FCC EMC TEST REPORT

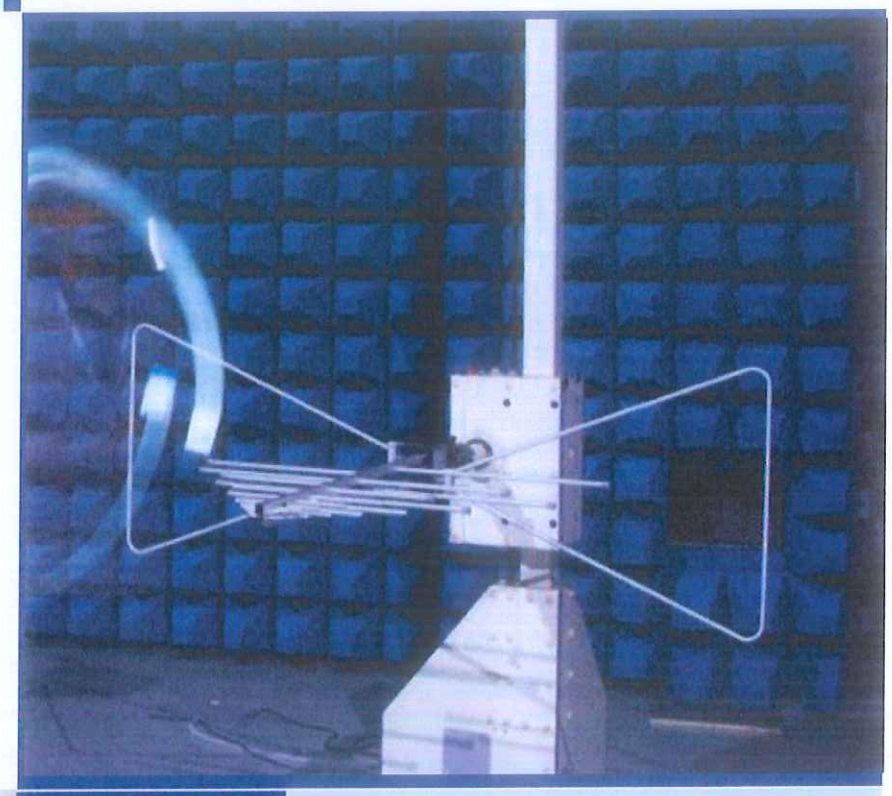
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Gee Chain One

ISSUED TO
Beijing Geek-geek Technology Co., Ltd.

Haidian Street No. 3 Building 1 1201-A1219/1201-A1220, Haidian District, No. 11, 1002, Beijing



Report No.:	BL-SZ1810293-401
EUT Name:	Gee Chain One
Model Name:	HC5962W
Brand Name:	HIWIFI
Test Standard:	47 CFR Part 15 Subpart B
FCC ID:	2AOXH-GJAN182018001
Test Conclusion:	Pass
Test Date:	Apr. 02, 2018 ~ Apr. 09, 2018
Date of Issue:	Apr. 23, 2018

Tested by: Xia Long
Xia Long
(Engineer)
Date Apr. 23. 2018

Approved by:
Liao Jianming
(Technical Director)
Date Apr. 23, 2018

NOTE: This test report of test results only related to testing samples, which 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 contact us.

Block B, 1st FL,Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong, P. R. China 518055
TEL: +86-755-66850100, FAX: +86-755-61824271
Email: qc@baluntek.com
www.baluntek.com

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Apr. 23, 2018	Initial Issue

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
Fax Number	+86 755 6182 4271

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	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organizatin accredited by FCC as a accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025.The accreditation certificate is 4344.01. 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.
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℃ to 25℃
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

(1) The test report refer to the BALUN report mode v6.6.

(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	Beijing Geek-geek Technology Co., Ltd.
Address	Haidian Street No. 3 Building 1 1201-A1219/1201-A1220, Haidian District, No. 11, 1002, Beijing

2.2 Manufacturer Information

Manufacturer	Beijing Geek-geek Technology Co., Ltd.
Address	Haidian Street No. 3 Building 1 1201-A1219/1201-A1220, Haidian District, No. 11, 1002, Beijing

2.3 Factory Information

Factory	Shenzhen Phoenix Telecom Technology Co., Ltd
Address	West of FuYuan 1st Road, Fuyong street, Baoan District, ShenZhen, Guangdong, China.

