# IEEE P802.11

Wireless Access Method and Physical Layer Specification

**DATE:** March 6, 1992

**TITLE:** **ANALYSIS OF RETURNS ON "IEEE 802.11 DESIGN GOALS QUESTIONNAIRE" P802.11-91/82B**

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# ANALYSIS OF RETURNS ON "IEEE 802.11 DESIGN GOALS QUESTIONNAIRE" P802.11/91-82B

## 1.0 DESCRIPTION OF RESPONDENTS APPLICATIONS

There were 7 respondents coded P and 4, 5, 6, 9, 11 and 12 from whom forms were received. The entire response to question 1.0 is shown below.

| CODE | **APPLICATION DESCRIPTION**--TRANSCRIBED RESPONSE TO 1.O |
|---|---|
| P | Local Area Network within major building providing file sharing, printer sharing, host connectivity (SNA), and E-mail. |
| 4 | Cordless connection to British Airways mainframe via PC based gateway. The PC terminals will be made up of a portable PC along with terminals software. This will allow access to Reservation and check in programs. |
| 5 | Various: digital records, contract gas, hand held terminals, etc. |
| 6 | Stock Exchange System (branch offices), (broadcast, daytime). |
| 9 | Branch system. |
| 11 | Running in airports. diskless workstations on subLAN's access servers on the backbone LAN. Initial download of environment, thereafter interactive traffic with databases on backbone and hosts via gateways on the subLAN. IBM token ring, Novell netware. |
| 12 | Wireless LAN within the Branch office environment. |

## 2.0 TRAFFIC, DESTINATION, AND DELAY QUESTIONS

### 2.1 File Size Distribution

Responses were obtained only from P, 5, 11 and 12; and they were so varied that averaging is not meaningful. Each of three selected a different size as dominant, and 5 gave a near uniform distribution over all but the smallest size.

It is concluded that no value could be obtained by biasing a system toward a file of any size from below 1K to above 1M.

### 2.2 File Transfer Frequency Distributions

This question produced three responses from P, 5 and 6 where P and 5 were detailed. The response from P show an order of magnitude more traffic than 5.

The question asked for a sort by size of transfer and average over an hour and over 5 minutes to obtain an indication of peakiness. It was found that for respondent P the peak values did not represent an intensity more than twice the hourly average values. A higher peak ratio was reported by 5 mostly in the range of 2 to 5.

### 2.3 Proportion of Station Originated File Transfer Traffic by Destination Category

Respondents 6 and 11 reported 100% of the traffic to a server within the department or the premises respectively, and 9 reported 100% to an off-premises host. Respondent 12 reported 100% of the traffic within the premises without further definition.

Respondent P reported 5% off-premises traffic to a host, and most of the remaining traffic within the department either to a host or to a server.

No other conclusion can be drawn except that all of the suggested cases are necessary in some particular case. Traffic can vary from mostly local to mostly or all off-premises.

### 2.4 Number of Transactions per Hour and Minute by Transfer Size

All questionnaires responded on this question with P and 5 reporting 10,000 or more transactions per hour and much higher 1 minute peak levels.

Very short messages <16 bytes were the entire traffic for 6 only. Short messages 16-100 bytes were the dominant traffic for P and 11. Long messages >100 bytes were the dominant traffic for P and 12, and the entire type of traffic for 4 and 5.

Respondents P, 4 and 5 showed no difference between the maximum 1 minute and 1 hour rate at 100 bytes and similar ratios for 16-100 bytes. The ratio of maximum minute to typical hour was near 5 for 11 and 2.5 for 12. The ratio of typical

to maximum hour was 15 for P , 48 for 4, 1.8 for 5, 2 for 11 and 1.33 for 12.

Only P reported a level of peak traffic that might approach the capacity of one LAN:

2400*80 + 300*5000 = 1.7 Mbytes = 13.5 Mbits/minute = 0.226 Mbits/sec

11 noted that a peak interval of 5 minutes was more appropriate than 1 minute.

### 2.5 Station-originated Transaction Traffic Proportion

Traffic entirely within the department was reported to be 100% by respondents 4, 6 and 9 and 90% by P. **No respondent reported station-station traffic.** The in-department traffic was either to a host or a server.

Traffic out of the department was reported at 10% by P of which 4% was off-premises.

