DOCKETED

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Document Title:	Appendix H Noise and Vibration
Description:	AFC Volume II
Filer:	Sabrina Savala
Organization:	NRG Oxnard Energy Center, LLC
Submitter Role:	Applicant
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APPENDIX H

NOISE AND VIBRATION

APPENDIX H-1

PHOTOGRAPHS OF SPL MEASUREMENT POSITIONS

APPENDIX H-1

The following is a list of photographs taken during the December 2014 outdoor ambient Sound Pressure Level field survey in the vicinity of the project, with emphasis on documenting Short-Term and Long-Term monitor setup locations.

Photograph 1
Date: December 16, 2014

View Direction:
Northeast

Comments:
LT-2: Long-term (LT) monitoring position (but converted to short-term [ST] measurement location) representing County of Ventura residence at 5718 Gonzales Road.

Photograph 2
Date: December 16, 2014

View Direction:
Southeast

Comments:
LT-2: LT monitoring position (but converted to ST measurement location) representing County of Ventura residence at 5718 Gonzales Road. (Mandalay Generating Station [MGS] Units 1 and 2 are visible, under plume, in the distance on horizon at center of the image.)

Photograph 3
Date: December 16, 2014

View Direction:
West

Comments:
LT-3: LT monitoring position representing northeastern corner of future City of Oxnard residential development on Harbor Boulevard. (MGS Units 1 and 2 are visible in the distance to the right of the image.)

Photograph 4
Date: December 16, 2014

View Direction:
Northwest

Comments:
LT-1: LT monitoring position representing northern edge of Oxnard Shores Mobile Home Park. MGS Units 1 and 2 and their stack are visible in the distance beyond county park dunes and vegetative cover.)

Photograph 5
Date: December 16, 2014

View Direction:
South

Comments:
LT-1: LT monitoring position representing northern edge of Oxnard Shores Mobile Home Park.

Photograph 6

Date: December 16, 2014

View Direction:
South

Comments:
Beach Crest (BC) ST sound-pressure level (SPL) measurement position. Homes along Mandalay Beach Road are visible to the left of the image.

Photograph 7

Date: December 16, 2014

View Direction:
North

Comments:
BC ST SPL measurement position. MGS Units 1 and 2 and their stack are visible in distance.

Photograph 8

Date: December 16, 2014

View Direction:
South

Comments:
ST SPL measurement position, approximately 400 feet north of MGS Unit 1.

APPENDIX H-2

OCTAVE BAND CENTER FREQUENCY (OBCF) DETAIL OF PROJECT OPERATIONS SOUND POWER LEVELS

APPENDIX H-2

The following table features quantitative descriptions of the major noise-producing sources considered in the Cadna/A sound propagation models for predicting project operation noise. Consistent with expectations of the California Energy Commission Siting Guidelines Appendix B(g) (4) (C), the table below shows unweighted octave-band center frequency (OBCF) sound power levels (L_w) for each sound source. The right-most columns show A-weighted and un-weighted "linear" overall L_w.

Major Noise-Producing Project Operations Sound Source	Octave-Band Center Frequency (OBCF, in Hertz) Unweighted Sound Power Level (L_w)										
	31.5	63	125	250	500	1000	2000	4000	8000	A-wtd.	Linear
Air Compressor Skid	86	93	91	91	88	87	86	85	81	93	98
Ammonia System (Pump/Inj/Vap)	95	105	99	99	96	95	94	93	89	101	108
Cooling Fan Module (entire fan array)	106	109	109	106	103	99	96	93	85	105	114
Dilution/Tempering Air Fan (A and B, Each)	n/a	102	100	96	92	91	83	79	79	95	105
Existing MGS Unit-3 "Start-Up" (each of four area sources)	123	126	120	115	105	102	105	105	103	113	129
Existing MGS Unit-3 "Steady-State" (full load, each of four area sources)	132	131	122	115	106	104	106	105	105	115	135
Fuel Gas Compressor Skid (Enclosure)	117	108	107	106	90	79	73	63	61	99	118
Fuel Gas Metering Skid	n/a	n/a	n/a	77	79	84	94	92	84	98	97
GT Enclosure – Air Discharge Vents	91	96	88	84	75	74	74	73	78	83	98
GT Enclosure – Air Inlet Vents	89	95	84	80	73	71	76	77	83	85	97
GT Enclosure Walls	93	94	86	77	70	74	75	67	57	80	97
GT Exhaust Diffuser	113	108	104	98	101	99	101	102	90	107	115
GT Generator	103	122	115	105	104	99	96	93	82	106	123
GT GSU Transformer	101	107	109	104	104	98	93	88	81	104	113
GT Inlet Filter House and Ducting	119	112	101	89	84	86	94	103	96	105	120
GT Load Compartment	91	95	94	86	88	93	92	87	77	97	101
GT Turbine Compartment	108	106	103	99	100	101	104	107	95	111	114
Hot SCR	133	119	120	113	105	88	80	84	66	109	133
Inlet Plenum	103	98	95	92	94	99	99	96	85	104	107
Lube Oil Module	104	106	102	101	100	99	98	97	89	105	111
UA Transformer	101	107	109	104	104	98	93	88	81	104	113

APPENDIX H-3

NOISE MEASUREMENT SITE DATA LOGS AND EQUIPMENT CALIBRATION RECORDS

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY Project #: _____ Date: 12/15/14 Page 1 of 1

Monitoring Location: LT3 - (ST) (EVENING → NIGHT) - WET Analyst: CK

Sound Level Meter
Model #: LxT
Serial #: _____
Weighting: (A) / C / Flat
Response: Slow / (Fast) / Impl
Windscreen : (Yes) / No (explain)

Field Calibration SEE OTHER ST SHEETS
Model #: _____
Serial #: _____
Calibration Level (dBA): 94 / 114
Pre-Test _____ dBA
Post-Test _____ dBA

Weather Data SEE OTHER ST SHEETS
Model #: _____
Serial #: _____
Wind: Steady/Gusty/Calm
Precipitation: Yes (explain) / No
Avg Wind Speed/Direction: _____
Temp (°F): _____ RH (%): _____
Bar Psr (Hg): Cloud Cover (%):

Topo: Flat / Hilly
Terrain: Hard/Soft/Mixed/Snow

GPS Coordinates (at SLM location)#

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events
	9:15	9:20							AUTO: 31
	9:20	9:25							AUTO: 27
	9:25	9:30							AUTO: 28, JET @ 9:29
	9:30	9:35							AUTO: 27, LOUD MC @ 9:31
	9:35	9:40							AUTO: 31, JET @ 9:36, 9:39
	9:40	9:45							AUTO: 30, DOOR RING MELODY @ 9:40
	9:45	9:50							AUTO: 32
	9:50	9:55							AUTO: 15
	9:55	10:00							AUTO: 22
	10:00	10:05							AUTO: 17
	10:05	10:10							AUTO: 22, JET @ 10:07
	10:10	10:15							AUTO: 10, JET @ 10:11

Roadway Name/Dir	HARBOR NB	HARBOR SB
Speed (post/obs)*	55	55
Number of Lanes	1	1
Width (pave/row)		
1- or 2- way	—	—
Grade	—	—
Bus Stops	—	—
Stoplights	—	—
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:
COLLOCATED ALONGSIDE ST 3

NOTES
*FACILITY OP AUDIBLE MOMENTARILY WHEN TRAFFIC FULLY CEASED (RARE)

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No (NIGHT)

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects
Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice

FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY Project #: _____ Date: 12/16/14 Page 1 of 1

Monitoring Location: LT3 - ST (EVENING → NIGHT) - DRY Analyst: CK

Sound Level Meter	Field Calibration (SEE OTHER ST SHEETS)	Weather Data (SEE OTHER ST SHEETS)
Model #: LxT	Model #: _____	Model #: _____
Serial #: _____	Serial #: _____	Serial #: _____
Weighting: A / C / Flat	Calibration Level (dBA): 94 / 114	Wind: Steady/Gusty/Calm
Response: Slow / Fast / Impl	Pre-Test _____ dBA	Precipitation: Yes (explain) / No
Windscreen : Yes / No (explain)	Post-Test _____ dBA	Avg Wind Speed/Direction: _____
Topo: Flat / Hilly	GPS Coordinates (at SLM location)#	Temp (°F): _____ RH (%): _____
Terrain: Hard/Soft/Mixed/Snow		Bar Psr (Hg): Cloud Cover (%):

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events
	21:55	22:00							AUTO: 31
	22:00	22:05							AUTO: 12
	22:05	22:10							AUTO: 14
	22:10	22:15							22:12 - POLICE INTERRUPT; AUTO 20+
									*BETWEEN VEHICLE PASSBYS, AUDIBLE SOURCES:
									• OCEAN BEACHBREAK
									• UNIDENTIFIABLE SOURCE TO EAST OF SLM
									• NO DOOR/NRG/SCE OR AUDIBLE

Roadway Name/Dir	HARBOR NB	HARBOR SB
Speed (post/obs)*	55	55
Number of Lanes	1	1
Width (pave/row)		
1- or 2- way	—	—
Grade	—	—
Bus Stops	—	—
Stoplights	—	—
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:

COLLOCATED ALONGSIDE ST 3

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No (NIGHT)

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: _____ Project #: _____ Date: 12/15/14 Page ___ of ___

Monitoring Location: OXNARD SHORES ST Analyst: STORM / MARTIN / KAISER

Sound Level Meter
Model #: _____
Serial #: _____
Weighting: A / C / Flat
Response: Slow / Fast / Impl
Windscreen : Yes / No (explain)

Field Calibration
Model #: _____
Serial #: _____
Calibration Level (dBA): 94 / 114
Pre-Test _____ dBA
Post-Test _____ dBA

Weather Data
Model #: SM-28
Serial #: _____
Wind: Steady/Gusty/Calm (TAKEN @ 9:10 PM)
Precipitation: Yes (explain) / No
Avg Wind Speed/Direction: 0 (CALM)
Temp (°F): 61 RH (%): 59
Bar Psr (Hg): 29.98 Cloud Cover (%): 100

Topo: Flat / Hilly
Terrain: Hard/Soft/Mixed/Snow

GPS Coordinates (at SLM location)#
~~32.2131, -119.2496~~

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:

- MEASUREMENT FROM 9:15 → 10:15 PM
- ~ 30 CARS ON FIFTH
- SOURCES INCLUDED:

AIRCRAFT OVERFLIGHTS, ROAD TRAFFIC, VOICE FROM PASSERBY, FROGS, RAIN, SURF WAVE CRASH (LOW FREQ RUMBLE)

WHEN RAIN INCREASED, NOISE ON OXNARD SHORES ROADS ↑ & STREETS ↑

8:46 PM PRE-CAL 12/15/14
L-XT = 0.07
820 1651 114.1
- 8:51 PM
- 8:50 PM
- 8:44 PM
AUDIBLE TRAIN HORNS AT BEST WESTERN OXNARD INN

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY - UNIT 3 OPS Project #: _____ Date: 12/16/14 Page _____ of _____

Monitoring Location: _____ Analyst: STORM/MARTIN/KAISER

Sound Level Meter
Model #: B&K 2250
Serial #: 2696963
Weighting: A / C / Flat
Response: Slow / Fast / Impl
Windscreen : Yes / No (explain)

Field Calibration
Model #: _____
Serial #: _____
Calibration Level (dBA): 94 / 114
Pre-Test 0.04Δ dBA
Post-Test _____ dBA

Weather Data (12/17/14 (TAKEN ~8:55 AM))
Model #: _____
Serial #: _____
Wind: Steady/Gusty/Calm
Precipitation: Yes (explain) / No
Avg Wind Speed/Direction: 5-7 MPH FROM EAST
Temp (°F): 57.5 RH (%): 58 3
Bar Psr (Hg): 30.__ Cloud Cover (%): 10%

Topo: Flat / Hilly
Terrain: Hard/Soft/Mixed/Snow

GPS Coordinates (at SLM location)#
34.20547, -119.25132

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	(12/17/14 Notes/Events)
006	10:06	10:08A							NEAR UMT 3 @ WEST FACADE, OFFLINE (UMT 3)
007	10:10	10:12A							" DOOR NORTHERN FENCE, UMT 3 OFF
008	10:16	10:19A							" SOUTHERN UMT 1/2 BLDG FACADE (UMT 3 OFF)
009	10:21	10:23A							(LOTS OF TOOL NOISE ON SUPERSTRUCTURE)
									NEAR ~~BUSES~~ BEARING COOLING WATER PUMPS
010	10:25	10:29A							WESTERN END OF CIRC. PUMP PIT
011	10:30	10:32							(AIR COMPRESSOR? HISS IN BACKGROUND) NEAR AIR COMP
012	10:33								AIR VALVE APPARENTLY OPEN (REASON FOR HISS)
									OTHER SIDE OF AIR COMP, AWAY FROM HISS

Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:

1:35-1:45PM CHECK 2250 AT NORTH OF UMT 1&2 POSITION:
- 2.5 mph SE,
- 67°F; 56%RH

TELON W/ DAR:
" UNIT 1 ONLINE @ 1:28PM,
UMT 2 " " 1:32PM "
WILL SEND US OPS LOG.

12/17/14: ~8:45AM SETUP @ DUNE RIDGE WITHIN MGAS PROPERTY LINE. AWAITING 9-9:30 AM UMT-3 STARTUP (UNITS 1&2 NOT ONLINE) SOUNDS OF TOOLS, REPAIR ON UMT 1&2 STRUCTURE. UMT 3 INTAKE LOUVERS OPEN @ 9 AM SHARP, STARTUP COMMENCES. INTERMITTENT TOOL NOISE FROM UMT 1/2 STILL AUDIBLE AS UMT 3 RAMPS UP. DOOR FACILITY TO SOUTH NOT AUDIBLE (MASKED); DOOR TELEPHONE RING AUDIBLE - SURF NOISE NOT AUDIBLE (@ ~9:06 AM)

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:
- 9:39 HELO & PROPLANE OVERFLIGHT
- AUDIBLE DOOR TELEPHONE @ 9:25AM
- DOOR ALARM @ 9:30 AM
- AUDIBLE HELO PASS-BY @ 9:22AM (COMING IN OFF OCEAN & TOWARDS DIRECTION OF OXNARD AIRPORT)
- UMT 3 RAMP-DOWN AFTER 9:28 CALL W/ DAR
- 9:35AM PROP-PLANE OVERFLIGHT (OCEAN → OXNARD)
- 9:36 GAS LINE VALVE NOISE (FROM BLDG. TO WEST OF UMT 3)
- 9:45 DOOR ALARM

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice

FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY - UNIT 3 OP. ST Project #: _____ Date: 12/16/14 Page ___ of ___

Monitoring Location: Analyst: CM/CK/MS

Sound Level Meter	Field Calibration	Weather Data
Model #: LD LxT	Model #: CAL200	Model #: _____
Serial #: 2527	Serial #: 5789	Serial #: _____
Weighting: (A) / C / Flat	Calibration Level (dBA): 94 / ~~114~~	Wind: Steady/Gusty/Calm
Response: (Slow) / Fast / Impl	Pre-Test 94.2 dBA	Precipitation: Yes (explain) / No
Windscreen : (Yes) / No (explain)	Post-Test 0.24 Δ dBA	Avg Wind Speed/Direction: _____
Topo: Flat / Hilly	GPS Coordinates (at SLM location)#	Temp (°F): _____ RH (%): _____
Terrain: Hard/Soft/Mixed/Snow	32.26602, -119.25142	Bar Psr (Hg): Cloud Cover (%):

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:

182' TO THE NORTHERN UNIT-3 FACADE

12/16/14, ~9:20 PM RETRIEVED

12/16/14, 10:30 PM START AT BEACH TO MEASURE SURF NOISE

DOG(?) ALARM JUST AUDIBLE ~10:33

58° F, 72% RH, 7-3 MPH FROM E

@ 10:40 PM, CHRIS & COLE SWAPPED SLMS (CHRIS WALKED UP TO DUNE RIDGE W/ LXT, COLE CAME DOWN TO BEACH SPOT)

10:45 PM START ON DUNE RIDGE AFTER SWAP

10:59 PM 0.34/0.32 CAL Δ

8:43 AM 0.23 CAL Δ 12/17/14

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:

- PASSING PROPELLER AIRCRAFT OVERHEAD @ 10:44 PM, 12/16

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice

FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY - UNIT 3 OP. ST Project #: _____ Date: 12/16/14 Page ___ of

Monitoring Location: Analyst: CM/CK/MS

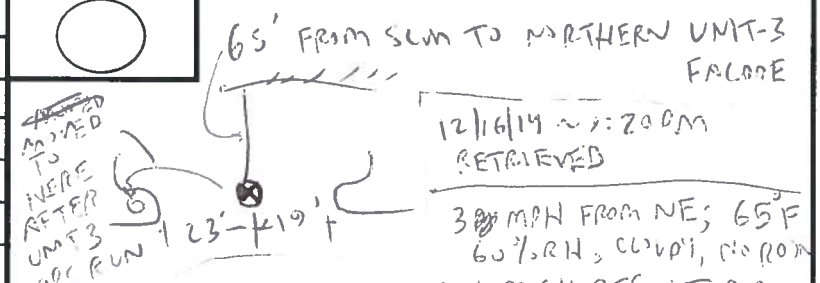
Sound Level Meter	Field Calibration	Weather Data
Model #: LD 820	Model #: CAL 200	Model #:
Serial #: 1651	Serial #: 5789	Serial #:
Weighting: (A) / C / Flat	Calibration Level (dBA): 94 / (114)	Wind: Steady/Gusty/Calm
Response: (Slow) / Fast / Impl	Pre-Test 113.8 dBA	Precipitation: Yes (explain) / No
Windscreen : (Yes) / No (explain)	Post-Test 114.0 dBA	Avg Wind Speed/Direction:
Topo: Flat / Hilly	GPS Coordinates (at SLM location)#	Temp (°F): RH (%):
Terrain: Hard/Soft/Mixed/Snow	34.20594, -119.25099	Bar Psr (Hg): Cloud Cover (%):

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:



- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY E.C. UNIT 3 OPS Project #: ____ Date: 12/16/14 Page ___ of ___

Monitoring Location: Analyst: STURN / MARTIN / KAISER

Sound Level Meter		Field Calibration		Weather Data	
Model #:	LD 824	Model #:		Model #:	
Serial #:		Serial #:		Serial #:	
Weighting: A / C / Flat		Calibration Level (dBA):	94 / (114)	Wind: (Steady)/Gusty/Calm	(TAKEN ~ 9:25 AM)
Response: Slow / Fast / Impl		Pre-Test	114.0 dBA	Precipitation: Yes (explain) / (No)	
Windscreen : Yes / No (explain)		Post-Test	dBA	Avg Wind Speed/Direction:	8-11 FROM EAST
Topo: Flat / Hilly		GPS Coordinates (at SLM location)#		Temp (°F): 60	RH (%): 63
Terrain: Hard/Soft/Mixed/Snow				Bar Psr (Hg): 30	Cloud Cover (%): 90

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

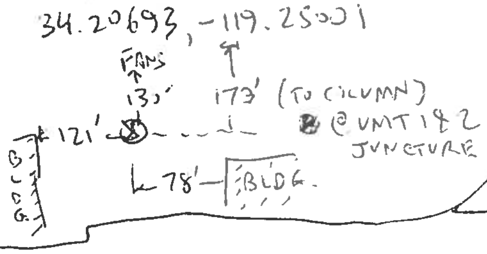
Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:

~9:30 AM UNIT-3 START-UP; SOUTHERN TURBINE, THEN BOTH
~9:40 AM UNIT-3 RAMP-UP, NOISE AUDIBLY INCREASES
(ORMOND FACILITY TO SOUTH STILL AUDIBLE AT THIS POSITION, BUT LESS SO)
"ALL 4 ENGINES LIT", RAMPING UP
~9:44 "~100 MW"

2:18 PM ST: EAST OF UNIT 1 & 2 PAIR
34.20693, -119.25001
{CALM, 70°F, 60% RH}



2:48 PM
2-3 MPH ~ W?
65°F, 66% RH

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No 12/17/14 ~ 8:30 AM

Additional Notes/Comments: PRE-MEAS CAL = 113.9

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: MANDALAY E.C. Project #: _____ Date: 12/15/14 Page 1 of
Monitoring Location: ~~SW~~ OXNARD SHORES (LT1) Analyst: STORM / MARTIN / KAISER

Sound Level Meter
Model #: LD712
Serial #: 0418
Weighting: A / C / Flat
Response: Slow / Fast / Impl
Windscreen : Yes / No (explain)

Field Calibration
Model #: _____
Serial #: _____
Calibration Level (dBA): 94 / 114
Pre-Test 114.0 dBA
Post-Test _____ dBA

Weather Data
Model #: _____
Serial #: _____
Wind: Steady/Gusty/Calm 7.5 MPH S
Precipitation: Yes (explain) / No
Avg Wind Speed/Direction: _____ (TAKEN @ 3:20 PM)
Temp (°F): ~~66~~ 64 RH (%): 49.3
Bar Psr (Hg): 29.86 Cloud Cover (%): 50

Topo: Flat / Hilly SAND DUNES
Terrain: Hard/Soft/Mixed/Snow

GPS Coordinates (at SLM location)#
34.1979, -119.2463

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

			compass
Roadway Name/Dir			
Speed (post/obs)*			
Number of Lanes			
Width (pave/row)			
1- or 2- way			
Grade			
Bus Stops			
Stoplights			
Motorcycles			
Automobiles			
Medium Trucks			
Heavy Trucks			
Buses			
Count duration			

Site Diagram:

- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects
Additional Notes and Sketches on Reverse

URS Acoustics and Noise Control Practice
FIELD NOISE MEASUREMENT DATA FORM

Project Name: MONDAY - UNIT 3 OP. ST Project #: _____ Date: 12/16/14 Page ___ of ___

Monitoring Location: _____ Analyst: STORM/KAISER/MARTIN

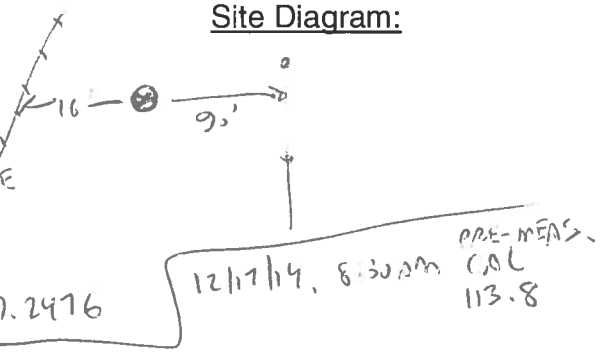
Sound Level Meter	Field Calibration	Weather Data
Model #: LD 820	Model #: CAL 200	Model #: _____
Serial #: 1652	Serial #: _____	Serial #: _____
Weighting: A / C / Flat	Calibration Level (dBA): 94 / (114)	Wind: Steady/Gusty/Calm
Response: Slow / Fast / Impl	Pre-Test 114.5 dBA	Precipitation: Yes (explain) / No
Windscreen : (Yes) / No (explain)	Post-Test _____ dBA	Avg Wind Speed/Direction: _____
Topo: Flat / Hilly	GPS Coordinates (at SLM location)#	Temp (°F): _____ RH (%): _____
Terrain: Hard/Soft/Mixed/Snow	34.20525, -119.24956	Bar Psr (Hg): _____ Cloud Cover (%): _____

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events

Roadway Name/Dir		
Speed (post/obs)*		
Number of Lanes		
Width (pave/row)		
1- or 2- way		
Grade		
Bus Stops		
Stoplights		
Motorcycles		
Automobiles		
Medium Trucks		
Heavy Trucks		
Buses		
Count duration		

compass

Site Diagram:



- note coordinate system * - Speed estimated by Radar / Driving / Observation

Photos Taken? Yes/No

Additional Notes/Comments:

Other Noise Sources: distant: aircraft/roadway traffic/trains/landscaping/rustling leaves/children playing/dogs barking/birds vocalizing/Insects

Additional Notes and Sketches on Reverse

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2014-193526

Instrument Model 712 (MPR005), Serial Number 0418, was calibrated on 15 Jul 2014. The instrument meets factory specifications per Procedure D0001.8207, ANSI S1.4 1983, IEC 651-Type 2 1979, and IEC 804-Type 2 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 15 Jul 2014
Calibration due: 15 Jul 2015

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2209	0445 / 0111	12 Months	15 Nov 2014	2013-182314

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 24 ° Centigrade

Relative Humidity: 34 %

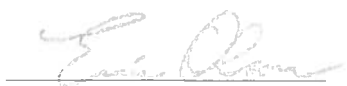
Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

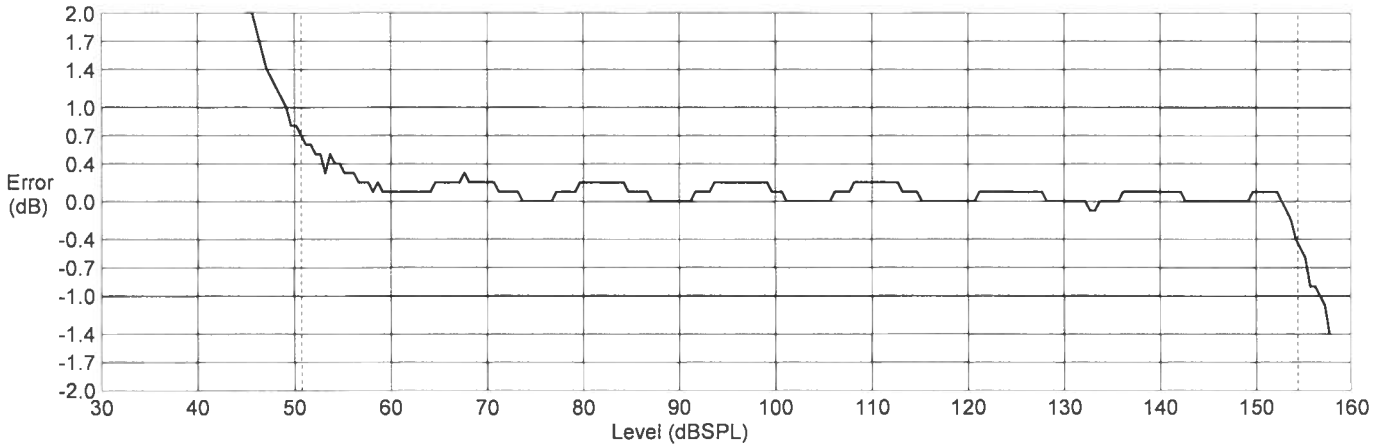
Signed: 

Technician: Eric Olson

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

Sound Level Meter Model: 712(MPR005) Serial Number: A0418
Log Linearity, Differential Linearity and Range Data

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's Log Linearity A-weighted fast response was then electrically tested using a 1kHz sine wave from 32.7 dBSPL to 157.7 dBSPL in 0.5 dB increments.



Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB
32.7	44.5	11.8	53.7	54.2	0.5	74.7	74.7	0.0	95.7	95.9	0.2	116.7	116.7	0.0	137.7	137.8	0.1
33.2	44.7	11.5	54.2	54.6	0.4	75.2	75.2	0.0	96.2	96.4	0.2	117.2	117.2	0.0	138.2	138.3	0.1
33.7	44.7	11.0	54.7	55.1	0.4	75.7	75.7	0.0	96.7	96.9	0.2	117.7	117.7	0.0	138.7	138.8	0.1
34.2	44.9	10.7	55.2	55.5	0.3	76.2	76.2	0.0	97.2	97.4	0.2	118.2	118.2	0.0	139.2	139.3	0.1
34.7	44.7	10.0	55.7	56.0	0.3	76.7	76.7	0.0	97.7	97.9	0.2	118.7	118.7	0.0	139.7	139.8	0.1
35.2	44.7	9.5	56.2	56.5	0.3	77.2	77.3	0.1	98.2	98.4	0.2	119.2	119.2	0.0	140.2	140.3	0.1
35.7	44.7	9.0	56.7	56.9	0.2	77.7	77.8	0.1	98.7	98.9	0.2	119.7	119.7	0.0	140.7	140.8	0.1
36.2	44.9	8.7	57.2	57.4	0.2	78.2	78.3	0.1	99.2	99.4	0.2	120.2	120.2	0.0	141.2	141.3	0.1
36.7	44.9	8.2	57.7	57.9	0.2	78.7	78.8	0.1	99.7	99.8	0.1	120.7	120.7	0.0	141.7	141.8	0.1
37.2	45.0	7.8	58.2	58.3	0.1	79.2	79.3	0.1	100.2	100.3	0.1	121.2	121.3	0.1	142.2	142.3	0.1
37.7	45.1	7.4	58.7	58.9	0.2	79.7	79.9	0.2	100.7	100.8	0.1	121.7	121.8	0.1	142.7	142.7	0.0
38.2	45.0	6.8	59.2	59.3	0.1	80.2	80.4	0.2	101.2	101.2	0.0	122.2	122.3	0.1	143.2	143.2	0.0
38.7	45.4	6.7	59.7	59.8	0.1	80.7	80.9	0.2	101.7	101.7	0.0	122.7	122.8	0.1	143.7	143.7	0.0
39.2	45.2	6.0	60.2	60.3	0.1	81.2	81.4	0.2	102.2	102.2	0.0	123.2	123.3	0.1	144.2	144.2	0.0
39.7	45.5	5.8	60.7	60.8	0.1	81.7	81.9	0.2	102.7	102.7	0.0	123.7	123.8	0.1	144.7	144.7	0.0
40.2	45.5	5.3	61.2	61.3	0.1	82.2	82.4	0.2	103.2	103.2	0.0	124.2	124.3	0.1	145.2	145.2	0.0
40.7	45.8	5.1	61.7	61.8	0.1	82.7	82.9	0.2	103.7	103.7	0.0	124.7	124.8	0.1	145.7	145.7	0.0
41.2	45.7	4.5	62.2	62.3	0.1	83.2	83.4	0.2	104.2	104.2	0.0	125.2	125.3	0.1	146.2	146.2	0.0
41.7	46.0	4.3	62.7	62.8	0.1	83.7	83.9	0.2	104.7	104.7	0.0	125.7	125.8	0.1	146.7	146.7	0.0
42.2	46.1	3.9	63.2	63.3	0.1	84.2	84.4	0.2	105.2	105.2	0.0	126.2	126.3	0.1	147.2	147.2	0.0
42.7	46.4	3.7	63.7	63.8	0.1	84.7	84.8	0.1	105.7	105.7	0.0	126.7	126.8	0.1	147.7	147.7	0.0
43.2	46.5	3.3	64.2	64.3	0.1	85.2	85.3	0.1	106.2	106.3	0.1	127.2	127.3	0.1	148.2	148.2	0.0
43.7	46.7	3.0	64.7	64.9	0.2	85.7	85.8	0.1	106.7	106.8	0.1	127.7	127.8	0.1	148.7	148.7	0.0
44.2	47.0	2.8	65.2	65.4	0.2	86.2	86.3	0.1	107.2	107.3	0.1	128.2	128.2	0.0	149.2	149.2	0.0
44.7	47.1	2.4	65.7	65.9	0.2	86.7	86.8	0.1	107.7	107.8	0.1	128.7	128.7	0.0	149.7	149.8	0.1
45.2	47.4	2.2	66.2	66.4	0.2	87.2	87.2	0.0	108.2	108.4	0.2	129.2	129.2	0.0	150.2	150.3	0.1
45.7	47.7	2.0	66.7	66.9	0.2	87.7	87.7	0.0	108.7	108.9	0.2	129.7	129.7	0.0	150.7	150.8	0.1
46.2	48.0	1.8	67.2	67.4	0.2	88.2	88.2	0.0	109.2	109.4	0.2	130.2	130.2	0.0	151.2	151.3	0.1
46.7	48.3	1.6	67.7	68.0	0.3	88.7	88.7	0.0	109.7	109.9	0.2	130.7	130.7	0.0	151.7	151.8	0.1
47.2	48.6	1.4	68.2	68.4	0.2	89.2	89.2	0.0	110.2	110.4	0.2	131.2	131.2	0.0	152.2	152.3	0.1
47.7	49.0	1.3	68.7	68.9	0.2	89.7	89.7	0.0	110.7	110.9	0.2	131.7	131.7	0.0	152.7	152.7	0.0
48.2	49.4	1.2	69.2	69.4	0.2	90.2	90.2	0.0	111.2	111.4	0.2	132.2	132.2	0.0	153.2	153.1	-0.1
48.7	49.8	1.1	69.7	69.9	0.2	90.7	90.7	0.0	111.7	111.9	0.2	132.7	132.6	-0.1	153.7	153.5	-0.2
49.2	50.2	1.0	70.2	70.4	0.2	91.2	91.2	0.0	112.2	112.4	0.2	133.2	133.1	-0.1	154.2	153.8	-0.4
49.7	50.5	0.8	70.7	70.9	0.2	91.7	91.8	0.1	112.7	112.9	0.2	133.7	133.7	0.0	154.7	154.2	-0.5
50.2	51.0	0.8	71.2	71.3	0.1	92.2	92.3	0.1	113.2	113.3	0.1	134.2	134.2	0.0	155.2	154.6	-0.6
50.7	51.4	0.7	71.7	71.8	0.1	92.7	92.8	0.1	113.7	113.8	0.1	134.7	134.7	0.0	155.7	154.8	-0.9
51.2	51.8	0.6	72.2	72.3	0.1	93.2	93.3	0.1	114.2	114.3	0.1	135.2	135.2	0.0	156.2	155.3	-0.9
51.7	52.3	0.6	72.7	72.8	0.1	93.7	93.9	0.2	114.7	114.8	0.1	135.7	135.7	0.0	156.7	155.7	-1.0
52.2	52.7	0.5	73.2	73.3	0.1	94.2	94.4	0.2	115.2	115.2	0.0	136.2	136.3	0.1	157.2	156.1	-1.1
52.7	53.2	0.5	73.7	73.7	0.0	94.7	94.9	0.2	115.7	115.7	0.0	136.7	136.8	0.1	157.7	156.3	-1.4
53.2	53.5	0.3	74.2	74.2	0.0	95.2	95.4	0.2	116.2	116.2	0.0	137.2	137.3	0.1			

Plotted per typical sensitivity of an MPR005 electret microphone; 5 mV/Pa.

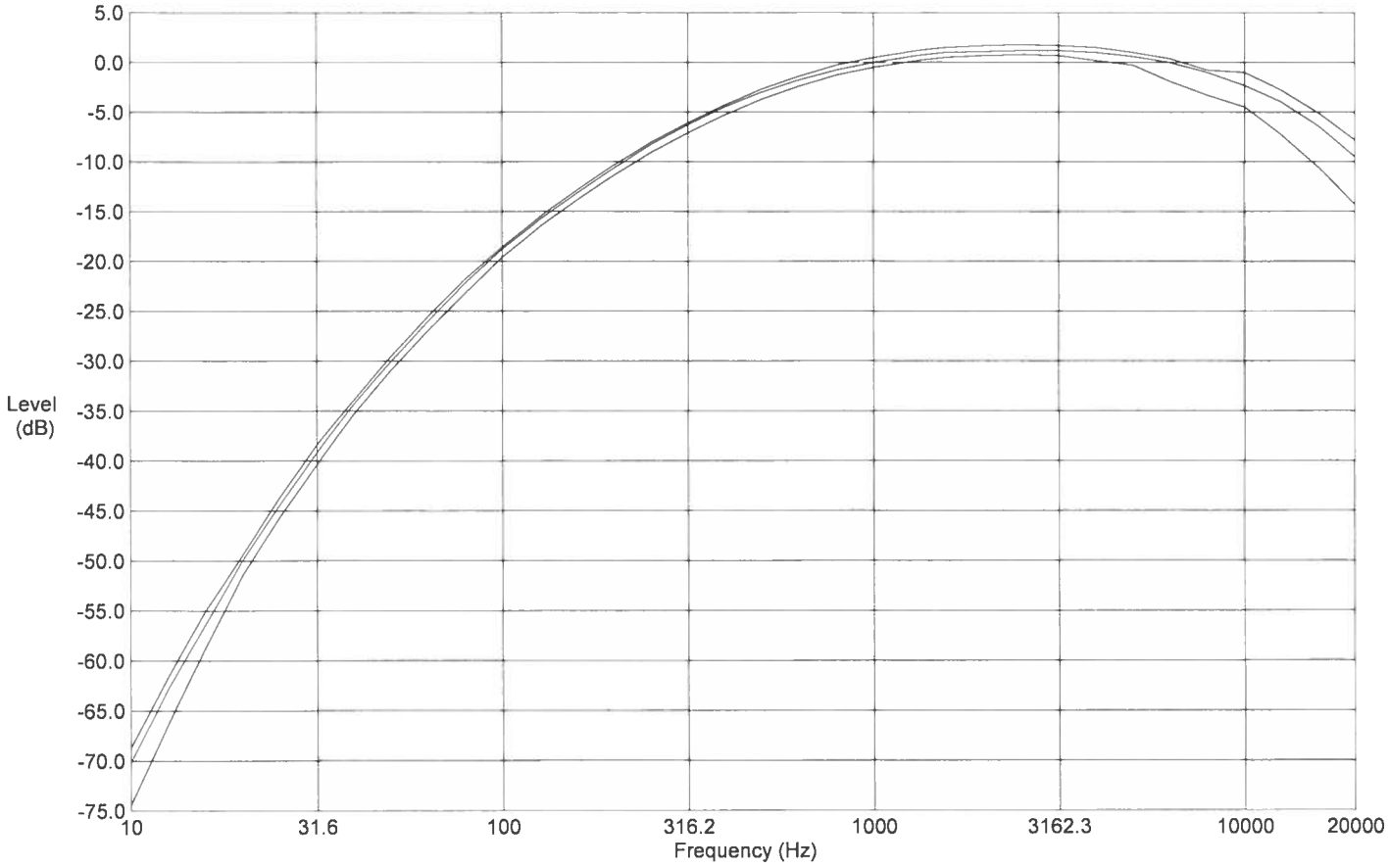
Overload occurs at 154.5 dBSPL.
Primary indicator range: 103.7 dB (lower limit: 50.7 dBSPL to upper limit: 154.4 dBSPL).
Dynamic range: 110.3 dB (noise floor: 44.1 dBSPL to upper limit: 154.4 dBSPL).

This instrument is in compliance with IEC 60651 (2001-10) 7.9 and 7.10, ANSI S1.4-1983 3.2 and IEC 60804 (2001-10) 9.2.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 15JUL2014

Sound Level Meter Model: 712(MPR005) Serial Number: A0418
Certificate of A-Weight Electrical Conformance

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's A-weighted response was then electrically tested using a 4.9 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



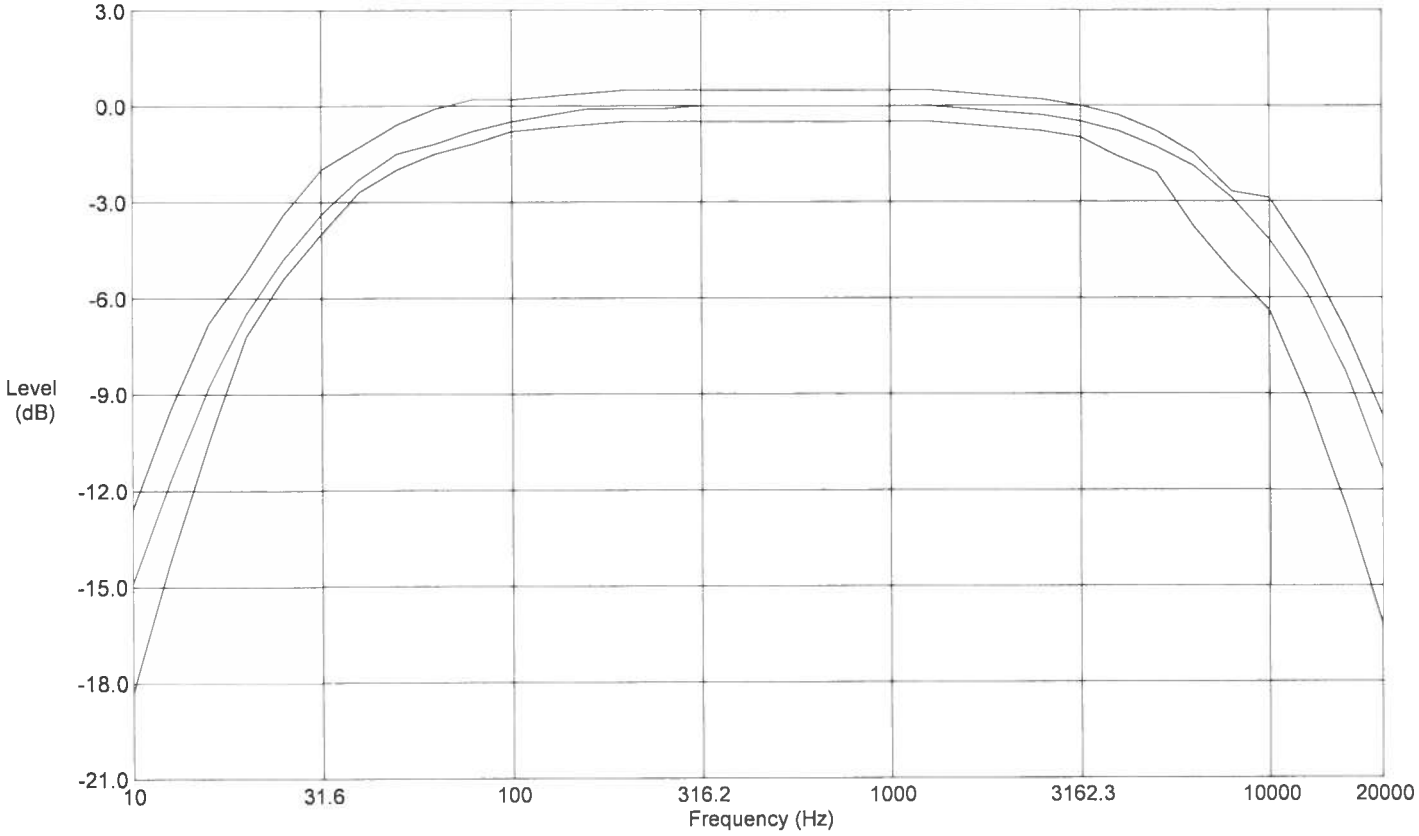
Freq (Hz)	Theor	Measured	Error	Tolerance	Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-70.4	-70.20	0.20	+1.7, -4.0	630.96	-1.9	-1.80	0.10	+0.5, -0.5
12.59	-63.4	-62.90	0.50	+1.7, -3.0	794.33	-0.8	-0.80	0.00	+0.5, -0.5
15.85	-56.7	-56.40	0.30	+1.7, -2.0	1000.00	0.0	0.00	0.00	+0.5, -0.5
19.95	-50.5	-50.00	0.50	+1.0, -1.0	1258.90	0.6	0.60	0.00	+0.5, -0.5
25.12	-44.7	-44.50	0.20	+1.0, -1.0	1584.90	1.0	1.00	0.00	+0.5, -0.5
31.62	-39.4	-39.20	0.20	+1.0, -1.0	1995.30	1.2	1.10	-0.10	+0.5, -0.5
39.81	-34.6	-34.30	0.30	+0.7, -0.7	2511.90	1.3	1.20	-0.10	+0.5, -0.5
50.12	-30.2	-30.00	0.20	+0.7, -0.7	3162.30	1.2	1.20	0.00	+0.5, -0.5
63.10	-26.2	-26.00	0.20	+0.7, -0.7	3981.10	1.0	1.00	0.00	+0.5, -0.8
79.43	-22.5	-22.20	0.30	+0.7, -0.7	5011.90	0.5	0.60	0.10	+0.5, -0.8
100.00	-19.1	-18.80	0.30	+0.5, -0.5	6309.60	-0.1	0.00	0.10	+0.5, -1.8
125.89	-16.1	-15.90	0.20	+0.5, -0.5	7943.30	-1.1	-1.00	0.10	+0.3, -2.2
158.49	-13.4	-13.20	0.20	+0.5, -0.5	10000.00	-2.5	-2.30	0.20	+1.5, -2.0
199.53	-10.9	-10.70	0.20	+0.5, -0.5	12589.00	-4.3	-4.00	0.30	+1.5, -3.0
251.19	-8.6	-8.30	0.30	+0.5, -0.5	15849.00	-6.6	-6.40	0.20	+1.5, -4.0
316.23	-6.6	-6.30	0.30	+0.5, -0.5	19953.00	-9.3	-9.50	-0.20	+1.5, -5.0
398.11	-4.8	-4.50	0.30	+0.5, -0.5	25119.00	-12.4	-13.30	0.00	n/a n/a
501.19	-3.2	-3.00	0.20	+0.5, -0.5	31623.00	-15.8	-17.70	0.00	n/a n/a

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 15JUL2014

Sound Level Meter Model: 712(MPR005) Serial Number: A0418
Certificate of C-Weight Electrical Conformance

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's C-weighted response was then electrically tested using a 4.9 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-14.3	-14.90	-0.60	+1.7, -4.0
12.59	-11.2	-11.70	-0.50	+1.7, -3.0
15.85	-8.5	-8.80	-0.30	+1.7, -2.0
19.95	-6.2	-6.50	-0.30	+1.0, -1.0
25.12	-4.4	-4.80	-0.40	+1.0, -1.0
31.62	-3.0	-3.40	-0.40	+1.0, -1.0
39.81	-2.0	-2.30	-0.30	+0.7, -0.7
50.12	-1.3	-1.50	-0.20	+0.7, -0.7
63.10	-0.8	-1.20	-0.40	+0.7, -0.7
79.43	-0.5	-0.80	-0.30	+0.7, -0.7
100.00	-0.3	-0.50	-0.20	+0.5, -0.5
125.89	-0.2	-0.30	-0.10	+0.5, -0.5
158.49	-0.1	-0.10	0.00	+0.5, -0.5
199.53	0.0	-0.10	-0.10	+0.5, -0.5
251.19	0.0	-0.10	-0.10	+0.5, -0.5
316.23	0.0	0.00	0.00	+0.5, -0.5
398.11	0.0	0.00	0.00	+0.5, -0.5
501.19	0.0	0.00	0.00	+0.5, -0.5
630.96	0.0	0.00	0.00	+0.5, -0.5
794.33	0.0	0.00	0.00	+0.5, -0.5
1000.00	0.0	0.00	0.00	+0.5, -0.5
1258.90	0.0	0.00	0.00	+0.5, -0.5
1584.90	-0.1	-0.10	0.00	+0.5, -0.5
1995.30	-0.2	-0.20	0.00	+0.5, -0.5
2511.90	-0.3	-0.30	0.00	+0.5, -0.5
3162.30	-0.5	-0.50	0.00	+0.5, -0.5
3981.10	-0.8	-0.80	0.00	+0.5, -0.8
5011.90	-1.3	-1.30	0.00	+0.5, -0.8
6309.60	-2.0	-1.90	0.10	+0.5, -1.8
7943.30	-3.0	-2.90	0.10	+0.3, -2.2
10000.00	-4.4	-4.20	0.20	+1.5, -2.0
12589.00	-6.2	-5.90	0.30	+1.5, -3.0
15849.00	-8.5	-8.30	0.20	+1.5, -4.0
19953.00	-11.2	-11.40	-0.20	+1.5, -5.0
25119.00	-14.3	-15.20	0.00	n/a n/a
31623.00	-17.7	-19.50	0.00	n/a n/a

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 15JUL2014

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2014-189297

Instrument Model 720 (MPR005), Serial Number 0436, was calibrated on 8 Apr 2014. The instrument meets factory specifications per Procedure D0001.8208, ANSI S1.4 1983, IEC 651-Type 2 1979, and IEC 804-Type 2 1985.

Instrument found to be in calibration as received: YES
Date Calibrated: 8 Apr 2014
Calibration due: 8 Apr 2015

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	LDSigGn/2239	0653 / 0101	12 Months	10 Apr 2014	2013-172563

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 23 ° Centigrade

Relative Humidity: 27 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.

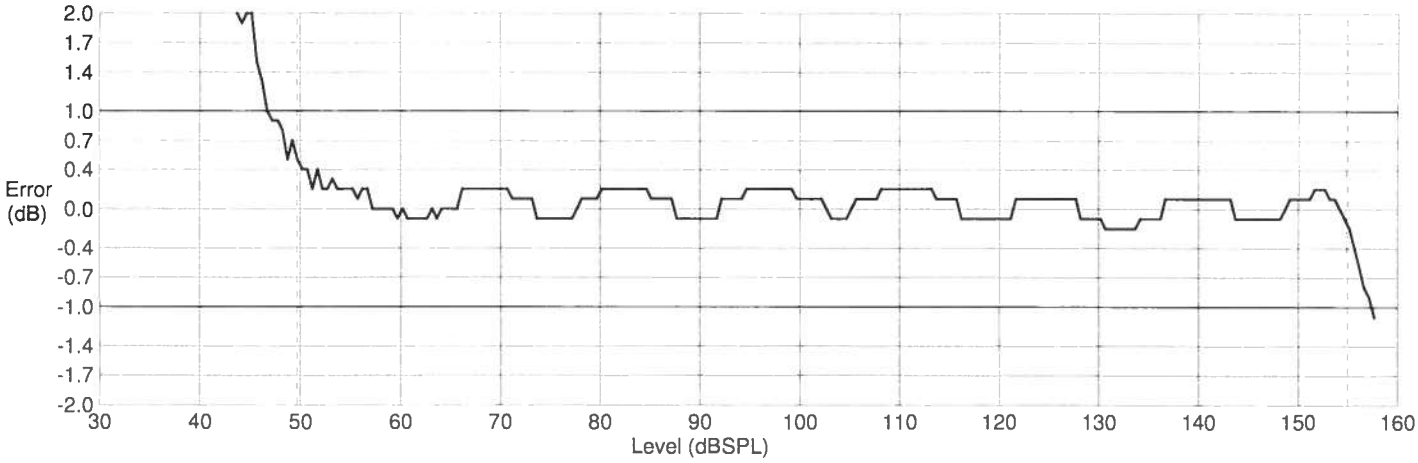
Signed: 

Technician: Eric Olson

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified

Sound Level Meter Model: 720(MPR005) Serial Number: A0436
Log Linearity, Differential Linearity and Range Data

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's Log Linearity A-weighted fast response was then electrically tested using a 1kHz sine wave from 32.7 dBSPL to 157.7 dBSPL in 0.5 dB increments.



Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB	Levl dBSPL	Meas dBSPL	Err dB
32.7	**43.3**	**10.6**	53.7	53.9	0.2	74.7	74.6	-0.1	95.7	95.9	0.2	116.7	116.6	-0.1	137.7	137.8	0.1
33.2	**43.4**	**10.2**	54.2	54.4	0.2	75.2	75.1	-0.1	96.2	96.4	0.2	117.2	117.1	-0.1	138.2	138.3	0.1
33.7	**43.8**	**10.1**	54.7	54.9	0.2	75.7	75.6	-0.1	96.7	96.9	0.2	117.7	117.6	-0.1	138.7	138.8	0.1
34.2	**43.7**	**9.5**	55.2	55.4	0.2	76.2	76.1	-0.1	97.2	97.4	0.2	118.2	118.1	-0.1	139.2	139.3	0.1
34.7	**43.6**	**8.9**	55.7	55.8	0.1	76.7	76.6	-0.1	97.7	97.9	0.2	118.7	118.6	-0.1	139.7	139.8	0.1
35.2	**43.7**	**8.5**	56.2	56.4	0.2	77.2	77.1	-0.1	98.2	98.4	0.2	119.2	119.1	-0.1	140.2	140.3	0.1
35.7	**44.1**	**8.4**	56.7	56.9	0.2	77.7	77.7	0.0	98.7	98.9	0.2	119.7	119.6	-0.1	140.7	140.8	0.1
36.2	**43.7**	**7.5**	57.2	57.2	0.0	78.2	78.3	0.1	99.2	99.4	0.2	120.2	120.1	-0.1	141.2	141.3	0.1
36.7	**43.8**	**7.1**	57.7	57.7	0.0	78.7	78.8	0.1	99.7	99.8	0.1	120.7	120.6	-0.1	141.7	141.8	0.1
37.2	**44.2**	**7.0**	58.2	58.2	0.0	79.2	79.3	0.1	100.2	100.3	0.1	121.2	121.1	-0.1	142.2	142.3	0.1
37.7	**44.0**	**6.3**	58.7	58.7	0.0	79.7	79.8	0.1	100.7	100.8	0.1	121.7	121.8	0.1	142.7	142.8	0.1
38.2	**44.2**	**6.0**	59.2	59.2	0.0	80.2	80.4	0.2	101.2	101.3	0.1	122.2	122.3	0.1	143.2	143.3	0.1
38.7	**44.6**	**5.9**	59.7	59.6	-0.1	80.7	80.9	0.2	101.7	101.8	0.1	122.7	122.8	0.1	143.7	143.6	-0.1
39.2	**44.6**	**5.4**	60.2	60.2	0.0	81.2	81.4	0.2	102.2	102.3	0.1	123.2	123.3	0.1	144.2	144.1	-0.1
39.7	**44.5**	**4.8**	60.7	60.6	-0.1	81.7	81.9	0.2	102.7	102.7	0.0	123.7	123.8	0.1	144.7	144.6	-0.1
40.2	**44.8**	**4.6**	61.2	61.1	-0.1	82.2	82.4	0.2	103.2	103.1	-0.1	124.2	124.3	0.1	145.2	145.1	-0.1
40.7	**45.1**	**4.4**	61.7	61.6	-0.1	82.7	82.9	0.2	103.7	103.6	-0.1	124.7	124.8	0.1	145.7	145.6	-0.1
41.2	**45.1**	**3.9**	62.2	62.1	-0.1	83.2	83.4	0.2	104.2	104.1	-0.1	125.2	125.3	0.1	146.2	146.1	-0.1
41.7	**45.5**	**3.8**	62.7	62.6	-0.1	83.7	83.9	0.2	104.7	104.6	-0.1	125.7	125.8	0.1	146.7	146.6	-0.1
42.2	**45.4**	**3.2**	63.2	63.2	0.0	84.2	84.4	0.2	105.2	105.2	0.0	126.2	126.3	0.1	147.2	147.1	-0.1
42.7	**45.8**	**3.1**	63.7	63.6	-0.1	84.7	84.9	0.2	105.7	105.8	0.1	126.7	126.8	0.1	147.7	147.6	-0.1
43.2	**45.9**	**2.7**	64.2	64.2	0.0	85.2	85.3	0.1	106.2	106.3	0.1	127.2	127.3	0.1	148.2	148.1	-0.1
43.7	**46.2**	**2.5**	64.7	64.7	0.0	85.7	85.8	0.1	106.7	106.8	0.1	127.7	127.8	0.1	148.7	148.7	0.0
44.2	**46.1**	**1.9**	65.2	65.2	0.0	86.2	86.3	0.1	107.2	107.3	0.1	128.2	128.1	-0.1	149.2	149.3	0.1
44.7	**46.8**	**2.1**	65.7	65.7	0.0	86.7	86.8	0.1	107.7	107.8	0.1	128.7	128.6	-0.1	149.7	149.8	0.1
45.2	**47.2**	**2.0**	66.2	66.4	0.2	87.2	87.3	0.1	108.2	108.4	0.2	129.2	129.1	-0.1	150.2	150.3	0.1
45.7	**47.2**	**1.5**	66.7	66.9	0.2	87.7	87.6	-0.1	108.7	108.9	0.2	129.7	129.6	-0.1	150.7	150.8	0.1
46.2	**47.5**	**1.3**	67.2	67.4	0.2	88.2	88.1	-0.1	109.2	109.4	0.2	130.2	130.1	-0.1	151.2	151.3	0.1
46.7	**47.7**	**1.0**	67.7	67.9	0.2	88.7	88.6	-0.1	109.7	109.9	0.2	130.7	130.5	-0.2	151.7	151.9	0.2
47.2	**48.1**	**0.9**	68.2	68.4	0.2	89.2	89.1	-0.1	110.2	110.4	0.2	131.2	131.0	-0.2	152.2	152.4	0.2
47.7	**48.6**	**0.9**	68.7	68.9	0.2	89.7	89.6	-0.1	110.7	110.9	0.2	131.7	131.5	-0.2	152.7	152.9	0.2
48.2	**49.0**	**0.8**	69.2	69.4	0.2	90.2	90.1	-0.1	111.2	111.4	0.2	132.2	132.0	-0.2	153.2	153.3	0.1
48.7	**49.2**	**0.5**	69.7	69.9	0.2	90.7	90.6	-0.1	111.7	111.9	0.2	132.7	132.5	-0.2	153.7	153.8	0.1
49.2	**49.9**	**0.7**	70.2	70.4	0.2	91.2	91.1	-0.1	112.2	112.4	0.2	133.2	133.0	-0.2	154.2	154.2	0.0
49.7	50.2	0.5	70.7	70.9	0.2	91.7	91.6	-0.1	112.7	112.9	0.2	133.7	133.5	-0.2	154.7	154.6	-0.1
50.2	50.6	0.4	71.2	71.3	0.1	92.2	92.3	0.1	113.2	113.4	0.2	134.2	134.1	-0.1	**155.2**	**155.0**	**-0.2**
50.7	51.1	0.4	71.7	71.8	0.1	92.7	92.8	0.1	113.7	113.8	0.1	134.7	134.6	-0.1	**155.7**	**155.3**	**-0.4**
51.2	51.4	0.2	72.2	72.3	0.1	93.2	93.3	0.1	114.2	114.3	0.1	135.2	135.1	-0.1	**156.2**	**155.6**	**-0.6**
51.7	52.1	0.4	72.7	72.8	0.1	93.7	93.8	0.1	114.7	114.8	0.1	135.7	135.6	-0.1	**156.7**	**155.9**	**-0.8**
52.2	52.4	0.2	73.2	73.3	0.1	94.2	94.3	0.1	115.2	115.3	0.1	136.2	136.1	-0.1	**157.2**	**156.3**	**-0.9**
52.7	52.9	0.2	73.7	73.6	-0.1	94.7	94.9	0.2	115.7	115.8	0.1	136.7	136.8	0.1	**157.7**	**156.6**	**-1.1**
53.2	53.5	0.3	74.2	74.1	-0.1	95.2	95.4	0.2	116.2	116.1	-0.1	137.2	137.3	0.1			

Plotted per typical sensitivity of an MPR005 electret microphone; 5 mV/Pa.

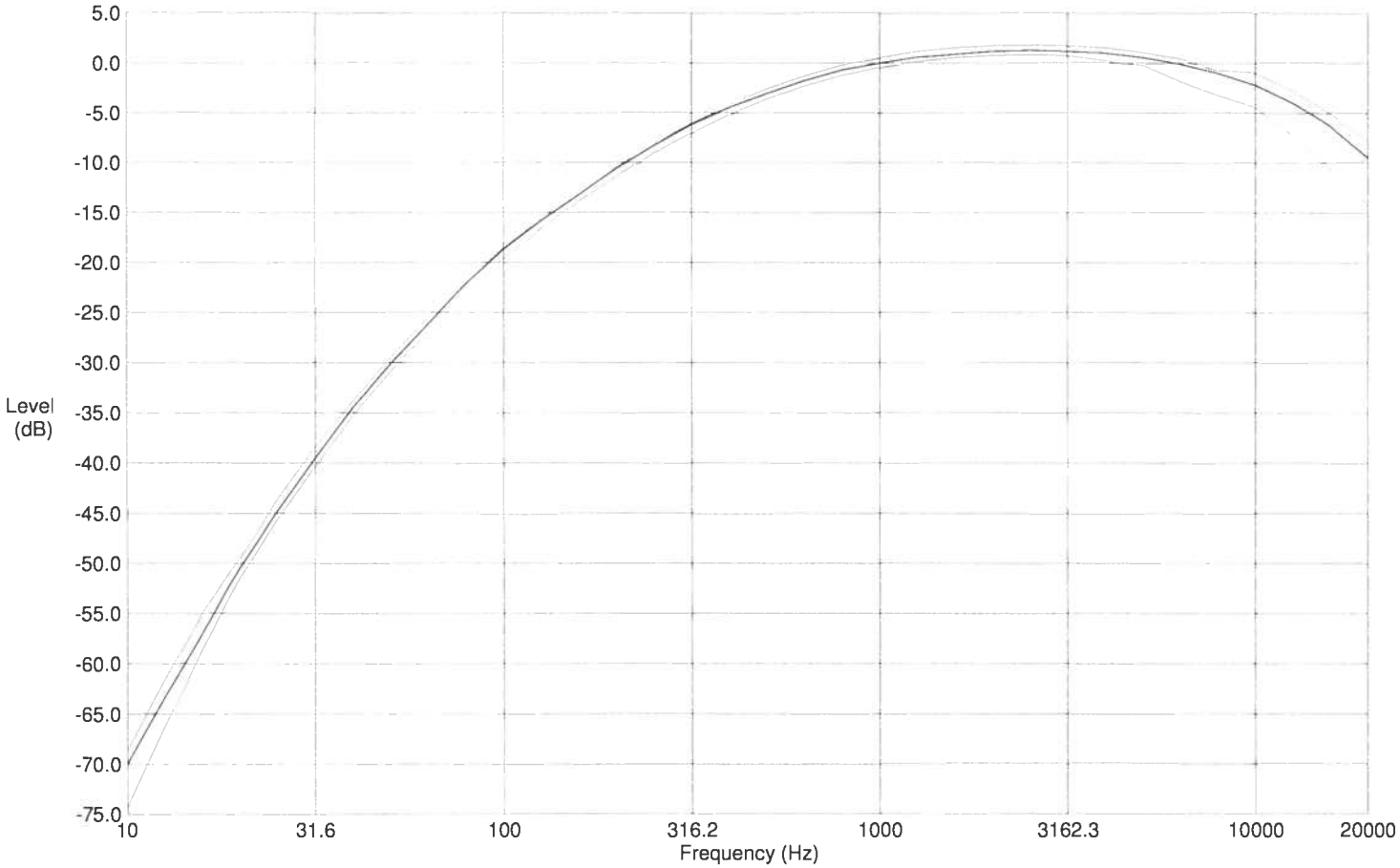
Overload occurs at 155.0 dBSPL.
Primary indicator range: 105.2 dB (lower limit: 49.7 dBSPL to upper limit: 154.9 dBSPL).
Dynamic range: 111.7 dB (noise floor: 43.2 dBSPL to upper limit: 154.9 dBSPL).

This instrument is in compliance with IEC 60651 (2001-10) 7.9 and 7.10, ANSI S1.4-1983 3.2 and IEC 60804 (2001-10) 9.2.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 08APR2014

Sound Level Meter Model: 720(MPR005) Serial Number: A0436
Certificate of A-Weight Electrical Conformance

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's A-weighted response was then electrically tested using a 5.2 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-70.4	-70.00	0.40	+1.7, -4.0
12.59	-63.4	-63.40	0.00	+1.7, -3.0
15.85	-56.7	-57.00	-0.30	+1.7, -2.0
19.95	-50.5	-50.40	0.10	+1.0, -1.0
25.12	-44.7	-44.80	-0.10	+1.0, -1.0
31.62	-39.4	-39.50	-0.10	+1.0, -1.0
39.81	-34.6	-34.50	0.10	+0.7, -0.7
50.12	-30.2	-30.10	0.10	+0.7, -0.7
63.10	-26.2	-26.10	0.10	+0.7, -0.7
79.43	-22.5	-22.10	0.40	+0.7, -0.7
100.00	-19.1	-18.70	0.40	+0.5, -0.5
125.89	-16.1	-15.80	0.30	+0.5, -0.5
158.49	-13.4	-13.20	0.20	+0.5, -0.5
199.53	-10.9	-10.60	0.30	+0.5, -0.5
251.19	-8.6	-8.30	0.30	+0.5, -0.5
316.23	-6.6	-6.20	0.40	+0.5, -0.5
398.11	-4.8	-4.50	0.30	+0.5, -0.5
501.19	-3.2	-3.10	0.10	+0.5, -0.5

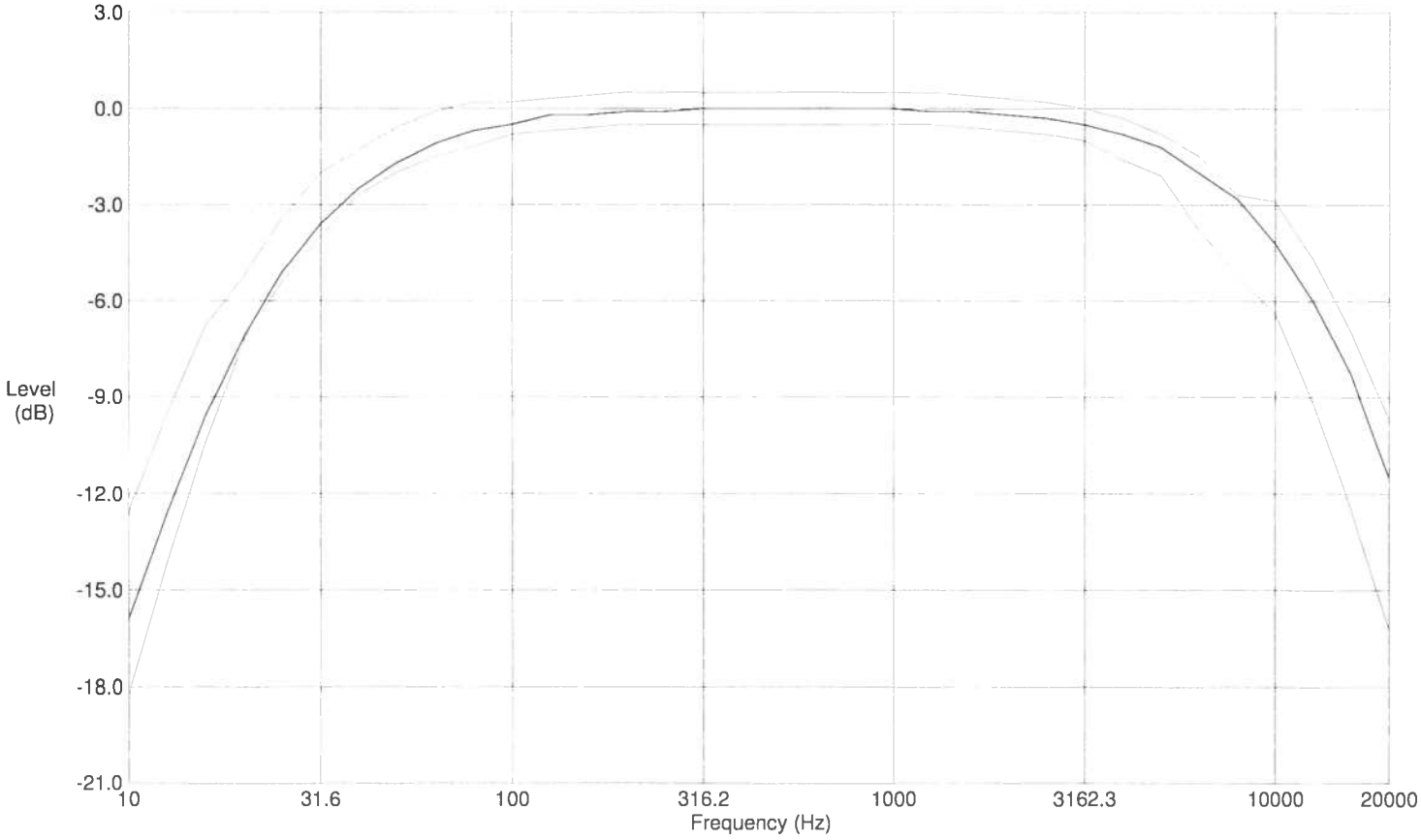
Freq (Hz)	Theor	Measured	Error	Tolerance
630.96	-1.9	-1.80	0.10	+0.5, -0.5
794.33	-0.8	-0.70	0.10	+0.5, -0.5
1000.00	0.0	0.00	0.00	+0.5, -0.5
1258.90	0.6	0.60	0.00	+0.5, -0.5
1584.90	1.0	0.90	-0.10	+0.5, -0.5
1995.30	1.2	1.20	0.00	+0.5, -0.5
2511.90	1.3	1.30	0.00	+0.5, -0.5
3162.30	1.2	1.20	0.00	+0.5, -0.5
3981.10	1.0	1.00	0.00	+0.5, -0.8
5011.90	0.5	0.60	0.10	+0.5, -0.8
6309.60	-0.1	-0.10	0.00	+0.5, -1.8
7943.30	-1.1	-1.00	0.10	+0.3, -2.2
10000.00	-2.5	-2.20	0.30	+1.5, -2.0
12589.00	-4.3	-4.00	0.30	+1.5, -3.0
15849.00	-6.6	-6.30	0.30	+1.5, -4.0
19953.00	-9.3	-9.50	-0.20	+1.5, -5.0
25119.00	-12.4	-13.20	0.00	n/a n/a
31623.00	-15.8	-17.50	0.00	n/a n/a

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 08APR2014

Sound Level Meter Model: 720(MPR005) Serial Number: A0436
Certificate of C-Weight Electrical Conformance

This Type 2 Sound Level Meter (with ADP046 input adapter) was calibrated with a reference 1kHz sine wave at a level of 136.0 dBSPL. The instrument's C-weighted response was then electrically tested using a 5.2 Vrms sinewave at exact frequencies as specified in IEC 60651 (2001-10) and ANSI S1.4-1983.



Freq (Hz)	Theor	Measured	Error	Tolerance	Freq (Hz)	Theor	Measured	Error	Tolerance
10.00	-14.3	-15.90	-1.60	+1.7, -4.0	630.96	0.0	0.00	0.00	+0.5, -0.5
12.59	-11.2	-12.60	-1.40	+1.7, -3.0	794.33	0.0	0.00	0.00	+0.5, -0.5
15.85	-8.5	-9.60	-1.10	+1.7, -2.0	1000.00	0.0	0.00	0.00	+0.5, -0.5
19.95	-6.2	-7.10	-0.90	+1.0, -1.0	1258.90	0.0	-0.10	-0.10	+0.5, -0.5
25.12	-4.4	-5.10	-0.70	+1.0, -1.0	1584.90	-0.1	-0.10	0.00	+0.5, -0.5
31.62	-3.0	-3.60	-0.60	+1.0, -1.0	1995.30	-0.2	-0.20	0.00	+0.5, -0.5
39.81	-2.0	-2.50	-0.50	+0.7, -0.7	2511.90	-0.3	-0.30	0.00	+0.5, -0.5
50.12	-1.3	-1.70	-0.40	+0.7, -0.7	3162.30	-0.5	-0.50	0.00	+0.5, -0.5
63.10	-0.8	-1.10	-0.30	+0.7, -0.7	3981.10	-0.8	-0.80	0.00	+0.5, -0.8
79.43	-0.5	-0.70	-0.20	+0.7, -0.7	5011.90	-1.3	-1.20	0.10	+0.5, -0.8
100.00	-0.3	-0.50	-0.20	+0.5, -0.5	6309.60	-2.0	-2.00	0.00	+0.5, -1.8
125.89	-0.2	-0.20	0.00	+0.5, -0.5	7943.30	-3.0	-2.80	0.20	+0.3, -2.2
158.49	-0.1	-0.20	-0.10	+0.5, -0.5	10000.00	-4.4	-4.20	0.20	+1.5, -2.0
199.53	0.0	-0.10	-0.10	+0.5, -0.5	12589.00	-6.2	-6.00	0.20	+1.5, -3.0
251.19	0.0	-0.10	-0.10	+0.5, -0.5	15849.00	-8.5	-8.30	0.20	+1.5, -4.0
316.23	0.0	0.00	0.00	+0.5, -0.5	19953.00	-11.2	-11.50	-0.30	+1.5, -5.0
398.11	0.0	0.00	0.00	+0.5, -0.5	25119.00	-14.3	-15.10	0.00	n/a n/a
501.19	0.0	0.00	0.00	+0.5, -0.5	31623.00	-17.7	-19.40	0.00	n/a n/a

This instrument is in compliance with IEC 60651 (2001-10) 6.1 and 9.2.2, ANSI S1.4-1983 5.1 and 8.2.1, and IEC 60804 (2001-10) 5.1 for Type 2 sound level meters.

Technician: Eric Olson Test Date: 08APR2014

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
NVLAP Lab Code: 200625-0

Calibration Certificate No.31256

Instrument:	**Sound Level Meter**
Model:	**2250**
Manufacturer:	**Brüel and Kjær**
Serial number:	**2653963**
Tested with:	**Microphone 4189 s/n 2643887** **Preamplifier ZC0032 s/n 9407**
Type (class):	**1**
Customer:	**URS Corporation**
Tel/Fax:	**858-812-8257 /**

Date Calibrated: **5/19/2014** *Cal Due:* **5/19/2015**

Status:	**Received**	**Sent**
In tolerance:	**X**	**X**
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes **X** No
Calibration service: __ **Basic** **X** **Standard**
Address: **4225 Executive Square, Suite 1600**
La Jolla, CA 92037

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/22/2012
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

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

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 2, 2013	Scantek, Inc./ NVLAP	Jul 2, 2014
DS-360-SRS	Function Generator	61646	Nov 20, 2012	ACR Env./ A2LA	Nov 20, 2014
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Nov 22, 2013	ACR Env. / A2LA	Nov 22, 2014
DPI 141-Druck	Pressure Indicator	790/00-04	Nov 21, 2012	ACR Env./ A2LA	Nov 21, 2014
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Mar 17, 2014	ACR Env./ A2LA	Sep 17, 2015
PC Program 1019 Norsonic	Calibration software	v.5.2	Validated Mar 2011	Scantek, Inc.	-
1251-Norsonic	Calibrator	30878	Nov 8, 2013	Scantek, Inc./ NVLAP	Nov 8, 2014

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 (%)
22.6 °C	101.009 kPa	42.7 %RH

Calibrated by:	Valentin Buzduga	**Authorized signatory:**	Mariana Buzduga
Signature		Signature	
Date	5/19/2014	Date	5/19/2014

Scantek, Inc.

CALIBRATION LABORATORY
ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP
(an ILAC MRA signatory)

NVLAP®

NVLAP Lab Code: 200625-0

Calibration Certificate No. 31258

Instrument:	**Accelerometer**	*Date Calibrated:*	**5/19/2014** *Due:* **5/19/2015**
Model:	**4513**	*Status:*	**Received** / **Sent**
Manufacturer:	**Bruel & Kjaer**	*In tolerance:*	X / X
Serial number:	**56522**	*Out of tolerance:*	
ID:	-	*See comments:*	
Tested with:	**4102C Current Source s/n 4186**	*Contains non accredited tests:*	___ Yes _X_ No
Mounting:	**Stud**		
Customer:	**URS Corporation**	*Address:*	**4225 Executive Square, Suite 1600**
Phone/Fax:	**858-812-8257**		**La Jolla, CA 92037**

Tested in accordance with the following procedures and standards:

- Calibration of Accelerometers, Scantek Inc., Rev. 6/21/2011

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

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence: Cal. Lab / Accreditation	Cal. Due
DS-360 - SRS	Function Generator	88077	Aug 30, 2012	ACR Env / A2LA	Aug 30, 2014
34401A - Agilent Technologies	Digital Voltmeter	MY47011118	Sep 3, 2013	ACR Env / A2LA	Sep 3, 2014
HM30-Thommen	Meteo Station	1040170/39633	Sep 30, 2013	ACR Env / A2LA	Sep 30, 2014
840-2 - Norsonic	Real Time Analyzer	18692	Jan 10, 2014	Scantek Inc / NVLAP	Jan 10, 2015
3056C-Dytran	Charge accelerometer	367	May 6, 2014	Scantek, Inc / NVLAP	May 6, 2015

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and PTB (Germany)

Calibrated by	Mariana Buzduga	Authorized signatory	Valentin Buzduga
Signature		Signature	
Date	5/19/2014	Date	5/19/2014

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
ACCREDITED by NVLAP (an ILAC MRA signatory)

NVLAP®
NVLAP Lab Code: 200625-0

Calibration Certificate No.31257

LIMITED USE

Instrument:	**Microphone**
Model:	**4189**
Manufacturer:	**Brüel & Kjær**
Serial number:	**2643887**
Composed of:	
Customer:	**URS Corporation**
Tel/Fax:	**858-812-8257/**

Date Calibrated: **5/16/2014** *Cal Due:* **5/16/2015**

	Received	Sent
Status:		
In tolerance:		
Out of tolerance:	X	X
See comments:	X	

Contains non-accredited tests: __Yes _X_ No

Address: **4225 Executive Square, Suite 1600**
La Jolla, CA 92037

Tested in accordance with the following procedures and standards:
Calibration of Measurement Microphones, Scantek, Inc., Rev. 11/30/2010

Instrumentation used for calibration: N-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Jul 2, 2013	Scantek, Inc./ NVLAP	Jul 2, 2014
DS-360-SRS	Function Generator	61646	Nov 20, 2012	ACR Env./ A2LA	Nov 20, 2014
34401A-Agilent Technologies	Digital Voltmeter	MY41022043	Nov 22, 2013	ACR Env. / A2LA	Nov 22, 2014
DPI 141-Druck	Pressure Indicator	790/00-04	Nov 21, 2012	ACR Env./ A2LA	Nov 21, 2014
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Mar 17, 2014	ACR Env./ A2LA	Sep 17, 2015
PC Program 1017 Norsonic	Calibration software	v.5.2	Validated Mar 2011	Scantek, Inc.	-
1253-Norsonic	Calibrator	28326	Nov 8, 2013	Scantek, Inc./ NVLAP	Nov 8, 2014
1203-Norsonic	Preamplifier	14059	Jan 2, 2014	Scantek, Inc./ NVLAP	Jan 2, 2015
4180-Brüel&Kjær	Microphone	2246115	Oct 15, 2013	NPL-UK / UKAS	Oct 15, 2015

Instrumentation and test results are traceable to SI - BIPM through standards maintained by NPL (UK) and NIST (USA)

Calibrated by:	Valentin Buzduga	**Authorized signatory:**	Mariana Buzduga
Signature		Signature	
Date	5/16/2014	Date	5/19/2014

PCB PIEZOTRONICS
A PCB GROUP COMPANY

Certificate of Calibration and Conformance

Certificate Number 2014-192711

Instrument Model LXT1, Serial Number 0002527, was calibrated on 18 Jun 2014. The instrument meets factory specifications per Procedure D0001.8306, ANSI S1.4-1983 (R 2006) Type 1, S1.43-1997, S1.25-1991; S1.11-2004; IEC 61672-2002, 60651-2001, 60804-2000, 61260-2001, 61252-2002.

Instrument found to be in calibration as received: YES
Date Calibrated: 18 Jun 2014
Calibration due: 18 Jun 2015

Calibration Standards Used

MANUFACTURER	MODEL	SERIAL NUMBER	INTERVAL	CAL. DUE	TRACEABILITY NO.
Larson Davis	2900 / 2239	0608 / 0110	12 Months	20 Dec 2014	2013-184004

Reference Standards are traceable to the National Institute of Standards and Technology (NIST)

Calibration Environmental Conditions

Temperature: 22 ° Centigrade

Relative Humidity: 35 %

Affirmations

This Certificate attests that this instrument has been calibrated under the stated conditions with Measurement and Test Equipment (M&TE) Standards traceable to the U.S. National Institute of Standards and Technology (NIST). All of the Measurement Standards have been calibrated to their manufacturers' specified accuracy / uncertainty. Evidence of traceability and accuracy is on file at Provo Engineering & Manufacturing Center. An acceptable accuracy ratio between the Standard(s) and the item calibrated has been maintained. This instrument meets or exceeds the manufacturer's published specification unless noted.

The collective uncertainty of the Measurement Standard used does not exceed 25% of the applicable tolerance for each characteristic calibrated unless otherwise noted.

The results documented in this certificate relate only to the item(s) calibrated or tested. A one year calibration is recommended, however calibration interval assignment and adjustment are the responsibility of the end user. This certificate may not be reproduced, except in full, without the written approval of the issuer.

"AS RECEIVED" data same as shipped data.
Tested with PRMLXT1L-0126

Signed: _____
Technician: Eric Olson

Provo Engineering and Manufacturing Center, 1681 West 820 North, Provo, Utah 84601
Toll Free: 888.258.3222 Telephone: 716.926.8243 Fax: 716.926.8215
ISO 9001-2008 Certified