



DEPARTMENT OF THE NAVY  
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY  
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3817 STRAUSS AVENUE, SUITE 108  
INDIAN HEAD, MD 20640-5151

8020  
Ser N844/172  
12 Feb 19

FIRST ENDORSEMENT on NAVSURFWARCENDIV Dahlgren ltr 8020 Ser B52/6781 of  
19 Sep 18

From: Commanding Officer, Naval Ordnance Safety and Security Activity  
To: Program Manager, Training Systems (PMM130/R. Adkins)

Subj: HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE, PERSONNEL,  
AND FUEL CERTIFICATION FOR THE USE OF PROGRAM MANAGER FOR  
TRAINING SYSTEMS MOBILE TRAINING EMITTER SYSTEMS (CURRENT AS  
OF FY17) AT ALL UNITED STATES MARINE CORPS BASES AND ANNEXES

Encl: (1) NAVSURFWARCENDIV Dahlgren ltr 8020 Ser B52/6781 of 19 Sep 18

1. The Naval Ordnance Safety and Security Activity (NOSSA) has reviewed and concurs with the Results and Conclusions provided in Naval Surface Warfare Center, Dahlgren Division (NSWCDD) letter 8020 Serial B52/6781. The NSWCDD letter contains the results of the Hazards of Electromagnetic Radiation to Ordnance (HERO), Personnel (HERP), and Fuel (HERF) analysis conducted to determine the impact of using Program Manager for Training Systems mobile training emitter systems (current as of FY17) at all United States Marine Corps bases and annexes.

2. The analysis concludes that there are potential HERO, HERP, and HERF concerns associated with the use of these mobile systems if the safe separation distances specified in the NSWCDD letter are not observed. Therefore, these installations are required to maintain the safe separation distances between the emitters' antennas and ordnance, personnel, and fuel areas as identified in the NSWCDD letter.

3. HERP and HERF certification is granted for this installation provided the transmitter equipment and antenna installation locations documented in the NSWCDD letter are up to date. Any new antenna/transmitter locations must be reviewed to assess their HERP/HERF impact.

4. The NOSSA point of contact is Mr. James Puffinburger (N844) on DSN 354-6853, commercial 301-744-6853, or email: james.puffinburger@navy.mil.

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ES.C.1229439207

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DN: cn=US, cn=U.S. Government, ou=DoD,  
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CHARLES C. DENHAM  
By direction

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Subj: HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE, PERSONNEL,  
AND FUEL CERTIFICATION FOR THE USE OF PROGRAM MANAGER FOR  
TRAINING SYSTEMS MOBILE TRAINING EMITTER SYSTEMS (CURRENT AS  
OF FY17) AT ALL UNITED STATES MARINE CORPS BASES AND ANNEXES

Copy to:

BUMED Falls Church (M3B3/LCDR A. Riccardi)  
CG MCIEAST-MCB CAMLEJ G SIX (Spectrum Managers/M. Johnson, M. Bishop)  
NOSSA ESSOLANT Norfolk (N5L/M. Price)  
NOSSA ESSOPAC San Diego (N5P/J.D. Sytsma)  
NCTAMS LANT Norfolk (N6 EMO/T. Severn)  
CO MCAS Miramar (ESO/P. Bazinet)  
MCB CAMP Pendleton (ESO/T. Bradley)  
MCAS CAMP Pendleton (ESO/R. Cardona)  
CO Blount Island CMD (ESO/J. Churchill)  
COMMARCORSYSCOM Quantico (ESO/C. Dauksys; ESO/D. Flick; ESO/J. Taylor;  
ESO/M. James))  
MCMWTC Brideport (ESO/C. Gomes)  
MCB Camp Lejeune (ESO/C. Gomez)  
CG MCRD ERR Parris Island (ESO/M. Heath)  
CG MCIPAC @ MCB Camp Butler/COMMARCORBASES JAPAN Camp Smedley D Butler  
(ESO/C. Holden)  
CG MCAGCC/CG MAGTF TRNGCOM TWENTYNINE Palms (ESO/S. Hurlbert)  
CG MCIEAST @ MCB Camp Lejeune (ESO/D. Jensen)  
CO MCB HAWAII Kanehoe Bay (ESO/P. Kaiahua)  
CG MCRD WRR San Diego (ESO/S. Koslowsky)  
CO MCLB Barstow (ESO/B. Korves)  
CATC Camp Fuji (ESO/D. Lawson)  
MCAS Futenma (ESO/S. Parker)  
CG MCIWEST @ MCB Camp Pendleton (ESO/M. Perez)  
COMMARFORPAC (ESO/M. Spencer)  
MCAS Beaufort (ESO/D. Tingley)  
MCAS Cherry Point (ESO/W. Westerfield)  
COMUSMARFORK Seoul (ESO/B. Wilde)  
MCAS New River (ESO/P. Wilson)  
CG MCINCR @ MCB Quantico (ESO/D. Wolfe)  
CO MCLB Albany (ESO/W. Womble)  
MCAS Iwakuni (ESO/C. Yonat)  
HQ MARINE CORPS SAFETY DIVISION Arlington (Senior Marine Corps Health  
Physicist/CDR M. Beery)  
COMMCICOM SAFETY (D. Spasojevich)  
NAVSURFWARCENDIV Dahlgren (B52/R. Magrogan)  
AECOM Dahlgren (E3 Team Online)



## DEPARTMENT OF THE NAVY

NAVAL SURFACE WARFARE CENTER  
DAHLGREN DIVISION  
6149 WELSH ROAD, SUITE 203  
DAHLGREN, VIRGINIA 22448-5130

IN REPLY REFER TO  
8020  
Ser B52/6781  
19 Sep 18

From: Commanding Officer, Naval Surface Warfare Center,  
Dahlgren Division

To: Program Manager, Training System (PMM130/Adkins)

Via: Commanding Officer, Naval Ordnance Safety and Security  
Activity (N8/Denham), Indian Head, MD

Subj: HAZARDS OF ELECTROMAGNETIC RADIATION TO ORDNANCE,  
PERSONNEL, AND FUEL ANALYSIS FOR THE USE OF PROGRAM  
MANAGER FOR TRAINING SYSTEMS MOBILE TRAINING EMITTER  
SYSTEMS (CURRENT AS OF FY17) AT ALL UNITED STATES  
MARINE CORPS BASES AND ANNEXES

Ref: (a) NAVSEA OP 3565, Volume 2, Nineteenth Revision of  
1 Jul 16  
(b) NAVSEA OP 3565/NAVAIR 16-1-529, Volume 1, Sixth  
Revision of 1 Feb 03  
(c) DoDINST 6055.11 of 19 Aug 09  
(d) PHONCON MCSC (PMM130) Mr. Adkins/NSWCDD (B52)  
Mr. Staton of 28 Aug 18  
(e) MCSC MIPR No. M9543017WRTR047 of 15 Dec 16

Encl: (1) System Specifications and Hazards of Electromagnetic  
Radiation to Ordnance Safe Separation Distances  
(2) System Specifications and Hazards of Electromagnetic  
Radiation to Personnel and Fuel Safe Separation  
Distances  
(3) Distribution List

1. In accordance with references (a) through (c) and as  
requested by reference (d) and funded by reference (e), a  
Hazards of Electromagnetic Radiation to Ordnance (HERO),  
Personnel (HERP), and Fuel (HERF) analysis was performed to  
assess the impact of using Program Manager for Training Systems  
mobile training emitter systems (current as of FY17) at all  
United States Marine Corps bases and annexes.

2. Enclosure (1) provides the system specifications and HERO  
safe separation distances. The HERO safe separation distances  
should be maintained between the antennas and any ordnance

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operations involving HERO UNSAFE and HERO SUSCEPTIBLE ORDNANCE items.

