FrontRow Calypso, LLC.

TEST REPORT FOR

Juno Tower Receiver, Model: ITR-02
AC/DC Adapter, Model: YHY-18003000

Tested To The Following Standard:

EN 300 328 v2.1.1

Report No.: 100397-7

Date of issue: October 2, 2017

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

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.

Testing the Future
CKC LABORATORIES, INC.

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

FrontRow Calypso, LLC.
1690 Corporate Circle
Petaluma, CA 94954

Representative: Roger Davis
Customer Reference Number: P121177

REPORT PREPARED BY:

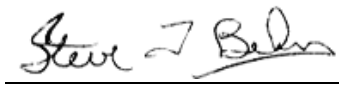
Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 100397

DATE OF EQUIPMENT RECEIPT: September 20, 2017
DATE(S) OF TESTING: September 20, 2017

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.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

SUMMARY OF RESULTS

Standard / Specification: EN 300 328 v2.1.1

Test Procedure/Method	Description	Modifications	Results
Transmitter Requirements			
Sub clause 4.3.2.2	RF Power Output	NA	NP
Sub clause 4.3.2.3	Power Spectral Density	NA	NP
Sub clause 4.3.2.4	Duty Cycle, Tx Sequence, Tx-gap	NA	NP
Sub clause 4.3.2.5	Medium Utilisation (MU) Factor	NA	NP
Sub clause 4.3.2.6	Adaptivity	NA	NP
Sub clause 4.3.2.7	Occupied Channel Bandwidth	NA	NP
Sub clause 4.3.2.8	Transmitter Unwanted Emissions in the OOB Domain	NA	NP
Sub clause 4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain - Conducted	NA	NA1
Sub clause 4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain - Radiated	NA	Pass
Receiver Requirements			
Sub clause 4.3.2.10	Receiver Spurious Emissions - Conducted	NA	NA1
Sub clause 4.3.2.10	Receiver Spurious Emissions - Radiated	Mod. #1	Pass
Sub clause 4.3.2.11	Receiver Blocking	NA	NP
Sub clause 4.3.2.12	Geo-location capability	NA	NA2

NP = CKC Laboratories was not contracted to perform test since the modulation is an approved modulation.
NA = Not Applicable
NA1 – Not applicable because the EUT has an integral antenna.
NA2 = Not applicable because the EUT is not used for Geo-location capability.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
Modification #1: Added a Ferrite EMI Plate (Laird: MP0760-100) on the processor.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST

The following model was tested by CKC Laboratories: **ITR-01**

Since the time of testing, the manufacturer has chosen to use the following model name in its place.
Any differences between the names does not affect their EMC characteristics and therefore meets the level of testing equivalent to the tested model: **ITR-02**

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Juno Tower Receiver	FrontRow Calypso, LLC	ITR-02	RD0133063
AC/DC Adapter	YHY	YHY-18003000	DS180054C8-W

Support Equipment:

Device	Manufacturer	Model #	S/N
PFM Transmitter	FrontRow Calypso, LLC	365T	0000582
Laptop	Lenovo	T60p	NA
Ethernet Switch	FrontRow Calypso, LLC	CM3000	C42494
Current Transformer	CR Magnetic	CR3310-3000	NA
Projector	Hitachi	CP-A220N	F1D003532
Sensor	FrontRow Calypso, LLC	950WS	NA
Sensor	FrontRow Calypso, LLC	950WS	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	BT 4.1
Operating Frequency Range:	2400 to 2483.5MHz
Output Power:	4dBm
Modulation Type(s):	GFSK
Nominal Channel Bandwidth(s):	1MHz
Number of TX Chains:	40
Number of RX Chains:	40
Antenna Gain (A):	0dBi
Beamforming Gain (Y):	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	100-240VAC
Firmware / Software used for Test:	Blue Test 3
Geo-Location Capability:	Not Supported

EN 300 328 V2.1.1

4.3.2 TECHNICAL REQUIREMENTS

4.3.2.9 Transmitter Unwanted Emissions in the Spurious Domain - Radiated

Test Setup/Conditions			
Test Location:	Fremont Lab C3	Test Engineer:	Hieu Song Nguyenpham
Test Method:	EN 300 328 v2.1.1 §5.4.9.2.2	Test Date(s):	9/20/2017
Configuration:	2		
Declaration:	None		
Test Setup:	The EUT is operated as intended. It is in active receive state which is declared by the manufacturer as a normal typical configuration. All ports on EUT populated with cables/peripherals. All cables are bundled accordingly. The EUT is connect to the Ethernet Switch which is outside of the chamber. The EIRP measurements will be gathered via radiated measurement procedure to establish EIRP and ERP.		

