

**환영 합니다!**

**DMR**  
**(Digital Mobile Radio)**  
**기초 이해**

- ETSI Standard 2005
- 상업용 무전기로 설계됨
- 무선 설계사 도움 필요
- 다양한 제품
- \$\$-\$\$\$ 가격대
- 컴퓨터 도움 필요
- 간단한 작동방식

- 아마추어 용으로 설계됨
- 키패드로 직접 프로그램 가능
- \$\$\$-\$\$\$\$ 가격대
- 컴퓨터 의존 없이 프로그램 가능



FM 안날로그 방식  
Full 25Khz bandwidth  
1 channel operation

TX=443.580  
PL=118.8  
FM Mode  
25Khz



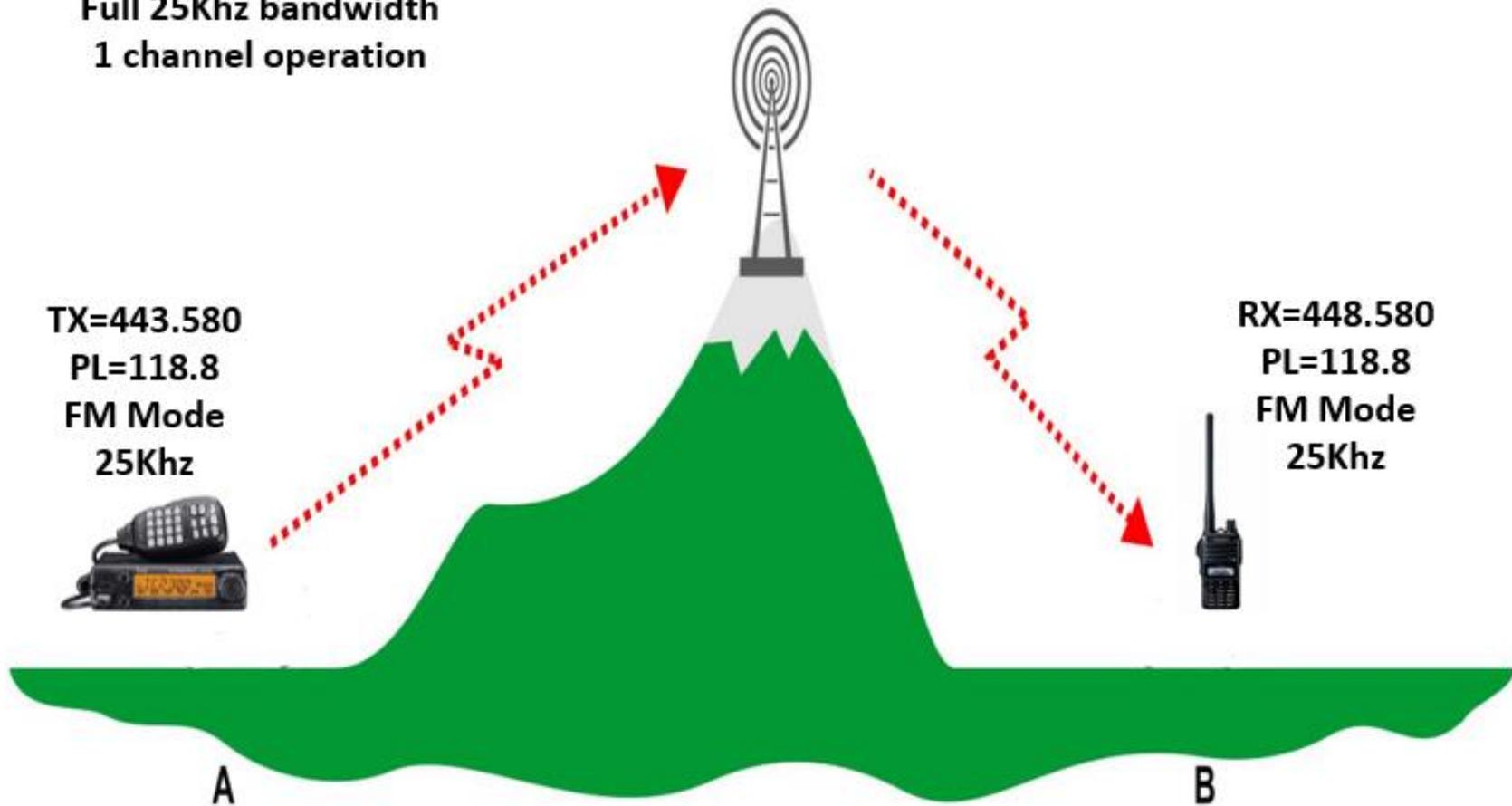
A



RX=448.580  
PL=118.8  
FM Mode  
25Khz



B



# FM 안날로그 방식 Full 25Khz bandwidth 1 channel operation



TX=443.580  
PL=118.8  
FM Mode  
25Khz



- 이중수신
- 판독저하
- 교신 불가능



TX=443.580  
PL=118.8  
FM Mode  
25Khz

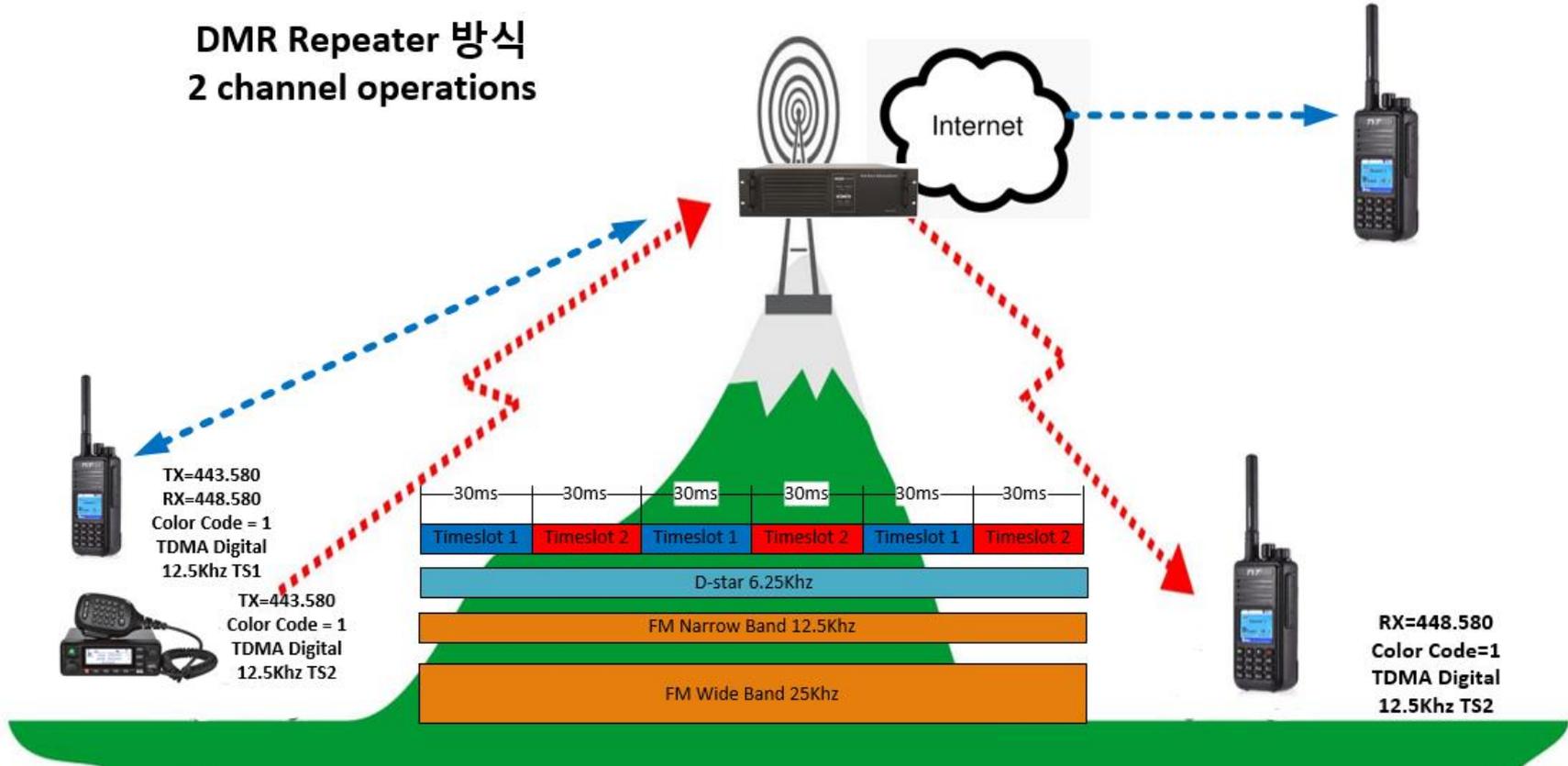
A



RX=448.580  
PL=118.8  
FM Mode  
25Khz

B

# DMR Repeater 방식 2 channel operations



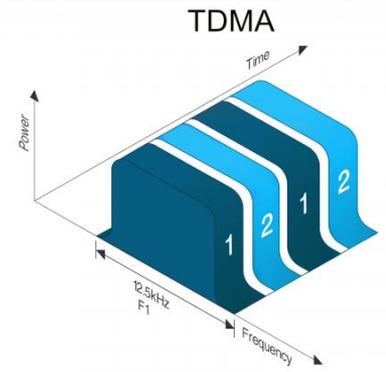
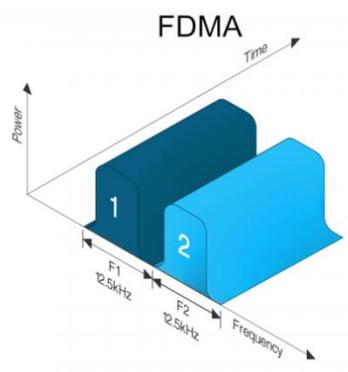
TX=443.580  
RX=448.580  
Color Code = 1  
TDMA Digital  
12.5Khz TS1

TX=443.580  
Color Code = 1  
TDMA Digital  
12.5Khz TS2

RX=448.580  
Color Code=1  
TDMA Digital  
12.5Khz TS2

A

B



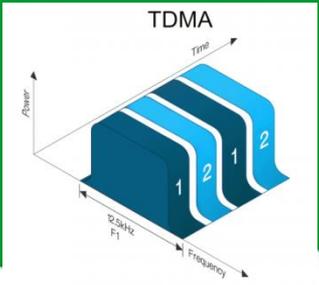
# DMR Repeater 방식 2 channel operations

TX=443.580  
RX=448.580  
Color Code = 1  
TDMA Digital  
12.5KHz TS1

현재 Timeslot 1  
송신중/In use by  
other station at  
this moment

TX=443.580  
RX=448.580  
Color Code = 1  
TDMA Digital  
12.5KHz TS1

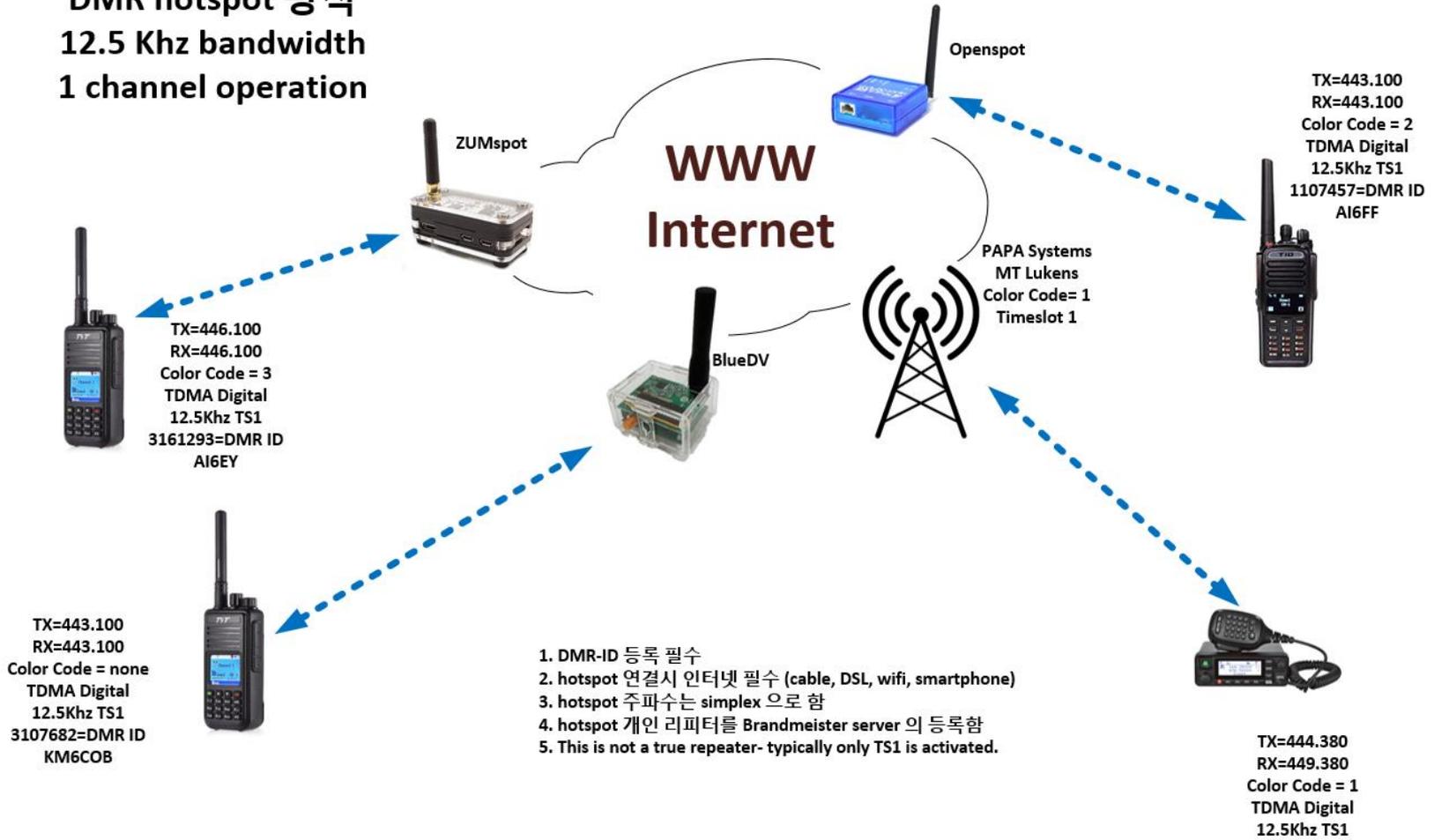
TX=443.580  
Color Code = 1  
TDMA Digital  
12.5KHz TS2



RX=448.580  
Color Code=1  
TDMA Digital  
12.5KHz TS2



# DMR hotspot 방식 12.5 KHz bandwidth 1 channel operation



1. DMR-ID 등록 필수
2. hotspot 연결시 인터넷 필수 (cable, DSL, wifi, smartphone)
3. hotspot 주파수는 simplex 으로 함
4. hotspot 개인 리피터를 Brandmeister server 의 등록함
5. This is not a true repeater- typically only TS1 is activated.

## DMR 운영의 도움되는 용어들

- Radio-ID(DMR-ID)- DMR 교신을 위해 배정된 번호
- Color Code- 안날로그 PL (Private Line) 방법과 비슷한 역할
- Timeslot1/2- 기존 25Khz analog bandwidth 에서 12.5Khz 낮추고 2-채널(디지털) 동시 사용 가능.
- Talkgroup- (contact 이라고도 부름)- 송신 할때 내가 원하는 대화방 그룹 (예, 450 한국, 3106 California)

## DMR 운영의 도움되는 용어들

- RX-group- 내가 수신할때 듣고 싶은 대화방 명록.
- ZONE- Talkgroup/Rxgroup 을 정돈/정리함으로 라디오 조작을 쉽게하기위한 프로그램 폴더역활을 함
- Channels- 리피터 주파수 또는 Hotspot 주파수, Color Code, Talkgroup, and RX-group을 입력하여 본인이 원하는 DMR channel 을 구성함. 무전기 channel position switch와 무상관.
- Codeplug- DMR은 상업용 기준으로 개발 되어서 보통 무전 설계사가 컴퓨터을 통해 프로그램을 관리함. 프로그램을 작성하고 무전기로 입력한 것을 codeplug 이라함. 쉽게 해석하면 HAM 무선사가 DMR 무전 설계사 역활을 함.

Subscriber IDs are 7 digits: XXXYZZZ  
 where XXX= Country (\*)  
 Y= State/Province  
 ZZZ= Sequentially assigned subscriber number

