Measurement of RF Emissions from a GWWCR Wireless Wall Console Transmitter

For	Genie Company One Door Drive Mount Hope, OH 44660
P.O. Number	922962
Date Tested	October 18, 2018
Test Personnel	Tylar Jozefczyk
Test Specification	FCC "Code of Federal Regulations" Title 47 Part15, Subpart C Industry Canada RSS-GEN Industry Canada RSS-210

Test Report By:

Tylar Jozefczyk
EMC Engineer

Requested By: Mike Whitley
Genie Company

Approved By:

Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

Elite Electronic Engineering Inc.
1516 CENTRE CIRCLE
DOWNERS GROVE, IL 60515
TEL: 630 - 495 - 9770
FAX: 630 - 495 - 9785
www.elitetest.com

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REVISION HISTORY

Revision	Date	Description
—	26 Oct 2018	Initial release

Measurement of RF Emissions from a Wireless Wall Console, Model No. GWWCR Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Wireless Wall Console, Model No. GWWCR (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit at approximately 315MHz and 390MHz using an internal antenna. The EUT was manufactured and submitted for testing by Genie Company located in Mount Hope, OH.

1.2. Purpose

The test series was performed to determine if the EUT meets the radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 for Intentional Radiators. The test series was also performed to determine if the EUT meets the radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex A for transmitters. Testing was performed in accordance with ANSI C63.4-2014.

1.3. Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4. EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by The American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

1.5. Laboratory Conditions

The temperature at the time of the test was 21°C and the relative humidity was 20%.

2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C
- 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"
- Industry Canada Radio Standards Specification, RSS-Gen, “General Requirements for Compliance of Radio Apparatus”, Issue 5, April 2018
- Industry Canada Radio Standards Specification, RSS-210, “License-Exempt Radio Apparatus: Category I Equipment”, Issue 9, November 2017

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a Genie Company, Wireless Wall Console, Model No. GWWCR. A block diagram of the EUT setup is shown as Figure 1.

3.1.1. Power Input

The EUT was powered by 3VDC from two (2) AAA batteries.

3.1.2. Grounding

The EUT was ungrounded during the tests.

3.2. Software

For all tests, the EUT had Firmware Versions WWC_V0-12_A and WWC_FCC2_V9-10_A loaded onto the device to provide correct load characteristics.

3.3. Operational Mode

For all tests, the EUT was placed on an 80cm high non-conductive stand for tests under 1GHz and 1.5 meters for tests above 1GHz. The EUT was energized. The unit was programmed to operate in one of the following modes:

Mode	Description
Tx	EUT was set to transmit continuously at the following frequencies: - 315MHz - 390MHz

3.4. EUT Modifications

No modifications were required for compliance.

4. Test Facility and Test Instrumentation

4.1. Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified in the requirements. The receiver bandwidth was 120kHz for the 30MHz to 1GHz radiated emissions data and 1MHz for the 1 to 4.5MHz radiated emissions data.

4.3. Calibration Traceability

Test equipment is maintained and calibrated on a regular basis with a calibration interval not greater than two years. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4. Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

Values of Expanded Measurement Uncertainty (95% Confidence) are presented below:

Measurement Type	Expanded Measurement Uncertainty
Conducted disturbance (mains port) (150 kHz – 30 MHz)	2.7

Radiated disturbance (electric field strength on an open area test site or alternative test site) (30 MHz – 1000 MHz)	4.3
Radiated disturbance (electric field strength on an open area test site or alternative test site) (1 GHz – 6 GHz)	3.1
Radiated disturbance (electric field strength on an open area test site or alternative test site) (6 GHz – 18 GHz)	3.2

5. TEST PROCEDURES

5.1. Powerline Conducted Emissions

5.1.1. Requirements

Since the EUT was powered by internal batteries, no conducted emissions tests were required.

5.2. Periodic Operation Measurements

5.2.1. Requirements

As stated in FCC 15.231(a) and RSS-210 A.1.1, a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. Also, a transmitter activated automatically shall cease transmission within 5 seconds after activation.

5.2.2. Procedures

The spectrum analyzer was setup to display the time domain trace. The EUT was set to transmit normally. The spectrum analyzer was used to record the amount of time that the EUT remained active following activation.

5.2.3. Results

The plot of the periodic timing is shown on data page 16. The data shows that the EUT ceases operation within the allotted time.

5.3. Duty Cycle Factor Measurements

5.3.1. Requirements

Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

5.3.2. Procedure

1) The EUT was placed on the non-conductive stand and set to transmit continuously.
2) A double ridged waveguide antenna was positioned at a 3 meter distance from the EUT. The output of the antenna was connected to the input of a spectrum analyzer.
3) The center frequency of the spectrum analyzer was set to the transmit frequency of the EUT.
4) The frequency span of the spectrum analyzer was set to 0Hz so that the time domain trace of the transmitted pulse of the EUT was displayed on the spectrum analyzer.
5) The sweep time of the spectrum analyzer was adjusted so that the beginning and end of a single pulse could be seen on the display of the spectrum analyzer.
6) The single sweep function of the spectrum analyzer was used multiple times to determine the maximum pulse width of the EUT.

7) The maximum pulse width display of the spectrum analyzer was recorded and then plotted using a 'screen dump' utility.
8) The sweep time of the spectrum analyzer was then adjusted to 100msec.
9) The single sweep function of the spectrum analyzer was used multiple times to determine the maximum number of transmitted pulses that occurred in a 100msec time period.
10) The maximum number of pulses transmitted in a 100msec time period was recorded and then plotted using a 'screen dump' utility.
11) The duty cycle correction was calculated using the following equation:

Duty Cycle Correction Factor (dB) = D.C. (dB)
D.C. (dB) = 20 x log [((pulse width (msec)) x (#pulses in a 100msecperiod)) / 100msec]

5.3.3. Results

Duty Cycle plots are shown on pages 17 through 19. The EUT transmits a 0.39ms pulse 40 times and a 0.19ms pulse 40 times in a 100msec period. This results in a duty cycle correction factor of -12.69dB.

5.4. Radiated Measurements

5.4.1. Requirements

FCC 15.231(b) has the following radiated emission limits:

Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	[1]1,250 to 3,750	[1]125 to 375
174-260	3,750	375
260-470	[1] 3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

[1] = Linear interpolations

In addition, emissions appearing in the Restricted Bands of Operation listed in paragraph 15.205(a) shall not exceed the general requirements shown in paragraph 15.209.

RSS-210 (A.1.2) has the following radiated emission limits:

Fundamental Frequency (MHz) – Excluding Restricted Frequency Bands Specified in RSS-Gen	Field Strength of Fundamental (microvolts/meter)
70-130	1,250
130-174	1,250 to 3,750[1]
174-260[1]	3,750
260-470[1]	3,750 to 12,500[1]
Above 470	12,500

[1] = Linear interpolation with frequency, f, in MHz:
For 130-174 MHz: Field Strength (μV/m) = (56.82 × f) − 6136
For 260-470 MHz: Field Strength (μV/m) = (41.67 × f) − 7083

All measurements are specified at a distance of 3 meters.

5.4.2. Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed

over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 4.5GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity. * Replace with the proper frequency range.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 4.5GHz. Between 30MHz and 1GHz, a tuned dipole antenna was used as the pick-up device. A broadband double ridged waveguide antenna was used as the pick-up device for all frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

1) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
2) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
3) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

5.4.3. Results

The preliminary plots are presented on data pages 20 through 27. The plots are presented for a reference only and are not used to determine compliance.

The final open area radiated levels are presented on data pages 28 and 29. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions level closest to the limit (worst case) occurred at 390MHz. The emissions level at this frequency was 4.9dB within the limit. Photographs of the test configuration which yielded the highest (or worst case) radiated emission levels are shown in Figures 2 and 3.

5.5. Occupied Bandwidth Measurements

5.5.1. Requirement

In accordance with paragraph 15.231(c), all emissions within 20dB of the peak amplitude level of the center frequency are required to be within a band less than 0.25% of the center frequency wide. Also, in accordance with paragraph RSS-210 A.1.3, the 99% bandwidth of momentarily operated devices shall be less than or equal to 0.25% of the center frequency for devices operating between 70MHz and 900MHz.

5.5.2. Procedures

The EUT was placed on an 80cm high non-conductive stand. The unit was set to transmit continuously. With an antenna positioned nearby, occupied bandwidth emissions were displayed on the spectrum analyzer.

5.5.3. Results

The plots of the emissions near the fundamental frequency is presented on data pages 30 through 33. As can be seen from these data pages, the transmitter met the occupied bandwidth requirements. The 99% bandwidth was measured to be 226.27kHz for 315MHz and 231.76kHz for 390MHz.

6. Other Test Conditions

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

6.2. Disposition of the EUT

The EUT and all associated equipment were returned to Genie Company upon completion of the tests.

7. Conclusions

It was determined that the Genie Company Wireless Wall Console, Model No. GWWCR did fully meet the radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 et seq. for Intentional Radiators, when tested per ANSI C63.4-2014.

It was also determined that the Genie Company Wireless Wall Console, Model No. GWWCR did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex A, for transmitters, when tested per ANSI C63.4-2014.

