Intertek ETL SEMKO

MAILED
10-27-05

FCC 15

October 27, 2005

Michael Sullivan
Astro-Med, Inc.
Astro-Med Industrial Park
600 East Greenwich Ave.
West Warwick, RI 02893

Mr. Sullivan:

Enclosed you will find your Emissions Test Report covering testing on your AURA-PSG and AURA-PSG Base Station.

If there are any questions regarding this report, please contact the undersigned or your account representative.

Sincerely,

Nicholas Abbondante
Project Engineer

Jeff Goulet
Engineering Team Leader, EMC

Enclosure

Intertek ETL SEMKO

EMISSIONS TEST REPORT

Report Number: 3078319BOX.017a
Project Number: 3078319

Testing performed on the
Model: AURA-PSG

to

FCC Part 15 Subpart C 15.247

For

Astro-Med, Inc.

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
Astro-Med, Inc.
600 East Greenwich Avenue
West Warwick, RI, 02893

Prepared by: _____ Date: 10/27/05
Nicholas Abbondante

Reviewed by: _____ Date: 10-27-2005
Roland W. Gubisch

1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of

Company:	Astro-Med, Inc. 600 East Greenwich Avenue West Warwick, RI 02893
Contact:	Michael Sullivan
Telephone:	401-828-4000
Fax:	401-822-2430

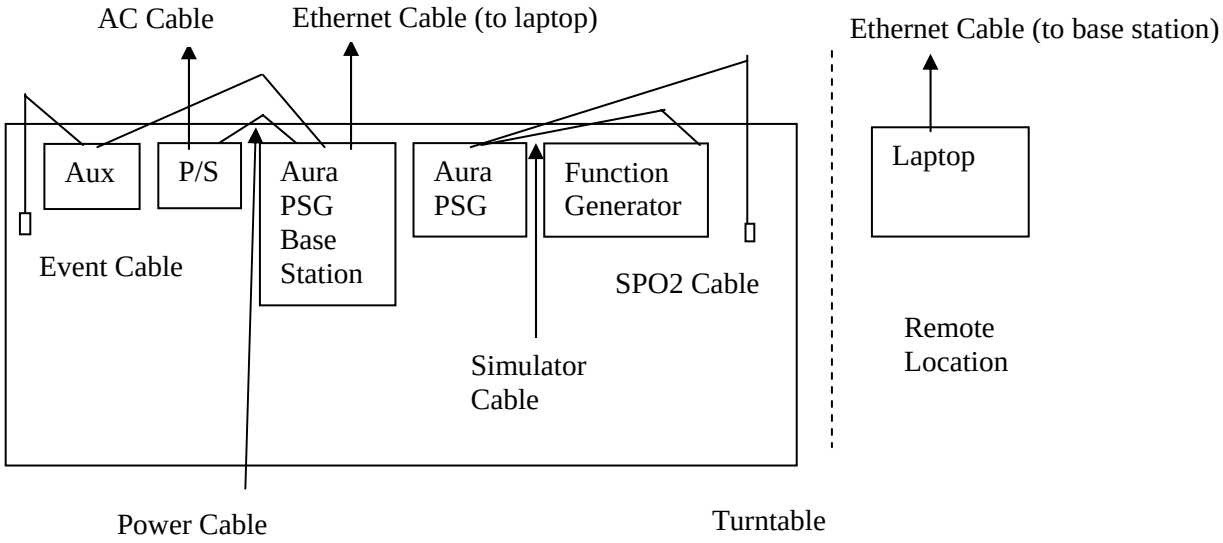
1.2 Equipment Under Test

Equipment Type:	EEG Amplifier with Wireless Mode
Model Number(s):	AURA-PSG
Serial number(s):	#3 & #4, and #5 & #5
Manufacturer:	Astro-Med, Inc.
EUT receive date:	06/24/2005
EUT received condition:	Good
Test start date:	06/24/2005
Test end date:	10/18/2005

1.3 Test Plan Reference: Tested according to the standards listed and ANSI C63.4:2003

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2 Cable List:

Cable	Shielding	Connector	Length (m)	Qty.
Event Cable	Braid	Metal Jack	3.0	1
Auxiliary Cable	Braid	Metal/360	2.0	1
AC Mains Cable	None	Plastic	3.0	1
Power Supply Cable	None	Metal Jack	2.0	1
Ethernet Cable	Foil	RJ45 with Metal Shield Grounds	5.0	1
Tether Cable	None	Plastic	3.0	1
SPO2 Cable	None	Plastic	1	1
Simulator Cable	None	Plastic	0.75	1

1.4.3 Support Equipment:

Name: Sony Laptop
Model No.: PCG-955A
Serial No.: 283183303623910

Name: Medi Cal Function Generator
Model No.: 220
Serial No.: 904

Name: Grass Telefactor Power Supply
Model No.: RPSAS40
Serial No.: 04A0696G

Name: Auxiliary DC Input Module
Model No.: DCM8
Serial No.: 03B0565G

1.5 Mode of Operation:

The AURA-PSG Base Station was activated from nominal AC power (120V/60Hz) and the AURA-PSG was activated from a fresh battery. A function generator was used to provide simulated EEG signals to the AURA-PSG. The AURA-PSG transmitted the amplified EEG signals to the AURA-PSG Base Station wirelessly via a transmitter.

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart C 15.247		
SUB-TEST	**TEST PARAMETER**	**COMMENT**
Occupied Bandwidth and Hopping Characteristics FCC 15.247(a)(1), (a)(1)(ii)	The hopping characteristics must conform to the requirements of FCC 15.247(a)(1), (a)(1)(ii). The channel bandwidth is the 20 dB bandwidth. The channel separation must be greater than the 20dB bandwidth. The minimum number of hopping channels is 15. The maximum channel dwell time is 0.4 seconds over the period of 0.4 seconds multiplied by the number of hopping channels.	Pass
Transmitter Output Power and EIRP, and Human RF Exposure FCC 15.247(b)(1, 4-5)	The output power must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm^2.	Pass
Radiated Spurious Emissions FCC 15.205, 15.209, 15.247(d)	The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209.	Pass
Band Edge Compliance FCC 15.215	The fundamental frequency must stay within the assigned frequency band.	Pass
AC Line-Conducted Emissions FCC 15.207	The AC line-conducted emissions must not exceed the limits of 15.207.	Pass

The channels selected for test were channels 0, 39, and 78.

Channel 0: 2402 MHz
Channel 39: 2441 MHz
Channel 78: 2480 MHz

3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

Level in μV/m = [10(32 dBμV/m)/20] = 39.8 μV/m

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where NF = Net Reading in dBμV
RF = Reading from receiver in dBμV
LF = LISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(48.1\ dB\mu V / 20)}$ = 254 μV/m

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.
The expanded uncertainty (k = 2) for radiated emissions from 30 to 1000 MHz has been determined to be:
±3.5 dB at 10m, ±3.8 dB at 3m

The expanded uncertainty (k = 2) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:
±2.6 dB

The expanded uncertainty (k = 2) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:
±3.2 for ISN and voltage probe measurements
±3.1 for current probe measurements

3.2 Site Description

Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Test Results: Pass

Test Standard: FCC 15.247(a)(1), (a)(1)(ii)

Test: Occupied Bandwidth and Hopping Characteristics

Performance Criterion: The channel bandwidth is the 20 dB bandwidth. The channel separation must be greater than the 20dB bandwidth. The minimum number of hopping channels is 15. The maximum channel dwell time is 0.4 seconds over the period of 0.4 seconds multiplied by the number of hopping channels.

