Smart Contract Security Audit V1

Mandala FON Smart Contract

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Table of Contents

Background

The purpose of the audit was to achieve the following:

- Ensure that the smart contract functions as intended.
- Identify potential security issues with the smart contract.

The information in this report should be used to understand the risk exposure of the smart contract, and as a guide to improve the security posture of the smart contract by remediating the issues that were identified.

Project Information

- **Platform**: Ethereum
- **Contract Address**: 0xfa8f2b75734e7412be3008abbc8d3f710ca7af9a
- **Code:**

https://github.com/Saferico/Smart-Contracts-for-Projects/blob/main/MandalaFON.sol

NFT Information

- Name: MandalaFON
- MAX Supply: 1011
- Holders:
- Total transactions:

Contracts address deployed to test net (Ethereum)

MandalaFON smart contract on ETH test net to test every function by the auditor.

https://rinkeby.etherscan.io/address/0xfa8f2b75734e7412be3008abbc8d3f710ca7af9a

Executive Summary

According to our assessment, the customer`s solidity smart contract is **“WELL SECURED”**. The team has fixed the low-level issues.

Well Secured	✓
Secured	
Poor Secured	
Insecure	

Automated checks are with remix IDE. All issues were performed by the team, which included the analysis of code functionality, manual audit found during automated analysis were manually reviewed and applicable vulnerabilities are presented in the audit overview section. The general overview is presented in the Project Information section and all issues found are located in the audit overview section.

Team found 0 critical, 0 high, 0 medium, 3 low, 0 very low-level issues and 0 note in all solidity files of the contract

The files:

MandalaFON.sol

File and Function Level Report

File in Scope:

Contract Name	SHA 256 hash	Contract Address
MandalaFON.sol	**1eaf7f6b30162a084bdfaf016fa8f1f0e14294d3bde6e293ceb250baad508e56**	0xfa8f2b75734e7412be3008abbc8d3f710ca7af9a

- Contract: MandalaFON
- Inherit: ERC721A, Ownable
- Observation: All passed including security check
- Test Report: passed
- Score: passed
- Conclusion: passed

Function	Test Result	Type / Return Type	Score
name	✓	Read / public	**Passed**
symbol	✓	Read / public	**Passed**
CONTRACT_URI	✓	Read / public	**Passed**
supportsInterface	✓	Read / public	**Passed**
contractURI	✓	Read / public	**Passed**
balanceOf	✓	Read / public	**Passed**
Owner	✓	Read / public	**Passed**
baseURI	✓	Read / public	**Passed**
tokenOfOwner	✓	Read / public	**Passed**
getApprovedForAll	✓	Read / public	**Passed**
hiddenMetadataUri	✓	Read / public	**Passed**
getApproved	✓	Read / public	**Passed**

ownerOf	✓	Read / public	**Passed**
tokenURI	✓	Read / public	**Passed**
totalSupply	✓	Read / public	**Passed**
MAX_SUPPLY	✓	Read / public	**Passed**
revealed	✓	Read / public	**Passed**
paused	✓	Read / public	**Passed**
uriSuffix	✓	Read / public	**Passed**
mint	✓	Write / public	**Passed**
approve	✓	Write / public	**Passed**
safeTransferFrom	✓	Write / public	**Passed**
safeTransferFrom	✓	Write / public	**Passed**
setPaused	✓	Write / public	**Passed**
withdraw	✓	Write / payable	**Passed**
setRevealed	✓	Write / public	**Passed**
transferOwnership	✓	Write / public	**Passed**
setApprovalForAll	✓	Write / public	**Passed**
transferFrom	✓	Write / public	**Passed**
reveal	✓	Write / public	**Passed**
setHiddenMetadataUri	✓	Write / public	**Passed**
renounceOwnership	✓	Write / public	**Passed**
setBaseURI	✓	Write / public	**Passed**
setContractURI	✓	Write / public	**Passed**

Issues Checking Status

No.	Issue Description	Checking Status
1	Compiler warnings.	**Passed**
2	Race conditions and Reentrancy. Cross-function race conditions.	**Passed**
3	Possible delays in data delivery.	**Passed**
4	Oracle calls.	**Passed**
5	Design Logic.	**Passed**
6	Timestamp dependence.	**Passed**
7	Integer Overflow and Underflow.	**Passed**
8	DoS with Revert.	**Passed**
9	DoS with block gas limit.	**Passed with Notes**
10	Methods execution permissions.	**Passed**
11	Economy model. If application logic is based on an incorrect economic model, the application would not function correctly and participants would incur financial losses. This type of issue is most often found in bonus rewards systems, Staking and Farming contracts, Vault and Vesting contracts, etc.	**Passed**
12	The impact of the exchange rate on the logic.	**Passed**
13	Private user data leaks.	**Passed**
14	Malicious Event log.	**Passed**
15	Scoping and Declarations.	**Passed**
16	Uninitialized storage pointers.	**Passed**
17	Arithmetic accuracy.	**Passed**

Severity Definitions

Risk Level	Description
Critical	Critical vulnerabilities are usually straightforward to exploit and can lead to tokens loss etc.
High	High-level vulnerabilities are difficult to exploit; however, they also have significant impact on smart contract execution, e.g. public access to crucial functions
Medium	Medium-level vulnerabilities are important to fix; however, they can't lead to tokens lose
Low	Low-level vulnerabilities are mostly related to outdated, unused etc. code snippets, that can't have significant impact on execution
Note	Lowest-level vulnerabilities, code style violations and info statements can't affect smart contract execution and can be ignored.

Audit Findings

Critical:

No Critical severity vulnerabilities were found.

High:

No High severity vulnerabilities were found.

Medium:

No Medium severity vulnerabilities were found

Low:

#Pragam version not fixed

Description

It is a good practice to lock the solidity version for a live deployment (use 0.8.14 instead of ^0.8.7). contracts should be deployed with the same compiler version and flags that they have been tested the most with. Locking the pragma helps ensure that contracts do not accidentally get deployed using, for example, the latest compiler which may have higher risks of undiscovered bugs. Contracts may also be deployed by others and the pragma indicates the compiler version intended by the original authors.

Remediation

Remove the ^ sign to lock the pragma version.

Status: Closed. Fixed in version 2.

#Owner privileges (In the period when the owner isn't renounced)

Description

The owner can mint the NFT.

The owner can pause and un pause the contract.

```
function mint(uint256 quantity) public onlyOwner mintCompliance(quantity) {
        _safeMint(owner(), quantity);
    }
function setPaused(bool _state) public onlyOwner {
        paused = _state;
    }
```

Remediation

Make these functions internal in next version or the team should announce the investors before pause or un paused the contract to give them time if they want to do anything.

P.S: This issue is common to the majority of NFT smart contracts.

Status: Acknowledged.

#Useless functions used in the contract

Description

The smart contract has a lot of useless functions like withdraw function, there isn't any price for NFT or the function that can be used for changing the price and the contract can't receive funds so no need for withdraw function. The smart contract has 2 write functions with the same job reveal the function and setReveal function, and 2 read functions with the same job CONTRACT_URI and contractURI functions.

```
function withdraw() external payable onlyOwner {
                (bool succ, ) =  payable(owner()).call{value:
address(this).balance}("");
        require(succ, "Balance transfer failed");
    }
function setRevealed(bool _state) public onlyOwner {
        revealed = _state;
    }
function reveal() public onlyOwner {
      revealed = true;
    }
function contractURI() public view returns (string memory) {
        return CONTRACT_URI;
    }
```

Remediation

Remove all useless or unnecessary functions from the smart contract to save ETH gas.

Status: Closed. Fixed in version 2.

Very Low:

No Very Low severity vulnerabilities were found.

Notes:

No Notes vulnerabilities were found.

Automatic Testing

1- Check for security

1eaf7f6b30162a084bdfaf016fa8f1f0e14294d3bde6e293ceb250baad508e56

File: Mandal... | Language: solidity | Size: 13552 bytes | Date: 2022-06-22T13:46:31.739Z

Critical	High	Medium	Low	Note
0	0	0	0	0

2- SOLIDITY STATIC ANALYSIS

SOLIDITY STATIC ANALYSIS

Select all | Autorun | Run

Security

Select Security

- **Transaction origin:** 'tx.origin' used
- **Check-effects-interaction:** Potential reentrancy bugs
- **Inline assembly:** Inline assembly used
- **Block timestamp:** Can be influenced by miners
- **Low level calls:** Should only be used by experienced devs
- **Block hash:** Can be influenced by miners
- **Selfdestruct:** Contracts using destructed contract can be broken

Gas & Economy

Select Gas & Economy

- **Gas costs:** Too high gas requirement of functions
- **This on local calls:** Invocation of local functions via 'this'
- **Delete dynamic array:** Use require/assert to ensure complete deletion
- **For loop over dynamic array:** Iterations depend on dynamic array's size
- **Ether transfer in loop:** Transferring Ether in a for/while/do-while loop

