

# FCC RF TEST REPORT

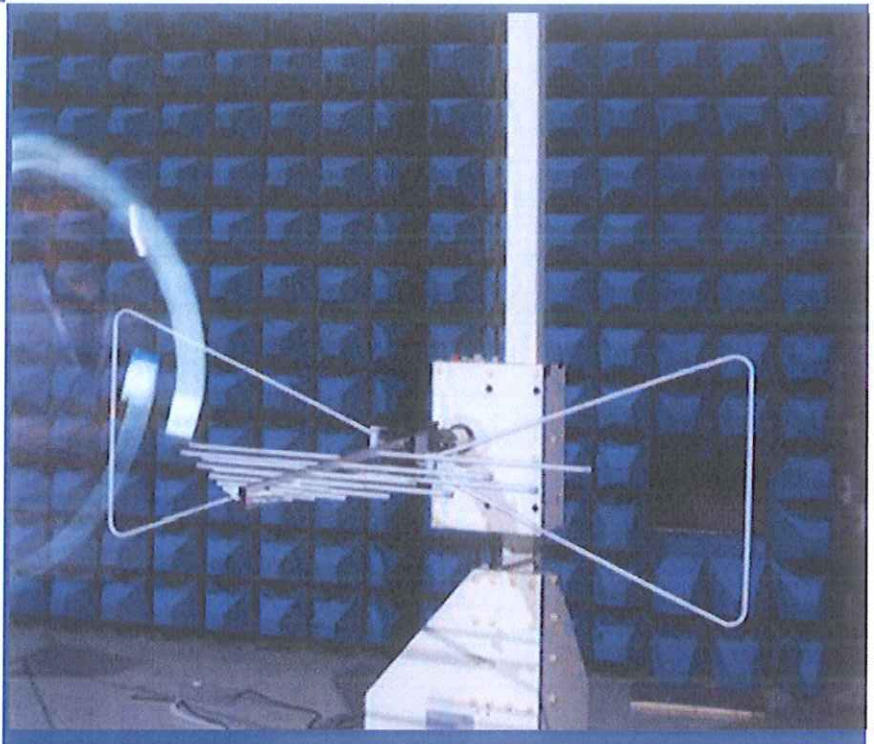
ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.



FOR  
**E504 series**

ISSUED TO  
Emomo Technology Co., Ltd.

4th Floor, Yonghe Building, Taiwan Industrial Park, Shiyan Town,  
Baoan, Shenzhen, Guangdong, China.



Tested by: 

Cao Shaocong  
(Engineer)

Date Sep. 22, 2016

Approved by: 

Liao Jianming  
(Technical Director)

Date Sep. 22, 2016

Report No.: BL-SZ1670062-401

EUT Type: E504 series

Model Name: E504

Brand Name: Emomo

Test Standard: FCC Part 15 C

FCC ID: A4E-E504

Test conclusion: Pass

Test Date: Aug. 01, 2016 ~ Aug. 08, 2016

Date of Issue: Sep. 22, 2016

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**Revision History**

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 22, 2016</u>	<u>Initial Issue</u>

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# 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	<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 v1.2.
- (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	Emomo Technology Co., Ltd.
Address	4th Floor, Yonghe Building, Taiwan Industrail Park, Shiyan Town, Baoan, ShenZhen, Guangdong, China.

### 2.2 Manufacturer Information

Manufacturer	Emomo Technology Co., Ltd.
Address	4th Floor, Yonghe Building, Taiwan Industrail Park, Shiyan Town, Baoan, ShenZhen, Guangdong, China.

### 2.3 Factory Information

Factory	Emomo Technology Co., Ltd.
Address	4th Floor, Yonghe Building, Taiwan Industrail Park, Shiyan Town, Baoan, ShenZhen, Guangdong, China.

### 2.4 General Description for Equipment under Test (EUT)

EUT Type	E504 series
Model Name Under Test	E504
Series Model Name	E504, E504A, E504B, E504C, E504-W, E504A-W, E504B-W, E504C-W
Description of Model name differentiation	E504 series of product are wireless charging coil with the function of wireless charging. This series "W" means white, the color of this product. "A" "B" "C" only shows the appearance such as color differences, there is no difference of function.
Hardware Version	V1
Software Version	V1
Network and Wireless connectivity	Qi 2.0
About the Product	Only the Qi 2.0 was tested in this report.

### 2.5 Ancillary Equipment

Ancillary Equipment 1	Charger	
	Brand Name	Dongguan GaoYi Electronic Co., Ltd
	Model No.	RSS1006-100050-W2-B
	Serial No.	N/A
	Rated Input	100-240 V~, 0.6 A, 50/60 Hz
	Rated Output	5 V=, 2.0 A

## 2.6 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Operating Frequency	110~205 kHz
Antenna Type	Coil Antenna
Antenna Gain	0 dBi
About Product	The EUT support the Qi technology, Only the Qi technology was tested in this report.



### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-15 Edition)	Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

#### 3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Result
1	Radiated Emission	15.209,15.215(b)	Pass	Annex A.1
2	Conducted Emission, AC Ports	15.207	Pass	Annex A.2
3	20 dB Bandwidth	15.215(c)	Pass	Annex A.3

#### 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)	4.12 dB
Radiated emissions (30 MHz-1 GHz)	4.16 dB
Radiated emissions (1 GHz-18 GHz)	5.97 dB



## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Environments

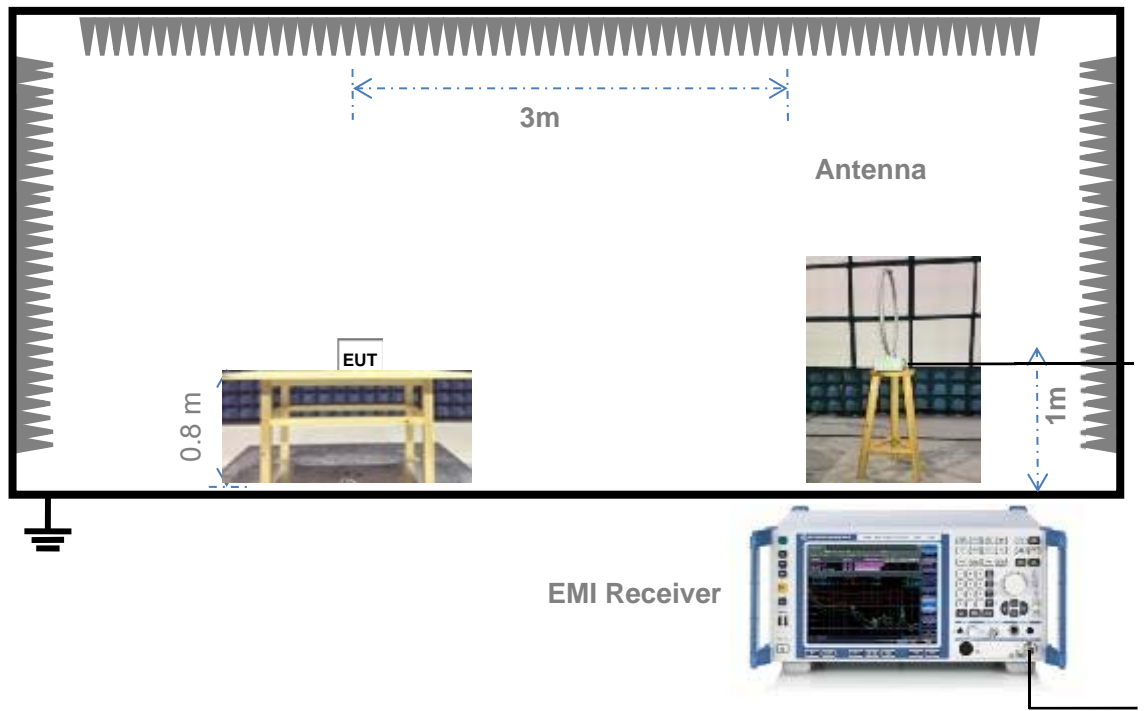
Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	120V/ 60Hz

### 4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
Test Antenna- Loop(9 kHz- 30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2015.07.22	2017.07.21
Test Antenna- Bi-Log(30 MHz- 3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21
Anechoic Chamber	RAINFORD	9 m*6 m*6 m	N/A	2015.02.28	2017.02.27
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04
LISN	SCHWARZBECK	NSLK 8127	8127-687	2016.07.05	2017.07.04
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A

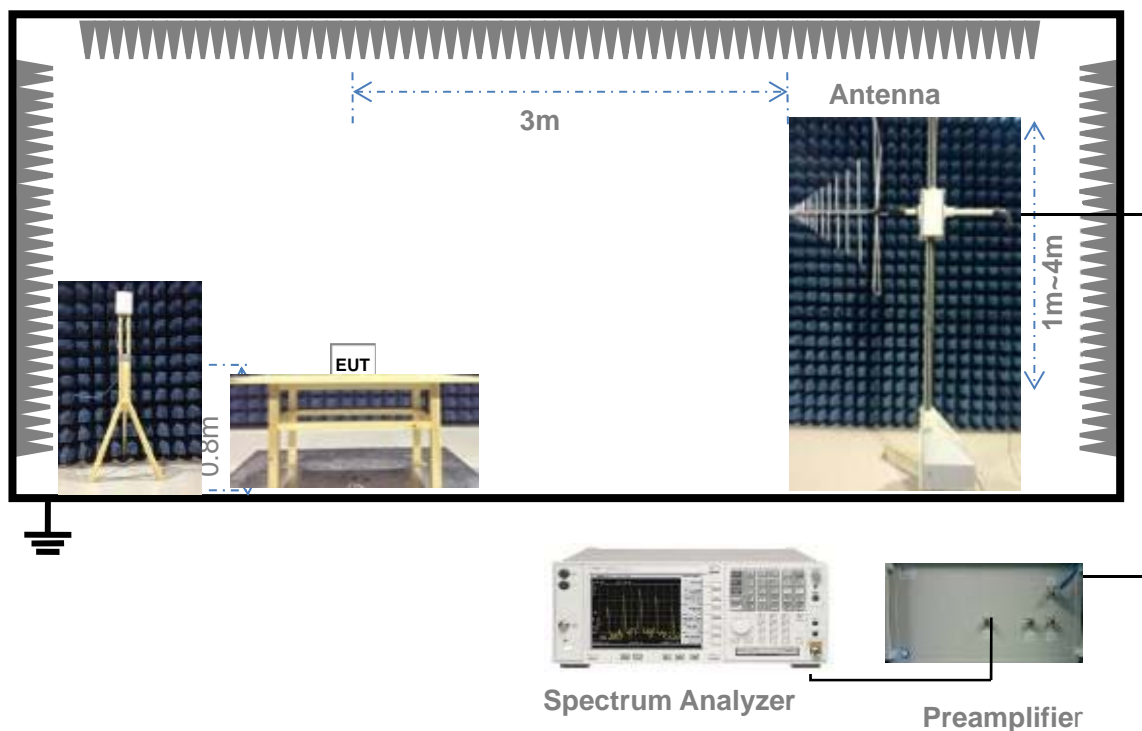
### 4.3 Test Setups

#### Test Setup 1



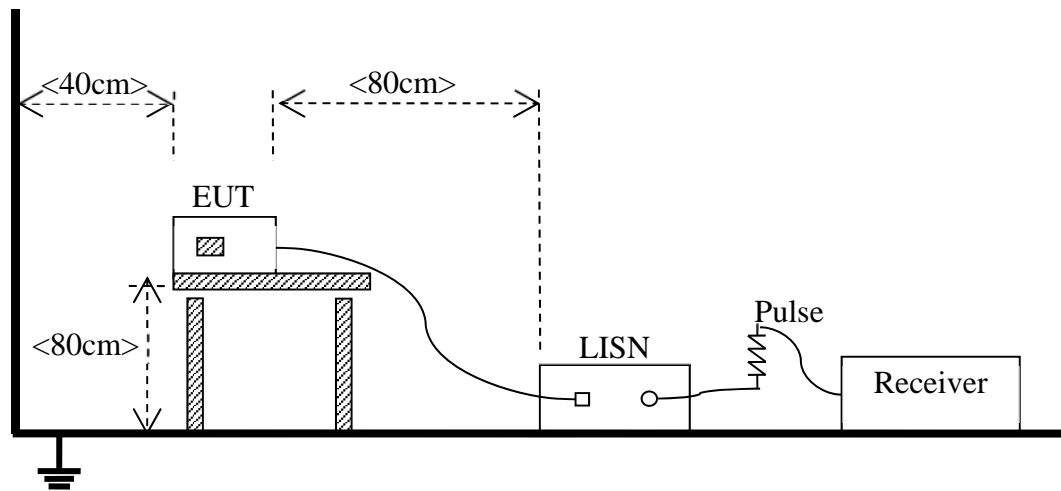
For Radiated Emission Test (Below 30 MHz))

#### Test Setup 2



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

### Test Setup 3



(For Conducted Emission, AC Ports Test)

## 5 TEST ITEMS

### 5.1 Emission Tests

#### 5.1.1 Radiated Emission

##### 5.1.1.1 Limit

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

NOTE:

- 1) Field Strength (dB $\mu\text{V/m}$ ) = 20\*log [Field Strength ( $\mu\text{V/m}$ )].
- 2) In the emission tables above, the tighter limit applies at the band edges.
- 3) For above 1000 MHz, limit field strength of harmonics: 54 dB $\mu\text{V/m}$ @3 m (AV) and 74 dB $\mu\text{V/m}$ @3 m (PK)

##### 5.1.1.2 Test Setup

Refer to 4.3 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)	Conducted Limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- 1) The limit is applicable to Class B ITE.
- 2) The lower limit shall apply at the band edges.
- 3) 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 4.3 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  $\Omega$ /50  $\mu$ 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.

### 5.1.3 20 dB Bandwidth

#### 5.1.3.1 Limit

FCC §15.215(c)

The 20 dB bandwidth is known as the 99% emission bandwidth, or 20 dB bandwidth ( $10 \cdot \log 1\% = 20$  dB) taking the total RF output power.

#### 5.1.3.2 Test Setup

Refer to 4.3 section test (test setup 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

#### 5.1.3.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW  $\geq$  1% of the 20 dB bandwidth

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate, Allow the trace to stabilize.

#### 5.1.3.4 Test Result

Please refer to ANNEX A.3.

