A Report to

Belo Inc.

Regarding

Field Measurements of CH 11 Digital Television Signals WLFI-DT Lafayette, Indiana

November 20, 2009

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PURPOSE

The purpose of this document is to describe the interference field testing conducted within the WLFI coverage area to analyze the interference that is predicted to occur due to the power increase at WHAS-DT 11 at Louisville, Kentucky. The DTV field test results herein were obtained after conducting DTV signal strength and DTV service field tests in areas near Indianapolis, Indiana and surrounding areas during October 22-25, 2009. The tests were conducted by the firm of Meintel, Sgrignoli, and Wallace (**MSW**) at the request of Belo Broadcasting and LIN Television. The tests were conducted in order to determine the impact of predicted interference from WHAS-DT 11 at Louisville, KY when the station raises its ERP from approximately 5.2 KW to 16.4 KW as authorized by the FCC under an STA.

WHAS-DT desired to raise its effective radiated power to the 16.4KW level permanently, however, the areas where "new" interference is predicted to occur were within areas where the DBS (Direct Broadcast Satellite) provider's pickup the WLFI-DT signal off-air. Concerns were raised that the "New" Predicted interference from WHAS to WLFI would impair the reception of WLFI in areas that are utilized for off-air pickup by the satellite television providers and cable television head-ends, as well as in areas where consumer off-air pickup of WLFI-DT is predominate.

These measurements were conducted in two distinct categories of predicted interference cells. First, the most populous cells where new interference is predicted were measured. Secondly, those cells with the largest change in predicted D/U ratio were also measured.

This document describes the field test goals, objectives, test equipment, test plan, test data, and summary of the test results. A companion spreadsheet containing the raw field test data and its analysis is available with this report along with a CD containing a PDF file of this report, the Excel data spreadsheet file, test site photographs, and all the spectrum analyzer data files (i.e., spectrum plots).

OBJECTIVES

The field measurement program undertaken by WHAS-DT and implemented by MSW had the objective of determining the impact of the WHAS-DT power increase on the reception of WLFI-DT in those areas where interference was predicted to occur.

The effect of the 5-dB increase in radiated power was evaluated on a margin-to-TOV-reduction basis, looking for the interference from the co-channel WHAS-DT to reduce the received signal margin to TOV.

Note that this field test was *not* designed or intended to be a statistically-meaningful test. Rather, the test was a "fact-finding" test on a sampled basis that was specifically aimed at the impact of co-channel interference to WLFI-DT from WHAS-DT.

After agreement between WHAS-DT, WLFI-DT, and MSW on the field testing goals and objectives, the field test was performed over a four-day period between the dates of **October 22, 2009** and **October 25, 2009**, inclusive. All field test data was organized into an Excel spreadsheet, checked for accuracy and completeness among the field test data gatherers, and then analyzed on an anecdotal basis. In addition to this final written report, a CD-ROM is available from MSW that contains a PDF file of the field test report, an Excel data spreadsheet file, and spectrum plot files.

FIELD TEST TRANSMITTER DESCRIPTION

The CH 11 WHAS-TV digital transmitter facility is located on Floyds Knob, Indiana (38-21-23 N & 85-50-52 W) northwest of downtown Louisville. A Harris Platinum series transmitter currently provides about 1.27 kW of average transmitter power output (**TPO**) that feeds a circularly-polarized omni-directional Dielectric traveling-wave TCL12A11 antenna employing 0.75 degrees of downward beam tilt. During the field test, this transmitter configuration provided 5.2 kW of ERP. The WHAS-TV transmit antenna is on a 984' AGL tower and has a Radiation Center Above Ground Level of about 287.6 meters (943 feet) and a Height Above Average Terrain (**HAAT**) of about 392 meters (1286 feet).

This digital field test was performed using the same circularly-polarized CH 11 omni-directional transmit antenna that has been used for many years for analog NTSC transmission. The analog NTSC signal watched by Louisville viewers was originally transmitted at 135 kW, *peak* ERP, which was about 14.14 dB higher than the currently authorized 5.2 kW *average* ERP of the DTV signal and 9.16 dB higher than the current STA-authorized increased ERP of 16.4 kW.

The WHAS-DT transmitter was operated at both the 5.2 KW and 16.4 KW ERP power levels for each test location. The MSW test engineer coordinated the transmitter power level switching with the transmitter engineer at WHAS-DT at each location.

FIELD TEST VEHICLE DESCRIPTION

Appendix 1 contains a picture of the MSW test van in **Figure A1-1**, and the van's electronic system block diagram of the reference test equipment used for *outside* measurements is illustrated in **Figure A1-2**. The test antenna was mounted on the pneumatic mast of the truck and was capable of being raised to 30' AGL and angularly rotated remotely from within the truck. A mast-mounted compass allowed direct readout of the antenna pointing angle, and a mast-mounted camera provided a view of the surrounding area that the antenna was "looking" through. A GPS unit inside the truck was used to determine the exact location of each test site as well as its distance and bearing back to the WLFI-DT and WHAS-DT transmitter sites. The GPS coordinates also provided accurate location information for a computer mapping program in order to identify and plot exact test site locations for this report.

For the WLFI-DT and WHAS-DT reception tests, an A.H. Systems Log Periodic antenna was utilized for measurements. This antenna was calibrated using a reference VHF dipole antenna (Potomac). Each of the two dipole elements was carefully adjusted to the appropriate element length per the chart associated with the dipole antenna (13 5/8"). The A.H. Systems log periodic antenna exhibited a gain of approximately 3 dB relative to the calibrated dipole antenna for channel 11 (the dipole antenna factor as published by Potomac is 14.7).

The *dipole factor* allows direct mathematical conversion between field strength (in dBµV/m) and signal power (in dBm). This value is known for CH 11 (-121.2 dBm – dBµV), and it was used, along with the antenna gain (in dBd), truck system gain (in dB), measured signal power level (in dBm in a 6 MHz bandwidth), and the selected variable attenuator value (in dB) to calculate the DTV field strengths at each test site. The *system gain* in the truck was made up of the coaxial downlead cable, the variable input attenuator, and the "works-in-a-drawer" (**WIAD**) RF amplifier system that included an internal 4-way splitter at its output for simultaneously feeding the incoming DTV signals to multiple receivers and a spectrum analyzer.

The system gain for the 30' AGL system was measured for calibration purposes before the start of *each* test day. The 30' AGL had a net system gain of approximately 11.8 dB. By using the selected attenuator value (to provide an *approximate* -50 dBm/6 MHz signal level at the spectrum analyzer input to minimize amplifier overload), the field strength was accurately calculated at each test site for the digital ATSC signal. The input attenuator also provided the means to determine the DTV site margin by attenuating the received signal to just above threshold of visible errors (**TOV**) and threshold of audible errors (**TOA**), a value that was determined by the truck's measured noise floor (and corrected for the spectrum analyzer's own measured noise floor) and found to have a value of approximately -86.0 dBm/6 MHz (as measurable by the spectrum analyzer).

The field test van utilizes two NTIA Certified Coupon Eligible Converter Boxes (CECB) for DTV receivers. This particular test utilized an LG and GE CECB. Each CECB is fed from an output from the WIAD Pre-amplifier system.

A Rhode & Schwarz FSH-3 Spectrum Analyzer is utilized for the measurement of the DTV signals, spectrum plots, and its internal tracking generator is used for system calibration purposes.

