



Prüfbericht-Nr.: <i>Test Report No.:</i>	10048894 001	Auftrags-Nr.: <i>Order No.:</i>	114031713	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>	26-Jan-15	
Auftraggeber: <i>Client:</i>	N.V. Nederlandsche Apparatenfabriek Nedap, Parallelweg 2, NL-7141 DC, Groenlo, The Netherlands			
Prüfgegenstand: <i>Test item:</i>	Anti-Pilferage System with metal detection			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	ASSY FC180R RF+MD			
Auftrags-Inhalt: <i>Order content:</i>	IC/FCC Part 15C Test report for 8.2 MHz portion			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.223 RSS-210 (12-2010) A2.4			
Wareneingangsdatum: <i>Date of receipt:</i>	5/19/2015			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000168995-004			
Prüfzeitraum: <i>Testing period:</i>	20-May-2015 - 24-Jun-2015			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
7-Jul-2015	Ryan W. T. Chen / Project Engineer	7-Jul-2015	Rene Charton/Senior Project Manager	
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>
				Unterschrift <i>Signature</i>
Sonstiges / Other:				
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 6dB BANDWIDTH

RESULT: Passed

5.1.4 99% BANDWIDTH

RESULT: Passed

5.1.5 SPURIOUS EMISSION

RESULT: Passed

5.2.1 CONDUCTED EMISSIONS LINE AND NEUTRAL

RESULT: Passed

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS.....	4
2.	TEST SITES	5
2.1	TEST LABORATORY	5
2.2	TEST FACILITY.....	5
2.3	LIST OF TEST AND MEASUREMENT INSTRUMENTS.....	6
2.4	TRACEABILITY	7
2.5	CALIBRATION	7
2.6	MEASUREMENT UNCERTAINTY	7
3.	GENERAL PRODUCT INFORMATION.....	8
3.1	PRODUCT FUNCTION AND INTENDED USE	8
3.2	RATINGS AND SYSTEM DETAILS.....	9
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.....	12
5.	TEST RESULTS	13
5.1	TRANSMITTER REQUIREMENT & TEST SUITES.....	13
5.1.1	<i>Antenna Requirement</i>	<i>13</i>
5.1.2	<i>Field strength of fundamental.....</i>	<i>14</i>
5.1.3	<i>6dB Bandwidth</i>	<i>15</i>
5.1.4	<i>99% Bandwidth</i>	<i>17</i>
5.1.5	<i>Spurious Emission</i>	<i>19</i>
5.2	MAINS CONDUCTED EMISSIONS	20
5.2.1	<i>Conducted Emissions Line and Neutral.....</i>	<i>20</i>
6.	LIST OF TABLES	21

1. General Remarks

1.1 Complementary Materials

These attachments are integral parts of this test report.:

- Appendix P: Photo Documentation**
(File Name: 10048894APPENDIX P)
- Appendix D: Test Result of Radiated Emissions**
(File Name: 10048894APPENDIX D)

Test Specifications

The following standards were applied.

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.223 ANSI C63.4:2014, ANSI C63.10:2013

2. Test Sites

2.1 Test Laboratory

TUV Rheinland Taiwan Ltd.
Taichung Branch Office

No.9, Lane 36, Minsheng Rd., Sec. 3, Daya District,
Taichung City 428
Taiwan (R.O.C.)

2.2 Test Facility

TUV Rheinland Taiwan Ltd.
Taipei Office

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

FCC RegistrationNo.: 365730
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2013-Jul-1st to 2016-Jun-30th



Testing Laboratory
0759

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Last Calibration	Next Calibration
EMI Test Receiver	R&S	ESR7	101062	31-Aug-14	30-Aug-15
Bilog Antenna	TESEQ	CBL6111D	29802	4-Jul-14	3-Jul-16
Spectrum Analyzer	R&S	FSV 40	100921	17-Dec-14	16-Dec-15
Spectrum Analyzer	Agilent	N9010A	MY53470241	1-Apr-15	30-Mar-16
Horn Antenna	ETS-Lindgren	3117	138160	12-Jan-15	11-Jan-17
Horn Antenna (18GHz~40GHz)	COM-POWER	AH840	101031	30-Oct-13	29-Oct-15
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	23-Aug-14	22-Aug-15
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	26-Aug-14	25-Aug-15
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM30180	60558	4-Nov-14	3-Nov-15
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	22-Oct-14	21-Oct-15
EMI Test Receiver	R&S	ESCI7	100797	28-Dec-14	27-Dec-15
LISN (1 phase)	R&S	ENV216	101243	31-May-14	30-May-15
LISN	Rolf Heine	NNB-2/16Z	99080	26-Aug-14	25-Aug-15

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
Adjacent channel power	± 3 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 EUT is an Electronic Article Surveillance System working in the 8 MHz Band. Additionally, there is a metal detector in the device that works at 127 kHz. This report relates to the 8 MHz portion of the device.

For details refer to the User Guide.

3.2 Ratings and System Details

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Anti-Pilferage System
Type Designation	ASSY FC180R RF+MD
FCC ID	CGDFC180RRFMD
Canada ID	1444A-FC180RRFMD

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	7565 kHz to 8571.25 kHz
Channel number	24
Operation Voltage	120V
Modulation	None, Hopping

No operation in restricted bands:

Nr.	Frequency (kHz)	Nr.	Frequency (kHz)	Nr.	Frequency (kHz)
1	7565.00	9	7915.00	17	8265.00
2	7608.75	10	7958.75	18	8308.75
3	7652.50	11	8002.50	19	8352.50
4	7696.25	12	8046.25	20	8396.25
5	7740.00	13	8090.00	21	8440.00
6	7783.75	14	8133.75	22	8483.75
7	7827.50	15	8177.50	23	8527.50
8	7871.25	16	8221.25	24	8571.25

So the fundamental emission are outside of the bands listed in Section 15.205 (a).

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel

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 Data interface which makes it possible to control them through a test software installed on a notebook computer.

Both alarming and non-alarming have been evaluated, only the worst case situation is shown.

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
--	--	--	--

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.

5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Standard : Part 15.203 and RSS-Gen 7.1.4
Requirement : use of approved antennas only

The antenna and the transmitter are one assembly with no possibility of replacement with a non-approved antenna by a normal the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

5.1.2 Field strength of fundamental

RESULT:
Passed

Test standard : FCC Part 15.223
RSS-210 A2.3

Basic standard : ANSI C63.10:2013

Test setup

Test Frequency : Low. High
Operation Mode : A

Atmospheric pressure : 100-103 kPa

Applicable Limit:

Frequency (MHz)	Field strength AV ($\mu\text{V/m}$)	Field strength AV (dB $\mu\text{V/m}$)	Field strength Pk (dB $\mu\text{V/m}$)	Measurement Distance (m)
1.705 - 10	100	40	60	30
1.705 - 10	10000	80	100	3

The center frequency is 8068 kHz.
The 6 dB BW is more than 810 kHz

Table 6: Field strength of fundamental, maximal level found

Frequency (MHz)	Level(3m) (dB $\mu\text{V/m}$)	Detector	Limit(3m) (dB $\mu\text{V/m}$)	Level(30m) (dB $\mu\text{V/m}$)	Limit(30m) (dB $\mu\text{V/m}$)	Remark	Result
7.6	86	PK	100	46	60	Same PAP as 8.218 MHz	Pass
8.2180	87.96	PK	100	47.96	60	--	Pass
8.2180	70.12	AV	80	30.12	40	--	Pass
8.6	86	PK	100	46	60	Same PAP as 8.218 MHz	Pass

Remark: For details refer to Appendix D

5.1.3 6dB Bandwidth

RESULT:**Passed**

Test standard : FCC Part 15.223
RSS-210 A2.3
Basic standard : ANSI C63.10:2013,
Kind of test site : Shielded room

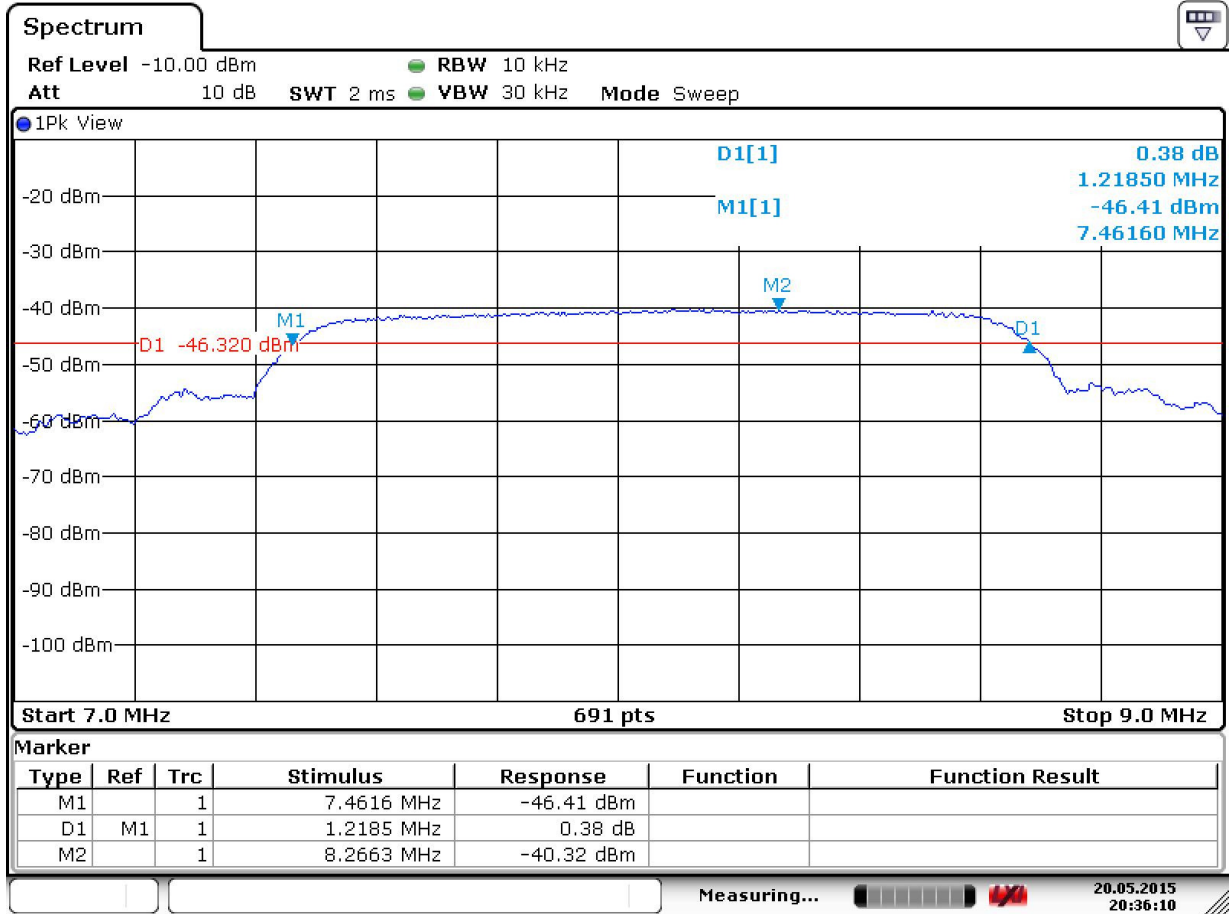
Test setup

Test Channel : Low/ High
Operation Mode : A

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

Table 7: Test result of 6dB Bandwidth

Antenna type	Channel Frequency low(MHz)	Channel Frequency high(MHz)	6dB Bandwidth (MHz)
integrated	7.4616	8.680	1.2185

6dB Bandwidth Measurement:


Date: 20.MAY.2015 20:36:10

5.1.4 99% Bandwidth

RESULT:**Passed**

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

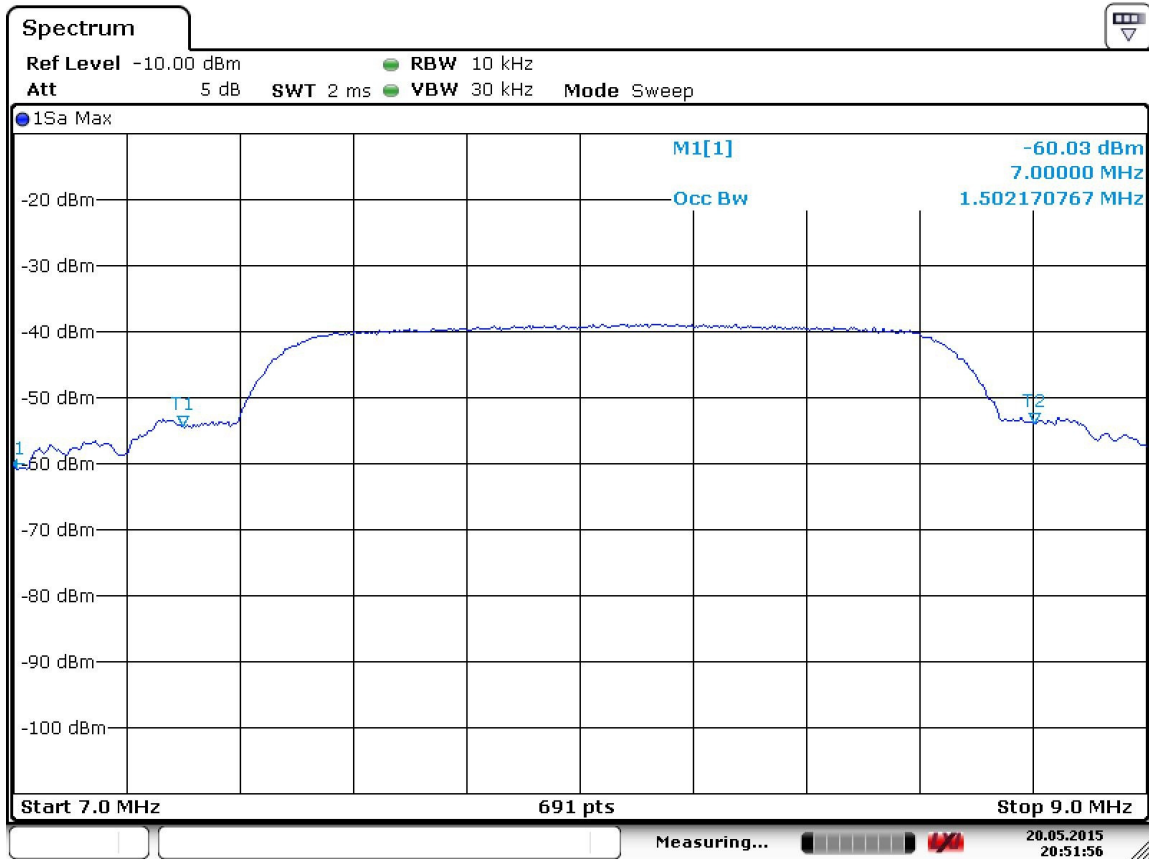
Test setup

Test Channel : Sweep on
Operation Mode : A

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

Table 8: Test result of 99% Bandwidth

Antenna type	99% Bandwidth (MHz)
integrated	1.502

Test Plot of 99% Bandwidth,


Date: 20.MAY.2015 20:51:55

5.1.5 Spurious Emission

RESULT:**Passed**

Test standard	:	FCC Part 15.223 RSS-210 A2.4 RSS-Gen
Basic standard	:	ANSI C63.10: 2013
Limits	:	The field strength of emissions outside of the band 1.705–10.0 MHz shall not exceed the general radiated emission limits in § 15.209 Outside of the swept frequency band, the out-of-band emission limits in sections A2.5 and A2.6, or the general field strength limits listed in RSS-Gen apply, whichever are less stringent. This test is to be carried out with the frequency sweep in operation
Kind of test site	:	3m Semi-Anechoic Chamber
Test setup		
Test Channel	:	Sweep on
Operation mode	:	A

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic.

For details refer to Appendix D.

5.2 Mains Conducted Emissions

5.2.1 Conducted Emissions Line and Neutral

RESULT:**Passed**

Test standard : LP0002: 2.3
FCC Part 15.207
FCC Part 15.107
RSS-Gen

Limits : Mains Conducted emissions as defined in
LP0002: 2.3 , must comply with the mains
conducted emission limits specified in LP0002:
2.3

Kind of test site : Shielded Room

Test setup

Test Channel : Sweep on
Operation mode : Normal

Remark: For details refer to Appendix D.

6. List of Tables

Table 1: Applied Standard and Test Levels	4
Table 2: List of Test and Measurement Equipment	6
Table 3: Emission Measurement Uncertainty.....	7
Table 4: Basic Information of EUT	9
Table 5: Technical Specification of EUT	9
Table 6: Field strength of fundamental, maximal level found.....	14
Table 7: Test result of 6dB Bandwidth	15