TEST REPORT

Test Report No.	**NC1305993.4**	Date of issue:	01 August 2013
Manufacturer	CalAmp WNG		
Address	299 Johnson Avenue – Suite 110		
	Waseca MN 56093		
Name of Equipment	VIPER SC+ 900 – 900 MHz Radio Modem		
Model No(s) Tested	1405098504		
Serial No(s) Tested	EP9442		
Test Result	■ **Compliant** ☐ **Non-compliant**		

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D I R E C T O R Y

Sign Explanations:
☐ - not applicable
■ - applicable

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	31	01 August 2013	Initial Release

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are accurate. The reader is cautioned that there is some measurement variability due to the tolerances of the test equipment that can contribute to a nominal product measurement uncertainty. Furthermore, component differences and manufacturing process variability of production units similar to that tested may result in additional product uncertainty. If necessary, refer to the test lab for the actual measurement uncertainty for specific tests.

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 23°C
Relative Humidity	: 66%
Atmospheric pressure	: 99 kPa

POWER SUPPLY UTILIZED

Power supply system	: 20 VDC

TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

FCC Part 90, Section 90.210 (c)(3), d)(3), (e)(3), g)(2), (j)(3)
FCC Part 22, Section 22.359
FCC Part 24, Section 24.133
FCC Part 101, Section 111

Radiated emission limits - Transmitter, FCC Part 90, Section 90.210, FCC Part 22.359, FCC Part 24.133, FCC Part 101.111

Test summary
The requirements are: ■ - MET ☐ - NOT MET

Test location
■ - Oakwood Lab (Open Area Test Site)

Test Distance
■ - 3 meters
☐ - 10 meters

Test equipment used:

TÜV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE03958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B 02-Jan-14
OWLE02074	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2504	07-Mar-14
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	13-Jan-14
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	13-Jan-14
WRLE03333	SME03	Rohde & Schwarz	Signal Generator	100003	29-Oct-13
OWLE02075	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	9001-3275	14-Feb-14
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	13-Jan-14
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	13-Jan-14
WRLE02681	85650A	Hewlett-Packard	Quasi-Peak Adapter	2430A00562	29-Jun-13
OWLE03202	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	02-Jul-13
OWLE02671	8447D	Hewlett-Packard	Preamplifier	2648A04942	Code B 07-Feb-14
WRLE03236	UHAP-10dB	Schwarzbeck	Dipole Antenna 300-1000	164	Code Y
WRLE03333	SME03	Rohde & Schwarz	Signal Generator	100003	29-Oct-13

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

Test Limit
-25 dBm eirp

Test Data
See following pages

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	1 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
Begin spurious emissions scan 1 - 9.6 GHz						
f0 = 943.95 MHz, 10 W						
maximized						
8.495 GHz	61.3 Pk	15.61 / 37.16 / 45.96 / 0.0	68.11	V / 1.63 / 175	-2.09	n/a
7.552 GHz	49.15 Pk	13.81 / 36.55 / 45.86 / 0.0	53.65	V / 1.63 / 175	-16.55	n/a
6.608 GHz	47.55 Pk	13.44 / 34.62 / 45.76 / 0.0	49.84	V / 1.63 / 175	-20.36	n/a
5.664 GHz	53.7 Pk	10.97 / 33.99 / 45.66 / 0.0	53.0	V / 1.63 / 175	-17.2	n/a
4.72 GHz	58.4 Pk	9.32 / 32.57 / 46.13 / 0.0	54.15	V / 1.63 / 175	-16.05	n/a
2.832 GHz	60.5 Pk	7.02 / 29.16 / 48.31 / 0.0	48.37	V / 1.63 / 175	-21.83	n/a
1.888 GHz	63.6 Pk	4.78 / 27.55 / 49.06 / 0.0	46.86	V / 1.63 / 175	-23.34	n/a
maximized						
4.72 GHz	69.45 Pk	9.32 / 32.57 / 46.13 / 0.0	65.2	V / 1.53 / 161	-5.0	n/a
1.888 GHz	68.55 Pk	4.78 / 27.55 / 49.06 / 0.0	51.81	V / 1.53 / 161	-18.39	n/a
6.608 GHz	49.1 Pk	13.44 / 34.62 / 45.76 / 0.0	51.39	V / 1.53 / 161	-18.81	n/a
1.1 GHz	57.2 Pk	3.27 / 25.5 / 50.52 / 0.0	35.45	V / 1.00 / 0	-34.75	n/a
1.15 GHz	67.7 Pk	3.36 / 25.7 / 50.42 / 0.0	46.33	V / 1.00 / 0	-23.87	n/a
1.198 GHz	65.3 Pk	3.44 / 25.89 / 50.33 / 0.0	44.3	V / 1.00 / 0	-25.9	n/a
1.25 GHz	65.6 Pk	3.53 / 25.8 / 50.24 / 0.0	44.7	V / 1.00 / 0	-25.5	n/a
1.3 GHz	63.3 Pk	3.62 / 25.7 / 50.15 / 0.0	42.48	V / 1.00 / 0	-27.72	n/a
1.346 GHz	58.55 Pk	3.7 / 25.61 / 50.06 / 0.0	37.8	V / 1.00 / 0	-32.4	n/a
1.45 GHz	60.55 Pk	3.9 / 25.63 / 49.87 / 0.0	40.21	V / 1.00 / 0	-29.99	n/a
1.5 GHz	61.65 Pk	4.0 / 25.75 / 49.78 / 0.0	41.62	V / 1.00 / 0	-28.58	n/a
1.55 GHz	55.7 Pk	4.1 / 25.87 / 49.68 / 0.0	35.99	V / 1.00 / 0	-34.21	n/a
1.396 GHz	65.05 Pk	3.79 / 25.51 / 49.97 / 0.0	44.38	V / 1.00 / 0	-25.82	n/a
3.776 GHz	55.8 Pk	8.32 / 32.03 / 47.08 / 0.0	49.07	V / 1.00 / 0	-21.13	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	2 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
1.1 GHz	59.3 Pk	3.27 / 25.5 / 50.52 / 0.0	37.55	V / 1.00 / 180	-32.65	n/a
1.15 GHz	68.85 Pk	3.36 / 25.7 / 50.42 / 0.0	47.48	V / 1.00 / 180	-22.72	n/a
1.3 GHz	65.25 Pk	3.62 / 25.7 / 50.15 / 0.0	44.43	V / 1.00 / 180	-25.77	n/a
1.346 GHz	63.3 Pk	3.7 / 25.61 / 50.06 / 0.0	42.55	V / 1.00 / 180	-27.65	n/a
1.888 GHz	75.05 Pk	4.78 / 27.55 / 49.06 / 0.0	58.31	V / 1.00 / 180	-11.89	n/a
2.832 GHz	61.35 Pk	7.02 / 29.16 / 48.31 / 0.0	49.22	V / 1.00 / 180	-20.98	n/a
5.664 GHz	54.65 Pk	10.97 / 33.99 / 45.66 / 0.0	53.95	V / 1.80 / 180	-16.25	n/a
1.25 GHz	66.45 Pk	3.53 / 25.8 / 50.24 / 0.0	45.55	V / 1.80 / 0	-24.65	n/a
1.55 GHz	58.0 Pk	4.1 / 25.87 / 49.68 / 0.0	38.29	H / 1.00 / 90	-31.91	n/a
1.346 GHz	66.45 Pk	3.7 / 25.61 / 50.06 / 0.0	45.7	H / 1.00 / 180	-24.5	n/a
maximized						
1.888 GHz	75.05 Pk	4.78 / 27.55 / 49.06 / 0.0	58.31	V / 1.00 / 180	-11.89	n/a
bore sight						
3.776 GHz	59.45 Pk	8.32 / 32.03 / 47.08 / 0.0	52.72	V / 2.50 / 180	-17.48	n/a
5.664 GHz	58.75 Pk	10.97 / 33.99 / 45.66 / 0.0	58.05	V / 2.50 / 180	-12.15	n/a
absorbers down						
no higher emissions detected						
f0 = 943.95 MHz, 1 W						
no higher emissions detected						
f0 = 928.05 MHz, 10 W						
1.856 GHz	71.45 Pk	4.71 / 27.4 / 49.12 / 0.0	54.45	V / 1.00 / 0	-15.75	n/a
2.784 GHz	58.0 Pk	6.89 / 29.03 / 48.37 / 0.0	45.55	V / 1.00 / 0	-24.65	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	3 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
3.712 GHz	59.6 Pk	8.25 / 31.84 / 47.16 / 0.0	52.53	V / 1.00 / 0	-17.67	n/a
3.712 GHz	59.8 Pk	8.25 / 31.84 / 47.16 / 0.0	52.73	V / 1.00 / 0	-17.47	n/a
4.64 GHz	60.95 Pk	9.23 / 32.47 / 46.24 / 0.0	56.4	V / 1.00 / 0	-13.8	n/a
5.568 GHz	56.8 Pk	10.8 / 34.05 / 45.65 / 0.0	56.0	V / 1.00 / 0	-14.2	n/a
6.496 GHz	48.2 Pk	13.39 / 34.4 / 45.75 / 0.0	50.25	V / 1.00 / 0	-19.95	n/a
7.424 GHz	43.75 Pk	13.76 / 36.59 / 45.85 / 0.0	48.25	V / 1.00 / 0	-21.95	n/a
8.352 GHz	49.0 Pk	14.83 / 37.04 / 45.95 / 0.0	54.93	V / 1.00 / 0	-15.27	n/a
9.28 GHz	44.4 Pk	15.98 / 37.38 / 46.05 / 0.0	51.71	V / 1.00 / 0	-18.49	n/a
2.784 GHz	59.85 Pk	6.89 / 29.03 / 48.37 / 0.0	47.4	V / 1.00 / 90	-22.8	n/a
1.856 GHz	73.9 Pk	4.71 / 27.4 / 49.12 / 0.0	56.9	V / 1.00 / 180	-13.3	n/a
2.784 GHz	61.0 Pk	6.89 / 29.03 / 48.37 / 0.0	48.55	V / 1.00 / 180	-21.65	n/a
4.64 GHz	66.45 Pk	9.23 / 32.47 / 46.24 / 0.0	61.9	V / 1.00 / 180	-8.3	n/a
6.496 GHz	50.65 Pk	13.39 / 34.4 / 45.75 / 0.0	52.7	V / 1.00 / 180	-17.5	n/a
7.424 GHz	45.35 Pk	13.76 / 36.59 / 45.85 / 0.0	49.85	V / 1.00 / 180	-20.35	n/a
8.352 GHz	51.05 Pk	14.83 / 37.04 / 45.95 / 0.0	56.98	V / 1.00 / 180	-13.22	n/a
maximized						
4.64 GHz	70.95 Pk	9.23 / 32.47 / 46.24 / 0.0	66.4	V / 1.58 / 160	-3.8	n/a
8.352 GHz	52.25 Pk	14.83 / 37.04 / 45.95 / 0.0	58.18	V / 1.63 / 166	-12.02	n/a
f0 = 928.05 MHz, 1 W						
no higher emissions detected						
f0 = 959.95 MHz, 10 W						
1.92 GHz	71.35 Pk	4.84 / 27.62 / 49.0 / 0.0	54.81	V / 1.00 / 0	-15.39	n/a
2.88 GHz	51.7 Pk	7.16 / 29.4 / 48.25 / 0.0	40.01	V / 1.00 / 0	-30.19	n/a
3.84 GHz	64.2 Pk	8.39 / 32.22 / 47.0 / 0.0	57.81	V / 1.00 / 0	-12.39	n/a
4.8 GHz	53.5 Pk	9.4 / 32.67 / 46.02 / 0.0	49.55	V / 1.00 / 0	-20.65	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	4 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
5.76 GHz	49.0 Pk	11.14 / 33.93 / 45.67 / 0.0	48.4	V / 1.00 / 0	-21.8	n/a
5.76 GHz	47.9 Pk	11.14 / 33.93 / 45.67 / 0.0	47.3	V / 1.00 / 0	-22.9	n/a
5.76 GHz	49.4 Pk	11.14 / 33.93 / 45.67 / 0.0	48.8	V / 1.00 / 0	-21.4	n/a
6.72 GHz	43.95 Pk	13.48 / 34.84 / 45.77 / 0.0	46.5	V / 1.00 / 0	-23.7	n/a
7.68 GHz	51.0 Pk	13.86 / 36.51 / 45.87 / 0.0	55.49	V / 1.00 / 0	-14.71	n/a
8.64 GHz	46.05 Pk	15.78 / 37.28 / 45.98 / 0.0	53.14	V / 1.00 / 0	-17.06	n/a
9.599 GHz	46.3 Pk	15.72 / 37.43 / 46.08 / 0.0	53.37	V / 1.00 / 0	-16.83	n/a
2.88 GHz	55.45 Pk	7.16 / 29.4 / 48.25 / 0.0	43.76	V / 1.00 / 90	-26.44	n/a
3.84 GHz	66.45 Pk	8.39 / 32.22 / 47.0 / 0.0	60.06	V / 1.00 / 90	-10.14	n/a
1.92 GHz	73.45 Pk	4.84 / 27.62 / 49.0 / 0.0	56.91	V / 1.00 / 180	-13.29	n/a
4.8 GHz	58.75 Pk	9.4 / 32.67 / 46.02 / 0.0	54.8	V / 1.00 / 180	-15.4	n/a
5.76 GHz	50.7 Pk	11.14 / 33.93 / 45.67 / 0.0	50.1	V / 1.00 / 180	-20.1	n/a
8.639 GHz	50.7 Pk	15.78 / 37.28 / 45.98 / 0.0	57.79	V / 1.00 / 180	-12.41	n/a
9.599 GHz	57.75 Pk	15.72 / 37.43 / 46.08 / 0.0	64.82	V / 1.00 / 180	-5.38	n/a
4.8 GHz	62.4 Pk	9.4 / 32.67 / 46.02 / 0.0	58.45	V / 1.80 / 270	-11.75	n/a
5.76 GHz	52.95 Pk	11.14 / 33.93 / 45.67 / 0.0	52.35	V / 1.80 / 270	-17.85	n/a
3.84 GHz	70.55 Pk	8.39 / 32.22 / 47.0 / 0.0	64.16	V / 1.80 / 180	-6.04	n/a
6.72 GHz	47.2 Pk	13.48 / 34.84 / 45.77 / 0.0	49.75	V / 1.80 / 180	-20.45	n/a
7.68 GHz	56.6 Pk	13.86 / 36.51 / 45.87 / 0.0	61.09	V / 1.80 / 180	-9.11	n/a
4.8 GHz	67.2 Pk	9.4 / 32.67 / 46.02 / 0.0	63.25	V / 1.80 / 0	-6.95	n/a
maximized						
3.84 GHz	73.45 Pk	8.39 / 32.22 / 47.0 / 0.0	67.06	V / 1.80 / 0	-3.14	n/a
4.8 GHz	67.2 Pk	9.4 / 32.67 / 46.02 / 0.0	63.25	V / 1.61 / 0	-6.95	n/a
9.599 GHz	58.2 Pk	15.72 / 37.43 / 46.08 / 0.0	65.27	V / 1.25 / 148	-4.93	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	5 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
f0 = 959.95 MHz, 1 W						
no higher emissions detected						
f0 = 952.95 MHz, 10 W						
1.906 GHz	70.85 Pk	4.81 / 27.61 / 49.03 / 0.0	54.24	V / 1.00 / 0	-15.96	n/a
2.859 GHz	64.45 Pk	7.1 / 29.29 / 48.28 / 0.0	52.57	V / 1.00 / 0	-17.63	n/a
3.812 GHz	59.1 Pk	8.36 / 32.14 / 47.03 / 0.0	52.56	V / 1.00 / 0	-17.64	n/a
4.765 GHz	57.9 Pk	9.36 / 32.63 / 46.07 / 0.0	53.82	V / 1.00 / 0	-16.38	n/a
5.718 GHz	54.45 Pk	11.07 / 33.95 / 45.67 / 0.0	53.81	V / 1.00 / 0	-16.39	n/a
6.671 GHz	47.55 Pk	13.46 / 34.74 / 45.77 / 0.0	49.99	V / 1.00 / 0	-20.21	n/a
7.624 GHz	50.05 Pk	13.84 / 36.53 / 45.87 / 0.0	54.54	V / 1.00 / 0	-15.66	n/a
8.577 GHz	47.6 Pk	15.71 / 37.23 / 45.97 / 0.0	54.57	V / 1.00 / 0	-15.63	n/a
9.529 GHz	47.25 Pk	15.78 / 37.46 / 46.07 / 0.0	54.41	V / 1.00 / 0	-15.79	n/a
2.859 GHz	66.8 Pk	7.1 / 29.29 / 48.28 / 0.0	54.92	V / 1.00 / 90	-15.28	n/a
3.812 GHz	64.5 Pk	8.36 / 32.14 / 47.03 / 0.0	57.96	V / 1.00 / 90	-12.24	n/a
1.906 GHz	78.15 Pk	4.81 / 27.61 / 49.03 / 0.0	61.54	V / 1.00 / 180	-8.66	n/a
8.576 GHz	51.3 Pk	15.71 / 37.23 / 45.97 / 0.0	58.27	V / 1.00 / 180	-11.93	n/a
9.529 GHz	48.3 Pk	15.78 / 37.46 / 46.07 / 0.0	55.46	V / 1.00 / 180	-14.74	n/a
3.812 GHz	66.55 Pk	8.36 / 32.14 / 47.03 / 0.0	60.01	V / 1.80 / 180	-10.19	n/a
7.624 GHz	50.95 Pk	13.84 / 36.53 / 45.87 / 0.0	55.44	V / 1.80 / 180	-14.76	n/a
4.765 GHz	62.7 Pk	9.36 / 32.63 / 46.07 / 0.0	58.62	V / 1.80 / 0	-11.58	n/a
maximized						
1.906 GHz	80.65 Pk	4.81 / 27.61 / 49.03 / 0.0	64.04	V / 1.00 / 175	-6.16	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	6 of 9

List of measurements for run #: 11

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
bore sight						
no higher emissions detected						
absorbers down						
no higher emissions detected						
f0 = 952.95 MHz, 1 W						
no higher emissions detected						
(sample substitution on run 1)						
End scan 1 - 9.6 GHz						

Tested by: Greg Jakubowski (Printed) — (Signature)

Reviewed by: Joel T Schneider (Printed) — (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	7 of 9

Measurement summary for limit1: -25 dBm eirp (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp
8.495 GHz	61.3 Pk	15.61 / 37.16 / 45.96 / 0.0	68.11	V / 1.63 / 175	-2.09
3.84 GHz	73.45 Pk	8.39 / 32.22 / 47.0 / 0.0	67.06	V / 1.80 / 0	-3.14
4.64 GHz	70.95 Pk	9.23 / 32.47 / 46.24 / 0.0	66.4	V / 1.58 / 160	-3.8
9.599 GHz	58.2 Pk	15.72 / 37.43 / 46.08 / 0.0	65.27	V / 1.25 / 148	-4.93
4.72 GHz	69.45 Pk	9.32 / 32.57 / 46.13 / 0.0	65.2	V / 1.53 / 161	-5.0
1.906 GHz	80.65 Pk	4.81 / 27.61 / 49.03 / 0.0	64.04	V / 1.00 / 175	-6.16
4.8 GHz	67.2 Pk	9.4 / 32.67 / 46.02 / 0.0	63.25	V / 1.80 / 0	-6.95
7.68 GHz	56.6 Pk	13.86 / 36.51 / 45.87 / 0.0	61.09	V / 1.80 / 180	-9.11
3.812 GHz	66.55 Pk	8.36 / 32.14 / 47.03 / 0.0	60.01	V / 1.80 / 180	-10.19
4.765 GHz	62.7 Pk	9.36 / 32.63 / 46.07 / 0.0	58.62	V / 1.80 / 0	-11.58
1.888 GHz	75.05 Pk	4.78 / 27.55 / 49.06 / 0.0	58.31	V / 1.00 / 180	-11.89
8.576 GHz	51.3 Pk	15.71 / 37.23 / 45.97 / 0.0	58.27	V / 1.00 / 180	-11.93
8.352 GHz	52.25 Pk	14.83 / 37.04 / 45.95 / 0.0	58.18	V / 1.63 / 166	-12.02
5.664 GHz	58.75 Pk	10.97 / 33.99 / 45.66 / 0.0	58.05	V / 2.50 / 180	-12.15
8.639 GHz	50.7 Pk	15.78 / 37.28 / 45.98 / 0.0	57.79	V / 1.00 / 180	-12.41
1.92 GHz	73.45 Pk	4.84 / 27.62 / 49.0 / 0.0	56.91	V / 1.00 / 180	-13.29
1.856 GHz	73.9 Pk	4.71 / 27.4 / 49.12 / 0.0	56.9	V / 1.00 / 180	-13.3
5.568 GHz	56.8 Pk	10.8 / 34.05 / 45.65 / 0.0	56.0	V / 1.00 / 0	-14.2
9.529 GHz	48.3 Pk	15.78 / 37.46 / 46.07 / 0.0	55.46	V / 1.00 / 180	-14.74
7.624 GHz	50.95 Pk	13.84 / 36.53 / 45.87 / 0.0	55.44	V / 1.80 / 180	-14.76
2.859 GHz	66.8 Pk	7.1 / 29.29 / 48.28 / 0.0	54.92	V / 1.00 / 90	-15.28
5.718 GHz	54.45 Pk	11.07 / 33.95 / 45.67 / 0.0	53.81	V / 1.00 / 0	-16.39
7.552 GHz	49.15 Pk	13.81 / 36.55 / 45.86 / 0.0	53.65	V / 1.63 / 175	-16.55
3.712 GHz	59.8 Pk	8.25 / 31.84 / 47.16 / 0.0	52.73	V / 1.00 / 0	-17.47
3.776 GHz	59.45 Pk	8.32 / 32.03 / 47.08 / 0.0	52.72	V / 2.50 / 180	-17.48
6.496 GHz	50.65 Pk	13.39 / 34.4 / 45.75 / 0.0	52.7	V / 1.00 / 180	-17.5
5.76 GHz	52.95 Pk	11.14 / 33.93 / 45.67 / 0.0	52.35	V / 1.80 / 270	-17.85
9.28 GHz	44.4 Pk	15.98 / 37.38 / 46.05 / 0.0	51.71	V / 1.00 / 0	-18.49
6.608 GHz	49.1 Pk	13.44 / 34.62 / 45.76 / 0.0	51.39	V / 1.53 / 161	-18.81