Off-premises traffic, was reported at 50% by 5, 90% by 9, and 75% by 12. All respondents reported the off-premises traffic was entirely to a host except P who noted 4% of the total traffic was to a server.

11 reported 100% of the off-premises traffic was to a host and a 50/50% division between host and server for on-premises traffic where the distinction between department and premises could not be made.

It was evident that the question was interpreted inconsistently by different respondents, though this has little effect on the qualitative conclusions. Some systems are satellites of a distant host and others are primarily, but not exclusively autonomous. Both needs are present.

Heavy use of an off-premises host or a remote server is consistent with methods using single destination links rather than ports on a switch or off-premises LAN taps.

### 2.6 Comments on Other Traffic Loading

5 reported "spanning tree" protocol overhead at 5-10%, a significant observation.

9 reported use of diskless workstations which download 1-2 Mb applications from a server when booted.

### 2.7 Load from Broadcast Traffic

The loading from broadcast traffic was included in the report in 2.3 for P, 4, 6 and 9, but not for the others.

Broadcast loading was reported as over 5% of the traffic by P, 5 and 6.

### 2.8 Traffic Timing Constraints

Only 5 respondents made any attempt to complete this section, and none addressed more than a fraction of the blanks.

Registration at entry was commonly allowed 3-5 seconds and 30 seconds by 11.

Access delay was not broken out between typical and worst case by any respondent, and the separation of known present and projected requirements drew no separate distinction. It is concluded that these respondents do not see requirements different from the present performance.

Access delay values, where given, showed values of 0.5 and 5 milliseconds (maybe) and 1 and 5 seconds. It is believed that the large values are associated with off-premises links and include delays unrelated to the LAN itself. The small values, if they are not a confusion in units, are those associated with predominantly in-department traffic.

Transit delay values appeared equally obscure. 11 alone seemed to have a sense of the difference between access and transit delay requiring 5 milliseconds access delay and allowing 4-5 seconds for transit delay. 11 alone gave variability of transit delay at 2-3 seconds. 4 had no different answer for access and transit delay. 12 had a longer provision for transit delay, but both were in seconds.

An acknowledgment requirement was seen only by 12 and that presumably was an upper layer function that already exists. P gave a 2 second wait for ACK as a requirement. In all other cases, no information was offered.

### 2.9 Connection-type Service

Only 5, 9 and 11 responded with a requirement which included the analog modem function for all and coded voice for 5 and 11.

Little direction was obtained from this question.

## 3.0 OPERATING ENVIRONMENT

### 3.1 Operating Environment Description

The environments that were most frequently checked were rooms, hallways with fixed partitions, high ceiling cluttered interior, single floor building. Only two checked suspended acoustic ceiling and three open areas with movable partitions. 4 only checked outdoor area descriptions.

Boundary conditions were checked by P, 4 and 11. 11 only noted space isolation. P and 11 noted like-type areas with P giving proportions.

P in 40% of the cases and 11 noted that the service boundary and walls coincided,

### 3.2 Quantities and Dimensions for Wired and Wireless

No. stations per enclosed area were small numbers in the range of 1 to 15, except for 5 who reported 1000, for the maximums. The typical numbers were 5-7 except for 5 where it was 200.

The enclosed area was typically given as 12, 30 or 1600 meters by the three respondents.

Both P and 5 are large systems but P is divided into much smaller rooms.

### 3.3 Quantities and Dimensions for Wireless Only with Infrastructure

Only 4, 11 and 12 responded in this sections. 11 gave only number of users and LANs and no information on the size of space.

4 and 12 both showed near 10 meters$^2$ per user typical for 20 to 100 meters$^2$ of enclosed area.

The per premise answers were essentially the same as answers for one enclosed area for 4 and 12.

### 3.4 Quantities and Dimensions for Wireless BCA with No Infrastructure

P, 4 and 6 attempted answers. 4 repeated answers for one enclosed area in 3.2 for one BCA in this question. P gave values that were equivalent to a few enclosed areas in 3.2. 6 reported values in which 2-7 autonomous wireless stations were operating within a much larger environment.

Station density was not much different from previous answers by P and 4.

P alone understood that several basic coverage areas (BCA) might compose one total coverage area (TCA) giving 10 BCAs per TCA as a maximum.

### 3.5 Co-located LANs

Co-located LANs are considered likely by 5 and 11, possible by P, 4 and 9 and improbable by 6 and 12. A common minimum distance between centers of co-located LANs was give as 40 meters by P and 4 and nil by 5 and 9. 11 said co-located LANs would be merged.

### 4.0 MOBILITY REQUIREMENT

Major incentive to use wireless was reported for staff away from desk only by 11, for wiring inaccessible places by P, 6 and 11, for quick relocation moves by P, 11 and 12. Nearly all categories of incentive suggested were checked as a minor incentive by 11.

This group or respondents is very light on mobile applications and strong on wiring alternatives for cost or convenience.

### ANALYSIS AND INTERPRETATION

It is clear that the drafting of the questionnaire was not well matched to the responding group's knowledge or operation, and it did not elicit more than a fraction of the information that was sought. After seeing the answers, many of the questions could have been differently drafted.

One or two did not read the introductory text for definitions, and so many blanks were unfilled that the form must be faulted.

It is also seems that some of these users do not have any way of knowing the breakdowns on traffic types in their own networks, and most did not choose to guess. Perhaps we are hoping for too much in obtaining designer's information by this means.

The information obtained on delay was superficial and not well related to source cause.

The sample is representative of the categories responding which are mostly users of mainframe services. The autonomous networks used for engineering and manufacturing do not appear. The absence of station-station traffic is striking.

Some good information was obtained that supports user density assumptions near 1 per 10 meter$^2$ and the existence of room sizes with enough stations to support one or more access-points.

There is not enough data to support exclusion of cases not reported or reported unused.

Respondent 4 intended a wireless LAN, and gave decent information about the environment, and on typical and peak transaction rate for over 100 byte traffic entirely within a department.

Except for 4, these respondents looked at wireless as a wiring replacement rather than a means of enabling station mobility. It is an indication that a large part of the wired LAN using community may only have a casual interest in wireless for a small number of situations where the wiring is inconvenient.

| File: 11REQ231.XLS | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **RESPONDENT CODE:** | **P** | **4** | **5** | **6** | **9** | **11** | **12** |
| Respondent type: | | | | | | | |
| **2.1 File size distribution** | | | | | | | |
| <1K: | 45 | N/A | 10 | | | 5 | |
| 1K-10K: | 50 | N/A | 20 | | | 10 | |
| 10K-100K: | 2 | N/A | 20 | | | 60 | 10 |
| 1K-1M: | 2 | N/A | 25 | | | 20 | 80 |
| >1M: | 1 | N/A | 25 | | | 5 | 10 |
| | | | | | | | |
| **2.2 Transfer freq distribution** | | | | | | | |
| per hour typ. | | | | | | | |
| <1K: | 100 | | 50 | 360 | | N/A | |
| 1K-10K: | 375 | | 5 | | 4 | N/A | |
| 10K-100K: | 50 | | 2 | | | N/A | |
| 1K-1M: | 36 | | 1 | | | N/A | |
| >1M: | 10 | | 1 | | | N/A | |
| per hour max. | | | | | | | |
| <1K: | 176 | | 200 | 500 | | N/A | |
| 1K-10K: | 1014 | | 10 | | | N/A | |
| 10K-100K: | 111 | | 5 | | | N/A | |
| 1K-1M: | 61 | | 1 | | | N/A | |
| >1M: | 15 | | 1 | | | N/A | |
| per 5 min. typ. | | | | | | | |
| <1K: | 9 | | 10 | | | N/A | |
| 1K-10K: | 32 | | 1 | | | N/A | |
| 10K-100K: | 4 | | 1 | | | N/A | |
| 1K-1M: | 4 | | | | | N/A | |
| >1M: | 0.90 | | | | | N/A | |
| per 5 min. peak | | | | | | | |
| <1K: | 15 | | 20 | | | N/A | |
| 1K-10K: | 96 | | 3 | | | N/A | |
| 10K-100K: | 9 | | 1 | | | N/A | |
| 1K-1M: | 7 | | 1 | | | N/A | |
| >1M: | 1 | | 1 | | | N/A | |

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| RESPONDENT CODE: | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **2.3 Stn orig file xfr traffic** | | | | | | | |
| within dept: | 83 | | 10 | | | | 15 |
| to stn: | N/A | | 5 | | | | |
| to host: | 15 | | 90 | | | | |
| to server: | 68 | | 5 | 100 | | | |
| within premises: | 12 | | 70 | | | | 85 |
| to stn: | N/A | | 5 | | | | |
| to host: | 5 | | 90 | | | | |
| to server: | 7 | | 5 | | | 100 | |
| off premises: | 5 | | 20 | | 100 | | 0 |
| to stn: | N/A | | | | | | |
| to host: | 5 | | 100 | | 100 | | |
| to server: | 0 | | | | | | |
| | | | | | | | |
| **2.4 No. of transactions** | | | | | | | |
| per hour typ: | | | | | | | |
| <16 bytes | 0 | | | 100 | | 5 | |
| 16-100 bytes | 10800 | | | | 20 | 25 | 300 |
| >100 bytes | 1200 | 75 | 36000 | | | 5 | 900 |
| per hour max: | | | | | | | |
| <16 bytes | 0 | | | 200 | | 10 | |
| 16-100 bytes | 162000 | | | | 50 | 50 | 400 |
| >100 bytes | 18000 | 3600 | 66000 | | | 10 | 1200 |
| per 1 min typ: | | | | | | | |
| <16 bytes | 0 | | | | | 0-1 | |
| 16-100 bytes | 180 | | | | 1 | 2 | 10 |
| >100 bytes | 20 | 2 | 600 | | | 0-1 | 30 |
| per 1 min max: | | | | | | | |
| <16 bytes | 0 | | | | | 1-2 | |
| 16-100 bytes | 2400 | | | | 1 | 4 | 15 |
| >100 bytes | 300 | 60 | 1100 | | | 1-2 | 45 |

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| RESPONDENT CODE: | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2.5 Stn orig transaction prop | | | | | | | |
| within dept: | 90 | 100 | | 100 | 10 | | |
| to stn: | N/A | | | | | | |
| to host: | 25 | | 100 | | | | |
| to server: | 65 | 100 | | 100 | 100 | | |
| within premises: | 6 | | 50 | | | | 25 |
| to stn: | N/A | | | | | | 0 |
| to host: | 1 | | 100 | | | 50 | 0 |
| to server: | 5 | | | | | 50 | 100 |
| off premises: | 4 | | 50 | | 90 | | 75 |
| to stn: | N/A | | | | | | 0 |
| to host: | 0 | | 100 | | 100 | 100 | 100 |
| to server: | 4 | | | | | | 0 |
| | | | | | | | |
| 2.6 Other traffic loading | No other significant loading | | Spanning tree-protocol overhead-5-10% | | Diskless workstations download application environment when booted. 1-2 MB traffic downloaded from server. | | |
| | | | | | | | |
| 2.7 Load from broadcast tfc | | | | | | | |
| Is loading acct'd for in 2.3: | YES | YES | NO | YES | YES | NO | NO |
| Is broadcast >5% time: | YES | NO | YES | YES | YES | NO | NO |

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| RESPONDENT CODE: | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2.8 Traffic timing constraints | | | | | | | |
| Initial registration at entry | | | | | | | |
| proj wrls wait/delay: | | 3-4 SEC | | | | 30 SEC | |
| proj wrls retry/remark: | | 3-4 SEC | | | | N/A | |
| knwn net perf/rqrm wait/delay | 5000 | 3-4 SEC | | | | 30 SEC | |
| knwn net perf/rqrm retry/remark | | 3-4 SEC | | | | N/A | |
| Comm access dly typ/wrst: | | | | | | | |
| proj wrls wait/delay: | | 0.50 | | | | 50 | 1 SEC/2 SEC |
| proj wrls retry/remark: | | 2 | | | | N/A | |
| knwn net perf/rqrm wait/delay | 5000 | 0.50 | | | | 5 | 1 SEC/3 SEC |
| knwn net perf/rqrm retry/remark | 8 | 2 | | | | N/A | |
| Transit delay typ/wrst case: | | | | | | | |
| proj wrls wait/delay: | | 0.50 | | | | 4-5 SEC | 3 SEC/3 SEC |
| proj wrls retry/remark: | | 2 | | | | N/A | |
| knwn net perf/rqrm wait/delay | UKN | 0.50 | 50-500 MS | | | 4-5 SEC | 3 SEC/3 SEC |
| knwn net perf/rqrm retry/remark | UKN | 2 | SET TO5 | | | N/A | |
| Trnst dly varibility range: | | | | | | | |
| proj wrls wait/delay: | | | | | | 90% 2-3 SEC | 10% |
| proj wrls retry/remark: | | | | | | N/A | |
| knwn net perf/rqrm wait/delay | N/A | | | | | 90% 2-3 SEC | 10% |
| knwn net perf/rqrm retry/remark | N/A | | | | | N/A | |
| Acknowledgment rqd: | | | | | | | |
| proj wrls wait/delay: | | N/A | | | | N/A | YES |
| proj wrls retry/remark: | | | | | | N/A | |
| knwn net perf/rqrm wait/delay | 2000 | | | | | N/A | YES |
| knwn net perf/rqrm retry/remark | | | | | | N/A | |

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| RESPONDENT CODE: | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2.9 Connection-type service | | | | | | | |
| Required Y/N: | NO | NO | YES | | YES | YES | NO |
| Analog modem: | | | 70 | | X | X | |
| Coded voice 32 kb/s: | | | 30 | X 25 | | X | |
| 64 kb/s clear chnl: | | | | | | | |
| ISDN BRI 144 kb/s: | | | | | | | |
| ISDN PRI 1536/2048 kb/s: | | | | | | | |
| ISDN 384 kb/s: | | | | | | | |
| Comments/usage | | | | | | | |
| Modem/X.25: | | | PERM. 70 | | | This is a gateway performing only communication with a host. The gateway serves several workstations (30-50) | |
| Clear 64 kb/s: | | | PERM. 30 | | | | |

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|---|---|---|---|---|---|---|---|---|
| **RESPONDENT CODE:** | | **P** | **4** | **5** | **6** | **9** | **11** | **12** |
| | | | | | | | | |
| **3.1 Operating environment description** | | | | | | | | |
| Interior Service Areas | | | | | | | | |
| Open areas with movable partitions | | | | | | | | |
| This LAN and BCA: | | X | | | | | | X |
| This LAN and TCA: | | X | | | | | X | |
| Nearby LAN: | | | | 1 | | | X | |
| Rooms, hallways with fixed partitions | | | | | | | | |
| This LAN and BCA: | | X | | | X | | | X |
| This LAN and TCA: | | X | | | | | | |
| Nearby LAN: | | | | | | | | |
| Meeting room, lecture hall: | | | | | | | | |
| This LAN and BCA: | | X | | | | | | |
| This LAN and TCA: | | X | | | | | | |
| Nearby LAN: | | | | 1 | | | | |
| High ceiling, industrial machinery | | | | | | | | |
| This LAN and BCA: | | | | | | | | |
| This LAN and TCA: | | | | | | | | |
| Nearby LAN: | | | | | | | | |
| High celling-cluttered interior | | | | | | | | |
| This LAN and BCA: | | X | X | | | | | |
| This LAN and TCA: | | X | | | X | | X | |
| Nearby LAN: | | | | 90 | | | X | |
| Public area-transportation terminals, hotel lobby, convention center | | | | | | More often | | |
| This LAN and BCA: | | | | | | | | |
| This LAN and TCA: | | | | | | | X | |
| Nearby LAN: | | | | | | | X | |
| Single floor building | | | | | | | | |
| This LAN and BCA: | | | X | | X | | | X |
| This LAN and TCA: | | | | | | | X | |
| Nearby LAN: | | | | 90 | | | | |
| Multi-story building | | | | | | | | |
| This LAN and BCA: | | | | | | | | X |
| This LAN and TCA: | | X | | | X | | | |
| Nearby LAN: | | | | 5 | | | | |
| Suspended acoustic ceiling | | | | | | | | |
| This LAN and BCA: | | X | | | | | | X |
| This LAN and TCA: | | X | | | | | | |
| Nearby LAN: | | | | | | | | |

