



TEST REPORT NO: RU1250/7053  
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FCC ID: T5V01EXEMIC

**REPORT ON THE CERTIFICATION TESTING OF A  
REVO LABS INC.  
SOLO MICROPHONE UNIT  
WITH RESPECT TO  
THE FCC RULES CFR 47, PART 15.323(c) & 15.323(e) February 2006  
INTENTIONAL RADIATOR SPECIFICATION**

TEST DATE: 12<sup>th</sup> – 19<sup>th</sup> June 2006

TESTED BY: \_\_\_\_\_ D WINSTANLEY

APPROVED BY: \_\_\_\_\_ P GREEN  
EMC PRODUCT  
MANAGER

DATE: 19<sup>th</sup> June 2006 \_\_\_\_\_

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**Notes:**

|   |   |
|---|---|
| 1. Component failure during test  | YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> [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: T5V01EXEMIC

PURPOSE OF TEST: Certification

TEST SPECIFICATION: FCC RULES CFR 47, Part 15.323(c) & 15.323(e) February 2006

TEST RESULT: Compliant to Specification

EQUIPMENT UNDER TEST: Solo Microphone Unit

EQUIPMENT SERIAL No: 279

EQUIPMENT TYPE: UPCS Transceiver

PRODUCT USE: Personal communications

CARRIER POWER: 14.5mW (see TUV Test report DI602355 for measurement)

ANTENNA TYPE: Integral

ALTERNATIVE ANTENNA: Not Applicable

BAND OF OPERATION: 1920 MHz – 1930 MHz

CHANNEL SPACING: Not Applicable

NUMBER OF CHANNELS: 5 frequencies, 6 double time slots per frequency giving 30 channels

FREQUENCY GENERATION: SAW Resonator  Crystal  Synthesiser

MODULATION METHOD: Amplitude  Digital  Angle

POWER SOURCE(s): +110Vac

TEST DATE(s): 12<sup>th</sup> – 19<sup>th</sup> June 2006

ORDER No(s): Pro Forma Invoice

APPLICANT: REVOLABS INC.

ADDRESS: 63 Great Rd  
Maynard  
MA 01754  
United States

TESTED BY: \_\_\_\_\_ D WINSTANLEY

APPROVED BY: \_\_\_\_\_ P GREEN  
EMC PRODUCT  
MANAGER

## APPLICANT'S SUMMARY

EQUIPMENT UNDER TEST (EUT): Solo Microphone Unit

EQUIPMENT TYPE: UPCS Transceiver

SERIAL NUMBER OF EUT: 279

PURPOSE OF TEST: Certification

TEST SPECIFICATION(s): FCC RULES CFR 47, Part 15.323(c) & 15.323(e) February 2006

TEST RESULT: COMPLIANT Yes  No

APPLICANT'S CATEGORY: MANUFACTURER   
IMPORTER   
DISTRIBUTOR   
TEST HOUSE   
AGENT

APPLICANT'S ORDER No(s): Pro Forma Invoice

APPLICANT'S CONTACT PERSON(s): Mr M Bodley

E-mail address: [MBodley@maestrolabs.com](mailto:MBodley@maestrolabs.com)

APPLICANT: REVOLABS INC.

ADDRESS: 63 Great Rd  
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MA 01754  
United States

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TEST LABORATORY: TRL Compliance Ltd

UKAS ACCREDITATION No: 0728

TEST DATE(s): 12<sup>th</sup> – 19<sup>th</sup> June 2006

TEST REPORT No: RU1250/7053

## EQUIPMENT TEST / EXAMINATIONS REQUIRED

| 1.    | TEST/EXAMINATION  | RULE PART                      | APPLICABILITY |
|-------|---|--------------------------------|---------------|
|       | Monitoring Thresholds   | 15.323 (c)(2)<br>15.323 (c)(9) | Yes           |
|       | Monitoring of Intended Transmit Window and Maximum Reaction Time  | 15.323 (c)(1)                  | Yes           |
|       | Monitoring Bandwidth  | 15.323 (c)(7)                  | Yes           |
|       | Access Criteria Test Interval   | 15.323 (c)(6)                  | No<br>note 1  |
|       | Duration of Transmission  | 15.323 (c)(3)                  | Yes           |
|       | Connection Acknowledgement  | 15.323 (c)(4)                  | Yes           |
|       | Lower threshold Selected Channel, Power Accuracy, Segment Occupancy   | 15.323 (c)(5)                  | Yes           |
|       | Monitoring Antenna  | 15.323 (c)(8)                  | Yes           |
|       | Duplex Connections  | 15.323 (c)(10)                 | Yes           |
|       | Alternative Monitoring Interval for Co-located Devices  | 15.323 (c)(11)                 | No<br>note 2  |
|       | Fair Access to Spectrum Related to (c)(10) & (c)(11)  | 15.323 (c)(12)                 | Yes           |
|       | Frame Period  | 15.323 (e)                     | Yes           |
| Note: | 1. The solo microphone unit does not transmit control and signalling information.<br>2. The manufacturer declares that the provisions of CFR47 part 15.323(c)(11) are not used. |                                |               |

This test report only covers CFR47 part 15.323(c) and CFR47 part 15.323(e). Please refer to TUV test report DI602355 for all other measurement information.

|   |                             |         |
|---|-----------------------------|---------|
| 2. Product Use:                             | Personal Communications     |         |
| 3. Duty Cycle:                              | 8.33%                       |         |
| 4. Transmitter bit or pulse rate and level: | 2Mbps                       |         |
| 5. Temperatures:                            | Ambient (T <sub>nom</sub> ) | 22°C    |
| 6. Supply Voltages:                         | V <sub>nom</sub>            | +110Vac |

