

FCC PART 24 TEST REPORT

for

# SATELLITE VEHICLE TRACKING UNIT

Model: DPU 4500

Prepared for

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DATE: JULY 14, 2003

	REPORT	APPENDICES			TOTAL		
	BODY	A	В	C	D	E	
PAGES	17	2	2	12	5	2	40

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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 or any other agency of the U.S. Government.

Device Tested: Satellite Vehicle Tracking Unit

Model: DPU 4500

S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Manufacturer: Trackcom, Ltd.

Trackcom House, 2 Newmarket Court, Chippenham Drive,

Milton Keynes MK10 0AQ, United Kingdom

Test Dates: July 9 and 10, 2003

File # For Canada: IC2154-D

Test Specifications: EMI requirements

CFR Title 47, Part 15 Subpart B; and CFR Title 47 Part 24 Section 24.238 (a)

Test Procedure: ANSI C63.4: 1992

Test Deviations: The test procedure was not deviated from during the testing.



#### **SUMMARY OF TEST RESULTS**

TEST	DESCRIPTION	RESULTS
1	Radiated Spurious Emissions on the EUT, 10 kHz to 19500 MHz	Complies with the limits of CFR Title 47, Part 24 Section 24.238 (a)





#### 1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Satellite Vehicle Tracking Unit Model: DPU 4500. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. 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 24, Section 24.238 (a).





#### 2. ADMINISTRATIVE DATA

#### 2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 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

Trackcom, Ltd.

Del Shindell President

Compatible Electronics Inc.

Kyle Fujimoto Test Engineer Scott McCutchan Lab Manager

#### 2.4 Date Test Sample was Received

The test sample was received on July 9, 2003.

#### 2.5 Disposition of the Test Sample

The test sample has not been returned to Trackcom, Ltd. as of July 14, 2003.

#### 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

Tx Transmitter Rx Receiver



#### 3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.
CFR Title 47, Part 24	FCC Rules – Personal Communications Services
TIA/EIA-603-A 2001	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards



#### 4. DESCRIPTION OF TEST CONFIGURATION

#### 4.1 Description of Test Configuration - EMI

Specifics of the EUT and Peripherals Tested

**For Part 24 testing**: The Satellite Vehicle Tracking Unit Model: DPU 4500 (EUT) was connected to a power supply, receiving antenna, and a wireless communications test set via its power, GPS antenna, and Tx antenna ports, respectively. The EUT is communicating with the wireless communications test set on a continuous basis. The wireless communications test set also allows the EUT to change channels so that the low, middle, and high channels can be checked.

The GPRS/GSM 900/1800/1900 Module MC 45 + DSB 45 + Voltronic Handset inside the EUT has already been approved by the FCC as a module. The FCC-ID of that module is **QIPMC45**.

The final radiated data was taken in the mode described above. Please see Appendix D for the data sheets.





#### 4.1.1 Cable Construction and Termination

<u>Cable 1</u> This is a 60 centimeter cable connecting the EUT to the DC Power Supply. It has a D-15 pin connector at the EUT end and is hard wired into the power supply.

This is a 3 meter braid shielded cable connecting the EUT to the GPS Antenna. It has a metallic TNC connector at the EUT and is hard wired into the GPS antenna. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connector at the EUT end only.

<u>Cable 3</u>
This is a 6 meter braid shielded cable connecting the EUT to the Wireless Communications Test Set. It has an SMA connector at each end. The shield of the cable was grounded to the chassis via the connectors.





FCC Part 24 Test Report

Satellite Vehicle Tracking Unit

Model: DPU 4500

#### 5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

#### 5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
SATELLITE VEHICLE TRACKING UNIT (EUT)	TRACKCOM, LTD.	DPU 4500	N/A	PMHDPU 4500
DC POWER SUPPLY	HEWLETT PACKARD	E3612A	KR22000610	N/A
WIRELESS COMMUNICAITONS TEST SET	AGILENT	E5515C	GB43042277	N/A
GPS ANTENNA	TRACKCOM, LTD.	N/A	N/A	N/A





