



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: 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.
  2. FCC EVALUATION LABORATORIES
  3. TRL Compliance Services Limited

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

## CONTENTS

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

|                                                  | <b>ANNEX</b> |
|--------------------------------------------------|--------------|
| 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: 3589.2 $\mu$ 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 ☒ Crystal ☐ Synthesiser ☐

MODULATION METHOD: Amplitude ☐ Digital ☒ Angle ☐

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  
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"/><br>No <input type="checkbox"/>                                                                                                                  |
| APPLICANT'S CATEGORY:          | MANUFACTURER <input checked="" type="checkbox"/><br>IMPORTER <input type="checkbox"/><br>DISTRIBUTOR <input type="checkbox"/><br>TEST HOUSE <input type="checkbox"/><br>AGENT <input type="checkbox"/> |
| APPLICANT'S ORDER No(s):       | Fax D Lowe                                                                                                                                                                                             |
| APPLICANT'S CONTACT PERSON(s): | Mr Dennis Lowe                                                                                                                                                                                         |
| E-mail address:                | <a href="mailto:Dennisl@bluewatertechnology.co.uk">Dennisl@bluewatertechnology.co.uk</a>                                                                                                               |
| APPLICANT:                     | BLUE WATER TECHNOLOGY Ltd.                                                                                                                                                                             |
| ADDRESS:                       | 3 Horton Court<br>Hortonwood<br>Telford<br>TF1 7GY<br>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 <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 (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 ☒  
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.<br>(MHz)    | MEAS.<br>Rx.<br>(dBµV) | CABLE<br>LOSS<br>(dB) | ANT<br>FACT.<br>dB/m | FIELD<br>STRENGTH<br>(dBµV/m) | EXTRAP.<br>FACTOR<br>(dB) | FIELD<br>STRENGTH<br>(µV/m) | LIMIT<br>(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    | <b>X</b>              |
| 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   | <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.<br>(MHz)                    | MEASUREMENT<br>Rx. READING<br>(dBµV) | CABLE<br>LOSS<br>(dB) | ANT<br>FACTOR<br>dB/M | FIELD<br>STRENGTH<br>(dBµV/m) | EXTRAP.<br>FACTOR<br>(dB) | FIELD<br>STRENGTH<br>(µV/m) |
|-----------------------------------|--------------------------------------|-----------------------|-----------------------|-------------------------------|---------------------------|-----------------------------|
| 433.92                            | 52.45                                | 2.3                   | 16.35                 | 71.1                          | -                         | 3589.219                    |
| Limit value @ fc                  |                                      |                       | 10996.68(µV/m)        |                               |                           |                             |
| Band occupancy @ -20dBc<br>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:

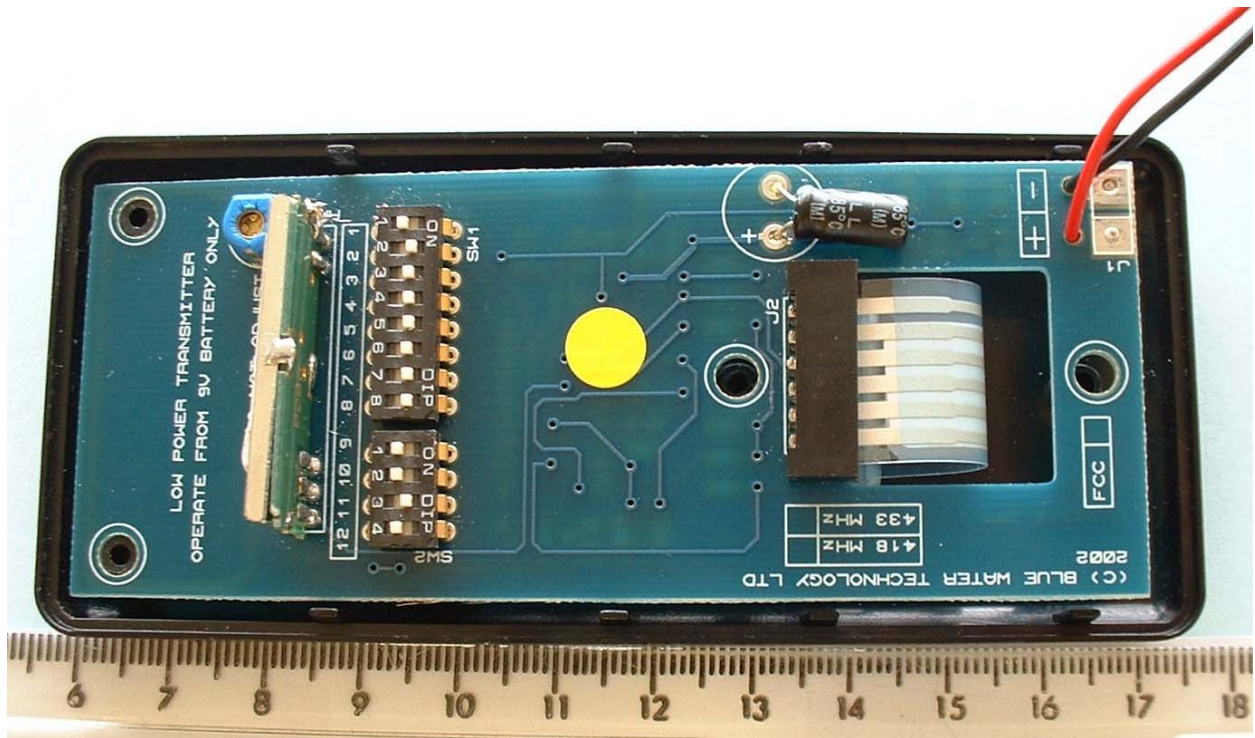
| TYPE OF EQUIPMENT                   | MAKER/ SUPPLIER | MODEL No  | SERIAL No    | TRL No | ACTUAL EQUIPMENT USED |
|-------------------------------------|-----------------|-----------|--------------|--------|-----------------------|
| AE, LOOP, Z2, 9kHz - 30MHz          | ROHDE & SCHWARZ | HFH2      | 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   | <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  |                       |

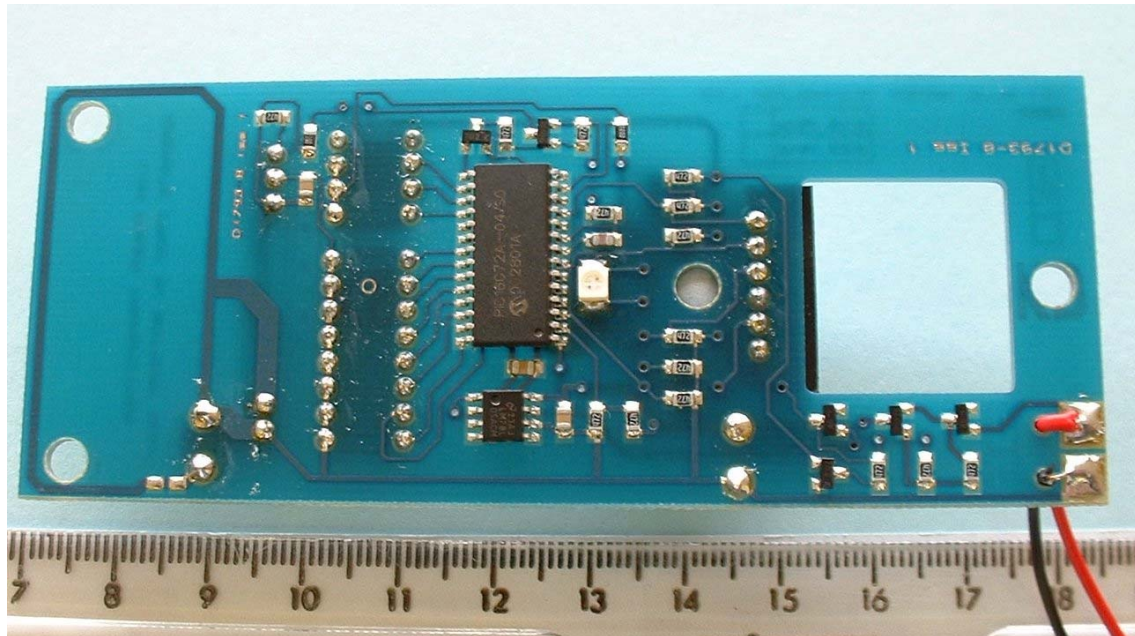
**ANNEX A**  
**PHOTOGRAPHS**











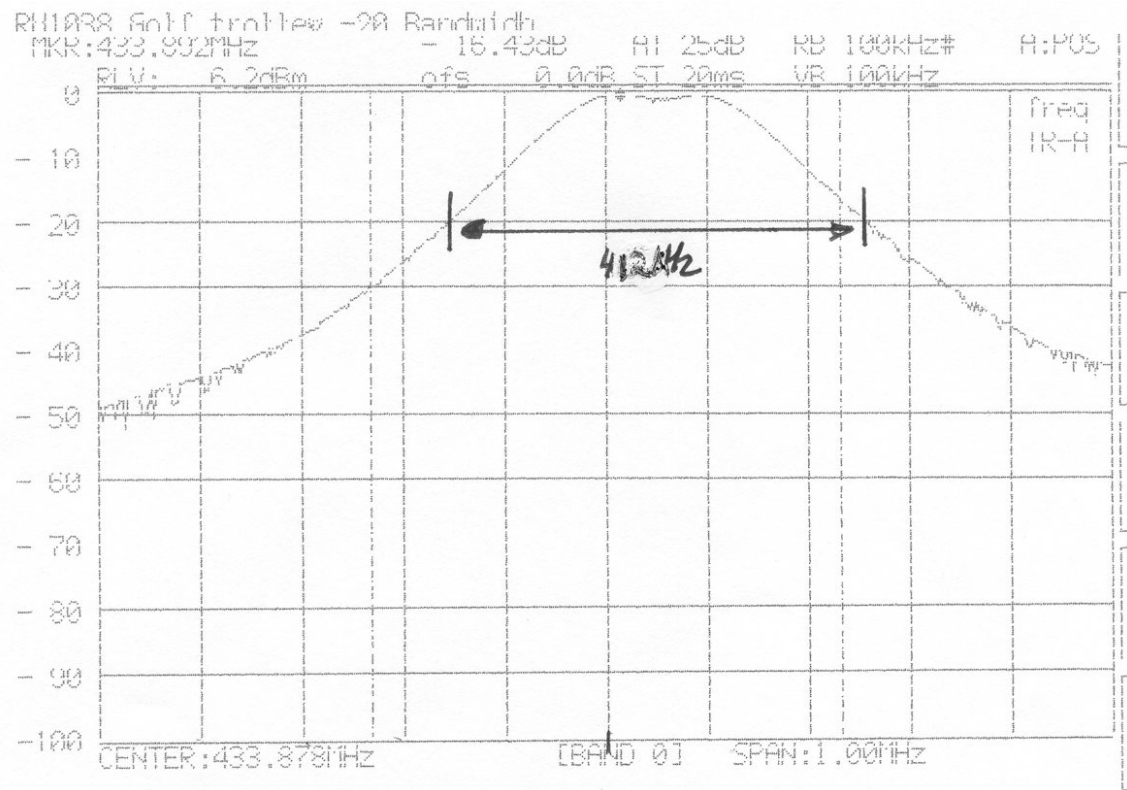
**ANNEX B**  
**APPLICANT'S SUBMISSION OF DOCUMENTATION LIST**

## 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

