

<b>Prüfbericht-Nr.:</b> <i>Test Report No.:</i>	<b>10048896 001</b>	<b>Auftrags-Nr.:</b> <i>Order No.:</i>	<b>114031713</b>	<b>Seite 1 von 21</b> <i>Page 1 of 21</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client Reference No.:</i>	<b>N/A</b>	<b>Auftragsdatum:</b> <i>Order date:</i>	<b>26-Jan-15</b>	
<b>Auftraggeber:</b> <i>Client:</i>	<b>N.V. Nederlandsche Apparatenfabriek Nedap, Parallelweg 2, NL-7141 DC, Groenlo, The Netherlands</b>			
<b>Prüfgegenstand:</b> <i>Test item:</i>	<b>Anti-Pilferage System</b>			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type No.:</i>	<b>ASSY FC180R RF</b>			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	<b>IC/FCC Part 15C Test report</b>			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	<b>FCC 47CFR Part 15: Subpart C Section 15.223 RSS-210 (12-2010) A2.4</b>			
<b>Wareneingangsdatum:</b> <i>Date of receipt:</i>	<b>5/19/2015</b>			
<b>Prüfmuster-Nr.:</b> <i>Test sample No.:</i>	<b>A000168995-004</b>			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	<b>20-May-2015 - 24-Jun-2015</b>			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	<b>EMC/RF Laboratory Taipei</b>			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	<b>TUV Rheinland Taiwan Ltd.</b>			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	<b>Pass</b>			
<b>geprüft von / tested by:</b>		<b>kontrolliert von / reviewed by:</b>		
<b>7-Jul-2015</b>	<b>Ryan W. T. Chen / Project Engineer</b>	<b>7-Jul-2015</b>	<b>Rene Charton / Senior Project Manager</b>	
<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>	<b>Unterschrift</b> <i>Signature</i>	<b>Datum</b> <i>Date</i>	<b>Name / Stellung</b> <i>Name / Position</i>
				
<b>Sonstiges / Other:</b>				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>		<b>Prüfmuster vollständig und unbeschädigt</b> <i>Test item complete and undamaged</i>		
<b>* Legende:</b>	<b>1 = sehr gut</b>	<b>2 = gut</b>	<b>3 = befriedigend</b>	<b>4 = ausreichend</b>
	<b>P(ass) = entspricht o.g. Prüfgrundlage(n)</b>	<b>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)</b>	<b>N/A = nicht anwendbar</b>	<b>5 = mangelhaft</b>
	<b>N/T = nicht getestet</b>			
<b>Legend:</b>	<b>1 = very good</b>	<b>2 = good</b>	<b>3 = satisfactory</b>	<b>4 = sufficient</b>
	<b>P(ass) = passed a m. test specification(s)</b>	<b>F(ail) = failed a m. test specification(s)</b>	<b>N/A = not applicable</b>	<b>5 = poor</b>
				<b>N/T = not tested</b>
<b>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.</b> <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*

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## 1. General Remarks

### 1.1 Complementary Materials

These attachments are integral parts of this test report.:

**Appendix P: Photo Documentation**

(File Name: 10048896APPENDIX P)

**Appendix D: Test Result of Radiated Emissions**

(File Name: 10048896APPENDIX D)

Test Specifications

The following standards were applied.

**Table 1: Applied Standard and Test Levels**

<b>Radio</b>
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  $\pm 3$ dB.

**Table 3: Emission Measurement Uncertainty**

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1.5$ dB
Adjacent channel power	$\pm 3$ dB
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6$ dB
Radiated emission of receiver, valid up to 26 GHz	$\pm 6$ dB
Temperature	$\pm 2$ °C
Humidity	$\pm 10$ %

### **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.  
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
FCC ID	CGDFC180RRF
Canada ID	1444A-FC180RRF

**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

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No operation in restricted bands:

<b>Nr.</b>	<b>Frequency (kHz)</b>	<b>Nr.</b>	<b>Frequency (kHz)</b>	<b>Nr.</b>	<b>Frequency (kHz)</b>
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**

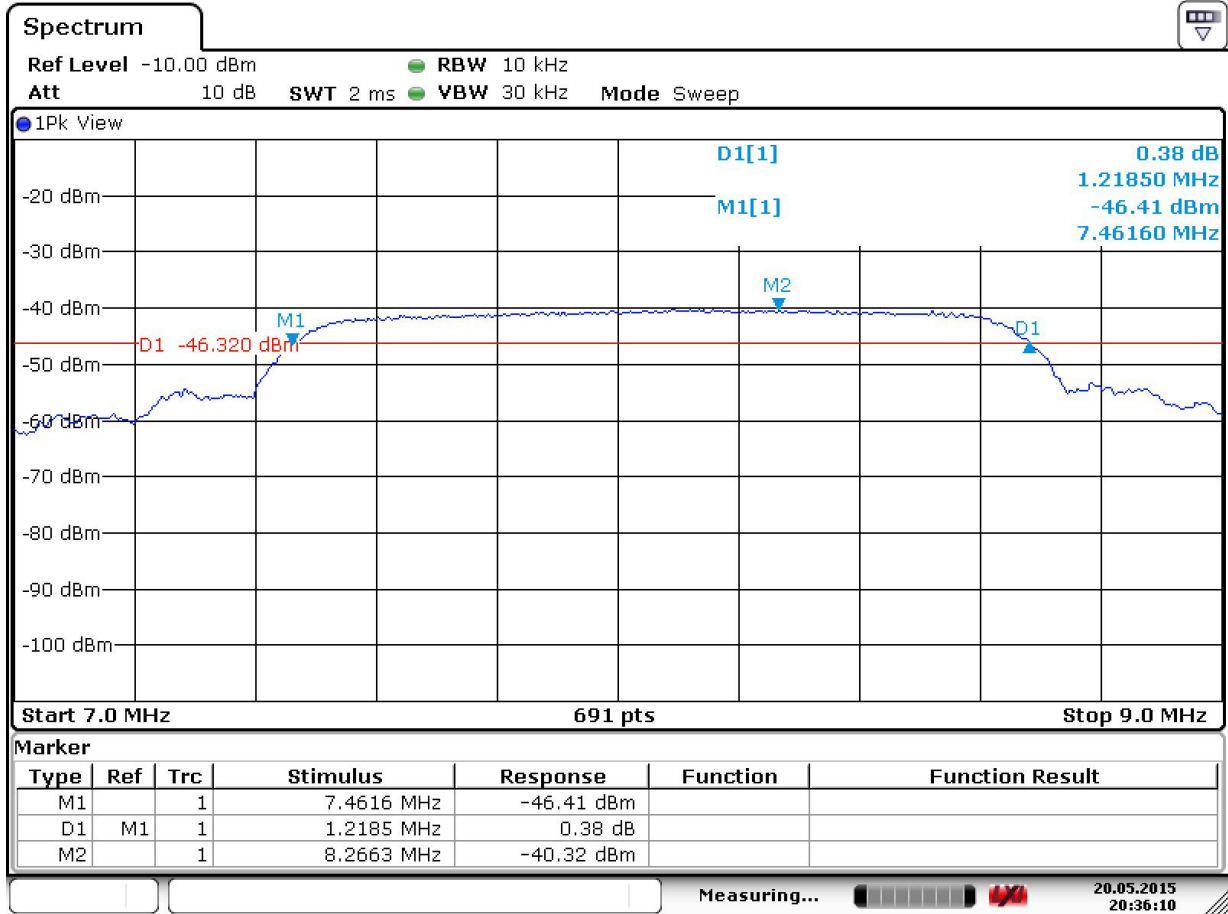
Test standard : FCC Part 15.223  
RSS-210 A2.3  
Basic standard : ANSI C63.10:2013,  
Kind of test site : Shielded room

**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:**


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### 5.1.4 99% Bandwidth

**RESULT:****Passed**

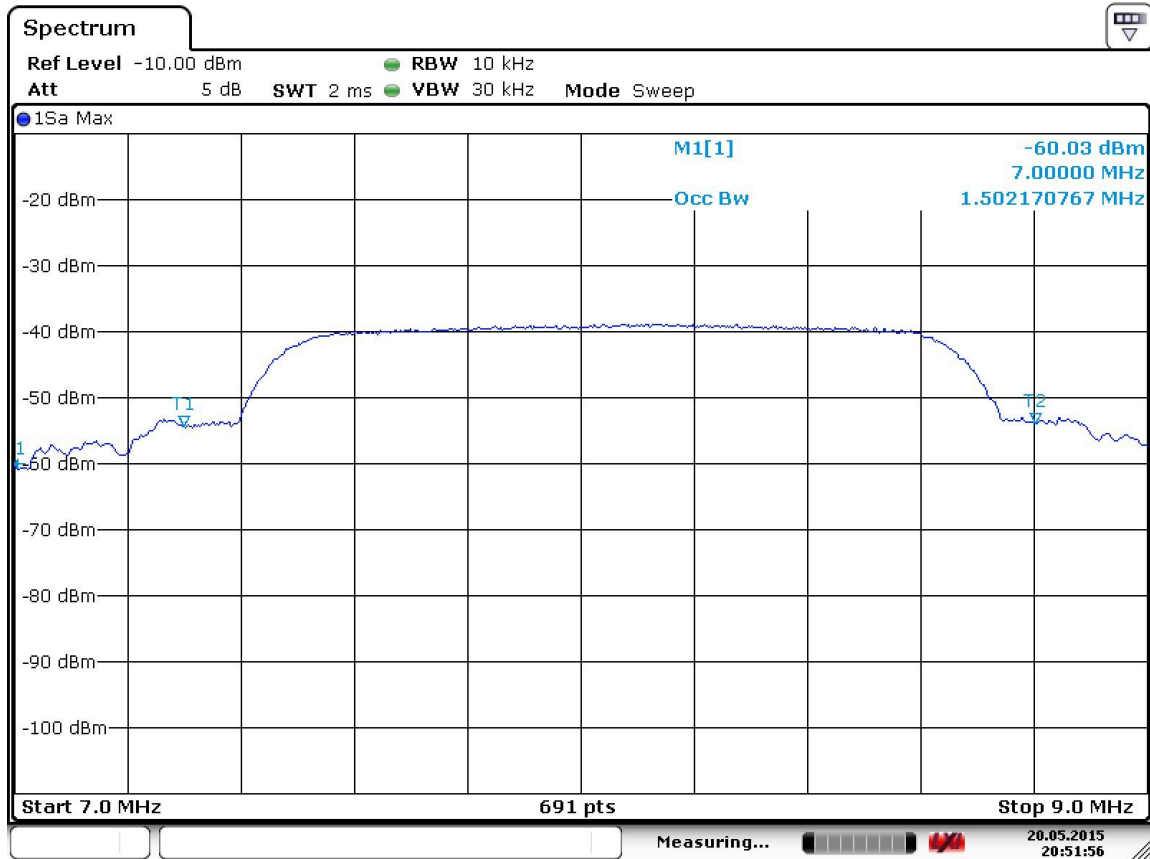
Test standard : RSS-Gen  
Basic standard : ANSI C63.10:2013  
Kind of test site : Shielded room

**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,**


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### 5.1.5 Spurious Emission

**RESULT:****Passed**

Test standard : LP0002(2011) 3.1  
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.

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