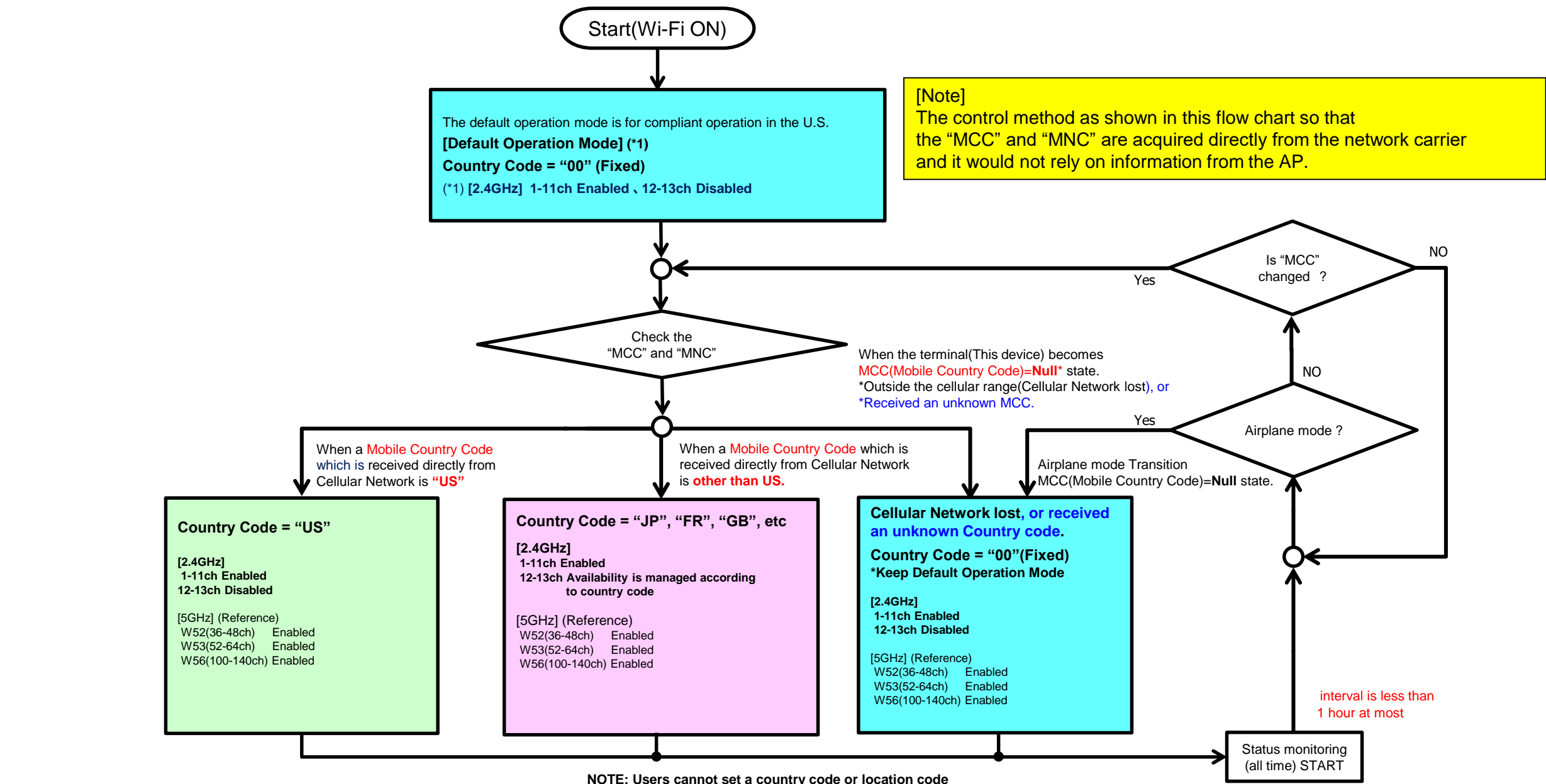# Verification report of control algorithm is accordance with KDB594280

FCC ID : APYHRO00271

Date : 2018 December-27
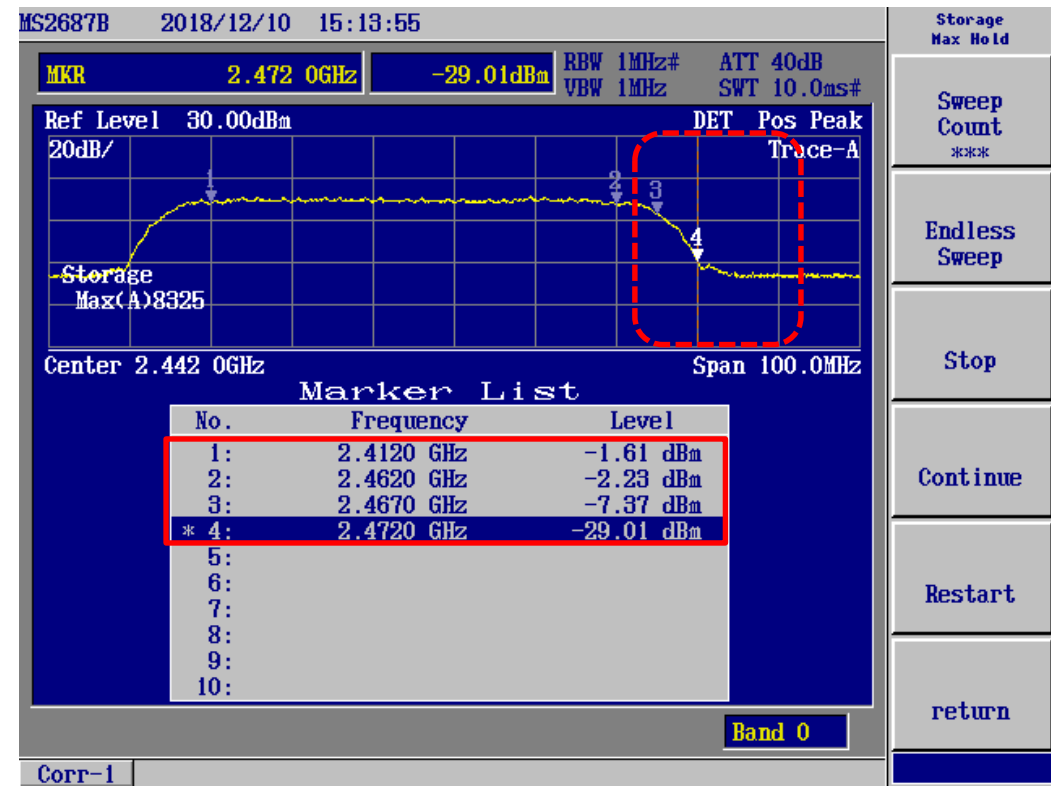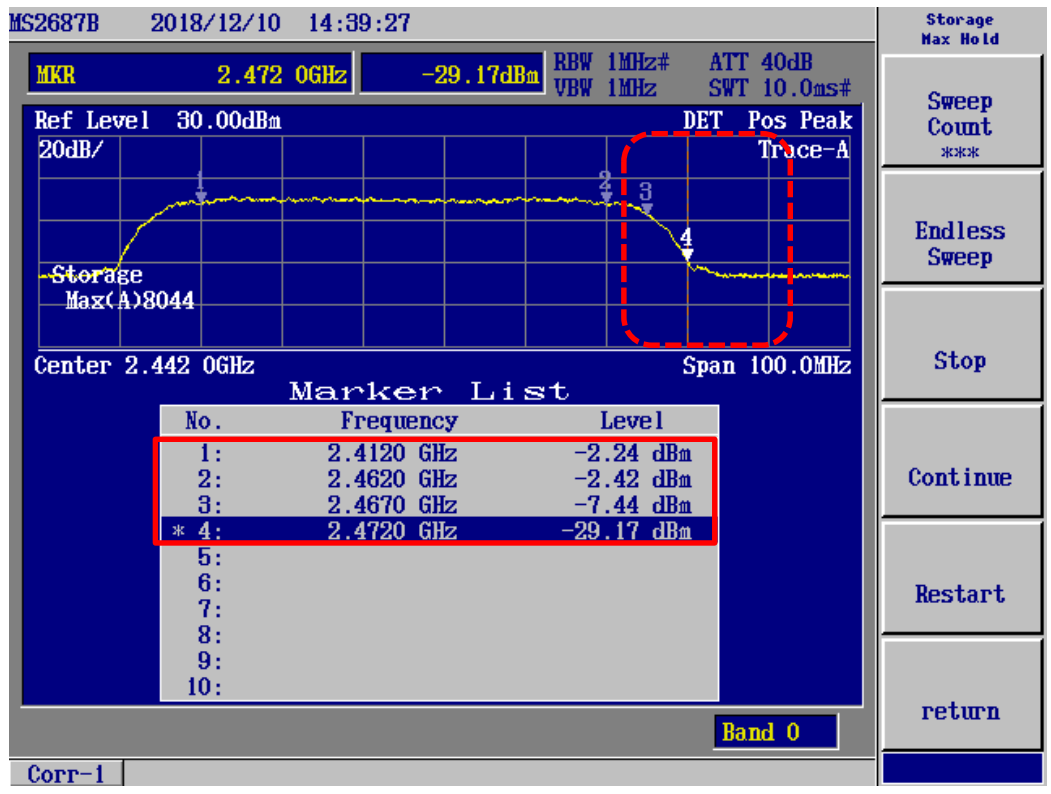
◆Channel Control Algorithm Flowchart

Start(Wi-Fi ON)

The default operation mode is for compliant operation in the U.S.

[Default Operation Mode] (*1)

Country Code = "00" (Fixed)

(*1) **[2.4GHz] 1-11ch Enabled 、12-13ch Disabled**

[Note]
The control method as shown in this flow chart so that
the "MCC" and "MNC" are acquired directly from the network carrier
and it would not rely on information from the AP.

Is "MCC" changed ?   — Yes / NO

Check the "MCC" and "MNC"

When the terminal(This device) becomes
MCC(Mobile Country Code)=**Null*** state.
*Outside the cellular range(Cellular Network lost), or
*Received an unknown MCC.

Airplane mode ?   — Yes / NO

When a Mobile Country Code which is received directly from Cellular Network is **"US"**

When a Mobile Country Code which is received directly from Cellular Network is **other than US.**

Airplane mode Transition
MCC(Mobile Country Code)=**Null** state.

Country Code = "US"

[2.4GHz]
 1-11ch Enabled
12-13ch Disabled

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

Country Code = "JP", "FR", "GB", etc

[2.4GHz]
 1-11ch Enabled
 12-13ch Availability is managed according
          to country code

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

Cellular Network lost, or received an unknown Country code.

Country Code = "00"(Fixed)
*Keep Default Operation Mode

[2.4GHz]
 1-11ch Enabled
 12-13ch Disabled

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

interval is less than
1 hour at most

Status monitoring
(all time) START

NOTE: Users cannot set a country code or location code

◆Scan Waveform on 2.4GHz(Country Code=US, 00(NULL))

[CC="US"]

