



TEST REPORT NO: RU1038/5000

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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: 25<sup>th</sup> October – 12<sup>th</sup> November 2002

TESTED BY: \_\_\_\_\_ J CHARTERS

APPROVED BY: \_\_\_\_\_ P GREEN  
PRINCIPAL ENGINEER

DATE: 18<sup>th</sup> NOVEMBER 2002

Distribution:

Copy Nos: 1. BLUE WATER TECHNOLOGY Ltd.  
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3. TRL Compliance Services Limited

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**Notes:**

1.	Component failure during test	YES NO	[ ] [X]
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:	3589.2 $\mu$ V/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 <input checked="" type="checkbox"/> Crystal <input type="checkbox"/>
MODULATION METHOD:	Amplitude <input type="checkbox"/> Digital <input checked="" type="checkbox"/>
POWER SOURCE(s):	9Vdc
TEST DATE(s):	25 <sup>th</sup> October – 12 <sup>th</sup> 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 PRINCIPAL

## 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  No

APPLICANT'S CATEGORY: MANUFACTURER   
IMPORTER   
DISTRIBUTOR   
TEST HOUSE   
AGENT

APPLICANT'S ORDER No(s): Fax D Lowe

APPLICANT'S CONTACT PERSON(s): Mr Dennis Lowe

E-mail address: [Dennisl@bluewatertechnology.co.uk](mailto:Dennisl@bluewatertechnology.co.uk)

APPLICANT: BLUE WATER TECHNOLOGY Ltd.

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

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<sup>th</sup> October – 12<sup>th</sup> 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 (T<sub>nom</sub>) 12°C

7. Supply Voltages: V<sub>nom</sub> 9Vdc

Note: V<sub>nom</sub> voltages are as stated above unless otherwise shown on the test report page

8. Equipment Category: Single channel  Two channel  Multi-channel

9. Channel spacing: Narrowband  Wideband

## 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. (dB $\mu$ V)	CABLE LOSS (dB)	ANT FACT. dB/m	FIELD STRENGTH (dB $\mu$ V/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH ( $\mu$ V/m)	LIMIT ( $\mu$ V/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 2169.5 2603.4 3471.2 3905.1(R) 4339.1(R)	32.07 43.0 31.07 36.45 28.1 20.8	0.4 0.4 0.4 0.5 0.5 0.5	26.6 28.0 29.2 31.8 32.8 32.8	59.07 71.4 60.67 68.8 61.4 54.1	20 20 20 20 20 20	89.84 371.53 108.0 275.4 117.5 50.69	1000 1000 1000 1000 500 500
Limits	1.705MHz to 30MHz		30 $\mu$ V/m @ 30m					
	30MHz to 88MHz		100 $\mu$ V/m @ 3m					
	88MHz to 216MHz		150 $\mu$ V/m @ 3m					
	216MHz to 960MHz		200 $\mu$ V/m @ 3m					
	960MHz to 1GHz		500 $\mu$ V/m @ 3m					
	1GHz to 5GHz		500 $\mu$ V/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 Part15.205
- 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	<b>X</b>
HORN ANTENNA	EMCO	3115	9010-3581	139	
SPECTRUM ANALYSER	TEKTRONIX	2756P	B010109	164	
BICONIC ANTENNA	CHASE	BBA9106	N/A	193	
ANTENNA, LOG PERIODIC 300MHz – 1GHz	CHASE	UPA6108	1061	203	
RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONIC 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	<b>X</b>
RANGE 1	TRL	3 METRE	N/A	UH06	<b>X</b>
AE, LOOP, Z2, 9KHz - 30MHz	ROHDE & SCHWARZ	HFH2	881058 - 53	07	
BILOG ANTENNA	CHASE	CBL6112	2129	UH93	<b>X</b>
SPECTRUM ANALYSER	MARCONI	2386/2380	152076/004	UH120	<b>X</b>

## 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 (dB $\mu$ V)	CABLE LOSS (dB)	ANT FACTOR dB/M	FIELD STRENGTH (dB $\mu$ V/m)	EXTRAP. FACTOR (dB)	FIELD STRENGTH ( $\mu$ V/m)
433.92	52.45	2.3	16.35	71.1	-	3589.219
Limit value @ fc			10996.68( $\mu$ V/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	
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RECEIVER	ROHDE & SCHWARZ	ESHS20	837960/003	237	
ANTENNA, BICONIC 20MHz - 300MHz	CHASE	VBA6106A	1193	251	
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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**

