

CVTE
CVTE Ax
2T2R
USB WiFi
Module



CVTE Ax 2T2R USB WiFi Module Owner's Manual

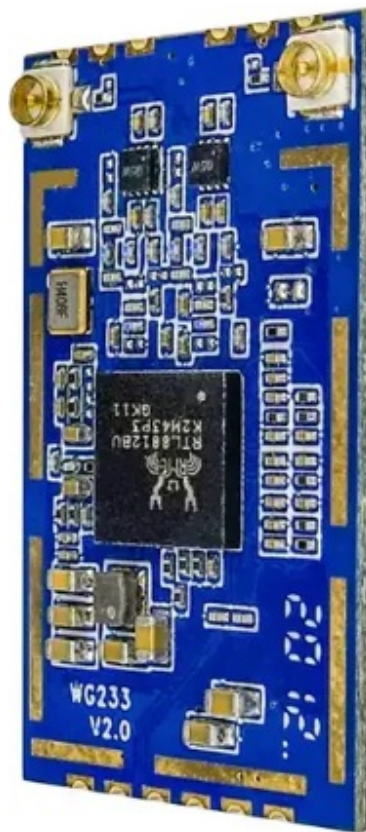
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CVTE Ax 2T2R USB WiFi Module



Introduction

- SKI.WB921AU.1 module is based on MediaTek MT7921AU solution.
- MT7921A is a highly integrated single chip which features a low power 2x2 11a/b/g/n/ac/ax dual-band Wi-Fi subsystem and a Bluetooth vS.2 subsystem, offering feature-rich wireless connectivity at high standards ,and delivering reliable ,cost-effective throughput from an extended distance.
- MT7921AUN data rate up to 800Mbps with USB3.0.Optimized RF architecture and baseband algorithms provide superb performance and low power consumption. Intelligent MAC design deploys a high efficient offload engine ,and hardware data processing accelerators which fully offloads Wi-Fi task of the host processor, MT7921A is designed to support standard based features in the areas of security, quality of service and international regulations, giving end users the greatest performance any time and in any circumstance. This documentation describes the engineering requirements specification.

Features

Reserving System	IEEE Std. 802.11a
	IEEE Std. 802.11b
	IEEE Std. 802.11g
	IEEE Std. 802.11n IEEE Std. 802.11ac IEEE Std. 802.11ax(SGHz)
	IEEE Std. 802.11ax(6GHz)
	BT 2.1+EDR
	BT4.2

	BT 5.2 with BLE (BT low energy)
Chip Solution	MT7921AU
Band & occupied band width	BT: 2400-2483.5MHz@±3MHz WiFi:2400-2483.5MHz@±4MHz 5150-5350MHz@±8MHz 5725-5850MHz@±8MHz
Modulation system	WiFi: DBPSK/DQPS K/CCK/BPS K/QPSK/ 16QAM/64QAM/256QAM/1024Q AM BT:GFSK, n/4-DQPSK, 8-DPSK
Dimensions R-r	30mmx23mmx2.6mm

Model	Installation Mode	Protocol I	Frequency	Antenna	Remark
SKI.WB921AU.1	SMD	IEEE 802.11a/b/g/n/ac/ax BT 2.1+EDR/4.2/5.2	2.4GHz/5GHz /6GHz	WiFi & BT: 1pex	30mmx23mm X2.6mm

