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Analysis of Interference to Remote Passive Microwave Sensors

July 1986

Prepared for:

NASA Headquarters
Office of Space Science and Applications
Code EC, John Kiebler
Washington, D.C. 20546

Contract Number: NASW-3973

Prepared by Douglas Boyd and Tom Tillotson

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Abstract

The final acts of the 1979 WARC were analyzed to determine potential interference to remote passive microwave sensors. Using interferer populations determined from the U.S. Government and FCC Master File Lists and assuming uniform geographical distribution of interferers, the level of interference from shared services and active services in adjacent and subharmonic bands was calculated for each of the 22 passive sensing bands. In addition, due to the theoretically large antennas required for passive sensing, an analysis was performed to determine if smaller antennas, i.e. relaxed resolution requirements, would have an effect on interference and to what extent.

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1. Introduction

The purpose of this report is to determine the compatibility between remote passive microwave sensors, shared services and active services in adjacent and subharmonic bands. In addition to studying compatability at required sensor resolutions, a parametric analysis has been made to assess interference potential with relaxed sensor resolution requirements.

This has included identification of frequency allocations for remote passive sensing from the 1979 World Administrative Radio Conference (WARC), determining typical sensor and interferer characteristics, and developing a model suitable for the quantization and assessment of the cummulative interference.

In this report and its annexes are presented the primary, secondary and footnoted passive sensing allocations for the Earth Exploration Service, general characteristics of passive microwave sensors and interferer characteristics, a description of the model used to assess interference, and conclusions based on results of the study. Also presented in annexes are the actual data used in the assessment of interference, the results from the interference model, and a detailed progressive explanation of the model used.

2. Sensor Characteristics

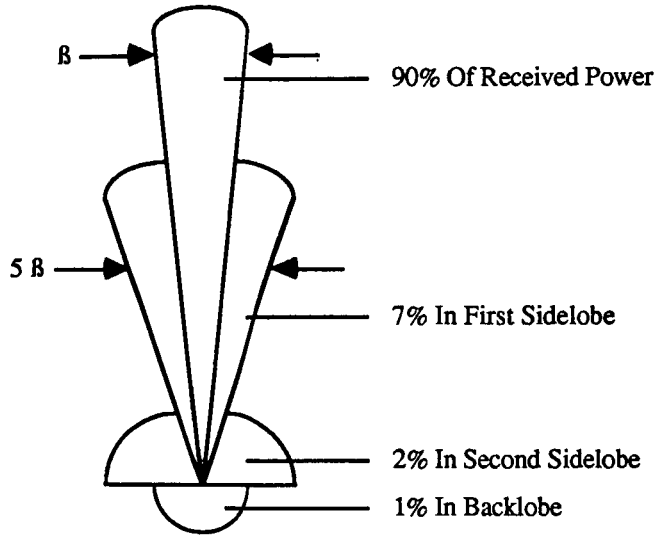
Table 1 lists the sensor parameters used in this study. The interference thresholds are defined in Report 694-1 as 20% of the minimum discernable power change (ΔT).

Antennas used on remote sensors are assumed to be high efficiency pencil beam antennas where the mainbeam gain provides a beamwidth narrow enough to meet resolution requirements. These antennas are modeled by assuming 90% of the received power is from the mainbeam, 7% from the first sidelobe, which has a beamwidth five times the mainbeam beamwidth, 2% from the remaining sidelobes, and 1% from the backlobe. The mainbeam beamwidth is determined from the required sensor resolution and orbit altitude. Gain is determined by the ratio of percent of power to percent of spherical area in the beam. This model is shown in Figure 1 along with the equations for antenna gain.

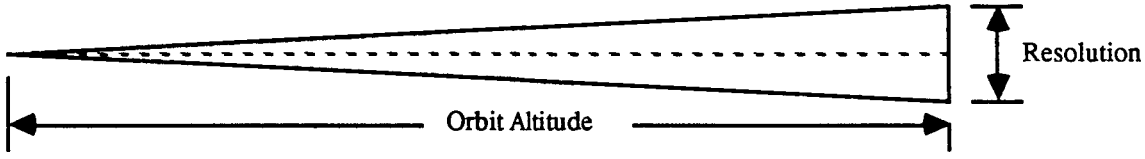
Input or RF filters are not used on sensors because of the extremely low power levels being detected. Input passband characteristics are then determined by the IF bandwidth, antenna, antenna

Table 1. Sensor Data

Sensor Frequency Lower - Upper	ΔT	Sensor Bandwidth	Receiver Poles	Sensor Resolution	Interference Threshold	Attenuation Oxygen	Attenuation Water
GHz	°K	MHz		km	dBW	dB/km	
1.400-1.427	0.1	27.0	4	20.0	-171.0	0.0000	0.0000
4.200-4.400	0.3	200.0	4	2.0	-158.0	0.0065	0.0000
6.425-7.075	0.3	200.0	4	20.0	-158.0	0.0068	0.0000
6.425-6.625	0.3	200.0	4	20.0	-158.0	0.0068	0.0000
6.875-7.075	0.3	200.0	4	20.0	-158.0	0.0068	0.0000
10.600-10.700	1.0	100.0	4	1.0	-156.0	0.0073	0.0090
15.200-15.400	0.2	200.0	4	2.0	-160.0	0.0078	0.0180
18.600-18.800	0.2	200.0	4	2.0	-152.0	0.0084	0.0430
21.200-21.400	0.2	200.0	4	2.0	-160.0	0.0104	0.1600
22.210-22.500	0.4	290.0	4	2.0	-155.0	0.0109	0.1500
23.600-24.000	0.2	400.0	4	2.0	-157.0	0.0120	0.1200
31.300-31.800	0.2	500.0	4	2.0	-156.0	0.0180	0.0700
36.000-37.000	1.0	1000.0	4	1.0	-146.0	0.0430	0.0830
50.200-50.400	0.3	200.0	4	10.0	-157.0	0.9000	0.0140
51.400-59.000	0.3	200.0	4	10.0	-157.0	15.0000	0.1600
51.400-51.600	0.3	200.0	4	10.0	-157.0	15.0000	0.1600
58.800-59.000	0.3	200.0	4	10.0	-157.0	15.0000	0.1600
64.000-65.000	0.3	200.0	4	10.0	-157.0	2.3000	0.2300
64.000-64.200	0.3	200.0	4	10.0	-157.0	2.3000	0.2300
64.800-65.000	0.3	200.0	4	10.0	-157.0	2.3000	0.2300
86.000-92.000	1.0	6000.0	4	1.0	-138.0	0.0480	0.4150
100.000-102.000	0.2	2000.0	4	1.0	-150.0	0.0350	0.5200
105.000-126.000	0.2	2000.0	4	1.0	-150.0	0.0465	0.0610
105.000-107.000	0.2	2000.0	4	1.0	-150.0	0.0465	0.0610
124.000-126.000	0.2	2000.0	4	1.0	-150.0	0.0465	0.0610
150.000-151.000	0.2	2000.0	4	1.0	-150.0	0.0154	1.2500
164.000-168.000	0.2	2000.0	4	1.0	-150.0	0.0125	2.3000
182.000-185.000	0.2	2000.0	4	1.0	-150.0	0.0120	10.0000
217.000-231.000	0.2	2000.0	4	1.0	-150.0	0.0088	2.7500
275.000-277.000	0.2	2000.0	4	1.0	-150.0	0.0070	5.1000



ß = Angle Which Gives Required Resolution From Orbit.



$$\beta = 2 \tan^{-1} \left(\frac{\text{Resolution}}{(2)\ (\text{Orbit Altitude})} \right)$$

$$\text{Gain} = 10 \log \left[\frac{4\pi\ (\text{fraction of power in beam})}{\text{area of beam on unit circle}} \right]$$

$$\text{Mainlobe Gain} = 10 \log \left[\frac{4\pi\ (.9)}{2\pi\ (1 - \cos\beta/2)} \right] = 10 \log \left[\frac{1.8}{1 - \cos\beta/2} \right]$$

$$\text{Firstlobe Gain} = 10 \log \left[\frac{4\pi\ (.07)}{2\pi\ (\cos\beta/2 - \cos 5\beta/2)} \right] = 10 \log \left[\frac{.14}{\cos\beta/2 - \cos 5\beta/2} \right]$$

$$\text{Second Sidelobe Gain} = 10 \log \left[\frac{4\pi\ (.01)}{2\pi\ (\cos 5\beta/2)} \right] = 10 \log \left[\frac{.04}{\cos 5\beta/2} \right]$$

$$\text{Backlobe Gain} = 10 \log \left[\frac{4\pi\ (.01)}{2\pi} \right] = -16.99 \text{ dB (Constant)}$$

Figure 1. Sensor Antenna Model

switch and waveguide characteristics. It is estimated that the input passband of a typical sensor can be modeled by a 4 pole Butterworth passband characteristic. If both the receiver passband and transmitter spectrum are modeled by a Butterworth filter characteristic, an out-of-band rejection factor (OBRF) can be defined as:

$$OBRF = \frac{\int_{-\infty}^{\infty} A^2(f)\, B(f)\, dw}{\int_{-\infty}^{\infty} B(f)\, dw}$$

where A(f) is the normalized receiver amplitude response, B(f) is the normalized interference spectrum, and:

$$A^2(f) = \frac{1}{\left(\frac{f-f_r}{\pi B_r}\right)^{2N_r} + 1}$$

$$B(f) = \frac{1}{\left(\frac{f-f_i}{\pi B_i}\right)^{2N_i} + 1}$$

where B_r is the -3 dB bandwidth, N_r is the number of poles and f_r is the center frequency in the receiver Butterworth characteristic. Similarly, B_i is the -3 dB bandwidth, N_i is the number of poles and f_i is the center frequency in the interferer spectrum. When implementing these integrals using numerical techniques the receiver was assumed to have a maximum filter rejection of 70 dB and all the interferer power was assumed to be contained within ± 10 times the interferer bandwidth.

Figure 2 shows the relationship between the OBRF, the number of receiver poles, and the guard band (band edge to band edge) for a single interferer. In the figure, the receiver is assumed to have a 200 MHz bandwidth with 4 to 8 pole Butterworth filter characteristics. The interferer spectrum is modeled by a 3 pole Butterworth characteristic.

An out of band rejection factor can be determined for an adjacent band containing a large number of interferers by calculating the OBRF for each channel or, to conserve computation time, by interpolating between points on curves such as those shown in Figure 2. If there is no apparent

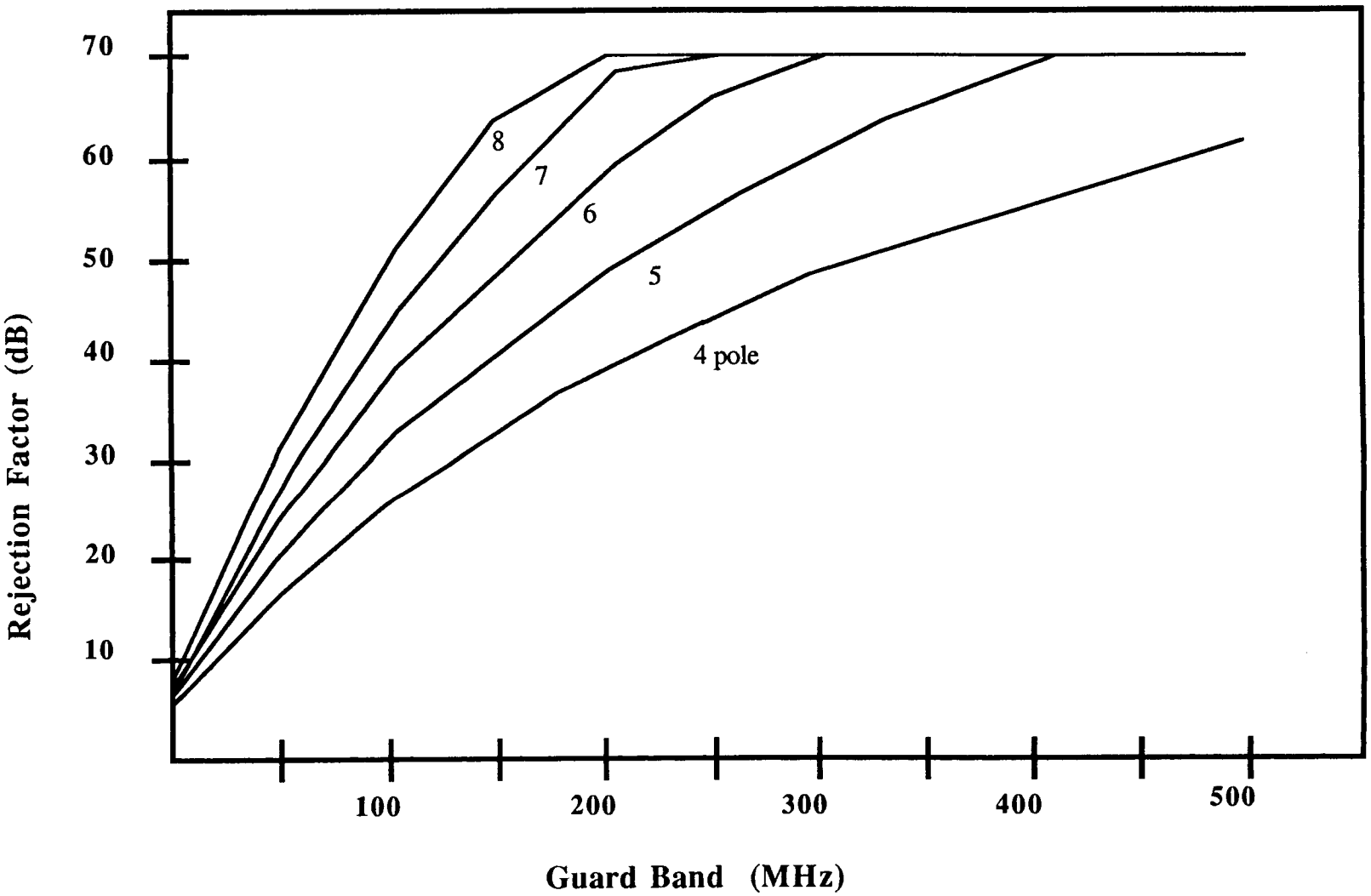


Figure 2. Out of Band Rejection Factor for a 20 MHz Bandwidth Interferer

(200 MHz bandwidth receiver with 4 to 8 pole Butterworth filter characteristic;
interferer spectrum modeled by 3 pole butterworth filter characteristics)

channeling plan for the adjacent band interferers, it is assumed they are uniformly distributed across the adjacent band.

As can be seen from Figure 2, for zero guard band there is very little change in OBRF as the number of receiver poles change from 4 to 8. A more effective way to increase the OBRF is to increase the guard band or to increase both the guard band and the number of receiver poles. There is, of course, no rejection of signals from interferers falling within the sensor passband, i.e. shared services or services in subharmonic bands.

3. Interferer Characteristics

The number and types of interferers in adjacent, subharmonic, and shared bands were accumulated by counting frequency assignments in the Government and FCC Master Files. For widebands containing a large number of assignments, estimates were made on the total number of assignments. Data required to characterize the typical station classes in an interfering band include bandwidth, transmit power, mainlobe gain, number of units, and band within which all units of the particular station class can be found (band of operation). Values of these parameters were chosen to best represent all assignments. Annex A contains the shared band interferer characteristics used in this study as well as a listing of station class abbreviations. For adjacent and subharmonic band interferer characteristics, see Annex B, Interference to Remote Passive Microwave Sensors from Active Services in Adjacent and Subharmonic Bands, April 1985, NASW-3973.

In order to realistically simulate actual interferer populations, the number of mobile stations counted from the frequency registrations have been reduced significantly. Since the number of interferers reported in the frequency assignments are often exaggerated (see NTIA manual, section 9.8.2, paragraph 39), the number of mobile stations were reduced 30%. In addition, a usage estimate of 10% was assumed, further decreasing the number to one-tenth of the 70%. Hence, the actual number of mobile stations expected to be transmitting at any given moment is only 7% of the actual number of units counted in the frequency assignments.

Also, because most radar utilize digital modulation and the frequency assignments list peak power, an average duty cycle of -30 dB was applied to radar stations. The application of a duty cycle is possible because passive sensors are integrating devices with integration times much longer than pulse duration times of a radar. Integration may be performed over tenths of a second while radar pulse durations are on the order of micro or milliseconds.

Knowing the mainlobe gain (G_{ML} in dB) of a particular terrestrial service, sidelobe gains were predicted with the following equation:

$$G(\theta) = 52 - 10 \log \left[\frac{1}{\pi} \sqrt{\frac{10^{G_{ML}/10}}{.55}} \right] - 25 \log \theta \text{ dB}$$

where q is the off-boresight angle. This equation follows sidelobe values of the antenna patterns given in Appendix 28 of the ITU Radio Regulations providing the first two terms do not reduce to less than 32. For purposes of this study, the gain will not be less than -10 dB.

Harmonic output from an interfering station was predicted using the Table of Maximum Permitted Spurious Emission Power Levels in Appendix 8 of the Radio Regulations. After reviewing the FCC and NTIA guidelines on spurious emissions the ITU regulations were chosen as the most conservative for this study, i.e., they allow the highest level of spurious emissions. These regulations are shown in Figure 3.

This study is limited to the first and second subharmonics of the sensing bands. Predicting the characteristics of interfering stations at high harmonics is a difficult task, especially the characterization of antennas. For parabolic antennas, one would expect an increase in gain proportional to the frequency squared, or, 9.5 dB increase at three times the fundamental frequency. This would be true for an ideal reflector and an all pass antenna feed. Tolerance losses from surface deviations in typical reflector antennas are on the order of 3 dB at frequencies below 30 GHz and are less than 1 dB below 10 GHz. Antenna feeds are designed to optimize operation at the desired fundamental frequency and no data has been found on their characteristics at harmonics. Predicting characteristics at harmonics would not be feasible because of the wide variety and complex structure of high efficiency feeds. For antennas other than reflector, monopole, or dipole types, predicting characteristics at harmonics is even more complicated. It is expected that the gain will actually decrease but without rigorous proof of the amount of actual decrease we will take a conservative stand and assume the antenna gain to be constant up to the second harmonic.

All transmitters were assumed to have a three pole Butterworth falloff characteristic for at least ten bandwidths removed from the assigned frequency. This is the minimum number of poles

Figure 3. Appendix 8

Table of Maximum Permitted Spurious Emission Power Levels

1. The following table indicates the maximum permitted levels of spurious emissions, in terms of the mean power level of any spurious component supplied by a transmitter to the antenna transmission line.

2. Spurious emission from any part of the installation other than the antenna and its transmission line shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.

3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.

4. For technical or operational reasons, specific services may demand more stringent levels than those specified in the table. The levels applied to these services shall be those agreed upon by the appropriate world administrative radio conference. More stringent levels may also be fixed by specific agreement between the administrations concerned.

5. For radiodetermination stations, until acceptable methods of measurement exist, the lowest practicable power of spurious emission should be achieved.

Frequency Band Containing the Assignment (lower limit exclusive, upper limit inclusive)	For any spurious component the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified in Columns A and B below and the absolute power levels given shall not be exceeded (Note 1)	
	A	B
	Levels applicable until 1 January 1994 to transmitters now in use and to those installed before 2 January 1985	Levels applicabel to transmitters installed after 1 January 1985 and to all transmitters after 1 January 1994
9 kHz to 30 MHz	40 decibels 50 milliwatts (Notes 2,3,4)	40 decibels 50 milliwatts (Notes 4,7,8)
30 MHz to 235 MHz		
-- mean power above 25 watts	60 decibles 1 milliwatt (Note 5)	60 decibels 1 milliwatt (Note 9)
-- mean power 25 watts or less	40 decibels 25 microwatts (Notes 5,6)	40 decibels 25 microwatts

235 MHz to 960 MHz -- mean power above 25 watts -- mean power 25 watts or less	No level is specified for transmitters operating on assigned frequencies above 235 MHz. For these transmitters the power of spurious emissions shall be as low as practicable.	60 decibels 20 milliwatts (Notes 10,11) 40 decibels 25 microwatts (Notes 10,11)
960 MHz to 17.7 GHz -- mean power above 10 watts -- mean power 10 watts or less		50 decibels 100 milliwatts (Notes 10,11,12,13) 100 microwatts (Notes 10,11,12,13)
Above 17.7 GHz		Due to the diverse nature of technologies employed by services operating above 17.7 GHz, further study by the CCIR is required prior to the specification of levels. To the extent possible, the values to be observed should be those shown in appropriate CCIR Recommendations. Until suitable Recommendations have been adopted, the lowest possible values achievable shall be employed (see Recommendation 66).

Notes in the Table of Maximum Permitted Spurious Emission Power Levels

1. When checking compliance with the provisions of the table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

2. For transmitters of mean power exceeding 50 kilowatts and which operate below 30 MHz over a frequency range approaching an octave or more, a reduction below 50 milliwatts is not mandatory, but a minimum attenuation of 60 decibels shall be provided and every effort should be made to comply with the level of 50 milliwatts.

3. For hand-portable equipment of mean power less than 5 watts which operates below 30 MHz, the attenuation shall be at least 30 decibels, but every effort should be made to attain 40 decibes attenuation.

4. For mobile transmitters which operate below 30 MHz any spurious component shall have an attenuation of at least 40 decibels without exceeding the value of 200 milliwatts, but every effort should be made to comply with the level of 50 milliwatts wherever practicable.

5. For frequency modulated maritime mobile radiotelephone equipment which operates above 30 MHz, the mean power of any spurious emission falling in any other international maritime mobile channel, due to products of modulation, shall not exceed a level af 10 microwatts and the mean power of any other spurious emission on any discrete frequency within the international maritime mobile band shall not exceed a level of 2.5 microwatts. Where, exceptionally, transmitters of mean power above 20 watts are employed, these levels may be increased in proportion to the mean power of the transmitter.

6. For transmitters having a mean power of less than 100 milliwatts, it is not mandatory to comply with an attenuation of 40 decibels provided that the mean power level does not exceed 10 microwatts.

7. For transmitters of a mean power exceeding 50 kilowatts which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 milliwatts is not mandatory, a minumum attenuation of 60 decibels shall be provided.

8. For hand-portable equipment of mean power less than 5 watts, the attenaution shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

9. Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

10. Where several transmitters feed a common antenna or closely spaced antennae on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

11. Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

12. These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant CCIR Recommendations, when available (see Recommendation 66).

13. These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant CCIR Recommendations, when available (see Recommendaion 66).

required to meet FCC and NTIA adjacent channel out-of-band emissions.

3.1 Non -Allocated Interferers

Footnote US 246 from the NTIA manual states: "No stations will be authorized to transmit in the bands 608-614 MHz, 1400-1427 MHz, 1660.6-1668.4 MHz, 2690-2700 MHz, 4990-5000 MHz, 10.68-10.70 GHz, 15.35-15.40 GHz, 23.6-24.0 GHz, 31.3-31.8 GHz, 51.4-54.25 GHz, 58.2-59.0 GHz, 64-65 GHz, 86-92 GHz, 100-102 GHz, 105-116 GHz, 164-168 GHz, 182-185 GHz, 217-231 GHz." Several assignments have been found in the above frequency bands, which are allocated only for passive sensing.

Initially, two assignments were found in the 1400-1427 MHz band, but upon further research of those assignments, it was discovered one was a typographical error (14000-14500 MHz instead of 1400-1450 MHz) and the other an A0 emission (unmodulated double-sideband) used for testing purposes. Similarly, several other assignments, which originally were in bands not authorized for transmission, were eliminated.

Listed below are the assignments found in bands not permitting transmission. These numbers were included in the first computer analysis performed for adjacent and subharmonic band analysis.

Interferers in Bands not Allocated for Transmission
[microfiche: FCC-Feb 1983, GMF-Sept 1985]

In Band Frequency	Microfiche	Station Class	Number of Units	Bandwidth	Power	Gain	Assigned Frequency
23.6-24.0 GHz	GMF	LR	12	250MHz	50 KW	45 dB	23.6-24.47 GHz
note:	Radar for airport radar ground control.						
31.3-31.8 GHz	FCC	FX	1	10 KHz		45 dB	31.5-31.6 GHz
	FCC	MO	1	10 KHz	10 KW	0 dB	31.5 GHz
	GMF	EXP	1	10 KHz	.5 W	42 dB	31.7 GHz
note:	Test for satellite program. Located in California.						
51.4-54.25 GHz	FCC	FB/MO	6	20 KHz	25 W	0 dB	51.895 & 53.289
	GMF	EXP	20	20 MHz	.1 W	35 dB	54.0-58.0 GHz
86-92 GHz	FCC	FB2	1	20 KHz	30 W	40 dB	86.34375 GHz
105-116 GHz	GMF	EXP	2	10 KHz	20 W	40 dB	102.0-130.0 GHz

note:	For research with communications system equipment. Bell Telephone, USA.						
	FCC	MO	2	25 MHz	20 W	0 dB	102.0-130.0 GHz
note:	Bell Telephone, New Jersey.						
217-231 GHz	GMF	EXP	10	25 MHz	20 W	40 dB	185.0-230.0 GHz
note:	For research with communications system equipment. Bell Telephone, USA.						

A second search of more recent frequency assignments revealed the following assignments in bands where supposedly no transmission is allowed.

Interferers in Bands not Allocated for Transmission
[microfiche: FCC-July 1985, GMF-March 1986]

In Band Frequency	Microfiche	Station Class	Number of Units	Bandwidth	Power	Gain	Assigned Frequency
23.6-24.0 GHz	FCC	?	1	3 MHz	400 W		23.6615 GHz
note:	Van Nuys, California. Licensee: Litton Systems, Inc.						
	GMF	LR	12	250 MHz	50 KW	45 dB	23.6-24.47 GHz
note:	Radar for airport radar ground control.						
31.3-31.8 GHz	FCC	?	1	10 MHz	20 KW		31.5-52.0 GHz
note:	Coordination with TV stations. Licensee: McDonnell Douglas Radio Services Corp.						
	GMF	EXP	1	10 KHz	.5 W	42 dB	31.7 GHz
note:	Test for satellite program. Located in California.						
51.4-54.25 GHz	GMF	EXP	20	20 MHz	.1 W	35 dB	54.0-58.0 GHz
86-92 GHz	GMF	EXP	1	4 GHz	.004 W	25 dB	91.0-95.0 GHz
note:	Ground based synthetic aperture radar measurement system. Located in California.						
	FCC	FB2	1	20 KHz	30 W	40 dB	86.34375 GHz
100-102 GHz	FCC	?	3	25 MHz	20 W		92.0-101.0 GHz
note:	Bell Telephone Laboratories, New York & New Jersey.						
105-116 GHz	FCC	MO	3	25 MHz	20 W	0 dB	102.0-130.0 GHz
note:	Bell Telephone Laboratories, New York & New Jersey.						
	FCC	?	89	100 KHz	5 W		110.525 GHz
note:	Licensed under police departments, sheriff's departments, city hall, etc.						
217-231 GHz	FCC	?	3	25 MHz	20 W		185.0-230.0 GHz
note:	Bell Telephone Laboratories, New York & New Jersey.						

Further investigation is required to determine the authority by which these assignments were made and whether they should actually have the assignments denied.

3.2 Digital Termination Systems

Presently, no digital termination systems are listed in the frequency files. However, since DTS nodal stations are allocated at 10.550-10.615 GHz and user stations at 10.615-10.680 GHz, a number of these systems have been added to the study in their respective allocated bands in order to determine what effect they would have on the 10.6-10.7 GHz sensing band. DTS systems also were placed in the 18.82-18.92 GHz band and analyzed as to their effect on the 18.6-18.8 GHz sensing band. While there is no allocation at present for DTS at 18 GHz, we do have literature on the development of such a system in this frequency range so have included this information in our study. For results of these analyses, see section 5.3, pages 26-28.

4. Interference Model

This study analyses interference levels into passive sensors from terrestrial stations using techniques similar to those in CCIR Report 694-1. The following is a description of the computer model developed to assess interference to a low orbit satellite from large interfering populations. The basic assumptions were that the population is uniformly distributed throughout the satellite's field of view and have random azimuths. Interference into the sensor mainlobe and firstlobe and interference into the sensor sidelobe are determined separately because of the sensor's high resolution, i.e., very narrow mainlobe and first sidelobe beamwidths.

For mainlobe and first sidelobe interference, a direct overflight, an area lost can be calculated from the sensor resolution. These areas are shown by the shaded regions in figure 4. The area lost is defined as all subsatellite points where interference is expected. Figure 5 shows the calculations used to determine the number of interferers in both the mainlobe and the first sidelobe from interferers in adjacent bands. The area lost from a single interferer then can be multiplied by the total number of terrestrial stations causing interference in the mainlobe or first sidelobe to yield a total area lost. This assumes the sensor will not see more than one interferer at a time in its mainlobe or first sidelobe. A typical resolution is 2 km and typical uniform distributions will not have interferers within 2 km of each other. The total area lost is compared to the total area in view of the sensor to find the percent of area lost due to mainlobe and first sidelobe interference.