2.4 General Description for Equipment under Test (EUT)

EUT Name	Gee Chain One
Model Name Under Test	HC5962W
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	HC5962-V4
Software Version	1.4.10
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Adapter	
	Brand Name	RUIJING
	Model No.	RJT018-AS120150U301
	Serial No.	N/A
	Rated Input	100-240 V~, 50 / 60 Hz, 500 mA
	Rated Output	12.0 V⎓ 1500 mA

2.6 Technical Information

Network and Wireless connectivity	WIFI 802.11a, 802.11b, 802.11g, 802.11n(HT20/40) and 802.11ac

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	FCC 47 CFR Part 15 Subpart B (10-1-16 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 to 26°C	AC 120 V/60 Hz	50% to 55%	100 kPa to 102 kPa

4.2 Test Equipment List

Radiated Emission Test For Frequency						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2017.11.08	2018.11.07	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2017.07.22	2019.07.21	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2016.07.12	2018.07.11	☒
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2019.02.20	☒

Conducted Emission Test						
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2017.06.22	2018.06.21	☒
LISN	SCHWARZBECK	NSLK 8127	8127-687	2017.06.22	2018.06.21	☒
LISN	SCHWARZBECK	NNLK 8129	8129-462	2017.11.08	2018.11.07	☐
AMN	SCHWARZBECK	NNBM8124	8124-509	2017.06.22	2018.06.21	☐
AMN	SCHWARZBECK	NNBM8124	8124-510	2017.06.22	2018.06.21	☐
ISN	TESEQ	ISN T800	34449	2017.06.22	2018.06.21	☐
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A	☒

4.3 Test Enclosure list

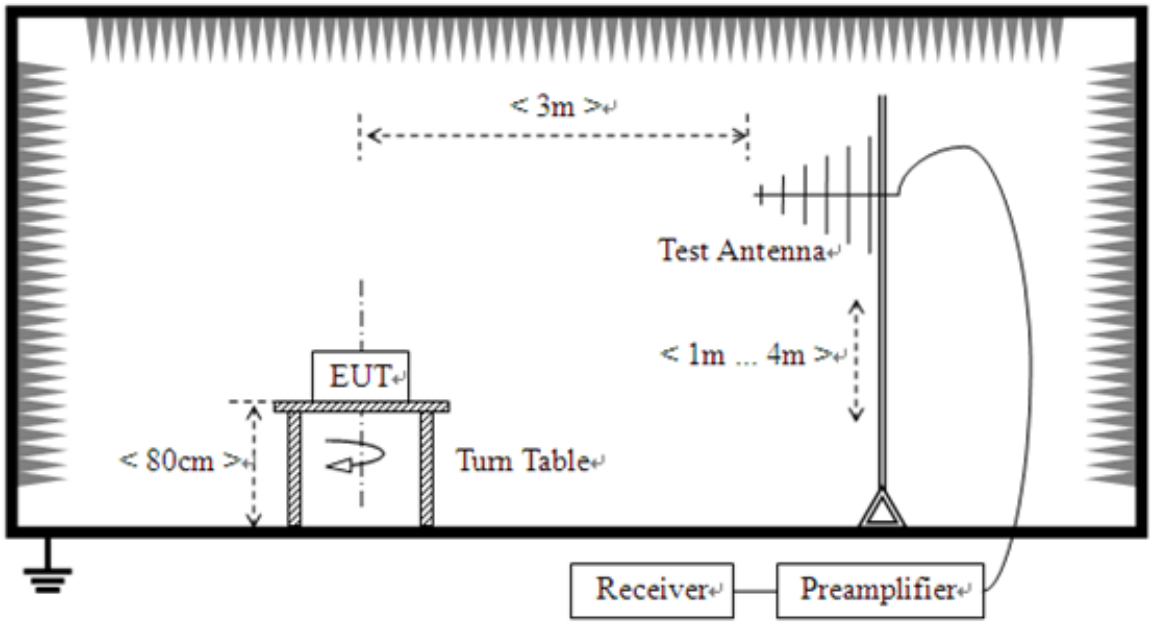
Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	Dell	015K3N	N/A	N/A	Special Handled	☐
Laptop	Lenovo	E31-80	R3026PU9	N/A	N/A	☒
Printer	HP	DESKJET 1000	N/A	N/A	N/A	☐
Keyboard	Logitech	Y-BP62a	N/A	N/A	N/A	☐
Mouse	Logitech	M100	N/A	N/A	N/A	☐
USB disk	Kingston	N/A	N/A	N/A	N/A	☒
TF Card	Kingston	N/A	N/A	N/A	N/A	☐
VGA Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
HDMI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
DVI Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
Coaxial video cable	N/A	N/A	N/A	2.0 m	Shielded with core	☐
iPhone	Apple	A1586	N/A	N/A	N/A	☐
Phone	MI	M4	N/A	N/A	N/A	☐
Bluetooth Earphone	SAMSUNG	Gear Circle	N/A	N/A	N/A	☐
Wireless Communications Test Set	R&S	CMW500	142028	N/A	Cal. Due 2018.06.11	☐
WIFI Router	TP-LINK	TL-WDR7500	N/A	N/A	N/A	☐
Earphone	N/A	OPPO	N/A	1.1 m	N/A	☐
Car Battery	Camel	55530	N/A	N/A	12 V/55 Ah	☐
Artificial load	N/A	N/A	N/A	N/A	2.5 Ω/100 W	☐
Artificial load	N/A	N/A	N/A	N/A	5 Ω/100 W	☐
Electronic Load	ITECH	IT8511	N/A	N/A	N/A	☐
USB Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☐
DC Power Supply	ITECH	IT6863A	60001401068 7210006	N/A	N/A	☐
LCD Monitor	SAMSUNG	UA32C4000P	N/A	N/A	N/A	☐
LCD Monitor	Dell	U241HB	N/A	N/A	N/A	☐
RJ45 Cable	N/A	N/A	N/A	1.5 m	Shielded with core	☒

