



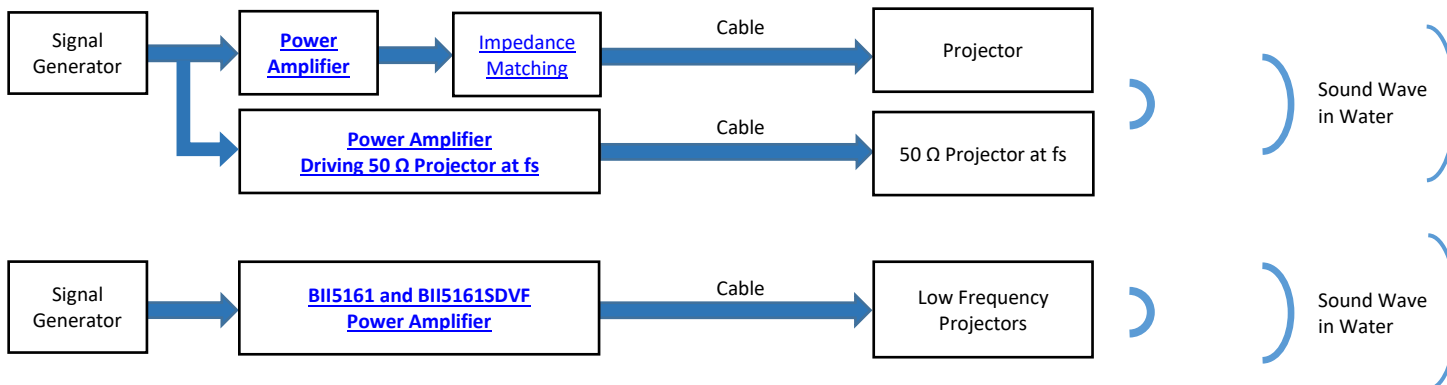
BII7620 Series Directional Broadband Low Frequency Transducers

The directional broadband low frequency transducers emit directional fan-shaped beams around 70° x 50° from 6 to 23 kHz range.

Typical Applications			
Underwater Communication/Telephone/Pinger	Artificial Acoustic Target	Echo-Repeater, Active-Acoustic Target.	Marine Bioacoustics

SYSTEM CONFIGURATION

Transmitting Sounds.



RELATED PRODUCTS

Power Amplifier for SONAR, NDT, and HIFU	Impedance Matching between Transducers and Amplifiers
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Specification

TVR: Transmitting Voltage Response, $\mu\text{Pa}/\text{V}@1\text{m}$. **FFVS:** Free-field Voltage Sensitivity, $\text{V}/\mu\text{Pa}$. **MIPP:** Maximum Input Pulse Power at f_s . **MPW:** Maximum Pulse Width at MIPP and at f_s . **MCIP:** Maximum Continuous Input Power at f_s .