Test Date: 7/18/2005, 10/17/2005 **Engineer Initials:** ~~A **Date:** 10/27/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** RWA **Date:** 10-27-05

Test Equipment Used:

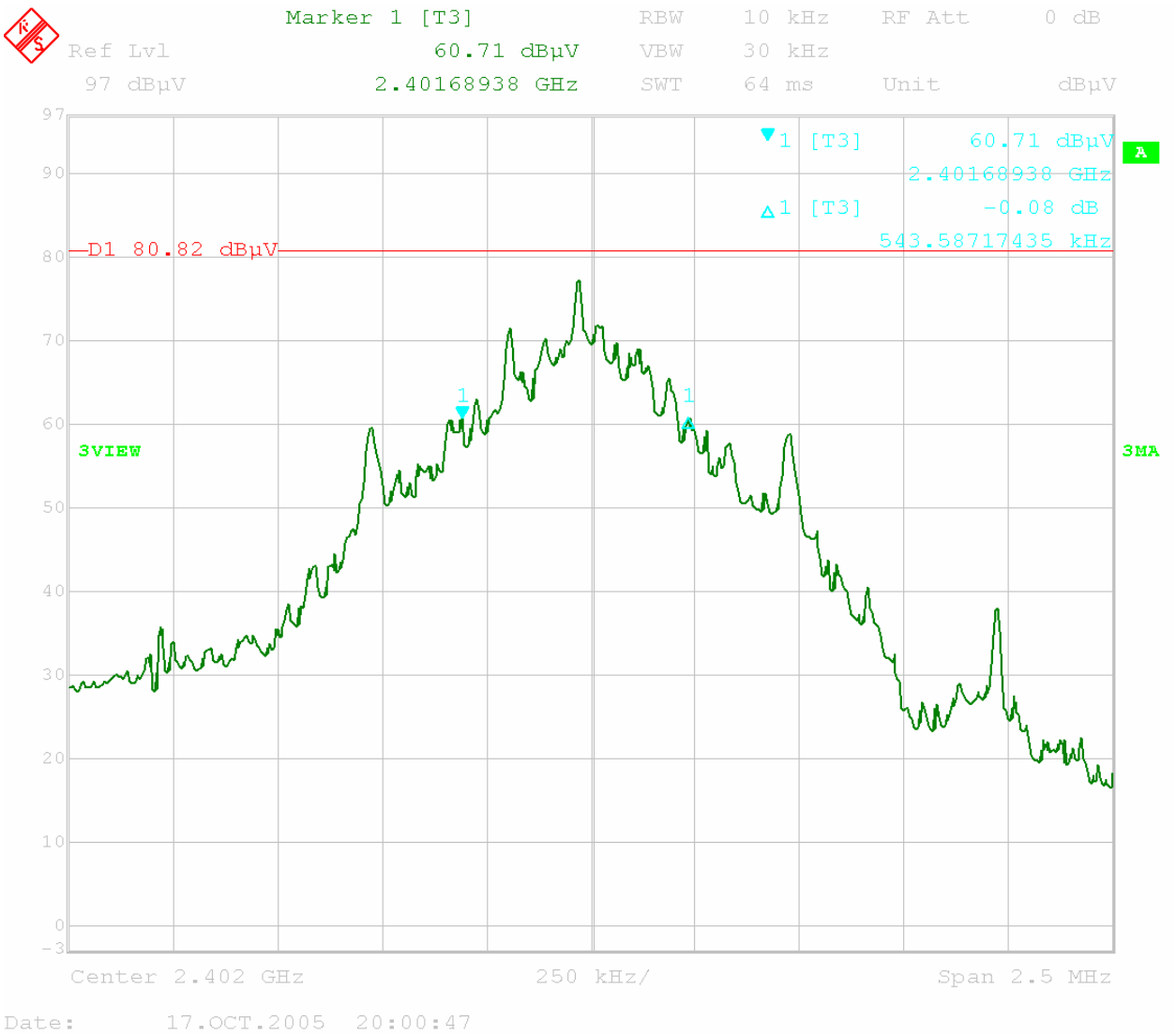
Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
-	Agilent	E7405A	US39150114	07/29/2005*
HORN3	EMCO	3115	9610-4980	09/13/2006
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
CBL030	Megaphase	TM40 K1K1 80	CBL030	12/01/2005
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

* - Used only on 7/18/05

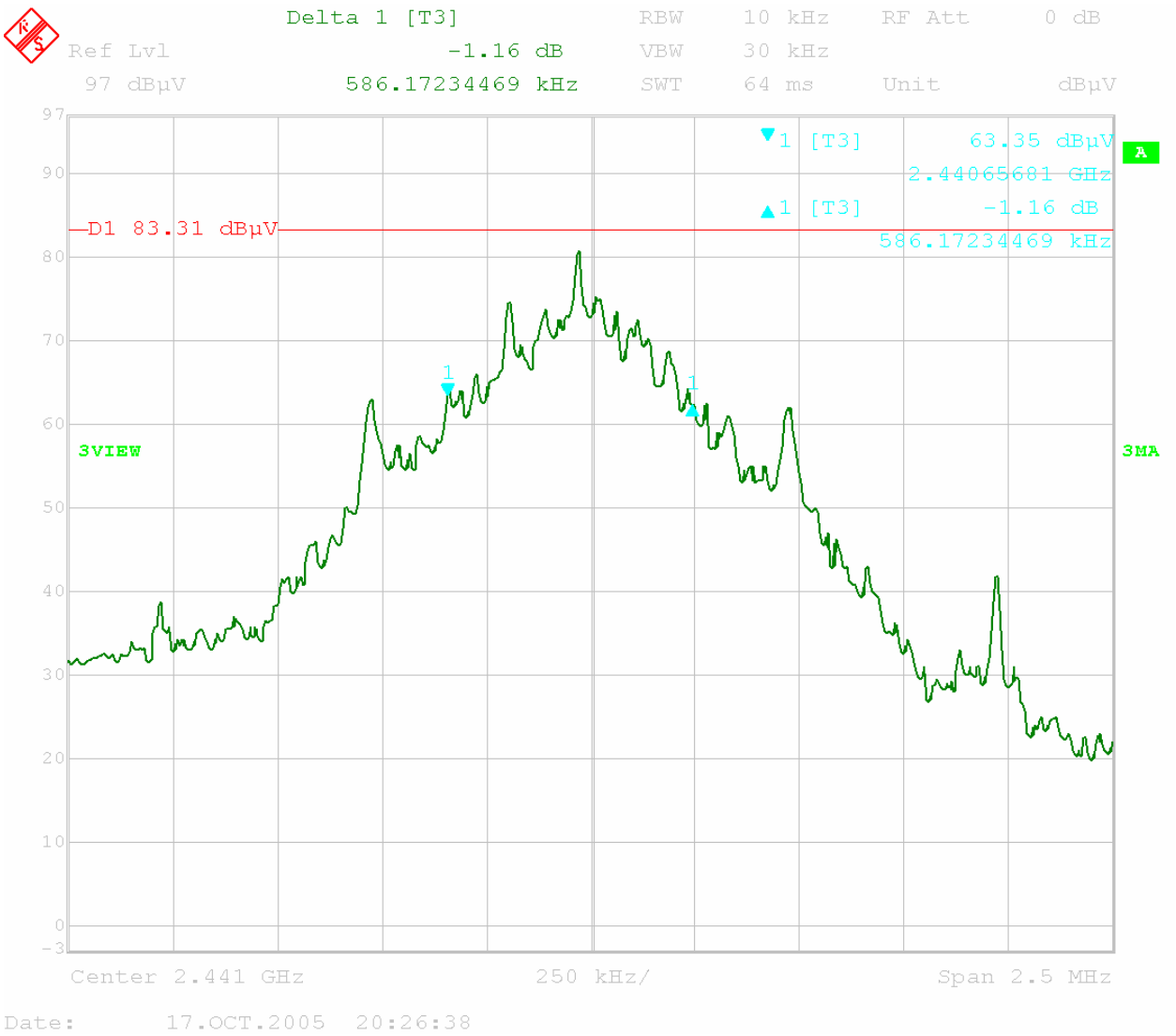
Test Details:

Channel	Frequency	20 dB Bandwidth
0	2402 MHz	543.6 kHz
39	2441 MHz	586.2 kHz
78	2480 MHz	571.1 kHz

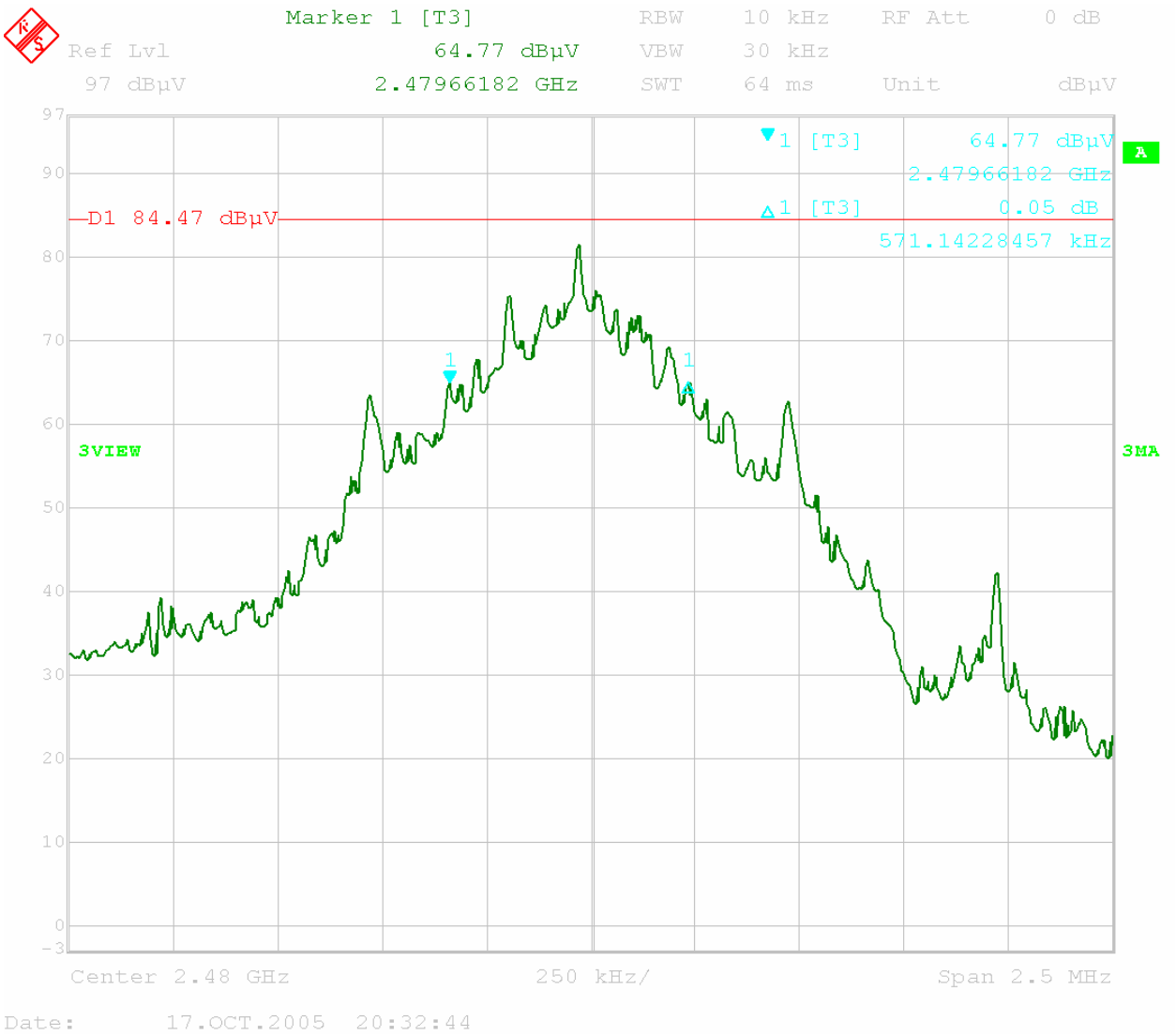
Number of Hopping Channels: 79
Channel Separation: 1.0 MHz
Single Hop Duration: 3.5 ms Duty Cycle: 3.5%
Duty Cycle Correction Factor = 20*LOG(hop time / 100 ms) = -29.1 dB adjusted to a maximum of -20 dB
Number of Hops per channel timeframe: 60 hops in 31.6 seconds
Channel dwell time: 210ms in 31.6 seconds



