

*FCC PART 15, SUBPART B and C
TEST REPORT*

for
WALL-MOUNT HELP BUTTON

MODEL: 2GIG-WMT1-345

Prepared for

NORTEK SECURITY & CONTROLS, LLC
 1950 CAMINO VIDA ROBLE, SUITE 150
 CARLSBAD, CALIFORNIA 92008

Prepared by: *Kyle Fujimoto*

KYLE FUJIMOTO

Approved by: *James Ross*

JAMES ROSS

COMPATIBLE ELECTRONICS INC.
 114 OLINDA DRIVE
 BREA, CALIFORNIA 92823
 (714) 579-0500

DATE: JANUARY 13, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	17	2	2	2	10	20	53

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



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 – Emissions	9
4.1.1 Cable Construction and Termination	9
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	10
5.1 EUT and Accessory List	10
5.2 Emissions Test Equipment	11
6. TEST SITE DESCRIPTION	12
6.1 Test Facility Description	12
6.2 EUT Mounting, Bonding and Grounding	12
7. TEST PROCEDURES	13
7.1 RF Emissions	13
7.1.1 Radiated Emissions Test	13
7.1.2 RF Emissions Test Results	14
7.2 Bandwidth of the Fundamental	15
7.3 Transmit Timeout	15
7.4 Fundamental Field Strength (Duty Cycle Calculations)	16
8. 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 and Charts <ul style="list-style-type: none">• Test Setup Diagrams• Antenna and Effective Gain Factors
E	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Layout of the Semi-Anechoic Test Chamber

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 certification, approval or endorsement by NVLAP, NIST or any agency of the federal government.

Device Tested: Wall-Mount Help Button
Model: 2GIG-WMT1-345
S/N: N/A

Product Description: The EUT is a transmitter used in a torque telemetry system.

Modifications: The EUT was not modified in order to meet the specifications.

Customer: Nortek Security & Controls, LLC
1950 Camino Vida Roble, Suite 150
Carlsbad, California 92008

Test Dates: December 16 and 17, 2016

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

Test Specifications covered by accreditation:



Test Specifications:

Emissions requirements

CFR Title 47, Part 15, Subpart B; and
Subpart C, sections 15.205, 15.209, and 15.231

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Spurious Radiated RF Emissions, 9 kHz – 3500 MHz (Transmitter and Digital portion)	Complies with the Class B limits of CFR Title 47, Part 15 Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.231
2	Conducted RF Emissions, 150 kHz to 30 MHz	This test was not performed because the EUT operates on battery power and does not connect to the AC mains.

1. PURPOSE

This document is a qualification test report based on the emissions tests performed on the Wall-Mount Help Button, Model: 2GIG-WMT1-345. The emissions measurements were performed according to the measurement procedure described in ANSI C63.4 and ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the Class B specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The emissions 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

Nortek Security & Controls, LLC

Josh Hansen Senior Regulatory Engineer

Compatible Electronics Inc.

Kyle Fujimoto Test Engineer

James Ross Test Engineer

2.4 Date Test Sample was Received

The test sample was received on December 20, 2016.

2.5 Disposition of the Test Sample

The test sample has not been returned to Nortek Security & Controls, LLC 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
DNF	Do Not Fit
URC	Universal Remote Control

3. APPLICABLE DOCUMENTS

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

SPEC	TITLE
FCC Title 47, Part 15 Subpart C	FCC Rules – Radio frequency devices (including digital devices) – Intentional Radiators
FCC Title 47, Part 15 Subpart B	FCC Rules – Radio frequency devices (including digital devices) – Unintentional Radiators
ANSI C63.4 2014	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 2013	American National Standard for Testing Unlicensed Wireless Devices

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration – Emissions

The Wall-Mount Help Button Model: 2GIG-WMT1-345 (EUT) was tested as a stand alone unit.

The EUT was continuously transmitting at 345 MHz.

The X orientation is when the front of the EUT is facing upwards and parallel to the ground. The setup photos shown in Appendix D show the X orientation.

The Y orientation is when the front of the EUT is perpendicular to the ground. This would be similar to when the EUT is mounted vertically to a wall.

The Z orientation is when the EUT is perpendicular to the ground with the front of the EUT rotated 90 degrees horizontally. This would be similar to when the EUT is mounted horizontally to a wall.

The final radiated data for the EUT was taken in the mode described.

Fresh batteries were inserted into the EUT prior to the testing.

The EUT was loaded with a custom firmware that would continuously send messages for the ease of testing as the transmitter under normal firmware with the button held down would stop transmitting after 30 seconds requiring a release and repress to continue transmitting.

The final radiated data for the EUT as was taken in the mode described above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

The EUT had no external cables.

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

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
WALL-MOUNT HELP BUTTON	NORTEK SECURITY & CONTROLS, LLC	2GIG-WMT1-345	N/A	WDQ-WMT1345

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT					
TDK TestLab	TDK RF Solutions, Inc.	9.22	700145	N/A	N/A
Computer	Hewlett Packard	p6716f	MXX1030PX0	N/A	N/A
LCD Monitor	Hewlett Packard	52031a	3CQ046N3MG	N/A	N/A
EMI Receiver	Keysight	N9038A	MY51210150	December 29, 2015	1 Year
RF RADIATED EMISSIONS TEST EQUIPMENT					
CombiLog Antenna	Com-Power	AC-220	61060	September 3, 2015	2 Year
Preamplifier	Com-Power	PA-118	551024	March 6, 2015	2 Year
Loop Antenna	Com-Power	AL-130	17089	February 6, 2015	2 Year
Horn Antenna	Com-Power	AH-118	071175	February 26, 2016	2 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
System Controller	Sunol Sciences Corporation	SC110V	112213-1	N/A	N/A
Turntable	Sunol Sciences Corporation	2011VS	N/A	N/A	N/A
Antenna-Mast	Sunol Sciences Corporation	TWR95-4	112213-3	N/A	N/A

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

Please refer to section 2.1 and 7.1 of this report for emissions test location.

6.2 EUT Mounting, Bonding and Grounding

For frequencies 1 GHz and below: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

For frequencies above 1 GHz: The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 1.5 meters above the ground plane.

The EUT was not grounded.

7. TEST PROCEDURES

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

7.1 RF Emissions

7.1.1 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was used to increase the sensitivity of the instrument. The EMI Receiver was initially used with the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit.

The fundamental and harmonic frequencies above 1 GHz were averaged by a “duty cycle correction factor”, derived from 20 Log (dwell time / 100ms). This duty cycle correction factor was then subtracted from the peak reading. There were no non-transmitter related spurious emissions detected above 1 GHz.

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

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Loop Antenna
150 kHz to 30 MHz	9 kHz	Loop Antenna
30 MHz to 1 GHz	120 kHz	Combilog Antenna
1 GHz to 3.5 GHz	1 MHz	Horn Antenna

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4. 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 (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results.

Radiated Emissions Test (Continued)

The EUT was tested at a 3-meter test distance from 10 kHz to 3.5 GHz.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and the limits of CFR Title 47, Part 15, Subpart C, Sections 15.209 and 15.231 (a) for radiated emissions. Please see Appendix E for the data sheets.

7.1.2 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
 Wall-Mount Help Button, Model: 2GIG-WMT1-345

Frequency MHz	Corrected Reading* dBuV/m	Specification Limit dBuV/m	Delta (Cor. Reading – Spec. Limit) dB
345 (V) (Y-Axis)	76.66 (Avg)	77.26	-0.60
345 (H) (X-Axis)	75.25 (Avg)	77.26	-2.01
2760 (V) (Y-Axis)	51.63 (Avg)	53.97	-2.34
345 (V) (Z-Axis)	73.36 (Avg)	77.26	-3.90
345 (H) (Y-Axis)	73.23 (Avg)	77.26	-4.03
3105 (H) (Y-Axis)	51.85 (Avg)	57.26	-5.41

Notes:

- (H) Horizontal
- (V) Vertical

* The complete emissions data is given in Appendix E of this report.

7.2 Bandwidth of the Fundamental

The -20 dB bandwidth was checked using the EMI 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 30 kHz and the VBW and set to 100 kHz. 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 lies wholly within the 0.25% of the operating frequency centered on the fundamental frequency.

7.3 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 requirement of CFR Title 47, Part 15, Subpart C, section 15.231 [c] for the Transmit Timeout less than 5 seconds.

7.4 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

n is the number of pulses of duration $t1$

m is the number of pulses of duration $t2$

ξ is the number of pulses of duration tx

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 = 44 small pulses * 137 uS and 281 large pulses * 281 us

Total On Time = 8.838 mS

The Duty Cycle Train only occurred once per 104.4 ms; therefore 100ms span was used.

8838 mS / 100 mS = 8.838%

20 log (0.08838) = -21.07 dB correction factor

Max Duty Cycle Correction Factor = -20.00 dB

Test Results:

The EUT complies with Part 15 Subpart C, Section 15.231 (a).

8. CONCLUSIONS

The Wall-Mount Help Button, Model: 2GIG-WMT1-345 (EUT), as tested, meets all of the specification limits defined in FCC Title 47, Part 15, Subpart B; and Subpart C, sections 15.205, 15.209, and 15.231.





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 — Requirement





APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC Subpart B and FCC 15.231 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the 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

Wall-Mount Help Button
Model: 2GIG-WMT1-345
S/N: N/A

There are no additional models covered under this report.

