FCC PART 15, SUBPART B and C
TEST REPORT

for

AIRBORNE EMBEDDED RADIO MODULE

MODEL: WLRG-RA-DP101

Prepared for

QUATECH, INC.
5675 HUDSON INDUSTRIAL PARKWAY
HUDSON, OHIO 44236

Prepared by:_____

KYLE FUJIMOTO

Approved by:_____

MICHAEL CHRISTENSEN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: JUNE 22, 2006

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST, or any other agency of the U.S. Government.

Device Tested:	Airborne Embedded Radio Module Model: WLRG-RA-DP101 S/N: 3
Product Description:	See Expository Statement.
Modifications:	The EUT was not modified during the testing.
Manufacturer:	Quatech, Inc. 5675 Hudson Industrial Parkway Hudson, Ohio 44236
Test Dates:	May 5, 9, 12, 15, 16, 17, 31; and June 22, 2006
Test Specifications:	EMI requirements Limits: CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247
Test Procedure:	ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B; and Subpart C, section 15.207
2	Spurious Radiated RF Emissions, 10 kHz - 25000 MHz	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.247(d)
3	Fundamental and Emissions produced by the intentional radiator in non-restricted bands, 10 kHz – 40 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d)
4	Emissions produced by the intentional radiator in restricted bands, 10 kHz – 40 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209(a), and section 15.247 (d)
5	6 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(a)(2)
6	Peak Power Output	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(b)(3)
7	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d)
8	Peak Power Spectral Density Conducted from the Intentional Radiator to the Antenna	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247 (e)

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Airborne Embedded Radio Module Model: WLRG-RA-DP101. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests of the testing described herein were performed at the test facility of Compatible Electronics at 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Quatech, Inc.

Jim Nahra	RF Engineer

Compatible Electronics, Inc.

Kyle Fujimoto	Test Engineer
Benigno Chavez	Test Engineer
Michael Christensen	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on May 1, 2006.

2.5 Disposition of the Test Sample

The sample has not been returned to Quatech, Inc. as of June 5, 2005.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
USB	Universal Serial Bus

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules - Radio frequency devices (including digital devices) – Intentional Radiators
ANSI C63.4 2003	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
FCC Title 47, Part 15 Subpart B	FCC Rules - Radio frequency devices (including digital devices) – Unintentional Radiators

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

The EUT was directly connected to the modular PCB. The modular PCB was directly connected to a PCMCIA extender card. The PCMCIA extender card was directly connected to the laptop's PCMCIA slot. The laptop was also connected to a AC Adaptor, printer, and joystick via its power, parallel, and USB ports, respectively.

The EUT was also connected to an antenna via its J1 port. The power for the EUT was provided by an external DC power supply (for radiated emissions) or an AC Adapter (for conducted emissions) that connected to the power port of the modular PCB.

Operation of the EUT during the testing

The EUT was controlled by a program on the laptop that locked one channel at a time so that the low, middle, and high channels could be tested. This program also allowed the EUT to either be in transmit or receive mode.

Three antennas were tested. Please see section 5.1 for the part numbers for each antenna.

The final radiated as well as the conducted data was taken in the mode above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

Cable 1 **(for radiated emissions testing only)**
This is a 1 meter unshielded cable connecting the PCB Module to the DC Power Supply. The cable has a banana plug to BNC connector at the DC Power Supply end and 2 alligator clips at the PCB Module end.

Cable 2 **(for the Swivel and Straight Antennas only)**
This is a 10 centimeter braid shielded cable connecting the EUT to the antenna. The cable has a UFL connector at the EUT end and a reverse SMA connector at the antenna end. The shield of the cable was grounded to the chassis via the connectors.

Cable 3 **(for the Magnetic Base Mount Antenna only)**
This is a 10 centimeter braid shielded cable connecting the EUT to cable #4. The cable has a UFL connector at the EUT end and a reverse SMA connector at the cable #4 end. The shield of the cable was grounded to the chassis via the connectors.

Cable 4 **(for the Magnetic Base Mount Antenna only)**
This is a 1.7 meter braid shielded cable connecting cable #3 to the antenna. The cable has a reverse SMA connector at the cable #3 end and is hard wired into the antenna. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 5 This is a 2 meter braid shielded cable connecting the laptop to the joystick. The cable has a USB connector at the laptop end and is hard wired into the joystick. The shield of the cable was grounded to the chassis via the connector.

Cable 6 This is a 1.8 meter braid and foil shielded cable connecting the laptop to the printer. The cable has a metallic Centronics type connector at the printer end and a D-25 pin metallic connector at the laptop end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 7 This is a 1.5 meter unshielded cable connecting the AC Adaptor to the laptop. The cable has a 1/8 inch power connector at the laptop end and is hard wired into the AC Adaptor. The cable was bundled to a length of 70 centimeters. The cable had a molded ferrite at the laptop end.

Cable 8 **(for conducted emissions testing only)**
This is a 2 meter unshielded cable connecting the AC Adapter to the PCB Module. The cable has a 1/8 inch power connector at the PCB Module end and is hard wired into the AC Adapter.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
AIRBORNE EMBEDDED RADIO MODULE	QUATECH, INC.	WLRG-RA-DP101	3	**F4AWLNG1**
DC POWER SUPPLY (for radiated emissions only)	HEWLETT PACKARD	E3620A	KR75307431	N/A
LAPTOP	IBM	TYPE: 2653	78-G2003	DoC
PRINTER	CITIZEN	LSP-10	1262247-73	DLK66TLSP-10
AC ADAPTOR	IBM	N/A	P/N: 02K6746	N/A
JOYSTICK	MICROSOFT	N/A	P/N: X03-57540	N/A
PCMCIA EXTENDER CARD	CELESTICA	68	N/A	N/A
PCB MODULAR BOARD	DPAC TECHNOLOGIES	1400716-01 Rev. A	19D07-16-01	N/A
STRAIGHT ANTENNA	NEARSON	N/A	P/N: S141AH-2450	N/A
BASE MOUNT ANTENNA	NEARSON	N/A	P/N: S151M2-L-2450S	N/A
SWIVEL ANTENNA	NEARSON	N/A	P/N: S151M2-L-2450S	N/A
AC ADAPTER (for conducted emissions only)	RADIO SHACK	CATEGORY #: 273-1756	N/A	N/A

5.2 EMI Test Equipment for Brea Facility – Part 1

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08768	June 21, 2005	June 21, 2006
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22262	June 21, 2005	June 21, 2006
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	June 17, 2005	June 17, 2006
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	May 26, 2006	May 26, 2007
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22279	May 26, 2006	May 26, 2007
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	May 26, 2006	May 26, 2007
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT BELOW 1 GHz					
Radiated Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Preamplifier	Com-Power	PA-102	1017	January 19, 2006	Jan. 19, 2007
Loop Antenna	Com-Power	AL-130	17089	September 21, 2005	Sept. 21, 2006
Biconical Antenna	Com-Power	AB-900	15227	March 9, 2006	March 9, 2007
Log Periodic Antenna	Com-Power	AL-100	16060	August 22, 2005	August 22, 2006
Antenna Mast	Com-Power	AM-100	N/A	N/A	N/A
Biconical Antenna	Com-Power	AB-900	15251	March 9, 2006	March 9, 2007
Log Periodic Antenna	Com-Power	AL-100	16247	August 22, 2005	August 22, 2006
Preamplifier	Com-Power	PA-103	1582	January 19, 2006	Jan. 19, 2007

5.3 EMI Test Equipment for Brea Facility – Part 2

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION CYCLE
RF RADIATED EMISSIONS TEST EQUIPMENT ABOVE 1 GHz					
Horn Antenna	Com-Power	AH-118	10067	July 27, 2004	July 27, 2006
Microwave Preamplifier	Com-Power	PA-122	181917	January 20, 2006	Jan. 20, 2007
EMI Receiver	Rohde & Schwarz	ESIB40	100172	October 28, 2004	October 28, 2006
Microwave Preamplifier	Com-Power	PA-840	711919	January 20, 2006	Jan. 20, 2007
Horn Antenna	Com-Power	AH826	71957	December 12, 2005	Dec. 12, 2007
Antenna Mast	EMCO	2070	N/A	N/A	N/A
Multi-Device Controller	EMCO	2090	9609-1176	N/A	N/A
POWER MEASUREMENT TEST EQUIPMENT					
RF Peak Power Meter / Analyzer	Boonton Electronics Corp.	4500A-01-30	1282	May 4, 2006	May 4, 2007
Peak Power Sensor	Boonton Electronics Corp.	57318	3723	May 8, 2006	May 8, 2007
RF CONDUCTED EMISSIONS TEST EQUIPMENT					
Emissions Program	Compatible Electronics	2.3 (SR19)	N/A	N/A	N/A
LISN	Com-Power	LI-215	12082	September 1, 2005	Sept. 1, 2006
LISN	Com-Power	LI-215	12078	September 1, 2005	Sept. 1, 2006
Transient Limiter	Seaward	252A910	1	August 17, 2005	Aug. 17, 2006

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Antenna Gain

The straight antenna (P/N: S141AH-2450) has a gain of 2 dBi.
The swivel antenna (P/N: S151M2-L-2450S) has a gain of 5 dBi.
The base mount antenna (P/N: S151M2-L-2450S) has a gain of 5 dBi.

8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics conducted emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B for conducted emissions; and the limits of CFR Title 47, Part 15, Subpart C, Section 15.207.

8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The spectrum analyzer and EMI Receiver were used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifiers Model: PA-102 and PA-103 were used for frequencies from 30 MHz to 1 GHz, the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies from 1 GHz to 18 GHz, and the Com Power Microwave Preamplifier Model: PA-840 was used for frequencies from 18 GHz to 25 GHz. The spectrum analyzer and EMI Receiver were used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer and/or EMI Receiver records the highest measured reading over all the sweeps.

The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets.

The frequencies above 1 GHz were averaged manually by narrowing the video filter down to 10 Hz and putting the sweep time on AUTO on the spectrum analyzer to keep the amplitude reading calibrated.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
10 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 25 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT by the Radiated Emission Manual Test software. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

Radiated Emissions (Spurious and Harmonics) Test (con't)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain the final data.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247 (d). Please see the data sheets located in Appendix E.

8.2 6 dB Bandwidth

The 6 dB bandwidth was measured using the EMI Receiver. The bandwidth was measured using a direct connection from the RF out on the EUT. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (a)(2).

8.3 Peak Output Power

The Peak Output Power was taken using the power meter and power sensor. The EUT was directly connected to the power sensor, which was directly connected to the power meter. The Peak Output Power was then taken.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (b)(3).

8.4 RF Antenna Conducted Test

The RF antenna conducted test was taken using the EMI Receiver. The RF antenna conducted test was measured using a direct connection from the RF out on the EUT into the input of the analyzer. The resolution bandwidth was 100 kHz, and the video bandwidth 300 kHz. The spans were wide enough to include all the harmonics and emissions that were produced by the intentional radiator.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (d).

8.5 Spectral Density Output

The spectral density output was measured using the EMI Receiver. The spectral density output was measured using a direct connection from the RF out on the EUT into the input of the EMI Receiver. The resolution bandwidth was 3 kHz, and the video bandwidth was 10 kHz. The highest 1.5 MHz of the signal was used as the frequency span with the sweep rate being 1 second for every 3 kHz of span.

Test Results:

This test complies with the relevant requirements of CFR Title 47, Part 15, Subpart C section 15.247 (e).

8.6 RF Band Edges

The RF band edges were taken at the start of the restricted bands (2390 MHz and 2483.5 MHz). The readings taken were also averaged by the EMI Receiver. Data sheets are included in Appendix E, which compares the reading from the EMI Receiver to the spec limit.

Test Results:

The EUT complies with the relevant requirements of FCC Title 47, Part 15, Subpart C section 15.247 (d). The RF power at the restricted bands closest to the band edges at 2390 MHz and 2483.5 MHz meet the limits of section 15.209. Please see the data sheets located in Appendix E.

9. CONCLUSIONS

The Airborne Embedded Radio Module Model: WLRG-RA-DP101 meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.207, 15.209, and 15.247.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and Subpart C specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Airborne Embedded Radio Module Model: WLRG-RA-DP101 S/N: 3

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

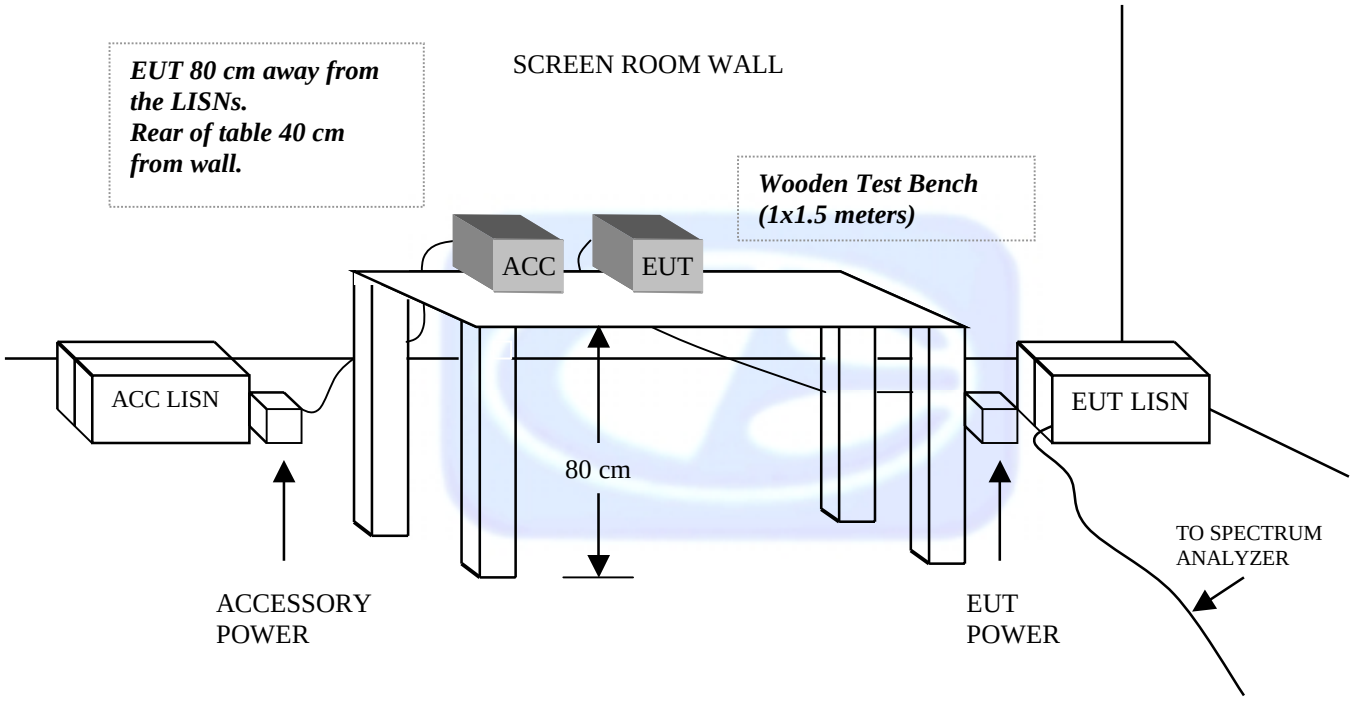
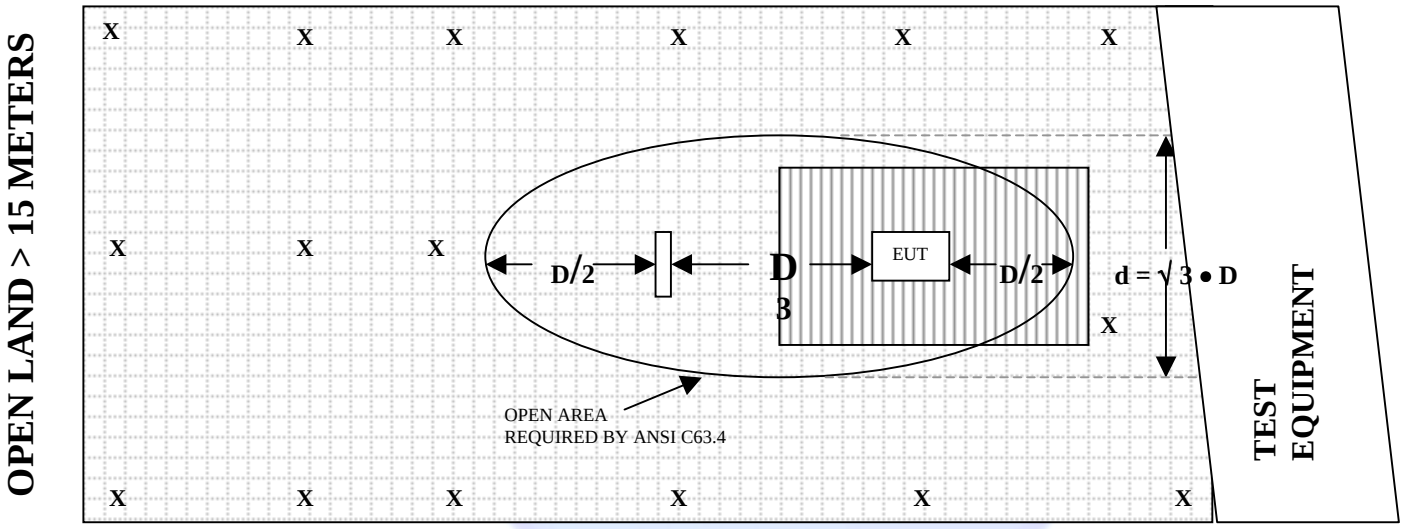


