Expressions for the field components of the magnetic field in a resonator, created on the base of a circular waveguide.

$$H_r = H_{r0} J'_m\left(\frac{\mu_{mn}}{R} r\right)\cos(m\varphi)\cos\left(\frac{p\pi}{l} z\right)\cos\left(\omega_{rez} t - \frac{\pi}{2}\right);$$

$$H_\varphi = H_{\varphi 0} J_m\left(\frac{\mu_{mn}}{R} r\right)\sin(m\varphi)\cos\left(\frac{p\pi}{l} z\right)\cos\left(\omega_{rez} t + \frac{\pi}{2}\right);$$

$$H_z = H_{z0} J_m\left(\frac{\mu_{mn}}{R} r\right)\cos(m\varphi)\sin\left(\frac{p\pi}{l} z\right)\cos\left(\omega_{rez} t - \frac{\pi}{2}\right);$$

$$E_r = E_{r0} J_m\left(\frac{\mu_{mn}}{R} r\right)\sin(m\varphi)\sin\left(\frac{p\pi}{l} z\right)\cos(\omega_{rez} t);$$

$$E_\varphi = E_{\varphi 0} J'_m\left(\frac{\mu_{mn}}{R} r\right)\cos(m\varphi)\sin\left(\frac{p\pi}{l} z\right)\cos(\omega_{rez} t);$$

$$E_z = 0.$$

Expressions for the field components of the electric field in a resonator, created on the base of a circular waveguide.

$$E_r = -E_{r0} J'_m\left(\frac{\nu_{mn}}{R} r\right)\cos(m\varphi)\sin\left(\frac{p\pi}{l} z\right)\cos(\omega_{rez} t);$$

$$E_\varphi = E_{\varphi 0} J_m\left(\frac{\nu_{mn}}{R} r\right)\sin(m\varphi)\sin\left(\frac{p\pi}{l} z\right)\cos(\omega_{rez} t);$$

$$E_z = E_{z0} J_m\left(\frac{\nu_{mn}}{R} r\right)\cos(m\varphi)\cos\left(\frac{p\pi}{l} z\right)\cos(\omega_{rez} t);$$

$$H_r = H_{r0} J_m\left(\frac{\nu_{mn}}{R} r\right)\sin(m\varphi)\cos\left(\frac{p\pi}{l} z\right)\cos\left(\omega_{rez} t - \frac{\pi}{2}\right);$$

$$H_\varphi = H_{\varphi 0} J'_m\left(\frac{\nu_{mn}}{R} r\right)\cos(m\varphi)\cos\left(\frac{p\pi}{l} z\right)\cos\left(\omega_{rez} t - \frac{\pi}{2}\right);$$

$$H_z = 0.$$

Resonance frequency f_{rez} and the resonance wavelength λ_{rez} of circular cavity in the case of electrical type waves.

E_{mnp}, circular resonator,
R=10mm, l=50mm.

m	n	p	λ_{rez}, mm	f_{rez}, GHz
0	1	0	26,14	11,48
0	1	1	25,29	11,86
0	1	2	23,16	12,95
0	1	3	20,57	14,59
0	1	4	18,07	16,61
1	1	0	16,40	18,29
1	1	1	16,18	18,54
0	1	5	15,88	18,89
1	1	2	15,58	19,25
1	1	3	14,72	20,39

$$f_{rez} = \frac{c}{2\pi}\sqrt{\left(\frac{p\pi}{l}\right)^2 + \left(\frac{\nu_{mn}}{R}\right)^2};$$

$$\lambda_{rez} = \frac{2\pi}{\sqrt{\left(\frac{p\pi}{l}\right)^2 + \left(\frac{\nu_{mn}}{R}\right)^2}}.$$

Resonance frequency f_{rez} and the resonance wavelength λ_{rez} of circular cavity in the case of magnetic type waves.

H_{mnp}, circular resonator,
R=10mm, l=50mm.

m	n	p	λ_{rez}, mm	f_{rez}, GHz
1	1	1	32,32	9,28
1	1	2	28,20	10,64
1	1	3	23,85	12,58
1	1	4	20,17	14,87
2	1	1	20,16	14,88
2	1	2	19,03	15,76
2	1	3	17,51	17,13
1	1	5	17,26	17,38
0	1	1	16,18	18,54
2	1	4	15,89	18,88

$$f_{rez} = \frac{c}{2\pi}\sqrt{\left(\frac{p\pi}{l}\right)^2 + \left(\frac{\mu_{mn}}{R}\right)^2};$$

$$\lambda_{rez} = \frac{2\pi}{\sqrt{\left(\frac{p\pi}{l}\right)^2 + \left(\frac{\mu_{mn}}{R}\right)^2}}.$$