CCS7 ID	Callsign	Name	Town / City	State / Country
1106994	K6ET	Jay Jung		

CCS7 ID	Callsign	Name	Town / City	State / Country
3107061	AB6AD	Woo	Sevenson Ranch	California

CCS7 ID	Callsign	Name	Town / City	State / Country
4507005	HL1GN	Youngho	Seochogu	Seoul

CCS7 ID	Callsign	Name	Town / City	State / Country
4500011	HL5BBD	Ivan	Ulsan	Ulsan

United States 



Talk groups

State	XXXY	State	XXXY
Alabama	3101	Montana	3130
Alaska	3102	Nebraska	3131
Arizona	3104	Nevada	3132
Arkansas	3105	New Hampshire	3133
California	3106, 3107	New Jersey	3134
Colorado	3108	New Mexico	3135
Connecticut	3109	New York	3136
Deleware	3110	North Carolina	3137
District of Columbia	3111	North Dakota	3138

Talk Group	Reflector	Description	Hose Line
TG 450	4510	Korea National	450
TG 45000		Korea National Emergency	45000
TG 45004		Linked to Wires-X Room 24082, C4FM-SEOUL, 119-YSF and XLX170D	45004
TG 45005		Linked to XRF071E, XRF082E, YSF071 and YSF082	45005
TG 45006		Linked to XRF071L	45006
TG 45007		CW (Sub TG 4500701~4500799)	45007
TG 45008		CW (Sub TG 4500801~4500899)	45008
TG 45021	4511	CHAT Korean	45021
TG 45022	4512	CHAT Korean	45022
TG 45023		CHAT Korean	45023
TG 45024		CHAT Korean	45024
TG 45059		Korea DX Talk - KDXT	45059

# DMR ID 등록

여기로 클릭합니다: <https://radioid.net/cgi-bin/trbo-database/userreg.cgi>

Home Database Register ID

### DMR USER Registration - Callsign Validation

Welcome to DMR User registration, before we proceed, we will validate your callsign using QRZ.com info.  
If any of the data auto populated on the next screen is incorrect, please change it and update QRZ.com as well.

Enter Callsign

Validate

### ADD DMR USER

Country	United States
Callsign	KM6ABC
First Name	HONGIL
Last Name	DONG
City	Los Angeles
State/Prov	(3100) California
Radio Type	DMR
E-Mail Address	email 주소 입력
Comment	Tell us something about yourself (Optional)

I'm not a robot 

Register

DMR 프로그램 케이블(USB) 과 무전기를 컴퓨터 에 연결 합니다



무전기와 함께 따라온 CPS (computer program software) 을 깔아줍니다.  
아래 사진은 WIN7의 환경 모습입니다.





- CPS MD390
  - Basic Information
  - General Setting
  - Menu Item
  - Buttons Definitions
  - Text Message
  - Privacy Setting
  - Digit Emergency System
  - Digital Contacts
  - Digital RX Group Lists
    - KR RX LIST 1
    - KR RX LIST 2
    - GroupList1
  - Zone Information
    - KOREA450
    - USA450
    - Zone1
  - Scan List
  - Channels Information
    - KARA\_440
    - KR\_450
    - KR\_45004
    - KR\_45005
    - KR\_45021
    - KR\_45022
    - KR\_45023
    - KR\_45024
    - KR\_45025
    - KR\_45050
    - KR\_45051
    - KR\_45052
    - KR\_45053
    - KR\_45054
    - KR\_45055
    - Channel1
  - DTMF Signaling
  - GPS System

Digital Contacts

No.	Contact Name	Call Type	Call ID	Call Receive Tone
1	KR_450	Group Call	450	No
2	KR_45004	Group Call	45004	No
3	KR_45005	Group Call	45005	No
4	KR_45021	Group Call	45021	No
5	KR_45022	Group Call	45022	No
6	KR_45023	Group Call	45023	No
7	KR_45024	Group Call	45024	No
8	KR_45025	Group Call	45025	No
9	KR_45050	Group Call	45050	No
10	KR_45051	Group Call	45051	No
11	KR_45052	Group Call	45052	No
12	KR_45053	Group Call	45053	No
13	KR_45054	Group Call	45054	No
14	KR_45055	Group Call	45055	No
15	TG_9	Group Call	9	No

Add Delete Export Import

Digital RX Group Lists

Group List Name: KR RX LIST 1

Available Contact

- KR\_45050
- KR\_45051
- KR\_45052
- KR\_45053
- KR\_45054
- KR\_45055

Contact Member

- KR\_450
- KR\_45004
- KR\_45005
- KR\_45021
- KR\_45022
- KR\_45023
- KR\_45024
- KR\_45025
- TG\_9

Add>> <<Delete

1 of 3 |< << >> >| Add Delete

Channels Information

Digital/Analog Data

Channel Mode: Digital Channel Name: KR\_450

Band Width: 12.5kHz RX Frequency(MHz): 446.10000

Scan List: None TX Frequency(MHz): 446.10000

Squelch: Normal Admit Criteria: Always

RX Ref Frequency: Low Auto Scan:

TX Ref Frequency: Low Rx Only:

TOT[s]: 240 VOX:

TOT Rekey Delay[s]: 0 Allow Talkaround:

Power: Low Send GPS Info:

Receive GPS Info:

Digital Data

Private Call Confirmed:

Emergency Alarm Ack:

Data Call Confirmed:

Compressed UDP Data Header:

Emergency System: None

Contact Name: KR\_450

Group List: KR RX LIST 1

Color Code: 1

Repeater Slot: 1

Privacy: None

Privacy No.: 1

In Call Criteria: Always

GPS System: None

Analog Data

Zone Information

Zone Name: KOREA450

Available Channel

- KR\_45050
- KR\_45051
- KR\_45052
- KR\_45053
- KR\_45054
- KR\_45055
- Channel1

Channel Member

- KARA\_440
- KR\_450
- KR\_45004
- KR\_45005
- KR\_45021
- KR\_45022
- KR\_45023
- KR\_45024
- KR\_45025

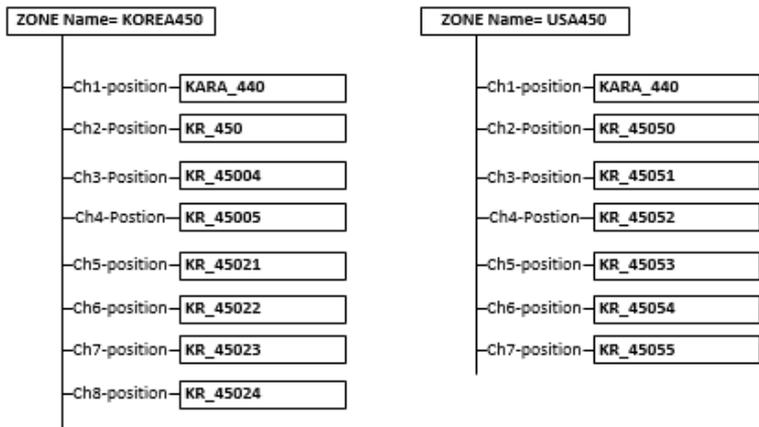
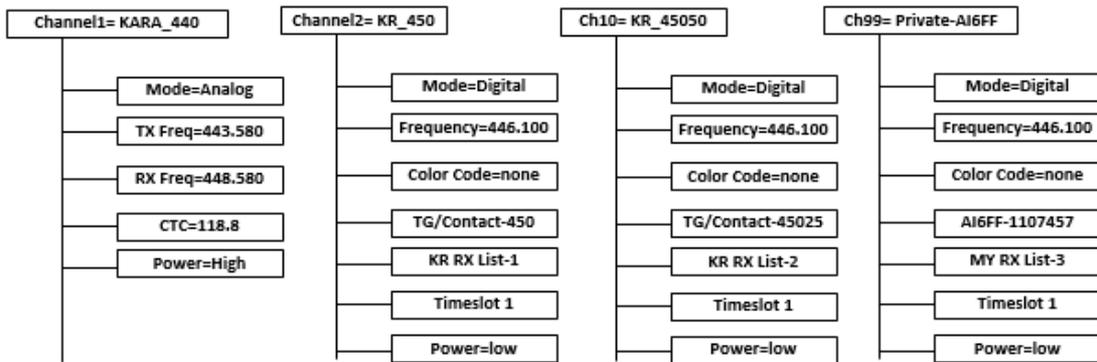
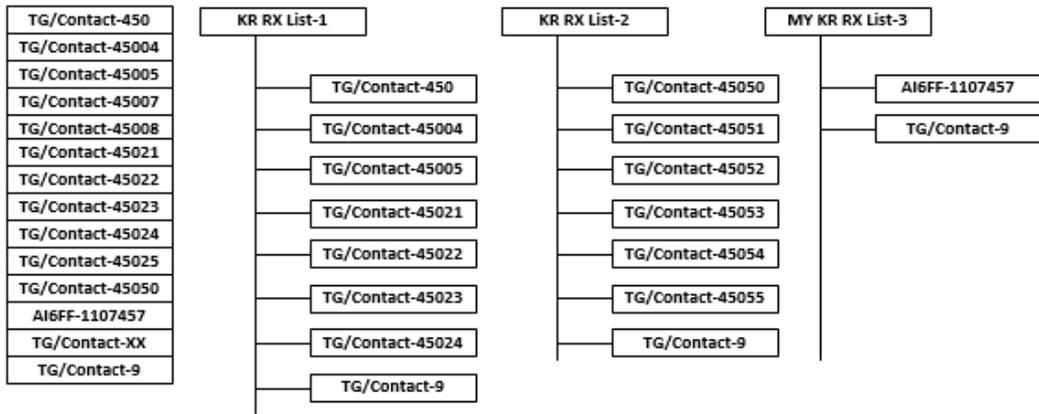
Add>> <<Delete

