FCC RF TEST REPORT

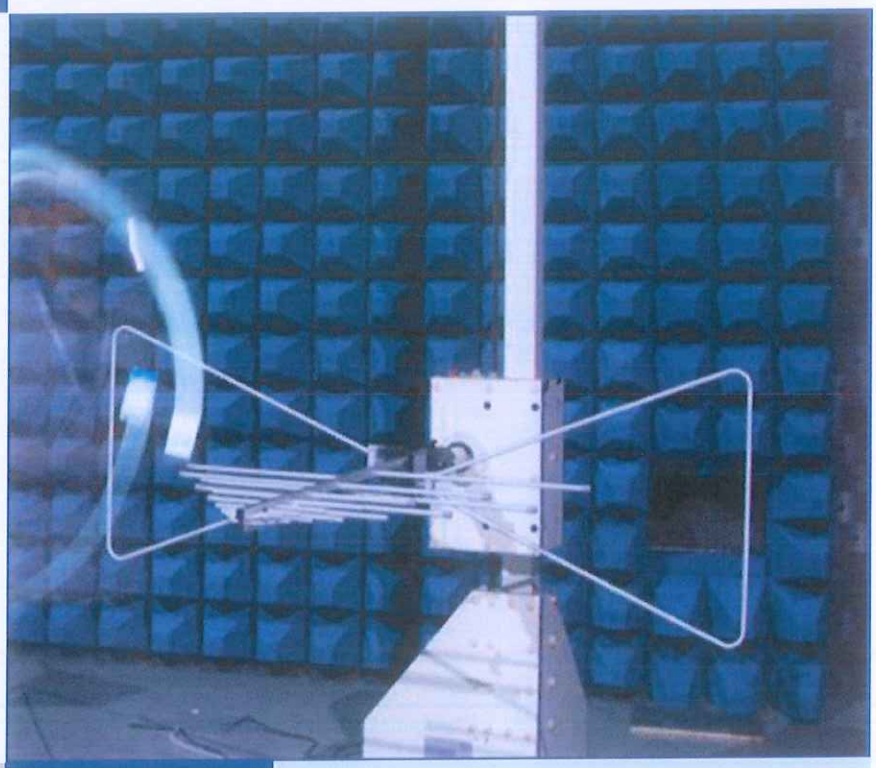
ISSUED BY
Shenzhen BALUN Technology Co., Ltd.

FOR

Embedded Wireless Charging System

ISSUED TO
Emomo Technology Co., Ltd.

4th Floor, Yonghe Building, Taiwan Industrail Park, Shiyan Town, Baoan, ShenZhen, Guangdong, China.



Tested by: Xia Long
Xia Long
(Engineer)
Date Nov. 23. 2017

Approved by:
Wei Yanquan
(Chief Engineer)
Date Nov. 23. 2017

Report No.:	BL-SZ16A0149-401
EUT Name:	Embedded Wireless Charging System
Model Name:	E506
Brand Name:	Emomo
Test Standard:	47 CFR Part 15 Subpart C
FCC ID:	A4EE506
Test conclusion:	Pass
Test Date:	Oct. 23, 2017 ~ Oct. 30, 2017
Date of Issue:	Nov. 23, 2017

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Revision History

Version	Issue Date	Revisions
Rev. 01	Nov. 23, 2017	Initial Issue

TABLE OF CONTENTS

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	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 organization 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°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 v2.4.

(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	Embedded Wireless Charging System
Model Name Under Test	E506
Series Model Name	E506, E506A, E506B, E506C, E506-W, E506A-W, E506B-W, E506C-W
Description of Model name differentiation	E506 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

2.5 Ancillary Equipment

Ancillary Equipment 1	Adapter	
	Brand Name	N/A
	Model No.	R122-0502000UD
	Serial No.	N/A
	Rated Input	100-240 V~, 0.4 A, 50/60 Hz
	Rated Output	5 V⎓, 2000 mA

2.6 Technical Information

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

Operating Frequency	110~205 kHz
Product Type	☒ Mobile ☐ Portable ☐ Fix Location
Antenna Type	Coil Antenna
Antenna Gain	0 dBi
About Product	The EUT support the QI and PMA technology, and they have the same operating frequency.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C (10-1-16 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)	3.23 dB
Radiated emissions (30 MHz-1 GHz)	4.30 dB
Radiated emissions (1 GHz-18 GHz)	4.81 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

