

FCC - TEST REPORT

Report Number : **60.790.15.002.01** Date of Issue : March 23, 2015

Model : **ENTERPRISE LITE**

Product Type : **ENTERPRISE TABLET LITE**

Applicant : Merchandising Tech. Inc.

Address : Room 1101 & 1103, 11/F, Premier Center, 20 Cheung Shun Street,
Lai Chi Kok, Kowloon, Hong Kong

Production Facility : Hualun Technology Co., Ltd

Address : 3F No. 82-4 Dongshun St. Shulin Dist new Taipei City 238 Taiwan

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : 38

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2 Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	ENTERPRISE TABLET LITE
Model no.:	ENTERPRISE LITE
FCC ID:	2AA2X185-2462
Rated Voltage:	100-240VAC for AC/DC adaptor – Model: EXA0703YJ Input: 100-240VAC 50-60Hz, 1.5A Output: 24VDC, 2.71A
Frequency:	13.56MHz
Description of the EUT:	The EUT is considered as wireless device, the frequency range is 13.56MHz. More details of EUT technical specification please refer to the User's Manual.

3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C Federal Communications Commission, PART 15 – Radio Frequency Devices, Subpart C – Intentional Radiators

4 Details about the Test Laboratory

Site 1

Company name: TÜV SÜD Hong Kong Ltd.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin, Hong Kong

Site 2

Company name: Hong Kong Productivity Council
LG1, HKPC Building,
78 Tat Chee Avenue,
Kowloon, Hong Kong
FCC Registration Number: 90656

Emission Tests	
Test Item	Test Site
FCC Part 15.207	
Conducted Emission Test	Site 2
FCC Part 15.209	
Radiated Emission Test	Site 2
FCC Part 15.225	
Operation within the band 13.110 – 14.010 MHz	Site 2

4.1. Test Equipment Site List

Radiated emission Test – Site 2

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Test Receiver	R & S	ESU26	100050	05-Jan-16
Bi-conical Antenna	R & S	HK116	100242	05-May-15
Log Periodic Antenna	R & S	HL223	841516/020	06-May-15
Coaxial cable 50ohm	Rosenberger	RTK081-05S-05S-10m	LA2-001-10M / 001	15-Nov-15
Microwave amplifier 0.5-26.5GHz, 25dB gain	HP	83017A	3123A00437	03-Oct-15
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28-Oct-15
Horn Antenna	EMCO	3115	9002-3351	11-May-15
Active Loop Antenna	EMCO	6502	9107-2651	21-Jun-15

Conducted Emission Test – Site 2

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESCI	100427	28-Feb-16
Coaxial Cable	N/A	N/A	N/A	03-June-15
LISN	Rohde & Schwarz	ENV 216	100432	19-May-15

4.2. Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty		
Items		Extended Uncertainty
Radiated Emissions	Level accuracy 30MHz to 1GHz 1GHz to 25GHz	± 3.19 dB
Conducted Emissions	Level accuracy 9 kHz to 30 MHz	± 2.48 dB

5 Summary of Test Results

Emission Tests				
FCC Part 15.207				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
Conducted Emission Test	10-11	☒	☐	☐
FCC Part 15.209				
Radiated Emission Test	12-17	☒	☐	☐
FCC Part 15.225				
Operation within the band 13.110 – 14.010 MHz	18	☒	☐	☐

6 General Remarks

Remarks

Test supporting Equipment: i-pad mini – Serial number: DLXNFHX1G5V3

SUMMARY:

- All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

- The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

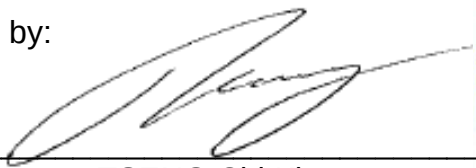
Sample Received Date: January 13, 2015

Testing Start Date: January 14, 2015

Testing End Date: March 4, 2015

- TÜV SÜD HONG KONG LTD. -

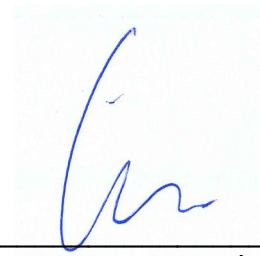
Reviewed by:



TSENG Chi Kit



Prepared by:



CHAN Kwong Ngai

7 Emission Test Results

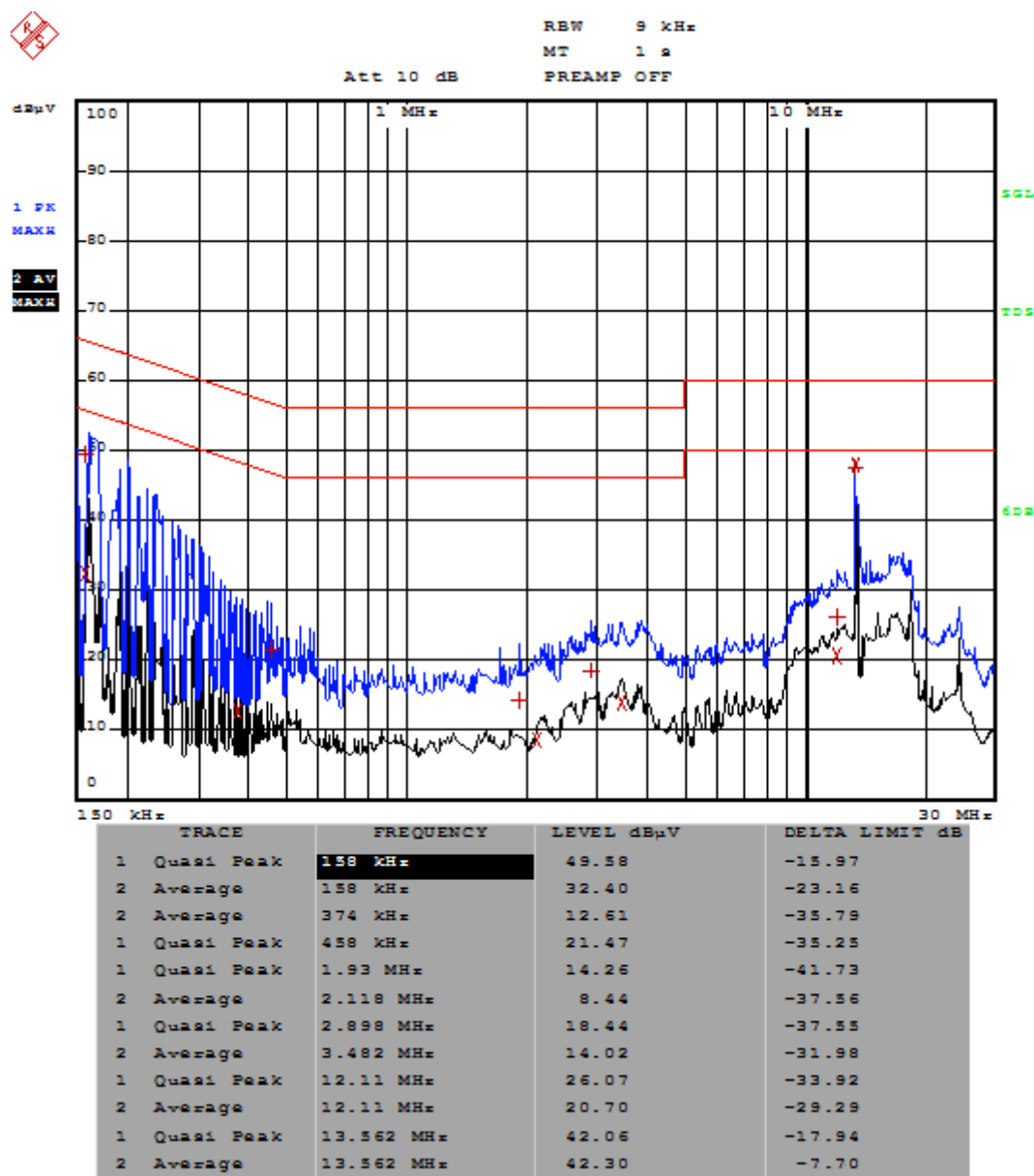
7.1 Conducted Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.207, AC Mains, L Line
 Comment: 120VAC, 60Hz

