

Fletcher, Heald & Hildreth, P.L.C.
1300 North 17th Street 11th floor
Arlington VA 22209
703-812-0400 (voice)
703-812-0486 (fax)

MITCHELL LAZARUS
703-812-0440
LAZARUS@FHHLAW.COM

January 31, 2003

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

Re: ET Docket No. 98-153, Ultra-Wideband Transmission Systems
Ex parte Communication

Dear Ms. Dortch

On behalf of the Ground Penetrating Radar Industry Coalition and pursuant to Section 1.1206(b)(2) of the Commission's Rules, I am electronically filing this notice of an oral *ex parte* communication.

Today Dennis Johnson of Geophysical Survey Systems, Inc., Matt Wolf of Mala Geoscience, Dave Redman of Sensors and Software, Inc., and I, collectively representing the Ground Penetrating Radar Industry Coalition, met (separately) with Sam Feder of Commissioner Martin's office; Commissioner Copps and Paul Margie of his office; Jennifer Manner of Commissioner Abernathy's office; Barry Ohlson and Michael Sandner of Commissioner Adelstein's office; and Bryan Tramont of Chairman Powell's office. Ed Thomas and Julius Knapp of the Office of Engineering joined the meeting with Mr. Tramont.

We reiterated and explained the points raised in the Petition for Partial Reconsideration of the Ground Penetrating Radar Industry Coalition (filed June 17, 2002). A copy of our presentation outline is attached. Also attached are materials distributed by Mr. Johnson relating to GPR generally and to his company's products.

If there are any questions about this filing, please call me at the number above.

Respectfully submitted,

Mitchell Lazarus
Counsel for the GPR Industry Coalition

cc: Meeting Participants

Ground Penetrating Radar Industry Coalition

at the

Federal Communications Commission

January 30, 2003

Contact:

Mitchell Lazarus
Fletcher, Heald & Hildreth, PLC
1300 North 17th St. 11th floor
Arlington VA 22209
703-812-0440
lazarus@fhhlaw.com

Agenda

- GPRIC Petition for Partial Reconsideration in FCC ET Docket No. 98-153 (filed June 17, 2002)

- Critical points:
 1. GPRs do not cause interference.

 2. The Commission should repeal Section 15.509(a) (requiring a GPR's "UWB bandwidth" to lie below 960 MHz)
 - the rule serves no purpose and hinders GPR performance.

 3. All studies support raising GPR emissions levels to Class B at 960-3100 MHz.

Overview

- About GPRIC
- Examples of GPR applications
- GPRs are non-interfering
- GPRIC emphasizes FCC reconsideration of two rules:
 - Section 15.509(a): "UWB bandwidth" below 960 MHz
 - Section 15.509(d): emissions limits below Class B
- Conclusion

About GPRIC

- Member companies sell 98% of U.S. commercial GPRs
 - Geophysical Survey Systems, Inc.
 - Mala Geoscience, Inc.
 - Sensors & Software, Inc.
 - Underground Imaging Technologies

What is Ground Penetrating Radar?

- Ground Penetrating Radar (GPR) uses ultra-wideband radio signals to image underground.
- Sample applications (more examples follow):
 - detecting pipes and wires before excavation
 - finding defects in airport runways
 - identifying conditions hazardous to miners
 - archaeological exploration.
- GPR has been used for 30 years with no reports of interference.
- No other technology can substitute for GPR.

Examples of Routine GPR Applications (Nearly All Support Public Safety)

■ **INSPECTION/DETECTION**

- **AIRPORT RUNWAY** - locate dangerous voids and thin pavement areas (used by NASA and all major airports)
- **HIGHWAY** - identify defects, pipes, pavement thickness
- **BRIDGE DECK** - for quality assurance, and maintenance decisions
- **RAILROAD BED** - find leaking pipes and voids
- **UTILITY DETECTION AND MAPPING** – detect and 3-D map utility lines before digging
- **HAZARDOUS WASTE** - determine location and extent of contamination
- **MINING** - detect dangerous conditions; locate mineral deposits, seams, water levels

Routine Applications (cont'd)

■ MEASUREMENT

- **NUCLEAR POWER PLANTS** - inspect foundations
- **AVALANCHE** - locate victims
- **EXCAVATION** - test soundness of subsurface before excavation
- **ARCHAEOLOGY** - map underground sites prior to digging
- **ICE THICKNESS** – find safe ice roads on rivers and lakes
- **GEOPHYSICAL SURVEYS** - locate bedrock, water table, voids
- **FORENSICS** - locate criminal evidence, including buried victims

Examples of One-Time Applications

▪ **DISCOVERED:**

- Woolly mammoth in Siberia (Discovery Channel)
- Unknown village near Macchu Pichu (National Geographic expedition)
- The "Lost Squadron" in Greenland in 1992 (leading to December 2002 flight of recovered P-38 aircraft, "Glacier Girl")
- Massive emerald deposit in North Carolina

▪ **SURVEYED:**

- Unopened royal tomb in Xian, China
- Washington's Mount Vernon, Jefferson's Monticello, and FDR's home

▪ **DEVELOPING:**

- GPR system for Mars exploration, to locate underground water

GPRs Are Non-Interfering

- GPR energy is directed into the soil
 - ◆ manufacturers deliberately suppress air-borne emissions to improve performance.
- Few GPRs in use -- typically a small number per county.
- Most GPRs operate only a small percentage of the time.
 - ◆ The few GPRs that operate continuously do so only for short periods and while in motion at high speed (e.g., inspecting highways).

NTIA: GPRs Do Not Interfere With GPS

- NTIA found no GPS interference from UWB devices with PRFs typical of GPRs (below 100-500 kHz), *even well above at Class B levels.*⁽¹⁾
- The current GPS-band limits derive from a high (20 MHz) PRF.⁽²⁾
- But at at low PRFs typical of GPRs, the GPS receiver functioned properly at emissions levels 37 dB (5,000 times) higher.⁽³⁾

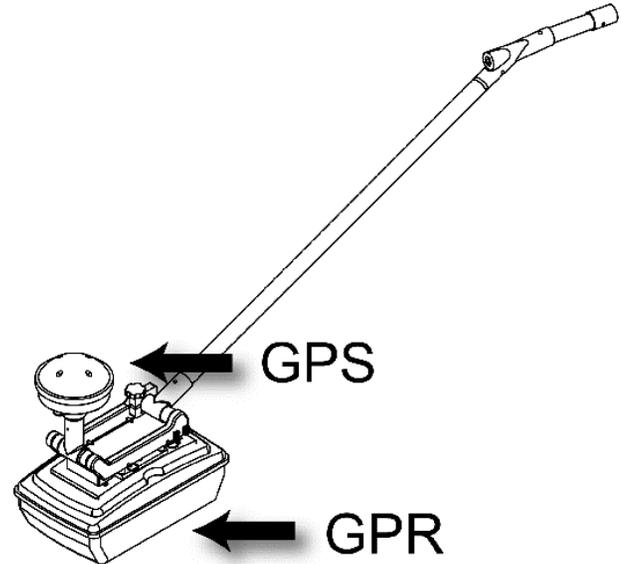
(1) *Assessment of Compatibility Between Ultrawideband (UWB) Systems and Global Positioning System (GPS) Receivers (Report Addendum)* NTIA Special Publication 01-47 at xi (November 2001).

(2) *Measured Emissions Data for Use in Evaluating the Ultra-wideband (UWB) Emissions Limits in the Frequency Bands Used by the Global Positioning System (GPS)*, Project TRB 02-02 at 9 (October 22, 2002)

(3) *Measurements to Determine Potential Interference to GPS Receivers from Ultrawideband Transmission Systems*, NTIA Report No. 01-389, Addendum to NTIA Report 01-384 at pages 9-10, Figures 3.1, 3.3 (September 2001).

GPRs Do Not Interfere With GPS (Cont'd)

- We test this question in the field hundreds of times each working day.
- Nearly all GPRs are designed to work with a GPS receiver located only centimeters from the antenna.
 - (GPS is needed to map locations of GPR readings).
- We do not know of a single instance in which the GPR has ever caused interference to GPS.



UWB Opponents: GPRs Do Not Interfere

- **Aeronautical:** “Precautions such as limiting UWB operations in the restricted bands to . . . [GPRs] may serve to minimize the impact of any harmful interference by UWB operations on GPS and other safety-of-life operations.”⁽¹⁾
- **PCS:** “Sprint does not necessarily oppose these [penetrating radar] applications.”⁽²⁾
- **Amateur:** “ARRL does not object to permitting GPRs to be operated anywhere in the spectrum . . . subject to appropriate emission limits.”⁽³⁾
- **DARS:** GPRs “are unlikely to pose a significant threat of interference to DARS reception.”⁽⁴⁾

(1) Comments of Aeronautical Radio, Inc. and the Air Transport Association of America, Inc. at (filed Sept. 12, 2000).

(2) Sprint PCS Supplemental Comments at 2 n. 3 (filed Oct. 6, 2000).

(3) Comments of ARRL, the National Association for Amateur Radio at 16 (filed Sept. 12, 2000).

(4) Reply Comments of XM Radio Inc. at 6 n. 8 (filed Oct. 27, 2000).

FCC: GPRs Do Not Interfere

- “We believe the risk of interference from GPRs is negligible because the overwhelming majority of their energy is directed into the ground where most of the energy is absorbed. . . . In addition, GPRs are expected to have a low proliferation and usually operate at infrequent intervals. Thus, the interference potential of these devices should be low. . . . [A]ccording to the comments, these devices have been used in limited numbers for quite some time . . . *without any known instances of harmful interference.*”(1)
 - Nothing in the record says otherwise.
- The Commission later affirmed: “GPRs and wall imaging systems have been operating in the 1000-2000 MHz band for many years, and *we are unaware of a single report of harmful interference.*”(2)

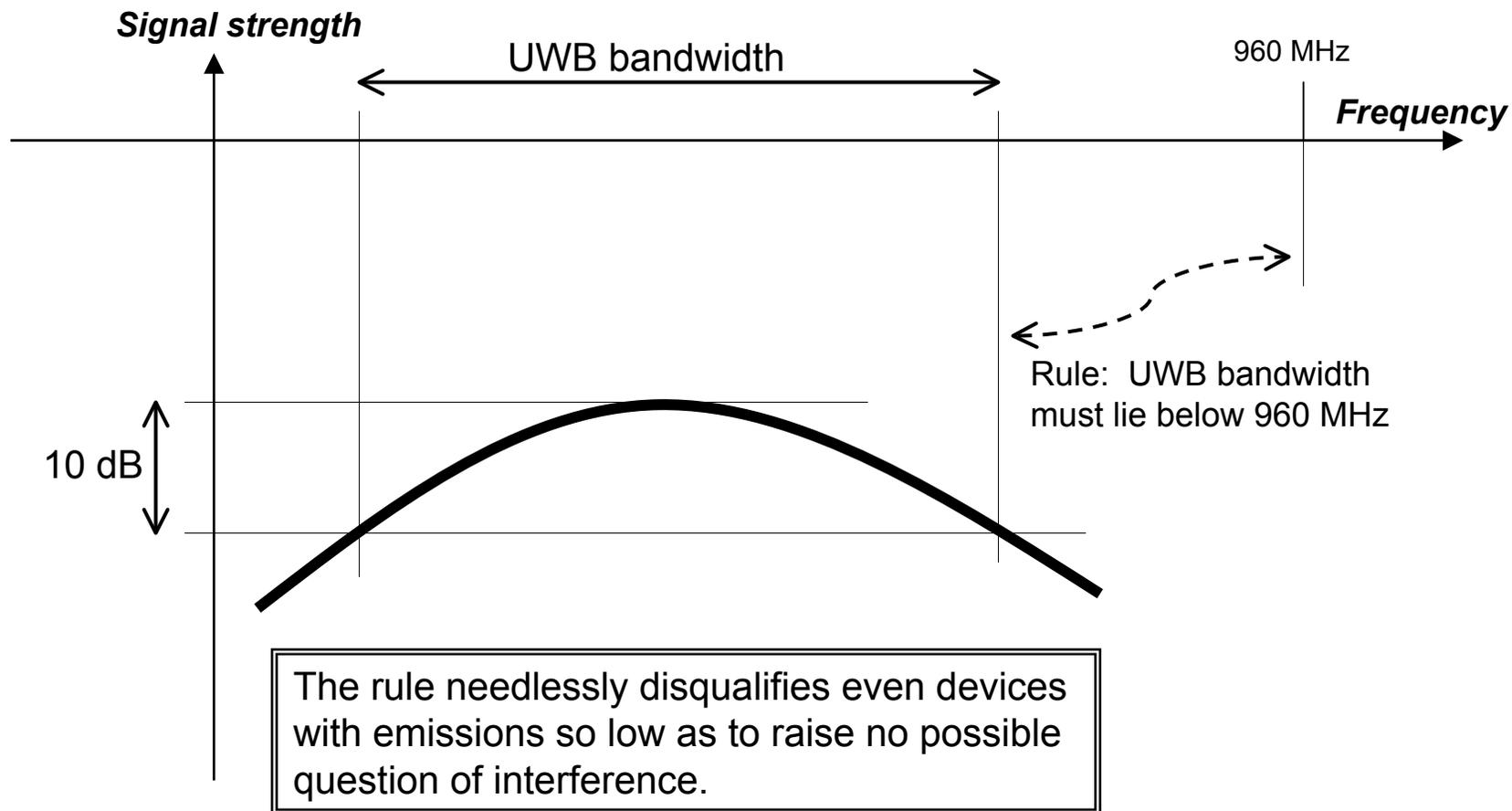
(1) *Ultra-Wideband Transmission Systems*, 15 FCC Rcd 12086 (2000) (Notice of Proposed Rule Making) (emphasis added).

