

EMISSIONS TEST REPORT

Report Number: 3164500BOX-001a
Project Number: 3164500

Testing performed on the
VCA200 Radio
Model: BAEVCA200

To

FCC Part 15 Subpart C "Intentional Radiators"

For
BAE Systems – Homeland Security Solutions

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
BAE Systems – Homeland Security Solutions
2 Forbes Road
Lexington, MA 02420

Prepared by:



Nicholas Abbondante

Date: 10/29/2008

Reviewed by:



Jeff Goulet

Date: 10/29/08

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1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: BAE Systems – Homeland Security Solutions
2 Forbes Road
Lexington, MA 02420

Contact: Mr. Ralph Lombardo

Telephone: 603-885-7172

Fax: N/A

Email: Ralph.lombardo@baesystems.com

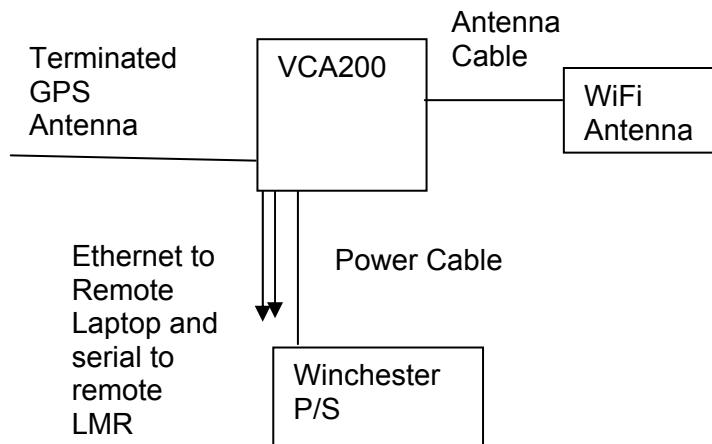
1.2 Equipment Under Test

Equipment Type: VCA200 Radio
Model Number(s): BAEVCA200
Serial number(s): 0841HNH000835
Manufacturer: BAE Systems – Homeland Security Solutions
EUT receive date: 10/10/2008
EUT received condition: Prototype in Good Condition
Test start date: 10/22/2008
Test end date: 10/23/2008

1.3 Test Plan Reference: Tested according to the standards listed, and ANSI C63.4:2003.

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
WiFi Antenna Cable	Braid	SMA	4.2	1
GPS Antenna Cable	Braid	SMA	5.5	1
Ethernet	None	Plastic RJ-45	6.4	1
Serial DB9	Braid	Metal/360 DB9	3.0	1
Power Cable	None	Plastic/Wire	3.25	1

1.4.3. Support Equipment:

Name: Antenex WiFi Antenna 2.4-2.5 GHz
 Model No.: A10245
 Serial No.: N/L

Name: Motorola Land Mobile Radio XTS1500
 Model No.: H66UCD9PW5BN
 Serial No.: 687CJJ1349

Name: Compaq Armada Laptop Computer
 Model No.: E500
 Serial No.: AE5 P3600T4X12DM6458

Name: All-Start Winchester Portable Power Generator
 Model No.: WPG103
 Serial No.: N/L

1.5 Mode(s) of Operation:

During testing, the EUT was powered from a nominal 12V DC power supply. During the FCC Part 15 Subpart C testing, the EUT was fully powered but only the WiFi transmitter was transmitting at maximum duty cycle. The ethernet was activated and was being pinged continuously from the support laptop.

1.6 Floor Standing Equipment:

 Applicable: Not Applicable: X

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart C		
SUB-TEST	TEST PARAMETER	COMMENT
FCC Part 15 Subpart C		
RF Output Power FCC §15.247(b)(3)	Conducted RF Output Power must not exceed 1 Watt (30 dBm). EIRP must not exceed 4 Watts (36 dBm).	Pass
Radiated Emissions FCC §15.205, §15.209, §15.247(d)	Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209.	Pass

3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength in $\text{dB}\mu\text{V}/\text{m}$

RA = Receiver Amplitude (including preamplifier) in $\text{dB}\mu\text{V}$

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 $\text{dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 $\text{dB}\mu\text{V}/\text{m}$. This value in $\text{dB}\mu\text{V}/\text{m}$ was converted to its corresponding level in $\mu\text{V}/\text{m}$.

$$RA = 52.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}/\text{m}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$FS = 32 \text{ dB}\mu\text{V}/\text{m}$$

$$\text{Level in } \mu\text{V}/\text{m} = [10(32 \text{ dB}\mu\text{V}/\text{m})/20] = 39.8 \mu\text{V}/\text{m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in $\text{dB}\mu\text{V}$

RF = Reading from receiver in $\text{dB}\mu\text{V}$

LF = LISN Correction Factor in dB

CF = Cable Correction Factor in dB

AF = Attenuator Loss Factor in dB

To convert from $\text{dB}\mu\text{V}$ to μV or mV the following was used:

$$UF = 10^{(NF/20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V}/20)} = 254 \mu\text{V}/\text{m}$$

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:

± 3.5 dB at 10m, ± 3.8 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 2.6 dB

The expanded uncertainty ($k = 2$) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 3.2 for ISN and voltage probe measurements

± 3.1 for current probe measurements

3.2 Site Description

Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Test Results: Pass

Test Standard: FCC Part 15 Subpart C

Test: RF Output Power, FCC §15.247(b)(3)

Performance Criterion: Conducted RF Output Power must not exceed 1 Watt (30 dBm). EIRP must not exceed 4 Watts (36 dBm).

Test Environment:

Environmental Conditions During Testing:		Ambient (°C):	17	Humidity (%):	42	Pressure (hPa):	986
Pretest Verification Performed		Yes		Equipment under Test:		BAEVCA200	
Test Engineer(s):	Nicholas Abbondante			EUT Serial Number:		0841HNH000835	
Engineer's Initials:	NNA	Date Test Performed:	10/23/2008	Reviewer's Initials:	jmg	Date Reviewed:	10/29/08

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
2	40 GHz Cable	Megaphase	TM40-K1K1-80	7030802 002	06/05/2009
3	10W, 30dB Attenuator	Weinschel Corp	47-30-34	BD43291	10/15/2009
4	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008

Software Utilized:

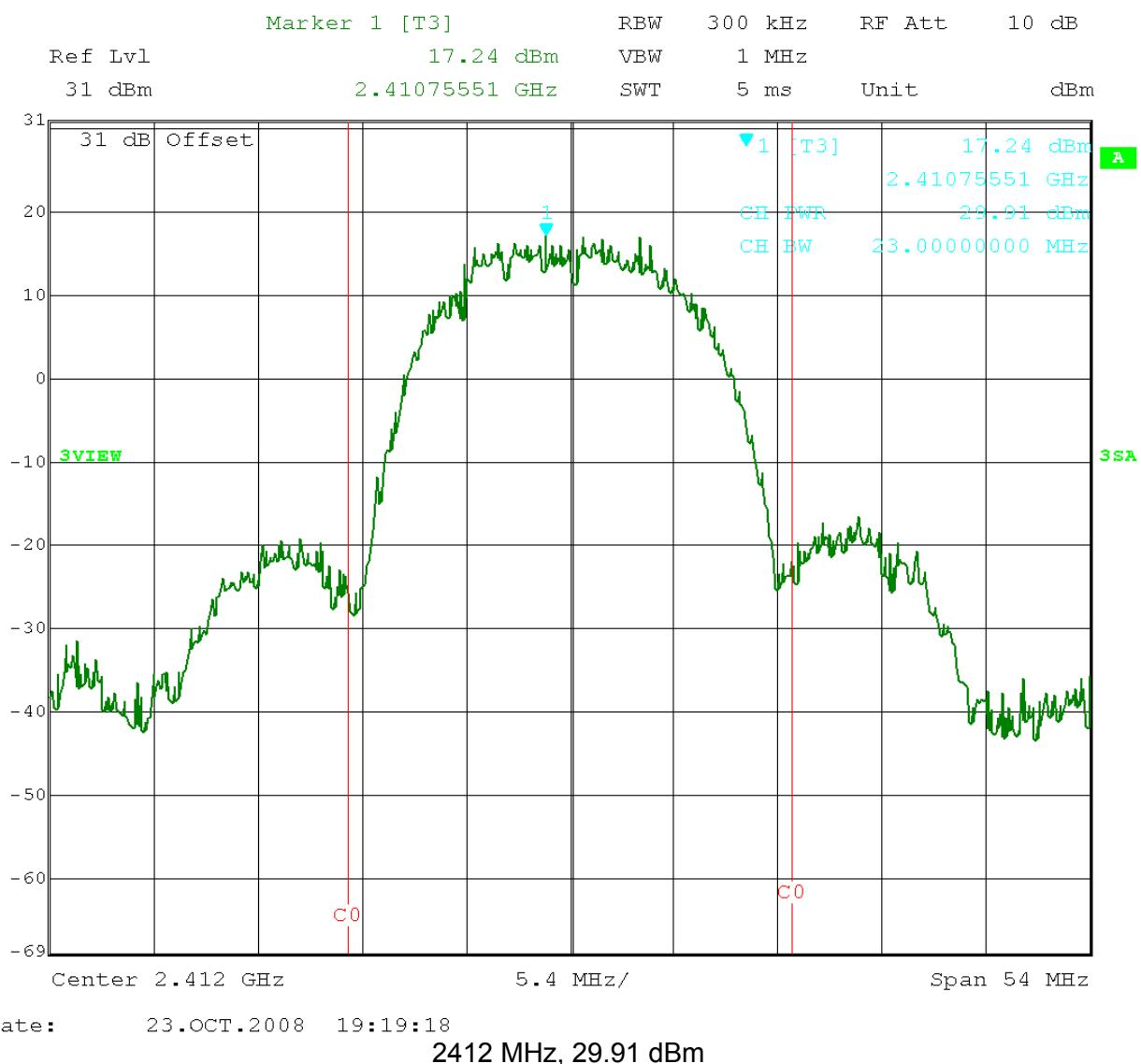
Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

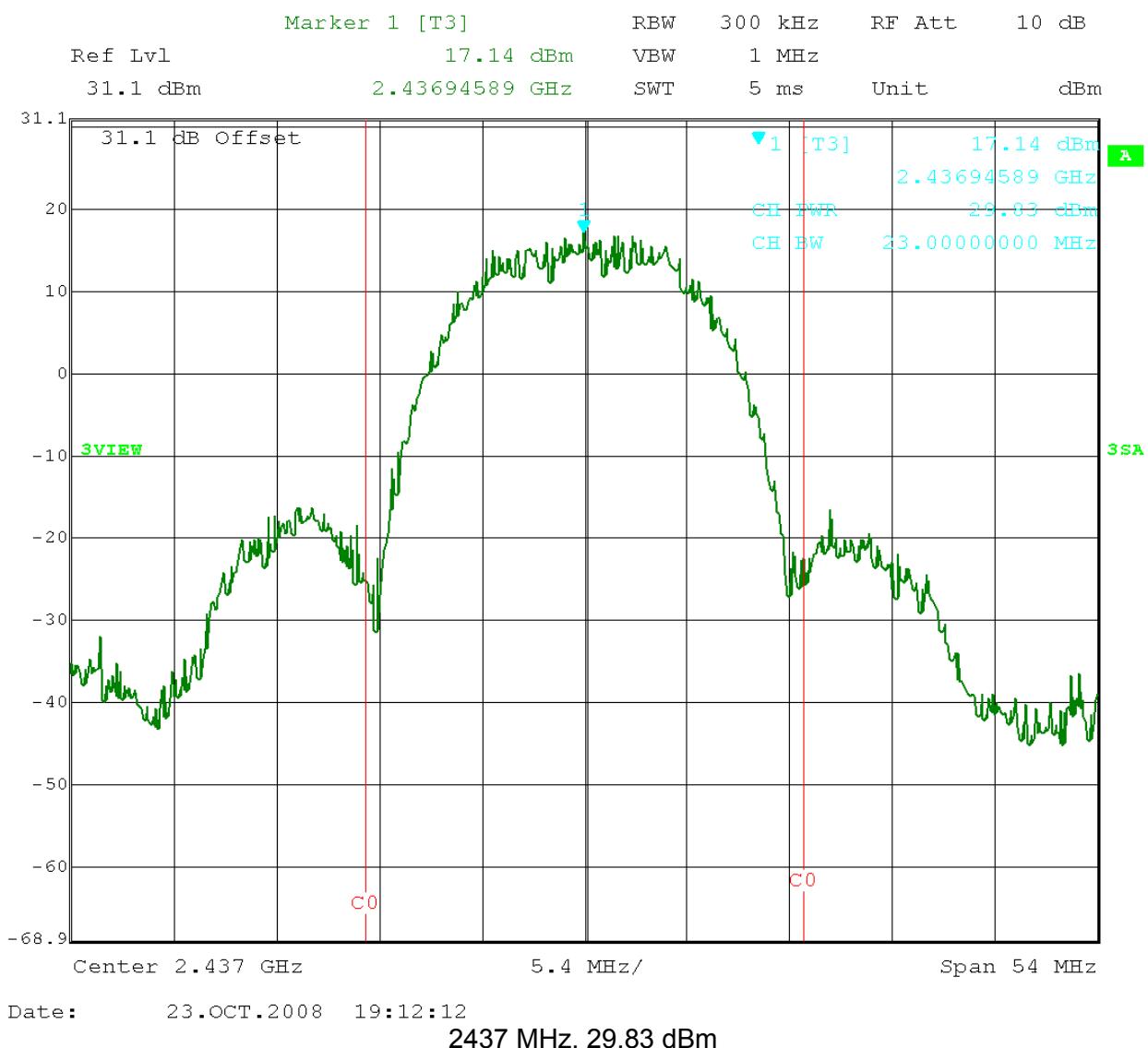
Test Details:

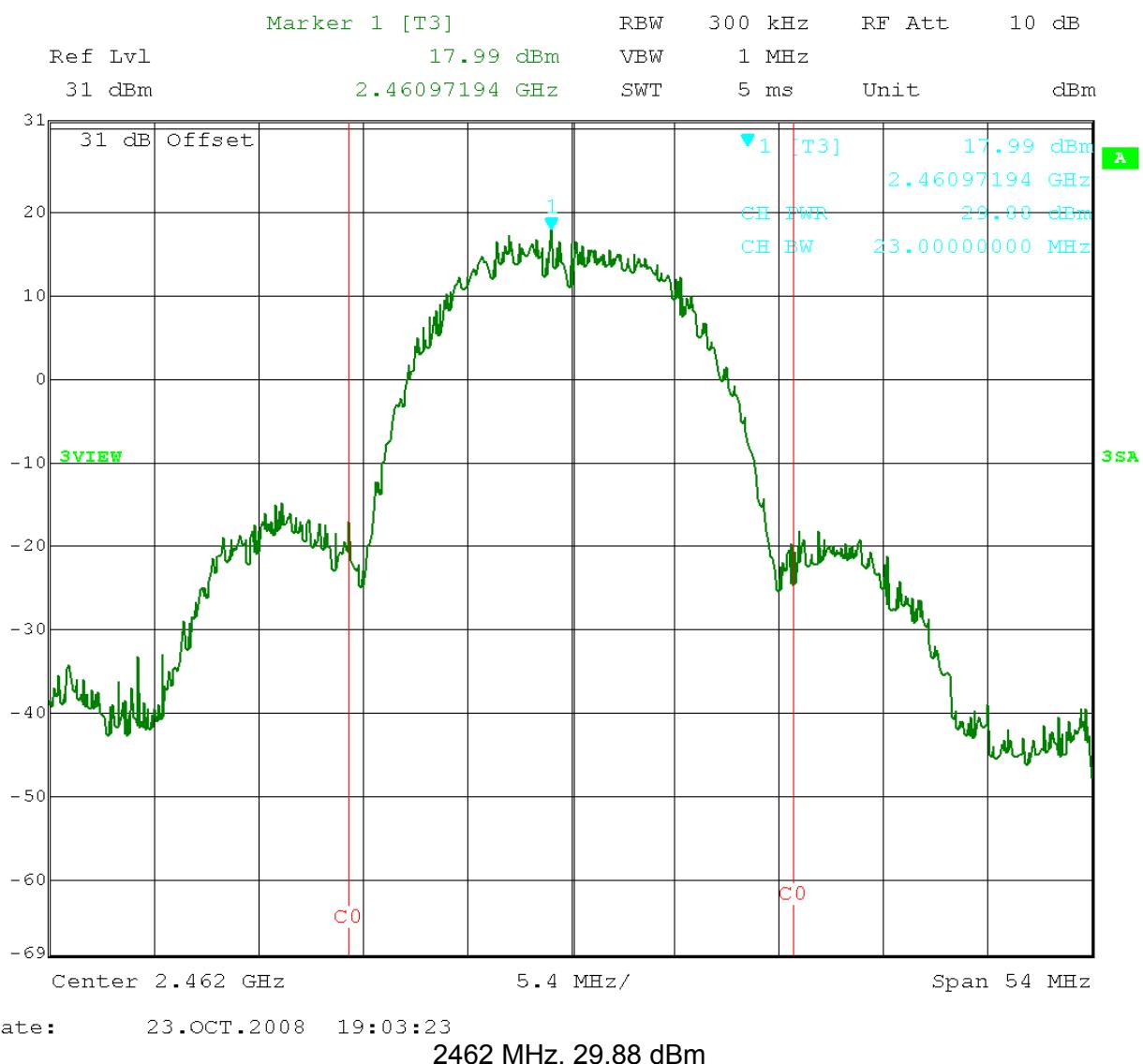
Channel 1 (2412 MHz): 29.91 dBm

Channel 6 (2437 MHz): 29.83 dBm

Channel 11 (2462 MHz): 29.88 dBm







Test Results: Pass

Test Standard: FCC Part 15 Subpart C

Test: Radiated Emissions, FCC §15.205, §15.209, §15.247(d)

Performance Criterion: Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209.

Test Environment:

Environmental Conditions During Testing:		Ambient (°C):	See Tables	Humidity (%):	See Tables	Pressure (hPa):	See Tables
Pretest Verification Performed		Yes		Equipment under Test:		BAEVCA200	
Test Engineer(s):	Nicholas Abbondante			EUT Serial Number:		0841HNH000835	
Engineer's Initials:	NNA	Date Test Performed:	10/22-23/2008	Reviewer's Initials:	jmg	Date Reviewed:	10/29/08

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	ANTENNA	EMCO	3142	9711-1223	02/22/2009
2	10 Meter in floor cable for site 2	ITS	RG214B/U	S2 10M FLR	09/23/2009
3	9kHz to 3GHz EMI Test Receiver	Rohde & Schwartz	ESCI 1166.5950K03	100067	01/25/2009
4	40GHz Cable	Megaphase	TM40-K1K1-197	7030801 001	06/05/2009
5	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	10/15/2009
6	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	04/11/2009
7	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	03/27/2009
8	40 GHz Cable	Megaphase	TM40-K1K1-197	7030801 002	06/05/2009
9	HORN ANTENNA	EMCO	3115	22023	04/02/2009
10	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	11/26/2008
11	Digital 4 Line Barometer	Mannix	0ABA116	BAR1	06/01/2009
12	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	12/26/2008
13	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/06/2008
14	40 GHz Cable	Megaphase	TM40-K1K1-80	7030802 002	06/05/2009

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:
Special Radiated Emissions

Company: BAE Systems
 Model #: VCA200
 Serial #: 0841HNH000835
 Engineers: Nicholas Abbondante
 Project #: 3164500 Date(s): 10/22/08
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: R&S ESCI (ROS002)
 PreAmp: PRE9 03-27-09.txt
 PreAmp Used? (Y or N): N Voltage/Frequency: 12VDC Frequency Range: 30-1000 MHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Note: WiFi Mode Channel 1 (2412 MHz)											
PK	V	33.480	10.0	12.4	0.7	0.0	-10.5	33.6	90.9	-57.3	120/300 kHz
PK	V	47.040	19.6	7.8	0.9	0.0	-10.5	38.8	90.9	-52.1	120/300 kHz
PK	V	64.800	11.0	6.5	1.6	0.0	-10.5	29.6	90.9	-61.3	120/300 kHz
PK	V	74.640	14.9	6.7	1.7	0.0	-10.5	33.8	90.9	-57.1	120/300 kHz
PK	V	87.000	16.3	7.7	1.9	0.0	-10.5	36.3	90.9	-54.6	120/300 kHz
QP	V	109.008	8.7	8.6	2.0	0.0	-10.5	29.8	43.5	-13.7	120/300 kHz
QP	V	117.324	9.3	8.3	2.1	0.0	-10.5	30.2	43.5	-13.3	120/300 kHz
QP	V	124.716	11.4	8.2	2.2	0.0	-10.5	32.3	43.5	-11.2	120/300 kHz
QP	V	133.284	11.2	8.4	2.3	0.0	-10.5	32.3	43.5	-11.2	120/300 kHz
PK	V	151.594	14.6	11.0	2.4	0.0	-10.5	38.4	90.9	-52.5	120/300 kHz
QP	V	166.100	4.1	11.5	2.5	0.0	-10.5	28.5	43.5	-15.0	120/300 kHz
PK	V	233.100	7.4	13.1	2.4	0.0	-10.5	33.4	90.9	-57.5	120/300 kHz
QP	V	262.500	1.5	13.4	2.6	0.0	-10.5	28.0	46.0	-18.0	120/300 kHz
PK	V	288.100	14.3	13.8	2.8	0.0	-10.5	41.3	90.9	-49.6	120/300 kHz
PK	V	294.700	13.7	13.7	2.8	0.0	-10.5	40.6	90.9	-50.3	120/300 kHz
PK	V	310.300	24.2	14.5	2.8	0.0	-10.5	51.9	90.9	-39.0	120/300 kHz
PK	V	319.000	14.4	14.8	2.8	0.0	-10.5	42.5	90.9	-48.4	120/300 kHz
QP	V	327.500	13.9	15.2	2.9	0.0	-10.5	42.5	46.0	-3.5	120/300 kHz
PK	V	360.100	12.3	16.5	3.1	0.0	-10.5	42.3	90.9	-48.6	120/300 kHz
PK	V	393.000	20.7	18.0	3.3	0.0	-10.5	52.4	90.9	-38.5	120/300 kHz
PK	V	414.500	20.5	17.4	3.3	0.0	-10.5	51.6	90.9	-39.3	120/300 kHz
PK	V	425.700	8.4	17.6	3.4	0.0	-10.5	39.8	90.9	-51.1	120/300 kHz

Special Radiated Emissions

Company: BAE Systems

Model #: VCA200

Serial #: 0841HNH000835

Engineers: Nicholas Abbondante

Project #: 3164500

Date(s): 10/22/08

Standard: FCC Part 15 Subpart C 15.247

Receiver: R&S ESCI (ROS002)

Limit Distance (m): 3

PreAmp: PRE9 03-27-09.txt

Test Distance (m): 10

PreAmp Used? (Y or N): N

Voltage/Frequency: 12VDC Frequency Range: 30-1000 MHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: N Bands: N, LF, HF, SHF

Antenna: LOG2 2-22-09 V10m.txt LOG2 2-22-09 H10m.txt

Cable(s): S2 10M FLR 09-23-09.txt NONE.

Barometer: BAR1

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
Note: WiFi Mode Channel 6 (2437 MHz)												
PK	V	35.500	8.6	11.8	0.8	0.0	-10.5	31.6	90.9	-59.3	120/300 kHz	
PK	V	47.880	20.5	7.7	0.9	0.0	-10.5	39.6	90.9	-51.3	120/300 kHz	
PK	V	64.300	13.0	6.5	1.6	0.0	-10.5	31.6	90.9	-59.3	120/300 kHz	
PK	V	74.640	13.8	6.7	1.7	0.0	-10.5	32.7	90.9	-58.2	120/300 kHz	
PK	V	85.800	16.7	7.5	1.8	0.0	-10.5	36.5	90.9	-54.4	120/300 kHz	
QP	V	108.840	7.6	8.6	2.0	0.0	-10.5	28.7	43.5	-14.8	120/300 kHz	RB
QP	V	117.324	4.6	8.3	2.1	0.0	-10.5	25.5	43.5	-18.0	120/300 kHz	RB
QP	V	124.464	12.3	8.2	2.2	0.0	-10.5	33.2	43.5	-10.3	120/300 kHz	RB
QP	V	131.100	13.9	8.3	2.2	0.0	-10.5	34.9	43.5	-8.6	120/300 kHz	RB
PK	V	141.260	10.8	9.3	2.4	0.0	-10.5	32.9	90.9	-58.0	120/300 kHz	
PK	V	151.556	13.0	11.0	2.4	0.0	-10.5	36.8	90.9	-54.1	120/300 kHz	
QP	V	166.300	3.9	11.5	2.5	0.0	-10.5	28.3	43.5	-15.2	120/300 kHz	RB
PK	V	233.500	7.2	13.2	2.4	0.0	-10.5	33.2	90.9	-57.7	120/300 kHz	
QP	V	262.000	6.4	13.4	2.6	0.0	-10.5	32.9	46.0	-13.1	120/300 kHz	RB
PK	V	288.500	17.7	13.8	2.8	0.0	-10.5	44.7	90.9	-46.2	120/300 kHz	
PK	V	290.400	18.3	13.8	2.8	0.0	-10.5	45.3	90.9	-45.6	120/300 kHz	
PK	V	298.500	16.1	13.8	2.8	0.0	-10.5	43.2	90.9	-47.7	120/300 kHz	
PK	V	305.900	22.7	14.3	2.8	0.0	-10.5	50.2	90.9	-40.7	120/300 kHz	
PK	V	319.300	11.7	14.9	2.9	0.0	-10.5	39.9	90.9	-51.0	120/300 kHz	
QP	V	327.500	13.2	15.2	2.9	0.0	-10.5	41.8	46.0	-4.2	120/300 kHz	RB
PK	V	360.500	7.8	16.5	3.1	0.0	-10.5	37.9	90.9	-53.0	120/300 kHz	
PK	V	392.900	21.0	18.0	3.3	0.0	-10.5	52.8	90.9	-38.1	120/300 kHz	
PK	V	414.700	18.8	17.4	3.3	0.0	-10.5	49.9	90.9	-41.0	120/300 kHz	
PK	V	425.000	9.6	17.6	3.4	0.0	-10.5	41.0	90.9	-49.9	120/300 kHz	
PK	V	443.300	10.8	17.9	3.5	0.0	-10.5	42.6	90.9	-48.3	120/300 kHz	
PK	V	730.500	12.4	22.3	4.7	0.0	-10.5	49.8	90.9	-41.1	120/300 kHz	

Special Radiated Emissions

Company: BAE Systems

Model #: VCA200

Serial #: 0841HNH000835

Engineers: Nicholas Abbondante

Project #: 3164500

Date(s): 10/22/08

Standard: FCC Part 15 Subpart C 15.247

Receiver: R&S ESCI (ROS002)

Limit Distance (m): 3

PreAmp: PRE9 03-27-09.txt

Test Distance (m): 10

PreAmp Used? (Y or N): N

Voltage/Frequency: 12VDC Frequency Range: 30-1000 MHz

Net = Reading (dB_uV/m) + Antenna Factor (dB₁/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: N Bands: N, LF, HF, SHF

Antenna: LOG2 2-22-09 V10m.txt LOG2 2-22-09 H10m.txt

Cable(s): S2 10M FLR 09-23-09.txt NONE.

Barometer: BAR1

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
Note: WiFi Mode Channel 11 (2462 MHz)												
PK	V	32.400	12.0	12.9	0.8	0.0	-10.5	36.2	90.9	-54.7	120/300 kHz	
PK	V	47.280	18.6	7.8	0.9	0.0	-10.5	37.8	90.9	-53.1	120/300 kHz	
PK	V	64.200	12.3	6.5	1.6	0.0	-10.5	30.9	90.9	-60.0	120/300 kHz	
PK	V	74.640	13.8	6.7	1.7	0.0	-10.5	32.7	90.9	-58.2	120/300 kHz	
PK	V	85.080	20.7	7.5	1.8	0.0	-10.5	40.4	90.9	-50.5	120/300 kHz	
QP	V	108.840	6.5	8.6	2.0	0.0	-10.5	27.6	43.5	-15.9	120/300 kHz	RB
QP	V	116.988	5.2	8.4	2.1	0.0	-10.5	26.1	43.5	-17.4	120/300 kHz	RB
QP	V	124.464	14.5	8.2	2.2	0.0	-10.5	35.4	43.5	-8.1	120/300 kHz	RB
QP	V	131.436	13.6	8.3	2.2	0.0	-10.5	34.6	43.5	-8.9	120/300 kHz	RB
PK	V	141.196	11.9	9.2	2.4	0.0	-10.5	34.0	90.9	-56.9	120/300 kHz	
PK	V	151.553	13.0	11.0	2.4	0.0	-10.5	36.8	90.9	-54.1	120/300 kHz	
QP	V	166.025	4.9	11.5	2.5	0.0	-10.5	29.4	43.5	-14.1	120/300 kHz	RB
PK	V	221.900	10.5	12.0	2.4	0.0	-10.5	35.3	90.9	-55.6	120/300 kHz	
PK	V	233.400	8.2	13.1	2.4	0.0	-10.5	34.2	90.9	-56.7	120/300 kHz	
QP	V	262.000	6.4	13.4	2.6	0.0	-10.5	32.9	46.0	-13.1	120/300 kHz	RB
PK	V	288.400	18.2	13.8	2.8	0.0	-10.5	45.2	90.9	-45.7	120/300 kHz	
PK	V	291.000	17.9	13.8	2.8	0.0	-10.5	44.9	90.9	-46.0	120/300 kHz	
PK	V	294.900	17.1	13.7	2.8	0.0	-10.5	44.1	90.9	-46.8	120/300 kHz	
PK	V	305.600	24.0	14.3	2.8	0.0	-10.5	51.6	90.9	-39.3	120/300 kHz	
PK	V	319.200	11.6	14.8	2.8	0.0	-10.5	39.7	90.9	-51.2	120/300 kHz	
QP	V	327.400	12.4	15.2	2.9	0.0	-10.5	41.0	46.0	-5.0	120/300 kHz	RB
PK	V	360.100	9.9	16.5	3.1	0.0	-10.5	39.9	90.9	-51.0	120/300 kHz	
PK	V	393.000	21.3	18.0	3.3	0.0	-10.5	53.1	90.9	-37.8	120/300 kHz	
PK	V	414.700	19.2	17.4	3.3	0.0	-10.5	50.4	90.9	-40.5	120/300 kHz	
PK	V	425.600	9.4	17.6	3.4	0.0	-10.5	40.9	90.9	-50.0	120/300 kHz	
PK	H	437.600	9.6	17.3	3.4	0.0	-10.5	40.8	90.9	-50.1	120/300 kHz	
PK	H	730.300	15.4	22.0	4.7	0.0	-10.5	52.6	90.9	-38.3	120/300 kHz	

Special Radiated Emissions

Company: BAE Systems

Model #: VCA200

Serial #: 0841HNH000835

Engineers: Nicholas Abbondante

Project #: 3164500

Date(s): 10/23/08

Standard: FCC Part 15 Subpart C 15.247

Receiver: R&S FSEK-30 (ROS001)

Limit Distance (m): 3

PreAmp: PRE9 03-27-09.txt

Test Distance (m): 3

PreAmp Used? (Y or N): N

Voltage/Frequency: 12VDC Frequency Range: 1-4 GHz

 Net = Reading (dB_{uV/m}) + Antenna Factor (dB_{1/m}) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: LF Bands: N, LF, HF, SHF

Antenna: EMC-54 V3m 4-02-09.txt EMC-54 H3m 4-02-09.txt

Cable(s): MEG001 06-05-09.txt MEG002 06-05-09.txt

Barometer: BAR1

Location: Site 2

Temp/Humidity/Pressure: 17c 42% 986mB

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
PK	V	2412.000	75.6	28.6	5.9	0.0	0.0	110.1	-	-	100/300 kHz
PK	V	2437.000	76.3	28.7	5.9	0.0	0.0	110.9	-	-	100/300 kHz
PK	V	2462.000	75.1	28.8	5.9	0.0	0.0	109.9	-	-	100/300 kHz

FCC

Special Radiated Emissions

Company: BAE Systems

Model #: VCA200

Serial #: 0841HNH000835

Engineers: Nicholas Abbondante

Project #: 3164500

Date(s): 10/23/08

Location: Site 2

Antenna & Cables: HF Bands: N, LF, HF, SHF

Antenna: EMC-54 V3m 4-02-09.txt EMC-54 H3m 4-02-09.txt

Cable(s): MEG002 06-05-09.txt MEG004 06-05-09.txt

Barometer: BAR1

Standard: FCC Part 15 Subpart C 15.247

Limit Distance (m): 3 Temp/Humidity/Pressure: 17c 42% 986mB

Receiver: R&S FSEK-30 (ROS001)

Test Distance (m): 3

PreAmp: PRE9 03-27-09.txt

Voltage/Frequency: 12VDC Frequency Range: 4-18 GHz

PreAmp Used? (Y or N): Y Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
PK	H	4824.000	38.0	32.7	6.1	29.3	0.0	47.6	74.0	-26.4	1/3 MHz	RB
AVG	H	4824.000	32.1	32.7	6.1	29.3	0.0	41.7	54.0	-12.3	1/3 MHz	RB
PK	V	7236.000	27.3	36.0	7.8	28.4	0.0	42.7	90.9	-48.2	100/300 kHz	
PK	H	9648.000	29.5	37.8	9.3	27.4	0.0	49.1	90.9	-41.8	100/300 kHz	
PK	H	12060.000	35.8	39.1	10.7	27.4	0.0	58.1	74.0	-15.9	1/3 MHz	RB
AVG	H	12060.000	26.8	39.1	10.7	27.4	0.0	49.1	54.0	-4.9	1/3 MHz	RB
PK	H	14472.000	28.9	41.7	12.0	27.6	0.0	55.0	74.0	-19.0	1/3 MHz	RB
AVG	H	14472.000	21.5	41.7	12.0	27.6	0.0	47.6	54.0	-6.4	1/3 MHz	RB
PK	V	16884.000	25.7	39.7	13.3	28.1	0.0	50.6	90.9	-40.3	100/300 kHz	
PK	H	4874.000	37.9	32.8	6.2	29.3	0.0	47.6	74.0	-26.4	1/3 MHz	RB
AVG	H	4874.000	30.9	32.8	6.2	29.3	0.0	40.7	54.0	-13.3	1/3 MHz	RB
PK	H	7311.000	37.3	36.2	7.9	28.4	0.0	53.0	74.0	-21.0	1/3 MHz	RB
AVG	H	7311.000	28.7	36.2	7.9	28.4	0.0	44.3	54.0	-9.7	1/3 MHz	RB
PK	H	9748.000	28.9	37.8	9.4	27.4	0.0	48.7	90.9	-42.2	100/300 kHz	
PK	H	12185.000	29.7	39.0	10.8	27.4	0.0	52.0	74.0	-22.0	1/3 MHz	RB
AVG	H	12185.000	22.5	39.0	10.8	27.4	0.0	44.7	54.0	-9.3	1/3 MHz	RB
PK	V	14622.000	25.7	41.3	12.1	27.6	0.0	51.5	90.9	-39.4	100/300 kHz	
PK	H	17059.000	26.3	40.7	13.4	28.1	0.0	52.2	90.9	-38.7	100/300 kHz	
PK	H	4924.000	38.7	32.9	6.2	29.3	0.0	48.6	74.0	-25.4	1/3 MHz	RB
AVG	H	4924.000	29.3	32.9	6.2	29.3	0.0	39.2	54.0	-14.8	1/3 MHz	RB
PK	V	7386.000	36.9	36.4	7.9	28.3	0.0	52.9	74.0	-21.1	1/3 MHz	
AVG	V	7386.000	30.2	36.4	7.9	28.3	0.0	46.2	54.0	-7.8	1/3 MHz	
PK	V	9848.000	29.5	37.9	9.4	27.4	0.0	49.4	90.9	-41.5	100/300 kHz	
PK	V	12310.000	30.4	38.8	10.8	27.4	0.0	52.6	74.0	-21.4	1/3 MHz	RB
AVG	V	12310.000	21.5	38.8	10.8	27.4	0.0	43.8	54.0	-10.2	1/3 MHz	RB
PK	V	14772.000	25.1	40.9	12.1	27.6	0.0	50.6	90.9	-40.3	100/300 kHz	
PK	V	17234.000	25.4	41.7	13.5	28.2	0.0	52.3	90.9	-38.6	100/300 kHz	

Special Radiated Emissions

Company: BAE Systems

Model #: VCA200

Serial #: 0841HNH000835

Engineers: Nicholas Abbondante

Project #: 3164500

Date(s): 10/23/08

Location: Site 2

Antenna & Cables: SHF Bands: N, LF, HF, SHF

Antenna: EMC04 V 1m 12-26-2008.txt EMC04 H 1m 12-26-2008.txt

Cable(s): CBL030 12-06-08.txt MEG004 06-05-09.txt

Barometer: BAR1

Standard: FCC Part 15 Subpart C 15.247

Temp/Humidity/Pressure: 17c 42% 986mB

Receiver: R&S FSEK-30 (ROS001)

Limit Distance (m): 3

PreAmp: PRE9 03-27-09.txt

Test Distance (m): 3

PreAmp Used? (Y or N): Y

Voltage/Frequency: 12VDC

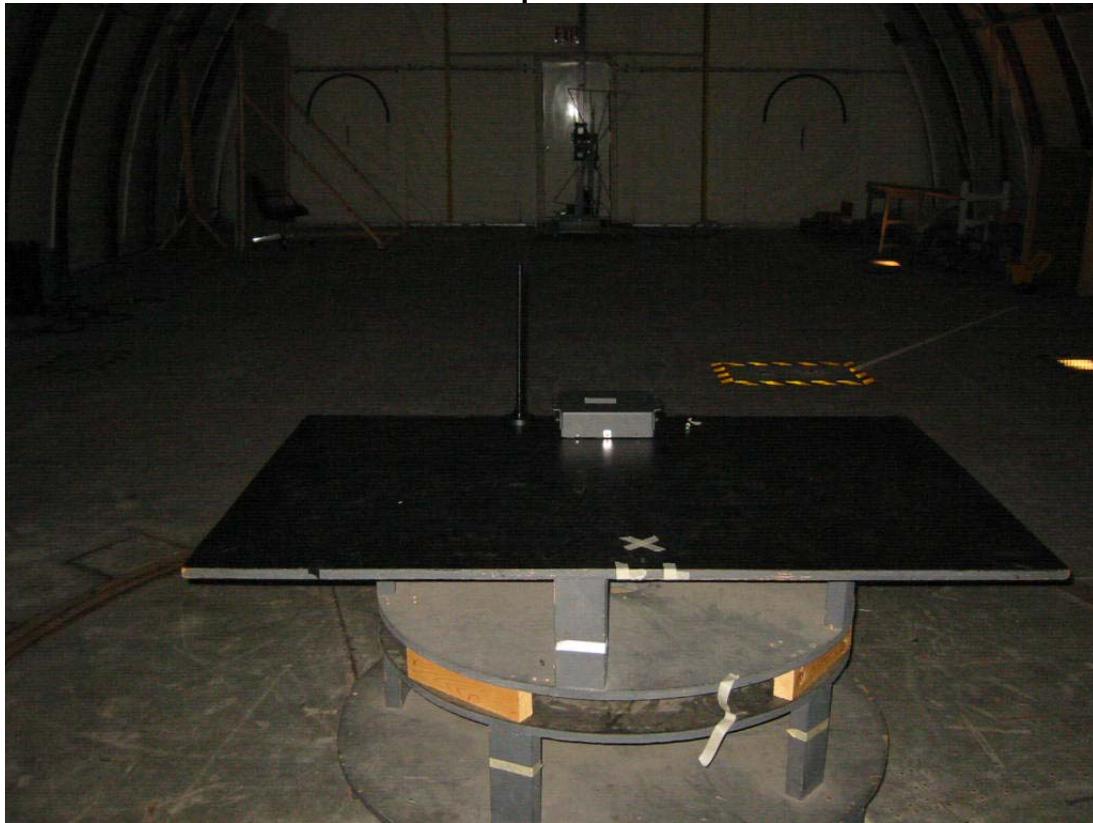
Frequency Range: 18-26 GHz

Net = Reading (dB_{uV/m}) + Antenna Factor (dB_{1/m}) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
PK	V	19296.000	34.1	45.3	8.5	28.7	0.0	59.1	74.0	-14.9	1/3 MHz	RB
AVG	V	19296.000	24.0	45.3	8.5	28.7	0.0	49.1	54.0	-4.9	1/3 MHz	RB
PK	V	21708.000	23.7	45.4	9.1	28.0	0.0	50.2	90.9	-40.7	100/300 kHz	
PK	V	24120.000	19.4	45.6	9.9	26.7	0.0	48.2	90.9	-42.7	100/300 kHz	
PK	V	19496.000	30.8	45.4	8.5	28.8	0.0	55.9	74.0	-18.1	1/3 MHz	RB
AVG	V	19496.000	24.4	45.4	8.5	28.8	0.0	49.6	54.0	-4.4	1/3 MHz	RB
PK	V	21933.000	22.9	45.3	9.2	27.9	0.0	49.5	90.9	-41.4	100/300 kHz	
PK	V	24370.000	22.9	45.9	10.0	26.6	0.0	52.3	90.9	-38.6	100/300 kHz	
PK	V	19696.000	30.1	45.4	8.6	28.8	0.0	55.2	74.0	-18.8	1/3 MHz	RB
AVG	V	19696.000	25.4	45.4	8.6	28.8	0.0	50.6	54.0	-3.4	1/3 MHz	RB
PK	V	22158.000	29.1	45.4	9.3	27.7	0.0	56.0	74.0	-18.0	1/3 MHz	RB
AVG	V	22158.000	20.0	45.4	9.3	27.7	0.0	46.9	54.0	-7.1	1/3 MHz	RB
PK	V	24620.000	22.9	46.2	10.1	26.4	0.0	52.7	90.9	-38.2	100/300 kHz	

Setup Photos



30-1000 MHz Radiated Emissions

Setup Photos



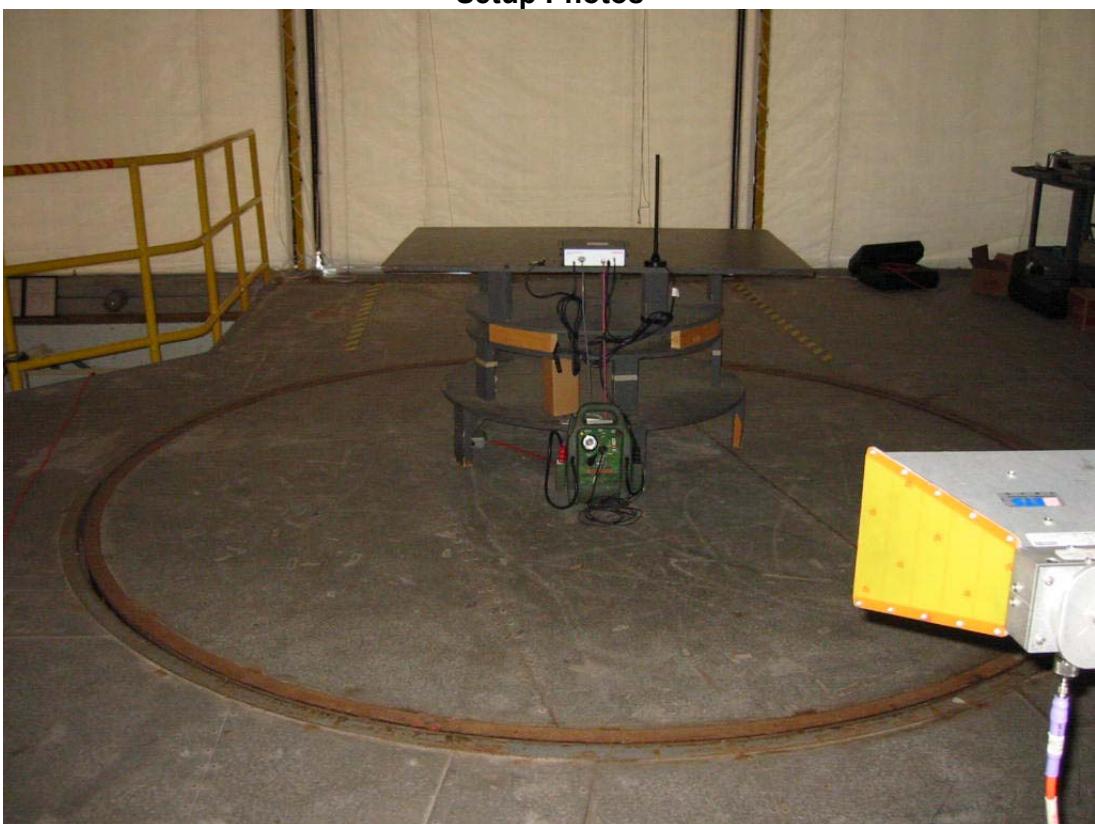
30-1000 MHz Radiated Emissions

Setup Photos



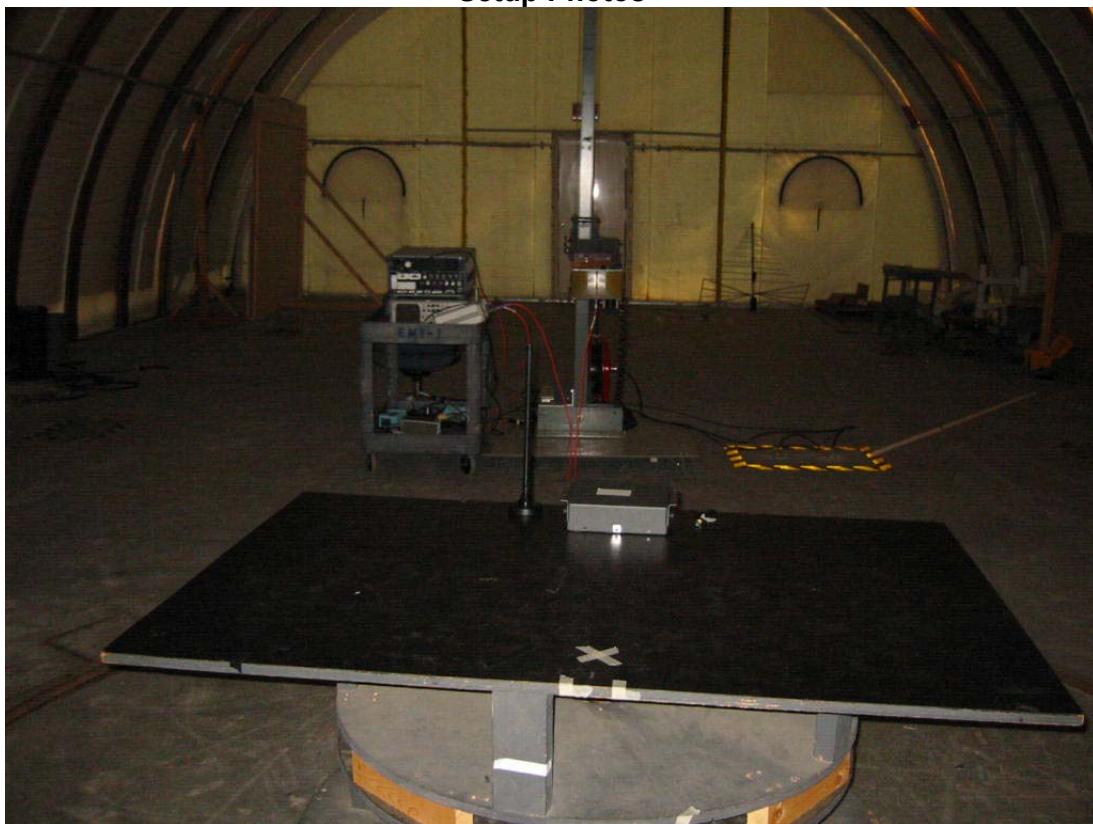
1-4 GHz Radiated Emissions

Setup Photos



1-4 GHz Radiated Emissions

Setup Photos



4-18 GHz Radiated Emissions

Setup Photos



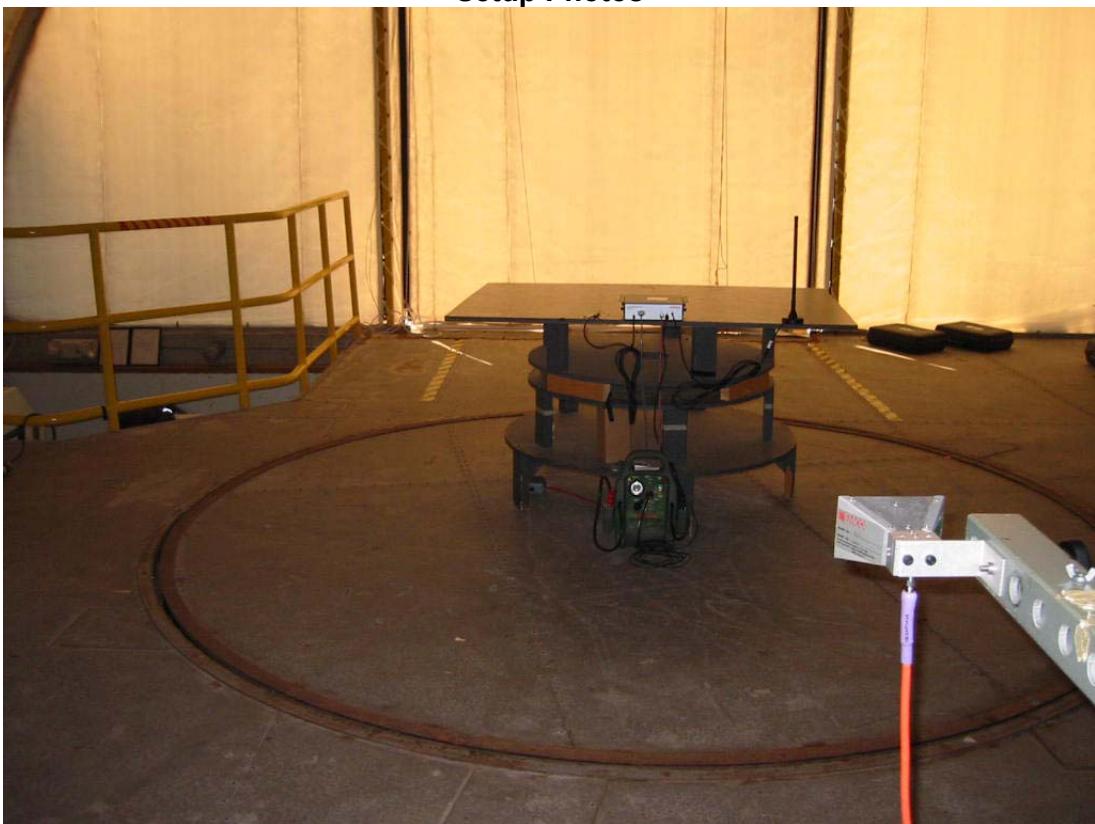
4-18 GHz Radiated Emissions

Setup Photos



18-25 GHz Radiated Emissions

Setup Photos



18-25 GHz Radiated Emissions