4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	The Working Test Mode EUT + Adapter + Laptop + RJ45 Cable + USB disk + WIFI Link

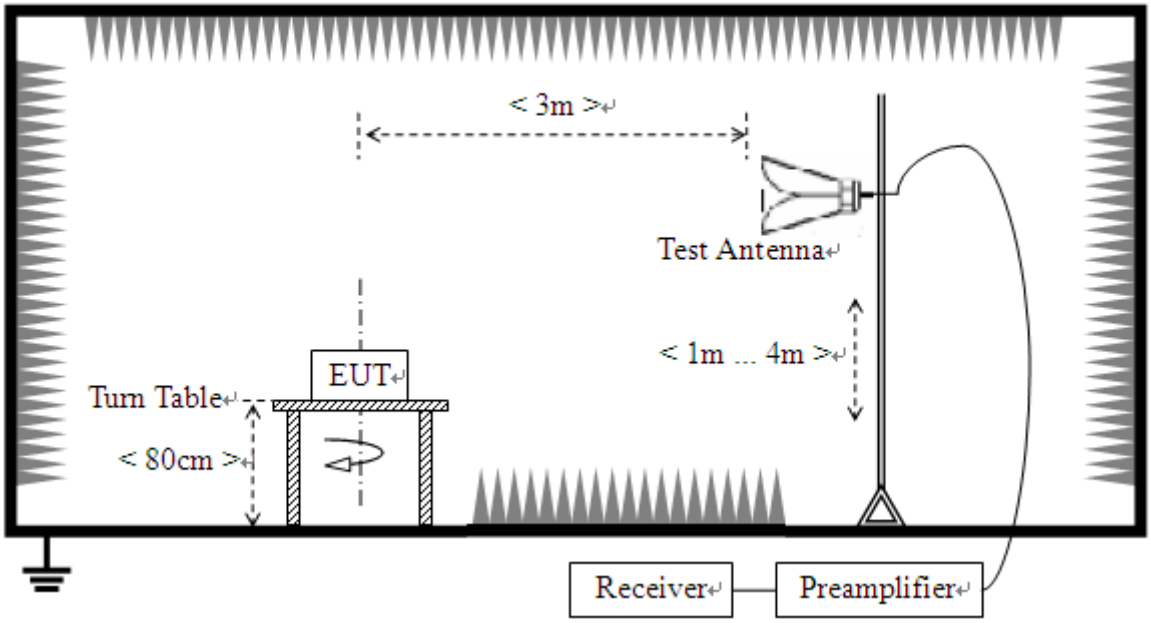
4.5 Test Setups

Test Setup 1



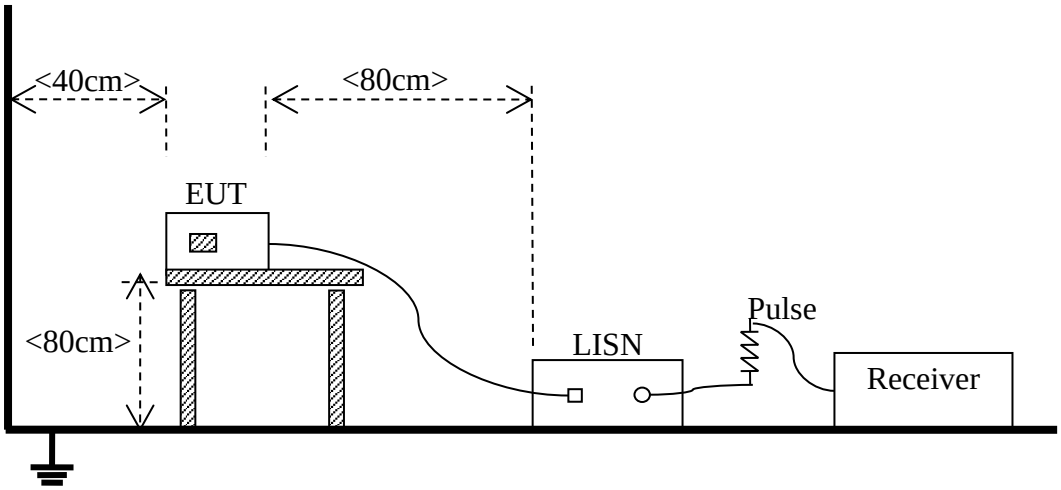
(For Radiated Emission Test (30 MHz-1 GHz))

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 Note
Conducted Emission, AC Ports	Test Env.	NTNV
	Test Setup	Test Setup 3
	Test Configuration	TC01 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 Working 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 B (at 10 m)	Class A (at 10 m)	
	Field Strength (µV/m)	Field Strength (dBµV/m)	Field Strength (dBµV/m)	Field Strength (µV/m)	Field Strength (dBµV/m)
30 - 88	100	40	30	90	39
88 - 216	150	43.5	33.5	150	43.5
216 - 960	200	46	36	210	46.4
Above 960	500	54	44	300	49.5

NOTE:

1) Field Strength (dBµV/m) = 20*log [Field Strength (µV/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 setup 1 to test setup 2) 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 (dBμV)	Average (dBμV)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dBμV)	Average (dBμV)
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 μH 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

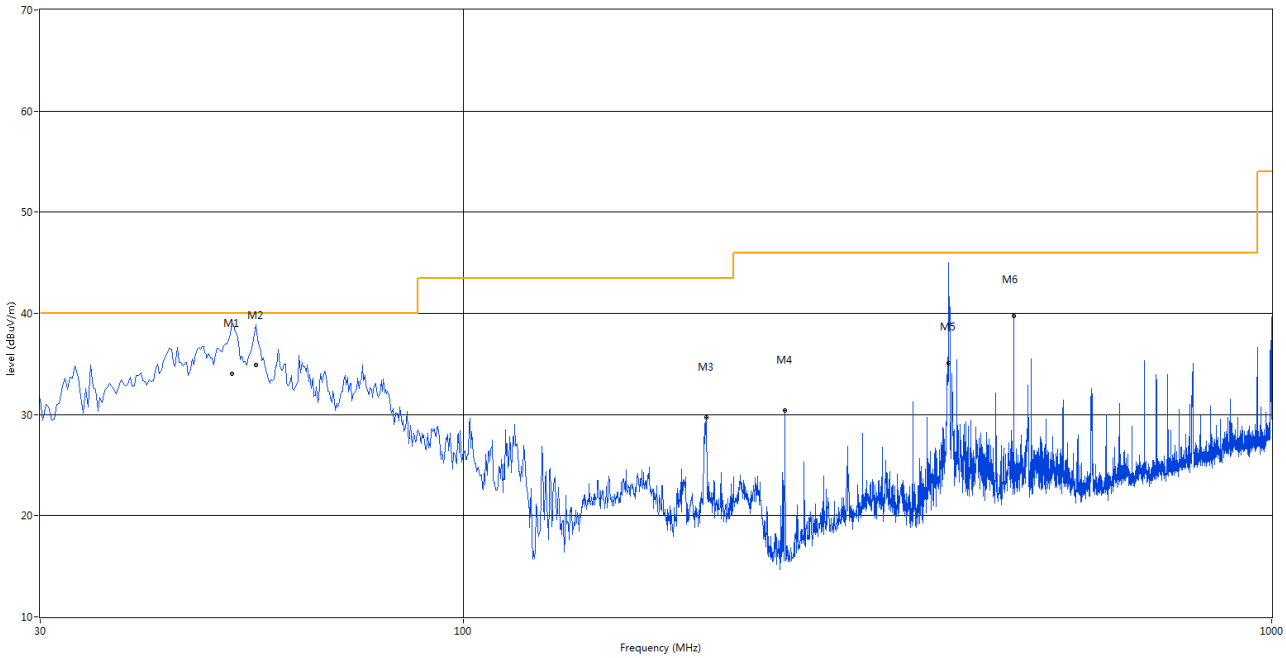
Note 1: The symbol of "--" in the table which means not application.

