

Test report no. : 132075 - 5

Item tested : Passport Executive TX

Type of equipment : 672–696 MHz Wireless Microphone

Client : Fender Musical Instrument Corporation

www.nemko.com

FCC Part 74H.861
Licensed wireless microphone

26 November 2009

Authorized by : 

Frode Sveinsen
Technical Verificator

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1 GENERAL INFORMATION

1.1 Testhouse Info

Name : Nemko AS
Address : Nemko Kjeller
 Instituttveien 6, Box 96
 N-2027 Kjeller, NORWAY
Telephone : +47 64 84 57 00
Fax : +47 64 84 57 05
E-mail: comlab@nemko.com
FCC test firm
registration # : 994405
IC OATS registration # : 2140D-1
Total Number of Pages: 29

1.2 Client Information

Name : Fender Musical Instrument Corporation
Address : 8860 E, Chaparral Road Suite 100, Scottsdale, AZ 85250-2610
 USA

Telephone : -

Fax : -

Contact:

Name : Larry Clauss
Telephone : +4803675203
E-mail : lclauss@fender.com

1.3 Manufacturer (if other than client)

..“

2 Test Information

2.1 Test Item

Name :	Passport Executive TX
Model/version :	PR692
Serial number :	/
Hardware identity and/or version:	MPR
Software identity and/or version :	/
Operating frequency:	Ch1 – Ch16
Switching range:	672.000 – 696.00MHz
Allowed band :	614.000 – 806.000MHz
Emission designator :	150KF3E
Tuneable Bands :	None
Number of Channels :	16
Operating Modes :	Transmitter
Channel bandwidth:	200kHz
TX data rate:	/
Type of Modulation :	FM (analogue)
User Frequency Adjustment :	None
Rated Output Power :	20mW
Threshold audio input level:	150mV
Type of Power Supply :	Battery 3.0 V DC
Antenna Connector :	Integral
Antenna Diversity Supported :	None

Theory of Operation

The passport Executive is an analogue wireless transmitter for head microphone.

Exposure Evaluation

The EUT is a portable device and is designed to be worn in a belt clip and head microphone on face.

2.2 Test Environment

2.2.1 Normal test condition

Temperature:	20 - 25 °C
Relative humidity:	30 - 50 %
Normal test voltage:	3.0 V DC

The values are the limit registered in the laboratory during the test period. All tests except the Frequency Stability test were performed with a fully charged battery.

The Frequency Stability test was performed with a regulated DC Power Supply.

2.3 Test Period

Item received date:	2009-07-14
Test period:	from 2009-07-31 to 2009-08-07

3 TEST REPORT SUMMARY

3.1 General

Manufacturer: Fender
Model No.: See paragraph 2.1

All measurements are traceable to national standards.

The tests were conducted for the purpose of demonstrating compliance with FCC CFR 47 Parts 74H.861

Test methods were in accordance with ANSI/TIA-603-C-2004 and ANSI C63.4-2003.

The radiated tests were made in a semi-anechoic chamber at measuring distances of 3m and 10m. The measurements at 3m were performed with floor absorbers.

- | | |
|-----------------------------------------------------|---------------------------------------------------------|
| <input checked="" type="checkbox"/> New Submission | <input type="checkbox"/> Production Unit |
| <input type="checkbox"/> Class II Permissive Change | <input checked="" type="checkbox"/> Pre-production Unit |
| / Equipment Code | <input type="checkbox"/> Family Listing |

THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.
Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".



TEST REPORT #: 132075-5

TESTED BY: G. Suhanthakumar
G.Suhanthakumar, Test Engineer

DATE: 23-Nov-2009

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3.2 Test Summary

Name of test	FCC Part 74H.861	Result
RF Power Output	2.1046, 74.861(e)(1)(ii)	Pass
Modulation Characteristics, - Audio Frequency Response - Modulation Limiting	2.1047 74.861 (e)(3)	Pass
Occupied Bandwidth	2.1049, 74.861 (e)(5) (e)(6)	Pass
Spurious Emissions at antenna terminals	2.1051, 2.1057, 74.861 (e)(6)	Pass
Radiated spurious emissions	2.1051, 2.1057, 74.861 (e)(6)	Pass
Frequency Stability	2.1055, 74.861 (e)(4)	Pass
Receiver Spurious Emissions	N/A	Pass

The tested equipment transmits analog voice.
The tested equipment has integral antenna only.

3.3 Description of modification for Modification Filing

Not applicable.

3.4 Comments

The pre-programmed frequencies and power levels can not be changed by the user.

3.5 Family List Rationale

Not Applicable.

4 TEST RESULTS

4.1 RF Output Power, Conducted

Para. No.: 2.1046, 74.861 (e)(1)(ii)

Test Performed By: G.Suwanthakumar	Date of Test: 31-Jul-2009
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Test Results: Complies

Measurement Data:

Maximum Conducted Peak Output Power, mW

RF channel	Ch1/ 672MHz	Ch8/ 683.2MHz	Ch16/ 696MHz
Measured value in mW	48.1	47.4	42.5

Radiated Maximum ERP, mW

Frequency (MHz)	Out-put power from EUT (dBm)	Polarization	Generator output power (dBm)	Cable loss (dB)	Antenna gain (dB)*	Isotropic gain (dB)	ERP (dBm)	ERP (mW)
Ch1/672	-33.18	VP	20.26	2.89	-8.9	-2.15	6.32	4.29
Ch8/683	-32.83	VP	20.32	2.90	-8.9	-2.15	6.37	4.34
Ch16/696	-32.63	VP	20.83	3.01	-8.9	-2.15	6.77	4.75

* gain of measuring antenna relative to an ideal dipole

Calculation:

ERP (dBm)= Generator out-put power (dBm) – cable loss (dB) + Antenna gain (dB) – 2.15 dB

Measured According to TIA -603 Cl.2.2.17.2

Maximum battery voltage is 3.0V DC .The variation within 2.1 to 3.0V DC has no influence on Peak Output Power and spurious emissions.

Both parts of this measurement were performed with a power meter and without modulation.

The conducted test was performed on the temporary 50 Ohm antenna connector.

The radiated test was performed in a semi-anechoic chamber with floor-absorbers at 3m measuring distance.

Requirements:

FCC 74.861 (e)(1)(ii)

The maximum output power must not exceed 250mW

Instruments Used: 3, 6, 16, 19

4.2 Modulation Characteristics

4.2.1 *Audio Frequency Response*

Para. No.: 2.1047

Test Performed By: G.Suwanthakumar

Date of Test: 04-Aug-2009

Test Results: Complies

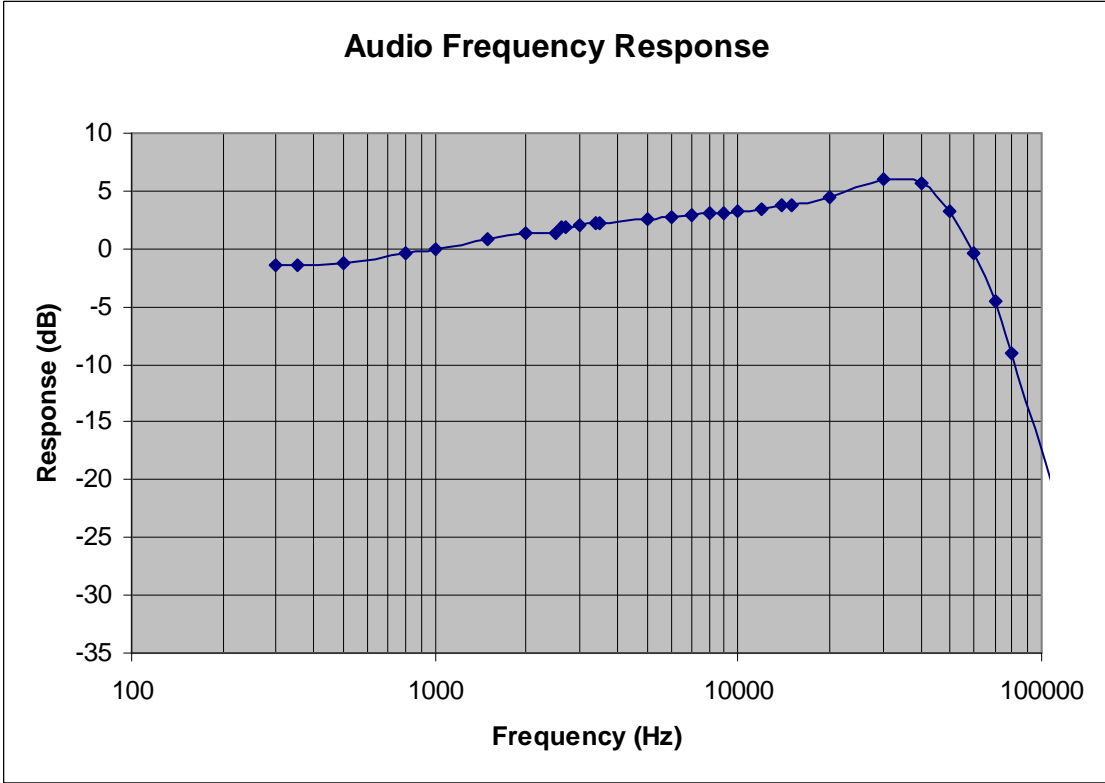
Measurement Data:

See attached plots.

Requirements:

None.

Instruments Used: 1, 6



Audio frequency response

4.2.2 Modulation Limiting

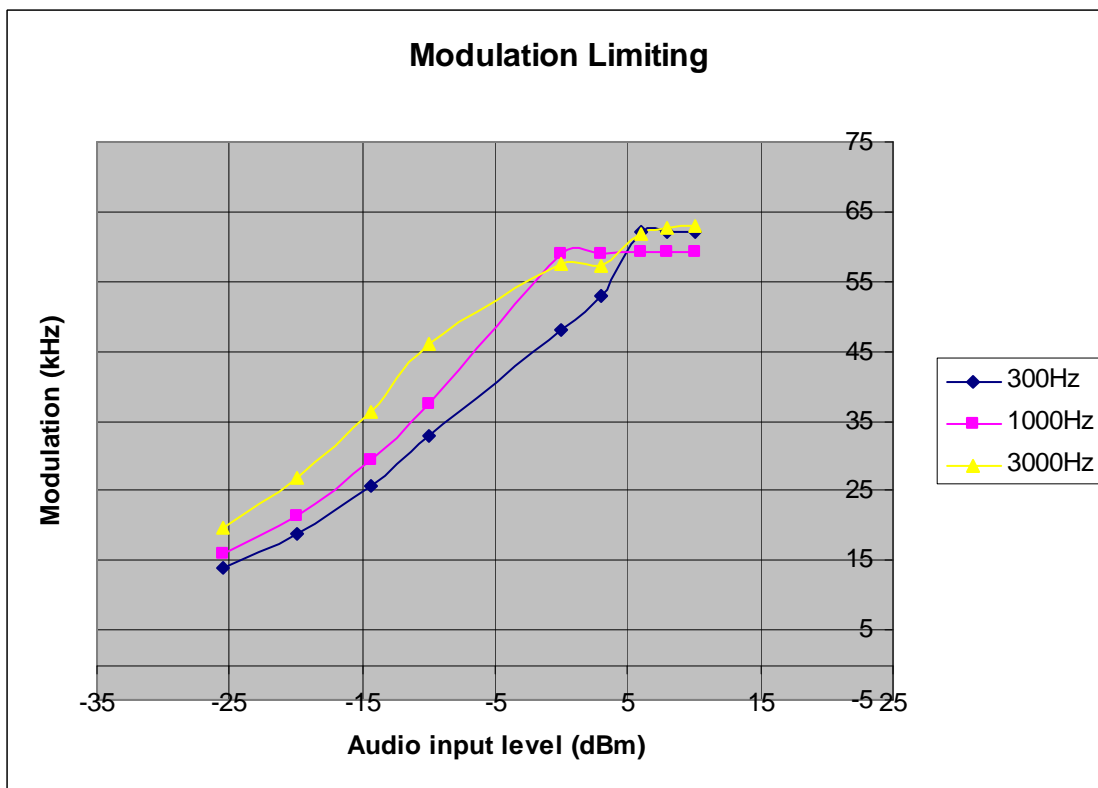
Para. No.: 2.1047

Test Performed By: G.Suhandhakumar Date of Test: 05-Aug-2009

Test Results: Complies

Measurement Data:

See attached plots.



4.3 Occupied Bandwidth

Para. No.: 2.1049, 74.861 (e)(5) (e)(6)

Test Performed By: G.Suhandhakumar	Date of Test: 07-Aug-2009
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Test Results: Complies

Measurement Data:

Carrier Frequency	99% Occupied Bandwidth
Ch1/672MHz	149.7kHz
Ch8/683.2MHz	149.7kHz
Ch16/696MHz	149.7kHz

Calculated value: $2M+2DK=2 \times 15+2 \times 75 \times 1=180$ kHz

modulation frequency M = 15 kHz, K=1

maximum frequency deviation D = 75 kHz

See attached plots.

For this test the EUT was made to transmit continuously with modulation activated.

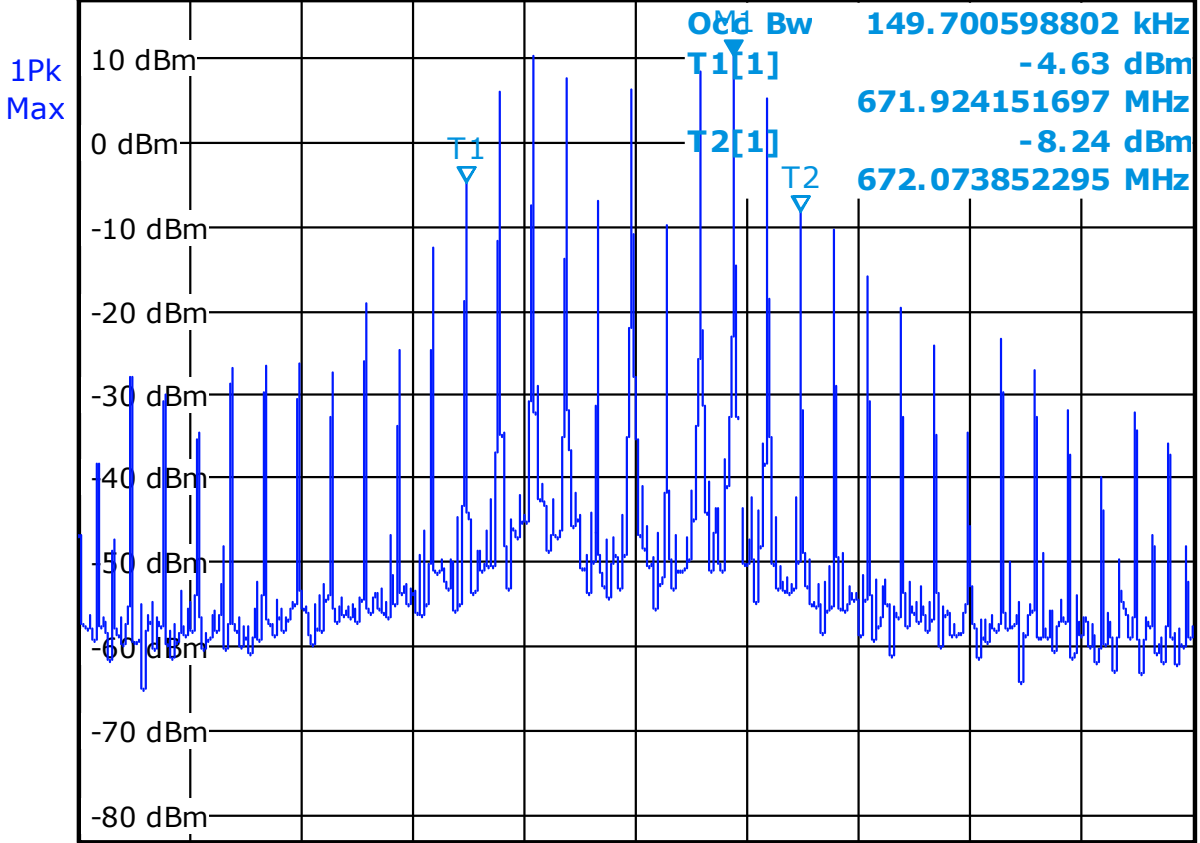
Modulated at 15kHz with 16dB overdrive

Requirements:

See 2.1049, 74.861 (e)(5) (e)(6)

