China

FCC - TEST REPORT

Report Number	:	**60.790.15.011.01R01**	Date of Issue	:	May 31, 2016
Model	:	**WAE Outdoor 04Plus**			
Product Type	:	**Bluetooth Speaker**			
Applicant	:	Guillemot Corporation S.A.			
Address	:	Place Du Granier – B.P. 97143, 35571 Chantepie Cedex, France			
Production Facility	:	NIL			
Address	:	NIL			
Test Result	:	■**Positive**	☐**Negative**		
Total pages including Appendices	:	51			

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2 Description of Equipment Under Test

Description of the Equipment Under Test

Product:	Bluetooth Speaker
Model no.:	WAE Outdoor 04Plus
FCC ID:	NAM5063090
Rating:	1) 3.7VDC (Internal Rechargeable Battery)
	2) 5.0VDC (USB port)
Frequency:	2402MHz-2480MHz
Antenna gain:	0 dBi
Number of operated channel:	40
Modulation:	GFSK

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3 Summary of Test Standards

Test Standards
FCC Part 15 Subpart C 10-1-14 Edition Federal Communications Commission, PART 15 — Radio Frequency Devices, Subpart C — Unintentional Radiators

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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: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12&13 Zhiheng Wisdomland Business Park,
Nantou Checkpoint Road 2,
Shenzhen 518052, P.R.China
FCC Registration Number: 502708

Emission Tests	
Test Item	Test Site
FCC Part 15 Subpart C	
FCC Title 47 Part 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	Site 2
FCC Title 47 Part 15.207 Conduct Emission	Site 2
FCC Title 47 Part 15.247(a)(2) 6dB & 99% Bandwidth	Site 2
FCC Title 47 Part 15.247(b) Peak Output Power	Site 2
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	Site 2
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	Site 2
FCC Title 47 Part 15.247(e) Power Spectral Density	Site 2
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	Site 2

4.1 Test Equipment Site List

Site 2:

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	17-Aug-16
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	17-Aug-17
Horn Antenna	Rohde & Schwarz	HF907	102294	17-Aug-17
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	17-Aug-16
3m Semi-anechoic chamber	TDK	9X6X6	----	29-May-19
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	17-Aug-16
LISN	Rohde & Schwarz	ENV4200	100249	17-Aug-16
LISN	Rohde & Schwarz	ENV216	100326	17-Aug-16
ISN	Rohde & Schwarz	ENY81	100177	17-Aug-16
ISN	Rohde & Schwarz	ENY81-CAT6	101664	17-Aug-16
High Voltage Proble	Rohde & Schwarz	TK9420 (VT9420)	9420-58	17-Aug-16
RF Current probe	Rohde & Schwarz	EZ-17	100816	17-Aug-16
Signal Generator	Rohde & Schwarz	SMB100A	108272	17-Aug-16
Signal Analyzer	Rohde & Schwarz	FSV40	101030	17-Aug-16
Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	17-Aug-16
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	17-Aug-16

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4.2 Measurement System Uncertainty

Measurement System Uncertainty Emissions

System Measurement Uncertainty	
Items	**Extended Uncertainty**
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.54dB
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-25000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;
Uncertainty for Conducted RF test	2.04dB

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5 Summary of Test Results

Emission Tests				
FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
FCC Title 47 Part 15.205, 15.209 & 15.247(d) Spurious Radiated Emission	10-15	☒	☐	☐
FCC Title 47 Part 15.207 Conduct Emission	16-17	☒	☐	☐
FCC Title 47 Part 15.247(a)(2) 6dB & 99% Bandwidth	18-23	☒	☐	☐
FCC Title 47 Part 15.247(b) Peak Output Power	24-26	☒	☐	☐
FCC Title 47 Part 2.1051 & 15.247(d) Spurious Emissions at Antenna Terminals	27-29	☒	☐	☐
FCC Title 47 Part 15.247(d) 100kHz Bandwidth of band edges	30-33	☒	☐	☐
FCC Title 47 Part 15.247(e) Power Spectral Density	34-36	☒	☐	☐
FCC Title 47 Part 15.203 & 15.247(b) Antenna Requirement	37	☒	☐	☐

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6 General Remarks

Remarks

NIL

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: May 27, 2015

Testing Start Date: May 28, 2015

Testing End Date: September 30, 2015

- TÜV SÜD HONG KONG LTD. -

Reviewed by: Prepared by:

TSENG Chi Kit EMC Project Engineer	CHAN Kwong Ngai EMC Test Engineer

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7 Emission Test Results

7.1 Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Horizontal
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	33.05	43.5	-10.45	Quasi Peak
167.982	33.03	43.5	-10.47	Quasi Peak
431.943	36.64	46	-9.36	Quasi Peak
1094.500	39.90	74	-34.10	Peak
1094.500	31.02	54	-22.98	Average
1198.500	39.46	74	-34.54	Peak
1536.000	44.71	74	-29.29	Peak
4803.750	58.54	74	-15.46	Peak
4803.750	39.82	54	-14.18	Average
7206.250	47.74	74	-26.26	Peak
7206.250	40.53	54	-13.47	Average

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Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Vertical
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	28.94	43.5	-14.56	Quasi Peak
167.982	29.59	43.5	-13.91	Quasi Peak
268.135	30.47	46	-15.53	Quasi Peak
566.652	32.17	46	-13.83	Quasi Peak
1536.000	45.75	74	-28.25	Peak
1536.000	31.56	54	-12.44	Average
4803.750	55.11	74	-18.89	Peak
4803.750	40.13	54	-13.87	Average
7206.250	50.51	74	-23.49	Peak
7206.250	40.54	54	-13.46	Average

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Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Horizontal
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	33.05	43.5	-10.45	Quasi Peak
167.982	33.03	43.5	-10.47	Quasi Peak
431.943	36.64	46	-9.36	Quasi Peak
1536.000	44.31	74	-29.69	Peak
1536.000	30.98	54	-23.02	Average
4880.000	63.35	74	-10.65	Peak
4880.000	39.87	54	-14.13	Average
7320.000	52.22	74	-21.78	Peak
7320.000	40.23	54	-13.77	Average

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Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Vertical
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	28.94	43.5	-14.56	Quasi Peak
167.982	29.59	43.5	-13.91	Quasi Peak
268.135	30.47	46	-15.53	Quasi Peak
566.652	32.17	46	-13.83	Quasi Peak
1536.000	45.45	74	-28.18	Peak
1536.000	29.56	54	-14.44	Average
4880.000	61.51	74	-12.49	Peak
4880.000	39.97	54	-14.03	Average
7320.000	49.28	74	-24.72	Peak
7320.000	40.53	54	-13.47	Average

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Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Horizontal
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	33.05	43.5	-10.45	Quasi Peak
167.982	33.03	43.5	-10.47	Quasi Peak
431.943	36.64	46	-9.36	Quasi Peak
1536.000	43.58	74	-30.42	Peak
1536.000	30.32	54	-13.68	Average
4960.000	67.28	74	-6.72	Peak
4960.000	40.21	54	-13.79	Average
7440.000	51.76	74	-22.24	Peak
7440.000	41.00	54	-13.00	Average

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Spurious Radiated Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.205, 15.209 & 15.247(d) Antenna: Vertical
Comment:	3.7VDC
Remark:	9kHz to 25GHz

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
95.960	28.94	43.5	-14.56	Quasi Peak
167.982	29.59	43.5	-13.91	Quasi Peak
268.135	30.47	46	-15.53	Quasi Peak
566.652	32.17	46	-13.83	Quasi Peak
1536.000	46.58	74	-27.42	Peak
1536.000	40.29	54	-13.71	Average
4960.000	65.11	74	-8.89	Peak
4960.000	40.31	54	-13.69	Average
7440.000	50.42	74	-23.58	Peak
7440.000	41.03	54	-12.97	Average

