

Prüfbericht-Nr.: Test Report No.:	50140648 001	Auftrags-Nr.: Order No.:	114075529	Seite 1 von 17 Page 1 of 17
Kunden-Referenz-Nr.: Client Reference No.:	N/A	Auftragsdatum: Order date:	14-Mar-2018	
Auftraggeber: Client:	Visteon Electronics Germany GmbH Visteonstrasse 4-10, 50170 Kerpen Germany			
Prüfgegenstand: Test item:	Vehicle body domain controller			
Bezeichnung / Typ-Nr.: Identification / Type No.:	BDC-03			
Auftrags-Inhalt: Order content:	NCC LP0002 Test report			
Prüfgrundlage: Test specification:	NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018)			
Wareneingangsdatum: Date of receipt:	20-Mar-2018			
Prüfmuster-Nr.: Test sample No.:	A000710440-001			
Prüfzeitraum: Testing period:	10-Apr-2018- 10-Apr-2018			
Ort der Prüfung: Place of testing:	EMC/RF Laboratory Taipei			
Prüflaboratorium: Testing laboratory:	TUV Rheinland Taiwan Ltd.			
Prüfergebnis*: Test result*:	Pass			
Report date / tested by: 12-Jun-2018 Brenda Chen /Project Manager		kontrolliert von / reviewed by: 12-Jun-2018 Rene Charton /Expert		
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung Name / Position
				Unterschrift Signature
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt 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				
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. 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.				

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Test Report No.

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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Passed

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Passed

5.1.3 SPURIOUS EMISSION

RESULT: Passed

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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: Photo Documentation

(File Name: 50140648APPENDIX P)

Appendix D: Test Result of Radiated Emissions

(File Name: 50140648APPENDIX D)

Test Specifications

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

Table 1: Applied Standard and Test Levels

Radio
NCC Low-power Radio-frequency Devices Technical Regulations LP0002(2018)(107 年 1 月 10 日)

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.: 340738
IC Canada Registration No.: 9465A-1
TAF Accredited NCC Test Lab. No.:0759
TAF ISO17025 Certification effective periods: 2016-Jul-1st to 2019-Jun-30th



Testing Laboratory
0759

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Test Software	Farad	EZ_EMC	Ver. TUV3A1	N/A	N/A
EMI Test Receiver	R&S	ESR 7	101549	2017/11/10	2018/11/10
Spectrum Analyzer	R&S	FSV 40	100921	2017/05/02	2018/05/01
Spectrum Analyzer	Agilent	N9010A	MY53470241	2017/05/23	2018/05/22
Preamplifier (30MHz -1GHz)	HP	8447F	2805A03335	2017/08/14	2018/08/14
Preamplifier (18 GHz -40 GHz)	COM-POWER	PAM-840	461257	2018/01/18	2019/01/18
Pre-Amplifier (1GHz~18GHz)	EM Electronics	EM01G18G	60558	2017/11/21	2018/11/21
Bilog Antenna	TESEQ	CBL6111D	29804	2017/08/18	2018/08/18
Horn Antenna	ETS-Lindgren	3117	201918	2017/08/18	2018/08/18
Horn Antenna (18GHz~40GHz)	COM-POWER	AH-840	101029	2017/11/28	2018/11/28
Loop Antenna	Schwarzbeck	FMZB 1513	1513-076	2017/06/14	2018/06/14
EMI Test Receiver	R&S	ESR 7	101549	2017/11/10	2018/11/10
Spectrum Analyzer	R&S	FSL3	101943	2015/09/07	2018/09/07
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	2017/03/09	2019/03/09
LISN (1 phase)	R&S	ENV216	101243	2017/06/18	2018/06/18
LISN	R&S	ENV216	101262	2017/06/22	2018/06/21

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 basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

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

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a vehicle body domain controller, working at 125 kHz. It is a car access control system. The scope of this test report is the 125 kHz Key fob detection function. The controller system uses two kinds of external antennas:

1) CA antenna (up to 7 pieces)

These antennas are for detecting the Key fob in the vicinity of the car (within 2m) and for localization if Key fob is in- or outside the car.

In the test report this antenna is described as "keyless"

2) Immobilizer Coil (1 piece)

This antenna requires the Key fob to be placed close to it at a defined position (only in case of empty battery of Key fob).