FIGURE 2: PLOT MAP AND LAYOUT OF 3 METER RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

X = GROUND RODS	= GROUND SCREEN
D = TEST DISTANCE (meters)	= WOOD COVER

FRONT VIEW

QUATECH, INC.
AIRBORNE EMBEDDED RADIO MODULE
MODEL: WLRG-RA-DP101
FCC SUBPART B and C - RADIATED EMISSIONS – ANTENNA P/N: S141AH-2450

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

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AIRBORNE EMBEDDED RADIO MODULE
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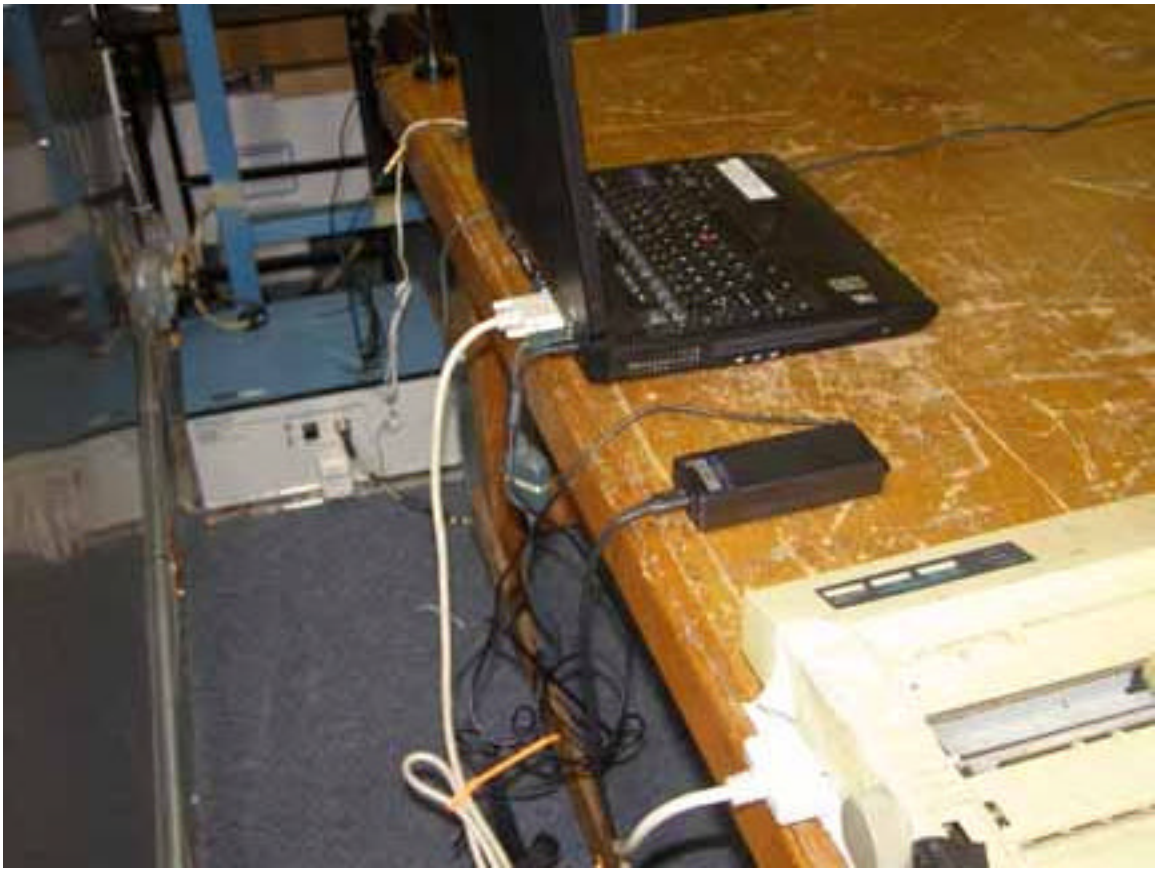
AIRBORNE EMBEDDED RADIO MODULE
MODEL: WLRG-RA-DP101
FCC SUBPART B and C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



REAR VIEW

QUATECH, INC.
AIRBORNE EMBEDDED RADIO MODULE
MODEL: WLRG-RA-DP101
FCC SUBPART B and C – CONDUCTED EMISSIONS

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15227

CALIBRATION DATE: MARCH 9, 2006

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	11.12	120	13.50
35	10.17	125	12.63
40	9.75	140	12.20
45	12.22	150	11.85
50	13.28	160	13.25
60	11.36	175	15.74
70	7.95	180	16.23
80	5.95	200	16.79
90	7.62	250	16.47
100	10.89	300	17.49

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16060

CALIBRATION DATE: AUGUST 22, 2005

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.73	700	19.72
400	13.38	800	20.49
500	15.12	900	21.31
600	16.27	1000	24.25

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 19, 2006

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.3	300	38.4
40	38.4	350	38.4
50	38.3	400	38.0
60	38.4	450	38.1
70	38.5	500	37.5
80	38.4	550	38.0
90	38.4	600	38.0
100	38.4	650	37.7
125	38.1	700	37.7
150	38.5	750	37.7
175	38.4	800	37.0
200	38.3	850	37.2
225	38.3	900	36.6
250	38.1	950	36.3
275	38.3	1000	36.3

COM-POWER PA-122

PREAMPLIFIER

S/N: 181917

CALIBRATION DATE: JANUARY 20, 2006

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	34.697	10.0	36.558
1.5	33.817	10.5	35.048
2.0	33.587	11.0	33.258
2.5	33.804	11.5	32.960
3.0	33.850	12.0	33.312
3.5	33.943	12.5	33.836
4.0	34.399	13.0	34.178
4.5	34.847	13.5	34.197
5.0	35.172	14.0	33.769
5.5	35.383	14.5	33.392
6.0	35.539	15.0	33.387
6.5	34.802	15.5	34.038
7.0	33.793	16.0	34.884
7.5	33.511	16.5	35.740
8.0	33.910	17.0	35.341
8.5	34.907	17.5	34.729
9.0	36.036	18.0	33.760
9.5	36.661		

