

Product User Guide

产品名称：车载蓝牙模块
APPELLATION: Car Kit Bluetooth Module
产品型号：BT-MC55-JKX
MODEL: BT-MC55-JKX
客户名称：
CUSTOMER:
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VERSION: R1.0

客户承认 CUSTOMER APPROVED

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产品规格书变更履历表

Revision History

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1	1.0	首次发行 First Release				
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1.介绍 INTRODUCTION

1.1 简要 OVERVIEW

- ★ BC5多媒体芯片是由一单芯片射频和基带IC组成的应运于蓝牙2.4G系统;
The BlueCore™5-Multimedia External is a single-chip radio and baseband IC for Bluetooth 2.4GHz systems;
- ★ CSR BC5多媒体芯片支持高达32M的外部FLASH存储;
BlueCore5-Multimedia External interfaces up to 32Mbits of external Flash memory. When used with the CSR;
- ★ 当用户采用CSR蓝牙协议栈时, 它完整兼容蓝牙V3.0规格体系在数据和语音上的应用.
Bluetooth stack provides a fully compatibility with Bluetooth v3.0 specification system for data and voice use.

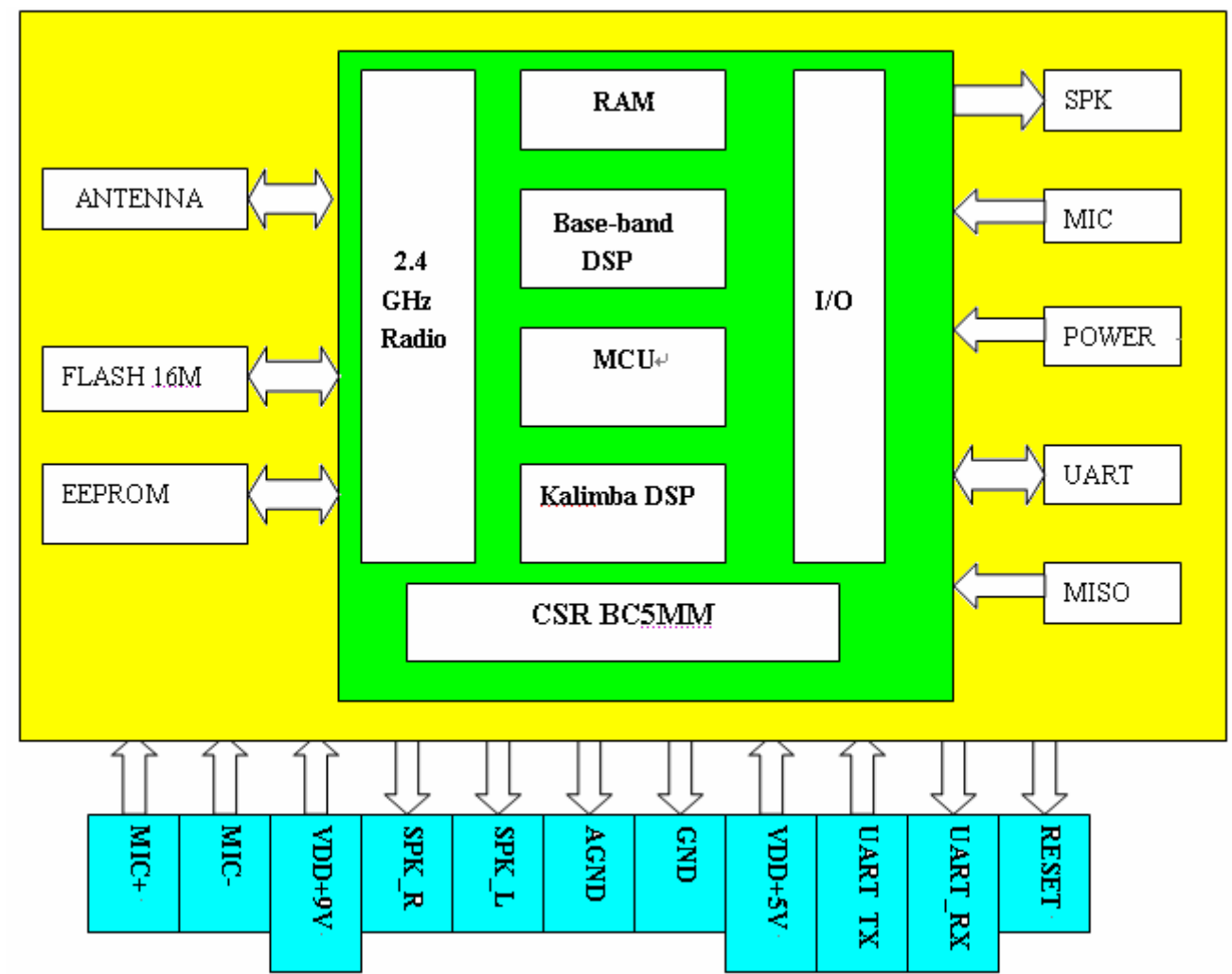
1.2 特征 FEATURES

- ★ 频率范围 在2.402GHz ~ 2.480GHz之间
Frequency Band 2.402GHz ~ 2.480GHz
- ★ 蓝牙2.1+增强数率模式/蓝牙3.0
Bluetooth V2.1+ EDR/ Bluetooth 3.0
- ★ 高级音频传输协议, 音视频远程控制协议, 耳机/免提协议, 串口通信协议
A2DP, AVRCP, HS/HFP , SPP, PBAP Profiles
- ★ 状态指示 (配对, 铃音, 拨号, 通话)
Status indication (Pairing, Ringing, Dialing, Talking).
- ★ 模块和手机端音频相互转换
Audio transfer between car-kit and mobile phone.
- ★ 噪声抑制
Noise Reduction.
- ★ 回音消除
Acoustic Echo cancellation.
- ★ 内部16位立体声编解码
Build-in 16-bit stereo Audio Codec
- ★ 蓝牙有效自由空间连接距离长达10m
Range up to ten meters cable free connection with Bluetooth devices
- ★ 立体声音乐播放, 停止, 暂停, 前进, 后退功能
Stereo audio play, stop, pause, forward, backward.
- ★ 电话本下载
Phonebook download