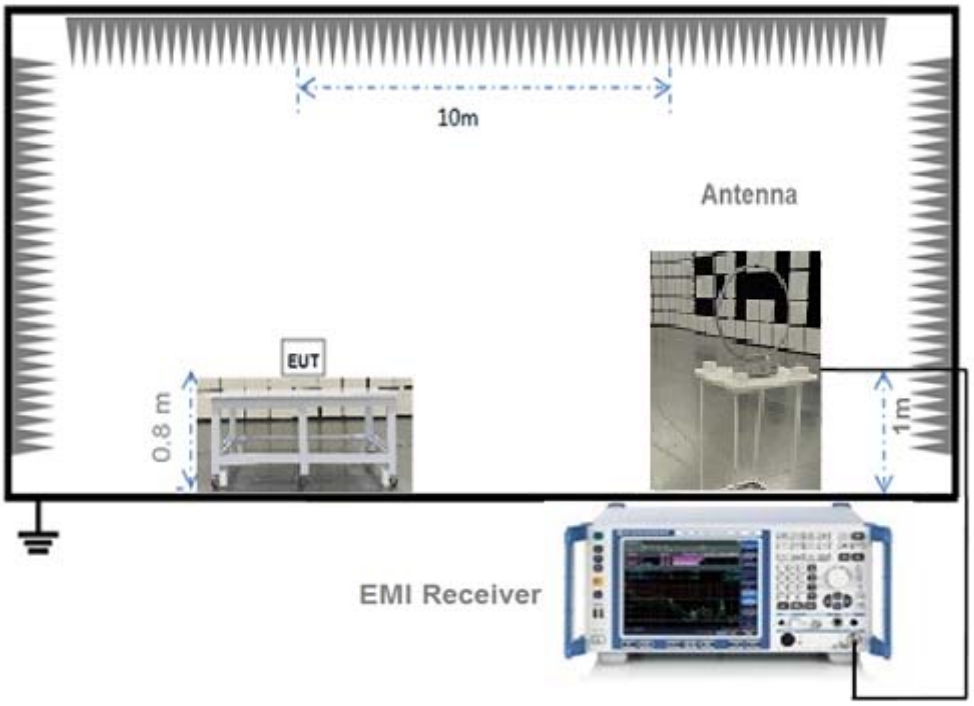
Relative Humidity	45% - 55%	
Atmospheric Pressure	100 kPa - 102 kPa	
Temperature	NT (Normal Temperature)	+22℃ to +25℃
Working Voltage of the EUT	NV (Normal Voltage)	5 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2017.06.22	2018.06.21
Test Antenna-Rod(9 kHz-30 MHz)	SCHWARZBECK	VAMP 9243	9243-556	2017.06.22	2018.06.21
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2017.06.22	2018.06.21
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2017.06.22	2018.06.21
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2016.08.09	2018.08.08
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2017.06.22	2018.06.21
LISN	SCHWARZBECK	NSLK 8127	8127-687	2017.06.22	2018.06.21
Shielded Enclosure	ChangNing	CN-130701	130703	N/A	N/A

