

STMicroelectronics

TEST REPORT FOR

915 MHz Low Power RF Module Model SP1ML-915

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207 & 15.249

Report No.: 95078-22

Date of issue: January 16, 2014



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

STMicroelectronics
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REPORT PREPARED BY:

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Mariposa, CA 95338

REPRESENTATIVE: Giuseppe Scrocchi

Project Number: 95078

DATE OF EQUIPMENT RECEIPT:

December 16, 2013

DATE(S) OF TESTING:

December 16, 2013 - January 6, 2014

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4	Pass
Fundamental Field Strength	FCC Part 15 Subpart C Section 15.249(a)	Pass
Field Strength of Harmonics	FCC Part 15 Subpart C Section 15.249(b)	Pass
Radiated Emissions	FCC Part 15 Subpart C Section 15.209	Pass
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e)	Pass
-20dBc Occupied Bandwidth	FCC Part 15 Subpart C Section 15.249	Pass
Band Edge Compliance	FCC Part 15 Subpart C Section 15.249	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

915 MHz Low Power RF Module

Manuf: STMicroelectronics

Model: SP1ML-915

Serial: Unit #1

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Module Dev Board

Manuf: STMicroelectronics

Model: SPIRIT1

Serial: 05

AC to USB Power Adapter

Manuf: Rhino

Model: PSNC-75M

Serial: 12-B013481

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **95078** Date: 12/16/2013
 Test Type: **Conducted Emissions** Time: 7:42:42 PM
 Equipment: **915 MHz Low Power RF Module** Sequence#: 18
 Manufacturer: STMicroelectronics Tested By: S. Yamamoto
 Model: SP1ML-915 120V 60Hz
 S/N: Unit #1

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T4	AN00848.1	50uH LISN-Line 1 (L1) (dB)	3816/2nm	3/14/2013	3/14/2015
	AN00848.1	50uH LISN-Line 2 (L2) (dB)	3816/2nm	3/14/2013	3/14/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power at the highest power channel with OOK. Frequency range of data sheet is 150kHz to 30MHz. 150kHz-30MHz RBW=9kHz=VBW. Site D. Temperature: 21°C, Humidity: 35%, Pressure: 100kPa.

Ext Attn: 0 dB

Measurement Data:

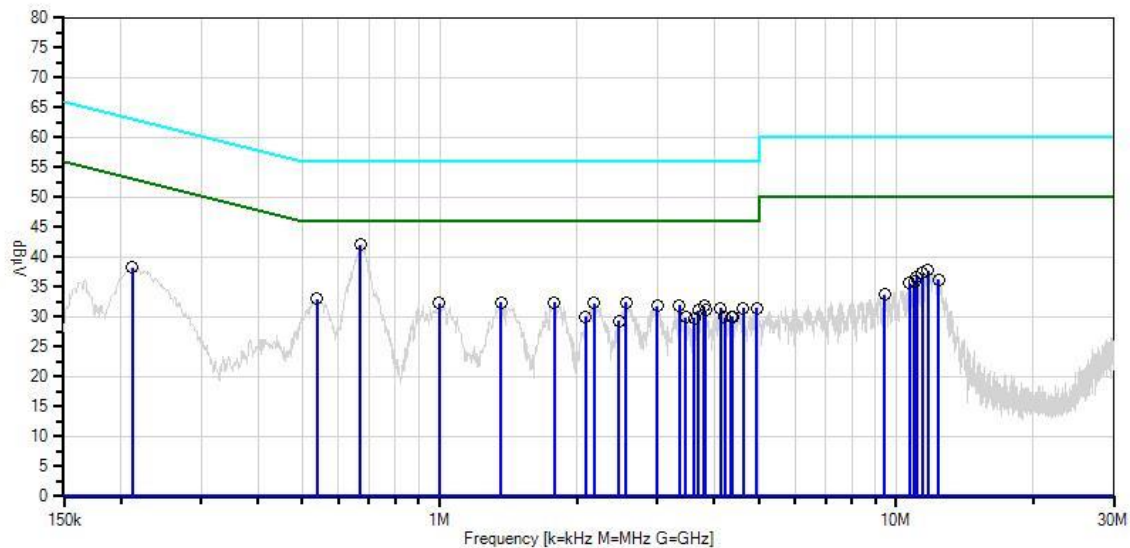
Reading listed by margin.

Test Lead: L1(L)

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	670.679k	36.0	+0.2	+0.1	+5.7	+0.1	+0.0	42.1	46.0	-3.9	L1(L)
2	11.743M	31.2	+0.2	+0.3	+5.8	+0.3	+0.0	37.8	50.0	-12.2	L1(L)
3	11.409M	30.7	+0.2	+0.3	+5.8	+0.3	+0.0	37.3	50.0	-12.7	L1(L)
4	538.328k	27.0	+0.2	+0.1	+5.7	+0.0	+0.0	33.0	46.0	-13.0	L1(L)
5	11.085M	30.1	+0.2	+0.3	+5.8	+0.3	+0.0	36.7	50.0	-13.3	L1(L)
6	1.362M	26.5	+0.1	+0.1	+5.7	+0.1	+0.0	32.5	46.0	-13.5	L1(L)
7	1.783M	26.4	+0.2	+0.1	+5.7	+0.1	+0.0	32.5	46.0	-13.5	L1(L)
8	2.561M	26.3	+0.2	+0.2	+5.7	+0.1	+0.0	32.5	46.0	-13.5	L1(L)
9	996.281k	26.3	+0.1	+0.1	+5.7	+0.1	+0.0	32.3	46.0	-13.7	L1(L)
10	2.179M	26.2	+0.2	+0.1	+5.7	+0.1	+0.0	32.3	46.0	-13.7	L1(L)
11	12.409M	29.5	+0.2	+0.4	+5.8	+0.3	+0.0	36.2	50.0	-13.8	L1(L)
12	3.348M	25.9	+0.1	+0.2	+5.7	+0.1	+0.0	32.0	46.0	-14.0	L1(L)
13	10.977M	29.4	+0.2	+0.3	+5.8	+0.3	+0.0	36.0	50.0	-14.0	L1(L)
14	2.999M	25.7	+0.2	+0.2	+5.7	+0.1	+0.0	31.9	46.0	-14.1	L1(L)
15	3.795M	25.7	+0.1	+0.2	+5.7	+0.1	+0.0	31.8	46.0	-14.2	L1(L)
16	10.697M	29.1	+0.2	+0.3	+5.8	+0.3	+0.0	35.7	50.0	-14.3	L1(L)
17	4.131M	25.4	+0.1	+0.2	+5.7	+0.1	+0.0	31.5	46.0	-14.5	L1(L)
18	4.620M	25.4	+0.1	+0.2	+5.7	+0.1	+0.0	31.5	46.0	-14.5	L1(L)
19	4.956M	25.4	+0.1	+0.2	+5.7	+0.1	+0.0	31.5	46.0	-14.5	L1(L)
20	211.813k	32.3	+0.2	+0.1	+5.7	+0.0	+0.0	38.3	53.1	-14.8	L1(L)

21	3.688M	25.0	+0.1	+0.2	+5.7	+0.1	+0.0	31.1	46.0	-14.9	L1(L)
22	3.820M	25.0	+0.1	+0.2	+5.7	+0.1	+0.0	31.1	46.0	-14.9	L1(L)
23	2.085M	24.0	+0.2	+0.1	+5.7	+0.1	+0.0	30.1	46.0	-15.9	L1(L)
24	4.377M	24.0	+0.1	+0.2	+5.7	+0.1	+0.0	30.1	46.0	-15.9	L1(L)
25	3.454M	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	L1(L)
26	4.220M	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	L1(L)
27	4.356M	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	L1(L)
28	3.607M	23.7	+0.1	+0.2	+5.7	+0.1	+0.0	29.8	46.0	-16.2	L1(L)
29	9.454M	27.2	+0.2	+0.3	+5.8	+0.3	+0.0	33.8	50.0	-16.2	L1(L)
30	2.472M	23.2	+0.2	+0.2	+5.7	+0.1	+0.0	29.4	46.0	-16.6	L1(L)

CKC Laboratories, Inc. Date: 12/16/2013 Time: 7:42:42 PM STMicroelectronics WO#: 95078
15.207 AC Mains - Average Test Lead: L1(L) 120V 60Hz Sequence#: 18 Ext ATTN: 0 dB



— Sweep Data
○ Peak Readings
* Average Readings
— 1 - 15.207 AC Mains - Average
— Readings
× QP Readings
▼ Ambient
— 2 - 15.207 AC Mains - Quasi-peak

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **95078**
 Test Type: **Conducted Emissions**
 Equipment: **915 MHz Low Power RF Module**
 Manufacturer: **STMicroelectronics**
 Model: **SP1ML-915**
 S/N: **Unit #1**

Date: 12/16/2013
 Time: 7:45:49 PM
 Sequence#: 19
 Tested By: S. Yamamoto
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
	AN00848.1	50uH LISN-Line 1 (L1) (dB)	3816/2nm	3/14/2013	3/14/2015
T4	AN00848.1	50uH LISN-Line 2 (L2) (dB)	3816/2nm	3/14/2013	3/14/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power at the highest power channel with OOK. Frequency range of data sheet is 150kHz to 30MHz. 150kHz-30MHz RBW=9kHz=VBW. Site D. Temperature: 21°C, Humidity: 35%, Pressure: 100kPa.

