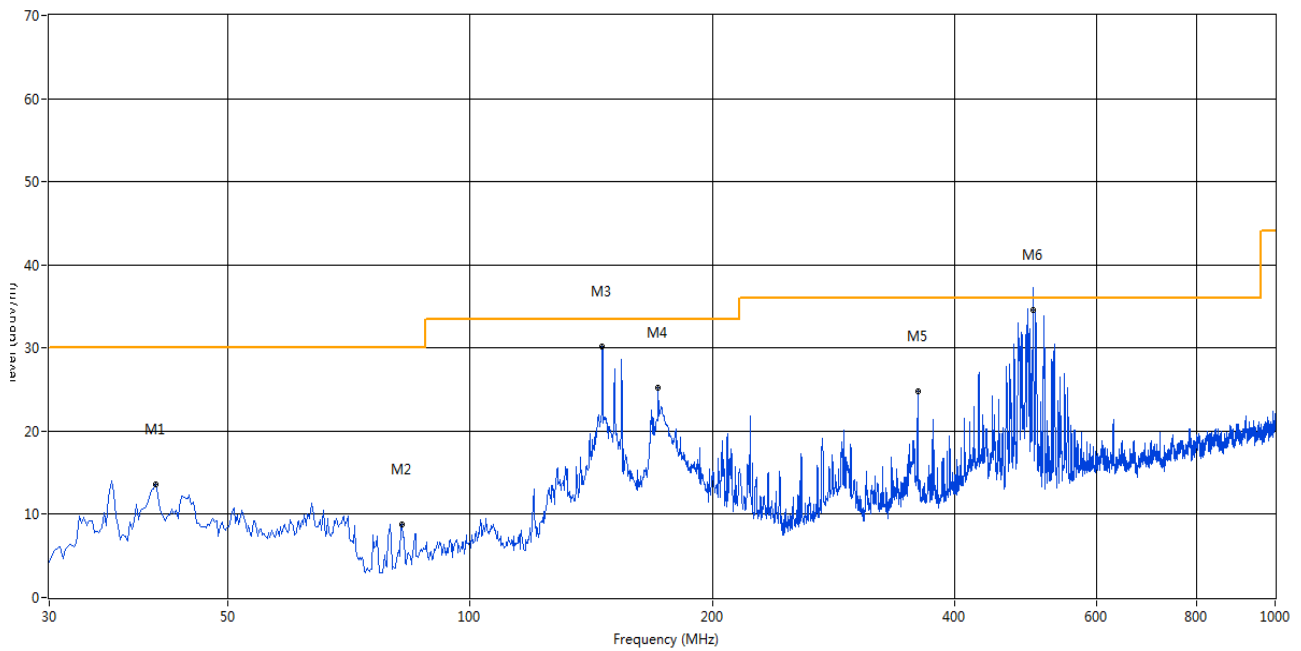
The USB connect Simulator Test Mode

A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



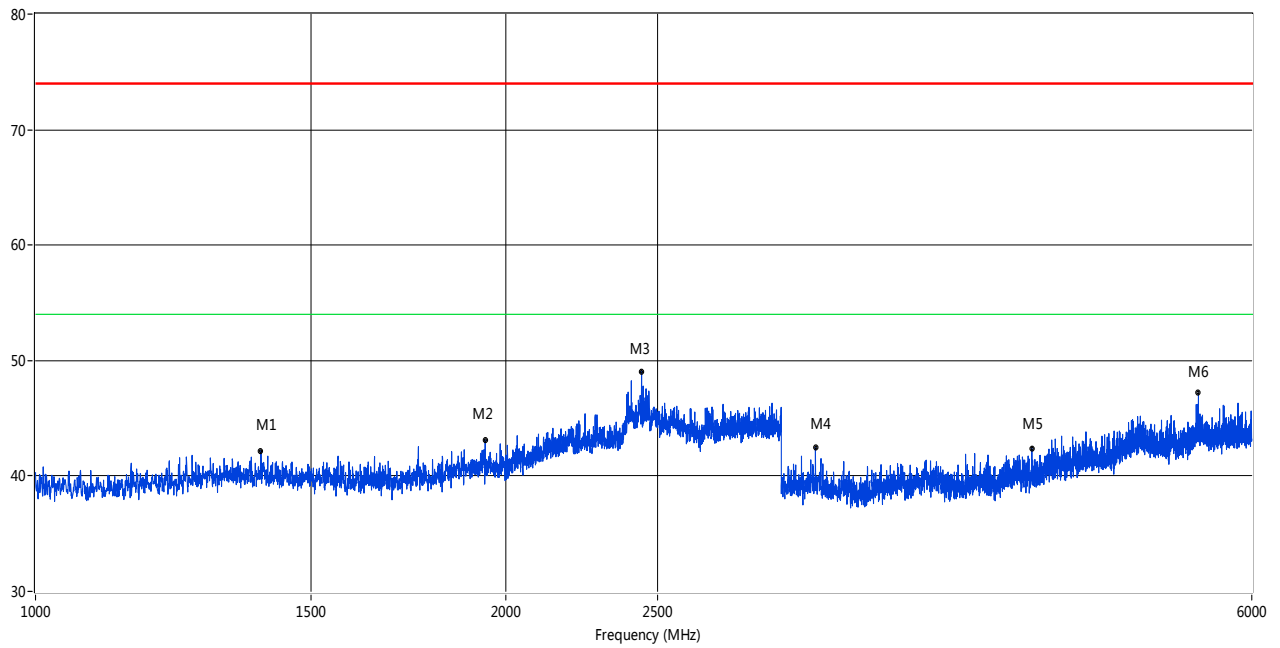
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	40.425	26.32	-14.82	30.0	3.68	Peak	146.00	100	Vertical	Pass
2	70.245	22.37	-18.32	30.0	7.63	Peak	0.00	200	Vertical	Pass
3	145.886	29.09	-19.54	33.5	4.41	Peak	174.00	100	Vertical	Pass
4	291.350	20.88	-13.62	36.0	15.12	Peak	329.00	200	Vertical	Pass
5	516.091	33.89	-8.86	36.0	2.11	Peak	111.00	400	Vertical	Pass
6	547.366	29.49	-8.21	36.0	6.51	Peak	114.00	400	Vertical	Pass

A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



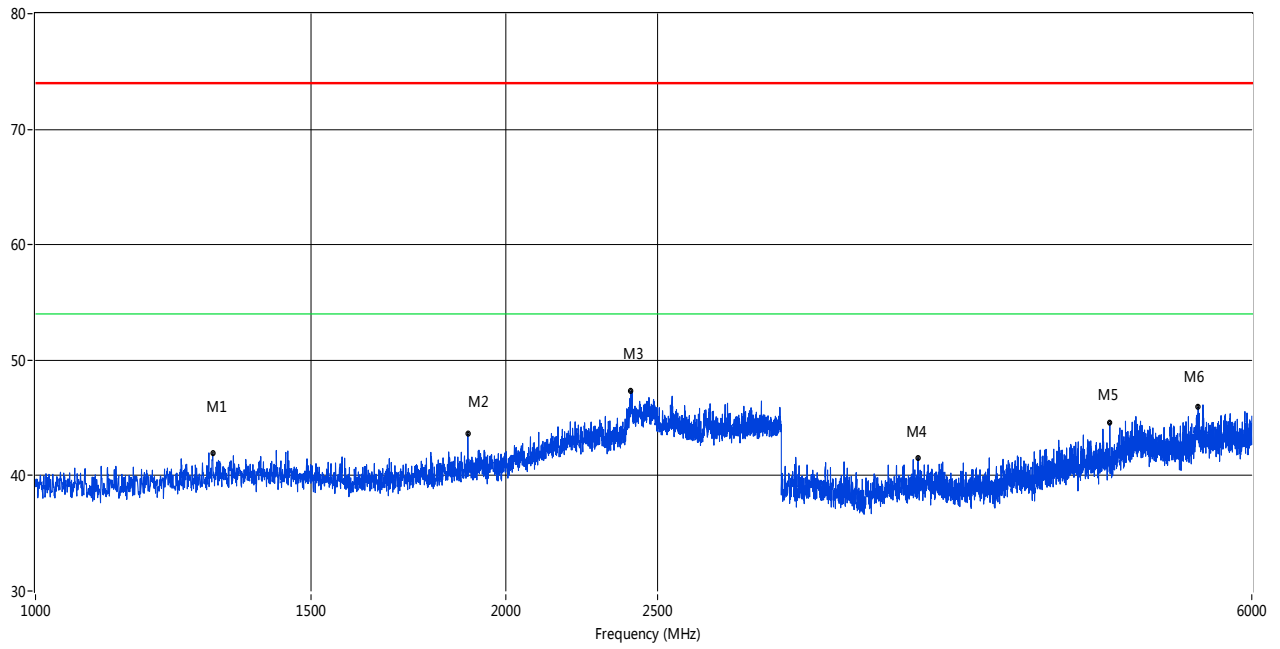
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	40.667	13.64	-14.73	30.0	16.36	Peak	145.00	200	Horizontal	Pass
2	82.367	8.84	-19.61	30.0	21.16	Peak	353.00	200	Horizontal	Pass
3	145.886	27.85	-19.54	33.5	5.65	Peak	333.00	200	Horizontal	Pass
4	171.342	20.15	-18.35	33.5	13.35	Peak	0.00	200	Horizontal	Pass
5	359.960	24.19	-11.69	36.0	11.81	Peak	0.00	200	Horizontal	Pass
6	500.017	37.29	-9.12	36.0	-1.29	Peak	340.00	166.00	Horizontal	N/A
6*	500.017	34.52	-9.12	36.0	1.48	QP	340.00	166.00	Horizontal	Pass

A.1.3 Test Antenna Vertical, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1394.000	42.20	-3.94	74.0	31.80	Peak	100.80	100	Vertical	Pass
2	1939.500	43.13	-2.42	74.0	30.87	Peak	106.90	100	Vertical	Pass
3	2442.500	49.04	1.99	74.0	24.96	Peak	47.30	100	Vertical	Pass
4	3155.250	42.48	5.81	74.0	31.52	Peak	42.60	100	Vertical	Pass
5	4339.500	42.40	8.05	74.0	31.60	Peak	251.70	100	Vertical	Pass
6	5547.000	47.20	10.99	74.0	26.80	Peak	344.70	100	Vertical	Pass

A.1.4 Test Antenna Horizontal, 1 GHz – 6 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1298.500	41.90	-4.64	74.0	32.10	Peak	211.80	100	Horizontal	Pass
2	1891.000	43.63	-2.51	74.0	30.37	Peak	298.10	100	Horizontal	Pass
3	2404.500	47.31	1.88	74.0	26.69	Peak	60.70	100	Horizontal	Pass
4	3670.500	41.56	6.41	74.0	32.44	Peak	306.60	100	Horizontal	Pass
5	4868.250	44.56	9.45	74.0	29.44	Peak	322.60	100	Horizontal	Pass
6	5544.750	45.96	11.16	74.0	28.04	Peak	338.00	100	Horizontal	Pass