Block Diagram

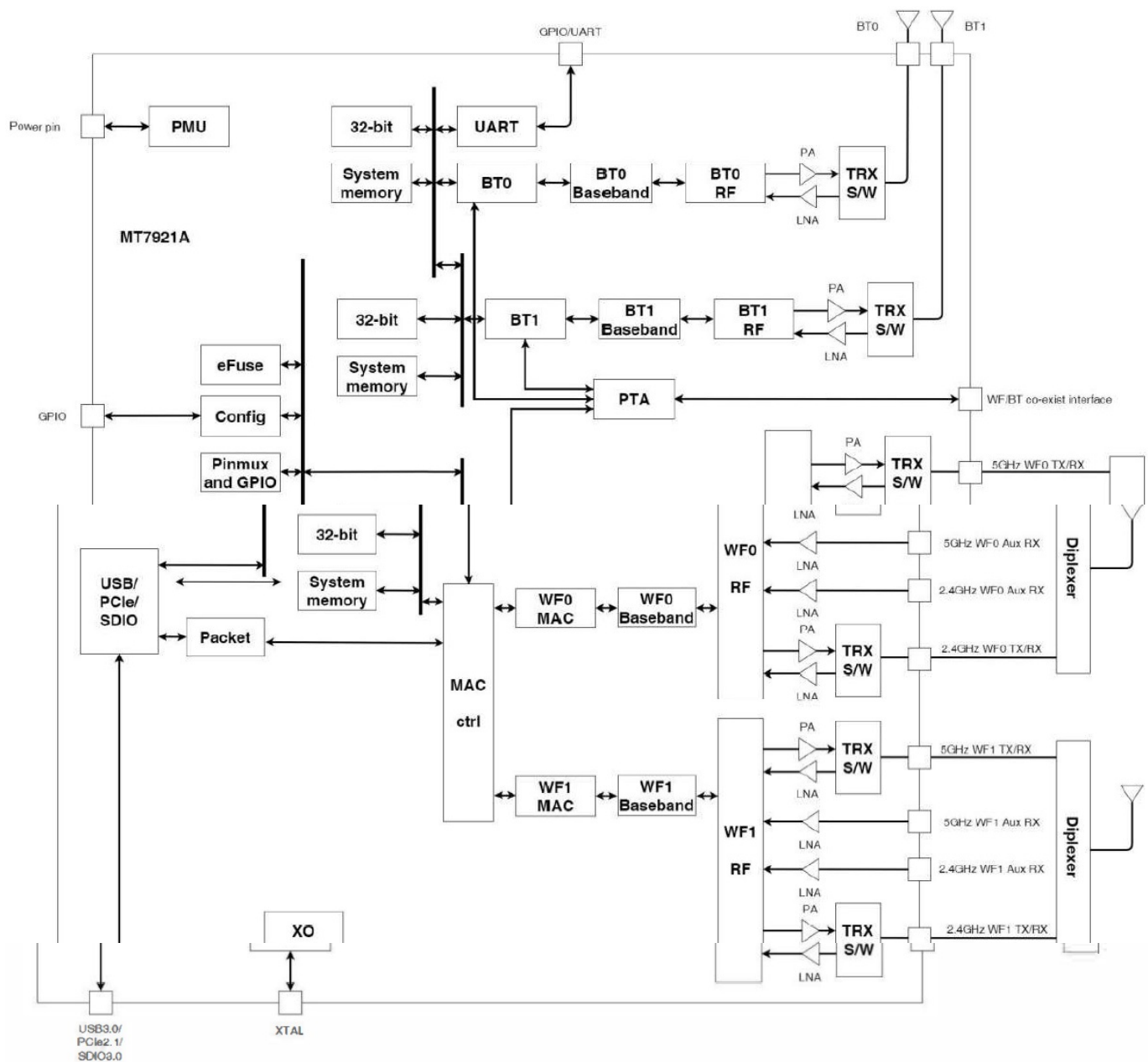
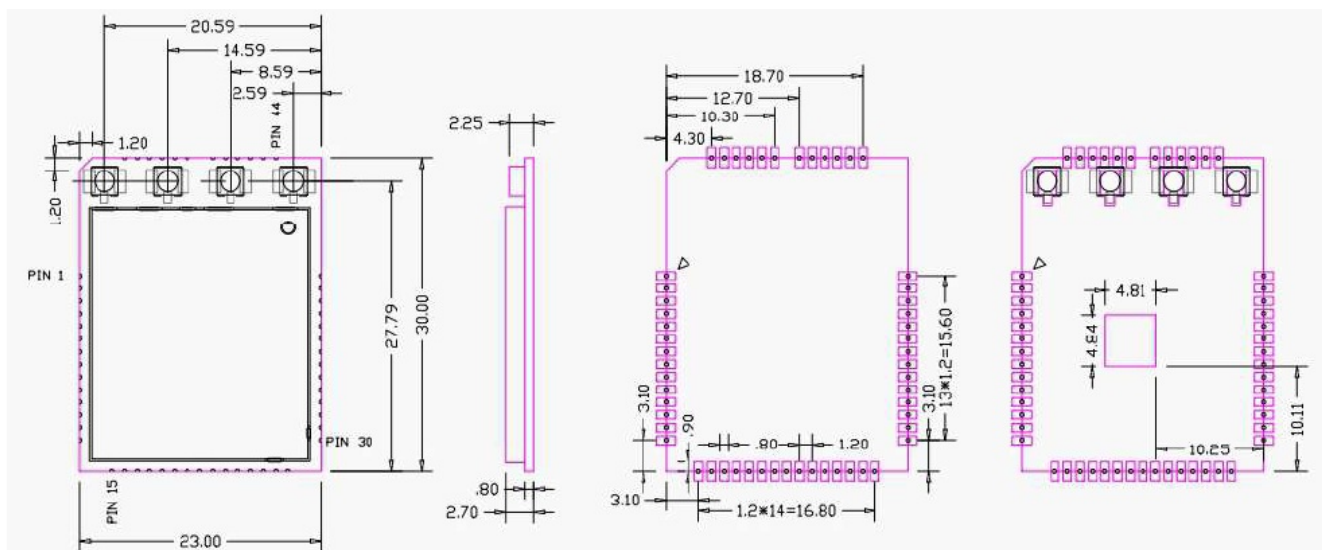
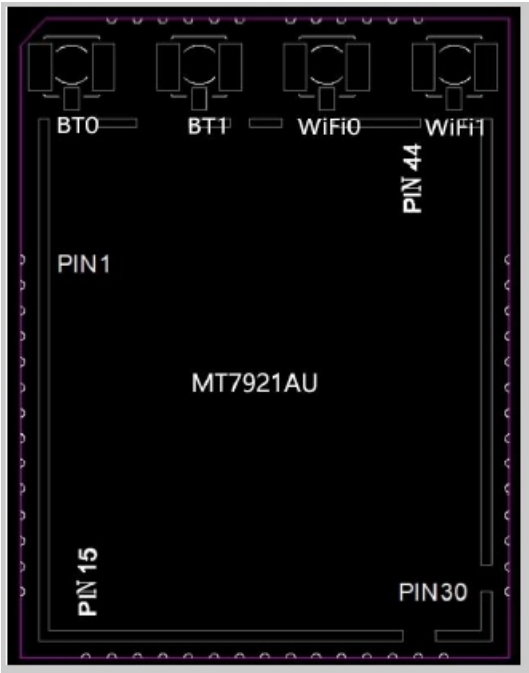


