

*DUTY CYCLE
TEST REPORT*

for

ROKU REMOTE

MODEL: RC07

Prepared for

ROKU, INC.
12980 SARATOGA AVENUE, SUITE #D
SARATOGA, CALIFORNIA 95070

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DATE: OCTOBER 18, 2013

	REPORT BODY	APPENDICES A	TOTAL
PAGES	11	6	17

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NIST or any other agency of the U.S. Government.

Device Tested: Roku Remote
 Model: RC07
 S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified during the testing.

Customer: Roku, Inc.
 12980 Saratoga Avenue, Suite #D
 Saratoga, California 95070

Manufacturer: Universal Electronics, Inc.
 201 East Sandpointe Avenue, 8th Floor
 Santa Ana, California 92707

Test Dates: September 9, 2013

Test Specifications: KDB 447498
 CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.247

Test Procedure: ANSI C63.4 and ANSI C63.10

Test Deviations: The test procedure was not deviated from during the testing.

1. PURPOSE

This document is a qualification test report based on obtaining the duty cycle for the Roku Remote, Model: RC07 for SAR purposes per KDB 447498 v05r01.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Roku, Inc.

Greg Garner Director of Hardware Engineering

Compatible Electronics Inc.

James Ross Test Engineer

Kyle Fujimoto Test Engineer

2.4 Date Test Sample was Received

The test sample was received prior to the date of testing.

2.5 Disposition of the Test Sample

The test sample has not been returned as of the date of this test report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
N/A	Not Applicable

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
KDB 447498	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
ANSI C63.4: 2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10: 2010	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION**4.1 Description of Test Configuration – Duty Cycle**

The EUT was tested as follows:

1. The EUT was placed in a mode where it attempted to establish a link with the Roku box. (Pairing Mode)
2. The EUT was communicating with the Roku Box in normal operation with the pause / play button being pressed and released continuously to start and stop the streaming video from the Roku box.
3. The EUT was communicating with the Roku Box in normal operation with the fast forward button being pressed and released continuously to speed up the streaming video from the Roku box.

Note: The other buttons on the EUT were also investigated during the initial scan to determine the worst duty cycle. The modes mentioned above were the ones that created the worst duty cycle.

Please see Appendix E for the data sheets.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
ROKU REMOTE (EUT)	ROKU, INC.	RC07	N/A	TC2-RC07
ROKU BOX	N/A	N/A	N/A	N/A

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED					
EMI Receiver	Rohde & Schwarz	ESIB40	100194	November 19, 2012	2 Year
Power Measuring Analyzer	Boonton Electronics	4500A-01	1282	June 26, 2013	1 Year
Peak Power Sensor	Boonton Electronics	57318	3724	June 26, 2013	1 Year

6. TEST SITE DESCRIPTION**6.1 Test Facility Description**

Please refer to section 2.1 of this report for test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was not grounded.



7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests.

7.1 Duty Cycle

The EUT was connected to the EMI Receiver. The EMI Receiver was placed at 0 Hz span and the sweep time varied depending on the mode of operation of the EUT.

The pulses were measured per the following modes described in section 4.1 of this test report with the worst case 100 ms being used in each mode to determine the duty cycle.

The duty cycle was calculated as follows for each mode:
(worst case pulses in 100 ms / 100 ms)

