

P/DIO Audio, D-Audio, AVN Proposal

With smartphone connectivity

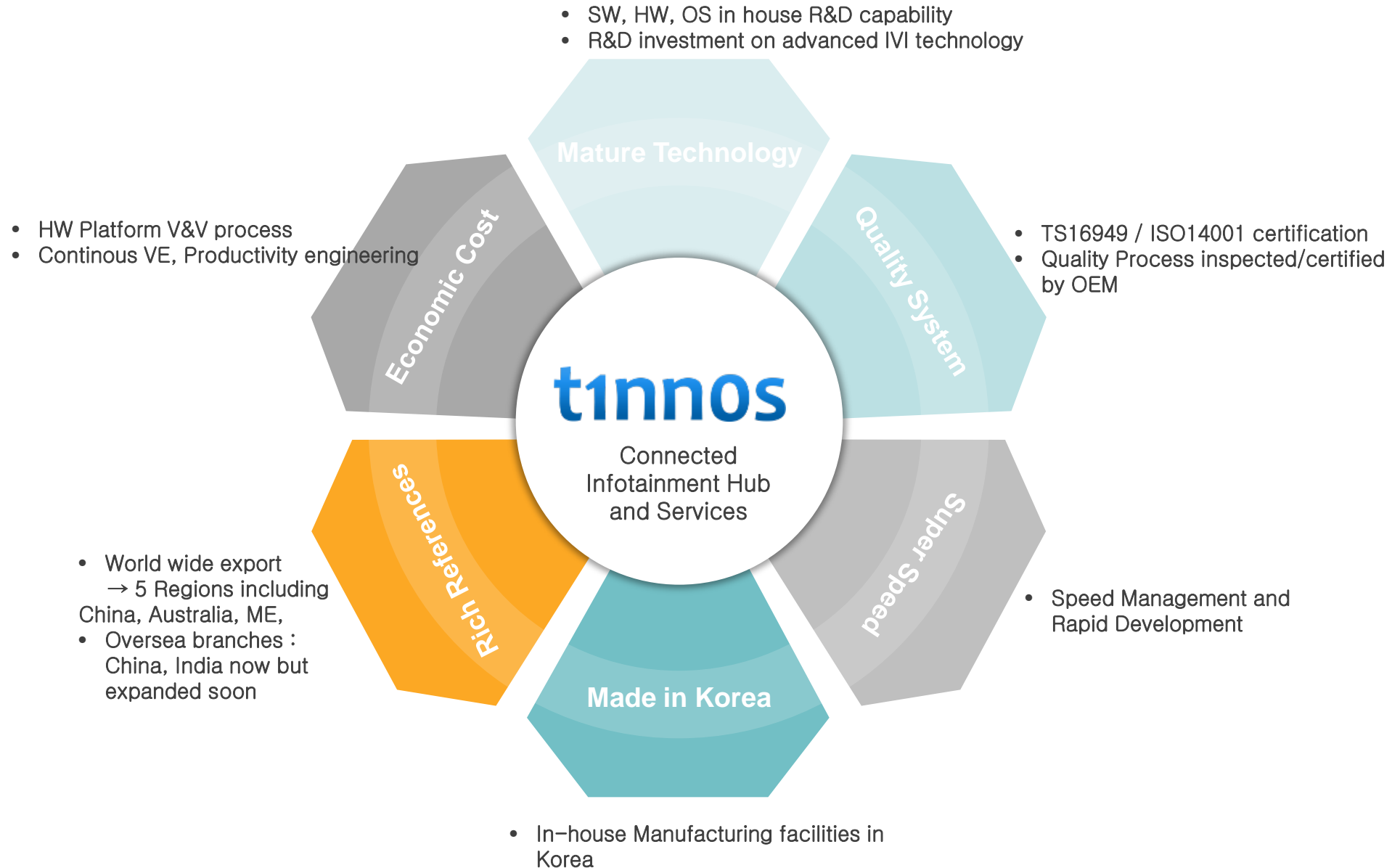
2015.10

t1nnos

1. Company Overview in 2014

Company Name	Tinnos, Inc.		
Year Founded	2005	Capital(USD)	1,000,000
Representative Director	Dr. Sanglak Lee	Revenue(USD)	83,000,000
Number of Employees	80 Engineers+200 Employees	Head Office	4F, Banpo-daero 25, Seoul, Korea
Main production site	<ul style="list-style-type: none">- Ansung Factory(in-house) : 360,000 AVN units/year- Anyang Factory(out sourced) : 420,000 AVN units/year		
Website	www.tinnos.com		
Main Business Partners	<ul style="list-style-type: none">• OEM: Hyundai/KIA Motor Company• Tier1 : Hyundai MOBIS(5 Regions / 35 AVN models supplied)• Others : AM3D, RealVNC, NNG, Navitel, Mappers and MNSOFT		
Main Facilities	<ul style="list-style-type: none">- high speed SMD lines (lead-free) : 420,000 AVN sets / year- In line assembly lines : 330,000 AVN units / year		
Core Technologies	<ul style="list-style-type: none">- IVI platform (Car Radio, Display Audio, AV/Navigation and other AVN accessories)- Phone Connectivities : CarPlay, Android Auto, MiraCast and MirrorLink		

