Worksheet A: Instructions — Categorical Exemption for Station Evaluation

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It is easy to determine if you need to do a routine station evaluation. The requirement to do a routine station evaluation is based on Table 1.1, showing peak envelope power (PEP) input to the antenna.

A, B, C: For your records, enter the call sign of the station (A) , the name of the station licensee (B) and station location (C) onto the top of the worksheet.

D. Enter the station operating frequency band being considered for evaluation (D).

E. Enter the maximum PEP output you use on that band (E).
(This can be determined by measurement or estimated from factors such as the rated output power of your transmitter. Alternatively, you can estimate from other factors. See Chapter 5, the section titled: “How to Calculate Peak Envelope Power to the Antenna.”)

F, G. Enter your feed line type (F) and length (G).

H. Enter the specification for the loss in dB per 100 feet for your cable type. Use the manufacturer’s specification or use the table in Chapter 5.

I. Divide the feed line length (G) by 100, then multiply the result by the specification for your feed line type for loss in dB per 100 feet. This will give you the total feed line loss in dB (I).

J. Enter the total feed line loss in dB (I) and convert it to a percentage (J).
(See the formulas or table in Chapter 5 or, optionally, you can use 0 dB for a conservative estimate. If you use 0 dB, skip to step J and enter 0%.)

K. Multiply the maximum transmitter PEP used on this band (E) by the percentage of power lost in the feed line (J). The result is the total power lost in the feed line (K).

L. Subtract the power lost in the feed line (K) from the transmitter PEP used on this band (E). The result is the PEP input to the antenna.

Compare the PEP input to the antenna (L) to the level in Table 1.1. If the power to the antenna is greater than the level in Table 1.1 for that frequency band, it will be necessary for you to perform a routine evaluation on your station. If your PEP to the antenna does not exceed the limits in Table 1.1, the rules do not require you to do a routine station evaluation on that band.

WORKSHEET A: CATEGORICAL EXEMPTION FOR STATION EVALUATION WORKSHEET
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Use this worksheet for each band you operate to determine if you need to do a station evaluation on that band.

(A): Station Call Sign: _____ (B) Station Licensee: _____

(C) Station Location: _____

_____

(D) Frequency Band: _____

(E) Maximum Transmitter PEP used on this band: _____ W PEP

Refer to Table 1.1 — If the power on line (E) of this worksheet is less than or equal to the power limits given in the table for this band, you do not need to do an evaluation on this band. If the power exceeds the limits, continue with this worksheet.

Calculate Feed Line Loss in dB:
(F) Feed Line Type: _____ (G) Feed Line Length: _____ ft

(H) Enter Feed Line Loss in dB per 100 ft: _____ dB
(From Chapter 5 or manufacturers specification. You can use 0 dB for a conservative estimate. If you use 0 dB, skip to step J and enter 0%.)

(G) _____	/	100	×	(H) _____ dB	=	(I) _____ dB
Feed Line Length from (G)	divide by	100	then multiply by	loss in dB per 100 feet from (H)	equals	Feed Line Loss in dB

Convert to percentage:

(I) _____ dB	=	(J) _____ %
Feed Line Loss in dB from (I)		Convert to percentage of power lost in the feed line. See Chapter 5 or use 0% as a conservative estimate.

Power to antenna:

(E) _____ W PEP	×	(J) _____ %	=	(K) _____ W PEP
Maximum transmitter PEP used on this band from (E)	times	Percentage of power lost in the feed line from (J)	equals	Power lost in the feed line

(E) _____ W PEP	–	(K)_____ W	=	(L) _____ W PEP
Maximum transmitter PEP used on this band from (E)	minus	Power lost in feed line	equals	PEP input to the antenna

Conclusion and decision:
Compare the power input to the antenna (L) to Table 1.1. If the power input to the antenna is less than or equal to this power level, you do not have to evaluate your station on this band.

Worksheet B: Instructions — Station Evaluation Worksheet

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If you do have to do a station evaluation for one or more powers or modes, use this worksheet to guide you through the process. This single page worksheet and instructions will suffice for many stations. See Chapter 5 for multiple transmitter sites and repeaters.

A, B. For your records, enter the call sign of the station (A), the station licensee (B) onto the top of the worksheet.

C. Enter the frequency band being evaluated.

D. Enter the operating mode being evaluated.

E. Enter the maximum transmitter peak-envelope power being used on this band (E). (See Chapter 5, the section titled: “How to Calculate Peak Envelope Power to the Antenna.”)

F. Enter the peak-envelope power input to the antenna from line L of Worksheet A (F).
(As a conservative first estimate, you can skip to steps J and K, using this power level.)