1 of 3 |< << >> >| Add Delete

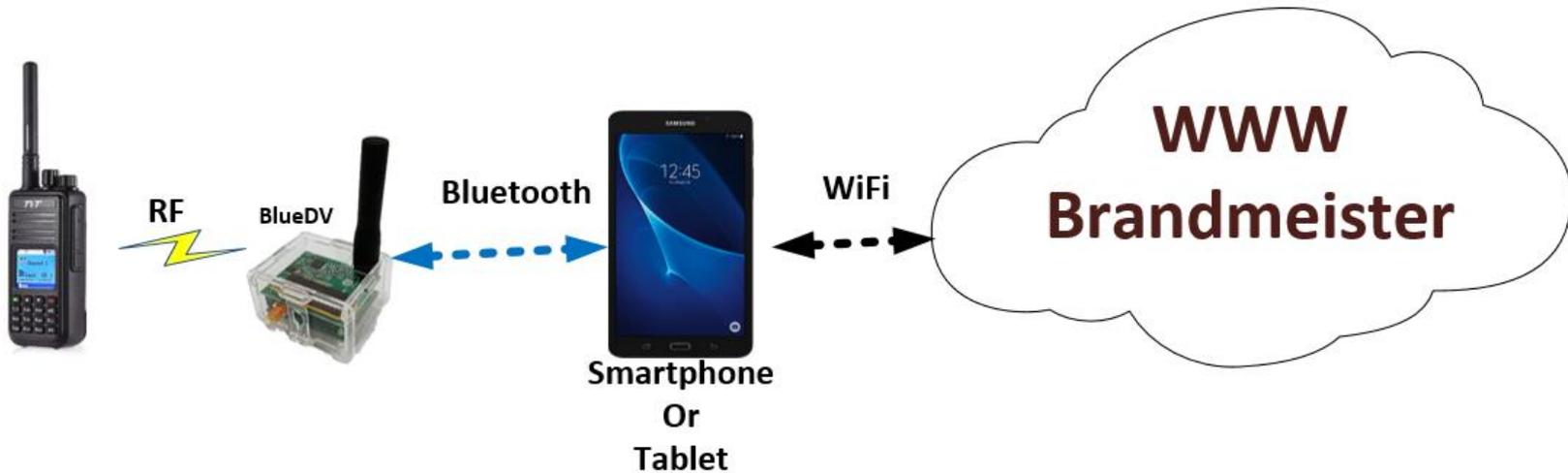
TalkGroup/RX Group

Logical Channels

Zone/Physical channel

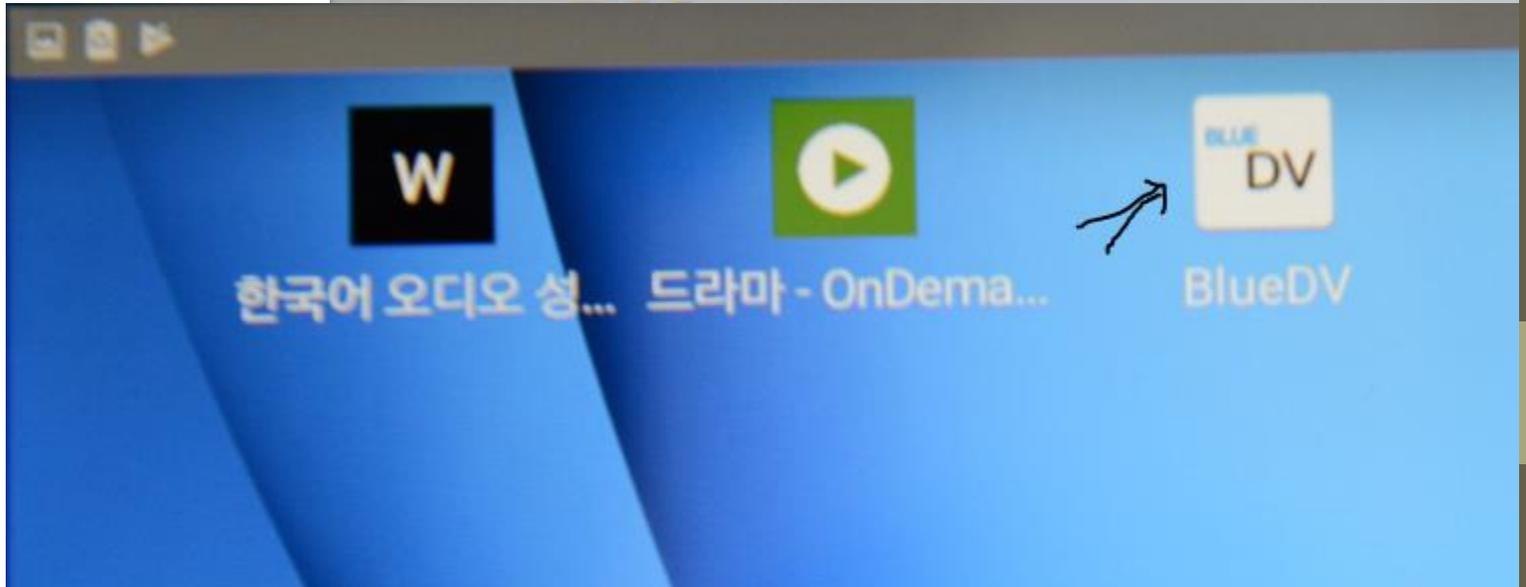
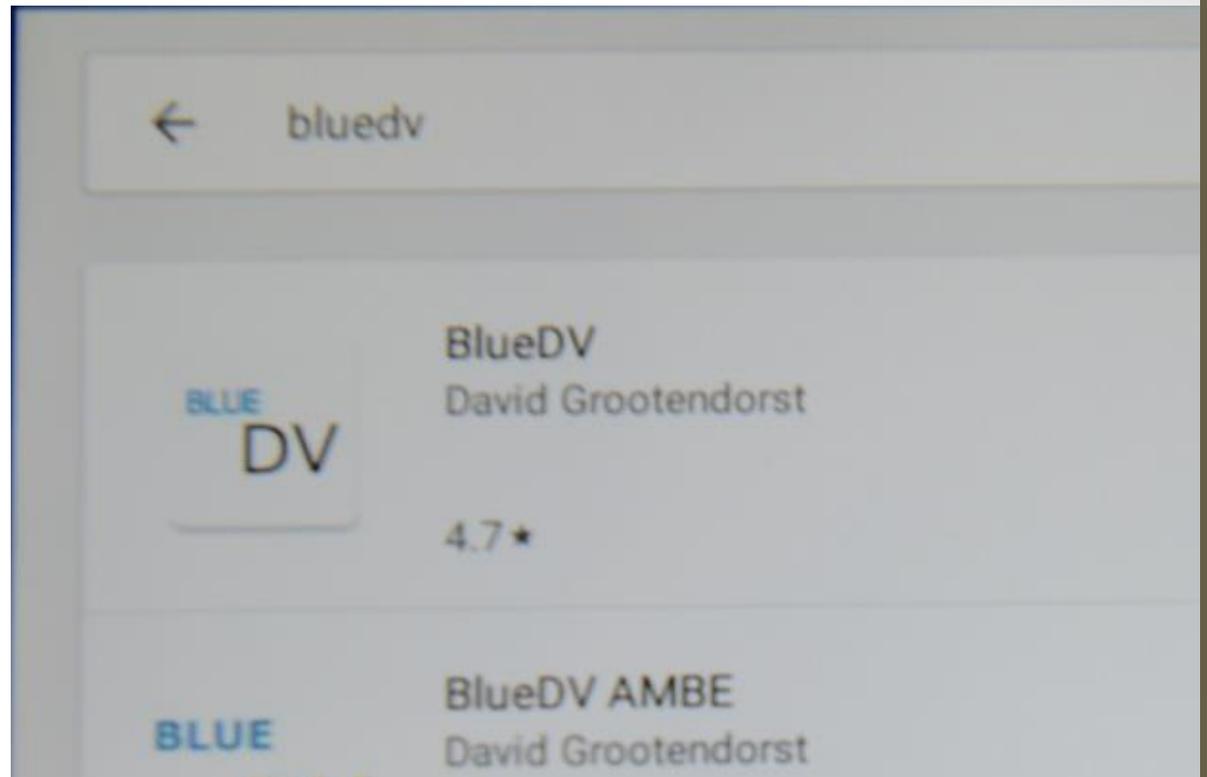