## ANNEX A TEST RESULTS

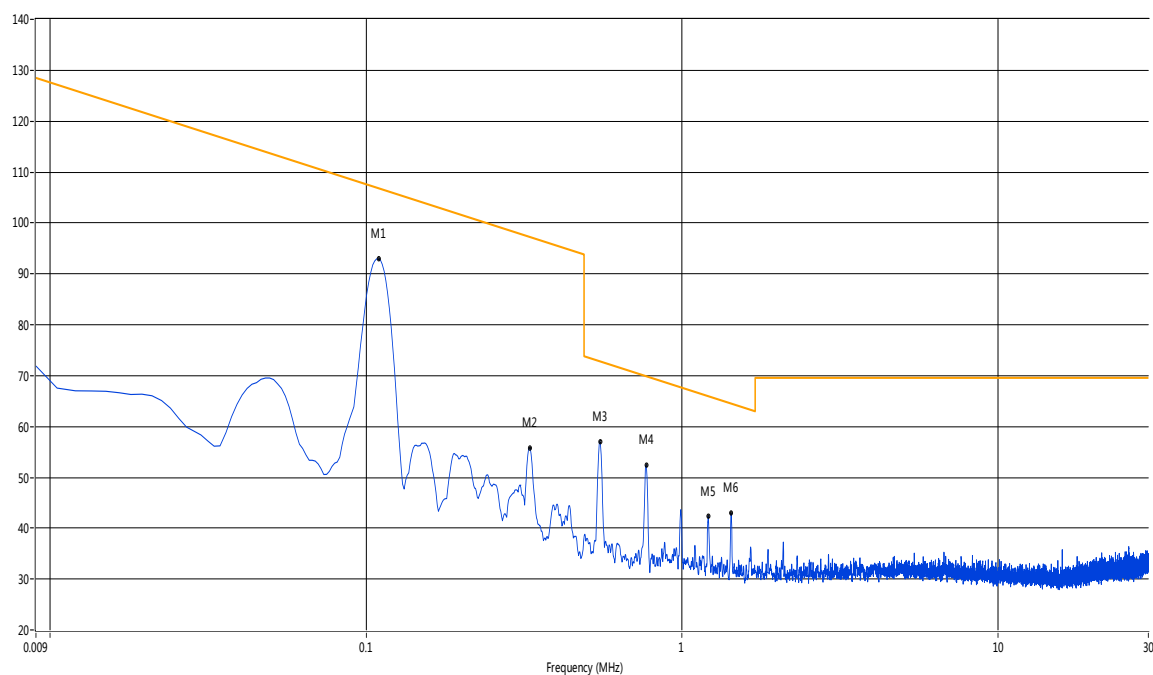
### A.1 Radiated Emission

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

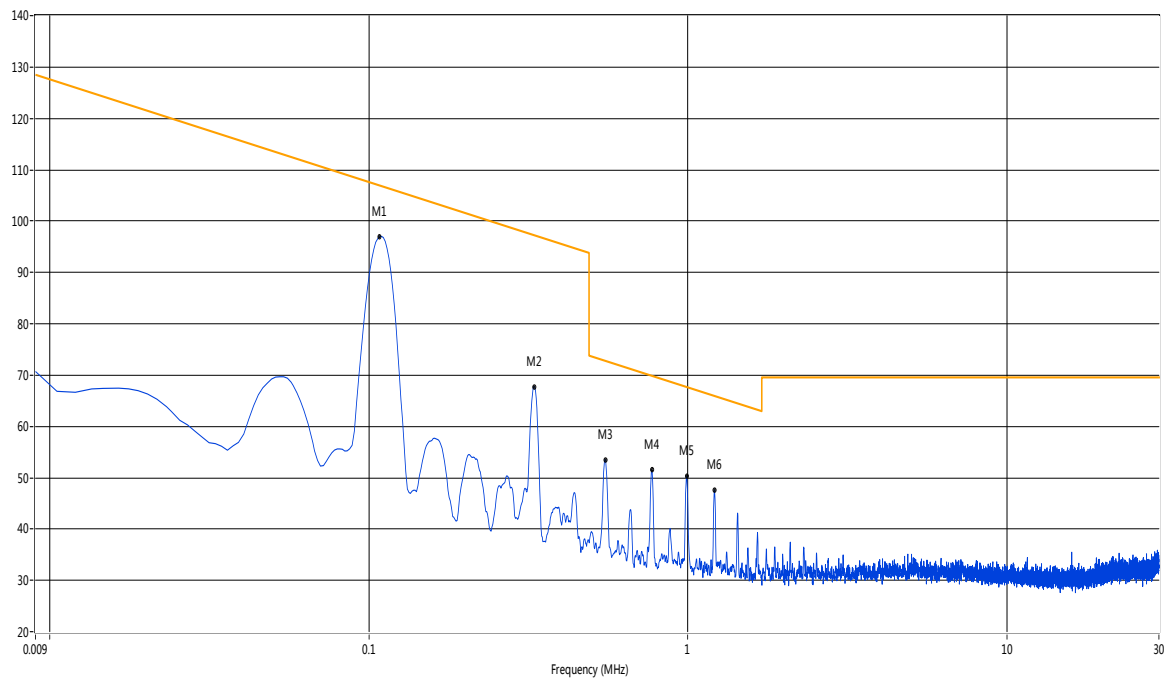
##### A.1.1 Test Antenna Vertical, 9 kHz –30 MHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.11	92.90	19.82	121.3	28.40	Peak	360.30	100	Vertical	Pass
2	0.33	55.75	19.88	105.4	49.65	Peak	285.30	100	Vertical	Pass
3	0.55	56.88	19.94	73.3	16.42	Peak	359.90	100	Vertical	Pass
4	0.77	52.11	20.19	71.3	19.19	Peak	359.50	100	Vertical	Pass
5	1.21	42.37	20.19	67.4	25.03	Peak	359.50	100	Vertical	Pass
6	1.43	42.89	20.28	65.4	22.51	Peak	360.30	100	Vertical	Pass

