FCC EMC TEST REPORT

ISSUED BY Shenzhen BALUN Technology Co., Ltd.

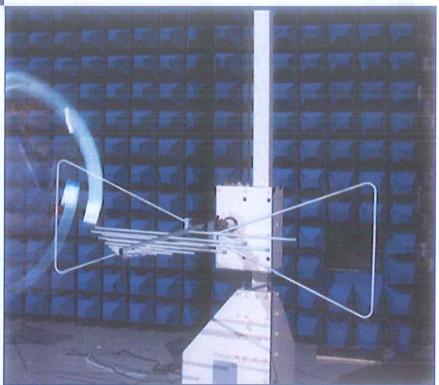


FOR

Rugged PDA

ISSUED TO Winmate Inc.

9F, No. 111-6, Shing-De Road, San-Chung District, New Taipei City 24158, Taiwan



Tested by: 2 lung (ungung Yanqing (Engineer)

Date January

Wel Yanquan

Date January

Wel Yanquan

Date January

Report No.:

t No.: BL-SZ16B0008-401

EUT Name:

Rugged PDA

Model Name:

E500RM8, E500XXXXXXXXXX

Brand Name:

Winmate

Test Standard:

47 CFR Part 15 Subpart B

Test Conclusion:

Pass

Test Date:

Dec. 14, 2016 ~ Dec. 15, 2016

Date of Issue:

Jan. 19, 2017

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Revision History

Version

Issue Date

Revisions Content

Rev. 01 Jan. 19, 2017

Initial Issue

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1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name Shenzhen BA		Shenzhen BALUN Technology Co., Ltd.
Address		Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi
71001033		Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Nun	nber	+86 755 6685 0100
Fax Number	er	+86 755 6182 4271

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.		
Addross	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi		
Address	Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China		
	The laboratory has been listed by Industry Canada to perform		
	electromagnetic emission measurements. The recognition numbers		
	of test site are 11524A-1.		
A ditation	The laboratory has been listed by US Federal Communications		
Accreditation	Commission to perform electromagnetic emission measurements.		
Certificate	The recognition numbers of test site are 832625.		
	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.		
	All measurement facilities used to collect the measurement data are		
Description	located at Block B, FL 1, Baisha Science and Technology Park, Shahe		
Description	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 v5.3.
- (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 Winmate Inc.	
Addroop	9F, No. 111-6, Shing-De Road, San-Chung District, New Taipei City
Address	24158, Taiwan

2.2 Manufacturer Information

Manufacturer	Winmate Inc.	
Address	9F, No. 111-6, Shing-De Road, San-Chung District, New Taipei City	
	24158, Taiwan	

2.3 Factory Information

Factory	Winmate Inc.
Addroop	9F, No. 111-6, Shing-De Road, San-Chung District, New Taipei City
Address	24158, Taiwan

2.4 General Description for Equipment under Test (EUT)

EUT Name	Rugged PDA		
Model Name Under Test	E500RM8		
Series Model Name	E500RM8, E500XXXXXXXXXX		
Description of Model name differentiation	The Circuit, PCB Layout, Electrical Parts and Outlook of E500XXXXXXXXXX are identical to E500RM8. E500XXXXXXXXXXX(X=A-Z, 0-9, a-z, "-", "/", "\" or blank for marketing purpose only, and no impact safety related constructions or critical components such as PCB, circuit and so on).		
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, WIFI, GPS		



2.5 Ancillary Equipment

	Battery		
	Brand Name	Winmate Inc.	
Anaillan: Fauinnant 1	Model No.	E430	
Ancillary Equipment 1	Capacitance	3900 mAh	
	Rated Voltage	3.7 V	
	Limit Charge Voltage	4.2 V	
	Adapter		
Ancillary Equipment 2	Brand Name	ENG	
	Model Name	6A-181WP05	
	Rated Input	100-240 V~, 50/60 Hz, 0.6 A	
	Rated Output	5 V=, 3.0 A	
Ancillant Equipment 2	USB Cable		
Ancillary Equipment 3	Length	1.2 m	
Ancillary Equipment 4	TF Card		

2.6 Technical Information

N/A



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 (9 kHz-30 MHz)	3.97 dB
Radiated emissions (30 MHz-1 GHz)	4.30 dB
Radiated emissions (1 GHz-18 GHz)	4.81 dB
Radiated emissions (18 GHz-26.5 GHz)	5.71 dB



4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

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&SCHW ARZ	ESRP	101036	2016.07.05	2017.07.04	\boxtimes		
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-977	2016.07.19	2018.07.18	\boxtimes		
Test Antenna- Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21			
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60* 7.35m	N/A	2016.08.09	2018.08.08	\boxtimes		

	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	\boxtimes				
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2015.07.22	2017.07.21					
Test Antenna- Horn	SCHWARZBECK	BBHA 9120D	9120D-1148	2015.07.22	2017.07.21	\boxtimes				
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2015.02.28	2017.02.27	\boxtimes				

Conducted disturbance Test								
Description Manufacturer Model Serial No. Cal. Date Cal. Due								
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2016.07.05	2017.07.04	\boxtimes		
LISN	SCHWARZBECK	NSLK 8127	8127-687	2016.07.05	2017.07.04	\boxtimes		
Shielded	ChangNing	CN-130701	130703	N/A	N/A	\boxtimes		
Enclosure	ChangNing	CIN-130701	130703	IN/A	IN/A			



4.3 Test Enclosure list

Description	Manufacturer	Model	Serial No.	Length	Description	Use
PC	Dell	015K3N	N/A	N/A	Special Handled	
Laptop	Apple	A1465	N/A	N/A	N/A	\boxtimes
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	\boxtimes
GPS/GLONAS S Vector signal generator	R&S	N5172B EXG	N/A	N/A	N/A	\boxtimes
WIFI Router	TP-LINK	TL-WDR7500	N/A	N/A	N/A	\boxtimes
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	
Smart Card	N/A	N/A	N/A	N/A	N/A	\boxtimes



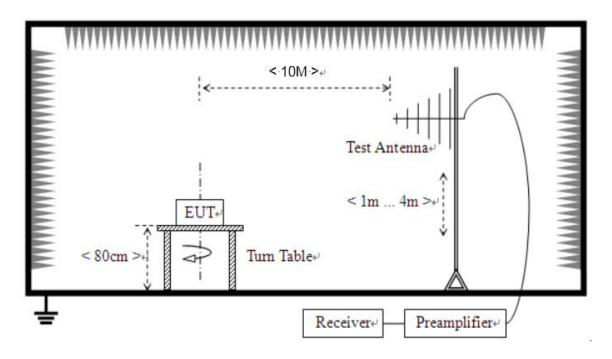
4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	The Data Transmission and Video Record test mode EUT + Battery + TF Card + Adapter + USB Cable + Laptop + BT Link + WIFI Link + GPS RX
TC02	The Video Play and Barcode Reader test mode EUT + Battery + TF Card + Adapter + Barcode Reader ON + BT Link + WIFI Link + GPS RX
TC03	The Smart Card Reader test mode EUT + Battery + TF Card + Adapter + Smart Card
TC04	The Idle test mode EUT + Battery + TF Card+ Adapter



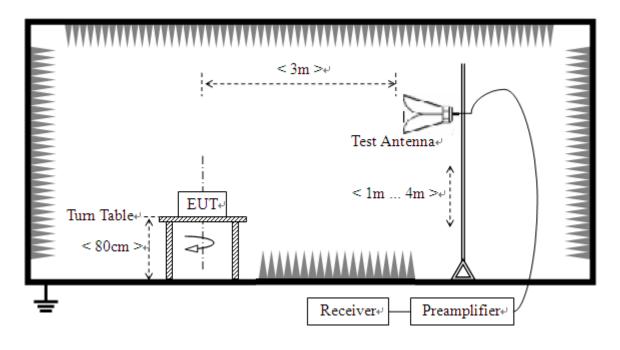
4.5 Test Setups

Test Setup 1



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

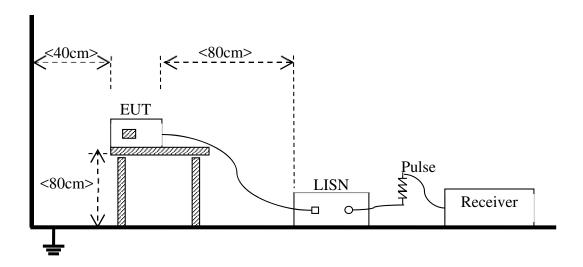
Test Setup 2



(For Radiated Emission Test (above 1 GHz))



Test Setup 3



(For Conducted Emission, AC Ports Test)



4.6 Test Conditions

Test Case	Test Conditions		
	Test Env.	NTNV	
Radiated Emission	Test Setup	Test Setup 1&2	
	Test Configuration	TC01~TC04 Note	
Conducted Emission, AC Ports	Test Env.	NTNV	
	Test Setup	Test Setup 3	
	Test Configuration	TC01~TC04 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 Data Transmission and Video Record 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 (MHz)	Field Strength (µV/m) at 3 m	Field Strength (µV/m) at 10 m
30 - 88	100	90
88 - 216	150	150
216 - 960	200	210
Above 960	500	300

NOTE:

- 1) Field Strength ($dB\mu V/m$) = 20*log [Field Strength ($\mu V/m$)].
- 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 dBuV/m@3 m (AV) and 74 dBuV/m@3 m (PK)

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

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

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

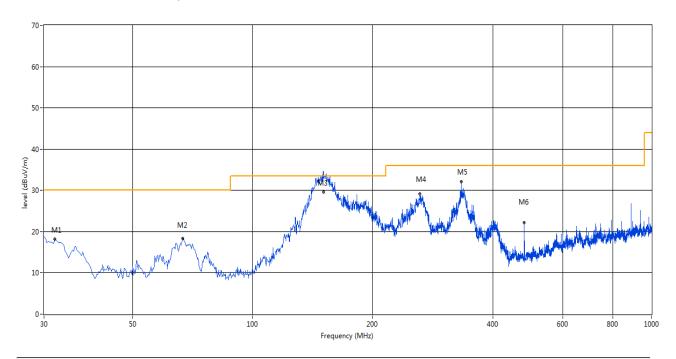
Note 1: The symbol of "--" in the table which means not application.

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 Data Transmission and Video Record test mode

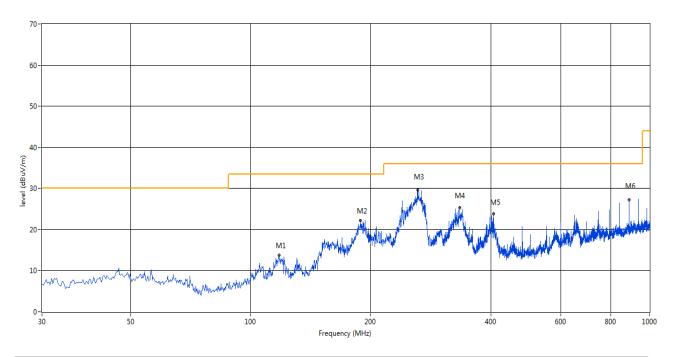
A.1.1 Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(0)	(cm)		
1	31.940	18.14	-16.92	30.0	11.86	Peak	128.00	300	Vertical	Pass
2	66.851	18.35	-16.93	30.0	11.65	Peak	291.00	200	Vertical	Pass
3	150.690	35.79	-19.58	33.5	-2.29	Peak	288.0	141.00	Vertical	N/A
3*	150.690	29.56	-19.58	33.5	3.94	QP	288.00	141.00	Vertical	Pass
4	262.499	29.17	-14.27	36.0	6.83	Peak	205.00	200	Vertical	Pass
5	333.292	32.06	-12.43	36.0	3.94	Peak	326.00	100	Vertical	Pass
6	479.968	22.18	-9.69	36.0	13.82	Peak	22.00	100	Vertical	Pass



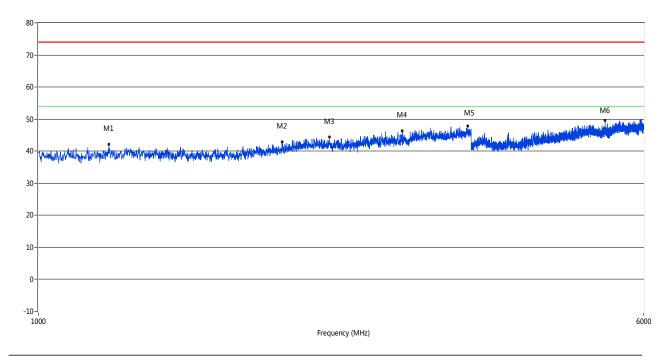
A.1.2 Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(0)	(cm)		
1	118.005	13.83	-17.45	33.5	19.67	Peak	0.00	400	Horizontal	Pass
2	188.313	22.15	-16.87	33.5	11.35	Peak	358.00	100	Horizontal	Pass
3	262.257	29.67	-14.31	36.0	6.33	Peak	360.00	100	Horizontal	Pass
4	334.504	25.34	-12.32	36.0	10.66	Peak	113.00	100	Horizontal	Pass
5	406.023	23.89	-10.60	36.0	12.11	Peak	120.00	100	Horizontal	Pass
6	887.751	27.18	-2.76	36.0	8.82	Peak	229.00	100	Horizontal	Pass



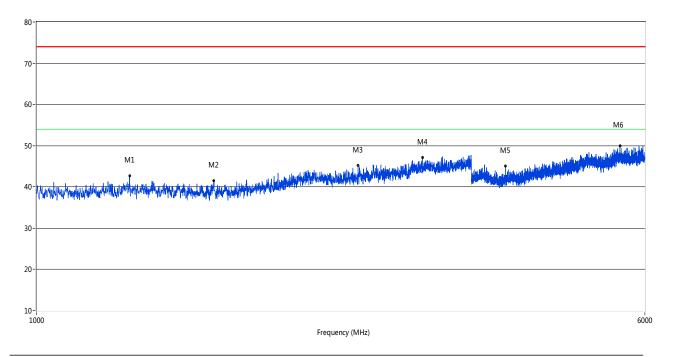
A.1.3 Test Antenna Vertical, 1 GHz – 6 GHz



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)		(0)	(cm)		
1	1232.050	42.06	-3.20	74.0	31.94	Peak	360.00	100	Vertical	Pass
2	2056.250	42.89	-0.09	74.0	31.11	Peak	335.20	100	Vertical	Pass
3	2365.650	44.43	1.91	74.0	29.57	Peak	139.60	100	Vertical	Pass
4	2937.000	46.32	4.08	74.0	27.68	Peak	82.00	100	Vertical	Pass
5	3563.600	47.83	5.37	74.0	26.17	Peak	220.00	100	Vertical	Pass
6	5352.600	49.56	11.78	74.0	24.44	Peak	152.90	100	Vertical	Pass



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



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)		(dBuV/m)	(dB)			(cm)		
1	1314.600	42.65	-2.11	74.0	31.35	Peak	48.30	100	Horizontal	Pass
2	1684.450	41.57	-0.71	74.0	32.43	Peak	222.30	100	Horizontal	Pass
3	2578.200	45.16	2.18	74.0	28.84	Peak	222.30	100	Horizontal	Pass
4	3115.100	47.21	4.67	74.0	26.79	Peak	210.70	100	Horizontal	Pass
5	3981.000	45.12	8.23	74.0	28.88	Peak	199.70	100	Horizontal	Pass
6	5575.200	49.95	11.68	74.0	24.05	Peak	358.50	100	Horizontal	Pass



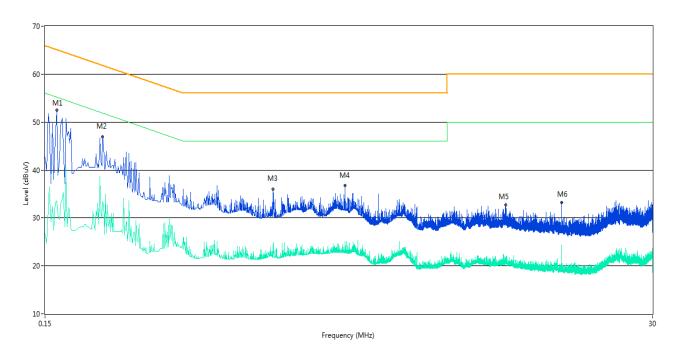
A.2 Conducted Emission

Test Data and Plots

The Data Transmission and Video Record 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.

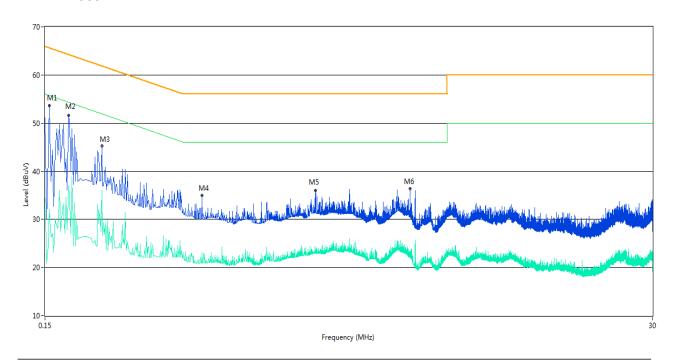
A.2.1 L Phase



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Line	Verdict
	(MHz)	(dBuV)		(dBuV)	(dB)			
1	0.166	52.5	11.00	65.2	12.70	Peak	L Line	Pass
1**	0.166	33.6	11.00	55.2	21.60	AV	L Line	Pass
2	0.248	46.9	11.00	61.8	14.90	Peak	L Line	Pass
2**	0.248	33.5	11.00	51.8	18.30	AV	L Line	Pass
3	1.096	36.0	11.00	56.0	20.00	Peak	L Line	Pass
3**	1.096	24.0	11.00	46.0	22.00	AV	L Line	Pass
4	2.052	36.7	11.00	56.0	19.30	Peak	L Line	Pass
4**	2.052	25.0	11.00	46.0	21.00	AV	L Line	Pass
5	8.350	32.7	11.00	60.0	27.30	Peak	L Line	Pass
5**	8.350	19.7	11.00	50.0	30.30	AV	L Line	Pass
6	13.610	33.2	11.00	60.0	26.80	Peak	L Line	Pass
6**	13.610	24.4	11.00	50.0	25.60	AV	L Line	Pass



A.2.2 N Phase



No.	Frequency	Results	Factor (dB)	Limit	Margin	Detector	Line	Verdict
	(MHz)	(dBuV)		(dBuV)	(dB)			
1	0.156	53.7	11.00	65.7	12.00	Peak	N Line	Pass
1**	0.156	32.1	11.00	55.7	23.60	AV	N Line	Pass
2	0.184	51.6	11.00	64.3	12.70	Peak	N Line	Pass
2**	0.184	37.0	11.00	54.3	17.30	AV	N Line	Pass
3	0.246	45.2	11.00	61.9	16.70	Peak	N Line	Pass
3**	0.246	36.1	11.00	51.9	15.80	AV	N Line	Pass
4	0.590	35.0	11.00	56.0	21.00	Peak	N Line	Pass
4**	0.590	23.0	11.00	46.0	23.00	AV	N Line	Pass
5	1.586	36.0	11.00	56.0	20.00	Peak	N Line	Pass
5**	1.586	23.5	11.00	46.0	22.50	AV	N Line	Pass
6	3.620	36.4	11.00	56.0	19.60	Peak	N Line	Pass
6**	3.620	23.4	11.00	46.0	22.60	AV	N Line	Pass



ANNEX B TEST SETUP PHOTOS

Please refer the document "BL-SZ16B0008-AE.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "BL-SZ16B0008-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "BL-SZ16B0008-AI.PDF".

--END OF REPORT--