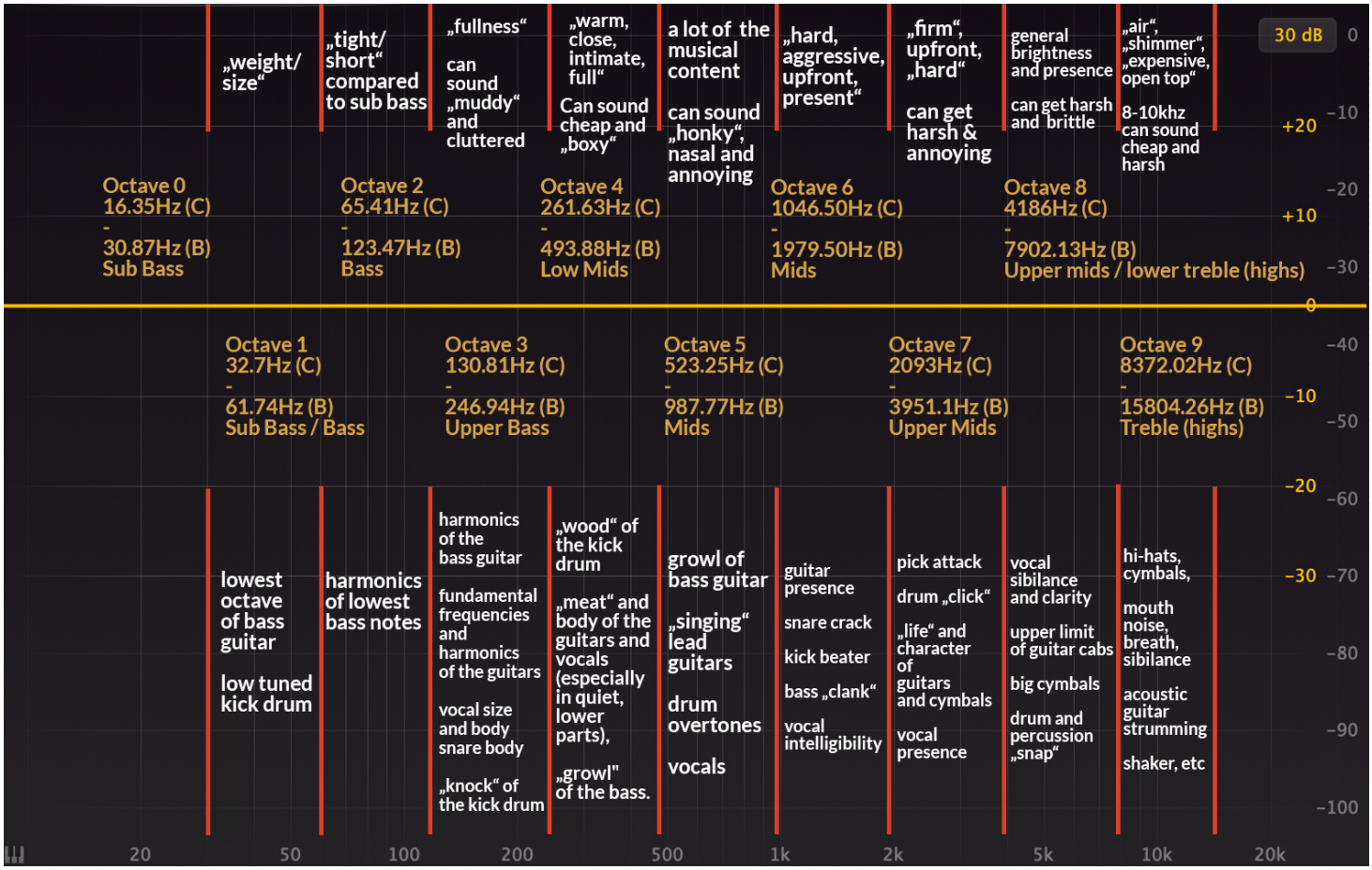
TSRB Academy Frequency Chart & Spectrum Overview



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Octave 0 | 16.35Hz (C) - 30.87Hz (B) | Sub Bass

This can't really be reproduced by most speakers systems. Humans can theoretically hear frequencies above 16Hz, but we feel this octave more than we actually hear it. The low „B“ on a 5-string bass guitar has the fundamental at 30.87 Hz. Most instruments (with the exception of some synth sounds) won't have any useful information lower than that.

Octave 1 | 32.7Hz (C) - 61.74Hz (B) | Sub Bass / Bass

Now it gets more interesting. This is where the lowest octave of the bass guitar lives and also the fundamental frequency of a low tuned kick drum. This area is where the „weight“ and „size“ is. Sounds round, „long“ and full, but rather undefined. Can get boomy quickly and there shouldn't be more than 1 or 2 elements in that area, usually. And only one should be really dominant here in most cases.

Octave 2 | 65.41Hz (C) - 123.47Hz (B) | Bass

This is where the harmonics of the lowest bass guitar notes are. If octave 1 is missing, our brain can still „recreate“ the fundamental frequencies when we hear these harmonics. This is called „the missing fundamental effect“. So when we leave room for a low tuned kick drum in the very low end, we can have the bass be more dominant here. And vice versa. This part of the spectrum generally feels a little tighter, „shorter" / more defined than the sub bass part of it.

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Octave 3 | 130.81Hz (C) - 246.94Hz (B) | Upper Bass

This is audible on most speaker systems and therefore very important. This part of the spectrum feels a lot more tight and defined but can get cluttered and muddy very easily. There's just a LOT going on here: Harmonics of the bass guitar, fundamental frequencies and harmonics of the guitars, vocal size and body, snare body/weight/fundamental, „knock" of the kick drum. Decide what's most important here and what can be a littler higher up and „thinner" sounding (or below and have more „weight"). Something's gotta give, if you want your arrangement to work.

Octave 4 | 261.63Hz (C) - 493.88Hz (B) | Low Mids

This part of the spectrum can make everything sound „boxy" and small quickly, but if we don't have anything here, things will start to sound „hollow" and distant. This is where the wood of the kick drum is, the „meat" and body of the guitars, the vocals (especially in quiet, lower parts), and the lower „growl" of the bass. This area is what many people perceive as „warm", „close" and „intimate". But also as „boxy" and „cheap" if there's too much.

Octave 5 | 523.25Hz (C) - 987.77Hz (B) | Mids

This area can sound „honky", nasal and annoying. But it's also where much of the „music" is. Guitar chords sound hollow and distant if there is not enough in this area. Vocals take up most of the space here. This is also where the growl of the bass is the most pleasant and important, so that the bass can cut through the arrangement. Drums often sound cheap in this part of the frequency spectrum. But if you want a ringy snare, for example, and capture the overtones, this is where they usually are. Also, you can make lead guitars „sing" here.

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Octave 6 | 1046.50Hz (C) - 1979.50Hz (B) | Mids

The lower part here can still sound nasal, small and honky. The upper part here is often perceived as „hard“ sounding and can be painful, when too much. But it’s where guitars can have presence without becoming too harsh out too noisy. It’s also where the crack of a snare and the beater attack of a rock kick drum begins, although it’s not too „clicky“ here. In the upper part there’s also the intelligibility of the vocals and the „clank“ of the bass guitar.

Octave 7 | 2093Hz (C) - 3951.1Hz (B) | Upper Mids

The lower part here (around 2kHz) sounds „firm“, upfront and „hard“. The higher it gets, the more it gets harsh and annoying, if too much. Between 3kHz and 5kHz guitars and cymbals can be really painful and unpleasant. But if you are too careful, you will suck the life and character out of your arrangement. This is also, where the vocals ned to cut through the arrangement. And this is where the more „clicky“ stick and beater attack of the drums is, as well as the pick attack and click of the bass guitar.

Octave 8 | 4186Hz (C) - 7902.13Hz (B) | Upper mids / lower treble (highs)

Here’s a lot of the presence of most instruments. Again, if there’s too much going on, it’s gonna sound brittle and harsh. If there’s not enough it’s gonna be dark or dull. Vocal sibilance can be an issue here and needs to be checked. This is about as high as a guitar cabinet will go. Above that, electric guitars won’t have much useful information. Bigger cymbals will live in this area, as well as the strumming sound of acoustic guitars and also the presence of some micro timing elements, like tambourines.

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Octave 9 | 8372.02Hz (C) - 15804.26Hz (B) | Treble (highs)

Around 8kHz-10kHz it can sound a little cheap and harsh. 12kHz and above typically sounds smooth, „airy“ and more expensive. Cymbals live here and smaller cymbals, like hi-hats are a little higher up in the 10-12kHz+ area. Mouth noises, intimacy, „air“, „breath“ and also sibilance can be found here, as well as smaller micro timing elements, like shakers. Also, the top end of acoustic guitars and a lot of the string noise is happening here in the top octave (can clash with hi-hat or shaker patterns). This area is often perceived as „open“, „shimmery“ and „hi-fi“ (when combined with a big low end).

Everything above that

Humans can theoretically hear up to about 20kHz, but this number gets lower, the older we get. So everything above 16kHz is not really audible for most of us and there won’t be too much useful information up there in most of the elements of your arrangement. But many people still perceive a song differently, if it has an open top end. So it’s not completely unnecessary. On the other hand, if you have too much going on there and above, some gear might react weird or cause audible distortion. So, it’s best to just leave the top end natural and open, but get rid of unwanted noise, sibilance or hiss, if possible.

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Here's a full frequency chart with the corresponding notes:

	Octave 0	Octave 1	Octave 2
C	16.35 Hz	32.70 Hz	65.41 Hz
C#/Db	17.32 Hz	34.65 Hz	69.30 Hz
D	18.35 Hz	36.71 Hz	73.42 Hz
D#/Eb	19.45 Hz	38.89 Hz	77.78 Hz
E	20.60 Hz	41.20 Hz	82.41 Hz
F	21.83 Hz	43.65 Hz	87.31 Hz
F#/Gb	23.12 Hz	46.25 Hz	92.50 Hz
G	24.50 Hz	49.00 Hz	98.00 Hz
G#/Ab	25.96 Hz	51.91 Hz	103.83 Hz
A	27.50 Hz	55.00 Hz	110.00 Hz
A#/Bb	29.14 Hz (lowest piano note)	58.27 Hz	116.54 Hz
B	30.87 Hz	61.74 Hz	123.47 Hz

	Octave 3	Octave 4	Octave 5
C	130.81 Hz	261.63 Hz (Middle C)	523.25 Hz
C#/Db	138.59 Hz	277.18 Hz	554.37 Hz
D	146.83 Hz	293.66 Hz	587.33 Hz
D#/Eb	155.56 Hz	311.13 Hz	622.25 Hz
E	164.81 Hz	329.63 Hz	659.25 Hz
F	174.61 Hz	349.23 Hz	698.46 Hz
F#/Gb	185.00 Hz	369.99 Hz	739.99 Hz
G	196.00 Hz	392.00 Hz	783.99 Hz
G#/Ab	207.65 Hz	415.30 Hz	830.61 Hz
A	220.00 Hz	440.00 Hz	880.00 Hz
A#/Bb	233.08 Hz	466.16 Hz	932.33 Hz
B	246.94 Hz	493.88 Hz	987.77 Hz

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	Octave 6	Octave 7	Octave 8
C	1046.50 Hz	2093.00 Hz	4186.01 Hz (Highest Piano Note)
C#/Db	1108.73 Hz	2217.46 Hz	4434.92 Hz
D	1174.66 Hz	2349.32 Hz	4698.63 Hz
D#/Eb	1244.51 Hz	2489.02 Hz	4978.03 Hz
E	1318.51 Hz	2637.02 Hz	5274.04 Hz
F	1396.91 Hz	2793.83 Hz	5587.65 Hz
F#/Gb	1479.98 Hz	2959.96 Hz	5919.91 Hz
G	1567.98 Hz	3135.96 Hz	6271.93 Hz
G#/Ab	1661.22 Hz	3322.44 Hz	6644.88 Hz
A	1760.00 Hz	3520.00 Hz	7040.00 Hz
A#/Bb	1864.66 Hz	3520.00 Hz	7458.62 Hz
B	1975.53 Hz	3951.07 Hz	7902.13 Hz

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