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| RESPONDENT CODE: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | P | 4 | 5 | 6 | 9 | 11 | 12 |
| **3.1 Operating environment description (cont)** | | | | | | | | |
| Exterior service areas: | | | | | | | | |
| Campus between buildings | | | | | | | | |
| This LAN and BCA: | | | X | | | | | |
| This LAN and TCA: | | | | | | | | |
| Nearby LAN: | | | | | | | | |
| Storage yards-high stacks | | | | | | | | |
| This LAN and BCA: | | | X | | | | | |
| This LAN and TCA: | | | | | | | | |
| Nearby LAN: | | | | | | | | |
| Freight and package terminals | | | | | | | | |
| This LAN and BCA: | | | X | | | | | |
| This LAN and TCA: | | | | | | | | |
| Nearby LAN: | | | | | | | | |
| Boundary | | | | | | | | |
| Open-gap over 5 coverage radii | | | | | | | | |
| This LAN and BCA: | | | X | | | | | |
| This LAN and TCA: | | | | | | | | |
| Nearby LAN: | | | | | | | | |
| Adjoining like-type area | | | | | | | | |
| This LAN and BCA: | | 40 | X | | | | | |
| This LAN and TCA: | | 40 | | | | | X | |
| Nearby LAN: | | 40 | | | | | X | |
| Boundary & attenuating wall coincide | | | | | | | | |
| This LAN and BCA: | | 10 | | | | | | |
| This LAN and TCA: | | 10 | | | | | | |
| Nearby LAN: | | 10 | | | | | | |
| Adjoining area independently used | | | | | | | | |
| This LAN and BCA: | | 20 | | | | | | |
| This LAN and TCA: | | 20 | | | | | | |
| Nearby LAN: | | 20 | | | | | | |
| **NOTES for 3.1** | | | | | | | **Adjacent workstations NOT connected to the same (sub)LAN. BCA not relevant. No two airports are the same. New conditions apply to every new installation.** | |



B

| RESPONDENT CODE: | | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 3.2 Quantities & Dimensions-All | | | | | | | | |
| Per LAN | | | | | | | | |
| No. stations per enclosed area: | minimum: | 1 | 2 | 15 | | 2 | N/A | 6 |
| | maximum: | 10 | 15 | 1000 | | 15 | N/A | 10 |
| | typical: | 5 | 7 | 200 | | 6-7 | N/A | |
| Area per enclosed area: | minimum: | 9 | 20 | 16 | | | N/A | 40 |
| | maximum: | 60 | 8 diameter | 8000 | | | N/A | 100 |
| | typical: | 12 | 30 | 1600 | | | N/A | |
| No. stations: | minimum: | 24 | 2 | 15 | | 2 | 30 | 6 |
| | maximum: | 400 | 15 | 1000 | | 15 | 50 | 10 |
| | typical: | 50 | 7 | 200 | | 6-7 | 40 | |
| Total area: | minimum: | 375 | 20 | 16 | | | N/A | 40 |
| | maximum: | 3000 | 80 | 8000 | | | N/A | 100 |
| | typical: | 700 | | 1600 | | | N/A | |
| Per Premise | | | | | | | | |
| No. users: | minimum: | 70 | 2 | 10 | | | 100 | 6 |
| | maximum: | 800 | 15 | 1500 | | | 500 | 15 |
| | typical: | 100 | 7 | 250 | | | 300 | |
| Total area: | minimum: | 2025 | 20 | 200 | | | N/A | 40 |
| | maximum: | 21000 | 80 | 16000 | | | N/A | 100 |
| | typical: | 3000 | 7 | 8000 | | | N/A | |
| No. floors for area given | minimum: | 3 | 1 | 1 | | 1 | 1 | 1 |
| | maximum: | 7 | 1 | 2 | | 2 | 2 | 2 |
| | typical: | 3 | 1 | 1 | | 1 | 1 | |
| No. LANs: | minimum: | 1 | 1 | 1 | | 1 | 3 | 1 |
| | maximum: | 15 | 1 | 6 | | 5 | 6 | 1 |
| | typical: | 4 | 1 | 1 | | 1 | 5 | |