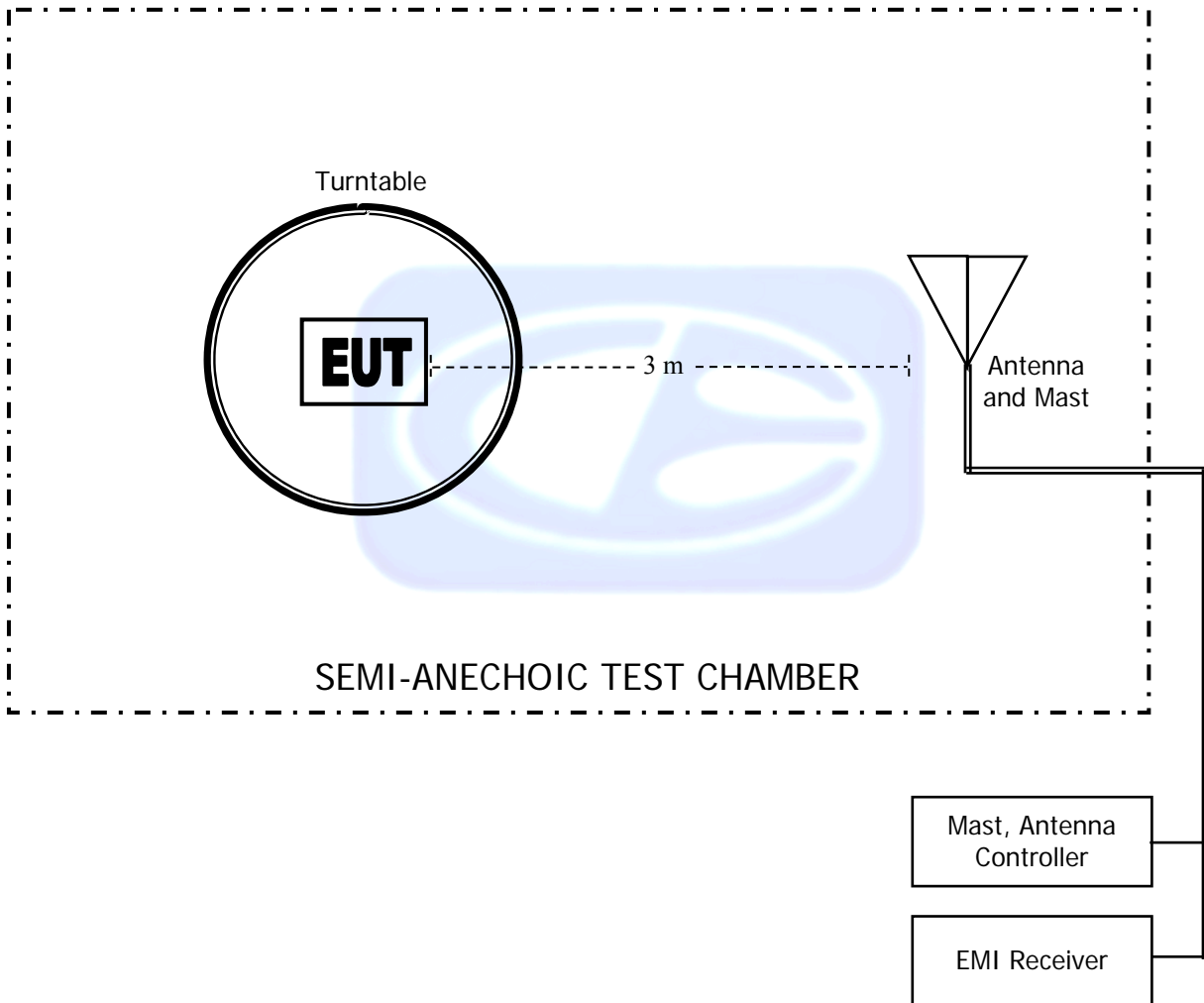




APPENDIX D

DIAGRAMS AND CHARTS

FIGURE 1: LAYOUT OF THE SEMI-ANECHOIC TEST CHAMBER



COM-POWER AL-130**LOOP ANTENNA**

S/N: 17089

CALIBRATION DATE: FEBRUARY 6, 2015

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-33.18	18.32
0.01	-34.10	17.40
0.02	-38.65	12.85
0.03	-39.28	12.22
0.04	-40.09	11.41
0.05	-40.85	10.65
0.06	-40.88	10.62
0.07	-41.07	10.43
0.08	-41.04	10.46
0.09	-41.19	10.31
0.1	-41.20	10.30
0.2	-41.52	9.98
0.3	-41.53	9.97
0.4	-41.42	10.08
0.5	-41.53	9.97
0.6	-41.53	9.97
0.7	-41.43	10.07
0.8	-41.23	10.27
0.9	-41.13	10.37
1	-41.14	10.36
2	-40.80	10.70
3	-40.66	10.84
4	-40.61	10.89
5	-40.33	11.17
6	-40.53	10.97
7	-40.47	11.03
8	-40.48	11.02
9	-39.93	11.57
10	-39.81	11.69
15	-43.35	8.15
20	-39.16	12.34
25	-40.24	11.26
30	-43.18	8.32

COM-POWER AC-220**COMBILOG ANTENNA****S/N: 61060****CALIBRATION DATE: SEPTEMBER 3, 2015**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	24.00	200	13.00
35	24.30	250	15.30
40	25.40	300	18.20
45	21.50	350	17.90
50	22.50	400	18.60
60	15.40	450	19.80
70	12.70	500	21.60
80	11.10	550	22.40
90	13.40	600	23.70
100	13.80	650	24.30
120	15.40	700	24.00
125	15.40	750	24.50
140	13.10	800	24.30
150	17.20	850	26.30
160	13.20	900	26.90
175	14.20	950	26.00
180	14.30	1000	25.60

COM POWER AH-118**HORN ANTENNA**

S/N: 071175

CALIBRATION DATE: FEBRUARY 26, 2016

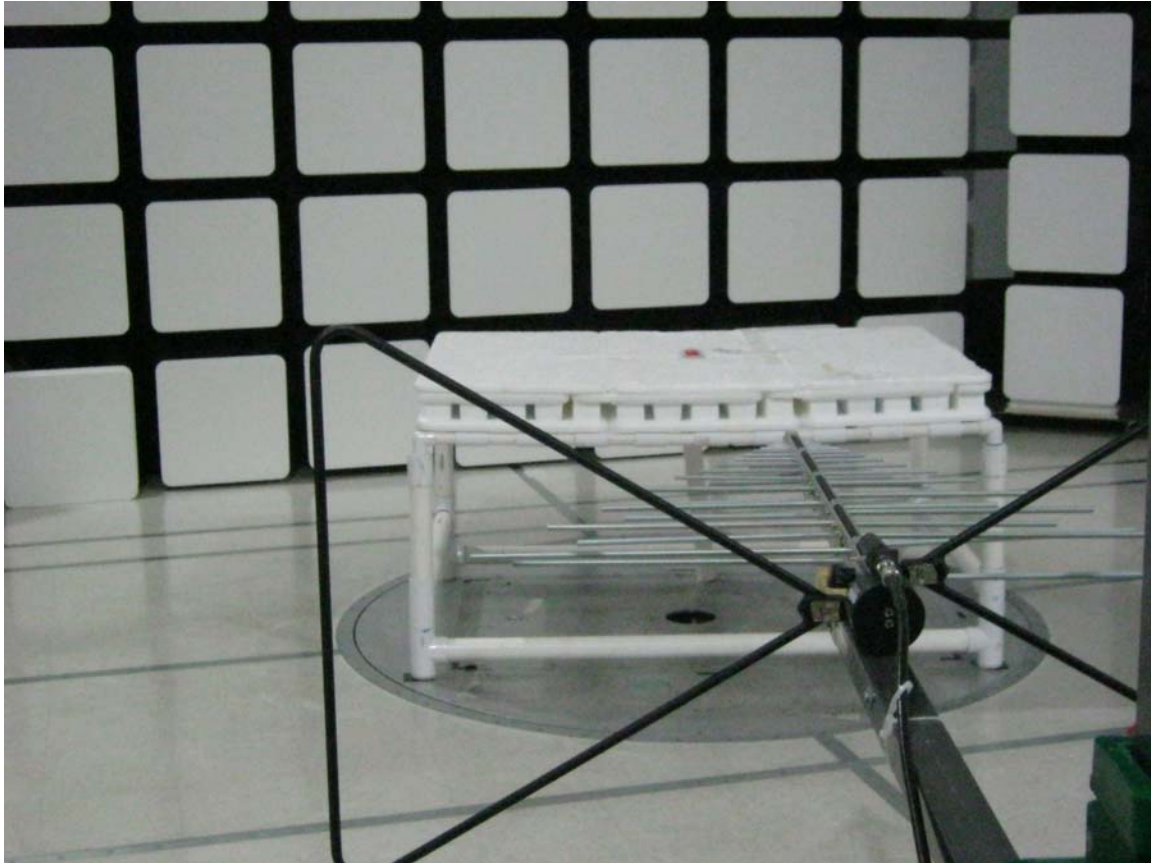
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	23.93	10.0	39.33
1.5	25.54	10.5	39.64
2.0	28.09	11.0	41.04
2.5	30.21	11.5	44.29
3.0	30.15	12.0	41.22
3.5	30.17	12.5	41.50
4.0	31.90	13.0	41.62
4.5	33.51	13.5	40.63
5.0	33.87	14.0	39.94
5.5	35.08	14.5	41.84
6.0	34.81	15.0	42.69
6.5	34.26	15.5	39.03
7.0	36.33	16.0	39.07
7.5	37.03	16.5	41.40
8.0	37.56	17.0	43.18
8.5	40.07	17.5	47.01
9.0	38.92	18.0	46.48
9.5	38.21		