(2) *Ultra-Wideband Transmission Systems*, ET Docket No. 98-153, Order, DA 02-1658 at para. 9 (OET released July 12, 2002) (emphasis added).

GPRIC Seeks Reconsideration of Four Rules; Emphasizes the First Two

1. Section 15.509(a): requiring all of a GPR's "UWB bandwidth" to lie below 960 MHz;
2. Section 15.509(d): setting emissions limits for GPRs well below the Part 15 general limits;
3. Section 15.509(b)(1): limiting GPR operation to law enforcement, fire and emergency rescue organizations, scientific research institutes, commercial mining companies, and construction companies; and
4. Section 15.525: requiring prior coordination of GPR operation with NTIA.

1. Section 15.509(a): "UWB bandwidth" below 960 MHz



Unintended Consequences of Bandwidth Rule

Less interfering device fails

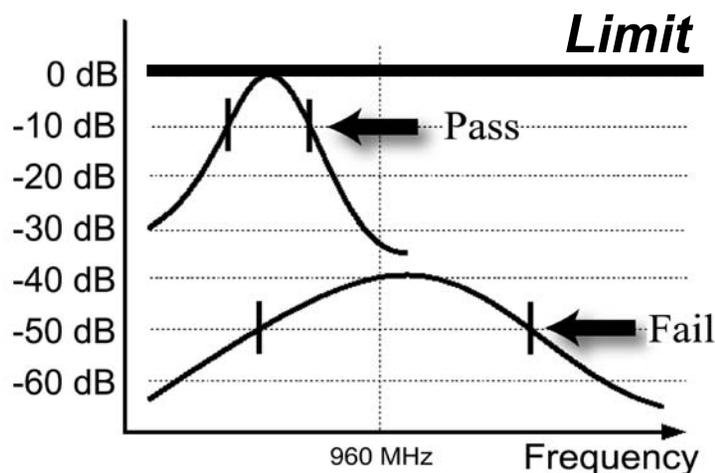


Figure 2

Increasing interference potential
allows device to pass

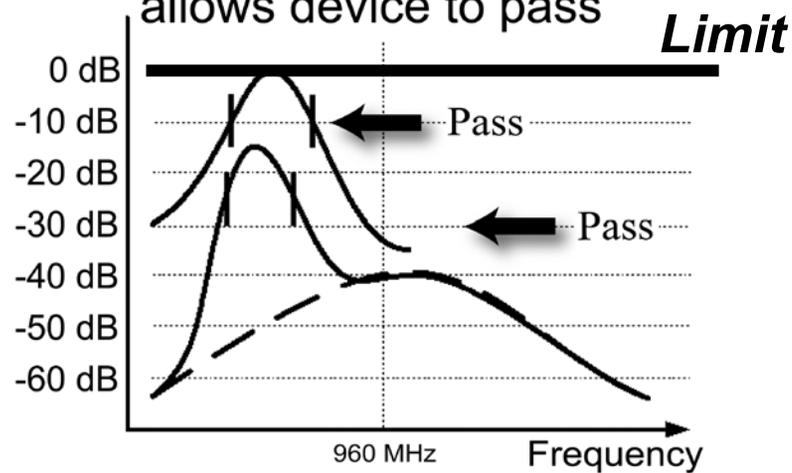
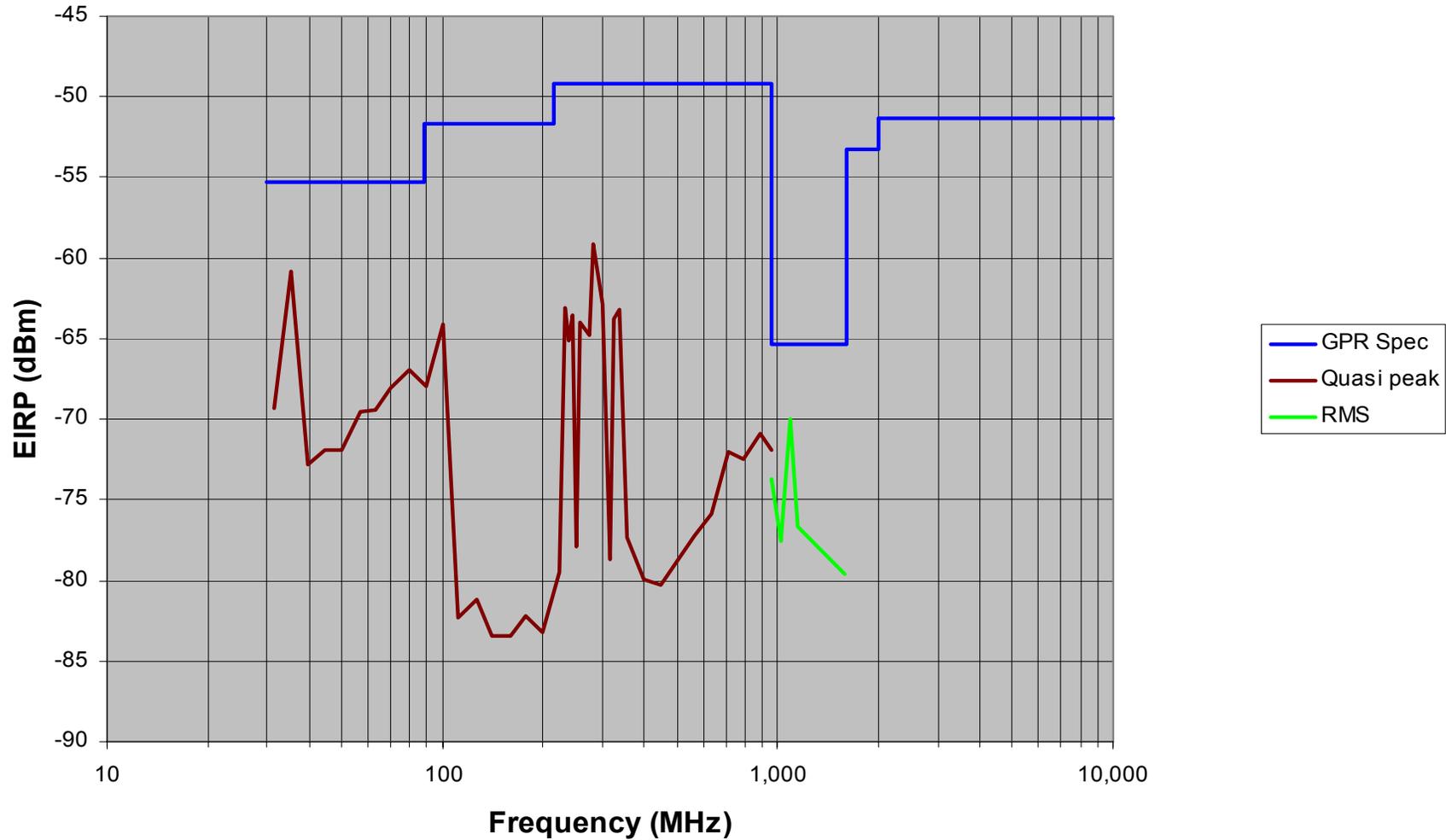


