

Interference Analysis Orlando, FL



Prepared on Behalf of
Qualcomm
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1.0 Executive Summary

On behalf of Qualcomm, Comsearch has completed a detailed interference study on Qualcomm's new advance wireless (AWS) technologies that will be temporarily operating at the CTIA show 2007. The demonstrations will be hosted in two different booths within the Orange County Convention Center in Orlando, FL. Qualcomm is planning on operating on the frequency ranges of 2160-2180 MHz and either 2150-2160 MHz or 2180-2190 MHz.

Qualcomm will like Comsearch to determine if their proposed AWS technologies can create harmful interference into any "Licensed" BRS or MW systems operating near the convention center. Also, Comsearch will determine the interference levels that Qualcomm's devices can receive from any of these "Licensed" BRS or MW systems. A cell site was created based on site information and the technical parameters that Qualcomm provided on their device. The Interference calculations were made based on this cell site using IQ.clear XG software and proprietary MW/BRS database of incumbent systems. The results of the study determines the predicted interference levels. The table below summarizes the number of BRS/ MW paths analyzed in the study area and the resulting number of BRS and MW sites that either create or receive interference from Qualcomm's proposed AWS technology.

Summary of Results

Qualcomm's proposed AWS technology will not create any harmful interference into any MW path or BRS system. Please see appendix B for the calculated interference levels.

	Qualcomm AWS's Technology to MW/BRS Systems		
	System 1	System 2A	System 2B
	2160 – 2180	2150- 2160	2180- 2190
Number of BRS sites considered in analysis	0	2	0
Number of BRS sites predicted to receive interference	0	0	0
Number of MW paths considered in analysis	9	0	0
Number of MW paths predicted to receive interference	0	0	0

Qualcomm's proposed AWS technology will not receive any harmful interference from any active MW path or BRS system. Please see appendix B for the calculated interference levels.

	MW/BRS Systems into Qualcomm AWS's Technology		
	System 1	System 2A	System 2B
Frequency ranges (MHz)	2160 – 2180	2150- 2160	2180- 2190
Number of BRS sites considered in analysis	0	2	0
Number of BRS sites predicted to create interference	0	0	0
Number of MW paths considered in analysis	15	0	7
Number of MW paths predicted to create interference	0	0	0

2.0 Parameters and Assumptions

Spectrum Allocation

This study analyzed the use of spectrum between 2150-2190 MHz.

Study Area

The study was conducted using Qualcomm's AWS technology. All MW paths and BRS sites within the TIA TSB Bulletin 10-F derived coordination contour were analyzed for potential interference.

Input Parameters and Assumptions

The following input parameters were assumed in the analysis.

AWS Parameters

EIRP	10 dBm (Worst case)
Frequency Ranges (MHz)	2160 -2180, 2150-2160 and 2180-2190
Bandwidth (MHz)	20, 10
Max Cell Size (Radius)	3 meters
Frequency Division Duplex	Base Station Transmit at 2.1 GHz
Convention Center Coordinates	Latitude: 28-25-30.5 N/ Longitude 81-28-11 W
Antenna	Omni Antenna (Worst case)

Interference Criteria

Propagation Model	OH Loss (base)
Digital Interference Criteria	Receiver Threshold - T/I
Excess Fade Margin Based on	99.999% Link Reliability
Polarization	Co-polarization

3.0 Analysis Results

2.1 GHz BRS Systems

Interference Calculations

Plot of all MW paths and BRS systems analyzed and Interference Report on the calculated interference levels are provided in Appendix B.

BRS Data

The reports in the Appendices contain status information for each BRS receive station. The various statuses are defined as follows:

- Licensed - Licensed with the FCC and responded to Public Notice #2 indicating that the system was operational.
- Questionable – Licensed with the FCC and responded to Public Notice #1 but did not respond to Public Notice #2, therefore operational status is unknown.
- Dead – Licensed with the FCC and responded to Public Notice #2 indicating that the system was not operational.