1.3 应用 APPLICATIONS

- ★ 车载免提 [Hands-Free Car Kits](#)
- ★ 高音质单声道耳机 [High Quality Mono Headsets](#)
- ★ 高音质立体声无线耳机 [High Quality Stereo Wireless Headsets](#)
- ★ 无线通话 [Wireless Speakers](#)
- ★ USB端口多媒体传输 [Analogue and USB Multimedia Dongles](#)

1.4 模块框图 MODULE BLOCK



2. 规格 SPECIFICATION

2.1 普通规格 GENERAL SPECIFICATION

▶ 产品或项目名称 Product or Project Name	:	Car Kit Bluetooth Module
▶ 芯片类型 Chip set	:	CSR BC05 Multi-Media external
▶ 产品射频功率等级 Power class level	:	☒ Class 2
▶ 额定电压 Rated Voltage	:	5V; 9V
▶ 波特率 Baud Rate	:	115200
▶ 工作电压范围 Operation Voltage range	:	5.3~4.7V; 9.3~8.5V
▶ 湿度 Humidity	:	10% ~ 90%
▶ 工作范围 Operation Range	:	10 meters (33 feet)
▶ 尺寸 Dimension	:	42×51× 4.2mm
▶ 核心规格版本 Core Specification Version	:	☐ 1.2 ☐ 2.0 ☐ 2.0+EDR ☐ 2.1 ☒ 2.1+EDR ☒ 3.0 ☐ 3.0+HS ☐ 4.0

2.2 温度规格 TEMPERATURE SPECIFICATION

▶ 工作温度范围 Operation Temperature range	:	-40~85℃
▶ 储存温度范围 Storage Temperature range	:	-40~90℃

2.3 射频规格 RF SPECIFICATIONS

2.3.1 发射射频规格 TX Radio Characteristics

项目 Items		条件 Conditio	最小 Min.	典型 Typ.	最大 Max	单位 Unit
调制特性 Modulation characteristics	Delta-f1 avg	NTC	140		175	kHz
	Delta-f2 max	NTC	115			kHz
	Df2avg/Df1avg	NTC	0.8			
初始载波频率误差 Initial carrier-frequency tolerance		NTC	-75		75	kHz
载波频率漂移 Carrier frequency drift	DH1	NTC	-25		25	kHz
	DH3	NTC	-40		40	kHz
	DH5	NTC	-40		40	kHz
	Drift rata/50us		-20		20	KHz

※ NTC:Normal Test Conditions +15 to +35℃,

2.3.2 射频接收规格 RX Radio Characteristics

项目 Items	条件 Condition	最小 Min.	最大 Max	单位 Unit
单时隙灵敏度 (P=-70dBm) Single sensitivity (P=-70dBm)	NTC		<0.1%	
多时隙灵敏度 (P=-70dBm) Multi Sensitivity (P=-70dBm)	NTC		<0.1%	
最大输出电平 (P=-20dBm) Maximum output Level (P=-20 dBm)	NTC		<0.1%	

※ NTC:Normal Test Conditions +15 to +35℃,

2.4 音频规格 AUDIO SPECIFICATION

项目 Item	范围值 Range	典型值 Type	单位 unit	备注 Remark
电压伏值 Vrms OUT-PUT LEVEL	1.0±0.1	1.0	V	音源 1khz
频率响应 FREQUENCY RESPONSE	-3~+3		DB	音源 17~20000hz,
失真度 DISTORTION	<-60	-65	DB	音源 1khz
信噪比 S/N Ratio	>80	85	DB	音源 1khz/ZERO
通道分离度 CH SEPARATION	>75	80	DB	音源 1khz
通道不平衡度 Channel Unbanlance	<1.5	0.05	DB	音源 1khz

备注：音频指标测试规格是采用 A2DP 方式测量值定义

2.5 电流规格 CURRENT SPECIFICATION

模式 Mode	最大 Max	单位 Unit
电源开启（开启瞬间） Power on(split second)	83	mA
正在配对 pairing	70	mA
配对成功 Paired	50	mA
连接状态 Connected	45	mA
呼叫 In call	60	mA

3. 设计应用 DESIGN APPLICATION

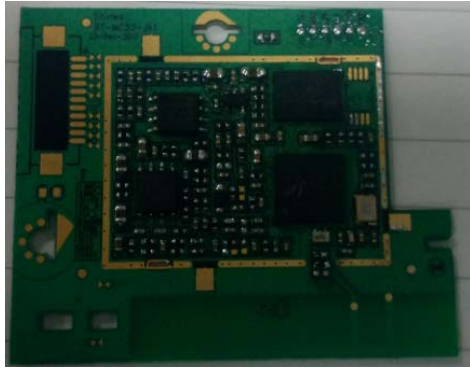
3.1 管脚配置 PIN CONFIGURATION



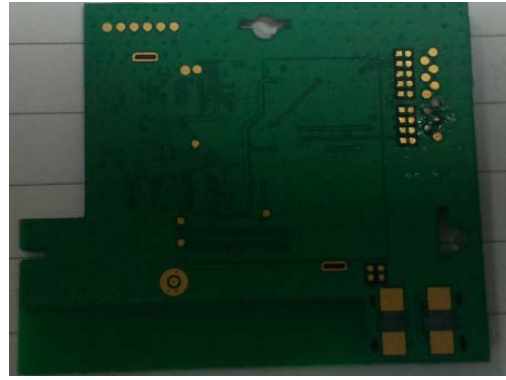
3.2 管脚定义 PIN DEFINITION

PIN	NAME	DESCRIPTION
1	MIC+	差动正极的 MIC 输入 Differential input (+) for MIC input
2	MIC-	差动负极的 MIC 输入 Differential input (-) for MIC input
3	+9V	电源供应 Power supply +9V
4	AUDIO_R	音频右声道输出 Audio SPK_R Channel Output
5	AUDIO_L	音频左声道输出 Audio SPK_L Channel Output
6	AGND	音频地 Audio Ground
7	GND	Ground 地
8	+5V	电源供应 Power supply +5V
9	UART_TX	串口的输出 Serial data output
10	UART_RX	串口的输入 Serial data input
11	RESET	复位脚 Reset When low, must low for >5ms cause a reset

3.3 物理尺寸 PHYSICAL DIMENSION



TOP 层

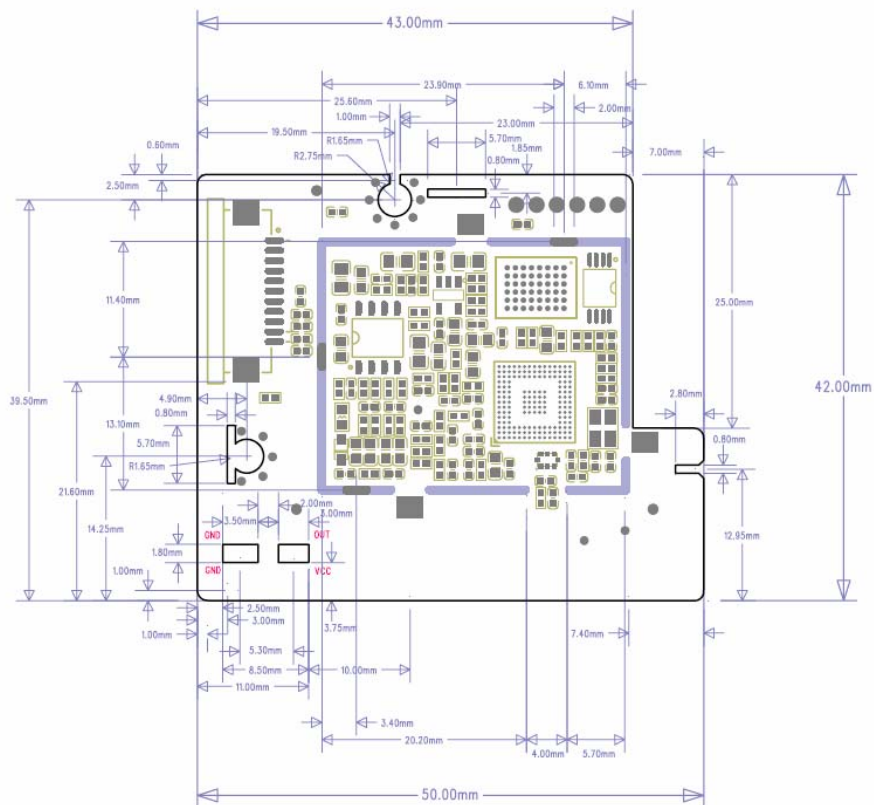


BOTTOM 层

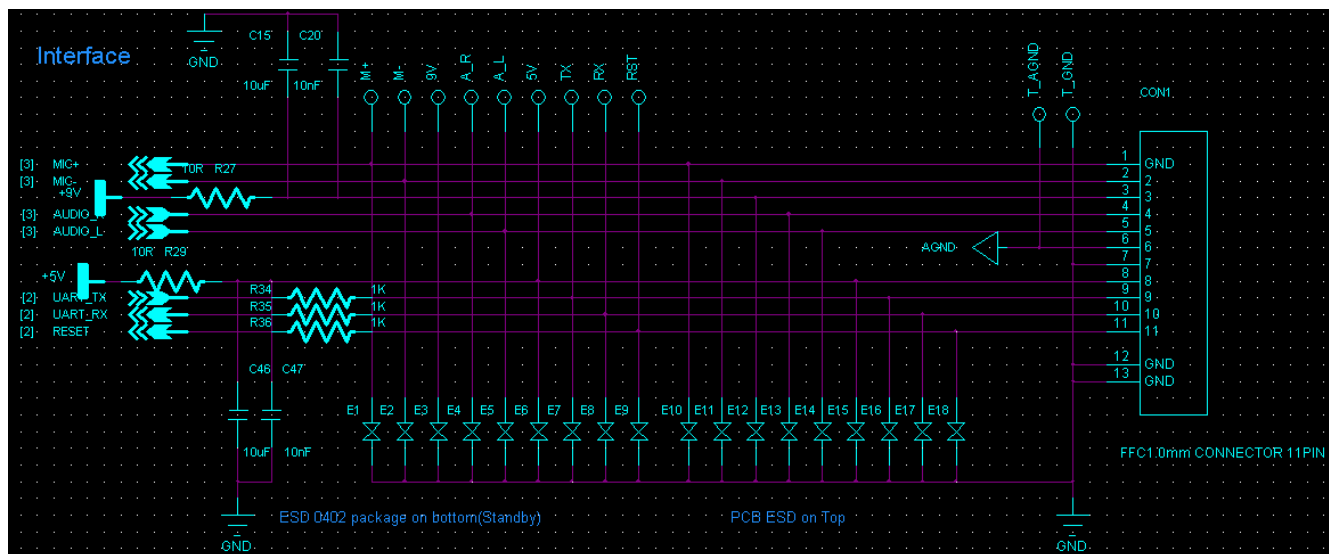
参考实物图 尺寸 42*51*4.2mm

备注：若实物与图片存在差异，请以实物为主

3.4 PCB 封装 RECOMMENDED PCB MOUNTING PATTERN



3.5 原理图应用 APPLICATION SCHEMATIC



3.6 注意事项 NOTICE PROCEEDING

3.6.1 串口 UART

蓝牙核心模组工作电压是 3.3V，对于串口通信信号线的 UART_TX，UART_RX 设计，请按以下要求配合模块设计电路：

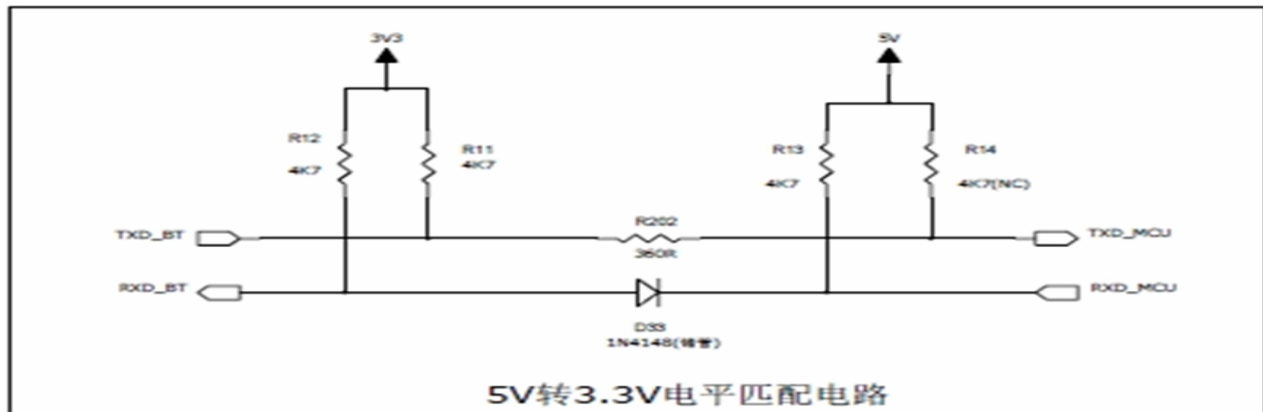
The core module of Bluetooth works at 3.3V. For the circuit design of serial communication signal line UART_TX and UART_RX, you can fulfill it according to follow suggestions

1. 如果主机 MCU 是 5V 工作，需增加电平匹配电路；

If the host MCU works at 5V, it is necessary to increase the level matching circuit;

2. 如果主机 MCU 是 3.3V 工作，则也需增加串接 470R-1K 电阻匹配设计，避免出现电压不匹配工作损坏蓝牙的串口；

If the host MCU works at 3.3V, you also need to add threaded 470R-1K resistor matching design to avoid the damage to the serial interface caused by the voltage not matching;



4. 可靠性测试 RELIABILITY TEST

测试项目 Test Item	条件 Conditions	测试编码 Test No
高温存储 High Temperature(Storage)	在 90℃环境下放置 24 小时，然后在常温常湿下放置 2 小时后测试，模块应满足可靠性测试标准。	Test 1
低温存储 Low Temperature(Storage)	在-40℃环境下放置 24 小时，然后在常温常湿下放置 2 小时后测试，模块应满足可靠性测试标准。	Test 2
高湿存储 High Humidity(Storage)	在 +40℃，90%RH环境下放置48小时，然后在常温常湿下放置2小时后测试，模块应满足可靠性测试标准。	Test 3
高温工作 High Temperature(Operating)	模块必须能够在 +85℃ 环境下连续工作 24 小时，在此过程中应满足 HFP 通话和 A2DP 音乐播放功能	Test 4
低温工作 Low Temperature(Operating)/	模块必须能够在-40 环境下连续工 24 小时，在此过程中，模块应满足 HFP 通话和 A2DP 音乐播放功能	Test 5
高低温循环 High Temperature and High Temperature cycle	在-40℃环境下放置 1 小时，然后温度升至+85℃（温度转换时间为 1 小时），在+85℃环境下放置 1 小时；然后温度降至-40℃（温度转换时间为 1 小时），再在-40℃环境下放置 1 小时；如此不停的循环 5 次，最后在室温恢复 2 小时后测试模块应满足可靠性测试标准	Test 6

可靠性测试标准 Standard of Reliability Test.

项 目 Item		最小值 Min	典 型 值 Typ.	最大值 Max	单 位 Unit
载波频率漂移 Carrier Frequency Drift	DH1	-25		25	KHz
	DH3	-40		40	KHz
	DH5	-40		40	KHz
	Drift rata/50us	-20		20	KHz
调制特性 Modulation Characteristic	Df1avg	140		175	KHz
	Df2max	115			KHz
	f2avg/Df1avg	0.8			
单/多时隙灵敏度 (P=-70dBm) single/multi Sensitivity(P=-70dBm)				<0.1	%(BER)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

“Contains Transmitter Module FCC ID: ZWYMC55” or “Contains FCC ID: ZWYMC55.”

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

If the IC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following:

“Contains transmitter module IC: 12033A-MC55” or “Contains IC: 12033A-MC55.”

when the module is installed inside another device, the user manual of this device must contain below warning statements;

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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