

MapCHECK 2™

Raising the Bar in IMRT QA

The leader in quick and precise measurement of modulated radiotherapy beams

Benefits

- › Proven solution for film-less rotational delivery and IMRT QA
 - More than 1500 installations worldwide
 - More than 9 years of clinical use
 - More than 60 published papers
 - MapCHECK is a turn-key solution
- › SunPoint™ Diode Detectors
 - Smallest detector available (0.000019 cm³)
 - Highest sensitivity
 - Proven stability
- › Familiar and efficient software (SNC Patient)
 - Single click comparisons
 - Advanced software features such as structure filter analysis and MLC QA
- › Arc delivery QA capable
 - When used with MapPHAN™, MapCHECK 2 becomes arc enabled

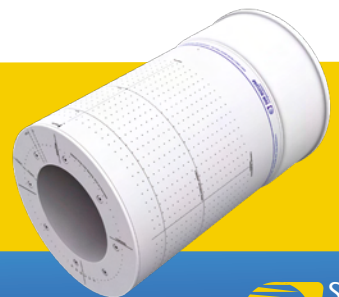
Sets up in Minutes and Easy to Use

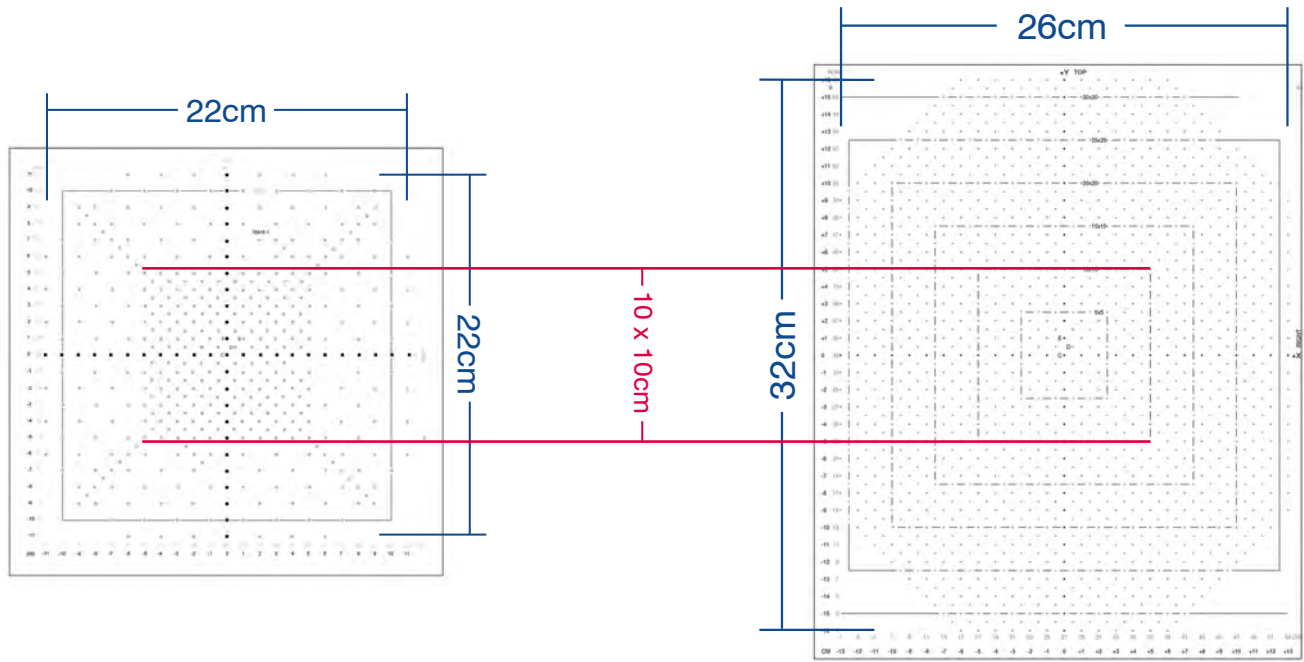
- › Portable and lightweight
- › Single power/data cable
- › No pre-irradiation or warm-up required for absolute dose measurements

Stable User Calibration

- › Sun Nuclear's patented 15 minute method
- › No need to send back to manufacturer
- › Typically calibrated once per year

