



ITU Workshop Combating grey devices

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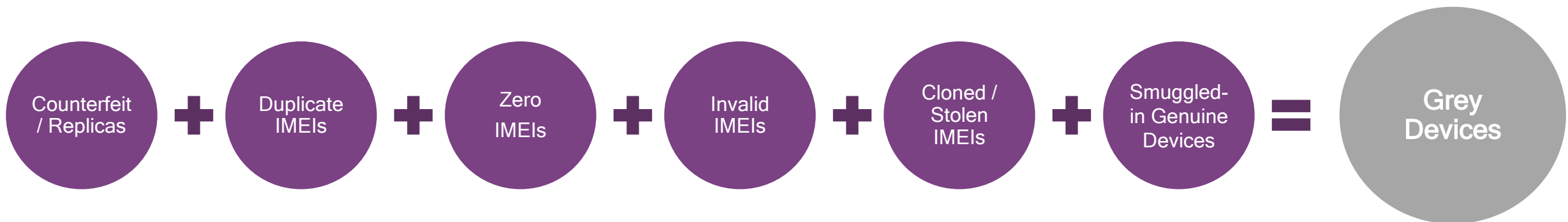
Security solutions

Qualcomm's vision



Grey devices

- Breakdown if IMEIs count include:
 - All zeros
 - Invalid duplicate
 - Invalid non-duplicate
 - Non-TAC-aged duplicate
 - TAC-aged duplicate
 - TAC-aged non-duplicate
 - Valid



Negative impacts of the grey market

GOVERNMENT

- **Revenue loss** (non-payment of customs duties and sales taxes)
- **Need of additional measures to ensure compliance with national regulations** (import, sale, certification, changing the IMEI etc.)
- **Danger to public security** (phones with invalid IMEI or “no IMEI” number are potentially attractive for criminal activity and terrorism)
- **Quality of Service & Impact on Broadband Penetration**

INDUSTRY

- **Losses for OEMs**
- **unfair competition**
- **loss of sales**
- **price may be affected**
- **copyright and trademark infringement, adverse effect on brand value and reputation**

END USER

- **Low quality and reliability** (performance degradation, high % of dropped calls, access failures, handover problems)
- **Failed warranty and technical support**
- **Potential hazard to health** (use of hazardous substances, higher SAR, batteries’ explosion etc.)
- **Security and privacy issues** (in cases of theft or stolen phone, it is difficult to track the phone with invalid IMEI or “no IMEI” number)

OPERATOR

- **Lowering QoS of mobile telecommunication services** (loss in voice and data capacities, data transmit speeds, reduced coverage)
- **Potential interference problems**
- **Need of expensive and unnecessary technical measures** (more antenna installations, base stations and the need of more spectrum)

Hazardous substances in counterfeit mobile phones

Counterfeits or fakes by their nature are illegal and those behind them aren't interested in the safety checks or in meeting the quality standards for regular products.

Some of the counterfeit phones have been found to contain high levels of lead and other substances which can harm the environment and are a danger to human health.

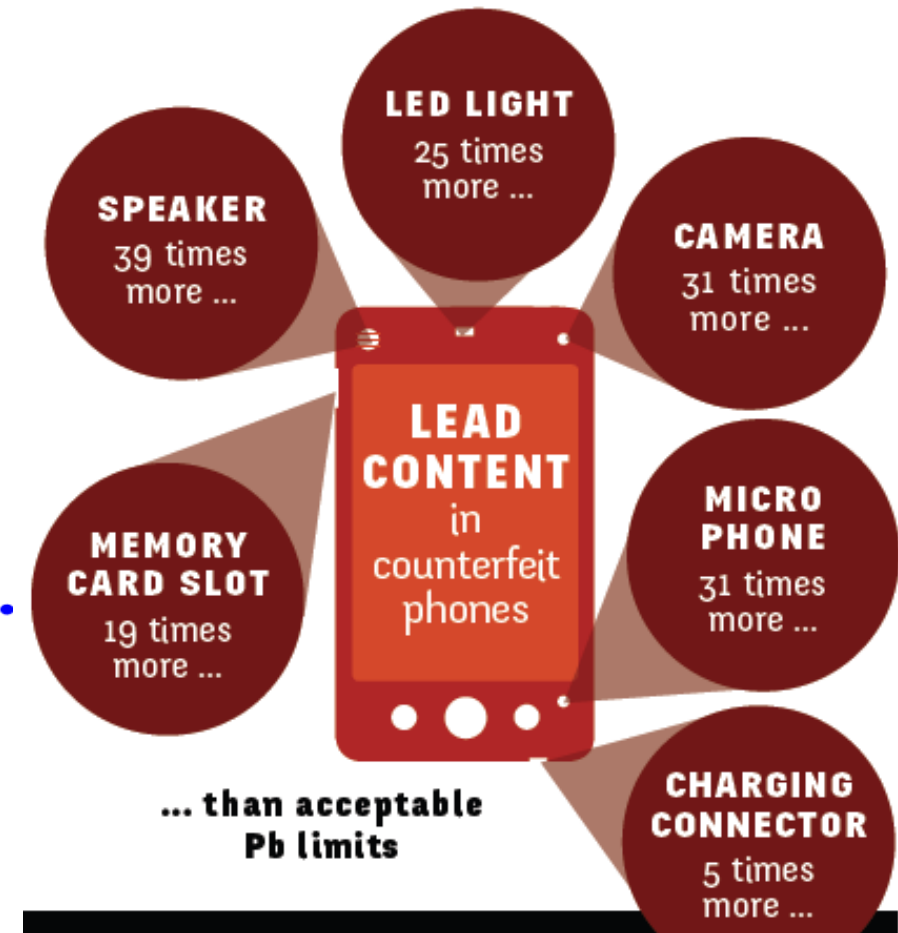
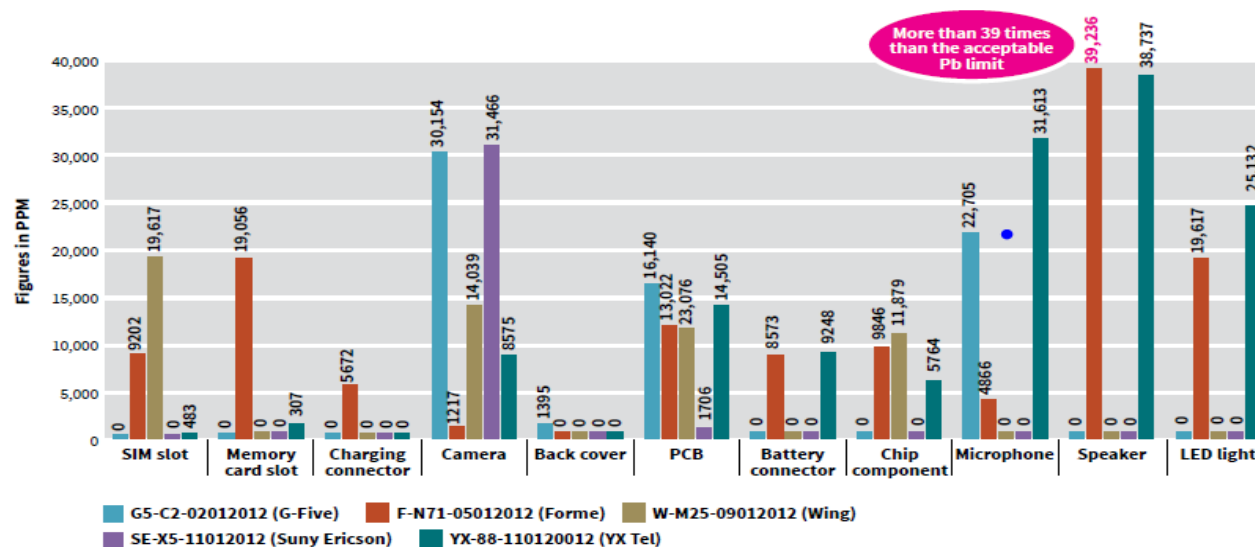


FIGURE B: High Lead (Pb) content found in all handsets tested - clearly amplifying their substandard character



Source: MMF Report

Regulatory solution against grey devices

Implement a program to ensure device imports through official / legal channels only



Ensure use of officially sanctioned TAC/IMEIs by GSMA as part of Device Type Approval process



Register all legally imported mobile devices in a Central database using IMEIs – ‘Whitelist’



Enact a government mandate barring operators from providing services to devices not in the Whitelist (*Blacklisting*)

