

MUSICA® The diagnosis is in the details

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Every image counts and every patient deserves the best care. With MUSICA® image processing and the MUSICA® Workstation, you can deliver the image quality and content needed for a confident diagnosis, within a seamless and efficient workflow

In making diagnosis, radiologists rely on the quality and content of the images produced by radiography systems. Suboptimal images lead to reduced diagnostic value, and every retake has a 'cost' to the patient.

In the end, it is always about taking care of the patient in the best way possible. And that can only happen when you 'take care' of all the aspects involved in making medical images.

Delivered with every Agfa direct radiography (DR) and computed radiography (CR) solution, MUSICA® supports each user, so that radiology can play its critical role in ensuring the best patient care, within the complex health ecosystem. Co-developed with the input of many end-users, supported by Agfa's long history and expertise in medical imaging, the MUSICA® portfolio – MUSICA® image processing and the MUSICA® Workstation – uses the latest technologies to enable a fluid, intuitive workflow in which 'one image is all it takes'.

"Gold-standard" image processing: a tradition of innovation

For decades, MUSICA® has continuously taken image processing to the next level, with software that automatically and consistently produces optimized images. A truly intelligent solution, MUSICA® provides the high-quality images needed to support diagnosis, while saving both time and effort. That's why once customers have experienced the MUSICA® difference, it becomes their preferred go-to for future projects.

As imaging technology and acquisition systems have advanced, so has MUSICA®. Its newest generation offers features, benefits and technologies to match your evolving needs.



MUSICA® image processing:

- > Excellent image quality
- > State-of-the-art
- > Intelligence, independence and evolution
- > Improved performance for difficult image areas
- > Supports both static and dynamic imaging



Easy, intuitive, intelligent: the MUSICA® Workstation

The MUSICA® Workstation is the 'nerve center' of all your Agfa DR and CR imaging systems. If offers you a single, intuitive interface for general radiography, fluoroscopy, mammography and full leg/full spine (FLFS) exams. All functionalities are available in just a few clicks. Quick previews reduce time between exposures, and help increasing throughput. The result is a lower cost per exam and faster patient experience.



The MUSICA® Workstation:

- > Enhanced productivity and workflow
- > A single, intuitive interface for smooth, efficient imaging
- > Easy adjustment, with no need for intensive training
- > Quick previews that reduce time between exposures, and thus increase throughput
- > Everything needed is available with just a few clicks
- > Lower costs per exam and faster patient experience

I am a

- ✓ radiologist
- radiographer
- hospital manager

For radiologists, seeing is believing: MUSICA® image processing

With the MUSICA® portfolio, Agfa covers the complete range of X-ray imaging, from general radiography, fluoroscopy, mammography to full leg/full spine (FLFS) exams. Dedicated packages, technologies and applications help ensure the best image quality, even for more specific and complex imaging tasks.



MUSICA®2: improving the overall visibility of clinically relevant structures

MUSICA^{®2} uses a multi-scale, layered representation of an image to enable **precise control** over many aspects of an image's 'look', improving the overall visibility of clinically relevant structures.

- Always delivers consistent, high quality results, independent of collimation or direct exposure areas (image background).
- Its focus on the enhancement of subtle contrasts enhances the visibility of all clinically relevant structures, regardless of frequency content – revealing details that might otherwise remain undetected.
- Combined with this excellent image quality, MUSICA®2 offers maximum ease of use and optimum image output every time, regardless of collimation, body part, modality or patient position. It automatically gets the parameters it needs directly from the input image, analyzes the characteristics of each image, and optimizes the processing parameters.
- MUSICA^{®2} can be flexibly finetuned to match tastes and preferences, enabling more comfortable and faster reading, a smoother imaging workflow, enhanced departmental productivity, and improved diagnostic confidence.
- Through MUSICA® and Agfa's DR technology optimal measurable image quality can be achieved at just 50% of the prescribed German reference dose.

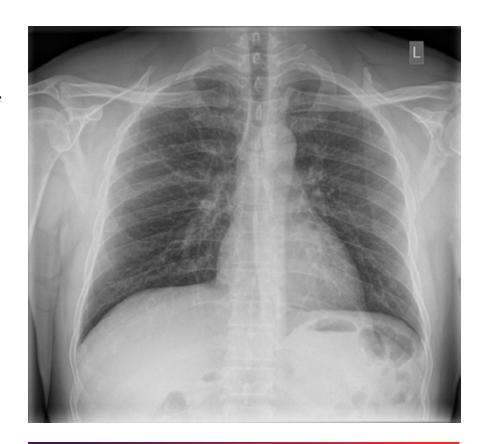


MUSICA®2:

- > No configuration required
- > Self-adaptive: virtually no radiographer or radiologist interaction is needed
- > Covers all body parts and exam types
- > Excellent generic image quality

MUSICA®3: revealing the subtle details in images

MUSICA®3 uses Fractional Multiscale Processing (FMP), which further decomposes image components into microscopic fractions for separate processing. The result is excellent image quality that lets you see and distinguish the elusive details in images. Subtle contrasts are enhanced, revealing things that might otherwise be hidden, and giving more diagnostic information from images.



MUSICA®3:

- > Better viewing of challenging areas
- > Balanced presentation of both bone and soft tissue
- > Excellent rendering of overlapping bone structures
- > Visualization of subtle details in abdomen
- > True presentation of implants with clear bone interfaces
- > High level of detail in the mediastinum





MUSICA®3+: dedicated packages to get the most from your challenging exams

MUSICA®3+ is all about getting the most out of every image — even when dealing with difficult exams and areas. Dedicated packages offer

improved results for gridless exams, bariatric patients and transversal acquisitions. Improved contrast for extremities and difficult chest areas delivers greater lung detail, a more homogenous presentation of all tissue (including overlapping bone structures), and a more detailed and natural presentation of soft tissue.

MUSICA®3+ packages

- > MUSICA®3 Skeleton+
- > MUSICA®3 Chest+
- > MUSICA®3 Abdomen+





MUSICA®3 Skeleton+

Low penetration and high scatter in examinations of large-sized patients in particular can reduce detail.

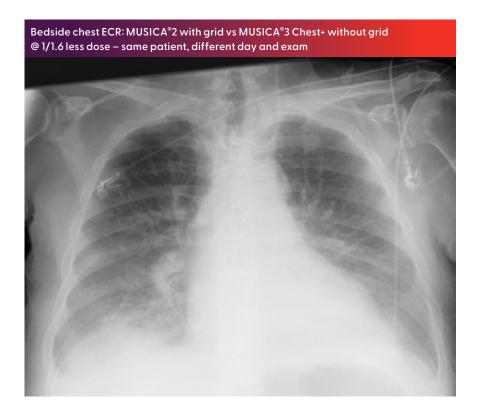
MUSICA®3 Skeleton+ enhances the difficult areas. Suitable for all spine, pelvis and rib examinations, it provides more detail in trabecular structures and delineation of vertebrae.

The result is diagnostic quality images for every patient.

MUSICA®3 Chest+

This special package for non-grid bedside imaging compensates for the impact of scatter and produces an image that resembles the image quality of an exposure made with a physical anti-scatter grid.

- Delivers significant improvement in image contrast for bedside chest images of normal-weight to larger-size patients taken without an anti-scatter grid.
- Reduces the need for bulky grids, thereby also lowering the associated radiation dose.
- Avoids the risk of misaligned grids, which can result in grid artefacts, long exposure times and lower-quality images, especially for larger-sized patients.
- Makes it easier and faster to position the detector, resulting in enhanced patient comfort and a faster, smoother workflow.







MUSICA®3 Abdomen+

High scatter in X-rays of larger-sized patients can reduce the visibility of subtle abdominal details and organ margins. MUSICA®3 Abdomen+ enables better visualization of abdominal X-ray examinations, without over-enhancing irrelevant detail and noise, especially for large-sized and for bariatric patients.

The result is sharper delineation of the bowel wall; clear and simultaneous presentation of both dense and non-dense areas; improved visualization of the kidneys, liver and bladder; as well as enhanced presentation of catheters, sutures, stents, stoma, clips balloons etc.





MUSICA®3 Neonatal

MUSICA®3 Neonatal image processing was developed for improved reading of low dose images such as for newborn infants, facilitating optimal rendering of lung tissue, abdomen, and bone structures in the same X-ray image. This improves visualization of organ boundaries and free air, as well as clear lung markings typical for the respiratory stress syndrome.







MUSICA®3 Catheter processing

The dedicated MUSICA®3 Catheter processing creates an extra, non-diagnostic thorax AP/PA image to facilitate fast and reliable recognition of lung catheters. The second image can be sent as a complement to the softcopy station in the same DICOM series.