프로그램 실행 순서

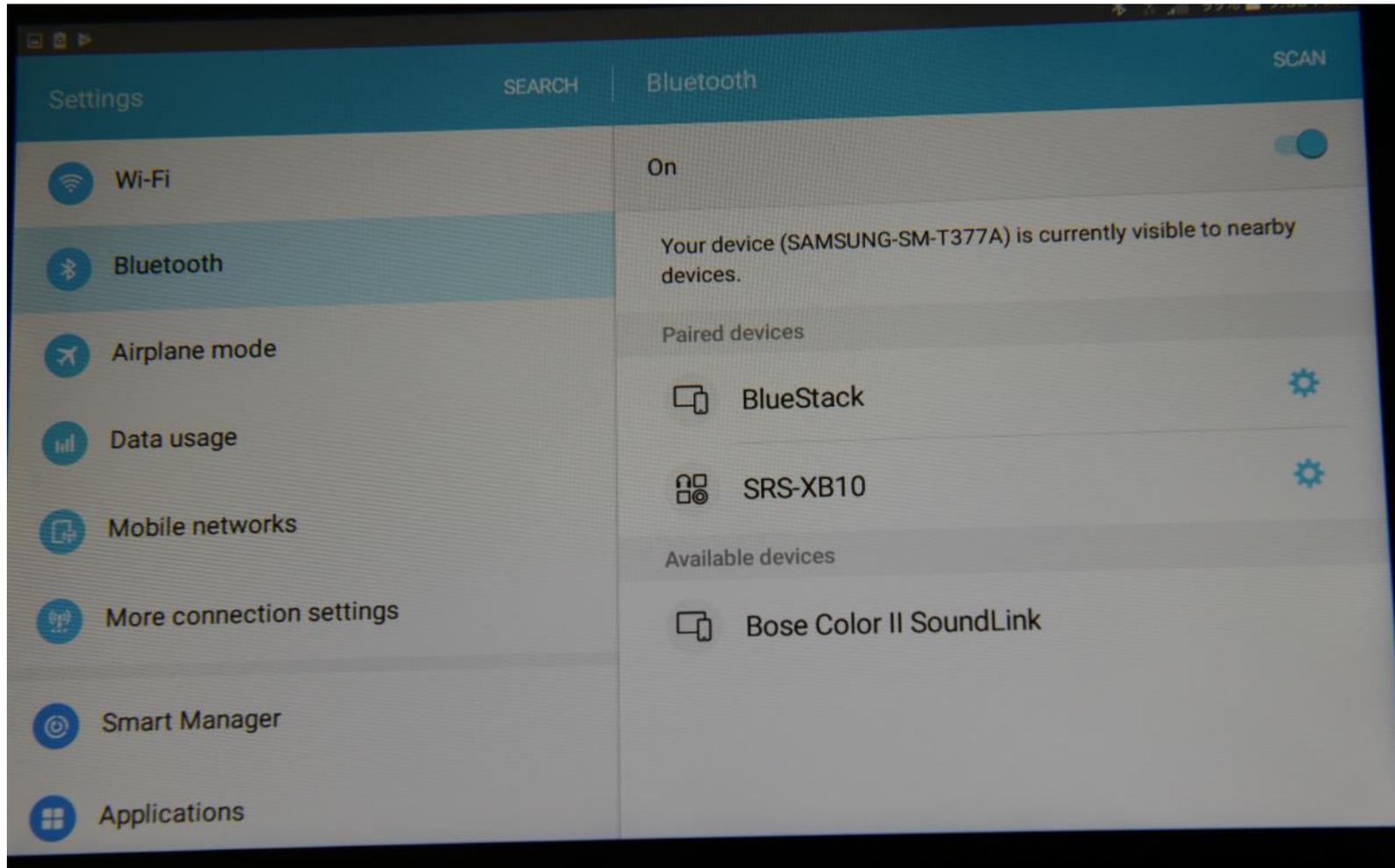


- 라디오 프로그램설계 완료
- 개인용 Bluestack simplex repeater 설정 필요
- BlueDv 구입할때 (Android or Apple phone)

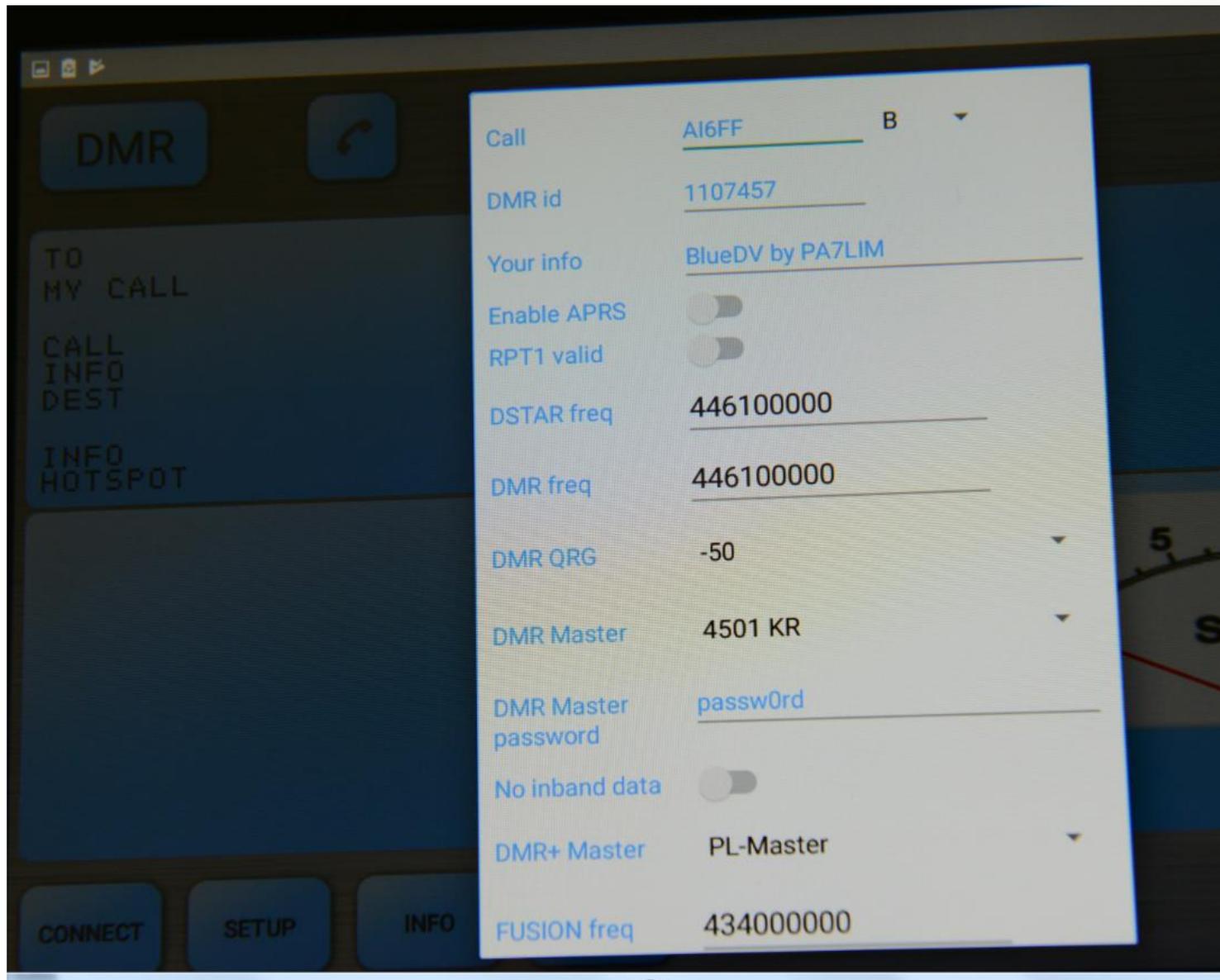
- Android Google Play
- Download BlueDV
- Install BlueDV



