



Test Report

Prepared for: EMS Technologies Honeywell Satcom

Model: Aspire HDU-200

Description: Aeronautical Satcom Transceiver

Serial Number: LI-154-1-30101

FCC ID: K6KHSD-XI

To

FCC Part 87

Date of Issue: September 16, 2015

On the behalf of the applicant:

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Attention of:

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Alex Macon
Project Test Engineer

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All results of this test report relate only to the item(s) that were tested.

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	September 15, 2015	Alex Macon	Original Document
2.0	September 16, 2015	Alex Macon	Replaced DLNA with IPLD

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ILAC / A2LA

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The tests results contained within this test report all fall within our scope of accreditation, unless noted in the table below

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts: FCC Part 87.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	Humidity (%)	Pressure (mbar)
23.2	42.1	969.6

EUT Description

Model: Aeronautical Satcom Transceiver

Description: Aspire HDU-200

Firmware: N/A

Software: N/A

Serial Number: LI-154-1-30101

Additional Information:

The EUT is an aircraft based satellite communication system. The EUT was tested to determine the new data rates still comply too the FCC rules.

EUT Operation during Tests

EUT was supplied 28VDC using a DC power supply. The device was controlled using a serial terminal and code provided by the manufacturer.

Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
2.1046, 87.131	Carrier Output Power (Conducted)	N/A	The C2PC does not effect this test
2.1051, 87.139(i)(1)	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1053	Field Strength of Spurious Radiation	N/A	The C2PC does not effect this test
2.1049, 87.139(i)(3)	Emission Masks (Occupied Bandwidth)	N/A	The C2PC does not effect this test
2.1047	Audio Low Pass Filter (Voice Input)	N/A	The EUT does not contain an audio input
2.1047	Audio Frequency Response	N/A	The EUT does not contain an audio input
2.1047	Modulation Limiting	N/A	The EUT does not contain an audio input
2.1055, 87.133(a)	Frequency Stability (Temperature Variation)	N/A	The C2PC does not effect this test
2.1055, 87.133(a)	Frequency Stability (Voltage Variation)	N/A	The C2PC does not effect this test

Conducted Spurious Emissions

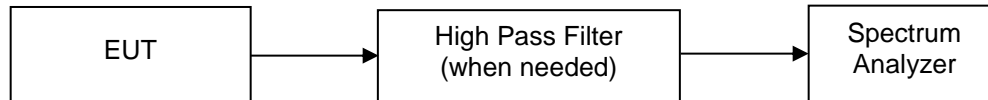
Engineer: Alex Macon

Test Date: 9/14/15

Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the EUT met the requirements for spurious emissions. The RBW was set according to the requirements of 87139 (i)(1). The power was corrected for the measurement RBW bandwidth. The IPLD rejection, corrected power, and measured attenuation were summed together to provide a system rejection greater than the FCC limit. A negative value indicates a passing result.

Test Setup



64 QAM 220KD7W 1626.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.2	4.45	-59.77	-135	-138.22	-3.22
1026.5 to 1525	0.004	94	3.2	4.45	-68.12	-135	-166.57	-31.57
1525 to 1559	0.004	120	3.2	4.45	-80.18	-203	-204.63	-1.63
1559 to 1585	1	94	19.7	19.7	-52.98	-155	-166.68	-11.68
1585 to 1605	1	71	19.7	19.7	-52.91	-143	-143.61	-0.61
1605 to 1610	1	51	19.7	19.7	-52.22	-117	-122.92	-5.92
1610 to 1610.6	1	48	19.7	19.7	-50.89	-95	-118.59	-23.59
1610.6 to 1613.8	1	33	19.7	19.7	-56.56	-50*	-109.26	-59.26
1613.8 to 1614	1	32	19.7	19.7	-48.18	-95	-99.88	-4.88
1614 to 1620	0.004	3.5	3.2	4.45	-74.90	-70	-82.85	-12.85
1620 to 1624.5	0.004	1	3.2	4.45	-69.65	-70	-75.10	-5.10
1624.5 to 1625.5	0.004	1	3.2	4.45	-67.40	-70	-72.85	-2.85
1625.5 to 1626.5	0.004	1	3.2	4.45	-65.20	-70	-70.65	-0.65
1626.5 to 1660	0.004	0.1	3.2	4.45	-65.60	-70	-70.15	-0.15
1660 to 1670	0.02	1	13.6	11.84	-55.12	-19.5*	-67.96	-48.46
1670 to 1735	0.004	18.5	3.2	4.45	-67.67	-60	-90.62	-30.62
1735 to 1865	0.004	50	3.2	4.45	-66.29	-105	-120.74	-15.74
1865 to 2260.5	0.004	60	3.2	4.45	-66.29	-105	-130.74	-25.74
2260.5 to 3250	0.004	60	3.2	4.45	-63.94	-105	-128.39	-23.39
3250 to 3330	0.004	70	3.2	4.45	-32.30	-105	-106.75	-1.75
3330 to 4000	0.004	50	3.2	4.45	-63.00	-105	-117.45	-12.45
4000 to 12000	0.004	65	3.2	4.45	-37.60	-105	-107.05	-2.05
12000 to 18000	0.004	50	3.2	4.45	-60.28	-70	-114.73	-44.73

64 QAM 220KD7W 1643.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.5	4.75	-59.76	-135	-138.51	-3.51
1026.5 to 1525	0.004	94	3.5	4.75	-68.28	-135	-167.03	-32.03
1525 to 1559	0.004	120	3.5	4.75	-81.45	-203	-206.20	-3.20
1559 to 1585	1	94	19.5	19.5	-55.85	-155	-169.35	-14.35
1585 to 1605	1	71	19.5	19.5	-54.49	-143	-144.99	-1.99
1605 to 1610	1	51	19.5	19.5	-51.88	-117	-122.38	-5.38
1610 to 1610.6	1	48	19.5	19.5	-52.71	-95	-120.21	-25.21
1610.6 to 1613.8	1	33	19.5	19.5	-58.57	-50*	-111.07	-61.07
1613.8 to 1614	1	32	19.5	19.5	-50.32	-95	-101.82	-6.82
1614 to 1620	0.004	3.5	3.5	4.75	-66.93	-70	-75.18	-5.18
1620 to 1624.5	0.004	1	3.5	4.75	-67	-70	-72.75	-2.75
1624.5 to 1625.5	0.004	1	3.5	4.75	-68.44	-70	-74.19	-4.19
1625.5 to 1626.5	0.004	1	3.5	4.75	-66.59	-70	-72.34	-2.34
1626.5 to 1660	0.004	0.1	3.5	4.75	-65.5	-70	-70.35	-0.35
1660 to 1670	0.02	1	13.4	11.64	-56.57	-19.5*	-69.21	-49.71
1670 to 1735	0.004	18.5	3.5	4.75	-64.42	-60	-87.67	-27.67
1735 to 1865	0.004	50	3.5	4.75	-66.99	-105	-121.74	-16.74
1865 to 2260.5	0.004	60	3.5	4.75	-65.82	-105	-130.57	-25.57
2260.5 to 3250	0.004	60	3.5	4.75	-64.67	-105	-129.42	-24.42
3250 to 3330	0.004	70	3.5	4.75	-33.8	-105	-108.55	-3.55
3330 to 4000	0.004	50	3.5	4.75	-64.18	-105	-118.93	-13.93
4000 to 12000	0.004	65	3.5	4.75	-37.9	-105	-107.65	-2.65
12000 to 18000	0.004	50	3.5	4.75	-60.54	-70	-115.29	-45.29

64 QAM 220KD7W 1660.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.9	5.15	-59.91	-135	-139.06	-4.06
1026.5 to 1525	0.004	94	3.9	5.15	-68.69	-135	-167.84	-32.84
1525 to 1559	0.004	120	3.9	5.15	-81.07	-203	-206.22	-3.22
1559 to 1585	1	94	19.7	19.7	-55.59	-155	-169.29	-14.29
1585 to 1605	1	71	19.7	19.7	-55.08	-143	-145.78	-2.78
1605 to 1610	1	51	19.7	19.7	-53.42	-117	-124.12	-7.12
1610 to 1610.6	1	48	19.7	19.7	-52.26	-95	-119.96	-24.96
1610.6 to 1613.8	1	33	19.7	19.7	-51.4	-50*	-104.10	-54.10
1613.8 to 1614	1	32	19.7	19.7	-50.22	-95	-101.92	-6.92
1614 to 1620	0.004	3.5	3.9	5.15	-65.95	-70	-74.60	-4.60
1620 to 1624.5	0.004	1	3.9	5.15	-66.85	-70	-73.00	-3.00
1624.5 to 1625.5	0.004	1	3.9	5.15	-69.49	-70	-75.64	-5.64
1625.5 to 1626.5	0.004	1	3.9	5.15	-68.03	-70	-74.18	-4.18
1626.5 to 1660	0.004	0.1	3.9	5.15	-65.9	-70	-71.15	-1.15
1660 to 1670	0.02	1	13.4	11.64	-37.27	-19.5*	-49.91	-30.41
1670 to 1735	0.004	18.5	3.9	5.15	-70.11	-60	-93.76	-33.76
1735 to 1865	0.004	50	3.9	5.15	-67.02	-105	-122.17	-17.17
1865 to 2260.5	0.004	60	3.9	5.15	-67.31	-105	-132.46	-27.46
2260.5 to 3250	0.004	60	3.9	5.15	-64.01	-105	-129.16	-24.16
3250 to 3330	0.004	70	3.9	5.15	-34.4	-105	-109.55	-4.55
3330 to 4000	0.004	50	3.9	5.15	-64.65	-105	-119.80	-14.80
4000 to 12000	0.004	65	3.9	5.15	-37.3	-105	-107.45	-2.45
12000 to 18000	0.004	50	3.9	5.15	-60.7	-70	-115.85	-45.85

64 QAM 110KD7W 1626.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	6.2	7.45	-59.14	-135	-140.59	-5.59
1026.5 to 1525	0.004	94	6.2	7.45	-64.30	-135	-165.75	-30.75
1525 to 1559	0.004	120	6.2	7.45	-84.40	-203	-211.85	-8.85
1559 to 1585	1	94	19.8	19.8	-54.25	-155	-168.05	-13.05
1585 to 1605	1	71	19.8	19.8	-52.91	-143	-143.71	-0.71
1605 to 1610	1	51	19.8	19.8	-52.32	-117	-123.12	-6.12
1610 to 1610.6	1	48	19.8	19.8	-51.20	-95	-119.00	-24.00
1610.6 to 1613.8	1	33	19.8	19.8	-55.45	-50*	-108.25	-58.25
1613.8 to 1614	1	32	19.8	19.8	-48.32	-95	-100.12	-5.12
1614 to 1620	0.004	3.5	6.2	7.45	-60.54	-70	-71.49	-1.49
1620 to 1624.5	0.004	1	6.2	7.45	-68.90	-70	-77.35	-7.35
1624.5 to 1625.5	0.004	1	6.2	7.45	-66.10	-70	-74.55	-4.55
1625.5 to 1626.5	0.004	1	6.2	7.45	-65.90	-70	-74.35	-4.35
1626.5 to 1660	0.004	0.1	6.2	7.45	-65.50	-70	-73.05	-3.05
1660 to 1670	0.02	1	16.2	14.44	-55.28	-19.5*	-70.72	-51.22
1670 to 1735	0.004	18.5	6.2	7.45	-57.55	-60	-83.50	-23.50
1735 to 1865	0.004	50	6.2	7.45	-66.19	-105	-123.64	-18.64
1865 to 2260.5	0.004	60	6.2	7.45	-66.28	-105	-133.73	-28.73
2260.5 to 3250	0.004	60	6.2	7.45	-62.35	-105	-129.80	-24.80
3250 to 3330	0.004	70	6.2	7.45	-28.70	-105	-106.15	-1.15
3330 to 4000	0.004	50	6.2	7.45	-65.24	-105	-122.69	-17.69
4000 to 12000	0.004	65	6.2	7.45	-34.30	-105	-106.75	-1.75
12000 to 18000	0.004	50	6.2	7.45	-60.35	-70	-117.80	-47.80

64 QAM 110KD7W 1643.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	6	7.25	-58.86	-135	-140.11	-5.11
1026.5 to 1525	0.004	94	6	7.25	-64.58	-135	-165.83	-30.83
1525 to 1559	0.004	120	6	7.25	-83.7	-203	-210.95	-7.95
1559 to 1585	1	94	19.8	19.8	-60.4	-155	-174.20	-19.20
1585 to 1605	1	71	19.8	19.8	-53.12	-143	-143.92	-0.92
1605 to 1610	1	51	19.8	19.8	-50.85	-117	-121.65	-4.65
1610 to 1610.6	1	48	19.8	19.8	-51.52	-95	-119.32	-24.32
1610.6 to 1613.8	1	33	19.8	19.8	-51.16	-50*	-103.96	-53.96
1613.8 to 1614	1	32	19.8	19.8	-45.87	-95	-97.67	-2.67
1614 to 1620	0.004	3.5	6	7.25	-65.62	-70	-76.37	-6.37
1620 to 1624.5	0.004	1	6	7.25	-66.82	-70	-75.07	-5.07
1624.5 to 1625.5	0.004	1	6	7.25	-69.55	-70	-77.80	-7.80
1625.5 to 1626.5	0.004	1	6	7.25	-65.72	-70	-73.97	-3.97
1626.5 to 1660	0.004	0.1	6	7.25	-67.54	-70	-74.89	-4.89
1660 to 1670	0.02	1	15.8	14.04	-39.95	-19.5	-54.99	-35.49
1670 to 1735	0.004	18.5	6	7.25	-44.72	-60	-70.47	-10.47
1735 to 1865	0.004	50	6	7.25	-65.82	-105	-123.07	-18.07
1865 to 2260.5	0.004	60	6	7.25	-63.66	-105	-130.91	-25.91
2260.5 to 3250	0.004	60	6	7.25	-62.45	-105	-129.70	-24.70
3250 to 3330	0.004	70	6	7.25	-32.2	-105	-109.45	-4.45
3330 to 4000	0.004	50	6	7.25	-65.48	-105	-122.73	-17.73
4000 to 12000	0.004	65	6	7.25	-36.3	-105	-108.55	-3.55
12000 to 18000	0.004	50	6	7.25	-60.14	-70	-117.39	-47.39

64 QAM 110KD7W 1660.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	6.4	7.65	-58.96	-135	-140.61	-5.61
1026.5 to 1525	0.004	94	6.4	7.65	-65.33	-135	-166.98	-31.98
1525 to 1559	0.004	120	6.4	7.65	-82.5	-203	-210.15	-7.15
1559 to 1585	1	94	19.8	19.8	-50.97	-155	-164.77	-9.77
1585 to 1605	1	71	19.8	19.8	-53.84	-143	-144.64	-1.64
1605 to 1610	1	51	19.8	19.8	-51.25	-117	-122.05	-5.05
1610 to 1610.6	1	48	19.8	19.8	-51.36	-95	-119.16	-24.16
1610.6 to 1613.8	1	33	19.8	19.8	-51.62	-50*	-104.42	-54.42
1613.8 to 1614	1	32	19.8	19.8	-47.96	-95	-99.76	-4.76
1614 to 1620	0.004	3.5	6.4	7.65	-65.4	-70	-76.55	-6.55
1620 to 1624.5	0.004	1	6.4	7.65	-67.11	-70	-75.76	-5.76
1624.5 to 1625.5	0.004	1	6.4	7.65	-68.39	-70	-77.04	-7.04
1625.5 to 1626.5	0.004	1	6.4	7.65	-69.21	-70	-77.86	-7.86
1626.5 to 1660	0.004	0.1	6.4	7.65	-67.43	-70	-75.18	-5.18
1660 to 1670	0.02	1	16.5	14.74	-38.88	-19.5*	-54.62	-35.12
1670 to 1735	0.004	18.5	6.4	7.65	-41.25	-60	-67.40	-7.40
1735 to 1865	0.004	50	6.4	7.65	-66.21	-105	-123.86	-18.86
1865 to 2260.5	0.004	60	6.4	7.65	-64.86	-105	-132.51	-27.51
2260.5 to 3250	0.004	60	6.4	7.65	-64.55	-105	-132.20	-27.20
3250 to 3330	0.004	70	6.4	7.65	-33.24	-105	-110.89	-5.89
3330 to 4000	0.004	50	6.4	7.65	-66.1	-105	-123.75	-18.75
4000 to 12000	0.004	65	6.4	7.65	-36.1	-105	-108.75	-3.75
12000 to 18000	0.004	50	6.4	7.65	-59.42	-70	-117.07	-47.07

32 QAM 220KD7W 1626.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.4	4.65	-58.18	-135	-136.83	-1.83
1026.5 to 1525	0.004	94	3.4	4.65	-65.83	-135	-164.48	-29.48
1525 to 1559	0.004	120	3.4	4.65	-86.37	-203	-211.02	-8.02
1559 to 1585	1	94	19.4	19.4	-53.85	-155	-167.25	-12.25
1585 to 1605	1	71	19.4	19.4	-54.48	-143	-144.88	-1.88
1605 to 1610	1	51	19.4	19.4	-52.48	-117	-122.88	-5.88
1610 to 1610.6	1	48	19.4	19.4	-51.28	-95	-118.68	-23.68
1610.6 to 1613.8	1	33	19.4	19.4	-57.45	-50*	-109.85	-59.85
1613.8 to 1614	1	32	19.4	19.4	-48.88	-95	-100.28	-5.28
1614 to 1620	0.004	3.5	3.4	4.65	-74.99	-70	-83.14	-13.14
1620 to 1624.5	0.004	1	3.4	4.65	-68.80	-70	-74.45	-4.45
1624.5 to 1625.5	0.004	1	3.4	4.65	-66.70	-70	-72.35	-2.35
1625.5 to 1626.5	0.004	1	3.4	4.65	-66.20	-70	-71.85	-1.85
1626.5 to 1660	0.004	0.1	3.4	4.65	-66.31	-70	-71.06	-1.06
1660 to 1670	0.02	1	13.5	11.74	-55.61	-19.5*	-68.35	-48.85
1670 to 1735	0.004	18.5	3.4	4.65	-67.36	-60	-90.51	-30.51
1735 to 1865	0.004	50	3.4	4.65	-66.68	-105	-121.33	-16.33
1865 to 2260.5	0.004	60	3.4	4.65	-67.42	-105	-132.07	-27.07
2260.5 to 3250	0.004	60	3.4	4.65	-64.25	-105	-128.90	-23.90
3250 to 3330	0.004	70	3.4	4.65	-33.30	-105	-107.95	-2.95
3330 to 4000	0.004	50	3.4	4.65	-65.17	-105	-119.82	-14.82
4000 to 12000	0.004	65	3.4	4.65	-37.80	-105	-107.45	-2.45
12000 to 18000	0.004	50	3.4	4.65	-60.80	-70	-115.45	-45.45

32 QAM 220KD7W 1643.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.3	4.55	-59.71	-135	-138.26	-3.26
1026.5 to 1525	0.004	94	3.3	4.55	-65.37	-135	-163.92	-28.92
1525 to 1559	0.004	120	3.3	4.55	-85.06	-203	-209.61	-6.61
1559 to 1585	1	94	19.5	19.5	-42.67	-155	-156.17	-1.17
1585 to 1605	1	71	19.5	19.5	-54.7	-143	-145.20	-2.20
1605 to 1610	1	51	19.5	19.5	-53.32	-117	-123.82	-6.82
1610 to 1610.6	1	48	19.5	19.5	-52.66	-95	-120.16	-25.16
1610.6 to 1613.8	1	33	19.5	19.5	-59.14	-50*	-111.64	-61.64
1613.8 to 1614	1	32	19.5	19.5	-50.79	-95	-102.29	-7.29
1614 to 1620	0.004	3.5	3.3	4.55	-64.61	-70	-72.66	-2.66
1620 to 1624.5	0.004	1	3.3	4.55	-65.44	-70	-70.99	-0.99
1624.5 to 1625.5	0.004	1	3.3	4.55	-66.13	-70	-71.68	-1.68
1625.5 to 1626.5	0.004	1	3.3	4.55	-66.9	-70	-72.45	-2.45
1626.5 to 1660	0.004	0.1	3.3	4.55	-66.6	-70	-71.25	-1.25
1660 to 1670	0.02	1	13.3	11.54	-56.48	-19.5*	-69.02	-49.52
1670 to 1735	0.004	18.5	3.3	4.55	-65.94	-60	-88.99	-28.99
1735 to 1865	0.004	50	3.3	4.55	-66.45	-105	-121.00	-16.00
1865 to 2260.5	0.004	60	3.3	4.55	-66.15	-105	-130.70	-25.70
2260.5 to 3250	0.004	60	3.3	4.55	-63.88	-105	-128.43	-23.43
3250 to 3330	0.004	70	3.3	4.55	-36.6	-105	-111.15	-6.15
3330 to 4000	0.004	50	3.3	4.55	-64.64	-105	-119.19	-14.19
4000 to 12000	0.004	65	3.3	4.55	-40.3	-105	-109.85	-4.85
12000 to 18000	0.004	50	3.3	4.55	-61.17	-70	-115.72	-45.72

32 QAM 220KD7W 1660.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	3.7	4.95	-60.99	-135	-139.94	-4.94
1026.5 to 1525	0.004	94	3.7	4.95	-69.78	-135	-168.73	-33.73
1525 to 1559	0.004	120	3.7	4.95	-84.44	-203	-209.39	-6.39
1559 to 1585	1	94	19.7	19.7	-55.38	-155	-169.08	-14.08
1585 to 1605	1	71	19.7	19.7	-54.76	-143	-145.46	-2.46
1605 to 1610	1	51	19.7	19.7	-53.41	-117	-124.11	-7.11
1610 to 1610.6	1	48	19.7	19.7	-51.7	-95	-119.40	-24.40
1610.6 to 1613.8	1	33	19.7	19.7	-51.02	-50*	-103.72	-53.72
1613.8 to 1614	1	32	19.7	19.7	-50.27	-95	-101.97	-6.97
1614 to 1620	0.004	3.5	3.7	4.95	-66.87	-70	-75.32	-5.32
1620 to 1624.5	0.004	1	3.7	4.95	-66.47	-70	-72.42	-2.42
1624.5 to 1625.5	0.004	1	3.7	4.95	-70.65	-70	-76.60	-6.60
1625.5 to 1626.5	0.004	1	3.7	4.95	-68.9	-70	-74.85	-4.85
1626.5 to 1660	0.004	0.1	3.7	4.95	-65.76	-70	-70.81	-0.81
1660 to 1670	0.02	1	13.3	11.54	-41.28	-19.5*	-53.82	-34.32
1670 to 1735	0.004	18.5	3.7	4.95	-67.12	-60	-90.57	-30.57
1735 to 1865	0.004	50	3.7	4.95	-66.75	-105	-121.70	-16.70
1865 to 2260.5	0.004	60	3.7	4.95	-68.15	-105	-133.10	-28.10
2260.5 to 3250	0.004	60	3.7	4.95	-64.19	-105	-129.14	-24.14
3250 to 3330	0.004	70	3.7	4.95	-38.05	-105	-113.00	-8.00
3330 to 4000	0.004	50	3.7	4.95	-64.69	-105	-119.64	-14.64
4000 to 12000	0.004	65	3.7	4.95	-40.71	-105	-110.66	-5.66
12000 to 18000	0.004	50	3.7	4.95	-60.23	-70	-115.18	-45.18

32 QAM 110KD7W 1626.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	6.2	7.45	-59.08	-135	-140.53	-5.53
1026.5 to 1525	0.004	94	6.2	3.65	-65.41	-135	-163.06	-28.06
1525 to 1559	0.004	120	6.2	3.65	-86.37	-203	-210.02	-7.02
1559 to 1585	1	94	19.8	20.96	-42.12	-155	-157.08	-2.08
1585 to 1605	1	71	19.8	20.96	-53.76	-143	-145.72	-2.72
1605 to 1610	1	51	19.8	20.96	-52.02	-117	-123.98	-6.98
1610 to 1610.6	1	48	19.8	20.96	-50.16	-95	-119.12	-24.12
1610.6 to 1613.8	1	33	19.8	20.96	-53.40	-50*	-107.36	-57.36
1613.8 to 1614	1	32	19.8	20.96	-47.15	-95	-100.11	-5.11
1614 to 1620	0.004	3.5	6.2	7.45	-73.46	-70	-84.41	-14.41
1620 to 1624.5	0.004	1	6.2	7.45	-66.30	-70	-74.75	-4.75
1624.5 to 1625.5	0.004	1	6.2	7.45	-65.80	-70	-74.25	-4.25
1625.5 to 1626.5	0.004	1	6.2	7.45	-65.40	-70	-73.85	-3.85
1626.5 to 1660	0.004	0.1	6.2	7.45	-64.70	-70	-72.25	-2.25
1660 to 1670	0.02	1	16.1	14.34	-59.65	-19.5*	-74.99	-55.49
1670 to 1735	0.004	18.5	6.2	7.45	-70.55	-60	-96.50	-36.50
1735 to 1865	0.004	50	6.2	7.45	-63.86	-105	-121.31	-16.31
1865 to 2260.5	0.004	60	6.2	7.45	-63.86	-105	-131.31	-26.31
2260.5 to 3250	0.004	60	6.2	7.45	-63.86	-105	-131.31	-26.31
3250 to 3330	0.004	70	6.2	7.45	-29.70	-105	-107.15	-2.15
3330 to 4000	0.004	50	6.2	7.45	-64.05	-105	-121.50	-16.50
4000 to 12000	0.004	65	6.2	7.45	-34.40	-105	-106.85	-1.85
12000 to 18000	0.004	50	6.2	7.45	-60.14	-70	-117.59	-47.59

32 QAM 110KD7W 1643.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	5.9	7.15	-59.92	-135	-141.07	-6.07
1026.5 to 1525	0.004	94	5.9	7.15	-65.98	-135	-167.13	-32.13
1525 to 1559	0.004	120	5.9	7.15	-85.19	-203	-212.34	-9.34
1559 to 1585	1	94	19.6	19.6	-55.24	-155	-168.84	-13.84
1585 to 1605	1	71	19.6	19.6	-54.08	-143	-144.68	-1.68
1605 to 1610	1	51	19.6	19.6	-52.7	-117	-123.30	-6.30
1610 to 1610.6	1	48	19.6	19.6	-51.76	-95	-119.36	-24.36
1610.6 to 1613.8	1	33	19.6	19.6	-50.78	-50*	-103.38	-53.38
1613.8 to 1614	1	32	19.6	19.6	-49.75	-95	-101.35	-6.35
1614 to 1620	0.004	3.5	5.9	7.15	-61.28	-70	-71.93	-1.93
1620 to 1624.5	0.004	1	5.9	7.15	-75.42	-70	-83.57	-13.57
1624.5 to 1625.5	0.004	1	5.9	7.15	-81.5	-70	-89.65	-19.65
1625.5 to 1626.5	0.004	1	5.9	7.15	-69.45	-70	-77.60	-7.60
1626.5 to 1660	0.004	0.1	5.9	7.15	-66.5	-70	-73.75	-3.75
1660 to 1670	0.02	1	16.1	14.34	-59.44	-19.5*	-74.78	-55.28
1670 to 1735	0.004	18.5	5.9	7.15	-65.42	-60	-91.07	-31.07
1735 to 1865	0.004	50	5.9	7.15	-65.29	-105	-122.44	-17.44
1865 to 2260.5	0.004	60	5.9	7.15	-65.29	-105	-132.44	-27.44
2260.5 to 3250	0.004	60	5.9	7.15	-63.28	-105	-130.43	-25.43
3250 to 3330	0.004	70	5.9	7.15	-32.9	-105	-110.05	-5.05
3330 to 4000	0.004	50	5.9	7.15	-65.52	-105	-122.67	-17.67
4000 to 12000	0.004	65	5.9	7.15	-36.5	-105	-108.65	-3.65
12000 to 18000	0.004	50	5.9	7.15	-60.35	-70	-117.50	-47.50