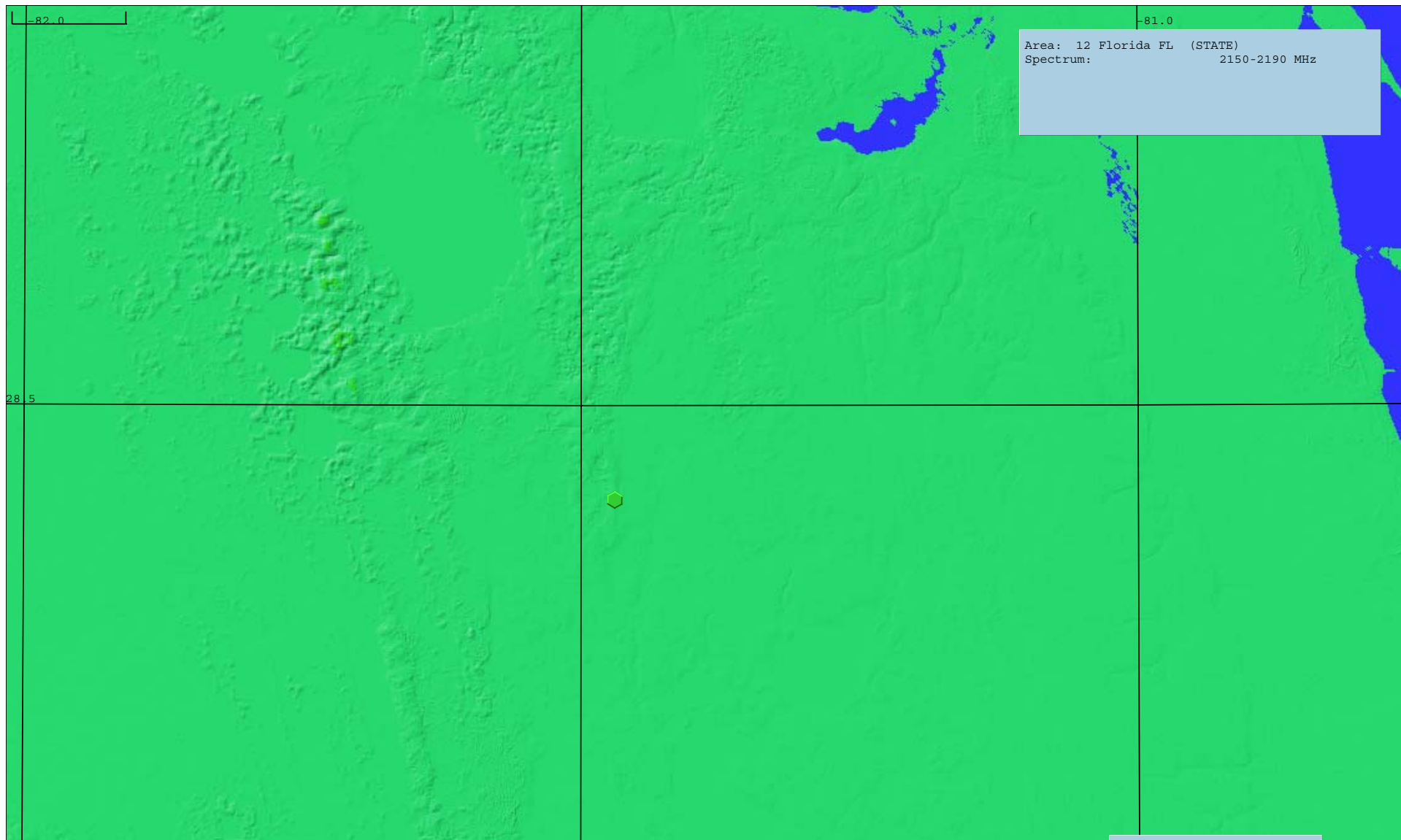
Microwave Data

The reports in the Appendices contain status information for each link. The various statuses are defined as follows:

- Licensed - Licensed with the Federal Communications Commission (FCC).
- Replaced - Licensed with the FCC but a new application has been filed to replace the existing path. Once the new path becomes licensed by the FCC, the status changes to Relocated.
- Relocated – Within the 18-month build out period for a new license on a different frequency band.
- Expired – Past the FCC expiration date and no renewal filed.
- Operating - Confirmed by licensee to be operating, but actual site data does not match FCC license.
- Questionable - One side of the path is listed as licensed with the FCC while the other end has been canceled or expired. This occurs because the FCC maintains licenses by transmit site rather than by path.
- Secondary - Operating in a secondary capacity based on FCC special conditions.
- Dead – Licensed with the FCC and responded to Public Notice #2 indicating that the system was not operational.

APPENDIX A:

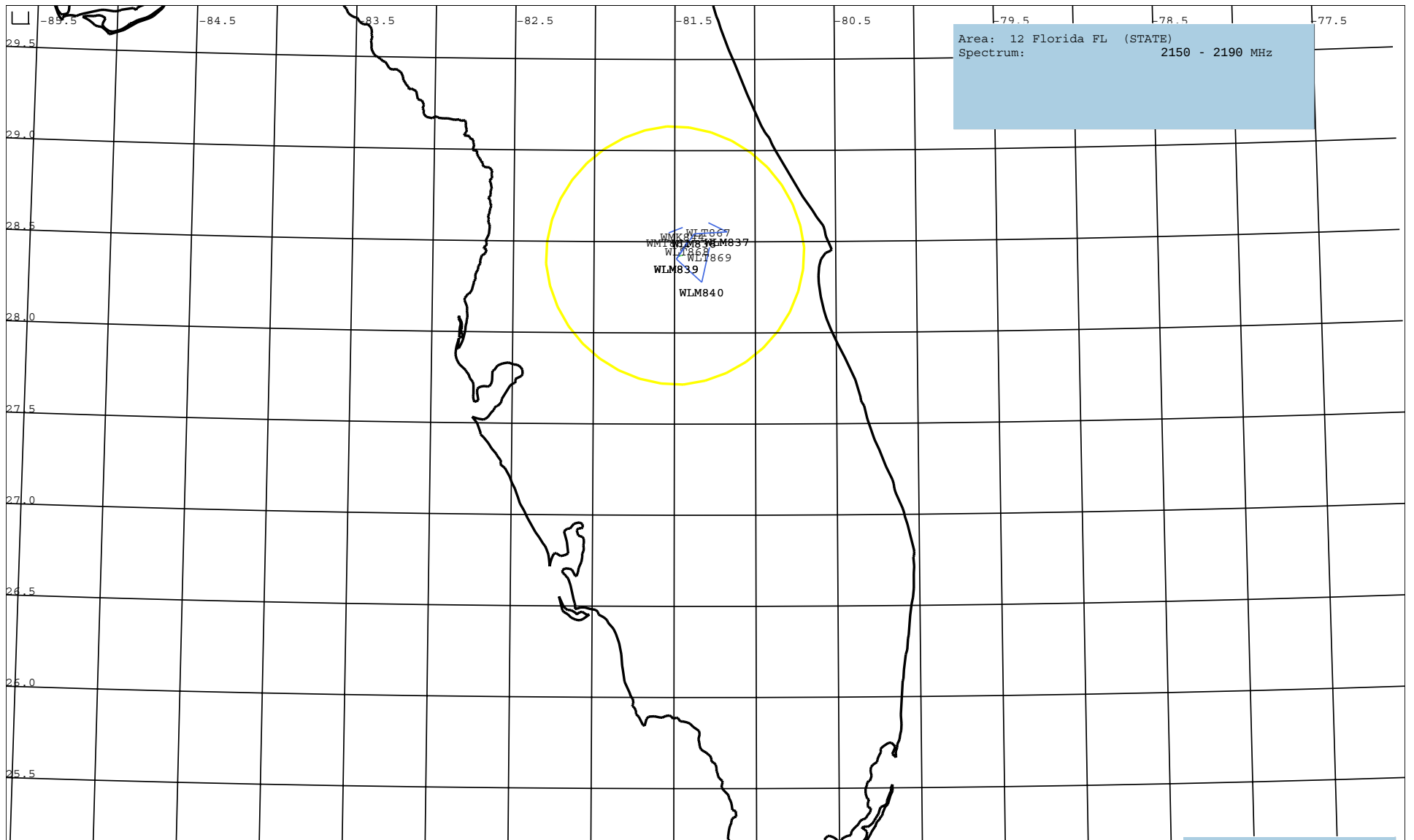
Cell Layout



APPENDIX B1:

**Interference Calculations – Qualcomm’s AWS device to
MW/BRS Systems**

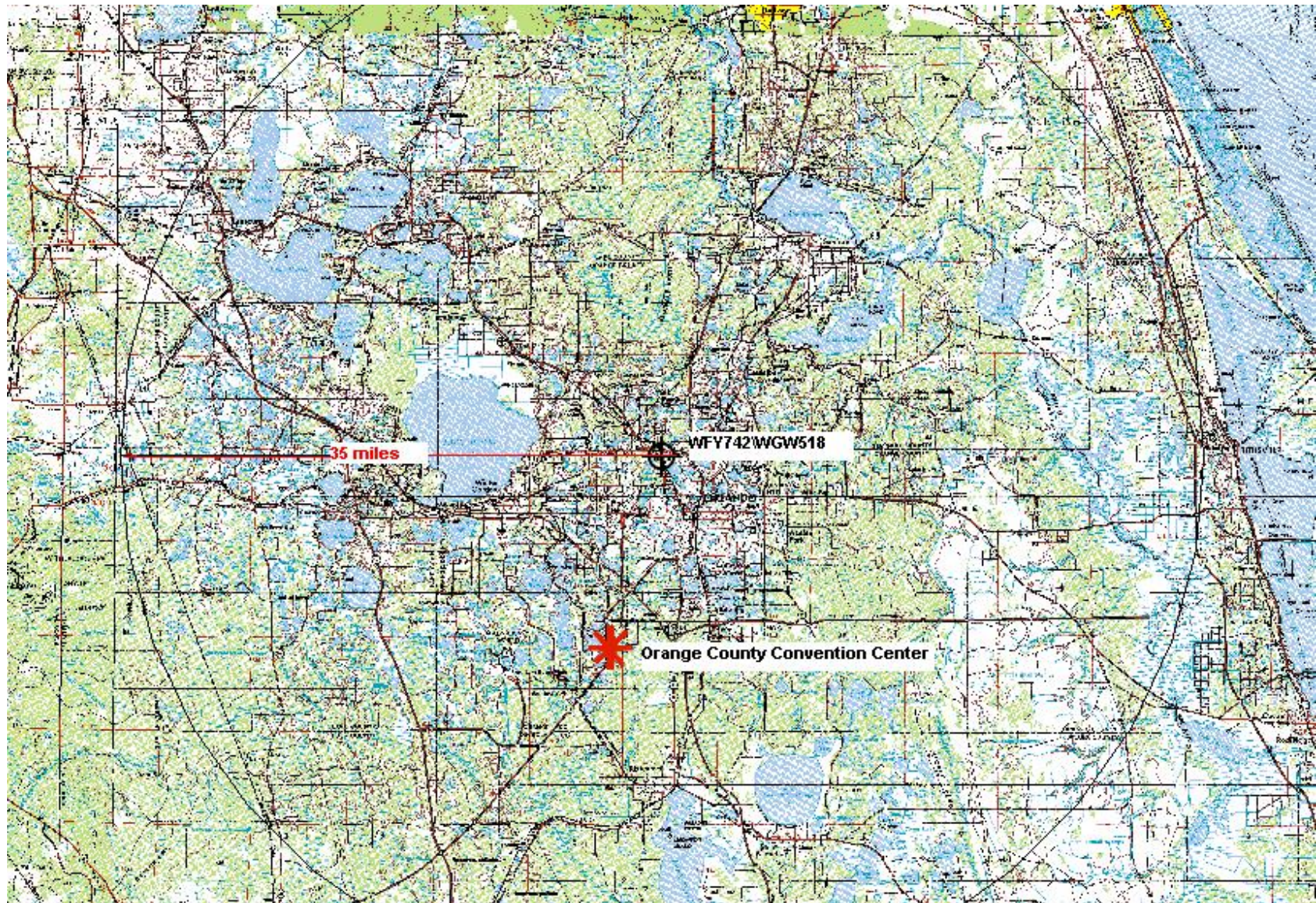
10 km



Interference Calculation

Qualcomm's AWS device to MW paths

Interfering: Orange County Convention Center Victim : All MW paths operating in 2150 - 2190 MHz range and situated at most 70 km away from the Convention Center									
Licensee	Site Names	CallSign	Status	Frequencies (MHz)	Distance	Interference Level (Worst Case)	Rx RSL=C	C/I	Active (Y/N)
New Cingular Wireless PCS LLC - FL, GA	LONGWOOD BITHLO	WLM836 WLM837	Questionable	2162 2112	32.3	-125.8	-43	82.8	N
New Cingular Wireless PCS LLC - FL, GA	GOLDENROD BITHLO	WLT867 WLM837	Relocated	2162 2112	32.3	-124.8	-37.1	87.7	N
New Cingular Wireless PCS LLC - FL, GA	KISSIMMEELAKE BUENA	WLM840 WLM839	Relocated	2165.2 2115.2	2.9	-103.4	-36.7	66.7	N
New Cingular Wireless PCS LLC - FL, GA	TANGELO PARKLAKE	WLT868 WLM839	Relocated	2171.6 2121.6	2.9	-88	-41.9	46.1	N
New Cingular Wireless PCS LLC - FL, GA	MTS0 BITHLO	WLM838 WLM837	Relocated	2171.6 2121.6	32.3	-115.3	-33.1	82.2	N
Orlando SMSA Ltd Partnership	ORL-BC ORL-AC	WMK844 WMT861	Questionable	2171.6 2121.6	15.2	-120.9	-39.5	81.4	N
New Cingular Wireless PCS LLC - FL, GA	MTSO LAKE BUENA	WLM838 WLM839	Terminated	2174.8 2124.8	2.9	-80.9	-31.8	49.1	N
New Cingular Wireless PCS LLC - FL, GA	LONGWOOD OCOEE	WLM836 WLM819	Questionable	2174.8 2124.8	10.8	-120.3	-44.4	75.9	N
New Cingular Wireless PCS LLC - FL, GA	KISSIMMEE AIRPORT	WLM840 WLT869	Relocated	2174.8 2124.8	18.9	-116.4	-36.5	79.9	N



Interference Calculation

Qualcomm's AWS device to BRS

Victim Path:		BRS operating in 2150 - 2160 MHz range								
Interfering :		Orange County Convention Center								
Licensee	Site Names	CallSign	Status	Channel	Frequencies (MHz)	Distance from Convention Center (km)	Interference Level (Worst Case)	Interference Objective	Interference Margin	Clear (Y/N)
Orange County Chairman Board of County Commissioners	P02041	WFY742 RX	Questionable	CH 1	2150 - 2156	20.616	-148.5	-105.6	42.9	Y
Orange County Chairman Board of County Commissioners	P00137	WGW518 RX	Questionable	2A	2156 -2160	20.616	-148.5	-105.2	43.3	Y

APPENDIX B2:

Interference Calculations – MW/BRS systems to Qualcomm's AWS device

[illegible]

Interference Calculation

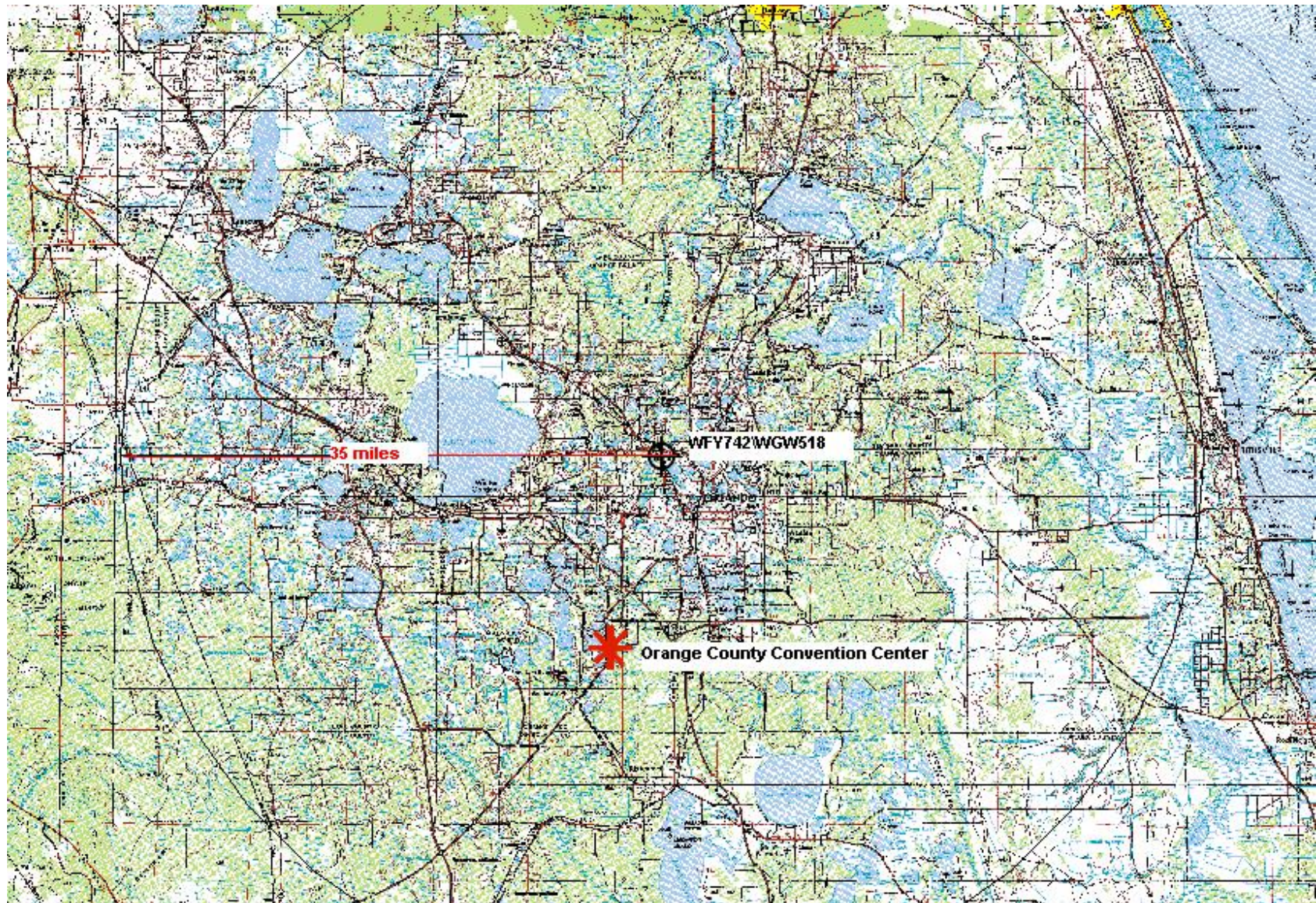
MW to Qualcomm's AWS device

Victim Path: All MW paths operating in 2150 - 2190 MHz range and situated at most 70 km away from the Convention Center											
Interfering : Orange County Convention Center											
Licensee	Site Names	CallSign	Status	Frequencies (MHz)	Distance from Convention Center (km)	Interference Level (Worst Case)	Rx RSL=C	C/I	Qualcomm's External Interference Level	Interference Margin	Active (Y/N)
New Cingular Wireless PCS LLC - FL, GA	GOLDENROD BITHLO	WLT867 WLM837	Relocated	2162 2112	26.5	-92.1	-93.12	-1.02	-82	10.1	N
New Cingular Wireless PCS LLC - FL, GA	LONGWOOD BITHLO	WLM836 WLM837	Questionable	2162 2112	36.6	-92.9	-93.12	-0.22	-82	10.9	N
New Cingular Wireless PCS LLC - FL, GA	KISSIMMEE LAKE BUENA	WLM840 WLM839	Relocated	2165.2 2115.2	21.2	-75.4	-93.12	-17.72	-82	-6.6	N
Melbourne Cellular Telephone Company	MIMS BITHLO	WLT621 WLM837	Relocated	2168.4 2118.4	66.2	-69.6	-93.12	-23.52	-82	-12.4	N
New Cingular Wireless PCS LLC - FL, GA	LAKELAND BARTOW	WLN787 WLN788	License	2168.4 2118.4	65.3	-113.9	-93.12	20.78	-82	31.9	Y
New Cingular Wireless PCS LLC - FL, GA	TANGELO PARK LAKE BUENA	WLT868 WLM839	Relocated	2171.6 2121.6	2.9	-63	-93.12	-30.12	-82	-19	N
New Cingular Wireless PCS LLC - FL, GA	MTSO BITHLO	WLM838 WLM837	Terminated	2171.6 2121.6	15.9	-86.6	-93.12	-6.52	-82	4.6	N
Orlando SMSA Ltd Partnership	ORL-BC ORL-AC	WMK844 WMT861	Questionable	2171.6 2121.6	17.1	-94.9	-93.12	1.78	-82	12.9	N
New Cingular Wireless PCS LLC - FL, GA	MTSO LAKE BUENA	WLM838 WLM839	Terminated	2174.8 2124.8	15.9	-51.1	-93.12	-42.02	-82	-30.9	N
New Cingular Wireless PCS LLC - FL, GA	LONGWOOD OCOEE	WLM836 WLM819	Questionable	2174.8 2124.8	36.6	-85.9	-93.12	-7.22	-82	3.9	N
New Cingular Wireless PCS LLC - FL, GA	KISSIMMEE AIRPORT	WLM840 WLT869	Relocated	2174.8 2124.8	21.2	-100.3	-93.12	7.18	-82	18.3	N
Orlando SMSA Ltd Partnership	ST CLOUD KENANSVILLE	WLM966 WLM967	License	2174.8 2124.8	35.3	-106.3	-93.12	13.18	-82	24.3	Y
New Cingular Wireless PCS LLC - FL, GA	CELL 2 CELL 4A	WLV651 WHD263	Questionable	2174.8 2124.8	63.3	-110.2	-93.12	17.08	-82	28.2	N
Orlando SMSA Ltd Partnership	MTC-A BITHLO	WLM968 WLM964	Questionable	2178 2128	66.5	-80.4	-93.12	-12.72	-82	-1.6	N
ALLTEL	BUSHNRLL WILWOOD	WMI769 WLS571	License	2178 2128	68.1	-113.4	-93.12	20.28	-82	31.4	Y
FLORIDA POWER AND LIGHT COMPANY	OSTEEN TITUSVILLE	WNET806 WPOS633	License	2183.2 2133.2	60.2	-101.9	-93.12	8.78	-92	9.9	Y
LAKELAND CITY FLORIDA	BACKUP TRANS POLICE TRANS	WNEY848 WNEY847	License	2183.2 2133.2	63.6	-104.1	-93.12	10.98	-92	12.1	Y
SUMTER ELECTRIC COOPERATIVE	GROVELAND SUMTERVILLE	WNEJ519 WNEJ517	License	2184.8 2134.8	41.1	-102.2	-93.12	9.08	-92	10.2	Y
ORLANDO UTILITIES COMMISSION	STANTON EN INDIAN RIVE	WNEP942 WEG954	License	2186.4 2136.4	31.1	-105.5	-93.12	12.38	-92	13.5	Y

Interference Calculation

MW to Qualcomm's AWS device

FLORIDA POWER AND LIGHT COMPANY	OSTEEN DAYTONA BCH	WNET806 WNET805	License	2186.4 2136.4	60.2	-110.6	-93.12	17.48	-92	18.6	Y
SUMTER ELECTRIC COOPERATIVE	EUSTIS SUMTERVILLE	WNEJ515 WNEJ517	License	2188 2138	49.2	-102.2	-93.12	9.08	-92	10.2	Y
Seminole County Board of Commissioners	FIVE POINTS SANFORD PD	WNEU522 WNTC338	License	2189.6 2139.6	38.8	-102.4	-93.12	9.28	-92	10.4	Y



Interference Calculation

BRS to Qualcomm's AWS device

Victim Path: Orange County Convention Center										
Interfering : BRS operating in 2150 - 2160 MHz range										
Licensee	Site Names	CallSign	Status	Channel	Frequencies (MHz)	Distance from Convention Center (km)	Interference Level (Worst Case)	Qualcomm's External Interference Level	Interference Margin	Clear (Y/N)
Orange County Chairman Board of County Commissioners	P02041	WFY742 RX	Questionable	CH 1	2150 - 2156	20.616	-157.1	-92	65.1	Y
Orange County Chairman Board of County Commissioners	P00137	WGW518 RX	Questionable	2A	2156 -2160	20.616	-157.1	-92	65.1	Y