#### 5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU- FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiated Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	June 14, 2002	June 14, 2003
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22279	June 14, 2002	June 14, 2003
Spectrum Analyzer – Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	June 14, 2002	June 14, 2003
Preamplifier	Com Power	PA-102	1017	Jan. 2, 2003	Jan. 2, 2004
Biconical Antenna	Com Power	AB-100	1548	Sept. 19, 2002	Sept. 19, 2003
Log Periodic Antenna	Com Power	AL-100	16089	Oct. 4, 2002	Oct. 4, 2003
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Loop Antenna	Com-Power	AL-130	25310	June 4, 2003	June 4, 2004
Dipole Antennas (transmit)	Com Power	AD-100	721002	April 10, 2001	April 10, 2004
RF Signal Generator	Gigatronics	6062A	9620906	N.C.R.	N/A
RF Signal Generator	Hewlett Packard	8673E	2715A00293	N.C.R.	N/A
Horn Antenna	Com Power	AH-118	10073	Jan. 21, 2002	Jan. 21, 2004
Horn Antenna	Antenna Research	DRG-118/A	1053	Jan. 13, 2002	Jan. 13, 2004
Microwave Preamplifier	Com-Power	PA-122	25196	Jan. 10, 2003	Jan. 10, 2004



#### 6. TEST SITE DESCRIPTION

#### **6.1** Test Facility Description

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

#### 6.2 EUT Mounting, Bonding and Grounding

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

The EUT was not grounded.





#### 7. TEST PROCEDURES

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

#### 7.1 Radiated Emissions (Spurious and Harmonics) Test for Part 24

The spectrum analyzer 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, and the Com Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 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 video bandwidth was set at 300 kHz for spurious emissions below 1 GHz, and 3 MHz for spurious emissions above 1 GHz.

The sweep time was set to a time slow enough to maintain the measurement calibration of the spectrum analyzer.

The resolution bandwidths and transducers used for this test were:

FREQUENCY RANGE	RESOLUTION BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	10 kHz	Active Loop Antenna
150 kHz to 30 MHz	10 kHz	Active Loop Antenna
30 MHz to 300 MHz	10 kHz	Biconical Antenna
300 MHz to 1 GHz	10 kHz	Log Periodic Antenna
1 GHz to 19.5 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: 1992 and TIA/EIA-603-A: 2001. 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.

The substitution method was used to obtain the data as follows:



#### Radiated Emissions (Spurious and Harmonics) Test for Part 24 (continued)

The substitution method was used to obtain the data as follows:

- 1. The EUT was mounted on an 80 cm high non-conductive table that was placed on the turntable. The EUT's antenna port was terminated to the Wireless Communications Test Set (50 ohms input).
- 2. The receiving antenna was mounted in a horizontal polarization and raised and lowered between 1 meter and 4 meters to obtain the maximum reading on the spectrum analyzer. Then the turntable was rotated 360 degrees to determine the maximum reading. This procedure was repeated to obtain the highest possible reading. The maximum reading was recorded.
- 3. Step #2 was repeated for the vertical polarization.
- 4. The spectrum analyzer settings were kept as mentioned above.
- 5. The EUT was replaced with a substitution antenna. The center of the substitution antenna was placed approximately at the same location as the center of the EUT.
- 6. The substitution antenna was fed a signal from an external signal generator by means of a non-radiating cable. Both the substitution and receiving antenna were placed in the horizontal polarization. The signal generator was then tuned to the particular spurious frequency. The receiving antenna was then raised and lowered to obtain a maximum reading at the spectrum analyzer. The level of the signal generator output was then adjusted to match the previously recorded maximum reading obtained in step #2.
- 7. Step #6 was repeated for the vertical polarization.
- 8. The output of the signal generator was measured by connecting the non-radiating cable connected to the output of the signal generator to the spectrum analyzer. This was so that the loss of the non-radiating cable could be taken in to account. The reading measured by the spectrum analyzer was then recorded.
- 9. The gain of the substitution antenna was then added from the spectrum analyzer reading. This reading was then compared to the spec limit.



#### 7.2 Radiated Emissions Specification Limits, Section 24.238 (a)

The limits for radiated emissions are based on the power of the transmitter at the operating frequency.

For an operating power range of 0.933 watts, the radiated emissions limit for spurious signal outside of the assigned frequency block is 43+10 Log (mean output power in watts) dB below the measured amplitude at the operating power.

The measured effective radiated power of the EUT was 29.70 dBm. The required attenuation is 43 + 10 log (0.933) or 42.7 dB. Thus, the limit for spurious and harmonic emissions is:

29.70 dBm - 42.7 dB = -13.0 dBm





#### 8. CONCLUSIONS

The Satellite Vehicle Tracking Unit Model: DPU 4500 meets all of the specification limits defined in CFR Title 47, Part 24, Section 24.238 (a).







### APPENDIX A

# **MODIFICATIONS TO THE EUT**





# MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Part 24, Section 24.238 (a) specifications.

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

No modifications were made to the EUT during the testing.







#### **APPENDIX B**

# ADDITIONAL MODELS COVERED UNDER THIS REPORT



# ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Satellite Vehicle Tracking Unit

Model: DPU 4500

S/N: N/A

No additional models were covered under this report.



#### **APPENDIX C**

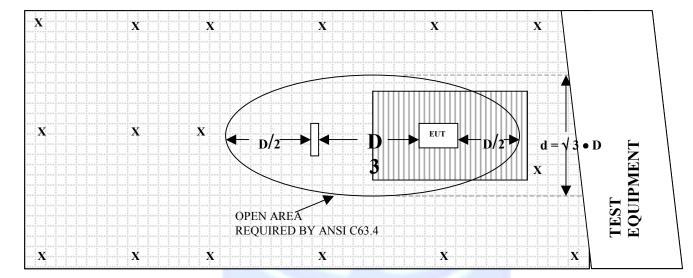
# DIAGRAMS, CHARTS AND PHOTOS





# FIGURE 1: PLOT MAP AND LAYOUT OF RADIATED SITE

#### **OPEN LAND > 15 METERS**



#### **OPEN LAND > 15 METERS**

X = GROUND RODS = GROUND SCREEN

= WOOD COVER D = TEST DISTANCE (meters)







#### **FRONT VIEW**

TRACKCOM, LTD.
SATELLITE VEHICLE TRACKING UNIT
MODEL: DPU 4500
FCC PART 24 - RADIATED EMISSIONS – 07-09-03 and 07-10-03

# PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS





#### **REAR VIEW**

TRACKCOM, LTD.
SATELLITE VEHICLE TRACKING UNIT
MODEL: DPU 4500
FCC PART 24 - RADIATED EMISSIONS – 07-09-03 and 07-10-03

# PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS





#### **FRONT VIEW**

TRACKCOM, LTD.
SATELLITE VEHICLE TRACKING UNIT
MODEL: DPU 4500
FCC PART 24 - RADIATED EMISSIONS – 07-09-03 and 07-10-03

# PHOTOGRAPH SHOWING THE SUBSTITUTION METHOD TEST SETUP



# **COM-POWER AB-100**

# **BICONICAL ANTENNA**

S/N: 01548

CALIBRATION DATE: SEPTEMBER 19, 2002

FREQUENCY	FACTOR	FREQUENCY	FACTOR
(MHz)	(dB)	(MHz)	(dB)
30	14.30	120	10.70
35	14.00	125	11.40
40	13.70	140	12.70
45	12.00	150	12.50
50	11.40	160	12.90
60	9.70	175	14.10
70	8.30	180	14.70
80	7.60	200	15.10
90	7.80	250	16.90
100	8.60	300	19.10





# **COM-POWER AL-100**

# LOG PERIODIC ANTENNA

S/N: 16089

CALIBRATION DATE: OCTOBER 4, 2002

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.10	700	17.70
350	14.40	750	19.60
400	14.30	800	20.50
450	15.70	850	21.20
500	16.60	900	21.20
550	16.60	950	22.50
600	17.30	1000	24.60
650	18.80		





# **COM-POWER PA-102**

# **PREAMPLIFIER**

S/N: 1017

CALIBRATION DATE: JANUARY 2, 2003

FREQUENCY	FACTOR	FREQUENCY	FACTOR
(MHz)	(dB)	(MHz)	(dB)
30	38.4	300	38.3
40	38.4	350	38.3
50	38.3	400	38.3
60	38.4	450	37.9
70	38.4	500	38.1
80	38.4	550	38.2
90	38.4	600	38.1
100	38.3	650	37.9
125	38.4	700	37.9
150	38.4	750	37.7
175	38.2	800	37.4
200	38.4	850	37.6
225	38.2	900	37.4
250	38.3	950	36.7
275	38.5	1000	37.0





# **COM-POWER PA-122**

### MICROWAVE PREAMPLIFIER

S/N: 25196

CALIBRATION DATE: JANUARY 10, 2003

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	32.3	6.0	27.9
1.1	32.6	6.5	28.9
1.2	32.4	7.0	29.2
1.3	32.1	7.5	29.3
1.4	31.8	8.0	29.4
1.5	31.7	8.5	28.5
1.6	31.6	9.0	28.7
1.7	31.6	9.5	27.9
1.8	31.0	10.0	27.0
1.9	32.0	11.0	26.9
2.0	31.0	12.0	28.7
2.5	30.5	13.0	28.6
3.0	30.5	14.0	28.7
3.5	30.0	15.0	27.1
4.0	30.0	16.0	26.1
4.5	29.9	17.0	26.0
5.0	29.7	18.0	23.9
5.5	30.2		





