

WiMAX Job Interview Questions And Answers



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WiMAX Interview Questions And Answers Guide.

Question - 1:

How WiMax works?

Ans:

WiMax combines the advantages of favorite Wi-Fi and a wide coverage of cellular network. It takes a best part of wi-fi networks, the fast speed and broadband internet experience. WiMax is a WAN technology, service providers will deploy a wimax network that enables access over long distance. Coverage for a geographical area is divided into a series of overlapping areas called cells. Each cell provides coverage for users within that immediate vicinity. When you travel from one cell to another, the wireless connection is handed off from one cell to another.

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Question - 2:

What is base station in WiMAX system?

Ans:

The central radio transmitter/receiver installed by service provider to broadcasts WiMax signals. These transmitters are typically mounted on towers or tall buildings. Cellular networks are based on the concept of cells (a logical division of geographical area), each such cell is allocated a frequency and is served by a base station. Base station consists of a receiver, transmitter and a control unit. Adjacent base stations use different frequencies to avoid cross-talk.

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Question - 3:

What is wimax network entry procedure?

Ans:

The procedure helps wimax subscriber camp on to wimax compliant base station. Following are the summarized steps for network entry. Please note that this procedure is as per IEEE 802.16-2004 OFDM PHY and MAC layer specifications. This version of wimax is also referred as fixed wimax due to non-mobility of subscriber stations. The procedure for mobile version of wimax i.e. mobile wimax is similar to this but there are few changes to MAPs/channel descriptors and header format as well as addition in MAC messages.

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Question - 4:

Define ranging procedure in WiMAX system?

Ans:

In wimax system, ranging procedure is initiated by SS(Subscriber Station) to establish connection with BS(Base Station). This ranging procedure are of many types mainly available for synchronization and maintenance of RF link. After Ranging is completed Base station waits for SBC REQ message transmitted by the Wimax SS. Using SBC REQ message SS informs BS of its basic capabilities. Unlike ranging request(RNG REQ) there is no dedicated slot for bandwidth request and SBC REQ. Bandwidth request can be transmitted any where in the uplink subframe except the reserved ranging slot.

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Question - 5:

What does WiMAX support for encryption?

Ans:

WiMAX supports the following for encryption:

- *Advanced encryption standard
- *Triple data encryption standard

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Question - 6:

Which modulation schemes are supported by WiMAX?

Ans:

The following modulation schemes are supported by WiMAX:



- * Binary phase shift keying modulation
- * Quadrature phase shift keying modulation
- * Quadrature amplitude modulation

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Question - 7:

What frequencies are used by WiMax networks?

Ans:

Standards does not define any uniform global licensed spectrum for WiMax, however the WiMax forum has published 3 licensed spectrum profiles 2.3 GHz, 2.5 GHz and 3.5 GHz, in an effort to drive standardization and decrease cost. Also plans for use of analog TV spectrum (700 MHz) await the complete deployment of digital TV.

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Question - 8:

Please tell me if WiMax is secure or not?

Ans:

Yes, WiMax is a standard based design, and WiMax standards are well defined to provide much better and flexible security than wi-fi networks.

- * WiMax security stack supports two encryption standards one is popular DES3 (Data Encryption Standard) and other is AES (Advanced Encryption Standard).
- * Additionally it requires dedicated security processor for base station.
- * It also defines minimum encryption requirements for the traffic and for end to end authentication.

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Question - 9:

Can you tell me why do we need WiMax technology?

Ans:

We need WiMAX technology for high speed broadband like internet access on the move. We have broadband connections that provide high speed networks, but are attached to LAN systems i.e. not portable. Wi-fi provides access to such systems but limited to a much shorter distance. Then we have cellular networks which provide internet access but their speed is limited and they are relatively costly. To overcome these problems we need WiMax or comparable technology.

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Question - 10:

Tell us what are the limitations of WiMax?

