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## FCC PART(S) 22, 24, and 27 TEST REPORT

<b>Applicant</b>	Harris Corp.
<b>Address</b>	1025 West NASA Boulevard Melbourne FL 32919-0001 USA
<b>FCC ID</b>	NK7-3166210
<b>Model Number</b>	
<b>Product Description</b>	<b>NK7-3166210</b> WITH 300KGXW & 1M25F9W
<b>Date Sample Received</b>	12/23/2009
<b>Date Tested</b>	12/28/2009
<b>Tested By</b>	Nam Nguyen
<b>Approved By</b>	Mario R. de Aranzeta
<b>Timco Report No.</b>	3127AUT9TestReport.doc
<b>Test Results</b>	<input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



Certificate # 0955-01



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## **STATEMENT OF COMPLIANCE**

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

### **Summary**

The device under test does:

fulfill the general approval requirements as identified in this test report  
 not fulfill the general approval requirements as identified in this test report

This equipment has been tested in accordance with the standards identified in the referenced test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report and demonstrate that the equipment complies with the appropriate standards.

I attest that the necessary measurements were made by me or under my supervision, at Timco Engineering, Inc. located at 849 N.W. State Road 45, Newberry, Florida 32669 USA.

**Authorized by:** Mario de Aranzeta



**Signature:**

**Function:** Engineer

**Date:** 12/28/2009

## GENERAL INFORMATION

### DUT Specification

The test results relate only to the items tested.	
<b>FCC Rule Part(s)</b>	§ 22H, § 24E, and § 27
<b>DUT Description</b>	NK73166210 WITH 300KGXW & 1M25F9W
<b>FCC ID</b>	NK7-3166210
<b>Model Name</b>	NK73166210
<b>Tx Frequency</b>	<b>300KGXW &amp; 1M25F9W:</b> (869–894) MHz, (1931–1990) MHz 1M25F9W: (2110 – 2154) MHz
<b>Max. Power Rating</b>	0.01 Watts.
<b>Emission Designators</b>	300KGXW & 1M25F9W
<b>Modulation(s)</b>	*** SS; ?LKž%A & : - K
<b>User Power Control</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>DUT Power Source</b>	<input type="checkbox"/> 110–120Vac/50– 60Hz
	<input checked="" type="checkbox"/> DC Power
	<input type="checkbox"/> Battery Operated Exclusively
<b>Test Item</b>	<input type="checkbox"/> Prototype <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Production
<b>Type of Equipment</b>	<input checked="" type="checkbox"/> Fixed <input type="checkbox"/> Mobile <input type="checkbox"/> Portable

**Test Facility:** The test sites used by Timco Engineering Inc. for radiated and conducted emission data are located at 849 NW State Road 45 Newberry, FL 32669 USA.

**Test Condition:** The DUT was tested in the laboratory in an environment with normal temperature and humidity. The temperature was 26°C with a relative humidity of 50%.

**Modification to the DUT:** No modification was made to the DUT during testing.

**Test Exercise (e.g software description, test signal, etc.):** The DUT was placed in continuous transmit mode of operation.

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## EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
AC Voltmeter	HP	400FL	2213A14499	CAL 3/23/09	3/23/11
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 6/10/09	6/10/11
Frequency Counter	HP	5385A	3242A07460	CAL 5/26/09	5/26/11
Hygro-Thermometer	Extech	445703	0602	CAL 1/30/09	1/30/11
Modulation Analyzer	HP	8901A	3435A06868	CAL 5/26/09	5/26/11
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 5/18/09	5/18/11
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/21/09	11/21/11
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/22/09	11/22/11
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/21/09	11/21/11
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/24/09	11/24/11
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/08	4/25/10

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## TEST PROCEDURE

**Power Line Conducted Interference:** The procedure used was ANSI C63.4-2003 using a 50uH LISN. Both lines were observed with the DUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**Bandwidth 20 dB:** The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

**Power Output:** The RF power output was measured at the antenna feed point using a peak power meter.

**Antenna Conducted Emissions:** The RBW = 100 kHz, VBW = 300 kHz and the span set to 10 MHz and the spectrum was scanned from 30 MHz to the 10<sup>th</sup> Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz, the VBW = 3 MHz, and the span 50 MHz.

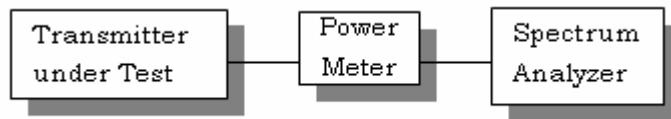
**Radiation Interference:** The test procedure used was ANSI C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

## RF POWER OUTPUT

**Rules Part No.:** Part 2.1046(a), Part 22.913, Part 27.50

**Requirements:**

**Method of Measuring:** This test was conducted per ANSI/TIA 603-C: 2004 using the. RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector.



**Test Data:**

300KGXW (high)		300KGXW (low)	
Channel (MHz)	Output Power (dBm)	Channel (MHz)	Output Power (dBm)
869.20	2.7	1930.20	3.1
881.60	2.6	1960.00	2.1
893.80	2	1989.8	1.1

1M25F9W		1M25F9W	
Channel (MHz)	Output Power (dBm)	Channel (MHz)	Output Power (dBm)
870.25	7.4	1931.25	8.6
881.52	7.1	1960.00	8
893.75	6.7	1988.75	6.4

1M25F9W			
Channel (MHz)	Output Power (dBm)	Channel (MHz)	Output Power (dBm)
2111.25	7.1		
2132.50	7.1		
2153.75	7		

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## VOICE MODULATION CHARACTERISTICS

**Rules Part No.:** Part 2.1047(a)

**Requirements:**

**Method of Measurement:**

**Test Data:** Not applicable, F9 or G9 type of emission.

## AUDIO LOW PASS FILTER

**Rules Part No.:** Part 2.1047

**Requirements:**

**Method of Measurement:**

**Test Data:** This DUT does not have a low pass filter.



## OCCUPIED BANDWIDTH

**Rules Part No.:** §2.1049, §22.917a, §22.917b, §24.238, and §27.53

**Requirements:**

Out of band emissions: The mean power of emissions must be attenuated below the mean power of the un-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by: At least  $43 + 10\log(P_o) = \text{dB}$ .

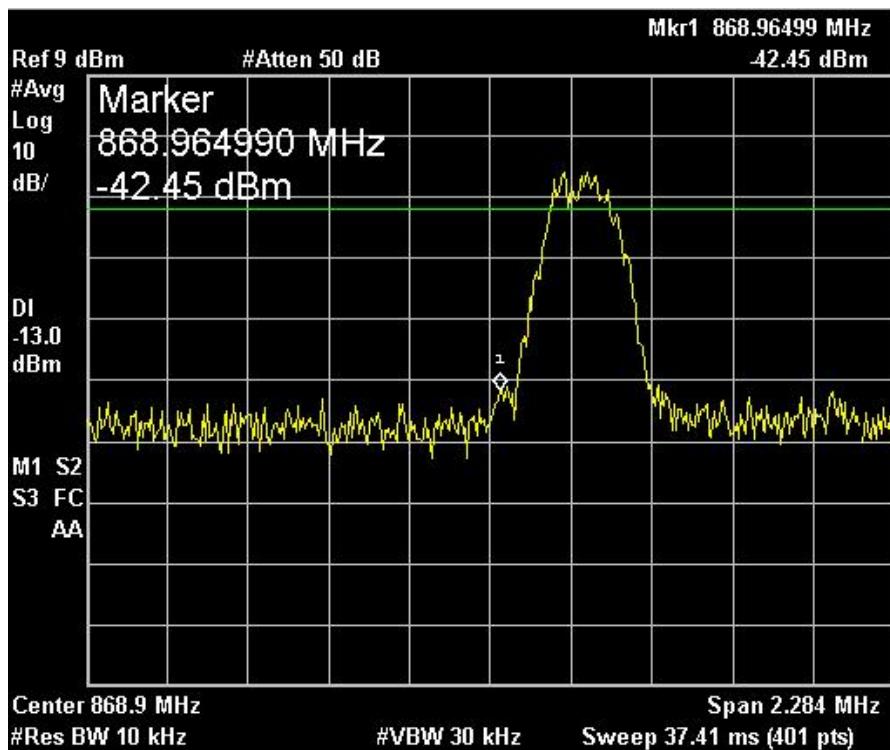
Please refer to the plots below.

Band-edges compliance: Measurement were performed in accordance with Part 22.917 (b)

Please refer to the plots below.

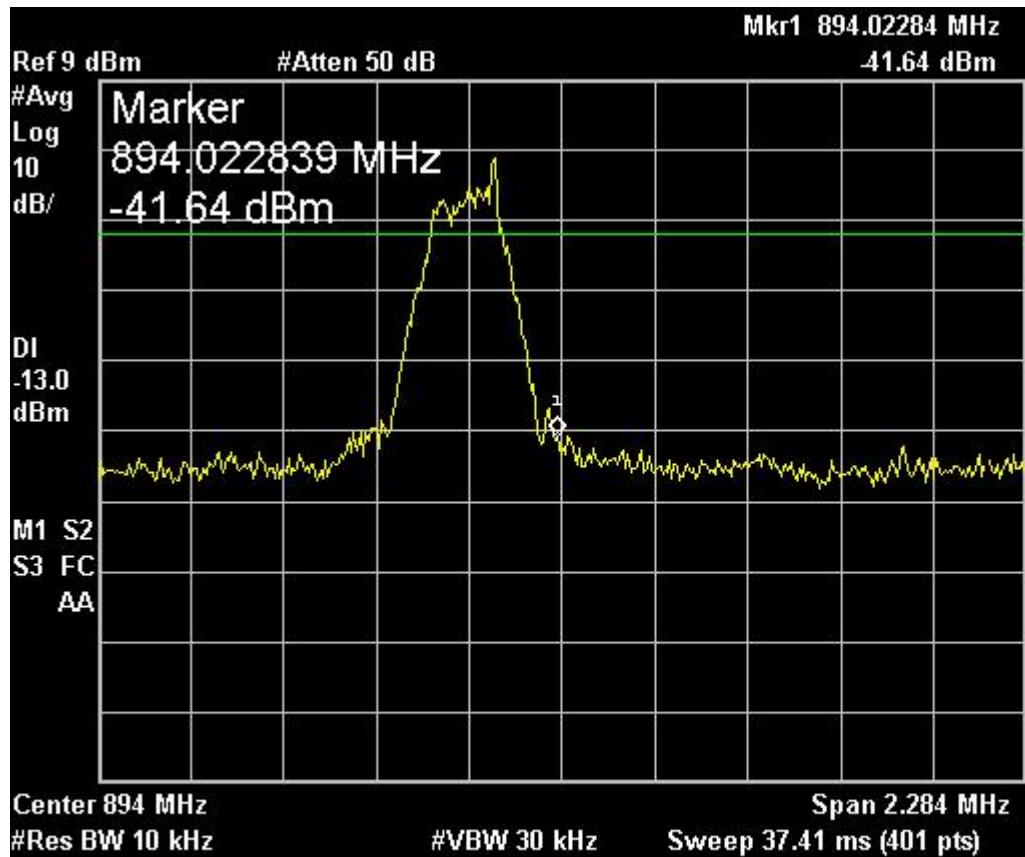
300KGXW

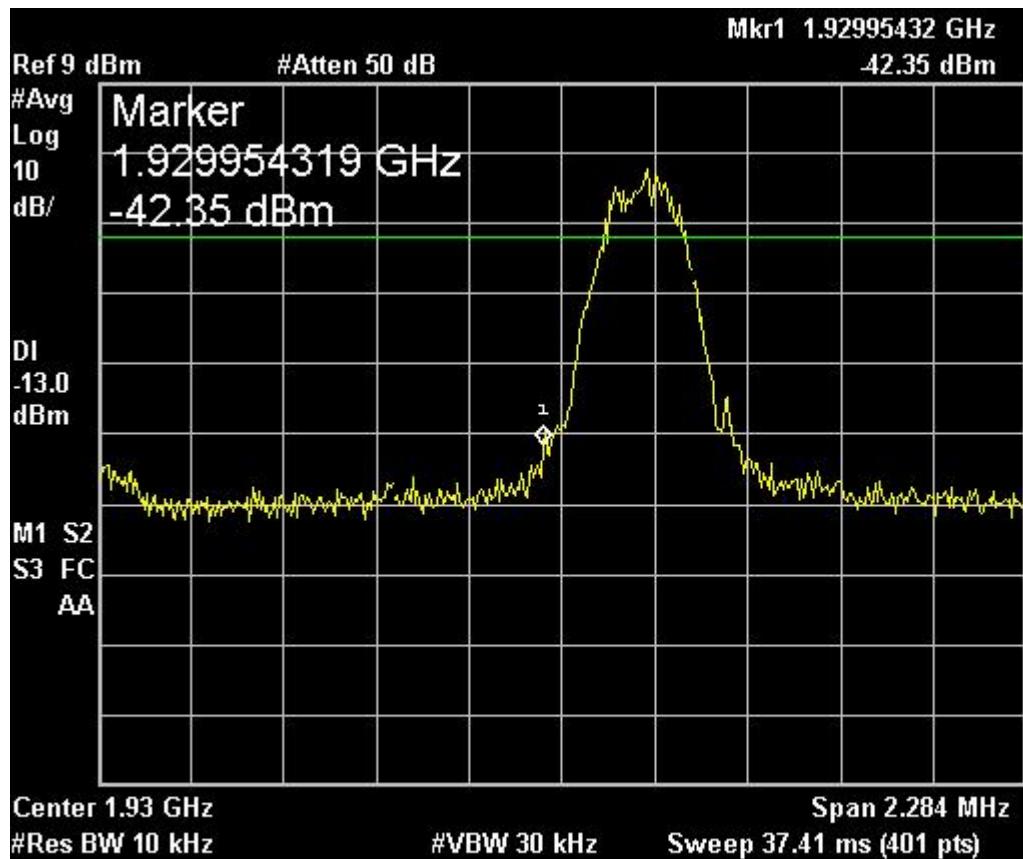
Channel Frequency (MHz)	Band-edge Frequency Emission (MHz)	Amplitude at the band-edge (dBm)	Limit (dBm)
869.2	868.96	-43.94	-13
893.8	894.02	-44.00	-13
1930.2	1929.96	-43.10	-13
1989.8	1990.02	-45.62	-13

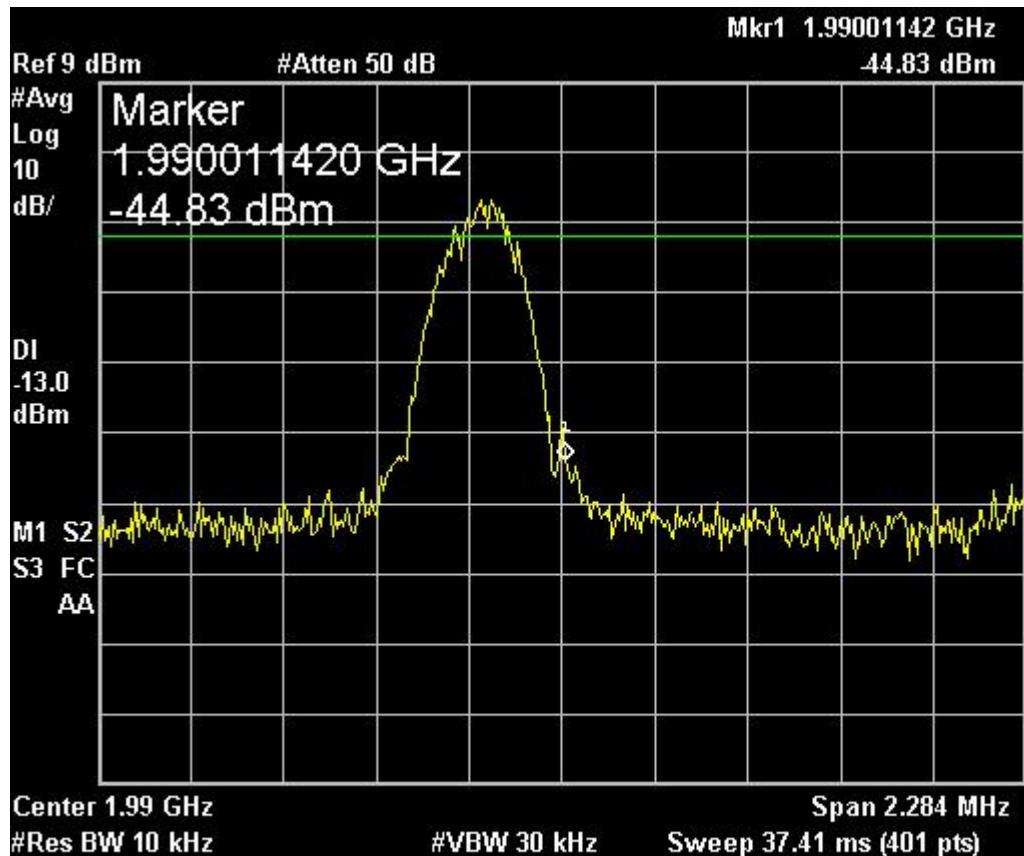


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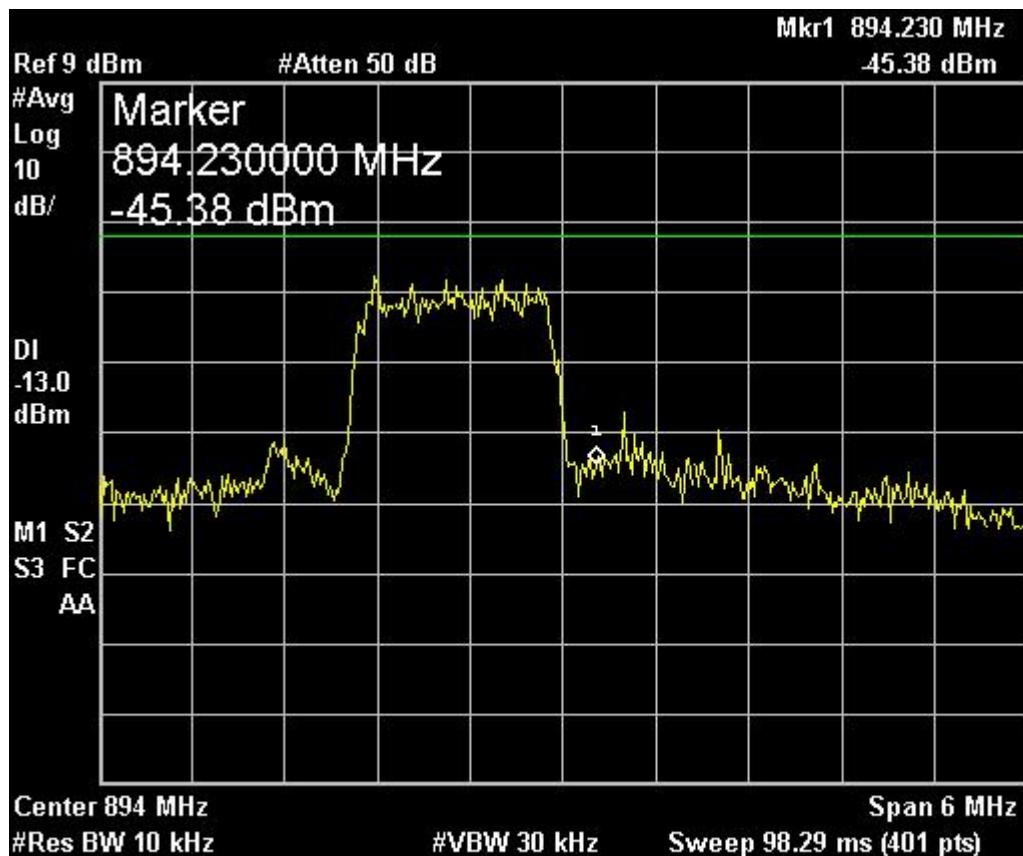


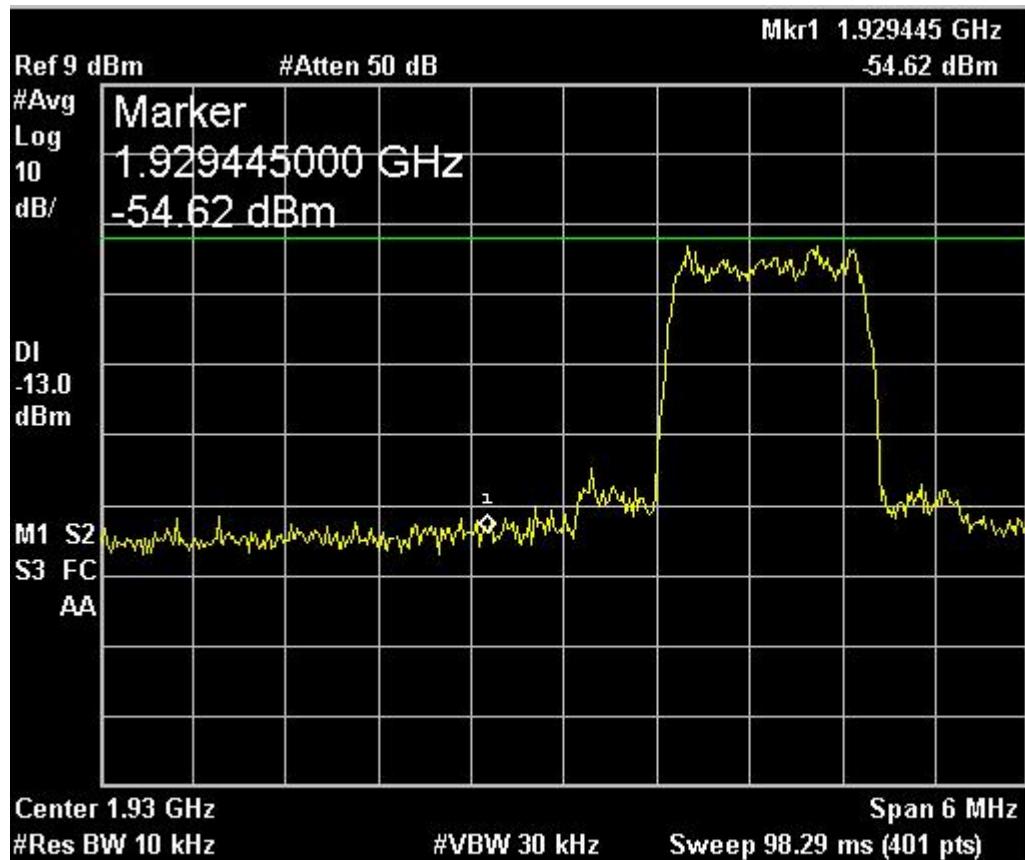


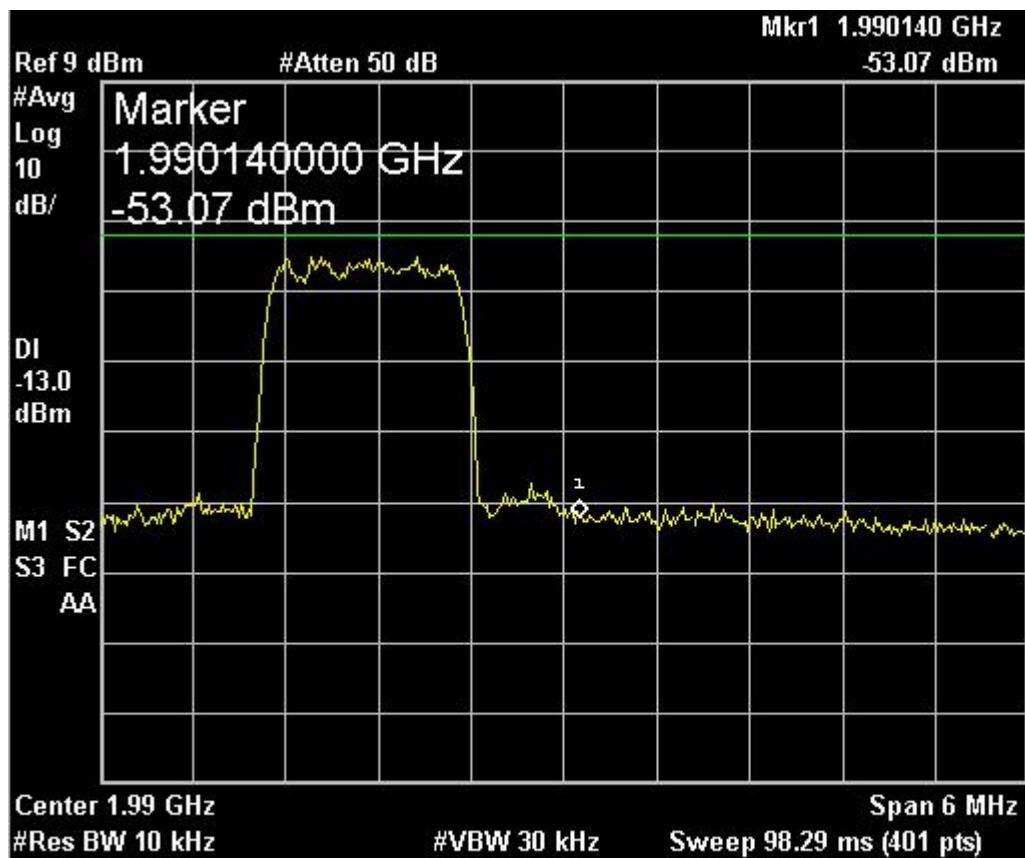
1M25F9W

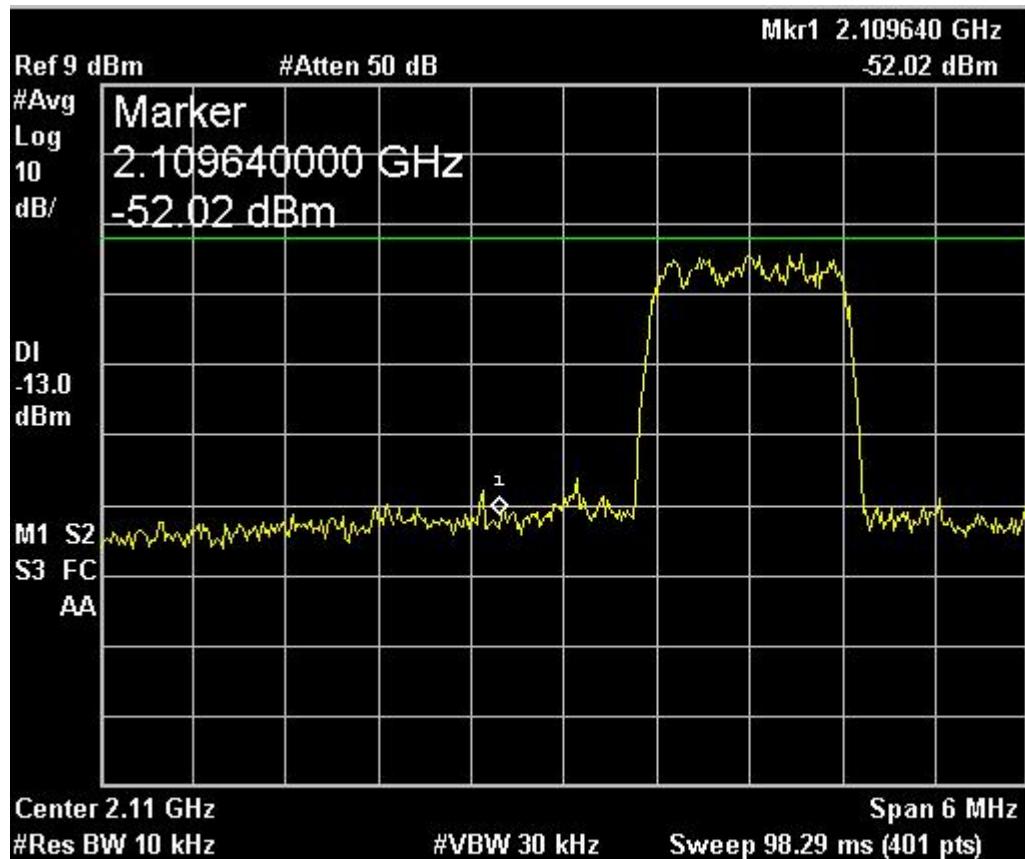
Channel Frequency (MHz)	Band-edge Frequency Emission (MHz)	Amplitude at the band-edge (dBm)	Limit (dBm)
870.03	868.84	-45.26	-13
893.31	894.23	-44.26	-13
1931.25	1929.45	-56.14	-13
1988.75	1990.14	-60.76	-13
2111	2109.64	-58.51	-13
2153.8	2155.35	-58.67	-13

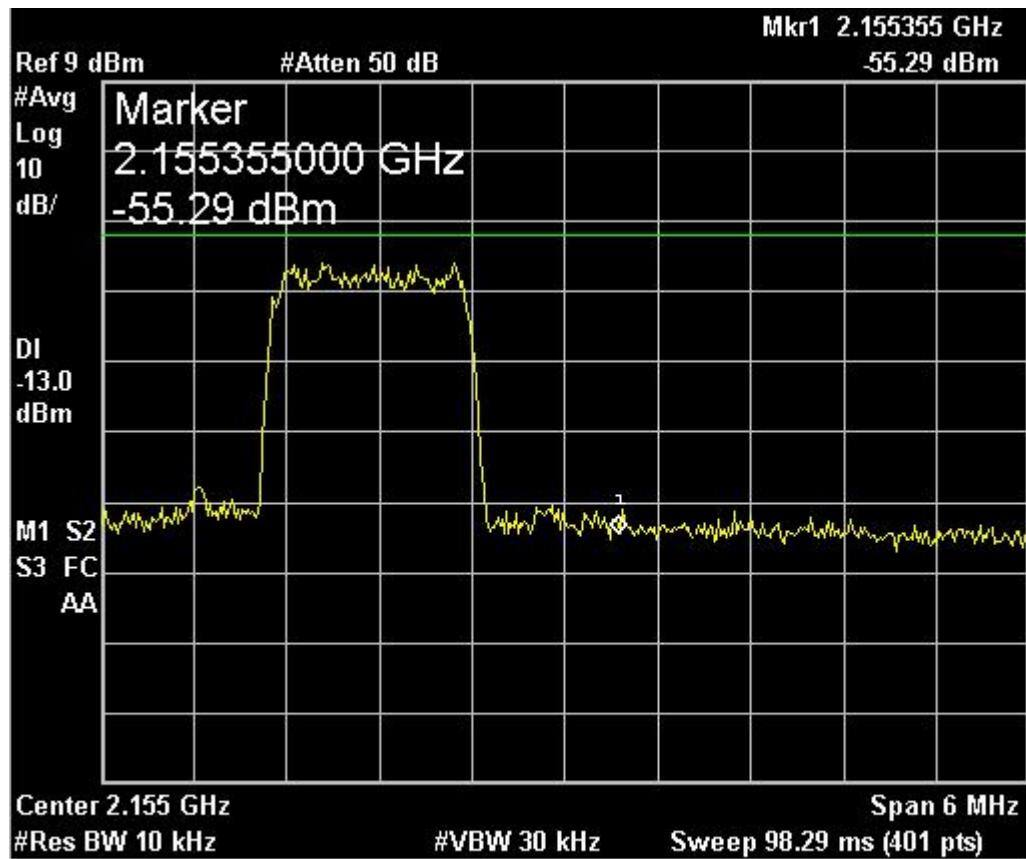












## SPURIOUS EMISSIONS AT ANTENNA TERMINALS

**Rules Part No.:** §2.1051

**Requirements:** Emissions must be  $43 + 10 \log(P_o)$  dB below the mean power output of the transmitter.:

$$43 + 10\log(0.01) = 23.0 \text{ dB}$$

**Method of Measurement:** For analog modulation, the carrier was modulated 100% using a 2500 Hz tone. For digital modulation, the carrier is modulated to its maximum extent. The spectrum was scanned from 9kHz or the lowest frequency used to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard ANSI/TIA 603-C: 2004.

300KGXW

TF MHz	Emission MHz	dBc
869.20	1738.40	68.7
	2607.60	77.2
	3476.80	78.0
	4346.00	78.2
	5215.20	NF
	6084.40	NF
	6953.60	NF
	7822.80	NF
	8692.00	NF

TF MHz	Emission MHz	dBc
881.60	1763.20	68.2
	2644.80	77.1
	3526.40	77.7
	4408.00	77.4
	5289.60	NF
	6171.20	NF
	7052.80	NF
	7934.40	NF
	8816.00	NF

TF MHz	Emission MHz	dBc
893.80	1787.60	69.1
	2681.40	76.3
	3575.20	77.2
	4469.00	76.5
	5362.80	NF
	6256.60	NF
	7150.40	NF
	8044.20	NF
	8938.00	NF

TF MHz	Emission MHz	dBc
1930.20	3860.40	76.2
	5790.60	76.7
	7720.80	76.0
	9651.00	75.6
	11581.20	NF
	13511.40	NF
	15441.60	NF
	17371.80	NF
	19302.00	NF

TF MHz	Emission MHz	dBc
1960.00	3920.00	75.8
	5880.00	68.9
	7840.00	69.4
	9800.00	68.6
	11760.00	NF
	13720.00	NF
	15680.00	NF
	17640.00	NF
	19600.00	NF

TF MHz	Emission MHz	dBc
1989.80	3979.60	75.1
	5969.40	67.5
	7959.20	67.7
	9949.00	67.8
	11938.80	NF
	13928.60	NF
	15918.40	NF
	17908.20	NF
	19898.00	NF

NF is noise floor

Note: 1: Emissions were tested to the tenth harmonic.

**1M25F9W**

TF MHz	Emission MHz	dBc
870.06	1740.12	61.6
	2610.18	73.3
	3480.24	74.1
	4350.30	73.8
	5220.36	NF
	6090.42	NF
	6960.48	NF
	7830.54	NF
	8700.60	NF

TF MHz	Emission MHz	dBc
881.52	1763.04	59.9
	2644.56	72.4
	3526.08	72.6
	4407.60	71.8
	5289.12	NF
	6170.64	NF
	7052.16	NF
	7933.68	NF
	8815.20	NF

TF MHz	Emission MHz	dBc
893.31	1786.62	63.3
	2679.93	72.8
	3573.24	73.3
	4466.55	72.6
	5359.86	NF
	6253.17	NF
	7146.48	NF
	8039.79	NF
	8933.10	NF

TF MHz	Emission MHz	dBc
1931.25	3862.50	72.8
	5793.75	65.3
	7725.00	70.7
	9656.25	72.5
	11587.50	NF
	13518.75	NF
	15450.00	NF
	17381.25	NF
	19312.50	NF

TF MHz	Emission MHz	dBc
1960.00	3920.00	71.6
	5880.00	64.9
	7840.00	69.1
	9800.00	71.2
	11760.00	NF
	13720.00	NF
	15680.00	NF
	17640.00	NF
	19600.00	NF

TF MHz	Emission MHz	dBc
1988.75	3977.50	71.5
	5966.25	64.2
	7955.00	70.1
	9943.75	71.3
	11932.50	NF
	13921.25	NF
	15910.00	NF
	17898.75	NF
	19887.50	NF

TF MHz	Emission MHz	dBc
2111.25	4222.50	69.8
	6333.75	65.5
	8445.00	70.4
	10556.25	70.8
	12667.50	NF
	14778.75	NF
	16890.00	NF
	19001.25	NF
	21112.50	NF

TF MHz	Emission MHz	dBc
2132.50	4265.00	66.1
	6397.50	64.6
	8530.00	69.0
	10662.50	70.7
	12795.00	NF
	14927.50	NF
	17060.00	NF
	19192.50	NF
	21325.00	NF

TF MHz	Emission MHz	dBc
2153.75	4307.50	70.0
	6461.25	64.6
	8615.00	69.7
	10768.75	71.6
	12922.50	NF
	15076.25	NF
	17230.00	NF
	19383.75	NF
	21537.50	NF

NF is noise floor

Note: 1: Emissions were tested to the tenth harmonic.

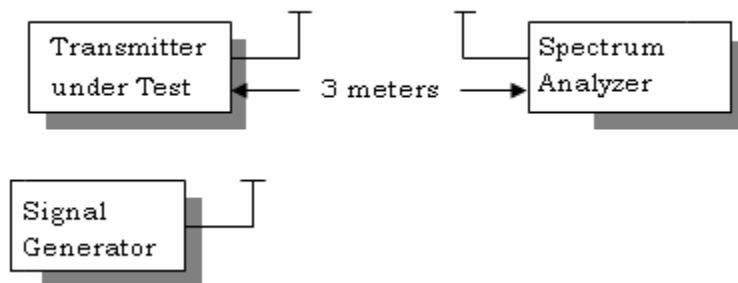
## FIELD STRENGTH OF SPURIOUS EMISSIONS

**Rules Part No.:** Part 2.1053

**Requirements:** Emissions must be  $43 + 10\log(P_o)$  dB below the mean power output of the transmitter.

**Method of Measurements:** The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental. This test was conducted per ANSI/TIA 603-C: 2004 using the substitution method. Equipment placed 80 cm above ground on a rotating table platform. Tuned, calibrated antenna which may be raised from 1m to 4m above ground and changed in polarization.

### Test Setup Diagram:



### Test Data:

#### 300KGXW

TF (MHz)	Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
869.2	1,738.40	V	64
	2,607.60	V	64
	3,476.80	V	62.4
	4,346.00	V	61.6
	5,215.20	V	60.4
881.6	1,763.20	V	65.2
	2,644.80	V	63.4
	3,526.40	V	62.1
	4,408.00	V	61.6
	5,289.60	V	60.7
893.8	1,787.60	V	64.4
	2,681.40	V	63.8
	3,575.20	V	61.9
	4,469.00	V	60
	5,362.80	V	61.5

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1M25F9W

TF (MHz)	Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
1,931.30	3,862.50	V	60.2
	5,793.75	V	59.9
	7,725.00	V	57.4
	9,656.25	V	56
	11,587.50	V	55.3
1,960.00	3,920.00	V	61.6
	5,880.00	V	59.4
	7,840.00	V	57.6
	9,800.00	V	56.5
	11,760.00	V	55.1
1,988.80	3,977.50	V	61.5
	5,966.25	V	59.6
	7,955.00	V	57.1
	9,943.00	V	56.1
	11,932.50	V	53.9
2,111.30	4,222.50	V	59.9
	6,333.75	V	58.8
	8,445.00	V	57.1
	10,556.25	V	57.2
2,132.50	4,265.00	V	57.6
	6,397.50	V	59
	8,530.00	V	56.9
	10,662.50	V	56.8
2,153.80	4,307.50	V	58
	6,461.25	V	58.6
	8,615.00	V	56.5
	10,768.75	V	56.8

Note: 1: The worst case channels were tested.  
 Emissions were tested to the tenth harmonic.

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## FREQUENCY STABILITY

**Rules Part No.:** Part 2.1055, Part 22.355, Part 24.235, and Part 27.54

**Requirements:** Temperature and voltage tests were performed to verify that the frequency remains within the .00025%, 2.5ppm specification limit for.

Part 27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands.

**Method of Measurement:** The measurement technique is in accordance with ANSI/TIA 603- C: 2004. The transmitter was placed in the temperature chamber at 25° C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15-second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30° C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15-second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

### Test Data:

<b>Reference Frequency</b>	881.606012
----------------------------	------------

<b>TEMPERATURE °C</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
0°C	881.606324	0.35
10°C	881.606286	0.31
20°C	881.606134	0.14
30°C	881.606097	0.10
40°C	881.606474	0.52
50°C	881.606593	0.66

<b>Battery (V)</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
-15%	881.606079	0.08
+15%	881.606055	0.05

Device under test ceases to function below 0 °C

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<b>Reference Frequency</b>	1960.036000
----------------------------	-------------

<b>TEMPERATURE °C</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
0°C	1960.036697	0.36
10°C	1960.036375	0.19
20°C	1960.036167	0.09
30°C	1960.036248	0.13
40°C	1960.036481	0.25
50°C	1960.036761	0.39

<b>Battery (V)</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
-15%	1960.036221	0.11
+15%	1960.036255	0.13

<b>Reference Frequency</b>	2132.500000
----------------------------	-------------

<b>TEMPERATURE °C</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
0°C	2132.500688	0.32
10°C	2132.500534	0.25
20°C	2132.500361	0.17
30°C	2132.500446	0.21
40°C	2132.500862	0.40
50°C	2132.500965	0.45

<b>Battery (V)</b>	<b>FREQUENCY MHz</b>	<b>PPM</b>
-15%	2132.500156	0.07
+15%	2132.500094	0.04