

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of )  
 )  
UltraVision Security Systems, Inc., ) ET Docket No. 06-195  
Request for Interpretation and Waiver of )  
Section 15.511 of the Commission's Rules )

**REPLY TO COMMENTS OF MSTV**

March 8, 2007

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**REPLY TO COMMENTS OF MSTV**

**A. Summary**

UltraVision Security Systems, Inc. seeks a waiver to permit certification and sale of UltraSensor™, an ultra-wideband (UWB) surveillance system. UltraSensor offers performance advantages for life safety, commercial security, and national security that are unmatched by other security and surveillance technologies.

The Commission's Rules require a UWB surveillance system to have its operating emissions above 1990 MHz, and also permit emissions below 960 MHz at the usual (extremely low) Part 15 levels. UltraSensor conflicts with the rule in having no emissions above 1990 MHz. It meets the limits below 960 MHz. Paradoxically, then, UltraSensor fails to comply only because its emissions are lower than those of a compliant device.

The Association for Maximum Service Television, Inc. (MSTV) filed the sole opposition. Its concern is the potential for interference to TV reception. MSTV points to a casual demonstration that showed interference from an UltraSensor unit close to a TV receiver. It also cites a technical study in the "TV white space" proceeding that, according to MSTV, shows operation at Part 15 levels causing interference to digital TV at a distance of 78 feet, and to analog TV at 452 feet.

The demonstration, however, proved nothing beyond what it showed: interference to digital TV at about 5 meters, and to analog TV at about 8 meters. No interference was seen outside those distances. No measurements were taken of distance, of incoming TV signal strength, or of anything else. The demonstration provides no basis for extrapolation to other conditions.

Nor can MSTV blindly carry over the results from the "white space" study. For historical reasons, the Commission's compliance procedures specify "quasi-peak" measurements below 960 MHz, even though "average" measurements generally correlate better with interference. The white space study used an emitter that emulates a high-data-rate wireless device. Its average emissions are only a little below the quasi-peak. UltraSensor, in contrast, has average emissions that are hundreds or thousands of times lower than the quasi-peak. Thus the emitter used in the white space study is far more interfering than an UltraSensor unit, at the same compliant quasi-peak levels. As a result, MSTV's projections, based on the white space study, greatly overestimate the interference potential of UltraSensor.

Nevertheless: **UltraVision will accept a waiver condition that prohibits installation of an UltraSensor unit within 140 meters (452 feet) of a residentially zoned area through February 18, 2009, or within 24 meters (78 feet) of residential zoning after that date.**

Analog transmission will cease on February 18, 2009, ending the need for protection of analog TV after that date. This condition will eliminate any threat of interference to residential TV reception, according to MSTV's own numbers.

MSTV also opposes a waiver of the location restrictions on UWB surveillance systems. Comparing the technical rules for surveillance systems to those for unrestricted categories shows

the restrictions are intended to protect users in the 960-3100 MHz range. Having no emissions there, UltraSensor should not be subject to the restrictions.

## **B. Introduction**

On October, 6, 2006, UltraVision filed a "Request for Interpretation and Waiver of Section 15.511 of the Commission's Rules" to permit the certification and marketing of "UltraSensor™," a UWB surveillance system offering important benefits in life safety, commercial security, and national security.<sup>1</sup> The request explained that UltraSensor is ideal for protecting homeland security and critical infrastructure installations such as nuclear power plants, government offices, cellular towers, harbor facilities, airports, and pipeline pumping stations, in addition to high-value commercial sites. Because UltraSensor devices are buried under pavement or lawn, they are invisible to intruders, tamper-proof, and require no maintenance. UltraSensor can be programmed to alarm for an intruder's location, velocity, and mass, thus minimizing false alarms. The sensor is compatible with existing IP-enabled security systems.

