6.1.2 Test Procedure

Because of ambient emissions, direct pick-up and spurious radiated emissions from the WSD systems, it was not possible to derive a clean test signal on the bench by sampling the radiated signal from a wireless microphone with a receive antenna and applying it to the antenna input connector of the WSD. It was thus determined that the testing needed to be performed with the wireless microphone in an anechoic chamber. This approach avoided interference to the test from undesired signals, and allowed a sample of the radiated signal from the microphone to be received with an antenna in the chamber. This received signal was then conducted by coaxial cable to the control room for connection to the antenna terminal of the WSD, as shown in Figure 6-3.

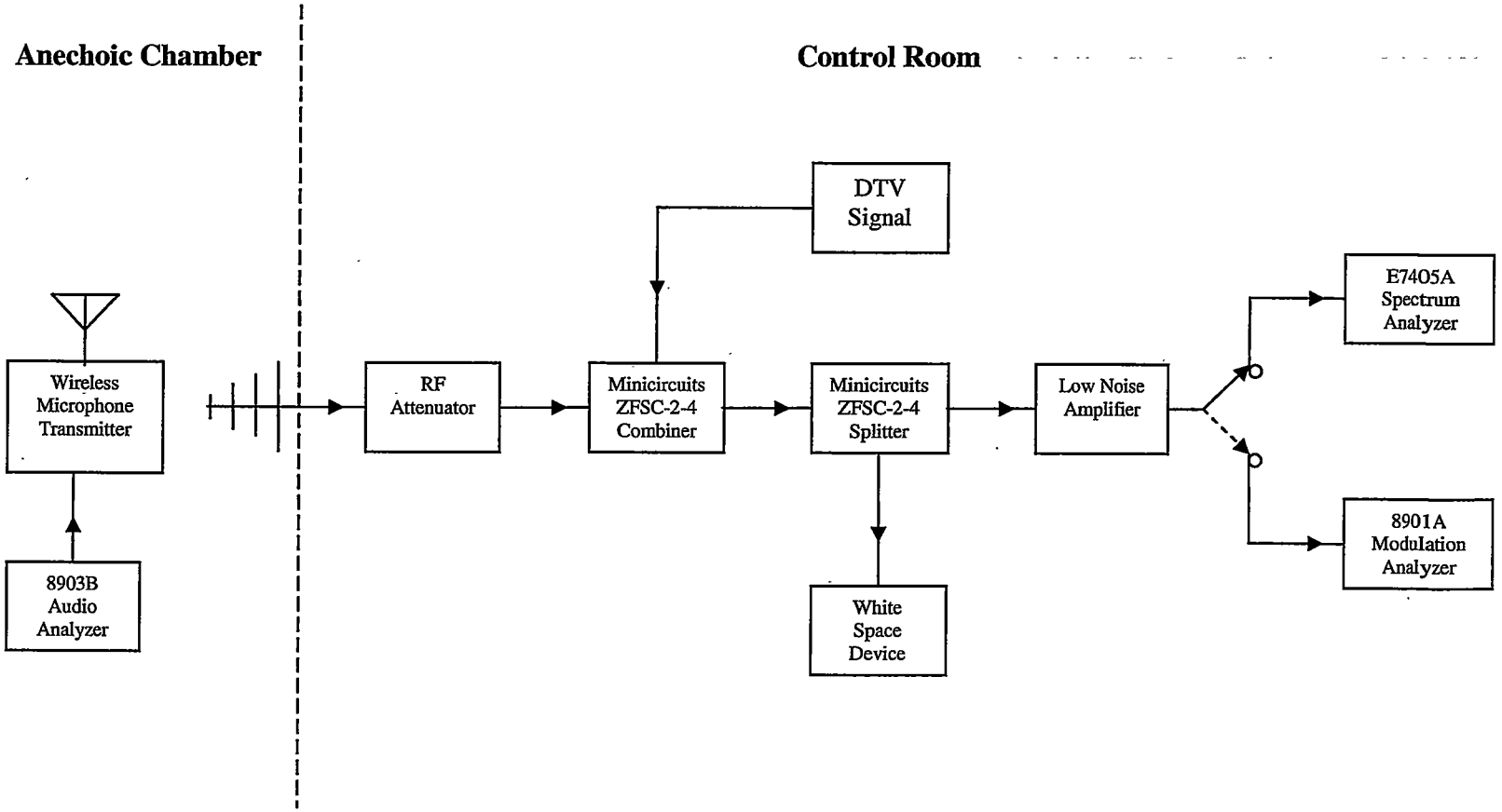

Figure 6-3. Wireless Microphone Sensing Test Setup

The WSDs were first tested for sensitivity to a wireless microphone signal at a low, middle and high frequency within a TV channel with no other signals present. The sensitivity threshold of a WSD was defined as the lowest bandpower at which the microphone is detected on 10 of 10 successive scans. Each WSD was tested with the FM microphone modulated and, in some cases, unmodulated. The digital microphone was tested with or without modulation since there was no