MEASUREMENT AND TECHNICAL REPORT

COMTECH EF DATA
2114 West 7th Street
Tempe, AZ 85281

DATE: 24 July 2003

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	Movement Tracking System, Model MT2011, A-KIT 9985-1, MTS-V2-01	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: **Defer until:**	No: X
Company Name **agrees to notify the Commission by:** **of the intended date of announcement of the product so that the grant can be issued on that date.**	N/A	
Transition Rules Request per 15.37?	Yes:	No: X*

(*) FCC Part 25

Report Prepared by:

TÜV AMERICA, INC
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

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TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

1.0 GENERAL INFORMATION

1.1 Product Description

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

EUT Description: Movement Tracking System

EUT Name: Movement Tracking System

Model No.: MT2011, A-KIT 9985-1, MTS-V2-01 Serial No.: 5510, 031550634, 857

Product Options: --

Configurations to be tested: Standard transmit/receive

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: 24VDC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: --

Current (Amps/phase(max)): 1.5 amps Current (Amps/phase(nominal)): 1 amp

Other: --

Other Special Requirements

--

Typical Installation and/or Operating Environment

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

Military vehicle

EUT Power Cable

☐ Permanent OR ■ Removable Length (in meters): 1
■ Shielded OR ☐ Unshielded
☐ Not Applicable

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EUT Interface Ports and Cables

Interface				Shielding								
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE:												
RS232	☐	☒	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
RS422	☐	■	1	■	☐	Foil braid	--	Round military	--	2	■	☐
Computer power	■	☐	1	■	☐	Foil braid	--	Round military	--	2	■	☐
Ignition power	■	☐	1	■	☐	Foil braid	--	Round military	--	2	■	☐
Interface	■	■	--	■	☐	Foil braid	--	Round military	--	--	■	☐

EUT Software.

Revision Level: 14.0 Software Revision

Description: --

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. Standard mode: UUT is composed of an antenna, DC power supply, and ruggedized computer. Unit is initialized and runs automatically, bursting for GPS locations ever 5 seconds (in test mode) and every 120 seconds under normal operation

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EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)			
Description	**Model #**	**Serial #**	**FCC #**
Antenna	MT2011	5510	--
Power supply	A-KIT 9985-1	031550634	--
Ruggedized computer	MTS-V2-01	857	--

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)			
Description	**Model #**	**Serial #**	**FCC #**
DC Laboratory Power Supply	HP 6267B	2206A-07367	--

Oscillator Frequencies			
Frequency	**Derived Frequency**	**Component # / Location**	**Description of Use**
200 MHz	--	--	--
10.8 MHz	--	--	--
11.059 MHz	--	--	--
6 MHz	--	--	--
32.768 MHz	--	--	--
19.095 MHz	--	--	--
1.482 GHz	--	--	--

Power Supply					
Manufacturer	**Model #**	**Serial #**	**Type**		
Custom	A-KIT 9985-1	031550634	■ Switched-mode	(Frequency)	230 kHz
			☐ Linear ☐ Other		--

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Power Line Filters		
Manufacturer	**Model #**	**Location in EUT**
--		

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	**Manufacturer**	**Part # or Value**	**Qty**	**Component # / Location**
--				

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

--

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1.2 Related Submittal Grant

None

1.3 Tested System Details

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the following tests.

TEST	FCC CFR 47#	PASS/FAIL
Frequency Stability	25.202	Pass
Spectrum Mask	25.202(f)(1); (2); (3)	Pass
Radiated Spurious Emissions	25.202(f)(3)	Pass

Testing was performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8-M1983.

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

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10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI C63.4 and are registered with the FCC, 7435 Oakland Mills Road, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emissions in the following configuration:

See Test Setup Photos Exhibit

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Equipment Modifications

None

2.5 Configuration of Test System

See Test Setup Photos Exhibit

3.0 FREQUENCY STABILITY EQUIPMENT/DATA
SPECTRUM MASK EQUIPMENT/DATA
RADIATED SPURIOUS EMISSIONS EQUIPMENT/DATA

See following page(s).

