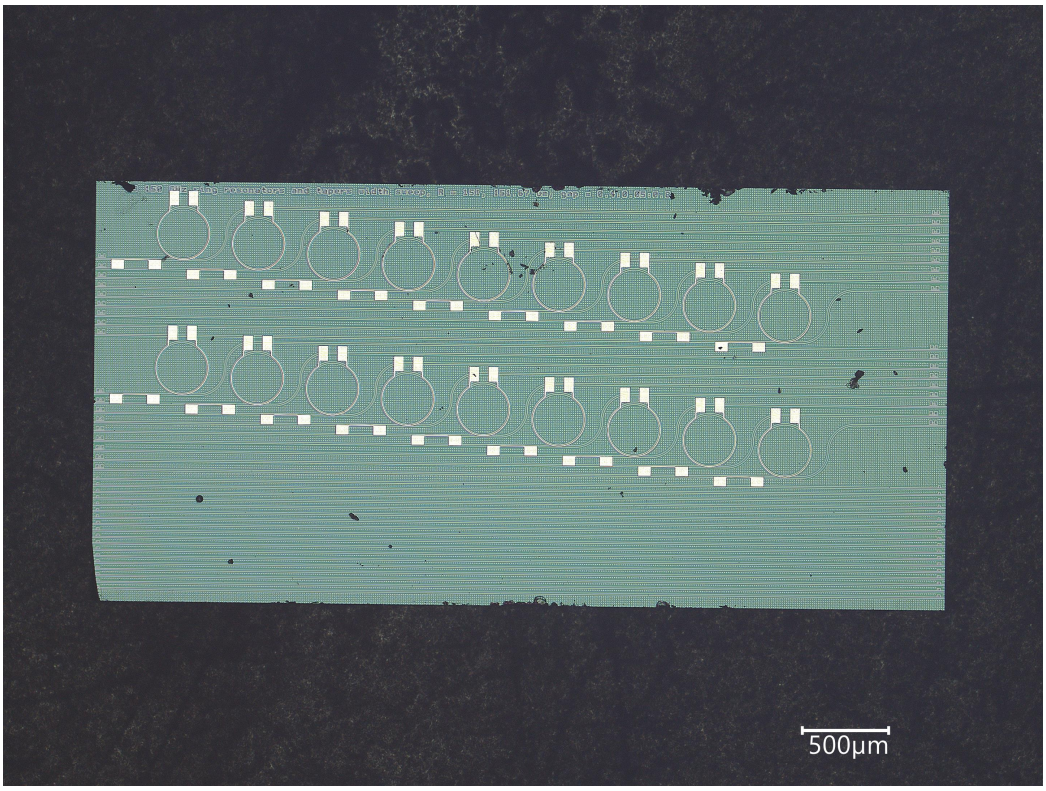
CHARACTERIZATION REPORT

Model: DKS-BD-1550

CHIP ID: DLT-DKS-BD-1550-0004



FSR=150 GHz, center wavelength=1550 nm

0.1 Microscope image of the comb die

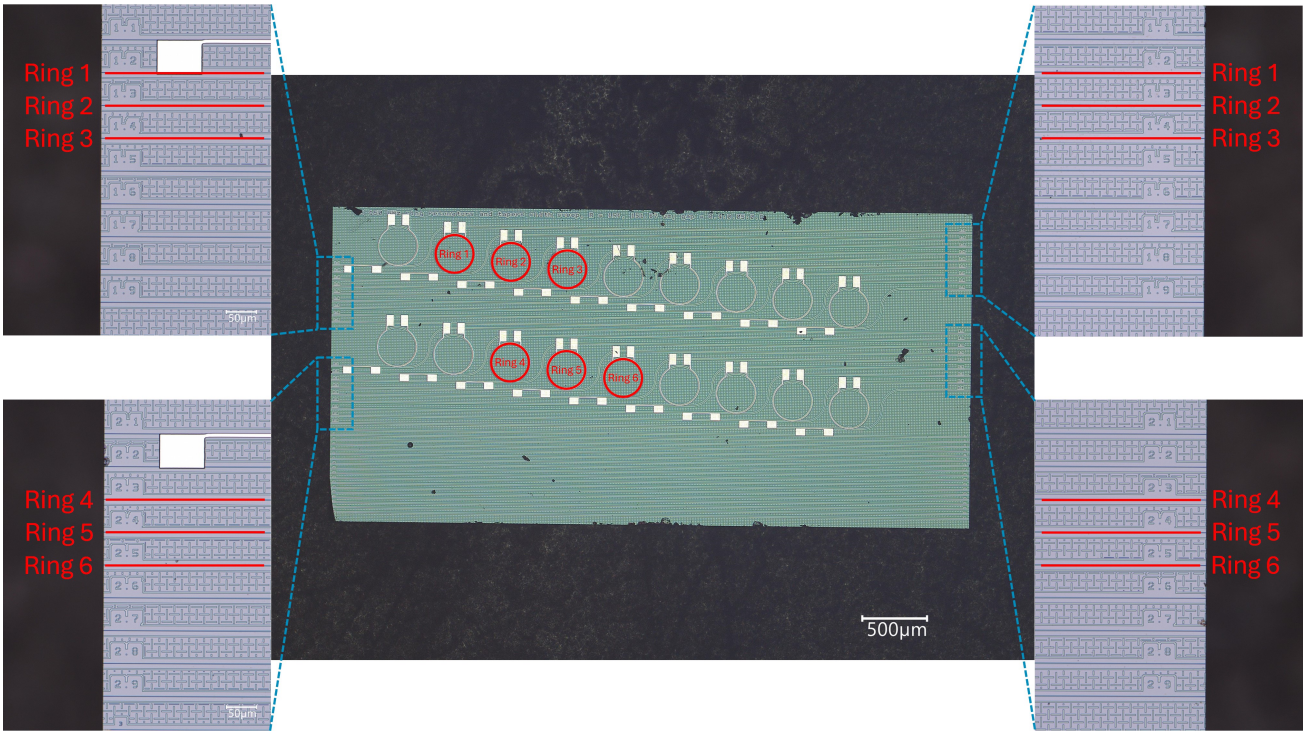


Figure 1: Microscope image of the comb die. The known good rings are indicated by the red circles. The associated input and output edge couplers are zoomed-in.

