



TEST REPORT NO: RU1038/5000
COPY NO: 2
ISSUE NO: 1
FCC ID: QQSD179X

**REPORT ON THE CERTIFICATION TESTING OF A
BLUE WATER TECHNOLOGY Ltd.
BLUE WATER REMOTE GOLF TROLLEY
WITH RESPECT TO
THE FCC RULES CFR 47, PART 15.231
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 25th October – 12th November 2002

TESTED BY: _____ J CHARTERS
APPROVED BY: _____ P GREEN
PRINCIPAL ENGINEER
DATE: 18th NOVEMBER 2002

Distribution:

- Copy Nos:
1. BLUE WATER TECHNOLOGY Ltd.
 2. FCC EVALUATION LABORATORIES
 3. TRL Compliance Services Limited

THIS DOCUMENT MAY BE REPRODUCED ONLY IN ITS ENTIRETY AND WITHOUT CHANGE

TRL COMPLIANCE SERVICES LTD EMC DIVISION
LONG GREEN FORTHAMPTON GLOUCESTER GL19 4QH UNITED KINGDOM
TELEPHONE +44 (0)1684 833818 FAX +44 (0)1684 833858
E-MAIL test@trlcompliance.com www.trlcompliance.com



0728

CONTENTS

	PAGE
CERTIFICATE OF CONFORMITY & COMPLIANCE	3
APPLICANT'S SUMMARY	4
EQUIPMENT TEST CONDITIONS	5
TESTS REQUIRED	5
TEST RESULTS	6-9

	ANNEX
PHOTOGRAPHS	A
PHOTOGRAPH No. 1: Test setup	
PHOTOGRAPH No. 2: Transmitter front view	
PHOTOGRAPH No. 3: Transmitter rear view	
PHOTOGRAPH No. 4: Transmitter PCB track side	
PHOTOGRAPH No. 5: Transmitter PCB component side	

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST	B
BAND OCCUPANCY PLOT	C
TRANSMITTER SHUTDOWN TIME	D

Notes:

- | | | | |
|----|--|-----|-------------------------------------|
| 1. | Component failure during test | YES | <input type="checkbox"/> |
| | | NO | <input checked="" type="checkbox"/> |
| 2. | If Yes, details of failure: | | |
| 3. | The facilities used for the testing of the product contain in this report are FCC Listed. | | |
| 4. | The contents of the attached applicants declarations and other supplied information are not covered by the scope of this laboratory's UKAS or FCC accreditations' and is provided in good faith. | | |



CERTIFICATE OF CONFORMITY & COMPLIANCE

FCC IDENTITY: QQSD179X

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.231

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: BLUE WATER REMOTE GOLF TROLLEY

EQUIPMENT SERIAL No: Engineering Sample

ITU:EMISSION CODE: 100KF7D

EQUIPMENT TYPE: BLUED179X

PRODUCT USE: Telemetry

CARRIER EMISSION: 3589.2μV/m @ 3 metres

ANTENNA TYPE: Integral

ALTERNATIVE ANTENNA: N/A

BAND OF OPERATION: 260MHz – 470MHz

CHANNEL SPACING: N/A wideband allocation

NUMBER OF CHANNELS: 1

FREQUENCY GENERATION: SAW Resonator ☒ Crystal ☐ Synthesiser ☐

MODULATION METHOD: Amplitude ☐ Digital ☒ Angle ☐

POWER SOURCE(s): 9Vdc

TEST DATE(s): 25th October – 12th November 2002

ORDER No(s): Fax D Lowe

APPLICANT: BLUE WATER TECHNOLOGY Ltd.

ADDRESS: 3 Horton Court
Hortonwood
Telford
TF1 7GY
United Kingdom

TESTED BY: _____ J CHARTERS

APPROVED BY: _____ P GREEN
ENGINEER
PRICIPAL

APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT):	BLUE WATER REMOTE GOLF TROLLEY
EQUIPMENT TYPE:	D179X
SERIAL NUMBER OF EUT:	Engineering sample
PURPOSE OF TEST:	Certification
TEST SPECIFICATION(s):	FCC RULES CFR 47, Part 15.231
TEST RESULT:	COMPLIANT Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
APPLICANT'S CATEGORY:	MANUFACTURER <input checked="" type="checkbox"/> IMPORTER <input type="checkbox"/> DISTRIBUTOR <input type="checkbox"/> TEST HOUSE <input type="checkbox"/> AGENT <input type="checkbox"/>
APPLICANT'S ORDER No(s):	Fax D Lowe
APPLICANT'S CONTACT PERSON(s):	Mr Dennis Lowe
E-mail address:	Dennisl@bluewatertechnology.co.uk
APPLICANT:	BLUE WATER TECHNOLOGY Ltd.
ADDRESS:	3 Horton Court Hortonwood Telford TF1 7GY United Kindom
TEL:	+44 (0)1952 606300
FAX:	+44 (0)1952 606000
MANUFACTURER:	BLUE WATER TECHNOLOGY Ltd.
EUT(s) COUNTRY OF ORIGIN:	United Kingdom
TEST LABORATORY:	TRL EMC
UKAS ACCREDITATION No:	0728
TEST DATE(s)	25 th October –12 th November 2002
TEST REPORT No:	RU1038/5000

EQUIPMENT TEST / EXAMINATIONS REQUIRED

1.	TEST/EXAMINATION	RULE PART	DETECTOR	APPLICABILITY
	Intentional Emission Frequency:	15.231	Quasi Peak	Yes
	Intentional Emission Field Strength:	15.231(b)	Quasi Peak	Yes
	Intentional Emission Band Occupancy:	15.231(c)	Peak	Yes
	Intentional Emission ERP (mW):	N/A	N/A	N/A
	Spurious Emissions – Conducted:	15.207	N/A	N/A
	Spurious Emissions – Radiated <1000MHz:	15.209	Quasi Peak	Yes
	Spurious Emissions – Radiated >1000MHz:	15.231(b)	Peak	Yes
	Maximum Frequency of Search:	15.33	N/A	Yes
	Antenna Arrangements Integral:	15.203	N/A	Yes
	Antenna Arrangements External Connector:	15.204	N/A	N/A
	Restricted Bands	15.205	N/A	Yes
	Extrapolation Factor	15.31(f)	N/A	Yes

- | | | | |
|----|--|----------------|------|
| 2. | Product Use: | Telemetry | |
| 3. | Emission Designator: | 100KF7D | |
| 4. | Duty Cycle: | <10% | |
| 5. | Transmitter bit or pulse rate and level: | 1000bps | |
| 6. | Temperatures: | Ambient (Tnom) | 12°C |
| 7. | Supply Voltages: | Vnom | 9Vdc |
- Note: Vnom voltages are as stated above unless otherwise shown on the test report page
- | | | | |
|----|---------------------|----------------|-------------------------------------|
| 8. | Equipment Category: | Single channel | <input checked="" type="checkbox"/> |
| | | Two channel | <input type="checkbox"/> |
| | | Multi-channel | <input type="checkbox"/> |
| 9. | Channel spacing: | Narrowband | <input type="checkbox"/> |
| | | Wideband | <input checked="" type="checkbox"/> |

TRANSMITTER TESTS

TRANSMITTER SPURIOUS EMISSIONS – RADIATED – PART 15.209

Ambient temperature	=	12°C(<1GHz)	3m measurements <1GHz	[]
Relative humidity	=	54% (<1GHz),	3m measurements >1GHz	[X]
Conditions	=	Open Area Test Site (OATS)	3m extrapolated from 0.3m	[X]
Supply voltage	=	9Vdc		
Channel number	=	433.92MHz		

