

**APPENDIX F**

**NOISE**

USTA Tennis Center  
 Noise Measurement Results  
 Noise Appendix  
 Parking Garage Analysis  
 Parking Lot A  
**Build**

**1) Parking Garage**

$$\begin{aligned} \text{Leq @ 50 Feet} &= \text{SEL ref} + \text{CN} - 35.6 \\ &= 92 - 3.7366 - 35.6 \\ &= 52.7 \\ \text{Usage Factor} &= 1.0 \\ \text{SEL ref} &= 92 \\ \text{\# of autos per hour} &= 423 \\ \text{Leq @ 50 Feet} &= 52.7 \end{aligned}$$

Receptor	Distance (feet)	Leq (1-Hour)
1	3050	17.0
2	2000	20.7
3	800	28.6
4	720	29.5

**No Action**

**1) Park and Ride**

$$\begin{aligned} \text{Leq @ 50 Feet} &= \text{SEL ref} + \text{CN} - 35.6 \\ &= 101 - 10 - 35.6 \\ &= 55.4 \\ \text{Usage Factor} &= 1.0 \\ \text{SEL ref} &= 101 \\ \text{\# of autos per hour} &= 200 \\ \text{Leq @ 50 Feet} &= 55.4 \end{aligned}$$

Receptor	Distance (feet)	Leq (1-Hour)
1	3050	19.7
2	2000	23.4
3	800	31.3

Parking Lot B  
**Build**

**1) Parking Garage**

$$\begin{aligned} \text{Leq @ 50 Feet} &= \text{SEL ref} + \text{CN} - 35.6 \\ &= 92 - 4.31798 - 35.6 \\ &= 52.1 \\ \text{Usage Factor} &= 1.0 \\ \text{SEL ref} &= 92 \\ \text{\# of autos per hour} &= 370 \\ \text{Leq @ 50 Feet} &= 52.1 \end{aligned}$$

Receptor	Distance (feet)	Leq (1-Hour)
1	1350	23.5
2	1400	23.2
3	2000	20.1
4	720	20.4

**No Action**

**1) Park and Ride**

$$\begin{aligned} \text{Leq @ 50 Feet} &= \text{SEL ref} + \text{CN} - 35.6 \\ &= 101 - 13.0103 - 35.6 \\ &= 52.4 \\ \text{Usage Factor} &= 1.0 \\ \text{SEL ref} &= 101 \\ \text{\# of autos per hour} &= 100 \\ \text{Leq @ 50 Feet} &= 52.4 \end{aligned}$$

Receptor	Distance (feet)	Leq (1-Hour)
1	1350	23.8
2	1400	23.5
3	2000	20.4

USTA Tennis Center  
 Noise Measurement Results  
 Noise Appendix  
 Parking Garage Analysis

SiteID	Location	Time	Existing/No Action			Future With Action			Build Increment	
			Parking Lot A L <sub>eq</sub>	Parking Lot B L <sub>eq</sub>	Total L <sub>eq</sub>	Parking Lot A L <sub>eq</sub>	Parking Lot B L <sub>eq</sub>	Total L <sub>eq</sub>		
1	Promenade of Industry North of Industry Pond	WD	MD	19.7	23.8	63.1	17.0	23.5	63.1	0.0
			PM	19.7	23.8	61.3	17.0	23.5	61.3	0.0
		WE	MD	19.7	23.8	61.7	17.0	23.5	61.7	0.0
			PM	19.7	23.8	60.3	17.0	23.5	60.3	0.0
2	Herbert Hoover Promenade between United Nations Avenue and Avenue of Commerce	WD	MD	23.4	23.5	55.9	20.7	23.2	55.9	0.0
			PM	23.4	23.5	58.3	20.7	23.2	58.3	0.0
		WE	MD	23.4	23.5	57.6	20.7	23.2	57.6	0.0
			PM	23.4	23.5	63.5	20.7	23.2	63.5	0.0
3	United Nations Avenue between Avenue of Science and Grand Central Parkway	WD	MD	31.3	20.4	63.2	28.6	20.1	63.2	0.0
			PM	31.3	20.4	62.9	28.6	20.1	62.9	0.0
		WE	MD	31.3	20.4	62.7	28.6	20.1	62.7	0.0
			PM	31.3	20.4	63.6	28.6	20.1	63.6	0.0

USTA Tennis Center  
Noise Measurement Results

SiteID	Location			L <sub>eq</sub>	L <sub>1</sub>	L <sub>10</sub>	L <sub>50</sub>	L <sub>90</sub>	L <sub>Min</sub>	L <sub>Max</sub>
1	Promenade of Industry North of Industry Pond	WD	12:29 PM	63.1	72.9	63.8	61.1	59.6	56.8	78.9
			4:31 PM	61.3	68.0	62.4	60.7	59.4	58.5	74.7
		WE	11:12 AM	61.7	70.1	63.5	60.0	58.6	57.5	74.8
			12:58 PM	62.1	68.6	63.0	59.6	58.1	56.5	84.7
			3:09 PM	62.1	66.6	63.0	61.6	60.6	59.7	77.8
			4:54 PM	62.4	65.0	63.9	62.1	60.9	59.3	69.5
			6:36 PM	61.8	64.2	63.1	61.7	60.4	58.8	67.0
8:13 PM	60.3	62.5	61.0	60.1	59.3	58.3	68.5			
2	Herbert Hoover Promenade between United Nations Avenue and Avenue of Commerce	WD	1:06 PM	55.9	61.5	57.5	55.2	53.8	53.0	64.8
			5:07 PM	58.3	63.2	59.3	57.8	56.6	55.4	72.0
		WE	11:39 AM	57.8	64.7	59.4	56.9	55.5	54.3	71.3
			1:28 PM	57.6	62.7	59.0	57.1	55.8	54.7	68.0
			3:35 PM	59.9	64.4	61.3	59.4	58.2	56.5	69.1
			5:22 PM	63.5	73.6	64.9	61.3	59.5	58.0	80.3
			7:03 PM	63.6	71.3	65.8	62.0	60.1	58.6	76.7
3	United Nations Avenue between Avenue of Science and Grand Central Parkway	WD	1:42 PM	63.2	69.4	64.8	62.3	61.2	58.4	76.2
			5:48 PM	62.9	67.6	64.9	62.2	60.7	58.8	75.2
		WE	12:16 PM	64.4	72.0	65.4	63.2	62.1	60.5	78.1
			2:04 PM	62.7	66.4	63.9	62.4	61.4	60.1	68.1
			4:12 PM	64.2	67.4	65.5	63.8	62.9	61.8	69.4
			5:57 PM	64.9	72.2	66.4	63.8	62.5	61.5	77.4
			7:34 PM	63.6	68.4	64.6	63.0	62.0	60.5	73.5
15 feet South of Louis Armstrong Stadium		WD	11:29 AM	72.1	76.2	73.8	71.6	70.3	69.0	82.1
			3:37 PM	72.0	77.6	73.3	71.3	70.1	68.9	82.1
			7:54 PM	72.0	75.5	73.9	71.5	70.0	68.7	78.1
65 feet South of Louis Armstrong Stadium		WD	11:56 AM	72.5	78.8	74.7	71.6	69.3	67.7	83.4
			4:00 PM	71.9	76.6	73.7	71.1	69.6	67.8	85.8
			8:17 PM	71.6	76.7	73.9	70.7	68.9	67.4	82.8