FIELD TEST PLAN

The following text outlines the WLFI-DT measurements. MSW conducted these measurements throughout the metropolitan Indianapolis area during **October 2009**. The field test generally followed the field testing methodology used in the past, including field work performed during the Grand Alliance tests in Charlotte, NC, the Model HDTV Station tests in Washington DC, and subsequent numerous field tests around the country performed by MSW.

Note that this relatively short field test did ***not*** produce statistically-meaningful results, but rather they provided a sampling of impact on reception of the WLFI-DT channel 11 DTV signal in those areas where the co-channel WHAS-DT channel 11 DTV signal was predicted to impair reception of the desired WLFI-DT signal.

MEASUREMENT OVERVIEW

These DTV field tests were a joint exercise between MSW, WLFI-DT and WHAS-DT. MSW provided a *customized* field test plan and data spreadsheet, two experienced field testers, reference test equipment and a fully-equipped test vehicle, expert data analysis, and a written report. In addition to the report, MSW archived all of the spectrum plots, test site photographs, and data spreadsheet. On the other hand, WLFI-DT and WHAS-DT provided technical information regarding their transmitter, a transmitter engineer to change radiated power when required.

Specifically, a team of two experienced MSW testers (an engineer and a technician) in the fully-equipped MSW field test truck made the measurements in the truck at the outdoor test locations and at the two DBS pickup locations. MSW provided all the test equipment, reference measurements, data gathering and organization, data analysis, and report writing.

The measurement program consisted of 27 outdoor test sites and 2 DBS pickup location test sites. Four (4) test days were required to do these tests, excluding the test van transportation time. The field test was performed on **October 22**, **2009** through **October 25, 2009** inclusive. The measurements for each field test day typically occurred between approximately 9:00 AM and 5:00 PM, *exclusive* of travel times.

A calibrated log-periodic antenna was used to accurately measure (and plot) the 6 MHz DTV signal of WLFI-DT at 30' AGL (mast-mounted) with the antenna adjusted for maximum field strength The outside test measurements included field strength, service determination (3-minute sample period), and service margin (if it existed), all at the WHAS-TV transmitter ERP of 5.2 kW. These measurements were then repeated with the WHAS-DT transmitter ERP raised to 16.4KW. This allowed a comparison of the reception margin and other criteria with the co-channel interferer at both power levels.

In this way, a decrease in the reception margin of the WLFI-DT signals (margin reduction) would be indicative of co-channel interference from the WHAS-DT facility to WLFI-DT.

MEASUREMENT LOCATIONS

The test sites were selected based on a study of predicted interference to WLFI-DT from the increased ERP of WHAS-DT. This Longley-Rice study produced a detailed map indicating areas where "new" interference was predicted. In other words, specifically in locations where DTV service from WLFI-DT was predicted to be acceptable with the WHAS-DT facility at 5.2KW and where reception is predicted to be lost when the WHAS-DT ERP is raised to 16.4KW. ("New" interference areas).

These locations were generally clustered around the Indianapolis, Indiana metropolitan area as well as a cluster near Anderson, Indiana. (See maps in **Appendix 2**). A list of the geographic coordinates of the centroid of the population cells was generated and sorted into two categories.

First, a list of the centroids with the most populous cells was generated and these areas were plotted on a map. In general, the top 20 locations were targeted as areas for measurements.

Secondly, a list of the centroids with the highest changes in desired-to-undesired signal ratios (D/U) was generated and these areas were plotted on a map. Again, in general, the top 20 locations were targeted as areas desirable for measurements.

In total, 27 measurement locations were visited during the field testing program. Again, the number of field test sites visited was *not* statistically meaningful, but rather this number provided some good information, both general and specific, regarding a variety of receive conditions in this small sample of test sites.

Of these 27 locations, 15 were from the list of most populous centroids and 12 were from the list of the highest D/U ratio changes.

In addition, 2 locations were measured at proposed DBS pickup points. These locations were the WISH-TV Studios in Indianapolis on N. Meridian Street, near the rear of the parking lot using the off-air channel 11 antenna installed on the STL tower. A second location is used by Dish Network at the WTHR-DT transmitter site on Ditch Road. This location was also measured using the 30' AGL mast and antenna. Both of these locations were measured with the WHAS-DT signal at both power levels.

MEASUREMENT PROCEDURES

The following is a description of the test procedures used in the WLFI-DT / WHAS-DT field test. The following test procedures were utilized for making measurements with the WHAS-DT signal at both power levels.

Outdoor Test Procedure

1. Plot test locations on electronic road maps *prior* to the start of testing.
2. Plan each test day's work to achieve the maximum results with the least amount of drive time.
3. At the start of *each* test day, confirm proper operation of the transmitter and field test van equipment (i.e., Calibration Tests).
    a. Verify truck generator, mast, mast-mounted compass & camera, and GPS functionality.
    b. Verify sufficient truck gas & tire tread, generator gas, truck and generator oil.
    c. Verify and *record* truck system gain, in dB (antenna output to spectrum analyzer input).
    d. Verify truck attenuator functionality, in dB (10 dB steps and 1 dB steps).
    e. Verify and *record* truck noise floor, in dBm/6 MHz.
    f. Verify proper operation of truck's DTV receivers, monitors, and remote controls (use an existing DTV signal in the proper frequency band).
    g. Verify DTV transmitters are operating properly (signal quality & emission mask) and at full power (i.e., authorized ERP).
4. At each measurement test site, perform the following:
    a. Confirm the feasibility of *safely* raising antenna to 30' AGL in front of the test residence without encountering obstructions such as tree limbs or overhead wires.
    b. If the location is not suitable, move to closest suitable location.
    c. When location is deemed suitable, place traffic cones to warn passing motorists.
    d. Attach antenna to the pneumatic *mast*, connect it to mast's coaxial feedline, and raise the antenna to 30' AGL.
    e. Employing GPS, determine exact coordinates of test site location, determine the distance and bearing to the transmitter. Record these results together with a description of the test site (including a street address, if possible, and nearby cross streets). Note and record weather conditions (temperature, sunny, cloudy, rain, fog, sleet, snow, etc.).
    f. Record comments relative to any anomalous observations regarding the test site.
    g. Orient antenna for maximum DTV signal strength as measured on the Spectrum Analyzer.
    h. Perform **DTV** measurements on mast-mounted antenna:
        i. Adjust input attenuator to achieve a RF system DTV output level of *about* -50 dBm/6 MHz. Verify and record input attenuator setting.
        ii. Measure the *exact* average power in 6 MHz of the received DTV signal at the spectrum analyzer input. Note any RF signal level variations over a 3 minute time period.
        iii. Calculate DTV RMS field strength (in dBμV/m/6 MHz) using truck system parameters (antenna gain, dipole factor, input attenuator, and RF system gain).

iv. Calculate SNR value using truck system parameters (signal power in 6 MHz, noise power in 6 MHz, input attenuator).

v. Record spectrum analyzer plot (20 MHz span, 10 dB/div). Note any nearby large signals (i.e., potential interferers). Note any anomalous large FM radio signals in the FM band.

vi. If service is available, increase input attenuator until just above TOV, and record the attenuator setting (i.e., site margin). Note any "hits" (i.e., burst errors) from passing traffic.

i. Have WHAS-DT raise its ERP from the nominal operating power to the authorized STA power.

j. Perform **DTV** measurements as before at higher WHAS-DT power:

   i. Adjust input attenuator to achieve a RF system DTV output level of *about* -50 dBm/6 MHz. Verify and record input attenuator setting.

   ii. Measure the *exact* average power in 6 MHz of the received DTV signal at the spectrum analyzer input. Note any RF signal level variations over a 3 minute time period.

   iii. Calculate DTV RMS field strength (in dBμV/m/6 MHz) using truck system parameters (antenna gain, dipole factor, input attenuator, and RF system gain).

   iv. Calculate SNR value using truck system parameters (signal power in 6 MHz, noise power in 6 MHz, input attenuator).

   v. Record spectrum analyzer plot (20 MHz span, 10 dB/div). Note any nearby large signals (i.e., potential interferers). Note any anomalous large FM radio signals in the FM band.

   vi. If service is available, increase input attenuator until just above TOV, and record the attenuator setting (i.e., the site margin). Note any "hits" (i.e., burst errors) from passing traffic.