Low Frequency Transducer	BII7623DP	BII7624DP	BII7626DP
Signal Type:	SINE Pulse, Chirp, PSK, FSK, Pulsed Square Waveform, etc...		
Resonant Frequency fs:	20 kHz ± 10%	14 kHz ± 10%	10 kHz ± 10%
	1. Efficiency is low in the frequency range far from fs, so it is NOT recommended to operate transducer at frequency far from fs. 2. Transducer can operate in low power at frequency far from fs, the input power Pi should be much less than 1% MCIP at fs.		
Directivity Pattern:	Fan-shaped Beam		
-3 dB Beam Width: (Horizontal x Vertical)	70° x 50°	68° x 55°	75° x 60°
	Bespoke Vertical beam width is available. Contact BII for more information.		
Side Lobe Level:	Side lobes ≤ -28 dB		
Free Capacitance Cr @ 1kHz:	130 nF ±10%	53 nF ±10%	335 nF ±10%
	Cr is valid for transducers without built-in impedance matching.		
Dissipation D @ 1kHz:	0.008 at low electric field.		
Quality Factor Qm:	3.5	2.0	3.0
TVR at fs:	148.0 dB	143.0 dB	148.3 dB
Radiation Sound Level SL:	SL = 20*logVi + TVR, dB μPa@1m. Driving Voltage Vi is in unit of Vrms.		
Admittance at fs:	Refer to TVR (Transmitting Voltage Response) , Admittance , and Impedance .		
Transducer without Impedance Matching Unit			
Driving Voltage Vi at fs:	Pulsed Driving Signal and Duty Cycle D < 100%: Maximum Vi, Vimax = √(MIPP/Gmax) or 300, whichever is less, in Vrms.		
	Continuous Operation at 100% Duty Cycle: Maximum Vi, Vimax = √(MCIP/Gmax), in Vrms.		
	To achieve higher sound level, built-in impedance matching is recommended to step up driving voltage inside the transducer.		
Transducer with Impedance Matching Unit			
Driving Voltage Vi at fs:	Pulsed Driving Signal and Duty Cycle D < 100%: Vimax = √(MIPP * Z), in Vrms. Z is impedance with Impedance Matching Unit at fs.		
	Continuous Operation at 100% Duty Cycle: Maximum Vi, Vimax = √(MCIP * Z), in Vrms.		
Input Power Pi:	Pi = Vi ² * G. Refer to G-B Graph : G is conductance, Gmax is maximum G at fs.		
MIPP at fs:	850 Watts	850 Watts	1500 Watts
MPW at MIPP and fs:	40 Seconds with Duty Cycle D ≤ 15%.	85 Seconds with Duty Cycle D ≤ 20%.	220 Seconds with Duty Cycle D ≤ 15%.
MCIP at fs:	120 Watts	160 Watts	320 Watts

How to determine pulse width, duty cycle and off-time with input pulse power (peak power) at f_s :

- Determine the input pulse power (IPP, peak power) with sound intensity required by the project. IPP MUST be less than MIPP.
- Pulse Width $\leq (MIPP \cdot MPW \cdot (120^\circ\text{C} - T) / 103^\circ\text{C}) / \text{IPP}$. T: Water Temperature in $^\circ\text{C}$.

