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Report On

FCC Testing of the
ASH Wireless Electronics Ltd SWB TAG
In accordance with FCC 47 CFR Part 15B

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FCC ID: 2AF3J-XOTAG001

Document 75932139 Report 04 Issue 1

November 2015



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PREPARED FOR

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PREPARED BY

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APPROVED BY

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Authorised Signatory

DATED

24 November 2015

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15B. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

G Lawler



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SECTION 1

REPORT SUMMARY

FCC Testing of the
ASH Wireless Electronics Ltd SWB TAG
In accordance with FCC 47 CFR Part 15B



1.1 INTRODUCTION

The information contained in this report is intended to show the verification of FCC Testing of the ASH Wireless Electronics Ltd SWB TAG to the requirements of FCC 47 CFR Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	ASH Wireless Electronics Ltd
Model Number(s)	SWB TAG
Serial Number(s)	2280
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15B (2014)
Incoming Release Date	Application Form 25 September 2015
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	PO-000129 24 September 2015
Start of Test	22 November 2015
Finish of Test	22 November 2015
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4 (2014)



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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC 47 CFR Part 15B is shown below.

Section	Specification Clause	Test Description	Result	Comments/Base Standard
Idle Mode				
2.1	15.109	Radiated Emissions	Pass	



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1.3 APPLICATION FORM

EQUIPMENT DESCRIPTION	
Model Name/Number	SWB TAG
Part Number	AC22-P0001
Hardware Version	Rev C
Software Version	1.1.0
FCC ID (if applicable)	2AF3J-XOTAG001
Industry Canada ID (if applicable)	N/A
Technical Description (Please provide a brief description of the intended use of the equipment)	This is a hand worn device that provides a visual display using LEDs to the user based on measured skin resistance which it also reports back to a base station. The base station is able to send configuration commands to the wristband.

POWER SOURCE	
☐ AC mains	State voltage
AC supply frequency (Hz)	
VAC	
Max Current	
Hz	
☐ Single phase	☐ Three phase
And / Or	
☐ External DC supply	
Nominal voltage	V Max Current A
Extreme upper voltage	V
Extreme lower voltage	V
Battery	
☐ Nickel Cadmium	☐ Lead acid (Vehicle regulated)
☐ Alkaline	☐ Leclanche
☒ Lithium	☐ Other Details : CR2032
3	Volts nominal.
End point voltage as quoted by equipment manufacturer	2.6 V



FREQUENCY INFORMATION					
Frequency Range	2445 to 2460	MHz			
Channel Spacing (where applicable)					
Receiver Frequency Range (if different)	to	MHz			
Channel Spacing (if different)					
Test Frequencies*	Bottom	2445	MHz	Channel Number (if applicable)	19
	Middle		MHz	Channel Number (if applicable)	
	Top	2460	MHz	Channel Number (if applicable)	22
Intermediate Frequencies			MHz		
Highest Internally Generated Frequency :		2460 MHz			

POWER CHARACTERISTICS			
Maximum TX power	0.01	W	
Minimum TX power	fixed	W (if variable)	
Is transmitter intended for :			
Continuous duty		☐ Yes	☐ No
Intermittent duty		☒ Yes	☐ No
If intermittent state DUTY CYCLE			
Transmitter ON	15 micro seconds		
Transmitter OFF	2.999985 seconds		

ANTENNA CHARACTERISTICS			
☐ Antenna connector		State impedance	Ohm
☐ Temporary antenna connector		State impedance	Ohm
☒ Integral antenna	Type PCB	State impedance	0 dBi
☐ External antenna	Type	State impedance	dBi

MODULATION CHARACTERISTICS	
☐ Amplitude	☐ Frequency
☒ Phase	☐ Other (please provide details):
Can the transmitter operate un-modulated? ☐ Yes ☒ No	

CLASS OF EMISSION USED
ITU designation or Class of Emission:
1 2G445G2D / 2G460G2D
(if applicable) 2
(if applicable) 3
If more than three classes of emission, list separately:



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BATTERY POWER SUPPLY			
Model name/number	CR203 2	Identification/Part number	CR203 2
Manufacturer	Stand ard off- the- shelf	Country of Origin	

ANCILLARIES (If applicable)	
Model name/number	Identification/Part number
Manufacturer	Country of Origin

EXTREME CONDITIONS					
Extreme test voltages (Max)	3.3	V	Extreme test voltages (Mix)	2.7	V
Nominal DC Voltage	3	V	DC Maximum Current	40mA	A
Maximum temperature	50	°C	Minimum temperature	0	°C

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Name: Steve Williams

Position held: Technical Director

Date: 25/09/2015



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1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a ASH Wireless Electronics Ltd SWB TAG. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 3.0 V DC supply using an integral battery.

FCC Measurement Facility Registration Number
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



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SECTION 2

TEST DETAILS

FCC Testing of the
ASH Wireless Electronics Ltd SWB TAG
In accordance with FCC 47 CFR Part 15B



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2.1 RADIATED EMISSIONS**2.1.1 Specification Reference**

FCC 47 CFR Part 15B, Clause 15.109

2.1.2 Equipment Under Test and Modification State

SWB TAG S/N: 2280 - Modification State 0

2.1.3 Date of Test

22 November 2015

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Procedure

The test was performed in accordance with ANSI C63.4-2014, Clause 8.

Remarks

All final measurements were assessed against the Class B emission limits in FCC 47 CFR Part 15, Clause 15.109.

2.1.6 Environmental Conditions

Ambient Temperature	20.9°C
Relative Humidity	23.0%

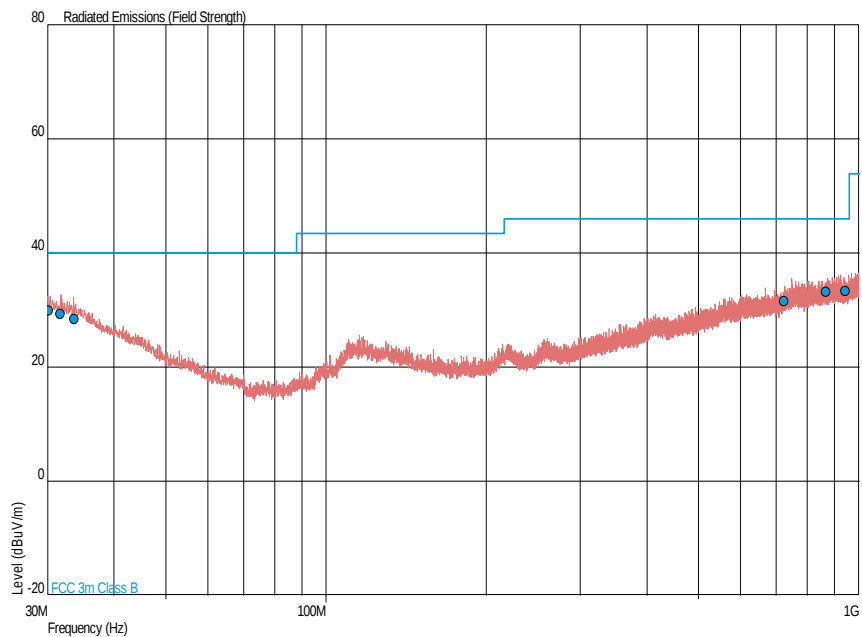


2.1.7 Test Results

Idle Mode, 30 MHz to 1 GHz Results

Frequency (MHz)	Quasi-Peak Level (dBμV/m)	Quasi-Peak Level (μV/m)	Quasi-Peak Margin (dμV/m)	Quasi-Peak Margin (μV/m)	Angle (°)	Height (m)	Polarisation
30.155	29.9	31.3	-10.1	-68.7	8	1.00	Vertical
31.698	29.4	29.5	-10.6	-70.5	100	1.00	Horizontal
33.721	28.5	26.6	-11.5	-73.4	93	1.00	Horizontal
722.235	31.6	38.0	-14.4	-162.0	193	1.00	Horizontal
868.095	33.2	45.7	-12.8	-154.3	0	1.00	Horizontal
941.662	33.3	46.2	-12.7	-153.8	148	1.00	Horizontal

