

**FCC PART 15 SUBPART B, SUBPART C SECTION 15.231,
RSS GEN, & RSS 210
TEST REPORT**

for

**REPEATER
Model: 2GIG-RPTR1-345**

Prepared for

**2GIG TECHNOLOGIES
1950 CAMINO VIDA ROBLE, SUITE 150
CARLSBAD, CA 92008**

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Reviewed by: 

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20621 PASCAL WAY
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DATE: SEPTEMBER 20, 2016

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	19	2	2	2	11	23	59

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E	Radiated & Conducted Emissions Data Sheets

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FIGURE	TITLE
1	Plot Map And Layout of Test Site Below 1GHz
2	Plot Map And Layout of Test Site Above 1GHz
3	Conducted Emissions Test Setup



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: Repeater
Model: 2GIG-RPTR1-345
S/N: None

Product Description: The 2GIG Wireless Indoor Repeater (2GIG-RPTR1-345) is a remotely powered wireless indoor repeater. The repeater is a peripheral device that communicates with the 2GIG Panel using a proprietary 345 MHz transmission protocol. The repeater receives and recognizes messages from other 345 MHz devices that are unable to directly communicate with the system, and "repeats" those messages to extend the range of these devices.

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

Manufacturer: 2GIG Technologies
1950 Camino Vida Roble, Suite 150
Carlsbad, CA 92008

Test Dates: September 2, 2016

Test Specifications Covered by Accreditation:



EMI requirements

CFR Title 47, Part 15 Subpart C Sections 15.205, 15.207, 15.209 and 15.231
RSS GEN & RSS 210

Test Procedure: ANSI C63.4 & C63.10



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SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the limits of CFR Title 47, Part 15 Subpart C Section 15.207, & RSS GEN.
2	Radiated RF Emissions & Harmonics, 9 kHz – 3,450 MHz.	Complies with the limits of CFR Title 47, Part 15 Subpart C Section 15.209, 15.231, & RSS GEN.
3	-20 dB Occupied Bandwidth of the Emission	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231 & RSS 210.
4	Peak Radiated EMI	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231 & RSS 210.
5	Transmit Timeout	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231 & RSS 210.

**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	AV	H	345.00	77.24	77.26	-0.02	3-Meter
2	AV	V	345.00	75.90	77.26	-1.36	3-Meter
3	AV	H	690.00	39.56	46.00	-6.44	3-Meter
4	QP	V	47.50	30.46	40.00	-9.54	3-Meter
5	QP	V	68.70	29.57	40.00	-10.43	3-Meter
6	QP	V	60.30	28.77	40.00	-11.23	3-Meter

**TABLE 2
SIX HIGHEST CONDUCTED EMISSIONS READINGS**

	Reading Type (PK / QP / AV)	Line (L/N)	Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Delta (dB)
1	QP	L	0.43	40.41	57.33	-16.92
2	QP	L	0.41	39.59	57.57	-17.98
3	QP	L	0.40	36.02	57.81	-21.79
4	QP	L	0.44	32.77	57.02	-24.25
5	QP	N	0.42	32.01	57.49	-25.47
6	QP	N	0.39	30.33	58.15	-27.81



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Repeater Model: 2GIG-RPTR1-345. The EMI measurements were performed according to the measurement procedure described in ANSI 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 section 15.109, Subpart C sections 15.205, 15.209, 15.231, RSS GEN, & RSS 210.



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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

2GIG Technologies

Verdin Orozco

Sr. Regulatory Compliance Engineer

Compatible Electronics, Inc.

Matt Harrison

Lab Manager

Torey Oliver

Test Engineer

2.4 Date Test Sample was Received

The test sample was received on September 2nd, 2016.

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
RSS GEN	General Requirements for Compliance of Radio Apparatus
RSS 210	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration

The Repeater Model: 2GIG-RPTR1-345 (EUT) was setup in a tabletop configuration. It was connected to the power supply via hardwired connection. The EUT was checked all 3 axes. The worst case was found to be the X-Axis. The EUT was continuously charging the battery during all tests and transmitting during the transmit tests and receiving during the receiver tests.

The EUT voltage was varied $\pm 15\%$ and the transmitting signal amplitude and frequency did not vary.

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 (X-Axis Shown)



4.1.2 Cable Construction and Termination

Cable 1:

This is a 2-meter, round, unshielded cable connecting the EUT to the Power Supply. It was hardwired into both ends of the cable. The cable was bundled to a length of 1 meter.



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

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER
1	REPEATER (EUT)	2GIG TECHNOLOGIES	2GIG-RPTR1-345	NONE
2	POWER SUPPLY	ZB POWER	ZB-H140017	NONE
3	BATTERY	GENERIC	HSD14500 2.96Wh 3.7V	NONE



5.2 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	09/22/2015	09/22/2016
Antenna, Loop	Com Power	AL-130	121049	12/06/2014	12/06/2016
Antenna, CombiLog	Com Power	AC-220	003	05/19/2016	05/19/2017
Antenna, Horn 1-18GHz	Com Power	AH-118	071225	05/17/2016	05/17/2017
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
Power Source	Chroma	61511	615114800078	2/8/2016	2/8/2017
Multi Meter	Fluke	85	62700530	3/16/2016	3/16/2017



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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

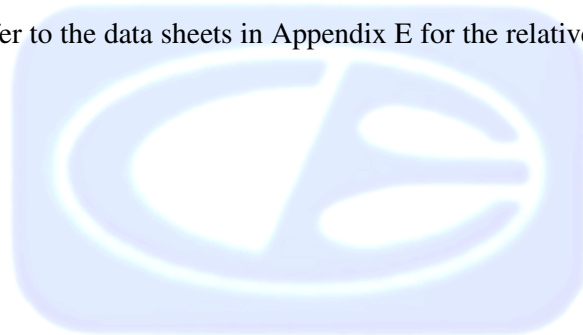
The EUT was mounted 1.0 meter high on a non-conductive surface, which was placed above the ground plane.

For above 1GHz the EUT was mounted on a 1.5 meter high non-conductive tabletop, which was placed on 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.



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

The EUT has one operating channel and the EUT has OOK modulation. The EUT has a fixed output power.

1 == 345 MHz

7.2 Antenna

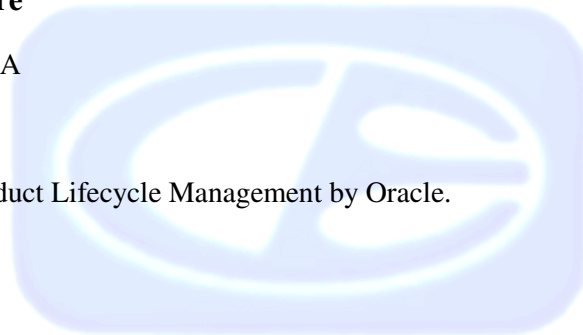
The antenna is made up of a wire soldered to the PCB.

7.3 EUT Test Software

PN: 10007488 Rev. A

Date: 08/23/2016

Location: Agile Product Lifecycle Management by Oracle.



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

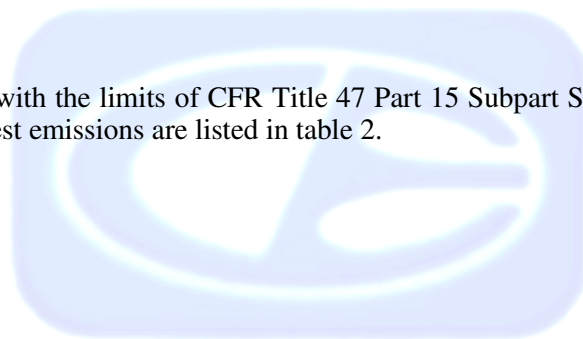
The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for 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 final data was collected under program control by the computer software.

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart Subpart C section 15.207 & RSS GEN. The six highest emissions are listed in table 2.



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.

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 & 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 (120kHz for QP Measurements)
1000 to 3450	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, Subpart C sections 15.205, 15.209, 15.231, RSS GEN & RSS 210. The six highest emissions are listed in table 1.



