



Why DMR?

A graphic of a silver shield with a red and yellow radio icon in the center, emitting three black signal waves from the top right corner.

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JUNE 17, 2021

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DMR System Design, Leonardo S.p.A.

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WHY DMR?

**Modern – Digital - Future proof – High Performance –
Feature Rich - Highly Spectrum Efficient – Fits in
existing Analogue Licencing - Secure – Value for
money**

**And for the Accountants/Shareholders - Low Risk
of ownership**

How?



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Wide choice of
Manufacturers
Promotes Competition

Open Standards
guarantee
Interoperability –
User can mix
manufacturers

Open Published ETSI
Standard

Competition Promotes
Quality

Competition Creates
Value for money



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How many Manufactures offer DMR and want your business?



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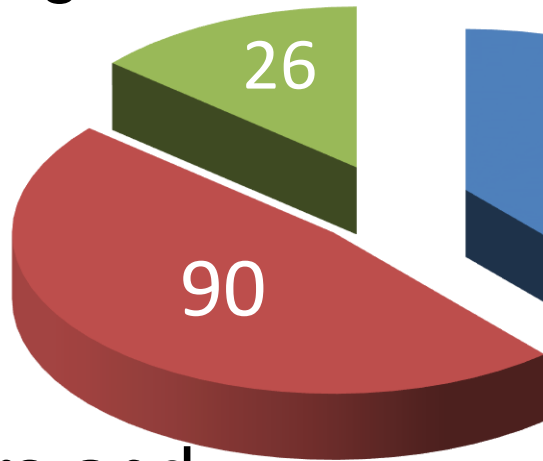
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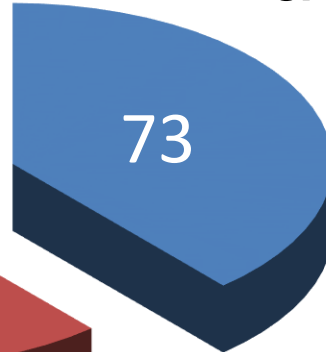


ETSI DMR Manufacturers

System Integrators



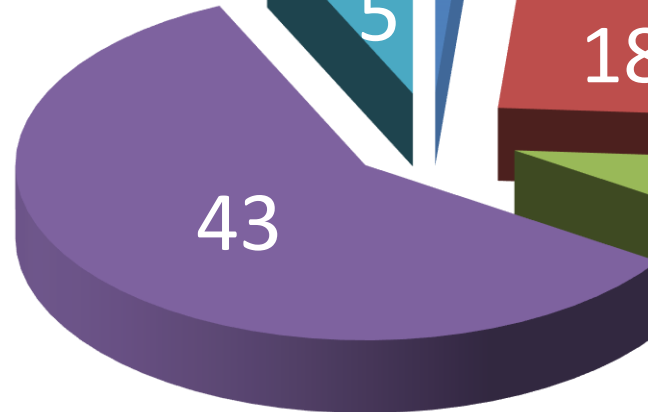
DMR Manufacturers



Users and Operators

Far East

Manufacturers

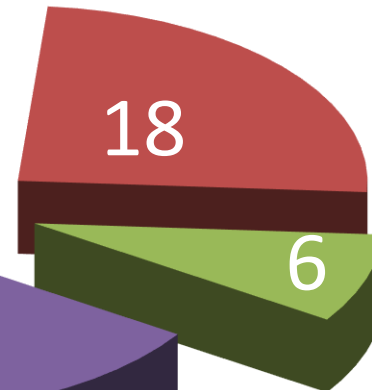


Eastern Europe

Australasia



Europe



North America



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21st century digital radio standard

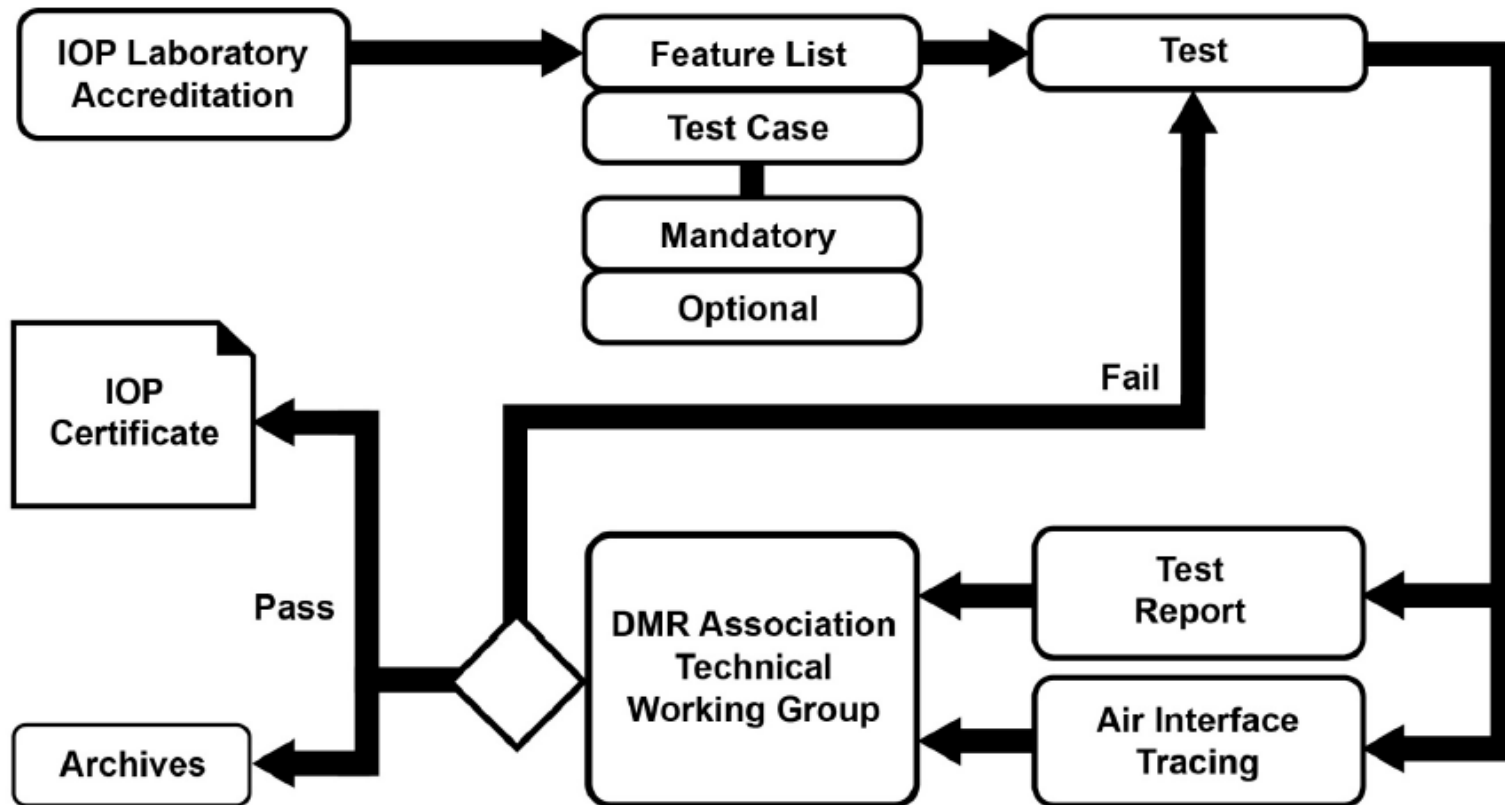
- We work with our members, worldwide, to ensure that DMR Digital Mobile Radio is the most widely supported digital business radio standard
- Our members are companies, organisations and individuals who use or build DMR products professionally or those working to support the DMR standard in other ways
- By using a combination of education, awareness, certification and interoperability training we operate to make sure that business buyers of today's digital radio technology have the security of knowing that they are investing in the future
- We're here to ensure that DMR products exist within a successful, open, multi-vendor chain

