FCC Test Report

Report No.:	RF_FCC_SL21030302-CMM-011_B14 Rev_1.0
FCC ID:	QHYRPM-A5A11-B14
Test Model:	RPM-A5A11-B14
Host Name:	RP5200 Base Band Module
Series Model:	N/A
Received Date:	03/16/2021
Test Date:	04/16/2021-04/22/2021
Issued Date:	06/02/2021
Standards:	FCC Part 2, FCC Part 90
Applicant:	CommScope
Address:	900 Chelmsford St, Lowell, MA 01851

Issued By:	Bureau Veritas Consumer Products Services, Inc.
Lab Address:	775 Montague Expressway, Milpitas, CA 95035
Test Location (1):	775 Montague Expressway, Milpitas, CA 95035
FCC Registration / Designation Number:	540430
ISED# / CAB identifier:	4842D

ACCREDITED
TESTING CERT # 2742-01

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Release Control Record

Issue No.	Description	Date Issued
RF_FCC_SL21030302-CMM-011_B14	Original Release	04/26/2021
RF_FCC_SL21030302-CMM-011_B14 Rev_1.0	Update per review	06/02/2021

1 Certificate of Conformity

Product:	OneCell Radio Point
Brand:	CommScope
Test Model:	RPM-A5A11-B14
Host Name:	RP5200 Base Band Module
Series Model:	N/A
Sample Status:	Engineering Sample
Applicant:	CommScope
Test Date:	04/16/2021-04/22/2021
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 : Gary Chou , **Date:** 06/02/2021

Gary Chou / Test Engineer

Approved by : Deon , **Date:** 06/02/2021

Deon Dai / 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	Meet the requirement of limit.
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 output power and 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) (±)
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	03/09/2021	03/09/2022
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	01/23/2020	01/23/2022
DRG Horn Antenna ETS-Lingren	3117	214309	11/22/2020	11/22/2021
Attenuator Mini-Circuits	VAT-30W2+	1112	N/A	N/A

3 General Information

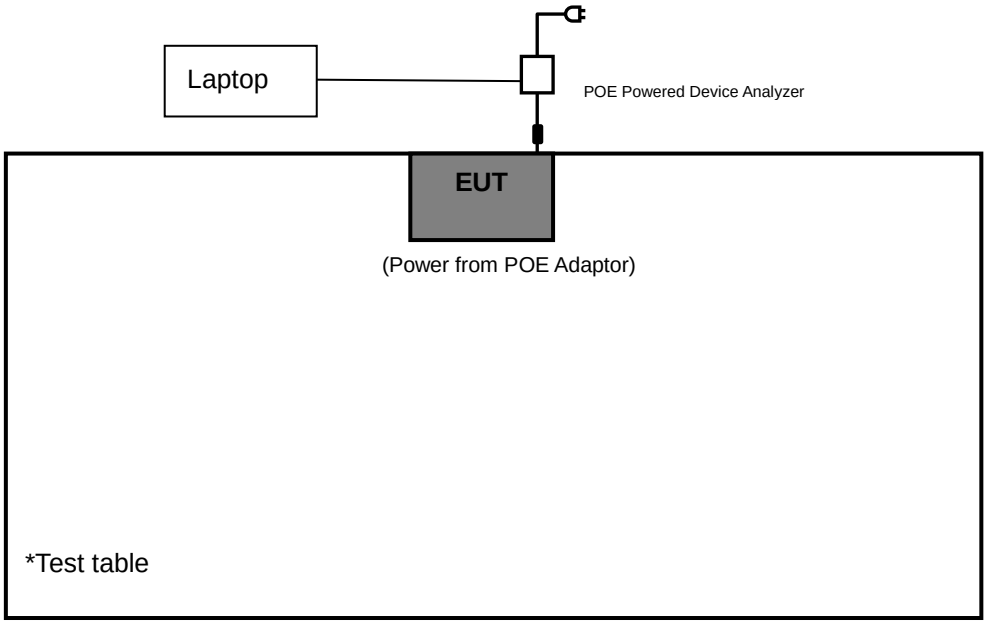
3.1 General Description of EUT

Product	OneCell Radio Point
Host Name	RP5200 Base Band Module
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
Antenna Type	PCB antenna
Antenna Gain	4 dBi
Antenna Connector	U.FL

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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	Gary Chou

3.3 EUT Operating Conditions

The EUT work at maximum output power under transmission mode and specific channel frequency throuth the software “NGPR_Bringup_BV” provided by customer.

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 Output Power Measurement

4.1.1 Limits of Output Power Measurement

Per FCC Part 90.542

Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

4.1.2 Test Procedures

EIRP / ERP Measurement:

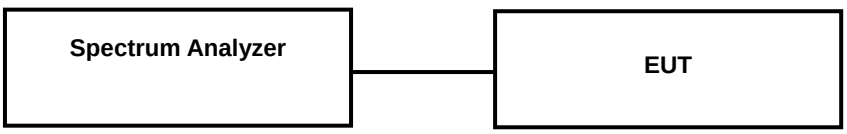
EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

Conducted Power Measurement:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

4.1.3 Test Setup

CONDUCTED POWER MEASUREMENT:



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

4.1.4 Test Results

Conducted Output Power

LTE Band 14						
BW	Modulation	CH	Frequency (MHz)	Power Chain 0 (dBm)	Power Chain 1 (dBm)	Combined (dBm)
5 MHz	QPSK	5305	760.5	21.22	21.34	24.29
		5330	763.0	21.03	21.08	24.07
		5355	765.5	21.27	21.24	24.27
	16QAM	5305	760.5	21.09	21.33	24.22
		5330	763.0	20.98	21.03	24.02
		5355	765.5	21.34	21.52	24.44
	64QAM	5305	760.5	21.4	20.88	24.16
		5330	763.0	21.45	20.89	24.19
		5355	765.5	20.8	20.97	23.90
	256QAM	5305	760.5	20.57	20.56	23.58
		5330	763.0	20.59	20.92	23.77
		5355	765.5	20.8	21.03	23.93
10MHz	QPSK	5330	763.0	21.42	21.23	24.34
	16QAM	5330	763.0	21.33	21.52	24.44
	64QAM	5330	763.0	21.04	20.99	24.03
	256QAM	5330	763.0	20.82	20.72	23.78

4.2 Radiated Emission Measurement

4.2.1 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 log10(P) dB. The limit of emission equal to –13dBm.

(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.

4.2.2 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 = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

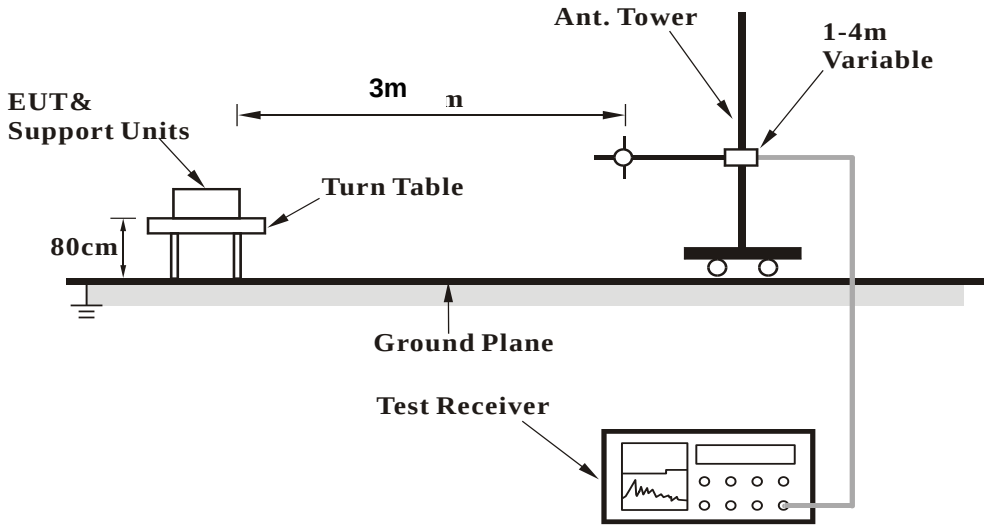
d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15dBi.

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

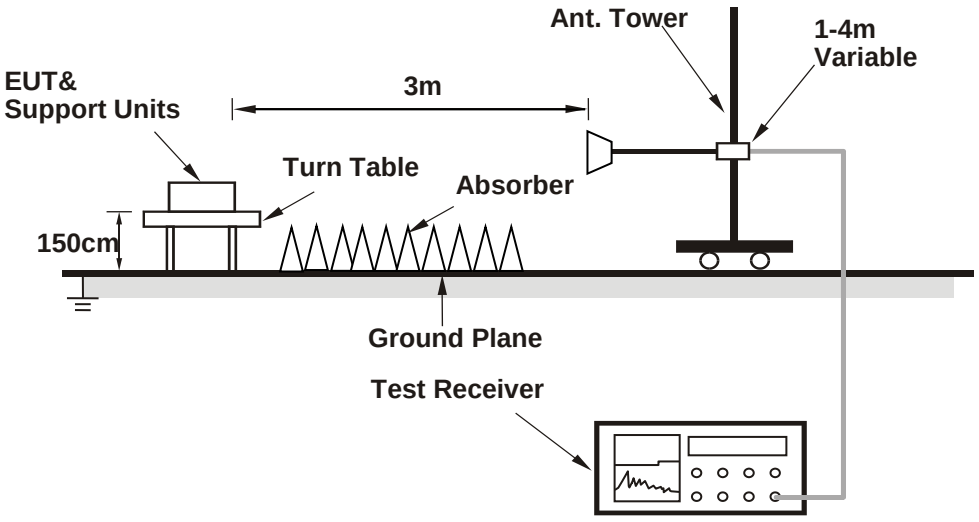
4.2.3 Deviation from Test Standard
No deviation.

4.2.4 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).

4.2.5 Test Results

Below 1GHz

Below 1GHz Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	**Operating Channel**	763MHz

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)**
59.95	-68.13	244	165	V	59.95	-61.81	0	0.22	-62.03	-13	-49.03
59.95	-69.07	149	149	H	59.95	-64.1	0	0.22	-64.32	-13	-51.32
133.4	-65.82	264	168	V	133.4	-60.22	0	0.36	-60.58	-13	-47.58
133.4	-67.66	153	156	H	133.4	-61.87	0	0.36	-62.23	-13	-49.23

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	-61.17	154	153	V	2281.5	-56.07	9.27	1.56	-48.36	-13	-35.36
2281.5	-60.45	254	163	H	2281.5	-54.97	9.27	1.56	-47.26	-13	-34.26
6548	-55.17	198	150	V	6548	-49.34	10.67	2.77	-41.44	-13	-28.44
6548	-53.91	143	149	H	6548	-48.07	10.67	2.77	-40.17	-13	-27.17

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)
1590	-66.08	211	150	V	1590	-61.14	9.42	1.3	-53.02	-40	-13.02
1590	-64.93	210	153	H	1590	-59.53	9.42	1.3	-51.41	-40	-11.41

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)
1605	-71.68	298	150	V	1605	-67.16	9.42	1.3	-59.04	-50	-9.04
1605	-72.45	269	149	H	1605	-67.7	9.42	1.3	-59.58	-50	-9.58

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	-59.98	154	150	V	2289	-54.23	9.27	1.56	-46.52	-13	-33.52
2289	-61.07	18	144	H	2289	-55.67	9.27	1.56	-47.96	-13	-34.96
6075	-54.29	244	165	V	6075	-48.28	10.24	2.56	-40.6	-13	-27.6
6075	-55.08	259	155	H	6075	-49.14	10.24	2.56	-41.46	-13	-28.46

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	-67.83	198	165	V	1583	-62.54	9.42	1.3	-54.42	-40	-14.42
1583	-68.97	266	149	H	1583	-64.25	9.42	1.3	-56.13	-40	-16.13

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)
1604	-72.37	154	150	V	1604	-67.16	9.42	1.3	-59.04	-50	-9.04
1604	-75.16	254	165	H	1604	-68.62	9.42	1.3	-60.5	-50	-10.5

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	-59.98	148	154	V	2296	-55.57	9.27	1.56	-47.86	-13	-34.86
2296	-62.57	128	165	H	2296	-57.32	9.27	1.56	-49.61	-13	-36.61
6958	-53.16	352	175	V	6958	-48.52	10.55	2.85	-40.82	-13	-27.82
6958	-55.68	198	156	H	6958	-50.24	10.55	2.85	-42.54	-13	-29.54

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)
1599	-68.1	254	150	V	1599	-63.29	9.42	1.3	-55.17	-40	-15.17
1599	-67.39	144	150	H	1599	-61.83	9.42	1.3	-53.71	-40	-13.71

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)
1608	-72.35	125	165	V	1608	-67.45	9.42	1.3	-59.33	-50	-9.33
1608	-73.83	26	149	H	1608	-68.36	9.42	1.3	-60.24	-50	-10.24

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	-62.13	264	168	V	2289	-56.83	9.27	1.56	-49.12	-13	-36.12
2289	-63.39	153	156	H	2289	-57.86	9.27	1.56	-50.15	-13	-37.15
6247	-54.98	269	169	V	6247	-50.72	10.41	2.62	-42.93	-13	-29.93
6247	-56.62	113	149	H	6247	-51.12	10.41	2.62	-43.33	-13	-30.33

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)
1584	-65.81	198	166	V	1584	-59.7	9.42	1.3	-51.58	-40	-11.58
1584	-67.51	186	149	H	1584	-62.29	9.42	1.3	-54.17	-40	-14.17

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)
1604	-71.24	245	150	V	1604	-66.3	9.42	1.3	-58.18	-50	-8.18
1604	-73.13	214	153	H	1604	-67.84	9.42	1.3	-59.72	-50	-9.72

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.

If you have any comments, please feel free to contact us at the following:

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Email: sales.eaw@us.bureauveritas.com
Web Site: www.cpsusa-bureauveritas.com

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

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