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

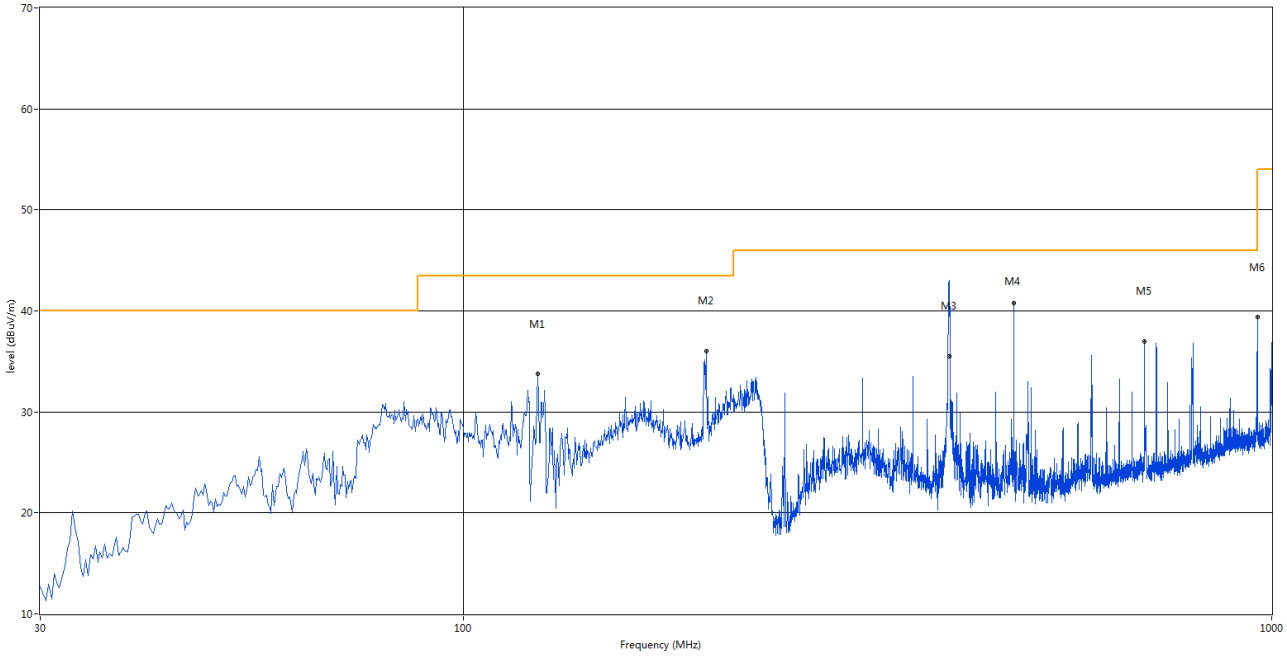
The worst test mode: The Working Test Mode

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



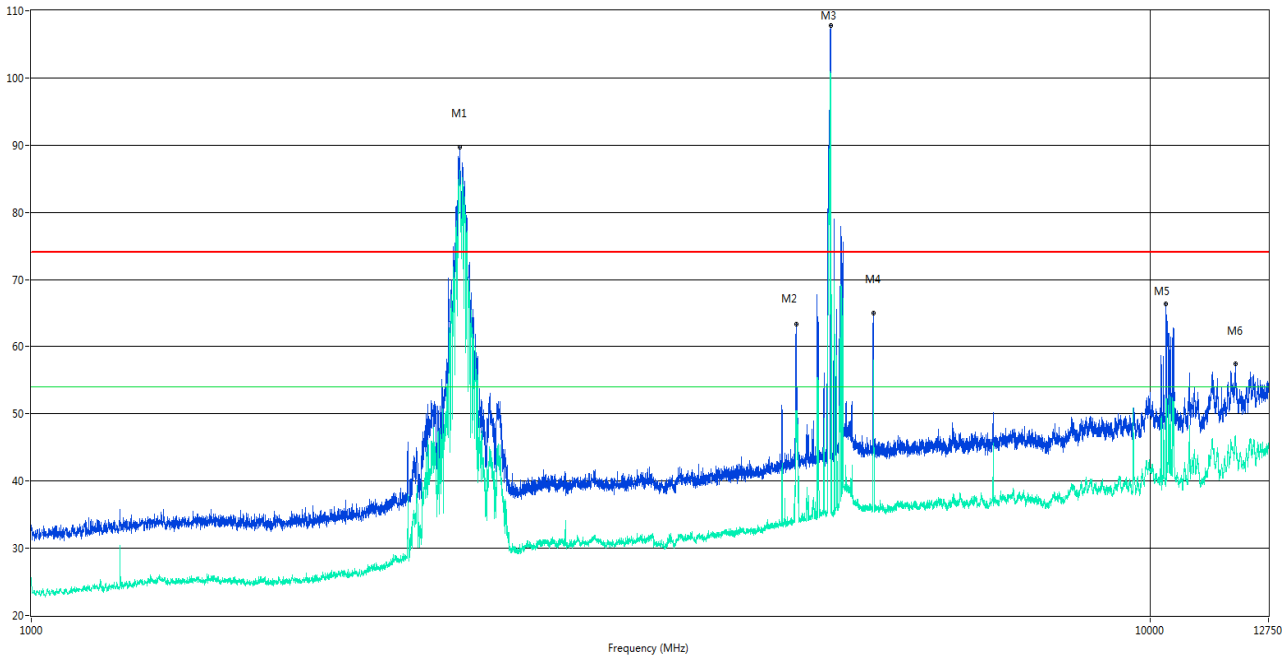
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	52.292	39.27	-23.27	40.0	0.73	Peak	29.00	114	Vertical	N/A
1*	52.292	34.06	-23.27	40.0	5.94	QP	29.00	114	Vertical	Pass
2	55.278	40.05	-23.72	40.0	-0.05	Peak	35.00	105	Vertical	N/A
2*	55.278	34.92	-23.72	40.0	5.08	QP	35.00	105	Vertical	Pass
3	199.750	29.57	-23.94	43.5	13.93	Peak	136.00	200	Vertical	Pass
4	249.947	30.43	-22.15	46.0	15.57	Peak	268.00	100	Vertical	Pass
5	398.832	44.54	-18.02	46.0	1.46	Peak	16.00	114	Vertical	N/A
5*	398.832	35.09	-18.02	46.0	10.91	QP	16.00	114	Vertical	Pass
6	480.080	39.73	-15.91	46.0	6.27	Peak	293.00	200	Vertical	Pass

