



# ***Castra without Zigbee FCC Part 22&24 Test Report***

**80-VR789-4 Rev. A**

**June 25, 2009**

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June 25, 2009

Castra without Zigbee FCC Part 22&24 Test Report  
80-VR789-4 Rev. A

## Revision history

Revision	Date	Description
A	June 2009	Initial release

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## VERIFICATION TEST REPORT

**Report Number:** 2009 05128052 FCCA

**Project Number:** 28489-1

**Nex Number:** 128052

**Applicant:** QUALCOMM INC.  
5775 MOREHOUSE DR  
SAN DIEGO, CA 92121


**Equipment Under Test (EUT):** TRACKING MODULE

**Model:** CASTRA WITHOUT ZIGBEE

**FCC ID:** J9CCASTRAWOZB

**In Accordance With:** FCC Part 22, Subpart H  
FCC Part 24, Subpart E

**Tested By:** Nemko USA Inc.  
11696 Sorrento Valley Road, Suite F  
San Diego, CA 92121

**Authorized By:**   
Alan Laudani, EMC/RF Test Engineer

**Date:** May 16, 2009

**Revision A:** June 25, 2009

**Total Number of Pages:** 25

## Section1: Summary of Test Results

### General

#### All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 22 and Part 24. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

<b>Apparatus Assessed:</b>	Tracking Module
<b>Model:</b>	Castra without Zigbee
<b>Specification:</b>	FCC Part 22, Subpart H FCC Part 24, Subpart E
<b>Date Received in Laboratory:</b>	May 12, 2009
<b>Compliance Status:</b>	Complies
<b>Exclusions:</b>	None
<b>Non-compliances:</b>	None



**Report Release History**

REVISION	DATE	COMMENTS
-	May 16, 2009	Prepared By: Ferdinand Custodio
-	May 16, 2009	Initial Release: Alan Laudani
A	June 25, 2009	Release: Alan Laudani

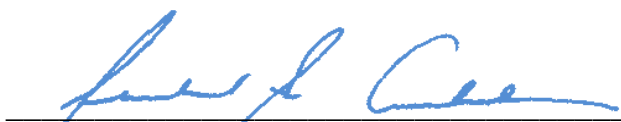
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Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:   
Ferdinand S. Custodio, EMC Test Engineer

Date: May 16, 2009

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## Section 2: Equipment Under Test

### Product Identification

The Equipment Under Test was indentified as follows:

**QUALCOMM INC. CASTRA WITHOUT ZIGBEE TRACKING MODULE (SN B0A4F5 / PN 20-A6248-1) with MU901/1801/UMTS-MMS Magnetic Mount, Triple Frequency Mobile Antenna**







## Theory of Operation

The Castra without Zigbee is a Tracking Module. The inGeo II module, Castra without Zigbee, is the Qualcomm® second generation dedicated tracking module. inGeo II is a CDMA2000®-1X module powered by the Qualcomm QSC6055™ chipset. Gen II module supports CDMA BC0 and BC1, with a single diversity in addition to GPS. The module also hosts, as options, a Bosch three axes accelerometer. inGeo II modules are meant to be integrated into various dedicated tracking devices and can include a customized UI, antenna, and additional proprietary circuitry. The following Figure 1 provides the general module mechanical dimensions.

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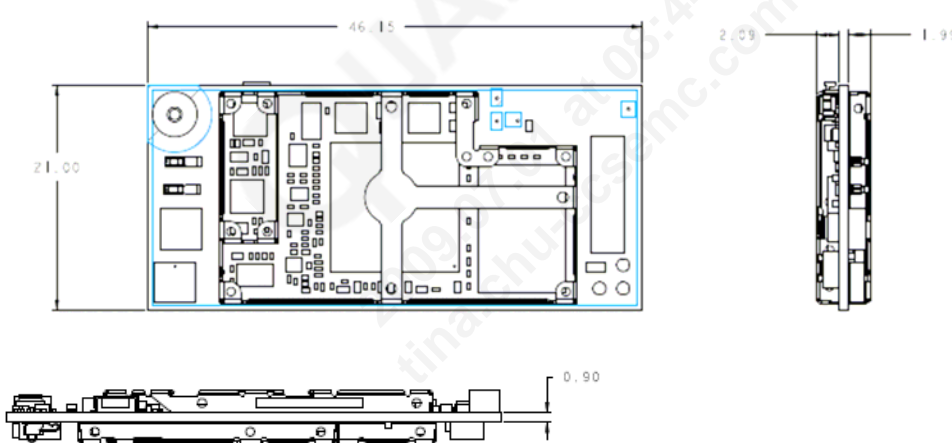


Figure 1 inGeo module dimensions

It is a 7.3 gram, 21 mm x 46 mm x 5 mm sized devices. While CDMA2000 1X compliant, the HTT design is optimized for minimal cost, minimal size, maximum battery life and superb position location performance. The device uses A-GPS to obtain position location and sends this information back to the network by SMS or packed data. For the most active mode of operation, a position fix occurs about every 15 seconds followed by a 3 second SMS message or packet data stream. Other modes of simplified operation request position fixes less often. The hibernation mode extends the battery life beyond normal cellular phone standby time. Hibernation technology comprises of several innovative modes of battery saving. Smart mechanism selects the best fit mode based on future activities of the device.



**The main on-board Qualcomm chipsets include:**

Single chip solution (Baseband + RF + Power Management): QSC6055™

Key connectivity support includes:

- Generic 40-pin connector providing USB 2.0 high-speed, power, GPIOs and serial interfaces
- Antenna pads and test connector
- Audio interface (microphone and loudspeaker)
- Battery connection

**Technical Specifications of the EUT****Manufacturer:** Qualcomm Inc.**Operating Frequency:**

Operating Band	Tx Frequency Range (MHz)	Rx Frequency Range (MHz)
CDMA Cell (BC0)	824 to 849	869 to 894
CDMA PCS (BC1)	1850 to 1910	1930 to 1990
GPS Position Locator		1574.42 to 1576.42

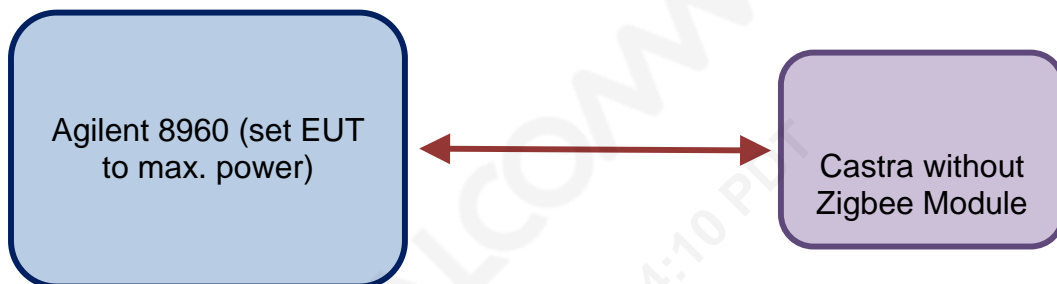
**Peak Output Power:** 0.31 watts ERP in cell; 0.76 watts EIRP in PCS**Emission Designator:**

Mode	Tx Frequency Range (MHz)	Emission Designator
CDMA	824.7 – 848.31	1M28F9W
	1851.25 – 1908.75	1M28F9W

**Modulation:** CDMA 1X-BPSK**Antenna Data:** Mobile: Cellular and PCS band. Antenna gain is 0dBi**Antenna Connector:** U.FL-R-SMT (Hirose)**Power Source:** 3.8VDC



**Block Diagram of the EUT Setup**



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**Summary of Test Results**

**Maximum Radiated Output Power**

Mode	Max Power in Cell band (ERP)	Max Power in PCS band (EIRP)
CDMA 1X	24.95dBm/0.31 watts	28.79 dBm/0.76 watts

**Field Strength of Spurious**

Mode	Frequency (MHz)	Total Power (dBm)	Spec (dBm)	Margin (dBm)
CDMA 1X (PCS)	3702.50	-33.08	-13	-20.1
CDMA 1X (PCS)	5553.75	-32.15	-13	-19.2
CDMA 1X (PCS)	3760.00	-33.23	-13	-20.2
CDMA 1X (PCS)	5640.00	-34.15	-13	-21.2
CDMA 1X (PCS)	3817.50	-33.27	-13	-20.3
CDMA 1X (PCS)	5726.25	-33.44	-13	-20.4
CDMA 1X (PCS)	3702.50	-33.08	-13	-20.1

Note the table only lists the spurious which are within 20dB of the limits.



## Section 3: Test Methodology

### 3.1 Test Standards

The tests documented in this report were performed in accordance with:

- FCC CFR 47 Part 2
- FCC CFR 47 Part 22, Subpart H Cellular Radiotelephone Service
- FCC CFR 47 Part 24, Subpart E Broadband PCS
- TIA/EIA 603C (2004)
- ANSI C63.4 (2003)

### 3.2 Antenna Substitution Method

1) Methodology Used: TIA/EIA-603 Clause 2.2.17

2) The Substitution Method is used for fundamental power levels and spurious emissions when RF emission signals are measured within 20 dB of the limit.

3) Formula Used to calculate the values:

- a) Measured value + antenna factor + cable loss - preamplifier = Max Level
- b) Margin = Max level - Limit
- c) Signal Generator power level - cable loss + antenna gain = ERP Part 22 or EIRP Part 24
- d) Substituted Margin = ERP (or EIRP) - Limit

Note: gain for dipole = 0; antenna factor is not the same as antenna gain

Note: The signal generator power level is the power required when transmitting into the substituting antenna to duplicate the Measured Value. Substituted margin is reported in 731 forms pertaining to certification grants and Class II Permissive Changes when a direct conducted power reading cannot be performed.



## **Section 4: Test Conditions**

### **4.1 Specifications**

The apparatus was assessed against the following specifications:

- FCC Part 22, Subpart H Cellular Radiotelephone Service
- FCC Part 24, Subpart E Broadband PCS

### **4.2 Deviations From Laboratory Test Procedures**

No deviations were made from laboratory test procedures.

### **4.3 Test Environment**

All tests were performed under the following environmental conditions:

Temperature range : 13-18 °C  
Humidity range : 63-83 %  
Pressure range : 102 - 105 kPa



**Test Equipment**

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
746	Signal Generator	HP	8648B	3642U1905	22-Jan-09	22-Jan-10
765	Antenna Set, Dipole	EMCO	3121C	1214	25-Jul-08	25-Jul-10
752	Antenna, DRWG	EMCO	3115	4943	12-Nov-08	12-Nov-10
317	Preamplifier	HP	8449A	2749A00167	16-Apr-09	16-Apr-10
901	pre amp	Sonoma	310 N	130607	27-Mar-09	27-Mar-10
115	Antenna, Bicon	EMCO	3104	3020	15-Sep-08	15-Sep-10
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	28-Jul-08	28-Jul-10
111	Antenna, LPA	EMCO	3146	1382	20-Oct-08	20-Oct-10
911	Spectrum Analyzer	Agilent	E4440A	US41421266	06-Nov-08	06-Nov-09

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2040B-1 OATS/RN# 329550-01

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## **Section 5: Observations**

### **5.1 Modifications Performed During Assessment**

No modifications were performed during assessment.

### **5.2 Record Of Technical Judgements**

No technical judgements were made during the assessment.

### **5.3 EUT Parameters Affecting Compliance**

The user of the apparatus could not alter parameters that would affect compliance.

### **5.4 Test Deleted**

See Section 6.

### **5.5 Additional Observations**

There were no additional observations made during this assessment.

## Section 6: Results Summary

The results contained in this section are representative of the operation of the apparatus as originally submitted.

Name of Test	Para. No.	Result
RF Power Output	2.1046	COMPLIES
Audio Low Pass Filter Response	2.1047	NA <sup>1</sup>
Audio Frequency Response	2.1047	NA <sup>1</sup>
Modulation Limiting	2.1047	NA <sup>1</sup>
Occupied Bandwidth (WB Data)	2.1049	NA <sup>2</sup>
Spurious Emissions at antenna Terminals	2.1051	NA <sup>2</sup>
Field Strength of Spurious Emissions	2.1053	COMPLIES
Frequency Stability	2.1055	NA <sup>2</sup>

**Footnotes for N/A's:**

<sup>1</sup>Digital Modulation

<sup>2</sup>Test methodology and results will be provided by the client





## Appendix A: Test Results

### Para. No. : 2.1046 RF Power Output

#### **§ 22.913 Effective radiated power limits.**

The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone Service must not exceed the limits in this section.

(a) *Maximum ERP.* In general, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. However, for those systems operating in areas more than 72 km (45 miles) from international borders that:

- (1) Are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census; or,
- (2) Extend coverage on a secondary basis into cellular unserved areas, as those areas are defined in §22.949, the ERP of base transmitters and cellular repeaters of such systems must not exceed 1000 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

#### **§ 24.232 Power and antenna height limits.**

(c) 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.

(d) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

### Test Conditions:

Sample Number:	Castra without Zigbee	Temperature:	16.7-18°C
Date:	May 12, 2009 and May 13, 2009	Humidity:	67-81%
Test Procedure:	ANSI C63.4 (2003) Clause 8	Tester:	FSCustodio
		Laboratory:	SOATS

### Test Results:

Complies, see tables in the following pages.

**Additional Observations:**

- Emissions within 20 dB of the limit were substituted by a signal generator and matching antenna and were shown to comply. Please see Field Strength of Spurious Emissions test for substitution data.

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**Radiated Power Data**

Job #: 28489-1 Test #: 2  
Page 1 of 1

Client Name :	<u>Qualcomm</u>		
EUT Name :	<u>Tracking Device</u>		
EUT Model # :	<u>Castra without Zigbee</u>		
EUT Part # :	<u>20-A6248-1</u>		
EUT Serial # :	<u>B0A4F5</u>		
EUT Config. :	<u>CDMA 2000 1X RC3 SO55</u>		
Specification :	<u>FCC Part 22</u>		
Rod. Ant. # :	<u>NA</u>	Temp. (°C) :	<u>17.3</u>
Bicon Ant. # :	<u>NA</u>	Humidity (%) :	<u>81</u>
Log Ant. # :	<u>111_3m</u>	EUT Voltage :	<u>3.8 VDC</u>
DRG Ant. # :	<u>877</u>	EUT Frequency :	<u>NA</u>
Dipole Ant. # :	<u>NA</u>	Phase :	<u>NA</u>
Cable# :	<u>SOATS</u>	Location :	<u>RN#: 329550-01</u>
Preamp# :	<u>NA</u>	Distance :	<u>3m</u>
Spec An. # :	<u>911</u>	ERP conversion factor :	<u>7</u>
QP # :	<u>NA</u>		
PreSelect# :	<u>NA</u>		

Reference :  
Date : 5/12/2009  
Time : 8:00AM  
Staff : FSCustodio  
Photo ID : \_\_\_\_\_  
Peak Bandwidth: 1.3 MHz  
Video Bandwidth 5 MHz

Meas. Freq. (MHz)	Meas. (dBuV) pk	Ant Orientation	CF (db)	Max Level (dBm) pk	Spec. Limit (ERP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	COMMENT
824.70	97.9	V	25.38	26.0	38.5	-12.4	B	1.2	Pass	
836.52	97.7	V	25.62	26.0	38.5	-12.4	B	1.2	Pass	
848.31	97.9	V	25.81	26.4	38.5	-12.1	B	1.2	Pass	



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**Radiated Power Data**

Job # : 28489-1 Test # : 3  
Page 1 of 1

Client Name : Qualcomm  
EUT Name : Tracking Device  
EUT Model # : Castra without Zigbee  
EUT Part # : 20-A6248-1  
EUT Serial # : B0A4F5  
EUT Config. : CDMA 2000 1X PCS RC3 SO55

Specification :	<u>FCC Part 24</u>	Reference :	
Rod. Ant. #:	<u>NA</u>	Temp. (°C) :	<u>18</u>
Bicon Ant.#:	<u>NA</u>	Humidity (%) :	<u>67</u>
Log Ant.#:	<u>111_3m</u>	EUT Voltage :	<u>3.8VDC</u>
DRG Ant. #	<u>877</u>	EUT Frequency :	<u>NA</u>
Dipole Ant.#:	<u>NA</u>	Phase:	<u>NA</u>
Cable#:	<u>40ft</u>	Location:	<u>RN#: 329550-01</u>
Preamp#:	<u>NA</u>	Distance:	<u>3m</u>
Spec An.#:	<u>911</u>	EIRP conversion fact	<u>5.5</u>
QP #:	<u>NA</u>		
PreSelect#:	<u>NA</u>		

Date : 5/12/2009  
Time : 8:00AM  
Staff : FSCustodio  
Photo ID: \_\_\_\_\_  
Peak Bandwidth: 1.3 MHz  
Video Bandwidth: 5 MHz

Meas. Freq. (MHz)	Meas. (dBuV) pk	Ant Orientation	CF (db)	Max Level (dBm) pk	Spec. Limit (EIRP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	COMMENT
1851.25	94.0	V	30.0	28.8	33.0	-4.2	B	1.0	Pass	
1880.00	93.4	V	30.0	28.2	33.0	-4.8	B	1.0	Pass	
1908.75	92.3	V	30.1	27.2	33.0	-5.8	B	1.0	Pass	



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**Radiated Emissions Data**

Job # : 28489-1 Test # : 1  
Page 1 of 1

Client Name : Qualcomm  
EUT Name : Tracking Device  
EUT Model # : Castra without Zigbee  
EUT Serial # : B0A4F5  
EUT Config. : CDMA 1X , BC0, TX

Specification : FCC Part 22 Reference : \_\_\_\_\_  
Rod. Ant. # : \_\_\_\_\_ Temp. (°C) : 16.7 Date : 05/13/09  
Bicon Ant.# : \_\_\_\_\_ Humidity (%) : 70 Staff : Ferdinand Custodio  
Log Ant.# : 110 EUT Voltage : NA Peak Bandwidth: 1 MHz  
DRG Ant. # : 877 EUT Frequency : NA Video Bandwidth 1 MHz  
Dipole Ant.#: \_\_\_\_\_ Phase: NA  
Cable#: 40ft Location: RN # 329550-01  
Preamp#: 317 Distance: 3m  
Spec An.#: 911 ERP conversion factor 7

Meas. Freq. (MHz)	Vertical (dBuV) pk	Horizontal (dBuV) pk	CF (db)	Max Level (dBm) pk	Spec. Limit (ERP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	Comment
1649.40	60.1	57.0	-5.3	-42.5	-13.0	-29.5		1.2	Pass	*
2474.10	47.0	47.0	0.9	-49.3	-13.0	-36.3			Pass	NF
3298.80			4.5		-13.0					NF
4123.50	51.0	49.9	7.6	-38.7	-13.0	-25.7		1.2	Pass	*
4948.20	47.4	47.4	8.7	-41.2	-13.0	-28.2			Pass	NF
5772.90			11.6		-13.0					NF
6597.60			14.3		-13.0					NF
7422.30			16.7		-13.0					NF
8247.00			18.9		-13.0					NF
9071.70			20.1		-13.0					NF
1673.04	62.5	59.0	-5.3	-40.1	-13.0	-27.1		1.2	Pass	*
2509.56	48.9	48.9	2.8	-45.6	-13.0	-32.6			Pass	NF
3346.08			5.4		-13.0					NF
4182.60	49.8	49.7	7.6	-39.9	-13.0	-26.9		1.2	Pass	*
5019.12	47.0	47.0	10.6	-39.6	-13.0	-26.6			Pass	NF
5855.64			11.8		-13.0					NF
6692.16			14.2		-13.0					NF
7528.68			16.9		-13.0					NF
8365.20			19.3		-13.0					NF
9201.72			20.5		-13.0					NF
1696.62	62.3	60.0	-5.3	-40.3	-13.0	-27.3		1.2	Pass	*
2544.93	50.2	48.5	2.8	-44.2	-13.0	-31.2		1.2	Pass	*
3393.24	50.6	49.3	5.4	-41.3	-13.0	-28.3		1.2	Pass	*
4241.55	51.2	51.0	7.6	-38.5	-13.0	-25.5		1.2	Pass	*
5089.86	47.2	47.2	10.6	-39.4	-13.0	-26.4			Pass	NF
5938.17			11.8		-13.0					NF
6786.48			14.7		-13.0					NF
7634.79			16.9		-13.0					NF
8483.10			18.9		-13.0					NF
9331.41			20.2		-13.0					NF

\* = Signal Measured NF = Noise Floor, no signal observed, even at lower RBW.

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**Radiated Emissions Data**

Job #: 28489-1 Test #: 6  
Page 1 of 1

Client Name : Qualcomm  
EUT Name : Tracking Device  
EUT Model # : Castra without Zigbee  
EUT Serial # : B0A4F5  
EUT Config. : CDMA 1X , BC1, TX

Specification : FCC Part 24 Reference : \_\_\_\_\_  
Rod. Ant. #: \_\_\_\_\_ Temp. (°C) : 16.7 Date : 05/13/09  
Bicon Ant.#: \_\_\_\_\_ Humidity (%) : 70 Staff : Ferdinand Custodio  
Log Ant.#: 110 EUT Voltage : NA Peak Bandwidth: 1 MHz  
DRG Ant. # 877 EUT Frequency NA Video Bandwidth 1 MHz  
Dipole Ant.#: \_\_\_\_\_ Phase: NA  
Cable#: 40ft Location: RN # 329550-01  
Preamp#: 317 Distance: 3m  
Spec An.#: 911 EIRP conversion: 5.5

Meas. Freq. (MHz)	Vertical (dBuV) pk	Horizontal (dBuV) pk	CF (db)	Max Level (dBm) pk	Spec. Limit (ERIP) (dBm) pk	Margin dB pk	EUT Rotation	Ant. Height	Pass Fail Unc.	Comment
3702.50	62.86	59.72	5.6	-26.8	-13.0	-13.8		1.2	Pass	*
5553.75	55.66	52.13	11.0	-28.6	-13.0	-15.6		1.2	Pass	*
7405.00	44.67	44.67	16.7	-33.9	-13.0	-20.9			Pass	NF
9256.25			20.5		-13.0					NF
11107.50			24.4		-13.0					NF
12958.75			27.0		-13.0					NF
14810.00			35.3		-13.0					NF
16661.25			42.8		-13.0					NF
18512.50			60.3		-13.0					NF
20363.75			69.3		-13.0					NF
3760.00	61.09	56.93	5.6	-28.6	-13.0	-15.6		1.2	Pass	*
5640.00	53.60	49.62	11.2	-30.4	-13.0	-17.4		1.2	Pass	*
7520.00	44.43	44.43	16.9	-34.0	-13.0	-21.0			Pass	NF
9400.00			20.2		-13.0					NF
11280.00			23.9		-13.0					NF
13160.00			28.8		-13.0					NF
15040.00			37.1		-13.0					NF
16920.00			42.8		-13.0					NF
18800.00			60.4		-13.0					NF
20680			71.7		-13.0					NF
3817.50	61.99	57.87	5.9	-27.3	-13.0	-14.3		1.2	Pass	*
5726.25	53.23	49.57	11.6	-30.4	-13.0	-17.4		1.2	Pass	*
7635.00	44.69	44.69	16.9	-33.7	-13.0	-20.7			Pass	NF
9543.75			20.3		-13.0					NF
11452.50			24.3		-13.0					NF
13361.25			28.2		-13.0					NF
15270.00			36.6		-13.0					NF
17178.75			48.6		-13.0					NF
19087.50			61.9		-13.0					NF
20996.25			72.2		-13.0					NF

\* = Signal Measured NF = Noise Floor, no signal observed, even at lower RBW.

**Test Procedure:** TIA/EIA 603 Clause 2.2.17

**Para. No.:2.1053 Field Strength of Spurious (Substitution Method including Fundamental)**



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**Substitution Method For Radiated Emissions**

Complete <u> X </u>	Job # : <u> 28489-1 </u>	Test # : <u> 1 </u>
Preliminary <u> </u>	Page <u> 1 </u>	of <u> 1 </u>
Client Name : <u> Qualcomm </u>		
EUT Name : <u> Tracking Module </u>		
EUT Model # : <u> Castra without Zigbee </u>		
EUT Part # : <u> 20-A6248-1 </u>		
EUT Serial # : <u> B0A4F5 </u>		
EUT Config. : <u> CDMA 2000 1X RC3 S055 </u>		
Specification : <u> FCC Part 22 </u>		Reference : <u> </u>
Rod. Ant. # : <u> NA </u>	Temp. (deg. C) : <u> 13 </u>	Date : <u> 5/13/2009 </u>
Bicon Ant.#: <u> NA </u>	Humidity (%) : <u> 83 </u>	Time : <u> 1PM </u>
Log Ant.#: <u> 111 </u>	EUT Voltage : <u> NA </u>	Staff : <u> FSCustodio </u>
DRG Ant. # <u> NA </u>	EUT Frequency : <u> NA </u>	Photo ID: <u> </u>
Dipole Ant.#: <u> 765 </u>	Phase: <u> NA </u>	Peak Bandwidth: <u> 1.3MHz RBW </u>
Cable#: <u> 60ft </u>	Location: <u> RN# 329550-01 </u>	
Preamp#: <u> NA </u>	Distance: <u> 3m </u>	
Spec An.#: <u> 911 </u>		
QP #: <u> 911 </u>		
Sig Gen#: <u> 746 </u>		

**Part 22 Substitution (Fundamental)**

Target		dipole	Cable loss dB	Signal Generator dBm	Total (ERP) dBm	Spec dBm	Margin dBm
Frequency MHz	Level dBuV/m						
824.70	97.9		3.48	28.19	24.71	38.45	-13.7
836.52	97.7		3.54	28.12	24.58	38.45	-13.9
848.31	97.9		3.55	28.5	24.95	38.45	-13.5



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**Substitution Method For Radiated Emissions**

Complete <u>  X  </u>	Job # : <u>  28489-1  </u>	Test # : <u>      1      </u>
Preliminary <u>      </u>	Page <u>      1      </u>	of <u>      1      </u>

Client Name : Qualcomm  
 EUT Name : Tracking Device  
 EUT Model # : Castra without Zigbee  
 EUT Part # : 20-A6248-1  
 EUT Serial # : B0A4F5  
 EUT Config. : Transmit at max power

Specification : <u>FCC Part 24</u>	Reference : <u>      </u>
Rod. Ant. # : <u>  NA  </u> Temp. (deg. C) : <u>  13  </u>	Date : <u>5/13/2009</u>
Bicon Ant.# : <u>  NA  </u> Humidity (%) : <u>  83  </u>	Time : <u>2:30PM</u>
Log Ant.# : <u>  NA  </u> EUT Voltage : <u>  NA  </u>	Staff : <u>FSCustodio</u>
DRG Ant. # <u>529/877</u> EUT Frequency : <u>  NA  </u>	Photo ID: <u>      </u>
Dipole Ant.# : <u>  NA  </u> Phase: <u>  NA  </u>	Peak Bandwidth: <u>1.3MHz RBW-Fundamental</u>
Cable# : <u>  60ft  </u> Location: <u>RN# 329550-01</u>	<u>1.0MHz RBW-Harmonics</u>
Preamp# : <u>  NA  </u> Distance: <u>  3m  </u>	
Spec An.# : <u>  911  </u>	
QP # : <u>  911  </u>	
Sig Gen# : <u>  746  </u>	

***Part 24 Substitution Fundamental***

Target		Horn Gain dBi	Cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
Frequency MHz	Level dBuV/m						
1851.25	94.0	8.8	5.35	25.34	28.79	33	-4.2
1880.00	93.4	8.8	5.52	25.08	28.36	33	-4.6
1908.75	92.3	8.9	5.46	24.89	28.33	33	-4.7

***Part 24 Substitution Harmonics***

Target		Horn Gain dBi	Cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
Frequency MHz	Level dBuV/m						
3702.50	62.9	9.9	7.53	-35.45	-33.08	-13	-20.1
5553.75	55.7	10.86	9.78	-33.23	-32.15	-13	-19.2
3760.00	61.1	9.9	7.57	-35.56	-33.23	-13	-20.2
5640.00	53.6	10.97	9.78	-35.34	-34.15	-13	-21.2
3817.50	62.0	9.9	7.94	-35.23	-33.27	-13	-20.3
5726.25	53.2	11.07	9.84	-34.67	-33.44	-13	-20.4



## Appendix B: Setup Photographs





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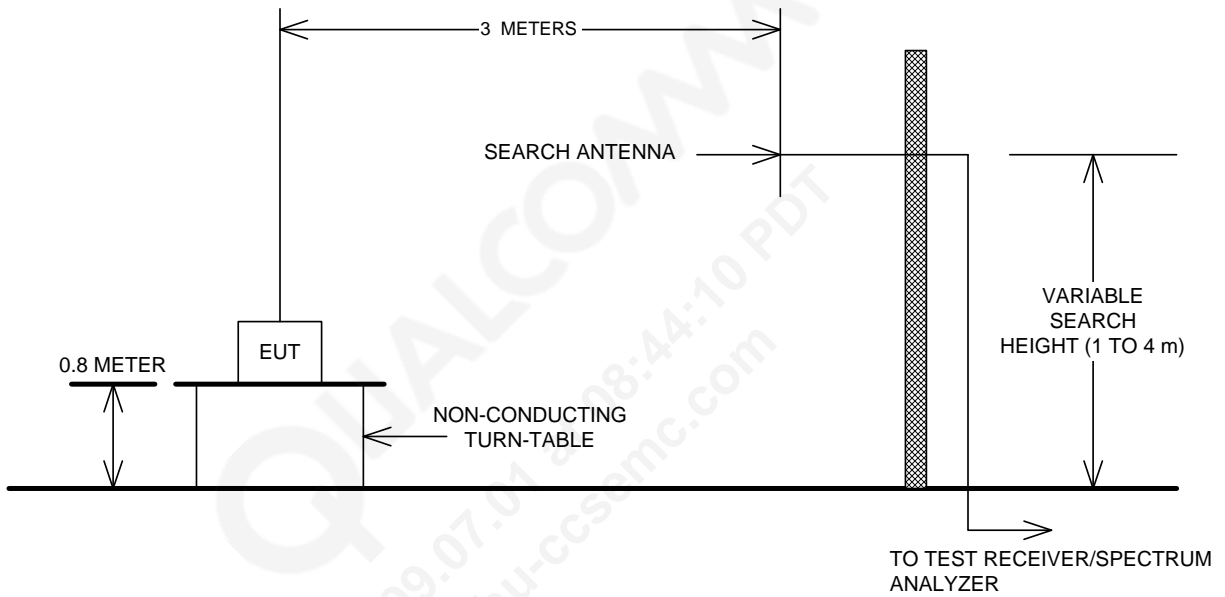
[www.nemko.com](http://www.nemko.com)

2009.07.01 at 08:44:10  
tina.chu-cisemc.com



## Appendix C: Block Diagram of Test Setups

### Test Site For Radiated Emissions



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