MUSICA® goes dynamic

For more than 20 years, MUSICA® has been helping you get more from your images, with market leading image quality at the lowest dose reasonably achievable and a smooth, efficient workflow. Agfa Radiology Solutions also brings those benefits to dynamic and semi-dynamic procedures, such as fluoroscopy and tomosynthesis.

Advanced technologies

- > Dynamic MUSICA® for fluoroscopy
- > Digital Subtraction Angiography (DSA) and roadmaps
- > Digital tomosynthesis (DTS)

Dynamic imaging (fluoroscopy)

Dynamic MUSICA® for dynamic imaging is available on the DR 800 multitool for digital imaging, for both pulsed and continuous fluoroscopy.

The patented Dynamic Multiscale Enhancement™ (DME) offers a new approach for enabling optimal dynamic image quality at the lowest possible radiation dose.

Dynamic imaging creates new challenges for optimal image processing, building up the framework of a dynamic series of images, rather than the one-shot acquisition of static processing. Dynamic imaging thus has a temporal nature, meaning specific care must be taken for both the beginning of the dynamic series, and for variations of basic image quality within the series. The latter can include differences in patient thickness and absorption, as well as

the presence of diagnostic or interventional devices that move, such as catheters or needles.

DME offers a unique dose efficiency concept that provides fluoroscopy sequences with consistent, good signal-to-noise performance at decreased dose levels. The product consistently delivers superior image quality at low radiation doses, surpassing even the stringent German DIN standards.





Digital Subtraction Angiography and roadmapping

MUSICA®'s Digital Subtraction Angiography (DSA) and roadmapping further extend the possibilities of dynamic imaging on the DR 800.

Digital subtraction angiography (DSA) is a fluoroscopy technique used in interventional radiology to clearly visualize blood vessels in a bony or dense soft tissue

environment. Images are produced using contrast medium by subtracting a 'pre-contrast image' or mask from subsequent images, once the contrast medium has been introduced into a structure.

Roadmapping is a technique used to assist live wire and catheter guidance in fluoroscopy images. It is included in the MUSICA® application as a separate workflow. Agfa's patented DME noise suppression concept supports

low-dose/low-noise fluoroscopy images, including for the projected vessel roadmap.

MUSICA® DSA and roadmapping are suitable for all exam types, except neurology and cardiology. There are options available for adapting and optimizing vessel contrast and brightness, as well as tools for image correction (pixel or mask shift, landmarking, etc.). A minimum/maximum opacity feature (full vessel tree) completes the toolset.

DSA Example | Image: Control of the control of the



Digital Tomosynthesis (DTS)

Digital tomosynthesis (DTS) is an add-on imaging feature to Agfa's DR 800 and DR 600 X-ray rooms. It extends one-directional, 2D-projection radiography with a two-dimensional sweep that provides information in an additional (z-) direction.

DTS produces image slices through an object or body using a direct digital (DR) imaging system with a digital semi- or full dynamic flat-panel detector. This is done by making a larger number (typically between 23 and 46) of low-dose image acquisitions across a range of projection angles of the X-ray tube, followed by an interactive reconstruction algorithm that creates thin slices in coronal direction. The diagnostic reconstructed slices are postprocessed to obtain 2D-like image quality and appearance. DTS is, in this sense, an add-on imaging feature to commonly available DR systems.

Tomosynthesis enables the selection of a small (15 degrees) or large (22 or 30 degrees) system-dependent sweep angle and a slice thickness between 2 and 9 mm. For the subsequent (post-exposure) reconstruction, three quality levels are available: low, medium and high. Each offers different levels of detail and reconstruction times (from 30 to 90 seconds).

MUSICA® image processing then automatically processes the final reconstructed slices, which are transferred to the image archiving system for diagnosis, together with the 2D X-ray images. DTS is suitable for all typical Genrad body parts.













The radiographer's three steps to optimal images: the MUSICA® Workstation

Radiologists rely on the quality and content of the images the radiographer acquires, to make a confident diagnosis. Optimal X-ray images are created step by step: positioning, exposure, image

Built with the input of the radiographers who use it, the workstation puts Agfa's long history of experience in medical imaging to work for every user, so that the best patient care can be delivered, even under complex or demanding conditions. And as technologies and standards evolve, so does the MUSICA® Workstation, to ensure a consistently fluid and intuitive workflow.

Within the process of image creation, these 3 main steps are important:









Step 1: Positioning

Poor positioning accounts for as much as 68% of image rejections. But accurately positioning the collimation area can be difficult, especially with obese patients or for lateral views. Occasionally, the patient may move after being positioned. These

challenges can result in low-quality images and the need for retakes.

The MUSICA® Workstation supports smart tools that guide the radiographer to fewer clicks, fewer rejects, greater image consistency, and more.



SmartPositioning™ offers an augmented live view of the patient. Smart overlays project the image area onto the patient's body. The resulting augmented reality image also shows the location of the system's active exposure control cells. Just before pressing the exposure button, the radiographer can confirm at a single glance that the patient hasn't moved from the original, optimal position.



SmartAlign™ is also a key support during the positioning step, providing guidance for tube and panel alignment. It enables projection consistency in mobile and free exposures, to avoid problems with:

- Unwanted variation in projections, which can make it difficult to compare images with later, follow-up exams:
- Unwanted anatomical superposition, increasing the risk of retakes.

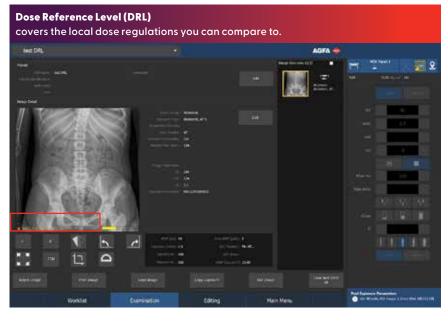
Step 2: Exposure

A good exposure technique is essential to get an optimal image. It guarantees the transmission of the minimal necessary dose to achieve the diagnostic image quality required by the radiologist.

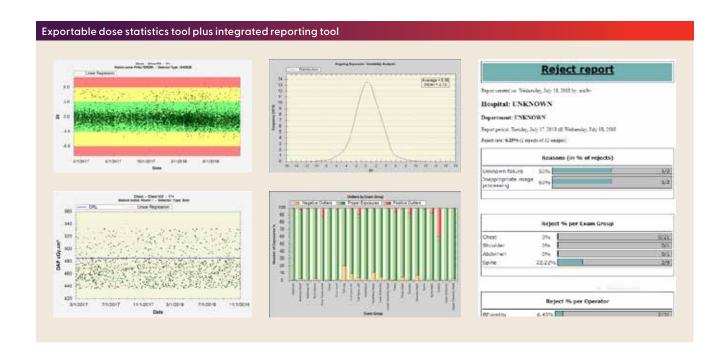
The MUSICA® Workstation includes quality control tools that not only help maintain and improve image quality, but also ensure the performance of your imaging department on the machine level, through the identification and correction of potential quality issues. Online feedback, periodic quality evaluations, and statistical analyses support early detection of quality issues.

The Workstation also provides an indication of appropriate detector dose immediately after exposure, assisting you with **dose monitoring**.









Step 3: Image processing

With the high-performance, automatic MUSICA® image processing, radiographers do not have to adjust and re-adjust multiple minor yet influential parameters to get optimal and consistent images. At the same time, MUSICA® sets the parameters based upon the content of each individual image, rather than using

standard, 'one-size-fits-all' settings — which could in many cases result in sub-optimal image quality.

Radiographers retain the option to set parameters, but can be confident that MUSICA® will extract the best out of every image, leaving them free to focus on other aspects of their role.

Efficiency, workflow and peace of mind

The MUSICA® Workstation offers radiographers what they need to put their time and effort where they can make the most difference:

- It acts as an assistant, looking over the radiographer's shoulder to provide support and a 'second eye'
 while the radiographer remains in full control.
- It offers a 'one-click' workflow: the radiographer simply clicks on an exposure, and the workstation prepares all the components (modality, generator, detector processing parameters, etc.) according to the predefined parameters.
- The soft console offers a full overview of the settings and allows the radiographer to easily adapt them to the situation and condition of the patient.
- The workstation supports

 SmartRotate™, which presents
 each image ready for viewing,
 automatically. SmartRotate™ uses
 a Deep Neural Net to interpret the
 image contents, and then rotates
 the image accordingly. By reducing
 postprocessing actions, the radiographer saves time and can focus
 on imaging, not rotating. This also
 ensures the images are consistently
 presented on the PACS for the
 radiologist.

A single interface, designed with the radiographer in mind

With the MUSICA® Workstation, the radiographers have everything they need, right at their fingertips: one source — one screen — one view — one flow — one logic. No scattered information over multiple screens, no unnecessary information. It's the perfect solution to deliver simple, effective and supportive workflows in the most demanding environments.

And it's the same proven, intuitive, customizable interface for all the Agfa Radiology Solutions equipment in your hospital: from ergonomic mobile units to high-productivity ceiling-suspended X-ray rooms; from static to dynamic imaging.

Full integration

The MUSICA® Workstation is fully integrated according to standards, allowing an automated and efficient workflow.

- DICOM compliance:
 The MUSICA® Workstation supports seamless integration with both RIS and PACS (DICOM), with fully automated and customized connections.
- IHE compliance:
 The Workstation allows
 automated documentation of
 patient dose via Structured
 Dose Reporting.



Optimize, improve, excel: MUSICA® benefits throughout the hospital

A safe, secure and high-quality experience for every patient

Data and IT safety issues can have far-reaching effects, including the risk of financial losses, missed or delayed diagnoses or wrong treatments, loss of departmental productivity, loss of reputation, and more.

Agfa Radiology Solutions supports hospitals in their goal to offer every patient a safe and high-quality healthcare experience.



 30%¹ of serious radiology "wrongevents" are due to patient identification errors. All MUSICA® Workstations (including those in our mobile systems) offer robust patient identification tools that use a barcode reader to scan patient wristbands.

- Integrated dose management tools reduce the risk of wrong patient exposures and the workload needed for recording radiation incidents.
- The MUSICA® workstation embeds the SmartXR® and ScanXR™ functionalities to screen patients for pathologies that require immediate action or are underdiagnosed.
 Patient care is enhanced, and workflows are optimized.





ScanXR™: faster identification and notification of suspected pathologies²

In times of growing healthcare staff shortages, radiology reporting delays tend to increase. Prioritizing patients at risk from a critical or underdiagnosed pathology is thus critical. The ScanXR™ portfolio intelligently assists clinicians and radiologists to accelerate the notification of certain pathologies that tend to be underdiagnosed or that need to be treated immediately, including suspicious pathologies in chest X-rays and automated osteoporosis screening.

- 1 Pennsylvania Patient Safety
 Authority (2011) Pennsylvania
 Patient Safety Advisory, Applying
 the Universal Protocol to Improve
 Patient Safety in Radiology.
 ECRI Institute, 8, 63-69.
- 2 Not all ScanXR functionalities are available in all regions. Contact your local sales representative for availability in your area.

SmartXR®: an intelligent radiography workflow assistant

With hospitals and radiology departments under growing pressure from radiographer shortages, you need to find ways to optimize workflows, while delivering quality that keeps your referring physicians satisfied. The SmartXR® portfolio puts smart technology to work for you, to support operational efficiency and clinical consistency.

Excellence in compliance

The rules governing hospitals and healthcare in general are increasingly strict. Ensuring compliance with HIPAA, the GDPR, data security requirements, etc. is a critical responsibility for hospital administration. Agfa offers you peace of mind, by:

- Following DISA (Defense Information Security Agency) guidelines for the MUSICA® Workstation.
- Using robust security tools for remote service connection and scanning for vulnerabilities.
- Enabling traceability by automatically identifying users in the workstation, with Imprivata OneSign.

Attract, train and retain the best staff

From onboarding new hires to enabling the continuous improvement of your radiographers, you need to ensure that you maintain the high quality of the images delivered to clinicians and referring physicians. The MUSICA® Workstation gives you the data you need to improve procedures and plan training programs.

- Detailed information on trends, with extended dose reports;
- Remote access through the Central Monitoring Station, to enable the centralization of information from multiple units, without the need to physically travel to the unit carrying out the exposure;
- Automatic identification of the user, which simplifies data analysis and avoids duplication.

Reduce overheads, with smooth user access

MUSICA® Workstations enable you to standardize the workflow across the hospital, using the single sign-on licenses in your Agfa X-ray modalities.

MyAgfaRadiologySolutions

The MUSICA® workstation is connected to a web-based portal. You can access all the data in your MUSICA® Workstations on the MyAgfaRadiologySolutions portal. With a glance at the dashboard, the self-service portal empowers you to enhance process efficiency, streamline operations, prepare for upcoming maintenance and audits, and increase the satisfaction of everyone using your Agfa solutions.



https://agfaradiologysolutions.com/



Conclusion

Agfa's MUSICA® Workstation serves the needs for all clinical parties involved in creating an X-ray image in the most efficient and optimal manner. Its state-of-the-art tools and features support radiologists, radiographers and hospital IT personnel to optimize their tasks and focus their efforts on their shared goal: offering every patient a safe and high-quality healthcare experience.

For the radiologist:

Agfa Radiology Solutions' MUSICA® takes image processing to the next level, delivering software that automatically and consistently produces optimized images. It stands for excellent diagnostic quality, using state-of-theart image processing technology and techniques such as FMP (Fractional Multiscale Processing).

MUSICA® guarantees the highest level of image detail, while maintaining full image consistency. With MUSICA®2, MUSICA® 3 and MUSICA® Dynamic, Agfa covers the complete range of X-ray imaging, from general radiography, fluoroscopy, mammography to full leg/full spine (FLFS) exams. Dedicated packages including MUSICA® Plus, Neonatal and Catheter processing, help ensure the best image quality for more specific and complex imaging tasks. Dynamic MUSICA®, DSA and roadmapping processing are available on the DR 800 multitool X-ray room, while Digital Tomosynthesis is available on both the DR 800 and the DR 600 top performance room.

MUSICA®'s value and quality have been proven globally, with more than **65,000 users** worldwide. **Whitepapers** and other healthcare sector literature underpin the outstanding capability of this 'gold standard' image processing to contribute to fast and confident diagnosis.

For the radiographer:

Agfa Radiology Solutions' MUSICA® Workstation is the radiographer's trusted partner for efficiently acquiring and managing image workflows in the X-ray department. It offers a 'one-click' radiographer workflow for optimal image acquisition and processing for any x-ray image.

The radiographer's MUSICA®
Workstation is built on three pillars.

- 1. Smart features including

 SmartPositioning™ or

 SmartAlign™ aid in effectively

 handling and positioning both the

 patient and the X-ray device.
- 2. Dose relevant information like Dose Area Product (DAP) and Exposure Index (EI) are instantly available with every single image. **Extended dose monitoring** can be used to effectively track, analyze and optimize X-ray dose across time, departments, and users.
- 3. MUSICA®'s self-adaptiveness
 requires minimal interaction to
 create the final, processed image.
 Tools and visual aids assist the
 radiographer to concentrate on the
 patient rather than time-consuming image manipulation. In addition, SmartRotate™, based on a
 Deep Neural Network, ensures that
 every image is perfectly oriented.

For hospital management:

Agfa Radiology Solutions offers a variety of **IT features** that support hospitals' patient care goals.

Embedded functionalities including the intelligent SmartXR® and ScanXR™, and robust tech and patient identification tools. With the barcode reader, for example, the caregiver can scan the patient's wristband to retrieve patient information prior to an examination, safely and effectively.

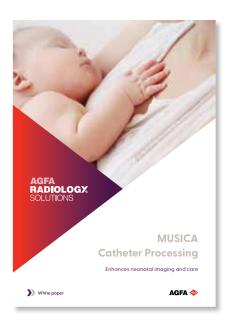
Agfa supports the hospital's **compliance** requirements for HIPAA, the GDPR, and other data security obligations.

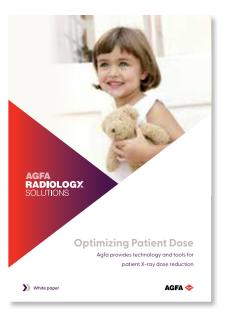
Tools and features are available to improve procedures and plan training programs, such as extended dose reports and remote access through the NX Central Monitoring Station.

MUSICA® Workstation is connected to the self-service

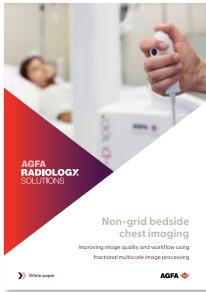
MyAgfaRadiologySolutions portal,
which empowers the user to enhance process efficiency, streamline operations, and prepare for upcoming maintenance and audits.

An overview of our MUSICA white papers

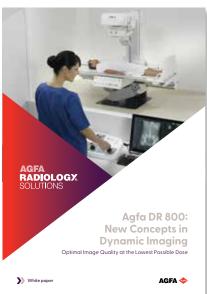
















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