

Letter for FCC

Subject: Justification for 125 kHz Transmitter Compliance with FCC Part 15.209

To Whom It May Concern,

This letter provides justification for classifying the 125 kHz transmitter under the provisions of FCC Part 15.209.

The transmitter fundamental at 125 kHz was measured at a maximum field strength of **54.769 dB μ V/m at 3 meters**.

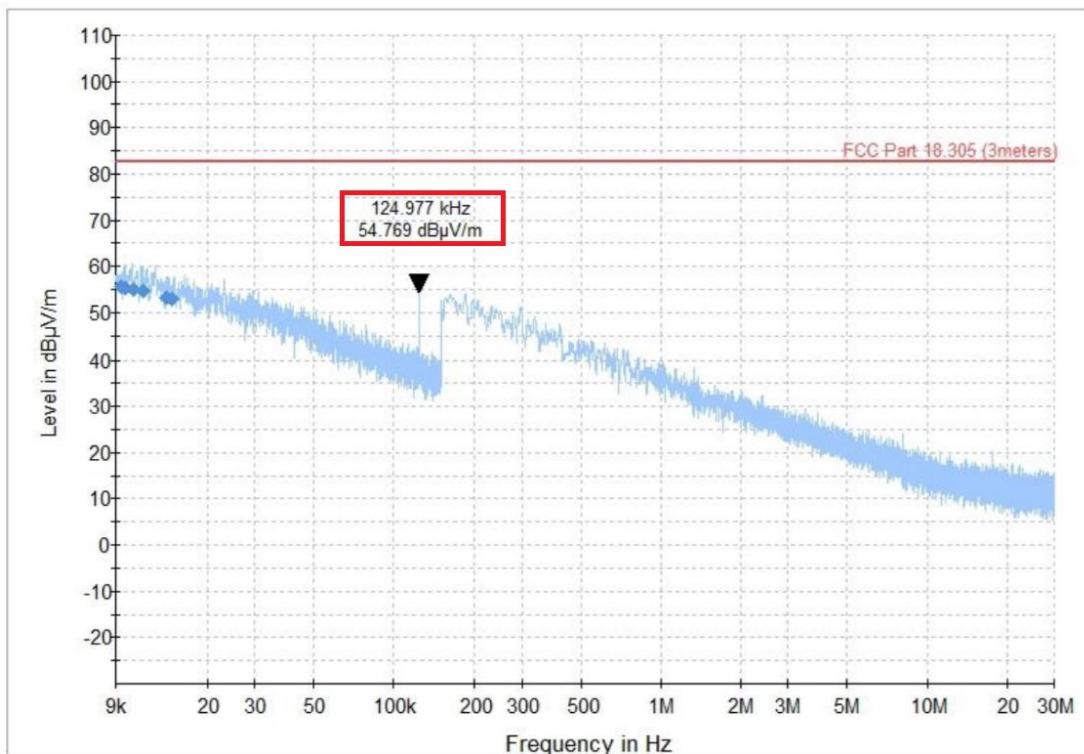


Figure 8.1-2: Radiated emissions spectral plot (9 kHz - 30 MHz) - 90 Degree

Table 8.1-2: Radiated emissions results

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
0.009468	55.57	82.60	27.03	15000.0	0.200	H	227.0	19.4
0.009773	55.41	82.60	27.19	15000.0	0.200	H	282.0	19.2
0.010520	54.87	82.60	27.73	15000.0	0.200	H	336.0	18.8
0.011471	54.58	82.60	28.02	15000.0	0.200	H	170.0	18.4
0.014056	53.28	82.60	29.32	15000.0	0.200	H	61.0	17.2
0.014652	53.05	82.60	29.55	15000.0	0.200	H	309.0	17.0

Notes: ¹ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

According to FCC Part 15.209(a), the general radiated emission limit for frequencies between 9 kHz and 490 kHz is defined as:

Field strength (μ V/m) = 2400 / F(kHz), measured at 300 meters.

At 125 kHz, the applicable limit at 300 meters is:

- $2400 / 125 = 19.2 \mu$ V/m
- Equivalent in logarithmic units: **25.7 dB μ V/m**

As specified in §15.31(f)(2), for measurements made below 30 MHz, limits are adjusted for measurement distances using a factor of $40 \times \log_{10}(d_1/d_2)$, unless the measurement is made in the far field. Applying this factor to convert from 300 meters to 3 meters:

$$40 \times \log_{10}(300/3) = 80 \text{ dB}$$

Thus, the corrected limit at 3 meters is:

$$25.7 \text{ dB μ V/m} + 80 \text{ dB} = \mathbf{105.7 \text{ dB μ V/m}}$$

The maximum measured field strength of **54.769 dB μ V/m at 3 meters** is therefore more than **40 dB below** the applicable limit.

This demonstrates compliance with the general radiated emission limits of FCC Part 15.209. Accordingly, the transmitter is eligible for operation under Part 15 and does not require certification under Part 18.

Respectfully submitted,

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