ACTA DE APERTURA DEL SOBRE DOS Y TRES PARA LA SELECCIÓN DE LA EMPRESA QUE PRESTARÁ EL SERVICIO DE MANTENMIENTO TI. EXPEDIENTE 16/18.

Asisten al presente acto en nombre del Comité de Dirección de CONTURSA (al menos 2 miembros):

- Don José Manuel del Río Castillo.
- Don Miguel Osuna España.

Con la asistencia del Asesor Jurídico de CONTURSA, Don Joaquín López Pérez.

No asiste, pese a estar debidamente citado, ningún representante de FIBRATEL S.L.

I.- Siendo las 11:00 horas del 19 de mayo de 2.018 y conforme se establece en el Pliego de Condiciones del presente concurso, se procede a la apertura del sobre dos y tres de la única empresa que se ha presentado al concurso y ha cumplido con la totalidad de requisitos previos.

Queda anexa al presente acta la oferta económica y técnica que presenta la licitadora.

II.- Se informa que por parte del comité de dirección se dará traslado de toda la documentación e información necesaria al órgano de contratación a los efectos de resolución del presente concurso.

Una vez sea adjudicado provisionalmente el concurso, con respeto a las condiciones establecidas, se requerirá a la empresa para que, en los plazos establecidos, proceda a remitir la documentación y certificados necesarios y previos a la adjudicación definitiva y posterior firma del contrato, dejando señalado que la empresa licitadora ya acreditó la solvencia económica y financiera, así como la técnico y profesional al incluir en el sobre 1 los documentos necesarios para ello.

Verificado lo anterior, se procederá a la firma del contrato.

III.- Y en muestra de asistencia y conformidad, los asistentes firman el presente acta en la fecha y lugar señalada en el encabezamiento, siendo las 11:15 horas del mismo día 19 de julio de 2.018.

ANEXO II

MODELO DE PROPOSICIÓN ECONÓMICA

D. Luis Carlos Sanz Fernández con D.N.I. nº.51393941G, y domicilio en Madrid c/Xaudaró, nº 11, en representación de la empresa Fibratel, S.L., con CIF B80444508, en calidad de Administrador Único

E X P O N E

PRIMERO.- Que enterado de las condiciones y requisitos, que acepta y que se exigen para la adjudicación por PROCEDIMIENTO ABIERTO del SERVICIO DE MANTENIMIENTO TI, a cuya realización se compromete en su totalidad con estricta sujeción al Proyecto y Pliegos de Prescripciones Técnicas y de Condiciones Particulares que se define, presenta la siguiente oferta (Excluido IVA):

- **90.000 € (Noventa mil euros)**

SEGUNDO.- Que en la elaboración de la presente oferta han sido tenidas en cuenta las obligaciones medioambientales, las obligaciones de protección del empleo, las condiciones de trabajo incluido el Convenio colectivo sectorial de aplicación, igualdad de oportunidades entre mujeres y hombres, prevención de riesgos laborales y obligaciones tributarias.

TERCERO.- El CONVENIO COLECTIVO SECTORIAL DE APLICACIÓN que aplicará en la ejecución del contrato será el siguiente:
Convenio del metal de la provincia de Sevilla

En Sevilla, a 13 de Julio de 2018

fibratel
CIF.: B80444508

Fdo.: D. Luis Carlos Sanz Fernández
Administrador Único

fibratel

Expediente: 16/18

Sobre 3: Oferta técnica

FIBES, PALACIO DE CONGRESOS Y EXPOSICIONES

Sobre 3: MANTENIMIENTO TOTALIDAD DE EQUIPAMIENTO TI

Versión	Fecha	Autor	Descripción
Rev.1A	26/05/2018	Silvia León	Versión Inicial

ÍNDICE DE CONTENIDOS

1. HERRAMIENTAS Y CERTIFICACIONES

Fibratel posee un gran número de certificaciones y herramientas para ofrecer un mejor servicio a sus clientes.

1.1 Herramienta Ekahau

Fibratel dispone Licencia del software Ekahau para poder realizar Site Survey, para así realizar estudios de cobertura, análisis del espectro.

Ekahau Site Survey Pro 9.1.2.237

This product is licensed to:

Name: FIBRATEL

Company: FIBRATEL

License key: 12C1-02AW-4190-AX7W

License expiration date:

Support expiration date: 2019-03-27

US 7228136, 2005/0136944, US 7196662, US 7209752, 2005/0181804, US 7299059, 2007/0149216, 2007/0149215, PCT/FI2007/050651

1.2 Certificaciones Ingenieros Ekahau

Ekahau Certified Survey Engineer (ECSE)

Wi-Fi Network Design, Deployment and Maintenance

José Manuel Tallado

Ekahau Certified Survey Engineer

Wi-Fi Network Design, Deployment and Maintenance

Juan Francisco Moreda

has taken the ECSE course and passed the exam.

Certification # 1979

May 19, 2017 - Madrid, SP

Date & Place

Ferney Munoz Vergara
Ekahau Certified Trainer

Bicsi
CONTINUING EDUCATION
CREDIT PROVIDER

About ECSE Certification

The ECSE evaluates the knowledge of Wi-Fi technologies when using professional Wi-Fi deployment and maintenance tools such as Ekahau Site Survey (including Wi-Fi planner), Ekahau Spectrum Analyzer and Mobile Survey Android application. The holder of this certification is a proven expert in planning, deploying, and troubleshooting robust, reliable, high performance Wi-Fi networks in any enterprise environment.

ekahau
Wi-Fi Design

Ekahau Certified Survey Engineer (ECSE)

Wi-Fi Network Design, Deployment and Maintenance

David García Sanz

has taken the ECSE course and passed the exam.

Certification # 1143

May 20, 2016 Madrid - Spain
Date & Place

Keith R. Parsons
Ekahau Certified Trainer

Bicsi
CONTINUING EDUCATION
CREDIT PROVIDER

Event ID:
OV-EKHU-OC-0616-1

BICSI CECs Awarded:
13 BICSI CECs

About ECSE Certification

The ECSE evaluates the knowledge of Wi-Fi technologies when using professional Wi-Fi deployment and maintenance tools such as Ekahau Site Survey (including Wi-Fi planner), Ekahau Spectrum Analyzer and Mobile Survey Android application. The holder of this certification is a proven expert in planning, deploying, and troubleshooting robust, reliable, high performance Wi-Fi networks in any enterprise environment.

ekahau
Wi-Fi Design

1.3 Certificaciones Cisco Meraki

A continuación se detallan las certificaciones Cisco Meraki que poseen los trabajadores de Fibratel.

1.3.1 CMNA

Certificación para partner altamente técnica para la configuración y administración de los dispositivos Cisco Meraki.

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

Ruben Hornero

For successfully completing the technical training required to become a

Certified Meraki Networking Associate

Awarded on 6/6/2018

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

David Carrion

For successfully completing the technical training required to become a

Certified Meraki Networking Associate

Awarded on 2/25/2015

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

David Garcia Sanz

For successfully completing the technical training required to become a

Certified Meraki Networking Associate

Awarded on 4/7/2016

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

Silvia León

For successfully completing the technical training required to become a

Certified Meraki Networking Associate

Awarded on 6/6/2018

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

Enrique Relucio

For successfully completing the technical training required to become a

Certified Meraki Networking Associate

Awarded on 10/26/2017

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

1.3.2 CMNO

Certificación para que los operadores de redes se familiaricen con los productos Cisco Meraki.

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

David Rafael García Sanz

for successfully completing the technical training required to become a

Certified Meraki Network Operator

Awarded on March 30, 2018

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

CMNO Number 007364

1.3.3 CMNP

Exclusivo programa de capacitación en laboratorio y certificación que se lleva a cabo en la central de Meraki.

cisco Meraki

WE ARE PLEASED TO RECOGNIZE

David Carrion

For successfully completing the technical training required to become a

Certified Meraki Networking Professional

Awarded on 6/26/2018

TODD NIGHTINGALE
General Manager

PETER ATKIN
Vice-President, Meraki Sales

1.4 Certificaciones CISCO. FIBRATEL

Partner Name	First Name	Last Name	Certification	Certification Description
FIBRATEL, S.L.	VANESSA	ARES ALONSO	PSDCUCAM	Cisco Data Center Unified Computing AM Exam (#650-987)
FIBRATEL, S.L.	VANESSA	ARES ALONSO	CSE-6.0	Cisco Sales Expert 6.0 (#646-206)
FIBRATEL, S.L.	VANESSA	ARES ALONSO	CQS-ASAAMR	Advanced Security Architecture Account Manager Representativ
FIBRATEL, S.L.	VANESSA	ARES ALONSO	ASAAM260	Advanced Security Architecture for AMs 700-260
FIBRATEL, S.L.	VANESSA	ARES ALONSO	CQS-UCTAMR	Unified Computing Technology Account Manager Representative
FIBRATEL, S.L.	VANESSA	ARES ALONSO	PATVSSE	TelePresence Video Sales Specialist for Express Exam
FIBRATEL, S.L.	VANESSA	ARES ALONSO	BE6KAM	Business Edition 6000 for Account Manager (#700-104)
FIBRATEL, S.L.	VANESSA	ARES ALONSO	CQS-ECAM	Express Collaboration Account Manager
FIBRATEL, S.L.	VANESSA	ARES ALONSO	DTBAA440	Adopting the Cisco Business Arch Approach Exam 810-440
FIBRATEL, S.L.	Ignacio	Cereijo Anacabe	CSE-6.0	Cisco Sales Expert 6.0 (#646-206)
FIBRATEL, S.L.	Ventura	De La Torre Garcia	SPCORE887	Implementing Cisco SP Next-Generation Core Network Services
FIBRATEL, S.L.	Ventura	De La Torre Garcia	BCMSN	Building Converged Cisco Multilayer Switched Networks

FIBRATEL, S.L.	Ventura	De La Torre Garcia	LCSE93	Cisco Lifecycle Services Express Exam (650-393)
FIBRATEL, S.L.	Ventura	De La Torre Garcia	IQOS	Implementing Cisco QOS (#642-642)
FIBRATEL, S.L.	Ventura	De La Torre Garcia	ISCW	Implementing Secure Converged Wide Area Networks
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	DCUCD998	Data Center Unified Computing Design Exam 642-998
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	DCSNS357	Designing Cisco Storage Network Solutions Exam 642-357
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	DESGN310	Designing for Cisco Internetwork Solutions exam 200-310
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	IPCEAM	IP Communications Express AM (#646-222)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CSE-3.0	Cisco Sales Expert 3.0 (#646-203)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	4011REC	4011 Recognition
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CCME2	IP Telephony Express (#642-143)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	SSSE	Security Solutions for SEs (#642-565)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	SND	Securing Cisco Network Devices Exam
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	IPCAAM	Advanced IP Communications AM (#646-229)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	SMBENG	Small Business Engineer Exam (#642-176)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	SBCSEN	SBCS for Engineers (#650-178)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	LCSE93	Cisco Lifecycle Services Express Exam (650-393)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	ASAM	Advanced Security for AMs (#646-561)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	EVODD6	IP Telephony Design Exam (#642-414)
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CCDA	CCDA
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CQS-ECSE	Express Collaboration Sales Engineer
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CQS-UCTSER	Unified Computing Technology Systems Engineer Representative
FIBRATEL, S.L.	JUAN CARLOS	GUZMAN HERAS	CH-ECSEV2	Express Collaboration Systems Engineer Representative v2
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCNP-SEC	CCNP - Security Specialized
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CQS-ASAFER	Advanced Security Architecture Field Engineer Representative
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	ROUTE101	Implementing Cisco IP Routing exam 300-101
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	4011REC	4011 Recognition
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	IPS33	Implementing Intrusion Prevention Systems (#642-533)
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCIER101	CCIE Routing and Switching Written Exam 400-101
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	4013REC	4013 Recognition
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCNA-SEC	CCNA Security
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CH-ECSEV2	Express Collaboration Systems Engineer Representative v2
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCDP	CCDP
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCDA	CCDA
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	SVPN4	Cisco Secure VPN (#642-511 CSVPN)
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	BSCI2	Building Scalable Cisco Internetworks (#642-801-BSCI)
FIBRATEL, S.L.	Francisco Javier	Gomez Gomez	CCNP	CCNP Routing and Switching
FIBRATEL, S.L.	Antonio	Gonzalez Castilla	AWLANFE	Advanced Wireless for Field Engineers (#642-587)
FIBRATEL, S.L.	Antonio	Gonzalez Castilla	IUWMS747	Implementing Cisco Unified Wireless Mobility Svcs 642-747
FIBRATEL, S.L.	Antonio	Gonzalez Castilla	IAUWS737	Implementing Adv Cisco Unified Wireless Security 642-737
FIBRATEL, S.L.	Jose	Ibanez	DCUFI	Implementing Cisco Data Center Unified Fabric Exam 642-997
FIBRATEL, S.L.	Jose	Ibanez	CCME2	IP Telephony Express (#642-143)

FIBRATEL, S.L.	Jose	Ibanez	LCSEXP92	Cisco Lifecycle Services Express Exam (#646-392)
FIBRATEL, S.L.	Jose	Ibanez	CQS-UCTFER	Unified Computing Technology Field Engineer Representative
FIBRATEL, S.L.	Jose	Ibanez	CCME3	IP Telephony Express (642-144)
FIBRATEL, S.L.	Jose	Ibanez	LCSE93	Cisco Lifecycle Services Express Exam (650-393)
FIBRATEL, S.L.	Jose	Ibanez	DCUCI999	Implementing Cisco DC Unified Computing Exam 642-999
FIBRATEL, S.L.	Jose	Ibanez	CXFF	Express Foundation for FEs (#642-382)
FIBRATEL, S.L.	Jose	Loira montes	ABNASEE	Advanced Borderless Network Architecture SE Exam
FIBRATEL, S.L.	Jose	Loira montes	AWLANSE	Advanced Wireless LAN for System Engineers (#642-586)
FIBRATEL, S.L.	Jose	Loira montes	LCSAWLAN21	Cisco Lifecycle Services AWLAN (650-621)
FIBRATEL, S.L.	Fernando	Manzano Santin	DTBAA440	Adopting the Cisco Business Arch Approach Exam 810-440
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	TSHOOT135	Troubleshooting and Maintaining Cisco Networks exam 300-135
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	SWITCH115	Implementing Cisco IP Switched Networks exam 300-115
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCNA-SEC	CCNA Security
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCIER101	CCIE Routing and Switching Written Exam 400-101
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CQS-ASASER	Advanced Security Architecture System Engineer Representatve
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCDA	CCDA
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCDP	CCDP
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CQS-ENASER	Enterprise Networks Architecture System Engineer Represntatv
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CQS-CWSER	Core and WAN Systems Engineer Representative
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	WIDSN360	Designing Cisco Wireless Enterprise Networks Exam 300-360
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	ARCH320	Designing Cisco Network Service Architectures exam 300-320
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	DESGN310	Designing for Cisco Internetwork Solutions exam 200-310
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	ENCWE	ENCWE Exam 500-452
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCNP	CCNP Routing and Switching
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	ASASE265	Advanced Security Architecture for SEs 500-265
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	4011REC	4011 Recognition
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CQS-ASAFER	Advanced Security Architecture Field Engineer Representative
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CH-CUAR	Cisco Unified Access Representative
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	ENUAE	ENUAE Exam 500-451
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	CCNA-WL	CCNA Wireless
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	IINS260	Implementing Cisco Network Security Exam 210-260
FIBRATEL, S.L.	Juan Francisco	Moreda Hernandez	ROUTE101	Implementing Cisco IP Routing exam 300-101
FIBRATEL, S.L.	Raul	Moreno Vicente	CQS-AVAMR	Advanced Video Account Manager Representative
FIBRATEL, S.L.	Raul	Moreno Vicente	VSSR01	Cisco Video Solution Sales Representative Exam 700-001
FIBRATEL, S.L.	Raul	Moreno Vicente	CQS-EVAMR	Express Video Account Manager Representative
FIBRATEL, S.L.	Jose manuel	Rodriguez	CIPT1	Implementing Cisco Unified Communications Manager, Part 1
FIBRATEL, S.L.	Jose manuel	Rodriguez	CQS-CCSR1	Cisco Collaboration Field Engineer Representative 1
FIBRATEL, S.L.	Jose manuel	Rodriguez	CVOICEV8	Implementing Cisco Voice Communications and QoS v8.0
FIBRATEL, S.L.	Jose manuel	Rodriguez	UCCX051	Cisco IP Contact Center Express Specialist Exam 500-051
FIBRATEL, S.L.	Jose manuel	Rodriguez	ICOMM	Administering Cisco Voice & Unified Communications
FIBRATEL, S.L.	Jose manuel	Rodriguez	PATVFEA	TelePresence Video Field Engineer for Advanced Exam
FIBRATEL, S.L.	Jose manuel	Rodriguez	PATVSSP	TelePresence Video Sales Engineer for Advanced Exam

FIBRATEL, S.L.	Jose manuel	Rodriguez	CQS-IPCCER	Cisco IP Contact Center Express Representative
FIBRATEL, S.L.	Jose manuel	Rodriguez	CH-UCUCR	Cisco Unified Communications on UCS Representative
FIBRATEL, S.L.	Jose manuel	Rodriguez	UCUCS244	Cisco Unified Communications on UCS Exam 648-244
FIBRATEL, S.L.	Jose manuel	Rodriguez	PSACAFE038	Collaboration Architecture FE Exam 700-038
FIBRATEL, S.L.	Jose manuel	Rodriguez	CH-CVR	Cisco Video Representative
FIBRATEL, S.L.	Jose manuel	Rodriguez	CH-ECSEV2	Express Collaboration Systems Engineer Representative v2
FIBRATEL, S.L.	Jose manuel	Rodriguez	VIVND	Implementing Cisco Video Network Devices Exam 200-001
FIBRATEL, S.L.	Jose manuel	Rodriguez	CQS-ECSE	Express Collaboration Sales Engineer
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CH-WSDIR	Cisco Webex Solutn Design and Implementation Representative
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CTCOLLAB80	Troubleshooting Cisco IP Telephony & Video Exam 300-080
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CQS-ECSE	Express Collaboration Sales Engineer
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CH-ECSEV2	Express Collaboration Systems Engineer Representative v2
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CIVND065	Implementing Cisco Video Network Devices Exam 210-065
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CQS-CVNS	Cisco Video Network Specialist
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CCNP-COLLA	CCNP Collaboration
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CAPPS085	Implementing Cisco Collaboration Application Exam 300-085
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CH-CVR	Cisco Video Representative
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CIPTV2075	Implementing Cisco IP Telephony & Video, Part 2 Exam 300-075
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CCNA-COLLA	CCNA Collaboration
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CIPTV1	Implementing Cisco IP TV Exam 300-070
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CICD	Implementing Cisco Video Network Devices Exam 210-060
FIBRATEL, S.L.	SERGIO	VAZQUEZ	CWSDI232	WebEx Solutions Design and Implementation 648-232
FIBRATEL, S.L.	david	tomas zarzo	CSE-4.0	Cisco Sales Expert 4.0 (#646-204)
FIBRATEL, S.L.	Carlos	Castillo Lopez	CSE-5.0	Cisco Sales Expert 5.0 (#646-205)
FIBRATEL, S.L.	Carlos	Castillo Lopez	SBO-403	Selling Business Outcomes Exam 810-403
FIBRATEL, S.L.	Carlos	Castillo Lopez	PSACAS037	Collaboration Architecture Sales Exam 700-037
FIBRATEL, S.L.	Carlos	Castillo Lopez	CQS-CCSSR	Cisco Collaboration Account Manager Representative
FIBRATEL, S.L.	David Rafael	Garcia Sanz	CCNP	CCNP Routing and Switching
FIBRATEL, S.L.	David Rafael	Garcia Sanz	ROUTE101	Implementing Cisco IP Routing exam 300-101
FIBRATEL, S.L.	David Rafael	Garcia Sanz	WIDSN360	Designing Cisco Wireless Enterprise Networks Exam 300-360
FIBRATEL, S.L.	David Rafael	Garcia Sanz	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	David Rafael	Garcia Sanz	TSHOOT135	Troubleshooting and Maintaining Cisco Networks exam 300-135
FIBRATEL, S.L.	David Rafael	Garcia Sanz	CCNA-WL	CCNA Wireless
FIBRATEL, S.L.	David	Carrion Macias	CQS-CCADR	Collaboration Architecture Systems Engineer Representative
FIBRATEL, S.L.	David	Carrion Macias	CQS-SMDBE	Small and Midsize Business Engineer
FIBRATEL, S.L.	David	Carrion Macias	SMBEN501	SMB Solutions for Engineers 700-501
FIBRATEL, S.L.	David	Carrion Macias	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	David	Carrion Macias	CCDA	CCDA
FIBRATEL, S.L.	David	Carrion Macias	SMBENG	Small Business Engineer Exam (#642-176)
FIBRATEL, S.L.	David	Carrion Macias	SBCSEN	SBCS for Engineers (#650-178)
FIBRATEL, S.L.	David	Carrion Macias	CSA-1-0	Cisco Sales Associate 1.0 (#646-151)
FIBRATEL, S.L.	David	Carrion Macias	ROUTE101	Implementing Cisco IP Routing exam 300-101
FIBRATEL, S.L.	David	Carrion Macias	PSACASE039	Collaboration Architecture SE Exam 700-039

FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	TSHOOT135	Troubleshooting and Maintaining Cisco Networks exam 300-135
FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	CCNA-WL	CCNA Wireless
FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	CCNP	CCNP Routing and Switching
FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	SWITCH115	Implementing Cisco IP Switched Networks exam 300-115
FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	CCNA	CCNA Routing and Switching
FIBRATEL, S.L.	Jose Manuel	Tellado Orcoyen	ROUTE101	Implementing Cisco IP Routing exam 300-101

1.5 ISO 20000

La ISO/IEC 20000 es el estándar reconocido internacionalmente en gestión de servicio TI.

Certificate ES12/13156

The management system of

FIBRATEL, S.L.

C/ Xaudaro, 11 Madrid

has been assessed and certified as meeting the requirements of

ISO/IEC 20000-1:2011

For the following activities

The IT service management system of Fibratel, which supports the maintenance of telecommunication solutions according to current service catalogue, from Madrid and Seville sites to national and international customers.

Sistema de gestión de servicios TI de Fibratel que presta apoyo al servicio de mantenimiento de soluciones de telecomunicaciones de acuerdo al catálogo de servicios vigente, desde las sedes de Madrid y Sevilla a sus clientes de ámbito nacional e internacional.

Further clarifications regarding the scope of this certificate and the applicability of ISO/IEC 20000-1:2011 requirements may be obtained by consulting the organization

From the following sites:
c/ Xaudaro, 11 Madrid. España
C/ Renio, 19 Sevilla. España

This certificate is valid from 7 December 2012 until 7 December 2015
and remains valid subject to satisfactory surveillance audits
Re certification audit due before 22 November 2012
Issue 1. Certified since 7 December 2012

Authorized by

Álvaro Rodríguez de Rivs
Director de Seguridad de la Información y
Gobierno TI SGS ICS
SGS ICS Ibérica, S.A.
C/ Trespaderne 29,
28042 Madrid. España

Page 1 of 1

1.6 ISO 14001

Certificado nº ES04/0896/MA

El sistema de gestión de

FIBRATEL, S.L.

C/ Xauderó, 11
28034 Madrid

ha sido evaluado y certificado en cuanto al cumplimiento de los requisitos de

ISO 14001:2004

Para las siguientes actividades

- ✓ **Diseño, instalación y servicio posventa de sistemas de cableado de voz, datos, imagen y redes informáticas.**
- ✓ **Instalación y servicio posventa de: Centrales telefónicas, Equipos de Red y Sistemas Operativos de Comunicaciones.**

realizadas en/desde los siguientes emplazamientos

C/ Xauderó, 11 28034 Madrid

Este certificado es válido desde
21 de noviembre de 2010 hasta 21 de noviembre de 2013
Edición 4. Certificado con SGS desde octubre de 2004.

Autorizado por

J. Moya
Director de Certificación

SGS ICS Ibérica, S.A. Systems & Services Certification
C/Trespaderne, 29. 28042 Madrid. España.
t 34 91 313 8115 f 34 91 313 8102 www.sgs.com

1.7 Fluke calibrado equipos medida F.O y cobre

Es fundamental realizar calibraciones de los equipos de medida, para tener seguridad de que los resultados que proporcionan dichos equipos son correctos, para así asegurar la calidad de la red.

Todas las certificaciones de calibrado de equipos tanto de fibra óptica como de cobre se presentan en el Anexo I.

ANEXO I: CERTIFICACIONES FLUKE

LABORATORIO DE CALIBRACIÓN

CERTIFICADO DE CALIBRACIÓN

Certificate of Calibration

Número: EL173126
Number

AFC INGENIEROS S.A.
LABORATORIO DE CALIBRACIÓN

Paseo Imperial nº 6- 2º D/1 28005 MADRID
Tel: 91 365 44 05 Fax Nº 91 365 44 04
e-mail: afc@afc-ingenieros.com
http://www.afc-ingenieros.com

INSTRUMENTO: *Instrument*	ANALIZADOR DE CABLES
FABRICANTE: *Manufacturer*	FLUKE
MODELO: *Model*	DTX-1800
IDENTIFICACIÓN: *Identification*	E-019 (9109001)
PETICIONARIO: *Customer*	FIBRATEL, S.L. C/ Xaudaró, 11 28034 MADRID
FECHA/S DE CALIBRACIÓN: *Date/s of calibration*	18/12/17

Signatario/s Autorizado/s
Autorized signatory/ies

Fecha de emisión: 18/12/17
Date of issue

Realizado por: Rachid Serroukh El Yemlahi

Jefe del Laboratorio

Técnico de Calibración

INSTRUMENTO OBJETO DE LA CALIBRACIÓN:

DENOMINACIÓN:	ANALIZADOR DE CABLES
MARCA:	FLUKE
MODELO:	DTX-1800
IDENTIFICACION:	E-019 (9109001)

MEDIOS EMPLEADOS EN LA CALIBRACIÓN:

- OSCILADOR AFCINV0631 Nº Certificado: ROA-010/17
- CONTADOR AFCINV0231 Nº Certificado: 12809
- DÉCADAS DE RESISTENCIAS AFCINV0632 Nº Certificado: ESTEM-MAD-CI-17018004

MEDIOS AUXILIARES EMPLEADOS EN LA CALIBRACIÓN:

- ANALIZADOR REMOTO FLUKE DTX-1800 Nº de serie: 9109002
- CABLE CARACTERIZADO CAT-6A

CONDICIONES AMBIENTALES:

Las condiciones ambientales del Laboratorio durante la calibración, fueron:

TEMPERATURA = 23 ºC ± 2 ºC

HUMEDAD RELATIVA < 70 %

PROCEDIMIENTO DE CALIBRACIÓN:

La calibración ha sido realizada con los patrones mencionados y el procedimiento específico de calibración el indicado en su manual de fabricante.

TRAZABILIDAD:

En cumplimiento de los requisitos de la Norma ISO 9001 los patrones de Referencia utilizados en la calibración, tienen certificado de calibración emitidos por Laboratorios de Calibración Nacionales e internacionales debidamente acreditados.

RESULTADOS:

Los resultados obtenidos son los que aparecen en el presente certificado y están realizados de acuerdo con los procedimientos anteriormente citados.

1.- LONGITUD DEL CABLE

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR NOMINAL		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
79,15	m	1 - 2	77,8	-1,4	1,2E-01	1,9	Si
85,32	m	3 - 6	84,0	-1,3	1,2E-01	2,1	Si
83,96	m	4 - 5	82,7	-1,3	1,2E-01	2,0	Si
81,22	m	7 - 8	80,3	-0,9	1,2E-01	2,0	Si

2.- MEDIDA DE RESISTENCIA

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR APLICADO		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
0,00	Ω	1 - 2	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,2	0,2	6,2E-02	2,2	Si
20,00	Ω		20,2	0,2	6,2E-02	2,4	Si
50,00	Ω		50,3	0,3	6,4E-02	3,0	Si
100,00	Ω		100,3	0,3	6,5E-02	4,0	Si
0,00	Ω	3 - 6	0,4	0,4	5,8E-02	2,0	Si
10,00	Ω		10,3	0,3	6,2E-02	2,2	Si
20,00	Ω		20,4	0,4	6,2E-02	2,4	Si
50,00	Ω		50,3	0,3	6,4E-02	3,0	Si
100,00	Ω		100,4	0,4	6,5E-02	4,0	Si
0,00	Ω	4 - 5	0,3	0,3	5,8E-02	2,0	Si
10,00	Ω		10,4	0,4	6,2E-02	2,2	Si
20,00	Ω		20,3	0,3	6,2E-02	2,4	Si
50,00	Ω		50,3	0,3	6,4E-02	3,0	Si
100,00	Ω		100,5	0,5	6,5E-02	4,0	Si
0,00	Ω	7 - 8	0,3	0,3	5,8E-02	2,0	Si
10,00	Ω		10,3	0,3	6,2E-02	2,2	Si
20,00	Ω		20,2	0,2	6,2E-02	2,4	Si
50,00	Ω		50,4	0,4	6,4E-02	3,0	Si
100,00	Ω		100,4	0,4	6,5E-02	4,0	Si

3.- COMPROBACIÓN DEL TIEMPO DE PROPAGACIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	376 ns	- - -	498 ns	Si
3 - 6	406 ns	- - -	498 ns	Si
4 - 5	400 ns	- - -	498 ns	Si
7 - 8	388 ns	- - -	498 ns	Si

4.- COMPROBACIÓN DE LA DIFERENCIA DE RETARDO

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	8 ns	- - -	44 ns	Si
3 - 6	30 ns	- - -	44 ns	Si
4 - 5	24 ns	- - -	44 ns	Si
7 - 8	12 ns	- - -	44 ns	Si

5.- COMPROBACIÓN DE LAS PÉRDIDAS DE INSERCIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	FRECUENCIA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	25,9 dB	250 MHz	43,8 dB	Si
3 - 6	27,2 dB	250 MHz	43,8 dB	Si
4 - 5	29,6 dB	250 MHz	43,8 dB	Si
7 - 8	28,8 dB	250 MHz	43,8 dB	Si

6.- COMPROBACIONES EFECTUADAS

MAPA DE CABLEADO	CORRECTO
NEXT	CORRECTO
PS NEXT	CORRECTO
ACR-N	CORRECTO
PS ACR-N	CORRECTO
ACR-F	CORRECTO
PS ACR-F	CORRECTO

La incertidumbre expandida de medida se ha obtenido multiplicando la incertidumbre típica de medición por el factor de cobertura k=2 que, para una distribución normal, corresponde a una probabilidad de cobertura de aproximadamente el 95%. La incertidumbre típica de medida se ha determinado conforme al documento EA-4/02 M: 2013.

OBSERVACIONES:

El equipo queda dentro de las especificaciones dadas por el fabricante en las magnitudes en las que se indica.

LABORATORIO DE CALIBRACIÓN

CERTIFICADO DE CALIBRACIÓN

Certificate of Calibration

Número: EL172567
Number

AFC INGENIEROS S.A.
LABORATORIO DE CALIBRACIÓN

Paseo Imperial nº 6- 2º D/1 28005 MADRID
Tel: 91 365 44 05 Fax Nº 91 365 44 04
e-mail: afc@afc-ingenieros.com
http://www.afc-ingenieros.com

INSTRUMENTO: *Instrument*	ANALIZADOR DE CABLES
FABRICANTE: *Manufacturer*	FLUKE
MODELO: *Model*	DTX-1800
IDENTIFICACIÓN: *Identification*	E-021 (9375061)
PETICIONARIO: *Customer*	FIBRATEL CATALUNYA, S.L. C/ Buenos Aires, 12-14 08902 L'Hospitalet de Llobregat BARCELONA
FECHA/S DE CALIBRACIÓN: *Date/s of calibration*	11/10/17

Signatario/s Autorizado/s
Autorized signatory/ies

Fecha de emisión: 13/10/17
Date of issue

Firmado digitalmente por Jose Maria Gomez Nogales
Fecha: 2017.10.13 14:48:51 +02'00'

Jefe del Laboratorio

Realizado por: Rachid Serroukh El Yemlahi

Técnico de Calibración

INSTRUMENTO OBJETO DE LA CALIBRACIÓN:

DENOMINACIÓN:	ANALIZADOR DE CABLES
MARCA:	FLUKE
MODELO:	DTX-1800
IDENTIFICACION:	E-021 (9375061)

MEDIOS EMPLEADOS EN LA CALIBRACIÓN:

- OSCILADOR AFCINV0631 Nº Certificado: ROA-010/17
- CONTADOR AFCINV0231 Nº Certificado: 12809
- DÉCADAS DE RESISTENCIAS AFCINV0632 Nº Certificado: 98338

MEDIOS AUXILIARES EMPLEADOS EN LA CALIBRACIÓN:

- ANALIZADOR REMOTO FLUKE DTX-1800 Nº de serie: 9375062
- CABLE CARACTERIZADO CATEGORIA 6A

CONDICIONES AMBIENTALES:

Las condiciones ambientales del Laboratorio durante la calibración, fueron:

TEMPERATURA = 23 ºC ± 2 ºC

HUMEDAD RELATIVA < 70 %

PROCEDIMIENTO DE CALIBRACIÓN:

La calibración ha sido realizada con los patrones mencionados y el procedimiento específico de calibración el indicado en su manual de fabricante.

TRAZABILIDAD:

En cumplimiento de los requisitos de la Norma ISO 9001 los patrones de Referencia utilizados en la calibración, tienen certificado de calibración emitidos por Laboratorios de Calibración Nacionales e internacionales debidamente acreditados.

RESULTADOS:

Los resultados obtenidos son los que aparecen en el presente certificado y están realizados de acuerdo con los procedimientos anteriormente citados.

1.- LONGITUD DEL CABLE

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR NOMINAL		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
79,15	m	1 - 2	78,1	-1,1	1,2E-01	1,9	Si
85,32	m	3 - 6	84,1	-1,2	1,2E-01	2,1	Si
83,96	m	4 - 5	82,8	-1,2	1,2E-01	2,0	Si
81,22	m	7 - 8	80,1	-1,1	1,2E-01	2,0	Si

2.- MEDIDA DE RESISTENCIA

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR APLICADO		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
0,00	Ω	1 - 2	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,0	0,0	6,2E-02	2,2	Si
20,00	Ω		20,1	0,1	6,2E-02	2,4	Si
50,00	Ω		50,2	0,2	6,4E-02	3,0	Si
100,00	Ω		100,1	0,1	6,5E-02	4,0	Si
0,00	Ω	3 - 6	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,1	0,1	6,2E-02	2,2	Si
20,00	Ω		20,1	0,1	6,2E-02	2,4	Si
50,00	Ω		50,1	0,1	6,4E-02	3,0	Si
100,00	Ω		100,1	0,1	6,5E-02	4,0	Si
0,00	Ω	4 - 5	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,1	0,1	6,2E-02	2,2	Si
20,00	Ω		20,1	0,1	6,2E-02	2,4	Si
50,00	Ω		50,1	0,1	6,4E-02	3,0	Si
100,00	Ω		100,2	0,2	6,5E-02	4,0	Si
0,00	Ω	7 - 8	0,1	0,1	5,8E-02	2,0	Si
10,00	Ω		10,1	0,1	6,2E-02	2,2	Si
20,00	Ω		20,2	0,2	6,2E-02	2,4	Si
50,00	Ω		50,1	0,1	6,4E-02	3,0	Si
100,00	Ω		100,2	0,2	6,5E-02	4,0	Si

3.- COMPROBACIÓN DEL TIEMPO DE PROPAGACIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	387 ns	- - -	555 ns	Si
3 - 6	416 ns	- - -	555 ns	Si
4 - 5	409 ns	- - -	555 ns	Si
7 - 8	396 ns	- - -	555 ns	Si

4.- COMPROBACIÓN DE LA DIFERENCIA DE RETARDO

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	0 ns	- - -	50 ns	Si
3 - 6	29 ns	- - -	50 ns	Si
4 - 5	22 ns	- - -	50 ns	Si
7 - 8	9 ns	- - -	50 ns	Si

5.- COMPROBACIÓN DE LAS PÉRDIDAS DE INSERCIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	FRECUENCIA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	21,5 dB	250 MHz	36,0 dB	Si
3 - 6	24,2 dB	250 MHz	36,0 dB	Si
4 - 5	23,0 dB	250 MHz	36,0 dB	Si
7 - 8	21,9 dB	250 MHz	36,0 dB	Si

6.- COMPROBACIONES EFECTUADAS

MAPA DE CABLEADO	CORRECTO
NEXT	CORRECTO
PS NEXT	CORRECTO
ACR-N	CORRECTO
PS ACR-N	CORRECTO
ACR-F	CORRECTO
PS ACR-F	CORRECTO
AUTODIAGNÓSTICO	CORRECTO

La incertidumbre expandida de medida se ha obtenido multiplicando la incertidumbre típica de medición por el factor de cobertura k=2 que, para una distribución normal, corresponde a una probabilidad de cobertura de aproximadamente el 95%. La incertidumbre típica de medida se ha determinado conforme al documento EA-4/02 M: 2013.

OBSERVACIONES:

El equipo queda dentro de las especificaciones dadas por el fabricante en las magnitudes en las que se indica.

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1972227**

Instrument	Description	1 GHZ DSX CABLE ANALYZER
	Manufacturer	FLUKE NETWORKS
	Model	DSX-5000 INTL
	Serial Number	3691156
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 5.	

Date of Calibration	08 Nov 2017
Date of Recalibration	08 Nov 2018
Place of Calibration	Son
Tested by	R. Kalidien

Issue date: 08 Nov 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1972227**

Remarks

- The data type found in this certificate on the top of each page must be interpreted as:

As-Found	: Calibration data collected before the unit is adjusted and / or repaired
As-Left	: Calibration data collected after the unit has been adjusted and / or repaired
Found-Left	: Calibration data collected without any adjustment and / or repair performed

- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
DSX-CALVERST//FLKN	E000060	WP2389	26 Sep 2018	EVL384285

FLUKE networks

DSX Cable Analyzer

As-Found Report

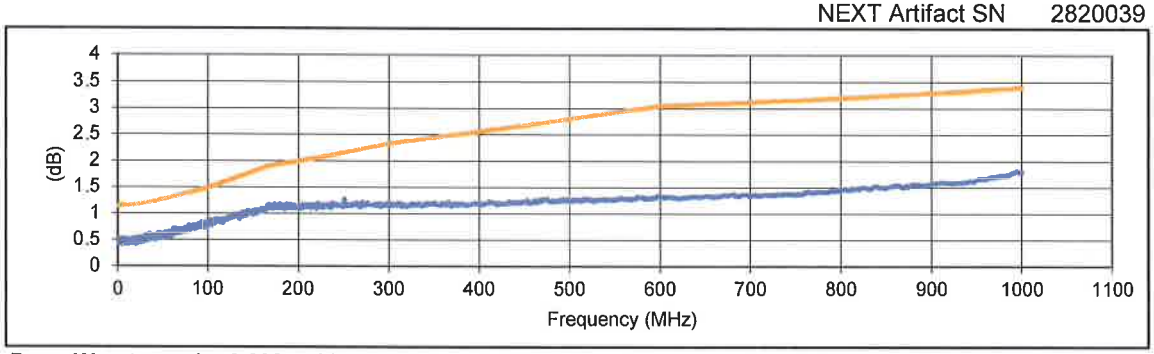
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691156**

Test date 8-Nov-17

NEXT

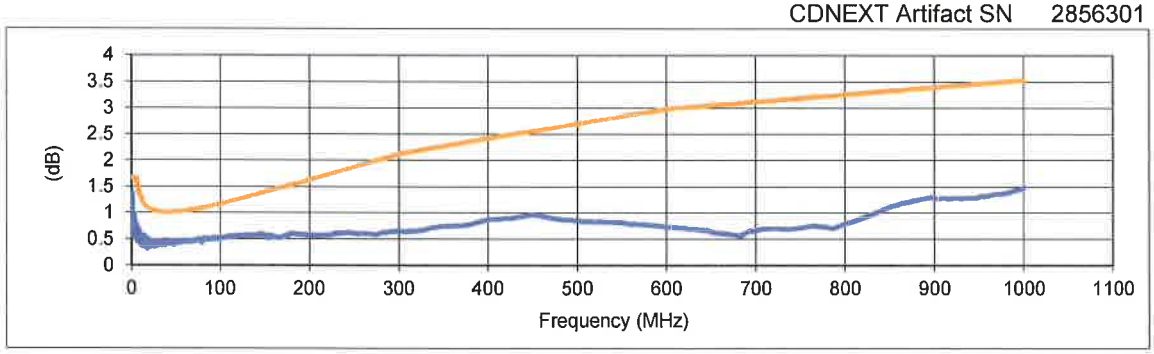
NEXT Artifact SN 2820039



Pass Worst margin: 0.600 at 36.25 MHz in pair 36-45. Worst accuracy at each frequency shown.

CDNEXT

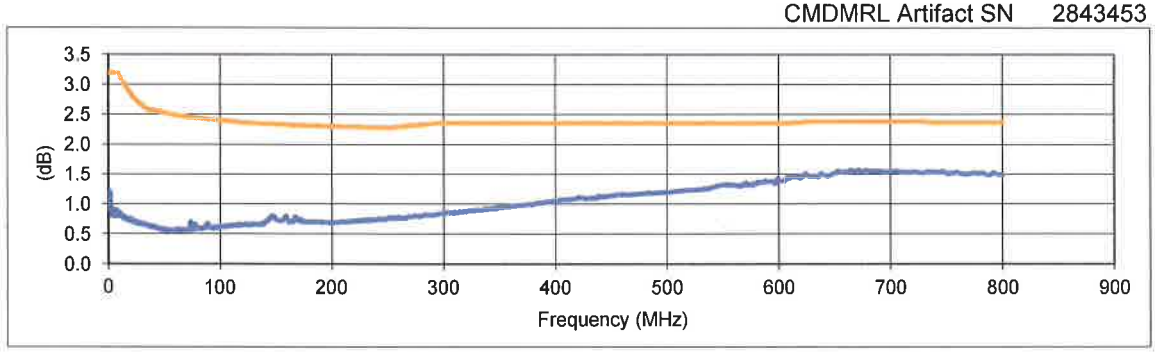
CDNEXT Artifact SN 2856301



Pass Worst margin: 0.280 at 1.13 MHz in pair 45-78. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2843453



Pass Worst margin: 0.810 at 664 MHz in pair 36. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

As-Found Report

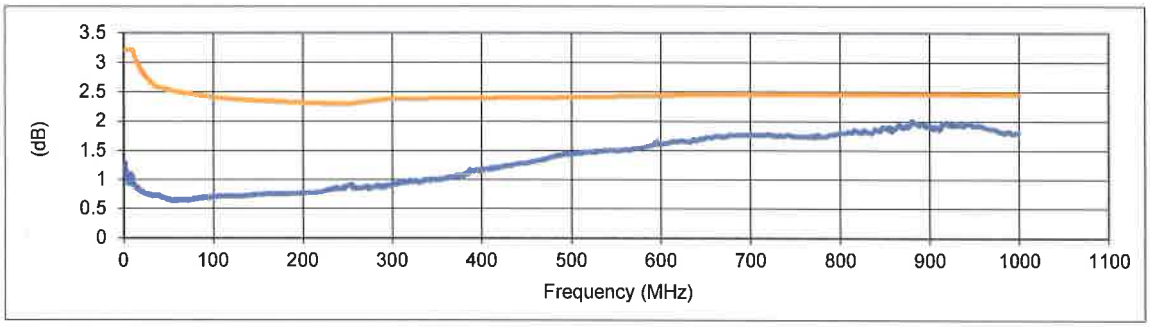
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691156**

Test date 8-Nov-17

RL

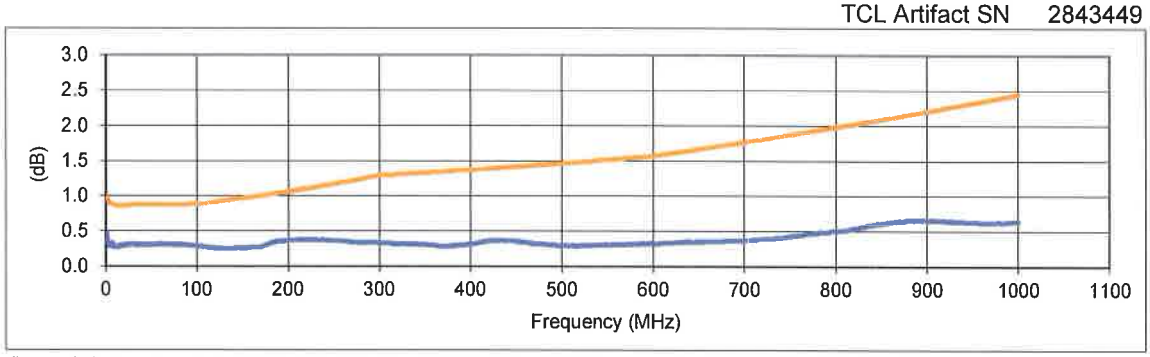
CMDMRL Artifact SN 2843453



Pass Worst margin: 0.450 at 880 MHz in pair 12. Worst accuracy at each frequency shown.

TCL

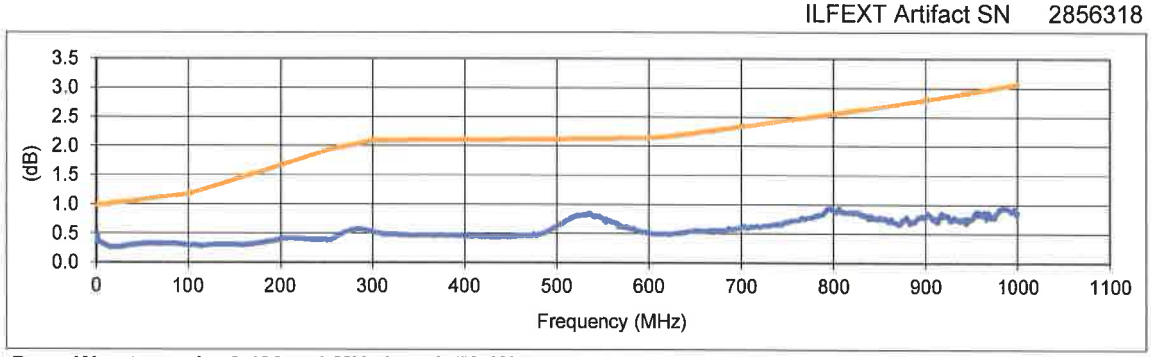
TCL Artifact SN 2843449



Pass Worst margin: 0.500 at 1 MHz in pair 12. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2856318



Pass Worst margin: 0.490 at 1 MHz in pair 78. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

As-Found Report

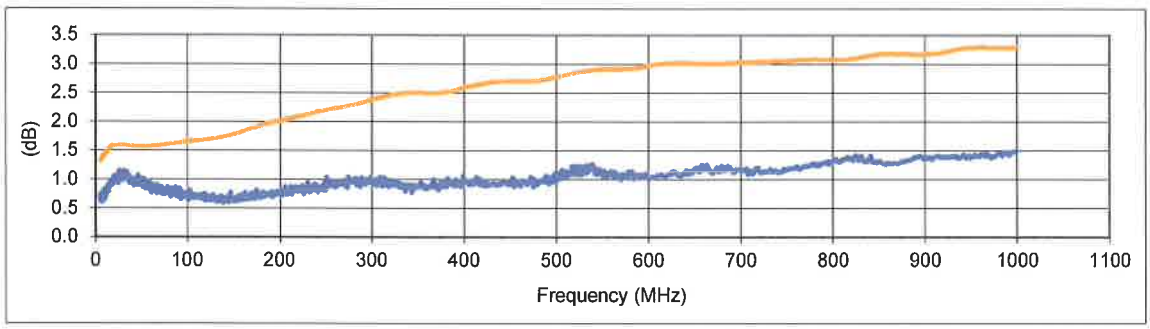
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691156**

Test date 8-Nov-17

FEXT

ILFEXT Artifact SN 2856318



Pass Worst margin: 0.450 at 25.38 MHz in pair 78-36. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860459

	Measured	Expected	Limit	
Resistance on pair 12	0.23	0.00	0.80	Pass
Resistance on pair 36	50.02	49.80	0.60	Pass
Resistance on pair 45	100.02	99.80	1.60	Pass
Resistance on pair 78	453.03	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860571

	Measured	Expected	Limit	
Resistance on pair 12	0.23	0.00	0.80	Pass
Resistance on pair 36	25.07	24.90	0.90	Pass
Resistance on pair 45	12.33	12.13	0.90	Pass
Resistance on pair 78	24.28	24.05	0.90	Pass
Resistance imbalance on pair 12	0.01	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL

Not applicable

M FEXT

Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1972230**

Instrument	Description	1 GHZ DSX CABLE ANALYZER
	Manufacturer	FLUKE NETWORKS
	Model	DSX-5000 INTL
	Serial Number	3691140
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 5.	

Date of Calibration	08 Nov 2017
Date of Recalibration	08 Nov 2018
Place of Calibration	Son
Tested by	R. Kalidien

Issue date: 08 Nov 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

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FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1972230**

Remarks

- The data type found in this certificate on the top of each page must be interpreted as:

As-Found	: Calibration data collected before the unit is adjusted and / or repaired
As-Left	: Calibration data collected after the unit has been adjusted and / or repaired
Found-Left	: Calibration data collected without any adjustment and / or repair performed

- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
DSX-CALVERST//FLKN	E000060	WP2389	26 Sep 2018	EVL384285

FLUKE networks

DSX Cable Analyzer

As-Found Report

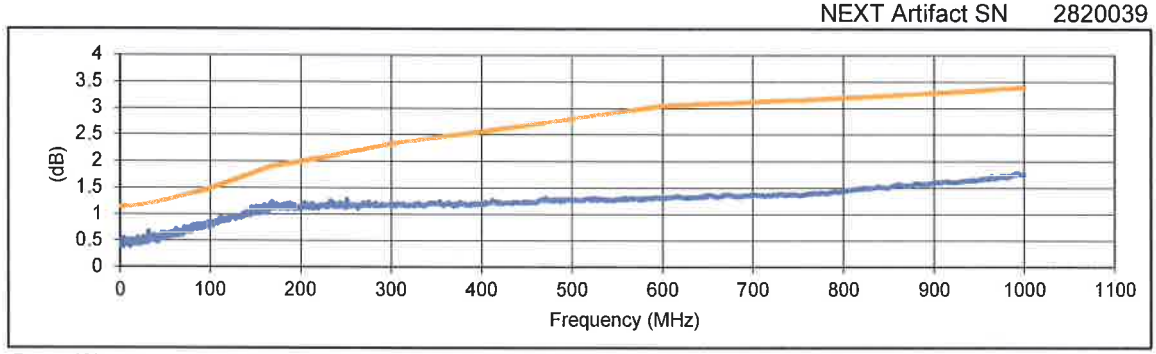
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691140**

Test date 8-Nov-17

NEXT

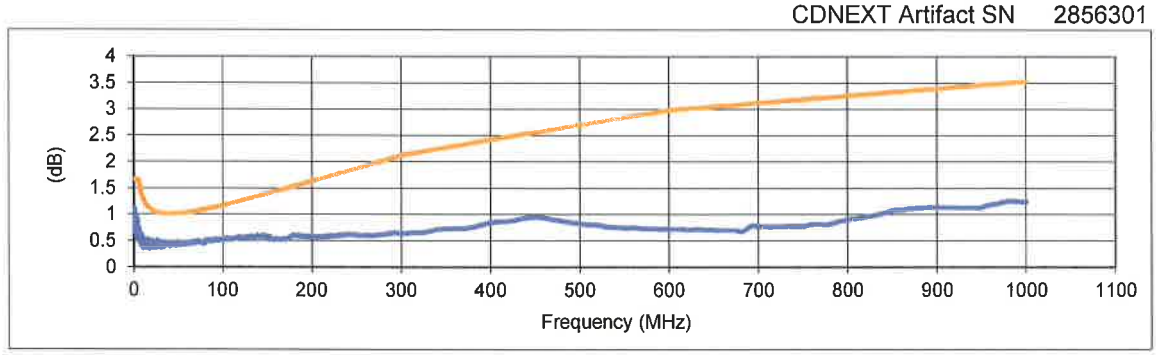
NEXT Artifact SN 2820039



Pass Worst margin: 0.530 at 31.5 MHz in pair 36-78. Worst accuracy at each frequency shown.

CDNEXT

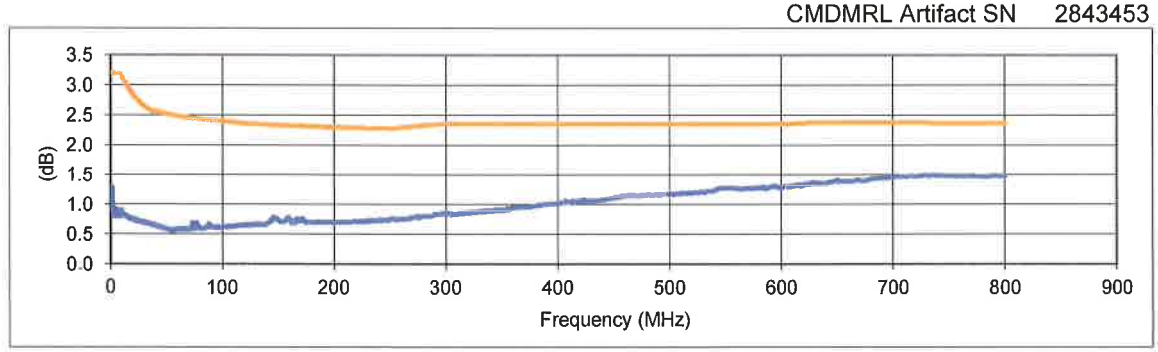
CDNEXT Artifact SN 2856301



Pass Worst margin: 0.530 at 27.13 MHz in pair 36-12. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2843453



Pass Worst margin: 0.880 at 734 MHz in pair 78. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

As-Found Report

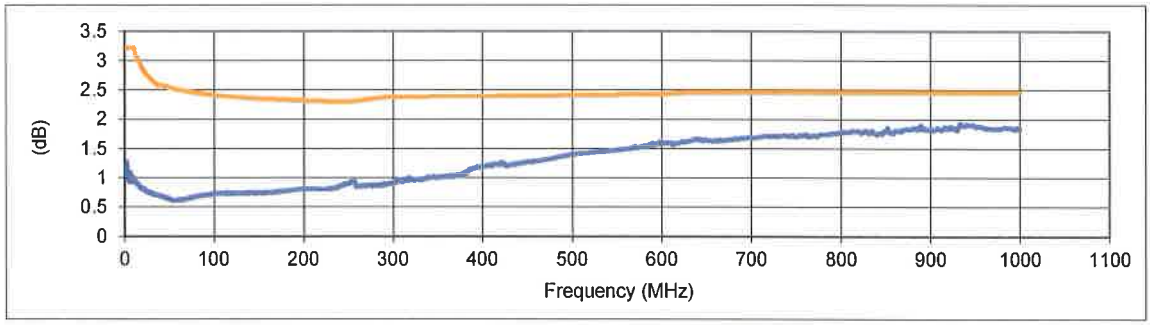
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691140**

Test date 8-Nov-17

RL

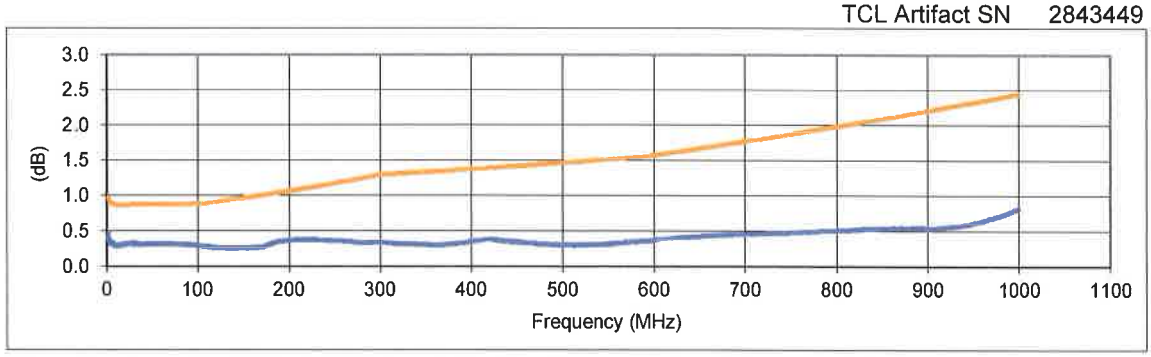
CMDMRL Artifact SN 2843453



Pass Worst margin: 0.530 at 933 MHz in pair 45. Worst accuracy at each frequency shown.

TCL

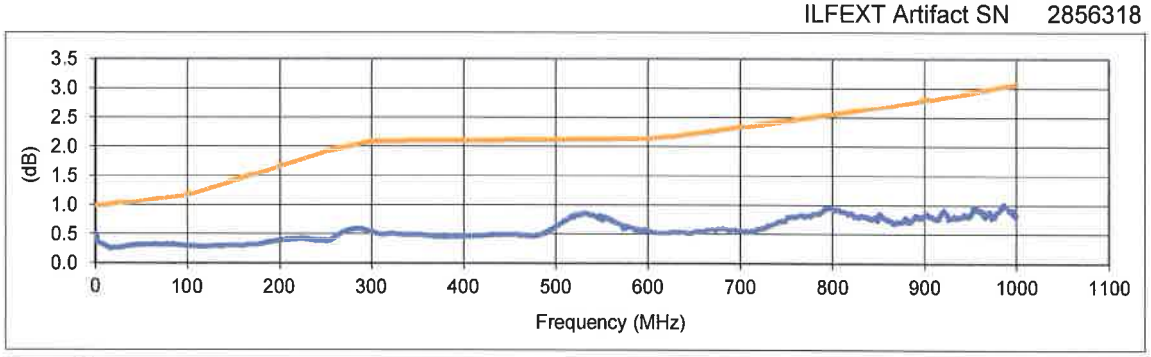
TCL Artifact SN 2843449



Pass Worst margin: 0.490 at 1 MHz in pair 12. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2856318



Pass Worst margin: 0.490 at 1 MHz in pair 36. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks. **DSX Cable Analyzer**

As-Found Report

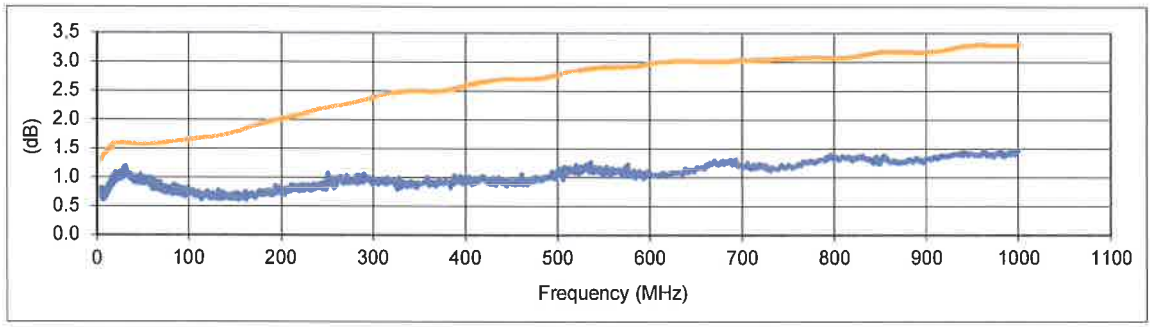
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3691140**

Test date 8-Nov-17

FEXT

ILFEXT Artifact SN 2856318



Pass Worst margin: 0.430 at 32 MHz in pair 12-78. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860459

	Measured	Expected	Limit	
Resistance on pair 12	0.19	0.00	0.80	Pass
Resistance on pair 36	50.05	49.80	0.60	Pass
Resistance on pair 45	100.02	99.80	1.60	Pass
Resistance on pair 78	452.99	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860571

	Measured	Expected	Limit	
Resistance on pair 12	0.16	0.00	0.80	Pass
Resistance on pair 36	25.10	24.90	0.90	Pass
Resistance on pair 45	12.29	12.13	0.90	Pass
Resistance on pair 78	24.25	24.05	0.90	Pass
Resistance imbalance on pair 12	0.01	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL

Not applicable

M FEXT

Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Tektronix® FLUKE®

Verification statement

Data Type: FOUND-LEFT **Certificate No: 1972228**

Instrument	Description	VERSIV MAIN UNIT
	Manufacturer	FLUKE NETWORKS
	Model	VERSIV-MU
	Serial Number	3625540
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument is Functionally tested.	

Date of Verification	08 Nov 2017
Date of Reverification	08 Nov 2018
Place of Calibration	Son
Tested by	R. Kalidien

Issue date: 08 Nov 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. Traceable calibration is not required or possible. According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, is a safety test not required. Therefore not performed.

Tektronix® FLUKE®

Verification statement

Data Type: FOUND-LEFT **Certificate No: 1972229**

Instrument	Description	VERSIV REMOTE UNIT
	Manufacturer	FLUKE NETWORKS
	Model	VERSIV-RU
	Serial Number	3623064
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument is Functionally tested.	

Date of Verification	08 Nov 2017
Date of Reverification	08 Nov 2018
Place of Calibration	Son
Tested by	R. Kalidien

Issue date: 08 Nov 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. Traceable calibration is not required or possible. According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, is a safety test not required. Therefore not performed.

Comunicado de Verificaciónt

Tipo de Dato: FOUND-LEFT **Certificado N°:1980332**

Instrumento	Descripción	VERSIV MAIN UNIT
	Marca	FLUKE NETWORKS
	Modelo	VERSIV-MU
	N° de Serie	3655679
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento esta funcionalmente probado.	

Fecha de Calibración	23 nov 2017
Fecha de Recalibración	23 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 23 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Calibrazione tracciabile non è necessaria o possibile. De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Tektronix® FLUKE®

Comunicado de Verificaciónt

Tipo de Dato: FOUND-LEFT **Certificado N°:1980333**

Instrumento	Descripción	VERSIV REMOTE UNIT
	Marca	FLUKE NETWORKS
	Modelo	VERSIV-RU
	N° de Serie	3702190
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento esta funcionalmente probado.	

Fecha de Calibración	23 nov 2017
Fecha de Recalibración	23 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 23 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Calibrazione tracciabile non è necessaria o possibile. De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Tektronix® FLUKE®

Comunicado de Verificaciónt

Tipo de Dato: FOUND-LEFT **Certificado N°:1980332**

Instrumento	Descripción	VERSIV MAIN UNIT
	Marca	FLUKE NETWORKS
	Modelo	VERSIV-MU
	N° de Serie	3655679
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento esta funcionalmente probado.	

Fecha de Calibración	23 nov 2017
Fecha de Recalibración	23 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 23 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Calibrazione tracciabile non è necessaria o possibile. De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Tektronix®

FLUKE®

Certificado de Calibración

Tipo de Dato: AS-LEFT **Certificado N°:1980339**

Instrumento	Descripción	1 GHZ DSX CABLE ANALYZER
	Marca	FLUKE NETWORKS
	Modelo	DSX-5000 INTL
	N° de Serie	3700072
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento cumple con sus especificaciones publicadas por el fabricante en los puntos testeados. Eparación y / o ajuste del equipo esta realizada. Los resultados de las mediciones se muestran de la página 3 a la5.	

Fecha de Calibración	23 nov 2017
Fecha de Recalibración	23 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 23 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Todas las mediciones siguen los estándares nacionales y / o internacionales o se han obtenido mediante la autorización de técnicas relacionadas. Normas utilizadas para esta calibración son ISO/IEC 17025:2005 acreditado de calibración. Este certificado no podrá ser reproducido a excepción de su totalidad. Certificados de calibración sin haber sido firmados no son válidos.

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: AS-LEFT **Certificado N°:1980339**

Observaciones

- El tipo de dato que se encuentra en este certificado en la parte superior de cada página debe ser interpretado como:

As-Found	: Datos de calibración recogidos antes de que la unidad haya sido ajustada y / o reparada
As-Left	: Datos de calibración recogidos despues que la unidad haya sido ajustada y / o reparada
Found-Left	: Datos de calibración recogidos sin ningún ajuste y / o reparación realizada

- Si la unidad a testear es utilizada en arduas condiciones recomendamos disminuir el periodo de intervalo de la calibración. Este periodo (fecha de vencimiento) es responsabilidad del usuario final.

- De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Estándares y equipo de testeo utilizado para esta calibración:

Modelo	N° de serie	Número de inventario	Vence en	N° certificado
DSX-CALVERST//FLKN	E000005	WP2060	12 Mar 2018	EVL326702

FLUKE networks

DSX Cable Analyzer

As-Left Report

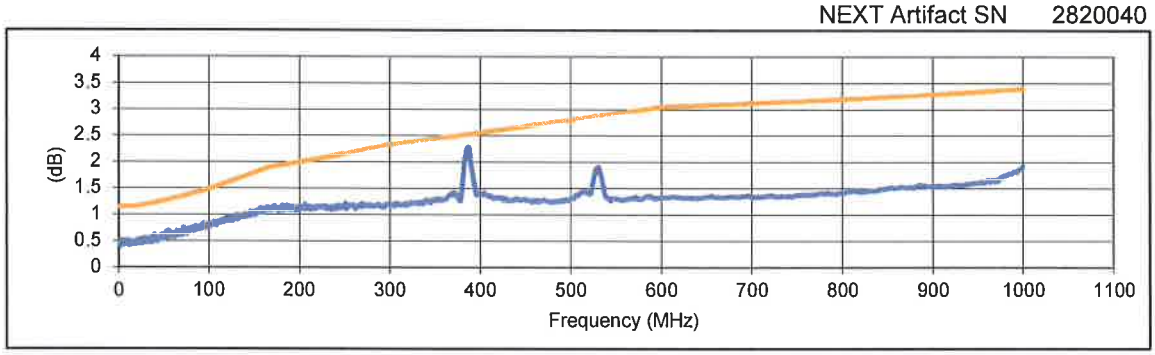
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700072**

Test date 23-Nov-17

NEXT

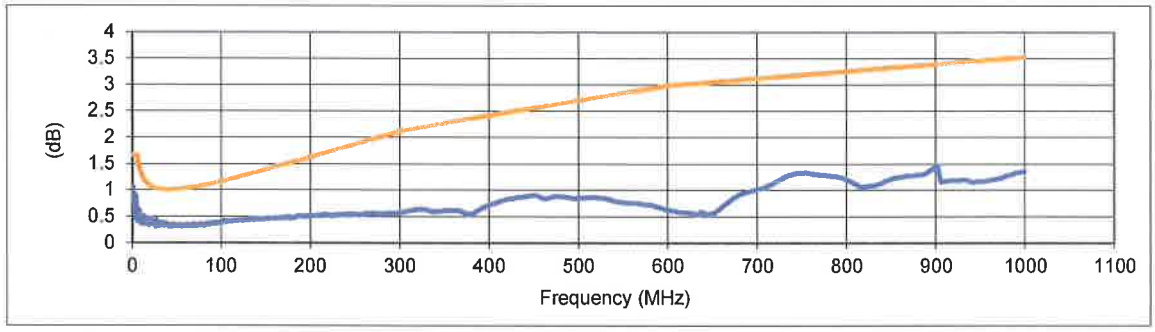
NEXT Artifact SN 2820040



Pass Worst margin: 0.240 at 386 MHz in pair 12-78. Worst accuracy at each frequency shown.

CDNEXT

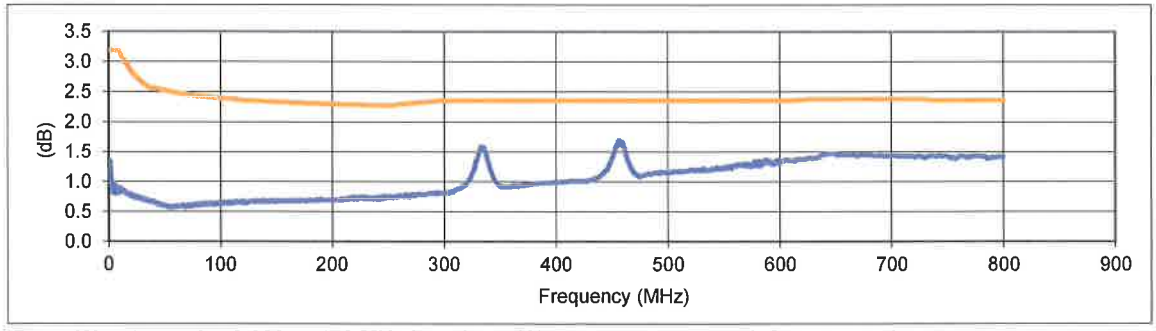
CDNEXT Artifact SN 2843471



Pass Worst margin: 0.590 at 27.88 MHz in pair 12-36. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2402125



Pass Worst margin: 0.680 at 456 MHz in pair 78. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

As-Left Report

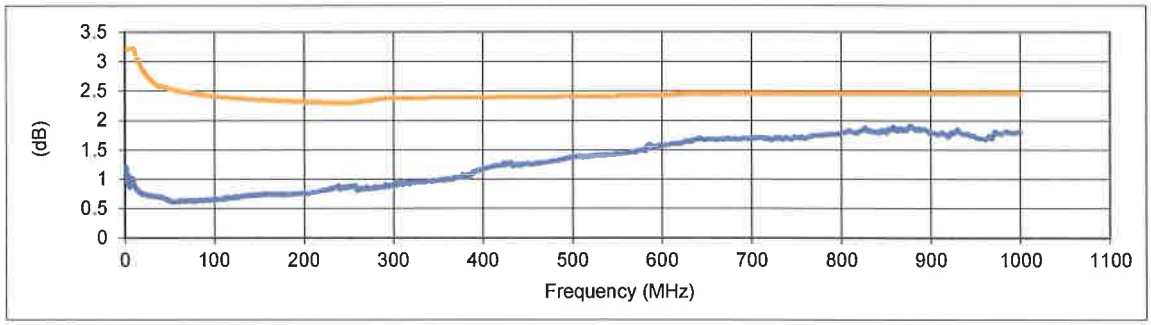
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700072**

Test date 23-Nov-17

RL

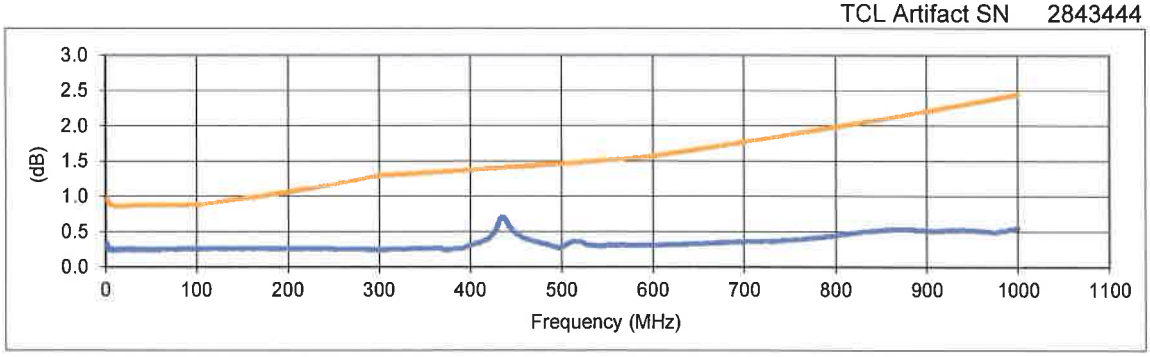
CMDMRL Artifact SN 2402125



Pass Worst margin: 0.550 at 876 MHz in pair 12. Worst accuracy at each frequency shown.

TCL

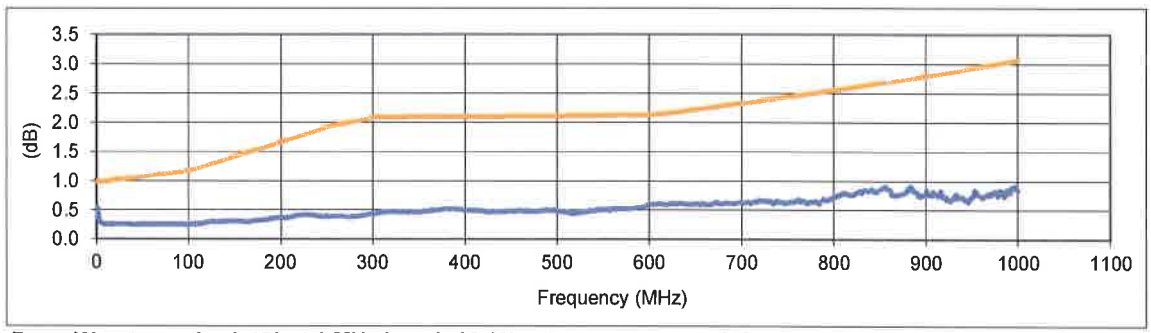
TCL Artifact SN 2843444



Pass Worst margin: 0.600 at 15.5 MHz in pair 78. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2860551



Pass Worst margin: 0.450 at 1 MHz in pair 12. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

As-Left Report

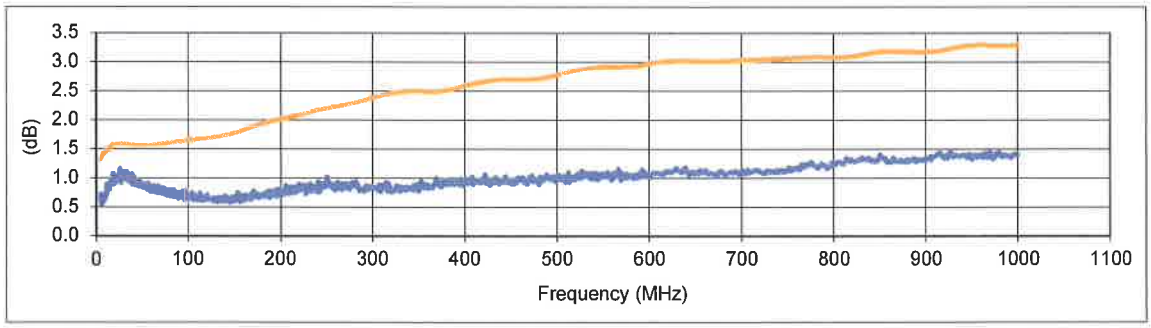
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700072**

Test date 23-Nov-17

FEXT

ILFEXT Artifact SN 2860551



Pass Worst margin: 0.440 at 25.88 MHz in pair 12-78. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860532

	Measured	Expected	Limit	
Resistance on pair 12	0.19	0.00	0.80	Pass
Resistance on pair 36	49.94	49.80	0.60	Pass
Resistance on pair 45	100.05	99.80	1.60	Pass
Resistance on pair 78	452.93	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860565

	Measured	Expected	Limit	
Resistance on pair 12	0.19	0.00	0.80	Pass
Resistance on pair 36	25.03	24.90	0.90	Pass
Resistance on pair 45	12.30	12.13	0.90	Pass
Resistance on pair 78	24.23	24.05	0.90	Pass
Resistance imbalance on pair 12	0.01	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL

Not applicable

M FEXT

Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Certificado de Calibración

Tipo de Dato: AS-LEFT **Certificado N°:1980340**

Instrumento	Descripción	1 GHZ DSX CABLE ANALYZER
	Marca	FLUKE NETWORKS
	Modelo	DSX-5000 INTL
	N° de Serie	3700109
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento cumple con sus especificaciones publicadas por el fabricante en los puntos testeados. Eparación y / o ajuste del equipo esta realizada. Los resultados de las mediciones se muestran de la página 3 a la5.	

Fecha de Calibración	23 nov 2017
Fecha de Recalibración	23 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 23 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Todas las mediciones siguen los estándares nacionales y / o internacionales o se han obtenido mediante la autorización de técnicas relacionadas. Normas utilizadas para esta calibración son ISO/IEC 17025:2005 acreditado de calibración. Este certificado no podrá ser reproducido a excepción de su totalidad. Certificados de calibración sin haber sido firmados no son válidos.

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: AS-LEFT **Certificado N°:1980340**

Observaciones

- El tipo de dato que se encuentra en este certificado en la parte superior de cada página debe ser interpretado como:

As-Found	: Datos de calibración recogidos antes de que la unidad haya sido ajustada y / o reparada
As-Left	: Datos de calibración recogidos despues que la unidad haya sido ajustada y / o reparada
Found-Left	: Datos de calibración recogidos sin ningún ajuste y / o reparación realizada

- Si la unidad a testear es utilizada en arduas condiciones recomendamos disminuir el periodo de intervalo de la calibración. Este periodo (fecha de vencimiento) es responsabilidad del usuario final.

- De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Estándares y equipo de testeo utilizado para esta calibración:

Modelo	N° de serie	Número de inventario	Vence en	N° certificado
DSX-CALVERST//FLKN	E000005	WP2060	12 Mar 2018	EVL326702

FLUKE networks

DSX Cable Analyzer

As-Left Report

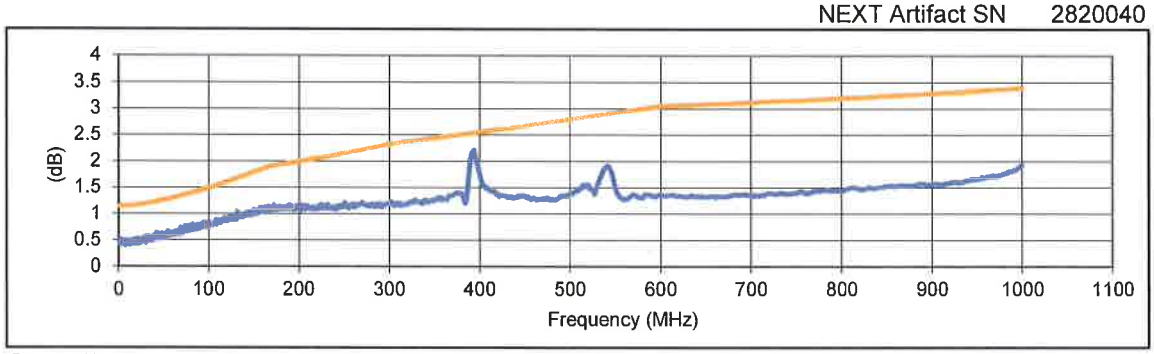
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700109**

Test date 23-Nov-17

NEXT

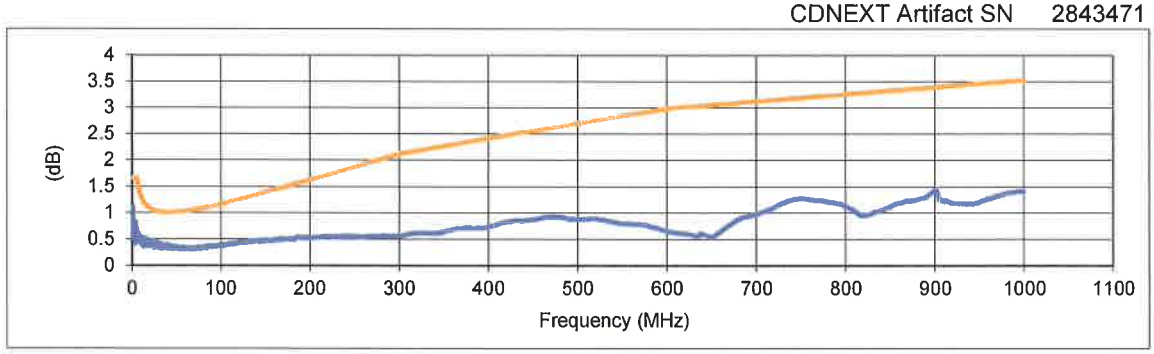
NEXT Artifact SN 2820040



Pass Worst margin: 0.340 at 393 MHz in pair 12-78. Worst accuracy at each frequency shown.

CDNEXT

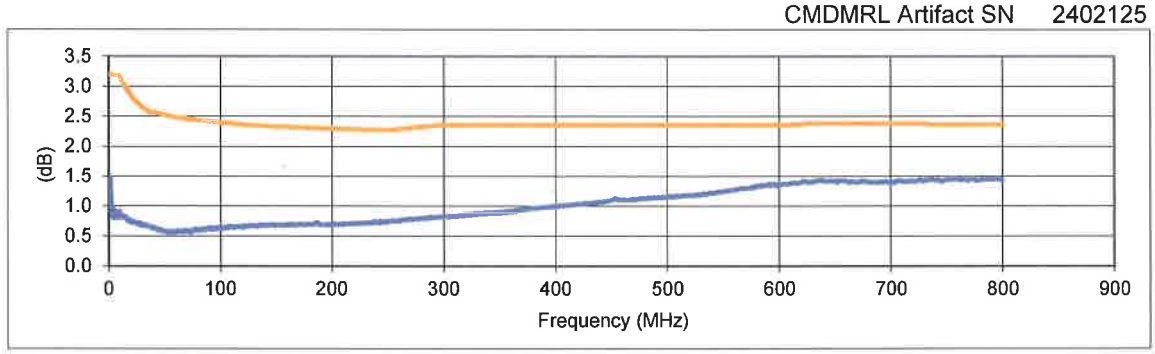
CDNEXT Artifact SN 2843471



Pass Worst margin: 0.540 at 1 MHz in pair 12-36. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2402125



Pass Worst margin: 0.900 at 754 MHz in pair 12. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

As-Left Report

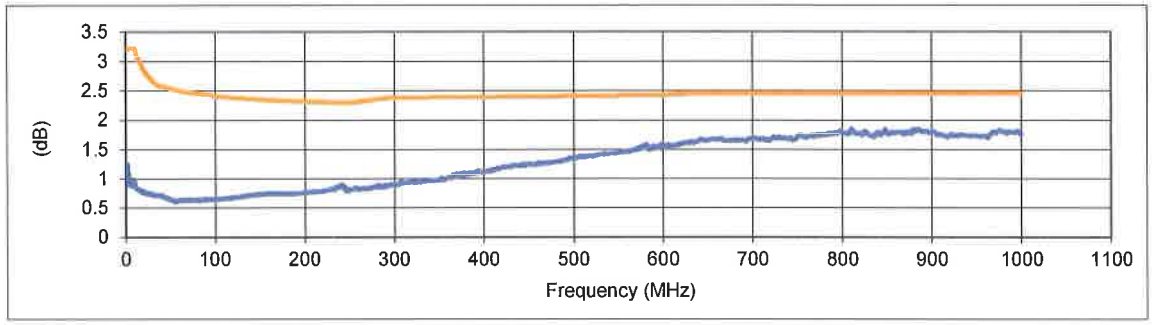
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700109**

Test date 23-Nov-17

RL

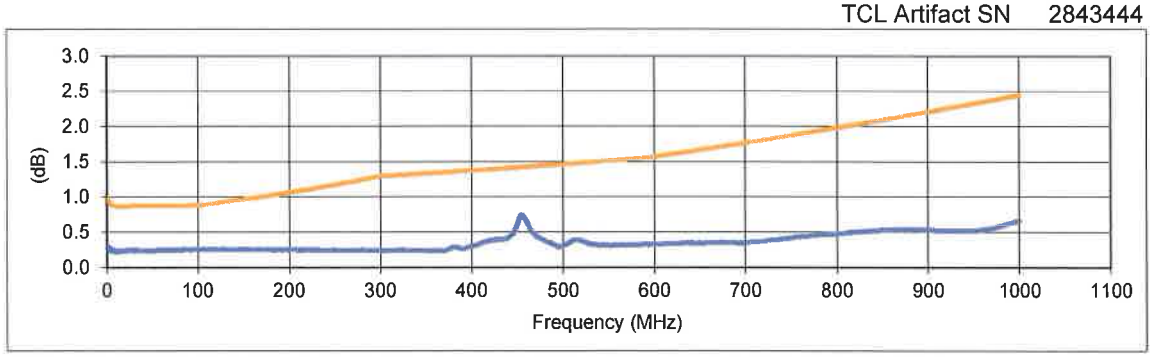
CMDMRL Artifact SN 2402125



Pass Worst margin: 0.600 at 810 MHz in pair 12. Worst accuracy at each frequency shown.

TCL

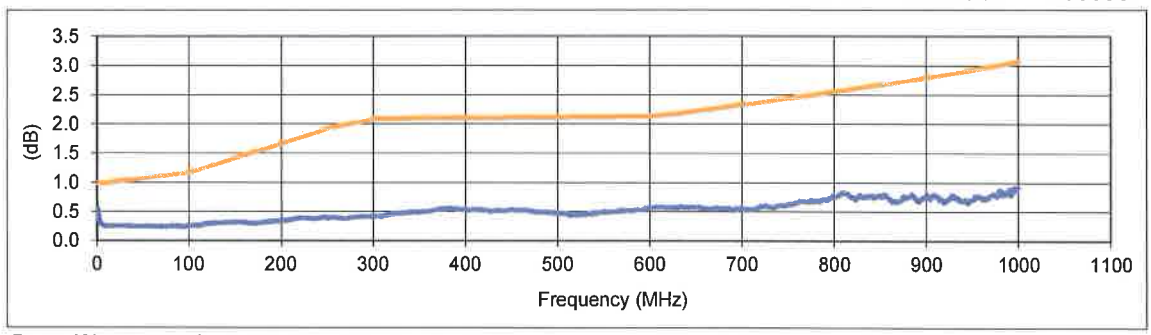
TCL Artifact SN 2843444



Pass Worst margin: 0.610 at 22.75 MHz in pair 78. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2860551



Pass Worst margin: 0.440 at 1 MHz in pair 12. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

As-Left Report

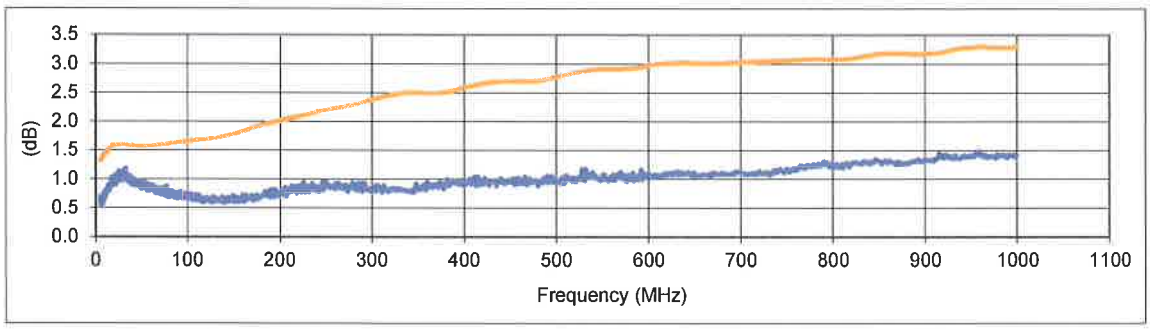
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3700109**

Test date 23-Nov-17

FEXT

ILFEXT Artifact SN 2860551



Pass Worst margin: 0.420 at 32.5 MHz in pair 78-12. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860532

	Measured	Expected	Limit	
Resistance on pair 12	0.29	0.00	0.80	Pass
Resistance on pair 36	50.10	49.80	0.60	Pass
Resistance on pair 45	100.19	99.80	1.60	Pass
Resistance on pair 78	453.18	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860565

	Measured	Expected	Limit	
Resistance on pair 12	0.26	0.00	0.80	Pass
Resistance on pair 36	25.14	24.90	0.90	Pass
Resistance on pair 45	12.37	12.13	0.90	Pass
Resistance on pair 78	24.35	24.05	0.90	Pass
Resistance imbalance on pair 12	0.01	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL

Not applicable

M FEXT

Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:1982812**

Instrumento	Descripción	OPTIFIBER PRO QUAD OTDR MODULE
	Marca	FLUKE NETWORKS
	Modelo	OFP-QUAD
	N° de Serie	3730003
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606184314
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento cumple con sus especificaciones publicadas por el fabricante en los puntos testeados. Los resultados de las mediciones se muestran de la página 3 a la3.	

Fecha de Calibración	22 nov 2017
Fecha de Recalibración	22 nov 2018
Sitio de Calibracion	Son
Testeado por	C. de Wert

Fecha de expedición: 22 nov 2017

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Todas las mediciones siguen los estándares nacionales y / o internacionales o se han obtenido mediante la autorización de técnicas relacionadas. Normas utilizadas para esta calibración son ISO/IEC 17025:2005 acreditado de calibración. Este certificado no podrá ser reproducido a excepción de su totalidad. Certificados de calibración sin haber sido firmados no son válidos.

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:1982812**

Observaciones

- El tipo de dato que se encuentra en este certificado en la parte superior de cada página debe ser interpretado como:

As-Found	: Datos de calibración recogidos antes de que la unidad haya sido ajustada y / o reparada
As-Left	: Datos de calibración recogidos despues que la unidad haya sido ajustada y / o reparada
Found-Left	: Datos de calibración recogidos sin ningún ajuste y / o reparación realizada

- Si la unidad a testear es utilizada en arduas condiciones recomendamos disminuir el periodo de intervalo de la calibración. Este periodo (fecha de vencimiento) es responsabilidad del usuario final.

- De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Estándares y equipo de testeo utilizado para esta calibración:

Modelo	N° de serie	Número de inventario	Vence en	N° certificado
FTE2058	WP1841	WP1841	22 May 2018	1054953
OMM-6810B	68104224	WP1791	31 Oct 2018	113244/AA

FLUKE networks

OptiFiber PRO OTDR

Calibration Data Report

Found - Left

Model **OptiFiber-Pro-QUAD**
Serial Number **3730003** Test date 22-Nov-2017

All measurements, except VFL, are in meters.

Test Step	Type	Expected	Measured	Lower Limit	Upper Limit	Result
MM Length						
MM 850nm Length Accuracy	End	1998.50	1998.85	1997.30	1999.70	PASS
MM 1300nm Length Accuracy	End	1997.60	1997.79	1996.40	1998.80	PASS
MM Event Deadzone						
MM 850nm Event Deadzone	Typical	0.50	0.60	**Performance Test Only**		
MM 1300nm Event Deadzone	Typical	0.70	0.69			
MM Attenuation Deadzone						
MM 850nm Attenuation Deadzone	Typical	2.50	2.38	**Performance Test Only**		
MM 1300nm Attenuation Deadzone	Typical	4.50	4.18			
MM Loss						
MM 850nm Minimum Loss	Loss	202.10	202.43	200.50	203.70	PASS
	End	404.60	404.95	403.50	405.70	PASS
SM Length						
SM 1310nm Length Accuracy	End	10002.50	10003.69	10000.80	10004.20	PASS
SM 1550nm Length Accuracy	End	10002.70	10003.13	10001.00	10004.40	PASS
SM Event Deadzone						
SM 1310nm Event Deadzone	Typical	0.60	0.67	**Performance Test Only**		
SM 1550nm Event Deadzone	Typical	0.60	0.63			
SM Attenuation Deadzone						
SM 1310nm Attenuation Deadzone	Typical	3.60	2.11	**Performance Test Only**		
SM 1550nm Attenuation Deadzone	Typical	3.70	3.66			
SM Loss						
SM 1310nm Minimum Loss	Loss	202.20	202.56	197.20	207.20	PASS
	End	404.90	405.26	403.80	406.00	PASS
SM 1550nm Minimum Loss	Loss	202.20	203.45	196.70	207.70	PASS
	End	405.00	405.34	403.90	406.10	PASS
VFL						
VFL Output Level (Watts)	Power		0.000802	0.000700	0.000900	PASS

Test Program: MantisTest v1.2.1
OFP Report: v2.31

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1990146**

Instrument	Description	CERTIFIBER PRO QUAD OLTS REPLACEMENT MODULE 1 UNIT
	Manufacturer	FLUKE NETWORKS
	Model	CFP-QUAD MOD
	Serial Number	3726510
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 3.	

Date of Calibration	07 Dec 2017
Date of Recalibration	07 Dec 2018
Place of Calibration	Son
Tested by	A.R Figarella Gomez

Issue date: 07 Dec 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

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FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1990146**

Remarks

- The data type found in this certificate on the top of each page must be interpreted as:

As-Found	: Calibration data collected before the unit is adjusted and / or repaired
As-Left	: Calibration data collected after the unit has been adjusted and / or repaired
Found-Left	: Calibration data collected without any adjustment and / or repair performed

- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
6BBS4-001K-ART	832533	WP2198	13 Jan 2019	4325856
1BBS4-001K-ART	832538	WP2199	13 Jan 2019	4325863
FMH-8705	87051324	WP2196	07 Feb 2018	318020
FTE2106	009	WP2197	08 Feb 2018	317626

FLUKE networks

CertiFiber PRO Loss Length , Power Meter Module

Calibration Data Report

Found - Left

Model **CFP-QUAD**
Serial Number **3726510**

Test date 7-Dec-2017

Power Meter - 850 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.113	-3.109	-0.004	-0.003	0.25	0.085	Pass
-5	-5.116	-5.113	-0.003	-0.001	0.25	0.085	Pass
-10	-10.099	-10.098	-0.001	0	0.2	0.085	Pass
-15	-15.126	-15.124	-0.002	-0.001	0.25	0.085	Pass
-20	-20.138	-20.138	0	0.001	0.25	0.085	Pass
-25	-25.121	-25.123	0.002	0.003	0.25	0.085	Pass
-30	-30.129	-30.13	0.001	0.002	0.25	0.085	Pass
-35	-35.131	-35.135	0.004	0.005	0.25	0.085	Pass
-40	-40.146	-40.151	0.005	0.006	0.25	0.085	Pass
-45	-45.151	-45.157	0.006	0.007	0.25	0.085	Pass
-50	-50.131	-50.135	0.004	0.006	0.25	0.085	Pass
-55	-55.123	-55.128	0.005	0.006	0.25	0.085	Pass
-56	-56.131	-56.139	0.008	0.009	0.3	0.15	Pass

Power Meter - 1310 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.17	-3.212	0.042	0.038	0.25	0.085	Pass
-5	-5.126	-5.149	0.023	0.019	0.25	0.085	Pass
-10	-10.088	-10.092	0.004	0	0.2	0.085	Pass
-15	-15.072	-15.072	0	-0.004	0.25	0.085	Pass
-20	-20.082	-20.082	0	-0.004	0.25	0.085	Pass
-25	-25.075	-25.075	0	-0.004	0.25	0.085	Pass
-30	-30.091	-30.091	0	-0.004	0.25	0.085	Pass
-35	-35.071	-35.073	0.002	-0.002	0.25	0.085	Pass
-40	-40.079	-40.08	0.001	-0.003	0.25	0.085	Pass
-45	-45.083	-45.085	0.002	-0.002	0.25	0.085	Pass
-50	-50.079	-50.078	-0.001	-0.005	0.25	0.085	Pass
-55	-55.077	-55.077	0	-0.004	0.25	0.085	Pass
-56	-56.071	-56.07	-0.001	-0.005	0.3	0.15	Pass

Loss Length - 1300 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1001.40	1002.56	992.20	1010.60	Pass

Loss Length - 1550 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1004.70	1006.54	995.50	1013.90	Pass

VFL Output Level Measured in watts

Measured	Lower Limit	Upper Limit	Result
0.0008007	0.0006	0.0009	Pass

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1990147**

Instrument	Description	CERTIFIBER PRO QUAD OLTS REPLACEMENT MODULE 1 UNIT
	Manufacturer	FLUKE NETWORKS
	Model	CFP-QUAD MOD
	Serial Number	3726509
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 3.	

Date of Calibration	07 Dec 2017
Date of Recalibration	07 Dec 2018
Place of Calibration	Son
Tested by	A.R Figarella Gomez

Issue date: 07 Dec 2017

G.J.J. Sprik
Head of laboratory

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Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1990147**

Remarks

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- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
6BBS4-001K-ART	832533	WP2198	13 Jan 2019	4325856
1BBS4-001K-ART	832538	WP2199	13 Jan 2019	4325863
FMH-8705	87051324	WP2196	07 Feb 2018	318020
FTE2106	009	WP2197	08 Feb 2018	317626

FLUKE networks

CertiFiber PRO Loss Length , Power Meter Module

Calibration Data Report

Found - Left

Model **CFP-QUAD**
Serial Number **3726509**

Test date 7-Dec-2017

Power Meter - 850 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.184	-3.111	-0.073	-0.005	0.25	0.085	Pass
-5	-5.19	-5.117	-0.073	-0.006	0.25	0.085	Pass
-10	-10.179	-10.111	-0.068	0	0.2	0.085	Pass
-15	-15.211	-15.138	-0.073	-0.006	0.25	0.085	Pass
-20	-20.227	-20.152	-0.075	-0.008	0.25	0.085	Pass
-25	-25.207	-25.13	-0.077	-0.01	0.25	0.085	Pass
-30	-30.215	-30.14	-0.075	-0.008	0.25	0.085	Pass
-35	-35.211	-35.136	-0.075	-0.008	0.25	0.085	Pass
-40	-40.228	-40.152	-0.076	-0.009	0.25	0.085	Pass
-45	-45.227	-45.15	-0.077	-0.01	0.25	0.085	Pass
-50	-50.208	-50.129	-0.079	-0.012	0.25	0.085	Pass
-55	-55.199	-55.112	-0.087	-0.019	0.25	0.085	Pass
-56	-56.205	-56.12	-0.085	-0.017	0.3	0.15	Pass

Power Meter - 1310 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.2	-3.2	0	0.011	0.25	0.085	Pass
-5	-5.143	-5.135	-0.008	0.002	0.25	0.085	Pass
-10	-10.095	-10.084	-0.011	0	0.2	0.085	Pass
-15	-15.073	-15.065	-0.008	0.003	0.25	0.085	Pass
-20	-20.083	-20.075	-0.008	0.003	0.25	0.085	Pass
-25	-25.076	-25.068	-0.008	0.003	0.25	0.085	Pass
-30	-30.091	-30.083	-0.008	0.003	0.25	0.085	Pass
-35	-35.072	-35.064	-0.008	0.003	0.25	0.085	Pass
-40	-40.081	-40.071	-0.01	0.001	0.25	0.085	Pass
-45	-45.083	-45.075	-0.008	0.003	0.25	0.085	Pass
-50	-50.077	-50.069	-0.008	0.003	0.25	0.085	Pass
-55	-55.076	-55.067	-0.009	0.002	0.25	0.085	Pass
-56	-56.068	-56.064	-0.004	0.006	0.3	0.15	Pass

Loss Length - 1300 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1001.40	1000.96	992.20	1010.60	Pass

Loss Length - 1550 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1004.70	1003.48	995.50	1013.90	Pass

VFL Output Level Measured in watts

Measured	Lower Limit	Upper Limit	Result
0.0007997	0.0006	0.0009	Pass

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1980337**

Instrument	Description	CERTIFIBER PRO QUAD OLTS REPLACEMENT MODULE 1 UNIT
	Manufacturer	FLUKE NETWORKS
	Model	CFP-QUAD MOD
	Serial Number	3744006
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 3.	

Date of Calibration	22 Nov 2017
Date of Recalibration	22 Nov 2018
Place of Calibration	Son
Tested by	A.R Figarella Gomez

Issue date: 22 Nov 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

Tektronix® FLUKE®

Certificate of Calibration

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- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
6BBS4-001K-ART	832533	WP2198	13 Jan 2019	4325856
1BBS4-001K-ART	832538	WP2199	13 Jan 2019	4325863
FMH-8705	87051324	WP2196	07 Feb 2018	318020
FTE2106	009	WP2197	08 Feb 2018	317626

FLUKE networks

CertiFiber PRO Loss Length , Power Meter Module

Calibration Data Report

Found - Left

Model **CFP-SM**
Serial Number **3744006**

Test date 22-Nov-2017

Power Meter - 850 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.075	-3.069	-0.006	0.008	0.25	0.085	Pass
-5	-5.078	-5.065	-0.013	0.001	0.25	0.085	Pass
-10	-10.06	-10.046	-0.014	0	0.2	0.085	Pass
-15	-15.089	-15.071	-0.018	-0.004	0.25	0.085	Pass
-20	-20.101	-20.082	-0.019	-0.005	0.25	0.085	Pass
-25	-25.082	-25.06	-0.022	-0.008	0.25	0.085	Pass
-30	-30.087	-30.06	-0.027	-0.013	0.25	0.085	Pass
-35	-35.089	-35.061	-0.028	-0.014	0.25	0.085	Pass
-40	-40.106	-40.075	-0.031	-0.016	0.25	0.085	Pass
-45	-45.111	-45.08	-0.031	-0.017	0.25	0.085	Pass
-50	-50.1	-50.069	-0.031	-0.016	0.25	0.085	Pass
-55	-55.118	-55.08	-0.038	-0.023	0.25	0.085	Pass
-56	-56.132	-56.087	-0.045	-0.031	0.3	0.15	Pass

Power Meter - 1310 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.191	-3.182	-0.009	-0.001	0.25	0.085	Pass
-5	-5.206	-5.201	-0.005	0.003	0.25	0.085	Pass
-10	-10.111	-10.103	-0.008	0	0.2	0.085	Pass
-15	-15.077	-15.069	-0.008	0	0.25	0.085	Pass
-20	-20.087	-20.079	-0.008	0	0.25	0.085	Pass
-25	-25.078	-25.069	-0.009	-0.001	0.25	0.085	Pass
-30	-30.095	-30.086	-0.009	-0.001	0.25	0.085	Pass
-35	-35.075	-35.066	-0.009	-0.001	0.25	0.085	Pass
-40	-40.086	-40.077	-0.009	-0.001	0.25	0.085	Pass
-45	-45.089	-45.079	-0.01	-0.002	0.25	0.085	Pass
-50	-50.087	-50.076	-0.011	-0.003	0.25	0.085	Pass
-55	-55.089	-55.078	-0.011	-0.003	0.25	0.085	Pass
-56	-56.085	-56.076	-0.009	-0.001	0.3	0.15	Pass

Loss Length - 1300 Not Applicable

Expected	Measured	Lower Limit	Upper Limit	Result

Loss Length - 1550 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1004.70	1004.71	995.50	1013.90	Pass

VFL Output Level Measured in watts

Measured	Lower Limit	Upper Limit	Result
0.0008005	0.0007	0.0009	Pass

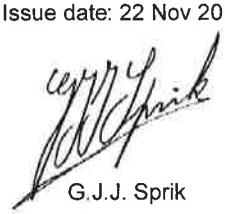
Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1980336**

Instrument	Description	CERTIFIBER PRO QUAD OLTS REPLACEMENT MODULE 1 UNIT
	Manufacturer	FLUKE NETWORKS
	Model	CFP-QUAD MOD
	Serial Number	3744010
	Inventory Number	-
Customer	Name	FIBRATEL
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606184314
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 3.	

Date of Calibration	22 Nov 2017
Date of Recalibration	22 Nov 2018
Place of Calibration	Son
Tested by	A.R Figarella Gomez

Issue date: 22 Nov 2017



G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1980336**

Remarks

- The data type found in this certificate on the top of each page must be interpreted as:

As-Found	: Calibration data collected before the unit is adjusted and / or repaired
As-Left	: Calibration data collected after the unit has been adjusted and / or repaired
Found-Left	: Calibration data collected without any adjustment and / or repair performed

- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
6BBS4-001K-ART	832533	WP2198	13 Jan 2019	4325856
1BBS4-001K-ART	832538	WP2199	13 Jan 2019	4325863
FMH-8705	87051324	WP2196	07 Feb 2018	318020
FTE2106	009	WP2197	08 Feb 2018	317626

FLUKE networks

CertiFiber PRO Loss Length , Power Meter Module

Calibration Data Report

Found - Left

Model **CFP-SM**
Serial Number **3744010**

Test date 22-Nov-2017

Power Meter - 850 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.076	-3.076	0	0	0.25	0.085	Pass
-5	-5.079	-5.075	-0.004	-0.004	0.25	0.085	Pass
-10	-10.062	-10.062	0	0	0.2	0.085	Pass
-15	-15.091	-15.079	-0.012	-0.012	0.25	0.085	Pass
-20	-20.104	-20.091	-0.013	-0.013	0.25	0.085	Pass
-25	-25.087	-25.067	-0.02	-0.02	0.25	0.085	Pass
-30	-30.091	-30.064	-0.027	-0.027	0.25	0.085	Pass
-35	-35.096	-35.075	-0.021	-0.021	0.25	0.085	Pass
-40	-40.112	-40.089	-0.023	-0.023	0.25	0.085	Pass
-45	-45.118	-45.094	-0.024	-0.023	0.25	0.085	Pass
-50	-50.102	-50.074	-0.028	-0.028	0.25	0.085	Pass
-55	-55.118	-55.085	-0.033	-0.033	0.25	0.085	Pass
-56	-56.137	-56.114	-0.023	-0.022	0.3	0.15	Pass

Power Meter - 1310 Measured in dB

Nominal	RefRdg	UUTRdg	Diff	LinErr	AbsTol	LinTol	Result
-3	-3.192	-3.228	0.036	0.001	0.25	0.085	Pass
-5	-5.212	-5.248	0.036	0.001	0.25	0.085	Pass
-10	-10.115	-10.15	0.035	0	0.2	0.085	Pass
-15	-15.081	-15.116	0.035	0	0.25	0.085	Pass
-20	-20.09	-20.126	0.036	0.001	0.25	0.085	Pass
-25	-25.081	-25.116	0.035	0	0.25	0.085	Pass
-30	-30.099	-30.132	0.033	-0.002	0.25	0.085	Pass
-35	-35.078	-35.107	0.029	-0.006	0.25	0.085	Pass
-40	-40.089	-40.125	0.036	0.001	0.25	0.085	Pass
-45	-45.093	-45.128	0.035	0	0.25	0.085	Pass
-50	-50.09	-50.127	0.037	0.002	0.25	0.085	Pass
-55	-55.093	-55.13	0.037	0.002	0.25	0.085	Pass
-56	-56.087	-56.121	0.034	-0.001	0.3	0.15	Pass

Loss Length - 1300 Not Applicable

Expected	Measured	Lower Limit	Upper Limit	Result

Loss Length - 1550 Measured in meters

Expected	Measured	Lower Limit	Upper Limit	Result
1004.70	1004.50	995.50	1013.90	Pass

VFL Output Level Measured in watts

Measured	Lower Limit	Upper Limit	Result
0.0007986	0.0007	0.0009	Pass

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:2028815**

Instrumento	Descripción	1 GHZ DSX CABLE ANALYZER
	Marca	FLUKE NETWORKS
	Modelo	DSX-5000 INTL
	N° de Serie	3676180
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606190466
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración		Excel Certificate and traceability procedure (3.20)
Results		El instrumento cumple con sus especificaciones publicadas por el fabricante en los puntos testeados. Los resultados de las mediciones se muestran de la página 3 a la5.

Fecha de Calibración	09 feb 2018
Fecha de Recalibración	09 feb 2019
Sitio de Calibracion	Son en Breugel
Testeado por	W.H.J. van Hulten

Fecha de expedición: 09 feb 2018

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Todas las mediciones siguen los estándares nacionales y / o internacionales o se han obtenido mediante la autorización de técnicas relacionadas. Normas utilizadas para esta calibración son ISO/IEC 17025:2005 acreditado de calibración. Este certificado no podrá ser reproducido a excepción de su totalidad. Certificados de calibración sin haber sido firmados no son válidos.

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:2028815**

Observaciones

- El tipo de dato que se encuentra en este certificado en la parte superior de cada página debe ser interpretado como:

As-Found	: Datos de calibración recogidos antes de que la unidad haya sido ajustada y / o reparada
As-Left	: Datos de calibración recogidos despues que la unidad haya sido ajustada y / o reparada
Found-Left	: Datos de calibración recogidos sin ningún ajuste y / o reparación realizada

- Si la unidad a testear es utilizada en arduas condiciones recomendamos disminuir el periodo de intervalo de la calibración. Este periodo (fecha de vencimiento) es responsabilidad del usuario final.

- De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Estándares y equipo de testeo utilizado para esta calibración:

Modelo	N° de serie	Número de inventario	Vence en	N° certificado
DSX-CALVERST//FLKN	E000062	WP2391	14 Nov 2018	EVL397864

FLUKE networks. **DSX Cable Analyzer**

Found-Left Report

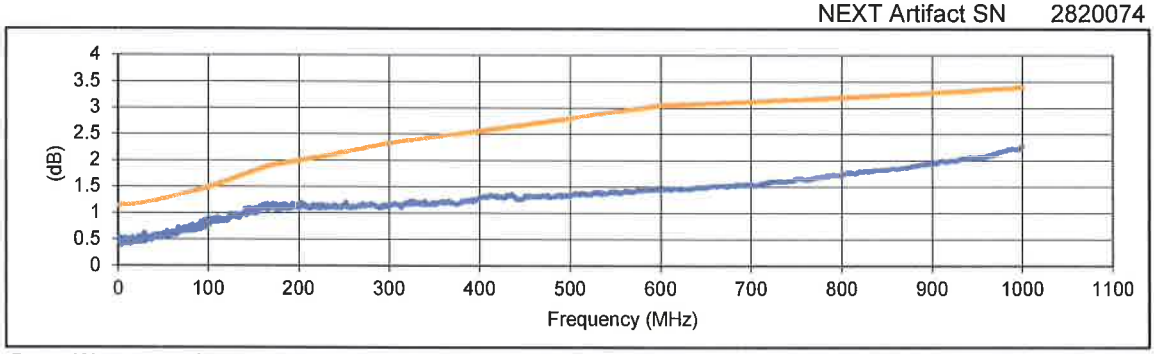
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676180**

Test date 9-Feb-18

NEXT

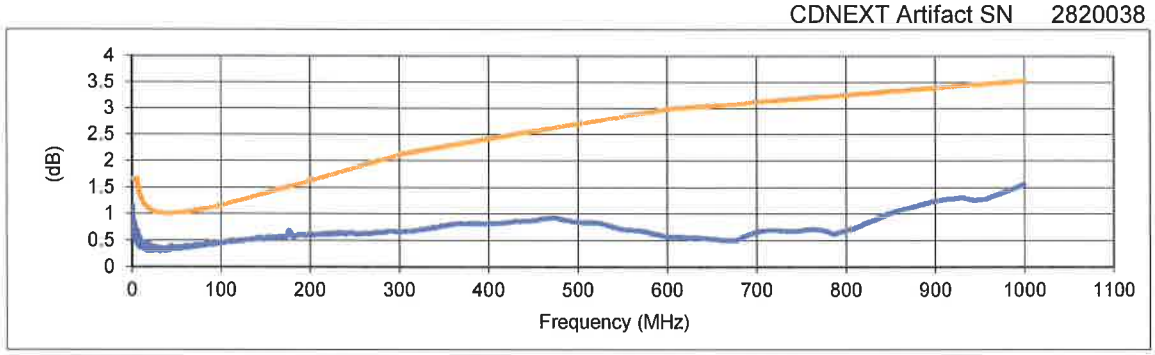
NEXT Artifact SN 2820074



Pass Worst margin: 0.570 at 29.38 MHz in pair 12-78. Worst accuracy at each frequency shown.

CDNEXT

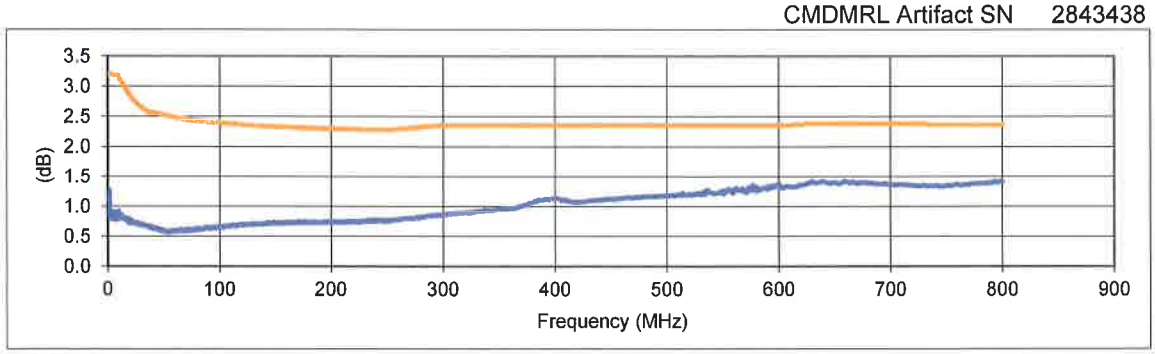
CDNEXT Artifact SN 2820038



Pass Worst margin: 0.500 at 1.13 MHz in pair 78-45. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2843438



Pass Worst margin: 0.950 at 793 MHz in pair 45. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Found-Left Report

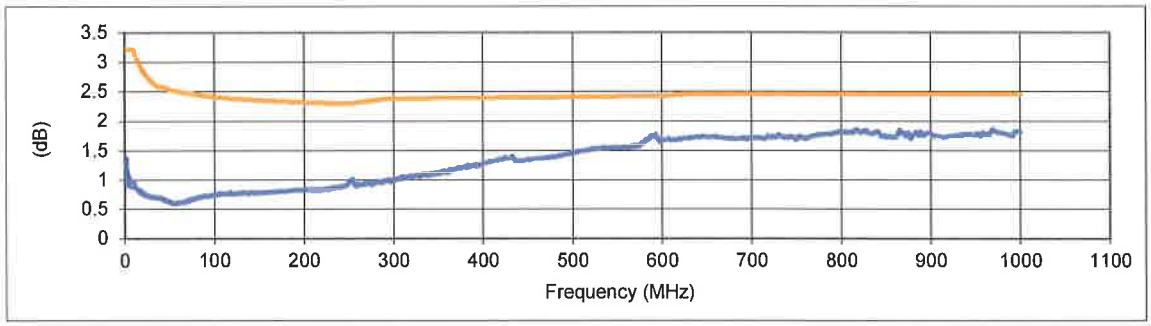
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676180**

Test date 9-Feb-18

RL

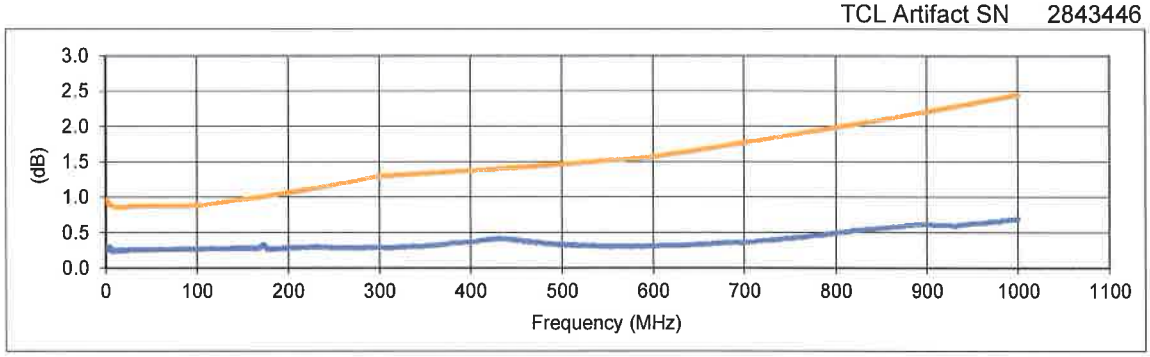
CMDMRL Artifact SN 2843438



Pass Worst margin: 0.600 at 816 MHz in pair 12. Worst accuracy at each frequency shown.

TCL

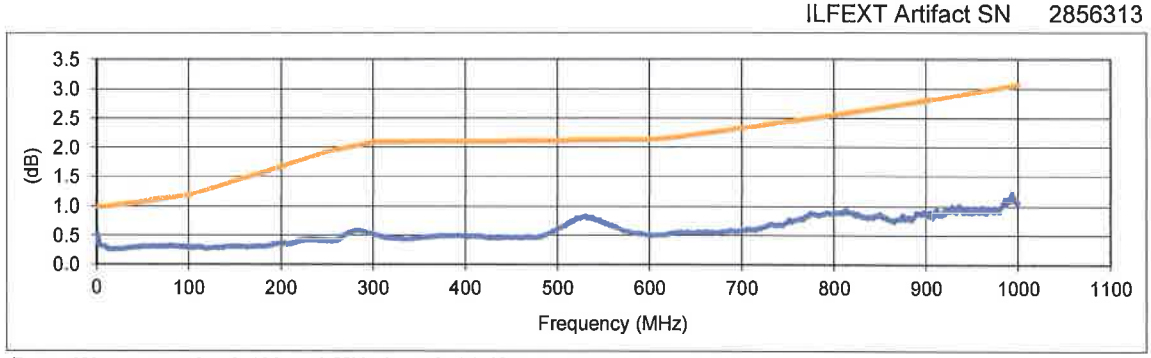
TCL Artifact SN 2843446



Pass Worst margin: 0.600 at 3.63 MHz in pair 45. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2856313



Pass Worst margin: 0.480 at 1 MHz in pair 36. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

Found-Left Report

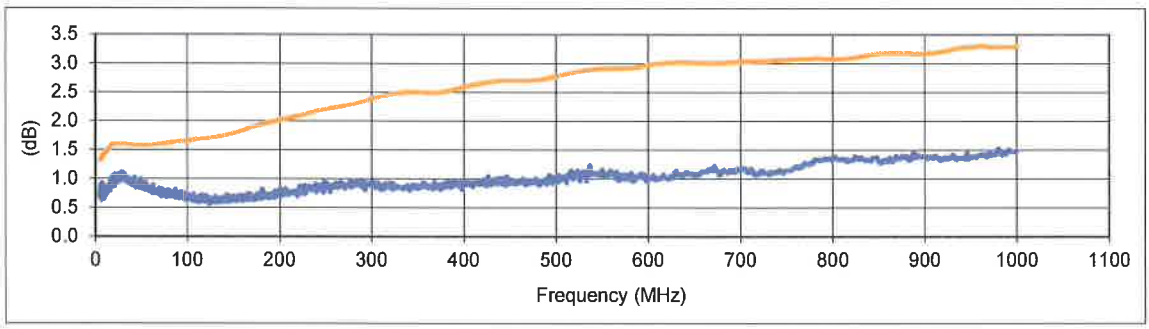
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676180**

Test date 9-Feb-18

FEXT

ILFEXT Artifact SN 2856313



Pass Worst margin: 0.450 at 7.25 MHz in pair 36-12. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860529

	Measured	Expected	Limit	
Resistance on pair 12	0.37	0.00	0.80	Pass
Resistance on pair 36	50.06	49.80	0.60	Pass
Resistance on pair 45	100.08	99.80	1.60	Pass
Resistance on pair 78	453.12	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860469

	Measured	Expected	Limit	
Resistance on pair 12	0.23	0.00	0.80	Pass
Resistance on pair 36	25.11	24.90	0.90	Pass
Resistance on pair 45	12.24	12.13	0.90	Pass
Resistance on pair 78	24.25	24.05	0.90	Pass
Resistance imbalance on pair 12	0.00	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL Not applicable

M FEXT Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:2028816**

Instrumento	Descripción	1 GHZ DSX CABLE ANALYZER
	Marca	FLUKE NETWORKS
	Modelo	DSX-5000 INTL
	N° de Serie	3676174
	N° de Inventario	-
Solicitante	Nombre	FIBRATEL
	Lugar	MADRID
	N° de Localización	2316895
N° de pedido	N° de RMA	606190466
Condiciones ambientales	Temperatura entre	(23.0 ± 3.0) °C
	Humedad entre	(45 ± 20) %rh
Procedimiento de Calibración	Excel Certificate and traceability procedure (3.20)	
Results	El instrumento cumple con sus especificaciones publicadas por el fabricante en los puntos testeados. Los resultados de las mediciones se muestran de la página 3 a la5.	

Fecha de Calibración	09 feb 2018
Fecha de Recalibración	09 feb 2019
Sitio de Calibracion	Son en Breugel
Testeado por	W.H.J. van Hulten

Fecha de expedición: 09 feb 2018

G.J.J. Sprik
Jefe del laboratorio

Esta calibración se realiza por DEKRA el certificado laboratorio para la norma ISO 9001:2008. Todas las mediciones siguen los estándares nacionales y / o internacionales o se han obtenido mediante la autorización de técnicas relacionadas. Normas utilizadas para esta calibración son ISO/IEC 17025:2005 acreditado de calibración. Este certificado no podrá ser reproducido a excepción de su totalidad. Certificados de calibración sin haber sido firmados no son válidos.

Tektronix® FLUKE®

Certificado de Calibración

Tipo de Dato: FOUND-LEFT **Certificado N°:2028816**

Observaciones

- El tipo de dato que se encuentra en este certificado en la parte superior de cada página debe ser interpretado como:

As-Found	: Datos de calibración recogidos antes de que la unidad haya sido ajustada y / o reparada
As-Left	: Datos de calibración recogidos despues que la unidad haya sido ajustada y / o reparada
Found-Left	: Datos de calibración recogidos sin ningún ajuste y / o reparación realizada

- Si la unidad a testear es utilizada en arduas condiciones recomendamos disminuir el periodo de intervalo de la calibración. Este periodo (fecha de vencimiento) es responsabilidad del usuario final.

- De acuerdo con la norma holandesa 'Funcionamiento de instalaciones eléctricas' NEN-EN-50110-1 publicada en 2005 y NEN 3140 publicada en 2015 párrafo 5.102.12 al 5.102.16, el test de seguridad no es requerido. Por tanto, no ha sido realizado.

Estándares y equipo de testeo utilizado para esta calibración:

Modelo	N° de serie	Número de inventario	Vence en	N° certificado
DSX-CALVERST//FLKN	E000062	WP2391	14 Nov 2018	EVL397864

FLUKE networks

DSX Cable Analyzer

Found-Left Report

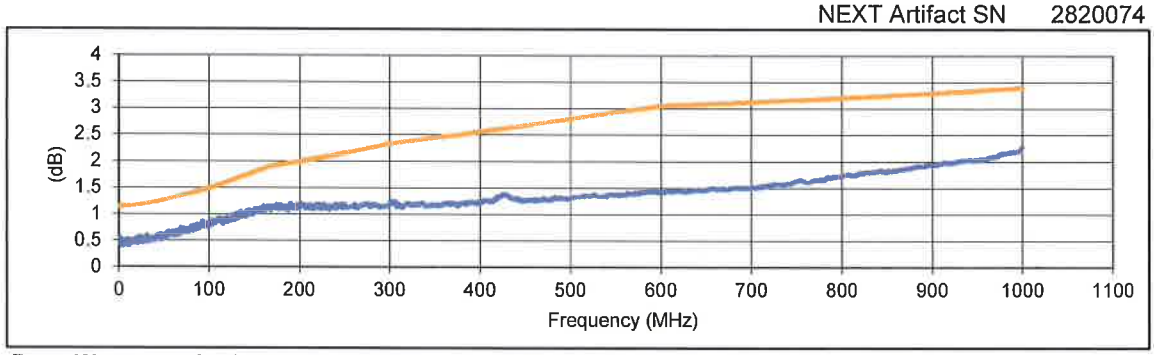
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676174**

Test date 9-Feb-18

NEXT

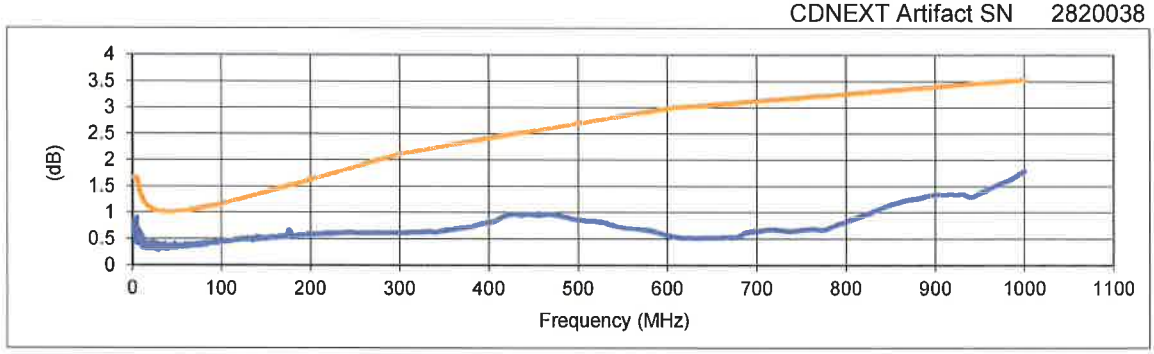
NEXT Artifact SN 2820074



Pass Worst margin: 0.590 at 1.75 MHz in pair 12-36. Worst accuracy at each frequency shown.

CDNEXT

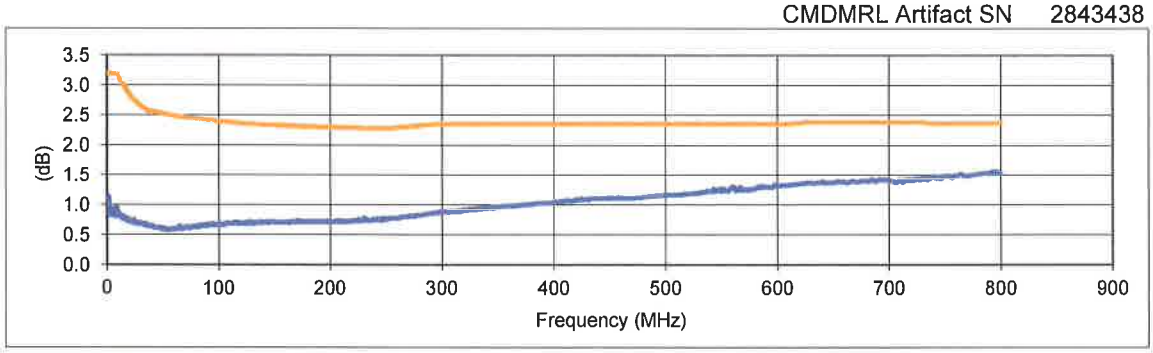
CDNEXT Artifact SN 2820038



Pass Worst margin: 0.600 at 36.75 MHz in pair 45-78. Worst accuracy at each frequency shown.

CMRL

CMDMRL Artifact SN 2843438



Pass Worst margin: 0.810 at 793 MHz in pair 45. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Found-Left Report

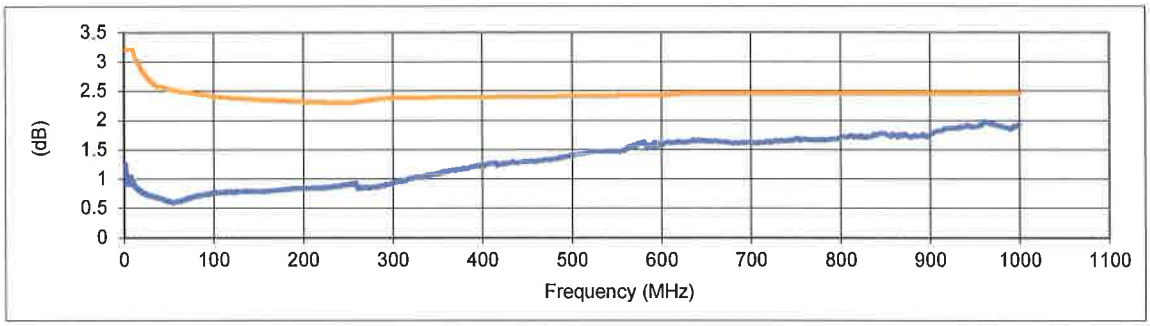
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676174**

Test date 9-Feb-18

RL

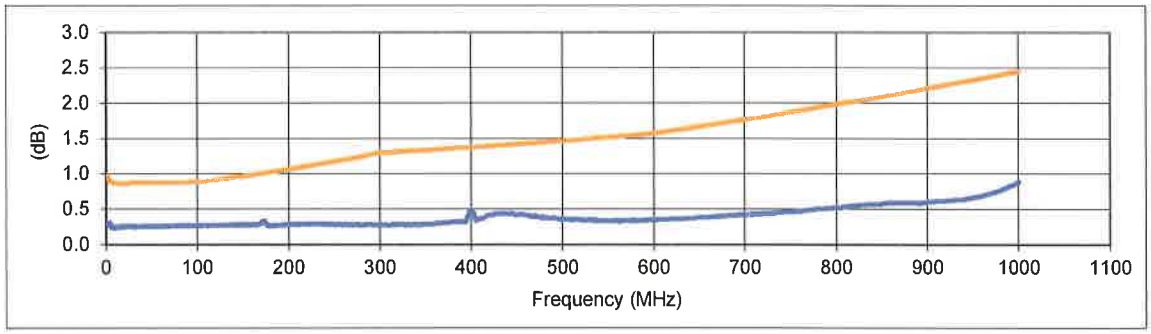
CMDMRL Artifact SN 2843438



Pass Worst margin: 0.470 at 960 MHz in pair 78. Worst accuracy at each frequency shown.

TCL

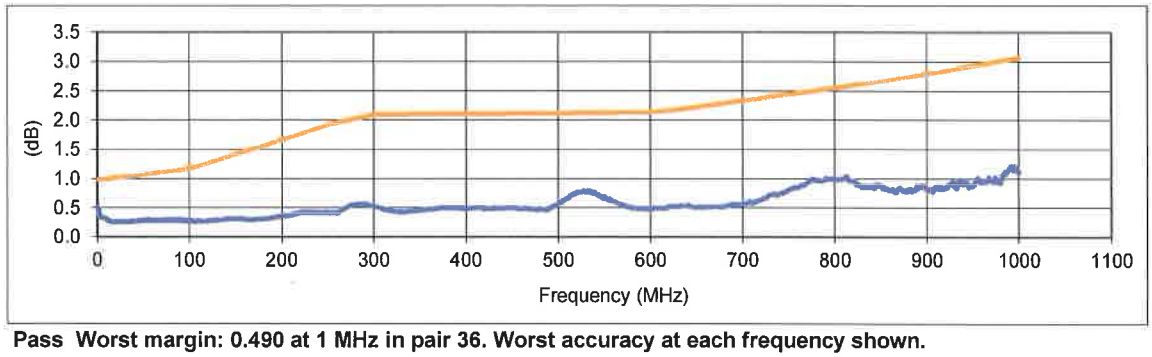
TCL Artifact SN 2843446



Pass Worst margin: 0.590 at 3.88 MHz in pair 45. Worst accuracy at each frequency shown.

IL

ILFEXT Artifact SN 2856313



Pass Worst margin: 0.490 at 1 MHz in pair 36. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

FLUKE networks

DSX Cable Analyzer

Found-Left Report

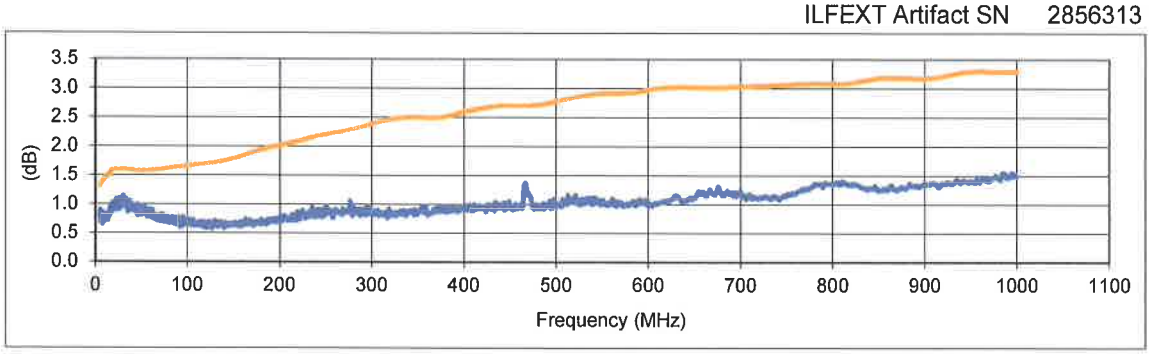
Model **DSX-5000 CAT 6A/CLASS Fa 1000MHz Copper Module**

Serial Number **3676174**

Test date 9-Feb-18

FEXT

ILFEXT Artifact SN 2856313



Pass Worst margin: 0.420 at 5 MHz in pair 12-45. Worst accuracy at each frequency shown.

Measured difference of DSX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.

Corresponding measurement accuracy requirement for nominally compliant Level IV or Level 2G/VI field tester.

Loop Resistance

Loop Resistance Artifact SN 2860529

	Measured	Expected	Limit	
Resistance on pair 12	0.05	0.00	0.80	Pass
Resistance on pair 36	50.06	49.80	0.60	Pass
Resistance on pair 45	100.01	99.80	1.60	Pass
Resistance on pair 78	453.08	453.00	4.00	Pass

Resistance imbalance

Resistance Unbalance Artifact SN 2860469

	Measured	Expected	Limit	
Resistance on pair 12	0.01	0.00	0.80	Pass
Resistance on pair 36	25.15	24.90	0.90	Pass
Resistance on pair 45	12.27	12.13	0.90	Pass
Resistance on pair 78	24.25	24.05	0.90	Pass
Resistance imbalance on pair 12	0.00	0.00	0.05	Pass
Resistance imbalance on pair 36	0.01	0.00	0.13	Pass
Resistance imbalance on pair 45	0.33	0.32	0.06	Pass
Resistance imbalance on pair 78	0.84	0.85	0.12	Pass

DSX-8000 only: M_IL and M_FEXT measurements validate the ability of the DSX-8000 to make measurements with DSX-5000 adapters.

M IL

Not applicable

M FEXT

Not applicable

Test Program TFSTest v2.3.6351

DSX Report Form v3.05 18-May-2017

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1926936**

Instrument	Description	CABLE ANALYZER
	Manufacturer	FLUKE NETWORKS
	Model	DTX-1800
	Serial Number	9480109-9480110
	Inventory Number	-
Customer	Name	FIBRATEL,
	City	MADRID
	Site Number	2316895
Order Number	RMA Number	606181963
Environmental Conditions	Temperature within	(23.0 ± 3.0) °C
	Humidity within	(45 ± 20) %rh
Calibration Procedure	Excel Certificate and traceability procedure (3.20)	
Results	The instrument meets the manufacturers published specifications at all points measured. The results of the measurements are shown on page 3 through 5.	

Date of Calibration	01 Sep 2017
Date of Recalibration	01 Sep 2018
Place of Calibration	Son
Tested by	P.A.F.R. Ansinger

Issue date: 01 Sep 2017

G.J.J. Sprik
Head of laboratory

This calibration is performed by a DEKRA certified lab for ISO 9001:2008. All measurements are traceable to national and/or international standards or have been derived by approved ratio techniques. When possible standards used for this calibration are ISO/IEC 17025:2005 accredited calibrated. This certificate may not be reproduced other than in full. Calibration certificates without signature are not valid.

Tektronix® FLUKE®

Certificate of Calibration

Data Type: FOUND-LEFT **Certificate No: 1926936**

Remarks

- The data type found in this certificate on the top of each page must be interpreted as:

As-Found	: Calibration data collected before the unit is adjusted and / or repaired
As-Left	: Calibration data collected after the unit has been adjusted and / or repaired
Found-Left	: Calibration data collected without any adjustment and / or repair performed

- If the unit under test is used under rough conditions we recommend to decrease the calibration interval period, the calibration interval (due date) is the responsibility of the end user;

- According to the European norm 'Operation of electrical installations' NEN-EN 50110-1 release 2005 and the Dutch norm NEN 3140 release 2015 paragraph 5.102.12 through 5.102.16, a safety test is not required. Therefore not performed.

Standards and test-equipment used for this calibration:

Model	Serial No	Inventory No	Due to	Certificate No
DTX ARTIFACT SET	N.A.	WP1061	02 Apr 2018	EVL333788
FTE1895	5745014	WP0758	26 Jan 2019	1726330

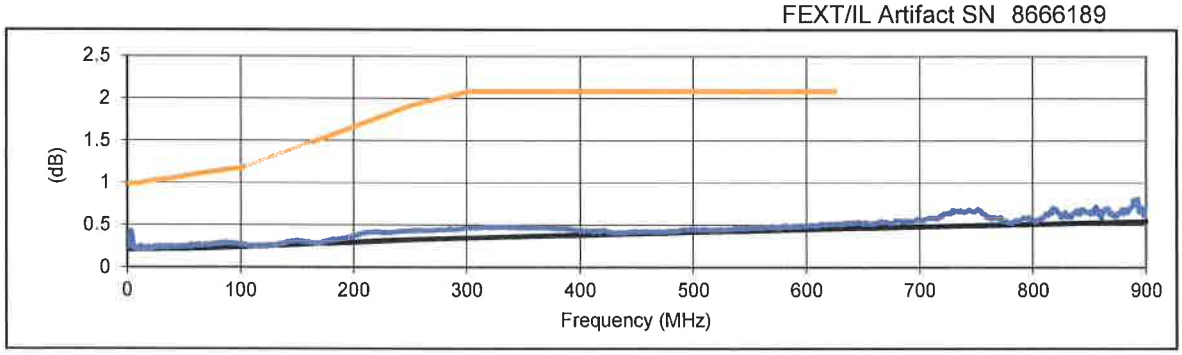
DTX CableAnalyzer

Found - Left Calibration Certification Report

Main	DTX-1800	9480109	Test Date	01 09 2017
Remote	DTX-1800R	9480110	Test Pgm	UluTest v1.3.001 12-Jun-2014

Main Insertion Loss

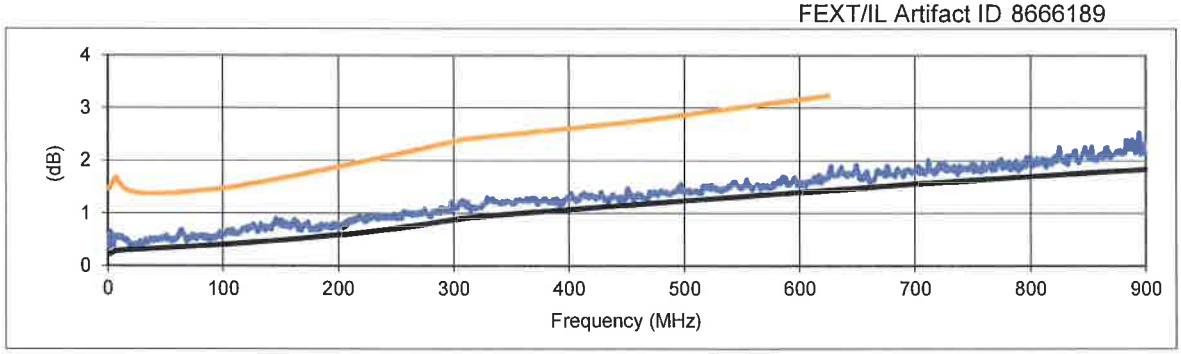
FEXT/IL Artifact SN 8666189



Pass Worst margin: 0.557 at 2.875 MHz in pair 45. Worst accuracy at each frequency shown.

Main FEXT

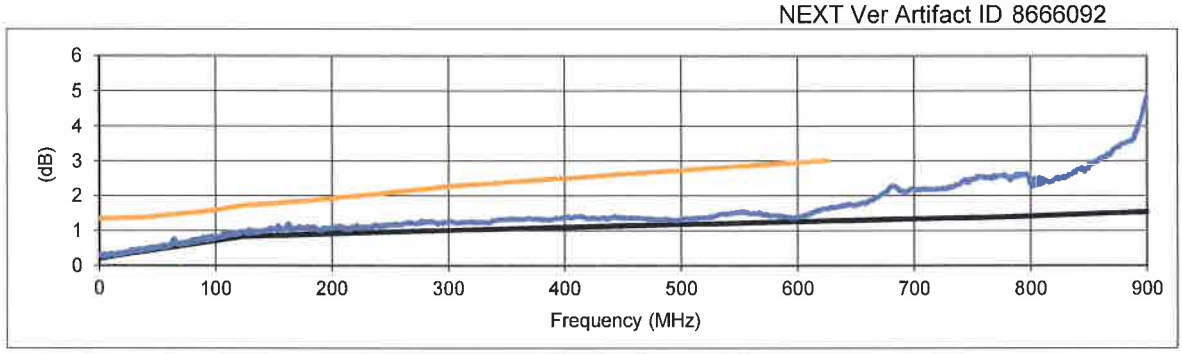
FEXT/IL Artifact ID 8666189



Pass Worst margin: 0.717 at 64.25 MHz in pair 78-36. Worst accuracy at each frequency shown.

Main NEXT

NEXT Ver Artifact ID 8666092



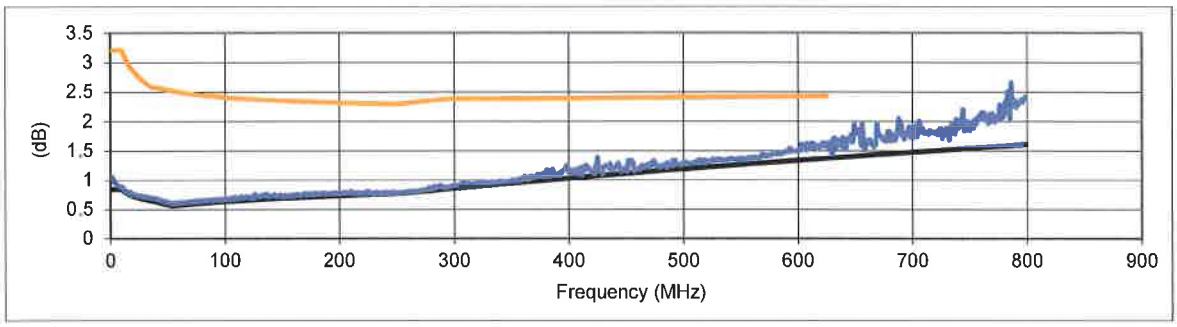
Pass Worst margin: 0.618 at 162.5 MHz in pair 36-45. Worst accuracy at each frequency shown.

Measurement accuracy requirement for nominally compliant Level IV field testers.
Measured difference of DTX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.
Estimated accuracy of reference laboratory equipment.

Main	DTX-1800	9480109	Test Date	01 09 2017
Remote	DTX-1800R	9480110		

Main Return Loss

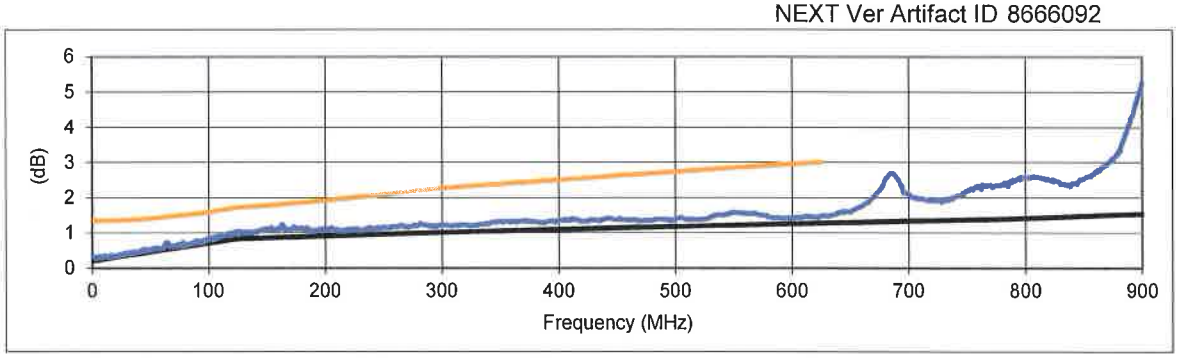
RL Ver Artifact ID 8666046



Pass Worst margin: 0.784 at 612 MHz in pair 36. Worst accuracy at each frequency shown.

Remote NEXT

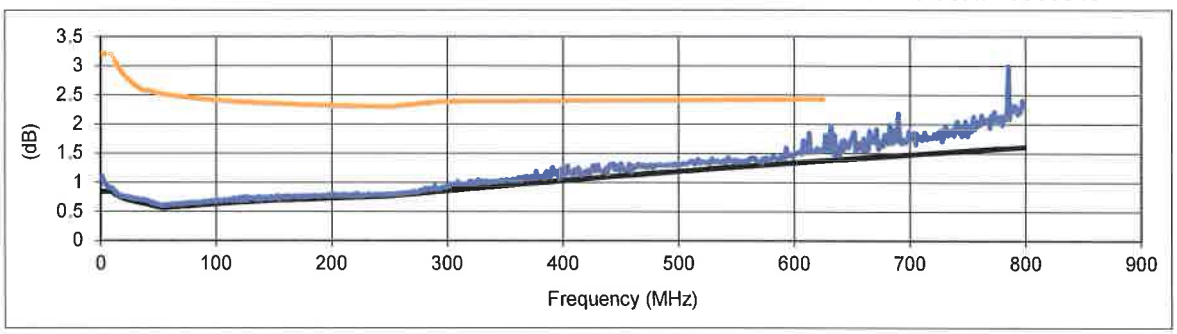
NEXT Ver Artifact ID 8666092



Pass Worst margin: 0.572 at 163 MHz in pair 36-45. Worst accuracy at each frequency shown.

Remote Return Loss

RL Ver Artifact ID 8666046



Pass Worst margin: 0.577 at 613 MHz in pair 78. Worst accuracy at each frequency shown.

Measurement accuracy requirement for nominally compliant Level IV field testers.
Measured difference of DTX and reference laboratory equipment added to measurement accuracy of reference laboratory equipment. Worst accuracy at each frequency shown.
Estimated accuracy of reference laboratory equipment.

Main	DTX-1800	9480109	Test Date	01 09 2017
Remote	DTX-1800R	9480110		

Propagation Delay

Cable Artifact Sn 5745014

	Standard	Meas	Deviation	Allow Dev	Units	Result
Pair 12	471.00	470.45	-0.55	20.00	ns	**Pass**
Pair 36	465.00	463.80	-1.20	20.00	ns	**Pass**
Pair 45	457.00	457.85	0.85	20.00	ns	**Pass**
Pair 78	456.00	455.61	-0.39	20.00	ns	**Pass**

Report version 3.0.59

LABORATORIO DE CALIBRACIÓN

CERTIFICADO DE CALIBRACIÓN

Certificate of Calibration

Número: EL180164
Number

AFC INGENIEROS S.A.
LABORATORIO DE CALIBRACIÓN

Paseo Imperial, 6 - 2º D/1 28005 MADRID
Tel: 91 365 44 05 Fax: 91 365 44 04
e-mail: afc@afc-ingenieros.com
http://www.afc-ingenieros.com

INSTRUMENTO: ANALIZADOR DE CABLES
Instrument

FABRICANTE: FLUKE
Manufacturer

MODELO: DTX-1800
Model

IDENTIFICACIÓN: EA-006 (9482045)
Identification

PETICIONARIO:
Customer

FIBRATEL, S.L.
C/ Xaudaró, 11
28034 MADRID

FECHA/S DE CALIBRACIÓN: 02/02/18
Date/s of calibration

Signatario/s Autorizado/s
Autorized signatory/ies

Fecha de emisión: 05/02/18
Date of issue

Firmado digitalmente por Jose Maria Gomez Nogales
Fecha: 2018.02.05 09:44:42 +01'00'

Jefe del Laboratorio

Realizado por: Rachid Serroukh El Yemlahi

Técnico de Calibración

INSTRUMENTO OBJETO DE LA CALIBRACIÓN:

DENOMINACIÓN:	ANALIZADOR DE CABLES
MARCA:	FLUKE
MODELO:	DTX-1800
IDENTIFICACION:	EA-006 (9482045)

MEDIOS EMPLEADOS EN LA CALIBRACIÓN:

- OSCILADOR AFCINV0299 Nº Certificado: 14321
- CONTADOR AFCINV0231 Nº Certificado: 14654
- DÉCADAS DE RESISTENCIA AFCINV0560 Nº Certificado: 13225

MEDIOS AUXILIARES EMPLEADOS EN LA CALIBRACIÓN:

- ANALIZADOR REMOTO FLUKE DTX-1800 Nº de serie: 9482046
- CABLE CARACTERIZADO CAT-6A

CONDICIONES AMBIENTALES:

Las condiciones ambientales del Laboratorio durante la calibración, fueron:

TEMPERATURA = 23 ºC ± 2 ºC

HUMEDAD RELATIVA < 70 %

PROCEDIMIENTO DE CALIBRACIÓN:

La calibración ha sido realizada con los patrones mencionados y el procedimiento específico de calibración el indicado en su manual de fabricante.

TRAZABILIDAD:

En cumplimiento de los requisitos de la Norma ISO 9001 los patrones de Referencia utilizados en la calibración, tienen certificado de calibración emitidos por Laboratorios de Calibración Nacionales e internacionales debidamente acreditados.

RESULTADOS:

Los resultados obtenidos son los que aparecen en el presente certificado y están realizados de acuerdo con los procedimientos anteriormente citados.

1.- LONGITUD DEL CABLE

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR NOMINAL		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
79,15	m	1 - 2	78,2	-1,0	1,2E-01	1,9	Si
85,32	m	3 - 6	84,0	-1,3	1,2E-01	2,1	Si
83,96	m	4 - 5	82,5	-1,5	1,2E-01	2,0	Si
81,22	m	7 - 8	80,3	-0,9	1,2E-01	2,0	Si

2.- MEDIDA DE RESISTENCIA

REFERENCIA		ANALIZADOR DE CABLES FLUKE DTX-1800					
VALOR APLICADO		PAR	MEDIDA	ERROR DE MEDIDA	INCERTIDUMBRE DE MEDIDA (±)	ESPECIFIC. (±)	CUMPLE ESPEC.
0,00	Ω	1 - 2	0,4	0,4	5,8E-02	2,0	Si
10,00	Ω		10,2	0,2	6,2E-02	2,2	Si
20,00	Ω		20,4	0,4	6,2E-02	2,4	Si
50,00	Ω		50,4	0,4	6,4E-02	3,0	Si
100,00	Ω		100,6	0,6	6,5E-02	4,0	Si
0,00	Ω	3 - 6	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,0	0,0	6,2E-02	2,2	Si
20,00	Ω		20,2	0,2	6,2E-02	2,4	Si
50,00	Ω		50,2	0,2	6,4E-02	3,0	Si
100,00	Ω		100,4	0,4	6,5E-02	4,0	Si
0,00	Ω	4 - 5	0,2	0,2	5,8E-02	2,0	Si
10,00	Ω		10,0	0,0	6,2E-02	2,2	Si
20,00	Ω		20,3	0,3	6,2E-02	2,4	Si
50,00	Ω		50,1	0,1	6,4E-02	3,0	Si
100,00	Ω		100,2	0,2	6,5E-02	4,0	Si
0,00	Ω	7 - 8	0,1	0,1	5,8E-02	2,0	Si
10,00	Ω		10,1	0,1	6,2E-02	2,2	Si
20,00	Ω		20,1	0,1	6,2E-02	2,4	Si
50,00	Ω		50,2	0,2	6,4E-02	3,0	Si
100,00	Ω		100,1	0,1	6,5E-02	4,0	Si

3.- COMPROBACIÓN DEL TIEMPO DE PROPAGACIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	378 ns	- - -	498 ns	Si
3 - 6	406 ns	- - -	498 ns	Si
4 - 5	399 ns	- - -	498 ns	Si
7 - 8	388 ns	- - -	498 ns	Si

4.- COMPROBACIÓN DE LA DIFERENCIA DE RETARDO

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	ERROR DE MEDIDA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	0 ns	- - -	44 ns	Si
3 - 6	28 ns	- - -	44 ns	Si
4 - 5	21 ns	- - -	44 ns	Si
7 - 8	10 ns	- - -	44 ns	Si

5.- COMPROBACIÓN DE LAS PÉRDIDAS DE INSERCIÓN

ANALIZADOR DE CABLES FLUKE DTX-1800				
PAR	MEDIDA	FRECUENCIA	ESPECIFIC. (<)	CUMPLE ESPEC.
1 - 2	30,6 dB	500 MHz	43,8 dB	Si
3 - 6	29,5 dB	500 MHz	43,8 dB	Si
4 - 5	28,8 dB	500 MHz	43,8 dB	Si
7 - 8	32,1 dB	500 MHz	43,8 dB	Si

6.- COMPROBACIONES EFECTUADAS

MAPA DE CABLEADO	CORRECTO
NEXT	CORRECTO
PS NEXT	CORRECTO
ACR-N	CORRECTO
PS ACR-N	CORRECTO
ACR-F	CORRECTO
PS ACR-F	CORRECTO
AUTODIAGNÓSTICO	CORRECTO

La incertidumbre expandida de medida se ha obtenido multiplicando la incertidumbre típica de medición por el factor de cobertura k=2 que, para una distribución normal, corresponde a una probabilidad de cobertura de aproximadamente el 95%. La incertidumbre típica de medida se ha determinado conforme al documento EA-4/02 M: 2013.

OBSERVACIONES:

El equipo queda dentro de las especificaciones dadas por el fabricante en las magnitudes en las que se indica.