3. Ensure that a HERO warning label is affixed to the operator's console of each system. Complete the labels with the appropriate distances as specified in enclosure (1) for HERO UNSAFE ORDNANCE and HERO SUSCEPTIBLE ORDNANCE. HERO warning labels may be downloaded from the Naval Ordnance Safety and Security Activity website at [www.nossa.navsea.navy.mil](http://www.nossa.navsea.navy.mil).

4. Enclosure (2) provides the system specifications and HERP/HERF safe separation distances.

5. Ensure the minimum HERF separation distances contained in enclosure (2) are maintained, or silence the transmitters during fueling operations.

6. The Naval Surface Warfare Center, Dahlgren Division (NSWCDD), Electromagnetic Environmental Effects (E3) Assessment and Evaluation Branch (B52) recommends incorporating enclosure (1) into the installation's HERO Instruction/Bill. Additionally, NSWCDD (B52) recommends incorporating enclosure (2) into the installation's HERP/HERF survey report. A copy of this certification should be maintained with the current HERP/HERF assessment report for these installations. All updates may also be found on the E3 Team Online Knowledge Management System (KMS). Any changes to the respective system specifications that are provided will require further reevaluation.

7. The E3 Team Online KMS is an official Department of the Navy web portal that provides access to HERO, HERP, and HERF E3 data; technical reports; and RADHAZ calculation tools. E3 Team Online can be accessed at <https://e3.nswc.navy.mil>. A valid Common Access Card is required for access to this web portal. To request an E3 Team Online account, visit <https://www.e3teamonline.org>. Upon receipt of account approval, visit <https://e3.nswc.navy.mil> for log-in. Questions regarding E3 Team Online content should be directed to Mr. Richard Magrogan, NSWCDD (B52), at commercial 540-653-3445

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SYSTEMS (CURRENT AS OF FY17) AT ALL UNITED STATES  
MARINE CORPS BASES AND ANNEXES

or DSN 249-3445, or via electronic mail at  
richard.magrogan@navy.mil. Questions regarding access to  
E3 Team Online should be directed to Ms. Rebecca Payne, AECOM,  
at commercial 540-663-9460 or via electronic mail at  
rebecca.payne@aecom.com.

8. These systems are recommended for HERO/HERP/HERF approval  
provided the safe separation distances in enclosure (1) for  
ordnance and (2) for personnel and fuel are observed.

9. Enclosure (3) is the distribution list for this letter.

10. If there are any questions or comments, please contact  
Steven Springer (B52) at commercial 540-653-2931 or  
DSN 249-2931, or via electronic mail at  
steven.p.springer@navy.mil.



RICHARD F. MAGROGAN  
By direction

Copy to:  
NAVORDSAFSECACT INDIAN HEAD MD (N843/Rash, N844/Puffinburger)