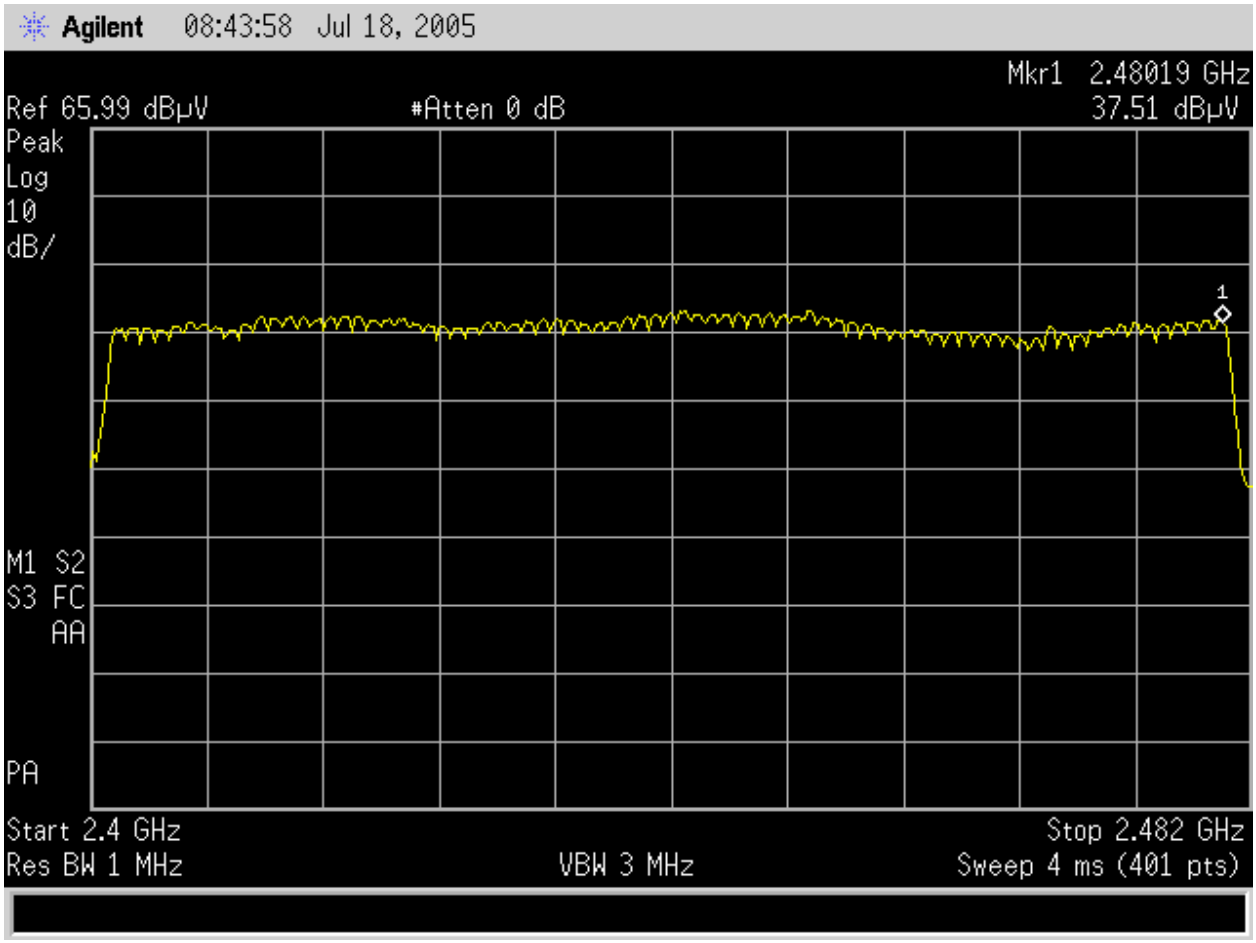
Channel 0 20 dB Bandwidth



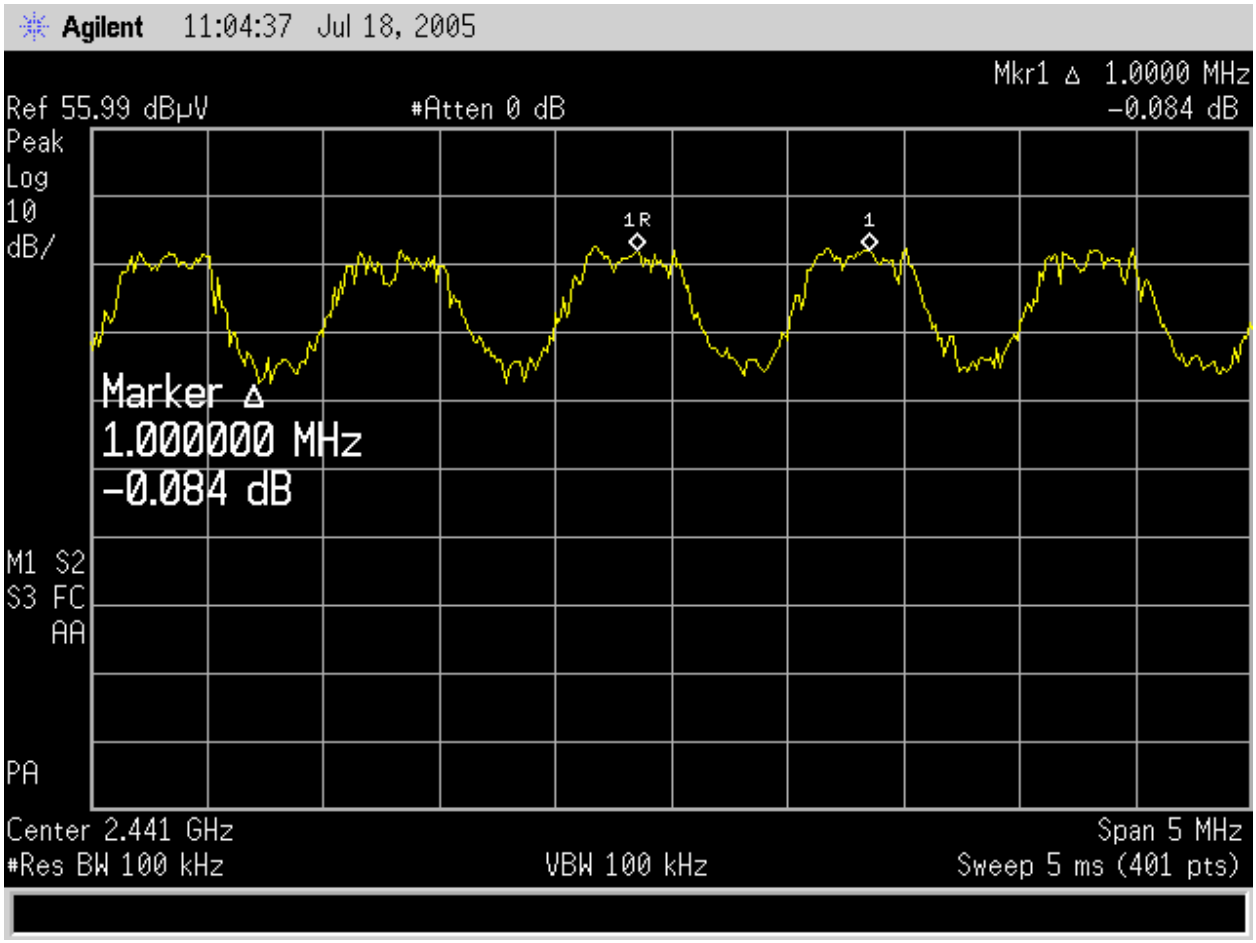
Channel 39 20 dB Bandwidth



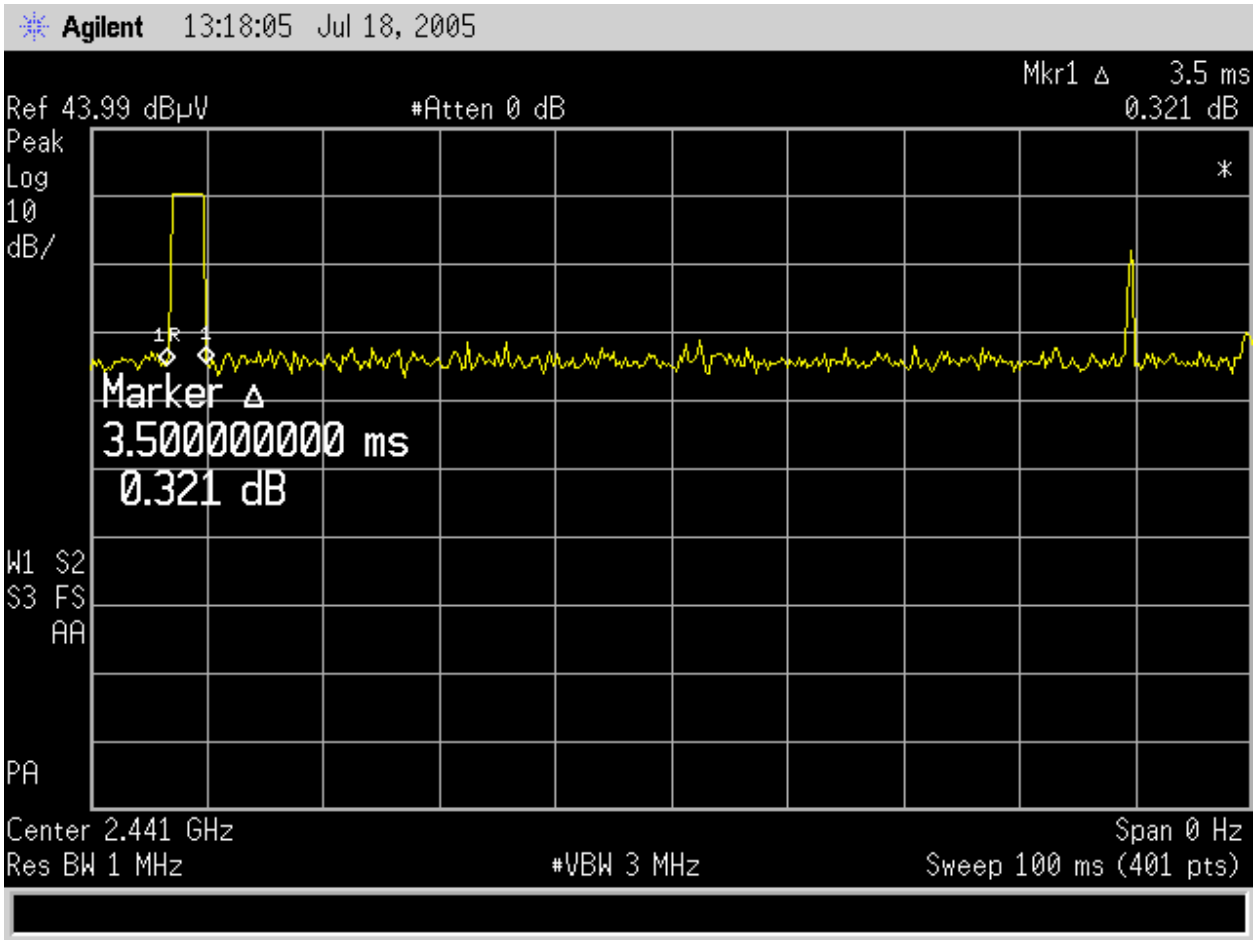
Channel 78 20 dB Bandwidth



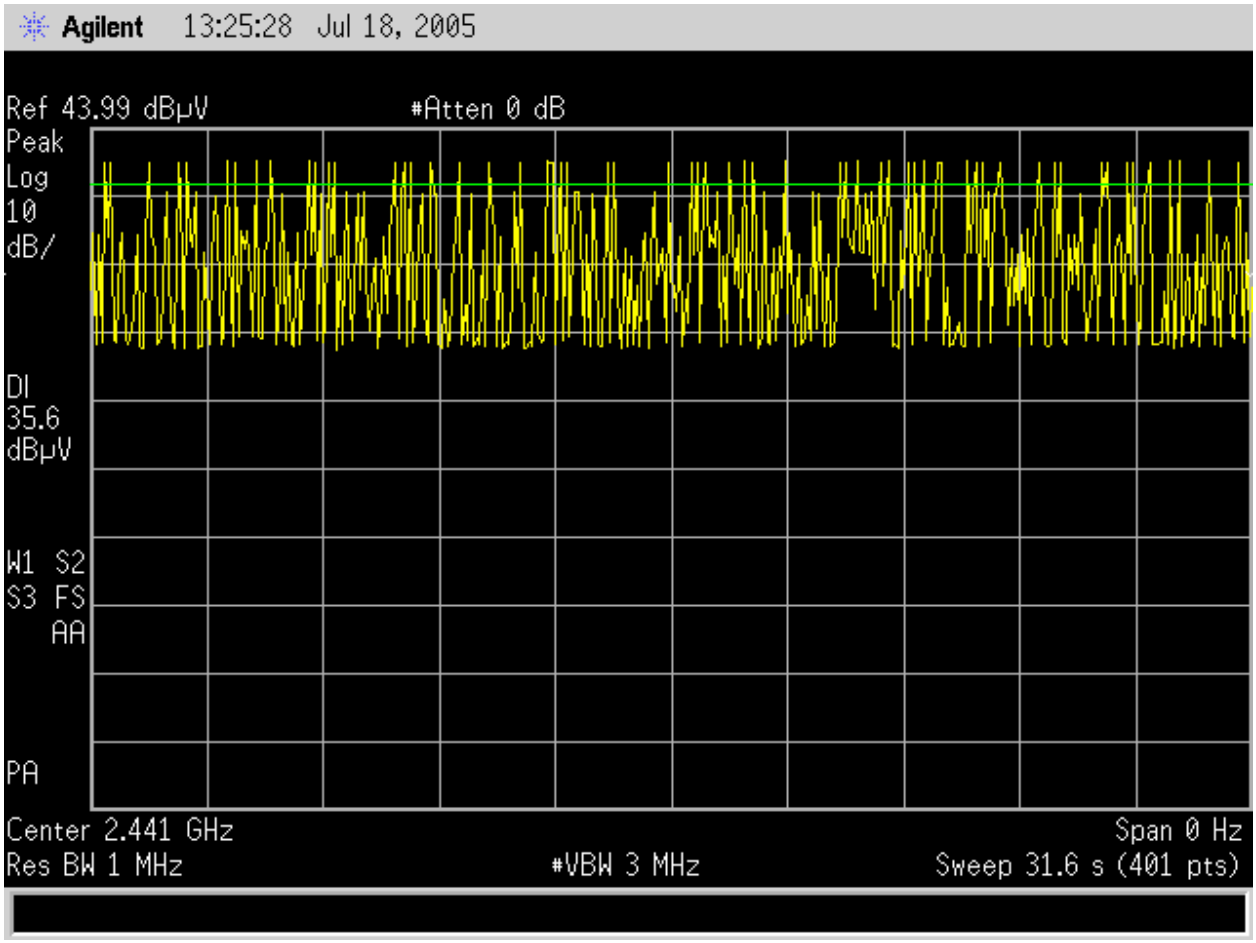
Number of Hopping Channels



Channel Separation



Single Hop Duration



Channel Dwell Time

Test Results: Pass

Test Standard: FCC 15.247(b)(1, 4-5)

Test: Transmitter Output Power and EIRP, and Human RF Exposure

Performance Criterion: The output power must not exceed 1 Watt (30 dBm) and 36 dBm EIRP. The human RF Exposure limit is 1 mW/cm^2.

Software:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	6/01/05 Revisions

Test Date: 10/17/2005 **Engineer Initials:** NN **Date:** 10/27/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** NAA **Date:** 10-27-05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
BAR2	Mannix	0ABA116	BAR2	08/02/2006
HORN3	EMCO	3115	9610-4980	09/13/2006
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
CBL030	Megaphase	TM40 K1K1 80	CBL030	12/01/2005
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Channel	Frequency	EIRP	EIRP Limit
0	2402 MHz	3.7 dBm	36.0 dBm
39	2441 MHz	4.7 dBm	36.0 dBm
78	2480 MHz	6.5 dBm	36.0 dBm

The EUT was measured radiatively. The output power was calculated using the formula given in DA 00-0705. The human RF exposure limit is 1 mW/cm^2. The power density S generated by some value of EIRP at a given distance d is related by the equation:

$$S=EIRP / (4\pi d^2)$$