Instruments Used: 1, 4, 6

Offs 14.00 dB * RBW 300 Hz
 Att 25 dB * VBW 30 kHz
 Ref 17.00 dBm SWT 5.6s

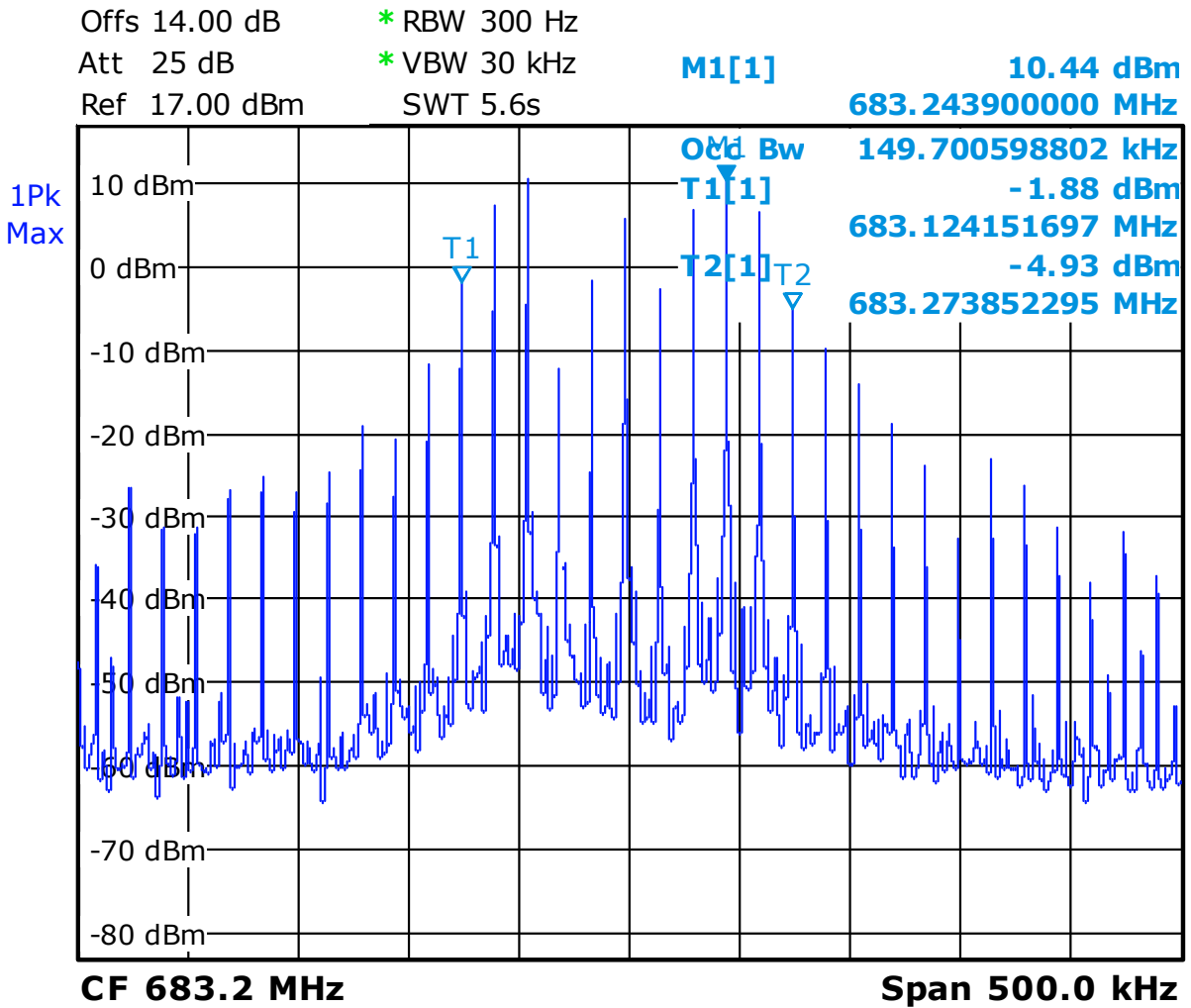


CF 672.0 MHz

Span 500.0 kHz

Date: 7.AUG.2009 08:48:24

Ch1, OBW

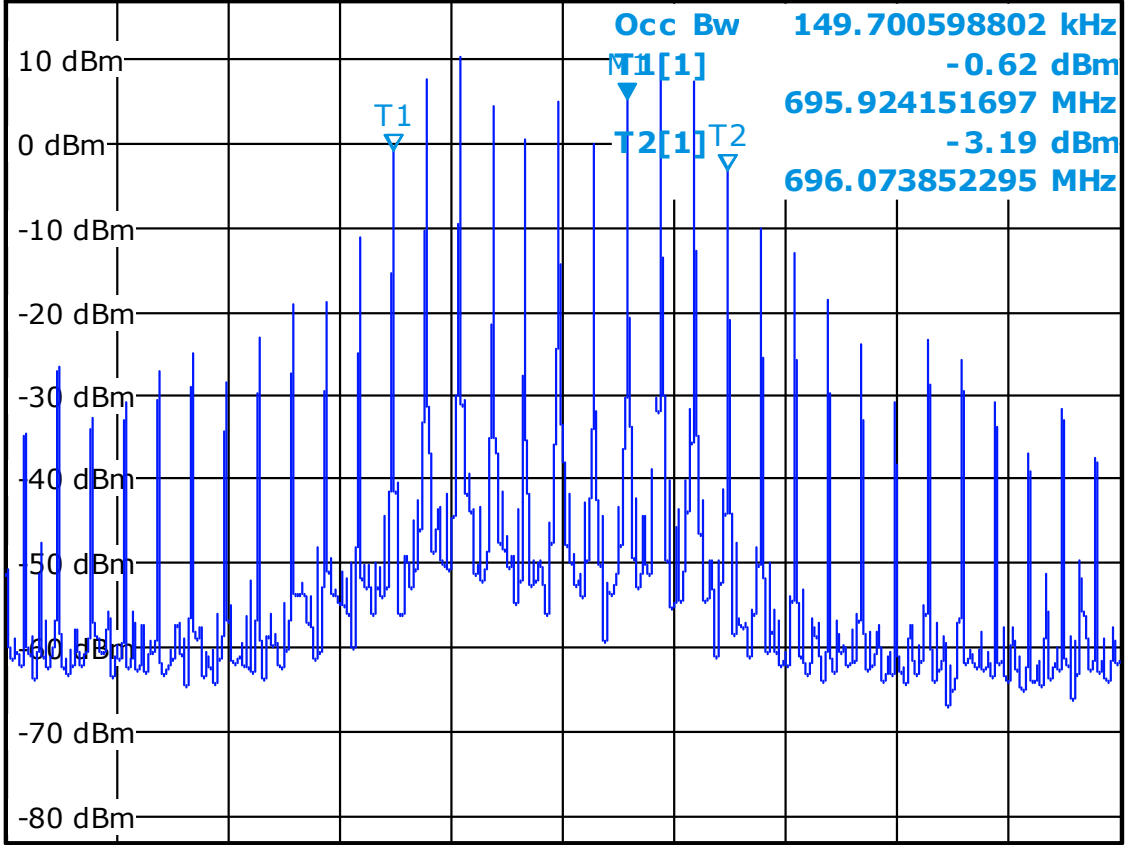


Date: 7.AUG.2009 08:50:19

Ch8, OBW

Offs 14.00 dB * RBW 300 Hz
 Att 25 dB * VBW 30 kHz
 Ref 17.00 dBm SWT 5.6s

1Pk
View



CF 696.0 MHz

Span 500.0 kHz

Date: 7.AUG.2009 08:45:31

Ch16, OBW

4.4 Spurious Emissions at the Antenna Terminal, Swept Frequency

Para. No.: 2.1053, 2.1057, 74.861 (e)(6)

Test Performed By: G.Suhandhakumar	Date of Test: 06-Aug-2009
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Test Results: Complies

Measurement Data:

The maximum emission is -15.94 dBm at 1.391 GHz. This is 2.94B below the specification limit. The spectrum was searched from 9kHz to 7000 MHz using a spectrum analyzer set to positive peak detector, 100kHz RBW/VBW below 1GHz and above 1 GHz , 1 MHz RBW/VBW. A band pass filter was used for each detected spurious to suppress the fundamental emission. Measurements were made using signal substitution method.

The measurements were made on ch1, ch8 & ch 16.

Modulated

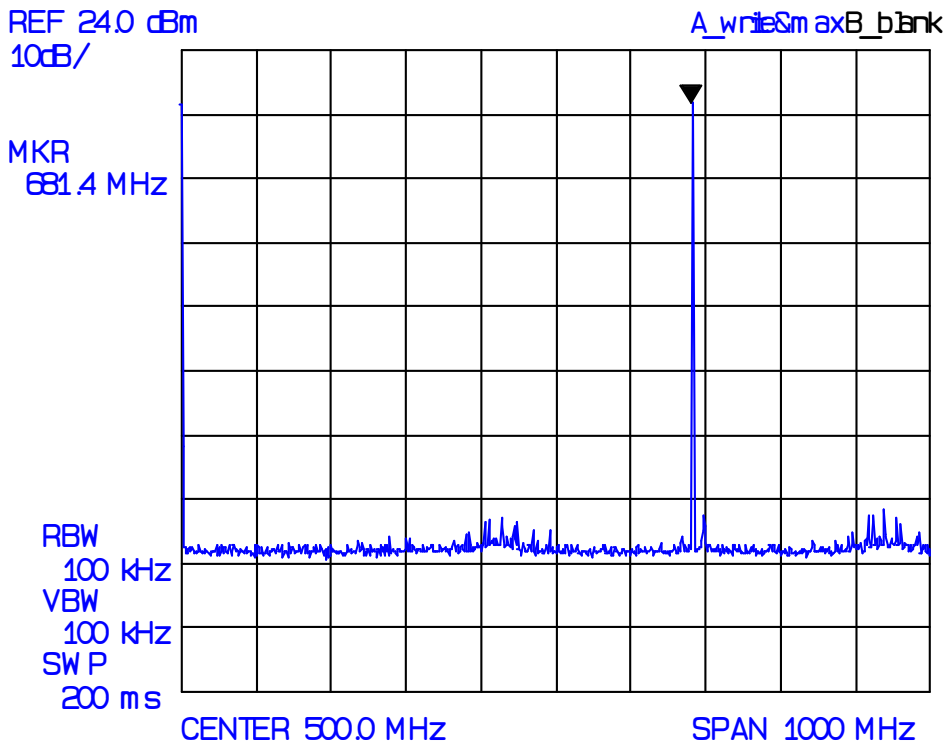
Frequency of Emission (MHz)	Channel	Measured Emission Level (dBm)	Limit (dBm) FCC 74.861 (e) (6) (iii) & (d)(3)	Margin (dB)
1343.9	Ch1/Lower	-18.2	-13	5.2
1366.4	Ch8/Middle	-17.2	-13	4.2
1391.7	Ch16/upper	-15.9	-13	2.94
2015.9	Ch1/Lower	-44.9	-13	31.9
2049.5	Ch8/Middle	-44.5	-13	31.5
2087.9	Ch16/upper	-45.9	-13	32.9

See attached plots.

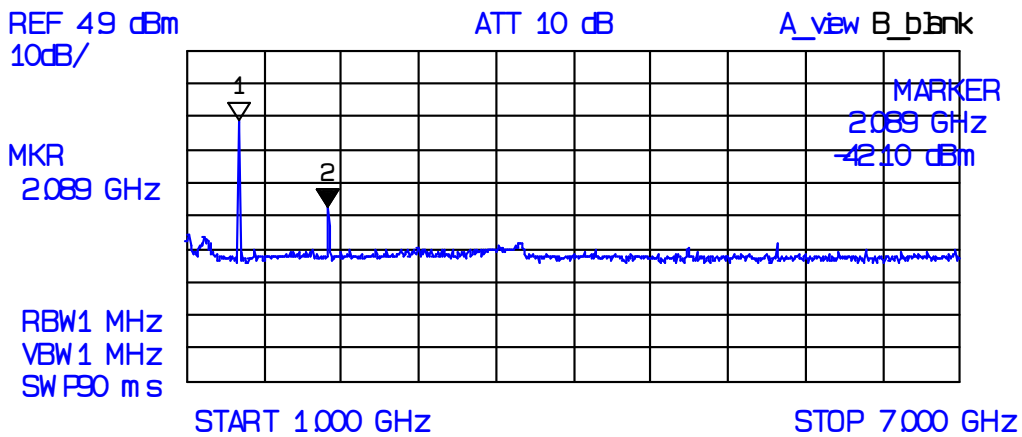
Requirements:

FCC 74.861 (e)(6) : Below -13 dBm

Instruments Used: 1, 2, 3, 6, 15, 19



Ch8 , 10kHz – 1000MHz , emission at antenna terminals



*** Multi Marker List ***

No.1:	1.403 GHz	-46.01 dBm	A
No.2:	2.089 GHz	-42.10 dBm	A
No.3:			
No.4:			
No.5:			
No.6:			
No.7:			
No.8:			

Ch8, 1 – 7GHz

4.5 Spurious Emissions at the Antenna Terminal, Emission Masks

Para. No.: 2.1053, 2.1057, 74.861 (e)(6)

Test Performed By: G.Suwanthakumar

Date of Test: 07-Aug-2009

Test Results: Complies

Measurement Data:

See attached plots.

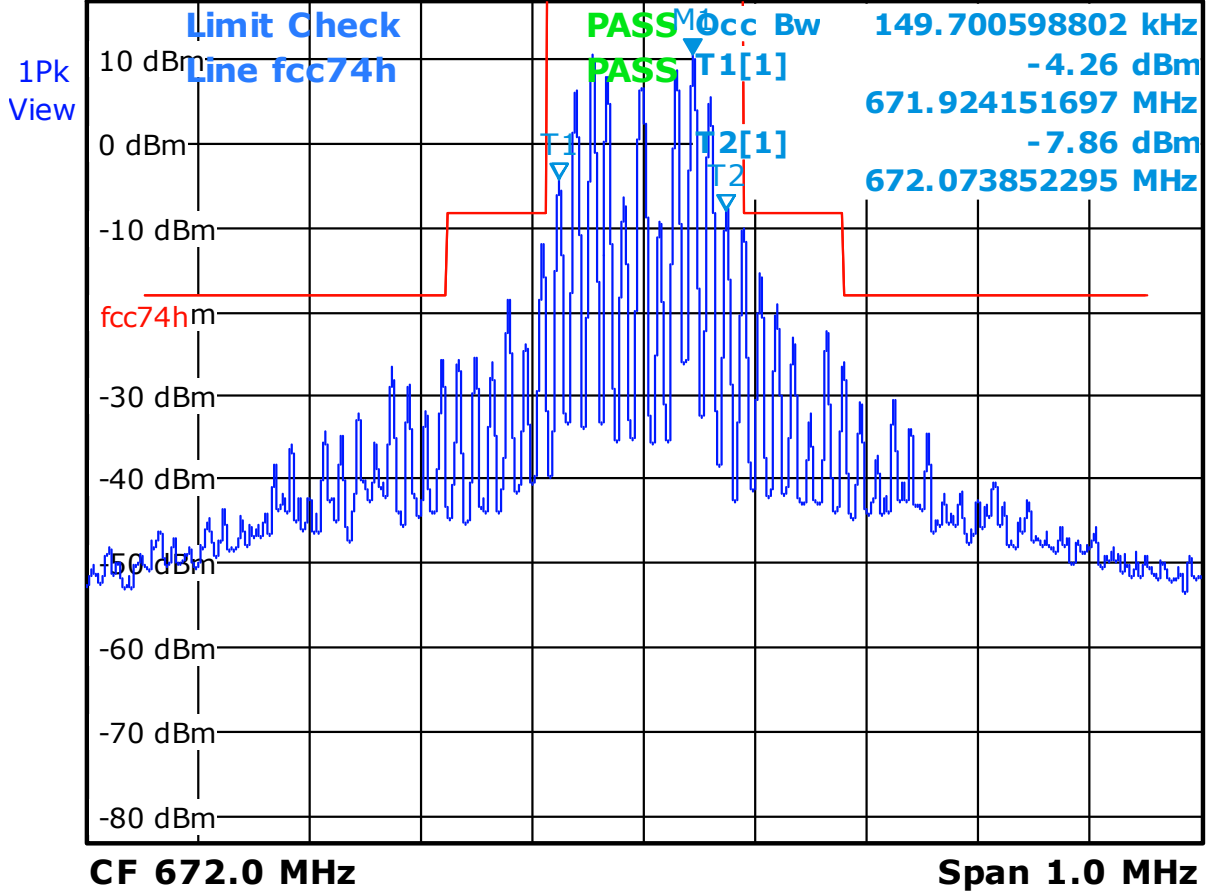
Modulated 15 kHz with 16dB overdrive

Requirements:

See 2.1053, 2.1057, 74.861 (e)(6)

Instruments Used: 1, 4, 6

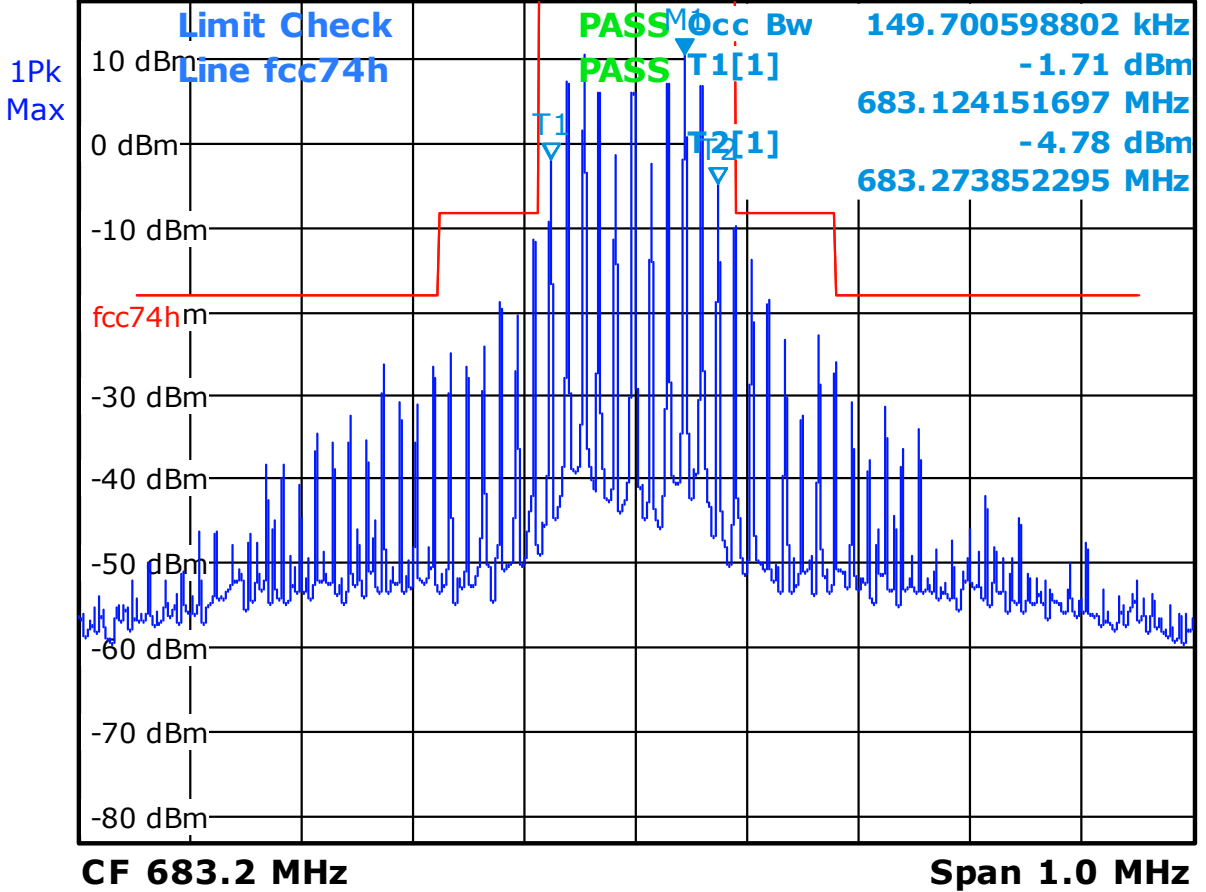
Offs 14.00 dB * RBW 3 kHz
 Att 25 dB * VBW 30 kHz
 Ref 17.00 dBm SWT 110ms