Test Result

☒ Passed

☐ Not Passed

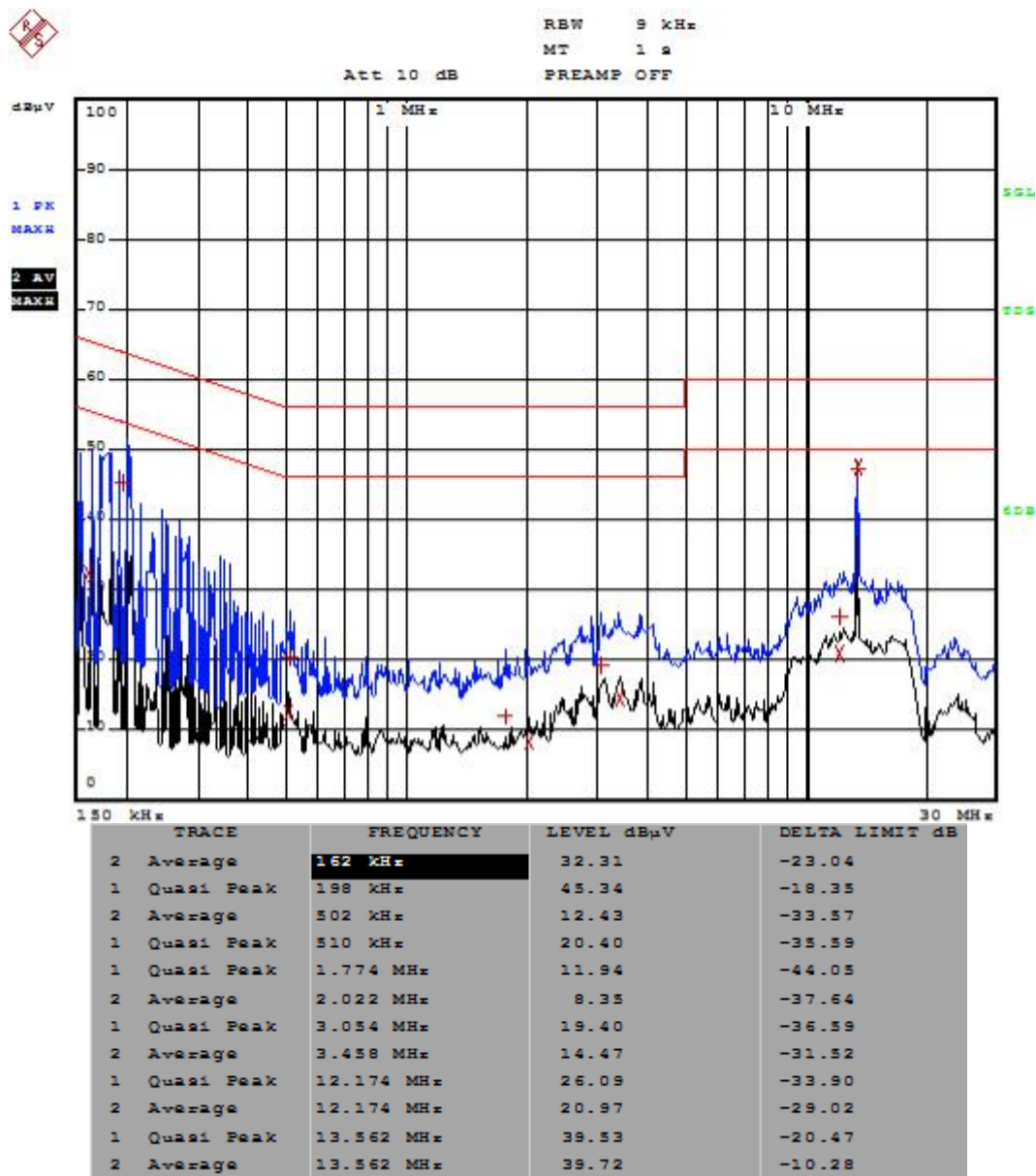


Conducted Emission

EUT: ENTERPRISE LITE
Op Condition: Normal Working
Test Specification: FCC 15.207, AC Mains, N Line
Comment: 120VAC, 60Hz

Test Result

☒ Passed
☐ Not Passed

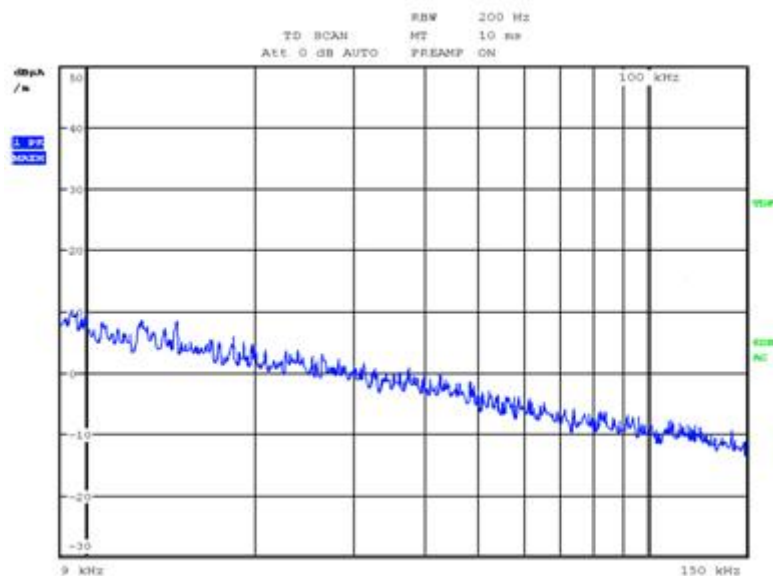


7.2 Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Face
 Comment: 120VAC, 60Hz (Measured at 3m)

Test Result

☒ Passed

☐ Not Passed


Limit of 9 kHz to 490 kHz = $20 \log (2400/F) \text{ uV/m @ } 300\text{m}$
 = 48.519 dBuV/m to 13.800 dBuV/m @ 300m
 = 88.519 dBuV/m to 53.842 dBuV/m @ 3m
 = 37.019 dBuA/m to 2.342 dBuA/m @ 3m

Limit of 490 kHz to 1.705 MHz = $20 \log (24000/F) \text{ uV/m @ } 30\text{m}$
 = 33.800 dBuV/m to 22.969 dBuV/m @ 30m
 = 53.800 dBuV/m to 42.969 dBuV/m @ 3m
 = 2.300 dBuA/m to -8.531 dBuA/m @ 3m

Limit of 1.705 MHz to 30 MHz = $30 \text{ uV/m @ } 30\text{m}$
 = 29.5 dBuV/m @ 30m
 = 49.5 dBuV/m @ 3m
 = -2.0 dBuA/m @ 3m

Where F = unwanted emission frequency in kHz

* For 13.56 MHz, it is not the subject to FCC 15.209; it is subject to FCC 15.225.

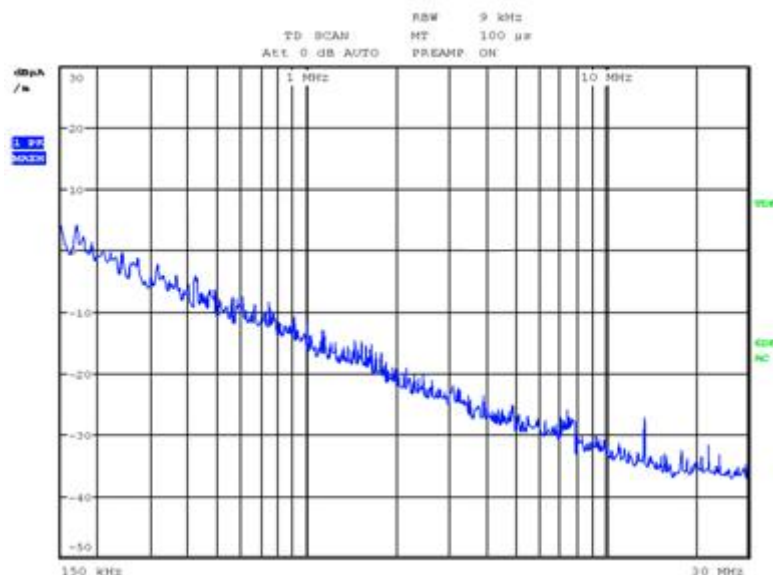
Frequency	QP	Limit	Margin
MHz	dBuA/m	dBuA/m	dB
0.010	+9.1	+37.019	-27.919
0.030	+0.5	+26.561	-26.061
0.100	-9.0	+16.104	-25.104

Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Face
 Comment: 120VAC, 60Hz (Measured at 3m)

Test Result

☒ Passed
☐ Not Passed



Limit of 9 kHz to 490 kHz = $20 \log (2400/F) \text{ uV/m @ 300m}$
 = 48.519 dBuV/m to 13.800 dBuV/m @ 300m
 = 88.519 dBuV/m to 53.842 dBuV/m @ 3m
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Limit of 1.705 MHz to 30 MHz = 30 uV/m @ 30m
 = 29.5 dBuV/m @ 30m
 = 49.5 dBuV/m @ 3m
 = -2.0 dBuA/m @ 3m

Where F = unwanted emission frequency in kHz

* For 13.56 MHz, it is not the subject to FCC 15.209; it is subject to FCC 15.225.

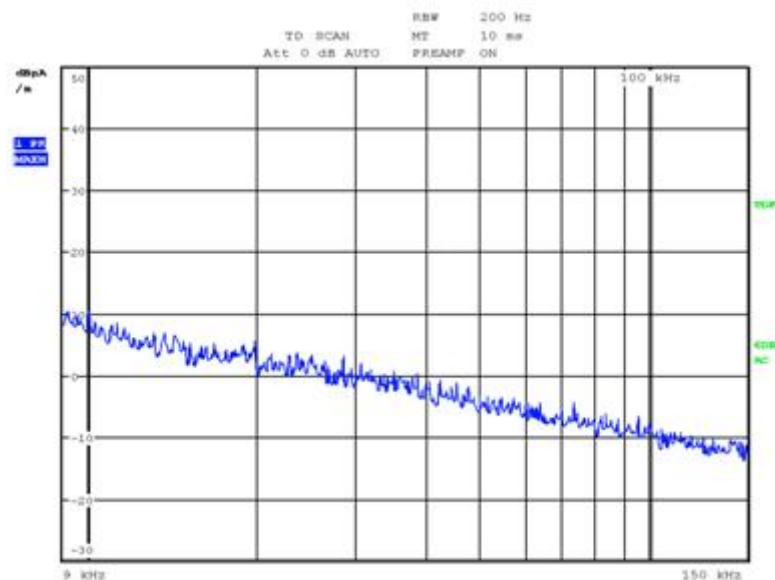
Frequency MHz	QP dBμA/m	Limit dBμA/m	Margin dB
0.162	+2.0	+12.580	-10.580
0.490	-8.0	+2.300	-10.3
1.705	-14.2	-8.531	-5.669
13.560	-27.1	-2.0	-25.1
27.120	-33.0	-2.0	-31.0

Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Side
 Comment: 120VAC, 60Hz (Measured at 3m)

Test Result

☒ Passed
☐ Not Passed



Limit of 9 kHz to 490 kHz = $20 \log (2400/F) \text{ uV/m @ 300m}$
 = 48.519 dBuV/m to 13.800 dBuV/m @ 300m
 = 88.519 dBuV/m to 53.842 dBuV/m @ 3m
 = 37.019 dBuA/m to 2.342 dBuA/m @ 3m

Limit of 490 kHz to 1.705 MHz = $20 \log (24000/F) \text{ uV/m @ 30m}$
 = 33.800 dBuV/m to 22.969 dBuV/m @ 30m
 = 53.800 dBuV/m to 42.969 dBuV/m @ 3m
 = 2.300 dBuA/m to -8.531 dBuA/m @ 3m

Limit of 1.705 MHz to 30 MHz = 30 uV/m @ 30m
 = 29.5 dBuV/m @ 30m
 = 49.5 dBuV/m @ 3m
 = -2.0 dBuA/m @ 3m

Where F = unwanted emission frequency in kHz

* For 13.56 MHz, it is not the subject to FCC 15.209; it is subject to FCC 15.225.

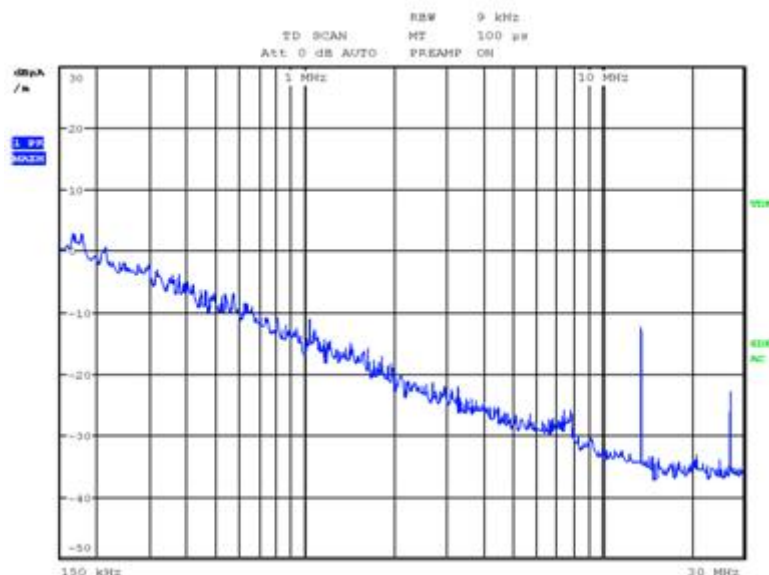
Frequency MHz	QP dBuA/m	Limit dBuA/m	Margin dB
0.010	+8.6	+37.019	-28.419
0.030	+0.7	+26.561	-25.861
0.100	-9.6	+16.104	-25.704

Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Side
 Comment: 120VAC, 60Hz (Measured at 3m)

Test Result

☒ Passed
☐ Not Passed



Limit of 9 kHz to 490 kHz = $20 \log (2400/F) \text{ uV/m @ 300m}$
 = 48.519 dBuV/m to 13.800 dBuV/m @ 300m
 = 88.519 dBuV/m to 53.842 dBuV/m @ 3m
 = 37.019 dBuA/m to 2.342 dBuA/m @ 3m

Limit of 490 kHz to 1.705 MHz = $20 \log (24000/F) \text{ uV/m @ 30m}$
 = 33.800 dBuV/m to 22.969 dBuV/m @ 30m
 = 53.800 dBuV/m to 42.969 dBuV/m @ 3m
 = 2.300 dBuA/m to -8.531 dBuA/m @ 3m

Limit of 1.705 MHz to 30 MHz = 30 uV/m @ 30m
 = 29.5 dBuV/m @ 30m
 = 49.5 dBuV/m @ 3m
 = -2.0 dBuA/m @ 3m

Where F = unwanted emission frequency in kHz

* For 13.56 MHz, it is not the subject to FCC 15.209; it is subject to FCC 15.225.

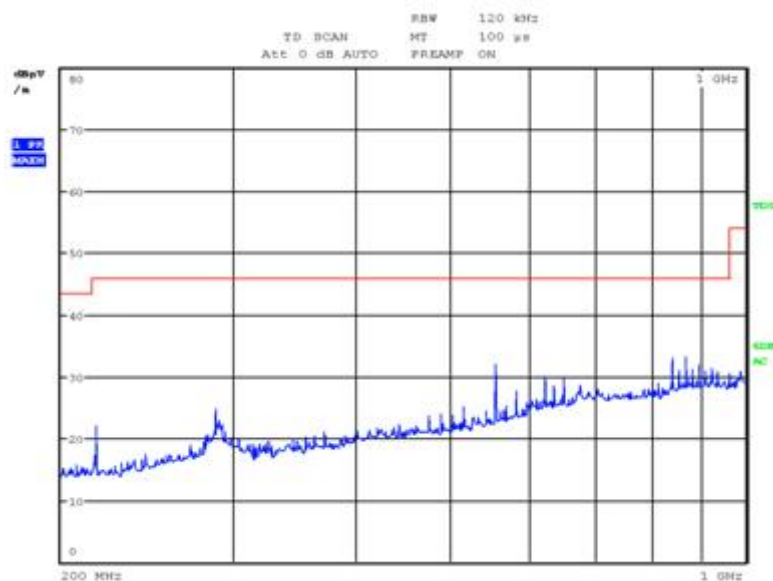
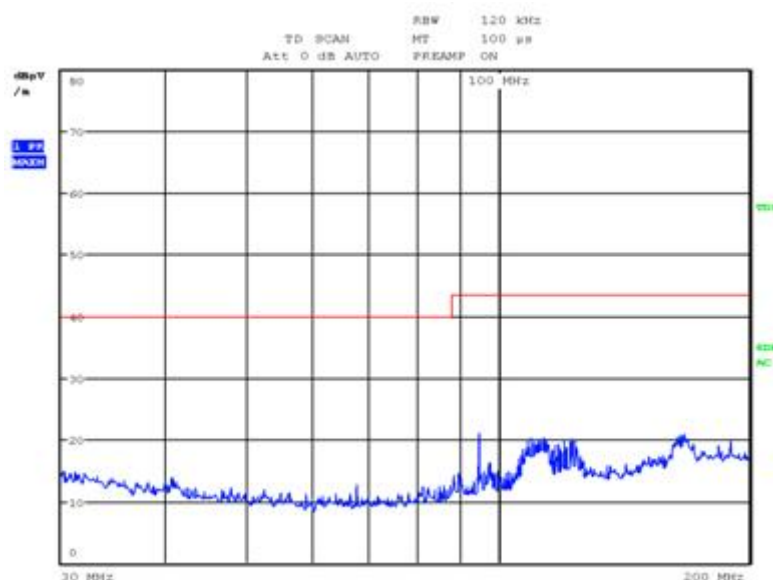
Frequency MHz	QP dBμA/m	Limit dBμA/m	Margin dB
0.163	+1.3	+12.580	-11.280
0.490	-7.2	+2.300	-9.500
1.705	-15.2	-8.531	-6.669
13.560	-12.3	-2.0	-10.3
27.120	-22.7	-2.0	-20.7

Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Horizontal
 Comment: 120VAC, 60Hz

Test Result

☒ Passed
☐ Not Passed



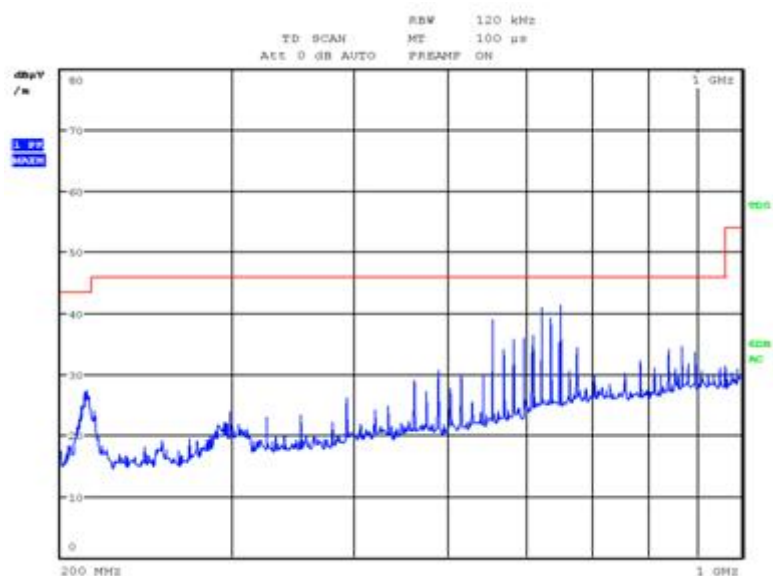
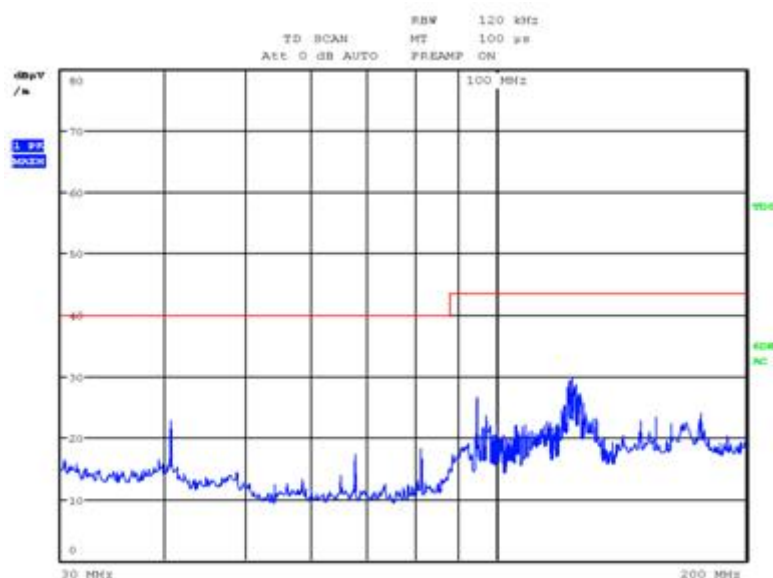
Frequency MHz	QP dBμV/m	Limit dBμV/m	Margin dB
94.920	21.0	43.5	-22.5
167.070	20.9	43.5	-22.6
555.980	32.0	46.0	-14.0
867.890	33.1	46.0	-12.9

Radiated Emission

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.209, Antenna: Vertical
 Comment: 120VAC, 60Hz