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Test Conditions: FREQUENCY STABILITY EQUIPMENT/DATA
SPECTRUM MASK EQUIPMENT/DATA
RADIATED SPURIOUS EMISSIONS EQUIPMENT/DATA

The following measurements were performed at the San Diego Testing Facility:

☐ **- Test not applicable**

■ - TR-2, Test Room
■ - Roof (Small Open Area Test Site)
■ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Test Equipment Used:

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Date Cal'ed
HP8566B	720	Spectrum Analyzer	Hewlett Packard	2115A00842	09/02
AMF-5D-010180-35-10P	719	PreAmplifier	Miteq	549460	NCR*
3115	251	Double Ridge Horn Antenna	EMCO	2495	11/02
FF 6548-2	783	2000 MHz High Pass Filter	Sage	008	NCR*
83592C	186	Sweep Oscillator/Signal Generator	Hewlett Packard	2328A00112	NCR*
3115	453	Horn Antenna	Electro Mechanics Co	3564	12/02
8481A	554	Power Sensor	Hewlett Packard	1926A27807	09/02
436A	775	Power Meter	Hewlett Packard	1918A05312	09/02
HP8566B	744	Spectrum Analyzer	Hewlett Packard	2618A02913	12/02
CBL6111	461	Antenna, Bilog	Chase	1291	NCR*
LPB 2520/A	739	Antenna, Bilog	Antenna Research	1170	05/03
ESVS 30	6732	EMI Test Receiver	Rhode & Schwarz	833825/003	04/03
7405	6437	Near Field Probe	EMCO	9812-4261	NCR*
T30RC	6225	Environmental Chamber	Tenney Environmental	27244-02	04/03
34401A	6709	Digital Multimeter	Hewlett Packard	3146A03945	07/02
Customer Provided Equipment					
6267B	--	DC Power Supply	--	2206A07367	NCR*

Remarks: One year calibration cycle for all test equipment and sites. (*) No Calibration Required.

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FREQUENCY STABILITY

SHEET - 1 - OF 5_

TEST REPORT # SC303096

TEST AREA __TestRoom 2__

DATE _July 10, 2003__

EUT MODEL # MT2011, A-KIT 9985-1, MTS-V2-01

TEMPERATURE __23 ºC

SPECIFICATION (S):
FCC 47 Part 25.202
Part 2.1055

EUT SERIAL # _5510/031550634/857_

HUMIDITY ___50 %

EUT DESCRIPTION MOVEMENT TRACKING SYSTEM

AIR PRESSURE *99.9* kPa

VOLTAGE VARIATION:
Temperature 23°C (room). EUT on for 30 minutes prior to first measurement.
Limit 0.001% = 16,300 Hz
Frequency (center) = (high + low)/2 as modulated emission does not allow for center frequency to be measured directly.

Frequency (high)	Frequency (low)	Frequency (Center)	Voltage Vdc	DELTA Hz	COMPLIES
1,633,627,600 Hz	1,633,524,600 Hz	1,633,586,100 Hz	24.01	--	
1,633,644,200 Hz	1,633,525,200 Hz	1,633,584,700 Hz	27.61	- 1400	Yes
1,633,650,000 Hz	1,633,525,000 Hz	1,633,587,500 Hz	20.41	+1400	Yes

TEMPERATURE VARIATION:
-19.7°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,637,500 Hz	1,633,536,400 Hz	1,633,586,950 Hz	+ 850	Yes
2	1,633,645,500 Hz	1,633,533,600 Hz	1,633,585,500 Hz	- 600	Yes
3	1,633,645,500 Hz	1,633,530,400 Hz	1,633,583,500 Hz	+ 2600	Yes
4	1,633,644,300 Hz	1,633,531,400 Hz	1,633,587,500 Hz	+1400	Yes
5	1,633,648,700 Hz	1,633,529,200 Hz	1,633,588,950 Hz	+2850	Yes
6	1,633,644,100 Hz	1,633,530,800 Hz	1,633,587,450 Hz	+1350	Yes
7	1,633,632,300 Hz	1,633,533,400 Hz	1,633,587,850 Hz	+1750	Yes
8	1,633,640,900 Hz	1,633,533,000 Hz	1,633,586,950 Hz	+850	Yes
9	1,633,644,300 Hz	1,633,531,000 Hz	1,633,587,650 Hz	+1550	Yes
10	1,633,647,100 Hz	1,633,529,200 Hz	1,633,588,150 Hz	+2450	Yes

FREQ STAB.doc
5/23/02

NOTES: EQUIPMENT USED: 9,13,14,15,16

TESTED BY: A. Laudani
A. Laudani

REVIEWED BY:

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

FREQUENCY STABILITY

SHEET - 2 - OF 5_

TEST REPORT # SC303096

TEST AREA __TestRoom 2__

DATE _July 10, 2003__

EUT MODEL # MT2011, A-KIT 9985-1, MTS-V2-01

TEMPERATURE __23 °C

SPECIFICATION (S): FCC 47 Part 25.202

Part 2.1055

EUT SERIAL # _5510/031550634/857_

HUMIDITY ___50 %

EUT DESCRIPTION MOVEMENT TRACKING SYSTEM

AIR PRESSURE *99.9* kPa

TEMPERATURE VARIATION:
-10.0°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,650,100 Hz	1,633,533,900 Hz	1,633,587,000 Hz	+900	Yes
2	1,633,649,100 Hz	1,633,526,700 Hz	1,633,587,900 Hz	+1800	Yes
3	1,633,646,500 Hz	1,633,529,800 Hz	1,633,588,150 Hz	+2050	Yes
4	1,633,647,500 Hz	1,633,526,100 Hz	1,633,586,800 Hz	+700	Yes
5	1,633,644,700 Hz	1,633,528,100 Hz	1,633,586,400 Hz	+300	Yes
6	1,633,647,500 Hz	1,633,526,900 Hz	1,633,587,200 Hz	+1100	Yes
7	1,633,637,300 Hz	1,633,527,900 Hz	1,633,587,600 Hz	+1500	Yes
8	1,633,648,100 Hz	1,633,529.000 Hz	1,633,588,550 Hz	+2450	Yes
9	1,633,651,500 Hz	1,633,528,400 Hz	1,633,589,950 Hz	+3850	Yes
10	1,633,648,000 Hz	1,633,528,100 Hz	1,633,588,050 Hz	+2950	Yes

TEMPERATURE VARIATION:
-0.1°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,647.000 Hz	1,633,526.000 Hz	1,633,586,500 Hz	+400	Yes
2	1,633,647,300 Hz	1,633,527,300 Hz	1,633,587,300 Hz	+1200	Yes
3	1,633,647,900 Hz	1,633,526,500 Hz	1,633,587,200 Hz	+1100	Yes
4	1,633,644,500 Hz	1,633,528,800 Hz	1,633,586.650 Hz	+550	Yes
5	1,633,644,900 Hz	1,633,527,300 Hz	1,633,586,100 Hz	--	Yes
6	1,633,648,100 Hz	1,633,528,800 Hz	1,633,588.450 Hz	+2350	Yes
7	1,633,647,700 Hz	1,633,525,300 Hz	1,633,586,500 Hz	+400	Yes
8	1,633,644,100 Hz	1,633,530.000 Hz	1,633,585.050 Hz	-1050	Yes
9	1,633,646,300 Hz	1,633,525,900 Hz	1,633,586,100 Hz	--	Yes
10	1,633,650,300 Hz	1,633,528,200 Hz	1,633,589.250 Hz	+3150	Yes

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5/23/02

NOTES: EQUIPMENT USED: 9,13,14,15,16

TESTED BY: A. Laudani

REVIEWED BY:

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

FREQUENCY STABILITY

SHEET - 3 - OF 5_

TEST REPORT # SC303096

TEST AREA __TestRoom 2__

DATE _July 10, 2003__

EUT MODEL # MT2011, A- kIT 9985-1, MTS-V2-01

TEMPERATURE __23 °C

SPECIFICATION (S):
FCC 47 Part 25.202
Part 2.1055

EUT SERIAL # _5510/031550634/857_

HUMIDITY ___50 %

EUT DESCRIPTION MOVEMENT TRACKING SYSTEM

AIR PRESSURE *99.9* kPa

TEMPERATURE VARIATION:
+9.8°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,655,900 Hz	1,633,519,100 Hz	1,633,587,500 Hz	+1400	Yes
2	1,633,657,100 Hz	1,633,516,700 Hz	1,633,586,900 Hz	+800	Yes
3	1,633,656,100 Hz	1,633,515,500 Hz	1,633,585,800 Hz	-300	Yes
4	1,633,655,500 Hz	1,633,519,900 Hz	1,633,587,700 Hz	+1600	Yes
5	1,633,654,500 Hz	1,633,515,500 Hz	1,633,585.000 Hz	-1100	Yes
6	1,633,655,700 Hz	1,633,516,100 Hz	1,633,585,900 Hz	-200	Yes
7	1,633,656,300 Hz	1,633,513,700 Hz	1,633,585.000 Hz	-1100	Yes
8	1,633,656,100 Hz	1,633,519,300 Hz	1,633,587,700 Hz	+1600	Yes
9	1,633,655,700 Hz	1,633,517,300 Hz	1,633,586,500 Hz	+400	Yes
10	1,633,656,300 Hz	1,633,519,300 Hz	1,633,587,800 Hz	+1700	Yes

TEMPERATURE VARIATION:
+20.3°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,656,500 Hz	1,633,517,100 Hz	1,633,586,800 Hz	+700	Yes
2	1,633,647,300 Hz	1,633,524,100 Hz	1,633,585,700 Hz	-400	Yes
3	1,633,647,900 Hz	1,633,523,300 Hz	1,633,585,600 Hz	-500	Yes
4	1,633,650,100 Hz	1,633,524,500 Hz	1,633,587,300 Hz	+1200	Yes
5	1,633,649,500 Hz	1,633,523,100 Hz	1,633,586,300 Hz	+200	Yes
6	1,633,652,700 Hz	1,633,520,700 Hz	1,633,586,700 Hz	+600	Yes
7	1,633,650,100 Hz	1,633,522,100 Hz	1,633,586,100 Hz	--	Yes
8	1,633,652,900 Hz	1,633,520,300 Hz	1,633,586,600 Hz	+500	Yes
9	1,633,651,900 Hz	1,633,519,300 Hz	1,633,585,600 Hz	-500	Yes
10	1,633,652,900 Hz	1,633,518,100 Hz	1,633,585,500 Hz	-600	Yes

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5/23/02

NOTES: EQUIPMENT USED: 9,13,14,15,16

TESTED BY: A. Laudani

REVIEWED BY:

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

FREQUENCY STABILITY

SHEET - 4 - OF 5_

TEST REPORT # SC303096

TEST AREA __TestRoom 2__

DATE _July 10, 2003__ | EUT MODEL # MT2011, A-KIT 9985-1, MTS-V2-01 | TEMPERATURE __23 °C

SPECIFICATION (S): FCC 47 Part 25.202 Part 2.1055 | EUT SERIAL # _5510/031550634/857_ | HUMIDITY ___50 %

EUT DESCRIPTION MOVEMENT TRACKING SYSTEM | AIR PRESSURE *99.9* kPa

TEMPERATURE VARIATION:
+30.1°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,657,500 Hz	1,633,517,100 Hz	1,633,587,300 Hz	+1200	Yes
2	1,633,656,300 Hz	1,633,519,300 Hz	1,633,587,800 Hz	+1700	Yes
3	1,633,655,900 Hz	1,633,514,500 Hz	1,633,585,200 Hz	-900	Yes
4	1,633,655,500 Hz	1,633,516,300 Hz	1,633,585,900 Hz	-200	Yes
5	1,633,658,100 Hz	1,633,516,300 Hz	1,633,587,200 Hz	+1100	Yes
6	1,633,656,900 Hz	1,633,515,900 Hz	1,633,586,400 Hz	+300	Yes
7	1,633,655,700 Hz	1,633,517,300 Hz	1,633,586,500 Hz	+400	Yes
8	1,633,653,900 Hz	1,633,517,500 Hz	1,633,585,700 Hz	-400	Yes
9	1,633,657,500 Hz	1,633,518,100 Hz	1,633,587,800 Hz	+1700	Yes
10	1,633,658,100 Hz	1,633,515,100 Hz	1,633,586,600 Hz	+500	Yes

TEMPERATURE VARIATION:
+40.1°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,639,100 Hz	1,633,520,900 Hz	1,633,584,900 Hz	-1200	Yes
2	1,633,633,700 Hz	1,633,521,500 Hz	1,633,583,900 Hz	-2200	Yes
3	1,633,647,100 Hz	1,633,521,100 Hz	1,633,584,700 Hz	-1400	Yes
4	1,633,646,100 Hz	1,633,523,700 Hz	1,633,587,100 Hz	+1000	Yes
5	1,633,642,900 Hz	1,633,522,700 Hz	1,633,587,400 Hz	+1300	Yes
6	1,633,643,300 Hz	1,633,519,900 Hz	1,633,584,500 Hz	-1600	Yes
7	1,633,639,700 Hz	1,633,522,900 Hz	1,633,586,100 Hz	--	Yes
8	1,633,642,100 Hz	1,633,524,100 Hz	1,633,585,700 Hz	-400	Yes
9	1,633,642,900 Hz	1,633,523,700 Hz	1,633,586,200 Hz	+100	Yes
10	1,633,641,100 Hz	1,633,518,500 Hz	1,633,584,100 Hz	-2	Yes

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5/23/02

NOTES: EQUIPMENT USED: 9,13,14,15,16

TESTED BY: A. Laudani

REVIEWED BY:

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

FREQUENCY STABILITY

SHEET - 5 - OF 5_

TEST REPORT # SC303096

TEST AREA __TestRoom 2__

DATE _July 10, 2003__ EUT MODEL # MT2011, A-KIT 9985-1, MTS-V2-01 TEMPERATURE __23 °C

SPECIFICATION (S): FCC 47 Part 25.202
Part 2.1055

EUT SERIAL # _5510/031550634/857_ HUMIDITY ___50 %

EUT DESCRIPTION MOVEMENT TRACKING SYSTEM AIR PRESSURE 99.9 kPa

TEMPERATURE VARIATION:
+50.1°C EUT turned on after 1 hour soak at temperature. Limit 0.001% = 16,300 Hz

Time on (min.)	Frequency (high)	Frequency (low)	Frequency (Center)	DELTA Hz	COMPLIES
1	1,633,639,100 Hz	1,633,533,600 Hz	1,633,586,300 Hz	+200	Yes
2	1,633,643,700 Hz	1,633,529,000 Hz	1,633,586,350 Hz	+250	Yes
3	1,633,647,100 Hz	1,633,529,200 Hz	1,633,588,100 Hz	+200	Yes
4	1,633,647,100 Hz	1,633,527,900 Hz	1,633,587,500 Hz	+1400	Yes
5	1,633,646,800 Hz	1,633,524,500 Hz	1,633,585,700 Hz	-400	Yes
6	1,633,642,300 Hz	1,633,527,100 Hz	1,633,584,700 Hz	-1400	Yes
7	1,633,634,700 Hz	1,633,534,700 Hz	1,633,584,200 Hz	-1900	Yes
8	1,633,642,100 Hz	1,633,520,400 Hz	1,633,587,500 Hz	+1400	Yes
9	1,633,642,900 Hz	1,633,528,600 Hz	1,633,585,750 Hz	-350	Yes
10	1,633,642,900 Hz	1,633,527,900 Hz	1,633,585,400 Hz	-700	Yes

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5/23/02

NOTES: EQUIPMENT USED: 9,13,14,15,16

TESTED BY: A. Laudani
A. Laudani

REVIEWED BY: J. Ow

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

REPORT No: SC303096 TESTER: Alan Laudani SPEC: FCC CFR 47 Part 25.202.(f)(1,2,3)