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center			Date	8/31/11	
Location		15' South of Louis Armstrong Stadium			# Site	2	
Equipment / Calibration Info	Meter	SN: 238 <del>4</del> 4814	Date:	7/26/11		Observer: Christian	
	Mic	SN: 2385722	Date:	7/26/11			
	Calib	SN: 2688762	Date:	8/3/11			
Plan View							
<p style="text-align: center;">Stadium</p> <p style="text-align: center;">  Entrance  </p> <p style="text-align: center;">15'</p> <p style="text-align: center;">⊗</p> <p style="text-align: center;">Pedestrian Plaza</p>							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:29		# Bus		# Motorcycle		# Airplane/ Train
L1	<del>76.0</del> 76.2	L50	<del>71.4</del> 71.6	Lmin	69.0	Leq	72.1
L10	<del>73.6</del> 73.8	L90	<del>70.2</del> 70.3	Lmax	82.1	Lpeak	
Note: 0002 ped noise greater than stadium (amplified)							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	15:37		# Bus		# Motorcycle		# Airplane/ Train
L1	<del>77.4</del> 77.6	L50	<del>71.2</del> 71.3	Lmin	68.9	Leq	<del>72.0</del> 72.1 72.0
L10	<del>73.2</del> 73.3	L90	<del>70.0</del> 70.1	Lmax	82.1	Lpeak	
Note: 0008							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	19:54		# Bus		# Motorcycle		# Airplane/ Train
L1	<del>75.4</del> 75.5	L50	<del>71.4</del> 71.5	Lmin	68.7	Leq	72.0
L10	<del>73.8</del> 73.9	L90	70.0	Lmax	78.1	Lpeak	
Note: 0014							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center			Date	8/31/11	
Location		65' South of Louis Armstrong Stadium			# Site	3	
Equipment / Calibration Info	Meter	SN: 2384814	Date:	8-7/26/11	Observer: Christian		
	Mic	SN: 2385722	Date:	7/26/11			
	Calib	SN: 2688762	Date:	8/3/11			
Plan View							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:56		# Bus		# Motorcycle		# Airplane/ Train
L1	78.6 78.8	L50	71.4 71.6	Lmin	67.7	Leq	72.5
L10	74.6 74.7	L90	69.2 69.3	Lmax	83.4	Lpeak	
Note:	D003 red noise dominant						
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:00		# Bus		# Motorcycle		# Airplane/ Train
L1	76.6	L50	71.0 71.1	Lmin	67.8	Leq	71.9
L10	73.6 73.7	L90	69.4 69.6	Lmax	85.8	Lpeak	
Note:	D009						
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	20:17		# Bus		# Motorcycle		# Airplane/ Train
L1	76.6 76.7	L50	70.6 70.7	Lmin	67.4	Leq	71.6
L10	73.8 73.9	L90	68.8 68.9	Lmax	82.8	Lpeak	
Note:	D015						
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center			Date	8/31/11	
Location		Promenade of Industry Immediately Not Pond			# Site	4	
Equipment / Calibration Info	Meter	SN: 2384814	Date:	7/26/11		Observer: Christian	
	Mic	SN: 2385722	Date:	7/26/11			
	Calib	SN: 2688762	Date:	8/3/11			

Plan View

Soccer Fields

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	12:29		# Bus		# Motorcycle	2	# Airplane/ Train
L1	22.8 72.9	L50	61.0 61.1	Lmin	56.8	Leq	63.1
L10	63.8	L90	59.4 59.6	Lmax	78.9	Lpeak	
Note: 0004 paused for planes							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:31		# Bus		# Motorcycle		# Airplane/ Train
L1	68.0	L50	60.6 60.7	Lmin	58.5	Leq	61.3
L10	62.2 62.4	L90	59.2 59.4	Lmax	74.7	Lpeak	
Note: 0010							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Page of

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	North of Industry Pond (Promenade of Industry)			# Site	<del>5</del> 4
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

See previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:12		# Bus		# Motorcycle		# Airplane/ Train
L1	70.1	L50	60.0	Lmin	57.5	Leq	61.7
L10	63.5	L90	58.6	Lmax	74.8	Lpeak	

Note: 0017 88°F, 9mph many soccer games going on, paused for planes, event vehicles

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	12:58		# Bus		# Motorcycle		# Airplane/ Train
L1	68.4 68.6	L50	59.4 59.6	Lmin	56.5	Leq	62.1
L10	63.0	L90	58.0 58.1	Lmax	84.7	Lpeak	

Note: 0020 87°F, 8mph

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	15:09		# Bus		# Motorcycle		# Airplane/ Train
L1	66.6	L50	61.6	Lmin	59.7	Leq	<del>63.5</del> 62.1
L10	63.0	L90	<del>60.4</del> 60.6	Lmax	77.8	Lpeak	

Note: 0023 80°F, 11mph paused for planes, event vehicles

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	16:54		# Bus		# Motorcycle		# Airplane/ Train
L1	64.8 65.0	L50	62.0 62.1	Lmin	59.3	Leq	62.4
L10	63.8 63.9	L90	60.8 60.9	Lmax	69.5	Lpeak	

Note: 0026 81°F, 10mph



NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	North of Industry Pond on Promenade of Industry			# Site	4
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

See previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	18:36		# Bus		# Motorcycle		# Airplane/ Train
L1	64.0 64.2	L50	61.6 61.7	Lmin	58.8	Leq	61.8
L10	63.0 63.1	L90	60.4	Lmax	67.0	Lpeak	

Note: 0029 77°F, 9mph

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	20:13		# Bus		# Motorcycle		# Airplane/ Train
L1	62.4 62.5	L50	60.0 60.1	Lmin	58.3	Leq	60.3
L10	61.0	L90	59.2 59.3	Lmax	68.5	Lpeak	

