

# RAK553 图传模块

# 规格书 V2.6



深圳市瑞科慧联科技有限公司 www. rakwireless. com

邮箱: info@rakwireless.com



## 目 录

1	概述		1
		模块概述	
		应用领域	
		产品特性	
		规格参数	
2		述	
		模块视图	
	2.2	模块尺寸	3
		安装定位孔	
	2.4	管脚定义	4
	2.5	LED 状态	4
		拨码定义	
		r性	
4		产性	
		绝对最大值	
_		推荐工作参数 	
		可以分	16



# 1 概述

#### 1.1 模块概述

RAK553 是一款完全支持 IEEE802.111a/b/g/n 无线协议的超低功耗支持 CVBS 输入的智能视频模块,具有封装小、易于使用的特点。集成了对音频视频图像的采集,编码压缩,传输。采用高效的硬编码方式,强大的 WIFI 通讯模组,保证了视频的清晰,流畅度。由智能终端 Android、iphone 等设备完成音频视频的播放及显示。此外,还具有透传串口的设计。提供一路高速 UART 接口供客户功能扩展。

RAK553 内置 WIFI 模组,支持 802.11a/b/g/n 2x2 MIMO,整体模块可以支持远距离图像传输。

#### 1.2 应用领域

- 飞行器
- 智能玩具
- 楼宇自动化
- 物流和货运管理
- 家庭安全与自动化
- 电网基站巡检

#### 1.3 产品特性

- 强大的 WIFI 功能
  - ➤ 满足 802.11a/b/g/n 协议
  - ▶ 发射功率: ≤22dBm
  - > Soft AP Mode
  - > 2x2 300M PHY Rate
  - ▶ 支持 Infra/Soft AP 网络类型
  - ▶ 支持多种安全认证机制: WEP64/WEP128/TKIP/CCMP(AES)/WEP/WPA-PSK/WPA2-PSK
  - ➤ 支持多种网络协议: TCP/UDP/ICMP/DHCP/DNS/HTTP
- 高效的视频处理
  - ➤ 支持 H.264/CIF/VGA/QVGA MJPG/RTP Stream
  - ➤ Continuous/Static JPEG/RTP Stream



- ▶ 20fps 体验流畅的视频
- ▶ 高效的硬编码技术
- ➤ Merged MJPG + MP3 Stream
- ➤ Separate MJPG + MP3 Stream
- ➤ Separate H.264 + PCMA Stream

### ● 输入源接口

- ▶ 1 路透传串口和 1 路高速 UART 接口资源
- ➤ MIC 接口
- ▶ 视频信号接口
- 模组体积

55mm\*30mm\*16.3(±0.2)mm (DIP LED)

55mm\*30mm\*13.1(±0.2)mm (Without LED)

### 1.4 规格参数

参数	描述
	VGA(640*480) 30FPS
视频参数	MJPEG/H.264 压缩格式
	强大的硬编码技术
传输距离	配合接收机 RAK554 工作:有效距离 1000m,较清晰流畅距离 500m
14 制此內	只有 RAK553 作为 AP 模式:有效距离 150m,较清晰流畅距离 100m
尺寸参数	55mm*30mm*16.3(±0.2)mm (DIP LED)
八寸少奴	55mm*30mm*13.1(±0.2)mm (Without LED)
串口透传波特率	115200bps (默认), 可通过命令修改
无线参数	满足 802.11a/b/g/n 协议,支持 Infra/Soft AP 网络类型,支持 Soft AP
电源参数	7-24V 电源,平均工作电流 150mA(输入电压为典型值:12V)
电₩多数	峰值电流是 300mA(输入电压为典型值:12V)
CPU	ARM926EJ-S
操作系统	Linux-2.6.35.5



# 2 硬件描述

### 2.1 模块视图

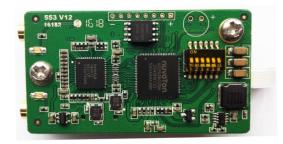




图2-1 RAK553 模块正面

图2-2 RAK553 模块反面

### 2.2 模块尺寸

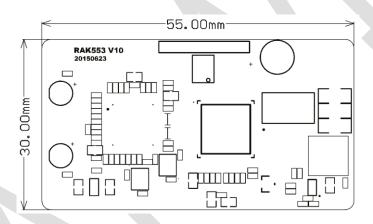
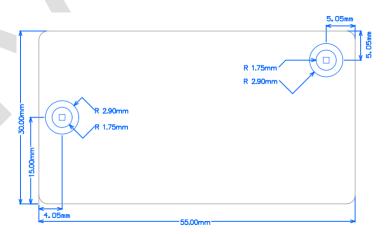