COM-POWER PA-118**PREAMPLIFIER**

S/N: 551024

CALIBRATION DATE: MARCH 6, 2015

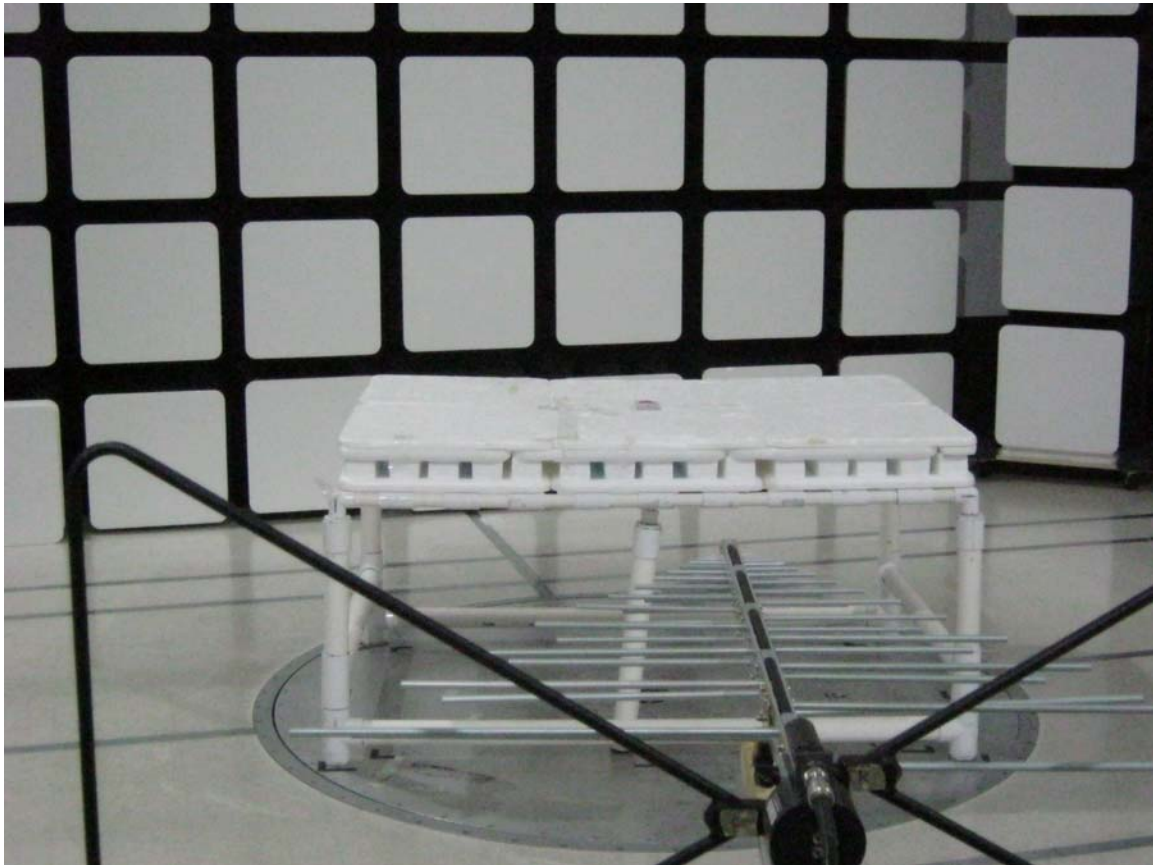
FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	39.76	6.0	38.77
1.1	40.46	6.5	38.46
1.2	40.05	7.0	38.27
1.3	40.58	7.5	38.77
1.4	39.50	8.0	39.25
1.5	39.92	8.5	38.63
1.6	40.40	9.0	39.58
1.7	40.10	9.5	42.12
1.8	40.49	10.0	38.53
1.9	38.86	11.0	40.21
2.0	41.53	12.0	41.15
2.5	41.05	13.0	40.51
3.0	40.29	14.0	40.32
3.5	40.82	15.0	39.47
4.0	40.88	16.0	39.88
4.5	41.37	17.0	39.79
5.0	40.73	18.0	40.61
5.5	39.05		



FRONT VIEW

NORTEK SECURITY & CONTROLS, LLC
WALL-MOUNT HELP BUTTON
MODEL: 2GIG-WMT1-345
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

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



REAR VIEW

NORTEK SECURITY & CONTROLS, LLC
WALL-MOUNT HELP BUTTON
MODEL: 2GIG-WMT1-345
FCC SUBPART B AND C – RADIATED EMISSIONS – BELOW 1 GHz

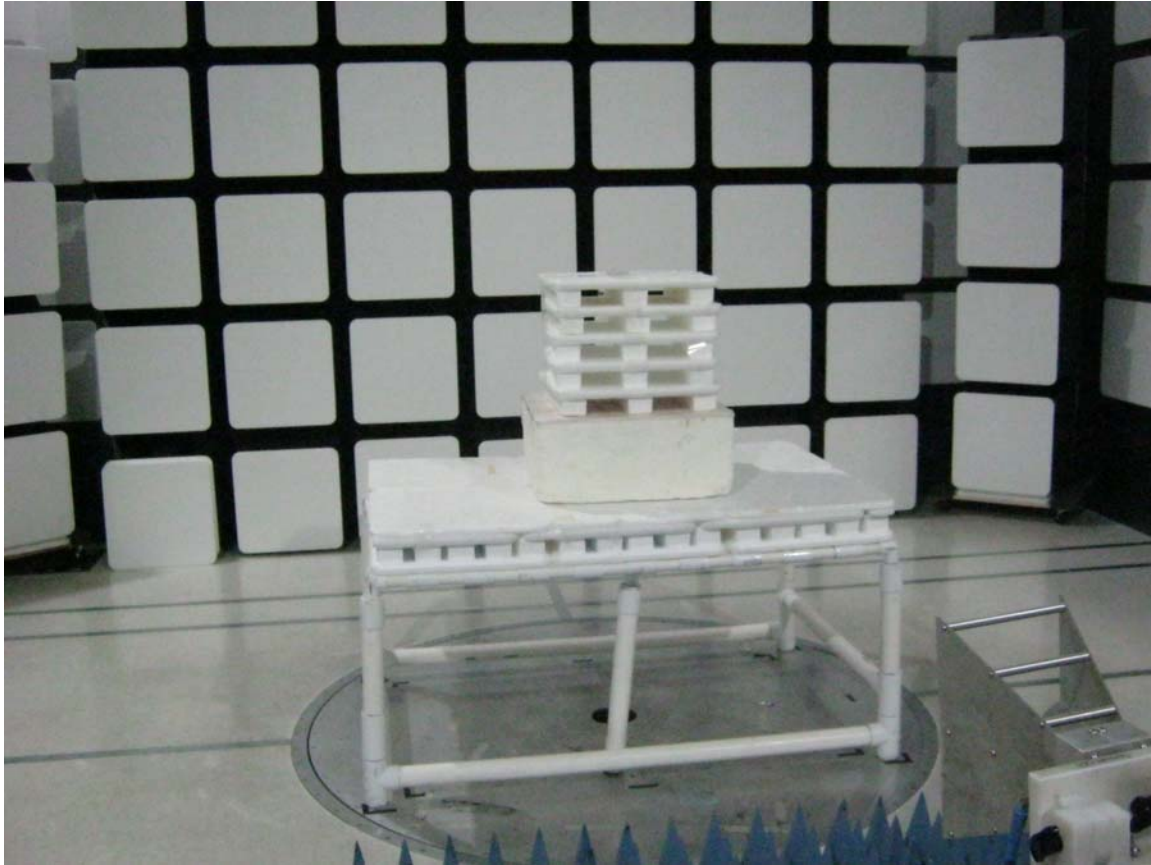
**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

NORTEK SECURITY & CONTROLS, LLC
WALL-MOUNT HELP BUTTON
MODEL: 2GIG-WMT1-345
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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



REAR VIEW

NORTEK SECURITY & CONTROLS, LLC
WALL-MOUNT HELP BUTTON
MODEL: 2GIG-WMT1-345
FCC SUBPART B AND C – RADIATED EMISSIONS – ABOVE 1 GHz

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

APPENDIX E

DATA SHEETS



***RADIATED EMISSIONS
DATA SHEETS***

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

Duty Cycle: 8.838%
Harmonic Emissions
X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	45.26	V	77.26	-32.00	Peak	89.25	150.00	
690.00	25.26	V	57.26	-32.00	Avg	89.25	150.00	
1035.00	43.80	V	73.97	-30.17	Peak	17.50	241.16	
1035.00	23.80	V	53.97	-30.17	Avg	17.50	241.16	
1380.00	37.03	V	73.97	-36.94	Peak	217.00	111.49	
1380.00	17.03	V	53.97	-36.94	Avg	217.00	111.49	
1725.00	58.16	V	77.26	-19.10	Peak	292.75	191.31	
1725.00	38.16	V	57.26	-19.10	Avg	292.75	191.31	
2070.00	58.97	V	77.26	-18.29	Peak	19.75	127.43	
2070.00	38.97	V	57.26	-18.29	Avg	19.75	127.43	
2415.00	62.20	V	77.26	-15.06	Peak	359.25	207.35	
2415.00	42.20	V	57.26	-15.06	Avg	359.25	207.35	
2760.00	53.34	V	73.97	-20.63	Peak	34.00	111.25	
2760.00	33.34	V	53.97	-20.63	Avg	34.00	111.25	
3105.00	67.28	V	77.26	-9.98	Peak	84.50	127.49	
3105.00	47.28	V	57.26	-9.98	Avg	84.50	127.49	
3450.00	65.60	V	77.26	-11.66	Peak	175.25	111.25	
3450.00	45.60	V	57.26	-11.66	Avg	175.25	111.25	

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

Duty Cycle: 8.838%
Harmonic Emissions
Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	53.43	V	77.26	-23.83	Peak	310.75	148.38	
690.00	33.43	V	57.26	-23.83	Avg	310.75	148.38	
1035.00	44.09	V	73.97	-29.88	Peak	218.25	159.67	
1035.00	24.09	V	53.97	-29.88	Avg	218.25	159.67	
1380.00	38.23	V	73.97	-35.74	Peak	289.25	223.73	
1380.00	18.23	V	53.97	-35.74	Avg	289.25	223.73	
1725.00	59.29	V	77.26	-17.97	Peak	246.50	191.37	
1725.00	39.29	V	57.26	-17.97	Avg	246.50	191.37	
2070.00	65.70	V	77.26	-11.56	Peak	252.50	128.44	
2070.00	45.70	V	57.26	-11.56	Avg	252.50	128.44	
2415.00	67.25	V	77.26	-10.01	Peak	254.50	128.38	
2415.00	47.25	V	57.26	-10.01	Avg	254.50	128.38	
2760.00	71.63	V	73.97	-2.34	Peak	256.75	112.38	
2760.00	51.63	V	53.97	-2.34	Avg	256.75	112.38	
3105.00	65.72	V	77.26	-11.54	Peak	185.50	128.50	
3105.00	45.72	V	57.26	-11.54	Avg	185.50	128.50	
3450.00	66.54	V	77.26	-10.72	Peak	95.25	112.98	
3450.00	46.54	V	57.26	-10.72	Avg	95.25	112.98	

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

Duty Cycle: 8.838%
Harmonic Emissions
Z-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	54.68	V	73.97	-19.29	Peak	7.50	168.62	
690.00	34.68	V	53.97	-19.29	Avg	7.50	168.62	
1035.00	43.83	V	73.97	-30.14	Peak	334.00	175.67	
1035.00	23.83	V	53.97	-30.14	Avg	334.00	175.67	
1380.00	37.65	V	73.97	-36.32	Peak	61.50	159.43	
1380.00	17.65	V	53.97	-36.32	Avg	61.50	159.43	
1725.00	60.79	V	77.26	-16.47	Peak	252.00	126.95	
1725.00	40.79	V	57.26	-16.47	Avg	252.00	126.95	
2070.00	61.23	V	77.26	-16.03	Peak	252.75	126.95	
2070.00	41.23	V	57.26	-16.03	Avg	252.75	126.95	
2415.00	59.06	V	77.26	-18.20	Peak	236.50	127.01	
2415.00	39.06	V	57.26	-18.20	Avg	236.50	127.01	
2760.00	64.42	V	73.97	-9.55	Peak	12.25	111.13	
2760.00	44.42	V	53.97	-9.55	Avg	12.25	111.13	
3105.00	67.79	V	77.26	-9.47	Peak	138.00	112.50	
3105.00	47.79	V	57.26	-9.47	Avg	138.00	112.50	
3450.00	58.91	V	77.26	-18.35	Peak	70.25	160.74	
3450.00	38.91	V	57.26	-18.35	Avg	70.25	160.74	

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

Duty Cycle: 8.838%
Harmonic Emissions
X-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	56.34	H	77.26	-20.92	Peak	199.75	216.86	
690.00	36.34	H	57.26	-20.92	Avg	199.75	216.86	
1035.00	44.59	H	73.97	-29.38	Peak	114.00	143.31	
1035.00	24.59	H	53.97	-29.38	Avg	114.00	143.31	
1380.00	37.67	H	73.97	-36.30	Peak	115.00	128.38	
1380.00	17.67	H	53.97	-36.30	Avg	115.00	128.38	
1725.00	60.62	H	77.26	-16.64	Peak	33.50	144.62	
1725.00	40.62	H	57.26	-16.64	Avg	33.50	144.62	
2070.00	61.32	H	77.26	-15.94	Peak	146.75	192.92	
2070.00	41.32	H	57.26	-15.94	Avg	146.75	192.92	
2415.00	69.64	H	77.26	-7.62	Peak	259.25	128.26	
2415.00	49.64	H	57.26	-7.62	Avg	259.25	128.56	
2760.00	65.49	H	73.97	-8.48	Peak	263.75	128.38	
2760.00	45.49	H	53.97	-8.48	Avg	263.75	128.38	
3105.00	69.19	H	77.26	-8.07	Peak	122.00	128.44	
3105.00	49.19	H	57.26	-8.07	Avg	122.00	128.44	
3450.00	59.12	H	77.26	-18.14	Peak	125.00	123.25	
3450.00	39.12	H	57.26	-18.14	Avg	125.00	123.25	

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

Duty Cycle: 8.838%
Harmonic Emissions
Y-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	55.75	H	77.26	-21.51	Peak	0.00	118.53	
690.00	35.75	H	57.26	-21.51	Avg	0.00	118.53	
1035.00	41.82	H	73.97	-32.15	Peak	304.25	223.73	
1035.00	21.82	H	53.97	-32.15	Avg	304.25	223.73	
1380.00	37.59	H	73.97	-36.38	Peak	85.25	143.39	
1380.00	17.59	H	53.97	-36.38	Avg	85.25	143.39	
1725.00	59.94	H	77.26	-17.32	Peak	166.50	143.49	
1725.00	39.94	H	57.26	-17.32	Avg	166.50	143.49	
2070.00	62.05	H	77.26	-15.21	Peak	183.50	111.31	
2070.00	42.05	H	57.26	-15.21	Avg	183.50	111.31	
2415.00	64.32	H	77.26	-12.94	Peak	72.75	127.31	
2415.00	44.32	H	57.26	-12.94	Avg	72.75	127.31	
2760.00	65.48	H	73.97	-8.49	Peak	173.25	175.61	
2760.00	45.48	H	53.97	-8.49	Avg	173.25	175.61	
3105.00	71.85	H	77.26	-5.41	Peak	104.50	111.07	
3105.00	51.85	H	57.26	-5.41	Avg	104.50	111.07	
3450.00	59.55	H	77.26	-17.71	Peak	335.50	175.61	
3450.00	39.55	H	57.26	-17.71	Avg	335.50	175.61	

FCC 15.231

Nortek Security & Control, LLC
 Wall-Mount Help Button
 Model: 2GIG-WMT1-345

Date: 12/16/2016
 Lab: D
 Tested By: Kyle Fujimoto

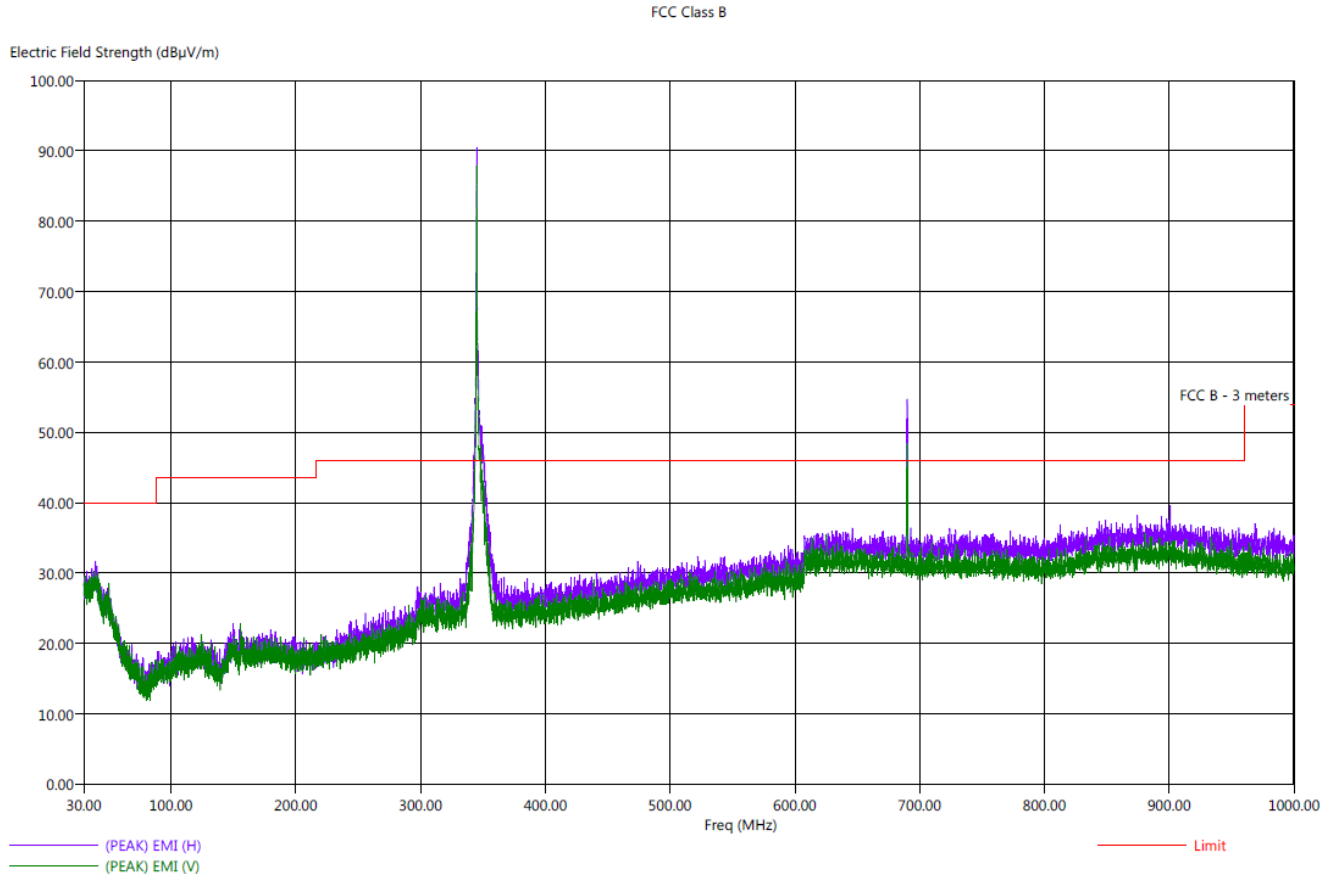
Duty Cycle: 8.838%
Harmonic Emissions
Z-Axis