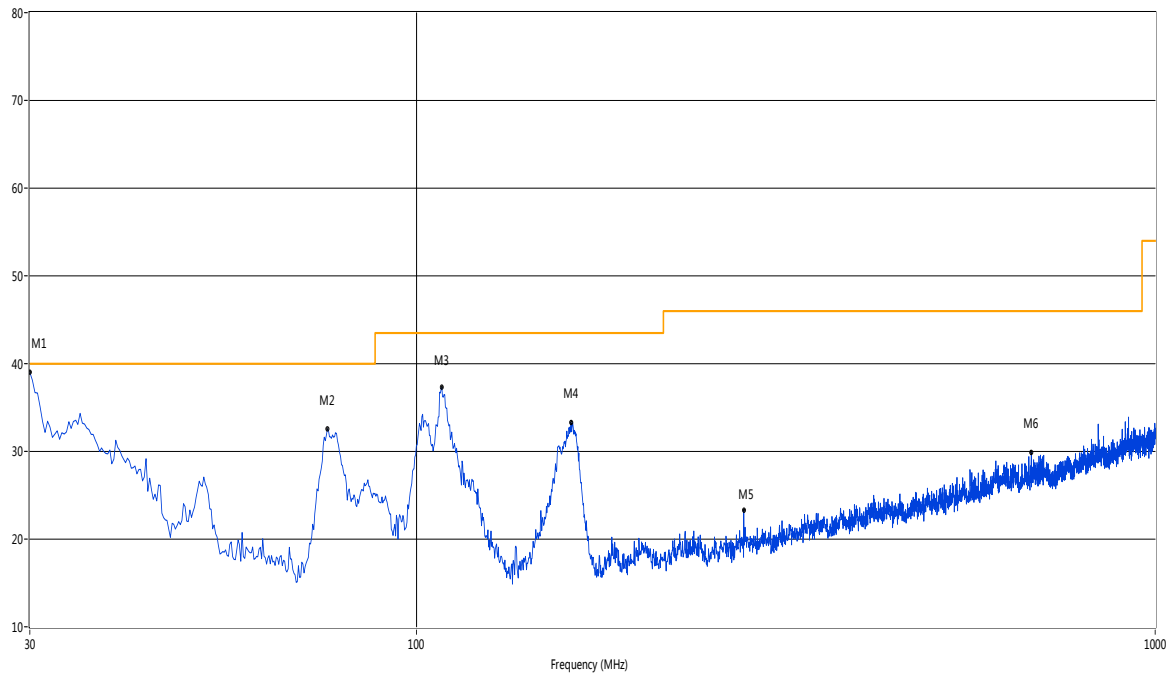


## A.1.2 Test Antenna Horizontal, 9 kHz –30 MHz



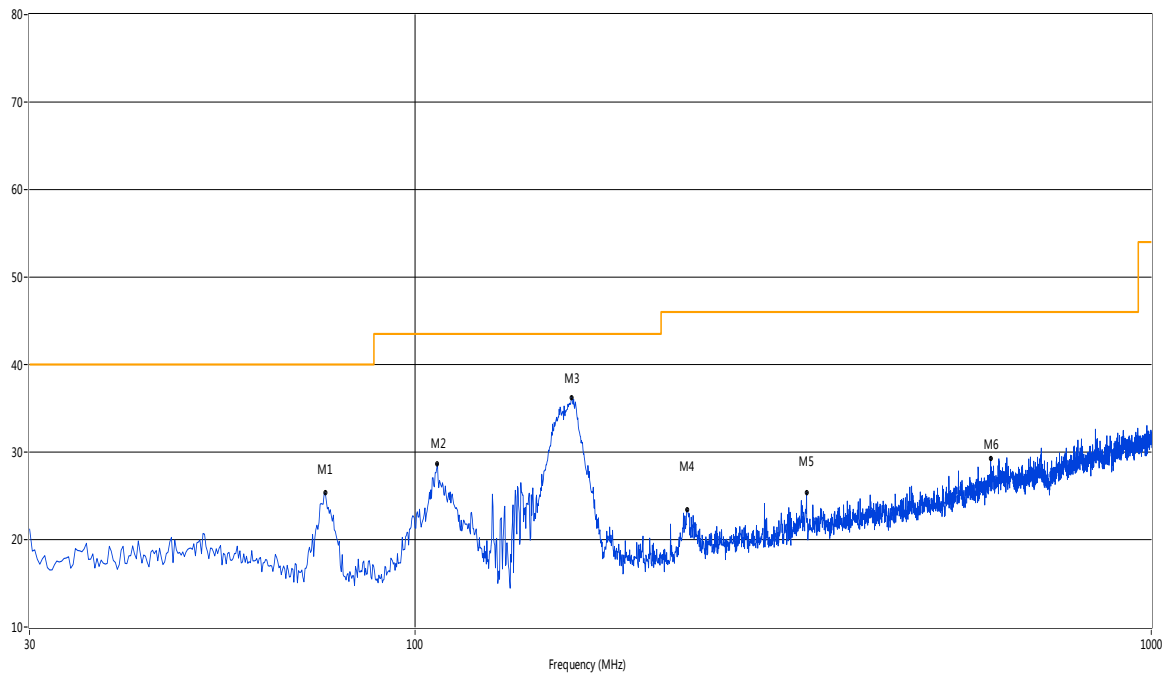
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.11	96.94	19.82	121.4	24.46	Peak	1.10	100	Horizontal	Pass
2	0.33	67.57	19.88	105.4	37.83	Peak	0.70	100	Horizontal	Pass
3	0.55	52.64	19.94	73.3	20.66	Peak	4.50	100	Horizontal	Pass
4	0.77	51.53	20.19	71.3	19.77	Peak	1.90	100	Horizontal	Pass
5	0.99	50.10	20.25	69.3	19.20	Peak	0.00	100	Horizontal	Pass
6	1.21	47.55	20.19	67.4	19.85	Peak	0.30	100	Horizontal	Pass

