CobaltFx Series

Frequency Extender Systems
• Frequency bands from: 18-54 GHz, 50-75 GHz, 60-90 GHz, 75-110 GHz

FEV Frequency Extender System in Collaboration with Farran Technology

EXTEND YOUR REACH™
CobaltFx is a new millimeter-wave frequency extension solution, the first that can be anchored by a 9 GHz or a 20 GHz VNA. CobaltFx series allows engineers to build a scalable and affordable 5G testing solution. Each frequency band can be incorporated into the CobaltFx solution as needed, allowing for easy expansion of the range of 5G components and products tested in development and production and smaller upfront investment. This cost-effective millimeter wave frequency extension system offers industry leading dynamic range and sweep speeds.

CobaltFx’s high dynamic range and directivity allow for highly accurate and stable millimeter-wave S-parameter measurements in four dedicated frequency bands:

- 18-54 GHz (coaxial)
- 50-75 GHz (waveguide)
- 60-90 GHz (waveguide)
- 75-110 GHz (waveguide)

CobaltFx offers an unparalleled combination of price, performance, flexibility and size. The VNAs used in this system are from Copper Mountain Technologies’ industry leading Cobalt Series. They feature fast sweep speeds down to 0.2 microseconds per point and a dynamic range of up to 152 dB, all comprised in a compact, USB form factor. FEV frequency extension modules are developed in collaboration with Farran technology, a globally recognized brand in millimeter-wave development.

Copper Mountain Technologies’ USB VNAs are next generation analyzers designed to meet the needs of 21st Century engineers. Our VNAs include an RF measurement module and a processing module, a software application which runs on a Windows or Linux PC, laptop, or tablet, connecting to the measurement hardware via USB interface.

This innovative approach delivers high measurement accuracy and enables users to take advantage of faster processors, newer computers and larger displays. USB VNAs have lower Total Cost of Ownership and fewer potential failure points. These instruments are smaller and lighter, can go almost anywhere, are very easy to share and eliminate the need for data purging or hard drive removal in secure environments.

“Frost & Sullivan analysis confirms that CMT distinguishes itself from competition by offering quality measurement VNAs that provide reliable results, yet are small, can be simply integrated into systems, and are more affordable than traditional analyzers.”

Jessy Cavazos
Industry Director, Frost & Sullivan

**Applications & Examples**

**Antenna Range Measurements**

Due to high free space loss between the transmitting and receiving antennas, near and far field antenna measurements as well as radar cross section measurements require high dynamic range and a fast-sweeping test system. During the measurement, antenna gain, pattern, efficiency and directivity can be verified, as well as parameters of a radome. Directivity and reflectivity measurements are fundamental for evaluating the backscatter parameters of the target. All these measurements can be performed by a millimeter wave S-parameter measurement system. CobaltFx offers industry-leading dynamic range and sweep time, as well as stability and ease of use.

**Material Characterization**

Increase in usage of millimeter waves for high speed digital radio communications and radar sensors is driving the need for high frequency characterization of various materials: PCB laminates, antenna radomes and lenses, vehicle windscreens and various other dielectric composites. Accurate characterization is fundamental to understanding frequency-dependent dielectric constant and loss tangents that allow for better modeling of structures, shorter development times and ultimately lower cost of products. The CobaltFx system is designed to be used for various methods of material characterization - free space, transmission line and resonance type. It offers an accurate, compact and cost-effective way of understanding the impact of various materials on high frequency performance in millimeter wave components and systems.

**Wafer S-Parameter Measurements**

On wafer S-parameters measurements provide for model generation of discrete semiconductor devices (diodes, transistors, mmics etc.). For accurate models, the data obtained during measurements must be accurate and the system must allow for long time intervals between calibrations. Such tasks require that millimeter-wave test equipment is stable and accurate while at the same time being compact and flexible. CobaltFx fits those two criteria perfectly.

