Prüfbericht-Nr.: *Test Report No.:*	**10048905 001**	**Auftrags-Nr.:** *Order No.:*	114036404	Seite 1 von 17 *Page 1 of 17*
Kunden-Referenz-Nr.: *Client Reference No.:*	N/A	**Auftragsdatum:** *Order date:*	22-May-2015	
Auftraggeber: *Client:*	N.V. Nederlandsche Apparatenfabriek "Nedap", Parallelweg 2, NL-7141 DC, Groenlo, The Netherlands			
Prüfgegenstand: *Test item:*	Long-range vehicle and driver identification reader			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	TRANSIT ULTIMATE			
Auftrags-Inhalt: *Order content:*	FCC Part15C / IC Test Report for 125 kHz portion			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.209 RSS-210 Issue 8, December 2010			

Wareneingangsdatum: *Date of receipt:*	5-Jun-2015
Prüfmuster-Nr.: *Test sample No.:*	A000210273-002
Prüfzeitraum: *Testing period:*	10-Jun-2015 – 10-Aug-2015
Ort der Prüfung: *Place of testing:*	EMC Laboratory Taipei
Prüflaboratorium: *Testing laboratory:*	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von / *tested by:*			**kontrolliert von** / *reviewed by:*		
27-Aug-2015	Ryan W. T. Chen / Project Engineer		27-Aug-2015	Rene Charton/Senior Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other:*

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT
RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL
RESULT: Passed

5.1.3 99% BANDWIDTH
RESULT: Passed

5.1.4 SPURIOUS EMISSION
RESULT: Passed

Contents

1. General Remarks

1.1 Complementary Materials

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

Appendix S: Photo Documentation
(File Name: 10048905APPENDIX S)
Appendix D: Test Result of Radiated Emissions
(File Name: 10048905APPENDIX D)

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

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15. 209 RSS-210 Issue 8, December 2010 RSS-Gen, Issue 4, November 2014 ANSI C63.10:2013

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

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

FCC Registration No.: 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

2.2 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
Spectrum Analyzer	R&S	FSL3	101943	14-Sep-14	14-Sep-15

2.3 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.

2.4 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 basics using in house standards or comparisons.

2.5 Measurement Uncertainty

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

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 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 ºC
Humidity	± 10 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a 2.4 GHz RFID Reader with a 433 MHz RF control Channel. As an option, the device can have an external 120 kHz Card reader. This test report is for the 120 kHz portion. 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	Long-range vehicle and driver identification reader
Type Designation	TRANSIT ULTIMATE
IC ID	1444A-TRANSITULTI
FCC ID	CGDTRANSITULTI

Table 5: Technical Specification of EUT

Item	Value
Operating Frequencies	120kHz
Channel number	1
Operation Voltage	100 - 240 VAC or 24 VDC
Modulation	CW

3.3 Independent Operation Modes

Basic operation modes are:

A. Transmitting
    1. Middle channel

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

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: The Card reader is continuously on.

4.3 Special Accessories and Auxiliary Equipment

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

None.

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

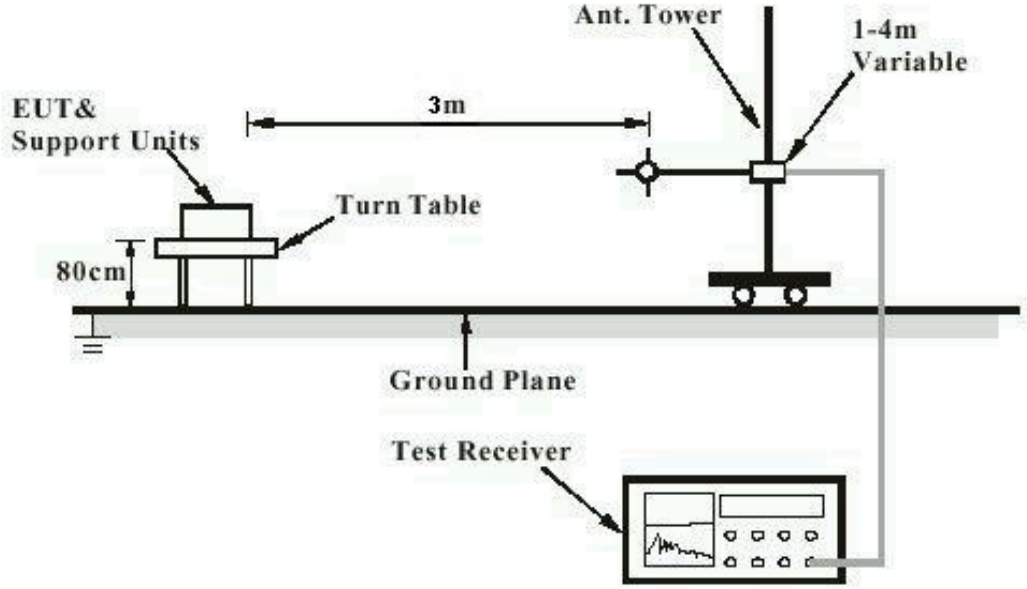
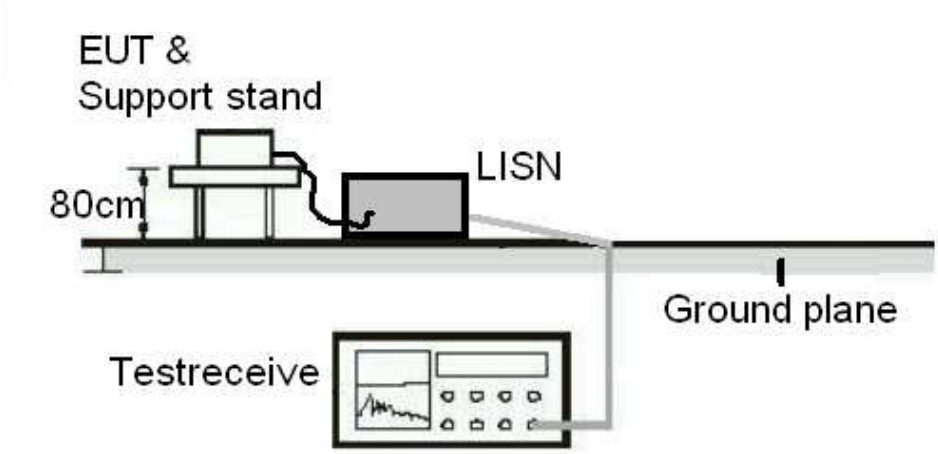


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Passed**

Standard	:	LP0002(2011): 2.2 Part 15.203 and RSS-Gen 7.1.4
Requirement	:	use of approved antennas only

The antenna is connected with a cable without connectors to the transmitter, 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 15.209
RSS-210 (12-2010) 2.5.1
LP0002(2011) 3.3.1
Basic standard : ANSI C63.10:2013

Test setup

Test Channel : 120 KHz
Operation Mode : A

Atmospheric pressure : 100-103 kPa

Table 6: Field strength of fundamental, maximal level found

Frequency (kHz)	Level(3m) (dBuV/m)	Detector	Limit(3m) (dBuV/m)	Level(300m) (dBuV/m)	Limit(300m) (dBuV/m)	Remark	Result
120	77.54	peak	125.67	-2.46	45.67	--	Pass
120	<77.54	average	105.67	<-2.46	25.67	--	Pass

Remark: For details refer to Appendix D

Limits:

Frequency	**Electric Field Strength (µV/m)**	**Measurement Distance (m)**
9-490 kHz	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	30
1,705-30 MHz	30	30

9-90 kHz and 110-490 kHz: Average detector.

5.1.3 99% Bandwidth

RESULT: **Passed**

Test standard : RSS Gen
Basic standard : ANSI C63.10:2013,

Test setup

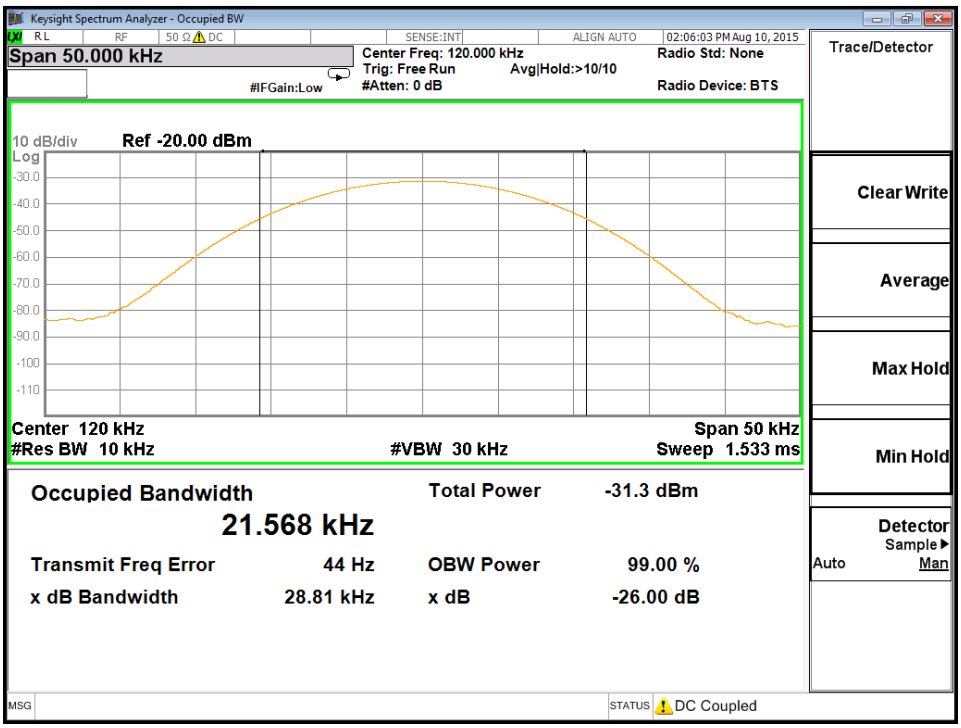
Operation Mode : A

Atmospheric pressure : 100-103 kPa

Table 7: Test result of 99% Bandwidth

Frequency	99% Bandwidth
120 kHz	21.568kHz

Test Plot of 99% BW



5.1.4 Spurious Emission

RESULT: **Passed**

Test standard	:	FCC part 15. 209 RSS-Gen LP0002(2011) 2.8
Basic standard	:	ANSI C63.10: 2013
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) OR LP0002 must comply with the radiated emission limits specified in FCC 15.209(a) AND 2.8 Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) AND 2.8
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	120kHz
Operation mode	:	A

Remark: Testing was carried out within frequency range 9kHz to the tenth harmonic.

For details refer to Appendix D.

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