communications

DATAFILE

INTERFERENCE ANALYSIS WORK SHEET.....10002-3

INSTRUCTIONS: Use DATAFILE Bulletin 10002-2 as a guide in using this Work Sheet. Describe the receiver and its RFI symptoms as completely as possible on pp. 1 and 2 and describe nearby transmitters on pp. 3 and 4. Pages 5 and 6 can be used to analyze the interference problem. Indicate any figures which are estimates. Use a separate Work Sheet for each case of interference.

Technician _____ Customer _____

Address _____ Receiving Site _____

_____ _____

1 RECEIVER EXPERIENCING RFI

Model: _____ Revision: _____ Operating Frequency: _____ MC

Crystal Frequencies: (1st) _____ (2nd) _____ (3rd) _____

Sensitivity: _____ µv Usable Sensitivity: (RFI present) _____ µv

Usable Sensitivity: (RFI absent) _____ µv

2 ANTENNA SYSTEM

Antenna Type: _____ Gain: _____ db Height: _____ FT Elev: _____ FT

Transmission Line: (type) _____ Length: _____ FT

3 REGULARITY OF RFI

☐ Continuous

☐ Intermittent

☐ Regular Intervals ☐ Irregular Intervals

If regular, when? _____

4 SEVERITY OF RFI

☐ Destructive

☐ Limits Receiver Performance

☐ Annoying

5 RECEIVING RANGE

With RFI Present: _____ miles

With RFI Absent: _____ miles

6 EFFECT ON SQUELCH

☐ None

☐ Opens squelch at critical setting

☐ Opens squelch at maximum setting

☐ Changes critical squelch setting

7 AUDIO HEARD FROM RECEIVER OUTPUT DURING RFI (squelch opened manually)

☐ None. Receiver noise output ☐ increases ☐ decreases with RFI present.

☐ Intelligible speech (apparently from a communication system). Audio level (compared to desired signal):

☐ very low ☐ low ☐ about same ☐ high ☐ obviously exceeding passband

☐ Non-intelligible speech (garbled speech)

☐ Broadcast: ☐ AM ☐ FM ☐ TV Apparent modulation: _____ KC

☐ Tones or Noise. Describe (give freq, if tone): _____

Does the interference appear to start or end in the middle of a transmission from the interfering station? ..... ☐ Yes ☐ No

8 **RECORD THE FOLLOWING RECEIVER METER READINGS (no desired signal present):**
If the meter readings are not stable, show the limits of the variation.

	Interference Absent		Interference Present	
	Antenna Connected	Antenna Disconnected	Modulation Present	Modulation Absent
LOW-IF				
LIM-1				
LIM-2				
DISCR				

Above readings taken with: ☐ VTVM ☐ 0-3 volt, 20,000 ohm-per-volt meter ☐ 2500-ohm microammeter

9 **TUNABLE RECEIVER: Listen at suspected frequencies with a tunable receiver, if available, to try to correlate transmitting time and modulation with presence of RFI.**

Summarize results: _____

_____

_____

10 **RECEIVER SPURIOUS FREQUENCIES: If receiver spurious response is suspected, calculate the receiver's image and half-IF response frequencies.**

	IF Frequency	Image Frequency (2 IF's above or below desired frequency*)	Half-IF Frequency (1/2 IF above or below desired frequency*)
IF-1			
IF-2			
(IF-3)			

* Spurious lies above desired frequency if injection is above signal in converter for that IF, or below if injection is below signal.

11 **RESULTS OF OTHER TESTS (see Table II in Bulletin 10002-2):** _____

12 LOCATIONS OF NEARBY TRANSMITTERS

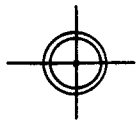
Use the box below to represent the location of the receiver experiencing interference.

a. Fill in the box and sketch in the location of:
   - all transmitters within 1000 feet of the receiver.
   - any other transmitters on nearby channels within 10 miles of the receiver and any suspected transmitters up to 80 miles of the receiver.
   - all AM, FM and TV broadcast transmitters within 5 miles of the receiver.

b. Starting with the closest transmitter, label them "A", "B", "C", etc. If the receiver is being operated duplex, label the associated transmitter "A".

c. Indicate the distance:
   - from the receiver's antenna to each transmitter's antenna. Indicate both vertical and horizontal distance if less than 500 feet.
   - between any transmitters less than 1 mile apart.

Indicate North



RECEIVER

Freq: _____ MC

Ant. Ht: _____ FT

Ant. Elev: _____ FT

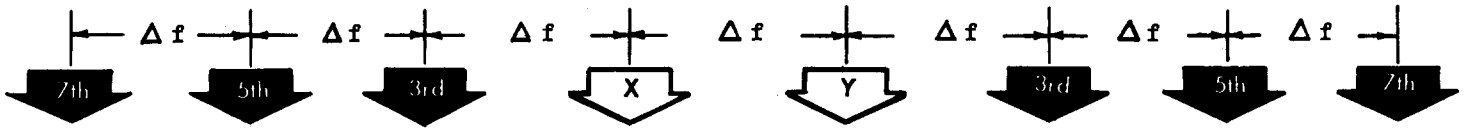
(13) DESCRIPTIONS OF NEARBY TRANSMITTERS

Describe each of the transmitters shown on page 3 in the chart below. Indicate any figures which are estimates.

	Call Sign	Transmitter Description				Antenna			Hrs. of Oper.	Notes
		Frequency or Channel	Crystal Frequency	Power (watts)	Type of Modulation	Type	Elev. (FT)	Height (FT)		
A										
B										
C										
D										
E										

14 INTERMODULATION PRODUCTS

Calculate 3rd order intermodulation products for all transmitters within 1 mile of each other.
Calculate 5th and 7th order products for all transmitters less than 500 feet apart.



			X	Δf	Y			
151.31	151.55	151.79	152.03	0.24	152.27	152.51	152.75	152.99

To calculate 2-signal intermodulation products of "X" and "Y" (see example above), record frequency of X and Y in chart, subtract to find Δf, add Δf to the right to find higher products and subtract Δf to the left to find lower products. This chart includes only the most common IM products. Other products of higher order may also produce RFI.

			A	Δf	B			
			A	Δf	C			
			B	Δf	C			
				Δf				
				Δf				
				Δf				
				Δf				
				Δf				
				Δf				
				Δf				

Calculate 3-signal intermodulation products for transmitters located very close to the receiver or having very high power. See examples 8 and 9 in Bulletin 10002-2.

TRANSMITTERS	A + B −C	A + C −B	B + C −A
A, B & C			
TRANSMITTERS ....., ... &			
TRANSMITTERS ....., ... &			

15 TRANSMITTERS SPURIOUS RADIATION

Calculate the common spurious frequencies of each transmitter within 1000 feet of receiver.

	Transmitter Frequency	Crystal Frequency	Crystal Spurious Xmtr Freq ± Xtal Freq		Final Multiplier Freq	Harmonics 2nd	Harmonics 3rd
A							
B							
C							

16 TRANSMITTER NOISE AND DESENSITIZATION

For all transmitters within both 500 feet of receiver and 4% of receiver's operating frequency, calculate the antenna spacing required to prevent greater than 3-db loss of signal due to transmitter noise and desensitization. Use DUPLEX OPERATION CURVES to make calculations.

	Separation Between Xmtr Freq and Rcvr Freq	Actual Antenna Spacing Vertical	Actual Antenna Spacing Horizontal	Required Antenna Spacing Vertical	Required Antenna Spacing Horizontal
A					
B					
C					

17 ANALYSIS OF INTERFERENCE:

18 RECOMMENDED METHODS FOR REDUCTION:

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