**5G Applications**

5G technology is considered to be a fundamental medium for the Internet of Things (IoT). It is believed that 5G will enable very diverse bandwidth usage with challenging requirements (up to 1Tb/s/km2 by 2030). With 3D/4K video streaming, vast millimeter wave and smart camera sensor networks, working in the cloud, autonomous driving and mission-critical broadcasting all planned to be part of IoT, the need for bandwidth and data transmission speed has never been greater. Unlocking the high mmWave part of the frequency spectrum (24-100 GHz) is fundamental to this concept. Such a system will be based on small antennas operating in standalone as well as multiple user arrangements with beamforming capabilities, where amplitude and phase shift need to be very well characterized. Base stations as well as handset devices will require comprehensive discrete components as well as system level characterization. The system to be deployed and consumer devices need to comply with very strict specifications and emission requirements, but also meet low cost requirements. CobaltFx is the most cost-effective solution to enable the integration of various devices, materials, antenna beamforming and channel propagation concepts for indoor and outdoor 5G communication.
### Applications & Examples

#### Benchtop DUT Characterization

Benchtop S-parameter measurements allow for accurate and time-effective verification of packaged products. Every test laboratory in a commercial or industry oriented organization involved in production and testing of various components must have a means of evaluating their products. These normally involve DUT-type unilateral or bilateral S-parameter measurements of passive and active components, compression point measurements for amplifiers and mixers, and intermodulation distortion. The measurement domain is either frequency or time. CobaltFx allows for all these measurements and with its flexibility and compactness it easily fits on the bench. It also fits the financial constraints that every commercial organization must take into account. What all these applications have in common is that they require an accurate, compact and affordable millimeter wave test and measurement solution and CobaltFx meets all these criteria.

#### Wigig at 60 GHz

Multi Gigabit WiFi technology operating at 60 GHz will expand capacity for indoor WiFi data transmission. With 3D and 4K video streaming within the wireless network and devices, there is a need for chipset and antenna technology to offer bandwidth and range that will reliably replace cable connectivity. Such applications put big constraints on the cost of the router as well as wireless devices. High levels of integration of various technologies, operating from single MHz to the 60 GHz range, requires very accurate and thorough characterization of consumer electronics equipment. CobaltFx is a system that allows for very cost effective, accurate and flexible verification of the product at the device or system level, allowing for low cost production.

#### Automotive Radar & Sensor Testing

With various automotive and non-automotive radar sensors, the need for thorough characterization of devices and materials at 77 and 79 GHz has never been greater. With adaptive cruise control (ACC), collision mitigation (CM) and pedestrian detection (PD) systems already available and autonomous driving under development the automotive industry is in need of cost- and time-effective test solutions for radar sensors. Also, non-automotive 77 GHz FMCW radar applications that cover foreign object detection, perimeter and security detection, collision avoidance and moving object detection also require test and measurement systems during their development and production. CobaltFx offers the most cost effective and flexible T&M solution for radar applications on the market.

#### Backhaul at 70 & 80 GHz

Backhaul radio communication is another technology that will support mobile data networks and IoT in the future. The technology provides short range 1-3 km, high speed 1-2 Gb/s radio transmission for existing mobile networks. Due to its flexibility, ease of deployment and capacity it is frequently used for point-to-point links where fiber networks are not feasible from an environmental point of view (water crossing etc.) or cost. Thorough characterization of passive and active devices (amplifiers, filters, up and down-converters, antennas) is always required as these systems must meet stringent spectrum mask requirements for licensed frequency range. CobaltFx is a system that allows for cost and time effective measurement of Backhaul components and subsystems.

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### CobaltFx Compatible Cobalt USB VNAs

#### Cobalt C4209

| Impedance | 50 Ohm |
| Test port connector type | N, female |
| Number of test ports | 2 ports |
| Direct Access (Source, Ref, and Meas) | Yes |
| Frequency range | 100 kHz to 2 GHz |
| Frequency resolution | 1 Hz |
| Number of measurement points | 2 to 500,001 |
| Measurement bandwidths (with 1/1.5/2/3/5/7 steps) | 1 Hz to 3 MHz |
| Dynamic range | 110 dB |

#### Cobalt C4220

| Impedance | 50 Ohm |
| Test port connector type | N, female |
| Number of test ports | 2 ports |
| Direct Access (Source, Ref, and Meas) | No |
| Frequency range | 100 kHz to 20 GHz |
| Frequency resolution | 1 Hz |
| Number of measurement points | 2 to 500,001 |
| Measurement bandwidths (with 1/1.5/2/3/5/7 steps) | 1 Hz to 3 MHz |
| Dynamic range | 110 dB |

