

FCC PART 15 SUBPART B & SUBPART C SECTION 15.249**TEST REPORT***for***ELECTRONIC LOGGING DEVICE
Model: PT30**

Prepared for

PACIFIC TRACK
1300 BRISTOL STREET NORTH, SUITE 100
NEWPORT BEACH, CA 92660

Prepared by: _____

TOREY OLIVER

Reviewed by: _____

MATT HARRISON

COMPATIBLE ELECTRONICS INC.
20621 PASCAL WAY
LAKE FOREST, CALIFORNIA 92630
(949) 587-0400

DATE: MARCH 24th, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	2	11	17	51

This report shall not be reproduced except in full, without the written approval of
Compatible Electronics.



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

TABLE OF CONTENTS

Section / Title	PAGE
GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS	5
1. PURPOSE	6
2. ADMINISTRATIVE DATA	7
2.1 Location of Testing	7
2.2 Traceability Statement	7
2.3 Cognizant Personnel	7
2.4 Date Test Sample was Received	7
2.5 Disposition of the Test Sample	7
2.6 Abbreviations and Acronyms	7
3. APPLICABLE DOCUMENTS	8
4. DESCRIPTION OF TEST CONFIGURATION	9
4.1 Description of Test Configuration	9
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	11
5.1 EUT and Accessory List	11
5.2 Software used for testing:	11
5.3 EMI Test Equipment	11
6. TEST SITE DESCRIPTION	13
6.1 Test Facility Description	13
6.2 EUT Mounting, Bonding and Grounding	13
6.3 Facility Environmental Characteristics	13
6.4 Measurement Uncertainty	13
7. CHARACTERISTICS OF THE TRANSMITTER	14
7.1 Channel Number and Frequencies	14
7.2 Antenna	14
8. TEST PROCEDURES	15
8.1 RF Emissions	15
9. TEST PROCEDURE DEVIATIONS	17
10. CONCLUSIONS	17



LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Charts, and Photos • Test Setup Diagrams • Antenna and Amplifier Gain Factors • Radiated Emissions Photos
E	Radiated Emissions Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Plot Map and Layout of Test Site Below 1GHz
2	Plot Map and Layout of Test Site Above 1GHz



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 in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Device Tested: Electronic Logging Device
Model: PT30
S/N: None

Product Description: The Pacific Track PT30 is an Electronic Logging Device (ELD) which collects data from a vehicle and a GPS engine and periodically send this data over a Bluetooth Low Energy link.

Modifications: The EUT was not modified in order to comply with specifications.

Manufacturer: Pacific Track
1300 Bristol Street North, Suite 100
Newport Beach, CA 92660

Test Date: March 23rd & 24th, 2017

Test Specifications covered by accreditation:



Test Specifications: EMI requirements

CFR Title 47, Part 15 Subpart B Sections 15.107, 15.109, Subpart C Sections 15.205, 15.207, 15.209, and 15.249

Test Procedure: ANSI C63.4 & C63.10



SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	The EUT is battery powered; therefore, this test was not performed.
2	Radiated RF Emissions & Harmonics, 9 kHz – 25,000 MHz.	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Sections 15.205, 15.209, & 15.249
3	Fundamental Field Strength	Complies with the limits of CFR Title 47 Part 15 Subpart C Section 15.249
4	Emissions Radiated Outside of the Fundamental Frequency Band	Complies with the limits of CFR Title 47 Part 15 Subpart B Section 15.109 & Subpart C Sections 15.205, 15.209, & 15.249

**TABLE 1:
SIX HIGHEST RADIATED EMISSIONS READINGS**

	Reading Type (PK / QP / AV)	Polarization (Vert / Horz)	Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Delta (dB)	Test Distance
1	QP	H	123.10	35.64	43.52	-7.88	3-Meter
2	QP	H	123.60	35.10	43.52	-8.42	3-Meter
3	QP	H	124.00	35.05	43.52	-8.47	3-Meter
4	QP	V	45.70	31.30	40.00	-8.70	3-Meter
5	QP	V	46.00	30.09	40.00	-9.91	3-Meter
6	QP	V	46.50	28.68	40.00	-11.32	3-Meter



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Electronic Logging Device Model: PT30. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 & C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT (equipment under test) hereafter, are within the specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart B sections 15.109, & Part 15 Subpart C sections 15.205, 15.209, & 15.249.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

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

Pacific Track

Bernard Debbasch

Compatible Electronics, Inc.

Torey Oliver

Test Engineer

Matt Harrison

Lab Manager

2.4 Date Test Sample was Received

The test sample was received on March 23rd, 2017.

2.5 Disposition of the Test Sample

The test sample remains at Compatible Electronics, Inc. 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
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
PCB	Printed Circuit Board
TX	Transmit
RX	Receive



3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2014	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: 2013	American National Standard for Testing Unlicensed Wireless Devices



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration

The Electronic Logging Device Model: PT30 (EUT) was setup in a tabletop configuration. The EUT was tested in all 3 axis. The worst case was found to be the Z-Axis. The EUT was continuously transmitting a data stream and constantly receiving during the receive mode during testing.

The tests were performed using new batteries.

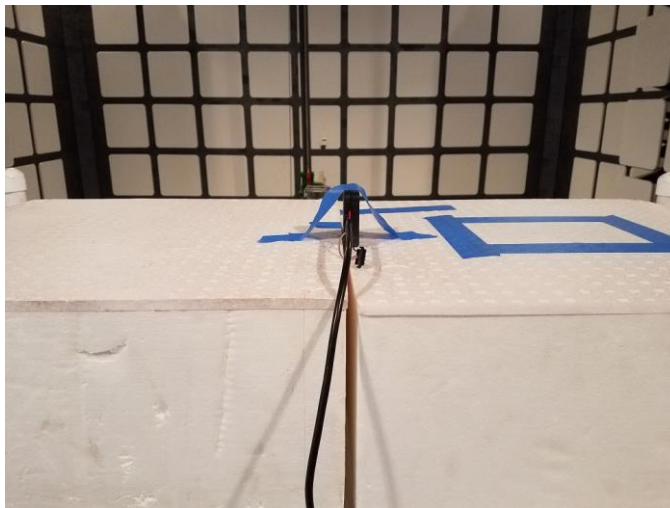
It was determined that the emissions were at their highest level when the EUT was transmitting in the configuration described above for Radiated Emissions. The final radiated data was taken in the above configuration. Please see Appendix E for the test data.

4.1.1 Photograph Test Configuration (Z-Axis)



4.1.2 Axis Determination

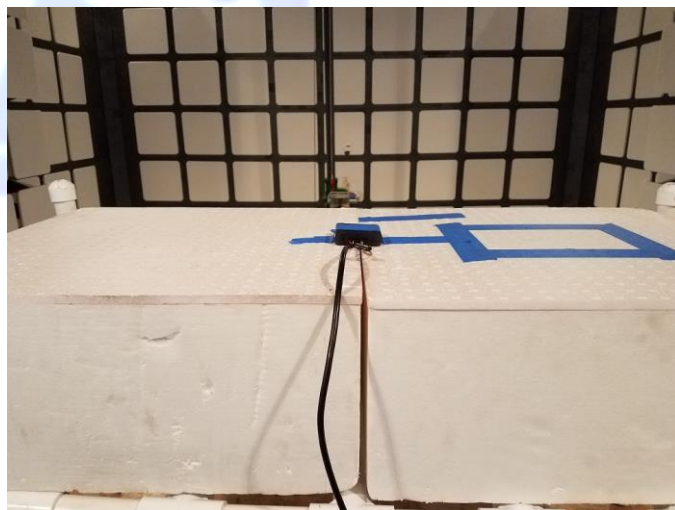
Z Axis



Y Axis



X Axis



4.1.3 Cable Construction and Termination

Cable 1

This is a 1.5 meter, braid shielded, cable that connected the EUT to the 12VDC Battery. The cable was hardwired at both ends of the cable. The shield of the cable was terminated via drain wire. This cable was not bundled.



