

Test 1

1.1 Put each verb in brackets in the correct tense and form.

In order to operate in mobile environments where reflections may cause a problem, data has to be transmitted (transmit) at a slow speed. If signals _____ (receive) via two paths, they will arrive at slightly different times because of the different path lengths. To overcome this, the data must _____ (sample) after all the signals have arrived and the signal is stable. Naturally, this reduces the speed at which data can _____ (send). Orthogonal Frequency Division Multiplexing (OFDM) overcomes this problem by transmitting a large number of carriers, and _____ (spread) the data across them. In this way high speed data can still _____ (transmit), while each individual carrier only carries data at a low data rate. When _____ (modulate), any carrier has sidebands that extend out either side. In fact it is these sidebands that carry the data. If the transmission is _____ (receive) and the data _____ (extract) there should not be interference from other nearby signals. If there is, then any data that is transmitted may _____ (corrupt) and errors may appear. In order to provide a sufficient level of spectrum efficiency it _____ (be) necessary to space the carriers close together. Using traditional techniques, this would mean that the different carriers and sidebands that _____ (comprise) the overall signal would interfere with each other. However, by making the carriers orthogonal to each other, the problem can _____ (overcome), and the required spectrum efficiency obtained.

1.2 Fill in the blanks with a suitable word.

- | | | | |
|-------------|-----------------|--------------|-----------|
| 1. referred | 2. corrupted | 3. correctly | 4. nulls |
| 5. flavours | 6. interference | 7. acronym | 8. symbol |

There are several flavours of OFDM, and the _____ COFDM is often seen. This form of transmission uses OFDM, but applies error coding to the signal. In any practical system of this nature, _____ will be caused by multipath effects and other problems may occur as a result of single frequency _____. These effects may result in a number of the carriers not being received, but most of the carriers being able to be received _____. By using error-coding techniques (which involves adding further data to the transmitted signal) much or all of the _____ data can be reconstructed within the receiver. This can be done because the error correction code is transmitted in a different part of the signal. It is this error coding which is _____ to in the Coded word in the title of COFDM.

1.3 Choose the correct definition of the underlined words.

The resilience to interference and the spectrum efficiency of OFDM are some of the main advantages of this type of transmission. Another advantage also arises from OFDM's resilience to multipath effects. In view of the fact that a guard period is allowed, to accommodate multipath effects, this means that it is also possible to broadcast the same transmission from a different transmitter on the same frequency. When it is received it then appears as if it is a multipath effect, and does not cause any problems. In this way it is possible to build what is termed a single frequency network (SFN) for broadcast transmission systems. Similarly if there is a small hole in the coverage it is possible to simply add another transmitter. The disadvantage of OFDM is that it relies heavily on digital signal processing. Receivers are accordingly far more complicated than those needed for AM or FM transmissions. Digital signal processors are needed and as a result this can have an impact on battery consumption for portable devices, although with the newer technology chips that are available today, this is much less of a problem.

1. coverage: the extent or degree to which something is observed, analyzed, and reported.
2. _____: to send through the air or transmit by radio or television.
3. _____: in a way that is suitable or right for the situation.
4. _____: the amount used.
5. _____: the quality or state of being flexible.
6. _____: to transmit without distortion.
7. _____: involving a lot of different parts, in a way that is difficult to understand.
8. _____: to hold comfortably without crowding.