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| RESPONDENT CODE: | | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **3.3 Quantities & dimensions--Wireless only** | | | | | | | | |
| Per LAN | | | | | | | | |
| No. stations per enclosed area: | minimum: | | 2 | | | | N/A | 6 |
| | maximum: | | 15 | | | | N/A | 10 |
| | typical: | | 7 | | | | N/A | |
| Area per enclosed area: | minimum: | | 20 | | | | N/A | 40 |
| | maximum: | | 80 | | | | N/A | 100 |
| | typical: | | | | | | N/A | |
| No. stations: | minimum: | | 2 | | | | 30 | 6 |
| | maximum: | | 15 | | | | 50 | 10 |
| | typical: | | 7 | | | | 40 | |
| Total area: | minimum: | | 20 | | | | N/A | 40 |
| | maximum: | | 80 | | | | N/A | 100 |
| | typical: | | | | | | N/A | |
| Per Premise | | | | | | | | |
| No. users: | minimum: | | 2 | | | | 100 | 6 |
| | maximum: | | 15 | | | | 500 | 15 |
| | typical: | | 7 | | | | 300 | |
| Total area: | minimum: | | 20 | | | | N/A | 40 |
| | maximum: | | 80 | | | | N/A | 100 |
| | typical: | | | | | | N/A | |
| No. LANs: | minimum: | | 1 | | | | 3 | 1 |
| | maximum: | | 1 | | | | 6 | 1 |
| | typical: | | | | | | 5 | |
| **NOTES for 3.3** | | | | | | | Adjacent workstations NOT connected to the same (sub)LAN-3 | |

B

| RESPONDENT CODE: | | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **3.4 Quantities & Dimensions -Wireless BCA** | | | | | | | | |
| Per BCA | | | | | | | | WHAT |
| No. stations per area | minimum: | 15 | 2 | | 2 | | | DOES |
| | maximum: | 75 | 15 | | 7 | | | BCA |
| | typical: | 20 | 7 | | 4 | | | STAND |
| Area | minimum: | 120 | 20 | | 300 | | | FOR? |
| | maximum: | 900 | 80 | | 500 | | | |
| | typical: | 160 | | | | | | |
| Per Premise | | | | | | | | |
| Area within which BCAs exist | minimum: | 120 | | | 300 | | | |
| | maximum: | 9000 | | | 500 | | | |
| | typical: | 480 | | | | | | |
| No. BCAs | minimum: | 1 | | | 1 | | | |
| | maximum: | 10 | | | 1 | | | |
| | typical: | 3 | | | 1 | | | |
| **NOTES for 3.4** | | | | | | | Infrastructure required | |
| | | | | | | | | |
| **3.5 Co-located LANs** | | | | | | | | |
| Will co-located LAN be Improbable, Possible , or Likely: | I, P or L | P | P | L | I | P | L | I |
| What is common minmum distance between the centers of nearby LANs? | | 40 | 40 | 0-1 | | 10 | Co-located LANs will be "merged". Adjacent workstations NOT on the same LAN. | x |

B

| RESPONDENT CODE: | | P | 4 | 5 | 6 | 9 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 4.1 Mobility requirement | | | | | | No mobil needs | | |
| For on-premise vehicles--speedft/sec | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | | | | | | MINOR | |
| No. per LAN: | range: | | | | | | | |
| For roving job-function employees--motivation | major/minor | | | | | | MINOR | |
| No. per LAN: | range: | | | | | | | |
| For visitors outside access | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | | | | | | MINOR | |
| No. per LAN | range: | | | | | | | |
| Staff away from desk--paging/full function | | | | | | | | |
| motivation-- | major/minor | | | | | | MAJOR | |
| For on premises machines--operating area | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | MINOR | | | | | MINOR | |
| No. per LAN: | range: | 5-40 | | | | | | |
| For wiring inaccessible locations--reach | range: | | | | 15 | | | |
| | maximum | | | | 20 | | | |
| motivation-- | major/minor | MAJOR | | | MAJOR | | MAJOR | MINOR |
| No. per LAN: | range: | 5-30 | | | None | | 4-10 | |
| For intrinsically safe control--reach | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | | | | | | MINOR | |
| No. per LAN: | range: | | | | | | | |
| For quick relocation--moves/mth-wk-day | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | MAJOR | | | | | MAJOR | MAJOR |
| No. per LAN: | range: | 5-10 | | | | | Areas equipped with portable PC's/Laptop's | |
| For hospital unwired monitoring | | | | | | | | |
| motivation-- | major/minor | | | | | | MINOR | |
| No. per LAN: | range: | | | | | | | |
| For wiring cost avoidance--% difference | range: | | | | | | | |
| | maximum | | | | | | | |
| motivation-- | major/minor | MINOR | | | | | MINOR | MINOR |
| No. per LAN: | range: | 20-30 | | | | | | |

B