Freq. (MHz)	Level (dBuV/m)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Table Angle (deg)	Ant. Height (cm)	Comments
690.00	49.22	H	77.26	-28.04	Peak	353.25	191.49	
690.00	29.22	H	57.26	-28.04	Avg	323.25	191.49	
1035.00	45.67	H	73.97	-28.30	Peak	92.00	111.31	
1035.00	25.67	H	53.97	-28.30	Avg	92.00	111.31	
1380.00	37.44	H	73.97	-36.53	Peak	296.75	111.50	
1380.00	17.44	H	53.97	-36.53	Avg	296.75	111.25	
1725.00	62.62	H	77.26	-14.64	Peak	247.75	144.56	
1725.00	42.62	H	57.26	-14.64	Avg	247.75	144.56	
2070.00	65.73	H	77.26	-11.53	Peak	260.50	143.13	
2070.00	45.73	H	57.26	-11.53	Avg	260.50	143.13	
2415.00	68.82	H	77.26	-8.44	Peak	266.75	112.26	
2415.00	48.82	H	57.26	-8.44	Avg	266.75	112.26	
2760.00	62.84	H	73.97	-11.13	Peak	80.00	191.31	
2760.00	42.84	H	53.97	-11.13	Avg	80.00	191.31	
3105.00	70.82	H	77.26	-6.44	Peak	60.75	111.25	
3105.00	50.82	H	57.26	-6.44	Avg	60.75	111.25	
3450.00	65.12	H	77.26	-12.14	Peak	313.50	112.44	
3450.00	45.12	H	57.26	-12.14	Avg	313.50	112.44	

Title: Pre-Scan - FCC Class B
 File: 1 - Agilent - Pre-Scan - X-Axis - FCC Class B - 30 MHz to 1000 MHz - 12-16-2016.set
 Operator: Kyle Fujimoto
 EUT Type: Wall-Mount Help Button
 EUT Condition: The EUT is Continuously Transmitting at 345 MHz
 Comments: Company: Nortec Security & Control, LLC
 Model: 2GIG-WMT1-345
 X-Axis

12/16/2016 2:02:43 PM
 Sequence: Preliminary Scan

Note: The emission at 345 MHz is the fundamental and subject to limits of FCC 15.231 (a).
 Note #2: The emissions at 690 MHz is the 2nd harmonic of the fundamental and is subject to the limits of FCC 15.231(a).



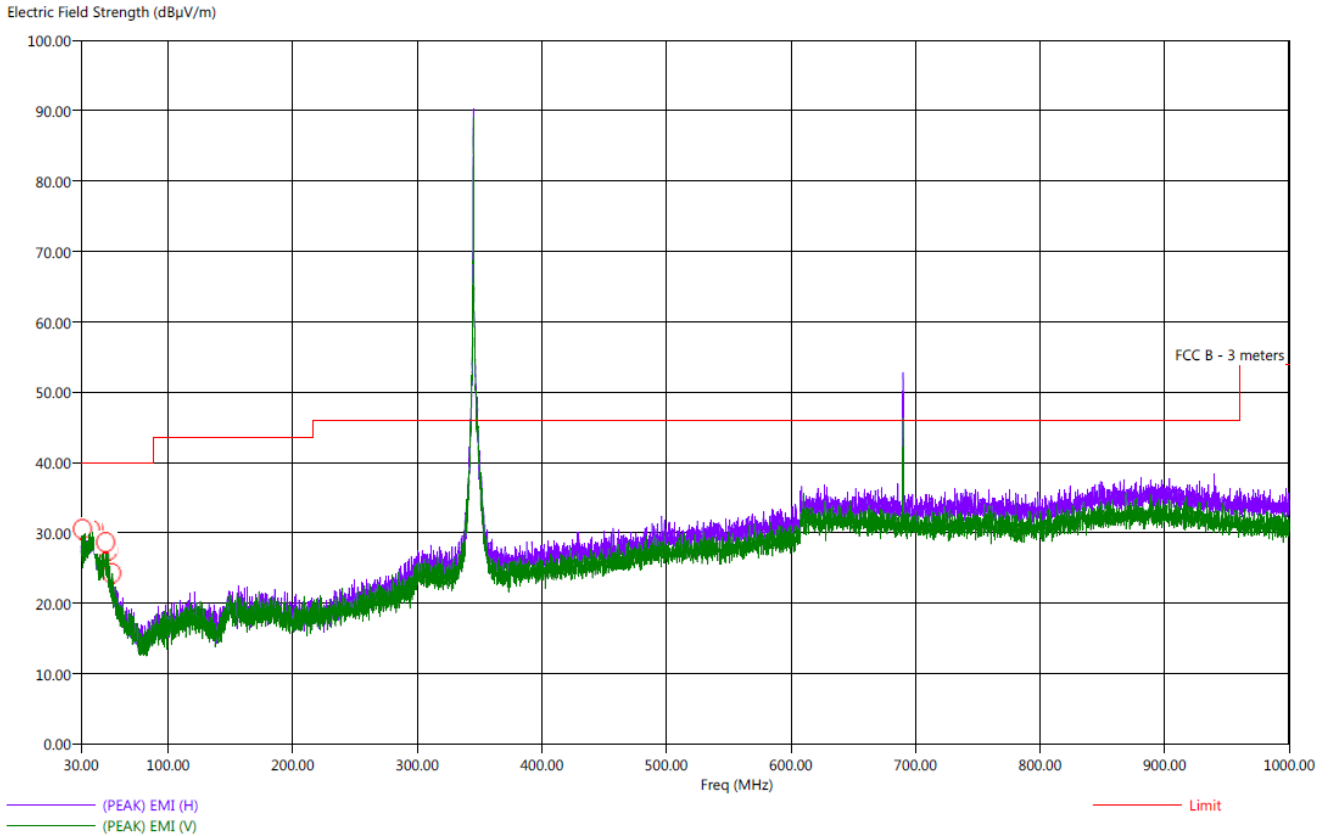
No additional spurious emissions were found between 10 kHz – 30 MHz and 1 GHz – 3.50 GHz

Title: Pre-Scan - FCC Class B
File: 1 - Agilent - Pre-Scan - Y-Axis - FCC Class B - 30 MHz to 1000 MHz - 12-16-2016.set
Operator: Kyle Fujimoto
EUT Type: Wall-Mount Help Button
EUT Condition: The EUT is Continuously Transmitting at 345 MHz
Comments: Company: Nortec Security & Control, LLC
Model: 2GIG-WMT1-345

12/16/2016 1:03:02 PM
Sequence: Preliminary Scan

Y-Axis
Note: The emission at 345 MHz is the fundamental and subject to limits of FCC 15.231 (a).
Note #2: The emissions at 690 MHz is the 2nd harmonic of the fundamental and is subject to the limits of FCC 15.231(a).

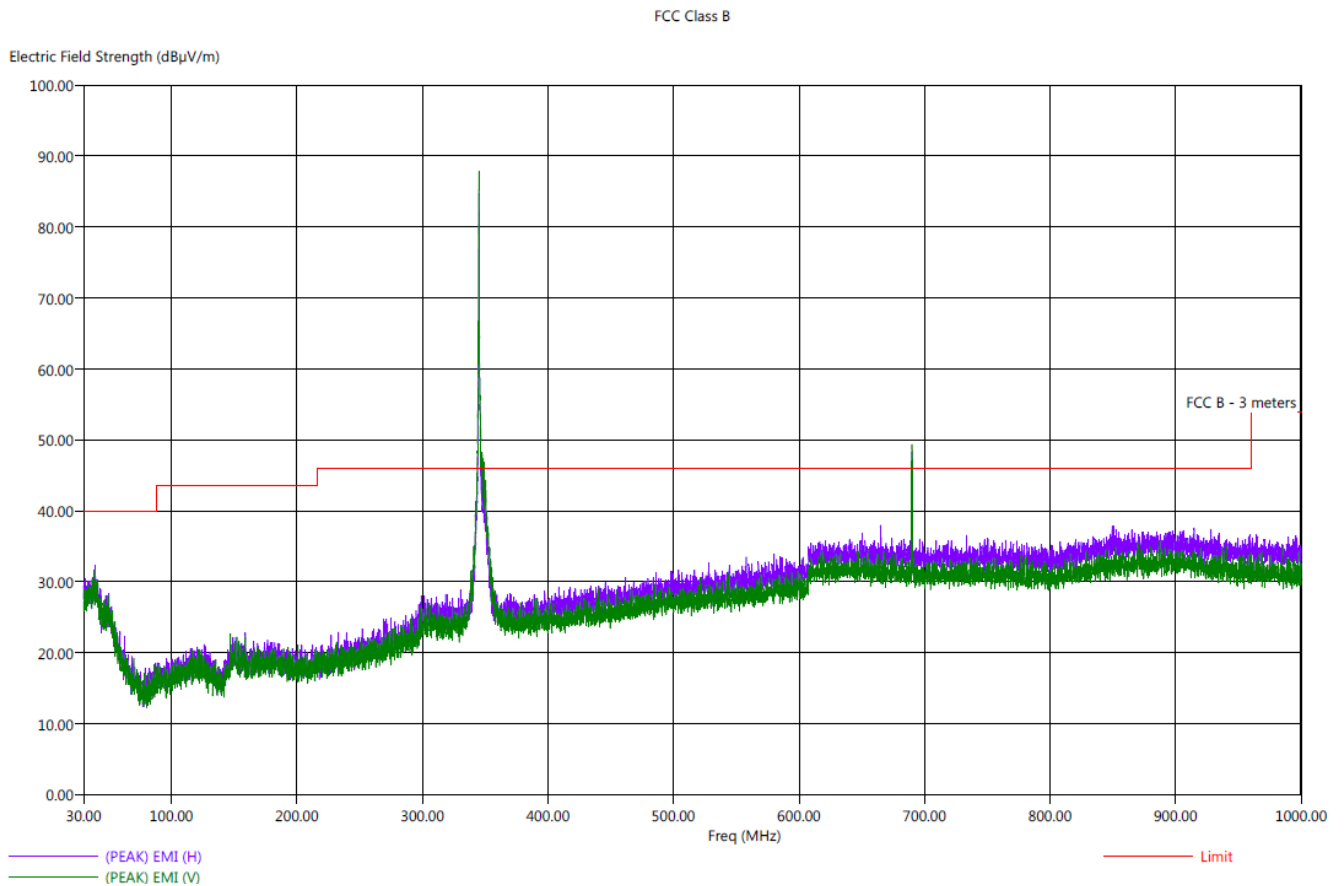
FCC Class B



No additional spurious emissions were found between 10 kHz – 30 MHz and 1 GHz – 3.50 GHz

Title: Pre-Scan - FCC Class B
 File: 1 - Agilent - Pre-Scan - Z-Axis - FCC Class B - 30 MHz to 1000 MHz - 12-16-2016.set
 Operator: Kyle Fujimoto
 EUT Type: Wall-Mount Help Button
 EUT Condition: The EUT is Continuously Transmitting at 345 MHz
 Comments: Company: Nortec Security & Control, LLC
 Model: 2GIG-WMT1-345
 Z-Axis
 Note: The emission at 345 MHz is the fundamental and subject to limits of FCC 15.231 (a).
 Note #2: The emissions at 690 MHz is the 2nd harmonic of the fundamental and is subject to the limits of FCC 15.231(a).

12/16/2016 2:12:20 PM
 Sequence: Preliminary Scan



No additional spurious emissions were found between 10 kHz – 30 MHz and 1 GHz – 3.50 GHz

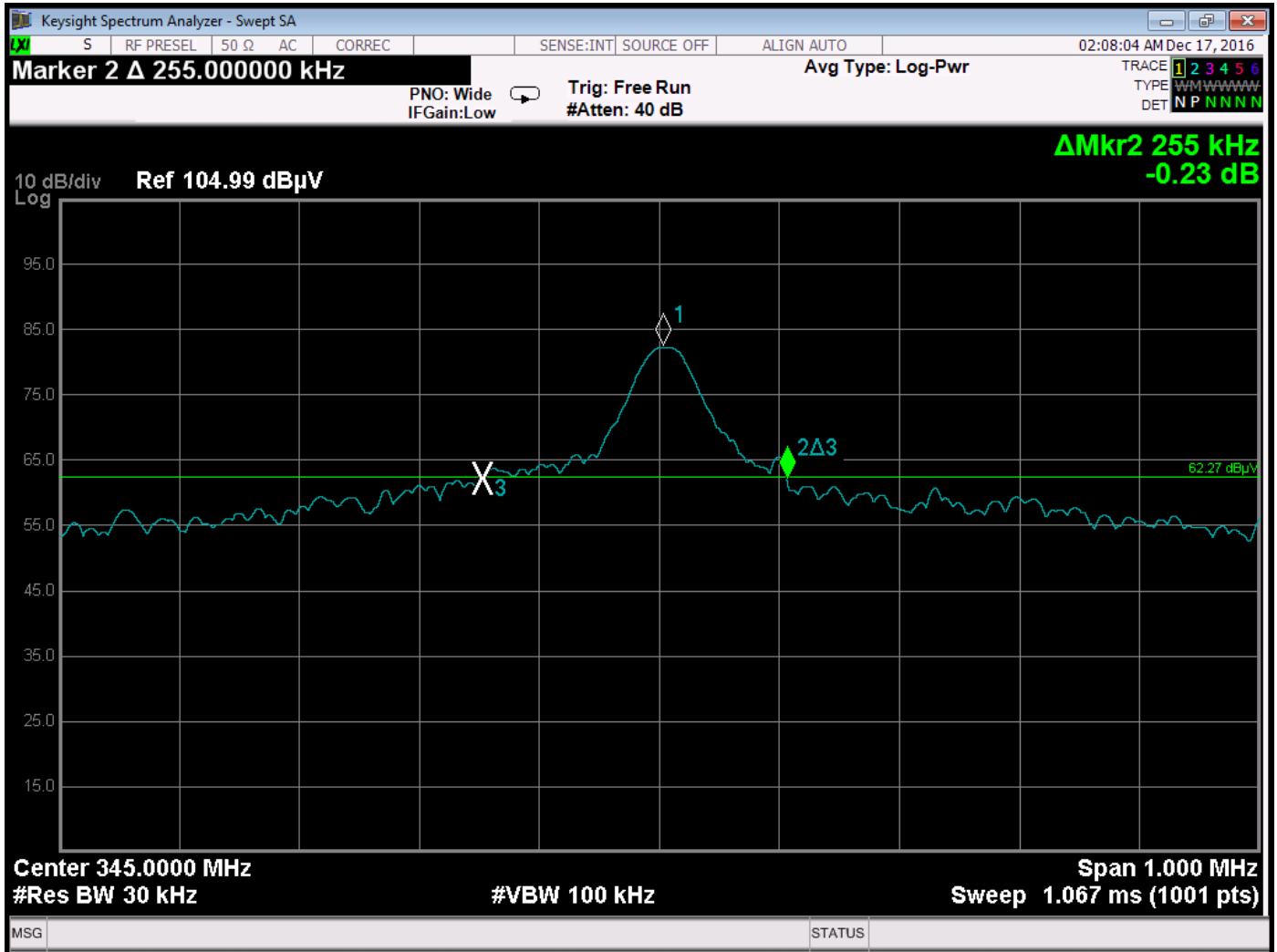
Title: Radiated Final - FCC Class B
 File: 1 - Agilent - Final Scan - Y-Axis - FCC Class B - 30 MHz to 1000 MHz - 12-16-2016.set
 Operator: Kyle Fujimoto
 EUT Type: Wall-Mount Help Button
 EUT Condition: The EUT is Continuously Transmitting at 345 MHz
 Comments: Company: Nortric Security & Control, LLC
 Model: 2GIG-WMT1-345
 Y-Axis Worst Case

12/16/2016 1:32:13 PM
 Sequence: Final Measurements

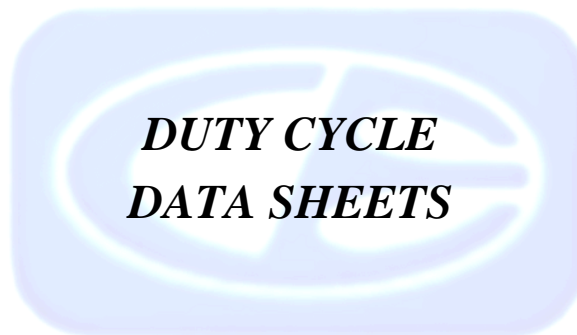
FCC Class B										
Freq (MHz)	Pol	(PEAK) EMI (dBμV/m)	(QP) EMI (dBμV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Limit (dBμV/m)	Transducer (dB)	Cable (dB)	Ttbl Aql (dea)	Twr Ht (cm)
31.30	H	31.50	26.35	-8.50	-13.65	40.00	24.08	0.31	314.25	316.14
37.70	H	32.71	26.95	-7.29	-13.05	40.00	24.95	0.38	41.75	400.02
40.30	H	32.30	27.15	-7.70	-12.85	40.00	25.05	0.40	80.75	127.25
49.80	V	29.46	24.09	-10.54	-15.91	40.00	22.42	0.40	150.25	319.85
51.70	H	27.85	22.86	-12.15	-17.14	40.00	21.13	0.40	298.75	191.31
54.70	H	25.55	20.62	-14.45	-19.38	40.00	18.89	0.40	1.50	271.85

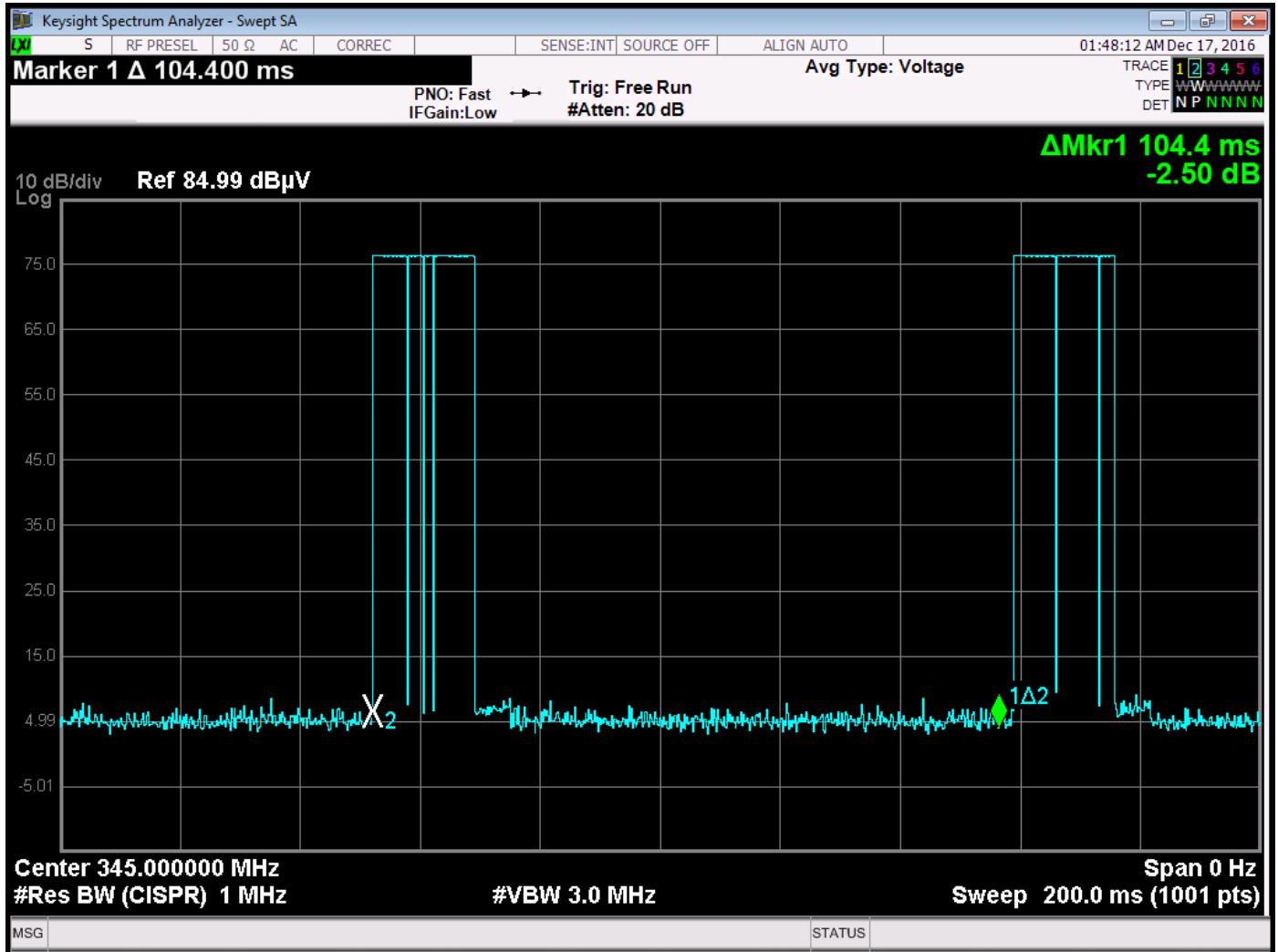
No additional spurious emissions were found between 10 kHz – 30 MHz and 1 GHz – 3.5 GHz



