replaces sections 3.2.2 and 3.2.5 of the earlier standard. The extension in frequency coverage involves a revision of the characteristics of the line impedance network. Copies of this standard are available from the Institute of Radio Engineers, 1 E. 79th St., New York 21, N.Y. for 50 cents per copy.

**Foreign Technical Literature**

Three bibliographies published monthly list scientific and technical material from East European and Russian publications received by the library of Congress and cooperating libraries.

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**The Search for the Elusive C63.1 Standard**

*Dan Hoolihan, Associate Editor*

The American National Standards Institute (ANSI) Accredited Standards Committee (ASC) C63® on EMC has approximately 27 standards that have a numbering scheme “C63.xx” where “xx” is numbered 1 through 27. We have consistently had a good library of those numbered standards. However, we had no copy of the first standard that carried the C63 label. After the passing of Dr. Ralph Showers, long time chair of ANSI ASC C63 in the fall of 2013, I decided to get serious about finding a copy of the elusive “C63.1”.

ANSI was the first organization that I approached about the C63.1 standard. A review of the archive of standards at ANSI led to a null result. The personnel at ANSI recommended several libraries and standards-publishers that specialized in “old” standards. I followed-up with the recommended potential sources; the results were the same, no sign of the “elusive C63.1”.

As the “luck of the Irish” would have it, I was on a work assignment in Pennsylvania in March 2014 not far from Dr. Showers’ home. The house is still occupied by his wife where she is supported by his three daughters and her health aides. I contacted Janet Showers, one of Dr. Showers’ daughters, and made arrangements to visit the house in the hopes that Dr. Showers’ extensive collection of paper-records might contain the C63.1 standard. You may remember from his obituary in the fourth-quarter 2013 EMC Society Magazine that he was chairman of the C63 Committee for over 38 years (1968-2005). Prior to becoming chairman, Dr. Showers was C63 vice-chairman in 1967-1968, C63 member-at-large in 1966-1967, and the IEEE representative on American Standards Association (ASA) C63 from 1948 to 1965. Thus, I reasoned, with more than 65 years of participation in C63, there was a very good chance he would have had a copy of C63.1.

As a result of exchanges via e-mails and telephone conversations with Janet Showers since her father’s passing, I knew that she and her sister Virginia had organized most of Dr. Showers’ records into broad categories such as IEEE, IEC, C63, CISPR, Military, Research, and other areas of his 70+ years of technical involvement with EMC and EMC standards development. The papers had been boxed and labeled. Each cardboard box was marked, using various colored and patterned Duck® tapes, to indicate whether the box held predominantly C63, IEC, IEEE, etc. records. These records eventually filled 250 cardboard boxes.

See the picture of boxes inside the Showers house.

After completing my work assignment, I arrived at the house near Philadelphia at around 0930 on a Friday morning. I found the boxes grouped by their Duck tape label and stacked throughout the Showers’ house. The majority were in the basement, with...
some also in Ralph’s second floor study and on the third floor. Janet and I set up a couple of tables in the basement and I began my search for C63.1. The first ten or so boxes I looked in were marked with yellow “Sponge-Bob” Duck tape, which was the code for “Really Old Stuff”. The boxes were full of papers, standards, and other written material dating back to the 1920s. I saw some very interesting material and pulled some of it for special marking for future reference. However, I did not find the C63.1 standard in those first boxes I reviewed.

So, I switched gears, and began to look through a stack of cardboard boxes that were marked with simple solid-black Duck tape, the code for “C63”. The first C63-box I opened was packed with many manila-folders all neatly annotated with Ralph’s handwriting. Halfway through the box, I read “C63.1” on a manila-folder tab. With a heightened pulse rate and high expectations, I opened the folder. There it was – the C63.1 standard!!!

The standard was quite thin; it consisted of the title page, a foreword page, a copy of a Military Standard (seven pages), a page giving credit to “personnel of the War Committee under whose direction this standard was developed”, and a concluding page.

It was an American War Standard and its official number was American Standards Association “C63.1-1946.” It was approved August 6, 1946.


The foreword page said: Early in the war there appeared a definite need for a uniform method of making radio interference tests on military and naval electrical equipment such as that used in aircraft, vehicles, and ships. While uniform test methods were being used by industry for other equipment such as domestic appliances, high voltage insulators, etc., (Report of Joint Coordinating Committee on Radio Reception: EElG-9, NEMA 107, or RMA 32) these methods were found unsuitable for making the tests required on military equipment. There were several reasons for this, among them being insufficient current capacity and insufficient frequency range. Also, in the testing of equipment for military use, it is often necessary to measure the interference field in the vicinity of the equipment as well as the conducted interference on the circuit which is usually measured. To obtain consistent measurements of interference field intensity, it is necessary to specify the antenna and its location, and the configuration of the test circuit and its position with respect to ground.

The War Committee on Methods of Measuring Radio Noise cooperated with the Armed Forces in the development of a uniform method for the measurement of conducted interference and interference field intensity produced by many types of electrical equipment furnished for military purposes. This method has already been incorporated, by suitable reference, in some of the equipment specifications of the Army and the Navy to which it is applicable. It was first approved as JAN-I-225, and now comprises the body of this war standard.

In approving this specification as an American War Standard, the Committee realized that some of the details concerning the method and its application need to be clarified, but it also believed that such matters would be taken care of when the American War Standards are brought up for review. Some of these details are discussed in the notes which follow.

Paragraph E2c (2) specifies that the power supply shall be connected to the test sample by means of two straight leads, 10 feet long, ½ inch apart, and ¼ inch from the specified ground plane, shunted by two 4-uF capacitors at the power supply end. At radio frequencies, the capacitance effectively closes the loop formed by the two leads and somewhat reduces noise originating in the power supply. An additional filter on the power supply side may be needed in some cases, particularly where a-c power is used. In lieu of the 10-foot conductors with capacitors, some purchasers have specified an impedance in the form of choke coils. Such an impedance has been found to give higher values of conducted interference than the 10-foot leads give at the lower frequencies (up to about 3 megacycles). When the impedance coils or 10-foot leads are used, suitable allowance should be made in interpreting the readings in light of the radio frequency impedance into which the apparatus under test will work under service conditions.

Two methods of measuring interference field intensity are described in paragraphs E2h (1) and E2h (2) of the specification. One method uses a rod antenna and the other method uses a loop probe. The method best suited to the conditions should be selected in each individual case. There is no fixed ratio between the readings obtained by these two methods. The loop probe generally gives significant results when the apparatus and all connecting leads are intended to be well shielded. The rod antenna generally gives significant results when the equipment is intended to be operated with an open wiring such as that used in aircraft, provided the specification as to configuration of leads and their location with respect to the ground plane is observed.

Other details which may be encountered in the testing of different kinds of apparatus and which may require future considerations are the disposition of unused leads such as the third conductor of a 3-phase device when tested single-phase, the connection from noise meter to test sample or terminal block, internal grounding of the device, bonding, effect of reactance in electrical loads, the matter of whether a sample should be “run in” prior to testing, the relation between steady noise and fluctuating noise of low repetition rate, etc.

Finally, the Committee wishes to point out that this method is intended for use with equipment supplied to the Armed Forces. The Services will designate the equipment to which it is applicable in their equipment specifications, or contracts, or orders in accordance with paragraph B-1 of the specification.
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The concluding page said, among other things that “Published by American Standards Association, 70 East Forty-fifth Street, New York 17, New York. No Charge.”

My quest to find C63.1 was successful. Dr. Showers had indeed kept a copy in his voluminous records!

Legal Distribution of C63.1

Gingerly holding this rare and elusive document, Janet made me a copy of the C63.1 standard. When I returned to Minnesota, I scanned the copy and sent it to my contact at ANSI’s office in Washington, DC. After relating how I obtained it, I asked for permission to distribute the standard. ANSI replied that since the IEEE was the current Secretariat of the C63 Committee, the legal decision should be made by the IEEE.

Approaching the IEEE legal department through our Secretariat liaison, Patricia Roder, I asked again for permission to distribute the standard. The IEEE legal staff replied that I could distribute it to the C63 Committee for the purpose of developing other standards based on C63.1.

Disposition of Dr. Ralph Showers’ Records

Janet Showers informed me, while I was in Pennsylvania, that Dr. Showers’ family was making a gift of Dr. Showers’ papers to the Hagley Museum and Library in Wilmington, Delaware. Janet said that with the business and technology focus of its archives, Hagley is an ideal fit given the importance of EMC research and standards in achieving electronic integration with modern society. In doing the initial organization of Ralph’s papers, Janet said it became clear that all aspects of her father’s long career — including his own research and that of his graduate students, his consulting, military contracts, and his work on standards with many organizations — provided input to the standards development process and vice versa; it was hard to separate one from another. Moreover, consulting on what to save with various people with interest in their father’s records, his daughters quickly realized that “one man’s trash is another man’s treasure”. Thus, Dr. Showers’ family is very pleased that at Hagley the archive will be kept intact and people will still be able to have access to the papers of interest to them.

On the Monday after I was at the Showers’ house, a truck and three men came to move the 250 boxes from the Showers’ house to Hagley. The movers coordinated the move with Hagley’s Chief Curator of Library Collections, Lynn Catanese, and several other staff members. The library at Hagley will seek financing to organize, repack, and possibly digitize the records on a selective basis.

The photos above show the boxes being unloaded and stored at one of Hagley’s storage facilities.

Dr. JoAnne Yates, Sloan Distinguished Professor of Management, Massachusetts Institute of Technology (MIT), played a key role in the disposition of Dr. Showers’ archives. She had been communicating with the Showers’ daughters and had visited the Showers’ house to review some of Ralph’s extensive records. She has been working on a history of industrial standards setting and has been studying both the IEEE EMC Society records and the C63 records including some of Leonard Thomas’ EMC Society Board minutes that had been made available to her by the History Committee of the EMC Society. Dr. Yates serves on the board of directors at Hagley and brought Dr. Showers’ records to the research library’s attention.

“I was extremely pleased that Dr. Yates contacted us about the Showers papers,” wrote Dr. Erik Rau, the library’s director. “Historians and other scholars in the humanities and social sciences who are interested in technology and commerce have long been interested in the development and implementation of standards. Dr. Showers’ papers are especially welcome since they describe recent standards in fields that define the modern experience. The papers complement our other technology collections, and we expect they will attract many researchers in the years ahead.”

Conclusion

From a historical perspective, it was an exciting moment to uncover a long-lost C63 Standard in Dr. Ralph Showers’ collection of records covering standards development and research efforts in EMC engineering. It is also very encouraging for the IEEE EMC Society History Committee to have the “Showers Collection” safely and responsibly stored at the Hagley Museum and Library in Delaware.

My thanks go to Janet Showers, Erik Rau, and JoAnne Yates for their contributions to this article.
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