05HHE–01

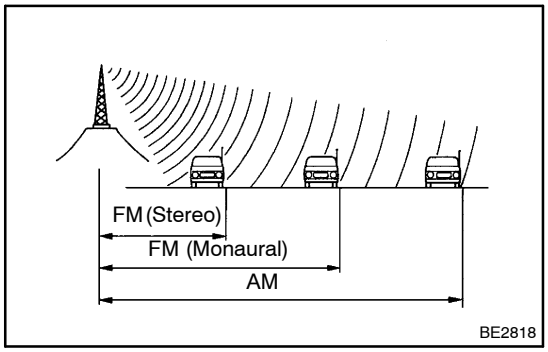
IDENTIFICATION OF NOISE SOURCE

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows.

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⟷		FM ⟷	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency
MF: Medium Frequency
HF: High Frequency
VHF: Very High Frequency

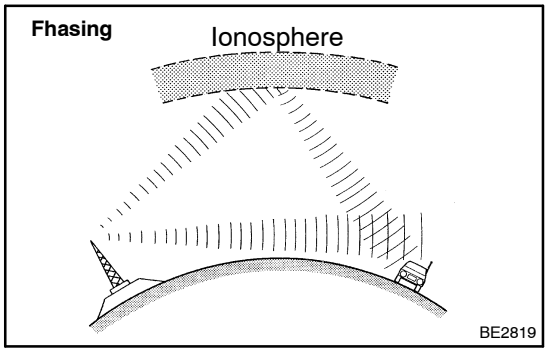


2. SERVICE AREA

(a) There is a great difference in the size of the service areas for AM and FM broadcasting. Sometimes an FM stereo broadcast cannot be received even though AM can be received very clearly.
FM stereo has the smaller service area, it also picks up static and other types of interference (”noise”) easily.

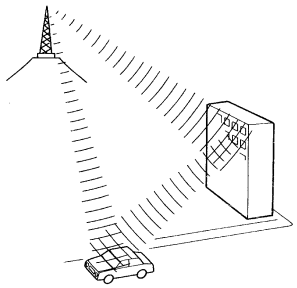
3. RECEPTION PROBLEMS

HINT:
Besides the problem of static, there are other problems called ”fhasing”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



(a) Fhasing
Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals that reach the vehicle’s antenna directly from the same transmitter. This type of interference is called ”fhasing”.

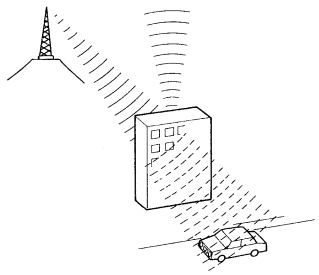
Multipath



BE2820

(b) Multipath
Interference caused by reflection of radio waves against obstructions is called ”Multipath”. Multipath occurs when radio signals emitted from the broadcast transmitter antenna are reflected against tall buildings or mountains and interferes with other signals which are to be received directly.

Fade Out



BE2821

(c) Fade Out
FM radio wave tends to be reflected against obstructions such as tall buildings or mountains because FM frequency is higher than that of AM. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind those obstructions. This phenomenon is called ”fade out”.

4. NOISE PROBLEMS

(a) It is very important for technicians to understand a customer’s claim about noise clearly. Use the following table to diagnose the phenomena.

Radio wave	Condition in which noise occurs	Probable cause
AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	The same program may be broadcasted from some local stations. If the program is the same, one of those may be tuned in.
FM	Noise occurs only at night.	Strong possibility of beat from a distant broadcasting.
	Noise occurs at a specific place during driving.	Strong possibility of multipath noise and fhasing noise caused by changes of FM frequency.

HINT:
If the condition when the noise occurs does not meet any of the above, find out the cause based on ”Reception Problems”. Refer to the description about Multipath and Fhasing mentioned previously.

5. IDENTIFICATION OF NOISE SOURCE

(a) Identify the condition in which the noise occurs, and check the noise filter on the related part.

Condition in which noise occurs	Noise Source
Depressing the acceleration pedal increases the noise, and stopping the engine erases the noise immediately.	Generator
Noise occurs during A/C or the heater operation.	Blower motor
Rapid acceleration while driving on the unpaved road or after the ignition switch is turned on makes noise.	Fuel pump
Pressing and then releasing the horn switch, and keeping pressing the horn switch makes unusual noise.	Horn
Stopping the engine erases small noise that has been heard.	Ignition
Noise occurs synchronously with the turn signal flash.	Flasher
Noise occurs during window washer operation.	Washer
Noise occurs during the engine running, and it continues even after the engine stops.	Engine coolant temperature sensor
Noise occurs during the wiper operation.	Wiper
Noise occurs when the brake pedal is depressed.	Stop light switch
Others.	Static electricity stored on the vehicle

(b) Reference:

- Make sure first that there is no noise from outside. Failing to do so makes the noise source detection difficult and leads to misunderstanding.
- The noise should be removed in descending order of loudness.
- Setting the radio unturned makes noise noticeable, making the recognition of the phenomenon easier.