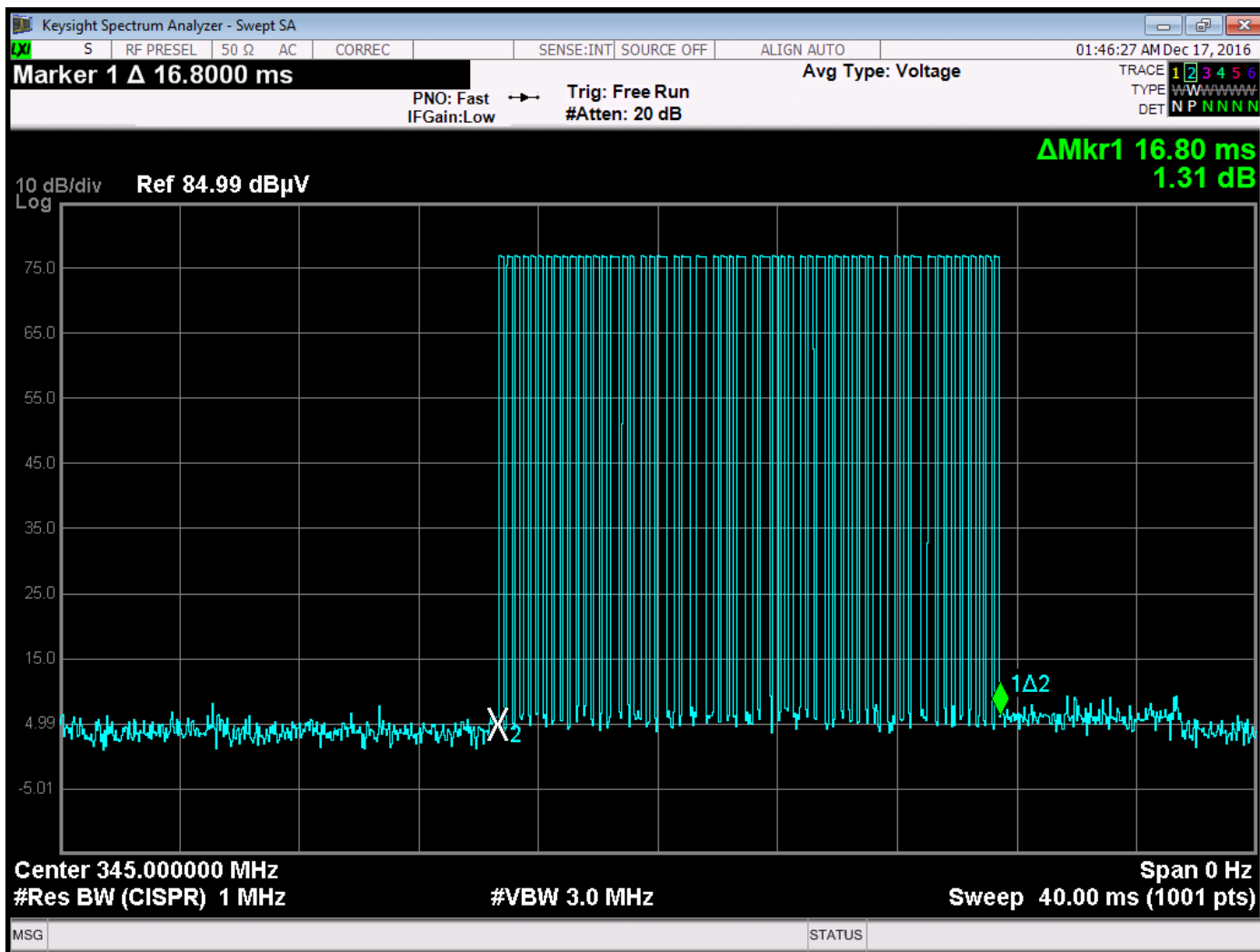


-20 dB Bandwidth of the Fundamental

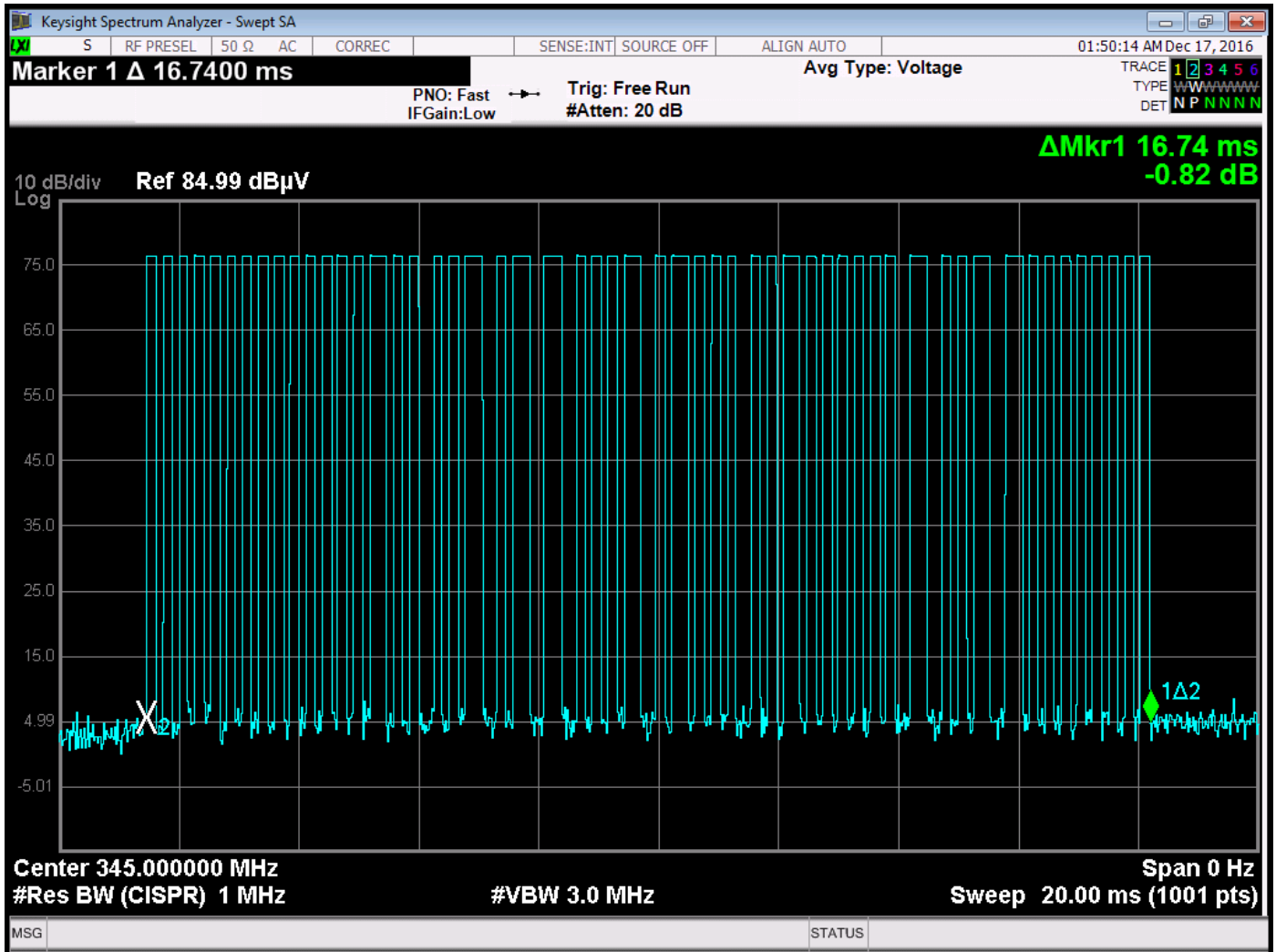




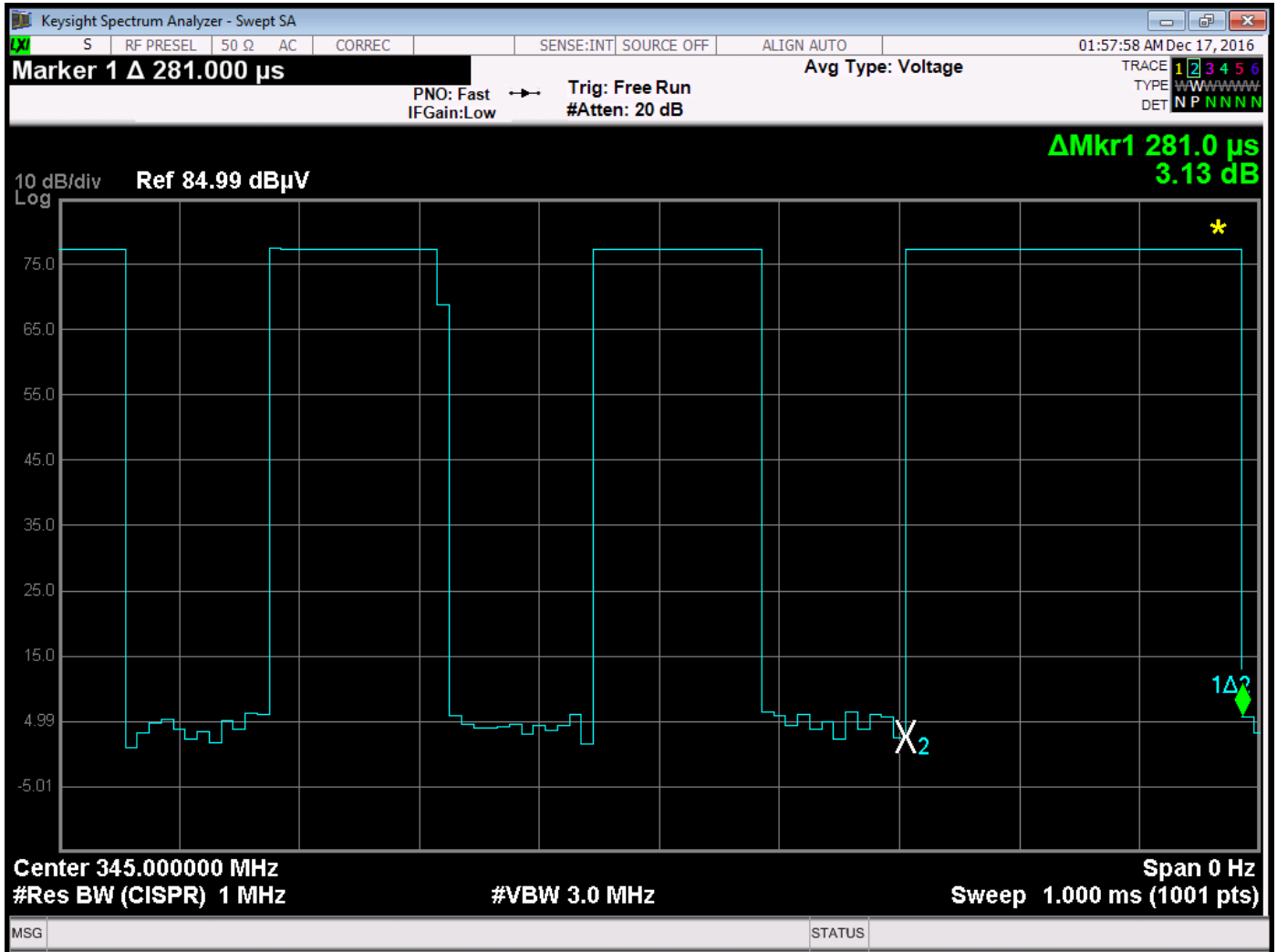
One Pulse Train per 100 ms



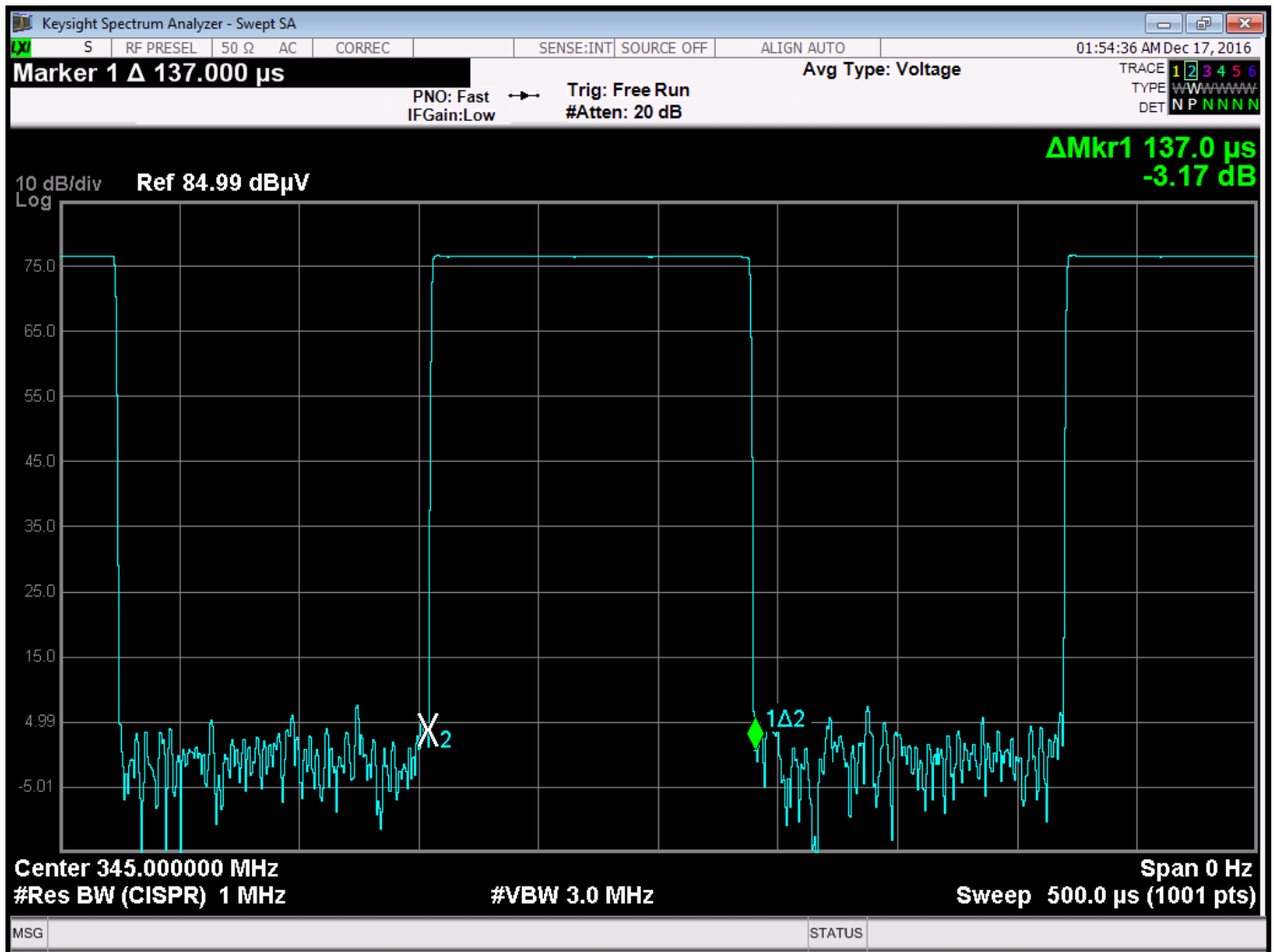
10 Large Pulses, 44 Small Pulses



Close-up of
 10 Large Pulses, 44 Small Pulses



Time of Large Pulse = 281 us



Time of Small Pulse = 137 us

Total Duty Cycle = (10 *281 us) + (44*137 us) = 8.838 ms =8.838%

The full 20 dB peak to average ratio can be used.