Test Result

☒ Passed
☐ Not Passed



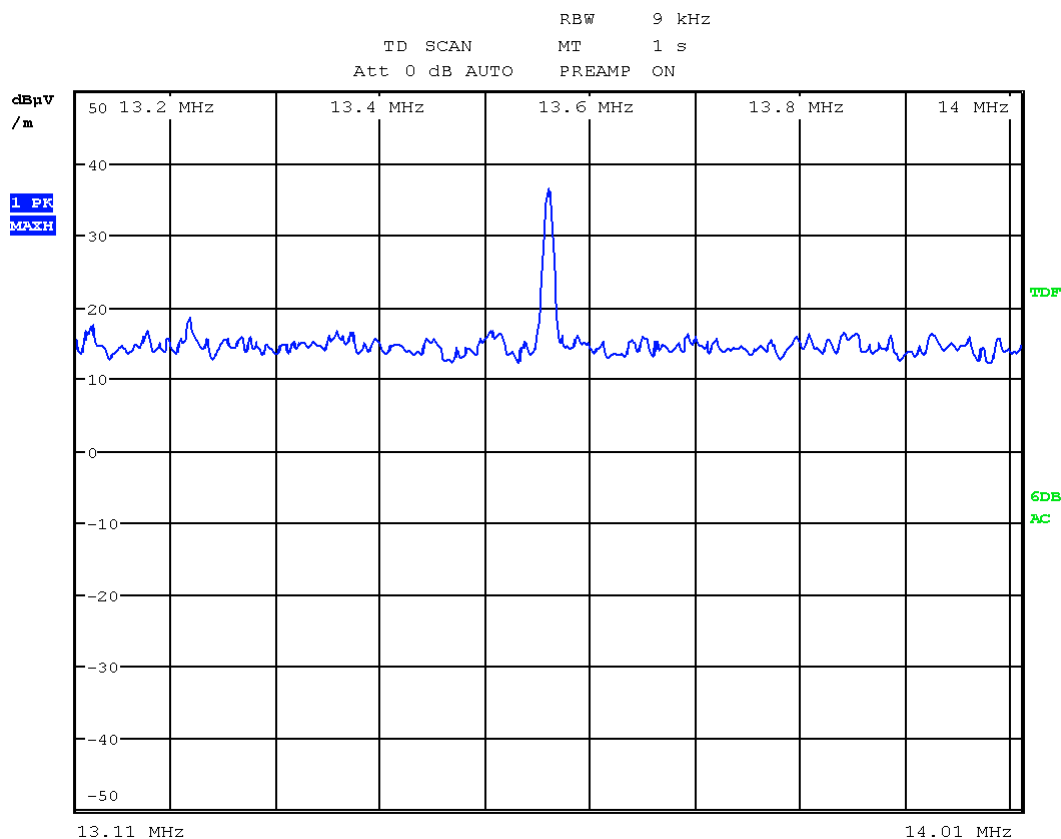
Frequency MHz	QP dBμV/m	Limit dBμV/m	Margin dB
94.920	26.6	43.5	-16.9
123.660	29.8	43.5	-13.7
623.780	40.9	46.0	-5.1
650.900	41.3	46.0	-4.7

7.3 Operation within the band 13.110 – 14.010 MHz

EUT: ENTERPRISE LITE
 Op Condition: Normal Working
 Test Specification: FCC 15.225
 Comment: 120VAC, 60Hz (Measured at 3m)

Test Result

☒ Passed

☐ Not Passed


The field strength of any emission shall not exceed the following limits:

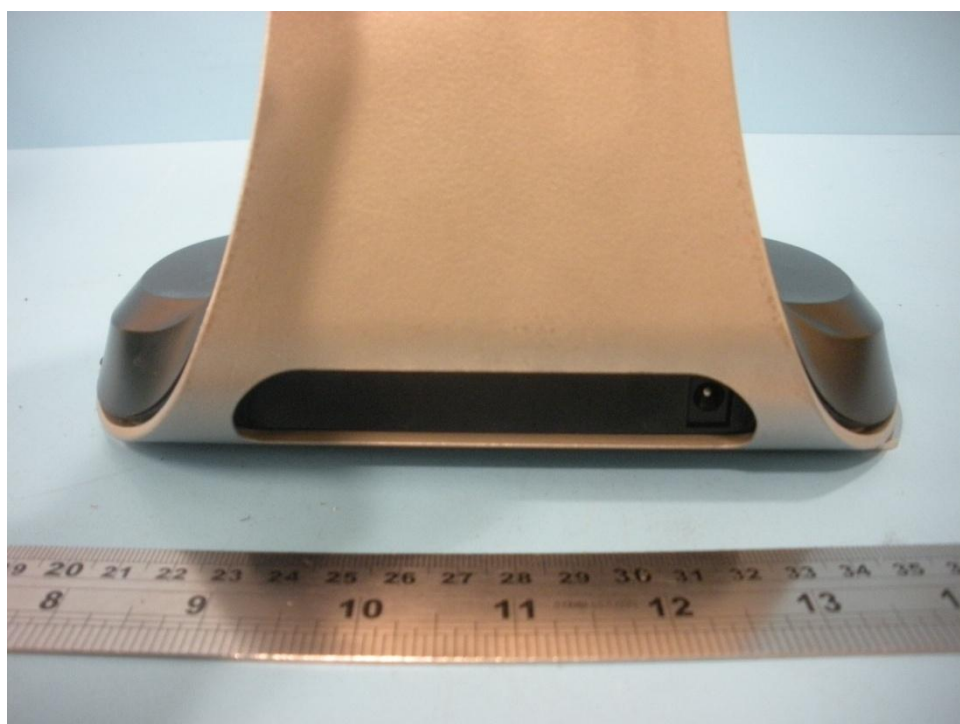
- (a) 15.848 millivolts/m (84 dBμV/m) at 30 m, (104 dBμV/m) at 3 m, within the band 13.553-13.567 MHz.
- (b) 334 microvolts/m (50.5 dBμV/m) at 30 m, (70.5 dBμV/m) at 3 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.
- (c) 106 microvolts/m (40.5 dBμV/m) at 30 m, (60.5 dBμV/m) at 3 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz.
- (d) 30 microvolts/m (29.5 dBμV/m) at 30 m, (49.5 dBμV/m) at 3 m, outside the band 13.110-14.010 MHz.