Note: 0032 76°F, 5mph

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center				Date	8/31/11
Location		H. Hoover Promenade btw UN Ave & Ave of Commerce				# Site	5
Equipment / Calibration Info	Meter	SN: 2384814	Date:	7/26/11	Observer:	Christian	
	Mic	SN: 2385722	Date:	7/26/11			
	Calib	SN: 2688762	Date:	8/3/11			
Plan View							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time	13:06		# Bus		# Motorcycle		# Airplane/ Train
L1	61.4 61.5	L50	55.0 55.2	Lmin	53.0	Leq	55.9
L10	57.4 57.5	L90	53.8	Lmax	64.8	Lpeak	
Note: DODS paused for planes, vehicles							
Period		2	# Automobile		# Medium Truck		# Heavy Truck
Time	17:07		# Bus		# Motorcycle		# Airplane/ Train
L1	63.0 63.2	L50	57.8	Lmin	55.4	Leq	58.3
L10	59.2 59.3	L90	56.4 56.6	Lmax	72.0	Lpeak	
Note: DOLL paused for planes, event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	H. Hoover Promenade btw UN Ave & Ave of Commerce			# Site	5
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

see previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	11:39		# Bus		# Motorcycle		# Airplane/ Train
L1	64.6 64.7	L50	56.8 56.9	Lmin	54.3	Leq	57.8
L10	59.4	L90	55.4 55.5	Lmax	71.3	Lpeak	

Note: 0018 78°F, 7mph paused for planes

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	13:28		# Bus		# Motorcycle		# Airplane/ Train
L1	62.6 62.7	L50	57.0 57.1	Lmin	54.7	Leq	57.6
L10	59.0	L90	55.6 55.8	Lmax	68.0	Lpeak	

Note: 0021 82°F, 7mph paused for planes, event vehicles

Period		5	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	15:35	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	64.4	L50	59.4	Lmin	56.5	Leq	59.9
L10	61.2 61.3	L90	58.0 58.2	Lmax	69.1	Lpeak	

Note: 0024 79°F, 6mph lots of people → soccer games, playing paused for planes, event vehicles

Period		1	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:22	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	73.6	L50	61.2 61.3	Lmin	58.0	Leq	63.5
L10	64.8 64.9	L90	59.4 59.5	Lmax	80.3	Lpeak	

Note: 0027 78°F, 4mph soccer games, whistles, yelling, paused for above

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	H. Hoover Promenade btw UN Ave & Ave of Commerce			# Site	5
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer:	Christian
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

See previous drawing

Period			# Automobile		# Medium Truck		# Heavy Truck
Time	19:03		# Bus		# Motorcycle		# Airplane/ Train
L1	<del>71.2</del> 71.3	L50	62.0	Lmin	58.6	Leq	63.6
L10	65.8	L90	<del>60.0</del> 60.1	Lmax	76.7	Lpeak	

Note: 0030 76°F, 4mph

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center				Date	8/31/11
Location		UN Ave btw Ave of Science & GCP				# Site	6
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11		Observer: Christian		
	Mic	SN: 2385722	Date: 7/26/11				
	Calib	SN: 2688762	Date: 8/3/11				
Plan View							
Period		19	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	13:42	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	69.2 69.4	L50	62.2 62.3	Lmin	58.4	Leq	63.2
L10	64.6 64.8	L90	61.0 61.2	Lmax	76.2	Lpeak	
Note: 0006 paused for planes & tournament vehicles							
Period		62	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:48	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	67.6	L50	62.2	Lmin	58.8	Leq	62.9
L10	64.8 64.9	L90	60.6 60.7	Lmax	75.2	Lpeak	
Note: 0012 paused for planes & event vehicles							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							
Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	
Note:							

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	UN Ave btw GCP & Ave of Science			# Site	6
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

see previous drawing

Period		21	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	12:16	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	<del>71.8</del> 72.0	L50	63.2	Lmin	60.5	Leq	64.4
L10	65.4	L90	62.0 62.1	Lmax	78.1	Lpeak	

Note: 0019 82°F, 2mph paused for planes & event vehicles

Period		15	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	14:04	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	<del>66.2</del> 66.4	L50	62.2 62.4	Lmin	60.1	Leq	62.7
L10	63.8 63.9	L90	61.4	Lmax	68.1	Lpeak	

Note: 0022 82°F, 3mph

Period		33	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	16:12	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	<del>67.2</del> 67.4	L50	63.8	Lmin	61.8	Leq	64.2
L10	65.4 65.5	L90	62.8 62.9	Lmax	69.4	Lpeak	

Note: 0025 79°F, 3mph

Period		64	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	17:57	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	72.2	L50	63.6 63.8	Lmin	61.5	Leq	64.9
L10	66.4	L90	62.4 62.5	Lmax	77.4	Lpeak	

Note: 0028 77°F, 2mph

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name	USTA Tennis Stadium			Date	9/3/11
Location	UN Ave btw Ave of Science & GCP			# Site	6
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 1800102	Date: 7/26/11		

Plan View

See previous drawing

Period		25	# Automobile	0	# Medium Truck	0	# Heavy Truck
Time	19:34	0	# Bus	0	# Motorcycle	0	# Airplane/ Train
L1	68.4	L50	63.0	Lmin	60.5	Leq	63.6
L10	64.6	L90	62.0	Lmax	73.5	Lpeak	

Note: 10031 75°F, 1mph

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

Period			# Automobile		# Medium Truck		# Heavy Truck
Time			# Bus		# Motorcycle		# Airplane/ Train
L1		L50		Lmin		Leq	
L10		L90		Lmax		Lpeak	

Note:

NOISE MONITORING FIELD DATA SHEET  
AKRF, Inc.

Project Name		USTA Tennis Center		Date	8/31/11
Location		Grandsand Court		# Site	7
Equipment / Calibration Info	Meter	SN: 2384814	Date: 7/26/11	Observer: Christian	
	Mic	SN: 2385722	Date: 7/26/11		
	Calib	SN: 2688762	Date: 8/3/11		
Plan View					
Period		# Automobile		# Medium Truck	# Heavy Truck
Time	19:31	# Bus		# Motorcycle	# Airplane/ Train
L1	84.9	L50	65.6	Lmin	57.9
L10	77.1	L90	61.0	Lmax	88.4
Note:		0013			
Period		# Automobile		# Medium Truck	# Heavy Truck
Time	21:10	# Bus		# Motorcycle	# Airplane/ Train
L1	92.9	L50	67.1	Lmin	56.3
L10	86.1	L90	60.0	Lmax	101.1
Note:		0016			
Period		# Automobile		# Medium Truck	# Heavy Truck
Time		# Bus		# Motorcycle	# Airplane/ Train
L1		L50		Lmin	Leq
L10		L90		Lmax	Lpeak
Note:					
Period		# Automobile		# Medium Truck	# Heavy Truck
Time		# Bus		# Motorcycle	# Airplane/ Train
L1		L50		Lmin	Leq
L10		L90		Lmax	Lpeak
Note:					



## Calibration Certificate No.24335

**Instrument:** Sound Level Meter  
**Model:** 2260  
**Manufacturer:** Brüel and Kjær  
**Serial number:** 2384814  
**Tested with:** Microphone 4189 s/n 2385722  
Preamplifier ZC0026  
**Type (class):** 1  
**Customer:** AKRF, Inc.  
**Tel/Fax:** 212-696-0670 / 212-213-3191

