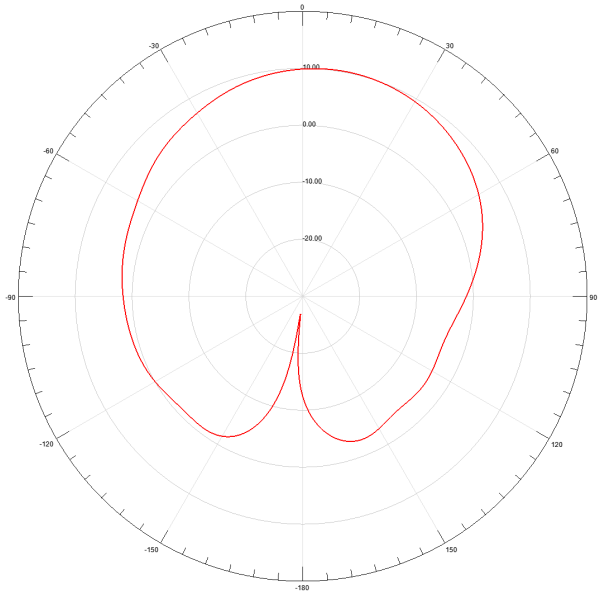
Revision Matrix

Revision	Date	Description
1	11/28/2018	Cheng Qi updated RF numbers
2	11/30/2018	Cheng Qi updated numbers with tx power margin
3	2/26/2019	Updated reader transmit power

Reader Transmitter:

Transmitter center frequency (MHz)	5800 MHz
Does transmitter frequency hop? If so, describe the pattern and dwell times.	No
Tuning range of transmitter — in other words, does the center frequency of the transmitter change, if so, over what range?	The center frequency is fixed.
3-dB bandwidth of transmitter (kHz)	BW of CW signal source (PLL) is 20 kHz
Peak RF power (W)	0.1 W (+20 dBm) maximum
Peak ERP (W)	.43 W
Maximum transmitter field strength (volts/meter); assume 1 meter from the source and transmitter radiating with deployed antenna	
Frequency Upper [MHz]	5801
Frequency Lower [MHz]	5799
Circuit Loss: [dB]	
Frequency tolerance of center frequency (+/- %)	+/- 0.0017%
Type of modulation (BPSK, GMSK, etc…)	Continuous Wave (No modulation)
Antenna Type	
Antenna gain (dBi)	8.5 dBi (simulated in free-space)
Antenna beam width (deg)	86 deg (simulated in free-space)
Antenna polarization	linear
Antenna Axial Ratio: [dB]	

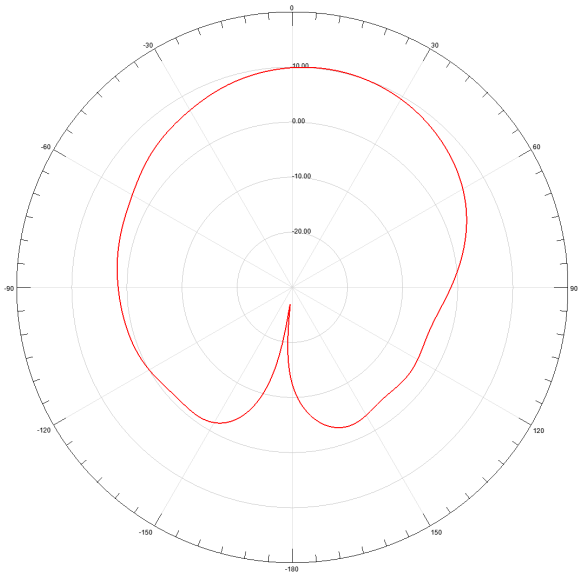
Antenna pattern (simulated free space):



Reader Receiver:

Transmitter center frequency (MHz)	5800 MHz
BW of modulated backscatter	The front-end filter 3-dB bandwidth is 125 MHz
Type of modulation (BPSK, GMSK, etc…)	The receiver is designed to receive a BPSK modulated signal from the RF tag
Total data rate	125 kHz
Antenna gain (dBi)	8.5 dBi (simulated free space)
Antenna beam width (deg)	86 deg
Antenna polarization	linear
Antenna description	
Receiver Noise Temp (K)	350 K
Receiver Sensitivity (dBW)	-85
Necessary Bandwidth per NTIA redbook, MHz	
20 dB Bandwidth, MHz	
60 dB Bandwidth, MHz	
Receiver span (MHz)	150 MHz
Intermediate Frequency(ies), MHz	N/A
Local Oscillator frequency, MHz	5800 MHz
Transmit Antenna output (EIRP), dBW	N/A
Receive Antenna Flux Density, dBW/m2 (receiver ON)	
Receiver Input Damage Threshold, (line loss included), dBm (If Spaceflight is not provided Receiver Input Damage Threshold, Spaceflight will assume -40dBm)	

Antenna pattern (simulated free space):



RF Tag:

Tag center frequency (MHz)	5800 MHz
Type of modulation (BPSK, GMSK, etc…)	The receiver is designed to receive a BPSK modulated signal from the RF tag
BW of modulated backscatter signal	125 KHz
Transmit power [dBm]	N/A
Energy harvester sensitivity [dBm]	-6 dBm
Communication Antenna type	Patch
Harvester Antenna type	Patch Array
Communication Antenna gain (dBi)	3 dBi (simulated free space)
Harvester Antenna gain (dBi)	10.1 dBi (simulated free space)
Communication Antenna beam width (deg)	105 deg
Harvester Antenna beam width (deg)	75 deg
Antenna (harvester and communication antennas) polarizations	linear

Antenna pattern: