FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554

M E M O R A N D U M

From: Julius Knapp, Chief, FCC Office of Engineering and Technology
P. Michele Ellison, Chief, FCC Enforcement Bureau

To: Manufacturers and Operators of Unlicensed 5 GHz Outdoor Network Equipment

Date: July 27, 2010

Subject: Elimination of interference to Terminal Doppler Weather Radar (TDWR)

The Federal Communications Commission (FCC), the National Telecommunications and Information Administration (NTIA) and the Federal Aviation Administration (FAA) have been investigating interference caused to Terminal Doppler Weather Radar (TDWR) systems operating in the 5600-5650 MHz band. TDWRs are used to detect wind shear and other weather conditions near airports. The interference manifests itself as a strobe line or lines on the radar display. While the radar continues to be usable, such interference is unacceptable and must be eliminated. More importantly, if the interference were to become severe, there may be a potential for missed alerts or false alarms.

We have found that the interference at each location has generally been caused by a few fixed wireless transmitters used by wireless internet service providers (WISPs) and operating outdoors in the vicinity of airports at high elevations that are line-of-sight to the TDWR installations (5 GHz outdoor network equipment). In most instances, the interference is caused by operations in the same frequency band as TDWRs, but there are some instances where the interference is caused by adjacent band emissions.

The 5 GHz outdoor network equipment is required to be certified under the FCC rules governing Unlicensed National Information Infrastructure (UNII) devices. In some instances, the interference was caused by equipment that was not certified or otherwise was not compliant with FCC rules. The FCC has taken appropriate enforcement action in those cases. We remind operators and manufacturers of UNII devices that any use or marketing of equipment that has not been certificated as required under the FCC rules or that has been modified such that it no longer complies with the certification requirements will result in FCC enforcement action.

In other instances, equipment that met the FCC's certification standards nonetheless caused interference, due to a variety of factors such as: the configuration of the transmitter, its height and azimuth relative to the TDWR, and the device's failure to

detect and avoid the radar signal. In such cases, the FCC's rules still require the elimination of the interference and the FCC has taken appropriate action in those cases.

The FCC, NTIA, and the FAA have been working with manufacturers of UNII devices and the Wireless Internet Service Provider Association (WISPA) to fully understand the causes of the interference problem and to develop effective and targeted remedies. Through our discussions, the various parties have agreed upon a number of immediate steps:

- The FAA has provided information on the locations of each of the TDWRs (see attached).

- The Wireless Internet Service Providers Association (WISPA) has voluntarily agreed to disseminate the location of the TDWRS to WISPs.[1] Moreover, WISPA has agreed to encourage operators that install devices within 35 km or the line-of-sight of the TDWRs, to operate at least 30 MHz away from the TDWR operation frequencies. WISPA has also agreed to voluntarily provide a database where WISPs can register the locations of the outdoor transmitters that they use. This database will be helpful for identifying sources of interference if it should occur. [2]

- The manufacturers of UNII devices involved in our discussions have also agreed to conduct outreach to their customers to alert them to the steps they must take to ensure that they do not cause interference to TDWRs. We urge all manufacturers of UNII devices to do the same. These steps include avoiding operation in the TDWR band and operating at least 30 MHz away from the TDWR operation frequencies when installing devices within 35 km or the line-of-sight of the TDWR sites.

The FCC, NTIA and FAA are continuing to vigorously investigate and eliminate cases of interference to TDWRs. It is our expectation that with your cooperation all such interference can be eliminated.

[1] See http://www.wispa.org/?page_id=2341
[2] See http://spectrumbridge.com/udrs/home.aspx

TDWR Location Information*

STATE	CITY	LONGITUDE	LATITUDE	FREQUENCY	TERRAIN ELEVATION (MSL) [ft]	ANTENNA HEIGHT ABOVE TERRAIN [ft]
AZ	PHOENIX	W 112 09 46	N 33 25 14	5610 MHz	1024	64
CO	DENVER	W 104 31 35	N 39 43 39	5615 MHz	5643	64
FL	FT LAUDERDALE	W 080 20 39	N 26 08 36	5645 MHz	7	113
FL	MIAMI	W 080 29 28	N 25 45 27	5605 MHz	10	113
FL	ORLANDO	W 081 19 33	N 28 20 37	5640 MHz	72	97
FL	TAMPA	W 082 31 04	N 27 51 35	5620 MHz	14	80
FL	WEST PALM BEACH	W 080 16 23	N 26 41 17	5615 MHz	20	113
GA	ATLANTA	W 084 15 44	N 33 38 48	5615 MHz	962	113
IL	MCCOOK	W 087 51 31	N 41 47 50	5615 MHz	646	97
IL	CRESTWOOD	W 087 43 47	N 41 39 05	5645 MHz	663	113
IN	INDIANAPOLIS	W 086 26 08	N 39 38 14	5605 MHz	751	97
KS	WICHITA	W 097 26 13	N 37 30 26	5603 MHz	1270	80
KY	COVINGTON CINCINNATI	W 084 34 48	N 38 53 53	5610 MHz	942	97
KY	LOUISVILLE	W 085 36 38	N 38 02 45	5646 MHz	617	113
LA	NEW ORLEANS	W 090 24 11	N 30 01 18	5645 MHz	2	97
MA	BOSTON	W 070 56 01	N 42 09 30	5610 MHz	151	113
MD	BRANDYWINE	W 076 50 42	N 38 41 43	5635 MHz	233	113
MD	BENFIELD	W 076 37 48	N 39 05 23	5645 MHz	184	113
MD	CLINTON	W 076 57 43	N 38 45 32	5615 MHz	249	97
MI	DETROIT	W 083 30 54	N 42 06 40	5615 MHz	656	113
MN	MINNEAPOLIS	W 092 55 58	N 44 52 17	5610 MHz	1040	80
MO	KANSAS CITY	W 094 44 31	N 39 29 55	5605 MHz	1040	64
MO	SAINT LOUIS	W 090 29 21	N 38 48 20	5610 MHz	551	97
MS	DESOTO COUNTY	W 089 59 33	N 34 53 45	5610 MHz	371	113
NC	CHARLOTTE	W 080 53 06	N 35 21 39	5608 MHz	807	113
NC	RALEIGH DURHAM	W 078 41 50	N 36 00 07	5647 MHz	400	113
NJ	WOODBRIDGE	W 074 16 13	N 40 35 37	5620 MHz	19	113
NJ	PENNSAUKEN	W 075 04 12	N 39 56 57	5610 MHz	39	113
NV	LAS VEGAS	W 115 00 26	N 36 08 37	5645 MHz	1995	64
NY	FLOYD BENNETT FIELD	W 073 52 49	N 40 35 20	5647 MHz	8	97
OH	DAYTON	W 084 07 23	N 40 01 19	5640 MHz	922	97
OH	CLEVELAND	W 082 00 28	N 41 17 23	5645 MHz	817	113
OH	COLUMBUS	W 082 42 55	N 40 00 20	5605 MHz	1037	113
OK	AERO. CTR TDWR #1	W 097 37 31	N 35 24 19	5610 MHz	1285	80
OK	AERO. CTR TDWR #2	W 097 37 43	N 35 23 34	5620 MHz	1293	97
OK	TULSA	W 095 49 34	N 36 04 14	5605 MHz	712	113
OK	OKLAHOMA CITY	W 097 30 36	N 35 16 34	5603 MHz	1195	64
PA	HANOVER	W 080 29 10	N 40 30 05	5615 MHz	1266	113
PR	SAN JUAN	W 066 10 46	N 18 28 26	5610 MHz	59	113
TN	NASHVILLE	W 086 39 42	N 35 58 47	5605 MHz	722	97
TX	HOUSTON INTERCONTL	W 095 34 01	N 30 03 54	5605 MHz	154	97
TX	PEARLAND	W 095 14 30	N 29 30 59	5645 MHz	36	80

TX	DALLAS LOVE FIELD	W 096 58 06	N 32 55 33	5608 MHz	541	80
TX	LEWISVILLE DFW	W 096 55 05	N 33 03 53	5640 MHz	554	31
UT	SALT LAKE CITY	W 111 55 47	N 40 58 02	5610 MHz	4219	80
VA	LEESBURG	W 077 31 46	N 39 05 02	5605 MHz	361	113
WI	MILWAUKEE	W 088 02 47	N 42 49 10	5603 MHz	820	113

Latitude and Longitude are specified in NAD 83

* Last updated July 12, 2010

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