3. Duty Cycle $D \leq MCIP \cdot (120^{\circ}\text{C-T}) / 103^{\circ}\text{C} / \text{IPP}$.			
4. Off-time $\geq PW \cdot (1-D) / D$.			
Receiving Sounds:	The transducers are NOT recommended to detect underwater sounds.		
Operating Depth:	Maximum 50 m and Limited by the cable length if the cable has wire leads or a non-waterproof connector.		
Mounting Options:	1. Default: Free Hanging (FH.) 2. Thru-hole Mounting with Single O-ring (THM-5/8".) 3. Bolt Fastening Mounting (Stainless Steel) (BFM-5/8".) 4. Bolt-Fastening Mounting with Free Hanging (BFM-FH-3/8".) 5. Free-hanging with Male Underwater Connector (FHUWC-2P, FHUWC-3P.) 6. End-face Mounting (EFMS.)		
	Please refer to online document AcousticSystem.pdf for a complete list of Mounting Options and more details.		
Cable Options:	1. Shielded Cable (SC), Rubber or PVC Jacket. SC with Two Conductors for transmit signal; SC with 4 conductors for receive signal. 2. 50 Ω RG58 Coax (RG58). 3. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, $\Phi D=4.0$ mm (SC40), up to 200°C, AWG20 Conductors (Not Waterproofed, ONLY for Dry Air Use). 4. Two Conductor Unshielded Cable (USC) for Underwater Connector 2 pins.		
	Handling: Do not use the cable to support transducer weight in air and water if the transducer has a mounting part. Do not bend the cable.		
Cable Length:	1. Default: (a) 15 m. (b) 0.6m with Underwater Mateable Connector (2 pins) (UMC2P) and (3 pins) (UMC3P). 2. Custom-fit.		
Connector:	1. Default: Wire Leads (WL), for Transmit, Receive Signal, and DC Power Supply. 2. Underwater Mateable Connector (2 pins) (UMC2P) (Max. Diameter $\Phi 21.5$ to $\Phi 35$ mm). Locking Sleeve: DLSA-M. Underwater Mateable Connector (3 pins) (UMC3P) (Max. Diameter $\Phi 21.5$ to $\Phi 35$ mm). Locking Sleeve: DLSA-M. Underwater Mateable Connectors are fixed with 0.6m unshielded cable. UMC is from global manufacturers of underwater connectors. Its part number is listed in quote in detail. 3. MIL-5015 Style (3 pin) (MIL3P) (Max. Diameter $\Phi 19$ to $\Phi 30$ mm). 4. XLR Receptacle with 3 Male Pins (XLR3P), (Max. Diameter $\Phi 20.2$ mm), for SE or DF. 5. DIN Receptacle with 3 Male Pins (DIN3P), (Max. Diameter $\Phi 17$ mm), for SE or DF. 6. Male BNC (BNC) (Max. Diameter $\Phi 14.3$ mm), for Transmit or Receive Grounded Signal.		
	Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed.		
Size $\Phi D \times H$:	$\Phi 89 \times 90$ mm	$\Phi 114 \times 140$ mm	$\Phi 168 \times 180$ mm
	Actual length depends on Mounting Parts.		
Weight in Air:	2.0 kg with 15 m cable.	2.7 kg with 15 m cable.	4.5 kg with 15 m cable.
	Actual weight depends on Mounting Parts, Cable Types and Length.		
Operation Temperature:	-10°C to +60°C or 14°F to 140°F.		
Storage Temperature:	-20°C to +60°C or -4°F to 140°F.		
Power Amplifier:	BII5000 Power Amplifiers for SONAR, NDT, HIFU. Order Separately as standalone devices.		
Impedance Matching at f _s :	BII6000 Bespoke Impedance Matching between transducers and power amplifiers. Order Separately as standalone devices or append -IMxx Ω to the part number for integrating BII6000 into the transducer and specify impedance in Ω at f _s . For example, BII7623DP-IM50 Ω : BII7623DP transducer with built-in Impedance Matching unit as 50 Ω load at f _s .		
	Phase Angle $ \theta $ of Complex Impedance $\leq 20^{\circ}$ at f _s .		
WARNING: DANGER — HIGH VOLTAGE on wires. Wires shall be insulated for safety. DO NOT TOUCH THE WIRES BEFORE THE DRIVING SIGNAL IS SHUT DOWN. Cable shield must be grounded firmly for safety.			
for 50 Ω BNC connector, it is buyer's sole responsibility to make sure that the BNC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC is not intended for hand-held use at voltages above 30Vac/60Vdc.			

Wiring Information.

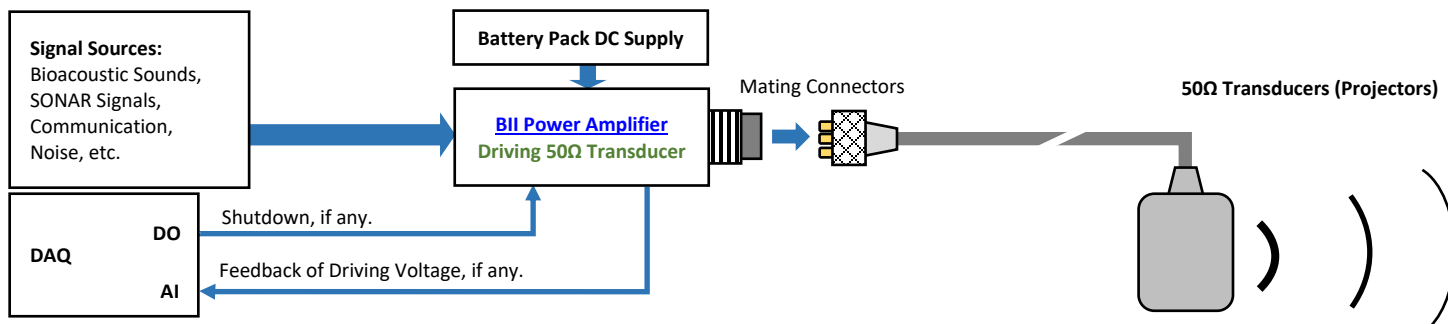
Transducer Wiring:	Shielded Cable	Coax, BNC.	UMC3P, Locking Sleeve: DLSA-M.	MIL3P	DIN3P	XLR3P
Signal:	White or Red	Center Contact	Contact 2	Contact C or G	Pin 3	Pin 2
Signal Common:	Black	Shield	Contact 1	Contact B	Pin 1	Pin 3
Shielding and Grounding	Shield	Shield	Contact 3	Contact A	Pin 2	Pin 1
Please contact us for bespoke wirings of differential transducers such as dipole, quadrupole, multimode rings, and flexensional sources.						
Wiring of Unshielded Cable:	Wire Leads WL	UMC2P (0.6m USC Cable originally coming from manufacturer of the connector, Fixed.). Locking Sleeve: DLSA-M.				
Signal	White	Contact 2				
Signal Common	Black	Contact 1				