1.1 Competency



1.2 Core Competency : Full cycle in-house development capability

Multimedia AVN Architecture

✓ 7/8/10" Color TFT LCD with Touch Screen

✓ ARM 9/Cortex A8/A9 with Windows CE/Android/Linux/Nucleus

✓ World-wide Band SDR Radio & Digital TV (DVB-T/1SEG/CMMB)

✓ Multi GNSS support with SiRF/Ublox /Trimble GNSS reciever

✓ Multi-format DVD

✓ Rearview Camera

✓ Made for iPod

CD, DVD

Map

NAVTEQ

Radio/GPS Ant

Speakers

Rear View Camera

Multimedia Unit

USB

iPod

AV AUX

S/W Remocon

Handsfree Mic

Bluetooth

Phone

In-house Technology		
Category	Features	Remarks
HW Platform	- MCU: 8/16/32bit - CPU: ARM 9/Cortex A8,A9	
SW Platform	- BSP /OS Customizing/APP Full cycle development - OS: WINCE, Linux, Android, Nucleus	
Radio	- Radio : Leaf Dice, Atomic2 - DSP : DiRaNa-II, HERO	
Media	- CD, DVD, USB, BT, AUX, Digital iPod	
Conne- ctivity	- USB: CarPlay, Android Auto - WiFi: MiraCast, DLNA	Integration

Full cycle in-house development

1.3 SMD Facility Overview



Maker	Panasonic
Model	
Line	2EA (Top/Bottom)
Capa.	
특징	- 3D SPI - 3D AOI - Auto Wave Solder



SPI (Solder Paste Inspection)



AOI (Auto Optical Inspection)