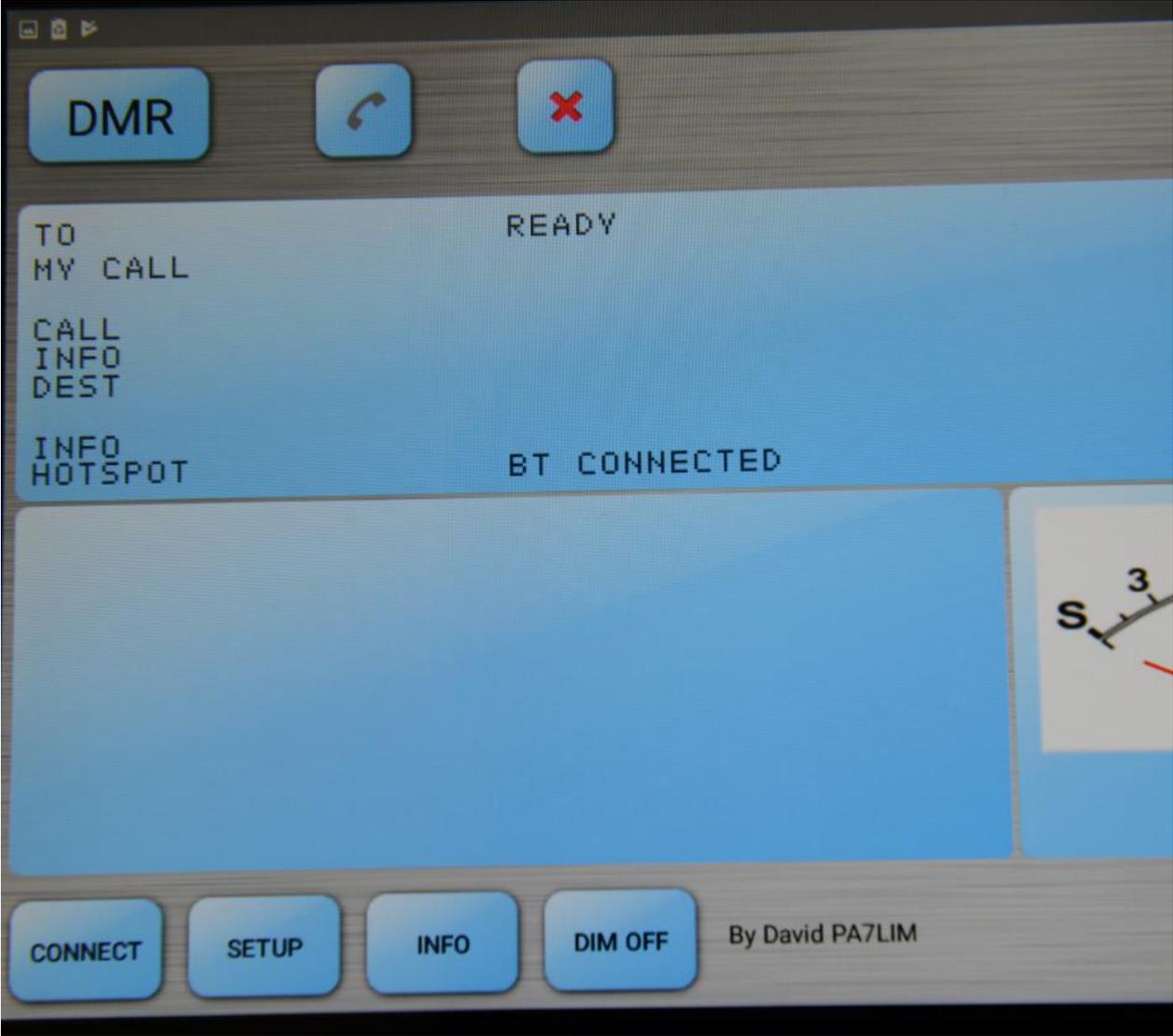
# Pair Bluestack DV hotspot with Bluetooth



Click "SETUP" and enter your Call Sign, DMR ID and radio simplex frequency



BlueDV hotspot is now connected and controlled by a tablet via Bluetooth



## Openspot (개인중계소) Connection to Brandmeister registration

6. 여기 링크로 가셔서 등록 합니다: <https://brandmeister.network/?page=login>

BrandMeister

Register Login EN Settings

User Dashboard  
Last Heard  
Repeaters 2008  
Hotspots 6106  
Masters 14  
Alerts  
Data Visualisation <  
Information <  
Services <

Login

Login with your SelfCare account

Callsign  
Callsign

Password  
Password

Login Forgot your password?

Not a member? Register!

Sysops

+ Add a sysop to AI6FF

Callsign	Read Settings	Write Settings	Manage Sysops	Actions
AI6FF	✓	✓	✓	

Actions

- Get IP address
- Drop call
- Drop dynamic groups
- Reset connection

Reflector Settings

Active reflector: 4510 ①

Default reflector: 0

Reflector timeout (sec): 0

Buttons: Set

Static Talkgroups

Input: 45025 ②

Buttons: →, ←

Dropdown: South Korea (450) (45004), (45005), (45021)

Annotation: ③ →

Scheduled static

+ Add Scheduled Static

Active Timed Statics:

Empty list area

Remove button

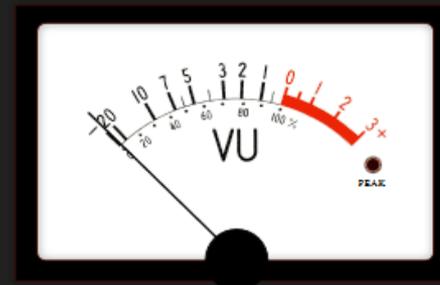
# Group South Korea (450)



## Who's calling?

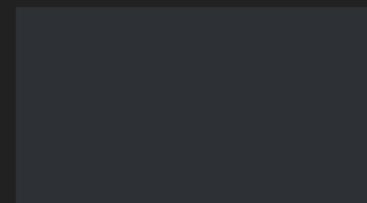


Seen	Time	Source
14:48:18	00:01.1	AI6FF Ho Choi
14:47:04	00:00.6	DS5DB0 Jeongsu
14:39:38	00:01.5	DS1IWR Inhyun
14:38:45	00:01.4	DS1IWR Inhyun
14:36:05	00:03.0	HL3BAT Tae-Sik
14:35:33	00:00.6	HL3BAT Tae-Sik
14:28:28	00:01.2	HL5BYA Hee Wen
14:23:16	00:01.7	DS5LAE Kim
14:22:33	00:06.4	HL5JVF Sang-
14:16:07	00:01.6	HL5BYA Hee Wen
14:15:57	00:00.0	DS5BWV Park
14:15:56	00:00.0	HL5JVF Sang-



Spectrum 0-6000Hz

Spectrograph



# 프로그램 실전 데모

질문/응답

고맙습니다!