The distance, given a maximum EIRP of 6.5 dBm (4.47 mW) at which the radiated power density of the EUT is equal to the human RF exposure limit is 0.60 cm from the antenna.

Radiated Emissions / Interference

Company:	Astro-Med, Inc.			Model #:	AURA-PSG and AURA-PSG Base Station	
Engineer:	Nicholas Abbondante	Barometer:	BAR2	Serial #:	#5 and #5	
Project #:	3078319	Pressure:	992 mB	Receiver:	R&S FSEK-30 (ROS001)	
Date:	10/17/05	Temp:	19c	N Antenna:	NONE.	NONE.
Standard:	FCC 15.247	Humidity:	56%	LF Antenna:	NONE.	NONE.
Class:	-	Group:	-	HF Antenna:	HORN3 9-13-06 V1m.txt	HORN3 9-13-06 H1m.txt
Antenna Band:	HF	Bands:	N, LF, HF, SHF	SHF Antenna:	EMC04 11-30-05 V1.ant	EMC04 11-30-05 H1.ant
PreAmp:	PRE8 11-16-05.amp			Cable(s):	CBL028 12-1-2005.cbl	CBL030 12-1-2005.cbl
Limit Distance:	3 meters			Test Distance:	3 meters	Location: Site 2
Voltage/Frequency:	Battery & AC Powered			Frequency Range:	2.4 - 2.5 GHz	

Peak: PK, Quasi-Peak: QP, Average: AVG, RMS: RMS, Restricted Band: RB, Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net Watts	Limit Watts	Margin Watts	Bandwidth	Net dBm
PK	V	2402.000	85.8	28.9	4.2	20.0	0.0	0.002	1.000	-0.998	1/3 MHz	3.7
PK	V	2441.000	86.7	29.0	4.2	20.0	0.0	0.003	1.000	-0.997	1/3 MHz	4.7
PK	H	2480.000	88.3	29.2	4.3	20.0	0.0	0.004	1.000	-0.996	1/3 MHz	6.5

Test Results: Pass

Test Standard: FCC 15.205, 15.209, 15.247(d)

Test: Radiated Spurious Emissions

Performance Criterion: The spurious emissions must be attenuated below the level of the fundamental by at least 20 dBc. Emissions which fall in the restricted bands must meet the general limits of 15.209.

Software:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	02/07/05 & 6/01/05 Revisions

Test Date: 07/15/05, 8/11/05, 10/17/05 **Reviewer Initials:** fcwh. **Date:** 10-27-05
Test Engineer: Kouma Sinn **Engineer Initials:** KPS **Date:** 10/27/05
Test Engineer: Nicholas Abbondante **Engineer Initials:** NNA **Date:** 10/27/05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
BAR3	Mannix	0ABA116	BAR3	07/19/2005*
LOG2	EMCO	3142	9711-1223	12/13/2005
-	Agilent	E7405A	US39150114	07/29/2005
BAR2	Mannix	0ABA116	BAR2	08/02/2006
HORN3	EMCO	3115	9610-4980	09/13/2006
EMC04	EMCO	3116	2090	11/30/2005
CBL027	Megaphase	TM40 K1K1 197	CBL027	12/01/2005
CBL029	Megaphase	TM40 K1K1 80	CBL029	12/01/2005
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
S2 10M FLR	ITS	RG214B/U	S2 10M FLR	09/02/2006

* - Used on 7/15/05 only

Note: Average values were obtained by applying the duty cycle correction factor of –20 dB to the peak emission values.

Test Details:

Radiated Emissions / Interference

Company: Astro-Med, Inc. Model #: AURA-PSG
Engineer: Nicholas Abbondante Barometer: BAR3 Serial #: #3 and #4
Project #: 3078319 Pressure: 1005 mB Receiver: Agilent E7405A (S/N: US39150114)
Date: 07/15/05 Temp: 23c Antenna: LOG2 12-13-05 V10.txt LOG2 12-13-05 H10.txt
Standard: FCC 15/209 Humidity: 66% PreAmp: NONE.
Class: - Group: - Cable(s): Site2, 10M Floor 9-15-05.cbl NONE.
Limit Distance: 3 meters Test Distance: 10 meters Location: Site 2
Voltage/Frequency: 120V/60Hz Frequency Range: 30 - 1000 MHz
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
QP	V	41.350	8.6	11.1	1.0	0.0	-10.5	31.1	40.0	-8.9	120/300 kHz
QP	V	50.240	15.0	8.5	1.1	0.0	-10.5	35.0	40.0	-5.0	120/300 kHz
QP	V	63.910	9.7	6.9	1.2	0.0	-10.5	28.3	40.0	-11.7	120/300 kHz
QP	V	133.400	15.5	6.9	1.8	0.0	-10.5	34.7	43.5	-8.8	120/300 kHz
QP	V	228.000	12.8	11.4	2.5	0.0	-10.5	37.1	46.0	-8.9	120/300 kHz
QP	V	264.000	9.9	12.6	2.7	0.0	-10.5	35.7	46.0	-10.3	120/300 kHz
QP	V	276.000	14.1	13.0	2.8	0.0	-10.5	40.3	46.0	-5.7	120/300 kHz
QP	V	288.000	16.7	13.2	2.8	0.0	-10.5	43.2	46.0	-2.8	120/300 kHz
QP	V	300.000	14.7	13.4	2.9	0.0	-10.5	41.4	46.0	-4.6	120/300 kHz
QP	V	324.000	11.8	14.4	3.0	0.0	-10.5	39.7	46.0	-6.3	120/300 kHz
QP	V	348.000	8.7	15.2	3.1	0.0	-10.5	37.5	46.0	-8.5	120/300 kHz
QP	H	468.000	7.0	17.8	3.7	0.0	-10.5	38.9	46.0	-7.1	120/300 kHz
QP	H	588.000	7.1	19.8	4.2	0.0	-10.5	41.6	46.0	-4.4	120/300 kHz

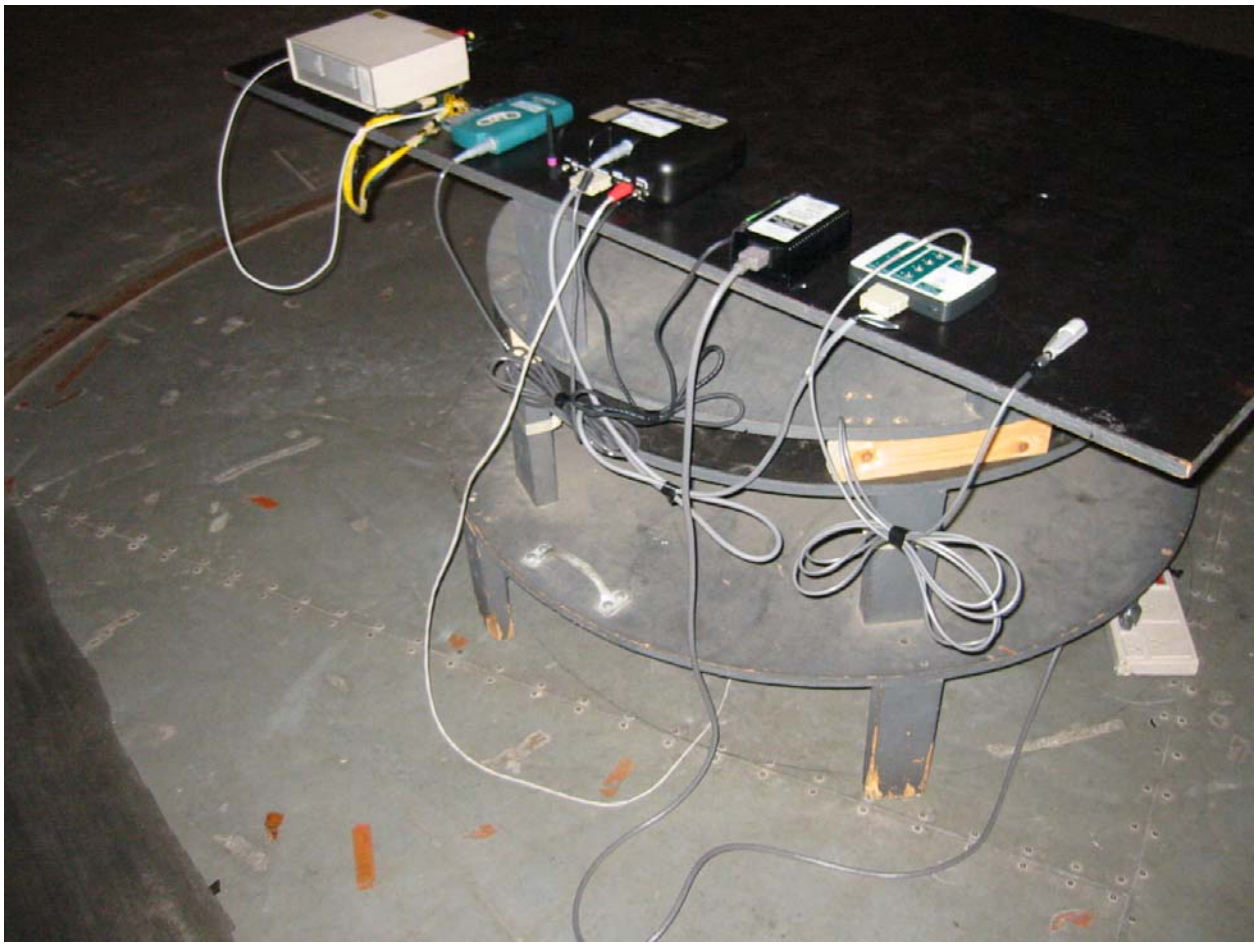
Radiated Emissions / Interference

Company:	Astro-Med, Inc.			Model #:	AURA-PSG	
Engineer:	Kouma Sinn	Barometer:	BAR2	Serial #:	#3 and #4	
Project #:	3078319	Pressure:	1001 mbar	Receiver:	R&S FSEK-30 (ROS001)	
Date:	08/11/05	Temp:	20C	N Antenna:	NONE.	NONE.
Standard:	FCC 15.209, 15.247	Humidity:	41%	LF Antenna:	NONE.	NONE.
Class:	-	Group:	-	HF Antenna:	HORN3 9-20-05 V3m.ant	HORN3 9-20-05 H3m.ant
Antenna Band:	HF	Bands:	N, LF, HF, SHF	SHF Antenna:	EMC04 11-30-05 V1.ant	EMC04 11-30-05 H1.ant
PreAmp:	PRE8 11-16-05.amp			Cable(s):	CBL027 12-1-2005.cbl	CBL029 12-1-2005.cbl
Limit Distance:	3 meters			Test Distance:	3 meters	Location: Site 2
Voltage/Frequency:	Battery & AC Powered			Frequency Range:	1-25GHz	