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

|                        |                |     |
|------------------------|----------------|-----|
| 7. Equipment Category: | Single channel | [ ] |
|                        | Two channel    | [ ] |
|                        | Multi-channel  | [X] |
| 8. Channel spacing:    | Narrowband     | [ ] |
|                        | Wideband       | [X] |
| 9. System Description: |                |     |

The system is made up of two parts, a fixed part and a portable part. The portable part is a tie mounted microphone about the body. The portable part is powered by an internal rechargeable 3.7Vdc battery. The system is supplied with a charging station for the microphones. The microphones have a jack socket to enable connection of an ear piece. The fixed part constitutes two pairs Radio Fixed Parts (RFPs) and each pair of RFPs having a pair of diversity antennae. The base unit is rack mounted and is powered from 110Vac. The base unit has audio inputs and outputs on the rear and

The system operates in the 1920MHz -1930MHz band. The system use 5 different frequency channels 1.728MHz apart using MC/TDMA/TDD (Multi Carrier / Time Division Multiple Access / Time Division Duplex) using QPSK modulation.

The system employs a 10ms frame, divided into 24 equal timeslots, numbered 0-23. The system uses double-slots only, where a double-slot always begins on an even-numbered slot. The Base station always transmits in the first half of the frame, and the Portable always transmits on the duplex mate in the second half. A physical bearer is composed of a transmit double-slot and a receive double-slot. The two halves of a given bearer are always exactly half a frame (5ms, 12 slots) apart.

During the testing the Solo Microphone Unit was frequency administered to allow operation on only certain channels during the test. The frequency administration was performed using software. The EUT was fitted with a temporary antenna connector to allow measurements to be performed conducted.

## MONITORING THRESHOLDS – PART 15.323 (c)(2); (c)(9)

The monitoring threshold calculations are carried out in accordance with ANSI C63.17 sub-clause 7.2.1 using the calculations laid out in ANSI C63.17 sub-clauses 4.3.3 and 4.3.4

Calculation of monitoring threshold limits for isochronous devices:

$$\text{Lower threshold: } T_L = -174 + 10\log_{10}B + M_U + P_{MAX} - P_{EUT} \text{ (dBm)}$$

$$\text{Upper threshold: } T_U = -174 + 10\log_{10}B + M_U + P_{MAX} - P_{EUT} \text{ (dBm)}$$

Where:

$B$  = Emission bandwidth (Hz)

$M_U$  = dBs the threshold may exceed thermal noise ( 30 for  $T_L$  & 50 for  $T_U$ )

$P_{MAX}$  = Output Power Limit (dBm)

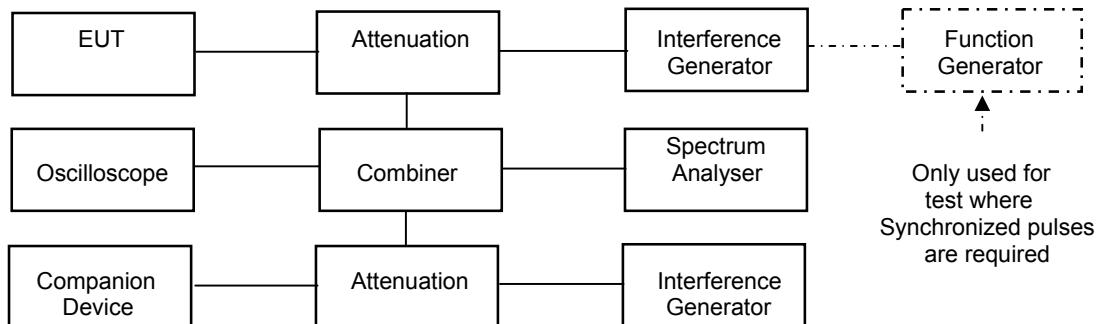
$P_{EUT}$  = Transmitted power (dBm)

| Monitor Threshold | B (MHz) | $M_U$ (dB) | $P_{MAX}$ (dBm) | $P_{EUT}$ (dBm) | Threshold (dBm) |
|-------------------|---------|------------|-----------------|-----------------|-----------------|
| $T_L$             | 1.46    | 30         | 20.8            | 11.61           | -73.2           |
| $T_U$             | 1.46    | 50         | 20.8            | 11.61           | -53.2           |

Note: 1. The upper threshold ( $T_U$ ) is only applicable for systems with a minimum of 40 channels

The monitoring threshold tests are carried out in accordance with ANSI C63.17 sub-clause 7.3 using the test setup 2. The lower threshold level was determined following the procedure as laid out in ANSI C63.17 sub-clause 7.3.1 (a) Frequency administration was used to allow operation on the carrier closest to the centre of the band.

Test Setup 1:



### Limits

The EUT must not transmit until the interference level is less than or equal to:

$$\text{Measured Threshold Level} \leq T_L + U_M$$

Where:

$T_L$  = Lower threshold level

$U_M$  = Margin of uncertainty in threshold measurements (6dB)

### Results

| Monitor threshold     | Measured Threshold Level | Limit     | Pass/Fail |
|-----------------------|--------------------------|-----------|-----------|
| Lower Threshold (dBm) | -72.2 dBm                | -67.2 dBm | Pass      |
| Upper threshold (dBm) | N/A                      | N/A       | Pass      |

Notes:

1. The threshold level for the Solo Microphone Unit is set using the 'thr' command as detailed in the document C7490-TM-002.
2. The value of 'thr' for the purpose of this test was 28 (decimal), it then remained at this level for the rest of the testing

## MONITORING OF INTENDED TRANSMIT WINDOW AND MAXIMUM REACTION TIME – PART 15.323 (c)(1)

The monitoring of intended transmit window was carried out in accordance with ANSI C63.17 sub-clause 7.5 using test setup 1. (page 7)

The EUT was frequency administered to only one operating frequency channel and only one of the interference generators in the test setup was utilized. The interference generator was fed pulses from the function generator to produce a pulsed carrier of the specified time length and the output of the interference generator was set to the required level. The pulse generator and companion device were synchronized so the position of the pulses corresponded to the time-slot pattern in the frame of the EUT. The test is performed with the unit frequency administered to operate only on bottom, middle or top frequency.

For each of the required tests the pulse width and interference level are as below:

### Test c)

With the interference generator output set at the calculated threshold level (lower) and the width of the pulse interference exceeds the largest of  $50\mu\text{s}$  and  $50\sqrt{1.25/B}\mu\text{s}$  verify that the EUT does not establish a connection.

### Test d)

With the interference generator output set at 6dB above the calculated threshold level (lower) and the width of the pulse interference exceeds the largest of  $35\mu\text{s}$  and  $35\sqrt{1.25/B}\mu\text{s}$  verify that the EUT does not establish a connection.

### Test e)

With the interference generator output set at 10dB above the calculated threshold level (lower) and the width of the pulse interference exceeds the largest of  $75\mu\text{s}$  and  $75\sqrt{1.25/B}\mu\text{s}$  verify that the EUT does not establish a connection.

Where  $B$  = Emission bandwidth of the EUT in MHz

## Results

| Test Equation<br>( $\mu\text{s}$ ) | Pulse<br>Width<br>( $\mu\text{s}$ ) | Interferer Level<br>(dBm) | Connection |       |       | Pass/Fail |
|------------------------------------|-------------------------------------|---------------------------|------------|-------|-------|-----------|
|                                    |                                     |                           | $F_L$      | $F_M$ | $F_H$ |           |
| $50\sqrt{1.25/B}$                  | 50                                  | Calculated                | No         | No    | No    | Pass      |
| $35\sqrt{1.25/B}$                  | 35                                  | Calculated + 6            | No         | No    | No    | Pass      |
| $75\sqrt{1.25/B}$                  | 75                                  | Calculated + 10           | No         | No    | No    | Pass      |

### **MONITORING BANDWIDTH – PART 15.323 (c)(7)**

The monitoring bandwidth test was carried out in accordance with ANSI C63.17 sub-clause 7.4 using test setup 1 (page 7).

ANSI C63.17 sub-clause 7.4 states that if the monitoring is made through the radio receiver used by the EUT for communication the intended monitoring bandwidth requirements met.

As declared by the manufacturer the EUT uses the radio receiver used for communication for monitoring the intended monitoring bandwidth therefore requirements of ANSI C63.17 sub-clause 7.4 are met.

### **DURATION OF TRANSMISSION – PART 15.323 (c)(3)**

The duration of transmission test was carried out in accordance with ANSI C63.17 sub-clause 8.2.2 using test setup 1.(page 7) (No interference generators were active during this test).

The time/spectrum window occupied by the connection was monitored using a spectrum analyzer for the spectrum window and an oscilloscope for the time slot. The connection was watched over a period of over 6 hours during this time the access criteria was repeated several times.

### **Result**

| Repetition of Access Criteria | Maximum Transmission Time | Maximum Transmission Time Limit | Pass/Fail |
|-------------------------------|---------------------------|---------------------------------|-----------|
| First                         | 2 Hours                   | <8 Hours                        | Pass      |
| Second                        | 2 Hours                   | <8 Hours                        | Pass      |

### **CONNECTION ACKNOWLEDGEMENT – PART 15.323 (c)(4)**

The connection acknowledgement test was carried out in accordance with ANSI C63.17 sub-clause 8.2.1 using test setup 1. (Page 7)(No interference generators were active during this test).

The test was carried out in two parts. The first was to verify that with the no acknowledgements received from the companion device the EUT does not transmit for more than the limit. The second was to verify that after a connection is broken the EUT terminates its transmission on the current communication channel within 30 seconds or less.

### **Result**

| Test  | Time Taken (seconds) | Limit (seconds) | Pass/Fail |
|---|----------------------|-----------------|-----------|
| Transmission on communication channel no acknowledgement received (note 1)                            | 0.206                | 1               | Pass      |
| Established communication channel termination, acknowledgements blocked during communication (note 1) | 5.20                 | 30              | Pass      |

Note:

1. The companion device transmits a beacon signal when acknowledgements are blocked.
2. The EUT does not transmit a control channel.
3. See Annex B for Transmission on comms channel no ACK received.
4. See Annex C for Established communication channel termination plot.

**UPPER THRESHOLD SELECTED CHANNEL, POWER ACCURACY, SEGMENT OCCUPANCY – PART 15.323  
(c)(5)**

**Least interfered Channel**

As this system has less than 40 channels the least interfered channel relating to the lower monitoring threshold shall be assessed. This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.3 using test setup 1.(page 7)

The EUT was frequency administered to operating on two frequencies only, f1 and f2.

f1 = 1924.992 MHz

f2 = 1923.264 MHz

**Test b)**

Interference on f1 was set at  $T_L + U_M + 7\text{dB}$  and at  $T_L + U_M$  on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

**Test c)**

Interference on f1 was set at  $T_L + U_M$  and at  $T_L + U_M + 7\text{dB}$  on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

**Test d)**

Interference on f1 was set at  $T_L + U_M + 1\text{dB}$  and at  $T_L + U_M - 6\text{dB}$  on f2. Initiate communication. The EUT should transmit on f2. Repeat 5 times. If the EUT transmits on f1 the test is failed.

