

FCC Test Report

Report No.: RF_FCC_SL20061901-CMM-004_B14

FCC ID: QHYRPM-A5A11-B14

Test Model: RPM-A5A11-B14

Host Name: RP5100 Base Band Module

Series Model: N/A

Received Date: 11/16/2020

Test Date: 11/19/2020-12/16/2020

Issued Date: 12/17/2020

Standards: FCC Part 2, FCC Part 90

Applicant: CommScope

Address: 900 Chelmsford St, Lowell, MA 01851

Issued By: Bureau Veritas Consumer Products Services, Inc.

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Test Location (1): 775 Montague Expressway, Milpitas, CA 95035

**FCC Registration /
Designation Number:** 540430

ISED# / CAB identifier: 4842D



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Release Control Record

Issue No.	Description	Date Issued
RF_FCC_SL20061901-CMM-004_B14	Original	12/17/2020

1 Certificate of Conformity

Product: OneCell Radio Point

Brand: CommScope

Test Model: RPM-A5A11-B14

Host Name: RP5100 Base Band Module

Series Model: N/A

Sample Status: Engineering Sample

Applicant: CommScope

Test Date: 11/19/2020-12/16/2020

Standards: FCC Part 2, FCC Part 90

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc., Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Deon Dai , **Date:** 12/17/2020
Deon Dai / Test Engineer

Approved by : Gary Chou , **Date:** 12/17/2020
Gary Chou / Engineer Reviewer

2 Summary of Test Results

Applied Standard: FCC Part 90 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1047	Modulation Characteristics	PASS	N/A
2.1046 90.542	Output Power	PASS*	N/A
2.1055 90.539	Frequency Stability	PASS*	N/A
2.1049	Occupied Bandwidth	PASS*	N/A
-	Peak To Average Ratio	PASS*	N/A
2.1051 90.543	Conducted Spurious Emissions	PASS*	N/A
2.1053 90.543	Radiated Spurious Emissions	PASS	Meet the requirement of limit.

Note: The report is reproduced in full content only.

The EUT is digital modulation.

All data rate QPSK, 16QAM, 64QAM and 256QAM are evaluated for output power and QPSK and 16QAM are the worst case.

Per ANSI C63.26: 2015 section 5.1.2.2, the results includes worst case modulation only.

Pass*: Only radiated spurious emission test in this report, for other details please refer report:

RF_FCC_LT19092001-CMM-001B14 Rev_4.0.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Test Instruments

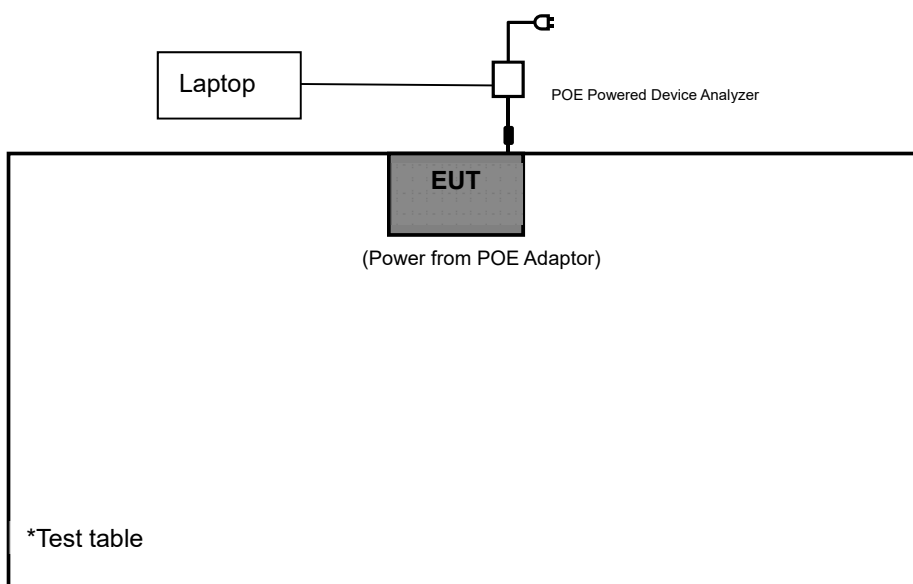
Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
EMI Receiver	ESW 44	1328.4100K-101662-MH	08/30/2020	08/30/2021
Biconilog Antenna Sunol	JB1	A030702	03/09/2019	03/09/2021
Pre-Amplifier RF Bay, Inc.	LPA-6-30	11170601	04/27/2020	04/27/2021
Horn Antenna ETS-Lindgren	3117	218554	11/22/2020	11/22/2021
Pre-Amplifier RF-Lambda	RAMP00M50GA	17032300048	06/18/2020	06/18/2021
Tuned Dipole Antenna 30 - 1000 MHz (4pcs set)	AD-100	40133	01/23/20120	01/23/2021

3 General Information

3.1 General Description of EUT

Product	OneCell Radio Point
Host Name	RP5100 Base Band Module
Host model	7778115-00
Brand	CommScope
Test Model	RPM-A5A11-B14
Module model	RPM-A5A11-B14
Identification No. of EUT	19198000003
Series Model	N/A
Model Difference	N/A
Power Supply Rating	POE : Input: 100-240VAC ; OutPut: 42-57V
Modulation Type	QPSK, 16QAM, 64QAM, 256QAM
Modulation Technology	OFDM
Operating Frequency	LTE band 14: 758-768MHz
Max. ERP Power	468.81mW
Antenna Type	Internal antenna2
Antenna Connector	U.FL

3.2 Configuration of System under Test



Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
Radiated Spurious Emission	21deg. C, 71%RH	48Vdc	Deon Dai

3.3 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 90

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

(1) The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB. The limit of emission equal to -13 dBm.

(2) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

4.1.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G
- c. $EIRP = \text{Output power level of S.G} - \text{TX cable loss} + \text{Antenna gain of substitution horn}.$
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, $E.R.P \text{ power} = E.I.P.R \text{ power} - 2.15 \text{ dBi}.$

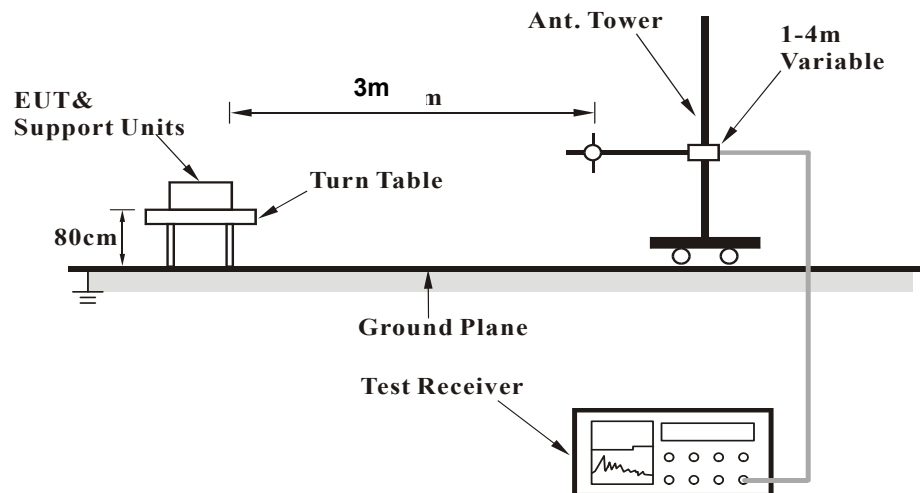
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.1.3 Deviation from Test Standard

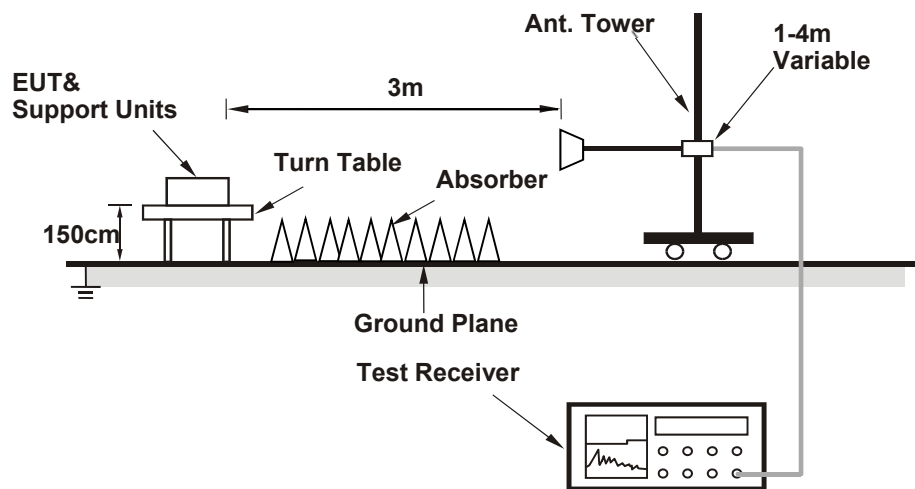
No deviation.

4.1.4 Test Setup

For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.5 Test Results

Below 1GHz

Below 1GHz Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	Operating Channel	763MHz
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Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
44.08	-71.52	41	198	V	44.08	-65.23	0	0.25	-65.48	-13	-52.48
44.08	-72.47	232	207	H	44.08	-67.52	0	0.25	-67.77	-13	-54.77
265.74	-69.24	166	150	V	265.74	-63.64	0	0.52	-64.16	-13	-51.16
265.74	-71.08	291	210	H	265.74	-65.29	0	0.52	-65.81	-13	-52.81

REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

Above 1GHz

LTE band 14

5MHz BW, low channel, QPSK

Measurement outside 1559-1610MHz

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2281.5	-66.42	14	176	V	2281.5	-61.32	9.27	1.56	-53.61	-13	-40.61
2281.5	-65.7	295	196	H	2281.5	-60.22	9.27	1.56	-52.51	-13	-39.51
6754.45	-56.27	206	152	V	6754.45	-50.44	10.67	3.08	-42.85	-13	-29.85
6754.45	-55.11	207	170	H	6754.45	-49.27	10.67	3.08	-41.68	-13	-28.68

Measurement inside 1559-1610MHz (1MHz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1589	-67.48	334	204	V	1589	-62.52	9.42	1.3	-54.4	-40	-14.4
1589	-66.23	253	200	H	1589	-60.83	9.42	1.3	-52.71	-40	-12.71

Measurement inside 1559-1610MHz (700Hz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1602	-72.75	115	222	V	1602	-68.23	9.42	1.3	-60.11	-50	-10.11
1602	-74.46	275	159	H	1602	-69.71	9.42	1.3	-61.59	-50	-11.59

REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

5MHz BW, mid channel, QPSK

Measurement outside 1559-1610MHz

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2289	-65.23	253	218	V	2289	-59.48	9.27	1.56	-51.77	-13	-38.77
2289	-66.32	234	230	H	2289	-60.92	9.27	1.56	-53.21	-13	-40.21
7322	-55.28	227	166	V	7322	-49.27	10.41	3.22	-42.08	-13	-29.08
7322	-56.12	189	183	H	7322	-50.18	10.41	3.22	-42.99	-13	-29.99

Measurement inside 1559-1610MHz (1MHz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1588	-68.21	258	158	V	1588	-62.92	9.42	1.3	-54.8	-40	-14.8
1588	-69.42	224	184	H	1588	-64.7	9.42	1.3	-56.58	-40	-16.58

Measurement inside 1559-1610MHz (700Hz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1579	-72.57	168	157	V	1579	-67.32	9.42	1.3	-59.2	-50	-9.2
1579	-75.82	206	204	H	1579	-69.28	9.42	1.3	-61.16	-50	-11.16

REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

5MHz BW, high channel, QPSK

Measurement outside 1559-1610MHz

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2296	-65.23	109	166	V	2296	-60.82	9.27	1.56	-53.11	-13	-40.11
2296	-67.82	182	162	H	2296	-62.57	9.27	1.56	-54.86	-13	-41.86
7092	-54.15	352	183	V	7092	-49.51	10.42	3.2	-42.29	-13	-29.29
7092	-56.7	121	168	H	7092	-51.26	10.42	3.2	-44.04	-13	-31.04

Measurement inside 1559-1610MHz (1MHz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1598	-68.33	282	150	V	1598	-63.52	9.42	1.3	-55.4	-40	-15.4
1598	-67.84	188	124	H	1598	-62.28	9.42	1.3	-54.16	-40	-14.16

Measurement inside 1559-1610MHz (700Hz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1601	-73.25	302	173	V	1601	-68.35	9.42	1.3	-60.23	-50	-10.23
1601	-74.7	209	208	H	1601	-69.23	9.42	1.3	-61.11	-50	-11.11

REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

10MHz BW, mid channel, QPSK

Measurement outside 1559-1610MHz

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
2289	-67.38	220	179	V	2289	-62.08	9.27	1.56	-54.37	-13	-41.37
2289	-68.64	291	155	H	2289	-63.11	9.27	1.56	-55.4	-13	-42.4
6427	-56.18	165	181	V	6427	-51.92	10.62	3.08	-44.38	-13	-31.38
6427	-57.71	201	154	H	6427	-52.21	10.62	3.08	-44.67	-13	-31.67

Measurement inside 1559-1610MHz (1MHz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1583	-66.29	254	124	V	1583	-60.18	9.42	1.3	-52.06	-40	-12.06
1583	-67.73	210	206	H	1583	-62.51	9.42	1.3	-54.39	-40	-14.39

Measurement inside 1559-1610MHz (700Hz BW)

Indicated			Test Antenna		Substituted						
Frequency (MHz)	Raw (dBm)	Degree	Hgt (cm)	Pol (V/H)	Frequency (MHz)	Level (dBm)	Ant Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
1602	-72.26	124	124	V	1602	-67.32	9.42	1.3	-59.2	-50	-9.2
1602	-74.11	278	181	H	1602	-68.82	9.42	1.3	-60.7	-50	-10.7

REMARKS:

1. Absolute level (dBm) = Level (dBm) + Ant Gain(dBi) – Cable Loss(dB)
2. Margin value = Absolute level – Limit value.

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

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The address and road map of all our labs can be found in our web site also.

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