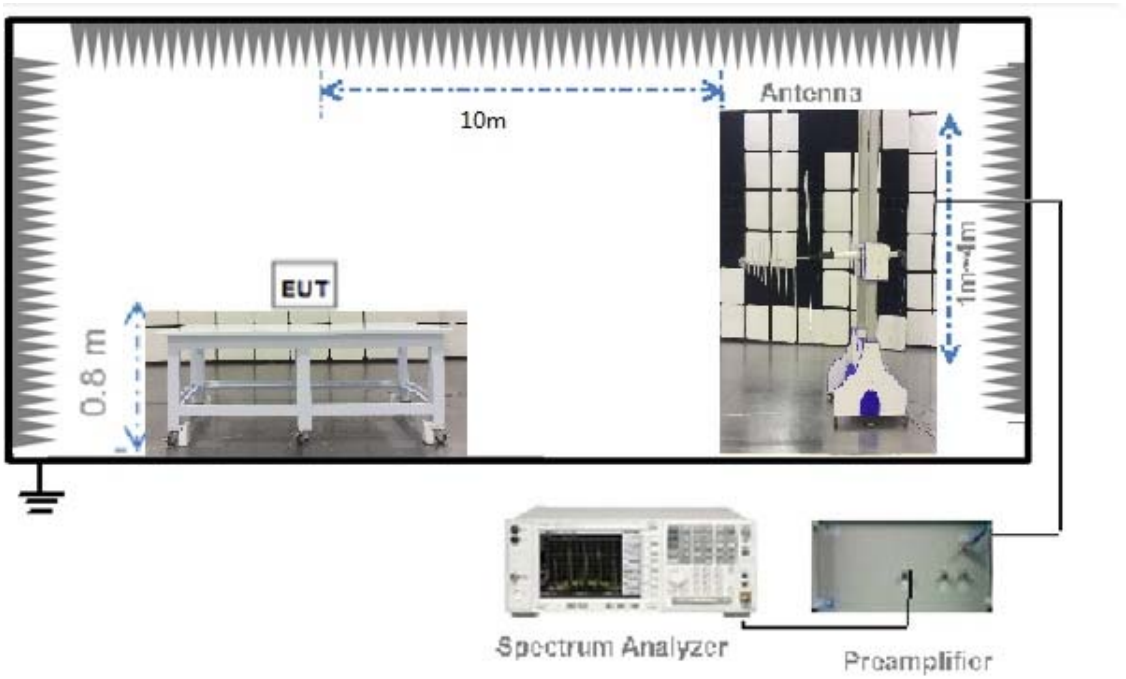
4.3 Test Setups

Test Setup 1



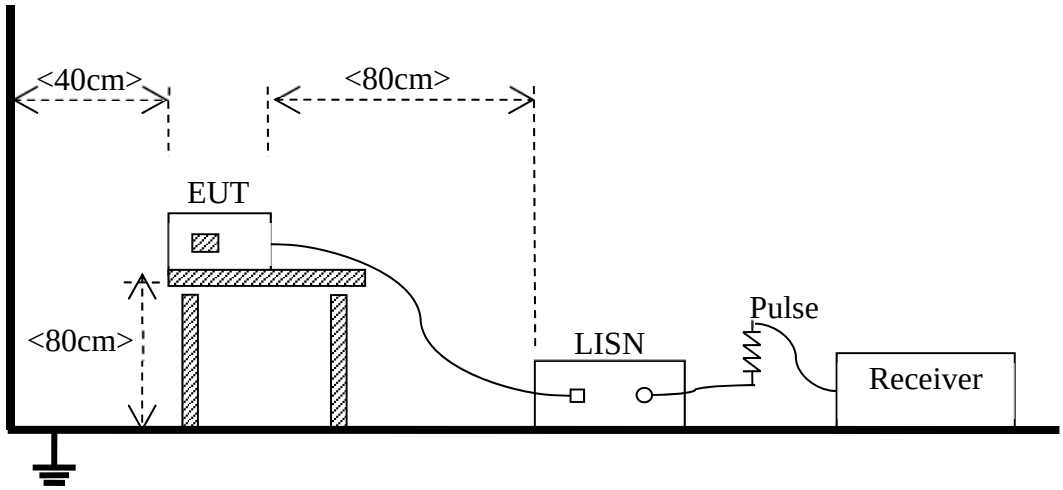
For Radiated Emission Test (Below 30 MHz))

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 (μV/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 (dBμV/m) = 20*log [Field Strength (μV/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 dBuV/m@3 m (AV) and 74 dBuV/m@3 m (PK)

4) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). For example, at the frequency 9 kHz, limit @10m = 20*log (2400/f) + 40log (dlimit/dmeasure) where limit = 300m, dmeasure=10m. limit @10m = 20*log (2400/9) + 40log (300/10) = 107.5 (dBμV/m).

5) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided, When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements). For example, at the frequency 30 MHz, limit @10m = 20*log (100) + 20log (dlimit/dmeasure) where limit = 3m, dmeasure=10m. limit @10m = 20*log (100) + 20log (3/10) = 29.5 (dBμV/m).

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 (dBμV)	
	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 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.

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*log1%=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 ≥ 1% of the 20 dB bandwidth

VBW ≥ 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

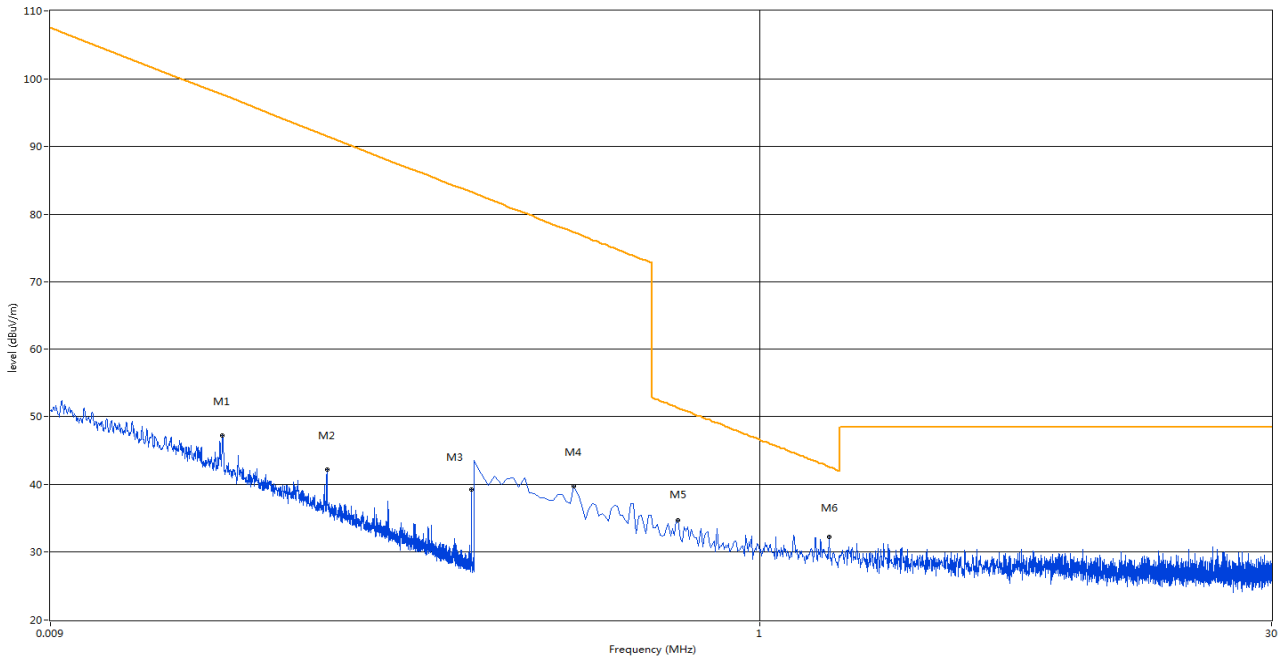
Note [1]: The symbol of "--" in the table which means not application.