5. Verify that all data is properly logged.
6. Prepare vehicle for travel.
7. Call transmitter site, and ERP to correct level in anticipation of next site.
8. Proceed to next measurement location and repeat the above steps.

FIELD TEST RESULTS

GENERAL OVERVIEW

The WLFI-DT field test results from the 27 test sites are summarized in **Table A3-1** in **Appendix 3**. The field strength levels, SNR values, and reception margin recorded in this table were all determined with the equipment setup described in Appendix 1 (which included a calibrated log-periodic antenna).

While this relatively small sample size field test was *not* statistically meaningful, the results from these test sites provide some useful data regarding the impact of the power increase at WHAS-DT on the reception of WLFI-DT.

It should be noted that the testing occurred at the test locations for a short period of time during the day, and therefore the tests could *not* determine what the prognosis will be for DTV reception and or interference over a longer period of time (e.g., an entire day that covers diurnal effects or over many months that cover seasonal effects). Both location and time variability need to be studied in the future. In order to determine statistically relevant data, large sample sizes would be required over a long sample period.

However, for now, these 27 test sites are used to determine if any impact was measured from the power increase at WHAS-DT on channel 11. **Table 1** contains a brief summary of the results.

Table 1

WLFI-DT Ch. 11	WHAS 5.2 KW ERP	WHAS 16.4 KW ERP
Sites Above Min F.S.	25 (92.6%)	25 (92.6%)
Sites Below Min F.S	2 (7.4%)	2 (7.4%)
Sites Successful Reception	8 (29.6%)	8 (29.6%)
Sites Above Min FS No Reception (Failed Sites)	17 (62.9%)	17 (62.9%)
Median Received F. S.	41.7 dBµV/m	41.8 dBµV/m
Median SNR	18.1 dB	18.2 dB
Median Margin (Only Successful Sites)	6 dB	6 dB

Based upon the forgoing data, it can be concluded that there is essentially no difference in the reception of WLFI-DT with the WHAS-DT transmitter operating at both power levels. There was no measureable change in the received margins for those sites that had successful reception of WLFI-DT with WHAS-DT operating at its lower 5.2KW power level versus WHAS-DT operating at 16.4KW. This is noted in the above table in the Median Margin data. Also, the median field strength and median SNR show no significant differences between the two power levels.

It is noted that a substantial number of locations did not have successful reception of the WLFI-DT signal even with WHAS-DT operating at its lower 5.2KW ERP. As noted below, there were several reasons for failed reception in these areas. These reasons were not correlated to the WHAS-DT power increase.

For the purposes of this test, approximately 63% of the test locations measured that were above the minimum field strength needed for successful reception did not have DTV service (failed sites).

These failed sites exhibited many different failure mechanisms. Evidence of co-channel NTSC signals was found in many locations. This co-channel NTSC interference is presumably from cable television system leakage or home wiring leakage that is attached to the CATV system. In many locations NTSC carriers were seen on each of the VHF television channels. In a few cases, these NTSC carriers were found to be more than +10dB above the DTV signal level. This is well above the TOV level for co-channel NTSC interference. (See Figure 2)

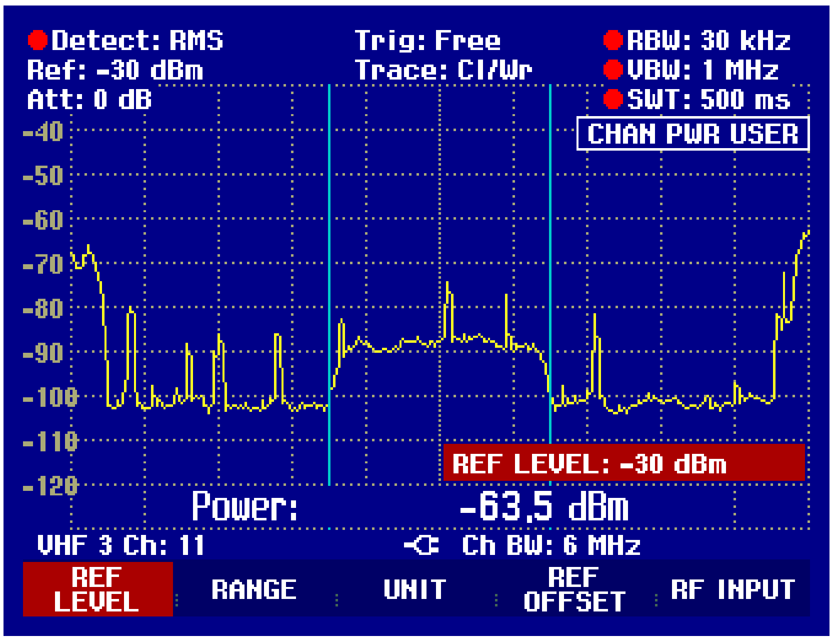

Figure 2: Example of Co-Channel Interference – WLFI-DT

In many locations moderate to severe impulse noise was found to exist within the High-VHF spectrum and specifically at channel 11 which likely precluded reception of the WLFI-DT signal. The impulse noise sources where undetermined. However, power line leakage and street light fixtures were likely causes.

In addition, very strong taboo channel signals on channel 9 and channel 13 were found in various locations within the test areas. These strong N-2 and N+2 taboo signals have been found in tests conducted by the FCC labs on CECB's to cause third-order intermodulation impairments in the tuner of the DTV receiver which can impair reception of a weaker signal (WLFI-DT) in the presence of higher level taboo signals (WISH and WTHR) by as much as 8-12dB. (See FCC/OET Report 9TR1003 regarding CECB Performance for Specific information on Taboo Channel interference).

SUMMARY OF RESULTS

The WLFI DTV field test was performed in October 22-25, 2009 in the greater Indianapolis area. There were 27 test sites, ranging from about 43.0 miles to 56.4 miles, measured field strengths at those locations ranged from approximately 37.6 dBµV/m to 48.9 dBµV/m. The signal-to-noise ratio at the measurement locations varied from 14.0 to 25.3dB.

Here are some **summary** points regarding the WLFI DTV field test results:

1) The CH 11 DTV field strength that was measured at the various measurement locations within the predicted “new interference” areas was generally sufficient for reception of the channel 11 signal. Two locations were found to be below the minimum field strength required for reception.

2) In those locations that had reception with WHAS at 5.2KW; the DTV Reception Margin was unchanged with WHAS operating at 16.4KW (+5dB).