图2-3 模块平面尺寸图

### 2.3 安装定位孔





## 2.4 管脚定义



图2-4 电源接口线序

脚号	名称	描述	备注
1	VDDIN	12V 供电	P
2	VDDIN	12V 供电	P
3	GND	地	P
4	GND	地	P



图2-5 音视频及串口接口

脚号	名称	描述	备注
1	NC	预留	I/O
2	NC	预留	I/O
3	HUR_TXD	高速串口发送引脚	0
4	HUR_RXD	高速串口接收引脚	Ι
5	LINE_IN	LINE 信号输入引脚	Ι
6	AV_IN	AV 信号输入引脚	Ι
7	GND	地	P
8	VCC12V	12V 供电	P

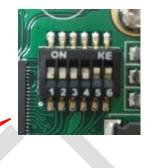
## 2.5 LED 状态

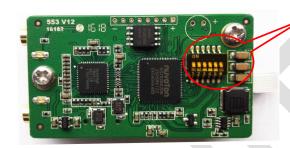


备注: LED 状态指示灯会根据实际的情况以及客户的需求调整,颜色可以更换。



## 2.6 拨码定义





拨码共计 6 组,ON 表示当前拨码接地,为低电平 0 。拨码处于数字边表示为高电平 1 。拨码编码顺序用 Sw1-6 表示。功能定义如下:

Sw6	Sw5	Band	信道	工作中心频率
1	1	4	149	5745
1	0	1	48	5240
0	1	1	36	5180
0	0	4	165	5825

出厂默认是 Band4 , 149 信道。

Sw1 你作为 WPS 的拨码控制吧,拉低后,保持3秒,之后马上拉高,就进入 WPS 配置状态。 进入 WPS 状态指示灯闪烁。



# 3 射频特性

Key specifications							
O QCA AR9375							
O 2T2R							
O USA: 2.400 ~ 2.483GHz, 5.15 ~ 5.25GHz, 5.725 ~ 5.85GHz							
O Europe: 2.400 ~ 2.483GHz, 5.15 ~ 5.25GHz							
O Japan: 2.400 ~ 2.497GHz, 5.15 ~ 5.25GHz,							
O 802.11 Legacy a/b/g							
DSSS (DBPSK, DQPSK, CCK)							
OFDM (BPSK, QPSK, 16-QAM, 64-QAM)							
DSSS (Direct Sequence Spread Spectrum) with							
DBPSK (Differential Binary Phase Shift Keying 1Mbps),							
DQPSK (Differential Quaternary Phase Shift Keying 2Mbps), and							
CCK (Complementary Code Keying 5.5&11Mbps), and							
OFDM (Orthogonal Frequency Division Multiplexing with BPSK for 6,9Mbps QPSK							
for 12,18Mbps 16QAM for 24,36Mbps 64QAM							
for 48,54Mbps)							
O 802.11n a/g O USB 2.0 O 802.11n b/g							
US/Canada: 11 (1 ~ 11)							
Major European country: 13 (1 ~ 13)							
France: 4 (10 ~ 13)							
Japan: 11b: 14 (1~13 or 14 <sup>th</sup> ), 11g: 13 (1 ~ 13)							
O 802.11n a							
1). US/Canada: channels (36,40,44,48,52, 149,153,157,161,165)							
2). Europe: channel (36,40,44,48,52)							
3). Japan: channels (36,40,44,48,52)							
O 5V +/- 5%							
802.11ng MCS8(40MHz) 802.11na MCS8(40MHz)							
(mA) Avg Avg							
5V 350 756							



The simplest, the	1	110						
		.11a Foot Enganon	<b>a:</b> a a	6 24 Tamast	26 Tra		. EA Tama-4	
	]	Fest Frequen	cies	6-24_Target	36_Targ			
		5180 5320		21	20	19	17	
Output Power		5320 5500		21 21	20	19 19	17 17	
(Typical-for					20 20			
each chain;		5600 5700		21		19	17	
with ±2dB		5700 5825		21 21	20 20	19 19	17 17	
tolerance).		3043		21	20	19	17	
	0 802	.11b						
This power		rest Freguen	cioc	1/2_Target	5.5_Targe	et 11_Target		
table bases on	,	2412	cies	1/2_1 ai get	3.5_1 arg	11_1 arget		
the maximum		2437		16	16	16		
HW capability		2472		16	16	16		
complying		21/2		10	10	10		
with IEEE	O 802	.11g						
spec		.115 Fest Frequen	cies	6-24_Target	36_Targ	get 48_Target	54_Target	
regardless the	_	2412	CICS	16	16	15	14	
regulatory		2437		16	16	15	14	,
limitation		2472		16	16	15	14	
		<u> </u>		10	10	13	47	
	O 802	.11n						
	002	••••						
	Freg. R	ange: HT20						
			MCS 1	/9 MCS 2/10	MCS 3/11	MCS 4/12 MCS	5/13 MCS 6/1	4 MCS 7/15
	5180		21	21	21		20 19	17
	5240		21	21	21		20 19	17
	5320		21	21	21		20 19	17
	5500		21	21	21		20 19	17
	5700		21	21	21		20 19	17
	5745		21	21	21		20 19	17
	5825		21	21	$\frac{\overline{2}}{21}$		20 19	17
	Freq. Ra	ange: HT40						
	Test Fr	eg MCS 0/8	MCS 1	/9 MCS 2/10	MCS 3/11	MCS 4/12 MCS	5/13 MCS 6/14	4 MCS 7/15
	5190	21	21	21	21		20 19	17
	5230	21	21	21	21	20	20 19	17
	5310	21	21	21	21		20 19	17
	5510	21	21	21	21	20	20 19	17
	5670	21	21	21	21	20	20 19	17
	5755	21	21	21	21		20 19	17
	5795	21	21	21	21	20	20 19	17
	_	ange: HT20						
						MCS 4/12 MCS		
	2412	16	16	16	16		15 14	14
	2437	16	16	16	16		15 14	14
	2472	16	16	16	16	15	15 14	14
	Freq. Ra	ange: HT40						
						MCS 4/12 MCS		
	2412		16	16	16		15 14	14
	2437		16	16	16		15 14	14
	2472	16	16	16	16	15	15 14	14



**EVM** 

The transmit modulation accuracy is measured using error vector magnitude (EVM). EVM is the magnitude of the phase difference as a function of time between an ideal reference signal and the measured transmitted signal.

	_	_	phase difference as a function of tin ured transmitted signal.	ıe between an ideal
0		and the meast	neu transmitteu signai.	
	802.11a Modulation	<b>Code Rate</b>	Relative constellation error (dB) IEEE Spec (1Tx dB)	Relative constellation error (dB) Typical (1Tx dB)
	BPSK	1/2	-5	-25
	BPSK	3/4	-8	-25
	QPSK	1/2	-10	-25
	QPSK	3/4	-13	-25
	16-QAM	1/2	-16	-25
	16-QAM	3/4	-19	-28
	64-QAM	2/3	-22	-30
	64-QAM	3/4	-25	-31
0	802.11b			
	Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)
			IEEE Spec (1Tx dB)	Typical (1Tx dB)
	DBPSK		-10	-28
	DQPSK		-10	-28
	ССК		-10	-28
0	802.11g			
	Modulation	Code Rate	Relative constellation error (dB)	Relative constellation error (dB)
	1120		IEEE Spec (1Tx dB)	Typical (1Tx dB)
	BPSK	1/2	-5	-28
	BPSK	3/4	-8	-28
	QPSK	1/2	-10	-28
	QPSK	3/4	-13	-28
	16-QAM	1/2	-16	-28
	16-QAM	3/4	-19	-29
	64-QAM	2/3	-22	-29
	64-QAM	3/4	-25	-29
)	802.11ng			
N	Modulation	Code Rate F	Relative constellation error (dB)	Relative constellation error (dl
	HT20		IEEE Spec (1Tx dB)	Typical (1Tx dB)
	(MCS0) BF	PSK 1/2	-5	-25
		PSK 1/2	-10	-26
	, , –	PSK 3/4	-13 16	-26 -26
	,	6-QAM 1/2	-16 10	-20 20

-19

-22

-25

-27

-5

-10

-13

-29

-30

-30

-31

-25

-26

-26

(MCS4)

(MCS5)

(MCS6)

(MCS7) (MCS8)

(MCS9)

(MCS10)

16-QAM 3/4

64-QAM 2/3

64-QAM 3/4

64-QAM 5/6

1/2

1/2

3/4

BPSK

**QPSK** 

**QPSK** 



The simplest, t	The Best				
	(MCS11)	16-QAM	1/2	-16	-26
	(MCS12)	<b>16-QAM</b>	3/4	-19	-29
	(MCS13)	64-QAM	2/3	-22	-30
	(MCS14)	64-QAM	3/4	-25	-30
	(MCS15)	64-QAM	5/6	-27	-31
	(1.10010)	v. Q.11.1	2, 0	<del>-</del> ·	
	HT40				
	(MCS0)	<b>BPSK</b>	1/2	-5	-26
	(MCS1)	<b>QPSK</b>	1/2	-10	-27
	(MCS2)	QPSK	3/4	-13	-27
	(MCS3)	16-QAM	1/2	-16	-27
	(MCS4)	16-QAM		-19	-29
	(MCS5)	64-QAM		-22	-30
	(MCS6)	64-QAM		-25	-30
	(MCS7)	64-QAM		-27	-31
	(MCS8)	BPSK	1/2	-5	-26
	(MCS9)	QPSK	1/2	-10	-27
	(MCS10)		3/4	-13	-27
		16-QAM		-16	-27
	` /	16-QAM		-19	-29
	,	64-QAM		-22	-30
	(	-			
	(MCS14)	64-QAM	3/4	-25	-30
	(MCS15)	64-QAM	5/6	-27	-31
	O 802.11na				
EVM			Doto D	elative constellation error (dB)	Relative constellation error (dB)
IL V IVI	Modulatio	Jii Coue i	Nate K		· ´
	HT20			IEEE Spec (1Tx dB)	Typical (1Tx dB)
	(MCS0)	BPSK	1/2	-5	-25
	(MCS1)	QPSK	1/2	-10	-26
	(MCS1) (MCS2)	QPSK QPSK	1/2 3/4	-10 -13	-26 -26
	(MCS1) (MCS2) (MCS3)	QPSK QPSK 16-QAM	1/2 3/4 1/2	-10 -13 -16	-26 -26 -26
	(MCS1) (MCS2) (MCS3) (MCS4)	QPSK QPSK 16-QAM 16-QAM	1/2 3/4 1/2 3/4	-10 -13 -16 -19	-26 -26 -26 -29
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5)	QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3	-10 -13 -16 -19 -22	-26 -26 -26 -29 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6)	QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4	-10 -13 -16 -19 -22 -25	-26 -26 -26 -29 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6	-10 -13 -16 -19 -22 -25 -27	-26 -26 -26 -29 -30 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2	-10 -13 -16 -19 -22 -25 -27 -5	-26 -26 -26 -29 -30 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2	-10 -13 -16 -19 -22 -25 -27 -5 -10	-26 -26 -26 -29 -30 -30 -31 -25 -26
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK QPSK	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13	-26 -26 -26 -29 -30 -30 -31 -25 -26
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16	-26 -26 -27 -29 -30 -30 -31 -25 -26 -26
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12)	QPSK QPSK 16-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19	-26 -26 -29 -30 -31 -25 -26 -26 -26 -29
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22	-26 -26 -29 -30 -31 -25 -26 -26 -26 -26 -27 -28 -28 -29 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25	-26 -26 -29 -30 -31 -25 -26 -26 -26 -26 -27 -30 -30 -30 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22	-26 -26 -29 -30 -31 -25 -26 -26 -26 -26 -27 -28 -28 -29 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25	-26 -26 -29 -30 -31 -25 -26 -26 -26 -26 -27 -30 -30 -30 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3 3/4	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25	-26 -26 -29 -30 -31 -25 -26 -26 -26 -26 -27 -30 -30 -30 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM PPSK QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 2/3 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -30 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -30 -31 -31 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -29 -30 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15) HT40 (MCS0) (MCS0) (MCS1)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM BPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 2/3 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -29 -30 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15) HT40 (MCS0) (MCS0) (MCS1) (MCS0)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -29 -30 -31 -27 -27
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15) HT40 (MCS0) (MCS1) (MCS1) (MCS1)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 5/6 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27 -5 -10 -19 -19 -19 -19 -19 -19 -19 -19	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -29 -30 -31 -31 -27 -27 -27
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15) HT40 (MCS0) (MCS0) (MCS1) (MCS2) (MCS3) (MCS2)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -27 -37 -27 -27 -29 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15) HT40 (MCS0) (MCS0) (MCS1) (MCS0) (MCS1) (MCS2) (MCS3) (MCS3) (MCS4) (MCS5) (MCS6)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -27 -30 -31 -27 -27 -27 -29 -30 -30 -30
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)  HT40 (MCS0) (MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -27 -30 -31  -27 -27 -27 -27 -29 -30 -30 -31
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)  HT40 (MCS0) (MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8)	QPSK QPSK 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 2/3 3/4 5/6 1/2 3/4 1/2 3/4 1/2 3/4 1/2 3/4 1/2 3/4 1/2	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -29 -30 -31 -31  -26 -27 -27 -27 -27 -27 -29 -30 -30 -31 -26
	(MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7) (MCS8) (MCS9) (MCS10) (MCS11) (MCS12) (MCS13) (MCS14) (MCS15)  HT40 (MCS0) (MCS1) (MCS2) (MCS3) (MCS4) (MCS5) (MCS6) (MCS7)	QPSK QPSK 16-QAM 16-QAM 64-QAM 64-QAM 16-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM 64-QAM	1/2 3/4 1/2 3/4 2/3 3/4 5/6 1/2 1/2 3/4 1/2 3/4 5/6	-10 -13 -16 -19 -22 -25 -27 -5 -10 -13 -16 -19 -22 -25 -27  -5 -10 -13 -16 -19 -22 -25 -27	-26 -26 -29 -30 -30 -31 -25 -26 -26 -26 -26 -27 -30 -31  -27 -27 -27 -27 -29 -30 -30 -31