Figure 1 SKI.WB921AU.1 Block Diagram

Package Outline and Mounting



Pin Definition



PIN	SYMBOL	DESCRIPTION
1	GND	GND
2	NC	Not connect
3	NC	Not connect
4	GND	GND

5	RESET	PMU RESET
6	GND	GND
7	GND	GND
8	3.3V	3.3V
9	3.3V	3.3V
10	GND	GND
11	NC	Not connect
12	NC	Not connect
13	GPI013	DEBUG,WL FW LOG
14	GPI04	DEBUG,BT FW LOG
15	GND	GND
16	WIFI_WAKE	WIFI
17	GPIO12	ICE DEBUG
18	Gili	ICE DEBUG
19	NC	Not connect

20	GND	GND
21	U3-TXN	USB3.0 TXN,
22	U3-TXP	USB3.0 TXP,;
23	GND	GND
24	NC	Not connect
25	NC	Not connect
26	GND	GND
27	U3-RXN	USB3.0
28	U3-RXP	USB3.0
29	GND	GND
30	U2-DP	USB2.0 DP,
31	U2-DM	USB2.0 DM,
32	GND	GND
33	NC	Not connect
34	BT_WAKE	BT
35	NC/BT_Stereo	Not connect/BT_Stereo
36	NC	Not connect
37	GND	GND
38	NC	Not connect
39	NC	Not connect
40	NC	Not connect
41	NC	Not connect
42	GND	GND

43	GND	GND
44	GND	GND
45	WiFi1	Not connect (ipex)
46	GND	GND
47	GND	GND
48	WiFi0	Not connect(ipex)
49	GND	GND
50	GND	GND
51	BT!	Not connect(ipex)
52	GND	GND
53	GND	GND
54	BT0	Not connect(ipex)
55	GND	GND

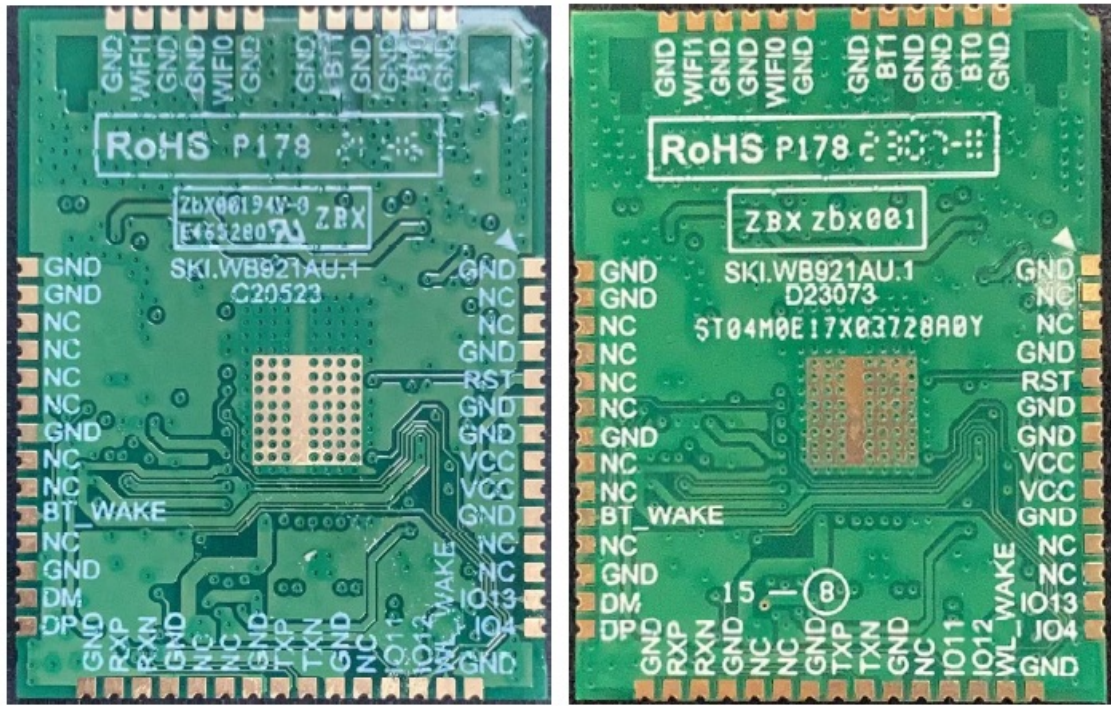
Product Pictures



(top view)

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	CVTE 'I4	
SKLWB921AU,1	1: 002.029.0000435	IPEX 1: 4 . 2WiFi+2 BT USB3,0-5G
	2: 002,029.0000436	IPEX : 3 . 2WiFi+1BT. BT0, ± BT) , USB3,0-5G
	' 3: 002.029.0000874	: 4 t . 2WiFi+2 BT USB3.0-5G
	4, 002.029.0000969	IPEX 1: 4 . 2WiFi+2 BT , USB3,0-2.5G
	5, 002.029.0000995	IPEX 1\ 4 . 2WiFi+2 BT ' , USB3,0-5G(xt.\' BT_Stereo)



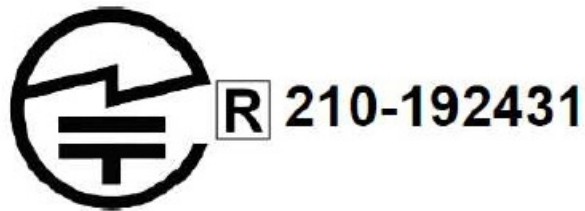
(bottom view)



(information view)

Key Materials

1		MT7921AU	109-DRQFN	
2	PCB	SKI.WB921AU.1	FR-4,4LAY	
3		CF4040M00006T2115218	40MHz	

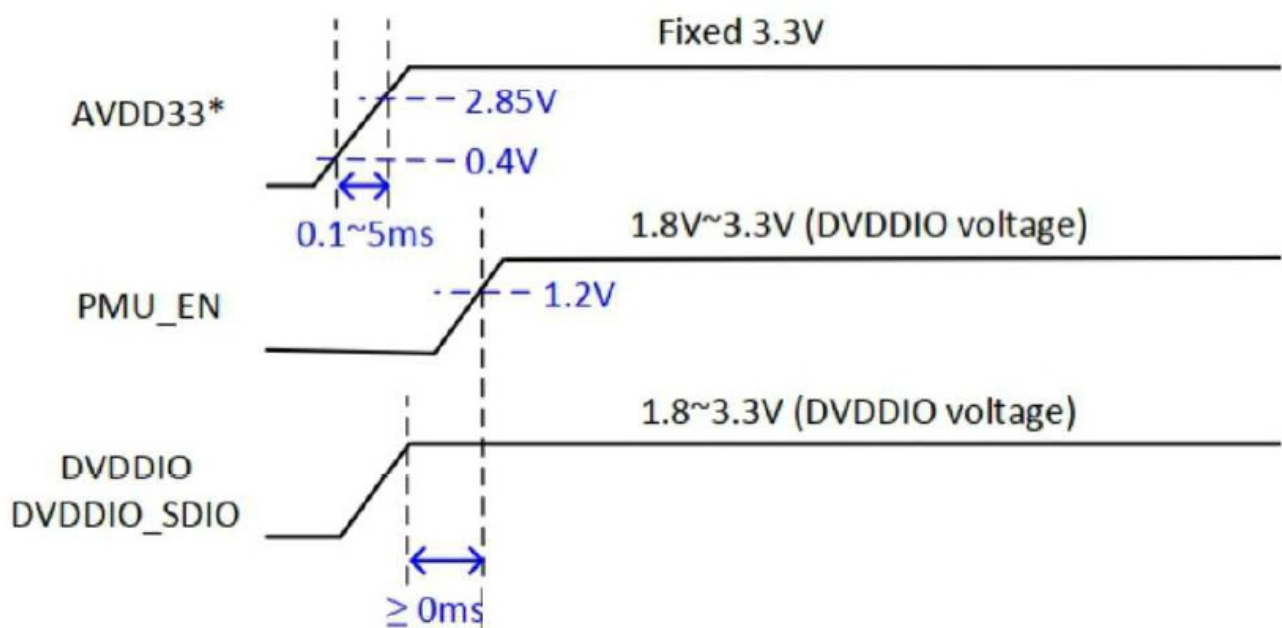


The device is restricted to indoor use when operating in 5150-5350MHz frequency range.

General Requirements

No.	Feature	Description
7-1	Operation Voltage	3.3V+/-0.3
7-2	Current Consumption	900mA 2A)
7-3	Ripple	,S120mV
7-4	Operation Temperature	-10°C to + 70°C
7-5	Antenna Type	External antenna
7-6	USB	High Speed USB 3.0 Interface High Speed USB 2.0 Interface)
7-7	Storage Temperature Zf.1it1lli.&	-40°C to +125°C

Interface Timing Specification



Ps:

1. After 3.3V power supply is stabilized, PMU_EN can be pulled up again (Delta 1>0);
2. It is recommended that the main chip be pulled down again PMU _ EN after the WIFI power is stabilized.

Electrical Characteristics

The Test for electrical specification was performed under the following condition unless otherwise specified:

- Ambient condition Temperature :25°C ± 5°C;
- Power supply voltages, 3.3V+/-0.3 input power at the Module;

IEEE 802.11b Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11b				
Mode	CCK				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels(Calibrated)					
1) For antenna port (CCK 11 M)	15	17	19	dBm	
2. Spectrum Mask @ target power					
1) fc +/-11MHz to +/-22MHz			-30	dBr	
2) fc > +/-22MHz			-50	dBr	
3 Constellation Error(EVM)@ target power					
1) 1Mbps			-10	dB	
2) 2Mbps			-10	dB	
3) 5.5Mbps			-10	dB	
4) 11Mbps			-10	dB	
4. Frequency Error	-20		20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 1Mbps (FER ;£8%)			-83	dBm	
2) 2Mbps (FER ;£8%)			-80	dBm	
3) 5.5Mbps (FER ;£8%)			-79	dBm	
4) 11Mbps (FER ;£8%)			-76	dBm	
6 Maximum Input Level (FER ;£8%)	-10			dBm	

IEEE 802.11g Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11g				
Mode	OFDM				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	Remark
1. Power Levels					
1) For antenna port (54M)	14	16	18	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz			-20	dBr	
2) at fc +/-20MHz			-28	dBr	
3) at fc > +/-30MHz			-40	dBr	
3 Constellation Error(EVM)@ target power					
1) 6Mbps			-5	dB	
2) 9Mbps			-8	dB	

3) 12Mbps			-10	dB	
4) 18Mbps			-13	dB	
5) 24Mbps			-16	dB	
6) 36Mbps			-19	dB	
7) 48Mbps			-22	dB	
8) 54Mbps			-25	dB	
4 Frequency Error	-20		20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 6Mbps (PER ; $\leq$ 10%)			-85	dBm	
2) 9Mbps (PER ; $\leq$ 10%)			-84	dBm	
3) 12Mbps (PER ; $\leq$ 10%)			-82	dBm	
4) 18Mbps (PER ; $\leq$ 10%)			-80	dBm	
5) 24Mbps (PER ; $\leq$ 10%)			-77	dBm	
6) 36Mbps (PER ; $\leq$ 10%)			-73	dBm	
7) 48Mbps (PER ; $\leq$ 10%)			-69	dBm	
8) 54Mbps (PER ; $\leq$ 10%)			-65	dBm	
6 Maximum Input Level (PER ; $\leq$ 10%)	-20			dBm	

IEEE 802.11n HT20 Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11n HT20@ 2.4GHz				
Mode	OFDM				
Channel	CH1 to CH13				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels					
1) For antenna port (MCS7)	13	15	17	dBm	
2. Spectrum Mask @ target power					
1) at fc +/-11MHz			-20	dBr	
2) at fc +/-20MHz			-28	dBr	
3) at fc > +/-30MHz			-45	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0			-5	dB	
2) MCS1			-10	dB	
3) MCS2			-13	dB	
4) MCS3			-16	dB	
5) MCS4			-19	dB	
6) MCS5			-22	dB	
7) MCS6			-25	dB	
8) MCS7			-28	dB	

4. Frequency Error	-20		20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5.Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER10%)			-82	dBm	
2)MCSI (PER10%)			-79	dBm	
3)MCS2 (PER10%)			-77	dBm	
4)MCS3 (PER10%)			-74	dBm	
5)MCS4 (PER10%)			-70	dBm	
6)MCS5 (PER10%)			-66	dBm	
7)MCS6 (PER10%)			-65	dBm	
8)MCS7 (PER10%)			-64	dBm	
7.Maximum Input Level (PER10%)	-20			dBm	

IEEE 802.11n HT40 Section(2.4GHZ)

Items	Contents				
Specification	IEEE802.11n HT40@ 2.4GHz				
Mode	OFDM				
Channel	CH3 to CH11				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port (MCS7)	13	15	17	dBm	
2. Spectrum Mask @target power					
1) at fc +/-22MHz			-20	dBr	
2) at fc +/-40MHz			-28	dBr	
3) at fc > +/-60MHz			-45	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0			-5	dB	
2) MCS1			-10	dB	
3) MCS2			-13	dB	
4) MCS3			-16	dB	
5) MCS4			-19	dB	
6) MCS5			-22	dB	
7) MCS6			-25	dB	
8) MCS7			-28	dB	
4. Frequency Error	-20		20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5. Minimum Input Level Sensitivity (each chain)					
1) MCS0 (PER10%)			-79	dBm	
2)MCSI (PER10%)			-76	dBm	
3)MCS2 (PER10%)			-74	dBm	