Ans:

WiMax can not provide highest performance over 50 kilometers. As the distance increases, bit error rate thus reducing performance. Reducing distance to less than 1km allows a device to operate at higher bit rate. A user closer to base station gets better speed at around 30 mbps. Also as an available bandwidth is shared between no of users, performance depends on number of active users connecting to that base station. So this needs a use of Quality of Service (QoS) mechanism to provide a minimum guaranteed throughput.

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Question - 11:

What is the Difference between CID and SFID in WiMAX system?

Ans:

A service flow in wimax is partially characterized by the following attributes:

- * A 32-bit Service Flow ID (SFID) is assigned to all existing service flows. The SFID serves as the principal identifier for the Service Flow and has an associated direction.
- * A 16-bit Connection ID (CID) is associated with each active SFID (connection active).
- * A set of QoS parameters specifying the required resources. The principal resource is bandwidth, but the specification may also include latency requirements.
- * A set of QoS parameters defining the level of service being provided.

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Question - 12:

What is a WiMax gateway?

Ans:

It is a stand alone indoor device which is installed at a good reception area. It acts as a wi-fi access point for other devices such as home pc, VOIP handset etc. WiMax operators generally provide this gateway device or subscriber unit which communicates with base station and provides wi-fi access within home or office for device like laptop, Smartphone.

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Question - 13:

Define BE class in WiMAX QoS?

Ans:

In this class, BW is granted to mobile subscriber if and only there will be left over bandwidth from other QoS classes. This QoS class guarantess neither delay nor throughput. It allows minimum reserved traffic rate and maximum sustained traffic rate.

[View All Answers](#)

**Question - 14:**

Define nrtPS class in WiMAX QoS?

Ans:

This type is used for non real time Variable bit rate traffic with no delay guarantee. But min. rate is guaranteed. FTP falls under this QoS type.

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Question - 15:

Define ertPS class in WiMAX QoS?

Ans:

This QoS type is developed to support VOIP along with silence suppression. There will be no traffic transmission during silence time. QoS parameters are same as UGS type. Check table-1 for application of this type. ertPS is similar to UGS in which base station assigns MST on active mode and no BW is allocated during silent time period. Here BS need to poll mobile subscriber to know whether silent period has been ended or it is continuing.

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Question - 16:

Define rtPS class in Wimax QoS?

Ans:

It is used for VBR real time traffic for example MPEG video. Unlike UGS where in fixed allocation is made by BS, here BS regularly polls MS to find out allocation need. Hence bandwidth is allocated on need basis and is adaptive in nature. For this wimax QoS type Min. reserved traffic rate and MST need to be mentioned separately. For UGS and ertPS Min. reserved traffic rate and MST are both same. QoS parameters are same as UGS.

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Question - 17:

Define UGS class in Wimax QoS?

Ans:

This Wimax QoS class provides fixed bandwidth allocation on periodic basis. Once the connectivity is established, no more requests are needed. For application of this type. QoS parameters for this type are MST, tolerated jitter and max. latency.

[View All Answers](#)

Question - 18:

What are the WiMAX QoS Classes?

Ans:

Following are the WiMAX QoS classes:

- * UGS
- * rtPS
- * ertPS
- * nrtPS
- * BE

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Question - 19:

What is the Difference between WiMAX and LTE?

Ans:

Both WiMAX and LTE are used for providing broadband wireless internet services.

WiMAX is the completely new standard developed for providing high data rate internet services. WiMAX is designed for only data applications. As it is entirely new technology without any legacy support, it is very costly and requires service provider to install all the equipments.

LTE follow cellular standards such as HSPA, WCDMA, GSM etc but it is designed mainly for data applications. It is also referred as all IP data network. Voice over LTE is also possible using legacy fall backs and using VOIP protocols. Due to predecessors existing equipments can be make use of and hence it is less costly and requires minimum initial investment.

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Question - 20:

Give an example of wimax TLV format?

Ans:

EXAMPLE:

FEC code type for downlink burst
150(0x96), 0x01(msb:0), 0x01(QPSK 1/2)

* Here first byte is type.