For second sidelobe interference a percent of area lost is not determined, only whether the cummulative interference is above the sensor's interference threshold. This is determined by placing the satellite in a fixed position, uniformly distributing the interferers within the field of view, and calculating the cummulative received power. This "static" geometry simulates interference to a sensor over a large, populated land mass. Interference over coastal areas and open

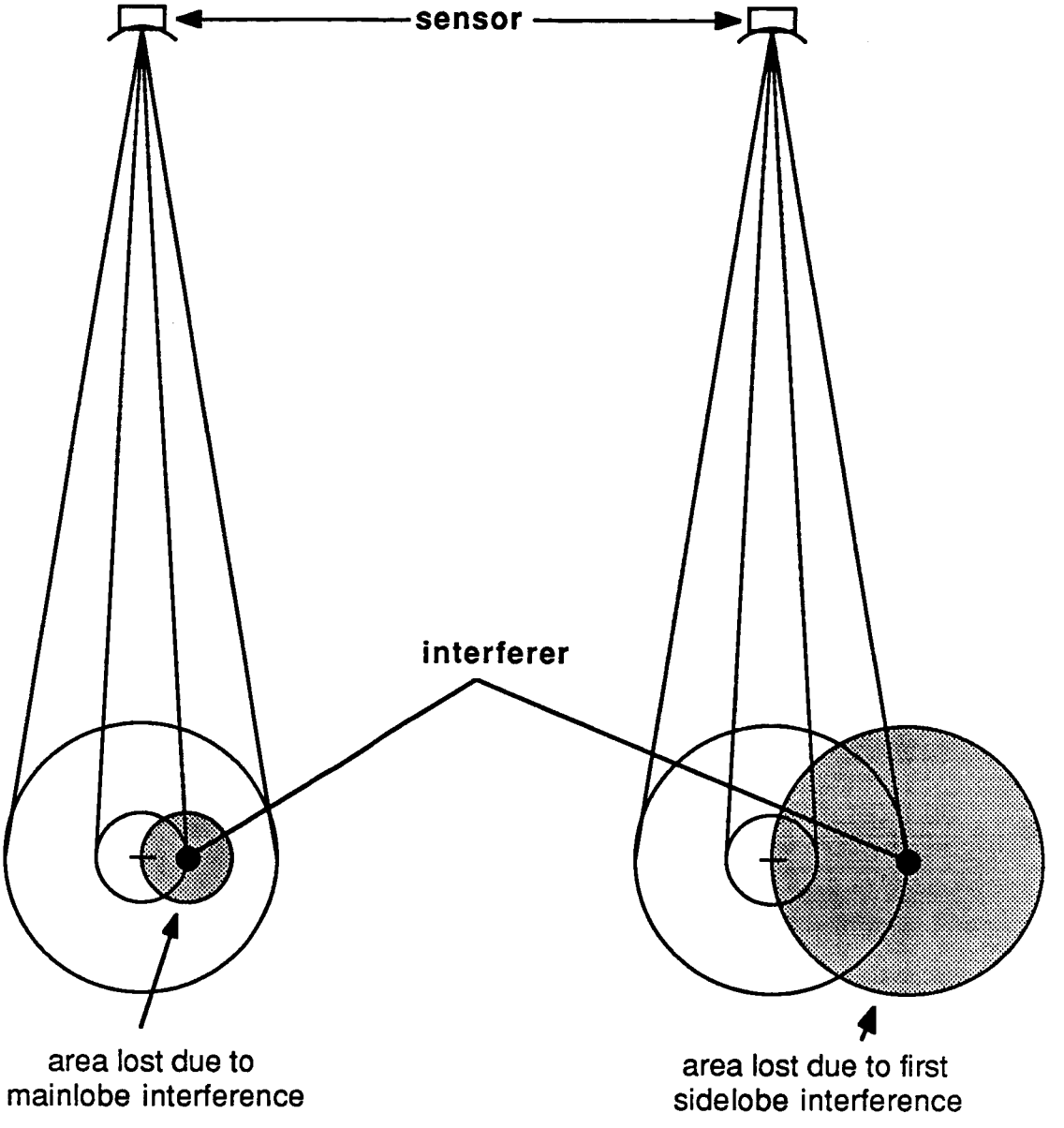
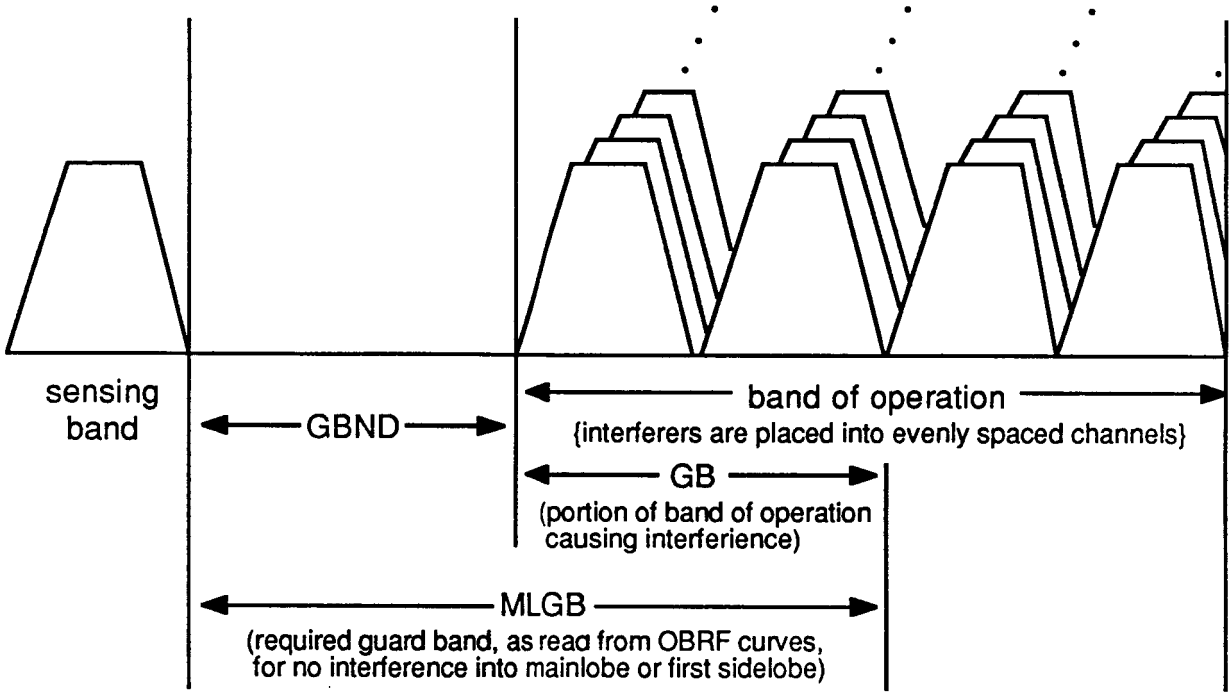


Figure 4. Area Lost Due to Mainlobe or First Sidelobe Interference



GB = MLGB - GBND

$$\frac{\text{number of interferers}}{\text{band of operation}} \times GB = \text{\# of interferers in mainlobe or first sidelobe}$$

Figure 5. Calculations to Determine Number of Interferers in the Mainlobe and Firstlobe

seas is expected to be somewhat less but has not been quantified.

A simplified geometry was used to obtain a uniform distribution and fast computing time. Assuming a fixed satellite 500 km above the earth, see figure 6, the central angle was incremented between the angle created by the mainlobe beam and the angle at the horizon, 21.98°. The increment used is (21.98° - angle created by the first sidelobe beam)/25 degrees. Each increment defines an annulus whose area increases as the central angle approaches 21.98 degrees. From the central angle, the elevation towards the spacecraft, the area of the annulus, and the distance to the spacecraft can be determined. [Table 2 lists the central angle and area of each of the 25 annuluses for the four different sensor resolutions.] The number of interferers in the annulus is set equal to the area of the annulus multiplied by the population per unit area, i.e., the total population in view of the spacecraft divided by the total area in view of the spacecraft.

Knowing the elevation angle, the average eirp towards the spacecraft can be determined, see figure 7. To determine the average eirp, the terrestrial station is rotated in 1 degree increments, the eirp towards the spacecraft summed, and the result divided by 360.

The average eirp is then multiplied by the population of the annulus to find the cummulative eirp towards the spacecraft. The atmospheric and path losses are then taken into account to find the annulus' contribution to the power density at the spacecraft. The contributions of each annulus are then summed and the total power received computed and compared with the interference threshold. This type of averaging, rotating an interferer in 1° increments, is a good approximation for large interferer populations where random azimuths would be evenly distributed around 360°.

The computations result in the geometry shown in figure 8. This model eliminates lengthy three dimensional computations using latitudes and longitudes, aliasing from azimuthal distributions, and eirp calculations from each individual interferer thus providing a fast running program to assess interference from large, uniformly distributed populations.

Presented in Annex B is a flow chart of the computer program along with a copy of the program itself which shows the correspondence between the steps in the flowchart and the progress of the program.

5. Interference Levels

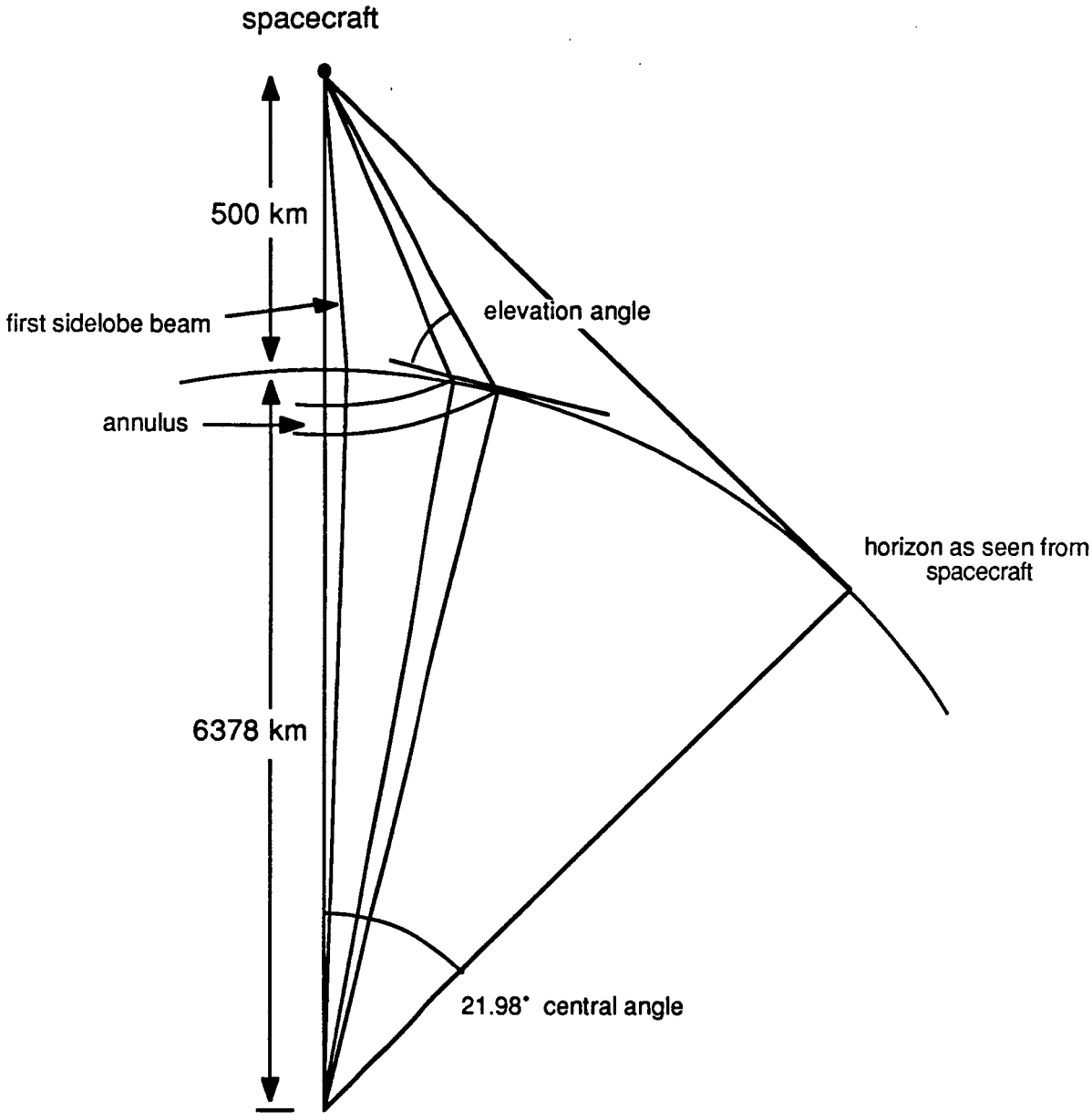


Figure 6. Interference Model Geometry

Table 2. Annulus Geometry for Various Sensor Resolutions

Resolution	1 km	2 km	10 km	20 km
Beta	0.1143	0.2292	1.1249	2.2920
CENANG(1)	0.0045	0.0090	0.0449	0.0898
CENANG(2)	0.0224	0.0449	0.2242	0.4507
CENANG(3)	21.98	21.98	21.98	21.98
DCANG	0.8783	0.8774	0.8702	0.8612

Annulus #	Central angle	Area	Central angle	Area	Central angle	Area	Central angle	Area
	degrees	km	degrees	km	degrees	km	degrees	km
1	0.90	31561	0.92	33037	1.09	44670	1.31	59086
2	1.78	91613	1.80	92965	1.96	103619	2.17	116810
3	2.66	151643	2.68	152871	2.83	162545	3.03	174508
4	3.54	211638	3.55	212742	3.71	221433	3.90	232166
5	4.41	271583	4.43	272563	4.58	280271	4.76	289771
6	5.29	331464	5.31	332320	5.45	339043	5.62	347312
7	6.17	391267	6.19	391999	6.32	397737	6.48	404774
8	7.05	450978	7.06	451586	7.19	456340	7.34	462144
9	7.93	510584	7.94	511067	8.06	514837	8.20	519410
10	8.81	570069	8.82	570428	8.93	573216	9.06	576559
11	9.68	629421	9.70	629656	9.80	631462	9.92	633577
12	10.56	688624	10.57	688736	10.67	689562	10.78	690452
13	11.44	747666	11.45	747654	11.54	747504	11.65	747171
14	12.32	806532	12.33	806397	12.41	805273	12.51	803722
15	13.20	865208	13.21	864951	13.28	862856	13.37	860091
16	14.08	923681	14.08	923302	14.15	920241	14.23	916266
17	14.95	981938	14.96	981437	15.02	977413	15.09	972233
18	15.83	1039963	15.84	1039341	15.89	1034359	15.95	1027981
19	16.71	1097744	16.72	1097002	16.76	1091067	16.81	1083497
20	17.59	1155267	17.59	1154405	17.63	1147523	17.67	1138768
21	18.47	1212519	18.47	1211538	18.50	1203715	18.54	1193782
22	19.35	1269485	19.35	1268387	19.37	1259629	19.40	1248526
23	20.22	1326154	20.23	1324938	20.24	1315252	20.26	1302988
24	21.10	1382511	21.10	1381178	21.11	1370572	21.12	1357156
25	21.98	1438542	21.98	1437095	21.98	1425576	21.98	1411017
Total		18577652		18577593		18575715		18569764

Beta - Mainbeam beamwidth required to produce desired resolution.

CENANG(1) - A variable used in the program to denote the central angle formed by the mainbeam footprint on the surface of the Earth.

CENANG(2) - A variable used in the program to denote the central angle formed by the first-sidelobe footprint on the surface of the Earth.

CENANG(3) - A variable used in the program to denote the central angle formed by the area in view of the satellite.

DCANG - A program variable used to denote the incremental central angle when determining the area of annuluses.

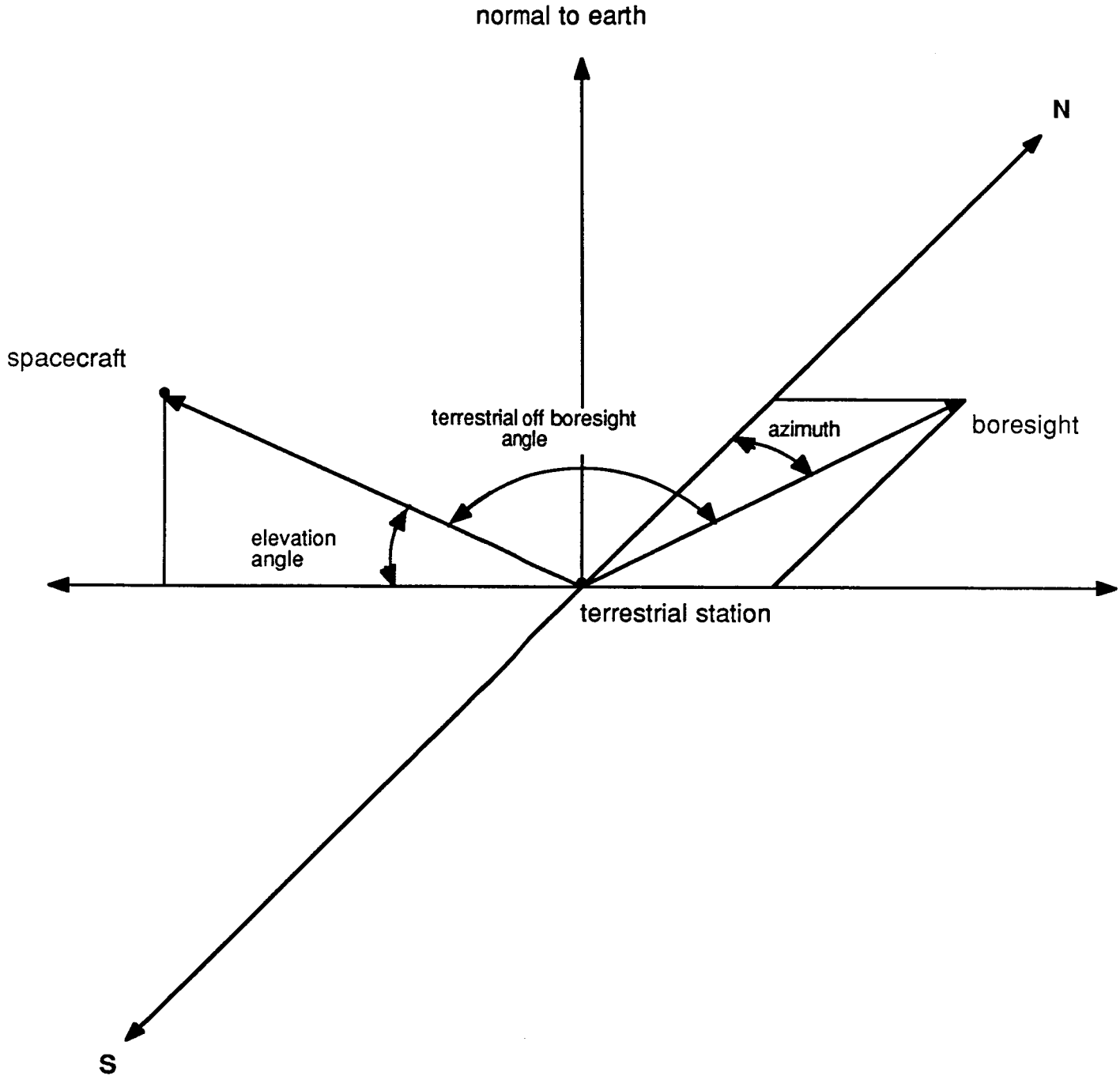


Figure 7. Geometry for Calculating Average EIRP Towards Spacecraft

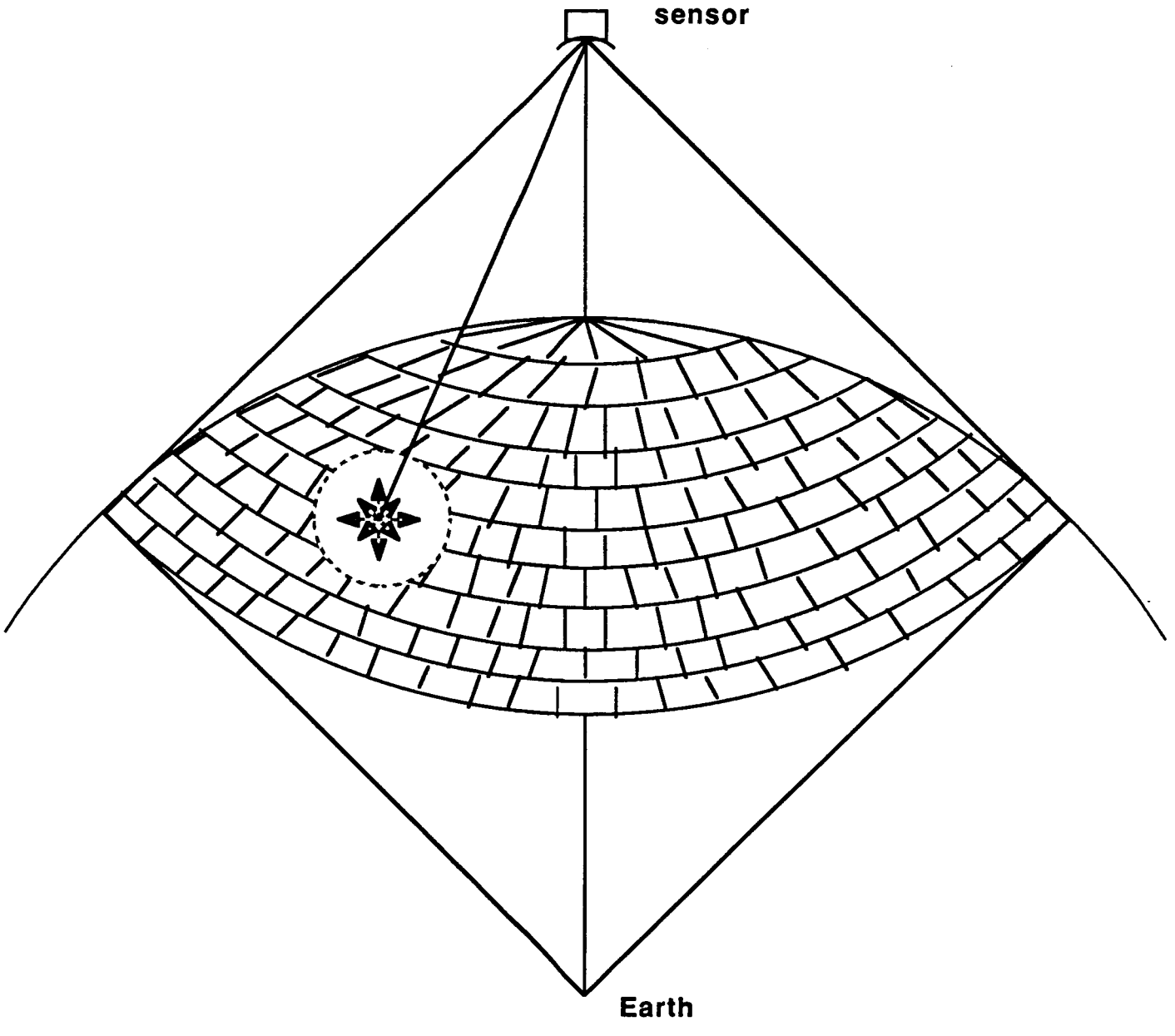


Figure 8. Resultant Interference Geometry

Uniformly Distributed by Population Per Unit Area
Terrestrial Stations Pointing in All Directions

5.1 Terrestrial Stations

Using the previously described model, an assessment of the interference from adjacent, subharmonic and shared bands to remote passive microwave sensors was made for conditions representative of those over the United States. Annex C shows the results of these calculations for sensors which have 4 pole Butterworth receiver characteristics. Each row in these tables lists the following calculated values for each station class and number of interferers in that station class: power received, second sidelobe interference margin, mainlobe interference margin, number of interferers in mainlobe, percent of area lost due to mainlobe interference, firstlobe interference margin, number of interferers in firstlobe, and percent of area lost due to firstlobe interference. The power received in the second sidelobe and the percentages of area lost are subtotaled for each adjacent, subharmonic and in band, and then are totaled to reflect the cummulative interference into the entire sensing band. The subtotals and totals express values including and excluding experimental station classes. Table 3 summarizes the interference calculations for 4 pole sensor receivers by listing the affected sensor frequency band, the interference threshold (from report 694-1), the calculated level of total interference power into the second sidelobe, and the percent of area lost. The total percent of area lost shown in Table 3 is a function of both the area lost due to direct overflights, i.e., the area lost due to interference into the sensor mainlobe or first sidelobe, and the area lost due to interference into the sensor second sidelobe. If the calculated level of second sidelobe interference exceeds the threshold, the total percent of area lost is specified as 100% and the area lost due to overflights is specified in parentheses; if not, the total percent of area lost is just that due to direct overflights.

In the cases of allocated bands which are wider than the sensor bandwidth, for example the 6425-7075 MHz band, the 51.4-59.0 GHz band, the 64-65 GHz band, and the 105-126 GHz band, the analysis assumed the sensor was located at the low frequency end, at the high frequency end, and at the center of the allocated band.

5.2 Harmful Interference

For all passive sensing bands above 10 GHz the received interference level is below the corresponding interference threshold and the percent of area lost is below 5%.

The results from the 1400-1427 MHz band show an interference level well above threshold (over 34 dB) in addition to 100% area lost due to overflights. This interference is due mainly to

Table 3. Interference Levels from Terrestrial Stations

Sensor Frequency		Interference Threshold	Interference Received into Second Sidelobe	Percent of Area Lost Total (overflight)
		dBW	dBW	%
1400-1427	MHz	-171.0	-136.7	100. (100)
4200-4400	"	-158.0	-146.8	100. (6.2)
6425-6625	"	-158.0	-150.7	100. (27.7)
6525-6725	"	-158.0	-172.9	4.5
6650-6850	"	-158.0	-169.9	3.28
6675-6775	"	-158.0	-161.7	4.4
6875-7075	"	-158.0	-144.6	100. (13.5)
10.600-10.700	GHz	-156.0	-156.9	3.25
15.200-15.400	"	-160.0	-162.8	0.63
18.600-18.800	"	-152.0	-162.8	0.43
21.200-21.400	"	-160.0	-186.1	0.01
22.210-22.500	"	-155.0	-186.8	0.02
23.600-24.000	"	-157.0	-161.8	0.06
31.300-31.800	"	-156.0	-164.2	0.02
36.000-37.000	"	-146.0	-150.3	0.00
50.200-50.400	"	-157.0	-248.9	0.05
51.400-59.000	"	-157.0	-335.9	0.26
51.400-51.600	"	-157.0	-335.9	0.30
58.800-59.000	"	-157.0	-335.9	0.33
64.000-65.000	"	-157.0	-300.2	0.00
64.000-64.200	"	-157.0	-300.1	0.00
64.800-65.000	"	-157.0	-300.2	0.00
86.000-92.000	"	-138.0	-186.9	0.00
100.000-102.000	"	-150.0	-204.2	0.00
100.000-101.000	"	-150.0	-203.4	0.00
101.000-102.000	"	-150.0	-203.7	0.00
105.000-126.000	"	-150.0	-230.5	0.00
105.000-107.000	"	-150.0	-229.7	0.00
124.000-126.000	"	-150.0	-198.1	0.00
150.000-151.000	"	-150.0	-223.1	0.00
164.000-168.000	"	-150.0	-240.3	0.00
182.000-185.000	"	-150.0	-342.2	0.00
217.000-231.000	"	-150.0	-227.9	0.00
275.000-277.000	"	-150.0	-334.3	0.00

radar, fixed and mobile stations in adjacent bands.

In the 4200-4400 MHz band there is also harmful interference with the total power received 11.2 dB above threshold and an area lost of 6.2% due to overflights. Interference is primarily due to a large number of fixed stations in the lower adjacent band.

Of special note in this 4200-4400 GHz sensing band analysis is the fact that the number of ROA station classes (altimeter stations) have been reduced by a factor of .07. These are Navy aircraft altimeters assigned to US and possessions. It is expected that many of their missions flown are outside the continental United States. The actual numbers were reduced because of the infrequency of use. And as with all radar station classes, a duty cycle of 30 dB applies.

Also of note is the first experimental station class in the upper adjacent band (with 671 interferers) of the 4200-4400 GHz sensing band. These assignments are listed in the government frequency files as FX stations with 1 kilowatt of power. They are owned by the military, however, and used for tactical training and testing. Again, because of the likelihood of intermittent use, they have been analyzed as experimental station classes.

Additional interference analyses were made in the 4200-4400 MHz sensing band. The sensing bandwidth was reduced to determine if the additional guardband resulting would give more favorable interference levels. The computer analysis showed that a sensing bandwidth as narrow as 95 MHz still yields an interference level just above threshold. The results of these additional analyses, with reduced sensor bandwidths, are shown in Table 4. Because some error is expected in our analysis, it is expected that operation with a 115 MHz bandwidth or less centered at 4292.5 MHz will be possible.

The level of interference in the 6425-7075 MHz sensing band is below threshold and the percent of area lost below 5% for the case where the 200 MHz sensing bandwidth is placed in the middle of the sensing band, at 6650-6850 MHz. However, when the sensing bandwidth is placed at the lower end of this frequency band (6425-6625 MHz) or at the upper end (6875-7075 MHz), interference levels above threshold result due to smaller guard bands to adjacent interferers.

Further analysis in the 6425-7075 MHz sensing band shows that the 200 MHz sensing bandwidth centered on 6625 MHz produces an interference level below threshold and a percent of area lost below 5%. Similarly, the 200 MHz bandwidth centered at 6775 MHz yields positive

Table 4. Analysis of Decreasing Sensor Bandwidths in the 4200-4400 MHz Sensing Band

Sensor Frequency	Sensor Bandwidth	Interference Levels From: Shared Band	Lower Adj	Upper Adj	Subharmonic #1	Subharmonic #2	Total Power Received	Interference Threshold
MHz	MHz	dBW					dBW	dBW
4220 - 4390	170	-161.7	-156.8	-143.1	-166.7	-194.2	-142.8	-158.5
4225 - 4390	165	-161.8	-159.2	-143.4	-166.8	-194.2	-143.2	-158.6
4225 - 4385	160	-161.9	-159.6	-146.3	-166.7	-194.2	-145.9	-158.8
4225 - 4380	155	-161.9	-159.9	-149.3	-166.7	-194.1	-148.6	-158.9
4225 - 4375	150	-162.0	-160.3	-152.3	-166.7	-194.1	-151.1	-159.0
4230 - 4390	160	-161.8	-161.5	-143.7	-166.8	-194.2	-143.5	-158.8
4230 - 4370	140	-162.0	-163.0	-155.9	-166.7	-194.1	-154.1	-159.4
4230 - 4365	135	-162.1	-163.4	-159.0	-166.7	-194.1	-155.9	-159.5
4235 - 4365	130	-162.1	-165.5	-159.7	-166.7	-194.1	-156.6	-159.7
4235 - 4360	125	-162.1	-165.8	-162.7	-166.7	-194.1	-157.9	-159.9
4235 - 4355	120	-162.2	-166.1	-165.6	-166.7	-194.1	-158.7	-160.0
4235 - 4350	115	-162.3	-166.4	-168.3	-166.7	-194.1	-159.3	-160.2
4235 - 4345	110	-162.3	-166.6	-170.9	-166.7	-194.1	-159.6	-160.4
4240 - 4345	105	-162.4	-168.2	-171.9	-166.7	-194.1	-160.0	-160.6
4240 - 4340	100	-162.5	-168.3	-174.1	-166.7	-194.1	-160.1	-160.8
4240 - 4335	95	-162.5	-168.5	-175.7	-166.7	-194.1	-160.3	-161.0
4245 - 4335	90	-162.5	-169.6	-176.4	-166.7	-194.1	-160.4	-161.3

results. Table 5 shows the results of placing the bandwidth at various locations throughout the 6425-7075 MHz sensing band.

It should be noted that in the 6400 GHz band, previous analysis (see CCIR Report 694-1) has shown that interference to passive sensors from fixed and mobile services sharing the same frequencies is significant in many areas of the world. This new analysis, we believe, is a more refined estimate of the actual interference that can be expected.

For results of all interference analyses, see Annex C.

5.3 Digital Termination System Interference

As mentioned in section 3.2, there currently are no digital termination systems listed in the frequency files. However, this study did take into account planned usage of DTS systems. The sensing bands that would be affected are the 10.6-10.7 GHz and 18.6-18.8 GHz bands. [Characteristics of digital termination systems used in this study were obtained from FCC document Opposition to Petitions for Reconsideration, June 1981, and Spectrum Microwave Corporation's documented description of DTS in the 10.6 and 18 GHz bands, November 1984.]

The DTS scenario envisioned by Xerox and the FCC would result in 400,000 user transmitters and 10,000 nodal transmitters nation-wide. The interference level resulting from this number of digital termination systems was computed (because of computer limitations, only 40,000 subscriber stations were used instead of 400,000) and the power received from the 40,000 subscribers alone was -154.8 dB, which exceeds the entire sensing band's threshold value of -156.0 dB. The complete results of this analysis are shown below.

Interference into the 10.600 - 10.700 GHz Sensing Band
from all Interferers Including Digital Termination Systems
-156 dBW Interference Threshold

In Band Interferers

STC	# INT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	13.	-197.7	-38.7	45.4	13.	0.00	19.7	13.	0.00
MO	8.	-180.0	-21.0	65.4	8.	0.00	39.7	8.	0.00
MO	12.	-195.1	-36.1	48.4	12.	0.00	22.7	12.	0.00
FB	5.	-189.4	-30.4	58.4	5.	0.00	32.7	5.	0.00
DTS-NOD [1]	2308.	-156.2	-0.2	46.5	2308.	0.00	20.8	2308.	0.48
DTS-SUB [2]	40000.	-154.8	1.2	35.5	40000.	0.00	9.8	40000.	8.39
FX [3]	100.	-178.3	-19.3	38.4	100.	0.00	12.7	100.	0.02
EXP	2.	-186.0	-27.0	54.4	2.	0.00	28.7	2.	0.00
EXP	2.	-172.0	-13.0	68.4	2.	0.00	42.7	2.	0.00

Table 5. Analysis of Various Sensor Bandwidth Locations Within the 6425-7075 MHz Sensing Band

6425 - 7075 MHz Sensing Band 200 MHz Sensing Bandwidth -158.0 dBW Interference Threshold

Sensor Frequency	Interference Received into Second Sidelobe	Interference Margin (- above)	Percent of Area Lost
MHz	dBW	dBW	%
6425 - 6625	-150.7	-7.3	27.7
6440 - 6640	-156.8	-1.2	13.0
6450 - 6650	-160.7	2.7	12.0
6460 - 6660	-164.2	6.2	10.8
6470 - 6670	-167.0	9.0	9.7
6475 - 6675	-168.2	10.2	9.2
6500 - 6700	-171.6	13.6	7.0
6525 - 6725	-172.9	14.9	4.5
6550 - 6750	-173.3	15.3	1.9
6650 - 6850	-169.9	11.9	3.3
6675 - 6875	-161.7	3.7	4.4
6700 - 6900	-156.7	-1.3	5.5
6725 - 6925	-154.4	-3.6	6.6
6750 - 6950	-153.0	-5.0	7.7
6680 - 6880	-159.9	1.9	5.1
6685 - 6885	-158.9	0.9	5.2
6690 - 6890	-158.0	0.0	5.3
6695 - 6895	-157.3	-0.7	5.4
6875 - 7075	-144.6	-13.4	13.5

EXP	2.	-162.0	-3.0	78.4	2.	0.00	52.7	2.	0.00
Subtotals inc exp		-151.9				0.00			8.89
Subtotals exc exp		-152.4				0.00			8.89

Lower Adjacent Band Interferers

STC	# INT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	3430.	-191.3	-35.3	31.3	3430.	0.26	6.3	865.	2.21
MR	443.	-188.2	-32.2	25.5	27.	0.00	0.6	1.	0.00
FX	24.	-172.5	-16.5	50.5	6.	0.00	25.5	2.	0.01
FX	27.	-214.4	-58.4	7.6	1.	0.00	-17.3	0.	0.00
FB	29.	-195.3	-39.3	44.1	5.	0.00	19.2	2.	0.00
RLD	20.	-190.2	-34.2	31.4	3.	0.00	6.5	1.	0.00
LR	147.	-176.6	-20.6	42.0	19.	0.00	17.0	5.	0.01
DTS-NOD [1]	7692.	-161.0	-5.0	43.3	7692.	0.01	17.7	6439.	1.35
EXP	30.	-197.6	-41.6	24.2	3.	0.00	-0.7	0.	0.00
EXP	121.	-137.7	18.3	80.5	121.	0.01	55.5	26.	0.07
Subtotals inc exp		137.7				0.28			3.65
Subtotals exc exp		160.6				0.27			3.58

Subtotals from Upper Adjacent and Subharmonic Bands [4]

Subtotals inc exp		-158.1				0.02			0.03
Subtotals exc exp		-181.6				0.02			0.03
Total inc exp		-137.5				0.30			12.57
Total exc exp		-151.8				0.29			12.50

Total percent of area lost including experimentals: 12.87%, excluding experimentals: 12.79%.

[1] Ten thousand Digital Termination Systems (nodes) were distributed evenly throughout the transmitting frequency 10 .55-10.615 GHz. Therefore, 50/65 ^{ths} of the 10,000 are in the lower adjacent band, while the rest are in band. The nodal systems have the following characteristics : .5 watts transmit power, 34 dB antenna gain, 800 kHz bandwidth.

[2] Forty thousand DTS subscribers, transmitting at 10.615-10.680 GHz, were placed in band. Characteristics: 40 milliwatts power, 34 dB antenna gain, 800 kHz bandwidth.

[3] No FX assignments were found, but 10.6-10.7 GHz is allocated for the fixed service, so 100 token FX station classes were included. Characteristics: .1 watt transmit power, 45 dB gain.

[4] For detailed results of the upper adjacent and subharmonic bands, see Annex C.

To meet the threshold requirement of -156.0 dB, approximately 3500 nodal digital termination systems can operate at 10.55-10.615 GHz (2700 of them in the lower adjacent band at 10.55-10.60 GHz; and 800 sharing the band at 10.60-10.615 GHz). In addition, 10,000 subscriber stations can operate sharing the band at 10.615-10.680 GHz. The results of the interference analysis using these new figures are shown below.

Totals at 10.6 GHz with 3500 nodals and 10,000 subscribers

10.600-10.700 GHz Sensing Band, -156.0 dBW Interference Threshold

	Power Received	% Area Lost Mainlobe	% Area Lost Firstlobe
Total inc exp	-137.6	0.01	3.49
Total exc exp	-156.9	0.01	3.46

Total percent of area lost including experimentals: 3.50%, excluding experimentals: 3.47%.

According to Spectrum Microwave Corporation's 18 GHz DTS description, there is presently DTS operation in the 18.82-18.92 and 19.16-19.26 GHz frequency band. Computer analysis was completed to determine the effect digital termination systems operating at 18.82-18.92 GHz have on the 18.6-18.8 GHz sensing band. It was determined that 10,000 DTS nodals and 40,000 DTS subscribers could safely operate at 18.82-18.92 GHz without adversely effecting the sensing operations in the 18.6-18.8 GHz band. Characteristics of these systems are as follows: 100 milliwatts power, 38 dB antenna gain, 10 MHz bandwidth. The totals of the results of analyzing the 18.6-18.8 GHz sensing band are shown below.

Totals at 18 GHz with 10,000 nodals and 40,000 subscribers

18.6-18.8 GHz Sensing Band, -152.0 dBW Interference Threshold

	Power Received	% Area Lost Mainlobe	% Area Lost Firstlobe
Total inc exp	-157.5	0.23	0.23
Total exc exp	-162.8	0.22	0.23

Total percent of area lost including experimentals: 0.46%, excluding experimentals: 0.45%.

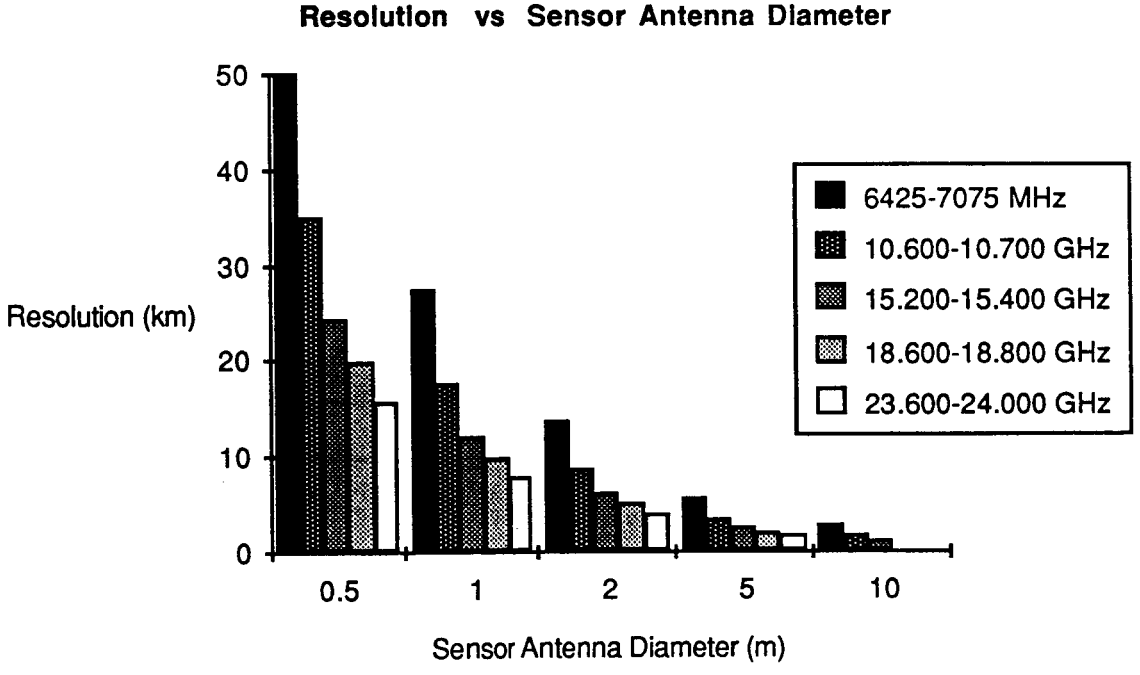
5.4 Interference from Non-Allocated Interferers

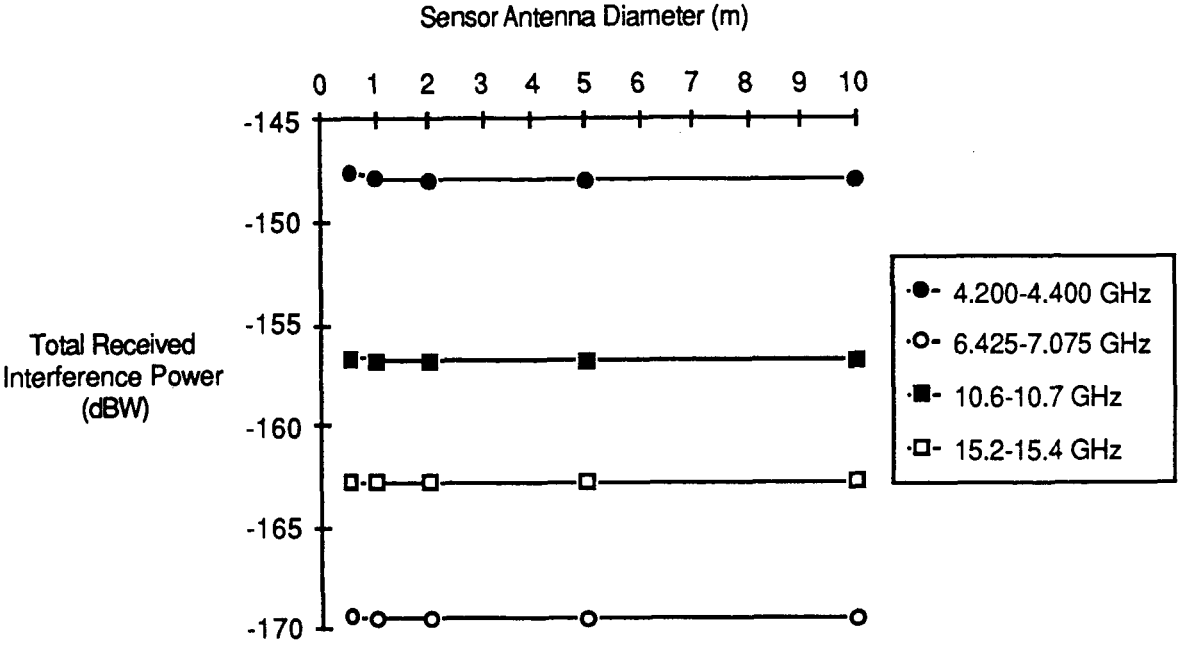
The numbers and characteristics of transmitters found in bands only allocated for passive microwave sensing were listed previously in section 3.1, page 11. These numbers were included in the analysis, and the results show that in the sensing bands in which these assignments are found, there is no harmful interference; and furthermore, that these particular assignments do not significantly change the cummulative power received by the sensor. For results of interference levels caused by non-allocated transmitters, see the frequency band and station class in Annex C corresponding to the list of interferers in the table in section 3.1.

6. Parameteric Effects of Antenna Diameter Changes

In addition to performing interference analyses on adjacent, subharmonic and shared band interferers, using the required sensor resolution, we also studied the parametric effects of utilizing different antenna diameters and relaxing resolution requirements. [See Table 6 for a list of the sensor frequencies with their required resolution and the antenna diameter necessary to meet that resolution.] To meet the required resolutions set forth in CCIR Report 694, very large antenna diameters are necessary. A smaller antenna diameter would result in a larger sensor resolution, thus, providing less detailed information. However, in many cases, a smaller antenna would be an advantageous cost trade at the expense of decreased resolution.

Using the existing computer model we studied the effects of various antenna diameters on resolution, total power received into the second sidelobe, and total area lost due to direct overflights. Table 7 summarizes the results of this analysis showing the total power received and the percent of area lost for the various antenna diameters studied. The effects of varying antenna diameters on resolution, total received power and percent of area lost are shown graphically below.





Received Interference Power vs Sensor Antenna Diameter

Percent of Area Lost vs Sensor Antenna Diameter

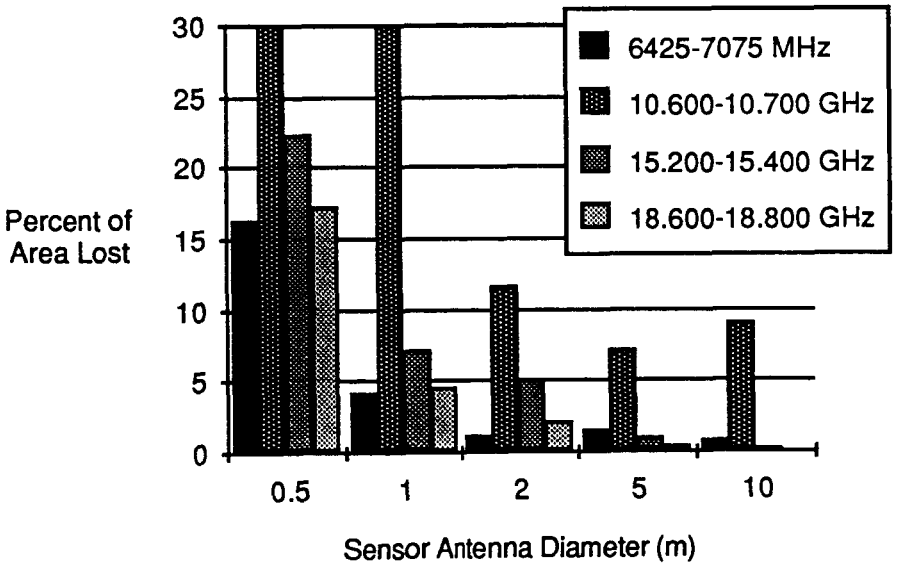


Table 6. Antenna Gains and Necessary Antenna Diameters

Frequency Band	Sensor Resolution	Mainlobe Gain	First Sidelobe Gain	Second Sidelobe Gain	Necessary Antenna Diameter
GHz	km	dB	dB	dB	m
1.400-1.427	20.0	39.5	14.7	-14.0	6.58
4.200-4.400	2.0	59.5	34.6	-14.0	21.61
6.425-7.075					
6.425-6.625	20.0	39.5	14.7	-14.0	1.42
6.525-6.725	20.0	39.5	14.7	-14.0	1.40
6.650-6.850	20.0	39.5	14.7	-14.0	1.38
6.675-6.875	20.0	39.5	14.7	-14.0	1.37
6.875-7.075	20.0	39.5	14.7	-14.0	1.33
10.600-10.700	1.0	65.6	40.7	-14.0	17.45
15.200-15.400	2.0	59.5	34.6	-14.0	6.07
18.600-18.800	2.0	59.5	34.6	-14.0	4.97
21.200-21.400	2.0	59.5	34.6	-14.0	4.36
22.210-22.500	2.0	59.5	34.6	-14.0	4.16
23.600-24.000	2.0	59.5	34.6	-14.0	3.90
31.300-31.800	2.0	59.5	34.6	-14.0	2.95
36.000-37.000	1.0	65.6	40.7	-14.0	5.09
50.200-50.400	10.0	45.6	20.7	-14.0	0.37
51.400-59.000					
51.400-51.600	10.0	45.6	20.7	-14.0	0.36
55.100-55.300	10.0	45.6	20.7	-14.0	0.34
58.800-59.000	10.0	45.6	20.7	-14.0	0.32
64.000-65.000					
64.000-64.200	10.0	45.6	20.7	-14.0	0.29
64.400-64.600	10.0	45.6	20.7	-14.0	0.29
64.800-65.000	10.0	45.6	20.7	-14.0	0.29
86.000-92.000	1.0	65.6	40.7	-14.0	2.09
100.000-102.000	1.0	65.6	40.7	-14.0	1.84
105.000-126.000					
105.000-107.000	1.0	65.5	40.7	-14.0	1.75
114.500-116.500	1.0	65.6	40.7	-14.0	1.61
124.000-126.000	1.0	65.6	40.7	-14.0	1.49
150.000-151.000	1.0	65.6	40.7	-14.0	1.24
164.000-168.000	1.0	65.6	40.7	-14.0	1.12
182.000-185.000	1.0	65.6	40.7	-14.0	1.01
217.000-231.000	1.0	65.6	40.7	-14.0	0.83

Table 7. Results of Parametric Study of Changing Antenna Diameters

Sensor Frequency		Interference Threshold	Total Power Received & Percent of Area Lost at Specified Antenna Diameter					Antenna Diameter Necessary for Req'd Resolution
			.5m	1m	2m	5m	10m	
		dBW	dBW/%	dBW/%	dBW/%	dBW/%	dBW/%	m
1400-1427	MHz	-171.0	-130.8 100.	-135.7 100.	-136.5 100.	-136.7 100.	-136.7 100.	6.58
4200-4400	"	-158.0	-147.6 100.	-147.9 100.	-148.0 100.	-148.0 100.	-148.0 100.	21.61
6425-6625	"	-158.0	-150.6 100.	-150.7 100.	-150.7 100.	-150.8 100.	-150.8 100.	1.42
6525-6725	"	-158.0	-172.7 3.7	-172.9 4.7	-172.9 3.3	-172.9 4.6	-172.9 1.7	1.40
6650-6850	"	-158.0	-169.7 8.9	-169.9 4.9	-169.9 2.0	-169.9 2.7	-169.9 1.8	1.38
6675-6875	"	-158.0	-161.5 18.3	-161.6 7.0	-161.7 2.6	-161.7 6.0	-161.7 2.5	1.37
6875-7075	"	-158.0	-144.4 100.	-144.6 100.	-144.6 100.	-144.6 100.	-144.6 100.	1.33
10.600-10.700	GHz	-156.0	-156.8 100.	-156.9 40.4	-156.9 11.6	-156.9 7.1	-156.9 9.0	17.45
15.200-15.400	"	-160.0	-162.8 22.3	-162.8 7.2	-162.8 5.1	-162.8 0.9	-162.8 0.2	6.07
18.600-18.800	"	-152.0	-162.8 17.2	-162.8 4.6	-162.8 2.0	-162.8 0.4		4.97
21.200-21.400	"	-160.0	-186.1 0.1	-186.1 0.0	-186.1 0.0	-186.1 0.0		4.36
22.210-22.500	"	-155.0	-186.8 0.1	-186.8 0.2	-186.8 0.1	-186.8 0.0		4.16
23.600-24.000	"	-157.0	-161.8 1.1	-161.8 0.3	-161.8 0.1	-161.8 0.1		3.90
31.300-31.800	"	-156.0	-164.2 0.1	-164.2 0.0	-164.2 0.0	-164.2 0.2		2.95
36.000-37.000	"	-146.0	-150.3 0.2	-150.3 0.1	-150.3 0.0	-150.3 0.0		5.09
50.200-50.400	"	-157.0	-248.9 0.0	-248.9 0.0	-248.9 0.0			0.37
51.400-59.000	"	-157.0	-335.9 0.1	-335.9 0.0	-335.9 0.0			0.34
64.000-65.000	"	-157.0	-300.2 0.0	-300.2 0.0	-300.2 0.0			0.29
86.000-92.000	"	-138.0	-186.9 0.0	-186.9 0.0	-186.9 0.0			2.09
100.000-102.000	"	-150.0	-204.2 0.0	-204.2 0.0				1.84
105.000-126.000	"	-150.0	-230.5 0.0	-230.5 0.0				1.61
150.000-151.000	"	-150.0	-223.1 0.0	-223.1 0.0				1.24
164.000-168.000	"	-150.0	-240.3 0.0	-240.3 0.0				1.12
182.000-185.000	"	-150.0	-342.2 0.0	-342.2 0.0				1.01
217.000-231.000	"	-150.0	-227.9 0.0					0.83
275.000-277.000	"	-150.0	-334.3 0.0					0.67

7. Conclusions

For 18 GHz and above, sensor resolution requirements can be relaxed to the point where a 1 meter antenna can be used at 18 GHz, and as small as a 0.5 meter antenna for bands above 18 GHz. This statement is based solely on an assessment of interference. Some consideration needs to be given to the actual usefulness of the resultant resolution, i.e. can enough detailed information be obtained at a reduced resolution to make sensing worthwhile?

Taking a closer look at the bands below 18 GHz we can see that the 1400-1427 GHz band has interference well above threshold, even for a resolution greater than that required for operation in this band. We can not determine any method at this time that will alleviate interference in this band.

Significant levels of interference exist in the 4200-4400 GHz band. The percent of area lost, 100%, is not indicative of direct overflight interference, but, of the cummulative interference being above threshold. The level of interference utilizing smaller than ideal antennas is the same as for utilizing the required 21.6 meter diameter antenna. This is because the second and far sidelobes still accumulate approximately 2% of the total interference power. A reduced sensor bandwidth of 120 MHz or less will bring the interference level to within approximately 1 dB of the interference threshold [See Table 4, page 24]. However, the interference level from shared band interferers alone is around -162 dB, so increasing the guard band beyond 35-40 MHz on each side will not be productive. If, at the required antenna diameter of 21.6 meters, we can determine a way to alleviate interference, it is expected that operation in this band would also be possible utilizing a smaller antenna, on the order of 2 meters.

As shown in the previous adjacent band study there are significant levels of interference to sensing operations performed at the extremes of the 6425-7075 MHz band. Interference levels at the lower end of the band, 6425-6625 MHz, are 8 dB above the interference threshold and at the upper end, 6875-7075 MHz, are 14 dB above threshold. Sensing can be performed in the center of the band. The interference experienced in the 6650-6850 MHz band is 11 dB below the interference threshold. The resolution required in this band is only 20 km, and thus only a 1.38 meter diameter antenna would be required. We have determined that an antenna as small as 1 meter can be used without exceeding 5% area lost. Additional antenna sizes are shown in Table 7 and indicate that higher resolutions than required can be obtained without adverse interference. It was determined that the sensor bandwidth of 200 MHz placed at 6525-6725 MHz (a 100 MHz guard band on the low end and 400 MHz on the upper end) yields an interference level nearly 15 dB

below threshold and an area lost of 4.5 %. Similarly, if the sensor bandwidth is placed at 6675-6875 MHz (a 250 MHz / 300 MHz guard band), the resulting interference level is 2.7 dB below threshold with an area lost of 4.4 %. See Table 5.

In the 10.6-10.7 GHz sensing band it does not appear feasible to utilize relaxed sensor resolutions. This is primarily due to the Digital Temination Systems planned for this band. Sensing could be accomplished for some years to come until DTS systems achieve greater use. As discussed earlier, the number of DTS systems used in this analysis was much less than predicted future use. We chose to present the data this way in order to indicate the level, or population, at which interference could be expected. The parametric analysis utilizing reduced sensor resolution was carried out using the reduced number of DTS systems indicated earlier in this report. The results show that not only is the number of DTS systems limited, but the percent of area lost is also greater than 5%; 9% utilizing a 10 meter antenna. It appears that relaxing the sensor resolution requirements is not viable in this band. Further analysis should be made to determine whether some operational restrictions can be used to achieve compatability between DTS systems and passive sensors.

In the 15.2-15.4 GHz sensing band a 6.1 meter antenna is required to achieve the desired resolution. Our study indicates that an antenna as small as 2 meters could be used for sensing with only 5.1% area loss and a cummulative interference level 2.8 dB below the interference threshold. If a larger area lost can be tolerated then antenna diameters as small as 0.5 meter can be used. At 0.5 meters the cummulative interference is still 2.8 dB below threshold, except the area lost is 22.3%. Sensing at this reduced resolution may be possible if it is limited to unpopulated areas where a direct overflight of an interferer is less likely.

ANNEX A

STATION CLASS ABBREVIATIONS AND SHARED BAND INTERFERER CHARACTERISTICS

Station Class Abbreviations and Shared Band Interferer Characteristics

The following is a list of station class abbreviations and their definitions from the National Telecommunications and Information Administration (NTIA) Manual, Section 6.1.3. Note where a definition is followed by the parenthetical expression "(RR)", it indicates that the definition is in the ITU Radio Regulations, 1982 Edition. Following the station class abbreviations are tables of the interferer characteristics of services in shared bands. Adjacent and subharmonic band interferer characteristics can be found in Annex B, Interference to Remote Passive Microwave Sensors from Active Services in Adjacent and Subharmonic Bands, April 1985.

Note that the number of mobile units shown is only 7% of the actual number counted in the frequency files. This is due to an exaggerated number of mobile units listed in the frequency assignment files (estimated to be 30% too high) and it is estimated that not more than 10% of the units will be transmitting at any given moment. Also, due to the pulsed nature of radar systems, an average duty cycle of -30 dB has been applied to radar station classes.

Also note where ever station classes are preceeded and followed by and asterix (*FX*), it indicates that no assignments of that particular station class were found in the frequency lists, but because that service was allocated to that frequency band, a representative number was added to the already existing interferers.

The list of abbreviations apply to station classes found in Annex C.

AX - Aeronautical Fixed Station: A station in the aeronautical fixed service. (RR)
BC - Broadcasting Station (sound): A station (sound) in the broadcasting service. (RR)
BT - Broadcasting Station (television): A station (television) in the broadcasting service. (RR)
EB - Broadcasting-Satellite Space Station (sound broadcasting): A space station (sound broadcasting) in the broadcasting-satellite service. (RR)
EC - Fixed-Satellite Space Station: A space station in the fixed-satellite service. (RR)
ECED - Space Telecommand Space Station in the fixed-satellite service.
ECEK - Space Tracking Space Station in the fixed-satellite service.
ECER - Space Telemetering Space Station in the fixed-satellite service.
ED - Space Telecommand Space Station: A space station which receives emissions used for space telecommand. (RR)
EE - Standard Frequency and Time Signal-Satellite Space Station: A space station in the standard frequency and time signal-satellite service. (RR)
EF - Radiodetermination-Satellite Space Station: A space station in the radiodetermination-satellite service. (RR)
EFED - Space Telecommand Space Station in the radiodetermination-satellite service.
EFEK - Space Tracking Space Station in the radio determination-satellite service.
EFER - Space Telemetering Space Station in the radiodetermination-satellite service.
EG - Maritime Mobile-Satellite Space Station: A space station in the maritime mobile-satellite service. (RR)
EGED - Space Telecommand Space Station in the maritime mobile-satellite service.
EGEK - Space Tracking Space Station in the maritime mobile-satellite service.
EGER - Space Telemetering Space Station in the maritime mobile-satellite service.
EH - Space Research Space Station: A space station in the space research service. (RR)
EHED - Space Telecommand Space Station in the space research service.
EHEK - Space Tracking Space Station in the space research service.
EHER - Space Telemetering Space Station in the space research service.
EJ - Aeronautical Mobile-Satellite Space Station: A space station in the aeronautical mobile-satellite service. (RR)
EJED - Space Telecommand Space Station in the aeronautical mobile-satellite service.
EJEK - Space Tracking Space Station in the aeronautical mobile-satellite service.
EJER - Space Telemetering Space Station in the aeronautical mobile-satellite sevice.
EK - Space Tracking Space Station: A space station which transmits or receives and retransmits emissions used for space tracking. (RR)
EM - Meteorological-Satellite Space Station: A space station in the meteorological-satellite service. (RR)
EMED - Space Telecommand Space Station in the meteorological-satellite service.
EMEK - Space Tracking Space Station in the meteorological-satellite service.
EMER - Space Telemetering Space Station in the meteorological-satellite service.
EN - Radionavigation-Satellite Space Station: A space station in the radionavigation-satellite service.
ENED - Space Telecommand Space Station in the radionavigation-satellite service.
ENEK - Space Tracking Space Station in the radionavigation-satellite service.
ENER - Space Telemetering Space Station in the radionavigation-satellite sevice.
EO - Aeronautical Radionavigation-Satellite Space Station: A space station in the aeronautical radionavigation-satellite service. (RR)
EOED - Space Telecommand Space Station in the aeronautical radionavigation-satellite service.
EOEK - Space Tracking Space Station in the aeronautical radionavigation-satellite service.
EOER - Space Telemetering Space Station in the aeronautical radionavigation-satellite service.
EQ - Maritime Radionavigation-Satellite Space Station: A space station in the maritime radionavigation-satellite service. (RR)
EQED - Space Telecommand Space Station in the maritime radionavigation-satellite service.
EQEK - Space Tracking Space Station in the maritime radionavigation-satellite service.
EQER - Space Telemetering Space Station in the maritime radionavigation-satellite service.
ER - Space Telemetering Space Station: A space station the emissions of which are used for space telemetering. (RR)
ES - Inter-Satellite Space Station: A space station in the inter-satellite service. (RR)
ESED - Space Telecommand Space Station in the inter-satellite service.
ESEK - Space Tracking Space Station in the inter-satellite service.

ESER - Space Telemetering Space Station in the inter-satellite service.
ET - Space Operation Space Station: A space station in the space operation service.
ETED - Space Telecommand Space Station in the space operation service.
ETEK - Space Tracking Space Station in the space operation service.
ETER - Space Telemetering Space Station in the space operation service.
EU - Land Mobile-Satellite Space Station: A space station in the land mobile-satellite service. (RR)
EUED - Space Telecommand Space Station in the land mobile-satellite service.
EUEK - Space Tracking space Station in the land mobile-satellite service.
EUER - Space Telemetering Space Station in the land mobile-satellite service.
EV - Broadcasting-Satellite Space Station (television): A space station (television) in the broadcasting-satellite service. (RR)
EW - Earth Exploration-Satellite Space Station: A space station in the earth exploration-satellite service. (RR)
EWED - Space Telecommand Space Station in the earth exploration-satellite service.
EWEK - Space Tracking Space Station in the earth exploration-satellite service.
EX - Experimental Station: A station utilizing radio waves in experiments with a view to development of science or technique. (RR) (EX is not used on applications.)
FA - Aeronautical Station: A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. (RR)
FAB - Aeronautical Broadcast Station: An aeronautical station which makes scheduled broadcasts of meteorological information and notices to airmen. (In certain instances, an aeronautical broadcast station may be placed on board a ship.)
FAC - Airdrome Control Station: An aeronautical station providing communication between an airdrome control tower and aircraft.
FAD - Telecommand Aeronautical Station: A land station in the aeronautical mobile service the emissions of which are used for terrestrial telecommand.
FAT - Flight Test Station: An aeronautical station used for the transmission of essential communications in connection with the testing of aircraft or major components of aircraft.
FB - Base Station: A land station in the land mobile service. (RR)
FBD - Telecommand Base Station: A land station in the land mobile service the emissions of which are used for terrestrial telecommand.
FC - Coast Station: A land station in the maritime mobile service. (RR)
FCB - Marine Broadcast Station: A coast station which makes scheduled broadcast of time, meteorological and hydrographic information.
FCD - Telecommand Coast Station: A land station in the maritime mobile service the emissions of which are used for terrestrial telecommand.
FL - Land Station: A station in the mobile service not intended to be used while in motion. (RR)
FLD - Telecommand Land Station: A land station in the mobile service the emisssions of which are used for terrestrial telecommand.
FLE - Telemetering Land Station: A land station the emissions of which are used for telemetering.
FLEA - Aeronautical Telemetering Land Station: A telemetering land station used in the flight testing of manned or unmanned aircraft, missiles, or major components thereof.
FLEB - Flight Telemetering Land Station: A telemetering land station the emissions of which are used for telemetering to a balloon; to a booster or rocket, excluding a booster or rocket in orbit about the Earth or in deep space; or to an aircraft, excluding a station used in the flight testing of an aircraft.
FLEC - Surface Telemetering Land Station: A telemetering land station the emissions of which are intended to be received on the surface of the Earth.
FLH - Hydrologic and Meteorological Land Station: A land station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.
FLU - Aeronautical Utility Land Station: A land station lacated at airdrome control towers and used for control of ground vehicles and aircraft on the ground at airdromes.
FX - Fixed Station: A station in the fixed service. (RR)
FXD - Telecommand Fixed Station: A fixed station in the fixed service the emissions of which are used for terrestrial telecommand.
FXE - Telemetering Fixed Station: A fixed station the emissions of which are used for telemetering.

FXH - Hydrologic and Meteorological Fixed Station: A fixed station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

LR - Radiolocation Land Station: A station in the radiolocation service not intended to be used while in motion. (RR)

MA - Aircraft Station: A mobile station in the aeronautical mobile service other than a survival craft station, located on board an aircraft. (RR)

MAD - Telecommand Aircraft Station: A mobile station in the aeronautical mobile service the emissions of which are used for terrestrial telcommand.

MAP - Portable Aircraft Station: A portable station operating in the aeronautical mobile service.

ME - Space Station: A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere. (RR) (ME is not used on applications.)

ML - Land Mobile Station: A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent. (RR)

MLD - Telecommand Land Mobile Station in the land mobile service the emissions of which are used for terrestrial telecommand.

MLP - Portable Land Mobile Station: A portable station operating in the land mobile service.

MO - Mobile Station: A station in the mobile service intended to be used while in motion or during halts at unspecified points. (RR)

MOB - Radio Beacon Mobile Station: A mobile station the emissions of which are used to determine its location.

MOD - Telecommand Mobile Station: A mobile station in the mobile service the emissions of which are used for terrestrial telecommand.

MOE - Telemetering Mobile Station: A mobile station the emissions of which are used for telemetering.

MOEA - Aeronautical Telemetering Mobile Station: A telemetering mobile station used in the flight testing of manned or unmanned aircraft, missiles, or major components thereof.

MOEB - Flight Telemetering Mobile Station: A telemetering mobile station the emissions of which are used for telemetering from a balloon; from a booster or rocket, excluding a booster or rocket in orbit about the Earth or in deep space; or from an aircraft, excluding a station used in the flight testing of an aircraft.

MOEC - Surface Telemetering Mobile Station: A telemetering mobile station located on the surface of the Earth and the emissions of which are intended to be received on the surface of the Earth.

MOH - Hydrologic and Meteorological Mobile Station: A mobile station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

MOP - Portable Mobile Station: A portable station operating in the mobile service.

MOU - Aeronautical Utility Mobile Station: A mobile station used for communication at airdromes with the aeronautical utility land station, the airdrome control station, the FAA flight service station, ground vehicles, and aircraft on the ground. (All transmissions shall be subject to the control of the airdrome control station and shall be discontinued immediately when so requested by the airdrome control operators.)

MR - Radiolocation Mobile Station: A station in the radiolocation service intended to be used while in motion or during halts at unspecified points. (RR)

MRP - Portable Radiolocation Station: A portable station operating in the radiolocation service.

MS - Ship Station: A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station. (RR)

MSD - Telecommand Ship Station: A mobile station in the maritime mobile service the emissions of which are used for terrestrial telecommand.

MSP - Portable Ship Station: A portable station operating in the maritime mobile service.

OD - Oceanographic Data Station: A station in the maritime mobile service located on a ship, buoy or other sensor platform the emissions of which are used for the transmission of oceanographic data. (RR)

OE - Oceanographic Data Interrogating Station: A station in the maritime mobile service the emissions of which are used to initiate, modify, or terminate functions of equipment directly associated with an oceanographic data station, including the station itself. (RR)

RA - Radio Astronomy Station: A station in the radio astronomy service. (RR) (This is always a receiving station.)

RG - Radio Direction-Finding Station: A radiodetermination station using radio direction-finding. (RR)

RL - Radionavigation Land Station: A station in the radionavigatin service not intended to be used while in motion. (RR)

RLA - Aeronautical Marker Beacon Station: A radionavigation land station in the aeronautical radionavigation

service which employs a marker beacon.

RLB - Aeronautical Radiobeacon Station: A radiobeacon station in the aeronautical radionavigation service intended for the benefit of aircraft.

RLC - Radar Beacon (racon) Station: A station which employs a radar beacon (racon).

RLG - Glide Path (Slope) Station: A radionavigation land station in the aeronautical radionavigation service which employs the Instrument Landing System Glid Path.

RLL - Localizer Station: A radionavigation land station in the aeronautical radionavigation service which employs an Instrument Landing System Localizer.

RLM - Marine Radiobeacon Station: A radiobeacon station in the maritime radionavigation service intended for the benefit of ships.

RLN - Loran Station: A long distance radionavigation land station transmitting synchronized pulses. Hyperbolic lines of position are determined by the measurement of the difference in the time of arrival of these pulses.

RLO - Omnidirectional Range Station: A radionavigation land station in the aeronautical radionavigation service providing direct indication of the bearing (omnibearing) of that station from an aircraft.

RLR - Radio Range Station: A radionavigation land station in the aeronautical radionavigation service providing radial equisignal zones. (In certain instances a radio range station may be placed on board a ship.)

RLS - Surveillance Radar Station: A radionavigation land station in the aeronautical radionavigation service employing radar to display the presence of aircraft within its range. (In certain instances, a surveillance radar station may be placed on board a ship.)

RLTM - Radionavigation Land Test Station (Maintenance Test Facility): A radionavigation land station in the aeronautical radionavigation service which is used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit maintenance testing by aircraft radio service personnel.

RLTO - Radionavigation Land Test Station (Operational Test Facility): A radio navigation land station in the aeronautical radionavigation service which is used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit the pilot to check a radionavigation system aboard the aircraft prior to takeoff.

RO - Radionavigation Mobile Station: A station in the radionavigation service intended to be used while in motion or during halts at unspecified points. (RR)

ROA - Altimeter Station: A radionavigation mobile station in the aeronautical radionavigation service which employs a radio altimeter.

SN - Sounder Network Station: A station equipped with an ionosphere sounder used for the real-time selection of frequencies for operational communication circuits.

SP - Sounder Prediction Station: A station equipped with an ionoshpere sounder for real-time monitoring of upper atmosphere phenomena or to obtain data for the prediction of propagation conditions.

SS - Standard Frequency and Time Signal Station: A station in the standard frequency and time signal service. (RR)

TB - Aeronautical Mobile-Satellite Earth Station: A fixed earth station in the aeronautical mobile-satellite service. (RR)

TBTD - Space Telecommand Earth Station (fixed) in the aeronautical mobile-satellite service.

TBTK - Space Tracking Earth Station (fixed) in the aeronautical mobile-satellite service.

TBTR - Space Telemetering Earth Station (fixed) in the aeronautical mobile-satellite service.

TC - Fixed-Satellite Earth Station: An earth station in the fixed-satellite service. (RR)

TCTD - Space Telecommand Earth Station in the fixed-satellite service.

TCTK - Space Tracking Earth Station in the fixed-satellite service.

TCTR - Space Telemetering Earth Station in the fixed-satellite service.

TD - Space Telecommand Earth Station; An earth station the emissions of which are used for space telecommand. (RR)

TE - Typical Transmitting Earth Station for Emergency Position-Indication Radio Beacon (EPIRB) in a Mobile-Satellite Service (RR).

TETD - Space Telecommand Transmitting Earth Station for an Emergency Position-Indication Radio Beacon (EPIRB) in a Mobile-Satellite Service.

TETK - Space Tracking Transmitting Earth Station for an Emergency Position-Indication Radio Beacon (EPIRB) in

a Mobile-Satellite Service.

TETR - Space Telemetering Transmitting Earth Station for an Emergency Position-Indication Radio Beacon (EPIRB) in a Mobile-Satellite Service.

TF - Radiodetermination-Satellite Earth Station: A fixed earth station in the radiodetermination-satellite service. (RR)

TFTD - Space Telecommand Earth Station (fixed) in the radiodetermination-satellite service.

TFTK - Space Tracking Earth Station (fixed) in the radiodetermination-satellite service.

TFTR - Space Telemetering Earth Station (fixed) in the radiodetermination-satellite service.

TG - Maritime Mobile-Satellite Mobile Earth Station: A mobile earth station in the maritime mobile-satellite service. (RR)

TGTD - Space Telecommand Earth Station (mobile) in the maritime mobile-satellite service.

TGTK - Space Tracking Earth Station (mobile) in the maritime mobile-satellite service.

TGTR - Space Telemetering Earth Station (mobile) in the maritime mobile-satellite service.

TH - Space Research Earth Station: An earth station in the space research service. (RR)

THTD - Space Telecommand Earth Station in the space research service.

THTK - Space Tracking Earth Station in the space research service.

THTR - Space Telemetering Earth Station in the space research service.

TI - Maritime Mobile-Satellite Earth Station: An earth station in the maritime mobile-satellite service at a specified fixed point. (RR)

TITD - Space Telecommand Earth Station (fixed) in the maritime mobile-satellite service.

TITK - Space Tracking Earth Station (fixed) in the maritime mobile-satellite service.

TITR - Space Telemetering Earth Station (fixed) in the maritime mobile-satellite service.

TJ - Aeronautical Mobile-Satellite Mobile Earth Station: A mobile earth station in the aeronautical mobile-satellite service. (RR)

TJTD - Space Telecommand Earth Station (mobile) in the aeronautical mobile-satellite service.

TJTK - Space Tracking Earth Station (mobile) in the aeronautical mobile-satellite service.

TJTR - Space Telemetering Earth Station (mobile) in the aeronautical mobile-satellite service.

TK - Space Tracking Earth Station: An earth station which transmits or receives emissions used for space tracking. (RR)

TL - Radiodetermination-Satellite Mobile Earth Station: A mobile earth station in the radiodetermination-satellite service. (RR)

TLTD - Space Telecommand Earth Station (mobile) in the radiodetermination-satellite service.

TLTK - Space Tracking Earth Station (mobile) in the radiodetermination-satellite service.

TLTR - Space Telemetering Earth Station (mobile) in the radiodetermination-satellite service.

TM - Meteorological-Satellite Earth Station: An earth station in the meteorological-satellite service. (RR)

TMTD - Space Telecommand Earth Station in the meteorological-satellite service.

TMTK - Space Tracking Earth Station in the meteorological-satellite service.

TMTR - Space Telemetering Earth Station in the meteorological-satellite service.

TN - Radionavigation-Satellite Earth Station: An earth station in the radionavigation-satellite service. (RR)

TNTD - Space Telecommand Earth Station in the radionavigation-satellite service.

TNTK - Space Tracking Earth Station in the radionavigation-satellite service.

TNTR - Space Telemetering Earth Station in the radionavigation-satellite service.

TO - Aeronautical Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the aeronautical radionavigation-satellite service.

TOTD - Space Telecommand Earth Station (mobile) in the aeronautical radionavigation-satellite service.

TOTK - Space Tracking Earth Station (mobile) in the aeronautical radionavigation-satellite service.

TOTR - Space Telemetering Earth Station (mobile) in the aeronautical radionavigation-satellite service.

TP - Earth Station (receiving): An earth station used for receiving. (RR) (TP is not used on applications.)

TQ - Maritime Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the maritime radionavigation-satellite service. (RR)

TQTD - Space Telecommand Earth Station (mobile) in the maritime radionavigation-satellite service.

TQTK - Space Tracking Earth Station (mobile) in the maritime radionavigation-satellite service.

TQTR - Space Telemetering Earth Station (mobile) in the maritime radionavigation-satellite service.

TR - Space Telemetering Earth Station: An earth station which receives emissions used for space telemetering.

(RR)

TT - Space Operation Earth Station: An earth station in the space operation service. (RR)

TTTD - Space Telecommand Earth Station in the space operation service.

TTTK - Space Tracking Earth Station in the space operation service.

TTTR - Space Telemetering Earth Station in the space operation service.

TU - Land Mobile-Satellite Mobile Earth Station: A mobile earth station in the land mobile-satellite service. (RR)

TUTD - Space Telecommand Earth Station (mobile) in the land mobile-satellite service.

TUTK - Space Tracking Earth Station (mobile) in the land mobile-satellite service.

TUTR - Space Telemetering Earth Station (mobile) in the land mobile-satellite service.

TW - Earth Exploration-Satellite Earth Station: An earth station in the earth exploration-satellite service. (RR)

TWTD - Space Telecommand Earth Station in the earth exploration-satellite service.

TWTK - Space Tracking Earth Station in the earth exploration-satellite service.

TWTR - Space Telemetering Earth Station in the earth exploration-satellite service.

TX - Maritime Radionavigation-Satellite Earth Station: A fixed earth station in the maritime radionavigation-satellite service. (RR)

TXTD - Space Telecommand Earth Station (fixed) in the maritime radionavigation-satellite service.

TXTK - Space Tracking Earth Station (fixed) in the maritime radionavigation-satellite service.

TXTR - Space Telemetering Earth Station (fixed) in the maritime radionavigation-satellite service.

TY - Land Mobile-Satellite Earth Station: A fixed earth station in the land mobile-satellite service. (RR)

TYTD - Space Telecommand Earth Station (fixed) in the land mobile-satellite service.

TYTK - Space Tracking Earth Station (fixed) in the land mobile-satellite service.

TYTR - Space Telemetering Earth Station (fixed) in the land mobile-satellite service.

TZ - Aeronautical Radionavigation-Satellite Earth Station: A fixed earth station in the aeronautical radionavigation-satellite service. (RR)

TZTD - Space Telecommand Earth Station (fixed) in the aeronautical radionavigation-satellite service.

TZTK - Space Tracking Earth Station (fixed) in the aeronautical radionavigation-satellite service.

TZTR - Space Telemetering Earth Station (fixed) in the aeronautical radionavigation-satellite service.

WXB - Radar Beacon Precipitation Gage Station: A transponder station in the meteorological aids service, the emissions of which are used for telemetering.

WXD - Meteorological Radar Station: A station in the meteorological aids service employing radar.

WXR - Radiosonde Station: A station in the meteorological aids service employing a radiosonde.

WXRG - Radiosonde Ground Station: A station in the meteorological aids service employing a ground station associated with a radiosonde.

XC - Experimental Contract Developmental Station: An experimental station used for the evaluation or testing under Government contract of electronics equipment or systems in a design or development stage.

XD - Experimental Developmental Station: An experimental station used for evaluation or testing of electronics equipment or systems in a design or development stage.

XE - Experimental Export Station: An experimental station intended for export and used for the evaluation or testing of electronics equipment or systems in the design or development stage.

XM - Experimental Composite Station: An experimental station used in experimental operations of a complex nature not readily specified or used in an operation which is a composite of two or more of the established experimental categories.

XR - Experimental Research Station: An experimental station used in basic studies concerning scientific investigation looking toward the improvement of the art of radiocommunications.

XT - Experimental Testing Station: An experimental station used for the evaluation or testing of electronics equipment or systems, including site selection and transmission path surveys, which have been developed for operational use.

Shared Band Interferer Characteristics

Sensor Frequency		Station Class	Antenna Gain		Transmitter Power	Number of Interferers	Transmitter Poles
MHz			dB		dBW		
4200.0	4400.0	FX	45.0		4.8	3.	3
4200.0	4400.0	MO	0.0	OMNI	7.0	18.	3
4200.0	4400.0	FB	0.0	OMNI	19.5	2.	3
4200.0	4400.0	TF	43.0		7.0	5.	3
4200.0	4400.0	RLT	40.0		-30.0	8.	3
4200.0	4400.0	RO	40.0		-6.0	10.	3
4200.0	4400.0	ROA	-9.0		-30.0	537.	3
4200.0	4400.0	ROA	-9.0		-13.0	86.	3
4200.0	4400.0	ROA	-9.0		-4.3	1335.	3
4200.0	4400.0	ROA	-9.0		0.0	2000.	3
4200.0	4400.0	EXP	11.0		7.0	23.	3
4200.0	4400.0	EXP	11.0		24.0	24.	3
4200.0	4400.0	EXP	33.0		30.0	4.	3
6425.0	7075.0	MO	0.0	OMNI	7.0	23.	3
6425.0	7075.0	MLT	36.0		0.0	385.	3
6425.0	7075.0	FXO	40.0		-30.0	3345.	3
6425.0	7075.0	FXN	40.0		0.0	543.	3
6425.0	7075.0	FXT	40.0		0.0	183.	3
6425.0	7075.0	EXP	40.0		10.0	2.	3
6425.0	7075.0	EXP	40.0		26.0	9.	3
6425.0	7075.0	EXP	25.0		57.0	6.	3
10600.0	10700.0	MO	0.0	OMNI	-13.0	13.	3
10600.0	10700.0	MO	0.0	OMNI	7.0	8.	3
10600.0	10700.0	MO	0.0	OMNI	-10.0	12.	3
10600.0	10700.0	FB	0.0	OMNI	0.0	5.	3
10600.0	10700.0	*FX*	45.0		-10.0	100.	3
10600.0	10700.0	DTS-NOD	34.0		-3.0	2308.	3
10600.0	10700.0	DTS-SUB	34.0		-3.0	40000.	3
10600.0	10700.0	EXP	40.0		6.0	2.	3
10600.0	10700.0	EXP	40.0		20.0	2.	3
10600.0	10700.0	EXP	40.0		30.0	2.	3
15200.0	15400.0	FX	46.0		-7.0	20.	3
15200.0	15400.0	MO	0.0	OMNI	18.5	2.	3
15200.0	15400.0	FB/MO	0.0	OMNI	20.4	5.	3
15200.0	15400.0	MO	0.0	OMNI	24.0	3.	3
15200.0	15400.0	FB	0.0	OMNI	1.4	3.	3
15200.0	15400.0	MLR	0.0	OMNI	14.8	6.	3
15200.0	15400.0	MOEC/FL	47.0		13.0	5.	3
15200.0	15400.0	THTD	66.0		9.4	3.	3
15200.0	15400.0	EXP	25.0		-10.0	3.	3
15200.0	15400.0	EXP	20.0		20.0	4.	3
15200.0	15400.0	EXP	40.0		50.0	5.	3

Sensor Frequency	Station Class	Antenna Gain	Transmitter Power	Number of Interferers	Transmitter Poles
18600.0 18800.0	FXO	45.0	-40.0	207.	3
18600.0 18800.0	*MO*	0.0 OMNI	13.0	200.	3
22210.0 22500.0	FX	37.0	-14.0	95.	3
22210.0 22500.0	FX	45.0	-7.0	10.	3
22210.0 22500.0	EXP	40.0	10.0	5.	3
22210.0 22500.0	EXP	40.0	36.0	2.	3
22210.0 22500.0	MO	0.0 OMNI	0.0	3.	3
22210.0 22500.0	TF	43.0	7.0	2.	3
23600.0 24000.0	FX	45.0	-15.0	2.	3
23600.0 24000.0	MO	0.0 OMNI	40.0	2.	3
23600.0 24000.0	LR	45.0	17.0	12.	3
23600.0 24000.0	EXP	40.0	44.8	2.	3
31300.0 31800.0	FX	45.0	0.0	2.	3
31300.0 31800.0	MO	0.0 OMNI	40.0	2.	3
31300.0 31800.0	EXP	35.0	10.0	6.	3
31300.0 31800.0	EXP	40.0	20.0	2.	3
31300.0 31800.0	EXP	40.0	50.0	2.	3
36000.0 37000.0	FX	30.0	-10.0	3.	3
36000.0 37000.0	FX	45.0	58.0	2.	3
36000.0 37000.0	*MO*	0.0 OMNI	13.0	5.	3
36000.0 37000.0	EXP	35.0	-10.0	117.	3
36000.0 37000.0	EXP	43.0	4.8	7.	3
36000.0 37000.0	EXP	45.0	30.0	2.	3
50200.0 50400.0	FX	45.0	-5.2	2.	3
50200.0 50400.0	*MO*	0.0 OMNI	13.0	2.	3
51400.0 59000.0	FX	45.0	13.0	2.	3
51400.0 59000.0	FX	45.0	43.0	2.	3
51400.0 59000.0	FB/MO	0.0 OMNI	14.0	6.	3
51400.0 59000.0	MO	0.0 OMNI	13.0	2.	3
51400.0 59000.0	EXP	35.0	-10.0	41.	3
51400.0 59000.0	EXP	40.0	13.0	10.	3
51400.0 59000.0	EXP	40.0	20.0	4.	3
51400.0 59000.0	EXP	40.0	60.0	2.	3
86000.0 92000.0	FX	45.0	13.0	2.	3
86000.0 92000.0	FB2	40.0	14.8	2.	3
100000.0 102000.0	MO	0.0 OMNI	13.0	2.	3
100000.0 102000.0	*FX*	45.0	10.0	2.	3
105000.0 126000.0	*FX*	45.0	-6.0	10.	3
105000.0 126000.0	*MO*	0.0 OMNI	13.0	10.	3
105000.0 126000.0	EXP	40.0	13.0	11.	3

Sensor Frequency	Station Class	Antenna Gain	Transmitter Power	Number of Interferers	Transmitter Poles
150000.0 151000.0	*FX*	45.0	-7.0	2.	3
150000.0 151000.0	MO	0.0 OMNI	13.0	2.	3
164000.0 168000.0	MO	0.0 OMNI	13.0	2.	3
217000.0 231000.0	MO	0.0 OMNI	13.0	2.	3
217000.0 231000.0	EXP	40.0	13.0	10.	3

ANNEX B

FLOW CHART AND COPY OF COMPUTER PROGRAM

Flow Chart and Copy of Computer Program

The following annex contains a flow chart and a copy of the computer program used to assess interference into passive microwave sensors from shared services and active services in adjacent and subharmonic bands.

The letters listed beside the figures in the flow chart correspond directly to the letters on the left side of the computer program. Also included on the right hand side of the program is some further explanation of the program with reference to the equations used.

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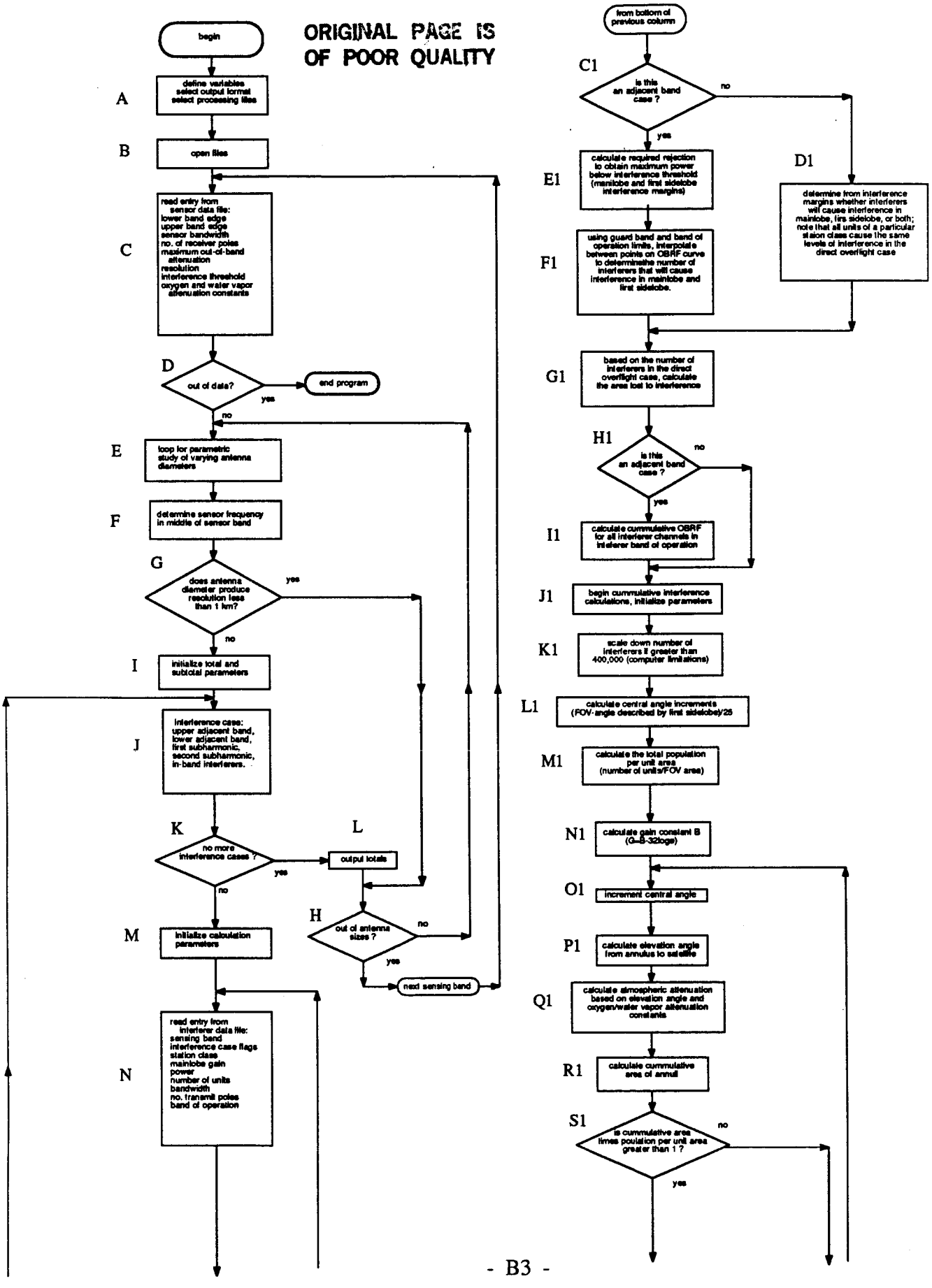

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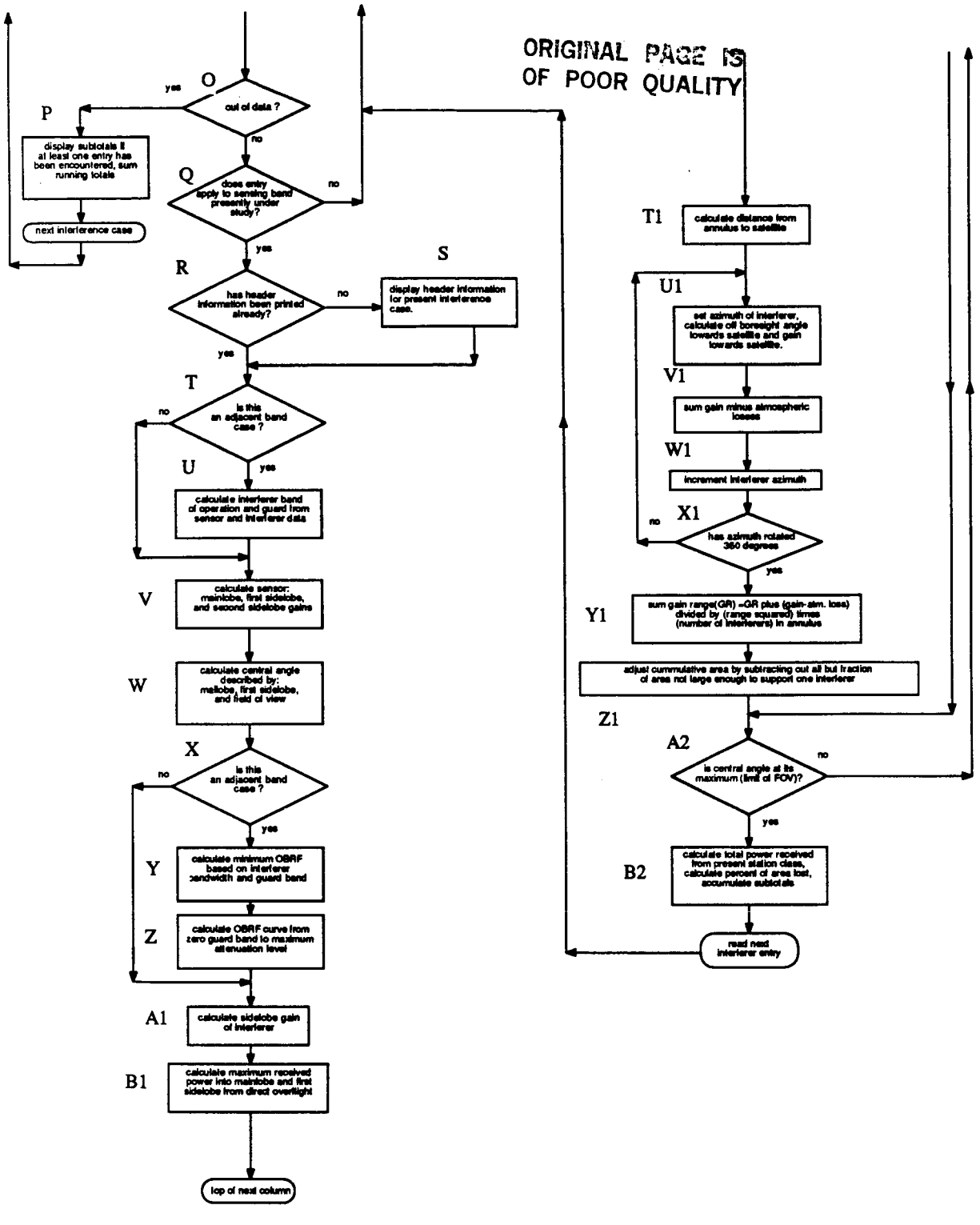

```
CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
C
C     'PARMOD' INTERFERENCE MODEL
C
C     THIS MODEL IS THE SAME AS THE MODEL USED IN THE
C     ADJACENT BAND STUDY EXCEPT IT HAS BEEN MODIFIED TO
C     PARAMETRICALLY STUDY THE EFFECTS OF CHANGING
C     ANTENNA DIAMETERS. THIS VERSION GENERATES A GR AND
C     OBRF FILE THAT CAN BE READ BY THE PROGRAM NEWMOD
C     TO ALLOW FASTER COMPUTATIONS.
C
C
C
      REAL*8 STC
      LOGICAL*1 NAME(11)
      REAL MLGI,PRFL,MINRF,MLIM,MLGB
      DIMENSION CENANG(3),RFCURV(11),DIAM(10)
      DATA DIAM/0.,1.,1.5,2.,3.,4.,5.,10.,15.,20./
      WRITE(7,3)
A     3 FORMAT(1X,'DO YOU WISH TO HAVE A HARD COPY ? ',$)
      ACCEPT 115,ZH
      ZG='N'
      IF(ZH.NE.1HY) GOTO 6
      WRITE(7,4)
      4 FORMAT(1X,'DO YOU WISH TO PRINT GRAND TOTALS ONLY ? ',$)
      ACCEPT 115,ZG
     11 WRITE(7,12)
     12 FORMAT(1X,'OUTPUT FILE NAME : ',$)
      ACCEPT 13,NAME
     13 FORMAT(15A1)
      OPEN(UNIT=3,NAME=NAME,TYPE='NEW')
    115 FORMAT(A1)
      8 WRITE(7,112)
    112 FORMAT(1X,'G-R OUTPUT FILE NAME : ',$)
B     ACCEPT 13,NAME
      OPEN(UNIT=4,NAME=NAME,TYPE='NEW')
    159 WRITE(7,160)
    160 FORMAT(1X,'SENSOR DATA FILE NAME : ',$)
      ACCEPT 13,NAME
      OPEN(UNIT=1,NAME=NAME,TYPE='OLD',ERR=8)
    161 WRITE(7,163)
    163 FORMAT(1X,'INTERFERER DATA FILE NAME : ',$)
      ACCEPT 13,NAME
      OPEN(UNIT=2,NAME=NAME,TYPE='OLD',ERR=161)
C & D 120 READ(1,116,END=9250)SFL,SFU,SBW,NR,ATTEN,RES,THLD,YO,YW
    116 FORMAT(F8.1,1X,F8.1,1X,F9.4,I2,2F5.1,F7.1,1X,2F7.4)
  E   164 DO 9197 IDIAM=1,1
  F     SFREQ=(SFL+SFU)/2.
      PI=4.*ATAN(1.)
      ALT=500.
      BETA=71.*300./(SFREQ*DIAM(IDIAM))*PI/180.
```

All sensor data is input: upper and lower sensor frequency; bandwidth; number of receiver poles; attenuation; resolution; interference threshold; oxygen and water attenuation constants.

Altitude of spaceborne sensor is 500 km.

