

EXHIBIT 4

A) Antenna Reflection Pattern

Antenna Characteristics (Ground Station)

File: 01000CP.DAT
Date: 15-Aug-01
Time: 13:36
Operator: komine
Ser. no.: 6001
Channel: LHCP_1

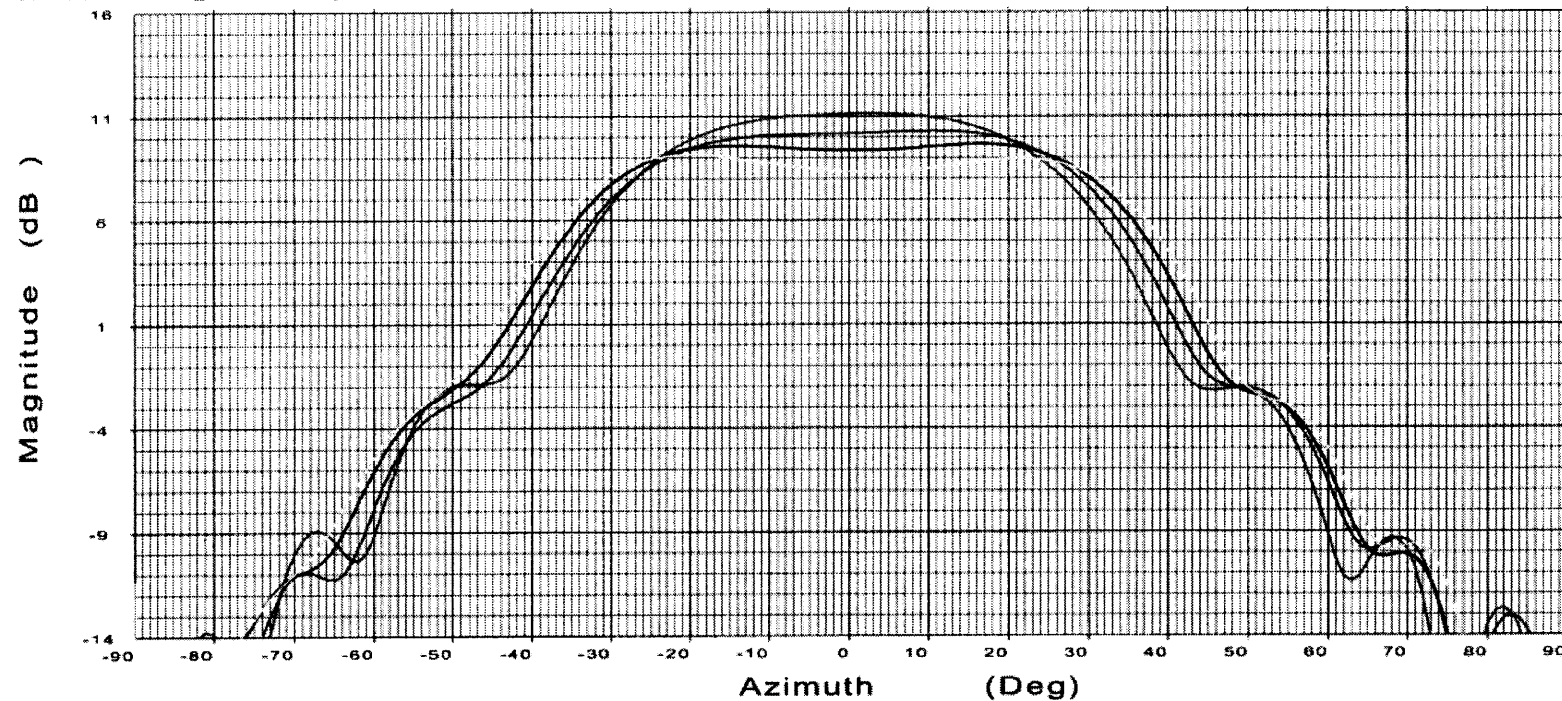
G8720

Calibration: On

Frequency : See Legend

Tx pol: Not Av

Rx pol: LHCP



Overlays

Frequency : 1.920 GHz —
Frequency : 1.950 GHz - - -
Frequency : 1.980 GHz . . .
Frequency : 2.010 GHz - . -

NEC Corporation

FR959
Automated Antenna
Measurement Systems

Fig.A-1. Helical antenna for ground station (Tx)

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Antenna Characteristics (Terminal & Relay Stations)

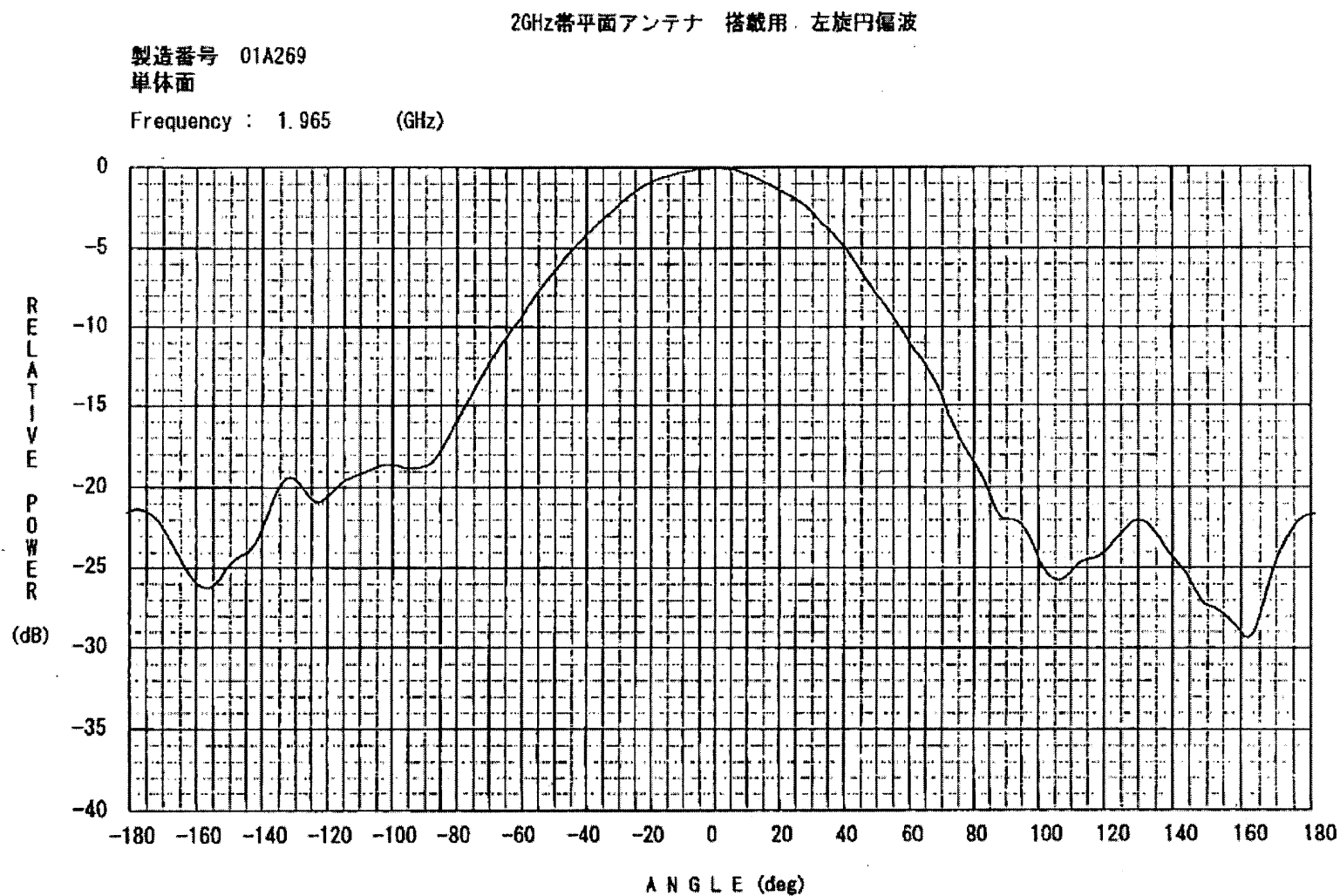


Fig.A-2. Patch antenna for ground terminal (Tx) & relay station (Tx,Rx)

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Antenna Characteristics (Ground Terminal)

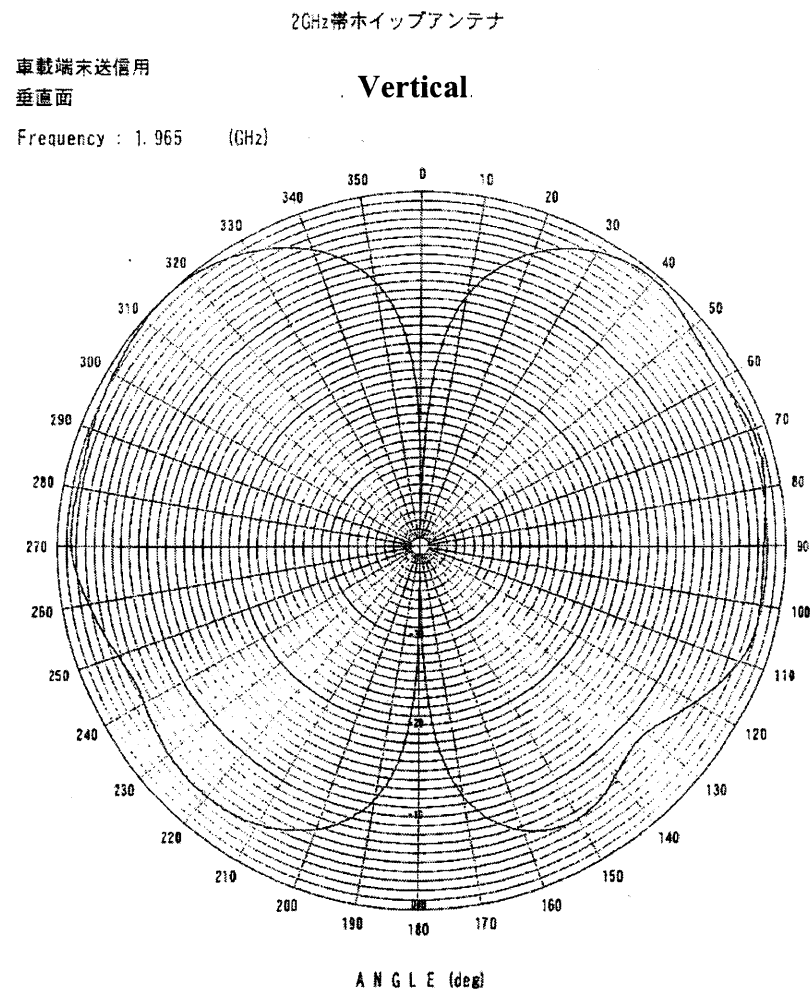
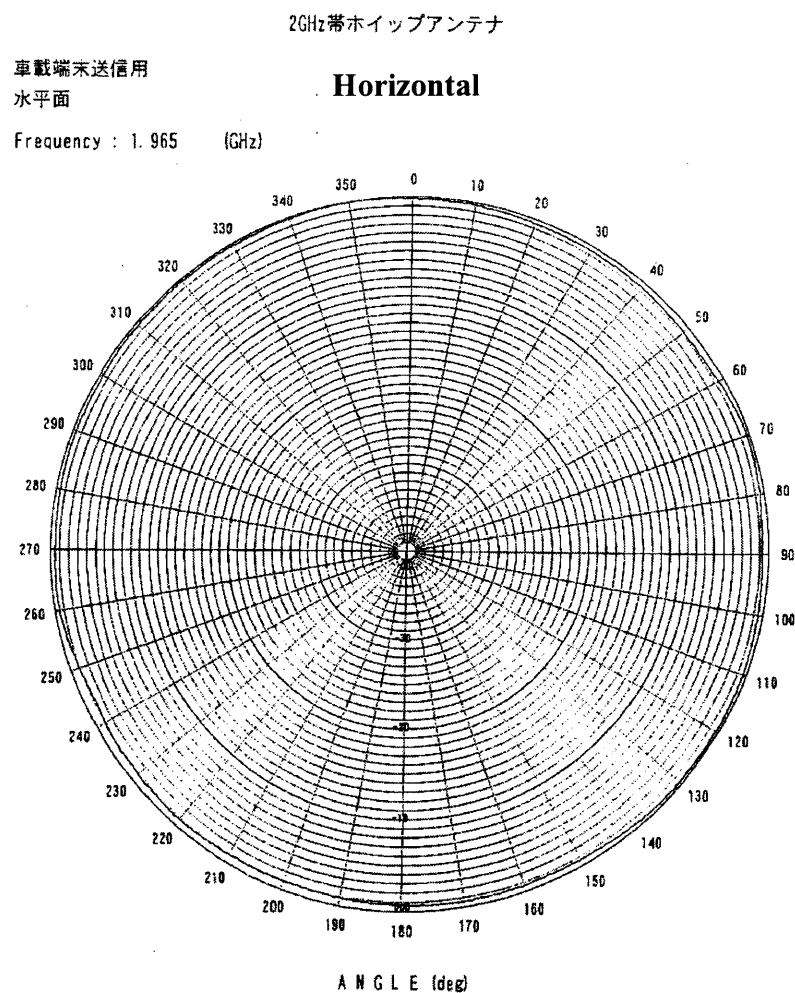


Fig.A-3. Whip antenna for ground terminal station (Tx)

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RF waveform of ground base station

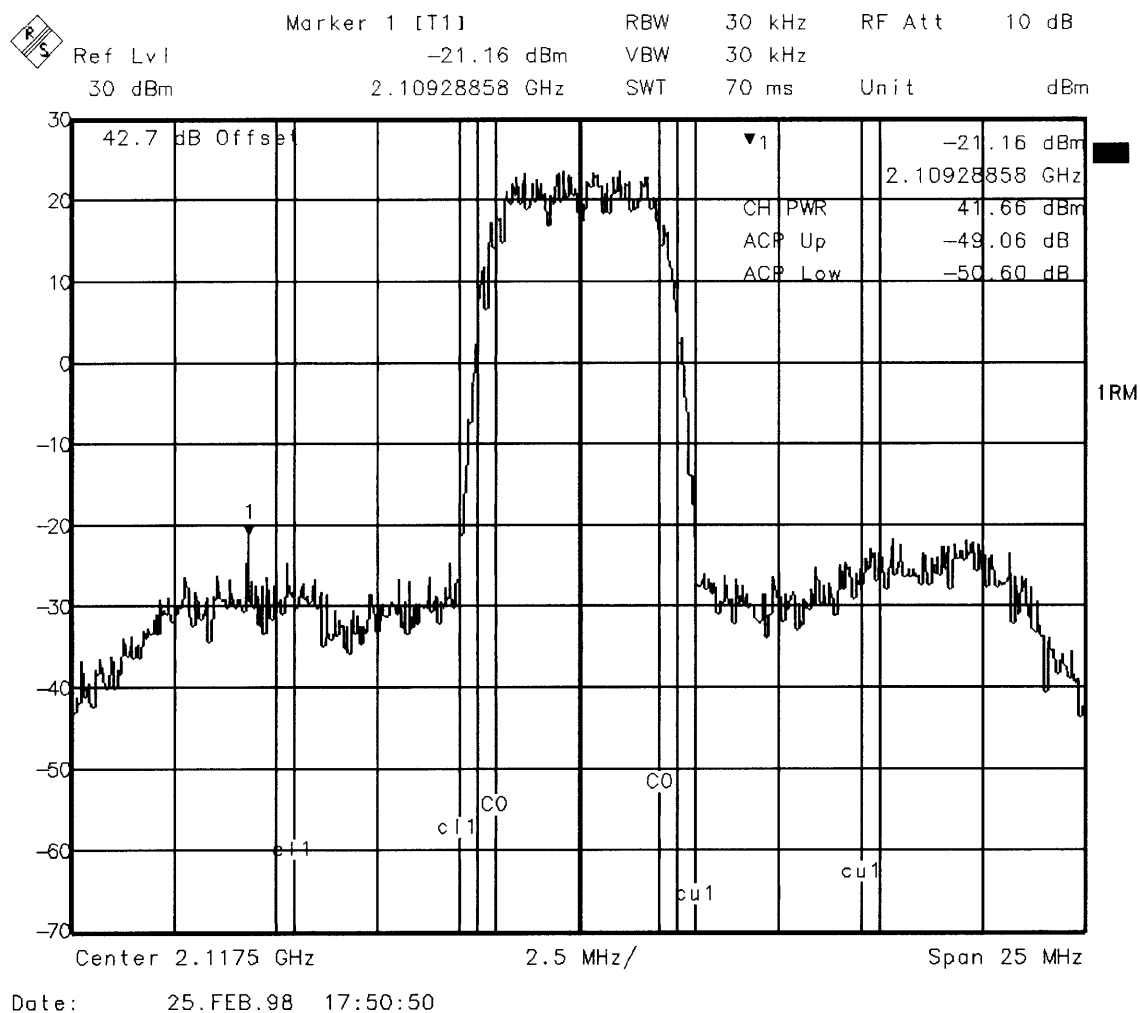


Fig.B-1. RF waveform of ground base station (Reference Data)

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RF waveform of ground terminal station

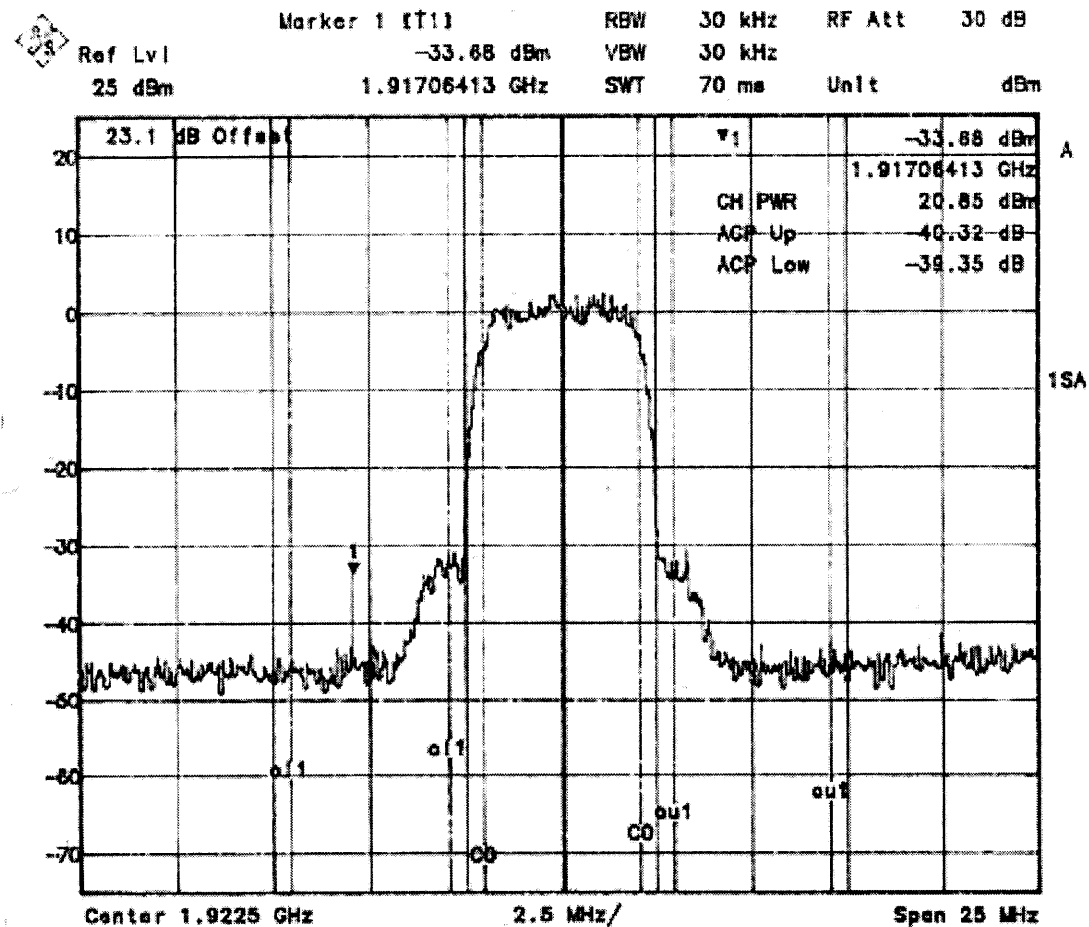


Fig.B-2. RF waveform of ground terminal station (Reference Data)

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<i>Pathfinder experiment for MT communication</i>					
	Flight altitude	Km	20.0	<Remarks> ce angle of elevation Base 90[deg] , Terminal 90[deg] ce Low-speed Moveie(Data rate : 384bps)	
	half-power band width	deg	60.0		
		deg	35.0		
	Data rate	Kbps	384.0		
	Base [] Terminal (Forward-Link)			Terminal [] @Base [Down-link]	
Tx	Base Tx output power	dBm	29.3	Terminal Tx output power	dBm 24.0
	Fedder loss	dB	-3.0	Fedder loss	dB -1.0
	Tx antenna gain	dB	8.5	Tx antenna gain	dB 10.0
	Base station ERP	dBm	34.8	Terminal station ERP	dBm 33.0
Up-Link	Free space loss	dB	-124.5	Free space loss	dB -124.5
	Rain attenuation	dB	0.0	Rain attenuation	dB 0.0
Repeater	Rx antenna gain	dB	10.0	Rx antenna gain	dB 10.0
	Polarization losses	dB	0.0	Polarization losses	dB 0.0
	Fedder loss	dB	-1.0	Fedder loss	dB -1.0
	Receiver input power	dBm	-80.7	Receiver input power	dBm -82.5
	Receiver thermal noise	dBm	-106.8	Receiver thermal noise	dBm -106.8
	Receiver NF	dB	4.0	Receiver NF	dB 4.0
	Up	dB	22.1	Up	dB 20.3
	Repeater amplitude	dB	110.7	Repeater amplitude	dB 112.5
	Repeater output	dBm	30.0	Repeater output	dBm 30.0
	Fedder loss	dB	-1.0	Fedder loss	dB -1.0
	Tx antenna gain	dB	10.0	Tx antenna gain	dB 10.0
	Repeater station ERP	dBm	39.0	Repeater station ERP	dBm 39.0
Down-Link	Free space loss	dB	-124.5	Free space loss	dB -124.5
	Rain attenuation	dB	0.0	Rain attenuation	dB 0.0
Rx	Rx antenna gain	dB	10.0	Rx antenna gain	dB 9.0
	Polarization losses	dB	0.0	Polarization losses	dB 0.0
	Fedder loss	dB	-1.0	Fedder loss	dB -3.0
	Reciver input power	dBm	-76.5	Reciver input power	dBm -79.5
	Receiver thermal noise	dBm	-106.8	Receiver thermal noise	dBm -106.8
	Receiver NF	dB	4.0	Receiver NF	dB 4.0
	Down link C/ N	dB	26.3	Down link C/ N	dB 23.3

Table-C Link budget of IMT communication experiment

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Footprint Model

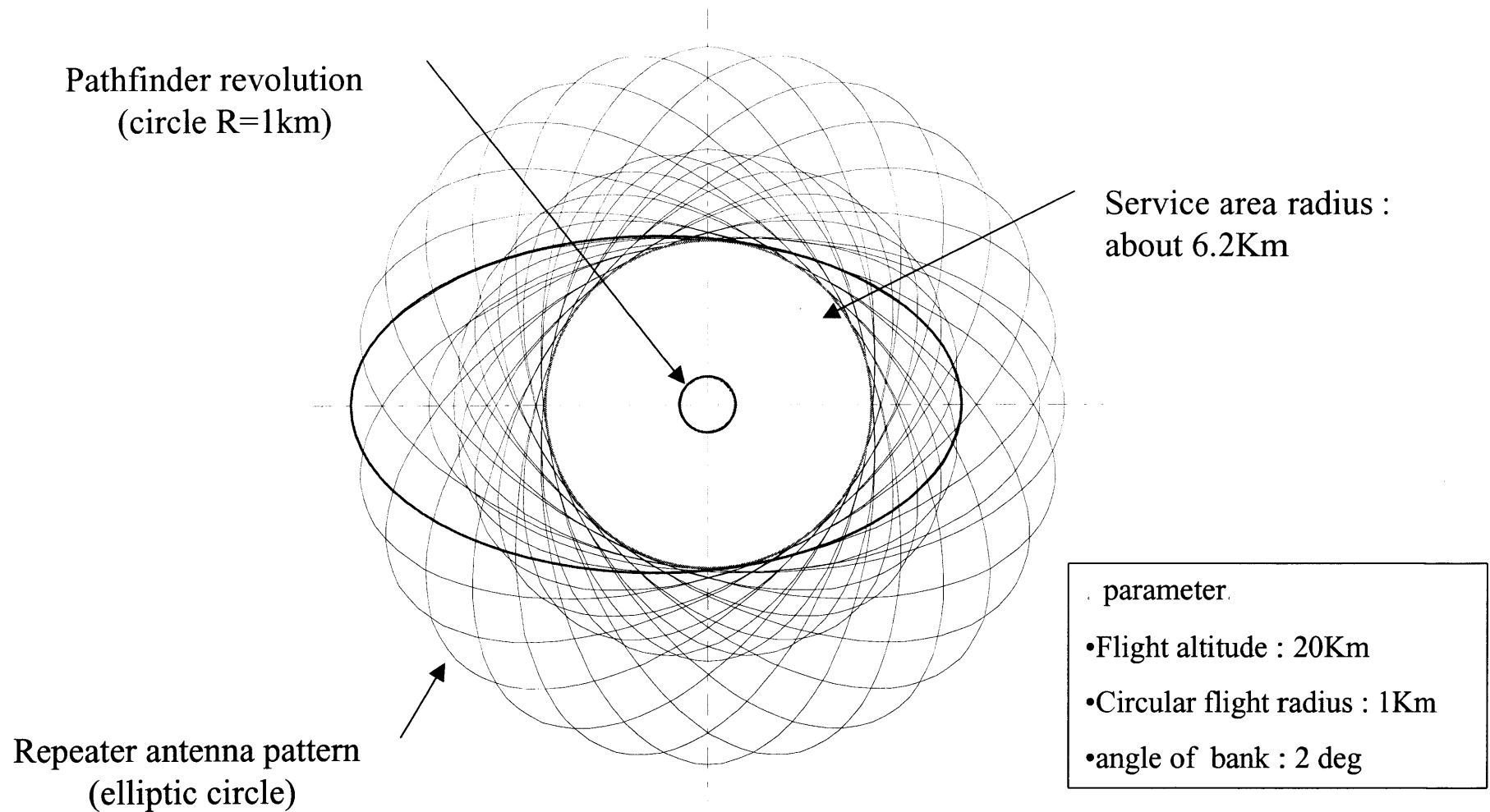


Fig-D Foot print pattern

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