**Test e)**

Interference on f1 was set at  $T_L + U_M - 6\text{dB}$  and at  $T_L + U_M + 7\text{dB}$  on f2. Initiate communication. The EUT should transmit on f1. Repeat 5 times. If the EUT transmits on f2 the test is failed.

**Result**

| Test | Transmit on f1 | Transmit on f2 | Wanted Transmit Channel | Pass/Fail |
|------|----------------|----------------|-------------------------|-----------|
| b    | No             | No             | f2                      | Pass      |
| c    | No             | No             | f1                      | Pass      |
| d    | No             | Yes            | f2                      | Pass      |
| e    | Yes            | No             | f1                      | Pass      |

Note:

1. All tests were repeated 5 times.
2. Tests b and c are deemed to comply as no transmissions occurred.

### **Selected Channel Confirmation**

This test was carried out in accordance with ANSI C63.17 sub-clause 7.3.4 using test setup 1 (page 7). The test is to ensure the EUT monitors the time/spectrum window immediately prior to transmission.

The EUT was frequency administered to operating on two frequencies only, f1 and f2.

$$\begin{aligned}f1 &= 1924.992 \text{ MHz} \\f2 &= 1921.536 \text{ MHz}\end{aligned}$$

#### **Test a)**

Interference is applied on f1 at a level of  $T_L + U_M$ . Verify a connection is established on f2.

Any connection is terminated.

#### **Test b)**

Interference is applied on f2 at a level of  $T_L + U_M$  and immediately removed from f1 and the EUT is immediately caused to attempt transmission. In this case the EUT should transmit on f1

### **Result**

| Test | Transmit on f1 | Transmit on f2 | Wanted Transmit Channel | Pass/Fail |
|------|----------------|----------------|-------------------------|-----------|
| a    | No             | Yes            | f2                      | Pass      |
| b    | Yes            | No             | f1                      | Pass      |

### **Power Accuracy**

The power measurement resolution for the previous comparison must be accurate to within 6dB. The monitoring threshold test covered in Part 15.323 (c)(2) automatically proves that this requirement is met.

### **Segment Occupancy**

This section is not applicable as no units will be located within 1 metre of each other.

### **MONITORING ANTENNA – PART 15.323 (c)(8)**

The antenna of the EUT used for transmitting is the same antenna that is used for monitoring.

## DUPLEX CONNECTIONS – PART 15.323 (c)(10)

The tests laid out in this section verify that the access criteria are met by two devices communicating over a duplex connection. The EUT is the initiating device and the companion is the responding device.

These tests are carried out in accordance with ANSI C63.17 sub-clause 8.3.1 using test setup 1 (page7)  
Before all tests are carried out any connection is terminated.

### Test b)

The system is restricted to operation on one frequency (1923.264 MHz) using administration. Verify that a connection between the EUT and its companion device can be made.

### Test c) & d)

Apply interference at a level  $T_L + U_M$  to all transmit time slots and to all but one receive time slots.  
The EUT should not establish a connection.

### Test e) & f)

Apply interference at a level  $T_L + U_M$  to all receive time slots and to all but one transmit time slots.  
The EUT should not establish a connection.

### Result

| Test  | Connection Made | Correct Time Slot | Required Slot | Pass/Fail |
|-------|-----------------|-------------------|---------------|-----------|
| b     | Yes             | N/A               | Any           | Pass      |
| c & d | No              | N/A               | N/A           | Pass      |
| e & f | No              | N/A               | N/A           | Pass      |

## ALTERNATIVE MONITORING INTERVAL FOR CO-LOCATED DEVICES – PART 15.323 (c)(11)

This test is carried out in accordance with ANSI C63.17 sub-clause 8.4.

The manufacturer declares that this provision is not utilized by the EUT.

## FAIR ACCESS TO SPECTRUM RELATED TO (c)(10) & (c)(11) – PART 15.323 (c)(12)

The provisions of (c)(10) & (c)(11) shall not be used to extend the range of spectrum occupied over space or time for the purposes of denying fair access to the spectrum to other devices.

The manufacturer declares that this device does not work in mode which denies fair access to the spectrum to others.

## FRAME PERIOD 15.323 (e)

Frame repetition stability is tested according with ANSI C63.17 sub-clause 6.2.2. Frame period and jitter are tested in accordance with ANSI C63.17 sub-clause 6.2.3. The test setup below is used for the above measurements.



Test Setup 3:

### Frame Repetition Stability

This is the mean value of the frame repetition rate recorded over 1000 samples. For devices that divide access in time the repetition rate shall not exceed 10ppm.

### Result

| Frame Repetition Stability (ppm) | Limit (ppm) | Pass/Fail |
|----------------------------------|-------------|-----------|
| 0.0                              | ±10         | Pass      |

### Frame Period and Jitter

Jitter is the difference in time between the rising edges of consecutive pulses.

### Result

| Maximum Jitter (μs) | 3xSD Jitter (μs) | Frame period (ms) | Limit (μs)        |             | Pass/Fail |
|---------------------|------------------|-------------------|-------------------|-------------|-----------|
|                     |                  |                   | Frame Period (ms) | Jitter (μs) |           |
| 0.01                | 0.03             | 10.00003          | 2 or 10/X         | ±25         | Pass      |

**ANNEX A**  
**PHOTOGRAPHS**

PHOTOGRAPH No. 1

**TEST SETUP**



PHOTOGRAPH No. 2

**TRANSMITTER OVERVIEW**

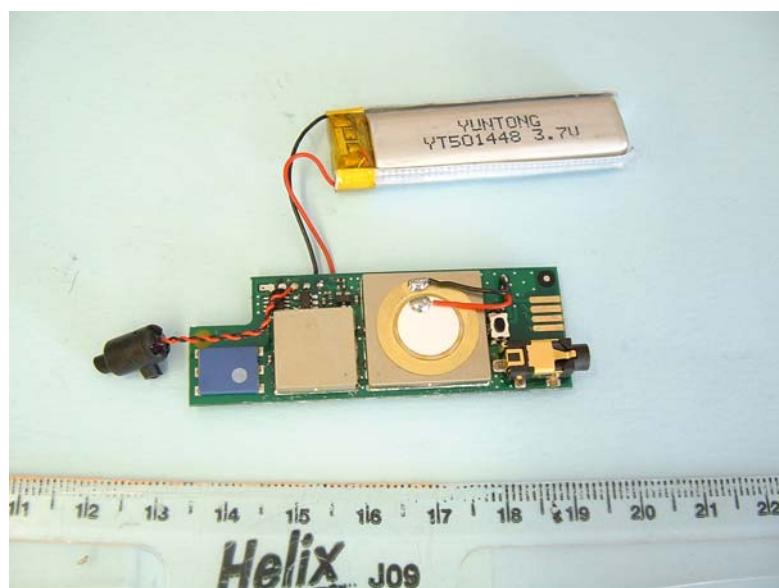


PHOTOGRAPH No. 3      **TRANSMITTER OVERVIEW BACK REMOVED**



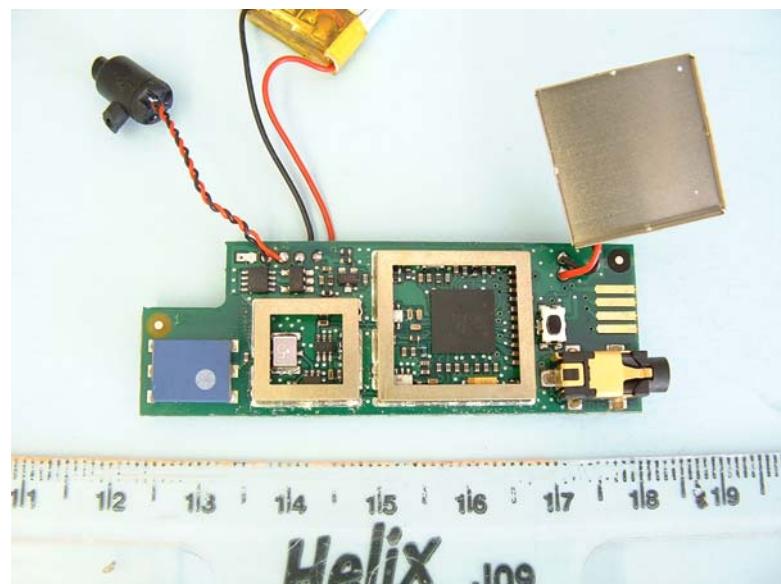
PHOTOGRAPH No. 4

**MAIN PCB RF SIDE**



PHOTOGRAPH No. 5

MAIN PCB RF SIDE CAN LIDS REMOVED



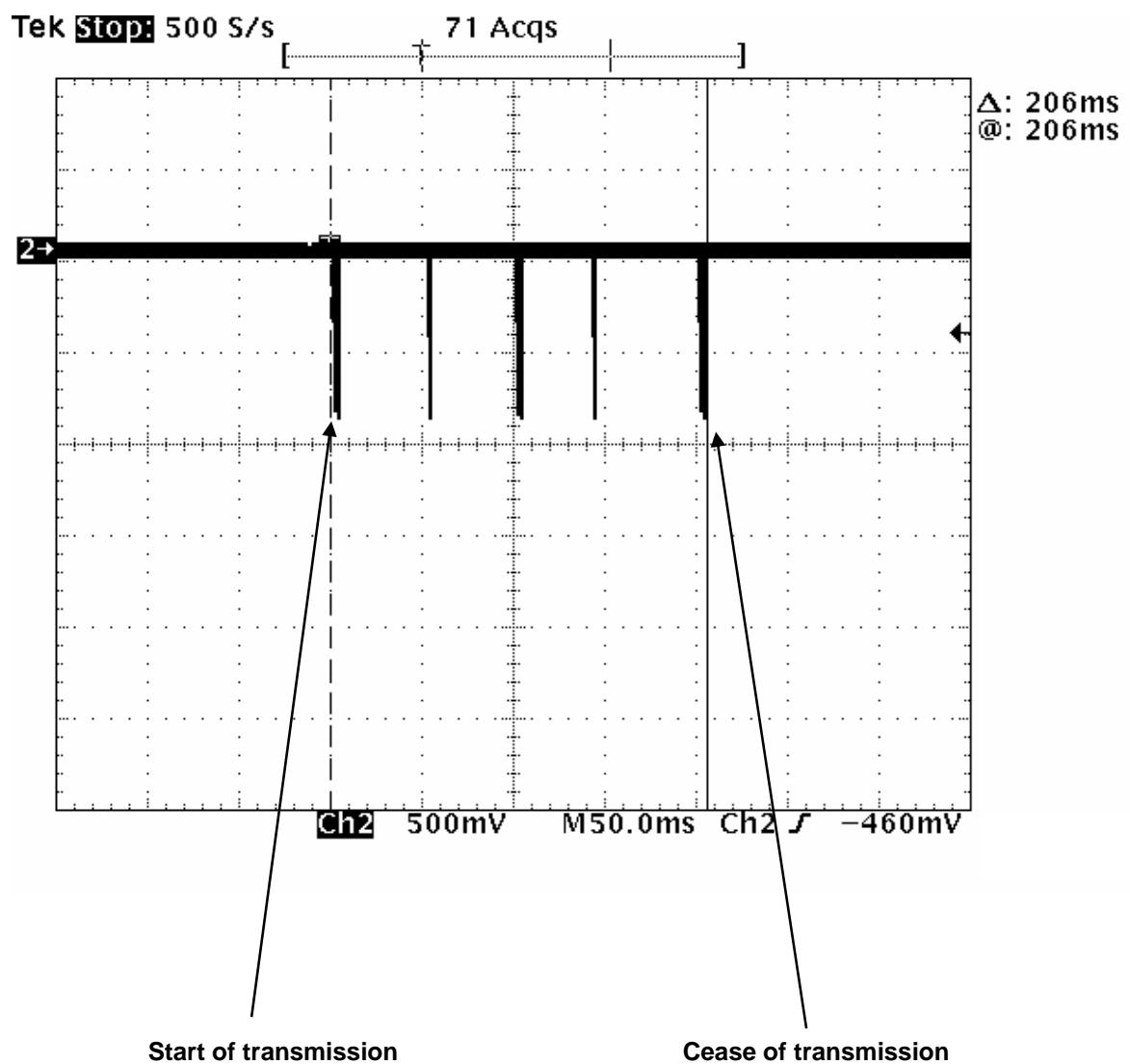
PHOTOGRAPH No. 6

**MAIN PCB CONTROL SIDE**

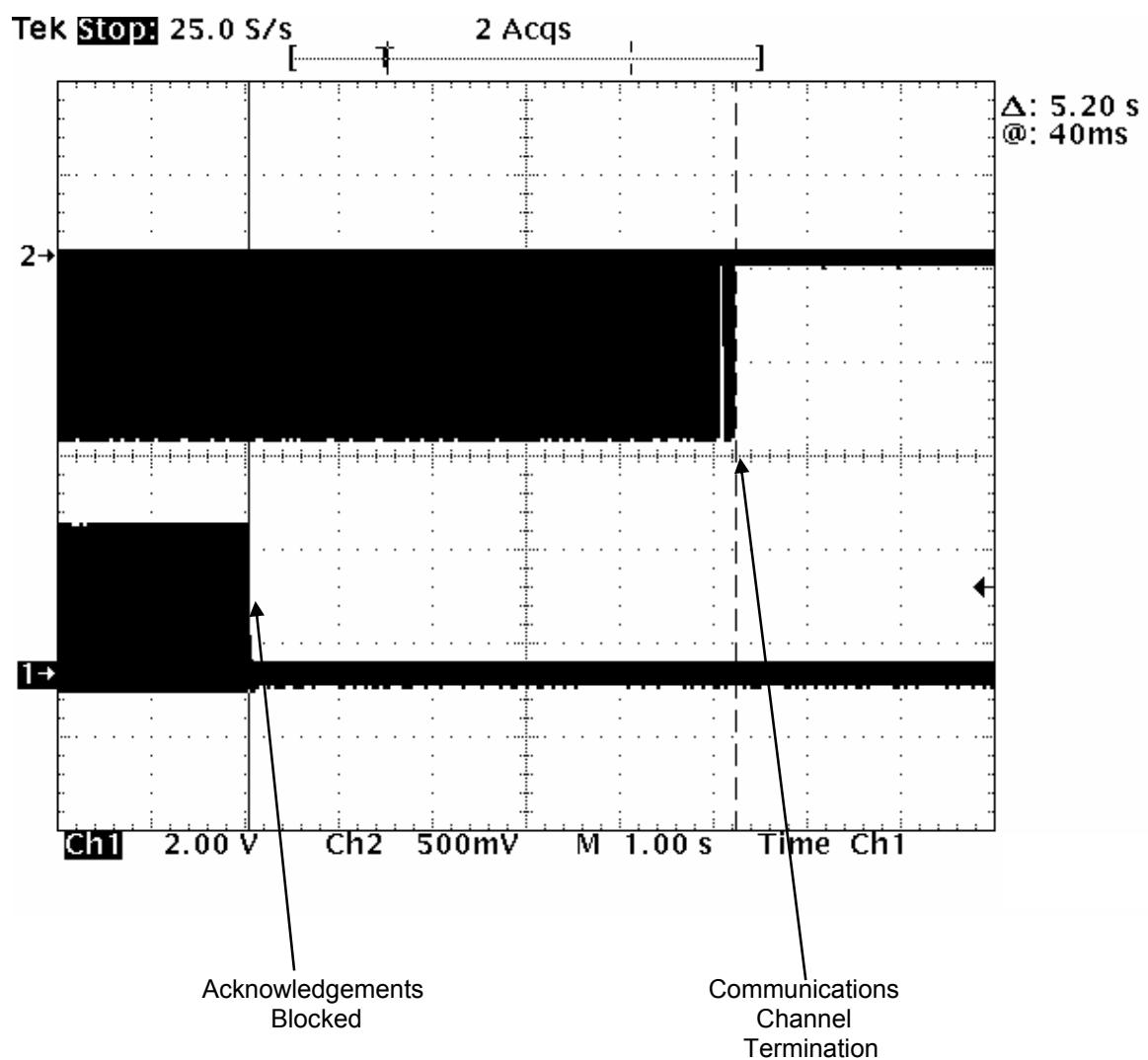


**ANNEX B**

**TRANSMISSION ON COMMUNICATIONS CHANNEL  
NO ACKNOWLEDGMENTS RECEIVED**

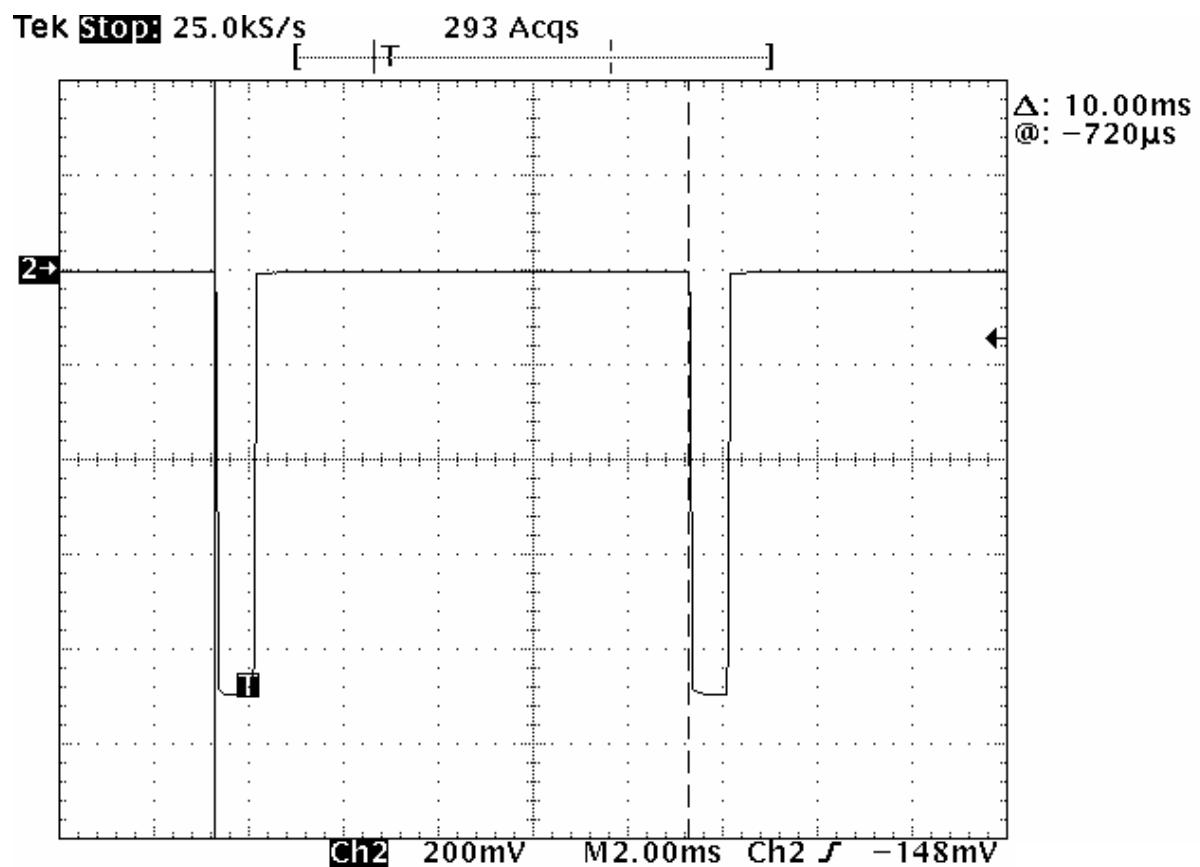


**ANNEX C**  
**COMMUNICATION CHANNEL TERMINATION**  
**ACKNOWLEDGMENTS BLOCKED**



**ANNEX D**  
**FRAME PERIOD**

FRAME PERIOD COMMUNICATIONS CHANNEL ACTIVE



**ANNEX E**  
**EQUIPMENT CALIBRATION**

| TRL Number | Equipment Type        | Manufacturer | Last Cal Calibration                 | Calibration Period | Due For Calibration  |
|------------|-----------------------|--------------|--------------------------------------|--------------------|----------------------|
| UH003      | Receiver              | R&S          | 22/06/2005                           | 12                 | 22/06/2006           |
| UH005      | LISN/AMN              | R&S          | 21/03/2005                           | 12                 | 21/03/2006           |
| UH006      | 3m Range ERP CAL      | TRL          | 06/01/2006                           | 12                 | 06/01/2007           |
| UH028      | Log Periodic Ant      | Schwarbeck   | 28/04/2005                           | 24                 | 28/04/2007           |
| UH029      | Bicone Antenna        | Schwarbeck   | 27/04/2005                           | 24                 | 27/04/2007           |
| UH041      | Multimeter            | AVOMeter     | 20/12/2005                           | 12                 | 20/12/2006           |
| UH093      | Bilog Antenna         | Chase        | 19/08/2005                           | 12                 | 19/08/2006           |
| UH122      | Oscilloscope          | Tektronix    | 07/06/2005                           | 24                 | 07/06/2007           |
| UH132      | Power meter           | Marconi      | 03/01/2006                           | 12                 | 03/01/2007           |
| UH162      | ERP Cable Cal         | TRL          | 06/01/2006                           | 12                 | 06/01/2007           |
| UH177      | Power supply          | Manson       | Use Calibrated Multimeter            |                    |                      |
| UH186      | Receiver              | R&S          | 01/02/2006                           | 12                 | 01/02/2007           |
| UH221      | Function Generator    | Wavetek      | Use Calibrated oscilloscope          |                    |                      |
| UH228      | Power Sensor          | Marconi      | 03/01/2006                           | 12                 | 03/01/2007           |
| UH253      | 1m Cable N type       | TRL          | 23/02/2006                           | 12                 | 23/02/2007           |
| UH254      | 1m Cable N type       | TRL          | 05/01/2006                           | 12                 | 05/01/2007           |
| UH271      | 1m Cable N type       | TRL          | 23/02/2006                           | 12                 | 23/02/2007           |
| UH273      | 1m Cable N type       | TRL          | 23/02/2006                           | 12                 | 23/02/2007           |
| UH297      | Signal Generator      | R&S          | 21/04/2006                           | 12                 | 20/04/2007           |
| L005       | CMTA                  | R&S          | 05/12/2005                           | 12                 | 05/12/2006           |
| L007       | Loop Antenna          | R&S          | 29/03/2005                           | 24                 | 29/03/2007           |
| L011       | Temperature chamber   | Shartree     | Use Calibrated Temperature Indicator |                    |                      |
| L119       | Combiner              | Elcom        | Calibrate in use                     |                    |                      |
| L138       | 1-18GHz Horn          | EMCO         | 15/04/2005                           | 24                 | 15/04/2007           |
| L139       | 1-18GHz Horn          | EMCO         | 03/05/2005                           | 24                 | 03/05/2007           |
| L170       | Combiner              | Elcom        | Calibrate in use                     |                    |                      |
| L176       | Signal Generator      | Marconi      | 15/02/2006                           | 12                 | 15/02/2007           |
| L193       | Bicone Antenna        | Chase        | 12/10/2003                           | 24                 | 12/10/2005           |
| L203       | Log Periodic Ant      | Chase        | 21/10/2003                           | 24                 | 21/10/2005           |
| L254       | Signal Generator      | Marconi      | 04/01/2006                           | 12                 | 04/01/2007           |
| L280       | 18GHz Cable           | Rosenberger  | 05/01/2006                           | 12                 | 05/01/2007           |
| L343       | CCIR Noise Filter     | TRL          | 07/06/2005                           | 12                 | 07/06/2006           |
| L426       | Temperature Indicator | Fluke        | 04/01/2006                           | 12                 | 04/01/2007           |
| L479       | Analyser              | Anritsu      | 18/11/2005                           | 12                 | 18/11/2006           |
| L552       | Signal Generator      | Agilent      | 25/04/2005                           | 12                 | 25/04/2006           |
| N/A        | High Pass Filter      | AFL          | 23/02/2006                           | 12                 | 23/02/2007           |
| N/A        | CMD60                 | R&S          |                                      |                    |                      |
| N/A        | Cables                | TRL          |                                      |                    | Calibrate in use     |
| N/A        | Attenuators           | TRL          |                                      |                    | Calibrate in use     |
| N/A        | RF Diode              |              |                                      |                    | For information only |

## **ANNEX F**

### **MEASUREMENT UNCERTAINTY**

## Radio Testing – General Uncertainty Schedule

All statements of uncertainty are expanded standard uncertainty using a coverage factor of 1.96 to give a 95% confidence where no required test level exists.

### **[1] Adjacent Channel Power**

Uncertainty in test result = **1.86dB**

### **[2] Carrier Power**

Uncertainty in test result (Equipment - TRLUH120) = **2.18dB**

Uncertainty in test result (Equipment – TRL05) = **1.08dB**

Uncertainty in test result (Equipment – TRL479) = **2.48dB**

### **[3] Effective Radiated Power**

Uncertainty in test result = **4.71dB**

### **[4] Spurious Emissions**

Uncertainty in test result = **4.75dB**

### **[5] Maximum frequency error**

Uncertainty in test result (Equipment - TRLUH120) = **119ppm**

Uncertainty in test result (Equipment – TRL05) = **0.113ppm**

Uncertainty in test result (Equipment – TRL479) = **0.265ppm**

### **[6] Radiated Emissions, field strength OATS 14kHz-18GHz Electric Field**

Uncertainty in test result (14kHz – 30MHz) = **4.8dB**, Uncertainty in test result (30MHz – 1GHz) = **4.6dB**, Uncertainty in test result (1GHz-18GHz) = **4.7dB**

### **[7] Frequency deviation**

Uncertainty in test result = **3.2%**

### **[8] Magnetic Field Emissions**

Uncertainty in test result = **2.3dB**

### **[9] Conducted Spurious**

Uncertainty in test result (Equipment TRL479) Up to 8.1GHz = **3.31dB**

Uncertainty in test result (Equipment TRL479) 8.1GHz – 15.3GHz = **4.43dB**

Uncertainty in test result (Equipment TRL479) 15.3GHz – 21GHz = **5.34dB**

Uncertainty in test result (Equipment TRLUH120) Up to 26GHz = **3.14dB**

### **[10] Channel Bandwidth**

Uncertainty in test result = **15.5%**

### **[11] Amplitude and Time Measurement – Oscilloscope**

Uncertainty in overall test level = **2.1dB**, Uncertainty in time measurement = **0.59%**, Uncertainty in Amplitude measurement = **0.82%**

### **[11] Power Line Conduction**

Uncertainty in test result = **3.4dB**