Beta is calculated (angle which gives required resolution from orbit) : 71 λ/ D

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```
      RES=2.*ALT*(SIN(BETA/2)/COS(BETA/2))
      REWIND 6
G     IF(RES.GT.1.) GOTO 170
      WRITE(7,168) DIAM(IDIAM),SFREQ/1000.
  168 FORMAT('0','AN ANTENNA DIAMETER OF ',F4.1,' m PRODUCES A
     C HYPOTHETICAL RESOLUTION',/,1X,'LESS THAN 1KM AT ',F8.4,
     C ' GHZ. THIS CASE WILL NOT BE STUDIED.')
      IF(ZH.EQ.1HY) WRITE(6,168) DIAM(IDIAM),SFREQ/1000.
H     GOTO 9197
  170 GTOPR=-350.
      GTOPC1=0.
      GTOPC2=0.
      GTPR=-350.
      GTPC1=0.
I     GTPC2=0.
      NSET=0
      SUBPR=-350.
      SUBPC1=0.
      SUBPC2=0.
      SBPR=-350.
      SBPC1=0.
      SBPC2=0.
J     DO 9190 IZ1=3,1,-1
      DO 9180 IZ3=1,2
      MINRF=0.
      NCH=1
      BNDRF=0.
M     MLIM=0.
      FLIM=0.
      GR=0.
      JYA=0
      DO 1117 I=1,11
 1117 RFCURV(I)=0.
  117 READ(2,118,END=130) SFLI,SFUI,IAS,IASN,STC,MLGI,Z2,PWRI,
N & O C RNINT,BWI,NT,BOL,BOU
  118 FORMAT(F8.1,1X,F8.1,2I2,1X,1A7,F5.1,A1,F6.1,F9.0,
     C F8.3,I2,1X,F8.1,1X,F8.1)
Q     IF((SFL.LT.SFLI.OR.SFL.GE.SFUI.OR.SFU.GT.SFUI.OR.SFU.LE.SFLI)
     C.OR.IAS.NE.IZ1.OR.IASN.NE.IZ3) GOTO 117
      IF(N2SET.EQ.0) WRITE(7,119) SFL/1000.,SFU/1000.,SBW,NR,
     C ATTEN,RES,THLD,DIAM(IDIAM)
  119 FORMAT('1',F7.3,'-',F7.3,' GHZ SENSING BAND, ',F5.0,' MHZ
     C BANDWIDTH, ',I2,' RECEIVER POLES,',/,1X,F6.2,' dB MAXIMUM
     C ATTEN, ', F5.1,' km RESOLUTION, ',F7.1,' dBW
     C INT THRESHOLD',/,1X,F7.2,' m DIAMETER ANTENNA')
 1119 FORMAT('1',F7.3,'-',F7.3,' GHZ SENSING BAND, ',F5.0,' MHZ
     C BANDWIDTH, ',I2,' RECEIVER POLES,',/,1X,F6.2,' dB MAXIMUM
     C ATTEN, ', F5.1,' km RESOLUTION, ',F7.1,' dBW
     C INT THRESHOLD',/,1X,F7.2,' m DIAMETER ANTENNA')
      IF(N2SET.EQ.0.AND.ZH.EQ.1HY.AND.ZG.EQ.1HY) WRITE(6,119)
     C SFL/1000.,SFU/1000.,SBW,NR,ATTEN,RES,THLD,DIAM(IDIAM)
      IF(N2SET.EQ.0.AND.ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,1119)
     C SFL/1000.,SFU/1000.,SBW,NR,ATTEN,RES,THLD,DIAM(IDIAM)
      IF(ZF.EQ.1HY.AND.N2SET.EQ.0) WRITE(3,119) SFL/1000.,SFU/1000.,
     C SBW,NR,ATTEN,RES,THLD,DIAM(IDIAM)
```

Resolution is calculated for particular antenna diameters: 2 * altitude * tan (ß/2)

Variables set equal to zero.

All interferer data is input: upper and lower frequency of the band being analyzed; whether the station is 1) in a subharmonic band 2) in an adjacent band or 3) in band; if a subharmonic, then whether it is 1) first subharmonic or 2) second subharmonic; if in an adjacent band, then whether it is in 1) lower adjacent band or 2) upper adjacent band; name of the station class; mainlobe gain; whether or not the antenna is omni-directional (Y or N); power; number of interferers in the station class; bandwidth; number of transmitter poles; upper and lower interferer frequency (band of operation).

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```
      N2SET=1
      IF(NSET.EQ.1) GOTO 178
      IF(IAS.EQ.3) GOTO 2125
      IF(IAS.EQ.1) GOTO 124
      IF(IASN.EQ.2) GOTO 122
      WRITE(7,121) SFL/1000.,SFU/1000.
121   FORMAT('0',F7.3,'-',F7.3,' GHZ SENSING BAND,
     C LOWER ADJACENT BAND INTERFERERS')
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,121) SFL/1000.,SFU/1000.
      IF(ZF.EQ.1HY) WRITE(3,121) SFL/1000.,SFU/1000.
      GOTO 128
122   WRITE(7,123) SFL/1000.,SFU/1000.
123   FORMAT('0',F7.3,'-',F7.3,' GHZ SENSING BAND,
     C UPPER ADJACENT BAND INTERFERERS')
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,123) SFL/1000.,SFU/1000.
      IF(ZF.EQ.1HY) WRITE(3,123) SFL/1000.,SFU/1000.
      GOTO 128
124   WRITE(7,125) SFL/1000.,SFU/1000.,IASN
125   FORMAT('0',F7.3,'-',F7.3,' GHZ SENSING BAND,
     C SUBHARMONIC NUMBER ',I2)
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,125) SFL/1000.,
     C SFU/1000.,IASN
      GOTO 128
2125  WRITE(7,2130) SFL/1000.,SFU/1000.
2130  FORMAT('0',F7.3,'-',F7.3,' GHZ SENSING BAND,
     C IN BAND INTERFERERS')
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,2130) SFL/1000.,SFU/1000.
      IF(ZF.EQ.1HY) WRITE(3,2130) SFL/1000.,SFU/1000.
128   WRITE(7,129)
129   FORMAT(1X,'  STC      NINT        PR      SSIM    MLIM
     C     NML   %AL ML    FLIM     NFL    %AL FL')
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,129)
131   NSET=1
      GOTO 178
130   REWIND 2
      IF(NSET.EQ.0) GOTO 9180
C
C     PRINT SUBTOTALS
C
      WRITE(7,134)
134   FORMAT(1X,78(1H-))
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,134)
      WRITE(7,135) SUBPR,SUBPC2,SUBPC1
135   FORMAT(1X,'SUBTOTALS INC EXP ',F7.1,23X,F7.2,16X,F7.2)
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,135) SUBPR,SUBPC2,SUBPC1
      WRITE(7,140) SBPR,SBPC2,SBPC1
140   FORMAT(1X,'SUBTOTALS EXC EXP ',F7.1,23X,F7.2,16X,F7.2)
      IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,140) SBPR,SBPC2,SBPC1
144   IF(GTOPR.LT.-350.OR.SUBPR.LT.-350) GOTO 145
      GTOPR=10.*ALOG10(10.**(GTOPR/10.)+10.**(SUBPR/10.))
145   GTOPC1=GTOPC1+SUBPC1
      GTOPC2=GTOPC2+SUBPC2
      IF(GTOPC1.GT.100) GTOPC1=100.
      IF(GTOPC2.GT.100) GTOPC2=100.
```

Statements for printed output.

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```
      IF(GTPR.LT.-350.OR.SBPR.LT.-350) GOTO 150
      GTPR=10.*ALOG10(10.**(GTPR/10.)+10.**(SBPR/10.))
  150 GTPC1=GTPC1+SBPC1
      GTPC2=GTPC2+SBPC2
      IF(GTPC1.GT.100.) GTPC1=100.
      IF(GTPC2.GT.100.) GTPC2=100.
      SUBPR=-350.
      SUBPC1=0.
      SUBPC2=0.
      SBPR=-350.
      SBPC1=0.
      SBPC2=0.
      NSET=0
      GOTO 9180
T 178 IF(IZ1.NE.2) GOTO 900
      BWCH=(BOU-BOL)/RNINT
      IF(BWCH.LT.BWI) BWCH=BWI
      BAND=BOU-BOL
U     IF(BAND.LT.BWI) BAND=BWI
      BAND=BWCH*INT(BAND/BWCH)
      BANDI=BAND
  180 GBND=BOL-(SFREQ+SBW/2)
      IF(IAS.EQ.2.AND.IASN.EQ.1) GBND=(SFREQ-SBW/2.)-BOU
C
C
C
  900 SMLG=10.*ALOG10(1.8/(1.-COS(BETA/2.)))
V     SFLG=10.*ALOG10(.14/(COS(BETA/2.)-COS(5.*BETA/2.)))
      SSLG=10.*ALOG10(.04/COS(5.*BETA/2.))
      A=BETA/2.
      CENANG(1)=ATAN(RES/(2.*6378))
      A=5.*BETA/2.
W     CENANG(2)=ATAN(ALT*TAN(5.*BETA/2.)/6378.)
      CENANG(3)=ACOS(6378./(6378.+ALT))
      MINRF=0.
      NCH=1
      BNDRF=0.
X     IF(IZ1.NE.2) GOTO 1100
Y     FSEP=GBND+(BWCH-BWI)/2.
      CALL OBRF(MINRF,SBW,NR,BWI,NT,FSEP,ATTEN)
      BAND=BAND-(BWCH-BWI)
C
C
C     CALCULATION OF OBRF CURVES
C
C
      AT=10.**(-ATTEN/10.)
      F=((1./AT-1.)**(1./(2.*NR)))*SBW/2.+10.*BWI
      F=F-(SBW/2.+BWI/2.)
Z     DF=F/10.
      DO 1120 IFN=0,9
      FSEP=IFN*DF+GBND
 1120 CALL OBRF(RFCURV(IFN+1),SBW,NR,BWI,NT,FSEP,ATTEN)
      RFCURV(11)=ATTEN
```

Band of operation is calculated and divided into an equal number of channels depending on the number of interferers in the band.

Sensor mainlobe gain is calculated: $10 \log \left[\frac{1.8}{1-\cos(\beta/2)} \right]$

Sensor firstlobe gain is calculated: $10 \log \left[\frac{.14}{\cos(\beta/2) - \cos(5\beta/2)} \right]$

Sensor second sidelobe gain is calculated: $10 \log \left[\frac{.04}{\cos(5\beta/2)} \right]$

Central angle 1, the angle the mainbeam makes with the earth, is calculated. Central angle 2, the angle the first sidelobe makes with the earth, is calculated. Then central angle 3 is calculated, the total area in view of the sensor. Central angle 3 measures 21.98°.

Out of band rejection factor curves are calculated.

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```
C
C
C
1100  SLGI=3.14-10.*ALOG10(SQRT(10.**(MLGI/10.))/PI)
      IF (SLGI.GT.MLGI) SLGI=MLGI
      IF (SLGI.LT.-10.) SLGI=-10.
      PRML=PWRI+SLGI-135.96+20.*ALOG10(300./SFREQ)+SMLG-MINRF
      PRFL=PWRI+SLGI-135.96+20.*ALOG10(300./SFREQ)+SFLG-MINRF
      RNML=0
      RNFL=0
      MLIM=PRML-THLD
      FLIM=PRFL-THLD
      IF (MLIM.LE.0.) GOTO 1600
      IF (IZ1.EQ.2) GOTO 1110
      IF (FLIM.LT.0.) GOTO 1105
      RNFL=RNINT
1105  IF (MLIM.LT.0.) GOTO 1500
      RNML=RNINT
      GOTO 1500
1110  RNFL=RNINT
      IF (FLIM+MINRF.GT.ATTEN-.01) GOTO 1600
      RNFL=0
      RNML=RNINT
      IF ((MLIM+MINRF.GT.ATTEN-.01).AND.(FLIM.LT.0.)) GOTO 1600
C
C
C
C
      IF (MLIM+MINRF.GT.ATTEN-.01) GOTO 1300
      DO 1200 IFN=2,10
1200  IF(MLIM+MINRF.LT.RFCURV(IFN)) GOTO 1250
1250  FN=IFN-1.+(MLIM+MINRF-RFCURV(IFN-1))/(RFCURV(IFN)-RFCURV(IFN-1))
      MLGB=(FN-1.)*DF+GBND
      GB=MLGB-GBND
      IF (GB.GT.BANDI) GB=BANDI
      RNML=GB*RNINT/BANDI
      IF (RNML.GT.RNINT) RNML=RNINT
1300  DO 1400 IFN=2,10
1400  IF(FLIM+MINRF.LT.RFCURV(IFN)) GOTO 1450
1450  FN=IFN-1.+(FLIM+MINRF-RFCURV(IFN-1))/(RFCURV(IFN)-RFCURV(IFN-1))
      FLGB=(FN-1.)*DF+GBND
      GB=FLGB-GBND
      IF (GB.GT.BANDI) GB=BANDI
      RNFL=GB*RNINT/BANDI
      IF (RNFL.GT.RNINT) RNFL=RNINT
      IF(RNFL.LT.0.) RNFL=0.
1500  RNML=RNML-RNFL
1550  IF((IZ1.EQ.1.OR.IZ1.EQ.3).AND.(FLIM.LT.0.)) RNFL=0.
C
C     CORRECT FOR ACTUAL NUMBER OF INTERFERERS
C
1600  ALSTML=RNML*PI*(6378.*CENANG(1))**2
      ALSTFL=RNFL*PI*(6378.*CENANG(2))**2
```

A1 B1 C1 D1 E1 F1 G1

Sidelobe gain of the interferer is calculated.

Power received in the mainlobe and first sidelobe is calculated:

$$\frac{P_t G}{4\pi R^2} \left(\frac{\lambda^2}{4\pi}\right) \left(G_R\right)$$

The mainlobe interference margin is the difference between power received in the mainlobe and the threshold.

The firstlobe interference margin is the difference between power received in the firstlobe and the threshold.

The mainlobe guard band (MLGB) is the guard band necessary for no interference. The actual guard band (GBND) is subtracted from MLGB to determine if there is interference. The result (GB) is then multiplied by the number of interferers per channel (in the case of interference) which results in number of interferers in the mainlobe. Similar computations are done to find number of interferers in the firstlobe.

Area lost due to direct overflight is calculated.

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```
C
C
C     CALCULATION OF OBRF FOR ALL CHANNELS (BNDRF VARIABLE)
C
C
C
H1        IF(IAS.EQ.1.OR.IAS.EQ.3) GOTO 1650
          NCH=BANDI/BWCH
          IF(NCH.LT.1) NCH=1
          FSEP=GBND+(BWCH-BWI)/2.
          DO 1610 I=0,NCH-1
          FCH=I*BWCH+FSEP
          FNO=10.*FCH/F
I1        IFN=INT(FNO)+1
          IF(IFN.GT.10) GOTO 1608
          RJFC=RFCURV(IFN)+(FNO-INT(FNO))*(RFCURV(IFN+1)-RFCURV(IFN))
          GOTO 1610
1608      RJFC=ATTEN
1610      BNDRF=BNDRF+10.**(-RJFC/10.)
          BNDRF=-10.*ALOG10(BNDRF)
C
C
C     CALCULATION OF MULTIPLE INTERFERENCE MODEL
C
C
C
1650      IC=0
          TOT=0.
          AREA=0.
J1        G=0.
          GR=0.
          IAZ=1
          DO 1670 I=0,8
K1        R2NI=RNINT/(2.**I)
1670      IF(R2NI.LT.400000.) GOTO 1680
1680      CR=2.**I
L1        CANG=CENANG(2)
          DCANG=(CENANG(3)-CENANG(2))/25.
M1        TPUA=R2NI/(2.*PI*6378.**2*(COS(CENANG(2))-6378./(6378.+ALT)))
N1        B=52.-10.*ALOG10(SQRT(10.**(MLGI/10.)/.55)/PI)
          IF(B.LT.32.) B=32.
2000      G=0.
O1        CANG=CANG+DCANG
          JYA=JYA+1
P1        EL=PI/2.-CANG-ATAN(6378.*SIN(CANG)/(6378.+ALT-6378.*COS(CANG)))
          IF (EL.LE.0.) EL=0.001
          ATMAT=16.*YO/(SQRT((SIN(EL))**2+16./8500.)+SIN(EL))+
Q1       C4.*YW/(SQRT((SIN(EL))**2+4./8500.)+SIN(EL))
          ATM2=ATMAT
          IF (ATMAT.GT.200.) ATMAT=200.
R1        AREA=AREA+2.*PI*6378.**2*(COS(CANG-DCANG)-COS(CANG))
S1        IF (AREA*TPUA.LT.1.) GOTO 2400
T1        D2=(6378.**2+(6378.+ALT)**2-2.*6378.*(6378.+ALT)*COS(CANG))*
         C10.**6
```

Out of band rejection factor is read from OBRF curves for particular interferer bandwidth and guard band.

DCANG is calculated: [CENANG (3) - CENANG (2)]/25. This is the incremental angle which results in 25 annuluses. For each annulus, the area is calculated and multiplied by the population per unit area (foung by dividing the total area in view of the sensor by the number of interferers). This results in a certain number of interferers per annulus, which are all assumed to be at the outer edge of the annulus.

Total population per unit area is calculated: $\frac{\text{\# of interferers}}{\text{area in view of sensor}}$

B (gain constant) is calculated: $52 - 10 \log \left[\frac{1}{\pi} \sqrt{\frac{10^{G_{ML}/10}}{.55}} \right]$

The central angle is incremented.

The elevation angle towards the spacecraft is calculated (to a minimum of .001°).

Atmospheric attenuation is calculated:

$$\frac{16\,Y_o}{\sqrt{\sin^2\theta + \frac{16}{8500} + \sin\theta}} + \frac{4\,Y_w}{\sqrt{\sin^2\theta + \frac{4}{8500} + \sin\theta}}$$

Area of the annulus is calculated: $2\pi R^2 (\cos\theta_1 - \cos\theta_2)$

Distance to the spacecraft is calculated.

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```
            GAT=0
            IF(Z2.EQ.1HY) GOTO 2200
            CEL=COS(EL)
            DO 2100 I=0,359,IAZ
U1          G1=B-25.*ALOG10(ACOS(-SIN(I*PI/180.)*CEL)*180./PI)
            IF (G1.GT.MLGI) G1=MLGI
            IF (G1.LT.-10) G1=-10.
V1          G=G+10.**((G1-ATMAT)/10.)
            GAT=GAT+G1
W1 & X1  2100 CONTINUE
            GOTO 2300
         2200 G1=B-25.*ALOG(EL*180./PI)
            IF (G1.GT.MLGI) G1=MLGI
            IF (G1.LT.-10) G1=-10.
            GAT=GAT+G1
            G=INT(360./IAZ)*10.**((G1-ATMAT)/10.)
Y1       2300 GR=GR+INT(AREA*TPUA)*G/D2
            IC=IC+1
            TOT=TOT+(INT((AREA*TPUA)*10.)/10.)
            IF(ZH.EQ.'Y') WRITE (6,2350) EL*180./PI,TOT,
           C(INT((AREA*TPUA)*10.)/10.),SQRT(D2),G/D2,CANG*180./PI,
           CATMAT,GAT/360.
         2350 FORMAT(3X,'EL= ',F4.1,3X,'TOTAL # OF INT= ',
           CF6.0,3X,'# INT IN ANNULUS= ',F5.0,/,3X,'DISTANCE= ',F9.1,
           C3X,'G-R= ',F11.6,3X,'CANG= ',F5.2,/,3X,'ATM ATTEN=',F5.2,
           C3X,'AVG GAIN TOWARDS S/C= ',F5.1,/)
Z1       2400 AREA=AREA-INT(AREA*TPUA)/TPUA
A2          IF (CANG.LT.CENANG(3)-.001) GOTO 2000
         2403 CONTINUE
            GR=GR*CR/NCH
            RIAZ=INT(360./IAZ)
            WRITE(4,2500) SFLI/1000.,SFUI/1000.,BOL/1000.,BOU/1000.,
           C DIAM(IDIAM),IZ1,IZ3,STC,RNINT,MINRF,BNDRF,10.*ALOG10(GR)
         2500 FORMAT(1X,4F9.4,F5.1,I2,I2,1X,1A7,F9.0,3F8.2)
            WRITE(4,2501) (RFCURV(I),I=1,11)
         2501 FORMAT(1X,11F8.2)
            PR=PWRI-10.*ALOG10(RIAZ)+SSLG+20.*ALOG10(300./(SFREQ*4.*PI))-
           CBNDRF+10.*ALOG10(GR)
            IF(PR.LT.-350.) PR=-350.
            PCT1=ALSTFL/9362807.*100.
            IF (PCT1.GT.100) PCT1=100.
            PCT2=ALSTML/9362807.*100.
            IF (PCT2.GT.100.) PCT2=100.
C
C
C
            WRITE(7,9000) STC,RNINT,PR,PR-THLD,MLIM,RNML+RNFL,PCT2,
           C FLIM,RNFL,PCT1
         9000 FORMAT(1X,1A7,F8.0,3X,3F7.1,1X,F8.0,F7.2,F7.1,1X,F8.0,F7.2)
            IF(ZH.EQ.1HY.AND.ZG.NE.1HY) WRITE(6,9000) STC,RNINT,PR,PR-THLD,
           CMLIM,RNML+RNFL,PCT2,FLIM,RNFL,PCT1
B2          IF(ZF.EQ.1HY) WRITE(3,9000) STC,RNINT,PR,PR-THLD,
           CMLIM,RNML+RNFL,PCT2,FLIM,RNFL,PCT1
         9005 IF(SUBPR.LT.-350.OR.PR.LT.-350) GOTO 9010
```

As the interferer is rotated in increments of 1°, the gain towards the spacecraft is calculated, summed and averaged to a minimum average gain of -10 dB. Atmospheric losses are subtracted out.

Same summation and averaging of gain towards the spacecraft for an omni-directional antenna.

The average gain is multiplied by the number of interferers in the annulus.

Statements for printed output.

Total power received from a particular station class is calculated to a munimum of -350 dB.

Percent of area lost is calculated.

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```
      SUBPR=10.*ALOG10(10.**(SUBPR/10.)+10.**(PR/10.))
 9010 SUBPC1=SUBPC1+PCT1
      SUBPC2=SUBPC2+PCT2
      IF(SUBPC1.GT.100.) SUBPC1=100.
      IF(SUBPC2.GT.100.) SUBPC2=100.
      IF(STC.EQ.'EXP') GOTO 9170
      IF(SBPR.LT.-350.OR.PR.LT.-350) GOTO 9010
      SBPR=10.*ALOG10(10.**(SBPR/10.)+10.**(PR/10.))
      SBPC1=SBPC1+PCT1
      SBPC2=SBPC2+PCT2
      IF(SBPC1.GT.100.) SBPC1=100.
      IF(SBPC2.GT.100.) SBPC2=100.
 9170 GOTO 117
 9180 CONTINUE
 9190 CONTINUE
K     IF(N2SET.EQ.0) GOTO 9197
      WRITE(7,9193)
 9193 FORMAT(1X,78(1H=))
      GTOP=GTOPC1+GTOPC2
      IF(GTOP.GT.100.) GTOP=100.
      GTP=GTPC1+GTPC2
      IF(GTP.GT.100.) GTP=100.
      IF(ZH.EQ.1HY) WRITE(6,9193)
      IF(ZF.EQ.1HY) WRITE(3,9193)
L     WRITE(7,9195) GTOPR,GTOPC2,GTOPC1,GTPR,GTPC2,GTPC1,
     C GTOP,GTP
      IF(ZH.EQ.1HY) WRITE(6,9195) GTOPR,GTOPC2,GTOPC1,GTPR,GTPC2,
     C GTPC1,GTOP,GTP
      IF(ZF.EQ.1HY) WRITE(3,9195) GTOPR,GTOPC2,GTOPC1,GTPR,GTPC2,
     C GTPC1,GTOP,GTP
 9195 FORMAT(1X,'    TOTAL INC EXP ',F7.1,23X,F7.2,16X,F7.2,/,1X,
     C '    TOTAL EXC EXP ',F7.1,23X,F7.2,16X,F7.2,/,1X,'TOTAL
     C PERCENT OF AREA LOST INC EXP : ',F7.2,'% , EXC EXP : ',
     C F7.2,'%',/,/)
 9197 CONTINUE
 9198 REWIND 2
      GOTO 120
 9250 CLOSE(UNIT=1)
      CLOSE(UNIT=2)
      IF(ZF.EQ.1HY) CLOSE(UNIT=3)
      CLOSE(UNIT=4)
 9999 STOP
      END
```

Subtotals are accumulated.

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ANNEX C

ASSESSMENT OF INTERFERENCE FROM SHARED SERVICES AND ACTIVE SERVICES IN ADJACENT AND SUBHARMONIC BANDS

Assessment of Interference from Adjacent, Subharmonic and Shared Bands to Passive Sensors with 4 Pole Butterworth Characteristics

The following tables show the results of calculated interference from adjacent, subharmonic and shared band services into passive microwave sensors with 4 pole Butterworth fiter characteristics. Each row in these tables lists the following:

STC - Station class.

NINT - Number of interferers in that station class.

PR - Total power received into the second sidelobe.

SSIM - Second sidelobe interference margin [the power received into the second sidelobe (PR) minus the interference threshold].

MLIM - Mainlobe interference margin [mainlobe received power minus the interference threshold].

NML - Number of mainlobe interferers (including number of firstlobe interferers).

%AL ML- Percent of area lost due to mainlobe interference only.

FLIM - Firstlobe interference margin [firstlobe received power minus the interference threshold].

NFL - Number of firstlobe interferers.

%AL FL - Percent of area lost due to firstlobe interference only.

The percentage of area lost and the total power received from all interferers are subtotaled for each adjacent, subharmonic and shared band and then totaled at the bottom for the entire sensing band. Two subtotal and total lines are printed to express values including and excluding experimental station classes.

1.400- 1.427 GHZ SENSING BAND, 27. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 20.0 km RESOLUTION, -171.0 dBW INT THRESHOLD
6.58 m DIAMETER ANTENNA

1.400- 1.427 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	92.	-167.9	3.1	69.2	92.	0.28	44.3	9.	0.80
TR	2.	-177.2	-6.2	55.9	2.	0.00	31.1	2.	0.17
FX	76.	-139.0	32.0	76.6	76.	0.22	51.7	10.	0.88
FB2	2.	-221.1	-50.1	14.1	2.	0.01	-10.8	0.	0.00
RL	2428.	-155.8	15.2	49.8	269.	0.59	24.9	94.	7.91
RLT	1845.	-157.7	13.3	47.7	189.	0.42	22.8	64.	5.41
LR/MR	128.	-151.9	19.1	54.8	128.	0.12	29.9	93.	7.85
EXP	55.	-185.9	-14.9	51.6	8.	0.02	26.7	3.	0.26
EXP	22.	-174.3	-3.3	41.8	3.	0.01	17.0	1.	0.10
EXP	19.	-135.7	35.3	92.7	19.	0.00	67.8	19.	1.60
SUBTOTALS INC EXP		-133.9				1.66			24.98
SUBTOTALS EXC EXP		-138.6				1.63			23.01

1.400- 1.427 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	61.	-172.6	-1.6	64.5	61.	0.18	39.6	8.	0.69
MOE	40.	-167.9	3.1	69.5	40.	0.11	44.6	7.	0.58
FBR/MLR	58.	-205.0	-34.0	15.1	58.	0.19	-9.8	0.	0.00
FLE	8.	-181.6	-10.6	44.2	8.	0.02	19.3	1.	0.10
FB	39.	-172.1	-1.1	65.3	39.	0.11	40.4	6.	0.49
FX	70.	-141.3	29.7	60.5	70.	0.00	35.6	70.	5.91
PL	136.	-192.0	-21.0	2.9	136.	0.46	-22.0	0.	0.00
ROA	7.	-183.9	-12.9	50.3	7.	0.02	25.4	1.	0.11
WXR	322.	-163.3	7.7	47.5	51.	0.11	22.6	17.	1.45
EXP	129.	-157.3	13.7	56.6	29.	0.06	31.7	11.	0.95
SUBTOTALS INC EXP		-141.2				1.27			10.27
SUBTOTALS EXC EXP		-141.3				1.21			9.32

1.400- 1.427 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	5.	-202.4	-31.4	5.1	5.	0.02	-19.8	0.	0.00
BTE/BTC	18.	-174.9	-3.9	46.7	18.	0.00	21.8	18.	1.52
BTR	72.	-171.7	-0.7	43.9	72.	0.00	19.0	72.	6.08
EXP	4.	-209.0	-38.0	15.7	4.	0.01	-9.2	0.	0.00
EXP	2.	-184.2	-13.2	39.2	2.	0.00	14.3	2.	0.17
SUBTOTALS INC EXP		-169.8				0.03			7.77
SUBTOTALS EXC EXP		-170.0				0.02			7.60

1.400- 1.427 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	118144.	-167.1	3.9	19.9	118144.	100.00	-5.0	0.	0.00
ML	460.	-196.0	-25.0	15.1	460.	1.54	-9.8	0.	0.00
MA	21.	-208.6	-37.6	15.9	21.	0.07	-9.0	0.	0.00
MOE	8.	-212.9	-41.9	15.9	8.	0.03	-9.0	0.	0.00
MOEC	16.	-214.6	-43.6	11.1	16.	0.05	-13.8	0.	0.00
FX1	99263.	-161.1	9.9	5.1	99263.	100.00	-19.8	0.	0.00
FB2	6201.	-172.5	-1.5	5.9	6201.	20.81	-19.0	0.	0.00
EXP	9.	-205.4	-34.4	20.2	9.	0.03	-4.7	0.	0.00
EXP	2.	-195.8	-24.8	14.9	2.	0.01	-10.0	0.	0.00
SUBTOTALS INC EXP		-159.9				100.00			0.00
SUBTOTALS EXC EXP		-159.9				100.00			0.00
TOTAL INC EXP		-133.2				100.00			43.02
TOTAL EXC EXP		-136.7				100.00			39.93

TOTAL PERCENT OF AREA LOST INC EXP : 100.00% , EXC EXP : 100.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.373E-03 TO REACH INTERFERENCE THRESHOLD

4.200- 4.400 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -158.0 dBW INT THRESHOLD
21.61 m DIAMETER ANTENNA

4.200- 4.400 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	3.	-177.4	-19.4	53.3	3.	0.00	28.4	3.	0.00
MO	18.	-168.1	-10.1	65.5	18.	0.00	40.6	18.	0.02
FB	2.	-165.5	-7.5	78.0	2.	0.00	53.1	2.	0.00
TF	5.	-169.9	-11.9	55.5	5.	0.00	30.6	5.	0.00
RLT	8.	-201.6	-43.6	18.5	8.	0.00	-6.4	0.	0.00
RO	10.	-176.7	-18.7	42.5	10.	0.00	17.6	10.	0.01
ROA	38.	-206.2	-48.2	19.5	38.	0.00	-5.4	0.	0.00
ROA	6.	-199.1	-41.1	36.5	6.	0.00	11.6	6.	0.01

ROA	144.	-174.5	-16.5	45.2	144.	0.00	20.3	144.	0.12
ROA	280.	-167.2	-9.2	49.5	280.	0.00	24.6	280.	0.23
EXP	23.	-156.9	1.1	68.1	23.	0.00	43.2	23.	0.02
EXP	24.	-139.8	18.2	85.1	24.	0.00	60.2	24.	0.02
EXP	4.	-144.3	13.7	80.1	4.	0.00	55.2	4.	0.00
SUBTOTALS INC EXP		-138.4				0.00			0.44
SUBTOTALS EXC EXP		-161.0				0.00			0.39

4.200- 4.400 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	32.	-171.9	-13.9	73.0	32.	0.00	48.0	15.	0.01
MR	982.	-216.2	-58.2	-17.0	0.	0.00	-42.0	0.	0.00
FX	25200.	-148.4	9.6	46.7	17412.	0.39	21.8	5715.	4.79
FLE	10.	-173.7	-15.7	45.5	10.	0.00	20.6	10.	0.01
ROA	4.	-183.1	-25.1	57.1	4.	0.00	32.1	2.	0.00
LR	9.	-153.6	4.4	75.1	9.	0.00	50.1	5.	0.00
EC	3.	-211.0	-53.0	22.1	1.	0.00	-2.9	0.	0.00
TCR	4540.	-209.3	-51.3	-11.4	0.	0.00	-36.4	0.	0.00
EXP	18.	-160.0	-2.0	67.8	18.	0.00	42.9	7.	0.01
EXP	16.	-126.0	32.3	101.0	16.	0.00	76.1	16.	0.01
SUBTOTALS INC EXP		-126.0				0.39			4.84
SUBTOTALS EXC EXP		-147.2				0.39			4.82

4.200- 4.400 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	179.	-165.6	-7.6	72.2	179.	0.00	47.3	100.	0.08
MOD	68.	-165.1	-7.1	76.5	68.	0.00	51.5	45.	0.04
MOA	31.	-176.0	-18.0	67.7	31.	0.00	42.8	15.	0.01
FLD/FXE	92.	-167.1	-9.1	54.9	69.	0.00	30.0	26.	0.02
FCL	3.	-166.4	-8.4	81.0	3.	0.00	56.0	3.	0.00
EXP	671.	-137.5	20.5	76.9	671.	0.01	51.9	444.	0.37
EXP	174.	-138.1	19.9	69.9	174.	0.00	44.9	174.	0.15
EXP	16.	-166.3	-8.3	61.2	16.	0.00	36.3	7.	0.01
SUBTOTALS INC EXP		-134.8				0.01			0.68
SUBTOTALS EXC EXP		-159.9				0.01			0.16

4.200- 4.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MLT	647.	-187.7	-29.7	17.4	647.	0.02	-7.5	0.	0.00
FX	4230.	-182.6	-24.6	8.5	4230.	0.14	-16.4	0.	0.00
FXO	9037.	-215.7	-57.7	-27.9	0.	0.00	-52.8	0.	0.00
THTD	32.	-166.9	-8.9	38.5	32.	0.00	13.6	32.	0.03
TH	27.	-191.7	-33.7	21.5	27.	0.00	-3.4	0.	0.00
EH	18.	-202.0	-44.0	13.2	18.	0.00	-11.7	0.	0.00
EXP	51.	-199.9	-41.9	14.1	51.	0.00	-10.8	0.	0.00
EXP	21.	-193.9	-35.9	21.5	21.	0.00	-3.4	0.	0.00
SUBTOTALS INC EXP		-166.7				0.17			0.03
SUBTOTALS EXC EXP		-166.7				0.17			0.03

4.200- 4.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	431.	-201.0	-43.0	18.5	431.	0.01	-6.4	0.	0.00
MOE	253.	-196.3	-38.3	25.5	253.	0.00	0.6	253.	0.21
FLD	12.	-204.2	-46.2	13.1	12.	0.00	-11.8	0.	0.00
FB	6.	-210.0	-52.0	28.9	6.	0.00	4.0	6.	0.01
FX	14.	-205.9	-47.9	10.3	14.	0.00	-14.6	0.	0.00
EXP	52.	-202.2	-44.2	8.5	52.	0.00	-16.4	0.	0.00
EXP	5.	-190.6	-32.6	34.1	5.	0.00	9.2	5.	0.00
SUBTOTALS INC EXP		-189.0				0.02			0.22
SUBTOTALS EXC EXP		-194.3				0.02			0.22
TOTAL INC EXP		-125.2				0.59			6.21
TOTAL EXC EXP		-146.8				0.58			5.62

TOTAL PERCENT OF AREA LOST INC EXP : 6.80% , EXC EXP : 6.20%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.752E-01 TO REACH INTERFERENCE THRESHOLD

6.425- 7.075 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 20.0 km RESOLUTION, -158.0 dBW INT THRESHOLD
1.38 m DIAMETER ANTENNA

6.425- 7.075 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FXO	6512.	-174.9	-16.9	-5.5	0.	0.00	-30.3	0.	0.00
EXP	2.	-177.7	-19.7	34.5	2.	0.00	9.7	2.	0.17

EXP	9.	-149.1	8.9	50.5	9.	0.00	25.7	9.	0.76
EXP	6.	-116.6	41.4	87.2	6.	0.00	62.3	6.	0.51
SUBTOTALS INC EXP		-116.6				0.00			1.44
SUBTOTALS EXC EXP		-174.9				0.00			0.00

6.425- 7.075 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	56.	-231.2	-73.2	2.9	3.	0.01	-22.0	0.	0.00
LR/MR	243.	-230.6	-72.6	-21.4	0.	0.00	-46.3	0.	0.00
FX	19786.	-200.2	-42.2	-10.8	0.	0.00	-35.7	0.	0.00
FLD	10.	-211.1	-53.1	10.5	2.	0.01	-14.4	0.	0.00
LR	4.	-217.3	-59.3	9.0	1.	0.00	-15.9	0.	0.00
RO	13.	-214.0	-56.0	7.5	2.	0.01	-17.3	0.	0.00
TC	468.	-219.2	-61.2	-38.5	0.	0.00	-63.3	0.	0.00
EXP	72.	-205.7	-47.7	24.1	31.	0.10	-0.8	0.	0.00
MO	5.	-225.1	-67.1	11.7	5.	0.02	-13.2	0.	0.00
FXO	4070.	-187.7	-29.7	-9.4	0.	0.00	-34.3	0.	0.00
EXP	2.	-196.2	-38.2	18.9	2.	0.00	-6.0	0.	0.02
EXP	9.	-163.0	-5.0	45.0	9.	0.02	20.1	4.	0.38
EXP	7.	-128.5	29.5	80.2	7.	0.00	55.3	7.	0.59
SUBTOTALS INC EXP		-128.5				0.17			0.99
SUBTOTALS EXC EXP		-187.4				0.04			0.00

6.425- 7.075 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	31.	-229.0	-71.0	7.2	2.	0.01	-17.7	0.	0.00
FX	12199.	-210.4	-52.4	-17.4	0.	0.00	-42.3	0.	0.00
FX	20.	-217.6	-59.6	1.9	1.	0.00	-23.0	0.	0.00
FXO	1000.	-192.9	-34.9	-15.5	0.	0.00	-40.3	0.	0.00
FC	11.	-214.0	-56.0	-15.5	0.	0.00	-40.3	0.	0.00
LR	59.	-211.5	-53.5	-21.5	0.	0.00	-46.3	0.	0.00
MR	1739.	-189.1	-31.1	-12.3	0.	0.00	-37.2	0.	0.00
TTR/MLT	126.	-230.5	-72.5	-17.6	0.	0.00	-42.5	0.	0.00
EC	638.	-226.8	-68.8	-14.4	0.	0.00	-39.3	0.	0.00
EJ	46.	-233.6	-75.6	-16.4	0.	0.00	-41.2	0.	0.00
TB/TJ	58.	-193.7	-35.7	21.5	12.	0.04	-3.4	0.	0.00
TC	159.	-221.0	-63.0	-8.4	0.	0.00	-33.3	0.	0.00
TG	105.	-204.3	-46.3	9.9	9.	0.03	-15.0	0.	0.00
WXD	24.	-183.9	-25.9	8.5	24.	0.08	-16.3	0.	0.00
EXP	81.	-181.9	-23.9	11.6	47.	0.16	-13.3	0.	0.00
EXP	205.	-197.0	-39.0	15.8	28.	0.09	-9.1	0.	0.00
EXP	90.	-177.2	-19.2	37.6	90.	0.27	12.7	9.	0.79
MLT	88.	-185.9	-27.9	13.8	31.	0.10	-11.1	0.	0.00
FXO	814.	-197.3	-39.3	-9.4	0.	0.00	-34.3	0.	0.00
FXN	1766.	-173.6	-15.6	13.7	621.	2.08	-11.2	0.	0.00
FXT	593.	-178.3	-20.3	13.7	209.	0.70	-11.2	0.	0.00
EXP	2.	-196.2	-38.2	18.9	2.	0.00	-6.0	0.	0.02
EXP	10.	-162.4	-4.4	45.3	10.	0.02	20.4	5.	0.42
EXP	7.	-128.5	29.5	80.2	7.	0.00	55.3	7.	0.59
SUBTOTALS INC EXP		-128.5				3.59			1.82
SUBTOTALS EXC EXP		-171.7				3.05			0.00

6.425- 7.075 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	50.	-214.4	-56.4	-5.5	0.	0.00	-30.3	0.	0.00
MR	13.	-220.6	-62.6	-22.5	0.	0.00	-47.3	0.	0.00
FX	32.	-196.6	-38.6	-3.7	0.	0.00	-28.5	0.	0.00
FA	26.	-210.3	-52.3	1.5	26.	0.09	-23.3	0.	0.00
LR	37.	-213.7	-55.7	-21.8	0.	0.00	-46.7	0.	0.00
PO	2.	-217.6	-59.6	-5.5	0.	0.00	-30.3	0.	0.00
EXP	27.	-185.2	-27.2	8.2	27.	0.09	-16.7	0.	0.00
EXP	2.	-196.6	-38.6	14.5	2.	0.01	-10.3	0.	0.00
SUBTOTALS INC EXP		-184.6				0.18			0.00
SUBTOTALS EXC EXP		-196.2				0.09			0.00

6.425- 7.075 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB	11.	-198.4	-40.4	17.5	11.	0.04	-7.3	0.	0.00
FB	13.	-217.5	-59.5	-2.5	0.	0.00	-27.3	0.	0.00
MO	17.	-196.2	-38.2	17.5	17.	0.06	-7.3	0.	0.00
MO	4.	-206.5	-48.5	14.5	4.	0.01	-10.3	0.	0.00
MO	16.	-216.6	-58.6	-2.5	0.	0.00	-27.3	0.	0.00
MOE	252.	-207.3	-49.3	-5.5	0.	0.00	-30.3	0.	0.00
FX	1748.	-200.5	-42.5	-25.5	0.	0.00	-50.3	0.	0.00
FXE	1833.	-192.9	-34.9	-16.3	0.	0.00	-41.2	0.	0.00
FXO	4720.	-224.8	-66.8	-52.3	0.	0.00	-77.2	0.	0.00
FLEA	250.	-199.6	-41.6	-7.8	0.	0.00	-32.7	0.	0.00
ER/EK	120.	-198.6	-40.6	-12.3	0.	0.00	-37.2	0.	0.00

TF	38.	-208.8	-50.8	-16.7	0.	0.00	-41.5	0.	0.00
ETEK	20.	-229.2	-71.2	-16.3	0.	0.00	-41.1	0.	0.00
THTR	40.	-209.4	-51.4	-17.8	0.	0.00	-42.7	0.	0.00
EXP	610.	-197.4	-39.4	-17.7	0.	0.00	-42.5	0.	0.00
SUBTOTALS INC EXP		-188.3				0.11			0.00
SUBTOTALS EXC EXP		-188.8				0.11			0.00
TOTAL INC EXP		-116.1				4.05			4.24
TOTAL EXC EXP		-169.9				3.28			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 8.29% , EXC EXP : 3.28%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.154E+02 TO REACH INTERFERENCE THRESHOLD

6.425- 6.625 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 20.0 km RESOLUTION, -158.0 dBW INT THRESHOLD
1.42 m DIAMETER ANTENNA

6.425- 6.625 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	3.	-180.9	-22.9	41.8	3.	0.00	16.9	3.	0.25
FXO	3256.	-177.7	-19.7	-5.2	0.	0.00	-30.1	0.	0.00
EXP	2.	-177.4	-19.4	34.8	2.	0.00	9.9	2.	0.17
EXP	9.	-148.8	9.2	50.8	9.	0.00	25.9	9.	0.76
EXP	6.	-116.3	41.7	87.4	6.	0.00	62.6	6.	0.51
SUBTOTALS INC EXP		-116.3				0.00			1.69
SUBTOTALS EXC EXP		-176.0				0.00			0.25

6.425- 6.625 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	56.	-182.6	-24.6	40.5	19.	0.04	15.6	6.	0.48
LR/MR	243.	-181.6	-23.6	16.0	24.	0.08	-8.9	0.	0.00
FX	19786.	-151.1	6.9	26.2	3735.	11.97	1.3	168.	14.15
FLD	10.	-164.6	-6.6	44.0	5.	0.01	19.1	2.	0.15
LR	4.	-178.0	-20.0	35.8	2.	0.00	10.9	1.	0.07
RO	13.	-166.7	-8.7	42.3	6.	0.01	17.4	2.	0.17
TC	468.	-218.9	-60.9	-30.3	0.	0.00	-55.2	0.	0.00
EXP	72.	-157.0	1.0	61.9	53.	0.11	37.0	21.	1.78
SUBTOTALS INC EXP		-149.8				12.23			16.81
SUBTOTALS EXC EXP		-150.8				12.12			15.03

6.425- 6.625 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	31.	-230.3	-72.3	-9.8	0.	0.00	-34.7	0.	0.00
FX	12199.	-211.8	-53.8	-35.0	0.	0.00	-59.9	0.	0.00
FX	20.	-218.9	-60.9	-14.7	0.	0.00	-39.6	0.	0.00
FXO	1000.	-192.6	-34.6	-15.2	0.	0.00	-40.1	0.	0.00
FC	11.	-213.7	-55.7	-15.2	0.	0.00	-40.1	0.	0.00
LR	59.	-211.2	-53.2	-21.2	0.	0.00	-46.1	0.	0.00
MR	1739.	-188.8	-30.8	-12.1	0.	0.00	-36.9	0.	0.00
TTR/MLT	126.	-231.8	-73.8	-35.1	0.	0.00	-60.0	0.	0.00
EC	638.	-228.2	-70.2	-32.4	0.	0.00	-57.2	0.	0.00
EJ	46.	-235.0	-77.0	-33.6	0.	0.00	-58.5	0.	0.00
TB/TJ	58.	-195.2	-37.2	4.3	3.	0.01	-20.6	0.	0.00
TC	159.	-222.4	-64.4	-26.2	0.	0.00	-51.1	0.	0.00
TG	105.	-205.7	-47.7	-7.8	0.	0.00	-32.7	0.	0.00
WXD	24.	-183.6	-25.6	8.8	24.	0.08	-16.1	0.	0.00
EXP	81.	-191.8	-33.8	5.1	25.	0.08	-19.8	0.	0.00
EXP	205.	-198.3	-40.3	-2.0	0.	0.00	-26.9	0.	0.00
EXP	90.	-178.6	-20.6	19.9	90.	0.30	-5.0	0.	0.00
MLT	88.	-228.9	-70.9	19.7	0.	0.00	-44.6	0.	0.00
FXO	8140.	-187.5	-29.5	-9.1	0.	0.00	-34.0	0.	0.00
FXN	1766.	-216.6	-58.6	-19.8	0.	0.00	-44.7	0.	0.00
FXT	593.	-221.4	-63.4	-19.8	0.	0.00	-44.7	0.	0.00
EXP	3.	-197.4	-39.4	15.3	1.	0.00	-9.5	0.	0.02
EXP	19.	-161.6	-3.6	45.5	14.	0.03	20.6	5.	0.40
EXP	14.	-128.5	29.5	80.5	14.	0.00	55.6	14.	1.18
SUBTOTALS INC EXP		-128.5				0.51			1.60
SUBTOTALS EXC EXP		-180.8				0.09			0.00

6.425- 6.625 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	50.	-214.1	-56.1	-5.2	0.	0.00	-30.1	0.	0.00
MR	13.	-220.3	-62.3	-22.2	0.	0.00	-47.1	0.	0.00
FX	32.	-196.3	-38.3	-3.4	0.	0.00	-28.3	0.	0.00
FA	26.	-210.0	-52.0	1.8	26.	0.09	-23.1	0.	0.00
LR	37.	-213.4	-55.4	-21.6	0.	0.00	-46.4	0.	0.00
PO	2.	-217.3	-59.3	-5.2	0.	0.00	-30.1	0.	0.00

EXP	27.	-184.9	-26.9	8.4	27.	0.09	-16.4	0.	0.00
EXP	2.	-196.3	-38.3	14.8	2.	0.01	-10.1	0.	0.00
SUBTOTALS INC EXP		-184.3				0.18			0.00
SUBTOTALS EXC EXP		-195.9				0.09			0.00

6.425- 6.625 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB	11.	-198.1	-40.1	17.8	11.	0.04	-7.1	0.	0.00
FB	13.	-217.2	-59.2	-2.2	0.	0.00	-27.1	0.	0.00
MO	17.	-195.9	-37.9	17.8	17.	0.06	-7.1	0.	0.00
MO	4.	-206.2	-48.2	14.8	4.	0.01	-10.1	0.	0.00
MO	16.	-216.3	-58.3	-2.2	0.	0.00	-27.1	0.	0.00
MOE	252.	-207.0	-49.0	-5.2	0.	0.00	-30.1	0.	0.00
FX	1748.	-200.2	-42.2	-25.2	0.	0.00	-50.1	0.	0.00
FXE	1833.	-192.6	-34.6	-16.1	0.	0.00	-40.9	0.	0.00
FXO	4720.	-224.5	-66.5	-52.1	0.	0.00	-76.9	0.	0.00
FLEA	250.	-199.3	-41.3	-7.6	0.	0.00	-32.4	0.	0.00
ER/EK	120.	-198.3	-40.3	-12.1	0.	0.00	-36.9	0.	0.00
TF	38.	-208.5	-50.5	-16.4	0.	0.00	-41.3	0.	0.00
ETEK	20.	-228.9	-70.9	-16.0	0.	0.00	-40.9	0.	0.00
THTR	40.	-209.1	-51.1	-17.6	0.	0.00	-42.4	0.	0.00
EXP	610.	-197.2	-39.2	-17.4	0.	0.00	-42.3	0.	0.00
SUBTOTALS INC EXP		-188.0				0.11			0.00
SUBTOTALS EXC EXP		-188.5				0.11			0.00
TOTAL INC EXP		-116.1				13.03			20.10
TOTAL EXC EXP		-150.7				12.41			15.28

TOTAL PERCENT OF AREA LOST INC EXP : 33.13% , EXC EXP : 27.69%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.188E+00 TO REACH INTERFERENCE THRESHOLD

6.875- 7.075 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 20.0 km RESOLUTION, -158.0 dBW INT THRESHOLD
1.33 m DIAMETER ANTENNA

6.875- 7.075 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MLT	88.	-163.2	-5.2	24.4	88.	0.30	-0.5	0.	0.00
FXN	1766.	-150.9	7.1	24.3	1766.	5.93	-0.6	0.	0.00
FXT	593.	-155.7	2.3	24.3	593.	1.99	-0.6	0.	0.00
EXP	2.	-178.0	-20.0	34.3	2.	0.00	9.4	2.	0.17
EXP	9.	-149.4	8.6	50.3	9.	0.00	25.4	9.	0.76
EXP	6.	-116.9	41.1	86.9	6.	0.00	62.0	6.	0.51
SUBTOTALS INC EXP		-116.9				8.21			1.44
SUBTOTALS EXC EXP		-149.5				8.21			0.00

6.875- 7.075 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	56.	-234.1	-76.1	-15.4	0.	0.00	-40.3	0.	0.00
LR/MR	243.	-233.5	-75.5	-39.6	0.	0.00	-64.5	0.	0.00
FX	19786.	-203.2	-45.2	-28.9	0.	0.00	-53.7	0.	0.00
FLD	10.	-213.8	-55.8	-6.5	0.	0.00	-31.4	0.	0.00
LR	4.	-219.6	-61.6	-6.1	0.	0.00	-31.0	0.	0.00
RO	13.	-216.9	-58.9	-9.8	0.	0.00	-34.7	0.	0.00
TC	468.	-219.5	-61.5	-38.7	0.	0.00	-63.6	0.	0.00
EXP	72.	-208.6	-50.6	5.8	10.	0.03	-19.1	0.	0.00
MO	5.	-248.2	-90.2	-11.9	0.	0.00	-36.8	0.	0.00
FXO	11396.	-188.1	-30.1	-9.7	0.	0.00	-34.5	0.	0.00
EXP	3.	-198.0	-40.0	14.8	1.	0.00	-10.1	0.	0.02
EXP	19.	-162.2	-4.2	44.9	14.	0.03	20.0	5.	0.39
EXP	14.	-129.1	28.9	79.9	14.	0.00	55.0	14.	1.18
SUBTOTALS INC EXP		-129.1				0.07			1.59
SUBTOTALS EXC EXP		-188.0				0.00			0.00

6.875- 7.075 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	31.	-183.4	-25.4	42.3	7.	0.02	17.4	2.	0.20
FX	12199.	-163.6	-5.6	19.5	803.	2.70	-5.4	0.	0.00
FX	20.	-172.5	-14.5	35.6	4.	0.01	10.7	1.	0.09
FXO	1000.	-193.2	-35.2	-14.4	0.	0.00	-39.3	0.	0.00
FC	11.	-214.3	-56.3	-15.7	0.	0.00	-40.6	0.	0.00
LR	59.	-211.8	-53.8	-21.7	0.	0.00	-46.6	0.	0.00
MR	1739.	-189.4	-31.4	-12.6	0.	0.00	-37.5	0.	0.00
TTR/MLT	126.	-183.7	-25.7	19.0	8.	0.03	-5.9	0.	0.00
EC	638.	-180.3	-22.3	23.2	52.	0.17	-1.7	0.	0.00
EJ	46.	-186.5	-28.5	19.4	3.	0.01	-5.5	0.	0.00
TB/TJ	58.	-146.7	11.3	57.3	21.	0.04	32.4	8.	0.68
TC	159.	-174.6	-16.6	28.9	18.	0.05	4.0	2.	0.20

TG	105.	-157.9	0.1	47.0	25.	0.06	22.1	9.	0.72
WXD	24.	-184.2	-26.2	8.3	24.	0.08	-16.6	0.	0.00
EXP	81.	-168.9	-10.9	19.4	65.	0.22	-5.5	0.	0.00
EXP	205.	-150.5	7.5	53.2	60.	0.13	28.3	22.	1.86
EXP	90.	-130.5	27.5	74.6	90.	0.22	49.7	23.	1.97
SUBTOTALS INC EXP		-130.3				3.73			5.72
SUBTOTALS EXC EXP		-146.3				3.16			1.90

6.875- 7.075 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	50.	-214.7	-56.7	-5.7	0.	0.00	-30.6	0.	0.00
MR	13.	-220.9	-62.9	-22.7	0.	0.00	-47.6	0.	0.00
FX	32.	-196.9	-38.9	-3.9	0.	0.00	-28.8	0.	0.00
FA	26.	-210.6	-52.6	1.3	26.	0.09	-23.6	0.	0.00
LR	37.	-214.0	-56.0	-22.1	0.	0.00	-47.0	0.	0.00
PO	2.	-217.9	-59.9	-5.7	0.	0.00	-30.6	0.	0.00
EXP	27.	-185.5	-27.5	7.9	27.	0.09	-17.0	0.	0.00
EXP	2.	-196.9	-38.9	14.3	2.	0.01	-10.6	0.	0.00
SUBTOTALS INC EXP		-184.9				0.18			0.00
SUBTOTALS EXC EXP		-196.5				0.09			0.00

6.875- 7.075 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB	11.	-198.7	-40.7	17.3	11.	0.04	-7.6	0.	0.00
FB	13.	-217.8	-59.8	-2.7	0.	0.00	-27.6	0.	0.00
MO	17.	-196.5	-38.5	17.3	17.	0.06	-7.6	0.	0.00
MO	4.	-206.8	-48.8	14.3	4.	0.01	-10.6	0.	0.00
MO	16.	-217.0	-59.0	-2.7	0.	0.00	-27.6	0.	0.00
MOE	252.	-207.5	-49.5	-5.7	0.	0.00	-30.6	0.	0.00
FX	1748.	-200.8	-42.8	-25.7	0.	0.00	-50.6	0.	0.00
FXE	1833.	-193.2	-35.2	-16.6	0.	0.00	-41.5	0.	0.00
FXO	4720.	-225.1	-67.1	-52.6	0.	0.00	-77.5	0.	0.00
FLEA	250.	-199.9	-41.9	-8.1	0.	0.00	-33.0	0.	0.00
ER/EK	120.	-198.9	-40.9	-12.6	0.	0.00	-37.5	0.	0.00
TF	38.	-209.1	-51.1	-16.9	0.	0.00	-41.8	0.	0.00
ETEK	20.	-229.5	-71.5	-16.5	0.	0.00	-41.4	0.	0.00
THTR	40.	-209.6	-51.6	-18.1	0.	0.00	-43.0	0.	0.00
EXP	610.	-197.7	-39.7	-17.9	0.	0.00	-42.8	0.	0.00
SUBTOTALS INC EXP		-188.6				0.11			0.00
SUBTOTALS EXC EXP		-189.1				0.11			0.00
TOTAL INC EXP		-116.7				7.78			9.01
TOTAL EXC EXP		-145.4				7.08			3.84

TOTAL PERCENT OF AREA LOST INC EXP : 16.80% , EXC EXP : 10.92%

MULTIPLY THE NUMBER OF INTERFERERS BY 0.546E-01 TO REACH INTERFERENCE THRESHOLD

10.600- 10.700 GHZ SENSING BAND, 100. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -156.0 dBW INT THRESHOLD
17.45 m DIAMETER ANTENNA

10.600- 10.700 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	13.	-197.6	-41.6	42.4	13.	0.00	16.7	13.	0.00
MO	8.	-180.4	-24.4	62.4	8.	0.00	36.7	8.	0.00
MO	12.	-195.2	-39.2	45.4	12.	0.00	19.7	12.	0.00
FB	5.	-189.1	-33.1	55.4	5.	0.00	29.7	5.	0.00
FX	100.	-178.3	-22.3	35.4	100.	0.00	9.7	100.	0.02
DTS-NOD	800.	-160.8	-4.8	43.5	800.	0.00	17.8	800.	0.17
DTS-SUB	10000.	-160.8	-4.8	32.5	10000.	0.00	6.8	10000.	2.10
EXP	2.	-185.8	-29.8	51.4	2.	0.00	25.7	2.	0.00
EXP	2.	-171.8	-15.8	65.4	2.	0.00	39.7	2.	0.00
EXP	2.	-161.8	-5.8	75.4	2.	0.00	49.7	2.	0.00
SUBTOTALS INC EXP		-156.2				0.00			2.30
SUBTOTALS EXC EXP		-157.7				0.00			2.29

10.600- 10.700 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	3430.	-191.3	-35.3	42.9	3430.	0.01	17.2	2609.	0.55
MR	443.	-188.2	-32.2	37.1	45.	0.00	11.4	11.	0.00
FX	24.	-172.5	-16.5	62.1	24.	0.00	36.4	3.	0.00
FX	27.	-214.4	-58.4	19.2	2.	0.00	-6.4	0.	0.00
FB	29.	-195.3	-39.3	55.7	8.	0.00	30.0	3.	0.00
RLD	20.	-190.2	-34.2	43.0	4.	0.00	17.4	1.	0.00
LR	147.	-176.6	-20.6	53.6	29.	0.00	27.9	10.	0.00
DTS-NOD	2700.	-165.6	-9.6	40.3	2700.	0.01	14.7	1795.	0.38
EXP	30.	-197.6	-41.6	35.8	4.	0.00	10.1	1.	0.00

EXP	121.	-137.7	18.3	92.0	121.	0.00	66.4	121.	0.03
SUBTOTALS INC EXP		-137.7				0.02			0.96
SUBTOTALS EXC EXP		-164.4				0.02			0.93

10.600- 10.700 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	77.	-195.9	-39.9	54.1	8.	0.00	28.4	3.	0.00
MLT	271.	-200.8	-44.8	30.6	9.	0.00	4.9	1.	0.00
FX	10468.	-184.4	-28.4	28.1	334.	0.00	2.4	26.	0.01
FXN	214.	-188.5	-32.5	38.4	11.	0.00	12.8	3.	0.00
CAR	97694.	-201.1	-45.1	-17.6	0.	0.00	-43.3	0.	0.00
TCR	95.	-188.6	-32.6	39.9	5.	0.00	14.2	2.	0.00
PR	18.	-218.2	-62.2	15.7	1.	0.00	-10.0	0.	0.00
EXP	39.	-185.8	-29.8	47.1	4.	0.00	21.4	1.	0.00
EXP	26.	-158.1	-2.1	76.2	26.	0.00	50.6	26.	0.01
SUBTOTALS INC EXP		-158.1				0.00			0.01
SUBTOTALS EXC EXP		-181.7				0.00			0.01

10.600- 10.700 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
RL	43.	-211.9	-55.9	5.4	43.	0.00	-20.3	0.	0.00
FB	7.	-197.7	-41.7	45.4	7.	0.00	19.7	7.	0.00
WXD	14.	-203.9	-47.9	18.4	14.	0.00	-7.3	0.	0.00
EXP	2.	-217.5	-61.5	28.5	2.	0.00	2.8	2.	0.00
EXP	2.	-196.0	-40.0	39.5	2.	0.00	13.8	2.	0.00
SUBTOTALS INC EXP		-193.3				0.00			0.00
SUBTOTALS EXC EXP		-196.6				0.00			0.00

10.600- 10.700 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MR	3.	-225.5	-69.5	6.0	3.	0.00	-19.7	0.	0.00
SUBTOTALS INC EXP		-225.5				0.00			0.00
SUBTOTALS EXC EXP		-225.5				0.00			0.00
TOTAL INC EXP		-137.6				0.02			3.27
TOTAL EXC EXP		-156.9				0.02			3.23

TOTAL PERCENT OF AREA LOST INC EXP : 3.28% , EXC EXP : 3.25%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.122E+01 TO REACH INTERFERENCE THRESHOLD

15.200- 15.400 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -160.0 dBW INT THRESHOLD
6.07 m DIAMETER ANTENNA

15.200- 15.400 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	20.	-187.4	-27.4	32.5	20.	0.00	7.5	20.	0.02
MO	2.	-178.0	-18.0	68.0	2.	0.00	43.0	2.	0.00
FB/MO	5.	-172.2	-12.2	69.9	5.	0.00	44.9	5.	0.00
MO	3.	-171.8	-11.8	73.5	3.	0.00	48.5	3.	0.00
FB	3.	-194.4	-34.4	50.9	3.	0.00	25.9	3.	0.00
MLR	6.	-177.1	-17.1	64.3	6.	0.00	39.3	6.	0.01
MOEC/FL	5.	-177.6	-17.6	52.5	5.	0.00	27.5	5.	0.00
THTD	3.	-185.3	-25.3	48.9	3.	0.00	23.9	3.	0.00
EXP	3.	-194.9	-34.9	35.1	3.	0.00	10.1	3.	0.00
EXP	4.	-162.9	-2.9	67.6	4.	0.00	42.6	4.	0.00
EXP	5.	-137.3	22.7	89.5	5.	0.00	64.5	5.	0.00
SUBTOTALS INC EXP		-137.3				0.00			0.05
SUBTOTALS EXC EXP		-167.3				0.00			0.04

15.200- 15.400 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB	27.	-178.1	-18.1	65.8	27.	0.00	40.8	27.	0.02
MO	238.	-168.3	-8.3	66.4	238.	0.00	41.5	238.	0.20
TC	212.	-240.6	-80.6	-38.7	0.	0.00	-63.7	0.	0.00
FX	247.	-189.0	-29.0	33.2	40.	0.00	8.2	8.	0.01
EXP	157.	-188.3	-28.3	38.6	31.	0.00	13.6	8.	0.01
EXP	53.	-146.2	13.8	84.3	53.	0.00	59.3	24.	0.02
SUBTOTALS INC EXP		-146.2				0.00			0.26
SUBTOTALS EXC EXP		-167.8				0.00			0.23

15.200- 15.400 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB	44.	-183.9	-23.9	63.7	23.	0.00	38.8	10.	0.01
MO	43.	-184.1	-24.1	63.7	23.	0.00	38.7	9.	0.01
FCL	8.	-230.3	-70.3	9.5	8.	0.00	-15.5	0.	0.00

FX	14.	-199.2	-39.2	32.5	5.	0.00	7.5	1.	0.00
LR	72.	-171.1	-11.1	54.3	53.	0.00	29.3	19.	0.02
MR	48.	-170.8	-10.8	58.4	41.	0.00	33.5	16.	0.01
RL/RO	40.	-188.2	-28.2	41.6	18.	0.00	16.6	6.	0.00
EXP	128.	-138.3	21.7	82.6	128.	0.00	57.6	111.	0.09
SUBTOTALS INC EXP		-138.3				0.00			0.14
SUBTOTALS EXC EXP		-167.7				0.00			0.05

15.200- 15.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FXO	2.	-216.5	-56.5	29.5	2.	0.00	4.5	2.	0.00
MO	1000.	-203.6	-43.6	14.9	1000.	0.03	-10.1	0.	0.00
FX	630.	-214.5	-54.5	-10.5	0.	0.00	-35.5	0.	0.00
SUBTOTALS INC EXP		-203.0				0.03			0.00
SUBTOTALS EXC EXP		-203.0				0.03			0.00

15.200- 15.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FXO	8.	-210.3	-50.3	29.5	8.	0.00	4.5	8.	0.01
MO	8000.	-194.5	-34.5	14.9	8000.	0.27	-10.1	0.	0.00
RO	4.	-224.1	-64.1	19.5	4.	0.00	-5.5	0.	0.00
EXP	15.	-202.3	-42.3	17.1	15.	0.00	-7.9	0.	0.00
SUBTOTALS INC EXP		-193.8				0.27			0.01
SUBTOTALS EXC EXP		-194.4				0.27			0.01
TOTAL INC EXP		-134.5				0.31			0.46
TOTAL EXC EXP		-162.8				0.31			0.33

TOTAL PERCENT OF AREA LOST INC EXP : 0.77% , EXC EXP : 0.63%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.193E+01 TO REACH INTERFERENCE THRESHOLD

18.600- 18.800 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -152.0 dBW INT THRESHOLD
4.97 m DIAMETER ANTENNA

18.600- 18.800 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FXO	207.	-213.7	-61.7	-10.2	0.	0.00	-35.2	0.	0.00
MO	200.	-165.4	-13.4	52.8	200.	0.00	27.8	200.	0.17
SUBTOTALS INC EXP		-165.4				0.00			0.17
SUBTOTALS EXC EXP		-165.4				0.00			0.17

18.600- 18.800 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	47.	-182.9	-30.9	49.3	32.	0.00	24.4	9.	0.01
FX	9.	-213.5	-61.5	12.2	1.	0.00	-12.8	0.	0.00
FX	7.	-167.5	-15.5	59.2	7.	0.00	34.2	3.	0.00
FXO	9.	-256.6	-104.6	-28.9	0.	0.00	-53.9	0.	0.00
EXP	9.	-159.0	-7.0	69.0	9.	0.00	44.1	4.	0.00
EXP	9.	-192.4	-40.4	35.9	3.	0.00	11.0	1.	0.00
SUBTOTALS INC EXP		-158.4				0.00			0.01
SUBTOTALS EXC EXP		-167.4				0.00			0.01

18.600- 18.800 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	4.	-244.8	-92.8	4.9	3.	0.00	-20.0	0.	0.00
MLT	9.	-272.2	-120.2	-40.2	0.	0.00	-65.2	0.	0.00
MR	4.	-263.9	-111.9	-38.3	0.	0.00	-63.3	0.	0.00
FX	9.	-181.2	-29.2	45.4	4.	0.00	20.4	1.	0.00
FXO	18.	-254.4	-102.4	-27.8	0.	0.00	-52.8	0.	0.00
DTS-NOD	10000.	-183.2	-31.2	11.4	495.	0.02	-13.6	0.	0.00
DTS-NOD	40000.	-177.2	-25.2	11.4	1980.	0.07	-13.6	0.	0.00
EXP	24.	-198.7	-46.7	28.5	2.	0.00	3.5	1.	0.00
SUBTOTALS INC EXP		-175.0				0.08			0.00
SUBTOTALS EXC EXP		-175.0				0.08			0.00

18.600- 18.800 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	56.	-194.0	-42.0	29.8	56.	0.00	4.8	56.	0.05
MR	3117.	-180.5	-28.5	9.9	3117.	0.10	-15.1	0.	0.00
FB	92.	-205.8	-53.8	15.8	92.	0.00	-9.2	0.	0.00
FX	8.	-199.5	-47.5	19.8	8.	0.00	-5.2	0.	0.00
LR	1112.	-199.2	-47.2	-4.2	0.	0.00	-29.2	0.	0.00
RLC	61.	-233.1	-81.1	-25.4	0.	0.00	-50.4	0.	0.00
RL/RO	1507.	-205.1	-53.1	-11.4	0.	0.00	-36.4	0.	0.00
WXD	84.	-186.5	-34.5	19.8	84.	0.00	-5.2	0.	0.00

PO	158.	-183.7	-31.7	19.8	158.	0.01	-5.2	0.	0.00
EXP	29.	-208.2	-56.2	2.8	29.	0.00	-22.2	0.	0.00
EXP	19.	-190.7	-38.7	21.4	19.	0.00	-3.6	0.	0.00
EXP	45.	-190.6	-38.6	19.8	45.	0.00	-5.2	0.	0.00
SUBTOTALS INC EXP		-177.5				0.12			0.05
SUBTOTALS EXC EXP		-178.0				0.12			0.05

18.600- 18.800 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2723.	-209.5	-57.5	-17.2	0.	0.00	-42.2	0.	0.00
TC	31.	-202.3	-50.3	9.8	31.	0.00	-15.2	0.	0.00
SUBTOTALS INC EXP		-201.5				0.00			0.00
SUBTOTALS EXC EXP		-201.5				0.00			0.00
TOTAL INC EXP		-157.5				0.20			0.23
TOTAL EXC EXP		-162.8				0.20			0.23

TOTAL PERCENT OF AREA LOST INC EXP : 0.43% , EXC EXP : 0.43%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.121E+02 TO REACH INTERFERENCE THRESHOLD

21.200- 21.400 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -160.0 dBW INT THRESHOLD
4.36 m DIAMETER ANTENNA

21.200- 21.400 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	4.	-257.0	-97.0	-9.1	0.	0.00	-34.1	0.	0.00
MLT	9.	-275.5	-115.5	-24.9	0.	0.00	-49.8	0.	0.00
MR	4.	-268.1	-108.1	-31.4	0.	0.00	-56.4	0.	0.00
FX	9.	-186.3	-26.3	52.3	9.	0.00	27.3	1.	0.00
FXO	18.	-260.3	-100.3	-20.9	0.	0.00	-45.9	0.	0.00
EXP	24.	-204.7	-44.7	35.4	3.	0.00	10.4	1.	0.00
SUBTOTALS INC EXP		-186.2				0.00			0.00
SUBTOTALS EXC EXP		-186.3				0.00			0.00

21.200- 21.400 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	15.	-206.6	-46.6	44.8	7.	0.00	19.8	2.	0.00
FX	38.	-203.4	-43.4	34.6	10.	0.00	9.7	2.	0.00
FXO	28.	-250.7	-90.7	-15.6	0.	0.00	-40.5	0.	0.00
EXP	23.	-181.7	-21.7	55.3	14.	0.00	30.4	5.	0.00
SUBTOTALS INC EXP		-181.6				0.00			0.01
SUBTOTALS EXC EXP		-201.7				0.00			0.00

21.200- 21.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	58.	-222.2	-62.2	11.4	58.	0.00	-13.5	0.	0.00
FB	4.	-250.0	-90.0	-3.4	0.	0.00	-28.3	0.	0.00
FB2	2.	-245.6	-85.6	-9.4	0.	0.00	-34.3	0.	0.00
FX	17.	-244.1	-84.1	-16.4	0.	0.00	-41.3	0.	0.00
TF	42.	-227.1	-67.1	-6.4	0.	0.00	-31.3	0.	0.00
SUBTOTALS INC EXP		-220.9				0.00			0.00
SUBTOTALS EXC EXP		-220.9				0.00			0.00

21.200- 21.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MLT	100.	-228.1	-68.1	-10.4	0.	0.00	-35.3	0.	0.00
FXN	337.	-228.5	-68.5	-13.4	0.	0.00	-38.3	0.	0.00
FXT	114.	-220.2	-60.2	-0.4	0.	0.00	-25.3	0.	0.00
TTR	13.	-232.2	-72.2	-7.3	0.	0.00	-32.2	0.	0.00
EXP	5.	-206.6	-46.6	24.0	5.	0.00	-0.9	0.	0.00
SUBTOTALS INC EXP		-206.3				0.00			0.00
SUBTOTALS EXC EXP		-218.9				0.00			0.00
TOTAL INC EXP		-180.3				0.00			0.01
TOTAL EXC EXP		-186.1				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.01% , EXC EXP : 0.01%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.410E+03 TO REACH INTERFERENCE THRESHOLD

22.210- 22.500 GHZ SENSING BAND, 290. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -155.0 dBW INT THRESHOLD
4.16 m DIAMETER ANTENNA

22.210- 22.500 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	95.	-194.3	-39.3	17.2	95.	0.00	-7.8	0.	0.00

FX	10.	-200.8	-45.8	24.2	10.	0.00	-0.8	0.	0.00
EXP	5.	-185.0	-30.0	41.2	5.	0.00	16.2	5.	0.00
EXP	2.	-164.8	-9.8	67.2	2.	0.00	42.2	2.	0.00
MO	3.	-202.0	-47.0	41.2	3.	0.00	16.2	3.	0.00
TF	2.	-195.2	-40.2	38.2	2.	0.00	13.2	2.	0.00
SUBTOTALS INC EXP		-164.8				0.00			0.01
SUBTOTALS EXC EXP		-190.9				0.00			0.00

22.210- 22.500 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	15.	-202.0	-47.0	29.8	11.	0.00	4.9	2.	0.00
FXO	28.	-249.3	-94.3	-20.1	0.	0.00	-45.1	0.	0.00
EXP	23.	-180.2	-25.2	50.9	16.	0.00	26.0	6.	0.00
SUBTOTALS INC EXP		-180.2				0.00			0.01
SUBTOTALS EXC EXP		-200.1				0.00			0.00

22.210- 22.500 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-211.5	-56.5	39.1	2.	0.00	14.2	2.	0.00
FX	72.	-213.4	-58.4	17.2	8.	0.00	-7.8	0.	0.00
FXO	102.	-244.7	-89.7	-19.2	0.	0.00	-44.2	0.	0.00
FAT	3.	-209.1	-54.1	38.8	2.	0.00	13.8	1.	0.00
LR	13.	-189.4	-34.4	38.0	8.	0.00	13.1	2.	0.00
EXP	13.	-217.9	-62.9	12.6	1.	0.00	-12.3	0.	0.00
SUBTOTALS INC EXP		-189.3				0.00			0.00
SUBTOTALS EXC EXP		-189.3				0.00			0.00

22.210- 22.500 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	175.	-260.9	-105.9	-48.8	0.	0.00	-73.8	0.	0.00
EXP	2.	-239.3	-84.3	-9.1	0.	0.00	-34.0	0.	0.00
SUBTOTALS INC EXP		-239.3				0.00			0.00
SUBTOTALS EXC EXP		-260.9				0.00			0.00

22.210- 22.500 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	753.	-221.5	-66.5	-15.8	0.	0.00	-40.8	0.	0.00
FB/MO	21.	-221.9	-66.9	11.2	21.	0.00	-13.8	0.	0.00
FB2	2.	-230.1	-75.1	0.1	2.	0.00	-24.8	0.	0.00
EC	128.	-231.1	-76.1	-21.2	0.	0.00	-46.1	0.	0.00
EXP	5.	-226.9	-71.9	-2.4	0.	0.00	-27.3	0.	0.00
SUBTOTALS INC EXP		-217.6				0.00			0.00
SUBTOTALS EXC EXP		-218.2				0.00			0.00
TOTAL INC EXP		-164.6				0.01			0.02
TOTAL EXC EXP		-186.8				0.01			0.01

TOTAL PERCENT OF AREA LOST INC EXP : 0.03% , EXC EXP : 0.02%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.151E+04 TO REACH INTERFERENCE THRESHOLD

23.600- 24.000 GHZ SENSING BAND, 400. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
3.90 m DIAMETER ANTENNA

23.600- 24.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-218.3	-61.3	17.7	2.	0.00	-7.3	0.	0.00
MO	2.	-162.2	-5.2	82.7	2.	0.00	57.7	2.	0.00
LR	12.	-175.8	-18.8	49.7	12.	0.00	24.7	12.	0.01
EXP	2.	-156.2	0.8	77.5	2.	0.00	52.5	2.	0.00
SUBTOTALS INC EXP		-155.2				0.00			0.01
SUBTOTALS EXC EXP		-162.0				0.00			0.01

23.600- 24.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-233.3	-76.3	14.1	2.	0.00	-10.9	0.	0.00
FX	72.	-212.0	-55.0	18.9	12.	0.00	-6.0	0.	0.00
FXO	102.	-243.2	-86.2	-17.5	0.	0.00	-42.4	0.	0.00
FAT	3.	-203.0	-46.0	46.0	3.	0.00	21.1	1.	0.00
LR	13.	-188.6	-31.6	40.2	9.	0.00	15.2	3.	0.00
EXP	13.	-215.9	-58.9	15.9	2.	0.00	-9.1	0.	0.00
SUBTOTALS INC EXP		-188.4				0.00			0.00
SUBTOTALS EXC EXP		-188.4				0.00			0.00

23.600- 24.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	1211.	-202.1	-45.1	29.6	306.	0.01	4.6	41.	0.03
FX	3.	-175.1	-18.1	57.7	3.	0.00	32.7	3.	0.00
FB	4.	-221.3	-64.3	27.4	2.	0.00	2.4	1.	0.00
EXP	11.	-190.4	-33.4	43.4	6.	0.00	18.5	2.	0.00
EXP	2.	-188.8	-31.8	50.0	2.	0.00	25.0	1.	0.00
SUBTOTALS INC EXP		-174.8				0.01			0.04
SUBTOTALS EXC EXP		-175.1				0.01			0.04

23.600- 24.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-239.2	-82.2	5.7	2.	0.00	-19.3	0.	0.00
FX	2.	-249.3	-92.3	-13.3	0.	0.00	-38.3	0.	0.00
EXP	4.	-216.6	-59.6	12.7	4.	0.00	-12.3	0.	0.00
SUBTOTALS INC EXP		-216.6				0.00			0.00
SUBTOTALS EXC EXP		-238.8				0.00			0.00

23.600- 24.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	511.	-226.1	-69.1	-17.3	0.	0.00	-42.3	0.	0.00
ANT	2.	-231.0	-74.0	0.9	2.	0.00	-24.1	0.	0.00
TC	67.	-215.1	-58.1	0.7	67.	0.00	-24.3	0.	0.00
TB	2.	-215.2	-58.2	21.7	2.	0.00	-3.3	0.	0.00
EXP	14.	-243.0	-86.0	-17.3	0.	0.00	-42.3	0.	0.00
EXP	70.	-192.8	-35.8	22.7	70.	0.00	-2.3	0.	0.00
SUBTOTALS INC EXP		-192.8				0.00			0.00
SUBTOTALS EXC EXP		-211.9				0.00			0.00
TOTAL INC EXP		-155.1				0.01			0.06
TOTAL EXC EXP		-161.8				0.01			0.05

TOTAL PERCENT OF AREA LOST INC EXP : 0.07% , EXC EXP : 0.06%

MULTIPLY THE NUMBER OF INTERFERERS BY 0.302E+01 TO REACH INTERFERENCE THRESHOLD

31.300- 31.800 GHZ SENSING BAND, 500. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 2.0 km RESOLUTION, -156.0 dBW INT THRESHOLD
2.95 m DIAMETER ANTENNA

31.300- 31.800 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-205.3	-49.3	29.2	2.	0.00	4.2	2.	0.00
MO	2.	-164.2	-8.2	79.2	2.	0.00	54.2	2.	0.00
EXP	6.	-183.2	-27.2	39.8	6.	0.00	14.9	6.	0.01
EXP	2.	-183.0	-27.0	49.2	2.	0.00	24.2	2.	0.00
EXP	2.	-153.0	3.0	79.2	2.	0.00	54.2	2.	0.00
SUBTOTALS INC EXP		-152.7				0.00			0.01
SUBTOTALS EXC EXP		-164.2				0.00			0.00

31.300- 31.800 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	52.	-210.0	-54.0	36.0	5.	0.00	11.0	2.	0.00
FB/MLR	5.	-229.9	-73.9	16.9	1.	0.00	-8.1	0.	0.00
FX	8.	-197.1	-41.1	37.2	2.	0.00	12.2	1.	0.00
EXP	7.	-203.8	-47.8	27.9	2.	0.00	2.9	0.	0.00
EXP	2.	-274.4	-118.4	-43.0	0.	0.00	-68.0	0.	0.00
SUBTOTALS INC EXP		-196.1				0.00			0.00
SUBTOTALS EXC EXP		-196.9				0.00			0.00

31.300- 31.800 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	61.	-207.0	-51.0	38.2	9.	0.00	13.2	3.	0.00
MR	12.	-201.3	-45.3	29.3	2.	0.00	4.4	1.	0.00
LR	15.	-197.8	-41.8	35.2	3.	0.00	10.3	1.	0.00
FX	12.	-225.4	-69.4	8.0	1.	0.00	-17.0	0.	0.00
EXP	11.	-170.1	-14.1	63.9	11.	0.00	38.9	3.	0.00
EXP	38.	-200.2	-44.2	31.5	5.	0.00	6.5	1.	0.00
SUBTOTALS INC EXP		-170.1				0.00			0.01
SUBTOTALS EXC EXP		-195.8				0.00			0.00

31.300- 31.800 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	159.	-215.0	-59.0	9.2	159.	0.01	-15.8	0.	0.00
LR/MR	31.	-218.0	-62.0	-0.8	0.	0.00	-25.8	0.	0.00
FX	5.	-254.9	-98.9	-26.8	0.	0.00	-51.8	0.	0.00
FX1	3.	-232.0	-76.0	-0.8	0.	0.00	-25.8	0.	0.00

ANT	2.	-221.8	-65.8	8.6	2.	0.00	-16.3	0.	0.00
RL	7.	-241.3	-85.3	-17.4	0.	0.00	-42.4	0.	0.00
EXP	34.	-205.6	-49.6	13.2	34.	0.00	-11.8	0.	0.00
EXP	5.	-226.1	-70.1	-0.8	0.	0.00	-25.8	0.	0.00
SUBTOTALS INC EXP		-204.8				0.01			0.00
SUBTOTALS EXC EXP		-212.6				0.01			0.00

31.300- 31.800 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	14506.	-208.4	-52.4	-3.8	0.	0.00	-28.8	0.	0.00
MR	7870.	-232.8	-76.8	-40.7	0.	0.00	-65.6	0.	0.00
LR	66.	-268.9	-112.9	-55.2	0.	0.00	-80.1	0.	0.00
PO	32828.	-200.6	-44.6	-13.8	0.	0.00	-38.8	0.	0.00
EXP	2.	-264.8	-108.8	-32.7	0.	0.00	-57.6	0.	0.00
EXP	8.	-224.1	-68.1	-0.8	0.	0.00	-25.8	0.	0.00
EXP	2.	-223.0	-67.0	9.2	2.	0.00	-15.8	0.	0.00
SUBTOTALS INC EXP		-199.9				0.00			0.00
SUBTOTALS EXC EXP		-199.9				0.00			0.00
TOTAL INC EXP		-152.6				0.01			0.02
TOTAL EXC EXP		-164.2				0.01			0.01

TOTAL PERCENT OF AREA LOST INC EXP : 0.03% , EXC EXP : 0.02%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.660E+01 TO REACH INTERFERENCE THRESHOLD

36.000- 37.000 GHZ SENSING BAND, 1000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -146.0 dBW INT THRESHOLD
5.09 m DIAMETER ANTENNA

36.000- 37.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	3.	-208.3	-62.3	17.8	3.	0.00	-7.9	0.	0.00
FX	2.	-150.4	-4.4	82.7	2.	0.00	57.0	2.	0.00
MO	5.	-190.9	-44.9	47.7	5.	0.00	22.0	5.	0.00
EXP	117.	-193.6	-47.6	15.3	117.	0.00	-10.4	0.	0.00
EXP	7.	-195.3	-49.3	29.5	7.	0.00	3.8	7.	0.00
EXP	2.	-178.4	-32.4	54.7	2.	0.00	29.0	2.	0.00
SUBTOTALS INC EXP		-150.3				0.00			0.00
SUBTOTALS EXC EXP		-150.3				0.00			0.00

36.000- 37.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	61.	-206.6	-60.6	35.2	16.	0.00	9.5	4.	0.00
MR	12.	-197.2	-51.2	32.5	4.	0.00	6.8	1.	0.00
LR	15.	-195.7	-49.7	36.9	5.	0.00	11.3	1.	0.00
FX	12.	-223.7	-77.7	9.4	1.	0.00	-16.3	0.	0.00
EXP	11.	-172.2	-26.2	60.9	11.	0.00	35.2	3.	0.00
EXP	38.	-200.3	-54.3	29.5	8.	0.00	3.8	1.	0.00
SUBTOTALS INC EXP		-172.2				0.00			0.00
SUBTOTALS EXC EXP		-193.2				0.00			0.00

36.000- 37.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	28.	-192.6	-46.6	51.0	16.	0.00	25.3	6.	0.00
FX	10.	-229.1	-83.1	4.1	1.	0.00	-21.6	0.	0.00
FXO	4.	-296.8	-150.8	-53.7	0.	0.00	-79.4	0.	0.00
EXP	31.	-218.1	-72.1	10.1	2.	0.00	-15.6	0.	0.00
EXP	6.	-211.4	-65.4	21.6	2.	0.00	-4.1	0.	0.00
SUBTOTALS INC EXP		-192.6				0.00			0.00
SUBTOTALS EXC EXP		-192.6				0.00			0.00

36.000- 37.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-217.2	-71.2	24.7	2.	0.00	-1.0	0.	0.00
FX	4.	-259.8	-113.8	-31.3	0.	0.00	-57.0	0.	0.00
EXP	7.	-227.8	-81.8	-4.2	0.	0.00	-29.9	0.	0.00
EXP	2.	-225.8	-79.8	7.7	2.	0.00	-18.0	0.	0.00
SUBTOTALS INC EXP		-216.3				0.00			0.00
SUBTOTALS EXC EXP		-217.2				0.00			0.00

36.000- 37.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	28.	-205.6	-59.6	24.7	28.	0.00	-1.0	0.	0.00
CAR/MLT	2.	-266.0	-120.0	-35.3	0.	0.00	-61.0	0.	0.00
FXO	691.	-227.7	-81.7	-22.3	0.	0.00	-48.0	0.	0.00
FB	2.	-235.4	-89.4	6.5	2.	0.00	-19.2	0.	0.00
ANT	2.	-224.9	-78.9	4.1	2.	0.00	-21.6	0.	0.00

EXP	12.	-233.4	-87.4	-12.3	0.	0.00	-38.0	0.	0.00
EXP	9.	-208.3	-62.3	14.7	9.	0.00	-11.0	0.	0.00
SUBTOTALS INC EXP		-203.7				0.00			0.00
SUBTOTALS EXC EXP		-205.5				0.00			0.00
TOTAL INC EXP		-150.3				0.00			0.01
TOTAL EXC EXP		-150.3				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.01% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.272E+01 TO REACH INTERFERENCE THRESHOLD

50.200- 50.400 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.37 m DIAMETER ANTENNA

50.200- 50.400 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-268.4	-111.4	6.9	2.	0.00	-18.0	0.	0.00
MO	2.	-249.0	-92.0	35.1	2.	0.00	10.2	2.	0.04
SUBTOTALS INC EXP		-249.0				0.00			0.04
SUBTOTALS EXC EXP		-249.0				0.00			0.04

50.200- 50.400 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-304.0	-147.0	-2.9	0.	0.00	-27.8	0.	0.00
FX	2.	-305.1	-148.1	-12.9	0.	0.00	-37.8	0.	0.00
FB2	2.	-308.4	-151.4	-35.4	0.	0.00	-60.3	0.	0.00
EXP	2.	-294.1	-137.1	-17.9	0.	0.00	-42.8	0.	0.00
EXP	2.	-317.9	-160.9	-44.9	0.	0.00	-69.8	0.	0.00
SUBTOTALS INC EXP		-293.2				0.00			0.00
SUBTOTALS EXC EXP		-300.7				0.00			0.00

50.200- 50.400 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-295.2	-138.2	-8.3	0.	0.00	-33.2	0.	0.00
FX	2.	-296.3	-139.3	-18.3	0.	0.00	-43.2	0.	0.00
PO	2.	-325.5	-168.5	-50.9	0.	0.00	-75.8	0.	0.00
SUBTOTALS INC EXP		-292.7				0.00			0.00
SUBTOTALS EXC EXP		-292.7				0.00			0.00

50.200- 50.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	30.	-273.3	-116.3	-34.9	0.	0.00	-59.8	0.	0.00
SUBTOTALS INC EXP		-273.3				0.00			0.00
SUBTOTALS EXC EXP		-273.3				0.00			0.00

50.200- 50.400 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
LR/MR	2.	-300.9	-143.9	-27.9	0.	0.00	-52.8	0.	0.00
RO	2.	-265.5	-108.5	5.7	2.	0.00	-19.2	0.	0.00
EXP	7.	-231.5	-74.5	5.7	7.	0.01	-19.2	0.	0.00
SUBTOTALS INC EXP		-231.5				0.01			0.00
SUBTOTALS EXC EXP		-265.5				0.00			0.00
TOTAL INC EXP		-231.4				0.01			0.04
TOTAL EXC EXP		-248.9				0.00			0.04

TOTAL PERCENT OF AREA LOST INC EXP : 0.05% , EXC EXP : 0.05%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.154E+10 TO REACH INTERFERENCE THRESHOLD

51.400- 59.000 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.34 m DIAMETER ANTENNA

51.400- 59.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-350.0	-193.0	24.3	2.	0.00	-0.6	0.	0.00
FX	2.	-350.0	-193.0	54.3	2.	0.00	29.4	2.	0.04
FB/MO	6.	-350.0	-193.0	35.3	6.	0.00	10.4	6.	0.13
MO	2.	-350.0	-193.0	34.3	2.	0.00	9.4	2.	0.04
EXP	41.	-350.0	-193.0	1.9	41.	0.03	-23.0	0.	0.00
EXP	10.	-350.0	-193.0	24.3	10.	0.01	-0.6	0.	0.00
EXP	4.	-350.0	-193.0	31.3	4.	0.00	6.4	4.	0.08
EXP	2.	-345.6	-188.6	71.3	2.	0.00	46.4	2.	0.04
SUBTOTALS INC EXP		-339.7				0.04			0.34
SUBTOTALS EXC EXP		-343.0				0.00			0.21

51.400- 59.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-35.7	0.	0.00	-60.6	0.	0.00
FX	2.	-350.0	-193.0	-45.7	0.	0.00	-70.6	0.	0.00
PO	2.	-350.0	-193.0	-51.7	0.	0.00	-76.6	0.	0.00
SUBTOTALS INC EXP		-344.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

51.400- 59.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-35.7	0.	0.00	-60.6	0.	0.00
FX	2.	-350.0	-193.0	-15.7	0.	0.00	-40.6	0.	0.00
FX	2.	-350.0	-193.0	-45.7	0.	0.00	-70.6	0.	0.00
FB2	2.	-350.0	-193.0	-31.7	0.	0.00	-56.6	0.	0.00
EXP	3.	-350.0	-193.0	-36.3	0.	0.00	-61.2	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.00
SUBTOTALS EXC EXP		-343.0				0.00			0.00

51.400- 59.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	89.	-350.0	-193.0	-6.9	0.	0.00	-31.8	0.	0.00
FB	10.	-350.0	-193.0	-13.9	0.	0.00	-38.8	0.	0.00
FX	7.	-350.0	-193.0	-43.9	0.	0.00	-68.8	0.	0.00
EXP	5.	-350.0	-193.0	-38.3	0.	0.00	-63.2	0.	0.00
SUBTOTALS INC EXP		-343.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

51.400- 59.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	40.	-350.0	-193.0	11.3	40.	0.03	-13.6	0.	0.00
FB	11.	-350.0	-193.0	-7.9	0.	0.00	-32.8	0.	0.00
FXO	206.	-350.0	-193.0	-18.7	0.	0.00	-43.6	0.	0.00
FX	15.	-350.0	-193.0	1.3	15.	0.01	-23.6	0.	0.00
FAT	2.	-350.0	-193.0	-17.7	0.	0.00	-42.6	0.	0.00
LR	6.	-350.0	-193.0	-58.7	0.	0.00	-83.6	0.	0.00
EXP	14.	-350.0	-193.0	-20.6	0.	0.00	-45.5	0.	0.00
EXP	5.	-350.0	-193.0	-5.7	0.	0.00	-30.6	0.	0.00
SUBTOTALS INC EXP		-340.5				0.05			0.00
SUBTOTALS EXC EXP		-341.5				0.05			0.00
TOTAL INC EXP		-334.5				0.09			0.34
TOTAL EXC EXP		-335.9				0.05			0.21

TOTAL PERCENT OF AREA LOST INC EXP : 0.43% , EXC EXP : 0.26%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.767E+18 TO REACH INTERFERENCE THRESHOLD

51.400- 51.600 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.36 m DIAMETER ANTENNA

51.400- 51.600 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-350.0	-193.0	24.9	2.	0.00	0.0	2.	0.04
FX	2.	-350.0	-193.0	54.9	2.	0.00	30.0	2.	0.04
FB/MO	6.	-350.0	-193.0	35.9	6.	0.00	11.0	6.	0.13
MO	2.	-350.0	-193.0	34.9	2.	0.00	10.0	2.	0.04
EXP	41.	-350.0	-193.0	2.5	41.	0.03	-22.4	0.	0.00
EXP	10.	-350.0	-193.0	24.9	10.	0.00	0.0	10.	0.21
EXP	4.	-350.0	-193.0	31.9	4.	0.00	7.0	4.	0.08
EXP	2.	-345.0	-188.0	71.9	2.	0.00	47.0	2.	0.04
SUBTOTALS INC EXP		-339.5				0.03			0.59
SUBTOTALS EXC EXP		-343.0				0.00			0.25

51.400- 51.600 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-8.5	0.	0.00	-33.4	0.	0.00
FX	2.	-350.0	-193.0	-18.5	0.	0.00	-43.4	0.	0.00
PO	2.	-350.0	-193.0	-33.3	0.	0.00	-58.2	0.	0.00
SUBTOTALS INC EXP		-344.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

51.400- 51.600 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-35.1	0.	0.00	-60.0	0.	0.00
FX	2.	-350.0	-193.0	-15.1	0.	0.00	-40.0	0.	0.00
FX	2.	-350.0	-193.0	-45.1	0.	0.00	-70.0	0.	0.00
FB2	2.	-350.0	-193.0	-31.1	0.	0.00	-56.0	0.	0.00

EXP	3.	-350.0	-193.0	-35.7	0.	0.00	-60.6	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.00
SUBTOTALS EXC EXP		-343.0				0.00			0.00

51.400- 51.600 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	89.	-350.0	-193.0	-6.3	0.	0.00	-31.2	0.	0.00
FB	10.	-350.0	-193.0	-13.3	0.	0.00	-38.2	0.	0.00
FX	7.	-350.0	-193.0	-43.3	0.	0.00	-68.2	0.	0.00
EXP	5.	-350.0	-193.0	-37.7	0.	0.00	-62.6	0.	0.00
SUBTOTALS INC EXP		-343.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

51.400- 51.600 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	40.	-350.0	-193.0	11.9	40.	0.03	-13.0	0.	0.00
FB	11.	-350.0	-193.0	-7.3	0.	0.00	-32.2	0.	0.00
FXO	206.	-350.0	-193.0	-18.1	0.	0.00	-43.0	0.	0.00
FX	15.	-350.0	-193.0	1.9	15.	0.01	-23.0	0.	0.00
FAT	2.	-350.0	-193.0	-17.1	0.	0.00	-42.0	0.	0.00
LR	6.	-350.0	-193.0	-58.1	0.	0.00	-83.0	0.	0.00
EXP	14.	-350.0	-193.0	-20.0	0.	0.00	-44.9	0.	0.00
EXP	5.	-350.0	-193.0	-5.1	0.	0.00	-30.0	0.	0.00
SUBTOTALS INC EXP		-340.5				0.05			0.00
SUBTOTALS EXC EXP		-341.5				0.05			0.00
TOTAL INC EXP		-334.4				0.08			0.59
TOTAL EXC EXP		-335.9				0.05			0.25

TOTAL PERCENT OF AREA LOST INC EXP : 0.67% , EXC EXP : 0.30%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.767E+18 TO REACH INTERFERENCE THRESHOLD

58.800- 59.000 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.32 m DIAMETER ANTENNA

58.800- 59.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-350.0	-193.0	23.8	2.	0.00	-1.1	0.	0.00
FX	2.	-350.0	-193.0	53.8	2.	0.00	28.9	2.	0.04
FB/MO	6.	-350.0	-193.0	34.8	6.	0.00	9.9	6.	0.13
MO	2.	-350.0	-193.0	33.8	2.	0.00	8.9	2.	0.04
EXP	41.	-350.0	-193.0	1.4	41.	0.03	-23.5	0.	0.00
EXP	10.	-350.0	-193.0	23.8	10.	0.01	-1.1	0.	0.00
EXP	4.	-350.0	-193.0	30.8	4.	0.00	5.9	4.	0.08
EXP	2.	-346.2	-189.2	70.8	2.	0.00	45.9	2.	0.04
SUBTOTALS INC EXP		-339.8				0.04			0.34
SUBTOTALS EXC EXP		-343.0				0.00			0.21

58.800- 59.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-36.2	0.	0.00	-61.1	0.	0.00
FX	2.	-350.0	-193.0	-46.2	0.	0.00	-71.1	0.	0.00
PO	2.	-350.0	-193.0	-52.2	0.	0.00	-77.1	0.	0.00
SUBTOTALS INC EXP		-344.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

58.800- 59.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	28.5	2.	0.00	3.6	1.	0.03
FX	2.	-350.0	-193.0	49.6	2.	0.00	24.7	2.	0.04
FX	2.	-350.0	-193.0	19.6	2.	0.00	-5.3	0.	0.00
FB2	2.	-350.0	-193.0	-32.2	0.	0.00	-57.1	0.	0.00
EXP	3.	-350.0	-193.0	-36.8	0.	0.00	-61.7	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.07
SUBTOTALS EXC EXP		-343.0				0.00			0.07

58.800- 59.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	89.	-350.0	-193.0	-7.4	0.	0.00	-32.3	0.	0.00
FB	10.	-350.0	-193.0	-14.4	0.	0.00	-39.3	0.	0.00
FX	7.	-350.0	-193.0	-44.4	0.	0.00	-69.3	0.	0.00
EXP	5.	-350.0	-193.0	-38.8	0.	0.00	-63.7	0.	0.00
SUBTOTALS INC EXP		-343.0				0.00			0.00
SUBTOTALS EXC EXP		-344.0				0.00			0.00

58.800- 59.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	40.	-350.0	-193.0	10.8	40.	0.03	-14.1	0.	0.00
FB	11.	-350.0	-193.0	-8.4	0.	0.00	-33.3	0.	0.00
FXO	206.	-350.0	-193.0	-19.2	0.	0.00	-44.1	0.	0.00
FX	15.	-350.0	-193.0	0.8	15.	0.01	-24.1	0.	0.00
FAT	2.	-350.0	-193.0	-18.2	0.	0.00	-43.1	0.	0.00
LR	6.	-350.0	-193.0	-59.2	0.	0.00	-84.1	0.	0.00
EXP	14.	-350.0	-193.0	-21.1	0.	0.00	-46.0	0.	0.00
EXP	5.	-350.0	-193.0	-6.2	0.	0.00	-31.1	0.	0.00
SUBTOTALS INC EXP		-340.5				0.05			0.00
SUBTOTALS EXC EXP		-341.5				0.05			0.00
TOTAL INC EXP		-334.5				0.09			0.41
TOTAL EXC EXP		-335.9				0.05			0.28

TOTAL PERCENT OF AREA LOST INC EXP : 0.50% , EXC EXP : 0.33%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.767E+18 TO REACH INTERFERENCE THRESHOLD

64.000- 65.000 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.29 m DIAMETER ANTENNA

64.000- 65.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-37.0	0.	0.00	-61.9	0.	0.00
FX	2.	-350.0	-193.0	-17.0	0.	0.00	-41.9	0.	0.00
FX	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
FB2	2.	-350.0	-193.0	-33.0	0.	0.00	-57.9	0.	0.00
EXP	3.	-350.0	-193.0	-37.6	0.	0.00	-62.5	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.00
SUBTOTALS EXC EXP		-343.0				0.00			0.00

64.000- 65.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	15.	-300.2	-143.2	-33.0	0.	0.00	-57.9	0.	0.00
FX	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
LR	2.	-350.0	-193.0	-60.0	0.	0.00	-84.9	0.	0.00
EXP	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
SUBTOTALS INC EXP		-300.2				0.00			0.00
SUBTOTALS EXC EXP		-300.2				0.00			0.00

64.000- 65.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
EXP	2.	-350.0	-193.0	-58.4	0.	0.00	-83.3	0.	0.00
SUBTOTALS INC EXP		-347.0				0.00			0.00
SUBTOTALS EXC EXP		-350.0				0.00			0.00

64.000- 65.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	4.	-324.2	-167.2	-30.0	0.	0.00	-54.9	0.	0.00
EXP	2.	-350.0	-193.0	-43.0	0.	0.00	-67.9	0.	0.00
SUBTOTALS INC EXP		-324.2				0.00			0.00
SUBTOTALS EXC EXP		-324.2				0.00			0.00
TOTAL INC EXP		-300.2				0.00			0.00
TOTAL EXC EXP		-300.2				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.207E+15 TO REACH INTERFERENCE THRESHOLD

64.000- 64.200 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.29 m DIAMETER ANTENNA

64.000- 64.200 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-37.0	0.	0.00	-61.9	0.	0.00
FX	2.	-350.0	-193.0	-17.0	0.	0.00	-41.9	0.	0.00
FX	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
FB2	2.	-350.0	-193.0	-33.0	0.	0.00	-57.9	0.	0.00
EXP	3.	-350.0	-193.0	-37.6	0.	0.00	-62.5	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.00
SUBTOTALS EXC EXP		-343.0				0.00			0.00

64.000- 64.200 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	15.	-300.1	-143.1	-33.0	0.	0.00	-57.9	0.	0.00
FX	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
LR	2.	-350.0	-193.0	-60.0	0.	0.00	-84.9	0.	0.00
EXP	2.	-350.0	-193.0	-47.0	0.	0.00	-71.9	0.	0.00
SUBTOTALS INC EXP		-300.1				0.00			0.00
SUBTOTALS EXC EXP		-300.1				0.00			0.00

64.000- 64.200 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
EXP	2.	-350.0	-193.0	-58.4	0.	0.00	-83.3	0.	0.00
SUBTOTALS INC EXP		-347.0				0.00			0.00
SUBTOTALS EXC EXP		-350.0				0.00			0.00

64.000- 64.200 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	4.	-324.2	-167.2	-30.0	0.	0.00	-54.9	0.	0.00
EXP	2.	-350.0	-193.0	-43.0	0.	0.00	-67.9	0.	0.00
SUBTOTALS INC EXP		-324.2				0.00			0.00
SUBTOTALS EXC EXP		-324.2				0.00			0.00
TOTAL INC EXP		-300.1				0.00			0.00
TOTAL EXC EXP		-300.1				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.204E+15 TO REACH INTERFERENCE THRESHOLD

64.800- 65.000 GHZ SENSING BAND, 200. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 10.0 km RESOLUTION, -157.0 dBW INT THRESHOLD
0.29 m DIAMETER ANTENNA

64.800- 65.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-193.0	-37.1	0.	0.00	-62.0	0.	0.00
FX	2.	-350.0	-193.0	-17.1	0.	0.00	-42.0	0.	0.00
FX	2.	-350.0	-193.0	-47.1	0.	0.00	-72.0	0.	0.00
FB2	2.	-350.0	-193.0	-33.1	0.	0.00	-58.0	0.	0.00
EXP	3.	-350.0	-193.0	-37.7	0.	0.00	-62.6	0.	0.00
SUBTOTALS INC EXP		-342.2				0.00			0.00
SUBTOTALS EXC EXP		-343.0				0.00			0.00

64.800- 65.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	15.	-300.2	-143.2	-33.1	0.	0.00	-58.0	0.	0.00
FX	2.	-350.0	-193.0	-47.1	0.	0.00	-72.0	0.	0.00
LR	2.	-350.0	-193.0	-60.1	0.	0.00	-85.0	0.	0.00
EXP	2.	-350.0	-193.0	-47.1	0.	0.00	-72.0	0.	0.00
SUBTOTALS INC EXP		-300.2				0.00			0.00
SUBTOTALS EXC EXP		-300.2				0.00			0.00

64.800- 65.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
EXP	2.	-350.0	-193.0	-58.5	0.	0.00	-83.4	0.	0.00
SUBTOTALS INC EXP		-347.0				0.00			0.00
SUBTOTALS EXC EXP		-350.0				0.00			0.00

64.800- 65.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	4.	-324.3	-167.3	-30.1	0.	0.00	-55.0	0.	0.00
EXP	2.	-350.0	-193.0	-43.1	0.	0.00	-68.0	0.	0.00
SUBTOTALS INC EXP		-324.3				0.00			0.00
SUBTOTALS EXC EXP		-324.3				0.00			0.00
TOTAL INC EXP		-300.2				0.00			0.00
TOTAL EXC EXP		-300.2				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.209E+15 TO REACH INTERFERENCE THRESHOLD

86.000- 92.000 GHZ SENSING BAND, 6000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -138.0 dBW INT THRESHOLD
2.09 m DIAMETER ANTENNA

86.000- 92.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-208.6	-70.6	21.9	2.	0.00	-3.7	0.	0.00
FB2	2.	-204.5	-66.5	23.7	2.	0.00	-1.9	0.	0.00
SUBTOTALS INC EXP		-203.1				0.00			0.00
SUBTOTALS EXC EXP		-203.1				0.00			0.00

86.000- 92.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	86.	-198.7	-60.7	31.2	86.	0.00	5.5	13.	0.00
FX	7.	-212.8	-74.8	16.6	4.	0.00	-9.1	0.	0.00
FB2	2.	-211.9	-73.9	22.5	2.	0.00	-3.2	0.	0.00
SUBTOTALS INC EXP		-198.4				0.00			0.00
SUBTOTALS EXC EXP		-198.4				0.00			0.00

86.000- 92.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	6.	-213.0	-75.0	27.3	6.	0.00	1.7	1.	0.00
MR	2.	-245.2	-107.2	-16.1	0.	0.00	-41.8	0.	0.00
RLT	2.	-187.4	-49.4	47.3	2.	0.00	21.7	2.	0.00
FX	5.	-234.2	-96.2	-10.0	0.	0.00	-35.7	0.	0.00
EXP	23.	-204.5	-66.5	17.4	19.	0.00	-8.2	0.	0.00
EXP	13.	-187.0	-49.0	36.1	13.	0.00	10.4	7.	0.00
SUBTOTALS INC EXP		-184.1				0.00			0.00
SUBTOTALS EXC EXP		-187.4				0.00			0.00

86.000- 92.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	25.	-237.6	-99.6	-11.1	0.	0.00	-36.7	0.	0.00
FBR/MLR	10.	-245.6	-107.6	-14.1	0.	0.00	-39.7	0.	0.00
FB	11.	-243.4	-105.4	-12.3	0.	0.00	-37.9	0.	0.00
EXP	3.	-260.8	-122.8	-33.4	0.	0.00	-59.1	0.	0.00
EXP	22.	-233.5	-95.5	-17.1	0.	0.00	-42.7	0.	0.00
SUBTOTALS INC EXP		-231.6				0.00			0.00
SUBTOTALS EXC EXP		-236.1				0.00			0.00

86.000- 92.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	8.	-241.0	-103.0	-8.5	0.	0.00	-34.1	0.	0.00
EXP	2.	-282.5	-144.5	-51.1	0.	0.00	-76.7	0.	0.00
EXP	2.	-259.3	-121.3	-31.1	0.	0.00	-56.7	0.	0.00
SUBTOTALS INC EXP		-240.9				0.00			0.00
SUBTOTALS EXC EXP		-241.0				0.00			0.00
TOTAL INC EXP		-183.9				0.00			0.00
TOTAL EXC EXP		-186.9				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.01% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.784E+05 TO REACH INTERFERENCE THRESHOLD

100.000-102.000 GHZ SENSING BAND, 1000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.84 m DIAMETER ANTENNA

100.000-102.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-209.4	-59.4	42.8	2.	0.00	17.2	2.	0.00
FX	2.	-213.6	-63.6	29.8	2.	0.00	4.2	2.	0.00
SUBTOTALS INC EXP		-208.0				0.00			0.00
SUBTOTALS EXC EXP		-208.0				0.00			0.00

100.000-102.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-206.6	-56.6	36.8	2.	0.00	11.2	2.	0.00
FB	2.	-250.4	-100.4	15.7	2.	0.00	-9.9	0.	0.00
FBT	2.	-248.6	-98.6	17.5	2.	0.00	-8.1	0.	0.00
EXP	17.	-227.4	-77.4	24.1	4.	0.00	-1.5	0.	0.00
EXP	5.	-271.3	-121.3	-15.1	0.	0.00	-40.8	0.	0.00
SUBTOTALS INC EXP		-206.6				0.00			0.00
SUBTOTALS EXC EXP		-206.6				0.00			0.00

100.000-102.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-247.6	-97.6	18.3	2.	0.00	-7.3	0.	0.00

EXP	2.	-263.4	-113.4	-10.7	0.	0.00	-36.4	0.	0.00
SUBTOTALS INC EXP		-247.5				0.00			0.00
SUBTOTALS EXC EXP		-247.6				0.00			0.00

100.000-102.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-259.4	-109.4	-7.2	0.	0.00	-32.8	0.	0.00
FX	2.	-260.6	-110.6	-17.2	0.	0.00	-42.8	0.	0.00
EXP	2.	-234.5	-84.5	9.8	2.	0.00	-15.8	0.	0.00
EXP	2.	-258.3	-108.3	-17.2	0.	0.00	-42.8	0.	0.00
SUBTOTALS INC EXP		-234.4				0.00			0.00
SUBTOTALS EXC EXP		-257.0				0.00			0.00

100.000-102.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
LR/MR	2.	-261.3	-111.3	-20.2	0.	0.00	-45.8	0.	0.00
FX	3.	-241.0	-91.0	-0.7	0.	0.00	-26.3	0.	0.00
EXP	22.	-222.2	-72.2	3.0	22.	0.00	-22.7	0.	0.00
SUBTOTALS INC EXP		-222.1				0.00			0.00
SUBTOTALS EXC EXP		-241.0				0.00			0.00
TOTAL INC EXP		-204.1				0.00			0.00
TOTAL EXC EXP		-204.2				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.265E+06 TO REACH INTERFERENCE THRESHOLD

100.000-101.000 GHZ SENSING BAND, 1000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.85 m DIAMETER ANTENNA

100.000-101.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-209.4	-59.4	42.9	2.	0.00	17.2	2.	0.00
FX	2.	-213.5	-63.5	29.9	2.	0.00	4.2	2.	0.00
SUBTOTALS INC EXP		-208.0				0.00			0.00
SUBTOTALS EXC EXP		-208.0				0.00			0.00

100.000-101.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-206.5	-56.5	36.9	2.	0.00	11.2	2.	0.00
FB	2.	-215.4	-65.4	36.9	2.	0.00	11.2	2.	0.00
FBT	2.	-213.6	-63.6	38.7	2.	0.00	13.0	2.	0.00
EXP	17.	-196.5	-46.5	43.7	6.	0.00	18.1	2.	0.00
EXP	5.	-247.2	-97.2	-0.9	0.	0.00	-26.6	0.	0.00
SUBTOTALS INC EXP		-196.0				0.00			0.00
SUBTOTALS EXC EXP		-205.3				0.00			0.00

100.000-101.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-265.4	-115.4	4.4	2.	0.00	-21.2	0.	0.00
EXP	2.	-275.0	-125.0	-19.4	0.	0.00	-45.0	0.	0.00
SUBTOTALS INC EXP		-265.0				0.00			0.00
SUBTOTALS EXC EXP		-265.4				0.00			0.00

100.000-101.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-259.4	-109.4	-7.1	0.	0.00	-32.8	0.	0.00
FX	2.	-260.5	-110.5	-17.1	0.	0.00	-42.8	0.	0.00
EXP	2.	-234.4	-84.4	9.9	2.	0.00	-15.8	0.	0.00
EXP	2.	-258.2	-108.2	-17.1	0.	0.00	-42.8	0.	0.00
SUBTOTALS INC EXP		-234.4				0.00			0.00
SUBTOTALS EXC EXP		-256.9				0.00			0.00

100.000-101.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
LR/MR	2.	-261.2	-111.2	-20.1	0.	0.00	-45.8	0.	0.00
FX	3.	-241.0	-91.0	-0.6	0.	0.00	-26.3	0.	0.00
EXP	22.	-222.1	-72.1	3.0	22.	0.00	-22.7	0.	0.00
SUBTOTALS INC EXP		-222.1				0.00			0.00
SUBTOTALS EXC EXP		-240.9				0.00			0.00
TOTAL INC EXP		-195.7				0.00			0.00
TOTAL EXC EXP		-203.4				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.220E+06 TO REACH INTERFERENCE THRESHOLD

101.000-102.000 GHZ SENSING BAND, 1000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.83 m DIAMETER ANTENNA

101.000-102.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-209.5	-59.5	42.8	2.	0.00	17.1	2.	0.00
FX	2.	-213.6	-63.6	29.8	2.	0.00	4.1	2.	0.00
SUBTOTALS INC EXP		-208.0				0.00			0.00
SUBTOTALS EXC EXP		-208.0				0.00			0.00

101.000-102.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-206.6	-56.6	36.8	2.	0.00	11.1	2.	0.00
FB	2.	-268.4	-118.4	1.6	2.	0.00	-24.0	0.	0.00
FBT	2.	-266.6	-116.6	3.4	2.	0.00	-22.2	0.	0.00
EXP	17.	-241.7	-91.7	11.5	3.	0.00	-14.2	0.	0.00
EXP	5.	-283.5	-133.5	-25.2	0.	0.00	-50.9	0.	0.00
SUBTOTALS INC EXP		-206.6				0.00			0.00
SUBTOTALS EXC EXP		-206.6				0.00			0.00

101.000-102.000 GHZ SENSING BAND, UPPER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-212.9	-62.9	39.3	2.	0.00	13.7	2.	0.00
EXP	2.	-242.9	-92.9	1.0	1.	0.00	-24.7	0.	0.00
SUBTOTALS INC EXP		-212.9				0.00			0.00
SUBTOTALS EXC EXP		-212.9				0.00			0.00

101.000-102.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-259.5	-109.5	-7.2	0.	0.00	-32.9	0.	0.00
FX	2.	-260.6	-110.6	-17.2	0.	0.00	-42.9	0.	0.00
EXP	2.	-234.5	-84.5	9.8	2.	0.00	-15.9	0.	0.00
EXP	2.	-258.3	-108.3	-17.2	0.	0.00	-42.9	0.	0.00
SUBTOTALS INC EXP		-234.5				0.00			0.00
SUBTOTALS EXC EXP		-257.0				0.00			0.00

101.000-102.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
LR/MR	2.	-261.3	-111.3	-20.2	0.	0.00	-45.9	0.	0.00
FX	3.	-241.1	-91.1	-0.7	0.	0.00	-26.4	0.	0.00
EXP	22.	-222.2	-72.2	2.9	22.	0.00	-22.8	0.	0.00
SUBTOTALS INC EXP		-222.1				0.00			0.00
SUBTOTALS EXC EXP		-241.0				0.00			0.00
TOTAL INC EXP		-203.6				0.00			0.00
TOTAL EXC EXP		-203.7				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.235E+06 TO REACH INTERFERENCE THRESHOLD

105.000-126.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.61 m DIAMETER ANTENNA

105.000-126.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
EXP	11.	-193.2	-43.2	31.7	11.	0.00	6.0	11.	0.00
SUBTOTALS INC EXP		-193.2				0.00			0.00
SUBTOTALS EXC EXP		-350.0				0.00			0.00

105.000-126.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-274.0	-124.0	-28.3	0.	0.00	-54.0	0.	0.00
EXP	2.	-272.9	-122.9	-38.3	0.	0.00	-64.0	0.	0.00
SUBTOTALS INC EXP		-270.4				0.00			0.00
SUBTOTALS EXC EXP		-274.0				0.00			0.00

105.000-126.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-253.0	-103.0	-7.3	0.	0.00	-33.0	0.	0.00
FX	3.	-251.3	-101.3	-17.3	0.	0.00	-43.0	0.	0.00
FB2	2.	-240.5	-90.5	-4.3	0.	0.00	-30.0	0.	0.00
EXP	9.	-265.0	-115.0	-40.7	0.	0.00	-66.4	0.	0.00

SUBTOTALS INC EXP	-240.0					0.00				0.00
SUBTOTALS EXC EXP	-240.0					0.00				0.00

105.000-126.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	32.	-233.2	-83.2	0.5	32.	0.00	-25.2	0.	0.00
LR/MR	5.	-250.2	-100.2	-21.3	0.	0.00	-47.0	0.	0.00
MLT	2.	-235.1	-85.1	-0.5	0.	0.00	-26.2	0.	0.00
FX	30.	-263.7	-113.7	-41.3	0.	0.00	-67.0	0.	0.00
FXO	4.	-286.6	-136.6	-54.3	0.	0.00	-80.0	0.	0.00
EXP	24.	-246.9	-96.9	-24.3	0.	0.00	-50.0	0.	0.00
EXP	47.	-257.5	-107.5	-40.7	0.	0.00	-66.4	0.	0.00
SUBTOTALS INC EXP		-230.9				0.00			0.00
SUBTOTALS EXC EXP		-231.0				0.00			0.00
TOTAL INC EXP		-193.2				0.00			0.00
TOTAL EXC EXP		-230.5				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.112E+09 TO REACH INTERFERENCE THRESHOLD

105.000-107.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.75 m DIAMETER ANTENNA

105.000-107.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
EXP	11.	-192.4	-42.4	32.4	11.	0.00	6.8	11.	0.00
SUBTOTALS INC EXP		-192.4				0.00			0.00
SUBTOTALS EXC EXP		-350.0				0.00			0.00

105.000-107.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-270.7	-120.7	-5.6	0.	0.00	-31.3	0.	0.00
EXP	2.	-224.4	-74.4	12.9	1.	0.00	-12.7	0.	0.00
SUBTOTALS INC EXP		-224.4				0.00			0.00
SUBTOTALS EXC EXP		-270.7				0.00			0.00

105.000-107.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-252.3	-102.3	-6.6	0.	0.00	-32.2	0.	0.00
FX	3.	-250.6	-100.6	-16.6	0.	0.00	-42.2	0.	0.00
FB2	2.	-239.8	-89.8	-3.6	0.	0.00	-29.2	0.	0.00
EXP	9.	-264.3	-114.3	-40.0	0.	0.00	-65.6	0.	0.00
SUBTOTALS INC EXP		-239.2				0.00			0.00
SUBTOTALS EXC EXP		-239.2				0.00			0.00

105.000-107.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	32.	-232.5	-82.5	1.2	32.	0.00	-24.4	0.	0.00
LR/MR	5.	-249.4	-99.4	-20.6	0.	0.00	-46.2	0.	0.00
MLT	2.	-234.4	-84.4	0.2	2.	0.00	-25.4	0.	0.00
FX	30.	-262.9	-112.9	-40.6	0.	0.00	-66.2	0.	0.00
FXO	4.	-285.8	-135.8	-53.6	0.	0.00	-79.2	0.	0.00
EXP	24.	-246.2	-96.2	-23.6	0.	0.00	-49.2	0.	0.00
EXP	47.	-256.7	-106.7	-40.0	0.	0.00	-65.6	0.	0.00
SUBTOTALS INC EXP		-230.1				0.00			0.00
SUBTOTALS EXC EXP		-230.3				0.00			0.00
TOTAL INC EXP		-192.4				0.00			0.00
TOTAL EXC EXP		-229.7				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.940E+08 TO REACH INTERFERENCE THRESHOLD

124.000-126.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.49 m DIAMETER ANTENNA

124.000-126.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	10.	-215.5	-65.5	12.0	10.	0.00	-13.7	0.	0.00
MO	10.	-198.2	-48.2	41.0	10.	0.00	15.3	10.	0.00
EXP	11.	-193.9	-43.9	31.0	11.	0.00	5.3	11.	0.00
SUBTOTALS INC EXP		-192.5				0.00			0.00
SUBTOTALS EXC EXP		-198.1				0.00			0.00

124.000-126.000 GHZ SENSING BAND, LOWER ADJACENT BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-274.7	-124.7	-29.0	0.	0.00	-54.7	0.	0.00
EXP	2.	-273.6	-123.6	-39.0	0.	0.00	-64.7	0.	0.00
SUBTOTALS INC EXP		-271.1				0.00			0.00
SUBTOTALS EXC EXP		-274.7				0.00			0.00

124.000-126.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-253.7	-103.7	-8.0	0.	0.00	-33.7	0.	0.00
FX	3.	-252.0	-102.0	-18.0	0.	0.00	-43.7	0.	0.00
FB2	2.	-241.2	-91.2	-5.0	0.	0.00	-30.7	0.	0.00
EXP	9.	-265.7	-115.7	-41.4	0.	0.00	-67.1	0.	0.00
SUBTOTALS INC EXP		-240.6				0.00			0.00
SUBTOTALS EXC EXP		-240.7				0.00			0.00

124.000-126.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB/MO	32.	-233.9	-83.9	-0.2	0.	0.00	-25.9	0.	0.00
LR/MR	5.	-250.9	-100.9	-22.0	0.	0.00	-47.7	0.	0.00
MLT	2.	-235.8	-85.8	-1.2	0.	0.00	-26.9	0.	0.00
FX	30.	-264.4	-114.4	-42.0	0.	0.00	-67.7	0.	0.00
FXO	4.	-287.3	-137.3	-55.0	0.	0.00	-80.7	0.	0.00
EXP	24.	-247.6	-97.6	-25.0	0.	0.00	-50.7	0.	0.00
EXP	47.	-258.2	-108.2	-41.4	0.	0.00	-67.1	0.	0.00
SUBTOTALS INC EXP		-231.6				0.00			0.00
SUBTOTALS EXC EXP		-231.7				0.00			0.00
TOTAL INC EXP		-192.5				0.00			0.00
TOTAL EXC EXP		-198.1				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.649E+05 TO REACH INTERFERENCE THRESHOLD

150.000-151.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.24 m DIAMETER ANTENNA

150.000-151.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FX	2.	-244.3	-94.3	9.4	2.	0.00	-16.3	0.	0.00
MO	2.	-223.1	-73.1	39.4	2.	0.00	13.7	2.	0.00
SUBTOTALS INC EXP		-223.1				0.00			0.00
SUBTOTALS EXC EXP		-223.1				0.00			0.00

150.000-151.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-273.1	-123.1	-10.6	0.	0.00	-36.3	0.	0.00
FX	2.	-274.3	-124.3	-20.6	0.	0.00	-46.3	0.	0.00
PO	2.	-279.6	-129.6	-26.6	0.	0.00	-52.3	0.	0.00
EXP	2.	-248.2	-98.2	6.4	2.	0.00	-19.3	0.	0.00
EXP	2.	-272.0	-122.0	-20.6	0.	0.00	-46.3	0.	0.00
SUBTOTALS INC EXP		-248.2				0.00			0.00
SUBTOTALS EXC EXP		-270.2				0.00			0.00
TOTAL INC EXP		-223.1				0.00			0.00
TOTAL EXC EXP		-223.1				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.204E+08 TO REACH INTERFERENCE THRESHOLD

164.000-168.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.12 m DIAMETER ANTENNA

164.000-168.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-240.3	-90.3	38.5	2.	0.00	12.9	2.	0.00
SUBTOTALS INC EXP		-240.3				0.00			0.00
SUBTOTALS EXC EXP		-240.3				0.00			0.00

164.000-168.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	14.	-261.7	-111.7	-9.1	0.	0.00	-34.7	0.	0.00
FX1	2.	-291.4	-141.4	-21.4	0.	0.00	-47.0	0.	0.00

SUBTOTALS INC EXP	-261.7					0.00					0.00
SUBTOTALS EXC EXP	-261.7					0.00					0.00
TOTAL INC EXP	-240.3					0.00					0.00
TOTAL EXC EXP	-240.3					0.00					0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.107E+10 TO REACH INTERFERENCE THRESHOLD

182.000-185.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
1.01 m DIAMETER ANTENNA

182.000-185.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 1

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-350.0	-200.0	-13.5	0.	0.00	-39.2	0.	0.00
FX	3.	-350.0	-200.0	-45.3	0.	0.00	-71.0	0.	0.00
EXP	2.	-350.0	-200.0	-53.7	0.	0.00	-79.4	0.	0.00
EXP	4.	-318.8	-168.8	-5.3	0.	0.00	-31.0	0.	0.00
SUBTOTALS INC EXP		-318.8				0.00			0.00
SUBTOTALS EXC EXP		-345.2				0.00			0.00

182.000-185.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
FB2	2.	-350.0	-200.0	-8.3	0.	0.00	-34.0	0.	0.00
SUBTOTALS INC EXP		-347.0				0.00			0.00
SUBTOTALS EXC EXP		-347.0				0.00			0.00
TOTAL INC EXP		-318.8				0.00			0.00
TOTAL EXC EXP		-342.2				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.167E+20 TO REACH INTERFERENCE THRESHOLD

217.000-231.0 00 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
0.83 m DIAMETER ANTENNA

217.000-231.000 GHZ SENSING BAND, IN BAND INTERFERERS

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-249.7	-99.7	35.9	2.	0.00	10.3	2.	0.00
EXP	10.	-217.7	-67.7	25.9	10.	0.00	0.3	10.	0.00
SUBTOTALS INC EXP		-217.7				0.00			0.00
SUBTOTALS EXC EXP		-249.7				0.00			0.00

217.000-231.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-299.7	-149.7	-14.1	0.	0.00	-39.7	0.	0.00
FX	2.	-300.9	-150.9	-24.1	0.	0.00	-49.7	0.	0.00
FXO	1000.	-227.9	-77.9	-7.1	0.	0.00	-32.7	0.	0.00
EXP	3.	-310.3	-160.3	-47.1	0.	0.00	-72.7	0.	0.00
EXP	2.	-298.6	-148.6	-24.1	0.	0.00	-49.7	0.	0.00
SUBTOTALS INC EXP		-227.9				0.00			0.00
SUBTOTALS EXC EXP		-227.9				0.00			0.00
TOTAL INC EXP		-217.3				0.00			0.00
TOTAL EXC EXP		-227.9				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.610E+08 TO REACH INTERFERENCE THRESHOLD

275.000-277.000 GHZ SENSING BAND, 2000. MHZ BANDWIDTH, 4 RECEIVER POLES,
70.00 dB MAXIMUM ATTEN, 1.0 km RESOLUTION, -150.0 dBW INT THRESHOLD
0.67 m DIAMETER ANTENNA

275.000-277.000 GHZ SENSING BAND, SUBHARMONIC NUMBER 2

STC	NINT	PR	SSIM	MLIM	NML	%AL ML	FLIM	NFL	%AL FL
MO	2.	-349.6	-199.6	-27.1	0.	0.00	-52.8	0.	0.00
FX	3.	-334.7	-184.7	-48.9	0.	0.00	-74.6	0.	0.00
EXP	3.	-309.5	-159.5	-25.9	0.	0.00	-51.6	0.	0.00
EXP	2.	-323.5	-173.5	-8.9	0.	0.00	-34.6	0.	0.00
SUBTOTALS INC EXP		-309.3				0.00			0.00
SUBTOTALS EXC EXP		-334.4				0.00			0.00
TOTAL INC EXP		-309.3				0.00			0.00
TOTAL EXC EXP		-334.3				0.00			0.00

TOTAL PERCENT OF AREA LOST INC EXP : 0.00% , EXC EXP : 0.00%
MULTIPLY THE NUMBER OF INTERFERERS BY 0.270E+19 TO REACH INTERFERENCE THRESHOLD