8.1.3 Peak radiated EMI

The EUT was tested at a 3-meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E. This data also shows compliance at the band edges.

Duty Cycle Correction Factor = -20.00dB

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

where

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

$$\text{Pulse Type 1} = 62 * 157.314629 \mu\text{S} = 9753.507 \mu\text{S}$$

$$\text{Pulse Type 2} = 1 * 293.587174 \mu\text{S} = 293.587 \mu\text{S}$$

$$9753.507 \mu\text{S} + 293.587 \mu\text{S} = 10.04709 \text{ mS}$$

$$\text{Total On Time} = 10.04709 \text{ mS}$$

$$\text{Pulse train is } 99.39 \text{ mS}$$

$$10.04709 / 99.40 \text{ mS} = 0.1011$$

$$20 \log (0.1011) = -19.91 \text{ dB correction factor}$$

Max Duty Cycle Correction Factor = -19.91 dB

Test Results:

The EUT complies with Part 15, Subpart C, section 15.231 & RSS 210.



8.1.4 Bandwidth of the Fundamental

The -20 dB bandwidth was checked using the MXE Receiver to see that the emissions were wholly within the 0.25% of the operating frequency centered on the fundamental frequency. The RBW was set to 1-5% of the occupied bandwidth and the VBW was set to approximately three times the RBW. The span was to between two and five times the occupied bandwidth. A Plot of the -20 dB bandwidth is located in Appendix E.

Test Results:

The EUT complies with the requirements of CFR Title 47, Part 15, Subpart C, section 15.231 (c) for the -20 dB bandwidth of the fundamental. The EUT has a -20 dB bandwidth that is lies wholly within the 0.25% of the operating frequency centered on the fundamental frequency.

8.1.5 Occupied Bandwidth

The occupied bandwidth was checked using EMI Receiver. The RBW was set to 1-5% of the occupied bandwidth and the VBW was set to approximately three times the RBW. The span was to between two and five times the occupied bandwidth. A Plot of the Occupied Bandwidth is located in Appendix E.

Test Results:

The EUT complies with the requirements of RSS GEN for the -20 dB bandwidth of the fundamental. The EUT has a -20 dB bandwidth that is lies wholly within the 0.25% of the operating frequency centered on the fundamental frequency.

8.1.6 Transmit Timeout

The Transmit timeout test was performed using the EMI Receiver to make sure the transmission coming from the transmitter would cease within 5 seconds after the activation. A Plot of the transmission duration is located in Appendix E.

Test Results:

The EUT complies with the requirements of CFR Title 47, Part 15, Subpart C, section 15.231 (c) & RSS 210 for Transmit Timeout less than 5 seconds.



9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The Repeater Model: 2GIG-RPTR1-345 meets all of the relevant specification requirements defined in the Code of Federal Regulations Title 47, Part 15 Subpart C sections 15.205, 15.207, 15.209, 15.231, RSS GEN, & RSS 210.



APPENDIX A***LABORATORY ACCREDITATIONS AND
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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."



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APPENDIX B***MODIFICATIONS TO THE EUT***

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MODIFICATIONS TO THE EUT

There were no modifications were made during testing.



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

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ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

REPEATER
Model: 2GIG-RPTR1-345
S/N: None

No additional models were tested.