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	8 of 9

Measurement summary for limit1: -25 dBm eirp (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp
6.671 GHz	47.55 Pk	13.46 / 34.74 / 45.77 / 0.0	49.99	V / 1.00 / 0	-20.21
7.424 GHz	45.35 Pk	13.76 / 36.59 / 45.85 / 0.0	49.85	V / 1.00 / 180	-20.35
6.72 GHz	47.2 Pk	13.48 / 34.84 / 45.77 / 0.0	49.75	V / 1.80 / 180	-20.45
2.832 GHz	61.35 Pk	7.02 / 29.16 / 48.31 / 0.0	49.22	V / 1.00 / 180	-20.98
2.784 GHz	61.0 Pk	6.89 / 29.03 / 48.37 / 0.0	48.55	V / 1.00 / 180	-21.65
1.15 GHz	68.85 Pk	3.36 / 25.7 / 50.42 / 0.0	47.48	V / 1.00 / 180	-22.72
1.346 GHz	66.45 Pk	3.7 / 25.61 / 50.06 / 0.0	45.7	H / 1.00 / 180	-24.5
1.25 GHz	66.45 Pk	3.53 / 25.8 / 50.24 / 0.0	45.55	V / 1.80 / 0	-24.65
1.3 GHz	65.25 Pk	3.62 / 25.7 / 50.15 / 0.0	44.43	V / 1.00 / 180	-25.77
1.396 GHz	65.05 Pk	3.79 / 25.51 / 49.97 / 0.0	44.38	V / 1.00 / 0	-25.82
1.198 GHz	65.3 Pk	3.44 / 25.89 / 50.33 / 0.0	44.3	V / 1.00 / 0	-25.9
2.88 GHz	55.45 Pk	7.16 / 29.4 / 48.25 / 0.0	43.76	V / 1.00 / 90	-26.44
1.5 GHz	61.65 Pk	4.0 / 25.75 / 49.78 / 0.0	41.62	V / 1.00 / 0	-28.58
1.45 GHz	60.55 Pk	3.9 / 25.63 / 49.87 / 0.0	40.21	V / 1.00 / 0	-29.99
1.55 GHz	58.0 Pk	4.1 / 25.87 / 49.68 / 0.0	38.29	H / 1.00 / 90	-31.91
1.1 GHz	59.3 Pk	3.27 / 25.5 / 50.52 / 0.0	37.55	V / 1.00 / 180	-32.65

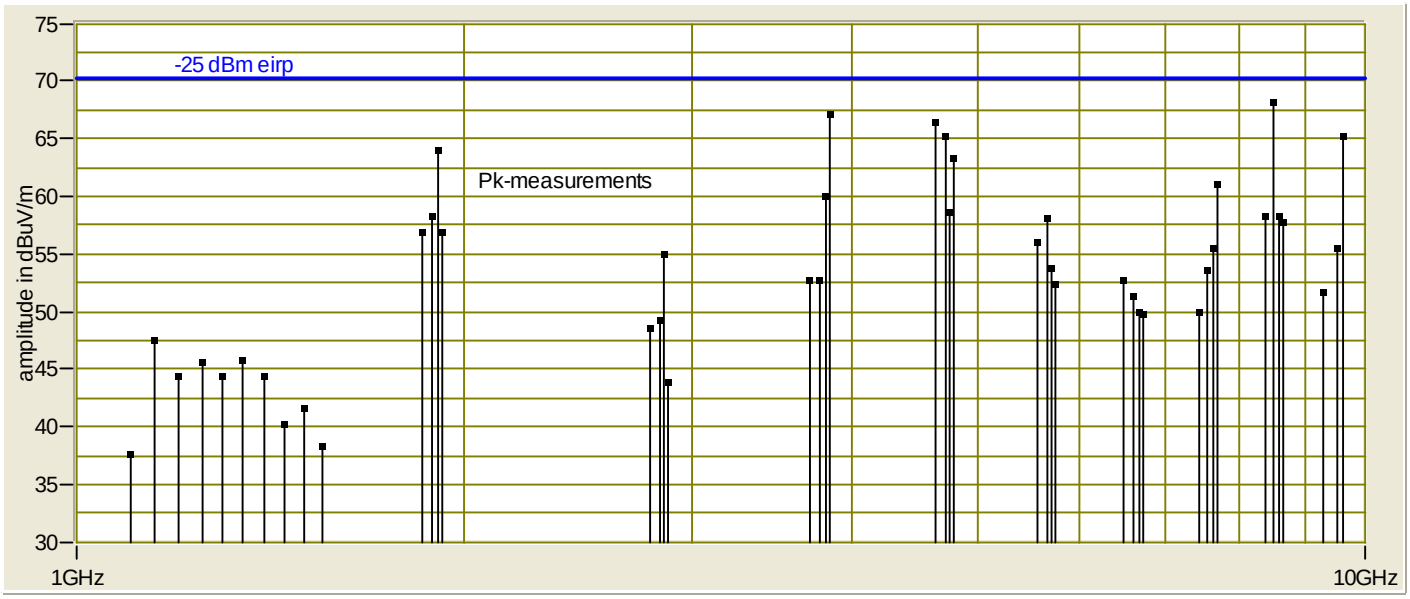
Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 11	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into a 50 ohm load.				
Data File Name:	5993.dat			Page:	9 of 9

Graph:



Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 12	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into 50 ohm load				
Data File Name:	5993.dat			Page:	1 of 4

List of measurements for run #: 12

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
Begin transmitter spurious emissions scan, 30 - 1000 MHz						
f0 = 928.05 MHz, 10 W						
125.0 MHz	35.0 Pk	0.82 / 8.51 / 24.23 / 0.0	20.09	V / 1.00 / 0	-50.11	n/a
150.0 MHz	37.0 Pk	0.91 / 9.71 / 24.33 / 0.0	23.3	V / 1.00 / 0	-46.9	n/a
175.0 MHz	36.6 Pk	1.01 / 9.37 / 24.4 / 0.0	22.58	V / 1.00 / 0	-47.62	n/a
177.786 MHz	36.25 Pk	1.02 / 9.64 / 24.4 / 0.0	22.5	V / 1.00 / 0	-47.7	n/a
200.0 MHz	43.25 Pk	1.1 / 10.61 / 24.37 / 0.0	30.58	V / 1.00 / 0	-39.62	n/a
225.0 MHz	36.9 Pk	1.19 / 11.12 / 24.3 / 0.0	24.91	V / 1.00 / 0	-45.29	n/a
240.004 MHz	36.1 Pk	1.24 / 11.66 / 24.3 / 0.0	24.71	V / 1.00 / 0	-45.49	n/a
250.0 MHz	38.45 Pk	1.28 / 12.02 / 24.3 / 0.0	27.45	V / 1.00 / 0	-42.75	n/a
275.0 MHz	37.45 Pk	1.37 / 12.4 / 24.3 / 0.0	26.92	V / 1.00 / 0	-43.28	n/a
299.36 MHz	38.1 Pk	1.46 / 13.17 / 24.3 / 0.0	28.43	V / 1.00 / 0	-41.77	n/a
300.004 MHz	38.2 Pk	1.47 / 13.19 / 24.3 / 0.0	28.56	V / 1.00 / 0	-41.64	n/a
375.0 MHz	35.15 Pk	1.74 / 15.35 / 24.3 / 0.0	27.94	V / 1.00 / 0	-42.26	n/a
500.0 MHz	34.1 Pk	2.2 / 17.4 / 24.22 / 0.0	29.48	V / 1.00 / 0	-40.72	n/a
550.0 MHz	33.7 Pk	2.29 / 18.1 / 24.13 / 0.0	29.96	V / 1.00 / 0	-40.24	n/a
650.0 MHz	35.5 Pk	2.47 / 19.6 / 24.23 / 0.0	33.34	V / 1.00 / 0	-36.86	n/a
177.786 MHz	38.1 Pk	1.02 / 9.64 / 24.4 / 0.0	24.35	V / 1.00 / 90	-45.85	n/a
199.49 MHz	32.4 Pk	1.1 / 10.63 / 24.37 / 0.0	19.75	V / 1.00 / 90	-50.45	n/a
199.49 MHz	39.55 Pk	1.1 / 10.63 / 24.37 / 0.0	26.9	V / 1.00 / 90	-43.3	n/a
225.0 MHz	40.65 Pk	1.19 / 11.12 / 24.3 / 0.0	28.66	V / 1.00 / 90	-41.54	n/a
240.004 MHz	38.65 Pk	1.24 / 11.66 / 24.3 / 0.0	27.26	V / 1.00 / 90	-42.94	n/a
250.0 MHz	43.25 Pk	1.28 / 12.02 / 24.3 / 0.0	32.25	V / 1.00 / 90	-37.95	n/a
125.0 MHz	40.6 Pk	0.82 / 8.51 / 24.23 / 0.0	25.69	V / 1.00 / 180	-44.51	n/a
175.0 MHz	39.3 Pk	1.01 / 9.37 / 24.4 / 0.0	25.28	V / 1.00 / 270	-44.92	n/a
199.49 MHz	41.9 Pk	1.1 / 10.63 / 24.37 / 0.0	29.25	V / 1.00 / 270	-40.95	n/a
240.004 MHz	41.85 Pk	1.24 / 11.66 / 24.3 / 0.0	30.46	V / 1.00 / 270	-39.74	n/a

Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 12	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into 50 ohm load				
Data File Name:	5993.dat			Page:	2 of 4

List of measurements for run #: 12

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp	DELTA2
225.0 MHz	44.15 Pk	1.19 / 11.12 / 24.3 / 0.0	32.16	H / 1.00 / 90	-38.04	n/a
240.004 MHz	44.0 Pk	1.24 / 11.66 / 24.3 / 0.0	32.61	H / 1.00 / 90	-37.59	n/a
250.0 MHz	45.95 Pk	1.28 / 12.02 / 24.3 / 0.0	34.95	H / 1.00 / 90	-35.25	n/a
275.0 MHz	40.4 Pk	1.37 / 12.4 / 24.3 / 0.0	29.87	H / 1.00 / 90	-40.33	n/a
299.36 MHz	41.4 Pk	1.46 / 13.17 / 24.3 / 0.0	31.73	H / 1.00 / 90	-38.47	n/a
300.004 MHz	40.5 Pk	1.47 / 13.19 / 24.3 / 0.0	30.86	H / 1.00 / 90	-39.34	n/a
225.0 MHz	45.9 Pk	1.19 / 11.12 / 24.3 / 0.0	33.91	H / 1.00 / 270	-36.29	n/a
240.004 MHz	47.3 Pk	1.24 / 11.66 / 24.3 / 0.0	35.91	H / 1.00 / 270	-34.29	n/a
250.0 MHz	47.05 Pk	1.28 / 12.02 / 24.3 / 0.0	36.05	H / 1.00 / 270	-34.15	n/a
275.0 MHz	44.8 Pk	1.37 / 12.4 / 24.3 / 0.0	34.27	H / 1.00 / 270	-35.93	n/a
299.36 MHz	44.65 Pk	1.46 / 13.17 / 24.3 / 0.0	34.98	H / 1.00 / 270	-35.22	n/a
300.004 MHz	43.6 Pk	1.47 / 13.19 / 24.3 / 0.0	33.96	H / 1.00 / 270	-36.24	n/a
500.0 MHz	35.6 Pk	2.2 / 17.4 / 24.22 / 0.0	30.98	H / 1.80 / 0	-39.22	n/a

f0 = 928.05 MHz, 1 W
No higher emissions detected
F0 set for 943.95, 952.95, 959.95 MHz at both 10 & 1 W
No new or higher emissions detected