Date: 7.AUG.2009 08:47:37

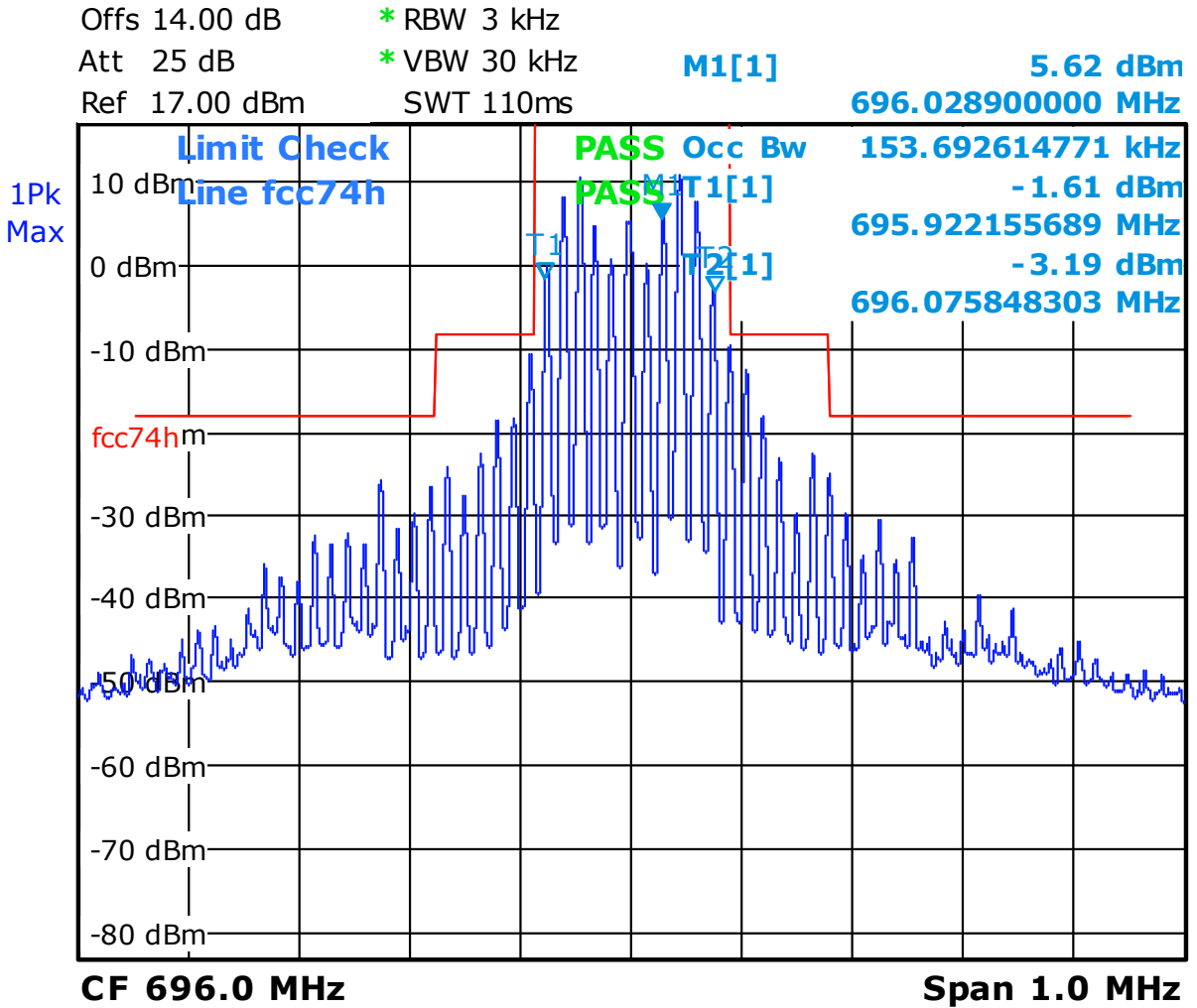
Ch1 , Emission Mask, FCC 74.861(e)(6)(i)(ii)(iii)

Offs 14.00 dB * RBW 1 kHz
 Att 25 dB * VBW 30 kHz
 Ref 17.00 dBm SWT 980ms



Date: 7.AUG.2009 08:51:03

Ch1 , Emission Mask, FCC 74.861(e)(6)(i)(ii)(iii)



Date: 7.AUG.2009 08:44:51

Ch16 , Emission Mask, FCC 74.861(e)(6)(i)(ii)(iii)

4.6 Radiated Spurious Radiations

Para. No.: 2.1053, 2.1057, 74.861 (e)(6)

Test Performed By: G.Suwanthakumar	Date of Test: 31-Aug-2009
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Test Results: Complies

Measurement Data:

Measured with integral antenna, Only highest values are given in the table.

Spurious Frequency MHz	Polarity	Measured EIRP (dBm)	Limit dBm	Margin dB
Ch16/ 1392	VP	-18.4	-13	5.4
Ch8/ 2049.7	HP	-35.8	-13	22.8

The measurement was made as a direct measurement with transducer factors pre-programmed in the Test Receiver/ Spectrum Analyzer.

The measurement was made at 10m with ground plane below 1 GHz and at 3m with floor-absorbers above 1 GHz.

The frequency band below 1 GHz is measured with 100 kHz and Peak Detector; the frequencies from 1 to 7 GHz were measured with 1 MHz RBW and Peak Detector.

The emissions on highest and lowest channel did not differ significantly from the values at the middle frequency.

EUT was transmitting continuously with modulation. The EUT was rotated in 3 planes for this test.

The measured values are in EIRP.

The attached graphs are pre-scans to identify the spurious frequencies.

Requirements:

FCC 74.861 (e)(6) : Below -13 dBm

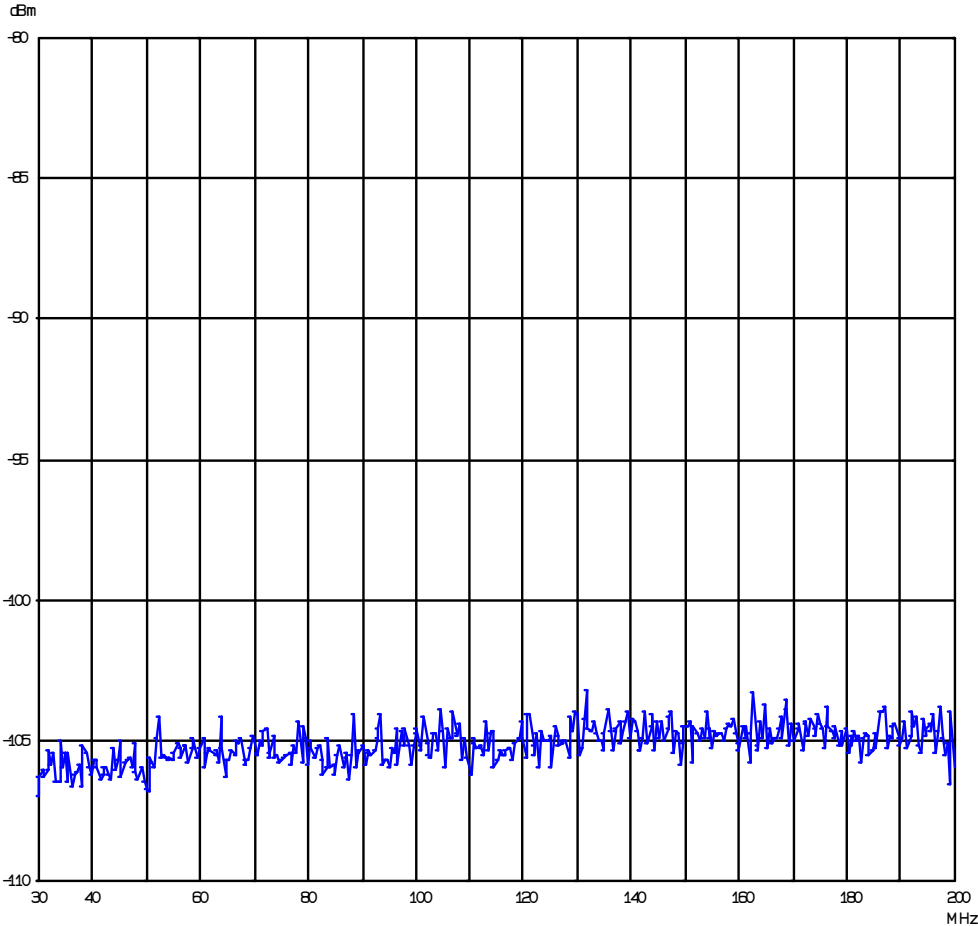
Instruments Used: 3,5,7,8,9,10,11,13,14

Nemko AS
 PK

31. JULI 09 09:20

Operator: gns
 Comment: Fender Executive
 TX
 Modulated
 HP

Scan Settings (1 Range)
 |-----Frequencies-----| |-----Receiver Settings-----|
 Start Stop Step IF BW Detector M-Time Atten Pream p O pRge
 30M 200M 50k 120k PK 50ms AUTO LN ON 60dB



Ch1, VP, 30 - 200MHz radiated emissions

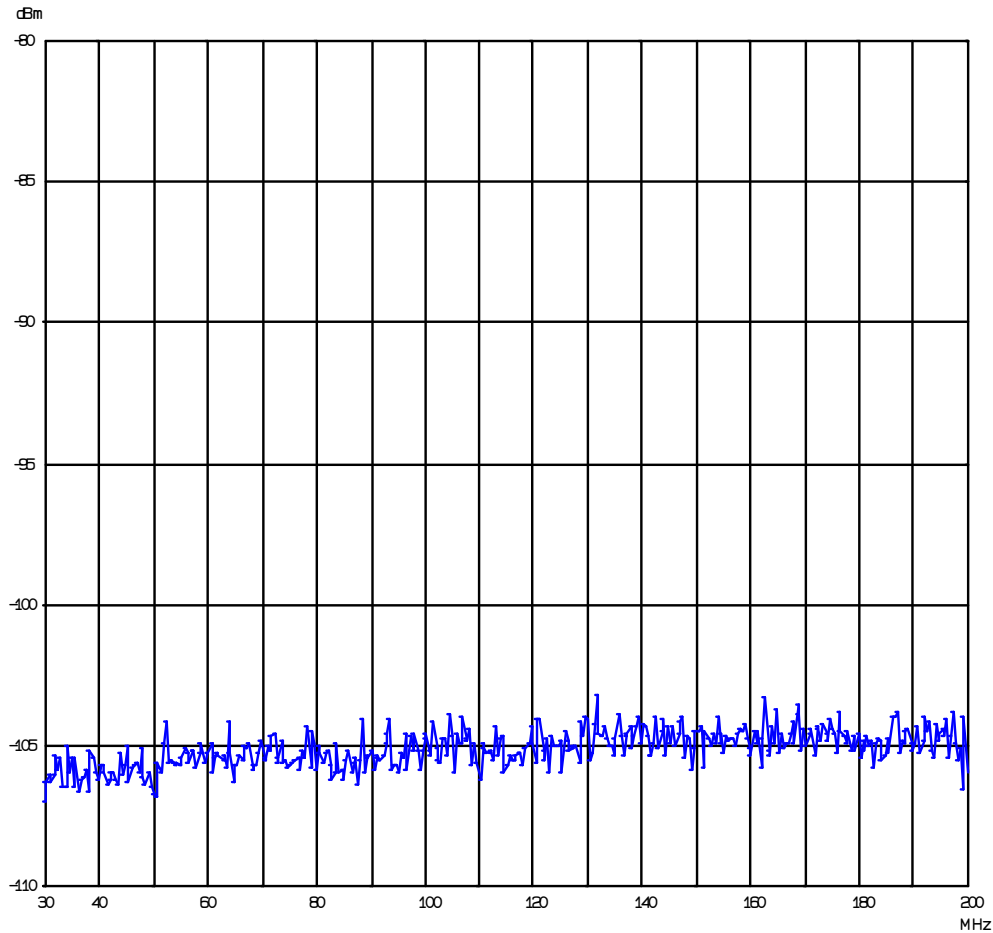
Nemko AS
 PK

31. Jul 09 09:20

Operator: gns
 Comment: FenderExecutive
 TX
 Modulated
 HP

Scan Settings (1 Range)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-T	In e Atten	Pream p	Q pRge
30M	200M	50k	120k	PK	50ms	AUTO	LN	DN 60dB



Ch1, HP, 30 – 200MHz- Only a Pre-Scan with peak detector

Nemko AS

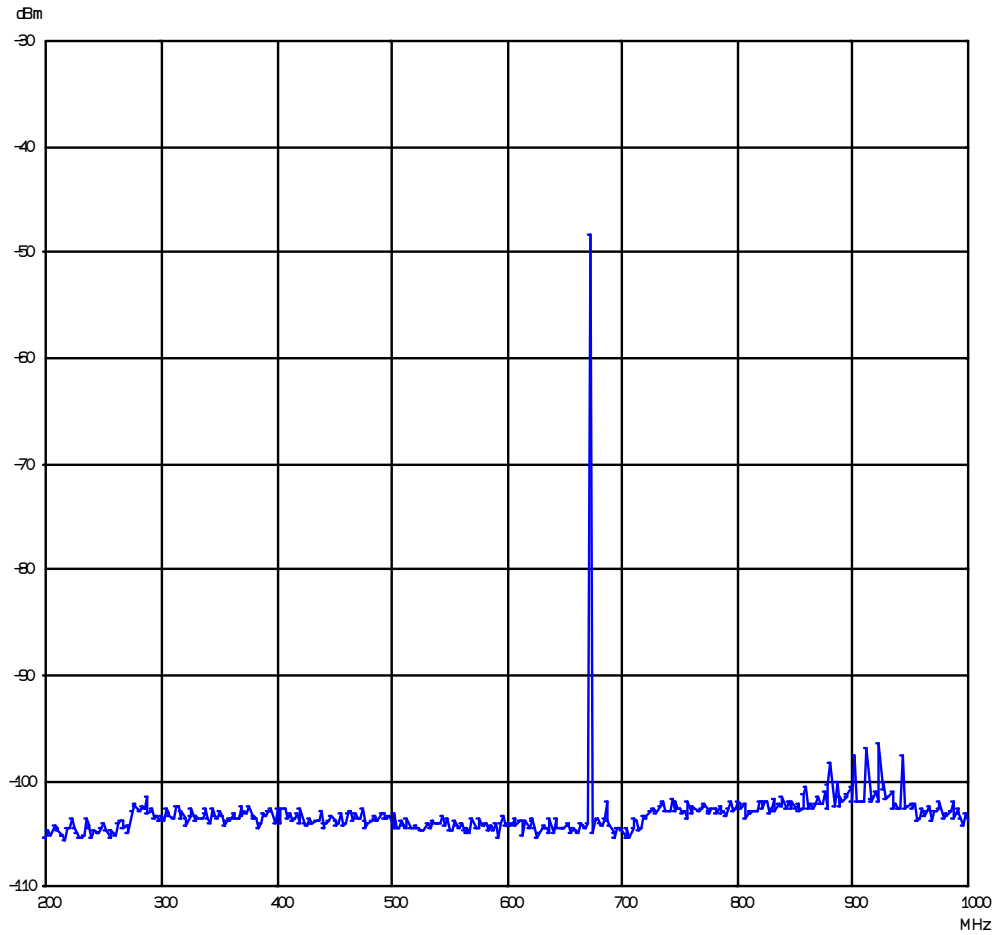
31. Jul 09 09:30

PK

Operator: gns
 Comment: FenderExecutive
 TX
 Modulated
 VP

Scan Settings (1 Range)

Frequencies		Receiver Settings							
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Pream	ppRge	
200M	1000M	500k	120k	PK	50ms	AUTO	LN	ON	60dB



Ch1, VP, 200 1000MHz

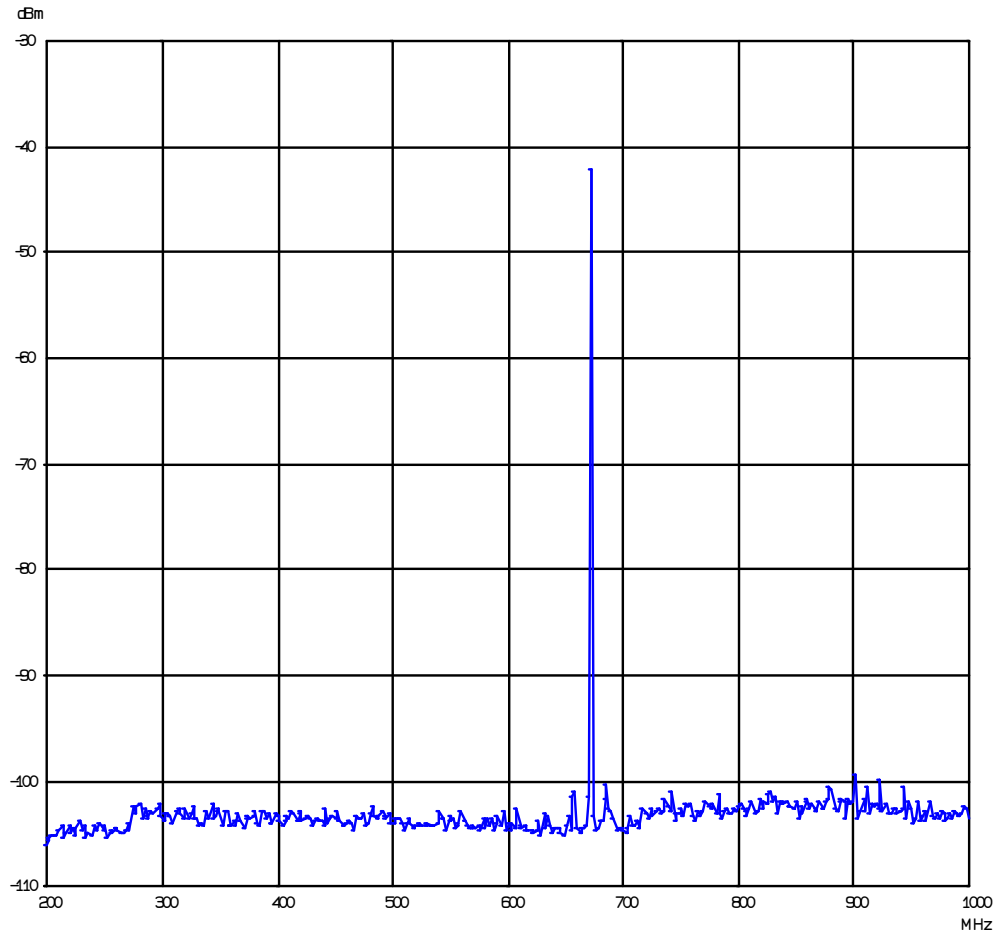
Nemko AS
 PK

31. Jul 09 09:56

Operator: gns
 Comment: FenderExecutive
 TX
 Modulated
 HP

Scan Settings (1 Range)

Frequencies		Receiver Settings							
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Pream	ppRge	
200M	1000M	500k	120k	PK	50ms	AUTO	LN	ON	60dB



Ch1, HP, 200 - 1000MHz

4.7 Frequency Stability

Para. No.: 2.1055, 80.209, 74.861 (e)(4)

Test Performed By: G.Suhandhakumar	Date of Test: 03-Aug-09
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Test Results: Complies

Measurement Data:

Assigned frequency 683.200 MHz (Middle)

Temperature	Measured Frequency (MHz)	Deviation (kHz)	Deviation (%)
+50 degrees C	683.19739	2.61	0.00038
+40 degrees C	683.19802	1.98	0.00029
+30 degrees C	683.19853	1.47	0.00022
+20 degrees C	683.19856	1.44	0.00021
+10 degrees C	683.19978	0.22	0.00003
0 degrees C	683.20001	-0.01	-0.0000015
-10 degrees C	683.19930	0.7	0.00010
-20 degrees C	683.19732	2.68	0.00039
-30 degrees C	683.19202	7.98	0.00116

Voltage	Measured Frequency (MHz)	Deviation (kHz)	Deviation (%)
3.0 Volts (Maximum)	683.19856	1.44	0.00021

Comment: battery operated

Requirements:

FCC part 74.861 (e)(4) The frequency tolerance shall be less than 0.005%.

Instruments Used: 3,6,17,19,20,21

5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model	Type of instrument/	Manufacturer	Calibration date	Next calibration	Ref. no.
1	CMTA	Radio Communications Analyzer	Rohde & Schwarz	11.01.08	11.01.10	LR 1087
2	SMHU	Signal generator	Rohde & Schwarz	04.03.08	04.03.10	LR 1079
3	77	Multi meter	Fluke	10.10.07	01.10.09 ¹	LR 155
4	FSU26	Spectrum Analyzer	Rohde & Schwarz	28.05.09	28.05.11	LR 1504
5	FSEK30	Spectrum Analyzer	Rohde & Schwarz	07.11.08	07.11.10	LR 1337
6	6810.17B	Attenuator	Suhner	25.09.08	25.09.10	LR 1184
7	ESN	Measuring Receiver	Rohde & Schwarz	24.09.08	24.09.09 ¹	LR 1237
8	8449B	Preamplifier	Hewlett Packard	04.08.09	04.08.11	LR 1322
9	3115	Horn Antenna	EMCO	06.11.08	06.11.11	LR 1226
10	HL223	Bi-conical Antenna	Rohde & Schwarz	24.07.07	24.07.10	LR 1261
11	HK116	Log-period Antenna	Rohde & Schwarz	26.04.07	26.04.10	LR 1260
12	HFH2-Z2	Loop Antenna	Rohde & Schwarz	31.07.07	31.07.10	LR 285
13	HZ-12	Substitution Dipoles	Rohde & Schwarz	14.11.08	14.11.11	LR 1332
14	HZ-13	Substitution Dipoles	Rohde & Schwarz	14.11.08	14.11.11	LR 1334
15	R3271	Spectrum Analyzer	Advantest	08.04.08	08.04.10	LR 1123
16	U2000A	USB Power Meter	Agilent	26.12.07	26.12.09	LR 1523
17	5386A	Frequency Counter	Hewlett Packard	16.06.08	06.06.10	LR1014
18	10855A	Amplifier	Hewlett Packard	15.01.09	05.01.10	LR 1445
19	B-32-10R	Power Supply	Oltronix	NA	NA	LR 016
20	TY80	Climatic Chamber	ACS	07.04.08	07.04.10	LR 1083
21	A10-8	Rubidium Frequency standards	Quartzlock	15.12.08	05.12.10	LR 1386

¹ Calibrated again in October 2009 for next two more years.

6 TEST SETUP

6.1 Test Site Radiated Emissions

