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EMC Equipment List

	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
X	3-Meter OATS	TEI	N/A	N/A	Listed 12/22/99	12/22/02
	3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
	Receiver, Beige Tower Spectrum Analyzer (Tan)	НР	8566B Opt 462	3138A07786 3144A20661	CAL 8/31/01	8/31/03
	RF Preselector (Tan)	HP	85685A	3221A01400	CAL 8/31/01	8/31/03
	Quasi-Peak Adapter (Tan)	HP	85650A	3303A01690	CAL 8/31/01	8/31/03
X X	Receiver, Blue Tower Spectrum Analyzer (Blue)	НР	8568B	2928A04729 2848A18049	CHAR 10/22/01	10/22/03
X	RF Preselector (Blue)	HP	85685A	2926A00983	CHAR 10/22/01	10/22/03
X	Quasi-Peak Adapter (Blue)	НР	85650A	2811A01279	CHAR 10/22/01	10/22/03
X	Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
	Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
	Biconnical Antenna	Eaton	94455-1	1057	CHAR 3/15/00	3/15/02
	BiconiLog Antenna	EMCO	3143	9409-1043		
X	Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
	Log-Periodic Antenna	Electro-Metrics	EM-6950	632	CHAR 10/15/01	10/15/03
	Log-Periodic Antenna	Electro-Metrics	LPA-30	409	CHAR 10/16/01	10/16/03
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	152	CAL 3/21/01	3/21/04
	Dipole Antenna Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 11/24/00	11/24/03
	Double-Ridged Horn Antenna	Electro-Metrics	RGA -180	2319	CAL 12/19/01	12/19/03
	Horn Antenna	Electro-Metrics	EM-6961	6246	CAL 3/21/01	3/21/03
	Horn Antenna	ATM	19-443-6R	None	No Cal Required	
	Passive Loop Antenna	EMC Test Systems	EMCO 6512	9706-1211	CHAR 7/10/01	7/10/03
	Line Impedance Stabilization	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03

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	DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
	Line Impedance Stabilization	Electro-Metrics	EM-7820	2682	CAL 3/16/01	3/16/03
	Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 5/25/99	5/25/01
	Termaline Wattmeter	Bird Electronic Corporation	6104	1926	CAL 12/12/01	12/12/03
	Oscilloscope	Tektronix	2230	300572	CHAR 2/1/01	2/1/03
	Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 1/22/02	1/22/04
	AC Voltmeter	HP	400FL	2213A14499	CAL 10/9/01	10/9/03
	AC Voltmeter	HP	400FL	2213A14261	CHAR 10/15/01	10/15/03
	AC Voltmeter	HP	400FL	2213A14728	CHAR 10/15/01	10/15/03
X	Digital Multimeter	Fluke	77	35053830	CHAR 1/8/02	1/8/04
	Digital Multimeter	Fluke	77	43850817	CHAR 1/8/02	1/8/04
	Digital Multimeter	HP	E2377A	2927J05849	CHAR 1/8/02	1/8/04
	Multimeter	Fluke	FLUKE-77-3	79510405	CAL 9/26/01	9/26/03
	Peak Power Meter	HP	8900C	2131A00545	CHAR 1/26/01	1/26/03
	Digital Thermometer	Fluke	2166A	42032	CAL 1/16/02	1/16/04
	Thermometer	Traulsen	SK-128		CHAR 1/22/02	1/22/04
X	Temp/Humidity gauge	EXTech	44577F	E000901	CHAR 1/22/02	1/22/04
	Frequency Counter	HP	5352B	2632A00165	CAL 11/28/01	11/28/03
	Power Sensor	Agilent Technologies	84811A	2551A02705	CAL 1/26/01	1/26/03
	Service Monitor	IFR	FM/AM 500A	5182	CAL 11/22/00	11/22/02
	Comm. Serv. Monitor	IFR	FM/AM 1200S	6593	CAL 5/12/02	5/12/04
	Signal Generator	HP	8640B	2308A21464	CAL 11/15/01	11/15/03
H	Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
	Near Field Probe	HP	HP11940A	2650A02748	CHAR 2/1/01	2/1/03

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DEVICE	MFGR	MODEL	SERNO	CAL/CHAR DATE	DUE DATE or STATUS
BandReject Filter	Lorch Microwave	5BR4-2400/ 60-N	Z1	CHAR 3/2/01	3/2/03
BandReject Filter	Lorch Microwave	6BR6-2442/ 300-N	Z1	CHAR 3/2/01	3/2/03
BandReject Filter	Lorch Microwave	5BR4-10525/ 900-S	Z1	CHAR 3/2/01	3/2/03
High Pas Filter	Microlab	HA-10N		CHAR 10/4/01	10/4/03
Audio Oscillator	HP	653A	832-00260	CHAR 3/1/01	3/1/03
Frequency Counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/03
Frequency Counter	HP	5385A	3242A07460	CHAR 12/11/01	12/11/03
Preamplifier	HP	8449B-H02	3008A00372	CHAR 3/4/01	3/4/03
Amplifier	HP	11975A	2738A01969	CHAR 3/1/01	3/1/03
Egg Timer	Unk			CHAR 8/31/01	8/31/03
Measuring Tape, 20M	Kraftixx	0631-20		CHAR 2/1/02	2/1/04
Measuring Tape, 7.5M	Kraftixx	7.5M PROFI		2/1/02	2/1/04
Coaxial Cable #51	Insulated Wire Inc.	NPS 2251-2880	Timco #51	CHAR 1/23/02	1/23/04
Coaxial Cable #64	Semflex Inc.	60637	Timco #64	CHAR 1/24/02	1/24/04
Coaxial Cable #65	General Cable Co.	E9917 RG233/U	Timco #65	CHAR 1/23/02	1/23/04
Coaxial Cable #106	Unknown	Unknown	Timco #106	CHAR 1/23/02	1/23/04

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TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal data transmission on a network.

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed. The ambient temperature of the UUT was $74^{\circ}F$ with a humidity of 44%.

BANDWIDTH 6.0dB: The measurements were made with the spectrum analyzer's resolution bandwidth(RBW)=100 kHz and the video bandwidth(VBW) = 300 kHz and the span set as shown on plot.

POWER OUTPUT: Both base and handset have built-in/integral antennas. The RF power output was measured as Effective Radiated Power (ERP).

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth(RBW) of the spectrum analyzer was 100 kHz up to 1 GHz and 1.0MHz above 1 GHz with an appropriate sweep speed. The VBW above 1.0 GHz was = 1.0 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 90°F with a humidity of 36%.

15.247(e): PROCESSING GAIN, This gain is supplied by the manufacturer of the UUT. (no longer a requirement)

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NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE

RULES PART NO.: 15.107(a)

REQUIREMENTS: .15 - 30 MHz 250 uV OR 47.96 dBuV

TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum was scanned from .15

to 30 MHz.

TEST DATA:

THE HIGHEST EMISSION READ FOR LINE 1 ON HOOK WAS 60.3 uV @ 150 kHz.

THE HIGHEST EMISSION READ FOR LINE 2 ON HOOK WAS 60.3 uV @ 150 kHz.

THE HIGHEST EMISSION READ FOR LINE 1 OFF HOOK WAS 56.9 uV @ 210 kHz.

THE HIGHEST EMISSION READ FOR LINE 2 OFF HOOK WAS 70.0 uV @ 150 kHz.

THE PLOTS ON THE FOLLOWING PAGES REPRESENT THE EMISSIONS TAKEN FOR THIS DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

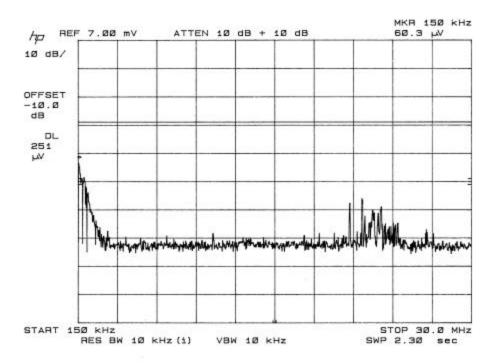
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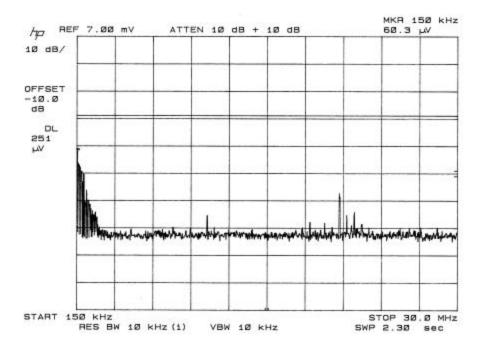
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POWER LINE CONDUCED PLOT - LINE 1 ON HOOK



POWER LINE CONDUCTED PLOT - LINE 2 ON HOOK



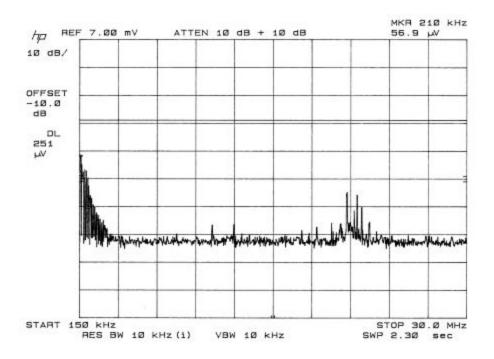
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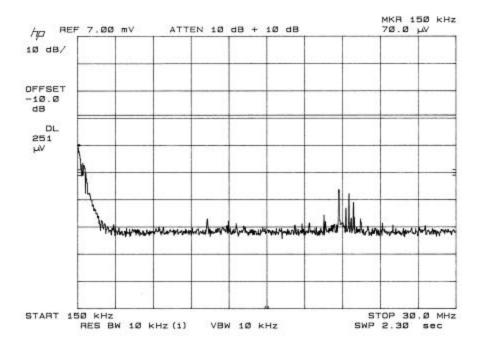
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POWER LINE CONDUCED PLOT - LINE 1 OFF HOOK



POWER LINE CONDUCTED PLOT - LINE 2 OFF HOOK



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NAME OF TEST: 20.0dB BANDWIDTH

RULES PART NO.: 15.247(a)

MEASUREMENT: The 20dB bandwidth measured @ 645 kHz was

-3.90 dB for both the base and pod.

NAME OF TEST: POWER OUTPUT

RULES PART NO.: 15.247(b) 1.0Watt or +30dBm

MEASUREMENT:

POD - 0.082 Watts

BASE - 0.063 Watts

 $15.247(c) \qquad \text{Method of Measuring RF Power output: The Peak power Sensor was} \\ \text{connected in place of the antenna.} \quad \text{The calculation is on the} \\ \text{following page, using the measured spectrum analyzer peak reading,} \\$