The simplest, th	e best			
	(MCS11) 16-QAM	1/2	-16	-27
	(MCS12) 16-QAM		-19	-29
	(MCS13) 64-QAM		-22	-30
	(MCS14) 64-QAM		-25	-30
	, , , , ,			
	(MCS15) <u>64-QAM</u>	1 5/0	-27	-31
	O 802.11a			
		C- J- D-4-	IEEE C (1D JD)	T:
	Modulation		IEEE Spec (1Rx dBm)	Typical (1Rx dBm)
	BPSK	1/2	-82	-88
	BPSK	3/4	- <b>81</b>	-86
	QPSK	1/2	-79	-85
	QPSK	3/4	-77	-83
	16-QAM	1/2	-74	-79
	16-QAM	3/4	-70	-77
	64-QAM	2/3	-66	-73
	64-QAM	3/4	-65	-70
	O 802.11b			
	Modulation	IEI	EE Spec (1Rx dBm)	Typical (1Rx dBm)
1	DBPSK		not specified	-93
	DQPSK		not specified	-91
	CCK		not specified	-87
	O 802.11g			
	Modulation	Code Rate	IEEE Spec (1Rx dBm)	Typical (1Rx dBm)
	BPSK	1/2	-82	-93
	BPSK	3/4	-81	-91
	QPSK	1/2	-79	-89
	QPSK	3/4	-77	-86
Sensitivity	16-QAM	1/2	-7 <i>1</i>	-83
(1RX with		3/4	-74 -70	-80
+4/-2dB	16-QAM			
tolerance,	64-QAM	2/3	-66	-75
	64-QAM	3/4	-65	-70
dBm)	0 902 11			
	O 802.11ng	C I D	4 IPPE (	T : 1(1D ID )
	Modulation	Code Ra	te IEEE Spec (1Rx dBm)	Typical (1Rx dBm)
	TATE OF THE PARTY			
	HT20			
	(MCS0) BPSK	1/2	-82	-90
	(MCS1) QPSK	1/2	-79	-87
	(MCS2) QPSK	3/4	-77	-86
	(MCS3) 16-QAM	1/2	-74	-84
	(MCS4) 16-QAM	3/4	-70	-80
	(MCS5) 64-QAM	2/3	-66	-77
	(MCS6) 64-QAM	3/4	-65	-72
	` , , , , , , , , , , , , , , , , , , ,			<b>47</b>
	(MCS7) 64-QAM	5/6	-64	-67
	11740			
1	HT40	1/2	70	00
1	(MCS0) BPSK	1/2	-79 76	-88
1	(MCS1) QPSK	1/2	-76	-86
	(MCS2) QPSK	3/4	-74 1	-84
1	(MCS3) 16-QAM	1/2	-71 -7	-80
1	(MCS4) 16-QAM	3/4	-67	-78
	(MCS5) 64-QAM	2/3	-63	-73
1	(MCS6) 64-QAM	3/4	-62	-70
	(MCS7) 64-QAM	5/6	-61	-64
1	incor, or Qam	5/0	-01	-07