Figure 3

A device can fail even if its emissions are *lower* than those of a compliant device *at all frequencies*.

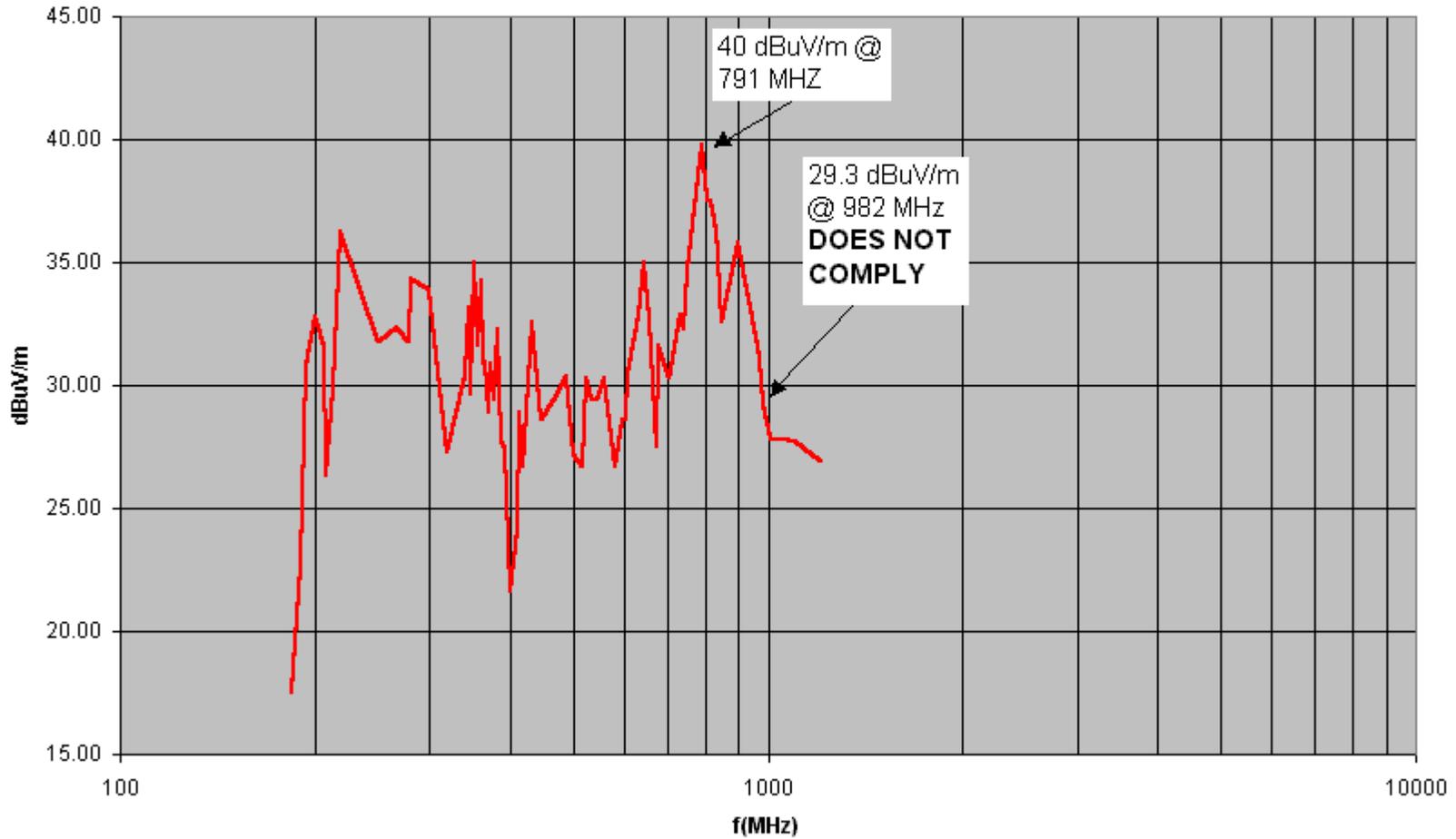
UWB Rule in Practice (1)



Handyscan Antenna on Sand PRF = 50 KHz

UWB Rule in Practice (2)

10dB bandwidth
HANDYSCAN, PRF = 50 KHz



UWB bandwidth rule violates the APA

- The rule has no support in the record (and hence violates the Administrative Procedure Act)
- The rule has no technical basis
 - ◆ not based on any test or other data.
- The rule has adverse unintended consequences (and hence violates the APA as being arbitrary and capricious):
 - ◆ the rule *disqualifies* some devices having a lower interference potential than compliant devices.
 - ◆ the rule allows a non-compliant device to be made compliant by *increasing* its interference potential (see slide 16).
- Reconsideration will promote the public interest (see next slide).

Reconsideration of the Bandwidth Rule is Critical to Public Safety and in the Public Interest

- GPRs with bandwidths extending above 960 MHz are needed for critical construction and engineering projects requiring detailed resolution.
- Examples of these applications:
 - pavement, roadbed, and bridge deck evaluation
 - runway and concrete building slab investigation for voids
 - determining ice thickness for ice roads
 - detecting shallow utility facilities
 - locating avalanche victims.
- *No GPR that complies with the bandwidth rule can deliver the resolution necessary to accomplish these purposes.*

2. Section 15.509(d): emissions limits below Class B

- The FCC originally proposed GPR operation at the "general limits" (numerically equal to Class B).
- There is no evidence in the record suggesting any threat of interference from GPRs at the general limits.
 - The courts consistently hold that agencies may not establish rules that run counter to the record. ⁽¹⁾
- And there is no showing that narrowband notches are needed to protect GPS.
 - GPR depends on smooth, broad spectral signals.
 - Narrowband notching precludes operation for many octaves on either side the notch.

(1) For citations, see Petition for Partial Reconsideration of the Ground Penetrating Radar Industry Coalition at 11-12 (filed June 17, 2002).

Class B Limits Are in the Public Interest

- NTIA data, confirmed by decades of experience, show that GPR PRFs cause no interference to GPS, even at the general emissions limits (see slides 10-11).

- General emissions limits are necessary for safe operation in public safety applications, e.g., roadway and bridge inspection:
 - the current limits restrict travel speed to 12 mph, creating traffic hazards -- at Class B limits, 60 mph is feasible
 - and general emissions limits needed to detect deep flaws in runways, roadbeds, etc.

3. Section 15.509(b)(1): limiting GPR operation to certain users

- The rule causes confusion and unnecessarily limits the industry.
- The rule flatly violates the Administrative Procedure Act:
 - was never proposed for public comment;
 - was adopted counter to all of the evidence in the record.
- But we agree consumers should not have access to GPRs.
 - GPRIC will not contest a rule that limits GPR operation to Part 90 eligibles (*i.e.*, to all companies and organizations, but **not** individuals).

4. Section 15.525: requiring prior NTIA coordination

- The rule causes confusion and potential delay.
- The rule likewise violates the Administrative Procedure Act:
 - was never proposed for public comment;
 - was adopted counter to all of the evidence in the record.
- We acknowledge NTIA's interest in protecting certain sensitive installations.
 - GPRIC will not contest a rule that requires one-time prior coordination within a reasonable radius of pre-identified installations.

Conclusion

1. All parties agree: GPRs are non-interfering.
2. None of the contested rules serves to reduce interference from GPRs.
3. All of the contested rules were adopted in violation of the Administrative Procedure Act.
4. Availability of GPRs serves the public interest and safety.
5. The contested rules hinder manufacture and deployment of some GPRs.
6. The FCC should repeal the contested rules.

Thank You!

The GPRIC appreciates this opportunity
to meet with the FCC.