UltraSensor does not comply with the Commission's UWB rules -- but only because it has *lower* emissions than a compliant device. The rules requires a UWB surveillance system to have its operating bandwidth between 1990 and 10,600 MHz.<sup>2</sup> But UltraSensor has no emissions at all in that band, and fully complies everywhere else in the spectrum. UltraSensor gets by

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<sup>1</sup> The request subsequently appeared on public notice. *Office of Engineering and Technology Declares the Ultravision Security Systems, Inc. Request for a Waiver of Part 15 to Be a "Permit-but-disclose" Proceeding for Ex Parte Purposes and Requests Comments*, ET Docket No. 06-195, DA 06-2102 (released Oct. 24, 2006). A later public notice extended the comment and reply dates.

<sup>2</sup> 47 C.F.R. Sec. 15.511(a).

under the limits intended for low-level spurious emissions. UltraVision accordingly requested a rule interpretation that its product qualifies as a UWB surveillance system.

The rules limit operation of surveillance systems to emergency responders, manufacturers, and petroleum and power companies. In view of UltraSensor's low emissions and consequently low likelihood of interference, UltraVision also requested a waiver to permit sales to any commercial, governmental, or non-profit entity, but excluding residential installations. In support of that request, UltraVision proposed a number of conditions to limit installations and facilitate coordination with other spectrum users.

One comment was filed in response to the public notice. The Association for Maximum Service Television, Inc. (MSTV) expresses concern that the UltraSensor device may threaten interference to TV reception.<sup>3</sup>

**C. Barring a Device Whose Emissions Are Lower than a Compliant Device Would Be Irrational.**

MSTV opposes a rule interpretation that UltraSensor complies with Section 15.511.<sup>4</sup>

UltraVision is in the odd position of needing an interpretation in order to certify a device whose emissions are *lower* overall, and nowhere higher, than a device in full compliance with the rules.

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<sup>3</sup> MSTV also raises procedural and legal issues. We deal with those in Part F, below.

<sup>4</sup> MSTV at 1-2. MSTV prefers to characterize this request as being one for waiver. MSTV at 1 n.1. At this stage, UltraVision is indifferent as to the procedural route.

Figure 1 shows the emissions limits for a UWB surveillance system.<sup>5</sup> Permitted emissions are highest between 1990 MHz and 10.6 GHz, and much lower below 960 MHz. (The logarithmic vertical scale compresses values toward the bottom of the plot.)

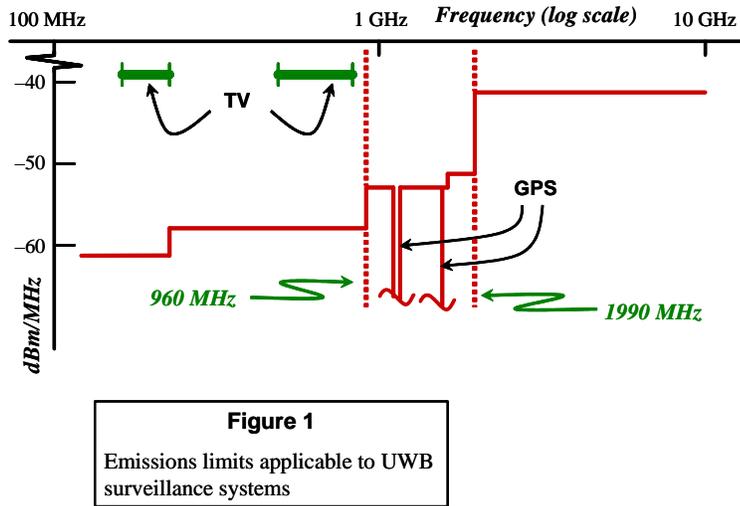


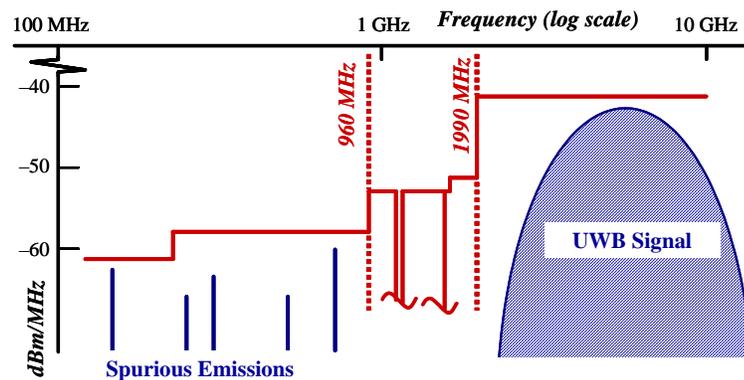
Figure 2 shows a "single-emitter" surveillance system having a UWB bandwidth between 1990 MHz and 10.6 GHz, as the rules require. The emissions below 960 MHz consist of spurious line emissions, a by-product of the UWB signal above 1990 MHz.

Figure 3 shows a hypothetical "two-emitter" surveillance device having two UWB signals: one above 1990 MHz, as in Figure 2, and also a second one below 960 MHz, within the prescribed limits. Nothing in the rules prohibits that second UWB signal, so long as its level is

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<sup>5</sup> *Technical note.* This and the following are schematic diagrams, and do not represent any specific device. The emissions levels below 960 MHz are drawn to reflect the lower measurement bandwidth in that region. They do not reflect the required use of quasi-peak measurement below 960 MHz. If drawn to a consistent measurement standard, the limits below 960 MHz would be shown lower than they are here, to a degree that depends on the modulation of the device under test.

below that of the higher-frequency signal and it serves some useful purpose.<sup>6</sup> The two-emitter configuration might not have been foreseen by the Commission's draftsmen, but it nonetheless complies squarely with the rule text. Were an applicant to submit such a device for certification, the Commission would have little choice but to grant it.

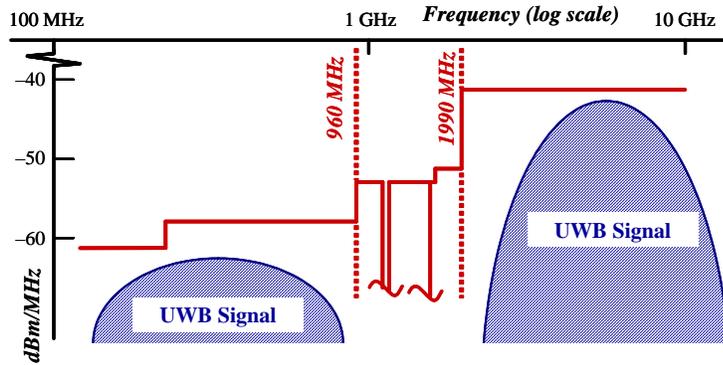


**Figure 2**  
"Single-emitter" UWB surveillance system

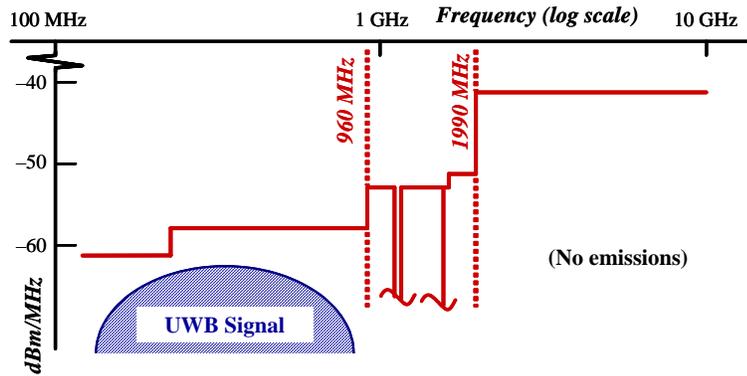
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<sup>6</sup> Section 15.511(a) requires the "UWB bandwidth" of the combined device to lie between 1990 MHz and 10.6 GHz. Section 15.503(a) defines the UWB bandwidth as "the frequency band bounded by the points that are 10 dB below the highest radiated emission." Accordingly, if the highest radiated emission is above 1990 MHz (as shown in the diagram), then so is the UWB bandwidth. The device then meets this criterion for a surveillance system.