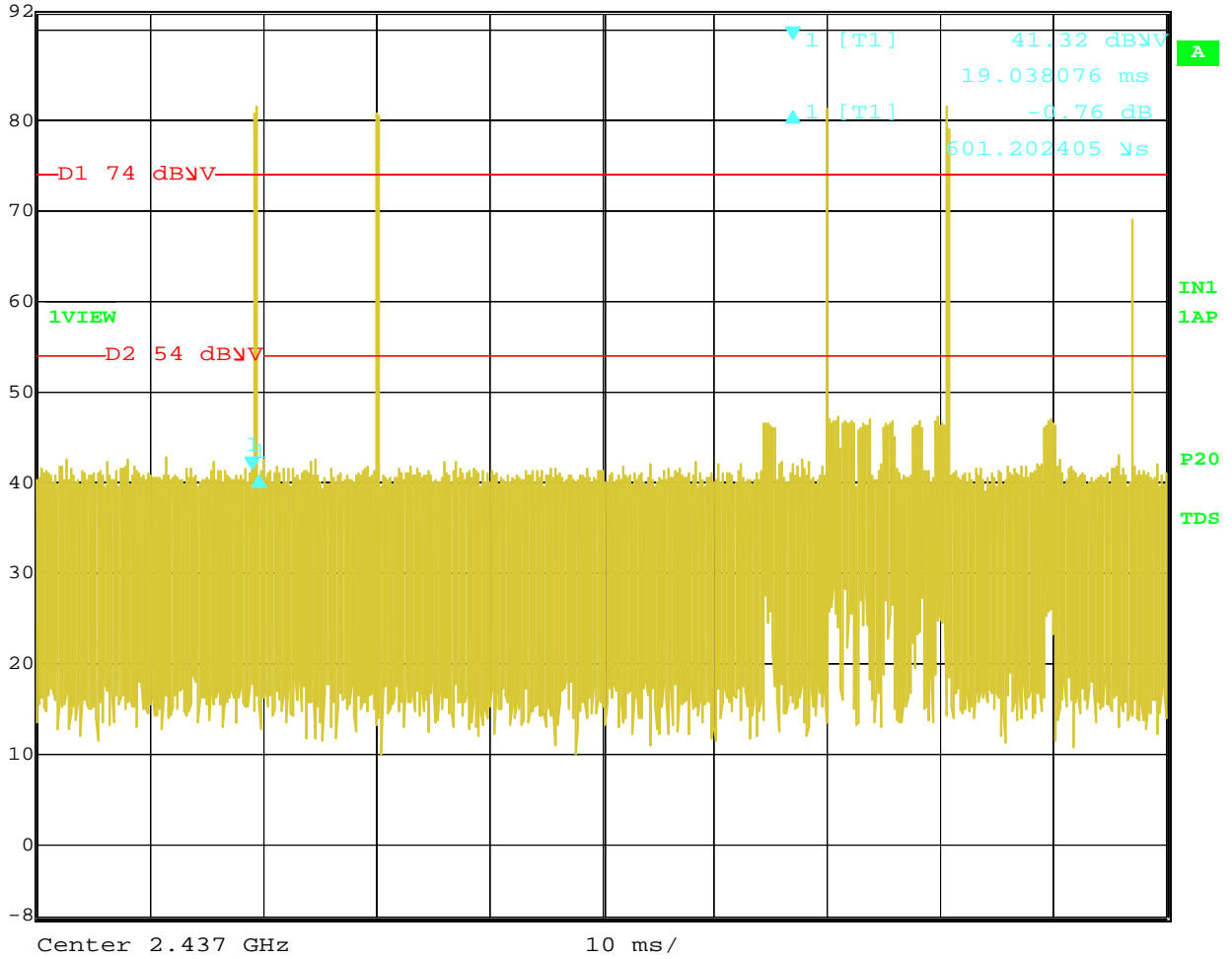


APPENDIX A

***DUTY CYCLE
DATA SHEETS***



Ref Lvl	Delta 1 [T1]	RBW	3 MHz	RF Att	20 dB
92 dBμV	-0.76 dB	VBW	1 MHz		
	601.202405 μs	SWT	100 ms	Unit	dBμV

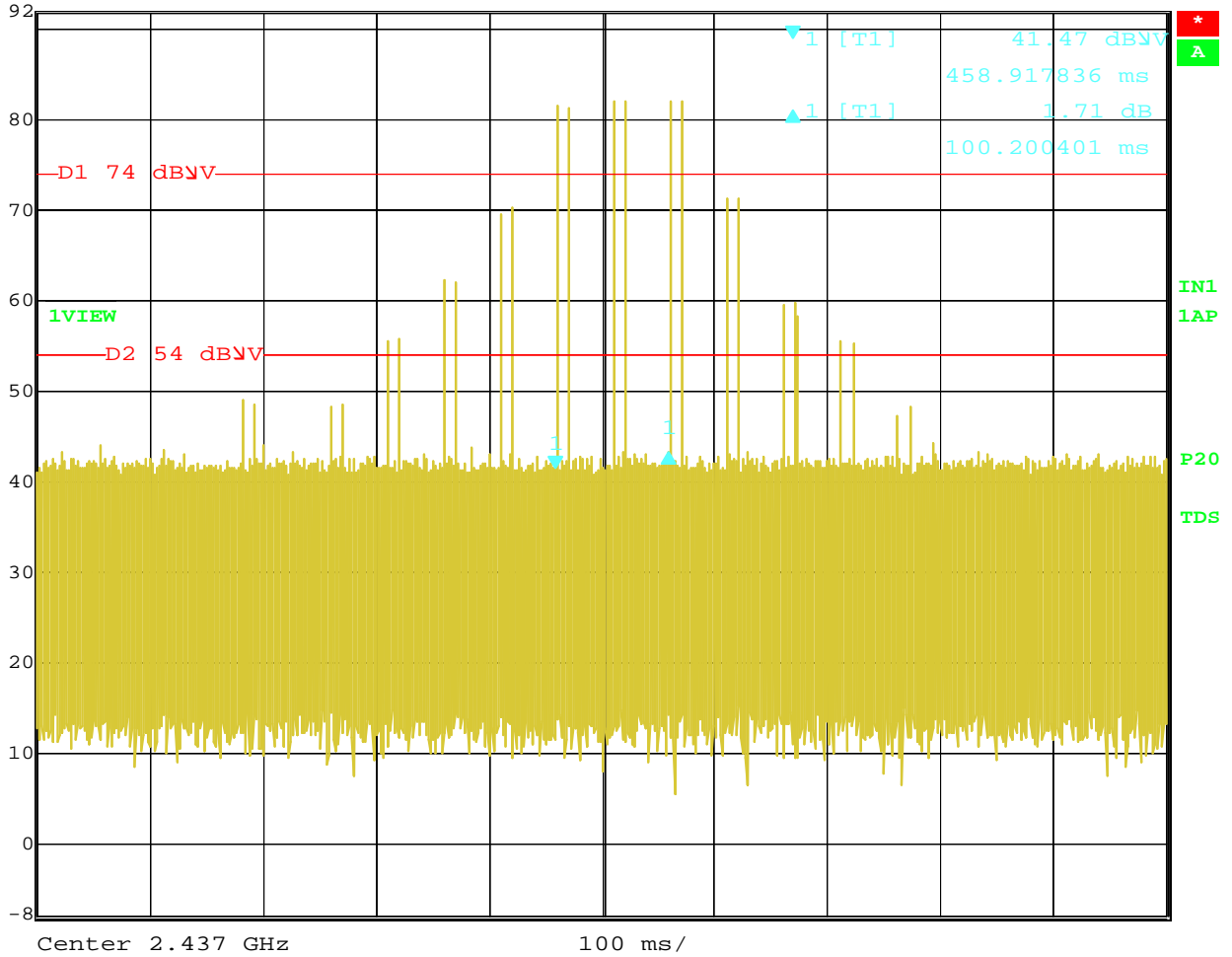


Date: 9.SEP.2013 13:10:16

Time of One Pulse in Pairing Mode

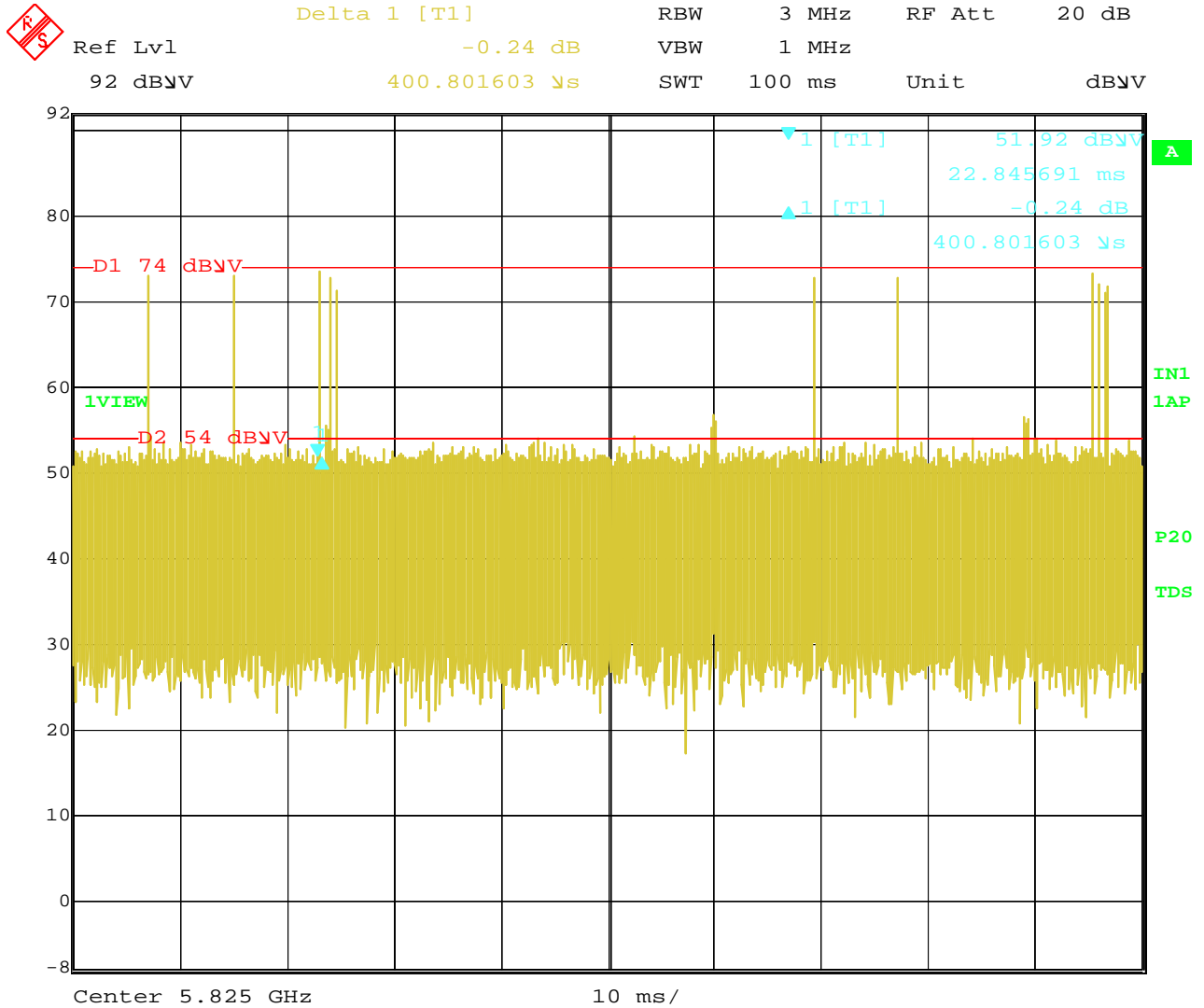


Ref Lvl	Delta 1 [T1]	RBW	3 MHz	RF Att	20 dB
92 dB μ V	1.71 dB	VBW	1 MHz		
	100.200401 ms	SWT	1 s	Unit	dB μ V



Date: 9.SEP.2013 13:09:19

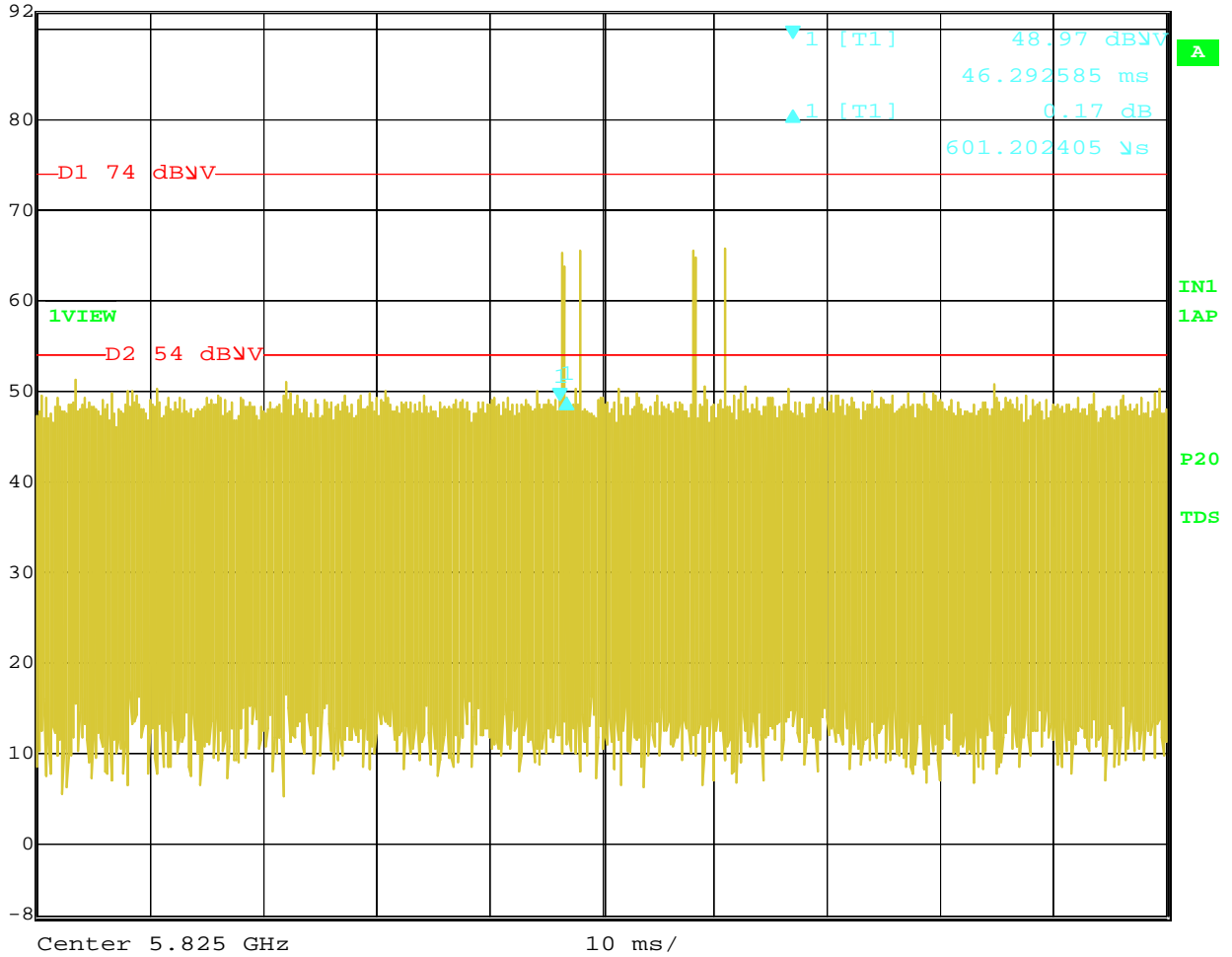
Time of Plot with Roku in Pairing Mode
 Worst Case Duty Cycle = (4*601.202405 us) / 100 mS = 2.405%



Date: 9.SEP.2013 13:16:56

Actual Operation of the Roku when the Pause / Play button was hit continuously.
 Duty Cycle = $(10 \times 400.801603 \text{ us}) / 100 \text{ ms} = 4.008\%$

	Delta 1 [T1]	RBW	1 MHz	RF Att	20 dB
	Ref Lvl	0.17 dB	VBW	3 MHz	
	92 dBμV	601.202405 μs	SWT	100 ms	Unit

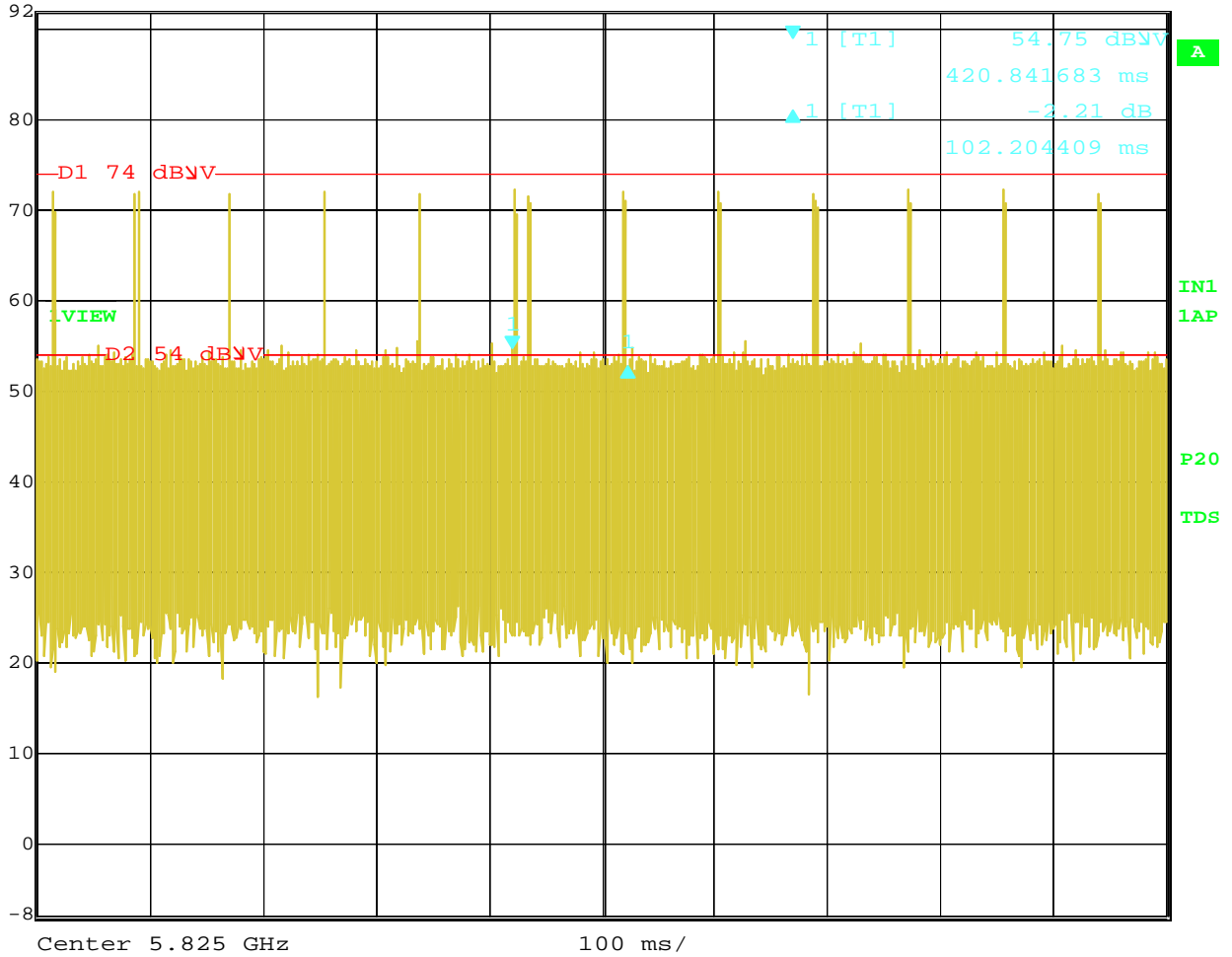


Date: 9.SEP.2013 13:28:22

Actual Operation of the Roku when the Fast Forward button was hit continuously. – 100 mS Scale
 Duty Cycle = $(4 * 601.202405 \text{ uS}) / 100 \text{ ms} = 2.4045\%$



Ref Lvl	Delta 1 [T1]	RBW	3 MHz	RF Att	20 dB
92 dBμV	-2.21 dB	VBW	1 MHz		
	102.204409 ms	SWT	1 s	Unit	dBμV



Date: 9.SEP.2013 13:13:46

Actual Operation of the Roku when the Fast Forward button was hit continuously. – 1 Second Scale
 Duty Cycle = (14*601.202405 us) / 1000 ms = 0.8417%

Note: Hitting the Fast Forward button continuously produced more pulses over 1 second period than holding the button down on a continuous basis