



Prüfbericht-Nr.: <i>Test report no.:</i>	50344114 002	Auftrags-Nr.: <i>Order no.:</i>	238493504	Seite 1 von 21 <i>Page 1 of 21</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2020-11-03	
Auftraggeber: <i>Client:</i>	Nedap N.V Parallelweg 2, 7141 DC Groenlo, The Netherlands			
Prüfgegenstand: <i>Test item:</i>	Nvite Reader			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	NVR2001			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (RFID 13.56MHz portion)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.203, 15.205, 15.207 and 15.225 ISED RSS-210 Issue 10, December 2019 ISED RSS-Gen, Issue 5, March 2019			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-02-10			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A001063683-001- A001063683-002			
Prüfzeitraum: <i>Testing period:</i>	2020-02-14 ~2020-04-17			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>reviewed by:</i>			genehmigt von: <i>authorized by:</i>	
Datum: 2020-11-17 <i>Date:</i>	R y a n C h e n		Datum: 2020-11-17 <i>Date:</i>	B r e n d a C h e n
Stellung / Position:	Senior Project Manager		Stellung / Position:	Senior Project Manager
Sonstiges / Other:	This report has been modified the description for the certification purpose. The test report No. 50344114 001 is replaced by this new test report No. 50344114 002. Test report No. 50344114 001 becomes invalid since 2020-11-04.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: *Passed*

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: *Passed*

5.1.3 FREQUENCY STABILITY

RESULT: *Passed*

5.1.1 99% BANDWIDTH

RESULT: *Passed*

5.1.2 SPURIOUS EMISSION

RESULT: *Passed*

5.2.1 CONDUCTED EMISSIONS LINE AND NEUTRAL

RESULT: *Passed*

Contents

HISTORY OF THIS TEST REPORT	5
1. GENERAL REMARKS	6
1.1 COMPLEMENTARY MATERIALS.....	6
1.2 COMPLEMENTARY MATERIALS.....	6
2. TEST SITES	7
2.1 TEST LABORATORY	7
2.2 TEST FACILITY.....	7
2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	8
2.4 TRACEABILITY	9
2.5 CALIBRATION	9
2.6 MEASUREMENT UNCERTAINTY	9
3. GENERAL PRODUCT INFORMATION.....	10
3.1 PRODUCT FUNCTION AND INTENDED USE	10
3.2 RATINGS AND SYSTEM DETAILS.....	10
3.3 INDEPENDENT OPERATION MODES.....	11
3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS	11
3.5 SUBMITTED DOCUMENTS.....	11
4. TEST SET-UP AND OPERATION MODES.....	12
4.1 PRINCIPLE OF CONFIGURATION SELECTION	12
4.2 TEST OPERATION AND TEST SOFTWARE.....	12
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	12
4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	13
4.5 TEST SETUP DIAGRAM	13
5. TEST RESULTS	15
5.1 TRANSMITTER REQUIREMENT & TEST SUITES.....	15
5.1.1 Antenna Requirement	15
5.1.2 Field strength of fundamental.....	16
5.1.3 Frequency Stability.....	17
5.1.4 99% Bandwidth	18
5.1.5 Spurious Emission	19
5.2 MAINS CONDUCTED EMISSIONS	20
5.2.1 Conducted Emissions Line and Neutral.....	20

6. LIST OF TABLES 21

Prüfbericht - Nr.: 50344114 002
Test Report No.

Seite 5 von 21
Page 5 of 21

HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
60362823 001	Original Release	2020-07-01
60362823 002	Modified the description in section 2.2 and 4.2	2020-11-04

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: EUT Photo Documentation
Appendix D: Test Result of Radiated Emissions
Appendix X: Photographs of the Test Set-Up

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.203, 15.205, 15.207 and 15.225 ISED RSS-210 Issue 10, December 2019 ISED RSS-Gen, Issue 5, March 2019 ANSI C63.10:2013

1.2 Complementary Materials

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

Prüfbericht - Nr.: 50344114 002
Test Report No.

Seite 7 von 21
Page 7 of 21

2. Test Sites

2.1 Test Laboratory

Taipei Testing laboratories
11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing laboratories
11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

FCC Registration No.: TW3567
IC Canada Registration No.: 9465A
CABID: TW3567
TAF Accredited NCC Test Lab. No.: 3567
TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022

Prüfbericht - Nr.: 50344114 002

Test Report No.

Seite 8 von 21

Page 8 of 21

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESR 7	101062	2019/10/15	2020/10/15
Spectrum Analyzer	Rohde & Schwarz	FSV-40	100921	2019/04/30	2020/04/30
Pre-Amplifier	Hewlett Packard	8447F	2805A03335	2019/09/11	2020/09/11
Pre-Amplifier	EM Electronics	EM01G18G	060558	2019/12/24	2020/12/24
Pre-Amplifier	EMC Instruments	EMC184045SE	980609(980408)	2019/06/14	2020/06/14
Bilog Antenna	TESEQ	CBL 6111D	29802	2019/09/10	2020/09/10
Horn Antenna	ETS-Lindgren	3117	00138160	2019/06/24	2020/06/24
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2019/07/11	2020/07/11
Test Software	Audix	e3	Ver. 9	N/A	N/A
Spectrum Analyzer	R&S	FSV40	101512	2020/02/24	2021/02/23
Thermo Chamber	Giant Force	GHT-150-40-CP-SD	MAA1902-010	2020/3/10	2021/3/9
Signal Generator	R&S	SMB100A03	181335	2020/1/8	2021/1/7
Power Meter	Anritsu	ML2495A	1901008	2019/4/29	2020/4/28
Power Sensor	Anritsu	MA2411B	1725269	2019/4/29	2020/4/28

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are ± 3 dB.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	± 1.5 dB
Radiated emission of transmitter, valid up to 26 GHz	± 6 dB
Radiated emission of receiver, valid up to 26 GHz	± 6 dB
Temperature	± 2 °C
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The NVR2001 is a SRD system that reads access codes from Near Field Communication and Blue Tooth enabled mobile telephones or Access cards, operating on 13.56 MHz. Additionally, there is a 120 kHz Card reader implemented. The scope of this test report is the 13.56 MHz inductive reader interface. The NVR2001 contains Transmitter BT Module with FCC ID: T9JRN4020 IC: 6514A-RN4020 For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	Nvite Reader
Type Identification	NVR2001
FCC ID	CGDNVR2001
IC ID	1444A-NVR2001

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	13.56 MHz
Operation Voltage	24Vdc
Modulation	ASK
Antenna Type	Loop antenna

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum emission level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a test mode firmware which makes it possible to transmit signal when switched on the power.

Regarding magnetic loop antenna testing, the antenna was orientated as required by ANSI C63.10 clause 6.5.7 (6.4.6).

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Kind of Equipment	Manufacturer	Model Name	S/N
DC Power Supply	LOKO	DPS-5050	L8000045147

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

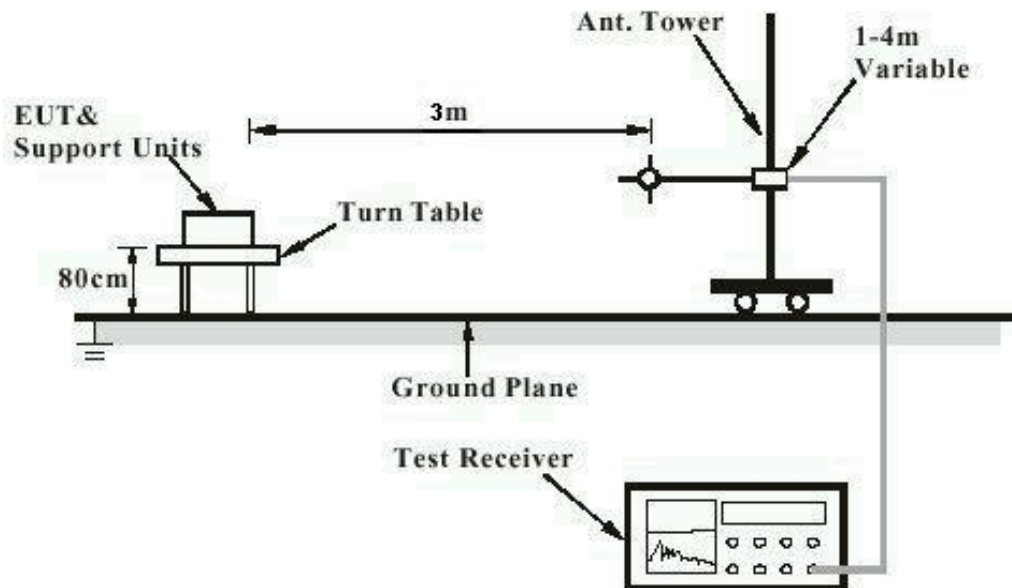
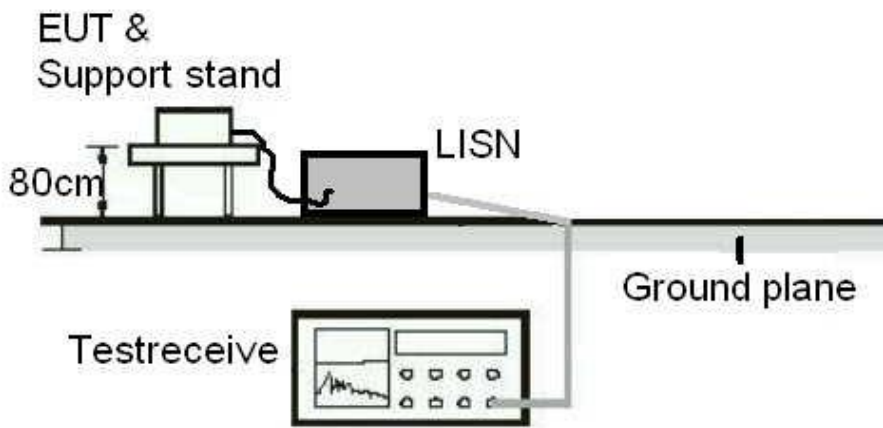


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Passed

Standard : Part 15.203 and ISED RSS-Gen 6.8
Requirement : use of approved antennas only

The antenna is Loop antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

Prüfbericht - Nr.: 50344114 002

Test Report No.

Seite 16 von 21

Page 16 of 21

5.1.2 Field strength of fundamental

RESULT:

Passed

Test standard : FCC Part 15.225, ISED RSS-210 B.6
Basic standard : ANSI C63.10:2013

Test setup

Test Frequency : 13.56 MHz
Operation Mode : A

Ambient temperature : see Appendix D
Relative humidity : see Appendix D
Atmospheric pressure : see Appendix D

For details refer to Appendix D.

5.1.3 Frequency Stability

RESULT:

Passed

Test standard : FCC Part 15. 225(e)
ISED RSS-210 B.6
Basic standard : ANSI C63.10:2013
Kind of test site : Shielded room

Test setup

Test Frequency : 13.56 MHz
Operation Mode : A

Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Table 6: Test result of Frequency Stability

Fundamental frequency (MHz)	Temperature (°C)	Voltage	Measurement frequency (MHz)	Frequency Error (ppm)	Limit ±0.01%
13.560030	-20	Normal	13.560120	6.64	±100ppm
	-10	Normal	13.560120	6.64	
	0	Normal	13.560060	2.21	
	10	Normal	13.560080	3.69	
	20	85%	13.560030	0.00	
	20	Normal	13.560030	0.00	
	20	115%	13.560060	2.21	
	30	Normal	13.560012	-1.33	
	40	Normal	13.560012	-1.33	
	50	Normal	13.560030	0.00	

5.1.4 99% Bandwidth

RESULT:

Passed

Test standard : ISED RSS-Gen
Basic standard : ANSI C63.10:2013
Kind of test site : Shielded room

Test setup

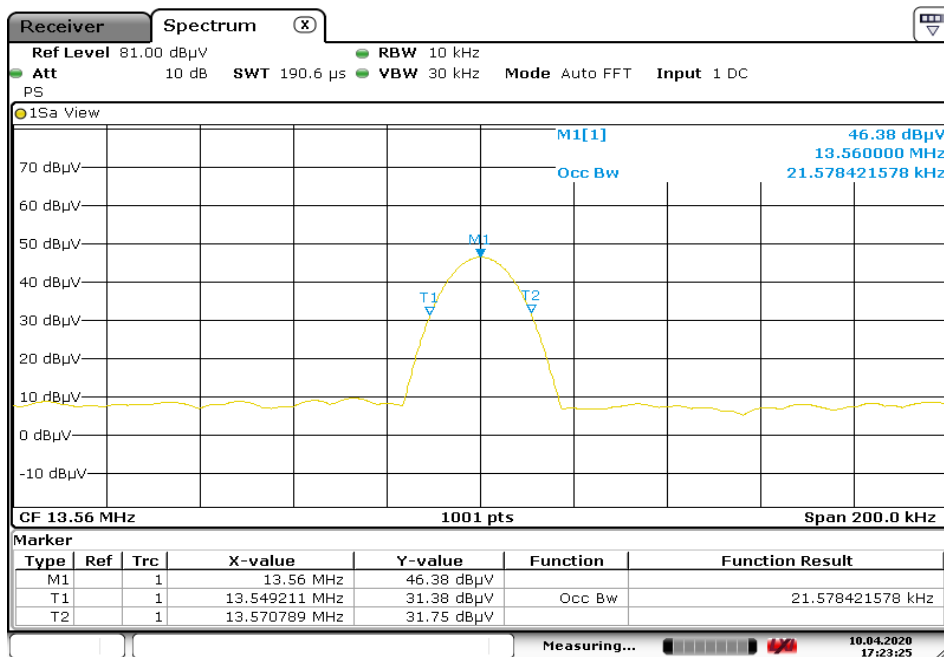
Operation Mode : A

Ambient temperature : 22-26 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Table 7: Test result of 99% Bandwidth

Channel	Frequency (MHz)	99% Bandwidth (kHz)
1	13.56	21.58

Test Plot of 99% Bandwidth



5.1.5 Spurious Emission

RESULT:

Passed

Test standard	:	FCC part 15.209 FCC part 15.225 ISED RSS-210 B.6
Basic standard	:	ANSI C63.10:2013
Limits	:	The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Operation mode	:	A
Ambient temperature	:	20 °C
Relative humidity	:	53 %
Atmospheric pressure	:	100-103 kPa

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

Prüfbericht - Nr.: 50344114 002
Test Report No.

Seite 20 von 21
Page 20 of 21

5.2 Mains Conducted Emissions

5.2.1 Conducted Emissions Line and Neutral

RESULT:

Passed

Test standard : FCC Part 15.207
FCC Part 15.107
Limits : Mains Conducted emissions as defined in Part
15.107(a), must comply with the mains
conducted emission.
Kind of test site : Shielded Room

Test setup

Test Channel : 13.56 MHz
Operation mode : A

Remark: For details refer to Appendix D.

6. List of Tables

Table 1: Applied Standard and Test Levels	6
Table 2: List of Test and Measurement Equipment	8
Table 3: Emission Measurement Uncertainty.....	9
Table 4: Basic Information of EUT	10
Table 5: Technical Specification of EUT	10
Table 6: Test result of Frequency Stability	17
Table 7: Test result of 99% Bandwidth.....	18