1. GRAMMAR DEFINITION.

```
\Sigma = \{\Sigma_T, \Sigma_{NT}, S, P\}
\Sigma_{\tau}(Terminal Symbols) = \{\}
\Sigma_{NT}(Non-Terminal Symbols) = \{\}
S: is the axiom \ start symbol.
P: is the set of productions.
P = {
      FILE ::= START DATA END
      START ::= {
      END ::= }
      DATA ::= VAR1 SEPARATOR VAR2 SEPARATOR VAR3
      SEPARATOR ::= ,
      EQUAL ::= :
      O ::= "
      P ::= .
      ALPHABET ::= a | b | c | d | e | f | g | h | i | j | k | I | m | n | o | p | q |
                   r | s | t | u | v | w | x | y | z
      NUMBERS ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
      VAR1 ::= LABEL1 EQUALS VALUE1
      LABEL1 ::= Q NAME1 Q
      NAME1 ::= Token Request
      VALUE1 ::= Q HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH Q (32H's)
      H ::= \mathbf{a} \mid \mathbf{b} \mid \mathbf{c} \mid \mathbf{d} \mid \mathbf{e} \mid \mathbf{f} \mid \mathsf{NUMBERS}
      VAR2 ::= LABEL2 EQUALS VALUE2
      LABEL2 ::= Q NAME2 Q
      NAME2 ::= Notification e-mail
      VALUE2 ::= Q EMAIL Q
      EMAIL ::= ENAME A DOMAIN P EXTENSION
      ENAME ::= ENAME ENAME | ALPHABET | NUMBERS
      DOMAIN ::= ALPHABET | ALPHABET DOMAIN
      EXTENSION ::= ALPHABET ALPHABET | ALPHABET ALPHABET ALPHABET
      VAR3 ::= LABEL3 EQUALS VALUE3
      LABEL3 ::= Q NAME3 Q
      NAME3 ::= Request Date
      VALUE3 ::= Q DATE TIME Q
      DATE ::= DAY S MONTH S YEAR
      S ::= /
      DAY ::= 0 NUMBERS | 1 NUMBERS | 2 NUMBERS | 30 | 31
```

```
MONTH ::= 0 NUMBERS | 10 | 11 | 12

YEAR ::= 1 NUMBERS NUMBERS NUMBERS |

2 NUMBERS NUMBERS NUMBERS

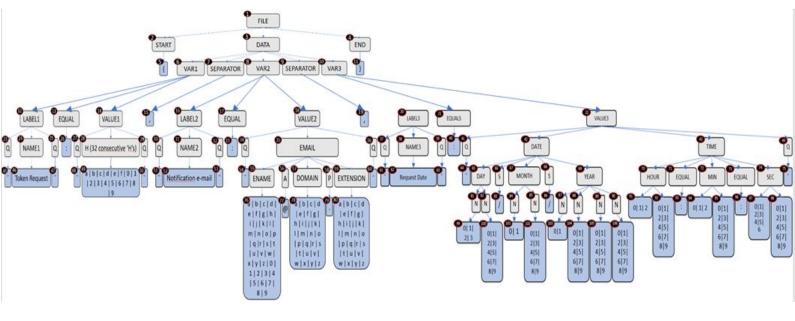
TIME ::= HOUR EQUALS MINSEC EQUALS MINSEC

HOUR ::= 0 NUMBERS | 1 NUMBERS | 21 | 22 | 23

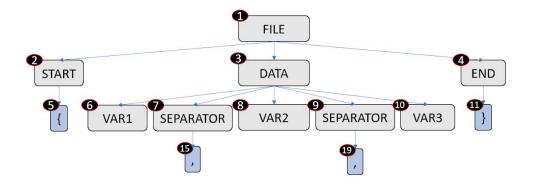
MINSEC ::= 0 NUMBERS | 1 NUMBERS | 2 NUMBERS | 3 NUMBERS |

4 NUMBERS | 5 NUMBERS
```

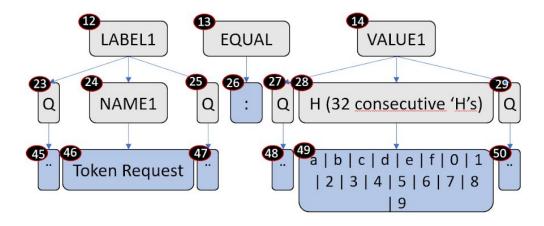
2.-Derivation Tree:



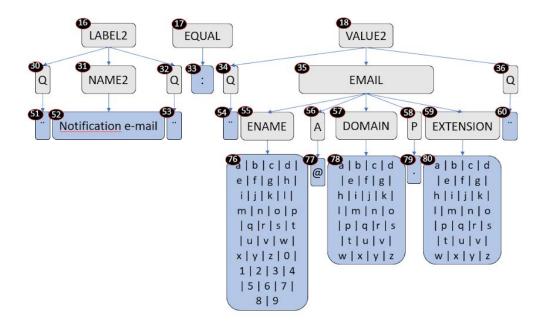
-Root:



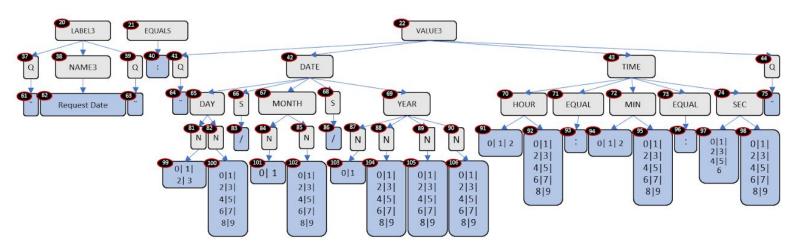
-VAR1:



-VAR2:



-VAR3:



Non-Terminal Nodes:	1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 55, 56, 57, 58, 59, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 81, 82, 84, 85, 87, 88, 89, 90
Terminal Nodes:	5, 11, 15, 19, 26, 33, 40, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 60, 61, 62, 63, 64, 75, 76, 77, 78, 79, 80, 83, 86, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106

3.-Selection of Test Cases:

Test Case ID	Input Parameters	Covered Nodes
AS-FR2-V-000	Result: File Exists Detail: All terminal nodes covered with valid cases Input: { "Token Request":"abcdef0123456789",	5, 11, 15, 19, 26, 33, 40, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 60, 61, 62, 63, 64, 75, 76, 77,

	"Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	78, 79, 80, 83, 86, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106
AS-FR2-NV-000	Detail: Non-Terminal 1 omission Input:	All terminals + non-terminals
AS-FR2-NV-001	Detail: Non-Terminal 2 omission Input: "Token Request": "abcdef0123456789", "Notification e-mail": "autonomous@vehicle.com", "Request Date": "24/03/2020 13:55:23" }	2, 5
AS-FR2-NV-002	Detail: Non-Terminal 2 repetition Input: {{ "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	2, 5
AS-FR2-NV-003	Detail: Non-Terminal 3 omission Input: { }	6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 41, 42, 43, 44, 55, 56, 57, 58, 59, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 81, 82, 84, 85, 87, 88, 89, 90, 15, 19, 26, 33, 40, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 60, 61, 62, 63, 64, 75, 76, 77, 78, 79, 80, 83, 86, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106
AS-FR2-NV-004	Detail: Non-Terminal 3 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com",	6, 7, 8, 9, 10, 12, 13, 14, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 34, 35, 36,

	"Request Date":"24/03/2020 13:55:23" "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	37, 38, 39, 41, 42, 43, 44, 55, 56, 57, 58, 59, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 81, 82, 84, 85, 87, 88, 89, 90, 15, 19, 26, 33, 40, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 60, 61, 62, 63, 64, 75, 76, 77, 78, 79, 80, 83, 86, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106
AS-FR2-NV-005	Detail: Non-Terminal 6 omission Input: { "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	6, 12, 13, 14, 23, 24, 25, 26, 27, 28, 29, 45, 46, 47, 48, 49, 50
AS-FR2-NV-006	Detail: Non-Terminal 6 repetition Input: { "Token Request":"abcdef0123456789" "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	6, 12, 13, 14, 23, 24, 25, 26, 27, 28, 29, 45, 46, 47, 48, 49, 50
AS-FR2-NV-007	Detail: Non-Terminal 7 omission Input: { "Token Request":"abcdef0123456789" "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	7, 15
AS-FR2-NV-008	Detail: Non-Terminal 7 repetition Input: { "Token Request":"abcdef0123456789",, "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	7, 15
AS-FR2-NV-009	Detail: Non-Terminal 12 omission Input: { "":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	12, 23, 24, 25, 45, 46, 47

AC EDO 111 / 242		12 22 24 25 45
AS-FR2-NV-010	Detail: Non-Terminal 12 repetition Input: { "Token Request" "Token Request": "abcdef0123456789", "Notification e-mail": "autonomous@vehicle.com", "Request Date": "24/03/2020 13:55:23" }	12, 23, 24, 25, 45, 46, 47
AS-FR2-NV-011	Detail: Non-Terminal 13 omission Input: { "Token Request" "abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	13, 26
AS-FR2-NV-012	Detail: Non-Terminal 13 repetition Input: { "Token Request"::"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	13, 26
AS-FR2-NV-013	Detail: Non-Terminal 14 omission Input: { "Token Request":, "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	14, 27, 28, 29, 48, 49, 50
AS-FR2-NV-014	Detail: Non-Terminal 14 repetition Input: { "Token Request":"abcdef0123456789" "abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	14, 27, 28, 29, 48, 49, 50
AS-FR2-NV-015	Detail: Non-Terminal 23 omission Input: { Token Request": "abcdef0123456789", "Notification e-mail": "autonomous@vehicle.com", "Request Date": "24/03/2020 13:55:23" }	23, 45
AS-FR2-NV-016	Detail: Non-Terminal 23 repetition Input: { ""Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	23, 45
AS-FR2-NV-017	Detail: Non-Terminal 24 omission	24, 46

	Input: { "":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	
AS-FR2-NV-018	Detail: Non-Terminal 24 repetition Input: { "Token RequestToken Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	24, 46
AS-FR2-NV-019	Detail: Terminal 26 modification Input: { "Token Request"/"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	26
AS-FR2-NV-020	Detail: Non-Terminal 28 omission Input: { "Token Request":"", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	29, 49
AS-FR2-NV-021	Detail: Non-Terminal 35 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"", "Request Date":"24/03/2020 13:55:23" }	35, 55, 56, 57, 58, 59, 76, 77, 78, 79, 80
AS-FR2-NV-022	Detail: Non-Terminal 35 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.comautonomous@vehicle.com" , "Request Date":"24/03/2020 13:55:23" }	35, 55, 56, 57, 58, 59, 76, 77, 78, 79, 80
AS-FR2-NV-023	Detail: Non-Terminal 42 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":" 13:55:23" }	42, 65, 66, 67, 68, 69, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 99, 100, 101, 102, 103, 104, 105, 106

AS-FR2-NV-024	Detail: Non-Terminal 42 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/202024/03/2020 13:55:23" }	42, 65, 66, 67, 68, 69, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 99, 100, 101, 102, 103, 104, 105, 106
AS-FR2-NV-025	Detail: Non-Terminal 43 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020" }	43, 70, 71, 72, 73, 74, 91, 92, 93, 94, 95, 96, 97, 98
AS-FR2-NV-026	Detail: Non-Terminal 43 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:2313:55:23" }	43, 70, 71, 72, 73, 74, 91, 92, 93, 94, 95, 96, 97, 98
AS-FR2-NV-027	Detail: Terminal 45 modification Input: {	45
AS-FR2-NV-028	Result: Terminal 46 modification Detail: All terminal nodes covered with valid cases Input: { "Tokon Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	46
AS-FR2-NV-029	Detail: Terminal 49 modification Input: { "Token Request":"abcdef01234;6789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	49
AS-FR2-NV-030	Detail: Terminal 52 modification Input: { "Token Request":"abcdef0123456789", "Notification email":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	52

AS-FR2-NV-031	Detail: Non-Terminal 55 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":" @vehicle.com", "Request Date":"24/03/2020 13:55:23" }	55, 76
AS-FR2-NV-032	Detail: Non-Terminal 56 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous vehicle.com", "Request Date":"24/03/2020 13:55:23" }	56, 77
AS-FR2-NV-033	Detail: Non-Terminal 56 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	56, 77
AS-FR2-NV-034	Detail: Non-Terminal 57 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@ .com", "Request Date":"24/03/2020 13:55:23" }	57, 78
AS-FR2-NV-035	Detail: Non-Terminal 58 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle com", "Request Date":"24/03/2020 13:55:23" }	58, 79
AS-FR2-NV-036	Detail: Non-Terminal 58 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehiclecom", "Request Date":"24/03/2020 13:55:23" }	58, 79
AS-FR2-NV-037	Detail: Non-Terminal 59 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle. ", "Request Date":"24/03/2020 13:55:23" }	59, 80
AS-FR2-NV-038	Detail: Non-Terminal 59 repetition	59, 80

	Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.comcom", "Request Date":"24/03/2020 13:55:23" }	
AS-FR2-NV-039	Detail: Terminal 62 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Dote":"24/03/2020 13:55:23" }	62
AS-FR2-NV-040	Detail: Non-Terminal 65 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":" /03/2020 13:55:23" }	65, 81, 82, 99, 100
AS-FR2-NV-041	Detail: Non-Terminal 65 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"2424/03/2020 13:55:23" }	65, 81, 82, 99, 100
AS-FR2-NV-042	Detail: Non-Terminal 66 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24 03/2020 13:55:23" }	66, 83
AS-FR2-NV-043	Detail: Non-Terminal 66 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24//03/2020 13:55:23" }	66, 83
AS-FR2-NV-044	Detail: Non-Terminal 67 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/ /2020 13:55:23" }	67, 84, 85, 101, 102
AS-FR2-NV-045	Detail: Non-Terminal 67 repetition Input:	67, 84, 85, 101, 102

	{ "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/0303/2020 13:55:23" }	
AS-FR2-NV-046	Detail: Non-Terminal 69 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/ 13:55:23" }	69, 87, 88, 89, 90, 103, 104, 105, 106
AS-FR2-NV-047	Detail: Non-Terminal 69 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/20202020 13:55:23" }	69, 87, 88, 89, 90, 103, 104, 105, 106
AS-FR2-NV-048	Detail: Non-Terminal 70 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 :55:23" }	70, 91, 92
AS-FR2-NV-049	Detail: Non-Terminal 70 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 1313:55:23" }	70, 91, 92
AS-FR2-NV-050	Detail: Non-Terminal 71 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13 55:23" }	71, 93
AS-FR2-NV-051	Detail: Non-Terminal 71 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13::55:23" }	71, 93
AS-FR2-NV-052	Detail: Non-Terminal 72 omission Input: {	72, 94, 95

	"Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13: :23" }	
AS-FR2-NV-053	Detail: Non-Terminal 72 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:5555:23" }	72, 94, 95
AS-FR2-NV-054	Detail: Non-Terminal 74 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55: " }	74, 97, 98
AS-FR2-NV-055	Detail: Non-Terminal 74 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:55:2323" }	74, 97, 98
AS-FR2-NV-056	Detail: Terminal 76 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"auto%omous@vehicle.com", "Request Date":"24/03/2020 13:55:23" }	76
AS-FR2-NV-057	Detail: Terminal 77 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous*vehicle.com", "Request Date":"24/03/2020 13:55:23" }	77
AS-FR2-NV-058	Detail: Terminal 78 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@veh{cle.com", "Request Date":"24/03/2020 13:55:23" }	78
AS-FR2-NV-059	Detail: Terminal 79 modification Input: { "Token Request":"abcdef0123456789",	79

	"Notification e-mail":"autonomous@vehicle,com", "Request Date":"24/03/2020 13:55:23" }	
AS-FR2-NV-060	Detail: Terminal 80 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.co+", "Request Date":"24/03/2020 13:55:23" }	80
AS-FR2-NV-061	Detail: Non-Terminal 81 omission Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":" 4/03/2020 13:55:23" }	81, 99
AS-FR2-NV-062	Detail: Non-Terminal 81 repetition Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"224/03/2020 13:55:23" }	81, 99
AS-FR2-NV-063	Detail: Terminal 83 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24(03/2020 13:55:23" }	83
AS-FR2-NV-064	Detail: Terminal 91 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 53:55:23" }	91
AS-FR2-NV-065	Detail: Terminal 92 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 1d:55:23" }	92
AS-FR2-NV-066	Detail: Terminal 93 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com",	93

	"Request Date":"24/03/2020 13.55:23" }	
AS-FR2-NV-067	Detail: Terminal 94 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/03/2020 13:95:23" }	94
AS-FR2-NV-068	Detail: Terminal 99 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"84/03/2020 13:55:23" }	99
AS-FR2-NV-069	Detail: Terminal 100 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"2h/03/2020 13:55:23" }	100
AS-FR2-NV-070	Detail: Terminal 101 modification Input: { "Token Request":"abcdef0123456789", "Notification e-mail":"autonomous@vehicle.com", "Request Date":"24/63/2020 13:55:23" }	101