COM-POWER AH-118

HORN ANTENNA

S/N: 10067

CALIBRATION DATE: JULY 27, 2004

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.0	10.0	37.8
1.5	27.9	10.5	39.4
2.0	31.5	11.0	39.4
2.5	31.1	11.5	40.6
3.0	30.6	12.0	40.8
3.5	30.5	12.5	40.5
4.0	30.6	13.0	41.2
4.5	31.4	13.5	42.0
5.0	33.7	14.0	43.1
5.5	33.8	14.5	43.4
6.0	34.7	15.0	39.2
6.5	35.0	15.5	38.8
7.0	35.9	16.0	40.1
7.5	38.1	16.5	40.2
8.0	38.2	17.0	43.4
8.5	37.7	17.5	46.6
9.0	37.7	18.0	45.8
9.5	38.4		

COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: SEPTEMBER 21, 2005

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-42.84	8.66
0.01	-41.93	9.57
0.02	-41.29	10.21
0.05	-42.37	9.13
0.07	-41.8	9.7
0.1	-41.83	9.67
0.2	-44.13	7.37
0.3	-41.73	9.77
0.5	-41.8	9.7
0.7	-41.53	9.97
1	-41.46	10.04
2	-41.14	10.36
3	-41.26	10.24
4	-41.46	10.04
5	-41.10	10.40
10	-40.83	10.67
15	-41.47	10.03
20	-35.44	16.06
25	-42.37	9.13
30	-42.94	8.56

COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711919

CALIBRATION DATE: JANUARY 20, 2006

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	27.932	29.5	27.310
18.5	28.277	30.0	26.860
19.0	28.500	30.5	27.450
19.5	28.397	31.0	27.448
20.0	28.570	31.5	27.868
20.5	28.183	32.0	27.922
21.0	28.007	32.5	27.866
21.5	27.823	33.0	27.314
22.0	27.747	33.5	27.403
22.5	27.290	34.0	26.687
23.0	27.406	34.5	26.390
23.5	26.508	35.0	26.365
24.0	26.657	35.5	26.347
24.5	27.102	36.0	26.138
25.0	27.742	36.5	26.481
25.5	27.646	37.0	26.236
26.0	27.934	37.5	27.029
26.5	27.976	38.0	27.883
27.0	26.984	38.5	29.021
27.5	26.745	39.0	29.408
28.0	27.075	39.5	28.429
28.5	27.015	39.75	27.704
29.0	27.169	40.0	26.441

COM-POWER AH826

HORN ANTENNA

S/N: 71957

CALIBRATION DATE: DECEMBER 12, 2005

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	32.4	22.5	32.0
18.5	31.4	23.0	32.2
19.0	31.5	23.5	31.2
19.5	30.9	24.0	33.1
20.0	33.1	24.5	33.1
20.5	33.4	25.0	33.4
21.0	32.1	25.5	33.4
21.5	32.5	26.0	32.9
22.0	32.3	26.5	33.6

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15251

CALIBRATION DATE: MARCH 9, 2006

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	11.27	120	13.04
35	10.29	125	12.67
40	9.72	140	11.91
45	11.45	150	11.61
50	13.34	160	13.67
60	11.44	175	15.97
70	8.41	180	16.64
80	6.21	200	16.54
90	7.5	250	16.96
100	11.65	300	17.48

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16247

CALIBRATION DATE: AUGUST 22, 2005

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.70	700	19.72
400	13.19	800	20.59
500	14.99	900	21.10
600	15.95	1000	24.35

COM-POWER PA-103

PREAMPLIFIER

S/N: 1582

CALIBRATION DATE: JANUARY 19, 2006

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	32.7	300	32.4
40	32.6	350	32.4
50	32.6	400	32.1
60	32.8	450	32.1
70	32.7	500	31.8
80	32.7	550	31.8
90	32.7	600	32.0
100	32.6	650	31.9
125	32.6	700	31.5
150	32.5	750	31.7
175	32.4	800	31.4
200	32.5	850	31.6
225	32.5	900	30.8
250	32.3	950	31.1
275	32.4	1000	30.9