Sample substitution measurement at 250 MHz
Matching 47.1 dBuV at spectrum analyzer input
Signal generator level = -51.9 dBm
Coax attenuation = 2.1 dB
Substitution antenna gain = -6.2 dBi
-51.9 dBm - 2.1 dB + -6.2 dBi = -60.2 dBm eirp
Limit = -25 dBm eirp

Tested by: Greg Jakubowski — Printed — Signature

Reviewed by: Joel T Schneider — Printed — Signature

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 12	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into 50 ohm load				
Data File Name:	5993.dat			Page:	3 of 4

Measurement summary for limit1: -25 dBm eirp (Pk)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 -25 dBm eirp
250.0 MHz	47.05 Pk	1.28 / 12.02 / 24.3 / 0.0	36.05	H / 1.00 / 270	-34.15
240.004 MHz	47.3 Pk	1.24 / 11.66 / 24.3 / 0.0	35.91	H / 1.00 / 270	-34.29
299.36 MHz	44.65 Pk	1.46 / 13.17 / 24.3 / 0.0	34.98	H / 1.00 / 270	-35.22
275.0 MHz	44.8 Pk	1.37 / 12.4 / 24.3 / 0.0	34.27	H / 1.00 / 270	-35.93
300.004 MHz	43.6 Pk	1.47 / 13.19 / 24.3 / 0.0	33.96	H / 1.00 / 270	-36.24
225.0 MHz	45.9 Pk	1.19 / 11.12 / 24.3 / 0.0	33.91	H / 1.00 / 270	-36.29
650.0 MHz	35.5 Pk	2.47 / 19.6 / 24.23 / 0.0	33.34	V / 1.00 / 0	-36.86
500.0 MHz	35.6 Pk	2.2 / 17.4 / 24.22 / 0.0	30.98	H / 1.80 / 0	-39.22
200.0 MHz	43.25 Pk	1.1 / 10.61 / 24.37 / 0.0	30.58	V / 1.00 / 0	-39.62
550.0 MHz	33.7 Pk	2.29 / 18.1 / 24.13 / 0.0	29.96	V / 1.00 / 0	-40.24
199.49 MHz	41.9 Pk	1.1 / 10.63 / 24.37 / 0.0	29.25	V / 1.00 / 270	-40.95
375.0 MHz	35.15 Pk	1.74 / 15.35 / 24.3 / 0.0	27.94	V / 1.00 / 0	-42.26
125.0 MHz	40.6 Pk	0.82 / 8.51 / 24.23 / 0.0	25.69	V / 1.00 / 180	-44.51
175.0 MHz	39.3 Pk	1.01 / 9.37 / 24.4 / 0.0	25.28	V / 1.00 / 270	-44.92
177.786 MHz	38.1 Pk	1.02 / 9.64 / 24.4 / 0.0	24.35	V / 1.00 / 90	-45.85
150.0 MHz	37.0 Pk	0.91 / 9.71 / 24.33 / 0.0	23.3	V / 1.00 / 0	-46.9

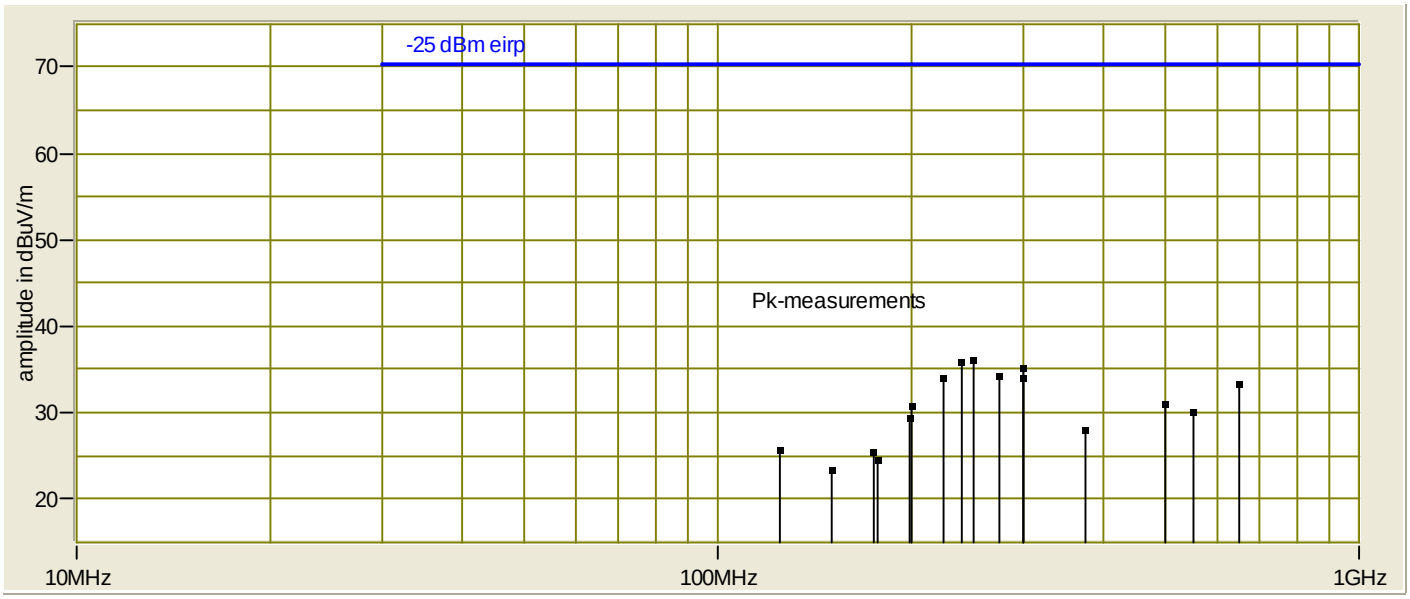
Tested by: Greg Jakubowski (Printed) — G Jakubowski (Signature)

Reviewed by: Joel T Schneider (Printed) — Joel T. Schneider (Signature)

RADIATED EMISSIONS

Test Report #:	NC1305993 Run 12	Test Area:	OW		
EUT Model #:	1405098504	Date:	6/20/2013		
EUT Serial #:	EP9442	EUT Power:	20.0 Vdc	Temperature:	23.0 °C
Test Method:	FCC			Air Pressure:	99.0 kPa
Customer:	CalAmp WNG			Rel. Humidity:	66.0 %
EUT Description:	Viper SC+ 900 VHF 928-960 MHz Radio Modem				
Notes:	DUT antenna port terminated into 50 ohm load				
Data File Name:	5993.dat			Page:	4 of 4

Graph:

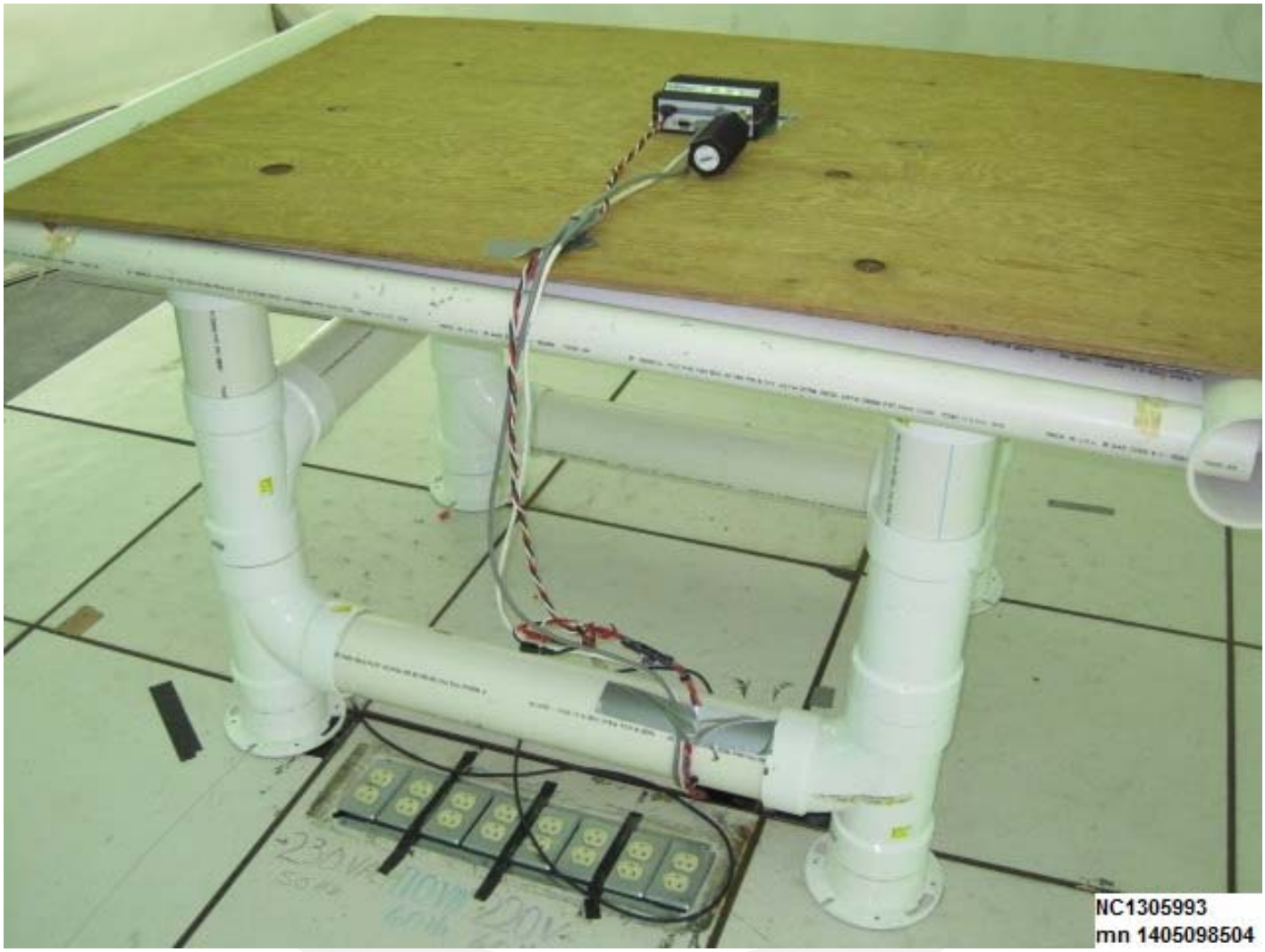


Tested by: Greg Jakubowski (Printed) _____ (Signature)

Reviewed by: Joel T Schneider (Printed) _____ (Signature)

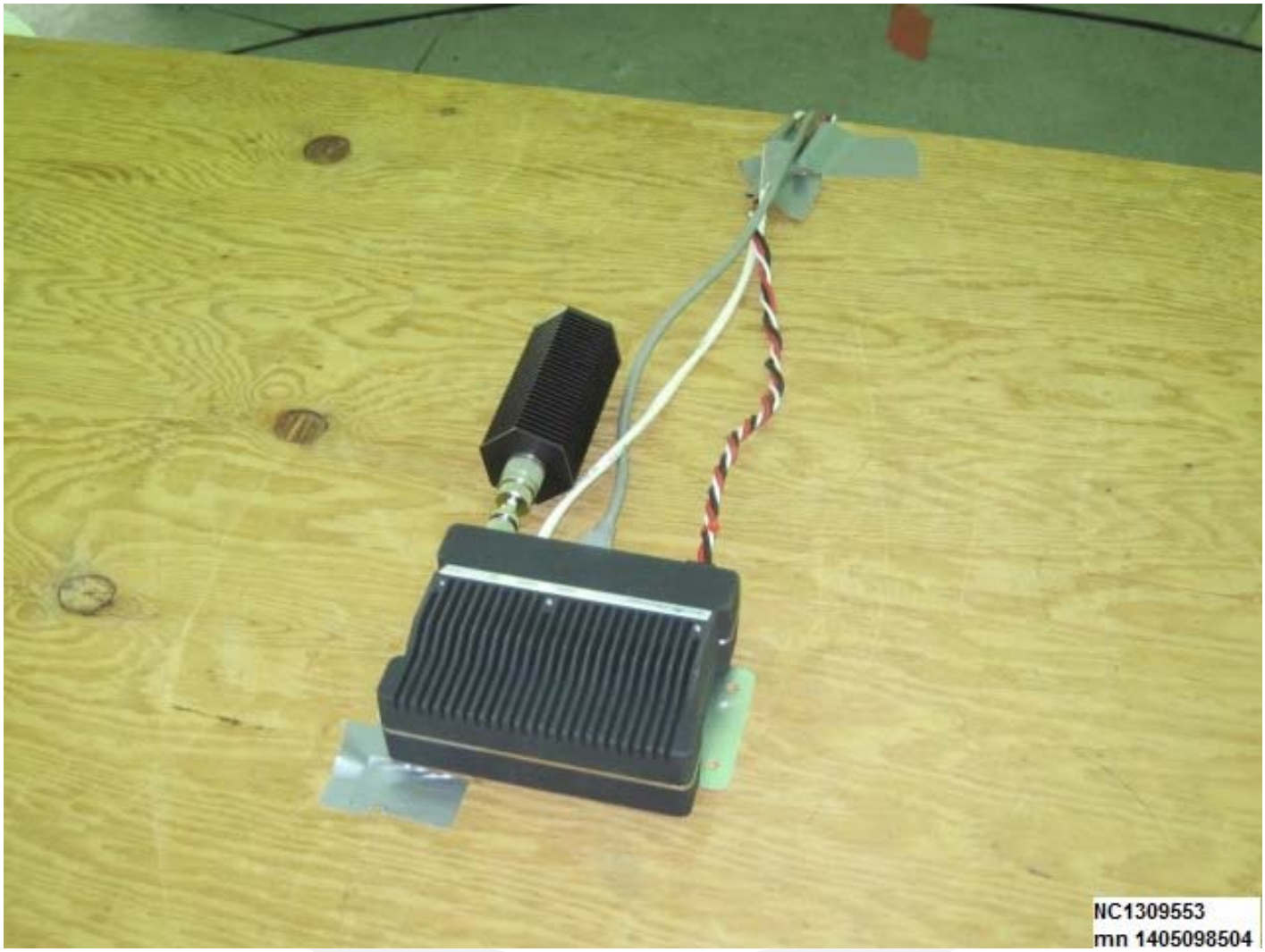
Test Setup Photo

Radiated emissions



Test Setup Photo

Radiated emissions



Test Setup Photo
Radiated emissions

DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

Modifications required to pass:

■ None
☐ As indicated in the Test Plan

Test Specification Deviations: Additions to or Exclusions from:

■ None
☐ As indicated in the Test Plan

SUMMARY:

The requirements according to the technical regulations are

■ - met
☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.
☐ - **not** fulfill the general approval requirements mentioned on page 3.

EUT Received Date:	17 June 2013
Condition of EUT:	Normal
Testing Start Date:	20 June 2013
Testing End Date:	20 June 2013

- TÜV SÜD AMERICA INC -

Greg S Jakubowski
Senior EMC Technician

Joel T Schneider
Senior EMC Engineer

Appendix A

Constructional Data Form

and

Block Diagram

Form

EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.
NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.

Company:	CalAmp WNG		
Address:	299 Johnson Ave Suite 110		
	Waseca, MN 56093		
Contact:	Bill Junge	Position:	RF Engineering Technologist
Phone:	507-833-6733	Fax:	507-833-6758
E-mail Address:	bjunge@calamp.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	900 MHz Radio Modem		
EUT Name	VIPER SC+ 900, 928-960MHZ		
Model No.:	1405098504	Serial No.:	TBD
Product Options:	None		
Configurations to be tested:	Power Supply @ 20.0 Vdc, RS232 connected to laptop, Antenna port 50 ohm load.		

Equipment Modification (*If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)*

Modifications since last test:

Modifications made during test:

Test Objective(s): ***Please indicate the tests to be performed, entering the applicable standard(s) where noted.***

- ☐ EMC Directive 2004/108/EC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC) Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive - 2004/104/EC (EMC)
  - ☐ Other Vehicle Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☒ FCC: Class ☒ A ☐ B Part
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B (Separate Report)
- ☒ Canada: Class ☒ A ☐ B
- ☐ Australia: Class ☐ A ☐ B

FCC Parts 15 Subpart B receive mode radiated emissions.
FCC Parts 22, 24, 90 and 101 transmitter mode radiated emissions.
IC RSS119 transmitter mode radiated emissions.
IC RSS-Gen receive mode radiated emissions.

- ☐ Other:
- ☐ Ag Directive *2009/64/EC (EMC)

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Third Party Certification (contact TÜV for quote), if applicable (*Signature on last page required).	
☐ Attestation of Compliance (AoC)*	☐ EMC Certification (used with Octagon Mark)*
☐ Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed	
Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III (Press **F1** when field is selected to show additional information on Protection Class.)	
☐ FCC / TCB Certification	☐ Taiwan Certification
☐ Industry Canada / FCB Certification	☐ Korean Certification
☐ e-Mark Certification	

Attendance

Test will be: ☐ Attended by the customer ☐ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TÜV SÜD America should:

☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: 4.74" Width: 5.75" Height: 2.17" Weight: 2.4 lbs.

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 10-30 Vdc (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): 2.3 Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

None

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Industrial Monitoring and Control

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 1.5m (60")

☐ Shielded OR ☒ Unshielded

☐ Not Applicable

Form

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EUT Interface Ports and Cables

Type			During Test		Qty	Shielding								
	Analog	Digital	Active	Passive		Yes	No	Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
RS232	☐	☒	☐	☒	1	☐	☒			Metallized 9-pin D-Sub	Characteristic Impedance	2	☒	☐
Power Cable	☒	☐	☐	☒	1	☐	☒	Weidmuller Power Plug		Two DC Power and Ground.	Characteristic Impedance of the power supply.	1.5m	☒	☐
Antenna Port	☒	☐	☒	☐	1	☐	☐	Bird 25-T-MN 50 ohm 25 Watt Load		Shielded Load	50 ohms	0	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

EUT Software.

Revision Level: V1.01.00

Description: Viper Tools Software

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Tested with the transmitter keyed up at 10.0 Watts at the low, mid and high frequencies of the authorized FCC and IC bands into a 50 ohm load.

2. Tested with the transmitter keyed up at 1.0 Watts at the low, mid and high frequencies of the authorized FCC and IC bands into a 50 ohm load.

3. Tested in receive mode for Local Oscillators and Modem emissions at the mid frequencies of the FCC and IC authorized bands into a 50 ohm load.

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
None			

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Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*
Compaq	nc6000	CNU447F26M	CNTWM3B2200BGA
RS232	Cable	N/A	N/A

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
Crystek CVCO55BE -1856-1920	1856-1920 MHz		4180001856 - Y800	928-960 MHz Transmitter VCO
Discrete Components	857-889 MHz		On Board VCO	On board Receiver Local Oscillator
Transko TCXO-1250	23.04 MHz		4187009230 - Y101	TCXO stable frequency source for the VCO/Synthesizers.
AD9864 PLL VCO	73.880 MHz		4444002040 - Y280	Second Oscillator Mix frequency

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
HP	HP6284	N/A	☐ Switched-mode: (Frequency) _____ ☒ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*
None		

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Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*
None				

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

None

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

Authorization (Signature Required if a Third Party Certification is checked on pg 1)

William M. Junge	5/22/2013
Customer authorization to perform tests according to this test plan.	Date
Test Plan/CDF Prepared By (please print)	Date

Appendix B

Measurement Protocol

MEASUREMENT PROTOCOL

Test Methodology
Emissions testing is performed according to the procedures in TIA-603-C and ANSI C63.4-2003.

Measurement Uncertainty
The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of ±1.8 dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of ±4.8 dB. The equipment comprising the test systems is calibrated on an annual basis.

Justification
The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

Radiated Emissions
The final level, in dBμV/m, equals the reading from the spectrum analyzer (Level dBμV), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Attachment A.
Example:

FREQ	LEVEL		CABLE/ANT/PREAMP			FINAL	POL/HGT/AZ			DELTA1
(MHz)	(dBuV)		(dB)	(dB/m)	(dB)	(dBuV/m)		(m)	(deg)	
60.80	42.5Qp	+	1.2	+ 10.9	- 25.5 =	29.1	V	1.0	0.0	-10.9

Substitution Method
Per TIA/EIA 603-C-2004, a radiated emission scan was also made with the EUT's antenna replaced with a termination to demonstrate case radiation compliance to the –25 dBm requirement. Radiated emissions from the EUT are measured in the frequency range of 30 to 9020 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The field strength levels were measured per ANSI C63.4. The EUT is then replaced with a tuned dipole antenna (below 1 GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the highest level measured from the EUT. The signal generator level minus the cable attenuation from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level.