

Model PRM2103 Outdoor Microphone Preamplifier



Larson Davis

PRM2103

Preamplifier

Reference Manual

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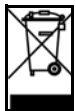
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Module 1 Overview

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1.1 Description

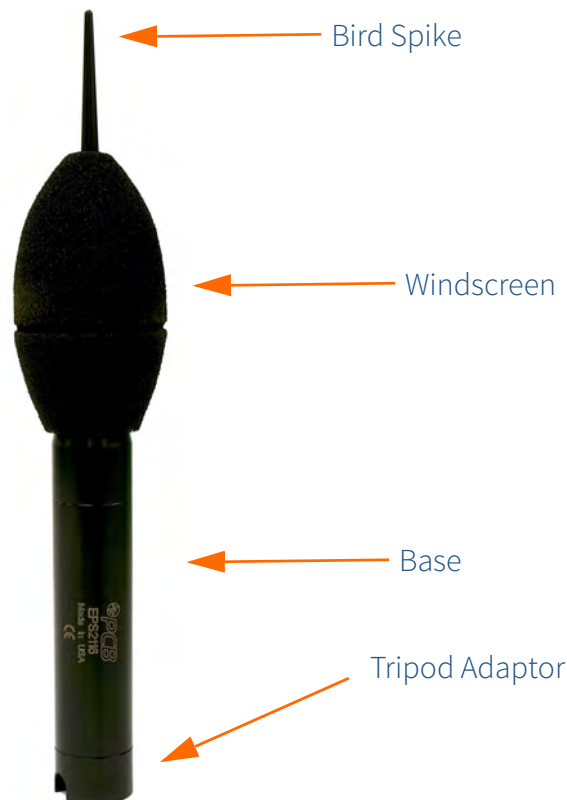
TAKE NOTE Use connected sound level meter microphone corrections with the PRM2103-FF.

The Larson Davis PRM2103 Outdoor Microphone Preamplifier has been designed for use with EPS2116, EPS2106-3, and EPS2108-3 Environmental Protection Shrouds and model 831 sound level meters (SoundAdvisor Model 831C and Model 831). It includes remotely-activated, multi-frequency calibration check functionality and desiccant-free automatic heaters for internal humidity control. The PRM2103 requires only one microphone to get free-field, random, or 90 degree response.

FIGURE 1-1 PRM2103-FF Outdoor Microphone Preamplifier



FIGURE 1-2 Outdoor Microphone System as part of an EPS2116



With the supplied 377B02 microphone, the PRM2103-FF provides frequency response characteristics consistent with precision sound level meter requirements for free-field measurements when used with Larson Davis sound level meters.

1.1.1 Application

The PRM2103-FF is an integral component of an outdoor noise monitoring system, like the SoundAdvisor NMS044 noise monitoring system.

FIGURE 1-3 Remote Noise Monitoring System (SoundAdvisor NMS044)



1.2 Features

The Larson Davis PRM2103-FF Outdoor Microphone Preamplifier provides the following features:

- Permanent outdoor noise monitoring for IEC 61672 Class 1 measurements (with 377B02 microphone and EPS2116, EPS2106-3 or EPS2108-3). Group Z compliant
- For use with Larson Davis EPS2116, EPS2106-3 or EPS2108-3 environmental protection shroud and Model 831 and SoundAdvisor Model 831C sound level meters
- Automatic calibration check at five frequencies, including 31.5, 250, 1000, 4000, and 8000 Hz
- Internal humidity and temperature sensor for automatic microphone humidity control
- Free-field, random or 90 degree response with single 377B02 microphone using digital correction in the Model 831 sound level meter
- 50mV/Pa microphone sensitivity for 16 dB to 140 dB typical range
- Protection from rain, wind, and birds when used with EPS2116, EPS2106-3, or EPS2108-3 environmental protection shroud
- Single cable connectivity
- On-screen device monitoring for connection with the Model 831 and SoundAdvisor Model 831C sound level meters
- Stainless steel construction

1.3 Supplied Accessories

- Prepolarized 377B02 1/2" free-field microphone
- Manual on CD

1.3.1 Other Accessories

Sound Level Meter

- SoundAdvisor Model 831C Sound Level Meter
- Model 831 Sound Level Meter

Environment Protection

- EPS2116 Outdoor Microphone and Preamplifier Protection, including rain, wind, and bird protection
- EPS2106-3 or EPS2108-3 Environment Protection Shroud, including rain, wind, and bird protection

Power Supplies

PSA027 DC Power Supply

- Input: 100 to 240 Vac; 47-63 Hz

- Output: 12 Vdc, 1.6 A
- 2.5 x 5.5 mm barrel connector

Cables

Used with Model 831-INT or 831-INT-ET

- CBL208-20
- CBL208-XX

Used with Model 831 or SoundAdvisor Model 831C

- CBL203-20
- CBL203-XX
- CBL222-XX

Calibrators

CAL200 Class 1 Sound Level Calibrator, 94/114 dB @ 1 kHz

CAL250 Class 1 Sound Level Calibrator, 114 dB @ 250 Hz

Software

G4 LD Utility

SLM LD Utility-G3

Module 2 Getting Started

2.1 Overview

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This module describes the mounting and setup of the PRM2103-FF preamplifier, wiring with supported instruments, and basic operation.

2.2 Environmental Protection Systems

LEARN MORE For basic mounting steps for the EPS2116, see 2.4 "EPS Installation" on page 2-4.

The PRM2103-FF is designed to be mounted on three Larson Davis products for outdoor noise monitoring. To learn more about these environmental protection systems and their mounting procedures, see the following reference manuals:

- Larson Davis EPS2116 Outdoor Microphone and Preamplifier Protection Manual
- Larson Davis EPS2106 Environmental Shroud Technical Reference Manual
- Larson Davis EPS2108 Environmental Shroud Technical Reference Manual

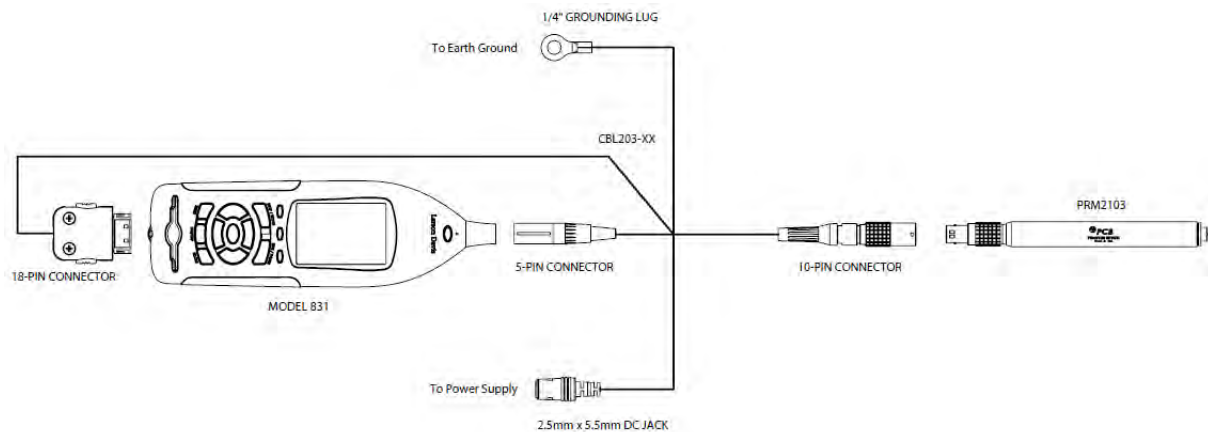
2.3 Wiring

The PRM2103 uses a single cable for both signal and control functions, but provides differing connections, depending on whether you are connecting to the 831 sound level meters or to the 831-INT, as follows:

Sound Level Meters

The CBL203 connects the PRM2103 to Larson Davis sound level meters, as shown in Figure 2-1.

FIGURE 2-1 Connection to 831/831C Only

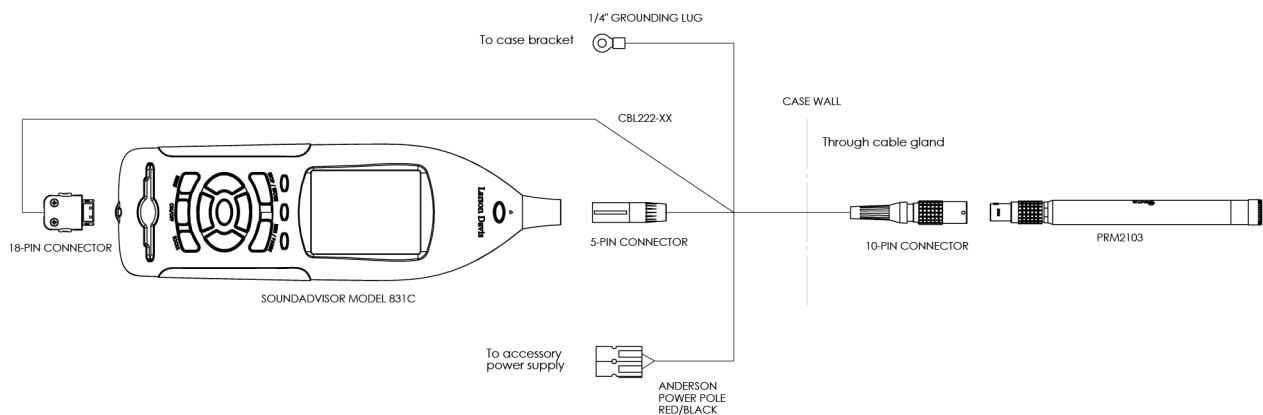


SoundAdvisor NMS044 Connections

When connecting the PRM2103 to the sound level meter, the CBL222-08 cable should be routed through the cable gland on the case. For more information, refer to the Larson Davis EPS044 & NMS044 Manual.

When connecting the PRM2103 to NMS044, follow Figure 2-2 as shown below.

FIGURE 2-2 Connection to NMS044

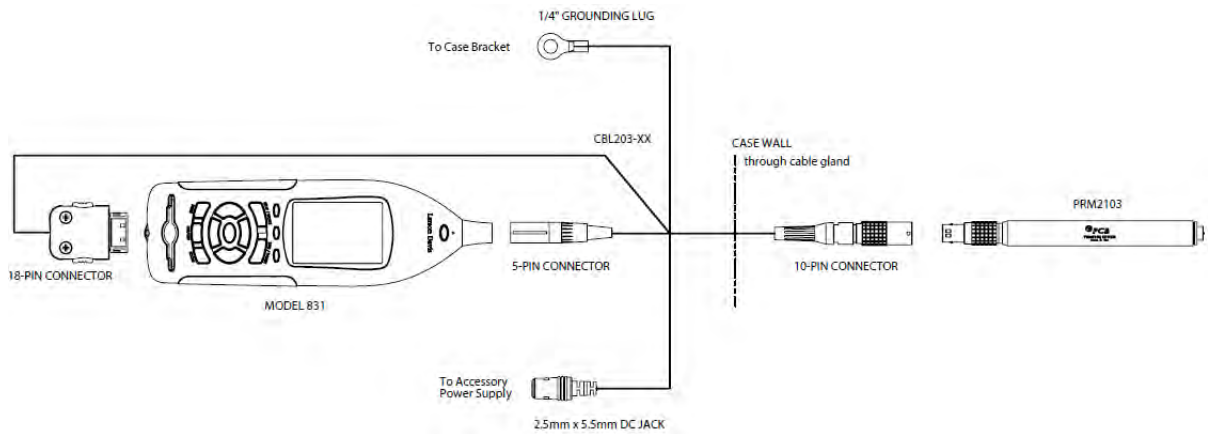


NoiseTutor Connections

When connecting the PRM2103 to the NoiseTutor System, the CBL203 cable should be routed through the cable gland on the NoiseTutor case. For more information, refer to the Larson Davis NoiseTutor System Manual.

When connecting the PRM2103 to a NoiseTutor, follow Figure 2-3 as shown below.

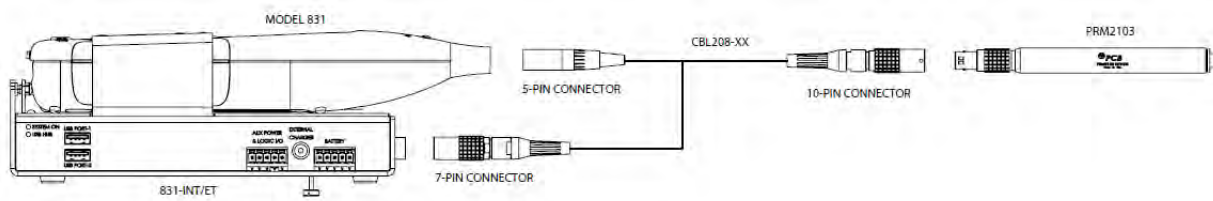
FIGURE 2-3 Connection to NoiseTutor



INT-ET Connections

The CBL208 connects the PRM2103 to the 831-INT or 831-INT-ET, as shown in Figure 2-4.

FIGURE 2-4 Connection to 831-INT or 831-INT ET

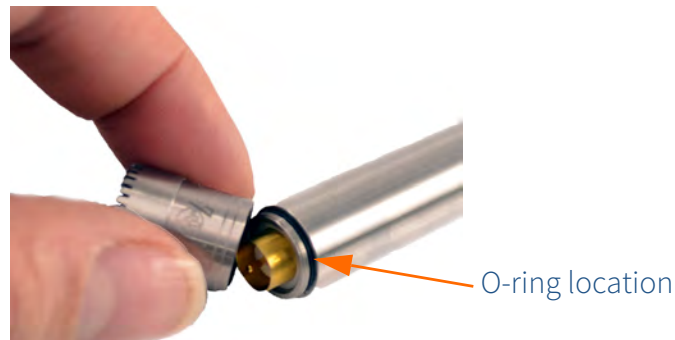


2.4 EPS Installation

The CBL203, CBL208, and CBL222 provide 10-pin connections between the PRM2103 and their connecting devices. To connect the PRM2103 and cable, follow these steps:

- Step 1** Assemble the microphone on top of the PRM2103 preamplifier. If needed, install an o-ring on the bottom thread of the preamplifier, see Figure 2-5.

FIGURE 2-5 Microphone Install



- Step 2** Thread the cable up through the EPS with the cable out the top, so it rotates freely.
- Step 3** Align the red dots on the PRM2103 and cable, then connect by pushing gently together. The whole assembly should be out and above the EPS.
- Step 4** Push the preamplifier into the EPS until the microphone is seated on top.

FIGURE 2-6 EPS Installation



2.5 Verifying Preamp Operation

2.5.1 With Model 831

TAKE NOTE Model 831 firmware version 2.204 or newer is required to support the PRM2103-FF.

When the PRM2103-FF is connected to the Model 831 sound level meter, a message appears, verifying that the connection has been established, as shown in FIGURE 2-6.

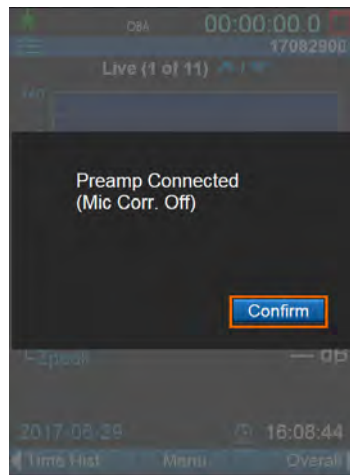
FIGURE 2-7 PRM2103-FF Connection Message



2.5.2 With SoundAdvisor Model831C

When the PRM2103 is connected to the SoundAdvisor Model 831C sound level meter, a message appears, verifying that the connection has been established, as shown in Figure 2-8.

FIGURE 2-8 PRM2103-FF Connection Message



2.6 Setting PRM2103-FF Corrections

TAKE NOTE It is important to select the proper correction. Failure to do this will result in a measurement that is not IEC 61672-1 Class 1 compliant.

The model 831 sound level meters provide corrections for the PRM2103-FF with EPS2116, EPS2106-3, or EPS2108-3 to produce a response that complies with the requirements of IEC 61672-1. These correction filters correct for the effects of the 377B02 microphone response and protection system. The selected correction is displayed on the meter whenever the preamplifier is connected or disconnected, as shown in FIGURE 2-6.

There are microphone corrections available in the SoundAdvisor and Model 831 to be applied the PRM2103, and three are applicable to the PRM2103-FF, as follows:

FF:RI 2116 and FF:RI 2106/8

Provides random incidence response.

FF:FF 2116 and FF:FF 2106/8

Provides corrected free-field response. This is usually selected when aiming the microphone for 0° measurements.

FF:90 2116 and FF:90 2106/8

Provides 90° response. This is usually selected when microphone placement is on a vertical pole but 90° measurements are needed.

To set PRM2103-FF microphone corrections, follow these steps:

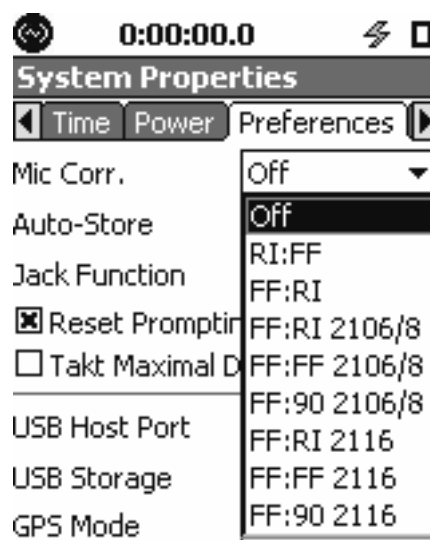
TAKE NOTE When using the PRM2103-FF with the EPS2116, select only corrections that include 2116 in the name. When using the PRM2103-FF with the EPS2106 or EPS2108, select only corrections that include 2106/8 in the name.

Step 1 On the SoundAdvisor or Model 831, navigate **Tools** → **System Properties** → **Preferences**,

Step 2 Select the Mic Corr. field and then choose the needed correction.

Figure 2-9 shows the Model 831 microphone corrections for the PRM2103-FF. These are the same for the 831C.

FIGURE 2-9 PRM2103-FF Microphone Corrections



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3.1 Overview

This module provides information for specifying PRM2103 heater controls, viewing data, performing calibration checks, and upgrading firmware through the SoundAdvisor Model 831C and G4 LD Utility.

3.2 Performing the Acoustic Calibration

To perform an acoustic calibration, follow these steps:

Step 1 Remove the birdspike and windscreen if the EPS2116 environmental protection system is installed.

CAUTION Do not remove the microphone or the microphone grid cap.

Step 2 Place the calibrator, like the CAL250 or CAL200, over the microphone. Apply the calibrator slowly to avoid applying a sudden large pressure change to the diaphragm.


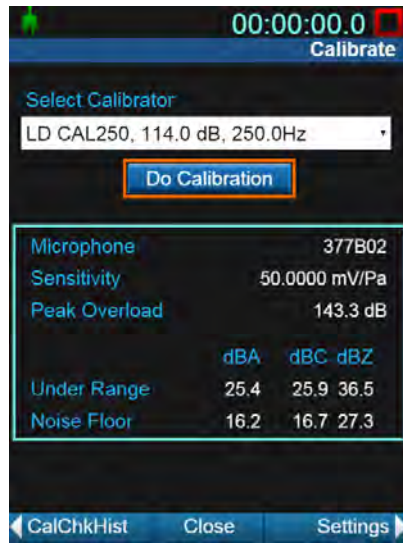
Step 3 To activate the Calibration function on the sound level meter, navigate  (TOOLS) → **Calibrate**.

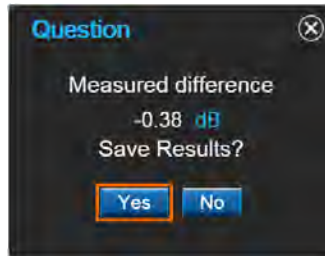
FIGURE 3-1 Calibration



Step 4 Select a calibrator from the list or enter new information about a calibrator.

Step 5 Turn on the calibrator. Select **Do Calibration**.

FIGURE 3-2 Calibrating Message



Step 6 When the calibration is completed, another message box appears that shows the amount of change being made to the calibration. To accept the calibration, select **Yes**. To reject this calibration, select **No**.

Step 7 After performing this acoustical calibration, perform a calibration check, see “Performing Calibration Checks” on page 3-10.

3.3 PRM2103 Heater Controls

The PRM2103 includes a heater to provide protection from condensation to the microphone. The heater state can be specified for one of four settings: Off, Low, High, or Auto. The default setting is Auto, which is recommended for most applications.

3.3.1 Manual Mode

- Off: The heater remains off in all conditions.
- Low: The heater remains on continuously at low power.
- High: The heater remains on continuously at high power.

3.3.2 Automatic Mode

The Auto mode alternates between three states automatically, according to the PRM2103 internal temperature and internal relative humidity. The states are as follows:

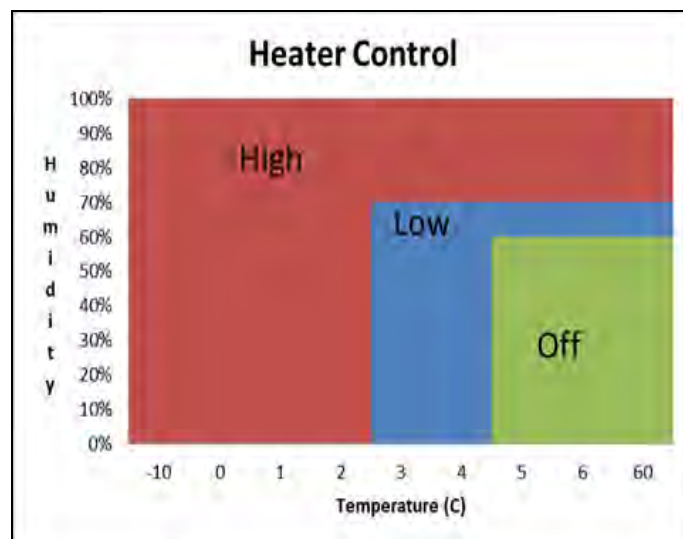
Off: The heater remains off.

Low: The heater turns on at low power when the PRM2103 internal relative humidity exceeds 65% or internal temperature drops below 5°C. The heater turns off when the relative humidity decreases below 60% or the temperature rises above 5°C.

High: The heater turns on high when the PRM2103 internal relative humidity exceeds 70% or when the internal temperature drops below 3°C. When the relative humidity decreases below 65% or the internal temperature rises above 3°C the heater switches to low.

Figure 3-3 shows the PRM2103 automatic heater states for internal temperature and relative humidity variations.

FIGURE 3-3 PRM2103 Heater Control Settings



3.3.3 Heater Controls on SoundAdvisor

TAKE NOTE The heater settings are visible on the SoundAdvisor only when the PRM2103 is connected to the sound level meter.

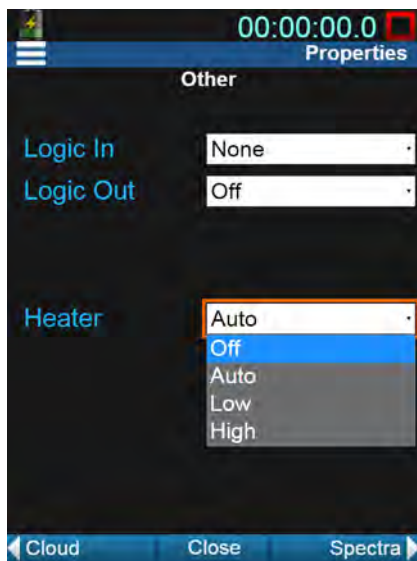
To specify the heater controls through the sound level meter, follow these steps:

Step 1 Navigate **Tools** → **System Properties** → **Other** tab

Step 2 In the PRM2103 Heater field, select **Off**, **Auto**, **Low**, or **High**.

Figure 3-4 shows the PRM2103 heater settings on the Other tab.

FIGURE 3-4 Heater Settings on the Other Tab



3.3.4 Heater Controls in G4 LD Utility Software

To specify heater controls through G4, follow these steps:

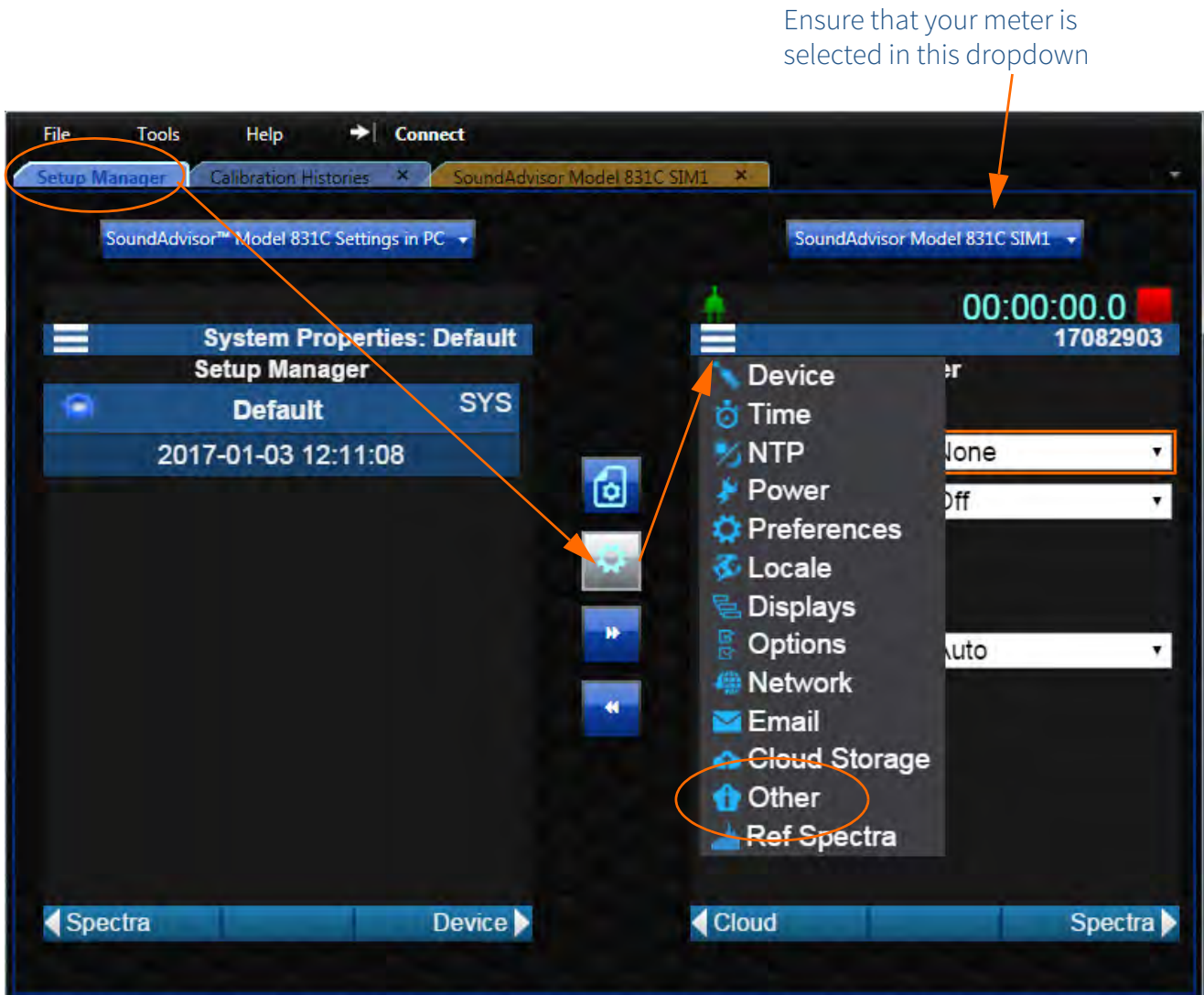
Step 1 Open the software. Connect to the SoundAdvisor sound level meter by selecting the Connect button and your instrument.

FIGURE 3-5 Connect Button



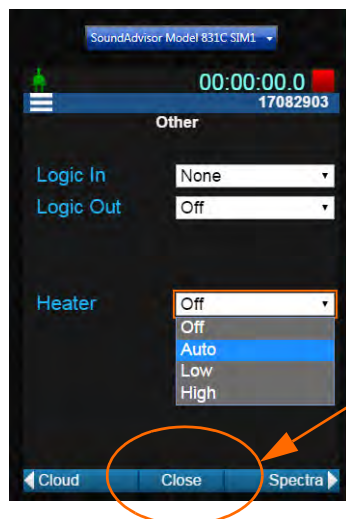
Step 2 Navigate to the **Setup Manager** tab and then click the **Other** tab within the Instrument Settings preferences.

FIGURE 3-6 Heater Settings on System Tab in G4 LD Utility Software



Step 3 Select heater setting. **Close** to save.

FIGURE 3-7 G4 Heater Settings



3.3.5 Viewing PRM2103 Data

The PRM2103 provides the following data:

- Preamplifier model
- PRM2103 serial number
- Internal PRM2103 temperature
- Internal PRM2103 relative humidity
- Internal PRM2103 dew point
- Heater setting status
- Calibrator check function status
- Preamplifier connection status to 831 sound level meter
- PRM2103 firmware version

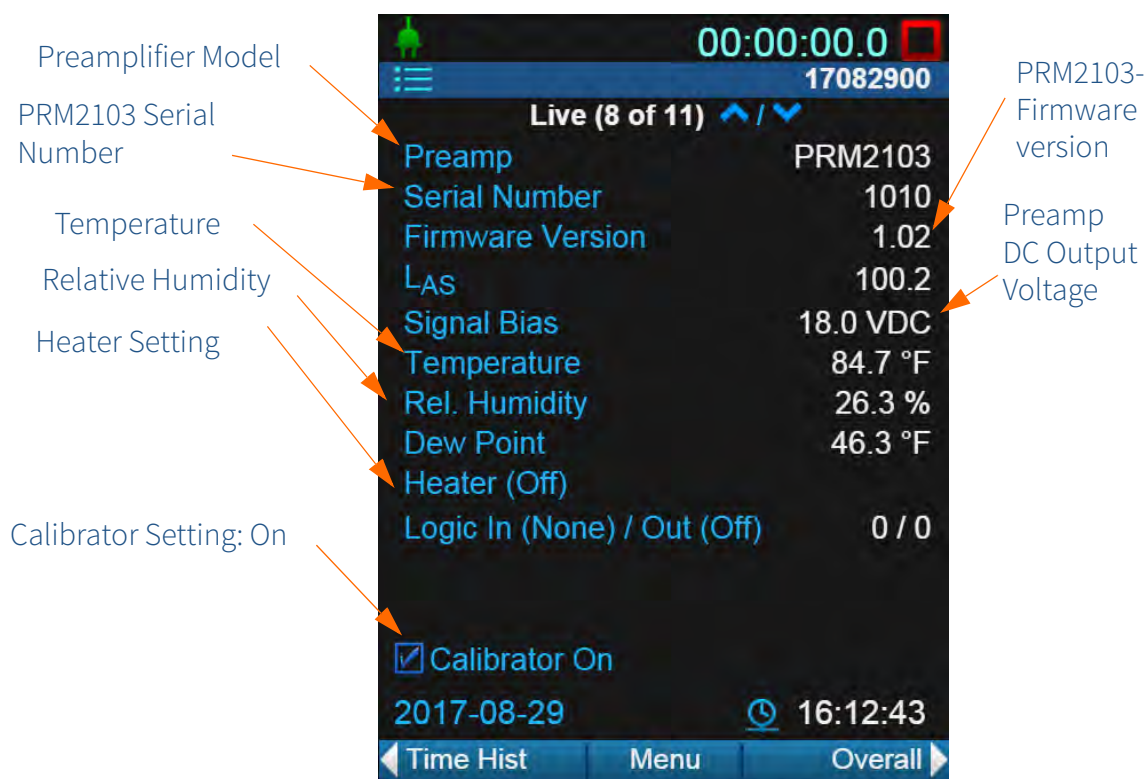
3.3.6 Data on the SoundAdvisor

TAKE NOTE The sound level meter receives temperature and humidity updates from the PRM2103 approximately every fifteen seconds.

The Preamp page, or the next-to-last page on the Live tab, always displays PRM2103 data when the PRM2103 is connected to the meter. Temperature, humidity, and dew point is updated every 15 seconds.

Figure 3-8 shows the Preamp page on the Live tab.

FIGURE 3-8 Live tab: PRM2103 Page



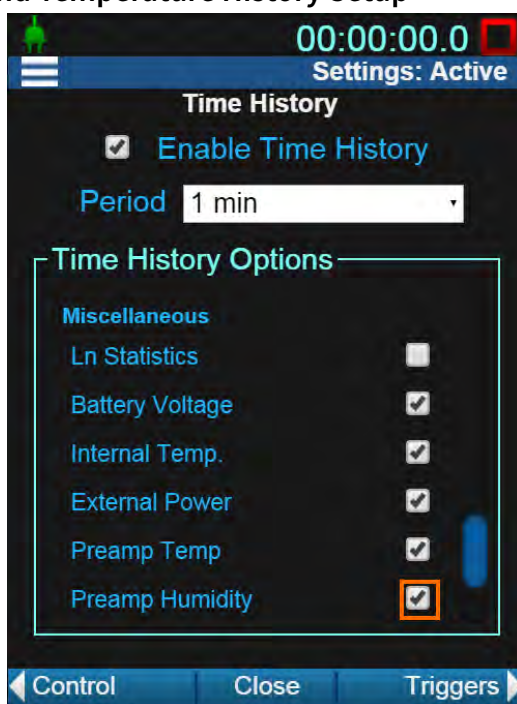
If the Preamp page displays a <Comm Error> message, the SoundAdvisor and PRM2103 are not communicating properly. Make sure the cables are completely connected and fastened and that power is supplied to the cable.

Humidity and Temperature History

To log internal humidity or temperature history for the PRM2103, follow these steps:

- Step 1** Navigate to the **Setup Manager** → **Time History**. Select the Enable Time History option.
- Step 2** Choose the **Period** of time for each measurement to be logged.
- Step 3** In the Time History list, enable Preamp Humidity or Preamp Temp., as shown in Figure 3-9.
- Step 4** **Close** to save.

FIGURE 3-9 Preamp Humidity and Temperature History Setup



TAKE NOTE When viewing measurement records with the $\left\langle \right\rangle$ and $\left\langle \right\rangle$ keys, you can press ENTER (ENTER) to toggle between displays of Preamp Temp. or Preamp Humidity.

After exiting the Setup Manager and performing measurements, you can view the PRM2103 internal humidity and temperature data by scrolling through the measurement records with the $\left\langle \right\rangle$ and $\left\langle \right\rangle$ keys on the Time History display. Each time the $\left\langle \right\rangle$ or the $\left\langle \right\rangle$ key is pressed, the cursor on the graph moves left or right, respectively, and displays the data associated with the record below the graph.