### A.1.3 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	30.00	39.00	-21.72	40.0	1.00	Peak	0.30	100	Vertical	N/A
1*	30.00	37.98	-21.72	40.0	2.02	QP	0.30	100	Vertical	Pass
2	75.82	32.56	-24.63	40.0	7.44	Peak	212.00	100	Vertical	Pass
3	108.31	37.28	-20.20	43.5	6.22	Peak	106.70	100	Vertical	Pass
4	161.89	33.26	-23.11	43.5	10.24	Peak	242.40	100	Vertical	Pass
5	277.53	23.31	-18.40	46.0	22.69	Peak	41.90	100	Vertical	Pass
6	679.74	29.88	-9.52	46.0	16.12	Peak	360.00	100	Vertical	Pass

#### A.1.4 Test Antenna Horizontal, 30 MHz – 1 GHz



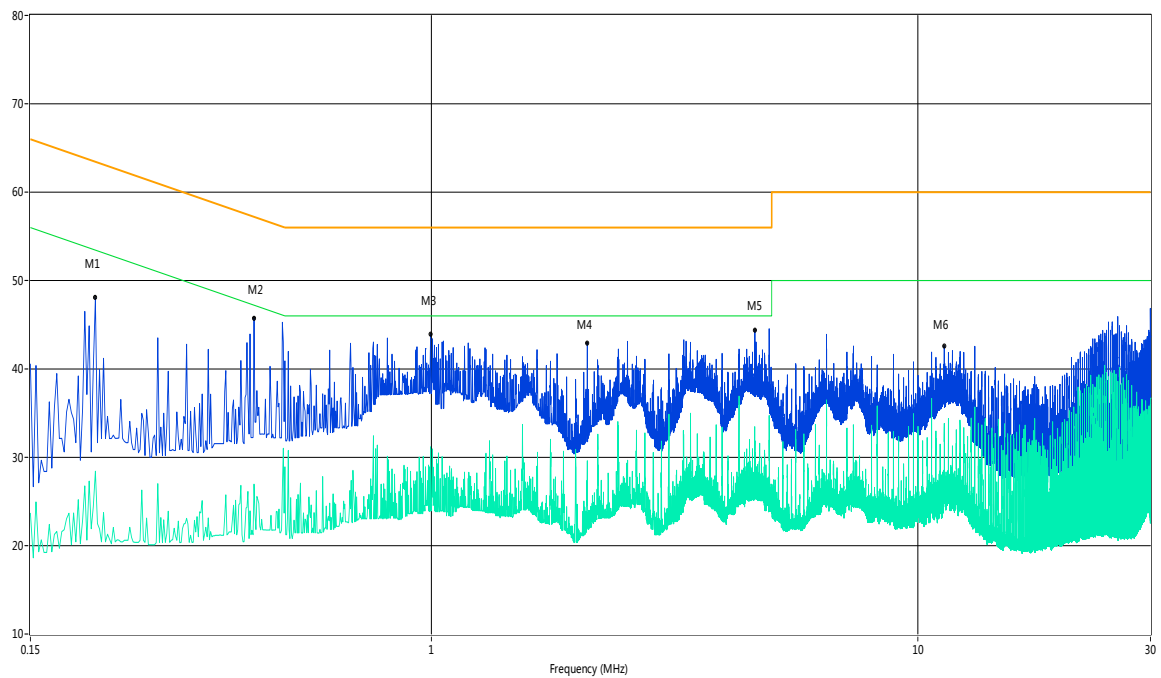
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	75.58	25.37	-24.53	40.0	14.63	Peak	358.80	100	Horizontal	Pass
2	107.34	28.70	-20.22	43.5	14.80	Peak	15.50	100	Horizontal	Pass
3	163.34	36.25	-22.98	43.5	7.25	Peak	6.50	100	Horizontal	Pass
4	234.62	23.41	-19.46	46.0	22.59	Peak	359.70	100	Horizontal	Pass
5	340.32	25.37	-16.27	46.0	20.63	Peak	231.70	100	Horizontal	Pass
6	605.31	29.32	-10.66	46.0	16.68	Peak	287.30	100	Horizontal	Pass

## A.2 Conducted Emission

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.