CUSTOMER: Comtech/EF Data TEST DIST: 3 Meters

E U T: Movement Tracking System TEST SITE: Roof

EUT MODE: Transmit BICONICAL: N/A

DATE: July 9, 2003 ERP Factor 5.5 LOG: N/A

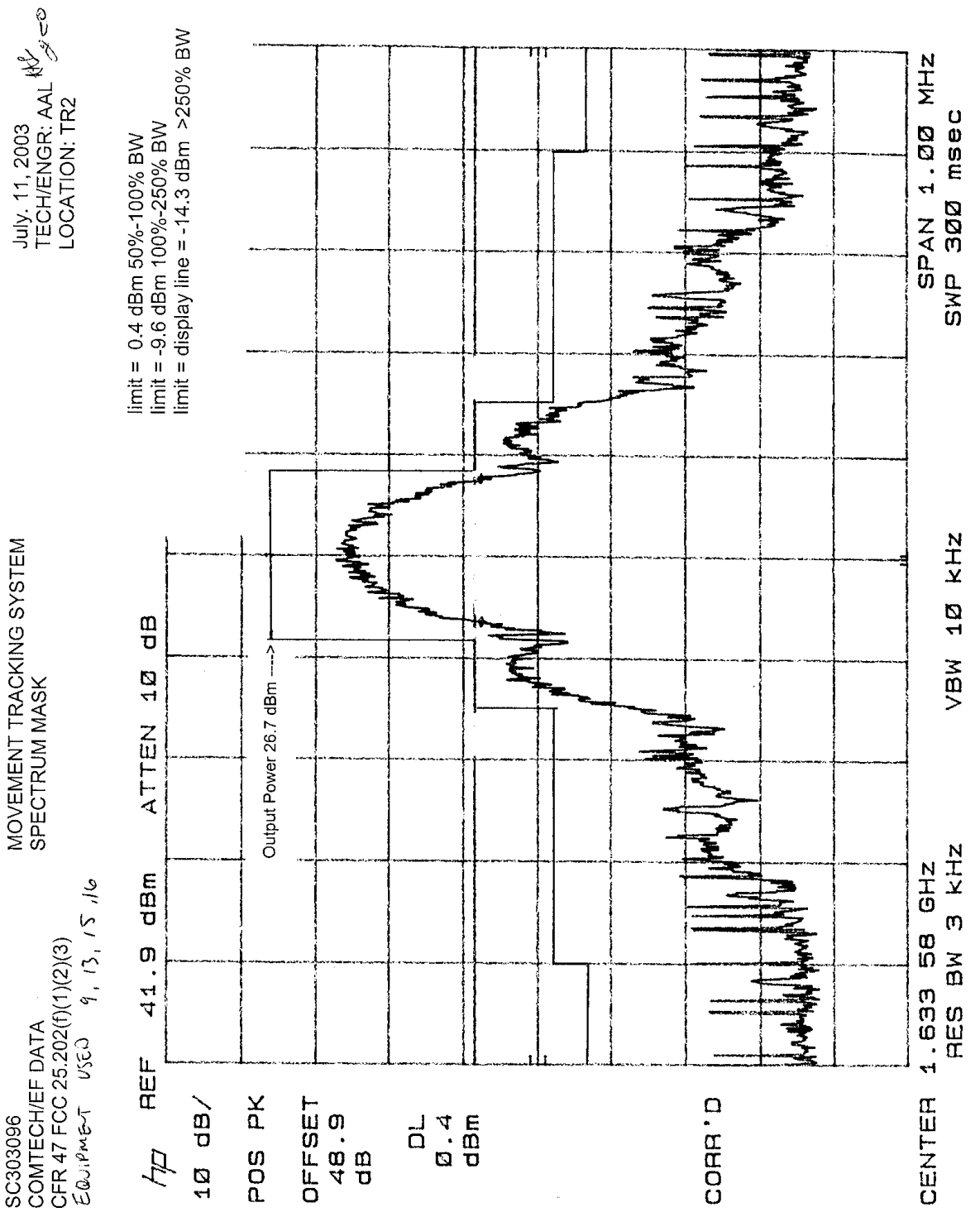
NOTES: RBW = 3 kHz, VBW = 10 KHz HORN: 251

Fundamental: CF = Antenna Factor + Cable Loss

Spurious: CF = Antenna Factor + Cable Loss - Preamplifier Gain

v.beta1a

FREQ (MHz)	VERTICAL (dBuv) pk		HORIZONTAL (dBuv) pk		CF (dB/m)	MAX LEVEL (dBm) pk		SPEC LIMIT (dBm) pk		MARGIN (dB) pk		EUT Rotation	Antenna Height	Notes
3267.18	70.9		57.6		-1.1	**-25.5**		-13.0		-12.5		109	1	
4900.77	55.7		49.9		1.2	**-38.3**		-13.0		-25.3		110	1	
6534.36	55.7		48.9		6.5	**-33.0**		-13.0		-20.0		140	1.2	
8167.95	46.0		37.3		10.6	**-38.7**		-13.0		-25.7		140	1.4	
9801.54	31.7		29.3		11.3	**-52.3**		-13.0		-39.3		96	1.1	
11435.13	34.4		28.3		14.6	**-46.3**		-13.0		-33.3		100	1.3	
13068.72	20.8		29.2		14.3	**-51.8**		-13.0		-38.8		60	1.3	
14702.31	19.9		19.3		17.3	**-58.1**		-13.0		-45.1				noise floor
16335.9	17.7		17.8		19.3	**-58.2**		-13.0		-45.2				noise floor
														Spurious (from prescan)
1439	36.2		53.1		-10.4	**-52.5**		-13.0		-39.5				ambient
2272	20.9		18.8		-5.0	**-79.4**		-13.0		-66.4				noise floor
2438.5	47.5		43.8		-4.2	**-52.0**		-13.0		-39.0				noise floor
2461.45	30.9		42.6		-4.1	**-56.7**		-13.0		-43.7				noise floor
3265.86	19.3		18.9		-1.1	**-77.1**		-13.0		-64.1				noise floor
4899.5	16.5		16.5		1.2	**-77.5**		-13.0		-64.5				noise floor