The DMR Association: Mission and Objectives

For DMR we do:

- Operate an equipment interoperability testing and certification program
- Communicate with the user community to capture new requirements
- Enhance the feature set of DMR with new functions.
- Offer education and updates about the standard
- Give advice to regulators to ascertain an environment in which the technology can flourish

The DMR Association: The Interoperability Process



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The DMR Association: The Interoperability Test Cases

Test case 4: Emergency Pre-Emption of Payload Channel with Reverse Channel Signalling. Multi-Site

Test case id: @IOP_T3_Emergency_PreEmption_PayloadChan_RevChanSig

Procedure

- 1) Set-up the trunking system so that on Site 1 only one control channel and two payload channels on a separate frequency pair are available. Also ensure that at least two payload channels are available on Site 2. This can be either achieved by the system restricting access to certain channels or “occupying” the channel by a mobile that is not part of the actual test setup.
- 2) Set up a group call on MS 6 to talkgroup ECHO and initiate a transmission
- 3) Set up a group call on MS 4 to talkgroup DELTA and initiate a transmission
- 4) Confirm that MS 5 can hear and clearly understand MS4’s transmission. MS 1, MS 2 and MS 3 can not hear MS 4’s transmission.
- 5) End talking on MS 4.
- 6) While no MS is transmitting in the call from MS 6 to talkgroup ECHO and no MS is transmitting in the call from MS 4 to talkgroup DELTA, initiate an emergency group call from MS 1 to Talkgroup CHARLIE.
- 7) **Pass Criterion:** The manufacturer specific information on the radios shows that one of the normal calls on Site 1 has been ended.
- 8) **Pass Criterion:** The manufacturer specific information on MS 1 shows that the emergency call has successfully been set up
- 9) **Pass Criterion:** Confirm that MS 2 and 3 can hear and clearly understand MS 1’s transmission.
- 10) End the call from MS 1.
- 11) **Pass Criterion:** The manufacturer specific information on MS 1 shows that the call has ended and has left the payload channel and that the trunked system releases the payload channel resource.



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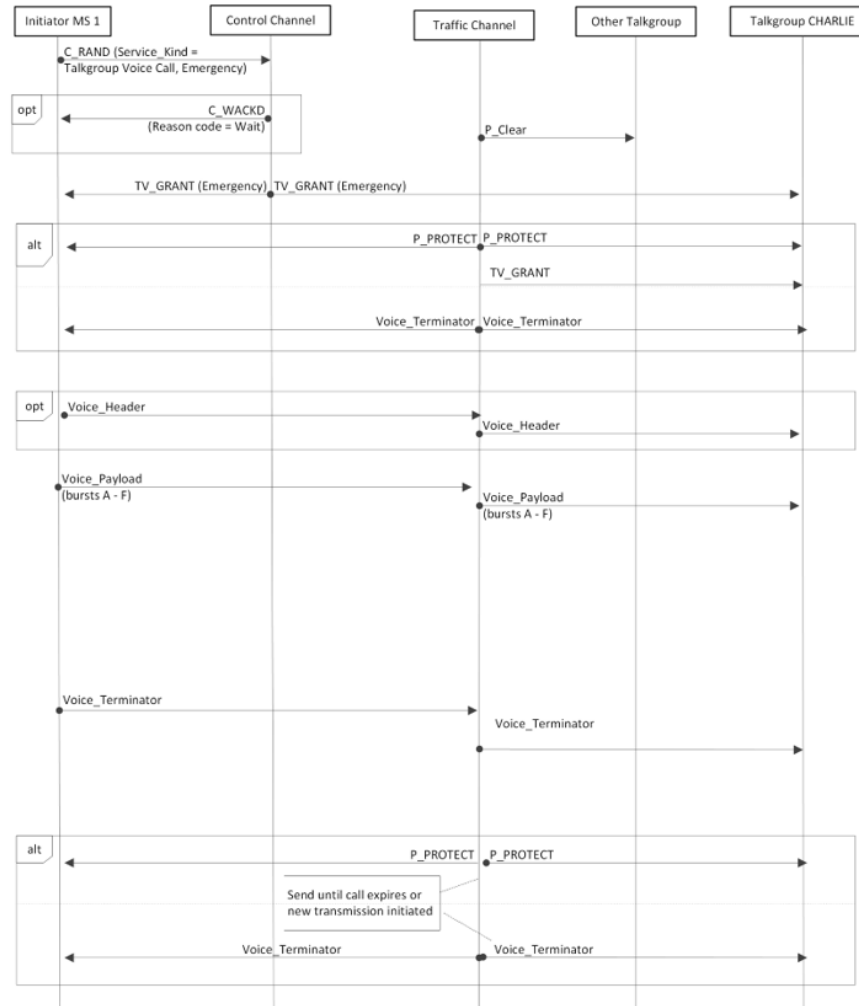
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The DMR Association: The Interoperability Test Cases