How to Order Transducers. The default options are for stock items which are regularly available.

FH: Free Hanging. SC for Transmit: Shielded Cable (Rubber Jacket, 600V) with 2 conductors. Coax: 50 Ω Coaxial Cable. WL: Wire Leads.					
Underwater Mateable Connector UMC2P is fixed with 0.6m unshielded cable (USC).					
Part Number	-Appendage	-Mounting	-Cable Length	-Cable Type	-Connector
BII7623DP, BII7624DP, BII7626DP.	Default: -IM50 Ω .	Default: BFM-FH-3/8".	Default: 15m or 0.6m.	Default: SC: Shielded Cable.	Default: WL.
Example:	Description				
BII7623DP-IM50 Ω -BFM-FH-3/8"-15m-SC-WL	BII7623DP Transducer, Built-in Impedance Matching Network as 50 Ω load at f _s , Bolt-Fastening Mounting with Free Hanging: BFM-FH-3/8", 15m Shielded Cable, Wire Leads.				
BII7623DP-BFM-FH-3/8"-0.6m-USC-UMC2P	BII7623DP Transducer, Bolt Fastening Mounting with Free Hanging: BFM-FH-3/8", 0.6m Unshielded Cable, Male Underwater Mateable Connector with Locking Sleeve: DLSA-M.				
BII7623DP-IM50 Ω -FH-20m-RG58-BNC	BII7623DP Transducer, Built-in Impedance Matching Network as 50 Ω load at f _s , Free Hanging, 20m RG58 Coax, Male BNC.				

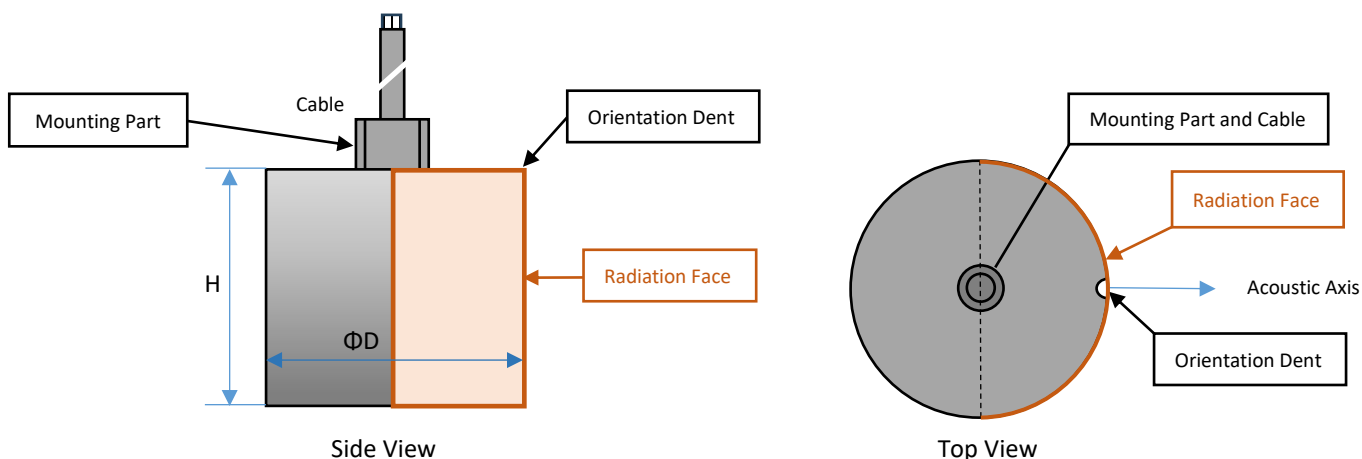
BII7623DP-IM8Q-FH-15m-SC-XLR3P | BII7623DP Transducer, Built-in Impedance Matching Network as 8Ω load at fs, Free Hanging, 15m Shielded Cable, XLR Plug.