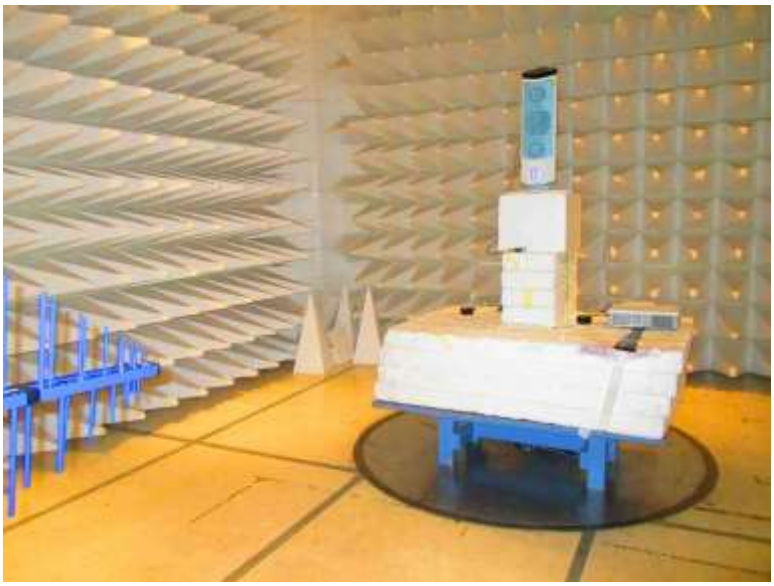
Environmental Conditions			
Temperature (ºC)	19.6	Relative Humidity (%):	49

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
01996	Biconilog Antenna	Chase	CBL6111C	11/1/2016	11/1/2018
P00880	Cable	Pasternack	RG214U	5/10/2016	5/10/2018
P06691	Cable	Pasternack	PE3062-180	6/23/2016	6/23/2018
P01187	Cable	Andrews	CNT-195	8/8/2016	8/8/2018
00971A	Preamp	HP	8447D	2/5/2016	2/5/2018
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018
02113	Horn Antenna	EMC Test Systems	3115	2/6/2017	2/6/2019
P06902	Cable	Astrolab	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
03607	Preamp	Miteq	AMF-7D-00101800-30-10P	6/6/2017	6/6/2019
P01210	Cable	Andrews	FSJ1P-50A-4A	1/16/2017	1/16/2019
03302	Cable	Astrolab	32026-29094K-29094K-72TC	1/29/2016	1/29/2018
03309	High Pass Filter	K & L	11SH10-3000/T10000-O/O	1/18/2016	1/18/2018

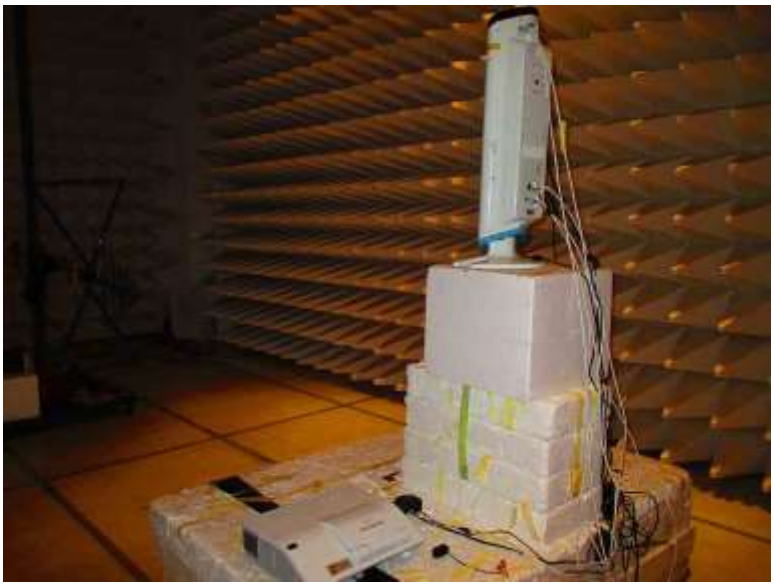
Unwanted Emissions in the Spurious Domain – Antenna Port Conducted					
Declared Antenna Gain, G (dBi): 0 dBi Declared Beam Forming Gain, Y (dB): NA Equipment operating frequencies (MHz): 2402MHz and 2480MHz					
Freq Range(MHz)	**Frequency (MHz)**	**Operational Mode**	**Measured EIRP (dBm)**	**Limit EIRP (dBm)**	**Results**
30 to 47	NED	Transmit	NED	-36	Pass
47 to 74	NED	Transmit	NED	-54	Pass
74 to 87.5	NED	Transmit	NED	-36	Pass
87.5 to 118	NED	Transmit	NED	-54	Pass
118 to 174	NED	Transmit	NED	-36	Pass
174 to 230	NED	Transmit	NED	-54	Pass
230 to 470	NED	Transmit	NED	-36	Pass
470 to 862	NED	Transmit	NED	-54	Pass
862 to 1000	NED	Transmit	NED	-36	Pass
1000 to 12750	NED	Transmit	NED	-30	Pass

NED: No emission detected from the EUT within 6dB of the applicable limit

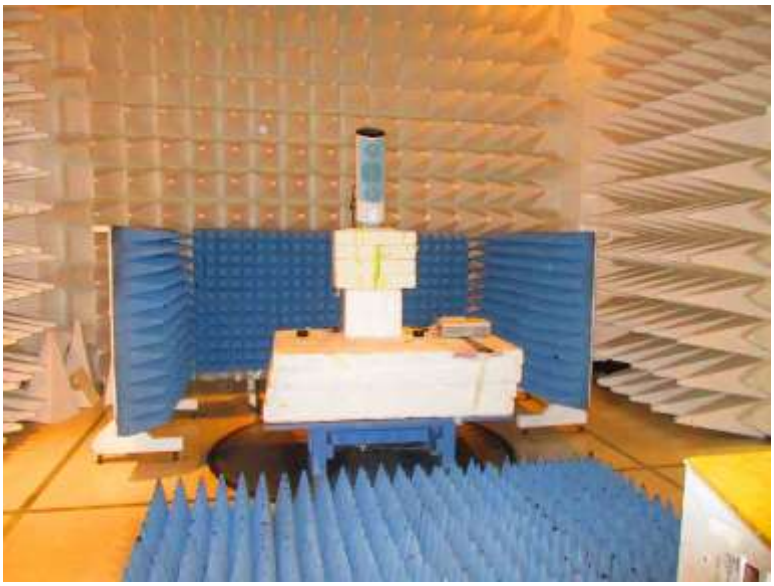
Test Setup Photos



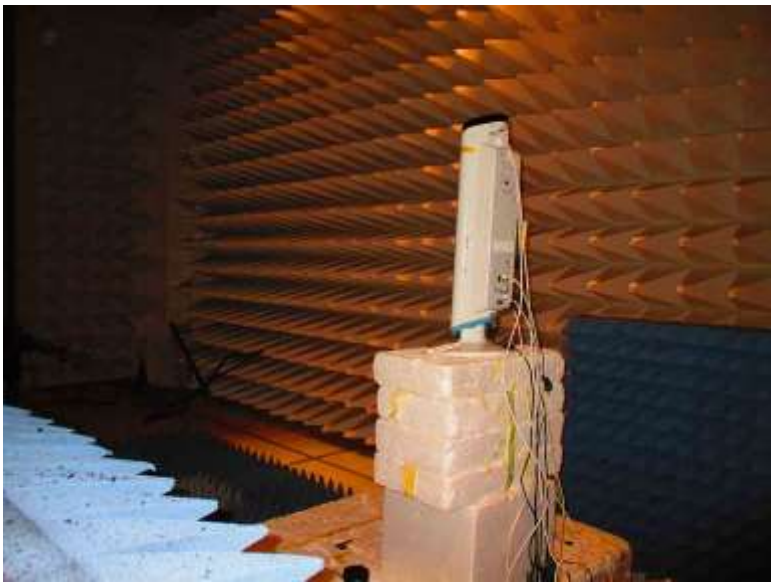
30MHz – 1GHz



30MHz – 1GHz



1 – 12.75GHz



1 – 12.75GHz

4.3.2.10 Receiver Spurious Emissions - Radiated

Test Setup/Conditions			
Test Location:	Fremont Lab C3	Test Engineer:	Hieu Song Nguyenpham
Test Method:	EN 300 328 v2.1.1 §5.4.10.2.2	Test Date(s):	9/20/2017
Configuration:	2		
Declaration:	Modification #1 was in place during testing.		
Test Setup:	The EUT is operated as intended. It is in active receive state which is declared by the manufacturer as a normal typical configuration. All ports on EUT populated with cables/peripherals. All cables are bundled accordingly. The EUT is connect to the Ethernet Switch which is outside of the chamber. The EIRP measurements will be gathered via radiated measurement procedure to establish EIRP and ERP.		

Environmental Conditions			
Temperature (ºC)	19.6	Relative Humidity (%):	49

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
01996	Biconilog Antenna	Chase	CBL6111C	11/1/2016	11/1/2018
P00880	Cable	Pasternack	RG214U	5/10/2016	5/10/2018
P06691	Cable	Pasternack	PE3062-180	6/23/2016	6/23/2018
P01187	Cable	Andrews	CNT-195	8/8/2016	8/8/2018
00971A	Preamp	HP	8447D	2/5/2016	2/5/2018
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018
02113	Horn Antenna	EMC Test Systems	3115	2/6/2017	2/6/2019
P06902	Cable	Astrolab	32022-29094K-29094K-36TC	12/30/2015	12/30/2017
03607	Preamp	Miteq	AMF-7D-00101800-30-10P	6/6/2017	6/6/2019
P01210	Cable	Andrews	FSJ1P-50A-4A	1/16/2017	1/16/2019
03302	Cable	Astrolab	32026-29094K-29094K-72TC	1/29/2016	1/29/2018

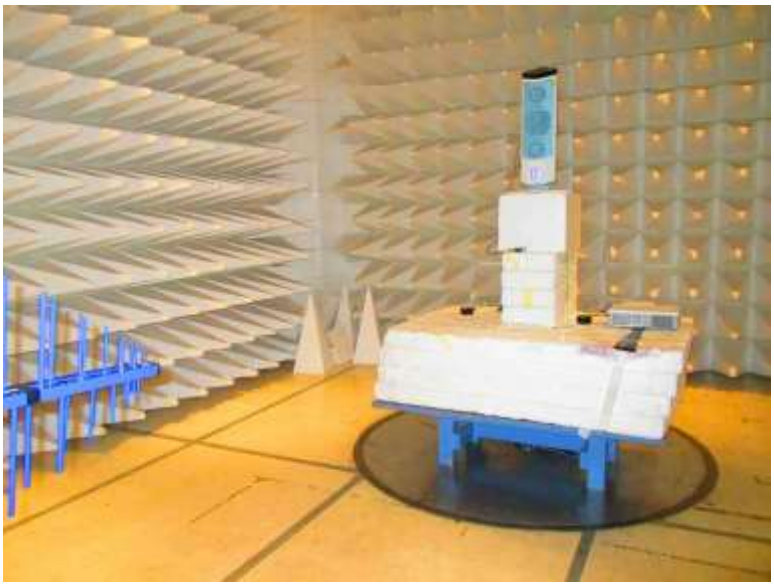
Receiver Spurious Emissions – Enclosure Radiated

Declared Antenna Gain, G (dBi): 0dBi
Declared Beam Forming Gain, Y (dB): NA
Equipment operating frequencies (MHz): 2402MHz to 2480MHz

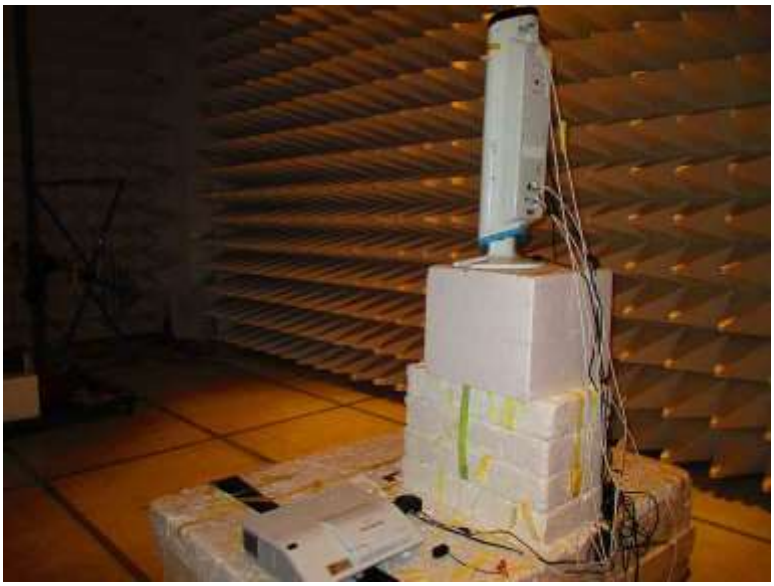
Freq Range (MHz)	Frequency (MHz)	Operational Mode	Measured EIRP (dBm)	Limit EIRP (dBm)	Results
30 to 1000	NED	Continuous Receive	NED	-57	Pass
1000 to 12750	NED	Continuous Receive	NED	-47	Pass

NED: No emission detected from the EUT within 6dB of the applicable limit

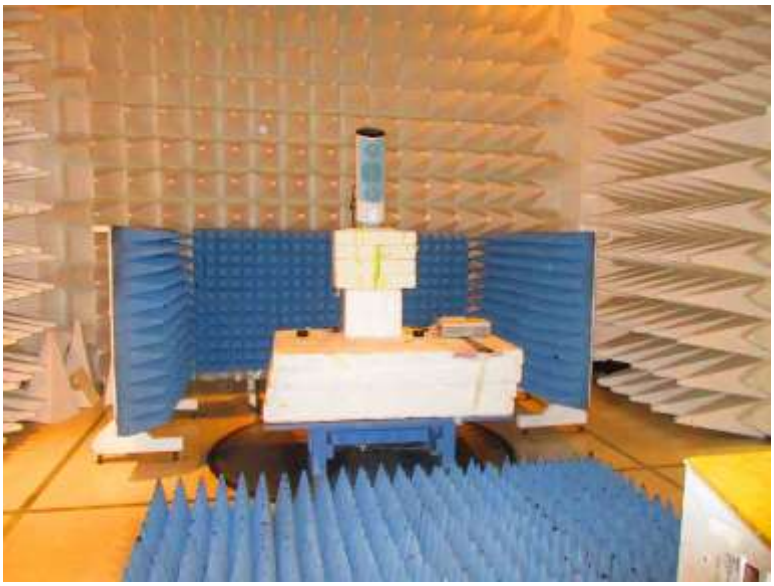
Test Setup Photos



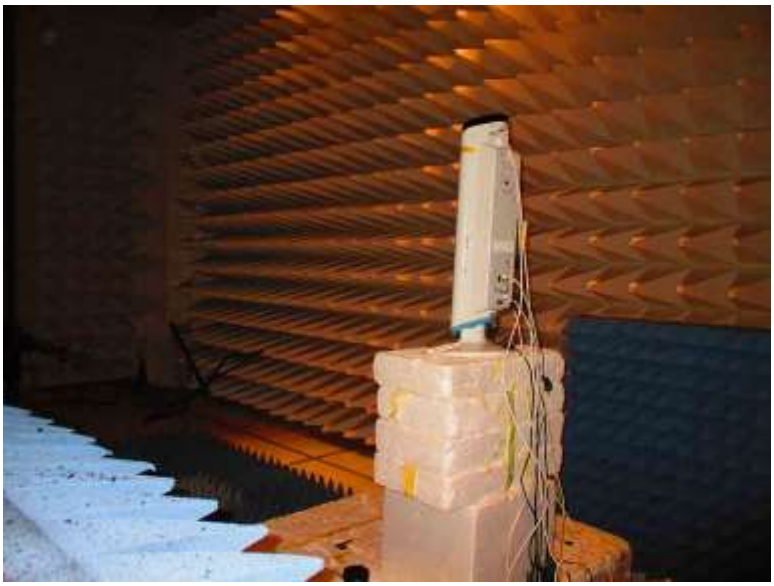
30MHz – 1GHz



30MHz – 1GHz



1 – 12.75GHz



1 – 12.75GHz

SUPPLEMENTAL INFORMATION

Measurement Uncertainty			
Parameter Uncertainty	**Actual**	**Limit**	**Unit of Measure**
Uncertainty Parameter	**Actual**	**Limit**	**Unit of Measure**
Occupied Channel Bandwidth	1	5	%
RF output power, conducted	0.67	1.5	dB
Power Spectral Density, conducted	0.67	3	dB
Unwanted Emissions, conducted	0.67	3	dB
All emissions, radiated	3.73	6	dB
Temperature	1	3	ºC
Humidity	3.4	5	%
DC and low frequency voltages	2	3	%
Time	1.1	5	%

Uncertainties reported are worst case for all CKC Laboratories' sites and 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.