Quartet
Downhole reservoir testing system enabled by wireless telemetry
The Quartet* downhole reservoir testing system delivers an altogether better reservoir testing performance by combining four leading downhole tools into one advanced string that lets you isolate, control, measure, and sample your reservoir—all in one efficient trip.

Now, the Quartet testing system is enabled by Muzic* wireless telemetry, allowing bidirectional downhole tool communication and real-time readout of pressure data, so you can react quickly to downhole events, validate test data in real time, and reach a better basis for your decisions.
Combining four leading downhole testing technologies with wireless telemetry, the Quartet system enabled by Muzic telemetry allows you to directly interact with leading downhole test tools, manage wellbore events, and refine the test in real time.

Specifically engineered for reservoir testing, the system offers multiple advantages over conventional string configurations, including:

- bidirectional wireless communication
- no drill collars or slip joints
- fewer seals and connections
- multicycle flexibility
- single-trip efficiency
- shorter string design
- less nitrogen
- lower operating pressure
- premium connections.

The Quartet system enabled by Muzic telemetry lets you obtain and validate real-time pressure data and modify your test design while you test, so you can make sure you have all of the data needed to meet your test objectives before ending the test.

Isolate, control, measure, and sample your reservoir—wirelessly and in a single trip.
The Quartet system enabled by Muzic telemetry offers multiple advantages over conventional strings. Bidirectional wireless communication enhances tool command and pressure data verification. Lower operating pressure and less nitrogen increase safety during operations. Eliminated drill collars and slip joints, as well as fewer seals and connections, provide more efficient handling for safer and more cost-effective downhole testing.

- 90% less nitrogen
- 75% shorter string
- 60% fewer connections
- 50% fewer seals
- 35% lower operating pressure

**Downhole string technology, simplified**

- **Quartet system string**
  - Radioactive marker sub
  - Single-shot reversing valve
  - Tubing
  - IRDV
  - SCAR
  - Signature
  - CERTIS

- **Conventional string**
  - Slip joint (fully open)
  - Slip joint (half open)
  - Slip joint (closed)
  - Drill collars
  - Radioactive marker sub
  - Circulating valve
  - Drill collars
  - Tester valve
  - Reference tool
  - Gauge carrier
  - Sample carrier
  - Jar
  - Safety joint
  - Hydraulic hold down
  - Packer

**Shorter string** 75%

**Less nitrogen** 90%

**Fewer connections** 60%

**Fewer seals** 50%

**Lower operating pressure** 35%
Isolate

OPTIMAL WELL ISOLATION WITH SINGLE-RUN RETRIEVALABILITY
Versatile, production-level isolation that allows testing and retrieval in a single trip

Control

GREATER COMMAND AND MORE CONTROL
Multicycle tester and circulating valve operations using low-pressure pulses or wireless commands, with real-time tool status updates transmitted via wireless telemetry

CERTIS
HIGH-INTEGRITY RESERVOIR TEST ISOLATION SYSTEM

- Production-quality isolation
- Rapid, reliable hydrostatic setting
- No string manipulation required to set
- Simplified, shorter string design
- Single-trip retrieval

IRDV
INTELLIGENT REMOTE DUAL VALVE

- Low-pressure or wireless commands
- Real-time tool feedback
- Independent command and control
- Reduced operating time
- Powered by hydrostatic pressure—no nitrogen required
- Complete record of operations
- On-command override
**Measure**

HIGH-QUALITY, REAL-TIME PRESSURE DATA FOR THE TEST DURATION
Wireless readout of high-resolution, accurate downhole measurements

- High resolution
- Stable pressure measurement
- Wireless transmission of real-time and historical data
- Large memory capacity
- Reliable power and memory autonomy

**Sample**

REPRESENTATIVE, SINGLE-PHASE SAMPLES CAPTURED MORE SAFELY AND RELIABLY
Independent or sequential inline samples maintained at or above reservoir pressure

- Inline conveyance
- Nonreactive samplers
- Independent gas charges
- Shorter length
- Independent sampler activation via wireless or pressure command
CERTIS

Optimal seal integrity without compromise
Retrievable, single-trip, production-level isolation
The CERTIS® high-integrity reservoir test isolation system combines the features of a retrievable DST packer with a hydraulic-set permanent packer for single-trip, production-quality well isolation. The system eliminates the need for drill collars and slip joints and can significantly reduce the number of tools in the downhole test string, making operations safer and saving rig time.

High-integrity well isolation
When the CERTIS system reaches the targeted depth in the wellbore, annulus pressure is applied to activate the hydraulic setting mechanism. No string manipulation is required for setting. Bidirectional slips set, the bypass closes, and the sealing element energizes when hydraulic pressure is applied. The isolation system is locked in the set position by a positive ratchet mechanism, which also retains the applied setting force.

Single-trip retrievability
Once the isolation system sets and the stinger is released from the packer body, the seals are free to move in the sealbore, operating much like a production packer with a floating seal assembly. At the end of the test, a straight pull moves the slips to a relaxed position within the packer body and releases the packer. Continued pulling reopens the packer bypass, eliminating swabbing when coming out of the well.

The CERTIS system combines permanent-packer-level isolation with single-trip retrievability in one simplified solution.
IRDV

Multicycle, independent command and control for reliable reservoir interaction
Fast-acting, independent dual valve control
The IRDV* intelligent remote dual valve is operated by the IRIS* intelligent remote implementation system, which uses low-intensity annular pressure pulses or wireless telemetry. The commands are implemented using downhole hydrostatic pressure to operate the dual valves, and tool status is wirelessly transmitted to surface.

Greater command
The IRDV dual valve has a flexible command system that includes automatic valve sequences for optimal downhole testing operations. Low-pressure commands make for easier communication with the tool and eliminate problems associated with high pressure in the annulus. As part of the Quartet system enabled by Muzic telemetry, the IRDV dual valve can be controlled using wireless commands or low-pressure pulses and provides real-time tool feedback.

More control
The IRDV dual valve is not affected by pressure changes caused by other tool operations or common operational procedures. The hydraulic system is automatically referenced with hydrostatic pressure, so the dual valve can function while descending or ascending in the wellbore.

The IRDV dual valve features nitrogen-free, hydrostatically powered testing and circulating valves in one tool that can operate in a range of conditions and is immune to downhole pressure and temperature fluctuations.
Premium pressure measurements for accurate reservoir description
Accurate, high-resolution measurements
Signature® quartz gauges consistently deliver high-quality downhole pressure measurements in any operating environment for the entire test duration. As part of the Quartet system enabled by Muzic telemetry, the gauges allow bidirectional communication for real-time pressure data verification while monitoring and controlling your downhole reservoir test. Each gauge can be interrogated independently for pressure or temperature data in both real time and historical modes. These data are wirelessly transmitted for analysis either on site or at a remote office, bringing greater flexibility and efficiency to reservoir testing.

Robust, reliable design
With an all-ceramic multichip module design and welded electronics housing, the Signature quartz gauge delivers dependable measurements that help you meet your test objectives.

High-integrity storage
Signature gauges have a large memory capacity that accommodates high data-sampling rates for a more comprehensive dataset. Their long battery life means you acquire high-quality measurements continuously for the duration of the test. Testing longer lets you see farther into the reservoir and allows boundaries to be more clearly detected for better reserves estimation.
Cleanest, most representative reservoir samples
Contaminant-free, representative fluid samples
SCAR* inline independent reservoir fluid sampling delivers reservoir-representative fluid samples from deep within the reservoir. Samples are collected directly in the flow stream with no contamination for more accurate reservoir characterization.

Multiple sampling options
As part of the Quartet system enabled by Muzic telemetry, samplers are activated using wireless commands or annulus pressure, so samples can be collected at any time during the flow period. Activation can be simultaneous or selective for greater flexibility during operations.

Reliable, safer collection
Each Inconel® sampler used for SCAR sampling has its own small, independent nitrogen gas charge, which ensures individual samples remain at or above reservoir pressure. Optional nonreactive coating of the sample chambers retains trace elements so the SCAR sampling delivers the most accurate, most representative downhole fluid samples.

From acquisition to analysis, chain-of-custody sample management from the well-site to the Schlumberger Reservoir Laboratory ensures that your reservoir fluid samples and analysis data are carefully managed.
Critical test data obtained using the Quartet system enabled by Muzic telemetry are transmitted via a robust wireless network and are integrated with whichever Schlumberger real-time well testing service best helps you meet your test objectives:

- **RT Connect** real-time test data transmission
  Access well test data in real time, via a web browser or a mobile device, with fast, on-demand data transmission that enables earlier detection of well test and reservoir issues.

- **RT Interactive** real-time test data aggregation and support
  Seamlessly integrate multiple acquisition sources into one comprehensive report for optimized efficiency, and consult with operations support engineers 24/7/365 for enhanced decision making.

- **RT Certain** real-time test collaboration with reservoir experts
  Share and stream interpretation results and recommendations using collaborative platforms to ensure real-time, on-demand prediction of reservoir characteristics, production, and quality.

*In the Quartet system enabled by Muzic telemetry, repeaters installed at intervals send wireless commands downhole and transmit the received tool status information and downhole data to the surface. These data can be analyzed on site or from remote locations using Schlumberger real-time well testing services.*
The **Quartet** system enabled by **Muzic** telemetry captures reservoir-representative fluid samples and delivers high-quality pressure measurements with real-time readout of downhole data, bringing greater control and certainty to your reservoir test.

On land or offshore, the Quartet system enabled by Muzic telemetry lets you interact with leading downhole technologies, manage wellbore events, and control the test in real time, helping you reach a better basis for your decisions and **be certain.**
Isolate  Control  Measure  Sample