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

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

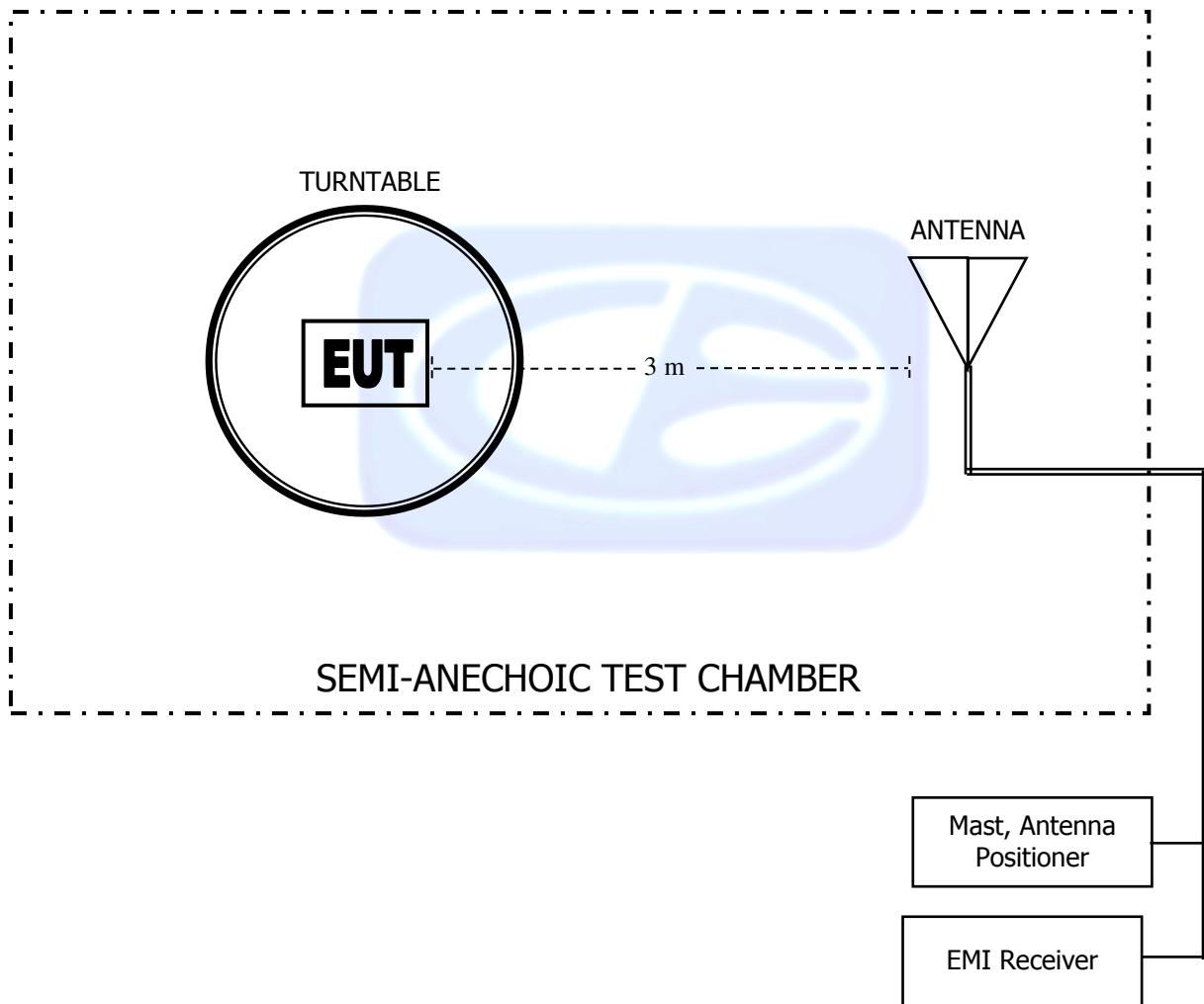


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE ABOVE 1GHZ

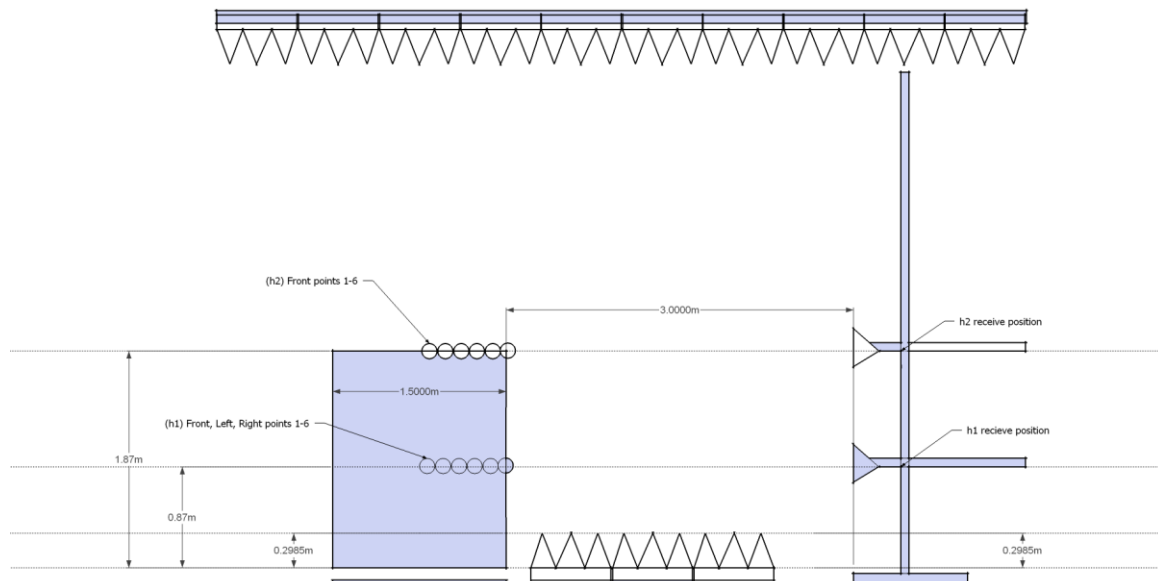
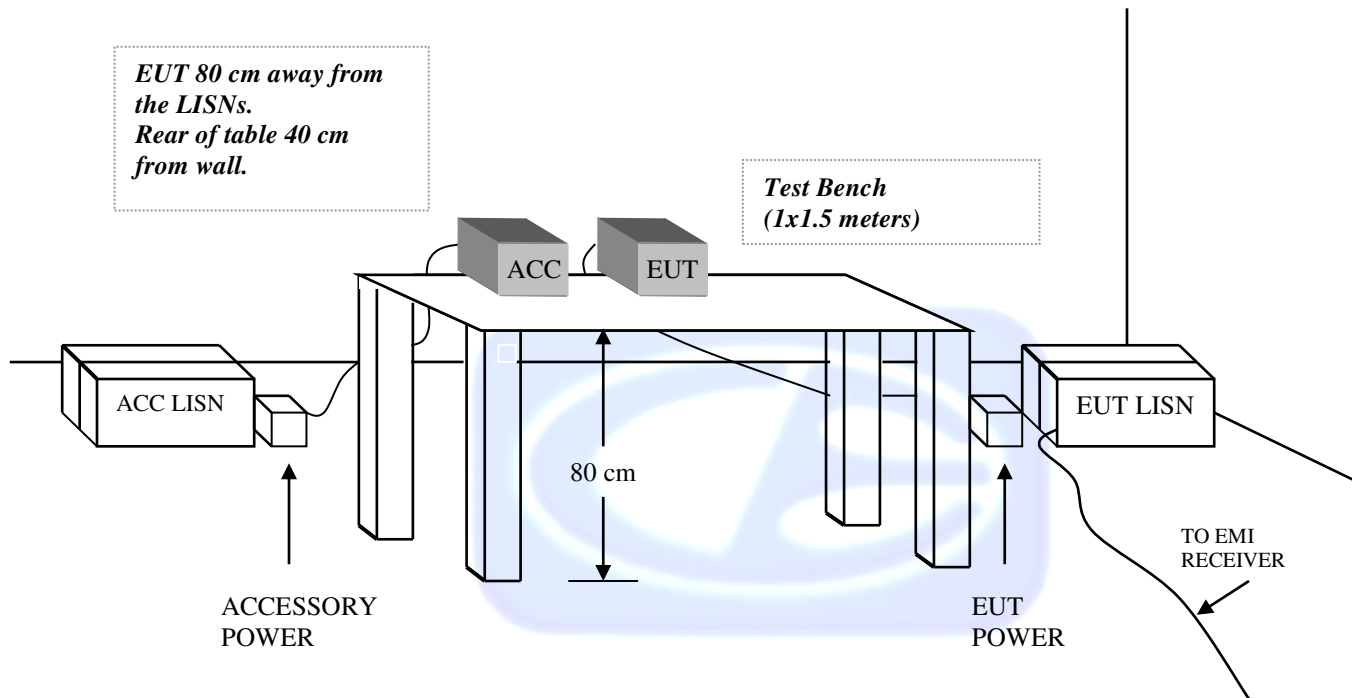


FIGURE 3: CONDUCTED EMISSIONS TEST SETUP

COM-POWER AL-130**LOOP ANTENNA****S/N: 121049****CALIBRATION DUE: DECEMBER 6, 2016**

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 21, 2016**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	22.90	160	15.20
35	22.80	180	14.40
40	23.50	200	14.10
45	21.90	250	15.90
50	22.00	300	18.20
60	18.10	400	19.40
70	12.80	500	21.50
80	12.10	600	22.00
90	12.70	700	23.90
100	13.00	800	25.80
120	15.50	900	27.00
140	14.40	1000	27.90



COM-POWER AH-118**HORN ANTENNA****S/N: 071225****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





FRONT VIEW

**2GIG TECHNOLOGIES
REPEATER**

Model: 2GIG-RPTR1-345

FCC SUBPART C - RADIATED EMISSIONS < 1GHz

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

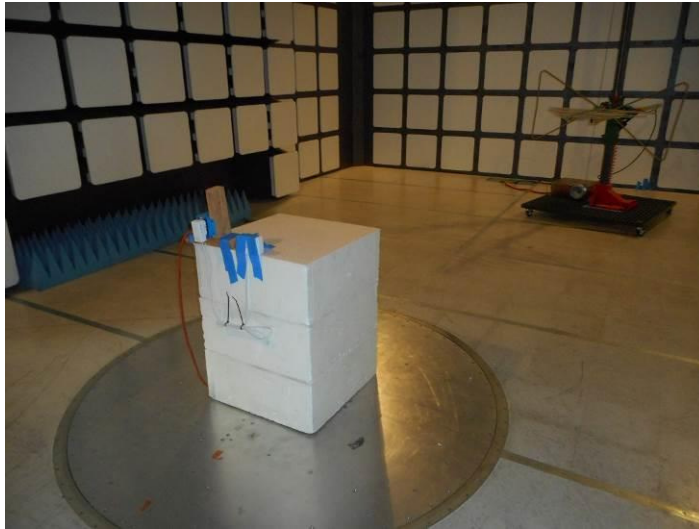


Brea Division
114 Olinda Drive
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(714) 579-0500