	FREQ. (MHz)	MEAS. Rx. (dBµV)	CABLE LOSS (dB)	ANT FACT. dB/m	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)	LIMIT (µV/m)
30MHz - 88MHz								
88MHz - 216MHz								
216MHz - 960MHz	867.8	26.0	3.6	20.1	49.7	-	305.49	500
960MHz - 1GHz								
1GHz - 5GHz	1735.6	32.07	0.4	26.6	59.07	20	89.84	1000
	2169.5	43.0	0.4	28.0	71.4	20	371.53	1000
	2603.4	31.07	0.4	29.2	60.67	20	108.0	1000
	3471.2	36.45	0.5	31.8	68.8	20	275.4	1000
	3905.1(R)	28.1	0.5	32.8	61.4	20	117.5	500
	4339.1(R)	20.8	0.5	32.8	54.1	20	50.69	500
Limits	1.705MHz to 30MHz		30µV/m @ 30m					
	30MHz to 88MHz		100µV/m @ 3m					
	88MHz to 216MHz		150µV/m @ 3m					
	216MHz to 960MHz		200µV/m @ 3m					
	960MHz to 1GHz		500µV/m @ 3m					
	1GHz to 5GHz		500µV/m @ 3m					

Notes:

- 1 Results quoted are extrapolated as indicated
- 2 Emissions were searched to: (x) 1000MHz inclusive, as per Part 15.33a
- 3 Extrapolation factor 9.5dB from 1m to 3m, as per Part 15.31f
- 4 Measurements >1GHz @ 1m as per Part 15.31f(1)
- 5 Receiver detector >1GHz = CISPR, Quasi-Peak, 120kHz bandwidth
- 6 Receiver detector >1GHz = Peak Hold, 1MHz resolution bandwidth
- 7 New batteries used for battery powered products.
- 8 (R) indicates frequency within restricted band from Part 15.205
- 9 Only results measured within 20 dB of limit are quoted.

Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 1992
- 2 Measuring distances as Notes 1 to 4 above
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded.

The test equipment used for the Transmitter Spurious Emissions – Radiated – Part 15.209 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	X
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	X

TRANSMITTER TESTS

TRANSMITTER INTENTIONAL EMISSION – RADIATED – Part 15.231

Ambient temperature	=	12°C(<1GHz),	3m measurements @ fc	[X]
Relative humidity	=	54%(<1GHz),	10m measurements @ fc	[]
Conditions	=	Open Area Test Site (OATS)	30m measurements @ fc	[]
Supply voltage	=	9Vdc	30m extrapolated from 3m	[]
Channel number	=	1	30m extrapolated from 10m	[]

FREQ. (MHz)	MEASUREMENT Rx. READING (dBµV)	CABLE LOSS (dB)	ANT FACTOR dB/M	FIELD STRENGTH (dBµV/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH (µV/m)
433.92	52.45	2.3	16.35	71.1	-	3589.219
Limit value @ fc			10996.68(µV/m)			
Band occupancy @ -20dBc 412kHz			f lower		f higher	
			433.721		434.133	
Transmitter switch off time			700 ms			

See spectrum analyser plot – Annex C

Notes:

- 1 Results quoted are extrapolated as indicated
- 2 Receiver detector @ fc = Quasi Peak 120kHz bandwidth
- 3 When battery powered the EUT was powered with new batteries
- 4 For transmitter shut down time see Annex D

Test Method:

- 1 As per Radio – Noise Emissions, ANSI C63.4: 1992
- 2 Measuring distances 3m
- 3 EUT 0.8 metre above ground plane
- 4 Emissions maximised by rotation of EUT, on an automatic turntable.
Raising and lowering the receiver antenna between 1m & 4m.
Horizontal and vertical polarisations, of the receive antenna.
EUT orientation in three orthogonal planes.
Maximum results recorded

The test equipment used for the Transmitter Intentional Emission – Radiated – Part 15.231 tests is shown overleaf:

TYPE OF EQUIPMENT	MAKER/ SUPPLIER	MODEL No	SERIAL No	TRL No	ACTUAL EQUIPMENT USED
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
HORN ANTENNA	EMCO	3115	9010-3580	138	
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONE ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONE 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
BILOG ANTENNA	CHASE	CBL6112	2098	274	
RECEIVER	ROHDE & SCHWARZ	ESVS10	837948/003	317	
RECEIVER	ROHDE & SCHWARZ	ESVS10	844594/003	352	
RECEIVER	ROHDE & SCHWARZ	ESHS10	844077/019	353	
V / UHF RECEIVER 20MHz - 1GHz	ROHDE & SCHWARZ	ESVS 20	838804 / 005	415	
BILOG ANTENNA	SCHAFFNER	CBL6112B	2761	431	
RECEIVER	ROHDE & SCHWARZ	ESHS 10	830051/001	UH03	
RECEIVER	ROHDE & SCHWARZ	ESVS 10	825892/003	UH04	X
RANGE 1	TRL	3 METRE	N/A	UH06	X
AE, LOOP, Z2, 9kHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	X
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	

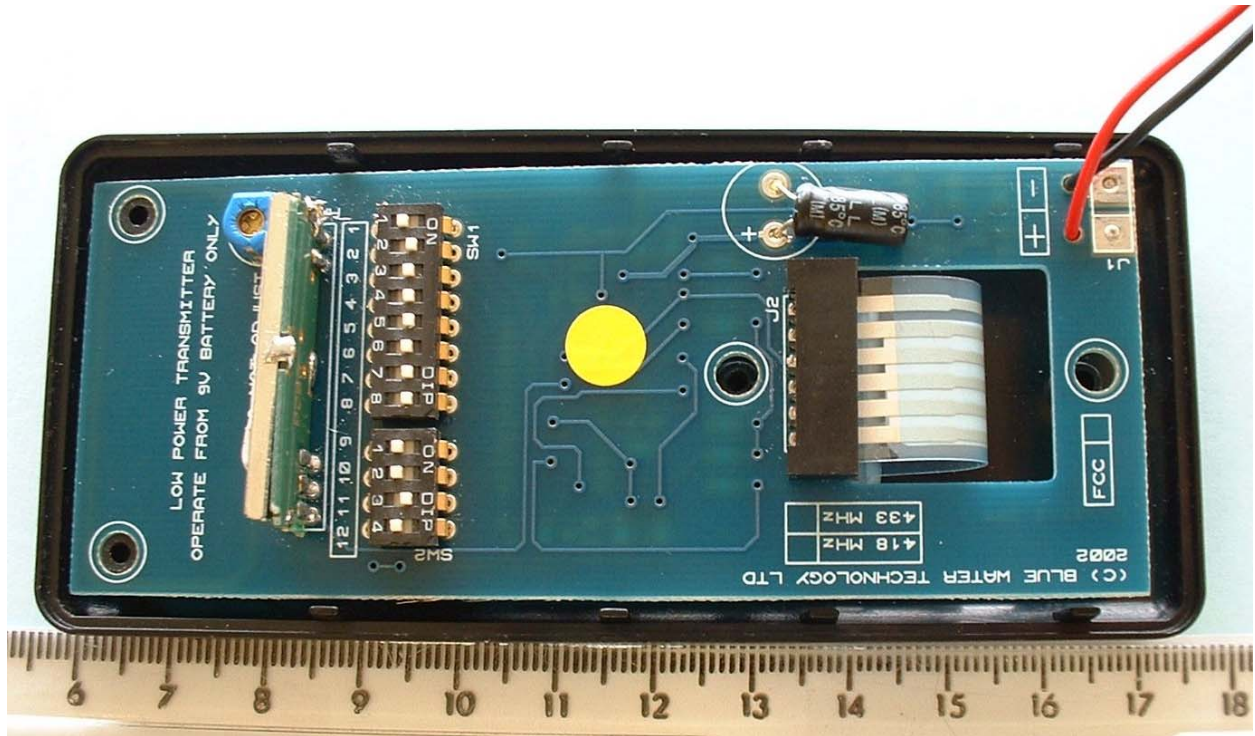
ANNEX A
PHOTOGRAPHS

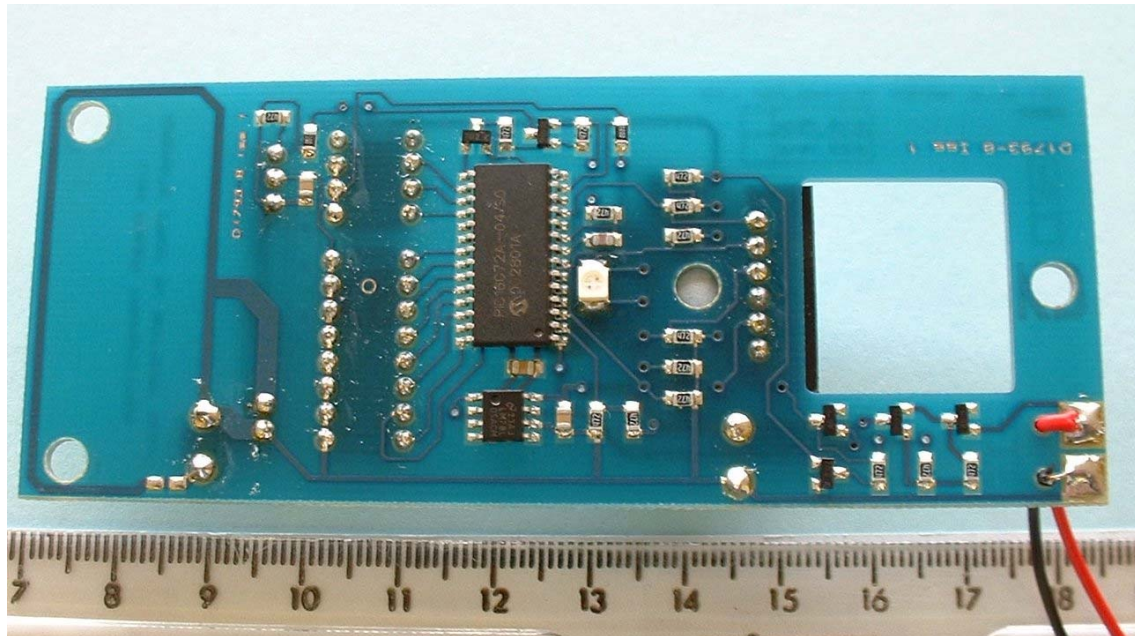






TRANSMITTER PCB TRACK SIDE





ANNEX B

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

APPLICANT'S SUBMISSION OF DOCUMENTATION LIST

a.	TCB	-	APPLICATION	[X]
		-	FEE	[X]
b.	AGENT'S LETTER OF AUTHORISATION	-		[X]
c.	MODEL(s) vs IDENTITY	-		[X]
d.	ALTERNATIVE TRADE NAME DECLARATION(s)	-		[]
e.	LABELLING	-	PHOTOGRAPHS	[]
		-	DECLARATION	[]
		-	DRAWINGS	[X]
f.	TECHNICAL DESCRIPTION	-		[X]
g.	BLOCK DIAGRAMS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
h.	CIRCUIT DIAGRAMS	-	Tx	[X]
		-	Rx	[X]
		-	PSU	[]
		-	AUX	[]
i.	COMPONENT LOCATION	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
j.	PCB TRACK LAYOUT	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
k.	BILL OF MATERIALS	-	Tx	[X]
		-	Rx	[]
		-	PSU	[]
		-	AUX	[]
l.	USER INSTALLATION / OPERATING INSTRUCTIONS	-		[X]

ANNEX C
BANDWIDTH PLOT

BANDWIDTH PLOT



ANNEX D
TRANSMITTER SHUT DOWN TIME

TRANSMITTER SHUT DOWN TIME

