ISO/TS 17444-2:2013-11 (E)

Electronic fee collection - Charging performance - Part 2: Examination Framework

Contents

Page

Foreword vi

Introduction vii

1 Scope 1

2 Normative references 1

3 Terms and definitions 2

4 Symbols and Abbreviated terms 7

5 Examination Framework 8
5.1 General 8
5.2 Method for defining a Specific Examination Framework 9
5.2.1 Selection of Metrics to be evaluated 9
5.2.2 Definition of environmental conditions and associated performance requirements 10
5.2.3 Determination of Required Sample Sizes 10
5.2.4 Selection of methods for generating Charging Input and Reference Data 10
5.2.5 Determination of Test Routes / Sub-set of Charged Network for generating representative trips 10
5.2.6 Documentation of the Specific Examination Framework 11
5.3 Sources of Data 11
5.4 Methods of generating charging input 14
5.4.1 Predefined routes (identifier: "PVP") 15
5.4.2 Reference System (used in combination with identifiers: "PVR" and "UVR") 16
5.4.3 Simulated OBE / FE (identifier: "SO") 17
5.4.4 Dedicated OBE Testing (identifier: "DO") 17
5.5 Applicability of metrics scheme types 18
5.6 Charging Metric Selection Tables 21
5.6.1 General 21
5.6.2 DSRC Discrete 21
5.6.3 Autonomous Discrete 22
5.6.4 Autonomous Continuous 23

6 Examination Tests 25
6.1 Common (and DSRC Discrete) Examination Tests 25
6.1.1 General 25
6.1.2 ET-CM-E2E-1 E2E Correct Charging Rate 25
6.1.3 ET-CM-E2E-2 E2E Overcharging Rate 26
6.1.4 ET-CM-E2E-3 E2E Undercharging Rate 26
6.1.5 ET-CM-E2E-4 E2E Late Charging Rate 27
6.1.6 ET-CM-UA-1 UA - Correct Charging Rate 28
6.1.7 ET-CM-UA-2 UA - Overcharging Rate 28
6.1.8 ET-CM-UA-3 UA - Undercharging Rate 29
6.1.9 ET-CM-UA-4 UA - Accurate application of Payments and Refunds 30
6.1.10 ET-CM-UA-5 UA - Accurate Personalisation of OBUs 30
6.1.11 ET-CM-PC-1 PC - Correct Charging Rate 31
6.1.12 ET-CM-PC-2 PC - Overcharging Rate 31
6.1.13 ET-CM-PC-3 PC - Undercharging Rate 32
6.1.14 ET-CM-PC-4 PC - Latency - TC 33
6.1.15 ET-CM-PC-5 PC - Late Payment Claims 33

6.1.16 ET-CM-PC-6 PC - Rejected Payment Claim Rate 34
6.1.17 ET-CM-BD-1 BD - Correct Charging Rate 34
6.1.18 ET-CM-BD-2 BD - Overcharging Rate 35
6.1.19 ET-CM-BD-3 BD - Undercharging Rate 36
6.1.20 ET-CM-BD-4 BD - Incorrect Charging Rate 37
6.1.21 ET-CM-BD-5 BD - Latency - TC 37
6.1.22 ET-CM-BD-6 BD - Late Billing Details 38
6.1.23 ET-CM-BD-7 BD - Rejected Billing Details Rate 38
6.1.24 ET-CM-BD-8 BD - Incorrectly rejected Billing Details Rate 39
6.1.25 ET-CM-BD-9 BD - Inferred Billing Details Rate 39
6.2 DSRC Discrete - Optional DSRC Toll Declaration Metrics 40
6.2.1 General 40
6.2.2 ET-CM-TD-1 TD - Correct Toll Declaration Generation 40
6.2.3 ET-CM-TD-2 TD - Incorrect Toll Declaration Generation 40
6.2.4 ET-CM-TD-3 TD - Late Toll Declarations 41
6.2.5 ET-CM-TD-4 TD - TSP Event Detection 41
6.2.6 ET-CM-TD-5 TD - TSP False Positive 42
6.3 Autonomous Discrete Specific Examination Tests 43
6.3.1 General 43
6.3.2 ET-CM-TD-1 TD - Correct Toll Declaration Generation 43
6.3.3 ET-CM-TD-2 TD - Incorrect Toll Declaration Generation 43
6.3.4 ET-CM-TD-3 TD - Late Toll Declarations 44
6.3.5 ET-CM-TD-4 TD - TSP Event Detection 44
6.3.6 ET-CM-TD-5 TD - TSP False Positive 45
6.3.7 ET-CM-DTD-1 DTD - Correct Charging Rate (Chargeable Events) 45
6.3.8 ET-CM-DTD-2 DTD - Incorrect Charge Event recognition 46
6.3.9 ET-CM-DTD-3 DTD - Missed Charge Event Recognition 46
6.3.10 ET-CM-DTD-4 DTD Overcharging Rate 47
6.3.11 ET-CM-CR-1 CR - Correct Charge Report Generation 47
6.3.12 ET-CM-CR-2 CR - Incorrect Charge Report Generation 48
6.3.13 ET-CM-CR-3 CR - Charge Report Latency 48
6.3.14 ET-CM-CR-4 CR - TSP Front End Event Detection 49
6.3.15 ET-CM-CR-5 CR - TSP Front End False Positive 49
6.3.16 ET-CM-DCR-1 DCR - Correct Charging Rate (Chargeable Events) 50
6.3.17 ET-CM-DCR-2 DCR - Incorrect Charge Event recognition 50
6.3.18 ET-CM-DCR-3 DCR - Missed Charge Event Recognition 51
6.3.19 ET-CM-DCR-4 DCR - Overcharging rate (Incorrect false positive Charge Event Recognition) 51
6.4 Autonomous Continuous Specific Examination Tests 52
6.4.1 General 52
6.4.2 ET-CM-TD-1 TD - Correct Toll Declaration Generation 52
6.4.3 ET-CM-TD-2 TD - Incorrect Toll Declaration Generation 52
6.4.4 ET-CM-TD-3 TD - Late Toll Declarations 53
6.4.5 ET-CM-TD-4 TD - TSP Event Detection 53
6.4.6 ET-CM-TD-5 TD - TSP False Positive 54
6.4.7 ET-CM-CTD-1 CTD Correct Charging Rate 54
6.4.8 ET-CM-CTD-2 CTD Overcharging Rate 55
6.4.9 ET-CM-CTD-3 CTD Accuracy of Distance/Time Measurement 55
6.4.10 ET-CM-CR-1 CR - Correct Charge Report Generation 56
6.4.11 ET-CM-CR-2 CR - Incorrect Charge Report Generation 57
6.4.12 ET-CM-CR-3 CR - Charge Report Latency 57
6.4.13 ET-CM-CR-4 CR - TSP Front End Event Detection 58
6.4.14 ET-CM-CR-5 CR - TSP Front End False Positive 58
6.4.15 ET-CM-CCR-1 CCR - Correct Charging Rate 59
6.4.16 ET-CM-CCR-2 CCR - Overcharging Rate 59
6.4.17 ET-CM-CCR-3 CCR - Accuracy of Distance/Time Measurement 60

Annex A (informative) Examination Test Documentation Template 61

Annex B (informative) Examination Framework Considerations 62

Annex C (informative) Statistical Considerations 66

Annex D (informative) Methods for reducing sample sizes for very high/low probability metrics during the Evaluation Phase 72

Annex E (informative) Example Specific Examination Frameworks 75

Bibliography 93