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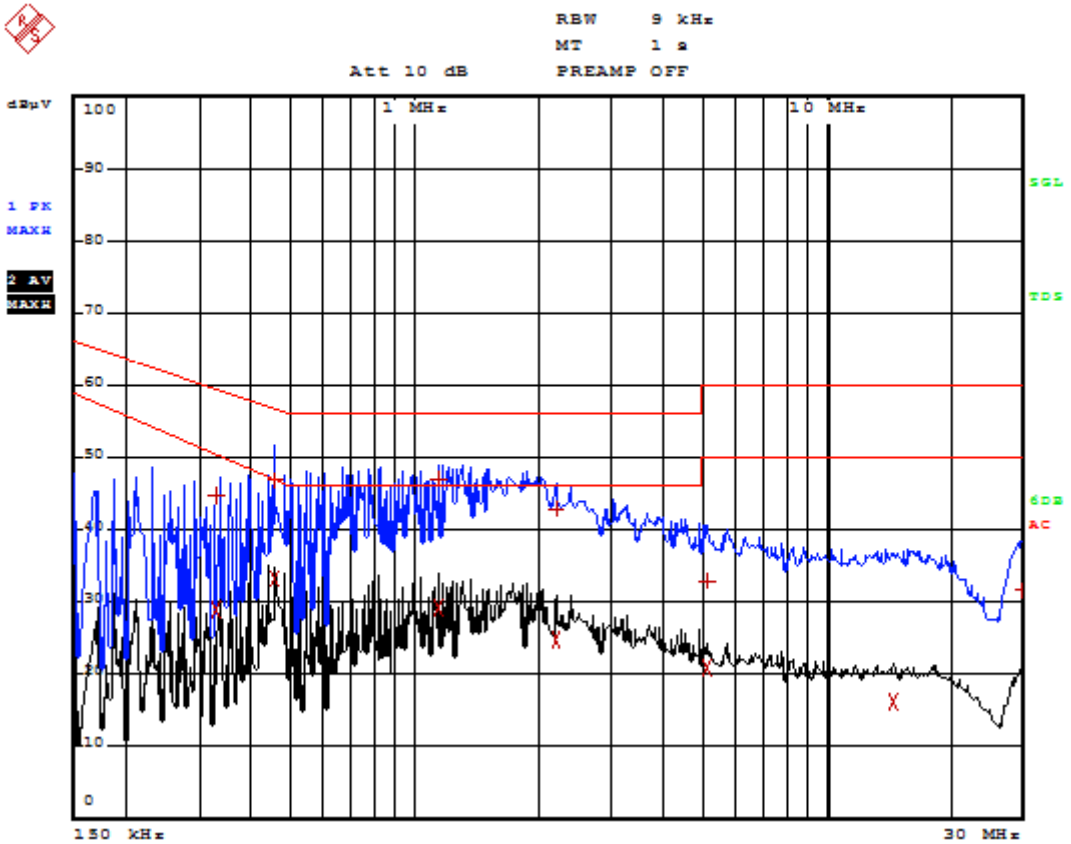
7.2 Conducted Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402/2440/2480MHz)
Test Specification:	FCC15.207, AC Mains, L Line
Comment:	120VAC

Test Result
☒ Passed
☐ Not Passed



	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	334 kHz	44.65	-14.69
2	Average	334 kHz	28.94	-21.41
1	Quasi Peak	458 kHz	46.87	-9.85
2	Average	458 kHz	33.16	-13.77
1	Quasi Peak	1.146 MHz	47.13	-8.86
2	Average	1.146 MHz	29.35	-16.64
1	Quasi Peak	2.21 MHz	42.84	-13.15
2	Average	2.21 MHz	24.76	-21.23
2	Average	5.142 MHz	20.79	-29.20
1	Quasi Peak	5.17 MHz	32.87	-27.12
2	Average	14.646 MHz	16.01	-33.98
1	Quasi Peak	29.858 MHz	31.56	-28.43

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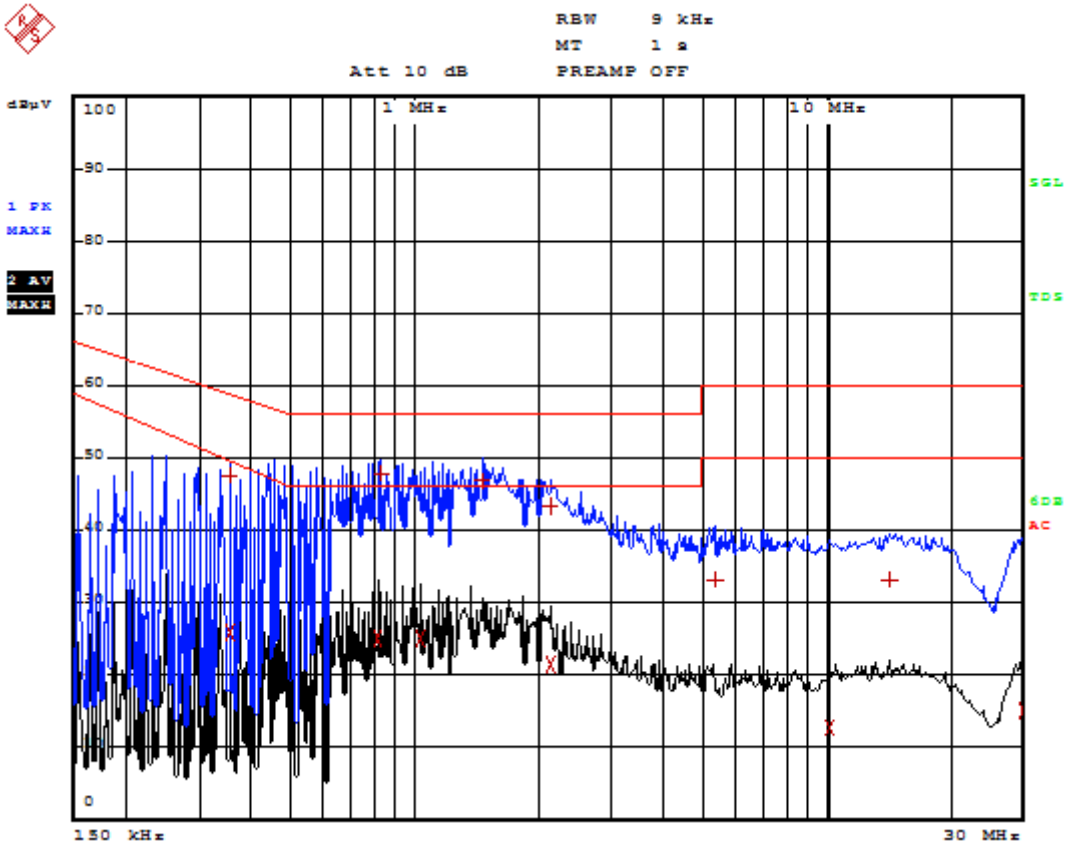
Conducted Emission

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402/2440/2480MHz)
Test Specification:	FCC15.207, AC Mains, N Line
Comment:	120VAC

Test Result
☒ Passed
☐ Not Passed



	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	354 kHz	47.67	-11.19
2	Average	354 kHz	25.76	-23.96
2	Average	814 kHz	25.07	-20.92
1	Quasi Peak	834 kHz	47.91	-8.08
2	Average	1.042 MHz	25.17	-20.82
1	Quasi Peak	1.458 MHz	46.72	-9.27
1	Quasi Peak	2.146 MHz	43.31	-12.68
2	Average	2.146 MHz	21.39	-24.60
1	Quasi Peak	5.39 MHz	33.25	-26.74
2	Average	10.206 MHz	12.81	-37.18
1	Quasi Peak	14.262 MHz	33.14	-26.85
2	Average	29.882 MHz	15.20	-34.79

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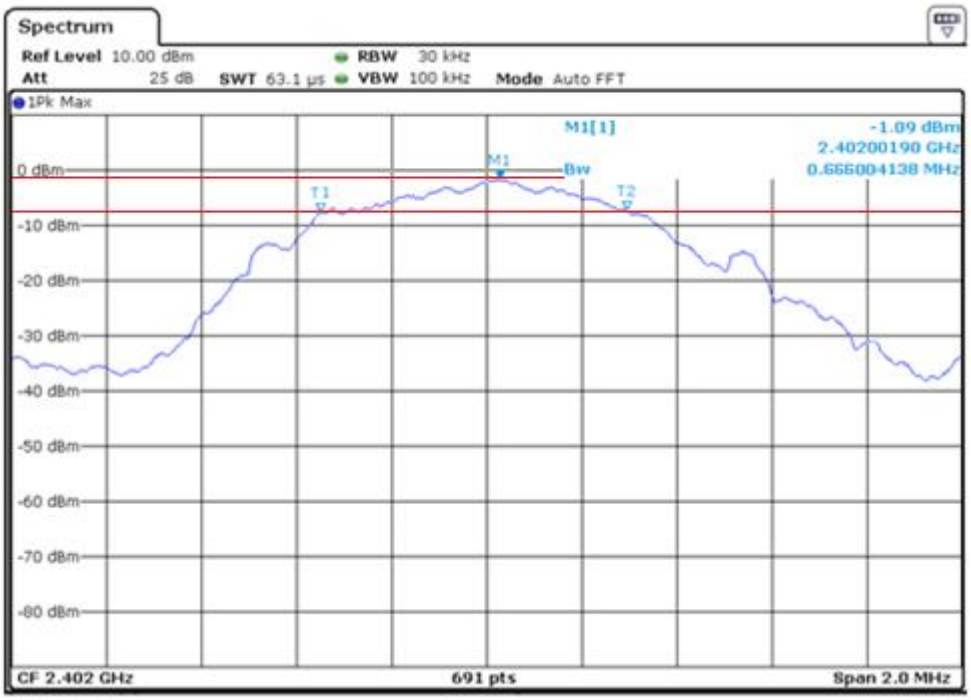
7.3 6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed



6dB bandwidth	Limit
666.004 kHz	> 500 kHz

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6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

99% bandwidth
1028.009 kHz

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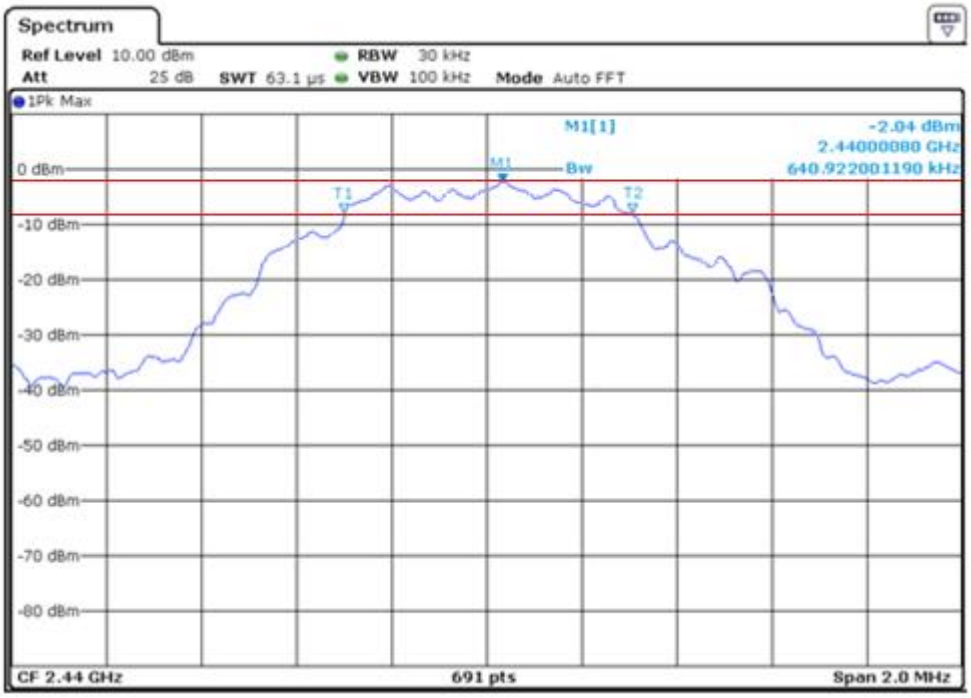
6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed



6dB bandwidth	Limit
640.922 kHz	> 500 kHz

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6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

99% bandwidth
999.988 kHz

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6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(a)(2), 6dB Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

6dB bandwidth	Limit
773.088 kHz	> 500 kHz

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6dB & 99% Bandwidth

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(a)(2), 99% Bandwidth
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

99% bandwidth
1039.048 kHz

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7.4 Peak Output Power

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(b)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Conducted Output Power	Limit
-2.09 dBm	< 30dBm

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Peak Output Power

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(b)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Conducted Output Power	Limit
-2.04 dBm	< 30dBm

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Peak Output Power

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(b)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Conducted Output Power	Limit
-2.30 dBm	< 30dBm

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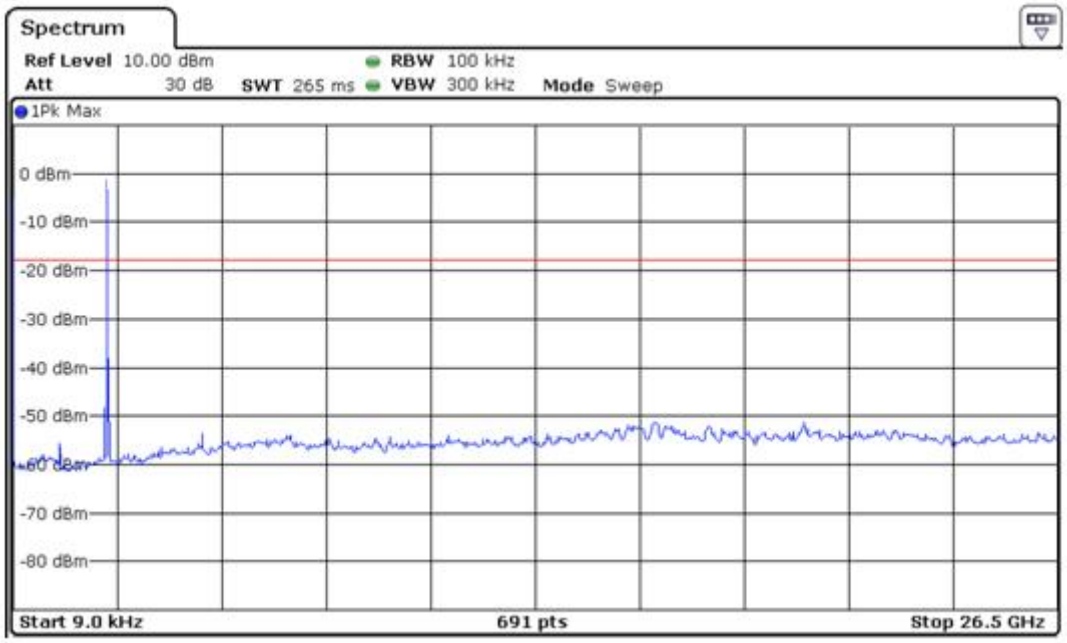
7.5 Spurious Emissions at Antenna Terminals

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.7VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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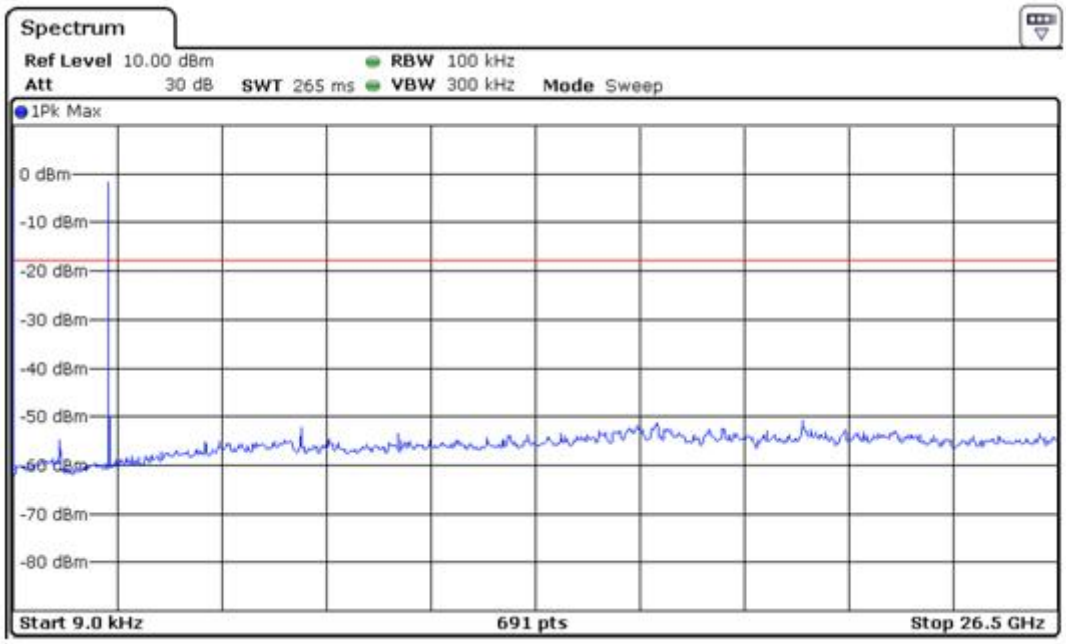
Spurious Emissions at Antenna Terminals