discernible difference between the modulated and unmodulated signal or in the response of the WSDs to the different signals. Testing was then performed with simulated DTV signals located in various combinations of first and second adjacent channels over a range of power levels. The simulated DTV signal was obtained from a Rohde& Schwarz SFU signal generator. The spectral characteristics of the simulated DTV signal with the emissions mask specified in Section 73.622(h) of the Commission's rules are shown in Figure 6.4.

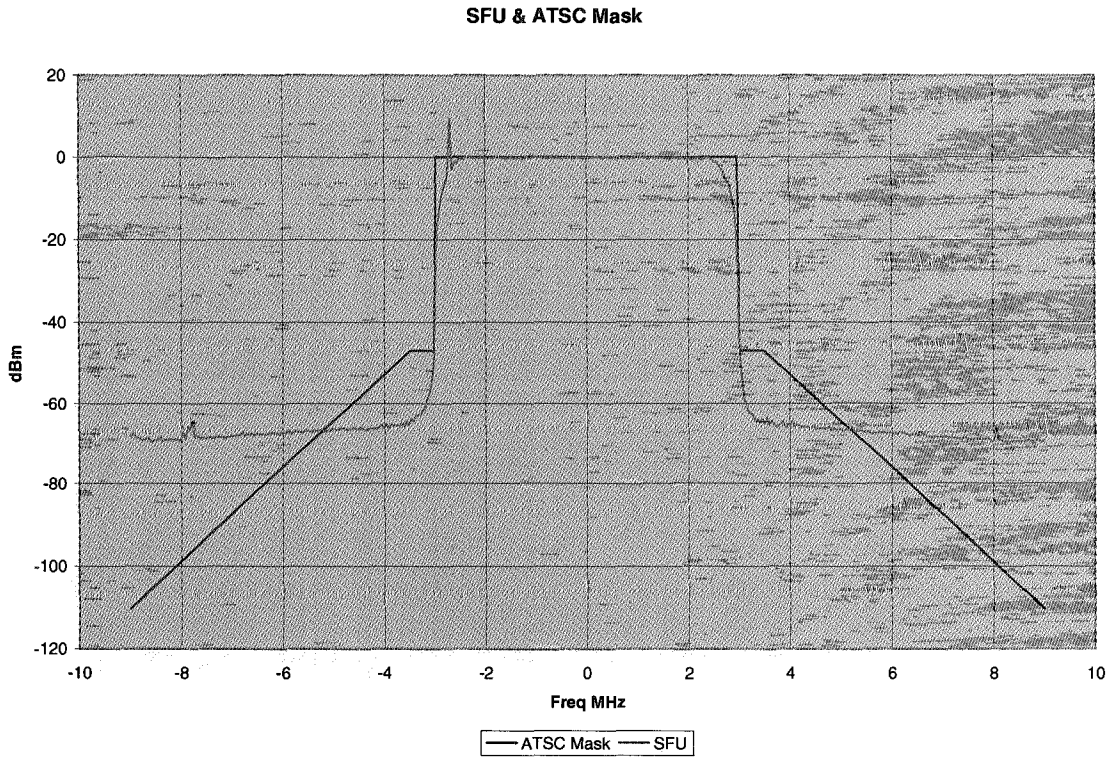

Figure 6-4. Simulated DTV Signal & ATSC Mask

6.1.3 Test Results with Microphones and No DTV Signals

The sensitivity of the WSDs with no other signals present is shown in tables 6-1 through 6-9. In most cases the FM wireless microphones were tested at 50 kHz above the low frequency edge of the channel, in the middle of the channel and 50 kHz below the high edge of the channel and, because of its wider occupied bandwidth, the digital microphone was tested 100 kHz above the low edge of the channel, in the middle of the channel and 100 kHz below the high edge of the channel. It was not always possible or considered necessary to test at all three frequencies within a channel. The Shure UR1 H4 is the same basic model as the UR1 L3 tuned to a different frequency range.

The Microsoft 205 WSD

Table 6-1. Shure UR1 L3 on Channel 44

Mic. Freq MHz	**Sensitivity dBm**	
	Modulated	Unmodulated
650.05	-119	-125
653	-125	-122
655.95	-124	-129

Table 6-2. Shure UR1 H4 on Channel 23

Mic. Freq MHz	**Sensitivity dBm**	
	Modulated	Unmodulated
524.05	-116	-123
527	-123	-120
529.95	-123	-128

Table 6-3. Lectrosonics UM 700 on Channel 44

Mic. Freq MHz	**Sensitivity dBm**	
	Modulated	Unmodulated
650.1	-117	---
653	-122	---
655.9	-122	---

The Philips #1 WSD

Table 6-4. Shure UR1 L3 on Channel 44

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
650.05	-117	-115
653	-116	-103
655.95	-117	-116

Table 6-5. Shure UR1 H4 on Channel 23

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
524.05	-117	-114
527	-116	-108
529.95	-118	-106

Table 6-6. Lectrosonics UM 700 on Channel 44

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
650.1	-112	---
653	-115	---
655.9	-113	---

The I2R (Test Mode: Lab; Scan Mode: All) WSD

Table 6-7. Shure UR1 L3 on Channel 44

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
650.05	-105	---
653	-127	-126
655.95	-94	---

Table 6-8. Lectrosonics UM 700 on Channel 29

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
---	---	---
563.2	---	-121
565.9	---	-110

Table 6-9. Shure UR1 H4 on Channel 30

Mic. Freq MHz	Sensitivity dBm	
	Modulated	Unmodulated
---	---	---
569	-123	---
---	---	---

6.1.4 Test Results with Microphones and DTV Signals

The WSDs were tested to determine their ability to sense a wireless microphone on a channel and with simulated DTV signals on various combinations of first and second adjacent channels. The DTV signals were provided at power levels -28, -53, -68 and -84 dBm, which represent a high, medium, low and very low signal level. In most cases, it was found that at DTV power levels of -68 dBm or higher, the WSDs would indicate that the wireless microphone channel was occupied when no microphone signal was present (false positive) and the Microsoft WSD would not sense a wireless microphone signal at -80 dBm when the DTV signal power was -28 dBm. In a few cases when the DTV signal was on the lower adjacent channel, the WSDs would only indicate a false positive if the DTV power was increased to a power level of -53 dBm or higher. Because of test

scheduling problems, the availability of test equipment or the malfunctioning of a device, formal measurements for some test conditions were not performed in all cases.
Sensitivity was measured with DTV signal levels below the power level that produced false positive indications. The results are given in the tables below. For comparison, the sensitivity without DTV signals is given in parentheses.

The Microsoft 205 WSD

Table 6-10. Shure UR1 L3 (modulated) on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43	650.05	-106 (-119)
	653	-125 (-125)
	655.95	-124 (-124)

Table 6-11. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43	650.1	-116 (-117)
	653	-122 (-122)
	655.9	-120 (-122)

Table 6-12. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
45	650.1	-117 (-117)
	653	-123 (-122)
	655.9	-121 (-122)

Table 6-13. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43,45	650.1	-115 (-117)
	653	-122 (-122)
	655.9	-121 (-122)

Table 6-14. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
42,43	650.1	-117 (-117)
	653	-120 (-122)
	655.9	-120 (-122)

Table 6-15. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
45,46	650.1	-117 (-117)
	653	-121 (-122)
	655.9	-121 (-122)

The Philips #1 WSD

Table 6-16. Shure UR1 L3 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm	
		Modulated	Unmodulated
43	650.05	-114 (-117)	-112 (-115)
	653	-116 (-116)	-93 (-103)
	655.95	-116 (-117)	-116 (-116)

Table 6-17. Shure UR1 L3 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm	
		Modulated	Unmodulated
45	650.05	-116 (-117)	-110 (-115)
	653	-115 (-116)	-115 (-103)
	655.95	-117 (-117)	-114 (-116)

Table 6-18. Shure UR1 L3 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm	
		Modulated	Unmodulated
43,45	650.05	-116 (-117)	-114 (-115)
	653	-116 (-116)	-101 (-103)
	655.95	-117 (-117)	-116 (-116)

Table 6-19. Shure UR1 L3 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm	
		Modulated	Unmodulated
42,43	650.05	-115 (-117)	---
	653	-116 (-116)	---
	655.95	-118 (-117)	---

Table 6-20. Shure UR1 L3 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm	
		Modulated	Unmodulated
45,46	650.05	-116 (-117)	---
	653	-116 (-116)	---
	655.95	-117 (-117)	---

Table 6-21. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43	650.1	-111 (-112)
	653	-116 (-115)
	655.9	-113 (-113)

Table 6-22. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
45	650.1	-111 (-112)
	653	-115 (-115)
	655.9	-113 (-113)

Table 6-23. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43,45	650.1	-112 (-112)
	653	-115 (-115)
	655.9	-113 (-113)

Table 6-24. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
42,43	650.1	-111 (-112)
	653	-115 (-115)
	655.9	-112 (-113)

Table 6-25. Lectrosonics UM 700 on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
45,46	650.1	-112 (-112)
	653	-114 (-114)
	655.9	-112 (-113)

I2R (Test Mode: Lab; Scan Mode: All)

Table 6-26. Shure UR1 L3 (modulated) on Channel 44

DTV Channels	Microphone Freq MHz	Sensitivity dBm
43	650.05	* (-105)
45	653	-124 (-127)
	655.95	-94 (-94)

* False positive at all DTV power levels

Table 6-27. Shure UR1 H4 (Modulated)

DTV Channels	Microphone Freq MHz	Sensitivity dBm
30	565.95 (Ch 29)	-99
	572.05 (Ch 31)	-98

Table 6-28. Lectrosonics UM 700

DTV Channels	Microphone Freq MHz	Sensitivity dBm
30	565.9 (Ch 29)	-110 (-110)
	572.1 (Ch 31)	-108

6.1.5 Summary

All of the WSDs gave false positive indications of microphone detection with DTV signal levels as low as -68 dBm in adjacent channels. The Microsoft device also gave false negative indications with a DTV signal level of -28 dBm in adjacent channels and a microphone power of -80 dBm. The presence of DTV signals had little effect on the sensitivity of the devices to the Lectrosonics microphone but there was insufficient data to determine the effect of DTV signals on the sensitivity of the Microsoft device to the Shure microphone. The sensitivity of the Philips device to a modulated Shure microphone signal was not significantly affected by the presence of DTV signals. However, when the Shure microphone signal was unmodulated, the Philips device was significantly less sensitive to a microphone in the middle of the TV channel with or without DTV signals in adjacent channels.

6.2 Wireless Microphone Field Tests

6.2.1 Introduction

Field tests were conducted to evaluate the performance of the WSDs in detecting wireless microphones under real-world conditions. Arrangements were made with the National Football League (NFL) and the ESPN Network (ESPN) to perform tests before and during a pre-season football game at FedEx Field in Landover, MD and with the Majestic Theater in New York City to perform tests before and during a performance of a Broadway play.

ESPN offered to simulate a game day broadcast at FedEx Field from 10:30 AM in the morning until 5:00 PM in the afternoon before the start of the game. During this time they would turn all their wireless microphones on or off upon request. The WSDs were operated and spectrum measurements were taken at four different locations at the venue: on the east (home field) side of the playing field from 10:30 AM to 12:00 PM, at the "tailgate" area outside the stadium from 12:40 PM to 2:00 PM, on the upper deck from 2:20 PM to 3:30 PM, and in the Press Box from 4:00 PM on. At 5:00 PM, ESPN was required to cease transmissions so the NFL could set up and test their wireless microphones for use during the game, which began at 7:00 PM. From 6:20 PM to 7:00 PM during pre-game activities and from 7:20 PM to 7:45 PM during the first quarter of the game, the WSDs were operated and spectrum measurements taken.

At the Majestic Theater, WSD tests and spectrum measurements were taken at three different locations before the performance: on the sidewalk at the entrance to the theater, in the middle of the mezzanine and in the orchestra seating area. Measurements were also taken at one location during the performance (entrance ramp to the orchestra seating area). Before the performance, measurements were performed with the wireless microphones to be used during the show turned on and off upon request.

6.2.2 Test Procedure

At each location the Philips and I2R WSDs were set up with their receive antennas located approximately 2 meters from the wireless microphone base unit. The frequency spectrum was scanned by the WSDs from TV channels 21 to 51 with the wireless microphones turned on and off. The channels indicated as occupied by the WSD were recorded in each case. The frequency spectrum was also observed and recorded with a spectrum analyzer using an antenna with a vertical ground plane. The measurement antenna used has a gain of approximately 0 dBi from channels 21 to 51.

6.2.3 Test Results

Tables 6-29 through 6-48 show the results of the WSD scans. "X" indicates the channels on which ESPN, the NFL or the Majestic Theater were operating wireless microphones and the channels which the WSDs reported as occupied with the microphones off and on. The channels indicated as NFL channels are those on which it appears that there were NFL microphones based on the spectrum scans. The spectrum plots obtained with the spectrum analyzer under the same conditions are given in Appendix A for FedEx Field and Appendix B for the Majestic Theater.

Additionally, during two of the field tests of the of the white space devices' ability to detect TV signals, brief tests were conducted to check the ability of the Philips and the I2R devices to detect wireless microphones. At the Portals location, it was found that the Philips device could detect the Shure UR1 and the Lectrosonics UM 700 microphones at distances up to 30.5 meters (100 feet) within the building with intervening walls. The I2R device reported detection of the Shure UR1 with less than 100% probability at 4.6 meters (15 feet) or less but could not detect the microphone at 30.5 meters (100 feet). The I2R device reported detection of the Lectrosonics unit with 100 % probability at distances up to 6.1 meters (20 feet) but with only 60% probability at distances of 30.5 meters (100 feet) and 61 meters (200 feet). At the #3 test site, a residential location, the Philips device could not be tested because it indicated that all channels were occupied. At this location, the I2R device could not detect the Shure UR2 even as close as 1.5 meters (5 feet) but it could detect the Lectrosonics UM 700 at distances up to 15.2 meters (50 feet) where the reported probability of detection decreased to 50%.

FedEx Field

X indicates occupied channel

Location: East (home team) side of field at the 50 yard line.

Time: 10:30 AM to 12:00 PM

Table 6-29. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-30. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off							X	X	X	X		X	X	X		X
Mic on		X				X	X	X	X	X			X	X		X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X	X		X	X	X		X			X		X	X
Mic on	X	X	X		X	X				X		X			X

Location: Tailgate area

Time: 12:40 PM to 2:00 PM

Table 6-31. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-32. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off		X						X	X	X		X	X			
Mic on							X	X	X	X			X			

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X				X	X	X								X
Mic on	X		X			X	X			X			X		X

Location: Upper deck, Section 401

Time: 2:20 PM to 3:30 PM

Table 6-33. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-34. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off			X						X	X					X	X
Mic on	X	X	X	X	X	X			X	X	X	X			X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X				X	X		X	X			X		X
Mic on	X	X			X	X		X	X	X	X		X		

Location: Press box

Time: 4:00 PM to 5:00 PM

Table 6-35. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-36. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
ESPN	X		X				X				X		X	X		
Mic off	X	X	X		X				X		X	X	X	X	X	X
Mic on	X	X	X		X				X		X			X		X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
ESPN							X	X	X		X		X		
Mic off		X	X		X	X	X	X	X		X	X	X	X	
Mic on		X	X		X	X		X	X		X	X	X	X	X

Location: Press box—Pre-game

Time: 6:20 PM to 7:00 PM

Table 6-37. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NFL	X		X		X						X					
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
NFL					X			X	X		X		X		
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-38. I2R

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NFL	X		X		X						X					
Mic on	X	X	X		X				X	X	X		X			X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
NFL					X			X	X		X		X		
Mic on		X	X	X	X	X	X	X	X		X	X	X		X

Location: Press box—First Quarter

Time: 7:20 PM to 7:45 PM

Table 6-39. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NFL	X		X		X						X					
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
NFL					X			X	X		X		X		
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-40. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NFL	X		X		X						X					
Mic on	X	X	X	X	X	X	X		X	X	X		X	X		X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
NFL					X			X	X		X		X		
Mic on		X	X	X	X		X	X	X		X	X	X		

Majestic Theater

X indicates occupied channel

Location: Sidewalk at entrance to theater

Time: 10:00 AM to 12:00 PM

Table 6-41. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-42. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off		X	X			X	X	X	X	X		X	X			X
Mic on	X	X		X				X	X	X			X			X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off	X	X		X				X	X			X			X
Mic on		X		X	X			X	X		X			X	X

Location: Middle of Mezzanine

Time: 12:00 PM to 2:00 PM

Table 6-43. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-44. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off				X				X	X	X			X			X
Mic on				X				X	X	X						X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off		X		X				X	X		X				X
Mic on		X		X				X	X						X

Location: Orchestra, stage right, row I

Time: 2:30 PM to 4:00 PM

Table 6-45. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off		X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-46. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic off				X				X	X	X	X		X			X
Mic on				X				X	X	X			X			X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic off		X		X				X	X		X				X
Mic on		X		X				X	X		X			X	X

Location: Ramp from lobby to orchestra, stage left

Time: 7:00 PM to 9:00 PM

Table 6-47. The Philips No. 2 WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic on	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 6-48. The I2R WSD

Channel	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Theater			X			X									X	
Mic on				X				X	X	X			X			X

Channel	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
Theater			X							X		X			
Mic on		X		X				X	X						X

6.2.4 Summary

Wireless microphone sensing tests were performed with the I2R and Philips devices at 2 locations. The tests were conducted first with microphones off, and then turned on, in pre-determined channels to determine if the devices could sense the presence of wireless microphones. At both sites and all the test locations, the Philips device reported all the channels on which the microphones were designated to transmit as occupied whether the microphone was transmitting or not. The I2R device indicated several channels as available even when the microphones were on.

Appendix A
Measurement Systems

This appendix provides information regarding the measurement equipment used to perform this test/measurement program and block diagrams showing the interconnections of the various test set-ups.

Table A-1 provides a list of the equipment used, including the manufacturer and model number, a brief description and where appropriate, the most recent manufacturer calibration date.

Figures A-1 through A-4 illustrate the measurement equipment and related interconnections used to perform the tests and measurements described in this report. Figure A-5 shows the spectral characteristics of the filtered DTV signal that was placed on the adjacent channel(s) in the adjacent-channel interference tests.

Table A-1. List of Measurement Equipment

Equipment	Quantity	Manufacturer and Model	Specifications	Last Calibrated
Spectrum Analyzer	1	Agilent E4448 PSA	3 Hz-50 GHz	03/13/08
Spectrum Analyzer	1	Agilent E7405A EMC	9 kHz – 26.5 GHz	05/08/08
Modulation Analyzer	1	Agilent 8901A	-	09/14/07
Audio Analyzer	1	Agilent 8903B	-	09/14/07
Signal Generator	1	Agilent E4437B ESG	250 kHz-4 GHz	05/02/08
Signal Generator	1	Agilent 4438C ESG	250 kHz – 6 GHz	07/03/08
Broadcast Test System	2	Rhode and Schwarz SFU	w/ ATSC Signal Generator	-
WS-2100 RF Player	1	Wavetech, Inc.	-	-
Step Attenuator	4	Agilent 8494B	0 to 11 dB DC – 18 GHz	08/14/07 09/17/07 12/05/07 12/06/07
Step Attenuator	3	Agilent 8495B	0 to 70 dB DC – 18 GHz	08/21/07 09/17/07 12/04/07
Step Attenuator	1	Agilent 8496B	0 to 110 dB DC – 18 GHz	12/05/07
TV Channel 29 Bandpass Filter	1	Micro Communications, Inc.; Interdigital Series 42100	560-566 MHz; 7-pole; 0.8-1.0 dB insertion loss; VSWR: 1.15	-
Signal Combiner	2	MiniCircuits ZFSC-2-1W	50 Ω	-
Log Periodic Antenna	1	A.R.A. LPB-2520/A	25 MHz – 2.0 GHz	-
Impedance Matching Transformer	1	Trilithic ZMT-57	75-50 Ω	-
Low Noise Preamplifier	1	Narda NEL-0102N305-1MH	0.5 to 2 GHz	-
Vertical Ground Plane Antenna	1	FCC Lab	0 dBi 512 to 698 MHz	11/13/07