Background Information on Draft Liaison Letters from IEEE 802.3 WG to TIA TR-42 re FOTP 30 & FOTP 54

Mabud Choudhury, OFS

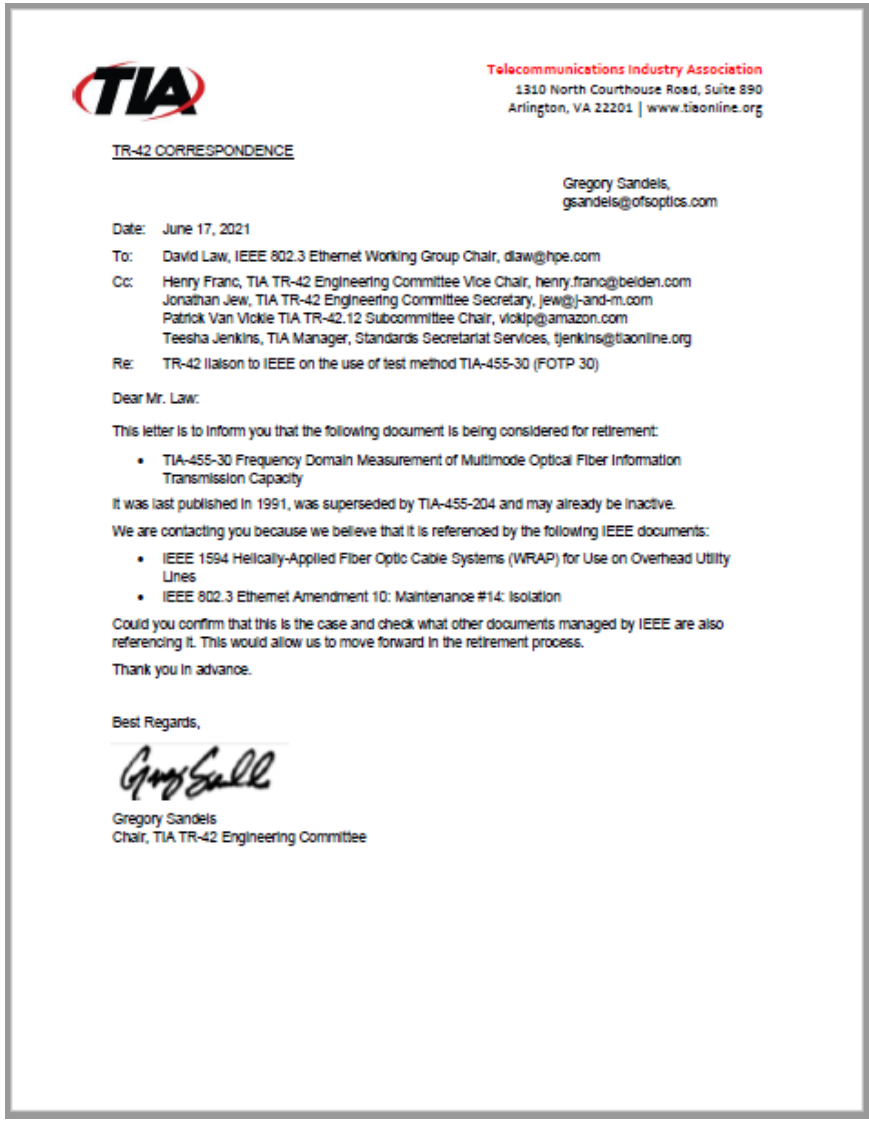
Robert Lingle, Jr., OFS

IEEE P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force

TF Plenary Meeting , July 19, 2021

TR-42 liaison to IEEE on the use of test method TIA-455-30 (FOTP 30)

- https://www.ieee802.org/3/minutes/jul21/incoming/TR-42%20Liaison%20to%20IEEE%20re%20FOTP-455-30.pdf



TIA

Telecommunications Industry Association
1310 North Courthouse Road, Suite 890
Arlington, VA 22201 | www.tiaonline.org

TR-42 CORRESPONDENCE

Gregory Sandels,
gsandels@ofsoptics.com

Date: June 17, 2021

To: David Law, IEEE 802.3 Ethernet Working Group Chair, dlaw@hpe.com

Cc: Henry Franc, TIA TR-42 Engineering Committee Vice Chair, henry.franc@belden.com
Jonathan Jew, TIA TR-42 Engineering Committee Secretary, jew@j-and-m.com
Patrick Van Vickle TIA TR-42.12 Subcommittee Chair, vickip@amazon.com
Teesha Jenkins, TIA Manager, Standards Secretariat Services, tjenkins@tiaonline.org

Re: TR-42 liaison to IEEE on the use of test method TIA-455-30 (FOTP 30)

Dear Mr. Law:

This letter is to inform you that the following document is being considered for retirement:

- TIA-455-30 Frequency Domain Measurement of Multimode Optical Fiber Information Transmission Capacity

It was last published in 1991, was superseded by TIA-455-204 and may already be inactive.

We are contacting you because we believe that it is referenced by the following IEEE documents:

- IEEE 1594 Helically-Applied Fiber Optic Cable Systems (WRAP) for Use on Overhead Utility Lines
- IEEE 802.3 Ethernet Amendment 10: Maintenance #14: Isolation

Could you confirm that this is the case and check what other documents managed by IEEE are also referencing it. This would allow us to move forward in the retirement process.

Thank you in advance.

Best Regards,

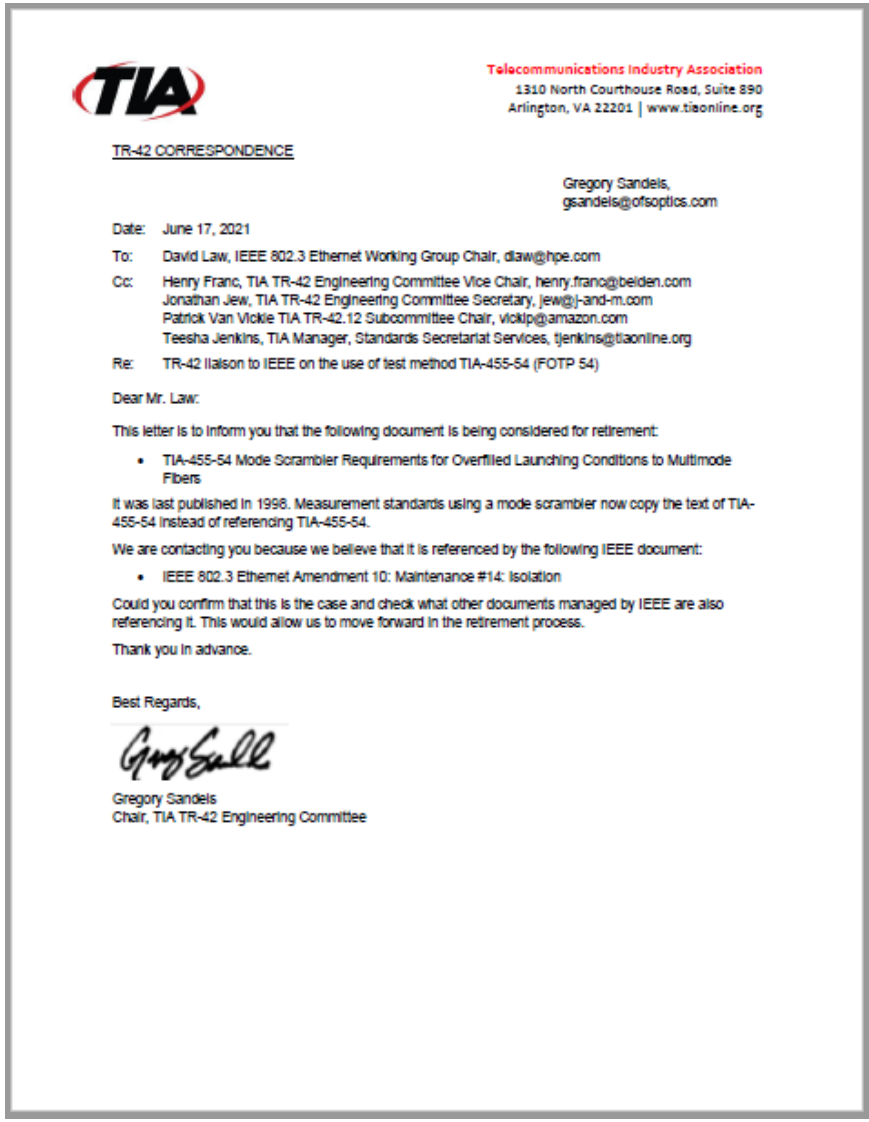
Gregory Sandels
Chair, TIA TR-42 Engineering Committee

TR-42 liaison to IEEE on the use of test method TIA-455-30 (FOTP 30)

- TIA TR-42 sent liaison to IEEE to notify that the following document is being considered for retirement:
  - TIA-455-30 Frequency Domain Measurement of Multimode Optical Fiber Information Transmission Capacity
  - It was last published in 1991, was superseded by TIA-455-204 and may already be inactive.
- TIA believes that TIA-455-30 is referenced by the following IEEE documents:
  - IEEE 1594 Helically-Applied Fiber Optic Cable Systems (WRAP) for Use on Overhead Utility Lines
  - IEEE 802.3 Ethernet Amendment 10: Maintenance #14: Isolation
- Requested IEEE 803.2 to confirm that this is the case and check what other documents managed by IEEE are also referencing TIA-455-30.

TR-42 liaison to IEEE on the use of test method TIA-455-54 (FOTP 54)

- https://www.ieee802.org/3/minutes/jul21/incoming/TR-42%20Liaison%20to%20IEEE%20re%20FOTP-455-54.pdf



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Teesha Jenkins, TIA Manager, Standards Secretariat Services, tjenkins@tiaonline.org

Re: TR-42 liaison to IEEE on the use of test method TIA-455-54 (FOTP 54)

Dear Mr. Law:

This letter is to inform you that the following document is being considered for retirement:

- TIA-455-54 Mode Scrambler Requirements for Overfilled Launching Conditions to Multimode Fibers

It was last published in 1998. Measurement standards using a mode scrambler now copy the text of TIA-455-54 instead of referencing TIA-455-54.

We are contacting you because we believe that it is referenced by the following IEEE document:

- IEEE 802.3 Ethernet Amendment 10: Maintenance #14: Isolation

Could you confirm that this is the case and check what other documents managed by IEEE are also referencing it. This would allow us to move forward in the retirement process.

Thank you in advance.

Best Regards,

Gregory Sandels
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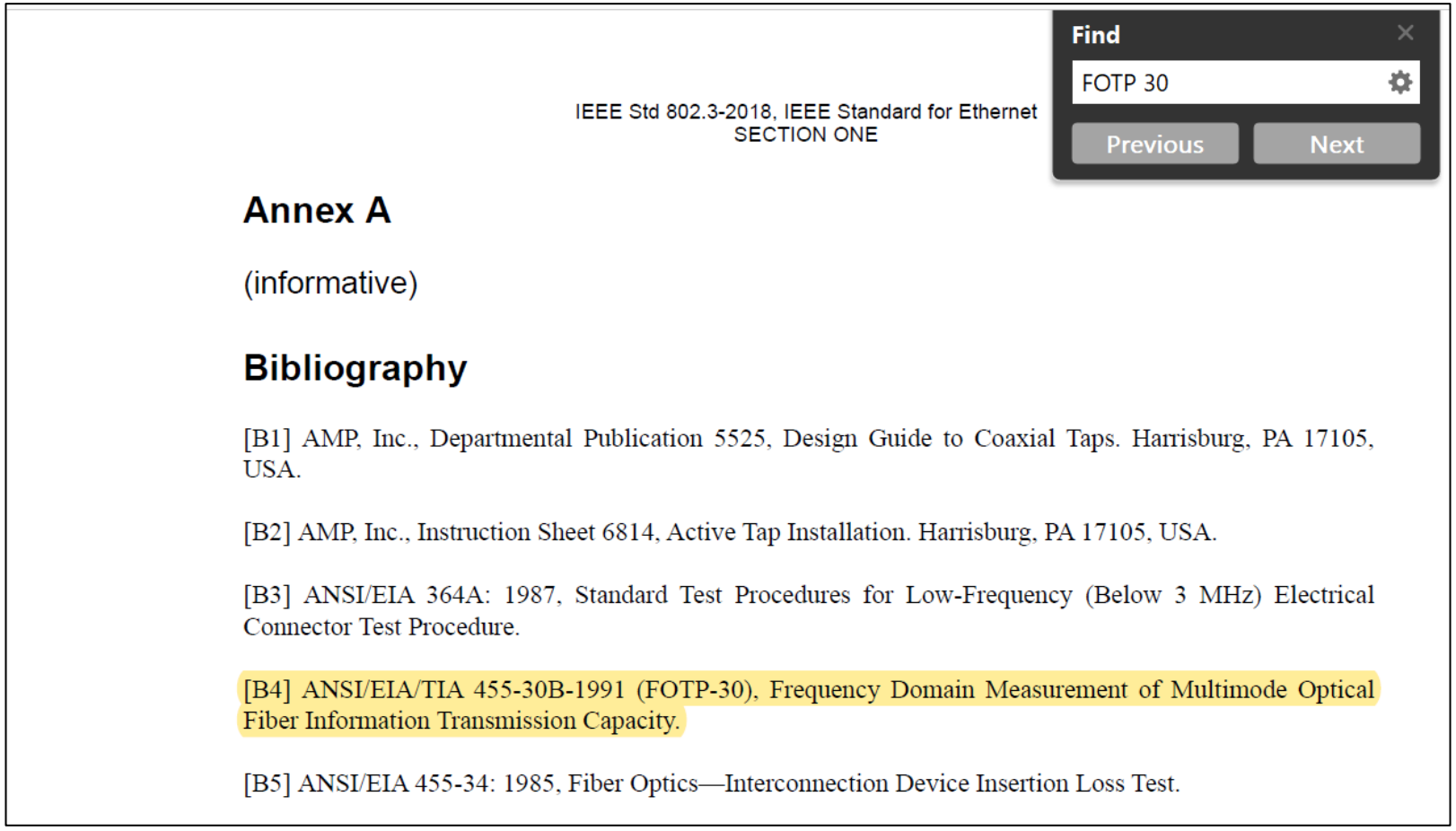
  - It was last published in 1998. Measurement standards using a mode scrambler now copy the text of TIA-455-54 instead of referencing TIA-455-54.
- TIA believes that TIA-455-54 is referenced by the following IEEE documents:
  - IEEE 802.3 Ethernet Amendment 10: Maintenance #14: Isolation
- Requested IEEE 803.2 to confirm that this is the case and check what other documents managed by IEEE are also referencing TIA-455-54.

IEEE 802.3 standards reviewed for TIA-455-30 & TIA-455-54 references

- IEEE Std 802.3™-2018, IEEE Standard for Ethernet
- IEEE Std 802.3cd™-2018, Amendment 3: Media Access Control Parameters for 50 Gb/s and Physical Layers and Management Parameters for 50 Gb/s, 100 Gb/s, and 200 Gb/s Operation
- IEEE Std 802.3cm™-2020, Amendment 7: Physical Layer and Management Parameters for 400 Gb/s over Multimode Fiber
- IEEE Std 802.3cr™-2021, Amendment 10: Maintenance #14: Isolation
- Following terms were used to do PDF search of the above standards:
  - TIA 455, TIA-455-30 (FOTP 30), TIA-455-30, TIA 455-30, FOTP 30, TIA 455-30B-1991
  - TIA-455-54 (FOTP 54), TIA-455-54, TIA 455-54, FOTP 54, TIA 455-54A-1990, overfilled launch

Only reference (informative) found for TIA-455-30, FOTP 30



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Annex A

(informative)

Bibliography

[B1] AMP, Inc., Departmental Publication 5525, Design Guide to Coaxial Taps. Harrisburg, PA 17105, USA.

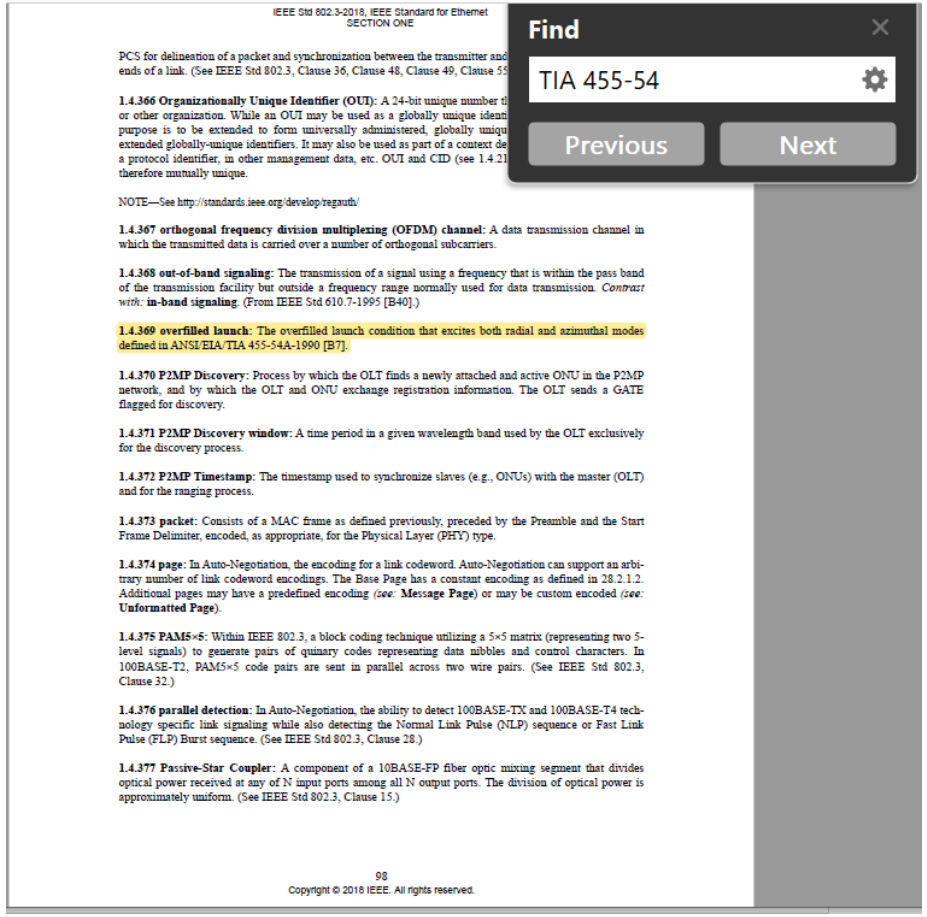
[B2] AMP, Inc., Instruction Sheet 6814, Active Tap Installation. Harrisburg, PA 17105, USA.

[B3] ANSI/EIA 364A: 1987, Standard Test Procedures for Low-Frequency (Below 3 MHz) Electrical Connector Test Procedure.

[B4] ANSI/EIA/TIA 455-30B-1991 (FOTP-30), Frequency Domain Measurement of Multimode Optical Fiber Information Transmission Capacity.

[B5] ANSI/EIA 455-34: 1985, Fiber Optics—Interconnection Device Insertion Loss Test.

Reference 1 (normative) for TIA-455-54, FOTP 54



IEEE Std 802.3-2018, IEEE Standard for Ethernet
SECTION ONE

PCS for delineation of a packet and synchronization between the transmitter and
ends of a link. (See IEEE Std 802.3, Clause 36, Clause 48, Clause 49, Clause 55

1.4.366 Organizationally Unique Identifier (OUI): A 24-bit unique number th
or other organization. While an OUI may be used as a globally unique identi
purpose is to be extended to form universally administered, globally uniqu
extended globally-unique identifiers. It may also be used as part of a context de
a protocol identifier, in other management data, etc. OUI and CID (see 1.4.21
therefore mutually unique.

NOTE—See http://standards.ieee.org/develop/regauth/

1.4.367 orthogonal frequency division multiplexing (OFDM) channel: A data transmission channel in which the transmitted data is carried over a number of orthogonal subcarriers.

1.4.368 out-of-band signaling: The transmission of a signal using a frequency that is within the pass band of the transmission facility but outside a frequency range normally used for data transmission. *Contrast with:* **in-band signaling**. (From IEEE Std 610.7-1995 [B40].)

1.4.369 overfilled launch: The overfilled launch condition that excites both radial and azimuthal modes defined in ANSI/EIA/TIA 455-54A-1990 [B7].

1.4.370 P2MP Discovery: Process by which the OLT finds a newly attached and active ONU in the P2MP network, and by which the OLT and ONU exchange registration information. The OLT sends a GATE flagged for discovery.

1.4.371 P2MP Discovery window: A time period in a given wavelength band used by the OLT exclusively for the discovery process.

1.4.372 P2MP Timestamp: The timestamp used to synchronize slaves (e.g., ONUs) with the master (OLT) and for the ranging process.

1.4.373 packet: Consists of a MAC frame as defined previously, preceded by the Preamble and the Start Frame Delimiter, encoded, as appropriate, for the Physical Layer (PHY) type.

1.4.374 page: In Auto-Negotiation, the encoding for a link codeword. Auto-Negotiation can support an arbitrary number of link codeword encodings. The Base Page has a constant encoding as defined in 28.2.1.2. Additional pages may have a predefined encoding (*see:* **Message Page**) or may be custom encoded (*see:* **Unformatted Page**).

1.4.375 PAM5×5: Within IEEE 802.3, a block coding technique utilizing a 5×5 matrix (representing two 5-level signals) to generate pairs of quinary codes representing data nibbles and control characters. In 100BASE-T2, PAM5×5 code pairs are sent in parallel across two wire pairs. (See IEEE Std 802.3, Clause 32.)

1.4.376 parallel detection: In Auto-Negotiation, the ability to detect 100BASE-TX and 100BASE-T4 technology specific link signaling while also detecting the Normal Link Pulse (NLP) sequence or Fast Link Pulse (FLP) Burst sequence. (See IEEE Std 802.3, Clause 28.)

1.4.377 Passive-Star Coupler: A component of a 10BASE-FP fiber optic mixing segment that divides optical power received at any of N input ports among all N output ports. The division of optical power is approximately uniform. (See IEEE Std 802.3, Clause 15.)

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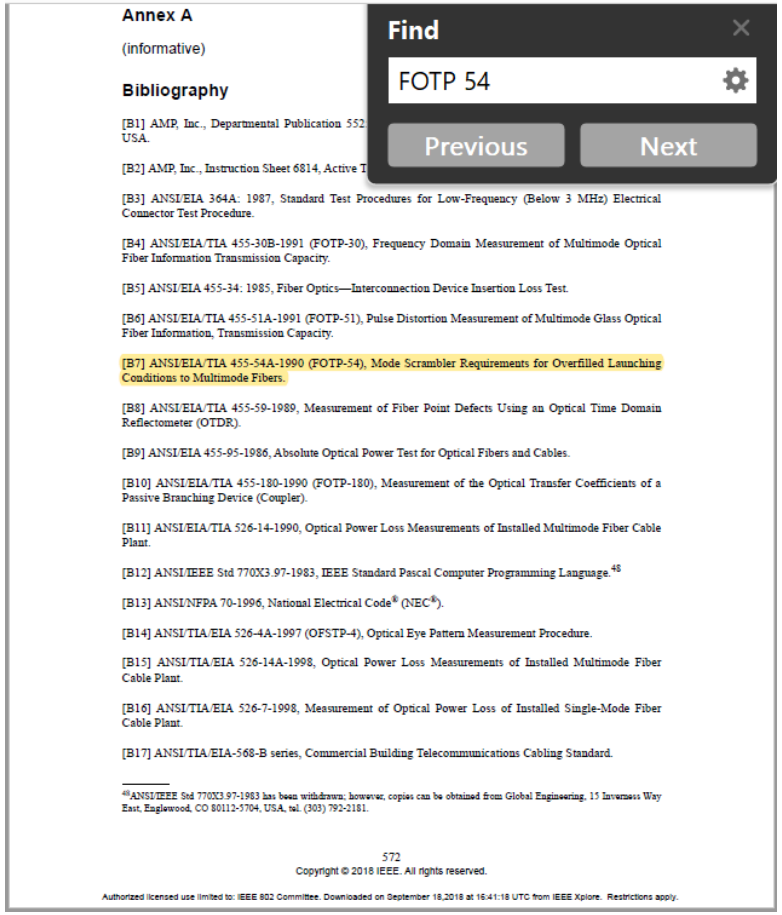
Reference 2 (informative) for TIA-455-54, FOTP 54



Annex A

(informative)

Bibliography

[B1] AMP, Inc., Departmental Publication 552
USA.

[B2] AMP, Inc., Instruction Sheet 6814, Active T

[B3] ANSI/EIA 364A: 1987, Standard Test Procedures for Low-Frequency (Below 3 MHz) Electrical Connector Test Procedure.

[B4] ANSI/EIA/TIA 455-30B-1991 (FOTP-30), Frequency Domain Measurement of Multimode Optical Fiber Information Transmission Capacity.

[B5] ANSI/EIA 455-34: 1985, Fiber Optics—Interconnection Device Insertion Loss Test.

[B6] ANSI/EIA/TIA 455-51A-1991 (FOTP-51), Pulse Distortion Measurement of Multimode Glass Optical Fiber Information, Transmission Capacity.

[B7] ANSI/EIA/TIA 455-54A-1990 (FOTP-54), Mode Scrambler Requirements for Overfilled Launching Conditions to Multimode Fibers.

[B8] ANSI/EIA/TIA 455-59-1989, Measurement of Fiber Point Defects Using an Optical Time Domain Reflectometer (OTDR).

[B9] ANSI/EIA 455-95-1986, Absolute Optical Power Test for Optical Fibers and Cables.

[B10] ANSI/EIA/TIA 455-180-1990 (FOTP-180), Measurement of the Optical Transfer Coefficients of a Passive Branching Device (Coupler).

[B11] ANSI/EIA/TIA 526-14-1990, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

[B12] ANSI/IEEE Std 770X3.97-1983, IEEE Standard Pascal Computer Programming Language.[48]

[B13] ANSI/NFPA 70-1996, National Electrical Code® (NEC®).

[B14] ANSI/TIA/EIA 526-4A-1997 (OFSTP-4), Optical Eye Pattern Measurement Procedure.

[B15] ANSI/TIA/EIA 526-14A-1998, Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.

[B16] ANSI/TIA/EIA 526-7-1998, Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant.

[B17] ANSI/TIA/EIA-568-B series, Commercial Building Telecommunications Cabling Standard.

[48]ANSI/IEEE Std 770X3.97-1983 has been withdrawn; however, copies can be obtained from Global Engineering, 15 Inverness Way East, Englewood, CO 80112-5704, USA, tel. (303) 792-2181.

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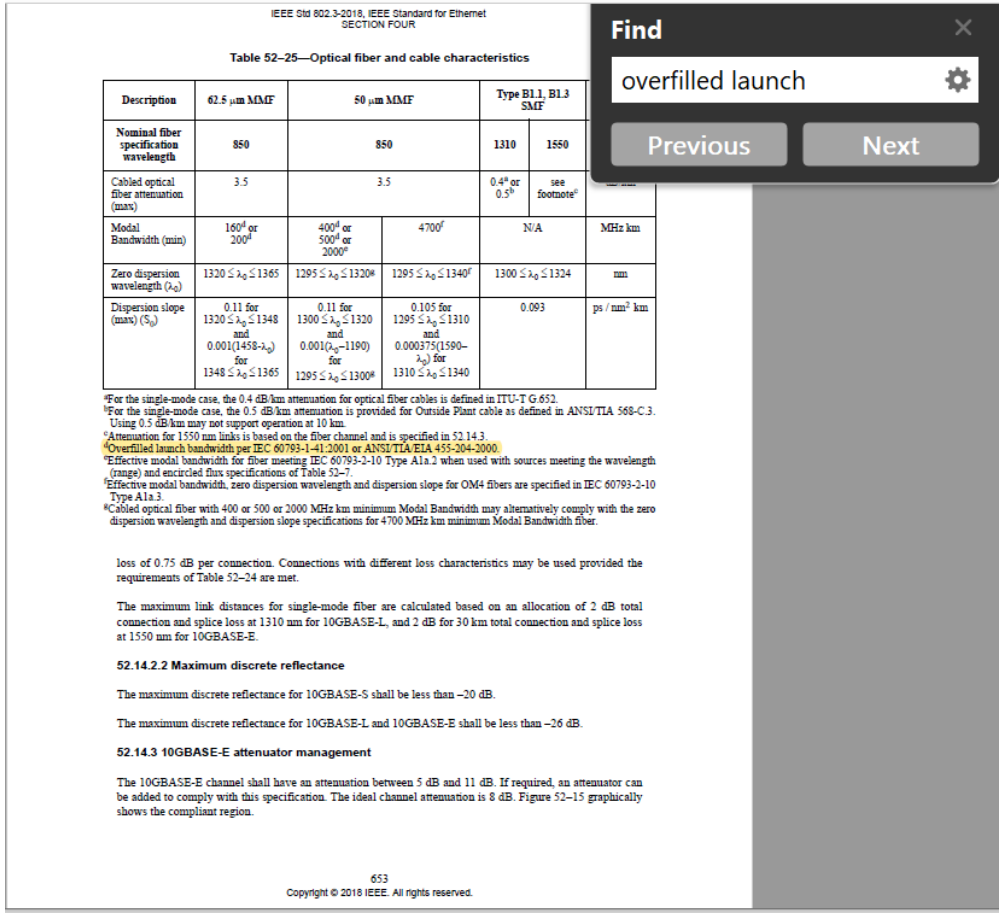
Reference to TIA 455-204 as possible replacement reference for TIA-455-54



IEEE Std 802.3-2018, IEEE Standard for Ethernet
SECTION FOUR

Table 52–25—Optical fiber and cable characteristics

Description	62.5 μm MMF	50 μm MMF		Type B1.1, B1.3 SMF		
Nominal fiber specification wavelength	850	850		1310	1550	
Cabled optical fiber attenuation (max)	3.5	3.5		0.4[a] or 0.5[b]	see footnote[c]	
Modal Bandwidth (min)	160[d] or 200[d]	400[d] or 500[d] or 2000[e]	4700[f]	N/A		MHz km
Zero dispersion wavelength (λ_0)	$1320 \le \lambda_0 \le 1365$	$1295 \le \lambda_0 \le 1320$[g]	$1295 \le \lambda_0 \le 1340$[f]	$1300 \le \lambda_0 \le 1324$		nm
Dispersion slope (max) (S_0)	0.11 for $1320 \le \lambda_0 \le 1348$ and $0.001(1458-\lambda_0)$ for $1348 \le \lambda_0 \le 1365$	0.11 for $1300 \le \lambda_0 \le 1320$ and $0.001(\lambda_0-1190)$ for $1295 \le \lambda_0 \le 1300$[g]	0.105 for $1295 \le \lambda_0 \le 1310$ and $0.000375(1590-\lambda_0)$ for $1310 \le \lambda_0 \le 1340$	0.093		ps / nm^2 km

[a]For the single-mode case, the 0.4 dB/km attenuation for optical fiber cables is defined in ITU-T G.652.
[b]For the single-mode case, the 0.5 dB/km attenuation is provided for Outside Plant cable as defined in ANSI/TIA 568-C.3. Using 0.5 dB/km may not support operation at 10 km.
[c]Attenuation for 1550 nm links is based on the fiber channel and is specified in 52.14.3.
[d]Overfilled launch bandwidth per IEC 60793-1-41:2001 or ANSI/TIA/EIA 455-204-2000.
[e]Effective modal bandwidth for fiber meeting IEC 60793-2-10 Type A1a.2 when used with sources meeting the wavelength (range) and encircled flux specifications of Table 52–7.
[f]Effective modal bandwidth, zero dispersion wavelength and dispersion slope for OM4 fibers are specified in IEC 60793-2-10 Type A1a.3.
[g]Cabled optical fiber with 400 or 500 or 2000 MHz km minimum Modal Bandwidth may alternatively comply with the zero dispersion wavelength and dispersion slope specifications for 4700 MHz km minimum Modal Bandwidth fiber.

loss of 0.75 dB per connection. Connections with different loss characteristics may be used provided the requirements of Table 52–24 are met.

The maximum link distances for single-mode fiber are calculated based on an allocation of 2 dB total connection and splice loss at 1310 nm for 10GBASE-L, and 2 dB for 30 km total connection and splice loss at 1550 nm for 10GBASE-E.

52.14.2.2 Maximum discrete reflectance

The maximum discrete reflectance for 10GBASE-S shall be less than –20 dB.

The maximum discrete reflectance for 10GBASE-L and 10GBASE-E shall be less than –26 dB.

52.14.3 10GBASE-E attenuator management

The 10GBASE-E channel shall have an attenuation between 5 dB and 11 dB. If required, an attenuator can be added to comply with this specification. The ideal channel attenuation is 8 dB. Figure 52–15 graphically shows the compliant region.

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2 potential options for replacing TIA-455-30 reference (informative)

1. We propose to replace the TIA-455-30B-1991 reference with TIA-455-204, which you indicated had superseded TIA-455-30. It is expected that comments will be submitted against the current revision of IEEE Std 802.3™-2018, IEEE Standard for Ethernet, proposing update to the above reference.

OR

2. Since the above reference is informative, we could propose consider deleting this reference. It is expected that comments will be submitted against the current revision of IEEE Std 802.3™-2018, IEEE Standard for Ethernet, proposing update to the above reference.

Request to TIA of potentially replacing TIA-455-54 references with TIA-455-204 (or another appropriate TIA standard)

There are two references to “TIA 455-54A-1990 (FOTP 54)”, both referenced in IEEE Std 802.3™-2018, IEEE Standard for Ethernet, Section One:

1) 1.4 Definitions, page 98:
    - 1.4.369 overfilled launch: The overfilled launch condition that excites both radial and azimuthal modes defined in ANSI/EIA/TIA 455-54A-1990 [B7].
2) Annex A (Informative), Bibliography, page 572:
    - “[B7] ANSI/EIA/TIA 455-54A-1990 (FOTP-54), Mode Scrambler Requirements for Overfilled Launching Conditions to Multimode Fibers.”

The first of the above references is normative; the second is informative. We could consider replacing the TIA 455-54A-1990 reference with another TIA 455 reference which subsumed the requisite language on mode scrambling from TIA 455-54-1990, such as TIA-455-204, FOTP-204 Measurement of Bandwidth on Multimode Fiber, or other appropriate TIA reference. We would appreciate your response in suggesting an appropriate TIA reference to replace the TIA-455-54 references above. Alternatively, TIA could furnish IEEE 802.3 with copies of FOTP-54 and FOTP-204 (or another suggested FOTP you recommend) so that we can evaluate the appropriateness of using that reference instead. It is expected that comments will be submitted against the current revision of IEEE Std 802.3™-2018, IEEE Standard for Ethernet, once alternate TIA or other standard that can be referenced, proposing update to the above references.

Thank You!