



DECT Site Survey Kit User Manual

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1 Site Survey Kit Contents

	Name	Quantity	Option
1	Measurement base station (incl. connecting wire to accupack)	1	
2	Accumulator package for base station	2	
3	Charger station for accupack	1	
4	Measurement handset (DeTeWe)	2	
5	Charger for measurement handset (DeTeWe)	2	
6	Headset for measurement handset (DeTeWe)	1	
7	Clip for measurement handset (DeTeWe)	2	
8	Data-Link-cable for measurement handset (DeTeWe)	1	
9	Link-cable for connection of external music source to measurement handset (DeTeWe)	1	
10	Manual	1	
11	Measurement handset (Kirk)	1	<input checked="" type="checkbox"/>
12	Charger station incl. power supply for measurement handset (Kirk)	1	<input checked="" type="checkbox"/>
13	Tripod (incl. mounting platform)	1	<input checked="" type="checkbox"/>

2 General

To ensure that a DECT system operates effectively, a homogeneous radio network must be implemented to provide connectivity and coverage in the locations required by the customer. The Avaya DECT site survey kit enables installation engineers to determine the optimum location for DECT base stations using specially calibrated WT9610 handsets and a DECTnet2 RFP base station, that are included in the kit.

EMEA and North America DECT specification survey kits are available from Avaya for BusinessPartners that intend to provide in-house network planning, site survey and implementation services. Completion of the 1/2 day Avaya IP DECT Solutions on-line technical training course (AVA00757WEN) and assessment is a pre-requisite for BPs in this case. Alternatively, Avaya can provide a full range of its own consulting and implementation offers for wireless voice.

3 Technical Data

Frequency range	1880 - 1990 MHz (EMEA) 1920 - 1930 MHz (NAR)
Number of carrier frequencies	10 (EMEA); 5 (NAR)
Max. transmitting power	250 mW (EMEA); 100 mW (NAR)
Access method	Time slot method with repetition frequency of 10 ms
Encoding method	TDMA
Number of time slots	24
Number of duplex channels	120 (EMEA); 60 (NAR)
Gross data rate	1152 kbit/s
Net data rate	32 Kbit/s Data (B-Field) unprotected 24,6 kbit/s Data (B-Field) protected 6,4 kbit/s Signalling

4 Preparation

4.1 Measurement Equipment

Unpack the survey kit as follows. Remove the handset chargers and the base station accupack charger. Charge the handsets and the accupack.

After the accumulators are charged, remove the base station and the connection cable from the kit. Connect the base station to the charged accumulator and charge the second accupack. The charging station controls charge of the accumulator and recharges it when necessary.

After connecting the accumulator to the base station, the base station should illuminate after a few seconds, indicating that it is ready for operation.

If it has not been done up to now, the handsets should be subscribed to the base station as described in the relevant documentation. Depending on the operating environment, the base station and accupack can be attached to the tripod by velcro.

4.2 Measurement

Make sure you are equipped with precise scale diagrams of the building and/or premises that you want to survey. Before beginning, it is strongly recommended that the following points are clarified:

- * How many DECT handsets are required and expected system traffic load ?
- * In which areas will the handsets most often be located and expected peak load for high usage base stations ?
- * Which areas of the building/premises should be covered by the DECT network ?
- * Quality and constitution of walls, doors, partitions etc. ?
- * Identification of materials or surfaces that could impact or impede radio propagation (metal, electro-magnetic and/or electrical features, amouring, other transmitters etc.)
- * Location of cable runs and wiring points

Two general procedures can be followed when conducting survey measurements:

1. Begin by entering the positions of all base stations in the building diagram. This represents a rough tentative plan. When taking subsequent measurements, the stations' positions are either maintained or corrected depending on the values you determine.
2. First select one base station as the starting point for the measurements. Then determine all further locations for the base stations, in succession, by taking measurements and entering the locations one after the other in the building diagram.

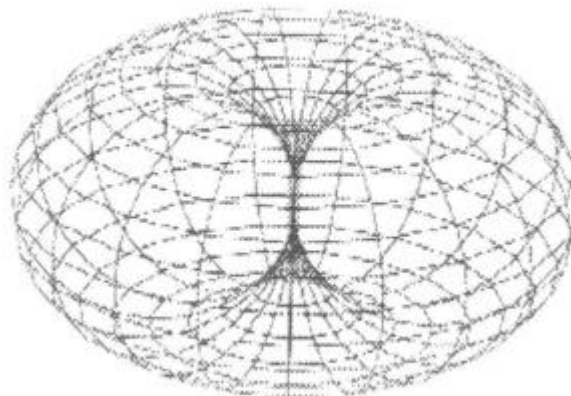
Please note that Radio Fixed Parts (RFPs) must have a clearance of 2,50m (8ft) to each other in the horizontal direction and of 0,25m (1ft) in the vertical direction. An ideal location for mounting a transmitter is between 1,80m (6ft) and 2,30m (7.5ft) but least 0,50m (1.5ft) below ceiling.

Please avoid mounting RFPs/base stations in false ceilings, cupboards or other closed fixtures, because then the quality of the radio network will deteriorate dramatically and you have additional need for RFPs or repeaters.

5 Range of a Base Station

The DECTnet2 base station (RFP 21) included in the survey kit has a circular antenna and a propagation that can be viewed as a torus (a doughnut-shaped ring) with a diameter of the inner circle that is equal to zero. The vertical propagation is similar to the horizontal propagation.

5.1 Radio Network with Circular Antennas



The average horizontal range of a base station outdoors is about 300m (1000ft). Indoors, the range depends very much on the building construction (reinforced concrete, brickwork, lightweight construction etc.), furniture and quality of fixtures (wood, steel etc.) and on the geometry of the building. Average range is a circle with 30m (100ft) radius. The following table shows typical signal attenuation (degradation) indoors compared to outdoors.

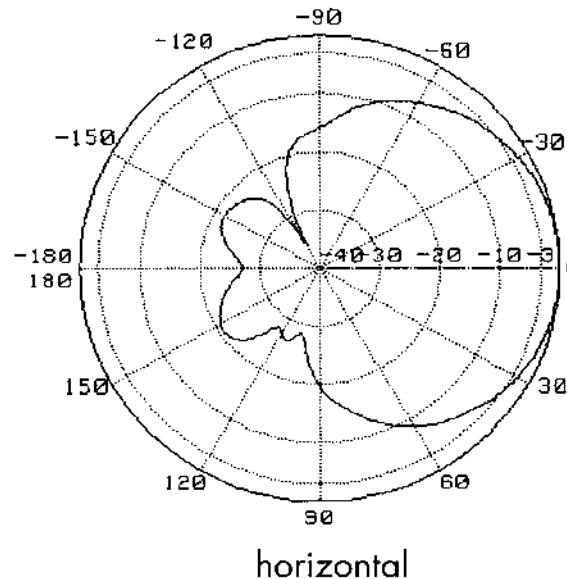
5.2 Attenuation of Different Materials

Material	Loss of range in % to outdoors
Glass, wood (untreated)	10%
Wood (treated)	25%
Plasterboard	27 – 41%
Brickwork (10 -12cm / 4"-5")	44%
Brickwork, (24cm / 10"cm)	60%
Wall of concrete	78%
Wall of wire-reinforced glass	84%
Ceiling of reinforced concrete	75 – 87%
metallic-coated glass	100%

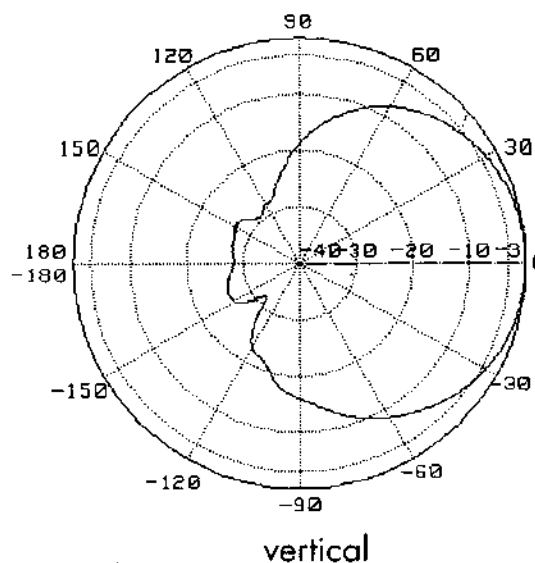
6 External Antenna

When using base stations with external antennas, please refer to the manufacturer's documentation to identify differences in specification from the standard circular antenna. The Avaya RFP34 Outdoor Base Station has a similar radio propagation to the RFP32 Indoor Base Station when equipped with the standard Dipole antenna set.

6.1 Radio Propagation Horizontal



6.2 Radio Propagation Vertical



7 Ready to Start!

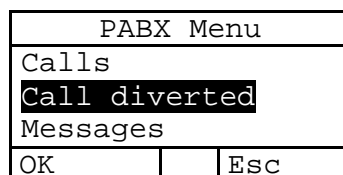
Establish a connection with both handsets. Connect a common device, e.g. CD player, radio etc., to the supplied link cable "measurement handset – music source" to one of the handsets. This music source will be extremely helpful for your measurement since you will notice interruptions of the music. Connect the headset supplied to the second handset, this keeps your hands free to enter the determined locations to the diagram and are able to read the display of the handset during measurement. Here is how to enter the measurement mode of the handset:

7.1 Switch to Measurement Mode

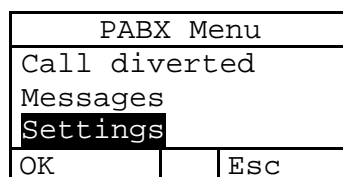
The service menu is protected by entering a service code and is for service use only. Starting in the idle state of the handset you have to enter the following procedure:



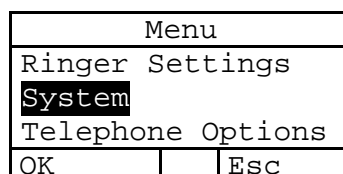
After a Long press of the Menu key, the following menu appears:



Scroll to the "Settings" menu option



Select Settings with OK, the following menu appears:



Now enter the dial string * * * 7 6 # and the service menu will appear

Service Menu	
Version Number	
Auto Call Test	
Auto Answer Test	
OK	Esc

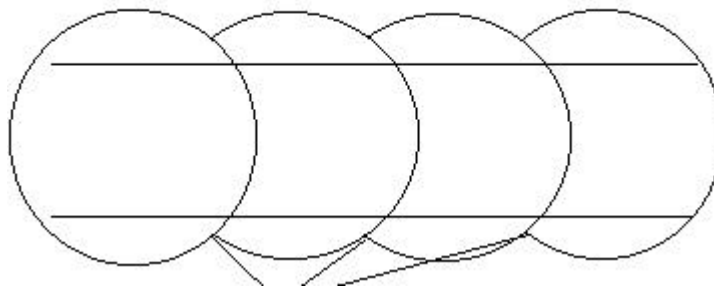
Scroll to the "Site Survey" menu option, select with OK and you can see the display for the survey measuring mode.

[Icons: Signal strength, Handset, Mail, Bluetooth, Battery]	
FE PP:	FP:
RSSI	-56 dBm
RFPI	1007A10602
TelBook	Menu

In Site Survey mode the number of errors occurring between the handset (PP) and in the base station (FP) is displayed, as well as the actual field strength of the receiving signal (RSSI) shown in dBm. Also the identification number of the Base Station (RFP) is displayed, that is actually connected to the handset. When located directly in front of the base station handset will indicate -40 dBm.

Now move with both handsets and the base station to the location where the first base station will be mounted. Fix the measurement base station temporarily at this location (e.g. by placing the tripod with the base station here). Now follow the circular perimeter of the transmitter range while watching the display and signal indicated on the handset until a field strength of -60 dBm is shown. Within this area, good quality and reliable voice communications can be expected. Now mark these points on your diagram for future reference.

7.2 Ideal Radio Network



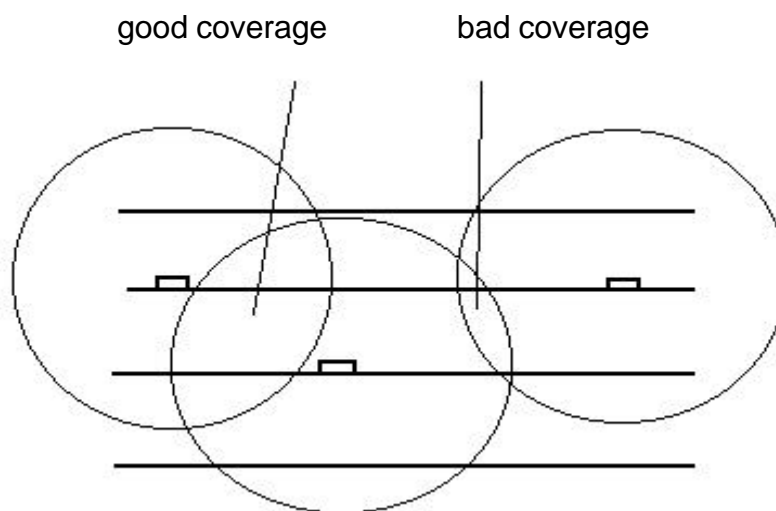
At these points you should measure -60 dBm

To guarantee interrupted phone calls when roaming, neighbouring base stations should provide at least -60 dBm their point of intersection. Now walk along the entire planned radio coverage area and determine the corresponding RFP locations and copy them into your diagram.

8 Distribution Inside a Building

Base station radio propagation has both a horizontal and vertical direction. So, for multi-floor buildings you have also to consider the field strength in the floors above and below the transmitter. The field strength and quality depends very much on the material used for the ceiling. By placing the base stations well you can optimize the total number required for complete radio coverage.

8.1 Multi-floor Radio Network



8.2 Mounting the base station

Mount the base stations at the locations you have determined during the survey. Make use that they are oriented vertically and check that the signal strengths match the measurements that you made during your survey. When mounting transmitters with external directional antennas, make sure the propagation of the antennas is the same direction. Clearance between the two antennas should at least equal wavelength (15,7cm/6").