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.7VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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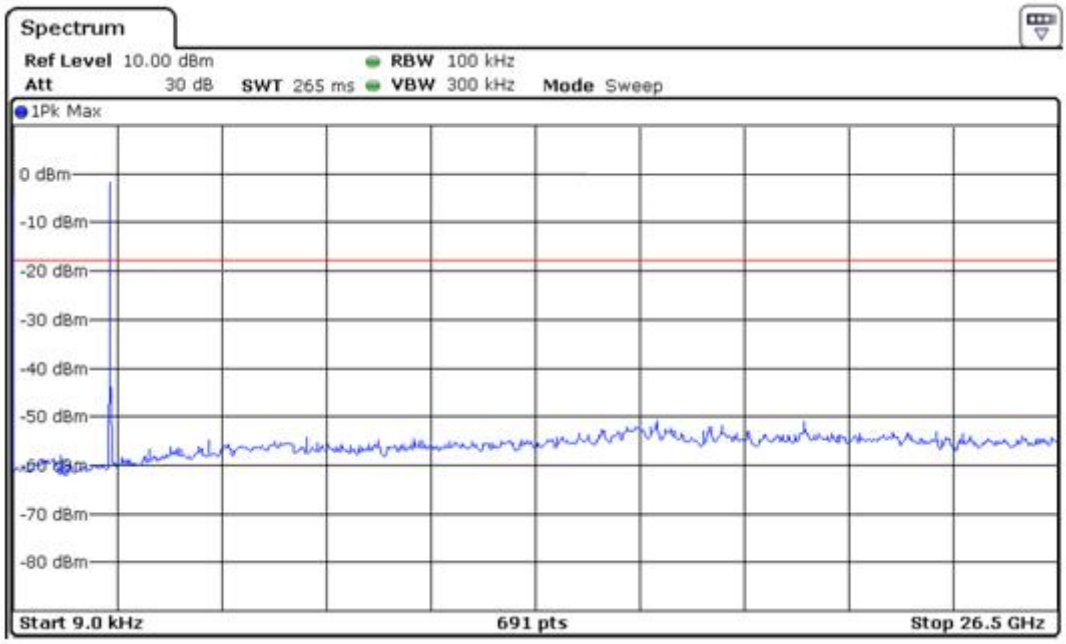
Spurious Emissions at Antenna Terminals

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC2.1051 & 15.247(d)
Comment:	3.7VDC
Remark:	9kHz to 26.5GHz

Test Result
☒ Passed
☐ Not Passed



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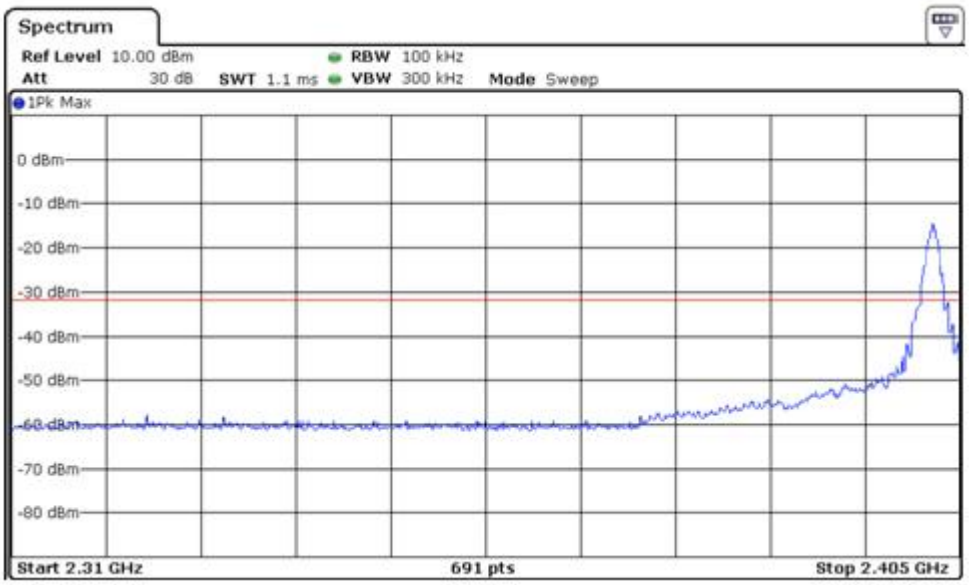
7.6 100kHz Bandwidth of band edges

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(d), Conducted
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	Result
2.402 GHz	-10.12 dBm
2.390 GHz	-51.73 dBm

Band edges	Limit
41.61dB	> 20dB

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100kHz Bandwidth of band edges

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(d), Radiated
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
2439.000	36.03	74	-37.97	Peak
2439.000	30.88	54	-23.12	Average

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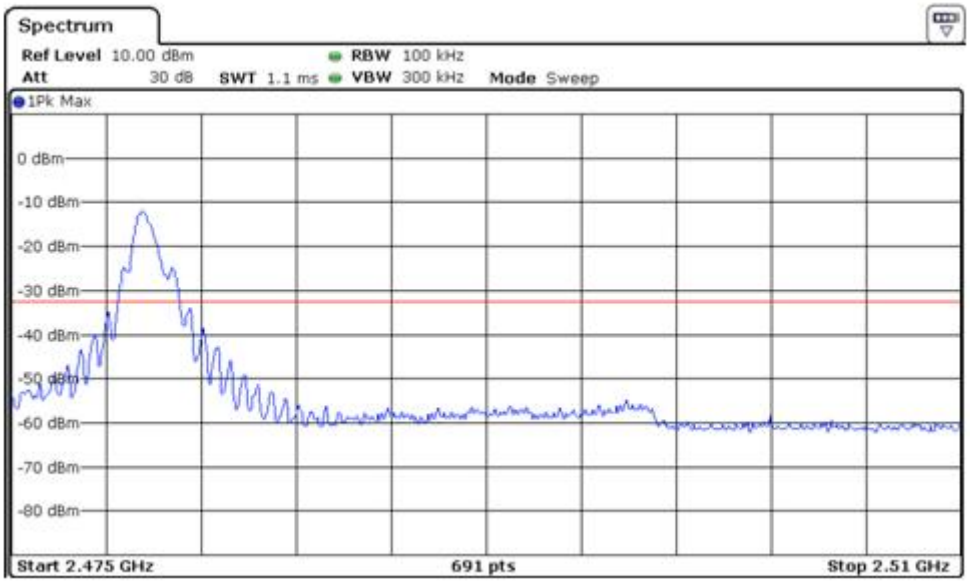
100kHz Bandwidth of band edges

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(d), Conducted
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed



Frequency	Result
2.480 GHz	-11.56 dBm
2.4835 GHz	-51.03 dBm

Band edges	Limit
39.47 dB	> 20dB

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100kHz Bandwidth of band edges

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(d), Radiated
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Frequency MHz	Result dBµV/m	Limit dBµV/m	Margin dB	Detector
2483.500	36.12	74	-37.88	Peak
2483.500	31.03	54	-22.97	Average

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7.7 Power Spectral Density

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2402MHz)
Test Specification:	FCC15.247(e)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Frequency	PSD	Result
2.402GHz	-2.09 dBm / 3kHz	< 8 dBm / 3 kHz

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Power Spectral Density

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2440MHz)
Test Specification:	FCC15.247(e)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Frequency	PSD	Result
2.440GHz	-2.04 dBm / 3kHz	< 8 dBm / 3 kHz

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Power Spectral Density

EUT:	WAE Outdoor 04Plus
Op Condition:	Operated, TX Mode (2480MHz)
Test Specification:	FCC15.247(e)
Comment:	3.7VDC

Test Result
☒ Passed
☐ Not Passed

Frequency	PSD	Result
2.480GHz	-2.30 dBm / 3kHz	< 8 dBm / 3 kHz

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7.8 Antenna Requirement

EUT:	WAE Outdoor 04Plus	Test Result
Op Condition:	Operated, TX Mode	☒ Passed
Test Specification:	FCC15.203 & 15.247(b)	☐ Not Passed
Comment:	3.7VDC	

Limit

For intentional device, according to FCC Title 47 Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC Title 47 Part 15.247(b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The antenna used in this product is PCB antenna, and the maximum gain of this antenna is 0.0 dBi.

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8 Appendix A - Photographs of EUT

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Appendix A

1519211230001004
QC
PASSED
QC

Hercules Wae Outdoor 04Plus
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
FCC ID: NAM5063090
Made in PRC
15192