**Date Calibrated:** 7/26/2011 **Cal Due:**  
**Status:**

Received	Sent
X	X

  
**In tolerance:**

X	X
---	---

  
**Out of tolerance:**

--	--

  
**See comments:**  
**Contains non-accredited tests:**    Yes X No  
**Calibration service:**    Basic X Standard  
**Address:** 440 Park Avenue South, 7th Floor  
New York, NY 10016

**Tested in accordance with the following procedures and standards:**  
Calibration of Sound Level Meters, Scantek Inc., 06/07/2005  
SLM & Dosimeters – Acoustical Tests, Scantek Inc., 06/15/2005

**Instrumentation used for calibration:** Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence	Cal. Due
				Cal. Lab / Accreditation	
483B-Norsonic	SME Cal Unit	25747	Jan 4, 2011	Scantek, Inc./ NVLAP	Jan 4, 2012
DS-360-SRS	Function Generator	61646	Nov 13, 2009	ACR Env. / A2LA	Nov 13, 2011
34401A-Agilent Technologies	Digital Multimeter	MY41022043	Nov 17, 2010	ACR Env. / A2LA	Nov 17, 2011
DPI 141-Druck	Pressure Indicator	790/00-04	Dec 13, 2010	ACR Env. / A2LA	Dec 13, 2012
HM30-Thommen	Meteo Station	1040170/3963 3	Jun 26, 2010	ACR Env. / A2LA	Dec 26, 2011
PC Program 1019 Norsonic	Calibration software	v.5.0	Validated July 2009	-	-
1251-Norsonic	Calibrator	30878	Dec 7, 2010	Scantek, Inc./ NVLAP	Dec 7, 2011

**Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).**

**Environmental conditions:**

Temperature (°C)	Barometric Pressure (kPa)	Relative Humidity (%)
23.7 °C	99.532 kPa	54.1 %RH

Calibrated by	Kristen van Otterloo	Checked by	Mariana Buzduga
Signature	<i>Kristen van Otterloo</i>	Signature	<i>lib</i>
Date	7/26/2011	Date	7/27/2011

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory.  
This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

**Results summary:** Device complies with following clauses of mentioned specifications:

CLAUSES <sup>1</sup> FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	MET <sup>2,3</sup>	NOT MET	MEASUREMENT EXPANDED UNCERTAINTY (coverage factor 2) [dB]
<b>IEC 60651/ANSI S1.4:</b>			
Input Amplifier Test: Gain Step test/Amplifier Setting (# 6.3/5.3)	X		0.15
Level Linearity Test (#7.9/ 6.9)	X		0.15
Weighting Network Tests: A, C, Lin network (#7.2.1/ 6.2.1-electrical test)	X		0.15
Overload Detector Test: A-network (#9.3.1/8.3.1)	X		0.15
F/S//Peak Test: Steady State Response (#7.4/ 6.4)	X		0.15
Fast and Slow Overshoot Test (# 8.4.1)	X		0.15
Fast-Slow Test: Single Sine Wave Burst (9.4.1&9.4.3/8.4.1 & 8.4.3)	X		0.15
Impulse Test: Continuous Sine Wave Burst (#7.3/ 6.3)	X		0.15
Impulse Test: Single Sine Wave Burst (#7.3/ 6.3)	X		0.15
Peak Detector Tests: single square wave burst (# 9.4.4/8.4.4)	X		0.15
RMS Detector Test: Continuous Sine Wave Burst (#9.4.2/8.4.2)	X		0.15
RMS Detector Test: Crest Factor Test (#9.4.2/ 8.4.2)	X		0.15
<b>IEC60804/ANSI S1.43</b>			
Level linearity Test (# 9.3.3/8.3.3)	X		0.15
Time Averaging Test (#9.3.2/ 8.3.2) (Leq and LE)	X		0.15/0.17
Acoustical Test: Accuracy at selected frequencies	X		0.15
Global Acoustical response: Summation (w/ actuator) (#5)	X		0.2-0.5
Filter Test: Octave Filters	X		0.2
Filter Test: 1/3 Octave Filters	X		0.2

<sup>1</sup> The results of this calibration apply only to the instrument type with serial number identified in this report.

<sup>2</sup> Parameters are certified at actual environmental conditions.

<sup>3</sup> The tests marked with (\*) are not covered by the current NVLAP accreditation.

**Comments:** The instrument was tested and met all specifications found in the referenced procedures.

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger. Compliance with any standard cannot be claimed based solely on the periodic tests.

**Tests made with the following attachments to the instrument:**

X	Microphone 4189 s/n 2385722 for acoustical test
X	Preamplifier ZC0026 for all tests
X	Other: line adaptor ADP005 (18pF) for electrical tests

**Measured Data:** in Test Report # 24335 of 12 + 1 pages.

**Place of Calibration: Scantek, Inc.**  
6430 Dobbin Road, Suite C  
Columbia, MD 21045 USA

Ph/Fax: 410-290-7726/ -9167  
callab@scantekinc.com

Calibration Certificates or Test Reports shall not be reproduced, except in full, without written approval of the laboratory. This Calibration Certificate or Test Reports shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the federal government.

Document stored as: Z:\Calibration Lab\SLM 2011\BNK2260\_2384814\_M2.doc

Page 2 of 2

# Calibration Summary of Test Report No.:24335

Brüel and Kjær Type: 2260 Serial no: 2384814

Customer: AKRF, Inc.  
Address: 440 Park Avenue South, 7th Floor New York, NY 10016  
Contact Person: Christian Thompson  
Phone No.: 212-696-0670  
Fax No.: 212-213-3191  
eMail: cthompson@akrf.com

Instrument software version: 1.2  
Microphone: Brüel & Kjær Type: 4189 Serial no: 2385722 Sens:-25.8dB  
Preamplifier Brüel & Kjær Type: ZC0026 Serial no:  
Calibrator: Brüel and Kjær Type: 4231 Serial no: 1800102 Level:93.94dB

Measured with Preamplifier

## Measurement Results:

Calibration of sound level meter - ANSI S1.4 Clause 3.2	Passed
Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clause 5.3	Passed
Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10	Passed
Weighting Network Test: A Network - ANSI S1.4-1983 Clause 8.2.1	Passed
Weighting Network Test: C Network - According to ANSI S1.4-1983 Clause 8.2.1	Passed
Weighting Network Test: Linear Network - According to ANSI S1.4-1983 Clause 8.2.1	Passed
Overload Detector Test: A-Network - ANSI S1.4-1983 Clause 8.3.1	Passed
F/S/I/Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4	Passed
Fast-Slow Test: Overshoot test - According to ANSI S1.4 1983 Clause 8.4.1	Passed
Fast-Slow Test: Single Sine Wave Burst - ANSI S1.4 1983 Clause 8.4.1 & 8.4.3	Passed
Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3	Passed
Impulse Test: Single Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.1 & 8.4.3	Passed
Peak Detector Test, single square wave burst - According to ANSI S1.4 1983 Clause 8.4.4	Passed
RMS Detector Test: Crest Factor Test - According to ANSI S1.4-1983 Clause 8.4.2	Passed
RMS Detector Test: Continuous Sine Wave Burst - According to ANSI S1.4-1983 Clause 8.4.2	Passed
Time Averaging Test: Averaging Functions - ANSI S1.43 Clause 9.3.2	Passed
Linearity Test - ANSI S1.43 Clause 9.3.3	Passed
Filter Test 1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3	Passed
Filter Test 1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3	Passed
Summation of acoustic tests - ANSI S1.4 Clause 5 using Actuator	Passed