8. Certification

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

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

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
CDY0	WORKSTATION	ELITE	WORKSTATION		WINDOWS 7	N/A	
NTA3	BILOG ANTENNA	TESEQ	6112D	32853	25-1000MHz	10/3/2018	10/3/2019
NWQ1	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS-LINDGREN	3117	66655	1GHZ-18GHZ	4/10/2018	4/10/2020
PHA0	MAGNETIC FIELD PROBE	ELECTRO-METRICS	EM-6882	134	22-230MHZ	NOTE 1	
RBG3	EMI ANALYZER	ROHDE & SCHWARZ	ESW44	101592	2HZ-44GHZ	2/20/2018	2/20/2019
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	

I/O: Initial Only
N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

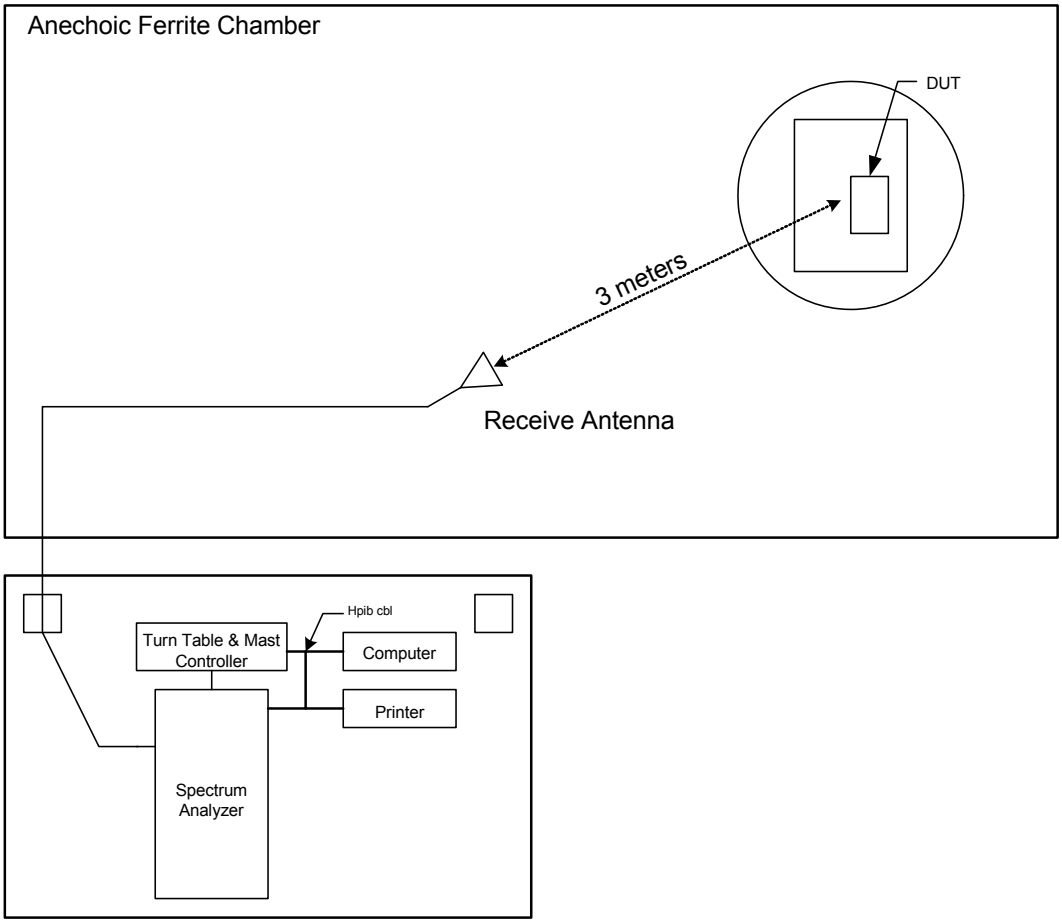


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

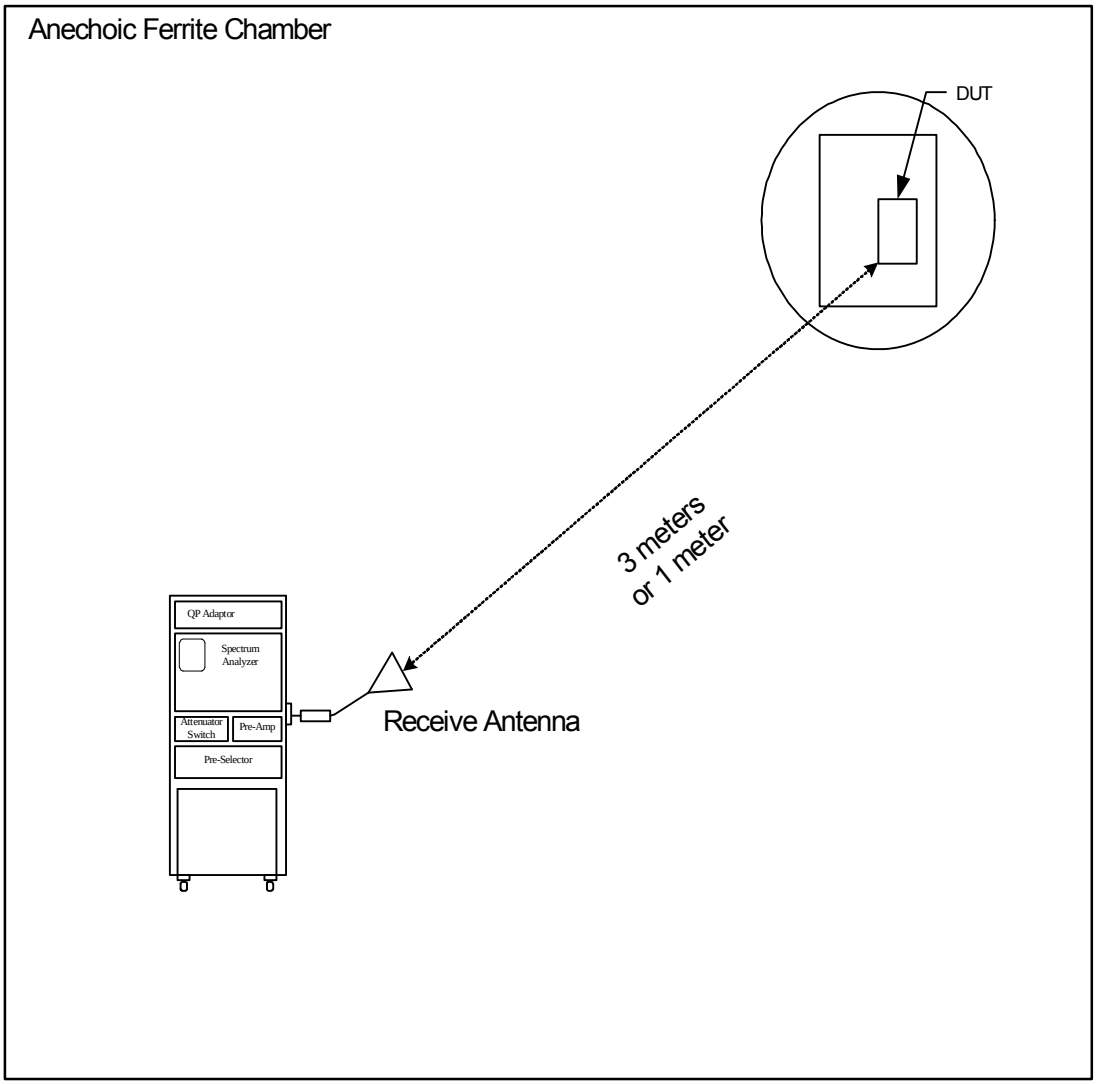
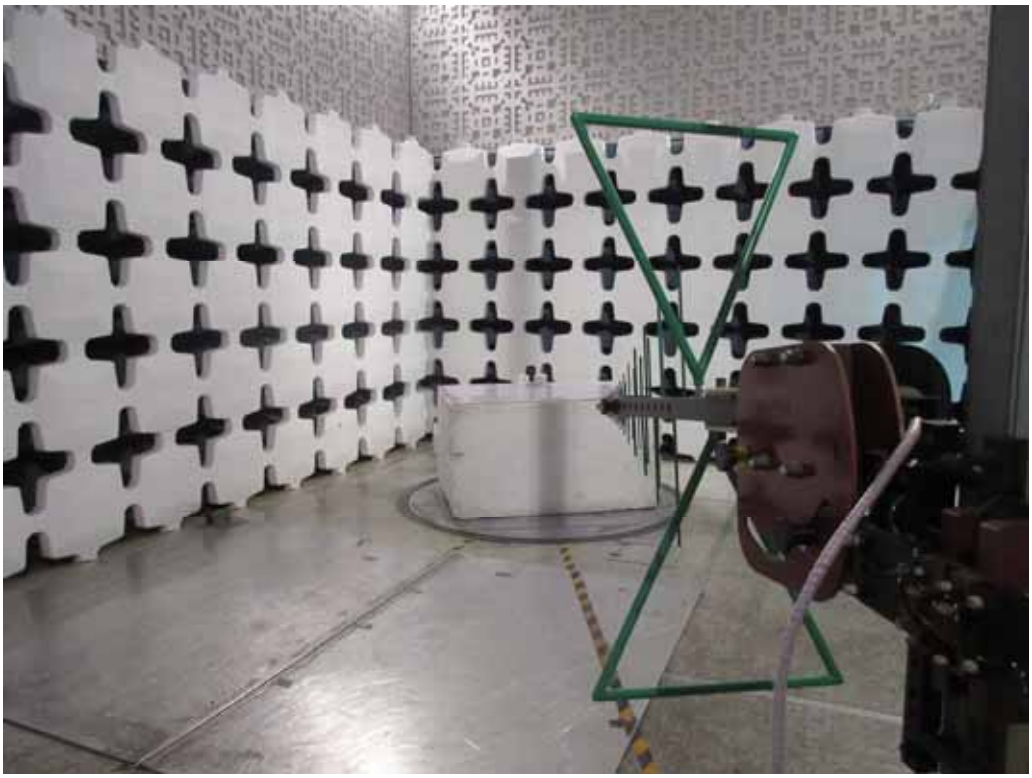

Anechoic Ferrite Chamber
DUT
3 meters
or 1 meter
QP Adaptor
Spectrum
Analyzer
Attenuator
Switch
Pre-Amp
Pre-Selector
Receive Antenna

Figure 2

Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

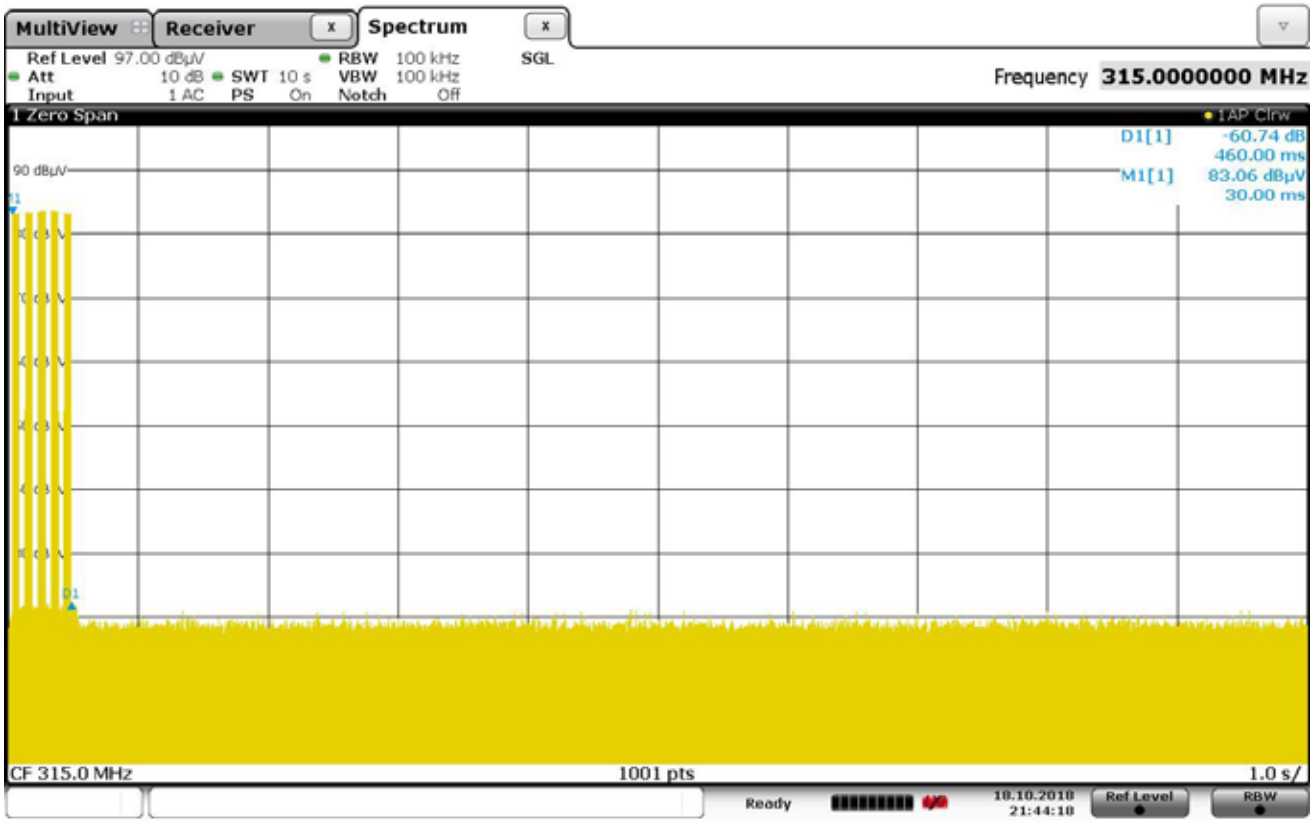
Figure 3

Test Setup for Radiated Emissions, 1 to 4.5GHz – Horizontal Polarization

Test Setup for Radiated Emissions, 1 to 4.5GHz – Vertical Polarization

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Periodic Operation Measurement
MODE	Tx
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	Periodic Operation time = 460ms

PERIODIC OPERATION



Date: 18.OCT.2018 21:44:18

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Duty Cycle
MODE	Tx
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	Wide Pulse = 0.39ms

DUTY CYCLE – WIDE PULSE

Date: 18.OCT.2018 21:41:14

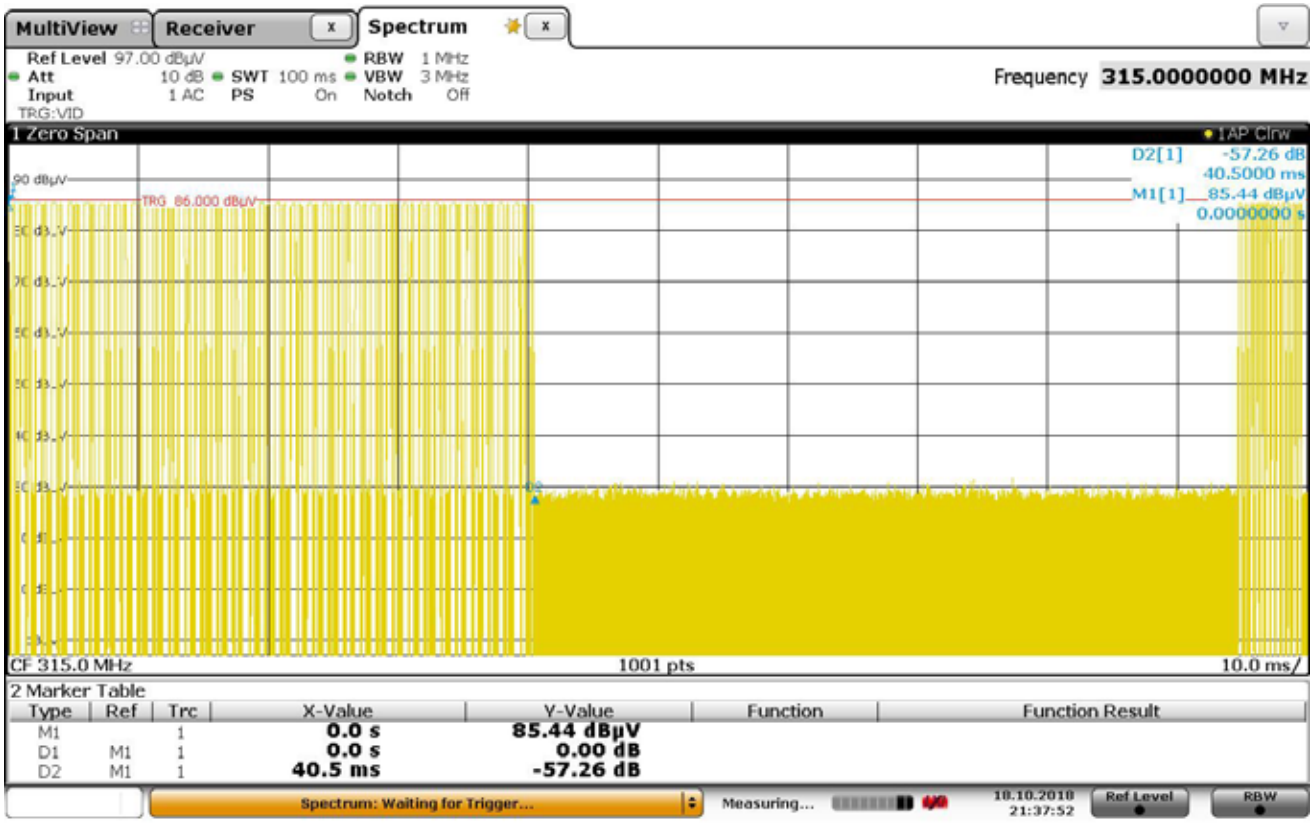
DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Duty Cycle
MODE	Tx
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	Narrow Pulse = 0.19ms

DUTY CYCLE – NARROW PULSE

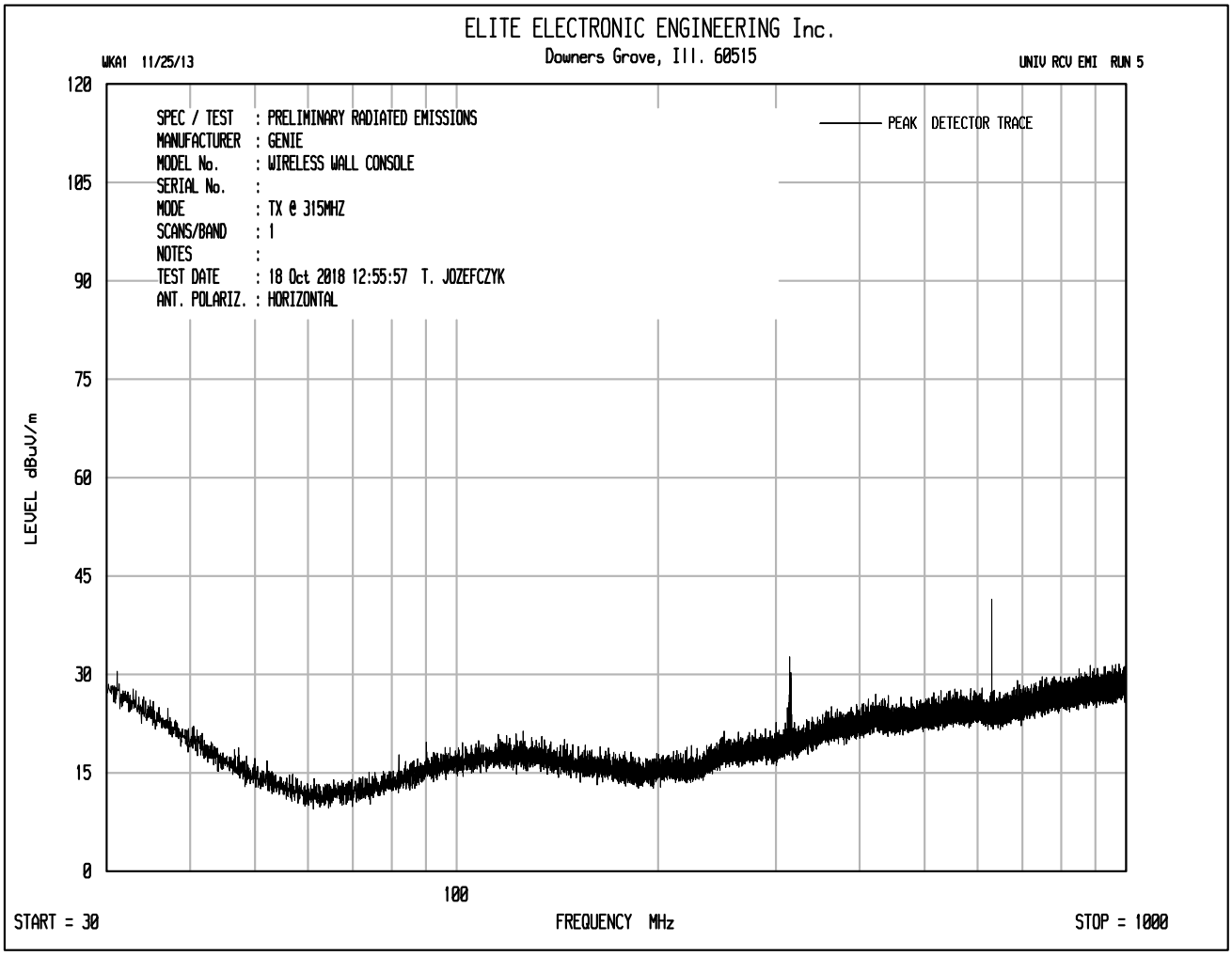
Date: 18.OCT.2018 21:42:16

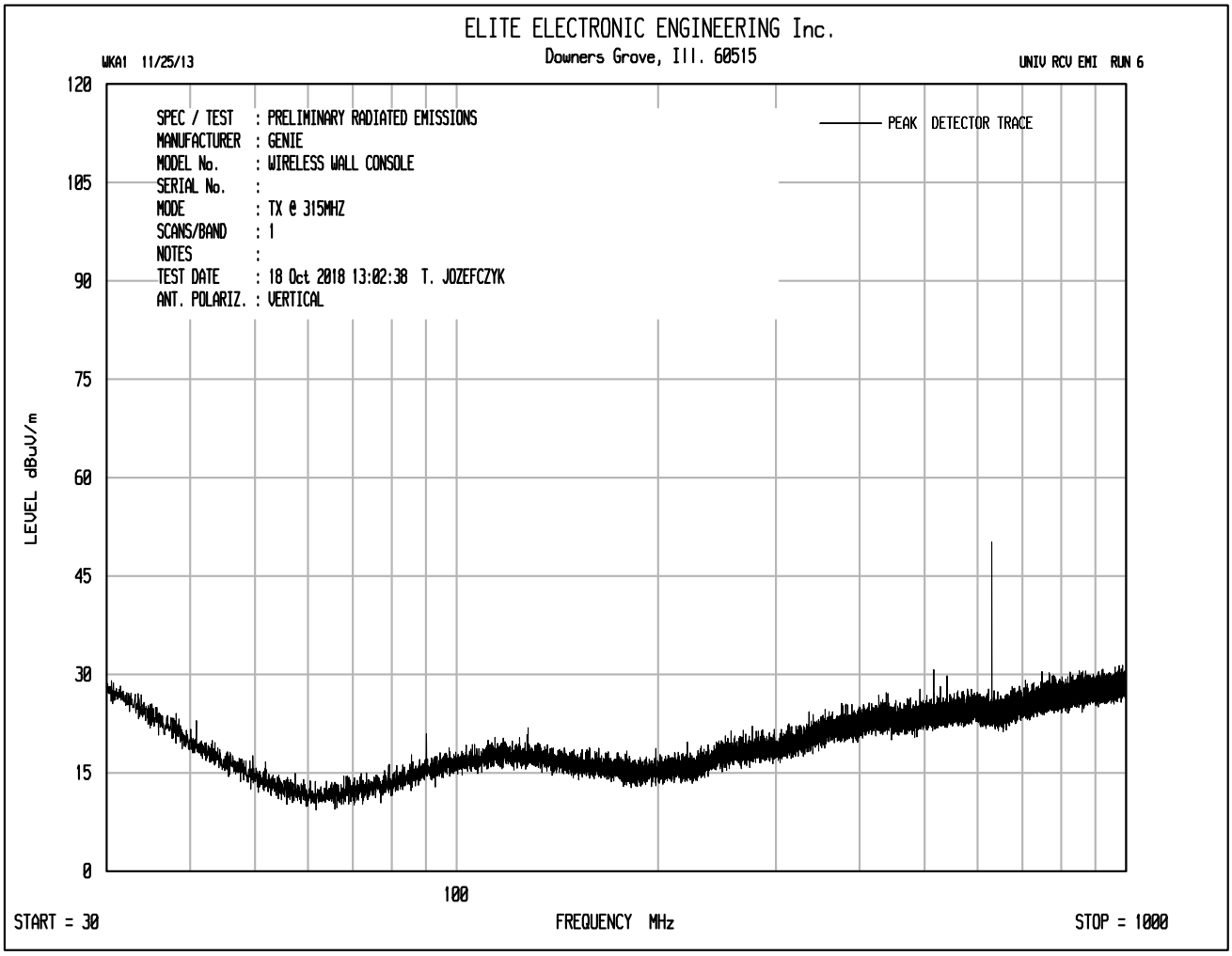
DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Duty Cycle
MODE	Tx
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	Duty Cycle Calculation: 40 × 0.39ms = 15.6ms 40 × 0.19ms = 7.6ms 15.6 + 7.6 = 23.2ms D.C = 20log(23.2/100) = **-12.69dB**

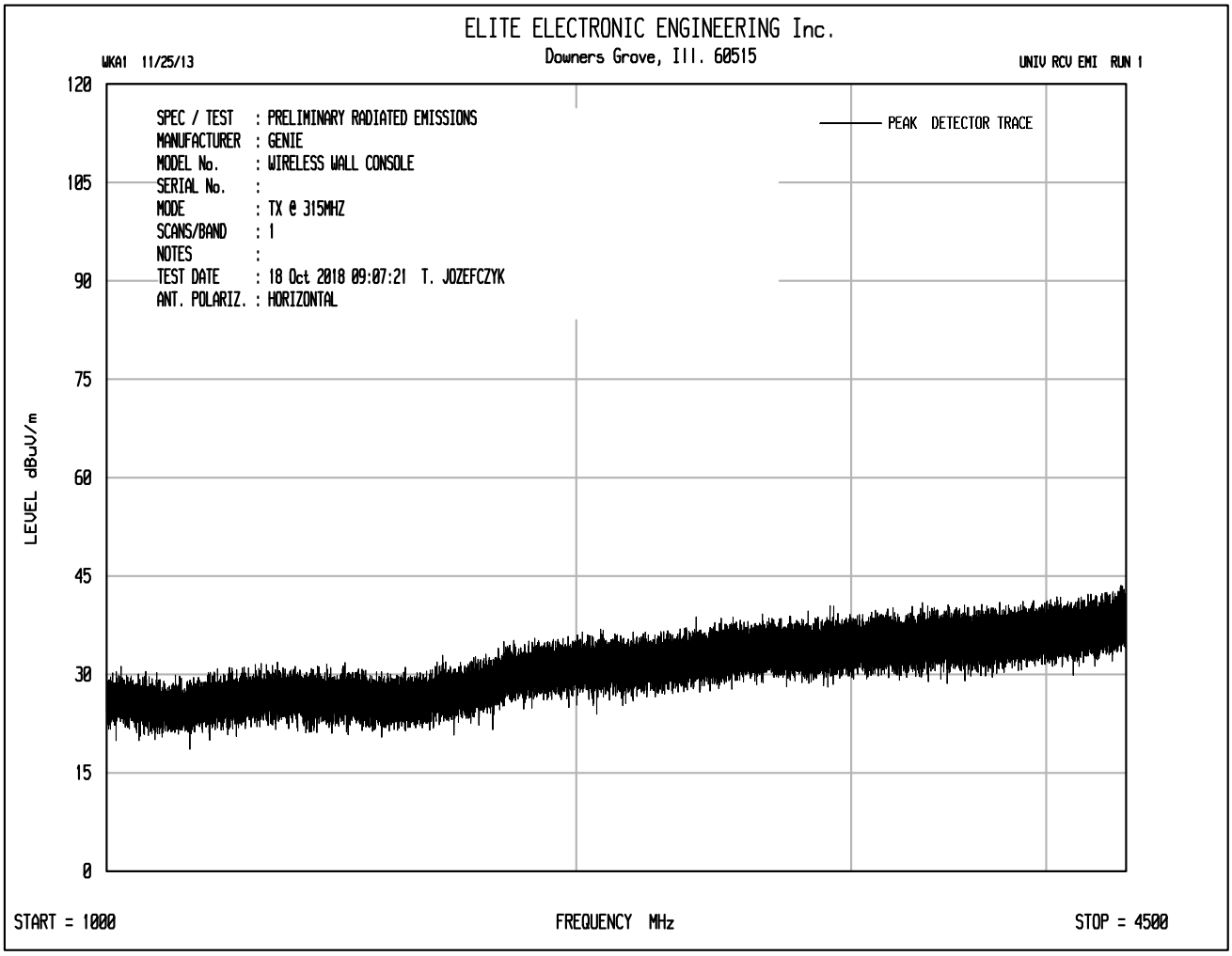
DUTY CYCLE

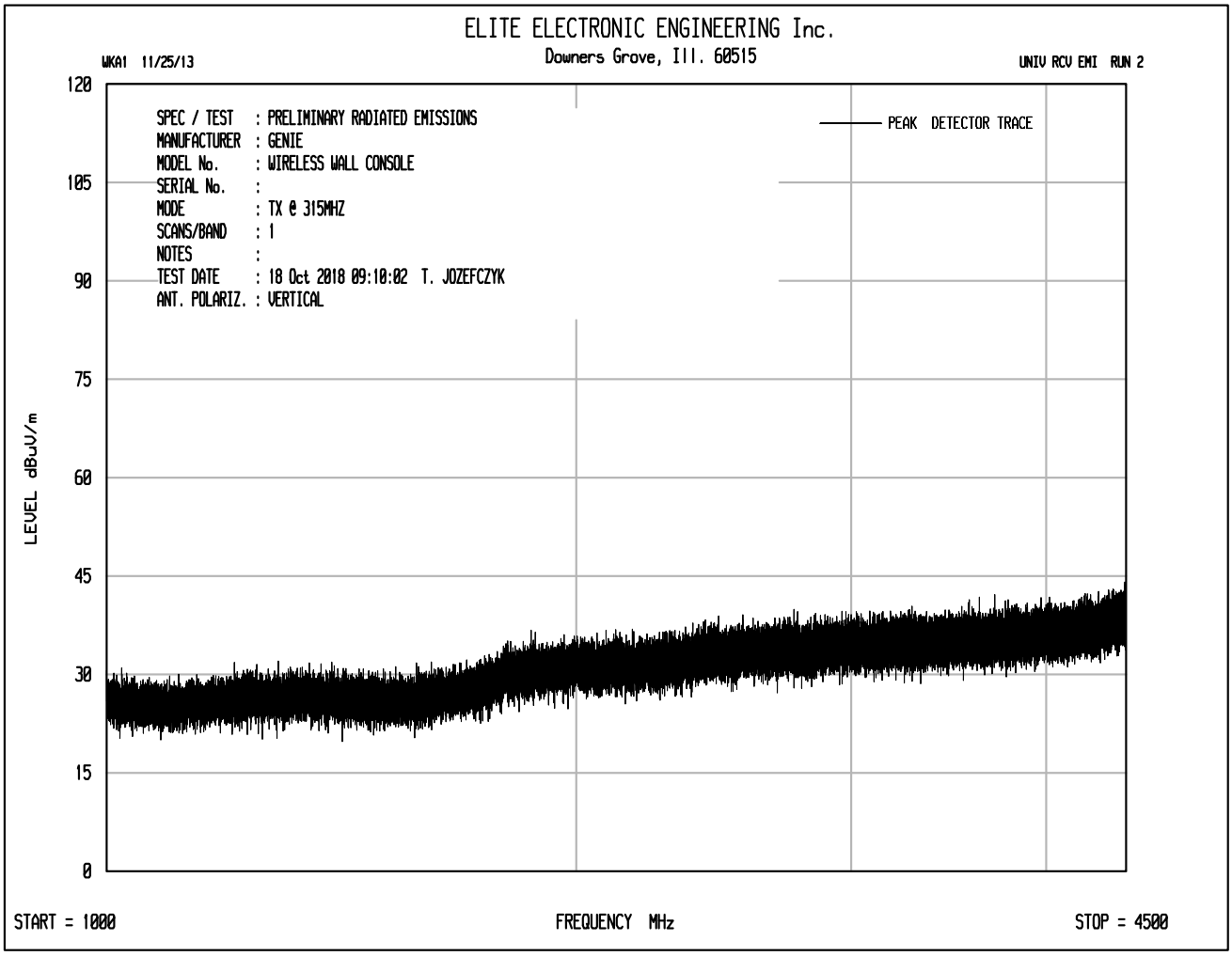


Date: 18.OCT.2018 21:37:52


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 12:55:57 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 13:02:38 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 09:07:21 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 315MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 09:10:02 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
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105
90
75
60
45
30
15
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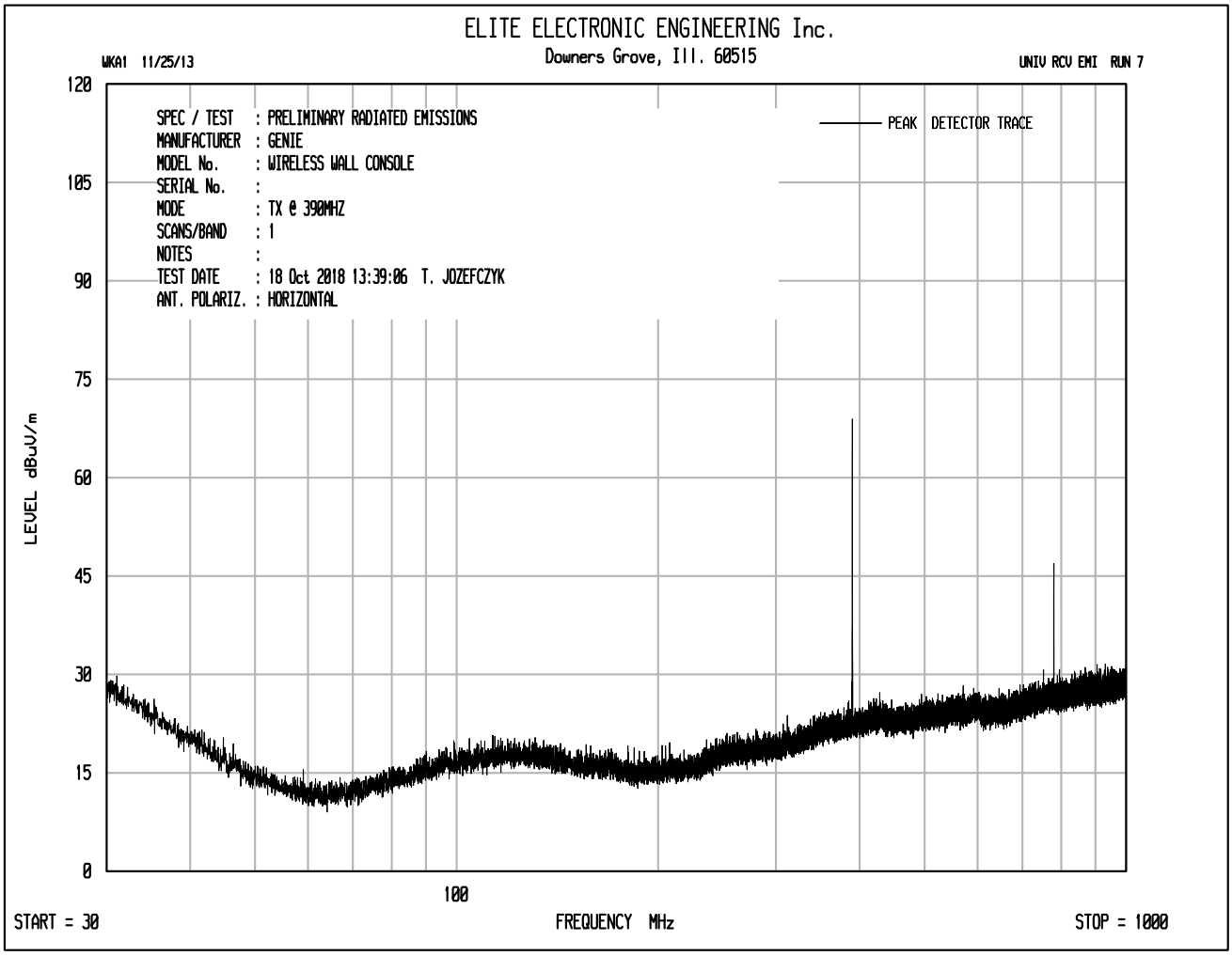
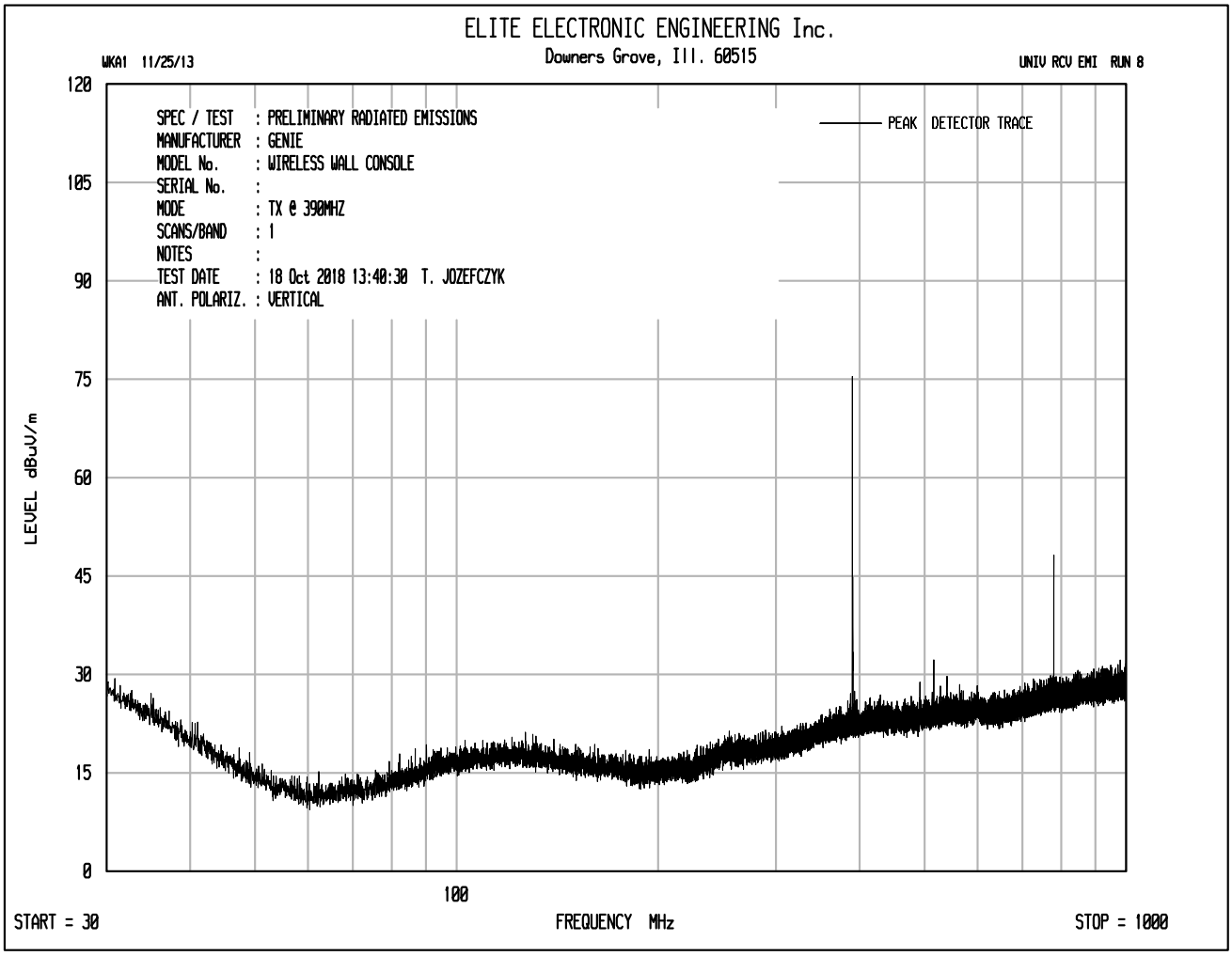
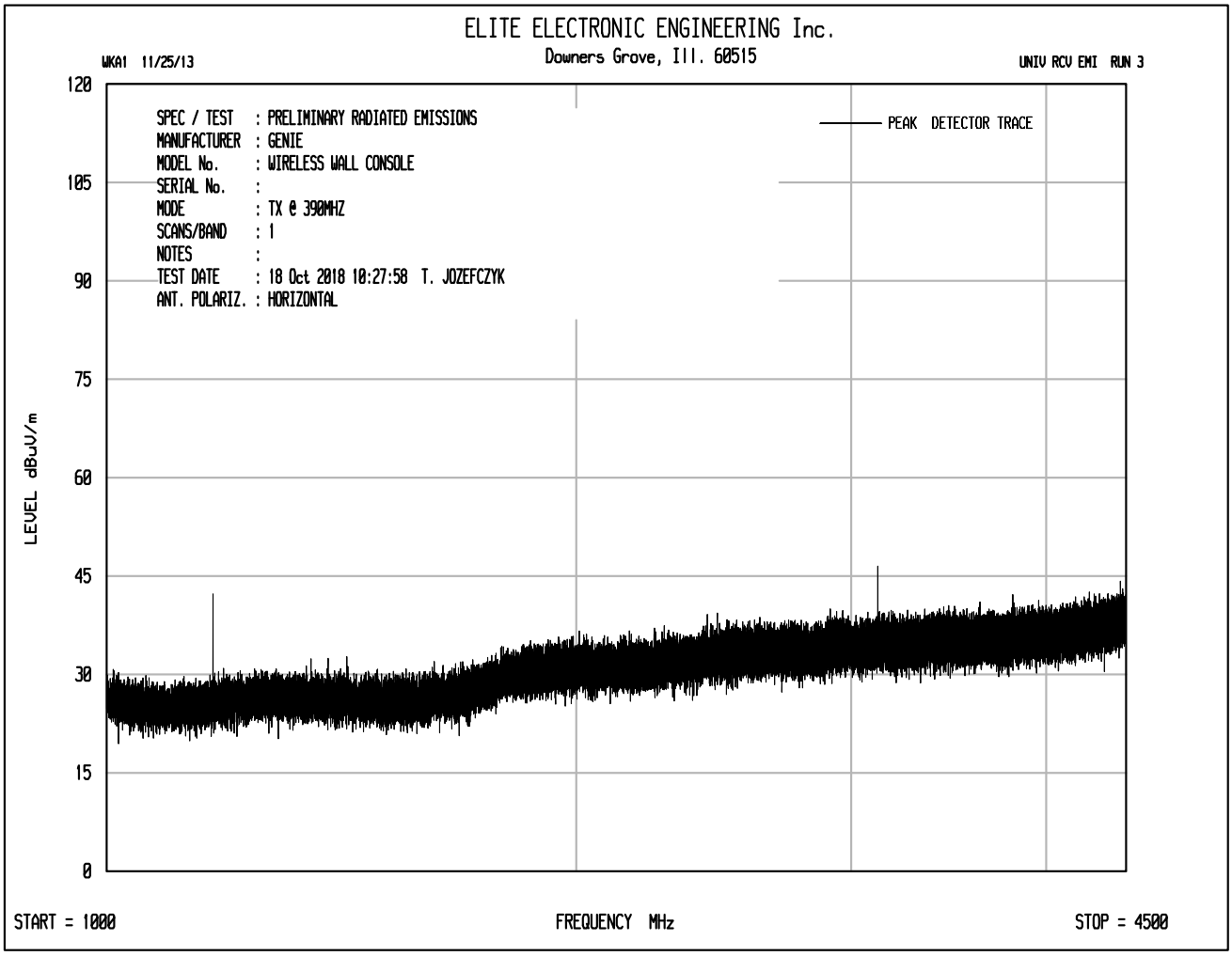
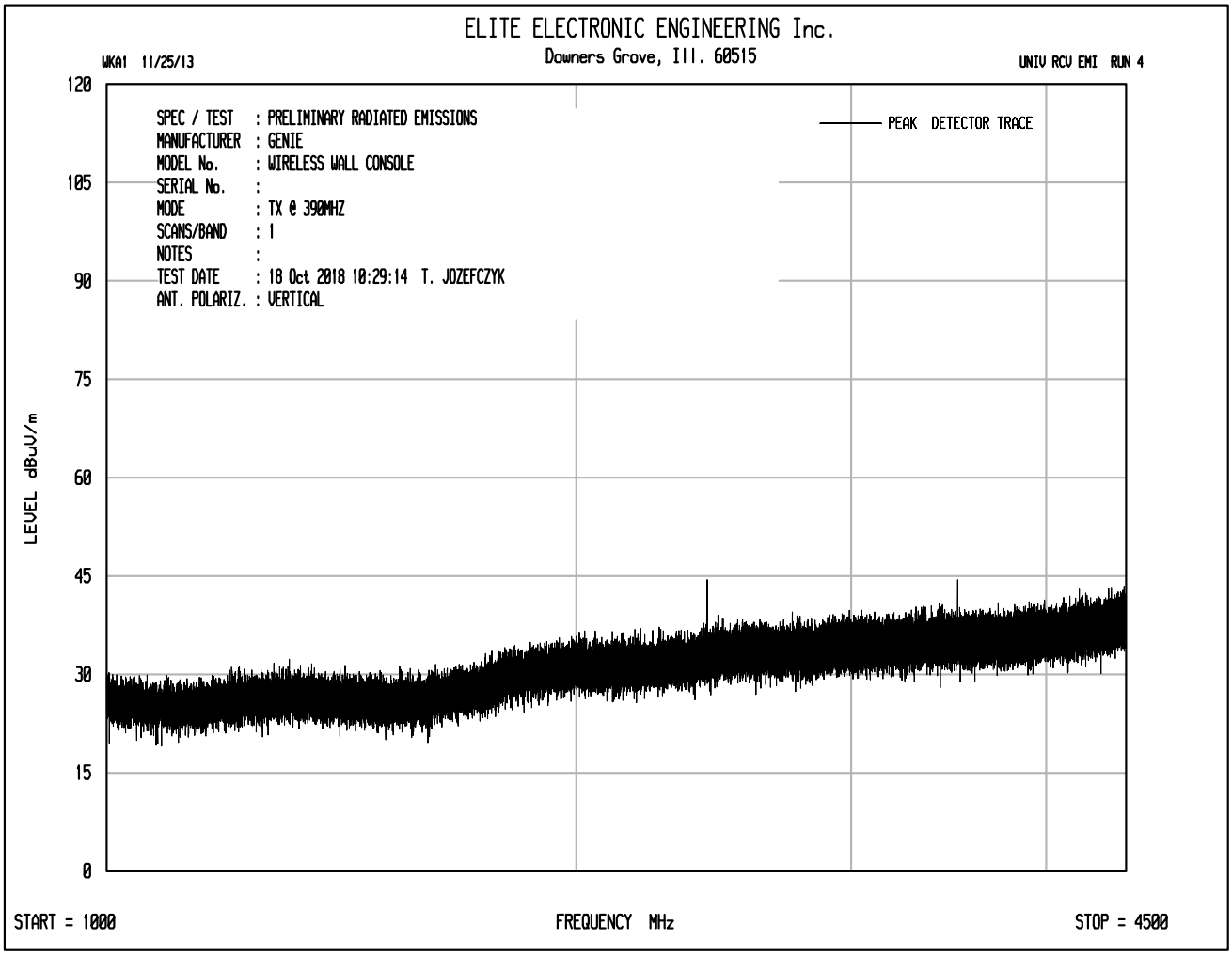
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 390MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 13:39:06 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 390MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 13:40:30 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 390MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 10:27:58 T. JOZEFCZYK
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : GENIE
MODEL No. : WIRELESS WALL CONSOLE
SERIAL No. :
MODE : TX @ 390MHZ
SCANS/BAND : 1
NOTES :
TEST DATE : 18 Oct 2018 10:29:14 T. JOZEFCZYK
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 4500

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Radiated Spurious Emissions - Harmonics
MODE	Tx – 315MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	

RADIATED SPURIOUS EMISSIONS

Freq. (MHz)	Ant. Pol.	Meter Reading (dBµV)	Ambient	CBL Fac. (dB)	Ant. Fac. (dB)	Pre Amp (dB)	Duty Cycle	Total (dBµV/m)	Total (µV/m)	Limit (µV/m)	Margin (dB)
315.000	H	53.0		1.7	19.4	0.0	-12.7	61.4	1172.5	6041.7	-14.2
315.000	V	55.9		1.7	19.4	0.0	-12.7	64.3	1648.6	6041.7	-11.3
630.000	H	20.1		2.4	25.1	0.0	-12.7	34.8	55.1	604.2	-20.8
630.000	V	25.0		2.4	25.1	0.0	-12.7	39.8	97.7	604.2	-15.8
945.000	H	11.5	Ambient	3.0	27.2	0.0	-12.7	29.0	28.1	604.2	-26.7
945.000	V	17.0		3.0	27.2	0.0	-12.7	34.5	52.9	604.2	-21.1
1260.000	H	11.3	Ambient	3.3	29.1	0.0	-12.7	31.1	35.7	604.2	-24.6
1260.000	V	11.7	Ambient	3.3	29.1	0.0	-12.7	31.4	37.3	604.2	-24.2
1575.000	H	11.6	Ambient	3.6	28.0	0.0	-12.7	30.6	33.7	500.0	-23.4
1575.000	V	11.4	Ambient	3.6	28.0	0.0	-12.7	30.4	33.0	500.0	-23.6
1890.000	H	12.0	Ambient	3.9	31.1	0.0	-12.7	34.3	52.0	604.2	-21.3
1890.000	V	11.8	Ambient	3.9	31.1	0.0	-12.7	34.2	51.2	604.2	-21.4
2205.000	H	12.5	Ambient	4.2	31.5	0.0	-12.7	35.4	59.2	500.0	-18.5
2205.000	V	12.1	Ambient	4.2	31.5	0.0	-12.7	35.0	56.5	500.0	-18.9
2520.000	H	14.6		4.4	32.6	0.0	-12.7	38.9	88.2	604.2	-16.7
2520.000	V	12.8		4.4	32.6	0.0	-12.7	37.1	71.6	604.2	-18.5
2835.000	H	14.0		4.7	32.5	0.0	-12.7	38.5	84.3	500.0	-15.5
2835.000	V	15.5		4.7	32.5	0.0	-12.7	40.0	99.4	500.0	-14.0
3150.000	H	14.6		5.1	32.8	0.0	-12.7	39.7	97.1	604.2	-15.9
3150.000	V	13.6		5.1	32.8	0.0	-12.7	38.8	87.3	604.2	-16.8

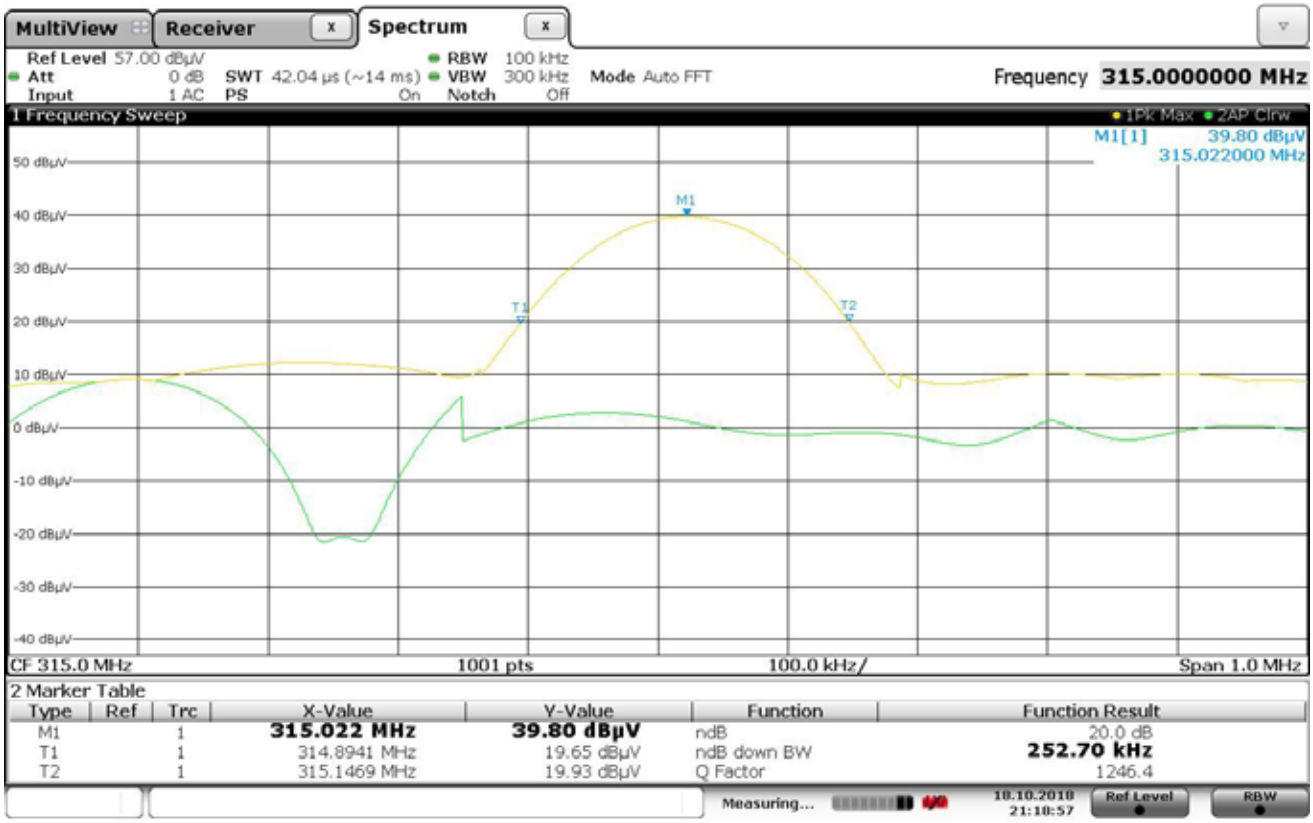
DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 Radiated Spurious Emissions - Harmonics
MODE	Tx – 390MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	

RADIATED SPURIOUS EMISSIONS

Freq. (MHz)	Ant. Pol.	Meter Reading (dBµV)	Ambient	CBL Fac. (dB)	Ant. Fac. (dB)	Pre Amp (dB)	Duty Cycle	Total (dBµV/m)	Total (µV/m)	Limit (µV/m)	Margin (dB)
390.000	H	56.4		1.8	21.7	0.0	-12.7	67.2	2295.7	9166.7	-12.0
390.000	V	63.6		1.8	21.7	0.0	-12.7	74.3	5210.9	9166.7	-4.9
780.000	H	19.9		2.7	26.0	0.0	-12.7	36.0	63.1	916.7	-23.2
780.000	V	30.8		2.7	26.0	0.0	-12.7	46.8	219.8	916.7	-12.4
1170.000	H	15.4		3.2	28.3	0.0	-12.7	34.3	51.6	500.0	-19.7
1170.000	V	15.5		3.2	28.3	0.0	-12.7	34.4	52.2	500.0	-19.6
1560.000	H	11.4	Ambient	3.6	28.0	0.0	-12.7	30.3	32.8	500.0	-23.6
1560.000	V	11.3	Ambient	3.6	28.0	0.0	-12.7	30.2	32.4	500.0	-23.8
1950.000	H	12.0	Ambient	4.0	31.2	0.0	-12.7	34.4	52.7	916.7	-24.8
1950.000	V	12.1	Ambient	4.0	31.2	0.0	-12.7	34.5	53.1	916.7	-24.7
2340.000	H	16.1		4.2	31.9	0.0	-12.7	39.5	94.4	500.0	-14.5
2340.000	V	13.8		4.2	31.9	0.0	-12.7	37.2	72.4	500.0	-16.8
2730.000	H	13.9		4.6	32.5	0.0	-12.7	38.3	82.2	500.0	-15.7
2730.000	V	14.9		4.6	32.5	0.0	-12.7	39.3	92.1	500.0	-14.7
3120.000	H	15.7		5.0	32.8	0.0	-12.7	40.8	109.6	916.7	-18.4
3120.000	V	15.1		5.0	32.8	0.0	-12.7	40.2	102.8	916.7	-19.0
3510.000	H	16.0		5.4	32.9	0.0	-12.7	41.6	120.3	916.7	-17.6
3510.000	V	14.8		5.4	32.9	0.0	-12.7	40.4	105.1	916.7	-18.8
3900.000	H	15.0	Ambient	5.5	33.2	0.0	-12.7	41.0	112.5	500.0	-13.0
3900.000	V	13.6	Ambient	5.5	33.2	0.0	-12.7	39.7	96.3	500.0	-14.3

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 20dB Bandwidth
MODE	Tx – 315MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	20dB BW = 252.7kHz Max allowed BW = (0.25% BW = 787.5kHz)