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



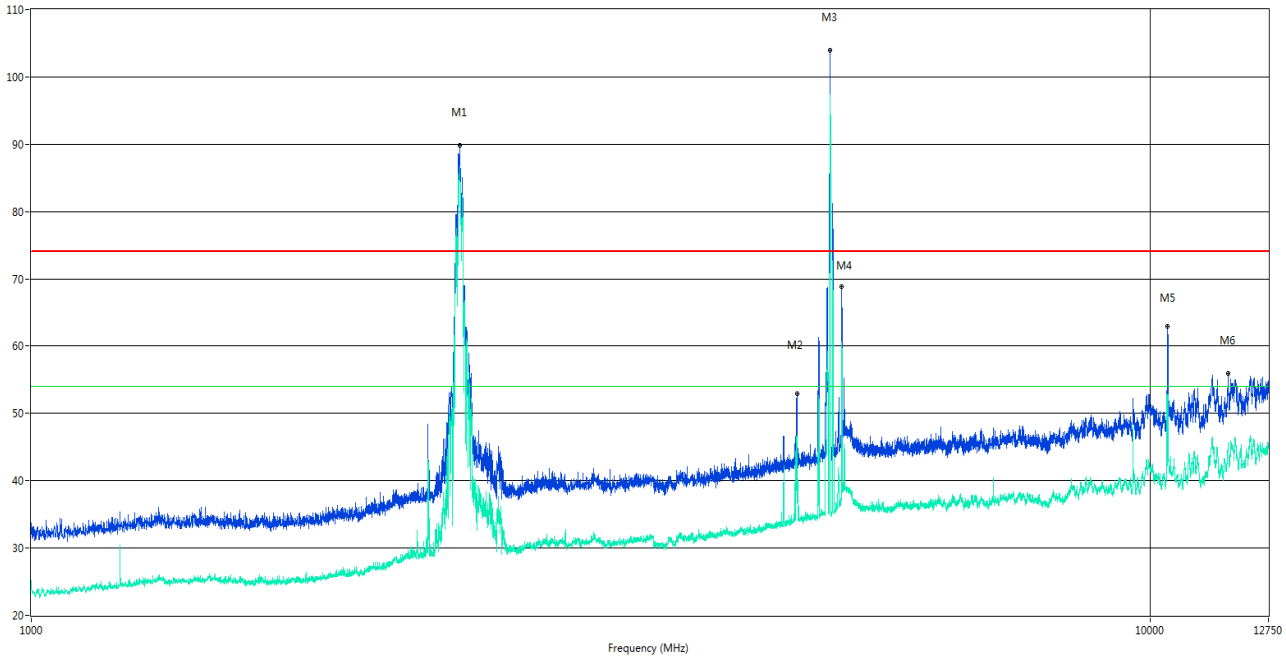
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	123.848	33.73	-26.72	43.5	9.77	Peak	0.00	200	Horizontal	Pass
2	199.750	36.01	-23.94	43.5	7.49	Peak	62.00	100	Horizontal	Pass
3	398.962	47.72	-17.86	46.0	-1.72	Peak	79.00	213	Horizontal	N/A
3*	398.962	35.53	-17.86	46.0	10.47	QP	79.00	213	Horizontal	Pass
4	480.080	40.77	-15.91	46.0	5.23	Peak	360.00	200	Horizontal	Pass
5	695.905	36.98	-11.39	46.0	9.02	Peak	360.00	200	Horizontal	Pass
6	959.987	39.37	-6.99	46.0	6.63	Peak	93.00	100	Horizontal	Pass

