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| UNCLASSIFIED | | |
| SECURITY SUMMARY & SPECIAL HANDLING REQUIREMENTS | | |
| <p>The title of this application is : AIRMOSS</p> <p>The overall classification of this application is : UNCLASSIFIED</p> | | |
| <p>Refer to your Security Manual for further guidance.</p> | | |
| <p>The Application Level Special Handling is : A</p> <p>Approved for public release; distribution is unlimited (DoD Directive 5230.24)</p> | | |
| DOWNGRADING INSTRUCTIONS | | |
| <p>Special Handling Instruction : A</p> | | CLASSIFICATION |
| | | UNCLASSIFIED |

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Selected Frequencies

(U) 430.0000 MHz

System Name : (U) AirMOSS(Nomenclature)

Stage : (U) 4 - Operational
Agency : (U) NASA - National Aeronautics and Space Administration
NTIA Certified : (U) No
Date Of Import : 7/6/2012 10:32:19 PM (GMT)
Date/Time Last Mod. : 3/25/2013 10:41:52 PM (GMT)
Overall Security : Unclassified

System Description

(U) The Airborne Microwave Observatory of Subcanopy and Subsurface (AirMOSS) is a 430 MHz, polarimetric synthetic aperture radar (SAR) designed to acquire airborne radar returns to derive root zone soil moisture (RZSM) integrated over a depth of 1.2 m from the surface and through substantial vegetation canopies. The radar will be designed to operate on a NASA Gulfstream III aircraft.

Geographic Areas for Stage 4

(U) USP (US & POSS) (U) Polygon

Predefined Trunking? : (U) No

Certification of Spectrum Support InformationReferences

Type : Previous Certification
Ref. To Cert. : True
Ref. Title : NASA - AirMOSS - 2 - Unapproved - J/F 12
Ref. Org. : (U) NASA
Ref. Date : 9/26/2011
Ref. Is Class. : False

Attachments

File Name : (U) AirMOSS_Stage4_ReqAttached.doc
Date of the Attachment : 3/25/2013

Recommending Official : Stephen J. Butcher
Title : Chairman Spectrum Planning Subcommittee
Certifying Official : Edward M. Davison
Title : Deputy Associate Administrator

Target Date(s)

System Approval : (U) 6/30/2013
System Activation : (U) 6/30/2013
System Termination : (U) 6/30/2018
NSEP Use : (U) No
ITU Waiver : (U) Yes
Number Of Units : (U) 1
Estimated Initial Cost of the System : (U) \$ 25800000

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Information Transfer Requirement

(U) See Attachment

System Essentiality

(U) The use of P-band (420 MHz - 440 MHz) is sensitive to Root Zone Soil Moisture (RZSM) through substantial vegetation canopy, the sensitivity to soil moisture decreases substantially for L-band and higher. The accurate knowledge of RZSM will reduce uncertainty in ecosystem models.

Replacement Information

(U) No

Stations**Station Name** : (U) AirMOSS**Transmitters**

(U) AirMOSS Radar Transmitter

Receivers

(U) AirMOSS Radar Receiver

Antennas

(U) AirMOSS P-band Antenna

Station Name : (U) US&P - Generic**Selected Modes****Link****Transmitting Station**

(U) AirMOSS

Receiving Station

(U) US&P - Generic

Radio Service : Radiodetermination**Station Classes** : MR**Equipment Combination****Transmitter** : (U) AirMOSS Radar Transmitter**Tx Antenna** : (U) AirMOSS P-band Antenna**Receiver** : (U) AirMOSS Radar Receiver**Rx Antenna** : (U) AirMOSS P-band Antenna**Selected Modes****Frequency**

(U) 430.0000 MHz

Em. Des

(U) 20M0Q3N

Power

(U) 2340 W Peak

Notes

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TRANSMITTER AirMOSS Radar Transmitter

Nomenclature : (U) AirMOSS Radar Transmitter
Manufacturer : (U) JET PROPULSION LABORATORY
Model Name : (U) P-band SAR
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 7/6/2012 10:32:19 PM (GMT)
Date/Time Last Mod. : 3/25/2013 10:41:28 PM (GMT)
Freq. Stability : (U) 0.1ppm
Output Device : (U) Crossed-Field Amplifiers
Tuning Method : (U) Fixed
Radar/Comm : (U) Radar
Supp. of Harmonics : (U) Yes

Powers

Power Type : Peak Envelope

Power : (U) 2340 W

Figure 1 - 2nd Harmonic Curve (U)

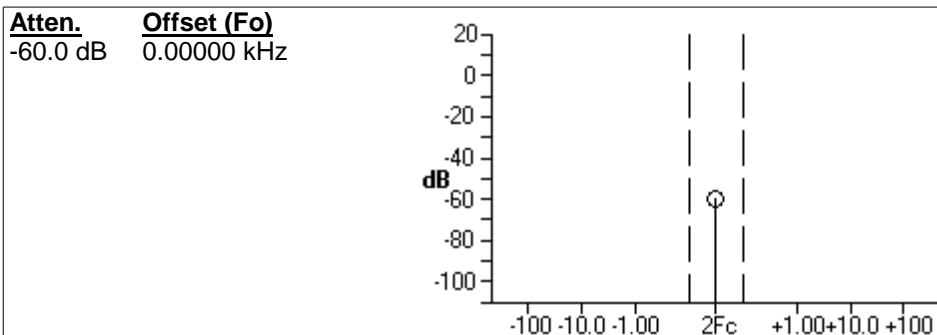
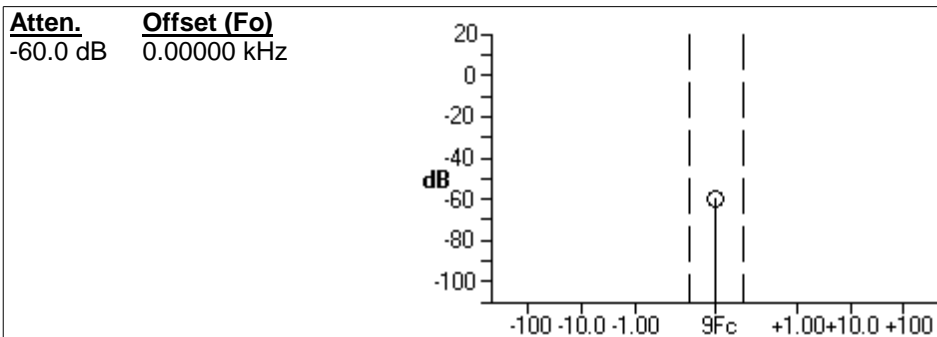


Figure 2 - Other Harmonic Curve (U)



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Figure 3 - 3rd Harmonic Curve (U)

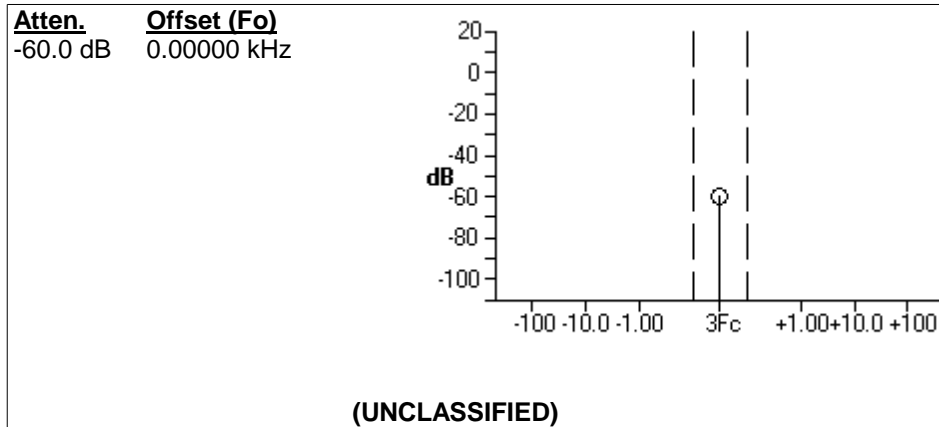
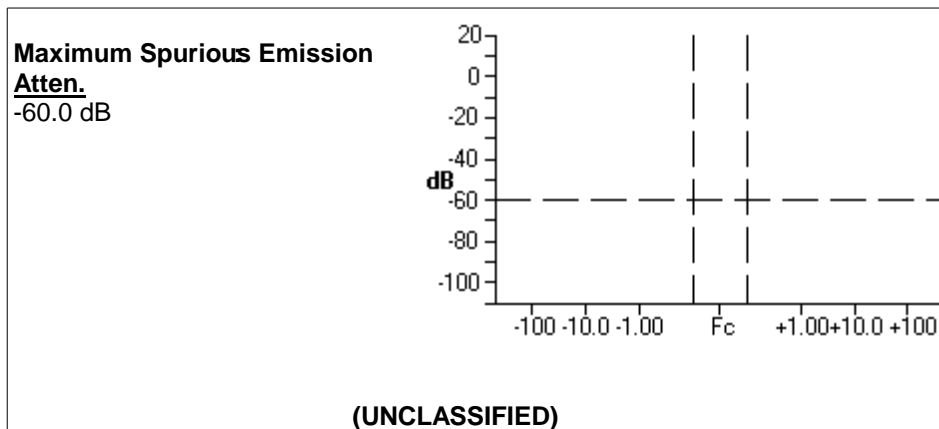


Figure 4 - Spurious Emission Curve (U)

Frequencies

Fixed Frequency : (U) 430.0000 MHz

Em. Designator : (U) 20M0Q3N

Necessary BW : (U) 20000 kHz

Modulation - 20M0Q3N

Measured/Calculated : (U) Measured

Radar/Communications : (U) Radar

Radar Type : (U) FM Pulse Radar

Pulse Repetition Rate : (U) 1200 pps

Pulse Rise Time : (U) 0.000123 ms

Pulse Fall Time : (U) 0.000138 ms

Pulse Width : (U) 0.0400 ms

Pulse Duty Cycle : (U) 4.800 %

Pulse Comp. Ratio : (U) 120

Pulse Freq. Deviation : (U) 17500 kHz

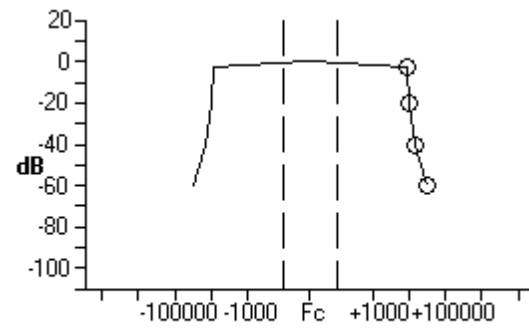
Spread Spectrum : No

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Figure 5 - Fundamental Curve (U)

Meas/Calc : Measured
Level Offset (Fo)

| | |
|----------|------------|
| -3.00 dB | 8750.0 kHz |
| -20.0 dB | 10000 kHz |
| -40.0 dB | 14250 kHz |
| -60.0 dB | 30000 kHz |



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RECEIVER AirMOSS Radar Receiver

Nomenclature : (U) AirMOSS Radar Receiver
Manufacturer : (U) JET PROPULSION LABORATORY
Model Name : (U) AirMOSS P-band Receiver
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 7/6/2012 10:32:19 PM (GMT)
Date/Time Last Mod. : 3/25/2013 10:41:52 PM (GMT)
Freq. Stability : (U) 0.1ppm
Image Reject : (U) 67.0 dB
Oscillator Tuned : (U) Above
Tuning Method : (U) Fixed

Frequencies

Fixed Frequency : (U) 430.0000 MHz

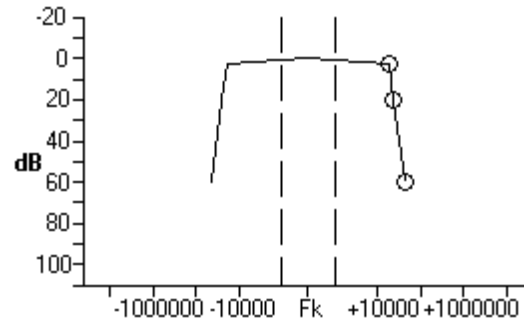
Sensitivities

Em. Designator : (U) 20M0Q3N
Necessary BW : (U) 20000 kHz
Perf. Crit. : (U) S/N - Signal to Noise Ratio (dB)
Perf. Value : (U) 20
Sensitivity : (U) -92.6 dBm
Noise Fig. : (U) 5.83 dB
Noise Temp. : (U) 820 K
Spur. Reject : (U) 60.0 dB
Intermod. Reject : (U) 60.0 dB
Adj. Channel Sel. : (U) 60.0 dB

Figure 6 - IF Selectivity Curve (U)

IF Freq. (Fk) : 1257.500 MHz
Meas/Calc : Measured

| <u>Atten.</u> | <u>Offset (Fo)</u> |
|---------------|--------------------|
| 3.00 dB | 18050 kHz |
| 20.0 dB | 24250 kHz |
| 60.0 dB | 43500 kHz |



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Figure 7 - RF Selectivity Curve (U)

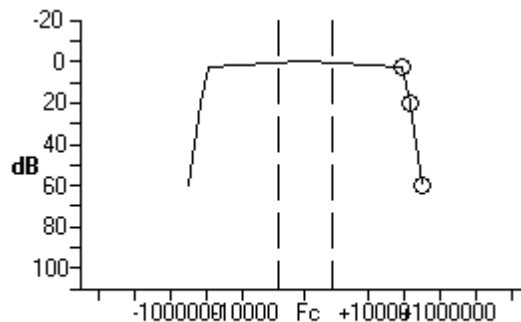
Meas/Calc : Measured

Atten. Offset (Fo)

3.00 dB 95750 kHz

20.0 dB 145000 kHz

60.0 dB 345000 kHz



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ANTENNA AirMOSS P-band Antenna

Nomenclature : (U) AirMOSS P-band Antenna
Manufacturer : (U) JET PROPULSION LABORATORY
Model Name : (U) AirMOSS P-band Antenna
Antenna Type : (U) Patch
Antenna Category : Linear
NTIA Approval Status : (U) Unapproved
Coordination ID : J/F 12
Date of Import : 7/6/2012 10:32:19 PM (GMT)
Date/Time Last Mod. : 3/25/2013 6:50:16 PM (GMT)
Lower Freq. Limit : (U) 280.0000 MHz
Upper Freq. Limit : (U) 440.0000 MHz
Polarization : (U) Horizontal and Vertical
Main Beam Gain : (U) 12.0 dBi
1st Horz. Sidelobe Level : (U) -3.00 dB
1st Vert. Sidelobe Level : (U) -3.00 dB
Atten. Rel/Act : (U) Actual dBi
Horz. Beamwidth : (U) 20.0 degrees
Vert. Beamwidth : (U) 65.0 degrees

Line Diagram: AirMOSS