G. Enter the duty factor of the mode being evaluated (H):
(See the section in Chapter 5 titled: “Duty Factor,” or use 40% for CW, 20-40% for SSB, 100% for FM or digital modes.)

H,I. Enter the maximum percentage of time the station could be on the air for controlled or uncontrolled exposure. (A good rule of thumb is to use 100% for controlled exposure, 67% for uncontrolled exposure. Also see the table in Chapter 5.)

J, K. Calculate average power.
(Multiply the PEP input to the antenna (F) by the duty factor of the mode being used (G) by the operating time percentage (H, I). The result is the average power to the antenna.

L. Refer to any of the evaluation methods described in the FCC’s *OET Bulletin 65* of Chapter 5. Determine that the antenna is located far enough away from areas where people are present or that the field strength is below the maximum permissible exposure (MPE) limits in areas where people are present. Describe briefly the method used to perform this evaluation.

M. Record the results of your station evaluation. Your station evaluation for this band and mode is now complete. Although it is not required by FCC rules, it is recommended that you retain a copy of your station evaluation in your station records.

If the station is not in compliance under all circumstances of its expected operation, attach a separate sheet describing any limitations of methods that the station operator will use to ensure compliance if people are present in areas that could be out of compliance.

WORKSHEET B: STATION EVALUATION WORKSHEET

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Use this worksheet for each band, mode and antenna combination you use to determine if your station complies with the FCC regulations for RF exposure.

(A): Station Call Sign: _____ (B) Station Licensee: _____

(C) Frequency Band: _____ (D) Operating mode being evaluated: _____

(E) Maximum Transmitter PEP used on this band: _____ W PEP

(F) PEP input to the antenna on this band (from line (L) on Worksheet A): _____W PEP
For a conservative estimate, you could use your maximum transmitter PEP and skip to step (L) and use this power for your evaluation. If you "pass," you do not need to do the other steps.

Mode and duty factor:

(D) Operating mode being evaluated: _____ (G) Duty Factor for this mode: _____%
(See Chapter 5 or use 40% for CW, 20% for SSB with no speech processing, 40% for SSB with heavy speech processing, 100% for FM or digital modes)

Maximum time the station could be transmitting in:
(H) 6-min period (controlled): ____ / 6 = _____ %

(I) 30-min period (uncontrolled): ____ / 30 = _____ %

Calculate average power — Controlled exposure:

(F) _____ W PEP	×	(G) _____ %	×	(H) _____ %	=	(J) _____ W avg
PEP input to the antenna from (F)	times	Duty Factor from (G)	times	Controlled operating time percentage	equals	Controlled average power input to the antenna

Calculate average power — Uncontrolled exposure:

(F) _____ W PEP	×	(G) _____ %	×	(I) _____ %	=	(K) _____ W avg
PEP input to the antenna from (F)	times	Duty Factor from (G)	times	Uncontrolled operating time percentage	equals	Uncontrolled average power input to the antenna

(L) Refer to any of the evaluation methods in FCC's *OET Bulletin 65* or Chapter 5. Determine if the antenna is located far enough away from areas where people are present or that the field strength is below the maximum permissible exposure (MPE) limits, based on the frequency, mode, average power and antenna type being used.

(M) Describe the method used to do the evaluation: _____

Using this method, did your station exceed the FCC RF exposure limits? (Y/N)

Controlled exposure: _____(Y/N) Uncontrolled exposure: _____ (Y/N)

If the station is not in compliance under all circumstances of its expected operation, attach a separate sheet describing any limitations of methods that the station operator will use to ensure compliance if people are present in areas that could be out of compliance.

IEEE C95.1-1982 Maximum Permissible RF Exposure Limits

Table 1--Maximum Permissible Exposure (MPE) Limits

	Controlled Exposure (6-Minute Average)			***Uncontrolled Exposure (30-Minute Average)***		
Frequency Range (MHz)	*Electric Field Strength (V/m)*	*Magnetic Field Strength (A/m)*	*Power Density (mW/cm^2)*	*Electric Field Strength (V/m)*	*Magnetic Field Strength (A/m)*	*Power Density (mW/cm^2)*
0.3-3.0	614	1.63	(100)*			
3.0-30	1842/f	4.89/f	($900/f^2$)*			
0.3-1.34				614	1.63	(100)*
1.34-30				824/f	2.19/f	($180/f^2$)*
30-300	61.4	0.163	1.0	27.5	0.073	0.2
300-1500	--	--	f/300	--	--	f/1500
1,500-100,000	--	--	5	--	--	1.0

f = frequency, in MHz.

* = Plane-wave equivalent power. (This means the equivalent far-field strength that would have the E- or H-field component calculated or measured. It does not apply well in the near field of an antenna.)

-- = Not specified.