

Attachment A

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner



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1 Introduction

Rohde & Schwarz has developed a millimeterwave Body Scanner and wants to market it in the United States. The QPS Personnel Security Scanner operates at frequencies from 70 GHz to 80 GHz. There seems to be no current regulations that would cover the QPS application in the Code of Federal Regulations – Title 47 (Communications)

The QPS 201 has been certified in Canada under the RSS-210 Annex A.1, with Special Authorization (waiver) on the frequency of operation and Electrical Field Strength. RSS-210 Annex A.1 is the Canadian equivalent to FCC 47 CFR Part 15 Subpart C, §15.231. Rohde & Schwarz originally applied for a waiver under §15.231, but discussions with FCC staff convinced us it would be more appropriate to seek a waiver of §15.209 (Radiated emission limits; general requirements). Hence this amended waiver request.

In support to our Request for Waiver, we are providing the following technical information:

- A Test Report outlining the Electromagnetic Field levels to which a scanned person or operator would be subjected is presented in Appendix A. The measurements have been performed by PTB laboratory located in Berlin, Germany.
- From the above indicated report from PTB laboratory, an analysis of the compliance to FCC 47 CFR Part 1 Subpart I, §1.1310 for RF exposure
- Measurements results of power density radiated by the QPS Personnel Security Scanner at a distance of 3 meters
- A list of benefits to the general public that would be provided by the certification of the QPS201
- Other users of the 70 to 80 GHz band and how they could be affected by the QPS201
- ISED (Canada) Certification and associated Special Authorization
- Published Technical Specifications of the QPS200 / QPS201 Personnel Security Scanners
- Description of operation (from an RF point of view)
- Marketing brochures of the QPS200 / QPS201 Personnel Security Scanner

From an RF point of view, the QPS200 and QPS201 are identical. The main difference is the reduced dimensions of the QPS201 (see marketing brochure for more details)

The Technical Specifications and the Marketing Brochure refer also to QPS100 model. The QPS100 consists of a single panel and the body scan is performed in 2 steps: One scan with the person facing the panel, the other with the person's back facing the panel. On the QPS200 and QPS201 models, two facing panels allow to perform the complete body scan without the person having to move.

The FCC certification is sought only for the QPS201 Personnel Security Scanner.

2 QPS Certification elsewhere in the world

The QPS Personnel Security Scanner is designed and manufactured in Germany. It is marketed around the world.

2.1 QPS Certification in Europe

In Germany, France and Great-Britain (among others), the QPS Personnel Security Scanner must be tested for RF Exposure. It must meet the ICNIRP safety limit of 1.0 mW/cm^2 . No further RF Testing or RF Certification is required.

For use in European airports, the QPS Personnel Security Scanner must be certified by the European Civil Aviation Conference (ECAC) but that is a functional certification (can the body scanner actually detect forbidden objects), not an RF certification. The QPS Personnel Security Scanner ECAC certifications are included in Appendix F.

2.2 QPS201 Certification in Canada

No current Canadian Standard exists to certify the QPS201 Personnel Security Scanner. And with its operating frequency of 70 to 80 GHz, the QPS201 operates in one of the Restricted Frequency Bands (above 38.6 GHz) as defined in RSS-Gen Issue 5 (April 2018).

After contacting Innovation, Science and Economic Development Canada (ISED) (formerly Industry Canada [IC]), Rohde & Schwarz was instructed to see if it could meet all the requirements of RSS-210 “Licence-Exempt Radio Apparatus: Category I Equipment” for “Momentarily Operated Devices” (Annex A.1).

RSS-210 Annex A.1 is the equivalent of FCC 47 CFR Part 15 Subpart C, §15.231.

RSS-210 Appendix A specifies the “Permissible Field Strength Limits for Momentarily Operated Devices” to 12,500 uV/m at 3 meters for all frequencies above 470 MHz. Measurements performed by Nemko Canada (see section “5 Radiated Field Strength” in the present document) have shown a maximum field strength of 31,060 uV /m at 3 meters, almost 8 dB higher than the 12,500 uV/m allowed limit (RSS-210 Annex A.1.2, Table A1).

Following this, ISED accepted to certify the QPS201 Personnel Security Scanner under Radio Standard Specifications RSS-210 Annex A.1 with a Special Authorization:

- granting a waiver for the requirements of RSS-210 Annex A.1.2, Table A1, “Permissible Field Strength Limits for Momentarily Operated Devices”, with a limit not exceeding 31,405 uV/m at 3 meters (8 dB higher than the 12,500 uV/m limit of RSS-210)
- granting a waiver for the requirement (in Sections 8.9 and 8.10 of RSS-Gen and in Annex A of RSS-210) that fundamental emissions are not permitted in the restricted bands listed in RSS-Gen (RSS-Gen forbids fundamental emission above 38.6 GHz)

The Appendix B of the present document contains the ISED Certification as well as the Special Authorization letter covering the frequency of operation and raising the limit for the emitted Field Strength.

3 Suggestion to certify according to §15.209

As part of the certification in Canada, Nemko Canada conducted the tests to RSS-210 Annex A.1 which are also the tests required by FCC 47 CFR Part 15 Subpart C, §15.231. Rohde & Schwarz originally applied to certify the QPS201 Personnel Security Scanner according to §15.231, with waivers similar to those obtained in Canada (frequency of operation, permissible field strength). Rohde & Schwarz is amending that request, following discussions with FCC staff, and now seeks a waiver of §15.209 (Radiated emission limits; general requirements) instead.

The field strength measurements performed as per §15.231 by Nemko Canada are still valid as the measurements and averaging were performed according to § 15.35 (Measurement detector functions and bandwidths) that apply to both §15.231 and §15.209.

3.1 Parameters requiring a Waiver

We have identified a number of parameters or requirements for which Rohde & Schwarz would need a waiver in order to certify the QPS201 Personnel Security Scanner under §15.209:

- §15.205 Restricted bands of operation
 - o The QPS operates in the 70 to 80 GHz frequency range. That frequency range is restricted, as per section §15.205, which restrict emission at a fundamental frequency higher than 38.6 GHz.
- §15.209 Radiated emission limits; general requirements .
 - o Field Strength limit set to 500 uV/m as per §15.209 (a). Measurements performed by test lab (Nemko Canada) indicate that the QPS generates 31,060 uV/m in the direction of strongest emission

The FCC may identify other parameters/requirements for which a waiver/exemption may be required.

4 RF Exposure - Compliance to §1.1310

A Test Report outlining the Electromagnetic Field levels to which a scanned person or operator would be subjected is presented in Appendix A. The measurements have been performed by PTB laboratory located in Berlin, Germany.

FCC 47 CFR Part 1 Subpart I, §1.1310 lists Radiofrequency radiation exposure limits. The relevant values for the QPS frequency range of operation (70 GHz to 80 GHz) are:

from §1.1310 (e) Table 1 (B)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
1,500-100,000			1.0	30

As per §1.1310 (e) Table 1 (B), the RF power is to be averaged over 30 minutes for the QPS frequency of operation (70 GHz to 80 GHz). The measurements reported in Appendix A were performed over a period of 44 s, following the guidelines of ICNIRP (tests were performed in Europe) (see page 12 of the PTB report in Appendix A). This difference in measurement time should be of no consequence as consecutive scans are separated by 3 to 5 seconds and each scan contains two RF bursts of 32 ms of transmission separated by a 100 ms pause (each panel burst: 3008 antennas x 128 frequencies x 80 ns = 32 ms approx.). (See “Appendix D – Description of Operation” of present document for more details on the QPS201 RF operation.)

As per §1.1310 (e) Table 1 (B), the allowed Power Density is 1 mW / cm²:

The measurements indicated in the Test Report in Appendix A are summarized in the following table (see page 2 of report in Appendix A, middle of the page):

Distance cm	Maximum Power Density mW / cm ²	Average Power Density mW / cm ²
5	0.063	
5.5		0.000053
50	0.00083	
55.5		0.0000071
100	0.00028	

5 cm constitutes a worst case scenario in terms of distance a person can be from the QPS panels.
50 cm constitutes the typical distance a person would be from the QPS panels.

All the measured power densities are well below the allowed power density of 1 mW / cm².

5 Radiated Field Strength

FCC 47 CFR Part 15 Subpart C, § 15.209 (a) limits the Radiated Field Strength of the fundamental frequency to 500 uV/m.

Measurements performed by test lab (Nemko Canada) indicate that at 70 GHz the QPS201 produces 89.56 dBuV/m @ 3 meters in the direction of strongest emission. That corresponds to 31,061 uV/m.

The following are excerpts from Nemko's test report:

8.5.4 Test data

Duty cycle/average factor calculations

§15.35(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed; the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

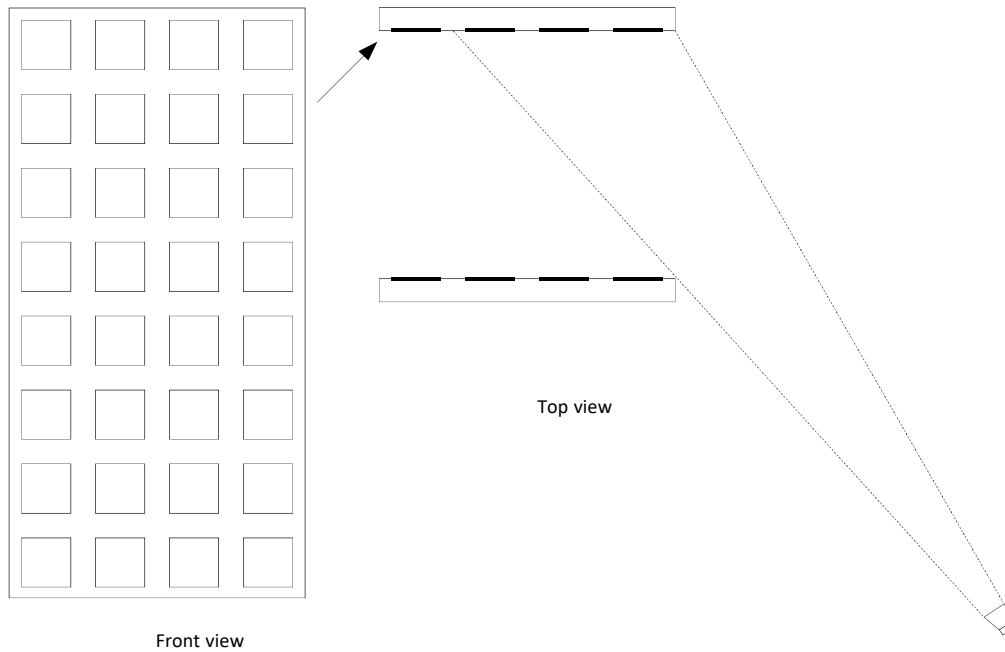
$$\text{Duty cycle or average factor} = 20 \times \log_{10} \left(\frac{Tx_{100\text{ms}}}{100_{\text{ms}}} \right)$$

Since both panels do not transmit simultaneously, only 32 ms is the total transmit time within any given 100 ms time window frame: Duty cycle correction factor for 32 ms pulse duration = $20 \times \log_{10} (32 / 100) = -9.9$ dB

Table 8.5-7: Radiated field strength of fundamental measurement results

Frequency, MHz	Peak field strength, dBμV/m @ 3 m	Duty cycle factor, dB	Average field strength, dBμV/m @ 3 m
69895.2380952381	101.96	-12.40	89.56
74886.9670702927	101.07	-12.40	88.67
79895.2380952381	98.81	-12.40	86.41

For the fundamental emissions measurement natural setup obstruction was taken into account. The measurement was performed from distance of 2 meters from the EUT perimeter. Since from the angle with the maximum level of emission only partial EUT antenna clusters (24 out of the 32) were in the line of sight of the measuring equipment, duty cycle was corrected to include only active antennas. From 32 ms of total transmit time (from all the clusters) only 24 ms were “visible” by the receiving equipment. The correction factor was calculated as follows: $20 \times \log_{10} (24 \text{ ms}/100 \text{ ms}) = -12.40 \text{ dB}$.



6 Public Interest Benefits

There seems to be no current regulations that would cover the QPS application in the Code of Federal Regulations – Title 47 (Communications). As such, the QPS201 cannot be directly FCC certified without a waiver to some technical parameters or some Guidance from the FCC.

Nonetheless, the general public (and homeland security) would benefit from the QPS201 being allowed to be used in the United States.

The QPS Personnel Security Scanner has many characteristics that are more advantageous than the current Body Scanners. These increased benefits apply to the general public as well as the facility operators (airports, etc). Here are some of these advantages:

- Easier for persons being scanned as they do not have to raise their hands above their head
 - Raising of the arms may be difficult for elder people.
 - Tall passengers have difficulties to place the hands above the head in competitor's cabin as cabins may not be high enough
- Passenger does not have to enter a cabin
 - Some Passengers don't like to enter cabins (claustrophobia) or at least feel uncomfortable within a cabin
- Easy bypass for wheelchair users
- Scanning time of only 164 ms (32ms transmission by one panel, 100ms pause, 32ms transmission by other panel) minimizes false alarms caused by movements of the passenger
 - Competitor's scanning times in excess of 1second bears higher risk for movement of passenger during scan, resulting in false alarms
- No obstacle in case of panic (fire, ...)
- More privacy for the persons being scanned
 - scanner does not provide a picture of the body but rather displays an avatar with the potential location of forbidden substances
- Excellent oversight on entire security lane and process
 - operator can observe the next person in line
- Operator has physical access to passenger being scanned
- High redundancy: Failure of few antennas does not significantly reduce detection quality
 - Only one TX-Antenna is transmitting at a time. All RX-Antennas are receiving simultaneously
- No moving parts; Improves Reliability and Availability
- ECAC Standard 1 and Standard 2 certified. See list of ECAC Certifications in Appendix F
- Certified for German Federal Police requirements
- QPS200 is approved by the TSA (USA's Transportation Security Administration). Copies of Press Releases are included in Appendix G.

A Marketing Brochure of the QPS200 / QPS201 is included in Appendix H.

The better performance of the QPS Personnel Security Scanner over its competitor's, would improve security and safety at airports, Nuclear facilities, etc.

7 Other Users in the 70-80 GHz band

7.1 Vehicular Radar

In this section we analyze the effect of QPS201 emitted power on Vehicular Radars and conclude that there will not be a risk of harmful interference.

Even though the signal produced by the QPS at the vehicle could in theory be large compared to the signal produced by a target reflection (assuming *arguendo* the QPS and vehicle are in relative close proximity), the effect of the QPS signal will be greatly attenuated due to many factors:

- The angle of the QPS201 radiation with respect to the radar antenna main lobe
 - o Vehicle radar antennas could be in the order of 30 dB.
 - o The radar antenna beamwidth is narrow, designed sometimes not to cover much wider than one lane width at a “far” distance (150 m for a vehicle Long Range Range [LRR] radar)
- The method by which radar process non-correlated interference signals compared to target reflections
 - o The vehicle radars have to cope with neighboring radars using similar and sometimes identical characteristics (same car make and model) that can be in close proximity to the vehicle; literally within few meters.
 - o Radars use Matched Filters to process the reflected signals. Matched Filters greatly reject signals that do not possess the particular “signature” of the emitted signal
 - Radars can use a number of “signature” parameters:
 - Pulse width
 - Pulse repetition
 - Frequency modulation
 - o Radar signals are repetitive (some are actually continuous, 100% duty cycle)
 - o QPS201 signals are much different than vehicle radar signals.
 - QPS201 signals are not modulated and are sporadic in nature (32ms transmission, 100ms silence, 32ms transmission, followed by a few seconds of silence). The transmissions are triggered manually by the body scanner operator.
 - Only one of the 32ms transmissions is likely to be in the direction of the vehicle, the two 32ms transmissions being made in opposite directions
 - Each 32ms transmission is composed of short unmodulated transmissions on a single of the 128 discrete frequencies in the 70 to 80 GHz range (approximately 250 micro-second transmission on each of the 128 frequencies)
 - o Radars systems will not make a critical determination based on the analysis of a single radar pulse.

In the next sub-sections we will calculate the power densities produced at the vehicular radar by interfering signals. We will calculate how the QPS201 radiation compares to:

- the signal reflected by a radar target
- the signals produced by other nearby car radars

The power radiated by the QPS201 being lower than the power radiated by car radars and the fact that QPS201 body scanners are typically further away from a vehicular than nearby cars, it is expected that the a vehicular radar is more likely to be impacted by another nearby car radar than by a QPS201.

7.1.1 Comparison with signal reflected by a vehicular radar target

In this section we compare the power density produced by the QPS201 with the power density produced by a target reflection.

Symbol	Description	Value used in calculations
ERP	Effective Radiated Power for vehicle radar	43 dBm (20 Watts) (reference 1)
d	Detection distance of car radar (distance of target)	150 meters
σ	Target radar cross-section	0.2 square meters
W_{qps}	QPS201 effective radiated power	7 dBm (5 milli-Watts) (1 dBm power, 6 dBi antenna gain)
r_q	Distance of QPS201 to vehicular radar	

Reference 1: Millimeter-wave integrated radar systems and techniques

Akram Al-Hourani, ... Udaya Parampalli, in Academic Press Library in Signal Processing, Volume 7, 2018 section 7.1.5 Automotive Radar: Trends and Standardization Efforts

The signal emitted by the QPS201 travels toward the vehicular radar and its power density diminishes as the square of the distance travelled.

The signal emitted by the vehicular radar follows a slightly more evolution. As the radar signal leaves the vehicle, the power density diminishes as the square of the distance travelled. When the signal reaches the target, a portion of the signal is “intercepted” by the target; The power so intercepted is equal to the power density multiplied by the target’s radar cross-section. The power so intercepted is reflected back toward the radar and the power density of this reflection also diminishes as the square of the distance travelled.

Power density, produced by vehicular radar, at the target:

$$\frac{ERP}{4\pi d^2}$$

Power reflected by the target:

$$\frac{ERP}{4\pi d^2} \sigma$$

Power density, produced by target reflection, at the vehicular radar:

$$\frac{\frac{ERP}{4\pi d^2} \sigma}{4\pi d^2} = \frac{ERP}{(4\pi d^2)^2} \sigma$$

Power density, due to QPS201 radiation, at the vehicular radar:

$$\frac{W_{qps}}{4\pi r_q^2}$$

r_{qps} (QPS201-to-vehicular radar distance) at which power density due to QPS201 is equal or greater than power density due to target reflection:

$$\frac{W_{qps}}{4\pi r_q^2} \geq \frac{ERP}{(4\pi d^2)^2} \sigma = \frac{ERP}{16\pi^2 d^4} \sigma$$

$$\Rightarrow r_q^2 \leq \frac{W_{qps}}{4\pi} \cdot \frac{1}{\sigma} \cdot \frac{16\pi^2 d^4}{ERP} = 4\pi \frac{W_{qps}}{ERP} \cdot \frac{1}{\sigma} \cdot d^4$$

$$\Rightarrow r_q \leq d^2 \cdot \sqrt{4\pi \frac{W_{qps}}{ERP} \cdot \frac{1}{\sigma}}$$

Using the values indicated in the table:

$$\Rightarrow r_q \leq (150m)^2 \cdot \sqrt{4\pi \frac{0.005 \text{ Watts}}{20 \text{ Watts}} \cdot \frac{1}{0.2 \text{ m}^2}}$$

$$\Rightarrow r_q \leq 2,826 \text{ m} \approx 2.8 \text{ km}$$

Although the signal of a distant QPS201 will be stronger than the reflection of a target, this should not be cause for concern for mainly two reasons:

- Radars have mechanisms to reject interfering signals
- Nearby vehicular radars will produce interfering signals much stronger than those produced by the QPS201.

7.1.2 Comparison with the signal of an interfering vehicular radar

In this section we compare the power density produced by the QPS201 with the power density produced by a nearby (interfering) vehicular radar.

Symbol	Description	Value used in calculations
ERP	Effective Radiated Power for vehicle radar	43 dBm (20 Watts)
d_i	Distance between two cars each equipped of vehicular radars (distance between vehicular radar of interest and interfering vehicular radar)	
W_{qps}	QPS201 effective radiated power	7 dBm (5 milli-Watts) (1 dBm power, 6 dBi antenna gain)
r_q	Distance of QPS201 to vehicular radar	

Power density, produced by the interfering vehicular radar, at the vehicular radar of interest:

$$\frac{ERP}{4\pi d_i^2}$$

Power density, due to QPS201 radiation, at the vehicular radar of interest:

$$\frac{W_{qps}}{4\pi r_q^2}$$

Conditions under which the power density produced by the QPS201 is greater than the power density produced by the interfering vehicular radar:

$$\frac{W_{qps}}{4\pi r_q^2} \geq \frac{ERP}{4\pi d_i^2}$$

$$\Rightarrow 4\pi r_q^2 \leq \frac{W_{qps}}{ERP} 4\pi d_i^2$$

$$\Rightarrow r_q^2 \leq d_i^2 \frac{W_{qps}}{ERP}$$

$$\Rightarrow r_q \leq d_i \sqrt{\frac{W_{qps}}{ERP}}$$

Using the values for W_{qps} and ERP indicated in the table above, the equation becomes:

$$\Rightarrow r_q \leq d_i \sqrt{\frac{0.005}{20}} = d_i \cdot \sqrt{0.00025}$$

$$r_q \leq 0.016 d_i$$

$$r_q \leq \frac{d_i}{63}$$

So, a QPS201 being located outdoor at 3 meters (10 feet) from a vehicular radar would produce, at the vehicular radar, a power density as strong as an interfering vehicular radar located at 190 meters (620 feet). This shows again that the greatest interference concern for a vehicular radar will be neighboring car radars and not the QPS201, and the vehicle radars are designed to operate with multiple other vehicles with radars operating in close proximity.

This theoretical modeling of potential harmful interference has been borne out by actual experience. For a few years now, we have been operating QPS scanners in Europe and Canada (along with some limited operations in the United States pursuant to a TSA testing program), and we are unaware of any issues with regard to harmful interference by the QPS scanners to vehicular radars.

7.2 Radio Astronomy

With regard to radio astronomy uses of this band, the National Academy of Sciences, through its Committee on Radio Frequencies (hereinafter, “CORF”), raised concerns regarding potential interference by the QPS 201 PSS to protected radio astronomy observations at 76-81 GHz. Rohde & Schwarz believes that the low power of the QPS 201 PSS transmitters, the directionality of those transmissions and terrain shielding of the radio telescopes should limit the risk of harmful interference. Indeed, the Commission determined that these factors were sufficient to mitigate the risk of harmful interference to radio astronomy observations when it authorized automotive radars to operate in the 76-81 GHz band.¹

¹ *Amendment of Parts 1, 2, 15, 90 and 95 of the Commission’s Rules to Permit Radar Services in the 76-81 GHz Band*, 32 FCC Rcd 8822 (2017) at ¶¶ 19-24. As the Commission observed at n. 82:

Vehicular radar sensors are generally mounted on vehicles near the ground, with downward directed transmissions, resulting in significant angular attenuation of the signal towards an observatory’s antenna. These factors, along with the high free space path loss associated with transmissions in this frequency band (*see supra* note 62) and the widespread shielding typically provided by the terrain in the remote RAS observatory locations, support our finding that vehicular radar operations in the 77.5-78 GHz band will not have any more potential to cause harmful interference to RAS operations in the 76-81 GHz band than vehicular radars that now operate in the 76-77 GHz band, and have not caused harmful interference to RAS operations in the 76-81 GHz band. Significantly, while vehicular radars will be operating in a larger bandwidth and likely in increased numbers, the fundamental characteristics and nature of their use is not changing.

Nevertheless, Rohde & Schwarz acknowledges the hyper-sensitivity of the potentially affected radio telescopes, as well as the importance of the research those radio telescopes are used to conduct. Thus, out of an abundance of caution and in order to expedite grant of this waiver, Rohde & Schwarz does not object to the Commission's initially imposing a condition as suggested by CORF that would prohibit outdoor use of the QPS 201 PSS within 70 kilometers of the U.S. observatories indicated in the CORF comments.² Rohde & Schwarz will include language in the operator's manual to specify this limitation. Rohde & Schwarz will also provide CORF with a 24-hour point of contact in case any interference issues arise. Rohde & Schwarz additionally intends to work directly with CORF and conduct testing, if necessary, to determine whether this condition can be modified or eliminated. Rohde & Schwarz will subsequently file a petition to modify the waiver grant if this coordination is successful.

² CORF Comments at p. 3 (identifying the Green Bank Observatory in West Virginia, the Kitt Peak Observatory in Arizona, the James Clerk Maxwell Telescope on Mauna Kea in Hawaii, and in the longer term, the Next Generation Very Large Array antennas in New Mexico and Texas).

Appendix A – RF Exposure Measurements

Test Report
Emission Measurement of Full Body Scanner

Note:

This section is considered Company Confidential and has been filed separately with the FCC, along with a request for confidential treatment.

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Appendix B – ISED Certification for QPS201

This Appendix contains the following documents:

- “Certificate of Conformity” for QPS201
 - Certificate number: 3261A-QPS2XX
- ISED Special Authorization letter for QPS201
 - Dated 2018-07-03
- R&S letter requesting exemption from providing detailed schematics
 - Issued on 2018-07-12

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Certificate of Conformity

Certificat de conformité

3261A-QPS2XX

354755-8

Certification number / Numéro de Certification

Certificate number / Numéro de Certificat

**Issued to /
Délivré à**

Rohde & Schwarz Canada Inc.
1 Hines Road, Suite 100, Kanata, Ontario K2K 3C7
Canada

**Specifications /
Spécification**

RSS-210 Issue 9

**Hardware Version Number/
Numéro d'identification de la version du matériel**

QPS201

**Product Marketing Name/
Marque du produit**

Quick Personnel Security Scanner

**Product description /
Description du produit**

Quick Personnel Security Scanner

**Firmware Version Identification Number/
Numéro d'identification de la version logiciel**

N/A

**Host Marketing Name/
Nom de marque de l'hôte**

N/A

**Type of equipment /
Genre de matériel**

Security Device / Alarm System

**Emissions information/
Information sur les émissions**

Annex 1 / Annexe 1

Certification of equipment means only that the equipment has met the requirements of the above-noted specification. Licence applications, where applicable to use certified equipment, are acted on accordingly by the Innovation, Science and Economic Development Canada issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Innovation, Science and Economic Development Canada. The equipment for which this certificate is issued shall not be manufactured, imported, distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by Innovation, Science and Economic Development Canada.

La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance d'innovation, Sciences et Développement économique Canada et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'innovation, Sciences et Développement économique Canada. Le matériel à l'égard duquel le présent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécifications techniques applicables publiées par d'innovation, Sciences et Développement économique Canada.

I hereby attest that the subject equipment was tested and found in compliance with the above-noted specification.

J'atteste, par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessus.

**Certified by /
certifié par**



Russell Grant, Senior Technical Assessor

Date 19 / 7 / 2018

Day, jour / Month, mois / Year, année

Annex 1 / Annexe 1

3261A-QPS2XX

Certification number / Numéro de Certification

354755-8

Certificate number / Numéro de Certificat

Frequency / Fréquences (MHz)	Field Strength / intensité de Champ (dBµV/m)	Emission designation / Genre d'émission
69895.238095 - 79895.238095	101.96	17M0P0N

Test laboratory /
Laboratoire d'essai

Nemko Canada Inc.
303 River Road, Ottawa, Ontario K1V 1H2
Canada
Telephone: 613-737-9680 Fax: 613-737-9691 www.nemko.com

Laboratory number /
Numéro de laboratoire

2040A

Antenna information /
Renseignements sur l'antenne

External



6th Floor, 235 Queen Street
Ottawa, Ontario, K1A 0H5

July 3, 2018

Mr. Angelo Pallotta, P. Eng.
Project Manager,
Rohde & Schwarz Canada, Inc.
1 Hines Road, Suite 100
Kanata, ON,
K2K 3C7

RE: Request for special authorization of Quick Personnel Security Scanner R&S® QPS201

Dear Mr. Pallotta,

This letter is in response to your request to Innovation, Science and Economic Development Canada (ISED) for a special authorization (exemption) of the Quick Personnel Security Scanner model R&S® QPS201 manufactured by Rohde & Schwarz.

It is the understanding of the department that the Quick Personnel Security Scanners can be used for airport security checks, security at public events with a high threat potential and access control at security-related facilities. The scanner uses multistatic operation with thousands of transmitter and receiver antennas per panel and operates in the 70-80 GHz frequency range. The scanner transmits at a power of 1 mW with a data acquisition time of 32 ms per panel. Based on the description provided, the R&S® QPS201 scanning device falls under RSS-210 - [Licence-Exempt Radio Apparatus: Category I Equipment - Annex A](#) where permitted field strength limits for momentarily operated devices are specified in Table A1.

After reviewing the information provided by Rohde & Schwarz and Nemko Canada, ISED will accept the special authorization request by waiving the permissible field strength limits permitting certification of the Quick Personnel Security Scanners model R&S® QPS201 under RSS-210 (as per section 2.9 of RSS-GEN, *General Requirements for Compliance of Radio Apparatus*).

This equipment is classified as Category I license-exempt radio apparatus under the *Radiocommunication Act* and will require a technical acceptance certificate (TAC) in order to be manufactured, imported, distributed, sold, offered for sale or leased in Canada. Either the ISED Certification and Engineering Bureau (CEB) or a recognized Certification Body can issue such a certificate so long as the requirements stated in the Annex of this letter are met.

A copy of this letter, including its annex, shall be attached to the test report for certification of this equipment.

Appendix B - ISED Certification - Special Authorization
Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner



Should you have any questions, please do not hesitate to contact the department.

Sincerely,

David Willis

David Willis for
Martin Proulx

Director General
Engineering, Planning and Standards Branch
Innovation, Science and Economic Development Canada

cc: Josette Gallant, Director, Regulatory Standards, ISED
Claude Beaudoin, Director, Certification and Engineering Bureau, ISED
Hughes Nappert, Manager, Regulatory Standards, ISED
Yan Losier, Manager, Regulatory Standards, ISED
Caroline Kennedy, Manager, Operational Policies, ISED
Nicolas Desmarais, Manager, Certification and Market Surveillance, ISED



Annex:

Requirements for certification of Quick Personnel Security Scanners product, model R&S®QPS201

The Quick Personnel Security Scanners model R&S® QPS201 equipment may be certified in accordance with the following requirements:

- a) The Quick Personnel Security Scanners model R&S® QPS201 shall conform to the provisions of the *Radiocommunication Act* and *Radiocommunication Regulations*.
- b) The Quick Personnel Security Scanners model R&S® QPS201 shall be certified under Radio Standard Specifications RSS-210, specifically under Annex A, "*Momentarily Operated and Remote Control Devices*", and shall operate as a licence-exempt low power device on a no-interference no-protection basis;
- c) The Radio Standards Procedures RSP-100 shall apply for the certification procedure and required labelling of each unit of the equipment model;
- d) The Quick Personnel Security Scanners model R&S® QPS201 shall comply with the requirements of RSS-Gen, for general administrative and technical requirements, and applicable limits for power line conducted emissions, as well as RSS-102, for RF exposure.
- e) The user manual shall contain the following text, or an equivalent notice, that shall be displayed in a conspicuous location, either in the user manual or on the device, or both:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following three conditions:

- 1. *This device may not cause interference.*
- 2. *This device must accept any interference, including interference that may cause undesired operation of the device.*
- 3. *This device shall be used indoor only.*

ISED grants a waiver for the requirements of RSS-210 Annex A.1.2, Table A1, "*Permissible Field Strength Limits for Momentarily Operated Devices*", with a limit not exceeding 31,405 µV/m at 3 meters.

For the unwanted radiated emissions, the applicable limits are found in RSS-210, Annex A.1.2 b), for the frequency range up to 200 GHz.

ISED also grants a waiver for the requirement (in Sections 8.9 and 8.10 of RSS-Gen and in Annex A of RSS-210) that fundamental emissions are not permitted in the restricted bands listed in RSS-Gen.



The above waiver is only valid for the Quick Personnel Security Scanners model R&S® QPS201,
manufactured by Rohde & Schwarz.



ROHDE & SCHWARZ

Rohde & Schwarz Canada Inc.
1 Hines Road, Suite 100, Kanata ON K2K 3C7
Tel. (613) 592-8000; Fax. (613) 592-8009

Certification and Engineering Bureau
Innovation, Science and Economic Development Canada
3701 Carling Avenue (Building 94)
Ottawa, Ontario
K2H 8S2

Reference: Certification of QPS201 Quick Personnel Security Scanner

To whom it may concern,

Following today's phone conversations between our engineer Angelo Pallotta and the Certification Bureau, we understand that, due to the large size of the QPS201, we can ask for the exemption from providing detailed schematics (down to the component value level) and detailed internal photographs (clear enough to read markings on the boards).

Should the need arise, that detailed information will be made available to ISED upon request.

Sincerely,

Avrum Kerzner
Director of Finance and Administration
Phone: +1 613-592-8000 x3227

Angelo Pallotta
Project Engineer
Phone: +1 613-592-8000 x3236

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Appendix C – QPS Technical Specifications

R&S®QPS201
Quick Personnel Security Scanner
Specifications

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R&S® QPS201

Quick Personnel Security Scanner Specifications



Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner



ROHDE & SCHWARZ

Specifications

Panel

Height of person to be scanned	max.	2.00 m (6 ft 7 in)
	min.	1.00 m (3 ft 3 in)
Scanning resolution	W × H × D	1.9 mm × 1.9 mm × 5.7 mm (0.07 in × 0.07 in × 0.22 in)
Scan time		2 × 32 ms
Evaluation time		4 s
Throughput	depends on application	up to 300 persons/h
RF power density (peak)	1 m in front of panel	80 nW/cm ²
RF power density (average)	1 m in front of panel	800 pW/cm ²

Touchscreen

Diagonal		381 mm (15 in)
Resolution		1024 × 768 pixel
Dimensions	W × H × D	351 mm × 307 mm × 202 mm (13.8 in × 12.1 in × 8.0 in)
Weight		4.5 kg (9.9 lb)

Touchscreen for resolution station (option)

Diagonal		396 mm (15.6 in)
Resolution		1366 × 768 pixel
Dimensions	W × H × D	378 mm × 247 mm × 29 mm (14.9 in × 9.7 in × 1.1 in)
Weight		2 kg (4.4 lb)

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

General data

Environmental conditions		
Temperature	operating temperature range	+5 °C to +40 °C (41 °F to 104 °F)
	storage temperature range	–10 °C to +60 °C (14 °F to 140 °F)
Humidity		+40 °C (104 °F) at 95 % rel. humidity, in line with IEC 60068-2-78
Protection class		IP20
Installation altitude		max. 2000 m (6562 ft) above sea level
Vibration		in line with IEC 60068-2-6
Shock		in line with IEC 60068-2-27
Transport		in line with IEC 60068-2-31 and IEC 60068-2-64
Verification interval		6 months

Power rating		
Rated voltage	without additional protective earthing	200 V to 230 V AC (± 10 %)
	with additional protective earthing ¹	200 V to 240 V AC (± 10 %)
Rated current	both panels and touchscreen, at 230 V	16 A
	both panels and touchscreen, at 240 V	15 A
	single panel, from 200 V to 240 V	10 A
Power consumption	average	2.4 kW
	standby	11 W
Rated frequency	without additional protective earthing	50 Hz (± 5 %)
	with additional protective earthing ¹	50 Hz to 60 Hz (± 5 %)

Product conformity		
Electromagnetic compatibility	EU: RED Directive 2014/53/EU (article 3 and the other relevant provisions)	applied standards: ETSI EN 301489-1, ETSI EN 301489-3 ² , ETSI EN 305550-1, ETSI EN 305550-2
Electromagnetic emission	documented in Test Report 20982 PTB 14 of Physikalisch-Technische Bundesanstalt (PTB; Germany's national metrology institute) of 8 Aug 2014	applied standards: ICNIRP guidelines as published in Health Physics Journal 99 (6), 2010, pp 818 to 836
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EU	applied standards: EN 61010-1, IEC 61010-1, UL 61010-1, CSA C22.2 61010-1
Hazardous substances	restriction of the use of hazardous substances in electrical and electronic equipment (RoHS) in line with 2011/65/EU	applied standard: EN 50581
International safety approvals	CSA – Canadian Standards Association	CSA _{UL} mark

Dimensions		
Panels and floor plate		see drawings on page 4

Weight		
Panel		170 kg (375 lb)
Floor plate		55 kg (121 lb)

Shipping dimensions		
Two panels and floor plate	W × H × D	2450 mm × 1400 mm × 800 mm (97 in × 55 in × 32 in)
Accessories	W × H × D	1600 mm × 350 mm × 600 mm (63 in × 14 in × 24 in)

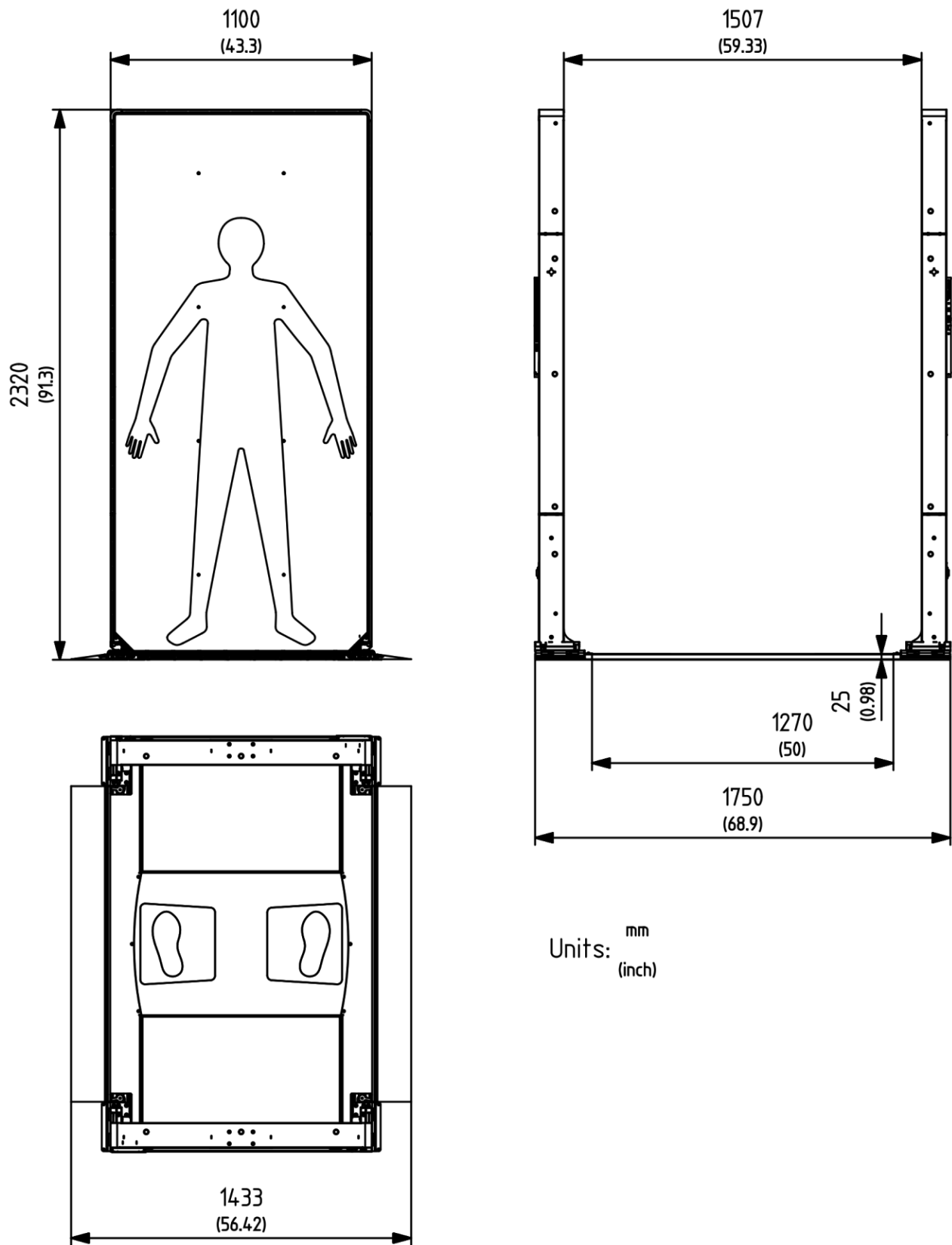
Shipping weight		
Two panels and floor plate		435 kg (959 lb)
Accessories		80 kg (176 lb)

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

¹ For additional protective earthing (grounding) a green/yellow earth wire with a cross section of at least 4 mm² is used.

² If the voltage drops to 70 % for 500 ms, a reboot occurs.



Dimensions of the R&S®QPS201.

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

Ordering information

Designation	Type	Order No.
Quick Personnel Security Scanner	R&S®QPS201	1333.5000K02
Option		
Resolution Station	R&S®MWI-Z101	1316.6154.03

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

Service that adds value

- ▮ Worldwide
- ▮ Local and personalized
- ▮ Customized and flexible
- ▮ Uncompromising quality
- ▮ Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

- ▮ Environmental compatibility and eco-footprint
- ▮ Energy efficiency and low emissions
- ▮ Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Rohde & Schwarz training

www.training.rohde-schwarz.com

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customersupport.china@rohde-schwarz.com

Appendix C - QPS201 Specifications

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG
Trade names are trademarks of the owners
PD 3607.7792.22 | Version 01.00 | May 2018 (ch)
R&S®QPS201 Quick Personnel Security Scanner
Data without tolerance limits is not binding | Subject to change
© 2018 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany



3607779222

Appendix D – Description of Operation

A description of operation, from an RF spectrum point of view

Note:

This section is considered Company Confidential and has been filed separately with the FCC, along with a request for confidential treatment.

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Appendix E – Summary of RF Data

Note:

This section is considered Company Confidential and has been filed separately with the FCC, along with a request for confidential treatment.

Note:

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This section is considered Company Confidential and has been filed separately with the FCC, along with a request for confidential treatment.

Appendix F – QPS ECAC Certifications

List of QPS Personnel Security Scanners certified by the European Civil Aviation Conference (ECAC).
Printout from ECAC's web page.

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Manufacturer	Equipment		Standard	Type of operations (*)	Notification
	Designation	Configuration ⁽¹⁾			
Rohde & Schwarz	R&S®QPS100	Detection hardware	1	A	20/02/2014
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS100	Detection hardware	1	A	27/08/2014
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS100	Detection hardware	1	A	04/12/2014
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS100	Detection hardware	2	A	04/12/2014
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS100	Detection hardware	1	A	30/01/2015
		System software			
		Detection software			
		CONOPS			

Manufacturer	Equipment		Standard	Type of operations (*)	Notification
	Designation	Configuration ⁽¹⁾			
Rohde & Schwarz	R&S®QPS100	Detection hardware	1	A	30/01/2015
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS100	Detection hardware	2	A	30/01/2015
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS200	Detection hardware	1	A	30/01/2015
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS200	Detection hardware	2	A	30/01/2015
		System software			
		Detection software			
		CONOPS			
Rohde & Schwarz	R&S®QPS200	Detection hardware	1	A	30/01/2015
		System software			
		Detection software			
		CONOPS			

Notes:

(*) On the basis of the Concept of Operations (CONOPS) of the tested security scanner, provided by the manufacturer, the security scanner performance was tested for a given type of operations:

Type A: Security scanner with automatic threat detection and indication of the location of detected objects on a stick figure.

Type B: Security scanner with a human reviewer to analyse the image and to indicate the location of detected objects.

(1) Information on configuration was provided by the equipment manufacturer as part of the testing process.



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Appendix G – QPS200 TSA Certification

Press Release indicating that Rohde & Schwarz QPS200 has achieved USA's Transportation Security Administration (TSA) Certification

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Press Release



R&S QPS200 Security Scanner

Munich/Columbia | 17-Nov-2017 | Test & Measurement

Rohde & Schwarz achieves Transportation Security Administration (TSA) certification for its R&S QPS200 Security Scanner

The R&S QPS 200 from Rohde & Schwarz is the first new people screening system to be certified by the TSA for use at US and international aviation and other security checkpoints.

Rohde & Schwarz, a world leader in manufacturing test and measurement, communications, and broadcast and media equipment, announced today that its R&S QPS200 millimeter wave technology has achieved TSA Advanced Imaging Technology (AIT) detection certification. TSA certification validates that the R&S QPS200 meets TSA's stringent aviation security detection requirements.

The R&S QPS200 security scanner uses safe millimeter wave radio frequency technology to screen passengers automatically for concealed threats while protecting passengers' privacy. "We are pleased that the R&S QPS200 has achieved the milestone of TSA detection certification and look forward to building a partnership with TSA at US airports to deliver next generation security capabilities," said Scott Bausback, President and CEO of Rohde & Schwarz USA, Inc. "We are dedicated to providing airports, air carriers and passengers with high-performance, passenger-friendly security screening technology."

The R&S QPS200 is the first Rohde & Schwarz AIT system to achieve TSA detection certification and has achieved certification by the European Civil Aviation Conference (ECAC) and is in use at airports across Europe. The millimeter wave technology is based on the company's many years of expertise in developing globally leading test and measurement equipment. The QPS system requires only a few milliseconds to scan passengers, which can speed checkpoint-screening operations and increase through-put. Privacy is protected by the use of a generic outline of a person to indicate to operators the location of an alarm. Scanning is easy as individuals simply stand in front of the technology with their arms held slightly away from the body and the system automatically detects potentially dangerous objects on the body. The QPS200 millimeter wave technology is safe and produces no more transmit power than a mobile phone.

Rohde & Schwarz

The Rohde & Schwarz technology group develops, produces and markets innovative information and communications technology products for professional users. Rohde & Schwarz focuses on test and measurement, broadcast and media, cybersecurity, secure communications and monitoring and network testing, areas that address many different industry and government-sector market segments. Founded more than 80 years ago, the independent company has an extensive sales and service network in more than 70 countries. On June 30, 2017, Rohde & Schwarz had approximately 10,500 employees. The group achieved a net revenue of approximately EUR 1.9 billion in the 2016/2017 fiscal year (July to June). The company is headquartered in Munich, Germany, and also has regional hubs in Asia and the USA. R&S® is a registered trademark of Rohde & Schwarz GmbH & Co.KG.

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https://www.rohde-schwarz.com/us/news-press/press-room/press-releases-detailpages/rohde-schwarz-achieves-transportation-security-administration-tsa-certification-for-its-r-s-qps200-security-scanner-press_releases_detailpage_229356-503426.html

Appendix G - QPS200 TSA Certification
Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

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Rohde & Schwarz Achieves Transportation Security Administration (TSA) Certification for Its R&S QPS200 Security Scanner

NEWS PROVIDED BY
Rohde & Schwarz →
Nov 17, 2017, 12:47 ET

MUNICH and COLUMBIA, South Carolina, November 17, 2017 /PRNewswire/ --

The R&S QPS 200 from Rohde & Schwarz is the first new people screening system to be certified by the TSA for use at US and international aviation and other security checkpoints.

Rohde & Schwarz, a world leader in manufacturing test and measurement, communications, and broadcast and media equipment, announced today that its R&S QPS200 millimeter wave technology has achieved TSA Advanced Imaging Technology (AIT) detection certification. TSA certification validates that the R&S QPS200 meets TSA's stringent aviation security detection requirements.

The R&S QPS200 security scanner uses safe millimeter wave radio frequency technology to screen passengers automatically for concealed threats while protecting passengers' privacy. "We are pleased that the R&S QPS200 has achieved the milestone of TSA detection certification and look forward to building a partnership with TSA at US airports to deliver next

generation security capabilities," said Scott Bausback, President and CEO of Rohde & Schwarz USA, Inc. "We are dedicated to providing airports, air carriers and passengers with high-performance, passenger-friendly security screening technology."

The R&S QPS200 is the first Rohde & Schwarz AIT system to achieve TSA detection certification and has achieved certification by the European Civil Aviation Conference (ECAC) and is in use at airports across Europe. The millimeter wave technology is based on the company's many years of expertise in developing globally leading test and measurement equipment. The QPS system requires only a few milliseconds to scan passengers, which can speed checkpoint-screening operations and increase through-put. Privacy is protected by the use of a generic outline of a person to indicate to operators the location of an alarm. Scanning is easy as individuals simply stand in front of the technology with their arms held slightly away from the body and the system automatically detects potentially dangerous objects on the body. The QPS200 millimeter wave technology is safe and produces no more transmit power than a mobile phone.

Contacts: USA: Pam Sanders phone: +1-410-910-7908; email: pam.sanders@rsa.rohde-schwarz.com

Europe: Simone Kneifl phone: +49-89-4129-16510; email: press@rohde-schwarz.com

SOURCE Rohde & Schwarz

<https://www.prnewswire.com/news-releases/rohde--schwarz-achieves-transportation-security-administration-tsa-certification-for-its-rs-qps200-security-scanner-658267513.html>

Appendix G - QPS200 TSA Certification

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

Appendix H – QPS Marketing Brochures

Marketing brochures:

QPS 100 (single Panel) and
QPS200 (two Panels)
R&S®QPS Quick Personnel Security Scanners

QPS201
R&S®QPS Quick Personnel Security Scanners

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R&S®QPS Quick Personnel Security Scanners



ROHDE & SCHWARZ

Appendix H - Marketing Brochures - QPS100 / QPS200

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

R&S®QPS Quick Personnel Security Scanners At a glance

The R&S®QPS is a state-of-the-art millimeterwave security scanner that automatically detects potentially dangerous items carried on the body or in clothing. The scanner can be used for airport security checks, security at public events with a high threat potential and access control at security-related facilities.

The R&S®QPS security scanner delivers high-precision and efficient security control while ensuring an unobtrusive and uncomplicated experience for scanned persons. It consists of a flat panel with thousands of transmitters that emit extremely low-power millimeterwaves in very short succession and just as many receivers that record high-resolution 3D information. Persons being scanned stand squarely in front or between the panels as if facing a mirror, holding their arms slightly away from their bodies.

The detection software uses machine-trained algorithms to search for conspicuous objects of all material types. The scanner searches for anomalies indicating unusual objects rather than for certain items, enabling it to discover unknown and new threats.

The R&S®QPS is designed for implicit privacy. Rather than generating photographic images, it evaluates physical information. Detected locations of interest are marked on a symbolic body graphic.

The R&S®QPS poses no health hazard whatsoever. It operates on frequencies similar to those of a vehicle distance warning system. The transmitted power at the scanned person's location is almost undetectable and several orders of magnitude lower than mobile phone emissions.



R&S®QPS

Quick Personnel Security Scanners

Benefits and key features

Detection characteristics

- ▮ Detection of all types of potentially dangerous objects (metal, ceramic, plastic, liquid)
- ▮ Outstanding full-body coverage, complete head, shoulder and leg illumination of tall and oversized individuals
- ▮ High system resolution, bandwidth and dynamic range for high detection performance and minimum false alarms
- ▮ Certified by the European Civil Aviation Conference (ECAC)

Benefits for operating company

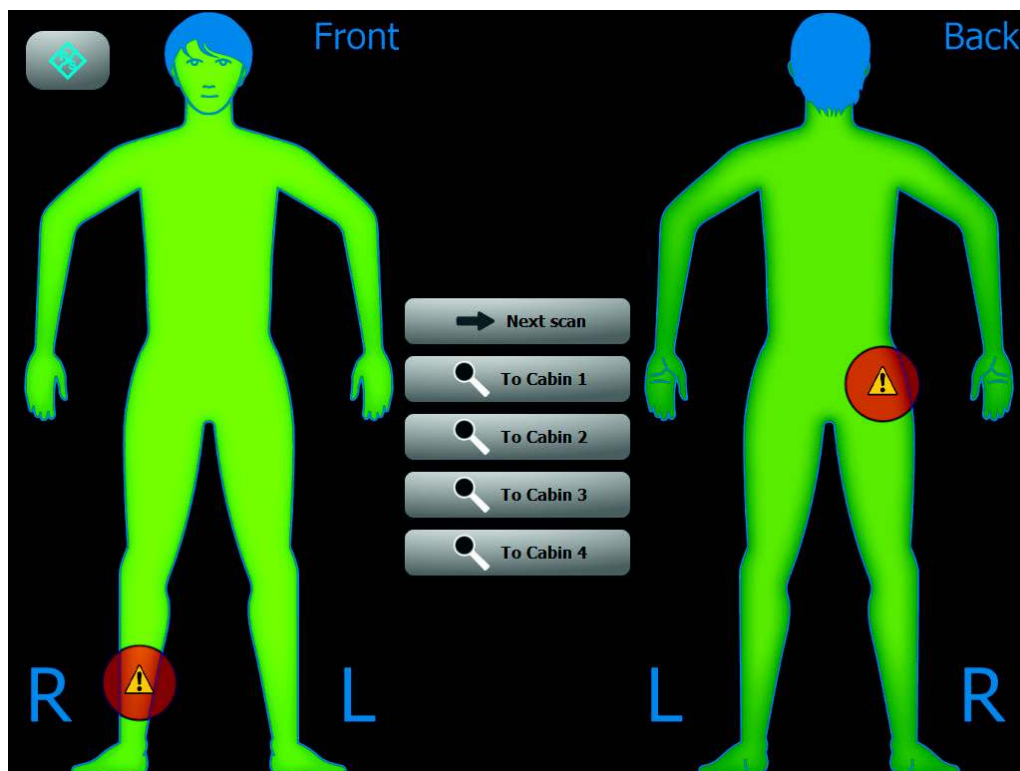
- ▮ Flat instrument with low weight and high positioning flexibility
- ▮ Escape routes through the lanes remain open
- ▮ Low fire load
- ▮ Mobile version (on wheels) also available
- ▮ Reliable, quiet continuous operation
- ▮ Insensitive to temperature fluctuations
- ▮ Low maintenance costs due to stable calibration and no moving parts
- ▮ Integration into local networks possible
- ▮ Software updates to meet future requirements

Benefits for operators

- ▮ Simple touch screen operation
- ▮ Unobstructed view of arriving passengers
- ▮ Direct access to passengers before scanning
- ▮ Wheelchair users can pass through without being scanned

Benefits for scanned persons

- ▮ Open, transparent scanning environment, no booth
- ▮ Easy to hold body posture
- ▮ Extremely short scan time



Scan results are visualized on a neutral body graphic.

R&S®QPS100

The R&S®QPS100 is the perfect solution for use after conventional metal detectors (secondary scan) or for small airports.

Two quick scans (front and back) with a duration of only 16 ms each make the scanning process quick and simple for the passenger.

Thanks to its extremely small footprint, the R&S®QPS100 is flexible to set up and maintains nearly the full lane-width for passengers.

The addition of up to four remote resolution stations in peak mode allows high throughput during peak periods.



R&S®QPS200

The R&S®QPS200 is designed for high throughput requirements, either as a replacement for metal detectors (primary scan) or as a secondary scan in conjunction with a metal detector.

A passenger is scanned in just 32 ms, in one easy-to-hold position between the panels.

The open architecture allows a clear view of arriving passengers, an open escape route and easy passage for wheelchairs.

Peak mode

Both the R&S®QPS100 and the R&S®QPS200 can operate in peak mode. For this purpose, up to four remote resolution stations are connected to the device. The scanner operator simply performs the scan and then sends the passenger to one of the free remote resolution stations. Here, the scan result is displayed and cleared by another operator.

Technical specifications

- Frequency range: 70 GHz to 80 GHz
- Multistatic operation with thousands of transmitters and receivers per panel
- Transmit power: approx. 1 mW
- Data acquisition time: approx. 16 ms/32 ms
- Fully electronic, no moving parts



Service that adds value

- ▮ Worldwide
- ▮ Local and personalized
- ▮ Customized and flexible
- ▮ Uncompromising quality
- ▮ Long-term dependability

About Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

- ▮ Environmental compatibility and eco-footprint
- ▮ Energy efficiency and low emissions
- ▮ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com/securityscanner

Contact

securityscanner@rohde-schwarz.com

Appendix H - Marketing Brochures - QPS100 / QPS200

Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 3606.7160.12 | Version 02.00 | November 2016 (as)

R&S®QPS Quick Personnel Security Scanners

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R&S®QPS Quick Personnel Security Scanners



Appendix H - Marketing Brochures - QPS201
Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner



ROHDE & SCHWARZ

R&S®QPS

Quick Personnel

Security Scanners

At a glance

The R&S®QPS is a state-of-the-art millimeterwave security scanner that automatically detects potentially dangerous items carried on the body or in clothing. The scanner can be used for airport security checks, security at public events with a high threat potential and access control at security-related facilities.

The R&S®QPS201 security scanner delivers high-precision and efficient security control while ensuring an unobtrusive and uncomplicated experience for scanned persons. It consists of a flat panel with thousands of transmitter antennas that emit extremely low-power millimeterwaves in very short succession and just as many receiver antennas that record high-resolution 3D information. Persons being scanned stand squarely between the panels as if facing a mirror, holding their arms slightly away from their bodies.

The detection software uses machine-trained algorithms to search for conspicuous objects of all material types. The scanner searches for anomalies indicating unusual objects rather than for certain items, enabling it to discover unknown and new threats. The R&S®QPS is designed for implicit privacy. Rather than generating photographic images, it evaluates physical information. Detected locations of interest are marked on a symbolic body graphic.

The R&S®QPS poses no health hazard whatsoever. It operates on frequencies similar to those of a vehicle distance warning system. The transmitted power at the scanned person's location is almost undetectable and several orders of magnitude lower than mobile phone emissions.



R&S®QPS

Quick Personnel Security Scanners

Benefits and key features

Detection characteristics

- ▮ Detection of all types of potentially dangerous objects (metal, ceramic, plastic, liquid)
- ▮ Outstanding body coverage; complete head, shoulder and leg illumination
- ▮ High system resolution, bandwidth and dynamic range for high detection performance and minimum false alarms
- ▮ Certified by the European Civil Aviation Conference (ECAC)

Benefits for operating company

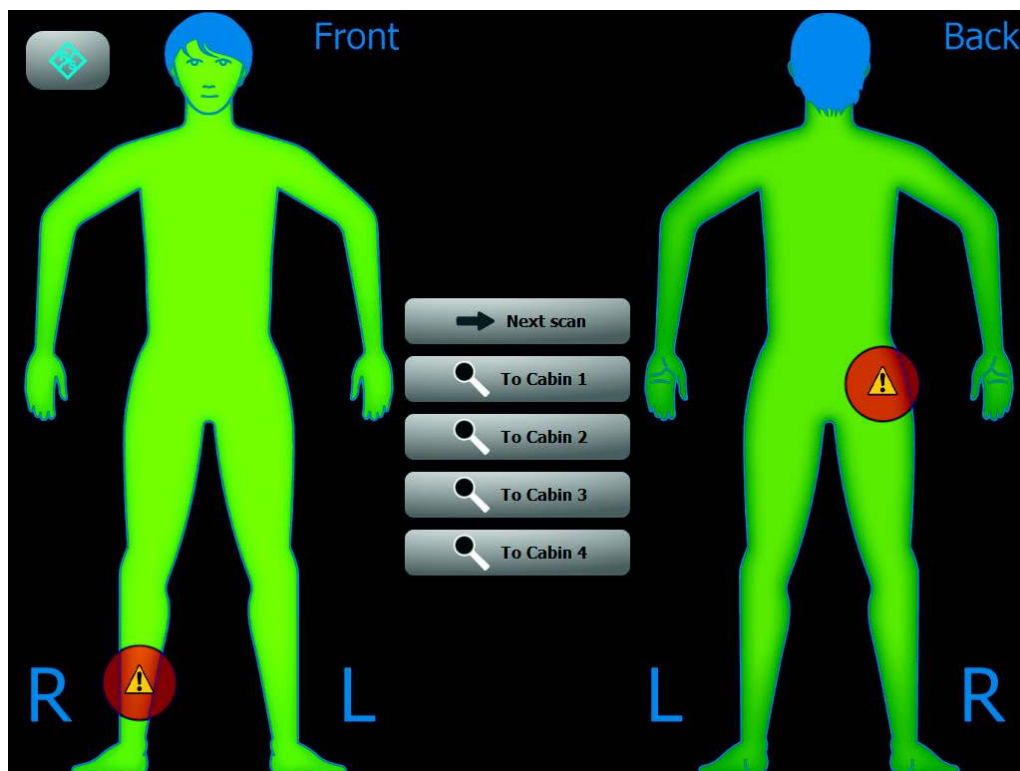
- ▮ Low processing time for highest throughput
- ▮ Flat with low weight and high positioning flexibility
- ▮ No operational interruption for calibration
- ▮ Escape routes through the lanes remain open
- ▮ Low fire load
- ▮ Reliable, quiet continuous operation
- ▮ Insensitive to temperature fluctuations
- ▮ Low maintenance costs due to stable calibration and no moving parts
- ▮ Easy service access since panels are installed on rails
- ▮ Integration into local networks possible
- ▮ Software updates to meet future requirements

Benefits for operators

- ▮ Simple touchscreen operation
- ▮ Unobstructed view of arriving passengers
- ▮ Direct access to passengers before scanning
- ▮ No obstacles for wheelchair users

Benefits for scanned persons

- ▮ Open, transparent scanning environment; no booth
- ▮ Easy-to-hold body posture; not necessary to raise arms
- ▮ Extremely short scan time
- ▮ Not necessary to change position



Scan results are visualized on a neutral body graphic.

R&S®QPS201

The R&S®QPS201 is the successor to the successful R&S®QPS200. It is designed for high throughput requirements, either as a replacement for metal detectors (primary scan) or as a secondary scan in conjunction with a metal detector.

A passenger is scanned in just 32 ms, in one easy-to-hold position between the panels.

The open architecture allows a clear view of arriving passengers, an open escape route and easy passage for wheelchairs.

Peak mode

Like the R&S®QPS200, the R&S®QPS201 can operate in peak mode. For this purpose, up to four remote resolution stations are connected to the device. The scanner operator simply performs the scan and then sends the passenger to one of the free remote resolution stations. Here, the scan result is displayed and cleared by another operator.

Technical specifications

- Frequency range: 70 GHz to 80 GHz
- Multistatic operation with thousands of transmitter and receiver antennas per panel
- Transmit power: approx. 1 mW
- Data acquisition time: approx. 32 ms
- Fully electronic; no moving parts

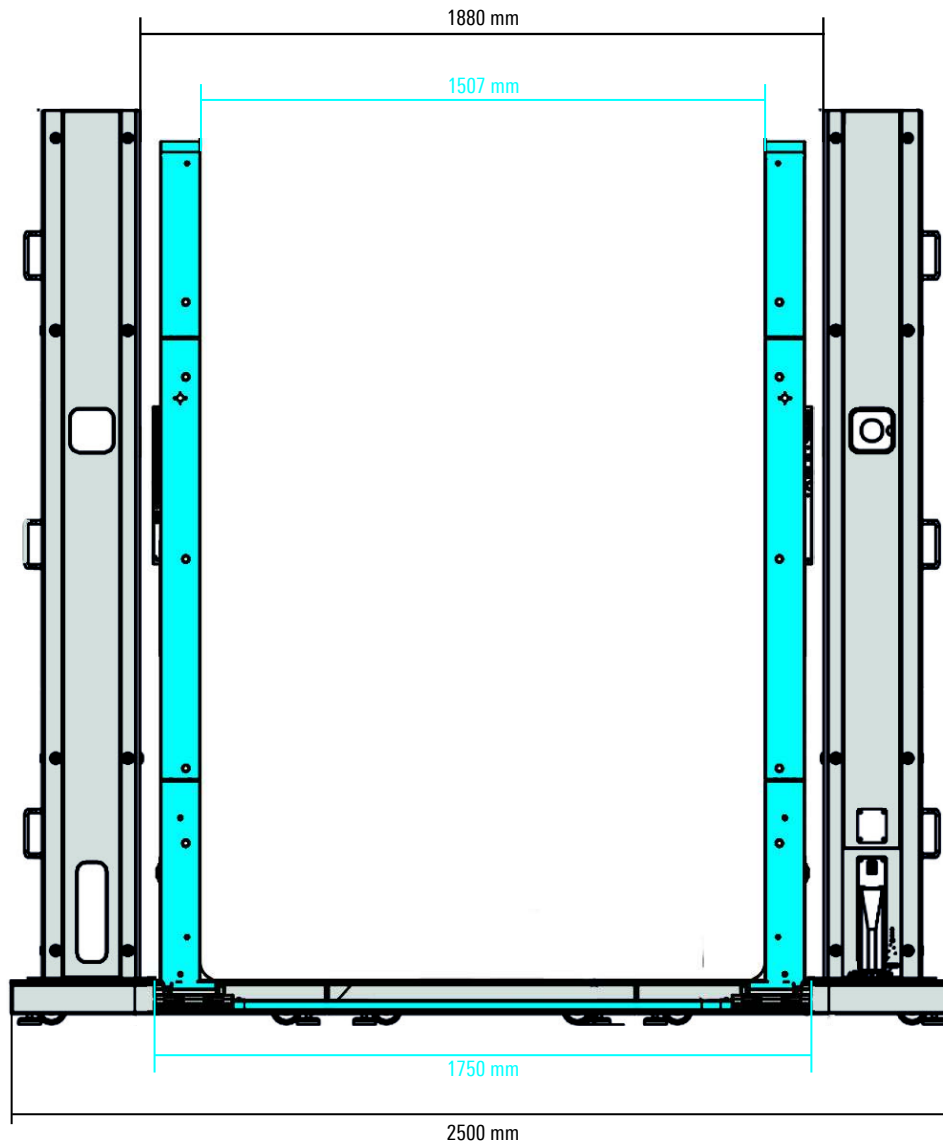


R&S®QPS201 optimizations

Optimizations compared with the previous R&S®QPS200 model

- Even lower false alarm rate and higher detection rate
- Extremely short processing time of well below 4 s
 - Highest achievable throughput in combination with optional, remote resolution stations
- Significantly reduced width allows use in narrow security lanes
- Shorter panels for use in lower buildings
- Significantly reduced weight allows use in areas with lower floor load capacity

Significantly reduced width of the R&S®QPS201 (blue) compared with the R&S®QPS200 (gray)



Service that adds value

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

Sustainable product design

- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership



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Request for Waiver for the Rohde & Schwarz QPS Personnel Security Scanner

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