#### Cobalt C4409

| Impedance | 50 Ohm |
| Test port connector type | NMD 3.5 mm, male |
| Number of test ports | 4 ports |
| Direct Access (Source, Ref, and Meas) | No |
| Frequency range | 100 kHz to 2 GHz |
| Frequency resolution | 1 Hz |
| Number of measurement points | 2 to 500,001 |
| Measurement bandwidths (with 1/1.5/2/3/5/7 steps) | 1 Hz to 3 MHz |
| Dynamic range | 110 dB |

#### Cobalt C4420

| Impedance | 50 Ohm |
| Test port connector type | NMD 3.5 mm, male |
| Number of test ports | 4 ports |
| Direct Access (Source, Ref, and Meas) | Yes |
| Frequency range | 100 kHz to 20 GHz |
| Frequency resolution | 1 Hz |
| Number of measurement points | 2 to 500,001 |
| Measurement bandwidths (with 1/1.5/2/3/5/7 steps) | 1 Hz to 3 MHz |
| Dynamic range | 110 dB |

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[1] All specifications subject to change without notice. [2] The dynamic range is defined as the difference between the specified maximum power level and the specified noise floor. The specification applies at 10 Hz IF bandwidth (5/16 25°C ~ 95°C after 1 hour warm-up and calibration. Assuming ideal NF and 100 cables © Copper Mountain Technologies - www.coppermountaintech.com - Rev 2018Q1]
CobaltFx FET1854 Specifications

1 All specifications subject to change without notice.
2 The dynamic range is defined as the difference between the specified maximum power level and the specified noise floor. The specification applies at 10 Hz IF bandwidth.
3 Reflection and transmission measurement accuracy applies over the temperature range of (73 ± 9) °F or (23 ± 5) °C after 60 minutes of warming-up, with less than 1 °C deviation from the full one-port calibration (for reflection coefficient only) or two-port calibration temperature, at output power of -10 dBm. Frequency points have to be identical for measurement and calibration (no interpolation allowed).
4 Transmission specifications are based on a matched DUT, and IF bandwidth of 1 Hz.
5 Reflection specifications are based on an isolating DUT.
6 Specification applies over full frequency range, at max output power.
7 Depends on selected VNA model. © Copper Mountain Technologies - www.coppermountaintech.com - Rev. 2018Q2

Effective System Data

18 GHz to 54 GHz
- Directivity 38 dB
- Source match 36 dB
- Load match 36 dB
- Reflection tracking ±0.1 dB
- Transmission tracking ±0.1 dB

Uncorrected System Performance

18 GHz to 54 GHz
- Directivity 10 dB
- Source match 10 dB
- Load match 10 dB

Test Port Output

- Power range
  - 18 GHz to 50 GHz -20 dBm to +3 dBm
  - 50 GHz to 54 GHz -20 dBm to -3 dBm
- Power accuracy ±1.5 dB
- Power resolution 0.1 dB
- Harmonic distortion -10 dBc
- Non-harmonic spurious -10 dBc

Test Port Input

- Noise floor
  - 18 GHz to 36 GHz -130 dBm/Hz
  - 36 GHz to 54 GHz -120 dBm/Hz
- Damage level
  - 18 GHz to 36 GHz +23 dBm
  - 36 GHz to 54 GHz +23 dBm
- Damage DC voltage 0 V

Measurement Speed

- Time per point 10 µs typ.

RF Input

<table>
<thead>
<tr>
<th>Port</th>
<th>RF IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
<td></td>
</tr>
<tr>
<td>Frequency range 1</td>
<td>4.5 GHz to 8.0 GHz (x4)</td>
</tr>
<tr>
<td>Frequency range 2</td>
<td>4.0 GHz to 6.25 GHz (x8)</td>
</tr>
<tr>
<td>Frequency range 3</td>
<td>4.25 GHz to 6.75 GHz (x16)</td>
</tr>
<tr>
<td>Input reflection coefficient</td>
<td>-15 dB</td>
</tr>
<tr>
<td>Damage level</td>
<td>+8 dBm</td>
</tr>
<tr>
<td>Damage DC voltage</td>
<td>0 V</td>
</tr>
<tr>
<td>Connector type</td>
<td>SMA, female</td>
</tr>
</tbody>
</table>