	O 802.11na								
	HT20	NT 1 1 4	C. L. D.A.			E C	. (1D	JD\	
		Modulation 1/2	Code Rate -82		IEE	-	c (1Rx	aBm)	
	(MCS0) BPSK (MCS1) QPSK	1/2 1/2	- <b>8</b> 2 -79				89 87		
	(MCS1) QPSK (MCS2) QPSK	3/4	-79 -77				37 34		
	(MCS2) QFSK (MCS3) 16-QAM	3/4 1/2	-77 -74				3 <del>4</del> 30		
	(MCS4) 16-QAM	3/4	-74 -70				77		
	(MCS5) 64-QAM	2/3	-66				7 <b>2</b>		
	(MCS6) 64-QAM	3/4	-65				71		
	(MCS7) 64-QAM	5/6	-64				67		
		3/0	-04			_	37		
Sensitivity	HT40								
(1RX with	(MCS0) BPSK	1/2	-79				34		
+4/-2dB	(MCS1) QPSK	1/2	-76				31		
tolerance,	(MCS2) QPSK	3/4	-74				79		
dBm)	(MCS3) 16-QAM	1/2	-71		-76				
	(MCS4) 16-QAM	3/4	-67				72		
	(MCS5) 64-QAM	2/3	-63				70		
	(MCS6) 64-QAM	3/4	-62			-(	<b>67</b>		
	(MCS7) 64-QAM	5/6	-61				54	40.17	
	<b>②</b> For transmitted fc−30MHz <f<fc+30mh< td=""><td></td><td>nask for 11a</td><td>shall</td><td>be</td><td>less</td><td>than</td><td>-40dBr</td><td>fo</td></f<fc+30mh<>		nask for 11a	shall	be	less	than	-40dBr	fo
Transmit	© For transmitted		ask for 11b	shall	be	less	than	-50dBr	fo
spectrum mask	fc-22MHz <f<fc+22mh< td=""><td></td><td>lask for 11b</td><td>Silaii</td><td>ВС</td><td>1033</td><td>tiiaii</td><td>-30<b>u</b>Di</td><td>10</td></f<fc+22mh<>		lask for 11b	Silaii	ВС	1033	tiiaii	-30 <b>u</b> Di	10
mask	© For transmitted		nask for 11g	shall	be	less	than	-40dBr	fo
	ltc=30MHz <t<tc+30mh< td=""><td>17.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<tc+30mh<>	17.							
	fc-30MHz <f<fc+30mh< td=""><td></td><td>r 11n 20MHz shal</td><td>l be less</td><td>than</td><td>-45</td><td>dBr for</td><td></td><td></td></f<fc+30mh<>		r 11n 20MHz shal	l be less	than	-45	dBr for		
	② For transmitted sp	oectral mask fo	r 11n 20MHz shal	l be less	than	-45	dBr for		
	② For transmitted sp fc-30MHz <f<fc+30mh< td=""><td>oectral mask for Iz.</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></f<fc+30mh<>	oectral mask for Iz.							
	② For transmitted sp	oectral mask for Iz. oectral mask for							
Transmit	<ul> <li>For transmitted specific—30MHz<f<fc+30mh< li=""> <li>For transmitted specific—60MHz<f<fc+60mh< li=""> <li>For 802.11a/g the</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	oectral mask for Iz. oectral mask for Iz. average energy	r 11n 40MHz shal	l be less ons in ea	than ch of	–450	dBr for	•	and
Transmit	<ul> <li>② For transmitted specific—30MHz<f<fc+30mh< li=""> <li>② For transmitted specific—60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/-	r 11n 40MHz shal of the constellatio 2dB from their av	l be less ons in ea	than ch of nergy.	-450	dBr for	s –161	ano
Transmit spectrum	<ul> <li>For transmitted specific—30MHz<f<fc+30mh< li=""> <li>For transmitted specific—60MHz<f<fc+60mh< li=""> <li>For 802.11a/g the specific transmitted specific for 802.11a deviate no For 802.11n 40MHz m</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag	r 11n 40MHz shal of the constellatio 2dB from their av ge energy of the co	l be less ons in ea erage en	than ch of nergy.	-450 spectr	dBr for	s –161 ctral	and
	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>③ For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. Dectral mask for Iz. average energy more than +/- node, the averag 42 will deviate i	of the constellation  2dB from their average energy of the common than +/- 2	l be less ons in ea erage en onstellati 2dB fron	than ch of nergy.	-450 spectr	dBr for	s –161 ctral	and
spectrum	<ul> <li>For transmitted specific—30MHz<f<fc+30mh< li=""> <li>For transmitted specific—60MHz<f<fc+60mh< li=""> <li>For 802.11a/g the specific transmitted specific for 802.11a deviate no For 802.11n 40MHz m</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. Dectral mask for Iz. average energy more than +/- node, the averag 42 will deviate i	of the constellation  2dB from their average energy of the common than +/- 2	l be less ons in ea erage en onstellati 2dB fron	than ch of nergy.	-450 spectr	dBr for	s –161 ctral	anc
spectrum flatness Transmit	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>③ For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. Dectral mask for Iz. average energy more than +/- node, the averag 42 will deviate i	of the constellation  2dB from their average energy of the common than +/- 2	l be less ons in ea erage en onstellati 2dB fron	than ch of nergy.	-450 spectr	dBr for	s –161 ctral	anc
spectrum flatness Transmit center	② For transmitted spfc-30MHz <f<fc+30mh +1+16="" +2+4="" 40mhz="" 802.11a="" 802.11n="" and="" deviate="" for="" g="" lines="" m="" no="" sp<="" spfc-60mhz<f<fc+60mh="" td="" the="" transmitted="" will="" −422="" ②=""><td>pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.</td><td>of the constellation of the co</td><td>l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB.</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>anc</td></f<fc+30mh>	pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB.	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	anc
spectrum flatness Transmit center frequency	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>③ For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> </f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB.	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