* As value is less than 127 length field in second byte is one byte with msb set to zero and its remaining 7 bytes indicates that size of value field is one(1).

* The value field is mentioned as 0x01 representing as QPSK 1/2 modulation-code rate.

If the size of 'value' field is more than 127 bytes(>127) then

* Size of length field shall be one byte more than what is actually used to mention size of 'value' field in bytes.

* MSB of first byte of 'length' field is set to one

* The remaining 7 bits of first byte of 'length' field indicates additional bytes of 'length' field

* The bytes other than first byte of 'length field' is used to mention size of the 'value field'.

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Question - 21:

What are the rules apply for wimax TLV encoding format?

Ans:

Following rules apply for this. Size of value field depends on length field specified.

If the actual size of 'value' field is less than or equal to 127 bytes(length<=127) then

* Size of 'length' field will be 1 byte

* MSB of 'length' field is set to zero

* The rest of 7 bits of length field indicates actual size of 'value' field in number of bytes.

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Question - 22:

Please tell me what is wimax TLV encoding format?

Ans:

In wimax TLV formats are used for parameters in both mac management messages as well configuration file. TLV stands for Type, length and value. Size of type field will be always 1 byte. Size of length field is either 1 byte or more than 1 byte.

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Question - 23:

Do you know what is WiMAX FCH/DLFP?

Ans:

The modulation-code rate of wimax FCH or DLFP is fixed to BPSK-1/2. It has total size of about 88 bits as mentioned below.

WiMAX FCH/DLFP: { BS ID(4 bits), Frame No.(4 bits), CCC(4 bits), Reserved(4 bits),

Rate ID(4 bits), Preamble(1bit), Length(11 bits), DIUC(4bits), Preamble(1bit), Length(11 bits),

DIUC(4bits), Preamble(1bit), Length(11 bits), DIUC(4bits), Preamble(1bit), Length(11 bits),

HCS(8 bits)

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Question - 24:

Please tell me the basics of FCH or DLFP in wimax system?

Ans:

As we know wimax frame consists of downlink subsubframe and uplink subframe. Downlink Subframe consists of preamble(2 OFDM symbols), header, downlink bursts(1, 2, 3 or 4). After downlink subframe, uplink subframe starts with some gap used for TTG and contention slots. The transmissions from BS to SSs is referred as downlink and transmissions from SSs to BS is referred as uplink subframe. Header mentioned above is known as FCH (Frame Control Header) or DLFP (Downlink Frame Prefix). On this page we will see header used in fixed wimax as per OFDM specifications for 256 point FFT.

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Question - 25:

What are basics of FCH or DLFP in wimax system?

Ans:

As we know wimax frame consists of downlink subsubframe and uplink subframe. Downlink Subframe consists of preamble(2 OFDM symbols), header, downlink bursts(1, 2, 3 or 4). After downlink subframe, uplink subframe starts with some gap used for TTG and contention slots. The transmissions from BS to SSs is referred as downlink and transmissions from SSs to BS is referred as uplink subframe. Header mentioned above is known as FCH (Frame Control Header) or DLFP (Downlink Frame Prefix). On this page we will see header used in fixed wimax as per OFDM specifications for 256 point FFT.

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Question - 26:

What is the difference between SISO and MIMO techniques in WiMAX?

Ans:

These are techniques based on number of antennas used at the transmitter and the receiver. SISO has been in use since the invention of wireless system. MIMO concept has been recently added to the wireless system. There are different MIMO algorithms which has been developed for two main reasons to increase coverage and to increase the data rates.

SISO means Single Input Single Output while MIMO means Multiple Input Multiple Output.

In SISO system only one antenna is used at transmitter and one antenna is used at Receiver while in MIMO case multiple antennas are used. Figure depicts 2x2 MIMO case.

MIMO system achieves better Bit Error rate compare to SISO counterpart at the same SNR. This is achieved using technique called STBC (Space Time Block Coding). With STBC coverage can be enhanced.