3) DTV Reception of WLFI was impaired by a variety of Interferors that were not correlated with the WHAS-DT signal. Substantial numbers of locations exhibited co-channel NTSC interference. This was presumably from Cable TV Leakage in these locations. In several cases the NTSC carriers were more than +10dB above the DTV signal from WLFI, causing substantial impairment. Furthermore, many locations exhibited substantial impulse noise related impairments.

4) Rx1 and Rx2 converter boxes exhibited susceptibility to the interference from the combination of the N+2 and N-2 Taboo Channels. In this case, interference from the very strong signals from Channel 9 (WISH) and Channel 13 (WTHR) did degrade the reception of channel 11 in certain areas where the 9 and 13 signals were very high (areas close to the tower farms). This interference mechanism would tend to predominate in the areas around Marion County.

5) It is noted that all of the predicted “New Interference” cells are outside the Lafayette, IN DMA.

6) Measurements at the WISH Studios and the WTHR transmitter site (locations of future and current DISH and DirecTV pickups) were unimpaired by the WHAS signal at the STA power when compared to the 5.2KW operation.

7) Viewers within these predicted ”new interference” areas that desire to achieve reception on channel 11 can mitigate this new interference by obtaining higher gain directional receive antennas, low-noise pre-amplifiers, or band-pass filters to increase their margin to TOV. These are easily implemented steps to achieve high levels of margin.

8) The “new interference” areas were predicted using the FCC’s OET-69 model which uses the Longley-Rice propagation prediction model. This is a terrain-dependant model which also uses other factors based upon measured data. In this case, there is likely significant terrain shielding from the WHAS-DT transmitter site to the measurement locations.

9) Based upon the measurement data, the measurement locations that were predicted to have "new interference" did not exhibit any measureable degradation at the time of the measurements with the interfering signal from WHAS being varied +5dB.

10) It should be reiterated that these measurements were not taken over substantially long periods of time. Thus, Time Variability of the interfering field is NOT accounted for in the testing that was conducted. Thus, it is possible that interference could result over certain periods of time, certain seasons, or times of day that are not fully accounted for in this test program. It should be noted that the predicted interference criteria is for 50% of the locations 10% of the time. Hence, the time variability factor of 10% necessarily dictates that it occurs infrequently and most likely not during the observation period.

CONCLUSIONS

Based upon the forgoing data and measurements taken during our observation period, it appears that the WLFI-DT Channel 11 signal is not substantially impaired in the predicted "New Interference" areas with WHAS operating at its STA power of 16.4KW.

Interference from Co-Channel NTSC Cable TV Leakage as well as impulse noise was found in many of the measurement locations. Furthermore, it is likely that the N-2 and N+2 taboo channel interference mechanisms would predominate co-channel interference from WHAS in the areas within northern Marion County.

Viewers wishing to enhance their DTV reception margin can easily implement a higher gain directional receive antenna , low-noise pre-amplifier, or filtering to achieve an additional margin above the TOV level.

In conclusion, in the tests conducted here we found no evidence of co-channel interference impairment from the WHAS-DT facility operating on channel 11 with an ERP of 16.4KW at the measurement locations visited by MSW during our observation period.

This Report is submitted this 20th Day of November, 2009.

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ACKNOWLEDGEMENTS

As with any challenging task, many individuals are typically involved. This field test was no different. The following individuals from various companies were involved in the planning and implementation of the 2009 WHAS-DT, Louisville, KY and WLFI-DT Lafayette, IN DTV field test.

WHAS-TV/ Belo Inc.: (Craig Harper, Wayne Kube, Bill Brown, Greg Lauer)

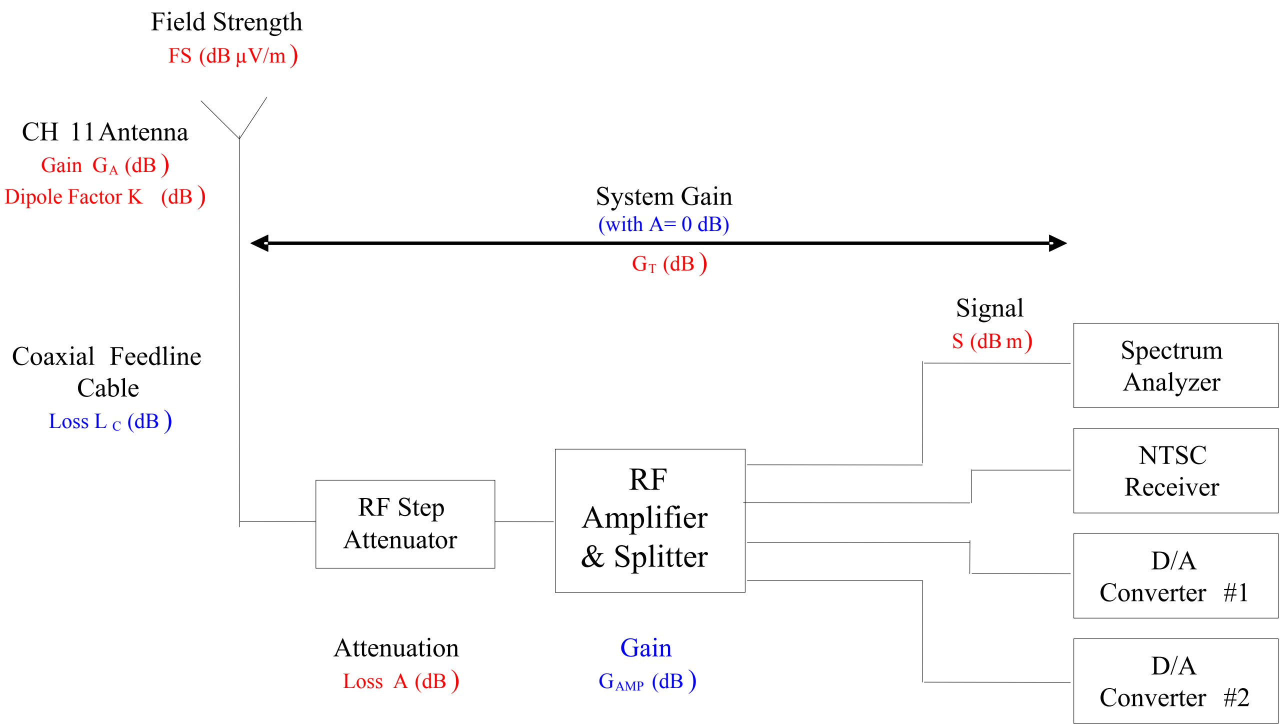
WLFI-TV / LIN Television: (John Vial, George Csahanin, Mark Brooks, Terry Vanbibber, Tom Weber, Mike Pruitt)

MSW: (David Meintel, Bill Meintel, Dennis Wallace)

APPENDIX 1 DTV Field Test Vehicle Description

The MSW field test van (shown below) was used for this November 2009 test in the WFLI-DT coverage area. The van was fully-equipped with RF test equipment, along with a pneumatic mast with 30' AGL mast extension as well as a 5.5 kW AC power generator. A picture of the test van and a system block diagram are shown below.

