



FCC PART 22H, 24E

TEST AND MEASUREMENT REPORT

For

AnyDATA Corporation

5 Oldfield, Irvine, CA 92618, USA

FCC ID: P4M-ACT210

Report Type: Original Report	Product Type: CDMA Vehicle Tracker with Bluetooth Function
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1210105-2224	Original Report	2012-11-27

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *AnyDATA Corporation*, and their product FCC ID: *P4M-ACT210*, model: *ACT210* or the “EUT” as referred on this report is a vehicle tracker with Bluetooth function. Model ACT210 is electronically identical to model ACT231 (FCC ID: P4M-ACT231). The difference is that the RKE transmitter board is removed from model ACT231.

1.2 Mechanical Description of EUT

The “EUT” measures approximately *80 mm (L) x 45mm (W) x 22mm (H)*, and weighs approximately *66.5g*.

The test data gathered are from typical production sample, serial number: 201209294817719 for radiated test and 201209294817718 for conducted test provided by the manufacturer.

1.3 Objective

This type approval report is prepared on behalf of AnyDATA Corporation in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E, of the Federal Communication Commissions rules

The objective is to determine compliance with FCC rules for Radiated Spurious Emissions and RF output power. Other test items related to Part 22H, 24E can be referred to FCC ID: P4M-ACT231.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15.247 report No.: R1210105-15.247 with FCC ID: P4M-ACT210.

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

FCC Part 22 Subpart H – Cellular Radiotelephone Service

FCC Part 24 Subpart E – Broadband PCS

Applicable Standards: TIA/EIA 603-C

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from ± 2.0 dB for Conducted Emissions tests and ± 4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionId=8430d44f1f47cf2996124343c704b367816b>

2 EUT Test Configuration

2.1 Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

The test utility used was AC21SP01 was provided by AnyDATA Corporation and was verified by Wei Sun to comply with the standard requirements being tested against.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Special Equipment

No special equipment used during testing.

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
Dell	Laptop	PP11L	CN-0D4571-48643-57F-7162

2.6 EUT Internal Configuration Details

Manufacturers	Descriptions	Models	Serial Numbers
AnyDATA Corporation	STN (Power) Board	ACT231 STN V1.1	SL100202
AnyDATA Corporation	CDMA and Bluetooth Board	ACT231 MAIN V1.0	2594V-0

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
Power Cable	< 3	EUT	DC/AC
USB Cable	< 3	EUT	Laptop
RF Cable	1	EUT	PSA

2.8 Power Supply List and Details

Manufacturer	Description	Model	Serial Number
HON-KWANG	AC/DC Adapter	HK-Q106-A12	-

3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Tests	Results
§2.1046 §22.913(a), §24.232	RF Output Power	Compliant
§2.1047	Modulation Characteristics	N/A ^{note 1}
§2.1049	Occupied Bandwidth / Out of Band Emissions	N/A ^{note 2}
§2.1053 §22.917, §24.238	Spurious Radiated Emissions	Compliant
§2.1051 §22.917, §24.238	Spurious Emissions at Antenna Terminals	N/A ^{note 2}
§22.917, §24.238	Band Edge	N/A ^{note 2}
§2.1055 §22.355, §24.235	Frequency Stability	N/A ^{note 2}
§2.1091	RF Exposure Information	Compliant

N/A ^{Note1}: EUT uses digital modulation

N/A ^{Note2}: share with FCC ID: P4M-ACT231

4 FCC §2.1053, §22.917 & §24.238 - Spurious Radiated Emissions

4.1 Applicable Standard

Requirements:

FCC §2.1053, §22.917 and §24.238

4.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 log (TX Power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log10 (power out in Watts)

4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Hewlett Packard	Pre-amplifier	8447D	2944A07030	2012-04-11	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2012-04-14	1 year
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2012-08-15	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
HP	Pre-amplifier	8449B	3147A00400	2012-02-03	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
A.R.A Inc.	Horn antenna	DRG-1181A	1132	2012-01-04	1 year
A.H. Systems	Horn antenna	SAS-200/671	261	2012-01-18	1 year
Rohde & Schwarz	Signal Generator	SMIQ03	849192/0085/ DE23746	2012-04-23	1 year

Statement of Traceability: *BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

4.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	40%
ATM Pressure:	101.29kPa

The testing was performed by Wei Sun on 2012-10-29 at 5 meter chamber #3.

4.5 Test Results

Cellular Band, Part 22H: RC2 (S055)

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.52 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC Part 22H	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
1673.04	28.51	0	100	V	1673.04	-43.75	9.46	2.21	-36.5	-13	-23.5
1673.04	28.24	0	100	H	1673.04	-43.98	9.46	2.21	-36.73	-13	-23.73
2509.56	28.17	0	100	V	2509.56	-43.95	9.68	3.04	-37.31	-13	-24.31
2509.56	28.19	0	100	H	2509.56	-43.95	9.68	3.04	-37.31	-13	-24.31
3346.08	27.44	0	100	V	3346.08	-44.76	9.77	3.5	-38.49	-13	-25.49
3346.08	27.36	0	100	H	3346.08	-47.13	9.77	3.5	-40.86	-13	-27.86

PCS Band, Part 24E: RC2 (S055)

30 MHz -20 GHz Radiated Emission at 3-meter (Middle Channel, 1880 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC Part 24E	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
3760	42.25	21	155	V	3760	-31.51	11.14	4	-24.37	-13	-11.37
3760	44.51	169	155	H	3760	-27.71	11.14	4	-20.57	-13	-7.57
5640	27.44	0	100	V	5640	-46.25	11.22	5.63	-40.66	-13	-27.66
5640	27.26	0	100	H	5640	-45.43	11.22	5.63	-39.84	-13	-26.84
7520	27.18	0	100	V	7520	-47.11	10.14	6.54	-43.51	-13	-30.51
7520	27.26	0	100	H	7520	-45.92	10.14	6.54	-42.32	-13	-29.32

5 FCC §2.1046, §22.913(a) & §24.232 – RF Output Power

5.1 Applicable Standard

According to FCC §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

According to FCC §24.232 , Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

5.2 Test Procedure

Conducted:

The RF output of the transmitter was connected to the signal generator and the spectrum analyzer through sufficient attenuation.