Auto Wave Solder

1.4 Assembly Facility Overview



Facia Assembly



MAIN Assembly



Inspection



Packaging



Inspection



AGING

1.5 References : 5 regions / 35 models



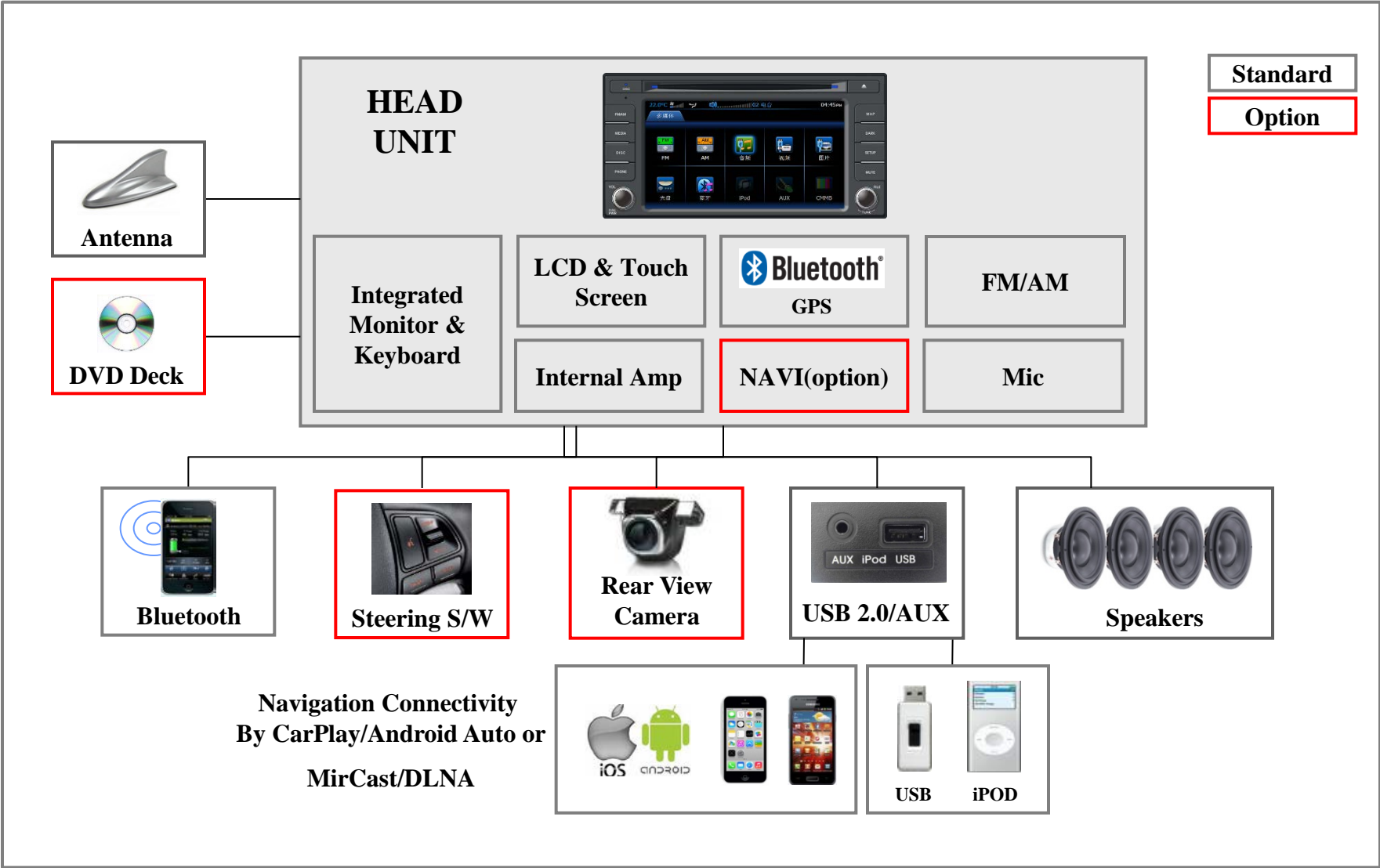
2. Products Overview

Products	▪ AVN, Display Audio, Display Radiom Smart Audio + Connectivity	
Target	▪ Development Schedule : <ul style="list-style-type: none">▪ A3 platform : 9 months▪ D1,D2,D3 platform : 12 months ▪ Connectivity : USB or WiFi connectivity	Requirement
		- Size : 2DIN/6.5"/7-10" AV(+DVD)+Navi - Functions : AM/FM, B/T, USB, Phone Connectivity - Phone OS support : Android, iOS - Etc : Internal AMP or External AMP support
Overview	<div>Connectivity</div> 	Features
		1. Phone connectivity (Android & iOS) 2. Optional Bluetooth Remote App
Connectivity	<div> Phones (Android & IOS)</div> <div> CarPlay/Android Auto MiraCast/DLAN</div> <div> Head Unit (USB)</div>	

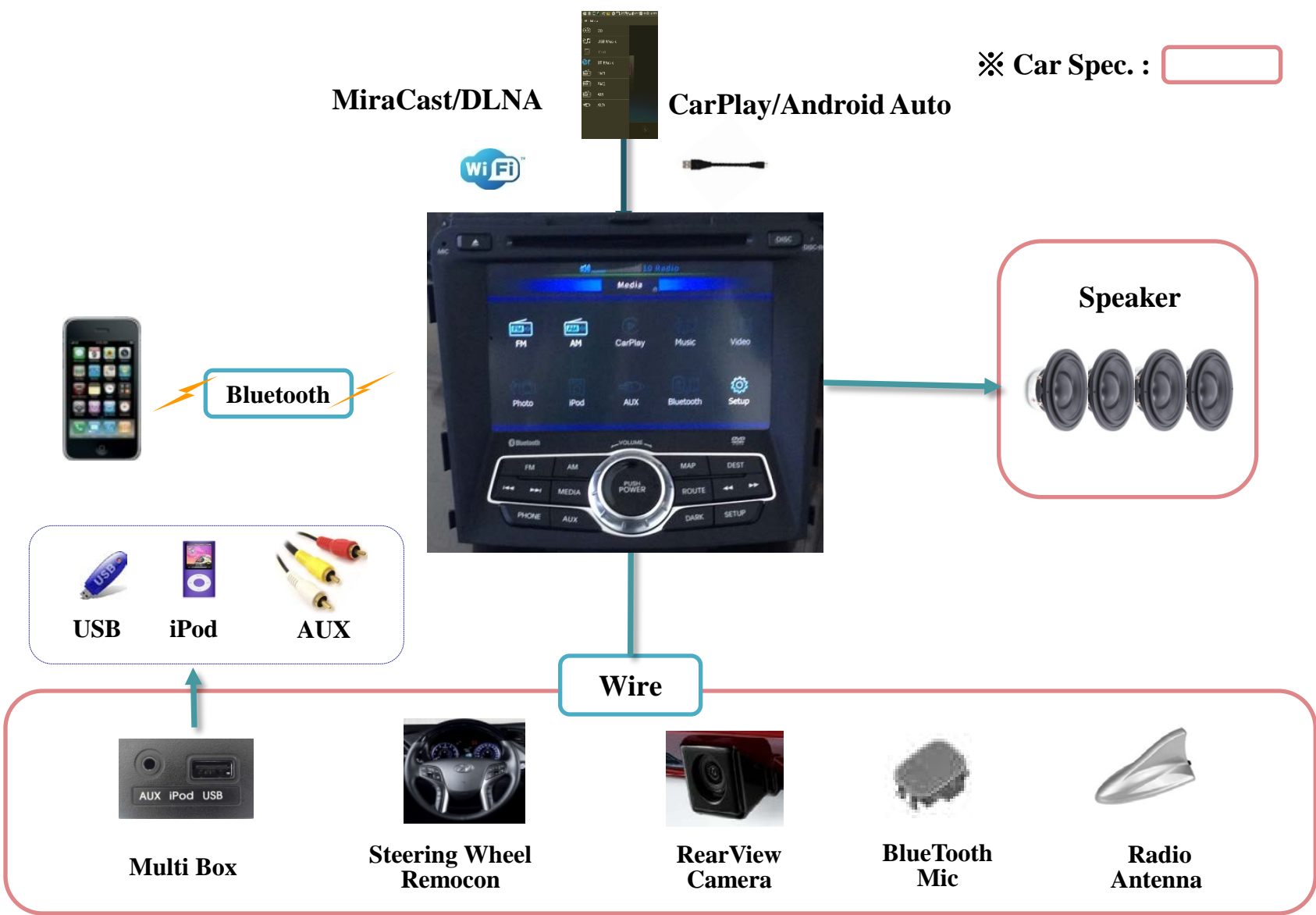
2. New Products Overview

Function		AVN+Connectivity	Display Audio	Display Radio	Smart Audio	Remarks
Spec.	CPU	Cortex A9 Dual	ARM 9	Dual A8	CalMac	
	OS	Android/Linux	Nucleus variants	Linux	RTOS	
	LCD	8-10"/HD	7-8"/800x480	←	Segment/Full dot	7~10"
	Touch panel	Capacitive/Resistive	←	←	X	
	Deck	DVD(Optional)	CD(Optional)	X	CD(Optional)	No VR/CD ripping support
	GPS	O	X	O	X	
Func-tions	FM/AM	O	←	←	X	World wide area support
	DSP Support	O	X	X	X	
	Sound Proc.	Option(DSP)	Option(CPU)	X	X	AM3D technology supported
	Bluetooth	HFP, PBAP, A2DP	HFP, PBAP, A2DP	X	Option	SPP/HID needed for touch
	iPod Audio	O	←	X	Option	
	WiFi	O	Option(Mirroring Module)	Option	X	
	Aux	Audio/Video	Audio/Video	X	Audio	
	USB	Audio/Video	Audio/Video	X	Audio	
	Connectivity	WiFi/USB	USB(CarPlay, Android Auto)	USB(CarPlay, Android Auto)	X	
	Remote App	Option	Option	Option	Option	Bluetooth SPP needed
	DTV	Option	X	X	X	External module
	Language	English/Chinese	←	←	←	Other Language supported
	Map	Option	X	X	X	
	Amplifier	Internal or External	←	←	Internal	CAN
Car Spec.	Rear View Camera	O	←	←	Option(with LCD)	
	CAN support	O	O	O	O	Multimedia CAN only
	Auto light	O	←	←	X	
	Steerting Wheel Remocon	O	←	←	←	
	TMU Support	Option	X	X	X	TMU:Telematics Unit
	ETC Support	Option	X	X	X	ETC : Electronic Toll Collection
	BT MIC	Internal Type	←	←	←	

