

**OUTDOOR SHOOTING RANGE NOISE STUDY
EXECUTIVE FIREARMS**

for

EXECUTIVE FIREARMS

Talking Rock, Georgia

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SHOOTING RANGE NOISE STUDY EXECUTIVE FIREARMS

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1.0 Introduction and Executive Summary

This report details Newcomb & Boyd's measurement results from the Executive Firearms shooting range in Talking Rock, Georgia. The task of this report is to:

- ☐ Report the measurements and findings from our field investigations.
- ☐ Report the impact from the shooting range upon 3 locations around the Executive Firearms property.
- ☐ Compare the levels heard at the receiver locations to the ambient levels.

The city council of Talking Rock, GA has requested an investigation as to the audibility of the shooting at the Executive Firearms range. There is a private home being constructed just south of the property which is the closest residence. There is also a horse farm to the north west and another private home to the north east.

For this investigation the following firearms were used, which are typical of the type of firearms intended for this range:

- ☐ Bolt action rifle with .308 cartridge
- ☐ Handgun with 9mm cartridge
- ☐ Semi-automatic rifle with .223 cartridge

The firing location has been identified as a natural depression as illustrated in Figure 1 below. A berm is intended to be installed at this location for additional noise mitigation, but was not built at the time of these measurements

The measurement occurred at the following locations:

- ☐ Source: Executive Firearms firing location on the property
- ☐ Receiver 1: Private Residence, under construction along GA-136
- ☐ Receiver 2: Private horse farm along Fisher Creak Road
- ☐ Receiver 3: Fisher Creak Road near a private residence.

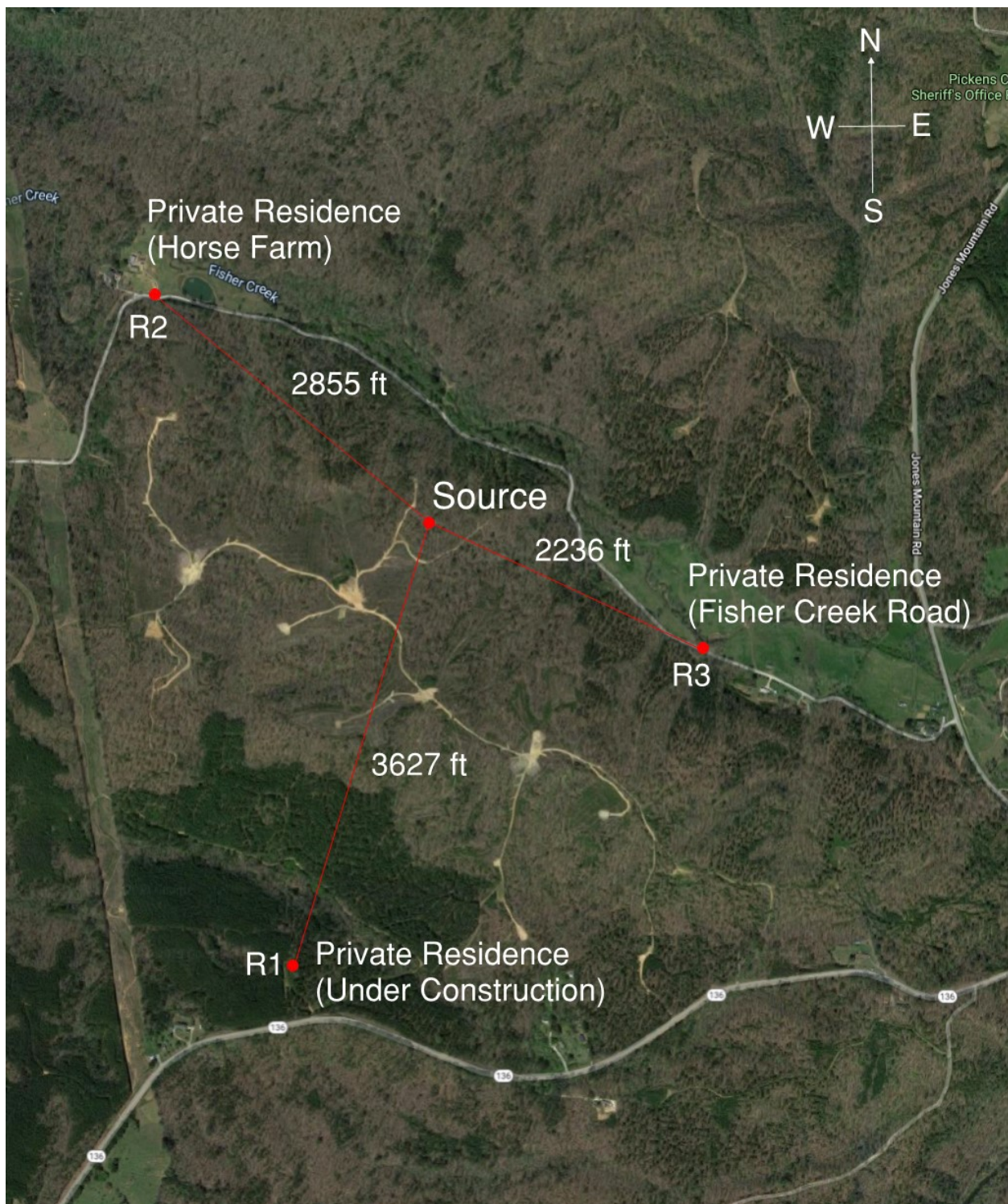


Figure 1: Locations of Source and 3 Receiver Positions from Google Maps

This report presents the results of the investigation only. Mitigation solutions, if needed, are to be discussed and presented as a separate document upon the request of the client.

Our findings indicate the following:

- ❑ Receiver 1: Private Residence, under construction along GA-136
 - Bolt action rifle with .308 cartridge: Audible but not louder than the general background or other typical sounds.
 - Handgun with 9mm cartridges: Not audible
 - Semi-automatic rifle with .223 cartridges: Audible but not louder than the general background or other typical sounds.
 - All firearms are less audible when firing in the north or east direction.
 - Impact at this location for outside, backyard, use is limited.
 - Do not expect impact upon this neighbor when they are inside the residence with the windows and door closed.
- ❑ Receiver 2: Private horse farm along Fisher Creak Road
 - Firearms were all barely audible or not audible at this location.
 - No disturbance to the animals visible in the field at the time of measurement.
 - No anticipated impact upon this location from the firearms measured.
- ❑ Receiver 3: Fisher Creak Road near a private residence.
 - All firearms were audible at this location.
 - Dog at nearby residence is also loud and potentially barks more frequently than the range will be in use.
 - Earth berm intended by ownership to be constructed is anticipated to decrease the levels on the surrounding properties.
 - Interior noise levels inside residence will be further dismissed and noise impacts are not expected to be considered a noise disturbance inside the residence.

2.0 Informative Discussion - Acoustics

This section covers general information discussed throughout this report. Specifically, it discusses the terminology and fundamental characteristics of sound; addresses details about the provided decibel measurements/readings; and outlines the guidelines and standards pertinent to the scope of work of this report.

2.1. Terminology

Because some terms utilized in this report are not commonly understood, brief definitions of the terms most commonly used in this section are mentioned in Table 2A. Full definitions of acoustical terms pertinent with this project are included in Appendix A.

Table 2A Brief Definitions of Common Acoustical Terms

Term	Definition
Ambient Sound Level	The composite of sound from all sources near and far
Background Sound Level	The underlying ever-present lower level sound that remains in the absence of intrusive or intermittent sounds, such as vehicular traffic
A-Weighted decibel (dBA)	A frequency-weighted sound level, in decibels, that approximates the frequency response of the human ear by deemphasizing the low frequency components of sound ear and correlates well with overall subjective reactions to noise. Symbolized as L_A
Peak Sound Level	Greatest absolute instantaneous sound pressure level within a specified time interval. Symbolized as L_{pk} .
decibel (dB)	A unitless measure describing the amplitude of sound
Equivalent Noise Level (L_{eq})	The mean of the sound level averaged over the measurement period, regarded as the average sound level
Minimum Sound Level	The lowest absolute root-mean square value of the instantaneous SPL during a given period of time. Symbolized as L_{min} .
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable
Sound	Any variation in pressure waves that the eardrum can detect
Impulsive Sound	Sound having a duration of less than one second with an abrupt onset and rapid decay.

2.2. Characteristics of Sound

Sound is a pressure wave that is most commonly associated with being transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of loudness of sound is the decibel (dB). Changes of 1 to 3 dB are usually undetectable except in very quiet, controlled conditions, while changes of less than 1 dB are virtually indiscernible to humans of average hearing capability (see Table 2B).

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are “felt” more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

Table 2B Human Perception to Change in Sound Pressure Level

Change in Sound Level (dB)	Relative Loudness Evaluation	Acoustical Energy Loss (%)
0	Reference	0
±3	Threshold of human perceptibility	50
±5	Distinctly perceptible	67
±10	Twice/half as loud	90
±20	Four times/one-quarter as loud	99
±30	Eight times/one-eighth as loud	99.9

Since the human ear is not equally sensitive to sound at all frequencies (see Figure 3), a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear, which is why this is the most common metric used to describe sound levels and has been adopted by regulatory bodies worldwide.

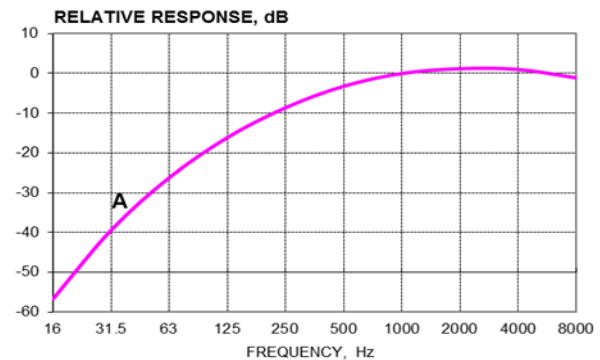


Figure 2: A-Weighting Network Scale

A-weighted sound levels are typically measured or presented as equivalent sound pressure level (L_{eq}), which is defined as the average noise level, on an equal energy basis for a stated period of time, and is commonly used to measure steady state sound or noise that is usually dominant. For this study the time period of measurements was set to 1/10th of a second, which is the shortest available time interval allowed by the sound level meter used.

Regardless of the time, the effects of noise on people can be listed in three general categories:

- ❑ Subjective effects of annoyance, nuisance, and dissatisfaction
- ❑ Interference with activities such as speech, sleeping, and learning
- ❑ Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the last category. The Executive Firearms range does not operate in the evening or night hours and the impulsive nature of the sound will not interfere with speech communication, therefore only the first category applies for this study.

Table 2C shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

Table 2C Typical Common Sound Source Levels

Sound Level (dBA)	Subjective Evaluation*	Possible Effects on Humans	Typical Noise Sources			Relative Loudness (Human Response)
			Speech	Outdoor	Indoor	
130-140	Threshold of pain	Continuous exposure to levels above		Jet aircraft takeoff from carrier (50 ft.)		64 times as loud
120-130	Deafening			Air raid siren (50 ft.)	Oxygen torch	32 times as loud

Sound Level (dBA)	Subjective Evaluation*	Possible Effects on Humans	Typical Noise Sources			Relative Loudness (Human Response)
			Speech	Outdoor	Indoor	
110-120	Uncomfortably Loud	80 can cause hearing loss in majority of population	Shout	Turbo-fan aircraft at take-off power (200 ft.)	Riveting machine Rock band concert near stage	16 times as loud
100-110	Uncomfortably Loud			Jackhammer (3 ft.)		8 times as loud
90-100	Very Loud			Gas lawn mower (3ft) Train whistle at crossing Wood chipper shredding trees Chain saw cutting trees (10 ft.)	Newspaper press	4 times as loud
80-90	Very Loud			Passing freight train (30 ft.) Leaf blower (5ft) Ambulance siren (100 ft.)	Garbage disposal Crowd noise at sporting event	2 times as loud
70-80	Loud			Busy urban street, daytime	Loud stereo Vacuum cleaner (10 ft.)	Reference loudness (70 dBA)
60-70	Moderately Loud	Speech Interference	Loud Normal	Residential air conditioner (100 ft.) Gas lawn mower (100 ft.) Normal automobile at 50 mph	Dishwasher on	1/2 as loud
50-60	Moderately Loud	Sleep Interference		Large transformer (100 ft.) Light auto traffic (100 ft.)	Living room with TV on Business office	1/4 as loud
40-50	Quiet			Bird calls Crickets chirp Water flowing in brook		1/8 as loud
30-40	Very Quiet				Walking on carpet Clock ticking in adjacent room	1/16 as loud
20-30	Faint			Slight rustling of leaves	Bedroom at night	1/32 as loud
10-20	Very Faint				Professional Broadcast/Recording Studio	1/64 as loud
0-10	Threshold of hearing					

* Does not apply to sound sources consisting primarily of just tones

The assessment method for predicting the estimated exterior noise impact associated with known sound sources and quantities makes use of the ISO 9613 standard, which specifies the attenuation of sound during propagation outdoors in community environments. The aim of this standard is to determine the average A-weighted sound pressure level under certain meteorological conditions favorable to the propagation from sources of known sound emission. The American National Standards Institute (ANSI) S12.9 *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-Term Community Response* defines gunfire as a highly impulsive sound.

2.3. Background Noise

The background or ambient noise was measured in each location. The background, or ambient noise in this case, represents natural sounds such as wind, birds, and insects and any traffic noise that occurred. The passing of cars and airplanes was not frequent but did occur during the measurements. These are noted where feasible.

3.0 Investigation

3.1. Standards and Equipment

The principles associated with *ANSI Standard S12.9-1993/Part 3 (reaffirmed 2008) – Quantities and Procedures for Description and Measurement of Environmental Sound. Part 3: Short-term measurements with an observer present* were performed. The equipment used as follows:

Table 3A Equipment Used for Testing

Manufacturer and Description	Model Number	Serial Number	Calibration Date
NTI Sound Level Meter/Real Time Analyzer	XL2	A2A-10212-EO	January 14, 2019
NTI Sound Level Meter/Real Time Analyzer	XL2	A2A-04416-D2	June 22, 2018
NTI Preamp for microphone	MA220	5566	June 22, 2018
NTI Preamp for microphone	MA220	1729	January 14, 2019
NTI Microphone	MC230	8535	June 22, 2018
ACO Pacific Microphone	7052	48171	January 14, 2019
Bruel & Kjaer Sound Level Calibrator	4230	1234188	June 22, 2018

The Brüel & Kjær calibrator was used to calibrate the SLMs before any measurements were conducted. A subsequent check of the calibration at the conclusion of the measurements indicated compliance within 0.1 decibels (dB).

Meteorological conditions remained steady throughout the investigation. No precipitation occurred. Using the Weather Underground website the following meteorological conditions were recorded before and after the measurements.

Table 3B Meteorological Conditions

	9:20 am Start of Measurements	11:15 pm Conclusion of Measurements
Temperature	70° F	76° F
Conditions	Partly cloudy	Sunny
Wind	2 mph, West Northwest	3 mph West Northwest
Humidity	86%	76%
Dew point	65 ° F	68 ° F
Pressure	28.21 inches	28.21 inches

No precipitation occurred. The Weather Underground station used is known as KGAJASPE33 and defined as located in Talking Rock, GA.

A wind screen was used to minimize any effects of wind upon the measurements. The wind screen was provided by NTI specifically for use with their XL2 sound level meters and was in compliance with the standard.

Data was analyzed using the software XL2 Data Explorer 1.50 which is sold and maintained by NTI for use with their sound level meters. The software allows for the review of the time history

while simultaneously listening to the recorded audio file of the measurement. This allowed us to review all data collected, identify peak impacts from specific gunshots, and eliminate contaminating or non-relevant sounds such as noise from airplane or large trucks.

The NTI XL2 meters were both set to record intervals of 1/10th of a second. The meters recorded wave files along with the data.

Full results of each measurement are included in Appendix B.

3.2. General Procedure

On May 20, 2019, we arrived in the morning at the Executive Firearm range. After meeting with the staff, we determined the following procedure.

- ☐ Measure the levels at the source and receiver locations simultaneously.
- ☐ One Newcomb & Boyd staff member will remain at the firing location.
- ☐ One Newcomb & Boyd staff member will be located at the receiver location.
- ☐ The acoustical staff will communicate via cell phone to confirm gun and cartridge being used as well as firing direction.

Source measurements were taken roughly 100 ft away from the firing position. Using a measurement window of 1/10th of a second allowed the meter to measure the peak sound of the fired shot. Figure 3 below shows each of the locations from Google Maps. To keep the map legible, not each source location at the club is shown. Stands 1, 3, 6, and 10 are indicated for reference. The stands are located very roughly for discussion.

Both sound level meters were set on tripods with the microphone 5'6" above the ground. The microphone was kept much further than the minimum of 24ft away from large reflecting surfaces, other than the ground, in keeping with the procedures in ANSI S12.9/Part 4. The microphones on the meters were pointed roughly toward the source and roughly 45-degree above parallel with the ground.

3.3. General Observations

All the measurement locations were in a rural area that is not highly developed. Traffic of various levels occurred throughout the morning and at least 2 small planes flew overhead during the time period. During the observations at the horse farm, at no point did the visible animal react to audible gun shots. The dog located close to the private residence at receiver 3 barks very loudly and consistently with any passing traffic, persons, or animals. There were large birds, possibly crows, which had very loud calls and sounded throughout the day.

There was very thick tree cover with thick underbrush across the Executive Firearms property which could potentially provide some of the attenuation observed between locations.

4.0 Measurements

The following sections discuss the measurements taken at Executive Firearms range and the 3 receiver locations. Recalling from above the measurement locations are as follows:

The measurement occurred at the following locations:

- ❑ Source: Executive Firearms firing location on the property
- ❑ Receiver 1: Private Residence, under construction along GA-136
- ❑ Receiver 2: Private horse farm along Fisher Creek Road
- ❑ Receiver 3: Fisher Creek Road near a private residence.

At each location the ambient levels and some non-firearms events were measured for reference. The firearms were fired in the North, South, and East directions at the firing position for reference.

Excerpts of the measurement result reports are included for discussion. Please see Appendix B for the full measurement reports.

- ❑ Bolt action rifle with .308 cartridge
- ❑ Handgun with 9mm cartridge
- ❑ Semi-automatic rifle with .223 cartridge

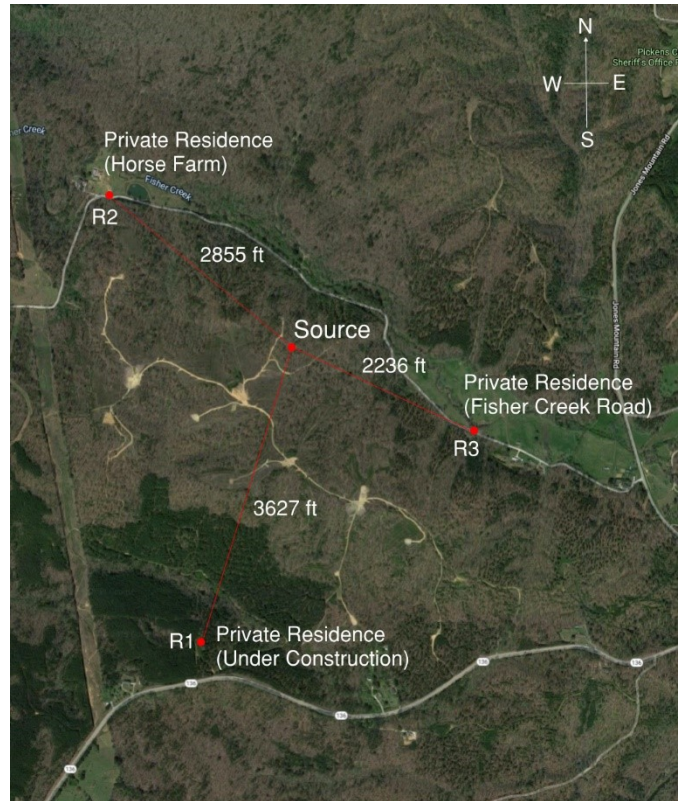


Figure 3: Locations of Measurements

4.1. Receiver 1 – Private Residence Under Construction

The following outlines the summary of the measured results. The average ambient level measured with no firearms activity is included for reference as are some non-firearms events such as airplanes or dogs. The source and receiver levels were measured simultaneously. The other items were measured at different instances but at the same receiver location.

Table 4A Results Measured at Receiver Location 1

Firearms	Direction Fired	Source Level (dBA)*	Receiver Level (dBA)	Ambient (dBA)	Non-firearms Noise Event (dBA)
Bolt Action / .308	North	104	39	44	Airplane Flyover: 60
Bolt Action / .308	South	108	40	44	Chainsaw nearby: 38
Bolt Action / .308	East	100	39	44	Lage Logging Truck: 55
Handgun / 9mm	North	99	41**	44	Car: 43
Handgun / 9mm	South	102	39**	44	
Handgun / 9mm	East	94	41**	44	
Semi-Automatic / .223	North	104	35	44	
Semi-Automatic / .223	South	106	43	44	
Semi-Automatic / .223	East	97	40	44	

* When multiple shots are measured, the loudest shot level is listed here.

** Shots were not audible or barely audible at the receiver location.

The following figures show some of these results for illustration and discussion. Please see Appendix B for the full reports. The following figures

Figure 4 shows the shot fired at the source location, highlighted in red, and Figure 5 shows the level of that same shot at the Receiver 1 location. You can see from the results that although the shot was very loud at the firing location, at the receiver it has decrease to near the level of the natural ambient sounds.

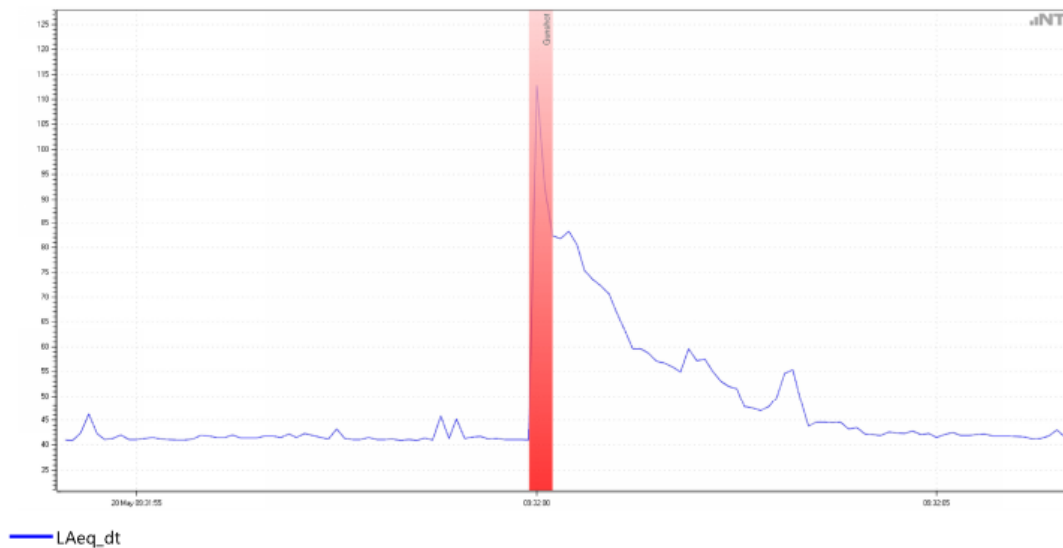


Figure 4: Source, Bolt Action .308, firing in the south direction

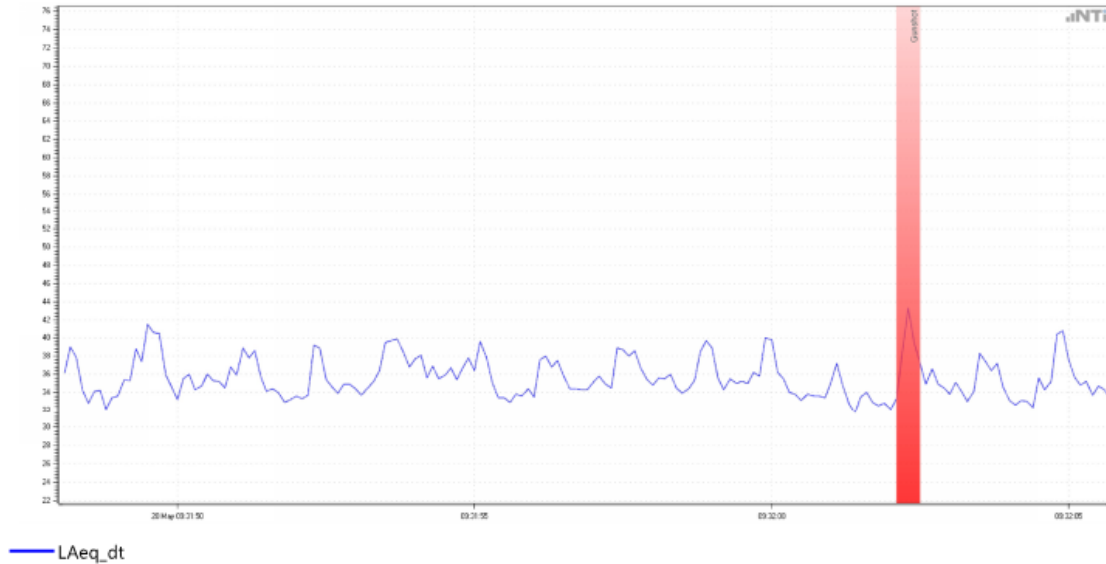


Figure 5: Receiver R1 for the Bolt-action .308 shot.

Figure 6 shows the source level at the firing location for the 9mm handgun when firing north, highlighted in red. The expedited arrival time of that sound is highlighted in Figure 7, but the shows themselves were not audible and the figure indicates no change in level from those shots. In fact, the car passing, and a chainsaw being used on an adjacent property were also heard during this time, as highlighted in the figure, and those were clearly audible and much louder than the 9mm shots.

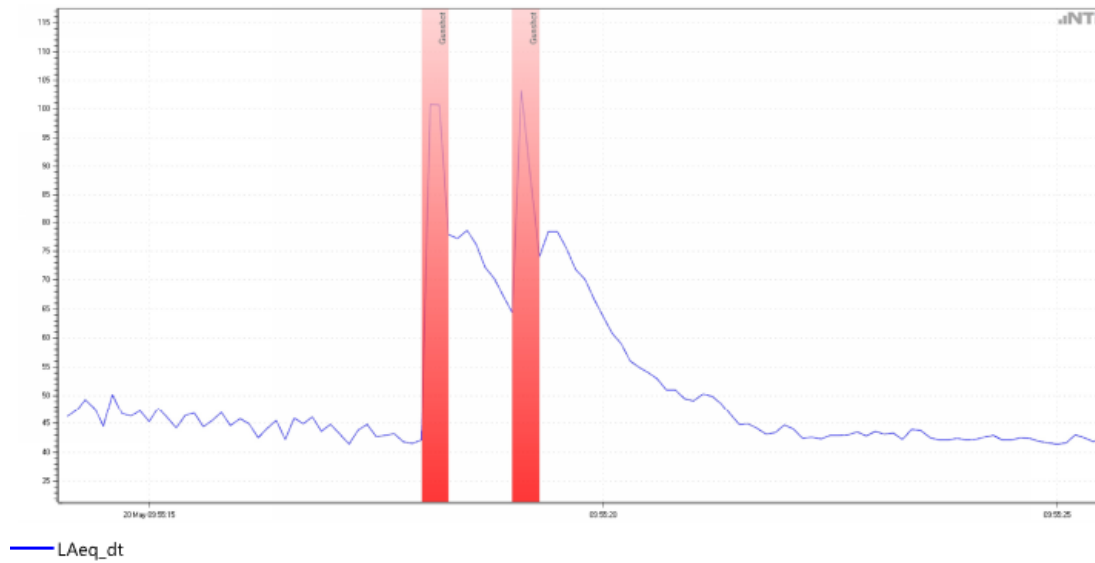


Figure 6: Source, 9mm, firing in the north direction

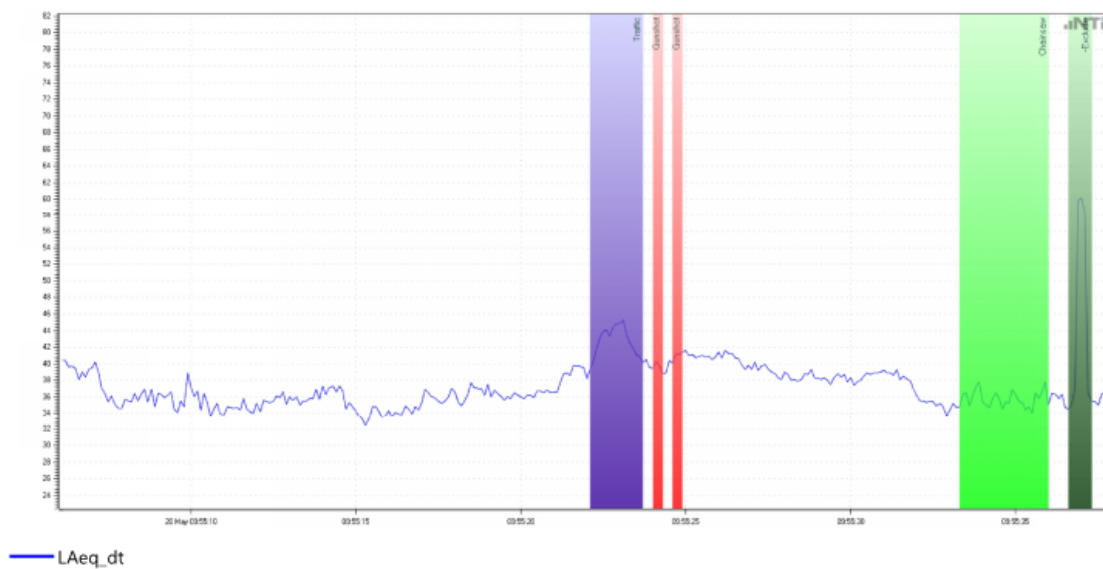


Figure 7: Receiver R1 location for 9mm handgun firing north.

4.2. Receiver 2 – Private Residence Horse Farm

Similar to Receiver location 1, the following outlines the summary of the measured results.

Table 4B Results Measured at Receiver Location 2

Firearms	Direction Fired	Source Level (dBA)*	Receiver Level (dBA)	Ambient (dBA)	Non-firearms Noise Event (dBA)
Bolt Action / .308	North	104	36**	41	Car Passing: 61
Bolt Action / .308	South	106	39**	41	
Bolt Action / .308	East	100	39**	41	
Handgun / 9mm	North	98	38**	41	
Handgun / 9mm	South	NA***	NA***	41	
Handgun / 9mm	East	NA***	NA***	41	
Semi-Automatic / .223	North	98	36**	41	
Semi-Automatic / .223	South	NA***	NA***	41	
Semi-Automatic / .223	East	NA***	NA***	41	

* When multiple shots are measured, the loudest shot level is listed here.

** Shots were not audible or barely audible at the receiver location.

*** Shots were not audible in the northerly direction toward the receiver. Other directions were not measured.

When measuring at this location, firing in the northerly direction would be the worst-case scenario as that is firing toward the listening position. When firing north was not audible other directions were not measured. Shots were so quiet that team had to call the firing location to confirm that shots had been fired.

4.3. Receiver 3 – Fisher Creek Road

The following outlines the summary of the measured results.

Table 4C Results Measured at Receiver Location 3

Firearms	Direction Fired	Source Level (dBA)*	Receiver Level (dBA)	Ambient (dBA)	Non-firearms Noise Event (dBA)
Bolt Action / .308	North	107	62	46	Dog Barking: 50
Bolt Action / .308	South	108	68	46	Car Passing: 60
Bolt Action / .308	East	101	62	46	
Handgun / 9mm	North	98	62	46	
Handgun / 9mm	South	102	56	46	
Handgun / 9mm	East	95	65	46	
Semi-Automatic / .223	North	109	70	46	
Semi-Automatic / .223	South	107	60	46	
Semi-Automatic / .223	East	98	68	46	

* When multiple shots are measured, the loudest shot level is listed here.

Measurements at this location we taken along the road, but out of sight of the nearby residence. The dog at that residence was loud and barked repeatedly when cars passed, animals from the farm become visible, or people were in view. Figure 8 shows the 9mm shot at this location as well as the dog. The shot is louder than the dog, but the dog barks more consistently.

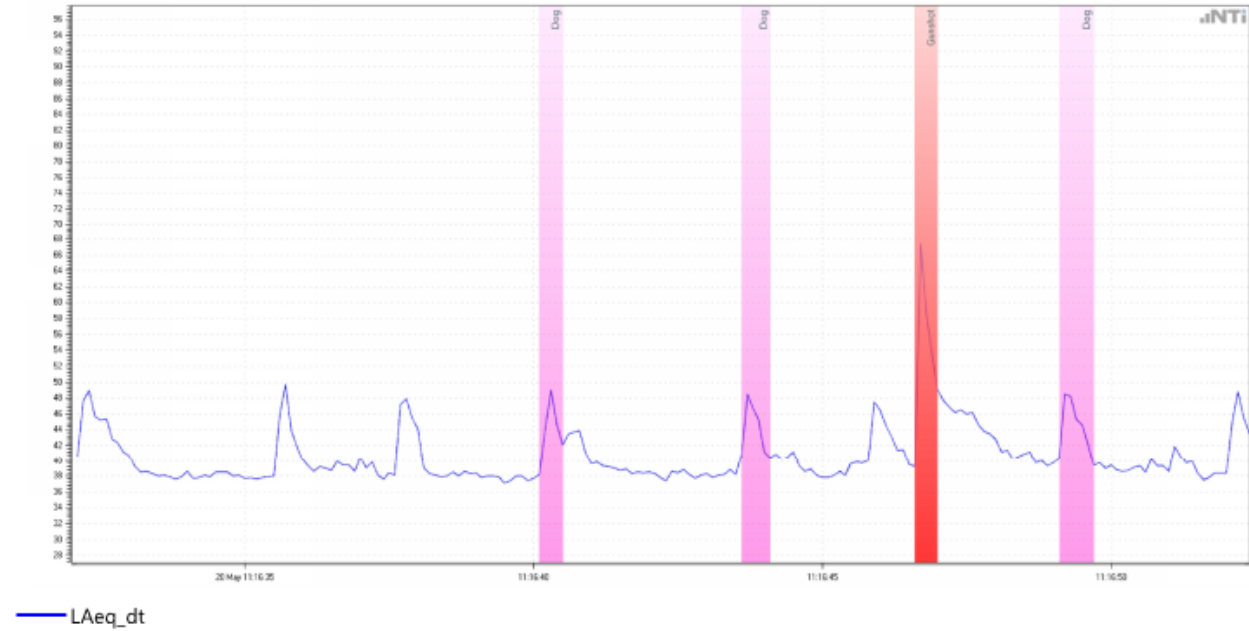


Figure 8: Receiver location 3, 9mm firing north, dog barking at this location.

5.0 Summary and Comments

From the measurement results and the aural observations of the team, this report shows the following:

Our findings indicate the following:

- ❑ Receiver 1: Private Residence, under construction along GA-136
 - Bolt action rifle with .308 cartridge: Audible but not louder than the general background or other typical sounds.
 - Handgun with 9mm cartridges: Not audible
 - Semi-automatic rifle with .223 cartridges: Audible but not louder than the general background or other typical sounds.
 - All firearms are less audible when firing in the north or east direction.
 - Impact at this location for outside, backyard, use is limited.
 - Do not expect impact upon this neighbor when they are inside the residence with the windows and door closed.
- ❑ Receiver 2: Private horse farm along Fisher Creek Road
 - Firearms were all barely audible or not audible at this location.
 - No disturbance to the animals visible in the field at the time of measurement.
 - No anticipated impact upon this location from the firearms measured.
- ❑ Receiver 3: Fisher Creek Road near a private residence.
 - All firearms were audible at this location.
 - Dog at nearby residence is also loud and potentially barks more frequently than the range will be in use.
 - Interior noise levels inside residence will be further dismissed and noise impacts are not expected to be considered a noise disturbance inside the residence.

Earth berm intended by ownership to be constructed is anticipated to decrease the levels on the surrounding properties.

Please feel free to contact us should you have any questions or comments.

JJC

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Appendix A

Acoustic Definitions

Term	Definition
A-weighted Sound Level (dB(A))	The filtering of sound using the A-weighted filter network, per ANSI S1.4, which de-emphasizes the low and high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with overall subjective reactions to noise. Symbolized as L_A .
Absorption	The attenuation (or reduction) of sound level that results when sound propagation through a medium (usually air) or through a dissipative material (sound absorptive material) such as glass fiber or open-cell foam. In the case of sound absorptive materials, attenuation of sound is produced by the conversion of molecular motion, which is sound, into thermal energy due to friction of air molecules with fibrous or cellular materials usually.
Acoustics	The science that is related to the production, control, transmission, reception, and effects of sound. From the Greek word <i>akouein</i> : to hear.
Acoustical Material	Any material considered in terms of acoustical properties. Commonly a material designed to absorb or diffuse sound.
Airborne Sound	Sound for which the transmission path from source to receiver occurs by propagation through air rather than through a liquid or solid structure.
Ambient Sound Level	The underlying ever-present sound in a given environment, being usually a composite of sounds from many sources near and far.
Attenuation	The reduction process in which sound/vibration is absorbed or diminished in intensity as the result of energy conversion sound/vibration to motion or heat.
Background Sound Level	The underlying ever-present lower level sound in a given environment that remains in the absence of the sound source of interest.
Broadband Noise	Sound with components relatively equally spread over a wide range of frequencies.
C-Weighting (dB(C))	The filtering of sound using the C-weighted filter network, per ANSI S1.4, which emphasizes the very low frequency components of the sound. The effect is a nearly flat response across all frequencies except the very low and very high. Symbolized as L_C .
decibel (dB)	A logarithmic unit denoting the ratio between two like quantities for expressing the magnitude of a physical quantity (usually power or intensity) relative to a specified or implied reference level.
Day Night Sound Level (DNL, L_{dn})	The 24-hour energy average sound level where a 10 dB “penalty” is applied to sound occurring at night between 10:00 PM and 7:00 AM. The penalty is intended to account for the increased sensitivity of a community to sound occurring at night.
Diffraction	The bending of waves around obstacles and the spreading of waves through openings that are approximately the same size as the wavelength of the waves.

Direct Field	That portion of a sound field which arrives from the sound source without having undergone any reflection.
Directivity Factor (Q)	Unitless measure of the directional propagation characteristics of sound expressed as a single number. Usually symbolized as Q. Nearby reflecting surfaces (i.e., floor, ceiling, walls) can alter the perceived Q. The lower the value, the less directional the sound propagation.
Equivalent Sound Level (L_{eq})	<p>The continuous average SPL, on an equal energy basis, throughout the entire measurement period. Mathematically, this is represented as:</p> $Leq = 10 \log \left[\frac{1}{n} \sum_{i=1}^N 10^{\frac{Li}{10}} \right]$
Free Field	That portion of a sound field where only direct radiated sound waves moving away from the sound source are present. This condition exists when a sound source is located a large distance from reflecting surfaces or when nearby surfaces are highly absorbent.
Frequency	A measure of the rate at which something repeats. This term usually refers to the repetition rate of a periodic waveform and is expressed in Hz (cycles per second) or kHz (thousands of cycles per second).
Insertion Loss (IL)	A measure of decrease, in dB, at a specific frequency, in the airborne transfer of sound when a sound attenuation device is inserted into the direct transmission path between the source and the receiver.
Mass	The fundamental property of a material relevant to sound transmission loss through that material. Generally, the more massive the material, the greater the sound transmission loss.
Mass Law	General rule helping quantify the sound transmission loss of a construction assembly or material. Below about half the critical frequency, doubling the mass per unit area of a construction assembly or material, or doubling the frequency for a given mass per unit area, increases the sound transmission loss by 6 dB.
Noise	Any sound which annoys or disturbs humans or causes or tends to cause an adverse psychological or physiological effect on humans. Sometimes referred to as unwanted sound.
Near Field	The sound field immediately surrounding the source where the sound pressure is influenced by the radiation characteristics of the sound source.
Noise Reduction (NR)	A measure of difference, in SPL, between any two points along the path of sound propagation.
Noise Reduction Coefficient (NRC)	A single number rating of the sound absorption properties of a material. It is the arithmetic mean of the sound absorption coefficients at the 250, 500, 1000, and 2000 Hz octave bands, rounded to the nearest multiple of 0.05 per ASTM C423. NRC has been superseded by SAA, although adoption has not been universal yet.
Octave Band	Groups of frequencies, as defined by ANSI S1.11, where the upper frequency of each band is equal to twice the lower frequency of each band. Octave bands are usually named by their geometric center

frequency. The full complement of octave bands in the audible frequency range is as follows: 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000, 16000 Hz.

Point Source	Source that radiates sound as if from a single point.	
Pressure Drop	The difference in static pressure from the inlet to the outlet of a system component.	
Sound	A vibratory disturbance, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.	
Sound Absorption Average (SAA)	A single number rating of the sound absorption properties of a material. It is the arithmetic mean of the sound absorption coefficients at the twelve one-third octave bands between 200 and 2500 Hz octave bands per ASTM C423.	
Sound Level Meter (SLM)	An instrument, per ANSI S1.4, comprised of a microphone, amplifier, output meter, and frequency-weighting networks which is used for the measurement of sound levels. Accuracy classification rates either Type 0 (laboratory-±0.4), 1 (precision-±0.7), or 2 (general purpose-±1.0) for a steady-state sinusoidal signal for each frequency weighting.	
Sound Pressure Level (L _p , SPL)	<p>The logarithm ratio of the RMS sound pressure to the sound pressure at the threshold of hearing. Mathematically, this is represented as:</p> $SPL = 10 \log \left(\frac{P_{RMS}}{P_0} \right)^2$ <p>P_0 is the reference pressure usually taken as 20μ Pascals in air. This logarithmic unit of measure for sound pressure level is called the decibel (dB) and usually symbolized with L_p. SPL is room, directionally, and distant dependent and is generally used to assess what the impact from that sound source will be for living creatures.</p>	
Sound Transmission Class (STC)	A single number rating based on laboratory-derived results of how well a particular construction assembly (i.e., wall, floor, door, window, etc...) blocks the transfer of sound from one side to the other. Individual TL values across 16 one-third octave bands between 125 Hz and 4000 Hz under carefully controlled test conditions per ASTM E90 are utilized. The STC is used during the building design phase to select a particular partition/window/door configuration to obtain desired sound isolation performance.	
Spectrum	The description of a sound wave's resolution into its components of frequency and amplitude. Generally, this term is used with some modifier indicating the resolution bandwidth (i.e., octave band, one-third octave band, etc..).	
Transmission Loss (TL)	<p>A measure, in dB, at a stated frequency, of the ability of a construction assembly (i.e., wall, floor, door, window, etc...) or material, to resist the airborne transfer of sound from one side of the assembly to the other. Mathematically, this is represented as:</p> $TL = 10 \log \frac{1}{\tau}$	

Appendix B

Measurement Reports

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

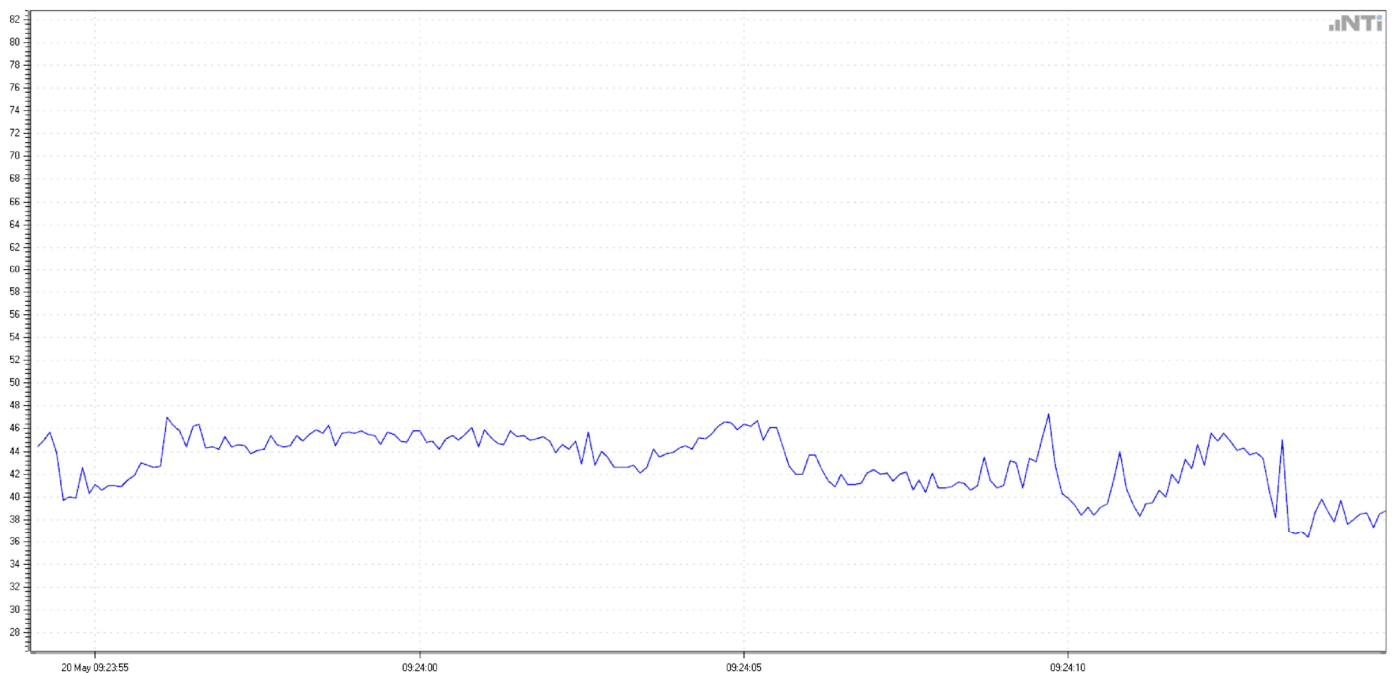
Start: 2019-05-20 09:23:54

End: 2019-05-20 09:24:14.9

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: Ambient



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:05:02

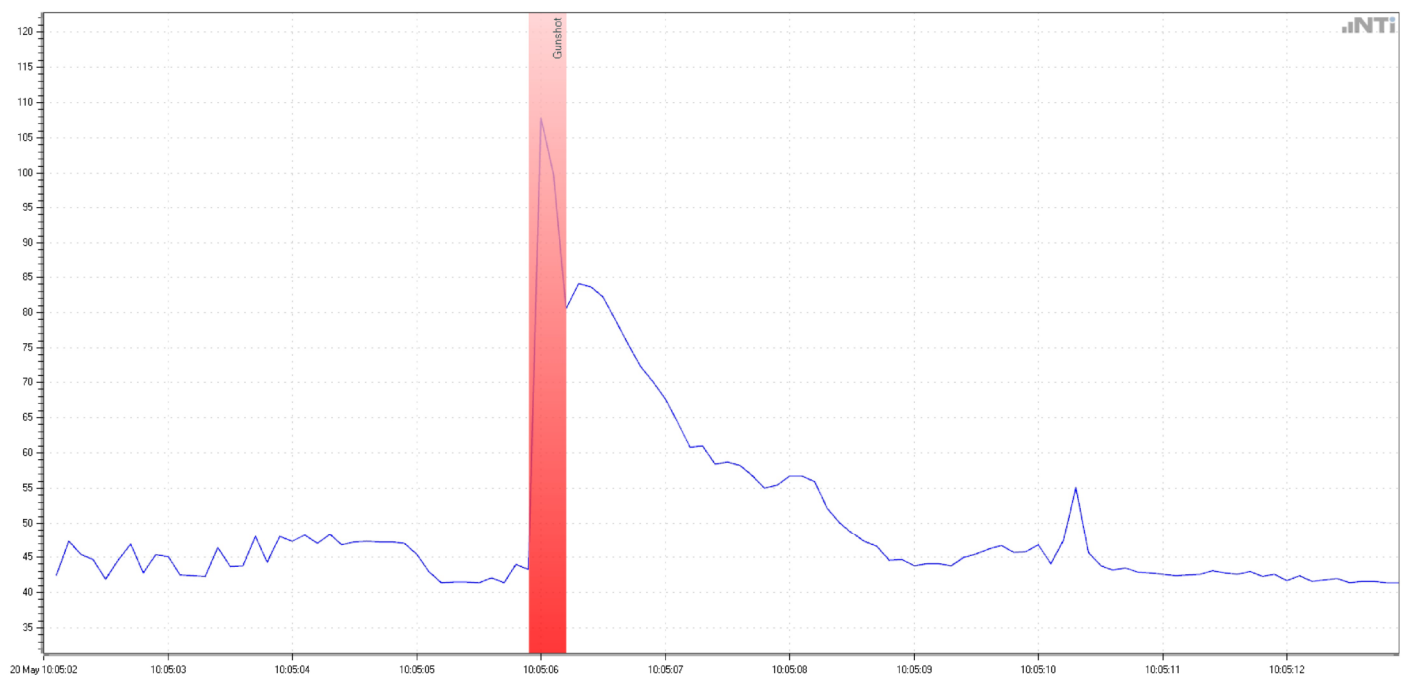
End: 2019-05-20 10:05:12.9

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:04:50

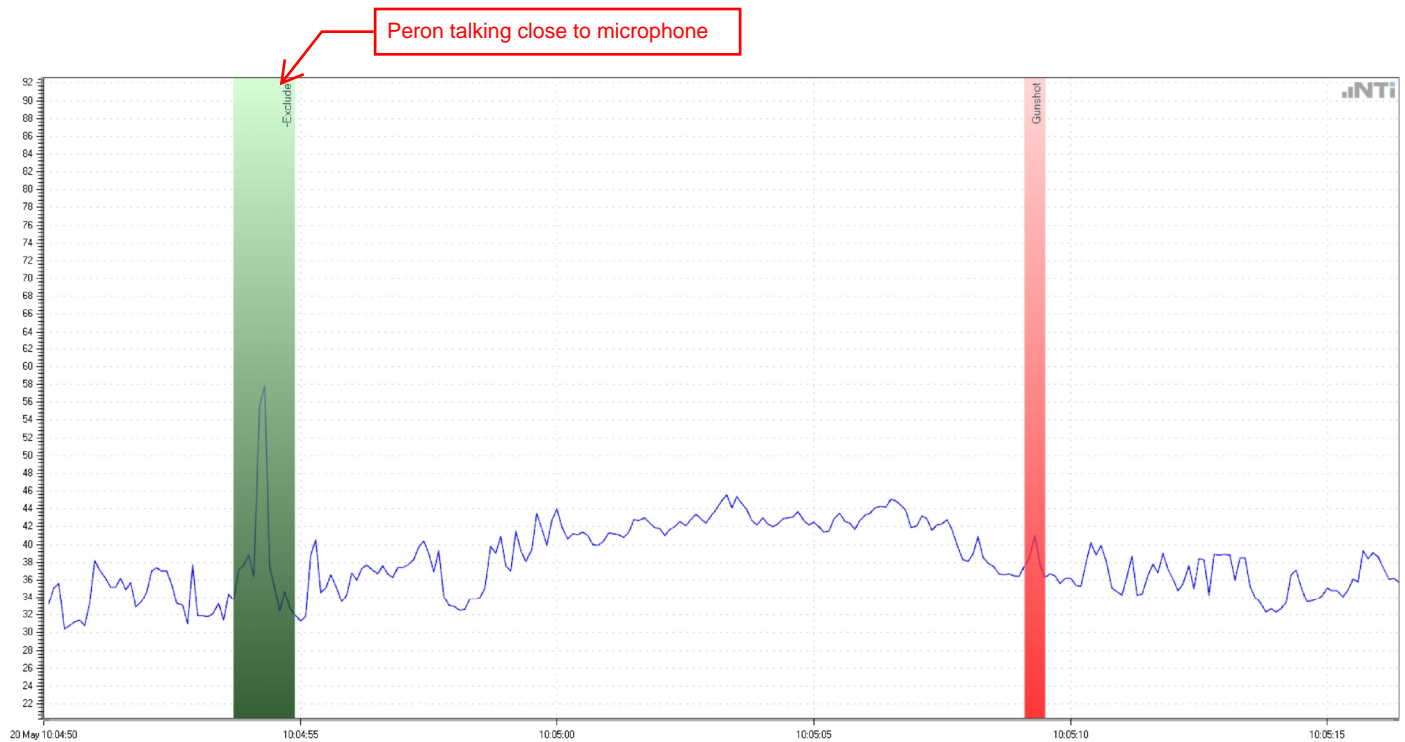
End: 2019-05-20 10:05:16.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .308 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:31:54

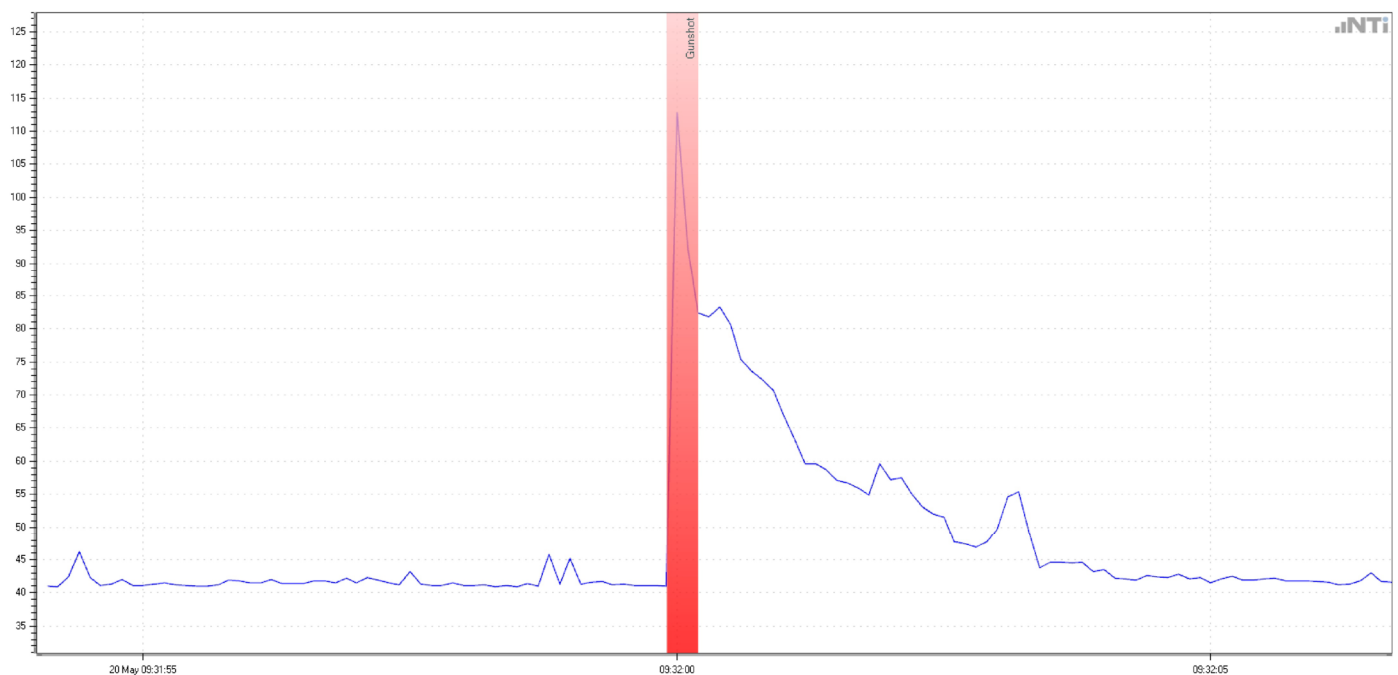
End: 2019-05-20 09:32:06.7

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308 munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:31:48

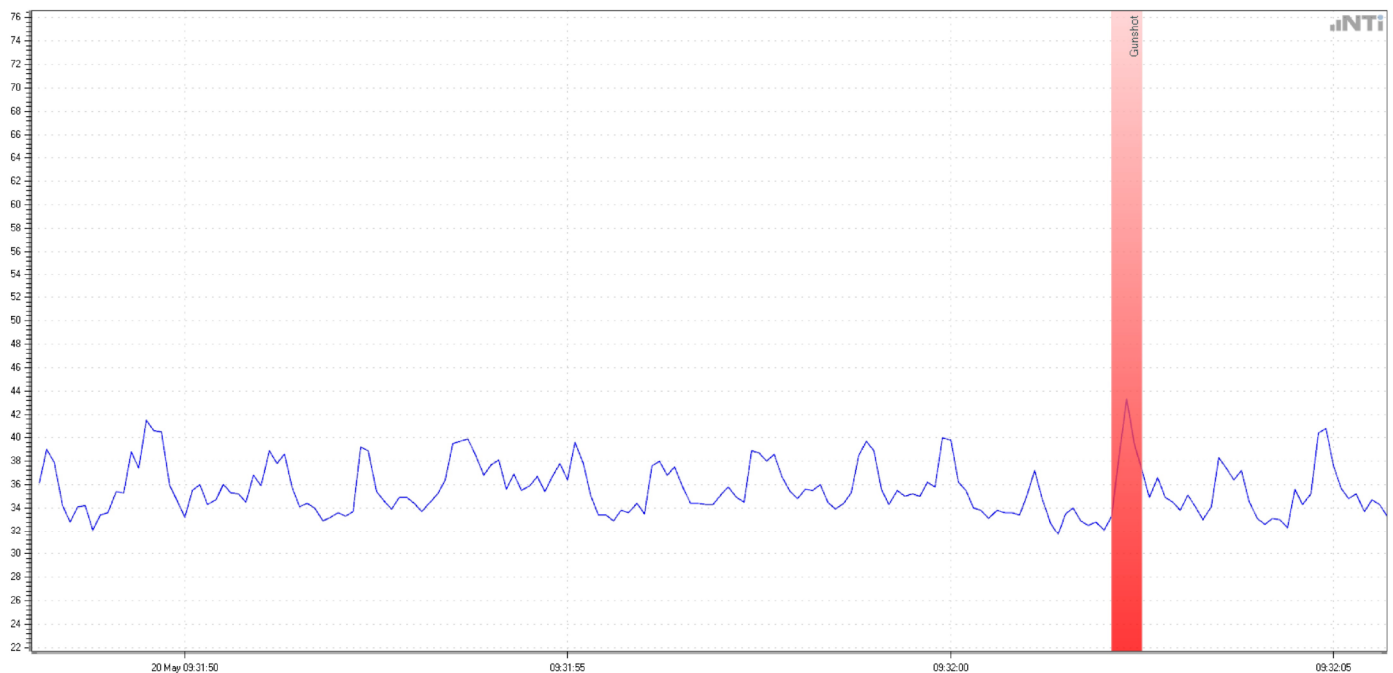
End: 2019-05-20 09:32:05.7

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .308 munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:03:28

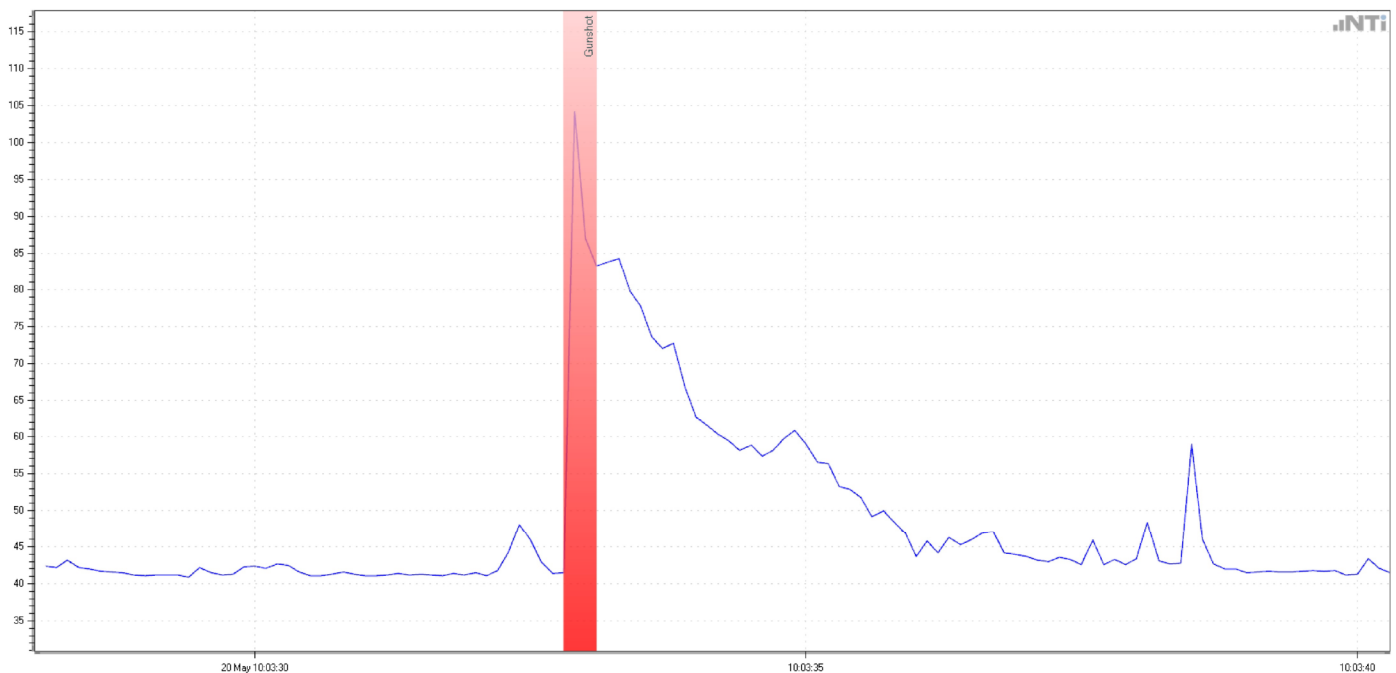
End: 2019-05-20 10:03:40.3

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:03:22

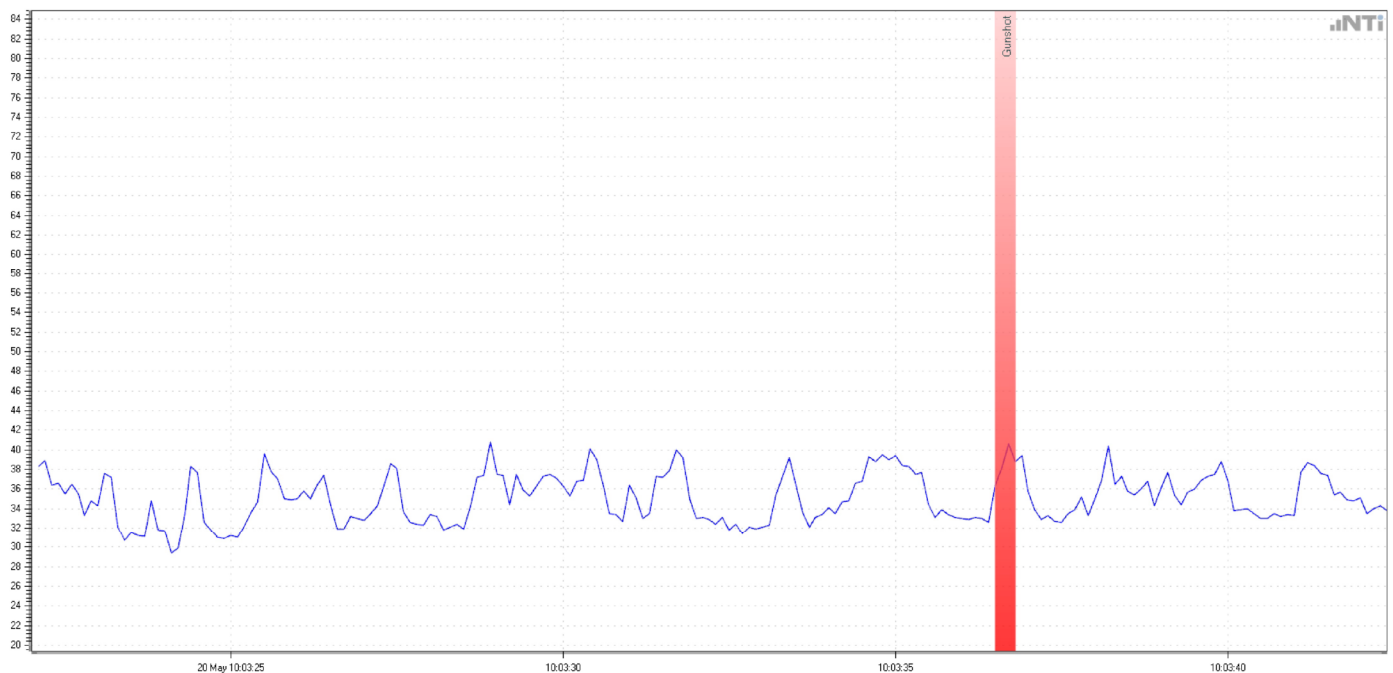
End: 2019-05-20 10:03:42.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .308 munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 09:55:14

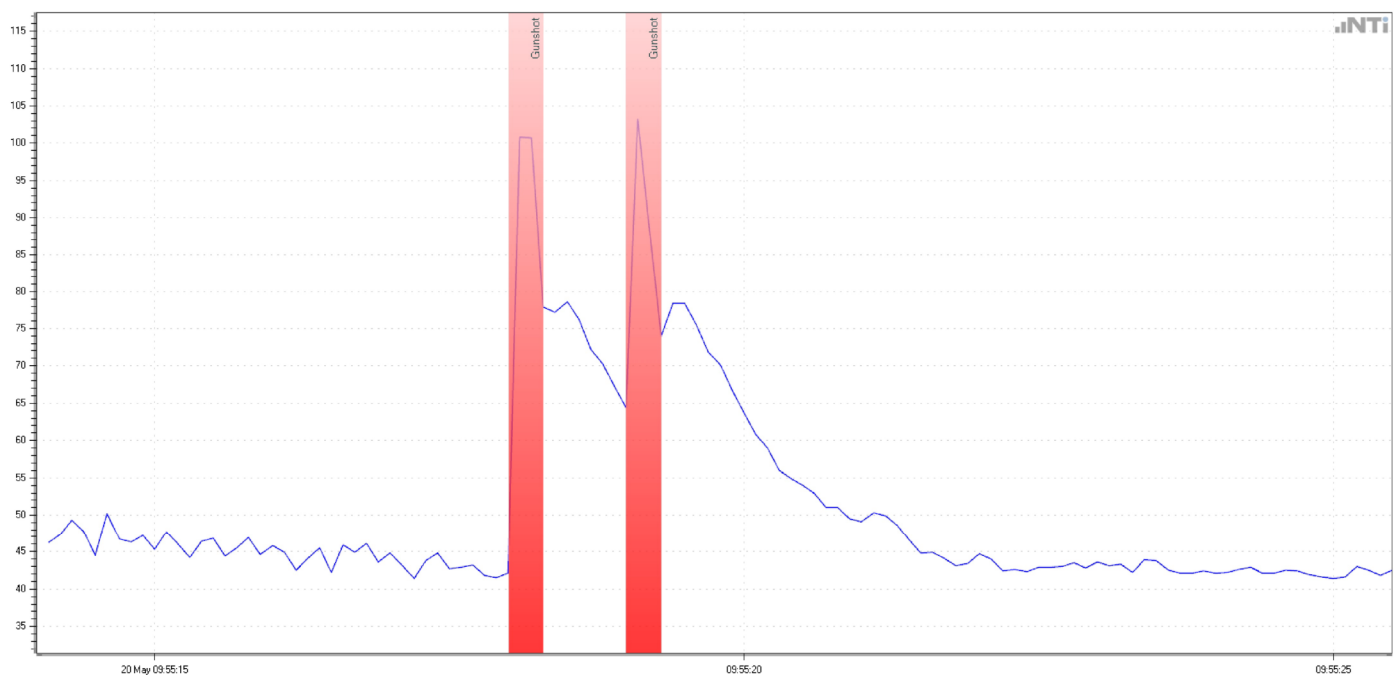
End: 2019-05-20 09:55:25.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:55:06

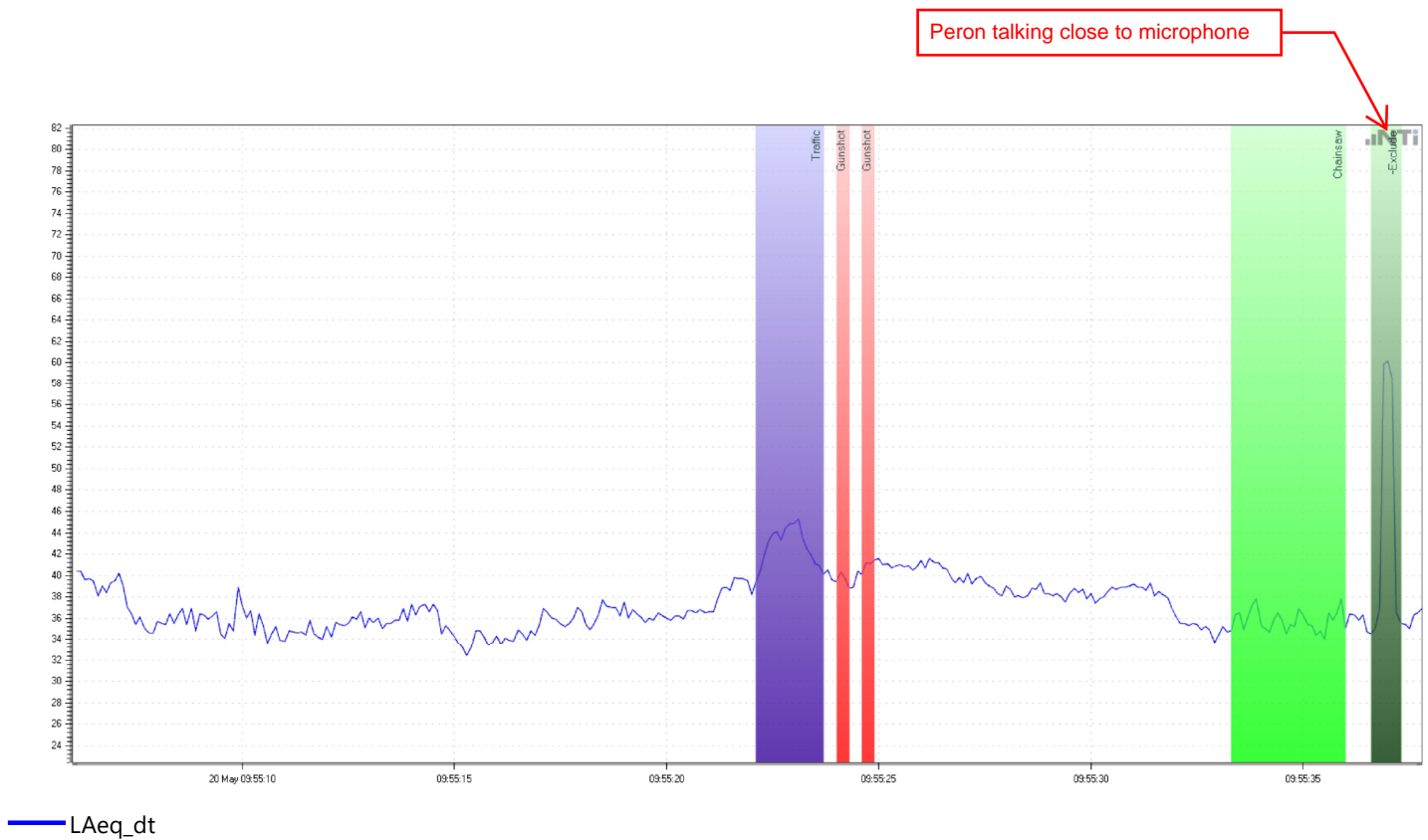
End: 2019-05-20 09:55:37.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: 9mm munition

Firing Direction: North



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 09:52:34

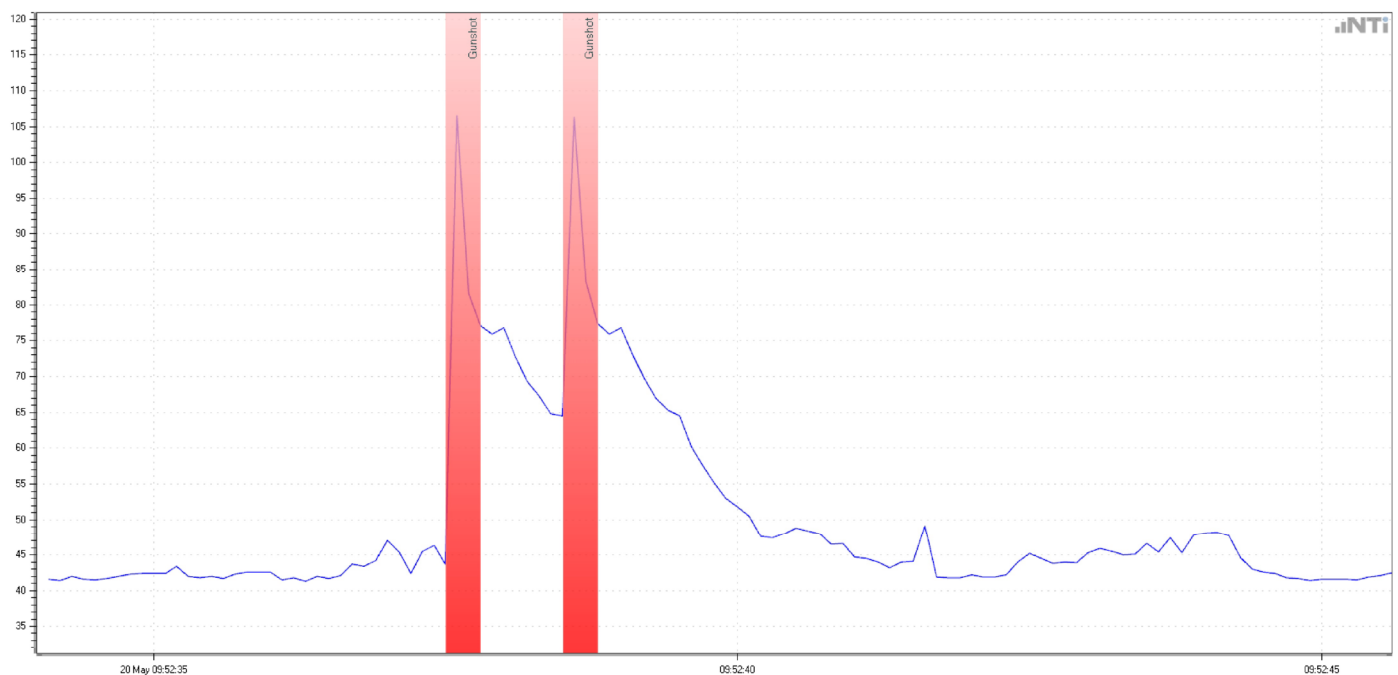
End: 2019-05-20 09:52:45.6

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:52:26

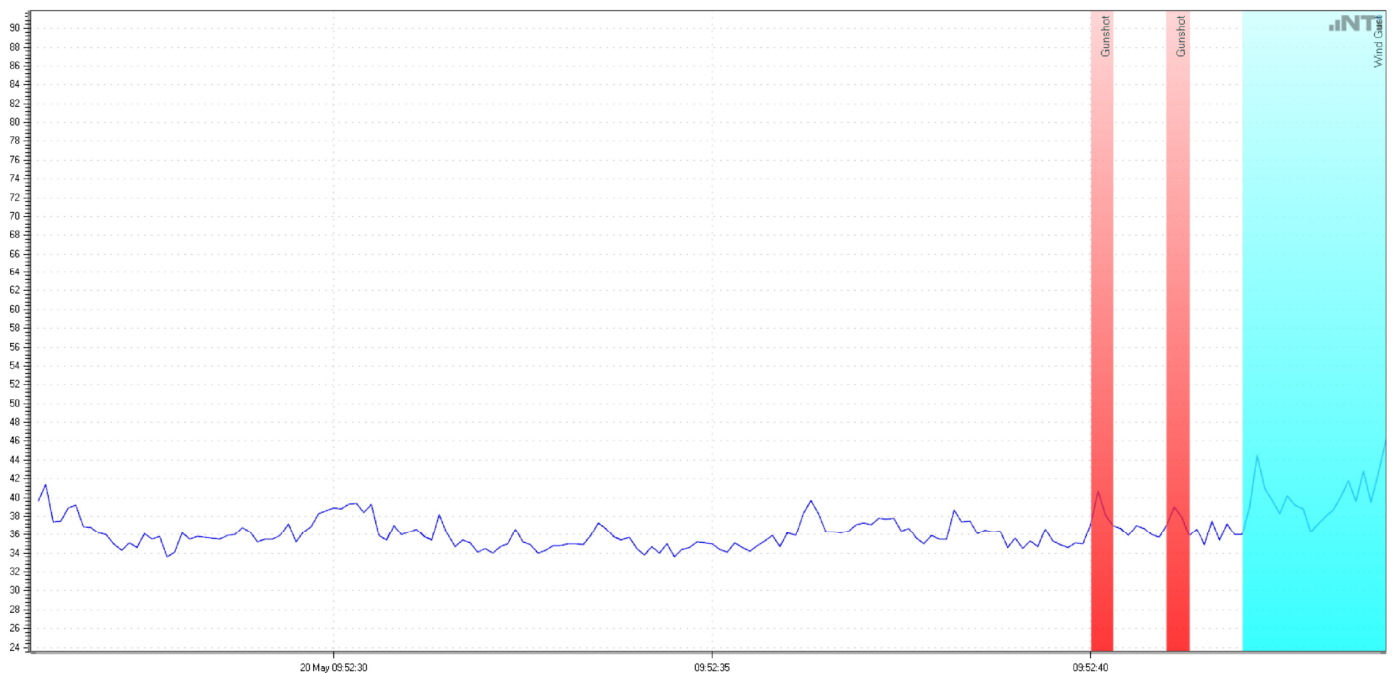
End: 2019-05-20 09:52:43.9

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: 9mm munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:53:16

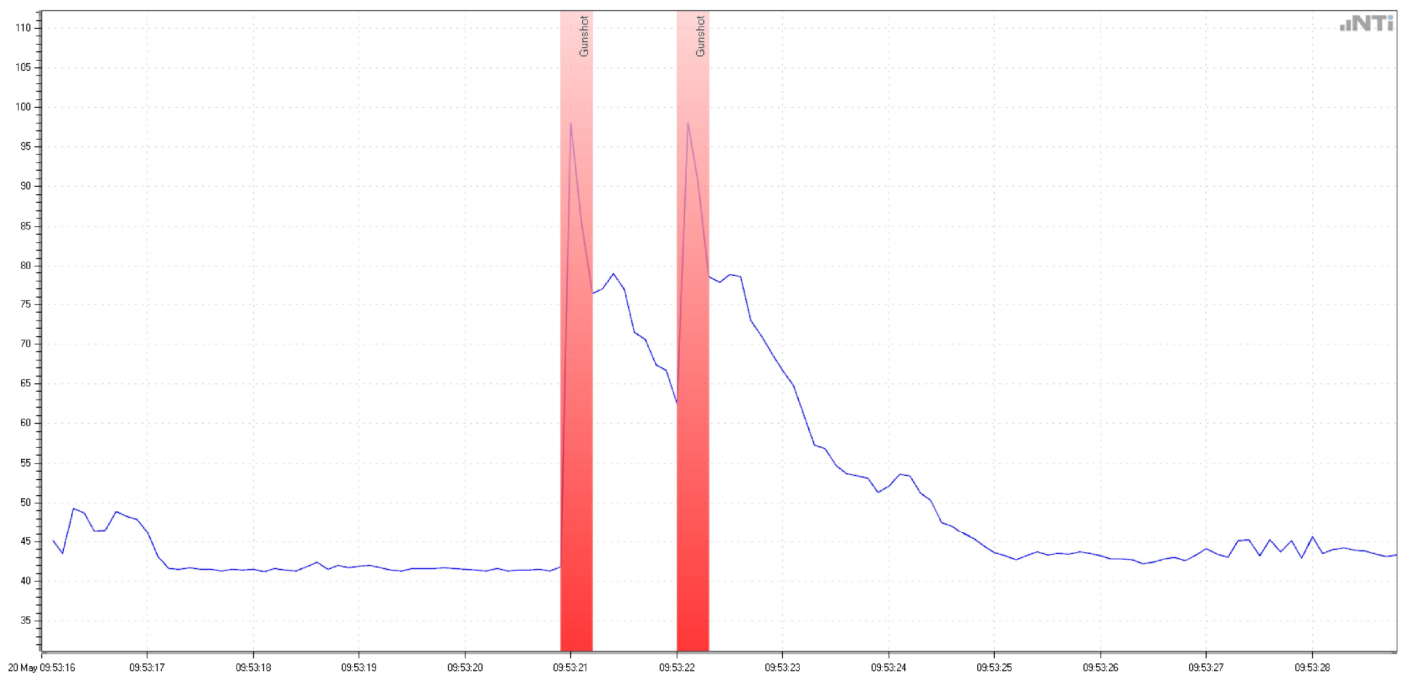
End: 2019-05-20 09:53:28.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:53:10

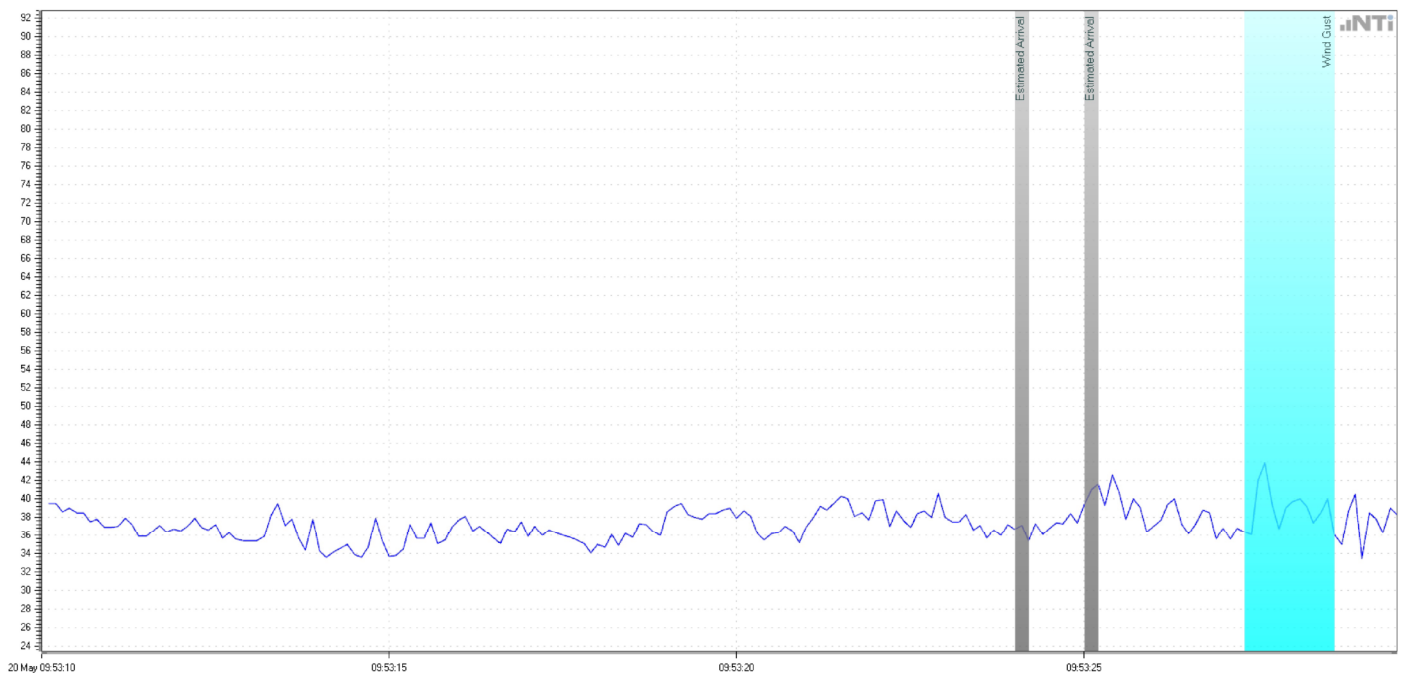
End: 2019-05-20 09:53:29.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: 9mm munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:50:16

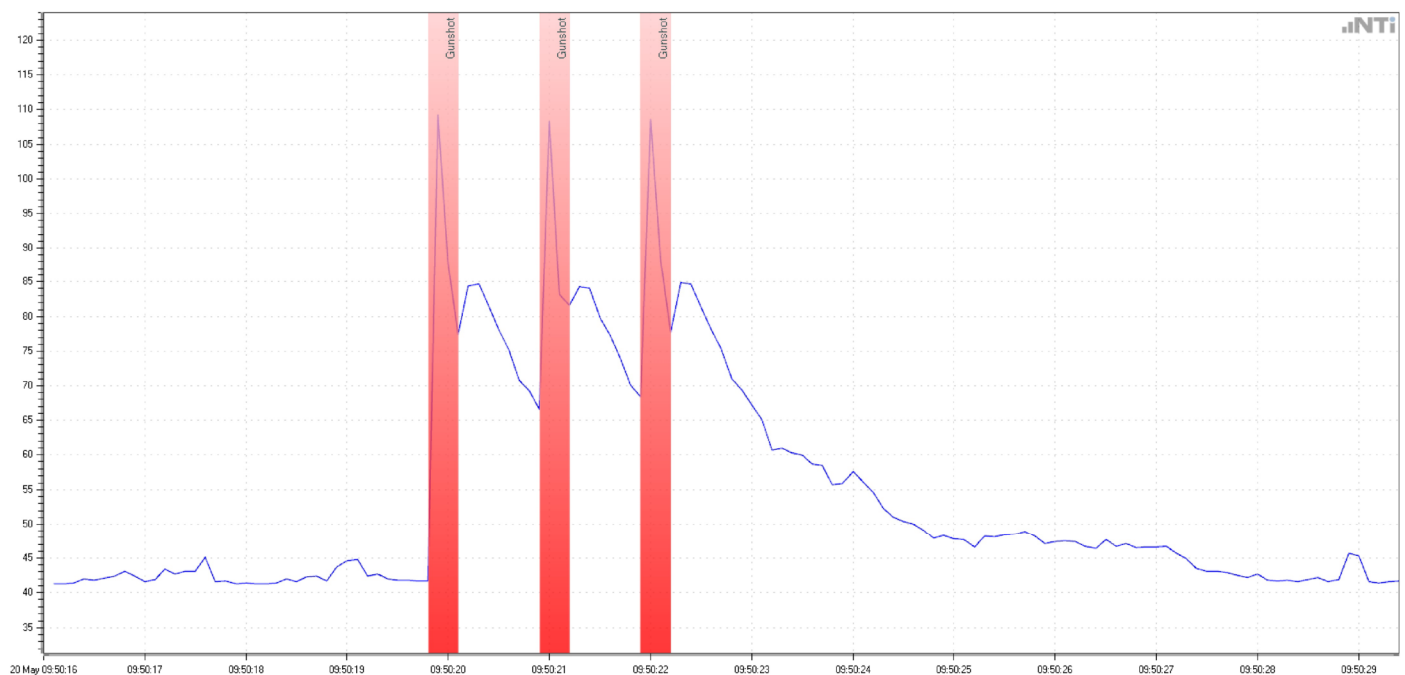
End: 2019-05-20 09:50:29.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:50:08

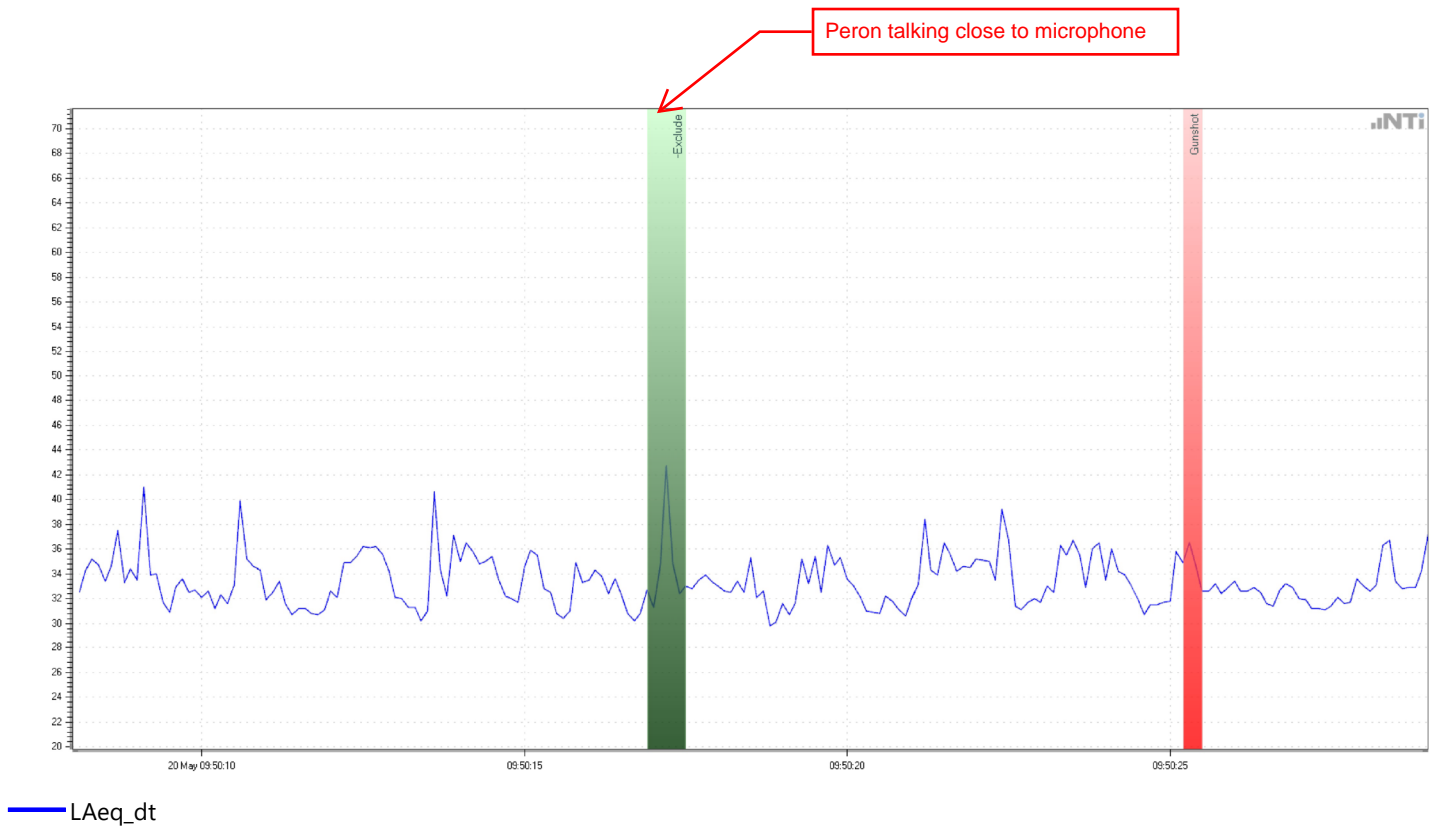
End: 2019-05-20 09:50:29

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .223 munition

Firing Direction: North



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 09:40:36

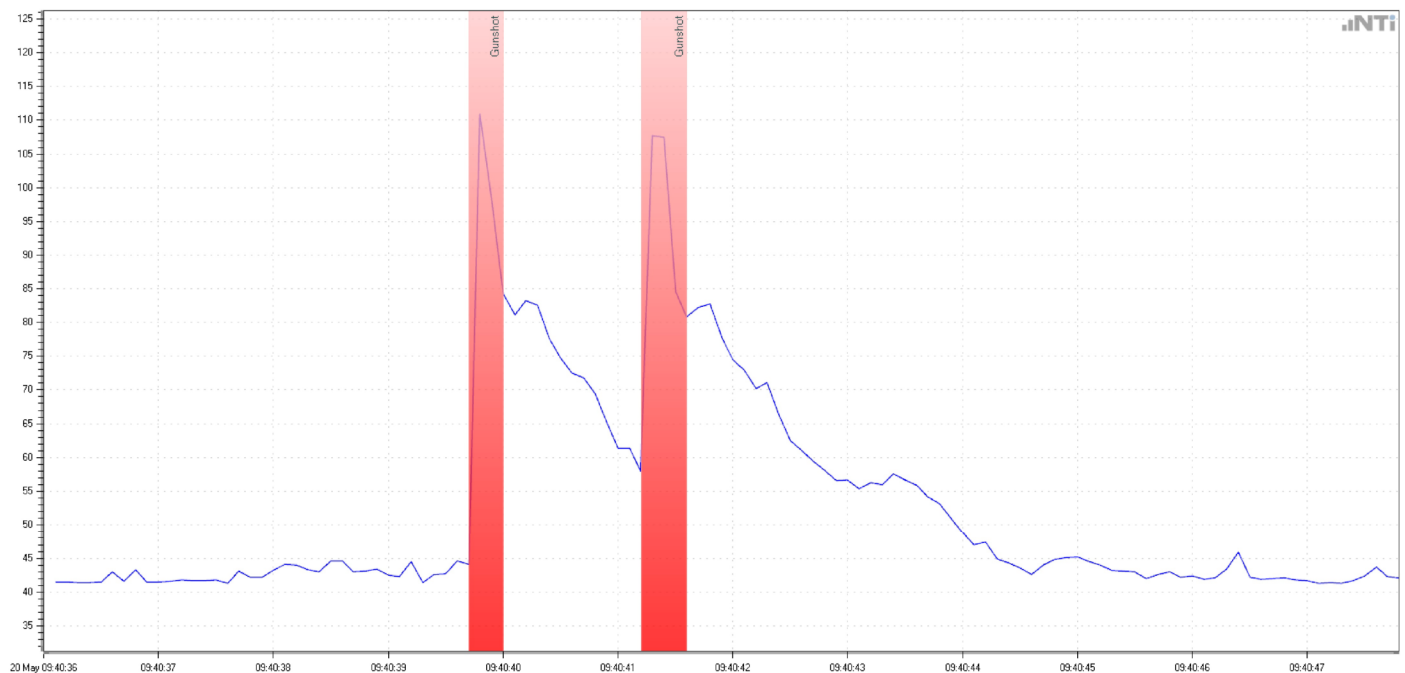
End: 2019-05-20 09:40:47.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223 munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:40:32

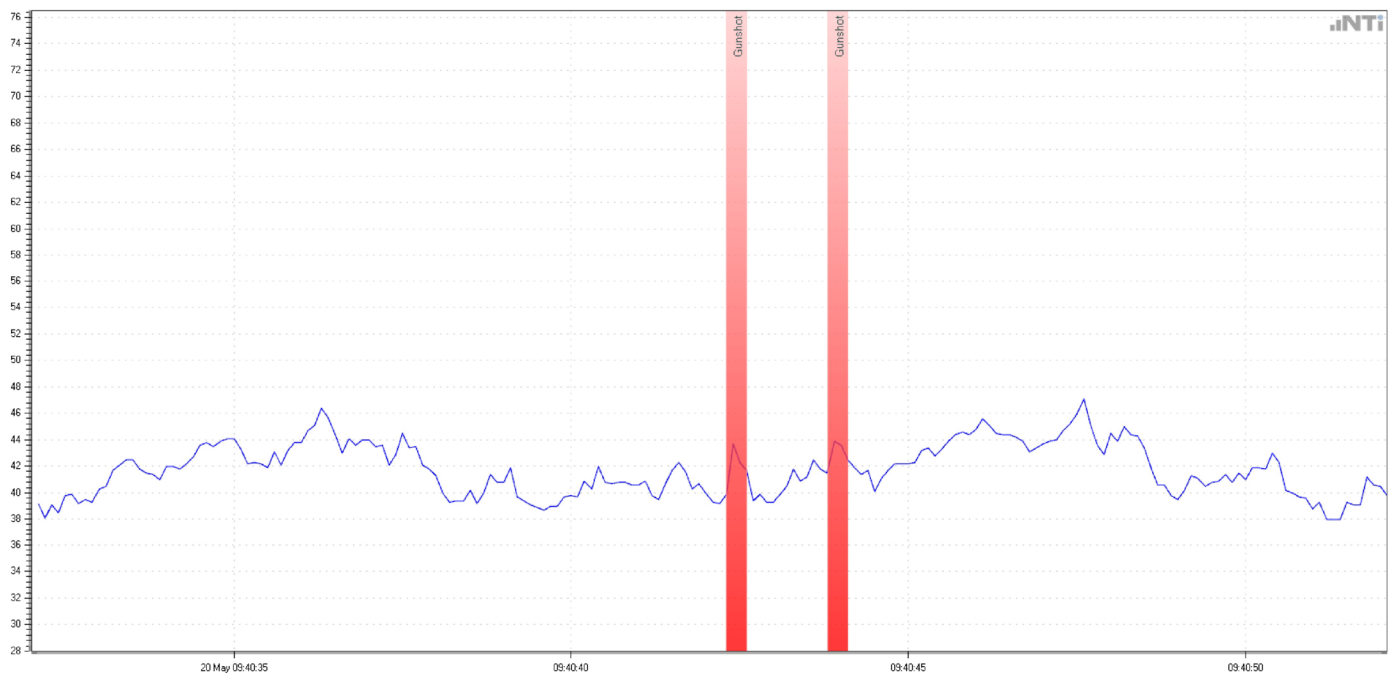
End: 2019-05-20 09:40:52.1

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .223 munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:45:20

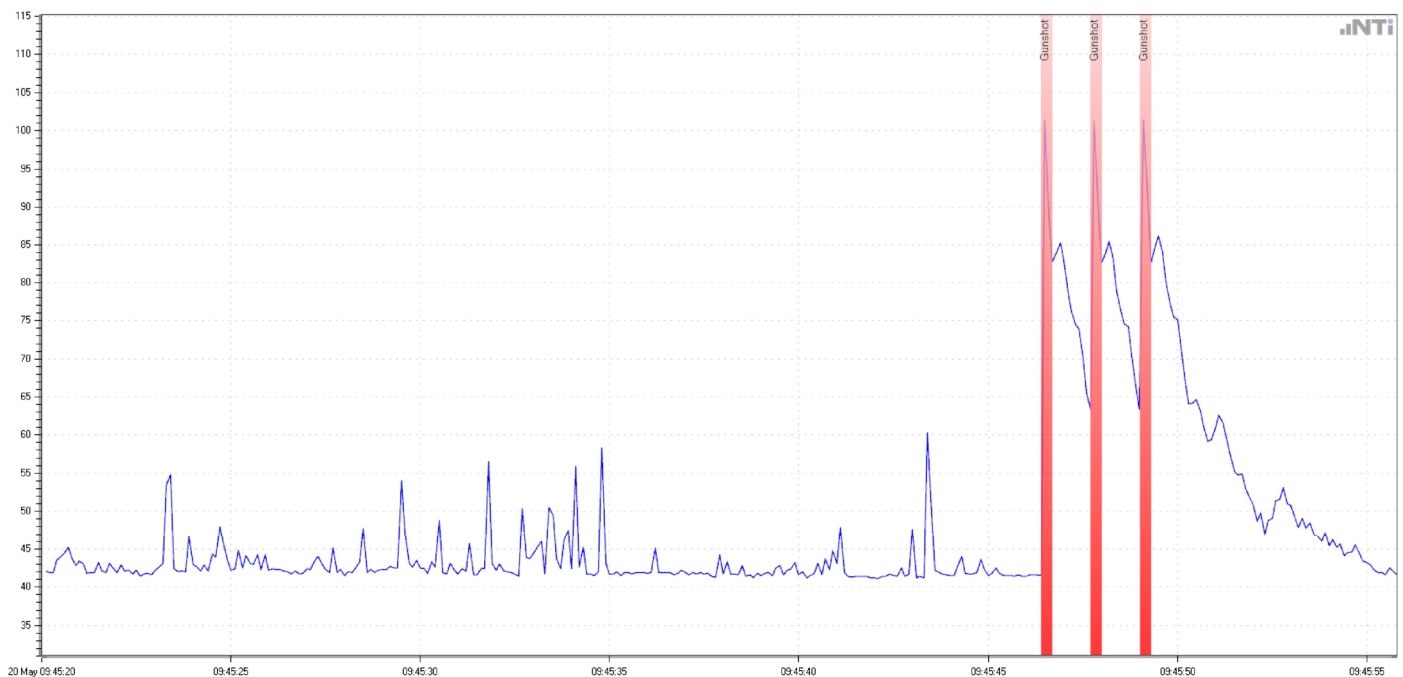
End: 2019-05-20 09:45:55.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223 munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 09:45:12

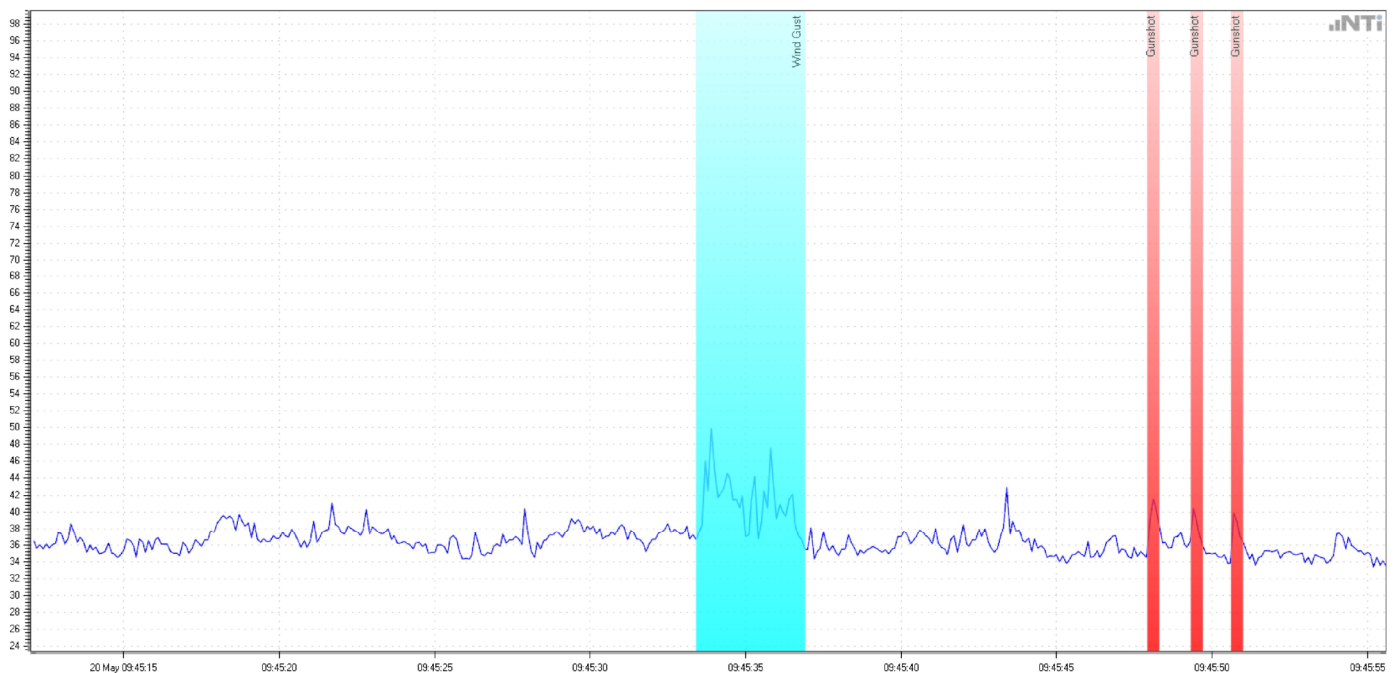
End: 2019-05-20 09:45:55.6

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R1.

Noise Type: .223 munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

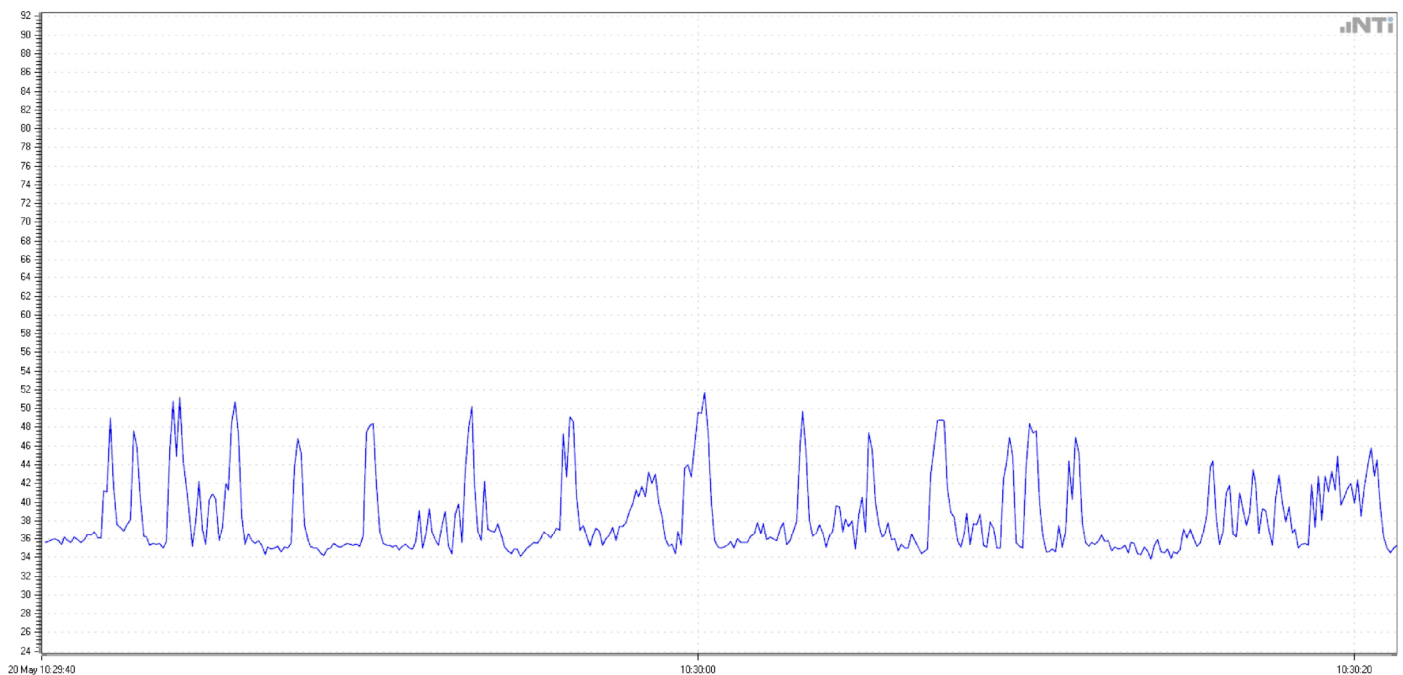
Start: 2019-05-20 10:29:40

End: 2019-05-20 10:30:21.3

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: Ambient



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:39:26

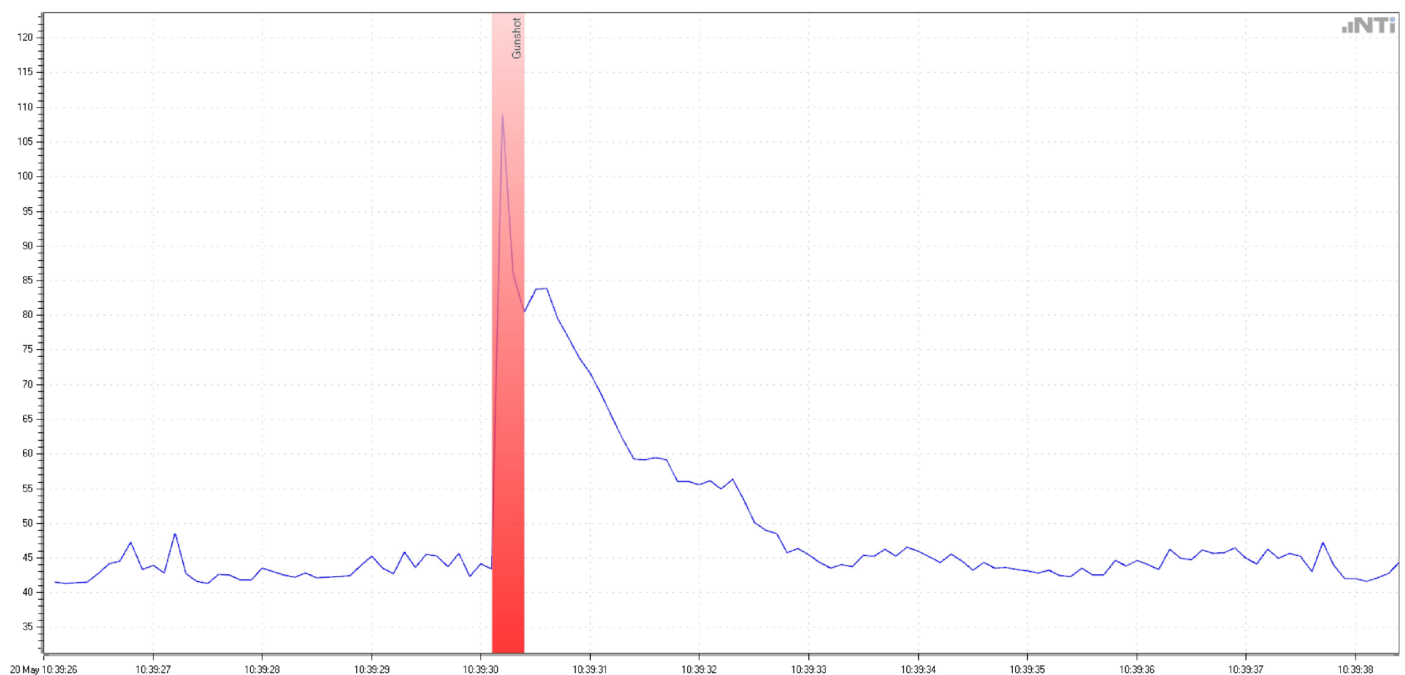
End: 2019-05-20 10:39:38.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive

Start: 2019-05-20 10:39:18

End: 2019-05-20 10:39:48.3

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: .308 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:35:20

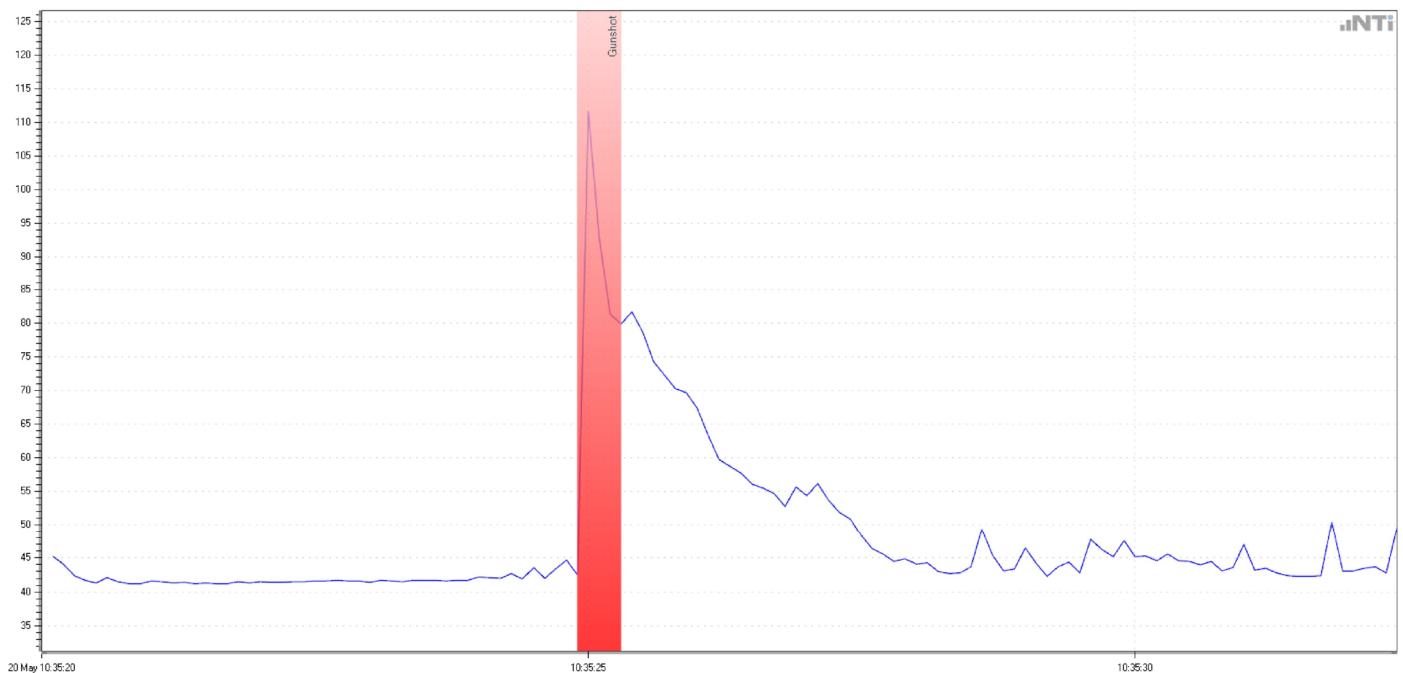
End: 2019-05-20 10:35:32.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:34:48

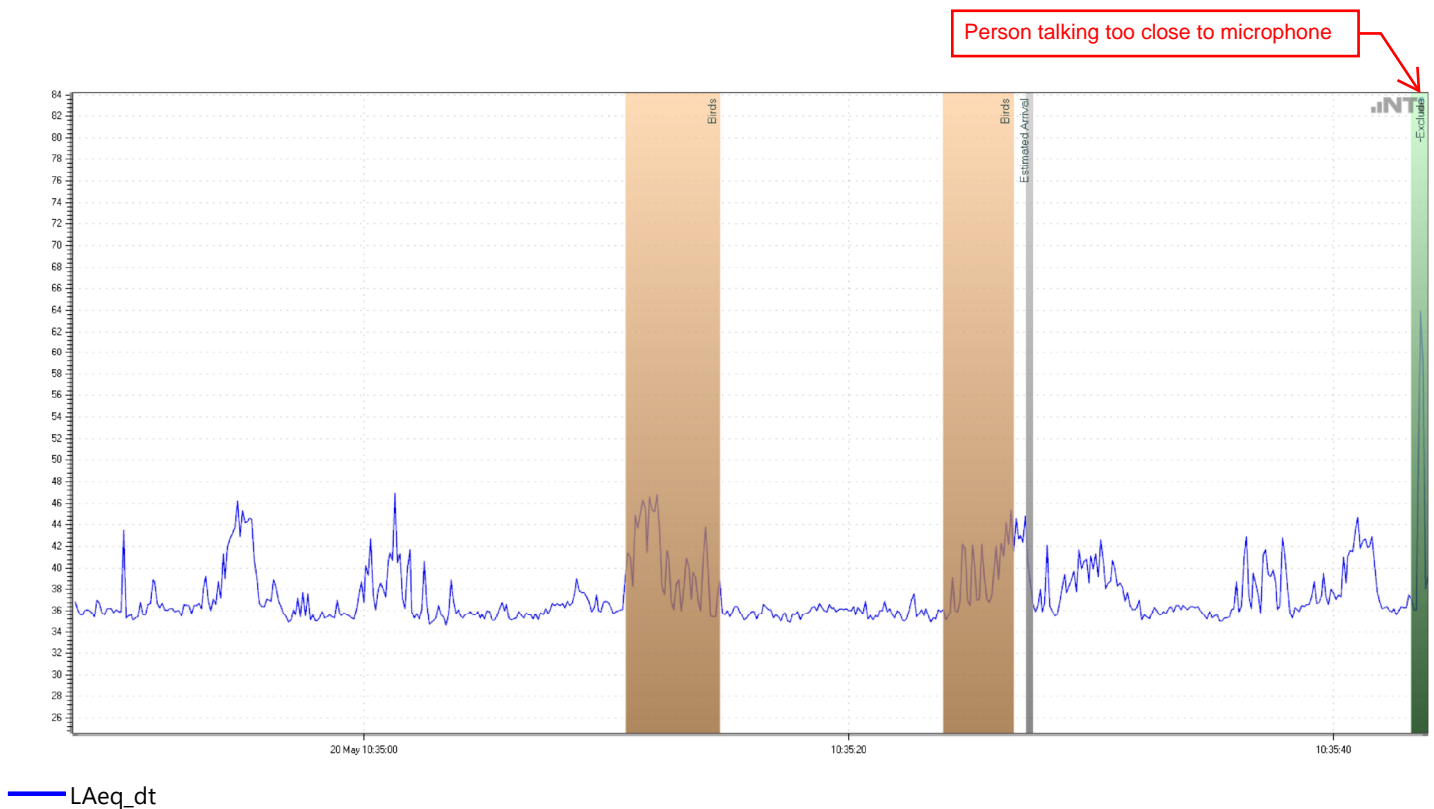
End: 2019-05-20 10:35:43.9

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: .308 munition

Firing Direction: South



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 10:36:32

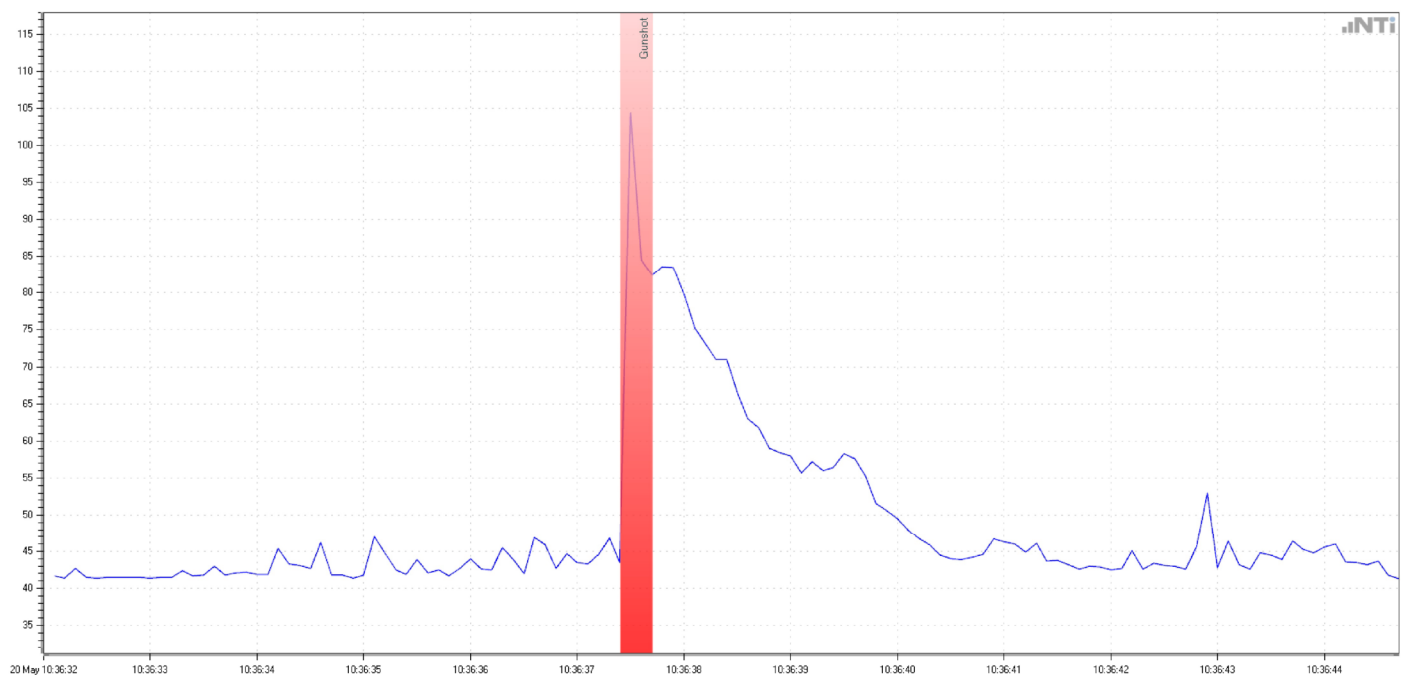
End: 2019-05-20 10:36:44.7

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:36:28

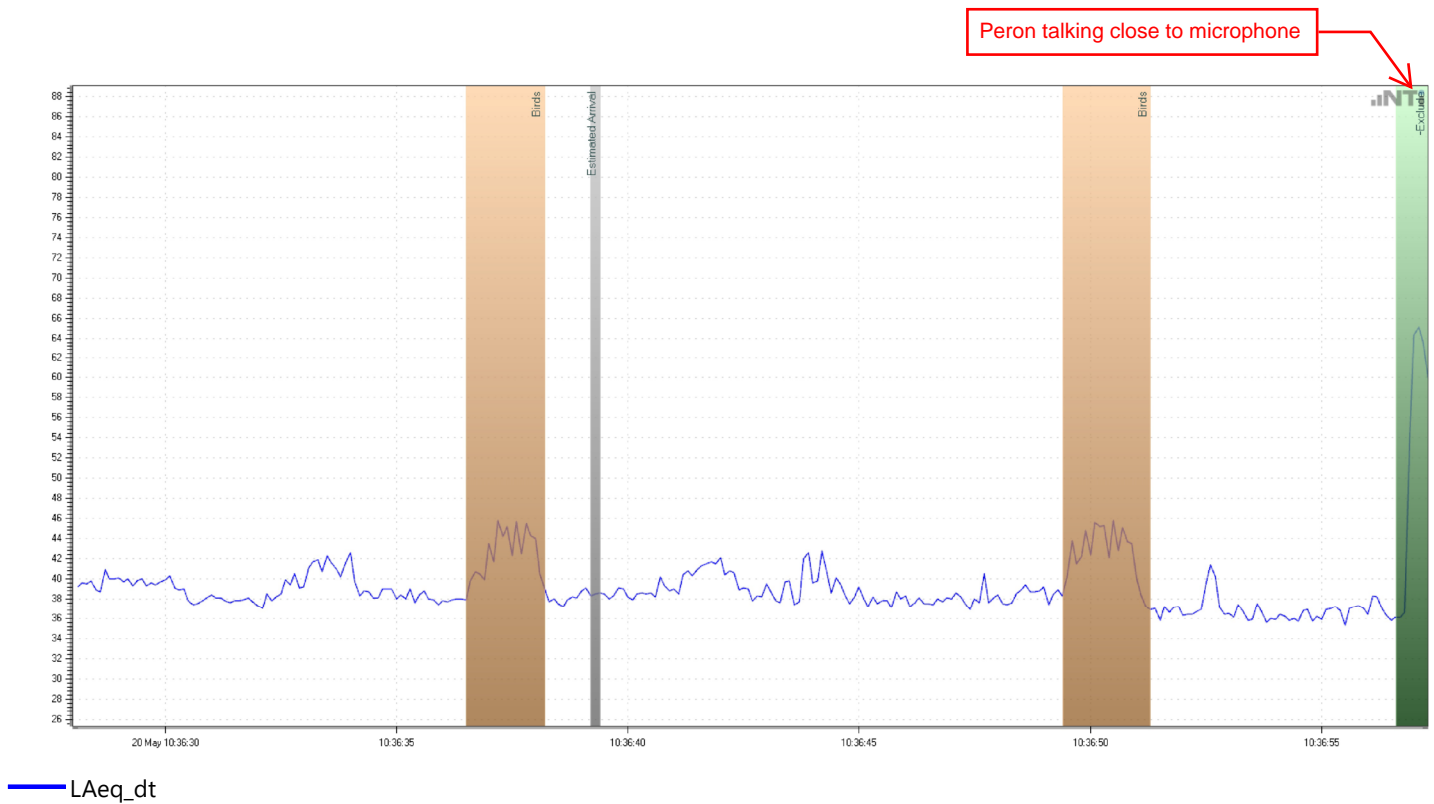
End: 2019-05-20 10:36:57.3

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: .308 munition

Firing Direction: East



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 10:44:50

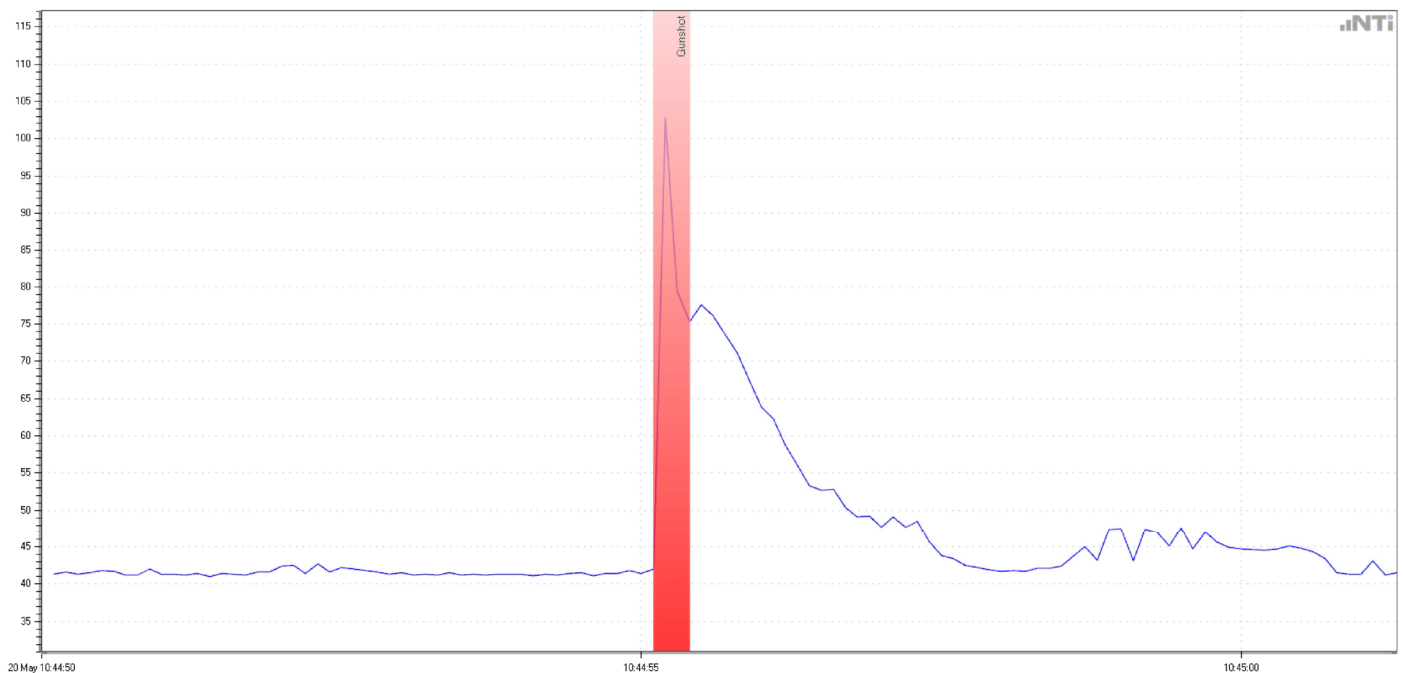
End: 2019-05-20 10:45:01.3

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:44:36

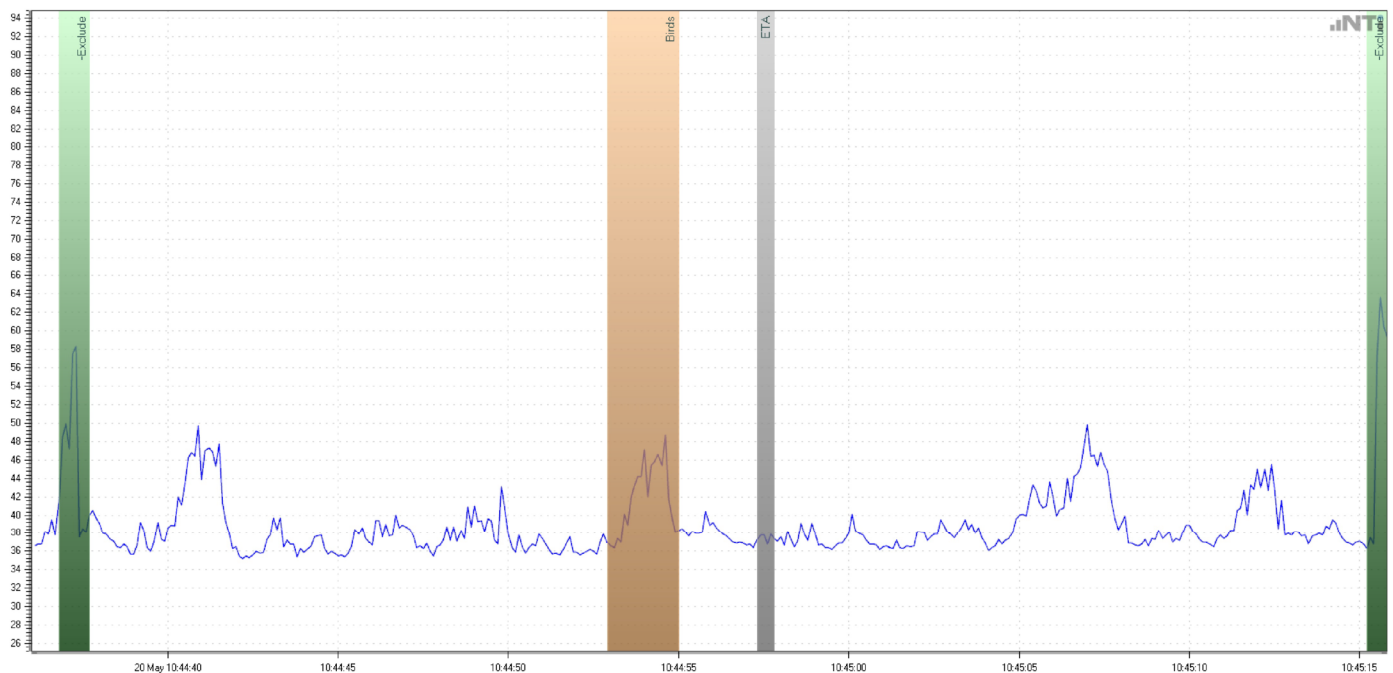
End: 2019-05-20 10:45:15.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: 9mm

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:43:00

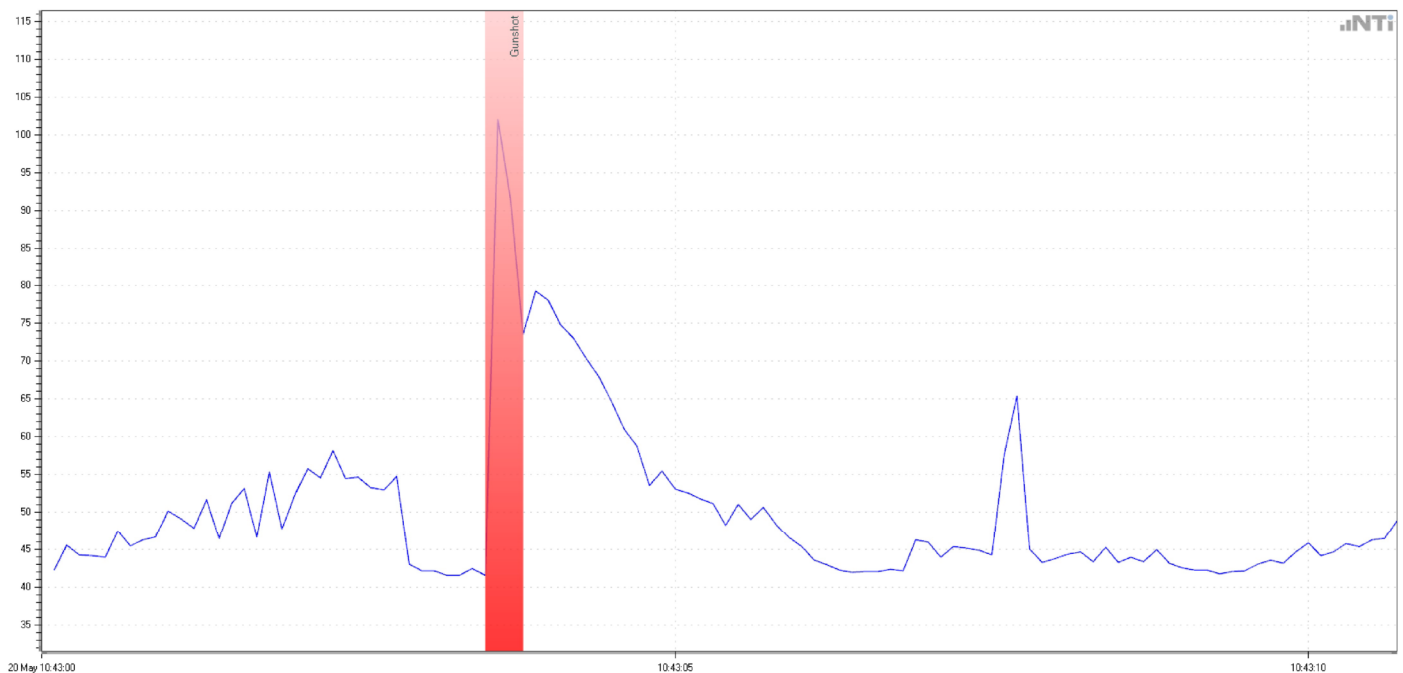
End: 2019-05-20 10:43:10.7

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 10:42:50

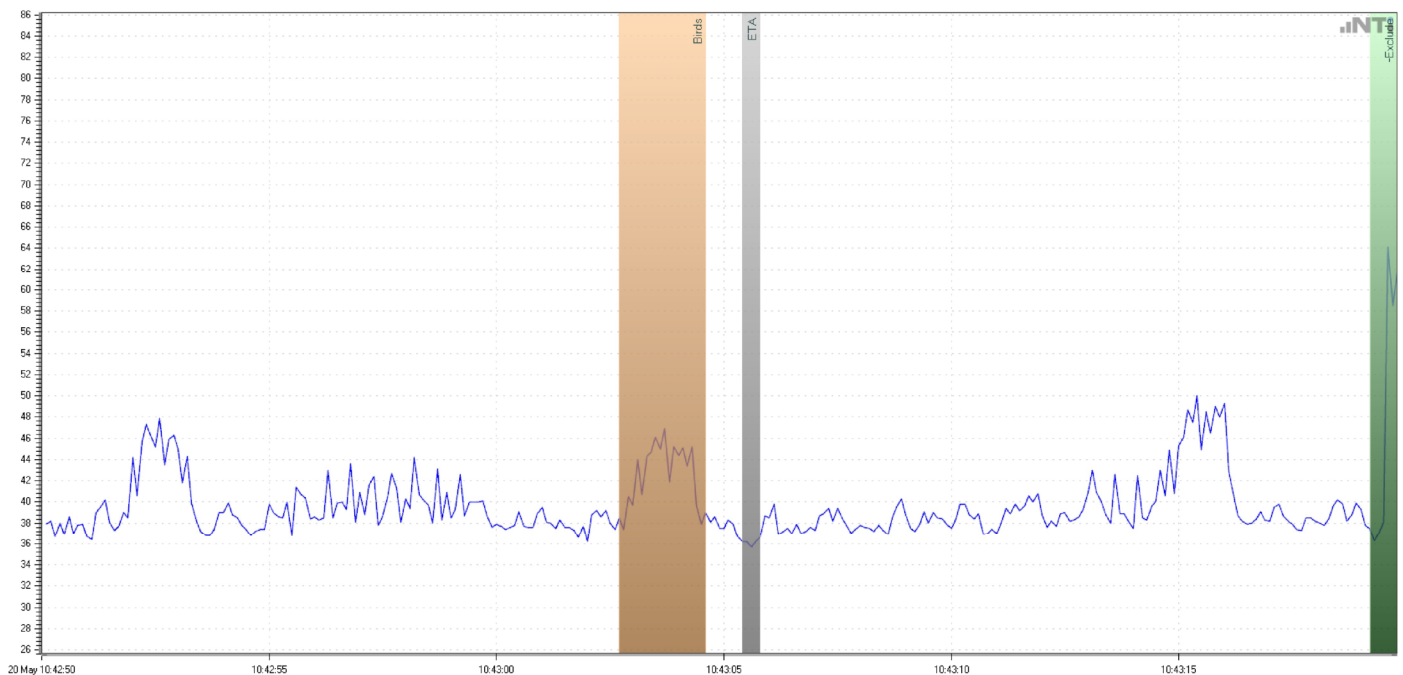
End: 2019-05-20 10:43:19.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R2.

Noise Type: .223 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

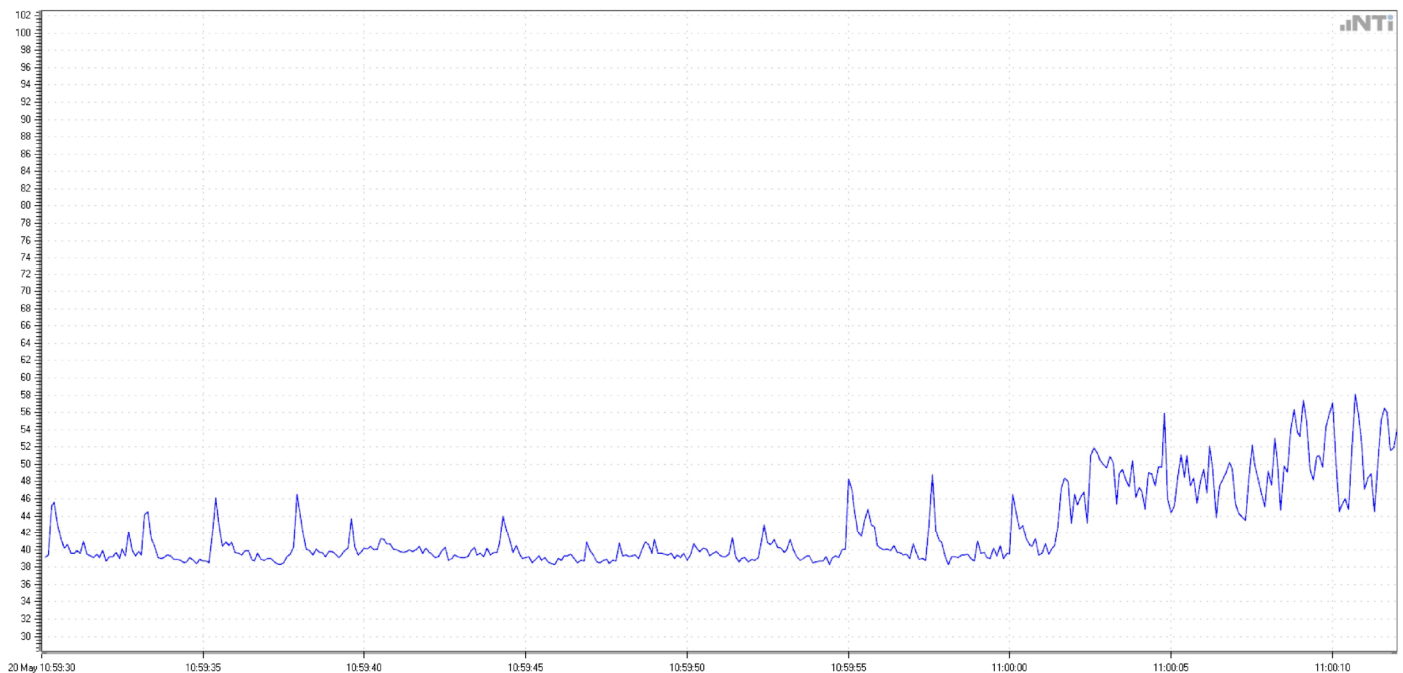
Start: 2019-05-20 10:59:30

End: 2019-05-20 11:00:12

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: Ambient



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:05:40

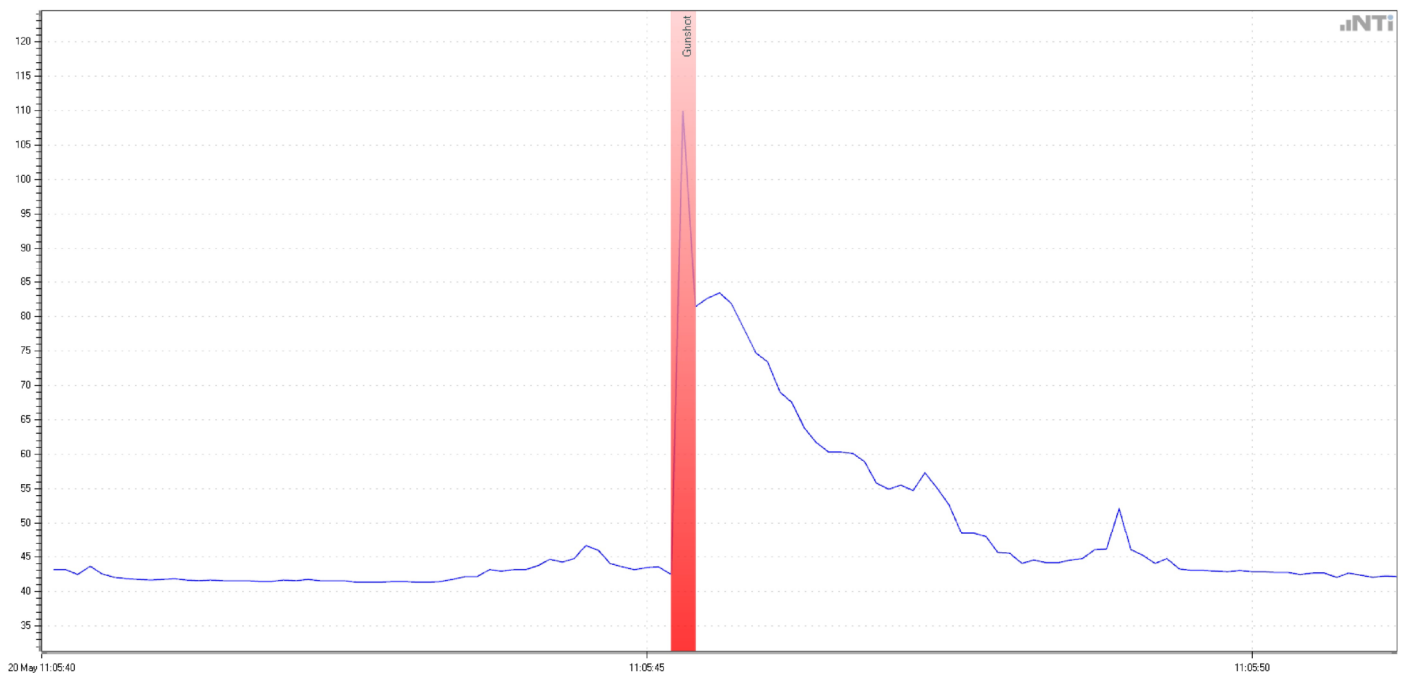
End: 2019-05-20 11:05:51.2

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:05:32

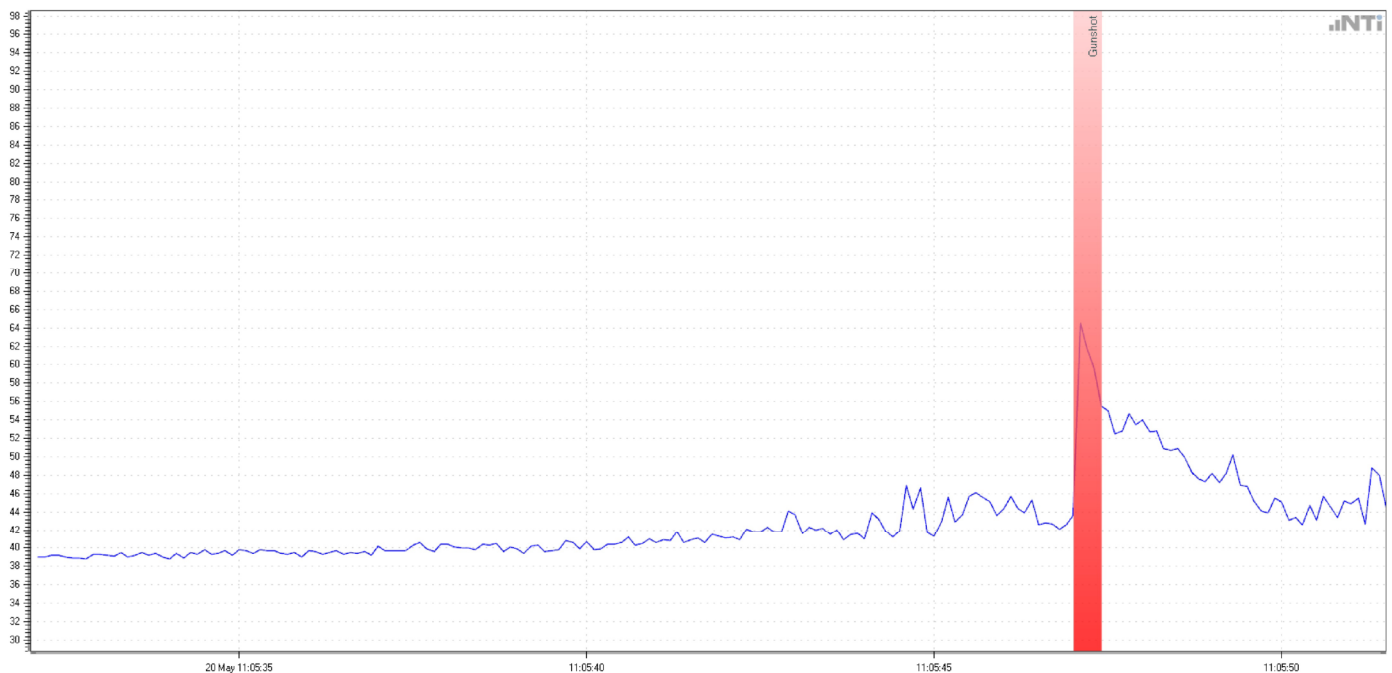
End: 2019-05-20 11:05:51.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .308 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:03:20

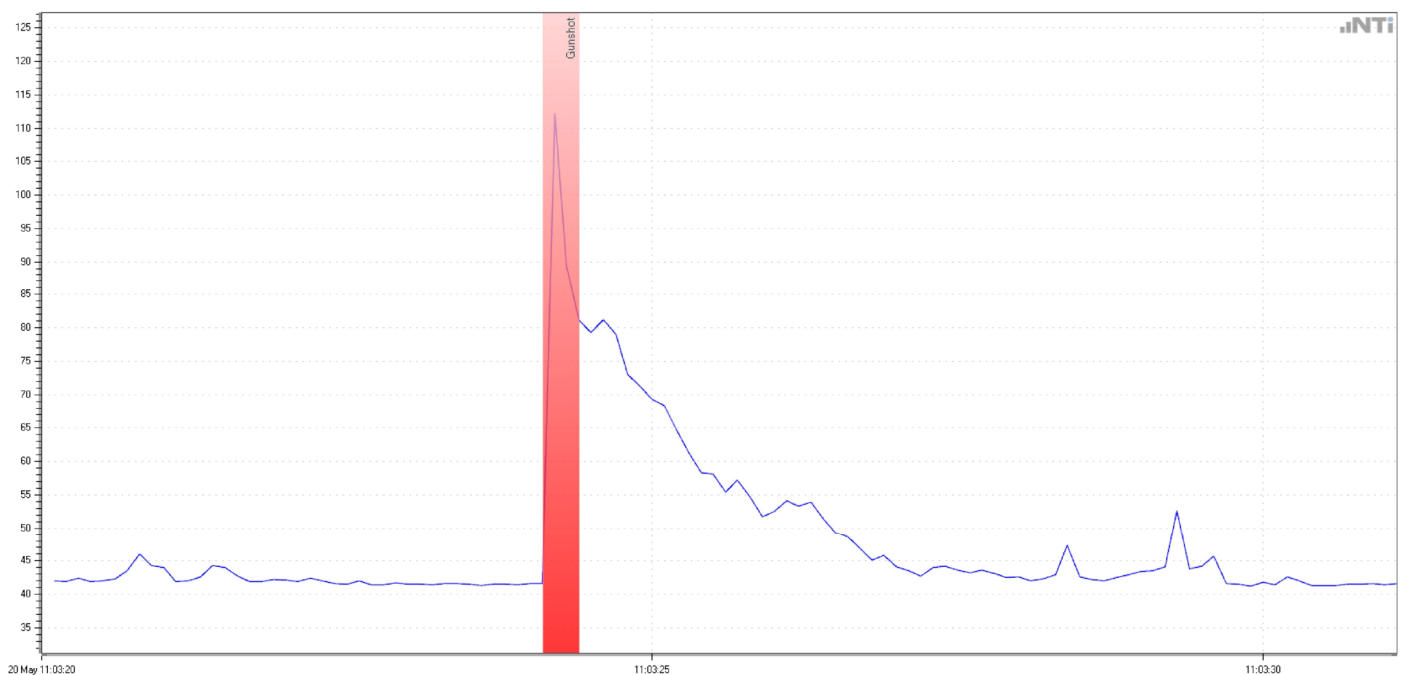
End: 2019-05-20 11:03:31.1

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:02:38

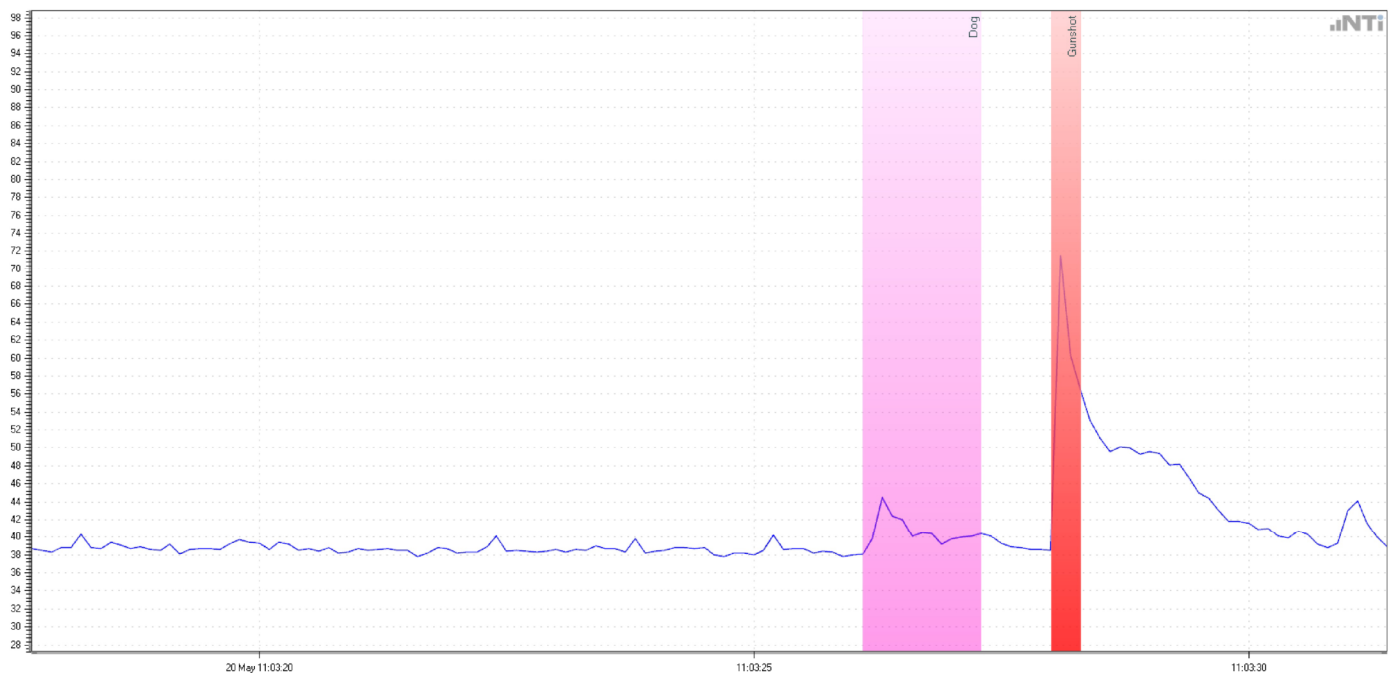
End: 2019-05-20 11:03:33.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .308

Firing Direction: South



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:04:30

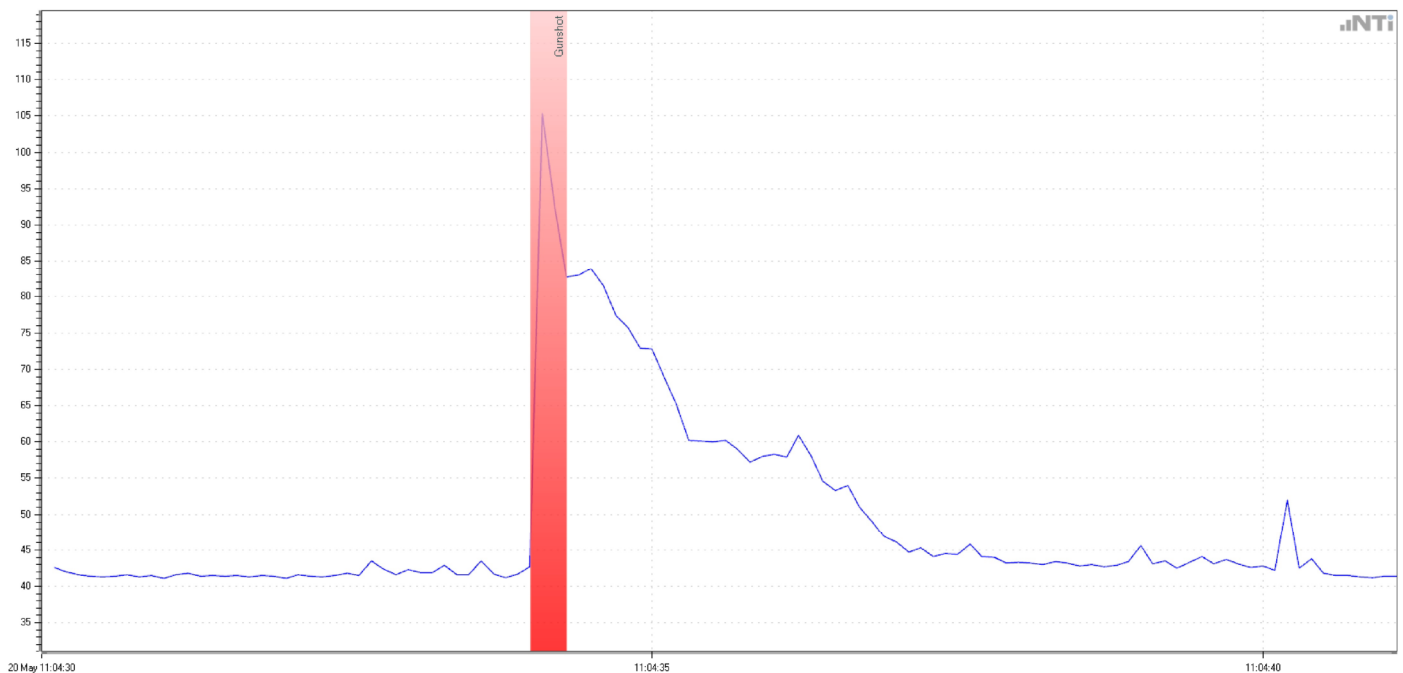
End: 2019-05-20 11:04:41.1

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .308

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:04:18

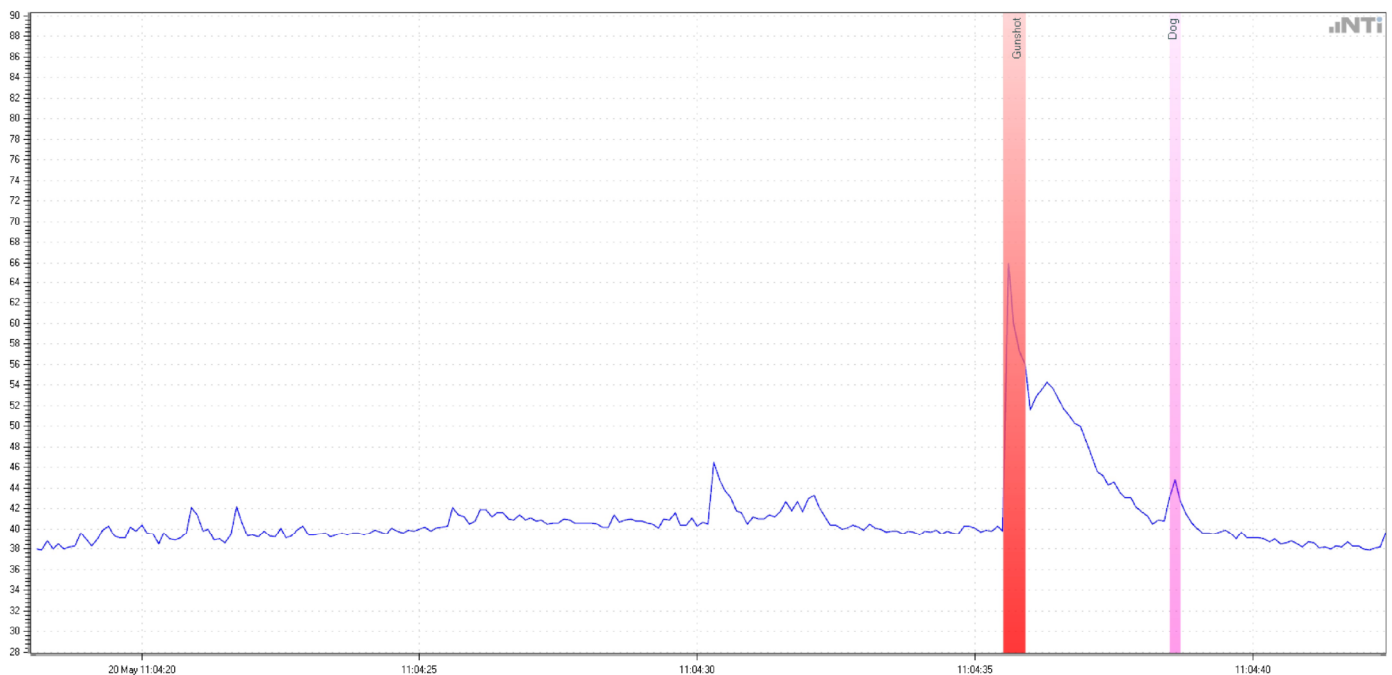
End: 2019-05-20 11:04:42.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .308

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 11:16:40

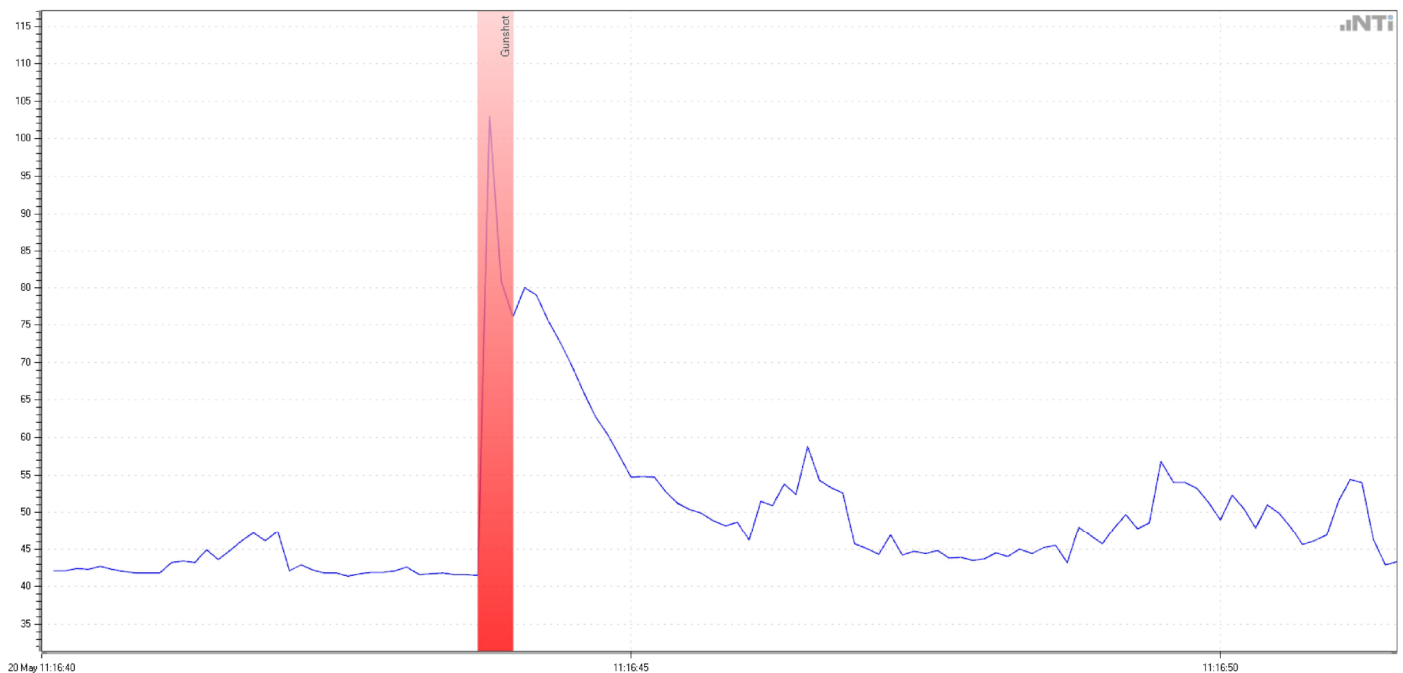
End: 2019-05-20 11:16:51.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:16:32

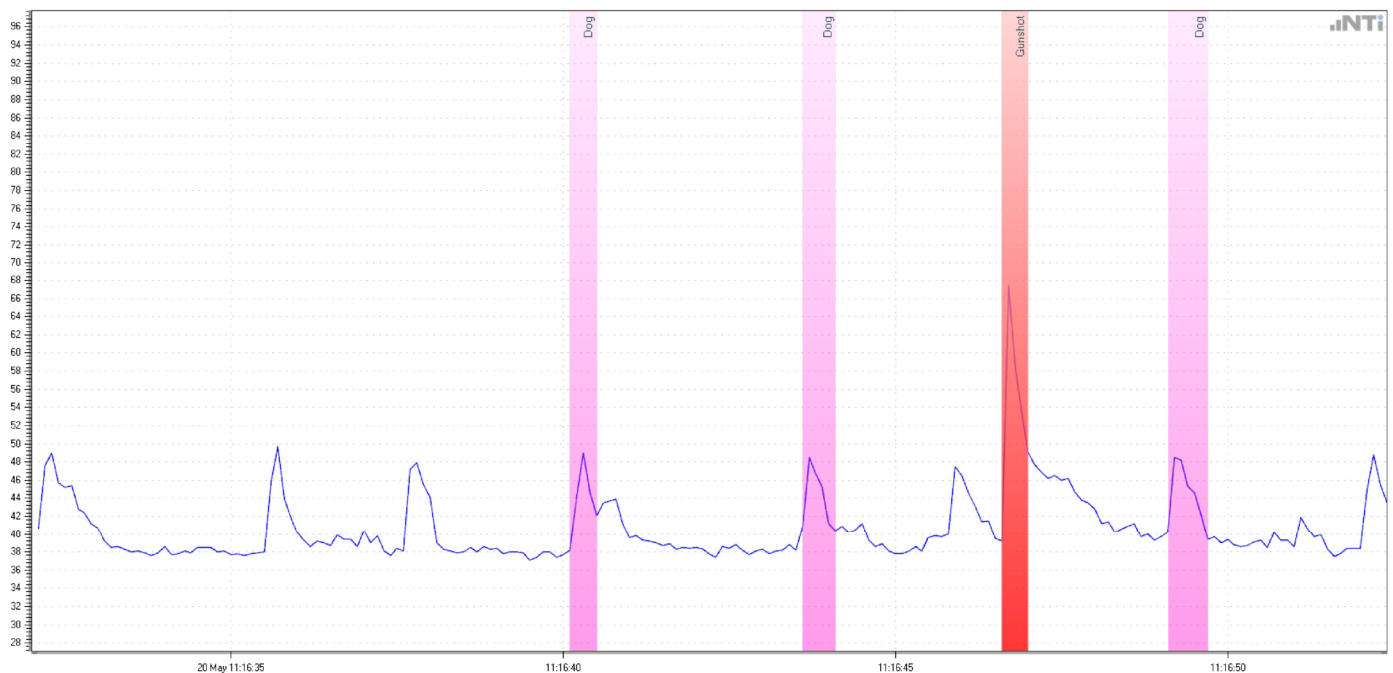
End: 2019-05-20 11:16:52.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: 9mm munition

Firing Direction: North



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Executive Firearms

Start: 2019-05-20 11:15:32

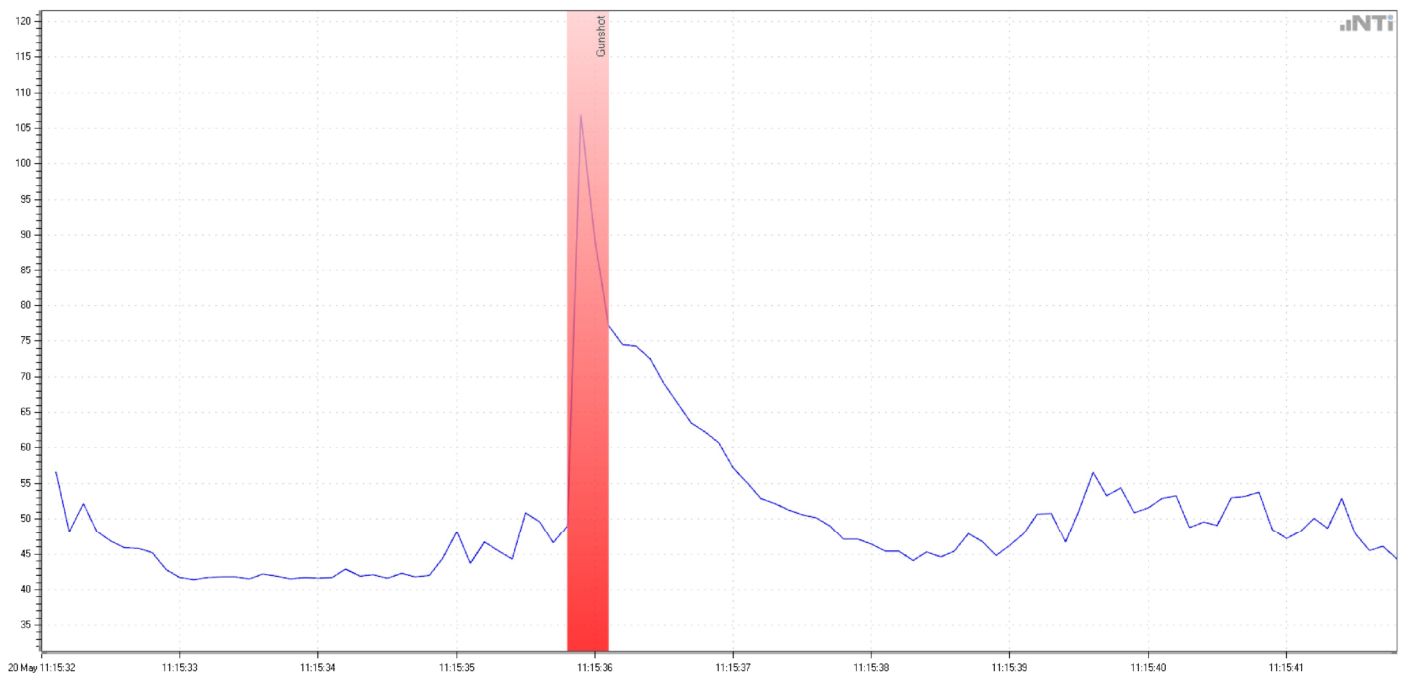
End: 2019-05-20 11:15:41.8

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:15:22

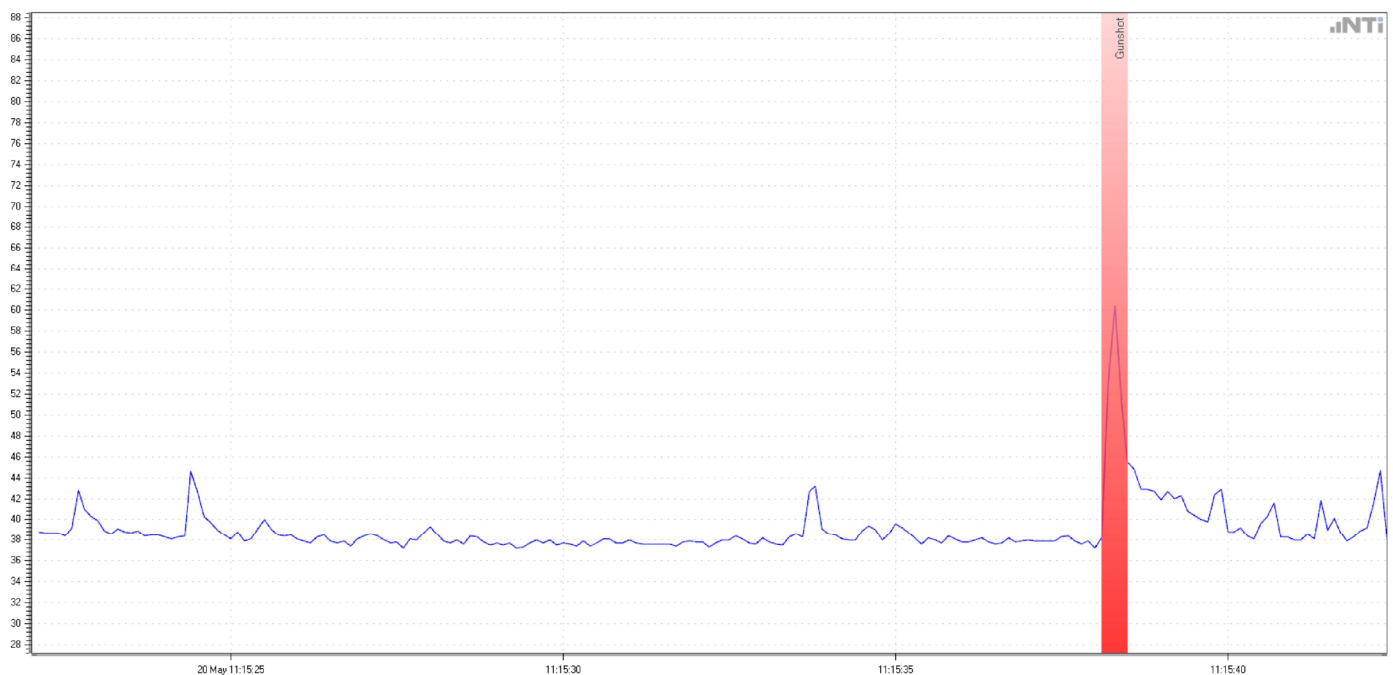
End: 2019-05-20 11:15:42.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: 9mm munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:16:08