Frequency MHz	QP dBμV/m	Limit dBμV/m	Margin dB
13.560	36.4	104	-67.6

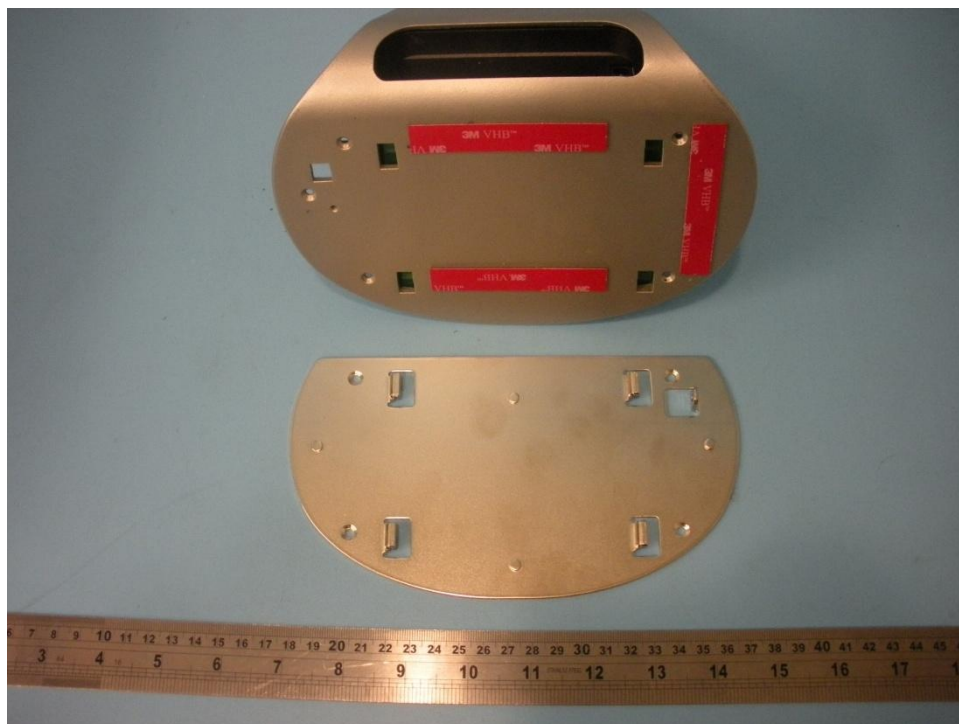
8 Appendix A - Photographs of EUT



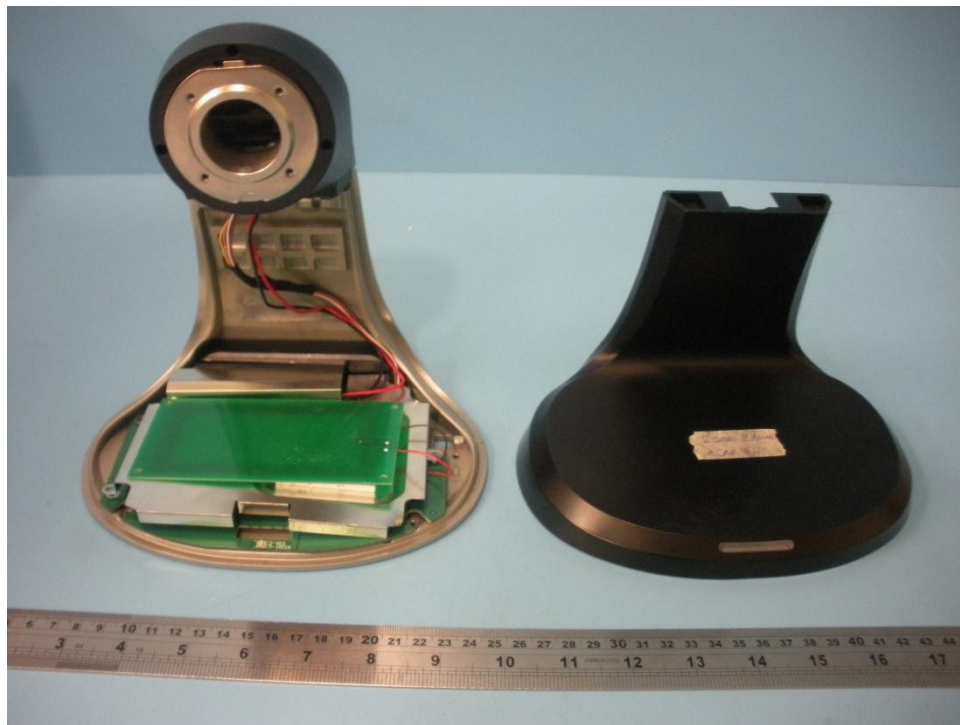
Appendix A



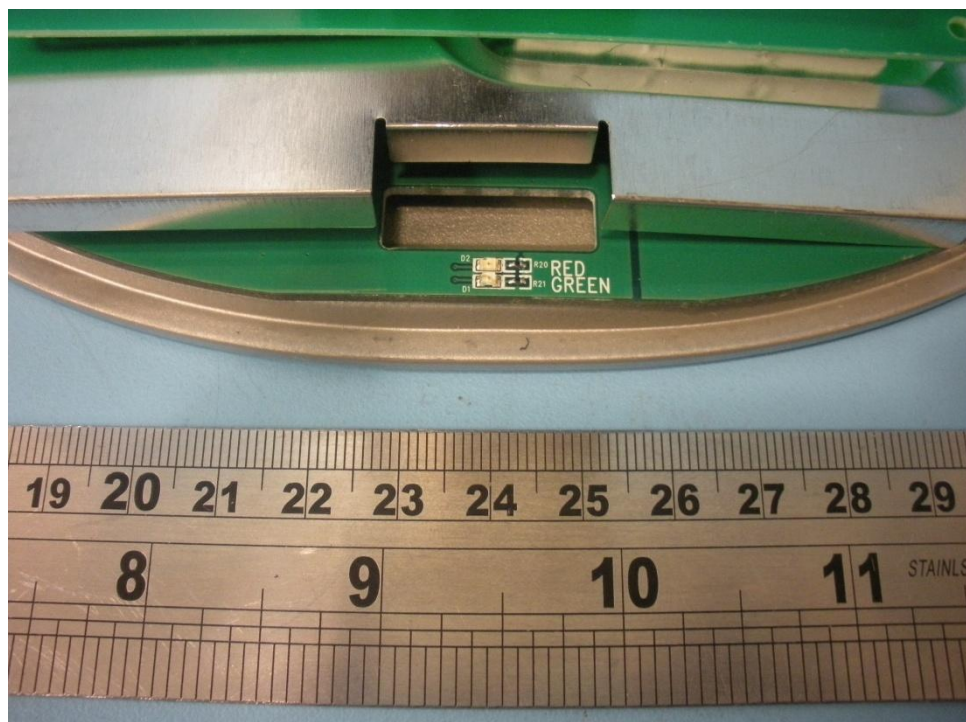
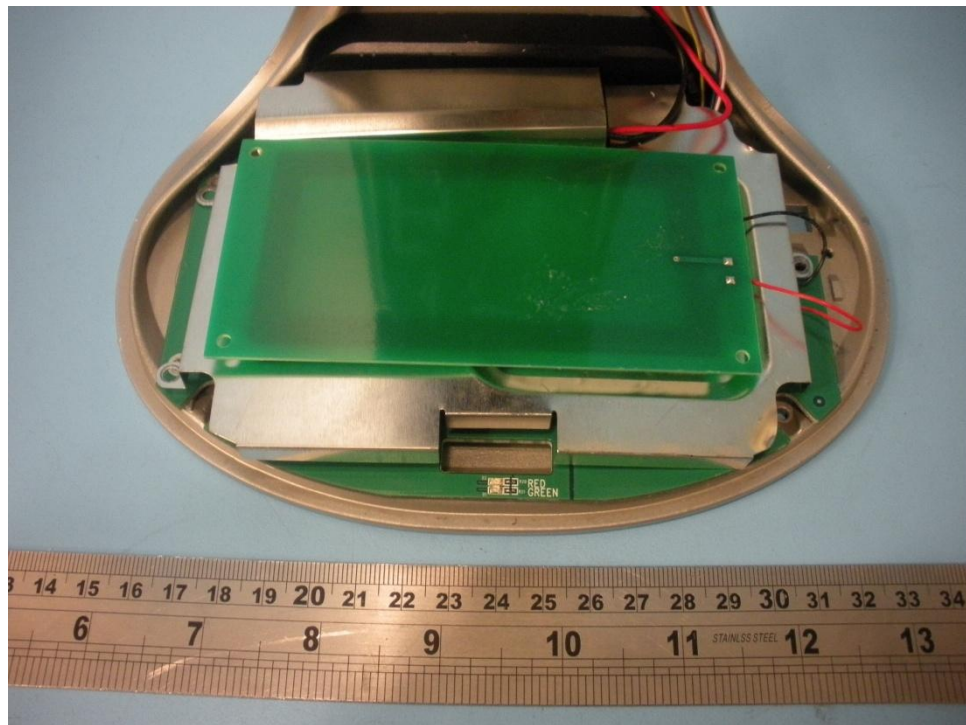
Appendix A



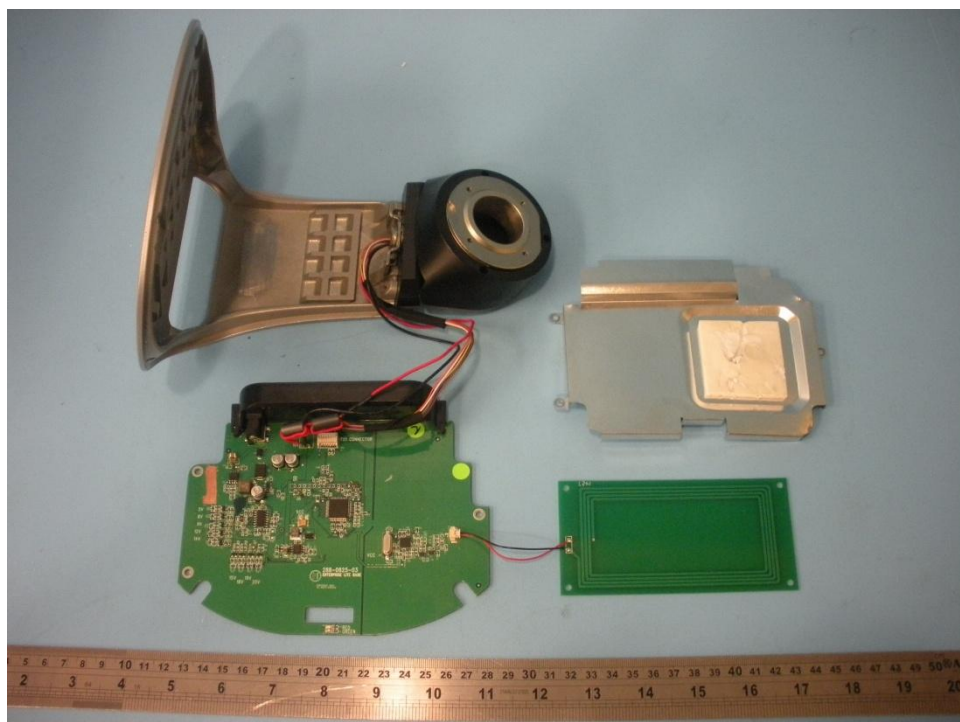
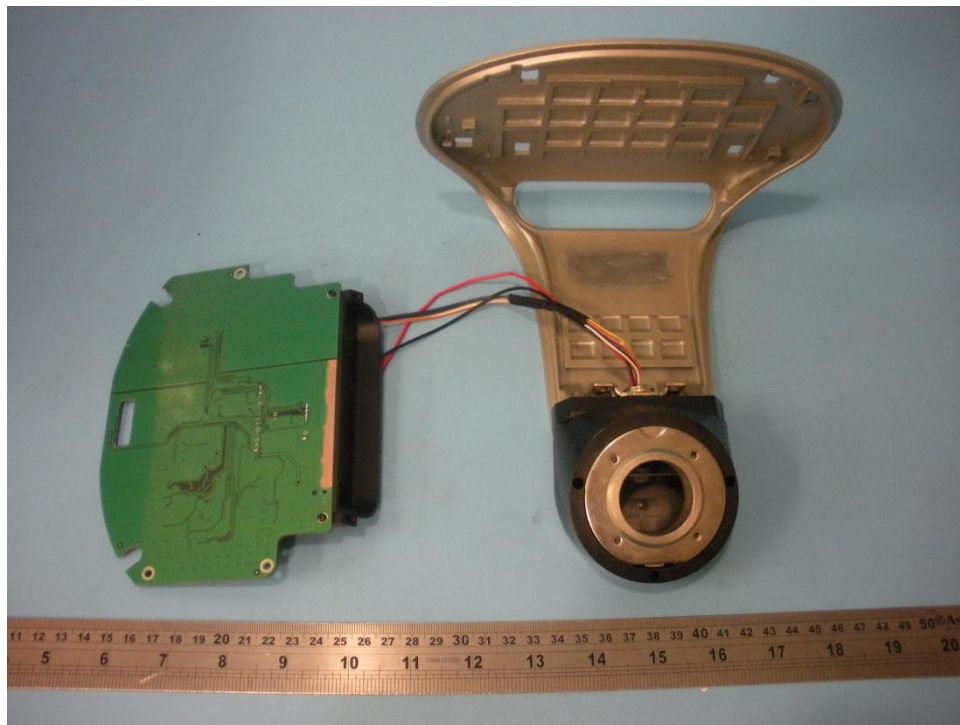
Appendix A



