FCC PART 15, SUBPART B and C
TEST REPORT

for

ThinQ SDS

MODEL: SSE/DSE-100/400

Prepared for

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

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KYLE FUJIMOTO

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DATE: FEBRUARY 14, 2005

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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:	ThinQ SDS Model: SSE/DSE-100/400 S/N: Prototype
Product Description:	See Expository Statement.
Modifications:	The EUT was modified during the testing. Please see the list located in Appendix B of this test report.
Manufacturer:	Quatech, Inc. 5675 Hudson Industrial Parkway Hudson, Ohio 44236
Test Dates:	February 7, 8, and 9, 2005
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: 2003
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 for the Receiver Portion, 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	Spurious Radiated RF Emissions for the Digital Portion, 30 MHz – 25000 MHz	Complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B
4	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)
5	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)
6	6 dB Bandwidth	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(a)(2)
7	Peak Power Output	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(b)(3)
8	RF Conducted Antenna Test	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.247(d)
9	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 ThinQ SDS Model: SSE/DSE-100/400. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2003. 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.

Note: The digital portion of the EUT was tested to the **Class A** limits for radiated emissions defined by CFR Title 47, Part 15, Subpart B.

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.

Michael Marlborough	Project Engineer
Chris Myers	Director of Engineering

Compatible Electronics, Inc.

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

2.4 Date Test Sample was Received

The test sample was received on February 7, 2005.

2.5 Disposition of the Test Sample

The sample has not been returned to Quatech, Inc. as of February 14, 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

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	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
EN 55022: 1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
CISPR 22: 1997	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement

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 connected to the AC Adapter via its power port. Also, the EUT had a loopback cable going from serial port #1 to serial port #2.

The accessories were connected as follows: The computer was connected to a monitor, keyboard, mouse, and access point via its video, keyboard, mouse, and Ethernet ports. The access point was also connected to an AC Adapter via its power port. The accessory equipment was placed 50 feet away from the test site.

Operation of the EUT during the testing

For the intentional radiator and receiver portion of the test: The EUT used a program that locked one channel at a time so that the low, middle, and high channels could be tested.

For the digital portion and conducted emission portion of the test: The EUT was receiving "H" characters from the computer's command prompt window #1 via a wireless access point and sending the "H" characters back to the computer's command prompt window #2.

Note: Any emission that was found to be over the **Class B** limit of CFR Title 47, Part 15, Subpart B was re-tested with the transmitter turned off to verify the emission did NOT go lower. If the emission did NOT go lower, it was determined the emission was coming from the digital section and then re-tested to the **Class A** limits of CFR Title 47, Part 15, Subpart B.

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 This is a 2 meter unshielded cable connecting the access point to the computer. The cable has an RJ-45 connector at each end.

Cable 2 This is a 2 meter unshielded cable connecting the access point to the AC Adapter. The cable has a 1/8 inch power connector at the access point end and is hard wired into the AC Adapter.

Cable 3 This is a 2 meter braid and foil shielded cable connecting the computer to the monitor. The cable has a high density D-15 pin metallic connector at the computer end and is hard wired into the monitor. The shield of the cable was grounded to the chassis via the connector.

Cable 4 This is a 6 foot foil shielded cable connecting the computer to the keyboard. The cable has a metallic 6 pin mini DIN connector at the computer end and is hard wired into the keyboard. The shield of the cable was grounded to the chassis via the connector.

Cable 5 This is a 6 foot foil shielded cable connecting the computer to the mouse. The cable has a metallic 6 pin mini DIN connector at the computer end and is hard wired into the mouse. The shield of the cable was grounded to the chassis via the connector.

Cable 6 This is a 5 foot braid and foil shielded cable connecting the EUT's Serial Port #1 to a gender changer. It has a D-9 pin metallic connector at the EUT end and a D-25 pin metallic connector at the gender changer end. This cable, combined with cable #7, 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 5 foot braid and foil shielded cable connecting the EUT's Serial Port #2 to a gender changer. It has a D-9 pin metallic connector at the EUT end and a D-25 pin metallic connector at the gender changer end. This cable, combined with cable #6, was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 8 This is a 2 meter unshielded cable connecting the EUT to the AC Adapter. The cable has a 1/8 inch power connector at the EUT end and is hard wired into the AC Adapter. A clip on ferrite (FairRite P/N: 0431164281) was placed at the EUT end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
ThinQ SDS (EUT)	QUATECH, INC.	SSE/DSE-100/400	N/A	F4ATHINQ1
ACCESS POINT	LINKSYS	WAP 11 VER 2.8	M31404600601	Q87-WAP11V28
AC ADAPTER FOR ACCESS POINT	LINKSYS	WD411200500	GPO0410	N/A
COMPUTER	DELL	DHM	JJ19M41	DoC
MONITOR	DELL	E773C	CN-0P0151-64180-36K-022D	DoC
KEYBOARD	DELL	RT7D20	CN-04N454-37172-419-4862	AQ6-7D20
MOUSE	DELL	M-SAW34	HCD35312230	DZL211029
AC ADAPTER FOR EUT	SUNNY	SYS1089-1005-T3	N/A	N/A

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiate Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Emissions Program	Compatible Electronics	2.3 (SR19)	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08768	June 24, 2004	June 24, 2005
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22262	June 24, 2004	June 24, 2005
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	June 24, 2004	June 24, 2005
Preamplifier	Com Power	PA-102	1017	January 5, 2005	Jan. 5, 2006
Biconical Antenna	Com Power	AB-100	1548	September 29, 2004	Sept. 29, 2005
Log Periodic Antenna	Com Power	AL-100	16060	September 27, 2004	Sept. 27, 2005
Computer	Hewlett Packard	D5251A 888	US74458128	N/A	N/A
Monitor	Hewlett Packard	D5258A	DK74889705	N/A	N/A
Loop Antenna	Com-Power	AL-130	17089	September 3, 2004	Sept. 3, 2005
Horn Antenna	Antenna Research	DRG-118/A	1053	January 16, 2004	Jan. 16, 2006
Microwave Preamplifier	Com-Power	PA-122	25195	August 19, 2004	Aug. 19, 2005
EMI Receiver	Rohde & Schwarz	ESIB40	100172	October 28, 2004	Oct. 28, 2005
Microwave Preamplifier	Com-Power	PA-840	711013	March 12, 2004	March 12, 2005
Horn Antenna	Com-Power	AH826	0071957	November 5, 2003	Nov. 5, 2005

5.3 EMI Test Equipment Continued

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Antenna Mast	Com-Power	AM-100	N/A	N/A	N/A
Turntable	Com-Power	TT-100	N/A	N/A	N/A
LISN	Com Power	LI-215	12078	October 28, 2004	Oct. 28, 2005
LISN	Com Power	LI-215	12082	October 28, 2004	Oct. 28, 2005
Transient Limiter	Seaward	252A910	Asset: 4002	September 20, 2004	Sept. 20, 2005
RF Peak Power Meter / Analyzer	Boonton Electronics Corp.	4500A-01-30	1282	February 23, 2004	Feb. 23, 2005
Peak Power Sensor	Boonton Electronics Corp.	57318	3723	February 23, 2004	Feb. 23, 2005

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 only grounded through the safety ground of the power cord.

7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Antenna Gain

The 802.11 b antenna has a gain of 2.2 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 10 dB attenuation pad 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: 2003. 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 EMI Receiver was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Preamplifier Model: PA-102 was 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 was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer 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 EMI Receiver 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: 2003. 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:

For the Intentional Radiator and Receiver Portion: The EUT complies with the **Class B** limits of CFR Title 47, Part 15 Subpart B for radiated emissions; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.205, 15.209, and 15.247 (d).

For the Digital Portion: The EUT complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B for radiated emissions.

8.2 6 dB and 20 dB Bandwidth

The 6 dB and 20 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 ThinQ SDS 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.

Modifications:

1) Added a clip-on ferrite (FairRite P/N: 0431164281) on the power cord at the EUT end.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	ThinQ SDS Model: SSE/DSE-100/400 S/N: Prototype

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

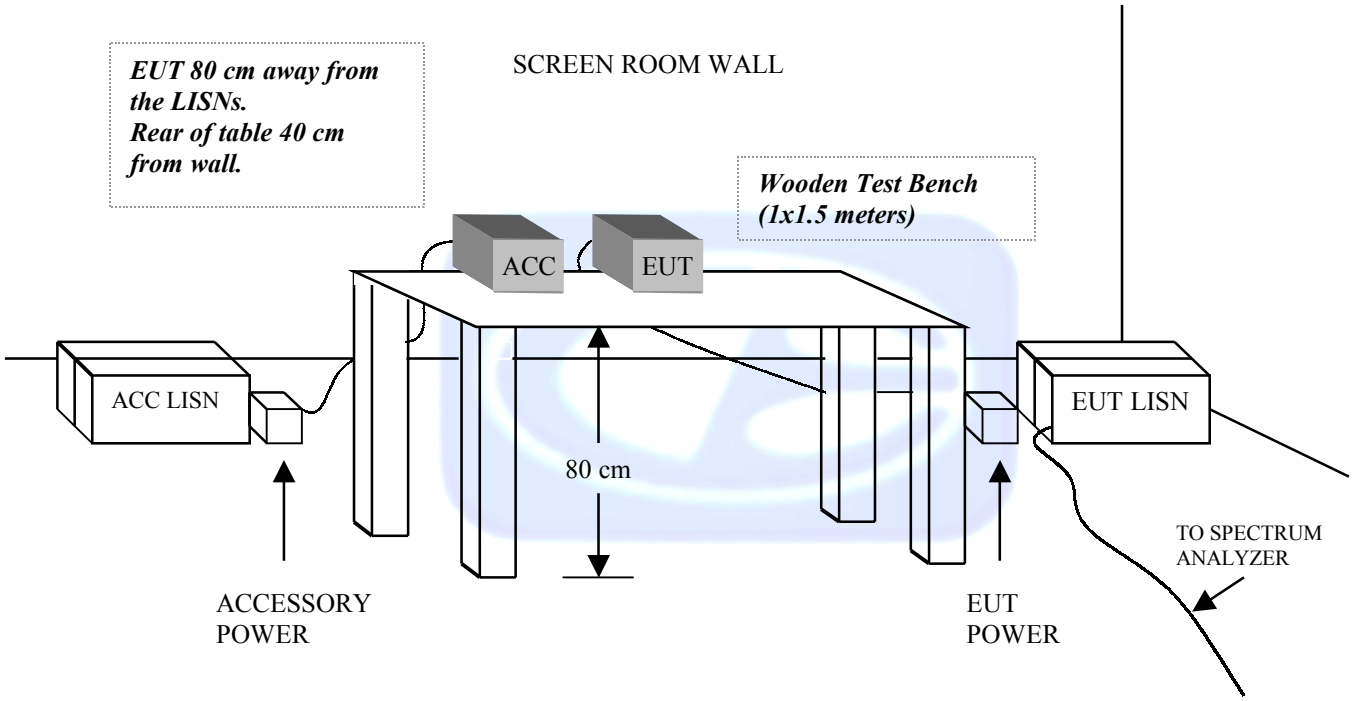


FIGURE 2: PLOT MAP AND LAYOUT OF 3 METER RADIATED SITE

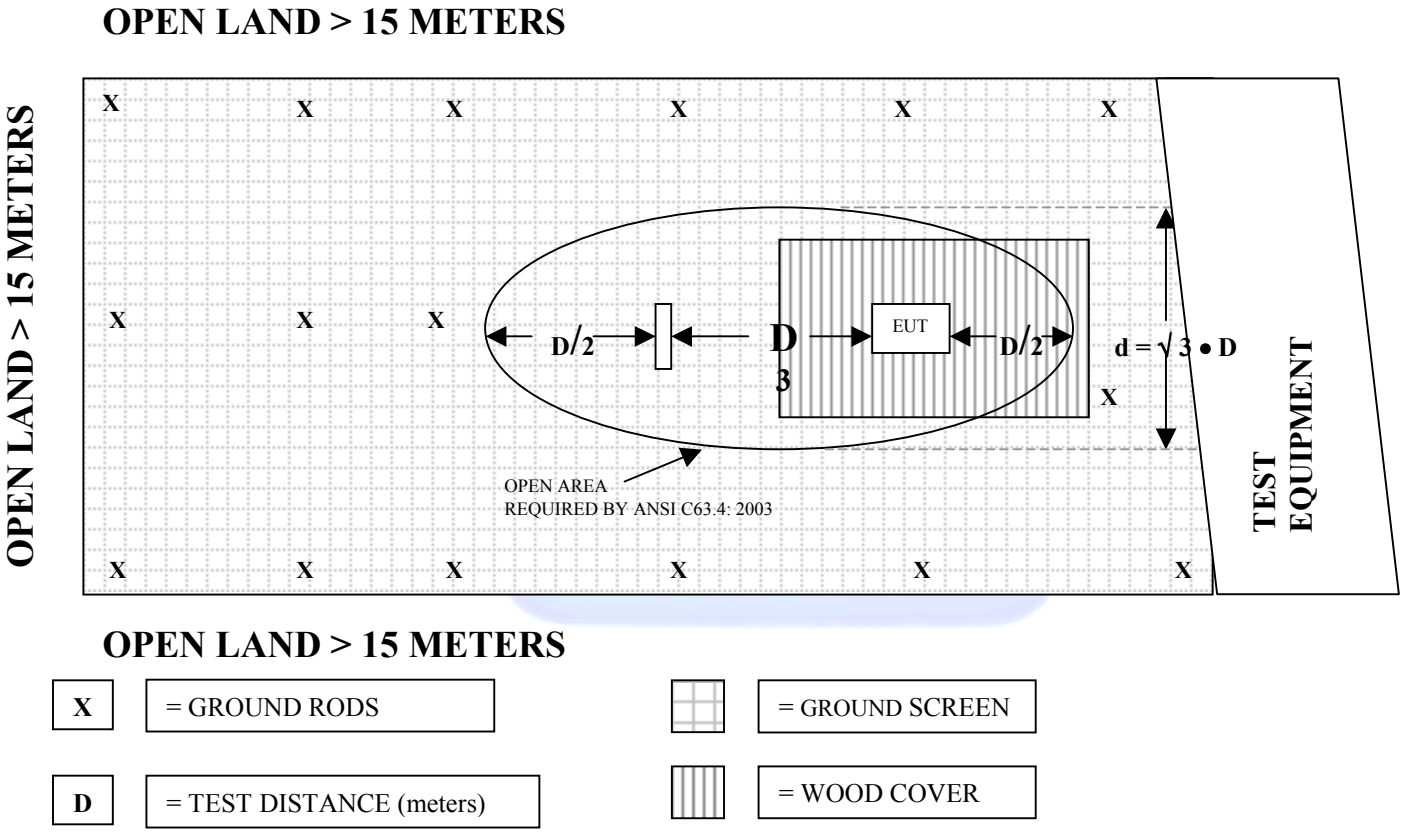
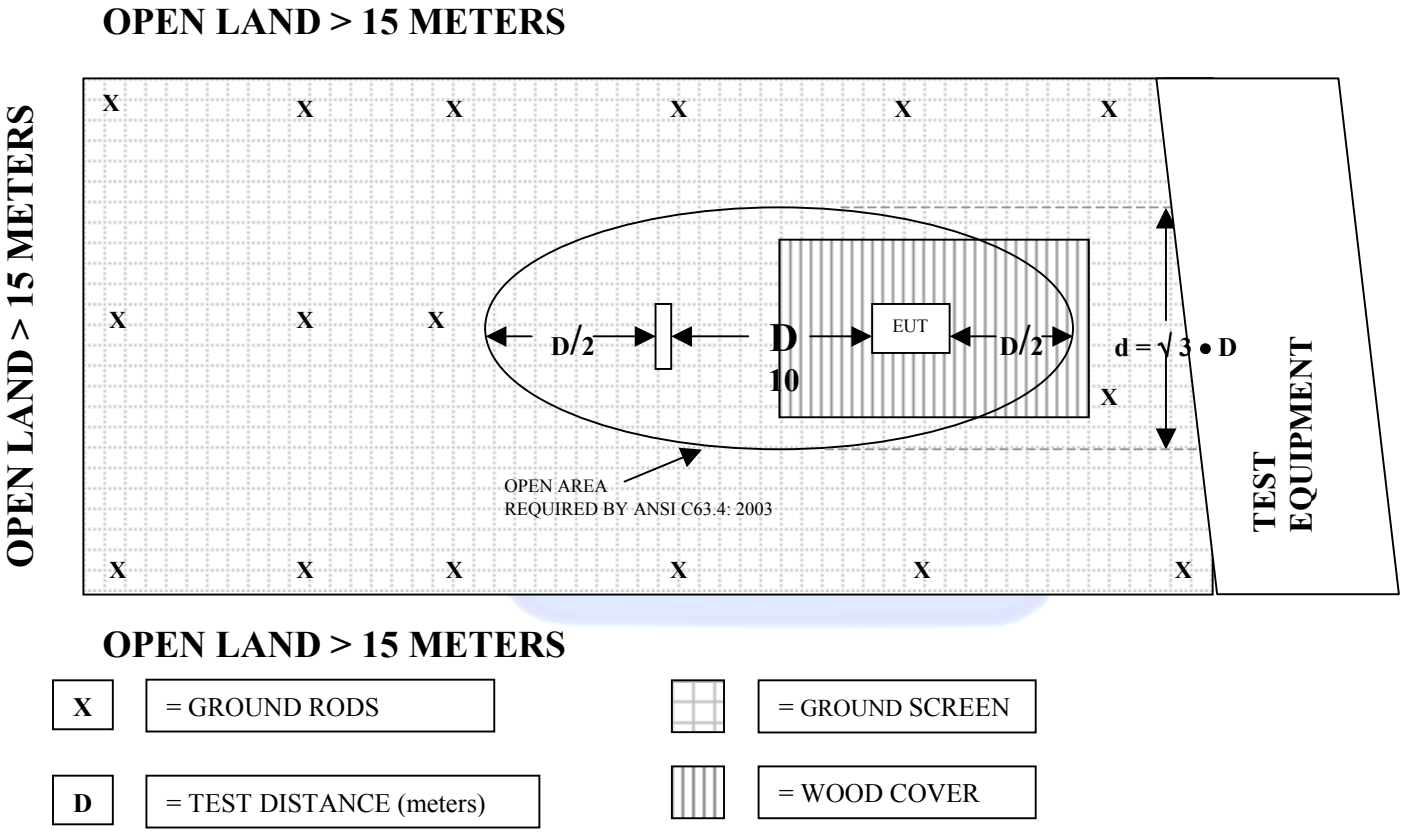


FIGURE 3: PLOT MAP AND LAYOUT OF 10 METER RADIATED SITE



FRONT VIEW

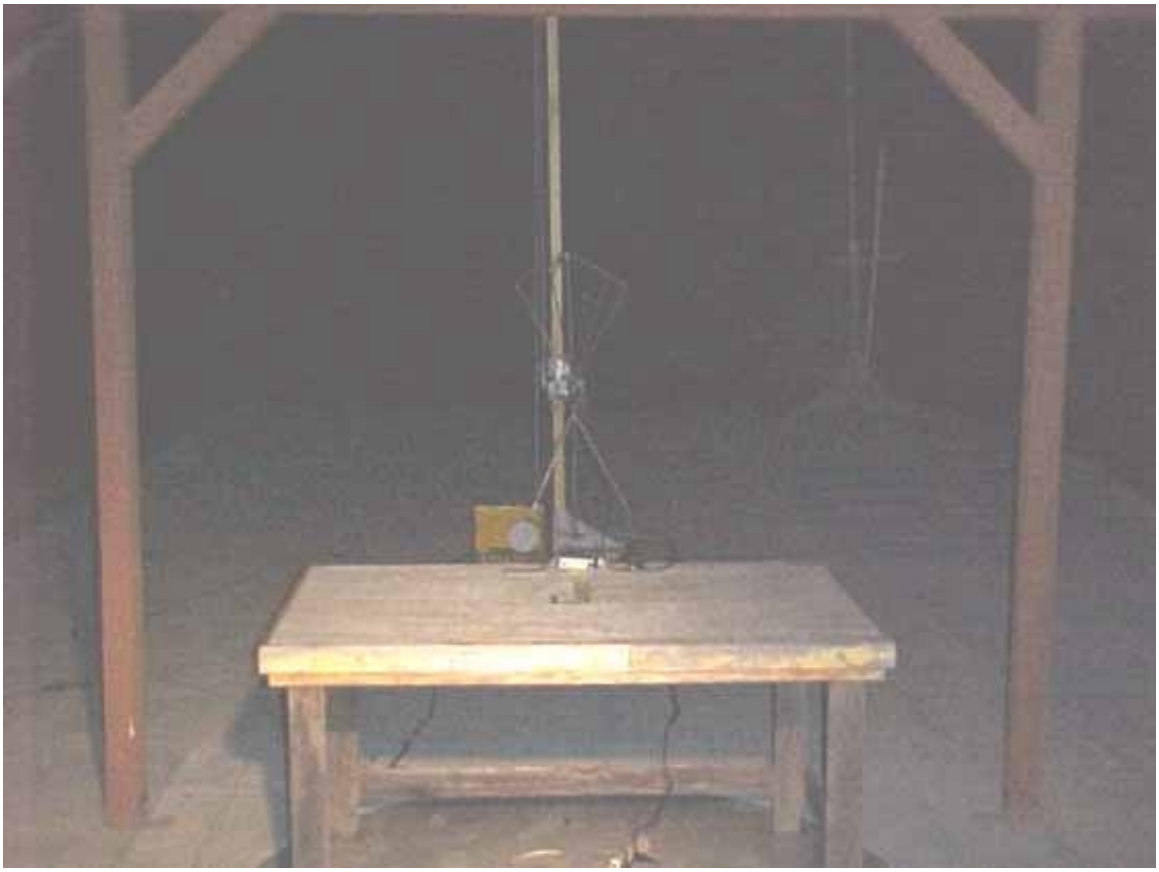
QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B and C – RADIATED EMISSIONS – 02-07-05 and 02-08-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B and C – RADIATED EMISSIONS – 02-07-05 and 02-08-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



FRONT VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B and C – RADIATED EMISSIONS – 02-09-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B and C – RADIATED EMISSIONS – 02-09-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B, CLASS A – RADIATED EMISSIONS – 02-09-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B, CLASS A – RADIATED EMISSIONS – 02-09-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B AND C – CONDUCTED EMISSIONS – 02-10-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

QUATECH, INC.
ThinQ SDS
MODEL: SSE/DSE-100/400
FCC SUBPART B AND C – CONDUCTED EMISSIONS – 02-10-05

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

COM-POWER AB-100

BICONICAL ANTENNA

S/N: 1548

CALIBRATION DATE: SEPTEMBER 29, 2004

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	13.87	140	12.02
35	12.48	150	11.70
40	12.66	160	13.55
45	12.49	175	14.36
50	12.47	180	14.67
60	10.30	200	14.95
70	8.26	250	16.86
80	7.94	275	18.16
90	8.36	287.5	23.23
100	8.73	295	19.10
120	11.06	300	19.70
125	10.64		

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16060

CALIBRATION DATE: SEPTEMBER 27, 2004

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.30	700	19.20
400	14.10	800	21.30
500	15.20	900	21.90
600	15.90	1000	25.20

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 5, 2005

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.4	300	38.5
40	38.3	350	38.5
50	38.2	400	38.3
60	38.4	450	38.0
70	38.4	500	38.0
80	38.3	550	38.1
90	38.3	600	38.2
100	37.7	650	37.8
125	38.4	700	37.9
150	38.6	750	37.5
175	38.4	800	37.2
200	38.5	850	37.6
225	38.	900	36.9
250	38.6	950	37.0
275	38.4	1000	36.3

COM-POWER PA-122

MICROWAVE PREAMPLIFIER

S/N: 25195

CALIBRATION DATE: AUGUST 19, 2004

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	30.50	6.0	30.57
1.1	30.24	6.5	30.39
1.2	30.44	7.0	30.08
1.3	30.38	7.5	29.92
1.4	30.11	8.0	28.88
1.5	29.91	8.5	28.08
1.6	29.74	9.0	28.08
1.7	30.26	9.5	29.11
1.8	30.41	10.0	30.21
1.9	30.19	11.0	29.00
2.0	30.37	12.0	29.10
2.5	30.69	13.0	29.77
3.0	31.63	14.0	28.67
3.5	31.61	15.0	29.72
4.0	31.46	16.0	30.54
4.5	31.45	17.0	30.05
5.0	31.33	18.0	28.47
5.5	31.15		

ANTENNA RESEARCH DRG-118/A

HORN ANTENNA

S/N: 1053

CALIBRATION DATE: JANUARY 16, 2004

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	24.4	9.5	38.6
1.5	25.2	10.0	38.7
2.0	28.2	10.5	39.0
2.5	28.5	11.0	38.9
3.0	30.1	11.5	41.3
3.5	31.0	12.0	40.5
4.0	31.2	12.5	40.0
4.5	31.9	13.0	40.2
5.0	33.2	13.5	40.5
5.5	33.7	14.0	41.6
6.0	34.3	14.5	44.8
6.5	35.0	15.0	41.4
7.0	36.7	15.5	39.2
7.5	37.3	16.0	39.4
8.0	37.1	16.5	40.9
8.5	37.3	17.0	42.6
9.0	37.7	17.5	45.1
		18.0	41.7

COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: SEPTEMBER 03, 2004

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-40.8	10.7
0.01	-40.9	10.6
0.02	-41.8	9.7
0.05	-42.0	9.5
0.07	-41.5	10.0
0.1	-41.7	9.8
0.2	-44.1	7.4
0.3	-41.6	9.9
0.5	-41.5	10.0
0.7	-41.4	10.1
1	-41.0	10.5
2	-40.6	10.9
3	-40.8	10.7
4	-41.0	10.5
5	-40.4	11.1
10	-40.7	10.8
15	-41.6	9.9
20	-41.3	10.2
25	-43.0	8.5
30	-42.6	8.9

COM-POWER AH826

HORN ANTENNA

S/N: 0071957

CALIBRATION DATE: NOVEMBER 05, 2003

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	33.3	22.5	32.9
18.5	32.9	23.0	33.0
19.0	32.7	23.5	33.6
19.5	32.6	24.0	33.6
20.0	32.7	24.5	33.5
20.5	33.0	25.0	33.5
21.0	33.0	25.5	33.7
21.5	33.2	26.0	34.1
22.0	32.9	26.5	34.5

COM-POWER PA-840

MICROWAVE PREAMPLIFIER

S/N: 711013

CALIBRATION DATE: MARCH 12, 2004

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
18.0	26.733	30.0	27.185
19.0	25.961	31.0	27.159
20.0	24.523	32.0	27.125
21.0	23.889	33.0	27.088
22.0	23.761	34.0	26.460
23.0	24.140	35.0	25.817
24.0	25.165	36.0	24.645
25.0	26.227	37.0	25.486
26.0	27.029	38.0	25.873
27.0	26.806	39.0	22.795
28.0	26.654	40.0	23.365
29.0	27.265		