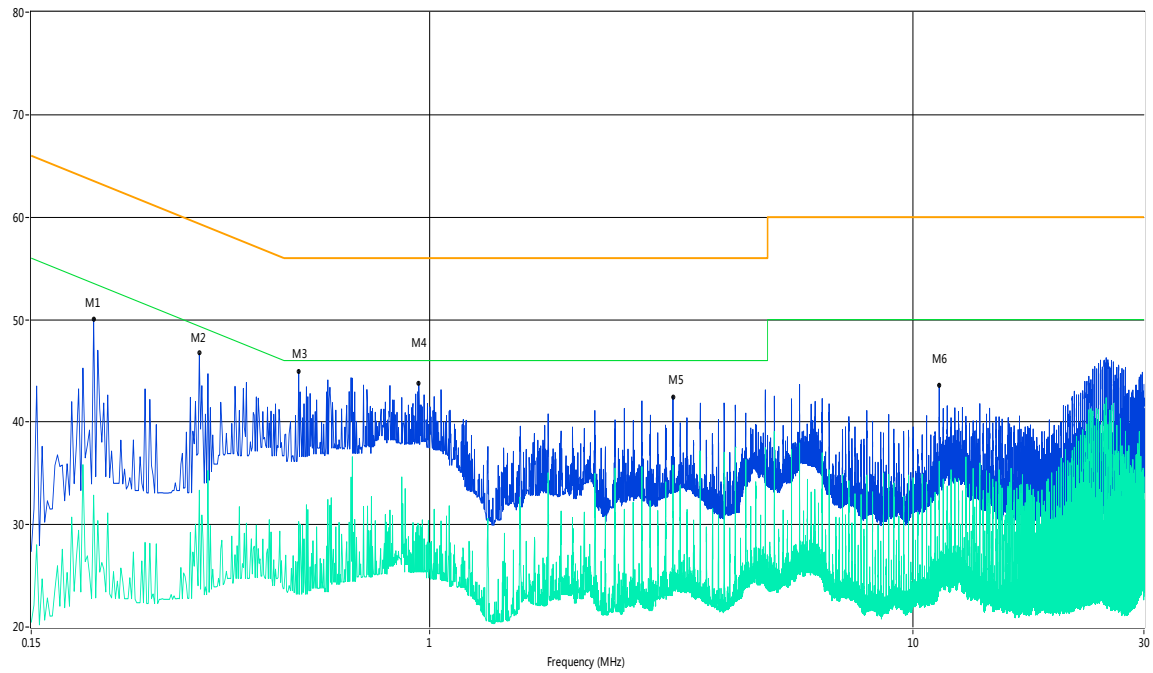
### Test Data and Plots

#### A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.20	48.0	11.00	64.5	16.50	Peak	L Line	Pass
1**	0.20	28.4	11.00	54.5	26.10	AV	L Line	Pass
2	0.43	45.8	11.00	57.9	12.10	Peak	L Line	Pass
2**	0.43	27.0	11.00	47.9	20.90	AV	L Line	Pass
3	1.00	43.9	11.00	56.0	12.10	Peak	L Line	Pass
3**	1.00	31.2	11.00	46.0	14.80	AV	L Line	Pass
4	2.09	43.0	11.00	56.0	13.00	Peak	L Line	Pass
4**	2.09	29.6	11.00	46.0	16.40	AV	L Line	Pass
5	4.62	44.4	11.00	56.0	11.60	Peak	L Line	Pass
5**	4.62	31.9	11.00	46.0	14.10	AV	L Line	Pass
6	11.31	42.5	11.00	60.0	17.50	Peak	L Line	Pass
6**	11.31	33.4	11.00	50.0	16.60	AV	L Line	Pass