4) MCS3 (PER ;£10%)			-71	dBm	
5) MCS4 (PER ;£10%)			-67	dBm	
6) MCS5 (PER ;£10%)			-63	dBm	
7) MCS6 (PER ;£10%)			-62	dBm	
8) MCS7 (PER ;£10%)			-61	dBm	
6. Maximum Input Level (PER ;£10%)	-20			dBm	

IEEE 802.11ax Section(2.4GHz)

Items	Contents				
Specification	IEEE802.11ax				
Mode	BPSK, QPSK, 16QAM, 64QAM,256QAM, 1024QAM and OFDMA				
Channel	HE20: CH1 to CH13 HE40: CH3 to CH11				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port (MCS11)	11	13	15	dBm	
2. Spectrum Mask @VHT20/VHT40/VHT80 target power					
1) at fc +/-11MHz/21MHz/41MHz			-20	dBr	
2) at fc +/-20MHz/40MHz/80MHz			-28	dBr	
3) at fc +/-30MHz/60MHz/120MHz			-40	dBr	
3. Constellation Error(EVM)@ target power					
1) MCS0			-5	dB	
2) MCS1			-10	dB	
3) MCS2			-13	dB	
4) MCS3			-16	dB	
5) MCS4			-19	dB	
6) MCS5			-22	dB	
7) MCS6			-25	dB	
8) MCS7			-27	dB	
9) MCS8			-30	dB	

10) MCS9			-32			dB	
11) MCS10			-34			dB	
12) MCS11			-35			dB	
4. Frequency Error	-20		20			ppm	
RX Characteristics	Min.	Typ.	Max.			Unit	
5. Minimum Input Level Sensitivity (each chain)			HE 20	HE 40			
1) MCS0 (PER ;£10%)			-82	-79		dBm	
2) MCS1 (PER ;£10%)			-79	-76		dBm	

3) MCS2 (PER ;£10%)			-77	-74		dBm	
4) MCS3 (PER ;£10%)			-74	-71		dBm	
5) MCS4 (PER ;£10%)			-70	-67		dBm	
6) MCS5 (PER ;£10%)			-66	-63		dBm	
7) MCS6 (PER ;£10%)			-65	-62		dBm	
8) MCS7 (PER ;£10%)			-64	-61		dBm	
9) MCS8 (PER ;£10%)			-59	-56		dBm	
10) MCS9 (PER ;£10%)			-57	-54		dBm	
11) MCS10 (PER ;£10%)			-54	-51		dBm	
12) MCS11 (PER ;£10%)			-52	-49		dBm	
6. Maximum Input Level (PER ;£10%)	-30					dBm	

IEEE 802.11a Section(SGHz)

Items	Contents				
Specification	IEEE802.11a				
Mode	OFDM				
Channel	CH36 to CH165				
TX Characteristics	Min.	Typ.	Max.	Unit	
1. Power Levels (Calibrated)					
1) For antenna port (54M)	14	16	18	dBm	
2. Spectrum Mask @target power					
1) at fc +/-11MHz			-20	dBr	
2) at fc +/-20MHz			-28	dBr	
3) at fc > +/-30MHz			-40	dBr	
3. Constellation Error(EVM)@ target power					
1) 6Mbps			-5	dB	
2) 9Mbps			-8	dB	
3) 12Mbps			-10	dB	
4) 18Mbps			-13	dB	
5) 24Mbps			-16	dB	
6) 36Mbps			-19	dB	
7) 48Mbps			-22	dB	
8) 54Mbps			-25	dB	
4 Frequency Error	-20		20	ppm	
RX Characteristics	Min.	Typ.	Max.	Unit	
5 Minimum Input Level Sensitivity (each chain)					
1) 6Mbps (PER :;;, 10%)			-82	dBm	
2) 9Mbps (PER :;;, 10%)			-81	dBm	
3) 12Mbps (PER :;;, 10%)			-79	dBm	
4) 18Mbps (PER :;;, 10%)			-77	dBm	

Documents / Resources

