ATTACHMENT A

Technical Appendix

A.1 SCOPE AND PURPOSE

This Technical Appendix provides the Federal Communications Commission ("Commission") with the information regarding the technical characteristics of Intuitive Machines, LLC's ("Intuitive Machines") NOVA-C Lunar Lander (the "NOVA-C") and payloads comprising Intuitive Machines' upcoming commercial mission to the Moon (the "IM-1 Mission"). The NOVA-C has been developed by Intuitive Machines for the NASA Commercial Lander Payload Services ("CLPS") program and will be carrying multiple payloads to the lunar surface. The IM-1 Mission is a nominal 21-day lunar mission, with 14 days spent performing payload data collection and transmission on the surface of the Moon.

The NOVA-C is currently expected to launch in early 2022. Therefore, Intuitive Machines respectfully requests that the Commission consider and authorize the proposed operations as soon as practicable. Intuitive Machines will update the Commission with the final launch date once the launch schedule is finalized.

A.2 GENERAL DESCRIPTION

Intuitive Machines seeks authority to operate the NOVA-C under the Commission's small spacecraft rules.[1]

The IM-1 Mission will operate in multiple phases: (i) Launch Phase; (ii) Transit Phase; (iii) Lunar Orbit Phase; and (iv) Lunar Surface Phase. After launch and launch vehicle separation, Intuitive Machines' control facility in Houston will seek to establish communications with the NOVA-C as quickly as possible during the Launch Phase to begin tracking the spacecraft and compute the trans-lunar injection ("TLI") burn. After a successful TLI, the IM-1 Mission enters the Transit Phase for approximately 3 to 8 days to reach lunar orbit.

The NOVA-C will generally utilize its two Thales Alenia ("Thales") transceivers with hemispherical antennas during Transit Phase. The two Thales transceivers have 8W RF transmit power and four (4) low-gain antennas (~5 dBiC) for redundancy. The Thales transceivers will receive uplink (Earth-to-space) signals using independent antennas, and one primary Thales transceiver will be active for transmit.

During the Transit Phase, two-tone ranging and doppler data are required. The NOVA-C will also intermittently utilize one of two Quasonix transmitters, each with up to 25W RF transmit power, in conjunction with a high-gain antenna (~15 dBiC) during the Transit Phase. The Thales transceivers and Quasonix transmitters will be utilized during the Lunar Orbit Phase covering 18 orbits of the Moon in preparation for autonomous descent and landing on the lunar surface. During each orbit of the Moon, NOVA Control will lose contact with the NOVA-C

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[1] *See* Streamlining Licensing Procedures for Small Satellites, *Report and Order,* IB Docket No. 18-86 (rel. Aug. 2, 2019) ("*Smallsat Order*").

when it goes behind the Moon and the lunar tracking, telemetry, and command network (“LTN”) will need to re-acquire when in line-of-sight.

During the Lunar Surface Phase, the Quasonix transmitters will be used to transmit data to Earth. The Thales transceivers will continue to be utilized for telemetry, tracking, and control (“TT&C”) and spacecraft system monitoring. The Thales transceivers will have a transmit and receive frequency that will be different from the Quasonix transmit frequency, with all frequencies in the S-Band range. This will require the use of two simultaneous downlink frequencies. The Lunar Surface Phase is expected to last 14 days. At the end of 14 days, the NOVA-C enters lunar night. By day 37, Intuitive Machines will attempt to make additional spacecraft contacts to see if the NOVA-C survived the harsh conditions to the subsequent sunrise. Intuitive Machines will request appropriate authority in the event that subsequent operations are possible and desired beyond the expiration of this authorization (~60 days).

A.3 NOVA-C OVERVIEW

The NOVA-C is a three-axis stabilized bus, with an approximate wet mass of 1908 kg, measuring 2.19 m x 2.385 m x 3.938 m. Three fixed body-mounted solar panels provide a maximum of 788 W of power, stored in Li-ion batteries, with a total energy capacity of 1554 Wh, and an unregulated 28 VDC bus voltage. Attitude determination and control is achieved with redundant inertial measurement units (“IMU”), star trackers, and a dual-redundant cold gas (pressurized helium) reaction control system (“RCS”). The NOVA-C will be separated from the Falcon 9 launch vehicle via a RUAG zero-debris deployment system. A representative view of the NOVA-C is shown in Figure A.3-1.

