Qualcomm
TECHNOLOGIES, INC

QCAT Common Analysis Guide

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Revision history

Revision	Date	Description
A	Jun 2014	Initial release

1 Introduction

1.1 Purpose

This guide provides interpretation for the various common analysis outputs produced by the Qualcomm CMDA Analysis Toolkit (QCAT) software application.

1.2 Scope

This document is intended to be a technical reference for engineers using QCAT to process and analyze log files. It is assumed that the user has data analysis expertise.

1.3 Organization

QCAT output can be either viewed as a display from within the application or generated as files in tab-delimited format. All output files will be located in the output path specified by you in the GUI or a script.

QCAT also generates a .txt file with the ASCII text representation of each packet processed from the corresponding binary log file. All signaling messages in this file are expanded out by each field. This text file is the same as the one generated by QCAT.

All analyzer outputs can be exported and formatted into Excel worksheets from the QCAT application. See [Q3] for a detailed description of exporting. Typically, each output file corresponds to one worksheet in the QCAT Workbook.

The individual outputs are explained in chapter sections, which have subsections containing an explanation of each QCAT output file and an illustration of the corresponding Excel worksheet. Note that this guide does not try to cover all possible scenarios encountered in mobile communications. Instead, it tries to give a set of examples and basic interpretations so that the user can extrapolate from the given information.

1.4 Conventions

Function declarations, function names, type declarations, and code samples appear in a different font, e.g., `#include`.

Code variables appear in angle brackets, e.g., `<number>`.

1.5 References

Reference documents are listed in Table 1-1. Reference documents that are no longer applicable are deleted from this table; therefore, reference numbers may not be sequential.

Table 1-1 Reference documents and standards

Ref.	Document	
Qualcomm Technologies		
Q1	*Application Note: Software Glossary for Customers*	CL93-V3077-1
Q2	*CDMA Dual-Mode Subscriber Station Serial Data Interface Control Document*	80-V1294-1
Q3	*QCAT 6 User Guide*	80-V1233-6
Q4	*Serial Interface Control Document for GSM and GPRS*	80-V5295-1
Q5	*Serial Interface Control Document for UMTS*	80-V4083-1
Standards		
S1	*Digital cellular telecommunications system (Phase 2+) (GSM); Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) layer specification (3GPP TS 04.06)*	ETSI TS 100 938 (2001)
S2	*European digital cellular telecommunications system (Phase 1);Radio transmission and reception (GSM 05.05)*	ETSI I-ETS 300 033 (1992)

1.6 Technical assistance

For assistance or clarification on information in this document, submit a case to Qualcomm Technologies, Inc. (QTI) at https://support.cdmatech.com/.

If you do not have access to the CDMATech Support Service website, register for access or send email to support.cdmatech@qti.qualcomm.com.

1.7 Acronyms

For definitions of terms and abbreviations, see [Q1].

2 General Log Information

2.1 Events and Debug Messages vs Time

Data source

- 0x1018 – Debug Message
- 0x1FEB – Extended Debug Message
- 0x1FEC – Debug Message
- 0x1FFB – Event

Events

All supported events

Description

The time grids show a chronological list of events and debug messages as they appear in the log file. The corresponding plots are graphical representations of the time when these events or debug messages are logged.

Figure 2-1 illustrates the Debug Messages vs Time grid.

Debug Messages vs. Time

Time	File Name	Line	Level	Message	Total Messages	Drop Count
04:44:54.711	wl1drxentity.c	738	H	DRX: Handle:1 wakes up in 3926500 usec		
04:44:54.711	wl1drxentity.c	738	H	DRX: Handle:6 wakes up in 87900 usec		
04:44:54.711	wl1m.c	7657	H	mDSP received go_to_sleep cmd		
04:44:54.711	*AEETelephone.c	484	F	=>Telephone Event CALL:0x106		
04:44:54.711	wl1m.c	8084	H	Sleep cmd to mDSP. awake_state:0		
04:44:54.712	wl1drxmanager.c	811	H	DRX: go_to_sleep(87 msec, 1) for handle:6		
04:44:54.712	wsleep.c	2337	H	[34040] enter go_to_sleep() 74 ms		
04:44:54.712	rftx.c	208	E	rftx_sleep() is set to NULL!		

Figure 2-1 Debug Messages vs Time grid

Figure 2-2 illustrates the Debug plot.

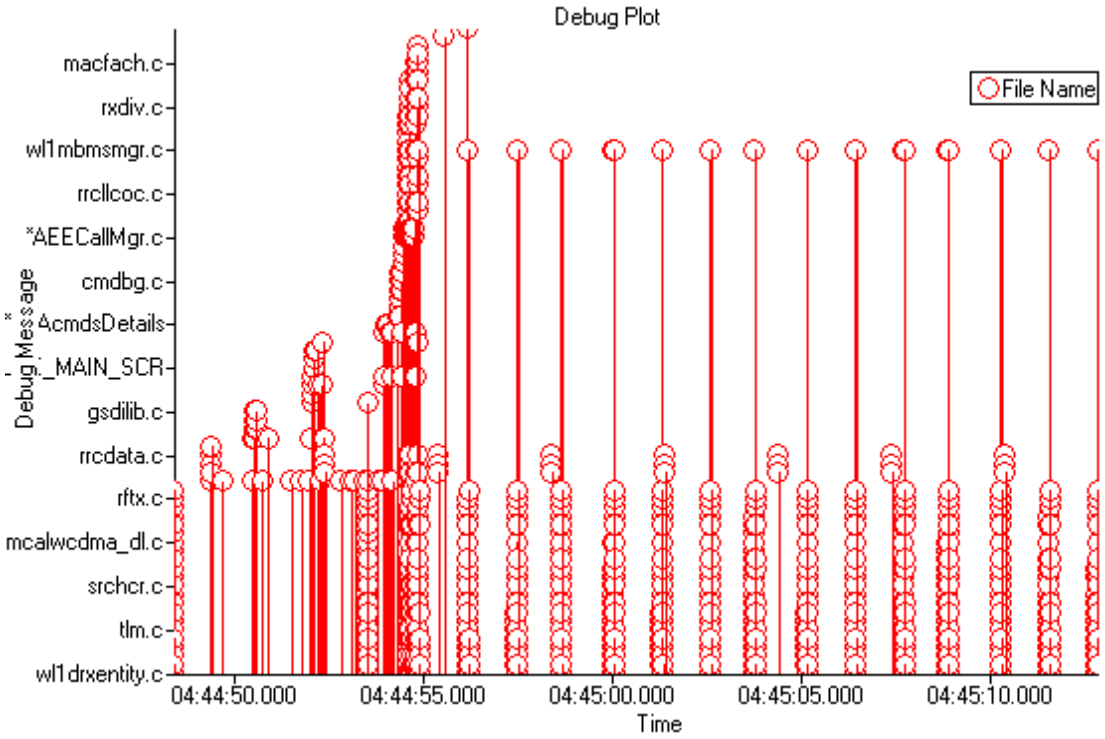


Figure 2-2 Debug plot

Figure 2-3 illustrates the Events vs Time grid.

Events vs. Time

Time Stamp	Event Id	Event Name	Description	Payload Dump
04:44:52.333	982	EVENT_ARM_CLK_FREQUENCY_CHANGE	Length: 0008	8E 00 00 00 80 0E 08 00
04:44:52.336	642	EVENT_BREW_APP_PAUSE	Class ID: 16809984, Client data: 0x00000000	00 80 00 01 00 00 00 00
04:44:52.336	641	EVENT_BREW_APP_STOP	Class ID: 16809984, Client data: 0x00000000	00 80 00 01 00 00 00 00
04:44:52.362	640	EVENT_BREW_APP_START	Class ID: 17059531, Client data: 0x00000000	CB 4E 04 01 00 00 00 00
04:44:53.015	982	EVENT_ARM_CLK_FREQUENCY_CHANGE	Length: 0008	8D 00 00 00 00 DC 05 00
04:44:54.269	982	EVENT_ARM_CLK_FREQUENCY_CHANGE	Length: 0008	8E 00 00 00 80 0E 08 00

Figure 2-3 Events vs Time grid

Figure 2-4 illustrates the Events plot.

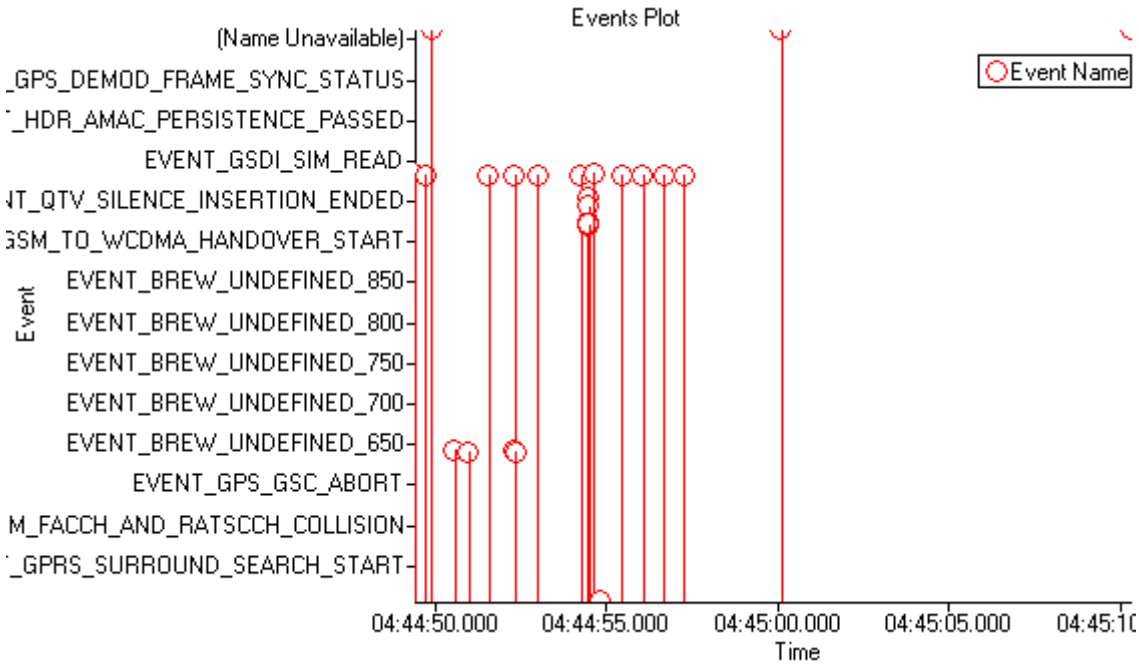


Figure 2-4 Events plot

Figure 2-5 illustrates the Events and Debug Msgs vs Time grid.

Events and Debug Msgs vs. Time

Time	File Name/Event Name	Line	Level	Message/Event Payload
04:44:54.855	rrcmbmsproc.c	4051	H	MBMS PL DB: pl_status 0, pl_needed 0
04:44:54.856	rrcmbmsproc.c	10217	H	Turning DRX ON till Infinite for MCCH Access Info
04:44:54.856	rrcmbmsproc.c	10228	H	Turning DRX ON till next Mod Prd for MCCH Critical Info
04:44:54.856	rrcmbmsproc.c	990	H	MCCH Acq db set for MCCH monitoring. db_state 2
04:44:54.856	rrccmd.c	401	H	allocated blptr 1773d668, ind2 wm:3
04:44:54.856	rrcmbmsproc.c	2184	H	MCCH Crit Info DRX Params: DRX State 1, DRX Mode 1, Ref SFN 1280
04:44:54.856	rrcmbmsproc.c	2189	H	MCCH Access Info DRX Params: DRX State 1, DRX Mode 2, Ref SFN 1280

Figure 2-5 Events and Debug Msgs vs Time grid

2.2 Event Counts

Data source

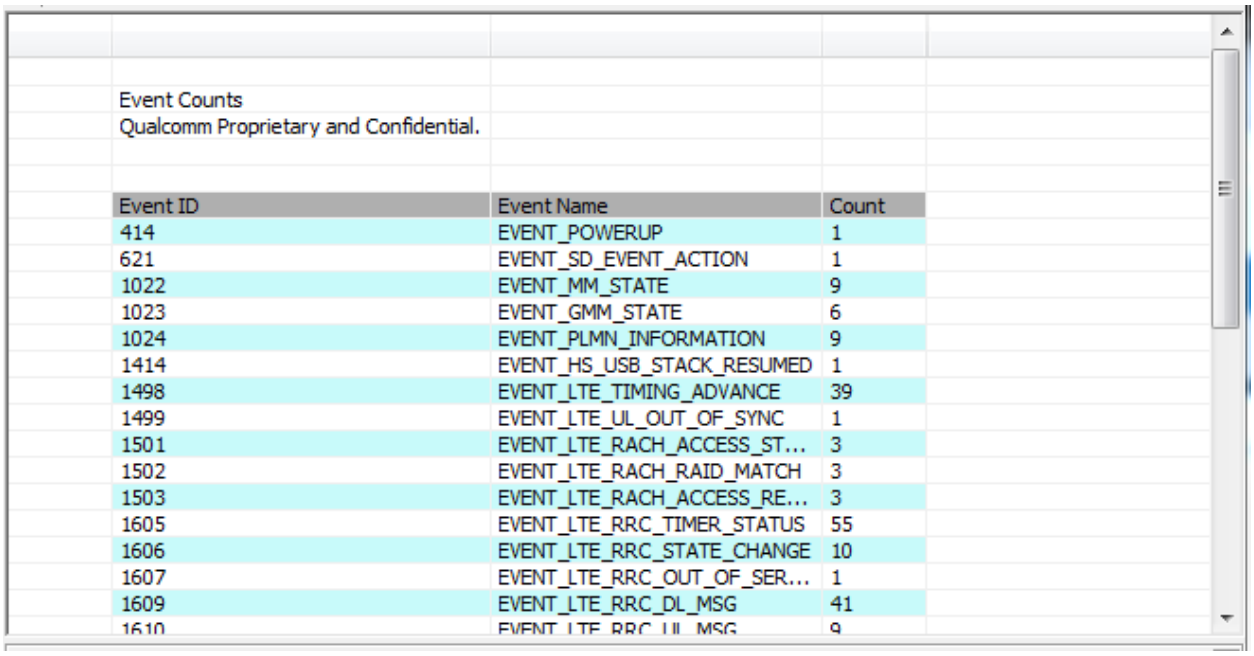
- 0x1FFB – Event

Events

All supported events

Description

The Event Counts grid shows the number of instances of each unique event that occurred in the log file.



Event Counts
Qualcomm Proprietary and Confidential.

Event ID	Event Name	Count
414	EVENT_POWERUP	1
621	EVENT_SD_EVENT_ACTION	1
1022	EVENT_MM_STATE	9
1023	EVENT_GMM_STATE	6
1024	EVENT_PLMN_INFORMATION	9
1414	EVENT_HS_USB_STACK_RESUMED	1
1498	EVENT_LTE_TIMING_ADVANCE	39
1499	EVENT_LTE_UL_OUT_OF_SYNC	1
1501	EVENT_LTE_RACH_ACCESS_ST...	3
1502	EVENT_LTE_RACH_RAID_MATCH	3
1503	EVENT_LTE_RACH_ACCESS_RE...	3
1605	EVENT_LTE_RRC_TIMER_STATUS	55
1606	EVENT_LTE_RRC_STATE_CHANGE	10
1607	EVENT_LTE_RRC_OUT_OF_SER...	1
1609	EVENT_LTE_RRC_DL_MSG	41
1610	EVENT_LTE_RRC_UL_MSG	9

Figure 2-6 Event Counts grid

2.3 Log File Information

Data source

- 0x1FF0 – Diagnostic Response Status
- 0x1FFD
- Diagnostic Version
- 0x1FFE
- Status 2
- 0x4FF6
- WCDMA Status Report
- 0x5FF6
- GSM Status Report
- 0x9000
- UTRAN Status Report

Description

This is a general information summary of the log file and a list of configurable parameters of QCAT, as illustrated in Figure 2-7.

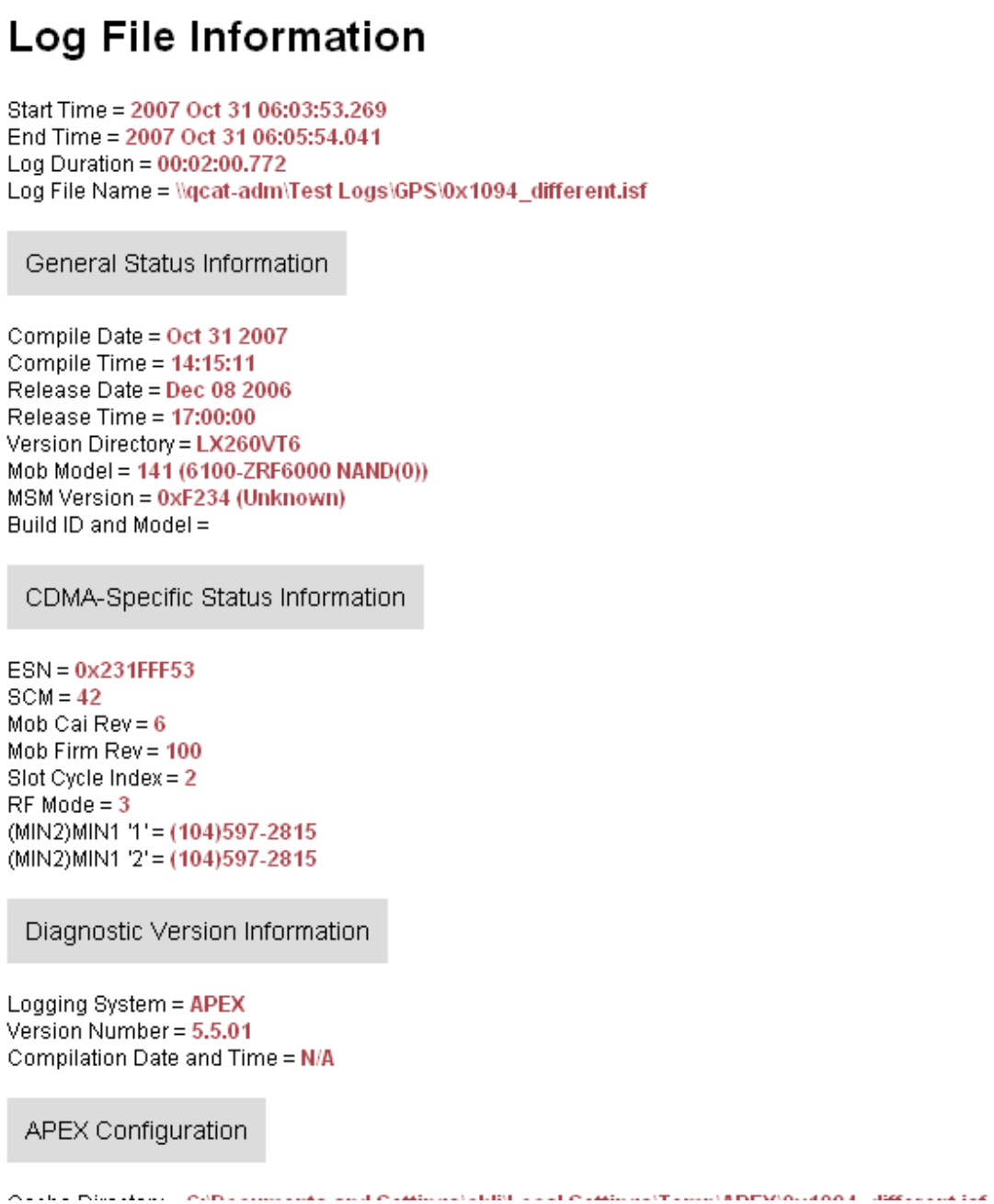


Figure 2-7 Log File Information

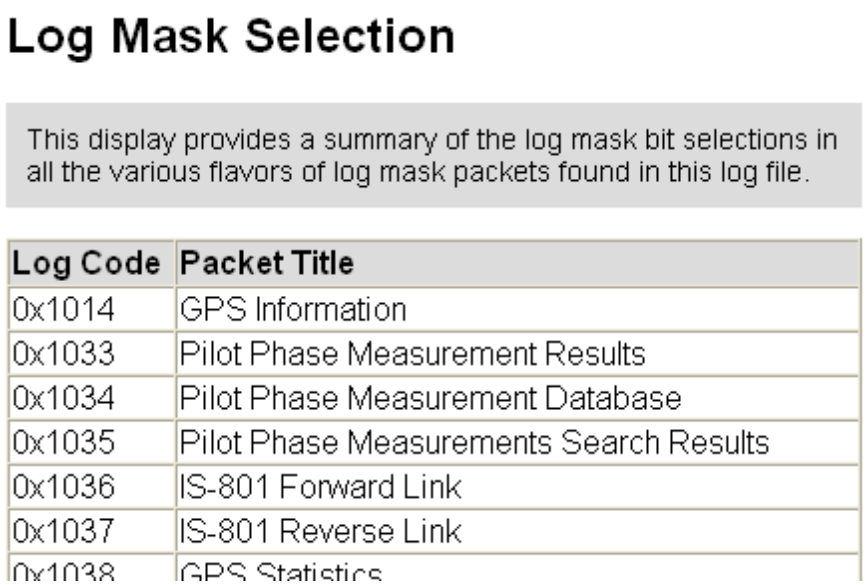
2.4 Log Mask Selection

Data source

- 0x1FF0
- Diagnostic Response Status
- 0x1FF9
- Extended Log Mask
- 0x1FFE
- Status 2

Description

This grid, illustrated in Figure 2-8, provides a summary of the log mask bit selections of all log mask packets in the log file.



Log Mask Selection

This display provides a summary of the log mask bit selections in all the various flavors of log mask packets found in this log file.

Log Code	Packet Title
0x1014	GPS Information
0x1033	Pilot Phase Measurement Results
0x1034	Pilot Phase Measurement Database
0x1035	Pilot Phase Measurements Search Results
0x1036	IS-801 Forward Link
0x1037	IS-801 Reverse Link
0x1038	GPS Statistics

Figure 2-8 Log Mask Selection

2.5 Log Packet Summary

Data source

All supported packets

Events

All supported events

Description

This grid, illustrated in Figure 2-9, gives aggregate statistics of all of the packets and events in the log file.

Log Packet Summary

Type	Description	Pkt Count	Channel	Message	Msg Count
0x1037	IS-801 Reverse Link	2			
0x1094	Unrecognized	4			
0x1095	Unrecognized	1			
0x109B	Unrecognized	2			
0x1FEA	Diagnostic Request	901			
0x1FEB	Extended Debug Message	87			
0x1FF0	Diagnostic Response Status	900			
0x1FFB	Event	284			
0x1FFC	Annotation	1			
0x1FFD	Diagnostic Version	1			

Figure 2-9 Log Packet Summary

3 GPS Information

3.1 GPS Source and Speed vs Position Data

Data source

- 0x1014 – GPS Data Packet
- 0x12F1 – MobileView GPS Position
- 0x1FEE – 3D GPS Info
- 0x1FF1 – GPS Information

Description

This grid, illustrated in Figure 3-1, provides GPS-related information for each packet.

GPS Source vs. Position							
color 1		GPS_2D					
color 2		GPS_3D					
color 3		DGPS_2/3D					
color 4		DR					
color 5		Degraded_DR					
color 6		Unkn/ETAK/Extp					
Time	latitude	longitude	color	GPS source	Speed (mph)	Heading	Altitude
01:25:22.695	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00032.1
01:25:23.341	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00031.9
01:25:24.695	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00031.7
01:25:25.284	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00032.0
01:25:26.668	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00031.7
01:25:27.288	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00031.2
01:25:28.730	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00031.1
01:25:29.313	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00030.7
01:25:30.669	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00030.7
01:25:31.284	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00030.5
01:25:32.699	+33.12797	-117.31744	2	GPS 3D	0.00	000	+00030.7

Figure 3-1 GPS Source and Speed vs Position Data

3.2 GPS Source vs Position Map

Data source

- 0x1014 – GPS Data Packet
- 0x12F1 – MobileView GPS Position
- 0x1FEE – 3D GPS Info
- 0x1FF1 – GPS Information

Description

This is a map of the source positions colored according to the type of GPS source of the packets, as illustrated in Figure 3-2. Microsoft MapPoint 2009 or higher must be installed for this display.

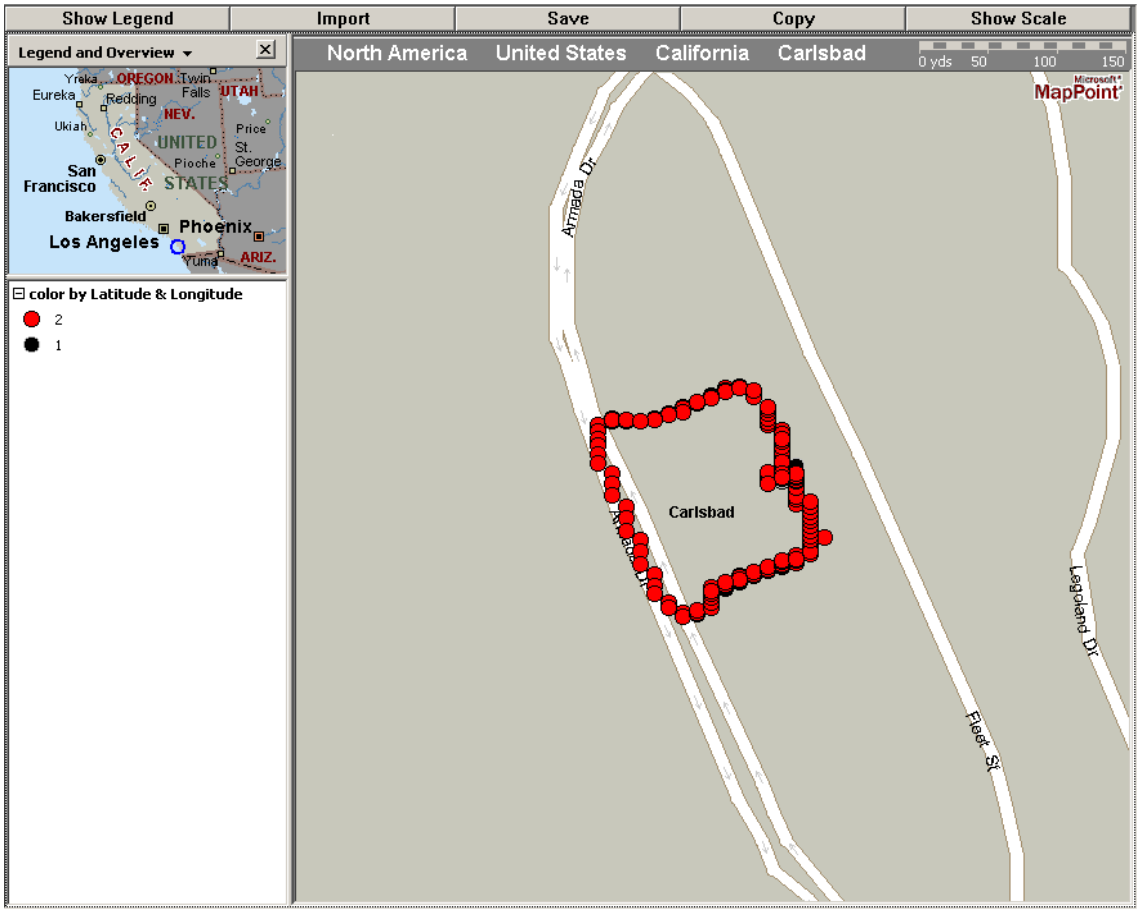


Figure 3-2 GPS Source vs Position Map

3.3 GPS Speed vs Position Map

Data source

- 0x1014 – GPS Data Packet
- 0x12F1 – MobileView GPS Position
- 0x1FEE – 3D GPS Info
- 0x1FF1 – GPS Information

Description

This is a map of the source positions colored by the speed of the source of each packet, as illustrated in Figure 3-3. Microsoft MapPoint 2009 or higher must be installed for this display.

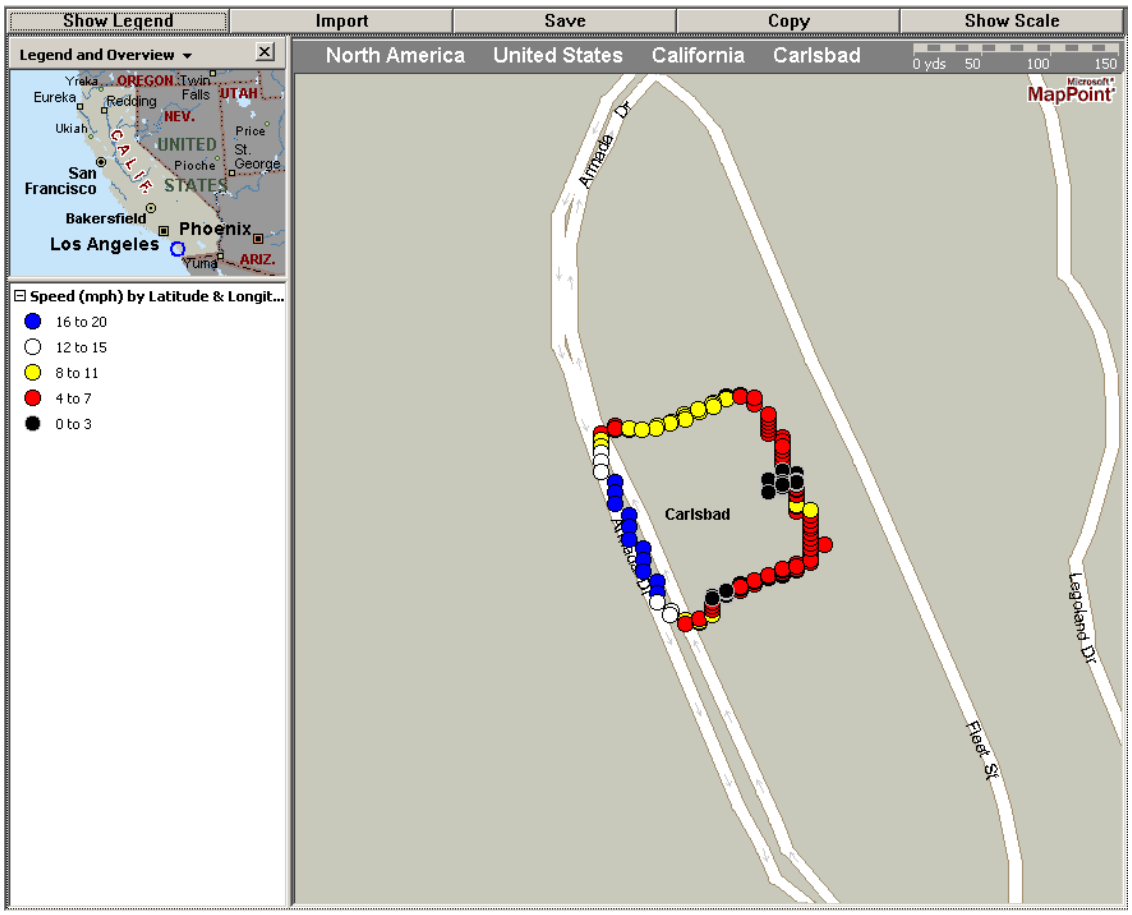


Figure 3-3 GPS Speed vs Position Map

3.4 Vehicle Speed Graph

Data source

- 0x1014 – GPS Data Packet
- 0x12F1 – MobileView GPS Position
- 0x1FEE – 3D GPS Info
- 0x1FF1 – GPS Information

Description

This grid, illustrated in Figure 3-4, gives the speeds of the vehicle when the packets are recorded.

Vehicle Speed Graph		
Samples		648
Mean		3.995 mph
Stdev		4.257 mph
Distance		0.36 miles
Run Time		00:05:47.568
bin val	count	pdf data
0	266	0.164
2.5	72	0.044
5	122	0.075
7.5	130	0.080
10	24	0.015
12.5	6	0.004
15	10	0.006
17.5	18	0.011
20	0	0.000
22.5	0	0.000
25	0	0.000

Figure 3-4 Vehicle Speed Graph grid

Figure 3-5 illustrates the Vehicle Speed Graph plot.

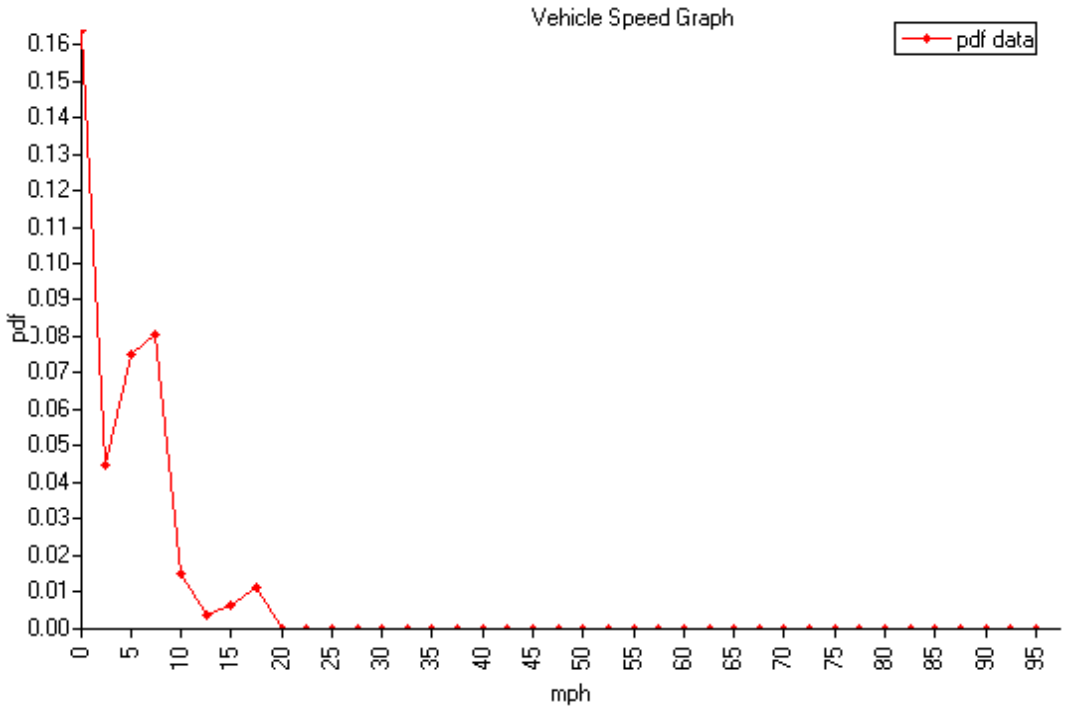


Figure 3-5 Vehicle Speed Graph plot