spectrum flatness Transmit center	② For transmitted spfc-30MHz <f<fc+30mh +1+16="" +2+4="" 40mhz="" 802.11a="" 802.11n="" and="" deviate="" for="" g="" lines="" m="" no="" sp<="" spfc-60mhz<f<fc+60mh="" td="" the="" transmitted="" will="" −422="" ②=""><td>pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.</td><td>of the constellation of the co</td><td>l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB.</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>ano</td></f<fc+30mh>	pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB.	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	ano
spectrum flatness  Transmit center frequency tolerance  Receiver	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>② For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> <li>② The transmitted sp</li> <li>② The transmitted compared to the spfer specific specif</li></f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>② For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> <li>② The transmitted sp</li> <li>② The transmitted compared to the spfer specific specif</li></f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz.  pectral mask for Iz.  average energy more than +/-  node, the average  42 will deviate in ectral flatness signs.	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
spectrum flatness  Transmit center frequency tolerance  Receiver	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>② For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> <li>② The transmitted sp</li> <li>② The transmitted compared to the spfer specific specif</li></f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	<ul> <li>② For transmitted spfc-30MHz<f<fc+30mh< li=""> <li>② For transmitted spfc-60MHz<f<fc+60mh< li=""> <li>② For 802.11a/g the +1+16 will deviate no For 802.11n 40MHz m lines -422 and +2+4</li> <li>② The transmitted sp</li> <li>② The transmitted compared to the spfer specific transmitted spfer specific transmitted compared to the spfer specific transmitted spfer specific transmitted</li></f<fc+60mh<></li></f<fc+30mh<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in ea- erage en onstellati 2dB fron 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	ano
Transmit center frequency tolerance  Receiver maximum	② For transmitted sp fc-30MHz <f<fc+30mh +1+16="" +2+2="" 40mhz="" 802.11a="" 802.11n="" and="" co<="" deviate="" fc-60mhz<f<fc+60mh="" for="" g="" lines="" m="" no="" sp="" td="" the="" transmitted="" will="" −422="" ②="" ③="" ④=""><td>pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s</td><td>of the constellation of the co</td><td>l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>and</td></f<fc+30mh>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	<ul> <li>For transmitted spfc-30MHz<f<fc+30mhz<fc+30mhz< li=""> <li>For transmitted spfc-60MHz<fc+60mhz< li=""> <li>For 802.11a/g the spfc-10 th</li></fc+60mhz<></li></f<fc+30mhz<fc+30mhz<></li></ul>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	② For transmitted spfc-30MHz <f<fc+30mhz +1+16="" +2+3="" 40mhz="" 802.11a="" 802.11b="" 802.11n="" and="" deviate="" for="" g="" lines="" m="" modulation="" modulation<="" no="" sp="" spfc-60mhz<f<fc+60mhz="" td="" the="" transmitted="" will="" −422="" ②="" ③="" ④=""><td>pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s</td><td>of the constellation of the co</td><td>l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>and</td></f<fc+30mhz>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	② For transmitted spfc-30MHz <f<fc+30mhz +24="" 40mhz="" 802.11a="" 802.11b="" 802.11n="" and="" dbpsk="" dqpsk<="" for="" g="" makes="" modulation="" nor="" spfc="" spfc-422="" spfc-60mhz<f<fc+60mh="" stransmitted="" td="" the="" transmitted="" ②="" ③=""><td>pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s</td><td>of the constellation of the co</td><td>l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>and</td></f<fc+30mhz>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	② For transmitted sp fc-30MHz <f<fc+30mhz +1+16="" +2+2="" 40mhz="" 802.11a="" 802.11b="" 802.11n="" and="" cck<="" dbpsk="" deviate="" dqpsk="" fc-60mhz<f<fc+60mh="" for="" g="" lines="" m="" modulation="" no="" sp="" td="" the="" transmitted="" will="" −422="" ②="" ③="" ⑤=""><td>pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s</td><td>of the constellation 2dB from their average energy of the constellation of the constellation</td><td>l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>and</td></f<fc+30mhz>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation 2dB from their average energy of the constellation	l be less ons in eacerage en onstellati 2dB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and
Transmit center frequency tolerance  Receiver maximum	② For transmitted sp fc-30MHz <f<fc+30mhz +1+16="" +2+2="" 40mhz="" 802.11a="" 802.11b="" 802.11g<="" 802.11n="" and="" cck="" dbpsk="" deviate="" dqpsk="" fc-60mhz<f<fc+60mh="" for="" g="" lines="" m="" modulation="" no="" sp="" td="" the="" transmitted="" will="" −422="" ②="" ③="" ⑤=""><td>pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s</td><td>of the constellation of the co</td><td>l be less ons in eacterage enconstellati edB from 2/- 4dB. e ±20 pp</td><td>than ch of nergy. ons in thei</td><td>–450 specto n each r aver</td><td>dBr for ral lines of spec rage end</td><td>s –161 ctral</td><td>and</td></f<fc+30mhz>	pectral mask for Iz. pectral mask for Iz. average energy more than +/- node, the averag 42 will deviate is ectral flatness s	of the constellation of the co	l be less ons in eacterage enconstellati edB from 2/- 4dB. e ±20 pp	than ch of nergy. ons in thei	–450 specto n each r aver	dBr for ral lines of spec rage end	s –161 ctral	and