Idle Mode, 30 MHz to 1 GHz Plot





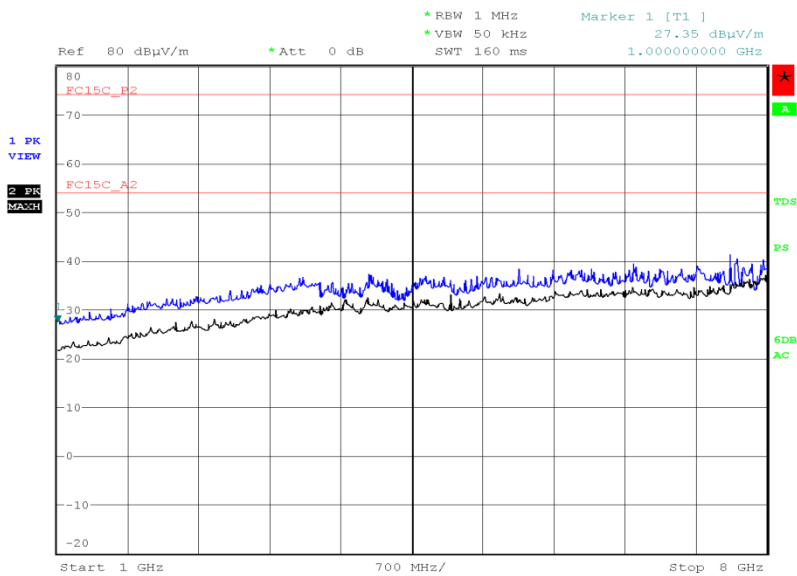
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Idle Mode, 1 GHz to 13 GHz Results

Frequency (MHz)	Average Level (dBµV/m)	Peak Level (dBµV/m)	Average Level (µV/m)	Peak Level (µV/m)	Angle (deg)	Height (m)	Polarisation
*							

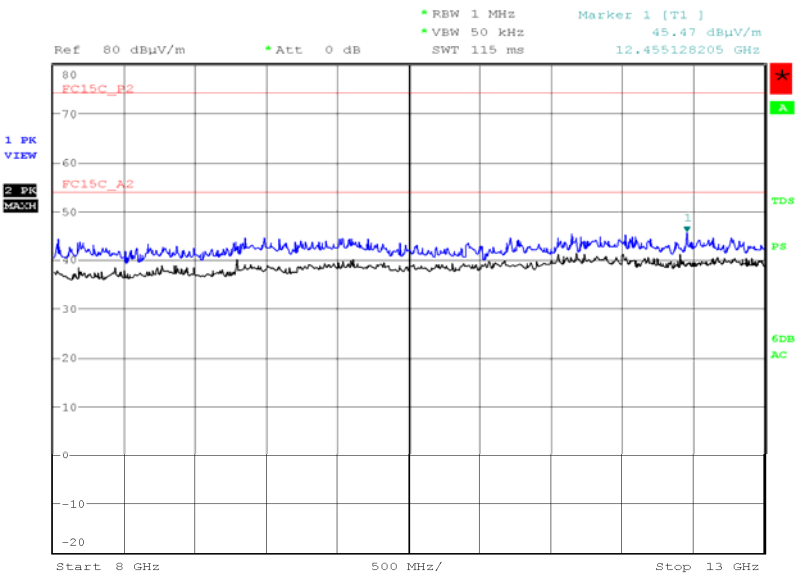
*No emissions were detected within 10 dB of the limit.

Idle Mode, 1 GHz to 8 GHz Plot



Date: 22.NOV.2015 09:12:57

Idle Mode, 8 GHz to 13 GHz Plot



Date: 22.NOV.2015 09:28:51



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FCC 47 CFR Part 15, Limit Clause 15.109Class B

Frequency of Emission (MHz)	Field Strength ($\mu\text{V/m}$)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500



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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 - Radiated Emissions					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	29-Apr-2016
Antenna (Bilog)	Schaffner	CBL6143	287	24	3-Feb-2016
Pre-Amplifier	Phase One	PS04-0086	1533	12	30-Jul-2016
Screened Room (5)	Rainford	Rainford	1545	36	20-Dec-2017
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Hygrometer	Rotronic	A1	2138	12	3-Dec-2015
Antenna (Bilog)	Chase	CBL6143	2904	24	11-Jun-2017
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	2-Nov-2016
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Multimeter	Fluke	177	3833	12	16-Jun-2016
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
1GHz to 8GHz Low Noise Amplifier	Wright Technologies	APS04-0085	4365	12	6-Oct-2016
Hygropalm Temperature and Humidity Meter	Rotronic	HP21	4410	12	15-Apr-2016
2m K-Type Cable (Rx)	Scott Cables	KPS-1501-2000-KPS	4527	-	TU
0.5m SMA Cable (Rx)	Scott Cables	SLSLL18-SMSM-00.50M	4528	6	19-Feb-2016

TU – Traceability Unscheduled



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3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	MU
Radiated Emissions	30 MHz to 1 GHz: ± 5.1 dB 1 GHz to 40 GHz: ± 6.3 dB



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SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
(Not UKAS Accredited).

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