

## Frequency Request Authorization Worksheet

Data Item	Data Entry
<b>NOTE: 1 worksheet for each transmitter. For the following please explain in the 520. If this is a transceiver. Explain uplink/downlink configuration pairing. If the receive and transmit location is the same lat/long. If you are transmitting from one location to another. If you are transmitting to or from an aircraft in a radius of operation.</b>	
005. What is the security classification? If classified, contact our office for additional information and handling.	Unclassified
110. The single transmit frequency needed from a specific band or multiple frequencies needed within a specific band, or a specific band. Provide which transmit frequencies is uplink and which transmit frequencies is downlink. Identify each frequency as F1, F2 etc. with its associated lat/long identified in 303.  F1: 24-30 GHz All frequencies are associated with a single lat/long as identified in 303. Receive and transmit are at the same lat/long and radar targets are located at a range distance of 5 meters maximum.	
113. What is the station class i.e., fixed, mobile, portable, transportable?	Portable
114. What is the bandwidth and type of transmission, e.g., AM, FM, etc?	Continuous wave (CW), single tone stepped over the 24 to 30 GHz band
115. What is the transmitter power?	0.3 milliwatts (maximum)
130. List the amount of daily use, e.g., 24 hours, night, day, and specified time/period (hours of operation).	7 am to 10 pm weekdays
140. When do you require the frequency e.g. start date?	30 March 2015
141. How long due you require the frequency e.g. completion date?	30 March 2016
207. What is your unit/organization/activity?	Group 86
209. Who is the operating unit, if different than item 207?	

### TRANSMITTER INFORMATION

300. What is the state or country will you be transmitting?	Massachusetts
301. What is the actual transmit location, e.g., "Hanscom, City, Town, state, area, aircraft, ect?"	Hanscom AFB, Bldg. 1715, Room 5B 204
303. List the geographical coordinates for item 301 stated in LAT/LONG and expressed in degrees, minutes, seconds. Identify associated LAT/LONG with F1, F2 frequency in 110.	Lat: 42 deg, 27.854' N Lon: 71 deg, 17.124' W
306. What radius will the transmitter operate in? In Kilometers.	0.005 Kilometers (the transmitter will illuminate a radar target at a maximum range distance of 5 meters.)
<b>315– 321 If your requirement involves space station/satellite operations, contact our office for additional information needed.</b>	

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340. What transmitter/transceiver will be used i.e., manufacturer, model number, part number. When sending request include/attach any technical data that you can find to aid in request.

The transmitter will be a custom unit that operates solely within 24-30 GHz, with emitted power < 0.3mW

341. How many transmitters will be used i.e., fixed, mobile, portables, etc.?

1 mobile transmitter

**If this request is for a pulse modulation system,**

346. What is the pulse width(s)?

CW

347. What is the pulse repetition rate(s)

CW

349. Does this system contain side lobe suppression? (Yes or No)

No

354. What type of transmit antenna will be used, e.g., parabolic, whip?

Patch antenna or slot antenna (only one antenna transmits at a time)

355. What is the transmit antenna manufacturer/model number?

Custom fabricated

356. What is the transmit antenna structure height? (In meters above ground)

1.5 meters (relative to the interior 2<sup>nd</sup> floor level of pylon B at Building 1715)

357. What is the transmit antenna gain?

5 dBi gain (peak gain relative to isotropic)

358. What is the transmit antenna terrain elevation, specify meters or feet AMSL?

73 meters feet above MSL

359. How high is the transmit antenna above the ground, specify meters or feet AMSL?

73 meters above MSL

362. Is the transmit antenna directional, non-directional, or does it rotate? If directional, provide direction relative true North.

Occasionally rotates by physical movement

363. How is the transmit antenna polarized, e.g., horizontal, vertical, etc.?

Horizontal or vertical polarization depending on orientation of the antenna

### RECEIVER INFORMATION

**NOTE: Include all receiver equipment and locations that will be receiving from the transmitter in the 340. Identify each receiver and location by R1, R2, ect.**

400. What is the state or country will you be receiving?

Massachusetts

401. What is the actual receive location, e.g., "Hanscom, City, Town, state, area, aircraft, ect?"

Hanscom AFB

403. List the geographical coordinates for item 401 stated in LAT/LONG and expressed in degrees, minutes, seconds. Identify associated LAT/LONG with R1, R2 in 440.

Lat: 42 deg, 27.332 min  
Lon: 71 deg, 16.22 min (Same as transmit, but separated by ~5 meters)

406. What radius will the receiver operate in? In Kilometers.

0.005 Kilometers (the receiver array antenna will receive signals scattered from

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	a radar target at a maximum range distance of 5 meters.)
<b>415 – 419, 470-472. If your requirement involves space station/satellite operations, contact our office for additional information needed.</b>	
440. What receiver/transceiver will be used i.e., manufacturer, model number, part number. When sending request include/attach any technical data that you can find to aid in request. Identify each receiver as R1, R2 ect and associate them with LAT/LONG in 403.  The receiver will be a custom unit that operates solely within 24-30 GHz.	
441. How many receivers will be used i.e., fixed, mobile, portables, etc.?	One receiver system, mobile
454. What type of receive antenna will be used, e.g., parabolic, whip?	Patch antenna or slot antenna (only one antenna operates at a time)
455. What is the receive antenna manufacturer/model number?	Custom fabricated
456. What is the receive antenna structure height? (In meters above ground)	5 meters above ground (relative to the interior 2 <sup>nd</sup> floor level of pylon B at Building 1715)
457. What is the receive antenna gain?	5 dBi elements (peak gain relative to isotropic)
458. What is the receive antenna terrain elevation, specify meters or feet AMSL?	73 meters above MSL
459. How high is the receive antenna above the ground, specify meters or feet AMSL?	5 meters
462. Is the receive antenna directional, non-directional, or does it rotate? If directional, provide direction relative true North.	Directional, angle will vary with respect to true North
463. How is the receive antenna polarized, e.g., horizontal, vertical, etc.?	Horizontal or vertical polarization depending on orientation of the antenna
506. List paired frequency of frequencies in 110. if applicable Not applicable	

### SUPPLEMENTARY DETAILS

520. Give a full detailed and specific description of your requirement for usage of this requested frequency and how you intended to use it i.e, what, how when, where, mission, exercise, or test supporting, etc. Include FCC Type Acceptance Number, Contract Number and Contractor. Include who this directly supports, ie Navy, FAA, DOE, Army, Air Force Unit, ect.

The proposed tests will support phased array antenna testing research on Program 10236-23 for the Department of Homeland Security. The approach will be to co-locate the receive antenna array with the transmit antenna array and to record data on individual antenna elements in the receive array. The transmit and receive antennas will be located indoors on the second floor of Pylon B at Building 1715. The walls surrounding the test room is primarily concrete and Building 1715 is a metal structure, so RF leakage should be negligible. The test data will be processed off-line to examine the beam forming capabilities of the array and to form images of radar targets. This series of tests is the first testing of

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the design, and it is expected that multiple runs will be required to optimize the performance of the array hardware and software.

530. If applicable, use to identify geographical area for operations i.e., transmitting in warning area xxx bounded by coordinates XXXXXNXXXXXXW, etc.

531. If applicable use to include/exclude states for an area of operation. Must be justified.

711. If this request is for aircraft, how high will it fly and what is the radius of operation? Elevation in Ft and radius in Kilometers.

No aircraft are involved

803. Provide requestors point of contact information e.g. name, phone number, office symbol.  
Dr. Alan J. Fenn, 781 981 2678, Group 86 MIT Lincoln Laboratory

### Remarks:

All emissions will originate in room 5B-204, building 1715, Hanscom AFB.