LAW OFFICES
GOLDBERG, GODLES, WIENER & WRIGHT
1229 NINETEENTH STREET, N.W.
WASHINGTON, D.C. 20036

HENRY GOLDBERG
JOSEPH A. GODLES
JONATHAN WIENER
MICHAEL A. MCCOIN

HENRIETTA WRIGHT
THOMAS G. GHERARDI, P.C.
COUNSEL

(202) 429-4900
TELECOPIER:
(202) 429-4912
general@g2w2.com

April 16, 2002

EX PARTE

William F. Caton, Acting Secretary
Federal Communications Commission
The Portals Building
445 12th Street, SW TW-A325
Washington, D.C. 20554

Re: ET Docket 01-278
RM-9375; RM-10051

Dear Mr. Caton:

On April 15, 2002, individuals representing Hughes Network Systems, Inc. (Joslyn Reed, Bob Kepley, Ken Sahai, Eryx Malcolm and Steve McPhilmy), Loral Space & Communications Ltd. (Young Lee), PanAmSat Corporation (Joseph Godles), the Satellite Industry Association (Richard DalBello), and SES Americom, Inc. (Nancy Eskenazi and Stanley Russo) met with Julius Knapp, Geraldine Matise, Karen Rackley and Hugh VanTuyl of the Office of Engineering & Technology and with Bob Nelson of the International Bureau concerning the above-referenced proceeding. The attached document was presented and discussed at the meeting.

Sincerely,

/s/ Joseph A. Godles
Joseph A. Godles
Attorney for PanAmSat Corporation

Attachment
cc: Julius Knapp
Geraldine Matise
Karen Rackley
Hugh VanTuyl
Bob Nelson

Satellite Industry Association

Ex Parte Presentation
Part 15 NPRM on Radar Detector Interference to Satellite Earth Stations

Monday, April 15, 2002

Introduction

- Concrete Evidence of Interference
- Measurements
- Calculations
- RADAR Comments
- Conclusions

Concrete Evidence

Auto Parts Store – Jackson, Michigan:

- HNS Field Service began to visit this site on November 12, 2001 to resolve problems with the HNS DirecPC relay.
- On December 17, 2001, a spectrum analyzer was shipped to the site and a field technician identified a radar detector in a vehicle parked next door as the source of the interference. The owner of the vehicle was located and the radar detector was powered off. The interference disappeared and the auto parts store was restored to service.
- On January 14, 2002, the store's system went off line again. The store manager reported that he saw the same vehicle with the radar detector parked next door and asked the owner if they would unplug the device. The owner refused to power off the radar detector and told the store manager to talk to her lawyer if he wanted it turned off.

Concrete Evidence (Continued)

Educational Network - Klamath Falls, Oregon:

- This SES Americom site experienced occasional loss of synchronization on a digital video carrier between 1997 and 1998. In response to repeated customer complaints, an Americom technician installed a remote controlled spectrum analyzer that captured high levels of spurious signals in the satellite passband and on top of the digital carrier. In a subsequent visit to the site, the technician identified the interference source by using a manually steerable antenna and determined it to be a vehicle equipped with a radar detector in a nearby parking lot. In one case the vehicle was 75 feet from the antenna.
- There was no practical technical solution in this instance. A sign was posted in the parking lot to remind drivers to turn off the devices. The site video-conference coordinator was trained to recognize the symptoms and when such symptoms were observed, she would search the parking lot and ask that they turn off their radar detectors.

Concrete Evidence (Continued)

Law Enforcement Agency – McAllen, Texas:

- HNS Field Service began to visit this site on December 11, 2001 to investigate extended outages in the customer's VSAT system.
- On January 15, 2002, a spectrum analyzer was shipped to the site and a field technician identified a radar detector in a vehicle parked nearby as the cause of the interference. The owner of the vehicle was found, the radar detector was powered off and the VSAT came back on line.

Concrete Evidence (Continued)

Parking lot – Ellenwood, Georgia:

- In July 2000, a PanAmSat TT&C antenna fell out of sync with PAS-9, the satellite it was controlling. It took several days for PanAmSat to trace the interference to a radar detector located in a PanAmSat employee's car, which was parked in the lot used by PanAmSat's employees. PanAmSat was able to resynchronize the link once the radar detector was powered off

Concrete Evidence (Continued)

Stock Brokerage – Metropolis, Illinois:

- HNS Field Service was dispatched to this site beginning on October 23, 2001 to resolve problems with lost data and video. A spectrum analyzer was brought to the site and radio frequency interference was found. Using the spectrum analyzer, the source of the interference was determined to be a radar detector in a car parked next door. The owner of the vehicle was found and the radar detector was powered off. The interference disappeared and the site came back online.

Concrete Evidence (Continued)

Car Rental – Mesquite, Texas:

- HNS Field Service was dispatched to this site beginning on December 31, 2001 to resolve problems with the customer losing data packets.
- On January 7, 2002, a spectrum analyzer was shipped to the site to check for radio frequency interference. A radar detector was found in a vehicle in the parking lot and identified as the source of the interference. The radar detector was powered off and the interference disappeared.

Concrete Evidence (Continued)

National News Organization – New York, NY

- In 2001, Loral Skynet and one of its customers jointly investigated an interference problem to a TV satellite news gathering (SNG) system.
- The customer, an FCC licensee, uses a 4.5-m antenna located on a rooftop to receive TV feeds from news trucks located across the U.S., Puerto Rico, and the U.S. Virgin Islands.
- A consulting firm specializing in frequency protection and interference investigation determined that the interference was coming from radar detectors in cars parked in a multi-story parking garage located across the street. The radar detectors were connected to cigarette lighter plugs that remained powered when the car ignition was turned off, causing continuous interference until the cars left the garage.
- In order to protect itself, the customer was required to absorb the significant costs, in time and money, to investigate the problem and construct shielding in front of the antenna between it and the parking garage to resolve the interference problem.

Concrete Evidence (Continued)

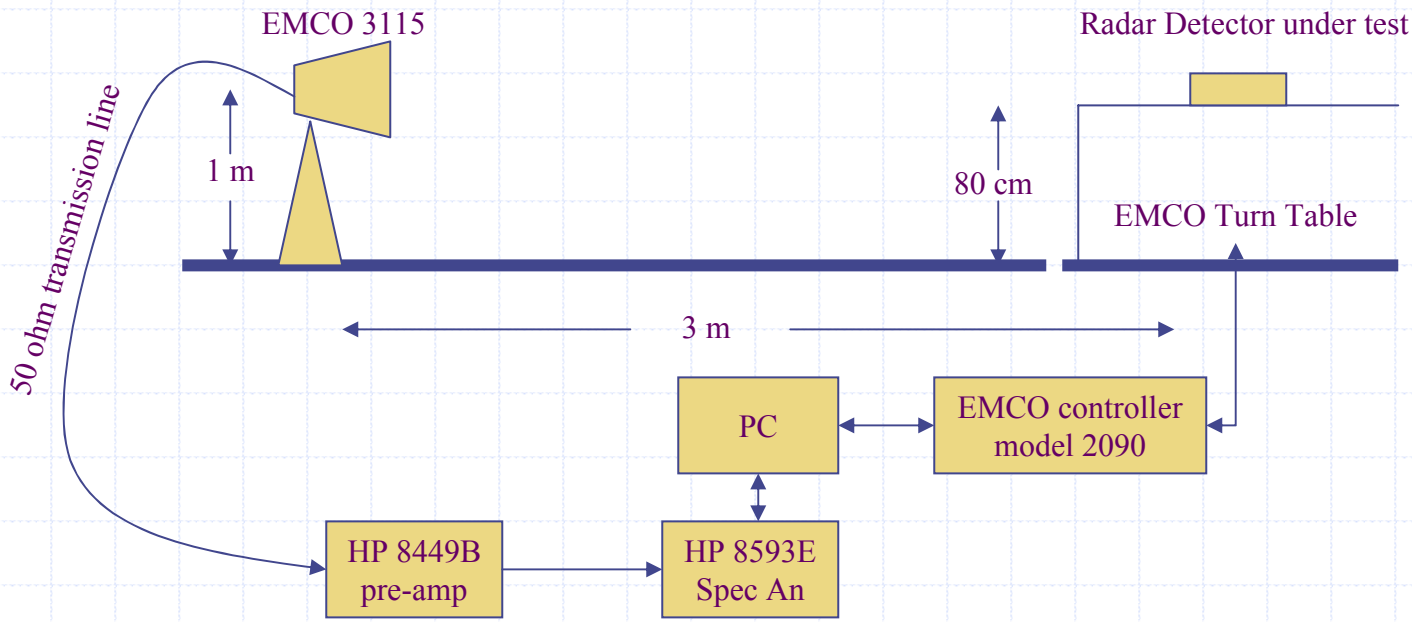
Gas Stations – Raleigh, NC

- In March 2002, HNS began investigation of intermittent outage problem reported by two gas stations owned by the same customer.
- The customer uses the VSATs tuned to 12.1 GHz for "pay at the pump," credit transactions and inventory control.
- A consulting firm specializing in frequency protection and interference investigation determined that the interference was coming from radar detectors in cars passing by or stopped at a red light at the intersection where the gas stations are located.
- It is discovered that the newer "9-band" radar detectors now emit into 400 MHz of the FSS receive band, not just the first 108 MHz as is observed in the older "6-band" radar detector models.

Measurements

HNS Agency Compliance Laboratory

Radar Detector Emission Test Set Up (not to scale)



Incident Field on Antenna; E (dBuV/m) = AF (dB) - Preamp Gain (dB) + Cable Loss (dB) + SA (dBuV)

Measurements

COBRA 6050LE 6 Band		
Frequency (Ghz)	E_Horizontal (uV/m)	E_ Vertical (uV/m)
11.468	N/A	65766
11.453	26062	N/A
11.505	21281	N/A
11.513	N/A	37068
11.550	17844	N/A
11.595	37196	45604
11.618	N/A	30974
11.663	36771	48250
11.678	36728	N/A
11.685	N/A	10940
11.700	31915	37757
11.730	N/A	36728
11.760	26546	N/A
11.768	N/A	23851
11.798	25498	N/A
11.805	N/A	33420
11.813	22568	N/A

Measurements (continued)

Whistler Model 1730 6 Band		
Frequency (Ghz)	E_Horizontal (uV/m)	E_ Vertical (uV/m)
11.453	12882	N/A
11.46	N/A	118168
11.483	5242	N/A
11.543	N/A	112980
11.550	10186	45604
11.565	5058	10940
11.58	N/A	108768
11.625	10012	30974
11.625	N/A	91728
11.663	21281	N/A
11.685	20989	N/A
11.685	N/A	62302
11.708	14706	37068
11.723	9386	N/A
11.723	N/A	72028
11.745	N/A	44668
11.768	N/A	27606
11.79	N/A	25674
11.805	15722	N/A
11.805	N/A	51582

Measurements (continued)

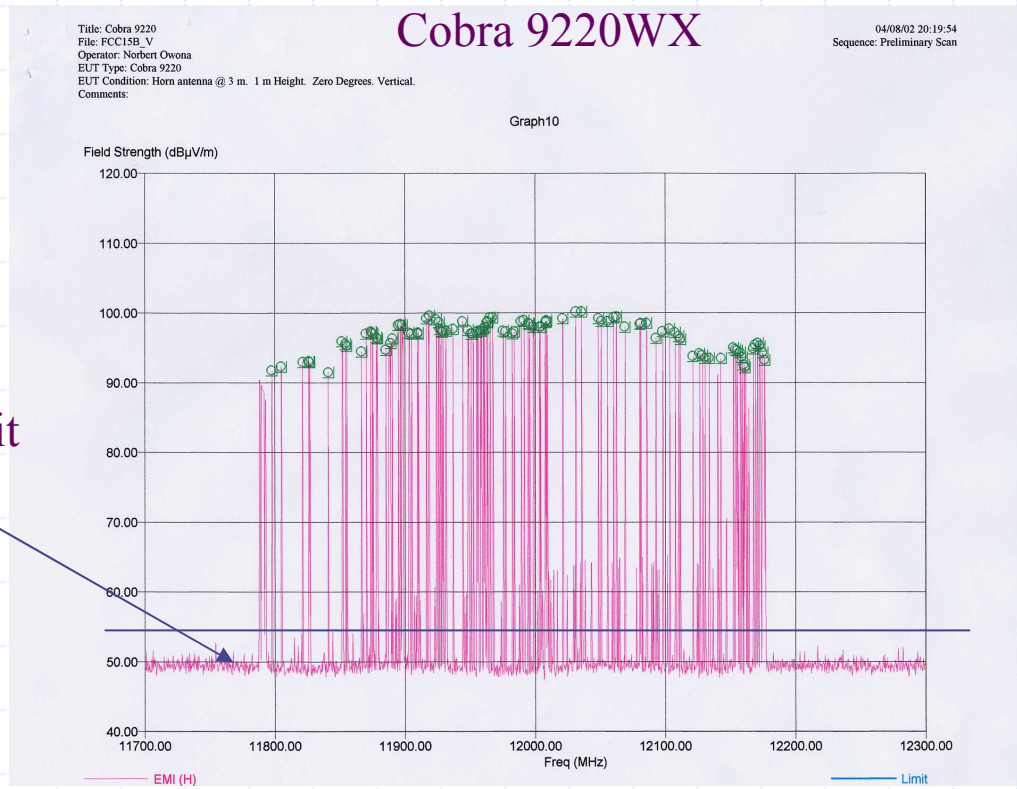
Beltronics Model 916 6 Band		
Frequency (Ghz)	E_Horizontal (uV/m)	E_ Vertical (uV/m)
11.205	9099	N/A
11.228	5082	N/A
11.243	N/A	11363
11.303	N/A	33228
11.310	6531	N/A
11.340	4493	N/A
11.363	N/A	19588
11.370	6223	N/A
11.468	N/A	21306
11.535	5768	N/A
11.580	4446	N/A
11.603	N/A	8680
11.618	4539	N/A
11.640	4581	N/A
11.655	N/A	10411
11.663	4726	N/A
11.685	N/A	9528
11.730	N/A	6887
11.753	N/A	7647
11.775	N/A	6152

Measurements (continued)

	Escort Solo 6 Band	
Frequency (GHz)	E_Horizontal (uV/m)	E_Vertical (uV/m)
11.573	N/A	19275
11.585	N/A	16311
11.753	N/A	14288
11.809	N/A	16330
11.816	N/A	17782
11.478	20965	N/A
11.487	19975	N/A
11.496	18771	N/A
11.503	19520	N/A
11.506	24265	N/A
11.527	18620	N/A
11.532	87277	N/A
11.622	20677	N/A
11.776	18988	N/A
11.779	19769	N/A

Measurements (continued)

- New device causing interference across the 11.79794 – 12.17678 GHz portion of the FSS downlink band.



FCC Part 15B Limit

11.7 11.8 11.9 12.0 12.1 12.2 12.3

GHz

Measurements (continued)

- New device causing interference across the 11.79794 – 12.17678 GHz portion of the FSS downlink band.

Cobra 9220WX 9 Band	
Freq (GHz)	E_Vertical (µV/m)
11.79794	38238
11.80487	41210
11.82137	44668
11.82599	44875
11.82698	44310
11.84084	37714
11.85173	62661
11.85437	59772
11.85536	57743
11.86658	52662
11.87021	70550
11.87351	73706
11.87483	72694
11.87549	71532
11.87813	66834

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
11.87813	66834
11.87879	66069
11.88539	54325
11.88902	60884
11.89034	65615
11.89496	81658
11.89628	83176
11.8976	81752
11.90321	71614
11.90519	70876
11.90981	71450
11.91047	72444
11.91641	90365
11.91872	96272

Measurements (continued)

- New device causing interference across the 11.79794 – 12.17678 GHz portion of the FSS downlink band.

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
11.924	90157
11.92598	85704
11.92697	77179
11.92829	74302
11.92928	73706
11.93159	74388
11.93687	77090
11.94446	87297
11.94842	75596
11.95073	70713
11.95238	70632
11.95502	72862
11.95634	74216
11.95799	74131

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
11.95898	74989
11.9603	76913
11.96129	79159
11.96294	85605
11.9636	87297
11.96558	92257
11.96756	92683
11.97581	74046
11.97746	73030
11.98241	70876
11.98406	73030
11.98934	86596
11.99165	88105
11.99462	84431

Measurements (continued)

- New device causing interference across the 11.79794 – 12.17678 GHz portion of the FSS downlink band.

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
11.99594	82604
11.99858	79524
12.00353	79524
12.00419	79708
12.00782	86000
12.00848	86796
12.00914	87801
12.02135	90991
12.03125	101158
12.03554	102094
12.04841	90573
12.05072	86497
12.05567	86796
12.06029	92576

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
12.0626	94297
12.0692	78795
12.08042	83081
12.08141	83753
12.0857	83946
12.09296	65388
12.09824	73114
12.10352	77090
12.10781	71945
12.11045	67999
12.11144	64714
12.12134	48529
12.12662	51345
12.12893	49602

Measurements (continued)

- New device causing interference across the 11.79794 – 12.17678 GHz portion of the FSS downlink band.

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
12.13058	47261
12.13388	47643
12.14279	46881
12.15269	56624
12.15401	54388
12.15566	53580
12.15764	52420
12.15929	48084
12.16061	42658
12.16127	40644
12.16787	55271
12.16952	59361
12.17117	60395
12.17249	58277

Cobra 9220WX 9 Band (continued)	
Freq (GHz)	E_Vertical (µV/m)
12.1748	51582
12.17678	46185

Calculations

- **BASIC ASSUMPTIONS**

  - Single interference source (radar detector) at a distance of 3 meters from the earth station
  - Earth station antenna gain towards interference source to be -10 dBi
  - Carrier to interference ratio objective of 20 dB
  - Narrowband carrier operating under FCC Blanket Licensing Rules

- **FOUR CASES STUDIED IN Ku BAND**

  - Wideband Carrier Case
    - Single wideband full transponder carrier
    - Receive antenna size 74 cm
    - Carrier bandwidth 36 MHz
  - Narrowband Carrier Case
    - Transponder operation in multi carrier mode
    - Carrier information rate 512 Kbps
    - Receive antenna size 1 meter
    - Carrier bandwidth 1229 KHz

Calculations (continued)

- Narrowband Carrier Case
  - Transponder operation in multi carrier mode
  - Carrier information rate 128 Kbps
  - Receive antenna size 1 meter
  - Carrier bandwidth 154 KHz
- Narrowband Carrier Case
  - Transponder operation in multi carrier mode
  - Carrier information rate 64 Kbps
  - receive antenna size 1.8 meter
  - Carrier bandwidth 40 KHz

Calculations (continued)

- **RESULTS**

  - Interfering signal limit in µV/m measured at 3 meters
    - 31 µV/m for 64 kbps carrier case
    - 43 µV/m for 128 kbps carrier case
    - 121 µV/m for 512 kbps carrier case
    - 720 µV/m for wideband carrier case

  - Interfering signal limit requirement function of carrier size

Radiated Emission Limit Definition

- FCC Part 15 Rules defines as the Electric Field Strength in μV/m measured at 3 meters
- Bandwidth not specified

RADAR Comments

- RADAR conjectures that radar detectors limited to Class B levels over the 11.7-12.2 GHz band will not cause harmful interference to VSATs since the VSAT community has not complained about other unintentional radiators permitted to operate at Class B emissions or higher.

- RADAR ignores the fact that radar detector emissions are within the Fixed Satellite Service frequency band unlike other unintentional Class B devices.

RADAR Comments

RADAR Technical Analysis:

- Reduces their emission levels by 10 dB on the basis of the detector's transmit directivity.

Response:

- The angle of the moving radar detector in reference to the VSAT is infinitely variable.
- Off axis discrimination has already been accounted for by assuming an average off-axis angle of 30 degrees.
- RADAR acknowledges that the detector's transmit pattern has not been measured.

RADAR Comments

RADAR Technical Analysis:

- Assumes a C/I of 10 dB

Response:

- This level of interference will still disrupt communications.
- SIA interference criteria is based on a C/I of 20 dB, a level consistent with ITU Regulation.

RADAR Comments

Statement:

- RADAR claims that interference results from VSAT's poor design and improper installation practices.

Response:

- VSATs design criteria is extremely stringent in that it must receive signals as small as -160 dBW, 50-80 dB lower in signal strength than their terrestrial microwave counterpart, and must discriminate between other satellites as close as 2 degrees on either side of the intended satellite. The antennas utilized comply with the antenna sidelobe requirements specified by FCC 25.209.
- VSAT installations must take into account numerous factors and generally limited to few options.

RADAR Comments

Statement:

- RADAR concludes that limiting radar detector emissions to 500 µV/m@ 3 meters in a 1 MHz measurement bandwidth translates to 20 µV/meter in a 40 KHz bandwidth and would satisfy HNS and SES Americom.

Response:

- RADAR's assumption that radar detector energy is distributed evenly across a 1 MHz bandwidth is incorrect. To the contrary, radar detector emissions are in fact of a spurious nature, concentrating all their RF output energy into a very narrow bandwidth as indicated in the various spectrum plots. This coupled with the fact that radar detector emissions sweep across a wide bandwidth makes for one of the most offensive types of interference mechanisms to redress.

RADAR Proposal Inadequate

Proposal:

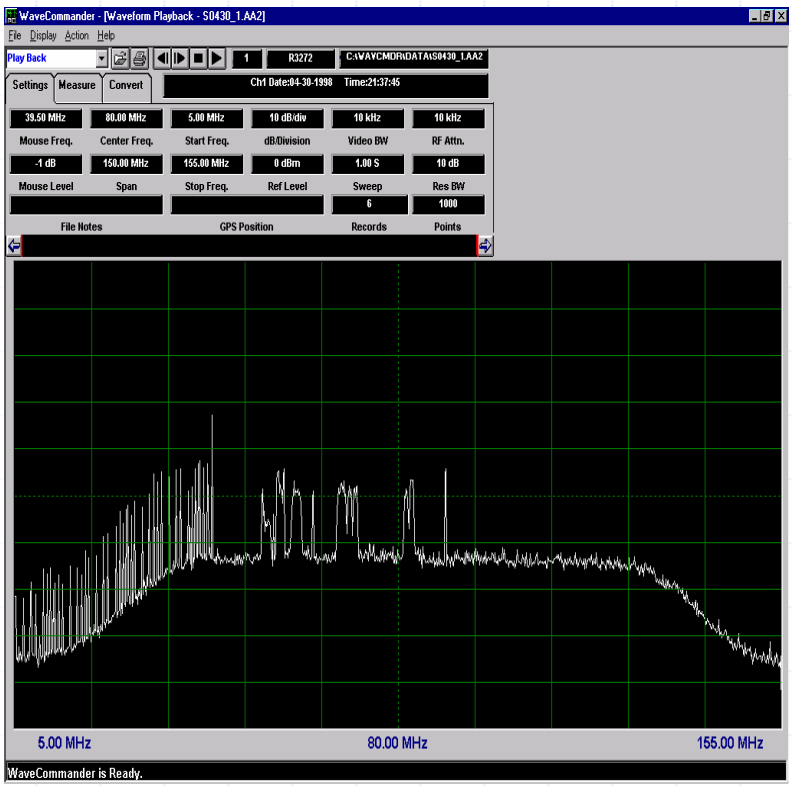
- RADAR offers to limit emissions to 500 µV/m @ 3 meters within the 11.7-12.2 GHz band

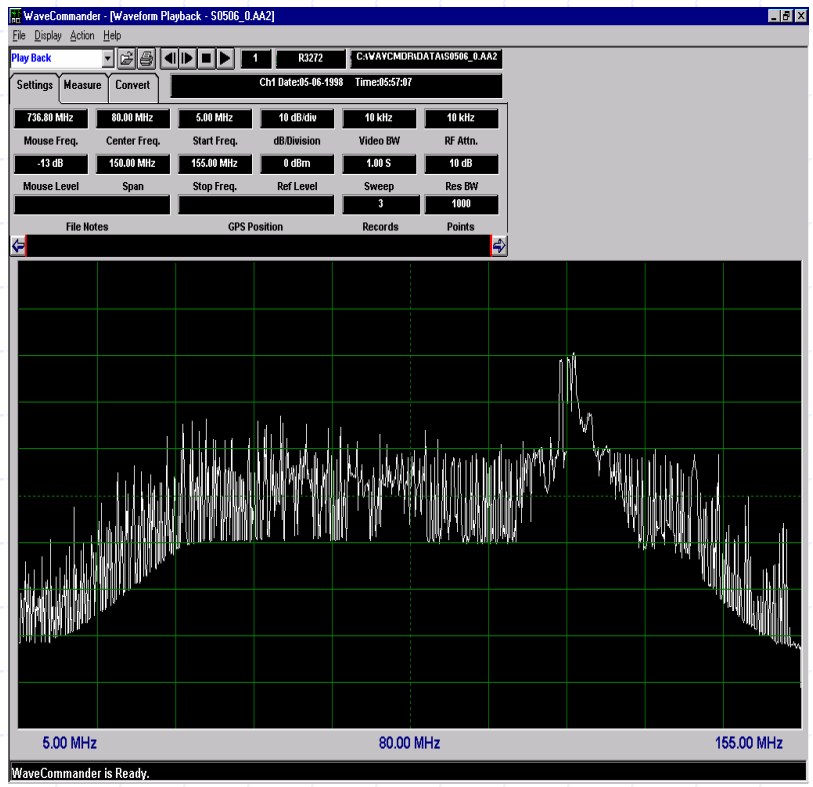
Response:

- Proposed level is more than 20 dB higher than the maximum allowable interference level.
- Does not address the Ku-band spectrum from 10.7 - 11.7 GHz.

Radar Detector Interference Educational Network

SES AMERICOM
An SES GLOBAL Company





SIA SATELLITE INDUSTRY ASSOCIATION

Conclusions

Conclusions

- Service providers and their customers have suffered, and continue to suffer significant harm from radar detector interference
- Older 6 Band radar detector measurements show 72,000 µV/m power levels across the 11.7 – 11.813 GHz band
- Newer 9 Band radar detector measurements show 102,000 µV/m power levels across the 11.79 – 12.17 GHz band
- 30 µV/m measured at 3 m limits are necessary across the 10.7 – 12.2 GHz band
- Request current radar detectors off the market ASAP

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