# Millimeter-Wave FCC Part 15 Transmitter Compliance Test

## Keysight Technologies and OML

## Achieve compliance with FCC Part 15 regulations using harmonic mixers and standard gain horn antennas

The Federal Communication Commission (FCC) specifies in Part 15 of the Code of Federal Regulation (CFR) the testing and certification procedures for millimeter-wave (mm-wave) applications. Engineers designing transmitters for the mm-wave unlicensed bands (e.g., 802.11ad, WiGig) must adhere to the intentional, unintentional, or incidental radiator requirements. In particular, FCC 15.33 states radiated measurements are necessary of the highest fundamental up to the fifth harmonic or to 200 GHz.

Using FCC procedures, engineers configure harmonic mixers, standard gain horn antennas and high performance spectrum analyzers to verify compliance with these regulations. For mm-wave coverage, the harmonic mixer technology enables measurements up to 200 GHz (and beyond).

OML provides harmonic mixers and standard gain horn antennas that externally connect to the Keysight Technologies PXA signal analyzer or PSA spectrum analyzer for mm-wave measurements. The excellent broadband conversion loss performance of the harmonic mixers offers sufficient dynamic range to measure output power, including spurious products. The standard gain (+24 dBi) antennas are compatible with ANSI C63.4, C63.5, C63.10 and C63.26 and enables measurements at safe distances with adequate signal-to-noise ratio. The waveguide interfaces of the harmonic mixer and antenna are compatible with MIL-DTL-3922/54 and MIL-DTL- 3922/67D.

Once connected, the OML harmonic mixer plus antenna assembly effectively multiplies the analyzer's microwave capabilities to the mm-wave spectrum. The familiar front panel operation for setup, calibration, measurement, and output are the same, except the readouts are in the mm-wave instead of microwave spectrum.

- Certify millimeter-wave transmitters to FCC Part 15 regulations
- Extend the frequency range of the Keysight PXA and PSA
- Harmonic mixer, antenna complies with Part 15 recommended testing methodologies
- Waveguide interface compatible with MIL-DTL-3922/54 and MIL-DTL 3922/67D
- Standard gain antennas comply with ANSI C63.4, C63.5, C63.10 & C63.26
- Four configurations spanning 40 GHz to 220 GHz


KEYSIGHT TECHNOLOGIES

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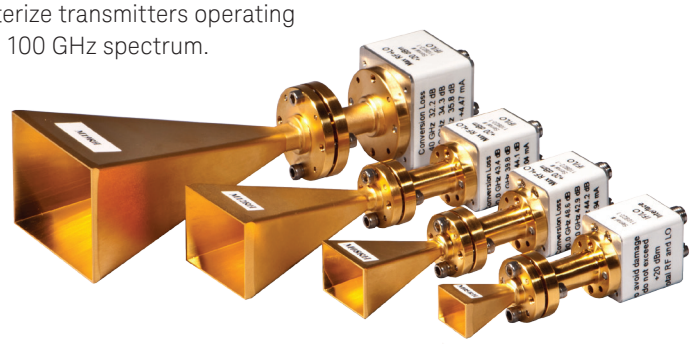
The OML FCC Part 15 compliance bundle that spans 40 GHz to 220 GHz consists of four waveguide bands: WR-19, WR-12, WR-08 and WR-05. This overall system solution can characterize transmitters operating in the 10 GHz to 100 GHz spectrum.



OML's harmonic mixers and standard gain horn antennas when combined with the Keysight PXA signal analyzer or PSA spectrum analyzer ensure that you can achieve compliance to FCC Part 15 regulations for your millimeter-wave transmitters.

**System Components**

| Keysight Technologies | |
|---|---|
| N9030A | PXA signal analyzer |
| N9030A-EXM | External mixing |
| E444xA | PSA spectrum analyzer |
| E444xA-AYZ | External mixing |

| OML | |
|---|---|
| 2378H231X | FCC Part 15 bundle, 40-220 GHz WR-19, WR-12, WR-08, WR-05 harmonic mixers Plus standard gain (+24 dBi) horn antennas |
| M19HWDX + M19RH | WR-19, 40-60 GHz, mixer + horn |
| M12HWDX + M12RH | WR-12, 60-90 GHz, mixer + horn |
| M08HWDX + M08RH | WR-08, 90-140 GHz, mixer + horn |
| M05HWDX + M05RH | WR-05, 140-220 GHz, mixer + horn |
| DPL-26 | External diplexer for Keysight PSA |

Note: X adds CSV data. Model numbers for PSA are MxxHWD (without CSV data)

To learn how this solution can address your specific needs please contact Keysight's solutions partner, OML
www.keysight.com/find/oml

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OML, Inc. is a premier supplier of innovative millimeter and sub-millimeter wave frequency extension products for vector network analyzers, scalar network analyzers, spectrum analyzers, converters, and signal generators. Our solutions empower engineers in R&D and manufacturing to pursue opportunities in emerging applications spanning radio astronomy, communication, imaging, space research, and homeland security
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