



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: EMS Technologies Honeywell Satcom

Model: HSD-MK2

Description: Aeronautical Satcom Transceiver

Serial Number: N/A

FCC ID: K6KHSD-MK2

To

FCC Part 87

Date of Issue: July 6, 2016

On the behalf of the applicant:

EMS Technologies Honeywell Satcom
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Attention of:

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Project No: p1640029

Alex Macon
Project Test Engineer

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All results contained herein relate only to the sample tested

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	June 22, 2016	Alex Macon	Original Document
2.0	July 8, 2016	Alex Macon	Added models covered to EUT description section.

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ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009).

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)
24.4 – 25.2	24.1 – 32.2	956 - 962

EUT Description

Model Tested: HSD-MK2

Description: Aeronautical Satcom Transceiver

Models Covered: 1252-A-3400, 1252-A-3410, 1252-A-3420-01, 1252-A-3420-02, 1252-A-3420-03, 1252-A-3420-04, 1252-A-3450, 1252-A-3500, 1252-A-3520-01, 1252-A-3520-02, 1252-A-3520-03, 1252-A-3520-04, 1252-A-3600-01, 1252-A-3600-02, 1252-A-3700-01, 1252-A-3700-03, 1252-A-3700-04

Firmware: N/A

Software: N/A

Serial Number: N/A

Additional Information:

The EUT is an aircraft based satellite communication system.

EUT Operation during Tests

EUT was supplied 115VAC at 400Hz using an AC 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)	Pass	
2.1051, 87.139(i)(1)	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1053	Field Strength of Spurious Radiation	Pass	
2.1049, 87.139(i)(3)	Emission Masks (Occupied Bandwidth)	Pass	See FCC waiver for allowable variance
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 modification that warranted the C2PC does not require that this test be repeated
2.1055, 87.133(a)	Frequency Stability (Voltage Variation)	N/A	The modification that warranted the C2PC does not require that this test be repeated

Carrier Output Power (Conducted)

Engineer: Alex Macon

Test Date: 6/14/16

Test Procedure

The Equipment Under Test (EUT) was connected directly to a spectrum analyzer with the RBW set to 1 MHz and the VBW set to 3 X RBW which set the RBW greater than the transmit signal ensuring there was no signal suppression while measuring a modulated signal. The average readings were taken for each modulation type and the result was then compared to the limit.

Test Setup

AcarsC Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.64	58	60
1643.5	47.74	59	60
1660.5	47.78	60	60

RTS600 Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.73	59	60
1643.5	47.78	60	60
1660.5	47.73	59	60

RTS1200 Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.78	60	60
1643.5	47.79	60	60
1660.5	47.67	59	60

RTS10500 Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.78	60	60
1643.5	47.8	60	60
1660.5	47.8	60	60



RT05Q Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.8	60	60
1643.5	47.73	59	60
1660.5	47.72	59	60

RT1Q Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.81	60	60
1643.5	47.69	59	60
1660.5	47.83	60	60

RT2Q Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.7	59	60
1643.5	47.74	59	60
1660.5	47.78	60	60

RT45Q Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.74	59	60
1643.5	47.8	60	60
1660.5	47.75	60	60

RT1X Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.67	59	60
1643.5	47.71	59	60
1660.5	47.75	60	60



RT2X Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.76	60	60
1643.5	47.58	57	60
1660.5	47.76	60	60

RT45X Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.7	59	60
1643.5	47.8	60	60
1660.5	47.76	60	60

S2K8 Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.8	60	60
1643.5	47.8	60	60
1660.5	47.71	59	60

S3K Transmitter Average Output Power

Tuned Frequency (MHz)	Measured Power (dBm)	Measured Power (W)	Limit (W)
1626.5	47.72	59	60
1643.5	47.66	59	60
1660.5	47.75	60	60

Conducted Spurious Emissions

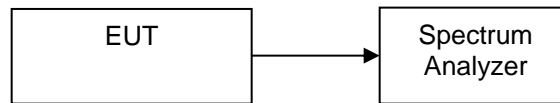
Engineer: Alex Macon

Test Date: 6/14/16

Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the UUT 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 dBc limit, the DLNA rejection, and corrected power were summed together to determine the necessary dBm value of the EUT to provide a system rejection greater than the FCC limit. This necessary value was compared to the measured value to ensure compliance to the specification, which is expressed as the margin. A negative value indicates a passing result.

Test Setup



Test Plots: See Annex A Conducted Spurious Emissions



RTS600

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	47.74	48.99	-30.27	-158.01	-135	-23.01	-167.51	-135	-32.51
1026.5 - 1525	0.004	0.003	-1.25	-135	80	47.74	48.99	-41	-168.74	-135	-33.74	-178.24	-135	-43.24
1525 - 1559	0.004	0.003	-1.25	-203	120	47.74	48.99	-38.28	-206.02	-203	-3.02	-215.52	-203	-12.52
1559 - 1585	1	1	0.00	-155	111	47.78	47.78	-19.5	-178.28	-155	-23.28	-187.78	-155	-32.78
1585 - 1605	1	1	0.00	-143	95	47.78	47.78	-19.5	-162.28	-143	-19.28	-171.78	-143	-28.78
1605 - 1610	1	1	0.00	-117	62	47.78	47.78	-19.5	-129.28	-117	-12.28	-138.78	-117	-21.78
1610 - 1610.6	1	1	0.00	-95	40	47.78	47.78	-19.5	-107.28	-95	-12.28	-116.78	-95	-21.78
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-19.5	-59.50	-50	-9.50	** -59.50	-50	-9.50
1613.8 - 1614	1	1	0.00	-95	40	47.78	47.78	-19.5	-107.28	-95	-12.28	-116.78	-95	-21.78
1614 - 1620	0.004	0.003	-1.25	-70	30	47.74	48.99	-26.23	-103.97	-70	-33.97	-113.47	-70	-43.47
1620 - 1624.5	0.004	0.003	-1.25	-70	20	47.74	48.99	-26.23	-93.97	-70	-23.97	-103.47	-70	-33.47
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	47.74	48.99	-26.23	-83.97	-70	-13.97	-93.47	-70	-23.47
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	47.74	48.99	-26.23	-75.27	-70	-5.27	-84.77	-70	-14.77
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	47.74	48.99	-21.45	-70.49	-70	-0.49	-79.99	-70	-9.99
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-26.02	-28.58	-19.5	-9.08	** -28.58	-19.5	-9.08
1670 - 1735	0.004	0.003	-1.25	-60	0.8	47.74	48.99	-27.46	-76.00	-60	-16.00	-85.50	-60	-25.50
1735 - 1865	0.004	0.003	-1.25	-105	50	47.74	48.99	-32.63	-130.37	-105	-25.37	-139.87	-105	-34.87
1865 - 2260.5	0.004	0.003	-1.25	-105	20	47.74	48.99	-39.85	-107.59	-105	-2.59	-117.09	-105	-12.09
2260.5 - 3250	0.004	0.003	-1.25	-105	20	47.74	48.99	-43.26	-111.00	-105	-6.00	-120.50	-105	-15.50
3250 - 3330	0.004	0.003	-1.25	-105	50	47.74	48.99	-36.48	-134.22	-105	-29.22	-143.72	-105	-38.72
3330 - 4000	0.004	0.003	-1.25	-105	40	47.74	48.99	-45.74	-133.48	-105	-28.48	-142.98	-105	-37.98
4000 - 12000	0.004	0.003	-1.25	-105	50	47.74	48.99	-33.8	-131.54	-105	-26.54	-141.04	-105	-36.04
12000 - 18000	0.004	0.003	-1.25	-70	15	47.74	48.99	-41.97	-104.71	-70	-34.71	-114.21	-70	-44.21

RTS1200

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	47.58	48.83	-34.02	-161.60	-135	-26.60	-171.10	-135	-36.10
1026.5 - 1525	0.004	0.003	-1.25	-135	80	47.58	48.83	-42.15	-169.73	-135	-34.73	-179.23	-135	-44.23
1525 - 1559	0.004	0.003	-1.25	-203	120	47.58	48.83	-36.36	-203.94	-203	-0.94	-213.44	-203	-10.44
1559 - 1585	1	1	0.00	-155	111	47.79	47.79	-18.58	-177.37	-155	-22.37	-186.87	-155	-31.87
1585 - 1605	1	1	0.00	-143	95	47.79	47.79	-18.58	-161.37	-143	-18.37	-170.87	-143	-27.87
1605 - 1610	1	1	0.00	-117	62	47.79	47.79	-18.58	-128.37	-117	-11.37	-137.87	-117	-20.87
1610 - 1610.6	1	1	0.00	-95	40	47.79	47.79	-18.58	-106.37	-95	-11.37	-115.87	-95	-20.87
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-18.58	-58.58	-50	-8.58	** -58.58	-50	-8.58
1613.8 - 1614	1	1	0.00	-95	40	47.79	47.79	-18.58	-106.37	-95	-11.37	-115.87	-95	-20.87
1614 - 1620	0.004	0.003	-1.25	-70	30	47.58	48.83	-27.98	-105.56	-70	-35.56	-115.06	-70	-45.06
1620 - 1624.5	0.004	0.003	-1.25	-70	20	47.58	48.83	-27.98	-95.56	-70	-25.56	-105.06	-70	-35.06
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	47.58	48.83	-27.98	-85.56	-70	-15.56	-95.06	-70	-25.06
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	47.58	48.83	-27.98	-76.86	-70	-6.86	-86.36	-70	-16.36
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	47.58	48.83	-22.68	-71.56	-70	-1.56	-81.06	-70	-11.06
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-25.05	-27.61	-19.5	-8.11	** -27.61	-19.5	-8.11
1670 - 1735	0.004	0.003	-1.25	-60	0.8	47.58	48.83	-28.74	-77.12	-60	-17.12	-86.62	-60	-26.62
1735 - 1865	0.004	0.003	-1.25	-105	50	47.58	48.83	-32.1	-129.68	-105	-24.68	-139.18	-105	-34.18
1865 - 2260.5	0.004	0.003	-1.25	-105	20	47.58	48.83	-40.48	-108.06	-105	-3.06	-117.56	-105	-12.56
2260.5 - 3250	0.004	0.003	-1.25	-105	20	47.58	48.83	-43.98	-111.56	-105	-6.56	-121.06	-105	-16.06
3250 - 3330	0.004	0.003	-1.25	-105	50	47.58	48.83	-36.3	-133.88	-105	-28.88	-143.38	-105	-38.38
3330 - 4000	0.004	0.003	-1.25	-105	40	47.58	48.83	-44.41	-131.99	-105	-26.99	-141.49	-105	-36.49
4000 - 12000	0.004	0.003	-1.25	-105	50	47.58	48.83	-35.45	-133.03	-105	-28.03	-142.53	-105	-37.53
12000 - 18000	0.004	0.003	-1.25	-70	15	47.58	48.83	-42.09	-104.67	-70	-34.67	-114.17	-70	-44.17



RTS10500

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	45.13	46.38	-36.2	-161.33	-135	-26.33	-170.83	-135	-35.83
1026.5 - 1525	0.004	0.003	-1.25	-135	80	45.13	46.38	-41.62	-166.75	-135	-31.75	-176.25	-135	-41.25
1525 - 1559	0.004	0.003	-1.25	-203	120	45.13	46.38	-38.37	-203.50	-203	-0.50	-213.00	-203	-10.00
1559 - 1585	1	1	0.00	-155	111	47.81	47.81	-19.92	-178.73	-155	-23.73	-188.23	-155	-33.23
1585 - 1605	1	1	0.00	-143	95	47.81	47.81	-19.92	-162.73	-143	-19.73	-172.23	-143	-29.23
1605 - 1610	1	1	0.00	-117	62	47.81	47.81	-19.92	-129.73	-117	-12.73	-139.23	-117	-22.23
1610 - 1610.6	1	1	0.00	-95	40	47.81	47.81	-19.92	-107.73	-95	-12.73	-117.23	-95	-22.23
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-19.92	-59.92	-50	-9.92	** -59.92	-50	-9.92
1613.8 - 1614	1	1	0.00	-95	40	47.81	47.81	-19.92	-107.73	-95	-12.73	-117.23	-95	-22.23
1614 - 1620	0.004	0.003	-1.25	-70	30	45.13	46.38	-27.52	-102.65	-70	-32.65	-112.15	-70	-42.15
1620 - 1624.5	0.004	0.003	-1.25	-70	20	45.13	46.38	-27.52	-92.65	-70	-22.65	-102.15	-70	-32.15
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	45.13	46.38	-27.52	-82.65	-70	-12.65	-92.15	-70	-22.15
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	45.13	46.38	-27.52	-73.95	-70	-3.95	-83.45	-70	-13.45
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	45.13	46.38	-21.07	-67.50	-70	2.50	-77.00	-70	-7.00
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-24.13	-26.69	-19.5	-7.19	** -26.69	-19.5	-7.19
1670 - 1735	0.004	0.003	-1.25	-60	0.8	45.13	46.38	-29.4	-75.33	-60	-15.33	-84.83	-60	-24.83
1735 - 1865	0.004	0.003	-1.25	-105	50	45.13	46.38	-32.37	-127.50	-105	-22.50	-137.00	-105	-32.00
1865 - 2260.5	0.004	0.003	-1.25	-105	20	45.13	46.38	-44.61	-109.74	-105	-4.74	-119.24	-105	-14.24
2260.5 - 3250	0.004	0.003	-1.25	-105	20	45.13	46.38	-42.82	-107.95	-105	-2.95	-117.45	-105	-12.45
3250 - 3330	0.004	0.003	-1.25	-105	50	45.13	46.38	-35.62	-130.75	-105	-25.75	-140.25	-105	-35.25
3330 - 4000	0.004	0.003	-1.25	-105	40	45.13	46.38	-45.89	-131.02	-105	-26.02	-140.52	-105	-35.52
4000 - 12000	0.004	0.003	-1.25	-105	50	45.13	46.38	-33.51	-128.64	-105	-23.64	-138.14	-105	-33.14
12000 - 18000	0.004	0.003	-1.25	-70	15	45.13	46.38	-41.85	-101.98	-70	-31.98	-111.48	-70	-41.48

AcarsC

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	45.95	47.20	-30.44	-156.39	-135	-21.39	-165.89	-135	-30.89
1026.5 - 1525	0.004	0.003	-1.25	-135	80	45.95	47.20	-37.52	-163.47	-135	-28.47	-172.97	-135	-37.97
1525 - 1559	0.004	0.003	-1.25	-203	120	45.95	47.20	-38.81	-204.76	-203	-1.76	-214.26	-203	-11.26
1559 - 1585	1	1	0.00	-155	111	47.74	47.74	-19.21	-177.95	-155	-22.95	-187.45	-155	-32.45
1585 - 1605	1	1	0.00	-143	95	47.74	47.74	-19.21	-161.95	-143	-18.95	-171.45	-143	-28.45
1605 - 1610	1	1	0.00	-117	62	47.74	47.74	-19.21	-128.95	-117	-11.95	-138.45	-117	-21.45
1610 - 1610.6	1	1	0.00	-95	40	47.74	47.74	-19.21	-106.95	-95	-11.95	-116.45	-95	-21.45
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-19.21	-59.21	-50	-9.21	** -59.21	-50	-9.21
1613.8 - 1614	1	1	0.00	-95	40	47.74	47.74	-19.21	-106.95	-95	-11.95	-116.45	-95	-21.45
1614 - 1620	0.004	0.003	-1.25	-70	30	45.95	47.20	-19.59	-95.54	-70	-25.54	-105.04	-70	-35.04
1620 - 1624.5	0.004	0.003	-1.25	-70	20	45.95	47.20	-21.08	-87.03	-70	-17.03	-96.53	-70	-26.53
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	45.95	47.20	-21.08	-77.03	-70	-7.03	-86.53	-70	-16.53
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	45.95	47.20	-21.08	-68.33	-70	1.67	-77.83	-70	-7.83
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	45.95	47.20	-20.44	-67.69	-70	2.31	-77.19	-70	-7.19
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-24.85	-27.41	-19.5	-7.91	** -27.41	-19.5	-7.91
1670 - 1735	0.004	0.003	-1.25	-60	0.8	45.95	47.20	-28.65	-75.40	-60	-15.40	-84.90	-60	-24.90
1735 - 1865	0.004	0.003	-1.25	-105	50	45.95	47.20	-45.09	-141.04	-105	-36.04	-150.54	-105	-45.54
1865 - 2260.5	0.004	0.003	-1.25	-105	20	45.95	47.20	-37.53	-103.48	-105	1.52	-112.98	-105	-7.98
2260.5 - 3250	0.004	0.003	-1.25	-105	20	45.95	47.20	-44.9	-110.85	-105	-5.85	-120.35	-105	-15.35
3250 - 3330	0.004	0.003	-1.25	-105	50	45.95	47.20	-35.41	-131.36	-105	-26.36	-140.86	-105	-35.86
3330 - 4000	0.004	0.003	-1.25	-105	40	45.95	47.20	-45.71	-131.66	-105	-26.66	-141.16	-105	-36.16
4000 - 12000	0.004	0.003	-1.25	-105	50	45.95	47.20	-32.02	-127.97	-105	-22.97	-137.47	-105	-32.47
12000 - 18000	0.004	0.003	-1.25	-70	15	45.95	47.20	-41.88	-102.83	-70	-32.83	-112.33	-70	-42.33



RT05Q

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	41.24	42.49	-22.11	-143.35	-135	-8.35	-152.85	-135	-17.85
1026.5 - 1525	0.004	0.003	-1.25	-135	80	41.24	42.49	-38.13	-159.37	-135	-24.37	-168.87	-135	-33.87
1525 - 1559	0.004	0.003	-1.25	-203	120	41.24	42.49	-39.08	-200.32	-203	2.68	-209.82	-203	-6.82
1559 - 1585	1	1	0.00	-155	111	47.73	47.73	-20.84	-179.57	-155	-24.57	-189.07	-155	-34.07
1585 - 1605	1	1	0.00	-143	95	47.73	47.73	-20.84	-163.57	-143	-20.57	-173.07	-143	-30.07
1605 - 1610	1	1	0.00	-117	62	47.73	47.73	-20.84	-130.57	-117	-13.57	-140.07	-117	-23.07
1610 - 1610.6	1	1	0.00	-95	40	47.73	47.73	-20.84	-108.57	-95	-13.57	-118.07	-95	-23.07
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-20.84	-60.84	-50	-10.84	** -60.84	-50	-10.84
1613.8 - 1614	1	1	0.00	-95	40	47.73	47.73	-20.84	-108.57	-95	-13.57	-118.07	-95	-23.07
1614 - 1620	0.004	0.003	-1.25	-70	30	41.24	42.49	-32.41	-103.65	-70	-33.65	-113.15	-70	-43.15
1620 - 1624.5	0.004	0.003	-1.25	-70	20	41.24	42.49	-32.41	-93.65	-70	-23.65	-103.15	-70	-33.15
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	41.24	42.49	-32.41	-83.65	-70	-13.65	-93.15	-70	-23.15
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	41.24	42.49	-32.41	-74.95	-70	-4.95	-84.45	-70	-14.45
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	41.24	42.49	-22.85	-65.39	-70	4.61	-74.89	-70	-4.89
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-30.49	-33.05	-19.5	-13.55	** -33.05	-19.5	-13.55
1670 - 1735	0.004	0.003	-1.25	-60	0.8	41.24	42.49	-30.68	-72.72	-60	-12.72	-82.22	-60	-22.22
1735 - 1865	0.004	0.003	-1.25	-105	50	41.24	42.49	-39.61	-130.85	-105	-25.85	-140.35	-105	-35.35
1865 - 2260.5	0.004	0.003	-1.25	-105	20	41.24	42.49	-40.88	-102.12	-105	2.88	-111.62	-105	-6.62
2260.5 - 3250	0.004	0.003	-1.25	-105	20	41.24	42.49	-43.17	-104.41	-105	0.59	-113.91	-105	-8.91
3250 - 3330	0.004	0.003	-1.25	-105	50	41.24	42.49	-35.23	-126.47	-105	-21.47	-135.97	-105	-30.97
3330 - 4000	0.004	0.003	-1.25	-105	40	41.24	42.49	-45.97	-127.21	-105	-22.21	-136.71	-105	-31.71
4000 - 12000	0.004	0.003	-1.25	-105	50	41.24	42.49	-28.58	-119.82	-105	-14.82	-129.32	-105	-24.32
12000 - 18000	0.004	0.003	-1.25	-70	15	41.24	42.49	-40.75	-96.99	-70	-26.99	-106.49	-70	-36.49

RT1Q

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	38.25	39.50	-24.4	-142.65	-135	-7.65	-152.15	-135	-17.15
1026.5 - 1525	0.004	0.003	-1.25	-135	80	38.25	39.50	-39.89	-158.14	-135	-23.14	-167.64	-135	-32.64
1525 - 1559	0.004	0.003	-1.25	-203	120	38.25	39.50	-38.53	-196.78	-203	6.22	-206.28	-203	-3.28
1559 - 1585	1	1	0.00	-155	111	47.69	47.69	-19.88	-178.57	-155	-23.57	-188.07	-155	-33.07
1585 - 1605	1	1	0.00	-143	95	47.69	47.69	-19.88	-162.57	-143	-19.57	-172.07	-143	-29.07
1605 - 1610	1	1	0.00	-117	62	47.69	47.69	-19.88	-129.57	-117	-12.57	-139.07	-117	-22.07
1610 - 1610.6	1	1	0.00	-95	40	47.69	47.69	-19.88	-107.57	-95	-12.57	-117.07	-95	-22.07
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-19.88	-59.88	-50	-9.88	** -59.88	-50	-9.88
1613.8 - 1614	1	1	0.00	-95	40	47.69	47.69	-19.88	-107.57	-95	-12.57	-117.07	-95	-22.07
1614 - 1620	0.004	0.003	-1.25	-70	30	38.25	39.50	-30.31	-98.56	-70	-28.56	-108.06	-70	-38.06
1620 - 1624.5	0.004	0.003	-1.25	-70	20	38.25	39.50	-30.31	-88.56	-70	-18.56	-98.06	-70	-28.06
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	38.25	39.50	-30.31	-78.56	-70	-8.56	-88.06	-70	-18.06
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	38.25	39.50	-31.49	-71.04	-70	-1.04	-80.54	-70	-10.54
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	38.25	39.50	-22.88	-62.43	-70	7.57	-71.93	-70	-1.93
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-26.08	-28.64	-19.5	-9.14	** -28.64	-19.5	-9.14
1670 - 1735	0.004	0.003	-1.25	-60	0.8	38.25	39.50	-30.29	-69.34	-60	-9.34	-78.84	-60	-18.84
1735 - 1865	0.004	0.003	-1.25	-105	50	38.25	39.50	-39	-127.25	-105	-22.25	-136.75	-105	-31.75
1865 - 2260.5	0.004	0.003	-1.25	-105	20	38.25	39.50	-40.83	-99.08	-105	5.92	-108.58	-105	-3.58
2260.5 - 3250	0.004	0.003	-1.25	-105	20	38.25	39.50	-42.71	-100.96	-105	4.04	-110.46	-105	-5.46
3250 - 3330	0.004	0.003	-1.25	-105	50	38.25	39.50	-32.41	-120.66	-105	-15.66	-130.16	-105	-25.16
3330 - 4000	0.004	0.003	-1.25	-105	40	38.25	39.50	-39.61	-117.86	-105	-12.86	-127.36	-105	-22.36
4000 - 12000	0.004	0.003	-1.25	-105	50	38.25	39.50	-31.9	-120.15	-105	-15.15	-129.65	-105	-24.65
12000 - 18000	0.004	0.003	-1.25	-70	15	38.25	39.50	-35.66	-88.91	-70	-18.91	-98.41	-70	-28.41



RT2Q

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin	
.010 - 1026.5	0.004	0.003	-1.25	-135	80	35.39	36.64	-27.07	-142.46	-135	-7.46	-151.96	-135	-16.96	
1026.5 - 1525	0.004	0.003	-1.25	-135	80	35.39	36.64	-34.64	-150.03	-135	-15.03	-159.53	-135	-24.53	
1525 - 1559	0.004	0.003	-1.25	-203	120	35.39	36.64	-41.47	-196.86	-203	6.14	-206.36	-203	-3.36	
1559 - 1585	1	1	0.00	-155	111	47.74	47.74	-20.58	-179.32	-155	-24.32	-188.82	-155	-33.82	
1585 - 1605	1	1	0.00	-143	95	47.74	47.74	-20.58	-163.32	-143	-20.32	-172.82	-143	-29.82	
1605 - 1610	1	1	0.00	-117	62	47.74	47.74	-20.58	-130.32	-117	-13.32	-139.82	-117	-22.82	
1610 - 1610.6	1	1	0.00	-95	40	47.74	47.74	-20.58	-108.32	-95	-13.32	-117.82	-95	-22.82	
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-20.58	-60.58	-50	-10.58	**	-60.58	-50	-10.58
1613.8 - 1614	1	1	0.00	-95	40	47.74	47.74	-20.58	-108.32	-95	-13.32	-117.82	-95	-22.82	
1614 - 1620	0.004	0.003	-1.25	-70	30	35.39	36.64	-31.53	-96.92	-70	-26.92	-106.42	-70	-36.42	
1620 - 1624.5	0.004	0.003	-1.25	-70	20	35.39	36.64	-31.53	-86.92	-70	-16.92	-96.42	-70	-26.42	
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	35.39	36.64	-31.53	-76.92	-70	-6.92	-86.42	-70	-16.42	
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	35.39	36.64	-31.53	-68.22	-70	1.78	-77.72	-70	-7.72	
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	35.39	36.64	-25.59	-62.28	-70	7.72	-71.78	-70	-1.78	
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-31.06	-33.62	-19.5	-14.12	**	-33.62	-19.5	-14.12
1670 - 1735	0.004	0.003	-1.25	-60	0.8	35.39	36.64	-28.97	-65.16	-60	-5.16	-74.66	-60	-14.66	
1735 - 1865	0.004	0.003	-1.25	-105	50	35.39	36.64	-38.57	-123.96	-105	-18.96	-133.46	-105	-28.46	
1865 - 2260.5	0.004	0.003	-1.25	-105	20	35.39	36.64	-45.29	-100.68	-105	4.32	-110.18	-105	-5.18	
2260.5 - 3250	0.004	0.003	-1.25	-105	20	35.39	36.64	-42.47	-97.86	-105	7.14	-107.36	-105	-2.36	
3250 - 3330	0.004	0.003	-1.25	-105	50	35.39	36.64	-34.48	-119.87	-105	-14.87	-129.37	-105	-24.37	
3330 - 4000	0.004	0.003	-1.25	-105	40	35.39	36.64	-38.7	-114.09	-105	-9.09	-123.59	-105	-18.59	
4000 - 12000	0.004	0.003	-1.25	-105	50	35.39	36.64	-34.51	-119.90	-105	-14.90	-129.40	-105	-24.40	
12000 - 18000	0.004	0.003	-1.25	-70	15	35.39	36.64	-36.42	-86.81	-70	-16.81	-96.31	-70	-26.31	

RT45Q

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin	
.010 - 1026.5	0.004	0.003	-1.25	-135	80	32.13	33.38	-31.65	-143.78	-135	-8.78	-153.28	-135	-18.28	
1026.5 - 1525	0.004	0.003	-1.25	-135	80	32.13	33.38	-38.02	-150.15	-135	-15.15	-159.65	-135	-24.65	
1525 - 1559	0.004	0.003	-1.25	-203	120	32.13	33.38	-46.27	-198.40	-203	4.60	-207.90	-203	-4.90	
1559 - 1585	1	1	0.00	-155	111	47.85	47.85	-20.82	-179.67	-155	-24.67	-189.17	-155	-34.17	
1585 - 1605	1	1	0.00	-143	95	47.85	47.85	-20.82	-163.67	-143	-20.67	-173.17	-143	-30.17	
1605 - 1610	1	1	0.00	-117	62	47.85	47.85	-20.82	-130.67	-117	-13.67	-140.17	-117	-23.17	
1610 - 1610.6	1	1	0.00	-95	40	47.85	47.85	-20.82	-108.67	-95	-13.67	-118.17	-95	-23.17	
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-20.82	-60.82	-50	-10.82	**	-60.82	-50	-10.82
1613.8 - 1614	1	1	0.00	-95	40	47.85	47.85	-20.82	-108.67	-95	-13.67	-118.17	-95	-23.17	
1614 - 1620	0.004	0.003	-1.25	-70	30	32.13	33.38	-32.46	-94.59	-70	-24.59	-104.09	-70	-34.09	
1620 - 1624.5	0.004	0.003	-1.25	-70	20	32.13	33.38	-32.46	-84.59	-70	-14.59	-94.09	-70	-24.09	
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	32.13	33.38	-27.4	-69.53	-70	0.47	-79.03	-70	-9.03	
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	32.13	33.38	-32.46	-65.89	-70	4.11	-75.39	-70	-5.39	
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	32.13	33.38	-31.27	-64.70	-70	5.30	-74.20	-70	-4.20	
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-28.46	-31.02	-19.5	-11.52	**	-31.02	-19.5	-11.52
1670 - 1735	0.004	0.003	-1.25	-60	0.8	32.13	33.38	-32.18	-65.11	-60	-5.11	-74.61	-60	-14.61	
1735 - 1865	0.004	0.003	-1.25	-105	50	32.13	33.38	-42.1	-124.23	-105	-19.23	-133.73	-105	-28.73	
1865 - 2260.5	0.004	0.003	-1.25	-105	20	32.13	33.38	-49.08	-101.21	-105	3.79	-110.71	-105	-5.71	
2260.5 - 3250	0.004	0.003	-1.25	-105	20	32.13	33.38	-48.82	-100.95	-105	4.05	-110.45	-105	-5.45	
3250 - 3330	0.004	0.003	-1.25	-105	50	32.13	33.38	-35.18	-117.31	-105	-12.31	-126.81	-105	-21.81	
3330 - 4000	0.004	0.003	-1.25	-105	40	32.13	33.38	-41.09	-113.22	-105	-8.22	-122.72	-105	-17.72	
4000 - 12000	0.004	0.003	-1.25	-105	50	32.13	33.38	-36.17	-118.30	-105	-13.30	-127.80	-105	-22.80	
12000 - 18000	0.004	0.003	-1.25	-70	15	32.13	33.38	-36.24	-83.37	-70	-13.37	-92.87	-70	-22.87	



RT1X

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin	
.010 - 1026.5	0.004	0.003	-1.25	-135	80	37.76	39.01	-24.89	-142.65	-135	-7.65	-152.15	-135	-17.15	
1026.5 - 1525	0.004	0.003	-1.25	-135	80	37.76	39.01	-38.53	-156.29	-135	-21.29	-165.79	-135	-30.79	
1525 - 1559	0.004	0.003	-1.25	-203	120	37.76	39.01	-40.76	-198.52	-203	4.48	-208.02	-203	-5.02	
1559 - 1585	1	1	0.00	-155	111	47.71	47.71	-20.49	-179.20	-155	-24.20	-188.70	-155	-33.70	
1585 - 1605	1	1	0.00	-143	95	47.71	47.71	-20.49	-163.20	-143	-20.20	-172.70	-143	-29.70	
1605 - 1610	1	1	0.00	-117	62	47.71	47.71	-20.49	-130.20	-117	-13.20	-139.70	-117	-22.70	
1610 - 1610.6	1	1	0.00	-95	40	47.71	47.71	-20.49	-108.20	-95	-13.20	-117.70	-95	-22.70	
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-20.49	-60.49	-50	-10.49	**	-60.49	-50	-10.49
1613.8 - 1614	1	1	0.00	-95	40	47.71	47.71	-20.49	-108.20	-95	-13.20	-117.70	-95	-22.70	
1614 - 1620	0.004	0.003	-1.25	-70	30	37.76	39.01	-31.17	-98.93	-70	-28.93	-108.43	-70	-38.43	
1620 - 1624.5	0.004	0.003	-1.25	-70	20	37.76	39.01	-31.17	-88.93	-70	-18.93	-98.43	-70	-28.43	
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	37.76	39.01	-24.05	-71.81	-70	-1.81	-81.31	-70	-11.31	
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	37.76	39.01	-31.17	-70.23	-70	-0.23	-79.73	-70	-9.73	
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	37.76	39.01	-25.74	-64.80	-70	5.20	-74.30	-70	-4.30	
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-25.3	-27.86	-19.5	-8.36	**	-27.86	-19.5	-8.36
1670 - 1735	0.004	0.003	-1.25	-60	0.8	37.76	39.01	-30.15	-68.71	-60	-8.71	-78.21	-60	-18.21	
1735 - 1865	0.004	0.003	-1.25	-105	50	37.76	39.01	-40.31	-128.07	-105	-23.07	-137.57	-105	-32.57	
1865 - 2260.5	0.004	0.003	-1.25	-105	20	37.76	39.01	-47.79	-105.55	-105	-0.55	-115.05	-105	-10.05	
2260.5 - 3250	0.004	0.003	-1.25	-105	20	37.76	39.01	-47.42	-105.18	-105	-0.18	-114.68	-105	-9.68	
3250 - 3330	0.004	0.003	-1.25	-105	50	37.76	39.01	-34.96	-122.72	-105	-17.72	-132.22	-105	-27.22	
3330 - 4000	0.004	0.003	-1.25	-105	40	37.76	39.01	-40.51	-118.27	-105	-13.27	-127.77	-105	-22.77	
4000 - 12000	0.004	0.003	-1.25	-105	50	37.76	39.01	-33.92	-121.68	-105	-16.68	-131.18	-105	-26.18	
12000 - 18000	0.004	0.003	-1.25	-70	15	37.76	39.01	-41.85	-94.61	-70	-24.61	-104.11	-70	-34.11	

RT2X

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin	
.010 - 1026.5	0.004	0.003	-1.25	-135	80	35.2	36.45	-27.88	-143.08	-135	-8.08	-152.58	-135	-17.58	
1026.5 - 1525	0.004	0.003	-1.25	-135	80	35.2	36.45	-31.52	-146.72	-135	-11.72	-156.22	-135	-21.22	
1525 - 1559	0.004	0.003	-1.25	-203	120	35.2	36.45	-40.64	-195.84	-203	7.16	-205.34	-203	-2.34	
1559 - 1585	1	1	0.00	-155	111	47.58	47.58	-19.9	-178.48	-155	-23.48	-187.98	-155	-32.98	
1585 - 1605	1	1	0.00	-143	95	47.58	47.58	-19.9	-162.48	-143	-19.48	-171.98	-143	-28.98	
1605 - 1610	1	1	0.00	-117	62	47.58	47.58	-19.9	-129.48	-117	-12.48	-138.98	-117	-21.98	
1610 - 1610.6	1	1	0.00	-95	40	47.58	47.58	-19.9	-107.48	-95	-12.48	-116.98	-95	-21.98	
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-19.9	-59.90	-50	-9.90	**	-59.90	-50	-9.90
1613.8 - 1614	1	1	0.00	-95	40	47.58	47.58	-19.9	-107.48	-95	-12.48	-116.98	-95	-21.98	
1614 - 1620	0.004	0.003	-1.25	-70	30	35.2	36.45	-30.81	-96.01	-70	-26.01	-105.51	-70	-35.51	
1620 - 1624.5	0.004	0.003	-1.25	-70	20	35.2	36.45	-30.81	-86.01	-70	-16.01	-95.51	-70	-25.51	
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	35.2	36.45	-25.61	-70.81	-70	-0.81	-80.31	-70	-10.31	
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	35.2	36.45	-30.81	-67.31	-70	2.69	-76.81	-70	-6.81	
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	35.2	36.45	-26.37	-62.87	-70	7.13	-72.37	-70	-2.37	
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-26.33	-28.89	-19.5	-9.39	**	-28.89	-19.5	-9.39
1670 - 1735	0.004	0.003	-1.25	-60	0.8	35.2	36.45	-30.12	-66.12	-60	-6.12	-75.62	-60	-15.62	
1735 - 1865	0.004	0.003	-1.25	-105	50	35.2	36.45	-42.09	-127.29	-105	-22.29	-136.79	-105	-31.79	
1865 - 2260.5	0.004	0.003	-1.25	-105	20	35.2	36.45	-45.16	-100.36	-105	4.64	-109.86	-105	-4.86	
2260.5 - 3250	0.004	0.003	-1.25	-105	20	35.2	36.45	-47.87	-103.07	-105	1.93	-112.57	-105	-7.57	
3250 - 3330	0.004	0.003	-1.25	-105	50	35.2	36.45	-35.46	-120.66	-105	-15.66	-130.16	-105	-25.16	
3330 - 4000	0.004	0.003	-1.25	-105	40	35.2	36.45	-40.96	-116.16	-105	-11.16	-125.66	-105	-20.66	
4000 - 12000	0.004	0.003	-1.25	-105	50	35.2	36.45	-32.76	-117.96	-105	-12.96	-127.46	-105	-22.46	
12000 - 18000	0.004	0.003	-1.25	-70	15	35.2	36.45	-35.25	-85.45	-70	-15.45	-94.95	-70	-24.95	



RT45X

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	32.16	33.41	-40.48	-152.64	-135	-17.64	-162.14	-135	-27.14
1026.5 - 1525	0.004	0.003	-1.25	-135	80	32.16	33.41	-33.75	-145.91	-135	-10.91	-155.41	-135	-20.41
1525 - 1559	0.004	0.003	-1.25	-203	120	32.16	33.41	-44.4	-196.56	-203	6.44	-206.06	-203	-3.06
1559 - 1585	1	1	0.00	-155	111	47.8	47.80	-20.85	-179.65	-155	-24.65	-189.15	-155	-34.15
1585 - 1605	1	1	0.00	-143	95	47.8	47.80	-20.85	-163.65	-143	-20.65	-173.15	-143	-30.15
1605 - 1610	1	1	0.00	-117	62	47.8	47.80	-20.85	-130.65	-117	-13.65	-140.15	-117	-23.15
1610 - 1610.6	1	1	0.00	-95	40	47.8	47.80	-20.85	-108.65	-95	-13.65	-118.15	-95	-23.15
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-20.85	-60.85	-50	-10.85	** -60.85	-50	-10.85
1613.8 - 1614	1	1	0.00	-95	40	47.8	47.80	-20.85	-108.65	-95	-13.65	-118.15	-95	-23.15
1614 - 1620	0.004	0.003	-1.25	-70	30	32.16	33.41	-32.35	-94.51	-70	-24.51	-104.01	-70	-34.01
1620 - 1624.5	0.004	0.003	-1.25	-70	20	32.16	33.41	-26.5	-78.66	-70	-8.66	-88.16	-70	-18.16
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	32.16	33.41	-29.7	-71.86	-70	-1.86	-81.36	-70	-11.36
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	32.16	33.41	-31.89	-65.35	-70	4.65	-74.85	-70	-4.85
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	32.16	33.41	-30.44	-63.90	-70	6.10	-73.40	-70	-3.40
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-31.14	-33.70	-19.5	-14.20	** -33.70	-19.5	-14.20
1670 - 1735	0.004	0.003	-1.25	-60	0.8	32.16	33.41	-31.25	-64.21	-60	-4.21	-73.71	-60	-13.71
1735 - 1865	0.004	0.003	-1.25	-105	50	32.16	33.41	-40.2	-122.36	-105	-17.36	-131.86	-105	-26.86
1865 - 2260.5	0.004	0.003	-1.25	-105	20	32.16	33.41	-51.23	-103.39	-105	1.61	-112.89	-105	-7.89
2260.5 - 3250	0.004	0.003	-1.25	-105	20	32.16	33.41	-46.99	-99.15	-105	5.85	-108.65	-105	-3.65
3250 - 3330	0.004	0.003	-1.25	-105	50	32.16	33.41	-36.14	-118.30	-105	-13.30	-127.80	-105	-22.80
3330 - 4000	0.004	0.003	-1.25	-105	40	32.16	33.41	-45.12	-117.28	-105	-12.28	-126.78	-105	-21.78
4000 - 12000	0.004	0.003	-1.25	-105	50	32.16	33.41	-35.64	-117.80	-105	-12.80	-127.30	-105	-22.30
12000 - 18000	0.004	0.003	-1.25	-70	15	32.16	33.41	-36.02	-83.18	-70	-13.18	-92.68	-70	-22.68

S3K

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin	Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	46.41	47.66	-37.61	-164.02	-135	-29.02	-173.52	-135	-38.52
1026.5 - 1525	0.004	0.003	-1.25	-135	80	46.41	47.66	-40.81	-167.22	-135	-32.22	-176.72	-135	-41.72
1525 - 1559	0.004	0.003	-1.25	-203	120	46.41	47.66	-39.62	-206.03	-203	-3.03	-215.53	-203	-12.53
1559 - 1585	1	1	0.00	-155	111	47.66	47.66	-21	-179.66	-155	-24.66	-189.16	-155	-34.16
1585 - 1605	1	1	0.00	-143	95	47.66	47.66	-21	-163.66	-143	-20.66	-173.16	-143	-30.16
1605 - 1610	1	1	0.00	-117	62	47.66	47.66	-21	-130.66	-117	-13.66	-140.16	-117	-23.16
1610 - 1610.6	1	1	0.00	-95	40	47.66	47.66	-21	-108.66	-95	-13.66	-118.16	-95	-23.16
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-21	-61.00	-50	-11.00	** -61.00	-50	-11.00
1613.8 - 1614	1	1	0.00	-95	40	47.66	47.66	-21	-108.66	-95	-13.66	-118.16	-95	-23.16
1614 - 1620	0.004	0.003	-1.25	-70	30	46.41	47.66	-32.16	-108.57	-70	-38.57	-118.07	-70	-48.07
1620 - 1624.5	0.004	0.003	-1.25	-70	20	46.41	47.66	-32.16	-98.57	-70	-28.57	-108.07	-70	-38.07
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	46.41	47.66	-27.57	-83.98	-70	-13.98	-93.48	-70	-23.48
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	46.41	47.66	-30.57	-78.28	-70	-8.28	-87.78	-70	-17.78
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	46.41	47.66	-27.78	-75.49	-70	-5.49	-84.99	-70	-14.99
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-28.1	-30.66	-19.5	-11.16	** -30.66	-19.5	-11.16
1670 - 1735	0.004	0.003	-1.25	-60	0.8	46.41	47.66	-30.6	-77.81	-60	-17.81	-87.31	-60	-27.31
1735 - 1865	0.004	0.003	-1.25	-105	50	46.41	47.66	-39.94	-136.35	-105	-31.35	-145.85	-105	-40.85
1865 - 2260.5	0.004	0.003	-1.25	-105	20	46.41	47.66	-45.49	-111.90	-105	-6.90	-121.40	-105	-16.40
2260.5 - 3250	0.004	0.003	-1.25	-105	20	46.41	47.66	-43.03	-109.44	-105	-4.44	-118.94	-105	-13.94
3250 - 3330	0.004	0.003	-1.25	-105	50	46.41	47.66	-33.06	-129.47	-105	-24.47	-138.97	-105	-33.97
3330 - 4000	0.004	0.003	-1.25	-105	40	46.41	47.66	-45.01	-131.42	-105	-26.42	-140.92	-105	-35.92
4000 - 12000	0.004	0.003	-1.25	-105	50	46.41	47.66	-33.1	-129.51	-105	-24.51	-139.01	-105	-34.01
12000 - 18000	0.004	0.003	-1.25	-70	15	46.41	47.66	-36.58	-97.99	-70	-27.99	-107.49	-70	-37.49



S2K8

Freq. (MHz)	RBW	RBW Used	RBW Correction	Limit (dBc)	Filter Rejection	Measured carrier Power	Corrected Power	Absolute Measured Spurious (dBm)	Corrected spur. (dBc)	Limit (dBc)	Margin		Corrected spur. (dBc)	Limit (dBc)	Margin
.010 - 1026.5	0.004	0.003	-1.25	-135	80	46.97	48.22	-30.34	-157.31	-135	-22.31		-166.81	-135	-31.81
1026.5 - 1525	0.004	0.003	-1.25	-135	80	46.97	48.22	-36.03	-163.00	-135	-28.00		-172.50	-135	-37.50
1525 - 1559	0.004	0.003	-1.25	-203	120	46.97	48.22	-40.27	-207.24	-203	-4.24		-216.74	-203	-13.74
1559 - 1585	1	1	0.00	-155	111	47.82	47.82	-22.15	-180.97	-155	-25.97		-190.47	-155	-35.47
1585 - 1605	1	1	0.00	-143	95	47.82	47.82	-22.15	-164.97	-143	-21.97		-174.47	-143	-31.47
1605 - 1610	1	1	0.00	-117	62	47.82	47.82	-22.15	-131.97	-117	-14.97		-141.47	-117	-24.47
1610 - 1610.6	1	1	0.00	-95	40	47.82	47.82	-22.15	-109.97	-95	-14.97		-119.47	-95	-24.47
1610.6 - 1613.8	1	1	0.00	-50	40	XX	XX	-22.15	-62.15	-50	-12.15	**	-62.15	-50	-12.15
1613.8 - 1614	1	1	0.00	-95	40	47.82	47.82	-22.15	-109.97	-95	-14.97		-119.47	-95	-24.47
1614 - 1620	0.004	0.003	-1.25	-70	30	46.97	48.22	-32.25	-109.22	-70	-39.22		-118.72	-70	-48.72
1620 - 1624.5	0.004	0.003	-1.25	-70	20	46.97	48.22	-32.51	-99.48	-70	-29.48		-108.98	-70	-38.98
1624.5 - 1625.5	0.004	0.003	-1.25	-70	10	46.97	48.22	-26.77	-83.74	-70	-13.74		-93.24	-70	-23.24
1625.5 - 1626.5	0.004	0.003	-1.25	-70	1.3	46.97	48.22	-31.59	-79.86	-70	-9.86		-89.36	-70	-19.36
1626.5 - 1660	0.004	0.003	-1.25	-70	1.3	46.97	48.22	-27.61	-75.88	-70	-5.88		-85.38	-70	-15.38
1660 - 1670	0.02	0.03	1.76	-19.5	0.8	XX	XX	-26.78	-29.34	-19.5	-9.84	**	-29.34	-19.5	-9.84
1670 - 1735	0.004	0.003	-1.25	-60	0.8	46.97	48.22	-28.95	-76.72	-60	-16.72		-86.22	-60	-26.22
1735 - 1865	0.004	0.003	-1.25	-105	50	46.97	48.22	-40.3	-137.27	-105	-32.27		-146.77	-105	-41.77
1865 - 2260.5	0.004	0.003	-1.25	-105	20	46.97	48.22	-42.38	-109.35	-105	-4.35		-118.85	-105	-13.85
2260.5 - 3250	0.004	0.003	-1.25	-105	20	46.97	48.22	-43.69	-110.66	-105	-5.66		-120.16	-105	-15.16
3250 - 3330	0.004	0.003	-1.25	-105	50	46.97	48.22	-33.95	-130.92	-105	-25.92		-140.42	-105	-35.42
3330 - 4000	0.004	0.003	-1.25	-105	40	46.97	48.22	-46.44	-133.41	-105	-28.41		-142.91	-105	-37.91
4000 - 12000	0.004	0.003	-1.25	-105	50	46.97	48.22	-31.88	-128.85	-105	-23.85		-138.35	-105	-33.35
12000 - 18000	0.004	0.003	-1.25	-70	15	46.97	48.22	-36.68	-98.65	-70	-28.65		-108.15	-70	-38.15

Field Strength of Spurious Radiation

Engineer: Alex Macon

Test Date: 6/15/16

Test Procedure

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power

Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.

G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

K) Repeat step J) with both antennas vertically polarized for each spurious frequency.

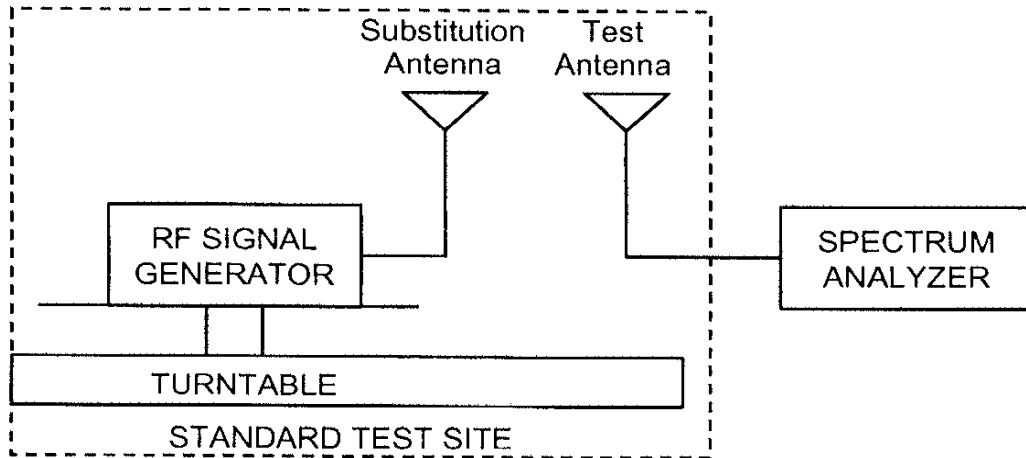
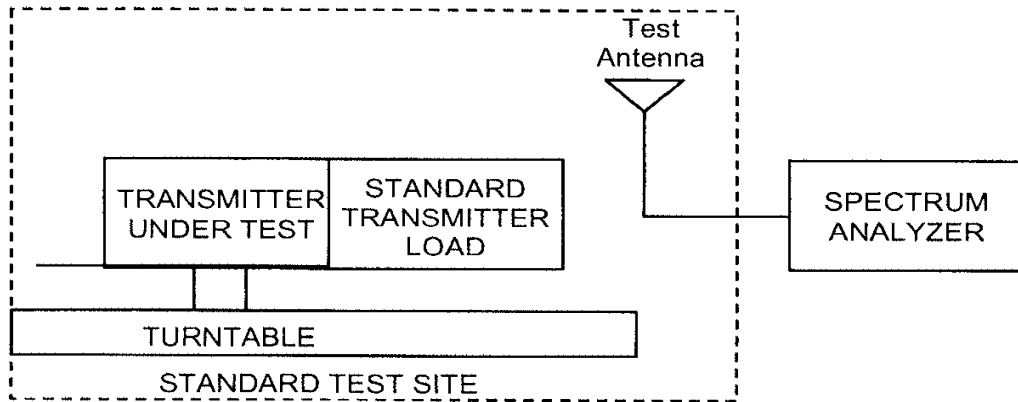
L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB = $10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Setup



Emission Masks (Occupied Bandwidth)

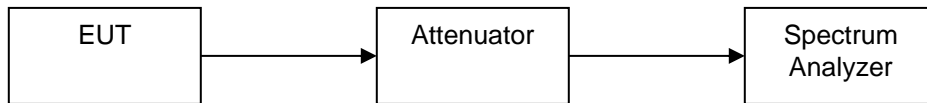
Engineer: Alex Macon

Test Date: 6/14/16

Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask. A reference level plot is provided to verify that the peak power was established prior to testing the mask. The transmitter is digital modulation therefore no data input is required to measure the emission mask. The RBW was set as close as possible to 1% of the occupied bandwidth to ensure accurate readings.

Test Setup



Test Plots: See Annex C Emission Masks



Necessary Bandwidth and Emission Bandwidth

Engineer: Alex Macon

Test Date: 6/14/16

BPSK

Modulation = 840HG1D

Necessary Bandwidth Calculation:

Signal States (S)	=	2
Data Rate (D)	=	0.6
Constant Factor (K)	=	0.7
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Modulation = 1K68G1D

Necessary Bandwidth Calculation:

Signal States (S)	=	2
Data Rate (D)	=	1.2
Constant Factor (K)	=	0.7
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Modulation = 21K0G1D

Necessary Bandwidth Calculation:

Signal States (S)	=	2
Data Rate (D)	=	3
Constant Factor (K)	=	3.5
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$



QPSK

Modulation = 6K80G1E

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	8.4
Constant Factor (K)	=			0.81
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 7K20G1E

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	5.6
Constant Factor (K)	=			1.29
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 10K5G1D

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	10.5
Constant Factor (K)	=			1
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 25K0G7W

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	33.6
Constant Factor (K)	=			0.74
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 40K0G1E

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	134.4
Constant Factor (K)	=			0.74
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 50K0G7W

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	67.2
Constant Factor (K)	=			0.74
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 100KG7W

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	134.4
Constant Factor (K)	=			0.74
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$

Modulation = 200KG7W

Necessary Bandwidth Calculation:

Signal States (S)	=		=	4
Data Rate (D)			=	302.4
Constant Factor (K)	=			0.66
Necessary Bandwidth (B _N), kHz	=			$2 * D * K / \text{LOG}_2(S)$



QAM

Modulation = 50K0D7W

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	134.4
Constant Factor (K)	=	0.74
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Modulation = 40K0G1E

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	134.4
Constant Factor (K)	=	0.6
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Modulation = 100KD7W

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	268.8
Constant Factor (K)	=	0.74
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Modulation = 200KD7W

Necessary Bandwidth Calculation:

Signal States (S)	=	16
Data Rate (D)	=	604.8
Constant Factor (K)	=	0.66
Necessary Bandwidth (B _N), kHz	=	$2 * D * K / \text{LOG}_2(S)$

Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Horn Antenna	EMCO	3115	i00103	1/20/15	1/20/17
Bilog Antenna	Teseq	CBL 6111Dk	i00349	10/19/15	10/19/17
EMI Analyzer	Agilent	E7405A	i00379	2/11/16	2/11/17
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	11/26/13	11/26/16
Spectrum Analyzer	Agilent	E4407B	i00331	09/18/15	09/18/16
Preamplifier for 1-18GHz horn antenna	Miteq	AFS44 00101 400 23-10P-44	i00509	N/A	N/A

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