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MINNESOTA PUBLIC RADIO®

Stamp and Return

September 22, 2009

Marlene Dortch
Secretary
Federal Communications Commission
236 Massachusetts Avenue, NE
Washington DC 20002

Re: Minnesota Public Radio (FRN 0002-6425-10)
KCRB - FM, Bemidji, MN (Facility ID No. 42970)
Report of Experimental Authority Operations

Dear Ms Dortch:

By letter dated June 15, 2009 the Commission granted to Minnesota Public Radio (MPR), the licensee of KCRB, experimental authority (copy attached) to permit KCRB-FM to operate with IBOC digital power levels above the currently permitted value of -20 dB relative to analog power. The experimental authority was requested in accordance with 47 CFR § 73.1510. The experimental authority requires "... a report detailing the methodology employed and the results obtained" within ninety days following the conclusion of the experimental operation.

As stated in the request for experimental authority and reiterated in the experimental authority as granted, the experimental operation was to be conducted in conjunction with iBiquity Digital Corporation and National Public Radio (NPR) as part of a study to be reported to the Commission by NPR. The purpose of the test was to determine the effect of the increased IBOC power of KCRB on neighboring station KBPN in Brainerd, MN (which is also licensed to MPR).

While MPR staff engineers cooperated with NPR's engineers, the experiment was primarily conducted by NPR Labs. Attached is a report prepared by NPR entitled "Advanced IBOC Coverage and Compatibility Study Test Procedures for KBPN (FM) Brainerd, Minnesota". This report details the methodology of the experiment. MPR awaits a final report from NPR about the experiment. It is our understanding that NPR will be submitting that report under separate cover.

MPR.ORG 480 CEDAR STREET, SAINT PAUL, MN 55101 P 651.290.1259 F 651.290.1243

An Anti-Drug Abuse Act certification form is attached. MPR is a noncommercial educational licensee, therefore, no fee is required for this filing.

Sincerely,

Mitzi T Gramling
Associate General Counsel

cc: Todd Stansbury, Esq (Wiley Rein)
Mike Starling (NPR Labs)
Ann Gallagher (FCC)

Exhibit

Anti-Drug Abuse Act Certification

The applicant certifies that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. §853a, or, in the case of a non-individual applicant (eg corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. §1.2002 (b).

Yes [X] No [ ]

Minnesota Public Radio

Thomas J Kigin, Executive Vice President

9/22/09
Date

H/Tkigin/Antidrug.doc

FEDERAL COMMUNICATIONS COMMISSION
445 Twelfth Street, SW
Washington, DC 20554

MEDIA BUREAU
AUDIO DIVISION
APPLICATION STATUS: (202) 418-2730
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June 15, 2009

Mitzi T. Gramling
Minnesota Public Radio
480 Cedar Street
Saint Paul, MN 55101

In re: Request for Experimental Authority
KCRB-FM, Bemidji, MN
Facility ID No.: 42970

Dear Ms. Gramling:

The staff has under consideration the request received on June 11, 2009, for experimental authority to permit KCRB-FM to operate with IBOC digital power levels above the currently permitted value of -20 dB relative to analog power. The experimental authority is requested pursuant to 47 C.F.R. § 73.1510 for a period of three months.

Minnesota Public Radio., licensee of KCRB-FM, describes the proposed experimental program as follows: "The requested operation at increased digital power levels is to be conducted in conjunction with the HD Radio system developer, iBiquity Digital Corporation, and National Public Radio (NPR), as part of a study ...to determine the effect on digital coverage and compatibility with analog FM broadcasting, to be reported to the Commission by NPR." The test program may include digital power levels as high as 10 dB above currently authorized levels. The objective of the test program is to evaluate digital coverage in buildings and also to collect audio recordings of analog reception by KBPN-FM, Brainerd, Minnesota, a nearby first-adjacent station also licensed to MPR. The licensee affirms that the experimental operation will be discontinued in the event of any unresolved interference complaints from adjacent channel stations.

Accordingly, the requested experimental authority for the hybrid digital operation described above IS HEREBY GRANTED. This authority is specifically conditioned on the lack of objectionable interference. A report detailing the methodology employed and the results obtained must be submitted within **ninety** days following the conclusion of the experimental operation pursuant to 47 C.F.R. § 73.1510(d). The report should describe the test procedures in detail, and should identify those adjacent channel stations vulnerable to interference and note any additional interference

observed during the tests. The report should also characterize the observed changes in digital coverage. This experimental authority expires on **December 15, 2009**. Any request for extension of this authority should be filed at least thirty days prior to this expiration date. **Additionally, such a request must include an interim version of the aforementioned report that details the progress of the experimental program as of the filing date.**

Sincerely,

Ann Gallagher

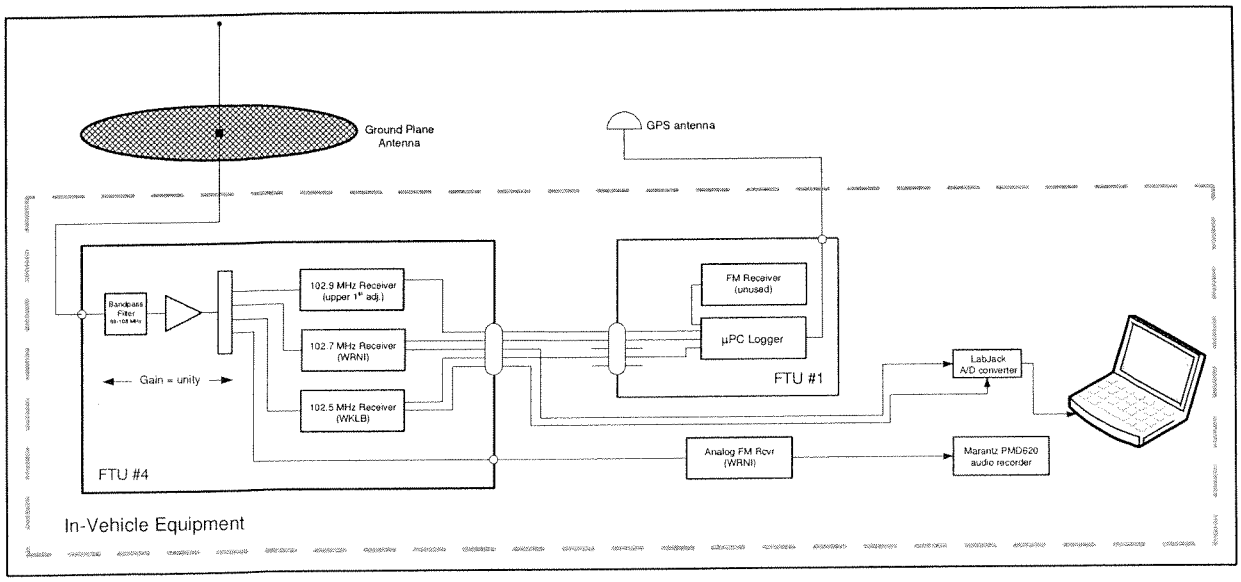
Ann Gallagher
Audio Division
Media Bureau

Advanced IBOC Coverage & Compatibility Study
Test Procedures for KBPN(FM), Brainerd, Minnesota

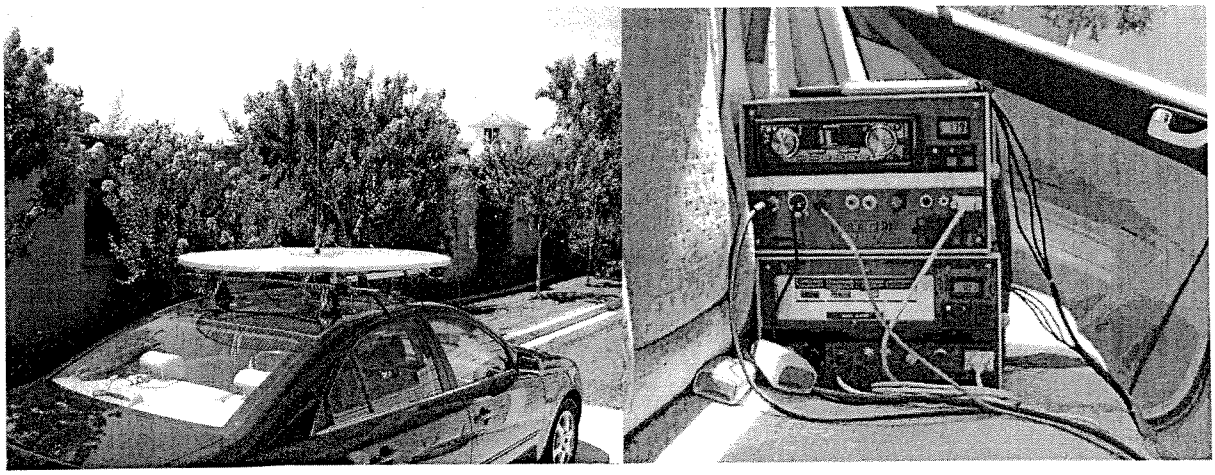
v 3.0

Connection and setup of recording and measurement instrumentation, referenced to the vehicle equipment diagram below:

- The vehicle instrumentation will use a common ground plane antenna, mounted to the roof of the test vehicle
- Field Test Unit #4 contains
  - a 88-108 MHz bandpass filter,
  - a low noise wide-dynamic range preamplifier,
  - a four-way splitter, and
  - three Kenwood KTC-HR100 "black box" tuners
- Field Test Unit #1 contains
  - the microcomputer data logger, and
  - a Kenwood KTC-HR100 tuner (not used); this unit records local mean field strength (slow fading)
- Each tuner's unfiltered DC signal strength line for the desired station and the upper and lower first-adjacent channels
  - is connected to a LabJack high-speed A/D converter to record fast fading;
  - the LabJack output is connected by USB to the laptop PC for file storage
- The fourth RF output from FTU #4
  - is connected to the reference analog FM mobile receiver;
  - the receiver's audio outputs (left and right channels) are connected to a Marantz PMD620 Professional Handheld Recorder, sampling with 16-bit PCM at a rate of 44.1 kHz; storage is to standard WAV files



Mobile Measurement Test Bed



Calibrated Test Antenna and Automobile Instrumentation Test Bed

The calibrated ground plane antenna is shown mounted atop the roof of a passenger car in the figure above, using supplied car-top padded pillars and roof rails. High-strength web straps are passed over the support beams of the antenna and through the front rear door openings of the vehicle to secure the antenna.

The antenna download cable is passed through the rear door window to Field Test Unit #4, shown the photo to the right as the lower cabinet. RF signal strength lines from the three tuners in FTU #4 are connected through a DB-9 to DB-9 cable to FTU #1, which contains the microcomputer logger and a fourth tuner, shown atop FTU #4. Power for both units is provided from the car's 12 VDC socket. Note that the cabinets are secured to the rear seat using the vehicle's seat belt cables.

The FTU #1 is connected to a GPS receiver unit, which is usually placed in the rear window of the vehicle, as the ground plane antenna usually obstructs the view of the satellites if mounted on the roof of the vehicle. The FTU #1 logger records the time in Universal Time Code, as well as latitude and longitude from the GPS four times per second. This data, along with calibrated signal strength data, is recorded to a MMC card, inserted in a slot on the front of the FTU.

The FTU #4 contains an 88-108 MHz filter, amplifier and splitter system having a net gain of unity (0 dB) at each of four RF output ports. Three of the ports are connected internally to the three Kenwood KTC-HR100 tuners. Each tuner is tuned to the desired station, KBPN -FM, on 88.3 MHz, the upper first adjacent channel on 88.5 MHz for the IBOC test station, KCRB-FM, and the lower first-adjacent channel on 88.1 MHz. The fourth RF output is connected to the Chevrolet Suburban car radio (not shown) for reference analog FM reception. The left and right audio channels of the car radio are connected to a Fireface 400 audio A/D unit, which samples the audio at 44.1 kHz in 16 bit PCM, for storage as WAV files on the laptop PC.

The laptop PC is connected to a LabJack U12, providing eight 12-bit analog inputs for high-speed sampling of the unfiltered DC signal strength lines from the three tuners in FTI #4. The LabJack PC software is operated in the streaming mode at a minimum rate of 50 samples per second. The software logs the voltages received by the A/D converters and a time since the start of the file with a resolution of 0.01 seconds. Since the LabJack does not record UTC it is necessary to provide a momentary interruption in the antenna line to all receivers to provide a synchronizing signal for the LabJack file with the FTU's logger file.

Transmitter Operation and Monitoring

To operate KCRB with IBOC sideband powers of up to -10 dBc, in addition to an FM carrier output of 13.2 kW, Harris Corporation is supplying a model HPX40 single-tube transmitter. The transmitter site is equipped with a 25 Bird dummy load for power testing. Figure 1and Figure 2 show the RF spectrum on the transmitter at the forward power sampler feeding the antenna system at -20 dBc and -10 dBc, respectively. To ensure that the transmitted signal is at the expected IBOC power levels NPR Labs will conduct over-the-air measurements with an Anritsu model 2712 spectrum analyzer in accordance with the NRSC-G201 compliance measurement procedure.

Figure 1 - KCRB antenna input at -20 dBc

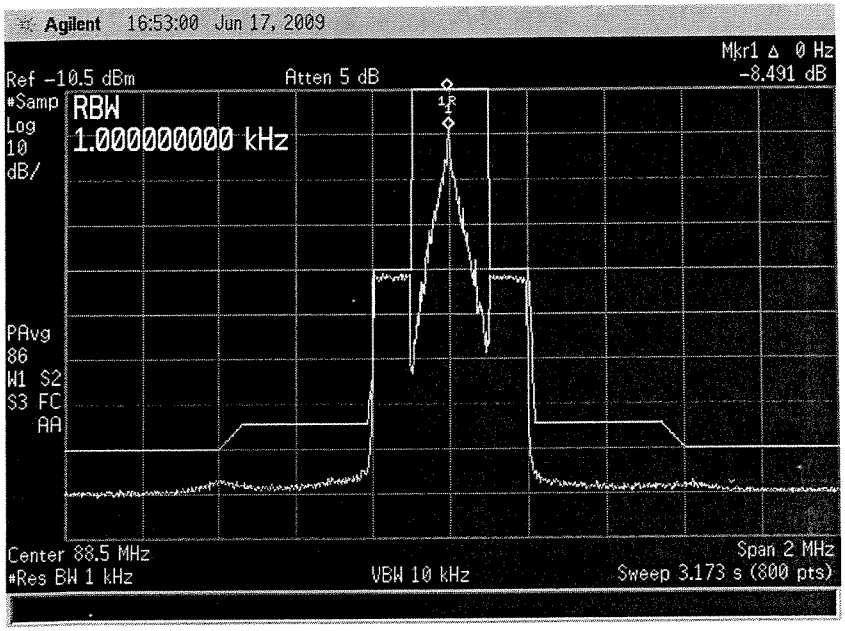
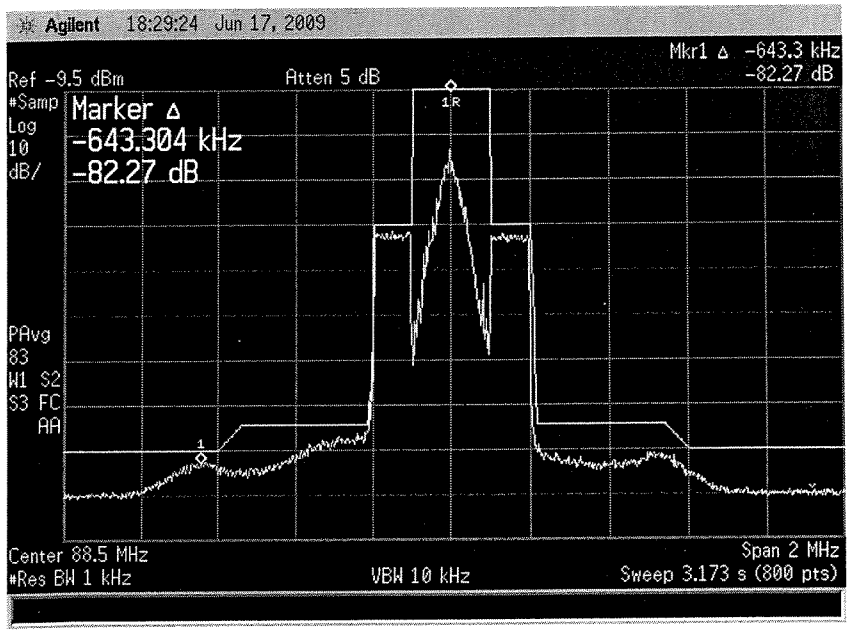


Figure 2 - KCRB antenna input a -10 dBc



KBPN operates a Harris Z8HD transmitter in split-level mode with a 6 dB hybrid combiner with an analog output power of 15.5 kW. A forward sample port is available for connection of the station's modulation monitor, which is a QEI model 691.

KBPN normally broadcasts in monophonic model. To provide stereo generation and to produce consistent audio processing with any laboratory-generated audio samples, NPR Labs is providing its Telos Omnia 6EX-HD processor and stereo generator. A stereo proof of performance will be conducted prior to audio tests to confirm high-quality stereo operation and occupied bandwidth in accordance with Section 73.1509 of the Commission's rules.

The Omni audio processing will use the "AdultContemp" preset. The audio test CD (same as used at WRNI) will be played by the Sony CD transport supplied by NPR Labs, connected directly to the Omnia processor and AES/EBU digital connection. The audio samples have been adjusted in amplitude so that the Omnia processor operates at an average of 10 dB gain reduction on the Broadband AGC. A gain reduction of 10 dB is the Return To Preset (RTP) gain of the Omnia in the AdultContemp preset. Modulation will be adjusted, after setup of the audio processing, to avoid more than 10 occurrences of modulation exceeding 100% peak, as determined by the QEI 691 monitor.

The following pages describe step-by step processes for operating the instrumentation and coordinating with the FM stations in the field tests.

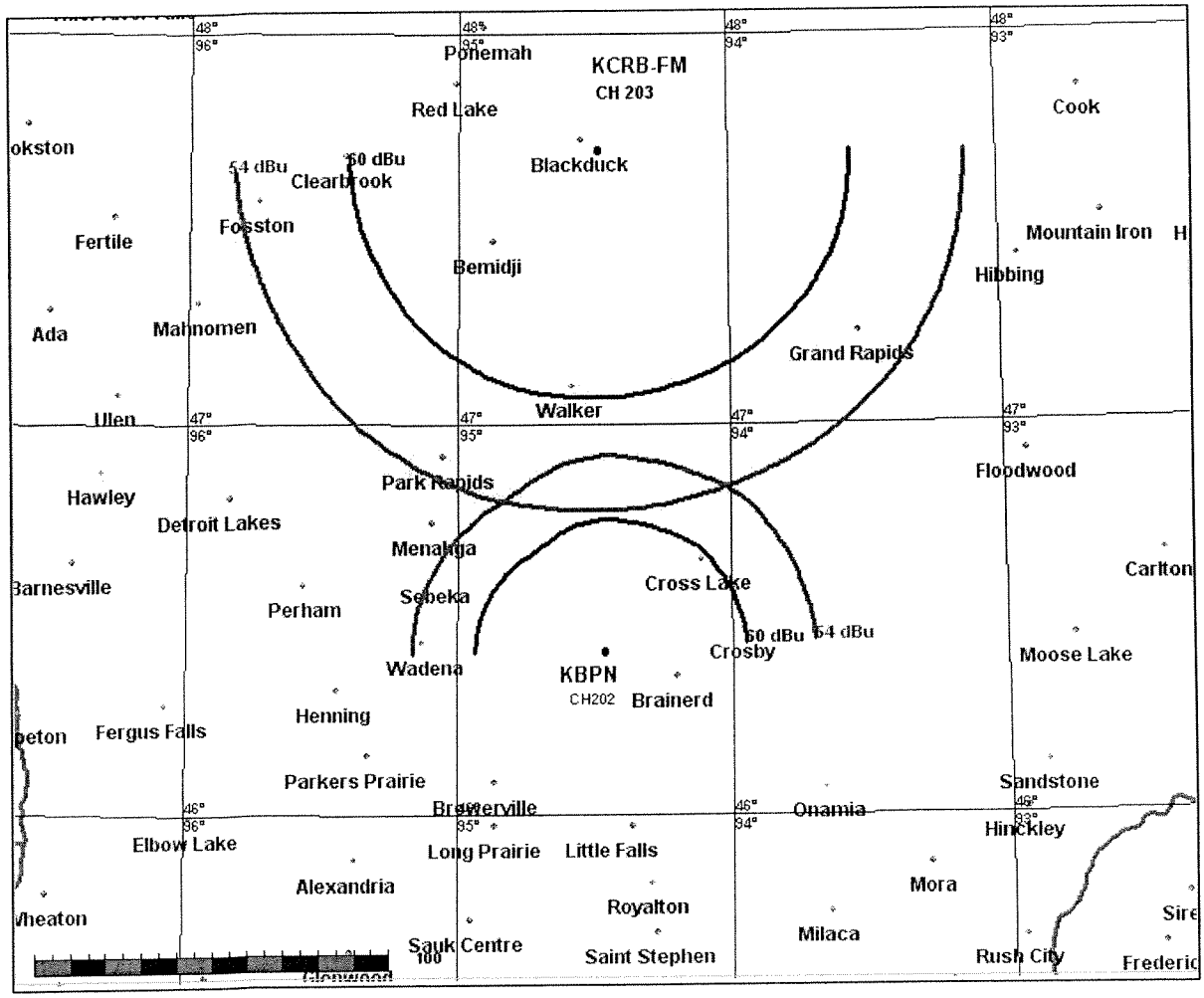
Test Route Selection

NPR Labs test team will perform the IBOC test in Minnesota with KCRB-FM located in Bemidji acting as the "interfering" station and the KBPN-FM located Brainerd as the first-adjacent channel"victim" station. Both participating stations are members of Minnesota Public Radio. The figure below shows the pertinent contours.

Minnesota Public Radio
FMCommander Single Allocation Study - 02-11-2009
KCRB-FM's Overlaps (In= 0.0 km, Out= 0.0 km)

KCRB-FM CH 203 C1
Lat= 47 42 21.0, Lng= 94 29 09.0
83.0 kW 301 M HAAT, 720 M COR
Prot.= 60 dBu, Intef.= 54 dBu

KBPN CH 202 C3 BLED20030722ACJ
Lat= 46 25 21.0, Lng= 94 27 41.0
5.0 kW 204 M HAAT, 597 M COR
Prot.= 60 dBu, Intef.= 54 dBu



NPR Labs test team will perform preliminary signal test drive measurements prior to the IBOC tests. Rather than using computer signal predictions to preselect locations, the field strength data of KCRB and KBPN will be used to determine the measurement sites. The suggested routes for measurement and analysis are shown in green on the map of the following page. KBPN's F(50,50) 60 dBu service contour is shown in black.

KCRB-FM's F(50,10) 54 dBu interfering contour is shown in red. The absolute field strengths and D/U ratios for route segments will be plotted as illustrated in the sample graph, below.

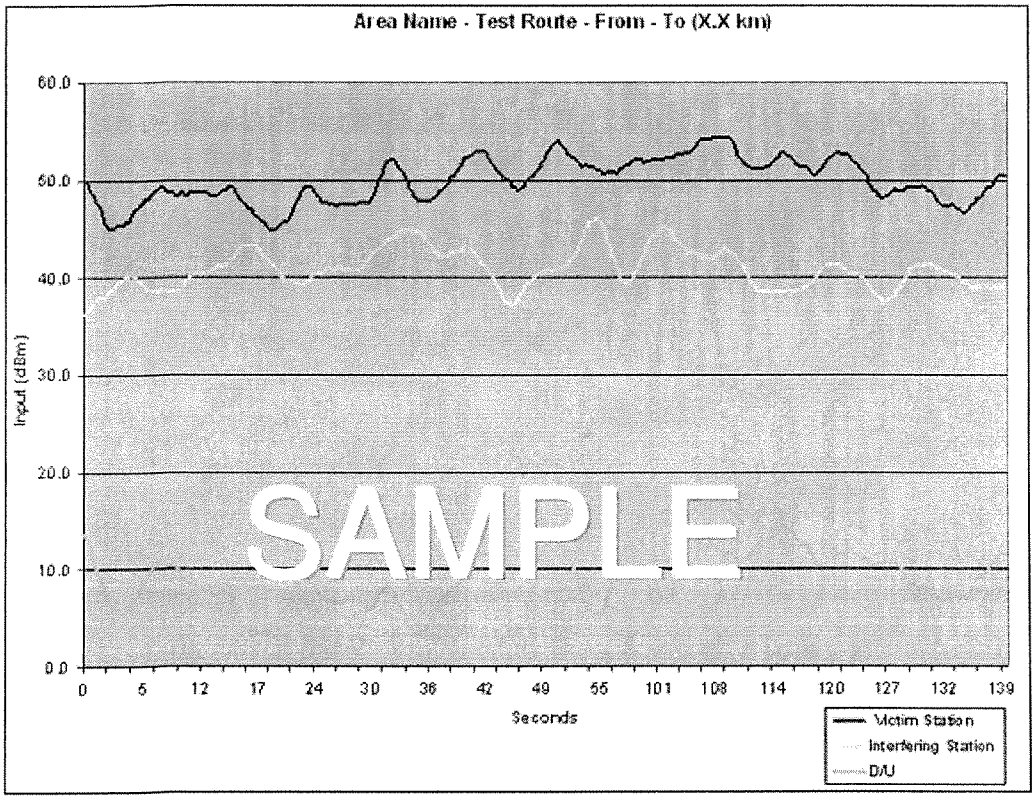


Figure 3 - D/U Graph Showing the Data Collected for Test Route Site Selection

Based on the following criteria, the NPR Labs test team will determine four desired test route areas. Test routes will be then determined with the following criteria:

- D/U Ratio ..... – Located in areas that exhibit D/U ratios as close to 6dB as possible.
- Signal anomalies – Areas exhibiting severe shadowing or signal interference will be avoided
- Length of test route – At least 1 minute long at the legal speed limit
- Start and stop points – At convenient locations for convenient, safe and efficient U-turns
- Continuity of test route – Should be preferably a main road or a road with no traffic lights

Maps of the signal (D/U) ratios of KBPN and KCRB are shown in Figure 3and Figure 4, using the TIREM and ITM (Longley-Rice) signal propagation models, respectively. For comparison, both models were set for median (50th percentile) time and location variability. Examples of the measurement site scripts and maps are shown on the following pages.

Figure 4 - KBPN/KCRB (D/U) Signal Ratio Map with TIREM (Median Time and Location Variability)

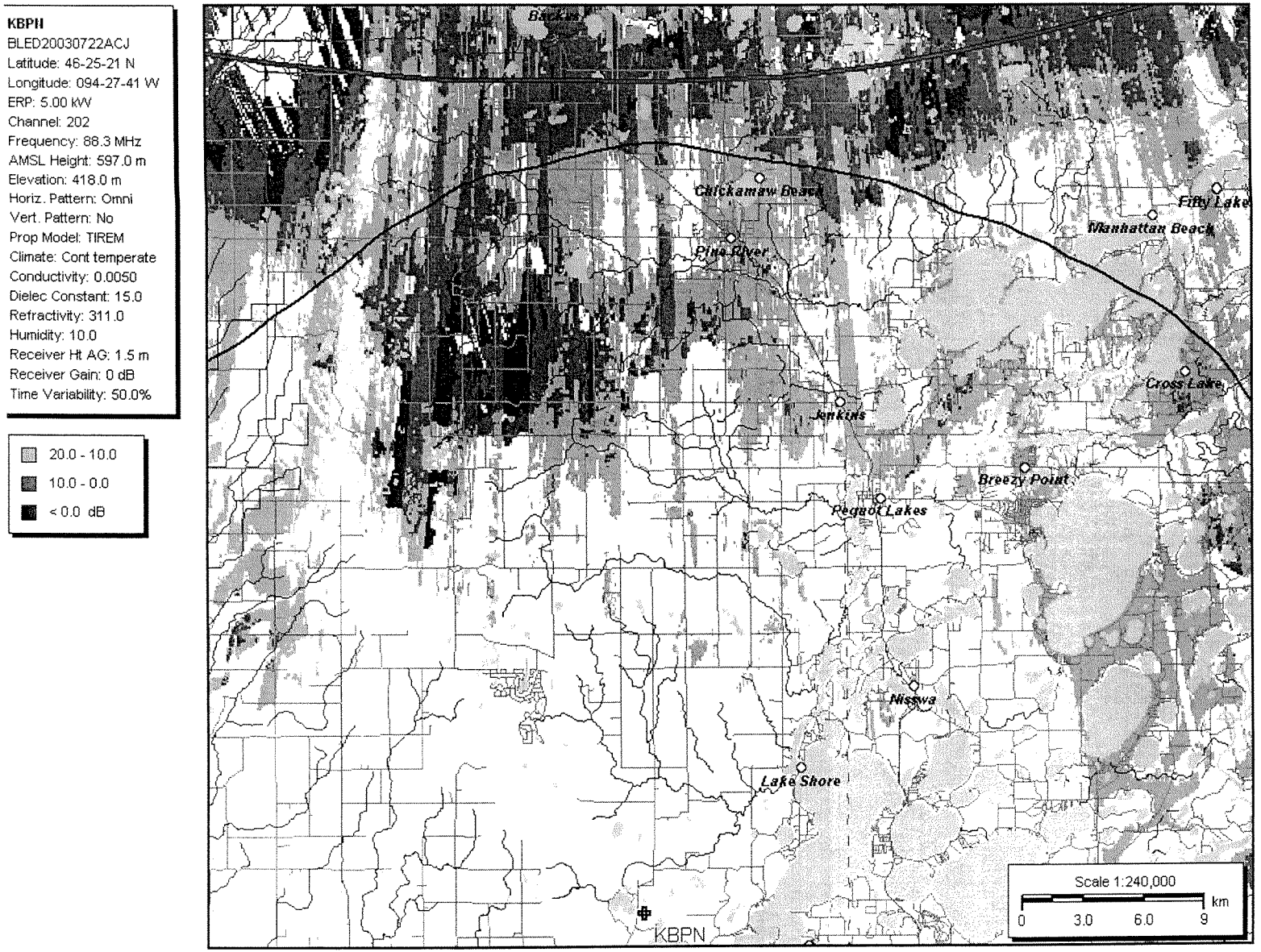


Figure 5 - KBPN/KCRB (D/U) Signal Ratio Map with ITM (Median Time and Location Variability)

KBPN
BLED20030722ACJ
Latitude: 46-25-21 N
Longitude: 094-27-41 W
ERP: 5.00 kW
Channel: 202
Frequency: 88.3 MHz
AMSL Height: 597.0 m
Elevation: 418.0 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: Longley/Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 1.5 m
Receiver Gain: 0 dB
Time Variability: 50.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast

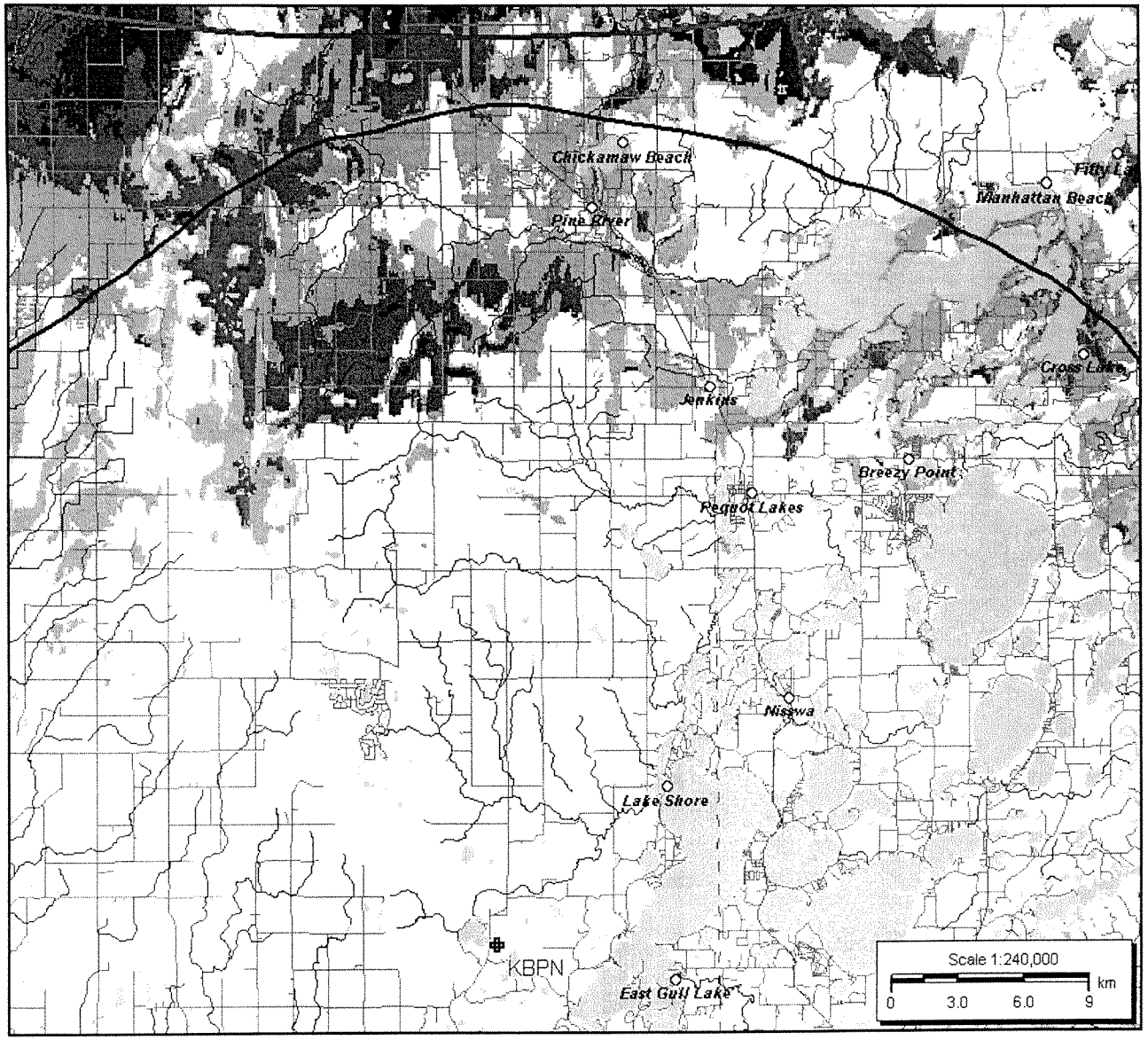


Figure 6 - Drive-test route for field strength and D/U measurement, with sample test areas (60 dBu contour approximate).

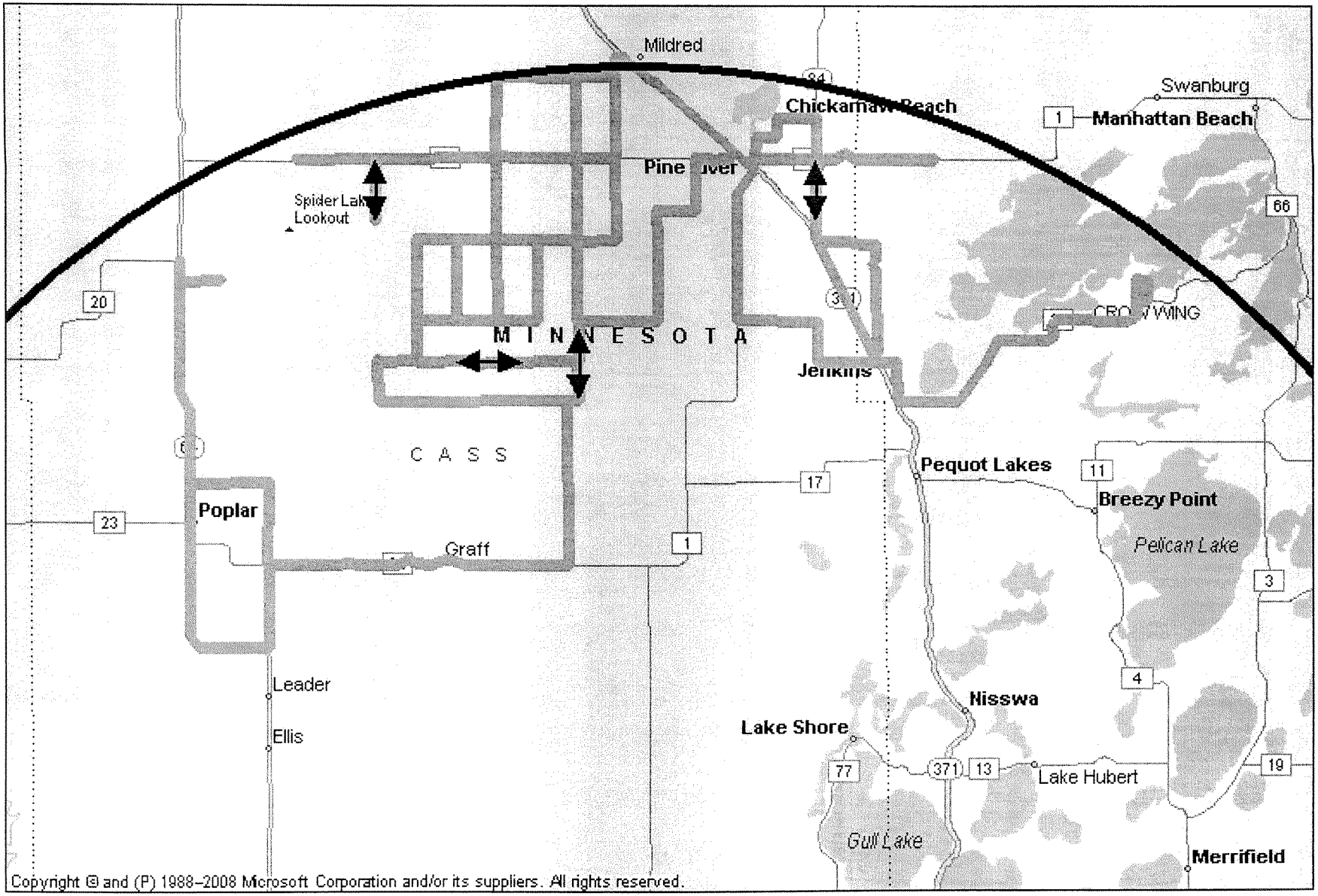
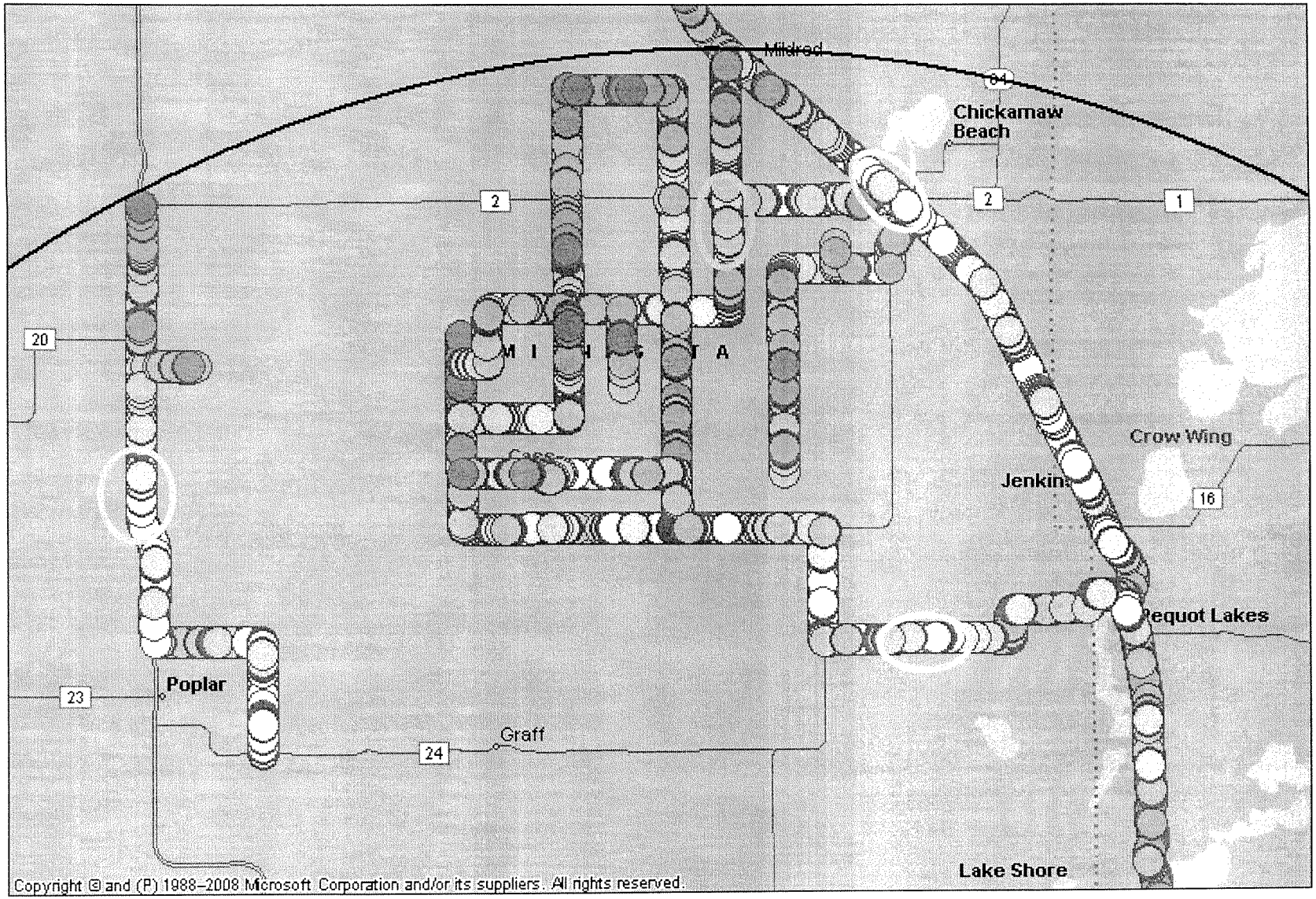
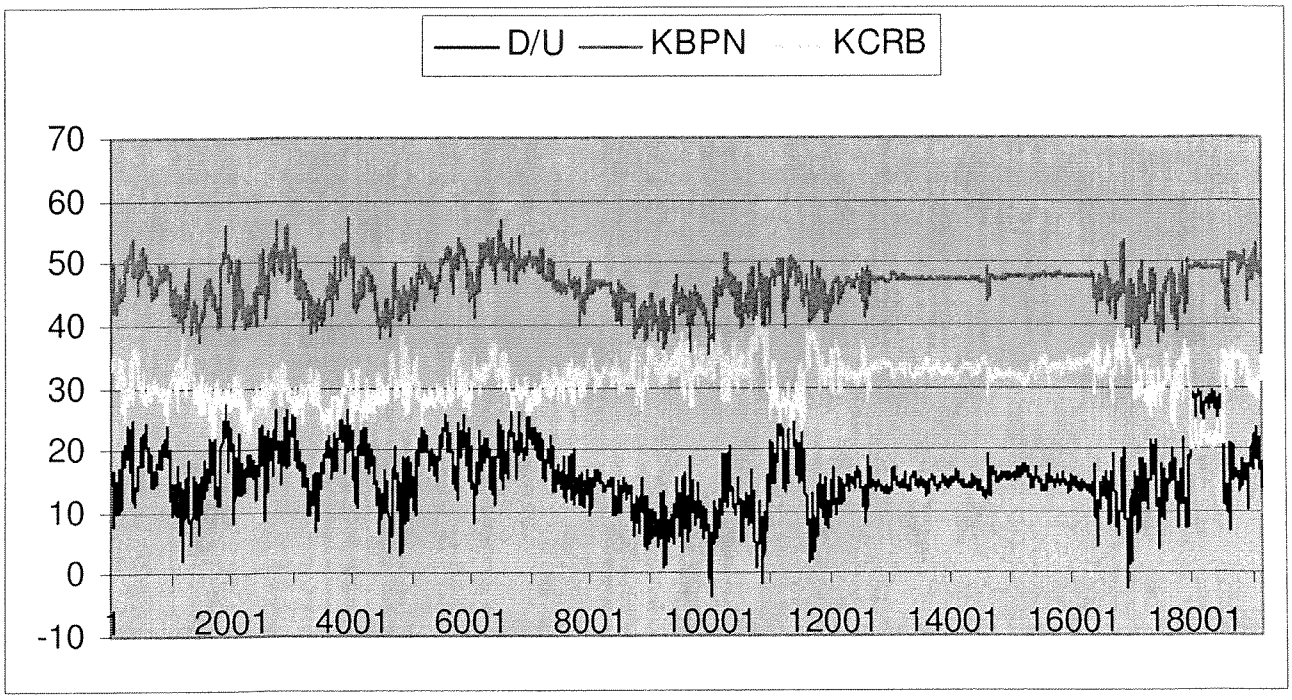


Figure 7 - RF D/U Ratios for measured roadways with selected test routes circled in yellow.