Ring 1

1.1 Ring Characterization Data

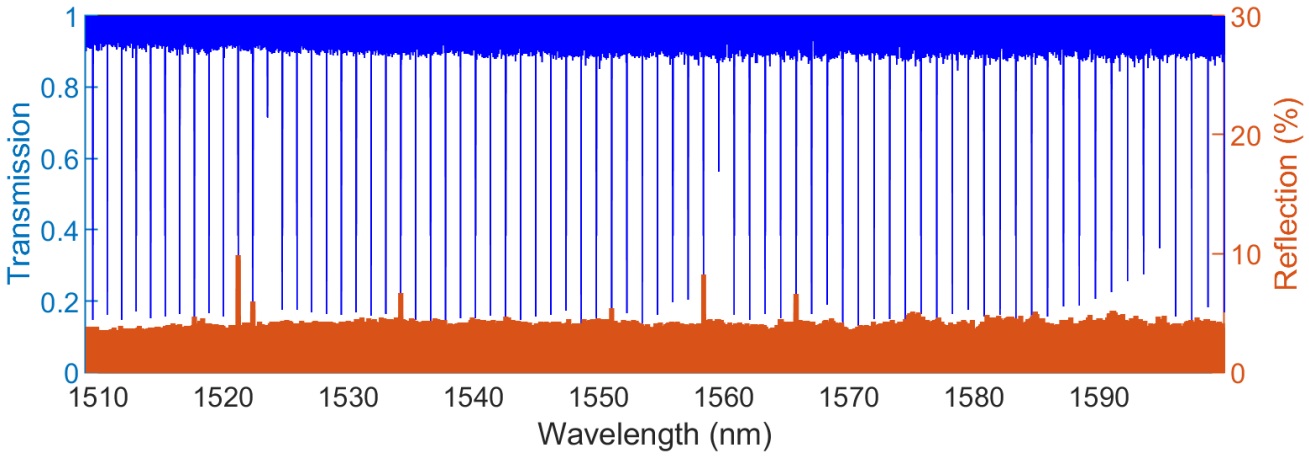


Figure 1.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

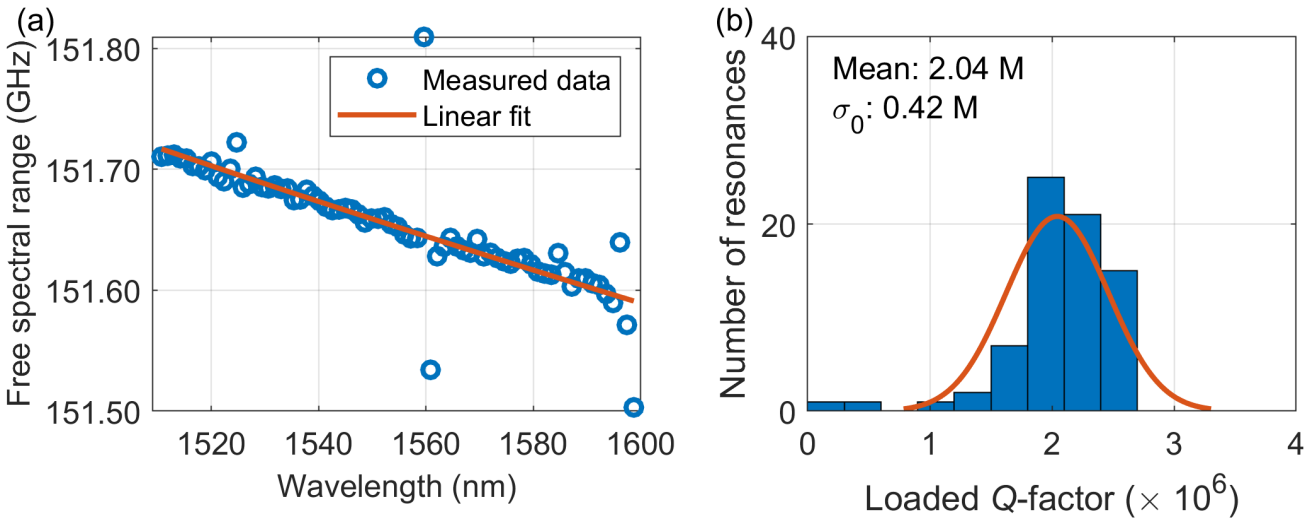


Figure 1.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

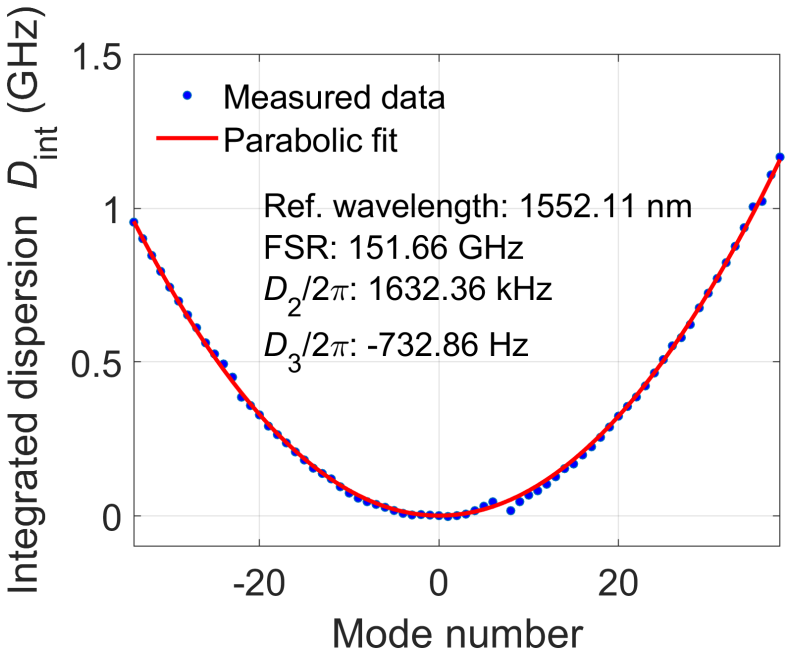


Figure 1.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

1.2 Comb Generation Data

Table 1.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1554.8	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	24.7	dB
Comb 3dB bandwidth (#lines)	28.2 (23 lines)	nm
Comb 10dB bandwidth (#lines)	57.6 (47 lines)	nm

[2]Input power corresponds to power at input fiber-end.

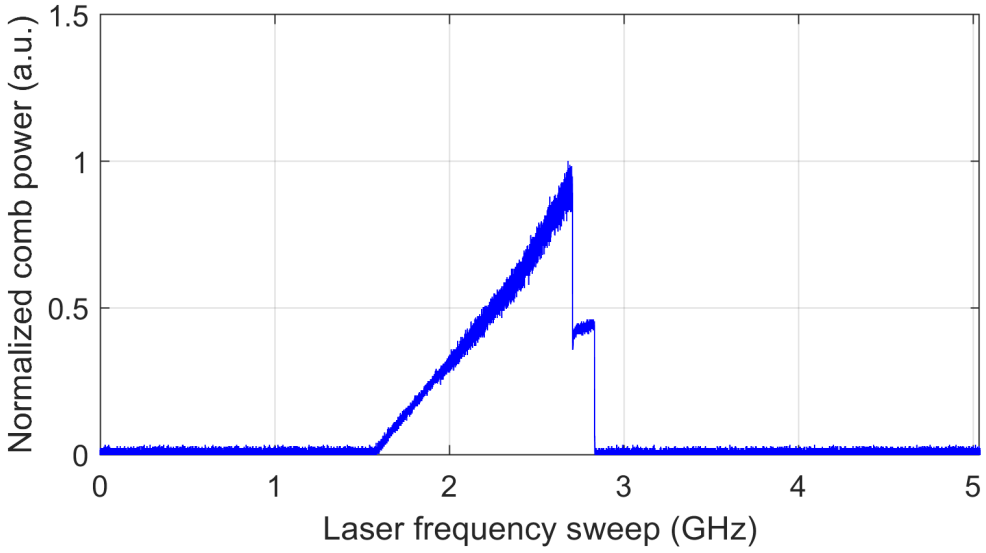


Figure 1.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

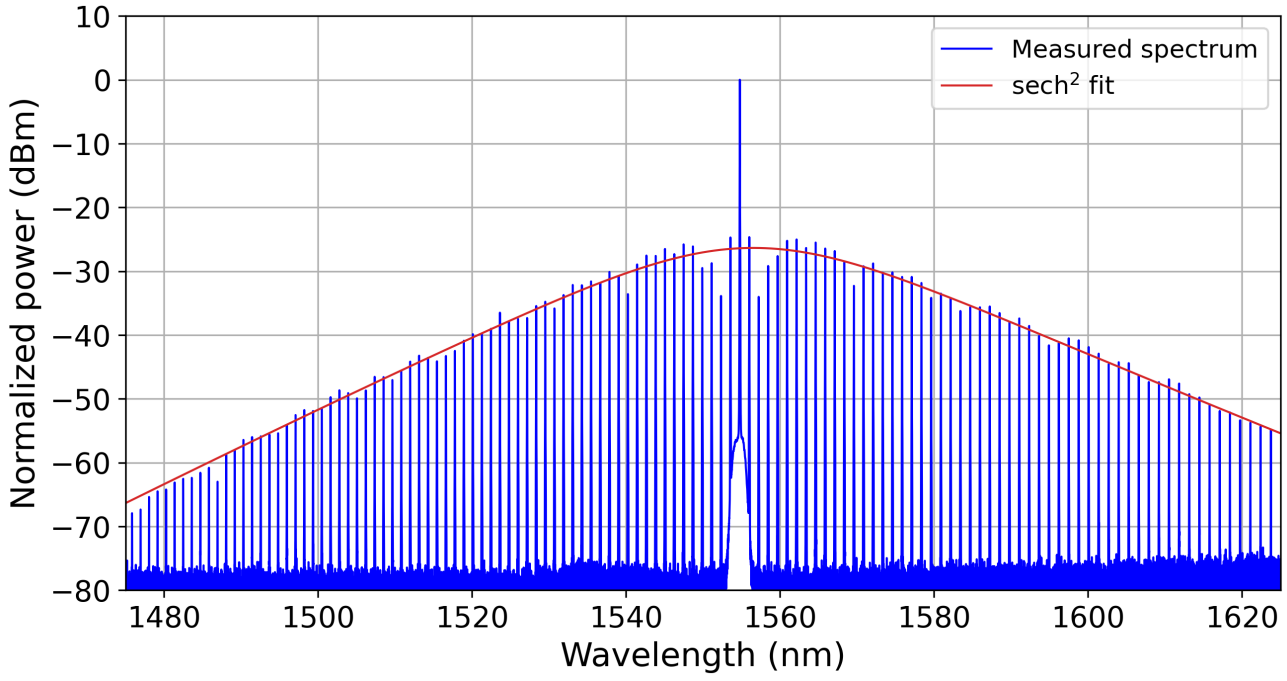


Figure 1.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Ring 2

2.1 Ring Characterization Data

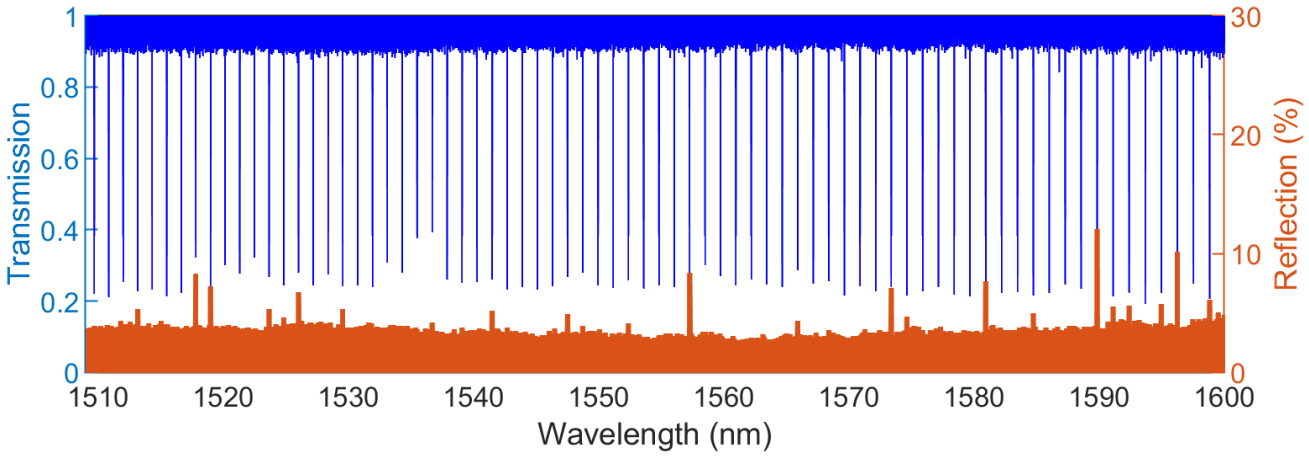


Figure 2.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

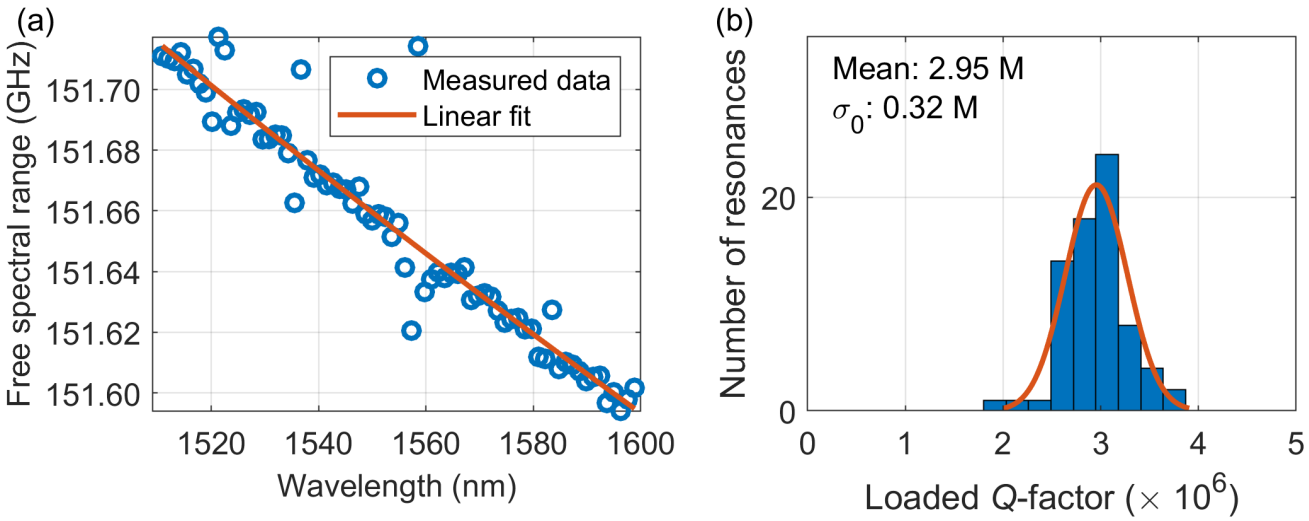


Figure 2.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

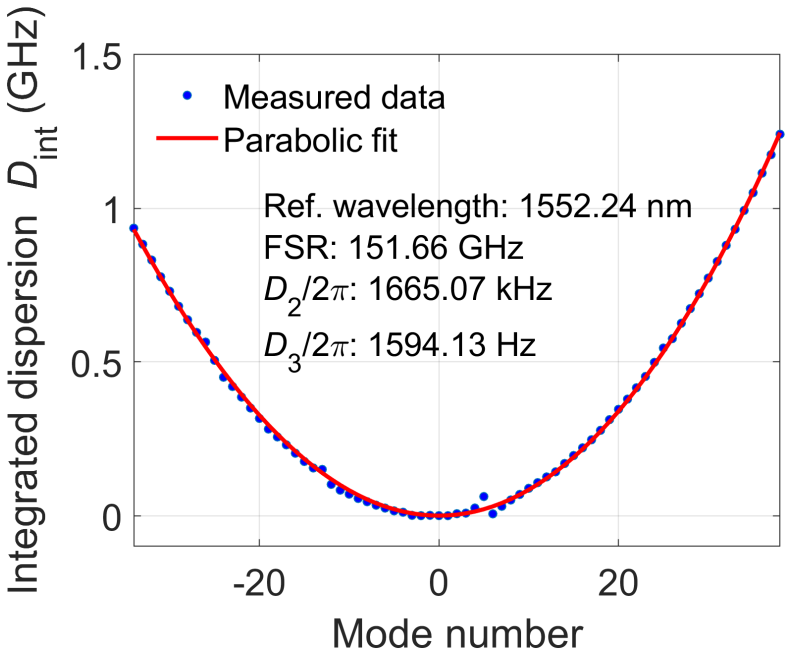


Figure 2.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

2.2 Comb Generation Data

Table 2.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1553.6	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	32.9	dB
Comb 3dB bandwidth (#lines)	34.7 (28 lines)	nm
Comb 10dB bandwidth (#lines)	73.1 (59 lines)	nm

[2]Input power corresponds to power at input fiber-end.

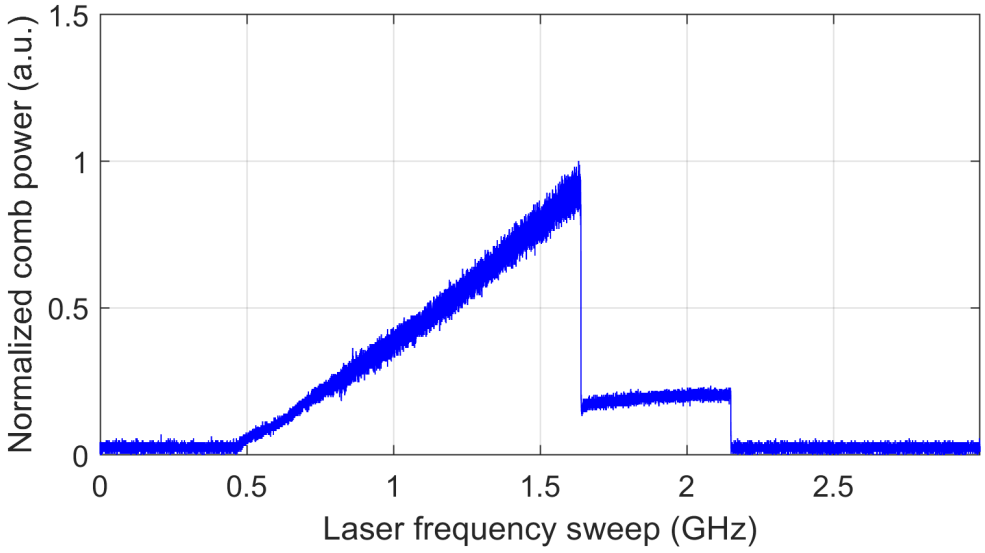


Figure 2.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

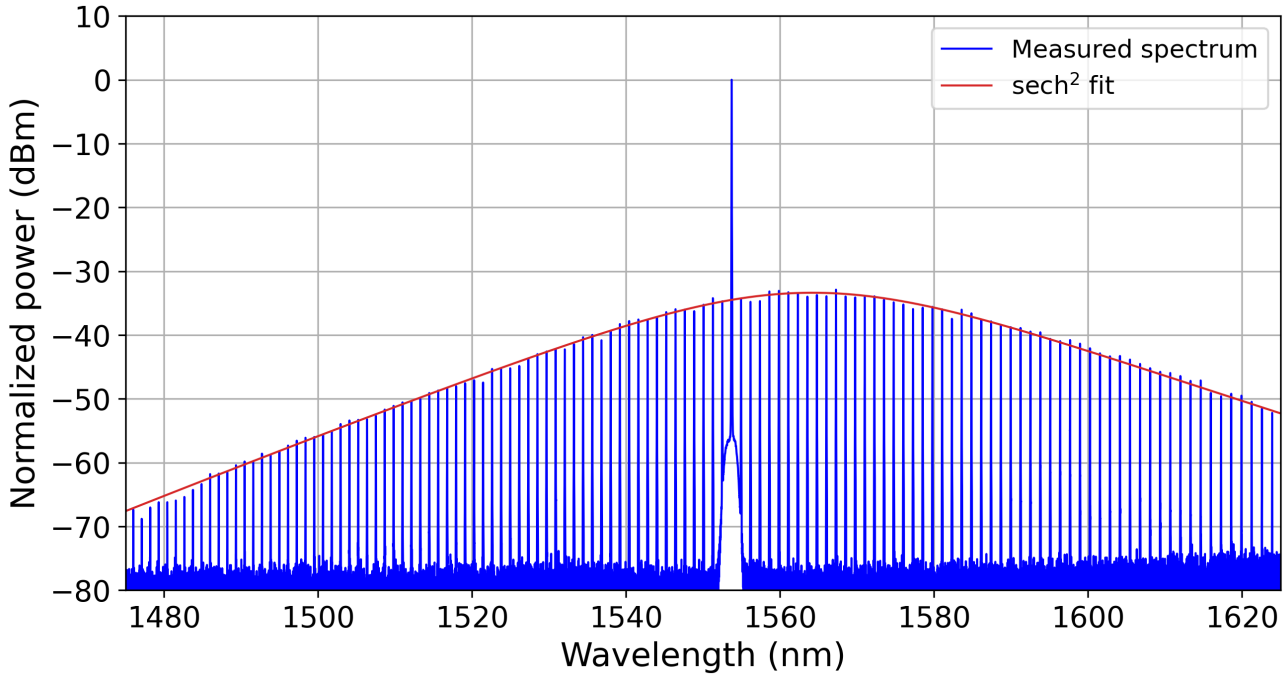


Figure 2.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Ring 3

3.1 Ring Characterization Data

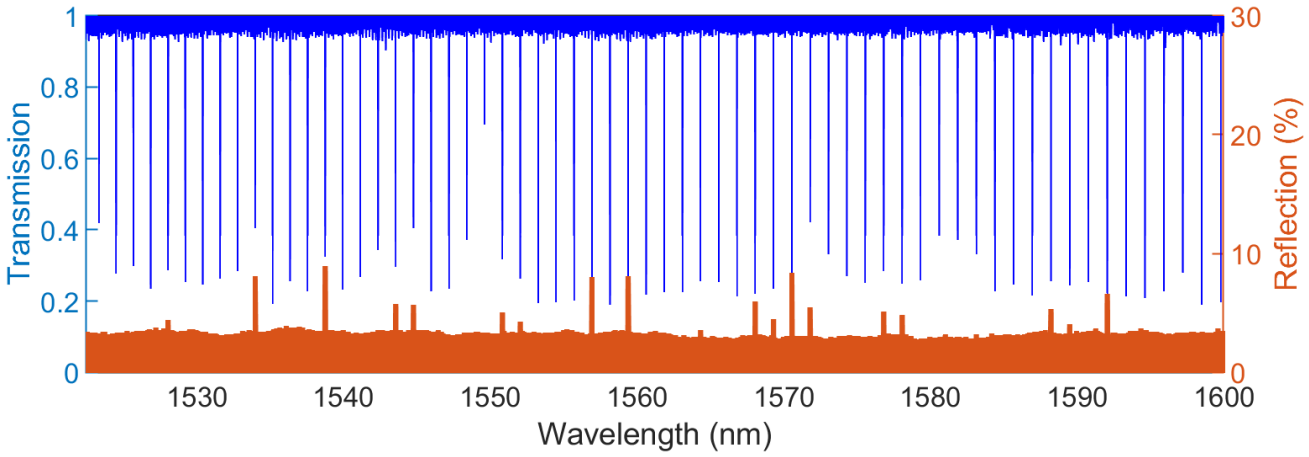


Figure 3.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

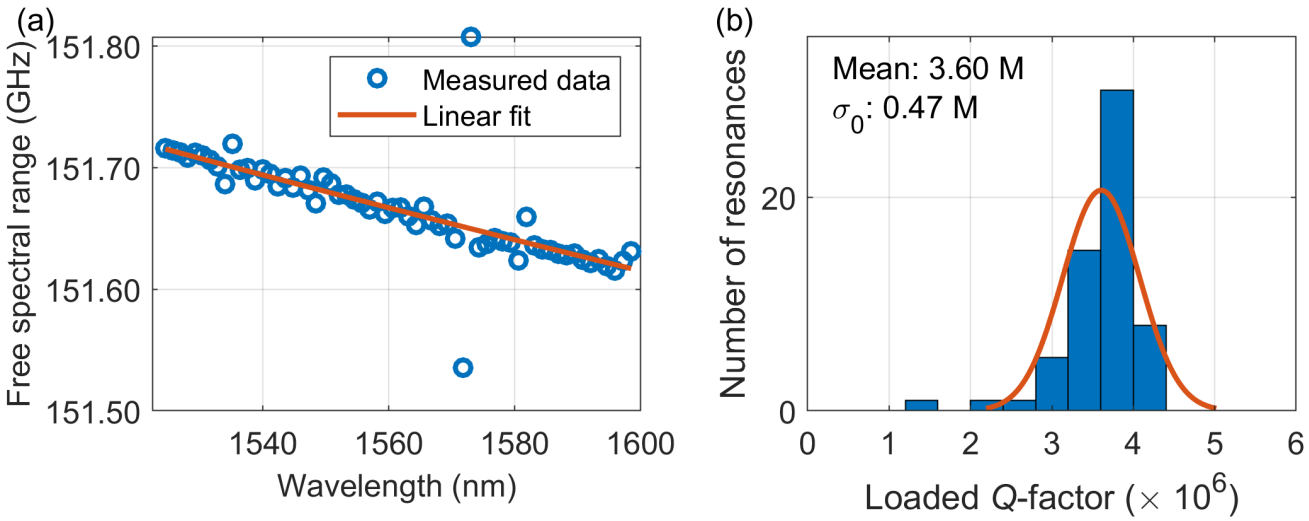


Figure 3.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

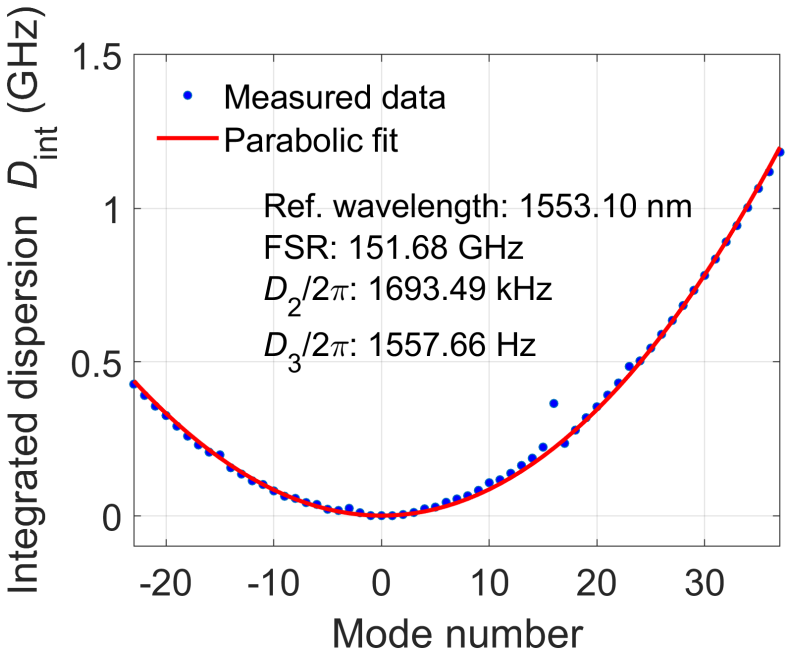


Figure 3.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

3.2 Comb Generation Data

Table 3.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1553.9	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	33.3	dB
Comb 3dB bandwidth (#lines)	23.3 (19 lines)	nm
Comb 10dB bandwidth (#lines)	50.3 (41 lines)	nm

[2]Input power corresponds to power at input fiber-end.

