



RF Exposure Technical Brief

IC Canada test site registration Number^{*)}: 7003A-2

Test Laboratory:

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Laboratory for EMC measurements

Merianstraße 28
D-63069 Offenbach

Tel.: +49 (0) 69 8306-747
Fax: +49 (0) 69 8306-620
E-mail: Stephan.Kloska@vde.com

Equipment under test

Applicant:	Cross Match Technologies GmbH; Unstrutweg 4, 07743 Jena
Manufacturer:	
File number:	2295300-3250-0012/106192
EUT:	Information Technology Equipment and Intentional Radiator
Brand/model:	D SCAN AUTHENTICATOR CF V1 (RJ 0479)
EUT received:	2008-07-10

Applied standards

Industry Canada: RSS-102, Issue 2, November 2005



"Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)"

Clause 2.5.1: Exemption from Routine Evaluation Limits - SAR Evaluation

Remarks: ---

Result: **Pass**

The conditions according to Clause 2.5.1 for the exemption from routine evaluation limits - SAR evaluation - are met. The EUT is deemed to be in compliance with the requirements of the standard.

Date of issue:	2009-03-11	
Tested by:	Mr. Wolfgang Klos EMC Test Engineer	
Reviewed:	Mr. Stephan Kloska, Dr.-Ing. Head of the Laboratory	

^{*)} Industry Canada Information:

A description of the test site has been registered by the Certification and Engineering Bureau of Industry Canada.



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1 Description of the sample (EUT)

1.1 General description

Type of EUT:	Live scanner for documents with USB 2.0 interface and built-in tag reader
Intended use:	To read the information contained in passports and similar documents from the transponder chip built in the document Typical users of this device will be officials from the police or customs and similar user groups. It is not a mass-product. It is not designed for use by the general public.
Brand name:	Cross Match Technologies
Model, Type designation:	D SCAN AUTHENTICATOR CF V1 (RJ 0479)
Serial number:	000900153.K2007

Units constituting the test setup:

a) Equipment under test

Device No.	Description	Manufacturer	Type/Model	Serial No.	Rated Supply Voltage	Remarks (e.g. FCC ID)
1	Document scanner	Cross Match Technologies	D SCAN AUTHENTICATOR CF V1 Model RJ 0479	000900169.C 2007	18-24 V DC 1 A Protection class III	

b) Support Equipment

Device No.	Description	Manufacturer	Type/Model	Serial No.	Rated Supply Voltage	Remarks (e.g. FCC ID)
2	External Power supply (supplying the EUT)	SINPRO	SPU63-107		100 – 240 VAC; 47-63 Hz; 1,6 A	
3	Notebook PC	Fujitsu Siemens	Amilo M1425	3948760419		acting as host computer
3a	External Power supply (supplying the Notebook PC)	Li Shin	0335C2065	A304351435 95		
4	Notebook PC	ASUS	M6000NE36M	4ANP007199		acting as a second device connected to the host pC for achieving a minimum configuration
4a	External Power supply (supplying the Notebook PC)	Delta Electronics	ADP-65DB			

Ports of the EUT:

No.	Description	specified length	Shield type
1	DC Power Input	1,5 m	shielded
2	USB 2.0 port	< 1,9 m	shielded

Possible operating modes of the sample

No.	Description
1	Optical scanning of the documents for recognition of the security characteristics and gathering of the information content of the document by reading out the RFID tag in the document
2	Ready (Device powered on, but no live communication because no application software is running)

Operating modes selected for testing

No.	Operating mode	Rationale
1	Continuously scanning of the document	This is the normal mode of operation with all the system components exercised. For test purposes, the application software was modified for continuous repetition of the reading process.
2	Ready	

Generated frequencies

Frequency of the wanted signal:	13,56 MHz
RF output power:	< 200 mW (stated by the applicant)
Operational frequencies:	150 kHz; 500 kHz; 12 MHz; 24 MHz; 36 MHz; 48 MHz; 480 MHz

Disturbance sources

No.	Description	Manufacturer	Type designation	Remarks
1	Power supply PCB	Cross Match	RJ0479:312.25 AEZ03	12 MHz
2	Base Cam PCB	Cross Match	RJ0479:302.25 AEZ01	24 MHz, 33 MHz
3	Illumination PCB	Cross Match	RJ0479:324.25 Rev. C	---
4	RFID Adapter ACG	Cross Match	RJ0479:385.25 Rev. F	8 MHz, 27.12 MHz
5	Antenna PCB (RFID-reader)	Cross Match	RJ0479:386.25 Rev. B	---

EMC-measures

No.	Location	Description	Specification	Manufacturer	Type designation
1	DC input	Suppressor diode			SMCJ 33 CA
2	Internal USB connections	Choke		Würth	744 231 371

Description of shield- and contacting measures for EMC

No.	Description of the measure
1	Metal screening plate on the camera board

Further measures

Description
- none -

Information about modifications to the EUT at the test laboratory:

In order to comply with the class B limits for radiated emissions, no modifications had to be implemented. Also no modifications were necessary to comply with the rules for intended radiators.

2 Evaluation

The here assessed transmitter is being utilized in a document reader and scanner.

At the time when the document to be read is put on the scanner surface, the distance between the device and the user may be less than 20 cm.

According to RSS-102, Clause 2.5, SAR evaluation is required except when the device operates

- from 3 kHz up to 1 GHz inclusively and its output power (i.e. the higher of the conducted or effective isotropic radiated power (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 200 mW for General Public Use and 1000 mW for Controlled Use;
- above 1 GHz up to 2.2 GHz inclusively and its output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 100 mW for General Public Use and 500 mW for Controlled Use;
- above 2.2 GHz up to 3 GHz inclusively and its output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 20 mW for General Public Use and 100 mW for Controlled Use;
- above 3 GHz up to 6 GHz inclusively and its output power (i.e. the higher of the conducted or radiated (e.i.r.p.) source-based time-averaged output power) is less than, or equal to 10 mW for General Public Use and 50 mW for Controlled Use.

2.1 Operation of the 13,56 MHz RFID reader

According to VDE Test Report FG43-5-106192, this transmitter meets the

- Limits of Annex A2.6 for wanted emissions in the frequency range from 13,553 MHz to 14,010 MHz and the
- General Field Strength Limits for Transmitters and Receivers which are specified in Tables 2 and 3 of RSS-210, Issue 7, June 2007 for all other emissions.

The total radiated power of the transmitter can be calculated by adding the radiated power at the frequency of the wanted signal and the spurious radiated power in the frequency range from 9 kHz to infinity. However, for the here assessed transmitter, the level of emissions at frequencies above 960 MHz is considered to be negligible.

2.1.1 Fundamental frequency

The manufacturer has declared that the transmitter output power is less than 200 mW.

According to VDE Test Report FG43-5-106192, the field strength of the fundamental signal is 44,5 dB(μV/m) or 168 μV/m at a distance of 30 m.

Using the formula given in Clause 4.8 of RSS-Gen and assuming an antenna gain of 1, the maximum transmitter output power at the fundamental frequency calculates to

$$TP\ 1 = (168 * 10^{-6} * 30)^2 / 30 * 1\ W = 847\ nW\ e.i.r.p.$$

This value represents the worst case (with the transmitter permanently on and transmitting with the maximum permissible output power).

2.1.2 Harmonics and other spurious emissions

2.1.2.1 Frequency range from 9 kHz to 30 MHz

Disturbances above the overall noise floor at other frequencies than the fundamental frequency are expected only at the frequency of harmonic order number 2 (at 27,12 MHz).

However, at 10 m distance, no reading was found above the noise floor at 20 dB(μV/m) or 10 μV/m.

Applying the same formula as above, the maximum transmitter output power at the fundamental frequency calculates to

$$TP\ 2 = (10 * 10^{-6} * 10)^2 / 30 * 1\ W = 0,33\ nW\ e.i.r.p.$$

2.1.2.2 Frequency range from 30 MHz to 960 MHz

According to VDE Test Report FG43-5-106192, this transmitter meets the General Field Strength Limits for Transmitters and Receivers which are specified in Table 2 of RSS-210, Issue 6, September 2005.

This means:

In the range from 30 MHz to 88 MHz, the maximum permissible e.i.r.p. is less than 3 nW in any 120 kHz band. Disturbances from the transmitter may be found at the following frequencies: 40,68 MHz, 54,24 MHz, 67,8 MHz and 81,36 MHz (4 frequencies). Hence, the total radiated power in this frequency range (if the device would generate a narrowband disturbance at each of the frequencies with the maximum permissible field strength) of $TP\ 3 = 3\text{ nW} \cdot 4 = 12\text{ nW}$.

In the range from 88 MHz to 216 MHz, the e.i.r.p. is less than 6,8 nW in any 120 kHz band. Disturbances from the transmitter may be found at all harmonics from 13,56 MHz which fall within this frequency range. In total, these are 9 frequencies. Hence, the total radiated power in this frequency range (if the device would generate a narrowband disturbance at each of the frequencies with the maximum permissible field strength) of $TP\ 4 = 6,8\text{ nW} \cdot 9 = 61,2\text{ nW}$.

In the range from 216 MHz to 960 MHz, the e.i.r.p. is less than 12 nW in any 120 kHz band. Disturbances from the transmitter may be found at all harmonics from 13,56 MHz which fall within this frequency range. In total, these are 55 frequencies. Hence, the total radiated power in this frequency range (if the device would generate a narrowband disturbance at each of the frequencies with the maximum permissible field strength) of $TP\ 5 = 12\text{ nW} \cdot 55 = 660\text{ nW}$.

At frequencies above 960 MHz, the level of disturbances caused by harmonics of the transmitter operating at 13,56 MHz is considered to be negligible. Hence, TP_6 is considered to be zero.

2.1.3 Calculation of the total radiated power

$$\begin{aligned} TP &= TP\ 0 + TP\ 1 + TP\ 2 + TP\ 3 + TP\ 4 + TP\ 5 + TP\ 6 \\ &= 847\text{ nW} + 0,33\text{ nW} + 12\text{ nW} + 61,2\text{ nW} + 660\text{ nW} + 0\text{ nW} = 1580,5\text{ nW} = 1,58\text{ }\mu\text{W} \end{aligned}$$

This value is far below the limit of 200 mW which is specified in RSS-102, Clause 2.5.1 for the frequency range from 3 kHz to 1 GHz.



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