

#### MEASUREMENT AND TECHNICAL REPORT

# **VEGA WIRELESS** 9900 East Baldwin Place El Monte, CA 91731-1342

**DATE: 06 June 2001** 

Original Grant: X This Report Concerns: Class II Change:

**Equipment Type:** Master Station (Splits: TX12, RX4; TX8, RX12; and TX4, RX8)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes: No: X

**Defer until:** 

Company Name agrees to notify the Commission by: N/A

of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? \*No: X Yes:

(\*) FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1053; 2.1055; Part 74, Paragraph

74.861(e)(1); (e)(3); (e)(5); and (e)(6)

Report Prepared by: TÜV PRODUCT SERVICE

> 10040 Mesa Rim Road San Diego, CA 92121-2912

Phone: 858 546 3999 858 546 0364 Fax:



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## 1 GENERAL INFORMATION

## 1.1 Product Description

EUT Description	Wireless I	Intercom Master Station						
EUT Name	MS-700 M	flaster Station						
Model No.:	MS-700	Serial No.: 102						
Product Options:		1)Nine Frequeny Splits for North America, Splits 4 through 12. 2)Two optional receivers (5 & 6) on one PWB Assy, installed in the EUT's						
Configurations to be t	tested:	Frequency Spilt TX12 and RX4; TX8, RX12; TX4, RX8						
Power Requirement	S							
Voltage: 100	-260	(If battery powered, make sure battery life is sufficient to complete testing.)						
# of Phases: sing	ale							
Current	.35	Current .25						
(Amps/phase(max)):		(Amps/phase(nominal)):						
Typical Installation	and/or Ope	erating Environment						
Sound Stage, Thea	ater, Film S	et, News Set						
EUT Power Cable								
	OR ⊠ OR □	Removable Length (in meters): 2.3 Unshielded						



EUT Interface Ports and Cables												
Interface				Shi	eldiı	ng						
Туре	Analog	Digital	Qty	Yes	No	Туре	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE:								Metallized 9-	Characteristic			
RS232		×	2			Foil over braid	Coaxial	pin D-Sub	Impedance	6	×	
RS232			1			Foil over braid		2.5 mm		1	$\boxtimes$	
Head Set			1			Foil over braid		1/4"Phone	50 Ohms	1	$\boxtimes$	
TX RF Out			1			1/4 Wave Ant	Y	BNC	50 Ohms	.1		
RX RF In			1			1/4 Wave Ant	Y	BNC	50 Ohms	.1		
AC Power			1			NEMA 5-15P	RFI Filter	IEC		2		
IC1/IC2 TW			1			Braid Shield	Y	3 Pin XLR	200 Ohm	1.5		
IC2			1			Braid Shield	Υ	3 Pin XLR	200 Ohm	1.5		
I/C1 4W			1			Braid Shield	Y	4 Pin XLR	600 Ohm	1.5		
I/C2 4W			1			Braid Shield	Y	4 Pin XLR	600 Ohm	1.5		
Program In			1			Braid Shield	Υ	3 Pin XLR	200 Ohm	1.5		
Aux Out			1			Braid Shield	Υ	3 Pin XLR	200 Ohm	1.5		
Mon Out Mon Out Mon CAS Aux Relay			111			Braid Shield Braid Shield Braid Shield		1/4"Phone 1/4" Phone 1/4" Phone D Conn	50 Ohm 50 Ohm 50 Ohm	1		





# **EUT Operating Modes to be Tested**

- 1. Six Receivers ON, TX OFF, ON: Low and High Power
- 2. TX Modulation ON and OFF

EUT System Components											
Description	Model #	Serial #	FCC ID #								
Wirless Intercom Master Station	MS-700	102	BFDQ700MS4								





Support Equi	pment					
Description		Model #	Serial #	FCC ID #		
Interface Progr	ram Box	QPA-1	001	N/A		
PC	_	DOS version S/W	N/A	N/A		
Oscillator Fre						
Frequency	Derived Frequency	Component # / Location	on	Description of Use		
4.9152 Mhz	4.9152 Mhz	Y1, U4 on Master S PWB Schematic 07		Microcontroller Clock		
540-810Mhz	540-810 Mhz	Q4, Q5 on Mother Schematic 072-017		RX1 LO VCO		
540-810 Mhz	540-810 Mhz	Q10, Q11 on Mothe Schematic 072-017		RX2 LO VCO		
540-810 Mhz	540-810 Mhz	Q16, Q17 on Mothe Schematic 072-017		RX3 LO VCO		
540-810 Mhz	540-810 Mhz	Q22, Q23 on Mothe Schematic 072-017		RX4 LO VCO		
540-810 Mhz	540-810 Mhz	Q4, Q5 on Optional Schematic 072-017		RX5 LO VCO		
540-810 Mhz	540-810 Mhz	Q10, Q11 on Option Schematic 072-017		RX6 LO VCO		
10.0 Mhz	10.0 Mhz	Y2, U6 on Mother E Schematic 072-017		RX1 Synthesizer Reference		
10.0 Mhz	10.0 Mhz	Y5, U18 on Mother Schematic 072-017		RX2 Synthesizer Reference		
10.0 Mhz	10.0 Mhz	Y8, U32 on Mother Schematic 072-017		RX3 Synthesizer Reference		
10.0 Mhz	10.0 Mhz	Y11, U46 on Mothe Schematic 072-01		RX4 Synthesizer Reference		
10.0 Mhz	10.0 Mhz	Y2, U6 on Optional Schematic 072-017		RX5 Synthesizer Reference		
10.0 Mhz	10.0 Mhz	Y5, U 18 on Option PWB Schematic 07		RX6 Synthesizer Reference		
59.3 Mhz	59.3 Mhz	Y1, Q3 on Mother E Schematic 072-017		RX1 2nd LO		
59.3 Mhz	59.3 Mhz	Y4, Q9 on Mother E Schematic 072-017		RX2 2nd LO		



IÜV
PRODUCT SERVICE

Support Equi	pment			
Description		Model #	Serial #	FCC ID #
59.3 Mhz	59.3 Mhz	Y7, Q 15 on Moth Schematic 072-01		RX3 2nd LO
59.3 Mhz	59.3 Mhz	Y10, Q 21 on Mot Schematic 072-01		RX4 2nd LO
59.3 Mhz	59.3 Mhz	Y1 Q 3 on Options Schematic 072-01		RX5 2nd LO
59.3 Mhz	59.3 Mhz	Y4, Q 9 on Optioa Schematic 072-01	anl Receiver PWB 175 Pg	RX6 2nd LO
4.9152 Mhz	4.9152 Mhz	Y3, U14 on Mothe Schematic 072-01		Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y6, U24 on Mothe Schematic 072-01		Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y9, U38 on Mothe Schematic 072-01		Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y12, U52 on Moth Schematic 072-01		Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y3, U14 on Option Schematic 072-01	nal Receiver PWB 175 Pg 2	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y6, U24 on Option Schematic 072-01	nal Receiver PWB 175 Pg 4	Decoder Reference
745.6- 1075.6 Mhz	745.6- 1075.6 Mhz.	Z1, Q1, Q2 on Ma PWB Schematic (		TX UHF VCO Up conversion Frequencies
275.6-335.6 Mhz	275.6-335.6 Mhz	Z2, Q3, Q4 on Ma PWB Schematic (		TX UHF Modulator VCO
10 Mhz	10 Mhz	Y1, U1 on Master PWB Schematic (		TX Synthesizer Reference
42 Khz	42 Khz	U98, on Master S Schematic 072-01		Sub-carrier Oscillator



Power Supply					
Manufacturer	Model #	Serial #	Туре		
EOS  Power Line Filters	VLT60- 3002S38	N/A	⊠ Switched-mode:	Boost 30 Khz, Converter 90 Khz	
Manufacturer	Mod	el#	Location in EUT		
CORCOM	3E(	GG1-1	Rear Panel		
<b>EMC Critical Detai</b>	I Describe	other EMC Design details u	sed to reduce high frequency n	oise.	

Complete (Top and Bottom)

ground planes on PWBs, Ferrite beads, RF bypass capacitors

RF Shields on each Receiver. RF Shield on Transmitter. Full Metal Enclosure with inner metal partitions at front and rear of mother board for RF barrier to front panel and rear panel PWB assembly and I/O connectors.





### 1 GENERAL INFORMATION (continued)

#### 1.2 Related Submittal/Grant

None

#### 1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

#### 1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

Test Performed: X 1. 1051Radiated Emission per FCC Part 2, Paragraph 2.1053

X 2. Conducted Emissions, FCC Part 2, Paragraphs 2.
 X 3. RF Power Output, Part 2, Paragraph 2. 1046
 X 4. Occupied Bandwidth, Part 2, Paragraph 2.1049

X 5. Modulation Characteristics, Part 2, Paragraph 2.1047 and Part 74, Paragraph 74.861(a) and (b)

and (b)

X 6. Frequency Stability, Part 2, Paragraph 2.1055, and Part 74, Paragraph 74.861(e)(4)

Both Conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 - M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 10 GHz).

#### 1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 546 3999 Fax: 858 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

#### 1.6 Part 2 Requirements

Range of operating power values - 50 mw or 250 mw via hi-low switch on panel Maximum power rating - 250 mw DC voltages applied to and dc currentes - 5 Vdc, <100 ma Equipment employing digital modulation techniques - N/A Equipment is an AM broadcast sterophonic exciter-generator - N/A

# MS-700 Terse Specifications

Frequency Range:

470 - 740 MHz, in nine 30 MHz ranges

Rated RF Power Output:

50 mw minimum (70 mw, +/- 1.5 dB), switchable to 250 mw

maximum (250 mw, +0, -2.5 dB)

Frequency Tolerance:

+/- 0.0025 %

**Emission Designator:** 

164F8E

Control microprocessor:

Microchip 16C65A





## 2. SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emission in the following configuration:

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.



# 3 RADIATED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

Low, mid and high channels tested. All emissions (spurious and harmonics) were greater than 20 dB below the limit. Frequency range investigated from lowest RF frequency generated up to the 10th harmonic.

RBW and VBW = 1 MHz for peak for fundamental and harmonics.
RBW and VBW = 30 kHz 20 video samples for average for fundamental.





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#### Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

Corrected Meter Reading Limit (CMRL) = SAR + AF + CL - AG - DC

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

CMRL = 29.4 dBuV + 9.2dB = 1.4 dB - 20 dB/M - 0.0 dB

CMRL = 20.0 dBuV/M

This result is well below the FCC and CSA Class A limit of 29.5 dbuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.





# 4 CONDUCTED EMISSION EQUIPMENT/DATA

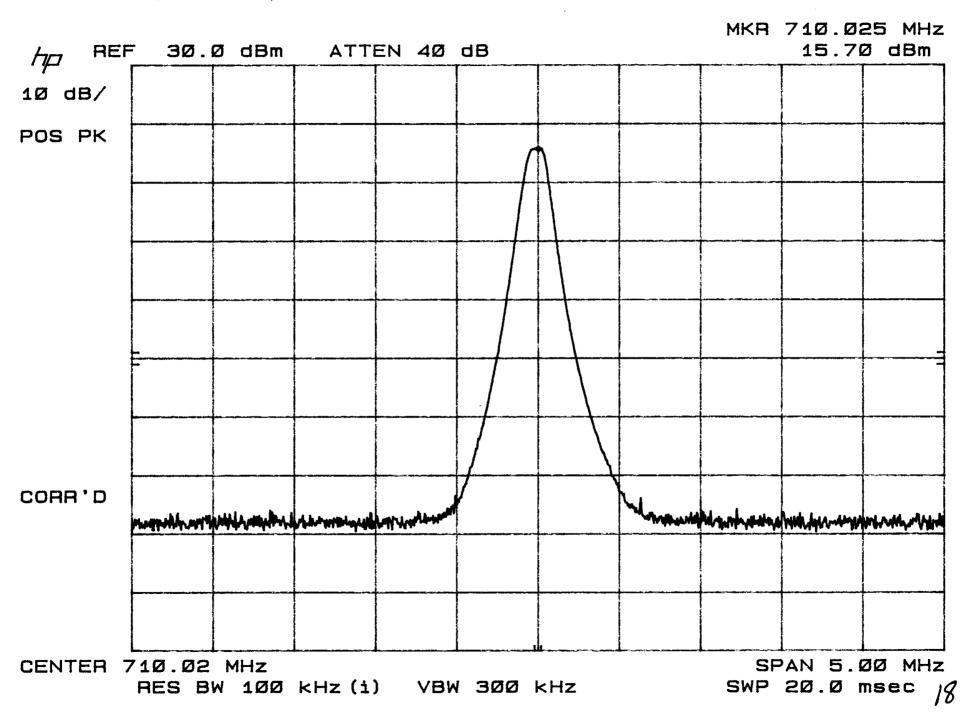
See following page(s).

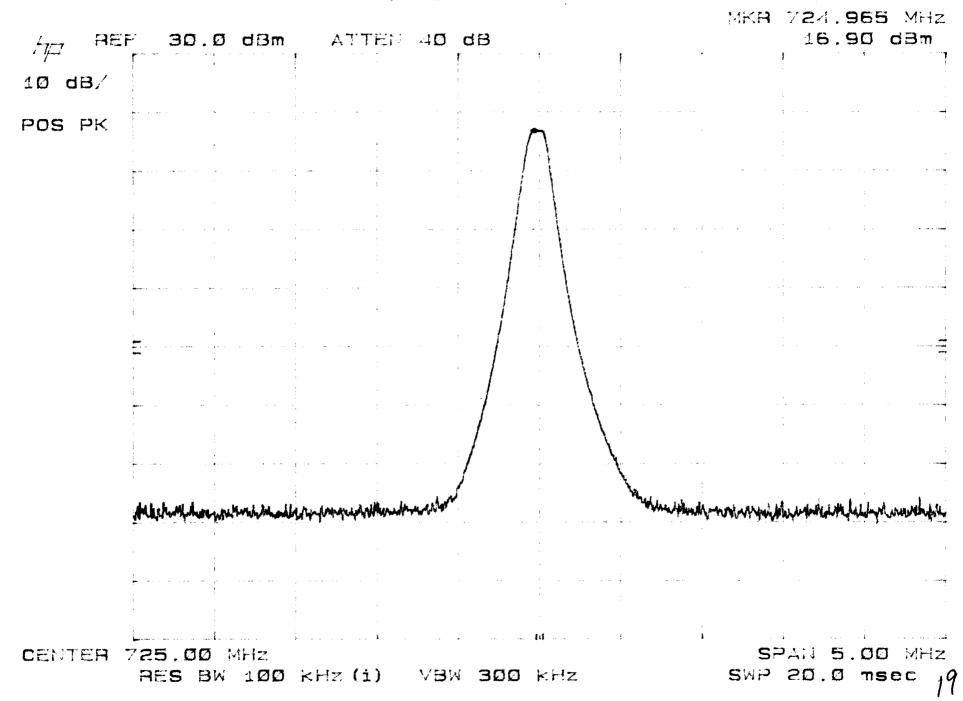


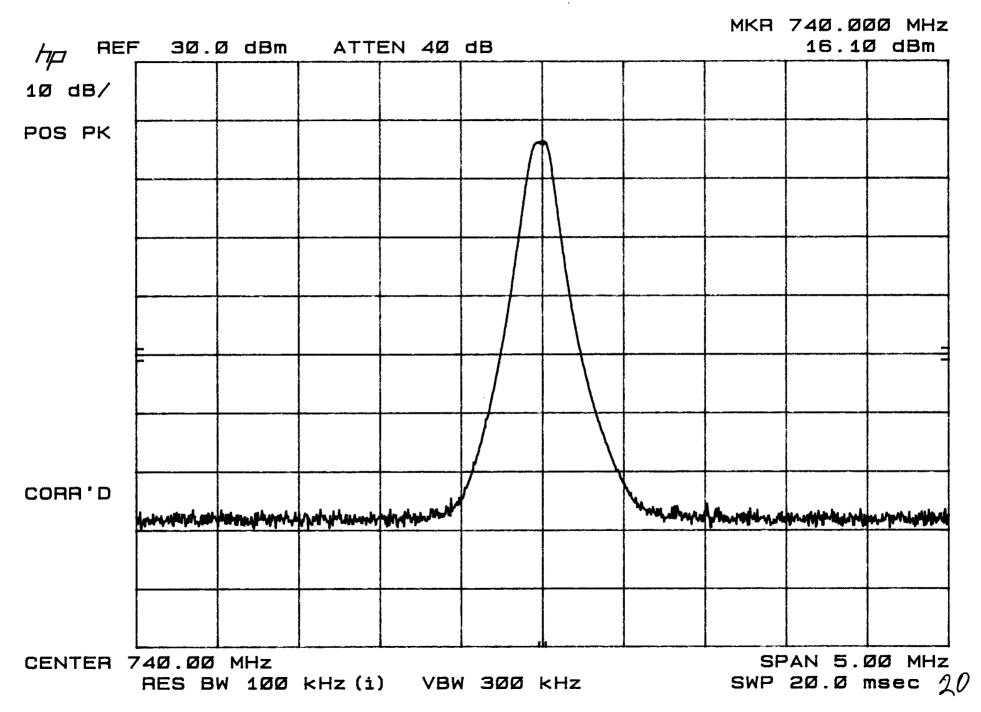


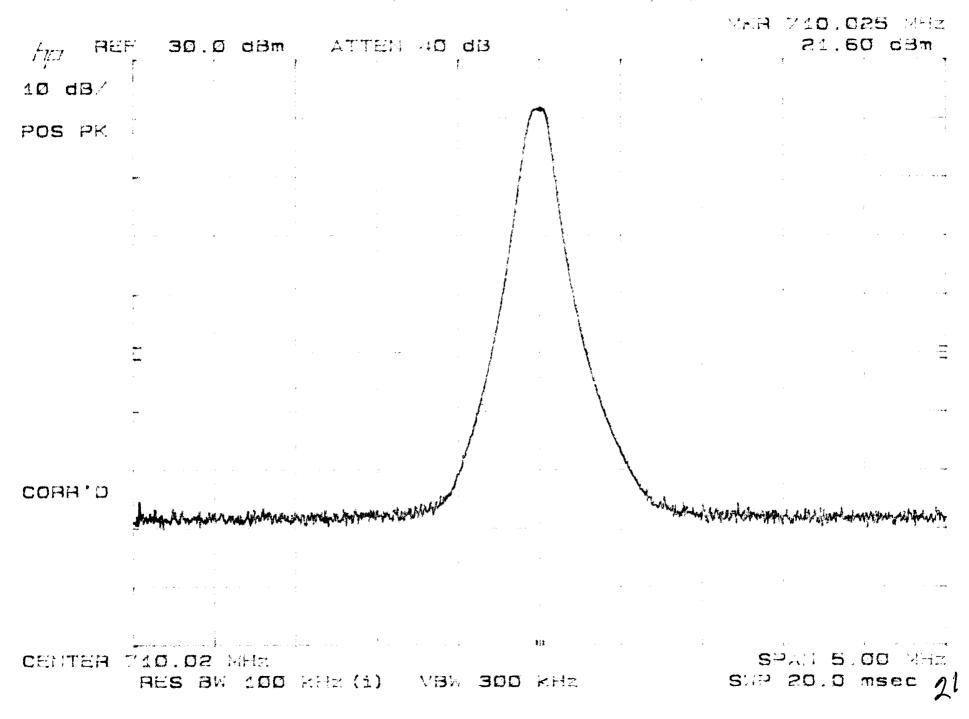
Emissions Test Conditions: CONDUCTED EMISSIONS; RF POWER OUTPUT; OCCUPIED BANDWIDTH; MODULATION CHARACTERISTICS AND FREQUENCY STATILITY: FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1055; Part 74, Paragraphs 74.861(e)(1); (e)(3); (e)(5); and (e)(6)(i)(ii)

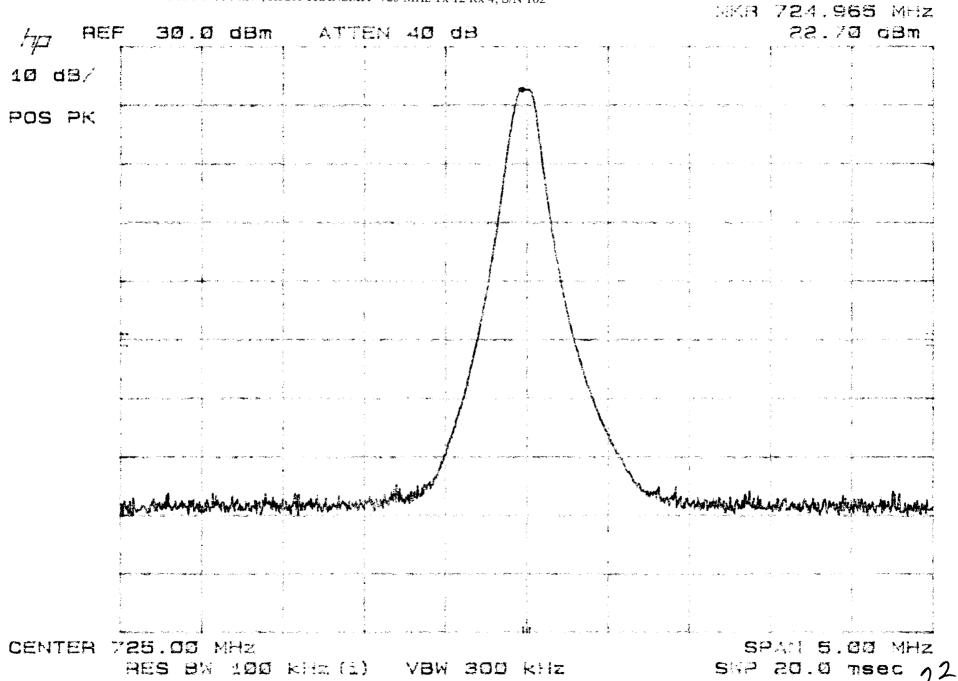
The measurements were performed at the following test location :
□ - Test not applicable
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
Test Equipment Used :
Spectrum Analyzer, Hewlett Packard, Model 8566B, S/N 2618A02913, Prop # 744, Cal 09/01 Spectrum Analyzer, Hewlett Packard, Model 8568B, S/N 2304A02500, Prop #: 187, Cal 11/01 Modulation Meter, Cal 12/01 Peak Power Meter, Hewlett Packard, Model 8900D, S/N 3607U00653, Prop # 802,Cal 03/01 Oscillator, Cal 12/01
Remarks:

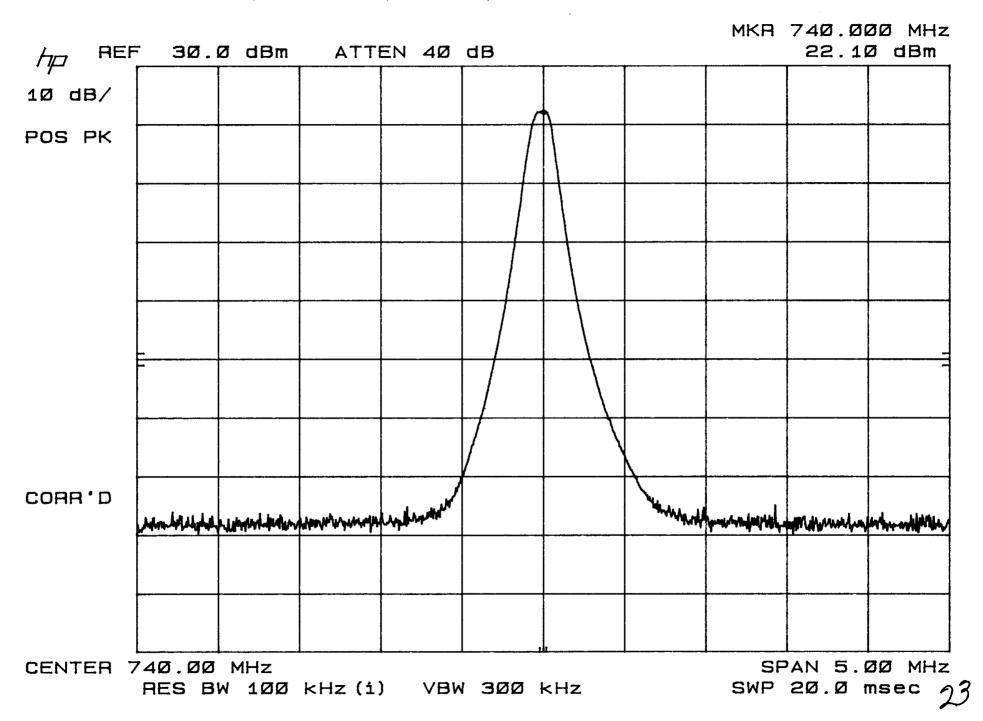












Medulation Characteristics FCC. Part 2, Para, 2, 1047(a)

Date: 02/12/01

Frequency Response

Customer: JEGA WILLESS

EUT: MASTER STATION MS 700

SIN 104 TX4 RX8 485MHz (MIO) HIGH POWER

Carrier Frequency:

NOTES:

DEV (Ref) on spectrum analyzer after applying modulation (kHz):

Audio Frequency (Hz)	Deviation noted on Spectrum
20	Anaylzer (kHz)
	(v.S
30	7
40	7
50	7.5
60	8
70	S
80 .	7
90	6.5
100	6
200	6.5
300	7
400	7
500	7
600	7.5
700	7.5
800	7.5
900	8
1000	পি
2000	12
4000	19
6000	22
8000	23
10000	2-3
12000	23
14000	18
16000	
18000	13
20000	
2500Hz	15

1042

Medulation Characteristics

Modulation Limiting

FCC Part 2, Para. 2. 1047(6) & Part 74, Para. 74. 861(0)(3)

Customer: YEGA WIFECESS

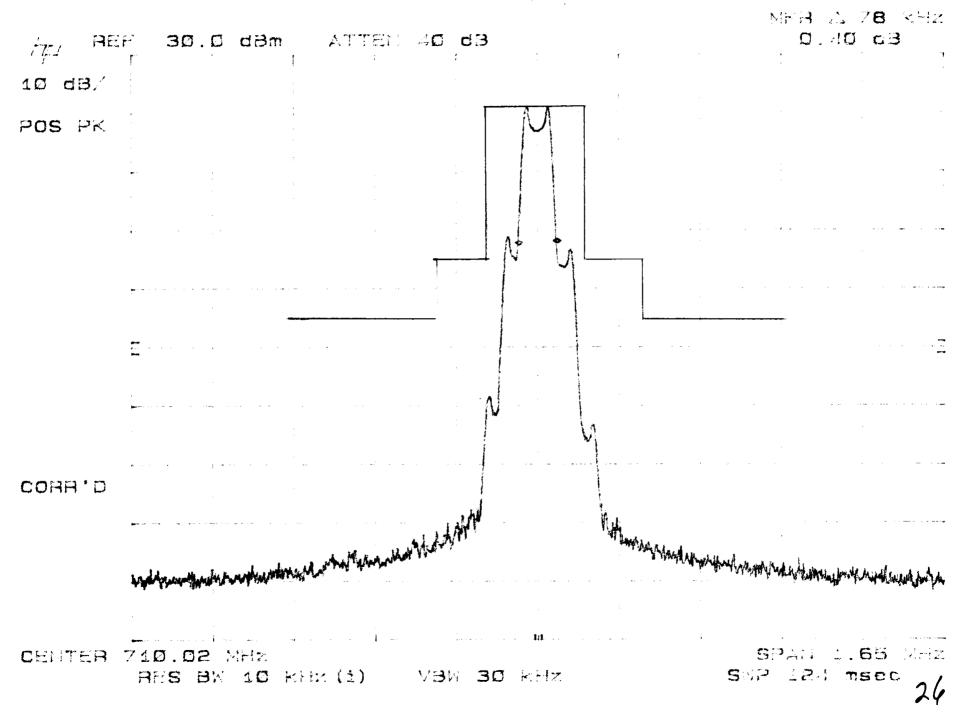
Date: 02/13/01

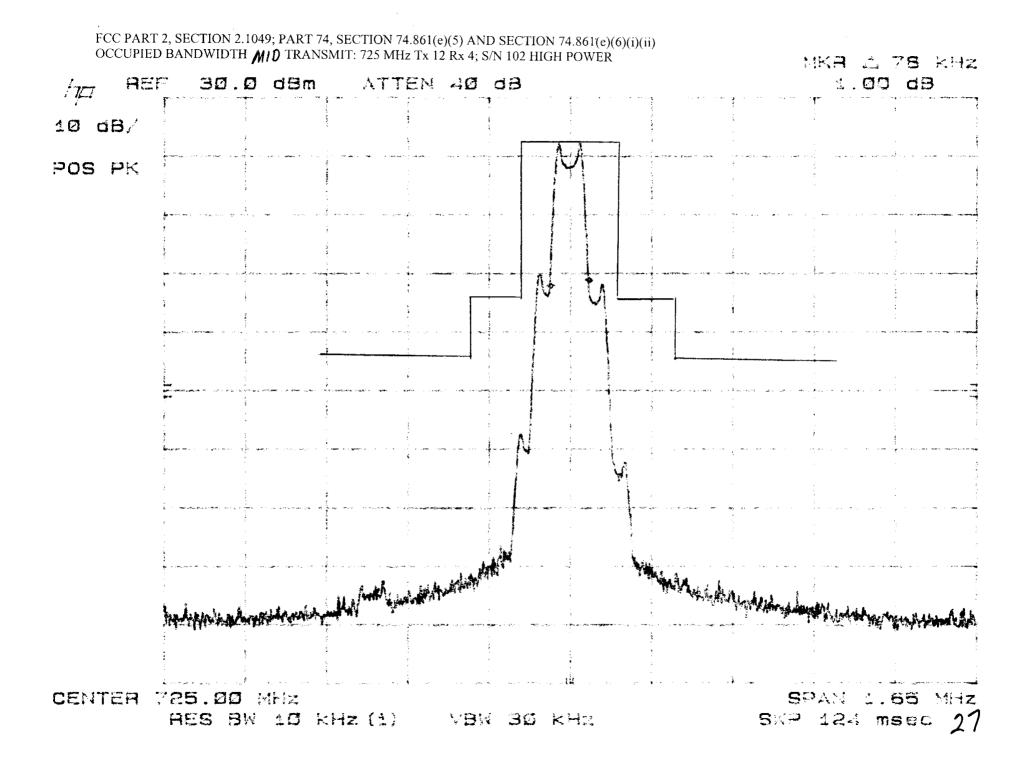
Eut: MS-700 MASTER STATION

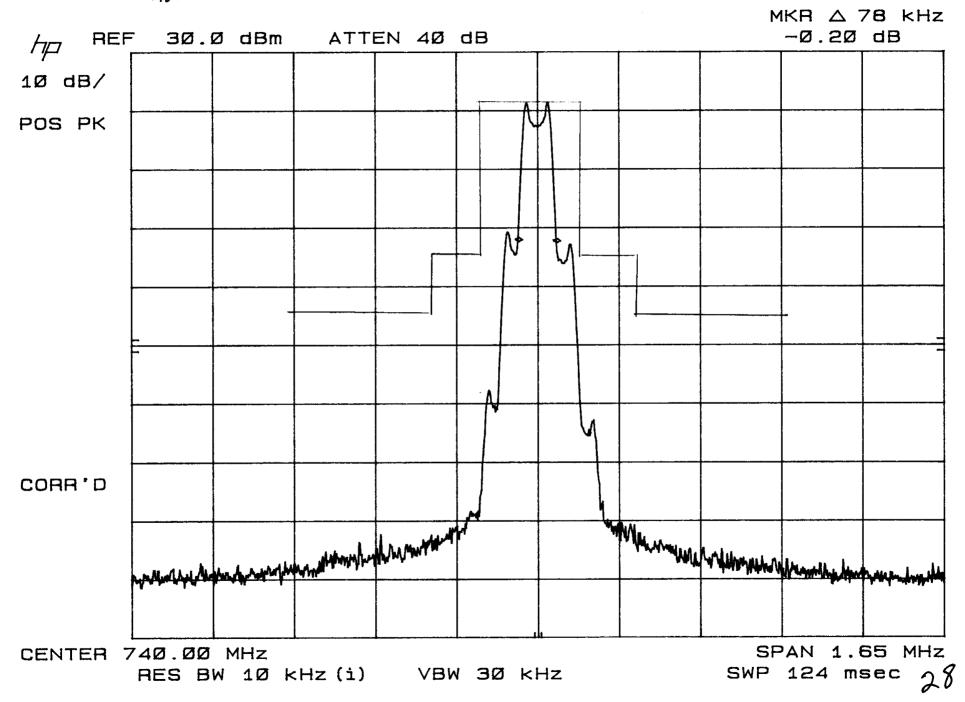
S/N 1011 TX4 RX8 485MH2 (MID) HIGH POYEVE Carrier Frequency:

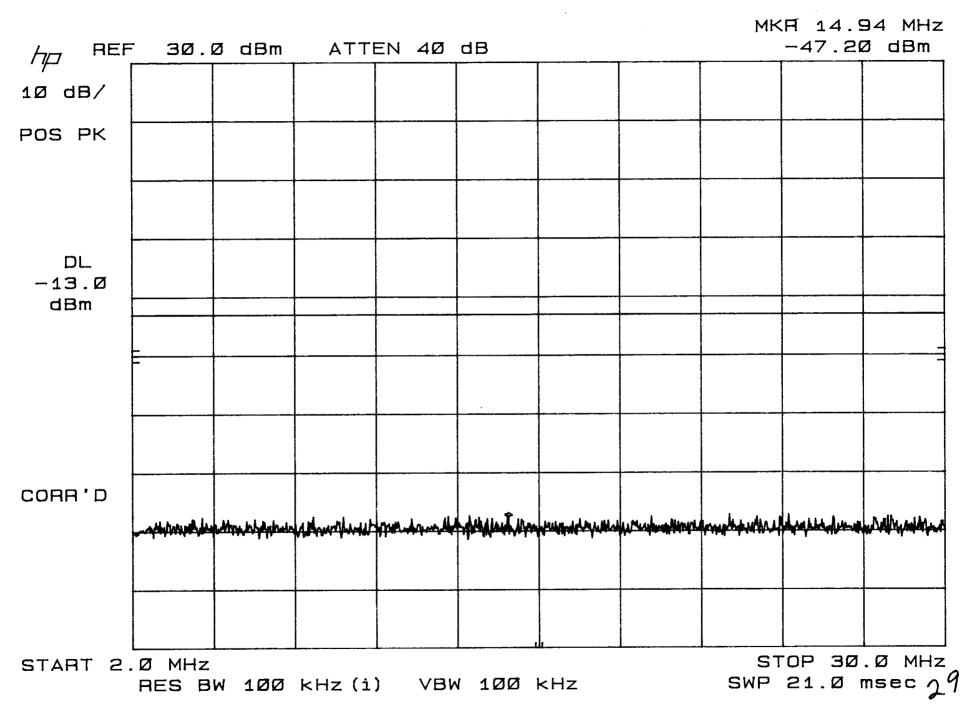
NOTES:

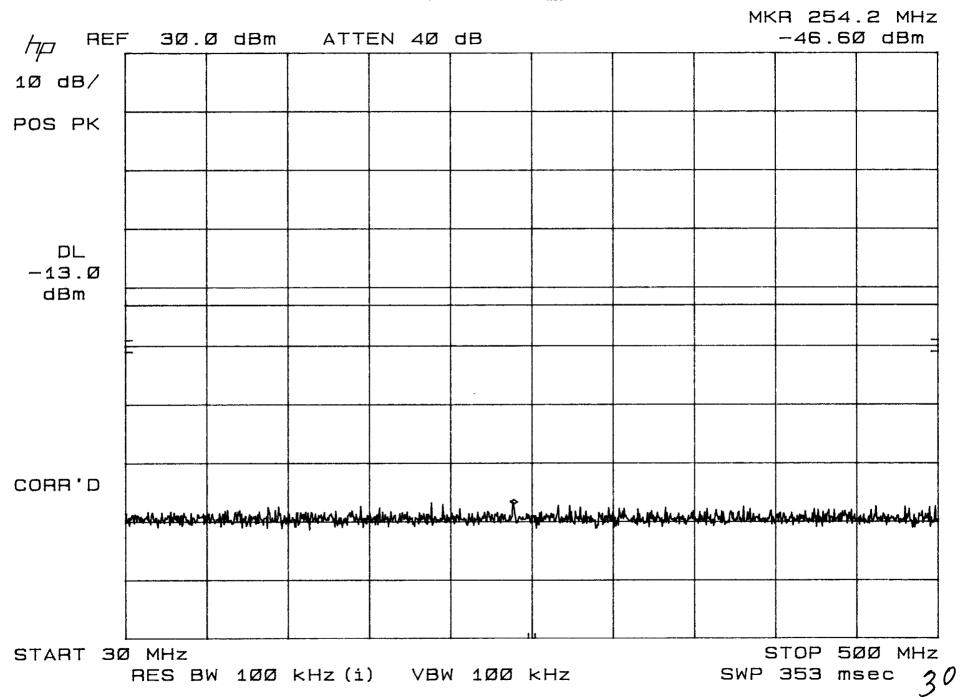
Audio Input Level			A	udio Input F	1				
(dBm)	30	0	i.0	K	1 2.	5 K	1 3.0K		
	+ Peak	- Peak	+ Peak	- Peak	+ Peak	- Peak	+ Peak	- Peak	
+14	18	19.5	21.5	23.5	23	25	23	25	
÷10	13.5	14.5	16	17.5	23	25	23	24.5	
0	9	9.5	10.5	17	110	17	17.5	19	
- iO	65	.7	7	7	10	iì	11	<i>i</i> 2_	
-20	5	5	5.5	55	7	7.5	75	8	
- 30	4.5	4.5	4.5	4.5	<b>5</b> 5	5.5	5.5	6	
(b)	4	4	4	4	4.5	4.5	4.5	5	

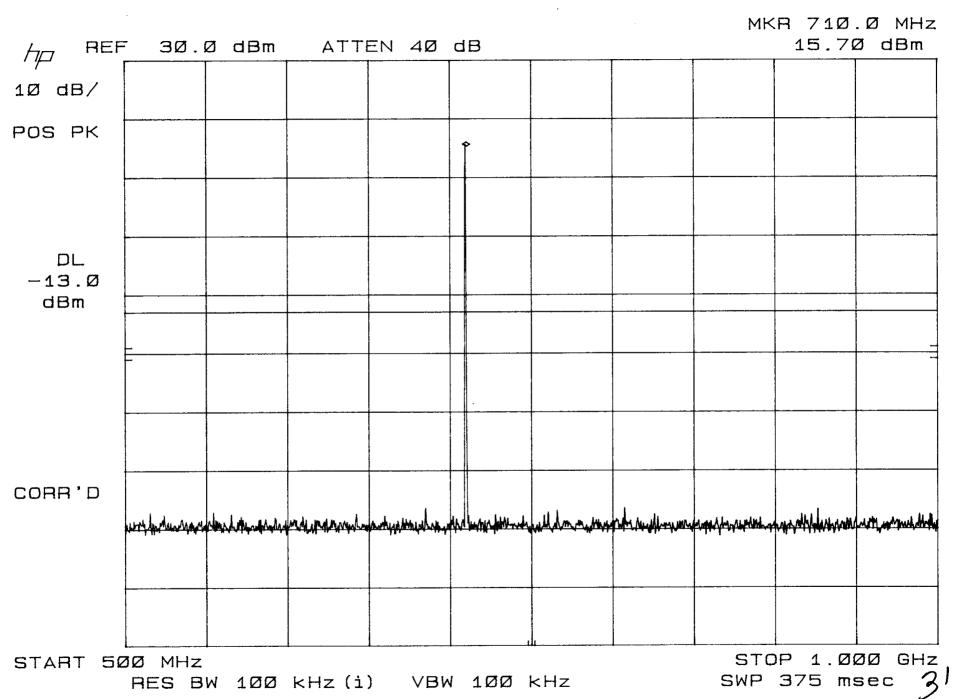












# FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER

VRIB I.**B**IT SHR - 45.50 aBm BOLD dBm ATTEN AD dB 10 dB POS PK DL -13.0 dBm COAR'D many property of the first of the property of START 4.00 GHZ ST3- 2.00 GHZ RES BY 100 kHz (i) VBW 100 kHz SIP 50 msec

# FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER

16 A . 1.30 : GHZ 46.2U c3m 4 40 여러, POS PF 13. -13.0dism COHH'D START 2.00 GHT AES BY 100 KAY (1) VAY 100 KAY SW3 2.25 560

									N 74.861(0 )2 Low P		ONDUCTI	ED SPURIO	OUS	10 <del>7</del> 614	6 0	Q /	7,2-7
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	:																
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-13.Ω d∂m	: -																
	<b>5</b>																
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START BUDG SHA DD RHA (1) VBU DD RHH

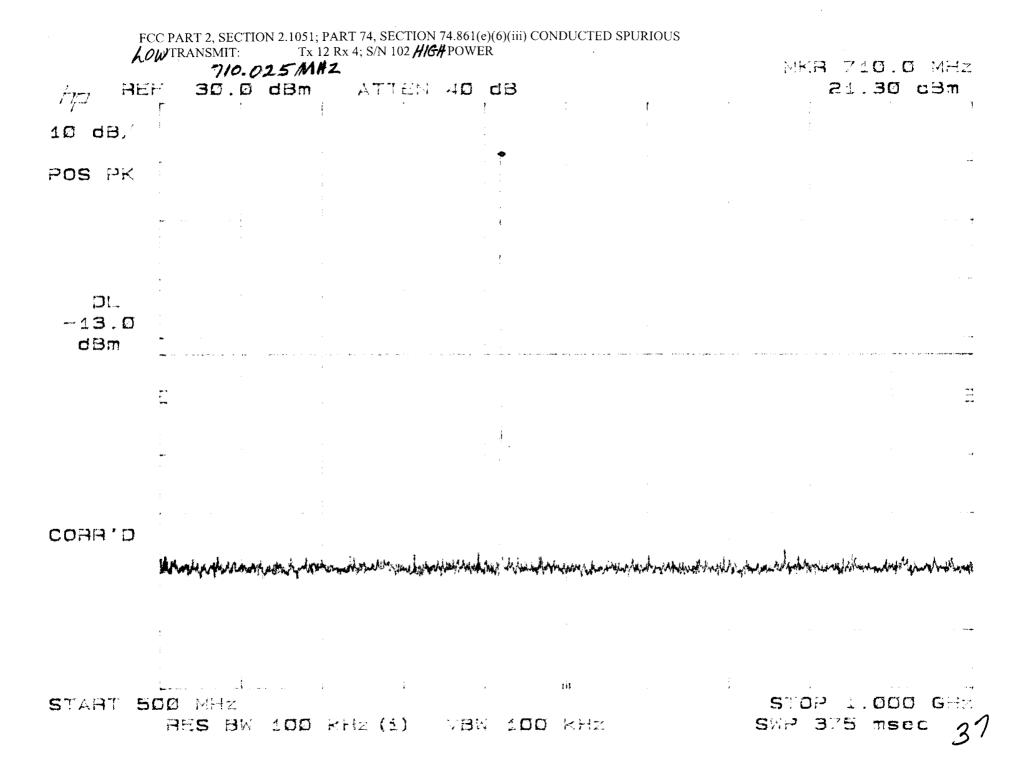
SWP 3,75 Sec 34

# FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 #16# POWER

/p HE	.F 30.D	d3m .	ATTEN 40	ុដន				0.42 MHz .60 d3m		
/ 10 d명/		:					:	i .		
POS PK								. <u></u>		
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	:									
	•							· -		
				121				·		
START S	.Ø MHz		*			. ,	STOP 30.0 MHz			
	RES BW	100 KH	z (i) VB:	√ 100 k	(HZ		5MP 21.1	msec 35		

# FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS Low TRANSMIT: Tx 12 Rx 4; S/N 102 HIGH POWER

710.025 MHZ				14, 5/11 10	, 5/1 1027 JUN 10 WER					MKH 397.1 MHz			
HEI	REF	a.ae	MED I	A.	TTEN	4 <b>5</b>	dB '		ţ	,		.7 <b>0 c</b>	371
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								* <b></b>					
START		MHZ							;	,		500	,
	i	RES BY	v 100	KHIZ	( i )	∀Bi		KHZ		ς.	SKP 353	nsec	36



Low	PART 2, SECTION TRANSMIT: 7/0	MITIZ IX 12 KX	4; S/N 102 <i>HIGH</i> P	OWER	o)(m) 001 <b>1</b> 00	CIED SFOR	1008	į.	KR 1.42:	i GHZ
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10 dB/	;						:			
POS PK		<b>i</b>				÷	; ;			· <del></del>
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	•									
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<b>4.</b>	, gas a consequence of a consequence of			•			sharehore year and the second	and the second s	· <u>.</u>	
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CORR'D										er enn
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START 1.00 GHZ RES BW 100 kHZ (1) VBW 100 kHZ STOP 2.00 GHz SWP 750 msec 2

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FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS LOW TRANSMIT: "MHz Tx 12 Rx 4; S/N 102 HIGH POWER

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START 500 MHz RES BW 100 KHz (i) VBW 100 KHz STOP 1.000 SHX SWP 376 msec 4/

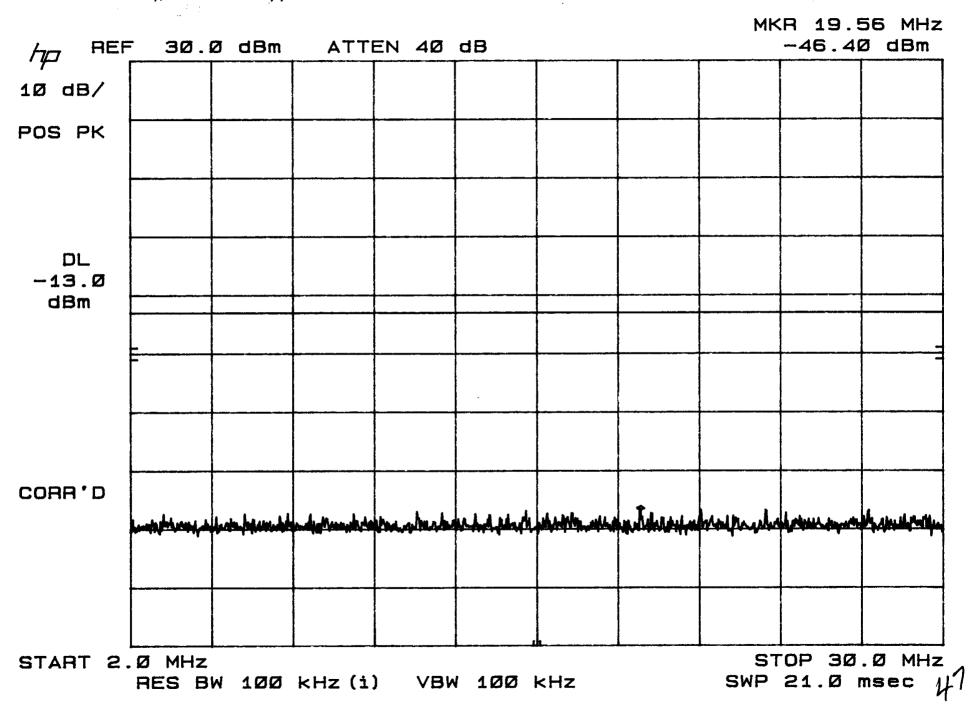
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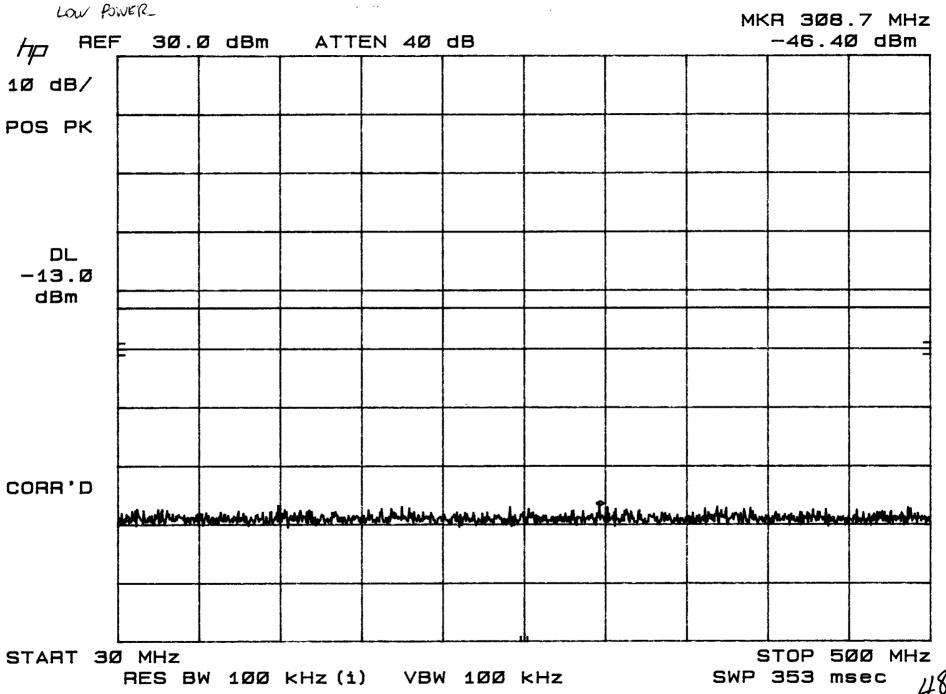
# FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS **MID** TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER

MKA 3.227 -45.80 40 러분/ POS PK -13.0dam

START 2.00 GHM HES BW 100 kHz (i) VBW 100 kHz STOP 5.00 GHz SSP 2.25 sec μβ

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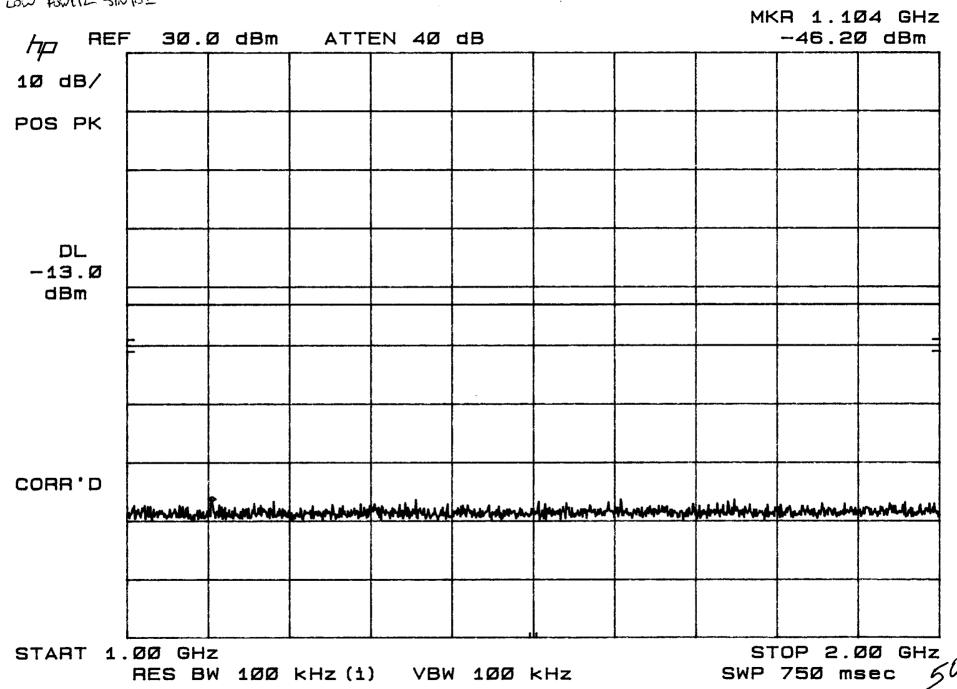


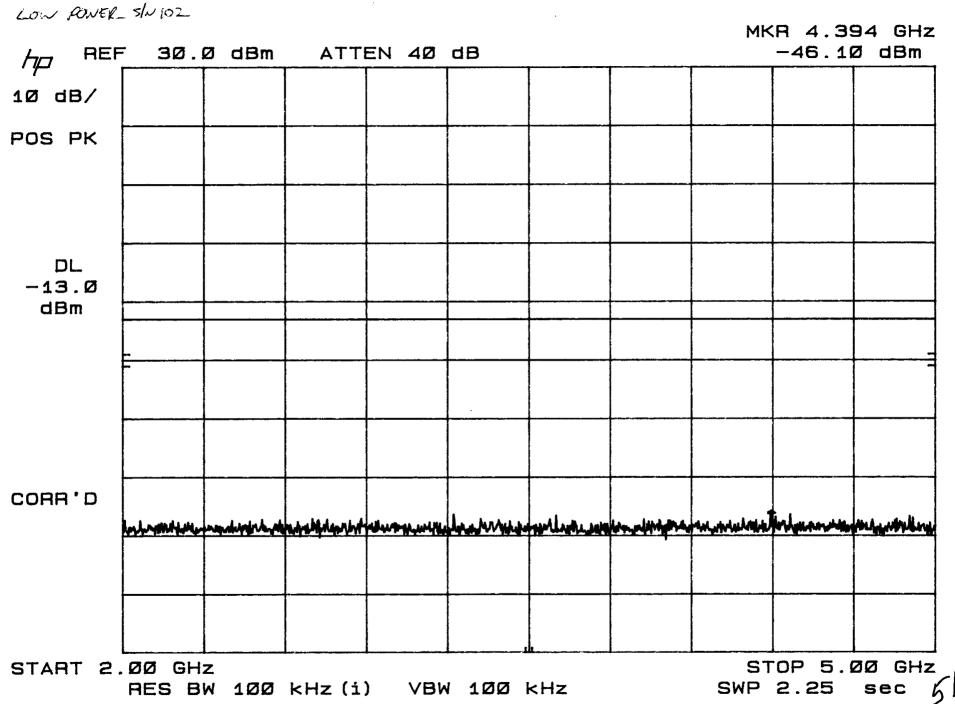


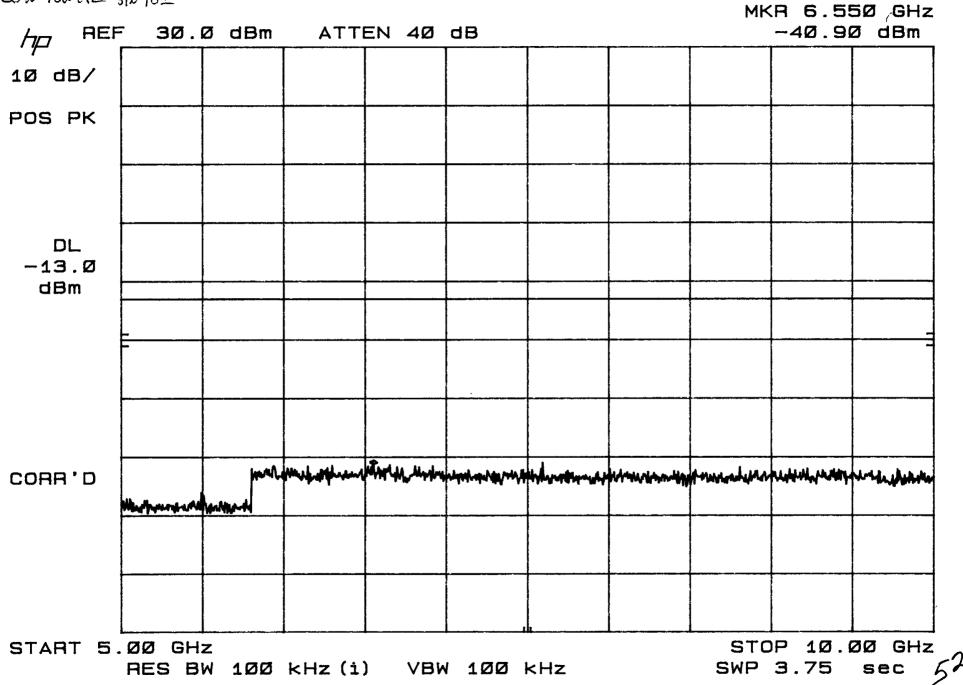
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS HIGH TEANSMIT THOMITY TXIZ FXY LOW POWER SINIOZ MKR 740.0 MHz REF 3Ø.Ø dBm 15.8Ø dBm ATTEN 4Ø dB 1Ø dB/ POS PK DL -13.Ø dBm CORR'D akaran makali ara de Maraka Madil Madilira di mandi kankara kangan di sikara kang Manadeki ng maga da di pinada ada ika ina meta.

START 500 MHz RES BW 100 kHz (i) VBW 100 kHz

STOP 1.000 GHz SWP 375 msec

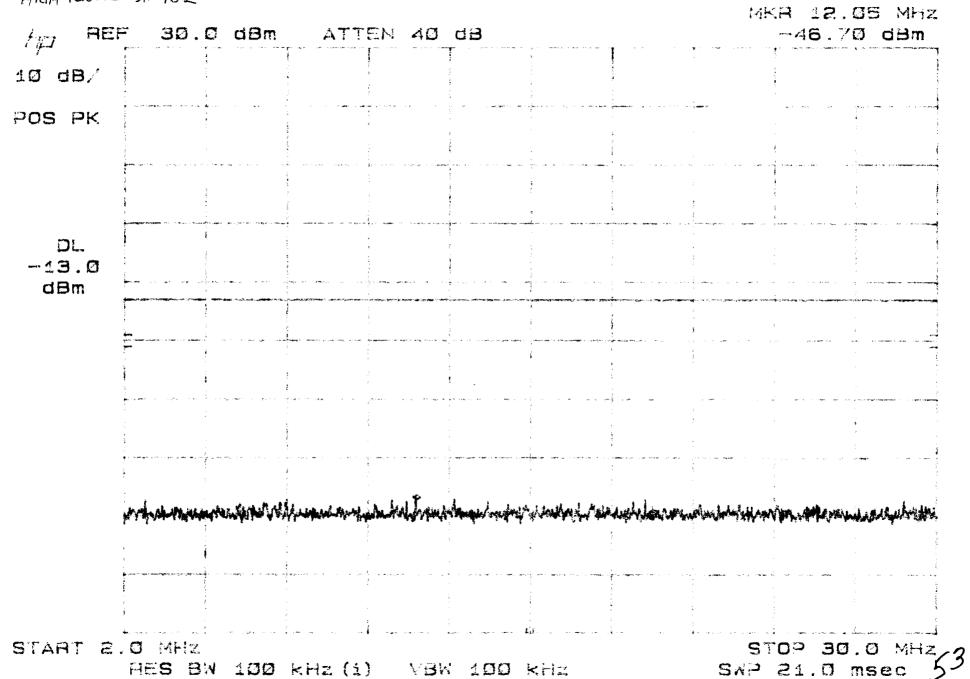






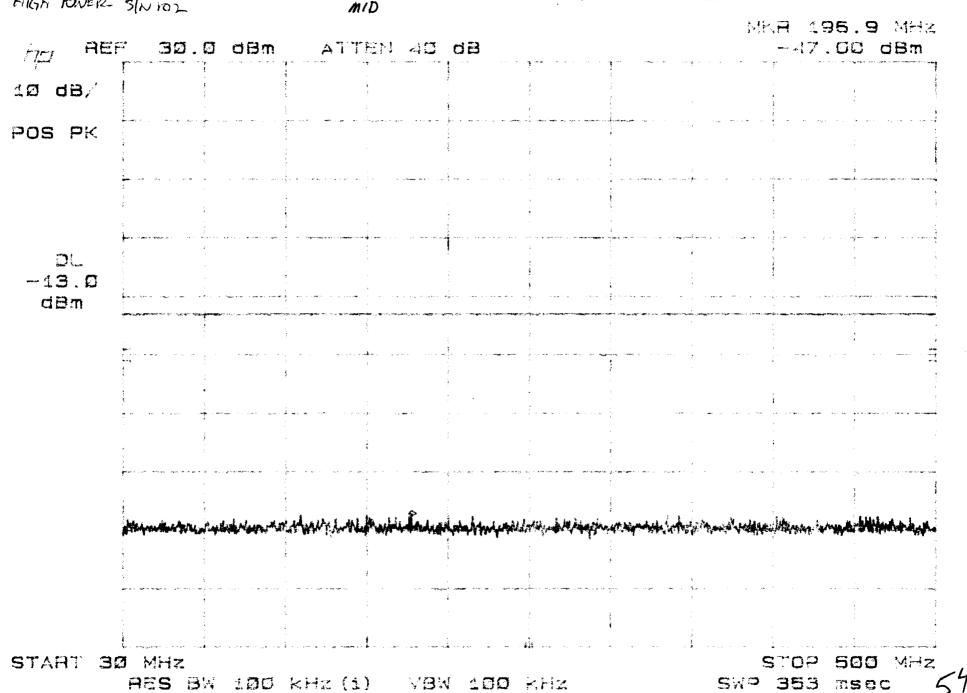
MID TRANSMIT 725 MHZ TX 12 Exy
HIGH PAUER SIN 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER



CONDUCTED SPURPLOUS MID TRANSIMIT 725 MHZ TX 12 RXY HIGH RIVER SIN 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

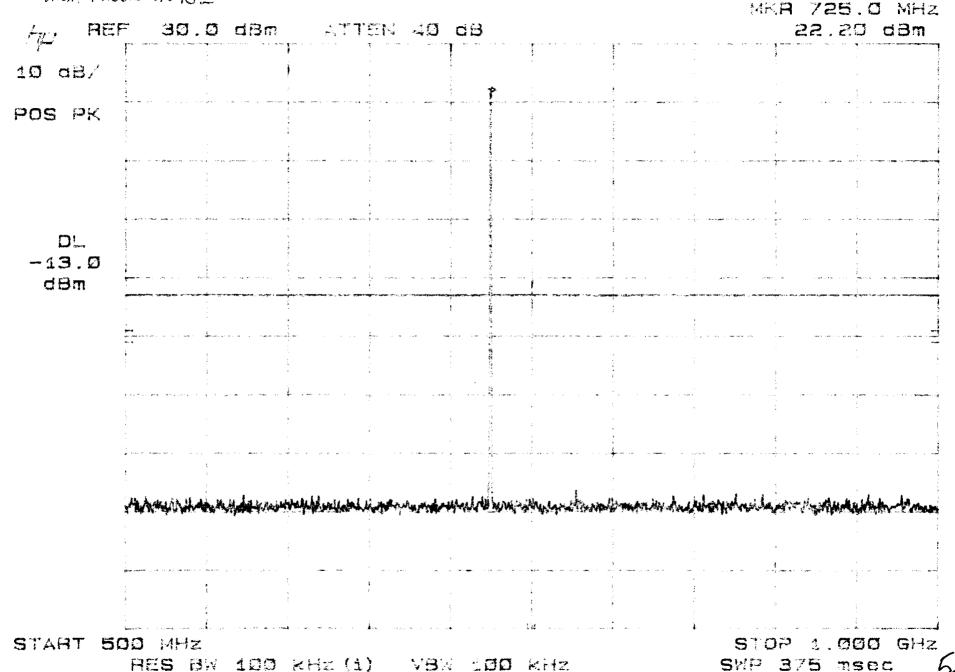


CONOUNTED SPURIOUS

MID TRANSMIT 725MHZ TXIZ RXY

HIGH POWER SINIOZ

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS M/D TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER



CONDUCTED SPURRIOUS
MID TRENSMIT 725 MH2 TXIZ FXY
HIGH POWER 5/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS (III) FRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

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COMPULE OSPUNERIOUS MIOTRANSIMIT 725 MHZ TX12 RXY MIGH FOWER 5/1102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS **M1D** TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

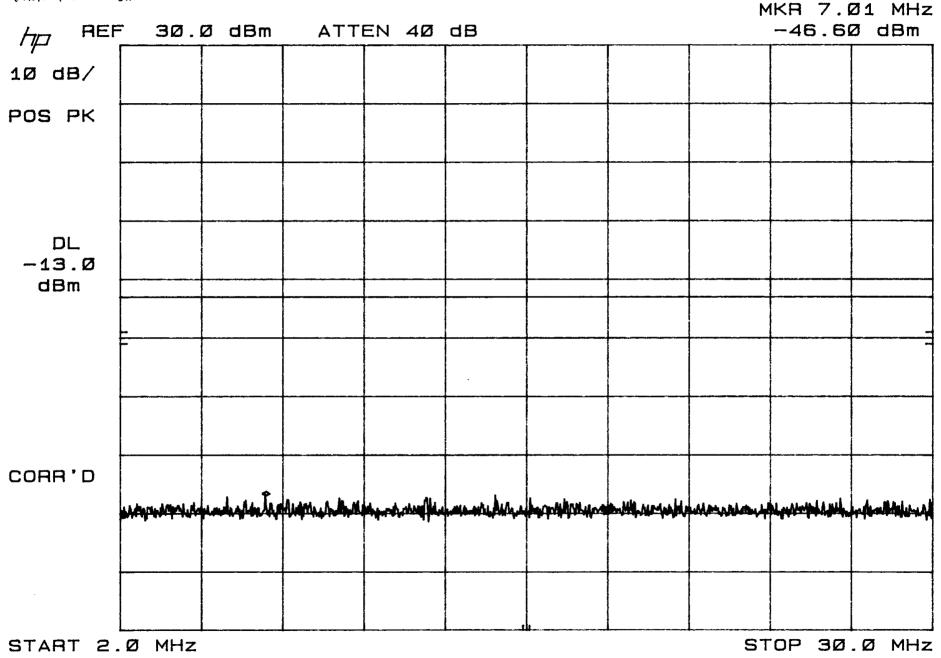
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CONDUCTED SPURILIONS MID TRANSMIT 725 WHZ TX12 RXY

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

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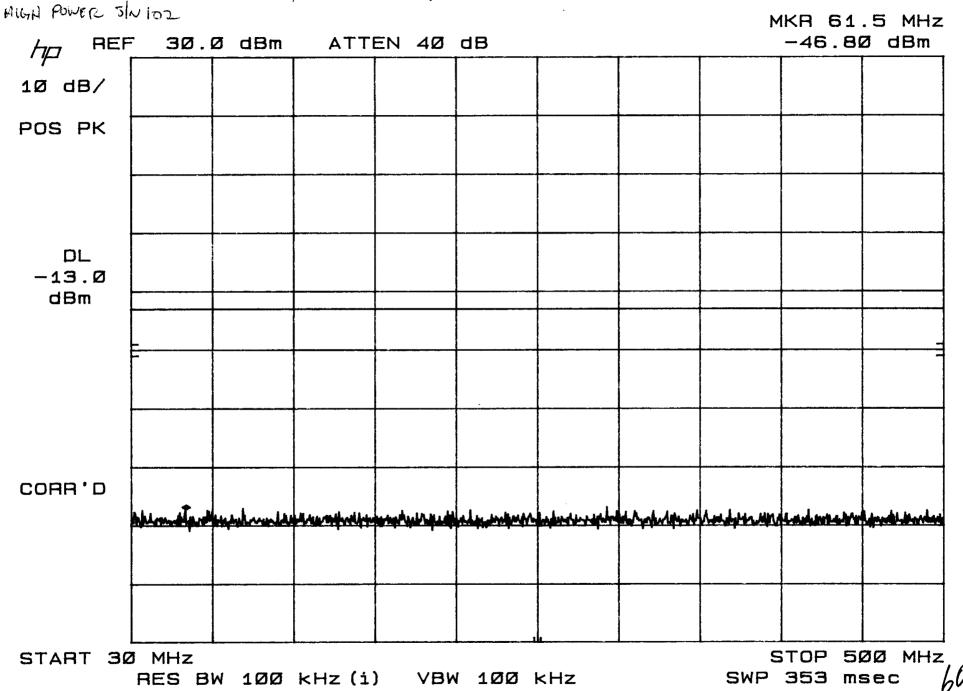
HIGH POWER SINIOZ



RES BW 100 kHz (i) VBW 100 kHz

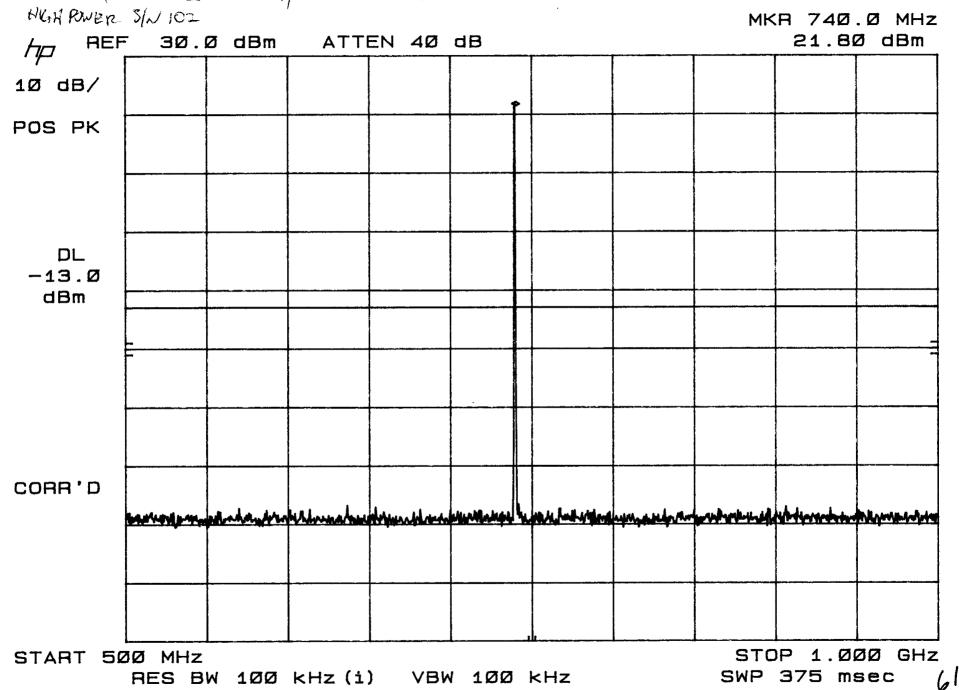
SWP 21.0 msec

COMPULTED SAMPLIOUS HIGH TRANSMIT 740 MHZ TX 12 RXY 2.1051. 74.861(eX6)(ii)



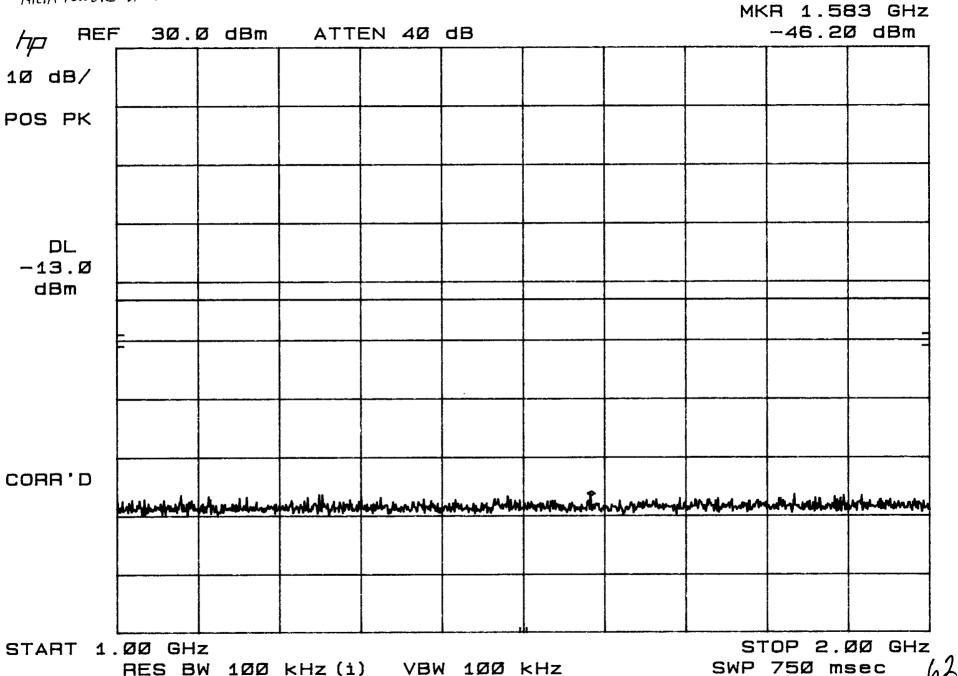
CONDUCTED SPURRIOUS
1-11519 TRANSMIT THOMAS TX 12 FX H

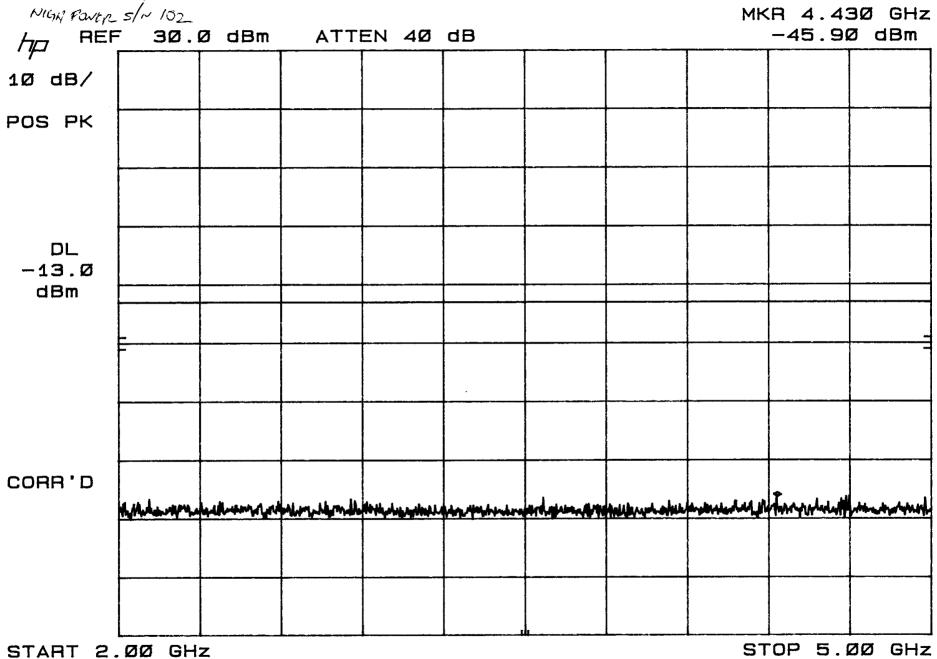
2.1051 74.861(ex(ex(c)(iii)



HIGH TRANS MIT 740 MINZ TXIZ RXY
HIGH POWER SINIOZ

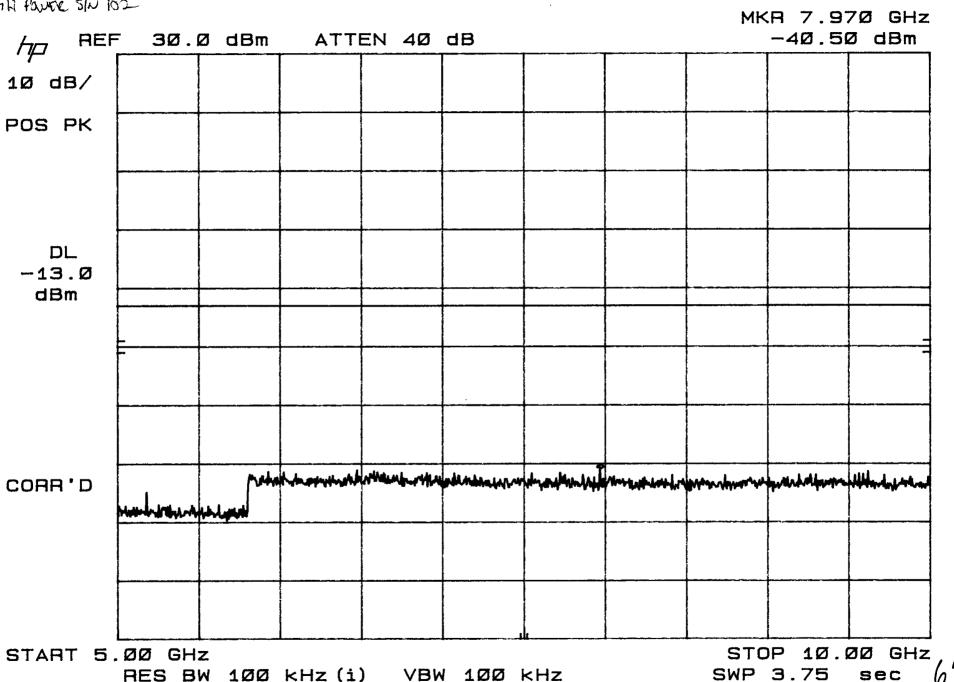
2.1051 74.861(e)(b)(iii)





RES BW 100 kHz (i) VBW 100 kHz

SWP 2.25 sec



Frequency 5. 1055

Vega Wireless Masterstation - 704.000MHz Reference February 6, 2001 TUV Product Service - San Diego

"11:50:08", -4096, -32.22 "11:51:13",-3072,-32.19 "11:52:18",-2304,-32.23 "11:53:23",-2240,-32.22 "11:54:28",-1920,-32.26 "11:55:33", -1664, -32.19 "11:56:37", -1728, -32.24 "11:57:42",-1600,-32.26 "11:58:47", -1728, -32.25 "11:59:51", -1600, -32.24 "13:00:06",-4608,-23.008 "13:01:11",-2944,-22.98 "13:02:15",-1984,-23.047 "13:03:20",-1216,-23.016 "13:04:25",-1152,-23.03 "13:05:29",-1152,-22.984 "13:06:34",-1216,-22.996 "13:07:39",-1024,-22.998 "13:08:44",-448,-23.029 "13:09:49",384,-23.034 "14:10:03",-1152,-13.466 "14:11:08", -576, -13.443 "14:12:13",704,-13.437 "14:13:18",1344,-13.491 "14:14:23",1600,-13.456 "14:15:27",1600,-13.418 "14:16:32",1664,-13.417 "14:17:37", 1536, -13.407 "14:18:41",1664,-13.427 "14:19:46",1472,-13.455 "15:20:01",1472,-3.853 "15:21:06",1472,-3.832 "15:22:10",1344,-3.811 "15:23:15",1472,-3.821 "15:24:20",1280,-3.813 "15:25:25",1280,-3.842 "15:26:29",1152,-3.841 "15:27:34",1344,-3.826 "15:28:39",1152,-3.79 "15:29:44",1088,-3.802 "16:29:58",1408,5.581

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"16:31:03",1152,5.6
"16:32:08",960,5.581
"16:33:13",1088,5.603
"16:34:17",704,5.621
"16:35:22",640,5.603
"16:36:27",512,5.644
"16:37:32",384,5.62
"16:38:36",384,5.636
"16:39:41",128,5.655
"17:39:56",704,14.664
"17:41:01",448,14.696
"17:42:05",448,14.728
"17:43:10",64,14.744
"17:44:15",192,14.728
"17:45:20", -384, 14.739
"17:46:24", -256, 14.767
"17:47:29",-256,14.81
"17:48:34", -320, 14.819
"17:49:39",-512,14.856
"18:49:53", -2048, 26.439
"18:50:58",-704,26.456
"18:52:03",-1280,26.477
"18:53:08",3392,26.459
"18:54:13",-64,26.491
"18:55:17",-2304,26.477
"18:56:22",-3392,26.527
"18:57:27", -3264, 26.52
"18:58:31",-1216,26.546
"18:59:36", -320, 26.537
"19:59:51",-1536,35.66
"20:00:56",-1664,35.62
"20:02:00",-2048,35.66
"20:03:05",-1920,35.67
"20:04:10",-1728,35.7
"20:05:15",-1984,35.71
"20:06:19",-1920,35.69
"20:07:24",-2240,35.68
"20:08:29", -2176, 35.72
"20:09:34",-2048,35.71
"21:09:48",-2240,45.51
"21:10:53",-1600,45.54
"21:11:58", -2048, 45.51
"21:13:03",-2112,45.54
"21:14:08",-1984,45.53
"21:15:13",-2048,45.56
"21:16:17",-2176,45.54
"21:17:22",-2048,45.57
"21:18:27",-2240,45.58
"21:19:32",-1984,45.58
```

# Vega Wireless Masterstation 485 MHz

Time Seq	Delta Freq F	Ref. Temp	Volt1	Volt2	Volt3
1:00:11	896	-31.18	5.451	14.922	-15.115
1:01:19	1088	-31.24	5.451	14.919	-15.118
1:02:27	1216	-31.32	5.452	14.917	-15.12
1:03:35	1312	-31.32	5.452	14.915	-15.122
1:04:43	1216	-31.3	5.452	14.912	-15.124
1:05:51	1408	-31.36	5.452	14.911	-15.125
1:06:59	1504	-31.35	5.452	14.909	-15.127
1:08:07	1504	-31.38	5.452	14.907	-15.127
1:09:14	1504	-31.38	5.452	14.906	-15.129
1:10:22	1600	-31.39	5.452	14.904	-15.13
2:10:40	288	-22.226	5.45	14.964	-15.063
2:11:48	512	-22.32	5.45	14.959	-15.069
2:12:56	800	-22.259	5.451	14.954	-15.073
2:14:04	992	-22.264	5.451	14.948	-15.077
2:15:12	1088	-22.394	5.451	14.944	-15.08
2:16:20	1216	-22.276	5.451	14.939	-15.083
2:17:28	1312	-22.281	5.452	14.935	-15.086
2:18:36	1408	-22.291	5.452	14.931	-15.088
2:19:43	1600	-22.224	5.452	14.927	-15.089
2:20:51	1600	-22.233	5.452	14.924	-15.092
3:21:09	150 <b>4</b>	-12.869	5.451	14.941	-15.071
3:22:17	1696	-12.794	5.451	14.936	-15.075
3:23:25	1696	-12.913	5.451	14.931	-15.079
3:24:33	1792	-12.802	5.452	14.926	-15.083
3:25:41	1888	-12.87	5.452	14.921	-15.086
3:26:49	1984	-12.911	5.452	14.916	-15.088
3:27:57	1984	-12.816	5.452	14.9	-15.125
3:29:04	1984	-12.891	5.452	14.896	-15.126
3:30:12	1888	-12.854	5.452	14.893	<i>-</i> 15.127
3:31:20	1888	-12.842	5.452	14.889	-15.129
4:31:38	1888	-3.198	5.451	14.892	-15.152
4:32:46	1984	-3.144	5.451	14.887	-15.154
4:33:54	1984	-3.245	5.452	14.881	-15.157
4:35:02	1888	-3.222	5.452	14.876	-15.16
4:36:10	1984	-3.201	5.452	14.871	-15.161
4:37:18	1792	-3.164	5.452	14.867	-15.162
4:38:26 4:39:34	1888 1792	-3.165	5.452	14.862	-15.165
4:40:42	1792	-3.133	5.452	14.858	-15.166
4:41:50	1792	-3.112 3.164	5.452	14.854	-15.167
5:42:08	1792	-3.164 6.117	5.452	14.851	-15.168
5:43:15	1792	6.086	5.451 5.452	14.859 14.853	-15.158
5:44:23	1600	6.14	5.452 5.452		-15.161 -15.163
5:44:23 5:45:31	1504	6.163	5.45∠ 5.452	14.848 14.844	-15.162 -15.164
5:46:39	1312	6.184	5.452 5.452	14.839	
5:47:47	1312	6.178	5.452 5.452	14.835	-15.165 -15.167
5:48:55	1216	6.181	5.452 5.452	14.832	-15.167 -15.168
5:50:03	1216	6.218	5.452 5.452	14.828	-15.166 -15.169
5:51:11	1216	6.228	5.452 5.452	14.825	-15.169 -15.17
•••	,_	J	J. 702	14.020	- 13.17

# Vega Wireless Masterstation 485 MHz

Time Seq	Delta Freq R	Ref. Temp	Volt1	Volt2	Volt3
5:52:19	992	6.186	5.452	14.822	-15.17
6:52:37	1088	15.165	5.451	14.828	-15.163
6:53:45	800	15.21	5.451	14.824	-15.165
6:54:53	704	15.196	5.451	14.82	-15.166
6:56:01	608	15.226	5.451	14.816	-15.168
6:57:09	512	15.277	5.451	14.812	-15.168
6:58:17	384	15.282	5.451	14.808	-15.169
6:59:25	384	15.284	5.451	14.805	-15.17
7:00:33	288	15.272	5.451	14.801	-15.171
7:01:41	192	15.314	5.451	14.798	-15.171
7:02:49	0	15.365	5.451	14.795	-15.173
8:03:12	-1088	34.5	5.448	14.724	-15.169
8:04:20	-1216	34.49	5.448	14.712	-15.17
8:05:23	0	24.24	5.451	14.797	-15.162
8:06:31	-96	24.033	5.451	14.796	-15.167
8:07:39	-96	24.003	5.451	14.793	-15.168
8:08:46	-384	23.898	5.451	14.789	-15.169
8:09:54	-512	23.909	5.451	14.785	-15.17
8:11:02	-608	23.93	5.451	14.782	-15.171
8:12:10	-704	23.987	5.45	14.778	-15.172
8:13:18	-800	24.053	5.45	14.775	-15.172
9:13:36	-1216	36.45	5.45	14.767	-15.164
9:14:44	-1408	36.44	5.45	14.763	<i>-</i> 15.168
9:15:52	-1504	36.45	5.449	14.759	-15.17
9:17:00	-1600	36.46	5.449	14.756	-15.171
9:18:08	-1600	36.46	5.449	14.752	-15.172
9:19:16	-1600	36.44	5.449	14.748	-15.172
9:20:24	-1792	36.44	5.449	14.745	-15.173
9:21:32	-1792	36.44	5.449	14.741	-15.173
9:22:40	-1888	36.46	5.448	14.738	-15.173
9:23:48	-1888	36.58	5.448	14.735	-15.174
10:24:06	-1984	46.17	5.448	14.728	-15.171
10:25:14	-1984	46.21	5.447	14.71	-15.17
10:26:22	-2112	46.21	5.447	14.707	-15.172
10:27:30	-1984	46.2	5.447	14.706	-15.172
10:28:38	-2208	46.23	5.447	14.7	-15.172
10:29:45	-2112	46.25	5.446	14.701	-15.172
10:30:53	-2208	46.24	5.446	14.703	-15.173
10:32:01	-2208	46.29	5.446	14.7	-15.173
10:33:09	-2208	46.26	5.446	14.693	-15.173
10:34:18	-2208	46.03	5.446	14.689	-15.173

### Vega Wireless Masterstation 485 MHz

## Voltage Frequency Stability Part 2.1055(d)(1)

Frequency	Voltage	Delta Frequency
484.998280 MHz	115 Vac (nominal)	Reference
484.998342 MHz	97.75 Vac (85%)	62 Hz
484.998240 MHz	132.25 Vac (115%)	-40 Hz

## Equipment Used:

HP 6843A AC Power Source

PN: 580

HP 8568B Spectrum Analyzer

PN: 187/188

Date Performed: April 4, 2001 Performed by: J Owen



#### **5. ATTESTATION STATEMENT**

#### **SUMMARY:**

All tests per CFR 47, FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1053; 2.1055; Part 74, Paragraph 74.861(e)(1); (e)(3); (e)(5); and (e)(6) were

- Performed

The Equipment Under Test

- - Fulfills the requirements of CFR 47, FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1053; 2.1055; Part 74, Paragraph 74.861(e)(1); (e)(3); (e)(5); and (e)(6).
- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Jim Owen (EMC Engineer)

#### 4/12/01

# Q700 MASTER STATION FREQUENCY STABILITY TEST VERSUS POWER SUPPLY VARIATIONS

### Unit # 102 Master Station TX12

Nominal Operating Frequency =

725.000000 MHz



Tolerance is.005%=.00005=+/-36.25kHz

85%	97 VAC	724.999817 MHz
100% Nominal Voltage	115 VAC	724.999862 MHz
115%	132 VAC	724.999769 MHz

### **UNIT #103 Master Station TX8**

Nominal operating frequency=

605.000000 MHz

Tolerance is .005%=.00005=+/-30.25kHz



85%	97VAC	605.001613 MHz
100% Nominal Voltage	115 VAC	605.001683 MHz
115%	132 VAC	605.001575 MHz

### **UNIT #104 Master Station TX4**

Nominal operating frequency=

485.000000 MHz



Tolerance is .005%=.00005=+/-24.25kHZ

85%	97 VAC	485.000213 MHz
100%	115 VAC	485.000143 MHz
115%	132 VAC	485.000102 MHZ

I certify that the above frequency measurements were made on the Master Stations with a calibrated HP53131A Frequency Counter.

James E. Pigg

Director of Engineering VEGA Holdings, Inc.