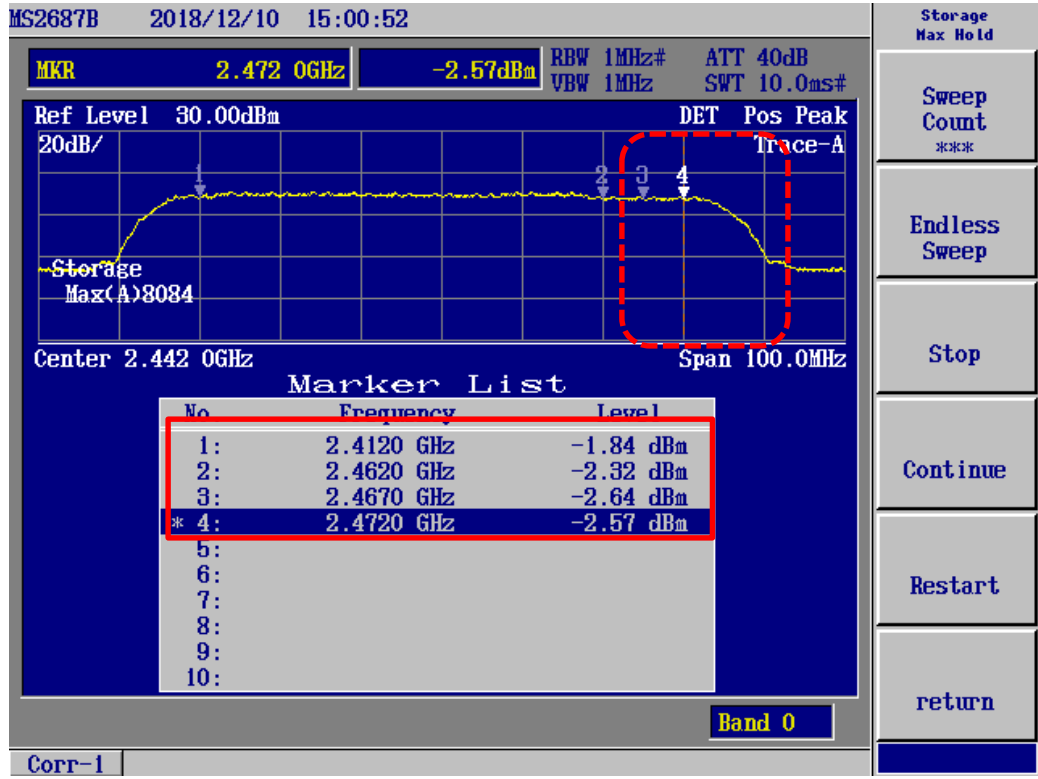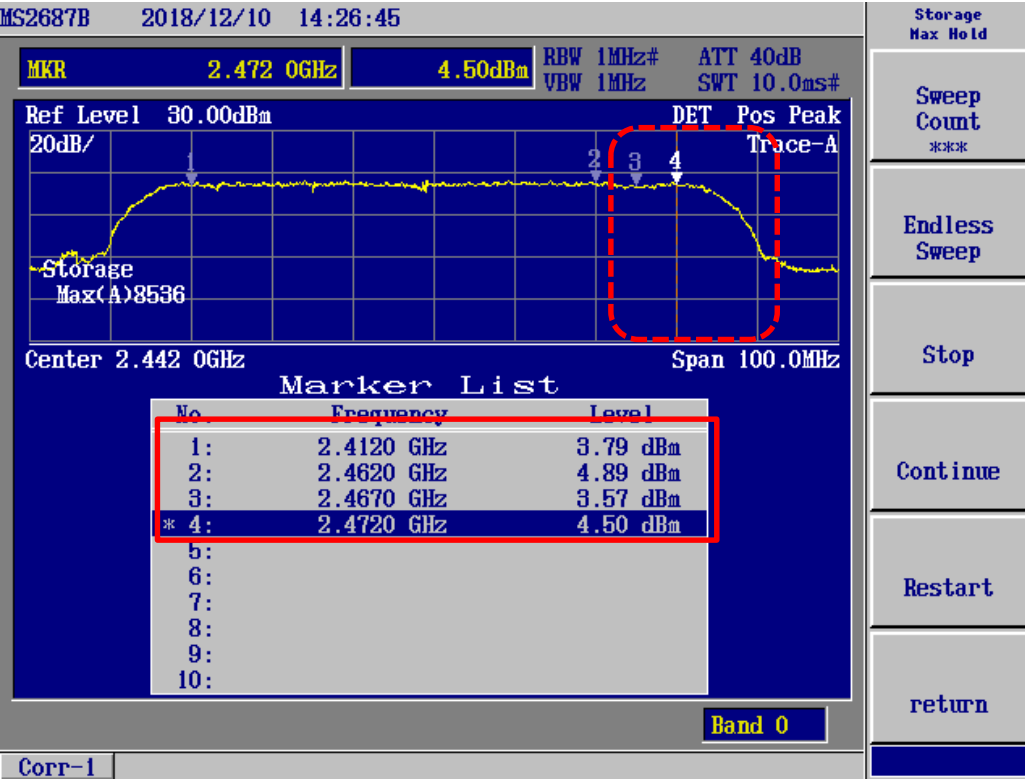**[CC="00"(NULL)] ※Default Operation Mode**

1-11ch   = Enabled
12-13ch = Disabled
⇒ **Operation Check Result = OK**

1-11ch   = Enabled
12-13ch = Disabled
⇒ **Operation Check Result = OK**

◆Scan Waveform on 2.4GHz(Country Code=JP, FR)

[CC="JP"]

[CC="FR"]

1-13ch = Enabled
⇒ Operation Check Result = OK

1-13ch = Enabled
⇒ Operation Check Result = OK

◆Channel Control Algorithm Flowchart

Start(Wi-Fi ON)

(1)
The default operation mode is for compliant operation in the U.S.
[Default Operation Mode] (*1)
Country Code = "00" (Fixed)
(*1) **[2.4GHz] 1-11ch Enabled、12-13ch Disabled**

[Note]
The control method as shown in this flow chart so that
the "MCC" and "MNC" are acquired directly from the network carrier
and it would not rely on information from the AP.

Is "MCC" changed ?
Yes / NO

Check the "MCC" and "MNC"

When the terminal(This device) becomes
MCC(Mobile Country Code)=**Null*** state.
*Outside the cellular range(Cellular Network lost), or
*Received an unknown MCC.
(3)

NO

Yes

Airplane mode ?

When a Mobile Country Code which is received directly from Cellular Network is **"US"**

When a Mobile Country Code which is received directly from Cellular Network is **other than US.**

Airplane mode Transition
MCC(Mobile Country Code)=Null state.

Country Code = "US"

[2.4GHz]
 1-11ch Enabled
12-13ch Disabled

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

(5)

Country Code = "JP", "FR", "GB", etc

[2.4GHz]
 1-11ch Enabled
 12-13ch Availability is managed according
          to country code

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

(2)

**Cellular Network lost, or received
an unknown Country code.**

Country Code = "00" (Fixed)
*Keep Default Operation Mode

[2.4GHz]
 1-11ch Enabled
 12-13ch Disabled

[5GHz] (Reference)
 W52(36-48ch)   Enabled
 W53(52-64ch)   Enabled
 W56(100-140ch) Enabled

(4)

Interval is less than
 hour at most

Status monitoring
(all time) START

NOTE: Users cannot set a country code or location code

◆Verification Pattern (Operation check result)

Check Result = OK

```
12-26 14:10:07.304 D/wpa_supplicant( 1964): wpa_driver_nl80211_driver_cmd COUNTRY 00 len = 0, 4096
12-26 14:10:07.317 D/wpa_supplicant( 1964): nl80211: Regulatory information - country=00
```

(1) 1; Terminal start-up and Wi-Fi startup,   Start default Country Code ="00" (Ch-12,13 are disabled)
         Effective frequency range = 2402-2472MHz(1-11ch=enable,12-13ch=disable)

```
12-26 14:10:15.999 D/MccTable( 2472): updateMccMncConfiguration mccmnc='44010' fromServiceState=true
12-26 14:10:16.309 D/wpa_supplicant( 1964): wpa_driver_nl80211_driver_cmd COUNTRY JP len = 0, 4096
12-26 14:10:16.316 D/wpa_supplicant( 1964): nl80211: Regulatory information - country=JP (DFS-JP)
```

(2) 2; Get MCC/MNC from Cellular network (Japan Operator-A),
       Change Country Code("00"->"JP") (Ch-12,13 are enabled)
       Effective frequency range = 2402-2482MHz(1-13ch=enable)

```
12-26 14:10:18.970 D/MccTable( 2472): updateMccMncConfiguration mccmnc='null' fromServiceState=true
```

(3) 3; Airplane mode transition (MCC : "JP"->"NULL")

```
12-26 14:10:26.097 D/wpa_supplicant( 2570): wpa_driver_nl80211_driver_cmd COUNTRY 00 len = 0, 4096
12-26 14:10:26.099 D/wpa_supplicant( 2570): nl80211: Regulatory information - country=00
```

(4) 4; Lost MCC/MNC from Cellular network (with Outside of the Cellular network),
       Change Country Code ("JP"->"00") (Ch-12,13 are disabled)
       Effective frequency range = 2402-2472MHz(1-11ch=enable,12-13ch=disable)

```
12-26 14:10:40.099 D/MccTable( 2472): updateMccMncConfiguration mccmnc='31010' fromServiceState=true
12-26 14:10:51.045 D/wpa_supplicant( 2570): wpa_driver_nl80211_driver_cmd COUNTRY US len = 0, 4096
12-26 14:10:51.056 D/wpa_supplicant( 2570): nl80211: Regulatory information - country=US
```

(5) 5; Airplane mode Release and Get MCC/MNC from Cellular network (US Operator-A*)   *Base station simulator
       Change Country Code ("00"->"US")(Ch-12,13 are disabled)
       Effective frequency range = 2402-2472MHz(1-11ch=enable,12-13ch=disable)