Peak: PK, Quasi-Peak: QP, Average: AVG, RMS: RMS, Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Duty Cycle Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
PK	V	2402.000	83.3	29.7	4.2	20.0	0.0	97.3	-	-	100/300 kHz
PK	V	2441.000	86.1	29.8	4.3	20.0	0.0	100.2	-	-	100/300 kHz
PK	V	2480.000	83.5	29.9	4.3	20.0	0.0	97.8	-	-	100/300 kHz
PK	V	4803.877	38.1	33.9	6.3	21.3	0.0	57.0	77.3	-20.3	100/300 kHz
PK	V	7205.834	32.7	36.4	8.0	20.3	0.0	56.8	77.3	-20.5	100/300 kHz
PK	V	4803.877	42.0	33.9	6.3	21.3	0.0	60.8	74.0	-13.2	1/3MHz
AVG	V	4803.877	39.5	33.9	6.3	21.3	20.0	40.8	54.0	-13.2	1/3 MHz
PK	H	4881.965	39.1	35.1	6.3	21.4	0.0	59.1	80.2	-21.1	100/300 kHz
PK	H	4881.965	39.9	35.1	6.3	21.4	0.0	59.9	74.0	-14.1	1/3MHz
AVG	H	4881.965	39.4	35.1	6.3	21.4	20.0	39.9	54.0	-14.1	1/3MHz
PK	H	7322.341	31.5	38.1	8.0	20.3	0.0	57.4	80.2	-22.8	100/300 kHz
PK	H	7322.341	36.6	38.1	8.0	20.3	0.0	62.5	74.0	-11.5	1/3MHz
AVG	H	7322.341	32.7	38.1	8.0	20.3	20.0	42.5	54.0	-11.5	1/3MHz
PK	V	4959.950	37.6	34.4	6.4	21.5	0.0	56.9	77.8	-20.9	100/300 kHz
PK	V	4959.950	37.8	34.4	6.4	21.5	0.0	57.0	74.0	-17.0	1/3MHz
AVG	V	4959.950	37.8	34.4	6.4	21.5	20.0	37.0	54.0	-17.0	1/3MHz
PK	H	7439.899	29.7	38.4	8.1	20.2	0.0	56.0	77.8	-21.8	100/300 kHz
PK	H	7439.899	32.2	38.4	8.1	20.2	0.0	58.5	74.0	-15.5	1/3MHz
AVG	H	7439.899	32.2	38.4	8.1	20.2	20.0	38.5	54.0	-15.5	1/3MHz

Setup Photos



Test Results: Pass

Test Standard: FCC 15.215

Test: Band Edge Compliance

Performance Criterion: The fundamental frequency must stay within the assigned frequency band.

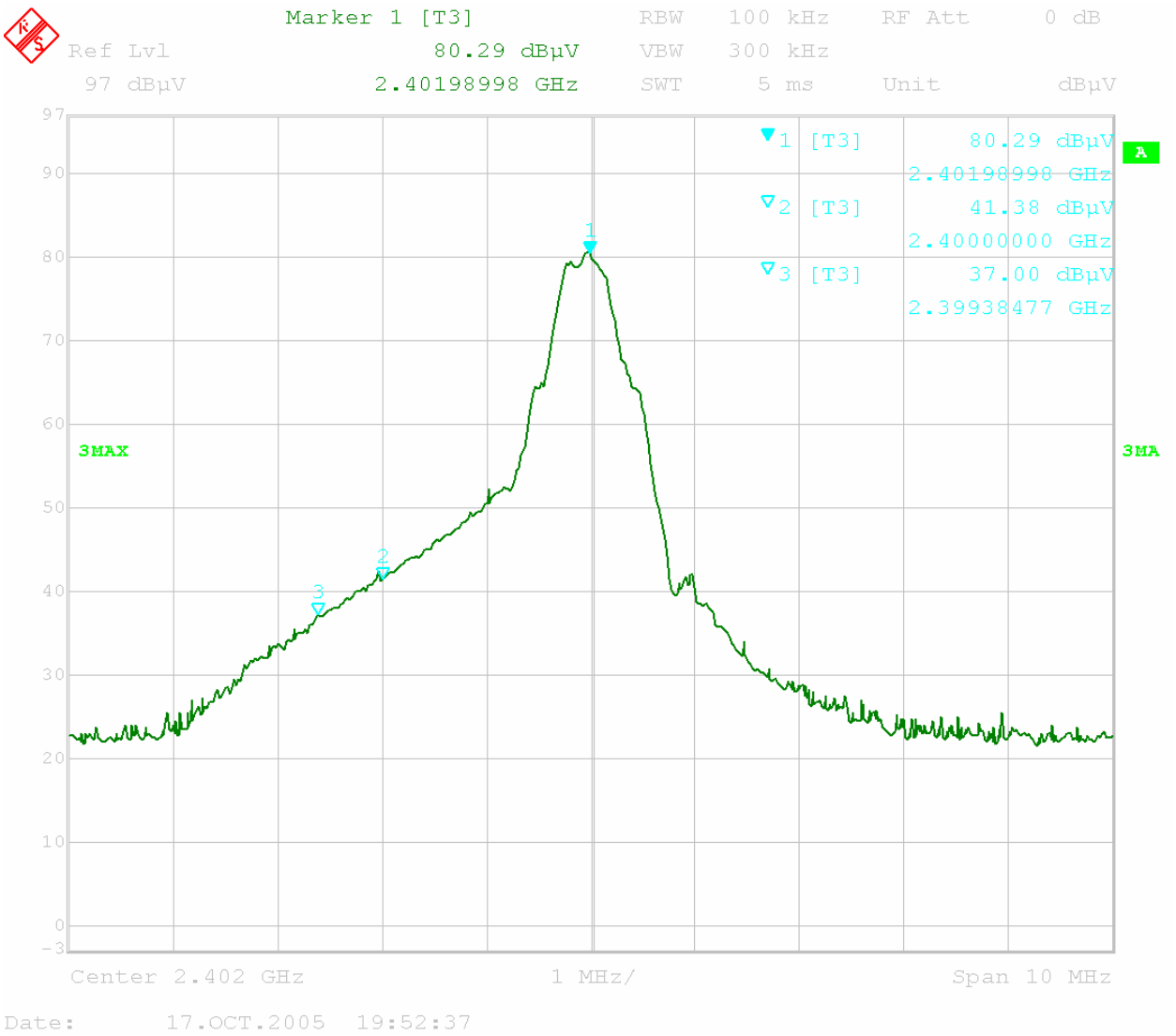
Test Date: 10/17/2005 **Engineer Initials:** NNA **Date:** 10/27/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** PWH **Date:** 10-27-05

Test Equipment Used:

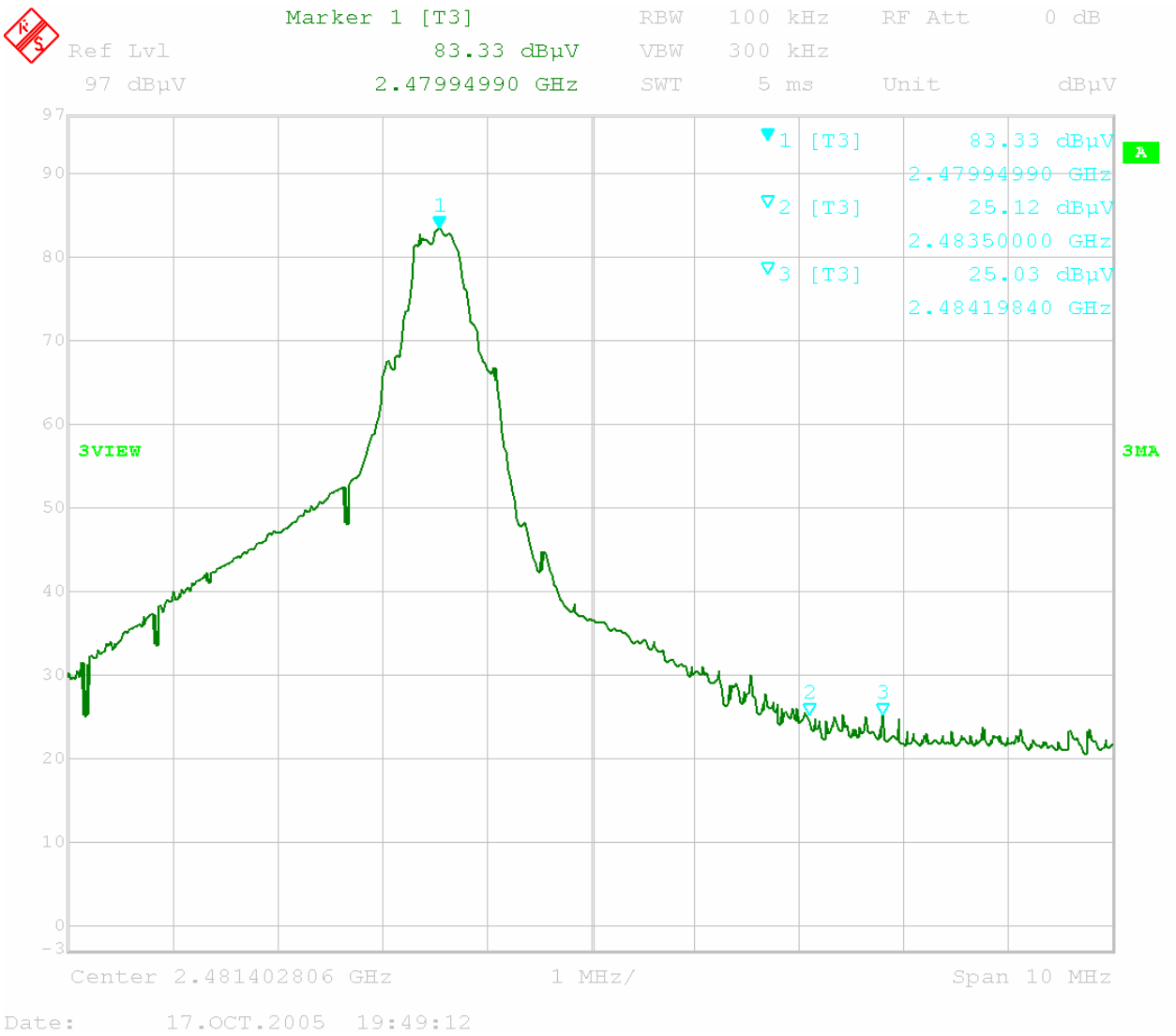
Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
HORN3	EMCO	3115	9610-4980	09/13/2006
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
CBL030	Megaphase	TM40 K1K1 80	CBL030	12/01/2005
ROS001	Rohde & Schwarz	FSEK-30	100225	07/26/2006
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005

Test Details:

Notes: The upper and lower channels (channels 0 and 78) were observed using a 100 kHz bandwidth. A marker was placed at the peak of the fundamental. Another marker was placed at the band edges, 2400 MHz and 2483.5 MHz and at the highest signal level above and below the band edge. It can be seen that the highest signal level below the 2400 MHz band edge is 38.9 dB below the peak signal level of the 2402 MHz fundamental, and the highest signal level above the 2483.5 MHz band edge is 58.2 dB below the peak signal level of the 2480 MHz fundamental.



Channel 0 – 2402 MHz



Channel 78 – 2480 MHz

Test Results: Pass

Test Standard: FCC 15.207

Test: AC Line-Conducted Spurious Emissions

Performance Criterion: Emissions must meet the general limits of 15.207.

Software:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

Test Date: 6/24/2005
Test Engineer: Vathana Ven

Engineer Initials: VV **Date:** 10/27/05
Reviewer Initials: [illegible] **Date:** 10-27-05

Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
CBL022	Belden	RG-58/U	CBL022	11/17/2005
DS22A	Mini Circuits	20 dB, 50 Ohm	DS22A	11/17/2005
REC2	Hewlett Packard	8542E	3520A00125	02/08/2006
RECFL2	Hewlett Packard	85420E	3427A00126	02/08/2006
BAR2	Mannix	0ABA116	BAR2	07/02/2005
LISN12	Solar Electronics	9252-50-R-24-BNC	941714	07/26/2005

Test Details:

Conducted Emissions / Interference

Company:	Astro-Med, Inc.			Model #:	AURA-PSG
Engineer:	Vathana F. Ven	Barometer:	BAR2	Serial #:	Prototype
Project #:	3078319	Pressure:	1007 mb	Receiver:	HP 8542E (REC2/RECFL2)
Date:	06/24/05	Temp:	21c	Cable:	CBL022 11-17-2005.cbl
Standard:	FCC 15.207	Humidity:	43%	LISN 1, 2:	LISN12 [1] 7-26-05.lsn LISN12 [2] 7-26-05.lsn
Class:	-	Group:	-	LISN 3, N:	NONE. NONE.
				Attenuator:	DS22A 11-17-2005.att Location: Site 2

Voltage/Frequency: 120 Vac/60 Hz Frequency Range: 0.150-30 MHz

Net is the sum of worst-case lisn, cable, & attenuator losses, preamp gain, and initial reading

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	QP Limit dB(uV)	Margin dB	Bandwidth
QP	0.150	28.6			27.6	48.8	66.0	-17.2	9/30 kHz
QP	0.200	32.5			31.3	52.7	63.6	-10.9	9/30 kHz
QP	4.216	22.8			22.2	43.3	56.0	-12.7	9/30 kHz
QP	4.949	23.5			22.6	44.0	56.0	-12.0	9/30 kHz
QP	5.996	27.3			23.2	47.8	60.0	-12.2	9/30 kHz
QP	11.130	29.3			27.8	50.0	60.0	-10.0	9/30 kHz
QP	17.630	27.9			28.0	48.8	60.0	-11.2	9/30 kHz
QP	19.140	26.0			26.1	47.0	60.0	-13.0	9/30 kHz

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	Average Limit dB(uV)	Margin dB	Bandwidth
AVG	0.150	8.5			12.3	32.4	56.0	-23.6	9/30 kHz
AVG	0.200	2.0			-5.3	22.2	53.6	-31.4	9/30 kHz
AVG	4.216	18.8			19.6	40.0	46.0	-6.0	9/30 kHz
AVG	4.949	10.3			8.9	30.8	46.0	-15.2	9/30 kHz
AVG	5.996	23.7			17.0	44.2	50.0	-5.8	9/30 kHz
AVG	11.130	23.3			22.2	44.0	50.0	-6.0	9/30 kHz
AVG	17.630	27.0			27.3	47.9	50.0	-2.1	9/30 kHz
AVG	19.140	25.0			25.4	46.0	50.0	-4.0	9/30 kHz

Setup Photos