### ANTENNA RESEARCH DRG-118/A

# HORN ANTENNA

S/N: 1053

# CALIBRATION DATE: JANUARY 13, 2002

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.5	9.5	39.1
1.5	26.6	10.0	39.7
2.0	29.4	10.5	40.9
2.5	30.4	11.0	40.7
3.0	31.2	11.5	42.4
3.5	32.3	12.0	42.6
4.0	32.9	12.5	42.4
4.5	33.0	13.0	41.5
5.0	34.8	13.5	41.0
5.5	35.2	14.0	40.5
6.0	36.4	14.5	43.6
6.5	36.6	15.0	43.7
7.0	38.8	15.5	43.3
7.5	38.8	16.0	42.8
8.0	38.0	16.5	43.0
8.5	38.1	17.0	42.7
9.0	39.9	17.5	44.0
		18.0	41.8





# **COM-POWER AH-118**

# HORN ANTENNA

S/N: 10073

CALIBRATION DATE: JANUARY 21, 2002

	T . CT . D		T. (T.)
FREQUENCY (GHz)	FACTOR	FREQUENCY (GHz)	FACTOR
	(dB)		(dB)
1.0	26.6	9.5	41.4
1.5	29.2	10.0	41.8
2.0	32.4	10.5	40.4
2.5	32.3	11.0	37.5
3.0	31.4	11.5	42.2
3.5	31.8	12.0	40.4
4.0	31.1	12.5	43.6
4.5	32.0	13.0	44.2
5.0	33.9	13.5	41.8
5.5	32.0	14.0	43.3
6.0	37.8	14.5	47.0
6.5	36.8	15.0	49.4
7.0	42.4	15.5	49.9
7.5	39.5	16.0	49.9
8.0	41.3	16.5	48.2
8.5	40.3	17.0	44.0
9.0	39.5	17.5	44.8
		18.0	44.7





# COM-POWER AL-130

# LOOP ANTENNA

S/N: 25310

CALIBRATION DATE: JUNE 4, 2003

EDECHENCY	MACNETIC	ELECEDIC
FREQUENCY	MAGNETIC	ELECTRIC
(MHz)	(dB/m)	(dB/m)
0.009	-41.2	10.3
0.01	-41.3	10.2
0.02	-42.3	9.2
0.05	-42.5	9.0
0.07	-42.3	9.2
0.1	-42.5	9.0
0.2	-42.6	6.9
0.3	-42.1	9.4
0.5	-42.4	9.1
0.7	-42.1	9.4
1	-41.5	10.0
2	-41.0	10.5
3	-41.3	10.2
4	-41.3	10.2
5	-40.9	10.6
10	-41.6	9.9
15	-42.1	9.4
20	-42.2	9.3
25	-42.7	8.8
30	-44.3	7.2



APPENDIX D

**DATA SHEETS** 



Model: DPU 4500

# RADIATED SPURIOUS EMISSIONS

FOR THE EUT

USING THE SUBSTITUTION METHOD



**FCC Part 24, Section 24.238 (a)** 

Trackcom Ltd. Date: 07/10/03

Satellite Vehicle Tracking Unit Lab: D

Model: DPU 4500 Tested By: Kyle Fujimoto

Temperature: 28 Degrees Celsisus, Relative Humidity 37%

Test Description: Low Channel - Spurious Emissions in Transmit Mode Vertical and Horizontal Polarization - Using the Substitution Method

	Reference		Antenna	Corr'd		Power
Freq.	Level	Power**	Gain***	Power^	Delta	Limit****
(MHz)	(dBuV)*	(dBm)	(dBi)	(dBm)	(dB)	(dBm)
925.1 (V)	38.1	-67.8	1.8	-66	-53	-13
3700.4 (V)	40.2	-62	10.06	-51.94	-38.94	-13
5550.6 (V)	42.1	-65.2	12.52	-52.68	-39.68	-13
925.1 (H)	40.1	-65.5	1.8	-63.7	-50.7	-13
3700.4 (H)	39.8	-62.1	10.06	-52.04	-39.04	-13
5550.6 (H)	42.1	-65.2	12.52	-52.68	-39.68	-13

<sup>\*</sup>The Reference Level is the meter reading off the Spectrum Analyzer after maximizing the EUT for Field Strength.

(V) = Vertical Polarization, (H) = Horizontal Polarization

Note #1: No Emissions found above 5550.6 MHz or below 925.1 MHz

Note #2: No Emissions were found when the EUT was put in standby mode



<sup>\*\*</sup> Power = Output of Signal Generator where the signal is injected into the Substitution Ant.