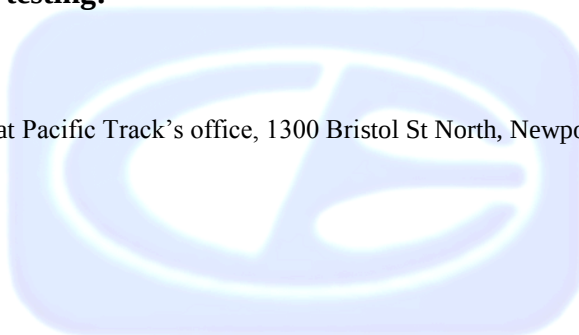
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER
1	Electronic Logging Device (EUT)	Pacific Track	PT30	None
2	12VDC Battery	Rayovac	Lantern	None
3	Laptop	Lenovo	T460p	None

5.2 Software used for testing:

Version: 1.0

Location: On a laptop at Pacific Track's office, 1300 Bristol St North, Newport beach, CA 92660



5.3 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Computer	Compatible Electronics	NONE	NONE	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100172	03/15/2017	03/15/2018
Antenna, Loop	Com Power	AL-130	121049	12/06/2014	12/06/2017
Antenna, CombiLog	Com Power	AC-220	003	05/19/2016	05/19/2017
Antenna, Horn 1- 18GHz	Com Power	AH-118	071250	05/17/2016	05/17/2017
Antenna, Horn 18- 26GHz	Com-Power	AH-826	081033	07/06/2015	07/06/2017
Pre-Amp, 1-18GHz	Com Power	PAM-118A	443013	04/18/2016	04/18/2017
Pre-Amp, 18- 40GHz	Com-Power	PA-840	181289	06/16/2015	06/16/2017
High Pass Filter	AMTI Microwave Circuits	H3G020G4	481230	3/16/2016	3/16/2018
Mast, Antenna Positioner	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Turntable	Sunol Science Corporation	FM 2001	N/A	N/A	N/A
Mast and Turntable Controller	Sunol Science Corporation	SC104V	020808-1	N/A	N/A



6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and the figures in Appendix D of this report for test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 by 0.8-meter-high non-conductive table, which was placed on the ground plane.

For above 1GHz testing the EUT was placed 1.5 meters above high, above the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

6.4 Measurement Uncertainty

“Compatible Electronics’ U_{lab} value is less than U_{cispr} , thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2 u_c(y)$
Conducted disturbance (mains port)	(150 kHz – 30 MHz)	3,6 dB	2.88
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	5,2 dB	3.53



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

There is a total of 40 channels. The low, middle, and high channels are 2402 MHz, 2440 MHz, & 2480 MHz. There is approximately 2 MHz separation between channels and the EUT uses GFSK modulation at a 1 Mbit/s data rate.

7.2 Antenna

The antenna is made up of a trace on the PCB.



8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

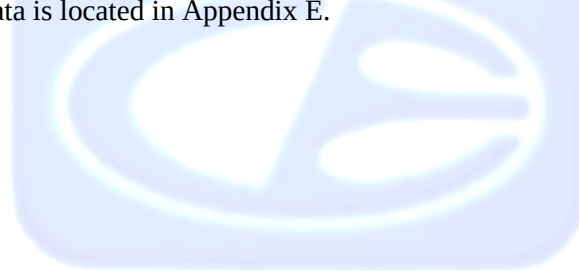
8.1.1 Conducted Emissions Test

Test Results: The EUT is battery powered; therefore, this test was not performed.

The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The different configurations were investigated to find the worst case as well the worst-case channel. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.



8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. There was one Microwave Preamplifier used for frequencies above 1 GHz.

For spurious emissions, the quasi-peak detector was used for frequencies below 1GHz and the average detector was used for frequencies above 1 GHz.

For the fundamental and harmonic emissions, a duty cycle average was used.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
.009 to .150	Active Loop Antenna	200 Hz
.150 to 30	Active Loop Antenna	9 kHz
30 to 1000	Combilog Antenna	100 kHz (120 kHz for QP Measurements)
1000 to 25000	Horn Antenna	1 MHz

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4 & ANSI C63.10. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart B section 15.109, & Part 15 Subpart C sections 15.205, 15.209, & 15.249. The six highest emissions are listed in table 1.



8.1.3 *Fundamental Field Strength (Duty Cycle Calculations)*

The Peak Transmit Radiated Field Strength was measured at a 3-meter test distance. The EMI Receiver was used to obtain the final test data. The final qualification data sheets are located in Appendix E.

Where

$$\delta(\text{dB}) = 20 \log \left[\sum (nt_1 + mt_2 + \dots + \xi t_x) / T \right]$$

n is the number of pulses of duration t_1

m is the number of pulses of duration t_2

ξ is the number of pulses of duration t_x

T is the period of the pulse train or 100 ms if the pulse train length is greater than 100 ms

Duty Cycle Correction Factor = -20.00dB

Pulse = 3 * 302.294589 uS

Total on Time = 0.906884 mS

0.906884 mS / 100 mS = 0.0091

20 log (0.0091) = -40.80 dB correction factor

Max Duty Cycle Correction Factor = -20.00dB

Test Results:

The EUT complies with Part 15 Subpart C, Section 15.249.

8.1.4 *Emissions Radiated Outside of the Fundamental Frequency Band*

The Band Edge measurement was measured using the EMI Receiver at a 3-meter test distance to obtain the final test data. The lower and upper channels were tuned during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15 Subpart C, Section 15.205 & 15.249.

9. **TEST PROCEDURE DEVIATIONS**

The test procedures were not deviated from throughout all tests.

10. **CONCLUSIONS**

The Electronic Logging Device Model: PT30 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart B section 15.109, & Subpart C sections 15.205, 15.209, & 15.249.



APPENDIX A
***LABORATORY ACCREDITATIONS AND
RECOGNITIONS***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

LABORATORY ACCREDITATIONS AND RECOGNITIONS



For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.

For the most up-to-date version of our scopes and certificates please visit

<http://celectronics.com/quality/scope/>

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX B

MODIFICATIONS TO THE EUT



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

MODIFICATIONS TO THE EUT

There were no modifications made during testing.



APPENDIX C
***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Electronic Logging Device
Model: PT30
S/N: NONE

No additional models were tested.



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX D***DIAGRAMS, CHARTS, AND PHOTOS***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

FIGURE 1: PLOT MAP AND LAYOUT OF TEST SITE BELOW 1GHZ

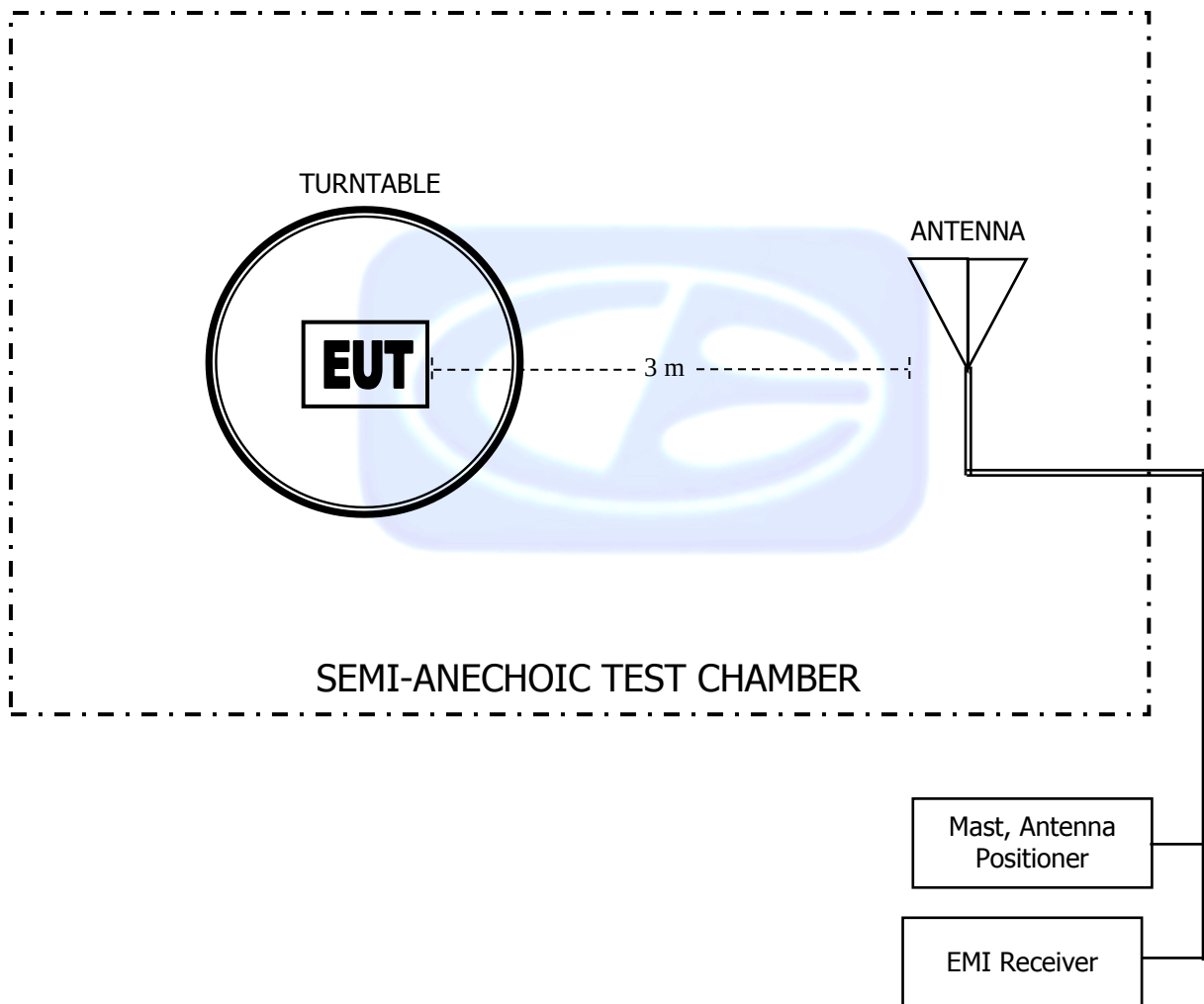
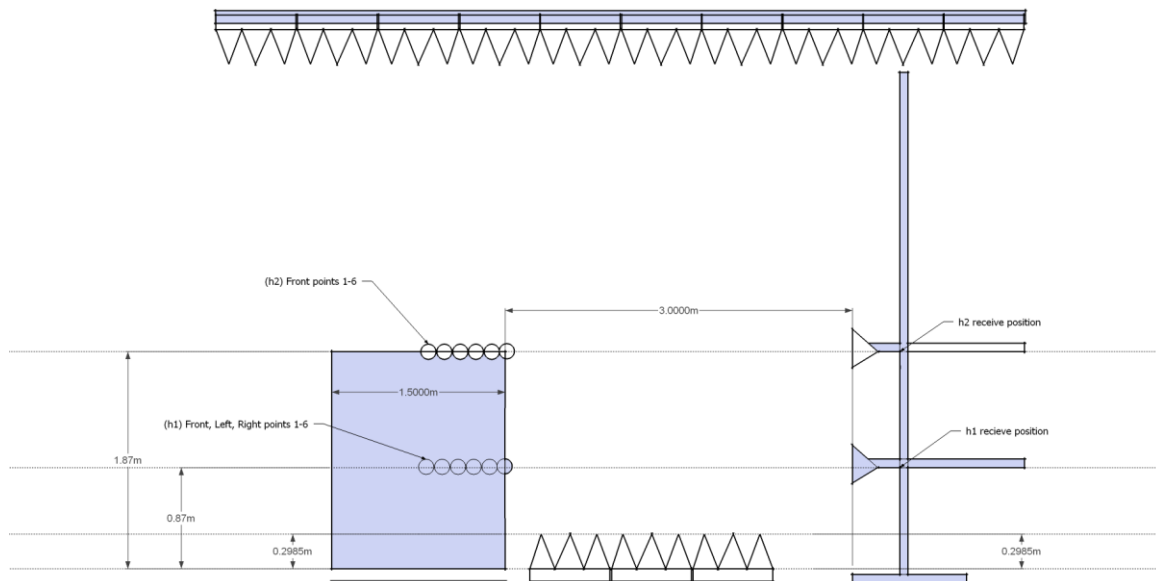


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ



COM-POWER AL-130**LOOP ANTENNA****S/N: 121049****CALIBRATION DUE: DECEMBER 6, 2017**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)	FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-34.64	16.86	0.8	-36.32	15.18
0.01	-34.78	16.72	0.9	-36.22	15.28
0.02	-35.91	15.59	1.0	-36.22	15.28
0.03	-35.48	16.02	2.0	-35.91	15.59
0.04	-35.82	15.68	3.0	-35.91	15.59
0.05	-36.49	15.01	4.0	-36.01	15.49
0.06	-36.30	15.20	5.0	-35.80	15.70
0.07	-36.43	15.07	6.0	-36.00	15.50
0.08	-36.30	15.20	7.0	-35.90	15.60
0.09	-36.39	15.11	8.0	-35.70	15.80
0.1	-36.41	15.09	9.0	-35.70	15.80
0.2	-36.61	14.89	10.0	-35.60	15.90
0.3	-36.63	14.87	15.0	-36.52	14.98
0.4	-36.52	14.99	20.0	-35.75	15.75
0.5	-36.63	14.87	25.0	-37.78	13.72
0.6	-36.62	14.88	30.0	-38.62	12.88
0.7	-36.53	14.97			



COM-POWER AC-220**LAB P - COMBILOG ANTENNA****S/N: 003****CALIBRATION DUE: MAY 19, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	23.6	160	13.5
35	23.6	180	14.4
40	23.7	200	14.5
45	23.9	250	15.7
50	24.2	300	18.1
60	22.6	400	19.9
70	19.1	500	22.3
80	13.8	600	24.4
90	12.9	700	26.6
100	14.6	800	26.2
120	14.4	900	27.5
140	16.2	1000	28.9



COM-POWER AH-118**HORN ANTENNA****S/N: 071250****CALIBRATION DUE: MAY 17, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	24.40	9500	39.11
1500	25.61	10000	39.38
2000	28.71	10500	39.55
2500	29.09	11000	39.66
3000	30.24	11500	40.28
3500	30.94	12000	40.26
4000	31.77	12500	40.64
4500	32.29	13000	41.33
5000	33.70	13500	41.74
5500	34.28	14000	41.52
6000	34.83	14500	41.80
6500	35.07	15000	43.51
7000	36.79	15500	41.03
7500	37.45	16000	40.88
8000	37.67	16500	40.18
8500	37.75	17000	42.59
9000	38.15	17500	44.49
		18000	45.27



COM-POWER PAM-118**1-18GHz - PREAMPLIFIER****S/N: 443013****CALIBRATION DUE: APRIL 18, 2017**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
500	39.74	5500	35.03
1000	40.74	6000	38.02
1100	38.40	6500	37.15
1200	40.64	7000	35.31
1300	39.71	7500	35.90
1400	39.39	8000	34.08
1500	41.05	8500	34.37
1600	38.74	9000	34.45
1700	39.95	9500	34.23
1800	39.88	10000	35.23
1900	39.32	11000	33.36
2000	40.83	12000	33.27
2500	41.14	13000	34.84
3000	39.42	14000	33.19
3500	40.22	15000	36.25
4000	40.94	16000	32.33
4500	38.59	17000	34.10
5000	38.13	18000	36.00





FRONT VIEW

PACIFIC TRACK

ELECTRONIC LOGGING DEVICE

MODEL: PT30

FCC SUBPART B & C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

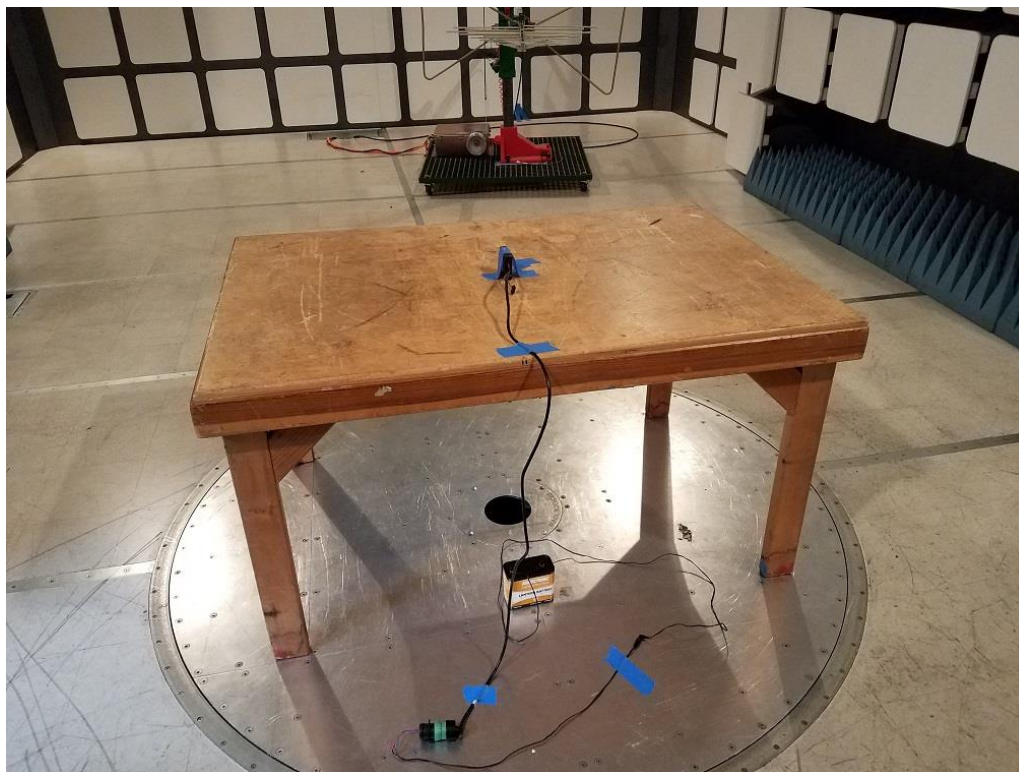


Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



REAR VIEW

PACIFIC TRACK

ELECTRONIC LOGGING DEVICE

MODEL: PT30

FCC SUBPART B & C - RADIATED EMISSIONS < 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

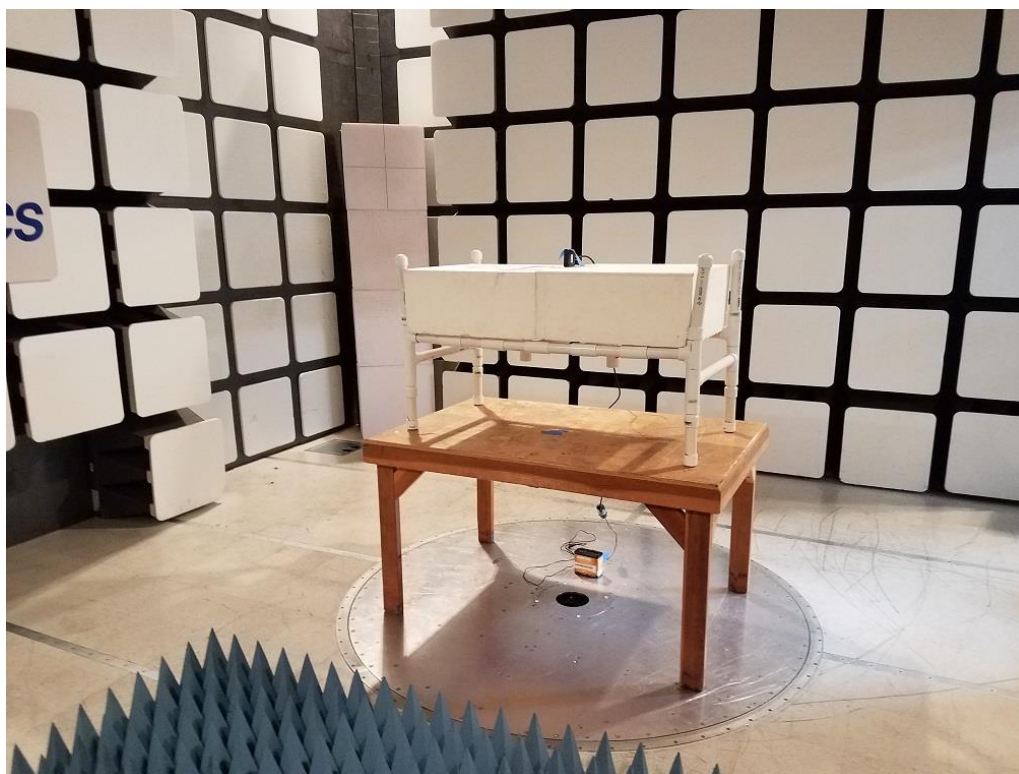


Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



FRONT VIEW

PACIFIC TRACK

ELECTRONIC LOGGING DEVICE

MODEL: PT30

FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**





REAR VIEW

PACIFIC TRACK

ELECTRONIC LOGGING DEVICE

MODEL: PT30

FCC SUBPART B & C - RADIATED EMISSIONS > 1GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION

FOR MAXIMUM EMISSIONS



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX E
RADIATED EMISSIONS DATA SHEETS

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

3/24/2017 4:42:46 PM

File: Radiated Pre-Scan 30-1000Mhz

Sequence: Preliminary Scan

Operator: Torey Oliver

EUT Type: Electronic Logging Device / PT30

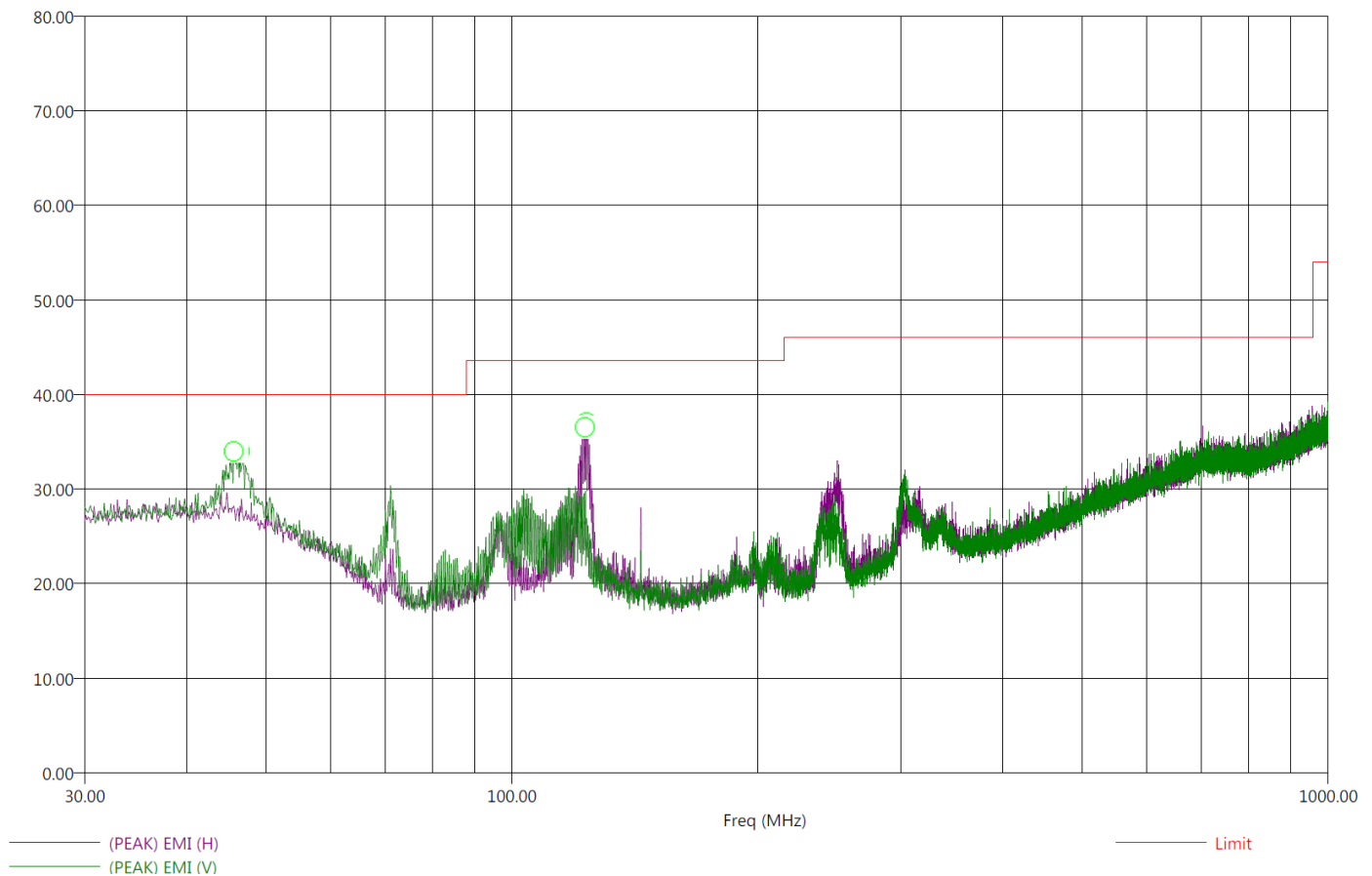
EUT Condition: The EUT is constantly transmitting 2402 MHz.

Comments: BLE

Temp: 72f

Hum: 46%

12VDC

Compatible Electronics, Inc. FAC-3 (Lab P)Electric Field Strength (dB μ V/m)

***There were no radiated emissions other than harmonics found below 30 MHz or above 1GHz.
This is the worst-case channel and mode.***



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

3/24/2017 5:03:54 PM

File: Radiated Final 30-1000Mhz

Sequence: Final Measurements

Operator: Torey Oliver

EUT Type: Electronic Logging Device / PT30

EUT Condition: The EUT is constantly transmitting 2402 MHz.

Comments: BLE

Temp: 72f

Hum: 46%

12VDC

Compatible Electronics, Inc. FAC-3 (Lab P)

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer(dB)	Cable (dB)
45.70	-8.70	31.30	36.34	40.00	V	359.50	106.29	23.95	0.58
46.00	-9.91	30.09	35.29	40.00	V	188.00	125.64	23.88	0.58
46.50	-11.32	28.68	34.03	40.00	V	111.50	172.58	23.72	0.59
123.10	-7.88	35.64	37.89	43.52	H	106.75	214.88	15.90	0.92
123.60	-8.42	35.10	37.53	43.52	H	123.00	207.70	15.86	0.92
124.00	-8.47	35.05	37.32	43.52	H	123.25	241.29	15.81	0.93

*There were no radiated emissions other than harmonics found below 30 MHz or above 1GHz.**This is the worst-case channel and mode.*

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

FUNDAMENTAL & HARMONICS

DATA SHEETS



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

FUNDAMENTAL FIELD STRENGTH

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/23/2017
Lab: P
Tested By: Torey Oliver

Compatible Electronics, Inc. FAC-3

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table	Tower	Comments
2402.00	87.44	H	113.97	-26.53	Peak	61	3.46	Z-Axis
2402.00	67.44	H	93.97	-26.53	Avg	61	3.46	Z-Axis
2402.00	97.82	V	113.97	-16.15	Peak	204	1.41	Z-Axis
2402.00	77.82	V	93.97	-16.15	Avg	204	1.41	Z-Axis
2440.00	87.14	H	113.97	-26.83	Peak	218	3.24	Z-Axis
2440.00	67.14	H	93.97	-26.83	Avg	218	3.24	Z-Axis
2440.00	97.26	V	113.97	-16.71	Peak	140	1.49	Z-Axis
2440.00	77.26	V	93.97	-16.71	Avg	140	1.49	Z-Axis
2480.00	88.54	H	113.97	-25.43	Peak	119	3.57	Z-Axis
2480.00	68.54	H	93.97	-25.43	Avg	119	3.57	Z-Axis
2480.00	96.64	V	113.97	-17.33	Peak	348	1.64	Z-Axis
2480.00	76.64	V	93.97	-17.33	Avg	348	1.64	Z-Axis

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS LOW CHANNEL HORIZONTAL

FCC 15.249

Company: Pacific Track

EUT: Electronic Logging Device

Model: PT30

Duty Cycle Correction Factor: -20

Date: 3/24/2017

Lab: P

Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4804.0	48.43	H	73.98	-25.55	Peak	1.35	134	
4804.0	28.43	H	53.98	-25.55	Avg	1.35	134	
7206.0	48.16	H	73.98	-25.82	Peak	2.82	360	
7206.0	28.16	H	53.98	-25.82	Avg	2.82	360	
9608.0	58.34	H	73.98	-15.64	Peak	1.12	229	
9608.0	38.34	H	53.98	-15.64	Avg	1.12	229	
12010.0		H	73.98		Peak			No Emissions Found
12010.0		H	53.98		Avg			No Emissions Found
14412.0		H	73.98		Peak			No Emissions Found
14412.0		H	53.98		Avg			No Emissions Found
16814.0		H	73.98		Peak			No Emissions Found
16814.0		H	53.98		Avg			No Emissions Found
19216.0		H	73.98		Peak			No Emissions Found
19216.0		H	53.98		Avg			No Emissions Found
21618.0		H	73.98		Peak			No Emissions Found
21618.0		H	53.98		Avg			No Emissions Found
24020.0		H	73.98		Peak			No Emissions Found
24020.0		H	53.98		Avg			No Emissions Found

Test distance

3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS LOW CHANNEL VERTICAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/24/2017
Lab: P
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4804.0	40.91	V	73.98	-33.07	Peak	1.94	205	
4804.0	20.91	V	53.98	-33.07	Avg	1.94	205	
7206.0	46.06	V	73.98	-27.92	Peak	1.22	260	
7206.0	26.06	V	53.98	-27.92	Avg	1.22	260	
9608.0	55.85	V	73.98	-18.13	Peak	1.00	360	
9608.0	35.85	V	53.98	-18.13	Avg	1.00	360	
12010.0		V	73.98		Peak			No Emissions Found
12010.0		V	53.98		Avg			No Emissions Found
14412.0		V	73.98		Peak			No Emissions Found
14412.0		V	53.98		Avg			No Emissions Found
16814.0		V	73.98		Peak			No Emissions Found
16814.0		V	53.98		Avg			No Emissions Found
19216.0		V	73.98		Peak			No Emissions Found
19216.0		V	53.98		Avg			No Emissions Found
21618.0		V	73.98		Peak			No Emissions Found
21618.0		V	53.98		Avg			No Emissions Found
24020.0		V	73.98		Peak			No Emissions Found
24020.0		V	53.98		Avg			No Emissions Found

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS MID CHANNEL HORIZONTAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/24/2017
Lab: P
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4880.0	41.15	H	73.98	-32.83	Peak	1.28	220	
4880.0	21.15	H	53.98	-32.83	Avg	1.28	220	
7320.0	54.11	H	73.98	-19.87	Peak	1.29	229	
7320.0	34.11	H	53.98	-19.87	Avg	1.29	229	
9760.0	50.24	H	73.98	-23.74	Peak	1.07	225	
9760.0	30.24	H	53.98	-23.74	Avg	1.07	225	
12200.0		H	73.98		Peak			No Emissions Found
12200.0		H	53.98		Avg			No Emissions Found
14640.0		H	73.98		Peak			No Emissions Found
14640.0		H	53.98		Avg			No Emissions Found
17080.0		H	73.98		Peak			No Emissions Found
17080.0		H	53.98		Avg			No Emissions Found
19520.0		H	73.98		Peak			No Emissions Found
19520.0		H	53.98		Avg			No Emissions Found
21960.0		H	73.98		Peak			No Emissions Found
21960.0		H	53.98		Avg			No Emissions Found
24400.0		H	73.98		Peak			No Emissions Found
24400.0		H	53.98		Avg			No Emissions Found

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS MID CHANNEL VERTICAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/24/2017
Lab: P
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4880.0	41.17	V	73.98	-32.81	Peak	2.50	35	
4880.0	21.17	V	53.98	-32.81	Avg	2.50	35	
7320.0	49.75	V	73.98	-24.23	Peak	2.27	360	
7320.0	29.75	V	53.98	-24.23	Avg	2.27	360	
9760.0	56.57	V	73.98	-17.41	Peak	1.00	310	
9760.0	36.57	V	53.98	-17.41	Avg	1.00	310	
12200.0		V	73.98		Peak			No Emissions Found
12200.0		V	53.98		Avg			No Emissions Found
14640.0		V	73.98		Peak			No Emissions Found
14640.0		V	53.98		Avg			No Emissions Found
17080.0		V	73.98		Peak			No Emissions Found
17080.0		V	53.98		Avg			No Emissions Found
19520.0		V	73.98		Peak			No Emissions Found
19520.0		V	53.98		Avg			No Emissions Found
21960.0		V	73.98		Peak			No Emissions Found
21960.0		V	53.98		Avg			No Emissions Found
24400.0		V	73.98		Peak			No Emissions Found
24400.0		V	53.98		Avg			No Emissions Found

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS HIGH CHANNEL HORIZONTAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/24/2017
Lab: P
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4960.0	48.65	H	73.98	-25.33	Peak	1.27	131	
4960.0	28.65	H	53.98	-25.33	Avg	1.27	131	
7440.0	48.11	H	73.98	-25.87	Peak	2.92	360	
7440.0	28.11	H	53.98	-25.87	Avg	2.92	360	
9920.0	53.29	H	73.98	-20.69	Peak	1.00	98	
9920.0	33.29	H	53.98	-20.69	Avg	1.00	98	
12400.0		H	73.98		Peak			No Emissions Found
12400.0		H	53.98		Avg			No Emissions Found
14880.0		H	73.98		Peak			No Emissions Found
14880.0		H	53.98		Avg			No Emissions Found
17360.0		H	73.98		Peak			No Emissions Found
17360.0		H	53.98		Avg			No Emissions Found
19840.0		H	73.98		Peak			No Emissions Found
19840.0		H	53.98		Avg			No Emissions Found
22320.0		H	73.98		Peak			No Emissions Found
22320.0		H	53.98		Avg			No Emissions Found
24800.0		H	73.98		Peak			No Emissions Found
24800.0		H	53.98		Avg			No Emissions Found

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

HARMONICS HIGH CHANNEL VERTICAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/24/2017
Lab: P
Tested By: Torey Oliver

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
4960.0	41.41	V	73.98	-32.57	Peak	2.03	214	
4960.0	21.41	V	53.98	-32.57	Avg	2.03	214	
7440.0	48.96	V	73.98	-25.02	Peak	2.11	269	
7440.0	28.96	V	53.98	-25.02	Avg	2.11	269	
9920.0	52.11	V	73.98	-21.87	Peak	1.10	305	
9920.0	32.11	V	53.98	-21.87	Avg	1.10	305	
12400.0		V	73.98		Peak			No Emissions Found
12400.0		V	53.98		Avg			No Emissions Found
14880.0		V	73.98		Peak			No Emissions Found
14880.0		V	53.98		Avg			No Emissions Found
17360.0		V	73.98		Peak			No Emissions Found
17360.0		V	53.98		Avg			No Emissions Found
19840.0		V	73.98		Peak			No Emissions Found
19840.0		V	53.98		Avg			No Emissions Found
22320.0		V	73.98		Peak			No Emissions Found
22320.0		V	53.98		Avg			No Emissions Found
24800.0		V	73.98		Peak			No Emissions Found
24800.0		V	53.98		Avg			No Emissions Found

Test distance
3 meter



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

***EMISSIONS RADIATED OUTSIDE OF THE FUNDAMENTAL
FREQUENCY BAND***

DATA SHEETS



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

BAND EDGES- HORIZONTAL

FCC 15.249

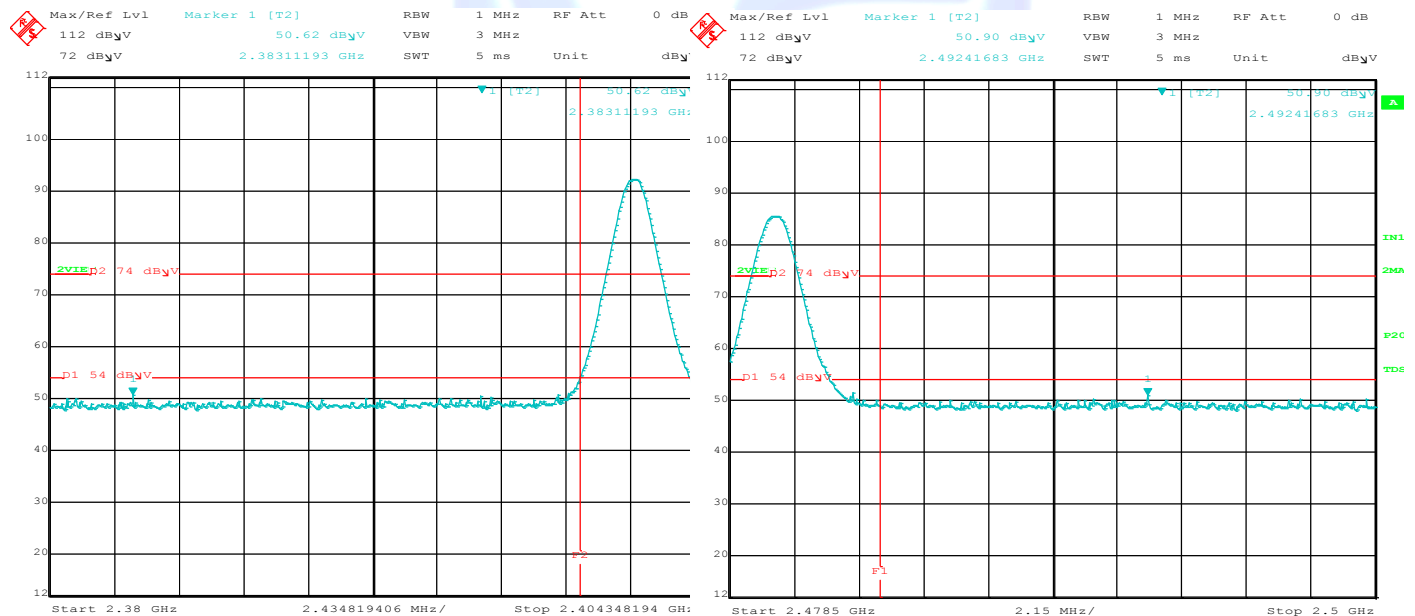
Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

Date: 3/23/2017
Lab: P
Test ENG: Torey Oliver

Compatible Electronics, Inc. FAC-3 (Lab R)

Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2383.11	50.62	H	53.98	-3.36	Peak	1.00	86	
2383.11	--	H	53.98	--	AVG	--	--	
2492.42	50.90	H	53.98	-3.08	Peak	3.57	119	No Marker Delta
2492.42	--	H	53.98	--	AVG	--	--	Method Used

Test distance
3 meter



Comment A: 2402MHz Lower Band Edge Horizontal

Comment A: 2480MHz Upper Band Edge Horizontal



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

BAND EDGES- VERTICAL

FCC 15.249

Company: Pacific Track
EUT: Electronic Logging Device
Model: PT30
Duty Cycle Correction Factor: -20

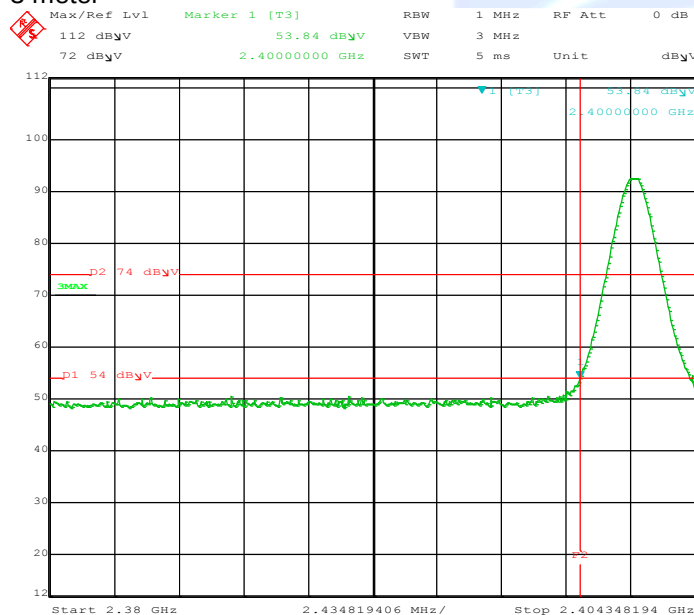
Date: 3/23/2017
Lab: P
Test ENG: Torey Oliver

Compatible Electronics, Inc. FAC-3 (Lab R)

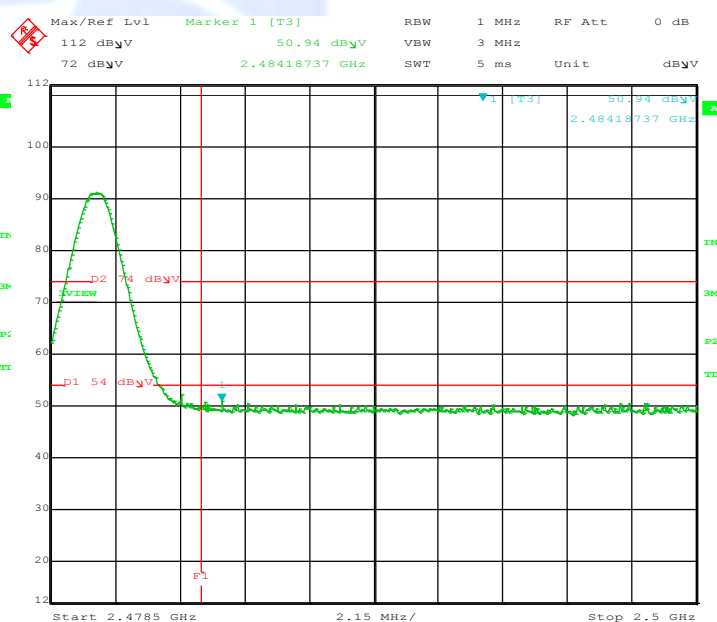
Freq. (MHz)	Level (dBμV/m)	Pol	Limit (dBμV)	Margin (dB)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
2400.00	53.84	V	53.98	-0.14	Peak	2.39	154	No Marker Delta
2400.00	--	V	53.98	--	AVG	--	--	Method Used
2484.19	50.94	V	53.98	-3.04	Peak	1.59	129	No Marker Delta
2484.19	--	V	53.98	--	AVG	--	--	Method Used

Test distance

3 meter



Comment A: 2402MHz Lower Band Edge Vertical



Comment A: 2480MHz Upper Band Edge Vertical



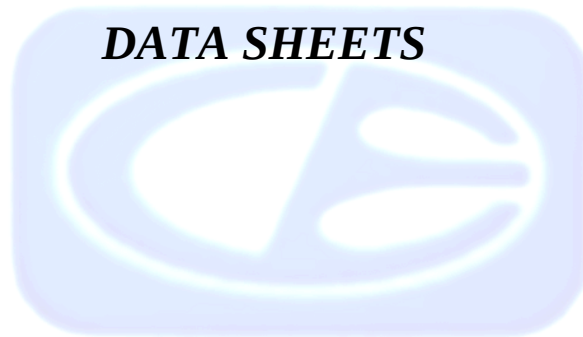
Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

***DUTY CYCLE
DATA SHEETS***



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

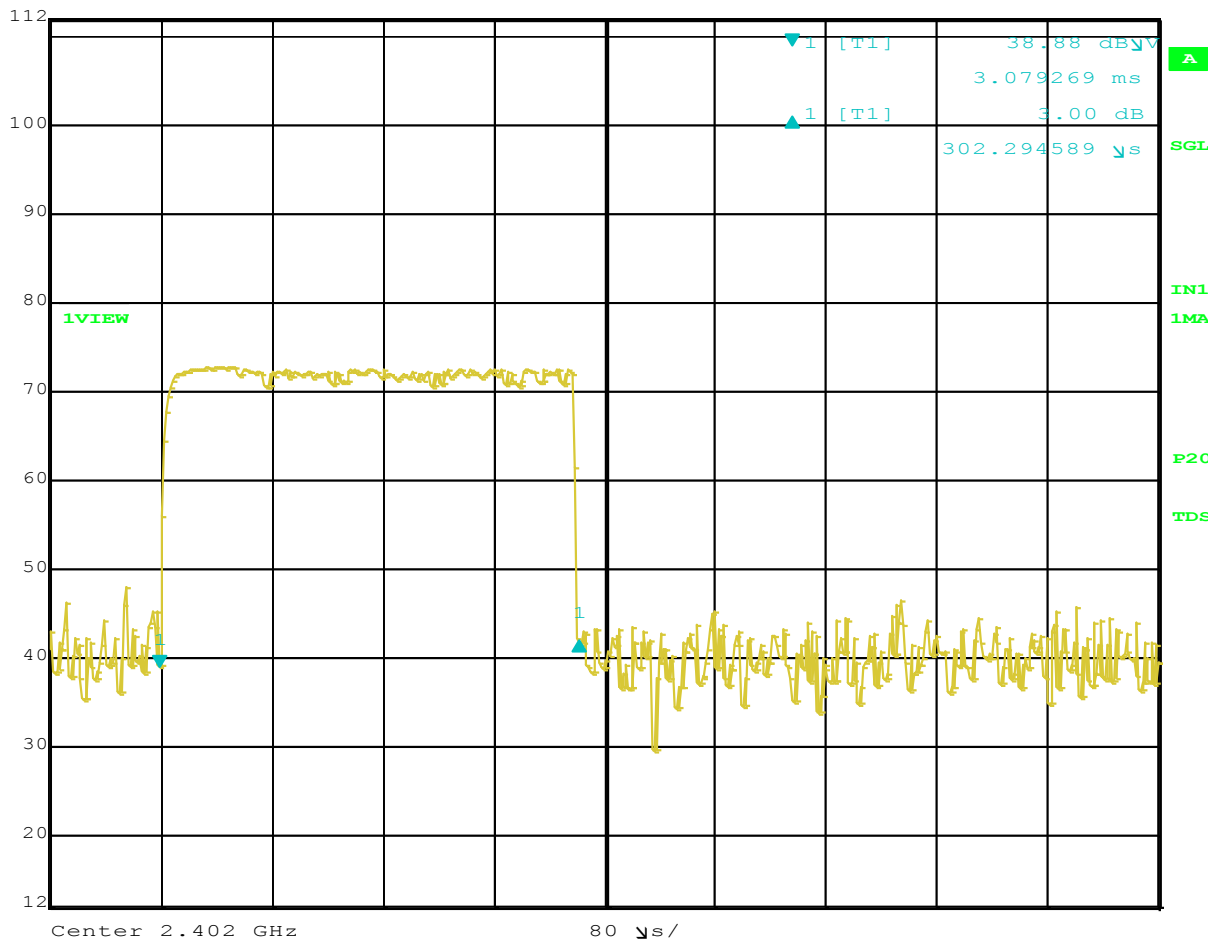
Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

DUTY CYCLE

Pulse Time (ms)	# of Pulses	Total on Time (ms)	period (ms)	Duty Cycle	Correction (dB)	Applied Correction (dB)
0.302294589	3	0.906884	100	0.0091	-40.80	-20.00



Max/Ref Lvl Delta 1 [T1] RBW 1 MHz RF Att 0 dB
112 dBμV 3.00 dB VBW 3 MHz
72 dBμV 302.294589 μs SWT 800 μs Unit dBμV



Comment A: Pulse Width



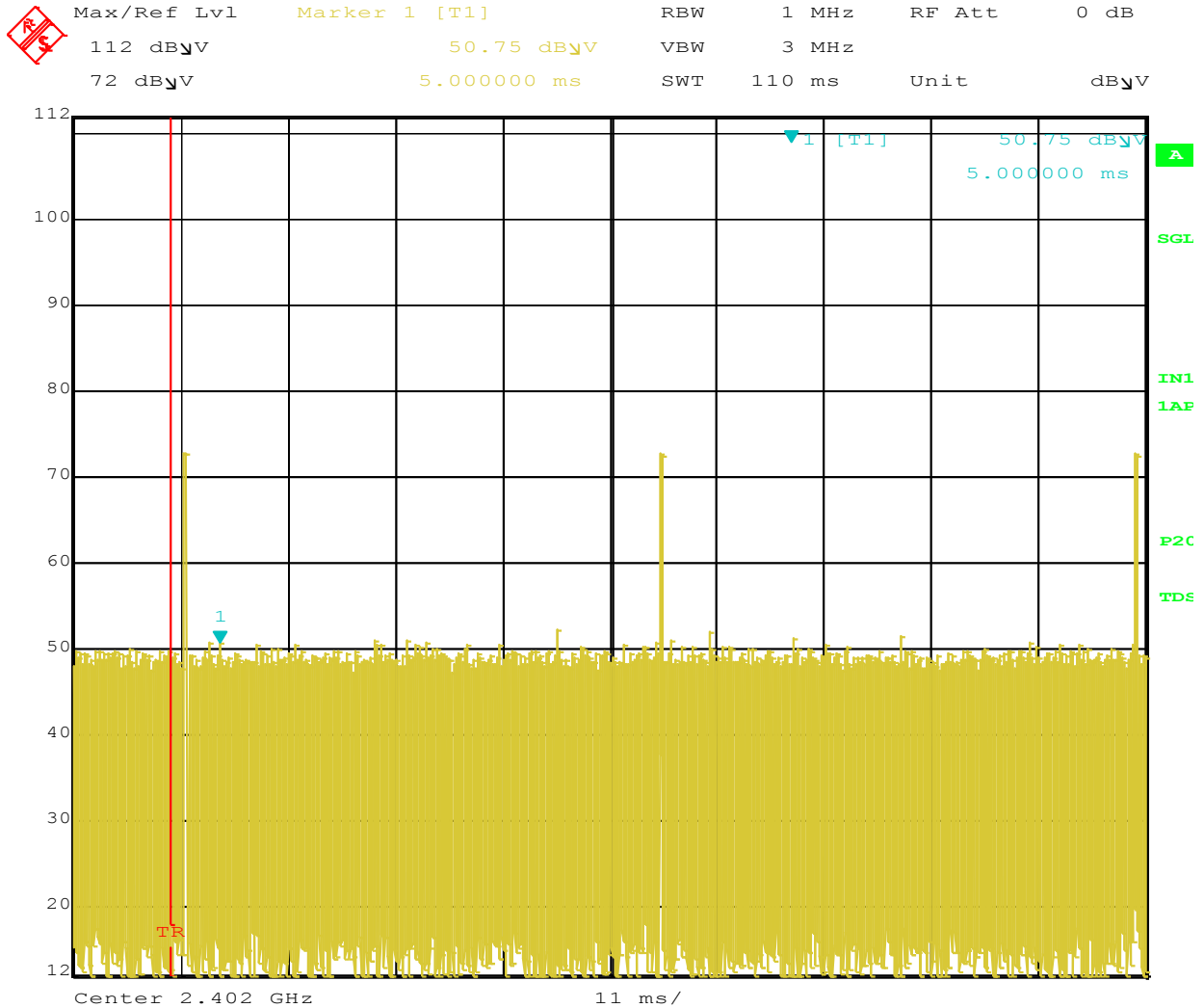
Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

DUTY CYCLE



This is the worst case duty cycle.

Pulse Train



Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

Agoura Division
 2337 Troutdale Drive
 Agoura, CA 91301
 (818) 597-0600

Silverado Division
 19121 El Toro Road
 Silverado, CA 92676
 (949) 589-0700

Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400