Figure A1-1 MSW field test truck photo



$$\mathbf{FS\ (dB\mu V/m)} = \mathbf{S - G_T + A + K - G_A}$$

where: $\mathbf{K} = +121.2$ dBµV -dBm (CH11)

Figure A1-2 WLFI-DT / WHAS-DT DTV *outdoor* field test truck system block diagram

APPENDIX 2 Map of DTV Field Test Sites

Figure A2-1 Map of WLFI-DT field test sites. Anderson Population Cells

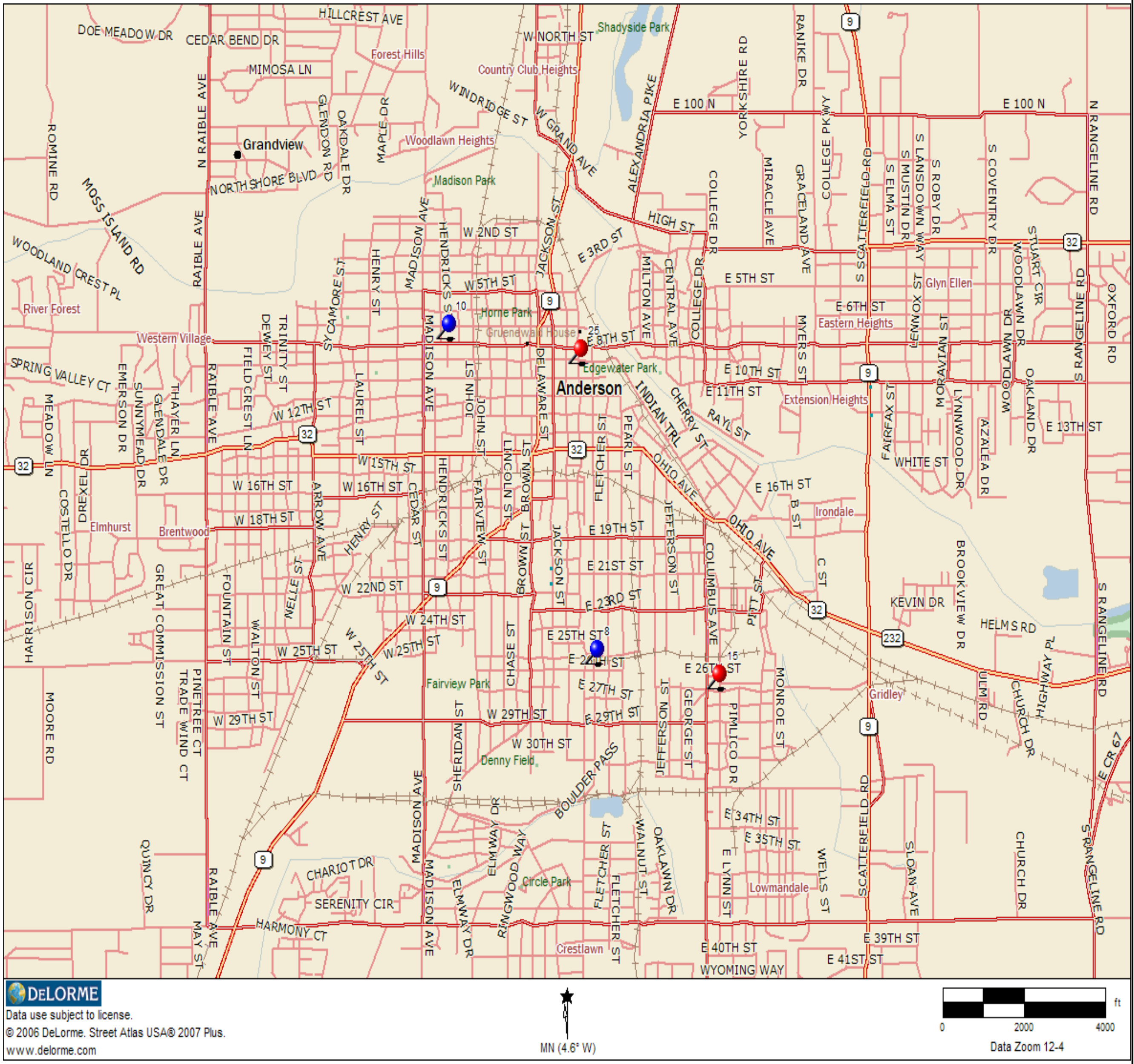


Figure A2-2 Map of WLFI-DT field test sites. Indianapolis Area Population Cells

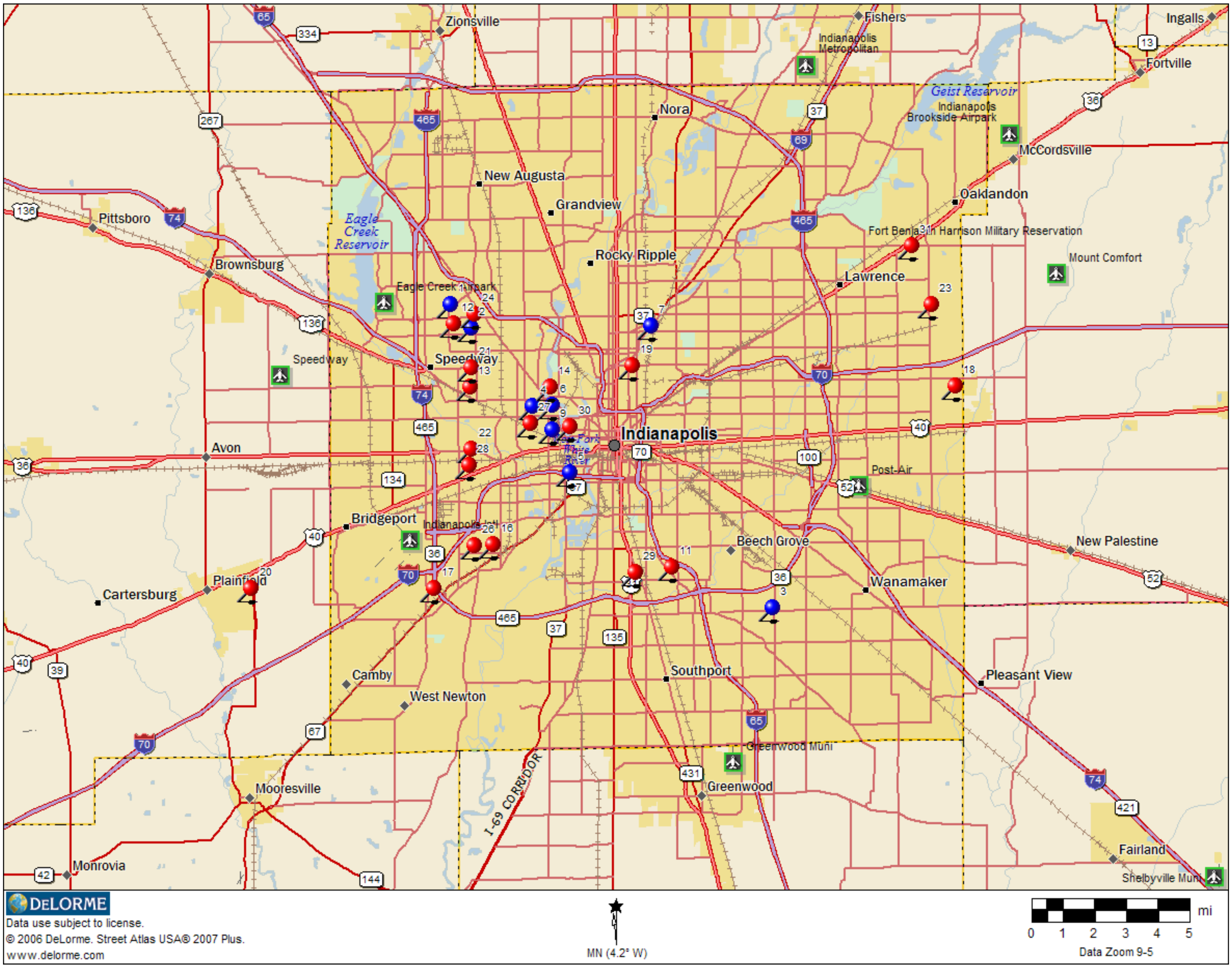
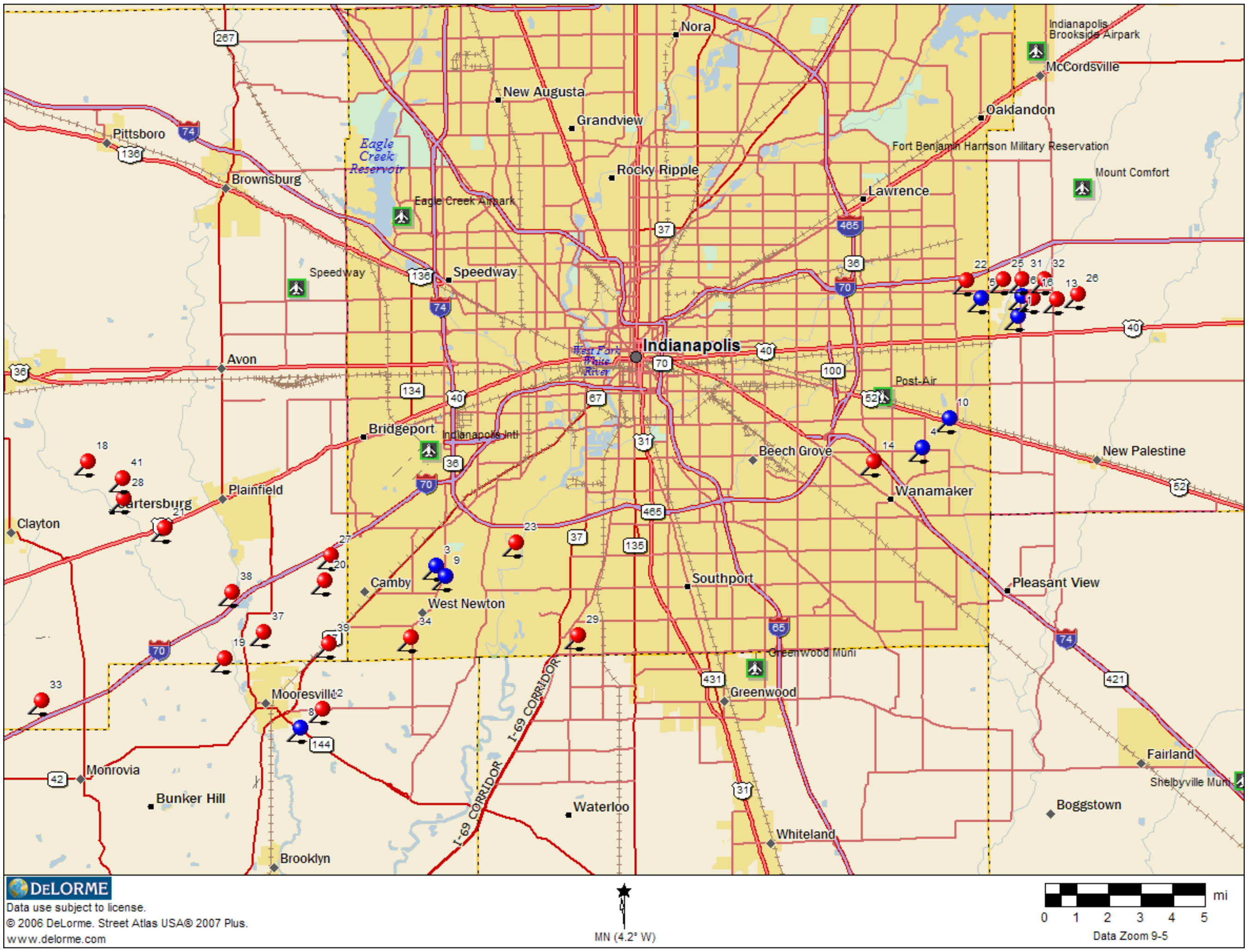
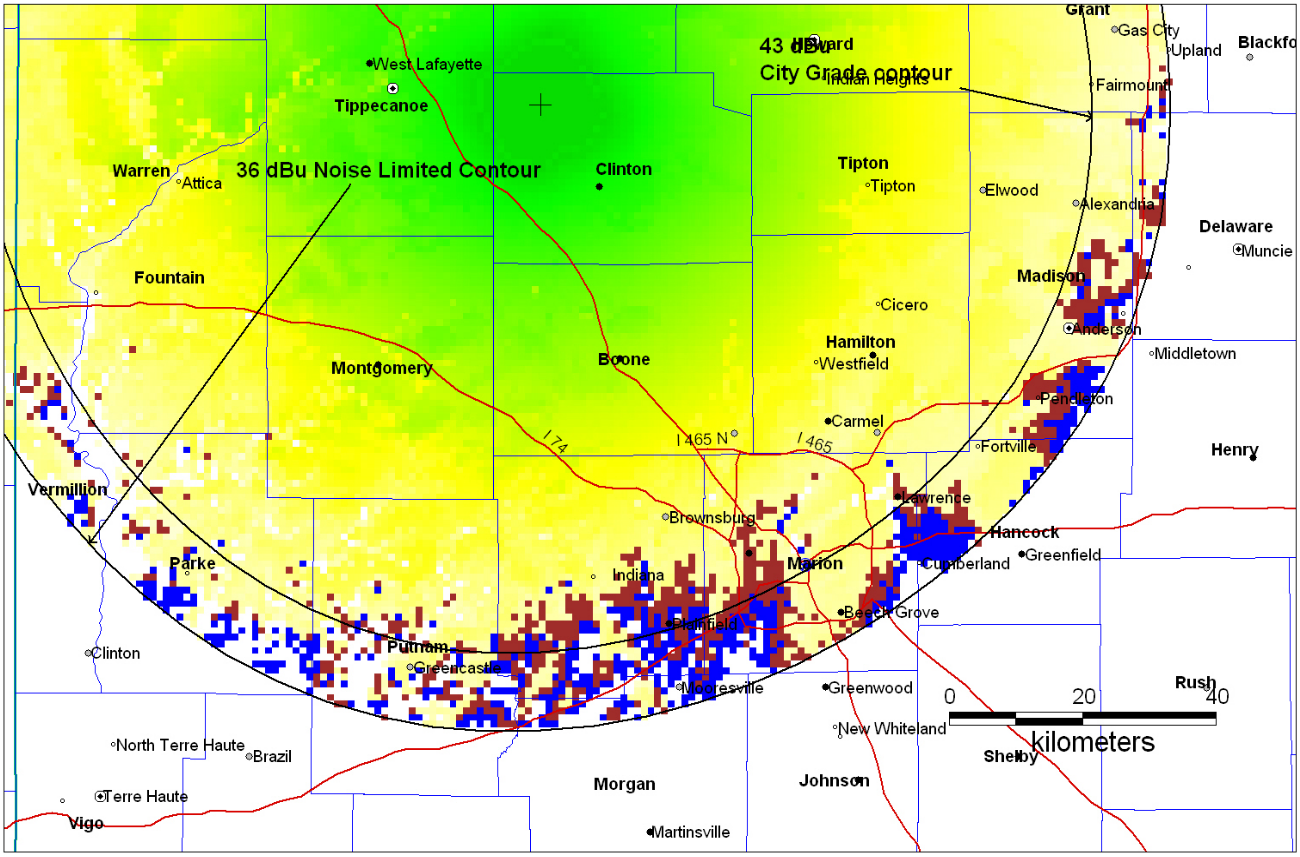