32 QAM 110KD7W 1660.5 MHz Conducted Spurious Emissions

Frequency (MHz)	RBW (MHz)	IPLD Rejection (dB)	Measured Power (dBm)	Corrected Power (dBm)	Measured Level (dBm)	Limit (dBc)	Calculated Attenuation (dB)	Margin (dB)
.010 to 1026.5	0.004	74	6	7.25	-59.56	-135	-140.81	-5.81
1026.5 to 1525	0.004	94	6	7.25	-65.52	-135	-166.77	-31.77
1525 to 1559	0.004	120	6	7.25	-82.57	-203	-209.82	-6.82
1559 to 1585	1	94	19.9	21.15	-51.2	-155	-166.35	-11.35
1585 to 1605	1	71	19.9	21.15	-53.89	-143	-146.04	-3.04
1605 to 1610	1	51	19.9	21.15	-52.51	-117	-124.66	-7.66
1610 to 1610.6	1	48	19.9	21.15	-51.21	-95	-120.36	-25.36
1610.6 to 1613.8	1	33	19.9	21.15	-51.43	-50*	-105.58	-55.58
1613.8 to 1614	1	32	19.9	21.15	-48.32	-95	-101.47	-6.47
1614 to 1620	0.004	3.5	6	7.25	-68.8	-70	-79.55	-9.55
1620 to 1624.5	0.004	1	6	7.25	-69.33	-70	-77.58	-7.58
1624.5 to 1625.5	0.004	1	6	7.25	-75.7	-70	-83.95	-13.95
1625.5 to 1626.5	0.004	1	6	7.25	-68.32	-70	-76.57	-6.57
1626.5 to 1660	0.004	0.1	6	7.25	-63.96	-70	-71.31	-1.31
1660 to 1670	0.02	1	16.2	14.44	-59.97	-19.5*	-75.41	-55.91
1670 to 1735	0.004	18.5	6	7.25	-71.96	-60	-97.71	-37.71
1735 to 1865	0.004	50	6	7.25	-65.92	-105	-123.17	-18.17
1865 to 2260.5	0.004	60	6	7.25	-64.75	-105	-132.00	-27.00
2260.5 to 3250	0.004	60	6	7.25	-63.38	-105	-130.63	-25.63
3250 to 3330	0.004	70	6	7.25	-33.8	-105	-111.05	-6.05
3330 to 4000	0.004	50	6	7.25	-65.23	-105	-122.48	-17.48
4000 to 12000	0.004	65	6	7.25	-37.2	-105	-109.45	-4.45
12000 to 18000	0.004	50	6	7.25	-60.42	-70	-117.67	-47.67

*This value is absolute.



Necessary Bandwidth and Emission Bandwidth

Engineer: Alex Macon

Test Date 9/15/15

QAM

Modulation = 100KD7W

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	268.8
Constant Factor (K)	=	0.74
Necessary Bandwidth (BN), kHz	=	$2 * D * K / \text{LOG2}(S)$

Modulation = 200KD7W

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	604.8
Constant Factor (K)	=	0.66
Necessary Bandwidth (BN), kHz	=	$2 * D * K / \text{LOG2}(S)$

Test Equipment Utilized

Asset#	Manufacturer	Model	Description	Last Calibration	Calibration Due
i00177	Trilithic	4HX3400-3-xx	High Pass Filter	Verified on: 9/14/15	
i00409	Yihua	PS-3010D	PowerSupply	Verified on: 9/11/15	
#1268142A	Agilent	E4407B	Spectrum Analyzer	7/8/15	7/8/16

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT