



Test Report

Prepared for: Spot, LLC

Model: Spot 3

Description: Handheld, Satellite Based Personal Tracking Unit

To

FCC Part 1.1310

Date of Issue: May 7, 2013

On the behalf of the applicant:

Spot, LLC
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Attention of:

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	May 7, 2013	Alex Macon	Original Document
2.0	June 20, 2013	John Erhard	Update to provide SAR exclusion calculations
3.0	July 16, 2013	John Erhard	Update to EIRP/Duty Cycle calculation
4.0	August 31, 2013	John Erhard	Include timing diagram
5.0	September 16, 2013	John Erhard	Edit per FCC guidance
6.0	September 27, 2013	John Erhard	Edit per FCC guidance
7.0	September 27, 2013	John Erhard	Edit per FCC guidance



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The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

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Testing Certificate Number: **2152.01**



FCC OATS Rag, #933597

IC Reg. #2044A-1

Non-accredited tests contained in this report:

N/A



This is a portable device as it is a hand-held satellite transmitter with the Low Duty Cycle SAR exclusion from KDB 447498 Appendix A being applied.

Duty Cycle Calculation

Maximum on time = 1.44 Second
Minimum time between transmissions = 150 Seconds
Duty Cycle = 0.96%

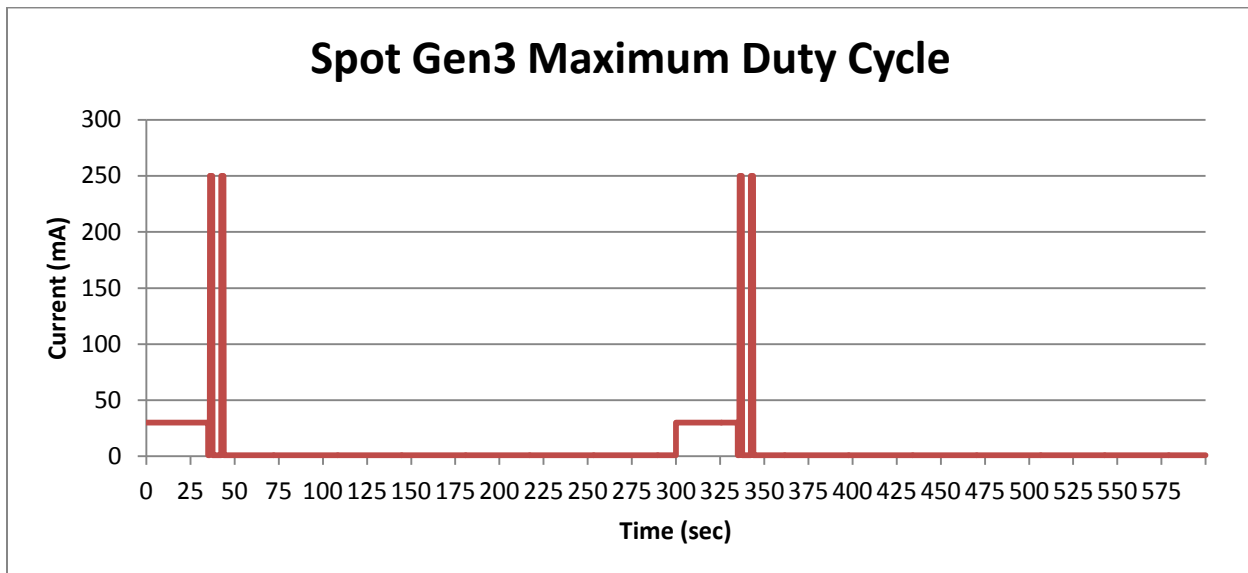
$(\text{On time} / \text{Time between transmissions}) * 100 = \text{Duty Cycle}$

$(1.44 / 150) * 100 = 0.96$

Satellite Transmitter Duty Cycle Timing Diagram

Spot Gen3 has a worst case duty cycle in 5 minute "Track Mode". In this mode of operation, the device first obtains a GPS fix which typically takes anywhere from 15 seconds to 4 minutes at roughly 30 mA. After obtaining a fix, the GPS receiver is shutdown and the TCXO clock source is turned on and allowed to stabilize (roughly 1 second). Then the device transmits the first of two 1.44 second long satellite messages which draws roughly 250mA. After 6 seconds of delay, it sends the second message which contains redundant GPS information from previous points for improved reliability. The device then goes into a sleep state until the remainder of the 5 minute period elapses and the cycle repeats as illustrated in the timing diagram below.

$1.44 \text{ seconds} * 2 \text{ messages} / 300 \text{ second period} = .0096 \rightarrow 0.96\% \text{ duty cycle}$



Exclusion Ratio

Formula 1 from Section 4.3.1 of KDB 447498 D01



$[(\text{conducted max. power of channel in } mW \cdot \text{duty cycle}) / (\text{test separation distance in mm})] \cdot (\sqrt{f}(\text{GHz}))$

$(97 \cdot 0.0096 / 5) \cdot (\sqrt{1.611}) = \text{Exclusion Ratio}$

$(0.186) \cdot (1.27) = \text{Exclusion Ratio}$

0.23 = Exclusion Ratio

Exclusion Threshold = 3.0

The final ratio of 0.23 is below the exclusion threshold of 3.0 therefore SAR testing is excluded.

Mechanical Information

Minimum test separation distance = 5 mm

Minimum test separation distance is less than 5mm, so default value of 5mm is used per Formula 1

PER the exclusion requirement of KDB 447498 a SAR measurement is not necessary.

END OF TEST REPORT