FIGURE 3-10 Time History Preamp Temp. Data

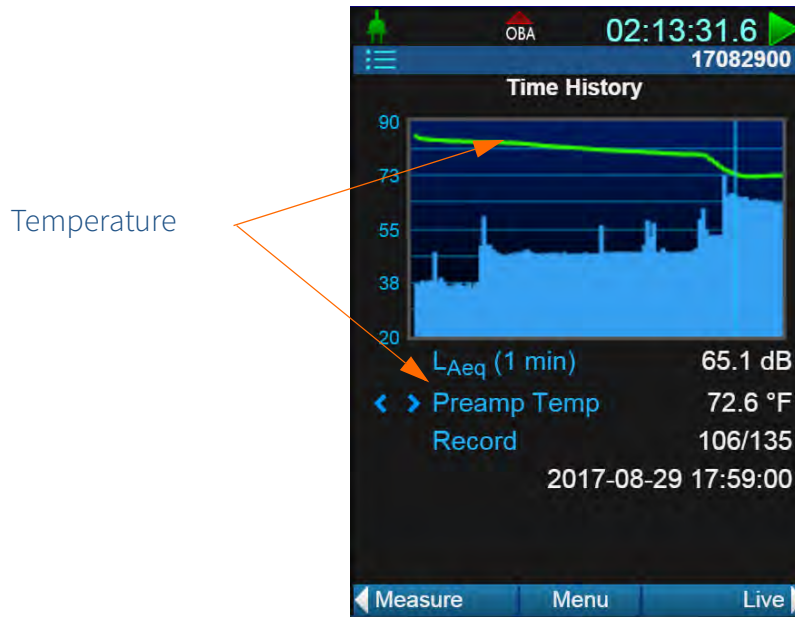
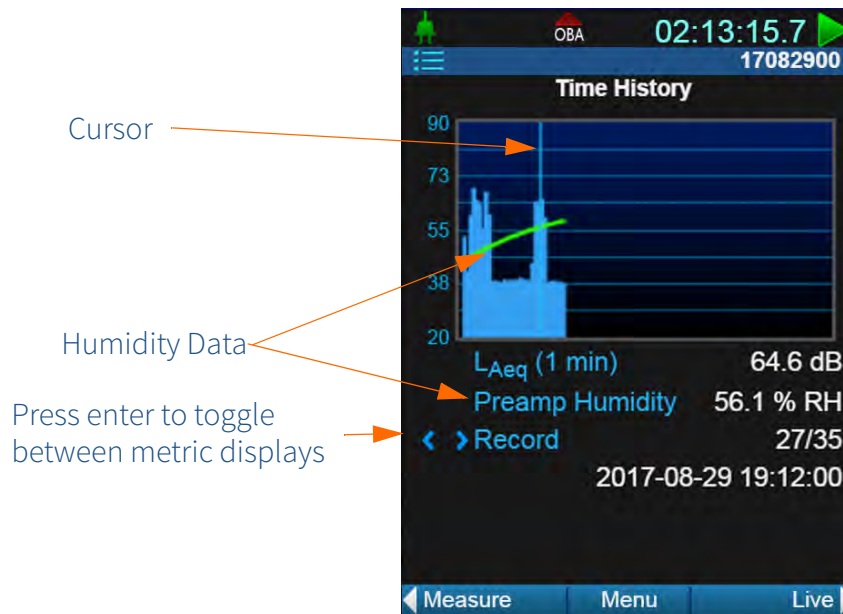


Figure 3-11 shows the Preamp Humidity data on the Time History tab.

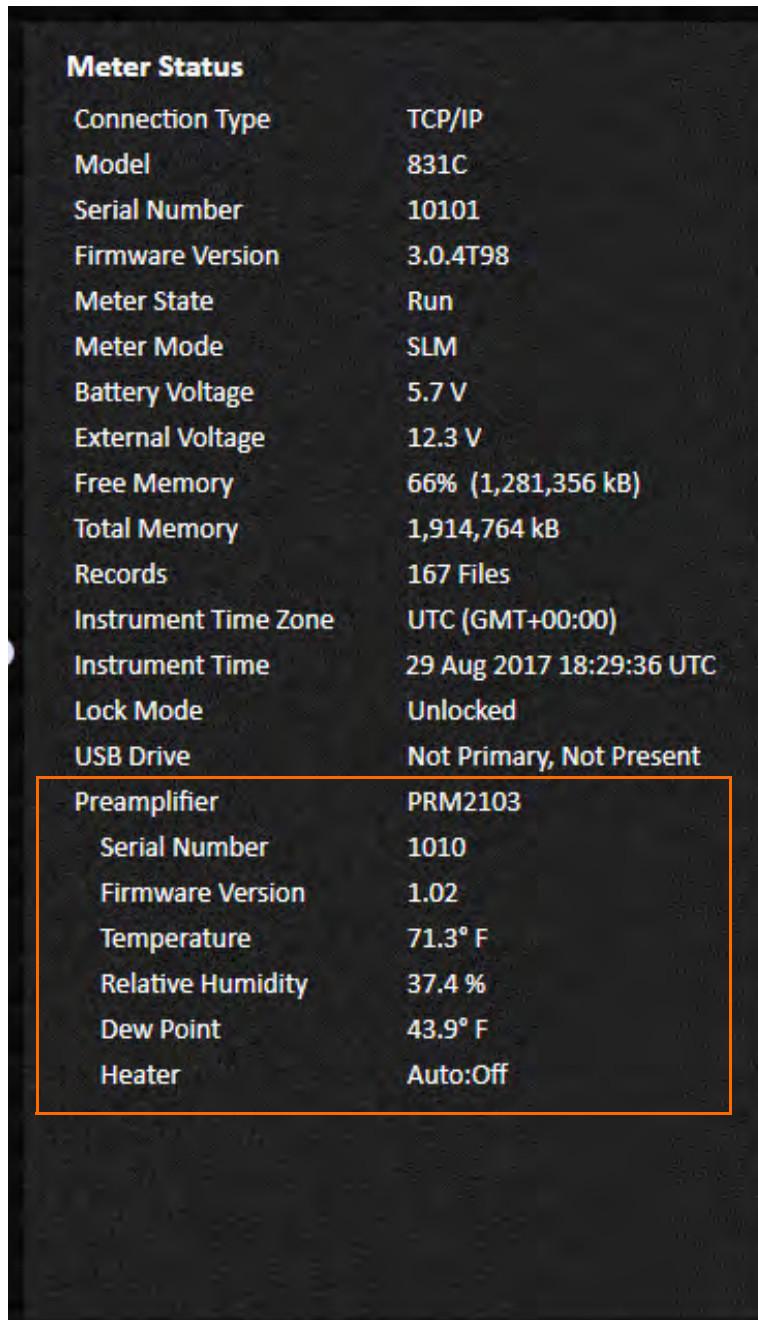
FIGURE 3-11 Time History Preamp Humidity Data



3.3.7 Data in G4 LD Utility Software

To view PRM2103 data in G4, open the software and connect to your sound level meter by selecting the Connect button and your meter.

FIGURE 3-12 PRM2103 Data on the Instrument Status Tab



The image shows a screenshot of the 'Instrument Status Tab' in the G4 LD Utility Software. The data is presented in a list format with a dark background and white text. A section of the data, starting with 'Preamplifier' and ending with 'Heater', is enclosed in an orange rectangular box.

Meter Status	
Connection Type	TCP/IP
Model	831C
Serial Number	10101
Firmware Version	3.0.4T98
Meter State	Run
Meter Mode	SLM
Battery Voltage	5.7 V
External Voltage	12.3 V
Free Memory	66% (1,281,356 kB)
Total Memory	1,914,764 kB
Records	167 Files
Instrument Time Zone	UTC (GMT+00:00)
Instrument Time	29 Aug 2017 18:29:36 UTC
Lock Mode	Unlocked
USB Drive	Not Primary, Not Present
Preamplifier	PRM2103
Serial Number	1010
Firmware Version	1.02
Temperature	71.3° F
Relative Humidity	37.4 %
Dew Point	43.9° F
Heater	Auto:Off

3.4 Performing Calibration Checks

TAKE NOTE The calibration check level reported by the SoundAdvisor is the broadband level.

The PRM2103 calibration check function produces five discrete tones simultaneously. Calibration checks can be performed automatically at specified times, or at any time manually, either on the SoundAdvisor or G4 LD Utility.

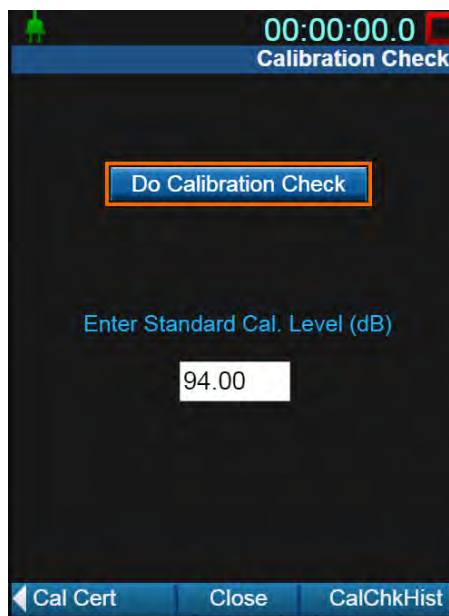
3.4.1 Manual Calibration Checks

To perform manual calibration on the SoundAdvisor, follow these steps:

TAKE NOTE The standard check level is set by performing a manual Cal Check directly after performing an acoustic calibration.

Step 1 After performing an acoustic calibration, navigate **Tools** → **Calibration** → **Cal Check** tab.

FIGURE 3-13 Cal. Check Tab



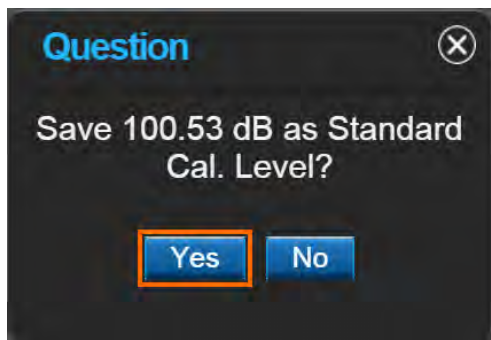
The Standard Cal. Level field holds the last saved cal check value. The default value is 94.00 dB.

You can manually change the dB level by navigating to the field and changing the number value.

After performing the calibration check, the meter displays a message prompting you to save a new Standard Cal. Level, if needed, as shown in Figure 3-14.

TAKE NOTE Answer Yes to save the Standard Cal. Level value. This should be done immediately following the first calibration check. Otherwise, answer No to simply record the level (and spectrum) in the Calibration Check History for trend determination.

FIGURE 3-14 Save New Standard Cal. Level



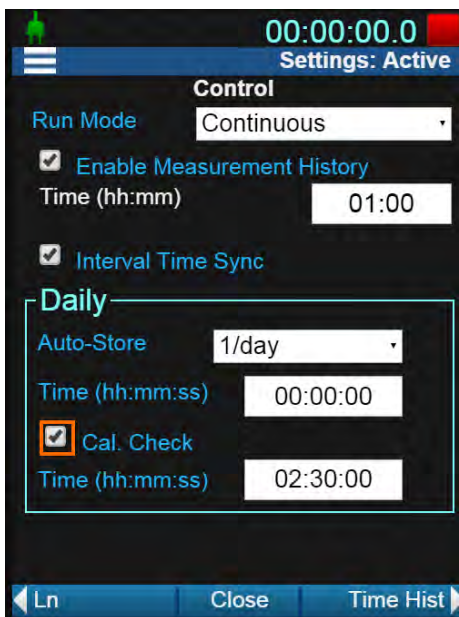
3.4.2 Automatic Calibration Checks

Calibration checks can also be scheduled to occur automatically on the Control tab by following these steps:

LEARN MORE For more information on setting up automatic calibration checks, refer to the SoundAdvisor Model 831C Sound Level Meter Manual.

- Step 1** Set the run mode to Continuous.
- Step 2** Select and enable the Cal. Check option.
- Step 3** Set the time of day when the check is to be performed. The default time is 2:30 AM.

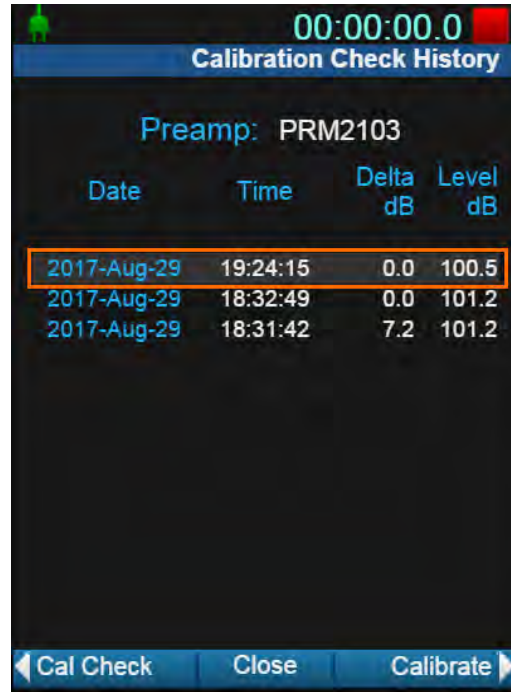
FIGURE 3-15 Scheduled Calibration Checks



3.4.3 Calibration Check History on the SoundAdvisor

The calibration Check History tab lists the last ten check records, with the date, time, and difference of the measured broadband level from the standard level and the measured level.

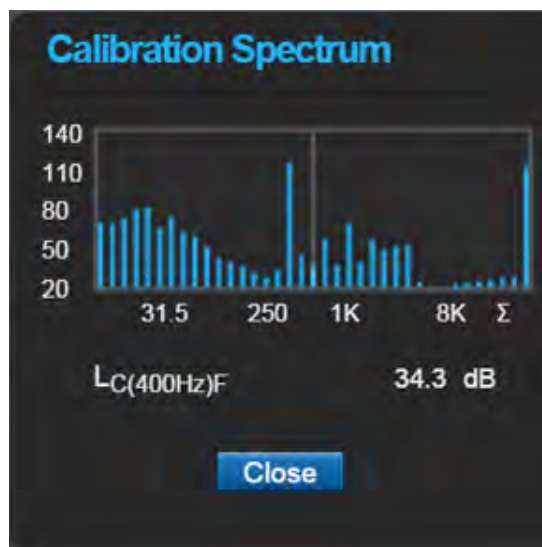
FIGURE 3-16 Check History Tab



To view a calibration check spectrum for a record in the history, select the record and press **ENTER**. Figure 3-17 shows a Cal. Check Spectrum.

TRY THIS Enable 1/1 or 1/3 Octave Band Analysis to display a calibration check spectrum.

FIGURE 3-17 Cal. Check Spectrum

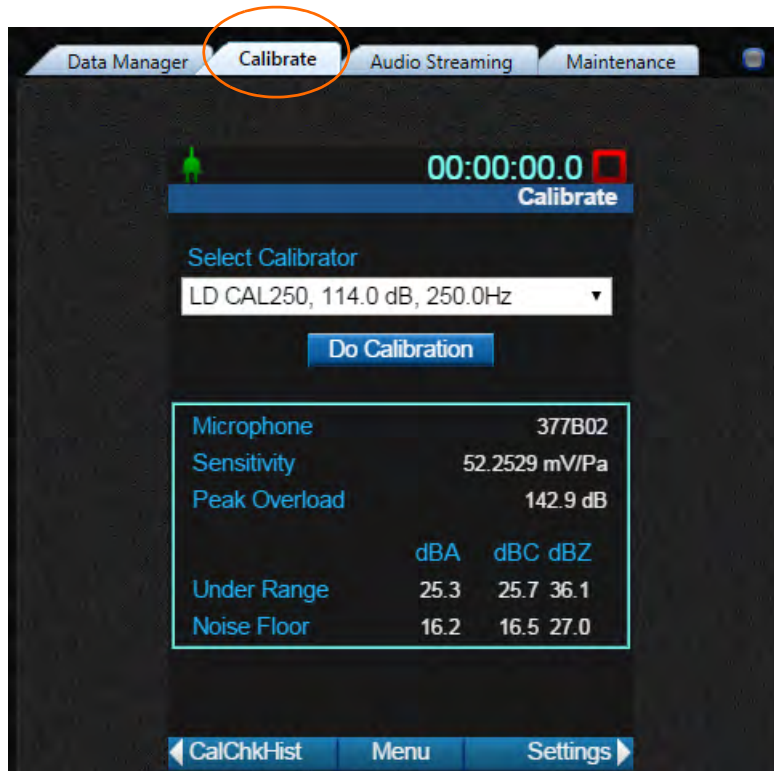


3.4.4 Manual Calibration Checks in G4 LD Utility

TAKE NOTE To perform manual calibration checks in G4 software, refer to the G4 Software Manual.

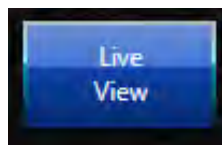
To perform manual calibration checks on the PRM2103 with G4 LD Utility software, navigate to the **Calibrate** tab in the meter manager and follow 3.4.1 "Manual Calibration Checks" on page 3-10.

FIGURE 3-18 Meter Manager - Calibrate



Alternatively, you can manage the settings in the **Live View** in G4 in the same manner.

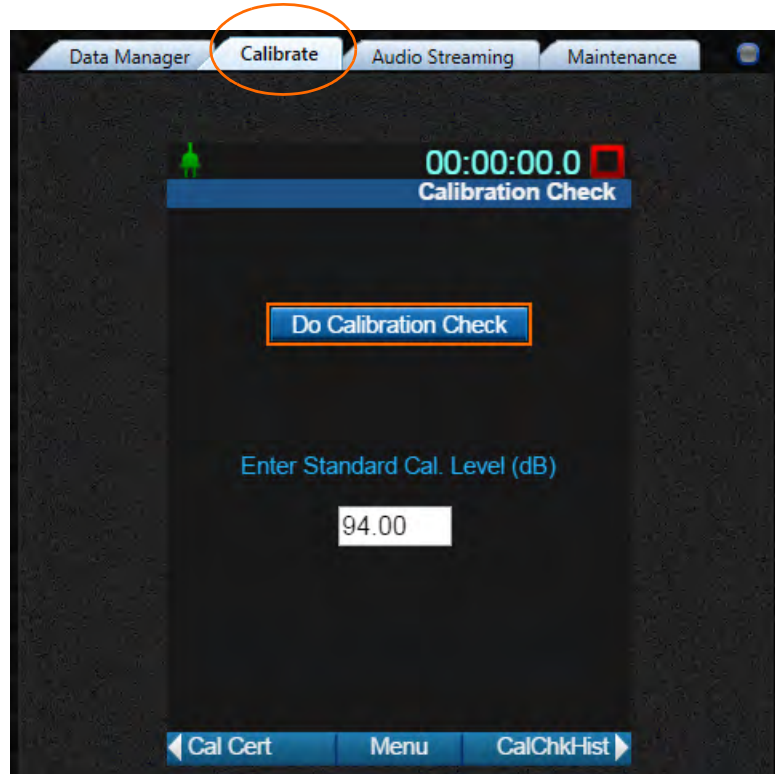
FIGURE 3-19 Live View



3.4.5 Automatic Calibration Checks in G4 LD Utility

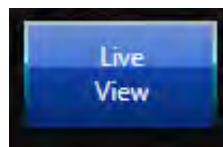
To setup automatic calibration checks on the PRM2103 with G4 LD Utility software, navigate to the **Calibrate** tab in the meter manager and follow 3.4.2 "Automatic Calibration Checks" on page 3-11.

FIGURE 3-20 Meter Manager - Calibration Check



Alternatively, you can manage the settings in **Live View** in G4 in the same manner.

FIGURE 3-21 Live View



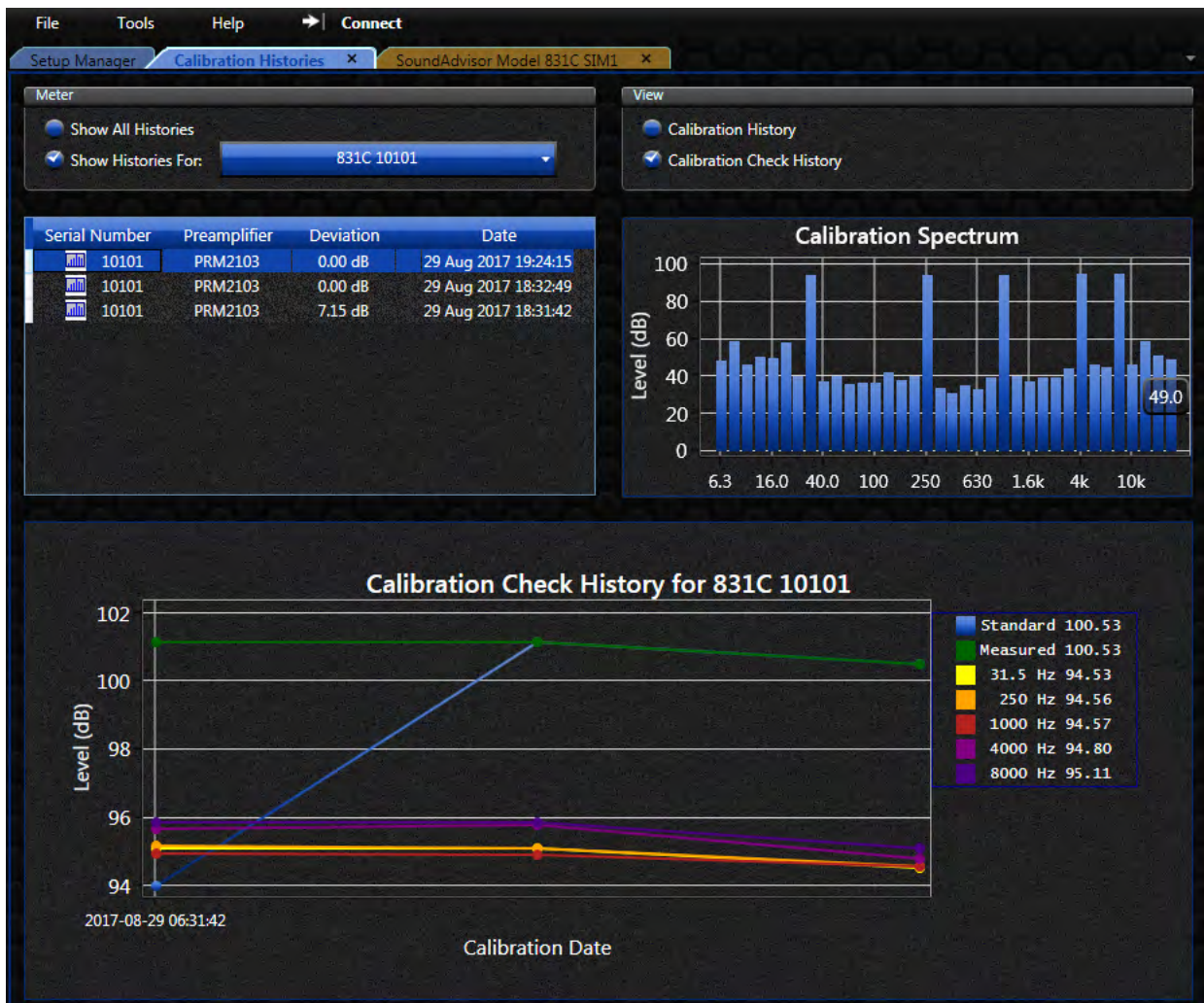
3.4.6 Calibration Check History in G4 LD Utility

LEARN MORE To view Calibration Check Histories in G4 Software, refer to the G4 Software Manual.

To view Calibration Check History, navigate to the **Calibration History** tab, select **Calibration Check History** radio button in the **View** section.

To view the calibration check spectrum, select the Calibration Check record and the spectrum for that record will appear in the **Calibration Spectrum** section.

FIGURE 3-22 Calibration History



3.5 Upgrading the PRM2103 Firmware

LEARN MORE Refer to the G4 Software Manual for more information.

TAKE NOTE Begin the firmware upgrade process with the instrument “disconnected” from G4.

TAKE NOTE Keep the PRM2103 and SoundAdvisor connected and properly powered until after firmware upgrades are complete.

The PRM2103 firmware is distributed with the SoundAdvisor firmware. The PRM2103 is upgraded automatically when connected to the meter. Firmware is not upgraded if the meter is making a measurement.

To upgrade the SoundAdvisor Model 831C sound level meter and PRM2103 firmware, follow these steps:

- Step 1** Download and install the G4 LD Utility software. Do not connect the meter to G4.
- Step 2** Navigate **File** → **Upgrade Firmware**. Select your meter and **Connect**.
- Step 3** Current instrument firmware is distributed as part of G4 LD Utility installation and can be found by browsing to the following folder:
C:\Program Files (x86)\PCB Piezotronics\G4\Firmware
- Step 4** Complete the Connection box options and then follow the Upgrade Wizard instructions to complete the upgrade.
- Step 5** On the meter, on the **Live** display, navigate to the Preamp page.

PRM2103 Firmware Upgrade



TAKE NOTE Firmware in the PRM2103 is upgraded only when the version stored in the SoundAdvisor is newer than the version in the preamplifier.

If the upgrade does not complete properly after multiple programming attempts, the Preamp Page displays the message “Fault 101.”

Appendix A Technical Specifications

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A.1 Overview

The technical specifications in this chapter are subject to change without notice. Please refer to calibration and test results for data on a specific unit. Unless otherwise noted, specifications are applicable to the following conditions: 20°C, 50%

RH, 12 V, when using PSA027 power supply, CBL203-20 or CBL208-20, 377B02 microphone, and Model 831.

Values specified are typical unless tolerances are provided.

A.2 Standards Met by PRM2103

Sound Level Meter Standards

IEC 61672-1 Ed. 1.0 (2002-05) Class 1, Group Z

ANSI S1.4-1983 Type 1

Octave Filter Standards (Option 831- OB3)

IEC 61260 Ed. 1.0 (1995-08) plus Amendment 1 (2001-09), 1/1 and 1/3-octave Bands, Class 1, Group X, all filters

ANSI S1.11-2004 (R2009) Class 1

Safety Requirements

Electrical Equipment for Measurement, Control, and Laboratory Use:

IEC 61010-1 (2010)

A.3 Electrical

Tested with ADP090 adaptor (12 pF), equivalent to capacitance of 377B02 microphone.

Microphone Bias	0 V
Input Impedance	10 G Ω // 0.1 pF (typical)
Gain (unweighted)	-0.1 dB at 1 kHz (typical)
Max Input Level (for THD < -30 dB)	\pm 18 V peak (142 dB re. 20 μ Pa)
Max Output Level (typical)	\pm 14 V peak (143 dB peak using 50 mV/Pa mic)
Max Output Current	10 mA
Output Impedance	50 Ω (typical)
Total Harmonic Distortion +N	< -60 dBc at 8V rms and 1 kHz
Power Supply	10 V to 15.5 V (12 V Nominal) Isolated from preamp circuitry for ground loop protection.
Output Slew Rate	> 3 V/ μ S
Phase Linearity	10 Hz to 32 Hz: -3° to 10° 32 Hz to 100 kHz: < \pm 3° The output is in phase with the input electrical signal. A positive change in acoustic pressure will give a positive output.
Calibration Check Level at 1 kHz	94 dB \pm 2 dB
Calibration Check Level - Other Frequencies	+/- 1.0 dB relative to 1 kHz
Calibration Check Frequencies	31.25, 250, 1000, 4000, & 8000 Hz
Calibration Check Sensitivity	\pm 0.005 dB/ $^{\circ}$ C (typical)
Dynamic Range	124 dB; 16 dB noise floor to 140 dB re. 20 μ Pa with input electrically tested through an ADP090 adaptor (12 pF)

Self-Generated Noise (with 377B02 Microphone)

Self-generated noise levels are time-averaged sound levels.

	A Weight	C Weight	Z Weight
0 dB Gain (typical)	18 dB re. 20 μ Pa	19 dB re. 20 μ Pa	28 dB re. 20 μ Pa
0 dB Gain (max.)	19 dB re. 20 μ Pa	24 dB re. 20 μ Pa	31 dB re. 20 μ Pa
+20 dB Gain (typical)	16 dB re. 20 μ Pa	18 dB re. 20 μ Pa	28 dB re. 20 μ Pa
+20 dB Gain (max.)	17 dB re. 20 μ Pa	20 dB re. 20 μ Pa	33 dB re. 20 μ Pa

Electrical Noise

Tested with ADP090 adaptor (12 pF), equivalent to

capacitance of 377B02 microphone.

	A Weight	C Weight	Z Weight

0 dB Gain	5.0 μV 14 dB μV	6.3 μV 16 dB μV	22.4 μV 27 dB μV
+20 dB Gain	2.5 μV 8 dB μV	5 μV 14 dB μV	22.4 μV 27 dB μV

The standard control cable length is 20 feet, but is also available in custom lengths up to 100 feet.

Internal Sensor Accuracy

Relative Humidity: $\pm 5\%$ RH

Temperature: $\pm 2^\circ\text{C}$

Power

Power Consumption (at 12 V for PRM2103 only)

	Calibration Check Status	
Heater Option	On	Off
Off	2.2 mA	0.2 mA
Low	22.2 mA	20.2 mA
High	42 mA	40 mA

Cable Drive

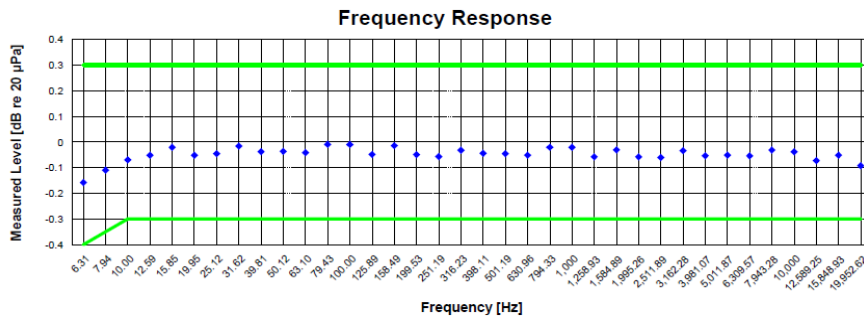
Control Cable (CBL203, CBL208, and CBL222)

Tested with ADP090 adaptor (12 pF), equivalent to capacitance of 377B02 microphone.

Length, ft	14 Vpeak	4.2 Vpeak	1.4 Vpeak
100	27 kHz	120 kHz	300 kHz

A.3.1 Frequency Response

FIGURE A-1 Frequency Response Test Report



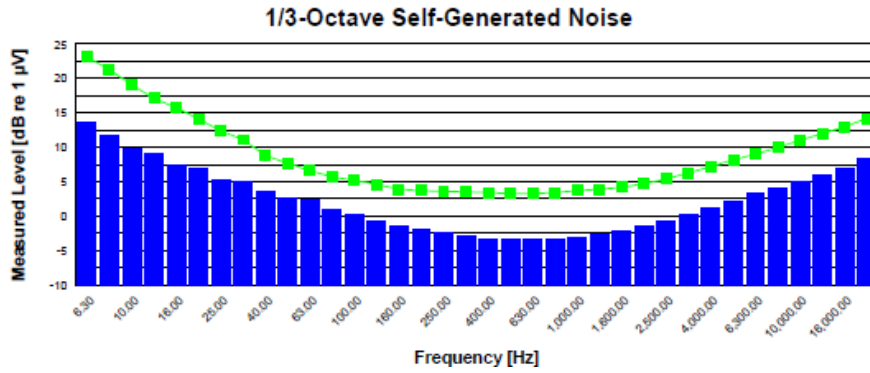
Frequency response electrically tested at 114.0 dB μV

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.31	-0.16	-0.40	0.30	0.10	Pass
7.94	-0.11	-0.35	0.30	0.10	Pass
10.00	-0.07	-0.30	0.30	0.10	Pass
12.59	-0.05	-0.30	0.30	0.10	Pass
15.85	-0.02	-0.30	0.30	0.10	Pass
19.95	-0.05	-0.30	0.30	0.10	Pass
25.12	-0.05	-0.30	0.30	0.10	Pass
31.62	-0.02	-0.30	0.30	0.10	Pass
39.81	-0.04	-0.30	0.30	0.10	Pass
50.12	-0.04	-0.30	0.30	0.10	Pass
63.10	-0.04	-0.30	0.30	0.10	Pass
79.43	-0.01	-0.30	0.30	0.10	Pass
100.00	-0.01	-0.30	0.30	0.10	Pass
125.89	-0.05	-0.30	0.30	0.10	Pass
158.49	-0.01	-0.30	0.30	0.10	Pass
199.53	-0.05	-0.30	0.30	0.10	Pass
251.19	-0.06	-0.30	0.30	0.10	Pass
316.23	-0.03	-0.30	0.30	0.10	Pass
398.11	-0.04	-0.30	0.30	0.10	Pass
501.19	-0.05	-0.30	0.30	0.10	Pass
630.96	-0.05	-0.30	0.30	0.10	Pass
794.33	-0.02	-0.30	0.30	0.10	Pass
1,000.00	-0.02	-0.30	0.30	0.10	Pass
1,258.93	-0.06	-0.30	0.30	0.10	Pass
1,584.89	-0.03	-0.30	0.30	0.10	Pass
1,995.26	-0.06	-0.30	0.30	0.10	Pass
2,511.89	-0.06	-0.30	0.30	0.10	Pass
3,162.28	-0.03	-0.30	0.30	0.10	Pass
3,981.07	-0.05	-0.30	0.30	0.10	Pass
5,011.87	-0.05	-0.30	0.30	0.10	Pass
6,309.57	-0.05	-0.30	0.30	0.10	Pass
7,943.28	-0.03	-0.30	0.30	0.10	Pass
10,000.00	-0.04	-0.30	0.30	0.10	Pass
12,589.25	-0.07	-0.30	0.30	0.10	Pass
15,848.93	-0.05	-0.30	0.30	0.10	Pass
19,952.62	-0.09	-0.30	0.30	0.10	Pass

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
1000 Hz Reference Measurement	113.67	113.40	114.00	0.13	Pass

Tested electrically using a 12pF capacitor to simulate microphone capacitance. Data reported in dB re 20 μPa assuming a microphone sensitivity of 50 mV/Pa.
 Temperature: 22.99 $^\circ\text{C} \pm 0.01^\circ\text{C}$ Humidity: 26.1 %RH $\pm 0.5\%$ RH Static Pressure: 87.36 kPa ± 0.03 kPa Technician: Eric Olson
 Calibration Date: 17 Jan 2014

FIGURE A-2 1/3-Octave Self-Generated Noise



Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	13.52	23.10	Pass
8.00	11.68	21.30	Pass
10.00	9.75	19.10	Pass
12.50	9.17	17.10	Pass
16.00	7.48	15.80	Pass
20.00	6.85	14.10	Pass
25.00	5.19	12.40	Pass
31.50	4.93	11.10	Pass
40.00	3.61	8.80	Pass
50.00	2.70	7.70	Pass
63.00	2.50	6.60	Pass
80.00	0.91	5.70	Pass
100.00	0.25	5.20	Pass
125.00	-0.67	4.60	Pass
160.00	-1.43	3.90	Pass
200.00	-1.89	3.70	Pass
250.00	-2.49	3.60	Pass
315.00	-2.83	3.50	Pass
400.00	-3.28	3.40	Pass
500.00	-3.35	3.30	Pass
630.00	-3.43	3.30	Pass
800.00	-3.29	3.40	Pass
1,000.00	-3.05	3.70	Pass
1,250.00	-2.75	3.90	Pass
1,600.00	-2.10	4.20	Pass
2,000.00	-1.40	4.70	Pass
2,600.00	-0.64	5.40	Pass
3,150.00	0.23	6.30	Pass
4,000.00	1.16	7.20	Pass
5,000.00	2.13	8.20	Pass
6,300.00	3.30	9.00	Pass
8,000.00	4.12	10.00	Pass
10,000.00	4.90	11.00	Pass
12,500.00	6.03	12.00	Pass
16,000.00	7.02	13.00	Pass
20,000.00	8.41	14.20	Pass
A-weighted Sum	13.53	16.00	Pass

A.4 Physical

Microphone Thread	11.7 mm - 60 UNS (.4606 - 60 UNS)
Diameter	12.7 mm (0.5 in)
Height	132.4 mm (5.25 in)
Weight	64.4 g (2.27 oz.)
Output Connector	10-pin male (FGA. 1B.310)
Venting	377B02 microphone is rear-vented and sealed to the PRM2103 using an O-ring. The PRM2103 is vented through the 10-pin connector for pressure equalization.
Microphone Reference Point	The center of the diaphragm of the 377B02 microphone.
Reference Frequency	1000 Hz
Reference Level	114 dB re. 20 μ Pa
Reference Calibrator	CAL200
Environmental	
Operating Temperature Range	- 40 °C to 70 °C (- 40 °F to 158 °F)
Operating Humidity Range	0 to 100% relative humidity, excluding internal condensing
Temperature Sensitivity	< \pm 1.0 dB at 1 kHz from -40 °C to -10 °C (-40 °F to 14 °F) < \pm 0.5 dB at 1 kHz from -10 °C to 50 °C (14 °F to 122 °F) < \pm 0.9 dB at 1 kHz from 50 °C to 70 °C (122 °F to 158 °F)
Humidity Sensitivity	< \pm 0.2 dB @ 1 kHz from 0 to 100% relative humidity, at 40 °C (104 °F)

Reference Direction

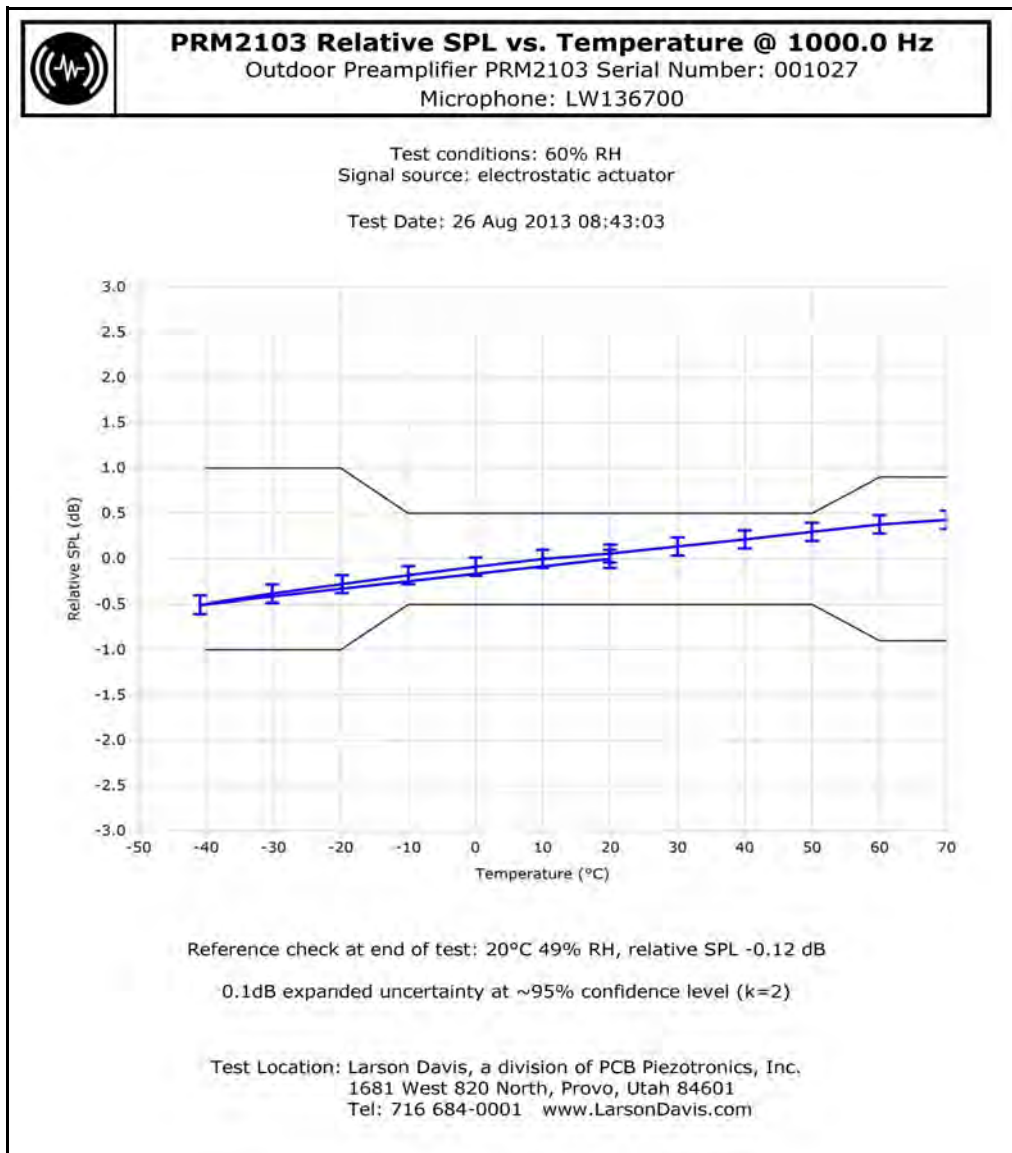
0° is perpendicular to plane of microphone diaphragm, as shown below

FIGURE A-3 Reference Direction.