In the test report this antenna is described as "immob"

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	Vehicle body domain controller
Type Designation	BDC-03
Brand Name	Visteon

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequency	125 kHz
Operation Voltage	13.5 Vdc (Test at 12 Vdc)
Modulation	ASK
Antenna Type	Magnetic antenna*7; Coil antenna*1

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

Special Accessories and Auxiliary Equipment

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

Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

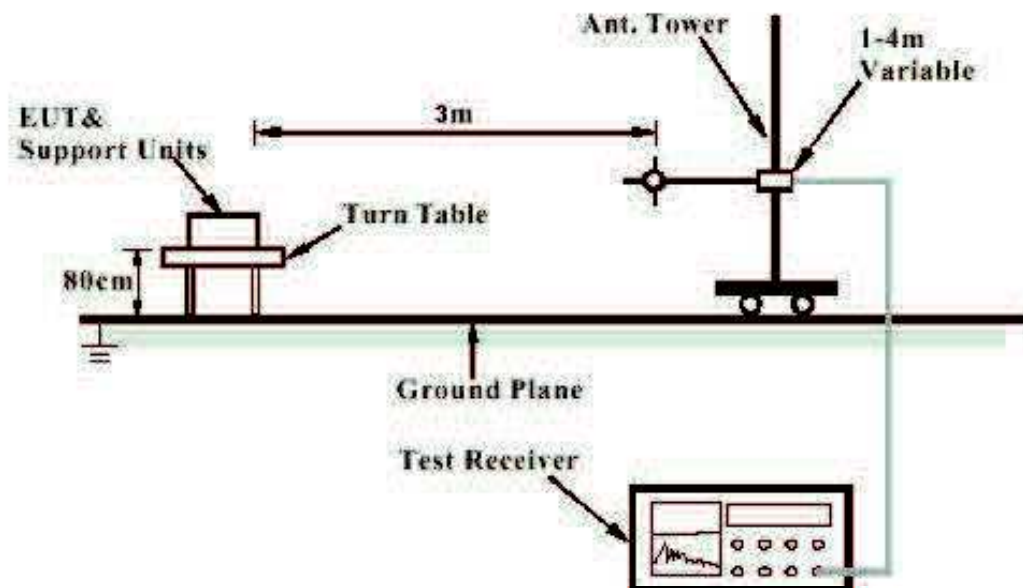
Software	TeraTerm
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4.3 Countermeasures to achieve EMC Compliance

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.

4.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Standard	:	LP0002(2018): 2.2 Part 15.203 and RSS-Gen 7.1.4
Requirement	:	use of approved antennas only

The antenna are seven Magnet antennas and one Coil 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.

5.1.2 Field strength of fundamental

RESULT:

Passed

Test standard : LP0002(2018) 2.8

Basic standard : ANSI C63.10:2009

Test setup

Test Frequency : 125 kHz

Operation Mode : A

Table 6: Test result of Field strength of fundamental and modulation sidebands

IMMO:

Frequency (kHz)	Test Result	Detector	Limits		Pass/Fail
	dBµV/m @3m		dBµV/m@3m	dBµV/m@300m	
125	92.60	AVG	105.66	25.66	Pass
125	92.67	peak	125.66	45.66	Pass

KEYLESS:

Frequency (kHz)	Test Result	Detector	Limits		Pass/Fail
	dBµV/m @3m		dBµV/m@3m	dBµV/m@300m	
125	96.90	AVG	105.66	25.66	Pass
125	98.09	peak	125.66	45.66	Pass

For details refer to Appendix D.

5.1.3 Spurious Emission

RESULT:**Passed**

Test standard : LP0002(2018) 2.8

Basic standard : ANSI C63.10: 2009

Limits : Radiated emissions which fall in the restricted bands, as defined in LP0002 2.8 must comply with the radiated emission limits specified in LP0002 2.8
Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in LP0002 2.8

Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Operation mode : A

Remark: Testing was carried out within frequency range 9kHz 30MHz to the tenth harmonic.

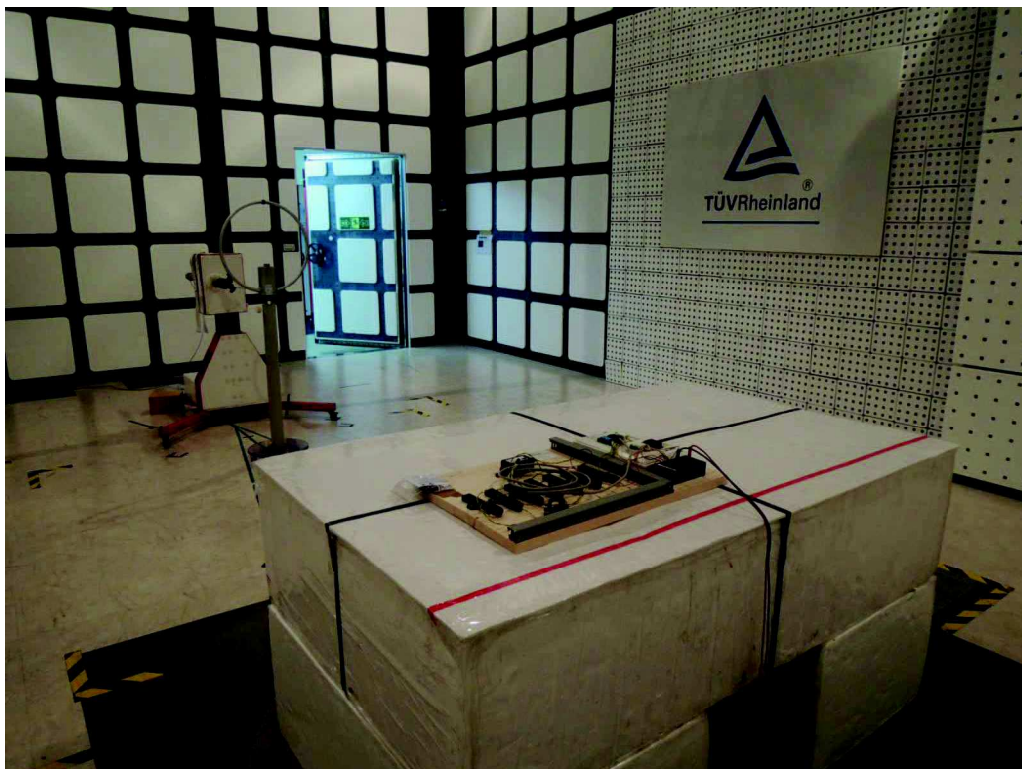
For details refer to Appendix D.

5.2 Photographs of the Test Set-Up

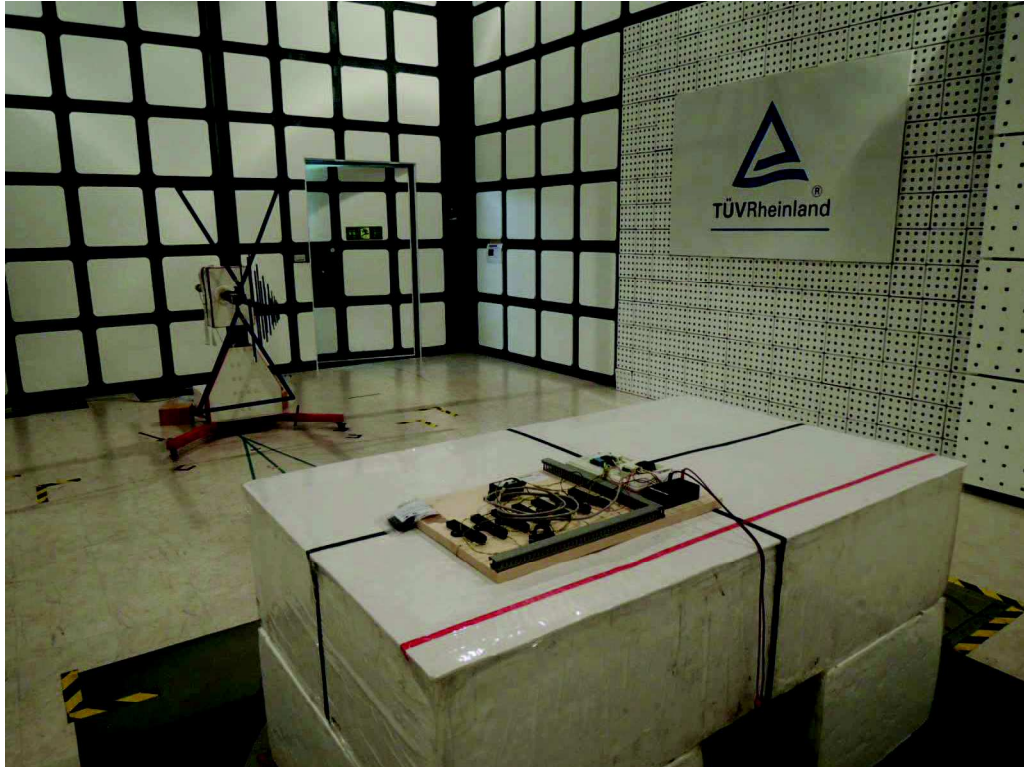
Photograph 1: Set-up for Spurious Emissions (Front View)



Photograph 2: Set-up for Spurious Emissions (Back View 1)



Photograph 3: Set-up for Spurious Emissions (Back View 2)



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