PHOTOGRAPH No. 1

**TEST SETUP**



PHOTOGRAPH No. 2

**TRANSMITTER FRONT VIEW**



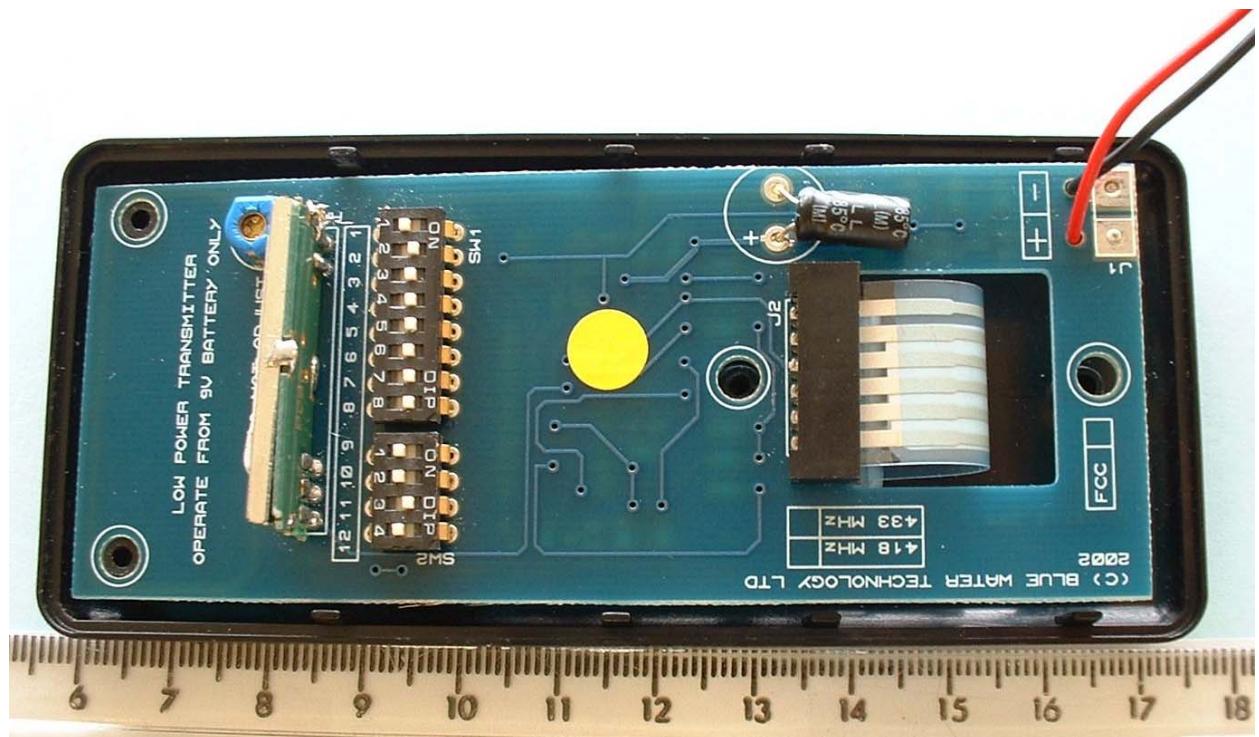
PHOTOGRAPH No. 3

**TRANSMITTER REAR VIEW**



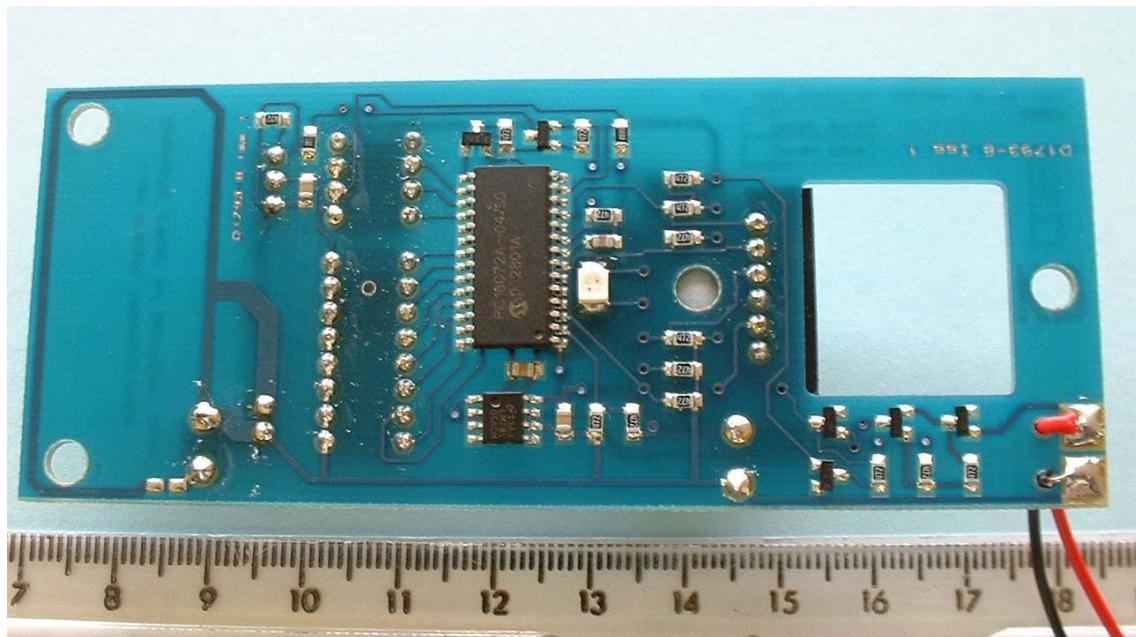
PHOTOGRAPH No. 4