System Block Diagram of Generate Sounds



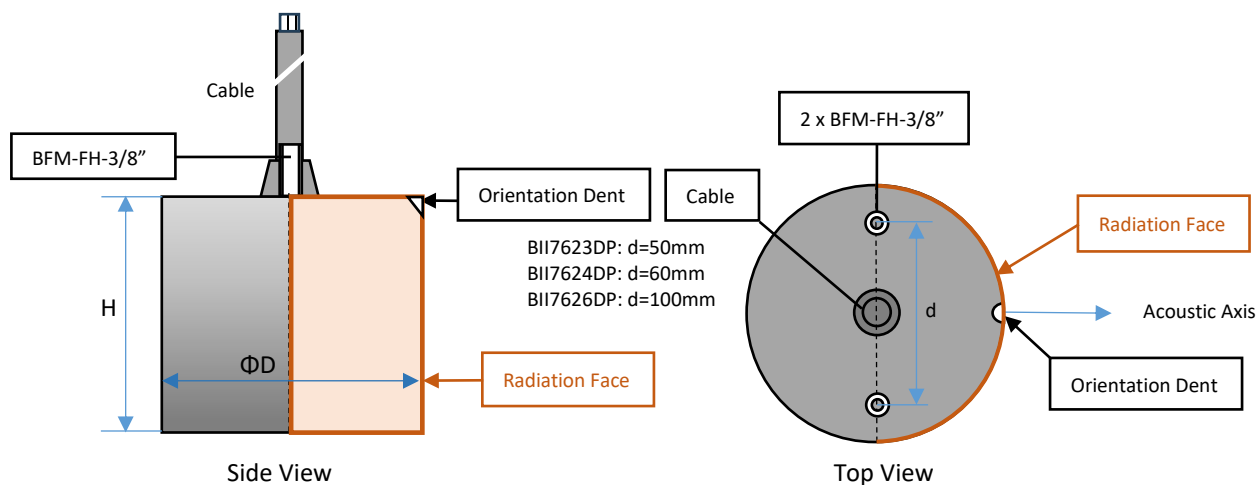
Physical Size (Dimensional Unit: mm)

1. Free Hanging (FH)



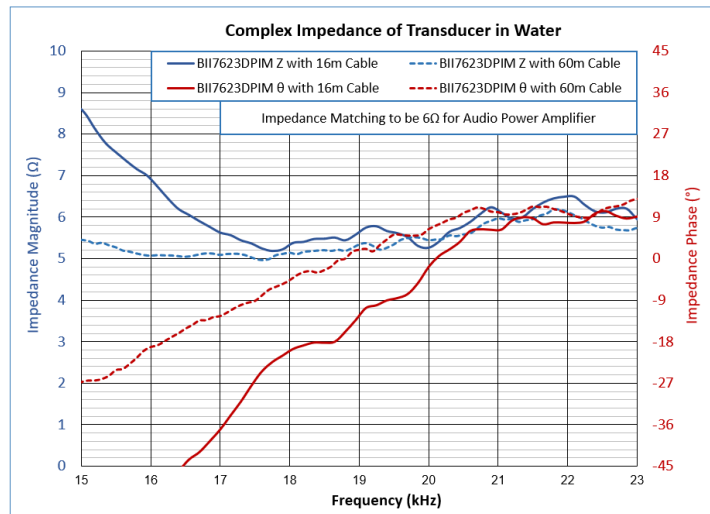
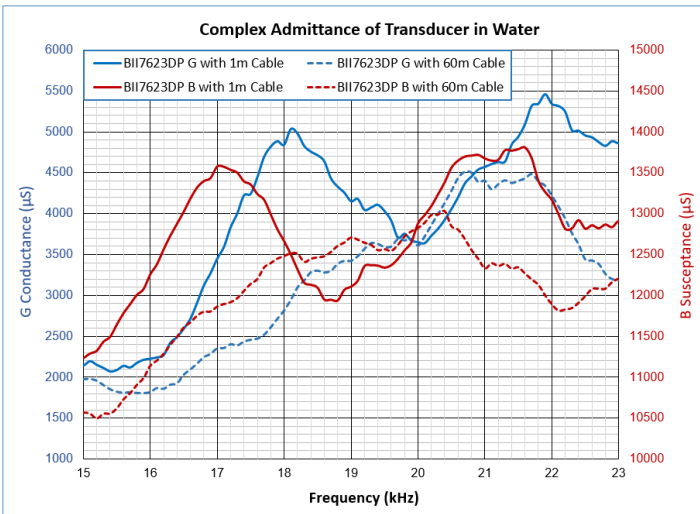
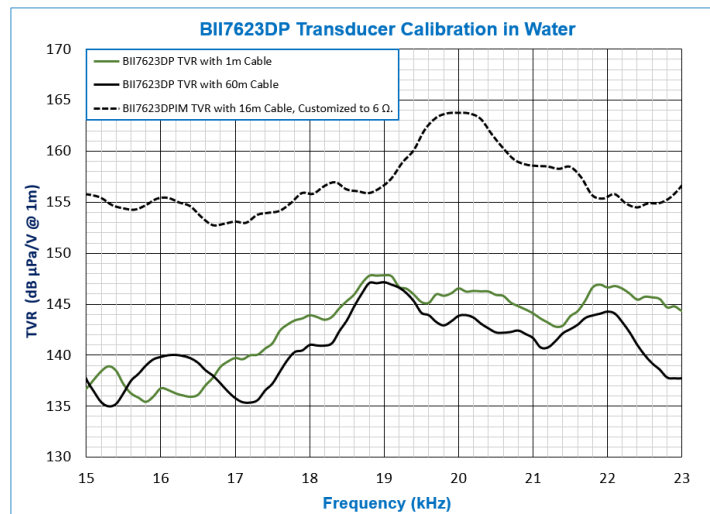
2. Bolt Fastening Mount with Free Hanging Cable (Two BFM-FH-3/8").

Cable-out Layout.

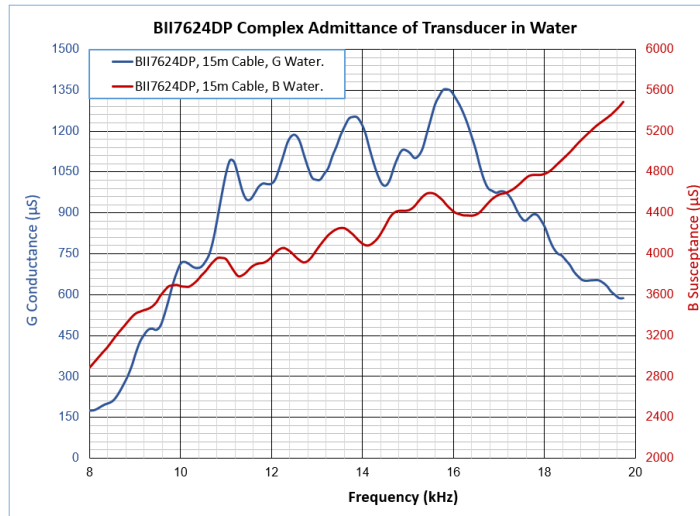
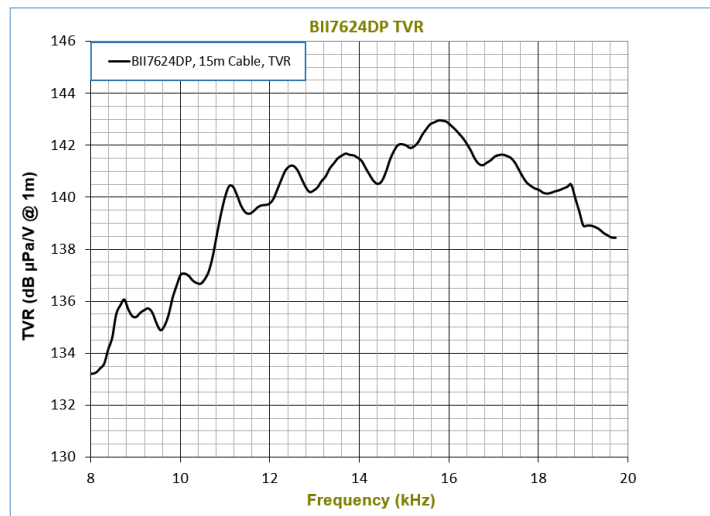


TVR (Transmitting Voltage Response), Admittance, and Impedance.

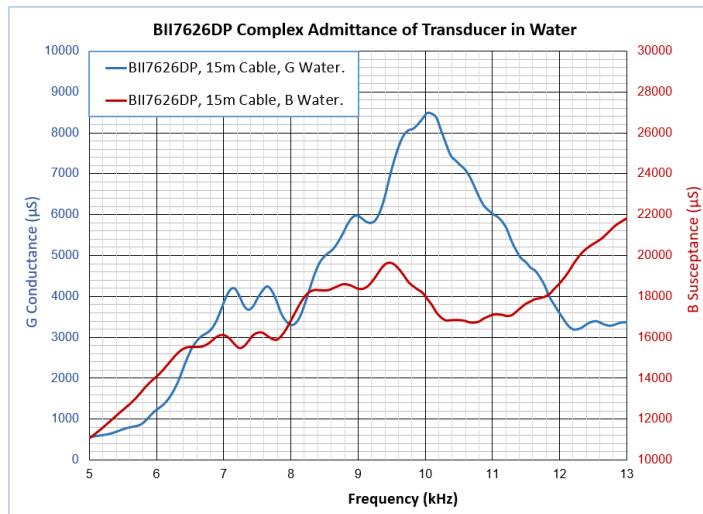
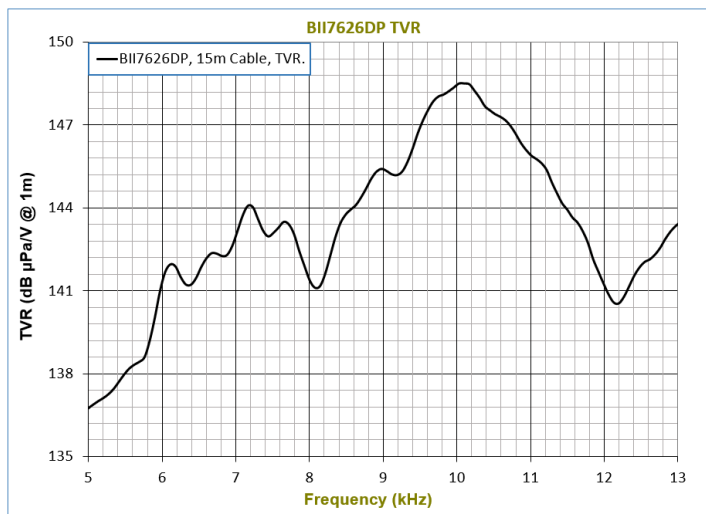
1. BII7623DP



2. BII7624DP.



3. BII7626DP.



Directivity Pattern:

