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

Applicant	Harris Corporation
Address	1025 West NASA Boulevard Melbourne FL 32919-0001 USA
Model Number	NK73092523
Product Description	NK73092523 with 300KGXW & 1M25F9W
Date Sample Received	10/16/2009
Date Tested	10/23/2009
Tested By	Nam Nguyen
Approved By	Mario de Aranzeta
Timco Report No.	2510AUT9\2510AUT9TestReport.doc
Test Results	☒ Pass ☐ Fail

ACCREDITED

Certificate # 0955-01

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STATEMENT OF COMPLIANCE

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/ Laboratory Supervisor

Date: **12/02/2009**

Tested by: Nam Nguyen

GENERAL INFORMATION

DUT Specification

The test results relate only to the items tested.

FCC Rule Part(s)	§ 22H, § 24E, and § 27		
DUT Description	**NK73092523 WITH 300KGXW & 1M25KF9W**		
FCC ID			
Model Name	**NK73092523**		
Tx Frequency	**300KGXW & 1M25F9W**:(869–894) MHz, (1931–1990) MHz 1M25F9W: (2110 – 2154) MHz		
Max. Power Rating	1.0 Watts.		
Emission Designators	300KGXW & 1M25F9W		
Modulation(s)	300KGXW & 1M25F9W		
User Power Control	☐ Yes	☒ No	
DUT Power Source	☒ 110–120Vac/50– 60Hz		
	☒ DC Power		
	☐ Battery Operated Exclusively		
Test Item	☐ Prototype	☒ Pre-Production	☐ Production
Type of Equipment	☒ Fixed	☐ Mobile	☐ 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 26ºC 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.

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 2/5/09	2/5/12
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Analyzer Open-Frame Tower Preamplifier	HP	8449B	3008A01075	CAL 7/22/09	7/22/11
Analyzer Open-Frame Tower Quasi-Peak Adapter	HP	85650A	2043A00305	CAL 7/22/09	7/22/11
Analyzer Open-Frame Tower RF Preselector	HP	85685A	3107A01282	CAL 7/22/09	7/22/11
Analyzer Open-Frame Tower Spectrum Analyzer	HP	8566B/85662A	2627A03154/2648A14276	CAL 7/22/09	7/22/11
Antenna: Biconnical	Eaton	94455-1	1057	CAL 1/15/08	1/15/10
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 10/1/09	10/1/11
Antenna: Log-Periodic	Eaton	96005	1243	CAL 12/13/07	12/13/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/1/09	10/1/11
LISN	Electro-Metrics	EM-7820	2682	CAL 9/24/09	0/24/11
Signal Generator	HP	8640B	2308A21464	CAL 8/4/09	8/4/11

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_{th} Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz, the VBW = 3 MHz, and the span 50 MHz.

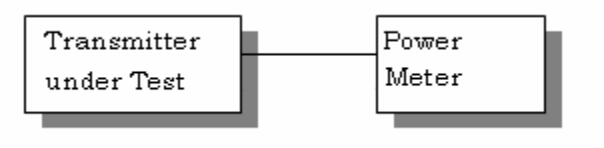
Radiation Interference: The test procedure used was ANSI C63.4-2003 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated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

RF POWER OUTPUT

Rules Part No.: Part 2.1046(a), Part 22.913, and 27.53

Requirements:

Method of Measuring: This test was conducted per ANSI/TIA 603-C:2004 using the RF power as 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	23.6	1930.20	20.3
881.60	23.3	1960.00	22.2
893.80	23.3	1989.8	22.7

1M25F9W		1M25F9W	
Channel (MHz)	Output Power (dBm)	Channel (MHz)	Output Power (dBm)
870.25	22.9	1931.25	16.6
881.52	22.3	1960.00	17.8
893.75	21.3	1988.75	18.8

1M25F9W			
Channel (MHz)	Output Power (dBm)	Channel (MHz)	Output Power (dBm)
2111.25	8.4		
2132.50	8.9		
2153.75	7.8		

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 audio 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 + 10log(Po) = dB.

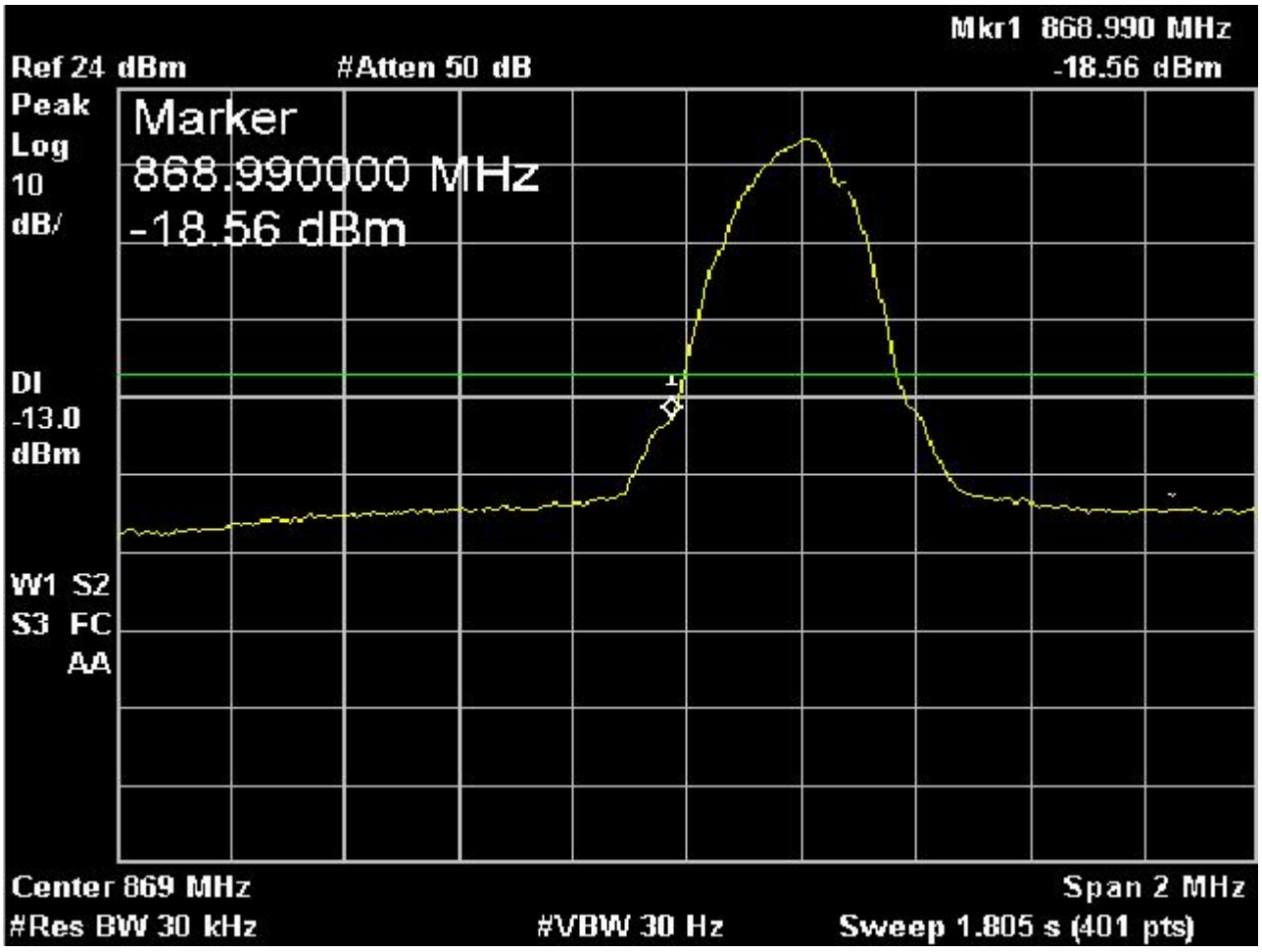
Please refer to the plots below.

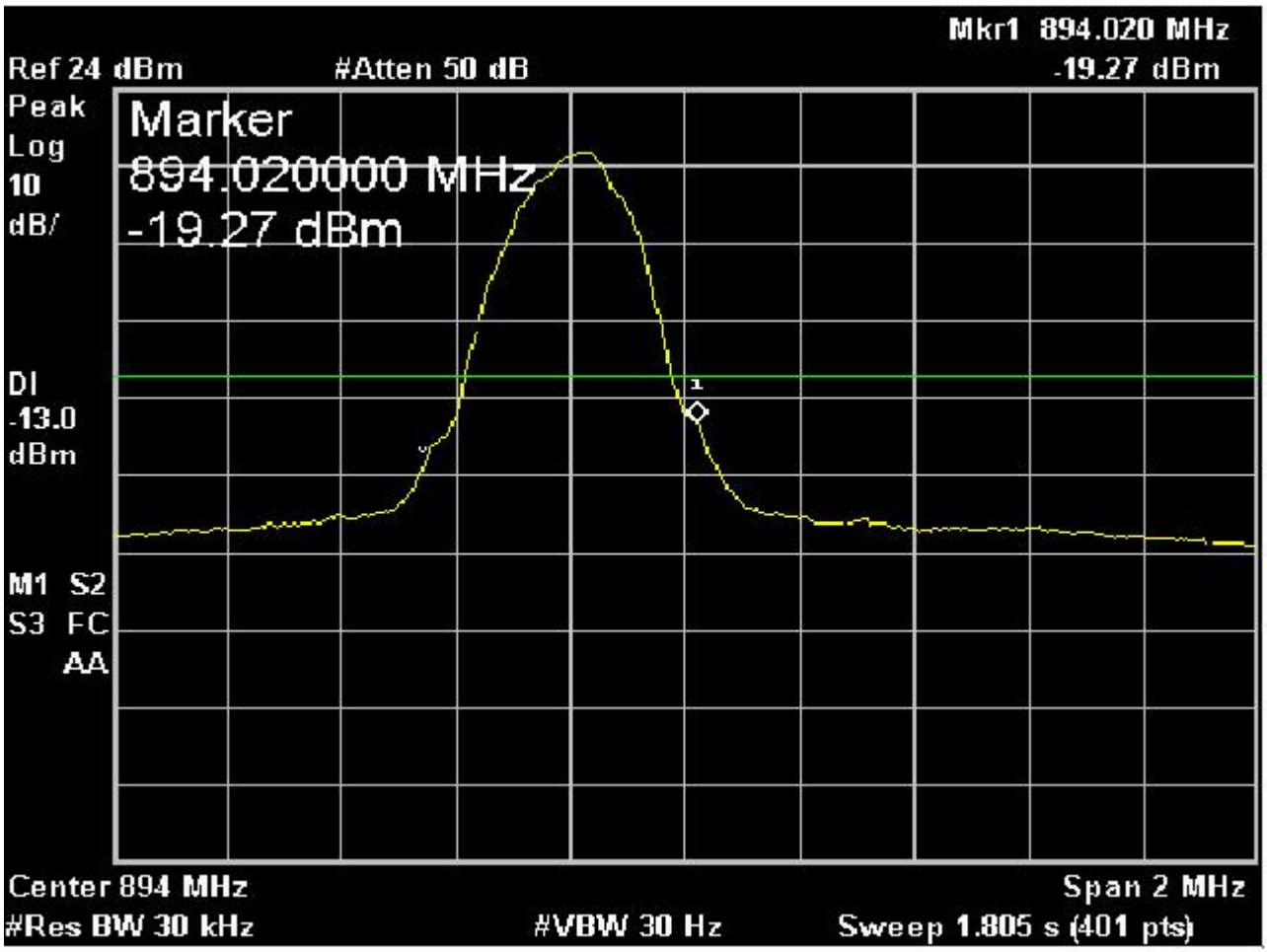
Band-edges compliance: Measurement were performed in accordance with Part 22.917 (b) and 27.53 (g)

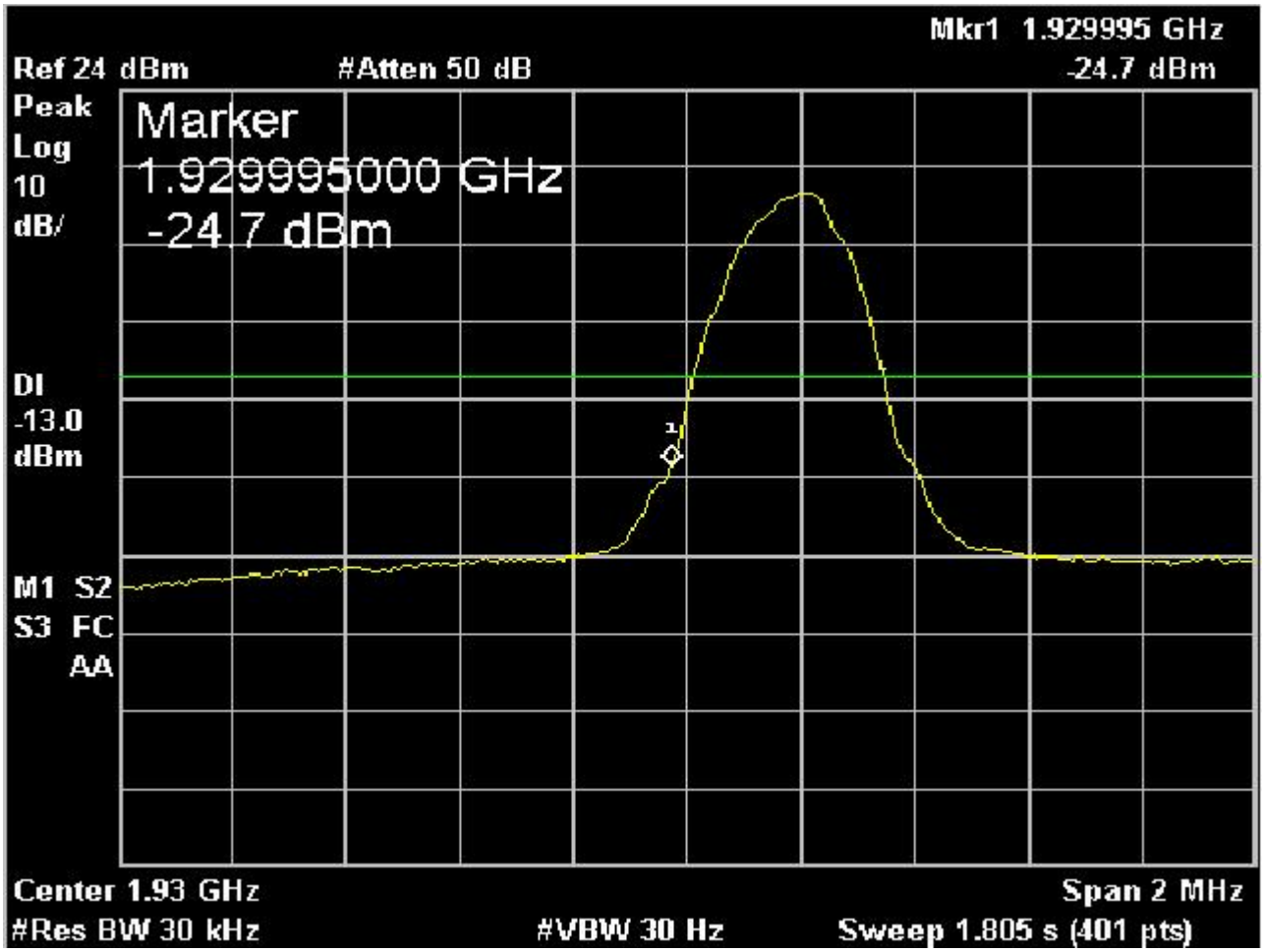
Please refer to the plots below.

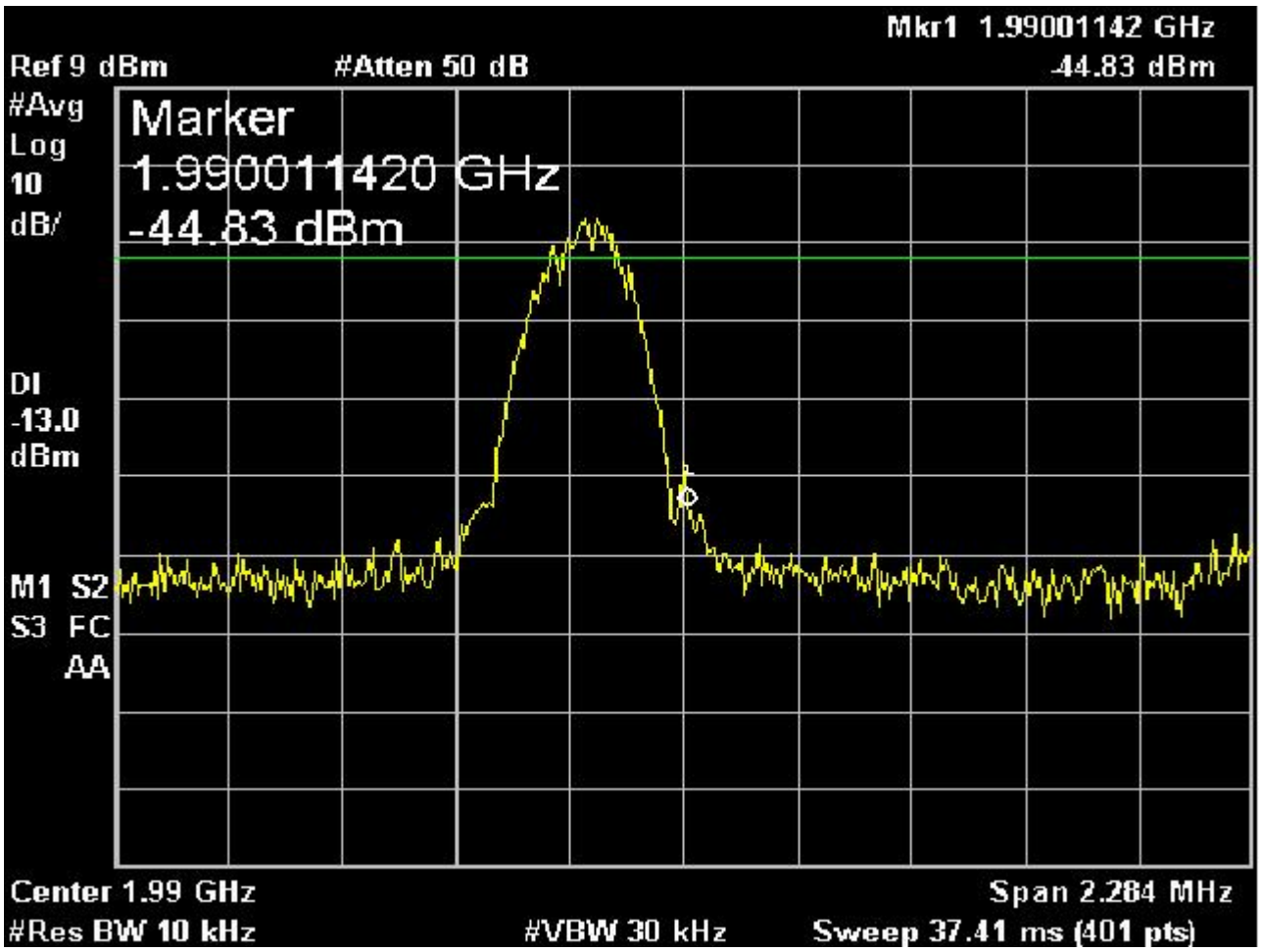
300KGXW:

Channel Frequency (MHz)	Band-edge Frequency Emission (MHz)	Amplitude at the band-edge (dBm)	Limit (dBm)
869.2	868.96	-22.34	-13
893.8	894.02	-22.01	-13
1930.2	1929.99	-25.73	-13
1989.8	1990.02	-21.29	-13



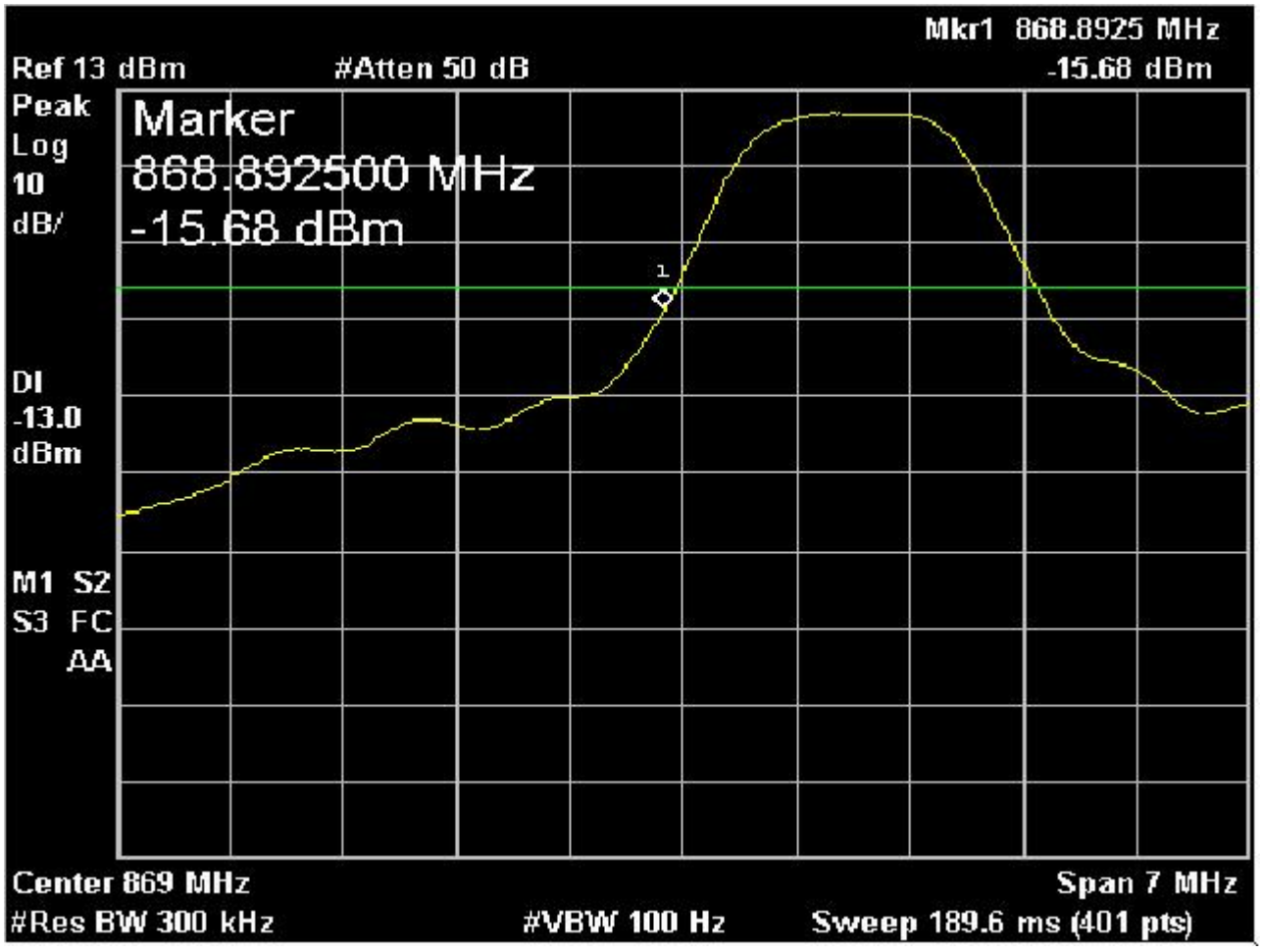

Mkr1 894.020 MHz
Ref 24 dBm
#Atten 50 dB
-19.27 dBm
Peak
Log
10
dB/
Marker
894.020000 MHz
-19.27 dBm
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Center 894 MHz
Span 2 MHz
#Res BW 30 kHz
#VBW 30 Hz
Sweep 1.805 s (401 pts)

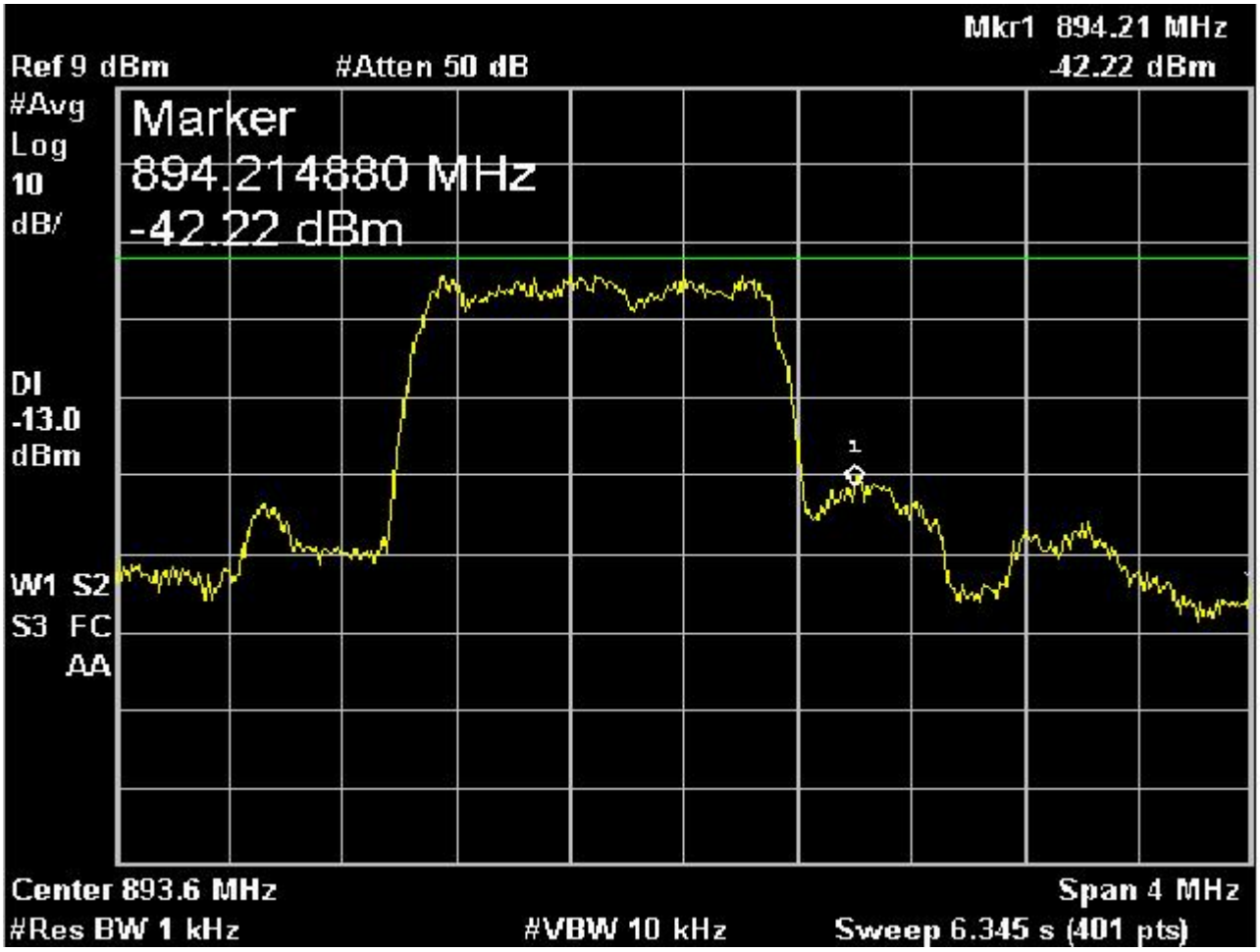

Mkr1 1.929995 GHz
Ref 24 dBm
#Atten 50 dB
-24.7 dBm
Peak
Log
10
dB/
Marker
1.929995000 GHz
-24.7 dBm
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Center 1.93 GHz
Span 2 MHz
#Res BW 30 kHz
#VBW 30 Hz
Sweep 1.805 s (401 pts)

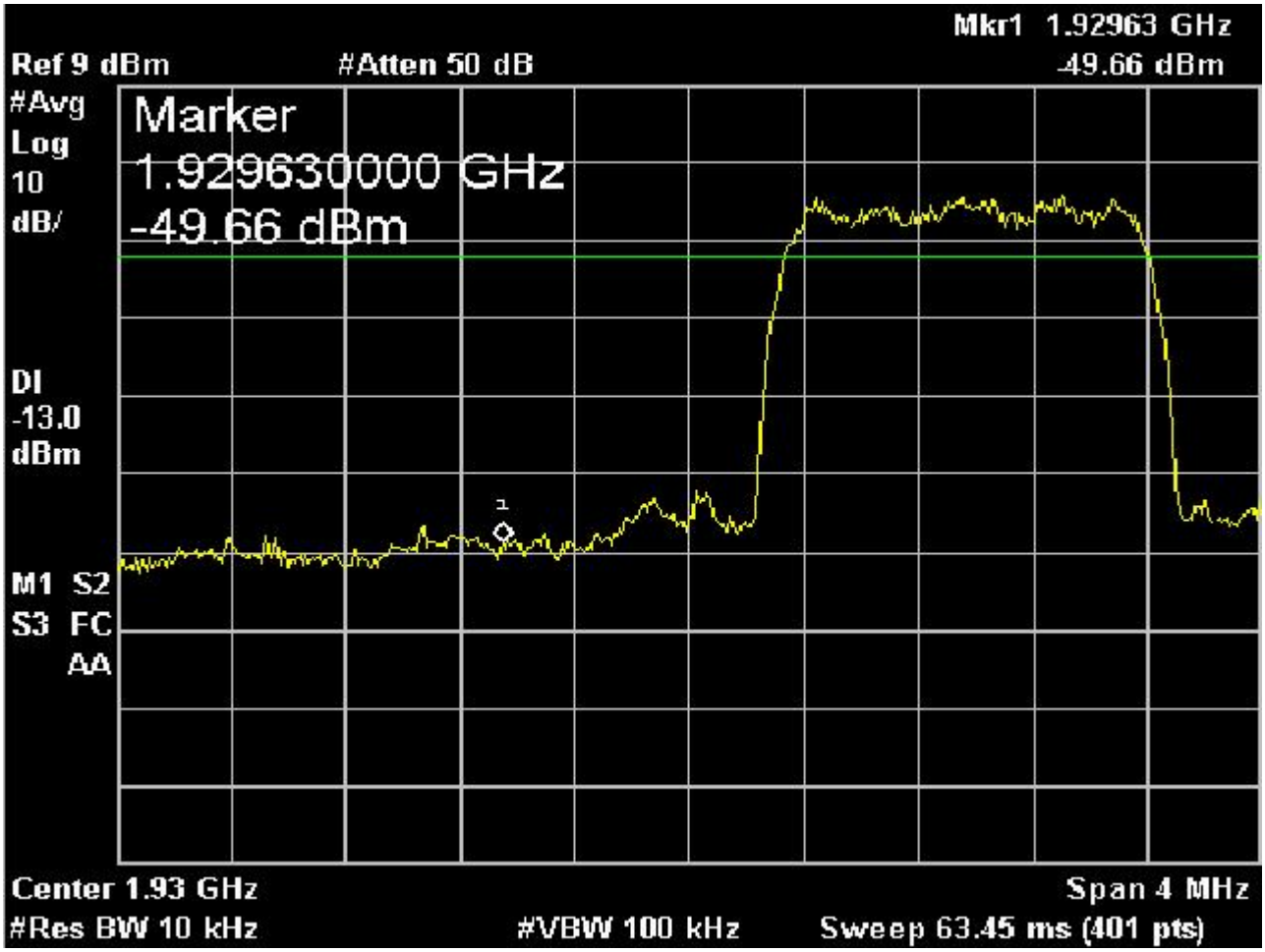

Mkr1 1.99001142 GHz
Ref 9 dBm
#Atten 50 dB
-44.83 dBm
#Avg
Log
10
dB/
Marker
1.990011420 GHz
-44.83 dBm
DI
-13.0
dBm
M1 S2
S3 FC
AA
Center 1.99 GHz
Span 2.284 MHz
#Res BW 10 kHz
#VBW 30 kHz
Sweep 37.41 ms (401 pts)

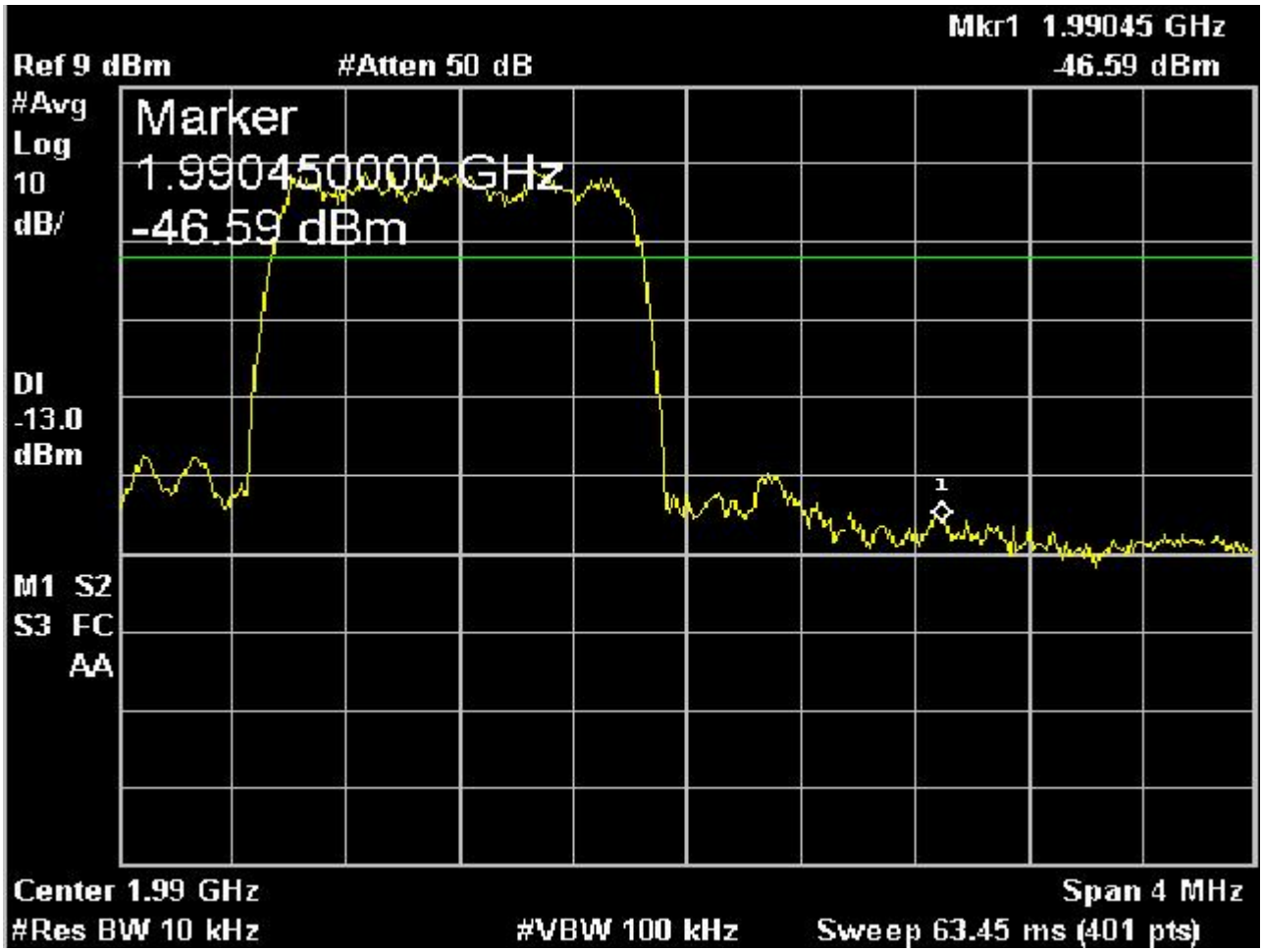
1M25F9W:

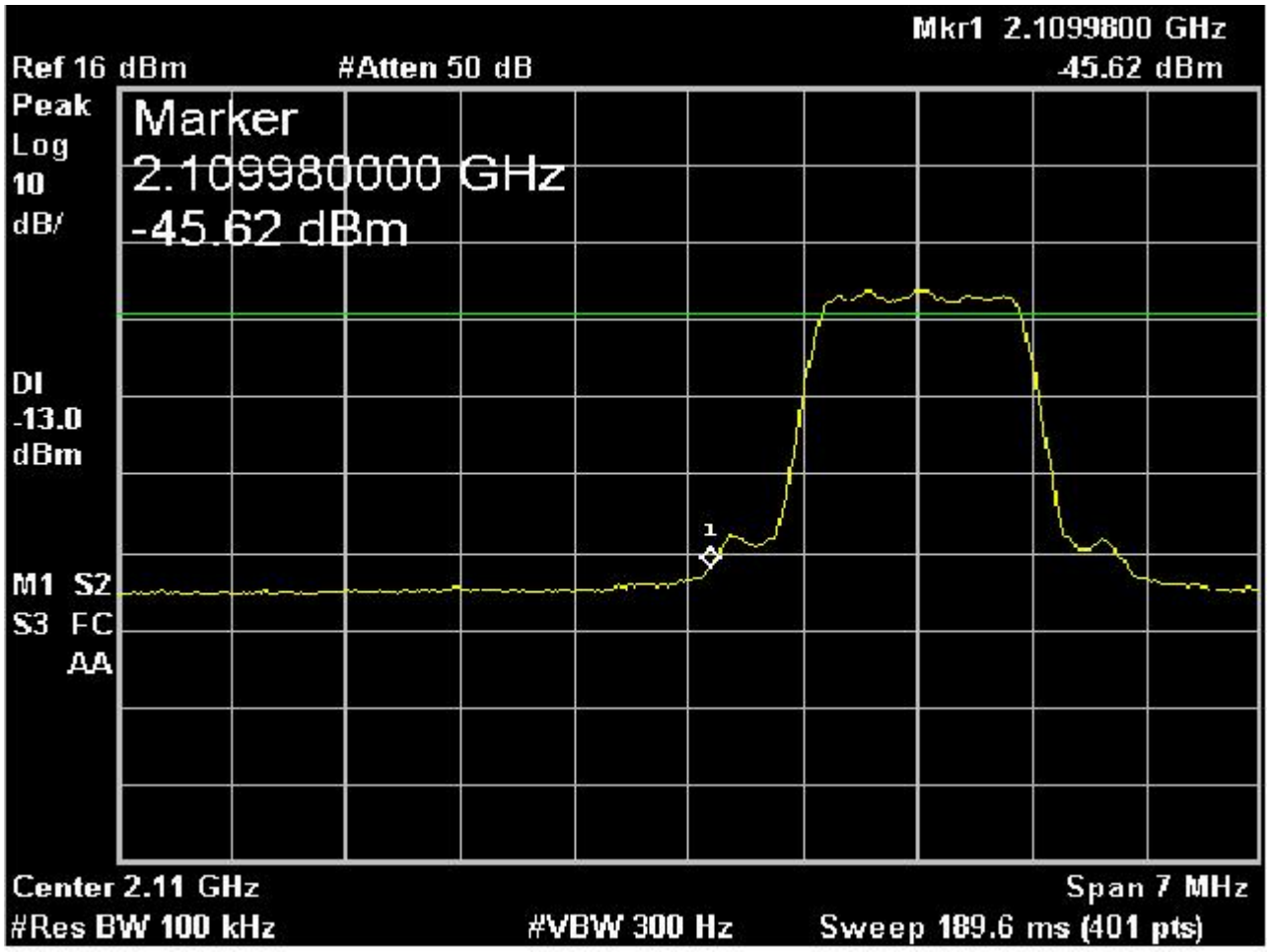
Channel Frequency (MHz)	Band-edge Frequency Emission (MHz)	Amplitude at the band-edge (dBm)	Limit (dBm)
870.03	868.89	-28.06	-13
893.31	894.21	-26.50	-13
1931.25	1929.64	-49.43	-13
1988.75	1990.45	-47.19	-13
2111	2109.97	-53.39	-13
2153.8	2155.13	-56.89	-13

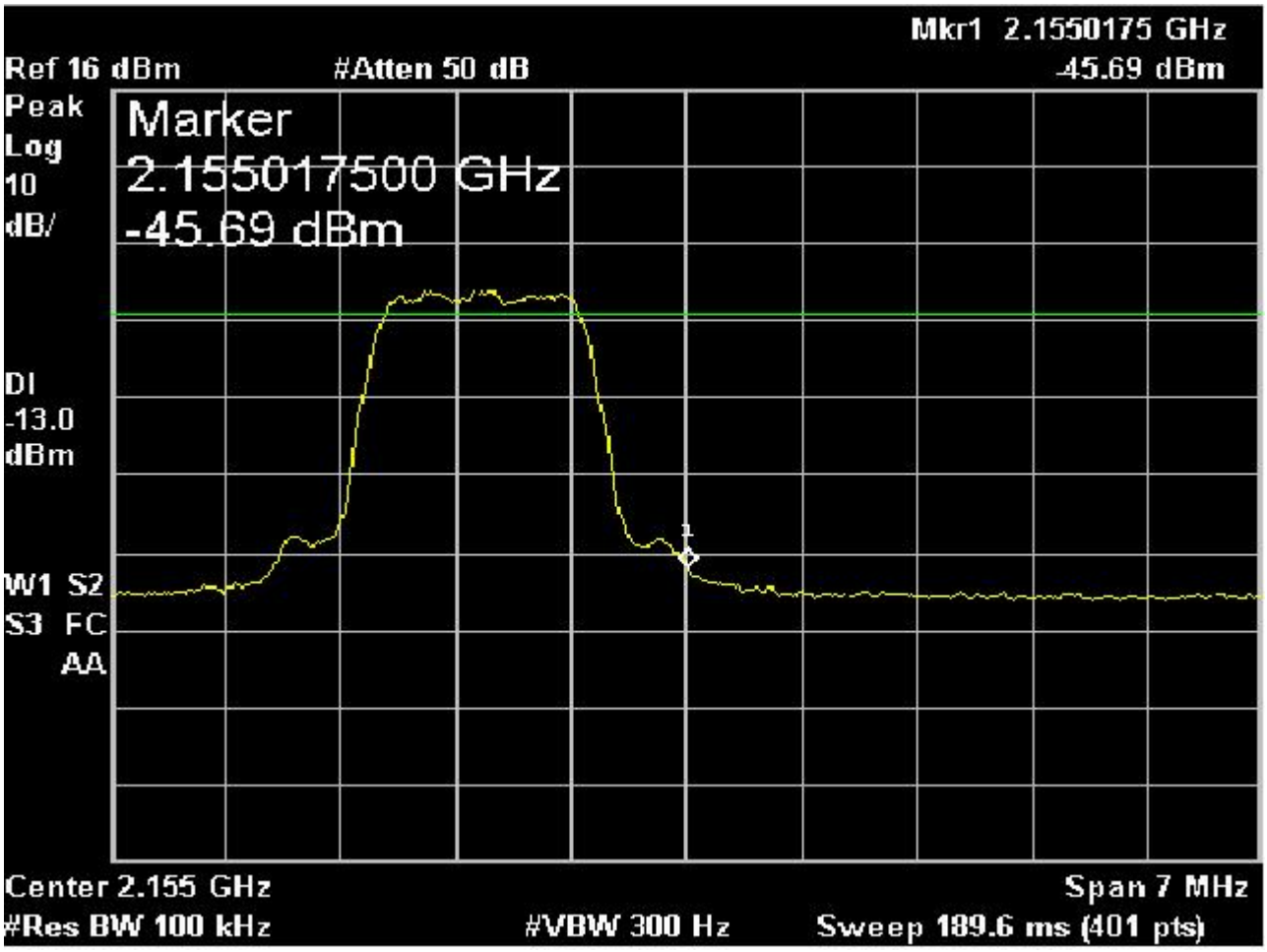



Mkr1 894.21 MHz
Ref 9 dBm
#Atten 50 dB
-42.22 dBm
#Avg
Log
10
dB/
Marker
894.214880 MHz
-42.22 dBm
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 893.6 MHz
Span 4 MHz
#Res BW 1 kHz
#VBW 10 kHz
Sweep 6.345 s (401 pts)


Mkr1 1.92963 GHz
Ref 9 dBm
#Atten 50 dB
-49.66 dBm
#Avg
Log
10
dB/
Marker
1.929630000 GHz
-49.66 dBm
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Center 1.93 GHz
Span 4 MHz
#Res BW 10 kHz
#VBW 100 kHz
Sweep 63.45 ms (401 pts)


Mkr1 1.99045 GHz
Ref 9 dBm
#Atten 50 dB
-46.59 dBm
#Avg
Log
10
dB/
Marker
1.990450000 GHz
-46.59 dBm
Dl
-13.0
dBm
M1 S2
S3 FC
AA
Center 1.99 GHz
Span 4 MHz
#Res BW 10 kHz
#VBW 100 kHz
Sweep 63.45 ms (401 pts)


Mkr1 2.1099800 GHz
Ref 16 dBm
#Atten 50 dB
-45.62 dBm
Peak
Log
10
dB/
Marker
2.109980000 GHz
-45.62 dBm
DI
-13.0
dBm
M1 S2
S3 FC
AA
Center 2.11 GHz
Span 7 MHz
#Res BW 100 kHz
#VBW 300 Hz
Sweep 189.6 ms (401 pts)


Mkr1 2.1550175 GHz
Ref 16 dBm
#Atten 50 dB
-45.69 dBm
Peak
Log
10
dB/
Marker
2.155017500 GHz
-45.69 dBm
Dl
-13.0
dBm
W1 S2
S3 FC
AA
Center 2.155 GHz
Span 7 MHz
#Res BW 100 kHz
#VBW 300 Hz
Sweep 189.6 ms (401 pts)

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Rules Part No.: §2.1051

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

43 + 10log(0.25) = 37.0 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 ANSI/TIA 603-C:2004.

300KGXW

TF MHz	Emission MHz	dBc
869.20	1738.40	87.7
	2607.60	72.0
	3476.80	88.3
	4346.00	87.1
	5215.20	84.4
	6084.40	NF
	6953.60	NF
	7822.80	NF
	8692.00	NF

TF MHz	Emission MHz	dBc
881.60	1763.20	85.1
	2644.80	73.2
	3526.40	86.7
	4408.00	88.0
	5289.60	85.1
	6171.20	NF
	7052.80	NF
	7934.40	NF
	8816.00	NF

TF MHz	Emission MHz	dBc
893.80	1787.60	81.8
	2681.40	79.6
	3575.20	87.2
	4469.00	87.7
	5362.80	83.9
	6256.60	NF
	7150.40	NF
	8044.20	NF
	8938.00	NF

TF MHz	Emission MHz	dBc
1930.20	3860.40	50.9
	5790.60	65.3
	7720.80	NF
	9651.00	NF
	11581.20	NF
	13511.40	NF
	15441.60	NF
	17371.80	NF
	19302.00	NF

TF MHz	Emission MHz	dBc
1960.00	3920.00	69.4
	5880.00	61.3
	7840.00	NF
	9800.00	NF
	11760.00	NF
	13720.00	NF
	15680.00	NF
	17640.00	NF
	19600.00	NF

TF MHz	Emission MHz	dBc
1989.80	3979.60	82.6
	5969.40	73.5
	7959.20	NF
	9949.00	NF
	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	77.5
	2610.18	71.7
	3480.24	NF
	4350.30	NF
	5220.36	NF
	6090.42	NF
	6960.48	NF
	7830.54	NF
	8700.60	NF

TF MHz	Emission MHz	dBc
881.52	1763.04	77.3
	2644.56	74.2
	3526.08	NF
	4407.60	NF
	5289.12	NF
	6170.64	NF
	7052.16	NF
	7933.68	NF
	8815.20	NF

TF MHz	Emission MHz	dBc
893.31	1786.62	74.4
	2679.93	75.4
	3573.24	NF
	4466.55	NF
	5359.86	NF
	6253.17	NF
	7146.48	NF
	8039.79	NF
	8933.10	NF

TF MHz	Emission MHz	dBc
1931.25	3862.50	63.2
	5793.75	84.5
	7725.00	NF
	9656.25	NF
	11587.50	NF
	13518.75	NF
	15450.00	NF
	17381.25	NF
	19312.50	NF

TF MHz	Emission MHz	dBc
1960.00	3920.00	84.1
	5880.00	82.6
	7840.00	NF
	9800.00	NF
	11760.00	NF
	13720.00	NF
	15680.00	NF
	17640.00	NF
	19600.00	NF

TF MHz	Emission MHz	dBc
1988.75	3977.50	87.6
	5966.25	85.7
	7955.00	NF
	9943.75	NF
	11932.50	NF
	13921.25	NF
	15910.00	NF
	17898.75	NF
	19887.50	NF

TF MHz	Emission MHz	dBc
2111.25	4222.50	69.7
	6333.75	65.9
	8445.00	NF
	10556.25	NF
	12667.50	NF
	14778.75	NF
	16890.00	NF
	19001.25	NF
	21112.50	NF

TF MHz	Emission MHz	dBc
2132.50	4265.00	69.6
	6397.50	66.5
	8530.00	NF
	10662.50	NF
	12795.00	NF
	14927.50	NF
	17060.00	NF
	19192.50	NF
	21325.00	NF

TF MHz	Emission MHz	dBc
2153.75	4307.50	69.1
	6461.25	66.4
	8615.00	NF
	10768.75	NF
	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

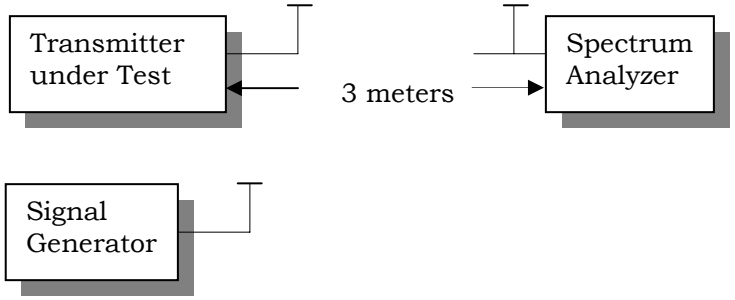
Rules Part No.: Part 2.1053

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

43 + 10log(0.25) = 37.0 dB

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	H	72.1
	2,607.60	V	72.8
	3,476.80	H	77.8
	4,346.00	V	75.8
	5,215.20	H	75.2
881.6	1,763.20	V	74.4
	2,644.80	V	74.8
	3,526.40	H	72.6
	4,408.00	H	77.3
	5,289.60	V	74.2
893.8	1,787.60	H	73.3
	2,681.40	H	76
	3,575.20	H	72.1
	4,469.00	V	77.7
	5,362.80	H	77.9

1M25F9W:

TF (MHz)	Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
1,931.30	3,862.50	H	74.5
	5,793.75	H	77.9
	7,725.00	H	74.9
	9,656.25	H	74.7
1,960.00	3,920.00	H	78.2
	5,880.00	H	76.6
	7,840.00	H	74.8
	9,800.00	H	74.8
1,988.80	3,977.50	H	76
	5,966.25	H	76.9
	7,955.00	H	74.2
	9,943.00	H	74.5
2,111.30	4,222.50	V	74.8
	6,333.75	V	76.6
	8,445.00	V	74.9
2,132.50	4,265.00	V	72.8
	6,397.50	V	76.3
	8,530.00	V	74.7
2,153.80	4,307.50	V	72.2
	6,461.25	V	76.1
	8,615.00	V	74.2

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

FREQUENCY STABILITY

Rules Part No.: Part 2.1055, Part 22.355, Part 24.235, 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:

Reference Frequency	881.607421

TEMPERATURE °C	**FREQUENCY MHz**	**PPM**
0°C	881.607586	0.19
10°C	881.607541	0.14
20°C	881.607537	0.13
30°C	881.607312	-0.12
40°C	881.607276	-0.16
50°C	881.606975	-0.51

Battery (V)	**FREQUENCY MHz**	**PPM**
-15%	881.607421	0.00
+15%	881.607421	0.00

Device under test ceases to function below 0 °C

Reference Frequency	1960.000000

TEMPERATURE °C	FREQUENCY MHz	PPM
0°C	1960.001891	0.96
10°C	1960.001620	0.83
20°C	1960.001205	0.61
30°C	1960.001000	0.51
40°C	1959.999361	-0.33
50°C	1959.999196	-0.41

Battery (V)	FREQUENCY MHz	PPM
-15%	1960.000000	0.00
+15%	1960.000000	0.00

Reference Frequency	2132.478000

TEMPERATURE °C	FREQUENCY MHz	PPM
0°C	2132.478989	0.46
10°C	2132.478752	0.35
20°C	2132.478586	0.27
30°C	2132.477719	-0.13
40°C	2132.477525	-0.22
50°C	2132.477146	-0.40

Battery (V)	FREQUENCY MHz	PPM
-15%	2132.478000	0.00
+15%	2132.478000	0.00