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July 16, 2003

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th St. S.W.
Washington, D.C. 20554

RE: Safety Cast Corporation
Application for Special Temporary Authority In the
Experimental Radio Service
File No.0183-EX-ST-2003

Dear Ms. Dortch,

Submitted herewith in duplicate is an Informal Objection in the matter of Safety Cast Corporation's application for Special Temporary Authorization; File No. 0183-EX-ST-2003.

This is not a docketed proceeding but is subject to rules concerning **ex parte** presentations in *permit-but-disclose* proceedings as per Section 1.1206(b) of the rules.

A written copy of this objection has been directly provided to the Experimental Licensing Branch Chief, James Burtle. Electronic copies have been sent to James Burtle, Charles Iseman, Bonnie Gay, Ed DeLaHunt, Dale Bickel and James Dailey at the FCC, as well as Mark Foss, C.E.O. of Safety Cast Corporation.

Sincerely,

JAMES MADISON UNIVERSITY BOARD OF VISITORS

William D. Fawcett
Director of Engineering, WMRA

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In re Application of)
Safety Cast Corporation)
)
) File No.0183-EX-ST-2003
For Special Temporary Authority)
In the Experimental Radio Service)
Low Power FM Broadcast Transmitter)
)
EX PARTE PRESENTATION)

To: Chief, Experimental Licensing Branch

INFORMAL OBJECTION

The Board of Visitors of James Madison University, licensee of WMRA (FM), Harrisonburg, Virginia ("**WMRA**") pursuant to Section 1.1206(b) of the Rules (*ex parte: permit-but-disclose*) hereby files an Informal Objection to the above referenced application (the "**Application**") of Safety Cast Corporation ("**Safety Cast**").

WMRA operates a regional network of public-radio transmitters and is fully involved in EAS broadcasts covering 17 counties or independent cities. **WMRA** is one of the primary (LP) stations for the Shenandoah Valley LECC and is at the terminating end of the State Relay network.

A simplified explanation of the proposed **Safety Cast** system is that it will over-ride licensed broadcasters on all

FM Channels (and eventually AM Channels) within 320 meters of the emergency vehicle equipped with the broadband jamming transmitter (hereafter "**jammer**").

While the instant **application** is for experimental testing, this objection will address both the testing and its logical expansion to a fully-installed system nationwide, as there is no merit in allowing testing of a system that is fatally flawed both in concept and in application. We intend to address the technical merits of this system, its potential harm to the Emergency Alert System ("**EAS**"), and the practicality of the system itself.

Technical Merit

The **application** indicates that **Safety Cast** will use an 80 milliwatt transmitter¹. Assuming a unity gain antenna, this does not appear to be enough power to work in a dependable manner.

Presumably this is what **Safety Cast** wishes to demonstrate with this experimental authorization. However, there are reliable computations that will prove this system unworkable without the bother of testing.

¹ Safety Cast original application for STA File Number 0183-EX-ST-2003

Many locales have FM "flame-throwers" which dominate the market, both in signal strength and in audience. These are the stations to which people will be listening. In many cases, these stations are located near the heart of the city. As an example, let us consider Harrisonburg, Virginia, home of WQPO-FM.

WQPO is a 50 KW station, with an HAAT of 150 Meters, placing a 103 dBu contour over most of the city (4 km radius). This is a really strong signal, but not unusual.

Using the rule-of-thumb capture-ratio of 10 dB, the jammer must produce a signal of 113 dBu. Using standard FCC methodology to predict FM signal strength (F50:50 table, assume 30 M HAAT) the 80 milliwatt jammer will produce a 113 dBu signal at a distance of 15 feet. Hardly useful.

Even considering a slightly-weaker 90 dBu signal, the jammer will produce a 100 dBu signal at a distance of 203 feet. For an emergency vehicle traveling at 60 MPH, this is not very much notice.

The FCC standard 70 dBu "city-grade" contour will require an 80 dBu signal to over-ride. That works out to 641 feet. Still less than the specified 320 meters.

The system as specified will not be able to render the promised 320 meter range under any practical circumstances.

Interference to Repeater Sites

Safety Cast indicates that it will block all transmissions within 610 meters of a broadcast installation. While this in itself will render **Safety Cast** ineffective (there are a lot of broadcast installations in major cities), the premise that **Safety Cast** can effectively jam all broadcasts within a 320 meter radius and yet not interfere with critical broadcast installations is without technical merit. Again, let us consider an example.

WMRA has a re-broadcast agreement with WMLU in Farmville, Virginia. WMLU receives WMRV transmissions from Crozet, Virginia on 103.5 MHz. The signal is extremely weak.

WMRV is 88 km distant, operates at 280 watts with a HAAT towards Farmville of 430 meters. That computes to a predicted signal strength of 32 dBu; and that prediction closely matches the actual situation. With a 3 dB fade-margin, let us call that signal 29 dBu. Too weak to reliably repeat? That describes this installation exactly. It also describes many long-distance state-network relays in the **EAS** system.

In order for the 80 milliwatt **jammer** to reasonably protect this signal, the **jammer** may not place a signal above 19 dBu at the reception site. That would require a quiet-zone

exceeding 10 kilometers. A 610 meter quiet-zone is not adequate.

Obviously if the power level of the **Safety Cast** system were increased to over-ride FM "flame-throwers" the weak reception sites would be in even greater jeopardy. The FM broadcast medium is fraught with dynamic-range problems; hence the complexity of the existing allocation scheme.

Needless to say, any **Safety Cast** jamming transmissions received by this, or hundreds of other licensed repeater installations, would be simultaneously re-broadcast to a city-wide audience. Imagine the confusion that would result.

The science of signal prediction and the concept of capture-ratio are well known to communications engineers. The instant **application** is devoid of any technical merit and does not warrant any serious consideration.

Interference to the Emergency Alert System

Broadcast Stations throughout the nation participate in the Emergency Alert System. Typically a broadcaster will monitor two other broadcast stations; these assignments are part of every Local Area Plan. Primary stations often monitor more; WMRA monitors 4 other FM stations.

Safety Cast has indicated that it has developed a "Safety Net" for **EAS** transmissions². Because (as we will show later) this will not work, we will address the proposal assuming that it will not.

EAS alerts are both received and transmitted by broadcast stations, and are received by end-users (on broadcast frequencies) including law- enforcement agencies, nuclear plants and schools as well as broadcasters. Because of the critical nature of the data bursts which open the alert, it is essential that those bursts are not corrupted by other transmissions. Any incoming alert that takes place simultaneously with a **Safety Cast** transmission will be effectively jammed: the very intention of the **Safety Cast** system.

1. If the jamming takes place during the data header (3 long breeps) the Alert will not be forwarded by the station.
2. If the jamming takes place during the audio message, the audio message will be compromised.
3. If the jamming takes place during the closing breeps, there is the possibility that it will hang up the system- causing rebroadcast of another stations programming. Commercials could even be aired on non-commercial stations.

² Media Release by Safety Cast on June 16, 2003; three days after Safety Cast CEO Mark Foss stated by personal correspondence that "The consideration for additional quiet spaces (like your EAS / LP station) needs to be (and will be) addressed."

Obviously, the law of averages is at play here; the possibility of both occurring at once may be low. However, we must be cognizant of the fact that a disaster will cause traffic on both the **EAS** and the **Safety Cast** system to be high, increasing the odds of a system failure at the most critical time.

This will be very hard to test in the field, but will be very damaging when the occasion arises. From a systems-failure analysis standpoint the proposed system is an invitation to disaster.

Amber Alert Systems Concerns

The Virginia State Emergency Communications Committee ("VA SECC") in conjunction with the State Amber Committee has spent a lot of time in creating safeguards to the **EAS** implementation of "Amber Alerts" in Virginia. These safeguards include a set criteria for Amber Alerts, and mandatory screening by the Virginia State Police.

In literature previously posted on **Safety Cast's** website (www.safetycast.com), **Safety Cast** made an issue about excessive delays of Amber Alerts by broadcasters³. A recent Amber Alert was broadcast statewide in Virginia within 15

³ This information has been removed from the Safety Cast website, however the claim continues to be made in the Amber video clip linked from the "News and Press" webpage.

minutes of the original transmission⁴. There was a significant delay in getting the request for the Alert to the State E.O.C.; that delay was directly attributable to the local law-enforcement agency.

Safety Cast's approach to Amber Alerts proposes to bypass the safeguards put in place by the VA SECC, the State Amber Alert Committee and the Virginia State Police.

The broadcast implementation of the Amber Alert system involves only ONE initial **EAS** alert. In Virginia, participating AMBER broadcasters typically re-broadcast the Alert (a non-**EAS** message) every twenty minutes for several hours utilizing supplemental information supplied by the originating agency.

It is highly likely that these non-**EAS** Amber announcements will also be overridden by the **Safety Cast jammer**. There really is no point to this; broadcasters can effectively cover much more area than any **jammer** (with reasonable power limitations). Concerns about critical time delays need to be addressed administratively by the law-enforcement agencies themselves, making certain that all requisite safeguards are in place.

⁴ Pending upgrades to the state distribution network (Emnet) will cut this time down to next to nothing.

The Safety Cast "Safety Net"

One working-day after personal correspondence⁵ with **Safety Cast** CEO Mark Foss, in which he stated "The consideration for additional quiet spaces (like your EAS / LP station) needs to be (and will be) addressed," Safety Cast made this grandiose announcement⁶:

SAFETY CAST DEVELOPES (sic)
'SAFETY NET' FOR EAS TRANSMISSIONS

June 16, 2003 - Jacksonville, FL. An integral part of the research and development stage should always include questions such as, "What if...then what". It was just such a process that led to the addition of a 'smart chip' in the Safety Cast transmitter. What if Safety Cast is being transmitted at the exact time an EAS transmission occurs? Then what? Whose transmission will be heard? The answer...why the EAS, of course!

The 'smart chip' will be programmed with 'black-out' areas where transmission would be halted immediately in the presence of an EAS alert.

Without being overly sarcastic, we find it incredulous that such a 'smart chip' could be added to the **Safety Cast** transmitter in a matter of a weekend.

One of **WMRA's EAS** monitoring assignments is a distant station. Our monitoring installation includes a seven-hundred

⁵ E-mail to the author on Friday June 13, 2003 from Mark Foss.

⁶ <http://www.safetycast.com/simple.asp?xCurrentPage=/press/default.asp&press=12>

dollar log-periodic antenna, a four-hundred dollar tuned cavity, several other tuned notch filters and a high-quality pre-amplifier. How is the **Safety Cast** transmitter going to monitor that station and know exactly when the transmission is coming in, and how is the jammer going to be silenced before the first data bit is received? A 'smart chip', indeed!

The concept is physically impossible. A mobile receiver cannot monitor weak stations while a co-located mobile transmitter is jamming that frequency. Applied experience with nulling (phasing) installations (fixed-location transmitters) have shown a practical limit of about 28 dB, and much instability at that depth-of-null⁷. It will be impossible to phase the transmitter out enough to monitor the same frequency, if that is indeed what is being proposed.

A Quiet Zone?

Elsewhere in their literature **Safety Cast** implies that they simply intend to silence the jammer near all **EAS** installations⁸. **Safety Cast** makes the claim "All **EAS** transmission locations will be programmed into each **Safety Cast** unit. This will effectively block all **Safety Cast**

⁷ The use of phasing-null systems is a common practice for transmitters located near the National Radio Astronomy Observatory installation in Green Bank, West Virginia.

⁸ Safety Cast "Frequently Asked Questions", <http://www.safetycast.com/about/documents/faq.pdf>
A copy is included in the appendix to this report.

transmission from a two- thousand foot area of an **EAS** transmitter thereby never interfering (sic) with an **EAS** emergency warning alert".

This claim makes no provision for where these "locations" will be obtained- there is no database of coordinates of **EAS** monitor receiver locations, which are often not located at the licensed transmitter site but often at a studio location, and in some cases at other remote locations.

As demonstrated before, the 80 milliwatt signal may cause interference to weak-signal reception locations at distances exceeding 3 kilometers.

Furthermore, the concept of a "broadcaster quiet zone" ignores the fact that **EAS** technology is available to every consumer as intended⁹. Programmable receivers are available to monitor broadcast stations; these receivers will alarm when pre-selected alerts are received. Many are already part of the installed base in schools, industrial locations as well as individual homes. Will **Safety Cast** protect these?

⁹ From FCC Report and Order 94-288 (pp. 75.): "During meetings and field tests related to this Order, representatives from the consumer electronics industry demonstrated equipment that could receive emergency alerts. The products included TV sets and radios, car radios, pagers, smoke detectors, CD players, cassette players, strobe lights, and other devices capable of immediately notifying the public of emergencies. An important quality that these consumer products shared was the ability to be turned on and off automatically.

The public will clearly benefit from devices that can turn on for alert purposes when danger threatens. A wide range of enhanced emergency alerting equipment is in use now, and industry is working on future prototypes. We encourage the development of these consumer products which enhance the access of Americans to instantaneous public safety messages. We will work to provide industry incentives by reducing unnecessary regulatory burdens".

Deliberate Interference to EANS

Safety Cast makes the claim that "Currently only about 48% of the United States subscribes to the **EAS** system, leaving many in our country without benefit of warnings or alerts"¹⁰. This is utter nonsense; the **EAS** is not a subscription system. In fact, certain **EAS** alerts are required to be broadcast by radio and television stations throughout the land. According to the FCC, there are very few, if any, locations where an **EAS** alert cannot be received¹¹.

One of the mandatory alerts is an EAN - Emergency Action Notification - which would be a Presidential announcement concerning a national civil emergency¹². These alerts will interrupt programming simultaneously on all broadcast stations; yet the **Safety Cast jammer** can do something that broadcasters cannot do: interrupt an EAN.

¹⁰ Safety Cast News Release, <http://www.safetycast.com/simple/asp?xCurrentPage=/press/default.asp&press=12xReload=> A copy is included in the appendix to this report.

¹¹ From FCC Report and Order 94-288 (pp. 29.): "Radio and television broadcast stations currently reach nearly every part of the country, often with several stations. There are radios and televisions in virtually every home and business".

¹² From FCC Report and Order 94-288 (pp. 5.): "Our authority to regulate emergency broadcasting emanates primarily from Sections 303(r) and 706(c) of the Communications Act, 47 U.S.C. 303(r) and 706(c). Section 303(r) is a general grant of rulemaking authority to the Commission. Section 706 grants specific, communications-related powers to the President in time of war or national emergency. In such event, the President may, for example, take control of, or suspend or amend the rules and regulations applicable to, any or all stations within the Commission's jurisdiction. Our EBS rules are designed to enable the President to exercise these powers quickly and efficiently".

This scenario does not jibe with **Safety Cast's** statement of their system "never interfering with an **EAS** emergency warning alert."¹³

The Camels Nose

We do not state that the **Safety Cast** system will not be perceived as beneficial by law enforcement agencies or others. At what point will they make the determination that the benefits of over-riding the quiet-zones near broadcasters is greater than the objections of those broadcasters? For broadcasters or consumers near a police station, hospital or busy street, the interference would be substantial.

Safety Cast, in its promotional website, cites applications for this technology not only for first responders, but for school buses, trains, and highway departments.

Most disturbing is the school bus application, which provides "one studio quality, pre-recorded alert message that is configured to transmit when the school bus comes to a stop and opens its doors"¹⁴. Who will tell the school system that

¹³ Frequently Asked Questions, op. cit.

¹⁴ Safety Cast website "Products/Guardian Series"
<http://www.safetycast.com/simple.asp?xCurrentPage=/products/guardian.asp&xReload=no>

the alert will not work within quiet zones? The argument "If just one life.." will undoubtedly come into play.

Furthermore, the system, if expanded to **Safety Cast's** intentions, has the potential to create so much interference to consumers radios that the consumers will find some other medium to entertain themselves, again rendering the **Safety Cast** system worthless.

Safety Cast states on its website: "Every **Safety Cast** transmitter will include a micro-chip which may be programmed with specific locations. This will allow any citizen to 'opt-out' from receiving the normal **Safety Cast** transmissions from their home or business location.¹⁵"

Even if this was practical (and it is not), the inconsistency of the product - working in some locations and not in others- will render it worthless, unless the ultimate intention is to ignore those quiet zones.

Part 15 is the Law

Part 15 is the law under which **Safety Cast** presumably would operate. Accordingly, the short-lived STA stated:
"Licensee should be aware that other stations may be licensed

on these frequencies and if any interference occurs, the licensee of this authorization will be subject to immediate shut down".

Certainly the power level would have to be much higher than those normally permitted by Part 15. International agreements concerning the use of broadcast frequencies for non-broadcast purposes would also have to be reviewed.

Simply put- there is no way that a system that is designed to create deliberate interference can be permitted under the existing structures imposed by the Federal Communications System. If the **Safety Cast** system does not create any interference then it is not living up to its stated purpose.

Deliberate, repetitive interference to broadcast transmissions by governmental agencies, for what ever purpose, would raise serious Constitutional issues that are beyond the scope of this objection.

¹⁵ Frequently Asked Questions, op. cit.

Conclusion

It is our contention that the applicant has not demonstrated any legitimate technical merit and therefore does not warrant a permit for experimentation. Furthermore, we have shown that should the unit be designed as intended (a 320 meter jamming device), it will cause significant harm to the licensed broadcast service and the Emergency Alert System. The entire premise of the **Safety Cast** system is a terrible mistake and the FCC should not burden broadcasters with this intrusive experiment.

For these reasons, the request of Safety Cast Corporation for Special Temporary Authorization should be denied.

James Madison University Board of Visitors



William D. Fawcett
Director of Engineering, WMRA

Appendices

1. Safety Cast News Release from Website
2. Safety Cast "Frequently Asked Questions" from website.
3. Safety Cast information on Guardian series from website.
4. Biography of William Fawcett



MEDIA RELEASE

FOR IMMEDIATE RELEASE

Contact: Robin Wilson, 904-998-7744 or 904-759-3674

SAFETY CAST DEVELOPES 'SAFETY NET' FOR EAS TRANSMISSIONS

June 16, 2003 – Jacksonville, FL. An integral part of the research and development stage should always include questions such as, “What if... then what?”. It was just such a process that led to the addition of a ‘smart chip’ in the Safety Cast transmitter. What if Safety Cast is being transmitted at the exact time an EAS transmission occurs? Then what? Whose transmission will be heard? The answer...why the EAS, of course!

The ‘smart chip’ will be programmed with ‘black-out’ areas where transmission would be halted immediately in the presence of an EAS alert. “It is our intent to be an adjunct and a compliment to our current EAS system,” said Mark Foss, President and CEO of Safety Cast. “We will never compete with them.” Currently only about 48% of the United States subscribes to the EAS system, leaving many in our country without benefit of warnings or alerts. Safety Cast, never meant to replace EAS, will help by allowing true disaster information to be delivered in a street by street, home by home method. This will encourage recipients to tune in to their own television or radio for important, life saving information. In simple terms, this partnership takes the EAS warning to the individual home, allowing alerts to focus exactly where the true emergency or disaster will have the most traumatic impact. In the end, the public will be better served and disaster information will be more efficiently and effectively delivered.

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Frequently Asked Questions

Q. How does Safety Cast work?

A. Quite simply, Safety Cast is a technology that utilizes basically the same qualities as an existing radio station transmission to momentarily emulate all AM and FM transmissions within a very limited area (1/5 of a mile/1000ft.) of the mobile transmitter.

Q. Will the Safety Cast transmission interfere with other devices such as medical equipment, cell phones, fax machines and radio transmissions with aircraft?

A. Absolutely not. The Safety Cast transmission is 10,000 times less powerful than a regular radio transmission. Therefore, interference with these other devices is impossible.

Q. Are the Safety Cast messages long?

A. No. The standard message which alerts a motorist that an emergency vehicle is in the area is approximately 6 seconds long.

Q. Is operation of the Safety Cast device complicated?

A. No. The Safety Cast technology will be most beneficial during times of high stress, rescue or pursuit situations. In most instances, the transmission will automatically engage once a siren is in its full operating position. To change the message or cease transmitting simply involves depressing two buttons.

Q. Can the direction of the Safety Cast transmission be controlled?

A. Yes. The user has the capability of broadcasting either in an omni-directional (360 degrees) or directional (to the front and/or rear of the vehicle).

Q. Can the Safety Cast message be changed?

A. Yes. In the Interceptor series (police series) an ad-hoc message may be recorded by unplugging the officer's microphone from their transmitter and plugging it into the front of the Safety Cast box, keying and speaking into the microphone automatically places the new message into the ad-hoc slot. This is an excellent feature for emergency situations including severe weather, accidents, and evacuations or to alert civilians near the scene of a serious crime.

Q. What if a message has been recorded, would a supervisor be able to audit the transmission to make certain protocol had been followed?

A. Yes. Each new message is automatically saved, time and date stamped. A simple audit of the unit will allow a supervisor to review the officer's message.

Q. Will a Safety Cast transmission effect radio broadcasts inside a private residence or business?

A. Any radio located within the 1/5 mile transmission area will pick up the Safety Cast alert message.

Q. What if a person lives or works in an area where emergency vehicle sirens are heavily used, i.e. around a hospital or near an interstate?

A. Each Safety Cast transmitter will include a micro-chip which may be programmed with specific locations. This will allow any citizen to 'opt-out' from receiving the normal Safety Cast transmissions from their home or business location. However, the 'opt-out' will not include emergency transmissions of a broad, public safety, all hazard alert such as any man-made or natural disaster information.



Q. What if an EAS transmission is being broadcasted? Will the Safety Cast transmission override these important alerts?

A. No. All EAS transmission locations will be programmed into each Safety Cast unit. This will effectively block all Safety Cast transmissions from a two thousand foot area of an EAS transmitter thereby never interfering with an EAS emergency warning alert.

 [Product Home](#) > **Safety Cast - Guardian Series**

The Safety Cast Guardian provides an extra layer of safety for our most important citizens, our children.

The Guardian is designed to be easily installed anywhere within reach of the bus driver. The Guardian provides one studio quality, pre-recorded alert message that is configured to transmit when the school bus comes to a stop and opens its doors. This alert is transmitted in an omni-directional pattern that alerts motorists that the school bus is loading or unloading children. This message is transmitted only once per stop.

Another feature of the Guardian is its ability to record an ad-hoc, situation specific message. This feature was designed to allow bus drivers to audibly record a message that may include their bus number and a message that the bus is in the area. This is a great feature to use in areas of the country where it is extremely cold and children should not have to wait outside for their bus.

Now in the safety of their home, children will be alerted via any AM/FM radio that their bus is in the area and at that time they can go outside for pick up.

Key Features of the Guardian Series:

- **One Pre-recorded Message**

The Guardian provides one studio quality, pre-recorded alert message that is configured to transmit when the school bus comes to a stop and opens its doors.

- **One Ad-hoc Message**

The Guardian has the ability to record an ad-hoc, situation specific message. This feature was designed to allow bus drivers to audibly record a message that may include their bus number and a message that the bus is in the area.

- **Omni Antenna Capability**

During loading or unloading times or when announcing the school bus is in the area to pick up children, these messages are transmitted in an omni-directional manner.

- **Message Transmit Audit Capability**

For auditing purposes, the Guardian series records time and date stamps for every ad-hoc message broadcasted. Along with this information is the message itself. This feature allows school districts to monitor use and helps curtail any possible abuse of this powerful technology.

- **Single Transmit Capability**

PRODUCT SERIES

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The Author

William D. Fawcett is employed by James Madison University of Harrisonburg, Virginia, an agency of the Commonwealth of Virginia as an *Electronics Manager I*, charged with "planning for future communications installations, weighing the relative costs and benefits of potential actions (and) determining implementation feasibility and making recommendations to management; monitoring FCC rules and regulations". He also has signature authority granted by the Board of Visitors of James Madison University concerning applications before the Federal Communications Commission.

He is one of only two broadcast engineers employed full-time by the Commonwealth of Virginia currently serving on the State Emergency Communications Committee. He also has served as the Chairman of the Shenandoah Valley Local Emergency Communications Committee since the inception of the Emergency Alert System.

He also has served on the state committee charged with creating a workable AMBER ALERT plan for the Commonwealth of Virginia.

He is licensed as an electronics contractor by the Commonwealth of Virginia; holder of Lifetime General Radio Telephone Operator License number PG-4-10874; and his qualifications are a matter of record before the Federal Communications Commission.