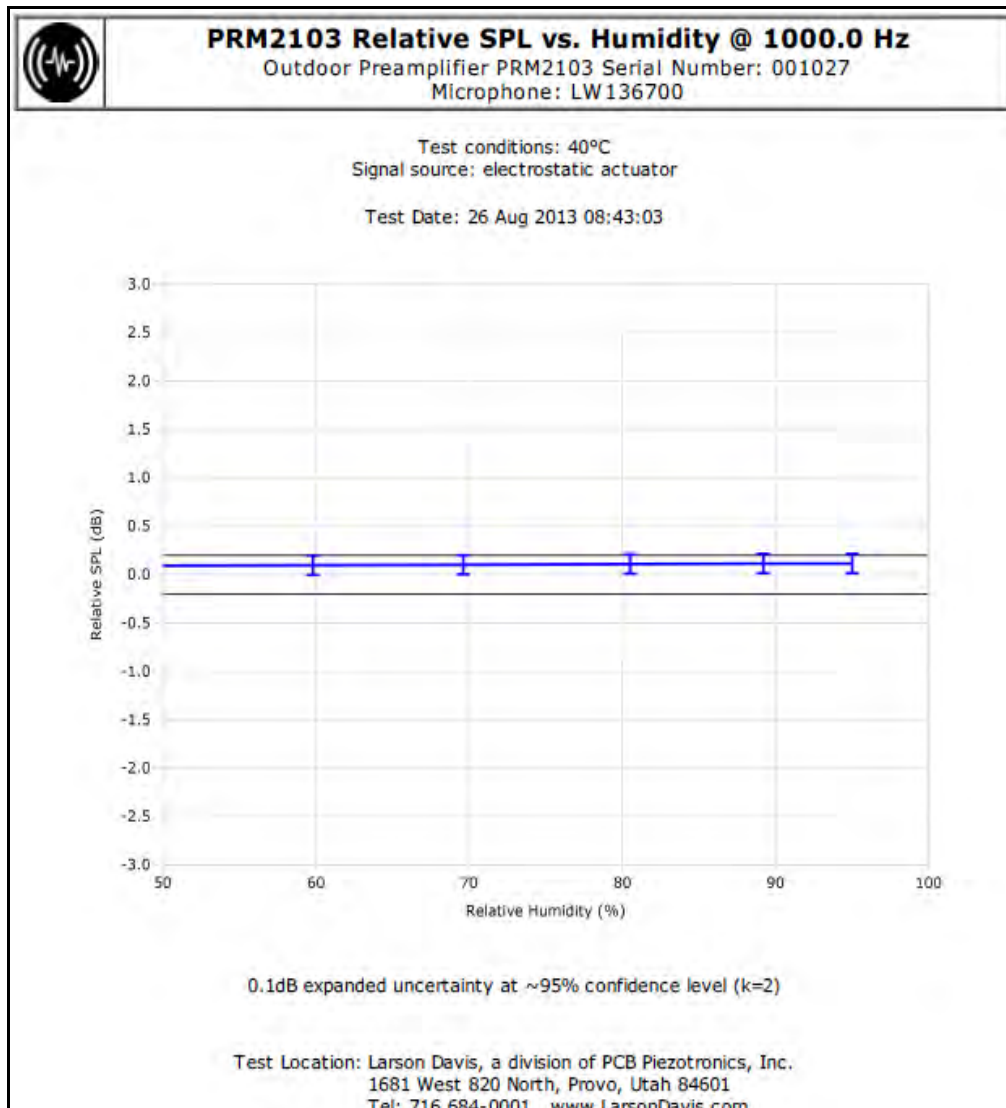
Effect of Temperature Variation

FIGURE A-4 Relative SPL versus Temperature



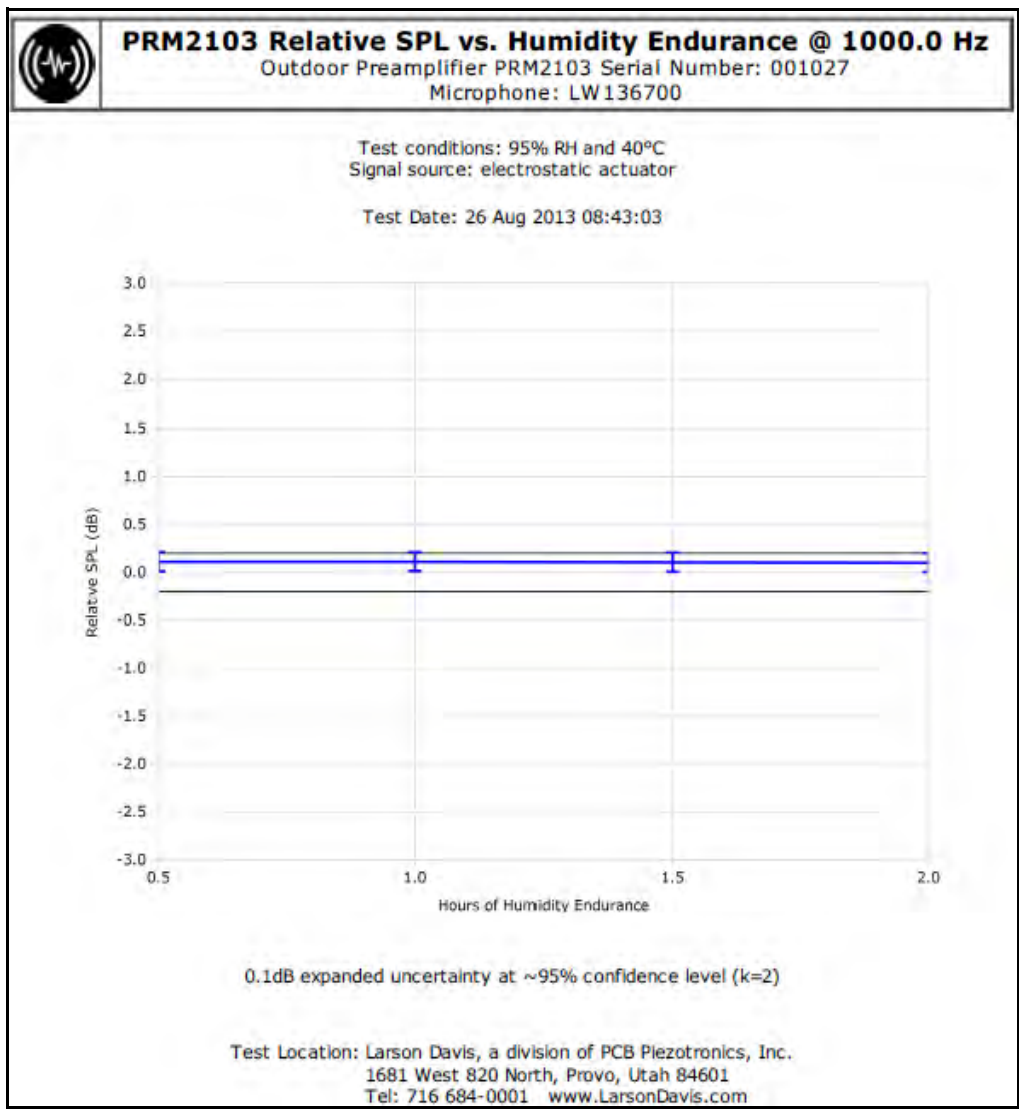
Effect of Humidity

FIGURE A-5 Relative SPL versus Humidity



Humidity Endurance

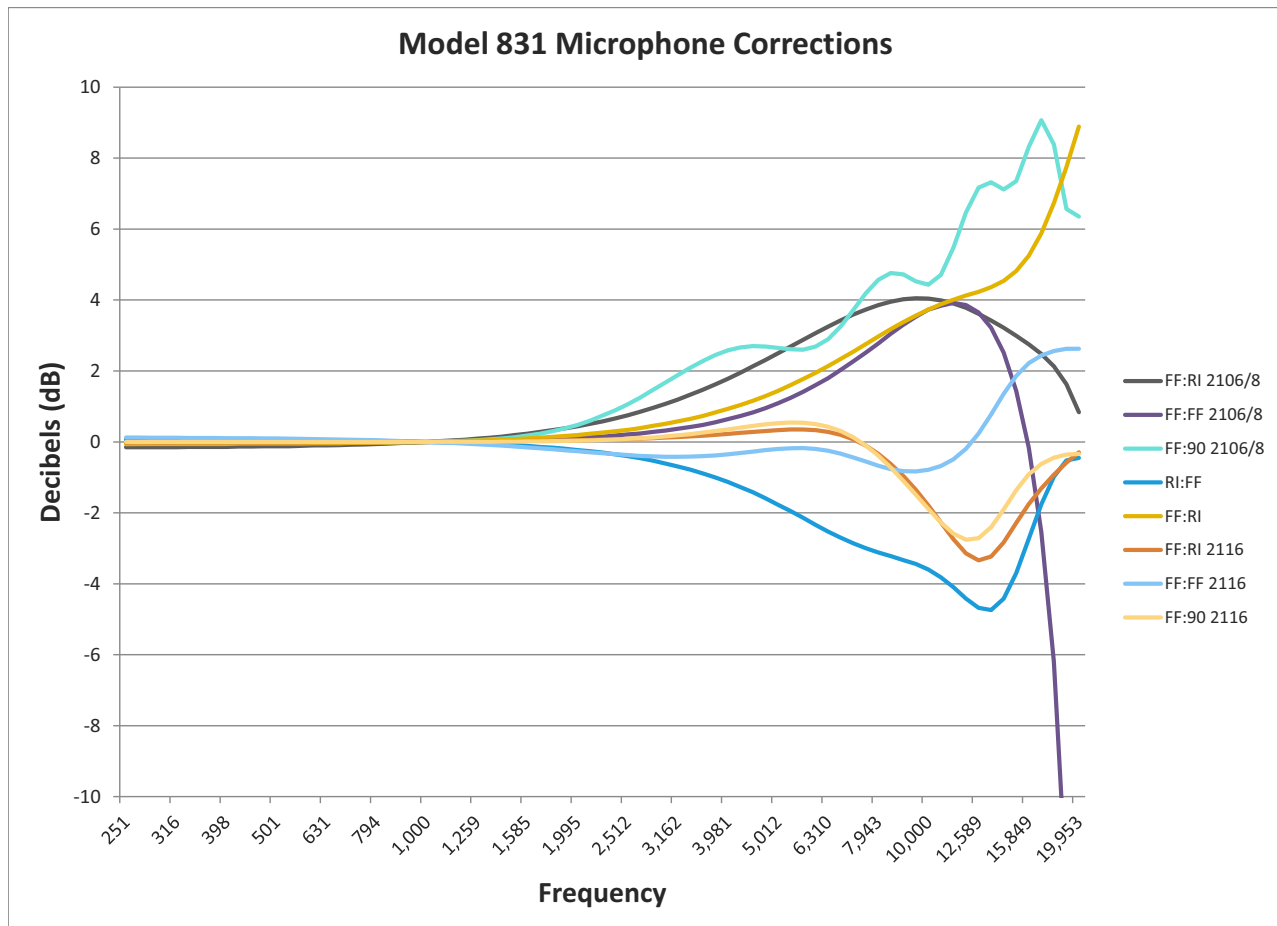
FIGURE A-6 Relative SPL versus Humidity Endurance



A.5 PRM2103 Corrections

Figure A-7 shows a graph of microphone corrections for the Model 831 and the correction values at different frequencies.

FIGURE A-7 Model 831 Microphone Corrections Graph



A.5.1 Model 831 Microphone Corrections

The following tables list the microphone corrections that can be applied through the Model 831 and the correction values at different frequencies.

Table A.1 Model 831 Microphone Corrections

Frequency	FF:RI 2106/8	FF:FF 2106/8	FF:90 2106/8	RI:FF	FF:RI	FF:RI 2116	FF:FF 2116	FF:90 2116
251.19	-0.15	-0.03	0.01	0.07	-0.06	-0.02	0.12	0.00
266.07	-0.15	-0.03	0.01	0.07	-0.06	-0.02	0.12	0.00
281.84	-0.15	-0.03	0.01	0.07	-0.06	-0.02	0.12	0.00
298.54	-0.15	-0.03	0.00	0.07	-0.06	-0.02	0.11	-0.01
316.23	-0.15	-0.03	0.00	0.07	-0.06	-0.02	0.12	0.00
334.97	-0.14	-0.03	0.00	0.07	-0.06	-0.02	0.11	0.00
354.81	-0.14	-0.03	0.00	0.06	-0.06	-0.02	0.11	0.00
375.84	-0.14	-0.03	0.00	0.06	-0.06	-0.02	0.11	0.00

Table A.1 Model 831 Microphone Corrections

398.11	-0.14	-0.03	0.00	0.06	-0.06	-0.01	0.11	0.00
421.70	-0.13	-0.03	0.00	0.06	-0.05	-0.02	0.11	0.00
446.68	-0.13	-0.03	0.00	0.06	-0.05	-0.02	0.10	0.00
473.15	-0.12	-0.03	0.00	0.06	-0.05	-0.02	0.10	0.00
501.19	-0.12	-0.03	0.00	0.06	-0.05	-0.01	0.10	0.00
530.88	-0.12	-0.03	-0.01	0.05	-0.05	-0.01	0.09	0.00
562.34	-0.11	-0.03	-0.01	0.05	-0.05	-0.01	0.09	0.00
595.66	-0.10	-0.02	-0.01	0.05	-0.04	-0.01	0.08	0.00
630.96	-0.10	-0.02	-0.01	0.04	-0.04	-0.01	0.07	0.00
668.34	-0.09	-0.02	-0.01	0.04	-0.04	-0.01	0.07	0.00
707.95	-0.08	-0.02	-0.01	0.04	-0.03	-0.01	0.06	0.00
749.89	-0.07	-0.02	-0.01	0.03	-0.03	-0.01	0.05	0.00
794.33	-0.06	-0.01	-0.01	0.03	-0.02	-0.01	0.04	0.00
841.40	-0.05	-0.01	-0.01	0.02	-0.02	-0.01	0.04	0.00
891.25	-0.03	-0.01	-0.01	0.02	-0.01	0.00	0.02	0.00
944.06	-0.02	0.00	0.00	0.01	-0.01	0.00	0.01	0.00
1000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1059.25	0.02	0.00	0.01	-0.01	0.01	0.00	-0.01	0.00
1122.02	0.04	0.01	0.02	-0.02	0.02	0.00	-0.03	0.00
1188.50	0.06	0.01	0.03	-0.03	0.03	0.01	-0.05	0.00
1258.93	0.09	0.02	0.05	-0.04	0.04	0.01	-0.07	0.00
1333.52	0.12	0.03	0.07	-0.06	0.05	0.01	-0.09	0.01
1412.54	0.15	0.04	0.10	-0.08	0.07	0.02	-0.11	0.01
1496.24	0.19	0.05	0.13	-0.09	0.08	0.02	-0.13	0.01
1584.89	0.23	0.06	0.18	-0.11	0.10	0.03	-0.15	0.01
1678.80	0.28	0.07	0.23	-0.14	0.12	0.03	-0.18	0.02
1778.28	0.33	0.08	0.30	-0.16	0.14	0.04	-0.21	0.02
1883.65	0.38	0.10	0.38	-0.19	0.17	0.04	-0.24	0.03
1995.26	0.44	0.11	0.48	-0.23	0.19	0.05	-0.26	0.03
2113.49	0.51	0.13	0.60	-0.26	0.23	0.06	-0.29	0.04
2238.72	0.58	0.15	0.74	-0.30	0.26	0.06	-0.32	0.06
2371.37	0.66	0.18	0.89	-0.35	0.30	0.07	-0.35	0.07
2511.89	0.75	0.21	1.06	-0.40	0.34	0.08	-0.37	0.08
2660.73	0.85	0.24	1.25	-0.46	0.39	0.09	-0.39	0.10
2818.38	0.96	0.28	1.46	-0.53	0.45	0.11	-0.41	0.13
2985.38	1.07	0.32	1.67	-0.61	0.51	0.12	-0.42	0.15
3162.28	1.19	0.37	1.88	-0.69	0.58	0.14	-0.42	0.18
3349.65	1.33	0.42	2.09	-0.78	0.65	0.16	-0.42	0.22
3548.13	1.47	0.48	2.28	-0.89	0.73	0.18	-0.40	0.26
3758.37	1.62	0.55	2.45	-1.00	0.83	0.20	-0.38	0.31
3981.07	1.78	0.64	2.58	-1.13	0.93	0.23	-0.35	0.35
4216.97	1.95	0.73	2.66	-1.27	1.04	0.25	-0.31	0.40
4466.84	2.13	0.83	2.70	-1.42	1.16	0.28	-0.27	0.45
4731.51	2.31	0.95	2.69	-1.59	1.29	0.31	-0.23	0.49
5011.87	2.50	1.09	2.65	-1.77	1.44	0.33	-0.20	0.53

Table A.1 Model 831 Microphone Corrections

5308.84	2.69	1.24	2.61	-1.95	1.60	0.35	-0.18	0.55
5623.41	2.88	1.41	2.60	-2.14	1.77	0.35	-0.18	0.54
5956.62	3.07	1.60	2.69	-2.34	1.95	0.33	-0.20	0.50
6309.57	3.25	1.80	2.90	-2.53	2.14	0.28	-0.25	0.43
6683.44	3.43	2.03	3.26	-2.70	2.34	0.20	-0.33	0.31
7079.46	3.59	2.27	3.72	-2.86	2.54	0.07	-0.44	0.13
7498.94	3.73	2.52	4.19	-3.00	2.76	-0.11	-0.55	-0.10
7943.28	3.86	2.78	4.57	-3.12	2.97	-0.34	-0.67	-0.39
8413.95	3.95	3.05	4.76	-3.22	3.18	-0.62	-0.77	-0.72
8912.51	4.02	3.30	4.72	-3.33	3.38	-0.96	-0.82	-1.09
9440.61	4.05	3.53	4.53	-3.44	3.56	-1.35	-0.83	-1.49
10000.00	4.04	3.73	4.43	-3.60	3.73	-1.79	-0.79	-1.89
10592.54	3.99	3.84	4.71	-3.82	3.88	-2.27	-0.68	-2.27
11220.18	3.90	3.92	5.48	-4.10	4.01	-2.75	-0.49	-2.58
11885.02	3.78	3.86	6.47	-4.42	4.13	-3.14	-0.19	-2.76
12589.25	3.61	3.65	7.17	-4.68	4.23	-3.34	0.24	-2.71
13335.21	3.42	3.22	7.32	-4.74	4.36	-3.23	0.78	-2.41
14125.38	3.22	2.52	7.12	-4.42	4.54	-2.83	1.35	-1.91
14962.36	2.99	1.44	7.35	-3.70	4.82	-2.28	1.86	-1.36
15848.93	2.75	-0.16	8.32	-2.73	5.25	-1.75	2.22	-0.91
16788.04	2.48	-2.54	9.07	-1.76	5.88	-1.31	2.44	-0.62
17782.79	2.13	-6.20	8.39	-0.98	6.73	-0.93	2.56	-0.44
18836.49	1.63	-12.60	6.57	-0.52	7.75	-0.59	2.62	-0.35
19952.62	0.84	-39.14	6.35	-0.45	8.89	-0.29	2.63	-0.34

A.6 Acoustical Response

Acoustical response data in the following sections are for PRM2103 mounted inside an EPS2116. Data for PRM2103 mounted inside an EPS2106-3 or

EPS2108-3 is included for legacy purposes.. Data also corresponds to proper selection of SLM 831 microphone corrections.

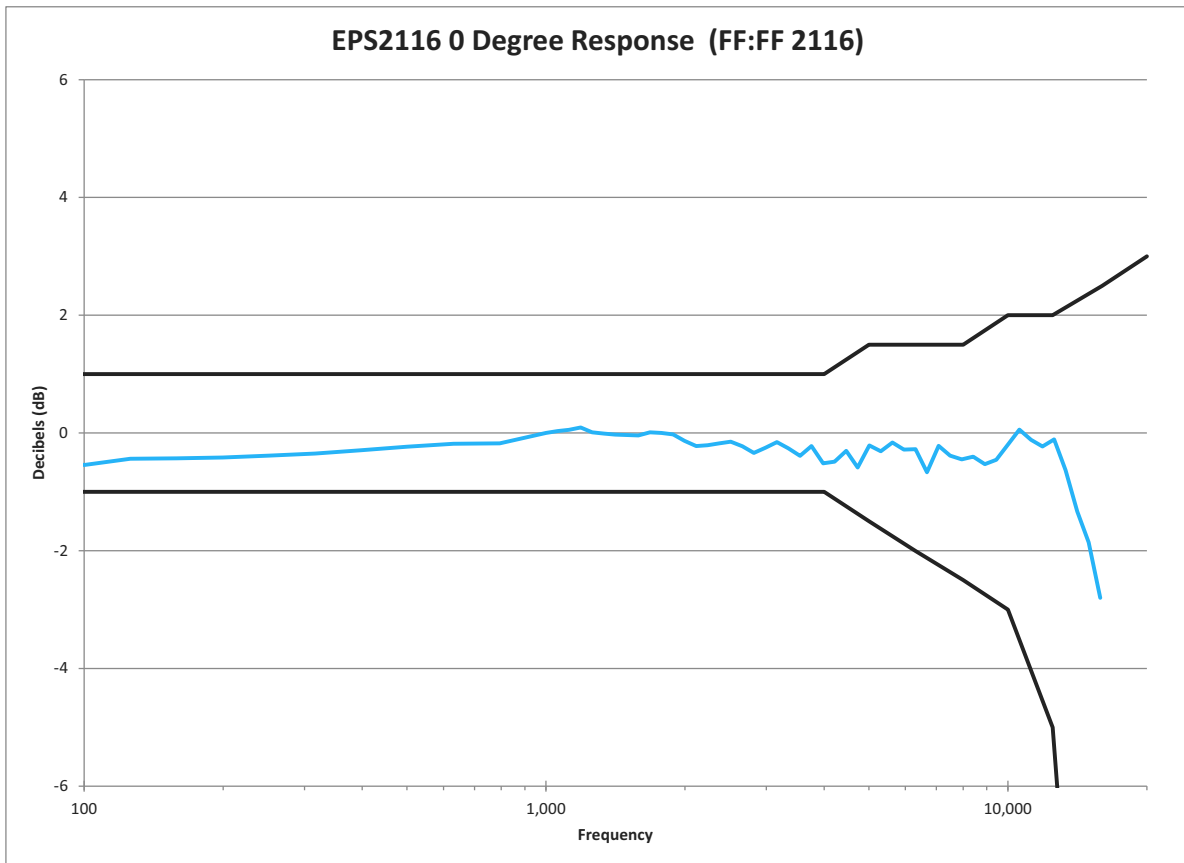
FIGURE A-8 Acoustical Frequency Response Limits

Acoustical Frequency Response Limits						
Frequency (Hz)	0 degree		90 degree		Random	
	Free-field		Free-field			
10.0	3.0	-4.0	3.0	-4.0	3.0	-4.0
12.5	2.5	-3.5	2.5	-3.5	2.5	-3.5
16.0	2.0	-3.0	2.0	-3.0	2.0	-3.0
20.0	2.0	-2.0	2.0	-2.0	2.0	-2.0
25.0	2.0	-1.5	2.0	-1.5	2.0	-1.5
31.5	1.5	-1.5	1.5	-1.5	1.5	-1.5
40 to 4000	1.0	-1.0	1.0	-1.0	1.0	-1.0
5000	1.5	-1.5	1.5	-1.5	1.5	-1.5
6300	1.5	-2.0	1.5	-2.0	1.5	-2.0
8000	1.5	-2.5	1.5	-2.5	1.5	-2.5
10000	2.0	-3.0	2.0	-3.0	2.0	-3.0
12500	2.0	-5.0	2.0	-5.0	2.0	-5.0
16000	2.5	-16.0	2.5	-16.0	2.5	-16.0
20000	3.0	-∞	3.0	-∞	3.0	-∞
with respect to level at 1 kHz						

A.6.1 EPS2116 Free Field Response (0°) with Corrections

For the following graphs, the applied correction is indicated in parentheses, e.g. (FF:FF2116).

FIGURE A-9 PRM2103-FF 0 Degree Response



Directional Characteristics

FIGURE A-10 PRM2103-FF Directional Response

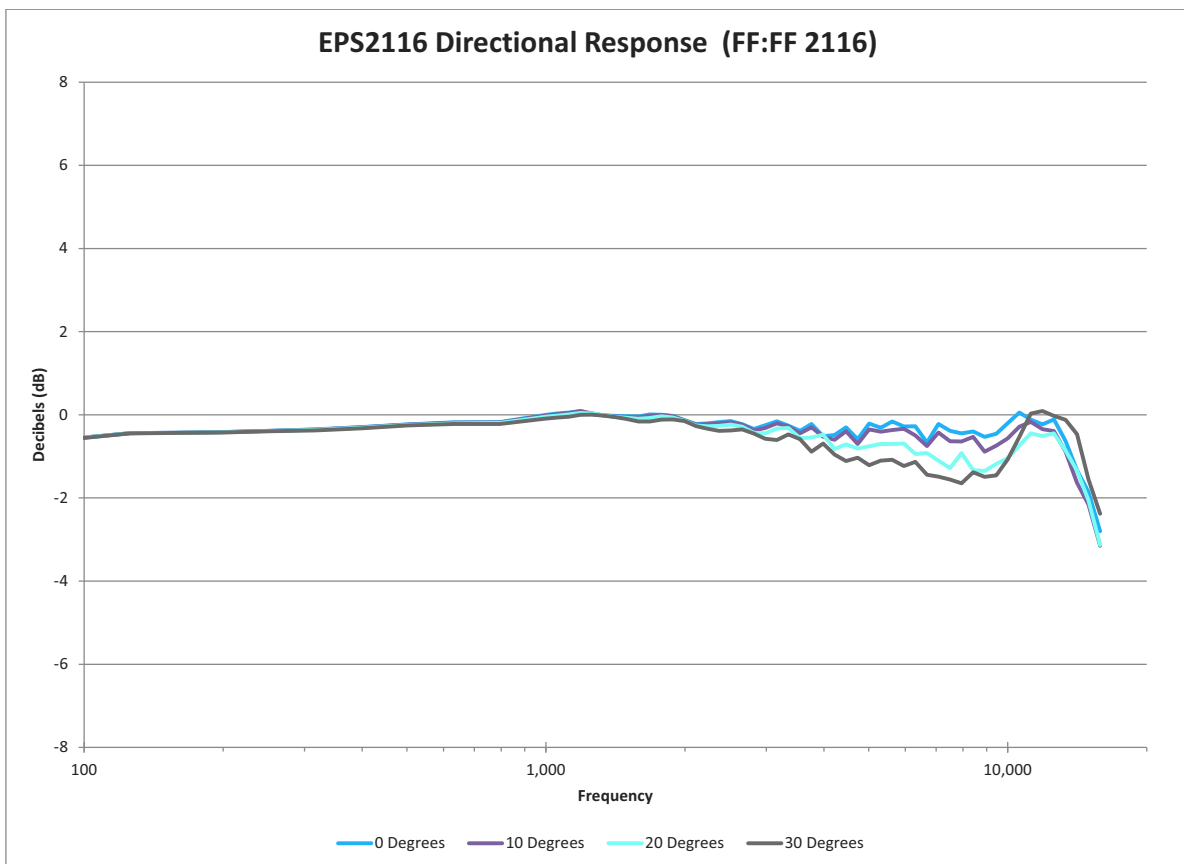


FIGURE A-11 PRM2103-FF Directional Response

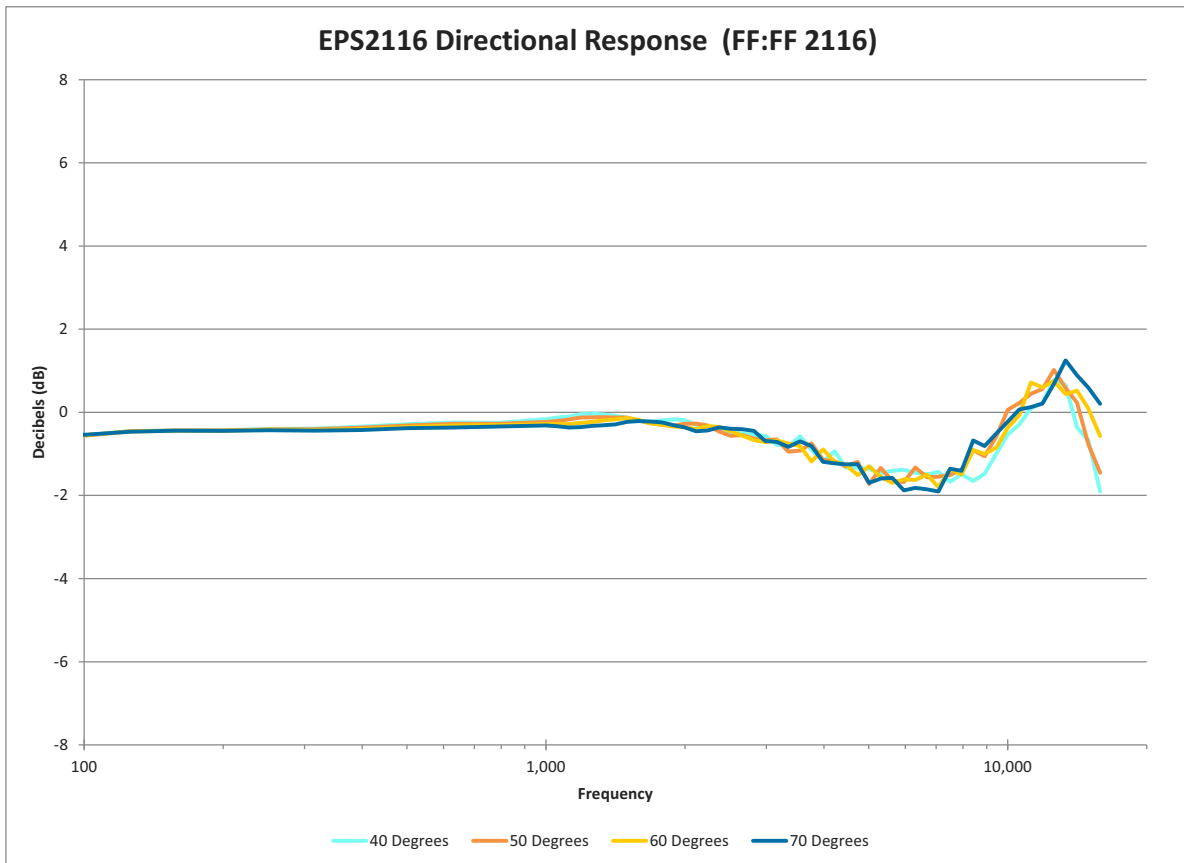


FIGURE A-12 PRM2103-FF Directional Response

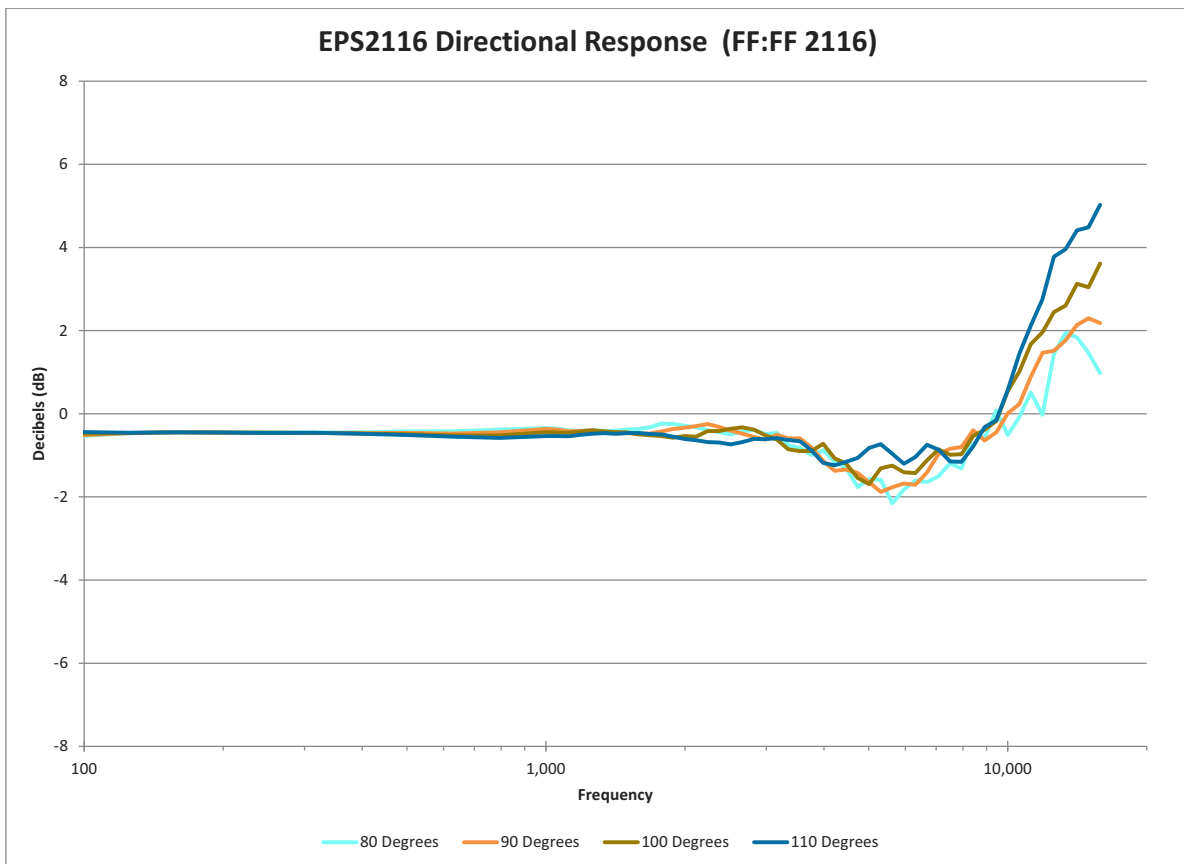


FIGURE A-13 PRM2103-FF Directional Response

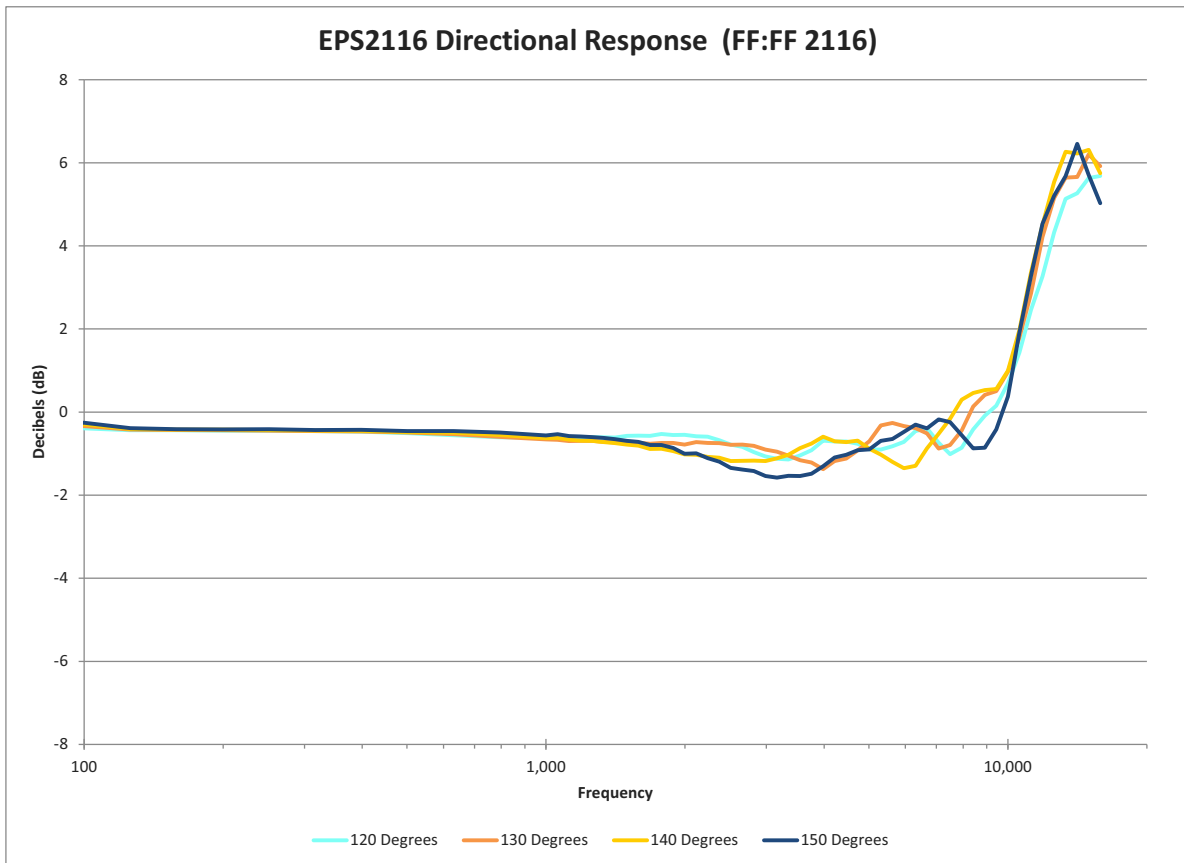


FIGURE A-14 PRM2103-FF Directional Response

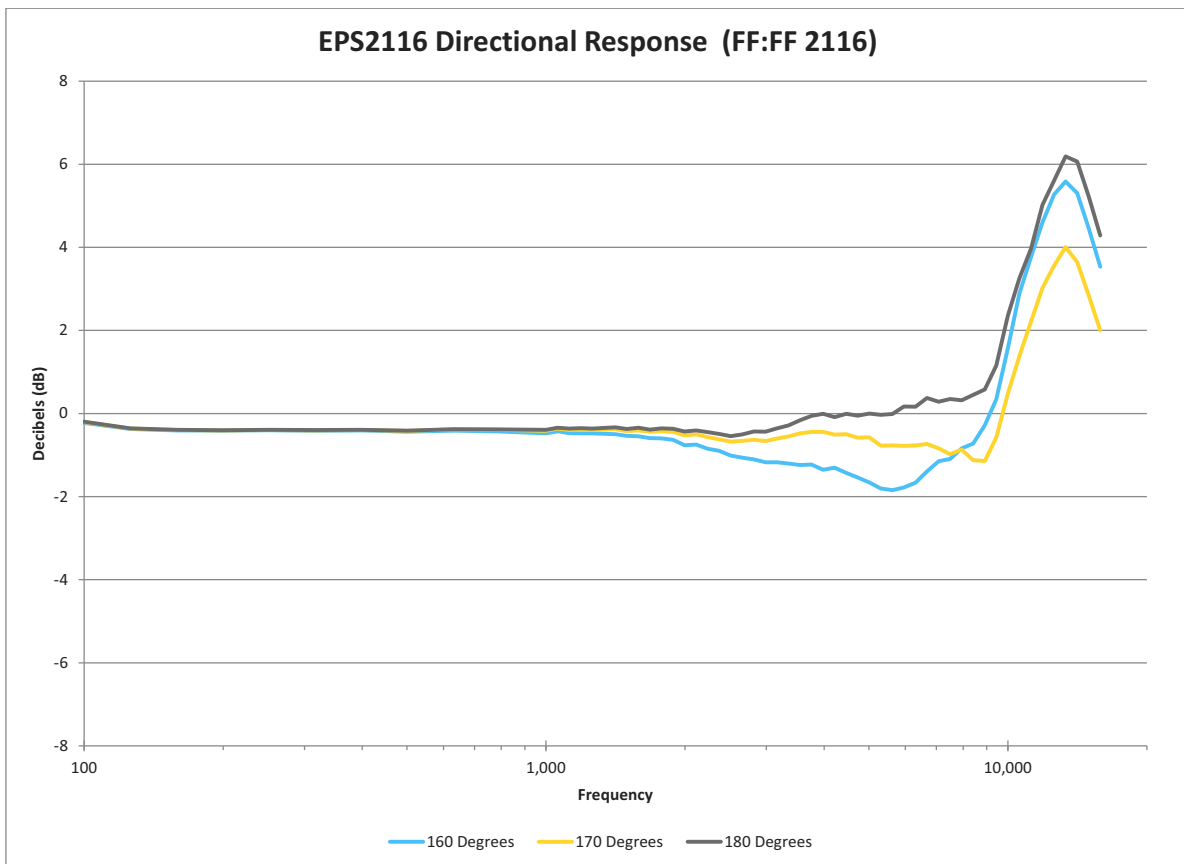


FIGURE A-15 PRM2103-FF Directional Response

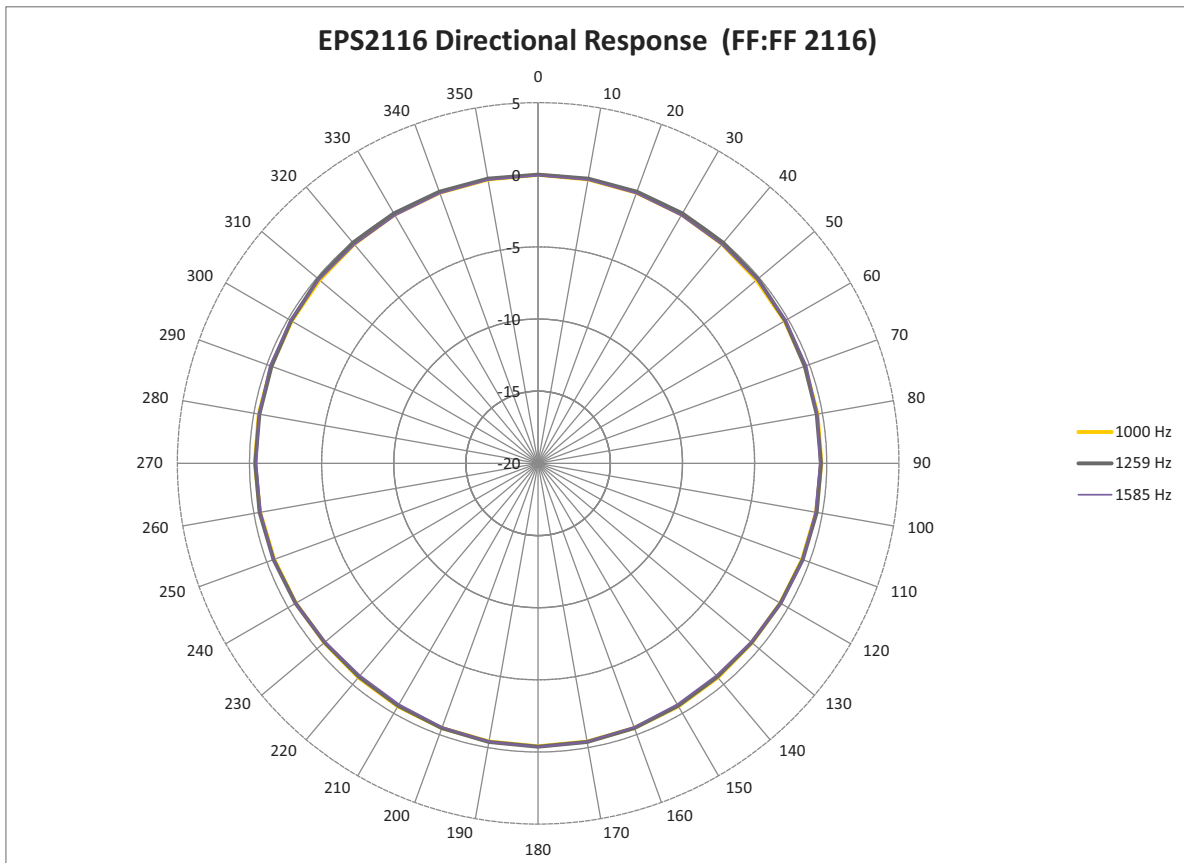


FIGURE A-16 PRM2103-FF Directional Response

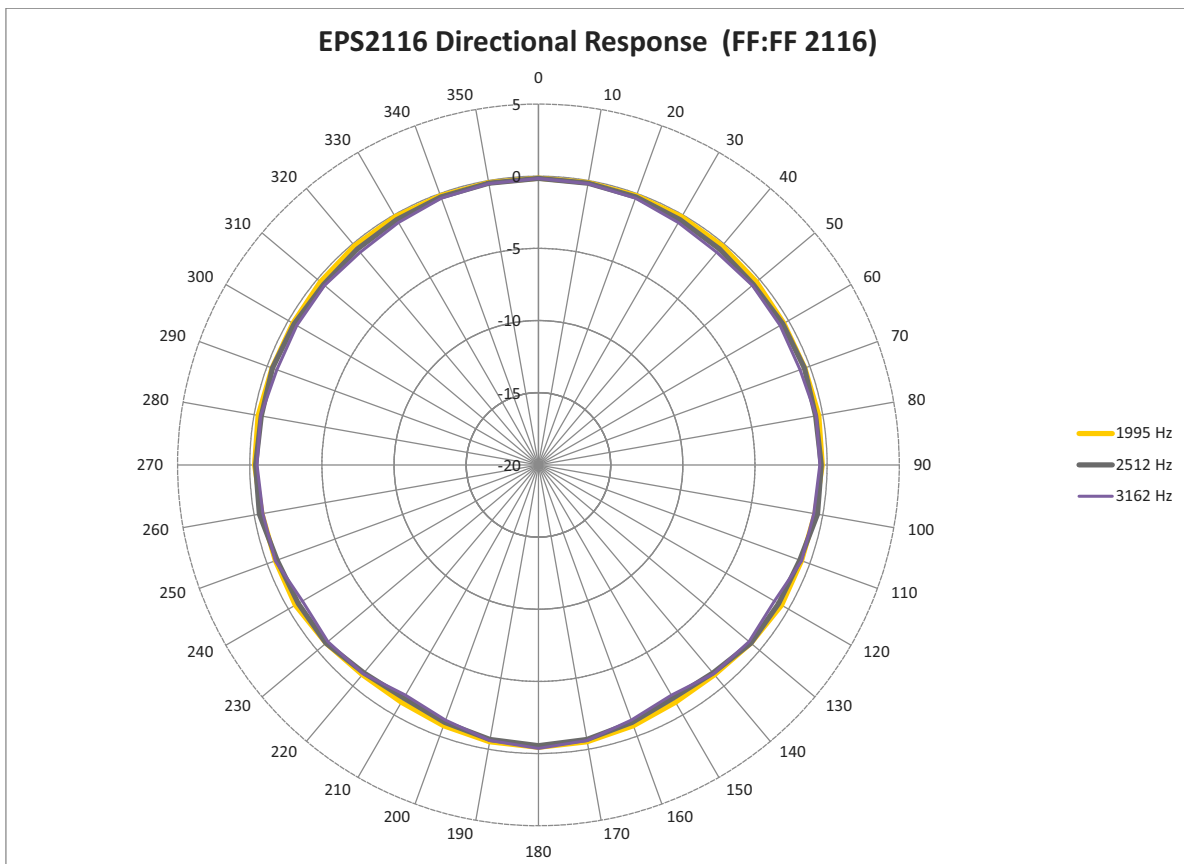


FIGURE A-17 PRM2103-FF Directional Response

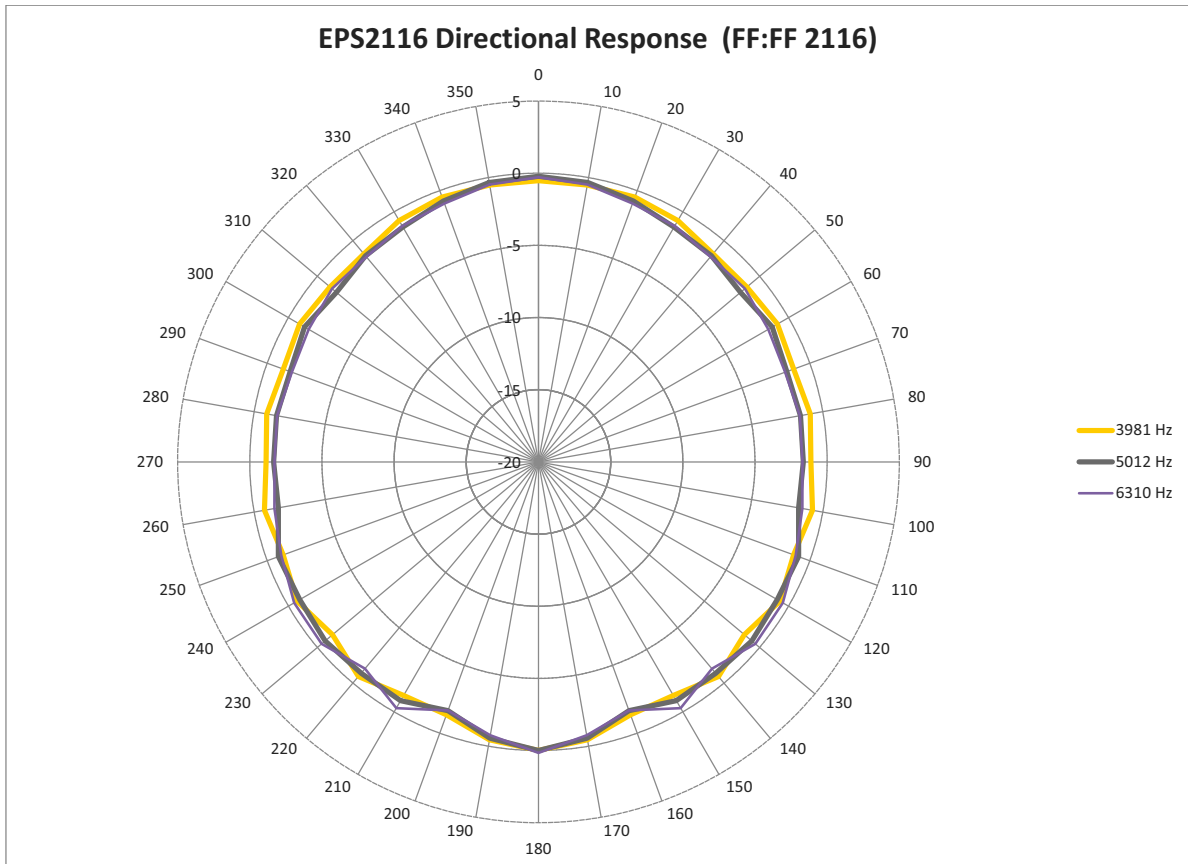


FIGURE A-18 PRM2103-FF Directional Response

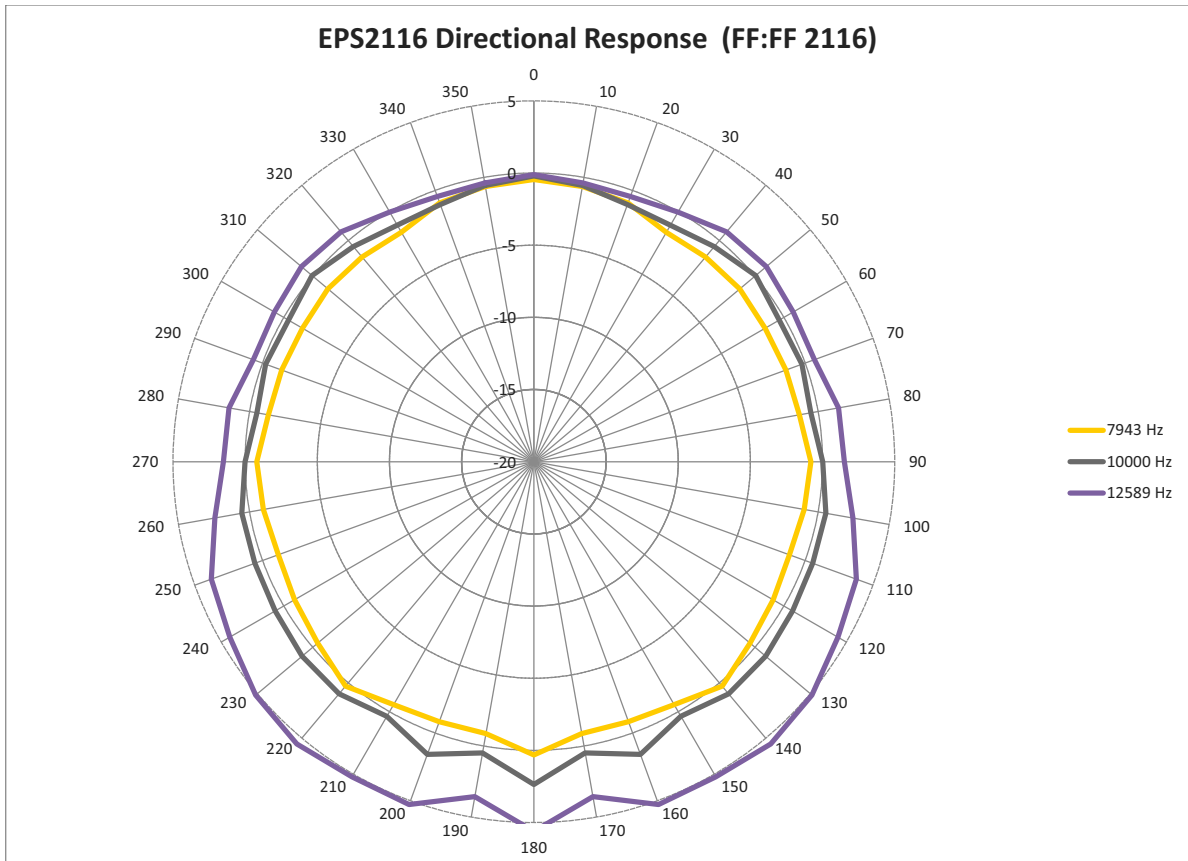


FIGURE A-19 PRM2103-FF Directional Response

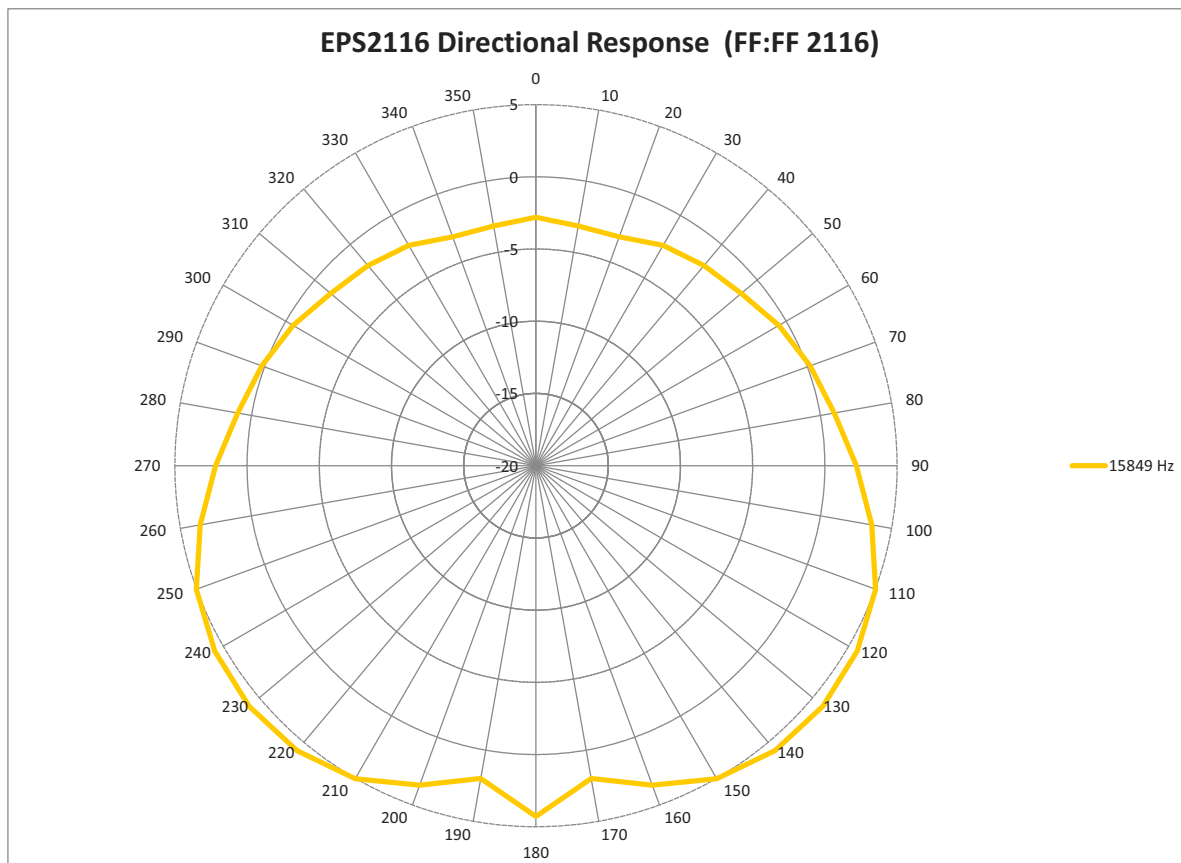
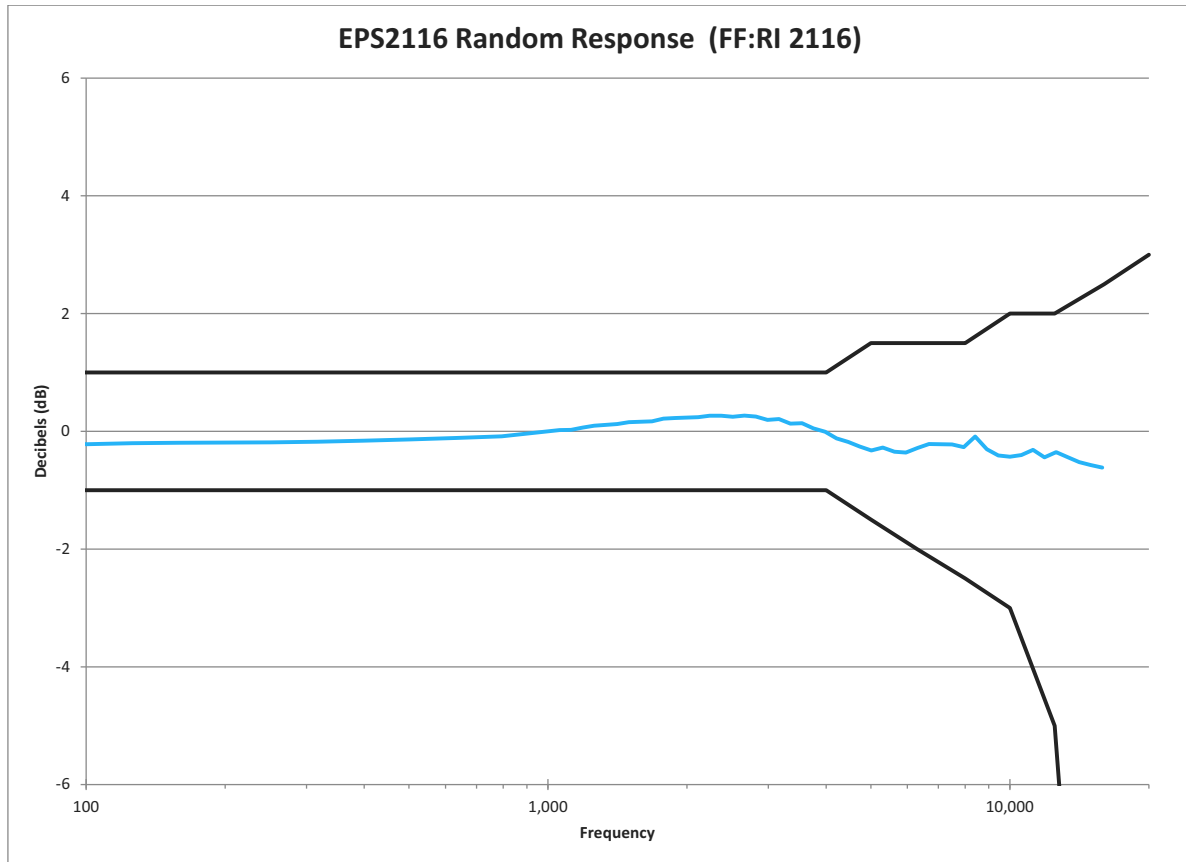