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.

Note [3]: This frequency which near 0.147 MHz with circle should be ignored because they are Fundamental frequency.

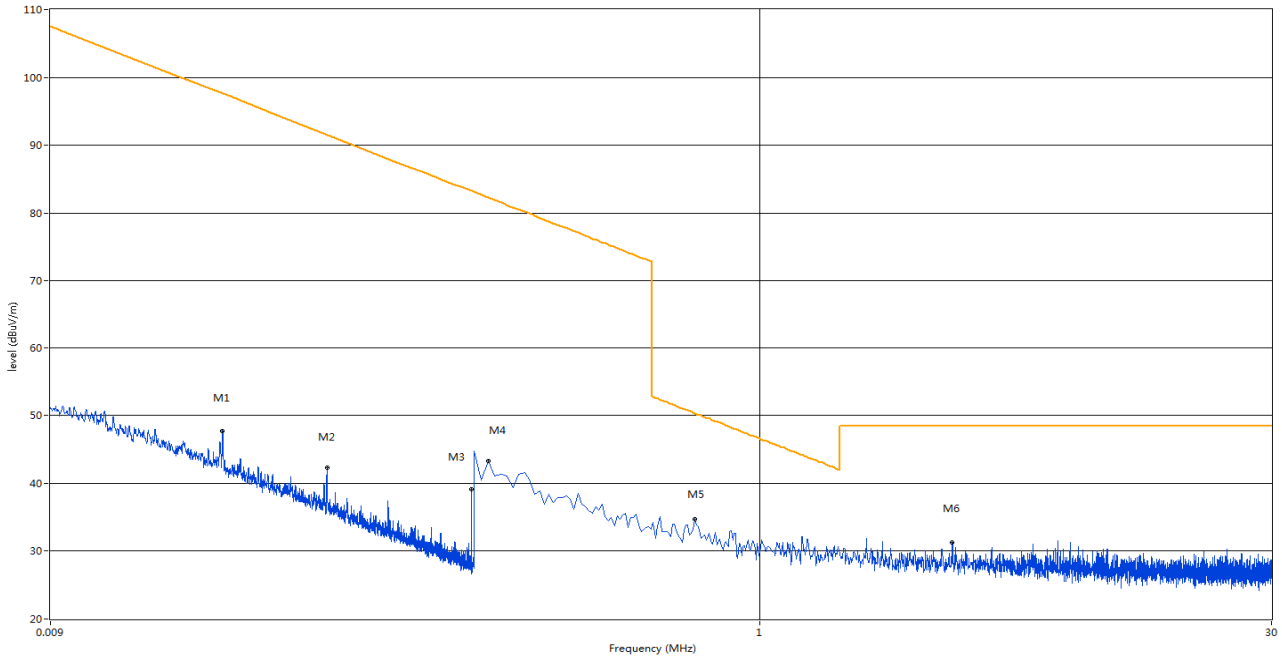
QI Test Data and Plots

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



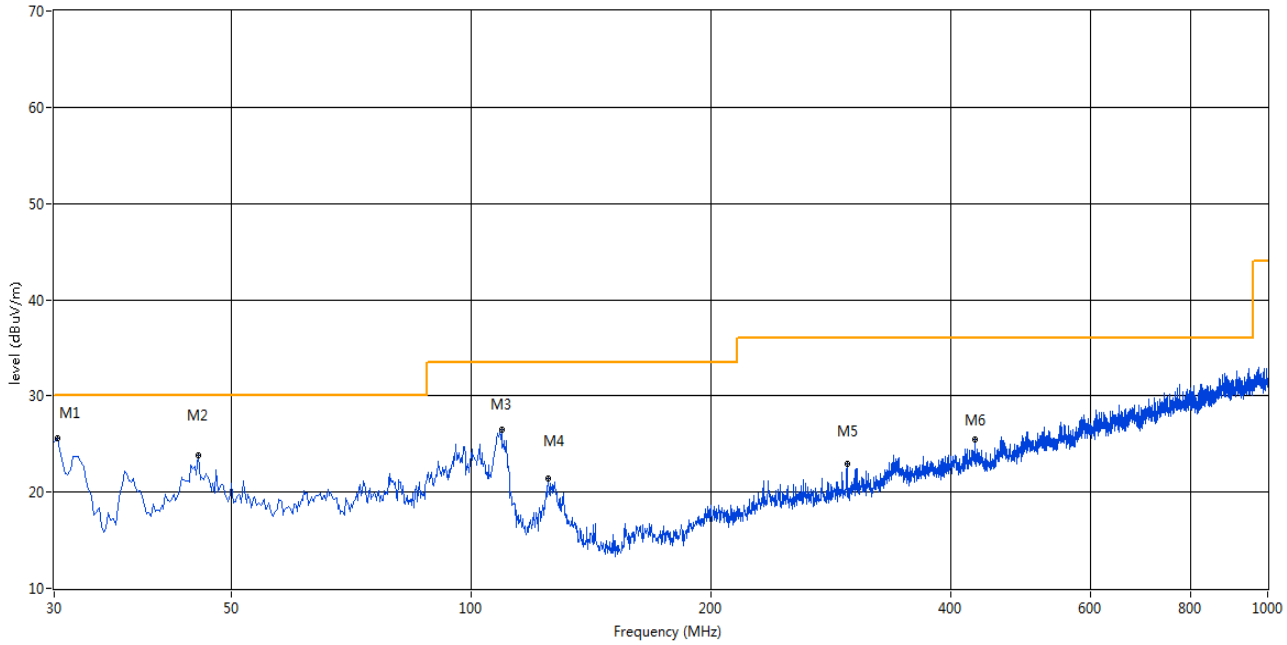
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.028	47.25	20.15	97.6	50.35	Peak	145.00	100	Vertical	Pass
2	0.057	42.22	20.20	91.5	49.28	Peak	133.00	100	Vertical	Pass
3	0.147	39.30	20.15	83.3	44.00	Peak	174.00	100	Vertical	Pass[Note3]
4	0.292	39.76	20.14	77.3	37.54	Peak	174.00	100	Vertical	Pass
5	0.583	34.71	20.32	51.3	16.59	Peak	0.00	100	Vertical	Pass
6	1.590	32.26	20.49	42.6	10.34	Peak	239.00	100	Vertical	Pass

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



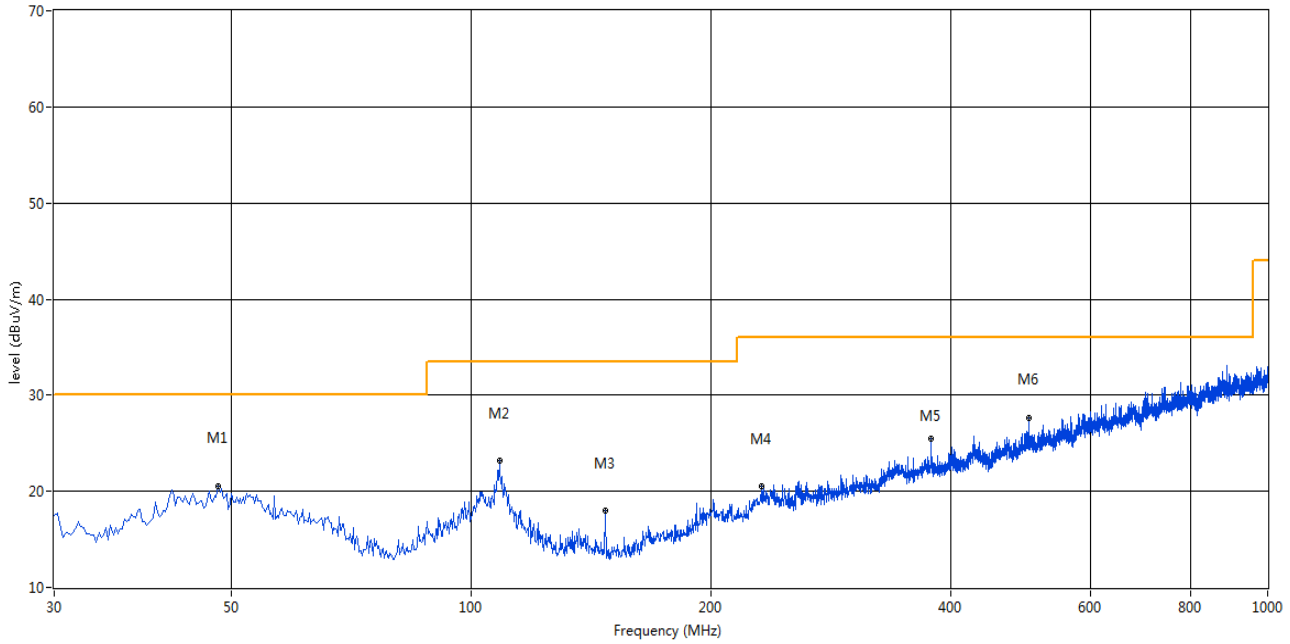
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	0.028	47.65	20.15	97.6	49.95	Peak	8.00	100	Horizontal	Pass
2	0.056	42.26	20.20	91.5	49.24	Peak	18.00	100	Horizontal	Pass
3	0.147	39.13	20.15	83.2	44.07	Peak	180.00	100	Horizontal	Pass Note3
4	0.165	43.24	20.10	82.2	38.96	Peak	246.00	100	Horizontal	Pass
5	0.650	34.68	20.36	50.3	15.62	Peak	270.00	100	Horizontal	Pass
6	3.598	31.28	20.63	48.5	17.22	Peak	97.00	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	30.242	25.57	-25.85	30.0	4.43	Peak	360.00	300	Vertical	Pass
2	45.520	23.82	-22.84	30.0	6.18	Peak	113.00	300	Vertical	Pass
3	109.298	26.54	-24.27	33.5	6.96	Peak	254.00	200	Vertical	Pass
4	125.060	21.36	-26.91	33.5	12.14	Peak	223.00	200	Vertical	Pass
5	296.508	22.96	-20.08	36.0	13.04	Peak	318.00	300	Vertical	Pass
6	429.155	25.47	-15.51	36.0	10.53	Peak	326.00	200	Vertical	Pass

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



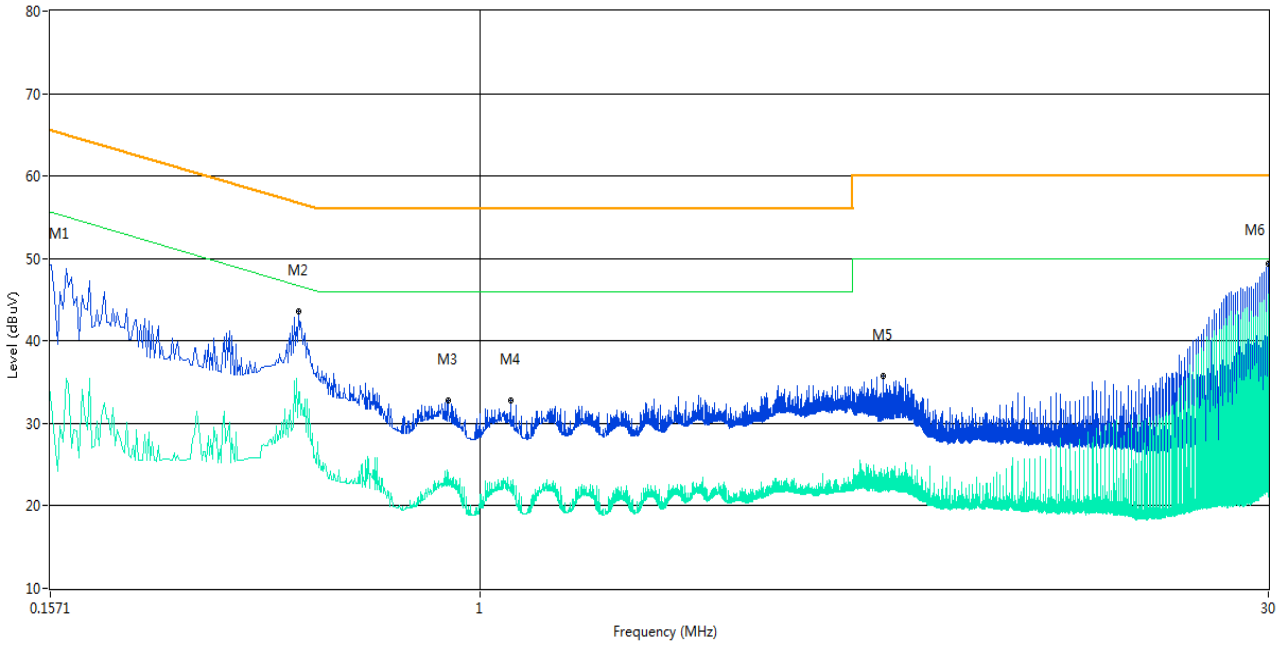
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	48.187	20.55	-22.74	30.0	9.45	Peak	0.00	200	Horizontal	Pass
2	108.570	23.20	-24.22	33.5	10.30	Peak	162.00	200	Horizontal	Pass
3	147.370	17.96	-27.61	33.5	15.54	Peak	123.00	300	Horizontal	Pass
4	231.760	20.50	-22.44	36.0	15.50	Peak	61.00	100	Horizontal	Pass
5	378.473	25.50	-17.13	36.0	10.50	Peak	219.00	300	Horizontal	Pass
6	501.420	27.59	-13.31	36.0	8.41	Peak	58.00	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.

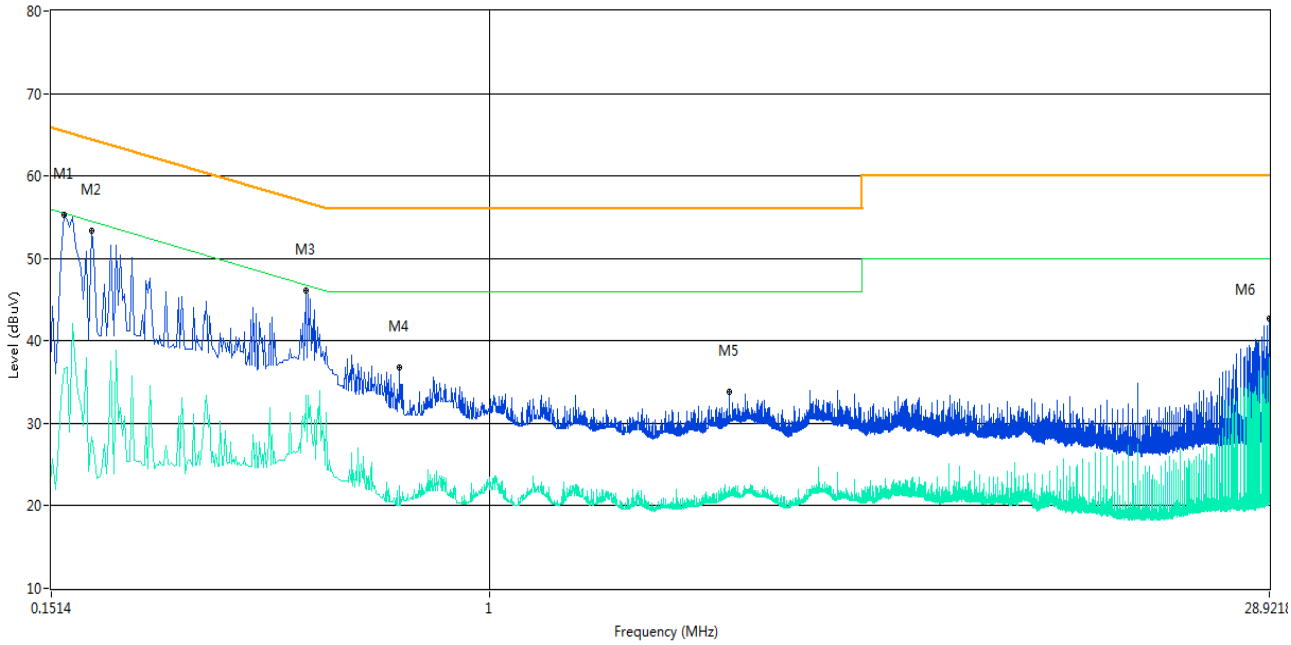
QI Test Data and Plots

A.2.1 L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.154	50.0	10.04	65.8	15.80	Peak	L Line	Pass
1**	0.154	35.7	10.04	55.8	20.10	AV	L Line	Pass
2	0.458	43.6	10.04	56.7	13.10	Peak	L Line	Pass
2**	0.458	33.9	10.04	46.7	12.80	AV	L Line	Pass
3	0.872	32.7	10.06	56.0	23.30	Peak	L Line	Pass
3**	0.872	22.6	10.06	46.0	23.40	AV	L Line	Pass
4	1.142	32.8	10.06	56.0	23.20	Peak	L Line	Pass
4**	1.142	22.4	10.06	46.0	23.60	AV	L Line	Pass
5	5.690	35.7	10.19	60.0	24.30	Peak	L Line	Pass
5**	5.690	23.3	10.19	50.0	26.70	AV	L Line	Pass
6	29.944	49.3	10.87	60.0	10.70	Peak	L Line	Pass
6**	29.944	45.6	10.87	50.0	4.40	AV	L Line	Pass

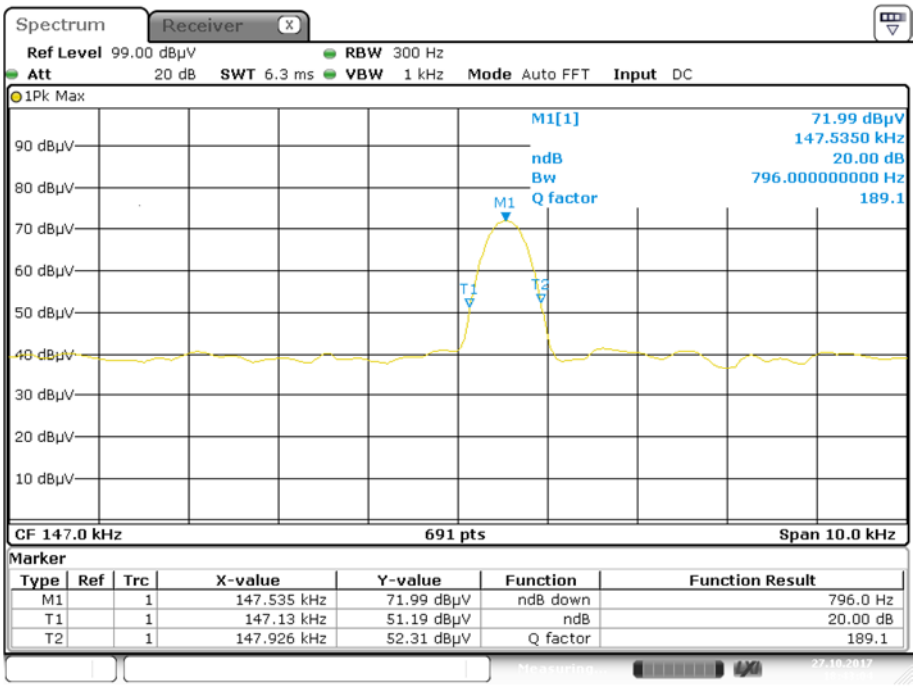
A.2.2 N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.160	55.3	10.04	65.5	10.20	Peak	N Line	Pass
1**	0.160	36.6	10.04	55.5	18.90	AV	N Line	Pass
2	0.180	53.3	10.04	64.5	11.20	Peak	N Line	Pass
2**	0.180	28.4	10.04	54.5	26.10	AV	N Line	Pass
3	0.454	46.1	10.04	56.8	10.70	Peak	N Line	Pass
3**	0.454	33.5	10.04	46.8	13.30	AV	N Line	Pass
4	0.680	36.8	10.05	56.0	19.20	Peak	N Line	Pass
4**	0.680	22.4	10.05	46.0	23.60	AV	N Line	Pass
5	2.816	33.9	10.11	56.0	22.10	Peak	N Line	Pass
5**	2.816	22.3	10.11	46.0	23.70	AV	N Line	Pass
6	28.956	42.8	10.84	60.0	17.20	Peak	N Line	Pass
6**	28.956	35.6	10.84	50.0	14.40	AV	N Line	Pass

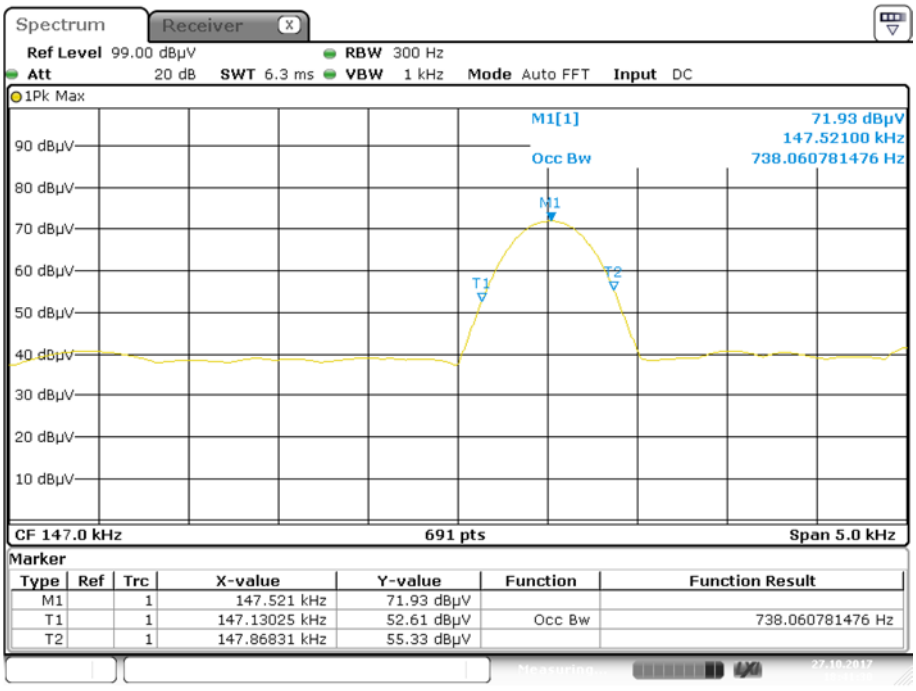
A.3 20 dB Bandwidth

QI Test Data and Plots



99% Occupied Bandwidth

QI Test Data and Plots



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ16A0149-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ16A0149-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ16A0149-AI.PDF”.

--END OF REPORT--