2.10 Field Strength of Spurious Radiation (FCC Section 2.1053)

Spurious emissions were evaluated from 30 MHz to 16.2 GHz at an EUT to antenna distance of 1 or 3 meters. The EUT was tested with an external power source and modulated by its own internal sources. Both a low and high channel were tested. The EUT was placed on an open area test site and the spurious emissions tested as stipulated by EIT/TIA-603: 1992 section 2.2.12. Measurements for 30 to 1000 MHz were made with the analyzer's bandwidth set to 120 kHz. Measurements above 1 GHz were made with the analyzer's bandwidth set to 1 MHz. The worse case results are shown in Table 4.

FCC Minimum Standard (FCC Section 25.202(f))

For out-of-band emissions for frequencies removed from the midpoint of the assigned frequency segment by more than 250% of the authorized bandwidth (2.5 MHz), at least

$$43 + 10 \log (P_{Watts})$$ attenuation below the mean power of the transmitter.

For Lowest Channel = 43 + 10 log (0.153) = 34.8 dB
For Highest Channel = 43 +10 log (0.159) = 35.0 dB

TABLE 4a
FIELD STRENGTH OF SPURIOUS RADIATION
Antenna with +4 dBi gain

Limit: 43 + 10 log (P_{Watts}) = 43 + 10 log (0.1462) = 34.6 dB

Worse Case Mode = High Channel

Frequency (MHz)	Polarity (H or V)	Corrected Substitution Level Relative to Dipole (dBm)	Attenuated Level Below Carrier Power (dB)
3223	V	-34.9	56.5

SAMPLE CALCULATION:

Attenuated Level Below Carrier Power =
10 log (TX Power in mW) – Corrected Substitution Level (dBm)
10 log (146.2) - -34.9 = 56.5

Test Date: June 26, 2003

Tester Signature: David P. Blethen **Name: David Blethen**

TABLE 4b

FIELD STRENGTH OF SPURIOUS RADIATION
Antenna with +5.5 dBi gain

Limit: 43 + 10 log (P_{Watts}) = 43 + 10 log (0.153) = 34.8 dB

Channel	Frequency (MHz)	Polarity (H or V)	Corrected Substitution Level Relative to Dipole (dBm)	Attenuated Level Below Carrier Power (dB)
Low	4.83368	V	-53.11	75.0
High	4.85618	H	-51.86	73.9

All other Harmonic frequencies were below 20 dB of the FCC Limits.

SAMPLE CALCULATION:

Attenuated Level Below Carrier Power =
10 log (TX Power in mW) – Corrected Substitution Level (dBm)
10 log (0.153) –53.11 = 75.0

Test Date: October 1, 2004

Tester Signature:  **Name: David Blethen**

2.11 Frequency Stability (FCC Section 2.1055 and 25.202(d))

The frequency tolerance of the carrier signal was measured by while ambient temperature was varied from -30 to 50 degrees centigrade. The frequency tolerance was verified at 10 degree increments. Additionally, the supply voltage was varied from 85% to 115% of the nominal value (except for hand carried, battery powered equipment which was additionally measured at battery endpoint).

FCC Minimum Standard

None

Report Number: 04-0017 FCC Part 25, Certification
Customer: Axonn, L.L.C.
Model: STU

FCC Verification
Axonn Model G-SENS STU
Frequency Stability vs. Temperature (At Startup)

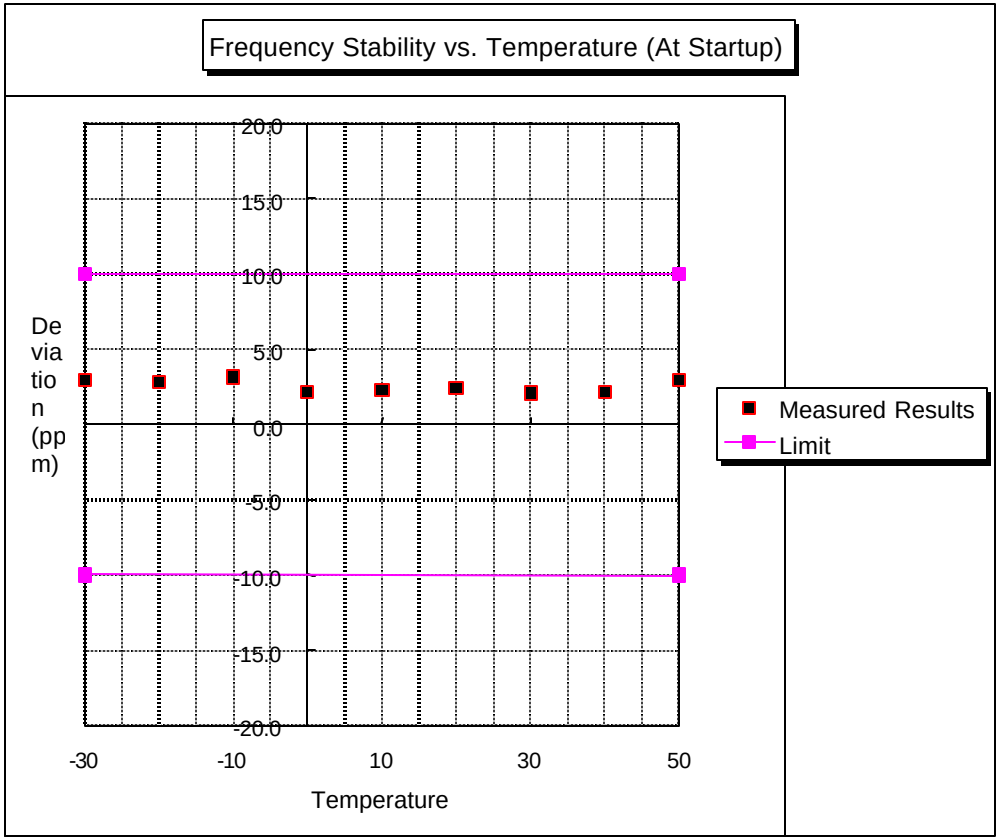
Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	1611.254800	3.0
-20	1611.254605	2.9
-10	1611.255092	3.2
0	1611.253494	2.2
10	1611.253762	2.3
20	1611.253917	2.4
30	1611.253370	2.1
40	1611.253438	2.1
50	1611.254805	3.0

Actual TX Frequency was: 1611.250 MHz

Maximum Deviation = 0.001% or 10 ppm

Test Results Reviewed By:

Timothy R. Johnson
NARTE Certified Engineer



Report Number: 04-0017 FCC Part 25, Certification
Customer: Axonn, L.L.C.
Model: STU

FCC Verification
Axonn Model G-SENS STU
Frequency Stability vs. Temperature (2 minutes after startup)

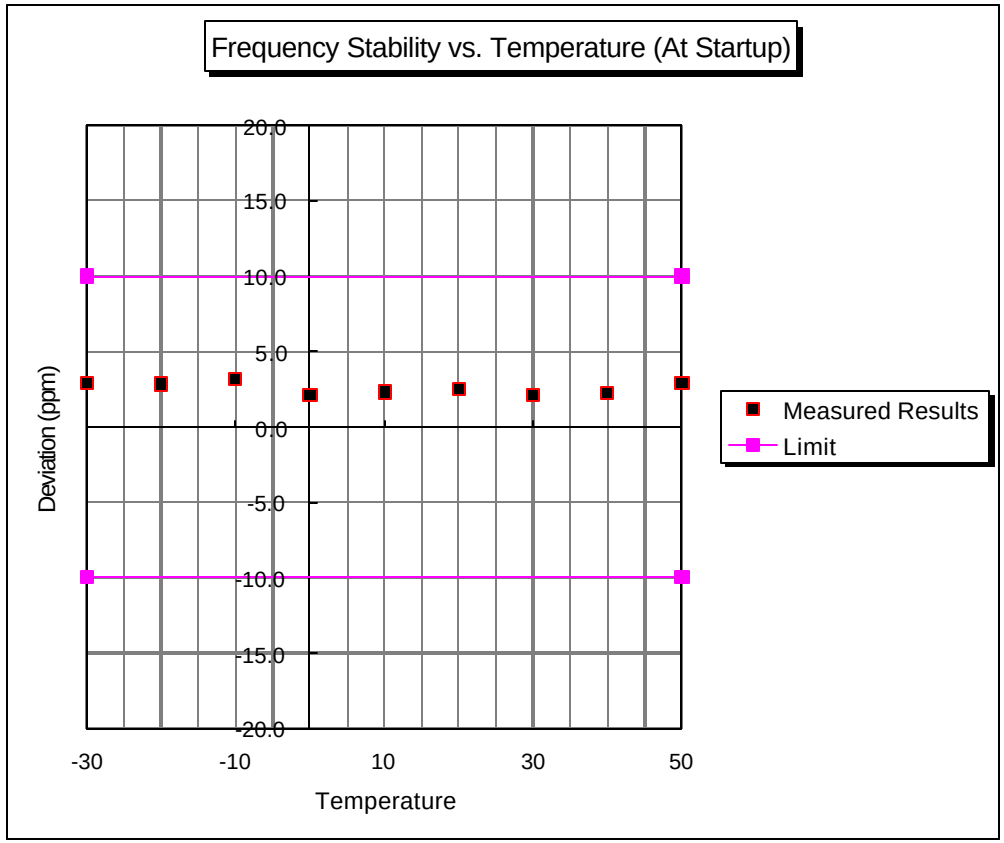
Test Results Reviewed By:

Timothy R. Johnson
NARTE Certified Engineer

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	1611.254700	2.9
-20	1611.254561	2.8
-10	1611.255036	3.1
0	1611.253346	2.1
10	1611.253730	2.3
20	1611.253989	2.5
30	1611.253366	2.1
40	1611.253609	2.2
50	1611.254733	2.9

Actual TX Frequency was: 1611.250 MHz

Maximum Deviation = 0.001% or 10 ppm



Report Number: 04-0017 FCC Part 25, Certification
Customer: Axonn, L.L.C.
Model: STU

FCC Verification
Axonn Model G-SENS STU
Frequency Stability vs. Temperature (5 minutes after startup)

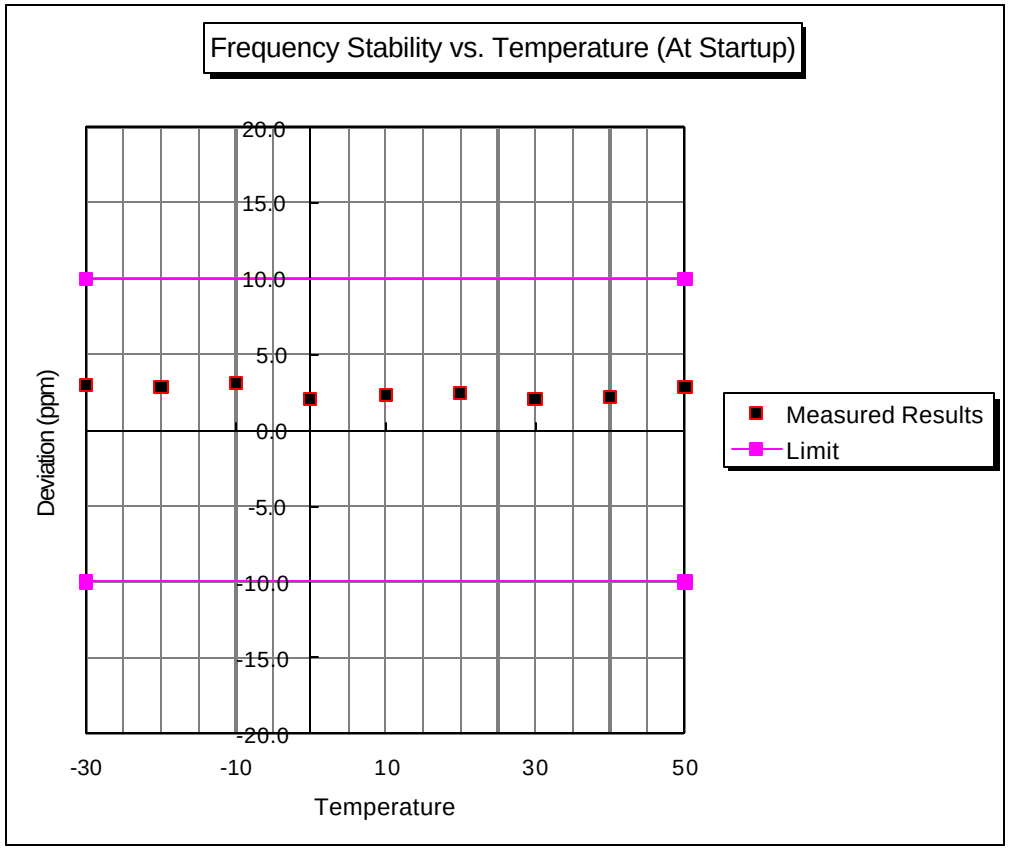
Test Results Reviewed By:

Timothy R. Johnson
NARTE Certified Engineer

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	1611.254900	3.0
-20	1611.254613	2.9
-10	1611.255040	3.1
0	1611.253374	2.1
10	1611.253757	2.3
20	1611.253953	2.5
30	1611.253318	2.1
40	1611.253554	2.2
50	1611.254673	2.9

Actual TX Frequency was: 1611.250 MHz

Maximum Deviation = 0.001% or 10 ppm



Report Number: 04-0017 FCC Part 25, Certification
Customer: Axonn, L.L.C.
Model: STU

FCC Verification
Axonn Model G-SENS STU
Frequency Stability vs. Temperature (10 minutes after startup)

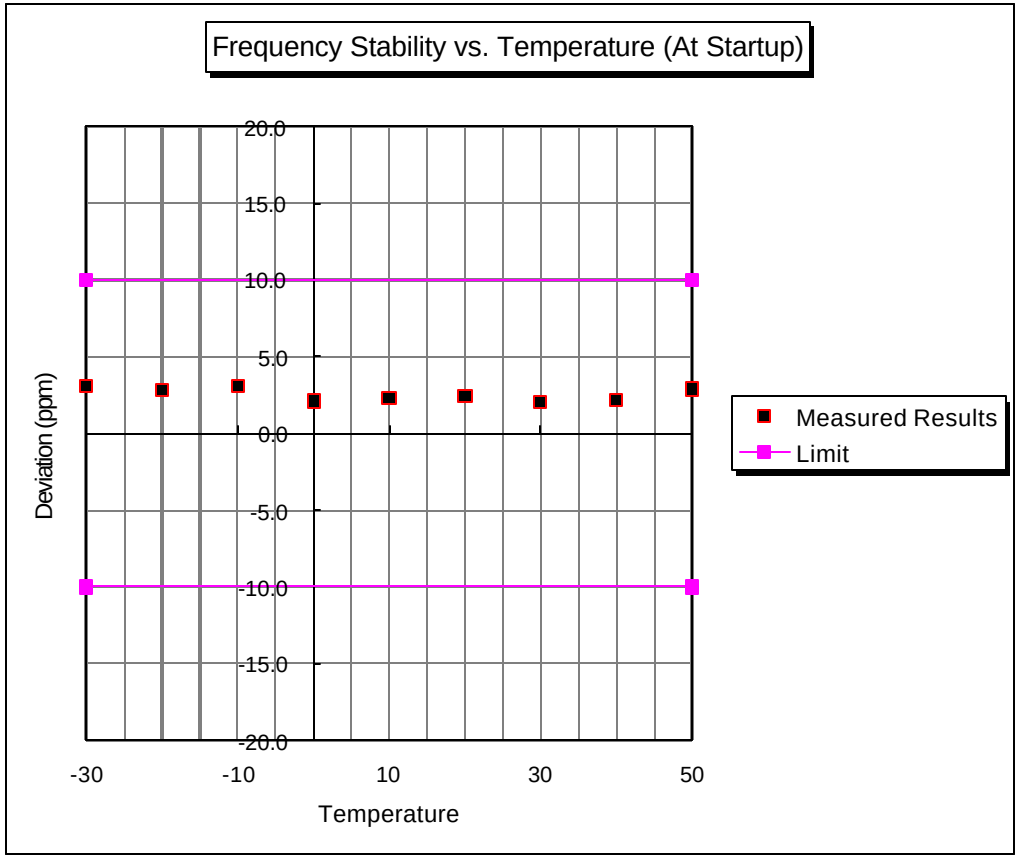
Test Results Reviewed By:

Timothy R. Johnson
NARTE Certified Engineer

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	1611.255050	3.1
-20	1611.254581	2.8
-10	1611.255036	3.1
0	1611.253398	2.1
10	1611.253773	2.3
20	1611.253973	2.5
30	1611.253346	2.1
40	1611.253562	2.2
50	1611.254661	2.9

Actual TX Frequency was: 1611.250 MHz

Maximum Deviation = 0.001% or 10 ppm



Report Number: 04-0017
Customer: Axonn, L.L.C.
Model: STU

FCC Part 25, Certification

FCC Verification
Axonn Model G-SENS STU
Frequency Stability vs. Voltage

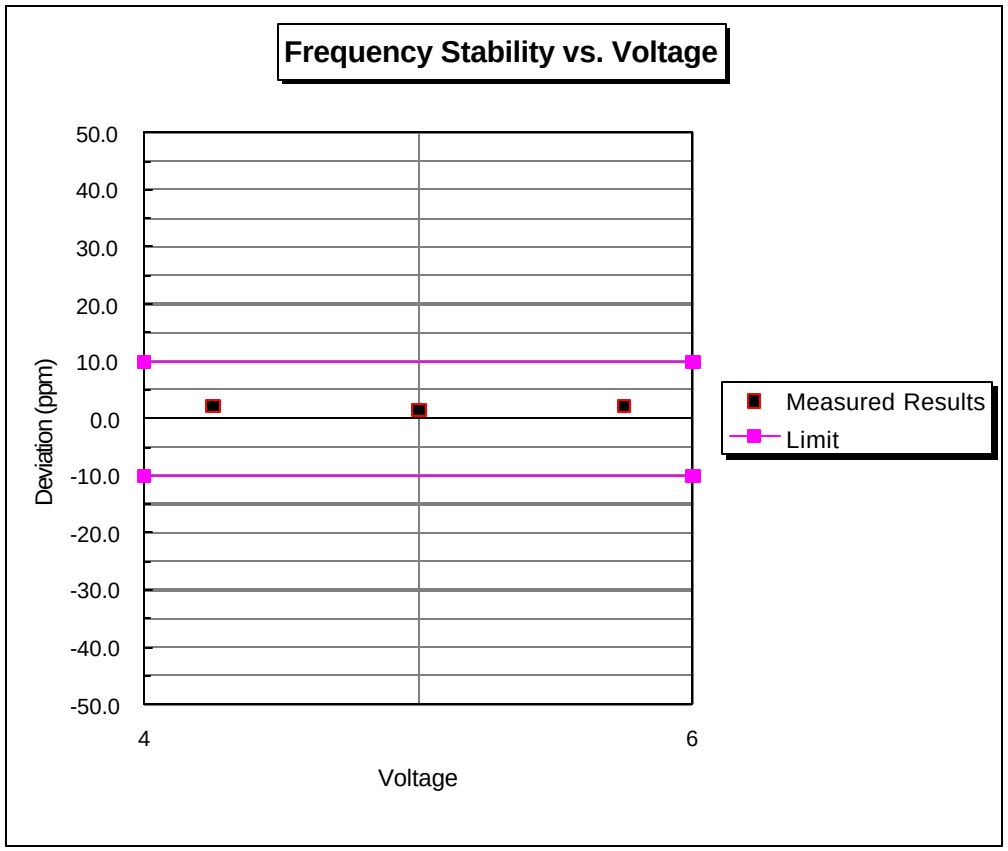
Test Results Reviewed By:

Timothy R. Johnson
NARTE Certified Engineer

Voltage (V DC)	Measured Frequency (MHz)	Deviation (ppm)
4.25	1611.253554	2.2
5	1611.252602	1.6
5.75	1611.253689	2.3

Actual TX Frequency was: 1611.250 MHz

Maximum Deviation = N/A



2.12 Emissions from Mobile Earth Stations for Protection of Aeronautical Radio Navigation-Satellite Service. (FCC Section 25.216)

Emissions from the EUT were evaluated from 1559 MHz – 1605 MHz and did not exceed the limit at -70dBW/MHz, averaged over 20 milliseconds.

Emissions from the EUT were evaluated from 1605 MHz – 1610 MHz and did not exceed the limits ranging from –70 dBW/MHz at 1605 MHz to –10dBW/MHz at 1610 MHz, averaged over 20 milliseconds.

Emissions were measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminal with the Resolution Bandwidth set to 1 MHz. Results are shown on figures 7a -7c.

Figure 7a.
Emissions from Mobile Earth Stations for Protection of Aeronautical Radio-navigation-Satellite Service

Limit = - 70 dBW/ MHz to –10 dBW/MHz + 4 dBi (-44 dBm to +16 dBm)

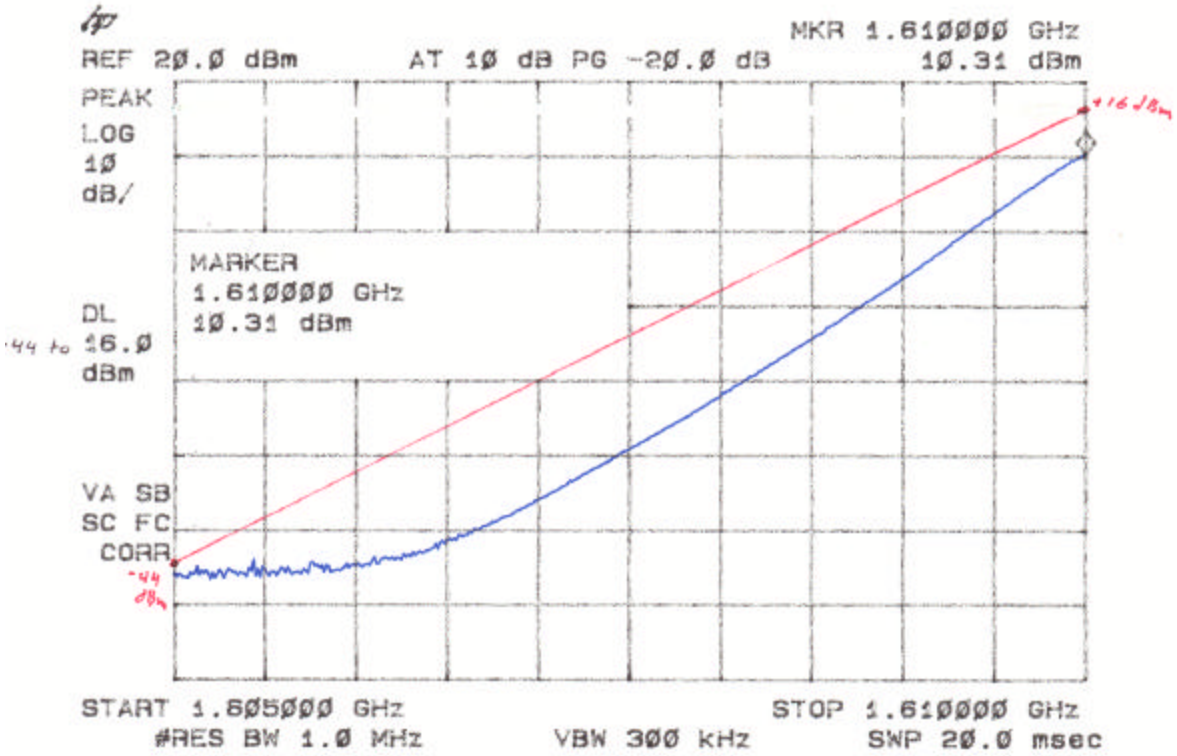


Figure 7b.
Emissions from Mobile Earth Stations for Protection of Aeronautical Radio-navigation-Satellite Service

Limit = - 70 dBW/MHz + 4 dBi (-44 dBm)

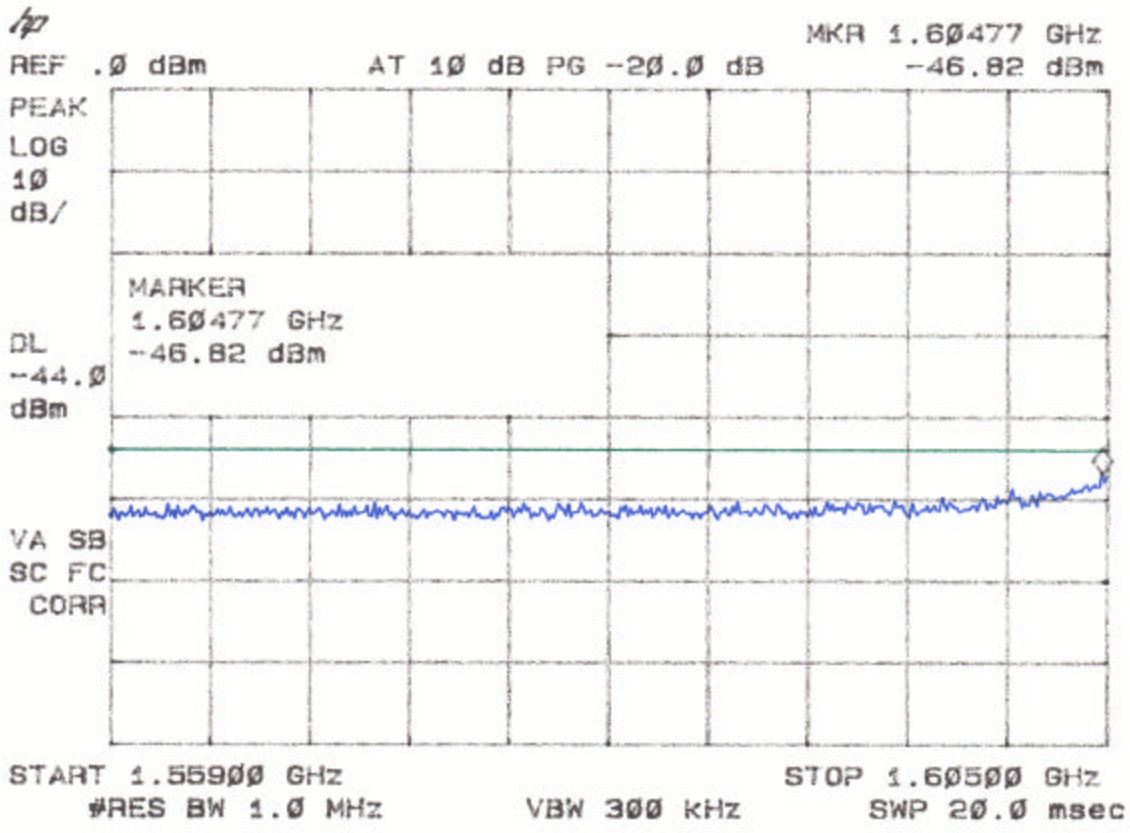
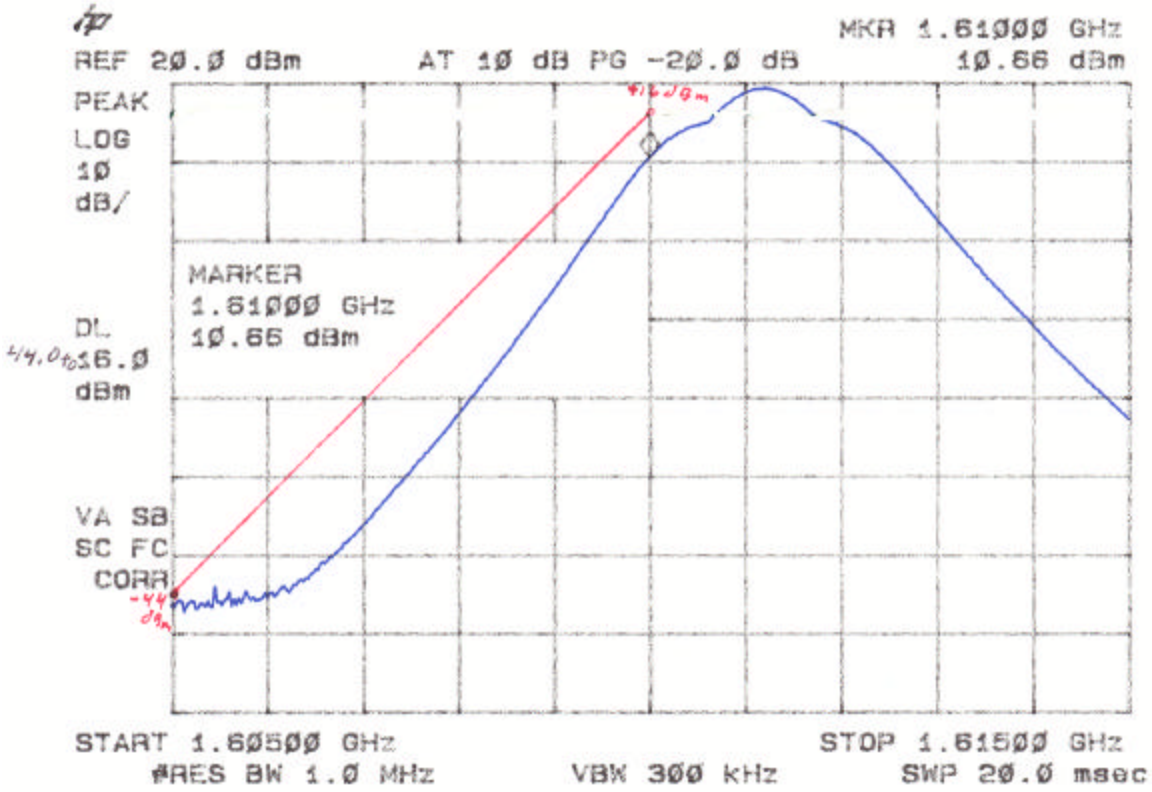


Figure 7c.
Emissions from Mobile Earth Stations for Protection of Aeronautical Radio-navigation-Satellite Service

Limit = -70 dBW/MHz to –10 dBW/MHz + 4 dBi (-44 dBm to +16dBm)



SECTION 3

PHOTOGRAPHS

PHOTOS OF THE TESTED EUT

The following photos are attached:

Photo 1. Front View – Test Unit
Photo 2. Back View - Test Unit
Photo 3. Top View Motherboard and Transmitter
Photo 4. Motherboard, Bottom – Test Unit
Photo 5. Transmitter, Bottom
Photo 6. Transmitter, Top

Report Number:	04-0017	FCC Part 25, Certification
Customer:	Axonn, L.L.C.	
Model:	STU	

Photo 1. Front View – Test Unit

Photo 2. Back View – Test Unit

Photo 3. Top View Motherboard and Transmitter

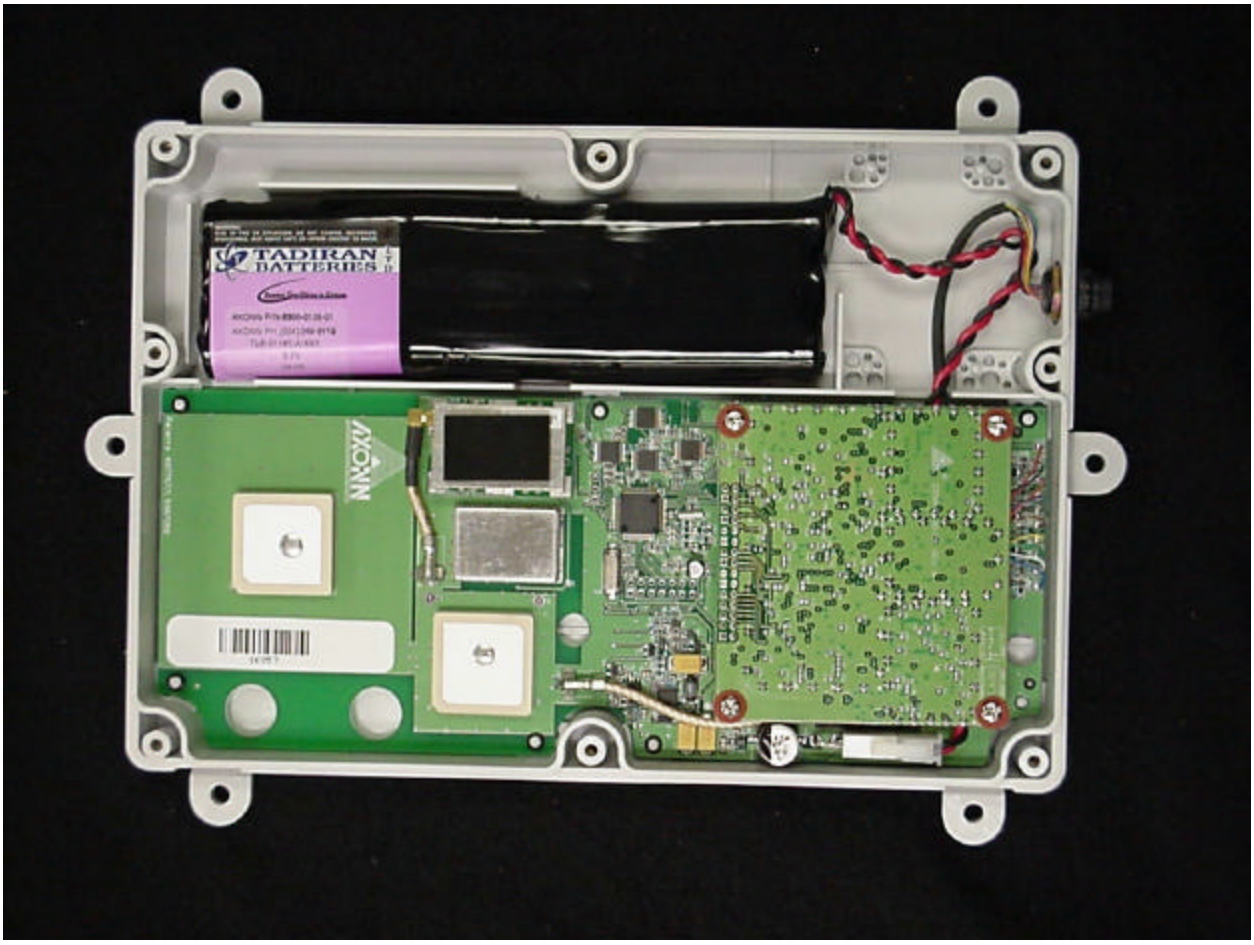


Photo 4. Motherboard, Bottom – Test Unit

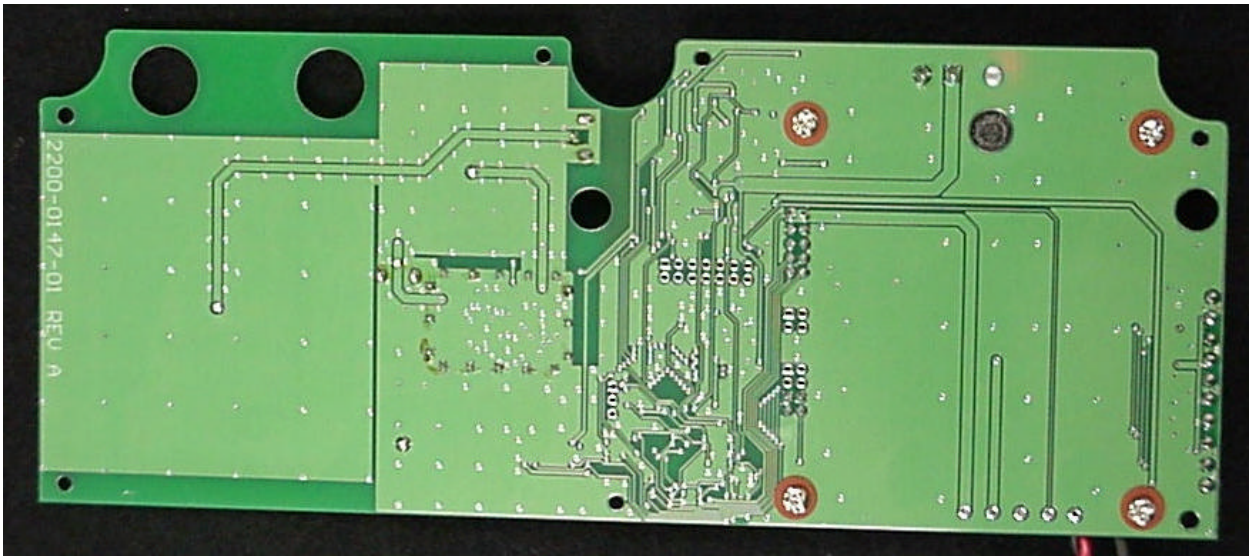


Photo 5. Transmitter, Bottom

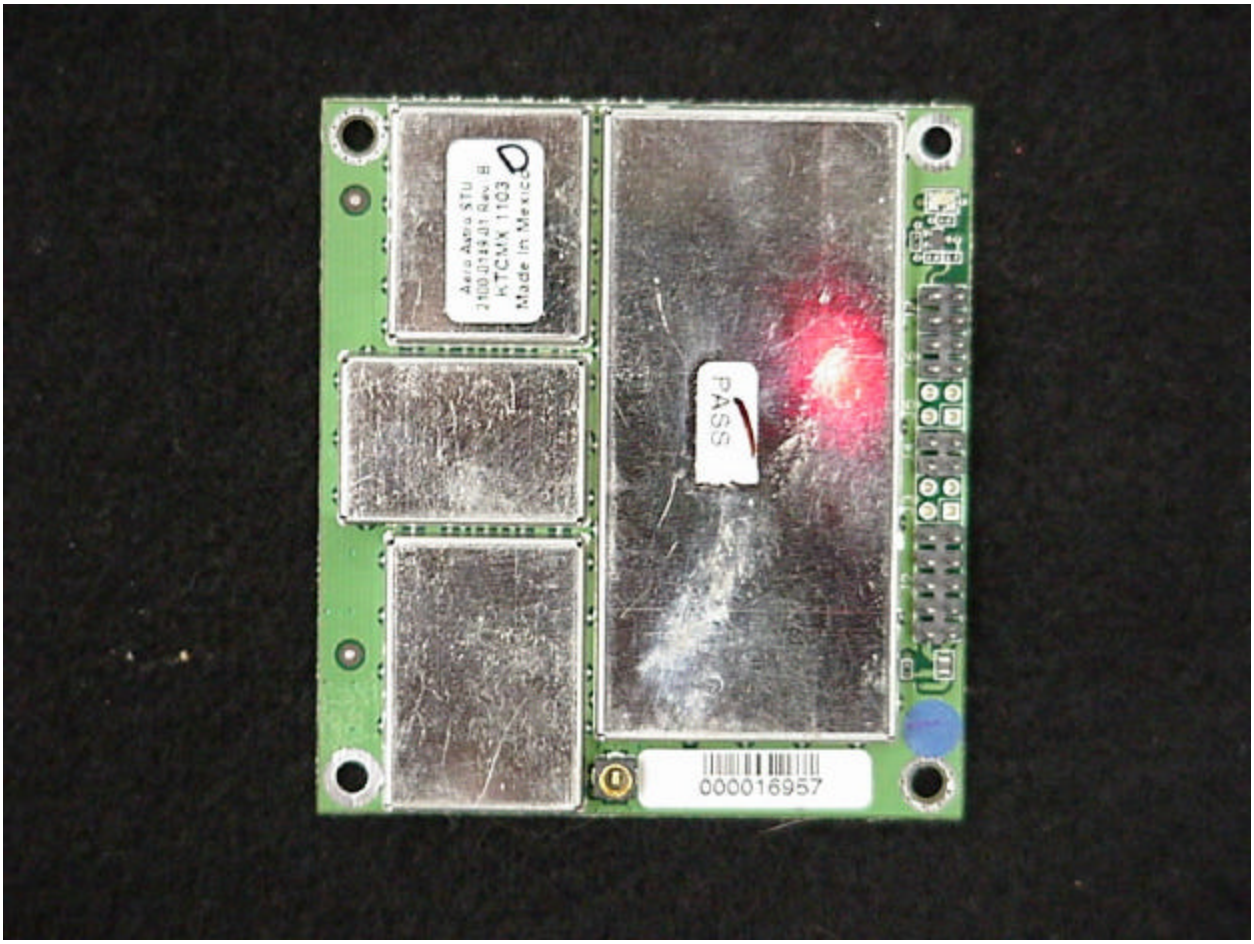
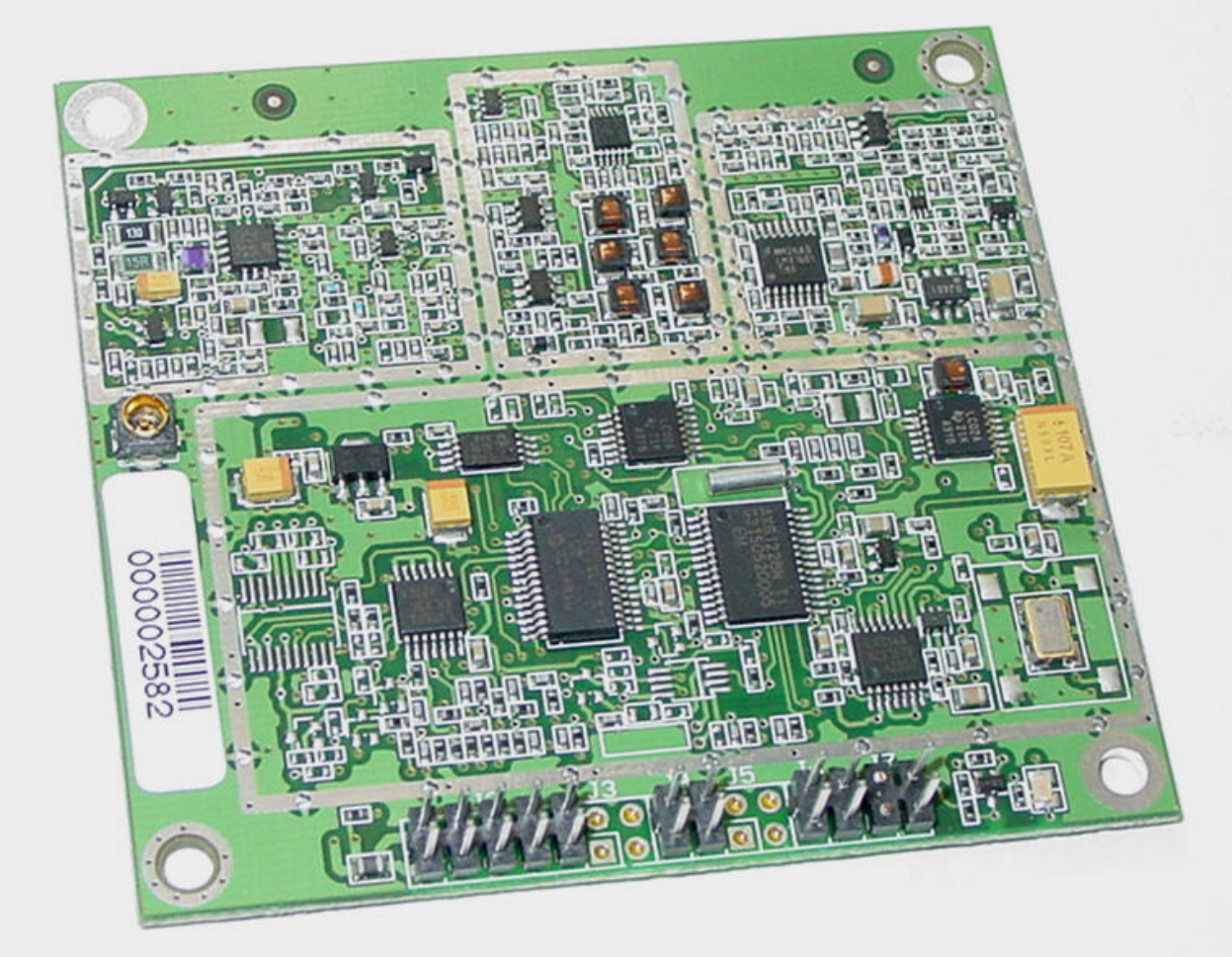


Photo 6. Transmitter, Top



SECTION 4

RF EXPOSURE INFORMATION

4.1 RF Safety Requirements to 2.1091 for Mobile Transmitters

Power Output

The EUT's maximum expected output power as shown in section 2.6 is

Frequency of Fundamental (MHz)	Measurement (dBm)	Measurement (Watt)
1618.60	22.01	0.159

Calculating +5.5 dBi gain antenna (worst case – vs – 4 dBi gain antenna)

0.159 * 5.5 = 0.875 W

Source Based Time Averaging

This information has not been included and the MPE calculations specified below do not take into consideration any duty cycle correction.

MPE Calculations

The limits for this unit (uncontrolled exposure) is 1.0 mW/cm^2. Taking the RF Density Field Equation:

S = (EIRP in mW)/($4\pi R^2$) and solving for Field Density S

Solving the above equation yields

S = (875(mW)/($4*\pi*$(20 cm)^2) = 0.174 mW/cm^2

The device should be installed to maintain 20 cm from humans during use. Information regarding installation and use should be contained in the users manual.