

DIN CEN/TR 16968:2018-12 (E)

Electronic Fee Collection - Assessment of security measures for applications using Dedicated Short-Range Communication; English version CEN/TR 16968:2016

Contents	Page
European foreword.....	4
Introduction	5
1 Scope.....	6
2 Terms and definitions	6
3 Abbreviations	9
4 Method	10
5 Security Objectives and Functional Requirements.....	13
5.1 Target of evaluation	13
5.2 Security objectives.....	14
5.2.1 Introduction	14
5.2.2 Confidentiality.....	14
5.2.3 Availability	14
5.2.4 Accountability	14
5.2.5 Data integrity.....	14
5.3 Functional security requirements	15
5.3.1 Introduction	15
5.3.2 Confidentiality.....	15
5.3.3 Availability	17
5.3.4 Accountability	18
5.3.5 Data integrity.....	20
5.4 Inventory of assets.....	21
5.4.1 Functional Assets	21
5.4.2 Data Assets.....	22
6 Threat analysis.....	22
7 Qualitative risk analysis	24
7.1 Introduction	24
7.1.1 General.....	24
7.1.2 Likelihood of a threat	24
7.1.3 Impact of a threat.....	25
7.1.4 Classification of Risk.....	26
7.2 Risk determination.....	26
7.2.1 Definition of high and low risk context.....	26
7.2.2 Threat T1: Access Credentials keys can be obtained	27
7.2.3 Threat T2: Authentication keys can be obtained	27
7.2.4 Threat T3: OBU can be cloned	28
7.2.5 Threat T4: OBU can be faked.....	28
7.2.6 Threat T5: Authentication of OBU data can be repudiated.....	29
7.2.7 Threat T6: Application data can be modified after the transaction	29
7.2.8 Threat T7: Data in the VST is not secure.....	30
7.2.9 Threat T8: DSRC Communication can be eavesdropped.....	30
7.2.10 Threat T9: Correctness of application data are repudiated	31
7.2.11 Threat T10: Master keys may be obtained from RSE.....	31
7.3 Summary	31

8	Proposals for new security measures	32
8.1	Introduction.....	32
8.2	Security measures to counter risks related to key recovery	32
8.3	Recommended countermeasures.....	34
8.4	Qualitative cost benefit analysis	35
9	Impact of proposed countermeasures.....	35
9.1	Current situation and level of fraud in existing EFC systems using CEN DSRC link.....	35
9.2	EETS legislation	36
9.3	Analysis of effects on existing EFC systems.....	36
9.3.1	Affected roles	36
9.3.2	The CEN DSRC equipment Manufacturers	36
9.3.3	The Toll Service Providers	37
9.3.4	The Toll Chargers	37
10	Recommendations.....	38
10.1	Add security levels and procedures to EN ISO 14906.....	38
10.2	Recommendation for other EFC standards	39
10.3	New standards	39
Annex A (informative)	Current status of the DEA cryptographic algorithm	40
A.1	Overview	40
A.2	ISO/IEC 9797-1 (MAC Algorithm 1).....	40
A.3	FIPS 46 (DEA Specification – DES)	40
A.4	ENISA recommendations	41
Annex B (informative)	Security considerations regarding DSRC in EFC Standards	42
B.1	Security vulnerabilities in EN 15509 and EN ISO 14906	42
B.2	Security vulnerabilities in EN ISO 12813 (CCC)	42
B.3	Security vulnerabilities in EN ISO 13141 (LAC).....	43
B.4	Security vulnerabilities in CEN/TS 16702-1 (SM-CC).....	43
	Bibliography	44