Regulatory solution against grey devices

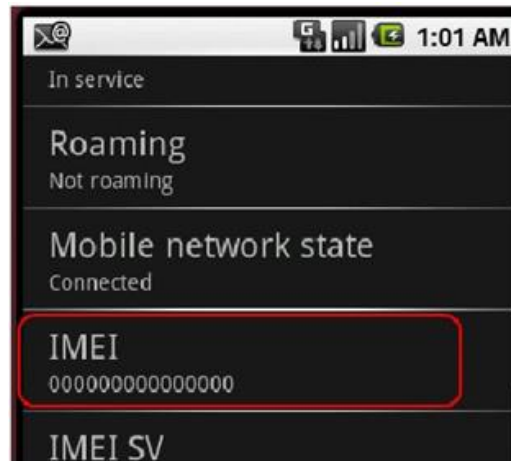
IMEI network blocking solution

The most effective way to deal with the grey market and counterfeit devices is to block these devices on the network using whitelist / blacklist approach

Stolen, duplicate, and counterfeit/substandard with invalid IMEIs can be blocked by the network when blacklisted as these devices must be authenticated in order to work

Null & All-zero and Duplicate IMEIs

- There were estimated to be 30 million GSM handsets in India with no IMEI
- MSAI was authorized by GSMA to offer a temporary amnesty programme involving the implantation of genuine IMEIs (genuine IMEI implant (GII) programme) in order to be able to uniquely identify each device.

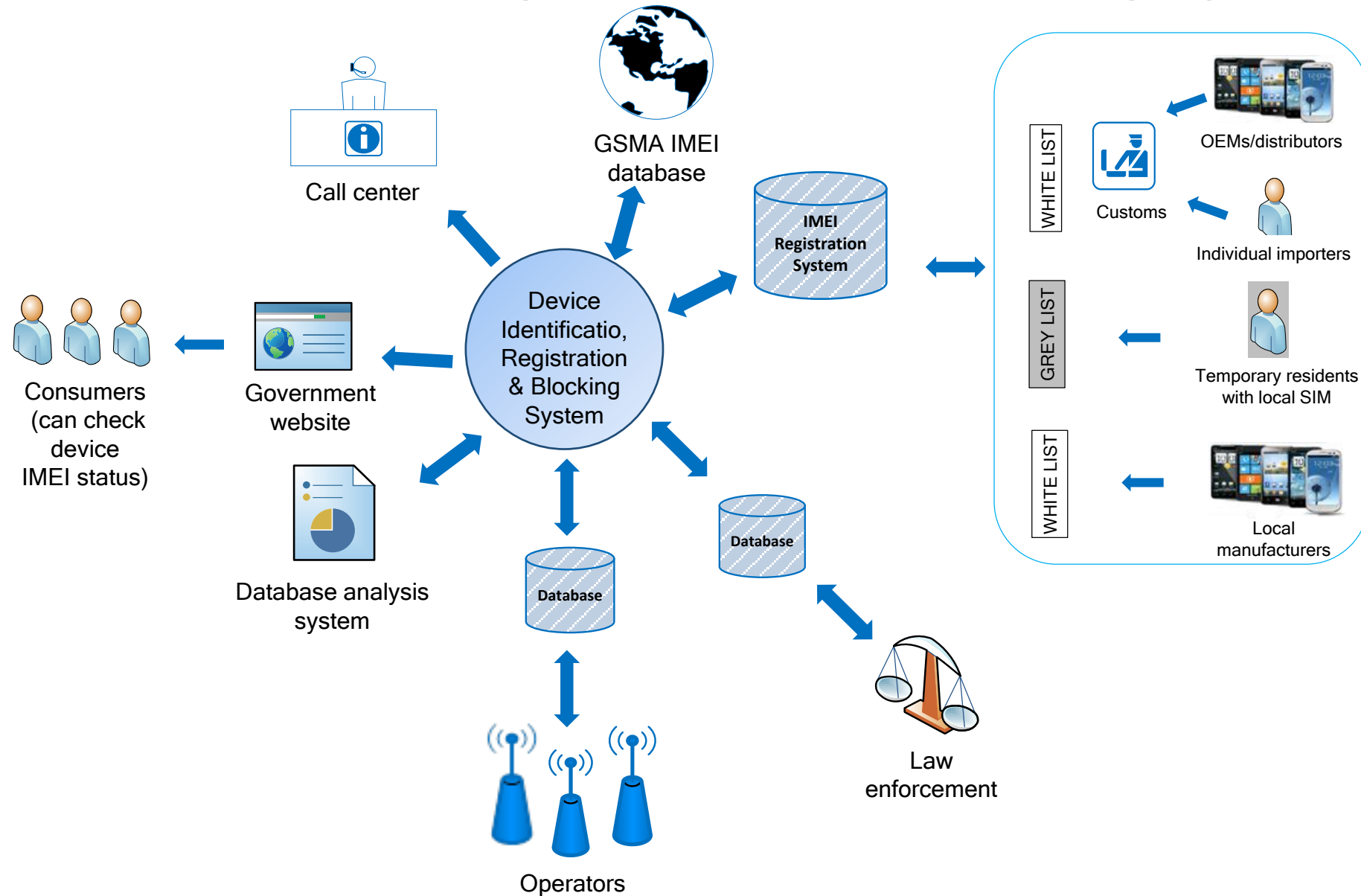


Unregistered IMEIs:

- A network operator in Uganda reported that the number of TACs on its network is greater than the total number of registered TACs allocated by GSMA

Device Identification, Registration and Blocking System

DIRBS



Establishing key elements for system implementation

System design, architecture, software customization, execution and deployment

Generally driven by in-country regulations and considerations

Addressing installed base of grey devices

1. Device Blocking after allowing for grace period
2. Device Locking with existing subscriptions
3. System cleanup (reprogramming vs forced registrations)

Invalid device detection

Tradeoffs for consumers (considerations for convenience and system robustness)

Real-time

Off-line

Identifying new grey devices

Detecting duplicates and clones

Identifying suspicious devices on the network

IMEI categorization

Valid/Invalid - based on whether TAC value is known to GSMA

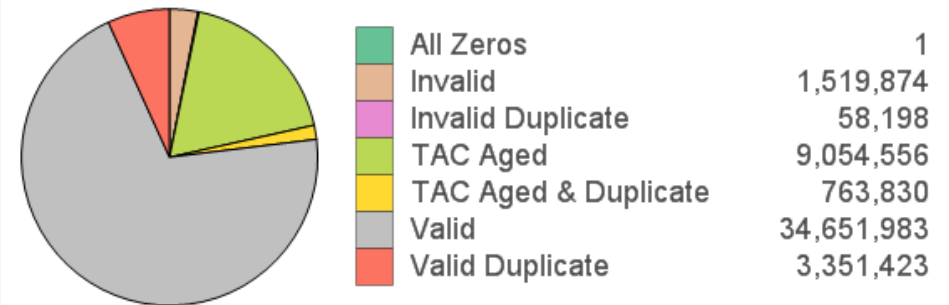
Upper/lower bound - thresholds for TAC Aged and Duplicate:

TAC Aged if allocated more than XX years ago;

Duplicate if seen with more than NN subscriptions

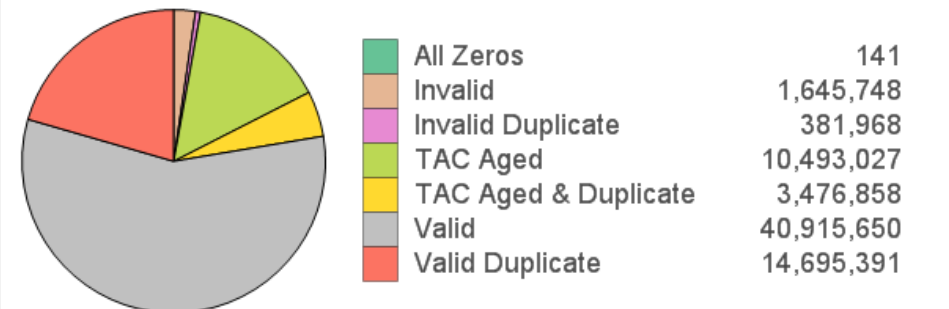
Upper Bound IMEIs (total of 49,399,865)

- An IMEI value observed with multiple subscriptions is counted once
- IMEI count includes values that were not matched in GSMA database



Upper Bound IMEI-Subscriber Pairs (total of 71,608,783)

- If an IMEI value is observed with many subscriptions, each one is counted



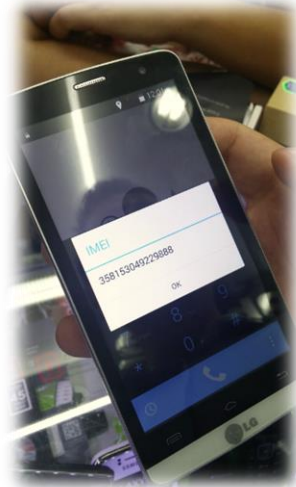
IMEI violations

Security is important to guarantee the efficiency of network blocking

Zero
IMEI



LG G3 counterfeit with 2G
cloned IMEI



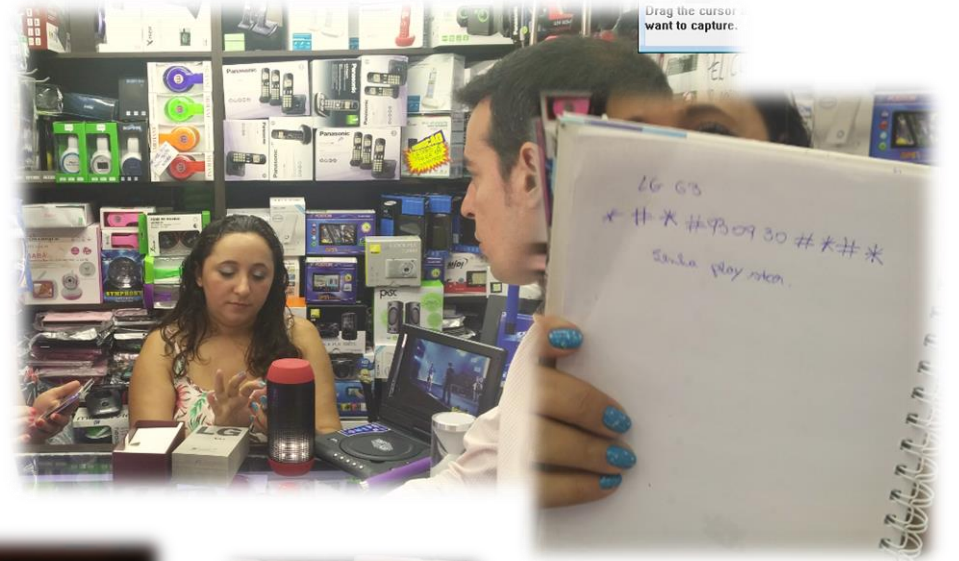
IMEI VERIFICATION RESULTS

IMEI Code : 358153049229888

IMEI legitimate Phone Model: TINMO F23

Manufactured by : Tinmo Technology (HK) Limited

Frequency bands : 2 SIM, GSM 1800, GSM 900



Private
Brand

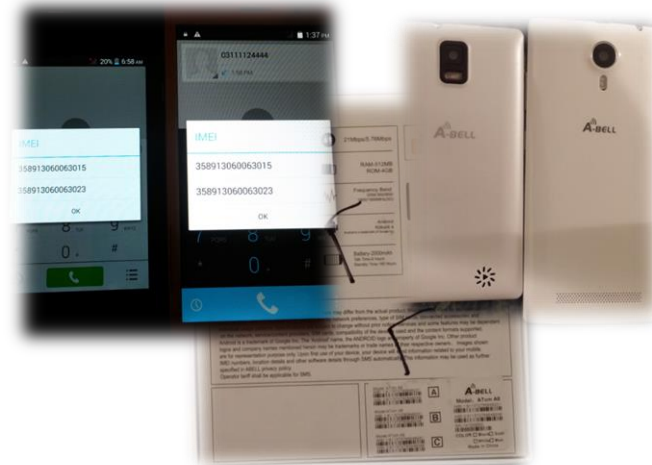
2G Cloned
IMEI

Enter IMEI code here :
VERIFY MY PHONE

IMEI VERIFICATION RESULTS
IMEI Code : 358378044949129
IMEI legitimate Phone Model: MAXX MX464
Manufactured by : Alkstone Telecommunication Limited
Frequency bands : GSM 1800, GSM 900



Note: If IMEI (358378044949129) is given by other type of phone, seek help from vendor as phone may be counterfeit



Cloned & Fake
Unmatched
IMEIs

In conclusion, some ways forward

- 1. Increase security on regular phones**
- 2. Strengthen existing network systems to block illegal devices**
- 3. Review IMEI standard to enhance fraud protection**



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