MIMO system delivers higher data rate due to transmission of multiple data symbols simultaneously using multiple antennas, this technique is called as Spatial Multiplexing (SM). With SM data rate can be enhanced.

MIMO with SM and beamforming can be employed to obtain enhancement to both the coverage and data rate requirement in a wireless system.

SISO is used in radio, satellite, GSM and CDMA systems while MIMO is used in next generation wireless technologies such as mobile wimax -16e, WLAN-11n,11ac,11ad, 3GPP LTE etc.

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Question - 27:

What is the difference between microcontroller and microprocessor in WiMAX?

Ans:

Microcontroller usually operates at frequencies in MHz range while today's Microprocessor operates in GHz frequency range. This clock is provided using oscillator.



Microcontroller and microprocessor both have their own applications. Hence both cannot be used for each other's functional areas except for few exceptions (very low size code/data application).

In addition to microprocessor (CPU) functionality microcontroller will have timers, counters, RAM, ROM and Input/Output ports. Most of the microprocessors have Op-codes for moving data from the external memory to the CPU; Microcontrollers may have one or two. Microprocessors have one/two types of bit handling instructions while Micro controllers have many. Microprocessor is used for general purpose applications while microcontroller is program specific and designed for particular application in consideration.

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Question - 28:

What is BW REQ Header in WiMAX?

Ans:

BW REQ Header requests refer to the mechanism that SSs use to indicate to the BS that they need uplink BW allocation. Because the uplink burst profile can change dynamically, all requests for BW shall be made in terms of the number of bytes needed to carry the MAC Header and payload but not the PHY overhead. BW REQ message may be transmitted during any uplink allocation, except during any initial ranging interval. BW is always requested on a CID basis and BW is allocated on an SS basis.

[View All Answers](#)

Question - 29:

What is the difference between FDM and TDM in WiMAX?

Ans:

- * TDM is employed in PCM transmission to obtain T1 at the rate of 1.544Mbps.
- * FDM is employed in satellite, Radio, HF and other wireless technologies.
- * Both TDM and FDM is employed in GSM cellular technology.

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Question - 30:

Do you know FDM and TDM in WiMAX?

Ans:

FDM is the short form of frequency division multiplexing and TDM is the short form of time division multiplexing.

[View All Answers](#)

Question - 31:

What are the advantages of OFDM in WiMAX?

Ans:

- * Frequency selective fading will be able to affect few of the subchannels/subcarriers and not entire band.
- * OFDM overcomes effect of ISI occurring mostly in multipath channel environment.

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Question - 32:

Tell me what is the difference between SC-FDMA and OFDM modulation techniques in WiMAX?

Ans:

- * SC-FDMA means Single Carrier Frequency Division Multiple Access and OFDM means Orthogonal Frequency Division Multiplexing.
- * SC-FDMA system usually will have low PAPR compare to OFDM system.
- * SC-FDMA system is less sensitive to frequency offset compare to OFDM system.
- * SC-FDMA is widely used in LTE subscriber terminals in the transmit path and its variant OFDMA is used in the eNodeB downlink(or receive path of LTE subscribers).
- * OFDM is used in many broadband technologies such as wimax-16d/16e, WLAN-11a/11n/11ac.
- * OFDM is referred as multicarrier modulation.
- * It uses multiple rf carrier signals at different frequencies which sends some of the bits on each of the assigned channels. This seems to be similar to FDM but in the case of OFDM, total subcarriers are divided into subchannels and these subchannels are mapped to one single data/traffic source.

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Question - 33:

What is the advantage and disadvantage of using QAM modulation over QPSK?

Ans:

QAM involves both amplitude and phase variation to map the digital data over the subcarriers. QPSK involves only phase variation while amplitude remains constant. 16QAM for example maps 4 bits of data on one single carrier and QPSK maps 2 bits of data on one single carrier. Hence 16QAM help increase data rate over QPSK but receiver will become complex in order to retrieve the modulated symbols if it is passed through the noisy channel environment.

[View All Answers](#)

Question - 34:

Please tell me what is RNG REQ in WiMAX?

Ans:

RNG REQ is transmitted by SS to BS. After performing Synchronization (Time, Freq, Channel) RNG REQ Frame is decoded to bits at BS. Type field just after GMH will describe message type which is '0x04' for RNG REQ, which tells BS what need to be done after receiving the message.

[View All Answers](#)

**Question - 35:**

What will be analysed with RNG RSP decoded by SS in WiMAX?

Ans:

RNG RSP decoded by SS will analyze following:

- * 'Timing Adjust' field (signed 32 bit) and will drive PHY to advance frame Transmission accordingly.
- * 'Power level Adjust' field (signed 8-bit, 0.25dB) and will drive RF attenuators at RF layer accordingly.
- * 'Offset Frequency Adjust' field (signed 32 bit, Hz units) and will drive RF synthesizer/Ref. OCXO accordingly.
- * Ranging Status (if status is 're range') will indicate whether SS need to do retransmit RNG REQ or (if status is 'Success') start BW REQ transmission for determining slot for SBC REQ.

[View All Answers](#)

Question - 36:

What is the unit of resource allocation in mobile wimax i.e OFDMA system?

Ans:

The unit of resource allocation in mobile wimax (OFDMA) is slot. The slot definition varies based on zone type. There are different zones supported in the mobile wimax frame. The most common used zone types are PUSC, FUSC and AMC. In the uplink PUSC and AMC are used.

In downlink PUSC, slot is 1 sub-channel X 2 symbols

In Uplink PUSC, slot is 1 sub-channel X 3 symbols

In downlink FUSC, slot is 1 sub-channel X 1 symbol

AMC is 2 symbols X 3 sub-channels.

[View All Answers](#)

Question - 37:

What are the wimax ranging procedures?

Ans:

There are various wimax ranging procedures as mentioned below.

- * Initial Ranging
- * Periodic Ranging
- * Contention Ranging
- * Non-Contention Ranging

[View All Answers](#)

Question - 38:

What is non-contention ranging procedure in WiMAX?

Ans:

Non-contention ranging is regulated by the BS to allow the SS to finish system access earlier when dedicated channel is provided and polled initial ranging.

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Question - 39:

What is contention ranging procedure in WiMAX?

Ans:

Contention ranging procedure is required by the SS to access the system for the first time and no dedicated connection resources assigned to the SS.

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Question - 40:

What is periodic ranging procedure in WiMAX?

Ans:

Periodic ranging is to maintain uplink communication with the BS and to adjust transmission parameters.

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Question - 41:

What is initial ranging procedure in WiMAX?

Ans:

Initial ranging acquires correct transmission parameters (Power adjustment, timing offset estimation and synchronization) to communicate with the BS.

[View All Answers](#)

Question - 42:

What is the difference between WiMAX system and LTE system?

Ans:

WiMAX and LTE both are used for providing broadband internet access services. Voice services are also planned to provide over wimax and LTE networks using Voice over IP protocols. WiMAX stands for World Wide Interoperability for Microwave Access and LTE stands for Long Term Evolution. WiMAX fall back to non-cellular technologies such as WLAN. LTE fall back to cellular technologies such as GSM, UMTS etc. In wimax both uplink and downlink use symmetric modulation schemes such as OFDM or OFDMA. In LTE downlink uses OFDMA and uplink uses SC-FDMA.

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**Question - 43:**

What is the difference between TDD and FDD in WiMAX?

Ans:

Both TDD and FDD are duplexing topologies used mainly to share the common central resources. In TDD, frequency is shared among subscribers time slot wise. In FDD, one pair of frequency is assigned for one connection one for downlink and one for uplink and hence transmission will happen simultaneously in both the directions.

[View All Answers](#)

Question - 44:

How is the data rate calculated in fixed WiMAX based on OFDM physical layer?