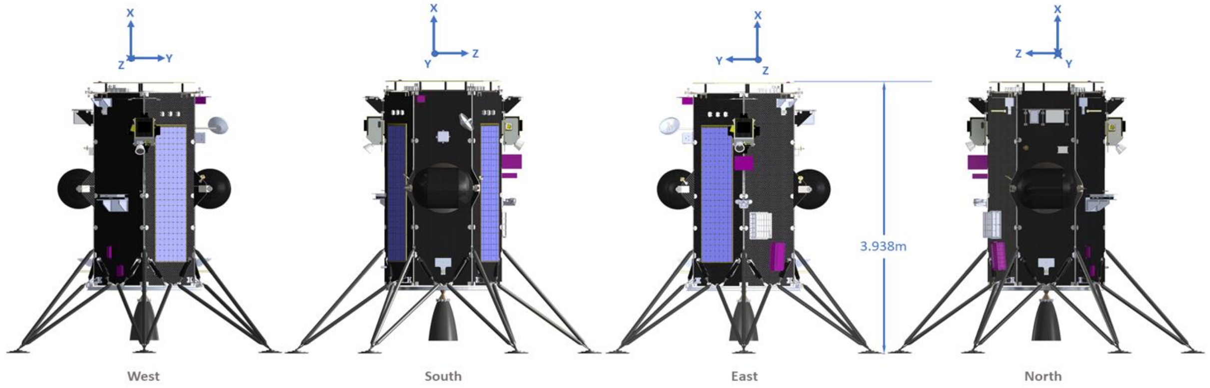

Figure A.3-1 Side views of the NOVA-C

A.4 ORBITAL PARAMETERS

The NOVA-C will spend less than a day in a transfer orbit before trans lunar injection and transit to lunar orbit. In the transfer orbit the NOVA-C will have apogee and perigee of 185 x 60,000 km, with 27.4-degree Earth inclination. This orbit is described in Schedule S due to the limitations of the electronic form which does not allow the larger orbit parameters when in the vicinity of the Moon. The bulk of operations will occur in transit, and then on the surface of the Moon. A lunar orbit insertion (“LOI”) burn will achieve a circular 100 x 100 km lunar orbit with 153-degree, retrograde lunar inclination.

A.5 SPECTRUM USAGE

The NOVA-C will use S-Band frequencies for transmit and receive operations during the IM-1 Mission. TT&C uplink operations will occur in the 2025-2110 MHz band, while TT&C and data downlink operations, and one payload communication mode will occur in the 2200-2290 MHz band. Additionally, certain payload-to-spacecraft communications on the lunar surface will utilize conventional 802.11ac protocol in the 5.5-5.85 GHz band. These Wi-Fi proximity links (tens of meters) will have an approximate peak power of 17 dBm, with data rate of approximately 54-300 Mbps.

Table A.5-1 provides channel, frequency, and bandwidth of the NOVA-C transmit beams.[2] All communications utilize right-hand circular polarization ("RHCP").

Table A.5-1: Transmitting (Downlink) Channels[3]

Channel ID[4]	Channel Bandwidth (kHz)	Center Frequency (MHz)	Data Link or TT&C
THM1	250	2210.6	TT&C/Data
THM2	75	2210.6	TT&C/Data
THG1	75	2210.6	TT&C/Data
QH1	6000	2250	Data
QH2	4500	2250	Data
QH3	3000	2250	Data
QH4	1500	2250	Data
QH5	750	2250	Data
QH6	562.5	2250	Data
QH7	375	2250	Data
QH8	187.5	2250	Data
QH9	93.75	2250	Data
QH10	45	2250	Data
QH11	30	2250	Data
QHM1	30	2250	Data

Table A.5-2 provides corresponding channel frequency and bandwidth of the NOVA-C receive beams.

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[2] *See* 47 C.F.R. § 25.114(c)(4)(i)-(ii).

[3] Due to limitations in the Schedule S software, only a single service category may be entered for transmitting channels. Intuitive Machines clarifies that the Thales transmitter will perform both TT&C and data downlink operations, while the Quasonix transmitter will provide only data downlink. Moreover, as no "data downlink" option was available, "service link" was selected in the Schedule S.

[4] The Channel names correspond with the following radio and antenna combinations: Thales Hemispherical Antenna ("THM"); Thales High-Gain Antenna ("THG"); Quasonix Hemispherical Antenna ("QHM"); Quasonix High-Gain Antenna ("QH").

Table A.5-2: Receiving (Uplink) Channels[5]

Channel ID[6]	Channel Bandwidth (kHz)	Center Frequency (MHz)	Data Link or TT&C
THU1	250	2035.59416	TT&C
THU2	250	2035.59416	TT&C

All communications with the NOVA-C are strictly for spacecraft control and payload data collection. In the United States, uplink and downlink will be handled at a single ground station site at Morehead State University in Kentucky.

TT&C uplink consists of two modes: one with ranging on and one with ranging off (*see* Table A.5-2). Thales uplink channels have the same bandwidth for ranging on and off. However, system architecture allows Thales downlink to utilize the necessary required bandwidth for ranging on, with modulated subcarrier (*see* Tables A.7.1-1 and A.7.1-2). Center frequency variation at +/- 2% of the assigned bandwidths gives 2035.5936-2035.5947 MHz with ranging on, and 2035.5939-2035.5944 MHz with ranging off.

Data downlink operations will encompass both the Thales transceiver as well as the Quasonix transmitter. Data downlink operations with the Thales transceiver will be centered at 2210.6 MHz and transmit primarily using low-gain antennas at variable bandwidth, with contingency operation on the high-gain antenna, as needed. Data downlink operations using the Quasonix transmitter will be centered at 2250 MHz and encompass up to 11 variable-rate channel bandwidths, with contingency operation on the low-gain antennas as noted in Table A.5-1 above.

A.6 LUNAR TELEMETRY, TRACKING, AND CONTROL

The NOVA-C flight computer will use the Consultative Committee for Space Data Systems ("CCSDS") standard 131.0-B-1 regarding TM Synchronization and Channel Coding as well as CCSDS 732.0-B-3 regarding the Advanced Orbiting Systems ("AOS") Space Data Link Protocol for telemetry formatting. The NOVA-C flight computer will encrypt all data before it is sent to the radios for transmission to Earth and decrypt all data sent from Earth.

When the NOVA-C transmits over S-band, the RF signals are received by the LTN, which is comprised of a geographically diverse set of large dish antennas under contract with Intuitive Machines as shown in Table A.10.1-1.

TT&C uplink operations will be centered at 2035.59416 MHz via the Thales transceivers using low-gain antennas, with variable bandwidth channels for ranging-on and ranging-off modes as noted above. TT&C downlink operations will be centered at 2210.6 MHz and transmit via the

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[5] Due to limitations in the Schedule S software, the uplink center frequency could only be entered up to 4 decimal places. Intuitive Machines clarifies that the complete center frequency is 2035.59416 MHz as listed in this Technical Appendix.

[6] Only the Thales transceiver with low gain antennas is contemplated for uplink (receive) operations.

Thales transceivers primarily using low-gain antennas at variable bandwidth, with contingency operation on the high-gain antenna, as needed.

A.7 COMMUNICATIONS PACKAGE

The NOVA-C will have four low-gain hemispheric antennas and one high-gain antenna used primarily for lunar operations. The parameters for these antennas are set forth in Table A.7-1.

Table A.7-1: Parameters of the NOVA-C Antennas

Parameters	Thales	Quasonix
Type/Number	Hemispherical/4	Dish/1
Power Level	≤ 8W	≤ 25W
Gain	Low—5 dBiC	High—15 dBiC

Figure A.7-1 shows the antenna placements and directions on the NOVA-C.

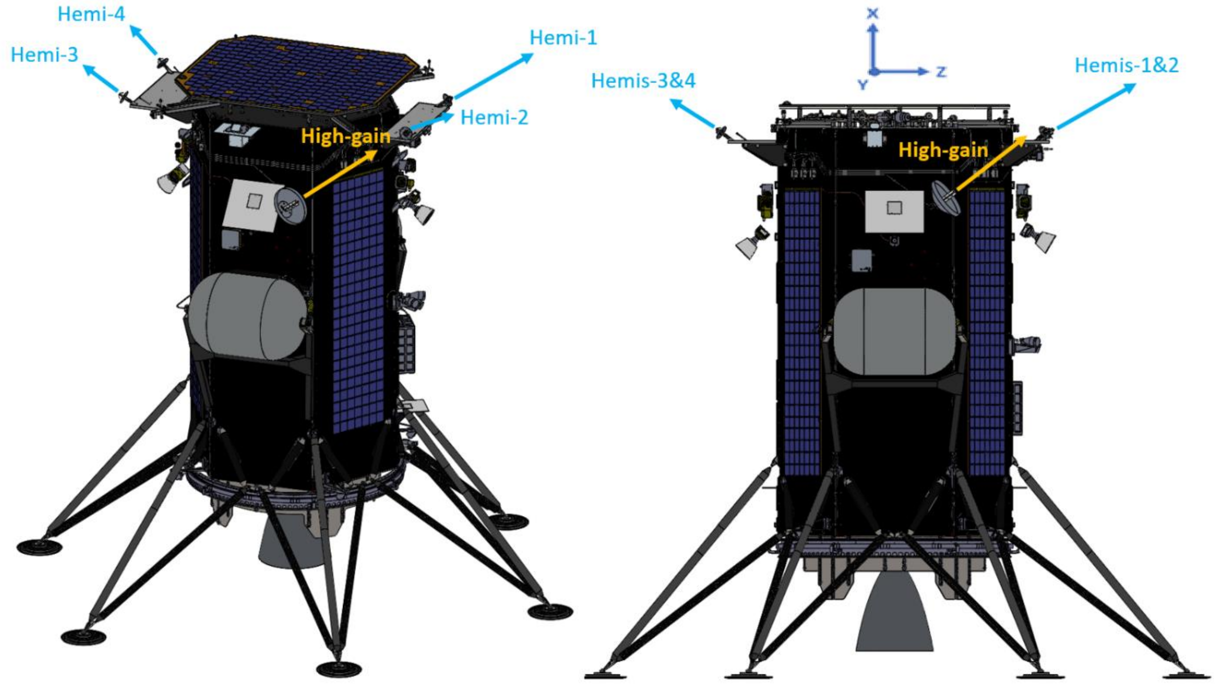

Figure A.7-1: NOVA-C Antenna Placements and Directions

A.7.1 Thales Transceiver Parameters

The Thales transceivers are fixed frequency units that transmit and receive in S-band. The modulation scheme is BPSK for both uplink and downlink operations. The Thales transceivers use the synchronous RS-422 interface standard for telemetry and have various output types for TT&C and status data. The transceivers are compatible with the European Space Agency's ("ESA") two-tone system for ranging. The Thales transceivers have 8W transmit power. The data rate for the space-to-Earth link is 2.5 kbps (encoded rate).

The parameters for the Thales transceivers are set forth in Table A.7.1-1 and A.7.1-2 below.

Table A.7.1-1: Thales Configuration with Ranging ON, Used During Transit

Parameters	Downlink – TT&C	Uplink – TT&C
Frequency	2210.600 MHz	2035.59416 MHz
Polarization	RHCP	RHCP
RF Bandwidth	250 kHz	250 kHz
Modulation Scheme – Ranging ON	BPSK/PM (PM plus BPSK modulated subcarrier) Phase modulate the telemetry onto the subcarrier using BPSK, and tones are phase modulated onto the carrier using Bi-Phase.	BPSK/PM (PM plus BPSK modulated subcarrier) Phase modulate the telemetry unto the subcarrier using BPSK, and tones shall be phase modulated onto the carrier using Bi-Phase.
Subcarrier frequency	30 kHz	8 kHz

Table A.7.1-2 Thales Transceiver with Ranging OFF, Used Primarily After Landing

Parameters	Downlink – TT&C	Uplink – TT&C
Frequency	2210.600 MHz	2035.59416 MHz
Polarization	RHCP	RHCP
RF Bandwidth	75 kHz	250 kHz
Modulation Scheme – Ranging OFF	BPSK direct on the carrier and no subcarrier	BPSK/PM (PM plus BPSK modulated subcarrier) Phase modulate the telemetry onto the subcarrier using BPSK, and tones shall be phase modulated onto the carrier using Bi-Phase.
Subcarrier frequency	N/A	8 kHz

A.7.2 Quasonix Transmitter Parameters (Tx only)

The Quasonix transmitters are tunable and transmit only. The modulation scheme is OQPSK modulation. The Quasonix transmitters use CCSDS protocol for downlink and interface to NOVA-C via synchronous RS-422 interface standard for telemetry, and asynchronous RS-422 for TT&C and status information. The Quasonix transmitters are reconfigurable by command. The expected configuration will be 25W RF transmit power, with encoded bit rate between 200 kbps rate and 8 Mbps. Moreover, bit rate will change depending on which ground station is being used.

The parameters for the Quasonix transmitters are set forth in Table A.7.2-1 below.

Table A.7.2-1 Quasonix Transmitter Parameters

Parameters	Downlink – Quasonix
Frequency	2250.0 MHz
Polarization	RHCP
RF Bandwidth	Variable (30 kHz-6 MHz)
Modulation Scheme	OQPSK
Modulation index	N/A

A.7.3 High-Gain Antenna

There is one high-gain antenna that will be used primarily for lunar surface operations, but it may also be used intermittently during transit. The high-gain antenna will be a dish type antenna. It is expected that the high-gain antenna will be used primarily with the Quasonix transmitter, but RF switches allow for the Thales transceiver to use the high-gain antenna as well and Intuitive Machines has provided relevant information regarding that configuration (beam THGD per Schedule S).

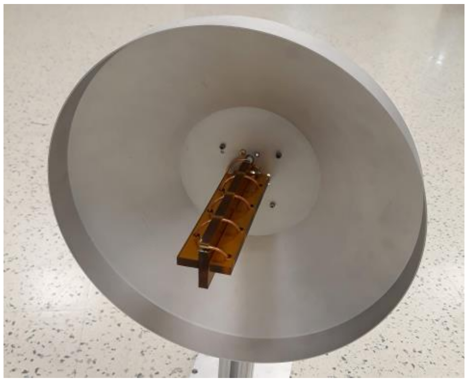

Figure A.7.3-1: NOVA-C High-Gain Antenna

A.7.4 Hemispheric Antennas

Four turnstile hemispheric antennas are located in various locations on the NOVA-C, with only two active at any time. RF switches allow for switching between the various antennas. It is expected that the Thales Transceivers will primarily use the hemispheric antenna, but the RF switches do allow for the Quasonix transmitters to use the hemispheric antennas and Intuitive Machines has provided relevant information regarding that configuration (beam QHMD per Schedule S).

Figure A.7.4-1: NOVA-C Hemispherical Antenna

A.8 PREDICTED SPACE STATION ANTENNA GAIN CONTOURS

The antenna gain contours for the beams of the NOVA-C are in the Schedule S associated with this application and are reproduced below, including: (i) the high-gain spacecraft transmission contours for two azimuthal angles, 0 and 90 degrees (Figure A.8-1); (ii) the low-gain contour for spacecraft transmission (Figure A.8-2); and (iii) the low-gain contour for spacecraft reception (Figure A.8-3).

All antennae are body-mounted on the NOVA-C. As there are no phased arrays, the beams are neither shapeable nor steerable. Moreover, antenna pointing is limited by the attitude control systems of the NOVA-C. The low-gain antennae are omni-directional, whereas the high-gain antenna will be pointed at specific ground stations during Earth-Moon transit and remain in a fixed, Earth-pointing orientation on the lunar surface.

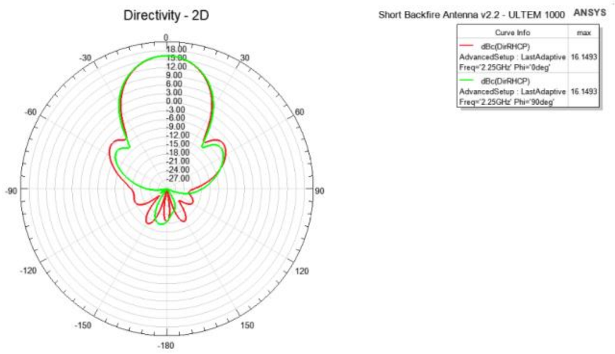

Figure A.8-1: NOVA-C High-Gain Contours (Tx)

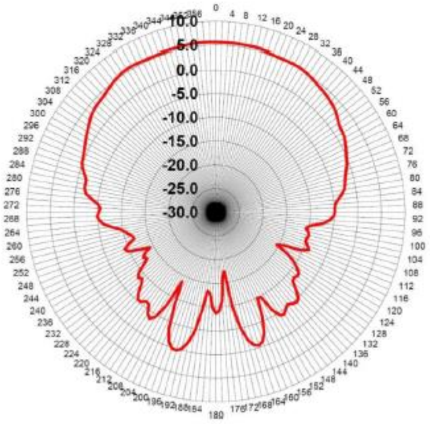

Figure A.8-2: NOVA-C Low-Gain Contour (Tx)

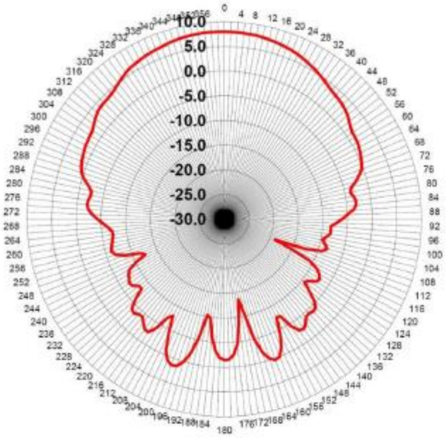

Figure A.8-3: NOVA-C Low-Gain Contour (Rx)

A.9 PAYLOADS

A.9.1 Laser Retroreflector Array (“LRA”)

LRA is a collection of eight approximately half-inch (1.25 centimeter) retro-reflectors – a unique kind of mirror that is used for measuring distance – mounted to the NOVA-C. This mirror reflects laser light from other orbiting and landing spacecraft to precisely determine the NOVA-C’s position. Retroflectors, unlike simple plane mirrors, reflect radiation from a broad range of incident angles back to its source, with minimal scattering, and brighter reflection. It requires no power or communications from the NOVA-C and can be detected by future spacecraft orbiting or landing on the Moon. It is being provided by NASA’s Goddard Space Flight Center in Greenbelt, Maryland.

A.9.2 Navigation Doppler Lidar for Precise Velocity and Range Sensing (“NDL”)

The NDL is a light detection and ranging-based (“LIDAR”) sensor composed of a three-beam optical head and a box with electronics and photonics that will provide extremely precise velocity and range sensing during descent and landing of the NOVA-C that will tightly control navigation precision for a soft and controlled touchdown on the Moon. NDL is being developed by Langley Research Center in Hampton, Virginia.

A.9.3 Stereo Cameras for Lunar Plume-Surface Studies (“SCALPSS”) Technology

SCALPSS will capture video and still image data of the NOVA-C’s plume as the plume starts to impact the lunar surface until after engine shut off, which is critical for future lunar and Mars vehicle designs producing less site contamination. It is being developed at NASA Langley, and leverages camera technology used on the Mars 2020 rover. The SCALPSS system is directly connected to the NOVA-C and payload data will be relayed back to Earth via the NOVA-C’s Quasonix transmitter primarily using the high-gain antenna.

A.9.4 Lunar Node 1 Navigation Demonstrator (“LN-1”) Science

LN-1 is a CubeSat-sized experiment being developed at NASA Marshall that will demonstrate autonomous navigation to support future surface and orbital operations. The LN-1 will operate in the S-Band at 2256.3 MHz and has previously flown on the International Space Station (“ISS”). Intuitive Machines understands that NASA is obtaining a separate authorization to operate this payload.

A.9.5 Low-frequency Radio Observations from the Near Side Lunar Surface (“ROLSES”)

ROLSES will use a low-frequency radio receiver system to determine photoelectron sheath density and scale height. These measurements will aide future exploration missions by demonstrating if there will be an effect on the antenna response or larger lunar radio observatories with antennas on the lunar surface. In addition, the ROLSES measurements will confirm how well a lunar surface-based radio observatory could observe and image solar radio bursts. This receive-only payload is being developed at NASA Goddard.

Intuitive Machines understands that the responsible U.S. government agencies for each of the payloads above (Sections A.9.1-A.9.5) have secured appropriate authority for the deployment and operation of the payloads.

A.9.6 SPACEBIT Rover

Upon landing, the NOVA-C will deploy the SPACEBIT Rover on the lunar surface primarily for technology demonstration operations. Both the SPACEBIT Rover and the EagleCAM payload discussed below will communicate with the NOVA-C via conventional 802.11ac in the 5 GHz band, covering a range on the order of a few tens of meters. EagleCAM includes a 4-antenna module attached to the NOVA-C (WPEQ-450AC), and a 2-antenna module on the payload itself (QCA9008-TBD1). The SPACEBIT rover will utilize the same 2-antenna module as the EagleCAM and both payloads will use Qualcomm chipsets.