## Environmental conditions:

Pressure: 99.532 kPa Temperature: 23.7 °C Relative humidity: 54.1 %RH

Date of calibration: 7/26/2011

Date of issue: 7/26/2011

Supervisor: Mariana Buzduga

Measurements performed by:



Kristen van Otterloo

Software version: 5.2a

**Scantek, Inc.**

6430 Dobbin Rd., Suite C, Columbia, MD 21045  
Ph: 410-290-7726 eMail: callab@scantekinc.com

# Test Report No.:24335

Manufacturer: Brüel and Kjær  
Instrument type: 2260  
Serial no: 2384814  
Customer: AKRF, Inc.  
Department:  
Order No:  
Contact Person: Christian Thompson  
Address: 440 Park Avenue South, 7th Floor New York, NY 10016

## Environmental conditions:

Pressure: 99.532 kPa  
Temperature: 23.7 °C  
Relative humidity: 54.1 %RH

Supervisor Mariana Buzduga  
Engineer Kristen van Otterloo  
Date: 7/26/2011

# Measurement Results:

## Calibration of sound level meter - ANSI S1.4 Clause 3.2

Reference Calibrator: WSC4 - NOR1251-30878  
Reference calibrator level: 113.97  
Before calibration:  
  Environmental corrections: 0.00  
  Other corrections: 0.1  
  Notional level: 114.07  
Reference calibrator level before calibration: 114.1  
After calibration:  
  Environmental corrections: 0.00  
  Other corrections: 0.1  
  Notional level: 114.07  
Reference calibrator level after calibration: 114.1  
Associated Calibrator: Brüel and Kjær - 4231 - 1800102  
Associated calibrator level: 93.94  
Initial level check:  
  Environmental corrections before calibration: 0.00  
  Other corrections: 0.1  
  Notional level: 94.04  
Indicated level before calibration: 94.0  
Final level statement:  
  Environmental corrections after calibration: 0.00  
  Other corrections: 0.1  
  Notional level: 94.04  
Indicated level after calibration: 94.0  
This value shall be used for adjusting the sound level meter in the future.  
Test Passed

## Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clause 5.3

The level range control is tested in 10 dB steps. The SLM is set to the reference range and the signal generator is adjusted to give a reading equal to the reference level (Normally 94 dB.) The SLM range control is then set to the least sensitive range, and the generator level is set to 10 dB below full scale. The level range control is then decreased in 10 dB steps until the most sensitive range is reached. The generator level is adjusted accordingly.

Full Scale (dB)	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
Measured at 31.5 Hz					
130	114.0	114.0	0.5	0.0	P
120	104.0	104.0	0.5	0.0	P
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P
Measured at 1000 Hz					
130	114.0	113.9	0.5	-0.1	P
120	104.0	104.1	0.5	0.1	P

Input Amplifier Test: Gain Test / Attenuator setting - According to ANSI S1.4-1983 Clause 6.9 & 6.10

Full Scale (dB)	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P
Measured at 8000 Hz					
130	114.0	114.0	0.5	0.0	P
120	104.0	104.0	0.5	0.0	P
110	94.0	94.0	0.5	0.0	P
100	84.0	84.0	0.5	0.0	P
90	74.0	74.0	0.5	0.0	P
80	64.0	64.0	0.5	0.0	P
70	54.0	54.0	0.5	0.0	P

Test Passed

**Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10**

The SLM is set to the reference range and the signal generator is adjusted to give a reading equal to the reference level (Normally 94dB.) The test signal is increased to give a reading equal to FSD. The generator is lowered in 1 dB step until the lower limit of the reference range is reached. The Fast SPL value is measured. The error is measured relative to 94 dB, in the last one dB step and the max error in a floating 10 dB window.

Nom. Value (dB)	Meas. Value (dB)	Tolerance limits (dB)	Error in the last 1dB (dB)	Max Error in the last 10dB (dB)	Error Rel. to ref. level (dB)
Measured at 31.5 Hz					
94.0	93.9	0.3/1.0/1.0	0.0 P	0.0 P	-0.1 P
95.0	95.0	0.3/1.0/1.0	0.1 P	0.1 P	0.0 P
100.0	100.0	0.3/1.0/1.0	0.0 P	0.1 P	0.0 P
105.0	105.0	0.3/1.0/1.0	0.0 P	0.0 P	0.0 P
106.0	106.0	0.3/1.0/1.0	0.0 P	0.0 P	0.0 P
107.0	106.9	0.3/1.0/1.0	-0.1 P	0.1 P	-0.1 P
108.0	107.9	0.3/1.0/1.0	0.0 P	0.1 P	-0.1 P
109.0	108.8	0.3/1.0/1.0	-0.1 P	0.2 P	-0.2 P
94.0	94.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
90.0	90.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
85.0	85.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
80.0	80.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
75.0	75.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
70.0	70.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
65.0	65.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
60.0	60.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
55.0	55.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
50.0	50.0	0.2/0.4/0.7	0.0 P	0.0 P	0.0 P
45.0	45.1	0.2/0.4/0.7	0.1 P	0.1 P	0.1 P
40.0	40.0	0.2/0.4/0.7	-0.1 P	0.1 P	0.0 P
37.0	37.1	0.2/0.4/0.7	0.1 P	0.1 P	0.1 P
36.0	36.1	0.2/0.4/0.7	0.0 P	0.1 P	0.1 P
35.0	35.1	0.2/0.4/0.7	0.0 P	0.1 P	0.1 P
34.0	34.2	0.2/0.4/0.7	0.1 P	0.2 P	0.2 P
Measured at 1000 Hz					

Level Linearity Test - According to ANSI S1.4-1983, Clause 6.9 & 6.10								
Nom. Value	Meas. Value	Tolerance limits	Error in the last 1dB		Max Error in the last 10dB		Error Rel. to ref. level	
(dB)	(dB)	(dB)	(dB)		(dB)		(dB)	
94.0	94.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
95.0	95.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
100.0	100.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
105.0	105.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
106.0	106.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
107.0	107.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
108.0	108.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
109.0	109.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
94.0	94.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
90.0	90.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
85.0	85.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
80.0	80.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
75.0	75.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
70.0	70.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
65.0	65.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
60.0	60.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
55.0	55.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
50.0	50.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
45.0	45.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
40.0	40.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
37.0	37.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
36.0	36.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
35.0	35.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
34.0	34.2	0.2/0.4/0.7	0.1	P	0.2	P	0.2	P
Measured at 8000 Hz								
94.0	94.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
95.0	95.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
100.0	100.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
105.0	105.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
106.0	106.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
107.0	107.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
108.0	108.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
109.0	109.0	0.3/1.0/1.0	0.0	P	0.0	P	0.0	P
94.0	94.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
90.0	90.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
85.0	85.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
80.0	80.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
75.0	75.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
70.0	70.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
65.0	65.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
60.0	60.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
55.0	55.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
50.0	50.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
45.0	45.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
40.0	40.0	0.2/0.4/0.7	0.0	P	0.0	P	0.0	P
37.0	37.1	0.2/0.4/0.7	0.1	P	0.1	P	0.1	P
36.0	36.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
35.0	35.1	0.2/0.4/0.7	0.0	P	0.1	P	0.1	P
34.0	34.2	0.2/0.4/0.7	0.1	P	0.2	P	0.2	P

Test Passed

### Weighting Network Test: A Network - ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm		Error Value (dB)	Result
			Upp. (dB)	Low. (dB)		
31.6	68.6	68.8	1.5	-1.5	0.2	P
63.1	81.8	81.8	1.0	-1.0	0.0	P
125.9	91.9	91.9	1.0	-1.0	0.0	P
251.2	99.4	99.4	1.0	-1.0	0.0	P
501.2	104.8	104.8	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	109.2	109.2	1.0	-1.0	0.0	P
3981.1	109.0	109.0	1.0	-1.0	0.0	P
7943.3	106.9	106.9	1.5	-3.0	0.0	P
12589.3	103.7	103.6	3.0	-6.0	-0.1	P

Test Passed

### Weighting Network Test: C Network - According to ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm		Error Value (dB)	Result
			Upp. (dB)	Low. (dB)		
31.6	105.0	105.0	1.5	-1.5	0.0	P
63.1	107.2	107.2	1.0	-1.0	0.0	P
125.9	107.8	107.8	1.0	-1.0	0.0	P
251.2	108.0	108.0	1.0	-1.0	0.0	P
501.2	108.0	108.0	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	107.8	107.8	1.0	-1.0	0.0	P
3981.1	107.2	107.2	1.0	-1.0	0.0	P
7943.3	105.0	105.0	1.5	-3.0	0.0	P
12589.3	101.8	101.7	3.0	-6.0	-0.1	P

Test Passed



## Weighting Network Test: Linear Network - According to ANSI S1.4-1983 Clause 8.2.1

The frequency weighting networks test is performed with the SLM set to reference range. Reference frequency is 1000 Hz. The test signal is adjusted to give a full scale indication at 1000 Hz. The frequency of the test signal is increased in 1/3 octave steps from 10 Hz to 20 kHz. All applicable networks can be tested (I.E. A, B and C).

Freq (Hz)	Ref. (dB)	Measured value (dB)	Tolerance norm		Error Value (dB)	Result
			Upp. (dB)	Low. (dB)		
31.6	108.0	108.0	1.5	-1.5	0.0	P
63.1	108.0	108.0	1.0	-1.0	0.0	P
125.9	108.0	108.0	1.0	-1.0	0.0	P
251.2	108.0	108.0	1.0	-1.0	0.0	P
501.2	108.0	108.0	1.0	-1.0	0.0	P
1000.0	108.0	108.0	1.0	-1.0	0.0	P
1995.3	108.0	108.0	1.0	-1.0	0.0	P
3981.1	108.0	108.0	1.0	-1.0	0.0	P
7943.3	108.0	108.0	1.5	-3.0	0.0	P
12589.3	108.0	107.9	3.0	-6.0	-0.1	P

Test Passed

## Overload Detector Test: A-Network - ANSI S1.4-1983 Clause 8.3.1

The SLM is set to A-weighted and the least sensitive range setting. A sine wave of 1000 Hz is applied to the SLM with an amplitude that gives a reading 5 dB less than the maximum level the SLM is designed to measure. The test signal is lowered in 1/3 octave frequency steps until 20 Hz is reached. The amplitude of the test signal is simultaneously increased corresponding to the inverse of the A-weighting curve. The overload indication shall be turned on before the measured Slow SPL value is deviating more than one dB from the initial value measured at 1000 Hz.

Freq. (Hz)	Level Increase (dB)	Meas. Value (dB)	Tol. Upp. Low.		Error Value (dB)	Error Code
			(dB)	(dB)		
The Reference range is used for this test because of expected high signal amplitude.						
1000.0	0.0	105.0	-1.0	1.0	0.0	P No overload
794.3	0.8	105.0	-1.0	1.0	0.0	P No overload
631.0	1.9	105.0	-1.0	1.0	0.0	P No overload
501.2	3.2	105.0	-1.0	1.0	0.0	P No overload
398.1	4.8	105.0	-1.0	1.0	0.0	P No overload
316.2	6.6	105.0	-1.0	1.0	0.0	P Overload

Test Passed

## F/S//Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4

A continuous sine wave is applied and adjusted to give an indication of 94.0 dB with time constant F(ast). The instrument is set to S(low) and I(mpulse), if applicable. The indication shall not differ more than 0.1 dB for type 0,1,2 instruments and 0.2 for type 3 instruments.

Time Const.	Norm Value (dB)	Measured Value (dB)	Tol. limit (dB)	Error Value (dB)
Fast	94.0	94.0	0.1	0.0 P
Slow	94.0	94.0	0.1	0.0 P

F/S/I/Peak Test: Steady State Response - According to ANSI S1.4 1983 Clause 6.4

Time Const.	Norm Value (dB)	Measured Value (dB)	Tol. limit (dB)	Error Value (dB)
Imp.	94.0	94.0	0.1	0.0 P

Test Passed

### Fast-Slow Test: Overshoot test - According to ANSI S1.4 1983 Clause 8.4.1

The overshoot is tested by applying a sine wave that step (sudden increase) in amplitude by 20 dB. The steady end response shall give a signal 4 dB below the upper limit of primary indicator range. The difference between the maximum value and the end value tells the overshoot. Both F(ast) and S(low) time constants are tested.

Time Const.	Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Overshoot (dB)	Error
Fast	89.0	89.0	1.1	0.0	P
Slow	89.0	89.0	1.6	0.0	P
Fast	49.0	49.0	1.1	0.0	P
Slow	49.0	48.6	1.6	-0.4	P

Test Passed

### Fast-Slow Test: Single Sine Wave Burst - ANSI S1.4 1983 Clause 8.4.1 & 8.4.3

A continuous sine wave is applied to the SLM and adjusted to give an indication 4 dB below upper limit of the primary indicator range. Then onset transient characteristics are tested using a single sine wave burst with an amplitude equal to the continuous signal and a duration of T(ms). The test is repeated at a level 24 dB below the upper limit of the primary indicator range.

Time Constant	Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)	Error Value (dB)
Fast	200.0	88.0	88.0	1.0 -1.0	0.0 P
Slow	500.0	84.9	84.9	1.0 -1.0	0.0 P
Fast	200.0	48.0	48.0	1.0 -1.0	0.0 P
Slow	500.0	44.9	44.9	1.0 -1.0	0.0 P

Test Passed

### Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3

A continuous sine wave signal is adjusted to give a FSD indication at the reference range. A continuous sine wave burst with the same amplitude as the continuous signal is used as a test signal. The repetition rate of the burst is 100 Hz, 20 Hz, and 2 Hz. The I(mpulse) indication is measured at various repetition rates of the burst signal (100 Hz, 20 Hz, and 2 Hz). At a repetition rate of 2 Hz the signal amplitude is increased by 5dB. The indication shall increase respectively with a tolerance of  $\pm 1.0$  dB. The test is repeated 20 dB below FSD. The flattest weighting network available is used for this test.

Repetition Frequency (Hz)	Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)
100	90.3	90.2	1.0	-0.1 P

Impulse Test: Continuous Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.3

Repetition Frequency (Hz)	Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)	
20	85.4	85.4	2.0	0.0	P
2	84.2	84.1	2.0	-0.1	P
2 +5dB	89.1	89.1	1.0	0.0	P
100	50.3	50.0	1.0	-0.3	P
20	45.4	43.7	2.0	-1.7	P
2	44.2	44.2	2.0	0.0	P
2 +5dB	49.2	49.1	1.0	-0.1	P

Test Passed

**Impulse Test: Single Sine Wave Burst - According to ANSI S1.4 1983 Clause 8.4.1 & 8.4.3**

Burst Duration (ms)	Ref. Value (dB)	Measured Value (dB)	Tolerance norm (dB)	Error Value (dB)	
20.0	89.4	89.3	1.5	-0.1	P
5.0	84.2	84.2	2.0	0.0	P
2.0	80.4	80.4	2.0	0.0	P
2.0 +10dB	90.4	90.3	1.0	-0.1	P
20.0	49.4	49.3	1.5	-0.1	P
5.0	44.2	44.1	2.0	-0.1	P
2.0	40.4	40.3	2.0	-0.1	P
2.0 +10dB	50.3	50.3	1.0	0.0	P

Test Passed

**Peak Detector Test, single square wave burst - According to ANSI S1.4 1983 Clause 8.4.4**

Pulse Duration	Pulse Polarity	Ref. Value (dB)	Measured Value (dB)	Tolerance Value (dB)	Error (dB)	
10ms	+	112.0	112.9	2.0	0.9	P
0.1ms	+	112.0	112.0	2.0	0.0	P
10ms	-	112.0	112.9	2.0	0.9	P
0.1ms	-	112.0	112.2	2.0	0.2	P
10ms	+	92.0	92.9	2.0	0.9	P
0.1ms	+	92.0	92.0	2.0	0.0	P
10ms	-	92.0	92.8	2.0	0.8	P
0.1ms	-	92.0	92.0	2.0	0.0	P

The results have been compensated for the impulse response of the C-weighting network.  
Test Passed

### RMS Detector Test: Crest Factor Test - According to ANSI S1.4-1983 Clause 8.4.2

The SLM is set to reference range. A continuous square wave with CF=1 is applied and adjusted to give an indication 2 dB below upper limit of primary indicator range. The duration of the square wave pulses is kept constant at 200  $\mu$ s and rise time less than 10 $\mu$ s. The RMS value of the signal is kept constant while the crest factor (CF) is increased from 1 to 10. The test is performed both for positive and negative going test signals.

Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tol. norm (dB)	Error Value (dB)	
Positive Pulses					
3.0	91.0	90.9	0.5	-0.1	P
5.0	91.0	90.9	1.5	-0.1	P
10.0	91.0	90.9	1.5	-0.1	P
Negative Pulses					
3.0	91.0	90.9	0.5	-0.1	P
5.0	91.0	90.9	1.5	-0.1	P
10.0	91.0	90.9	1.5	-0.1	P
Positive Pulses					
3.0	51.0	50.9	0.5	-0.1	P
5.0	51.0	51.0	1.5	0.0	P
10.0	51.0	51.0	1.5	0.0	P
Negative Pulses					
3.0	51.0	51.0	0.5	0.0	P
5.0	51.0	51.0	1.5	0.0	P
10.0	51.0	51.0	1.5	0.0	P
Test Passed					

### RMS Detector Test: Continuous Sine Wave Burst - According to ANSI S1.4-1983 Clause 8.4.2

The instrument is set to time constant Slow. A continuous sine wave (2kHz) is applied to the SLM and adjusted to give an indication 2 dB below upper limit of the primary indicator range. The signal is replaced by a sequence of tone bursts with a repetition rate of 40Hz. The RMS level of the signal is kept constant while the crest factor is increased from 1 to 10.

Test signal: Continuous sine wave burst with repetition rate of 40Hz

Crest Factor	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)	
3	91.0	91.0	0.5	0.0	P
5	91.0	91.0	1.5	0.0	P
10	91.0	91.0	1.5	0.0	P
3	51.0	51.0	0.5	0.0	P
5	51.0	51.0	1.5	0.0	P
10	51.0	51.0	1.5	0.0	P
Test Passed					

### Time Averaging Test: Averaging Functions - ANSI S1.43 Clause 9.3.2

The SLM is set to the reference range. The signal generator is adjusted to give a 4 kHz sine wave with an rms level equal to 20dB above the bottom end of the Linearity range. The sine wave is replaced by a sequence of tone burst with the same frequency. The burst duty factor (the distance between each burst) is increased, while the amplitude is increased to keep the same equivalent rms level. The measurement time is 100 sec for type 0 (and manually controlled) instruments and 10 sec for all other instruments.

Burst Duration (ms)	Ref. Value (dB)	Tolerance norm (dB)	Value (LeqA) (dB)	Error Value (dB)		Value (SEL) (dB)	Error Value (dB)	
1000.0	70.0	0.5	70.0	0.0	P	80.0	0.0	P
100.0	70.0	0.5	70.0	0.0	P	80.0	0.0	P
10.0	70.0	1.0	70.0	0.0	P	80.0	0.0	P
1.0	70.0	1.0	69.9	-0.1	P	79.9	-0.1	P
2min	70.0	1.0	70.0	0.0	P	90.8	0.0	P

Test Passed

### Linearity Test - ANSI S1.43 Clause 9.3.3

Int. Time (sec.)	Ref. Value (dB)	Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)		Meas. Value (dB)	Tolerance norm (dB)	Error Value (dB)	
10	94.0	93.9	0.4	-0.1	P	103.9	0.4	-0.1	P
10	110.0	109.9	0.7	-0.1	P	119.9	0.7	-0.1	P
10	50.0	49.9	0.7	-0.1	P	59.9	0.7	-0.1	P

Test Passed

### Filter Test 1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/1 octave filter X= 3 fexact=7943.282Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
1000.00	44.0	0.0	46.0	P
1995.26	63.2	0.0	65.5	P
3981.07	87.0	0.0	90.0	P
5623.41	104.1	103.5	105.7	P
6130.56	107.0	106.9	108.2	P
6683.44	107.9	107.6	108.2	P
7286.18	108.0	107.8	108.2	P
7943.28	108.0	107.9	108.2	P
8659.64	108.0	107.8	108.2	P
9440.61	108.0	107.6	108.2	P
10292.0	107.3	106.9	108.2	P
11220.2	104.7	103.5	105.7	P
15848.9	87.1	0.0	90.0	P
31622.8	.0	0.0	65.5	P
63095.7	.0	0.0	46.0	P

Test 1/1 octave filter X= 4 fexact=15848.932Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
1995.26	42.4	0.0	46.0	P
3981.07	61.7	0.0	65.5	P

Filter Test 1/octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

7943.28	85.7	0.0	90.0	P
11220.2	104.2	103.5	105.7	P
12232.1	107.2	106.9	108.2	P
13335.2	108.0	107.6	108.2	P
14537.8	108.0	107.8	108.2	P
15848.9	108.0	107.9	108.2	P
17278.3	108.0	107.8	108.2	P
18836.5	108.0	107.6	108.2	P
20535.3	107.6	106.9	108.2	P
22387.2	105.2	103.5	105.7	P
31622.8	.0	0.0	90.0	P
63095.7	.0	0.0	65.5	P
125893	.0	0.0	46.0	P

Test Passed

Filter Test 1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/3 octave filter X= 12 fexact=16000.000Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
5212.50	42.3	0.0	46.0	P
8479.30	60.9	0.0	65.5	P
12349.0	85.2	0.0	90.0	P
14254.4	104.3	103.5	105.7	P
14709.1	107.3	106.9	108.2	P
15152.4	107.9	107.6	108.2	P
15583.0	108.0	107.8	108.2	P
16000.0	108.0	107.9	108.2	P
16428.1	108.0	107.8	108.2	P
16895.0	108.0	107.6	108.2	P
17404.2	107.3	106.9	108.2	P
17959.4	104.3	103.5	105.7	P
20730.4	84.8	0.0	90.0	P
30191.2	.0	0.0	65.5	P
49112.7	.0	0.0	46.0	P

Test 1/3 octave filter X= 13 fexact=20158.737Hz class 0

Nominal f [Hz]	Measured L [dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
6567.33	42.8	0.0	46.0	P
10683.2	61.2	0.0	65.5	P
15558.8	85.9	0.0	90.0	P
17959.4	104.5	103.5	105.7	P
18532.3	107.3	106.9	108.2	P
19090.8	107.9	107.6	108.2	P
19633.4	108.0	107.8	108.2	P
20158.7	108.0	107.9	108.2	P
20698.2	108.0	107.8	108.2	P
21286.4	107.9	107.6	108.2	P
21927.9	107.3	106.9	108.2	P
22627.4	104.4	103.5	105.7	P
26118.7	36.0	0.0	90.0	P
38038.5	.0	0.0	65.5	P
61878.2	.0	0.0	46.0	P

Test Passed

## Summation of acoustic tests - ANSI S1.4 Clause 5 using Actuator

The microphone data are measured using electrostatic actuator.

### SLM: A-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-39.2	0.0	0.0		+/-1.5	0.2
63	-26.2	0.0	0.0		+/-1.5	0.0
125	-16.1	0.1	0.0		+/-1.0	0.1
250	-8.6	0.1	0.0		+/-1.0	0.1
500	-3.2	0.1	0.0		+/-1.0	0.1
1 k	0.0	0.1	0.0		+/-1.0	0.1
2 k	1.2	0.1	0.0		+/-1.0	0.1
4 k	1.0	0.1	0.0		+/-1.0	0.1
8 k	-1.1	-0.1	0.0		+1.5, -3	-0.1
12.5 k	-4.4	0.7	0.0		+3, -6	0.6

### SLM: C-Weighted results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	-3.0	0.0	0.0		+/-1.5	0.0
63	-0.8	0.0	0.0		+/-1.5	0.0
125	-0.2	0.1	0.0		+/-1.0	0.1
250	0.0	0.1	0.0		+/-1.0	0.1
500	0.0	0.1	0.0		+/-1.0	0.1
1 k	0.0	0.1	0.0		+/-1.0	0.1
2 k	-0.2	0.1	0.0		+/-1.0	0.1
4 k	-0.8	0.1	0.0		+/-1.0	0.1
8 k	-3.0	-0.1	0.0		+1.5, -3	-0.1
12.5 k	-6.3	0.7	0.0		+3, -6	0.6

### SLM: Lin results

Freq. (Hz)	SLM (dB)	Mic. (dB)	CR. (dB)	WS. (dB)	Tol. (dB)	Dev. (dB)
31.5	0.0	0.0	0.0		+/-1.5	0.0
63	0.0	0.0	0.0		+/-1.5	0.0
125	0.0	0.1	0.0		+/-1.0	0.1
250	0.0	0.1	0.0		+/-1.0	0.1
500	0.0	0.1	0.0		+/-1.0	0.1
1 k	0.0	0.1	0.0		+/-1.0	0.1
2 k	0.0	0.1	0.0		+/-1.0	0.1
4 k	0.0	0.1	0.0		+/-1.0	0.1
8 k	0.0	-0.1	0.0		+1.5, -3	-0.1
12.5 k	-0.1	0.7	0.0		+3, -6	0.6

Test Passed

The overall frequency response of the sound level meter, nominal case reflections and microphone has shown to conform with the requirements in §6 of the ANSI S1.4 for a type 1 sound level meter.

*Kyo*

**USTA NTP Master Plan Noise PCE Screening**

## Noise Appendix

<b>Intersection</b>	<b>No Action Volume (Fig. 10-5)</b>	<b>With Action Volume (Fig. 10-6)</b>	<b>dB change</b>
AA Exit and GCP WB	2497	2669	0.3
AA Enter and GCP WB	3073	3255	0.2
GCP WB	5827	6114	0.2
VWE 8B offramp and CP Blvd	3984	4056	0.1
58th Rd and CP Blvd	3639	3773	0.2
Park entrance/exit	607	1037	2.3
Park exit and CP Blvd	3180	3557	0.5
59th Ave and CP Blvd	577	577	0.0
LIE WB Service Rd and CP Blvd	4031	4485	0.5
LIE EB Service RD and CP Blvd	4248	4517	0.3
GCP EB	5826	6113	0.2
GCP EB Onramp	1660	1935	0.7
GCP EB Offramp	2138	2200	0.1
HHE Offramp	3422	3521	0.1
HHE and GCP EB Offramp	3423	3523	0.1
HHE and GCP EB Onramp	2945	3258	0.4
HHE WB and LIE WB	2945	3258	0.4

Note: vehicle mix assumed unchanged