8020  
Ser B52/6781

SYSTEM SPECIFICATIONS AND HAZARDS OF ELECTROMAGNETIC RADIATION TO  
ORDNANCE SAFE SEPARATION DISTANCES

## SYSTEM SPECIFICATIONS AND HERO SAFE SEPARATION DISTANCES

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
								HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
Mobile	Small-Arms Transmitters P/Ns 323110, 323112, &184270 (contains Texas Instruments CC2430)	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2404-2480	0.001	Embedded	0/0*	0/0*
Mobile	Grenade Simulator P/N 323135	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2404-2480	0.003	Embedded	0/0*	0/0*
Mobile	[I-MILES] TVS PAN	Helical whip ANT-2.4-CW-RH-SMA	Embedded	1.7	2404-2480	0.001	Embedded	0/0*	0/0*
Mobile	PLI Module Long-Range	Relay station using helical whip antenna, Model 227526b	Helical/Embedded	0.0	225-231	20.0	Radio transceiver, 329310	56/17	14/4.2
Mobile	PLI Module Long-Range	Relay station using Smiley whip antenna 22731P	Whip	0.0	225-231	20.0	Radio transceiver, 329310	56/17	14/4.2
Mobile	PLI Module Long-Range	M433 for Japan only	Whip	0.0	433-434	20.0	Radio transceiver, 329310	30/9	10/3
Mobile	I-TESS II	Proxim Wireless Corporation Tsunami MP.11 Model 5054-R-LR wireless bridge, Ethernet, point-to-point	Embedded	23.0	5150-5850	0.3	Tsunami MP.11 5054-R-LR	10/3	10/3
Mobile	I-TESS II	Cubic ¼ wave whip, ASPR7485 dipole, ½ wave, broadband, 1509-0016-205	¼ wave dipole	2.15	225-231	20.0	Relay radio transceiver, 323820, 323180	73/22	18/5.6
Mobile	I-TESS II	M433 for Japan only	Whip	2.15	433-434	20.0	Relay radio transceiver, 323820, 323180	38/12	10/3
Mobile	I-TESS II	Cubic Defense Applications (CDA) P/N 323235-1, using communication circuit card assembly, CDA P/N 323135	Embedded	1.7	2405-2480	0.003	BSEM, Cubic P/N 323235	0/0*	0/0*
Mobile	I-TESS II	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2405-2480	0.001	AT86RF231ZU transceiver 329310	0/0*	0/0*
Mobile	I-TESS II, SITE	Portable (laptop) exercise monitor - supports walkabout instructor viewing, but not controlling, exercise	Embedded	9.0	2416-2475	0.125	AW2400MTR	10/3	10/3
Mobile	I-TESS II, SITE	Wireless access point or bridge	Embedded	14.0	2400-2483	0.1	AIR-BR1310G	10/3	10/3
Mobile	I-TESS II	Wireless serial modem Pneumatic Target System (PTS) Pistol PTS	Embedded	3.0	902-928	0.001	9XCite OEM module	0/0*	0/0*
Mobile	I-TESS I, RTS-I, RTS-II	Wireless serial modem serial comm's PTS Pistol PTS	½ wave dipole	15.2	902.6-927.2	0.148	9XStream wireless OEM module (X009-001PK)	10/3	10/3
Mobile	RTS-II PTS	Wireless serial communication	Dipole	2.1	2400-2483	0.063	24XStream frequency hopping data modem 24XStream wireless OEM module	10/3	5/1.5
Mobile	RTS-II	Windows tablet 802.11a/b/g/n, BT 4.0	Embedded	1.0	2.4-13.56	0.01	BT610 (Bright Alliance) xTablet T1500	10/3	0/0*
Mobile	RTS-II	Bluetooth serial-port adapter	Embedded	3.0	2400-2483	0.05	Model OEMSPA33x transceiver (Bluetooth)	1/0.3	1/0.3

## SYSTEM SPECIFICATIONS AND HERO SAFE SEPARATION DISTANCES (CONT.)

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
								HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
Mobile	RTS-II	Intel WiFi 6235 module that supports 802.11a/b/g/n and Bluetooth 4.0	Embedded	5.8	2402-5250	0.003	6235 chipset	0/0*	0/0*
Mobile	I-TESS I, RTS-I, RTS-II	High-power MiniPCI wireless LAN card	Embedded	15.0	2412-2462	0.5	FastLine FLC830E	10/3	10/3
Mobile	RTS-II	Panasonic and Saab WBU Bluetooth WiFi and Bluetooth 4.0, 802.11a/g/n, G2.4/5	Flat-panel	16.1	2400-2483	0.0025	Centrino Advanced-N 6235 6235ANNGW	10/3	5/1.5
Mobile	RTS-II	Target control	Embedded	2.1	433.92	0.6	AM-RRQ3-433 (rec'r) AM-TXHP-433 (Xmit'r)	10/3	10/3
Mobile	RTS-II	Location of miss and hit: detects where passing bullet goes next to the target and scores based on that. The LOMAH system also passes the data to the RCS and the SDU.	Embedded	10.0	417	0.630	WLNN-ER-DP551, Durabook, MikroTik 2.4 GHz, MikroTik Metal 5SHPn, MikroTik R2SHPn, MikroTik R52Hn, Rajant JR2-24, Wiz630Wi	18/5.3	10/3
Mobile	RTS-I, II	MikroTik 2.4 GHz	Flat-panel	24.0	2412-2462	1.6	Metal 2SHPn	24/7.3	10/3
Mobile	RTS-II	Rajant backpack, ROC Rajant radio, Rajant target radio, Rajant laptop base station, Rajant laptop, RCS-Wi-Fi; talks to Centrino	Embedded	32.0	5745-5825	0.25	MikroTik metal 5SHPn	10/3	10/3
Mobile	RTS-II	Wireless access point router board	Embedded	24.0	2412-2462	1.6	R2SHPn	24/7.3	10/3
Mobile	RTS-II	Atheros AR9220 chipset	Embedded	2.5	2412-5000	0.3	R52Hn	10/3	10/3
Mobile	RTS-II	Atheros® Communication AR9220 dual-band configurable radio chipset	Embedded	2.0	2400-5825	0.3	R52n	10/3	5/1.5
Mobile	RTS-II	RB911-2HND MikroTik 911 Lite2 RB911-2HN	Embedded	24.0	2412-2462	0.5	MikroTik RB911-2HnD (RP 5/2/16))	13/4	10/3
Mobile	RTS-II	MMTS, LOMAH, RCS	Embedded	5.0	2412-2452	0.5	WLNN-ER-DP551	10/3	10/3
Mobile	RTS-II	Bluetooth and WiFi	Embedded	3.17	2402-2480	0.003	Centrino 6235 (Bluetooth)	0/0*	0/0*
Mobile	RTS-II	Rajant Breadcrumb JR2-24	Embedded	5.0	2402-2480	11.5	JR2-24	10/3	10/3
Mobile	RTS-II	Rajant, Rajant backpack, ROC Rajant radio, Rajant target radio, Rajant laptop base station, Rajant laptop, RCS-Wi-Fi; talks to Centrino	Embedded	6.0	5735-5835	1.6	JR2-50	10/3	10/3
Mobile	RTS-II	Replaces SAAB RCS WBU; included in Meggitt targets, ROC backpack, control tower (used to talk to Meggitt targets)	Embedded	6.0	136-155	5.0	RV-M7-VA	94/29	24/7.2
Mobile	RTS-II, IIT	Replaces SAAB RCS WBU; included in Meggitt targets, ROC backpack, control tower (used to talk to Meggitt targets); replacing Caswell	Embedded	6.0	136-155	0.029	RV-M7-VA-WX	10/3	5/1.5
Mobile	RTS-II	R-AN2400-5801RS	Flat-panel	3.17	2402-2480	0.029	Parani ESD1000	1/0.3	1/0.3
Mobile	I-TESS I, RTS-II	FSP 2/149	Whip	0.0	138-151	1.0	YM5000	21/6.3	10/3
Mobile	I-TESS I, RTS-II	FSP 2/149	Whip	0.0	138-420	1.0	YM5000	21/6.3	10/3



## SYSTEM SPECIFICATIONS AND HERO SAFE SEPARATION DISTANCES (CONT.)

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances	
								HERO UNSAFE ORDNANCE (feet/meters)	HERO SUSCEPTIBLE ORDNANCE (feet/meters)
Mobile	RTS-I, RTS-II	FSP 2/149	Whip	0.0	138-420	5.0	Satellite 3AS VHG/UHF, YM5000, YM1020, YM1040	47/14	12/4
Mobile	RTS-II	HG2405RD-RSP	Flat-panel	5.5	2402-2459	0.4	W-DMX TRX	10/3	10/3
Mobile	RTS-II	Unknown	Embedded	4.0	2400-2483	0.01	Wiz630wi	1/0.3	1/0.3
Mobile	RTS-II	CAF 94505 T131AH-2.4/4.9/5.X-S GW.71.5153 PC.11.07.0100A WS.01.B.305151 FXP.810.07.0100C EXP.830.07.0100C	Flat-panel	5.5	2400-5800	0.158	WLNN-AN-CE551, WLNN-EB-DP551	10/3	10/3
Mobile	RTS-II	PSTN2-2400/5600	Embedded	2.3	2405-2480	0.063	XBee/XBee-PRO Digimesh 2.4	10/3	5/1.5
Mobile	RTS-II	A09-HSM-675	Embedded	2.0	902-928	10.0	XBee-PRO XSC S3B	12.7/4	10/3
Mobile	RTS-II	KDA-150HQ	Whip	0.0	136-162	5.0	Ritron DTX-154, DTX-150-EB	48/15	12/4
Mobile	MGLFMS	Embedded	Embedded	5.0	2427-2447 5745-5830	1.0	Silvus Technologies SC3500 MIMO Radio	10/3	10/3

\* Do not allow antenna to come into contact with ordnance items.

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SYSTEM SPECIFICATIONS AND HAZARDS OF ELECTROMAGNETIC RADIATION TO  
PERSONNEL AND FUEL SAFE SEPARATION DISTANCES

## SYSTEM SPECIFICATIONS AND HERP/HERF SAFE SEPARATION DISTANCES

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances		
								Controlled HERP (feet/meters)	HERF (feet/meters)	Control Measure
Mobile	Small-Arms Transmitters P/N 323110, 323112, & 184270 (contains Texas Instruments CC2430)	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2404-2480	0.001	Embedded	0/0	10/3	None
Mobile	Grenade Simulator P/N 323135	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2404-2480	0.003	Embedded	0/0	10/3	None
Mobile	[I-MILES] TVS PAN	Helical whip ANT-2.4-CW-RH-SMA	Embedded	1.7	2404-2480	0.001	Embedded	0/0	10/3	None
Mobile	PLI Module Long-Range	Relay station using helical whip antenna, Model 227526b	Helical/Embedded	0.0	225-231	20.0	Radio transceiver, 329310	1/0.3	50/15	None
Mobile	PLI Module Long-Range	Relay station using Smiley whip antenna 22731P	Whip	0.0	225-231	20.0	Radio transceiver, 329310	1/0.3	50/15	None
Mobile	PLI Module Long-Range	M433 for Japan only	Whip	0.0	433-434	20.0	Radio transceiver, 329310	1/0.3	50/15	None
Mobile	I-TESS II	Proxim Wireless Corporation Tsunami MP.11 Model 5054-R-LR wireless bridge, Ethernet, point-to-point	Embedded	23.0	5150-5850	0.3	Tsunami MP.11 5054-R-LR	0.7/0.2	10/3	None
Mobile	I-TESS II	Cubic ¼ wave whip, ASPR7485 dipole, ½ wave, broadband, 1509-0016-205	¼ wave dipole	2.15	225-231	20.0	Relay radio transceiver, 323820, 323180	1.5/0.5	50/15	None
Mobile	I-TESS II	M433 for Japan only	Whip	2.15	433-434	20.0	Relay radio transceiver, 323820, 323180	1.3/0.4	50/15	None
Mobile	I-TESS II	Cubic Defense Applications (CDA) P/N 323235-1, using communication circuit card assembly, CDA P/N 323135	Embedded	1.7	2405-2480	0.003	BSEM, Cubic P/N 323235	0/0	10/3	None
Mobile	I-TESS II	Surface-mount chip antenna, FR05-S1-N-0-102	Embedded	1.7	2405-2480	0.001	AT86RF231ZU transceiver 329310	0/0	10/3	None
Mobile	I-TESS II, SITE	Portable (laptop) exercise monitor - supports walkabout instructor viewing, but not controlling, exercise	Embedded	9.0	2416-2475	0.125	AW2400MTR	0/0	10/3	None
Mobile	I-TESS II, SITE	Wireless access point or bridge	Embedded	14.0	2400-2483	0.1	AIR-BR1310G	0/0	10/3	None
Mobile	I-TESS II	Wireless serial modem Pneumatic Target System (PTS) Pistol PTS	Embedded	3.0	902-928	0.001	9XCite OEM module	0/0	10/3	None
Mobile	I-TESS I, RTS-I, RTS-II	Wireless serial modem serial comm's PTS Pistol PTS	½ wave dipole	15.2	902.6-927.2	0.148	9XStream wireless OEM module (X009-001PK)	0/0	10/3	None

## SYSTEM SPECIFICATIONS AND HERP/HERF SAFE SEPARATION DISTANCES (CONT.)

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances		
								Controlled HERP (feet/meters)	HERF (feet/meters)	Control Measure
Mobile	RTS-II PTS	Wireless serial communication	Dipole	2.1	2400-2483	0.063	24XStream frequency hopping data modem 24XStream wireless OEM module	0/0	10/3	None
Mobile	RTS-II	Windows tablet 802.11a/b/g/n, BT 4.0	Embedded	1.0	2.4-13.56	0.01	BT610 (Bright Alliance) xTablet T1500	0/0	10/3	None
Mobile	RTS-II	Bluetooth serial-port adapter	Embedded	3.0	2400-2483	0.05	Model OEMSPA33x transceiver (Bluetooth)	0/0	10/3	None
Mobile	RTS-II	Intel WiFi 6235 module that supports 802.11a/b/g/n and Bluetooth 4.0	Embedded	5.8	2402-5250	0.003	6235 chipset	0/0	10/3	None
Mobile	I-TESS I, RTS-I, RTS-II	High-power MiniPCI wireless LAN card	Embedded	15.0	2412-2462	0.5	FastLinc FLC830E	0/0	10/3	None
Mobile	RTS-II	Panasonic and Saab WBU Bluetooth WiFi and Bluetooth 4.0, 802.11a/g/n, G2.4/5	Flat-panel	16.1	2400-2483	0.0025	Centrino Advanced-N 6235 6235ANNGW	0/0	10/3	None
Mobile	RTS-II	Target control	Embedded	2.1	433.92	0.6	AM-RRQ3-433 (rec'r) AM-TXHP-433 (Xmit'r)	0/0	10/3	None
Mobile	RTS-II	Location of miss and hit: detects where passing bullet goes next to the target and scores based on that. The LOMAH system also passes the data to the RCS and the SDU.	Embedded	10.0	417	0.630	WLNN-ER-DP551, Durabook, MikroTik 2.4 GHz, MikroTik Metal 5SHPn, MikroTik R2SHPn, MikroTik R52Hn, Rajant JR2-24, Wiz630Wi	0/0	10/3	None
Mobile	RTS-I, II	MikroTik 2.4 GHz	Flat-panel	24.0	2412-2462	1.6	Metal 2SHPn	2/0.6	10/3	None
Mobile	RTS-II	Rajant backpack, ROC Rajant radio, Rajant target radio, Rajant laptop base station, Rajant laptop, RCS-Wi-Fi; talks to Centrino	Embedded	32.0	5745-5825	0.25	MikroTik metal 5SHPn	1.8/0.6	10/3	None
Mobile	RTS-II	Wireless access point router board	Embedded	24.0	2412-2462	1.6	R2SHPn	2/0.6	10/3	None
Mobile	RTS-II	Atheros AR9220 chipset	Embedded	2.5	2412-5000	0.3	R52Hn	0/0	10/3	None
Mobile	RTS-II	Atheros® Communication AR9220 dual band configurable radio chipset	Embedded	2.0	2400-5825	0.3	R52n	0/0	10/3	None
Mobile	RTS-II	RB911-2HND MikroTik 911 Lite2 RB911-2HN	Embedded	24.0	2412-2462	0.5	MikroTik RB911-2HnD (RP 5/2/16))	1.1/0.4	10/3	None
Mobile	RTS-II	MMTS, LOMAH, RCS	Embedded	5.0	2412-2452	0.5	WLNN-ER-DP551	0/0	10/3	None
Mobile	RTS-II	Bluetooth and WiFi	Embedded	3.17	2402-2480	0.003	Centrino 6235 (Bluetooth)	0/0	10/3	None
Mobile	RTS-II	Rajant Breadcrumb JR2-24	Embedded	5.0	2402-2480	11.5	JR2-24	0.5/1	50/15	None

## SYSTEM SPECIFICATIONS AND HERP/HERF SAFE SEPARATION DISTANCES (CONT.)

System Location	Antenna Location	Antenna Nomenclature	Antenna Type	Antenna Gain (dBi)	Transmitter Frequency (MHz)	Transmitter Max. Avg. Power (watts)	Transmitter Type	Separation Distances		
								Controlled HERP (feet/meters)	HERF (feet/meters)	Control Measure
Mobile	RTS-II	Rajant, Rajant backpack, ROC Rajant radio, Rajant target radio, Rajant laptop base station, Rajant laptop, RCS-Wi-Fi; talks to Centrino	Embedded	6.0	5735-5835	1.6	JR2-50	0/0	10/3	None
Mobile	RTS-II	Replaces SAAB RCS WBU; included in Meggitt targets, ROC backpack, control tower (used to talk to Meggitt targets)	Embedded	6.0	136-155	5.0	RV-M7-VA	1.3/0.4*	10/3	None
Mobile	RTS-II, IIT	Replaces SAAB RCS WBU; included in Meggitt targets, ROC backpack, control tower (used to talk to Meggitt targets); replacing Caswell	Embedded	6.0	136-155	0.029	RV-M7-VA-WX	0/0	10/3	None
Mobile	RTS-II	R-AN2400-5801RS	Flat-panel	3.17	2402-2480	0.029	Parani ESD1000	0/0	10/3	None
Mobile	I-TESS I, RTS-II	FSP 2/149	Whip	0.0	138-151	1.0	YM5000	0/0	10/3	None
Mobile	I-TESS I, RTS-II	FSP 2/149	Whip	0.0	138-420	1.0	YM5000	0/0	10/3	None
Mobile	RTS-I, RTS-II	FSP 2/149	Whip	0.0	138-420	5.0	Satellite 3AS VHG/UHF, YM5000, YM1020, YM1040	1/0.3*	10/3	None
Mobile	RTS-II	HG2405RD-RSP	Flat-panel	5.5	2402-2459	0.4	W-DMX TRX	0/0	10/3	None
Mobile	RTS-II	Unknown	Embedded	4.0	2400-2483	0.01	Wiz630wi	0/0	10/3	None
Mobile	RTS-II	CAF 94505 T131AH-2.4/4.9/5.X-S GW.71.5153 PC.11.07.0100A WS.01.B.305151 FXP.810.07.0100C FXP.830.07.0100C	Flat-panel	5.5	2400-5800	0.158	WLNN-AN-CE551, WLNN-EB-DP551	0/0	10/3	None
Mobile	RTS-II	PSTN2-2400/5600	Embedded	2.3	2405-2480	0.063	XBee/XBee-PRO Digimesh 2.4	0/0	10/3	None
Mobile	RTS-II	A09-HSM-675	Embedded	2.0	902-928	10.0	XBee-PRO XSC S3B	0/0	10/3	None
Mobile	RTS-II	KDA-150HQ	Whip	0.0	136-162	5.0	Ritron DTX-154, DTX-150-EB	0/0	10/3	None
Mobile	MGLFMS	Embedded	Embedded	5.0	2427-2447 5745-5830	1.0	Silvus Technologies SC3500 MIMO Radio	0/0	10/3	None

\* If effective isotropic radiating power (EIRP) is less than 28 watts, then specific absorption rate (SAR) evaluations are not recommended as per IEEE C95.1-2005. Therefore, there are no HERP concerns.

8020  
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