Lab Code: 200167-0

FCC PART 25
MEASUREMENT AND TEST REPORT

For

Qualcomm Incorporated

5775 Morehouse Drive,
San Diego, CA 92121, USA

FCC ID: J9CGSSDVM
Model: GSP-1720

Report Type:	**Product Type:**
☒ Class II Permissive Change	Satellite Transmitter Module

Test Engineer:	Oscar Au
Report Number:	R0702262-25
Report Date:	2007-03-24
Reviewed By:	Test Engineer: James Ma
Prepared By: (ct)	Bay Area Compliance Laboratories Corp. (BACL) 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The *Qualcomm Incorporated's* product, FCCID: J9CGSSDVM, model number: GSP-1720 as referred to in this report is a duplex, Satellite Transmitter Module that operates in Qualcomm mode only. It is an indoor mobile device, which is powered by an external DC power source provided by the user and communicates directly with overhead Qualcomm satellites and via those satellites to the nearest Globalstar Gateway and through the Gateway the rest of the network. Qualcomm provides the antenna cables (with SMA connectors), to meet customer antenna-cable length needs.

The service supports voice and data communications and provides user position location information. The User Terminal uses Code Division Multiple Access (CDMA) technology to provide secure, dependable service to the user. It is a transceiver that integrates a number of new features including a more efficient power management system, passive and powered antenna capability for enhanced performance plus multiple ports connectively with both USB and serial connections. Qualcomm also develops an Integrator's Kit which including the modem, software, user manual, cable and etc. The operating transmit frequency is: 1610-1625 MHz; receive frequency is: 2484-2499 MHz.

1.2 Mechanical Description:

The *Qualcomm Incorporated's* product, FCCID: J9CGSSDVM measures approximately 2*70 mmL x240 mmW x 130 mmH and weighs 1 kg*.

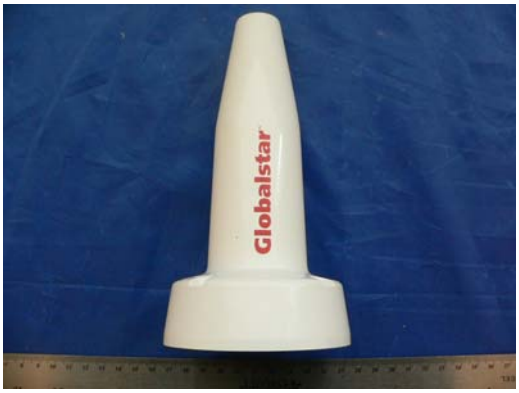
** The test data gathered are from production sample: 0104 provided by the manufacturer.*

1.3 Antenna Description

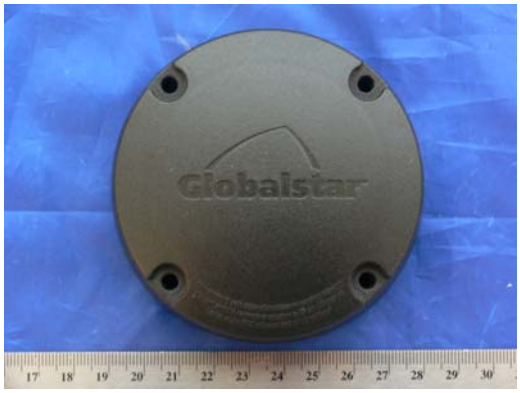
The antennae used are external, portable antennae for outdoor use. The patch antenna and passive TX/RX QFH antenna are mounted using fixed mounted screws whereas the active TX/RX QFH has a non-marring rubber base and magnet for attaching to any steel surface and mounting holes are also provided for fixed mounted screws.

Item Number	Model/Type	
Passive TX/RX Patch Antenna	P/N/ Model number:	826342-901-TG/ GAT-17PP
	Manufacturer:	Richardson Electronics
	Frequency Range:	TX: 1610 – 1626.5 MHz
	Connector Type/ Maximum Gain	SMA connector/ 4.5 dBi
	Antenna Type/ Pattern:	Passive Patch
	Measurement:	Length: 89 mmD x 38 mmH; Weight: 207 g
Active TX/RX Quadrafilar Helix (QFH) Antenna	P/N/ Model number:	826422-901-TG/ GAT-17HX
	Manufacturer:	Richardson Electronics
	Frequency Range:	TX: 1610 – 1626.5 MHz
	Connector Type/ Maximum Gain	SMA connector/ 3.3 dBi
	Antenna Type/ Pattern:	Active Quandrafilar Helix
	Measurement:	Length: 91 mmD x 177 mmH; Weight: 399 g
Passive TX/RX Quadrafilar Helix (QFH) Antenna	P/N/ Model number:	826421-901-TG/ GAT-17PH
	Manufacturer:	Richardson Electronics
	Frequency Range:	TX: 1610 – 1626.5 MHz
	Connector Type/ Maximum Gain	SMA connector/ 3.3 dBi
	Antenna Type/ Pattern:	Passive Quandrafilar Helix
	Measurement:	Length: 91 mmD x 177 mmH; Weight: 399 g

Active TX/RX Quadrafilar Helix (QFH) View



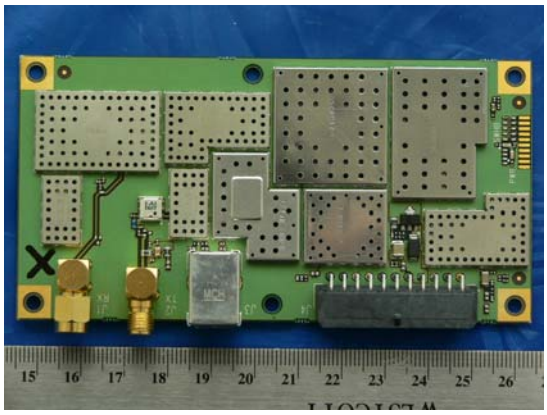
Passive TX/RX Quadrafilar Helix (QFH) View



Passive TX/RX Patch Antenna View

Please see Exhibit C for additional EUT photos

1.4 EUT Photo



Modem View

Please see Exhibit C for additional EUT photos

1.5 Objective

This type approval report is prepared on behalf of *Qualcomm Incorporated* in accordance with Part 2, Subpart J, and Part 25, Subparts C of the Federal Communication Commissions rules. Qualcomm Incorporated authorizes Globalstar, Inc. to perform a FCC Class II permissive change to the Satellite Transmitter Module GSP-1720.

The objective is to determine continued compliance with FCC Part 25 Standard's requirements for Power output, Occupied Bandwidth, RF exposure, spurious emission at Antenna Terminals, Field Strength of Spurious Radiation, Frequency Stability/ Tolerance, Spectrum Investigated, Emission Limitations (Emission Mask), Power Limits, Antenna Performance, Emission from Mobile Earth Station for Protection of Aeronautical Radio navigation-Satellite Service (e.i.r.p. density) after the class II permissive change made by Qualcomm Incorporated.

FCC ID: J9CGSSDVM is electrically identical to the same FCC ID tested by Qualcomm Incorporated, project number: TL80-C6569-102 Rev. A. The only change that has been made to the EUT is the addition of three new antennae: Active TX/RX Quadrafilar Helix (QFH, maximum gain 3.3 dBi), Passive TX/RX Quadrafilar Helix (QFH maximum gain 3.3 dBi) and Passive TX/RX Patch Antenna (maximum gain 4.5 dBi) have been added to the EUT. Please refer to Qualcomm Incorporated's Description letter filed along with this submission.

1.6 Related Submittal(s)/Grant(s)

Qualcomm Incorporated's report, project number: TL80-C6569-102 Rev. A, FCCID: J9CGSSDVM, granted on 2007-05-09.

1.7 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603-C.

1.8 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.9 Test Facility

The test site used by BACL Corp. to conduct and collect safety measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11, 1997 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-2463 and C-2698. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm.

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The host system was configured for testing according to TIA/EIA 603-C.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Exercise Software

The EUT was operating in max power mode during radiated and conducted testing.

2.3 Special Accessories

NA

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Laptop	560	78-HN065 97/04
Anritsu	Globalstar User terminal tester	MT8803G	MB06886
Anritsu	Globalstar User terminal tester	MT8803G	MB08587

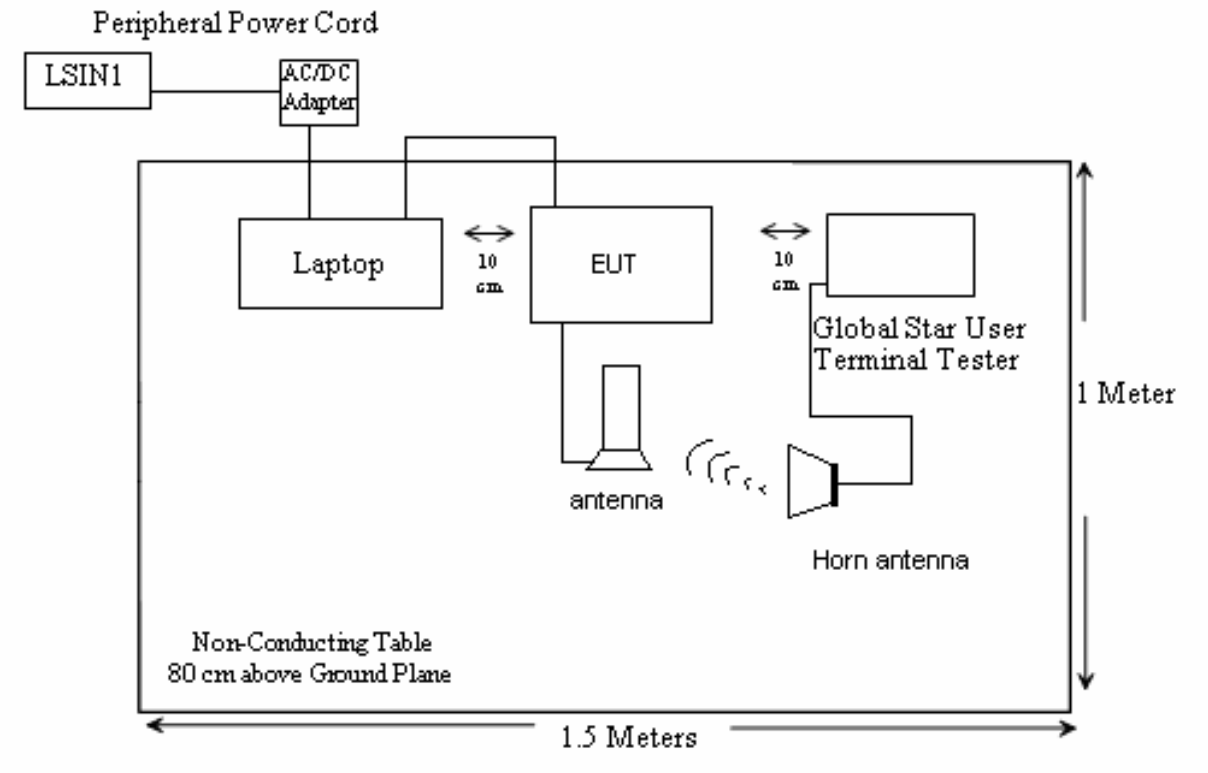
2.6 Power Supply Information

Manufacturer	Description	Model	Serial Number
HP	DC regulated power supply	6236B	2003A05705
BK Precision	DC regulated power supply	1740	26502000233

2.7 External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
USB cable	1.5	Laptop (IBM)	EUT

2.8 Test Setup Block Diagram



3 SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC Rules	Description of Test	Result
§25.209	Antenna Performance	Compliant
§1.1307(b)(1) & §2.1091	RF Exposure	Compliant
§2.1047 (d)	Modulation Characteristics	NA
§2.1051	Spurious Emission at Antenna Terminals	Compliant
§2.1053 & §25.202(f)	Field Strength of Spurious Radiation	Compliant
§25.202(f)	Emission Limitations (Emission Mask)	Compliant
§2.1049	Occupied Bandwidth	Compliant
§2.1046 & §25.204	Power Output	Compliant
§25.204(a)	Power Limits	Compliant
§25.216 (c) &/or (f)	Emission from Mobile Earth Station for Protection of Aeronautical Radio navigation-Satellite Service (e.i.r.p. density)	Compliant
§2.1055 & §25.202(d)	Frequency Stability/ Tolerance	Compliant*
§15.107	AC Line Conducted Emission	N/A
§2.1057	Spectrum Investigated	Compliant
§25.202(a)(4)(i)	1610 – 1626.5 GHz Authorized Frequency	NA
§25.213	Protection of Radio astronomy	site dependent

**Test data is derived from Qualcomm Incorporated's report, report number: TL80-C6569-102 Rev A. Please refer to the enclosed authorization letter from Qualcomm Incorporated.*

4 §1.1307(b) (1) & §2.1091 - RF EXPOSURE

4.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

4.2 MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal (dBm):	29.17
Maximum peak output power at antenna input terminal (mW):	826.04
Prediction distance (cm):	25.0
Prediction frequency (MHz):	1615.65
Maximum Antenna Gain, typical (dBi):	4.5
Maximum Antenna Gain (numeric):	2.82
Power density of prediction frequency at 25.0 cm (mW/cm^2):	0.297
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.00

4.3 Test Result

The power density of prediction frequency at 25 cm is 0.297 mW/cm^2 for the 4.5 dBi antenna which is compliant according to calculation under the MPE limit for uncontrolled exposure of 1.00 mW/cm^2.

5 §2.1047 – MODULATION CHARACTERISTICS

The EUT uses digital modulation techniques only which were employed during the tests for occupied bandwidth. Part 25 does not have a modulation characteristics requirement for digital modulation thus this section is not applicable.

6 §2.1051 & §25 – SPURIOUS EMISSIONS AT ANTENNA TERMINALS

6.1 Applicable Standard

§2.1051: The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§25: Protection of the radio-navigation-satellite service: Mobile earth stations operating in the 1610-1626.5 MHz band shall limit out-of-band emissions in the 1574.397-1576.443 MHz band so as not to exceed an e.i.r.p. density level of –70 dB (W/MHz) averaged over any 20 ms period. The e.i.r.p. of any discrete spurious emission (i.e., bandwidth less than 600 Hz) in the 1574.397-1576.443 MHz band shall not exceed -80 dBW.

For out-of-band emissions for frequencies removed from the midpoint of the assigned frequency segment by more than 250% of the authorized bandwidth (1.23MHz), at least

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

For Middle Channel = 43 + 10 log (0.826 W) = 42.17 dBc

6.2 Measurement Procedure

Spurious emissions appearing at the antenna terminals were measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer.

6.3 Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-04-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

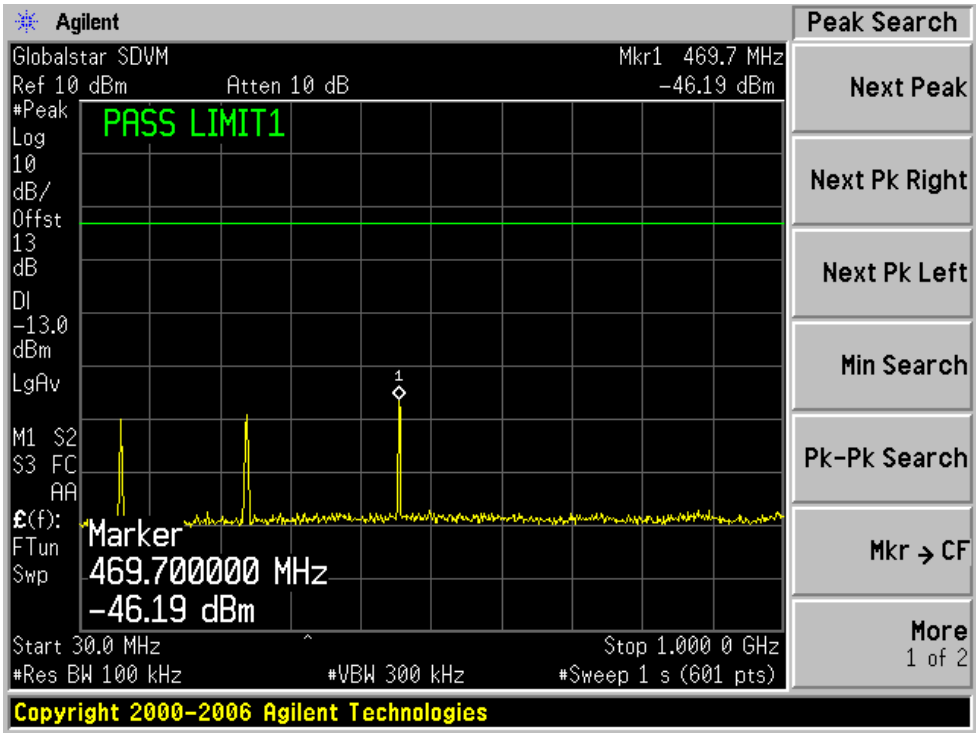
6.4 Measurement Result

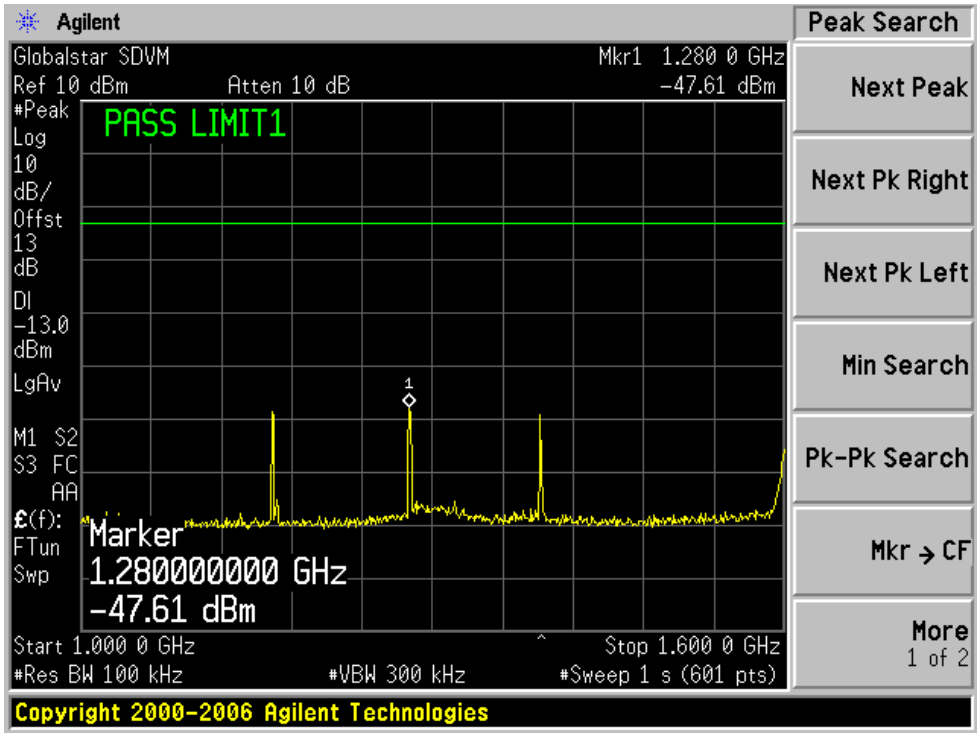
6.4.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	65 %
ATM Pressure:	102.5 kPa

** The testing was performed by Oscar Au on 2007-03-05.*

Mid Channel


Agilent
Peak Search
Globalstar SDVM
Mkr1 469.7 MHz
Ref 10 dBm
Atten 10 dB
-46.19 dBm
#Peak
Log
10
dB/
Offst
13
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
PASS LIMIT1
Marker
469.700000 MHz
-46.19 dBm
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Start 30.0 MHz
Stop 1.000 0 GHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 1 s (601 pts)
Copyright 2000-2006 Agilent Technologies


Agilent
Peak Search
Globalstar SDVM
Mkr1 1.280 0 GHz
Ref 10 dBm
Atten 10 dB
-47.61 dBm
#Peak
Log
10
dB/
Offst
13
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Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
PASS LIMIT1
Marker
1.280000000 GHz
-47.61 dBm
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
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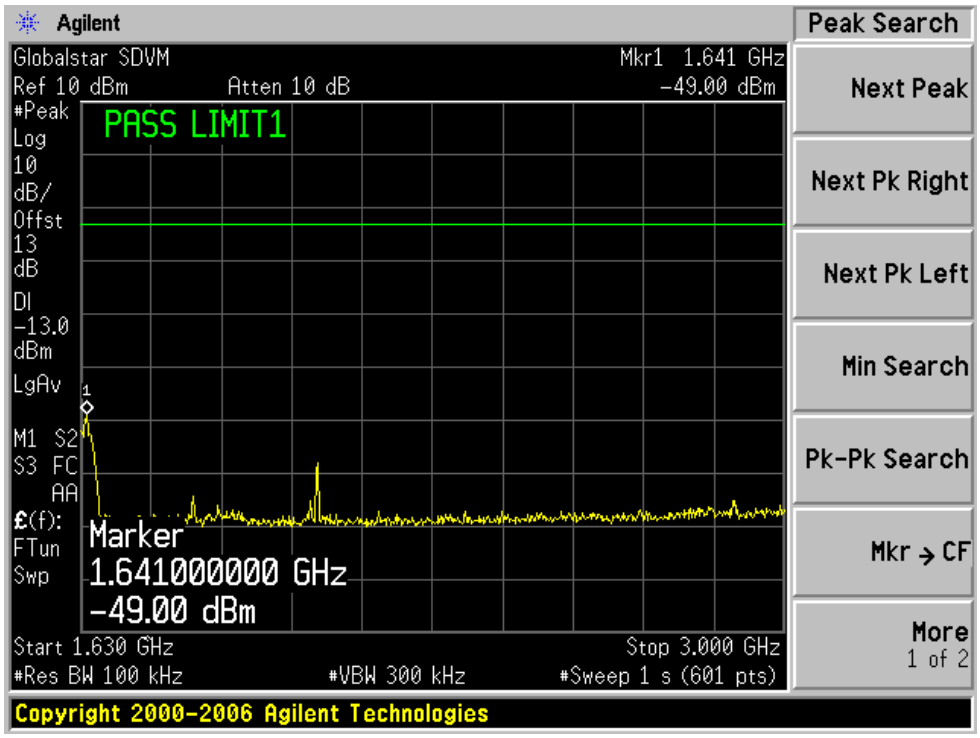
Stop 1.600 0 GHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 1 s (601 pts)
Copyright 2000-2006 Agilent Technologies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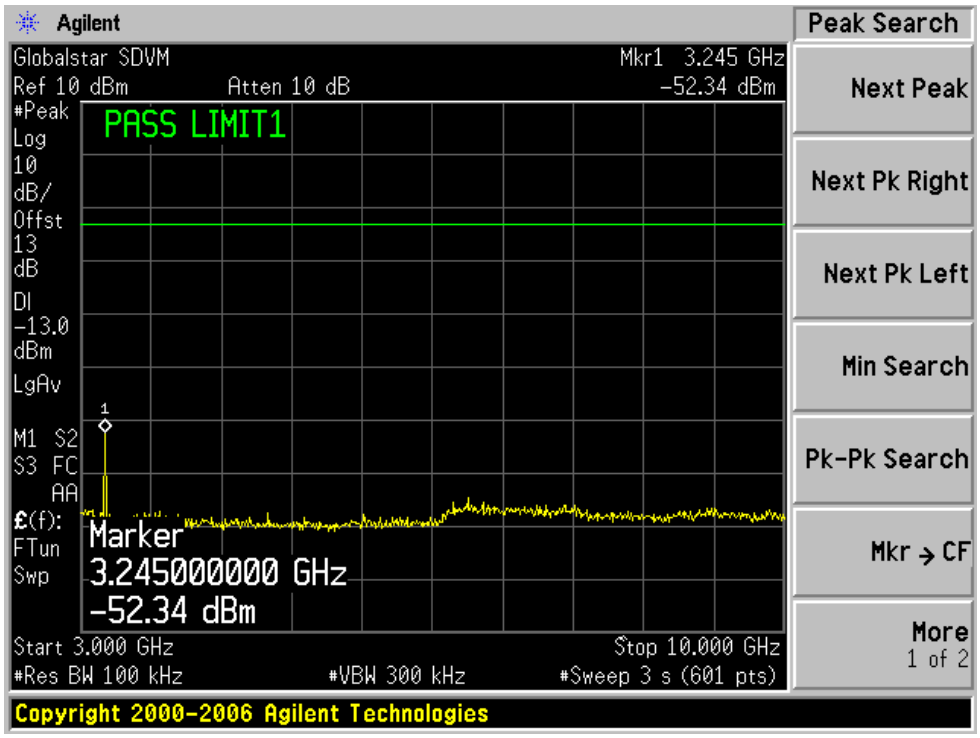
Peak Search
Globalstar SDVM
Mkr1 1.641 GHz
Ref 10 dBm
Atten 10 dB
-49.00 dBm
#Peak
Log
10
dB/
Offst
13
dB
Dl
-13.0
dBm
LgAv
PASS LIMIT1
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
1.641000000 GHz
-49.00 dBm
Start 1.630 GHz
Stop 3.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 1 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies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Globalstar SDVM
Mkr1 3.245 GHz
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Atten 10 dB
-52.34 dBm
#Peak
Log
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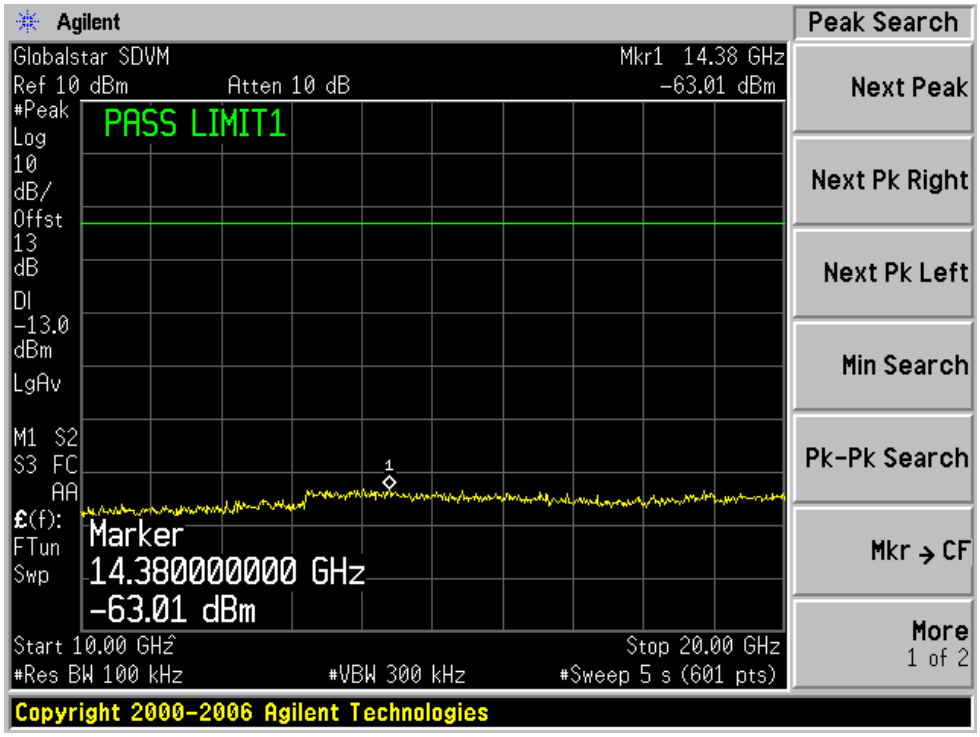
dB/
Offst
13
dB
Dl
-13.0
dBm
LgAv
PASS LIMIT1
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Marker
3.245000000 GHz
-52.34 dBm
Start 3.000 GHz
Stop 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 3 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Copyright 2000-2006 Agilent Technologies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Globalstar SDVM
Mkr1 14.38 GHz
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Atten 10 dB
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#Peak
Log
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dB/
Offst
13
dB
Dl
-13.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
PASS LIMIT1
Marker
14.380000000 GHz
-63.01 dBm
Start 10.00 GHz
Stop 20.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
#Sweep 5 s (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
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7 § 2.1053 & §25.202 (f) – FIELD STRENGTH OF SPURIOUS RADIATION

7.1 Applicable Standard

Requirements: CFR 47, § 25.202(f). The mean power of emission shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts;

In any event, when an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in paragraphs (f) (1), (2) and (3) of this section.

7.2 Measurement Procedure

The testing procedure was set according to TIA/EIA 603-C.

7.3 Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	2006-08-21
Sonoma Instrument	Amplifier Broadband (10 KHz - 2500 MHz)	317	260407	2006-03-20
Sunol Science	30Mhz ~ 3 GHz Antenna	JB3	A020106-3/S006628	2007-03-05
HP	Generator, Signal	83650B	3614A00276	2006-05-10
A.R.A	Antenna, Horn, DRG	DRG-118/A	1132	2005-08-17*

*Two years calibration cycle

Statement of Traceability: **BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.**

7.4 Measurement Result

7.4.1 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	45 %
ATM Pressure:	101.6 kPa

* The testing was performed by Oscar Au on 2007-03-08.

7.5 Test Results Summary

According to the data in the following table, the EUT was found compliant with the Class B limits of FCC Standard §25.202 and §15.209, and had the worst margin reading(s) of:

- **3.3 dBi Active TX/RX Quadrafilar Helix (QFH)**
  - **-6.3 dB at 6443.84 MHz** at the Low Channel setting in the **Vertical** polarization
  - **-5.5 dB at 6462.88 MHz** at the Middle Channel setting in the **Vertical** polarization
  - **-7.4 dB at 6443.84 MHz** at the High Channel setting in the **Vertical** polarization
- **3.3 dBi Passive TX/RX Quadrafilar Helix (QFH)**
  - **-38.72 dB at 3221.92 MHz** at the Low Channel setting in the **Vertical** polarization
  - **-38.62 dB at 3231.44 MHz** at the Middle Channel setting in the **Vertical** polarization
  - **-39.52 dB at 3241.24 MHz** at the High Channel setting in the **Vertical** polarization
- **4.5 dBi Passive TX/RX Patch Antenna**
  - **-37.52 dB at 3221.92 MHz** at the Low Channel setting in the **Vertical** polarization
  - **-37.62 dB at 3231.44 MHz** at the Middle Channel setting in the **Vertical** polarization
  - **-37.52 dB at 3221.92 MHz** at the High Channel setting in the **Vertical** polarization
- **Unintentional Radiated Emissions**
  - **-2.6 dB at 579.02 MHz** in the **Vertical** polarization from 30 – 1000 MHz

7.6 Out of Band (Carrier On)

Active TX/RX Quadrafilar Helix (QFH)

Final Scan 1GHz – 16.5GHz (Lowest Channel: 1610.73 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
6443.84	38.50	300.00	1.80	V	6443.84	-27.10	10.70	2.90	-19.30	-13.00	-6.30
6443.84	37.30	260.00	1.70	H	6443.84	-28.40	10.70	2.90	-20.60	-13.00	-7.60
3221.92	40.80	280.00	1.70	V	3221.92	-28.80	9.48	1.90	-21.22	-13.00	-8.22
3221.92	36.60	210.00	1.60	H	3221.92	-32.90	9.48	1.90	-25.32	-13.00	-12.32
4832.88	28.70	300.00	1.80	V	4832.88	-40.90	10.40	2.18	-32.68	-13.00	-19.68
4832.88	27.40	280.00	1.60	H	4832.88	-42.00	10.40	2.18	-33.78	-13.00	-20.78

Final Scan 1GHz – 16.5GHz (Middle Channel: 1615.65 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
6462.88	39.20	170.00	2.10	V	6462.88	-26.50	10.90	2.90	-18.50	-13.00	-5.50
6462.88	38.30	180.00	1.90	H	6462.88	-27.20	10.90	2.90	-19.20	-13.00	-6.20
3231.44	40.10	360.00	1.70	V	3231.44	-29.50	9.48	1.90	-21.92	-13.00	-8.92
3231.44	36.80	20.00	1.30	H	3231.44	-32.80	9.48	1.90	-25.22	-13.00	-12.22
4847.16	30.30	300.00	1.50	H	4847.16	-39.10	10.40	2.18	-30.88	-13.00	-17.88
4847.16	30.20	335.00	1.50	V	4847.16	-39.40	10.40	2.18	-31.18	-13.00	-18.18

Final Scan 1GHz – 16.5GHz (Highest Channel: 1620.57 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
6443.84	37.40	310.00	2.00	V	6443.84	-28.20	10.70	2.90	-20.40	-13.00	-7.40
6443.84	36.30	260.00	1.80	H	6443.84	-29.30	10.70	2.90	-21.50	-13.00	-8.50
3241.24	39.40	320.00	1.70	V	3241.24	-30.30	9.48	1.90	-22.72	-13.00	-9.72
3241.24	38.20	290.00	1.80	H	3241.24	-31.50	9.48	1.90	-23.92	-13.00	-10.92
4861.86	29.50	280.00	1.70	V	4861.86	-40.20	10.40	2.18	-31.98	-13.00	-18.98
4861.86	28.20	300.00	1.50	H	4861.86	-41.40	10.40	2.18	-33.18	-13.00	-20.18

* Testing was performed without pre-amplifier connected

Passive TX/RX Quadrafilar Helix (QFH)

Final Scan 1GHz – 16.5GHz (Lowest Channel: 1610.73 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3221.92	53.50	140.00	1.70	V	3221.92	-59.30	9.48	1.90	-51.72	-13.00	-38.72
3221.92	49.10	80.00	1.60	H	3221.92	-63.70	9.48	1.90	-56.12	-13.00	-43.12
4832.88	45.20	120.00	1.60	V	4832.88	-65.30	10.40	2.18	-57.08	-13.00	-44.08
4832.88	44.50	350.00	1.60	H	4832.88	-66.50	10.40	2.18	-58.28	-13.00	-45.28

Final Scan 1GHz – 16.5GHz (Middle Channel: 1615.65 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3231.44	53.60	120.00	1.60	V	3231.44	-59.20	9.48	1.90	-51.62	-13.00	-38.62
4847.16	48.30	125.00	1.20	H	4847.16	-62.40	10.40	2.18	-54.18	-13.00	-41.18
4847.16	46.90	170.00	1.60	V	4847.16	-64.70	10.40	2.18	-56.48	-13.00	-43.48
3231.44	47.80	355.00	1.40	H	3231.44	-64.90	9.48	1.90	-57.32	-13.00	-44.32

Final Scan 1GHz – 16.5GHz (Highest Channel: 1620.57 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3241.24	53.30	120.00	1.60	V	3241.24	-60.10	9.48	1.90	-52.52	-13.00	-39.52
3241.24	49.30	110.00	1.80	H	3241.24	-64.20	9.48	1.90	-56.62	-13.00	-43.62
4861.86	44.20	190.00	1.50	V	4861.86	-66.40	10.40	2.18	-58.18	-13.00	-45.18
4861.86	43.10	355.00	1.50	H	4861.86	-67.50	10.40	2.18	-59.28	-13.00	-46.28

Passive TX/RX Patch Antenna

Final Scan 1GHz – 16.5GHz (Lowest Channel: 1610.73 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3221.92	54.60	290.00	1.70	V	3221.92	-58.10	9.48	1.90	-50.52	-13.00	-37.52
3221.92	53.60	200.00	1.80	H	3221.92	-60.10	9.48	1.90	-52.52	-13.00	-39.52
4832.88	44.80	180.00	2.00	H	4832.88	-66.30	10.40	2.18	-58.08	-13.00	-45.08
4832.88	43.60	130.00	1.60	V	4832.88	-67.30	10.40	2.18	-59.08	-13.00	-46.08

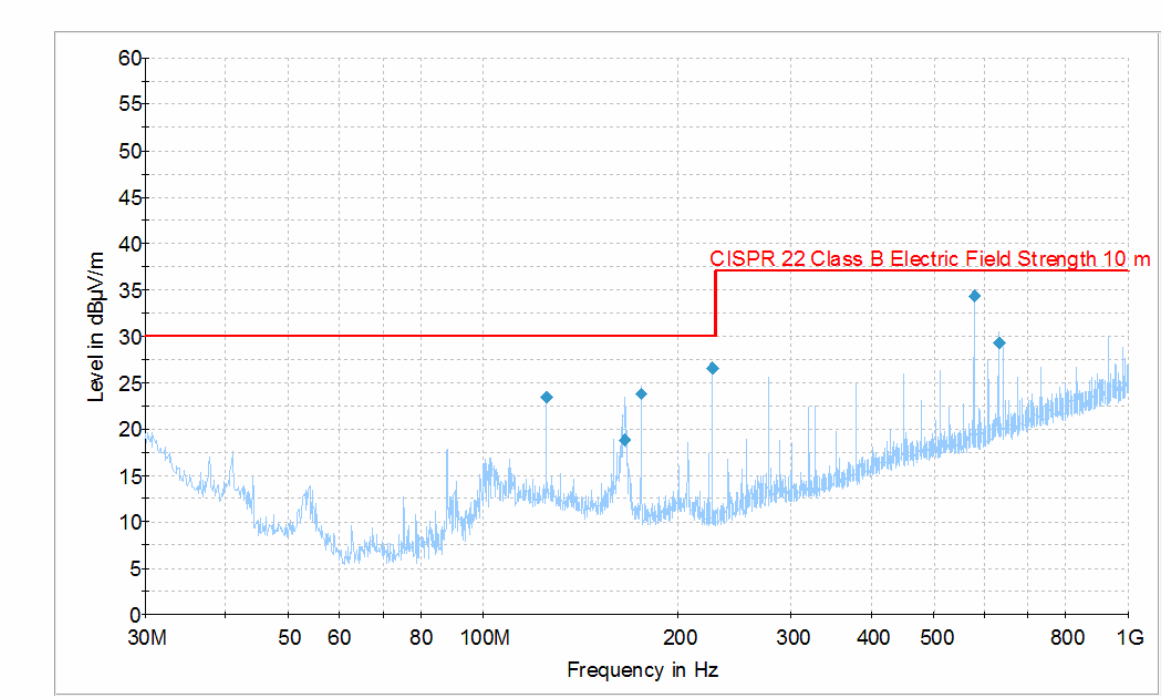
Final Scan 1GHz – 16.5GHz (Middle Channel: 1615.65 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3231.44	55.30	290.00	1.70	V	3231.44	-58.20	9.48	1.90	-50.62	-13.00	-37.62
3231.44	53.70	200.00	1.80	H	3231.44	-60.00	9.48	1.90	-52.42	-13.00	-39.42
4847.16	44.60	210.00	1.70	V	4847.16	-66.40	10.40	2.18	-58.18	-13.00	-45.18
4847.16	44.10	210.00	1.50	H	4847.16	-66.90	10.40	2.18	-58.68	-13.00	-45.68

Final Scan 1GHz – 16.5GHz (Highest Channel: 1620.57 MHz)

Indicated Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization H/V	Substituted					Limit (dB)	Margin (dB)
					Frequency (MHz)	Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)	Absolute Level (dBm)		
3221.92	54.60	290.00	1.70	V	3221.92	-58.10	9.48	1.90	-50.52	-13.00	-37.52
3221.92	53.60	200.00	1.80	H	3221.92	-60.10	9.48	1.90	-52.52	-13.00	-39.52
4832.88	44.80	180.00	2.00	H	4832.88	-66.30	10.40	2.18	-58.08	-13.00	-45.08
4832.88	43.60	130.00	1.60	V	4832.88	-67.30	10.40	2.18	-59.08	-13.00	-46.08

Final Scan 30 MHz – 1000 MHz



Frequency (MHz)	Corrected Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (V/H)	Turntable position Degrees	Limit (dBµV/m)	Margin (dB)
579.020000	34.4	99.0	V	190.0	37.0	-2.6
226.586250	26.7	99.0	V	28.0	30.0	-3.3
176.227500	23.8	99.0	V	75.0	30.0	-6.2
125.868750	23.5	99.0	V	196.0	30.0	-6.5
629.378750	29.3	99.0	V	175.0	37.0	-7.7
166.237500	18.8	113.0	V	16.0	30.0	-11.2

8 §25.202 (f) (1)... (3) – EMISSION LIMITATIONS

8.1 Applicable Standard

According to CFR 47, § 25.202 (f) (1) through (3), the mean power of emission shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: 25 dB;

(2) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 100 percent up to and include 250 percent of the authorized bandwidth: 35 dB;

(3) In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: An amount equal to 43 dB plus 10 times the logarithm (to the base 10) of the transmitter power in watts

8.2 Measurement Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 4 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

8.3 Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

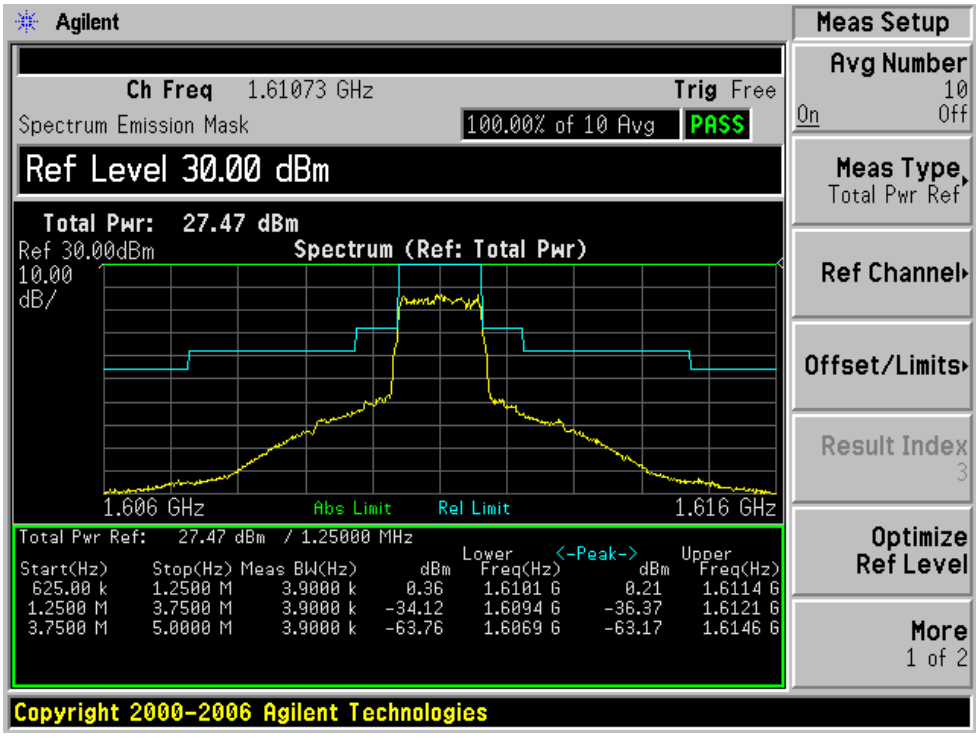
8.4 Measurement Result

8.4.1 Environmental Conditions

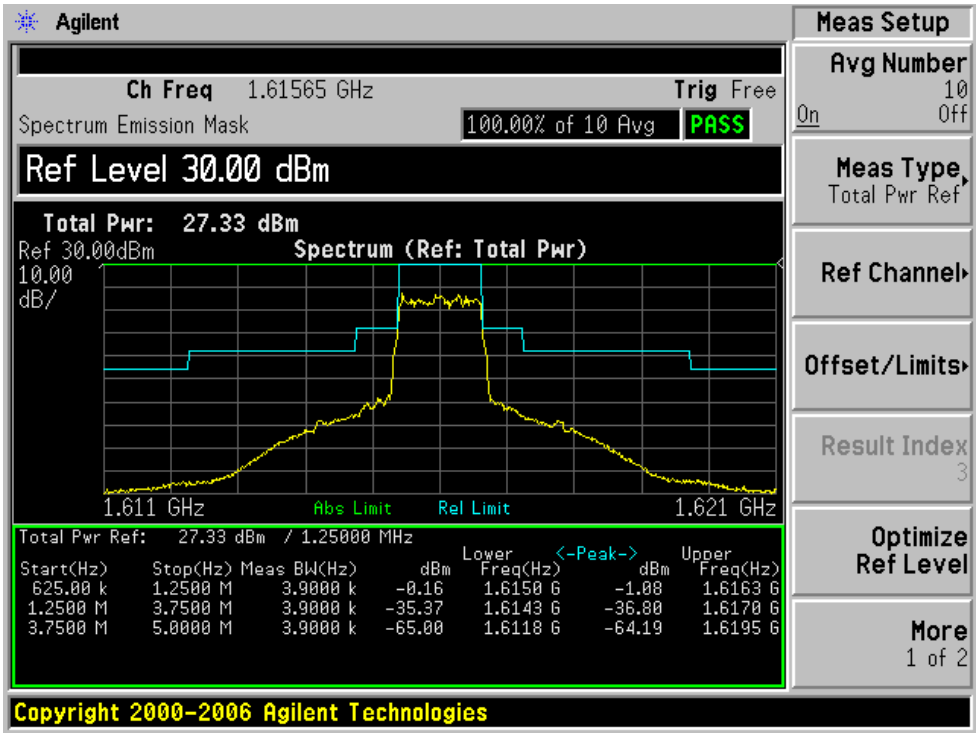
Temperature:	21 °C
Relative Humidity:	61 %
ATM Pressure:	101.4 kPa

** The testing was performed by Oscar Au on 2007-03-12.*

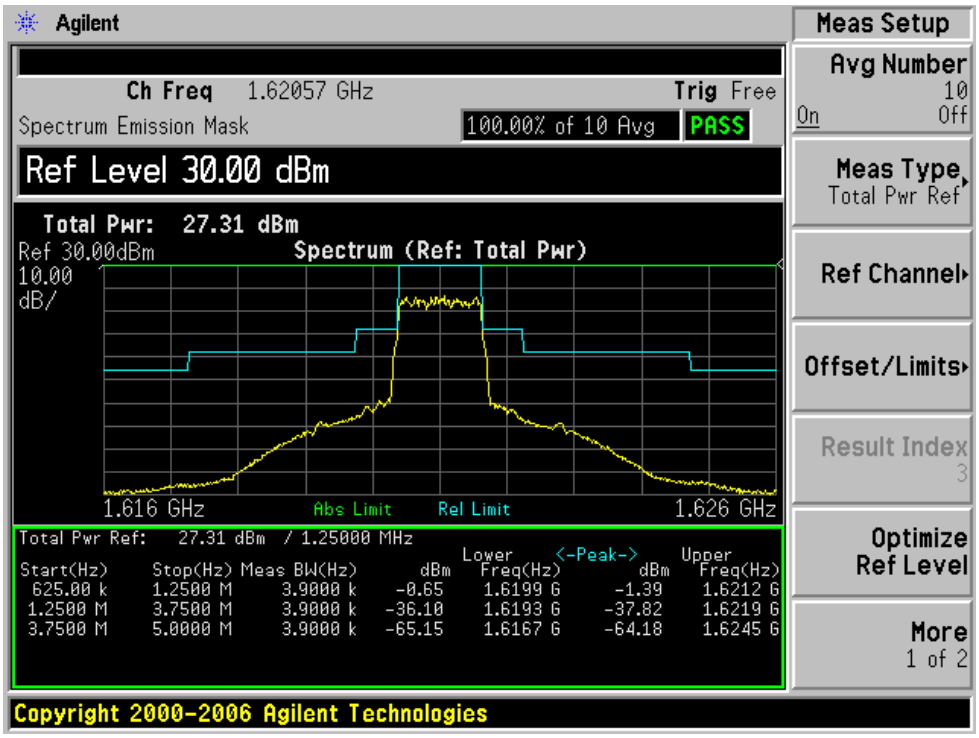
Low Channel



Middle Channel

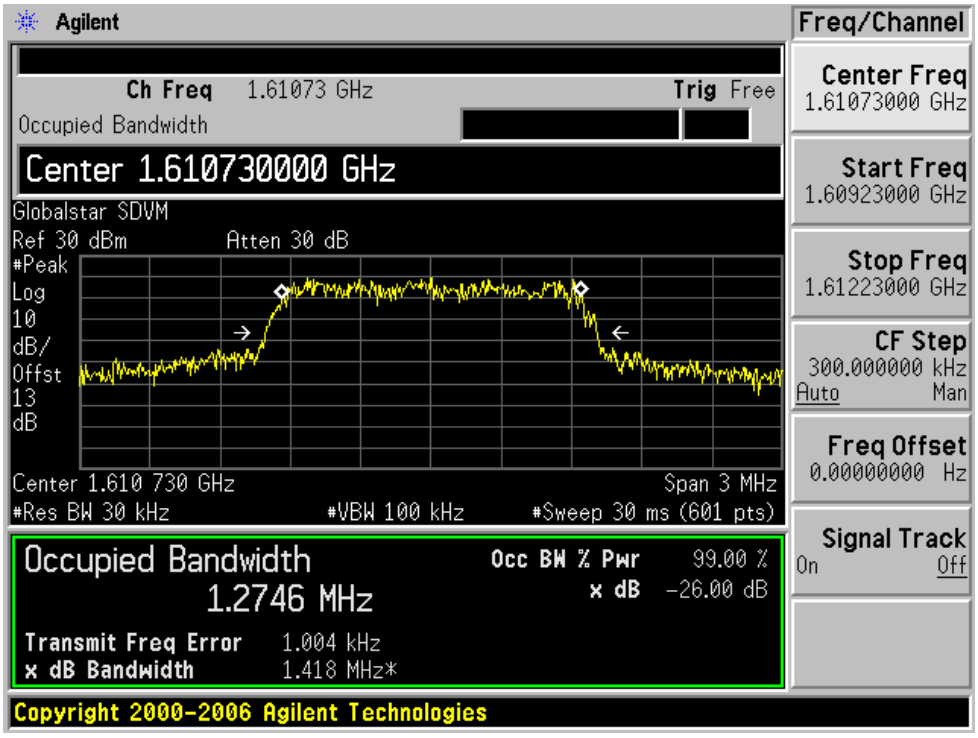


High Channel

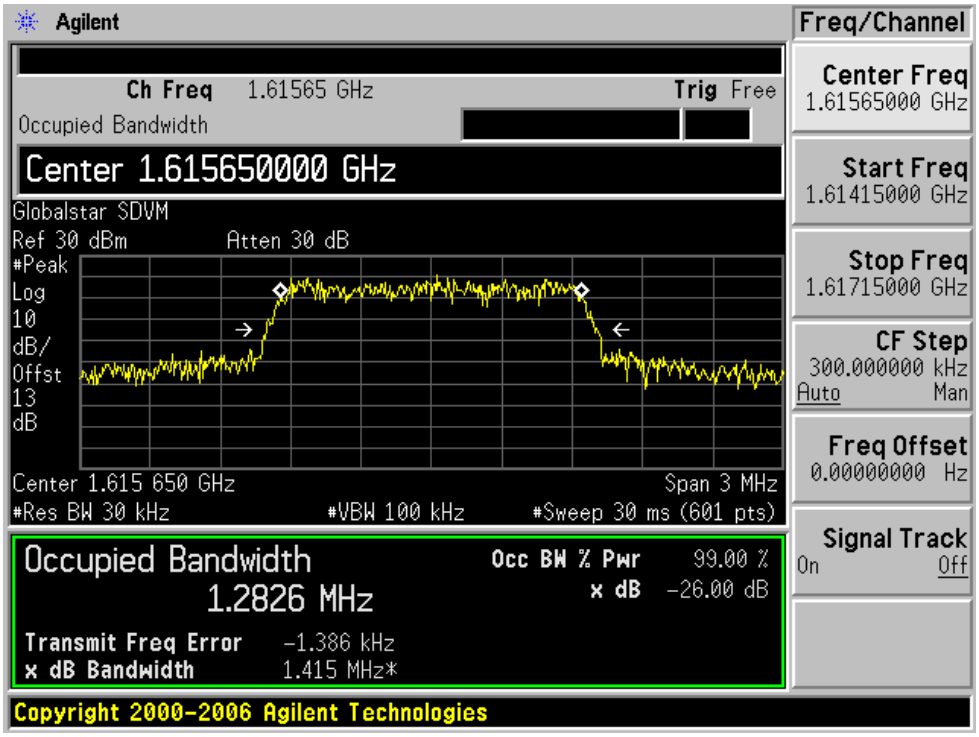


26 dB & Occupied Bandwidth

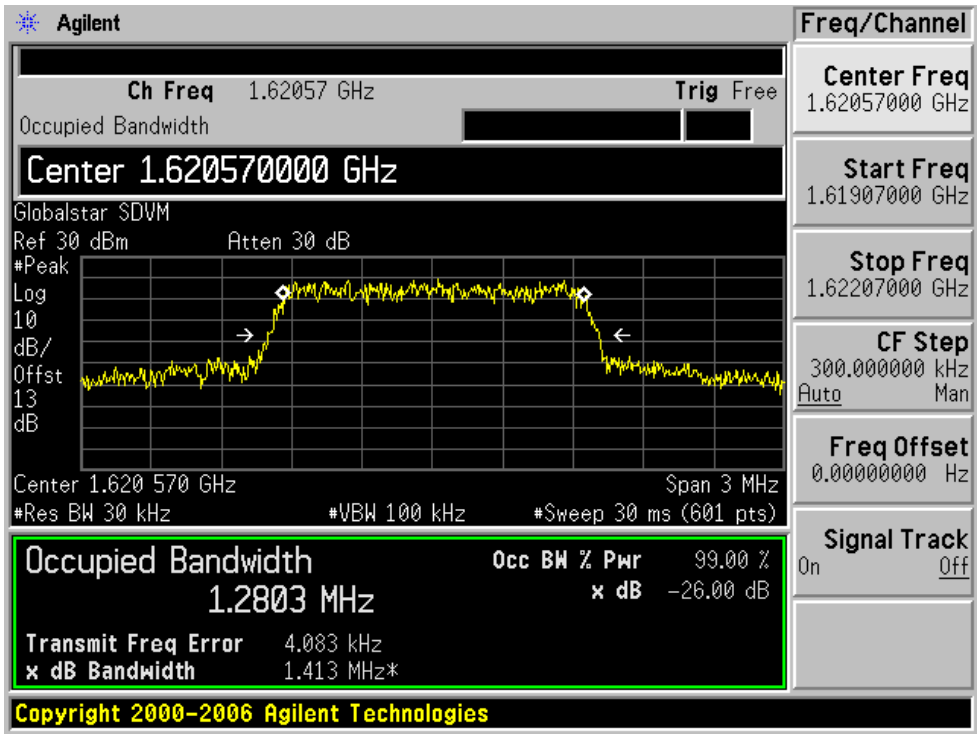
Low Channel



Mid channel



High channel



9 §2.1046 & §25.204 – POWER OUTPUT

9.1 Applicable Standard

According to §25.204 (a): in bands shared coequally with terrestrial radio communication services, the equivalent isotropically radiated power transmitted in any direction towards the horizon by an earth station, other than an ESV, operating in frequency bands between 1 and 15 GHz, shall not exceed the following limits except as provided for in paragraph (c) of this section:

+40 dBW in any 4 kHz band for $\Theta \leqslant 0^\circ$

+40 + 3Θ dBW in any 4 kHz band for $0^\circ < \Theta \leqslant 5^\circ$

where Θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

9.2 Measurement Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.

9.3 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

9.4 Measurement Result

9.4.1 Environmental Conditions

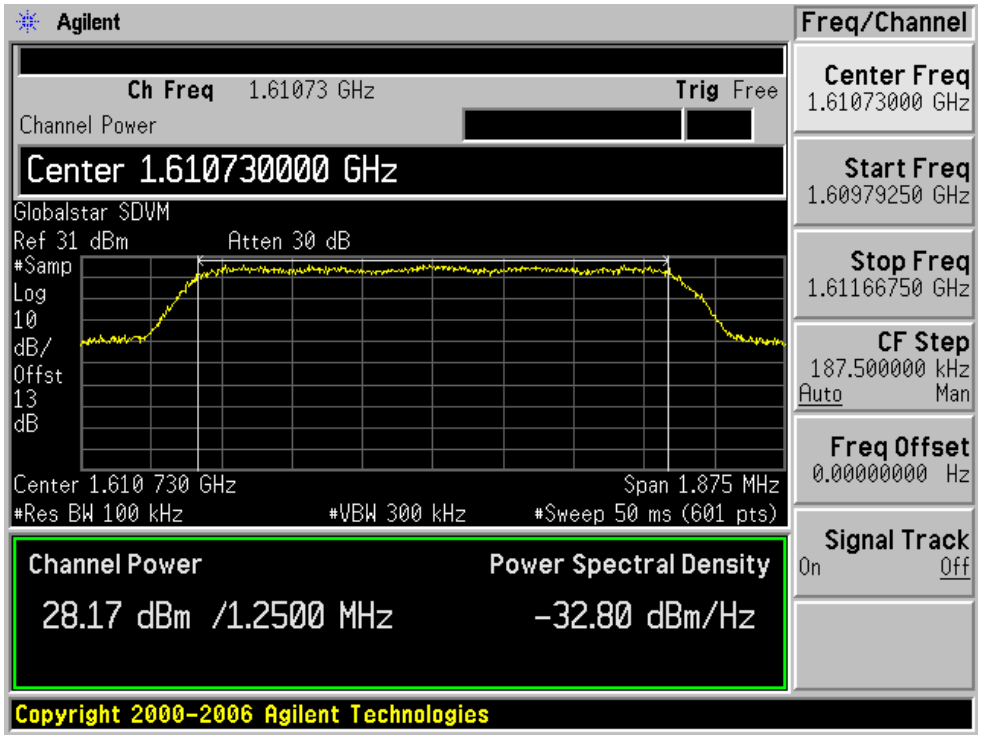
Temperature:	21 °C
Relative Humidity:	36 %
ATM Pressure:	102.1 kPa

** The testing was performed by Oscar Au on 2007-03-10.*

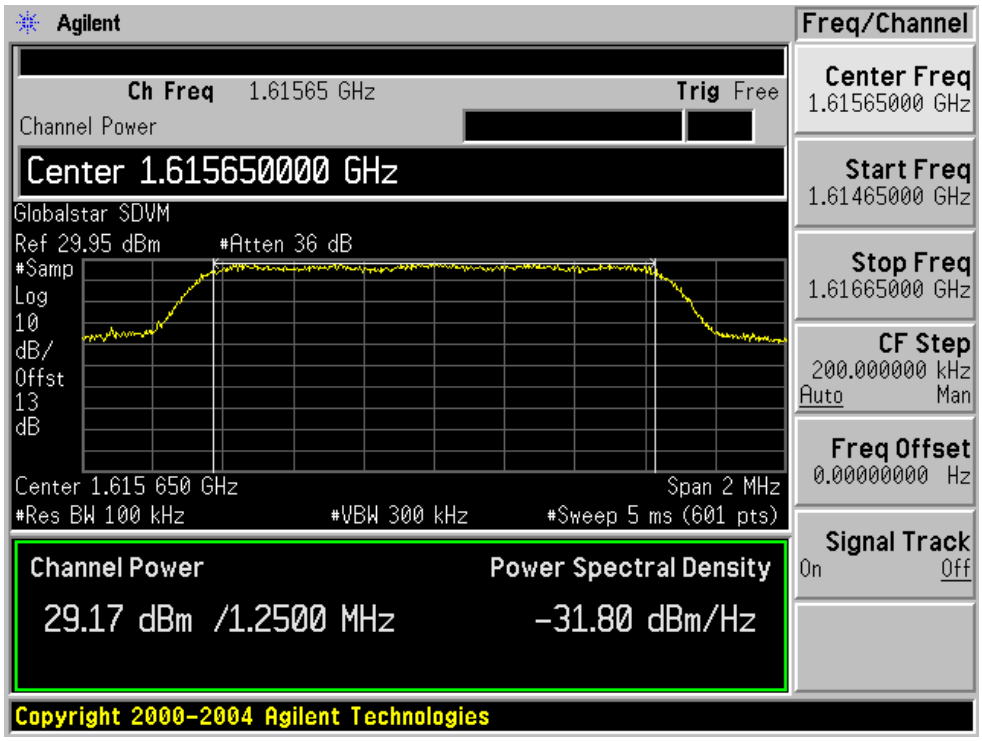
Antenna Gain = 4.5 dBi

Channel	Frequency (MHz)	Conducted Output Power (dBm)	Antenna Gain (dBi)	e.i.r.p (dBm)	Limit (dBW)
Low	1610.73	28.17	4.5	32.67	40
Mid	1618.11	29.17	4.5	33.67	
High	1620.57	27.24	4.5	31.74	

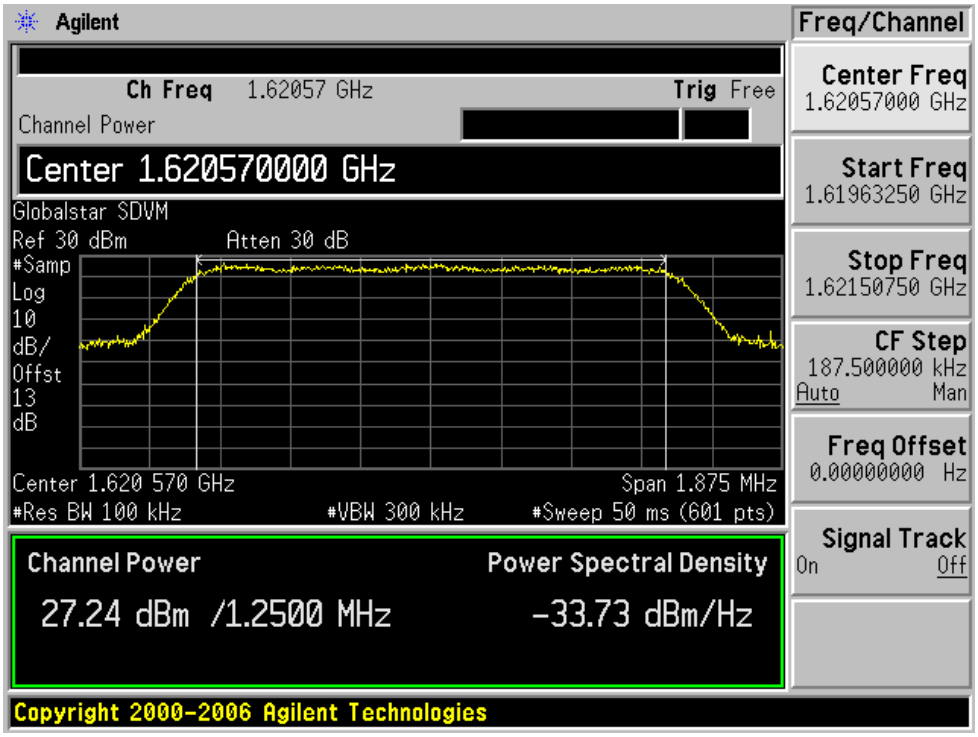
Low Channel



Middle Channel



High Channel



10 §25.216(b) & §25.216(g) – EMISSIONS FROM MOBILE EARTH STATIONS FOR PROTECTION OF AERONAUTICAL RADIONAVIGATION-SATELLITE SERVICE

10.1 Applicable Standard

According to §25.216(b), the e.i.r.p. density of emissions from mobile earth stations placed in service on or before July 21, 2002 with assigned uplink frequencies between 1610 MHz and 1626.5 MHz shall not exceed −64 dBW/MHz, averaged over any 2 millisecond active transmission interval, in the band 1587.42–1605 MHz. The e.i.r.p. of discrete emissions of less than 700 Hz bandwidth generated by such stations shall not exceed −74 dBW, averaged over any 2 millisecond active transmission interval, in the 1587.42–1605 MHz band.

According to §25.216(g), mobile earth stations manufactured more than six months after Federal Register publication of the rule changes adopted in FCC 03–283 with assigned uplink frequencies in the 1610–1626.5 MHz band shall suppress the power density of emissions in the 1605–1610 MHz band-segment to an extent determined by linear interpolation from −70 dBW/MHz at 1605 MHz to −10 dBW/MHz at 1610 MHz averaged over any 2 millisecond active transmission interval. The e.i.r.p of discrete emissions of less than 700 Hz bandwidth from such stations shall not exceed a level determined by linear interpolation from −80 dBW at 1605 MHz to −20 dBW at 1610 MHz, averaged over any 2 millisecond active transmission interval.

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

10.3 Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Analyzer, Spectrum	E4446A	US44300386	2007-03-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

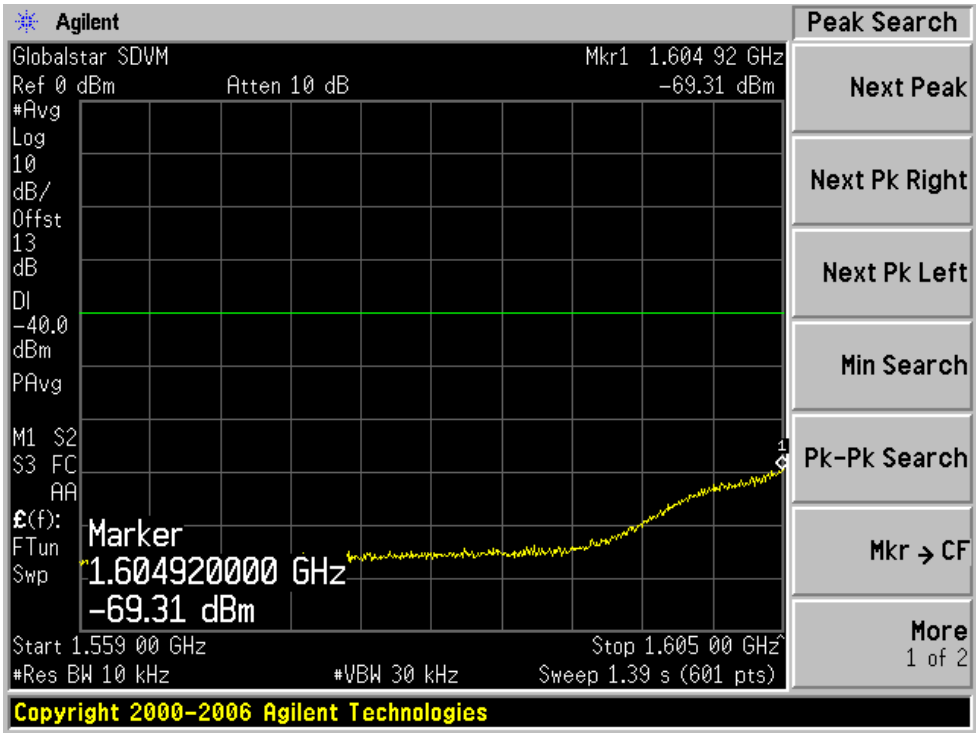
10.4 Measurement Result

10.4.1 Environmental Conditions

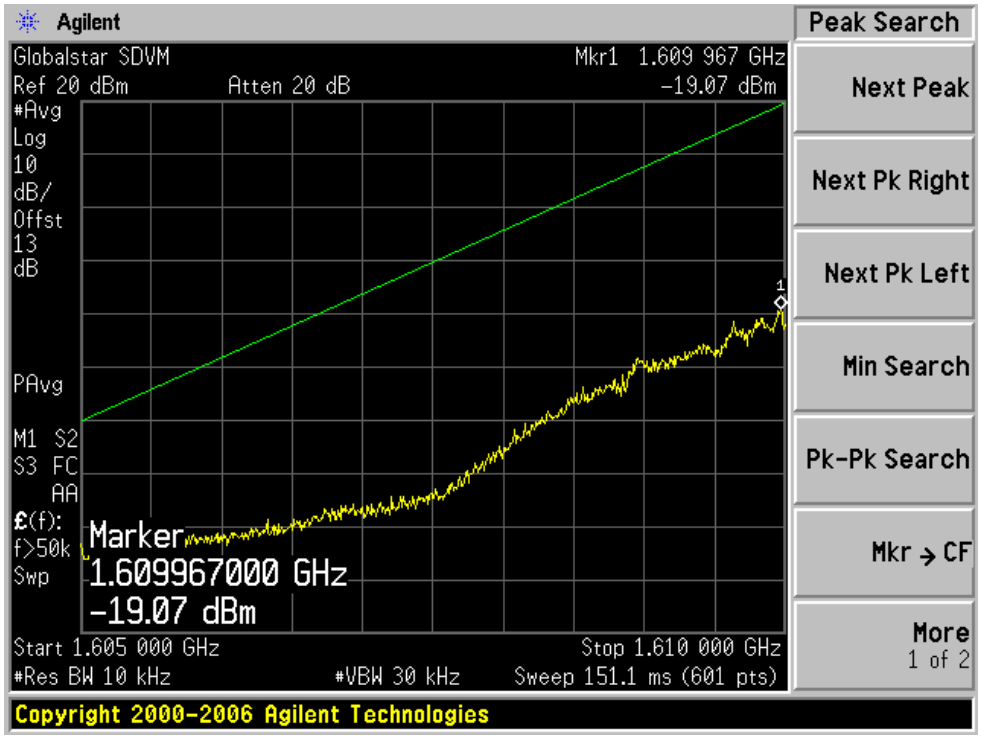
Temperature:	21 °C
Relative Humidity:	61 %
ATM Pressure:	101.5 kPa

** The testing was performed by Oscar Au on 2007-03-14.*

1559 MHz-1605 MHz



1605MHz-1610 MHz



11 §2.1055 – FREQUENCY STABILITY & §25.202(d) – FREQUENCY TOLERANCE

11.1 Standard Applicable

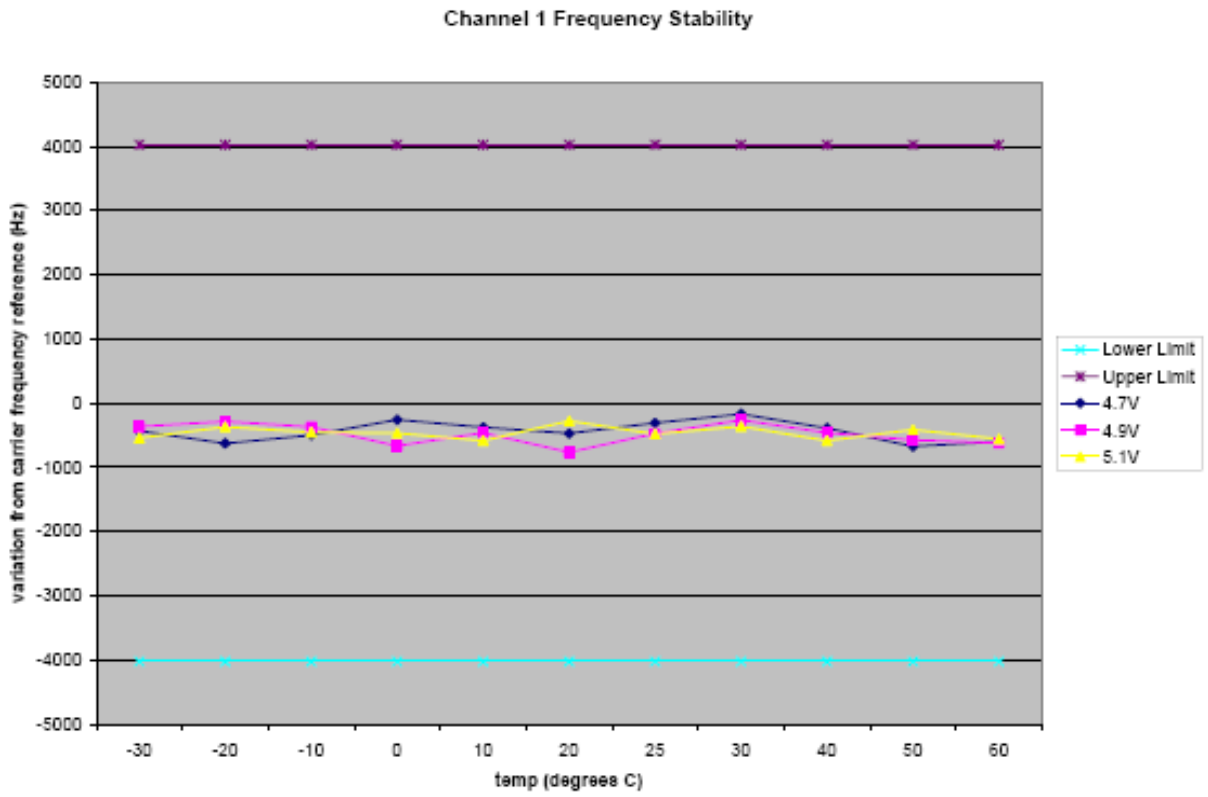
According to §25.202(d) *Frequency tolerance, Earth stations.* The carrier frequency of each earth station transmitter authorized in these services shall be maintained within 0.001 percent of the reference frequency.

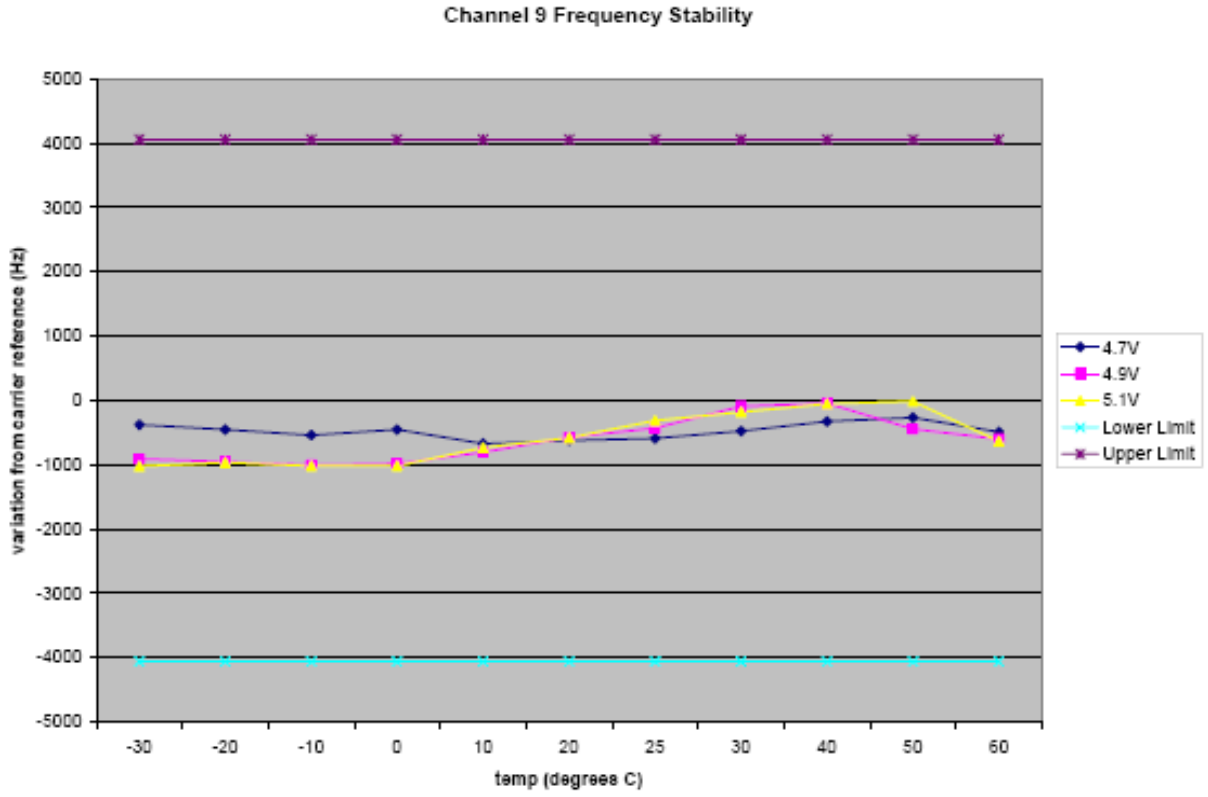
11.2 Measurement Result

Test result is derived from Qualcomm Incorporated's report, report number: TL80-C6569-102 Rev. A.
Part 25 References: 25.202 Frequency Stability, 25.202 Emissions Limits
Dates of Test: November 15, 2006 to December19, 2006
Test Performed by:
Paul Jayne
Senior EMC/Regulatory Engineer
QUALCOMM Incorporated

Transmitter Carrier Frequency Stability- FCC Part 2.1055
Transmitter RF Carrier Frequency Stability- FCC Part 2, Paragraph 2.1055
Measured with an Anritsu MT8803 Globalstar User Terminal Tester

	Variation from carrier frequency reference (Hz)-Channel 1				
	4.7V	4.9V	5.1V	Specification	
temp C	Hz offset	Hz offset	Hz offset	lower limit	upper limit
-30	-433	-365	-543	-4025	4025
-20	-628	-286	-369	-4025	4025
-10	-499	-369	-452	-4025	4025
0	-258	-667	-466	-4025	4025
10	-376	-461	-583	-4025	4025
20	-471	-766	-277	-4025	4025
25	-309	-473	-479	-4025	4025
30	-167	-264	-361	-4025	4025
40	-388	-460	-584	-4025	4025
50	-675	-573	-413	-4025	4025
60	-598	-619	-558	-4025	4025
	Variation from carrier frequency reference (Hz)-Channel 9				
	4.7V	4.9V	5.1V	Specification	
temp C	Hz offset	Hz offset	Hz offset	lower limit	upper limit
-30	-377	-907	-1021	-4060	4060
-20	-451	-953	-965	-4060	4060
-10	-538	-1003	-1017	-4060	4060
0	-453	-983	-1016	-4060	4060
10	-670	-805	-733	-4060	4060
20	-622	-571	-578	-4060	4060
25	-589	-429	-313	-4060	4060
30	-476	-91	-179	-4060	4060
40	-325	-44	-51	-4060	4060
50	-265	-442	-14	-4060	4060
60	-488	-598	-634	-4060	4060


Channel 1 Frequency Stability
variation from carrier frequency reference (Hz)
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-30
-20
-10
0
10
20
25
30
40
50
60
temp (degrees C)
Lower Limit
Upper Limit
4.7V
4.9V
5.1V


Channel 9 Frequency Stability
variation from carrier reference (Hz)
5000
4000
3000
2000
1000
0
-1000
-2000
-3000
-4000
-5000
-30
-20
-10
0
10
20
25
30
40
50
60
temp (degrees C)
4.7V
4.9V
5.1V
Lower Limit
Upper Limit