A.9.7 EagleCAM

The EagleCAM camera unit will be released just prior to landing, approximately 30 meters above the lunar surface, taking pictures of the dust plume as the NOVA-C descends. EagleCAM is intended to capture the first-ever third person view of a spacecraft extraterrestrial landing and to uncover new scientific findings through dust plume imagery, dust accumulation analysis, and lunar surface imagery.

A.9.8 ILO-X

The International Lunar Observatory Association ("ILOA Hawaii") ILO-X telescope experiment for imaging the arm of the Milky Way galaxy. The instrument includes a dual-camera miniaturized lunar imaging suite that aims to capture some of the first images of the Milky Way Galaxy Center from the surface of the Moon, as well as performing other exploration technology validations – including functionality and survivability in the lunar environment. The ILO-X uses the same camera type as the EagleCAM payload.

A.9.9 Tiger Eye

Tiger Eye is a commercially developed radiation measurement sensor modified for space applications, the effectiveness of which will be tested in the Lunar environment. The Tiger Eye has previously flown on the ISS. Like the SCALPSS payload, the Tiger Eye is directly connected to the NOVA-C and payload data will be relayed back to Earth via the NOVA-C's Quasonix transmitter primarily using the high-gain antenna.

A.9.10 GLL ("Galactic Legacy Labs")

The GLL is a passive data cache (etched metal storage units) mounted on the spacecraft and containing information about the Earth, similar to the golden records attached to the Voyager 1 and 2 spacecraft.

A.9.11 RFMG ("Radio Frequency Mass Gauging")

The RFMG is a propellant sweeping/measuring device using a low-power RF signal to measure changes in fluid level and liquid configuration. This is a legacy NASA payload previously flown on the ISS. The device is located within the propellant tank and operates at ultra-low power levels for tank monitoring only. The approximate power level is 0.1mW.

Electromagnetic interference testing has indicated approximate electric field strengths of the order of 80 dBµV/m over the frequency range 100-250 MHz, and 50 dBµV/m over the frequency range 250-500 MHz.[7] Testing conditions utilized a radiating element within an empty, 1-meter composite box. The actual device will be located within liquid methane or liquid oxygen, thus further reducing electric field strength. Given these conditions, it is not believed the RFMG presents constitutes a typical transmitting radio element.

A.9.12 Public Affairs Cameras

In addition to the payloads described above, the NOVA-C will be equipped with two cameras. Limited imagery from these cameras used during transit and on the lunar surface may be used for press releases.

A.10 EARTH STATION NETWORK

A.10.1 Earth Stations

The NOVA-C will communicate with various earth stations during transit and while on the lunar surface to ensure 24/7 coverage.

Table A.10.1-1: LTN Dish Network

Dish	Ground Station	Location	Size (meters)
MOREHEAD	Morehead State University Space Sciences Center	Morehead, KY USA	21
PARKES	Parkes Observatory (Rx only)	Parkes, NSW Australia	64
GH32	Goonhilly Satellite Earth Station	Helston, UK	32
ISDN32	Indian Deep Space Network	Byalalu, Karnataka, India	32
D18	Indian Deep Space Network	Byalalu, Karnataka, India	18
USC20	Uchinoura	Uchinoura, Japan	20
OKN2	Okinawa	Okinawa, Japan	18
SING09	Singapore	Singapore	9.1
MRTS07	Mauritius	Port Luis, Mauritius	7.1
DU1	Dubai	UAE	7
KRU1	Kourou	French Guiana	15

Some of the ground stations will provide access to baseband units connected to NOVA Control

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[7] *See* NASA Glenn Research Center EMI Test Data Report, *Radio Frequency Mass Gauge (RFMG) Measurement System RF Emissions Test Using 1 Meter composite and aluminum* Boxes, GRC-EMI-RPT-294 (2010).

to send commands and receive telemetry. At least three of the sites will host baseband units provided by Intuitive Machines which allows for more control in testing the terrestrial interfaces and raises confidence in mission success related to the communications systems.

A.11 POWER FLUX DENSITY ANALYSIS AND SPECTRUM COMPATIBILITY

The NOVA-C is not in any of the services, will not communicate in any of the frequency bands, and will not be located in any of the orbits, as defined in 47 C.F.R. § 25.208 (b)-(r). Therefore, the power flux density limit requirements do not apply. Intuitive Machines will coordinate with NASA and other relevant government agencies to ensure operations will not cause harmful interference.

A.12 CESSATION OF EMISSIONS

Each active spacecraft transmission chain can be individually turned on and off by ground telecommand, thereby causing cessation of emissions from the NOVA-C, as required by Section 25.207 of the Commission's rules.

A.13 FREQUENCY TOLERANCE

The frequency tolerance requirements of Section 25.202(e) that the carrier frequency of each space station transmitter be maintained within 0.002% of the reference frequency will be met. The technical specifications for the Quasonix transmitter indicate that for all bandwidths selected (*see* Table A.5-1 above for list of bandwidths), the carrier frequency will be maintained to within 0.0006%, even after 5 years of use. Likewise, the Thales transmitter technical specifications indicate for all bandwidths selected (*see* Tables A.5-1 and 2 above for list of bandwidths), the transmitter maintains a frequency variation of +/-33 kHz, or maintenance to within 0.0015%.

A.14 OUT-OF-BAND EMISSIONS

The out-of-band emission limits of Section 25.202(f)(1)-(3) for the Quasonix transmitters currently exceed the carrier for each of 25.202(f)(1)-(3) at 25, 35 and 56.98 dB by 11.5 dB, 17.5 dB, and 32 dB, respectively as illustrated in Figure A.14-1 below. The Quasonix transmitter envelope falls below 56.98 dB at approximately 65 MHz away from the center frequency and complies with the rule beyond that point. Due to the relatively small excursion beyond the limits set forth in Section 25.202(f)(1)-(3), the significant pathloss from the transmission on the Moon to any potential victim receiver reducing the potential for interference, as well as the brief nature of the mission, a waiver of the rule is being concurrently requested for this FCC application.[8]

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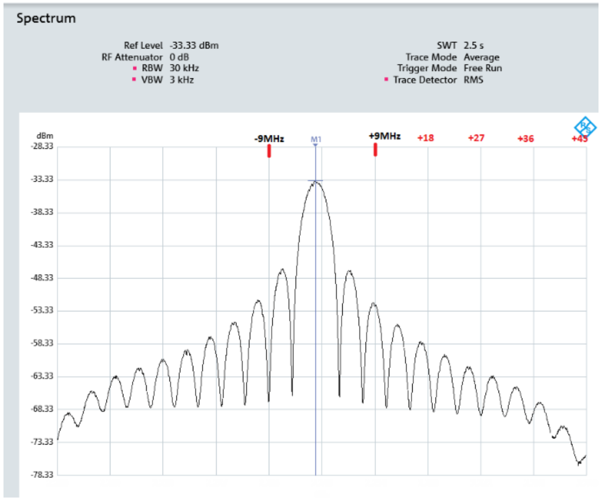
[8] *See* Narrative.



Ref Level -33.33 dBm
RF Attenuator 0 dB
RBW 30 kHz
VBW 3 kHz
SWT 2.5 s
Trace Mode Average
Trigger Mode Free Run
Trace Detector RMS

Figure A.14-1 Spectral Emission Limits

A.15 TELEMETRY MARKER

The NOVA-C will be identifiable by a unique signal-based telemetry marker distinguishing it from other space stations or space objects consistent with Section 25.123(b)(3).

A.16 ITU FILINGS

Intuitive Machines has prepared an International Telecommunication Union ("ITU") Advance Publication Information submission for its proposed system, as noted in the Narrative.[9]

A.17 ORBITAL DEBRIS MITIGATION

Intuitive Machines provided an Orbital Debris Assessment Report ("ODAR") as well as supplemental information in Attachment B of this application, which describes the characteristics applicable to the NOVA-C.[10] Intuitive Machines reaffirms that it will review orbit debris mitigation throughout design for the NOVA-C, and incorporate these objectives, as appropriate, into its operational plans. As the mitigation statement is necessarily forward looking, the process of designing, building, and testing may result in minor improvements to the parameters discussed herein. In addition, Intuitive Machines will continue to stay current with the Space Situational Awareness community and technology and, if appropriate, Intuitive Machines will modify its ODAR.

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[9] *Id.*

[10] *See generally*, Attachment B, Orbital Debris Assessment Report ("ODAR").

ENGINEERING CERTIFICATION

I hereby certify that I am the technically qualified person responsible for preparation of the engineering information contained in this application, that I am familiar with Part 25 of the Commission's rules, that I have either prepared or reviewed the engineering information submitted in this application, and that it is complete and accurate to the best of my knowledge and belief.

John Graves

Operations Lead, IM-1

Intuitive Machines LLC