## TRANSMITTER PCB TRACK SIDE



PHOTOGRAPH No. 5

**TRANSMITTER PCB COMPONENT SIDE**



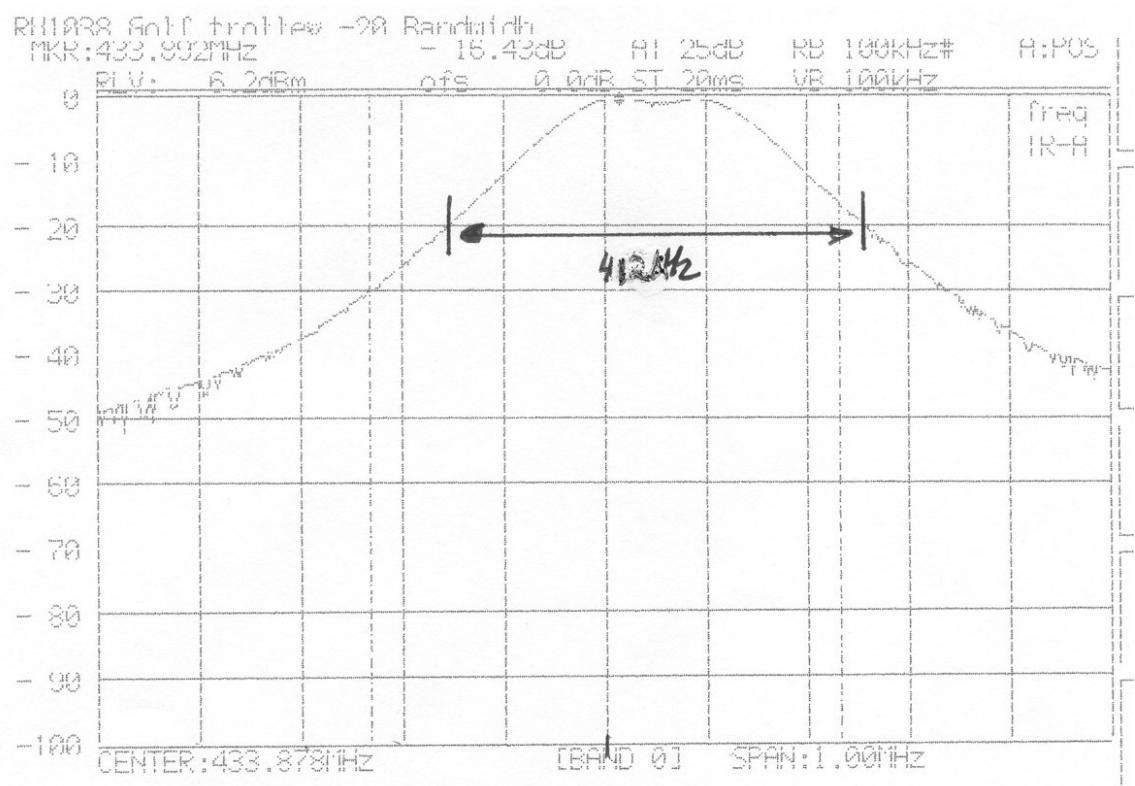
**ANNEX B**  
**APPLICANT'S SUBMISSION OF DOCUMENTATION LIST**

## 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