MSC Emergency Talkgroup Voice Pre-empting Payload Channel, Site 1, Part 1



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The DMR Association: The Interoperability Air I/F Tracing

No.	Time	Source	Destination	Protocol	Length	Info
65	9.539188000	192.168.0.1	192.168.0.100	DMR	86	INBOUND - CSBK - C_RANDOM: GRP_V_SRV from 3

Frame 65: 86 bytes on wire (688 bits), 86 bytes captured (688 bits) on interface 0
Ethernet II, Src: Prod-El_00:23:6a (00:16:64:00:23:6a), Dst: 38:63:bb:b9:37:c7 (38:63:bb:b9:37:c7)
Internet Protocol Version 4, Src: 192.168.0.1 (192.168.0.1), Dst: 192.168.0.100 (192.168.0.100)
User Datagram Protocol, Src Port: scp-config (10001), Dst Port: scp-config (10001)
Digital Mobile Radio Protocol (DMR), Tracer Release: Selex-ES Tracer 2 (PAT2)

Time Stamp Packet : 9628590 cells (1203573,750000 ms)

DMR Time since beginning of capture: 9540,000

Physical Layer (Layer 1), Channel: Inbound Data

Data Link Layer (Layer 2), Burst Type: CSBK

Color Code: 0

Payload after BPTC (196,96) Decoding: 9f 00 00 01 00 00 03 00 00 03 6f 97

Last Block (LB): 1 - Protect Flag (PF): 0 - Manufacturers Feature ID (MFID): 00

Checksum: CRC 16 - CCITT, (0x6f97) [correct]

Call Control Layer (Layer 3)

Tier III PDU type: C_RANDOM (Random Access Request)

Service_Kind: 0x1 (GRP_V_SRV - Talkgroup Voice Call Service)

Service_Options: 0x00

EMERG: 0 (Non-emergency service)

PRIVACY: 0 (Text/Voice plain)

SUPED_SV: 0 (No Supplementary_user data Transfer Service required for this call)

BCAST_SV: 0 (Non-broadcast service)

OVCM_SV: 0 (Non-OVCM call)

PRIORITY_SV: 0 (Normal -low- priority)

Proxy Flag (PROXY): 0 (Number of Extended BCD digits for addressing through a gateway = 1 to 20)

Appended Supplementary_Data (SUPED_VAL): 0 (Number of appended UDTs required to transport supplementary_user data)

Ambient Listening Service (ALS_SERV): 0 (Ambient Listening Service not requested)

Target_address: 3 [0x000003]

Source_address: 3 [0x000003]

Common Announcement Channel (CACH)

TDMA Channel: TS1

Inbound Signal (MS Sourced): No more CACH Information



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The DMR Association: Relationship with ETSI

The signatories:

ETSI (The European Telecommunications Standards Institute) produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, broadcast and Internet technologies. Our standards enable the technologies on which business and society rely. ETSI is an industry-led standards development organization with a membership of over 850 manufacturers, network operators, service providers, research bodies, regulatory bodies and universities from 65 countries. ETSI aims to produce globally applicable standards and is officially recognized by the European Union as a European Standardization Organization.