FIGURE A-20 PRM2103-FF Random Response



Directional Characteristics

FIGURE A-21 PRM2103-FF Directional Response

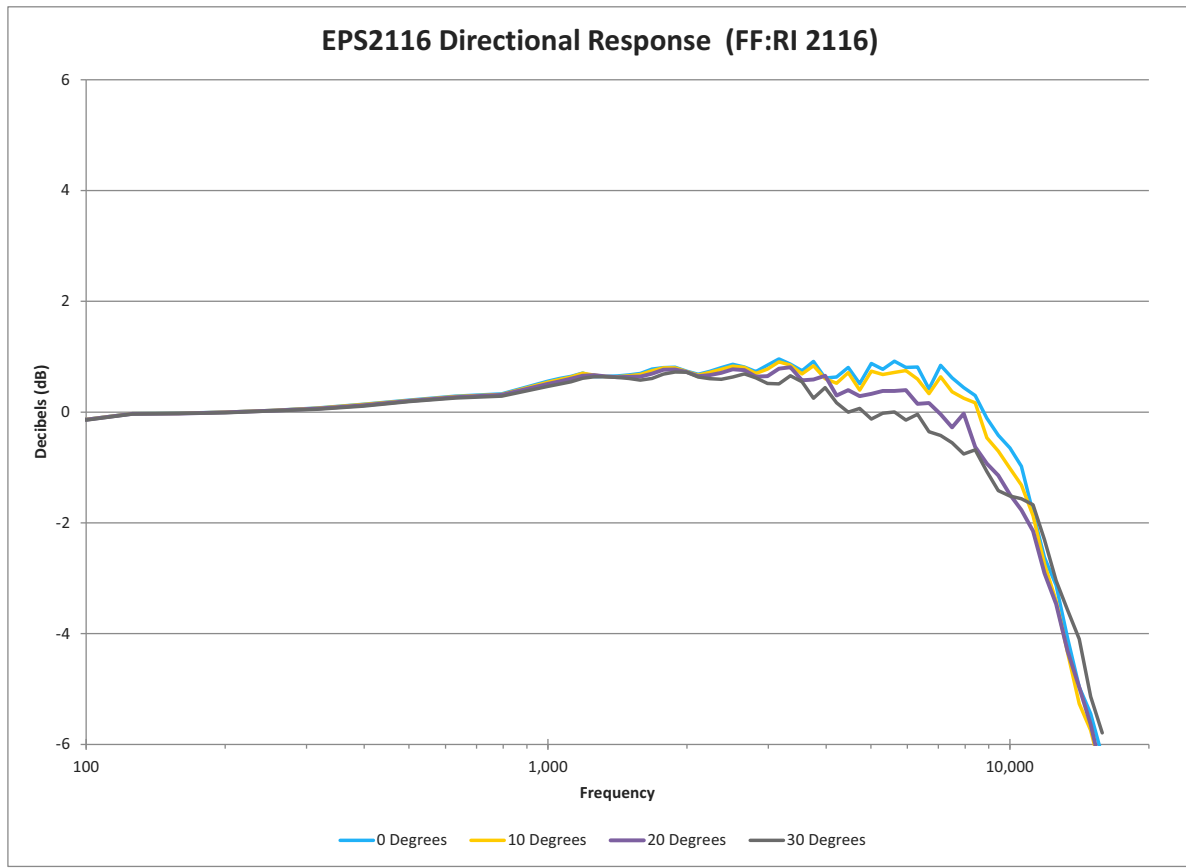


FIGURE A-22 PRM2103-FF Directional Response

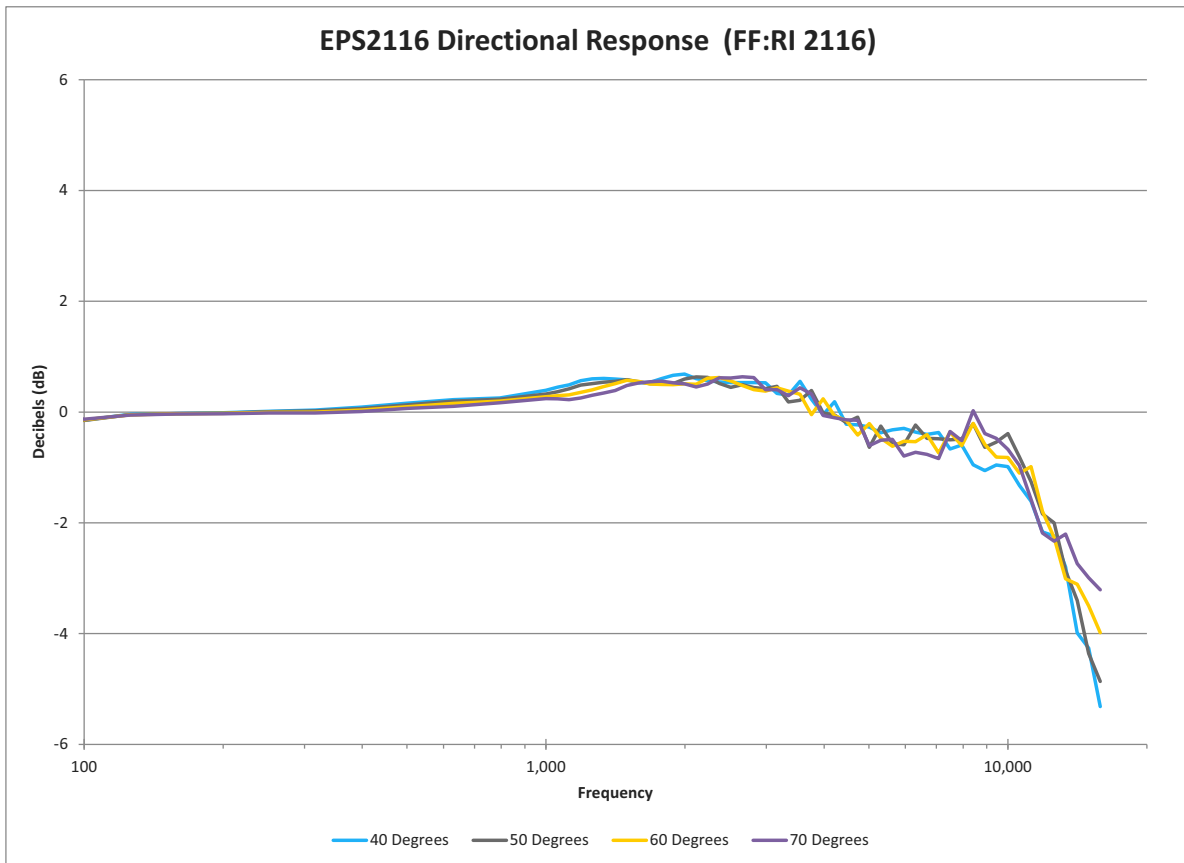


FIGURE A-23 PRM2103-FF Directional Response

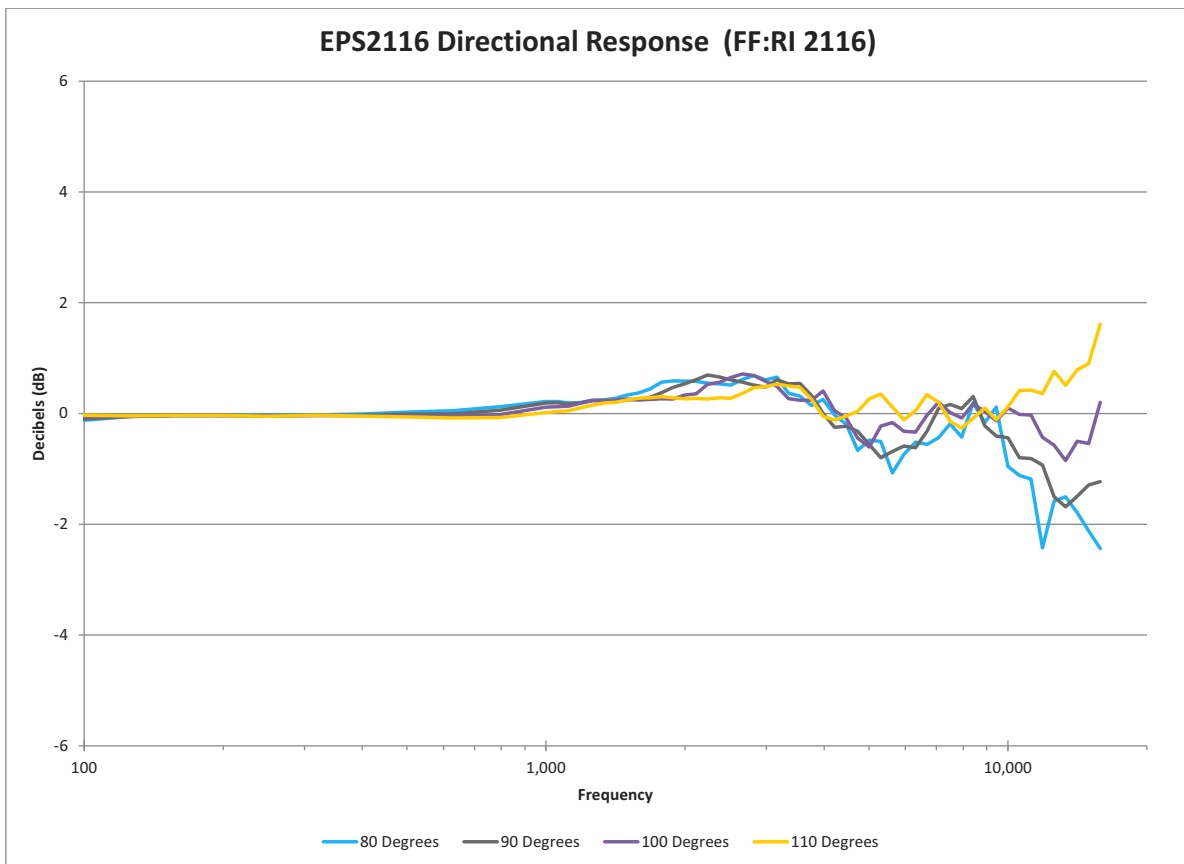


FIGURE A-24 PRM2103-FF Directional Response

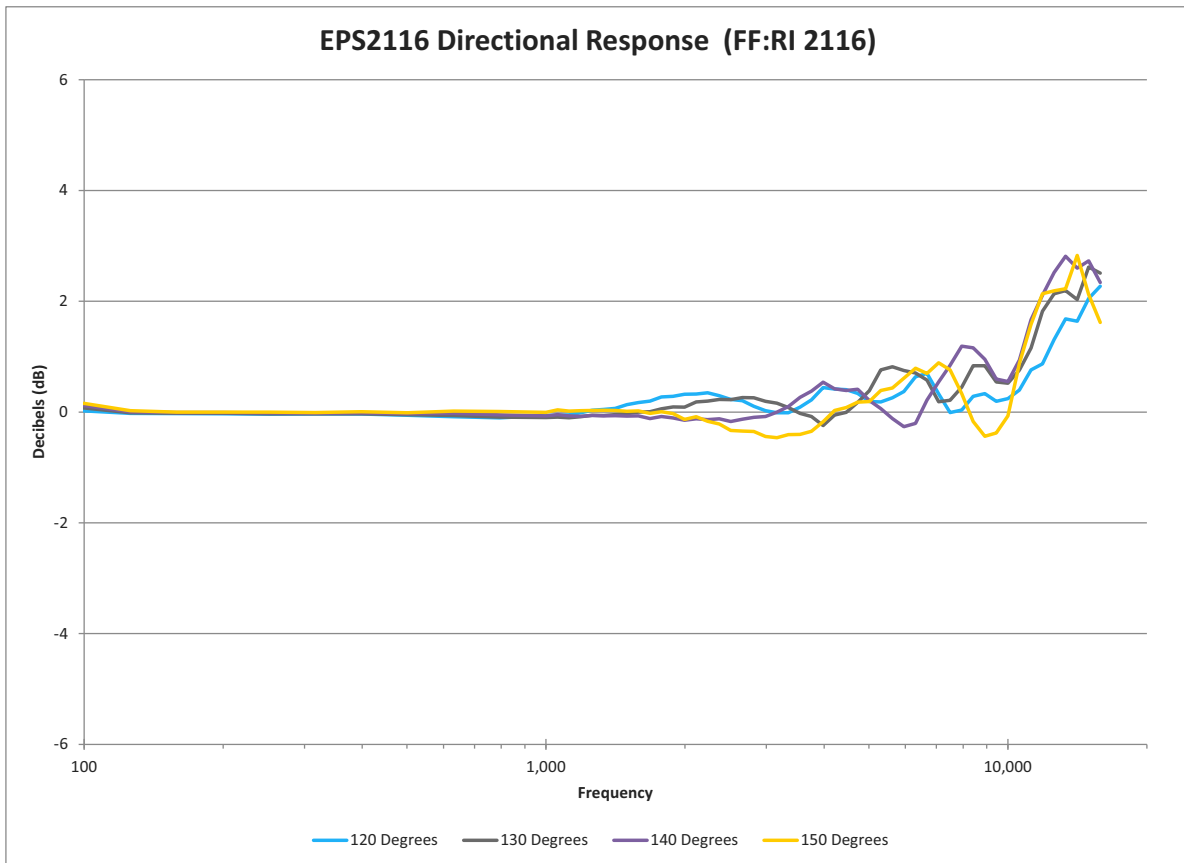


FIGURE A-25 PRM2103-FF Directional Response

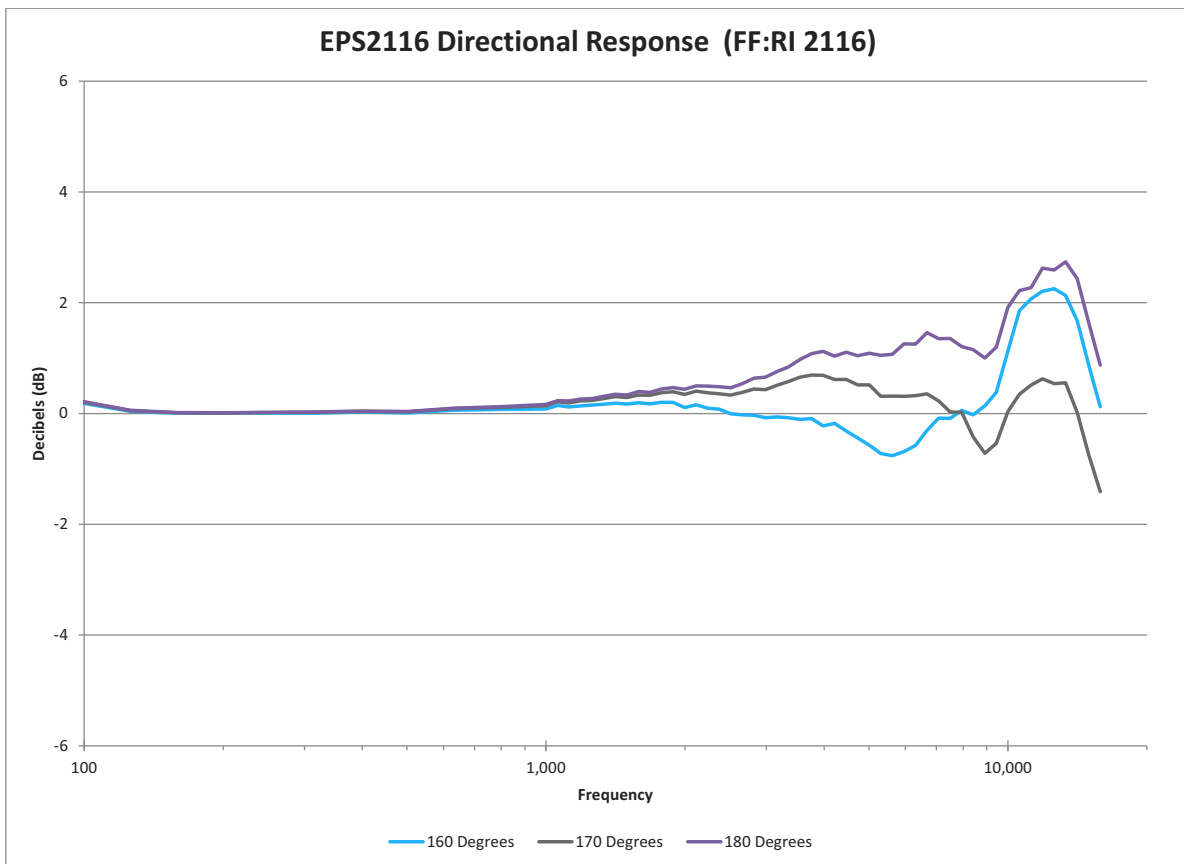


FIGURE A-26 PRM2103-FF Directional Response

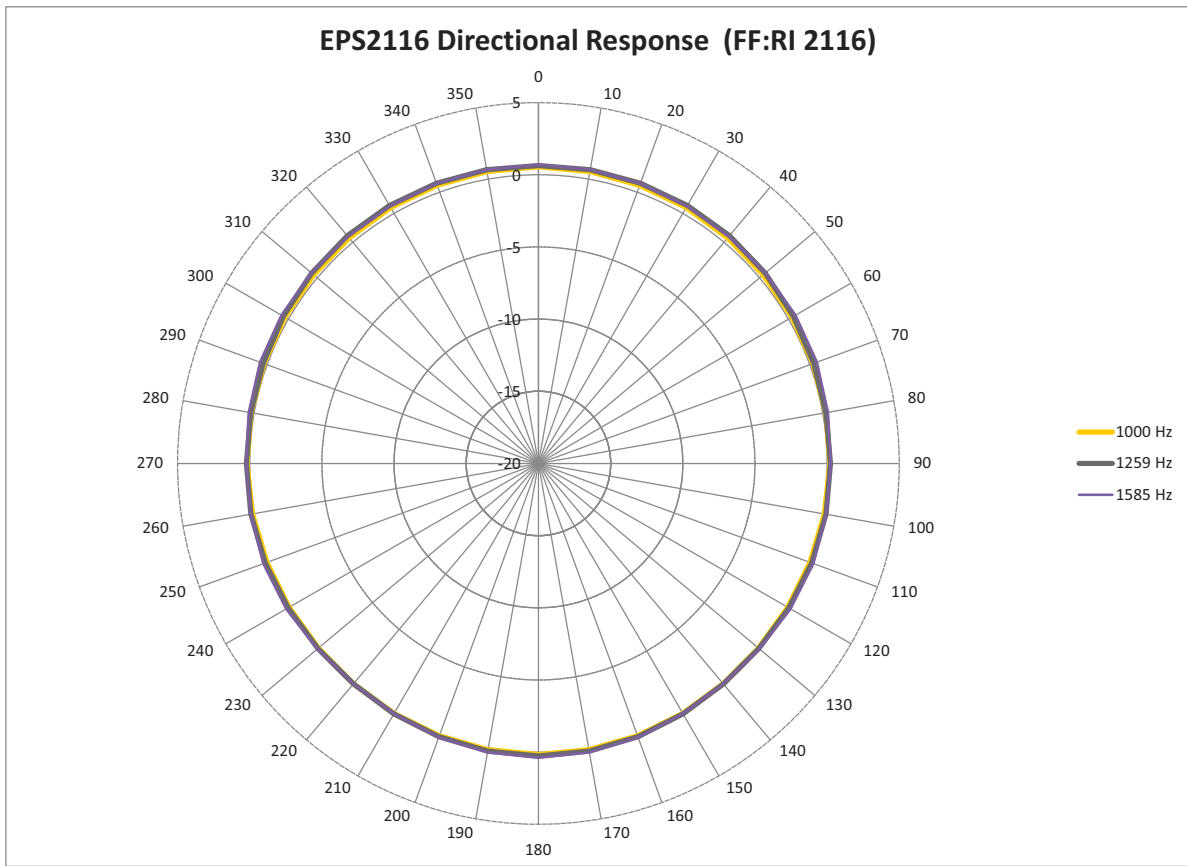


FIGURE A-27 PRM2103-FF Directional Response

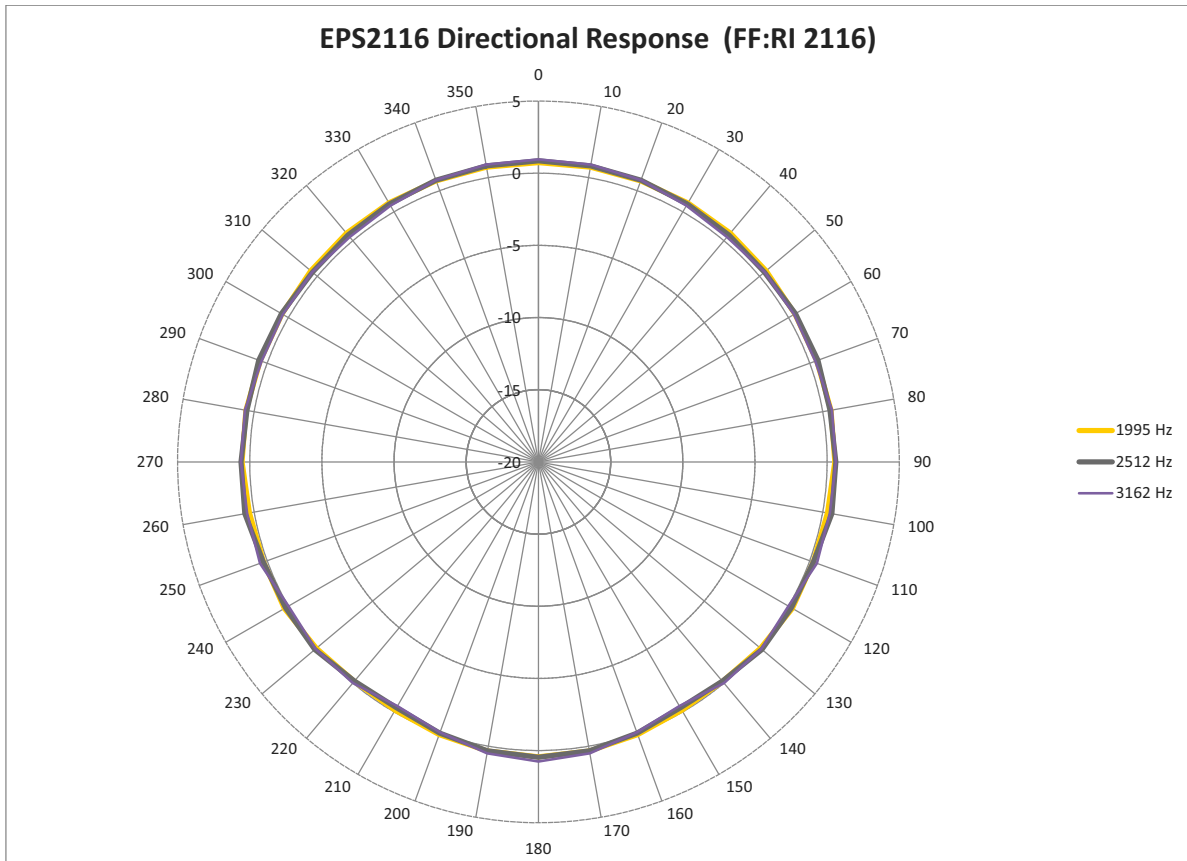


FIGURE A-28 PRM2103-FF Directional Response

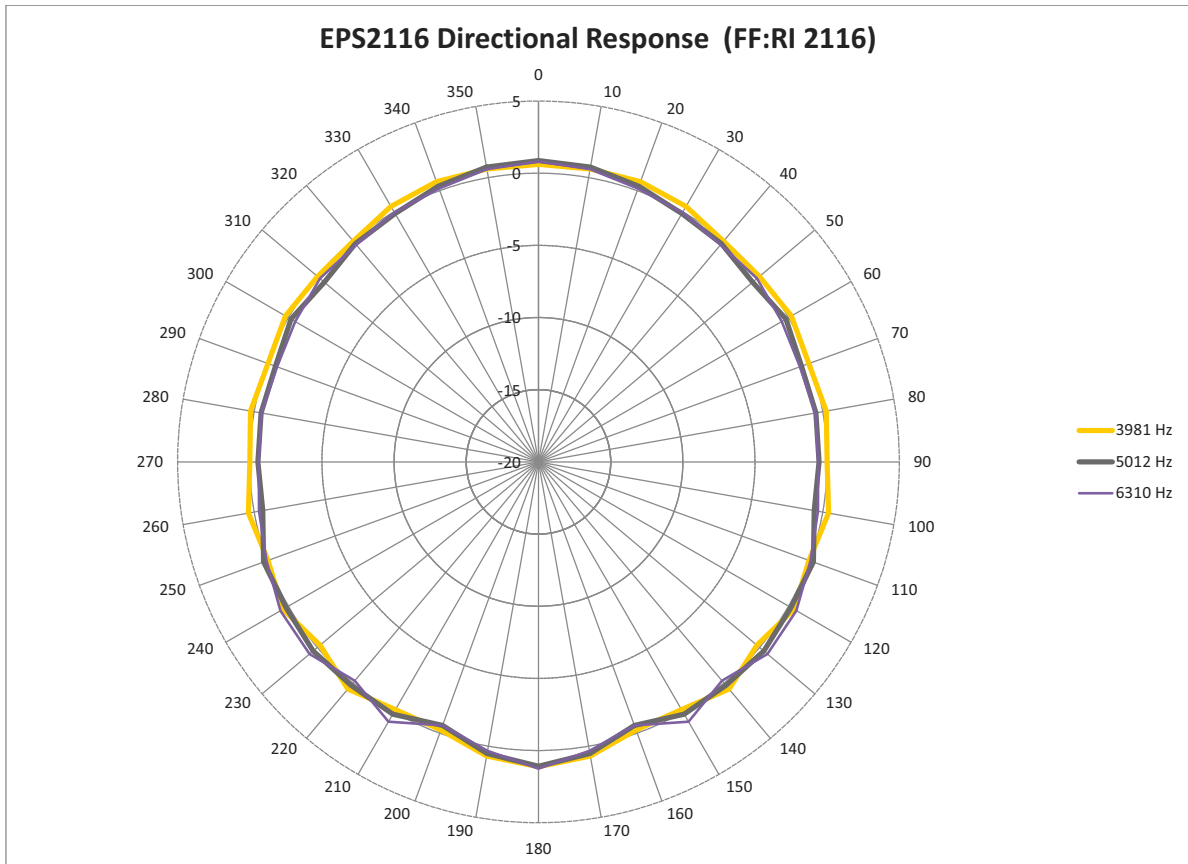


FIGURE A-29 PRM2103-FF Directional Response

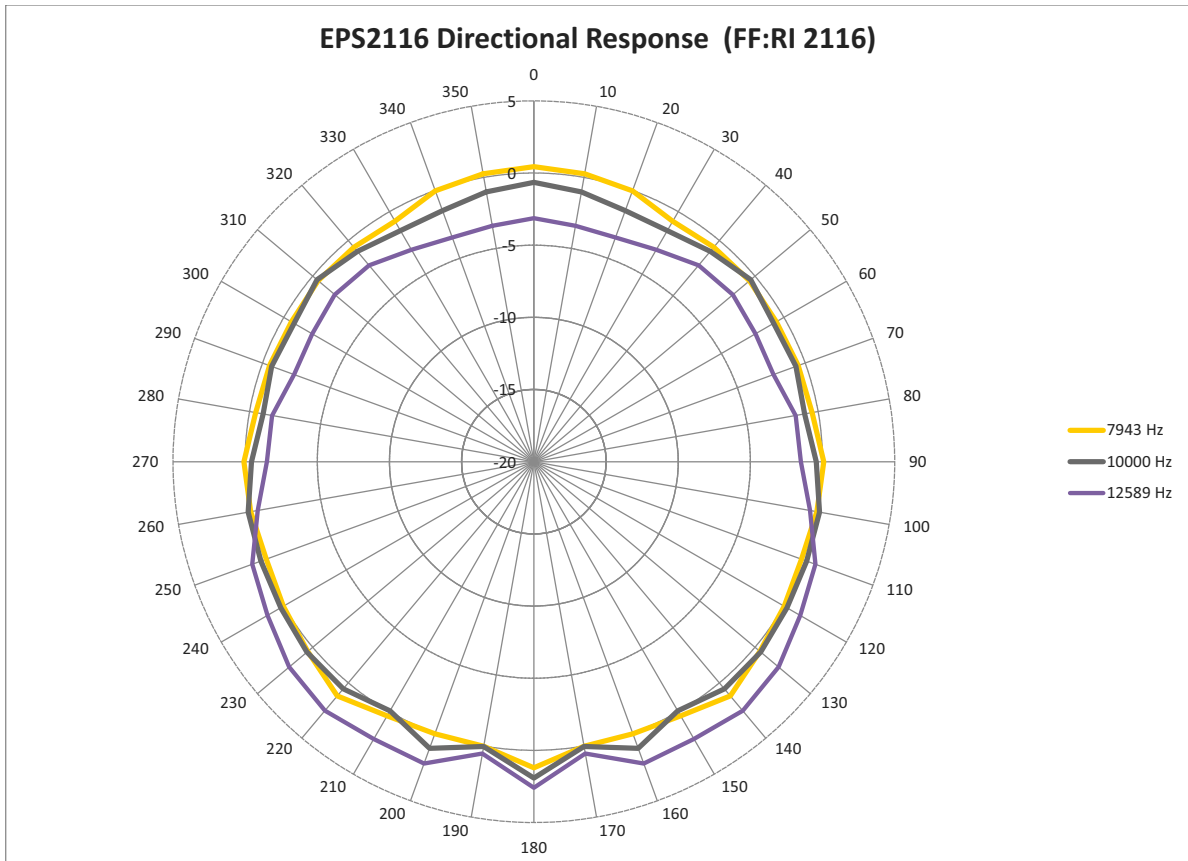


FIGURE A-30 PRM2103-FF Directional Response

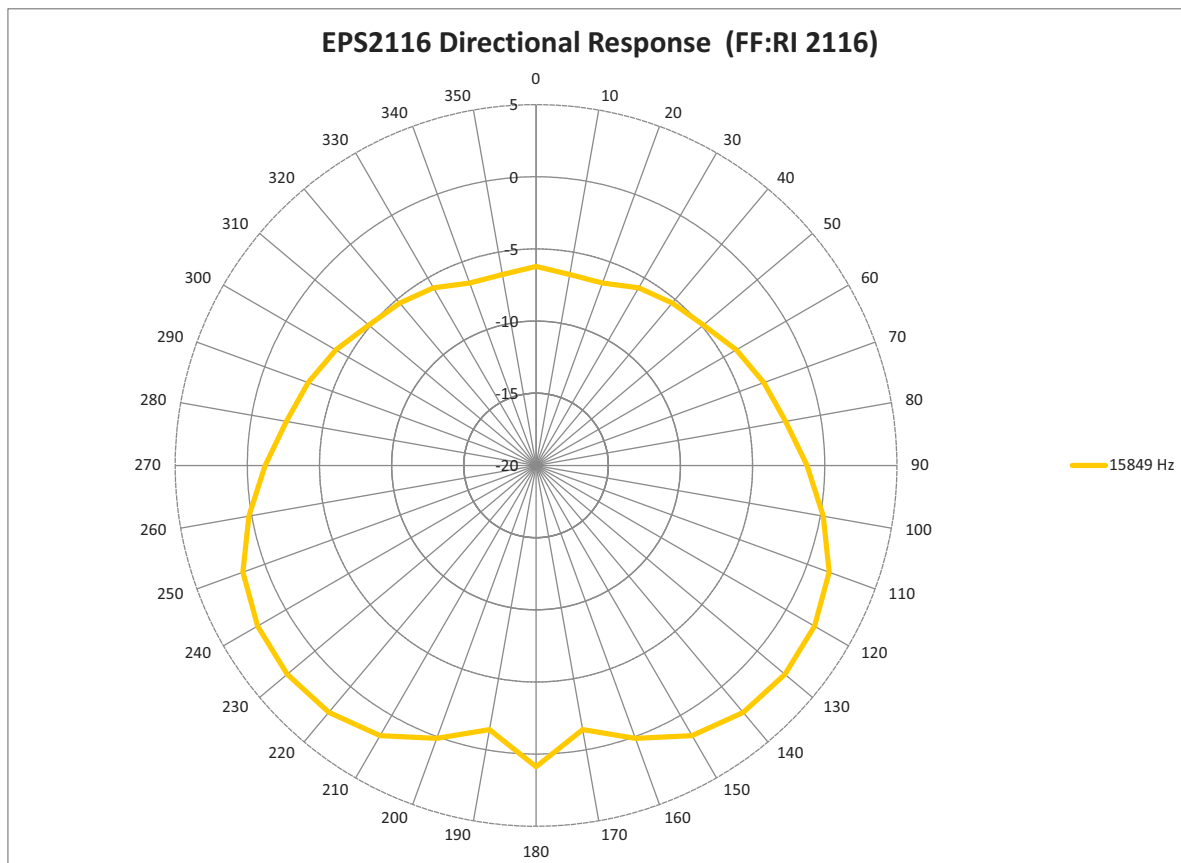
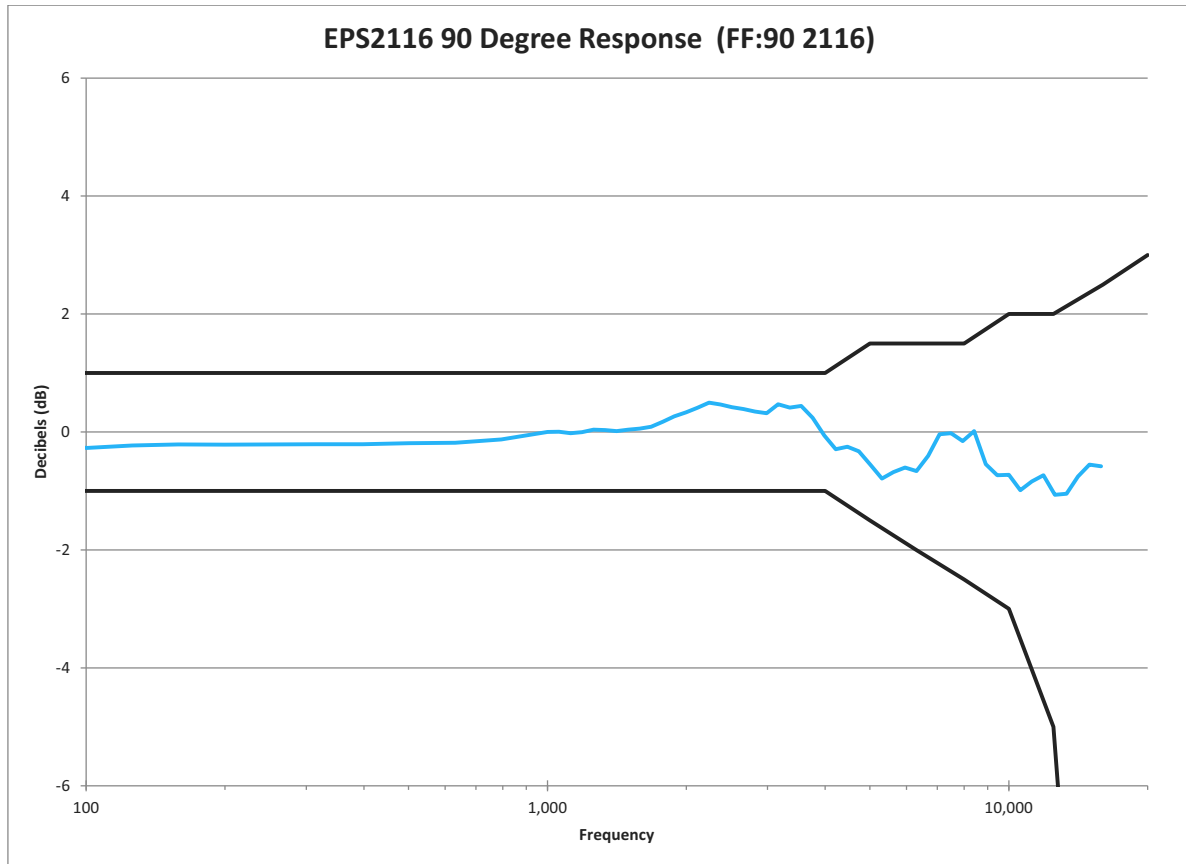


FIGURE A-31 PRM2103-FF 90 Degree Response



Directional Characteristics

FIGURE A-32 PRM2103-FF Directional Response

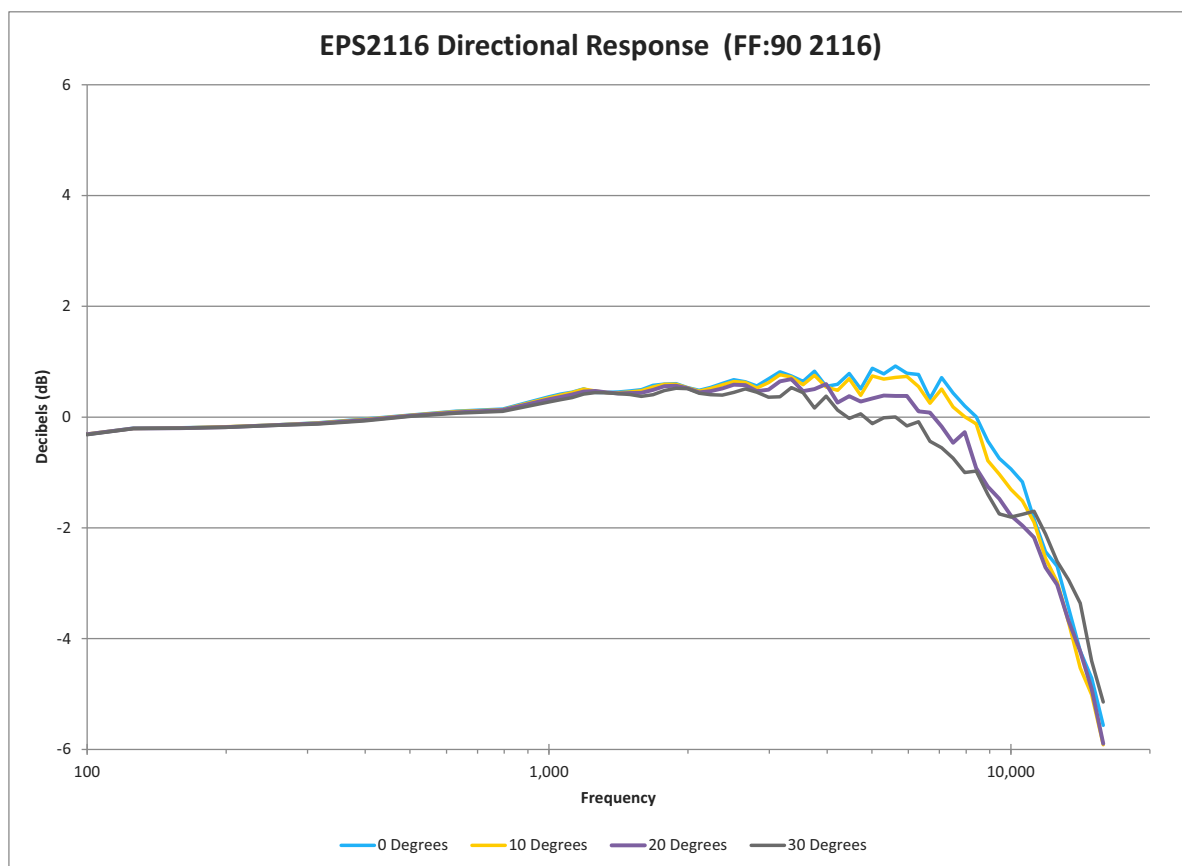


FIGURE A-33 PRM2103-FF Directional Response

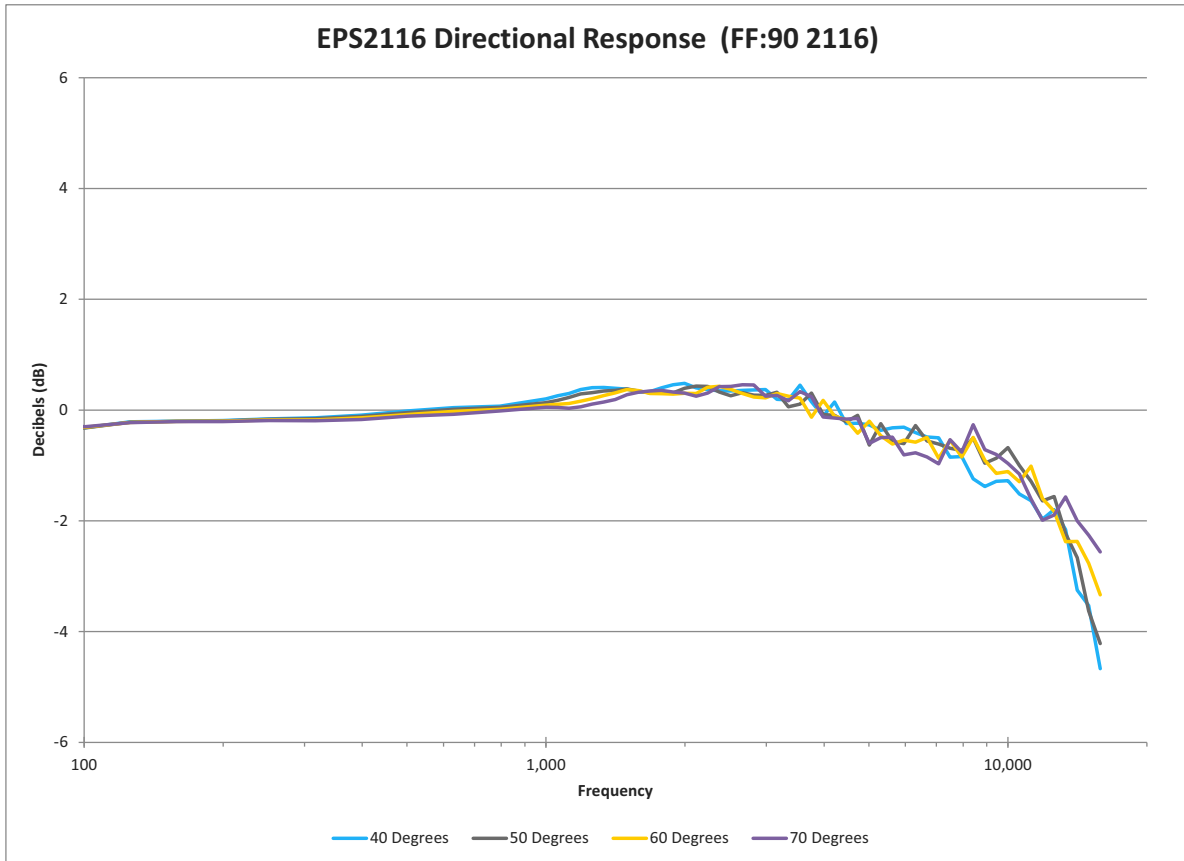


FIGURE A-34 PRM2103-FF Directional Response

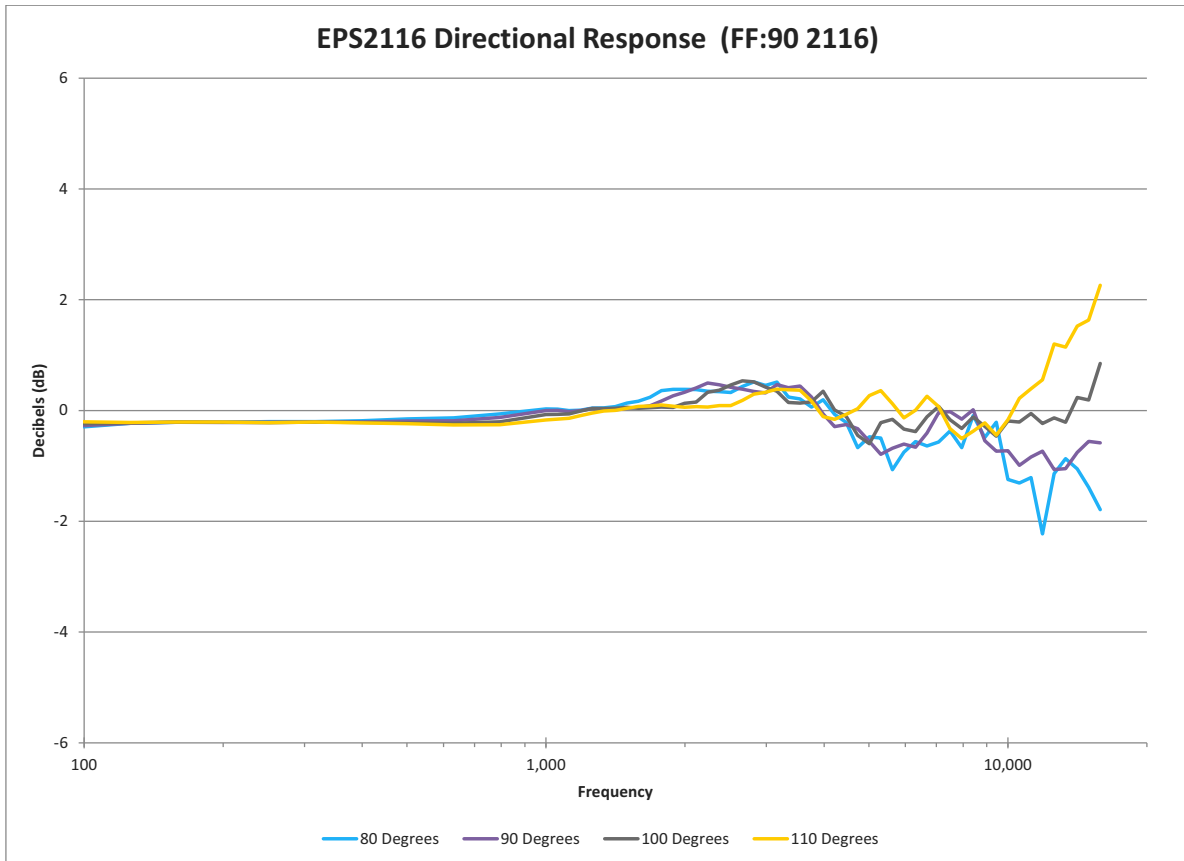


FIGURE A-35 PRM2103-FF Directional Response

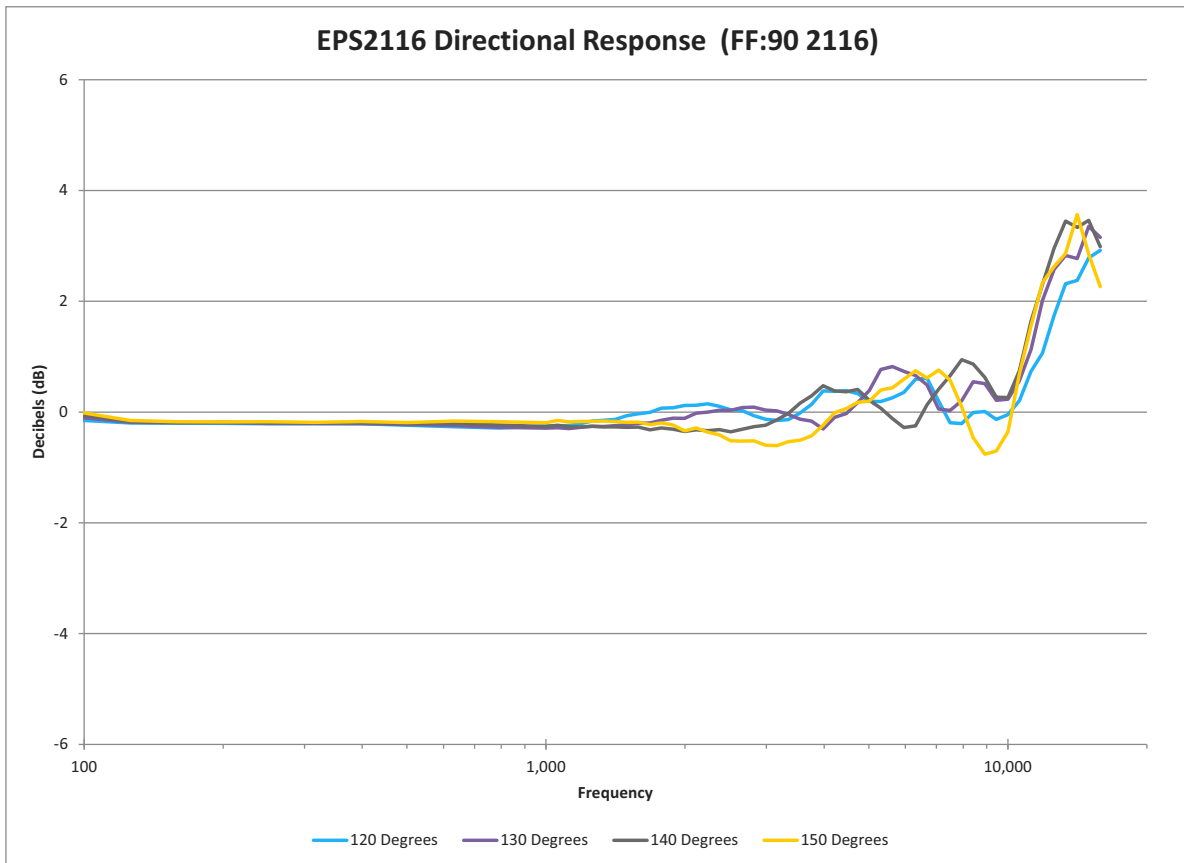


FIGURE A-36 PRM2103-FF Directional Response

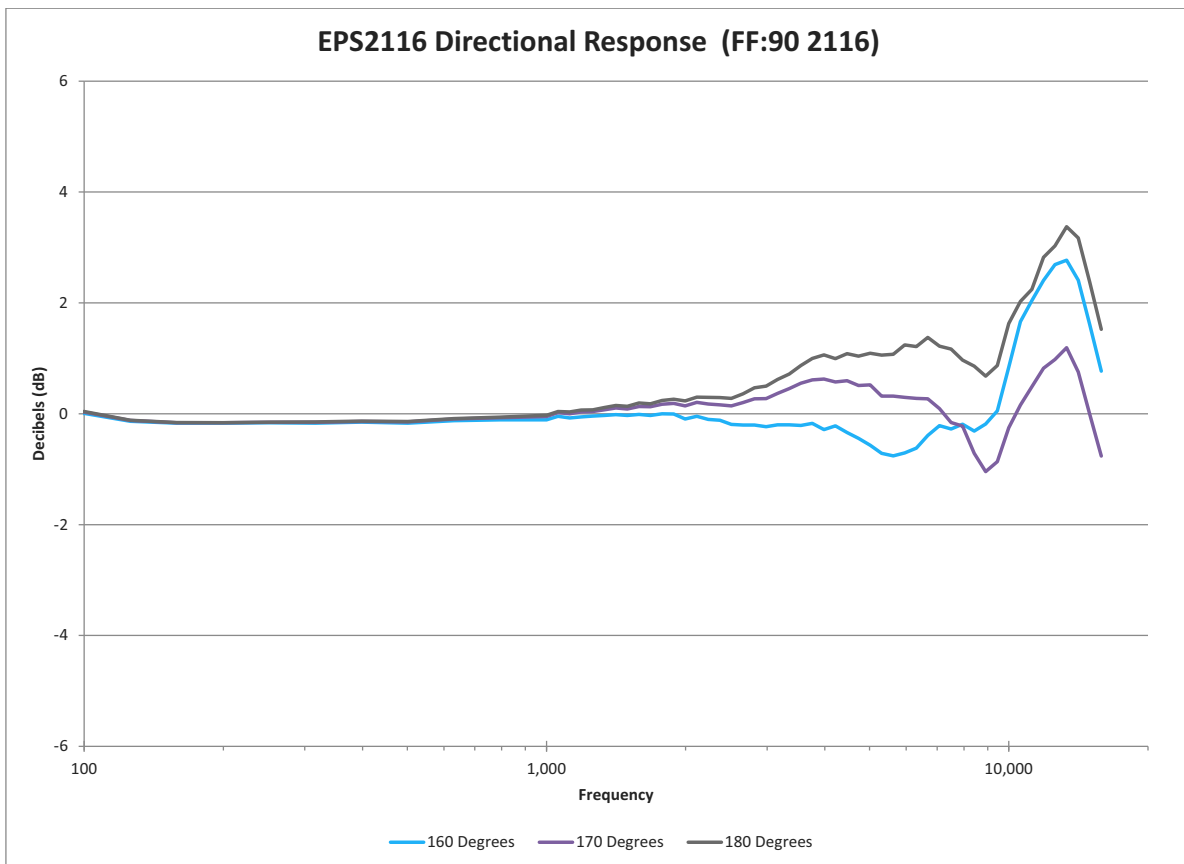


FIGURE A-37 PRM2103-FF Directional Response

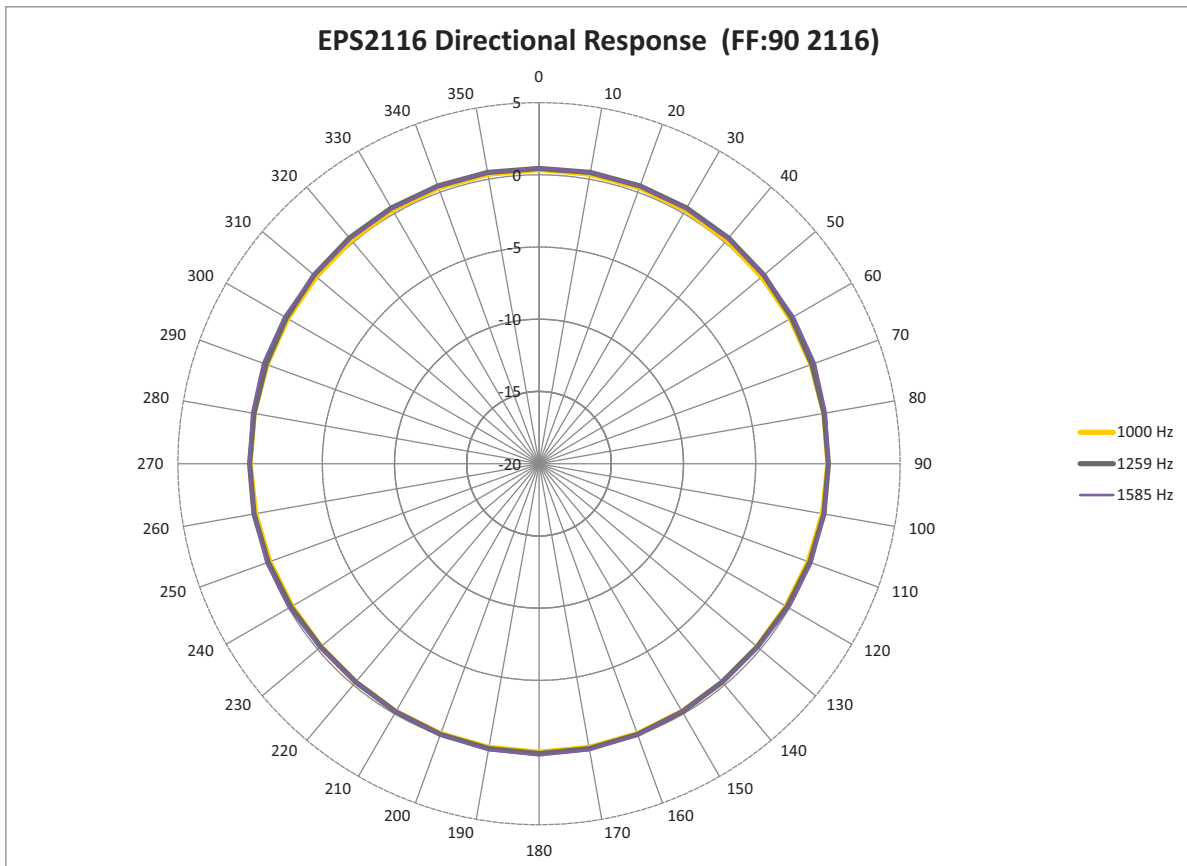


FIGURE A-38 PRM2103-FF Directional Response

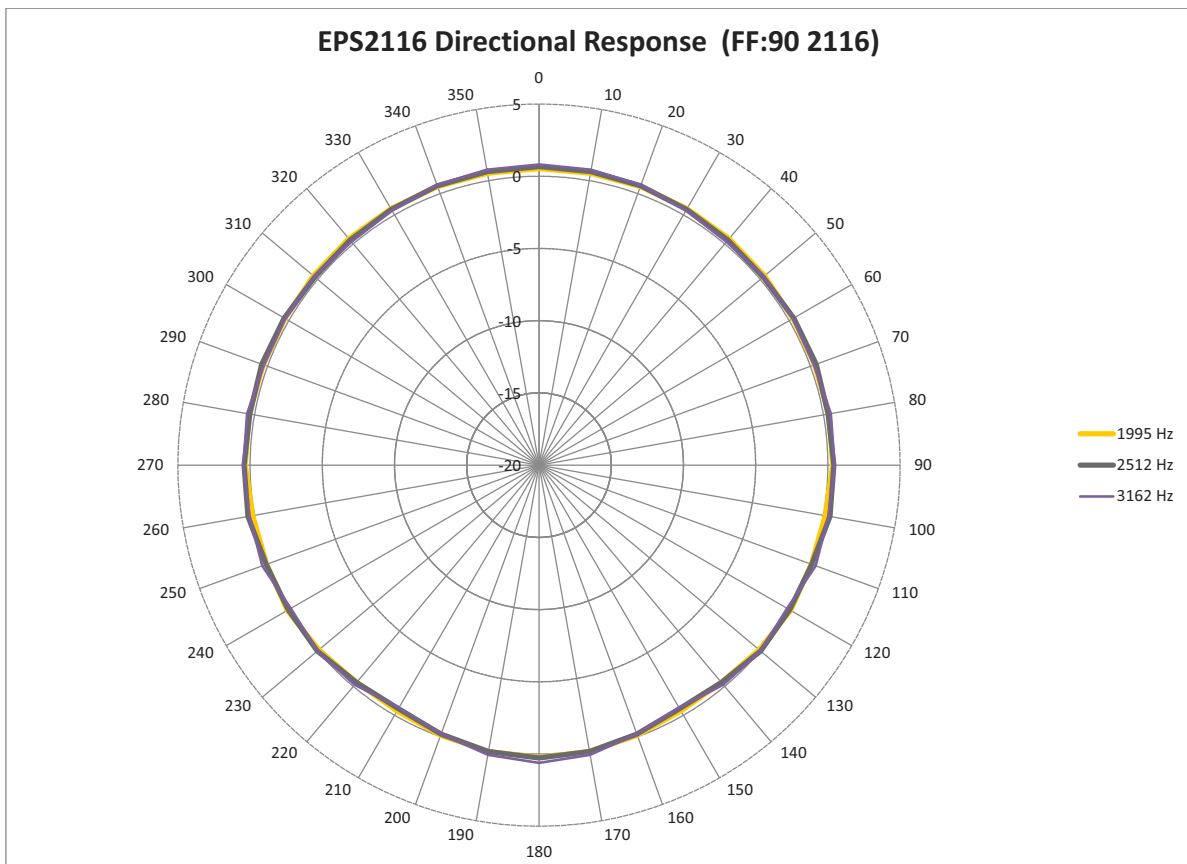


FIGURE A-39 PRM2103-FF Directional Response

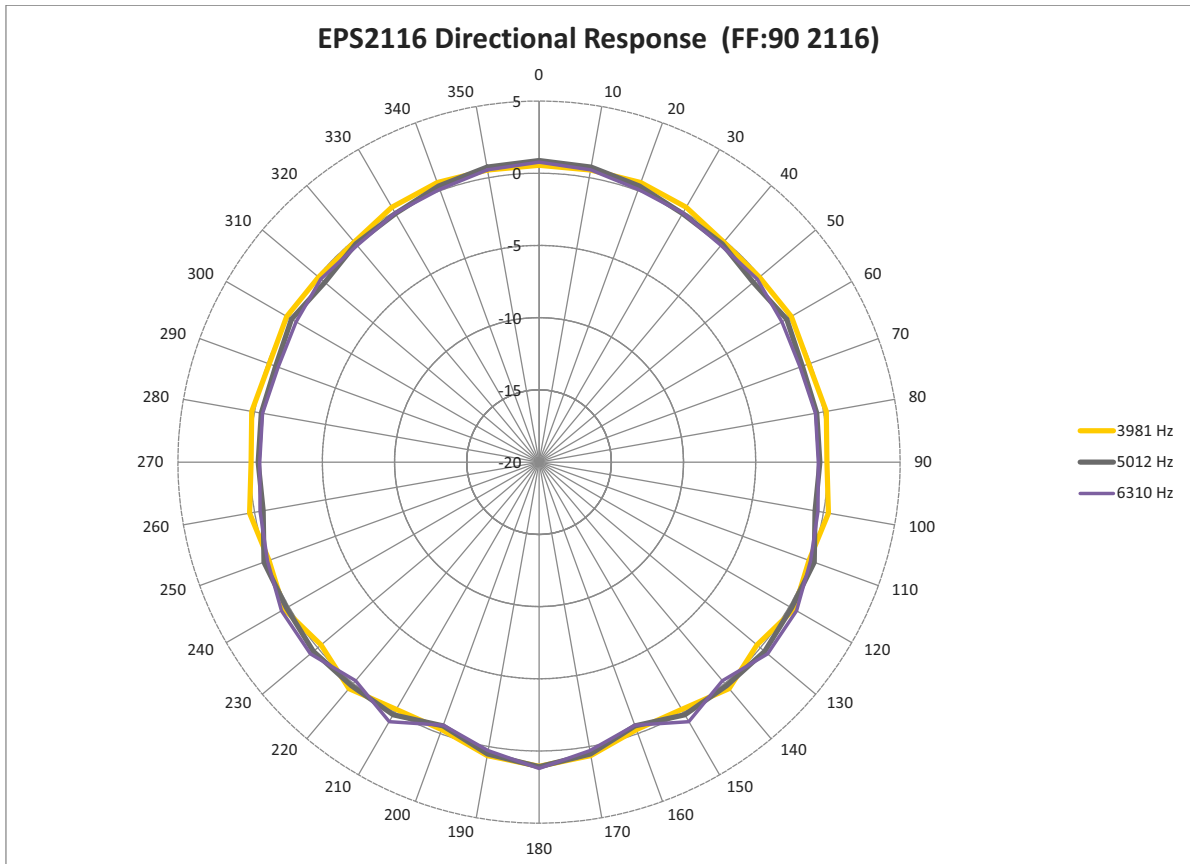


FIGURE A-40 PRM2103-FF Directional Response

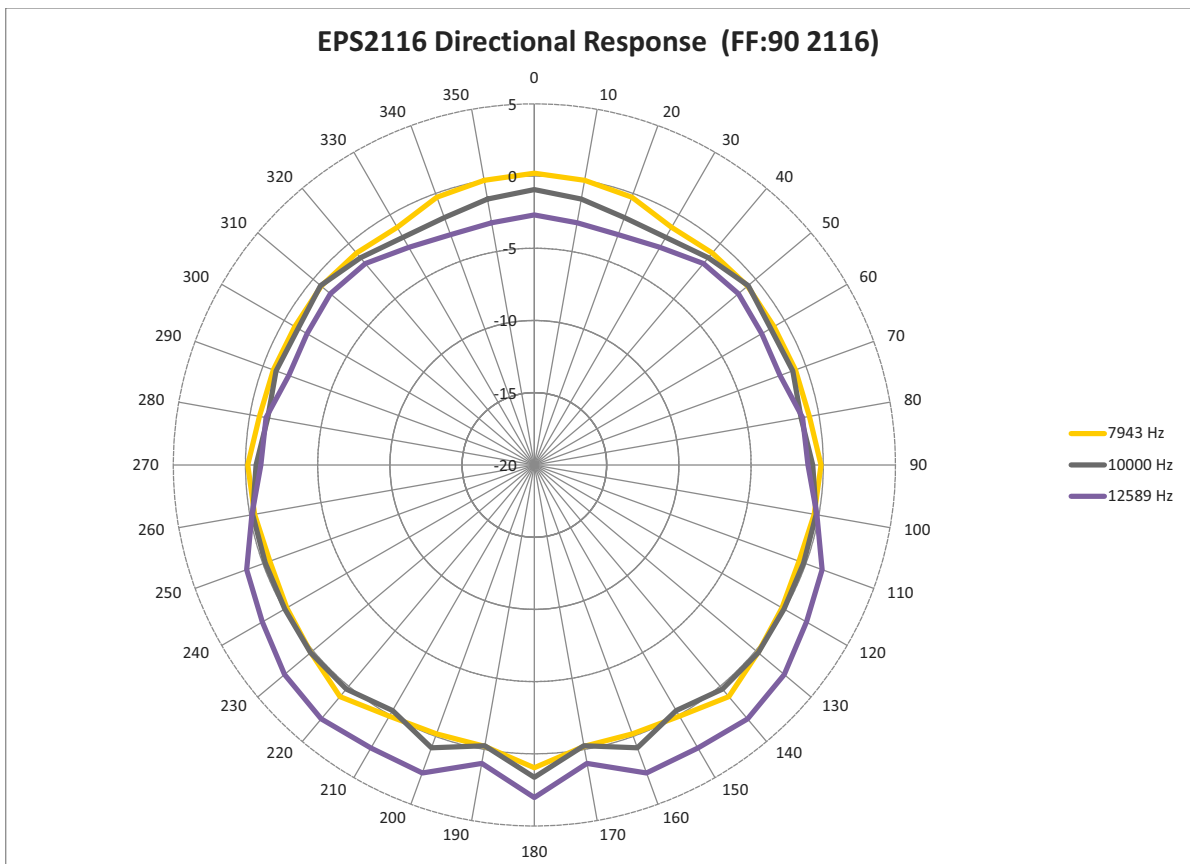
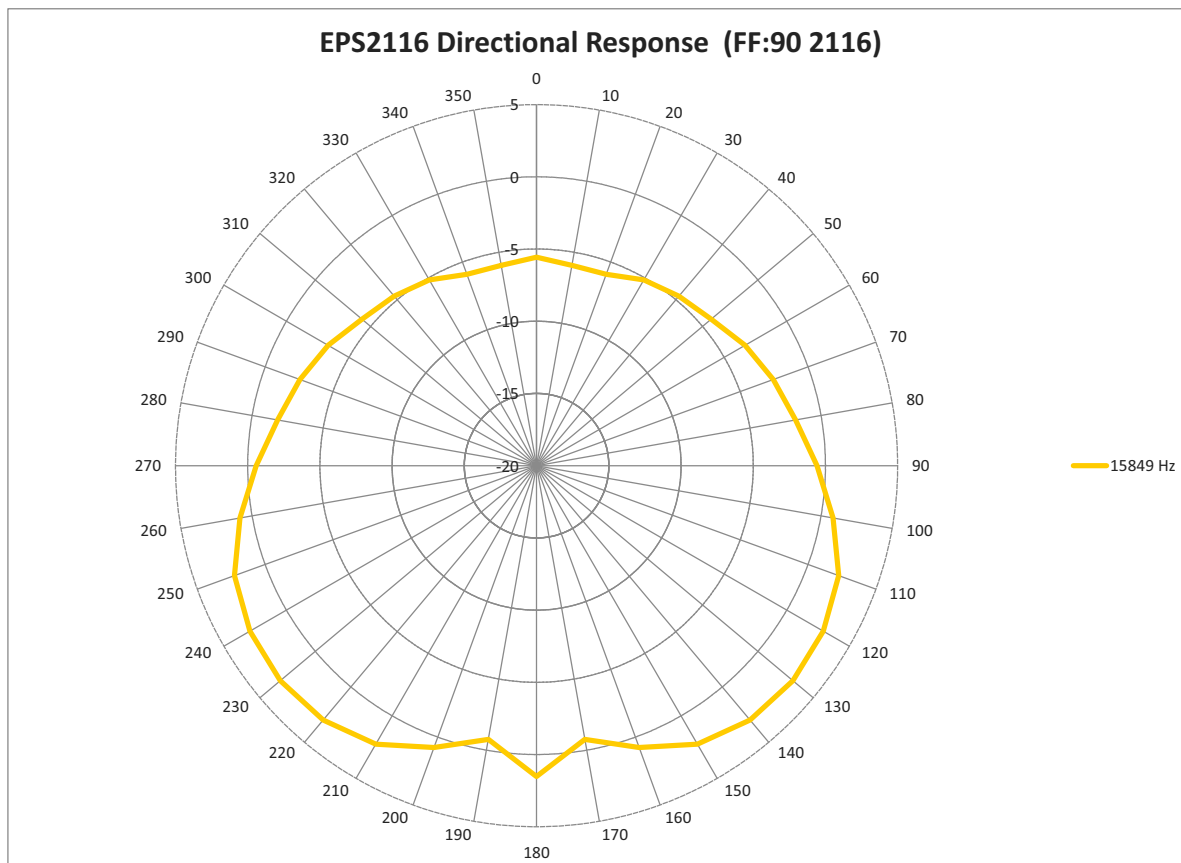


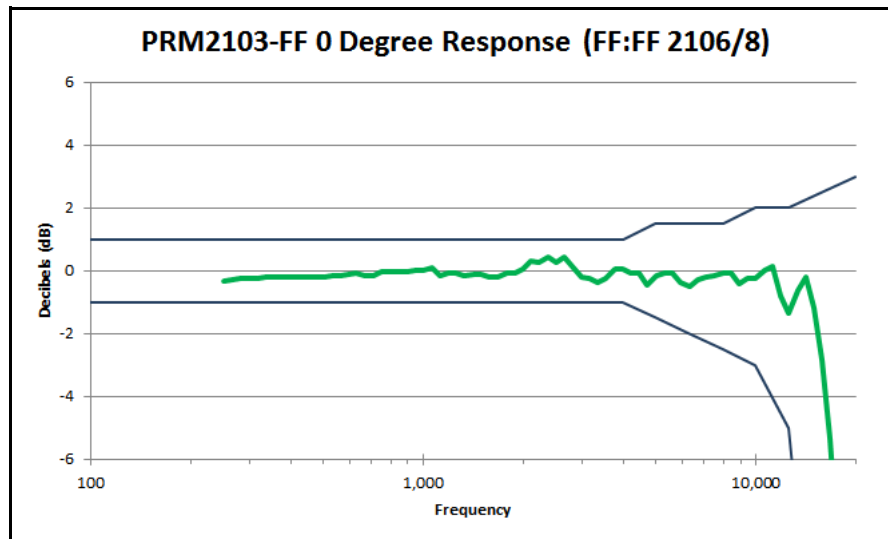
FIGURE A-41 PRM2103-FF Directional Response



A.6.4 EPS2106 Free Field Response (0°) with Corrections

For the following graphs, the applied correction is indicated in parentheses, e.g. (FF:FF2106/8).

FIGURE A-42 PRM2103-FF 0 Degree Response



Directional Characteristics

FIGURE A-43 PRM2103-FF Directional Response (FF:FF 2106/8)

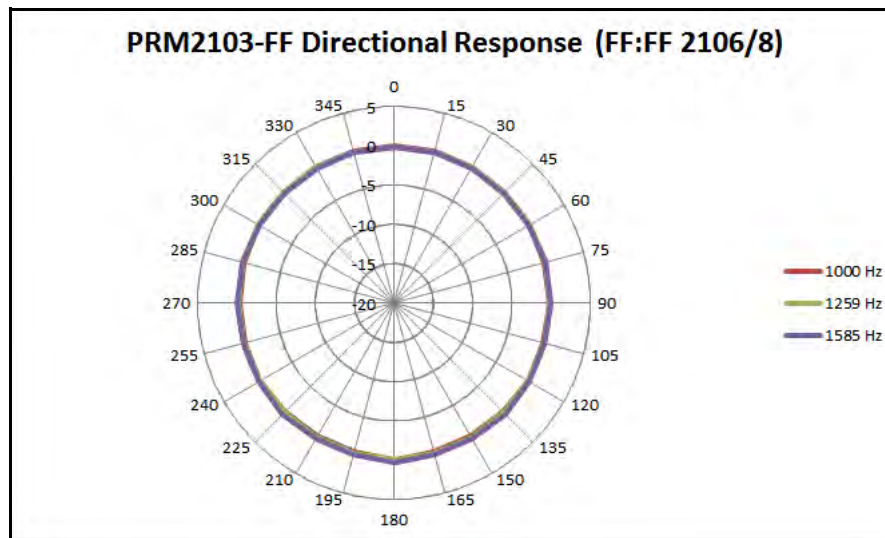


FIGURE A-44 PRM2103-FF Directional Response

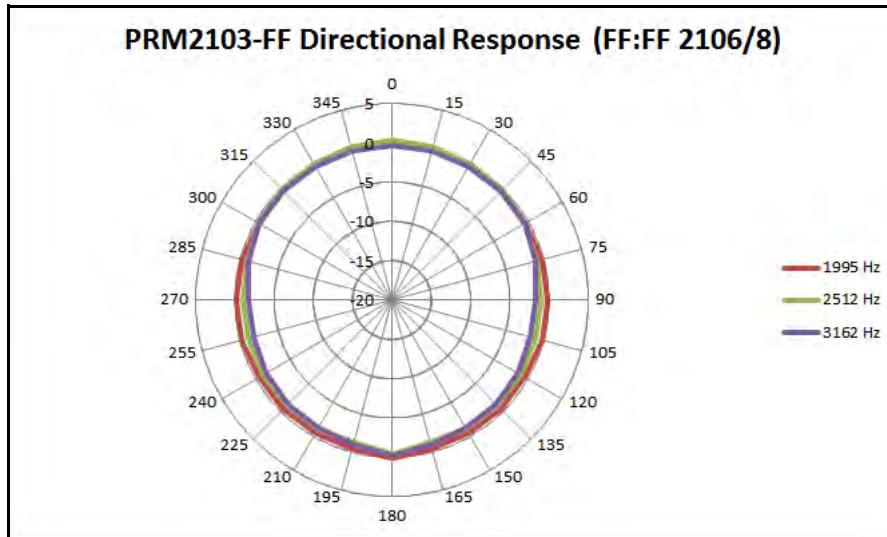


FIGURE A-45 PRM2103-FF Directional Response

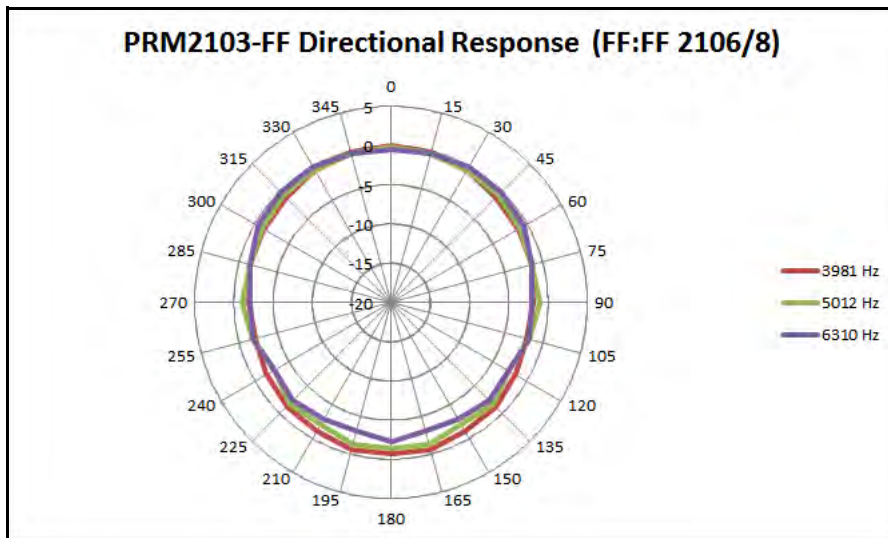


FIGURE A-46 PRM2103-FF Directional Response

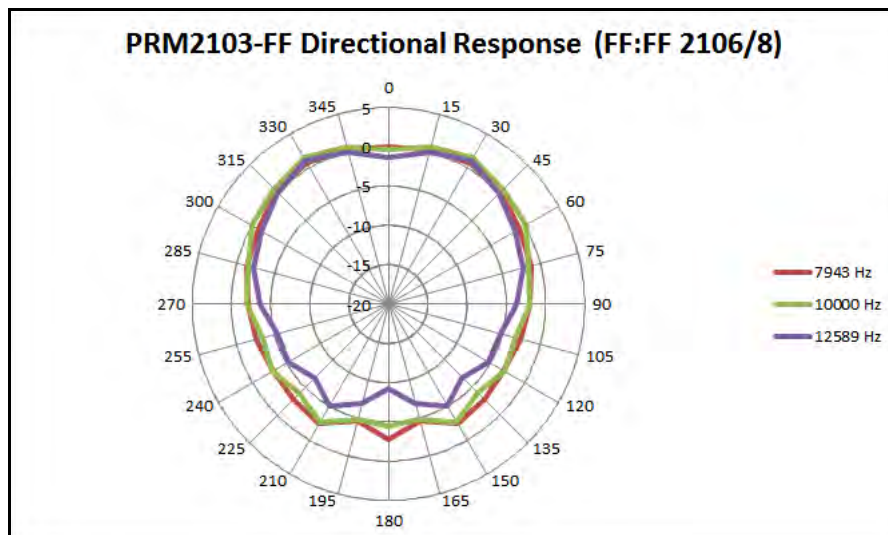
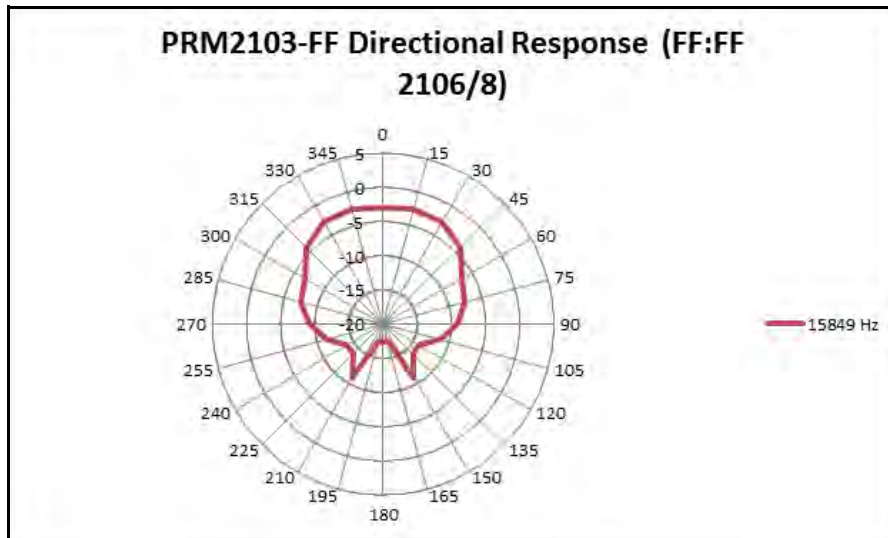


FIGURE A-47 PRM2103-FF Directional Response



A.6.5 Random Response (diffuse) with Corrections

FIGURE A-48 PRM2103-FF Random Response

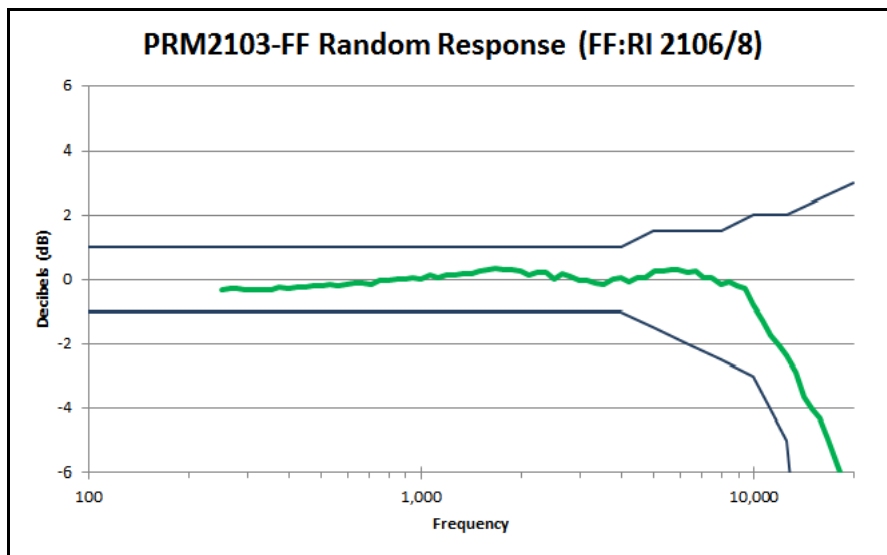


FIGURE A-49 PRM2103-FF Directional Response

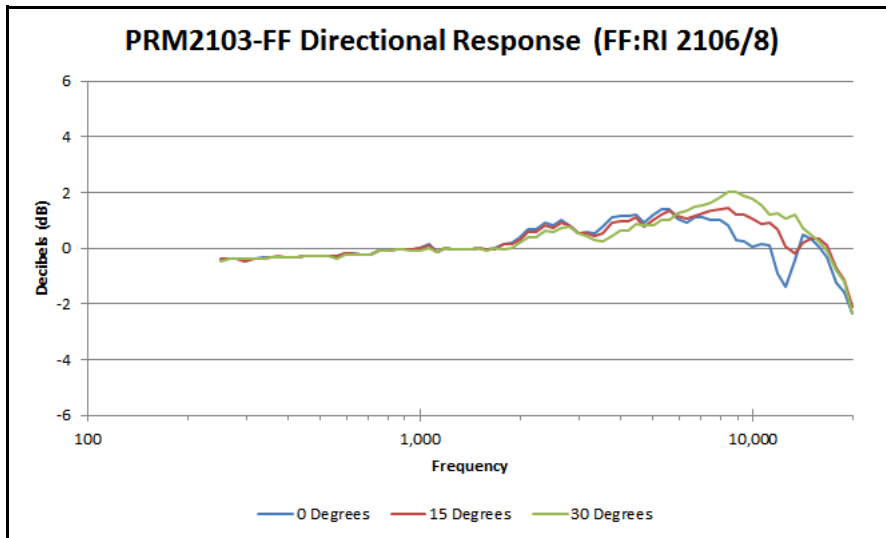


FIGURE A-50 PRM2103-FF Directional Response

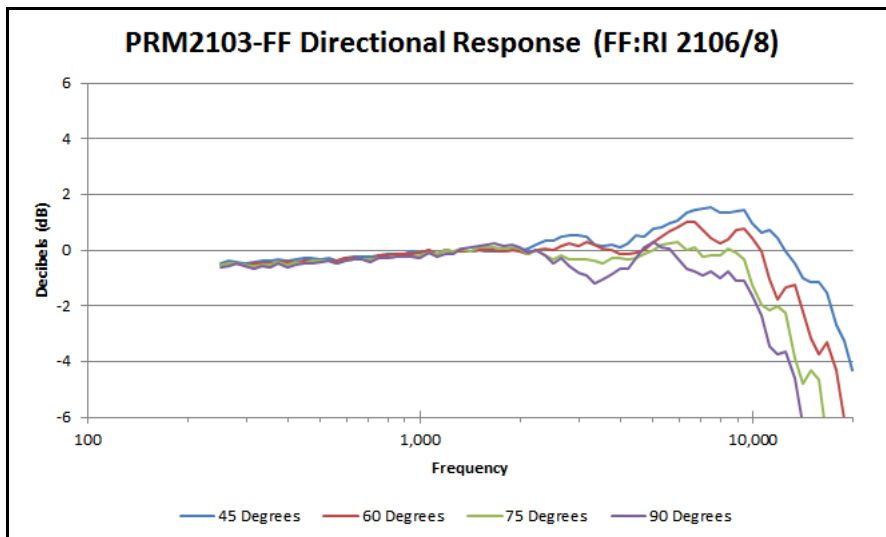
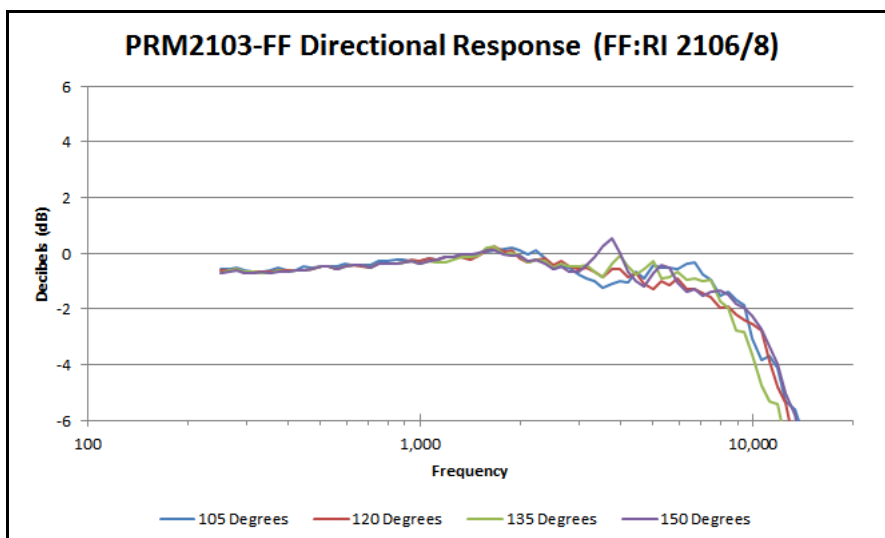


FIGURE A-51 PRM2103-FF Directional Response



Directional Characteristics

FIGURE A-52 PRM2103-FF Directional Response

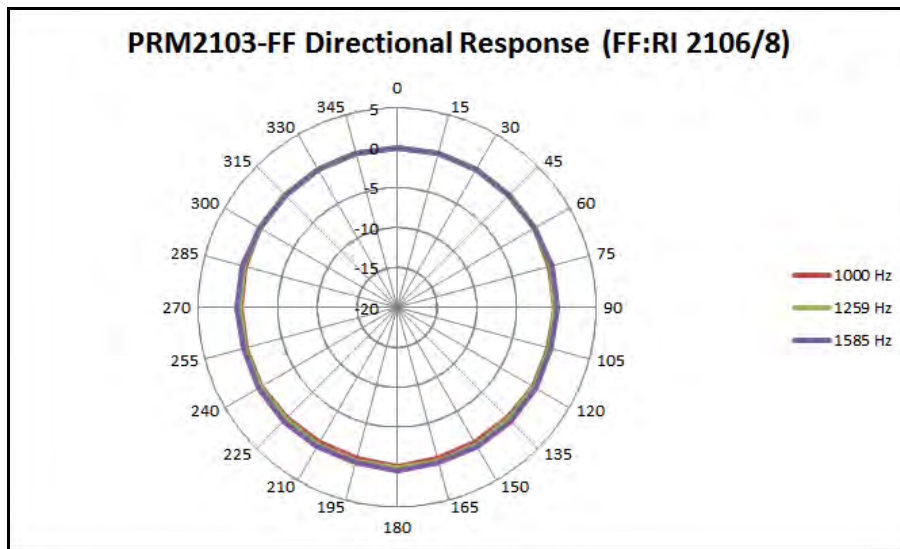


FIGURE A-53 PRM2103-FF Directional Response

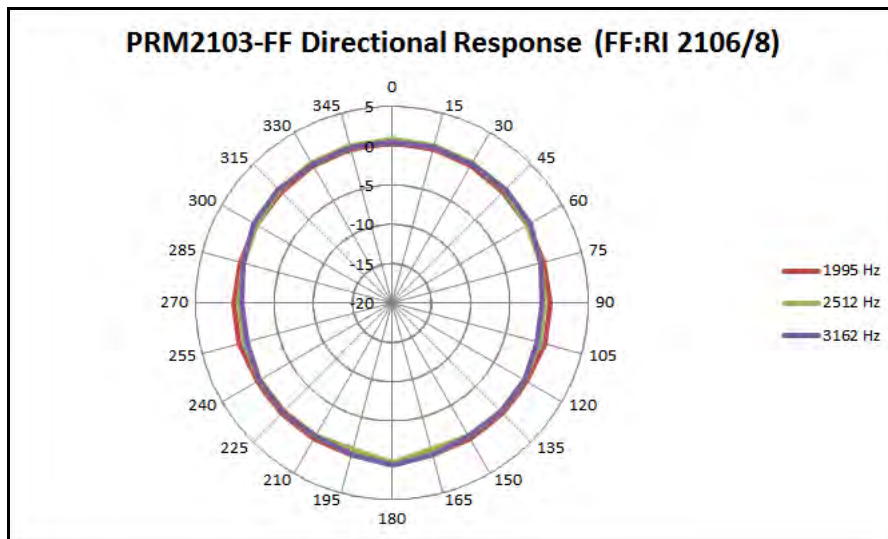


FIGURE A-54 PRM2103-FF Directional Response

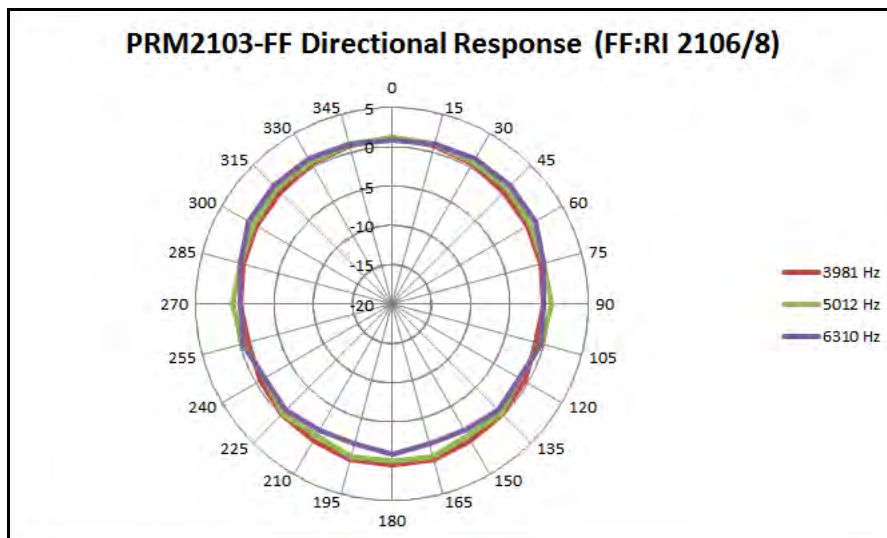


FIGURE A-55 PRM2103-FF Directional Response

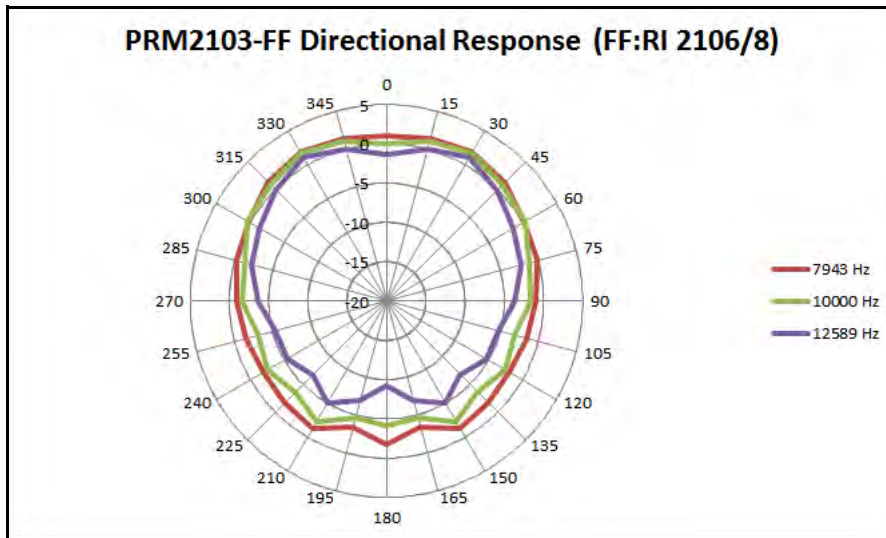


FIGURE A-56 PRM2103-FF Directional Response

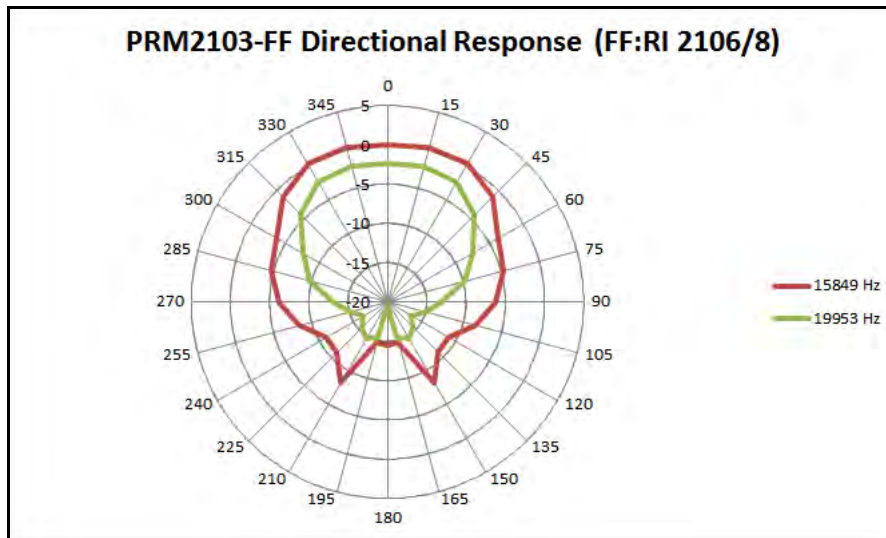


FIGURE A-57 PRM2103-FF 90 Degree Response

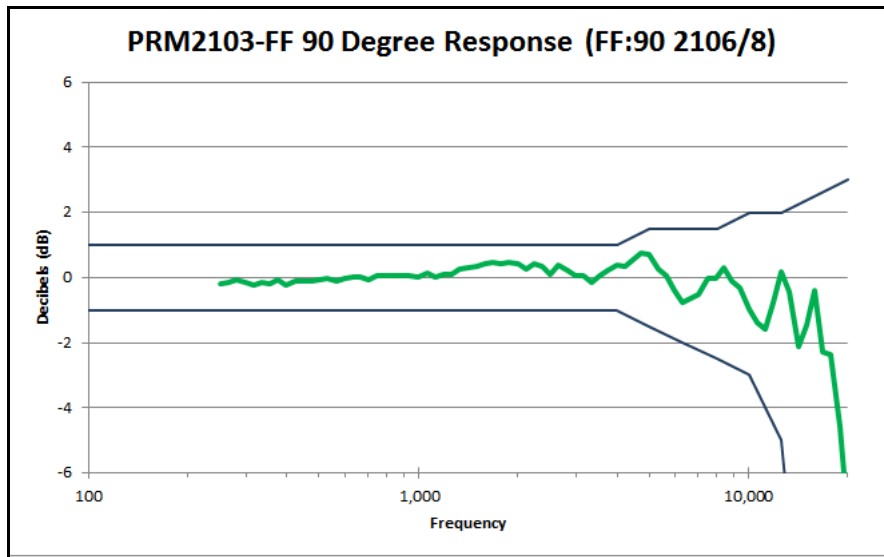


FIGURE A-58 PRM2103-FF 90 Degree Response

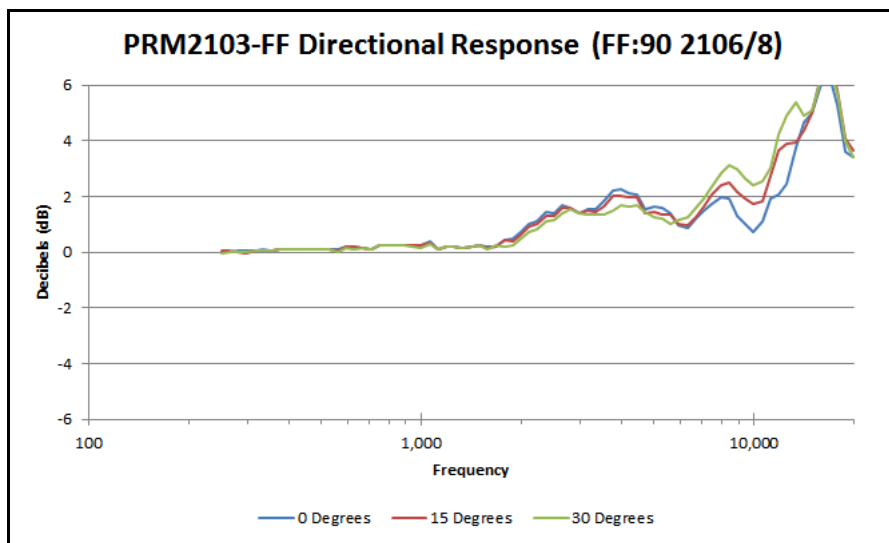


FIGURE A-59 PRM2103-FF 90 Degree Response

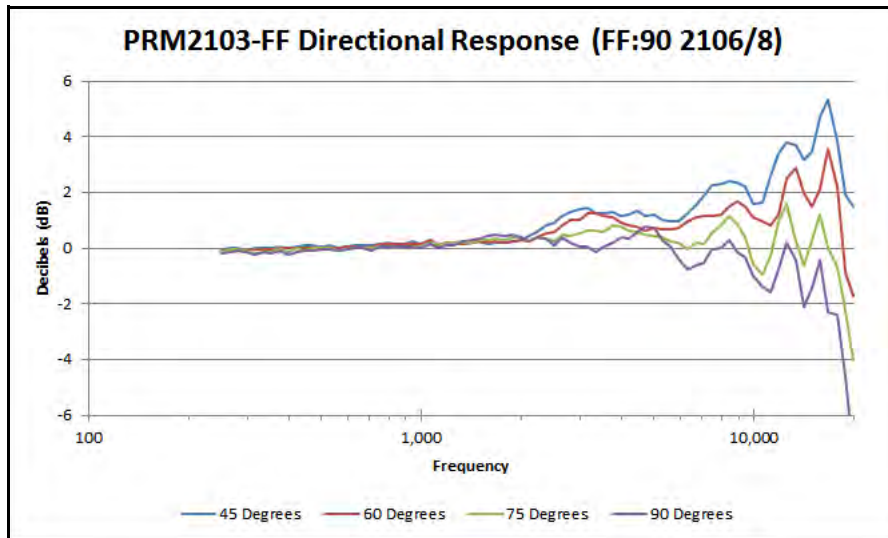
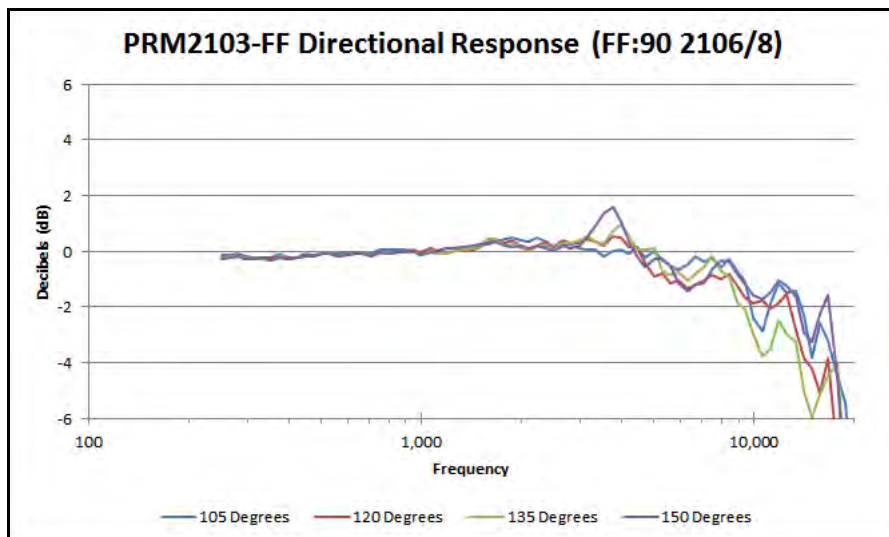


FIGURE A-60 PRM2103-FF 90 Degree Response



A.6.7 Directional Characteristics

For the following graphs, the applied correction is indicated in parentheses, e.g. (FF:90 2106/8).

FIGURE A-61 PRM2103-FF Directional Response

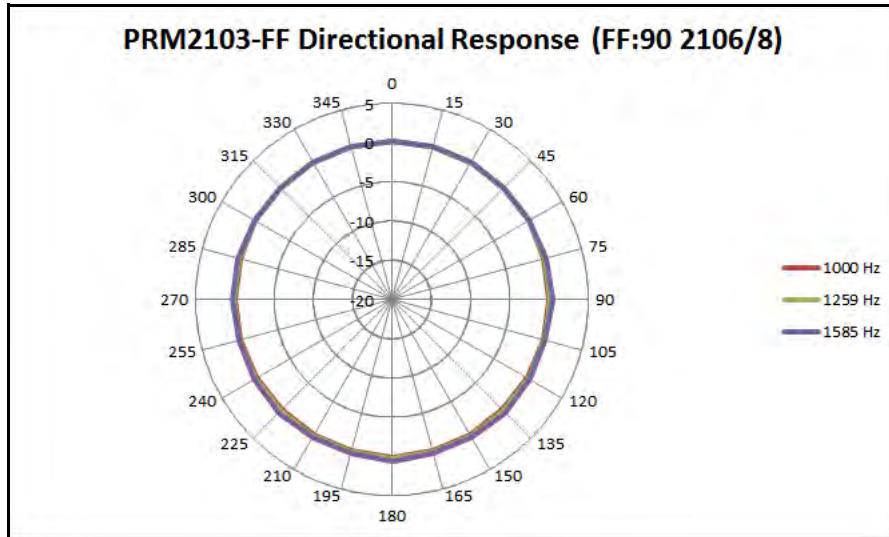


FIGURE A-62 PRM2103-FF Directional Response

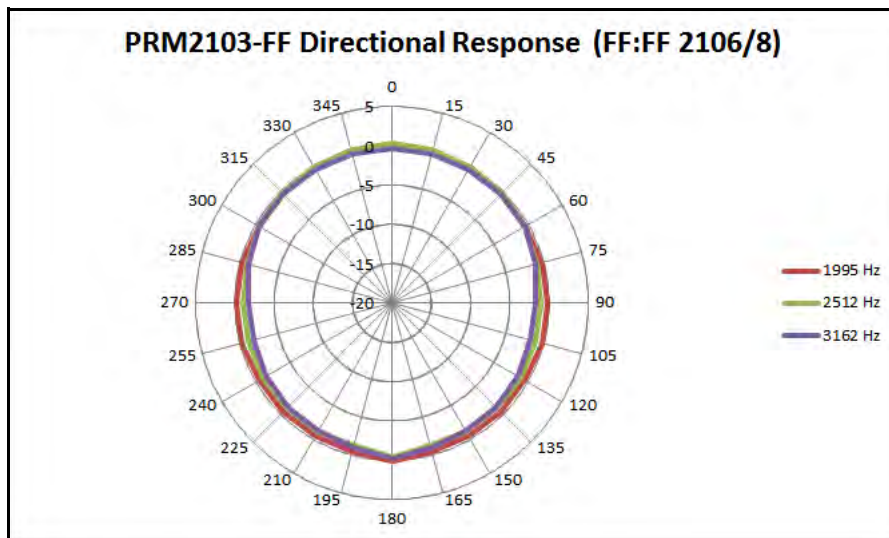


FIGURE A-63 PRM2103-FF Directional Response

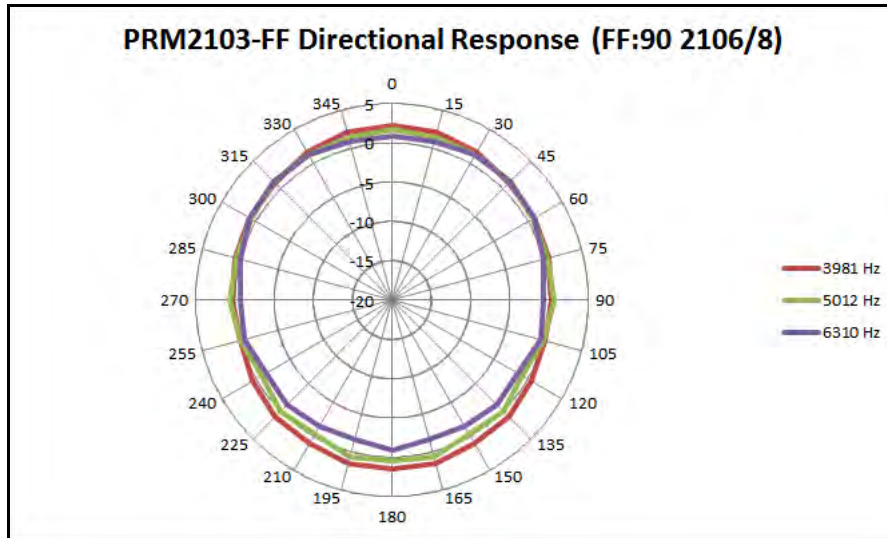


FIGURE A-64 PRM2103-FF Directional Response

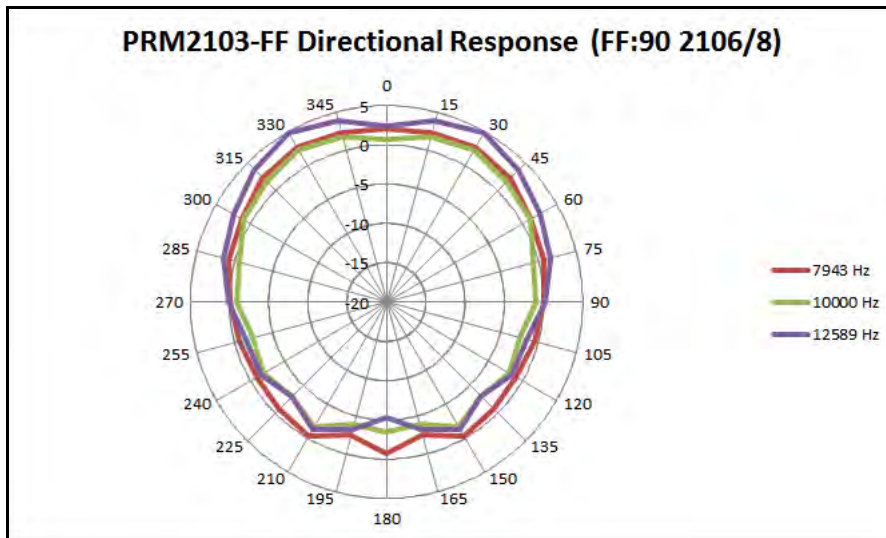
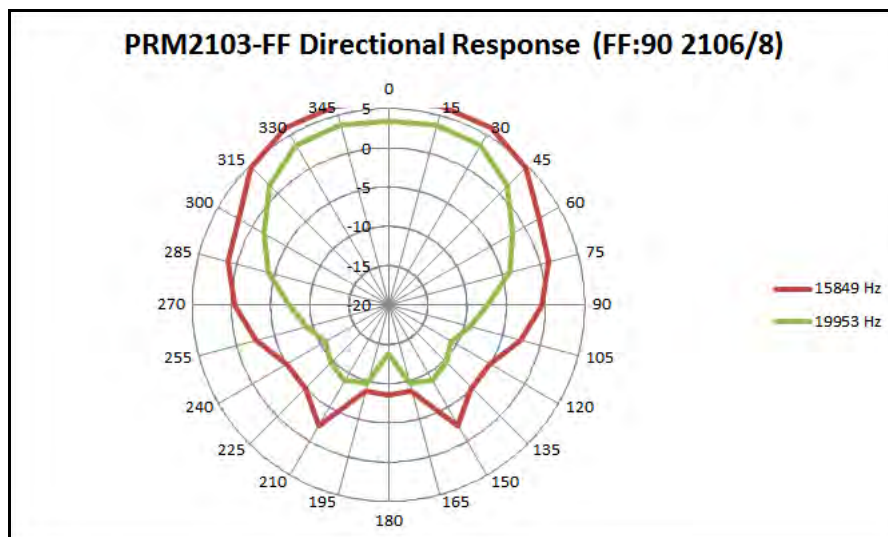


FIGURE A-65 PRM2103-FF Directional Response



A.7 Cables

The PRM2103 connects with either the CBL203, CBL208, or CBL222. The CBL203 connects directly into the Model 831 with an external power supply. The CBL208 connects into the Model 831 and Model 831-INT-ET.

The standard lengths for the CBL203 and CBL208 are 20', but are available up to 100'.

Figure A-66 shows the view looking directly into the CBL203, CBL208, or CBL222 10-pin connector (connecting to the PRM2103).

FIGURE A-66 View Looking Directly into CBL203, CBL208, CBL222 10-pin Connector

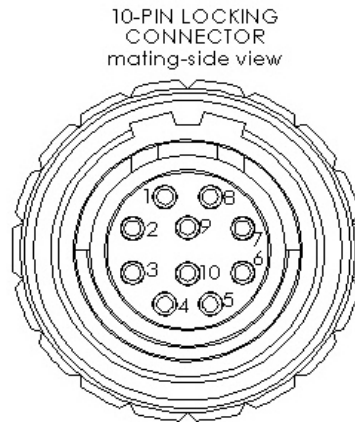
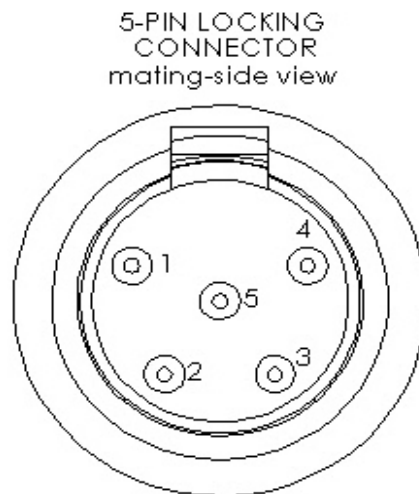


Figure A-67 shows the view looking directly into the CBL203 or CBL208 5-pin connector (connecting to the sound level meter).

FIGURE A-67 View Looking Directly into CBL203, CBL208, and CBL222 5-pin Connector



A.7.1 CBL203 and CBL222

Output

10-pin female connector with dual-keyed locking

Control Connector

10-pin female (PHA.1B.310)

Table A.2 shows the CBL203 pinout.

Table A.2 CBL203 and CBL222 Pinout

Signal	10-pin Connector	5-pin Connector	18-pin Connector	Power Jack (CBL203)	Anderson Connector (CBL222)	Ground Lug
Not Used	1	Not Used				
Digital Communications Clock	2	N/C	8	N/C	N/C	N/C
Preamp Ground	3	1	N/C	N/C	N/C	N/C
Data I/O	4	N/C	9	N/C	N/C	N/C
Preamp Signal Output	5	2	N/C	N/C	N/C	N/C
Digital Power	6	N/C	6 & 7	Center	Red	N/C
Preamplifier Power	7	3	N/C	N/C	N/C	N/C
Not Used	8	Not Used				
Preamp Self-identification	9	4	N/C	N/C	N/C	N/C
Digital Ground	10	N/C	1 & 5	Outside	Black	N/C
Inner Shield	N/C	N/C	Shell	N/C	N/C	N/C
Outer Shield	Shell	Shell	N/C	N/C	N/C	Lug

A.7.2 CBL208

Output

10-pin female connector with dual-keyed locking

Control Connector

10-pin female (PHA.1B.310)

Table A.3 shows the CBL208 pinout.

Table A.3 CBL208 Pinout

Signal Name	10-pin Connector	5-pin Connector	7-pin Connector
Digital Communications Clock	2	N/C	5
Preamp Ground	3	1	N/C
Data I/O	4	N/C	6
Preamp Signal Output	5	2	N/C
Digital Power	6	N/C	7
Preamplifier Power	7	3	N/C
Preamp Self-identification	9	4	N/C
Digital Ground	10	N/C	1 & 2
Inner Shield	N/C	N/C	Shell
Outer Shield	Shell	Shell	N/C

A.8 CE Declaration of Conformity

FIGURE A-68 Declaration of Conformity



EU Declaration of Conformity PS125
In Accordance with ISO/IEC 17050

Manufacturer: Larson Davis, a Division of PCB Piezotronics 1681 West 820 North Provo, Utah, USA 84601	Authorized European Representative: PCB Piezotronics Europe GmbH Porschestrasse 20-30 41836 Hückelhoven, Germany
--	---

Certifies that type of equipment: Model PRM2103 Outdoor Microphone Preamplifier

Whose Product Models Include: PRM2103 and PRM2103-FF

This declaration is applicable to all PRM2103 of the above series which have the CE mark on their data sheets and where those data sheets refer to this Declaration of Conformity. The data sheets for all model numbers referenced above which include the CE mark on such data sheets and refer to this Declaration of Conformity are hereby incorporated by reference into this Declaration.

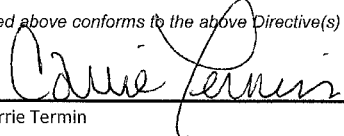
Conform to the following EC Directive(s) when installed per product documentation:	2014/30/EU 2014/35/EU 2011/65/EU	EMC Directive Low Voltage Directive RoHS Directive
---	--	--

Standards to which Conformity is Declared:

Harmonized Standards	EN 61326-1:2013 EN 61010-1:2010 EN 50581:2012	Electrical Equipment for Measurement, Control and Laboratory Use- EMC Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.
Emissions Test Standards	EN 55011:2009/ A1:2010	Industrial, scientific and medical(ISM) radio frequency equipment Electromagnetic disturbance characteristics- Limits and methods of Measurement Class B
Immunity Test Standard	EN 61326-1:2013	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements
Industry Standards	EN 61672-1:2002	Sound Level Meters – Part 1: Specifications
Test Reports	EMC Report Safety Report	D1247.0022(A)

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) Standard(s)

Place: Provo, UT Date: 08/02/2017

Signature: 
Name: Carrie Termin
Title: Regulatory Affairs and Product Certification Specialist

- ISO 9001 Certified PCB Piezotronics, Inc. Phone: 716-684-0001 FAX: 716-684-0987

PS125 Rev. A 08/02/2017

Appendix B Legacy Operation


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B.1 Overview

This module provides information for specifying PRM2103-FF heater controls, viewing data, performing calibration checks, and upgrading firmware through the Model 831 and SLM Utility-G3. The Model 831 can also be used with the latest software, G4 LD Utility.

B.2 Performing the Acoustic Calibration

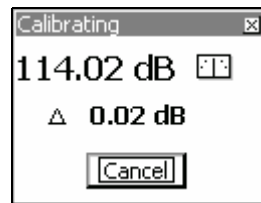
To perform an acoustic calibration, follow these steps:

- Step 1** Remove the birdspike and windscreen.
- Step 2** Loosen the thumb screw and lift the assembly from the PRM2103-FF to access the microphone. Do not remove the microphone or the microphone grid cap.
- Step 3** Place the calibrator over the microphone. Apply the calibrator slowly to avoid applying a sudden large pressure change to the diaphragm.
- Step 4** To activate the Calibration function on the sound level meter, press the  (TOOLS) key and highlight the Calibrate icon.

TAKE NOTE Alternately, you can perform an acoustic calibration with SLM Utility-G3 or G4 software. Refer to the respective software manuals for more information.

- Step 5** Press **ENTER** to open the Calibrate tool. The user may select a calibrator from the list or enter new information about a calibrator.
- Step 6** If using a Model CAL200 calibrator, set to 114 dB, and equivalent free-field level of -0.12 dB at 1 kHz should be applied for 1/2" free-field microphones.
- Step 7** Turn on the calibrator. Select the Calibrate button on the Model 831 and press **ENTER**. The Calibrating message box appears. The present sound level (114.0 dB), the difference between the calibration level and the present sound level (Δ), and an indication of stability are displayed in this message box. When the pointer in the stability indicator is vertical, the sound level is stable.

FIGURE B-1 Calibrating Message



- Step 8** After a few seconds, when the calibration is completed, another message box appears that shows the amount of change being made to the calibration. To accept the calibration, press **ENTER**. To reject this calibration, select No and press **ENTER**.
- Step 9** After performing this acoustical calibration, perform a calibration check.

B.3 PRM2103-FF Heater Controls

The PRM2103-FF includes a heater to provide protection from condensation to the microphone. The heater state can be specified for one of four settings: Off, Low, High, or Auto. The default setting is Auto, which is recommended for most applications. See 3.3 "PRM2103 Heater Controls" on page 3-3.

B.3.1 Heater Controls on the Model 831

TAKE NOTE The heater settings are visible on the Model 831 only when the PRM2103-FF is connected to the sound level meter.

To specify the heater controls through the sound level meter, follow these steps:

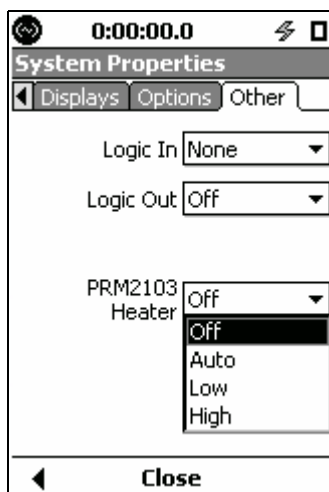
- Step 1** Press the **TOOLS** key.
- Step 2** Select System Properties and **ENTER**.

Step 3 Press the Right Softkey and navigate to the Other tab and then navigate to the PRM2103-FF Heater field.

Step 4 Select the desired setting and press .

Figure B-2 shows the PRM2103-FF heater settings on the Other tab.

FIGURE B-2 Heater Settings on the Other Tab



B.3.2 Heater Controls in SLM-G3 Utility Software

To specify heater controls through SLM-G3 Utility software, follow these steps:

TAKE NOTE You can also specify heater controls in G4 Software by connecting the instrument, viewing the System Properties and then clicking the Other tab. The Heater options are enabled when the PRM2103 is connected to the instrument.

Step 1 Open the software and connect to the Model 831 sound level meter by selecting the Connection menu option that best fits your configuration. The Instrument Manager dialog box appears.

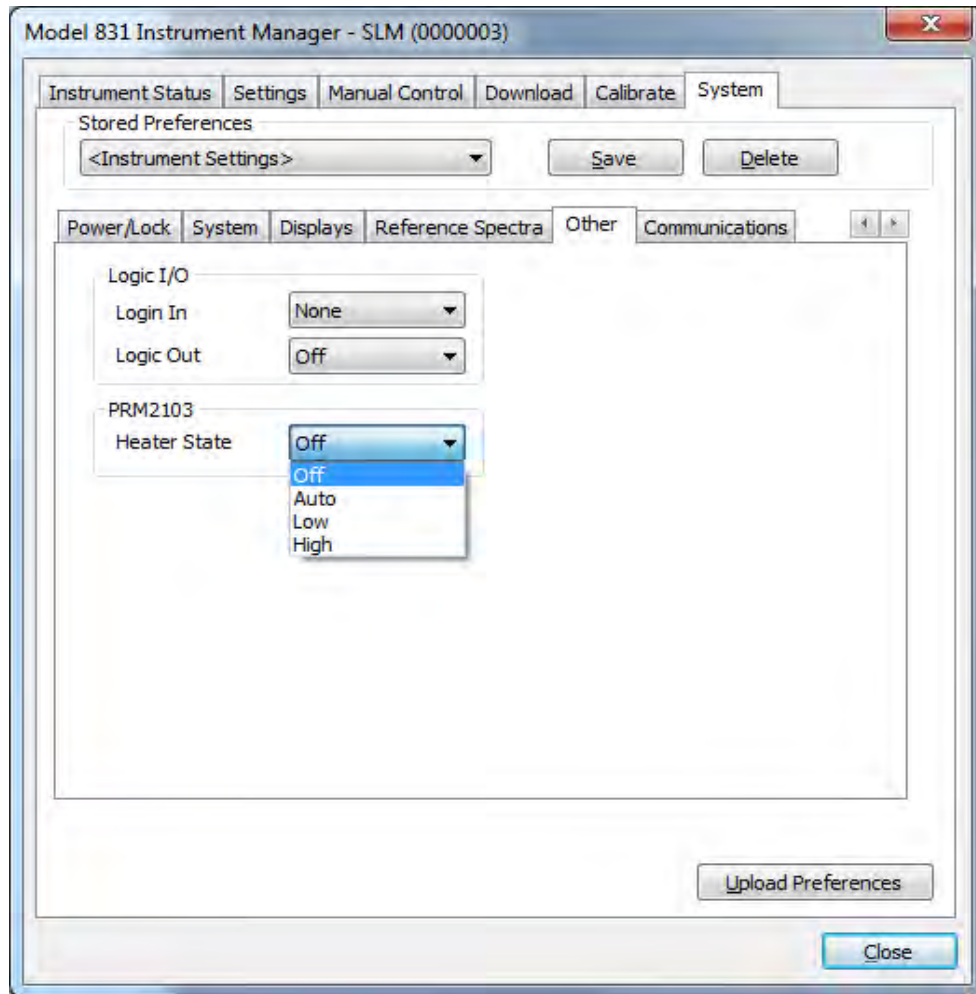
Step 2 Click the System tab and then click the Other tab within the Instrument Settings preferences.

Step 3 Select the heater setting in the PRM2103-FF Heater State drop-down window.

Step 4 Click Upload Preferences.

Figure B-3 shows the PRM2103 heater settings on the System tab in SLM-G3 Utility software.

FIGURE B-3 Heater Settings on System Tab in SLM-G3 Utility Software



B.3.3 Viewing PRM2103-FF Data

The PRM2103-FF provides the following data:

- Preamplifier model
- PRM2103-FF serial number
- Internal PRM2103-FF temperature
- Internal PRM2103-FF relative humidity
- Internal PRM2103-FF dew point
- Heater setting status
- Calibrator check function status
- Preamplifier connection status to 831 sound level meter
- PRM2103-FF firmware version

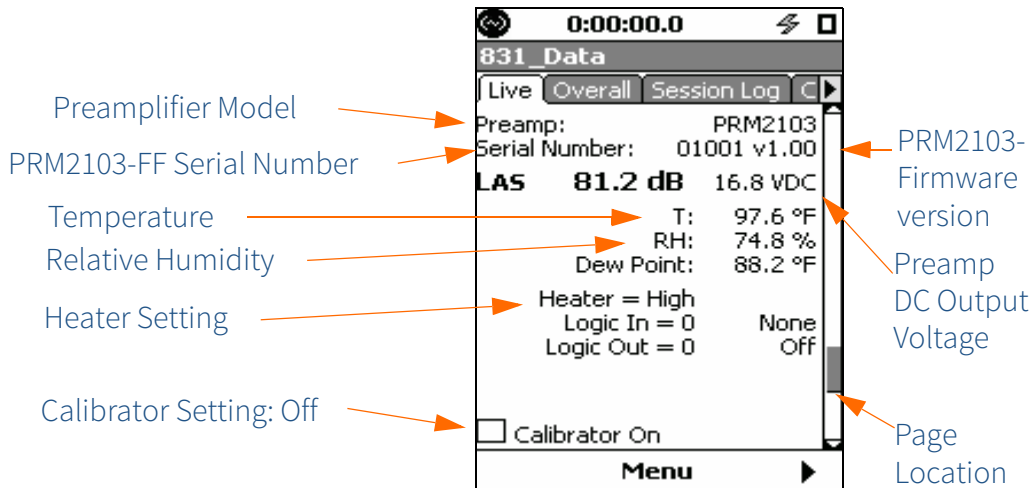
B.3.4 Data on the Model 831

TAKE NOTE The Model 831 sound level meter receives temperature and humidity updates from the PRM2103-FF approximately every fifteen seconds.

The Preamp page, or the next-to-last page on the Live tab, always displays PRM2103-FF data when the PRM2103-FF is connected to the meter. Temperature, humidity, and dew point is updated every 15 seconds.

Figure B-4 shows the Preamp page on the Live tab.

FIGURE B-4 Live tab: PRM2103-FF Page



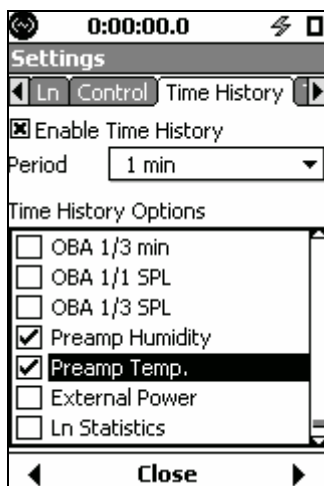
If the Preamp page displays a <Comm Error> message, the Model 831 and PRM2103-FF are not communicating properly. If you see this message, make sure the cables are completely connected and fastened and that power is supplied to the cable. If the problem persists, call Larson Davis Technical Support.

Humidity and Temperature History

To log internal humidity or temperature history for the PRM2103-FF, follow these steps:

- Step 1** In Settings, navigate to the Time History tab and select the Enable Time History option.
- Step 2** Select the Period of time for each measurement to be logged.
- Step 3** In the Time History list, press **ENTER** and scroll down the list of options. Press the **RIGHT ARROW** key to enable Preamp Humidity or Preamp Temp., as shown in Figure B-5.

FIGURE B-5 Preamp Humidity and Temperature History Setup



TAKE NOTE When viewing measurement records with the $\left\{ \right\}$ and $\left\} \right\}$ keys, you can press $\left\{ \right\}$ to toggle between displays of Preamp Temp. or Preamp Humidity.

After exiting the Settings tabs and performing measurements, you can view the PRM2103-FF internal humidity and temperature data by scrolling through the measurement records with the $\left\{ \right\}$ and $\left\} \right\}$ keys on the Time History tab. Each time the $\left\{ \right\}$ or the $\left\} \right\}$ key is pressed, the cursor on the graph moves left or right, respectively, and displays the data associated with the record below the graph.

Figure B-6 shows the Preamp Temp. data on the Time History tab.

FIGURE B-6 Time History Preamp Temp. Data

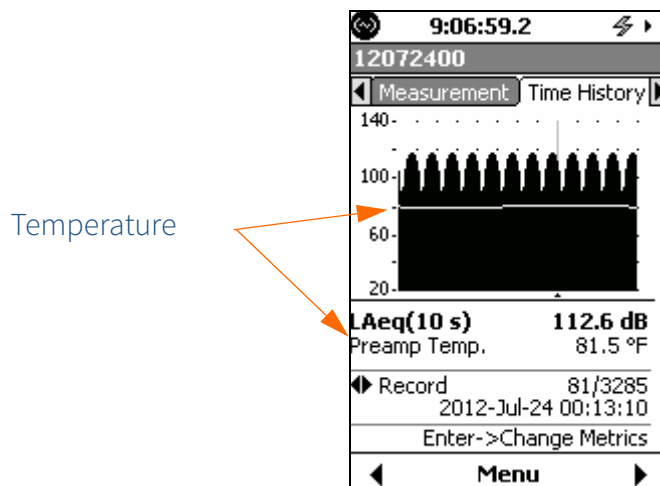
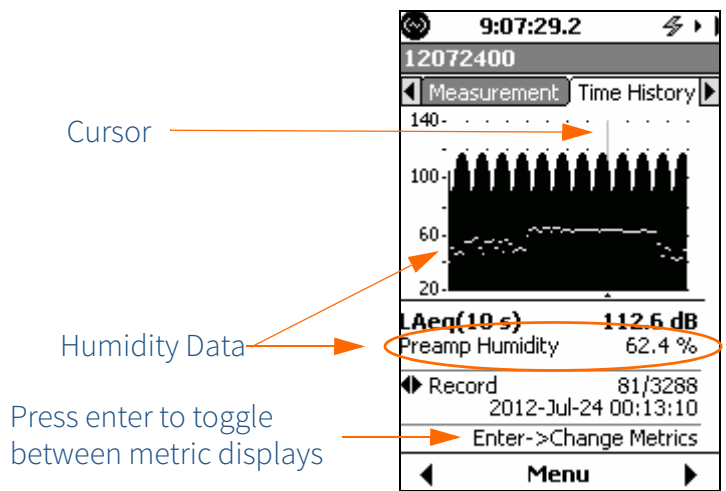


Figure B-7 shows the Preamp Humidity data on the Time History tab.

FIGURE B-7 Time History Preamp Humidity Data



B.3.5 Data in SLM Utility-G3 Software

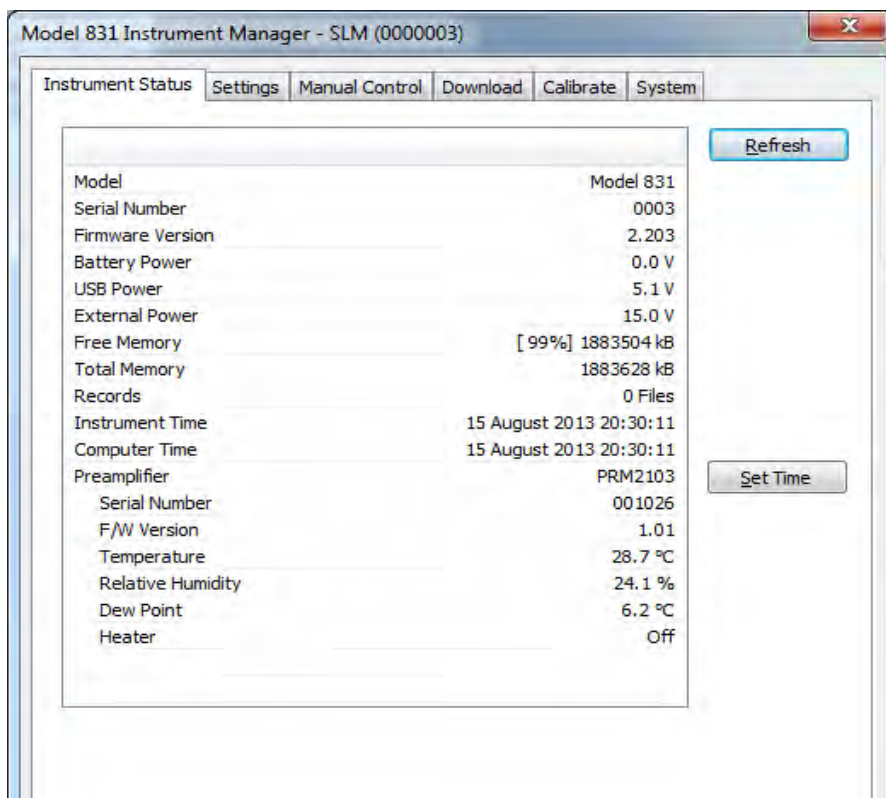
TRY THIS Click Refresh on the Instrument Status tab to receive the most recent data from the PRM2103-FF.

To view PRM2103-FF data in SLM Utility-G3 software, open the software and connect to the Model 831 sound level meter by selecting the Connection menu option that best fits your configuration. The Instrument Manager dialog box appears. Select the Instrument Status tab. The PRM2103-FF data appears in the Pre-amplifier section.

LEARN MORE Similar information can be viewed in the Status window of G4 Software, which appears upon connection with an instrument.

Figure B-8 shows PRM831 information on the Instrument Status tab in SLM Utility-G3 software.

FIGURE B-8 PRM2103-FF Data on the Instrument Status Tab



B.4 Performing Calibration Checks

TAKE NOTE The calibration check level reported by the Model 831 is the broadband level.

The PRM2103-FF calibration check function produces five discrete tones simultaneously. Calibration checks can be performed automatically at specified times, or at any time manually, either on the Model 831, with SLM Utility-G4, or with SLM Utility-G3 software.

B.4.1 Manual Calibration Checks on the Model 831

To perform manual calibration on the Model 831, follow these steps:




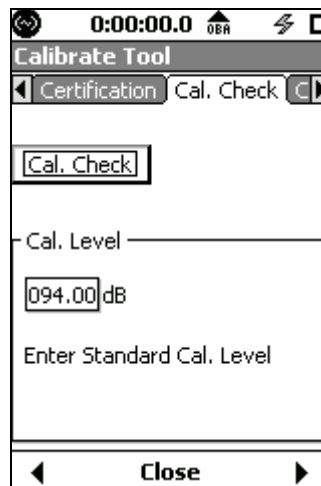
- Step 1** Press the  (TOOLS) key.
- Step 2** Select the Calibration icon and press .
- Step 3** Navigate to the Cal. Check tab.
- Step 4** Enable the Cal. Check button and press .

Figure B-9 shows the Cal. Check tab on the Calibrate Tool.

TAKE NOTE The standard check level is set by performing a manual Cal. Check directly after performing an acoustic calibration.

FIGURE B-9 Cal. Check Tab



The Standard Cal. Level field holds the last saved cal check value. The default value is 94.00 dB.

You can manually change the dB level by navigating to the field and changing the number value.

After performing the calibration check, the Model 831 displays a message prompting you to save a new Standard Cal. Level, if needed, as shown in Figure B-10.

TAKE NOTE Answer Yes to save the Standard Cal. Level value. This should be done immediately following the first calibration check. Otherwise, answer No to simply record the level (and spectrum) in the Calibration Check History for trend determination.

FIGURE B-10 Save New Standard Cal. Level



B.4.2 Automatic Calibration Checks on the Model 831

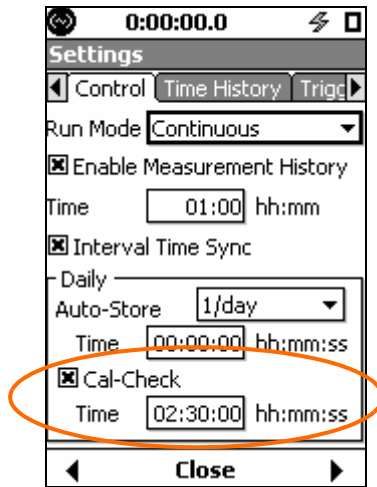
Calibration checks can also be scheduled to occur automatically on the Control tab by following these steps:

LEARN MORE For more information on setting up automatic calibration checks, refer to the Model 831 Sound Level Meter Manual.

- Step 1** Set the run mode to **Continuous**.
- Step 1** Select and enable the Cal-Check option.
- Step 1** Set the time of day when the check is to be performed. The default time is 2:30 AM.

Figure B-11 shows the Control tab options set for automatic calibration checks.

FIGURE B-11 Scheduled Calibration Checks



B.4.3 Calibration Check History on the Model 831

The calibration Check History tab lists the last ten check records, with the date, time, and difference of the measured broadband level from the standard level and the measured level.

Figure B-12 shows the Check History tab on the Calibration Tool.

FIGURE B-12 Check History Tab

The screenshot shows the 'Calibrate Tool' screen with the 'Cal. Check' tab selected. The 'Preamp' is set to 'PRM2103'. Below is a table with the following data:

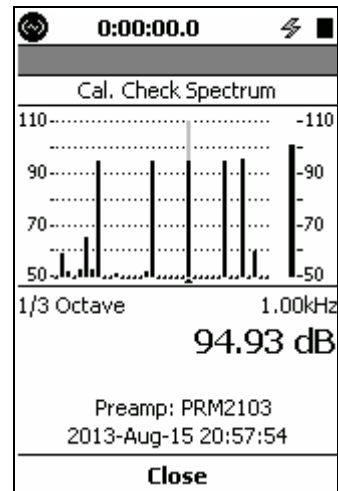
History			
Date	Time	Δ dB	Level dB
2012Sep06	02:30:03	-0.0	99.5
2012Sep05	02:30:04	-0.0	99.5
2012Sep04	02:30:04	-0.0	99.4
2012Sep03	08:10:40	-0.0	99.4
2012Sep03	02:30:04	-0.0	99.4
2012Sep02	02:30:03	-0.0	99.4
2012Sep01	02:30:03	-0.0	99.4
2012Aug31	02:30:04	-0.0	99.4
2012Aug30	02:30:05	-0.0	99.4
2012Aug29	10:48:54	+0.0	99.5

A 'Close' button is at the bottom.

To view a calibration check spectrum for a record in the history, select the record and press **ENTER**. Figure B-13 shows a Cal. Check Spectrum.

TRY THIS Enable 1/1 or 1/3 Octave Band Analysis to display a calibration check spectrum.

FIGURE B-13 Cal. Check Spectrum



B.4.4 Manual Calibration Checks in SLM Utility-G3 Software

TAKE NOTE To perform manual calibration checks in G4 software, refer to the G4 Software Manual.

To perform manual calibration checks on the PRM2103-FF with SLM Utility-G3 software, click the Calibrate tab on the Instrument Manager dialog box and then click the Calibration Check button.

Figure B-14 shows the Calibrate tab in SLM Utility-G3 Software.

FIGURE B-14 Calibrate Tab in SLM Utility-G3 Software

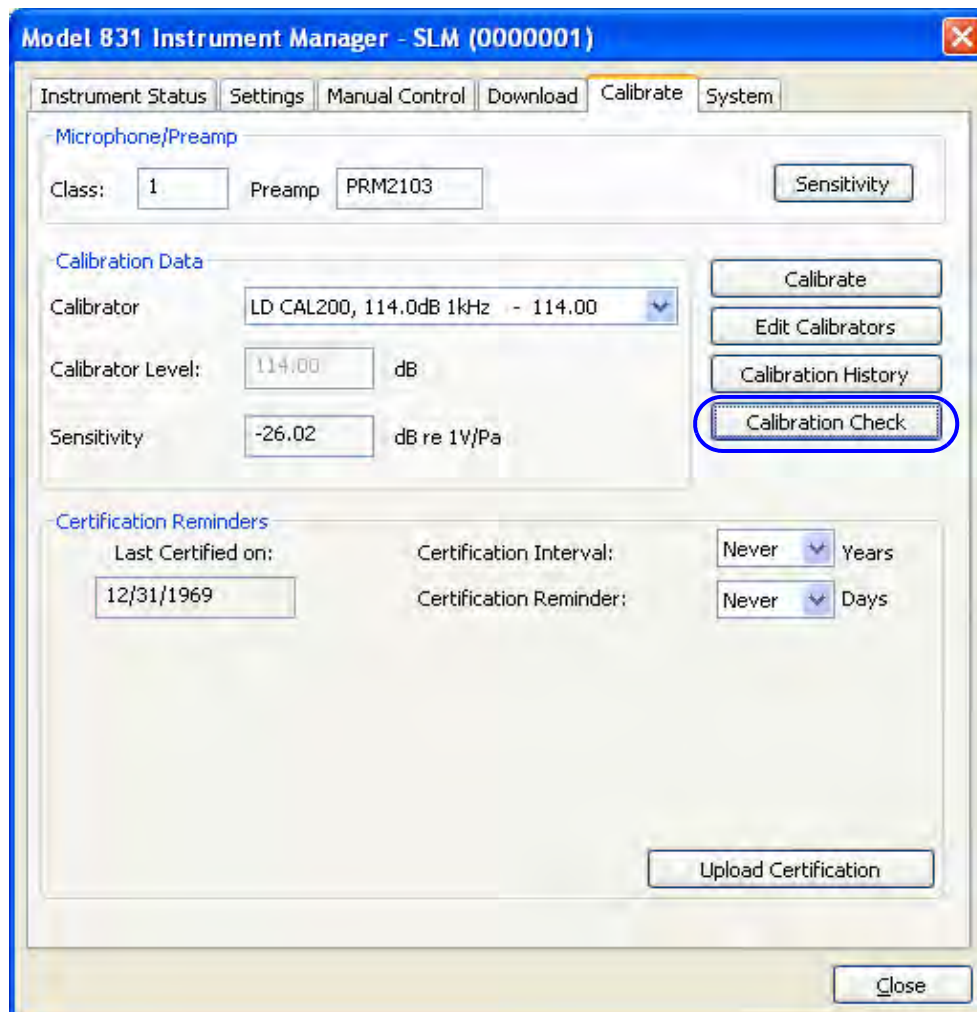
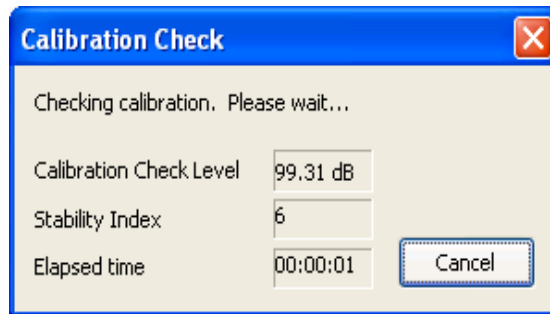


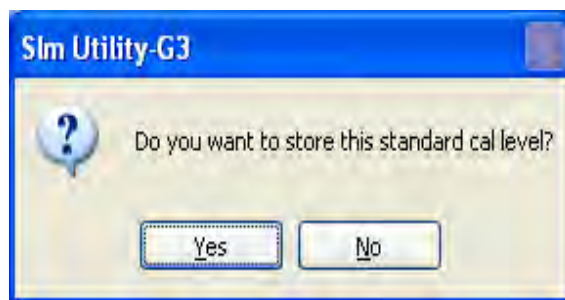
Figure B-16 shows the resulting Calibration Check message and the prompt to store the Standard Calibration Check Level.

FIGURE B-15 .Calibration Check



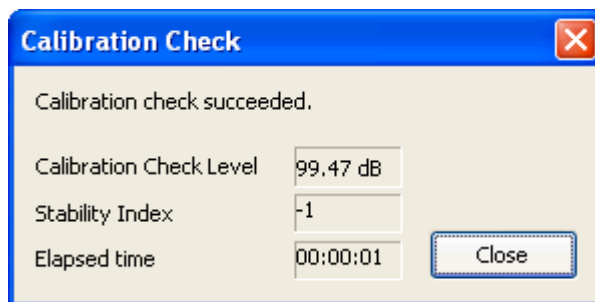
TAKE NOTE If you click Yes to this prompt and store a new Standard Calibration Check Level, all subsequent calibration checks in the Calibration Check History will measure deviations from this check.

FIGURE B-16 .Calibration Check Message and Prompt



Click No to simply check the value and have it stored in the Calibration Check History. Click Yes to store a new Standard Calibration Check Level. After clicking either option, the Calibration Check message indicates that the calibration has succeeded, as shown in Figure B-17.

FIGURE B-17 Calibration Check Succeeded



B.4.5 Automatic Calibration Checks in SLM Utility-G3 Software

LEARN MORE For more information on setting up calibration checks or viewing calibration data in the SLM Utility-G3 software, refer to SLM Utility-G3 Software Manual.

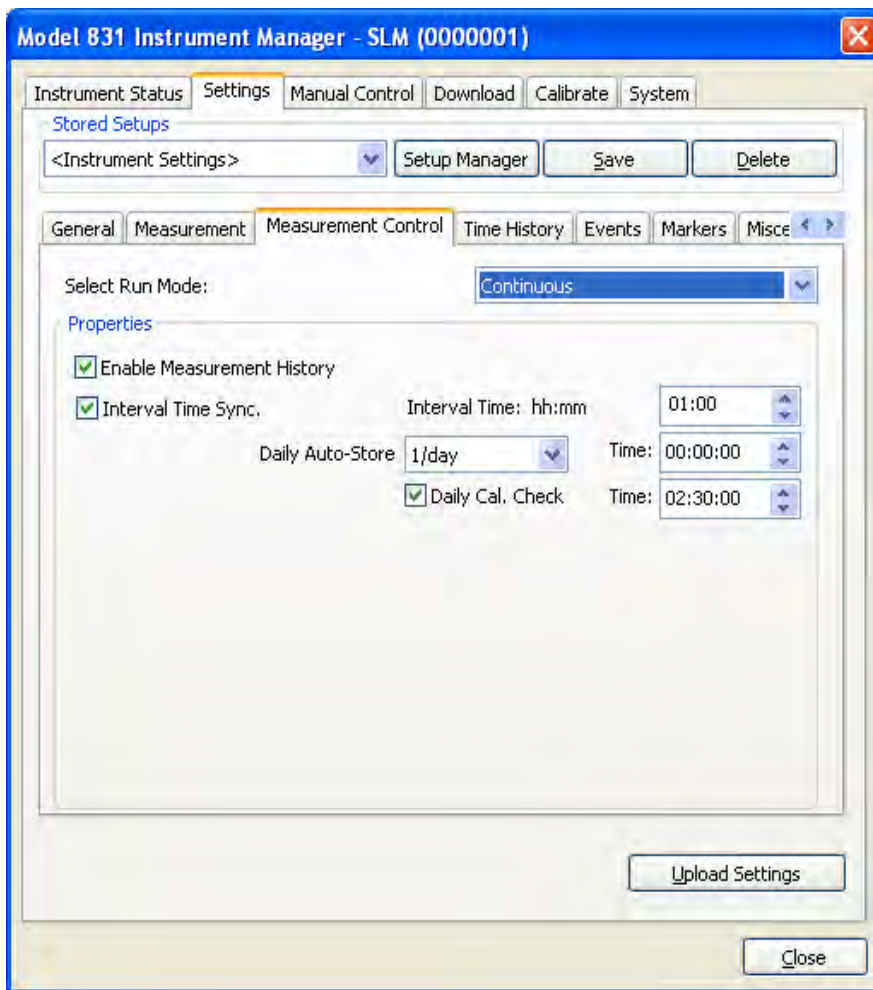
To schedule automatic calibration checks in SLM Utility-G3 software, follow these steps:

- Step 1** Click the Measurement Control tab after clicking the Settings tab.
- Step 2** Select the Enable Measurement History option, if desired.

- Step 3** Set the run mode to Continuous.
- Step 4** Specify the Time and Auto-Store settings, if desired.
- Step 5** Enable the Daily Cal-Check option and specify the time.
- Step 6** Specify the Daily Cal Check Time.
- Step 7** Click Upload Settings.

Figure B-18 shows the Measurement Control tab.

FIGURE B-18 Measurement Control Tab



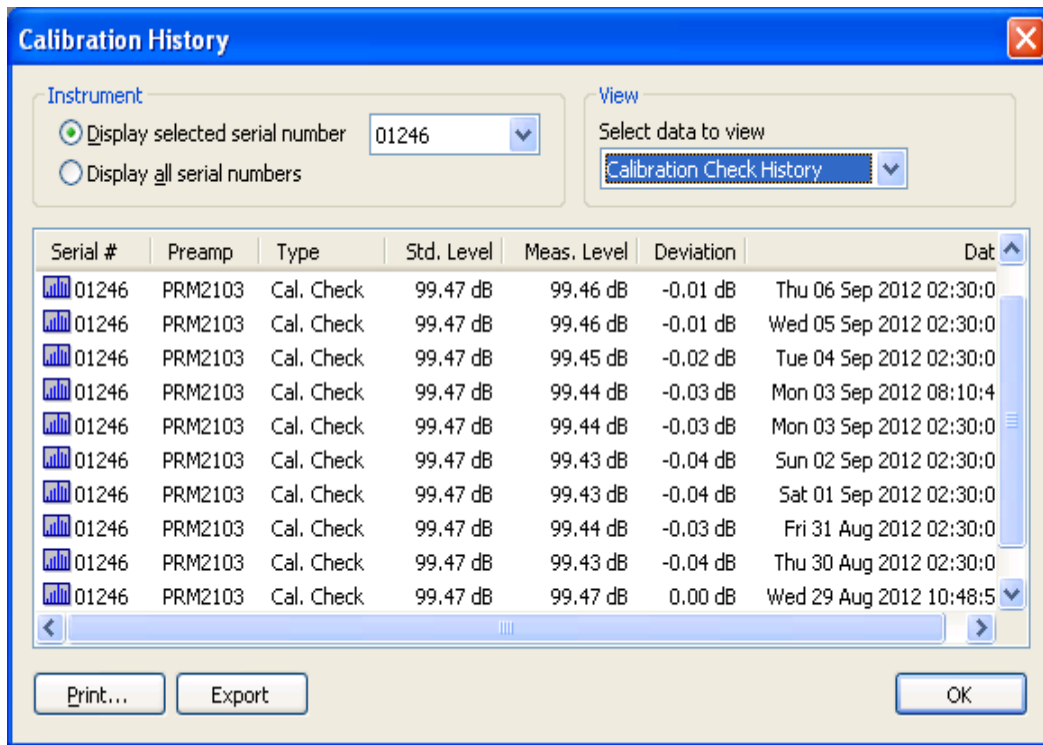
B.4.6 Calibration Check History in SLM Utility-G3 Software

LEARN MORE To view Calibration Check Histories in G4 Software, refer to the G4 Software Manual.

To view Calibration Check History, click the Calibration History button on the Calibrate tab. In the Select data to view drop down list, select Calibration Check History.

Figure B-19 shows the Calibration History box with a list of calibration checks.

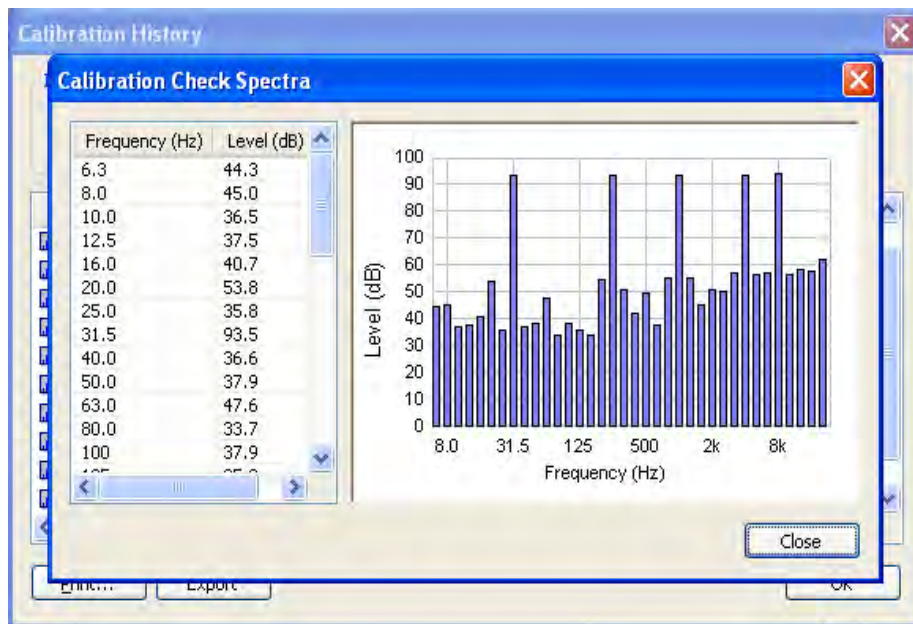
FIGURE B-19 Calibration History



To view the calibration check spectra, double-click on the Cal. Check record in the Calibration History dialog box.

Figure B-20 shows the Calibration Check Spectra.

FIGURE B-20 Calibration Check Spectra



B.5 Upgrading Firmware with SLM Utility-G3

LEARN MORE Although this procedure describes the steps for upgrading firmware in SLM Utility-G3, you can also upgrade firmware in G4 Software. Refer to the G4 Software Manual for more information.

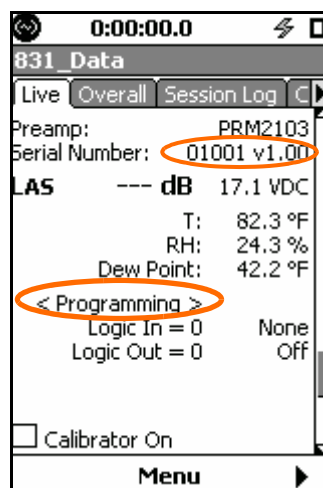
TAKE NOTE Keep the PRM2103-FF and Model 831 connected and properly powered until after firmware upgrades are complete.

The PRM2103-FF firmware is distributed with the Model 831 firmware. The PRM2103-FF is upgraded automatically when connected to the Model 831. Firmware is not upgraded if the Model 831 is making a measurement.

To upgrade the Model 831 sound level meter and PRM2103-FF firmware, follow these steps:

- Step 1** Download and install the SLM Utility-G3 software.
- Step 2** Upgrade the Model 831 firmware. If not already connected, connect the Model 831 to the PRM2103-FF with CBL203 or CBL205. See FIGURE 2-2 or FIGURE 2-5 for examples of these connections.
- Step 3** On the Model 831, navigate to the Preamp page on the Live tab. The Preamp page displays a “programming” message when the firmware is updating, as shown in .

PRM2103-FF Firmware Upgrade



TAKE NOTE Firmware in the PRM2103-FF is upgraded only when the version stored in the Model 831 is newer than the version in the preamplifier.

The Preamp page displays the new firmware version number after programming is complete, as shown in the top highlighted area in Figure B-20.

If the upgrade does not complete properly after multiple programming attempts, the Preamp Page displays the message “Fault 101.”