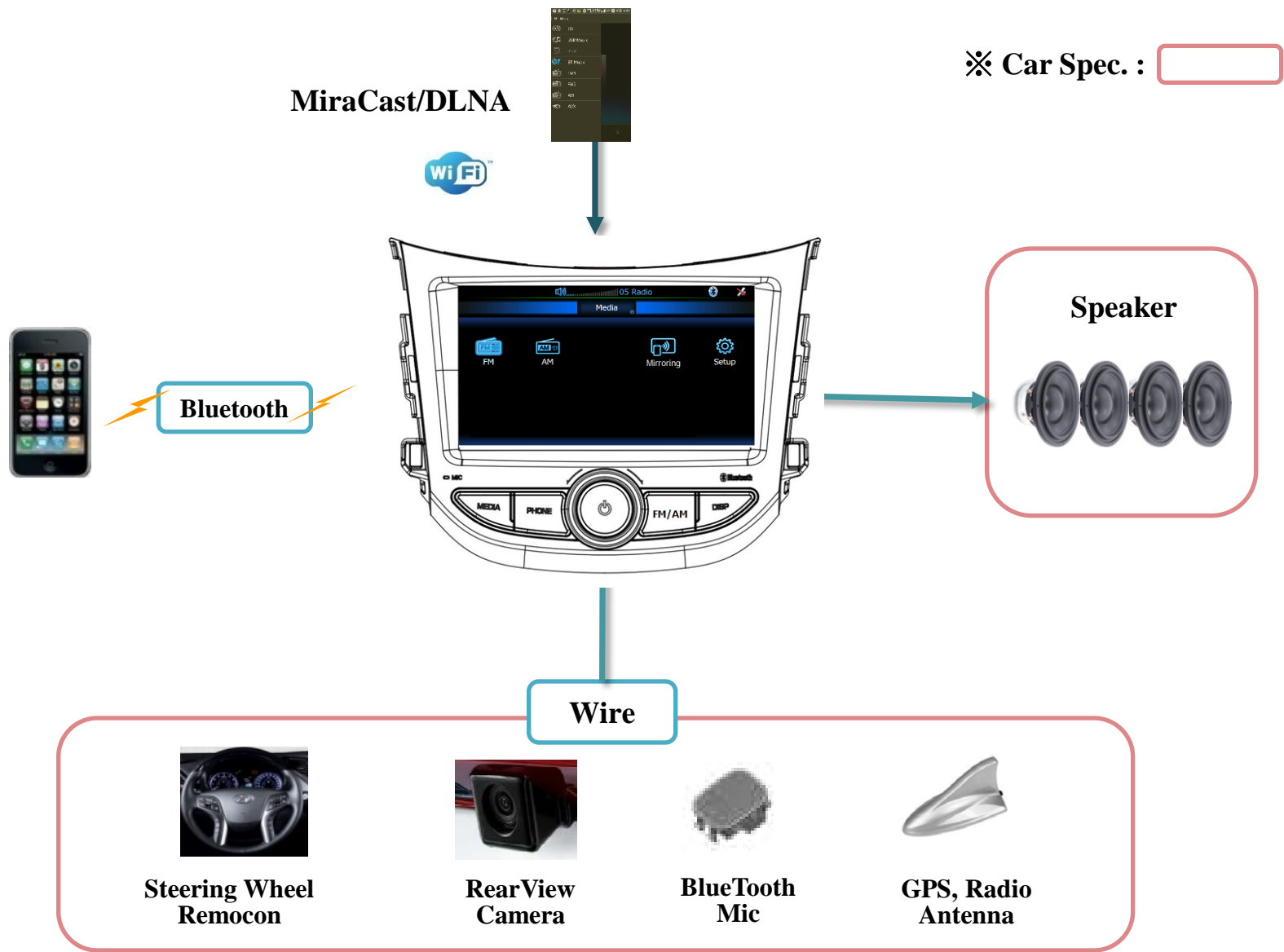
2.1 System Architecture – AVN+Connectivity



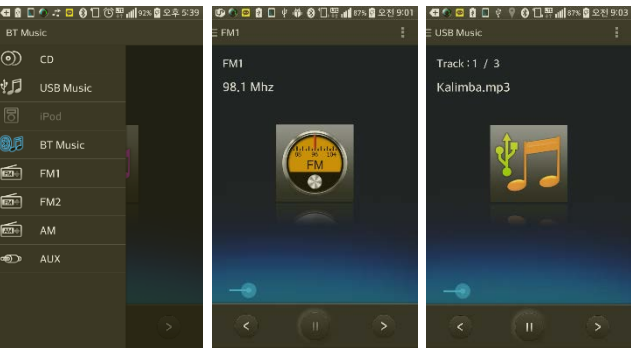
2.2 System Architecture – Display Audio



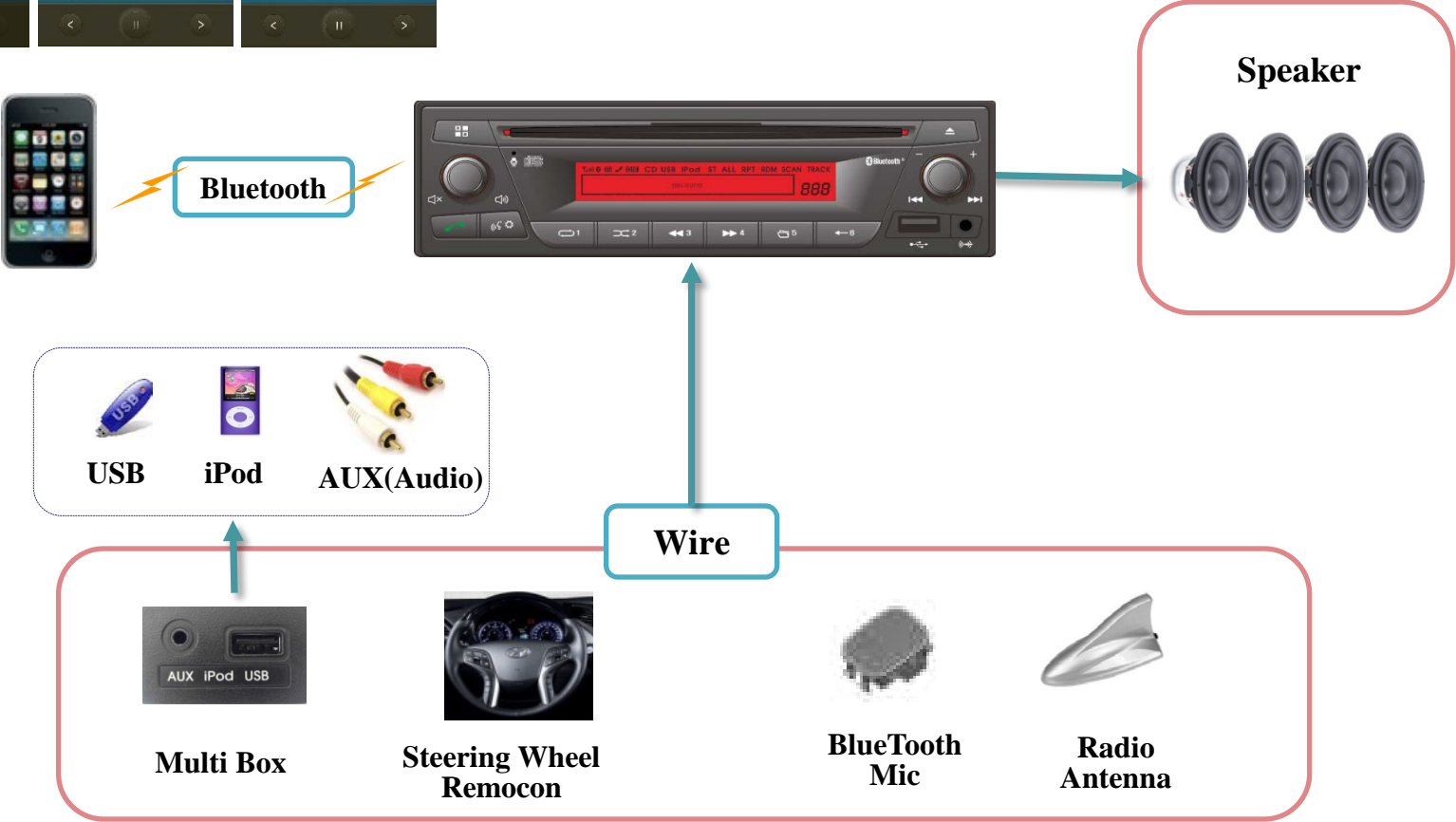
2.3 System Architecture – Display Radio



2.4 System Architecture – Smart Audio with Remote App



※ Car Spec. :



3. Map and NAVI SW

Area	Contouries	Map DB Supplier	NAVI App Supplier	Remarks
BRICs	Brazil	HERE	Mappers/NNG	
	Russia	Navitel	Navitel/NNG	
	India	MMI	Mappers/NNG	
	China	EMG	Mappers/NNG	AutoNAVI also supported
South East Asia	Thailand, Malaysia, Singapore, Indonesia, Vietnam, Philippines	HERE	Mappers/NNG	
Middle East	Iraq, Saudi Arabia, UAE, Kuwait, Qatar, Oman	HERE	Mappers/NNG	
	Iran	Memnav	Mappers/NNG	
South America	Brazil, Paraguay, Chile, Peru	HERE	NNG	
Oceania	Australia, New Zealand	HERE	NNG	
Europe	Including Turkey	NNG	NNG	

NOTE: 1. Navteq was merged into HERE
2. Mappers : Korean NAVI SW supplier
4. EMG : Chinese Map DB & NAVI SW supplier
5. Memnav: Persian Map DB supplier

Attachment 1 : Conectivities

tinnos

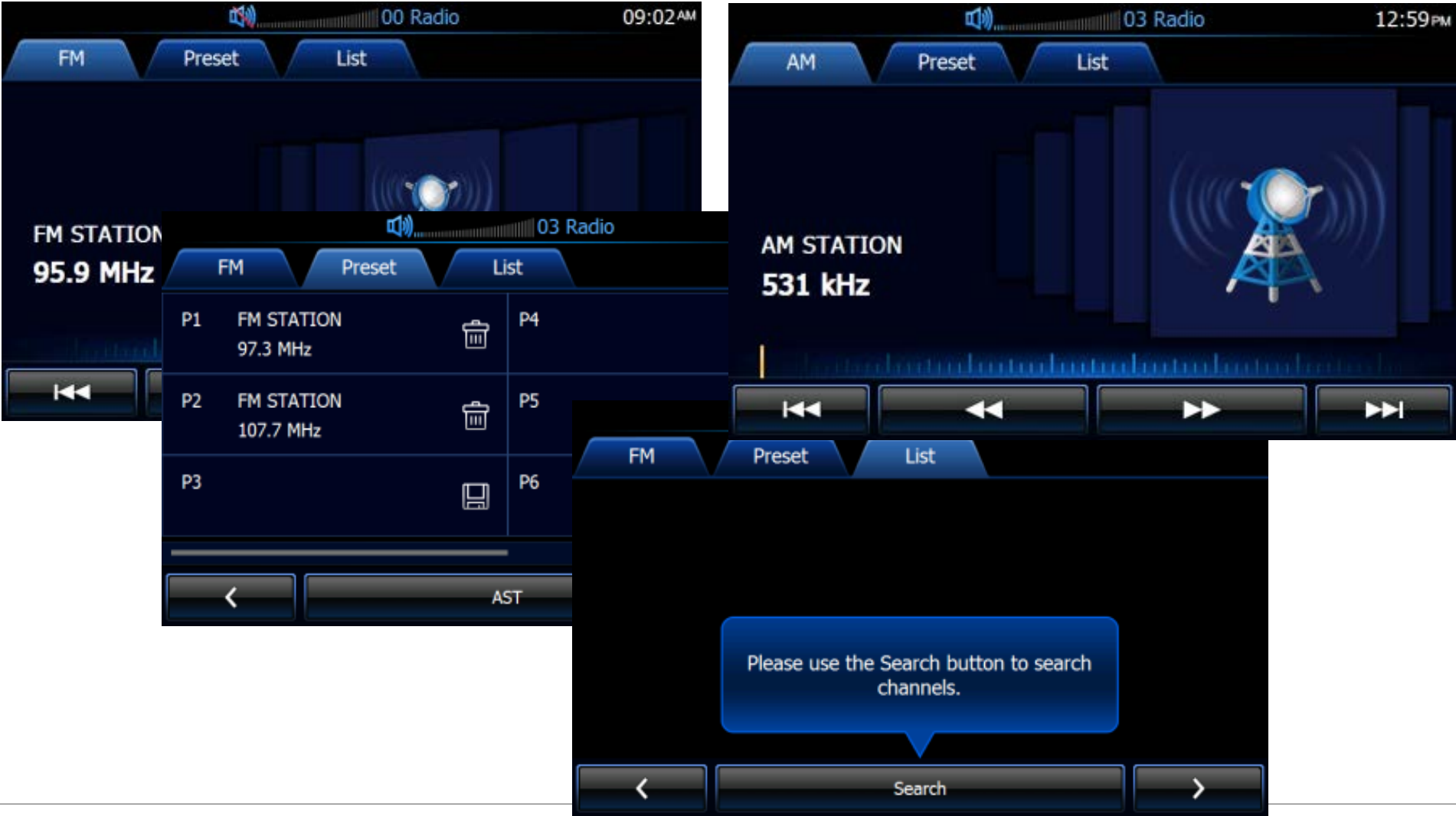
Item	AirPlay	MiraCast	Android Auto	CarLife	CarPlay	HDMI
Tinnos Support	Now	Now	2015.8	<2015.12	2015.8	TBD
Extra HW (Cost up)	WiFi	WiFi	X	X	X	O
Designer/Developer	APPLE	WiFi contortium	GOOGLE	BAIDU	APPLE	HDMI forum
Licensing to OEM	X	O	O	O	O	O
Connection with	WiFi	WiFi	USB cable	USB cable/WiFi	USB cable	Gender Cables
Android phone	X	O	O	O	X	MHL/HDMI cable
iPhone support	O	X	X	O	O	Lightning/HDMI cable
Screen Mirroring	O	O	X	▲ (for selected App)	X	O
Proctocol	WiFi, TCP/IP	WiFi, TCP/IP	USB/AOA2	USB/WiFi, TCP/IP	USB/iAP2	HDMI/MHL
Screen Capturing	H.264/HDCP	H.264/HDCP	H.264/HDCP	H.264	H.264/HDCP	HDMI/HDCP
Bidirectional Touch	Bluetooth	Bluetooth	USB	USB/WiFi	USB	Bluetooth HID
APP support	Any	Any	Dialer, SMS, Media, M ap and Selected	Dialer, SMS, Media, Map and Selected	Dialer, SMS, Media, Map and Selected	Any
Navigation APP	Any	Any	Google Map	Baidu Map	Apple Map	Any
H/U OS support	Linux/Android	Linux/Android	Linux/Android/QNX	Linux/Android/QNX	Linux/Android/QNX	Any
Phone recharging	Extra USB	Extra USB	O (LCD can be off)	O(LCD always on)	O (LCD can be off)	Extra USB
Applicable Countries	Any	Any	Excluding China	China , Taiwan, SE Asia, (Korea, Japan, India/TBC)	http://www.apple.com/ios/feature-availability/#applecarplay-applecarplay	Any

Features

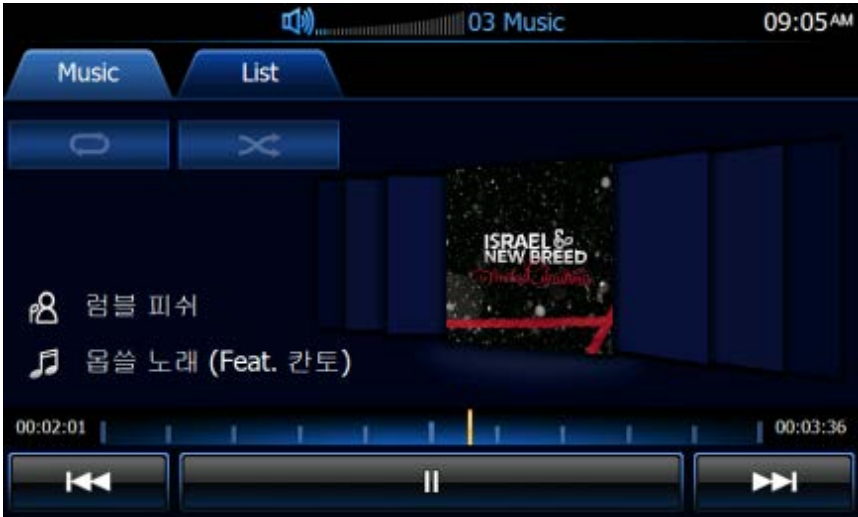
- Common functions : FM/AM, (USB) Music, (USB) Photo, Bluetooth, AUX
- Optional Function : (USB) Video, DISC(DVD/CD Video), iPOD and CMMB



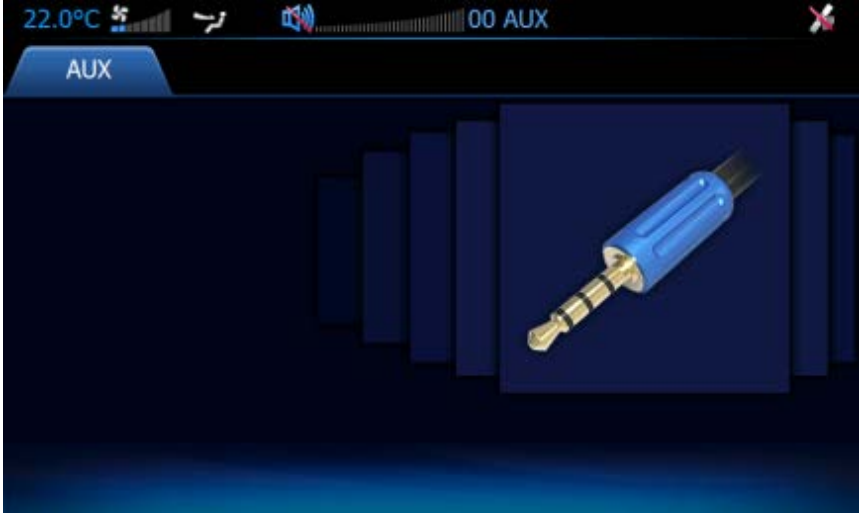
FM/AM Radio



(USB) Music & Vido



Bluetooth & AUX



iPOD & DVD/CD