The Digital Mobile Radio Association (**DMR Association**) is a global non profit industry association dedicated to promote the success of DMR technology by removing barriers to interoperability and supporting innovation and adoption of DMR. The Association is operating an interoperability testing and certification program to guarantee a genuine multi-vendor market for DMR equipment. By using a combination of education, awareness, certification and interoperability training, the Association operates to make sure that business buyers of today's digital radio technology have the security of knowing that they are investing in the future.

Overall objective:

ETSI and the **DMR Association** have the common objective to perform and promote, directly or indirectly, regional and international standardization with the aim of contributing to the establishment of a global information infrastructure.

ETSI and the **DMR Association** co-operate in the area of digital mobile radio systems and work together for their mutual benefit. Furthermore the parties may seek to encourage and develop collaborative activities in various ways, including the exchange of ideas and expertise in relation to the European Union's policy towards standardization in general.

ETSI and the **DMR Association** have noted the necessity of structuring and strengthening their relationship and fostering a closer co-operation.



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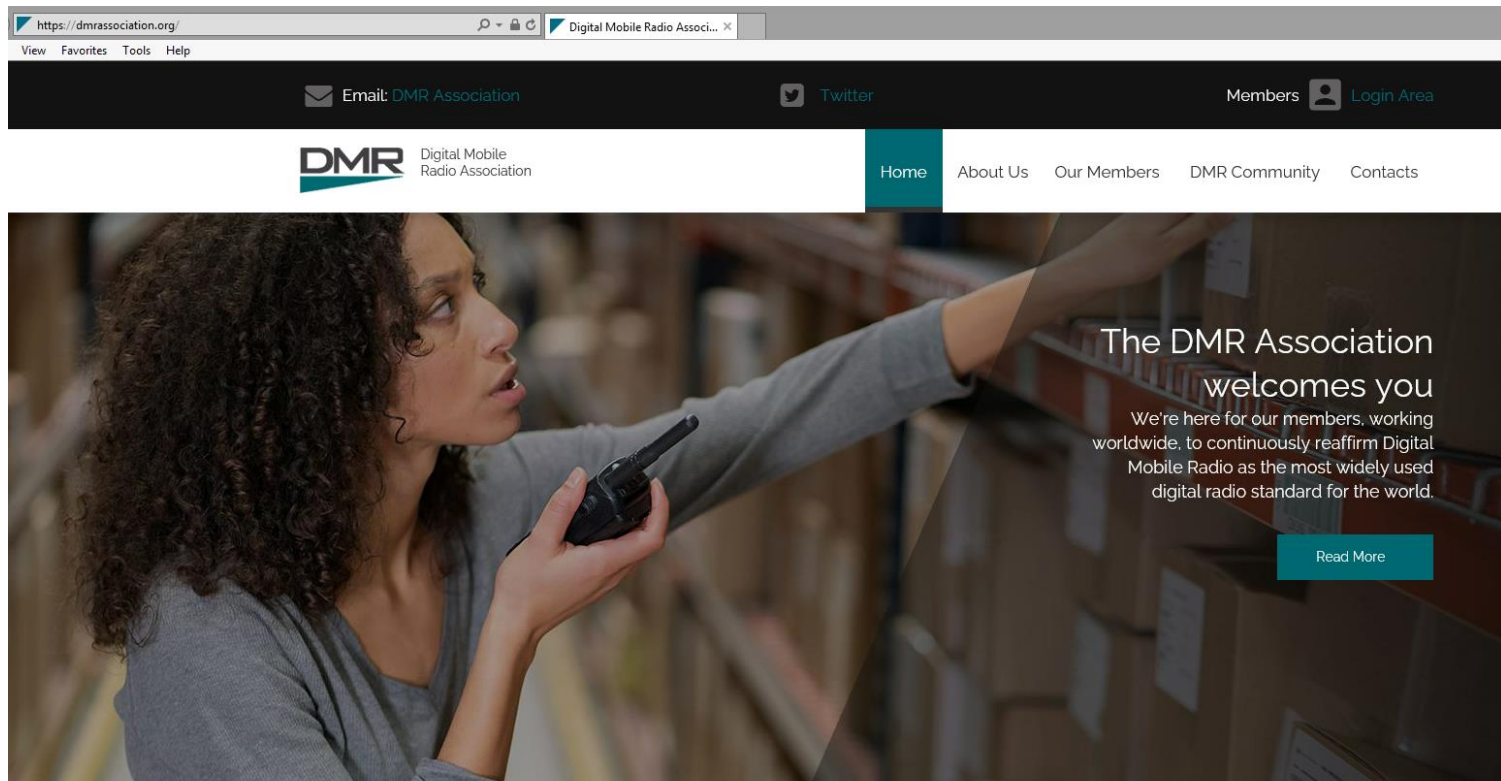
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The DMR Association: Website



Digital Mobile Radio (DMR) is trusted by over 15 Million Users

Welcome to the DMR Association; we're here for our members, working worldwide, to continuously reaffirm Digital Mobile Radio as the most widely used digital radio standard.

We began in 2005 as a group of market leading public mobile radio manufacturers to support ETSI during the DMR standardisation process.

The DMR Association's Technical Working Group works constantly on the Interoperability process, providing standards certification for manufacturers, the majority of which is at the highest Tier 3 specification. Membership is open to all organisations or individuals where DMR is a regular part of their business and for those working to support the professional use of the DMR standard in other ways.



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The DMR Association: Website - Members

The screenshot shows a web browser window with the URL <https://dmrassociation.org/dmra-members.html>. The browser's address bar includes search, lock, and refresh icons. Below the address bar is a navigation menu with links for "View", "Favorites", "Tools", and "Help". The website header features a dark background with an email icon and the text "Email: DMR Association", a Twitter icon and "Twitter", and a "Members" link with a user icon and "Login Area". The main navigation bar includes the DMR logo (Digital Mobile Radio Association) and links for "Home", "About Us", "DMR Community" (highlighted in teal), and "Contacts".

Members of the DMR Association

- > **Category 1** – Full Members, Manufacturers
- > **Category 2** – Application Developers, System Integrators, Test Equipment Manufacturers, Test Houses
- > **Category 3** – Users, Regulators and Operators
- > **Non Member** – Partnerships

+ Category 1 members:

+ Category 2 members:

+ Category 3 members:

+ Non Member Partnerships



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The DMR Association: Website Documents

https://dmrassociation.org/dmr-documents.html

View Favorites Tools Help

Email: DMR.Association Twitter Members [Login Area](#)

DMR Digital Mobile Radio Association

Home **About Us** DMR Community Contacts

DMR Documents

DMR Association Whitepapers

- [DMR Radio Performance Characteristics & Channel Sharing with other Radio Types](#)
- [FCC Narrowbanding Mandates](#)
- [Benefits and Features of DMR](#)
- [DMR Interoperability Process V1.1 \(2018\)](#)
- [Why choose Private Digital PMR Networks over Public Network](#)

[\(Presentation\) Critical Communications Russia 2020](#)

- [DMR Tier III Standard and Case Studies \(presented by Alessandro Guido\)](#)

[\(Presentation\) PMR Expo, Cologne, Germany; 26 to 28 November 2019](#)

- [Powerful new features in the ETSI DMR standards \(presented by Tom Johnson\)](#)

[\(Presentation\) 19-20 September 2019 - XIII International Forum Moscow](#)

- [New functions of DMR Tier III \(presented by Alessandro Guido\)](#)