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

2GIG TECHNOLOGIES
REPEATER

Model: 2GIG-RPTR1-345

FCC SUBPART C - RADIATED EMISSIONS < 1GHz

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



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(949) 587-0400

**FRONT VIEW**

2GIG TECHNOLOGIES
REPEATER

Model: 2GIG-RPTR1-345

FCC SUBPART C - RADIATED EMISSIONS > 1GHz

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



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REAR VIEW

2GIG TECHNOLOGIES
REPEATER

Model: 2GIG-RPTR1-345

FCC SUBPART C - RADIATED EMISSIONS > 1GHz

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

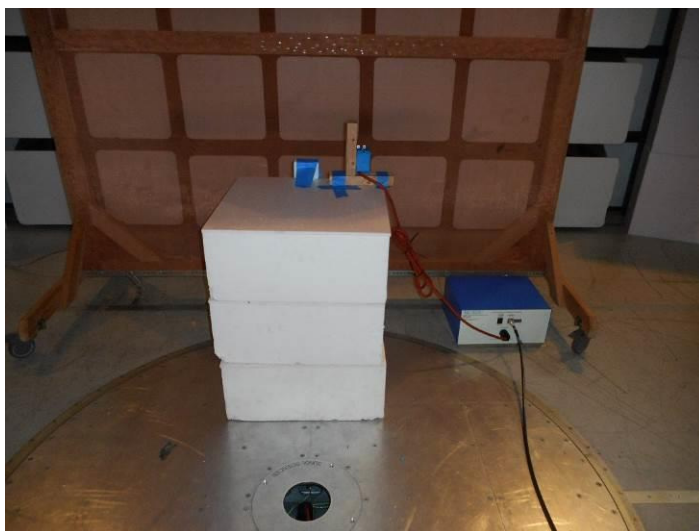


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FRONT VIEW

2GIG TECHNOLOGIES
REPEATER

Model: 2GIG-RPTR1-345

FCC SUBPART C - CONDUCTED EMISSIONS

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





REAR VIEW

2GIG TECHNOLOGIES
REPEATER

Model: 2GIG-RPTR1-345

FCC SUBPART C - CONDUCTED EMISSIONS

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



APPENDIX E***RADIATED EMISSIONS DATA SHEETS***

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(949) 589-0700

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

Title: FCC 15.209

9/2/2016 2:09:57 PM

File: Radiated Pre-Scan 30-1000Mhz

Sequence: Preliminary Scan

Operator: Matt Harrison

EUT Type: Repeater / 2GIG-RPTR1-345

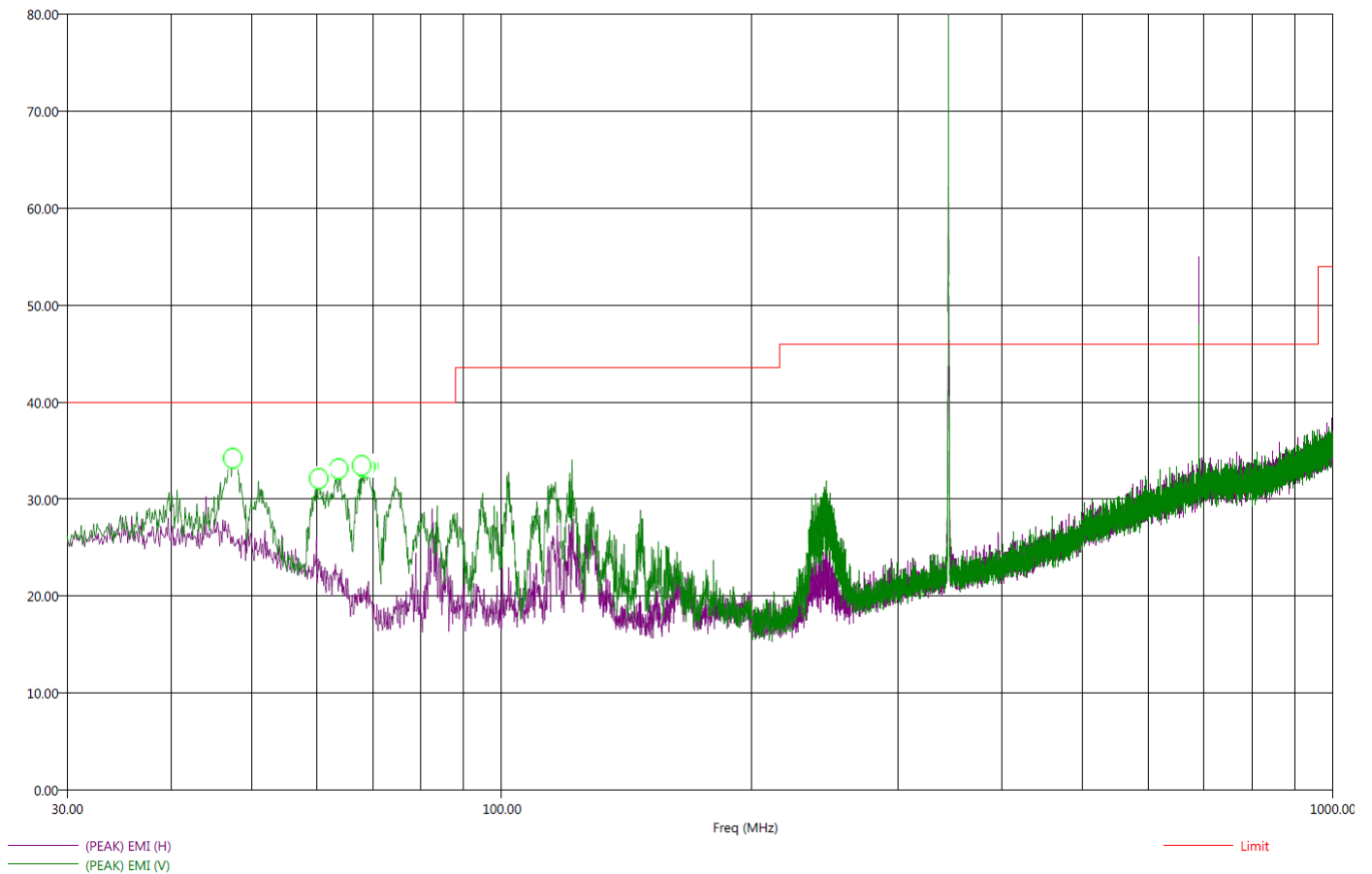
EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.

Comments: Connected to PSU. (X-Axis)

Temp: 73f

Hum: 43%

120V 60Hz

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 mode.******No additional emissions were found in receive mode.*****Brea Division**
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(714) 579-0500**Agoura Division**
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(949) 589-0700**Lake Forest Division**
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209

9/2/2016 2:22:36 PM

File: Radiated Final 30-1000Mhz

Sequence: Final Measurements

Operator: Matt Harrison

EUT Type: Repeater / 2GIG-RPTR1-345

EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.

Comments: Connected to PSU.

Temp: 73f

Hum: 43%

120V 60Hz

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)
47.50	-9.54	30.46	35.96	40.00	V	328.00	119.00	23.38	0.60
60.30	-11.23	28.77	33.71	40.00	V	133.25	107.05	18.92	0.67
63.70	-11.40	28.60	34.06	40.00	V	199.75	108.64	17.02	0.67
67.90	-11.40	28.60	34.14	40.00	V	112.25	101.76	14.83	0.67
68.70	-10.43	29.57	34.21	40.00	V	166.75	111.29	14.47	0.67
69.20	-12.84	27.16	32.20	40.00	V	0.25	231.47	14.24	0.67

*There were no radiated emissions other than harmonics found below 30 MHz or above 1GHz.**This is the worst case mode.**No additional emissions were found in receive mode.***Brea Division**
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APPENDIX E
CONDUCTED EMISSIONS DATA SHEETS

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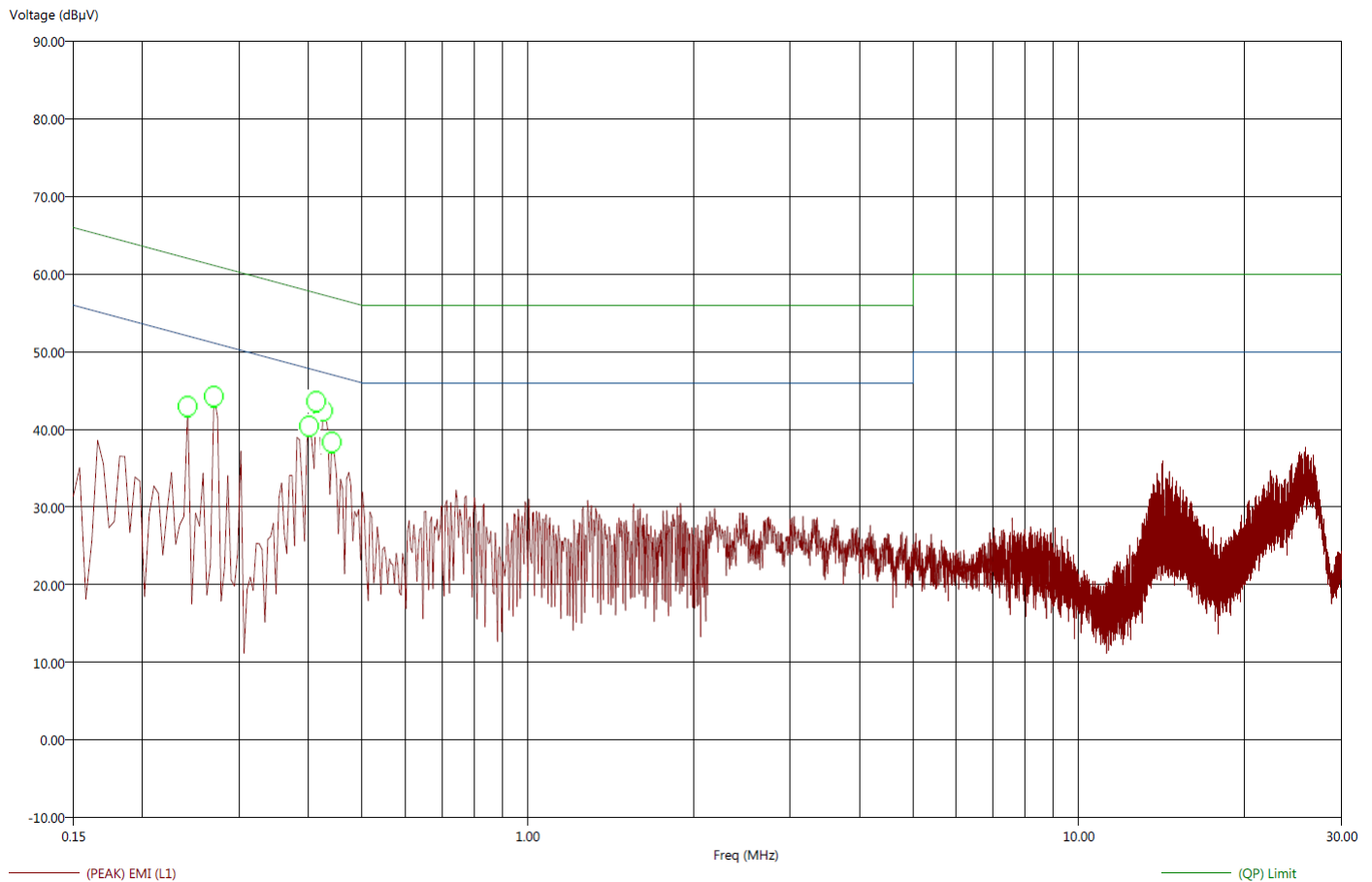
Agoura Division
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Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

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

Title: FCC 15.207
File: Conducted Pre-Line 120V
Operator: Matt Harrison
EUT Type: 2GIG-RPTR1-345.
EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.
Comments: Connected to PSU
Temp: 74f
Hum: 52%
120V 60Hz

9/2/2016 4:24:49 PM
Sequence: Preliminary Scan

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

***This was worst case for all modes
No additional emissions were found in receive mode.***



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

Title: FCC 15.207

9/2/2016 4:27:57 PM

File: Conducted Final-Line 120V

Sequence: Final Measurements

Operator: Matt Harrison

EUT Type: 2GIG-RPTR1-345.

EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.

Comments: Connected to PSU

Temp: 74f

Hum: 52%

120V 60Hz

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

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBμV)	(QP) EMI (dBμV)	(PEAK) EMI (dBμV)	(AVG) Limit (dBμV)	(QP) Limit (dBμV)	Transducer (dB)	Cable (dB)
0.24	-34.23	-30.44	17.80	31.59	51.56	52.03	62.03	0.21	0.01
0.27	-34.39	-31.50	16.73	29.61	49.66	51.12	61.12	0.16	0.01
0.40	-26.92	-21.79	20.89	36.02	45.59	47.81	57.81	0.03	0.01
0.41	-23.75	-17.98	23.82	39.59	45.39	47.57	57.57	0.03	0.01
0.43	-21.66	-16.92	25.67	40.41	44.89	47.33	57.33	0.03	0.01
0.44	-27.90	-24.25	19.13	32.77	40.56	47.02	57.02	0.03	0.01

*This was worst case for all modes**No additional emissions were found in receive mode.***Brea Division**
114 Olinda Drive
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(714) 579-0500**Agoura Division**
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(949) 589-0700**Lake Forest Division**
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.207

File: Conducted Pre-Neutral 120V

Operator: Matt Harrison

EUT Type: 2GIG-RPTR1-345.

EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.

Comments: Connected to PSU

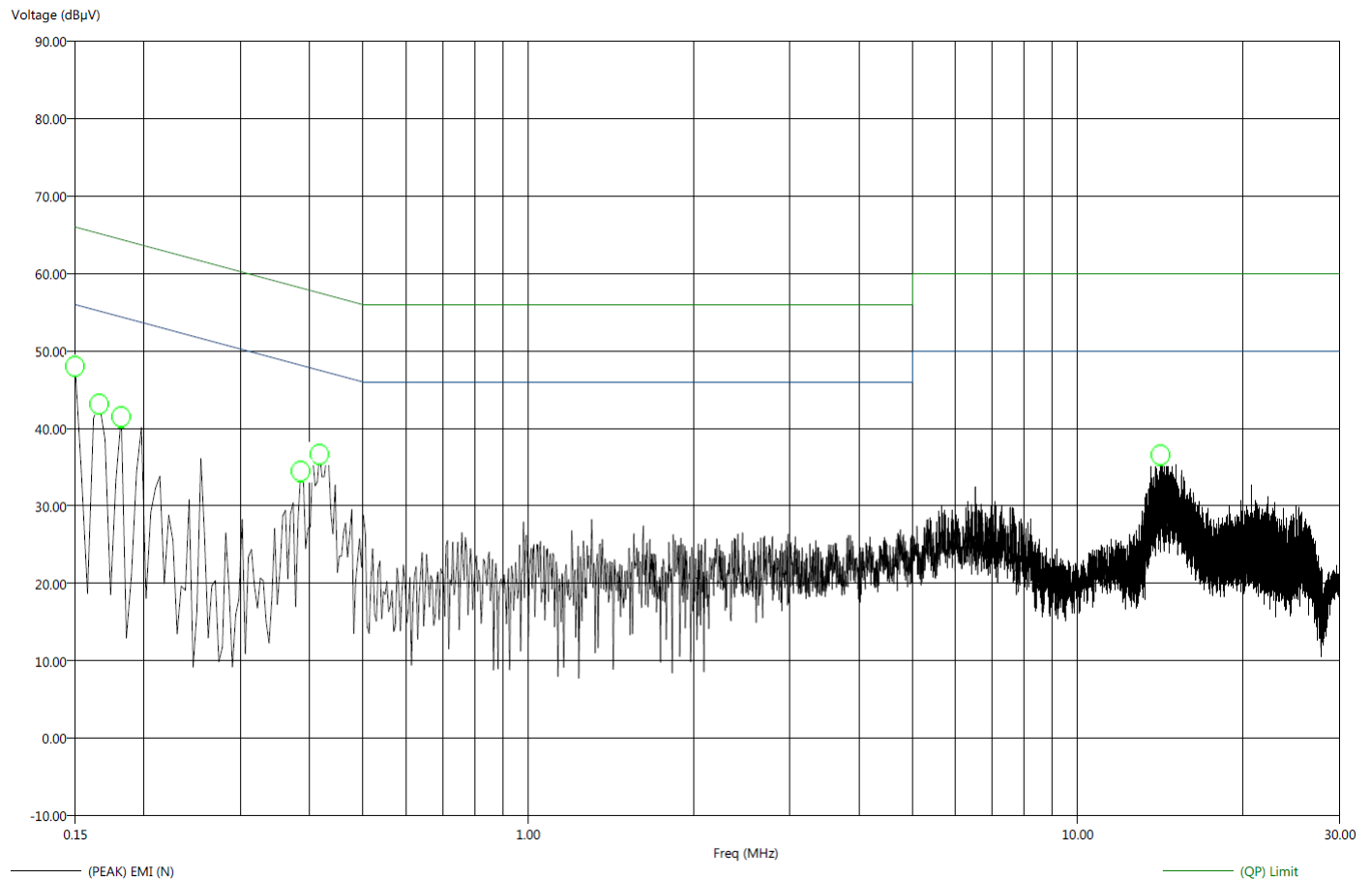
Temp: 74f

Hum: 52%

120V 60Hz

9/2/2016 4:34:46 PM

Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC-3 (LAB P)***This was worst case for all modes******No additional emissions were found in receive mode.*****Brea Division**
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Brea, CA 92823
(714) 579-0500**Agoura Division**
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(949) 589-0700**Lake Forest Division**
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.207
File: Conducted Final-Neutral 120V
Operator: Matt Harrison
EUT Type: 2GIG-RPTR1-345.
EUT Condition: The EUT is constantly transmitting 345 MHz and charging the battery.
Comments: Connected to PSU
Temp: 74f
Hum: 52%
120V 60Hz

9/2/2016 4:40:28 PM
Sequence: Final Measurements

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

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBμV)	(QP) EMI (dBμV)	(PEAK) EMI (dBμV)	(AVG) Limit (dBμV)	(QP) Limit (dBμV)	Transducer (dB)	Cable (dB)
0.15	-39.79	-30.49	16.21	35.51	53.49	56.00	66.00	0.44	0.01
0.17	-38.73	-31.17	16.42	33.99	51.25	55.16	65.16	0.39	0.01
0.18	-38.76	-32.07	15.63	32.32	48.91	54.39	64.39	0.35	0.01
0.39	-34.39	-27.81	13.76	30.33	36.84	48.15	58.15	0.04	0.01
0.42	-30.32	-25.47	17.17	32.01	41.77	47.49	57.49	0.04	0.01
14.16	-35.17	-33.42	14.83	26.58	36.49	50.00	60.00	0.04	0.30

*This was worst case for all modes
No additional emissions were found in receive mode.*



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FUNDAMENTAL & HARMONICS

DATA SHEETS



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Lake Forest, CA 92630
(949) 587-0400

FUNDAMENTAL FIELD STRENGTH

FCC 15.231

Company: 2GIG Technologies
EUT: Repeater
Model: 2GIG-RPTR1-345
Duty Cycle Correction Factor: -19.91

Date: 9/2/2016
Lab: P
Tested By: Matt H

Compatible Electronics, Inc. FAC-3

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table	Tower	Comments
345.00	97.15	H	97.26	-0.11	Peak	360	1.30	
345.00	77.24	H	77.26	-0.02	Avg	360	1.30	
345.00	95.81	V	97.26	-1.45	Peak	9	1.10	
345.00	75.90	V	77.26	-1.36	Avg	9	1.10	



HARMONICS HORIZONTAL

FCC 15.231

Company: 2GIG Technologies
EUT: Repeater
Model: 2GIG-RPTR1-345
Duty Cycle Factor: -19.91

Date: 9/2/2016
Lab: P
Tested By: Matt H

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
690.00	59.47	H	77.26	-17.79	Peak	1.01	338	
690.00	39.56	H	57.26	-17.70	Avg	1.01	338	
1035.00		H	73.98		Peak			No Emissions Found
1035.00		H	53.98		Avg			
1380.00		H	73.98		Peak			No Emissions Found
1380.00		H	53.98		Avg			
1725.00		H	77.26		Peak			No Emissions Found
1725.00		H	57.26		Avg			
2070.00		H	77.26		Peak			No Emissions Found
2070.00		H	57.26		Avg			
2415.00		H	77.26		Peak			No Emissions Found
2415.00		H	57.26		Avg			
2760.00		H	73.98		Peak			No Emissions Found
2760.00		H	53.98		Avg			
3105.00		H	77.26		Peak			No Emissions Found
3105.00		H	57.26		Avg			
3450.00		H	77.26		Peak			No Emissions Found
3450.00		H	57.26		Avg			

Test distance
3 meter



HARMONICS VERTICAL

FCC 15.231

Company: 2GIG Technologies
EUT: Repeater
Model: 2GIG-RPTR1-345
Duty Cycle Factor: -19.91

Date: 9/2/2016
Lab: P
Tested By: Matt H.

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
690.00	54.09	V	77.26	-23.17	Peak	1.10	45	
690.00	34.18	V	57.26	-23.08	Avg	1.10	45	
1035.00		V	73.98		Peak			No Emissions Found
1035.00		V	53.98		Avg			
1380.00		V	73.98		Peak			No Emissions Found
1380.00		V	53.98		Avg			
1725.00		V	77.26		Peak			No Emissions Found
1725.00		V	57.26		Avg			
2070.00		V	77.26		Peak			No Emissions Found
2070.00		V	57.26		Avg			
2415.00		V	77.26		Peak			No Emissions Found
2415.00		V	57.26		Avg			
2760.00		V	73.98		Peak			No Emissions Found
2760.00		V	53.98		Avg			
3105.00		V	77.26		Peak			No Emissions Found
3105.00		V	57.26		Avg			
3450.00		V	77.26		Peak			No Emissions Found
3450.00		V	57.26		Avg			

Test distance
3 meter



***DUTY CYCLE
PLOTS***



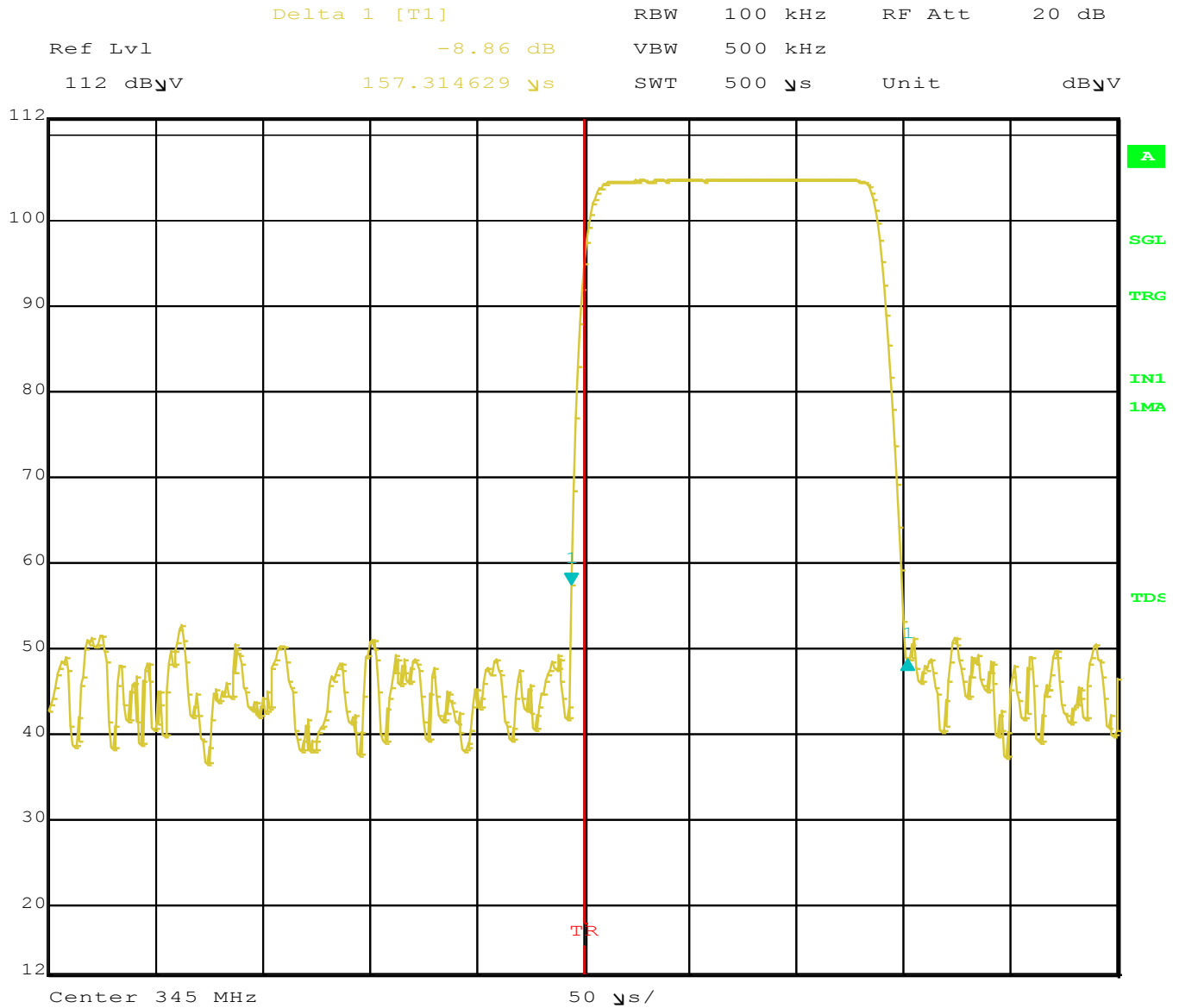
Brea Division
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Agoura Division
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Lake Forest Division
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(949) 587-0400

DUTY CYCLE



Title: 2GIG-RPTR-345

Time of Pulse Type 1 = 157.314629 μS



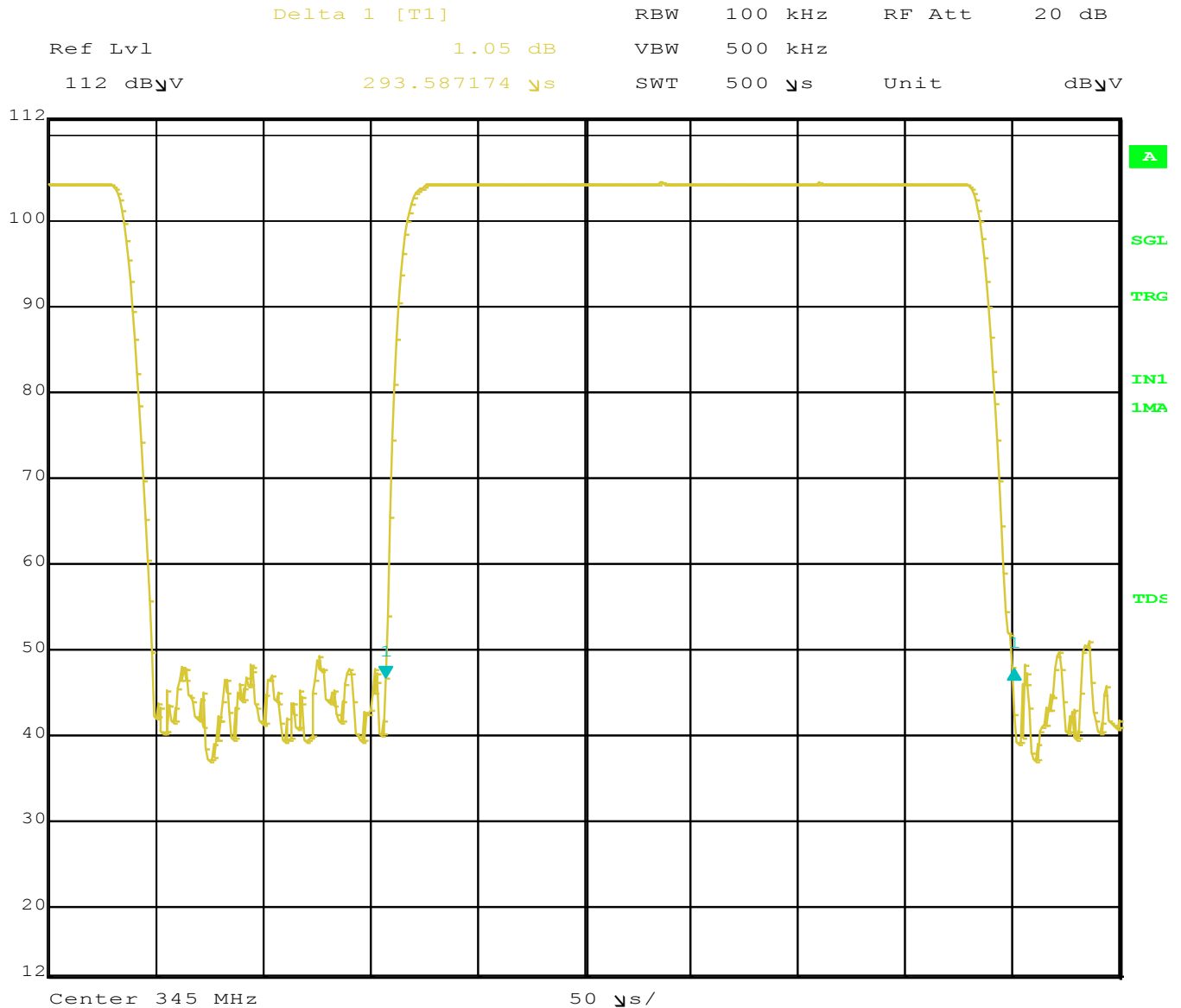
Brea Division
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DUTY CYCLE



Date: 30.AUG.2016 12:34:06

Time of Pulse Type 2 = 293.587174 μs



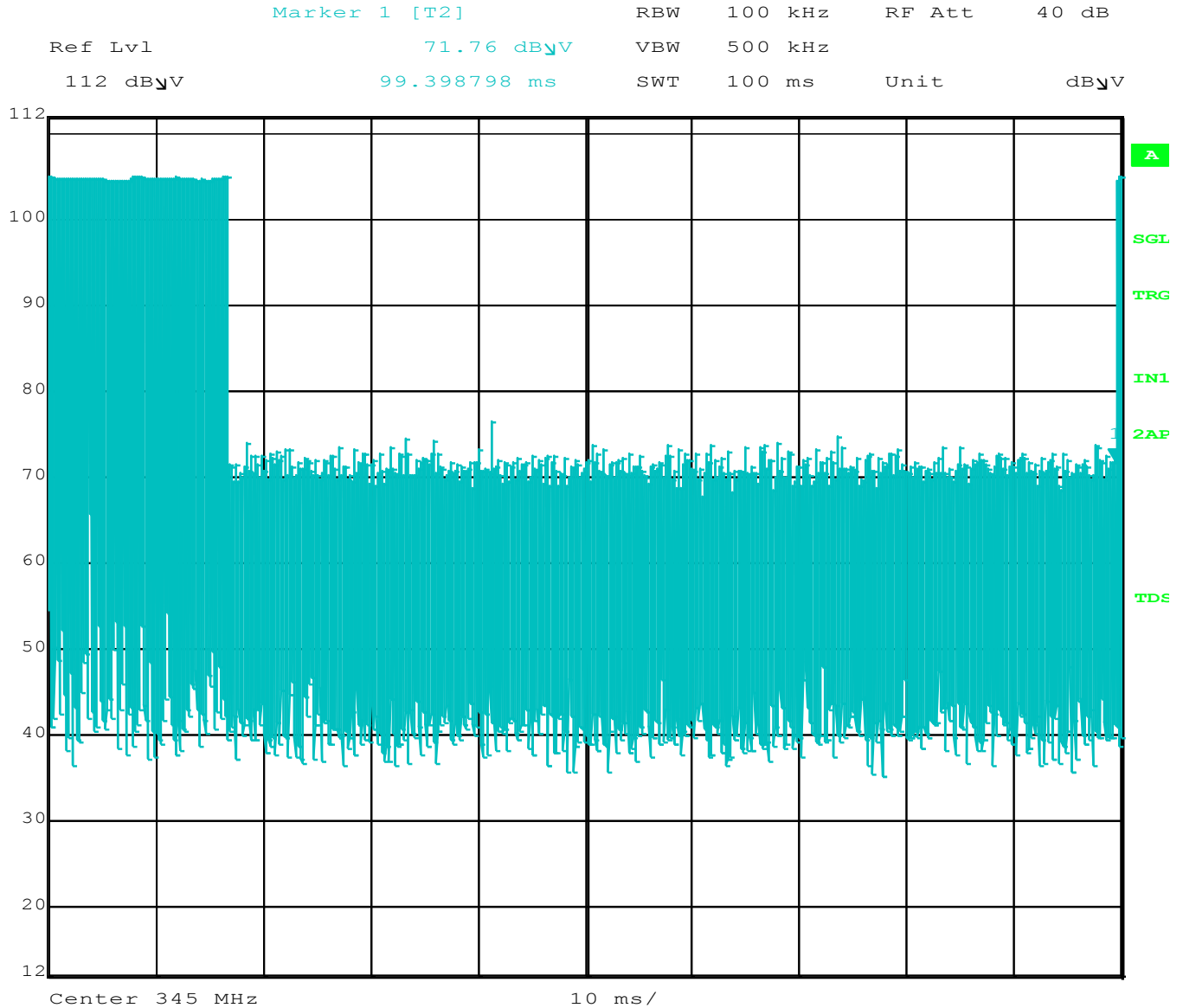
Brea Division
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DUTY CYCLE



