communications NOTE: This form is to be used with Datafile Bulletin 10003-1

DATAFILE SIGNAL STRENGTH CALCULATION FORM 10003-3

POINT TO POINT

	Base Station A	Base Station B
Transmitter Frequency	Mc	Mc
Location (coordinates)		
Distance between Stations	miles	miles
Effective Antenna Height	feet	feet
Average Noise Level	dbw	dbw
Desired Reliability	% of time	% of time

1 Draw profile of signal path from A to B on 4/3 Earth Curvature Profile Paper (ECM-94). Use Graph 5C to check for 0.6 fresnel zone clearance.

Does path have 0.6 fresnel zone clearance? ..... Yes ☐ No ☐

2 Use one of the appropriate methods below to determine transmission losses. (See Table I or Figure 3.) One of the other methods can be used as a check.

Free-Space Loss Method

Graph 1A or B	db
Graph 3B	db
Total	db

Empirical Method

Graph 5B (F)	db
Graph 5B (D_3)	db
Graph 5B (D_o)	db
Total	db

Smooth-Earth & Plane-Earth Loss Methods (2)

Graph 1A	db
Graph 2B (D_1)	db
Graph 2B (D_2)	db
Graph 2B (D_3)	db
Graph 3B	db
Total	db

Graph 1D	db
Graph 2A	db
Graph 3B	db
Total	db

Scatter Method

Graph 1C	db

3 Determine the total system losses and gains in both directions.

	A to B Losses	A to B Gains	B to A Losses	B to A Gains
Transmission Losses (from Step 2)	db		db	
Transmission Line Losses (xmtr & rcvr)	db		db	
Transmitter Power (db above 1 watt)		db		db
Receiver Sensitivity at Av. Noise Level (db below 1 watt)		db		db
Transmitting Antenna (use appropriate blank) ...	db or	db	db or	db
Receiving Antenna (use appropriate blank)	db or	db	db or	db
Probability Gain or Loss (from Graph 3A)	db or	db	db or	db
Total Gains and Losses	db	db	db	db

4 If the Total Gain exceeds the Total Loss, the system operation will exceed the Desired Reliability listed above. If the Total Loss is greater, the Desired Reliability will not be achieved.

BASE STATION TO MOBILE

The following procedure can be used to determine the mobile coverage which a Base Station will provide. To determine the transmitter power required to cover a certain area, reverse this procedure.

	Base Station	Mobile Station
Transmitter Frequency	Mc	Mc
Effective Antenna Height	feet	feet
Average Noise Level	dbw	dbw
Desired Reliability	% of time	% of time

1 Determine the total system losses and gains in both directions.

	Base to Mobile Losses	Base to Mobile Gains	Mobile to Base Losses	Mobile to Base Gains
Transmission Line Losses (xmtr & rcvr)	db		db	
Transmitter Power (db above 1 watt)		db		db
Receiver Sensitivity at Average Noise Level (db below 1 watt)		db		db
Transmitting Antenna (use appropriate blank) ..	db or	db	db or	db
Receiving Antenna (use appropriate blank)	db or	db	db or	db
Probability Gain or Loss (terrain factors from Graph 3A)	db or	db	db or	db
Total Gains and Losses	db	db	db	db

2 Determine Net Gain by subtracting Total Losses from Total Gains.

	Base to Mobile	Mobile to Base
Total Gain	db	db
Total Loss	- db	- db
Net Gain .... /	db	db

3 Select a distance in miles which would be required between the base station and the mobile station to produce a total attenuation (sum of attenuations determined from Graphs 1D and 2A) equal to the Net Gain found in Step 2. This is the distance which the base station will cover with the reliability indicated above.

	Base to Mobile	Mobile to Base
Distance Selected	miles	miles
Plane Earth Attenuation (Graph 1D)	db	db
Diffraction Loss (Graph 2A)	+ db	+ db
Total Attenuation (should equal Net Gain found in Step 2)	db	db

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