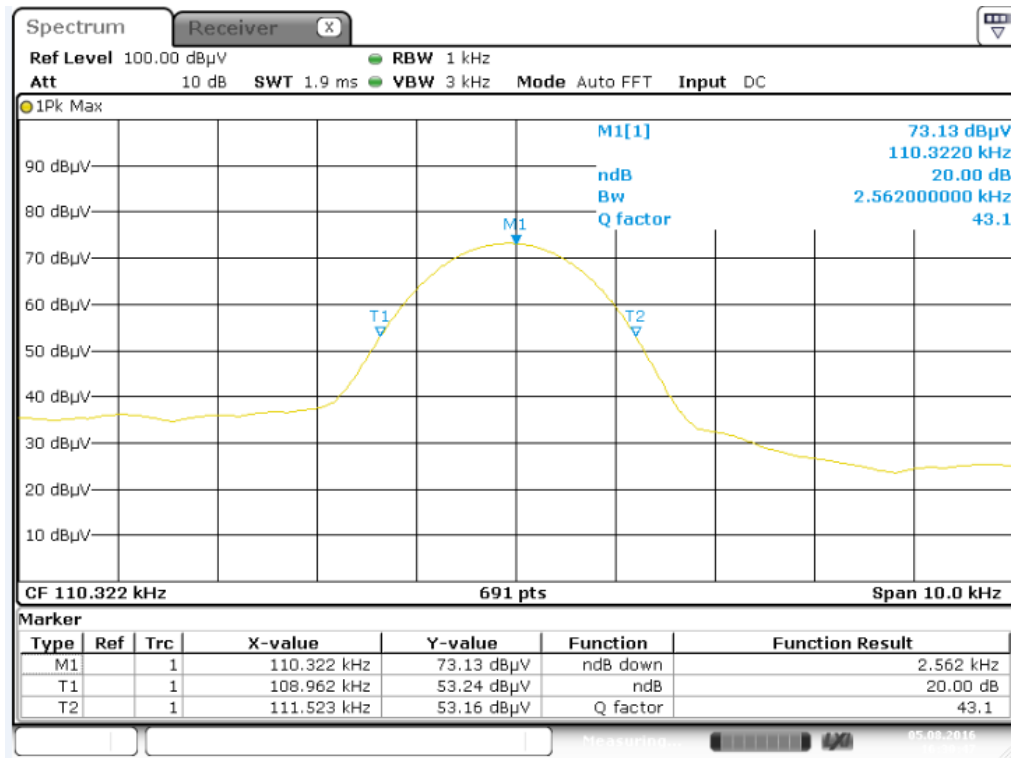
## A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.20	50.0	11.00	64.5	14.50	Peak	N Line	Pass
1**	0.20	32.9	11.00	54.5	21.60	AV	N Line	Pass
2	0.33	46.7	11.00	60.7	14.00	Peak	N Line	Pass
2**	0.33	33.3	11.00	50.7	17.40	AV	N Line	Pass
3	0.54	44.9	11.00	56.0	11.10	Peak	N Line	Pass
3**	0.54	30.3	11.00	46.0	15.70	AV	N Line	Pass
4	0.95	43.8	11.00	56.0	12.20	Peak	N Line	Pass
4**	0.95	28.9	11.00	46.0	17.10	AV	N Line	Pass
5	3.19	42.5	11.00	56.0	13.50	Peak	N Line	Pass
5**	3.19	35.8	11.00	46.0	10.20	AV	N Line	Pass
6	11.31	43.6	11.00	60.0	16.40	Peak	N Line	Pass
6**	11.31	32.3	11.00	50.0	17.70	AV	N Line	Pass

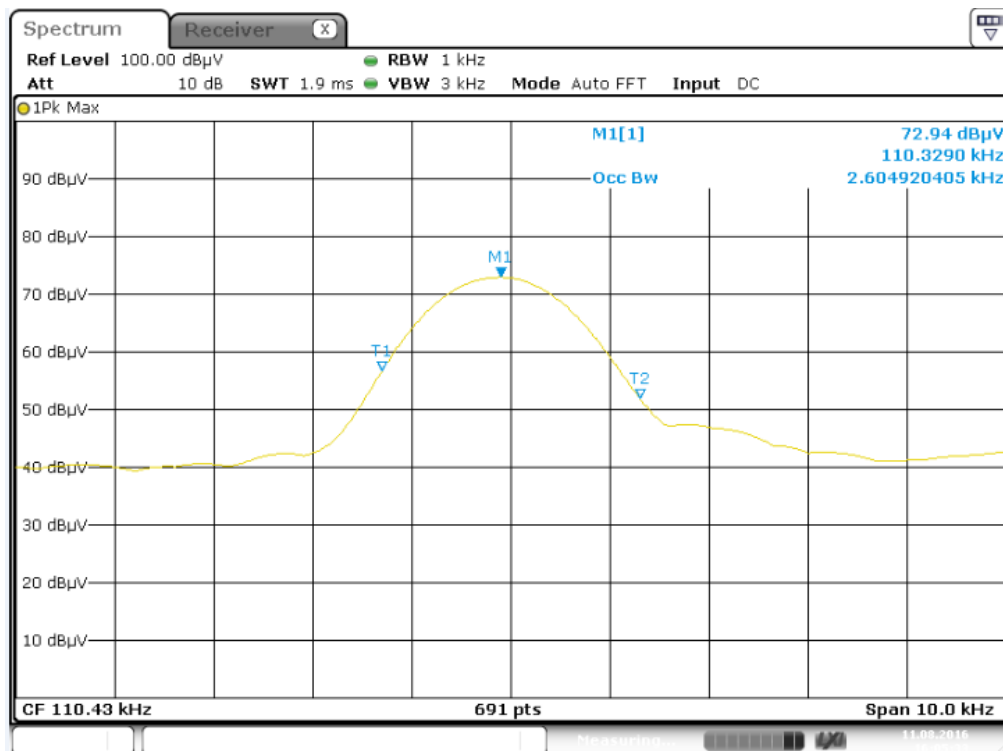
## A.3 20 dB Bandwidth

### Test Data and Plots



## 99% Occupied Bandwidth

### Test Data and Plots



## **ANNEX B TEST SETUP PHOTOS**

Please refer the document “BL-SZ1670062-AR.PDF”.

## **ANNEX C EUT EXTERNAL PHOTOS**

Please refer the document “BL-SZ1670062-AW.PDF”.

## **ANNEX D EUT INTERNAL PHOTOS**

Please refer the document “BL-SZ1670062-AI.PDF”.

--END OF REPORT--