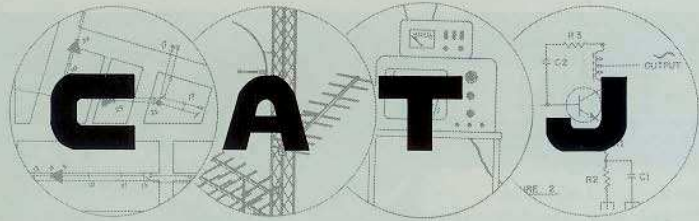


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OUR COVER

CATV field engineer John Falconer puts the Jerrold/Texscan VSM-1 through the paces, something that CATJ will also do in the January issue as we wrap-up signal level reading devices, Part 4.

COMPLYING WITH ANNUALIZED FCC MEASUREMENTS FOR 1974/75

MEASUREMENTS FOR 1975

On or before March 31, 1975 a series of system measurements must be completed by all systems. These are the "Phase Two Measurements" required under the Rules and Regulations of Part 76 (1).

The CATV industry is, at best, *slightly confused* by the measurement requirements dictated by Part 76. The primary confusion is the fact that *all systems must make certain measurements* on or before March 31, 1975, but that *only specified systems must comply* with the technical requirements of Part 76.

All systems (i.e. any system with more than 50 paying subscribers) are required to comply with all of the provisions of Part 76. Systems in operation prior to March 31, 1972 *comply by making measurements* in phased groups that began March 31, 1974 and continue through March 31, 1977. *Complying with the rules* for these *grandfathered systems* is full and complete by *merely making the tests* required in 1974, 1975, and 1976. . . 1977 is a separate matter, as we shall see.

For grandfathered systems, compliance (up to 1977) *is merely a matter of making measurements*. Technical compliance, that is system technical compliance, does not become mandatory until 1977. However, interim compliance, or the making of certain specified tests, is no matter to be taken lightly.

Section 76.601 (c) states, "the operator . . . shall maintain the resulting test data on file at the system's local office for at least five years. It shall be available for inspection by the Commission on request."

This simply means you *must make the tests* required, and *keep the written records of the tests* in your files for a period of not less than five years. Should an authorized representative of the Commission appear on the scene, you are directed to allow him to inspect those records.

If you do these things, and are a grandfathered (pre-March 31, 1972) system, *you have complied*.

What about a system that was not in operation prior to March 31, 1972? That is, a system that came into being after the Cable Television Report and Order of 1972, and is therefore operating under the written authority of a Certificate of Compliance (CAC). What about the measurements which it must perform, and the standards to which it must adhere?

All systems that began operation after March 31, 1972 are assumed to be legal systems, operating with CAC approval. Among the many things they agreed to do in order to obtain their CAC was to obey (i.e. live under) the Rules and Regulations of Part 76, which *includes* Sections 76.605 (technical standards) and 76.609 (measurements). Thus, all such systems must not only make measurements, as set

forth in Section 76.609, but must also assure themselves that the systems meet or exceed the technical requirements of 76.605. This is directly contrary to so-called grandfathered systems, which are required to make certain measurements each year through 1977, but do not have to have system technical compliance (with 76.605) until 1977.

If all of this is still confusing, check the box insert here for what you have to do, in either system category.

EXCEPTIONS

Grandfathered systems are allowed to make their measurements in phases; that is, only certain tests were required on or before March 31, 1974. Those same tests, plus *a few additional tests*, will be required on or before March 31, 1975. All of the 1974 and the 1975 tests, *plus yet more additional tests*, will be required by March 31, 1976. Finally, by March 31, 1977, all of the tests spelled out in 76.609 (pursuant to the technical standards spelled out in 76.605) will be required. At the same time, the system must *also* have technical compliance (with 76.605). The "phases" are spelled out in the box insert shown here.

Although all systems that began operation after March 31, 1972 are assumed to be in full technical compliance with the provisions of 76.605 at all times, and all measurements are to be made annually (1), there are two exceptions. Two of the measurements required have been suspended pending further study. They are 76.605 (a) (9) . . . a measurement of co-channel interference levels, and 76.605 (a) (10) . . . a measurement of intermodulation distortion. We will have more to say about this shortly. For now, understand that *if your system is new* (after 3-31-72) *you are required to annually make all measurements*, except those for 76.605 (a) (9) and 76.605 (a) (10). Even

WHO MAKES WHAT/WHEN?

Grandfathered systems were required to make the following measurements prior to March 31, 1974:

- (1) 76.605 (a) (4)—Visual signal level (minimum) on all channels;
- (2) 76.605 (a) (5)—Signal level variations between adjacent channels and all channels;
- (3) 76.605 (a) (6)—DB difference between all visual carriers and their companion aural carrier levels;
- (4) 76.605 (a) (9)—Signal-to-noise ratio of all Grade B or better grade signals;
- (5) 76.605 (a) (12)—Radiation from cable plant;

Grandfathered systems are required to re-make all of the above (1974) measurements **plus** the following new measurements prior to March 31, 1975:

- (6) 76.605 (a) (7)—Measurement of percentage of hum modulation present;
- (7) 76.605 (a) (8)—Measurement of in-channel response;
- (8) 76.605 (a) (11)—Measurement of terminal isolation between any two subscribers;

New systems are required to make all of the above measurements before March 31, 1975, **and** the following:

- (9) 76.605 (a) (1)—Measurement of frequency boundaries of all off-the-air system channels;
- (10) 76.605 (a) (2)—Measurement of visual carrier frequencies of all system off-the air channels;
- (11) 76.605 (a) (3)—Measurement of separation of visual and aural carriers.

New systems must **comply** with the specifications of 76.605 (a) 1 through 12 (including compliance with the Radiation Standards). **Measurement** of co-channel interference levels [76.605 (a) (9)] and intermod [76.605 (a) (10)] are presently waived, **although compliance is not**. All of these measurements will be discussed at length in the December CATJ.

(1—See data given above)

though you are not required to make measurements for 76.605 (a) (9) and 76.605 (a) (10), you are required to *certify your system complies* with the requirements of 76.605 (a) (9) and 76.605 (a) (10).

How is that again? We must comply with the technical requirements of co-channel (36 db or more down within Grade B pick-ups) and intermod (46 db or more down), but we are not required to measure it? That's it in a nutshell. We are told that the Commission has chosen this strange approach to these two measurements because both measurements require sophisticated equipment (a spectrum analyzer) to perform. The Commission has directed the C-TAC group to study how the "intent of the technical requirements could be met" *without actual measurements* being made. Since the C-TAC panel is still out, and will not make firm recommendations to the Cable Bureau until January 31st, the matter of measuring these two specifications for your system has been suspended, pending the receipt of the C-TAC study.

This year new systems are required to make all measurements, and old systems are required to make certain measurements, but only new systems are required to comply with the technical standards of 76.605. There is one standard or provision of 76.605 with which all systems including old systems, must comply. *That standard is 76.605 (a) (12), which is the radiation standard.* In 76.605 (a) (12) the Commission has gone back and picked up an old (pre-cable) set of rules originally known as Part 15 (something called "incidental radiation"). In the original "incidental radiation" standards, the Commission sought to assure that unlicensed devices did not interfere with the reception of licensed transmitters. If you will look on the back of most any television or radio receiver, transceiver, etc. you will see a sticker which

states, "*This Unit Complies With Part 15 Radiation Standards, In Effect At The Time of Manufacture*", or something similar. Here the Commission is worried about things like receiver local oscillators radiating throughout the neighborhood and becoming unwanted interfering signal sources that disrupt normal receiver operation. When it was found that cable television systems could on occasion radiate signals up and down the block, the standards of Part 15 were enlarged to include CATV. So, from virtually day-one of this industry, we have had something similar (if not identical) to 76.605 (a) (12). The Commission has had the authority, under earlier Part 15, to make life pretty miserable for any CATV system that was found to be line (or plant or apparatus) radiating more signal than the permissible standards allowed. *There is nothing new about this standard, and it applies equally to all systems (old and new).*

GRANDFATHER MEASUREMENTS

If you are a new system, you have gone into the CATV business with nothing less than a full understanding that you would be required to make measurements each year you were in operation. Our theory in presenting this material in this issue, and completing it in the next issue, is that as a part of that understanding, you comprehend the legal and technical requirements for making these tests, and that you have already made one full set of tests on or before March 31, 1974.

On the other hand, grandfathered systems are making many of their tests for the first time this year. These new tests which approximately 2,900 systems have never been required to perform before, are the tests to which we shall devote the majority of our report. We will also cover all of the grandfather-system-required tests for

this year, which includes the tests that were made for the first time last year. Our theory is that in making the tests for the first time last year, *you may have done more (or less) than is really required*, and now is as good a time to catch the error.

WHERE TESTS ARE MADE

One of the items which confuses some operators is the location of the tests. Section 76.601 (c) states that, ". . . tests shall be made on each (off-the-air) cable television channel. . . at no less than three widely separated points in the system, at least one of which is representative of the terminals most distant from the system (head end)."

To satisfy the testing requirements, each system must make identical full-range measurements at no fewer than *three locations*. This does not mean that a system can comply with the technical standards of 76.605 at *only* three (minimum locations). It means *the tests*, to validate the testing procedure, *must be done at no fewer than three locations*. As a matter of fact, the Commission may require ". . . additional tests, repeat tests, or tests involving specific subscriber terminals. . . to secure compliance with the technical standards".

The Commission also says, "*Successful completion of the performance tests (at the three designated locations) does not relieve the system of the obligation to comply with all pertinent technical standards at all subscriber terminals.*" Of course, for now, this pertains mostly to newer systems. The point is made that "handpicking three prime locations" and conducting your tests at these locations is not "full compliance with the technical standards", but rather *is compliance only with the measurement (instruction) requirement*.

Once again, many operators are confused with the difference between

KEEPING PROPER RECORDS

Section 76.601 spells out how system performance tests shall be recorded. All systems, new or old, shall:

- (A) Maintain at their in-town office a complete listing of all stations (and channels) carried on the system, showing channels added or deleted as permanent changes take place;
- (B) Maintain a listing of all subscribers connected to the system;
- (C) Conduct system performance tests once per calendar year, but in no case any less frequently than at 14 month intervals;
- (D) Maintain as a part of the recorded test procedure a description of the equipment utilized to make the tests, and a statement of the general qualifications of the individual(s) conducting the tests;
- (E) Record the results of all tests made, and keep those test results on file for a period of not less than five years;
- (F) Make the full set of records listed here available to any authorized employee of the Commission, and be prepared to show that the record keeping process (grandfathered systems) and the measurements themselves (new systems) are in full FCC compliance.

measurement requirements, and technical standards. *The measurement requirement is essentially a paper-work function.* Recall that when you make your measurements, you must compile a written log of the measurements (see box insert) and maintain those measurement logs on file for at least five years at your system office. In effect, *making these measurements satisfies only the requirement that you make measurements.* It is up to you, having made the measurements, to determine *whether or not your system meets the*

technical standards set forth in 76.605, which is an entirely *different* situation. A grandfathered system is totally exempt from meeting any *technical standards* [except radiation, 76.605 (a) (12)] until March 31, 1977.

Must the measurements be made inside of subscriber homes? *No*. Section 76.601 (c) states, "...the measurements may be taken at convenient monitoring points in the cable network, provided that data shall be included (in the written test results) to relate the measured performance (taken at the monitoring point) to the system performance as would be viewed from a nearby subscriber terminal."

Again, this confuses some operators. Let's go back to "three widely separated points in the system". Can one of these be at the head end? *Probably not*, because 76.601 (c) says "...as would be viewed from a nearby subscriber terminal". You might argue that you *could* have a subscriber at (or near) the head end, and in some cases you may actually start service *right outside* the head end site. In fact, you had better at least have a potential customer *and a way to serve him* (i.e. a feeder line or a DT in the trunk) *at the location*, if you choose the head end for one of your three measurement points. Sure, some systems use their head end test point, through a splitter or DT, to serve a farm house located on the same property as the head end, but that is "pretty thin" to defend. It is virtually *impossible* to defend if you have *no potential subscribers* within reasonable service distance from the head end. ("Would you believe a family lived in a trailer right outside the head end door, and they *just* pulled the trailer away as you drove up?" This might be hard for the visiting FCC man to swallow!).

There will probably never be anything like a *standard set of three measurement locations* in this business, but they might be as follows:

- (1) *The head end* (if you can substantiate that a customer is being served or could be served from there);
- (2) *Your office* (assuming it is on the cable);
- (3) *A customer service location at the far end of the plant* [this satisfies 76.601 (c) "...at least one of which is representative of terminals most distant from the system (head end) in terms of cable distance..."].

The term *representative of terminals* keeps cropping up. What does it mean? It means that you can make the measurements *at some location other than inside of a subscriber's home*. For example, if you are at the number three location suggested above (the most distant cable point in the plant), you could be making your measurements (1) *inside the home* at the end of the drop cable at the end of the longest and most distant feeder run in the plant, (2) *outside of the home*, off of the service DT using an unused output port on the DT, or (3) *off of the output* (or even input, although we cannot fathom why you would want to) test point on the last amplifier in the line.

To the Commission, representative means that *when* you measure at any physical point *except* the specified in-home location, that *'your measurements be corrected* for additional passive losses that could (or would) exist between the point of actual measurement and the point of actual connection to the subscriber's antenna terminals. In other words, make your measurements at the DT unused port if you wish to avoid disrupting the subscriber's life for twenty four hours (24 hours? Yes, we will get to that shortly.). When you note your measurement levels in your log, subtract from your RF level type measurements (and others that are quantitative in nature) *any additional loss that would occur from the DT test plug-in point to the*

subscriber's receiver (such as cable losses for 100 feet of RG-59/U drop cable). These "adjusted" numbers are the numbers you log, so that your log represents the real levels inside of the home.

This same situation exists for the other two measurements as well, when they are made at any point *except* at the end of the drop cable where it plugs into the matching transformer hanging on the back of the subscriber's receiver.

24 HOURS?

If you rushed right out and purchased a copy of the *Federal Register* for February 12, 1972 (which contained the initial 1972 release of the Part 76 Rules and Regulations), you probably missed the "later update" released in June, 1972 in the *Cable Television Report and Order and Reconsideration*. In the "reconsideration", Section 76.605 (a) (5) was modified to read:

"The visual signal level on each channel shall not vary more than 12 db *within any 24 hour period* and shall be maintained within:

- (i) 3 db of the visual signal level of any visual carrier within 6 MHz nominal frequency separation, and
- (ii) 12 db of the visual signal level on any other channel, and (iii) a maximum level such that signal degradation due to overload in the subscriber's receiver does not occur."

The portion added in italics (*within any 24 hour period*) may have missed your attention previously. This little "hooker" changes the rules of the game substantially. Previously where you could "best case" yourself into compliance, now you are required to stretch your "best case" into a period of at least 24 hours in length! We will deal with how you can comply with 76.605 (a) (5) subsequently.

MULTIPLE SYSTEM TESTS

There is one more confusing point in the rules. Because the Commission determined in their Cable Television Report and Order [76.5 (a)] that "... *in general, each separate and distinct community or municipal entity (including single, discrete, un-incorporated areas) served by cable television facilities constitutes a separate cable television system, even if there is a single head end and identical ownership of facilities extending into several communities*", you may have more than one complete set of tests to make.

Let's suppose you have your primary system in Podunk, a municipal entity which granted your firm a franchise. This requires three measurement points, *all located within Podunk* proper. Now you have extended your trunk into *Left Overshoe*, a smaller community that is served by the Podunk trunk after it goes through Podunk. You have a franchise for Left Overshoe, or at least permission to operate there, and you file a separate Form 325 on the Left Overshoe system. That is three more measurement points, *except these three must all be within Left Overshoe*. Finally, between Podunk and Left Overshoe (or beyond Podunk) you are *also serving* a group of customers in the country. They happen to number *51 subscribers*, which makes them a legal *separate* cable facility. You have no franchise at the moment (for whatever reason), but the system *is separate and distinct* as far as the FCC is concerned because the 51 homes served are outside of Podunk or Left Overshoe, and that is *three more measurement points*.

If Left Overshoe, or the un-incorporated area happen to have fewer than 50 subscribers, the Commission doesn't call these separate facilities "*CATV Systems*" and therefore, no measurements are required.

Before you go straight through the roof, remember how glad you were when you found out that each separate, distinct system had to have more than 500 subscribers before that nasty cherry picker station up the road could force you to provide non-duplication protection? When you *split up your billings* into Left Overshoe, Podunk, and the un-incorporated area [following Commission 76.5 (a) guidelines], you found that Podunk had 476 subscribers, Left Overshoe had 123, and the un-incorporated area had 51. This is a net effect of 650 homes connected to the head end, *but in no case 500 in any one (community) system.*

At that point you *loved* having (by FCC definition) three "separate" systems. Now, you are going to have to pay a small price (two more sets of measurements) for that luxury!

WHAT NEXT

Now that we have established the "ground rules" for the measurement technique, or at least the record keeping portion and the definition segment, what about the actual measurements? Can they be accomplished with only a field strength meter? In the December CATJ, we will complete this two-part series and cover step-by-step the 1974/75 crop of measurements.

ATTENTION STATE/REGIONAL ASSOCIATIONS

A new monthly **CATJ News Service** is being planned by CATJ. The latest FCC technical releases and rule change releases are being prepared by the CATJ staff in "news-story format" for mail-out to CATV state and regional associations for use in their newsletters. There is no charge for this service, which will begin in January. To get on the **CATJ News Service** mailing list for your association publication, place Heather Pennington, CATJ, 4209 NW 23rd, Suite 106, Oklahoma City, Oklahoma 73107 on your state/regional association mailing list, and drop us a note telling us to whom we should send the news service.



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