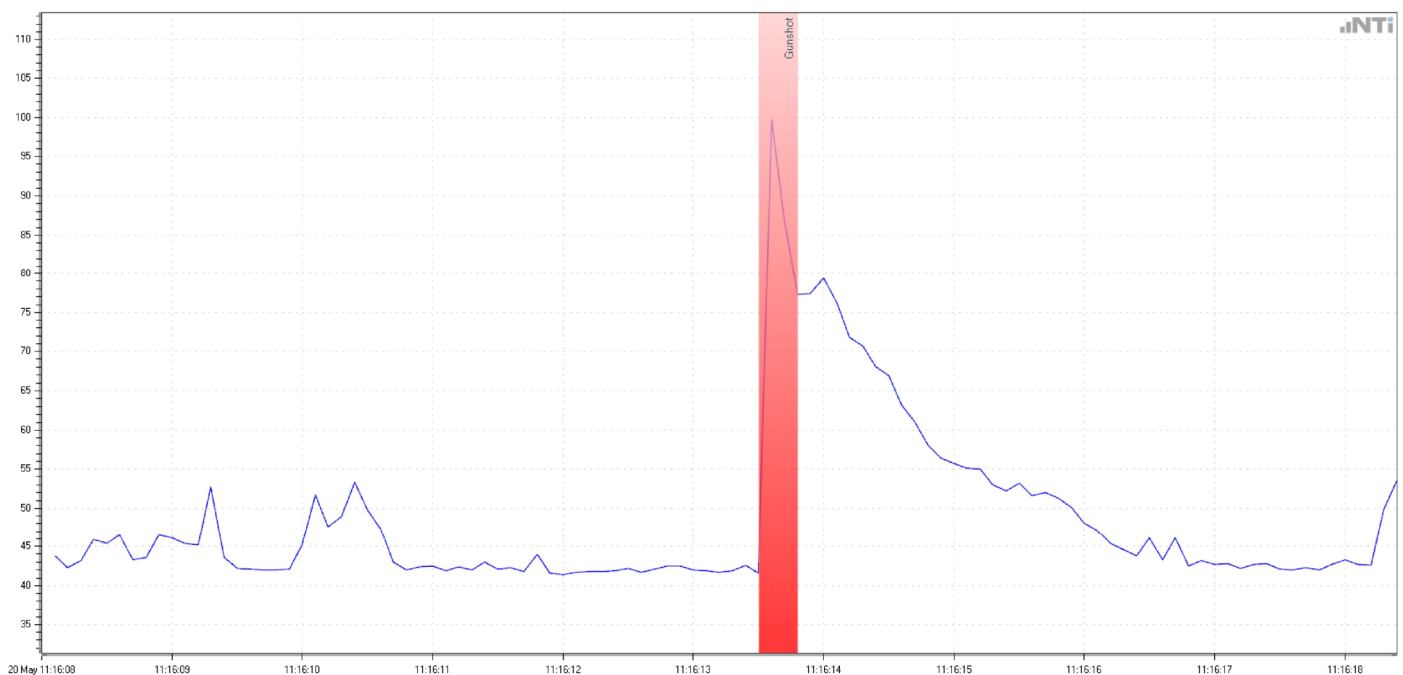
End: 2019-05-20 11:16:18.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: 9mm

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:16:00

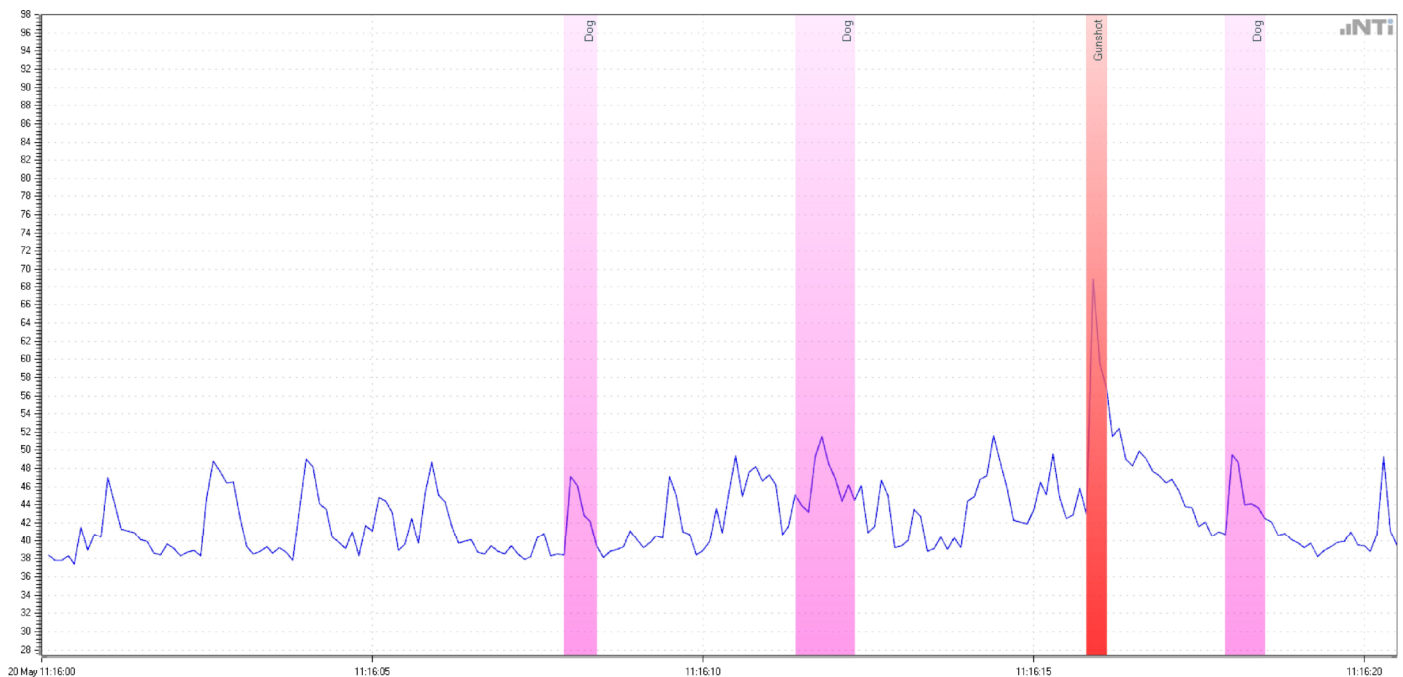
End: 2019-05-20 11:16:20.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: 9mm munition

Firing Direction: East



Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:09:20

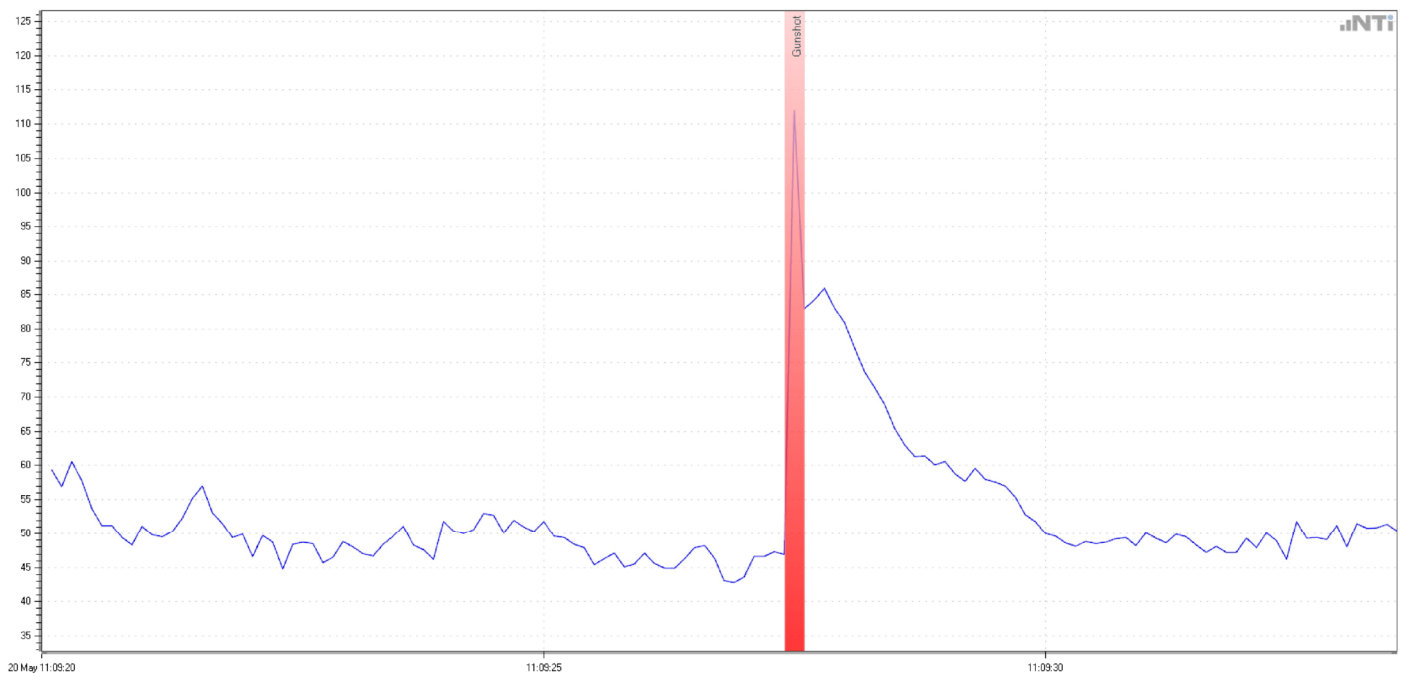
End: 2019-05-20 11:09:33.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:09:08

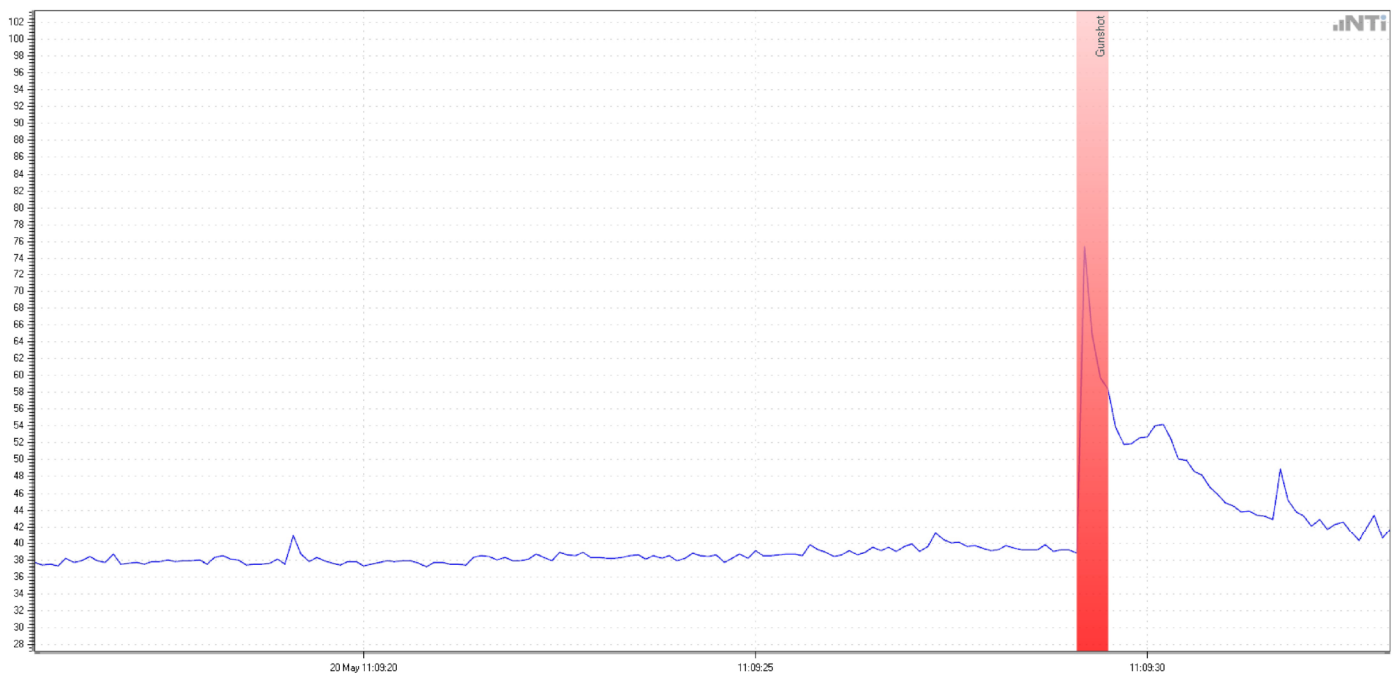
End: 2019-05-20 11:09:34.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .223 munition

Firing Direction: North



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:07:56

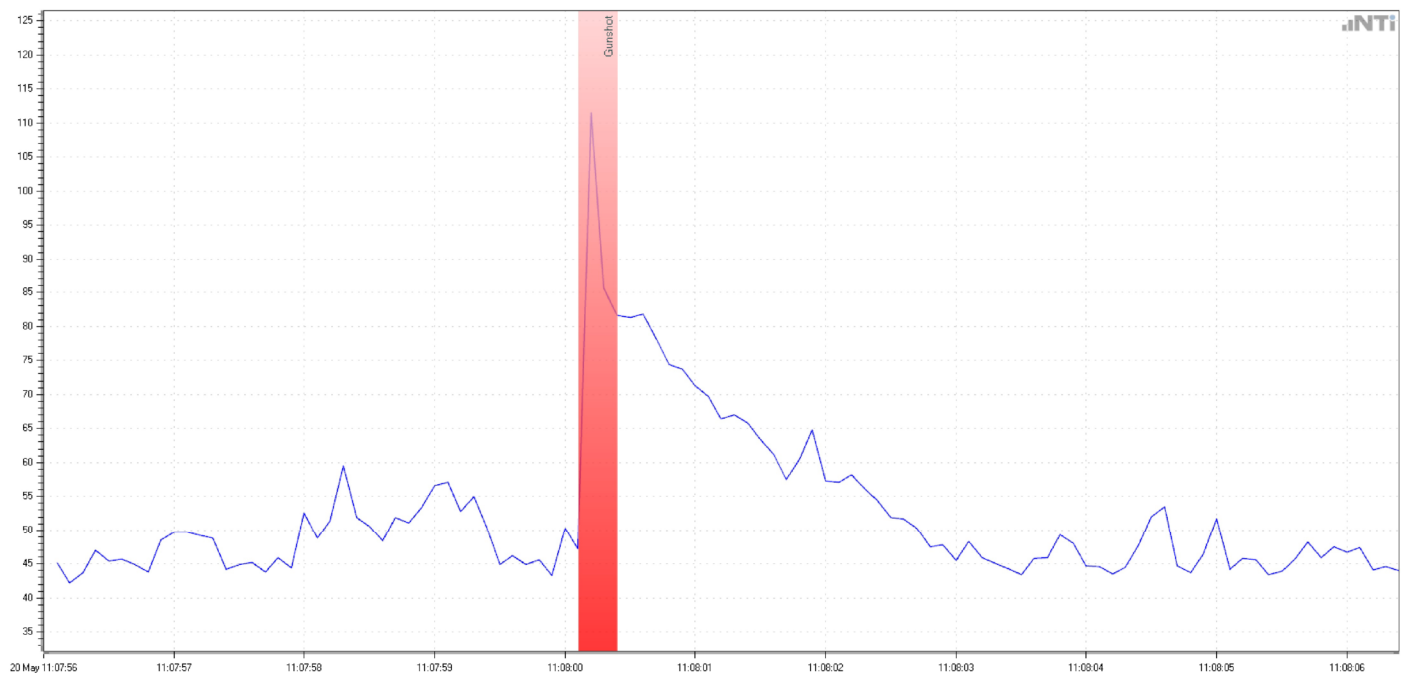
End: 2019-05-20 11:08:06.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:07:44

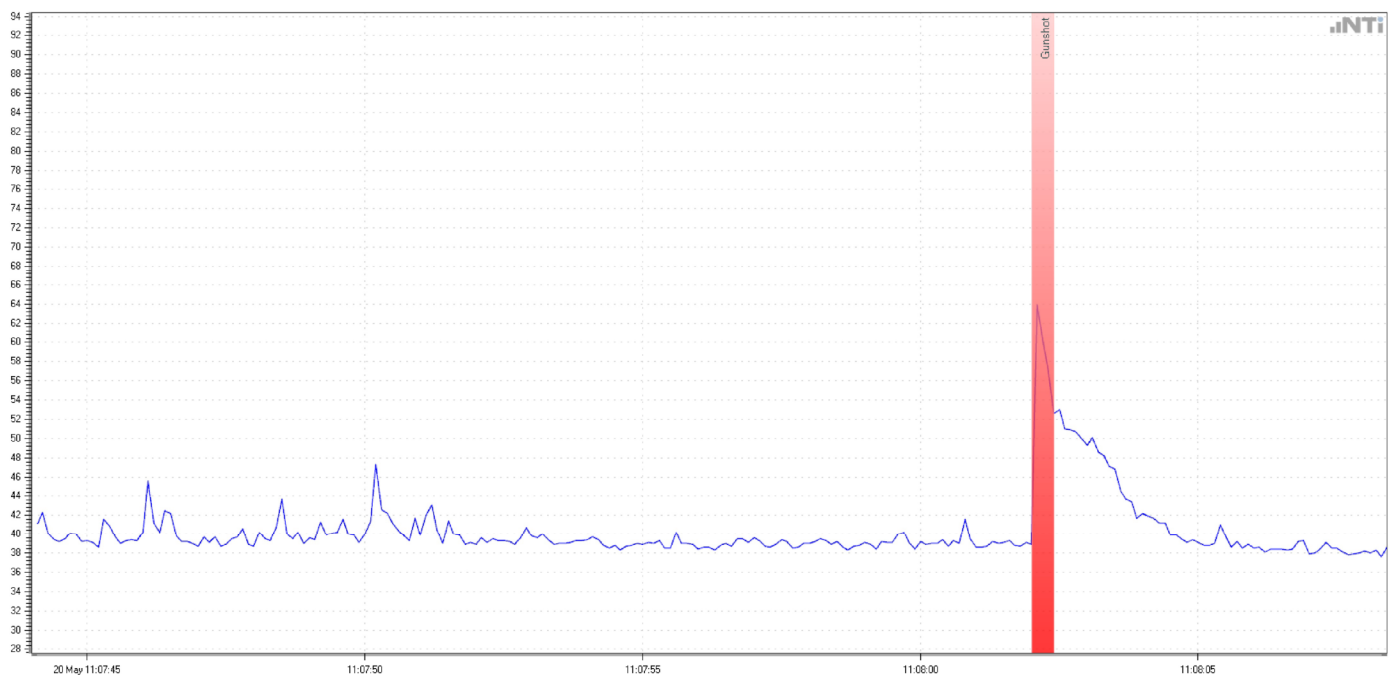
End: 2019-05-20 11:08:08.4

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .223 munition

Firing Direction: South



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:08:36

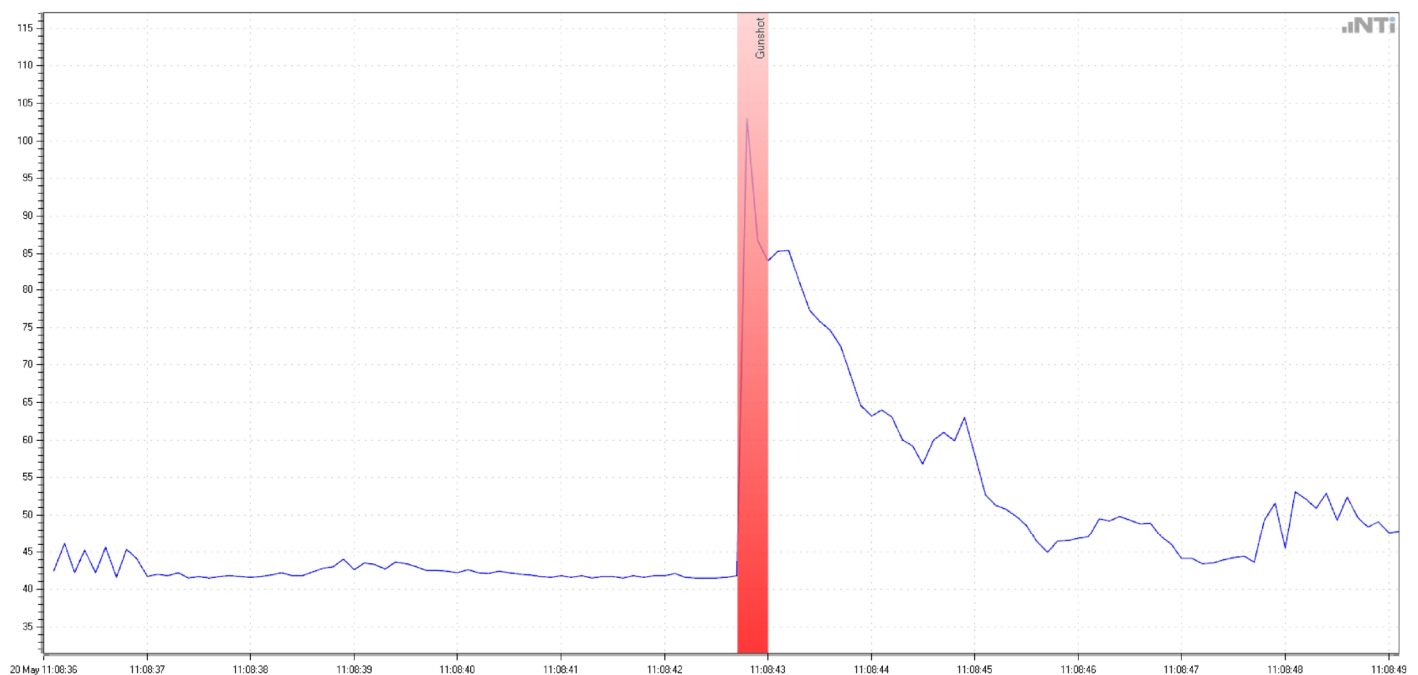
End: 2019-05-20 11:08:49.1

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was S.

Noise Type: .223

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-10212-E0, FW4.04

Mic Sensitivity: 47.4 mV/Pa (from NTi Audio M2230, SNo. 5566, User calibrated 2019-05-20 09:09)

Range: 40 - 140 dB

Newcomb & Boyd

CONSULTANTS AND ENGINEERS

Executive Firearms

Start: 2019-05-20 11:08:28

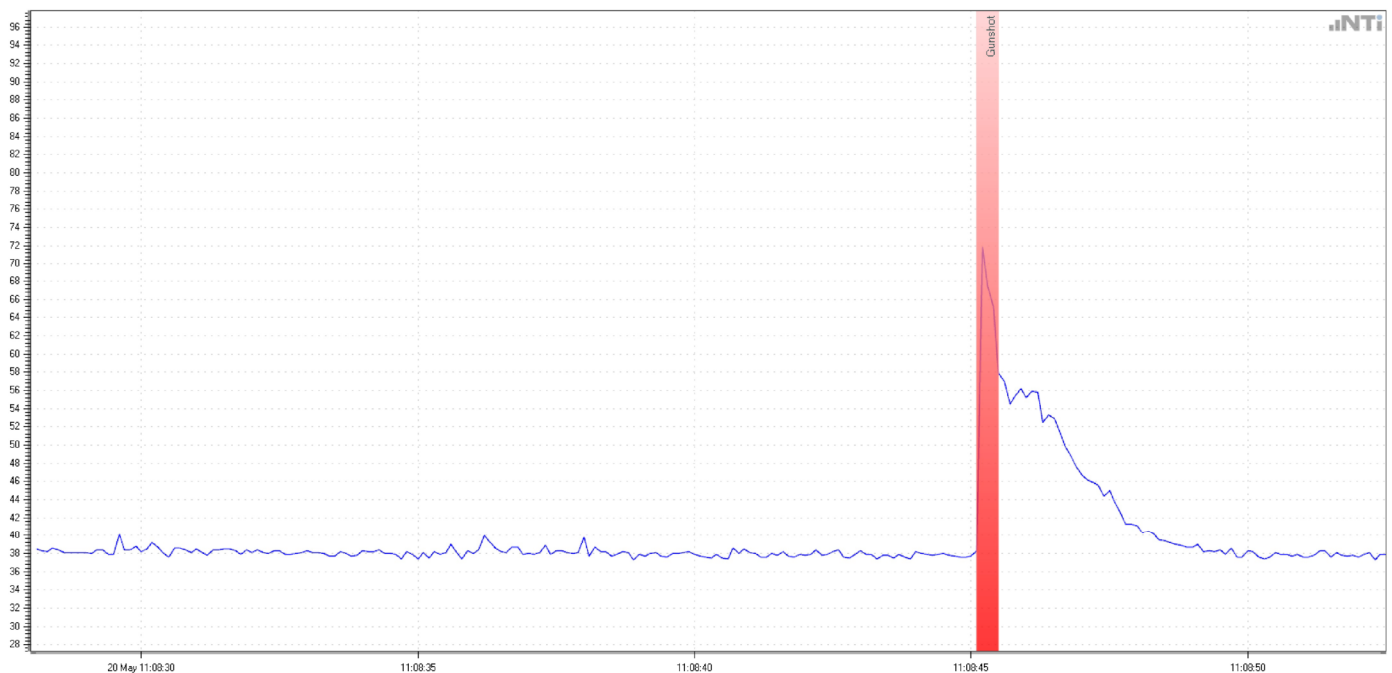
End: 2019-05-20 11:08:52.5

Measurements were taken for Executive Firearms in Talking Rock, GA.

The location of measurement was R3.

Noise Type: .223 munition

Firing Direction: East



— LAeq_dt

Configuration

Device Info: XL2, SNo. A2A-04416-D2, FW4.04

Mic Sensitivity: 24.4 mV/Pa (User calibrated 2019-05-20 09:21)

Range: 10 - 110 dB