Ans:

Data rate is the rate at which data is transmitted over the air and is measured in Mbps.

Raw data rate = $N_{sc} * b_m * C_r / T_s$;

Where N_{sc} is the number of data subcarriers (here 192 for OFDM),

b_m is coded bits per sub-carriers

C_r is ratio of input bits to output coded bits

T_s is the symbol duration

For BPSK 1/2, Maximum data rate will be $(192 * 1 * 1/2) / (11.8 \text{ microsec}) = 8.13 \text{ Mbps}$.

For 64QAM 3/4, Maximum data rate will be $(192 * 6 * 3/4) / (11.8) = 73.2 \text{ Mbps}$.

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Question - 45:

Explain WiMAX frame structure and various MAC fields such as DLMAP, DCD, ULMAP and UCD and their significance?

Ans:

In order to understand wimax frame structure interviewee need to understand and explain frame structure of both OFDM and OFDMA physical layers. Basic OFDM wimax frame consists of preamble part, header part (FCH) and downlink bursts (1 to 4). Preamble is used for synchronization purpose. FCH is always BPSK1/2 and carry modulation-code rate information of consecutive downlink bursts as well as their lengths in number of symbols. Downlink burst no.1 carry DLMAP, DCD, ULMAP, UCD. DLMAP and ULMAP specify the position of downlink bursts and uplink bursts in the entire wimax frame. DCD and UCD specify downlink channel descriptor and uplink channel descriptor which in turn map to modulation-code rate for the bursts i.e DIUC and UIUC.

[View All Answers](#)

Question - 46:

What is the difference between OFDM and OFDMA in WiMAX?

Ans:

OFDM and OFDMA differ in the way resources are allocated to the subscribers. Also in OFDM FFT size is fixed to 256 subcarriers. In OFDMA FFT size is variable and it can take any value from 128, 512, 1024 and 2048. Frame structure is also different. There is also difference in the physical layer modules.

[View All Answers](#)

Question - 47:

What is the unit of resource allocation in fixed wimax i.e OFDM system?

Ans:

The basic unit of resource allocation in fixed wimax is physical slot (PS). Physical slot is defined as $4 / (\text{sampling frequency})$ The sampling frequency = $N_{fft} * \Delta F$ Here, N_{fft} is the FFT size and ΔF is the subcarrier spacing.

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Question - 48:

Explain the functions of modules used in WiMAX OFDM physical layer?

Ans:

The most commonly employed in wimax devices are OFDM (Orthogonal Frequency Division Multiplexing) and OFDMA (Orthogonal Frequency Division Multiple Access). OFDM and OFDMA differ in the way data is mapped onto the resource. In OFDM all the 256 subcarriers are utilized by the subscribers (SSs) and they have been shared based on time interval between SSs. In OFDMA there are different FFT sizes supported. In case of 1024 point FFT, SSs are allocated few of the subcarriers and further shared based on time between them.

[View All Answers](#)

Question - 49:

How many physical layers are there as per WiMAX standard?

Ans:

There are five physical layers as mentioned in the wimax standard.

It includes:

* OFDM

* OFDMA

* SC

* SCa

* Wireless HUMAN.

[View All Answers](#)

**Question - 50:**

Why was the WiMAX system introduced?

Ans:

WiMAX system has been introduced as a replacement of DSL technologies. WiMAX is a broadband wireless technology used mainly for providing internet connectivity over the air. There are different physical layers and frequency bands of operation based on country and applications. It utilizes concept of OFDM modulation technique to achieve the higher data rate by transmitting data over multiple subcarriers closely packed without leaving much subcarrier spacing in between.

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Question - 51:

What frequency will WiMAX Technology use first?

Ans:

The first frequency with interoperable certified product to ship was in the International 3.5 GHz bands. Today products are available at 2.5 GHz, 5.8 GHz, 2.3 GHz and 3.65 GHz. Although no formal product profile has been set, likely the Forum will attempt to address the 700 MHz range. There are no plans for Mobile WiMAX Technology at 5.8 GHz.