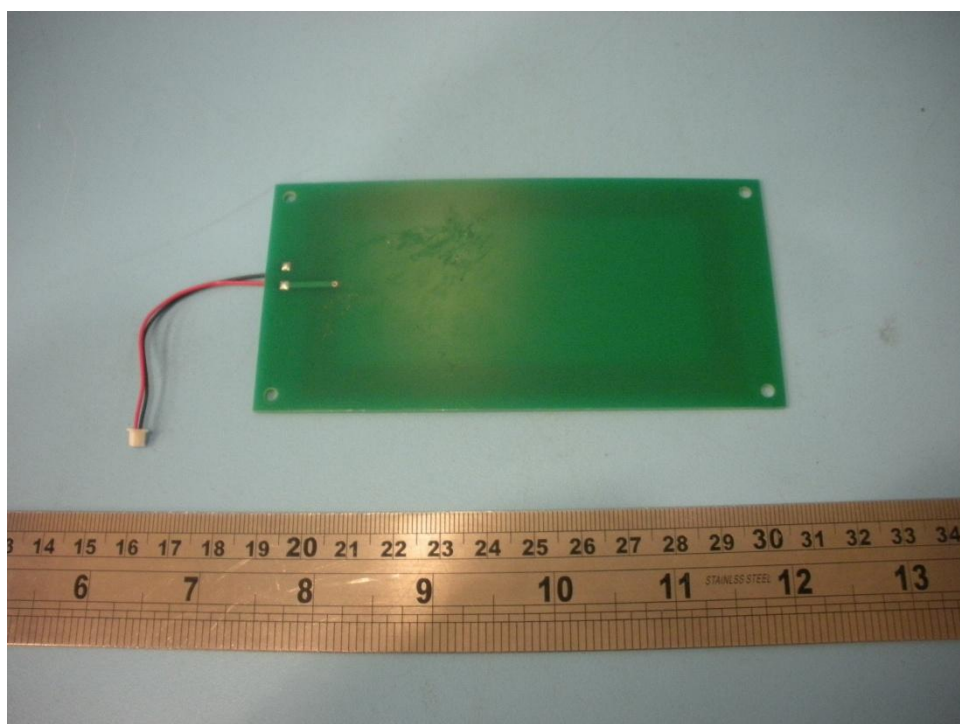
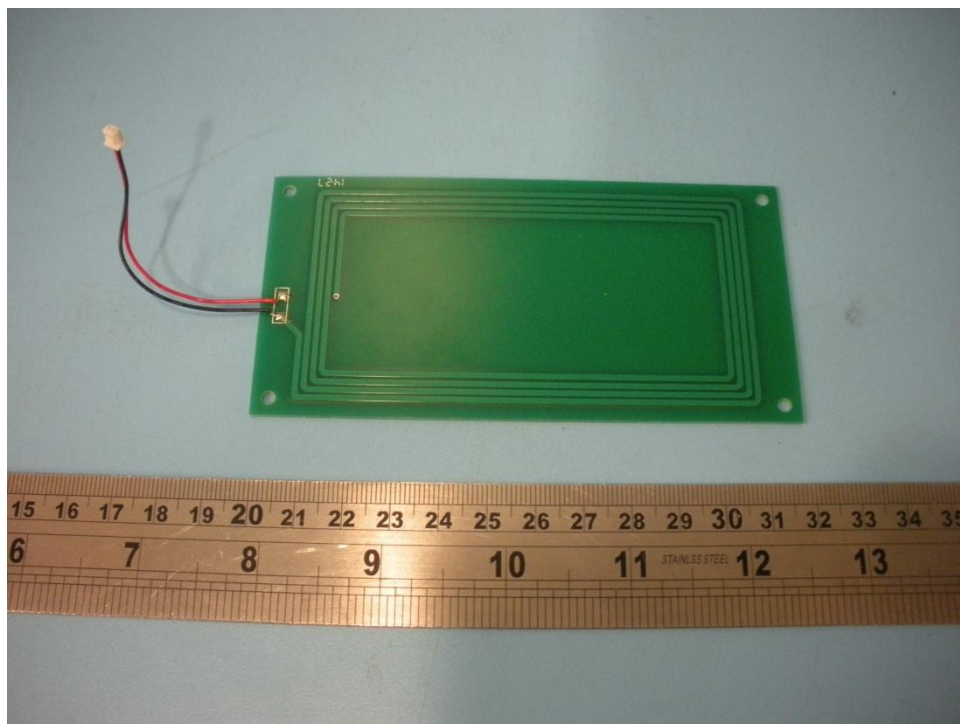
Appendix A



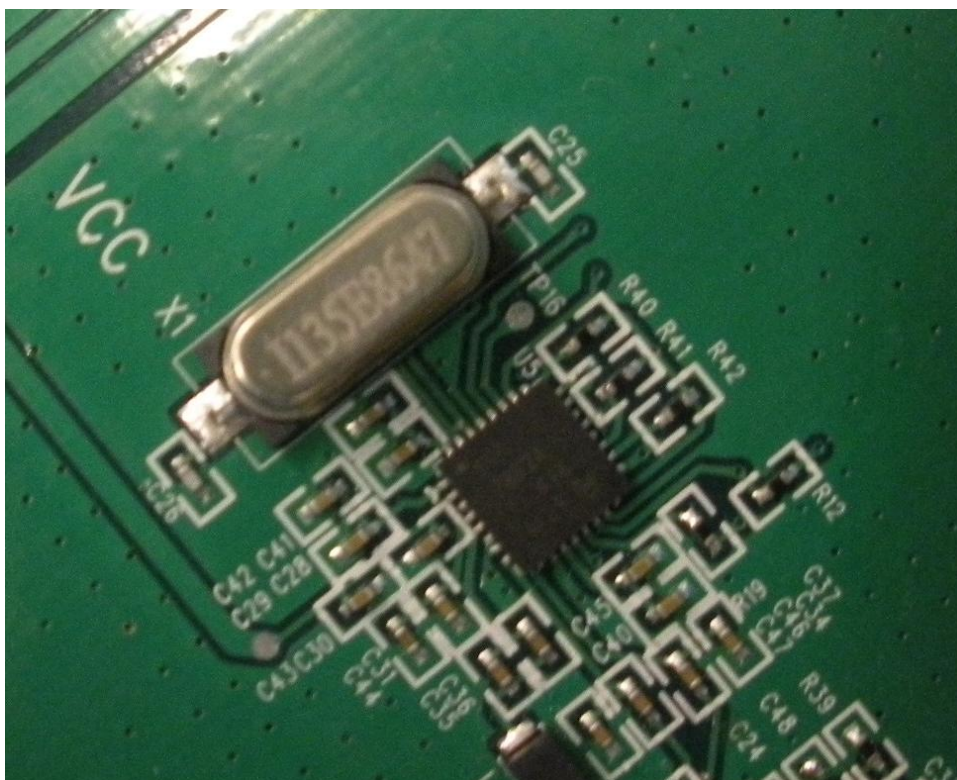
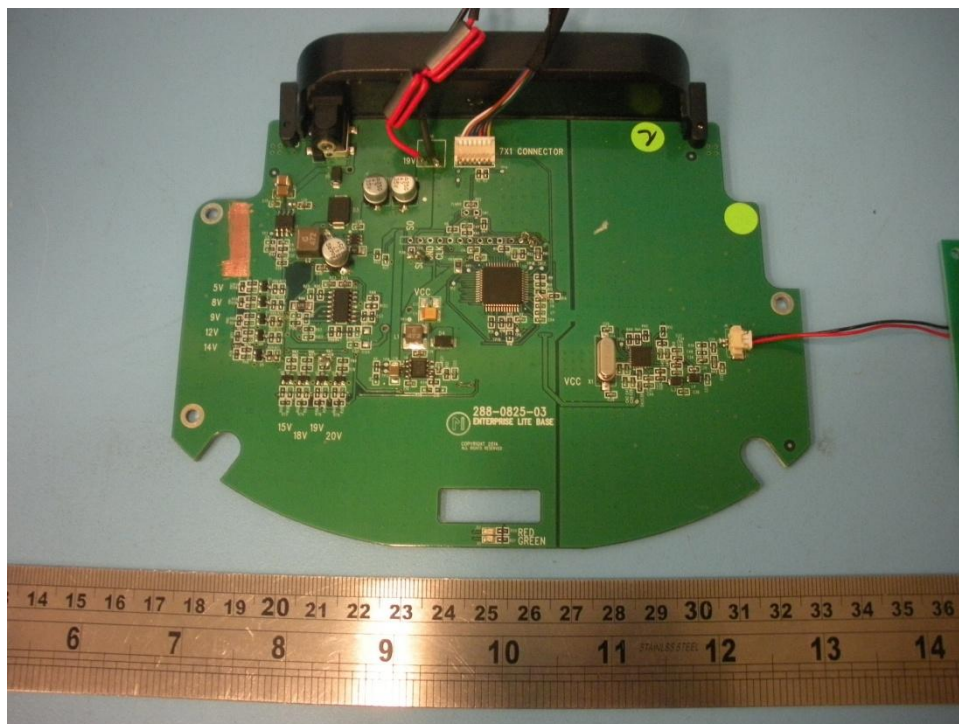
Appendix A



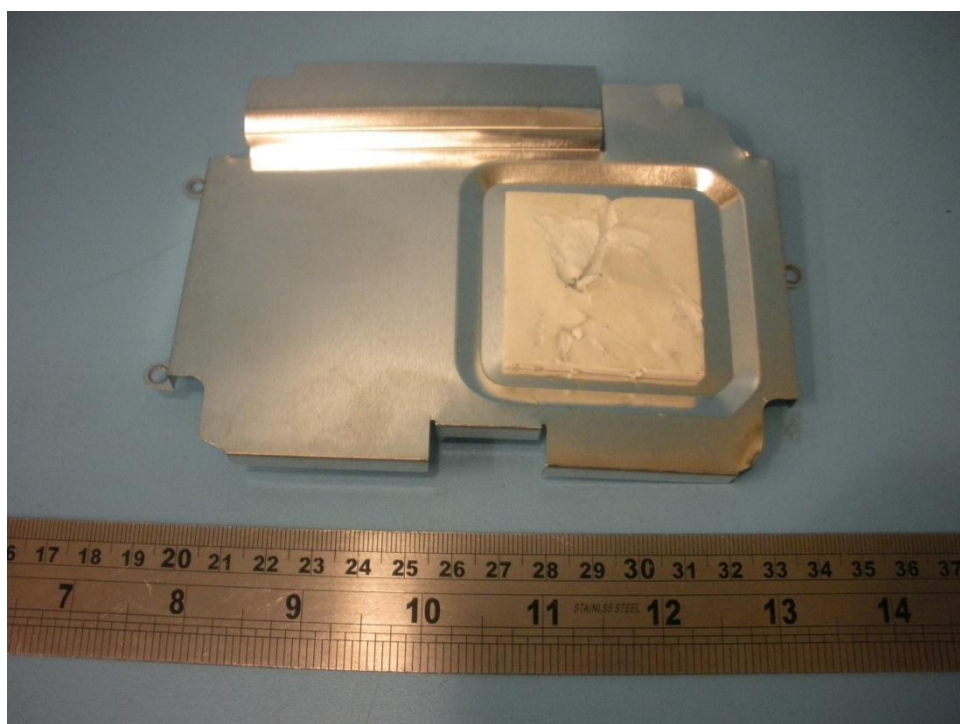
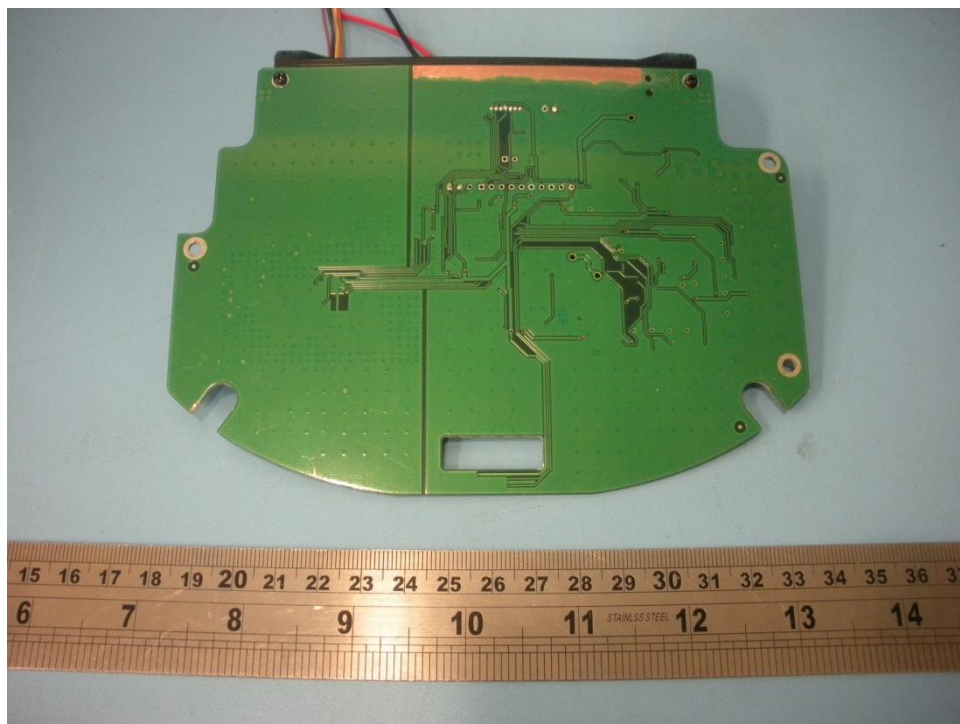
Appendix A



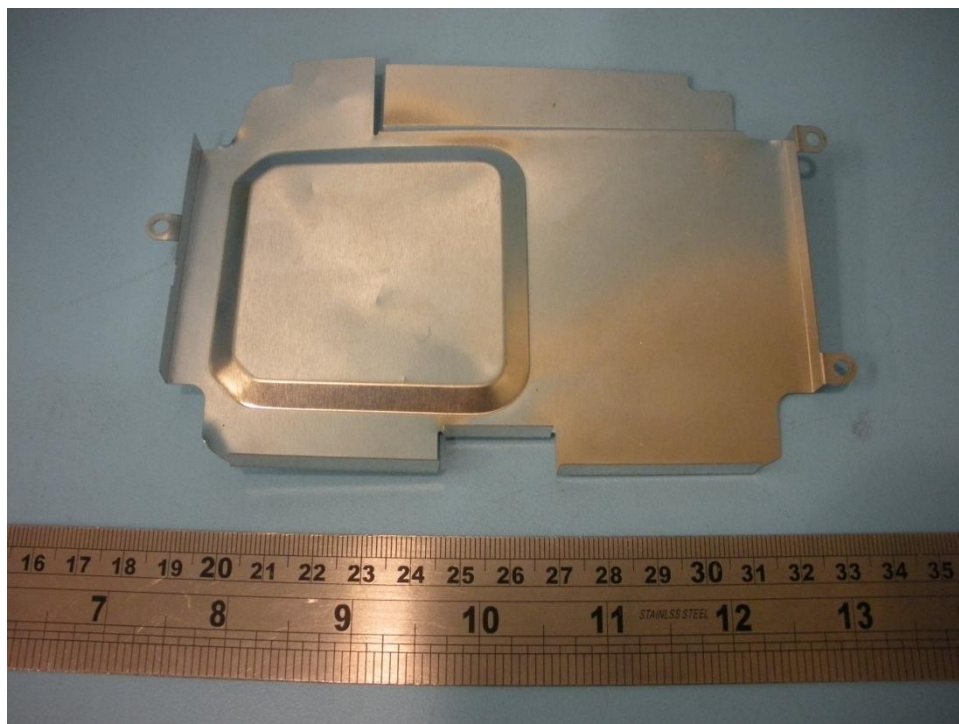
Appendix A



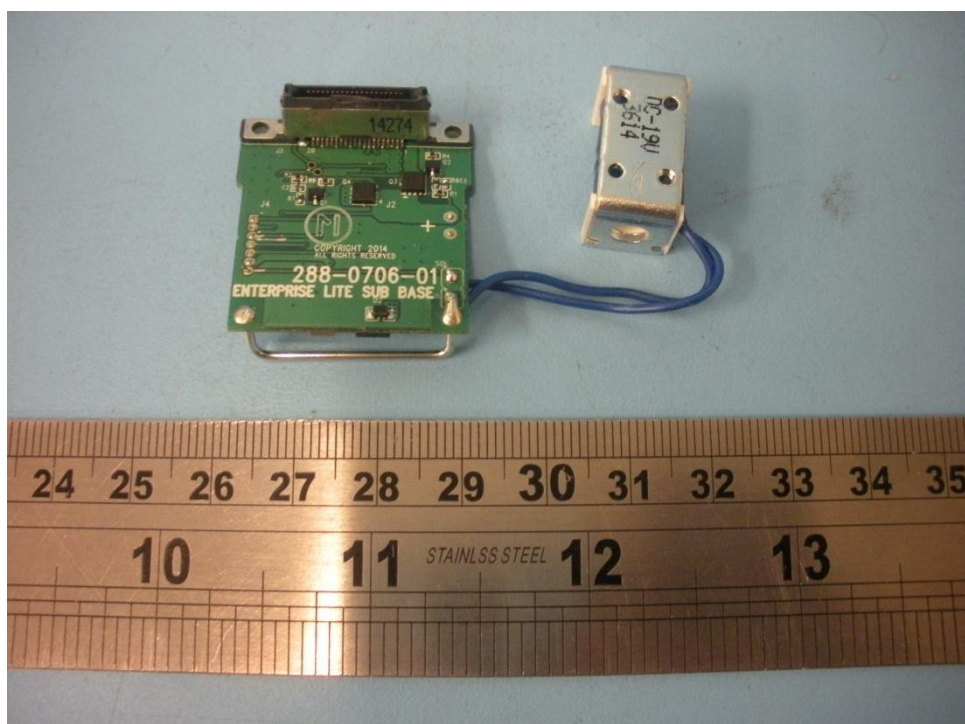
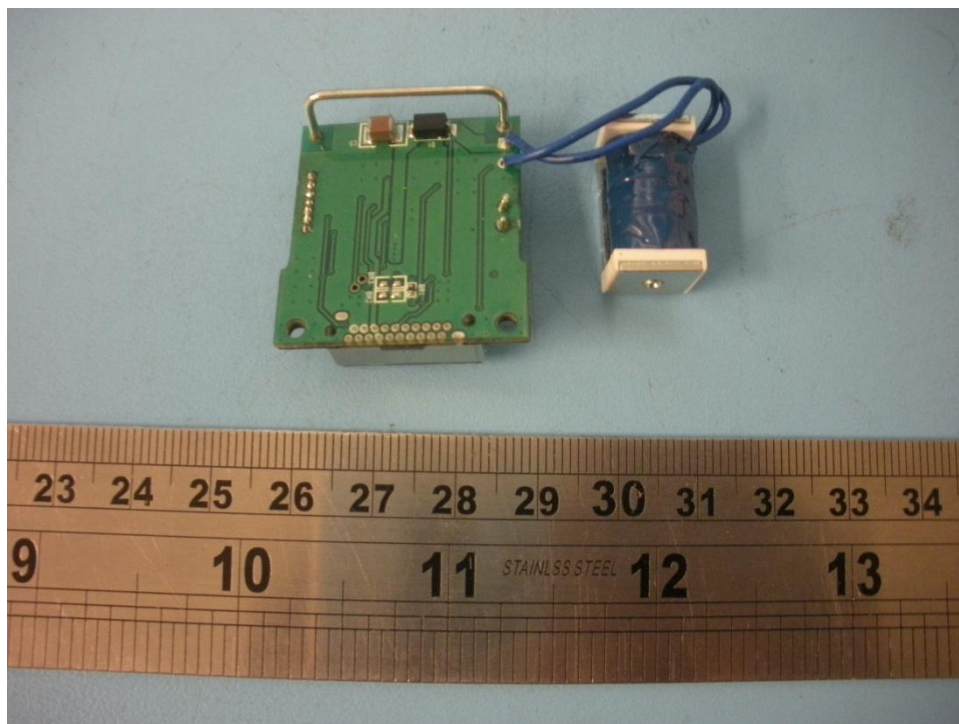
Appendix A