Title: 2GIG-RPTR-345

Total On Time in a 99.39ms Span = 10.047094 mS



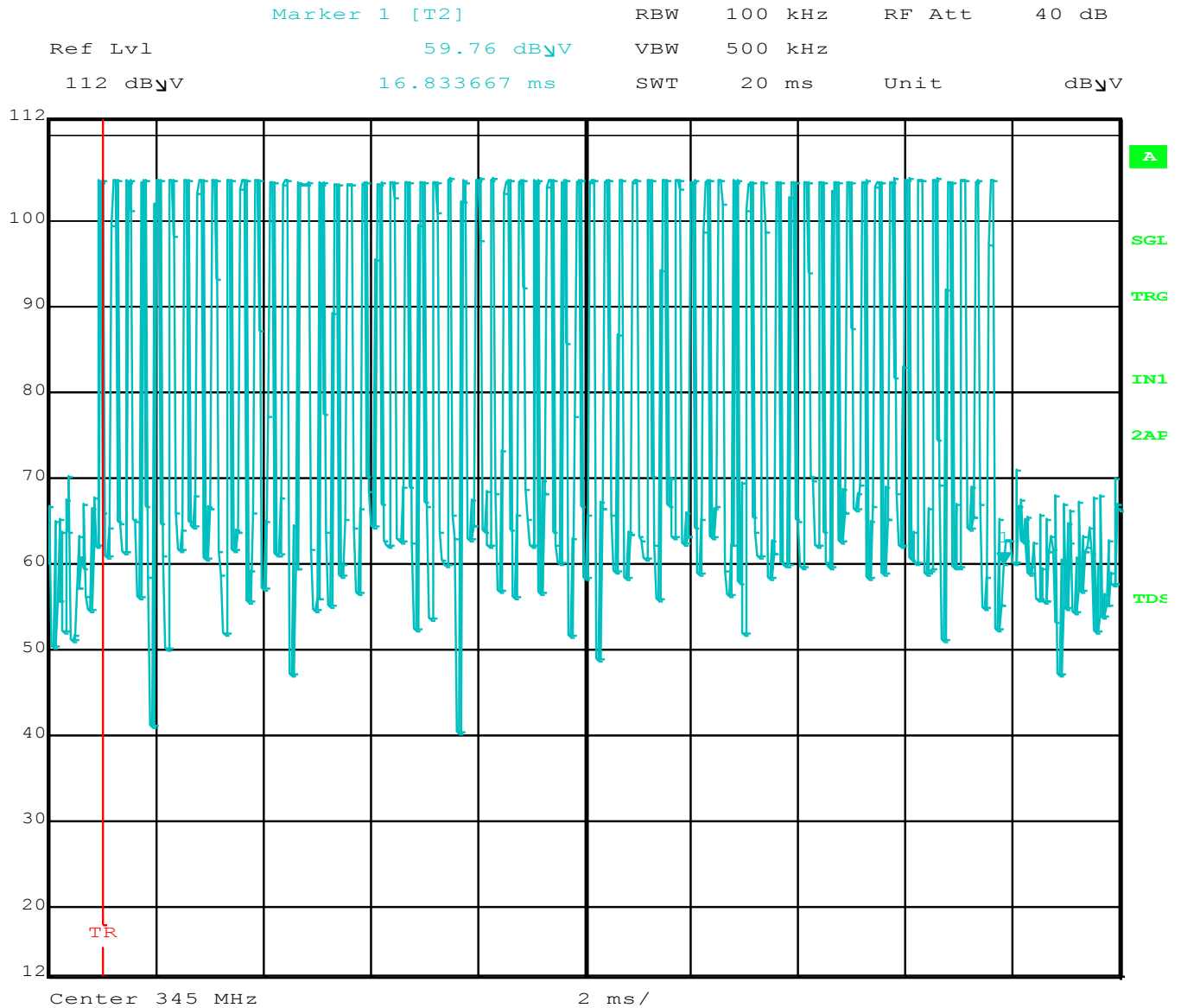
Brea Division
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Lake Forest, CA 92630
(949) 587-0400

Duty Cycle



Title: 2GIG-RPTR-345
Comment A: DUTY CYCLE.
Date: 1.JAN.1997 03:02:41

Number of Pulses in Worst Case 100 mS = 63

Pulse Type 1 On Time = $157.314629 \mu\text{S} \times 62 = 9753.507 \mu\text{S}$
Pulse Type 2 On Time = $293.587174 \mu\text{S} \times 1 = 293.5872 \mu\text{S}$
 $9753.507 \mu\text{S} + 293.5872 \mu\text{S} = 10.047094 \text{ mS}$
Duty Cycle = $10.047094 \text{ mS} / 99.39 \text{ mS} = 0.1011$
The Peak to Average Duty Cycle Correction = -19.91dB



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***TRANSMIT TIMEOUT
DATA***



Brea Division
114 Olinda Drive
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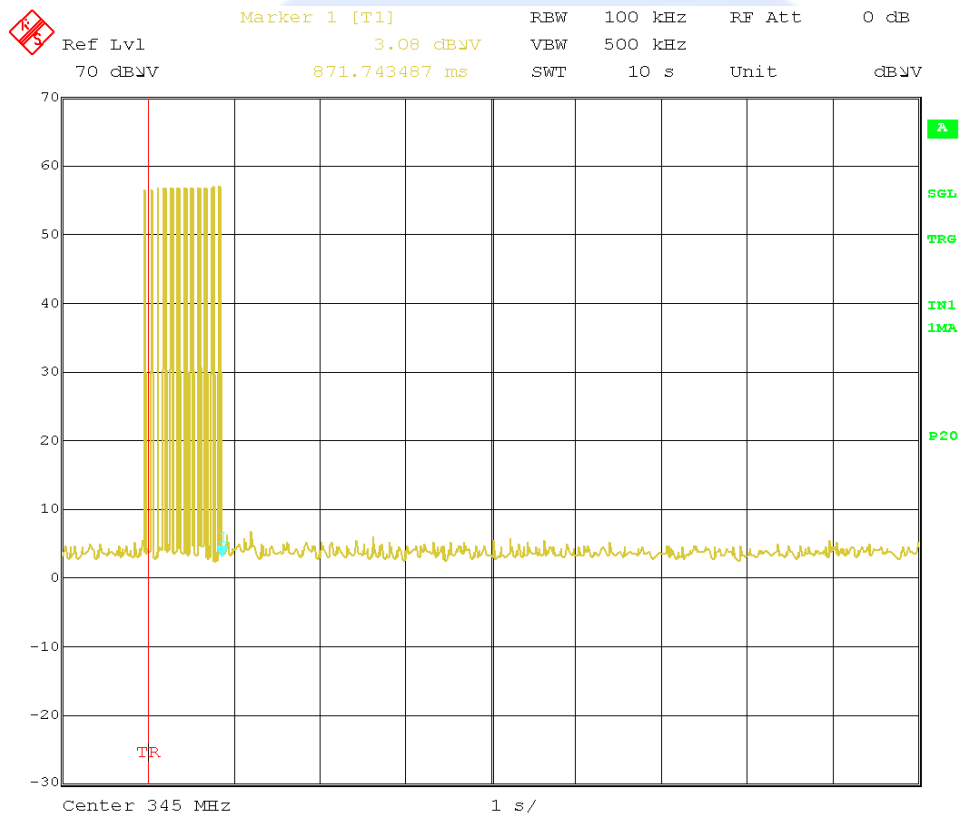
TRANSMIT TIMEOUT

FCC 15.231

Company: 2GIG Technologies
EUT: Repeater
Model: 2GIG-RPTR1-345

Date: 9/2/2016
Lab: P
Tested By: Matt H.

Freq. (MHz)	Time (S)	Limit (S)	Margin	Comments
345.00	0.87	5.00	-4.13	



Title: 2GIG-RPTR1-345.
Comment A: TTO



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

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
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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

***15.231 -20 dB Bandwidth
& RSS210 Occupied Bandwidth
DATA***



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