

```
// src/codec/textEncoder.ts
```

```
import {
    getWavelengthForLetter,
    getLetterForWavelength,
    ALPHABET_MAP,
} from "../protocol/wavelengthMap";
```

```
/**  
 * Normalize text:  
 * - Uppercase  
 * - Filter to A-Z only (non-letters are dropped in v1.0)  
 */  
export function encodeTextToLetters(text: string): string[] {  
    const normalized = text.toUpperCase();  
    const letters: string[] = [];  
    for (let i = 0; i < normalized.length; i++) {  
        const ch = normalized[i];  
        if (ch >= "A" && ch <= "Z") {  
            letters.push(ch);  
        }  
        // Future versions: handle spaces, punctuation via special  
        // codes.  
    }  
    return letters;  
}  
  
/**  
 * Convert letters to wavelength sequence (nm).  
 * Letters that cannot be mapped are skipped.  
 */
```

```
*/  
export function encodeLettersToWavelengths(letters:  
string[]): number[] {  
    const wavelengths: number[] = [];  
    for (const letter of letters) {  
        const wl = getWavelengthForLetter(letter);  
        if (typeof wl === "number") {  
            wavelengths.push(wl);  
        }  
    }  
    return wavelengths;  
}  
  
/**  
 * Convenience: directly encode text into wavelength  
sequence.  
 */  
export function encodeTextToWavelengthSequence(text:  
string): number[] {  
    const letters = encodeTextToLetters(text);  
    return encodeLettersToWavelengths(letters);  
}  
  
/**  
 * Decoding utilities  
 */  
  
/**  
 * Convert a sequence of wavelengths back into letters via  
nearest-neighbour mapping.  
 */
```

```
 */
export function decodeWavelengthsToLetters(wavelengths: number[]): string[] {
    return wavelengths
        .map((wl) => getLetterForWavelength(wl))
        .filter((l): l is string => !!l);
}

/** 
 * Convert letters to a reconstructed text string.
 * Currently simply joins letters without spaces.
 */
export function decodeLettersToText(letters: string[]): string {
    return letters.join("");
}

/** 
 * Helper to expose the alphabet mapping for UI purposes.
 */
export function getAlphabetMap() {
    return ALPHABET_MAP;
}
```