The "useful purpose" is necessary to satisfy Section 15.15(a), which generally prohibits unnecessary emissions.



**Figure 3**  
 Hypothetical compliant "double-emitter" UWB surveillance system



**Figure 4**  
 Emissions from UltraSensor are lower than from double-emitter system

We come then to Figure 4, which represents the UltraSensor device. It is identical to Figure 3 except that emissions above 960 MHz are missing. UltraSensor is thereby quieter and

less interfering than the compliant device of Figure 3. To deny certification simply because a device is *less* interfering than a qualifying device, we submit, makes no rational sense.

Accordingly, the Commission should rule that UltraSensor qualifies as a UWB surveillance system.

**D. Grant of the Requested Waiver Will Not Threaten Interference to TV Reception.**

UltraVision proposes to operate below 960 MHz at levels under the maximum prescribed for all UWB devices, namely, the limits set out in Section 15.209. MSTV contests the adequacy of Section 15.209 to protect TV reception,<sup>7</sup> and predicts that UltraSensor operation at those levels will cause harmful interference.<sup>8</sup>

**1. *MSTV has greatly overstated the risk of interference from UltraSensor.***

MSTV cites two sources for its concern about interference from UltraSensor.

First, UltraVision and MSTV cooperated last November on a brief, informal demonstration at MSTV's offices.<sup>9</sup> The unsurprising result: an UltraSensor unit can produce visible effects if operated close enough to a TV receiver. One MSTV representative reports seeing interference at "about 25 feet."<sup>10</sup> No one measured the distance, however. Another participant noted that interference to digital TV occurred only over shorter distances, about 15

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<sup>7</sup> MSTV at 4-6. MSTV notes this same issue is presently under review in the "TV white space" proceeding, ET Docket N0. 04-186. *Id.* at 5-6. That proceeding examines whether unlicensed devices can be used in locally vacant TV spectrum.

<sup>8</sup> MSTV at 1-4.

<sup>9</sup> MSTV at 3 & Appendix.

<sup>10</sup> MSTV at Appendix.

feet.<sup>11</sup> No one attempted to measure the received TV signal strength, which is important to interpreting the results.

In the end, the demonstration established only what it actually showed: that UltraSensor might interfere with TV reception at a few meters. It permits no reasoned inference about the potential impact of an outdoor, underground UltraSensor installation on a TV receiver situated a reasonable distance away.

MSTV's other source is a study in the Commission's "white space" docket that reports TV interference from a Section 15.209 compliant source tens of meters away.<sup>12</sup> Consistent with its purpose, however, that study tested a source simulating an unlicensed wireless transmitter using high-rate digital modulation. Specifically, the study examined interference caused by a COFDM modulator signal.<sup>13</sup>

The nature of the source is important. Below 1000 MHz, the region of interest here, Section 15.209 limits quasi-peak power, not the average power that better predicts most interference. The average power of a COFDM source is a large fraction of the permitted quasi-peak maximum. UltraSensor, in contrast, uses a pulsed signal having a very low duty cycle, between -38 dB and -44 dB.<sup>14</sup> This puts its average signal very far below the quasi-peak

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<sup>11</sup> See Declaration of Dennis J. Johnson, attached.

<sup>12</sup> MSTV at 5-6.

<sup>13</sup> MSTV/NAB comments in ET Docket No. 04-186 (Nov. 30, 2004) at Exhibit A, Appendix 1 at 30 (reporting on tests carried out by the Communication Research Centre Canada for MSTV). The COFDM modulator was set to 3 dB below Section 15.209 limits. *Id.*

<sup>14</sup> *Technical note.* UltraSensor has an interval between pulses of 12.5  $\mu$ sec to 50  $\mu$ sec. Pulse width is 2 nsec. The duty cycle therefore can range from 2 nsec/12.5  $\mu$ sec = 1/6,250 to 2 nsec/50  $\mu$ sec = 1/25,000. These values correspond respectively to -38 and -44 dB.

readings. In consequence, UltraSensor is much less interfering than a COFDM modulator at the same quasi-peak levels.

Putting this another way, an UltraSensor device compliant with Section 15.209 will cause interference at much shorter distances than the COFDM source than MSTV used to predict larger interference distances.

**2. *UltraVision will accept conditions that effectively eliminate any risk of interference to TV.***

MSTV asserts that a device compliant with the Section 15.209 emissions limits "could cause interference to DTV sets at distances up to 78 feet and interference to analog TV sets up to 452 feet."<sup>15</sup>

For the reasons given just above, UltraVision believes these numbers greatly overstate the interference threat.

Nevertheless, in order to expedite this proceeding, UltraVision will adopt MSTV's data to eliminate any risk of interference to TV viewers:

**UltraVision will accept a waiver condition that prohibits installation of an UltraSensor unit within 140 meters (452 feet) of a residentially zoned area through February 18, 2009, or within 24 meters (78 feet) of residential zoning after that date.**

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<sup>15</sup> MSTV at 6. We note, however, that the actual testing on which this prediction is based extended only to 24 meters. MSTV/NAB comments in ET Docket No. 04-186 (Nov. 30, 2004) at Exhibit A, Appendix 1 at 35.

(February 18, 2009, is the date when analog transmission must cease,<sup>16</sup> so that separations adequate to protect digital reception will suffice thereafter.)

In *Curtis-Wright Controls Inc.*,<sup>17</sup> the Commission recently adopted a similar separation mechanism for a UWB surveillance system waiver. *Curtis-Wright* was a very different case from this one: where UltraSensor is below the emissions limits at all frequencies, the *Curtis-Wright* emitter exceeded the limits over 960-4000 MHz by as much as 21.3 dB, potentially affecting GPS, wireless phones, various aeronautical radars, and C-band satellite, among others. The Commission nevertheless determined that it could protect those services in part by imposing a 110 meter separation distance between the UWB units and areas accessible to the public.<sup>18</sup> (Certain other conditions on the *Curtis-Wright* waiver, reflecting the over-limit emissions in sensitive bands, are inappropriate for UltraVision.) Similarly, the separations proposed above will adequately protect TV reception, according to MSTV's data.

**E. The Rationale for Restricting the Marketing of Surveillance Systems Does Not Apply to UltraSensor.**

Section 15.511(b) limits operation of UWB surveillance systems to "law enforcement, fire or emergency rescue organizations or by manufacturers licensees, petroleum licensees or power licensees." UltraVision asked for a waiver of this provision to allow to allow installation on the premises of any party eligible for licensing under Part 90 of the Commission's Rules

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<sup>16</sup> See 47 U.S.C. Sec. 309(j)(14)(A).

<sup>17</sup> *Curtis-Wright Controls Inc. Embedded Computing Petition for Waiver of the Part 15 Ultra-Wideband (UWB) Regulations*, DA 07-198 (Office of Engineering and Technology released Jan. 26, 2007).

<sup>18</sup> *Id.* at para. 22.

(which excludes consumers). MSTV opposes this request, again citing concerns of interference to TV reception.<sup>19</sup>

Two categories of UWB, "indoor" and "hand-held" devices, have no restrictions as to location of use.<sup>20</sup> The basis for restrictions on surveillance systems is apparent from a comparison of the emissions limits for the three types of devices:

Band in MHz	Limits in dBm/MHz		
	Surveillance	Indoor	Hand-Held
below 960	per § 15.209		
960-1610	-53.3	-75.3	-75.3
1610-1990	-51.3	-53.3	-63.3
1990-3100	-41.3	-51.3	-61.3
3100-10,600	-41.3		
Location Restrictions	Yes	No	

Source: 47 C.F.R. Secs. 15.511(c),15.517(c), 519(c).

The limits for surveillance systems exceed those for the two unrestricted categories only in the range 960-3100 MHz. It follows that the restrictions must be intended to protect other users at those frequencies. (As support for this hypothesis, we note that the use restrictions on through-the-wall imaging systems above 1990 MHz are much more demanding than on similar

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<sup>19</sup> MSTV at 4.

<sup>20</sup> See 47 C.F.R. Secs. 15.517, 15.519. To be sure, "indoor" units must be used indoors, but can be used in any indoor environment. Similarly, "hand-held" units must be primarily hand held, but can be used anywhere.

systems below 960 MHz.<sup>21</sup>) Because UltraSensor has no detectable emissions above 960 MHz, there is no basis for subjecting it to stringent location-of-use limitations.

Any concerns about TV interference that might result from relaxing the use restrictions should be completely resolved by the proposed separation from residential areas, according to MSTV's own data.

**F. MSTV's Legal and Procedural Objections Are Groundless.**

MSTV raises a number of legal and procedural challenges, but none stands up to examination.

MSTV appears to argue that a waiver is inappropriate because UltraSensor does not comply with the letter of the UWB rules.<sup>22</sup> But the U.S. Court of Appeals has long since squarely rejected this view. The much-cited case of *WAIT Radio v. FCC*<sup>23</sup> requires the agency to consider a well-framed waiver request, notwithstanding that the outcome will run counter to the rule:

The very essence of waiver is the assumed validity of the general rule, and also the applicant's violation unless waiver is granted. And as already noted, provision for waiver may have a pivotal importance in sustaining the system of administration by general rule.<sup>24</sup>

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<sup>21</sup> Compare 47 C.F.R. Sec. 15.510(d) (systems above 1990 MHz limited to public safety entities for law enforcement applications and emergency services) and Sec. 15.510(c)(1) (systems below 960 MHz available to all Part 90 eligibles).

<sup>22</sup> MSTV at 8 ("denying this waiver request would advance the Commission's goals in enacting the Part 15 UWB device rules by ensuring that Ultra Vision goes through the rulemaking process if it seeks to operate in a bandwidth not sanctioned by the current rules.")

<sup>23</sup> 418 F.2d 1153 (D.C. Cir. 1969).

<sup>24</sup> *Id.*, 418 F.2d at 1158.

MSTV also misstates the applicable waiver condition, alleging that UltraVision fails to satisfy a "unique circumstances" requirement.<sup>25</sup> This argument fails in two respects. First, MSTV relies on language in Section 1.925 of the Commission's Rules, which is inapplicable here.<sup>26</sup> Second, MSTV asserts that the UltraVision request fails to present "'unique circumstances' which would make application of the rules 'inequitable, unduly burdensome, or contrary to the public interest.'"<sup>27</sup> To the contrary, UltraVision showed the "unique circumstance" of a technology capable of serving the nation's security needs in ways not otherwise possible, at far lower emissions than are provided for under the rules. To the extent that the rules block this technology, they are indeed inequitable, burdensome, and contrary to the public interest. UltraVision has made every required showing for a waiver under any applicable standard.

MSTV cites a staff release as saying a waiver is appropriate only where "there is little potential for interference into any service authorized under the Table of Frequency Allocations."<sup>28</sup> Putting aside the question whether an order of the International Bureau's Satellite Division is binding precedent elsewhere in the Commission, UltraVision's proposed separation condition puts this criterion to rest by eliminating any potential for interference to TV.

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<sup>25</sup> MSTV at 9-10, *quoting* 47 C.F.R. Sec. 1.925(b)(3)(ii).

<sup>26</sup> Section 1.925 comes within Part 1, subpart F, which is captioned, "Wireless Telecommunications Services Applications and Proceedings." These provisions do not govern waivers under Part 15. *See* 47 C.F.R. Sec. 1.902 (scope of subpart F).

<sup>27</sup> MSTV at 9-10.

<sup>28</sup> MSTV at 10, *citing* *EchoStar Satellite Applications to Construct Satellites*, 20 FCC Rcd. 930 at para. 12 (Satellite Div. International Bur. 2004).

Finally, MSTV misconstrues UltraVision's reference to a change in the rules for UWB ground penetrating radars (GPRs).<sup>29</sup> The initial UWB Report and Order contained a provision that, in some circumstances, discriminated in favor of more interfering GPRs.<sup>30</sup> The Commission subsequently corrected the rule.<sup>31</sup> MSTV argues that decision has no bearing here "[f]irst and foremost" because it occurred in a rulemaking reconsideration, not a waiver proceeding.<sup>32</sup>

We cite the GPR decision for the proposition that the rules can unintentionally frustrate the Commission's policy favoring low-emission Part 15 devices. Whether the Commission fixes the problem in a reconsideration or a waiver is irrelevant to the principle.

### CONCLUSION

UltraSensor offers security benefits that are otherwise not available -- low false alarm rates, high reliability, low maintenance, tamper-proof installation, and accurate threat identification. UltraSensor is also less interfering overall than other UWB imaging technologies. A waiver is therefore in the public interest.

The sole objection to the waiver came from MSTV. By proposing a separation buffer based on MSTV's own data, UltraVision has fully addressed MSTV's substantive concerns.

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<sup>29</sup> MSTV at 11.

<sup>30</sup> For details, see "Petition for Partial Reconsideration of the Ground Penetrating Radar Industry Coalition" in ET Docket No. 98-153 at 17-19 (filed June 17, 2002).

<sup>31</sup> *Ultra-Wideband Transmission Systems*, 18 FCC Rcd 3857 at para. 21 (2003).

<sup>32</sup> MSTV at 11. MSTV also points to GPR-specific factors the Commission mentioned in the reconsideration. *Id.*

There being no other objections in the record, the Commission should grant the waiver expeditiously.

Respectfully submitted,

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March 8, 2007

## **TECHNICAL CERTIFICATION**

I am a technically qualified person who reviewed the foregoing Reply to Comments of MSTV.

I certify that the technical statements therein are correct to the best of my knowledge.

Dennis J. Johnson  
President  
UltraVision Security Systems, Inc.

## **DECLARATION OF DENNIS J. JOHNSON**

1. My name is Dennis J. Johnson. I am President of UltraVision Security Systems, Inc., 88 Stiles Road, Suite 103, Salem NH 03079.

2. I am a trained and qualified electrical engineer and have practiced that profession for 30 years.

3. I was present in the offices of MSTV on November 9, 2006, along with my counsel, Mitchell Lazarus, and Messrs. Victor Tawil, Bruce Franca, and David Donovan of MSTV. I participated in the informal demonstration described in the "Declaration of Bruce Franca" appended to the Comments of the Association for Maximum Service Television, Inc. dated February 20, 2007, filed in ET Docket No. 06-195.

4. Mr. Franca's Declaration alleges there was "significant interference" to both analog and digital TV over a distance of "about 25 feet." Declaration of Bruce Franca at 1. Mr. Franca does not make any distinction between analog and digital reception in this regard.

5. I saw detectable interference to digital reception only out to an estimated distance of 15 feet. No interference was visible beyond about 15 feet for digital and about 25 feet for analog.

6. Mr. Franca's Declaration further states that he and his colleagues explained that "the received digital TV signals were generally strong." Declaration of Bruce Franca at 2.

7. No one measured the received TV signal strength. No one evaluated whether the location of the MSTV offices relative to the various TV transmitters, or the low height of the office location relative to ground level, or construction of the building, or intervening buildings, terrain, etc. may have affected the received TV signal strength.

8. In my own opinion, considering the very limited nature of the November 9, 2006, demonstration, it is infeasible to extrapolate the results beyond the conditions of the demonstration itself. In particular, it would be unjustified to use the results for making predictions about whether TV interference will or will not occur under other circumstances.

Dennis J. Johnson

**CERTIFICATE OF SERVICE**

I, Deborah N. Lunt, a secretary with the law firm of Fletcher, Heald & Hildreth, PLC, hereby state that true copies of the foregoing REPLY TO COMMENTS OF MSTV have been served this 8th day of March, 2007, by first class mail, postage prepaid, to the following listed on the attached Service List, except that persons having addresses listed at the Federal Communications Commission were served by hand and/or by email.

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Deborah N. Lunt

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