Ask us about ArcCHECK™
for 4D arc delivery QA





MapCHECK

SunPoint Diode Detectors
445
7.07 inside 10 x 10cm
14.04 outside 10 x 10cm
22.0 x 22.0cm
Integrator

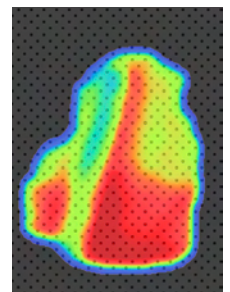
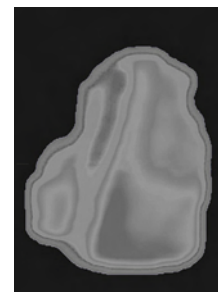
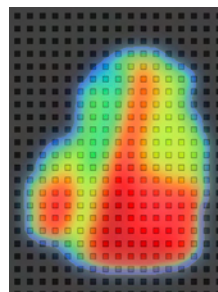
Detector type
Detector quantity
Detector spacing (mm)
Field size
Sampling rate

MapCHECK 2™

SunPoint Diode Detectors
1527
7.07 uniform throughout array
32.0 x 26.0cm
50ms

SunPoint Diode Detectors: The Right Choice for QA & Dosimetry

Smaller detectors provide pinpoint sized sampling of dose data proven to detect errors over an entire field, both in and out of gradient. Attempts to measure the entire field by increasing the detector size creates a blurred measurement in dose gradients. Such measurements are counter-productive to accurate and useful dose sampling.



Benefits of SunPoint Diode Detectors:

- > **Smaller Active Area**
- > **Better Sensitivity**
- > **Thinner Active Thickness & Volume**
- > **Less Drift**
- > **No Dose Volume Averaging**

Chambers ▶

Ion chamber measurements lack high-resolution, resulting in a blurred measurement

EPID/Film ▶

EPIDs and film have good density and resolution, however absolute dose, accuracy, uniformity and reproducibility need to be verified

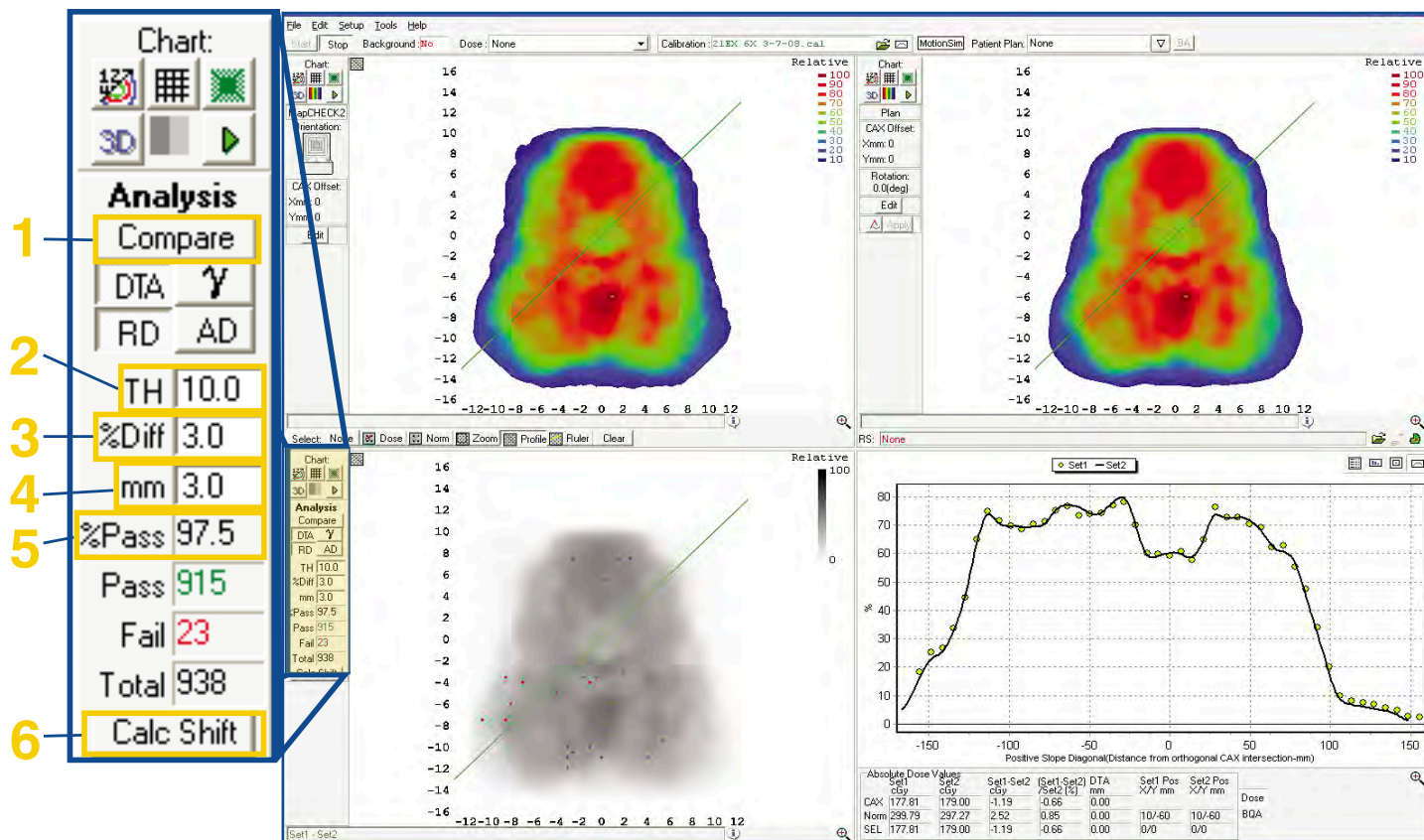
Diodes ▶

Diodes are capable of accurate, reproducible high-resolution measurements. MapCHECK 2 uses SunPoint™ Diode Detectors

*For detailed information on SunPoint Diode Detectors, please ask for our Sun Point Diode Detectors white paper document

Software

With a single mouse click, SNC Patient software compares measured dose points to planned dose points. Users can compare normalized data or absolute dose data using distance to agreement or Gamma. Three adjustable criteria guarantee maximum flexibility and are easily adjusted. Measured points that do not fit within the acceptance criteria are highlighted **red** for high dose and **blue** for low dose.



1 Compare: Measure and then click compare to see the results against the planned file

2 TH: Isodose percentage line that defines the dose area to evaluate

3 % Diff: Percent acceptance criterion between Set 1 and Set 2 dose values

4 mm: Distance-to-agreement criterion

5 % Pass: Percentage of detector points that passed within the defined threshold with a pass/fail indication

6 Calc Shift: Determines a misalignment between measured & planned dose maps and automatically corrects if accepted by the user

Standard Software Features

- > Arc delivery QA Support
- > Flatness and symmetry (Beam QA)
- > Histograms
- > Isodose overlay/subtraction
- > MLC QA
- > File management
- > Gamma analysis
- > Film analysis (including gafchromic)
- > Structure filter analysis
- > EPID image analysis
- > Profiles
- > User calibration
- > Reports (including PDF)
- > Batch analysis
- > Metrics tools

Advanced Features

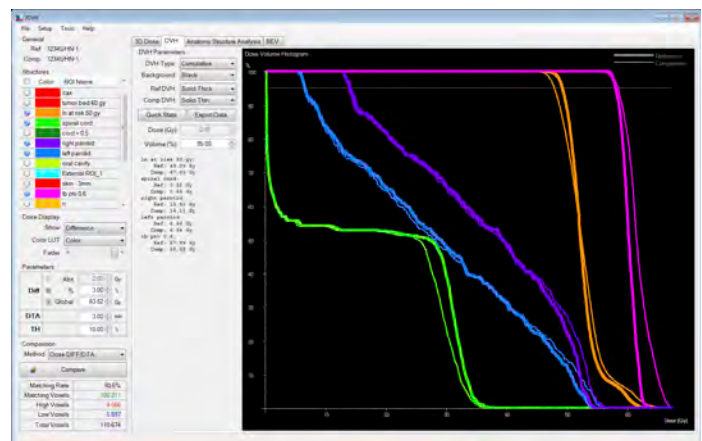
Feature	MapCHECK 2
1 File Manager	●
2 Batch Analysis	●
3 Structure Analysis	●
4 SunMETRIC™	●
5 MLC QA	●
6 Alignment Error Detection	●
7 Advanced Film Analysis	●
8 Beam QA	●
9 Stable User Calibration	●
10 EPID / CR Import	●
11 2D Dose Calculations	● (with MapCALC)
12 EPID to Dose Conversion	● (with EPIDose)
13 3DVH™ - 3D & DVH Analysis	●
14 Arc Delivery Enabled	● (with MapPHAN)
15 Motion Features	● (with MotionSim)
16 DICOM Server	●
17 SPLIT Feature	●

- 1 File Manager:** Easily manage QA files per patient with File Manager
- 2 Batch Analysis:** Using File Manager, perform a Batch Analysis on all fields
- 3 Structure Analysis:** Scrutinize QA results in relation to critical structures

- 4 SunMETRIC:** Quantify pass/fail decisions with a customizable scoring metric
- 5 MLC QA:** Perform MLC QA using the picket fence method
- 6 Alignment Error Detection:** Find alignment and setup errors using Calc Shift
- 7 Advanced Film Analysis:** Scan, analyze, and compare film in dose mode
- 8 Beam QA:** Instant flatness and symmetry analysis
- 9 Stable User Calibration:** Array calibration performed by the user without having to send back to factory
- 10 EPID / CR Import:** Import Computed Radiography and EPID files for comparison
- 11 Calculations:** Perform 2D dose calculations
- 12 EPID to Dose Conversion:** Convert EPID images to dose using EPIDose* and compare to plan
- 13 DVH Analysis:** Complete 3D patient dose and analysis with 3DVH
- 14 Arc Delivery Enabled:** Use MapCHECK 2 with MapPHAN for RapidArc®, VMAT and TomoTherapy®
- 15 Motion Features:** When used with MotionSim*; study QA target motion and gating effects
- 16 DICOM Server:** Provide time-savings and workflow efficiencies by 'listening' for DICOM files
- 17 SPLIT Feature:** Allow automatic separation of fields from composite measurement

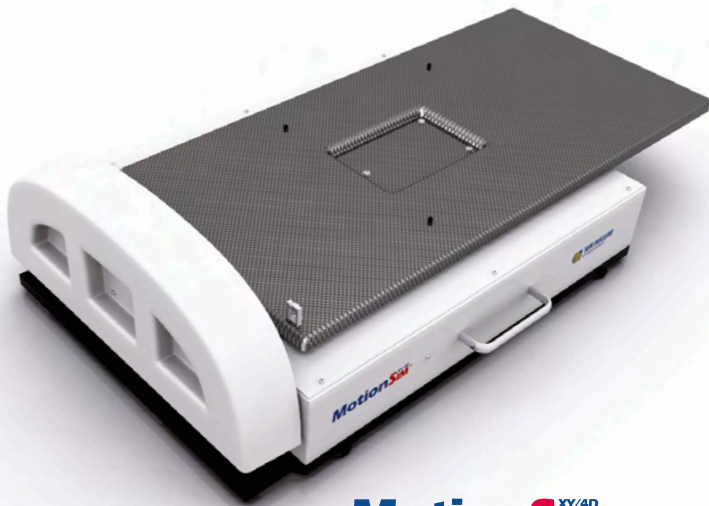
DVH Analysis (3DVH)

3DVH is a patented (U.S. Patent No. 7,945,022) method that enables the comparison of measured and planned DVH's without the complications of a secondary dose algorithm. The planned DVH is extracted from the DICOM patient plan file, then compared to the MapCHECK measured DVH result.

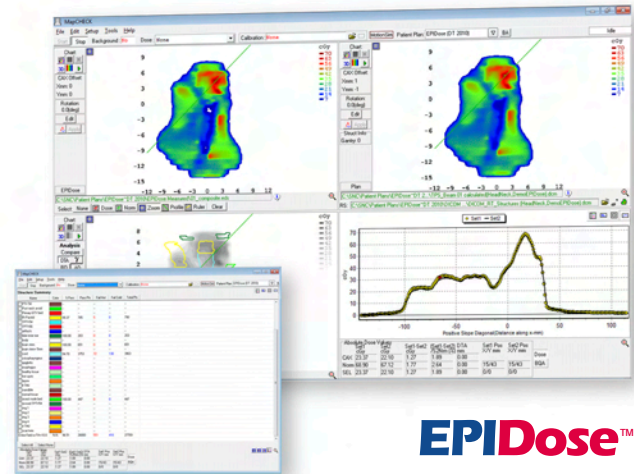


*MotionSim, EPIDose, and DVH analysis are, MapCHECK 2 accessories

Options



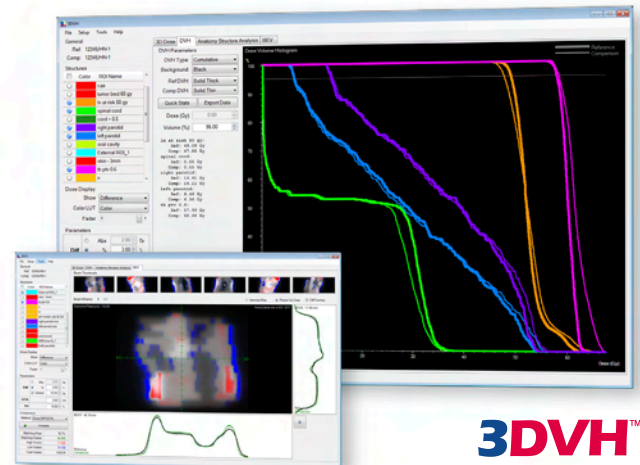
MotionSim^{XY/4D}
 Target Motion, Gating & Imaging QA
 > Reproduce actual target motion
 > Commission gating systems



EPI Dose™
 The Absolute in EPID Dosimetry

IMF™

- > Position the MapCHECK 2 at isocenter
- > Measure at any gantry angle



3DVH™
 Complete 3D Patient Dose Analysis

MapPHAN™

A water equivalent phantom that adapts any MapCHECK 2 for RapidArc®, VMAT, and TomoTherapy®. Setup time is fast and measurement may occur in coronal and sagittal orientation.

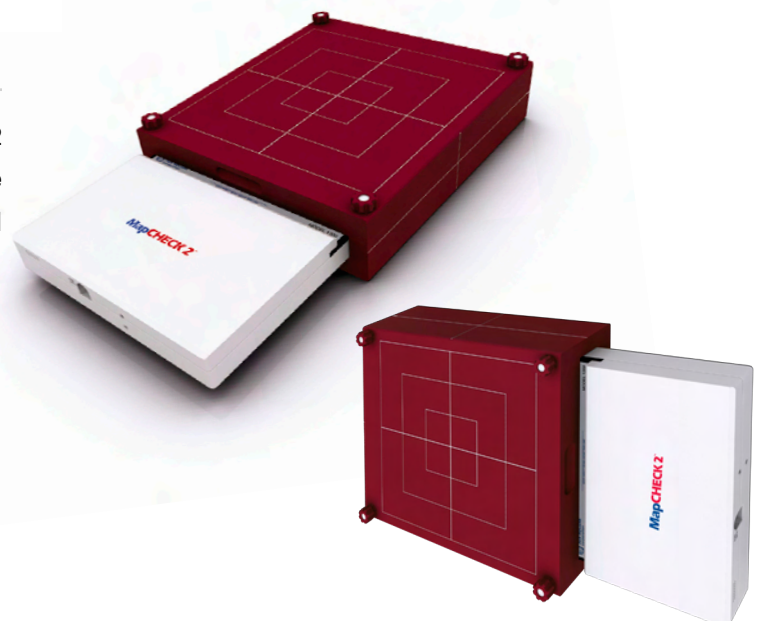
MapCHECK 2 with MapPHAN

Construction: Virtual Water

Available depths (cm): 5.0, 10.0

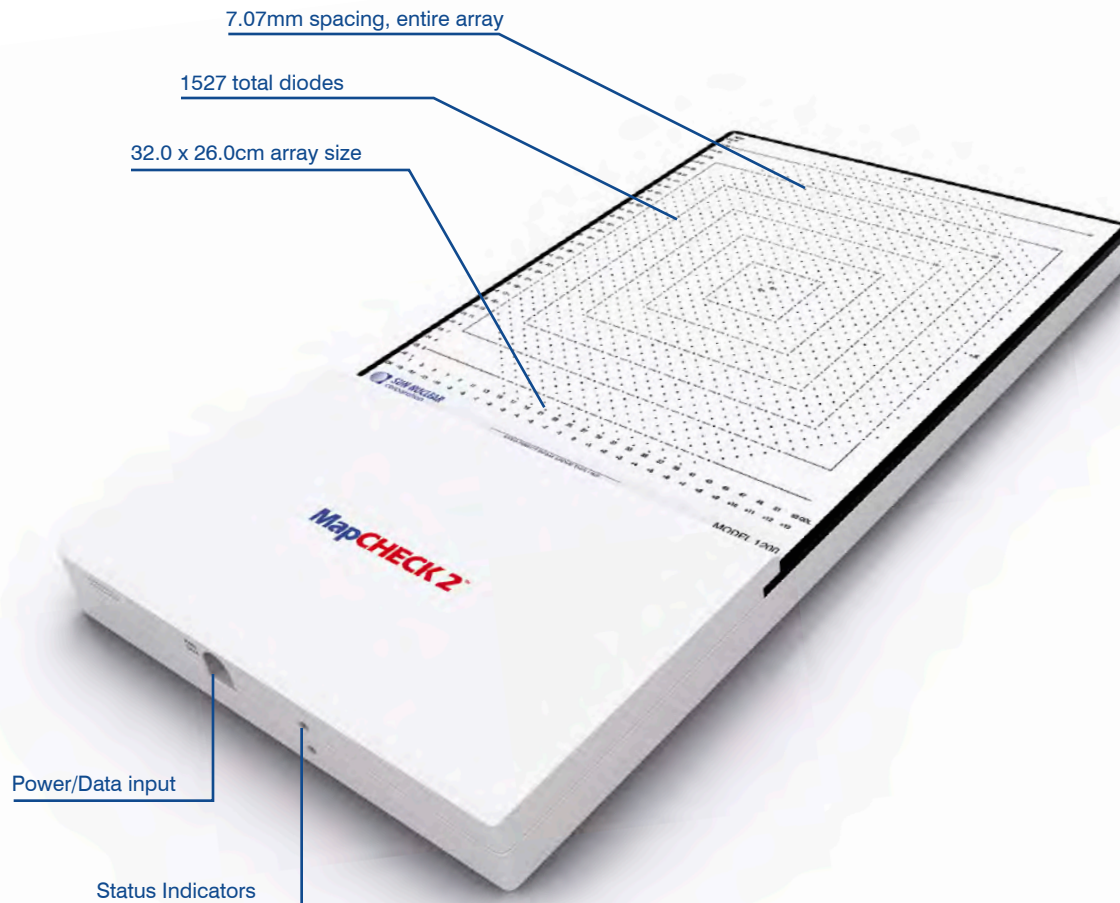
Area (cm²): 35.0 x 38.0

Weight (kg): 8.0 (5cm)
 21.0 (10cm)



*All clinical examples analyzed at 3%/3mm gamma in absolute dose

Features and Specifications



Detector type:	SunPoint Diode Detectors
Detector quantity:	1527
Field size (cm):	32.0 x 26.0
Array geometry (cm):	<ul style="list-style-type: none"> • Detector spacing parallel to X and Y axes: 1.0 • Row spacing offset: 0.5
Detector spacing (mm):	7.07 (uniform throughout array)
Active detector area (mm ²):	0.64
Active detector volume (cm ³):	0.000019
Detector sensitivity (nC/Gy):	32.0
Sampling frequency (ms):	50.0
Detector stability:	0.5%/kGy at 6MV
Dose rate limit (Gy/min):	56.0

Inherent buildup (g/cm ²):	2.0 ± 0.1
Inherent backscatter (g/cm ²):	2.75 ± 0.1
Radiation measured:	<ul style="list-style-type: none"> • Electrons: 4 MeV to 25MeV • Photons: Co-60 to 25MV
Number of connection cables:	Single power/data cable
Dimensions (cm) / Weight (kg):	28.7 x 56.0 x 4.3 / 7.1
Operating system:	Windows 2000, XP, Vista, 7 (32/64-bit)
Computer Requirements:	2 GB RAM, 1 available USB port, Dual-core processor (2.4GHz or higher), 5GB hard disk space, 16 MB VGA video card (1024 x 768), 16-bit color depth, OpenGL hardware accelerated