Ext Attn: 0 dB

Measurement Data:

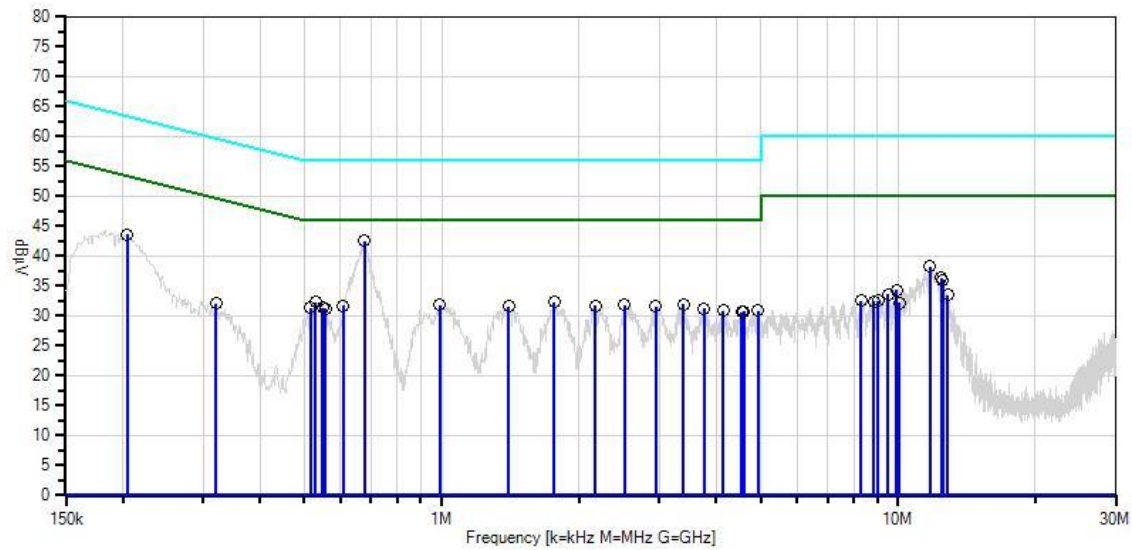
Reading listed by margin.

Test Lead: (N)L2

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	676.497k	36.6	+0.2	+0.1	+5.7	+0.0	+0.0	42.6	46.0	-3.4	(N)L2
2	204.540k	37.6	+0.2	+0.1	+5.7	+0.0	+0.0	43.6	53.4	-9.8	(N)L2
3	11.770M	31.7	+0.2	+0.3	+5.8	+0.3	+0.0	38.3	50.0	-11.7	(N)L2
4	12.436M	29.7	+0.2	+0.4	+5.8	+0.3	+0.0	36.4	50.0	-13.6	(N)L2
5	528.147k	26.2	+0.2	+0.1	+5.7	+0.1	+0.0	32.3	46.0	-13.7	(N)L2

6	1.762M	26.2	+0.2	+0.1	+5.7	+0.1	+0.0	32.3	46.0	-13.7	(N)L2
7	3.382M	25.9	+0.1	+0.2	+5.7	+0.1	+0.0	32.0	46.0	-14.0	(N)L2
8	12.517M	29.3	+0.2	+0.4	+5.8	+0.3	+0.0	36.0	50.0	-14.0	(N)L2
9	992.029k	25.9	+0.1	+0.1	+5.7	+0.1	+0.0	31.9	46.0	-14.1	(N)L2
10	2.515M	25.6	+0.2	+0.2	+5.7	+0.1	+0.0	31.8	46.0	-14.2	(N)L2
11	608.867k	25.7	+0.2	+0.1	+5.7	+0.0	+0.0	31.7	46.0	-14.3	(N)L2
12	2.174M	25.6	+0.2	+0.1	+5.7	+0.1	+0.0	31.7	46.0	-14.3	(N)L2
13	1.405M	25.6	+0.1	+0.1	+5.7	+0.1	+0.0	31.6	46.0	-14.4	(N)L2
14	2.944M	25.4	+0.2	+0.2	+5.7	+0.1	+0.0	31.6	46.0	-14.4	(N)L2
15	548.509k	25.3	+0.2	+0.1	+5.7	+0.1	+0.0	31.4	46.0	-14.6	(N)L2
16	515.057k	25.3	+0.2	+0.1	+5.7	+0.1	+0.0	31.4	46.0	-14.6	(N)L2
17	3.761M	25.2	+0.1	+0.2	+5.7	+0.1	+0.0	31.3	46.0	-14.7	(N)L2
18	555.781k	25.1	+0.2	+0.1	+5.7	+0.1	+0.0	31.2	46.0	-14.8	(N)L2
19	4.143M	24.8	+0.1	+0.2	+5.7	+0.1	+0.0	30.9	46.0	-15.1	(N)L2
20	4.939M	24.8	+0.1	+0.2	+5.7	+0.1	+0.0	30.9	46.0	-15.1	(N)L2
21	4.594M	24.7	+0.1	+0.2	+5.7	+0.1	+0.0	30.8	46.0	-15.2	(N)L2
22	4.543M	24.6	+0.1	+0.2	+5.7	+0.1	+0.0	30.7	46.0	-15.3	(N)L2
23	9.932M	27.8	+0.2	+0.3	+5.8	+0.3	+0.0	34.4	50.0	-15.6	(N)L2
24	9.517M	27.0	+0.2	+0.3	+5.8	+0.3	+0.0	33.6	50.0	-16.4	(N)L2
25	12.869M	26.8	+0.2	+0.4	+5.8	+0.3	+0.0	33.5	50.0	-16.5	(N)L2
26	8.301M	26.1	+0.2	+0.3	+5.8	+0.2	+0.0	32.6	50.0	-17.4	(N)L2
27	9.040M	26.0	+0.2	+0.3	+5.8	+0.3	+0.0	32.6	50.0	-17.4	(N)L2
28	8.851M	25.9	+0.2	+0.3	+5.8	+0.3	+0.0	32.5	50.0	-17.5	(N)L2
29	320.166k	26.1	+0.2	+0.1	+5.7	+0.0	+0.0	32.1	49.7	-17.6	(N)L2
30	10.058M	25.6	+0.2	+0.3	+5.8	+0.3	+0.0	32.2	50.0	-17.8	(N)L2

CKC Laboratories, Inc. Date: 12/16/2013 Time: 7:45:49 PM STMicroelectronics WO#: 95078
15.207 AC Mains - Average Test Lead: (N)L2 120V 60Hz Sequence#: 19 ExtATTN: 0 dB



Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **95078**
 Test Type: **Conducted Emissions**
 Equipment: **915 MHz Low Power RF Module**
 Manufacturer: **STMicroelectronics**
 Model: **SP1ML-915**
 S/N: **Unit #1**

Date: 1/6/2014
 Time: 4:41:59 PM
 Sequence#: 20
 Tested By: S. Yamamoto
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
T4	AN00848.1	50uH LISN-Line 1 (L1) (dB)	3816/2nm	3/14/2013	3/14/2015
	AN00848.1	50uH LISN-Line 2 (L2) (dB)	3816/2nm	3/14/2013	3/14/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power at the highest power channel with ASK. Frequency range of data sheet is 150kHz to 30MHz. 150kHz-30MHz RBW=9kHz=VBW. Site D. Temperature: 26°C, Humidity: 31%, Pressure: 100kPa.

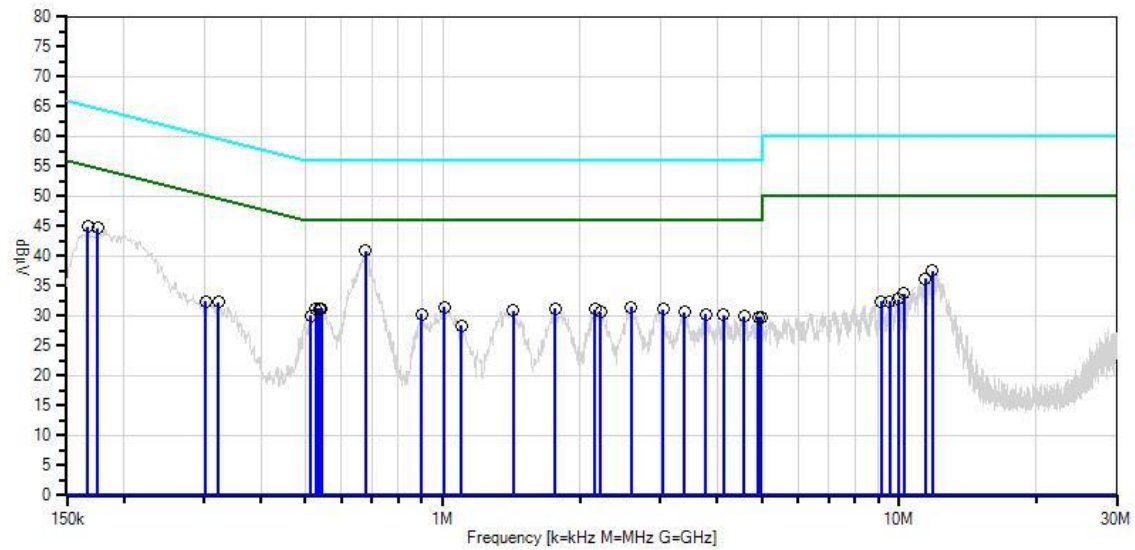
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Lead: L1(L)

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	677.952k	34.8	+0.2	+0.1	+5.7	+0.1	+0.0	40.9	46.0	-5.1	L1(L)
2	175.452k	38.5	+0.4	+0.1	+5.7	+0.0	+0.0	44.7	54.7	-10.0	L1(L)
3	166.726k	38.7	+0.4	+0.1	+5.7	+0.0	+0.0	44.9	55.1	-10.2	L1(L)
4	11.824M	30.9	+0.2	+0.3	+5.8	+0.3	+0.0	37.5	50.0	-12.5	L1(L)
5	11.418M	29.7	+0.2	+0.3	+5.8	+0.3	+0.0	36.3	50.0	-13.7	L1(L)

6	1.009M	25.5	+0.1	+0.1	+5.7	+0.1	+0.0	31.5	46.0	-14.5	L1(L)
7	2.587M	25.3	+0.2	+0.2	+5.7	+0.1	+0.0	31.5	46.0	-14.5	L1(L)
8	527.420k	25.3	+0.2	+0.1	+5.7	+0.0	+0.0	31.3	46.0	-14.7	L1(L)
9	542.691k	25.3	+0.2	+0.1	+5.7	+0.0	+0.0	31.3	46.0	-14.7	L1(L)
10	1.766M	25.2	+0.2	+0.1	+5.7	+0.1	+0.0	31.3	46.0	-14.7	L1(L)
11	536.874k	25.2	+0.2	+0.1	+5.7	+0.0	+0.0	31.2	46.0	-14.8	L1(L)
12	2.153M	25.0	+0.2	+0.1	+5.7	+0.1	+0.0	31.1	46.0	-14.9	L1(L)
13	3.042M	24.9	+0.2	+0.2	+5.7	+0.1	+0.0	31.1	46.0	-14.9	L1(L)
14	1.426M	24.8	+0.2	+0.1	+5.7	+0.1	+0.0	30.9	46.0	-15.1	L1(L)
15	2.221M	24.6	+0.2	+0.1	+5.7	+0.1	+0.0	30.7	46.0	-15.3	L1(L)
16	3.386M	24.5	+0.1	+0.2	+5.7	+0.1	+0.0	30.6	46.0	-15.4	L1(L)
17	898.469k	24.3	+0.1	+0.1	+5.7	+0.1	+0.0	30.3	46.0	-15.7	L1(L)
18	3.773M	24.2	+0.1	+0.2	+5.7	+0.1	+0.0	30.3	46.0	-15.7	L1(L)
19	4.118M	24.1	+0.1	+0.2	+5.7	+0.1	+0.0	30.2	46.0	-15.8	L1(L)
20	513.603k	24.0	+0.2	+0.1	+5.7	+0.0	+0.0	30.0	46.0	-16.0	L1(L)
21	4.569M	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	L1(L)
22	4.922M	23.7	+0.1	+0.2	+5.7	+0.1	+0.0	29.8	46.0	-16.2	L1(L)
23	4.985M	23.7	+0.1	+0.2	+5.7	+0.1	+0.0	29.8	46.0	-16.2	L1(L)
24	10.256M	27.1	+0.2	+0.3	+5.8	+0.3	+0.0	33.7	50.0	-16.3	L1(L)
25	9.968M	26.2	+0.2	+0.3	+5.8	+0.3	+0.0	32.8	50.0	-17.2	L1(L)
26	322.348k	26.3	+0.2	+0.1	+5.7	+0.0	+0.0	32.3	49.6	-17.3	L1(L)
27	1.098M	22.4	+0.1	+0.1	+5.7	+0.1	+0.0	28.4	46.0	-17.6	L1(L)
28	9.130M	25.8	+0.2	+0.3	+5.8	+0.3	+0.0	32.4	50.0	-17.6	L1(L)
29	9.553M	25.8	+0.2	+0.3	+5.8	+0.3	+0.0	32.4	50.0	-17.6	L1(L)
30	302.713k	26.4	+0.2	+0.1	+5.7	+0.0	+0.0	32.4	50.2	-17.8	L1(L)

CKC Laboratories, Inc. Date: 1/6/2014 Time: 4:41:59 PM STMicroelectronics WO#: 95078
 15.207 AC Mains - Average Test Lead: L1(L) 120V 60Hz Sequence#: 20 Ext ATTN: 0 dB



- | | |
|---------------------------------|------------------------------------|
| — Sweep Data | — Readings |
| ○ Peak Readings | × QP Readings |
| * Average Readings | ▼ Ambient |
| — 1 - 15.207 AC Mains - Average | — 2 - 15.207 AC Mains - Quasi-peak |

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **95078**
 Test Type: **Conducted Emissions**
 Equipment: **915 MHz Low Power RF Module**
 Manufacturer: **STMicroelectronics**
 Model: **SP1ML-915**
 S/N: **Unit #1**

Date: 1/6/2014
 Time: 4:46:15 PM
 Sequence#: 21
 Tested By: S. Yamamoto
 120V 60Hz

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/10/2013	1/10/2015
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/14/2012	12/14/2014
	AN00848.1	50uH LISN-Line 1 (L1) (dB)	3816/2nm	3/14/2013	3/14/2015
T4	AN00848.1	50uH LISN-Line 2 (L2) (dB)	3816/2nm	3/14/2013	3/14/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power at the highest power channel with ASK. Frequency range of data sheet is 150kHz to 30MHz. 150kHz-30MHz RBW=9kHz=VBW. Site D. Temperature: 26°C, Humidity: 31%, Pressure: 100kPa.

Ext Attn: 0 dB

Measurement Data:

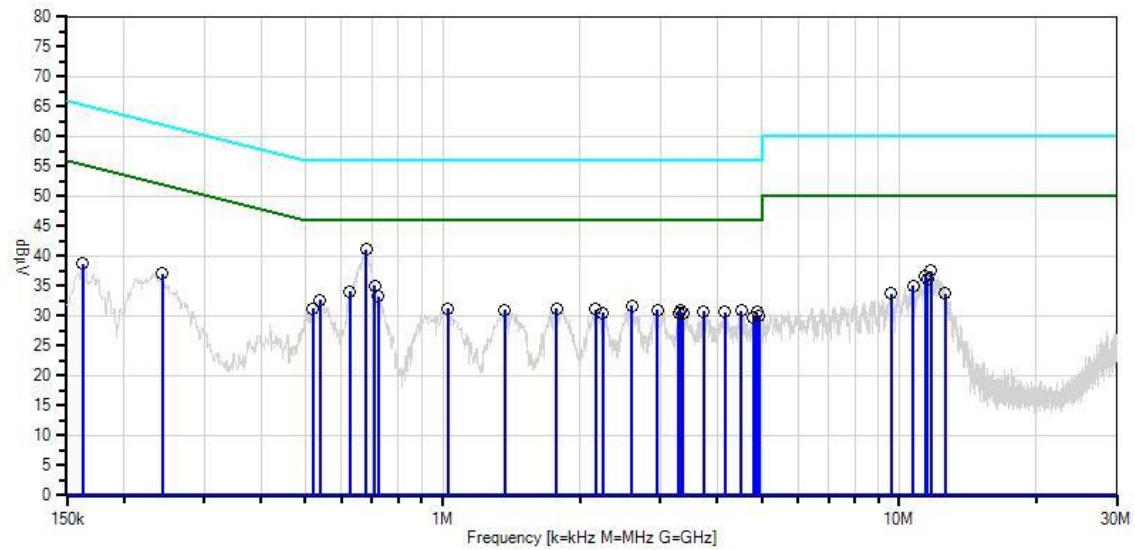
Reading listed by margin.

Test Lead: (N)L2

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	680.133k	35.1	+0.2	+0.1	+5.7	+0.0	+0.0	41.1	46.0	-4.9	(N)L2
2	710.676k	29.2	+0.1	+0.1	+5.7	+0.0	+0.0	35.1	46.0	-10.9	(N)L2
3	625.593k	28.1	+0.2	+0.1	+5.7	+0.0	+0.0	34.1	46.0	-11.9	(N)L2
4	11.734M	31.0	+0.2	+0.3	+5.8	+0.3	+0.0	37.6	50.0	-12.4	(N)L2
5	721.584k	27.4	+0.1	+0.1	+5.7	+0.0	+0.0	33.3	46.0	-12.7	(N)L2

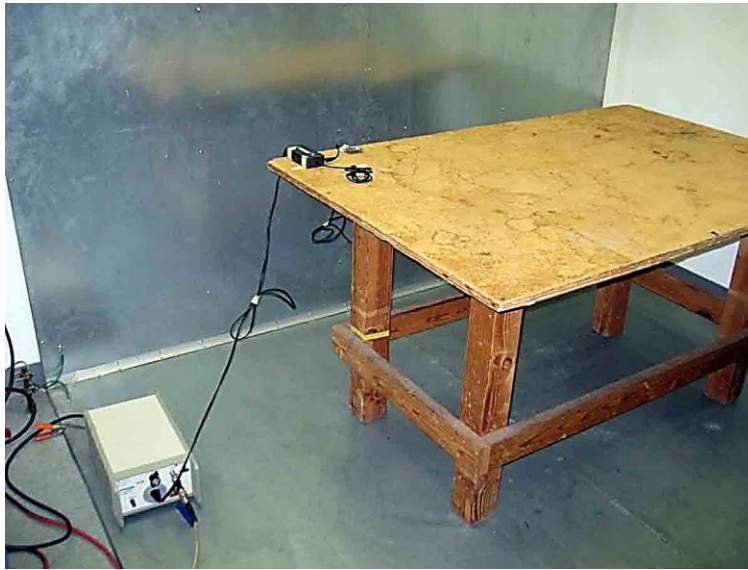
6	538.328k	26.6	+0.2	+0.1	+5.7	+0.1	+0.0	32.7	46.0	-13.3	(N)L2
7	11.409M	30.1	+0.2	+0.3	+5.8	+0.3	+0.0	36.7	50.0	-13.3	(N)L2
8	11.535M	29.7	+0.2	+0.3	+5.8	+0.3	+0.0	36.3	50.0	-13.7	(N)L2
9	2.600M	25.5	+0.2	+0.2	+5.7	+0.1	+0.0	31.7	46.0	-14.3	(N)L2
10	520.148k	25.2	+0.2	+0.1	+5.7	+0.1	+0.0	31.3	46.0	-14.7	(N)L2
11	1.026M	25.3	+0.1	+0.1	+5.7	+0.1	+0.0	31.3	46.0	-14.7	(N)L2
12	1.775M	25.1	+0.2	+0.1	+5.7	+0.1	+0.0	31.2	46.0	-14.8	(N)L2
13	243.082k	31.1	+0.2	+0.1	+5.7	+0.0	+0.0	37.1	52.0	-14.9	(N)L2
14	2.166M	25.0	+0.2	+0.1	+5.7	+0.1	+0.0	31.1	46.0	-14.9	(N)L2
15	10.743M	28.4	+0.2	+0.3	+5.8	+0.3	+0.0	35.0	50.0	-15.0	(N)L2
16	1.366M	25.0	+0.1	+0.1	+5.7	+0.1	+0.0	31.0	46.0	-15.0	(N)L2
17	2.957M	24.8	+0.2	+0.2	+5.7	+0.1	+0.0	31.0	46.0	-15.0	(N)L2
18	3.310M	24.9	+0.1	+0.2	+5.7	+0.1	+0.0	31.0	46.0	-15.0	(N)L2
19	4.518M	24.8	+0.1	+0.2	+5.7	+0.1	+0.0	30.9	46.0	-15.1	(N)L2
20	3.731M	24.7	+0.1	+0.2	+5.7	+0.1	+0.0	30.8	46.0	-15.2	(N)L2
21	4.883M	24.6	+0.1	+0.2	+5.7	+0.1	+0.0	30.7	46.0	-15.3	(N)L2
22	4.156M	24.5	+0.1	+0.2	+5.7	+0.1	+0.0	30.6	46.0	-15.4	(N)L2
23	2.242M	24.3	+0.2	+0.2	+5.7	+0.1	+0.0	30.5	46.0	-15.5	(N)L2
24	3.293M	24.4	+0.1	+0.2	+5.7	+0.1	+0.0	30.5	46.0	-15.5	(N)L2
25	3.357M	24.4	+0.1	+0.2	+5.7	+0.1	+0.0	30.5	46.0	-15.5	(N)L2
26	4.926M	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	(N)L2
27	4.802M	23.7	+0.1	+0.2	+5.7	+0.1	+0.0	29.8	46.0	-16.2	(N)L2
28	12.625M	27.1	+0.2	+0.4	+5.8	+0.3	+0.0	33.8	50.0	-16.2	(N)L2
29	9.616M	27.1	+0.2	+0.3	+5.8	+0.3	+0.0	33.7	50.0	-16.3	(N)L2
30	162.363k	32.4	+0.5	+0.1	+5.7	+0.0	+0.0	38.7	55.3	-16.6	(N)L2

CKC Laboratories, Inc. Date: 1/6/2014 Time: 4:46:15 PM STMicroelectronics WO#: 95078
15.207 AC Mains - Average Test Lead: (N)L2 120V 60Hz Sequence#: 21 Ext.ATTN: 0 dB

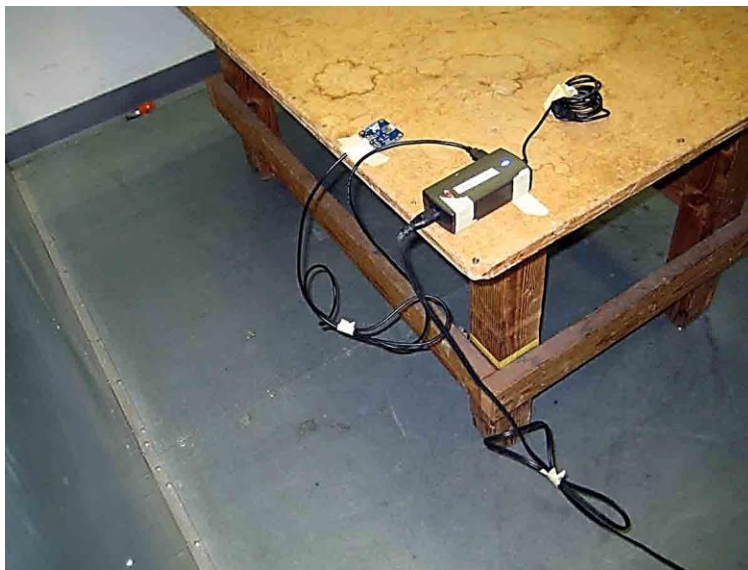


— Sweep Data
○ Peak Readings
* Average Readings
— Readings
× QP Readings
▼ Ambient
— 1 - 15.207 AC Mains - Average
— 2 - 15.207 AC Mains - Quasi-peak

Test Setup Photos



Front View



Back View

15.249(a) RF Power Output

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**

Specification: **15.249(a)**

Work Order #: **95078**

Date: 12/15/2013, 01/06/2014

Test Type: **Field Strength of Fundamental**

Equipment: **915 MHz Low Power RF Module**

Manufacturer: STMicroelectronics

Tested By: S. Yamamoto

Model: SP1ML-915

S/N: Unit #1

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014
AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power to the integral antenna. Data taken with EUT at a low, middle, and high channel. Frequency range of test 902 MHz to 928 MHz. Operating range of EUT 902 MHz to 928 MHz. RBW=120kHz, VBW=300kHz for OOK. Site D. Temperature: 21°C, Humidity: 38%, Pressure: 100kPa. Data taken with EUT positioned in each axis system and a total of six orientations. Maximum levels reported.

15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)
902-928 MHz	50

15.249(c)

Field strength limits are specified at a distance of 3 meters.

15.249(a) OOK Measured

Frequency (MHz)	Field strength (millivolts/meter)
902.5	46.7
915	48.3
927.5	24.2

Distance=3 meters

15.249(a) ASK Measured

Frequency (MHz)	Field strength (millivolts/meter)
902.5	46.7
915	46.7
927.5	29.4

Distance=3 meters

Test Setup Photos



15.249(b) Field Strength of Harmonics

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.249(a)**
 Work Order #: **95078** Date: 12/16/2013, 01/06/2014
 Test Type: **Field Strength of Harmonics**
 Equipment: **915 MHz Low Power RF Module**
 Manufacturer: STMicroelectronics Tested By: S. Yamamoto
 Model: SP1ML-915
 S/N: Unit #1

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
AN00787	Preamplifier	83017A	5/31/2013	5/31/2015
AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
ANP06360	Cable	L1-PNMMN-48	8/29/2012	8/29/2014
AN03169	High Pass Filter	HM1155-11SS	7/30/2013	7/30/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power to the integral antenna. Data taken with EUT at a low, middle, and high channel. Frequency range of test 1 GHz to 10 GHz. Operating range of EUT 902 MHz to 928 MHz. 1000MHz to 10000MHz RBW=VBW=1MHz for OOK. Site D. Temperature: 21°C, Humidity: 38%, Pressure: 100kPa. Data taken with EUT positioned in each axis system and a total of six orientations. Maximum levels reported.

15.249(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of harmonics (microvolts/meter)
902-928 MHz	500

15.249(c)

Field strength limits are specified at a distance of 3 meters.

15.249(a) OOK Measured

Frequency (MHz)	Field strength of harmonics (microvolts/meter)
6492.845	223.3
7220.1	223.3
6317.678	208.9
6317.011	206.5
2782.51	201.8
1805.015	199.5
2782.595	197.2
8347.411	195.0
6317.734	195.0
2782.565	192.8

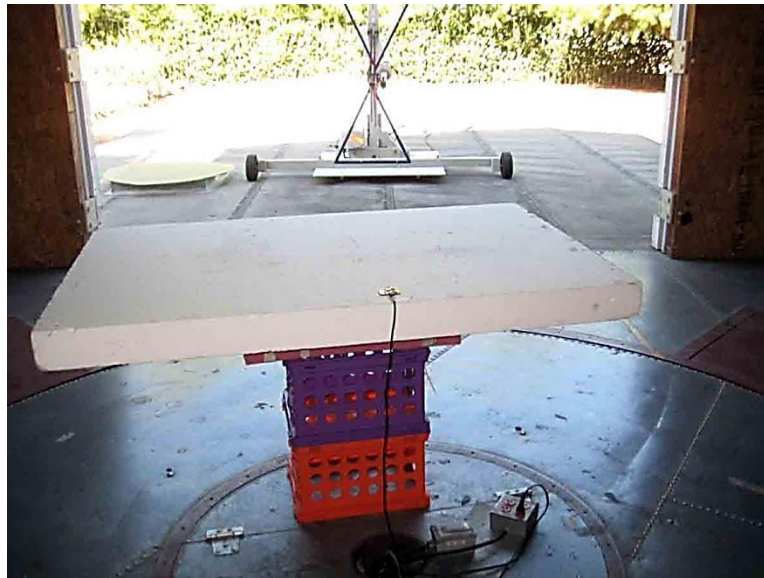
Distance=3 meters

15.249(a) ASK Measured

Frequency (MHz)	Field strength of harmonics (microvolts/meter)
6492.478	223.3
7219.946	218.8
6317.469	211.3
1805.034	211.3
2782.449	201.8
7220.003	197.2
6317.421	197.2
6492.475	192.8
1804.989	190.5
6317.273	186.2

Distance=3 meters

Test Setup Photos



15.209 Radiated Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **95078** Date: 12/16/2013
 Test Type: **Maximized Emissions** Time: 11:47:23
 Equipment: **915 MHz Low Power RF Module** Sequence#: 4
 Manufacturer: STMicroelectronics Tested By: S. Yamamoto
 Model: SP1ML-915
 S/N: Unit #1

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
	ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
	ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
	ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014
	AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
	AN00010	Preamp	8447D	3/29/2012	3/29/2014
	AN00787	Preamp	83017A	5/31/2013	5/31/2015
	AN01646	Horn Antenna	3115	4/13/2012	4/13/2014
	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
	ANP06360	Cable	L1-PNMNM-48	8/29/2012	8/29/2014
	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

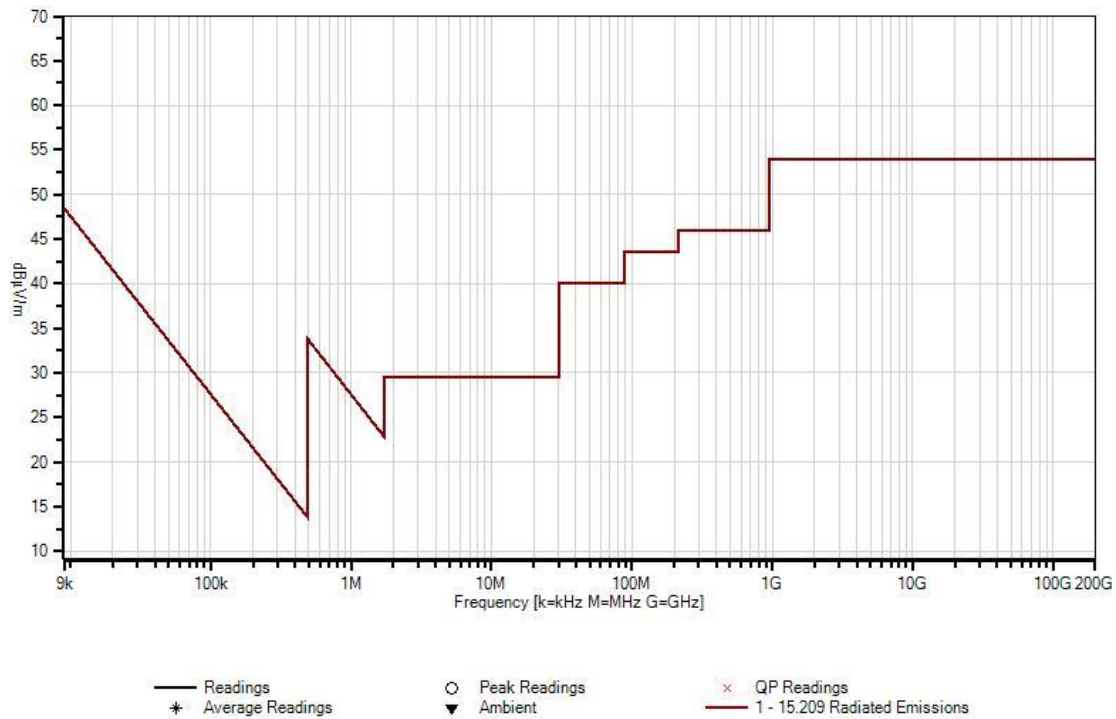
Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power with OOK and ASK. Data taken at a low, middle, and high channel. Data taken with EUT positioned in each axis system and a total of six orientations. Frequency range of data sheet is 9kHz to 10GHz. 9kHz to 150kHz RBW=VBW=200Hz. 150kHz to 30MHz RBW=VBW=9kHz. 30MHz to 1000MHz RBW=VBW=120kHz. 1000MHz to 10000MHz RBW=VBW=1MHz. Site D. Temperature: 25°C, Humidity: 35%, Pressure: 100kPa.

No emissions found within 20dB of the limit line for both OOK and ASK.

CKC Laboratories, Inc. Date: 12/16/2013 Time: 11:47:23 STMicroelectronics WO#: 95078
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 4 Ext ATTN: 0 dB



Test Setup Photos



15.31(e) Voltage Variations

Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**

Specification: **15.31(e)**

Work Order #: **95078** Date: 12/15/2013, 01/06/2014

Test Type: **Voltage Variation on Power**

Equipment: **915 MHz Low Power RF Module**

Manufacturer: STMicroelectronics Tested By: S. Yamamoto

Model: SP1ML-915

S/N: Unit #1

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
AN01438	DC Power Supply	6306D	1/11/2013	1/11/2015
AN01830	Multimeter	45	1/8/2013	1/8/2015
ANP05555	Cable	RG223/U	6/19/2012	6/19/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board is powered from the USB cable port on the module dev board. The EUT is powered from the external dc power supply. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power to the integral antenna. Data taken at a low, middle, and high channel. Frequency range of test 902 MHz to 928 MHz. Operating range of EUT 902 MHz to 928 MHz. RBW=120kHz, VBW=300kHz for OOK. Site D. Temperature: 21°C, Humidity: 38%, Pressure: 100kPa. Manufacturers declared nominal voltage is 2.5Vdc. The supply voltage was varied between 85% and 115% of the nominal rated voltage. There was no variation in power for the supply voltage at 85% and 115% of the nominal rated voltage.

15.31(e)

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

15.31(e) OOK

902.5MHz at 85% nominal voltage, and 115% of nominal voltage. E=46.7mV/m

915MHz at 85% nominal voltage, and 115% of nominal voltage. E=48.3mV/m

927.5MHz at 85% nominal voltage, and 115% of nominal voltage. E=24.2mV/m

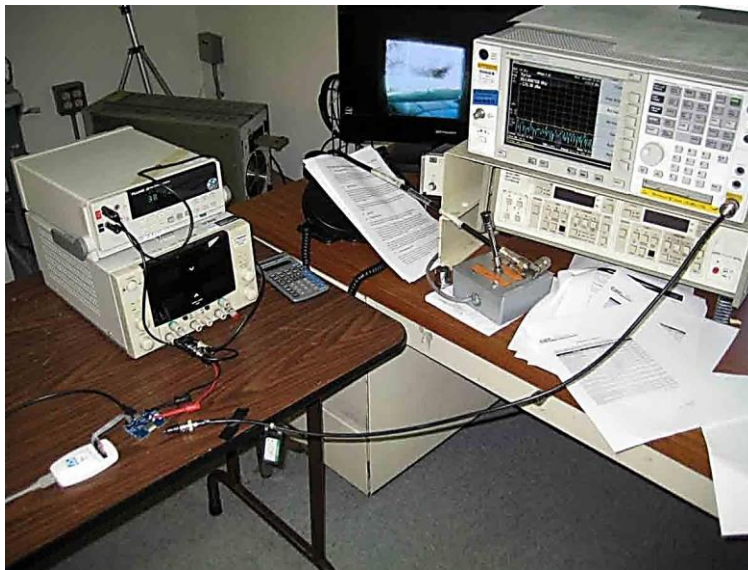
15.31(e) ASK

902.5MHz at 85% nominal voltage, and 115% of nominal voltage. E=46.7mV/m

915MHz at 85% nominal voltage, and 115% of nominal voltage. E=46.7mV/m

927.5MHz at 85% nominal voltage, and 115% of nominal voltage. E=29.4mV/m

Test Setup Photos



-20dBc Occupied Bandwidth

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**

Specification: **2.1049**

Work Order #: **95078** Date: 12/16/2013, 01/06/2014

Test Type: **Occupied Bandwidth**

Equipment: **915 MHz Low Power RF Module**

Manufacturer: STMicroelectronics Tested By: S. Yamamoto

Model: SP1ML-915

S/N: Unit #1

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014
AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

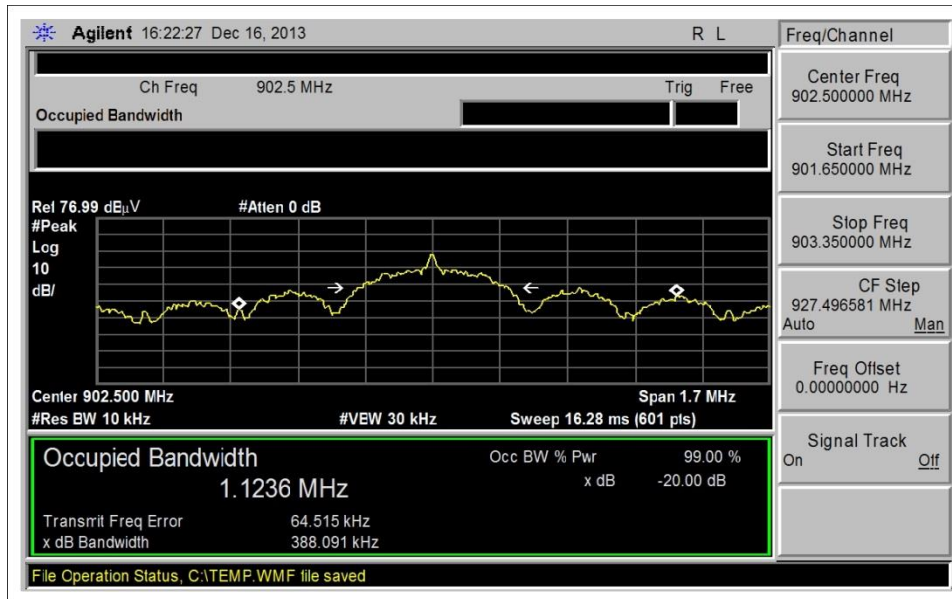
Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

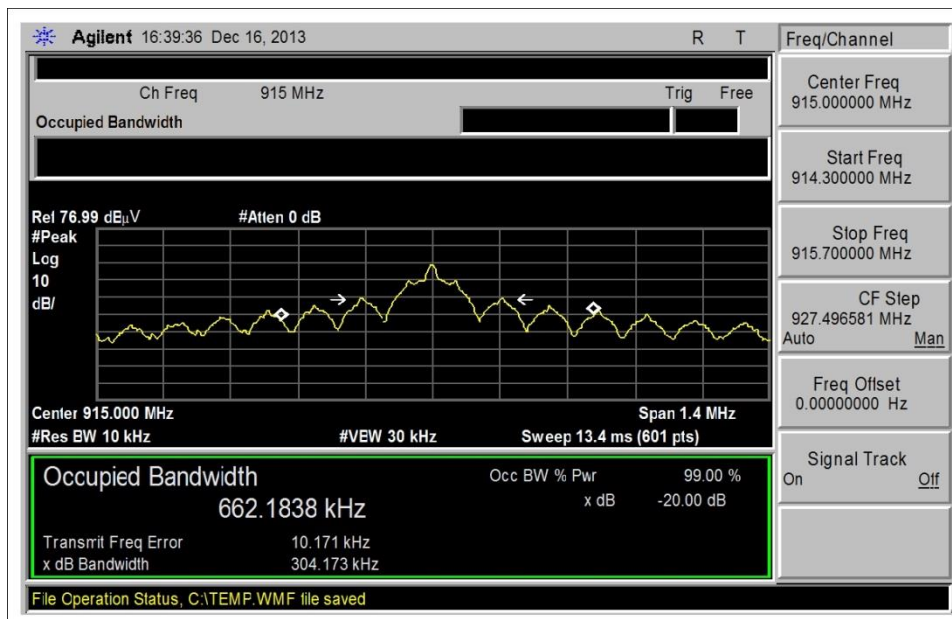
Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power to the integral antenna with OOK and ASK. Frequency range of test 902 MHz to 928 MHz. Operating range of EUT 902 MHz to 928 MHz. RBW=10kHz, VBW=30kHz. Site D. Temperature: 21°C, Humidity: 38%, Pressure: 100kPa.

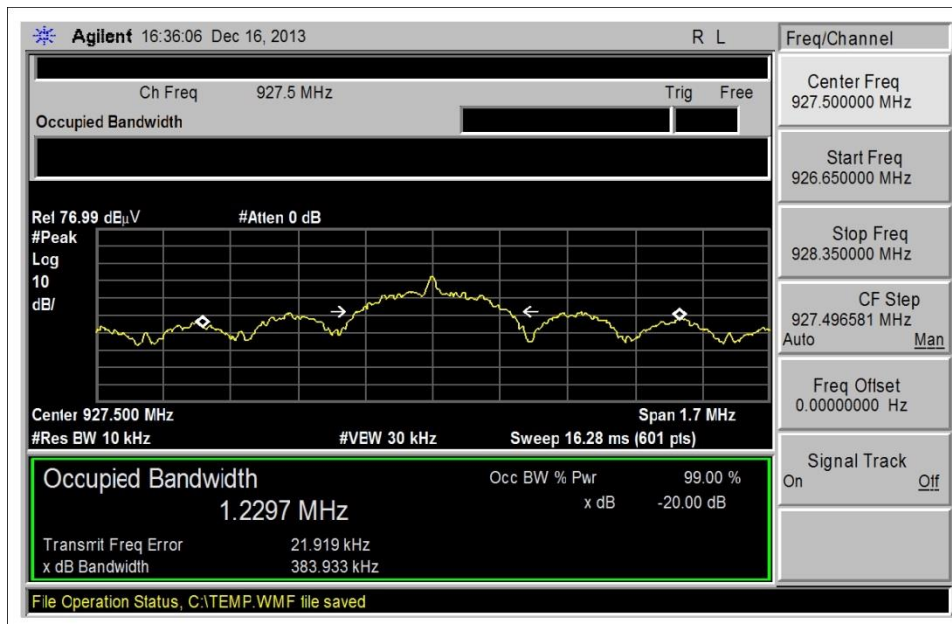
Test Plots



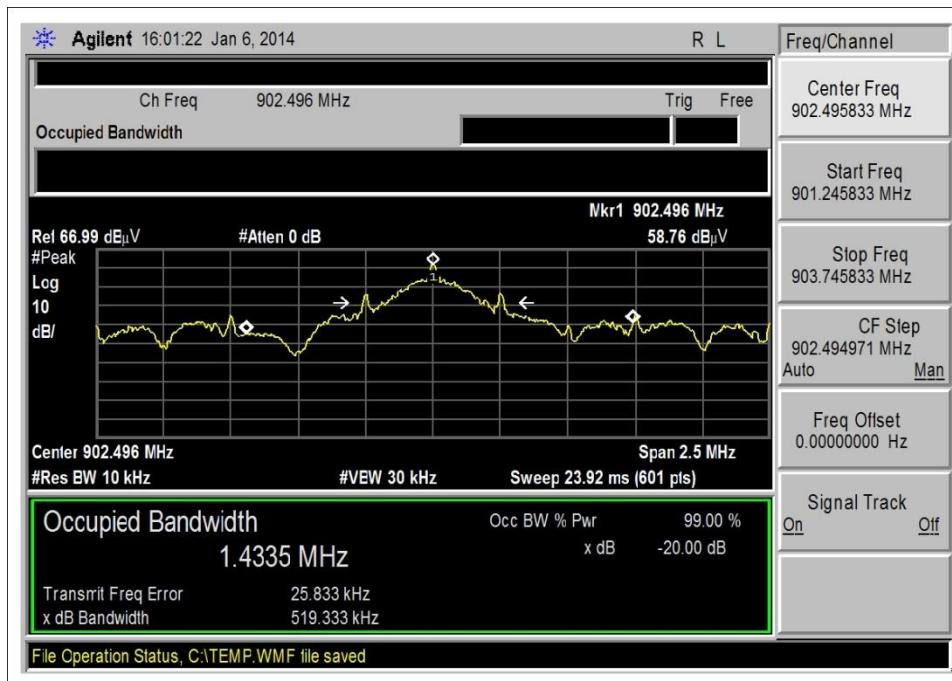
Occupied bandwidth Low OOK



Occupied bandwidth Middle OOK



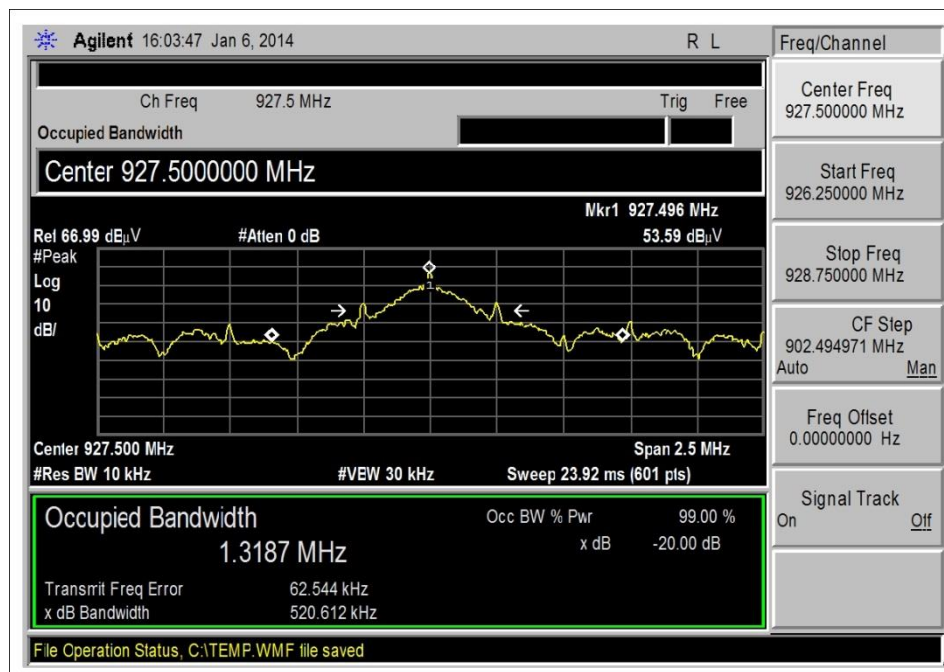
Occupied bandwidth High OOK



Occupied bandwidth Low ASK



Occupied bandwidth Middle ASK



Occupied bandwidth High ASK

Test Setup Photos



Band Edge Compliance

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **STMicroelectronics**

Work Order #: **95078** Date: 12/16/2013, 01/06/2014

Test Type: **Band Edge Compliance**

Equipment: **915 MHz Low Power RF Module**

Manufacturer: STMicroelectronics Tested By: S. Yamamoto

Model: SP1ML-915

S/N: Unit #1

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
ANP04382	Cable	LDF-50	8/30/2012	8/30/2014
ANP05555	Cable	RG223/U	6/19/2012	6/19/2014
ANP05569	Cable	RG-214/U	6/19/2012	6/19/2014
AN00851	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
915 MHz Low Power RF Module*	STMicroelectronics	SP1ML-915	Unit #1

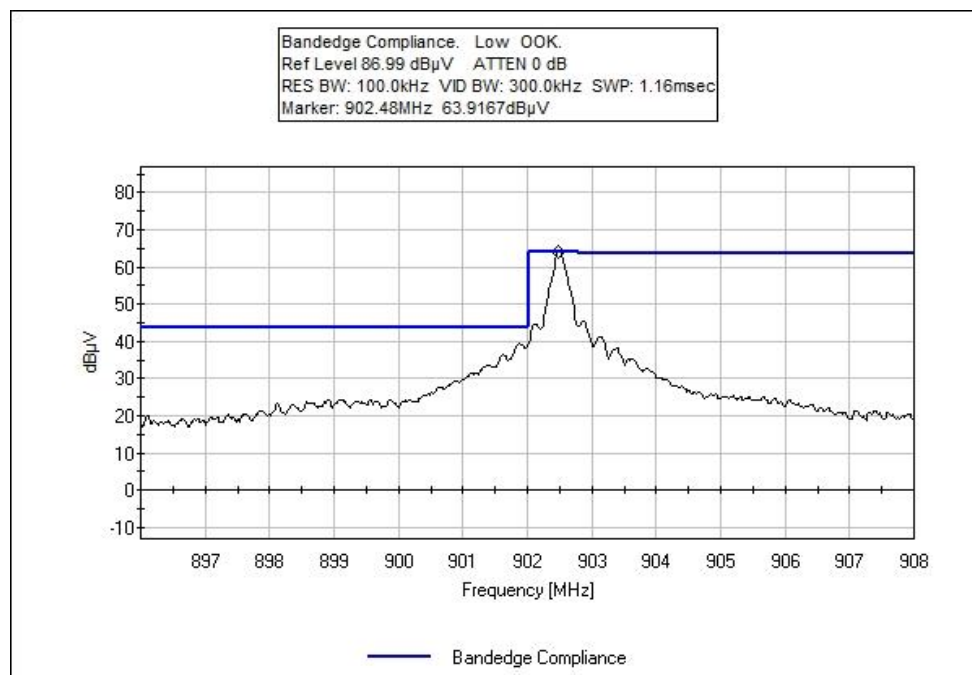
Support Devices:

Function	Manufacturer	Model #	S/N
Module Dev Board	STMicroelectronics	SPIRIT1	05
AC to USB Power Adapter	Rhino	PSNC-75M	12-B013481

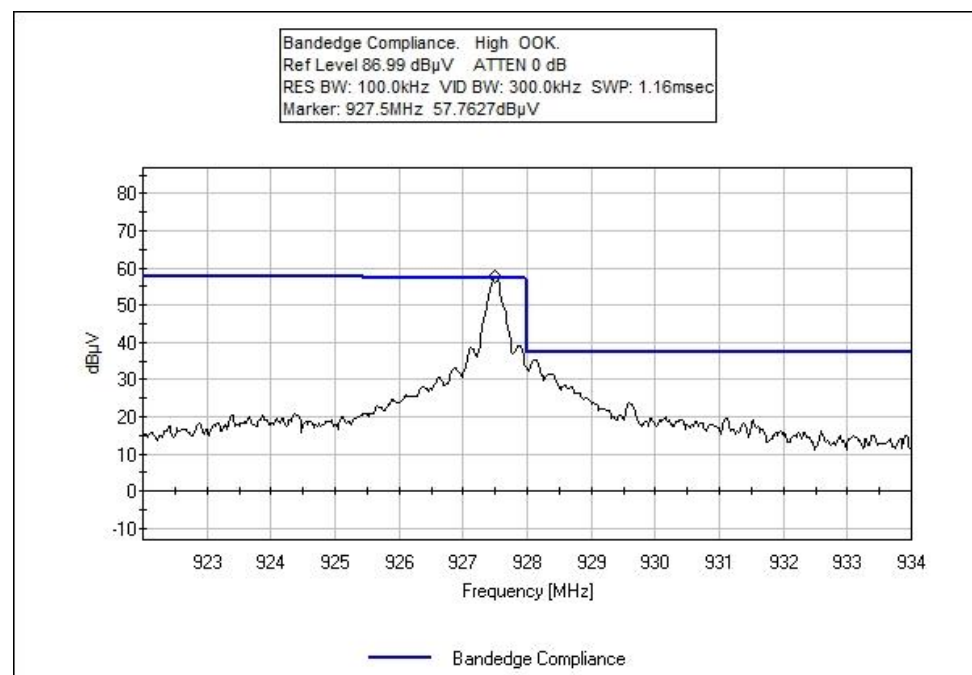
Test Conditions / Notes:

The equipment under test (EUT) is installed on the module dev board. The module dev board and EUT are powered from the USB cable port on the module dev board. The USB cable is connected to an AC to USB power adapter. The EUT is continuously transmitting at its rated maximum power to the integral antenna with OOK and ASK. Frequency range of test 902 MHz to 928 MHz. Operating range of EUT 902 MHz to 928 MHz. RBW=100kHz, VBW=300kHz. Site D. Temperature: 21°C, Humidity: 38%, Pressure: 100kPa.

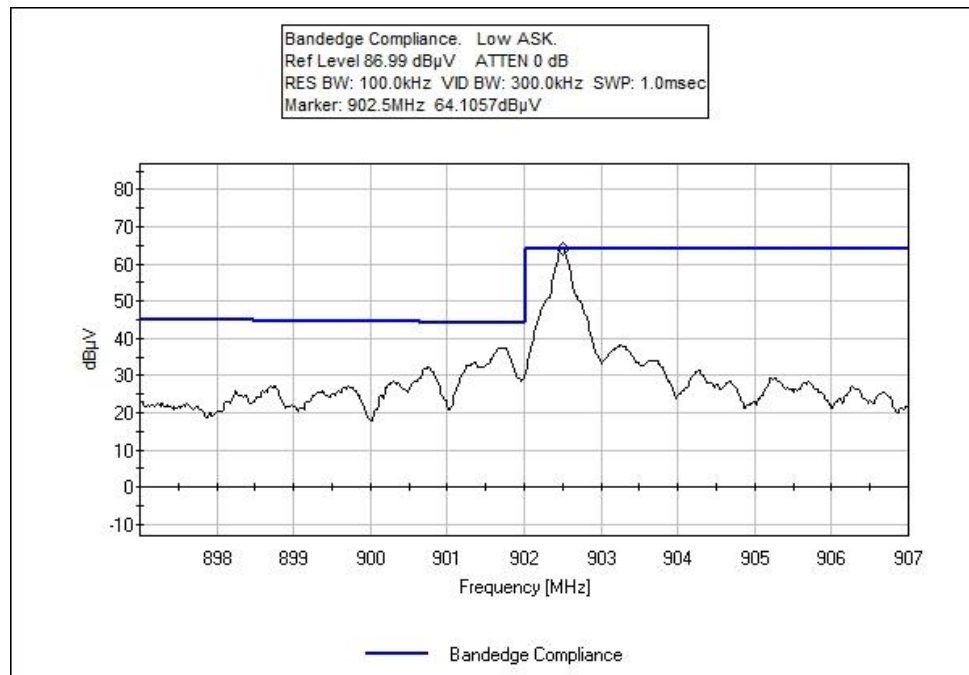
Test Data



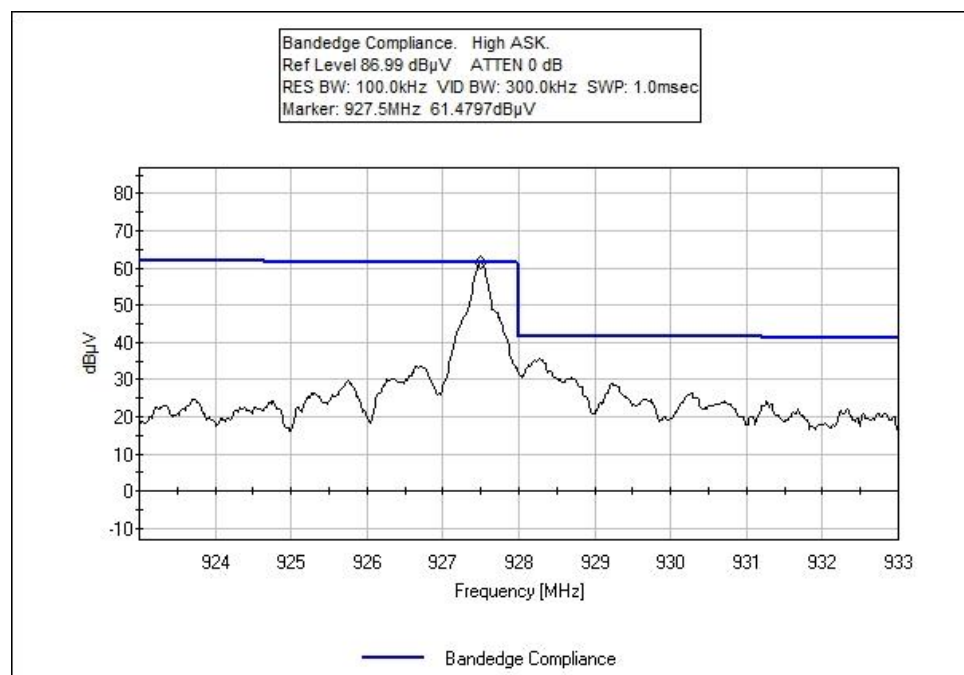
Band edge compliance Low OOK



Band edge compliance High OOK



Band edge compliance Low ASK



Band edge compliance High ASK

Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dB μ V/m, the spectrum analyzer reading in dB μ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.