Figure A2-3 Map of WLFI-DT field test sites. Indianapolis Area D/U Ratio Cells





WLFI-TV Channel 11 (BLCDT-20040520AIX)

Green indicates high field strength fading to yellow and then to white at the dipole adjusted threshold (36 dBμV/m)

Blue indicates areas of predicted existing interference
Brown indicates areas of predicted new interference from WHAS STA

Figure A2-4 Map of WLFI-DT Interference Areas
Predicted New Interference Areas to WLFI-DT from WHAS-DT STA Power at 16.4KW

Appendix 2 Figure 5

WHAS STA to WLFI
Points where new interference is predicted
Sorted by Population

From WHAS		Over									
DISTANCE	BEARING	Limit	CELL POP	LAT	LON		LAT			LON	
km	degrees	dB		SECONDS	SECONDS	DEG	MIN	SEC	DEG	MIN	SEC
167.0	347.7	0.20	3,245	143367	310549	39	49	27	86	15	49
165.7	348.0	1.93	3,187	143330	310505	39	48	50	86	15	5
149.6	352.6	0.01	3,028	142886	309864	39	41	26	86	4	24
161.3	348.8	0.83	2,740	143206	310374	39	46	46	86	12	54
157.8	349.2	3.66	2,489	143101	310295	39	45	1	86	11	35
161.2	349.1	1.88	2,458	143208	310332	39	46	48	86	12	12
164.1	351.1	2.15	2,408	143333	310121	39	48	53	86	8	41
193.3	4.3	0.16	2,390	144326	308440	40	5	26	85	40	40
160.0	349.1	1.83	2,384	143169	310332	39	46	9	86	12	12
195.2	3.9	2.02	2,380	144390	308487	40	6	30	85	41	27
152.3	350.8	0.52	2,146	142950	310077	39	42	30	86	7	57
166.1	347.7	1.83	2,130	143336	310543	39	48	56	86	15	43
162.9	347.8	0.72	2,053	143237	310507	39	47	17	86	15	7
162.1	349.2	3.36	2,052	143236	310337	39	47	16	86	12	17
193.2	4.6	0.66	1,909	144321	308401	40	5	21	85	40	1
155.1	347.6	7.41	1,869	142987	310458	39	43	7	86	14	18
153.7	346.3	8.30	1,828	142917	310584	39	41	57	86	16	24
159.5	356.4	22.31	1,827	143238	309474	39	47	18	85	57	54
162.3	350.7	13.19	1,818	143270	310161	39	47	50	86	9	21
156.2	343.0	9.12	1,770	142916	310974	39	41	56	86	22	54
163.8	347.9	0.24	1,765	143267	310504	39	47	47	86	15	4
159.9	347.5	1.23	1,756	143138	310505	39	45	38	86	15	5
163.5	356.1	9.36	1,755	143367	309525	39	49	27	85	58	45
166.3	348.1	1.96	1,750	143352	310497	39	49	12	86	14	57
195.1	4.2	1.35	1,724	144385	308445	40	6	25	85	40	45
155.2	347.2	3.85	1,720	142984	310497	39	43	4	86	14	57
160.5	348.7	3.06	1,709	143178	310379	39	46	18	86	12	59
159.1	347.5	2.03	1,700	143112	310508	39	45	12	86	15	8
152.3	350.1	0.44	1,690	142942	310154	39	42	22	86	9	14
159.9	349.4	1.11	1,668	143173	310294	39	46	13	86	11	34
166.5	355.8	12.20	1,667	143461	309568	39	51	1	85	59	28
163.2	349.2	2.32	1,623	143272	310345	39	47	52	86	12	25
195.4	4.5	1.15	1,617	144391	308399	40	6	31	85	39	59
147.2	349.4	0.48	1,608	142768	310193	39	39	28	86	9	53
154.8	347.9	8.48	1,596	142982	310421	39	43	2	86	13	41

155.6	347.9	7.07	1,575	143010	310424	39	43	30	86	13	44
197.1	3.6	0.49	1,549	144454	308525	40	7	34	85	42	5
161.1	347.6	1.25	1,535	143178	310511	39	46	18	86	15	11
159.6	355.7	6.55	1,526	143236	309556	39	47	16	85	59	16
163.2	351.1	1.90	1,519	143302	310119	39	48	22	86	8	39
195.5	5.1	6.45	1,518	144390	308315	40	6	30	85	38	35
195.4	4.8	7.21	1,505	144389	308354	40	6	29	85	39	14
168.6	356.0	0.38	1,466	143529	309552	39	52	9	85	59	12
146.2	348.8	1.56	1,452	142725	310246	39	38	45	86	10	46
161.2	348.5	0.90	1,447	143196	310409	39	46	36	86	13	29
161.1	349.4	1.37	1,424	143210	310300	39	46	50	86	11	40
145.2	342.4	11.13	1,413	142562	310895	39	36	2	86	21	35
159.3	349.0	3.99	1,385	143144	310338	39	45	44	86	12	18
158.9	347.9	2.21	1,351	143112	310460	39	45	12	86	14	20
150.5	346.3	11.78	1,334	142816	310546	39	40	16	86	15	46
196.2	4.8	2.75	1,331	144416	308361	40	6	56	85	39	21