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Question - 52:

Do I need a License for WiMAX Technology?

Ans:

Determining whether or not a service provider needs a license to deliver service is not a question answerable with a simple yes or no. Many elements must be factored into the decision of whether or not to attempt to obtain a license.

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Question - 53:

What RF Frequencies does WiMAX Technology work in?

Ans:

The most recent versions of both WiMAX Technology standards in 802.16 cover spectrum ranges from at least the 2 GHz range through the 66 GHz range. This is an enormous spectrum range. However, the practical market considerations of the Forum members dictated that the first product profiles focus on spectrum ranges that offered Forum vendors the most utility and sales potential.

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Question - 54:

What companies are involved with WiMAX Technology?

Ans:

As of last count, the WiMAX Forum membership included over 500 companies with many other firms evaluating the technology as a possible fit for their business and technical models. A complete list of WiMAX Forum members can be found on its site. WiMAX Forum Members.

[View All Answers](#)

Question - 55:

What is the actual throughput data transfer rate of WiMAX?

Ans:

WiMAX Technology supports very robust data throughput. The technology at theoretical maximums could support approximately 75 Mbps per channel (in a 20 MHz channel using 64QAM 3/4 code rate). Real world performance will be considerably lower---perhaps maxing out around 45 Mbps/channel in some fixed broadband applications. Remember however, that service across this channel would be shared by multiple customers. Actual transmission capabilities on a per customer basis could vary widely depending on the carrier's chosen customer base, which is actually an inherent strength because it can be defined by QoS in a deliberate fashion to offer different bandwidth capabilities to customers with different needs (and different budgets). Mobile WiMAX capabilities on a per customer basis will be lower in practical terms, but much better than competing 3G technologies. WiMAX is often cited to possess a spectral efficiency of 5 bps/Hz, which is very good in comparison to other broadband wireless technologies, especially 3G.

[View All Answers](#)

Question - 56:

Is WiMAX Secure?

Ans:

The short answer is yes, as never before with broadband wireless systems. However, this area appears to be early ground that vendors are staking out to differentiate their products and philosophies. The WiMAX standard itself incorporates much better and more flexible security support than the Wi-Fi standard. It can be sometimes confusing when industry pundits and detractors talk of standards such as WiMAX Technology and then in the same breath describe ways in which vendors will be "different" or that WiMAX Technology security might be weak. At first glance, these comments on the part of some vendors zealous to promote the added capabilities of their products can leave one feeling uncertain about the quality and reliability of the product.

[View All Answers](#)

Question - 57:

What is the Range of WiMAX Technology?

Ans:

The answer to this question probably generates more confusion than any other single aspect of WiMAX Technology. In the early days of WiMAX it was common to



see statements in the media describing WiMAX multipoint coverage extending 30 miles. In a strict technical sense (in some spectrum ranges) this is correct, with even greater ranges being possible in point to point links. In practice (and especially in the license-free bands) this is wildly overstated especially where non line of sight (NLOS) reception is concerned.

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Question - 58:

Will WiMAX Technology compete with Wi-Fi?

Ans:

Clearly, WiMAX Technology and Wi-Fi Technology are complementary technologies and will remain so for the foreseeable future. The widely available Wi-Fi technology used in hotspots in hotels, restaurants, airports and even larger Wi-Fi zones in some cities will continue to grow for many years. The recent flurry of municipal Wi-Fi mesh networks has only served to cement the technology into the wireless equation. Wi-Fi is not going away any time soon.

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Question - 59:

Why is the WiMAX Technology important for mobile broadband wireless?