A.1.3 Test Antenna Vertical, 1 GHz – 12.75 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1**	2416.000	85.9	-11.38	54.0	-31.90	AV	81.30	100	Vertical	N/A
1	2416.000	89.65	-11.38	74.0	-15.65	Peak	81.30	100	Vertical	N/A
2**	4824.000	51.1	-4.23	54.0	2.90	AV	356.10	100	Vertical	N/A
2	4824.000	64.5	-4.23	74.0	9.50	Peak	356.10	100	Vertical	N/A
3**	5185.000	99.4	-3.45	54.0	-45.40	AV	202.90	100	Vertical	N/A
3	5185.000	107.74	-3.45	74.0	-33.74	Peak	202.90	100	Vertical	N/A
4**	5654.000	52.3	-3.07	54.0	1.70	AV	360.00	100	Vertical	N/A
4	5654.000	65.03	-3.07	74.0	8.97	Peak	360.00	100	Vertical	N/A
5**	10327.812	52.4	1.25	54.0	1.60	AV	173.10	100	Vertical	N/A
5	10327.812	68.2	1.25	74.0	5.80	Peak	173.10	100	Vertical	N/A
6**	11919.126	46.2	10.27	54.0	7.80	AV	24.10	100	Vertical	Pass
6	11919.126	57.49	10.27	74.0	16.51	Peak	24.10	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**	2414.500	86.5	-11.48	54.0	-32.50	AV	69.50	100	Horizontal	N/A
1	2414.500	89.80	-11.48	74.0	-15.80	Peak	69.50	100	Horizontal	N/A
2**	4824.000	46.8	-4.23	54.0	7.20	AV	338.40	100	Horizontal	N/A
2	4824.000	53.0	-4.23	74.0	21.00	Peak	338.40	100	Horizontal	N/A
3**	5174.000	95.8	-3.39	54.0	-41.80	AV	161.00	100	Horizontal	N/A
3	5174.000	103.94	-3.39	74.0	-29.94	Peak	161.00	100	Horizontal	N/A
4**	5299.000	48.6	-0.63	54.0	5.40	AV	0.00	100	Horizontal	N/A
4	5299.000	68.82	-0.63	74.0	5.18	Peak	0.00	100	Horizontal	N/A
5**	10353.688	52.5	3.33	54.0	1.50	AV	231.90	100	Horizontal	N/A
5	10353.688	63.9	3.33	74.0	10.10	Peak	231.90	100	Horizontal	N/A
6**	11739.437	45.7	9.58	54.0	8.30	AV	31.70	100	Horizontal	Pass
6	11739.437	55.91	9.58	74.0	18.09	Peak	31.70	100	Horizontal	Pass

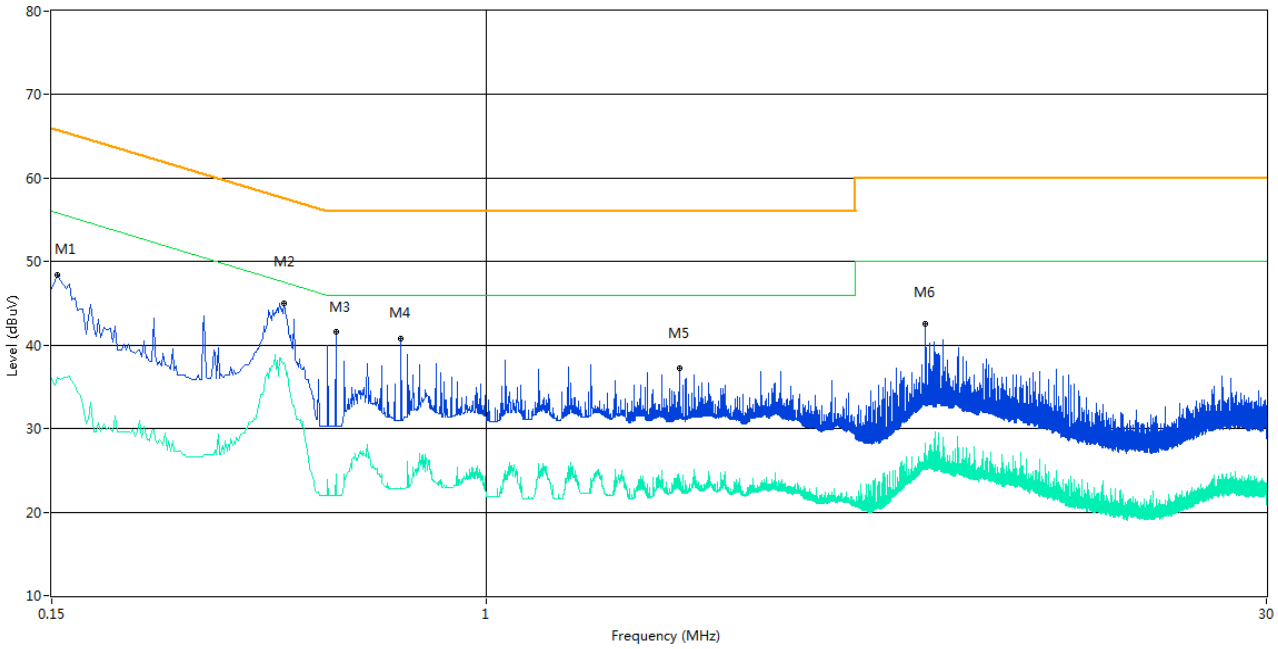
A.2 Conducted Emission

Test Data and Plots

The worst test mode: The Working Test Mode

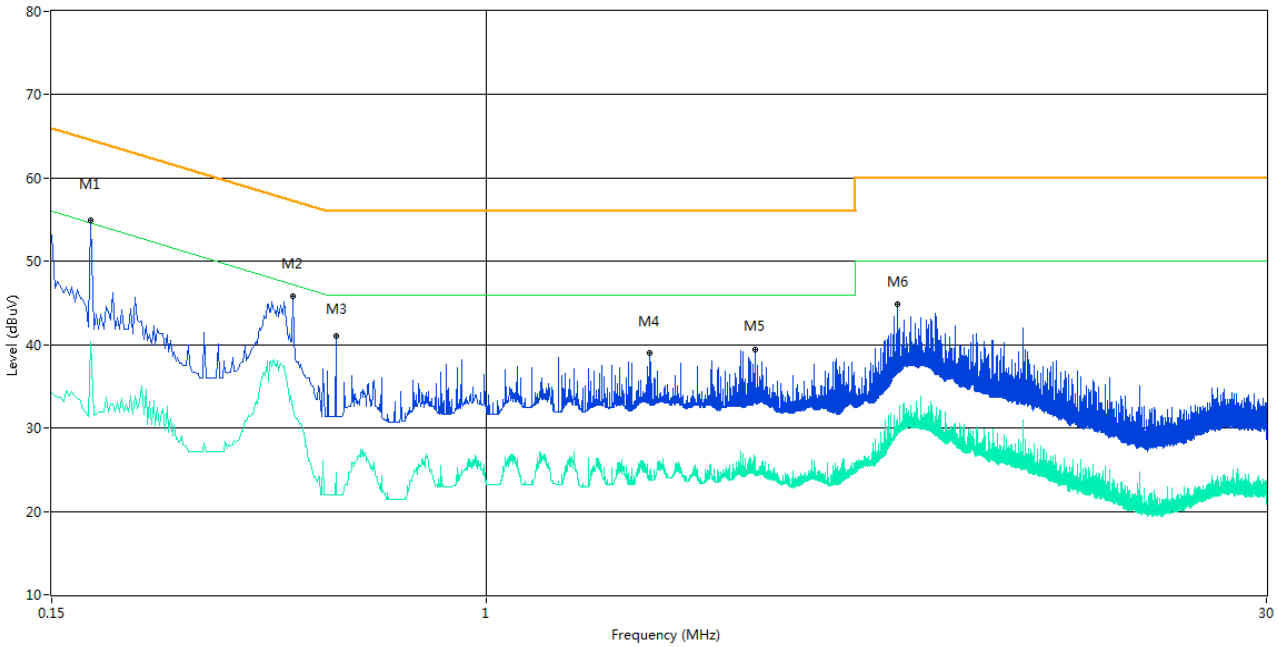
Note: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst 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	0.154	48.4	10.04	65.8	17.40	Peak	L Line	Pass
1**	0.154	36.1	10.04	55.8	19.70	AV	L Line	Pass
2	0.414	45.0	10.04	57.6	12.60	Peak	L Line	Pass
2**	0.414	37.9	10.04	47.6	9.70	AV	L Line	Pass
3	0.518	41.6	10.05	56.0	14.40	Peak	L Line	Pass
3**	0.518	24.6	10.05	46.0	21.40	AV	L Line	Pass
4	0.688	40.8	10.05	56.0	15.20	Peak	L Line	Pass
4**	0.688	23.0	10.05	46.0	23.00	AV	L Line	Pass
5	2.316	37.3	10.10	56.0	18.70	Peak	L Line	Pass
5**	2.316	24.1	10.10	46.0	21.90	AV	L Line	Pass
6	6.760	42.5	10.22	60.0	17.50	Peak	L Line	Pass
6**	6.760	28.2	10.22	50.0	21.80	AV	L Line	Pass

A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.178	54.9	10.04	64.6	9.70	Peak	N Line	Pass
1**	0.178	40.4	10.04	54.6	14.20	AV	N Line	Pass
2	0.430	45.9	10.04	57.3	11.40	Peak	N Line	Pass
2**	0.430	32.8	10.04	47.3	14.50	AV	N Line	Pass
3	0.518	41.0	10.05	56.0	15.00	Peak	N Line	Pass
3**	0.518	24.7	10.05	46.0	21.30	AV	N Line	Pass
4	2.032	39.0	10.09	56.0	17.00	Peak	N Line	Pass
4**	2.032	24.9	10.09	46.0	21.10	AV	N Line	Pass
5	3.224	39.4	10.12	56.0	16.60	Peak	N Line	Pass
5**	3.224	26.5	10.12	46.0	19.50	AV	N Line	Pass
6	6.014	44.8	10.20	60.0	15.20	Peak	N Line	Pass
6**	6.014	31.1	10.20	50.0	18.90	AV	N Line	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ1810293-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ1810293-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ1810293-AI.PDF”.

--END OF REPORT--