Radiated method:

TIA 603-C section 2.2.17

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Interval
Hewlett Packard	Pre-amplifier	8447D	2944A07030	2012-04-11	1 year
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2012-04-14	1 year
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2012-08-15	1 year
Sunol Science Corp	System Controller	SC99V	122303-1	N/R	-
HP	Pre-amplifier	8449B	3147A00400	2012-02-03	1 year
Agilent	Spectrum Analyzer	E4440A	MY44303352	2012-05-10	1 year
A.R.A Inc.	Horn antenna	DRG-1181A	1132	2012-01-04	1 year
A.H. Systems	Horn antenna	SAS-200/671	261	2012-01-18	1 year
Rohde & Schwarz	Signal Generator	SMIQ03	849192/0085/ DE23746	2012-04-23	1 year

Statement of Traceability: *BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.*

5.4 Test Environmental Conditions

Temperature:	23 °C
Relative Humidity:	40%
ATM Pressure:	101.29kPa

The testing was performed by Wei Sun on 2012-10-29 at 5 meters chamber #3.

5.5 Test Results

Conducted:

Cellular Band Part 22H

Mode	FED	REV	Low CH (824.7 MHz)	Middle CH (836.52 MHz)	High CH (848.31MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1 (S02)	24.47	24.21	24.45	38.45
	RC1	RC1 (S055)	24.47	24.19	24.44	38.45
	RC2	RC2 (S09)	24.43	24.20	24.45	38.45
	RC2	RC2 (S055)	24.51	24.24	24.48	38.45
	RC3	RC3 (S02)	24.44	24.22	24.46	38.45
	RC3	RC3 (S055)	24.46	24.21	24.43	38.45
	RC4	RC3 (S02)	24.45	24.20	24.47	38.45
	RC4	RC3 (S055)	24.46	24.23	24.46	38.45
	RC5	RC4 (S09)	24.48	24.22	24.44	38.45
	RC5	RC4 (S055)	24.47	24.20	24.45	38.45

PCS Band Part 24E

Mode	FED	REV	Low CH (1851.25 MHz)	Middle CH (1880.0 MHz)	High CH (1908.75 MHz)	Limit (dBm)
CDMA2000 1xRTT	RC1	RC1 (S02)	25.14	24.33	24.79	33
	RC1	RC1 (S055)	25.18	24.41	24.71	33
	RC2	RC2 (S09)	25.16	24.39	24.68	33
	RC2	RC2 (S055)	25.27	24.43	24.85	33
	RC3	RC3 (S02)	25.20	24.41	24.67	33
	RC3	RC3 (S055)	25.16	24.37	24.66	33
	RC4	RC3 (S02)	25.22	24.37	24.64	33
	RC4	RC3 (S055)	25.17	24.38	24.58	33
	RC5	RC4 (S09)	25.11	24.29	24.68	33
	RC5	RC4 (S055)	25.25	24.30	24.70	33

ERP/EIRP:

Cellular Band Part 22H: RC2 (S055)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
824.7	88.51	273	126	V	824.7	25.18	0	1.29	23.89	38.45	-14.56
824.7	86.95	218	155	H	824.7	23.97	0	1.29	22.68	38.45	-15.77
836.52	92.26	277	161	V	836.52	24.64	0	1.29	23.35	38.45	-15.1
836.52	90.74	222	155	H	836.52	22.08	0	1.29	20.79	38.45	-17.66
848.31	90.04	274	127	V	848.31	24.46	0	1.29	23.17	38.45	-15.28
848.31	90.55	241	159	H	848.31	25.45	0	1.29	24.16	38.45	-14.29

PCS Band Part 24E: RC2 (S055)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)		
1851.25	90.76	129	110	V	1851.25	17.99	8.74	2.37	24.36	33	-8.64
1851.25	91.42	267	155	H	1851.25	18.56	8.74	2.37	24.93	33	-8.07
1880	90.1	245	155	V	1880	17.87	8.74	2.37	24.24	33	-8.76
1880	90.19	219	122	H	1880	17.89	8.74	2.37	24.26	33	-8.74
1908.75	89.41	146	156	V	1908.75	17.55	8.74	2.37	23.92	33	-9.08
1908.75	90.21	127	205	H	1908.75	18.42	8.74	2.37	24.79	33	-8.21

6 FCC §1.1307(b)(1) & §2.1091 – RF Exposure Information

6.1 Applicable Standard

According to FCC §2.1091, §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

6.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

6.3 MPE Results

Cellular Band

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>24.51</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>282.49</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>824.7</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>-3.0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>0.5</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.0281</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>0.5498</u>

PCS Band

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>25.27</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>336.51</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>1851.25</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>-3.0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>0.5</u>
<u>Power density of prediction frequency at 20 cm (mW/cm²):</u>	<u>0.0335</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm²):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure.