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VERIFICATION TEST REPORT

Report Number: 2010 03145986 FCC

Project Number: 40965

Nex Number: 145986

Applicant: Qualcomm Inc.
5775 Morehouse Dr
San Diego, CA 92121

Equipment Under Test (EUT): Tracking Module

Model: WMD 1x

FCC ID: J9CWMD1X

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: March 12, 2010

Total Number of Pages: 30

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 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.

The assessment summary is as follows:

Apparatus Assessed:	Tracking Module
Model:	WMD 1x
Specification:	FCC Part 22, Subpart H FCC Part 24, Subpart E
Date Received in Laboratory:	March 11, 2010
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

Report Release History

REVISION	DATE	COMMENTS
-	March 12, 2010	Prepared By: Alan Laudani
-	March 12, 2010	Initial Release:

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:  Date: March 12, 2010
Alan Laudani, EMC Test Engineer



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Section 2: Equipment Under Test

Product Identification

The Equipment Under Test was indentified as follows:

Qualcomm Inc.
Model: WMD 1x
EUT: Tracking Module
Serial number: O21G4UKW3

Theory of Operation

The Wearable Mobile Device (WMD) is an ultra small, 21 x 22 x 4.5 mm WWAN module that can be integrated into a multitude of host devices. The WMD 1x module operates on the 800/1900 MHz CDMA2000 1x networks. The module uses Qualcomm's QSC 6055 chip set and has stand alone GPS, AGPS, gpsOneXTRA-tm and Bluetooth 2.0 technologies. Interfaces for the module include USB 2.0, Bluetooth 2.0, I2C, RUIM support, LCD, camera, keypad, 2 LED control lines, vibrator control, audio and primary RF coax. HTT is designed to be placed in a user's bag or attached to a belt or other article of clothing. The WMD design is optimized for minimal cost, minimal size, maximum battery life and superb position location performance. The WMD 1X device meets the following standards: IS-2000 for CDMA 1xRTT, IS-707-A Data, IS-637-B SMS, IS-683-A Service provisioning, gpsOne and IS-98 CDMA Minimum Performance.

Only 850 MHz (Cellular) and 1900 MHz (PCS) bands are used for operation. The DUT is a pre-production sample

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: 0.39 watts ERP in cell; 1.06 watts EIRP in PCS

Emission Designator:

CDMA
824.7 – 848.31
1M28F9W

1851.25 – 1908.75
1M28F9W

Antenna Data: Mobile: Cellular and PCS band. Antenna gain is 0dBi

Antenna Connector: U.FL-R-SMT (Hirose)

Power Source: 3.8VDC

Summary of Test Results

Maximum Radiated Output Power

Mode	Max Power in Cell band (ERP)	Max Power in PCS band (EIRP)
CDMA 1X	26.0 dBm/0.39 watts	30.3 dBm/1.06 watts

Field Strength of Spurious

No spurious emissions are within 20dB of the limits after signal substitution.

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	:	33-83 %
Pressure range	:	102 - 105 kPa



4.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
110	Antenna, Bicon	EMCO	LPA-25	1217	1/10/2009	2/10/2011
317	Preamplifier	HP	8449A	2749A00167	4/16/2009	4/16/2010
529	Antenna, DRWG	EMCO	3115	2505	9/30/2008	9/30/2010
765	Antenna Set, Dipole	EMCO	3121C	1214	25-Jul-08	25-Jul-10
836	Signal Generator	Agilent	E8254A	US41140229	2/5/2010	2/5/2011
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	7/28/2008	7/28/2010
911	Spectrum Analyzer	Agilent	E4440A	US41421266	12/17/2009	12/17/2010

2040B-1 OATS/RN# 329550-01

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 ¹
Audio Frequency Response	2.1047	NA ¹
Modulation Limiting	2.1047	NA ¹
Occupied Bandwidth (WB Data)	2.1049	NA ²
Spurious Emissions at antenna Terminals	2.1051	NA ²
Field Strength of Spurious Emissions	2.1053	COMPLIES
Frequency Stability	2.1055	NA ²

Footnotes for N/A's:

¹Digital Modulation

²Test 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:	WMD 1x	Temperature:	17°C
Date:	3/11/2010	Humidity:	38%
Test Procedure:	ANSI C63.4 (2003) Clause 8	Tester:	Alan Laudani
		Laboratory:	SOATS

Test Results:

Complies, see tables in the following pages.

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Radiated Emissions Data

Job # :	<u>40965</u>	Date :	<u>3-11-2010</u>	Page	<u>1</u>	of	<u>1</u>
NEX #:	<u>145986</u>	Time :	<u>1250</u>				
		Staff :	<u>aal</u>				
Client Name :	<u>Qualcomm Inc.</u>	EUT Voltage :	<u>120</u>				
EUT Name :	<u>Tracking Module</u>	EUT Frequency :	<u>60</u>				
EUT Model # :	<u>WMD</u>	Phase:	<u>1</u>				
EUT Serial # :	<u>O21G4UKW3</u>	NOATS	<u>X</u>				
EUT Config. :	<u>Transmit</u>	SOATS					
		Distance < 1000 MHz:	<u>3 m</u>				
		Distance > 1000 MHz:	<u>3 m</u>				
Specification :	<u>CFR47 Part 24</u>						
Loop Ant. #:	<u>NA</u>						
Bicon Ant.#:	<u>NA</u>	Temp. (°C) :	<u>17</u>				
Log Ant.#:	<u>NA</u>	Humidity (%) :	<u>38</u>				
DRG Ant. #	<u>877</u>	Spec Analyzer #:	<u>911</u>				
Cable LF#:	<u>SOATS</u>	Analyzer Display #:	<u>911</u>				
Cable HF#:	<u>SOATS</u>	Quasi-Peak Detector #:	<u>NA</u>				
Preamp LF#:	<u>NA</u>	Preselector #:	<u>NA</u>				
Preamp HF#	<u>317</u>						

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
	Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.
Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBm)	Spec. limit (dBm)	CR/SL Diff. (dB)	Pass Fail	Comment
1851.25	92.5	81.8	P		1.0	92.5	30.3				
3702.5	56.4	57.5	P		1.0	57.5	-27.3	-13.0	-14.3	Pass	2ND HARM.
5553.8	40.7	40.4	P		1.0	40.7	-36.6	-13.0	-23.6	Pass	AMBIENTS
7405.0	24.7	23.8	P		1.0	24.7	-44.3	-13.0	-31.3	Pass	30 kHz RBW
9256.3	24.9	23.7	P		1.0	24.9	-36.7	-13.0	-23.7	Pass	
11107.5	21.6	21.1	P		1.0	21.6	-35.1	-13.0	-22.1	Pass	9 kHz RBW
12958.8	22.1	22.0	P		1.0	22.1	-34.4	-13.0	-21.4	Pass	
14810.0	17.1	14.2	P		1.0	17.1	-36.8	-13.0	-23.8	Pass	3 kHz RBW
16661.3	16.5	16.5	P		1.0	16.5	-39.1	-13.0	-26.1	Pass	
18512.5	16.7	17.7	P		1.0	17.7	-34.5	-13.0	-21.5	Pass	1 kHz RBW
1880.00	94.4	83.9	P		1.0	94.4	32.2				
3760.00	54.1	47.5	P		1.0	54.1	-30.7	-13.0	-17.7	Pass	
5640.00	40.6	40.4	P		1.0	40.6	-36.6	-13.0	-23.6	Pass	AMBIENTS
7520.00	24.7	23.7	P		1.0	24.7	-44.2	-13.0	-31.2	Pass	30 kHz RBW
9400.00	24.9	24.2	P		1.0	24.9	-36.3	-13.0	-23.3	Pass	
11280.00	21.7	21.1	P		1.0	21.7	-35.5	-13.0	-22.5	Pass	9 kHz RBW
13160.00	22.1	22.3	P		1.0	22.3	-33.3	-13.0	-20.3	Pass	
15040.00	17.1	16.2	P		1.0	17.1	-36.3	-13.0	-23.3	Pass	3 kHz RBW
16920.00	11.8	11.7	P		1.0	11.8	-43.8	-13.0	-30.8	Pass	
18800.00	16.7	17.7	P		1.0	17.7	-34.5	-13.0	-21.5	Pass	1 kHz RBW
1908.75	92.8	82.9	P		1.0	92.8	30.8				
3817.5	48.0	44.1	P		1.0	48.0	-36.2	-13.0	-23.2	Pass	AMBIENTS
5726.3	51.9	51.8	P		1.0	51.9	-25.0	-13.0	-12.0	Pass	
7635.0	22.7	22.8	P		1.0	22.8	-45.9	-13.0	-32.9	Pass	30 kHz RBW
9543.8	21.6	21.6	P		1.0	21.6	-39.4	-13.0	-26.4	Pass	
11452.5	17.3	17.4	P		1.0	17.4	-39.4	-13.0	-26.4	Pass	9 kHz RBW
13361.3	17.8	17.9	P		1.0	17.9	-38.3	-13.0	-25.3	Pass	
15270.0	11.8	11.9	P		1.0	11.9	-42.0	-13.0	-29.0	Pass	3 kHz RBW
17178.8	11.7	11.6	P		1.0	11.7	-41.4	-13.0	-28.4	Pass	
19087.5	11.8	11.5	P		1.0	11.8	-42.1	-13.0	-29.1	Pass	1 kHz RBW



Radiated Emissions Data

Job # : 40965 Date : 3-11-2010 Page 1 of 1
NEX # : 145986 Time : 0900
Staff : aal

Client Name : Qualcomm Inc.
EUT Name : Tracking Module
EUT Model # : WMD
EUT Serial # : O21G4UKW3
EUT Config : Transmit

EUT Voltage : 120
EUT Frequency : 60
Phase : 1
NOATS : X
SOATS :
Distance < 1000 MHz : 3 m
Distance > 1000 MHz : 3 m

Specification : CFR47 Part 22
Loop Ant. # : NA
Bicon Ant.# : NA Temp. (°C) : 12
Log Ant.# : 110_3M Humidity (%) : 67
DRG Ant. # : 877 Spec Analyzer # : 911
Cable LF# : SOATS Analyzer Display # : 911
Cable HF# : SOATS Quasi-Peak Detector # : NA
Preamp LF# : NA Preselector # : NA
Preamp HF# : 317

Quasi-Peak	RBW: 120 kHz
	Video Bandwidth 300 kHz
Peak	RBW: 1 MHz
	Video Bandwidth 3 MHz
Average	RBW: 1 MHz
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Meas. Freq. (MHz)	Meter Reading Vertical	Meter Reading Horizontal	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
824.70	99.7	97.1	P		1.0	99.7	126.6				
1649.4	56.7	56.4	P		1.0	56.7	57.6	74.0	-16.4	Pass	2ND HARM.
2474.1	43.8	45.9	P		1.0	45.9	50.2	74.0	-23.8	Pass	AMBIENTS
3298.8	43.9	45.2	P		1.0	45.2	54.0	74.0	-20.0	Pass	
4123.5	44.9	43.0	P		1.0	44.9	57.6	74.0	-16.4	Pass	
4948.2	25.8	27.5	P		1.0	27.5	42.2	74.0	-31.8	Pass	
5772.9	26.4	26.4	P		1.0	26.4	44.7	74.0	-29.3	Pass	30 kHz RBW
6597.6	24.4	23.9	P		1.0	24.4	46.7	74.0	-27.3	Pass	
7422.3	23.2	25.4	P		1.0	25.4	51.6	74.0	-22.4	Pass	
8247.0	23.4	24.2	P		1.0	24.2	53.6	74.0	-20.4	Pass	
836.52	101.2	98.4	P		1.0	101.2	128.2				
1673.04	34.3	31.1	P		1.0	34.3	35.2	74.0	-38.8	Pass	AMBIENTS
2509.56	35.9	35.6	P		1.0	35.9	42.2	74.0	-31.8	Pass	
3346.08	37.8	38.3	P		1.0	38.3	48.0	74.0	-26.0	Pass	
4182.60	39.1	40.5	P		1.0	40.5	53.2	74.0	-20.8	Pass	
5019.12	38.1	38.3	P		1.0	38.3	55.3	74.0	-18.7	Pass	
5855.64	40.8	39.3	P		1.0	40.8	59.7	74.0	-14.3	Pass	30 kHz RBW
6692.16	39.6	40.4	P		1.0	40.4	63.1	74.0	-10.8	Pass	
7528.68	24.3	23.2	P		1.0	24.3	50.6	74.0	-23.4	Pass	
8365.20	24.9	23.6	P		1.0	24.9	55.0	74.0	-19.0	Pass	
848.31	99.1	96.1	P		1.0	99.1	126.4				
1696.6	41.0	41.4	P		1.0	41.4	42.3	74.0	-31.7	Pass	AMBIENTS
2544.9	40.9	39.7	P		1.0	40.9	47.2	74.0	-26.8	Pass	
3393.2	43.8	40.3	P		1.0	43.8	53.5	74.0	-20.5	Pass	
4241.6	41.8	41.8	P		1.0	41.8	54.7	74.0	-19.3	Pass	
5089.9	23.5	24.4	P		1.0	24.4	41.4	74.0	-32.6	Pass	
5938.2	22.5	22.9	P		1.0	22.9	41.9	74.0	-32.0	Pass	30 kHz RBW
6786.5	22.4	23.8	P		1.0	23.8	47.5	74.0	-26.5	Pass	
7634.8	23.4	22.6	P		1.0	23.4	49.9	74.0	-24.0	Pass	
8483.1	22.4	24.2	P		1.0	24.2	54.2	74.0	-19.8	Pass	

Test Procedure: TIA/EIA 603 Clause 2.2.17

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

Substitution Method For Radiated Emissions

Client Name :	<u>Qualcomm Inc.</u>	Date :	<u>3/12/2010</u>
EUT Name :	<u>Tracking Module</u>	Time :	<u>1000</u>
EUT Model # :	<u>WMD</u>	Staff :	<u>A. Laudani</u>
EUT Serial # :	<u>O21G4UKW3</u>		
EUT Config. :	<u>Transmit</u>		
Specification :	<u>FCC Part 22, 24</u>		
Log Ant.RX#:	<u>110 3m</u>	Temp. (deg. C) :	<u>17</u>
Dipole Ant TX#:	<u>765</u>	Humidity (%) :	<u>55</u>
DRG Ant. RX #	<u>877</u>	Location:	<u>SOATS</u>
DRG Ant. TX #	<u>529</u>	Distance:	<u>3m</u>
Cable RX #:	<u>SOATS</u>		
Preamp#:	<u>317</u>	Peak Bandwidth < 1 GHz:	<u>RBW-100kHz, VBW-300kHz</u>
Spec An.#:	<u>911</u>	Peak Bandwidth > 1 GHz:	<u>RBW-1MHz, VBW-1MHz</u>

target		dipole	cable loss dB	Signal Generator dBm	Total (ERP) dBm	Spec dBm	Margin dBm
Frequency mHz	level dBuV/m						
824.70	99.7	0	1.74	26.30	24.6	38.5	-13.9
836.52	101.2	0	1.75	27.70	26.0	38.5	-12.5
848.31	99.1	0	1.85	25.50	23.7	38.5	-14.8

target		Horn Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
Frequency mHz	level dBuV/m						
1648.0	56.7	7.84	2.34	-47.74	-42.2	-13	-29.2
1672.0	34.3	7.88	2.39	-70.00	-64.5	-13	-51.5
1696.0	41.4	7.91	2.43	-62.80	-57.3	-13	-44.3

target		Horn Gain dBi	cable loss dB	Signal Generator dBm	Total (EIRP) dBm	Spec dBm	Margin dBm
Frequency mHz	level dBuV/m						
1851.25	92.5	8.16	2.59	22.00	27.6	33.0	-5.4
1880.00	94.4	8.21	2.64	24.70	30.3	33.0	-2.7
1908.75	92.8	8.25	2.54	22.90	28.6	33.0	-4.4
3702.0	57.5	9.87	3.74	-40.00	-33.9	-13	-20.9
3760.0	54.1	9.88	3.74	-42.75	-36.6	-13	-23.6
3816.0	48.0	9.88	4.05	-47.92	-42.1	-13	-29.1



Appendix B: Setup Photographs





**Nemko USA,
Inc.**

FCC ID: J9CWMD1X

11696 Sorrento Valley Road, Suite F, San Diego, CA 92121
Phone (858) 755-5525 Fax (858) 452-1810

Report Number: 2010 03145986 FCC
Specification: FCC Part 22 Subpart H ,Part 24 Subpart E

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