SOLIDITY STATIC ANALYSIS

ERC

Select ERC

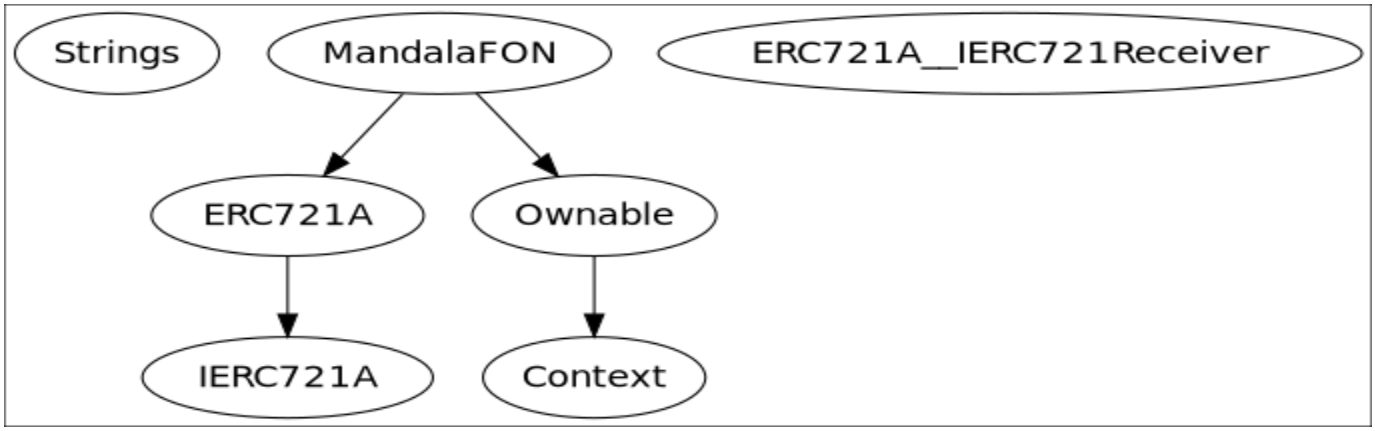
- **ERC20:** 'decimals' should be 'uint8'