	② 802.11na Modulation	Code Rate	IEEE Spec (1Rx dBm) >-30
	② 802.11ng Modulation	Code Rate	IEEE Spec (1Rx dBm) >-20
Transfer data rate	② 802.11b: 1, 2, 3 ③ 802.11g: 6, 9, 1 ② 802.11n: @800 z 2	12, 18, 24, 36, 48, OGI(400GI) 0MHz BW 1 Nss: 65(72.2) 2 Nss: 130(144) 0MHz BW	



# 4 电气特性

### 4.1 绝对最大值

下表中给出绝对最大值,超过该最大值范围可能使模块器件受损。为避免模块及器件受损请在规定条件下进行操作。

表 3-1:参数及范围

参数	符号	数值	单位
外部电源电压	VDDIN	7~~24	V
I0 口最大输入电压	3V3V <sub>in</sub> IOMax	3.6	V
IO 口最小输入电压	3V3V <sub>in</sub> IOMin	-0.3	V
存储环境温度	$T_{\mathrm{store}}$	-40~~+125	${\mathbb C}$
工作温度	Toper	-20~~+65	℃

### 4.2 推荐工作参数

表 3-2: 推荐工作参数范围

参数	符号	最小值	典型值	最大值	单位
外部电压	VDDIN	7.0	12.0	24.0	V



# 5 订购信息

表 5-1: 订购型号

产品	描述	单托盘数量	最小包装数量
RAK553	图传模组,即插即用	12 片/tray	60 片





# 6 销售与服务

#### 深圳总部

FAE 邮箱: ken.yu@rakwireless.com

电话: 0755-86108311

地址:深圳市南山区高新南六道航盛科技大厦 1007



### 上海

FAE 邮箱: steven.tang@rakwireless.com

电话:021-61553990

地址:上海市闵行区虹梅南路 2588 弄绿亮科创园 B205

### 北京

FAE 邮箱: allan.jin@rakwireless.com

地址:北京市昌平区回龙观腾讯众创空间





# 7 版本更新说明

版本号	修改内容	修改日期
V0.1	修改文档格式	2014-07-09
V0.2	更新联系方式,更新文档格式	2014-08-22
V0.3	更新图片、传输距离;修改产品特性;增加订购信息、销售与	2014-10-24
	服务	
V0.4	更新新模块的图片,尺寸及管脚定义	2015-04-07
V0.5	添加透传串口功能说明及参考设计	2015-04-17
V0.6	更新输入电压	2015-05-17
V0.7	更新新版模块实物图和相关硬件标注	2015-07-13
	更改电源参数,以及工作电流。	
V0.8	添加峰值工作电流	2015-07-31
V2.0	添加 LED 状态指示说明。并正式发布文档。	2015-08-31
V2.1	添加拨码定义指示说明。	2015-10-11
	1,增加信道选择功能。	
	2,增加 WPS 配对功能。	
V2.2	修改 8PIN eGH 接口 pin1 和 pin2 的定义。修改为 NC。	2015-11-11
V2.3	增加安装定位孔位置图。	2016-02-29
V2.4	删除部分错误分辨率,删除音频输入描述。	2016-8-25
V2.5	1, 更新销售服务信息	2016-11-10
	2, 更新产品照片	
V2.6	更新信道列表错误表述。	2017-03-03