SC303096
COMTECH/EF DATA
CFR 47 FCC 25.202(f)(1)(2)(3)
EQUIPMENT USED 9, 13, 15, 16
MOVEMENT TRACKING SYSTEM
SPECTRUM MASK
July. 11, 2003
TECH/ENGR: AAL
LOCATION: TR2
limit = 0.4 dBm 50%-100% BW
limit = -9.6 dBm 100%-250% BW
limit = display line = -14.3 dBm >250% BW
Output Power 26.7 dBm ---->
REF 41.9 dBm
ATTEN 10 dB
10 dB/
POS PK
OFFSET
48.9
dB
DL
0.4
dBm
CORR'D
CENTER 1.633 58 GHz
RES BW 3 kHz
VBW 10 kHz
SPAN 1.00 MHz
SWP 300 msec

REPORT No: SC303096 SPEC: FCC Part 25.202(f)(3)

CUSTOMER: Comtech/EF Data TEST DIST: 3 Meters

E U T: Movement Tracking System TEST SITE: 2

EUT MODE: Transmit BICONICAL: 739

DATE: 8-Jul-03 TESTED BY: Alan Laudani LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth. RCVR: 6732

24 Vdc

Equipment Used: 11, 12, 15, 16 * Ambients

Temperature: 28 C Relative Humidity: 43%

EUT MARGIN -47.2 dB at 750 MHz ver 1.8b

FREQUENCY (MHz)	VERTICAL measured (dBuv)	HORIZONTAL measured (dBuV)	CORRECTION FACTOR (dB/m)	MAXIMUM CORRECTED (dBuV/m)	SPECIFIED LIMIT (dBuV/m)	EUT MARGIN (dB)	EUT ROTATION (degrees)	ANTENNA HEIGHT (meters)
38.00	12	7.2	19.5	**31.5**	82.2	-50.7	57	1
80.00	18.2	20.5	9.1	**29.6**	82.2	-52.6	112	1
131.30	5	2.4	13.5	**18.5**	82.2	-63.7	180	1
270.00	1.6	14.1	16.7	**30.8**	82.2	-51.5	135	1
288.00	4.3	15.2	16.9	**32.1**	82.2	-50.1	12	1
291.60	2.5	14.4	17.1	**31.5**	82.2	-50.7	131	1
302.40	0.1	8.4	17.5	**25.9**	82.2	-56.3	135	1
350.00	-0.7	-0.6	19.0	**18.4**	82.2	-63.8	*	
500.00	-1	-0.4	23.2	**22.8**	82.2	-59.4	*	
750.00	3.4	7.4	27.7	**35.1**	82.2	-47.2	*	
990.00	-0.1	-0.1	30.9	**30.8**	82.2	-51.5	*	

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

SC303096

Comtech EF Data

7/9/03
Location: Roof Site
Temperature 21 C, Rel. Hum. 72%

Model: Movement Tracking System
FCC CFR 47 Part 25.202(f)(3)
Part 2.1053 Radiate Spurious Emissions - Results Substitution

Frequency MHz	target level dBuV/m	Ant Gain dBd	cable loss dB	Signal Generator dBm	Total (ERP) dBm	Spec dBm	Margin dBm	
1633.59	96.2	7.4	5.1	24.4	26.7			
3267.18	70.9	9.5	7.6	-30.9	-29.0	-13.0	-16.0	COMPLIES
6534.36	55.7	11.1	12.4	-39.5	-40.8	-13.0	-27.8	COMPLIES

limit = Power level - [43 dB + 10 log Power level]
limit = -43 dB
limit = -13 dBm

Equipment Used: 1,2,3,,5,6,7,8,15,16

Tested by A. Laudani

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

4.0 ATTESTATION STATEMENT

GENERAL REMARKS:

SUMMARY:

All tests were performed per CFR 47, Part(s) 25.202

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, Part(s) 25.202

Testing Start Date: 08 July 2003

Testing End Date: 11 July 2003

- TÜV AMERICA, INC. -

Responsible Engineer:

Jim Owen
(EMC Chief Engineer)

Responsible Engineer:

Alan Laudani
(EMC Engineer)

TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364