shows agreement with the peak power sensor measurement

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RF POWER OUTPUT CONTINUED

dBuV:= 116.5

efs := $10^{\frac{\text{dBuV}}{20}}$

efs = 6.683×10^5

 $efsmV := efs \cdot .001$

efsmV = 668.344

$$Po := \frac{(3 \cdot efsmV)^2}{49.2}$$

 $Po = 8.171 \times 10^4$

 $PoW := Po \cdot .000001$

PoW = 0.082 Watts

 $PomW := Po \cdot .001$

PomW = 81.71 mWatts

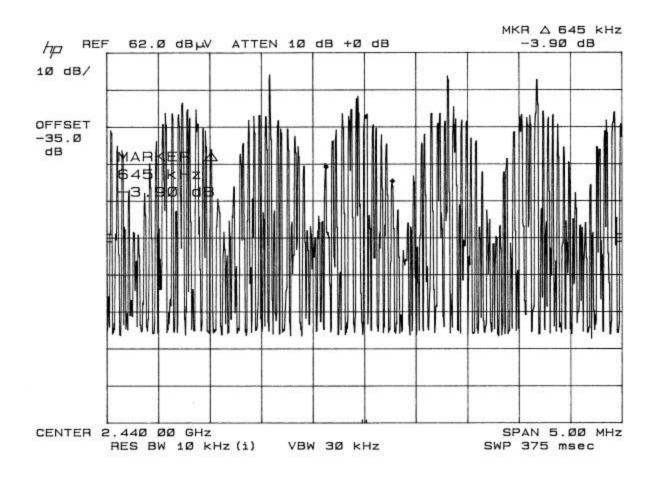
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20 dB BANDWIDTH - BASE

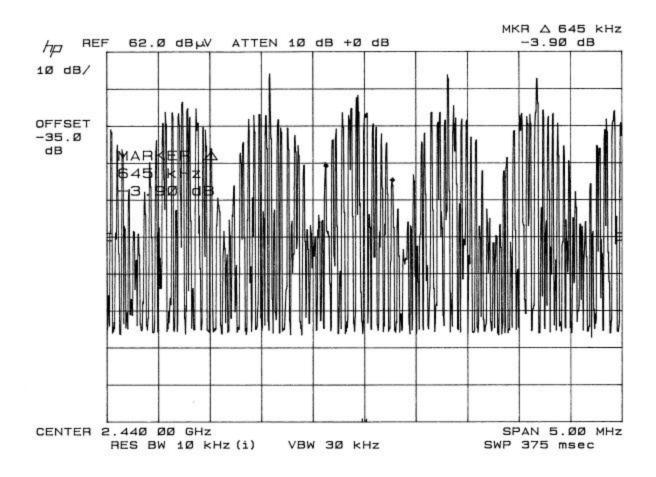


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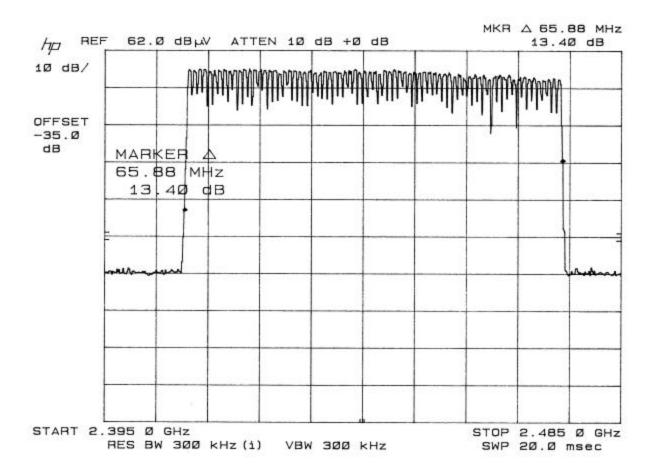


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OF CHANNEL PLOT BASE



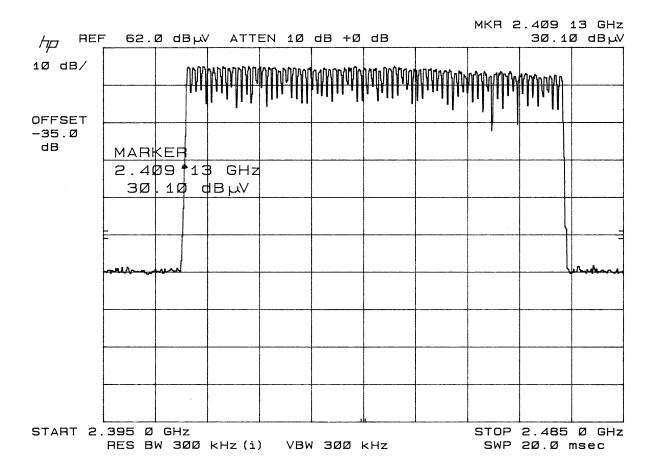
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OF CHANNEL PLOT POD



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15.247(c),15.205 &15.209(b) Field_strength_of_spurious_emissions:

REQUIREMENTS:

FIELD STRENGTH FIELD STRENGTH S15.209
of Fundamental: of Harmonics 30 - 88 MHz 40 dBuV/m @3M
902-928MHz 88 -216 MHz 43.5
2.4-2.4835GHz 216 -960 MHz 46
127.38dBuV/m @3m 54 dBuV/m @3m ABOVE 960 MHz 54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

REQUIREMENTS: Emissions that fall in the restricted bands (15.205) must be less than 54 dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

TEST DATA (ALL PEAK MEASUREMENTS):

BASE:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuv	Ant. Polarity	Coax Loss dB	Correction Factor dB	Pulsed CFactor dB	Field Strength dBuv/m	Margin dB
2441.50	2441.50	78.9	H	3.35	30.75	0.00	113.00	14.38
2441.50	2441.50	81.3	v	3.35	30.75	0.00	115.40	11.98
2441.50	4883.00	12.9	H	6.04	34.97	-20.00	33.91	20.09
2441.50	4883.00	16.2	v	6.04	34.97	-20.00	37.21	16.79

POD:

Tuned	Emission	Meter	Ant.	Coax	Correction	Pulsed	Field	
Frequency	Frequency	Reading	Polarity	Loss	Factor	CFactor	Strength	Margin
\mathtt{MHz}	\mathtt{MHz}	dBuv		dВ	đВ	đВ	\mathtt{dBuv}/\mathtt{m}	đВ
2,440.5	2,441.50	79.4	H	3.35	30.75	0.00	113.50	13.88
2,440.5	2,441.50	82.4	v	3.35	30.75	0.00	116.50	10.88
2,440.5	4,883.00	14.2	H	6.04	34.97	-20.00	35.21	18.79
2,440.5	4,883.00	15.8	v	6.04	34.97	-20.00	36.81	17.19

The unit was scanned at 3 places in the band and only the worst-case scenario is shown.

METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992 & the FCC/OET Guidance on Measurements for Frequency Hopping - Public Notice 54797 Dated July 12, 1995. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

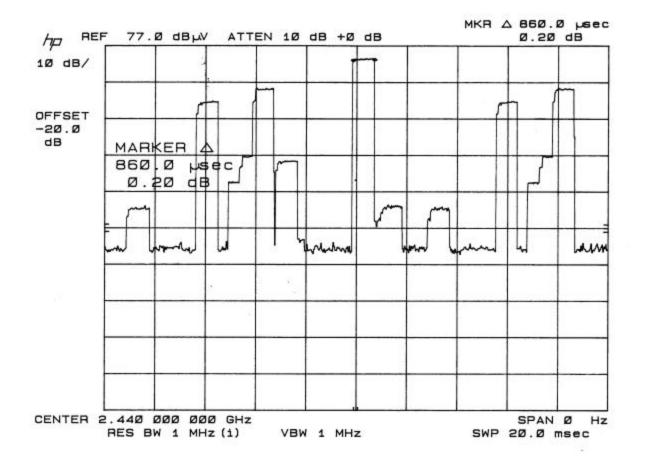
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DWELL TIME PLOT BASE



CALCULATION OF DUTY CYCLE:

The period of the pulse train is determined by observing it on an oscilloscope or a spectrum analyzer with zero(0) frequency span. A plot is then made of the pulse train with a sweep time of 100milliseconds. This sweep determines the duration of the pulse train, which in this case is 860 microseconds. For this EUT, only one pulse of 860 microseconds was observed in the 100 millisecond time period. The duty cycle was calculated to be: 41 dB. A maximum allowed value is 20 dB.

