HEADQUARTERS: 914 WEST PATAPSCO AVENUE • BALTIMORE, MARYLAND 21230 • PHONE (410) 354-3300 • FAX (410) 354-3313

06/03/2021

Digital Alert Systems
100 Housel Ave.
Lyndonville, New York 14098

Dear Adam Jones,

Enclosed is the Wireless test report for compliance testing of the Digital Alert Systems, DASDEC-III as tested to the requirements of Title 47 of the CFR, Ch. 1 Subchapter A Part 11.

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. If you have any questions regarding these results or if we can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS ELECTRICAL AND ELECTRONIC TESTING NA, INC.

Joel Huna
Documentation Department

Reference: (\Digital Alert Systems\WIR112465-FCC11)

ACCREDITED
TESTING CERT #0591.02

Electromagnetic Compatibility Criteria
Test Report

for the

Digital Alert Systems
DASDEC-III

Tested under
the FCC Certification Rules
contained in
Title 47 of the CFR, Ch. 1 Subchapter A Part 11

Report: WIR112465-FCC11

06/03/2021

Prepared For:

Digital Alert Systems
100 Housel Ave.
Lyndonville, New York 14098

Prepared By:
Eurofins Electrical and Electronic Testing NA, Inc.
914 West Patapsco Avenue, Baltimore, MD 21230

Electromagnetic Compatibility Criteria
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Title 47 of the CFR, Ch. 1 Subchapter A Part 11

Donald Salguero, Project Engineer
Electromagnetic Compatibility Lab

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules Part 11 under normal use and maintenance.

Steve Pitta,
Manager, Wireless Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	06/03/2021	Initial Issue

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Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Digital Alert Systems DASDEC-III, with the requirements of Part 11. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the DASDEC-III. Digital Alert Systems should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the DASDEC-III, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 11, in accordance with Digital Alert Systems, quote number 85664. All tests were conducted using measurement procedure ANSI C63.10-2013.

FCC Reference 47 CFR Part 11	Description	Compliance
Title 47 of the CFR, Part 11 §11.31	EAS Protocol	Compliant
Title 47 of the CFR, Part 11 §11.32	Encoder – Includes temp/humidity/voltage variation tests and 10V/m immunity requirements	Compliant
Title 47 of the CFR, Part 11 §11.33	Decoder	Compliant

Table 1: Executive Summary of EMC Part 11 ComplianceTesting

Equipment Configuration

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by Digital Alert Systems to perform testing on the DASDEC-III, under Digital Alert Systems' quote number 85664.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Digital Alert Systems, DASDEC-III.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	DASDEC-III	
Model(s) Covered:	DASDEC-III	
EUT Specifications:	Primary Power: 120 VAC 60 Hz	
	Type of Modulations:	N/A
	Peak RF Output Power:	8.23 dBm
	Highest Internal Frequency (MHz):	2700
	Firmware Version:	N/A
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Donald Salguero	
Report Date(s):	06/03/2021	

Table 2: EUT Summary Table

B. References

CFR 47, Part 11	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 11: Emergency Alert Systems (EAS)
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 558074 v04	Guidance For Performing Compliance Measurements On Digital Transmission Systems (DTS) Operating Under Section 15.247

Table 3: References

C. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins Electrical and Electronic Testing NA, Inc..

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.20	2	95%
Radiated Emissions, (1 GHz – 6 GHz)	±2.52	2	95%
Conducted Emission Voltage	±2.03	2	95%
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Table 4: Uncertainty Calculations Summary

E. Description of Test Sample

The DASDEC-III, Equipment Under Test (EUT), is an Emergency Alert System (EAS) Analog and Digital Encoder/Decoder platform. It is intended to be used by any organization that has a requirement to participate in the Emergency Alert System. The DASDEC III will interrupt an audio and/or video chain by various methods in order to successfully receive or transmit the emergency message.

F. Equipment Configuration

All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref.ID	Slot#	Name/Description	Model Number	Part Number	Serial Number	Rev. #
	n/a	EAS Encoder/Decoder	DASDEC-III	n/a	n/a	n/a

Table 5: Equipment List

The firmware installed in the EUT during testing was System is controlled VIA a web interface.

G. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref.ID	Name/Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
	Support Laptop	HP		
	EAS Encoder	Digital Alert Systems		

Table 6: Support Equipment

H. Ports and Cabling Information

Ref.ID	Port Name on EUT	Cable Desc. or reason for none	QTY	Length as tested (m)	Max Length (m)	Shielded?	Termination Box ID & Port Name
	Radio 3, Antenna In	F-Connector	1	3	n/a	Yes	F-style terminator
	Relay 1	2-wire	1	3	n/a	No	n/a
	Relay 2	2-wire	1	3	n/a	No	n/a
	GPI2	single-wire	1	3	n/a	No	n/a
	GPI1	single-wire	1	3	n/a	No	n/a
	GPI Common Ground	single-wire	1	3	n	No	ground
	Radio 2	F-style connector	1	3	n	Yes	F-style terminator
	Radio 1	F-style connector	1	3	n	Yes	F-style terminator
	Program Audio Output	CAT5/6 cable	1	5	n	No	EAS Encoder
	Program Audio Input	CAT5/6 cable	1	5	n	No	EAS Encoder
	Monitor 4 Input	CAT 5/6 cable	1	3	n	No	n/a
	AC Input	IEC Cable	1	1	1	No	AC Input
	PS2 Connector	Won't be used by end-user	n/a	n/a	n/a	No	n/a
	USB 3.0 (1)	Maintenance	n/a	n/a	n/a	No	n/a
	USB 3.0 (2)	Maintenance	n/a	n/a	n/a	No	n/a
	Parallel Port	Legacy Port	n/a	n/a	n/a	No	n/a
	Serial	9-pin	1	1	1	No	n/a
	VGA	VGA	1	0	0	No	Terminated Connector
	HDMI	HDMI	1	1	n/a	No	n/a
	Ethernet	CAT5/6	1	5	30	No	Support Laptop
	USB	Maintenance	n/a	n/a	n/a	No	n/a
	Audio Input	3.5mm Audio	1	6	n/a	No	n/a
	Mic Input	3.5mm Audio	1	6	n/a	No	n/a
	Audio Output	3.5mm Audio	1	6	n/a	No	n/a

Table 7: Ports and Cabling Information

I. Mode of Operation

The system operates in the following modes: Listen for EAS messages that will come from other sources, this would be received by Radio, Baseband, and/or the internet. Retransmit EAS messages that have been received using the above methods. These alerts would have passed internal (software configured) filters and were deemed approved for retransmission in this area. The system can operate in an automatic or manual mode for this process. Originate EAS messages. In the event the operator is designated to do so, EAS messages can be originated and sent from the DASDEC-III.

J. Method of Monitoring EUT Operation

The system has a front panel display that indicates its current state. There are also system and operational logs that are accessible VIA the GUI that provides detailed information regarding current and past status.

K. Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

L. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Digital Alert Systems upon completion of testing.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 11.31 EAS Protocol

Test Requirement: § 11.31:

(a) The EAS uses a four part message for an emergency activation of the EAS. The four parts are: Preamble and EAS Header Codes; audio Attention Signal; message; and, Preamble and EAS End Of Message (EOM) Codes.

(1) The Preamble and EAS Codes must use Audio Frequency Shift Keying at a rate of 520.83 bits per second to transmit the codes. Mark frequency is 2083.3 Hz and space frequency is 1562.5 Hz. Mark and space time must be 1.92 milliseconds. Characters are ASCII seven bit characters as defined in ANSI X3.4-1977 ending with an eighth null bit (either 0 or 1) to constitute a full eight-bit byte.

(2) The Attention Signal must be made up of the fundamental frequencies of 853 and 960 Hz. The two tones must be transmitted simultaneously. The Attention Signal must be transmitted after the EAS header codes.

(3) The message may be audio, video or text.

(b) The ASCII dash and plus symbols are required and may not be used for any other purpose. Unused characters must be ASCII space characters. FM or TV call signs must use a slash ASCII character number 47 (/) in lieu of a dash.

(c) The EAS protocol, including any codes, must not be amended, extended or abridged without FCC authorization. The EAS protocol and message format are specified in the following representation.

Examples are provided in FCC Public Notices.

[PREAMBLE]ZCZC-ORG-EEE-PSSCCC + TTTT-JJJHHMM-LLLLLLLL-(one second pause)

[PREAMBLE]ZCZC-ORG-EEE-PSSCCC + TTTTpJJJHHMM-LLLLLLLL-(one second pause)

[PREAMBLE]ZCZC-ORG-EEE-PSSCCC + TTTT-JJJHHMM-LLLLLLLL-(at least a one second pause)

(transmission of 8 to 25 seconds of Attention Signal)

(transmission of audio, video or text messages)

(at least a one second pause)

[PREAMBLE]NNNN (one second pause)

[PREAMBLE]NNNN (one second pause)

[PREAMBLE]NNNN (at least one second pause)

[PREAMBLE] This is a consecutive string of bits (sixteen bytes of AB hexadecimal [8 bit byte 10101011]) sent to clear the system, set AGC and set asynchronous decoder clocking cycles. The preamble must be transmitted before each header and End of Message code.

ZCZC—This is the identifier, sent as ASCII characters ZCZC to indicate the start of ASCII code.

ORG—This is the Originator code and indicates who originally initiated the activation of the EAS. These codes are specified in paragraph (d) of this section.

EEE—This is the Event code and indicates the nature of the EAS activation. The codes are specified in paragraph (e) of this section. The Event codes must be compatible with the codes used by the NWS Weather Radio Specific Area Message Encoder (WRSAME).

PSSCCC—This is the Location code and indicates the geographic area affected by the EAS alert. There may be 31 Location codes in an EAS alert. The Location code uses the codes described in the American National Standards Institute (ANSI) standard, ANSI INCITS 31-2009 ("Information technology—Codes for the Identification of Counties and Equivalent Areas of the United States, Puerto Rico, and the Insular Areas"). Each state is assigned an SS number as specified in paragraph (f) of this section. Each county and some cities are assigned a CCC number. A CCC number of 000 refers to an entire State or Territory. P defines county subdivisions as follows: 0 = all or an unspecified portion of a county, 1 = Northwest, 2 = North, 3 = Northeast, 4 = West, 5 = Central, 6 = East, 7 = Southwest, 8 = South, 9 = Southeast. Other numbers may be designated later for special applications. The use of county subdivisions will probably be rare and generally for oddly shaped or unusually large counties. Any subdivisions must be defined and agreed to by the local officials prior to use.

+ TTTT—This indicates the valid time period of a message in 15 minute segments up to one hour and then in 30 minute segments beyond one hour; *i.e.*, + 0015, + 0030, + 0045, + 0100, + 0430 and + 0600.

JJJHHMM—This is the day in Julian Calendar days (JJJ) of the year and the time in hours and minutes (HHMM) when the message was initially released by the originator using 24 hour Universal Coordinated Time (UTC).

LLLLLLLL—This is the identification of the EAS Participant, NWS office, etc., transmitting or retransmitting the message. These codes will be automatically affixed to all outgoing messages by the EAS encoder.

NNNN—This is the End of Message (EOM) code sent as a string of four ASCII N characters.

(d) The only originator codes are:

Originator	ORG code
EAS Participant	EAS
Civil authorities	CIV
National Weather Service	WXR
Primary Entry Point System	PEP

(e) The following Event (EEE) codes are presently authorized:

Nature of activation	Event codes
National Codes (Required):	
Emergency Action Notification (National only)	EAN.
National Information Center	NIC
National Periodic Test	NPT.
Required Monthly Test	RMT.
Required Weekly Test	RWT.
State and Local Codes (Optional):	
Administrative Message	ADR.
Avalanche Warning	AVW.
Avalanche Watch	AVA.
Blizzard Warning	BZW.
Blue Alert	BLU.
Child Abduction Emergency	CAE.
Civil Danger Warning	CDW.

Civil Emergency Message	CEM.
Coastal Flood Warning	CFW.
Coastal Flood Watch	CFA.
Dust Storm Warning	DSW.
Earthquake Warning	EQW.
Evacuation Immediate	EVI.
Extreme Wind Warning	EWW.
Fire Warning	FRW.
Flash Flood Warning	FFW.
Flash Flood Watch	FFA.
Flash Flood Statement	FFS.
Flood Warning	FLW.
Flood Watch	FLA.
Flood Statement	FLS.
Hazardous Materials Warning	HMW.
High Wind Warning	HWW.
High Wind Watch	HWA.
Hurricane Warning	HUW.
Hurricane Watch	HUA.
Hurricane Statement	HLS.
Law Enforcement Warning	LEW.
Local Area Emergency	LAE.
Network Message Notification	NMN.
911 Telephone Outage Emergency	TOE.
Nuclear Power Plant Warning	NUW.
Practice/Demo Warning	DMO.
Radiological Hazard Warning	RHW.
Severe Thunderstorm Warning	SVR.
Severe Thunderstorm Watch	SVA.
Severe Weather Statement	SVS.
Shelter in Place Warning	SPW
Special Marine Warning	SMW.
Special Weather Statement	SPS.
Storm Surge Watch	SSA.
Storm Surge Warning	SSW.

Tornado Warning	TOR.
Tornado Watch	TOA.
Tropical Storm Warning	TRW.
Tropical Storm Watch	TRA.
Tsunami Warning	TSW.
Tsunami Watch	TSA.
Volcano Warning	VOW.
Winter Storm Warning	WSW.
Winter Storm Watch	WSA.

(f) The All U.S., State, Territory and Offshore (Marine Area) ANSI number codes (SS) are as follows. County ANSI numbers (CCC) are contained in the State EAS Mapbook.

	ANSI No.
All U.S	00
State:	
AL	01
AK	02
AZ	04
AR	05
CA	06
CO	08
CT	09
DE	10
DC	11
FL	12
GA	13
HI	15
ID	16
IL	17
IN	18
IA	19
KS	20
KY	21

LA	22
ME	23
MD	24
MA	25
MI	26
MN	27
MS	28
MO	29
MT	30
NE	31
NV	32
NH	33
NJ	34
NM	35
NY	36
NC	37
ND	38
OH	39
OK	40
OR	41
PA	42
RI	44
SC	45
SD	46
TN	47
TX	48
UT	49
VT	50
VA	51
WA	53
WV	54
WI	55
WY	56

Terr.:	
AS	60
FM	64
GU	66
MH	68
PR	72
PW	70
UM	74
VI	78
Offshore (Marine Areas)[1]	
Eastern North Pacific Ocean, and along U.S. West Coast from Canadian border to Mexican border	57
North Pacific Ocean near Alaska, and along Alaska coastline, including the Bering Sea and the Gulf of Alaska	58
Central Pacific Ocean, including Hawaiian waters	59
South Central Pacific Ocean, including American Samoa waters	61
Western Pacific Ocean, including Mariana Island waters	65
Western North Atlantic Ocean, and along U.S. East Coast, from Canadian border south to Currituck Beach Light, N.C	73
Western North Atlantic Ocean, and along U.S. East Coast, south of Currituck Beach Light, NC, following the coastline to Ocean Reef, FL, including the Caribbean	75
Gulf of Mexico, and along the U.S. Gulf Coast from the Mexican border to Ocean Reef, FL	77
Lake Superior	91
Lake Michigan	92
Lake Huron	93
Lake St. Clair	94
Lake Erie	96
Lake Ontario	97
St. Lawrence River above St. Regis	98

[1]The numbers assigned to the offshore marine areas listed in this table are not described under the ANSI standard, but rather are numeric codes that were assigned by the National Weather Service.

Test Procedure: The EUT was connected to the input of the Oscilloscope thru a cable. Timing plots were taken to show compliance to 11.31(c) message structure. The Oscilloscope FFT function was used to measure the Attention signal tones 11.31(a)(2). Plots for the bit length of Mark and Space frequency were also recorded

Test Results: The EUT as tested is **compliant** with §11.31 EAS Protocol.

Test Engineer: Donald Salguero

Test Date: 05/04/2021

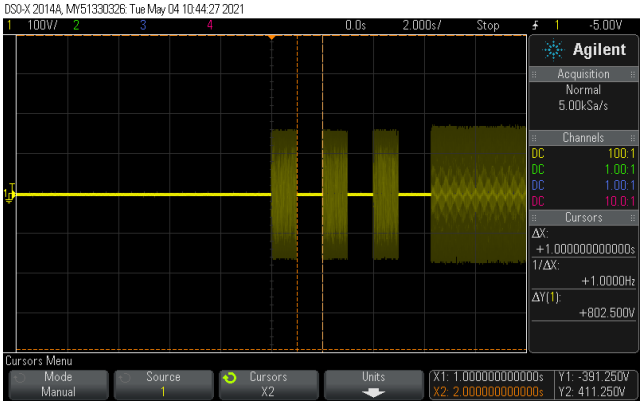

Figure 1: 1st Preamble Pause - 1s

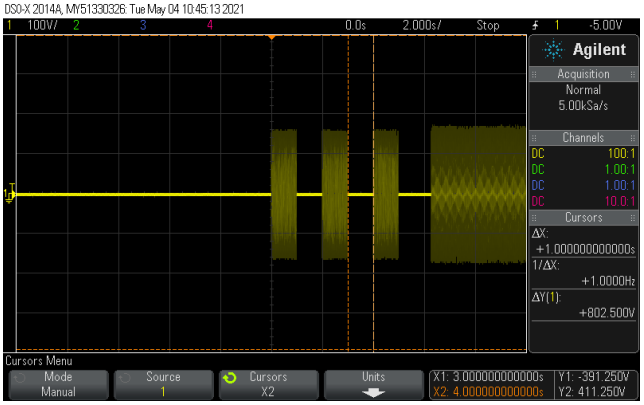

Figure 2: 2nd Preamble Pause - 1s

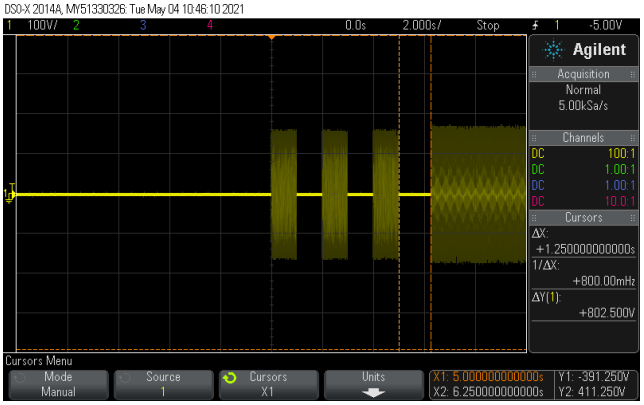

Figure 3: 3rd Preamble Pause - at least 1s

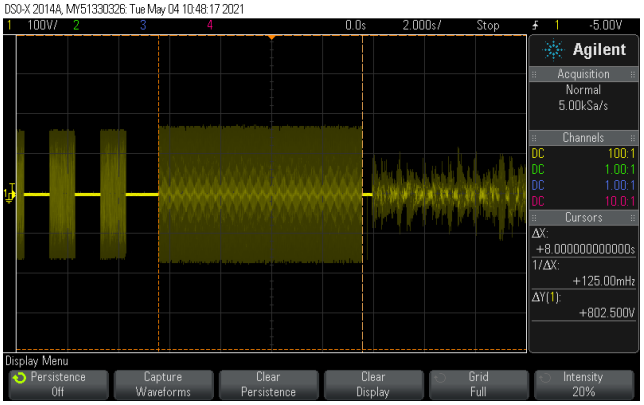

Figure 4: Attention Signal Duration

Figure 5: Post message pause - at least 1s

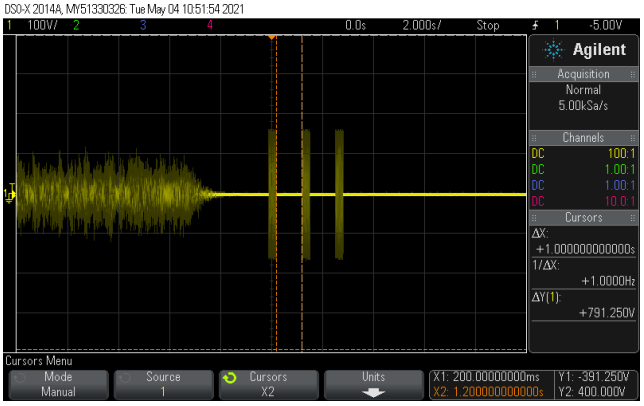

Figure 6: Post message preamble 1st pause - 1s

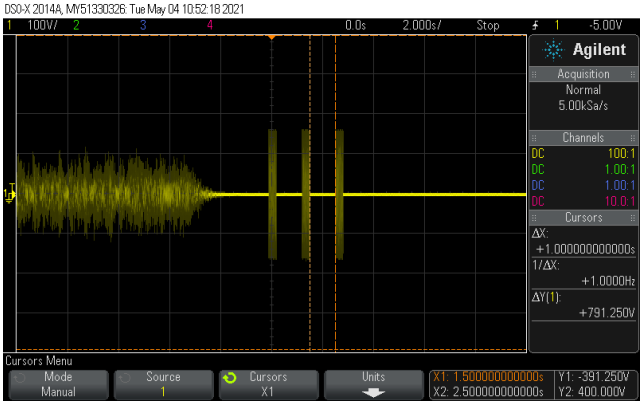

Figure 7: Post message preamble 2nd pause - 1s

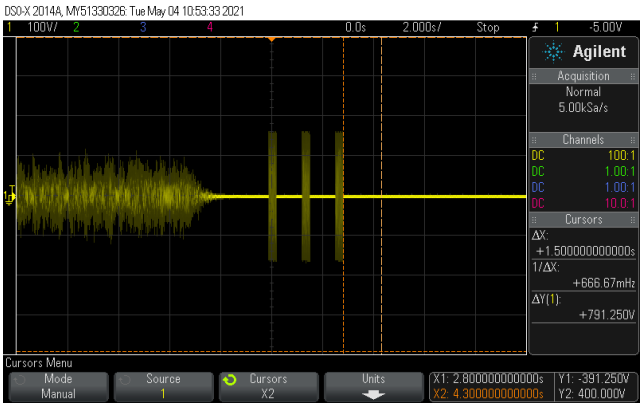

Figure 8: Post message preamble 3rd - at least 1s

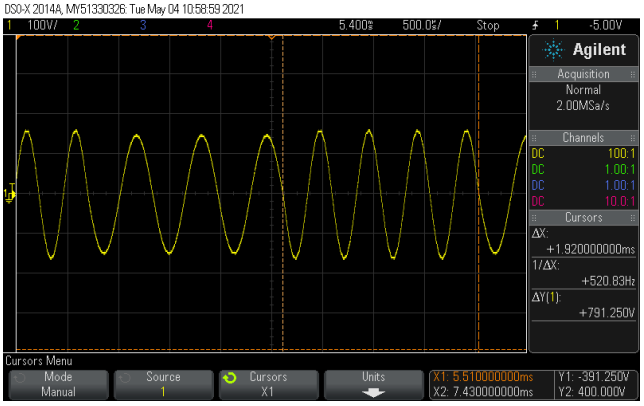

Figure 9: Mark Frequency (2083.3Hz) - 1.92ms

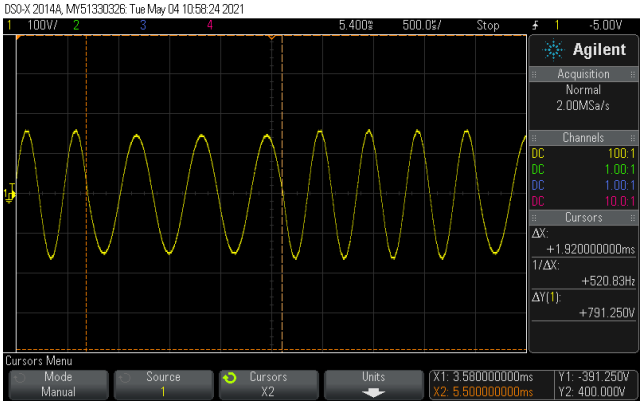

Figure 10: Space Frequency (1562.5Hz) - 1.92ms

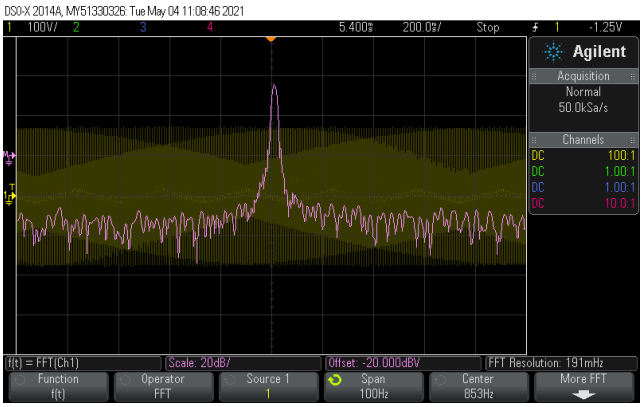

Figure 11: Tone 853Hz

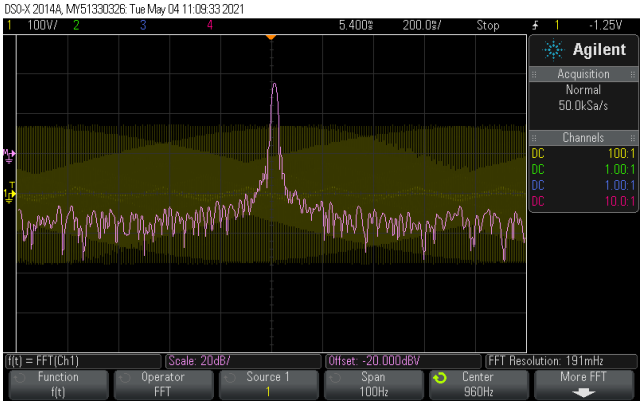

Figure 12: Tone 960Hz

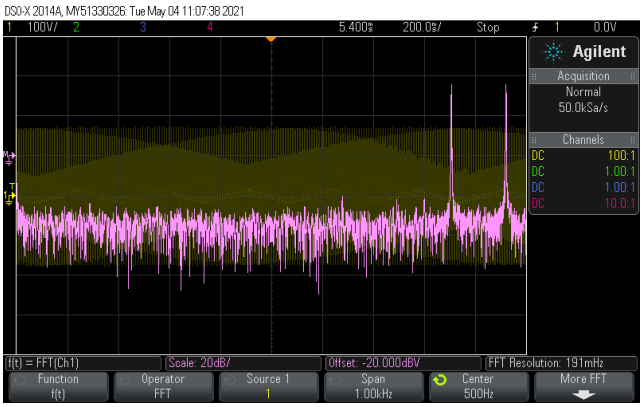

Figure 13: Tones 853Hz 960Hz

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T4774	Digital Storage Oscilloscope, 4-Channel, 100MHz	Agilent Technologies	DSO-X2014A	6/30/2020	12/30/2021

Table 8: EAS Protocol - Test Equipment

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 11.32 Encoder – Includes temp/humidity/voltage variation tests and 10 V/m immunity requirements

Test Requirement(s): **§ 11.32:**

(a) EAS Encoders must at a minimum be capable of encoding the EAS protocol described in §11.31 and providing the EAS code transmission requirements described in §11.51. EAS encoders must additionally provide the following minimum specifications:

(1) Encoder programming. Access to encoder programming shall be protected by a lock or other security measures and be configured so that authorized personnel can readily select and program the EAS Encoder with Originator, Event and Location codes for either manual or automatic operation.

(2) Inputs. The encoder shall have at least one input port used for audio messages and at least one input port used for data messages.

(3) Outputs. The encoder shall have at least one audio output port and at least one data output port.

(4) Calibration. EAS Encoders must provide a means to comply with the modulation levels required in §11.51(f).

(5) Day-Hour-Minute and Identification Stamps. The encoder shall affix the JJJHHMM and LLLLLLLL codes automatically to all initial messages.

(6) Program Data Retention. Program data and codes shall be retained even with the power removed.

(7) Indicator. An aural or visible means that it activated when the Preamble is sent and deactivated at the End of Message code.

(8) Spurious Response. All frequency components outside 200 to 4000 Hz shall be attenuated by 40 dB or more with respect to the output levels of the mark or space frequencies.

(9) Attention Signal generator. The encoder must provide an attention signal that complies with the following:

(i) Tone Frequencies. The audio tones shall have fundamental frequencies of 853 and 960 Hz and not vary over ±0.5 Hz.

(ii) Harmonic Distortion. The total harmonic distortion of each of the audio tones may not exceed 5% at the encoder output terminals.

(iii) Minimum Level of Output. The encoder shall have an output level capability of at least + 8 dBm into a 600 Ohm load impedance at each audio tone. A means shall be provided to permit individual activation of the two tones for calibration of associated systems.

(iv) Time Period for Transmission of Tones. The encoder shall have timing circuitry that automatically generates the two tones simultaneously for a time period of 8 seconds.

(v) Inadvertent activation. The switch used for initiating the automatic generation of the simultaneous tones shall be protected to prevent accidental operation.

(vi) Indicator Display. The encoder shall be provided with a visual and/or aural indicator which clearly shows that the Attention Signal is activated.

(b) Operating Temperature and Humidity. Encoders shall have the ability to operate with the above specifications within an ambient temperature range of 0 to + 50 degrees C and a range of relative humidity of up to 95%.

(c) Primary Supply Voltage Variation. Encoders shall be capable of complying with the requirements of this section during a variation in primary supply voltage of 85 percent to 115 percent of its rated value.

(d) Testing Encoder Units. Encoders not covered by §11.34(e) of this part shall be tested in a 10 V/m minimum RF field at an AM broadcast frequency and a 0.5 V/m minimum RF field at an FM or TV broadcast frequency to simulate actual working conditions.

[59 FR 67092, Dec. 28, 1994, as amended at 77 FR 16703, Mar. 22, 2012

Test Procedure:

11.32(a)(8) The EUT was connected to the balanced port connector on the Keysight U8903B. The spurious response was measured while the EUT was set to transmit at full drive level. The frequency spectrum function on the U8903B was used in order to capture the data. Frequency components outside 200-4000 Hz met the 40dBc requirement.

11.32(a)(9)(i) The EUT was connected to the balanced port connector on the Keysight U8903B. The frequency measurement function was used to verify that the Attention tones meet the 0.5Hz variation requirement. Table 12.

11.32(a)(9)(ii) The EUT was connected to the balanced port connector on the Keysight U8903B. The distortion was measured using the instrument distortion function. Table 12.

11.32(a)(9)(iii) The EUT was connected to the balanced port connector on the Keysight U8903B. The EUT was setup to transmit at full drive level. The instrument's amplitude function was used to measure the tone's amplitude levels. Table 12.

11.32(b) The EUT was placed inside a temperature/humidity chamber. The EUT performance was checked at 0º, 20º, and 50º Celsius while recording the controlled humidity. Messages were successfully decodes/encoded. Table 9.

11.32(c) The EUT power cable was connected to a programmable AC power supply. The supply was programmed to operate at 102V and 138V. At both voltages, the EUT was able to successfully encode/decode a message. Table 10.

11.32(d) The EUT was placed on a non-metallic table in the center of a shielded enclosure, and the radiating antenna was placed 2.5 m in front of the EUT. Support equipment for the EUT was located outside of the test room. The EUT was exposed to the required immunity fields. The amplitude and frequency of the radiated interference was set by an automated, computer-controlled system.

The chamber and signal generation/amplification system is calibrated to insure a uniform RF field with no EUT present. The recorded signal is played back by the controlling computer with the EUT placed in the area of uniform field. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT successfully encoded/decoded EAS messages. The test was performed with the antennae oriented in both a horizontal and vertical polarization. Testing was performed in a semi-anechoic chamber. Table 11.

Test Results: The EUT as tested is **compliant** with §11.32 EAS Encoder. %%CENOTE%%.

Test Engineer: Donald Salguero

Test Date: 05/13/2021

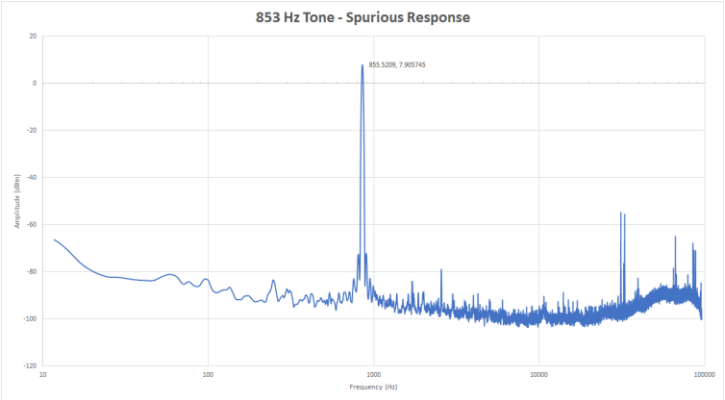

Figure 14: 853 Hz Tone - Spurious Response

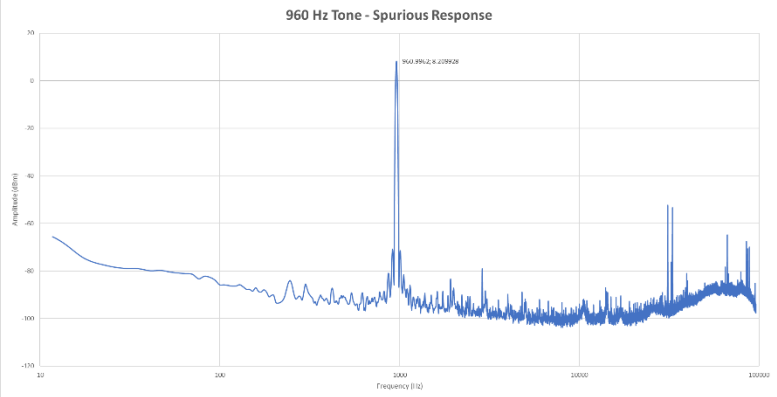

Figure 15: 960 Hz Tone - Spurious Response

Temperature	Humidity	Encode Result
50C	95%	Successful
25C	85%	Successful
0C	--	Successful

Table 9: EAS Encoder - Environmental Immunity

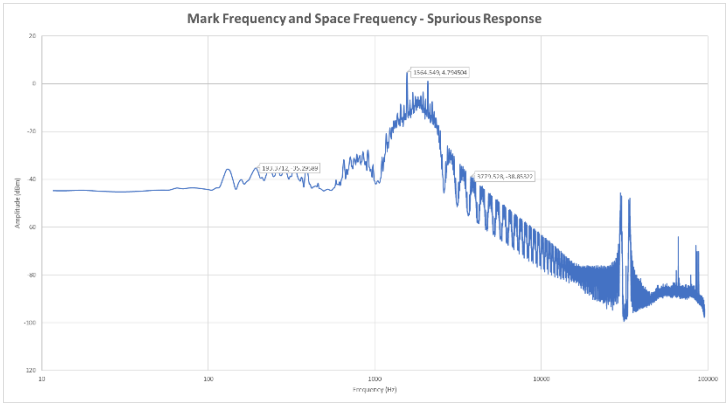

Figure 16: Mark and Space Frequencies - Spurious Response

AC Voltage	Mode	Result
102	Encoder	Successful Encode
138	Encoder	Successful Encode

Table 10: Power Variation Immunity - Encoder Test Results

EUT Orientation	Polarity	Frequency	Level (V/m)	Results
Front	V	108MHz	0.5	successful encode
Front	H	108MHz	0.5	successful encode
Left	H	108MHz	0.5	successful encode
Left	V	108MHz	0.5	successful encode
Right	V	108MHz	0.5	successful encode
Right	H	108MHz	0.5	successful encode
Back	H	108MHz	0.5	successful encode
Back	V	108MHz	0.5	successful encode
EUT Orientation	**Polarity**	**Frequency**	**Level (V/m)**	**Results**
Front	H	1MHz	10	Successful encode
Left	H	1MHz	10	Successful encode
Right	H	1MHz	10	Successful encode
Back	H	1MHz	10	Successful encode

Table 11: Radiated Immunity - EAS Encoder - Test Results

Tone	Measured Frequency (Hz)	Amplitude (dBm)	Harmonic distortion (%)
960	960.48	8.226	0.004925
853	853.42	8.23	0.004933

Table 12: U8903B - audio analyzer measurements

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T8753	Probe (Optical Repeater)	Narda	OR03	4/7/2020	4/7/2022
1T4119	Antenna: Biconilog	EMCO	3143	Func Verify	Func Verify
1T2624	Antenna: Lazy-H	Electro-Metrics	PEA-25	Func Verify	Func Verify
1T4456	EMC Video Camera #2	Sony	CCD=TRV328	Not Required	Not Required
1T4148	Shield Room #2 Semi-Anechoic	Rantec	20	1/2/2007	1/2/2008
1T8801A	1T8801 (RI amp, 10kHz-225MHz) - Harmonics Verifica			3/8/2021	3/8/2023
1T8801	Amplifier - 600 Watt	Amplifier Research	600A225A	Func Verify	Func Verify
1T8802A	(RI amp, 80MHz-1GHz) - Harmonics Verification			3/8/2021	3/8/2023
1T8802	Amplifier - 500 Watt	Amplifier Research	500W1000B	Func Verify	Func Verify
1T4476	Power Meter	Hewlett Packard	EPM-442A	3/3/2021	3/3/2022
1T4739	Signal Generator	Agilent Technologies	N5183A	9/16/2019	9/16/2021
1T4458	Power Sensor	Agilent Technologies	E9304A	3/3/2021	9/3/2022
1T4658	Termination Load	Narda	374BNM	Func Verify	Func Verify
1T4596	AC Power Source	California Instruments	2001RP	Func Verify	Func Verify
2T4001	Espec Temperature/Humidity Chamber	Espec North America, Inc.	EPX-4H	7/20/2020	7/20/2021
Rental	Audio Analyzer	Keysight	U8903B	5/3/2021	5/3/2022

Table 13: EAS Encoder - Test Equipment

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 11.33 Decoder

Test Requirements: **§ 11.33:**

(a) An EAS Decoder must at a minimum be capable of providing the EAS monitoring functions described in §11.52, decoding EAS messages formatted in accordance with the EAS Protocol described in §11.31, and converting Common Alerting Protocol (CAP)-formatted EAS messages into EAS alert messages that comply with the EAS Protocol, in accordance with §11.56(a)(2), with the exception that the CAP-related monitoring and conversion requirements set forth in §§11.52(d)(2) and 11.56(a)(2) can be satisfied via an Intermediary Device, as specified in §11.56(b), provided that all other requirements set forth in this part are met. An EAS Decoder also must be capable of the following minimum specifications:

(1) Inputs. Decoders must have the capability to receive at least two audio inputs from EAS monitoring assignments, and at least one data input. The data input(s) may be used to monitor other communications modes such as Radio Broadcast Data System (RBDS), NWR, satellite, public switched telephone network, or any other source that uses the EAS protocol.

(2) Valid codes. There must be a means to determine if valid EAS header codes are received and to determine if preselected header codes are received.

(3) Storage. Decoders must provide the means to:

(i) Record and store, either internally or externally, at least two minutes of audio or text messages. A decoder manufactured without an internal means to record and store audio or text must be equipped with a means (such as an audio or digital jack connection) to couple to an external recording and storing device.

(ii) Store at least ten preselected event and originator header codes, in addition to the seven mandatory event/originator codes for tests and national activations, and store any preselected location codes for comparison with incoming header codes. A non-preselected header code that is manually transmitted must be stored for comparison with later incoming header codes. The header codes of the last ten received valid messages which still have valid time periods must be stored for comparison with the incoming valid header codes for later messages. These last received header codes will be deleted from storage as their valid time periods expire.

(4) Display and logging. For received alert messages formatted in both the EAS Protocol and Common Alerting Protocol, a visual message shall be developed from any valid header codes for tests and national activations and any preselected header codes received. The message shall at a minimum include the Originator, Event, Location, the valid time period of the message and the local time the message was transmitted. The message shall be in the primary language of the EAS Participant and be fully displayed on the decoder and readable in normal light and darkness. The visual message developed from received alert messages formatted in the Common Alerting Protocol must conform to the requirements in §§11.51(d), (g)(3), (h)(3), and (j)(2) of this part. All existing and new models of EAS decoders manufactured after August 1, 2003 must provide a means to permit the selective display and logging of EAS messages containing header codes for state and local EAS events. Effective May 16, 2002, analog radio and television broadcast stations, analog cable systems and wireless cable systems may upgrade their decoders on an optional basis to include a selective display and logging capability for EAS messages containing header codes for state and local events. EAS Participants that install or

replace their decoders after February 1, 2004 must install decoders that provide a means to permit the selective display and logging of EAS messages containing header codes for state and local EAS events.

(5) Indicators. EAS decoders must have a distinct and separate aural or visible means to indicate when any of the following conditions occurs:

(i) Any valid EAS header codes are received as specified in §11.33(a)(10).

(ii) Preprogrammed header codes, such as those selected in accordance with §11.52(d)(2) are received.

(iii) A signal is present at each audio input that is specified in §11.33(a)(1).

(6) Program Data Retention. The program data must be retained even with power removed.

(7) Outputs. Decoders shall have at least one data port where received valid EAS header codes and received preselected header codes are available, at least one audio port that is capable of monitoring each decoder audio input, and an internal speaker to enable personnel to hear audio from each input.

(8) Decoder Programming. Access to decoder programming shall be protected by a lock or other security measures and be configured so that authorized personnel can readily select and program the EAS Decoder with preselected Originator, Event and Location codes for either manual or automatic operation.

(9) Reset. There shall be a method to automatically or manually reset the decoder to the normal monitoring condition. Operators shall be able to select a time interval, not less than two minutes, in which the decoder would automatically reset if it received an EAS header code but not an end-of-message (EOM) code. Messages received with the EAN Event codes shall disable the reset function so that lengthy audio messages can be handled. The last message received with valid header codes shall be displayed as required by paragraph (a)(4) of this section before the decoder is reset.

(10) Message Validity. An EAS Decoder must provide error detection and validation of the header codes of each message to ascertain if the message is valid. Header code comparisons may be accomplished through the use of a bit-by-bit compare or any other error detection and validation protocol. A header code must only be considered valid when two of the three headers match exactly; the Origination Date/Time field (JJJHHMM) is not more than 15 minutes in the future and the expiration time (Origination Date/Time plus Valid Time TTTT) is in the future (i.e., current time at the EAS equipment when the alert is received is between origination time minus 15 minutes and expiration time). Duplicate messages must not be relayed automatically.

(11) A header code with the EAN Event code specified in §11.31(c) that is received through any of the audio or data inputs must override all other messages.

(b) Decoders shall be capable of operation within the tolerances specified in this section as well as those in §11.32 (b), (c) and (d).

[59 FR 67092, Dec. 28, 1994, as amended at 60 FR 55999, Nov. 6, 1995; 67 FR 18510, Apr. 16, 2002; 70 FR 71033, Nov. 25, 2005; 77 FR 16703, Mar. 22, 2012; 83 FR 39620, Aug. 10, 2018]

Test Procedure:

11.33(b) ---
11.32(b)The EUT was placed inside a temperature/humidity chamber. The EUT performance was checked at 0º, 20º, and 50º Celsius while recording the controlled humidity. Messages were successfully decodes/encoded. Table 14.

11.32(c) The EUT power cable was connected to a programmable AC power supply. The supply was programmed to operate at 102V and 138V. At both voltages, the EUT was able to successfully encode/decode a message. Table 15.

11.32(d) The EUT was placed on a non-metallic table in the center of a shielded enclosure, and the radiating antenna was placed 2.5 m in front of the EUT. Support equipment for the EUT was located outside of the test room. The EUT was exposed to the required immunity fields. The amplitude and frequency of the radiated interference was set by an automated, computer-controlled system.

The chamber and signal generation/amplification system is calibrated to insure a uniform RF field with no EUT present. The recorded signal is played back by the controlling computer with the EUT placed in the area of uniform field. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT successfully encoded/decoded EAS messages. The test was performed with the antennae oriented in both a horizontal and vertical polarization. Testing was performed in a semi-anechoic chamber. Table 16.

Test Results: The EUT as tested is **compliant** with § 11.33 Decoder.

Test Engineer: Donald Salguero

Test Date: 05/13/2021

Temperature	Humidity	Decode Result
50C	95%	Successful
25C	85%	Successful
0C	--	Successful

Table 14: EAS Decoder - Environmental Immunity

AC Voltage	Mode	Result
102	Decoder	Successful Decode
138	Decoder	Successful Decode

Table 15: Power Variation Immunity - Decoder Test Results

EUT Orientation	Polarity	Frequency	Level (V/m)	Results
Front	V	108MHz	0.5	successful decode
Front	H	108MHz	0.5	successful decode
Left	H	108MHz	0.5	successful decode
Left	V	108MHz	0.5	successful decode
Right	V	108MHz	0.5	successful decode
Right	H	108MHz	0.5	successful decode
Back	H	108MHz	0.5	successful decode
Back	V	108MHz	0.5	successful decode
EUT Orientation	**Polarity**	**Frequency**	**Level (V/m)**	**Results**
Front	H	1MHz	10	successful decode
Left	H	1MHz	10	successful decode
Right	H	1MHz	10	successful decode
Back	H	1MHz	10	successful decode

Table 16: Radiated Immunity - EAS Decoder - Test Results

Asset	Equipment	Manufacturer	Model	Calibration Date	Calibration Due Date
1T8753	Probe (Optical Repeater)	Narda	OR03	4/7/2020	4/7/2022
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1T4456	EMC Video Camera #2	Sony	CCD=TRV328	Not Required	Not Required
1T4148	Shield Room #2 Semi-Anechoic	Rantec	20	1/2/2007	1/2/2008
1T8801A	1T8801 (RI amp, 10kHz-225MHz) - Harmonics Verifica			3/8/2021	3/8/2023
1T8801	Amplifier - 600 Watt	Amplifier Research	600A225A	Func Verify	Func Verify
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1T4596	AC Power Source	California Instruments	2001RP	Func Verify	Func Verify
2T4001	Espec Temperature/Humidity Chamber	Espec North America, Inc.	EPX-4H	7/20/2020	7/20/2021

Table 17: EAS Decoder - Test Equipment

End of Report