Ans:

Mobile broadband wireless or 3G has enjoyed two largely consistent standards, those being the code division multiple access (CDMA) based approach with its evolution data only (EVDO) and the universal mobile telecommunications system (UMTS) and its faster upgrade high speed downlink packet access (HSDPA), which in particular has gained some deployments in the past year. However, these technologies were slow to mature into economically viable and affordable iterations. The EVDO schema is now in a Revision A version which improves bandwidth considerably. Verizon and Sprint are the first US based carriers to begin wide deployment. Sprint currently has deployed most of its markets with 3G as has Verizon. The bandwidth limitations have been significant and the adoption by carriers, particularly those utilizing GSM technology here in the US has been very slow (as they are essentially incompatible technologies).

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Question - 60:

Why we need WiMAX Technology?

Ans:

To answer this question it is important to understand the state of technical fragmentation experienced in the past by the mobile wireless and fixed broadband wireless industry. Early broadband wireless systems began as extensions of indoor local area network (LAN) technology known as Wi-Fi Technology or the 802.11b protocol. This standard has evolved into a ubiquitous and widely available standard used in short range hotspots all over the globe. However, the media access controller (MAC) and physical layer (PHY) specifications for this protocol are suboptimum for outdoor citywide wireless networks or metropolitan area networks (MAN). Recent updates and new standards such as 802.11g, 802.11a and 802.11n have improved these elements. However, once again these technologies are configured for best performance in small venues and at short range.

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Question - 61:

Will WiMAX Technology replace DSL and Cable?

Ans:

It is important to remember that WiMAX Technology is a global broadband wireless standard. The question of whether or not it could replace either DSL or Cable will vary from region to region. Many developing countries simply do not have the infrastructure to support either cable or DSL broadband technologies. In fact, many such countries are already widely using proprietary broadband wireless technologies. Even in such regions however, it is very unlikely that either Cable or DSL technologies would disappear. The business case and basic infrastructure often dictates that the cheapest solutions will predominate. In many areas in developing nations, it may be cheaper to deploy Cable and DSL in the cities at least for fixed applications, whereas WiMAX Technology will dominate outside of major towns.

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Question - 62:

Is WiMAX Technology Safe?

Ans:

Since much of the technology being utilized in the IEEE 802.16 standard (WiMAX Technology standard) is widely deployed, there is a historical body of evidence supporting the safety of technologies used in upcoming WiMAX Technology and WiMAX products. Microwave and other spectrum technologies enjoy over a hundred years of historical evidence of safety when prudently handled and configured. The amount of power allowed to deliver broadband wireless signal varies from frequency to frequency, however, most are modest topping out at around 40 watts at the tower relay site. While certain basic precautions need to be taken when onsite at communications towers (i.e. standing directly in front of active microwave links at essentially zero range) the configurations for public use are understood and safe. Customer premise equipment is even safer.

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Question - 63:

Why is WiMAX Technology important for fixed broadband wireless?

Ans:

WiMAX Technology is arguably even more important for the fixed broadband wireless segment than mobile broadband, at least internally to that industry. It seems clear that mobile broadband wireless holds the loftier long term monetary and customer growth potential. However, the fixed wireless segment has been fragmented essentially since its inception. There are no cohesive standards for outdoor metropolitan area networks beyond the adapted Wi-Fi technologies. Wi-Fi Technology as a standard has been accepted in broad strokes by the industry and the public. However, it is not a well conceived citywide technology.

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Question - 64:



Where did the idea of WiMAX Technology come from?

Ans:

The WiMAX Forum and to the founding members of the WiMAX Technology Forum, which committed themselves early to the process of creating a collaborative standards body. As a founding member of the WiMAX Technology Forum, Intel recognized that a well developed ecosystem was necessary to drive adoption and thereby drive lower hardware costs. Intel was also instrumental in getting other silicon chip manufacturers involved whose products would form the core of WiMAX technology.

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Question - 65:

What is WiMAX Technology?

Ans:

WiMAX Technology is an IP based, wireless broadband access technology that provides performance similar to 802.11/Wi-Fi networks with the coverage and QoS (quality of service) of cellular networks. WiMAX is also an acronym meaning "Worldwide Interoperability for Microwave Access (WiMAX).

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