The Output of the Signal Generator is obtained when the output matches the Reference Level

<sup>\*\*\*</sup> The gain of the substitution antenna

<sup>^</sup> The Corr'd Power (dBm) = Power (dBm) + Antenna Gain (dBi)

<sup>\*\*\*\*</sup> Based on the Attenuation Formula 43+10 Log (P), where P = Power of the EUT in Watts
This Formula is then subtracted from the Rated Power (P) where P is now in dBm



**FCC Part 24, Section 24.238 (a)** 

Trackcom Ltd. Date: 07/10/03

Satellite Vehicle Tracking Unit Lab: D

Model: DPU 4500 Tested By: Kyle Fujimoto

Temperature: 28 Degrees Celsisus, Relative Humidity 37%

Test Description: Middle Channel - Spurious Emissions in Transmit Mode Vertical and Horizontal Polarization - Using the Substitution Method

	Reference		Antenna	Corr'd		Power
Freq.	Level	Power**	Gain***	Power^	Delta	Limit****
(MHz)	(dBuV)*	(dBm)	(dBi)	(dBm)	(dB)	(dBm)
943.85 (V)	40.1	-65.5	1.8	-63.7	-50.7	-13
3774.94 (V)	39.8	-62.1	10.32	-51.78	-38.78	-13
5662.7 (V)	42.1	-65.2	11.39	-53.81	-40.81	-13
943.85 (H)	40.1	-65.5	1.8	-63.7	-50.7	-13
3774.94 (H)	39.8	-62.1	10.32	-51.78	-38.78	-13
5662.7 (H)	42.1	-65.2	11.39	-53.81	-40.81	-13

<sup>\*</sup>The Reference Level is the meter reading off the Spectrum Analyzer after maximizing the EUT for Field Strength.

(V) = Vertical Polarization, (H) = Horizontal Polarization

Note #1: No Emissions found above 5662.7 MHz or below 943.85 MHz Note #2: No Emissions were found when the EUT was put in standby mode



<sup>\*\*</sup> Power = Output of Signal Generator where the signal is injected into the Substitution Ant.

The Output of the Signal Generator is obtained when the output matches the Reference Level

<sup>\*\*\*</sup> The gain of the substitution antenna

<sup>^</sup> The Corr'd Power (dBm) = Power (dBm) + Antenna Gain (dBi)

<sup>\*\*\*\*</sup> Based on the Attenuation Formula 43+10 Log (P), where P = Power of the EUT in Watts This Formula is then subtracted from the Rated Power (P) where P is now in dBm

FCC Part 24, Section 24.238 (a)

Trackcom Ltd. Date: 07/10/03

Satellite Vehicle Tracking Unit Lab: D

Model: DPU 4500 Tested By: Kyle Fujimoto

Temperature: 28 Degrees Celsisus, Relative Humidity 37%

Test Description: High Channel - Spurious Emissions in Transmit Mode Vertical and Horizontal Polarization - Using the Substitution Method

	Reference		Antenna	Corr'd		Power
Freq.	Level	Power**	Gain***	Power^	Delta	Limit****
(MHz)	(dBuV)*	(dBm)	(dBi)	(dBm)	(dB)	(dBm)
954.9 (V)	37.5	-68.2	2	-66.2	-53.2	-13
3819.6 (V)	40.6	-60.5	10.5	-50	-37	-13
5729.4 (V)	41.5	-64.6	10.71	-53.89	-40.89	-13
954.9 (H)	38.9	-62.5	1.9	-60.6	-47.6	-13
3819.6 (H)	39.2	-64.2	10.5	-53.7	-40.7	-13
5729.4(H)	45.2	-60.8	10.71	-50.09	-37.09	-13

<sup>\*</sup>The Reference Level is the meter reading off the Spectrum Analyzer after maximizing the EUT for Field Strength.

(V) = Vertical Polarization, (H) = Horizontal Polarization

Note #1: No Emissions found above 5729.4 MHz or below 954.9 MHz

Note #2: No Emissions were found when the EUT was put in standby mode



<sup>\*\*</sup> Power = Output of Signal Generator where the signal is injected into the Substitution Ant.

The Output of the Signal Generator is obtained when the output matches the Reference Level

<sup>\*\*\*</sup> The gain of the substitution antenna

<sup>^</sup> The Corr'd Power (dBm) = Power (dBm) + Antenna Gain (dBi)

<sup>\*\*\*\*</sup> Based on the Attenuation Formula 43+10 Log (P), where P = Power of the EUT in Watts
This Formula is then subtracted from the Rated Power (P) where P is now in dBm

APPENDIX E

# 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)