System & Power

- Operating system: Windows 7 and above
- Interface: SPI
- Connector type: LEMO B-series
- Power consumption: 26 W
- Input power: 9 V DC to 15 V DC

Dimensions

- Length: 240 mm
- Width: 144 mm
- Height: 60 mm
- Weight: 2.2 kg (78 oz)

Environmental Specifications

- Operating temperature: +5 °C to +40 °C (41 °F to 104 °F)
- Storage temperature: -50 °C to +70 °C (-58 °F to 158 °F)
- Humidity: 90 % at 25 °C (77 °F)
- Atmospheric pressure: 70.0 kPa to 106.7 kPa

VNA Compatibility

- 2 port VNAs: C4209, C4220
- 4 port VNAs: C4409, C4420

Necessary Accessories

For each set of extenders (2) DC cable, (4) IF cables, and (4) RF-LO cables are needed to operate the frequency extension system.
### T4311

#### Electrical Data
- Impedance: 50Ω
- Frequency range: DC to 43 GHz
- Connector Type: 2.92 mm
- Mating cycles: > 500
- Maximum torque: 1.70 Nm
- Recommended torque: 0.90 Nm
- Short Phase Error: ± 1.5°
- Load Return Loss: 26.5 GHz to 43 GHz
- Power Handling: ≤ 45 dB
- Electrical (Offset) delay: 23.360 ps
- Electrical (Offset) loss: 2.4 GHz
- Short Load: L<sub>1</sub> = 0 x 10<sup>-10</sup> H, L<sub>2</sub> = 0 x 10<sup>-10</sup> H
- Electrical (Offset) delay: 23.360 ps
- Electrical (Offset) loss: 2.4 GHz
- Thru Electrical (Offset) delay: 0.0 ps
- Electrical (Offset) loss: 0.0 GHz
- Mechanical Data
  - Connector Type: 2.92 mm
  - Mating cycles: > 500
  - Maximum torque: 1.70 Nm
  - Recommended torque: 1.00 Nm
  - Gauge: 0.00 mm to 0.08 mm

#### Coefficients
- **Open**
  - C<sub>1</sub> = 4.3 x 10<sup>-12</sup> F
  - C<sub>2</sub> = 431 x 10<sup>-10</sup> F
  - C<sub>3</sub> = 28.7 x 10<sup>-12</sup> F
  - C<sub>4</sub> = 0.12 x 10<sup>-12</sup> F
  - C<sub>5</sub> = -11.5 x 10<sup>-12</sup> F
- **Short**
  - L<sub>1</sub> = 0 x 10<sup>-10</sup> H
  - L<sub>2</sub> = 0 x 10<sup>-10</sup> H
- **Thru**
  - Electrical (Offset) delay: 0.0 ps
  - Electrical (Offset) loss: 0.0 GHz

### Z5411

#### Electrical Data
- Impedance: 50Ω
- Frequency range: DC to 50 GHz
- Connector Type: 2.92 mm
- Mating cycles: > 500
- Maximum torque: 1.00 Nm
- Recommended torque: 0.90 Nm
- Short Phase Error: ± 1.5°
- Load Return Loss: 26.5 GHz to 43 GHz
- Power Handling: ≤ 45 dB
- Electrical (Offset) delay: 87.394 ps
- Electrical (Offset) loss: 4.0 GHz
- Short Load: L<sub>1</sub> = 0 x 10<sup>-10</sup> H
- Electrical (Offset) delay: 23.360 ps
- Electrical (Offset) loss: 4.0 GHz
- Thru Electrical (Offset) delay: 0.0 ps
- Electrical (Offset) loss: 0.0 GHz
- Mechanical Data
  - Connector Type: 2.4 mm
  - Mating cycles: > 500
  - Maximum torque: 1.10 Nm
  - Recommended torque: 0.50 Nm
  - Gauge: 0.00 mm to 0.05 mm

#### Coefficients
- **Open**
  - C<sub>1</sub> = 4.3 x 10<sup>-12</sup> F
  - C<sub>2</sub> = -718 x 10<sup>-10</sup> F
  - C<sub>3</sub> = 28.7 x 10<sup>-12</sup> F
  - C<sub>4</sub> = 0.12 x 10<sup>-12</sup> F
  - C<sub>5</sub> = -718 x 10<sup>-12</sup> F
- **Short**
  - L<sub>1</sub> = 0 x 10<sup>-10</sup> H
- **Thru**
  - Electrical (Offset) delay: 3.5 GHz
  - Electrical (Offset) loss: 0.0 GHz

### CobaltFx FEV-15 Specifications

#### System Operating Frequency
- 50 GHz to 75 GHz
- Test Port Output Power
  - 5 dBm min., 8 dBm typ.
- System Dynamic Range
  - 110 dB min., 120 dB typ.
- Raw Coupler Directivity
  - 40 dB min., 45 dB typ.
- Trace Stability Magnitude
  - ±0.2 dB
- Trace Stability Phase
  - 2°
- Test Port Input 0.1 dB Compression Point
  - 15 dBm
- RF Input Frequency
  - 6.25 GHz to 8.75 GHz
- RF Input Power
  - 4.17 GHz to 5.25 GHz
- LO Input Power
  - ≤ 5 dBm
- IF Output Frequency
  - 7.5 MHz
- Test Port Damage Level
  - > 40 dBm
- RFLO Port Damage Level
  - > 10 dBm
- Test Port Interface
  - WR-15 IEEE 1785-2a compatible with UG-385U
- RFLO/IF Connector
  - SMA (F)
- DC Power Requirements
  - +6 V at 2200 mA
- Weight
  - 3.5 kg
- Dimensions
  - 220 x 105 x 80 mm (8 3/8 x 4 x 3 1/8 inches)

### CobaltFx FEV-12 Specifications

#### System Operating Frequency
- 60 GHz to 90 GHz
- Test Port Output Power
  - 2 dBm min., 5 dBm typ.
- System Dynamic Range
  - 100 dB min., 110 dB typ.
- Raw Coupler Directivity
  - 40 dB min., 45 dB typ.
- Trace Stability Magnitude
  - ±0.2 dB
- Trace Stability Phase
  - 2°
- Test Port Input 0.1 dB Compression Point
  - 15 dBm
- RF Input Frequency
  - 5 GHz to 7.5 GHz
- RF Input Power
  - 8 dBm
- LO Input Frequency
  - 5 GHz to 7.5 GHz
- LO Input Power
  - ≤ 5 dBm
- IF Output Frequency
  - 7.5 MHz
- Test Port Damage Level
  - > 40 dBm
- RFLO Port Damage Level
  - > 10 dBm
- Test Port Interface
  - WR-12 IEEE 1785-2a compatible with UG-385U
- RFLO/IF Connector
  - SMA (F)
- DC Power Requirements
  - +6 V at 2200 mA
- Weight
  - 3.5 kg
- Dimensions
  - 220 x 105 x 80 mm (8 3/8 x 4 x 3 1/8 inches)

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(1)[1] All specifications subject to change without notice. *Necessary Accessories are included in a standard length (4 feet). (2) Measured at 10 kHz BW (3) ±1.22 °C +/- 5 °C after 1 hour warm-up and calibration. Assuming ideal RF and LO cables © Copper Mountain Technologies - www.coppermountaintech.com - Rev. 2018Q2
**FEV-10 Specifications/Waveguide Calibration Kits**

### CobaltFx FEV 10

- **System Operating Frequency**: 75 GHz to 110 GHz
- **Test Port Output Power**: 0 dBm min., 5 dBm typ.
- **Raw Coupler Directivity**: 40 dB min., 45 dB typ.
- **Trace Stability Magnitude**: ±0.2 dB
- **Trace Stability Phase**: 2°
- **Test Port Input 0.1 dB Compression Point**: 10 dBm
- **RF Input Frequency**: 6.25 GHz to 9.17 GHz
- **RF Input Power**: 0 dBm
- **LO Input Frequency**: 4.688 GHz to 6.875 GHz
- **LO Input Power**: -5 dBm
- **IF Output Frequency**: 7.5 MHz
- **Test Port Damage Level**: +20 dBm
- **RF/LO Port Damage Level**: +10 dBm
- **Test Port Interface**: WR-10 IEEE 1785-2a compatible with UG-387/UM
- **RF/LO/IF Connector**: SMA (F)
- **DC Power Requirements**: +6 V at 2200 mA
- **Weight**: 3.5 kg
- **Dimensions**: 220 x 105 x 80 mm (8 3/5 x 4 1/8 x 3 1/8 inches)
- **Operating Temperature**: 0°C to 30°C (32°F to 86°F)

### Waveguide Calibration Kits compatible with CobaltFx FEV Models

<table>
<thead>
<tr>
<th>Operating Frequency Range</th>
<th>CobaltFx WR-15 Calibration Kit</th>
<th>CobaltFx WR-12 Calibration Kit</th>
<th>CobaltFx WR-10 Calibration Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 GHz to 75 GHz</td>
<td>WR-15, WG-25, typ.</td>
<td>WR-12, WG-26, typ.</td>
<td>WR-10, WG-27</td>
</tr>
<tr>
<td>60 GHz to 90 GHz</td>
<td>IEEE 1785-2a (Precision Style)</td>
<td>IEEE 1785-2a (Precision Style)</td>
<td>IEEE 1785-2a (Precision Style)</td>
</tr>
<tr>
<td>75 GHz to 110 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cut Off Frequency</td>
<td>38.786 GHz</td>
<td>48.962 GHz</td>
<td>58.0143 GHz</td>
</tr>
<tr>
<td>Fixed Load VSWR</td>
<td>≤ 1.05S:1</td>
<td>≤ 1.04:1</td>
<td>≤ 1.04:1</td>
</tr>
<tr>
<td>Flush Short Flatness</td>
<td>&lt; 0.015 mm</td>
<td>&lt; 0.012 mm</td>
<td>&lt; 0.012 mm</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>20 to 30°C (68 to 86°F)</td>
<td>20 to 30°C (68 to 86°F)</td>
<td>20 to 30°C (68 to 86°F)</td>
</tr>
</tbody>
</table>

### Typical Output Power Plots for FEV Models

- **Output Power vs Frequency**
  - CobaltFx FEV-15
  - CobaltFx FEV-12
  - CobaltFx FEV-10

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(1) All specifications subject to change without notice. (2) Measured at 10 Hz IF BW (3) At 21°C ± 5°C after 1 hour warm-up and calibration. Assuming ideal RF and LO cables © Copper Mountain Technologies - www.coppermountaintech.com - Rev. 2018Q2
Technology is supposed to move. It’s supposed to change and update and progress. It’s not meant to sit stagnant year after year simply because that’s how things have always been done.

The engineers at Copper Mountain Technologies are creative problem solvers. They know the people using VNAs don’t just need one giant machine in a lab. They know that VNAs are needed in the field, requiring portability and flexibility. Data needs to be quickly transferred, and a test setup needs to be easily automated and recalled for various applications. The engineers at Copper Mountain Technologies are rethinking the way VNAs are developed and used.

Copper Mountain Technologies’ VNAs are designed to work with the Windows or Linux PC you already use via USB interface. After installing the test software, you have a top-quality VNA at a fraction of the cost of a traditional analyzer. The result is a faster, more effective test process that fits into the modern workspace. This is the creativity that makes Copper Mountain Technologies stand out above the crowd.

We’re creative. We’re problem solvers.

<table>
<thead>
<tr>
<th>FET1854</th>
<th>FEV-15</th>
<th>FEV-12</th>
<th>FEV-10</th>
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</thead>
<tbody>
<tr>
<td>System Operating Frequency</td>
<td>18 GHz-54 GHz</td>
<td>50 GHz-75 GHz</td>
<td>60 GHz-90 GHz</td>
</tr>
<tr>
<td>Test Port Output Power</td>
<td>-20 dBm to +3 dBm</td>
<td>5 dBm (Min.), 8 dBm (Typ.)</td>
<td>2 dBm (Min.), 5 dBm (Typ.)</td>
</tr>
<tr>
<td>Variable</td>
<td>Fixed</td>
<td>Fixed</td>
<td>Fixed</td>
</tr>
<tr>
<td>System Dynamic Range</td>
<td>123 dB (Min.), 130 dB (Typ.)</td>
<td>110 dB (Min.), 120 dB (Typ.)</td>
<td>100 dB (Min.), 110 dB (Typ.)</td>
</tr>
</tbody>
</table>

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