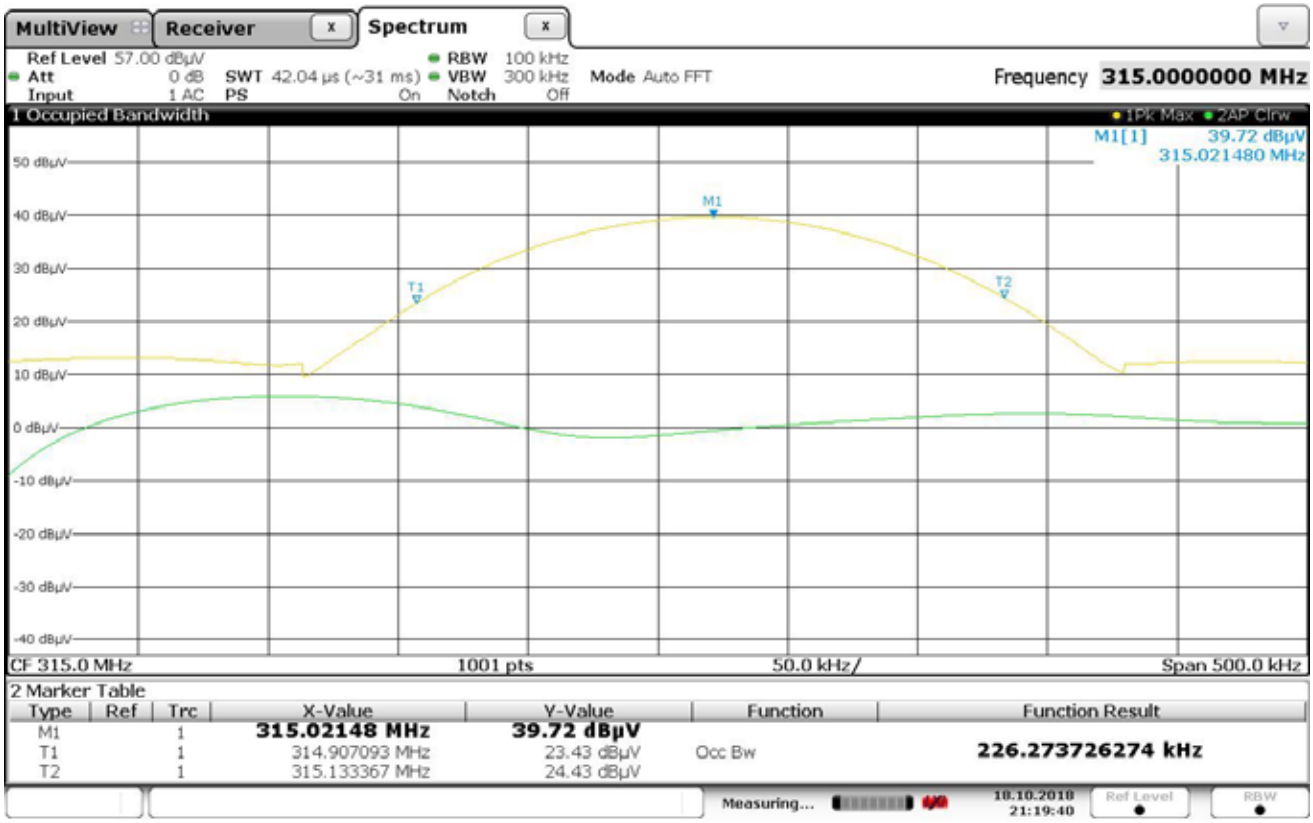
20DB BANDWIDTH



Date: 18.OCT.2018 21:18:57

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 99% Bandwidth
MODE	Tx – 315MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	99% BW = 226.27kHz Max Allowed BW = (0.25% BW = 787.5kHz)

99% BANDWIDTH



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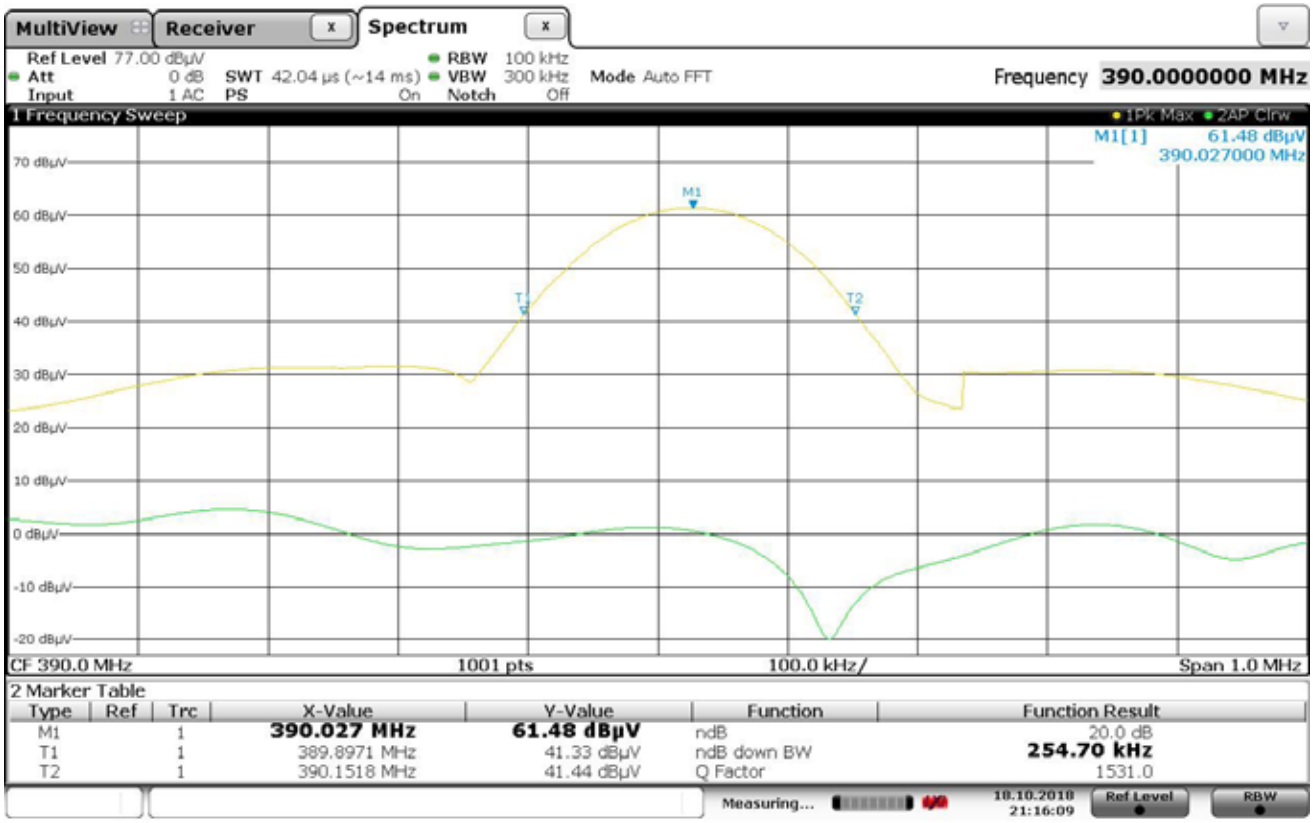
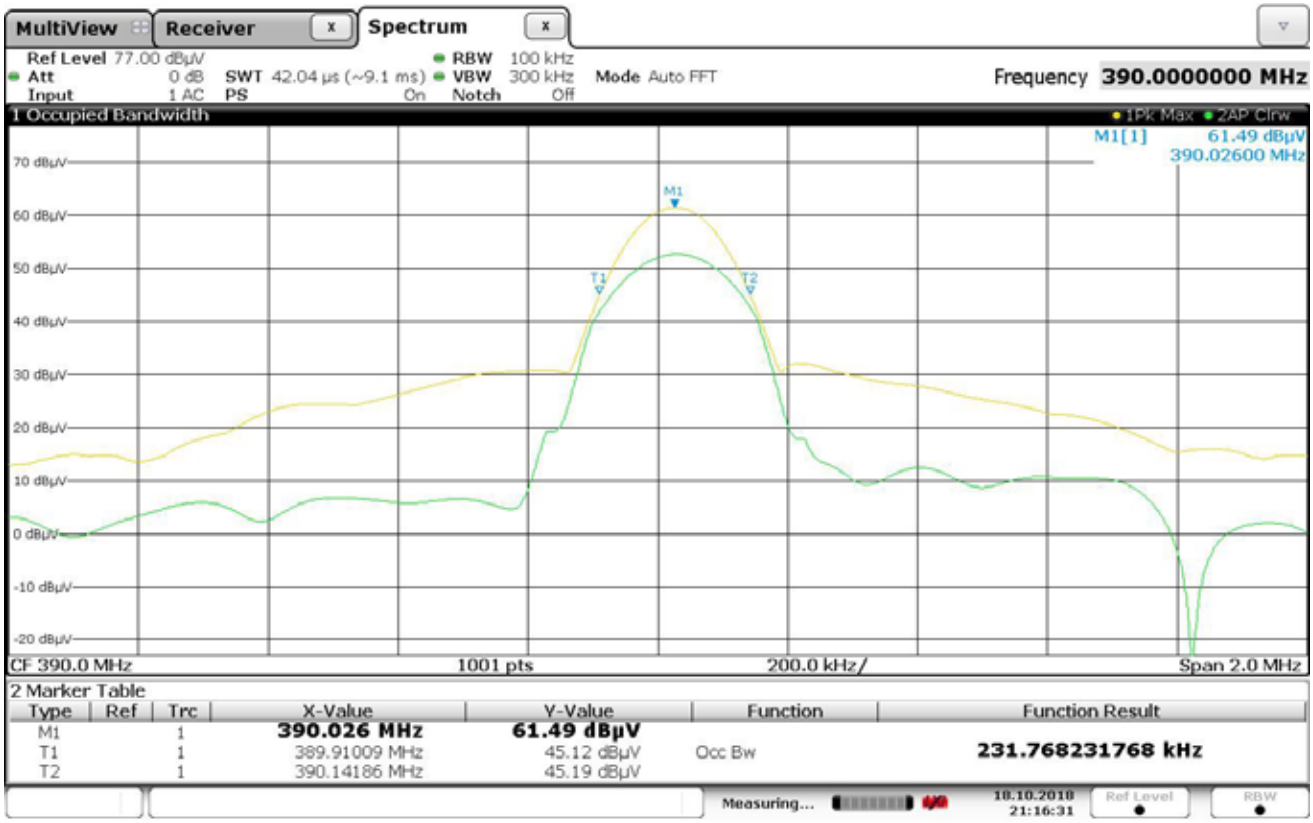
DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 20dB Bandwidth
MODE	Tx – 390MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	20dB BW = 254.7kHz Max Allowed BW= (0.25% BW = 975kHz)

20DB BANDWIDTH



Date: 18.OCT.2018 21:16:09

DATA PAGE	
MANUFACTURER	Genie Company
EUT	Wireless Wall Console
MODEL NO.	GWWCR
TEST	FCC §15.231, RSS-210 99% Bandwidth
MODE	Tx – 390MHz
DATE TESTED	October 18, 2018
TEST PERFORMED BY	Tylar Jozefczyk
NOTES	99% BW = 231.76kHz Max Allowed BW = (0.25% BW = 975kHz)

99% BANDWIDTH