D/U
KBPN
KCRB
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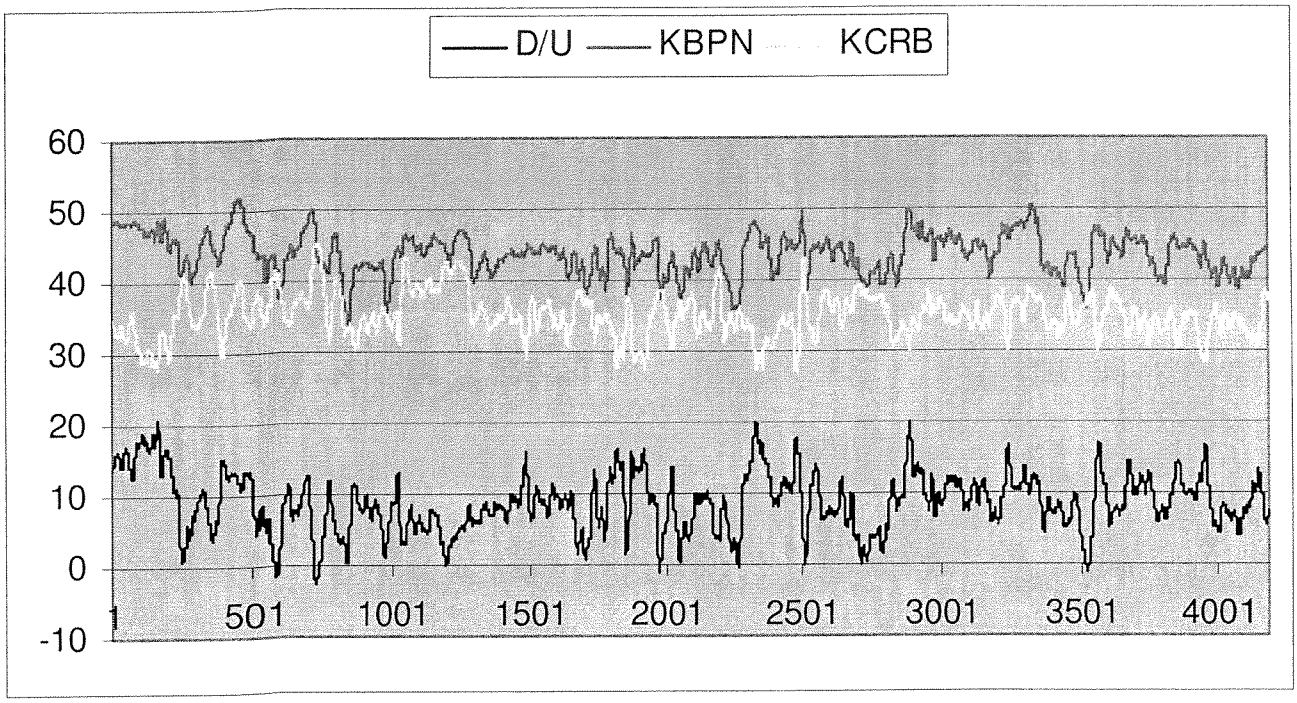
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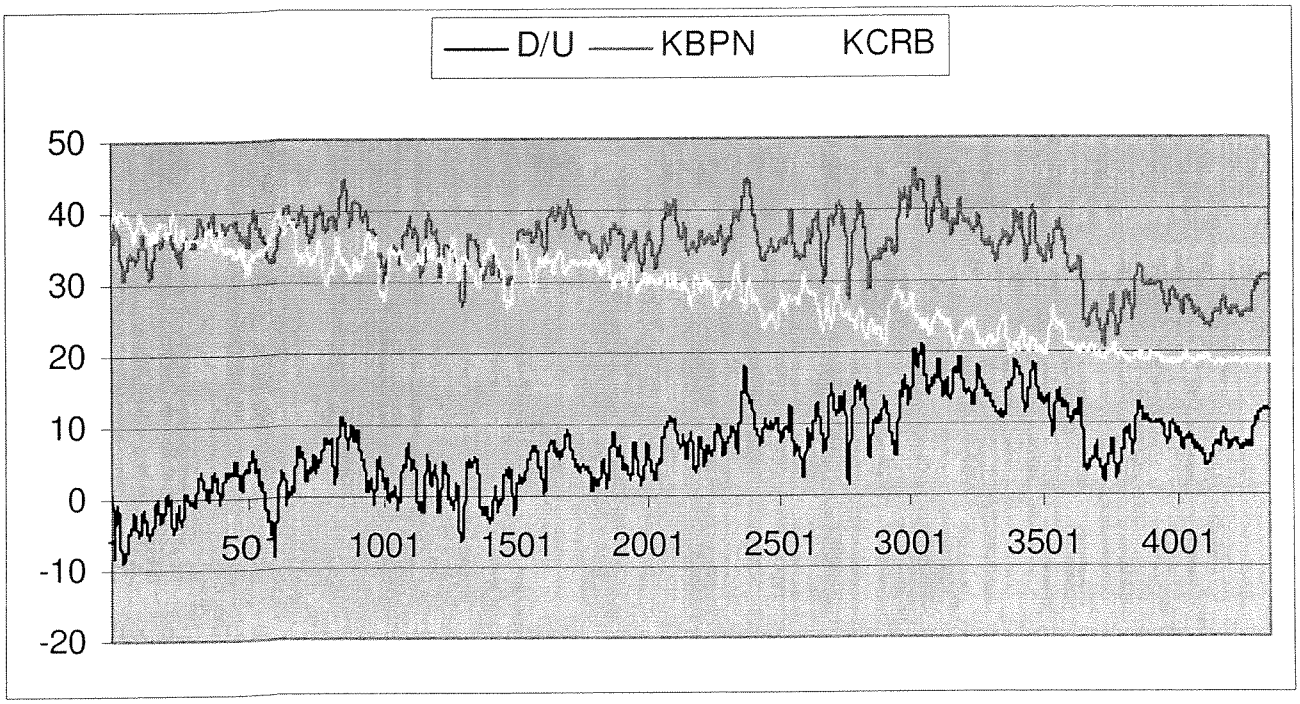
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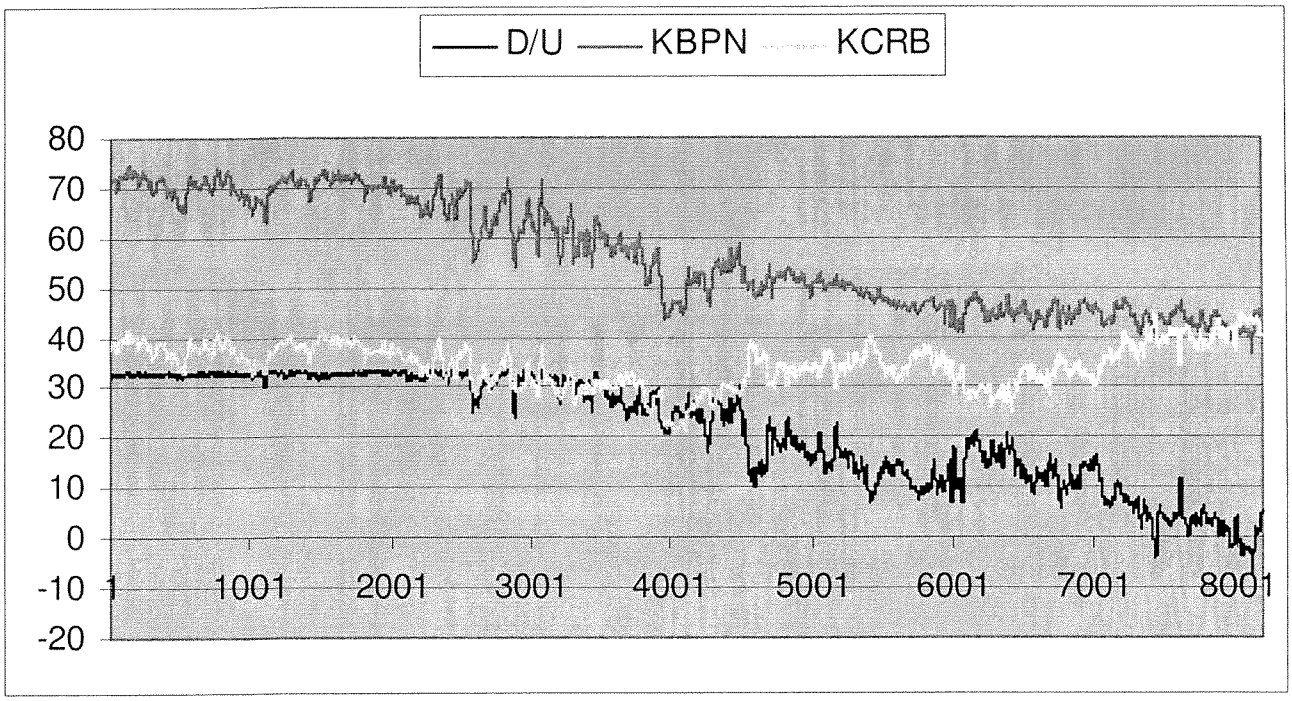
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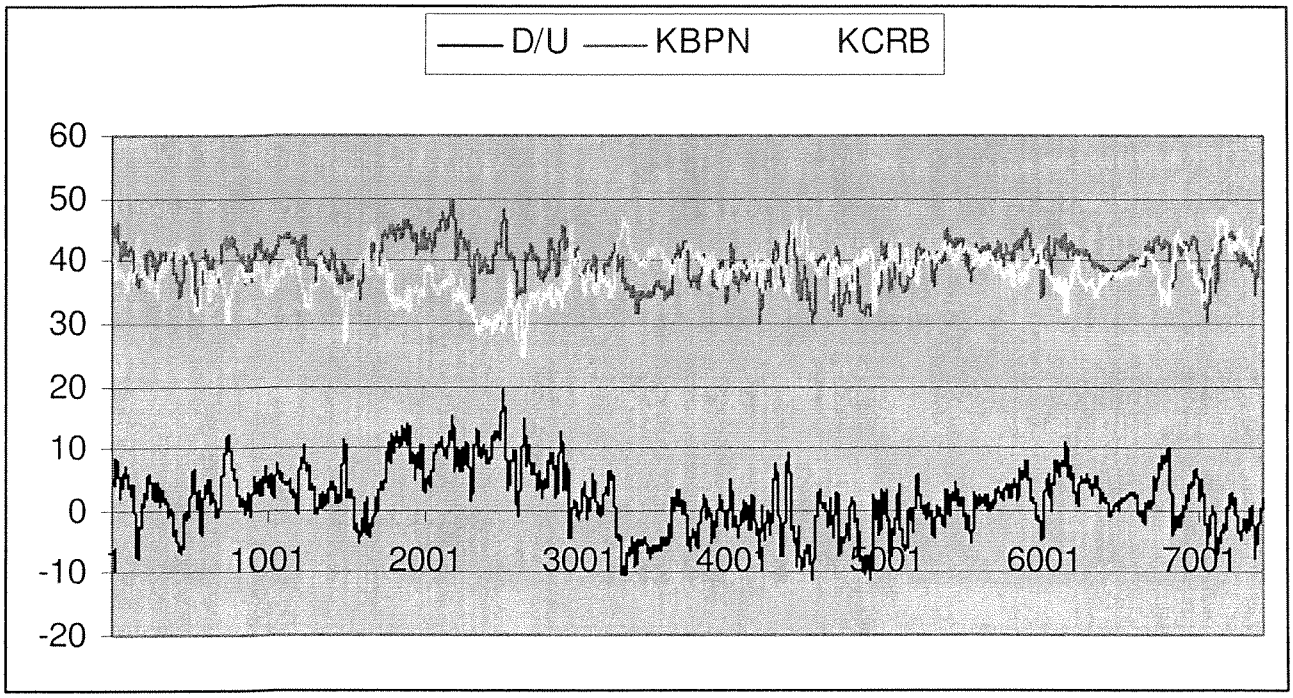
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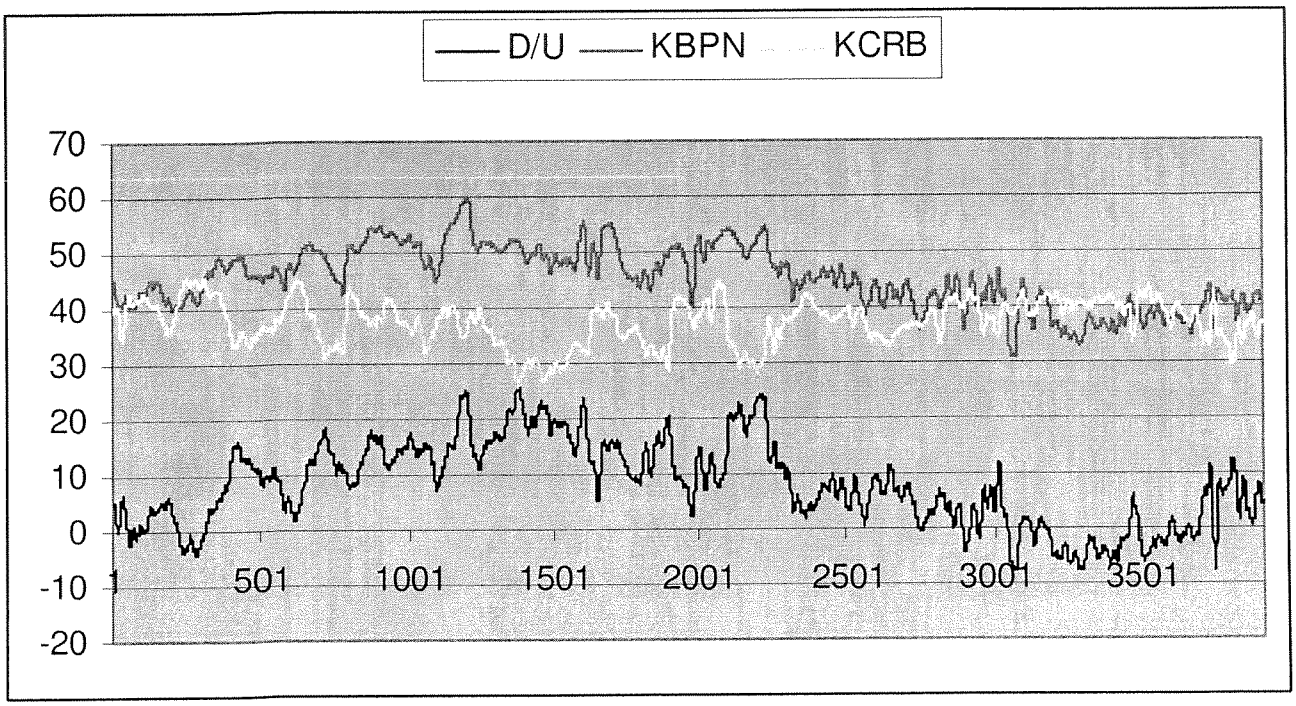
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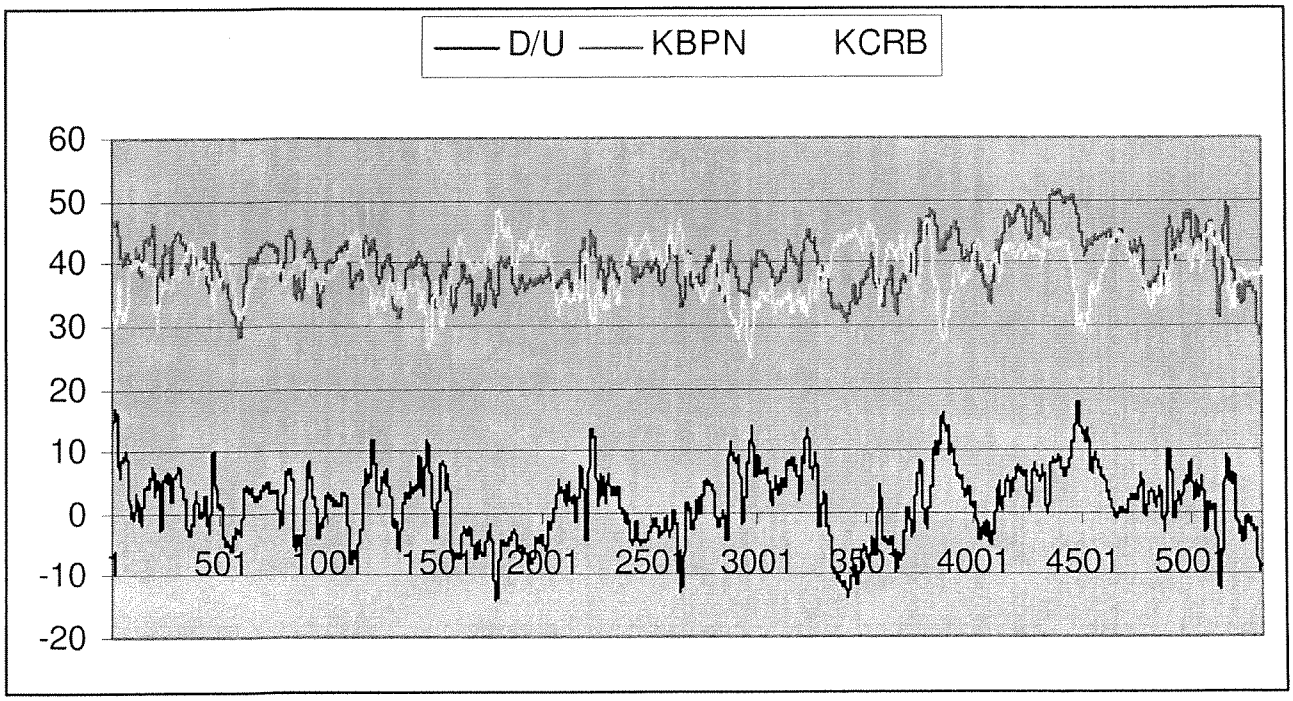
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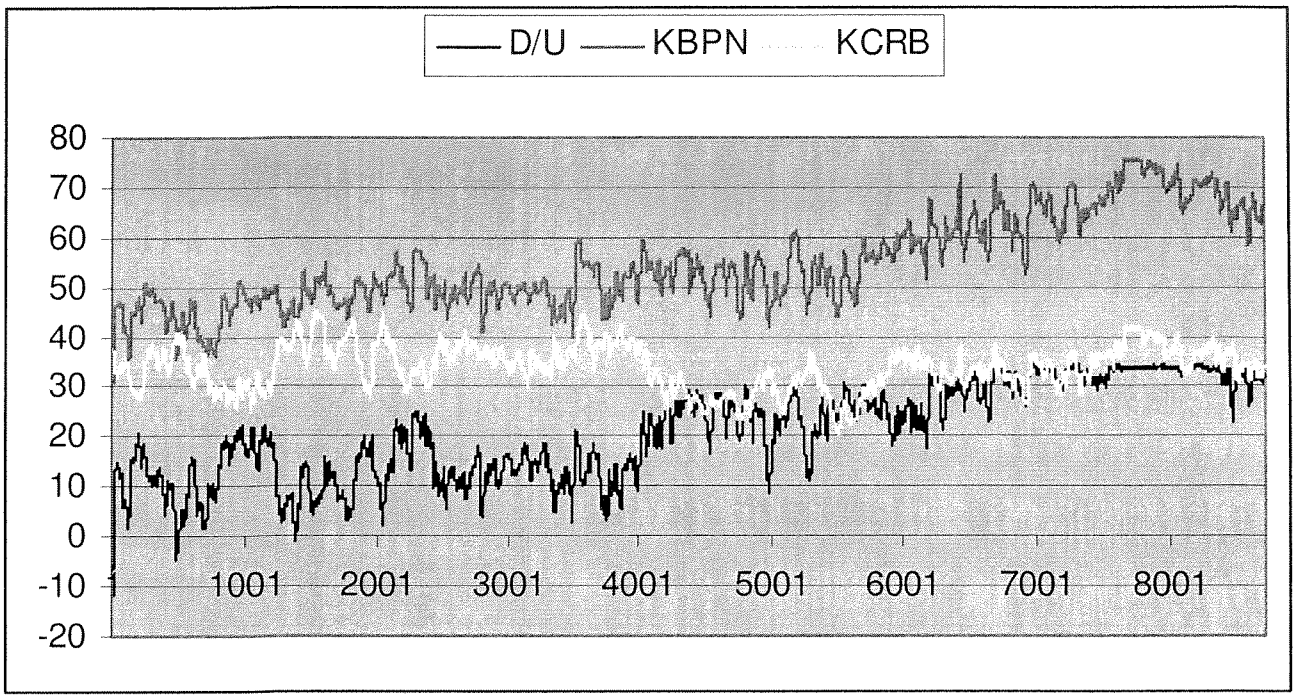
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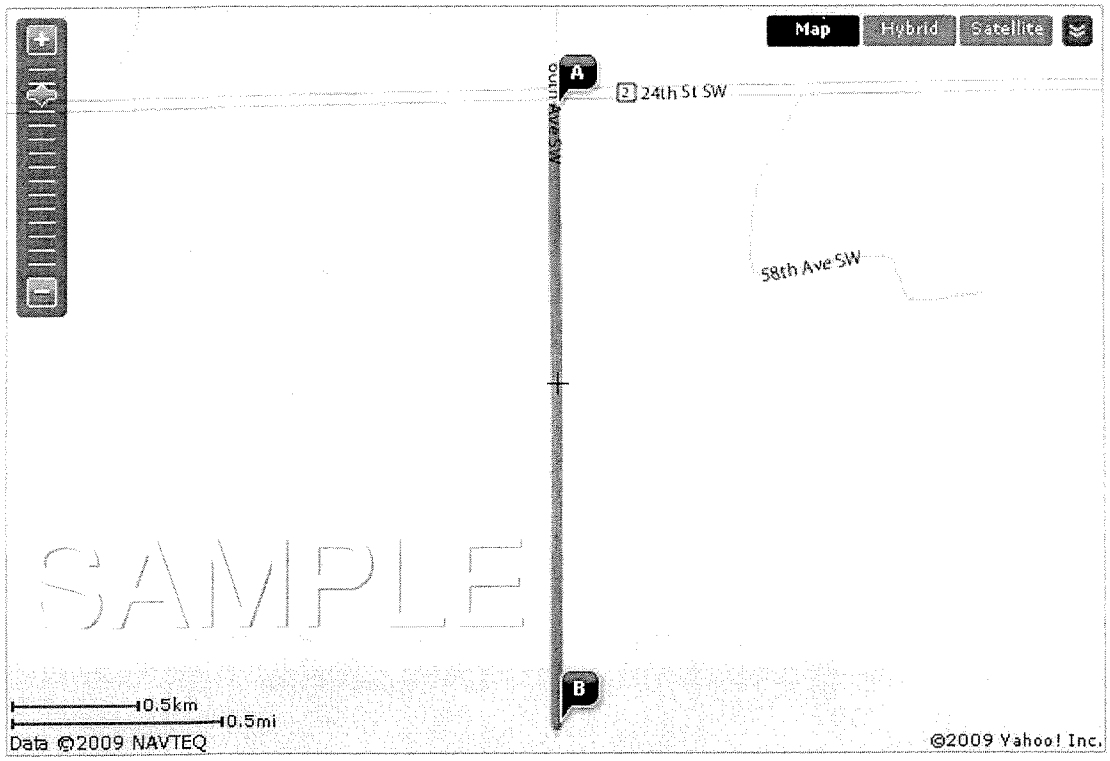
Sample Test Route 1

60th Ave SW, East of Spider Lake



Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	1-1
Test	Analog to analog interference	

Step #	Activity	Time
1	Call KCRB to set analog only transmission	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	1-2
Test	IBOC at -20 dBc (1%) injection	

Step #	Activity	Time
1	Call KCRB to set **-20 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	1-3
Test	IBOC at -14 dBc (4%) injection	

Step #	Activity	Time
1	Call KCRB to set **-14 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

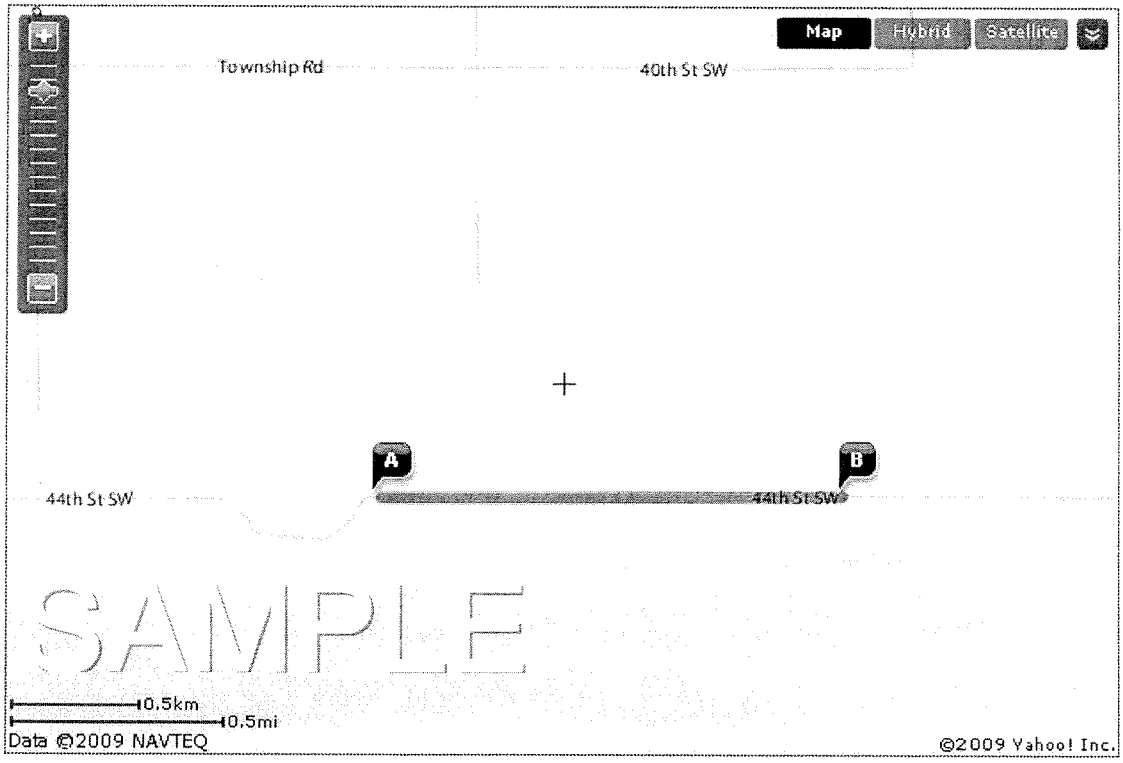
Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	1-4
Test	IBOC at -10 dBc (10%) injection	

Step #	Activity	Time
1	Call KCRB to set **-10 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	
	DIRECTIONS TO THE NEXT SITE: HERE	

Test Route 2

44th St SW, between 40th Ave SW and 56th Ave SW

SW of Pine River



Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	2-1
Test	Analog to analog interference	

Step #	Activity	Time
1	Call KCRB to set analog only transmission	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	2-2
Test	IBOC at -20 dBc (1%) injection	

Step #	Activity	Time
1	Call KCRB to set **-20 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

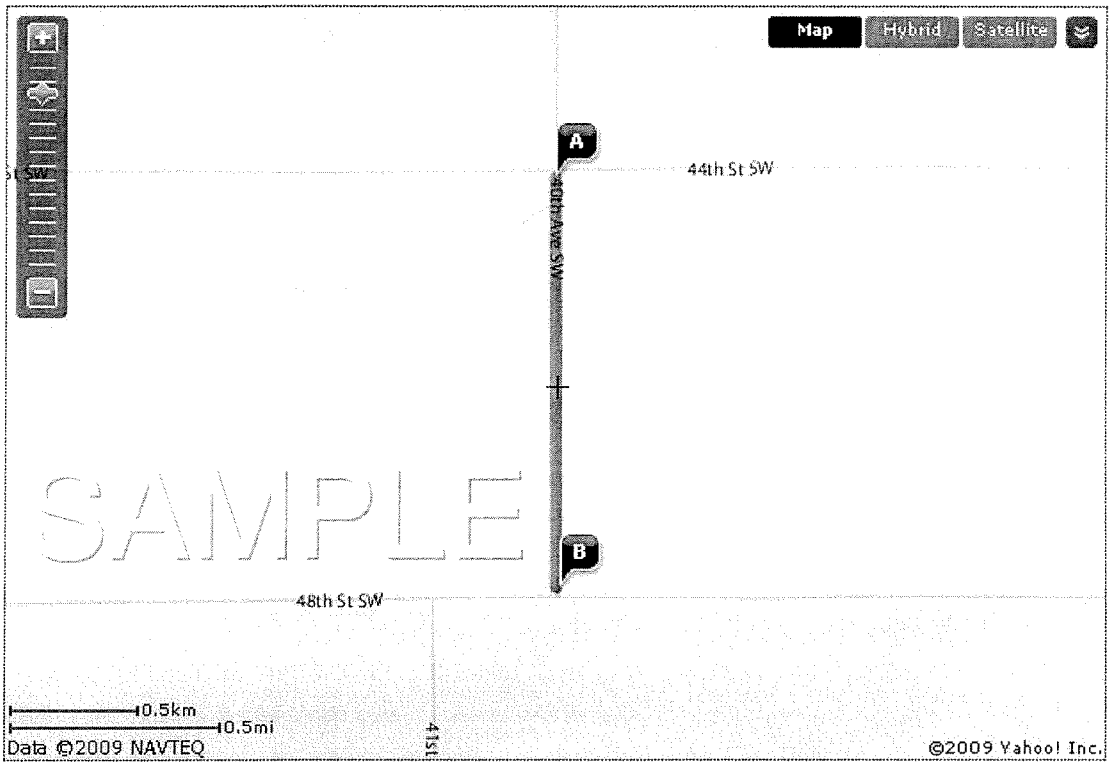
Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	2-3
Test	IBOC at -14 dBc (4%) injection	

Step #	Activity	Time
1	Call KCRB to set **-14 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	2-4
Test	IBOC at -10 dBc (10%) injection	

Step #	Activity	Time
1	Call KCRB to set **-10 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	
	DIRECTIONS TO THE NEXT SITE: HERE	

Test Route 3
40th Ave. SW between 44th St SW and 48th St SW
SW of Pine River



Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	3-1
Test	Analog to analog interference	

Step #	Activity	Time
1	Call KCRB to set analog only transmission	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map above)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	3-2
Test	IBOC at -20 dBc (1%) injection	

Step #	Activity	Time
1	Call KCRB to set **-20 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

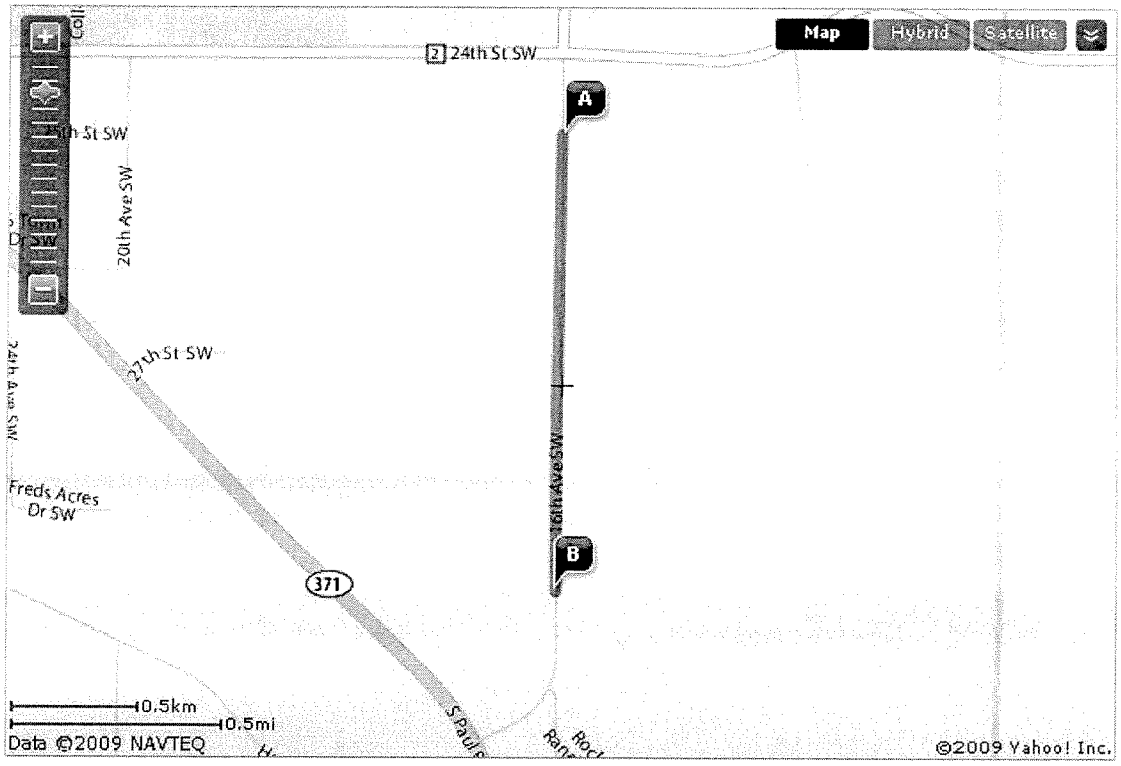
Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	3-3
Test	IBOC at -14 dBc (4%) injection	

Step #	Activity	Time
1	Call KCRB to set **-14 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	3-4
Test	IBOC at -10 dBc (10%) injection	

Step #	Activity	Time
1	Call KCRB to set **-10 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	
	DIRECTIONS TO THE NEXT SITE: HERE	

Test Route 4
16th Ave SW between 24th St SW and Rocking Ranch Rd, SE of Pine River



Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	4-1
Test	Analog to analog interference	

Step #	Activity	Time
1	Call KCRB to set analog only transmission	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	4-2
Test	IBOC at -20 dBc (1%) injection	

Step #	Activity	Time
1	Call KCRB to set **-20 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	4-3
Test	IBOC at -14 dBc (4%) injection	

Step #	Activity	Time
1	Call KCRB to set **-14 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Site	SITE NAME HERE (see map below)	Test Route
Address	DETAILED TEST ROUTE INFORMATION HERE	4-4
Test	IBOC at -10 dBc (10%) injection	

Step #	Activity	Time
1	Call KCRB to set **-10 dBc** injection	
2	Call KBPN to prepare to roll **Female Speech** track	
3	Begin field strength recording	
4	Begin audio recording	
5	Momentary interrupt in antenna input for synch of recordings	
6	Cue KBPN to roll **Female Speech** track	
7	Drive route - approx. 80 seconds elapsed time	
8	Return to starting point	
9	Repeat steps 2 through 5 with same audio track	
10	Call KBPN to prepare to roll **Male Speech** track	
11	Begin field strength recording	
12	Begin audio recording	
13	Cue KBPN to roll Male Speech track	
14	Drive route - approx. 80 seconds elapsed time	
15	Return to starting point	
16	Repeat steps 8 through 11 with same audio track	
17	Call KBPN to prepare to roll **Low Density** Music track	
18	Begin field strength recording	
19	Begin audio recording	
20	Cue KBPN to roll **Low Density Music** track	
21	Drive route - approx. 80 seconds elapsed time	
22	Return to starting point	
23	Repeat steps 14 through 17 with same audio track	
24	Call KBPN to prepare to roll **High Density** Music track	
25	Begin field strength recording	
26	Begin audio recording	
27	Cue KBPN to roll **High Density Music** track	
28	Drive route - approx. 80 seconds elapsed time	
29	Return to starting point	
30	Repeat steps 20 through 24 with same audio track	

Indoor/Mobile Coverage Measurements

As part of the Advanced IBOC Coverage & Compatibility Study, NPR Labs test team will also perform a test of perceived reception of the HD signal transmitted at two power levels. One being transmitted at usual 1% and second at elevated 10% IBOC power.

IBOC Digital Audio Broadcast(DAB) Coverage Measurements

Measurements of IBOC DAB reception for indoor and mobile service will be collected with a portable system containing the full instrumentation test bed developed specifically for mobile reception. This system also includes a provision to record the speed and distance traveled during the actual data collection. Any data recorded at a stop can be then removed from the measurement data set. A normal-mode helical antenna was chosen for indoor measurements. The system includes an antenna constructed with ½"diameter PVC tubing and tinned 22-guage wire, and fitted with a BNC connector at the base, which contains a series capacitor to compensate for inductive reactance. A small stainless steel disc is at the base to serve as a counterpoise, improving the gain and making the antenna quite immune to proximity effects of the person holding the antenna.

Portable System Containing the Full Instrumentation Test Bed

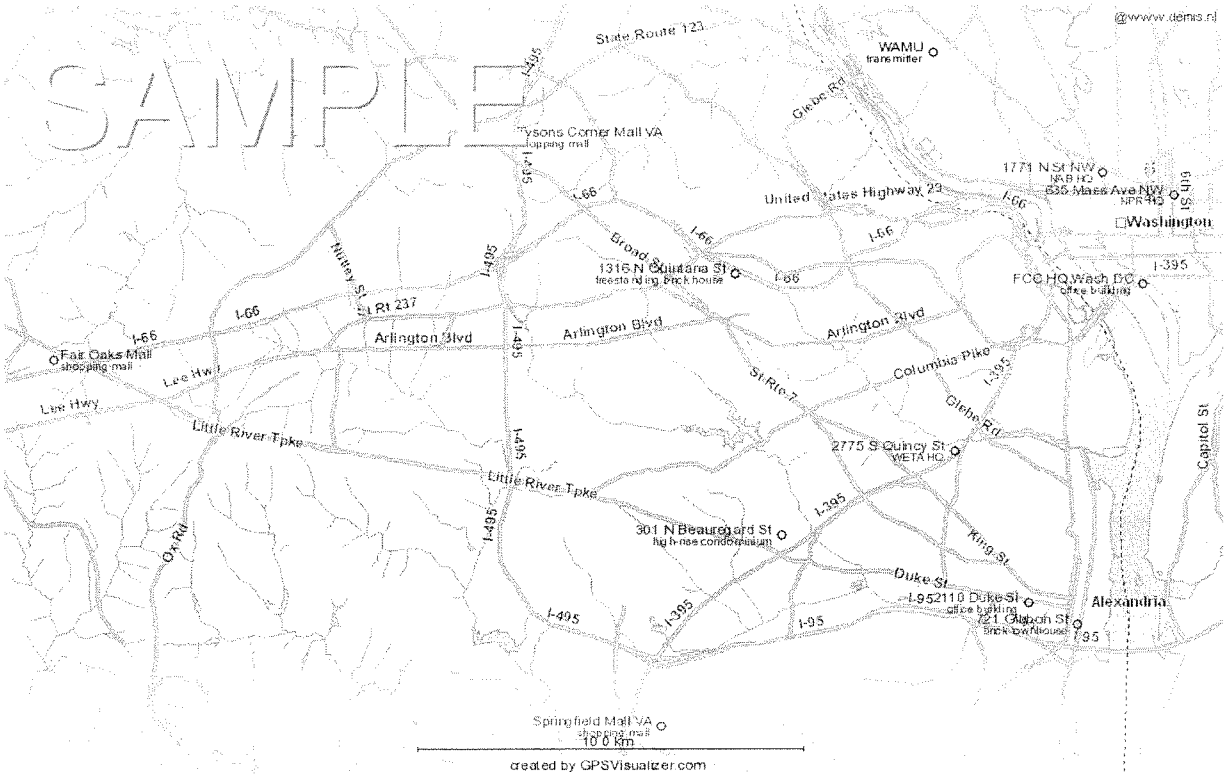
The portable system depicted in the figure above will simultaneously collect and record data relative to the following four signals:

- IBOC DAB receive status
- Field strength of the IBOC host FM
- Field strengths of the upper first-adjacent channel
- Field strengths of the lower first-adjacent channel

Indoor coverage measurements will be performed at ten test locations and will have the following characteristics:

- Type - Public spaces such as shopping malls, office buildings and condominium
- Selection - Test location will be selected based on
- Time of tests - **TBD**
- Test intervals - Each test segment will be of approximately **TBD** seconds in duration
- Power Levels - A 1% and 10% injection levels segment will be tested at test each location
- Data collection - Data will be recorded for subsequent analysis and archiving purposes

A map of the stations' service area depicting the transmitter site and the test site locations will be developed and included in the final report. A sample map is presented below:



Map of Transmitter Site and Test Site Locations

Data collected at each test location will be recorded. It will contain the following information for each test site:

- Location address
- Type of structure and test location within
- Distance from the transmitter site
- Bearing from the transmitter site
- Field strengths incident on the exterior of the building at ground level
- Field strength loss n the interior of the building

Test Results Analysis

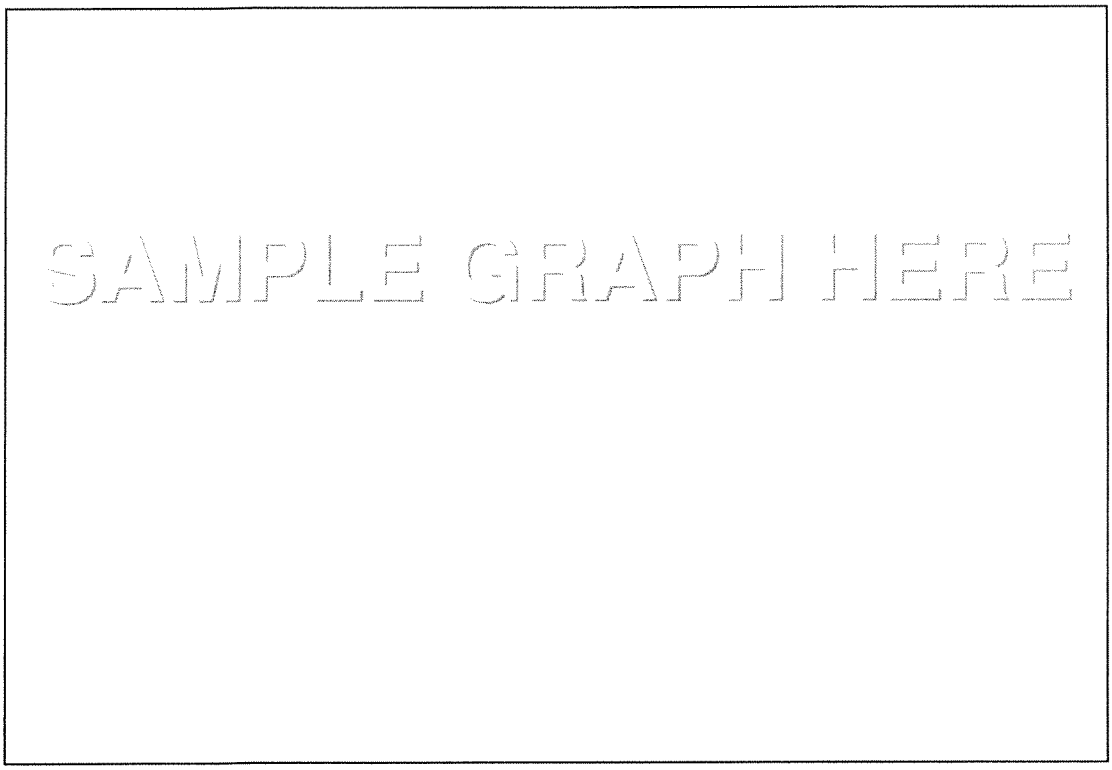
A part of test result analysis will include a comparison of measurements collected during the pre-selection to verify the consistency of atmospheric propagation

In most cases several measurements will be collected at different locations of the respective test site (building) and recorded. The table below shows the type of data collected at each of these test locations and the specific location within. The building penetration loss associated with these interior locations is provided.

Results from Indoor IBOC Receive Measurements at Multiple Locations within 10 Mobile Test Sites

Location	Notes	Distance (km)	Azimuth (deg T)	Exterior Field (dBu)	Bldg. Loss (dB)	IBOC Availability (%)
WAMU	transmitter site	0	0	-	-	-
301 N Beauregard St, Alexandria VA	high-rise condo 2nd floor	13.4	196	68	15	98
721 Gibbon St, Alexandria VA	Brick townhouse ground floor	15. 6	166	56 -	-	96
Fair Oaks Mall Fairfax VA	shopping mall upper deck	24.3	250	55	19	9

The results of all TBD indoor measurements from the 10 sites will be graphed. The graph will plot the percentage of time and locations at which IBOC DAB was received (on the vertical axis) against the mean field strength collected for each interior location. A 4th-order polynomial trend line, in black, helps will show the overall field strength required for availability from 0 to 100 percent.



Indoor - Mobile IBOC Reception Availability vs. Indoor Field Strength