[\(Presentation\) IWCE USA 2019](#)

- [DMR Tier III A Global Standard for Critical Communications](#)



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The DMR Association: Website - IOP Certificates

The screenshot shows a web browser window with the URL <https://dmrassociation.org/iop-certificates-and-test-results.html#>. The page header includes the DMR Association logo, navigation links (Home, About Us, DMR Community, Contacts), and social media links (Email: DMR Association, Twitter). The main content area is titled "Certificates and Summary of the Test Results" and contains a "Please Note" section. Below the note is a search bar for certificates, currently set to "By Certificate Date", and a list of years from 2010 to 2020, each with a plus sign and a horizontal line below it.

Certificates and Summary of the Test Results

Please Note: Starting from session 2018-001 IOP up to 2020-002 certificates are digitally signed and protected against modification using a GlobalSign CA2 certificate. From 2020-003 onwards all documents are signed using DocuSign. A certificate's authenticity can be verified by opening the document in Adobe Acrobat DC or Adobe Acrobat Reader DC. The document signing certificate information will be visible at the top of the certificate page. For any queries on the validity or authenticity of DMRA IOP certificates please contact the Chair of the Technical Working Group twgchair@dmrassociation.org. Furthermore note that from session 2018-001 all Tier 3 IOP sessions include the version of TS 102 361-4 supported during the test session which allows the viewer to determine version compatibility.

Search for Certificates By Certificate Date

- + 2020
- + 2019
- + 2018
- + 2017
- + 2016
- + 2015
- + 2014
- + 2013
- + 2012
- + 2011
- + 2010



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The DMR Association: Website Sections Visits

What pages do user visit?

Page	Page Views
/	5,282
/dmr-standards.html	1,851
/dmra-members.html	1,573
/index.html	992
/product-showcase.html	835
/dmr-key-benefits.html	657
/iop-certificates-and-test-results.html	595
/about-dmra.html	413
/dmr-documents.html	409
/dmr-iop-certification.html	315

Last 90 days



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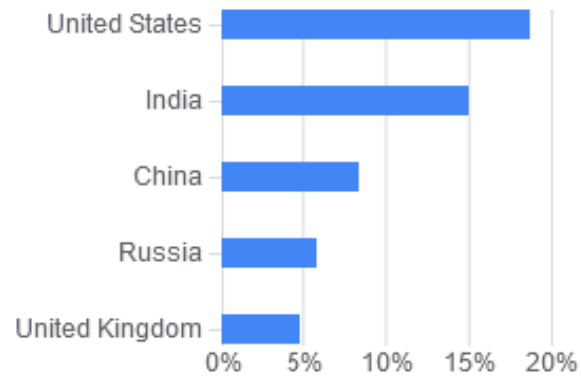
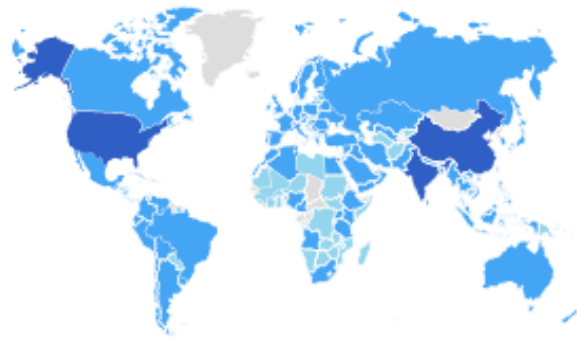
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The DMR Association: Geographical Areas of Website Visitors

Visits by Countries



Last 90 days



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ETSI DMR Fundamental Motives

Interoperability with a wide choice of manufacturers



Mature and Global Presence – 15 million users



**Fits in existing narrow band licenced channels.
2 in 12½kHz**



High performance with value for money



Voice security built in



Proven by a huge catalogue of case studies



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Thank you!

alessandro.guido@leonardocompany.com
<https://dmrassociation.org>