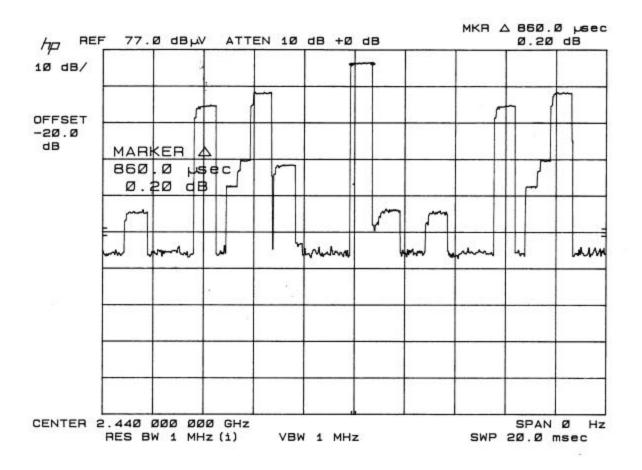
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DWELL TIME PLOT POD



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NAME OF TEST: RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These

emissions must be less than or equal to 500 uV/m (54 dBuV/m).

TEST PROCEDURE: An in band field strength measurement of the fundamental

Emission using the RBW and detector function required by ${\tt C63.4-2000}$ and FCC Rules. The procedure was repeated with an

average detector and a plot made. The calculated field

strength in the adjacent restricted band is presented below.

Base:

Frequency: 2400.02 MHz Frequency: 2483.51 MHz

- 1.40 dBuV - 0.90 dBuV +28.89 ACF +28.97 ACF

+ 3.32 Coax Loss -20.00 Pulsed CFactor + 3.32 Coax Loss -20.00 Pulsed CFactor

+10.81 dBuV +11.39 dBuV

POD:

Frequency: 2388.87 MHz Frequency: 2483.50 MHz

+ 8.50 dBuV + 9.50 dBuV +28.88 ACF +28.97 ACF

+ 3.31 Coax Loss -20.00 Pulsed CFactor + 3.39 Coax Loss -20.00 Pulsed CFactor

+20.69 dBuV +21.86 dBuV

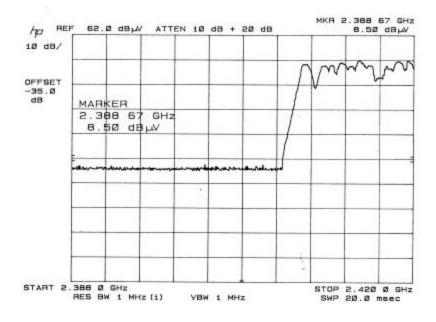
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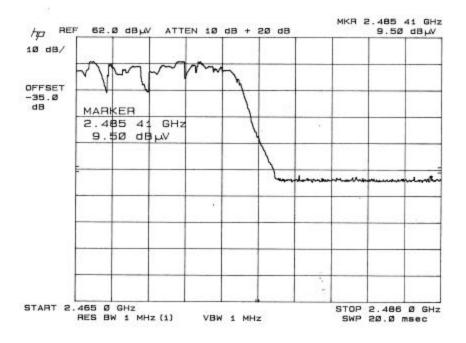
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BANDEDGE PLOT - POD



BANDEDGE PLOT - POD



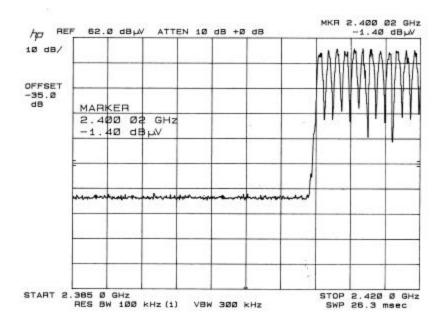
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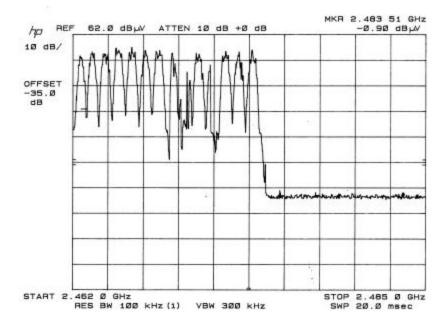
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BANDEDGE PLOT - BASE



BANDEDGE PLOT - BASE



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