Appendix A



Appendix A



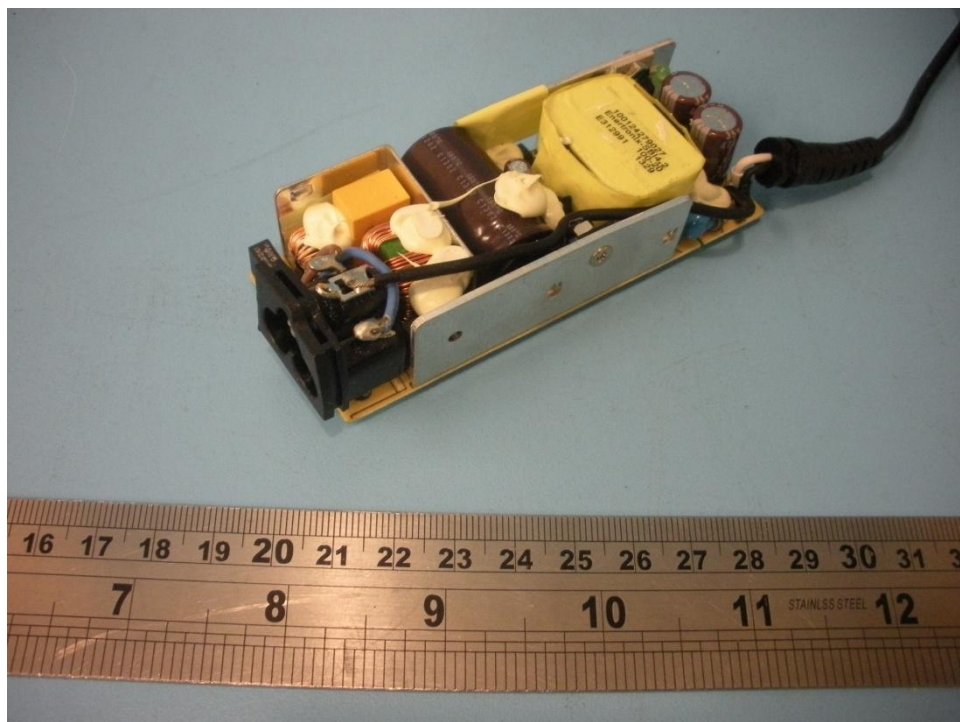
Appendix A



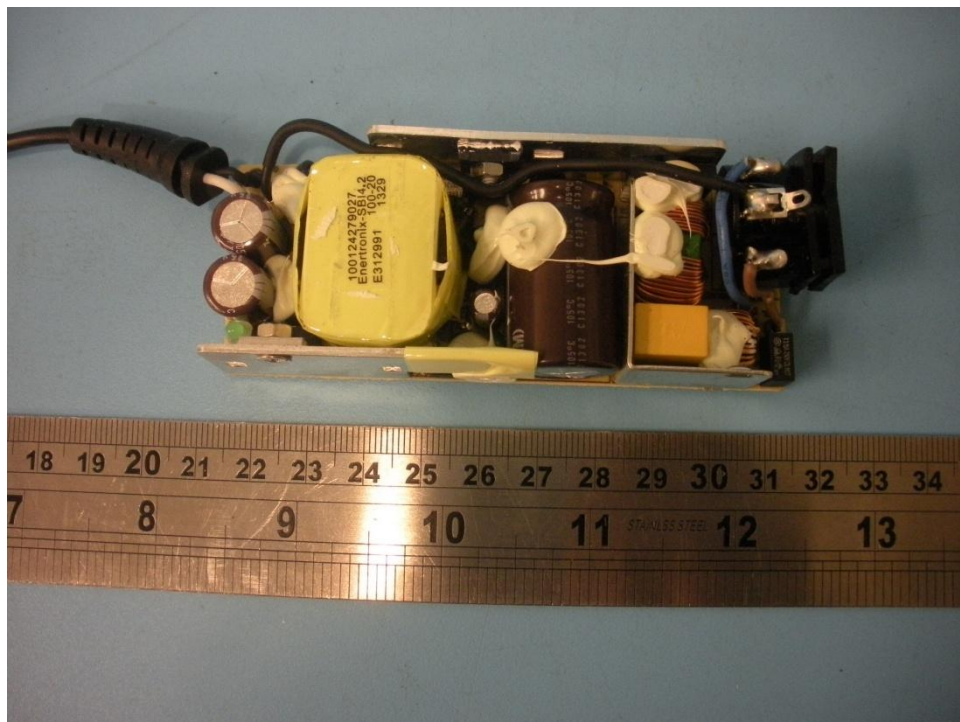
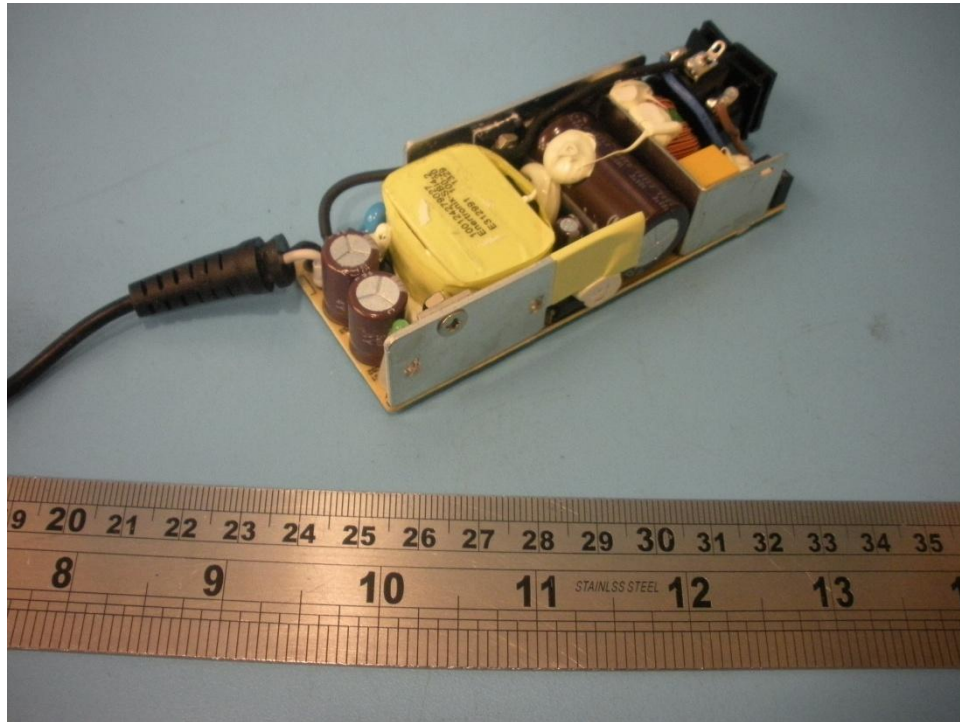
Appendix A



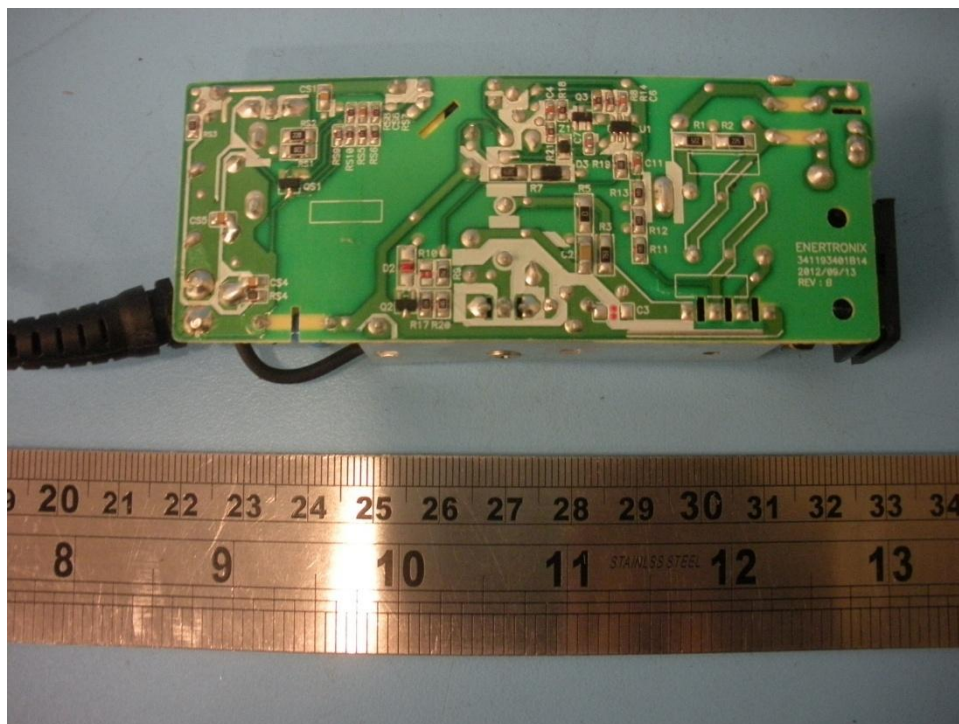
Appendix A



Appendix A



Appendix A



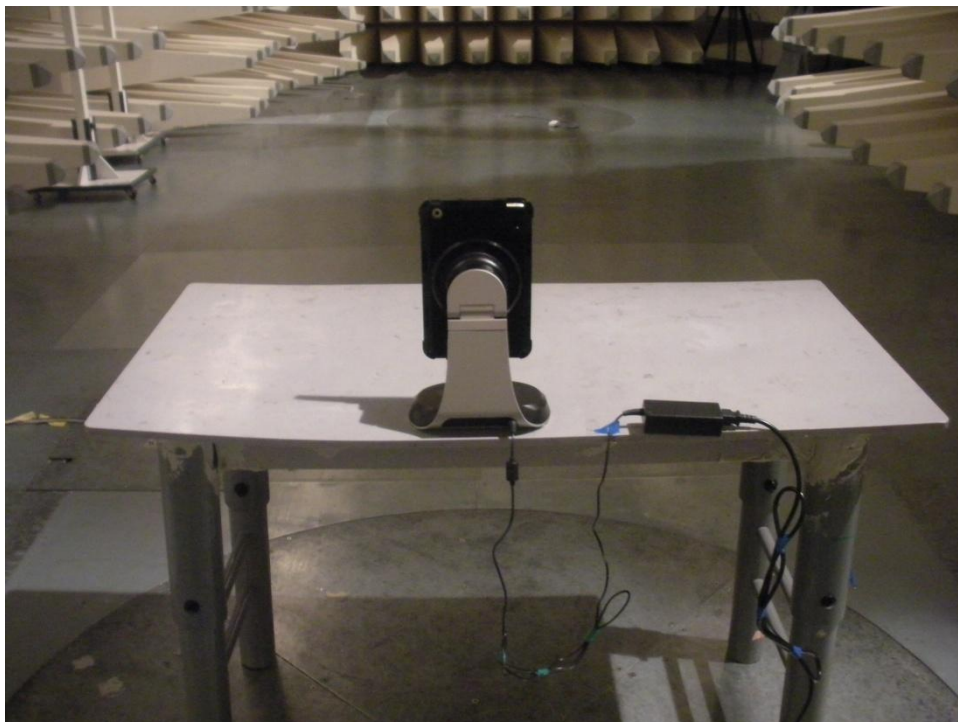
Appendix A

Test Support Equipment



9 Appendix B - Setup Photographs of EUT

Radiated Emission



Appendix B

Conducted Emission



10 Appendix C - Radiofrequency radiation exposure evaluation

According to KDB 447498 D01v05r02 section 4.3.1,

The 1-g SAR test exclusion thresholds, for transmission frequency below 100MHz, at test separation distances ≤ 50 mm are determined by:

Power = 0.00000246 mW EIRP

$\frac{1}{2} * [(0.00000246 \text{ mW}) / (50 \text{ mm})] \cdot [\text{sqrt}(0.01356 \text{ GHz})] = 0.00000000286$ which is ≤ 3.0 for 1-g SAR.

Therefore the device is exempt from stand-alone SAR test requirements.

>> The fundamental frequency of the EUT is 13.56 MHz and the test separation distance is < 50 mm.

>> The power of EUT measured is $-12.38\text{dBuA/m} = 39.12\text{dBuV/m} = -56.08\text{dBm} = 0.00000246\text{mW}$

* Where “dBuV/m = dBuA/m + 51.5” and “dBm = dBuV/m - 95.2”

* $0.00000246\text{mW} = 10 \log (0.00000246) \text{ dBm} \sim -56.08\text{dBm}$