Appendix A

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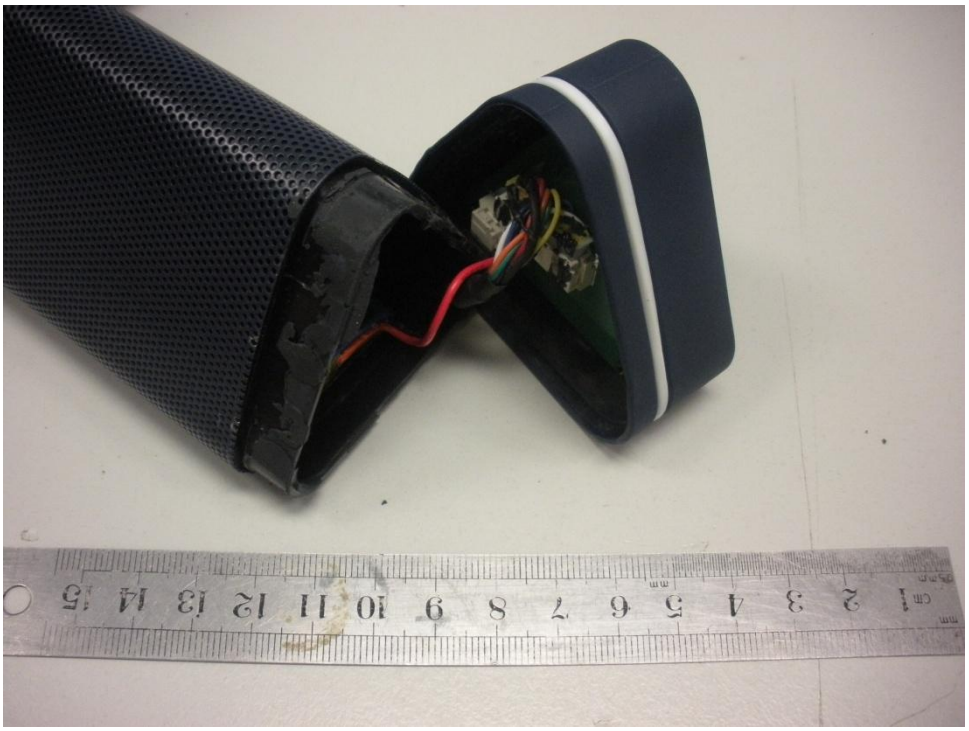
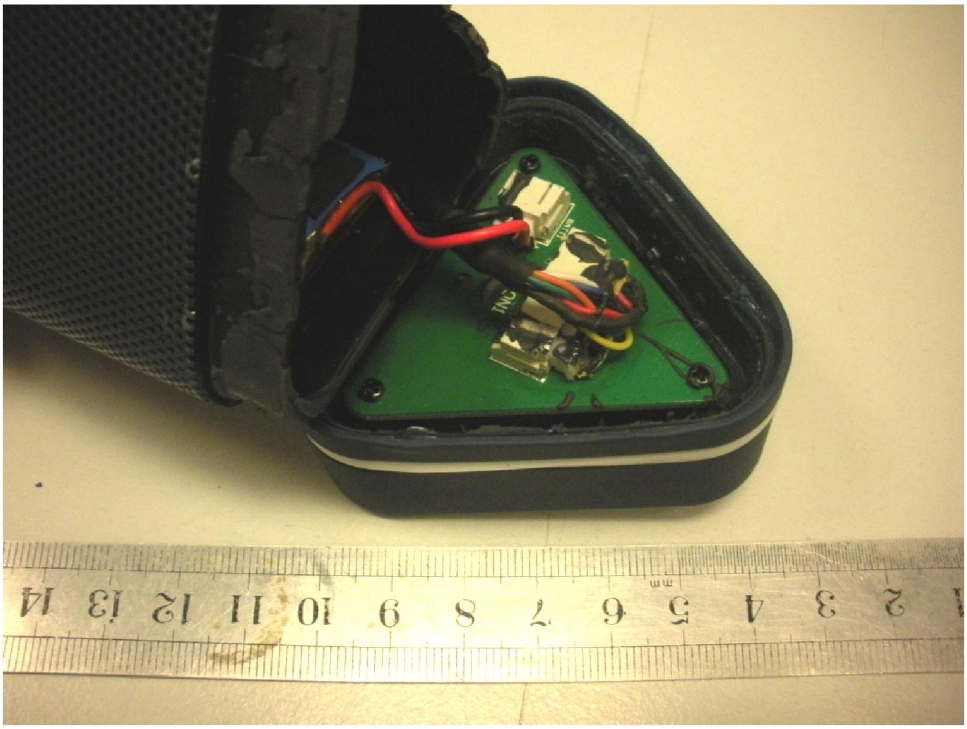
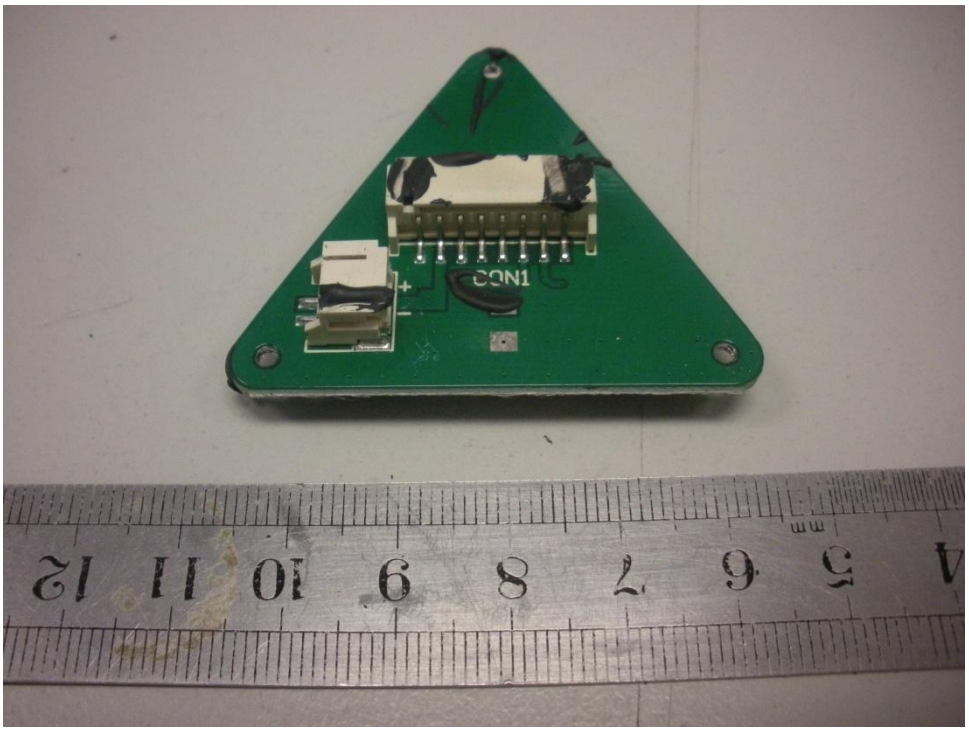
Appendix A

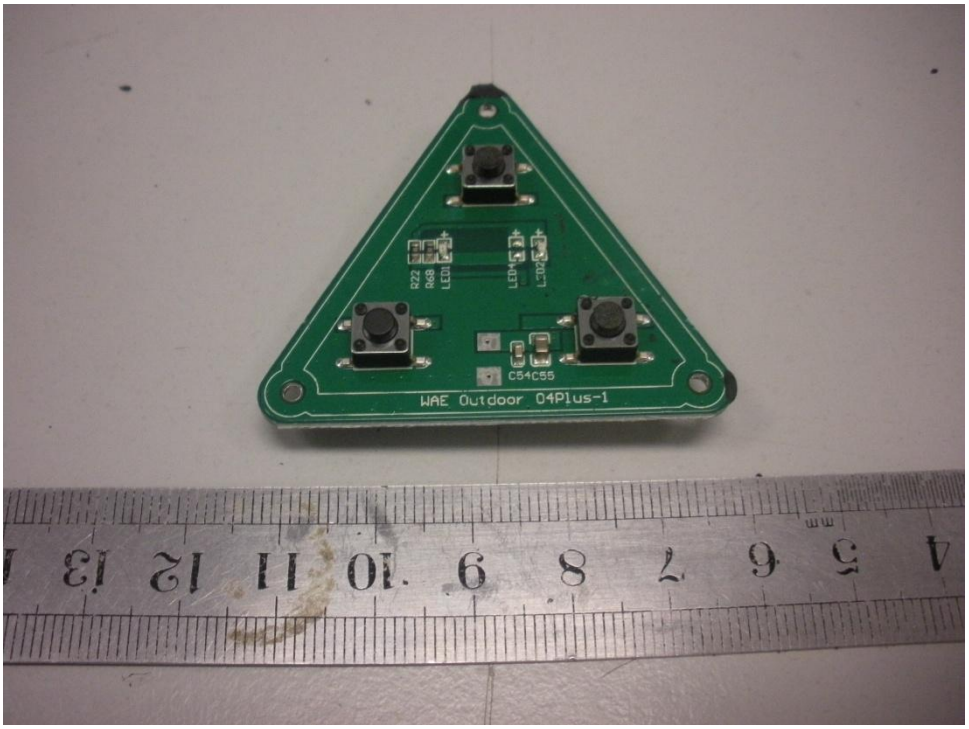
Appendix A



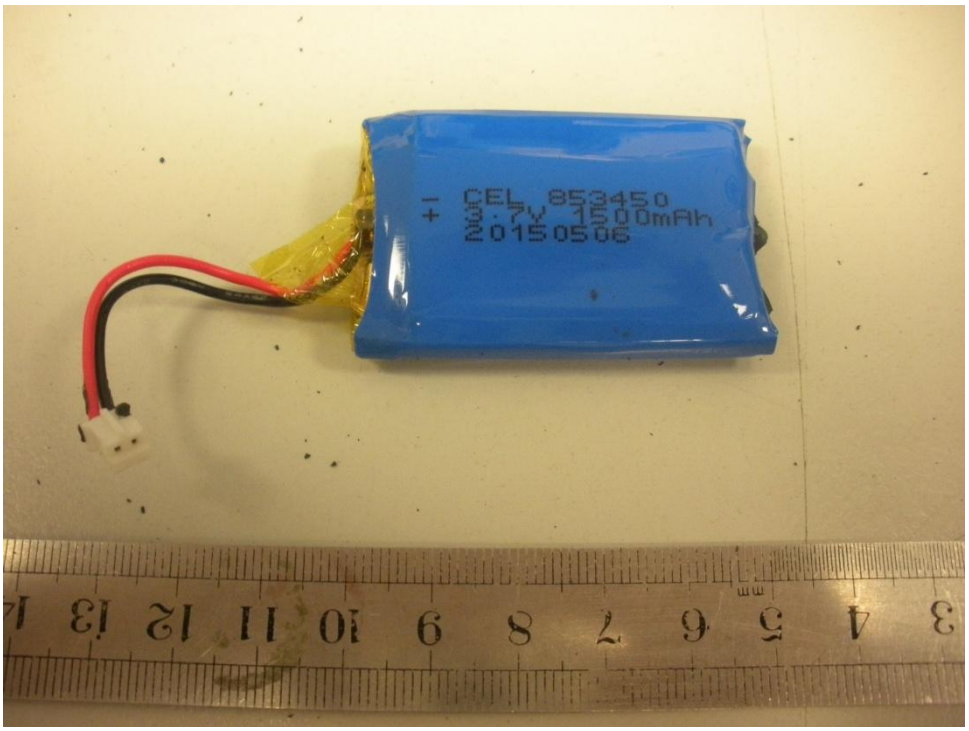


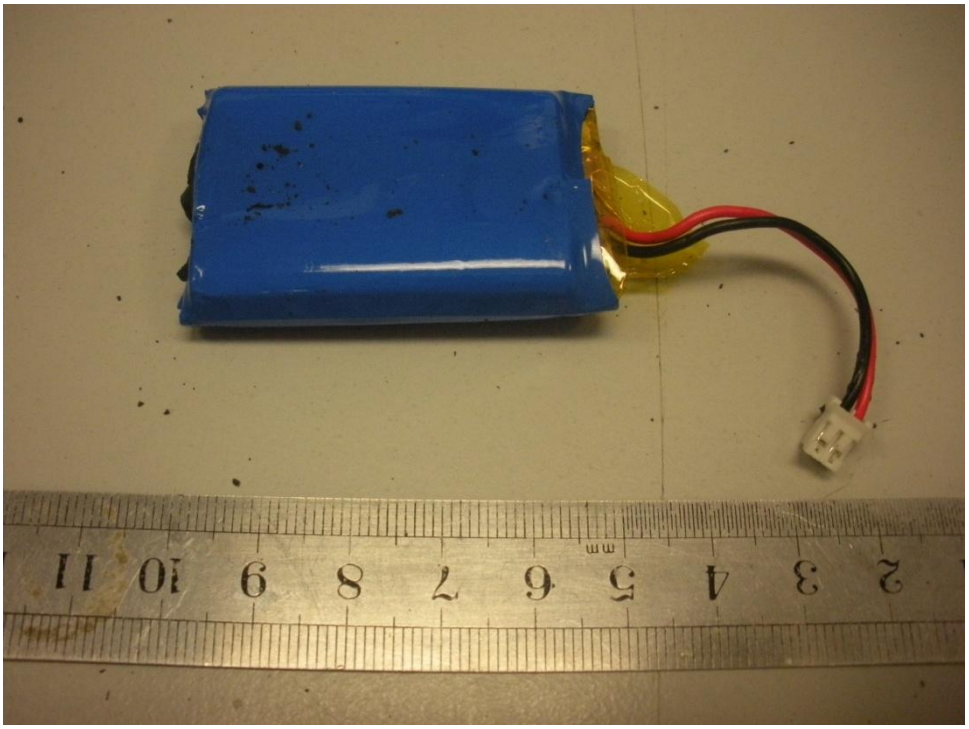
Appendix A





Appendix A





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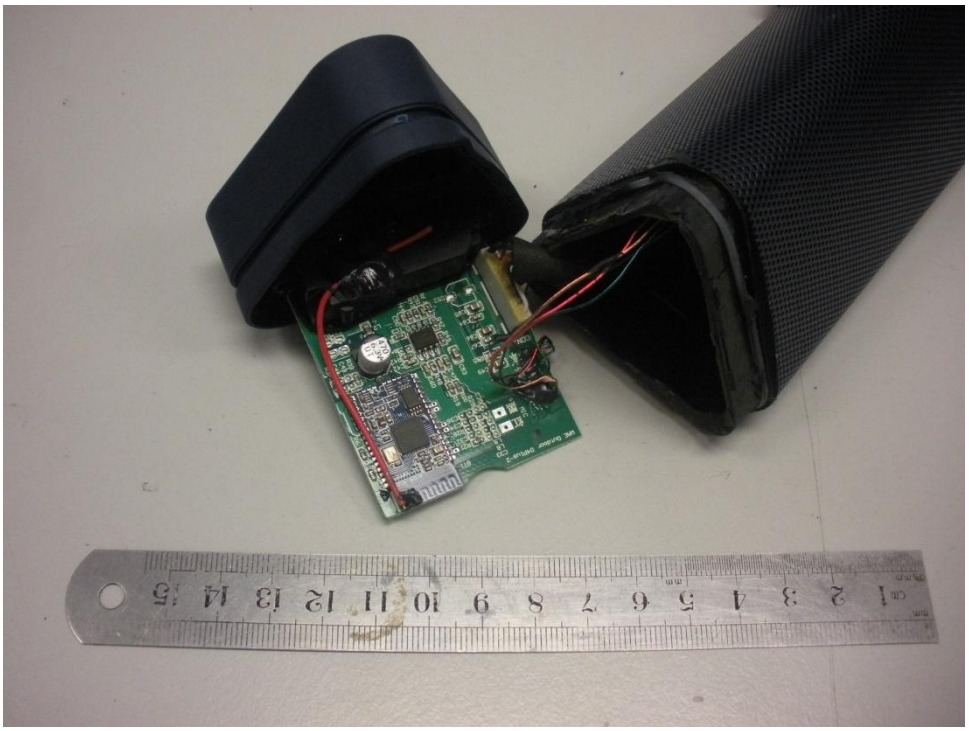
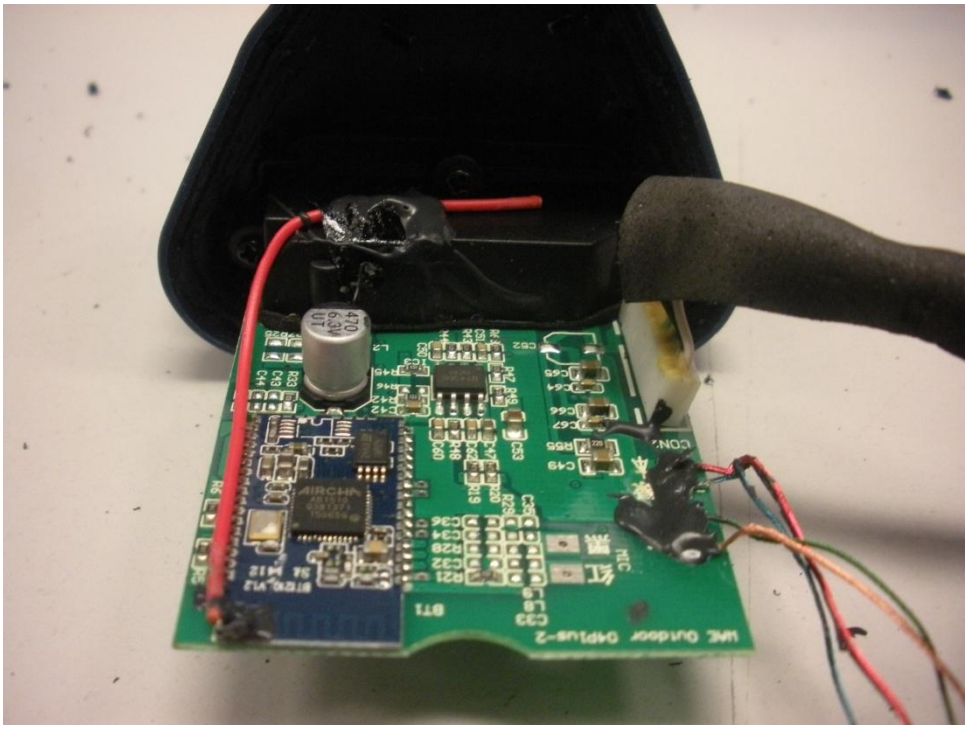
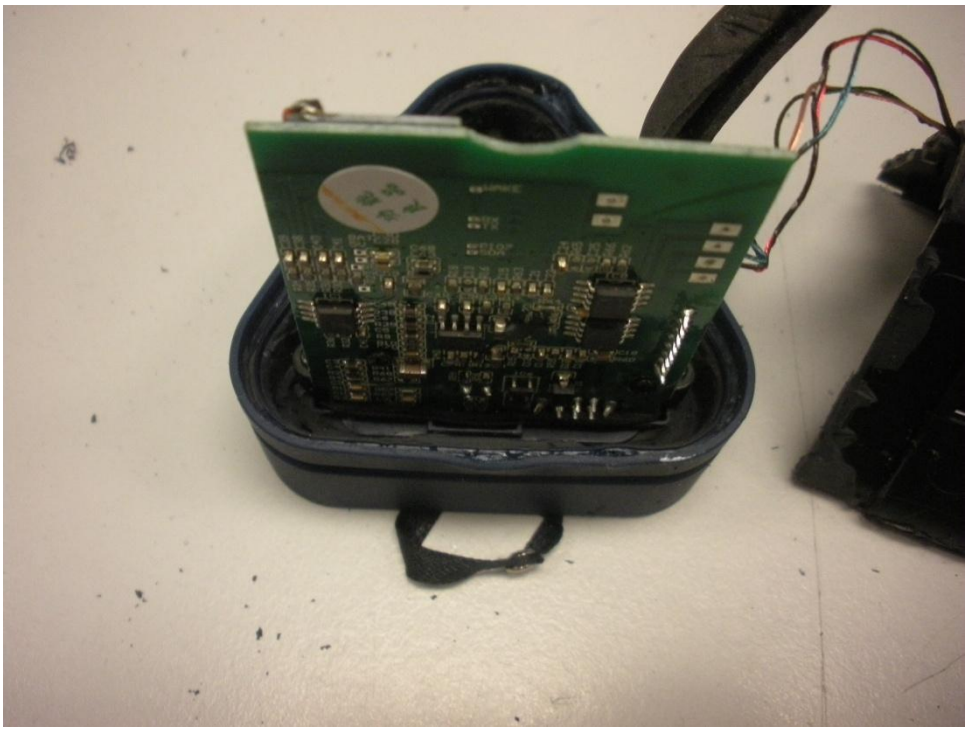
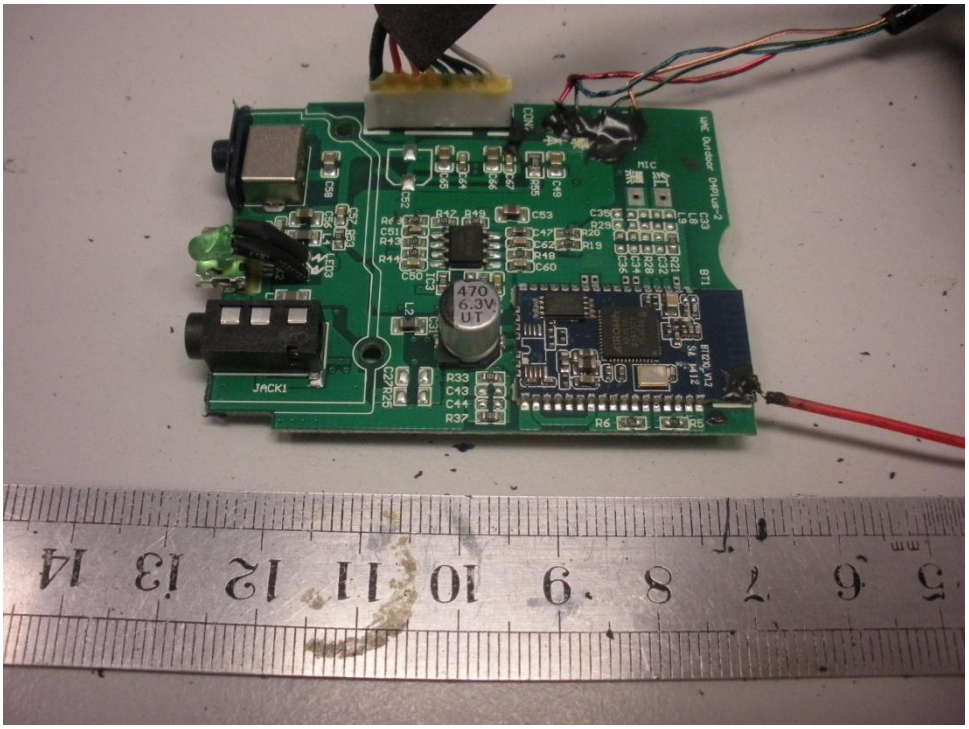


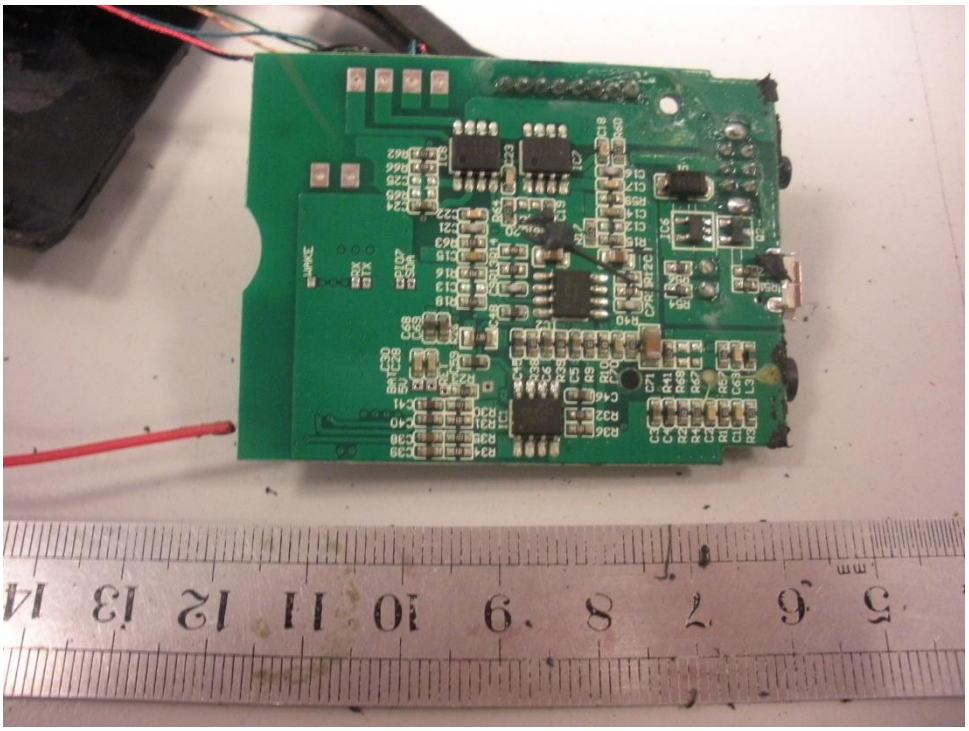


Appendix A

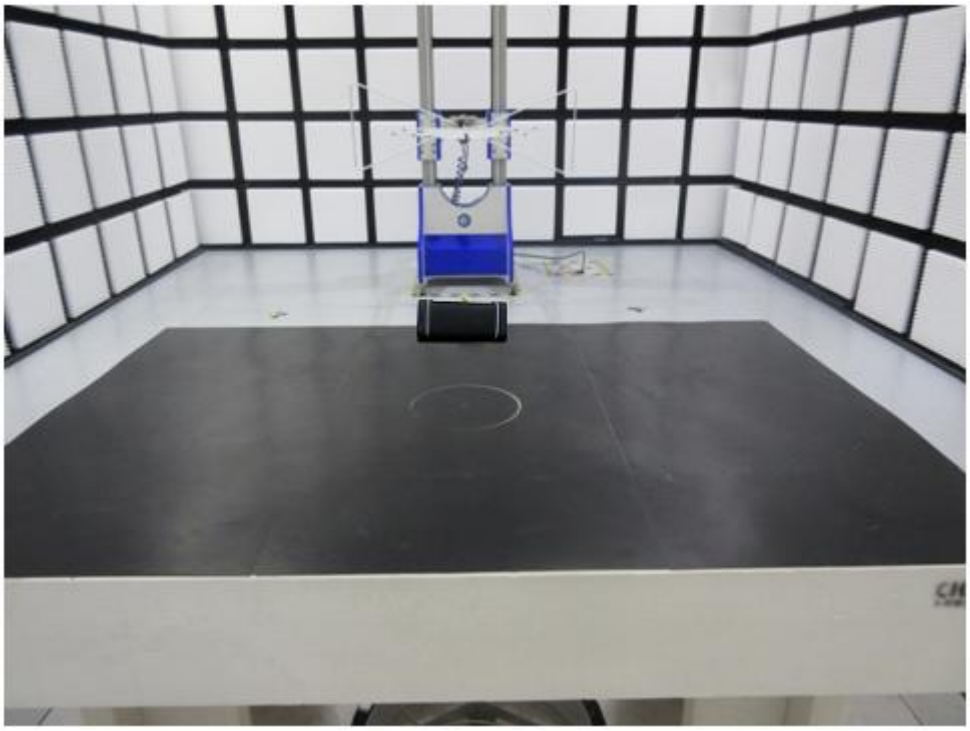




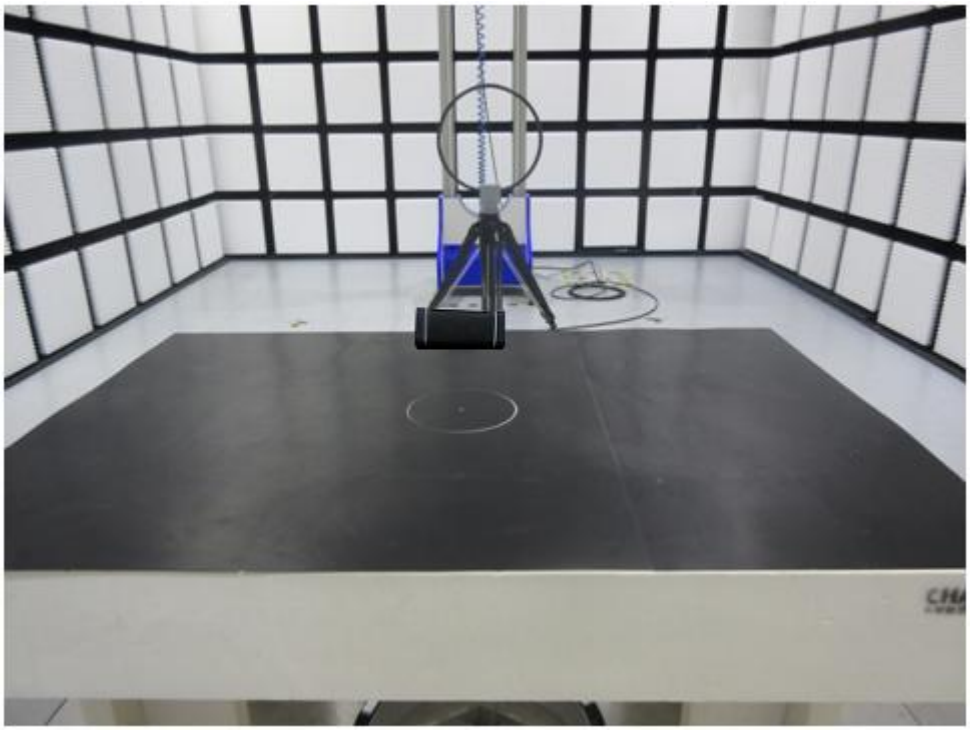
Appendix A

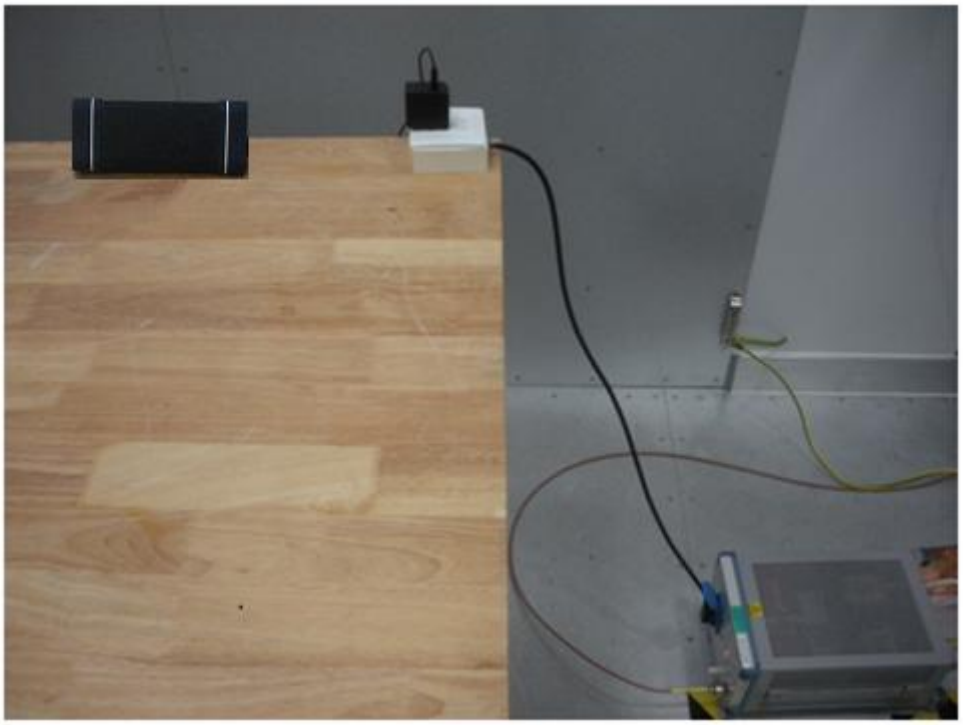


9 Appendix B - Setup Photographs of EUT



Appendix B





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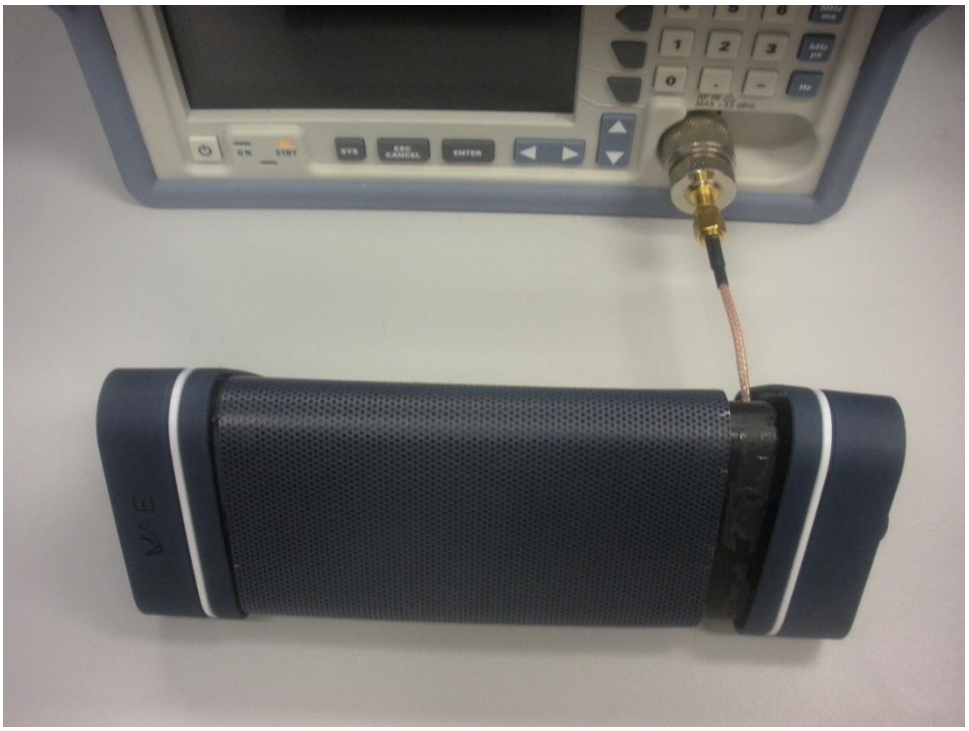

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10 Appendix C - General Product Information

Radiofrequency radiation exposure evaluation

According to KDB 447498 D01v06 section 4.3.1,

>> The 1-g SAR test exclusion thresholds, for 100MHz to 6GHz, at test separation distances ≤ 50 mm are determined by:

Power at 2402MHz = 0.6180 mW EIRP
Power at 2440MHz = 0.6251 mW EIRP
Power at 2480MHz = 0.5888 mW EIRP

[(0.6180 mW) / (20 mm)] · [sqrt (2.402 GHz)] = 0.0479 which is ≤ 3.0 for 1-g SAR.
[(0.6251 mW) / (20 mm)] · [sqrt (2.440 GHz)] = 0.0488 which is ≤ 3.0 for 1-g SAR.
[(0.5888 mW) / (20 mm)] · [sqrt (2.480 GHz)] = 0.0463 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 2402MHz-2480MHz, the test separation distance is < 50mm. (Manufacturer specified the separation distance is: 20mm)

>> The power of EUT measured is:

- For 2402MHz: 0.6180mW = 10 log (0.6180) dBm ~ -2.09dBm
- For 2440MHz: 0.6251mW = 10 log (0.6251) dBm ~ -2.04dBm
- For 2480MHz: 0.5888mW = 10 log (0.5888) dBm ~ -2.30dBm

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