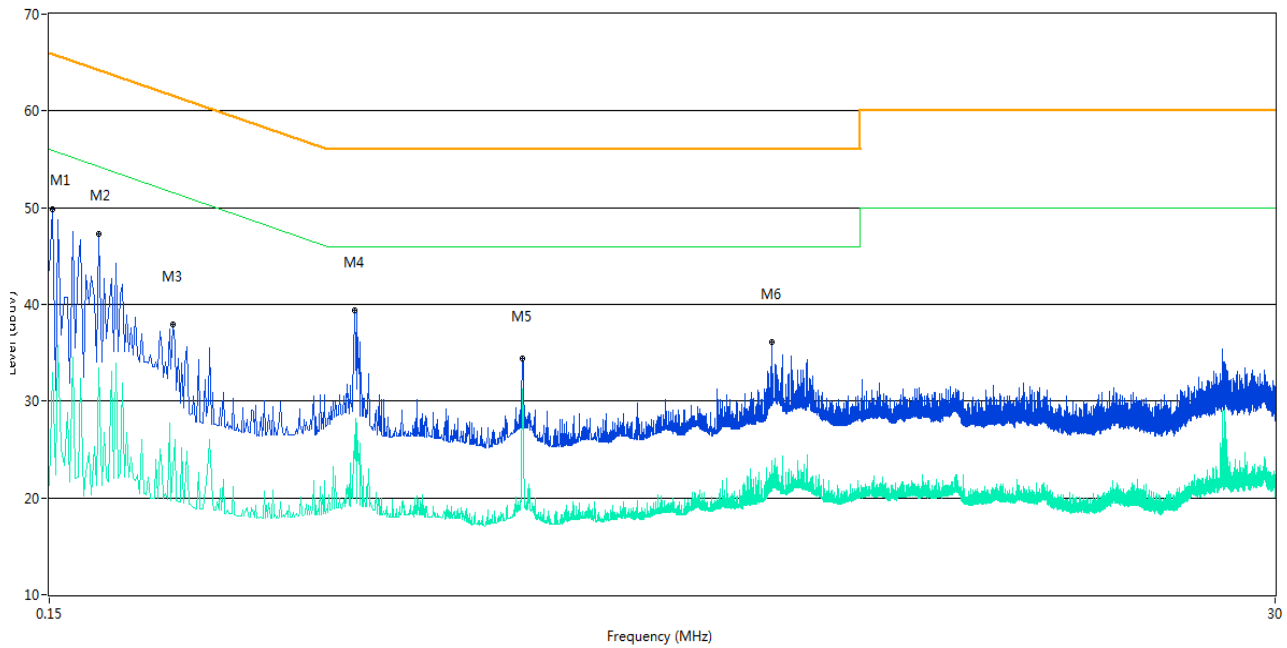
A.2 Conducted Emission

Test Data and Plots

The USB connect Simulator Test Mode

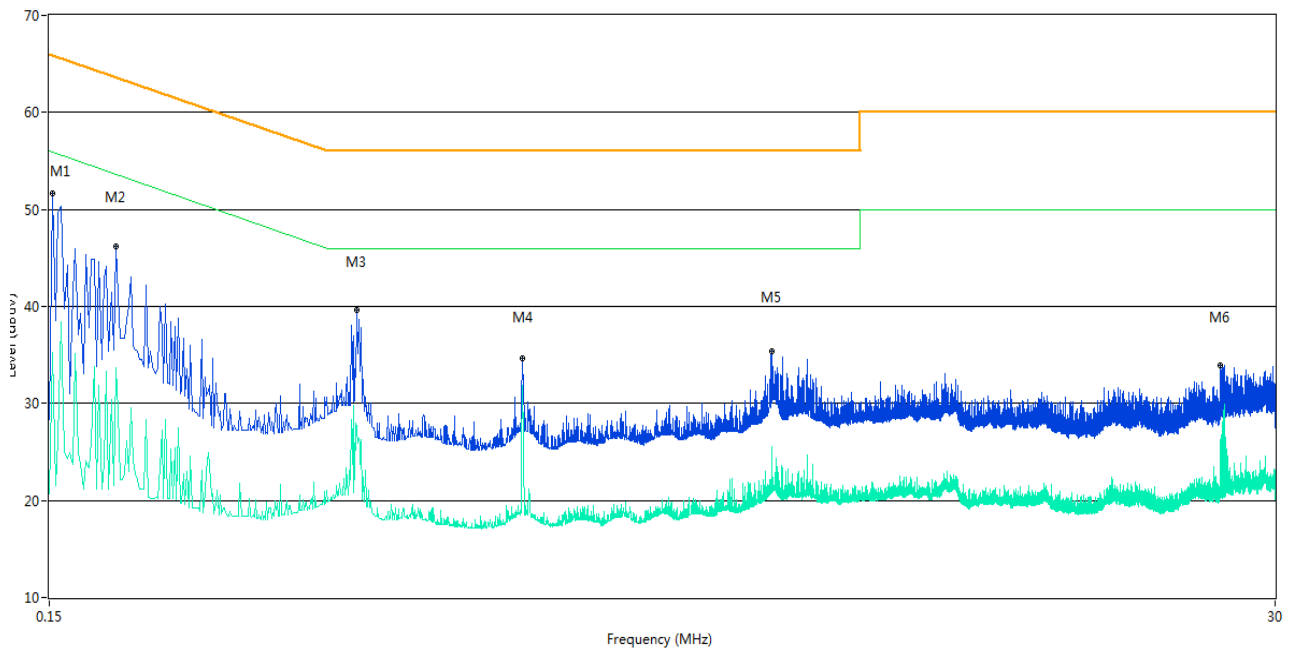
Note: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.152	49.8	11.00	65.9	16.10	Peak	L Line	Pass
1**	0.152	32.9	11.00	55.9	23.00	AV	L Line	Pass
2	0.186	47.2	11.00	64.2	17.00	Peak	L Line	Pass
2**	0.186	33.4	11.00	54.2	20.80	AV	L Line	Pass
3	0.256	37.9	11.00	61.6	23.70	Peak	L Line	Pass
3**	0.256	23.0	11.00	51.6	28.60	AV	L Line	Pass
4	0.562	39.4	11.00	56.0	16.60	Peak	L Line	Pass
4**	0.562	24.9	11.00	46.0	21.10	AV	L Line	Pass
5	1.162	34.4	11.00	56.0	21.60	Peak	L Line	Pass
5**	1.162	30.8	11.00	46.0	15.20	AV	L Line	Pass
6	3.414	36.2	11.00	56.0	19.80	Peak	L Line	Pass
6**	3.414	22.8	11.00	46.0	23.20	AV	L Line	Pass

A.2.2 N Phase



No.	Frequency (MHz)	Results (dBUV)	Factor (dB)	Limit (dBUV)	Margin (dB)	Detector	Line	Verdict
1	0.152	51.7	11.00	65.9	14.20	Peak	N Line	Pass
1**	0.152	35.3	11.00	55.9	20.60	AV	N Line	Pass
2	0.200	46.2	11.00	63.6	17.40	Peak	N Line	Pass
2**	0.200	33.7	11.00	53.6	19.90	AV	N Line	Pass
3	0.568	39.7	11.00	56.0	16.30	Peak	N Line	Pass
3**	0.568	27.3	11.00	46.0	18.70	AV	N Line	Pass
4	1.158	34.7	11.00	56.0	21.30	Peak	N Line	Pass
4**	1.158	30.6	11.00	46.0	15.40	AV	N Line	Pass
5	3.412	35.4	11.00	56.0	20.60	Peak	N Line	Pass
5**	3.412	25.5	11.00	46.0	20.50	AV	N Line	Pass
6	23.630	33.9	11.00	60.0	26.10	Peak	N Line	Pass
6**	23.630	26.3	11.00	50.0	23.70	AV	N Line	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ1720087-AE.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL-SZ1720087-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL-SZ1720087-AI.PDF".

--END OF REPORT--