



XR871 RF Validation Report

Revision 1.0

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Revision History

Version	Data	Summary of Changes
1.0	2017-12-1	Initial Version

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1 Introduction

This document is the RF validation report of the XR871, a single-chip wireless MCU for Wi-Fi and Internet-of-Things applications. The key RF performance test results, such as TX power, RX sensitivity etc. are shown in this document.

2 Summary of Test Result

2.1 Current Consumption

Section	Test Item	Status
3	Current Consumption	Excellent

Table 2-1 Summary Test Result of Current Consumption

2.2 WLAN TX Performance

Section	Test Item	Status
4	Transmit Power	Pass

Table 2-2 Summary Test Result of WLAN TX Test

2.3 WLAN RX Performance

Section	Test Item	Status
5.1	Receiver Sensitivity	Pass
5.2	Receiver Maximum Input Level	Pass
5.3	Adjacent channel rejection	Pass
5.4	Nonadjacent channel rejection	Pass

Table 2-3 Summary Test Result of WLAN RX Test

2.4 WLAN Field Trial Test

Section	Test Item	Status
6	Throughput in Shielding Room	Pass

Table 2-4 Summary Test Result of WLAN Field Trial Test

3 Current Consumption

Test Results:

State (at normal condition)	VCC (3.6V)		Unit
	Test	Max.	
MCU Hibernate, WLAN OFF	0.010	-	mA
MCU DeepSleep, WLAN OFF	0.125	-	mA
RX (MCU DeepSleep, WLAN Active, 2.4 GHz, 1M DSSS)	22.5	-	mA
RX (MCU DeepSleep, WLAN Active, 2.4 GHz, 54M OFDM)	22.5	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 19dBm, 1M DSSS)	173.9	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 19dBm, 11M CCK)	175.9	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 15dBm, 6M OFDM)	131.9	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 15dBm, 54M OFDM)	131.9	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 14dBm, MCS0)	125.9	-	mA
TX (MCU DeepSleep, WLAN Active, 2.4 GHz, 14dBm, MCS7)	123.9	-	mA
DTIM1(MCU DeepSleep, WLAN PS Mode)	0.67	-	mA
DTIM3(MCU DeepSleep, WLAN PS Mode)	0.29	-	mA
DTIM10(MCU DeepSleep, WLAN PS Mode)	0.157	-	mA

Table 3-1 Test Result of Current Consumption

4 WLAN TX Performance

4.1 11b Mode

Test Results:

Mode: 11b		Bandwidth: 20MHz					Data Rate: 11Mbps					Temperature: 30°C			
Channel	Spec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Output Power (dBm)	16±2	16.6	16.6	16.5	16.6	16.6	16.5	16.6	16.6	16.7	16.8	16.8	16.8	16.9	17.0
EVM (dB)	<-9	-33	-32	-32	-32	-32	-32	-32	-32	-32	-32	-32	-31	-32	-32
Mask		pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
Freq. Error (KHz)	±60	18.1	18.2	18.3	18.3	18.4	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.6
Symbol Clock Error (ppm)	±25	7.2	7.2	7.3	7.2	7.4	7.4	7.2	7.3	7.4	7.4	7.3	7.2	7.2	7.3
LO Leakage (dB)	<-15	-46	-47	-47	-48	-48	-49	-50	-49	-50	-50	-50	-49	-48	-46

Table 4-1 Test Result of TX Performance in 802.11b Mode

Pass Criteria:

Follow the criterions which are marked in “red color” in the table.

TX output power: 16 ± 2 dBm @ 802.11b 11Mbps.

The mask criterion of 802.11b mode is shown in Figure 4-1.

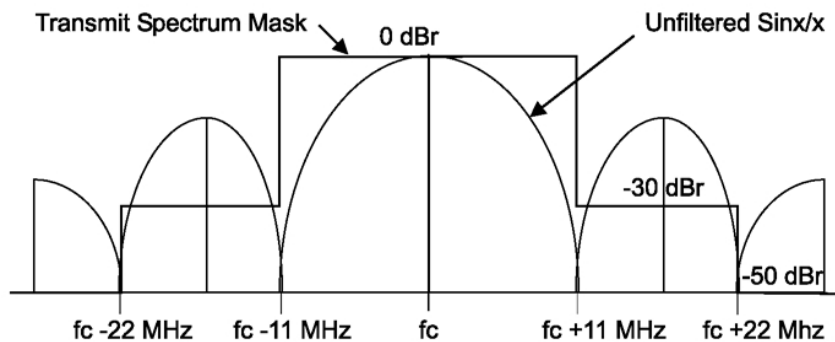


Figure 4-1 11b Mode Transmit Spectrum Mask

4.2 11g Mode

Test Results:

Mode: 11g		Bandwidth: 20MHz						Data Rate: 54Mbps				Temperature: 30°C			
Channel	Spec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Output Power (dBm)	15 ± 2	15.6	15.5	15.5	15.5	15.5	15.5	15.6	15.6	15.6	15.6	15.6	15.7	15.7	15.9
EVM (dB)	<-25	-31	-31	-31	-30	-31	-30	-30	-30	-30	-30	-30	-30	-30	-30
Mask		pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
Freq. Error (KHz)	± 48	17.1	17.1	17.0	17.0	17.0	17.0	17.0	17.1	17.5	16.9	16.9	17.0	17.6	17.7
Symbol Clock Error (ppm)	± 20	8.0	8.5	8.3	7.4	8.3	8.1	7.9	7.9	8.1	7.5	8.0	7.9	8.6	8.5
LO Leakage (dB)	<-15	-51	-50	-49	-49	-50	-49	-49	-48	-47	-48	-47	-47	-47	-50

Table 4-2 Test Result of TX Performance in 802.11g Mode

Pass Criteria:

Follow the criterions which are marked in “red color” in the table.

TX output power: 15 ± 2 dBm @ 802.11g 54Mbps.

The mask criterion of 802.11g mode is shown in Figure 4-2.

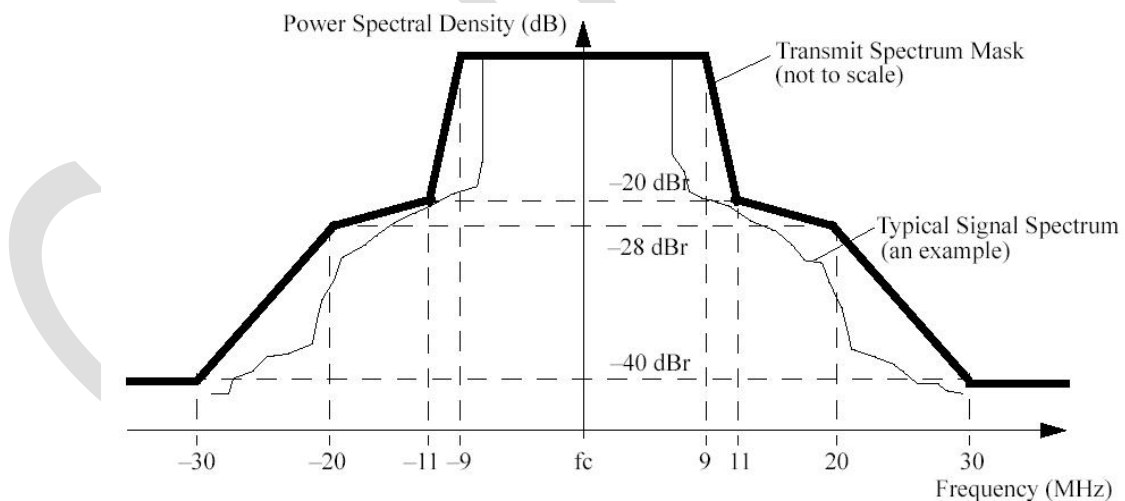


Figure 4-2 11g Mode Transmit Spectrum Mask

4.3 11n Mode

Test Results:

Mode: 11n		Bandwidth: 20MHz						Data Rate: 65Mbps				Temperature: 30°C			
Channel	Spec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Output Power (dBm)	14 ± 2	14.5	14.5	14.5	14.5	14.4	14.5	14.5	14.5	14.5	14.6	14.6	14.7	14.7	14.8
EVM (dB)	<-28	-32	-32	-31	-31	-32	-31	-31	-31	-31	-31	-31	-30	-31	-31
Mask		pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
Freq. Error (KHz)	± 48	16.5	16.4	16.5	16.8	17.0	17.1	17.3	17.5	17.6	17.7	17.8	17.9	17.9	17.9
Symbol Clock Error (ppm)	± 20	7.7	8.2	8.5	8.1	8.4	8.2	8.1	8.2	8.3	9.0	8.9	7.7	8.2	7.6
LO Leakage (dB)	<-15	-51	-49	-49	-50	-50	-49	-49	-48	-48	-48	-50	-49	-48	-49

Table 4-3 Test Result of TX Performance in 802.11n Mode

Pass Criteria:

Follow the criterions which are marked in “red color” in the table.

TX output power: 14 ± 2 dBm @ 802.11n mcs7.

The mask criterion of 802.11n mode is shown in Figure 4-3.

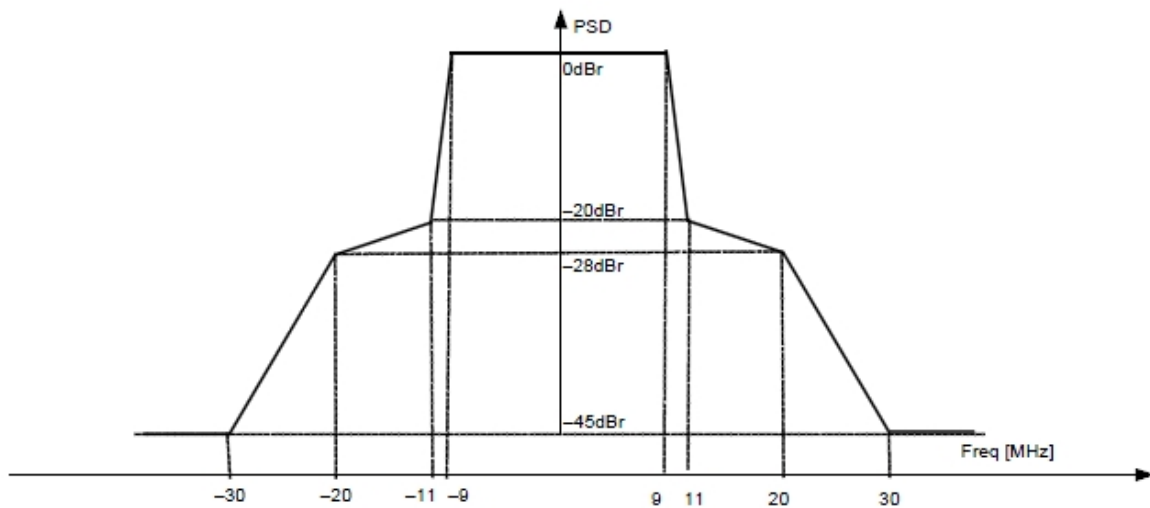


Figure 4-3 11n Mode Transmit Spectrum Mask

5 WLAN RX Performance

5.1 RX Sensitivity

Test Results:

Bandwidth: 20MHz		Temperature: 30°C													
Channel	Spec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
11b @ 11Mbps	<-85	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88
11g @ 54Mbps	<-70	-75	-75	-75	-74	-75	-74	-75	-74	-74	-74	-75	-74	-74	-74
11n @ mcs7	<-69	-72	-72	-72	-72	-72	-72	-72	-72	-72	-72	-72	-72	-72	-72

Table 5-1 Test Result of RX Sensitivity

Pass Criteria:

Follow the criterions which are marked in “red color” in the table.

5.2 RX Maximum Input Level

Test Results:

Bandwidth: 20MHz		Temperature: 30°C													
Channel	Spec.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
11b @ 11Mbps	>-10	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
11g @ 54Mbps	>-20	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
11n @ mcs7	>-20	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0

Table 5-2 Test Result of RX Maximum Input Level

Pass Criteria:

Follow the 802.11 criteria which are marked in "red color" in the table.

5.3 Adjacent Channel Rejection

Test Results:

Bandwidth: 20MHz		Temperature: 30°C			
Channel	Spec.	1	6	11	13
11b @ 11Mbps	>35	35.6	35.6	35.6	35.6
11g @ 54Mbps	>-1	17.6	16.6	16.6	16.6
11n @ mcs7	>-2	10.6	9.6	9.6	9.6

Table 5-3 Test Result of Adjacent Channel Rejection

Pass Criteria:

Follow the 802.11 criteria which are marked in "red color" in the table.

5.4 Nonadjacent Channel Rejection

Test Results:

Bandwidth: 20MHz		Temperature: 30°C			
Channel	Spec.	1	6	11	13
11g @ 54Mbps	>15	25.6	26.6	25.6	25.6
11n @ mcs7	>14	21.6	22.6	21.6	21.6

Table 5-4 Test Result of Nonadjacent Channel Rejection

Pass Criteria:

Follow the 802.11 criteria which are marked in "red color" in the table.

6 WLAN Field Trial Test

Test Equipment:

PC with Pentium 4 CPU inside or better equipment

Shielding room

Chariot v5.0 or later version or Iperf

Test Results:

Bandwidth: 20MHz		Distance: 1m				Mode: TCP				Temperature: 30°C					
Channel	Spec	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Up Link (TX)	>1000 KB	1225	1223	1227	1228	1234	1224	1231	1226	1238	1246	1247	1258	1253	1244
Down Link (RX)	>1000 KB	2387	2381	2368	2384	2372	2365	2354	2363	2345	2357	2374	2386	2375	2347

Table 6-1 Test Result of Throughput in Shielding Room

Pass Criteria:

Follow the criterions which are marked in "red color" in the table.