Appendix 2 Figure 6

WHAS STA to WLFI
Points where new interference is predicted
Sorted by D/U Ratio

From WHAS DISTANCE km	BEARING degrees	Over Limit dB	CELL POP	LAT SECONDS	LON SECONDS	LAT DEG	LAT MIN	LAT SEC	LON DEG	LON MIN	LON SEC
158.5	357.0	44.93	338	143209	309396	39	46	49	85	56	36
161.7	329.1	37.58	20	142562	312542	39	36	2	86	49	2
150.6	345.7	36.20	7	142807	310617	39	40	7	86	16	57
152.3	355.1	30.12	112	142997	309596	39	43	17	85	59	56
159.5	356.4	22.31	1,827	143238	309474	39	47	18	85	57	54
159.5	357.1	21.36	1,033	143241	309387	39	47	21	85	56	27
205.9	322.6	21.16	3	143347	314330	39	49	7	87	18	50
144.7	342.3	21.10	374	142544	310903	39	35	44	86	21	43
150.0	345.8	20.81	164	142790	310599	39	39	50	86	16	39
153.6	355.7	20.44	442	143044	309540	39	44	4	85	59	0
171.5	329.6	20.21	71	142856	312706	39	40	56	86	51	46
145.3	342.8	19.81	244	142576	310857	39	36	16	86	20	57
159.2	357.8	19.70	177	143236	309315	39	47	16	85	55	15
151.8	354.2	19.17	210	142974	309699	39	42	54	86	1	39
156.8	337.4	18.78	15	142767	311583	39	39	27	86	33	3
159.3	357.3	18.55	8	143238	309364	39	47	18	85	56	4
154.5	337.0	17.58	15	142681	311590	39	38	1	86	33	10
160.8	340.2	17.34	51	142975	311350	39	42	55	86	29	10
149.2	341.3	16.75	17	142657	311062	39	37	37	86	24	22
151.4	343.6	16.66	5	142782	310852	39	39	42	86	20	52
156.3	341.0	16.53	7	142867	311189	39	41	7	86	26	29
160.4	356.2	16.47	186	143266	309505	39	47	46	85	58	25
150.7	347.3	16.10	107	142843	310450	39	40	43	86	14	10
159.2	333.5	15.53	20	142686	312045	39	38	6	86	40	45
160.3	356.8	15.27	842	143268	309426	39	47	48	85	57	6
159.5	358.1	15.27	43	143245	309271	39	47	25	85	54	31
152.5	343.8	15.25	22	142823	310840	39	40	23	86	20	40
158.4	340.5	14.84	66	142915	311274	39	41	55	86	27	54
145.6	348.1	14.83	481	142694	310319	39	38	14	86	11	59
154.3	336.8	14.73	3	142667	311610	39	37	47	86	33	30
160.3	357.2	14.69	470	143269	309387	39	47	49	85	56	27
160.2	357.5	14.35	273	143268	309341	39	47	48	85	55	41
150.5	337.8	14.35	36	142589	311446	39	36	29	86	30	46
147.5	344.9	14.33	37	142690	310672	39	38	10	86	17	52
181.5	323.5	13.89	6	142783	313594	39	39	43	87	6	34

152.5	335.1	13.56	39	142556	311750	39	35	56	86	35	50
149.9	342.2	13.55	160	142700	310981	39	38	20	86	23	1
152.2	341.9	13.48	29	142763	311046	39	39	23	86	24	6
148.3	343.3	13.30	60	142680	310843	39	38	0	86	20	43
164.0	334.0	13.27	7	142845	312083	39	40	45	86	41	23
159.4	340.6	13.26	42	142948	311277	39	42	28	86	27	57
162.3	350.7	13.19	1,818	143270	310161	39	47	50	86	9	21
161.0	357.2	13.11	272	143290	309382	39	48	10	85	56	22
145.4	344.2	13.11	204	142611	310712	39	36	51	86	18	32
160.6	359.5	13.04	181	143283	309111	39	48	3	85	51	51
153.8	341.2	13.01	70	142794	311140	39	39	54	86	25	40
155.9	344.6	12.70	49	142949	310794	39	42	29	86	19	54
154.7	330.4	12.49	43	142426	312265	39	33	46	86	44	25
150.6	346.0	12.48	146	142814	310587	39	40	14	86	16	27
161.1	358.2	12.37	59	143298	309271	39	48	18	85	54	31
151.2	334.9	12.37	15	142510	311747	39	35	10	86	35	47

APPENDIX 3 FIELD TEST DATA

The raw data collected from the field test has been summarized into the following tables for easy reference. The actual detailed data is contained in one Excel spreadsheet that is available upon request from MSW. A CD-ROM containing this report and all the spectrum plot files are also available upon request from MSW. Note that the field strength, SNR values, and reception margins were determined by using the receive system described in the body of this report, and included a calibrated antenna.

Test Site Information					WLFI 30' STA ERP Data							WLFI 30' Nominal ERP Data						
Test #	Test Date	Site Type	Site #	WLFI Tx Dist (miles)	Field Strength (dBuV/m)	SNR Value (dB)	Rx #1 CCIR	Rx #2 CCIR	Rx #1 Margin	Rx #2 Margin	Failure Reason	Field Strength (dBuV/m)	SNR Value (dB)	Rx #1 CCIR	Rx #2 CCIR	Rx #1 Margin	Rx #2 Margin	Failure Reason
1	10/24/09	P1	1	43.0	42.2	18.6	555	555	0	0	1	42.8	19.2	5	5	0	0	1
2	10/24/09	P2	2	44.1	44.8	21.2	999	999	0	0	4	44.9	21.3	999	999	0	0	4
3	10/24/09	P13	3	45.7	44.4	20.8	0	0	8	8	0	44.7	21.1	0	0	8	8	0
4	10/24/09	P4	4	47.0	43.9	20.3	0	0	4	6	0	43.9	20.3	0	0	3	4	0
5	10/24/09	P6	5	47.3	39.9	16.3	999	555	0	0	1	40.1	16.5	999	555	0	0	1
6	10/24/09	P9	6	47.9	40.1	16.5	999	999	0	0	1	39.7	16.1	999	999	0	0	1
7	10/24/09	P5	7	49.2	39.2	15.6	999	999	0	0	1	41.7	18.1	999	999	0	0	1
8	10/24/09	P3	8	56.0	45.8	22.2	0	0	7	8	0	45.8	22.2	0	0	6	8	0
9	10/24/09	P11	9	53.2	44.5	20.9	0	0	7	7	0	44.5	20.9	0	0	7	7	0
10	10/24/09	P16	10	50.1	40.9	17.3	999	999	0	0	1	41.1	17.5	999	999	0	0	1
11	10/24/09	P17	11	51.3	41.7	18.1	999	555	0	0	1	41.7	18.1	999	555	0	0	1
12	10/24/09	D3	12	52.6	43.1	19.5	0	0	2	4	0	43.1	19.5	0	0	5	5	0
13	10/24/09	D9	13	53.6	42.3	18.7	555	555	0	0	1	42.2	18.6	555	555	0	0	1
14	10/24/09	D20	14	52.1	40.6	17.0	555	555	0	0	1	40.6	17.0	555	555	0	0	1
15	10/24/09	D12	15	55.9	39.1	15.5	999	999	0	0	4	38.9	15.3	999	999	0	0	4
16	10/24/09	D8	16	56.4	43.0	19.4	555	555	0	0	4	42.5	18.9	555	555	0	0	1
17	10/25/09	D14	17	56.0	48.9	25.3	0	0	11	11	0	49.1	25.5	0	0	12	12	0
18	10/25/09	D4	18	56.3	41.6	18.0	999	999	0	0	1	41.0	17.4	999	999	0	0	1
19	10/25/09	D10	19	56.1	42.9	19.3	999	999	0	0	1	40.4	16.8	999	999	0	0	1
20	10/25/09	D5	20	53.9	41.1	17.5	1	1	0	0	1	42.3	18.7	1	1	1	1	0
21	10/25/09	D1	21	55.2	41.9	18.3	555	555	0	0	4	41.2	17.6	555	555	0	0	4
22	10/25/09	D6	22	54.6	41.5	17.9	0	0	4	4	0	41.7	18.1	0	0	3	3	0
23	10/25/09	D32	23	54.6	41.8	18.2	555	555	0	0	1	40.1	16.5	555	555	0	0	1
24	10/25/09	P8	24	53.6	40.1	16.5	999	999	0	0	1	42.2	18.6	999	999	0	0	1
25	10/25/09	P15	25	54.1	38.5	14.9	999	999	0	0	1	37.4	13.8	999	999	0	0	1
26	10/25/09	P25	26	53.1	37.6	14.0	999	999	0	0	1	37.5	13.9	999	999	0	0	1
27	10/25/09	P10	27	52.4	42.2	18.6	555	555	0	0	1	41.7	18.1	555	555	0	0	1