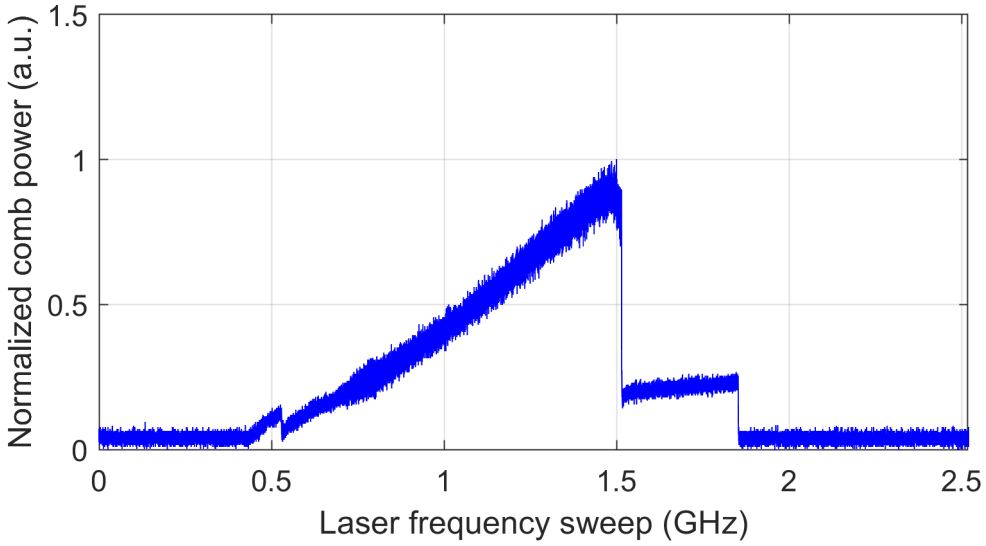


Figure 3.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

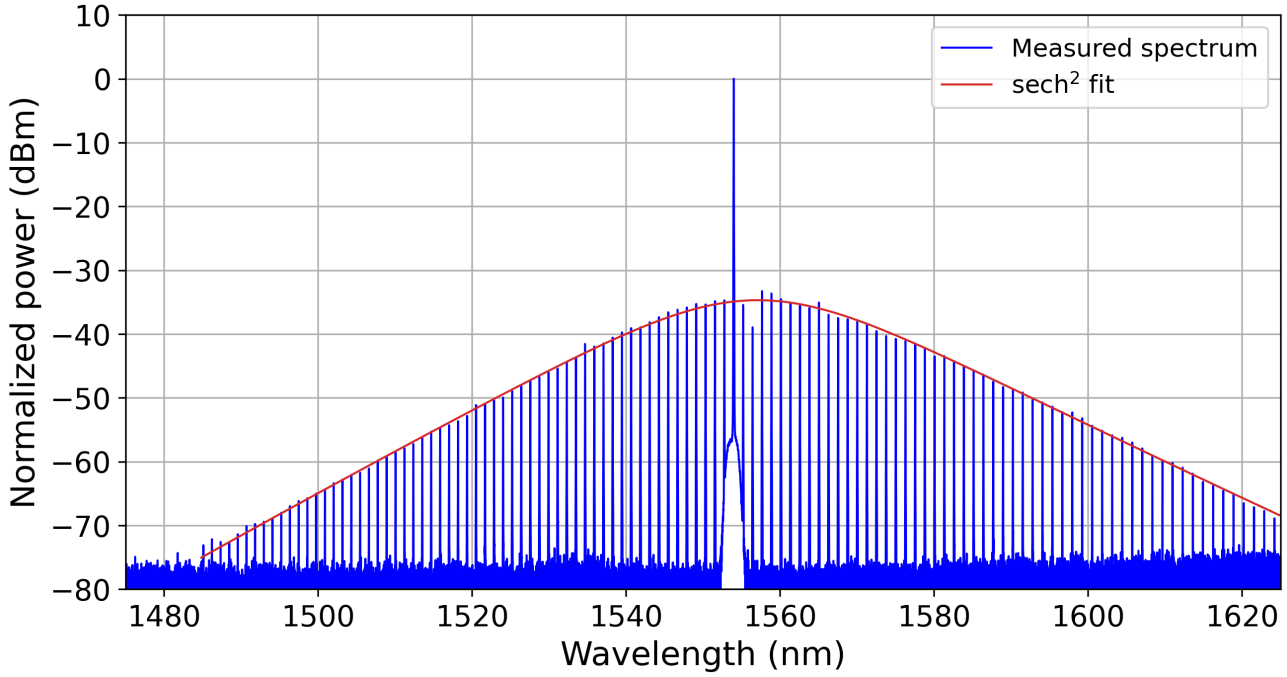


Figure 3.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Ring 4

4.1 Ring Characterization Data

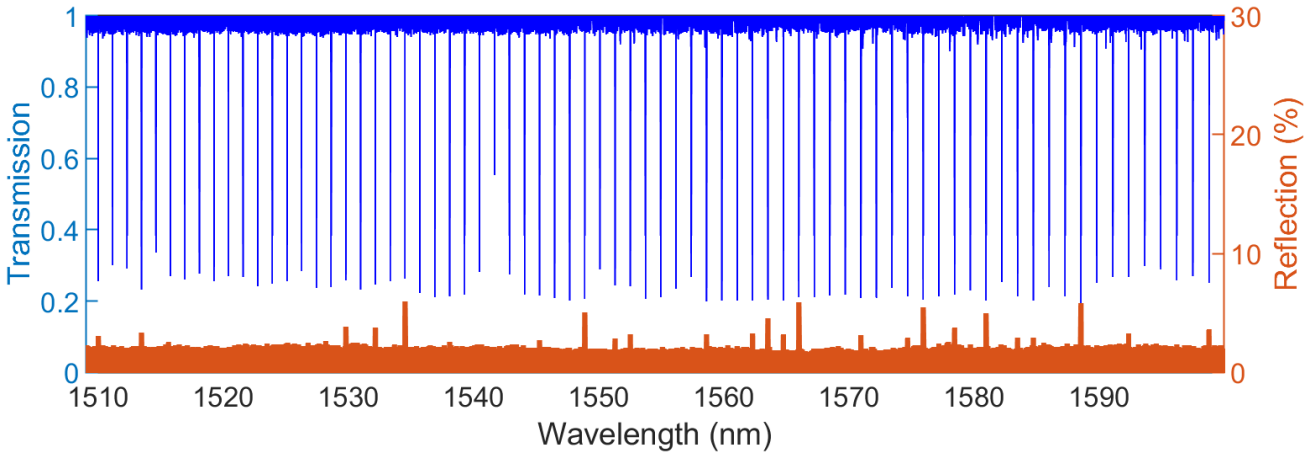


Figure 4.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

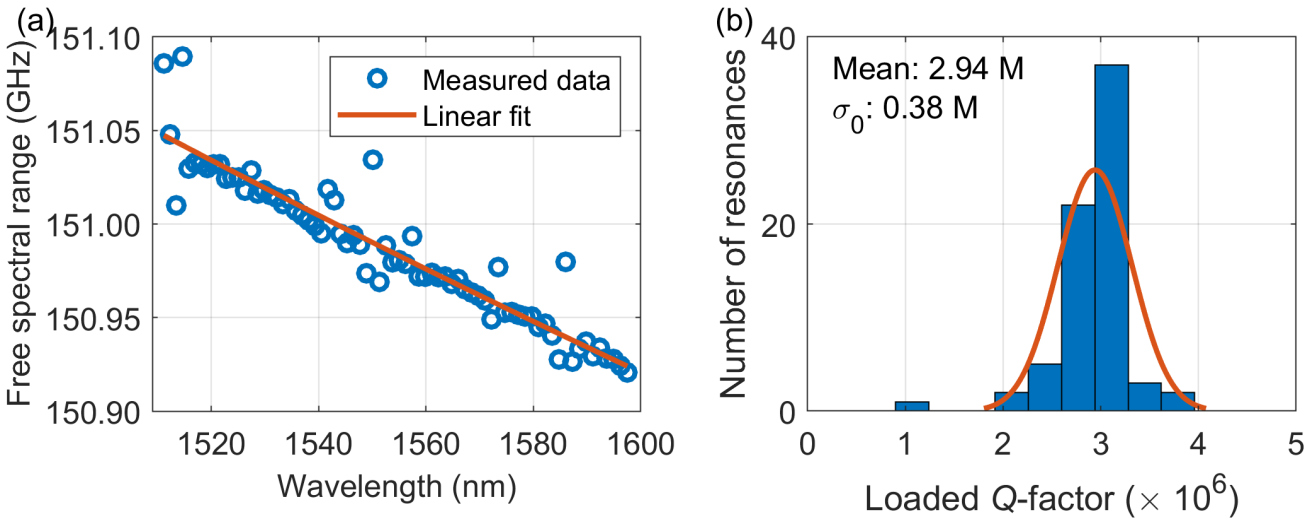


Figure 4.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

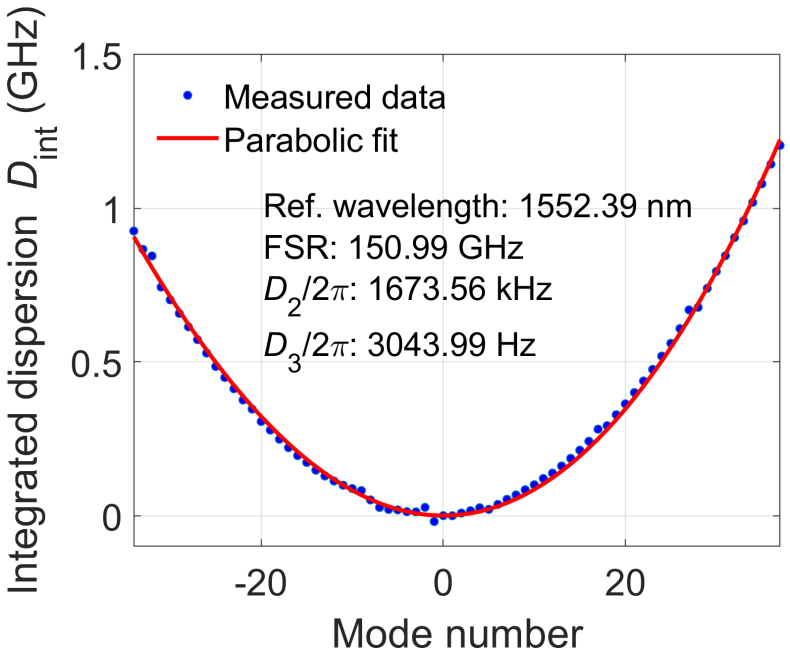


Figure 4.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

4.2 Comb Generation Data

Table 4.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1553.9	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	30.4	dB
Comb 3dB bandwidth (#lines)	22.0 (18 lines)	nm
Comb 10dB bandwidth (#lines)	46.4 (38 lines)	nm

[2]Input power corresponds to power at input fiber-end.

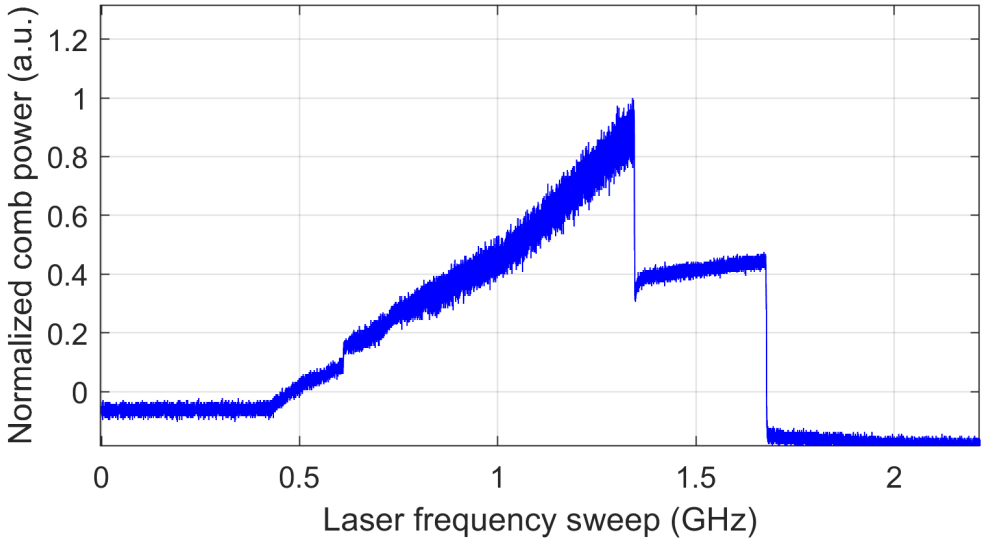


Figure 4.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

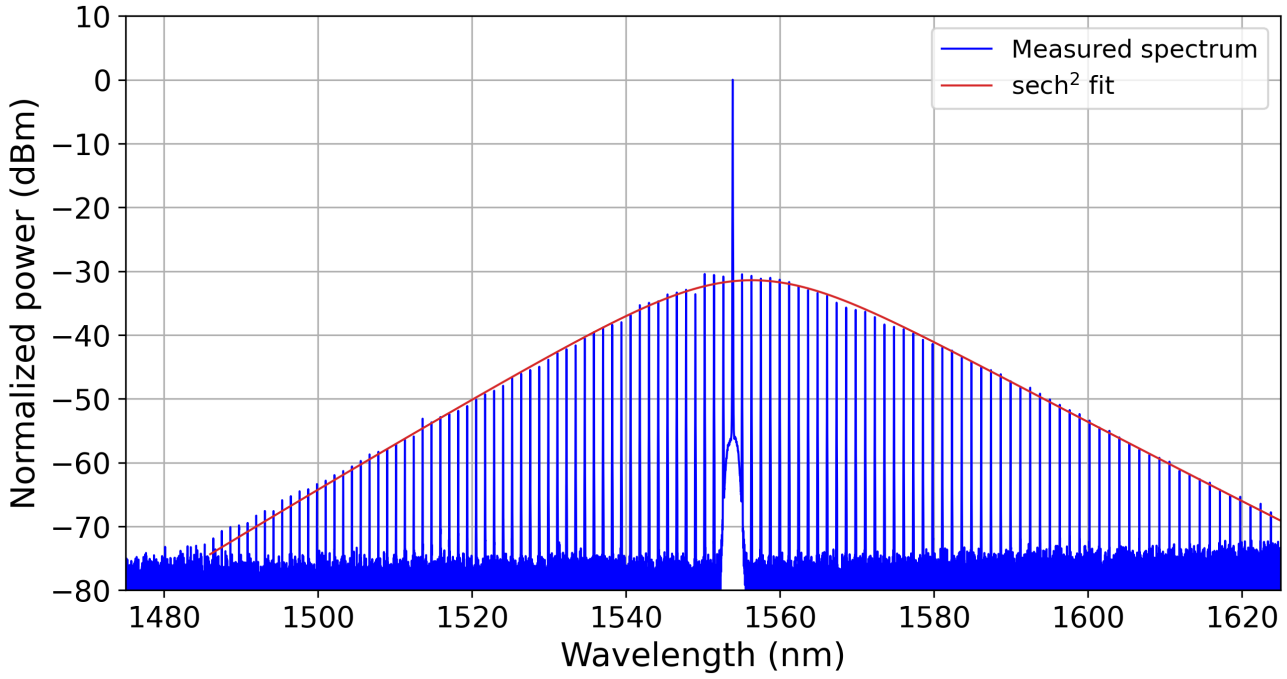


Figure 4.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Ring 5

5.1 Ring Characterization Data

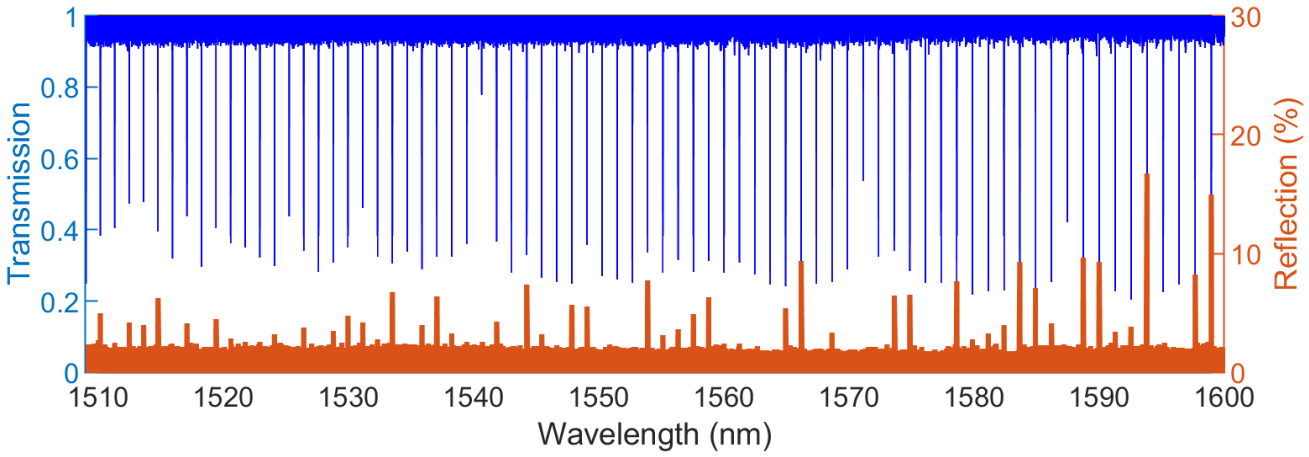


Figure 5.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

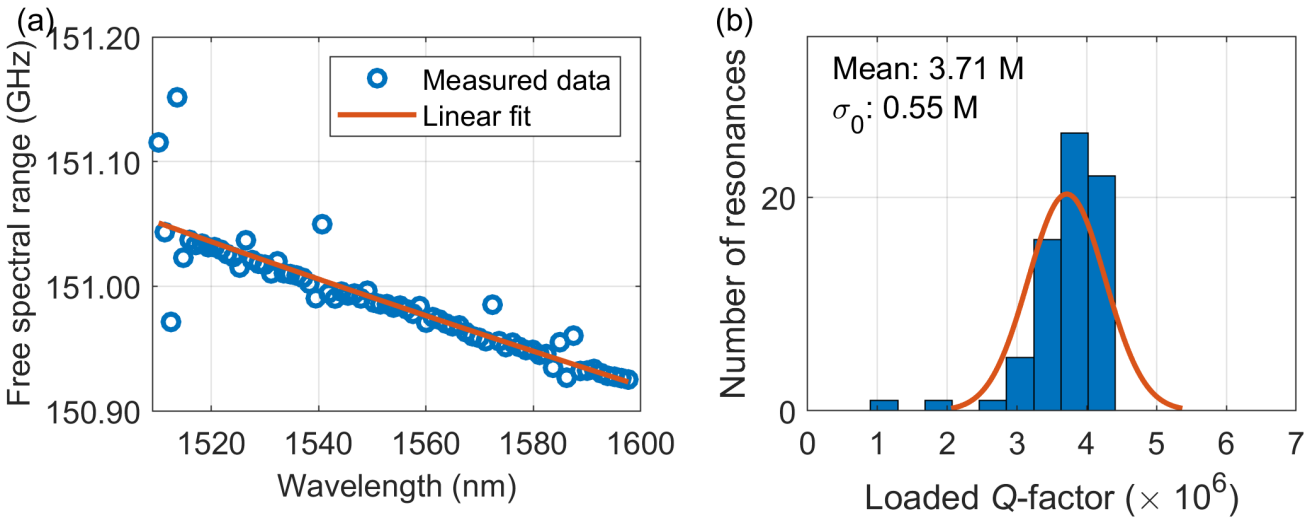


Figure 5.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

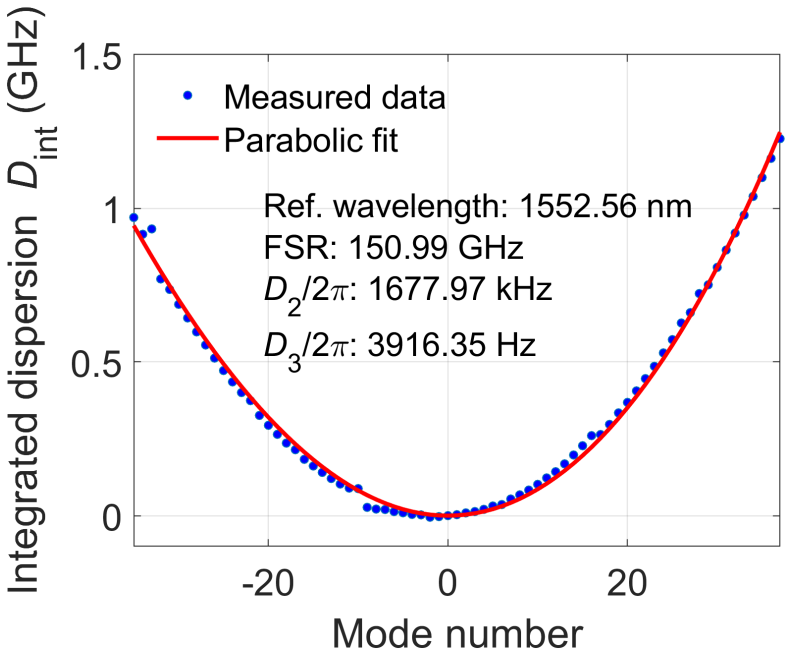


Figure 5.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

5.2 Comb Generation Data

Table 5.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1554	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	35.9	dB
Comb 3dB bandwidth (#lines)	33.4 (27 lines)	nm
Comb 10dB bandwidth (#lines)	69.2 (56 lines)	nm

[2]Input power corresponds to power at input fiber-end.

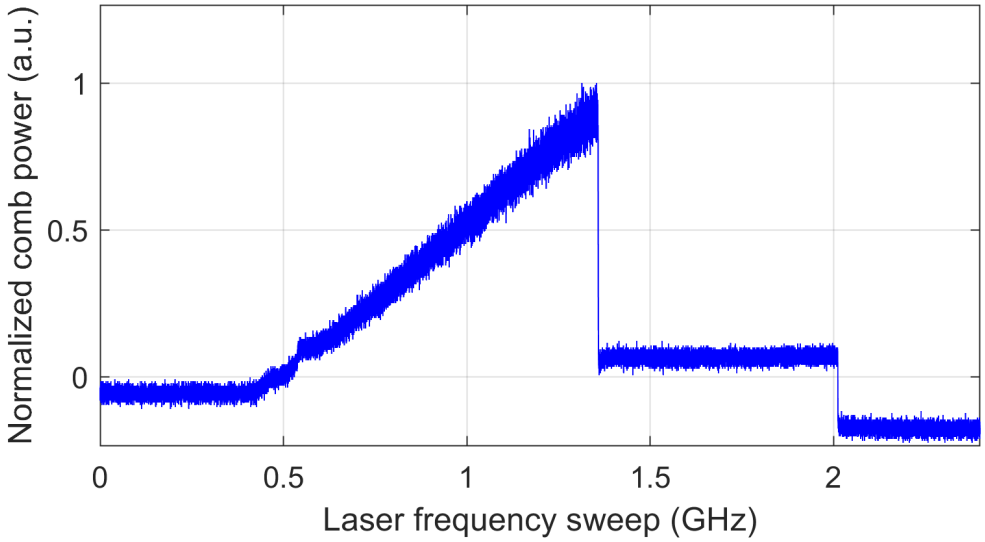


Figure 5.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

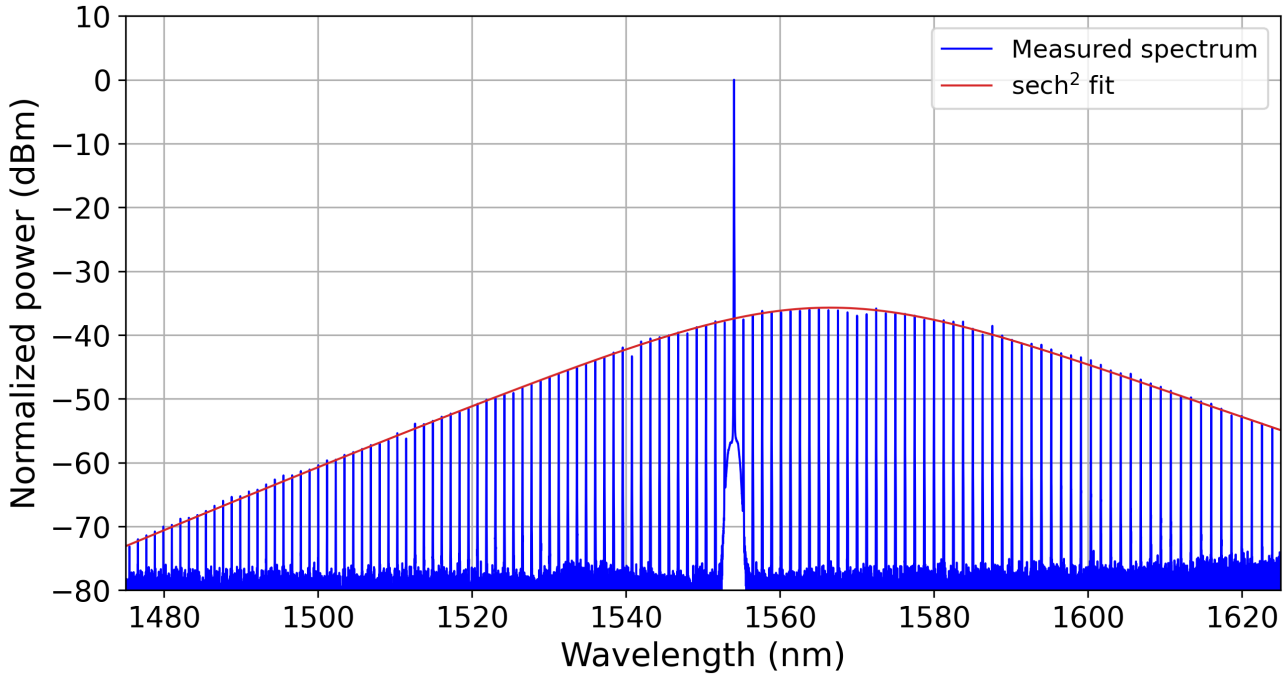


Figure 5.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Ring 6

6.1 Ring Characterization Data

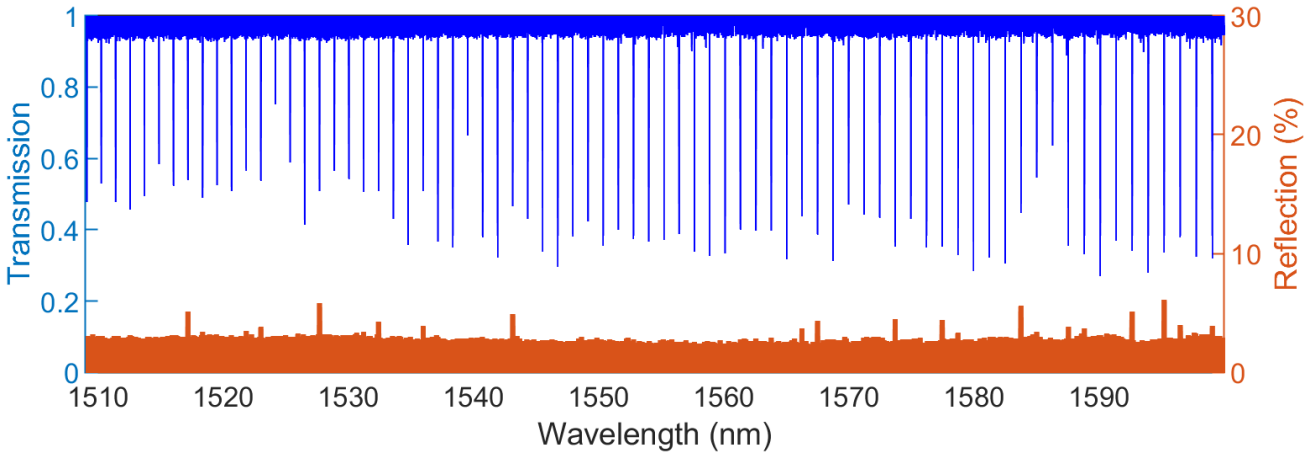


Figure 6.1: On-chip power transmission (blue) and reflection (red) coefficients vs. wavelength.

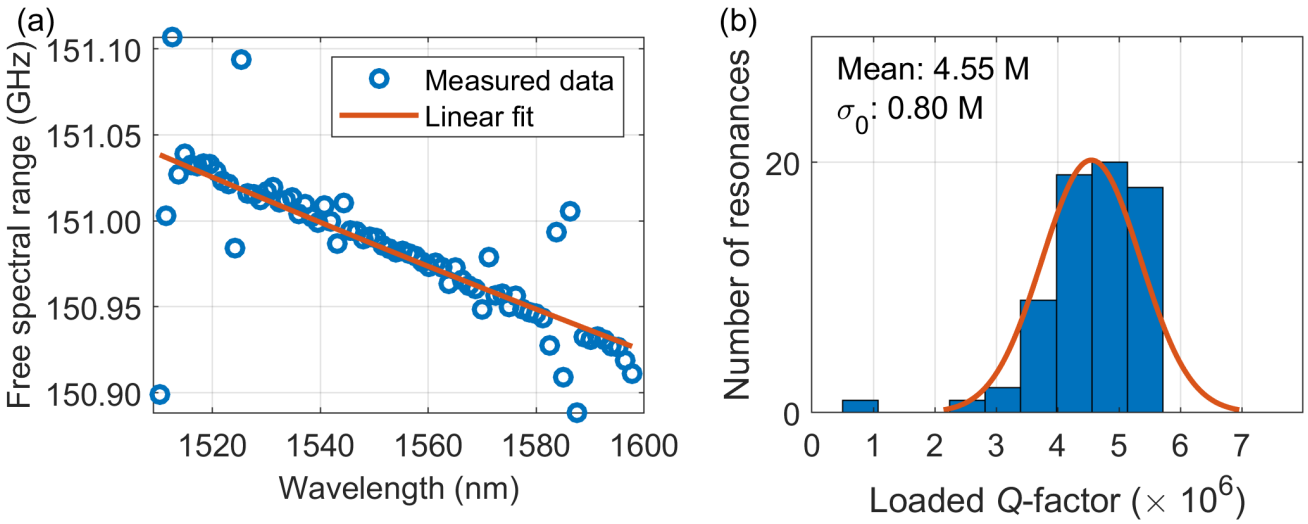


Figure 6.2: (a) Measured free spectral range (FSR). (b) Histogram distribution of loaded quality-factor (Q-factor).

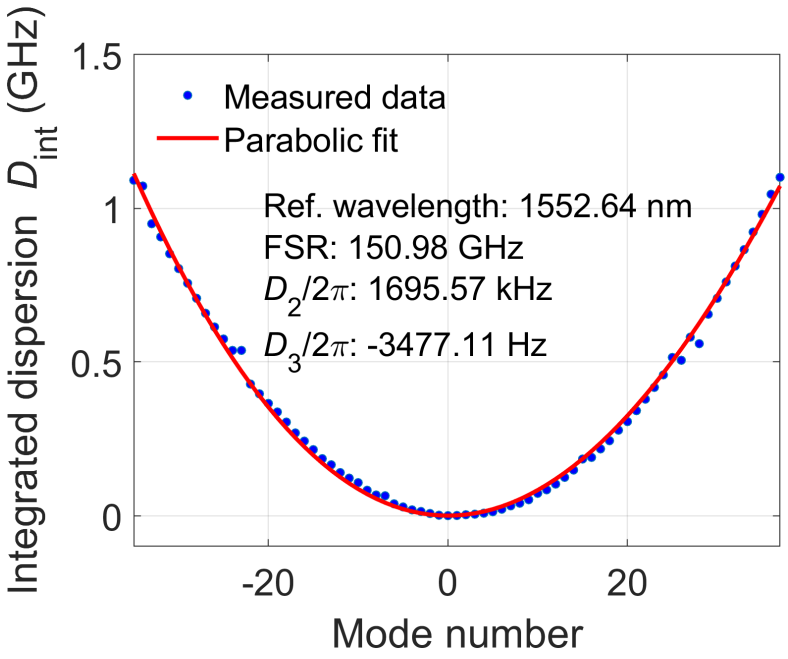


Figure 6.3: Integrated dispersion at a wavelength of 1552 nm[1].

[1]The integrated dispersion corresponds to the frequency deviations of the resonances from an equidistant grid centered at the reference wavelength, for details refer to "V. Brasch, M. Geiselmann, T. Herr, G. Lihachev, M. H. P. Pfeiffer, M. L. Gorodetsky, and T. J. Kippenberg. Photonic chip–based optical frequency comb using soliton Cherenkov radiation. Science, 351(6271), pp.357-360, (2015)".

6.2 Comb Generation Data

Table 6.1: Operation parameters and performance metrics

Parameter	Value	Unit
Input power[2]	200	mW
Pump wavelength	1554.1	nm
Temperature	25	°C
Edge coupler MFD	2	µm
Pump-to-comb power ratio	37.2	dB
Comb 3dB bandwidth (#lines)	30.9 (25 lines)	nm
Comb 10dB bandwidth (#lines)	64.4 (52 lines)	nm

[2]Input power corresponds to power at input fiber-end.

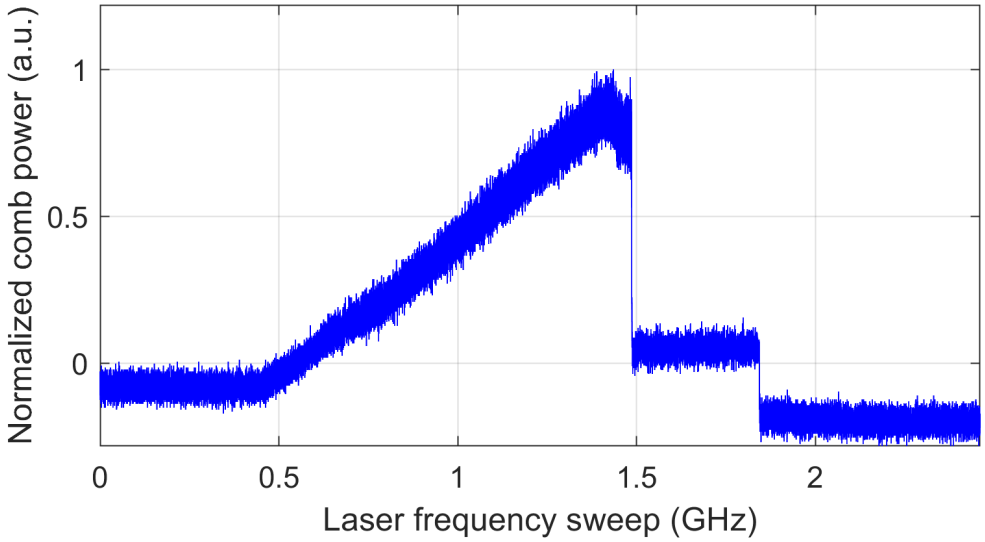


Figure 6.4: Normalized comb power obtained when scanning the laser frequency across the pumped resonance[3]. The operating parameters are shown in Table 1.1.

[3]To measure the comb power as a function of laser frequency sweep, the pump frequency is swept from the blue-detuned region to the red-detuned region with respect to the center of the ring resonance. The power of the generated comb with the suppressed pump tone is measured by a photodetector.

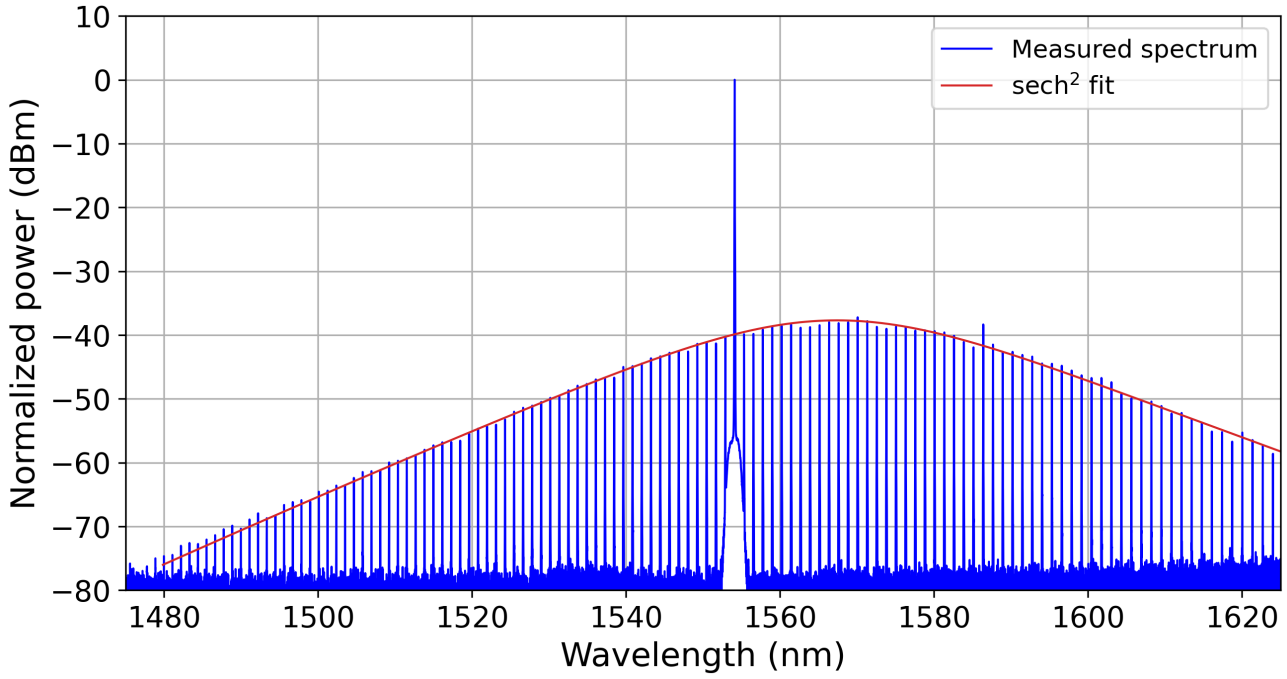


Figure 6.5: Single soliton optical spectrum obtained by operating the device with the parameters specified in Table 1.1.

Technical support

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