Miscellaneous

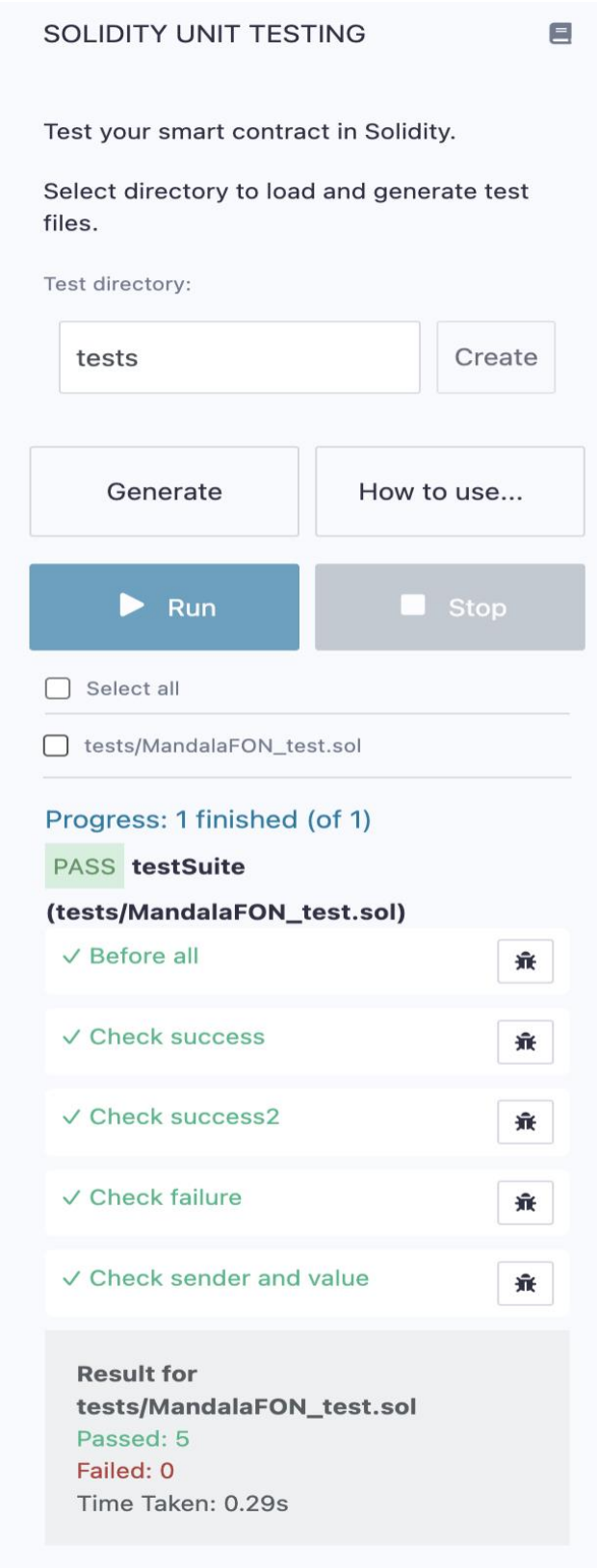
Select Miscellaneous

- **Constant/View/Pure functions:** Potentially constant/view/pure functions
- **Similar variable names:** Variable names are too similar
- **No return:** Function with 'returns' not returning
- **Guard conditions:** Ensure appropriate use of require/assert
- **Result not used:** The result of an operation not used
- **String length:** Bytes length != String length
- **Delete from dynamic array:** 'delete' leaves a gap in array
- **Data truncated:** Division on int/uint values truncates the result

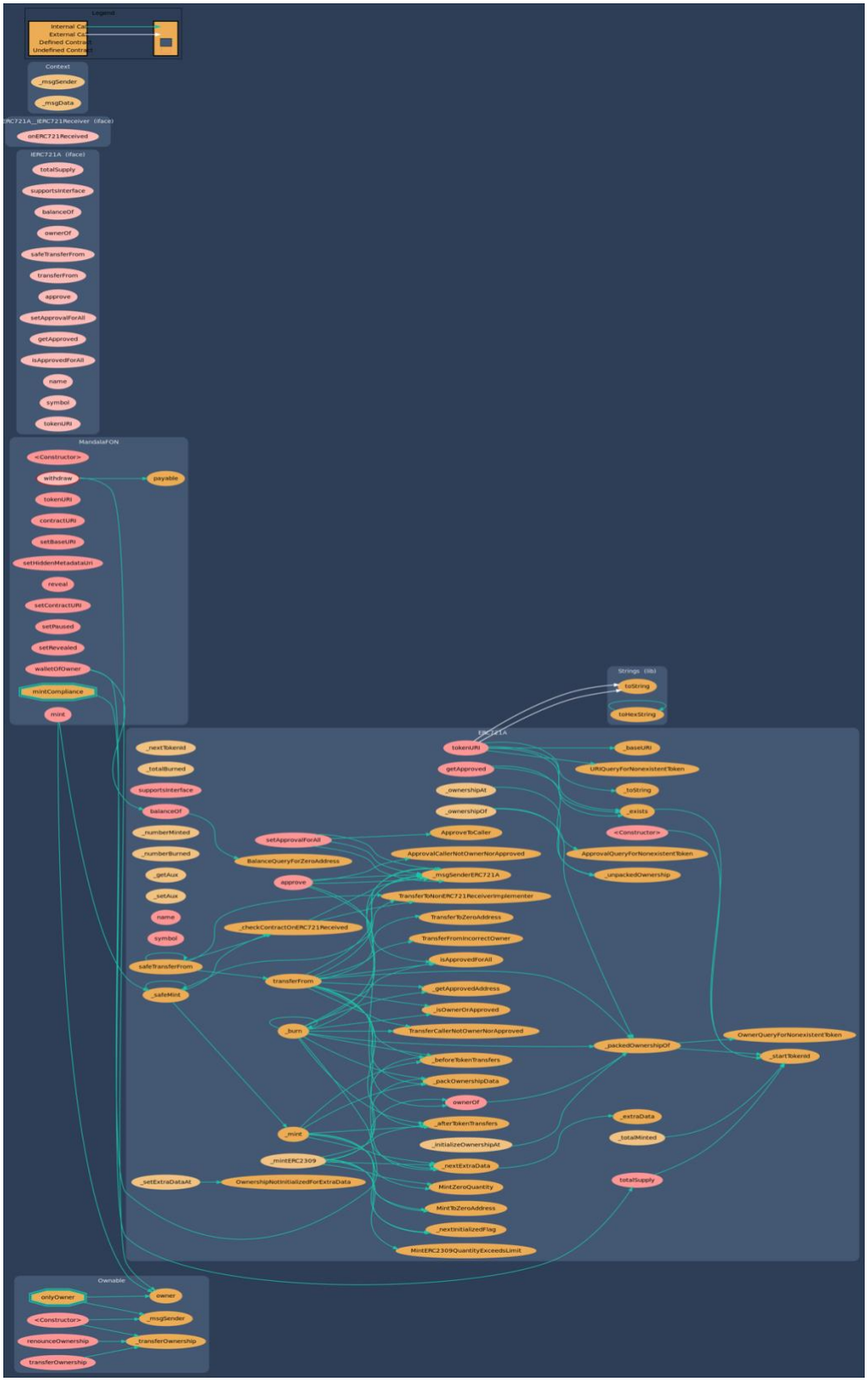
3- Inheritance graph



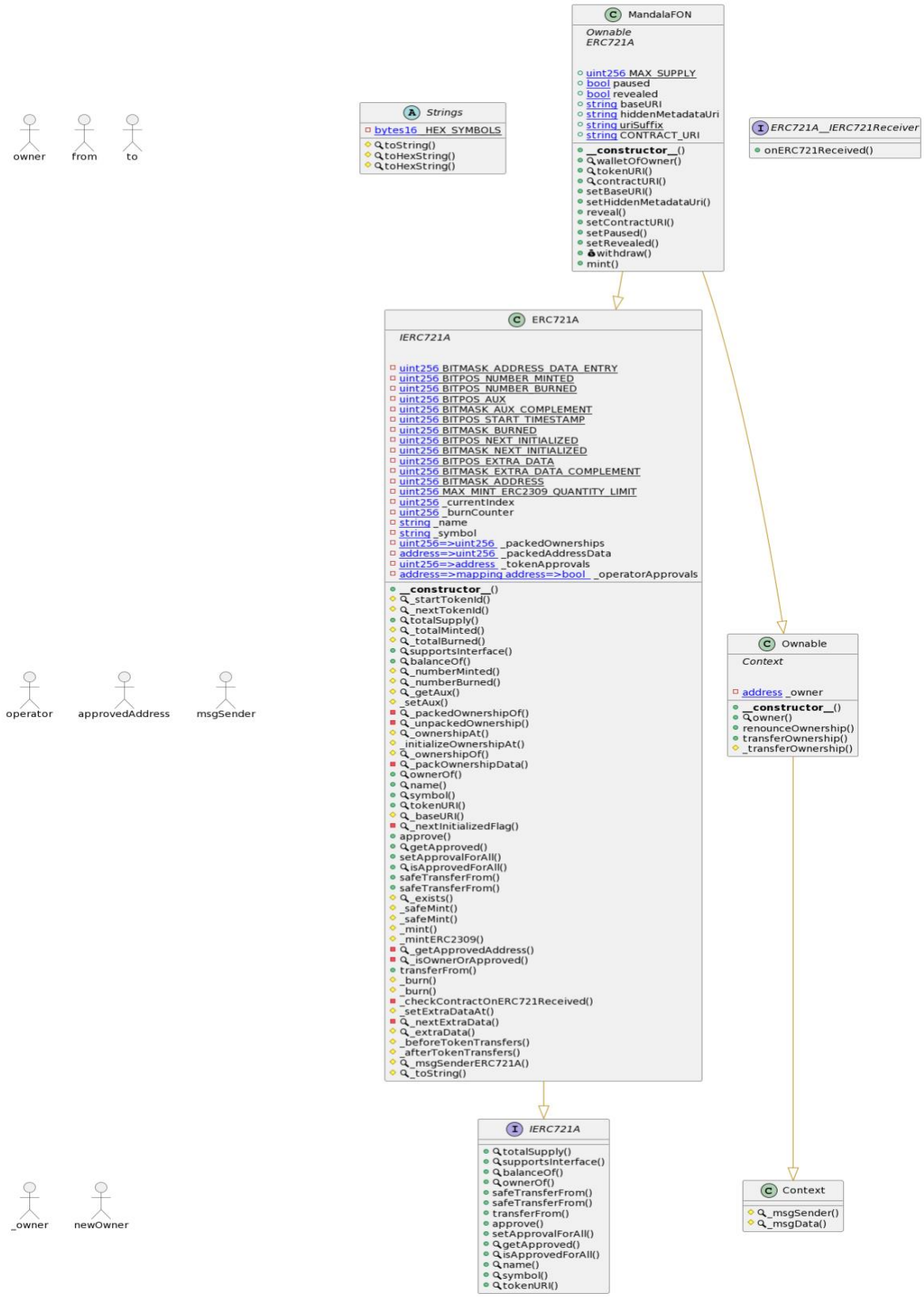
4- SOLIDITY UNIT TESTING



5- Call graph


Legend
Internal Call
External Call
Defined Contract
Undefined Contract
Context
_msgSender
_msgData
IERC721A__IERC721Receiver (iface)
onERC721Received
IERC721A (iface)
totalSupply
supportsInterface
balanceOf
ownerOf
safeTransferFrom
transferFrom
approve
setApprovalForAll
getApproved
isApprovedForAll
name
symbol
tokenURI
MandalaFON
<Constructor>
withdraw
payable
tokenURI
contractURI
setBaseURI
setHiddenMetadataUri
reveal
setContractURI
setPaused
setRevealed
walletOfOwner
mintCompliance
mint
Strings (lib)
toString
toHexString
ERC721A
_nextTokenId
_totalBurned
supportsInterface
balanceOf
_numberMinted
_numberBurned
_getAux
_setAux
name
symbol
safeTransferFrom
_safeMint
tokenURI
getApproved
_ownershipAt
_ownershipOf
setApprovalForAll
ApproveToCaller
BalanceQueryForZeroAddress
ApprovalCallerNotOwnerNorApproved
approve
_msgSenderERC721A
TransferToNonERC721ReceiverImplementer
_checkContractOnERC721Received
TransferToZeroAddress
TransferFromIncorrectOwner
IsApprovedForAll
transferFrom
_getApprovedAddress
_isOwnerOrApproved
_burn
TransferCallerNotOwnerNorApproved
_beforeTokenTransfers
_packOwnershipData
ownerOf
_afterTokenTransfers
_mint
_initializeOwnershipAt
_mintERC2309
_nextExtraData
_setExtraDataAt
OwnershipNotInitializedForExtraData
MintZeroQuantity
MintToZeroAddress
_nextInitializedFlag
MintERC2309QuantityExceedsLimit
_baseURI
URIQueryForNonexistentToken
_toString
_exists
<Constructor>
ApprovalQueryForNonexistentToken
_unpackedOwnership
_packedOwnershipOf
OwnerQueryForNonexistentToken
_startTokenId
_extraData
_totalMinted
totalSupply
Ownable
onlyOwner
owner
<Constructor>
_msgSender
renounceOwnership
_transferOwnership
transferOwnership

Unified Modeling Language (UML)



Functions signature

```
Sighash   |   Function Signature
========================
6900a3ae  =>  toString(uint256)
8fba8d5c  =>  toHexString(uint256)
63e1cbea  =>  toHexString(uint256,uint256)
18160ddd  =>  totalSupply()
01ffc9a7  =>  supportsInterface(bytes4)
70a08231  =>  balanceOf(address)
6352211e  =>  ownerOf(uint256)
b88d4fde  =>  safeTransferFrom(address,address,uint256,bytes)
42842e0e  =>  safeTransferFrom(address,address,uint256)
23b872dd  =>  transferFrom(address,address,uint256)
095ea7b3  =>  approve(address,uint256)
a22cb465  =>  setApprovalForAll(address,bool)
081812fc  =>  getApproved(uint256)
e985e9c5  =>  isApprovedForAll(address,address)
06fdde03  =>  name()
95d89b41  =>  symbol()
c87b56dd  =>  tokenURI(uint256)
150b7a02  =>  onERC721Received(address,address,uint256,bytes)
98995f77  =>  _startTokenId()
4a60f620  =>  _nextTokenId()
736bf591  =>  _totalMinted()
fd01bd4c  =>  _totalBurned()
4d388a98  =>  _numberMinted(address)
6ba1b8d0  =>  _numberBurned(address)
f4a540c5  =>  _getAux(address)
4ff8c452  =>  _setAux(address,uint64)
444996c1  =>  _packedOwnershipOf(uint256)
4fe3c13e  =>  _unpackedOwnership(uint256)
cbaf28ce  =>  _ownershipAt(uint256)
f2d31624  =>  _initializeOwnershipAt(uint256)
fb372cf2  =>  _ownershipOf(uint256)
bf460657  =>  _packOwnershipData(address,uint256)
743976a0  =>  _baseURI()
e0e30f80  =>  _nextInitializedFlag(uint256)
f8e76cc0  =>  _exists(uint256)
b3e1c718  =>  _safeMint(address,uint256)
6a4f832b  =>  _safeMint(address,uint256,bytes)
4e6ec247  =>  _mint(address,uint256)
4908d13b  =>  _mintERC2309(address,uint256)
56d5f541  =>  _getApprovedAddress(uint256)
be8825c4  =>  _isOwnerOrApproved(address,address,address)
9b1f9e74  =>  _burn(uint256)
834a9477  =>  _burn(uint256,bool)
d88343e2  =>  _checkContractOnERC721Received(address,address,uint256,bytes)
bd3cdd6d  =>  _setExtraDataAt(uint256,uint24)
5afe32e4  =>  _nextExtraData(address,address,uint256)
fc37bbd3  =>  _extraData(address,address,uint24)
ef435773  =>  _beforeTokenTransfers(address,address,uint256,uint256)
08c018f7  =>  _afterTokenTransfers(address,address,uint256,uint256)
b60986df  =>  _msgSenderERC721A()
f832e238  =>  _toString(uint256)
```

```
119df25f  =>  _msgSender()
8b49d47e  =>  _msgData()
8da5cb5b  =>  owner()
715018a6  =>  renounceOwnership()
f2fde38b  =>  transferOwnership(address)
d29d44ee  =>  _transferOwnership(address)
438b6300  =>  walletOfOwner(address)
e8a3d485  =>  contractURI()
55f804b3  =>  setBaseURI(string)
4fdd43cb  =>  setHiddenMetadataUri(string)
a475b5dd  =>  reveal()
938e3d7b  =>  setContractURI(string)
16c38b3c  =>  setPaused(bool)
e0a80853  =>  setRevealed(bool)
3ccfd60b  =>  withdraw()
a0712d68  =>  mint(uint256)
```

Automatic general report

```
Files Description Table

|  File Name  |  SHA-1 Hash  |
|-------------|--------------|
| /Users/macbook/Desktop/smart contracts/MandalaFON.sol |
7cc2f879a08b5ef4de89e514329e57154ddd152f |

 Contracts Description Table

|  Contract  |         Type        |       Bases      |                  |
|
|:----------:|:-------------------:|:----------------:|:----------------:|:--------
-------:|
|     └      |  **Function Name**  |  **Visibility**  |  **Mutability**  |
**Modifiers**  |
||||||
| **Strings** | Library |  |||
| └ | toString | Internal 🔒 |   | |
| └ | toHexString | Internal 🔒 |   | |
| └ | toHexString | Internal 🔒 |   | |
||||||
| **IERC721A** | Interface |  |||
| └ | totalSupply | External ❗ |   |NO❗ |
| └ | supportsInterface | External ❗ |   |NO❗ |
| └ | balanceOf | External ❗ |   |NO❗ |
| └ | ownerOf | External ❗ |   |NO❗ |
| └ | safeTransferFrom | External ❗ | 🛑  |NO❗ |
| └ | safeTransferFrom | External ❗ | 🛑  |NO❗ |
| └ | transferFrom | External ❗ | 🛑  |NO❗ |
| └ | approve | External ❗ | 🛑  |NO❗ |
| └ | setApprovalForAll | External ❗ | 🛑  |NO❗ |
| └ | getApproved | External ❗ |   |NO❗ |
| └ | isApprovedForAll | External ❗ |   |NO❗ |
| └ | name | External ❗ |   |NO❗ |
| └ | symbol | External ❗ |   |NO❗ |
| └ | tokenURI | External ❗ |   |NO❗ |
||||||
| **ERC721A__IERC721Receiver** | Interface |  |||
| └ | onERC721Received | External ❗ | 🛑  |NO❗ |
||||||
| **ERC721A** | Implementation | IERC721A |||
| └ | <Constructor> | Public ❗ | 🛑  |NO❗ |
| └ | _startTokenId | Internal 🔒 |   | |
| └ | _nextTokenId | Internal 🔒 |   | |
| └ | totalSupply | Public ❗ |   |NO❗ |
| └ | _totalMinted | Internal 🔒 |   | |
| └ | _totalBurned | Internal 🔒 |   | |
| └ | supportsInterface | Public ❗ |   |NO❗ |
| └ | balanceOf | Public ❗ |   |NO❗ |
| └ | _numberMinted | Internal 🔒 |   | |
| └ | _numberBurned | Internal 🔒 |   | |
| └ | _getAux | Internal 🔒 |   | |
```

└	_setAux	Internal 🔒	🛑	
└	_packedOwnershipOf	Private 🔐		
└	_unpackedOwnership	Private 🔐		
└	_ownershipAt	Internal 🔒		
└	_initializeOwnershipAt	Internal 🔒	🛑	
└	_ownershipOf	Internal 🔒		
└	_packOwnershipData	Private 🔐		
└	ownerOf	Public ❗		NO❗
└	name	Public ❗		NO❗
└	symbol	Public ❗		NO❗
└	tokenURI	Public ❗		NO❗
└	_baseURI	Internal 🔒		
└	_nextInitializedFlag	Private 🔐		
└	approve	Public ❗	🛑	NO❗
└	getApproved	Public ❗		NO❗
└	setApprovalForAll	Public ❗	🛑	NO❗
└	isApprovedForAll	Public ❗		NO❗
└	safeTransferFrom	Public ❗	🛑	NO❗
└	safeTransferFrom	Public ❗	🛑	NO❗
└	_exists	Internal 🔒		
└	_safeMint	Internal 🔒	🛑	
└	_safeMint	Internal 🔒	🛑	
└	_mint	Internal 🔒	🛑	
└	_mintERC2309	Internal 🔒	🛑	
└	_getApprovedAddress	Private 🔐		
└	_isOwnerOrApproved	Private 🔐		
└	transferFrom	Public ❗	🛑	NO❗
└	_burn	Internal 🔒	🛑	
└	_burn	Internal 🔒	🛑	
└	_checkContractOnERC721Received	Private 🔐	🛑	
└	_setExtraDataAt	Internal 🔒	🛑	
└	_nextExtraData	Private 🔐		
└	_extraData	Internal 🔒		
└	_beforeTokenTransfers	Internal 🔒	🛑	
└	_afterTokenTransfers	Internal 🔒	🛑	
└	_msgSenderERC721A	Internal 🔒		
└	_toString	Internal 🔒		
Context	Implementation			
└	_msgSender	Internal 🔒		
└	_msgData	Internal 🔒		
Ownable	Implementation	Context		
└	<Constructor>	Public ❗	🛑	NO❗
└	owner	Public ❗		NO❗
└	renounceOwnership	Public ❗	🛑	onlyOwner
└	transferOwnership	Public ❗	🛑	onlyOwner
└	_transferOwnership	Internal 🔒	🛑	
MandalaFON	Implementation	Ownable, ERC721A		
└	<Constructor>	Public ❗	🛑	ERC721A
└	walletOfOwner	Public ❗		NO❗
└	tokenURI	Public ❗		NO❗
└	contractURI	Public ❗		NO❗
└	setBaseURI	Public ❗	🛑	onlyOwner

└	setHiddenMetadataUri	Public ❗	🛑	onlyOwner
└	reveal	Public ❗	🛑	onlyOwner
└	setContractURI	Public ❗	🛑	onlyOwner
└	setPaused	Public ❗	🛑	onlyOwner
└	setRevealed	Public ❗	🛑	onlyOwner
└	withdraw	External ❗	💶	onlyOwner
└	mint	Public ❗	🛑	onlyOwner mintCompliance

Legend

Symbol	Meaning
🛑	Function can modify state
💶	Function is payable

Conclusion

The contracts are written systematically. Team found no critical issues. So, it is good to go for production.

Since possible test cases can be unlimited and developer level documentation (code flow diagram with function level description) not provided, for such an extensive smart contract protocol, we provide no such guarantee of future outcomes. We have used all the latest static tools and manual observations to cover maximum possible test cases to scan Everything.

Security state of the reviewed contract is “ Well Secured”.

✓ No volatile code.

✓ No many high severity issues were found.

✓ Low (or very low) level issues have been fixed.

Disclaimer

This is a limited report on our findings based on our analysis, in accordance with good industry practice as of the date of this report, in relation to cybersecurity vulnerabilities and issues in the framework and algorithms based on smart contracts, the details of which are set out in this report. In order to get a full view of our analysis, it is crucial for you to read the full report. While we have done our best in conducting our analysis and producing this report, it is important to note that you should not rely on this report and cannot claim against the team on the basis of what it says or doesn't say, or how team produced it, and it is important for you to conduct your own independent investigations before making any decisions. team go into more detail on this in the below disclaimer below – please make sure to read it in full.

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