



Certificate Number: 1449-02



ELECTROMAGNETIC EXPOSURE (EME)
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Addendum S.A.R. TEST REPORT
FCC ID: AZ489FT5806
H18UCH9PW7AN

November 13, 2001 - Rev. O

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REVISION HISTORY

Date	Revision	Comments
11/13/01	O	Original release.

1.0 Introduction

This report presents an addendum S.A.R. test report to the initial test report dated August 31, 2001 – Rev. C for the XTS5000 Portable Radio model number H18UCH9PW7AN (FCC ID: AZ489FT5806). This report reflects additional batteries tested for this radio. The measurements were performed at the Motorola Florida Research Lab (MFRL) EME laboratory and Motorola CGISS EME laboratory.

The applicable exposure environment is Occupational/Controlled.

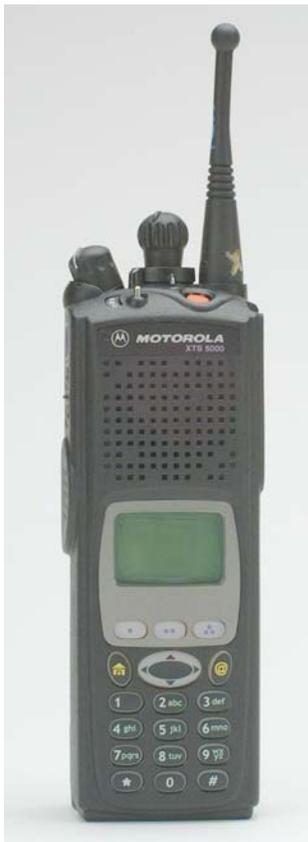
The test results included herein represent the highest SAR levels applicable to this radio and clearly demonstrate compliance with FCC's CFR 47 part 2 requirements for RF Exposure limits of 8.0 W/kg.

2.0 Reference Standards and Guidelines

This product is designed to comply with the following national and international standards and guidelines.

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- National Council on Radiation Protection and Measurements (NCRP) of the United States, Report 86, 1986
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radio communications (Electromagnetic Radiation - Human Exposure) Standard 1999 (applicable to wireless phones only).

3.0 Description of Test Sample



The XTS5000 Portable Radio, Model number H18UCH9PW7AN is a handheld transceiver that operates as a traditional simplex 2-way radio. It will be marketed to and used by employees solely for work - related operations, such as public safety agencies, e.g. police, fire and emergency medical.

The intended use positions are "at the face" with the microphone 1 to 2 inches from the mouth or "at the waist or abdomen" secured to the user's belt. When operated at the waist or abdomen, the audio and push-to-talk functions are routed to a remote accessory that connects to the side of the radio. The transmit duty cycle, 50% maximum for this type of device, is controlled by the user via the push - to - talk button.

The transmitter is capable of operating in the following bands: 764-767, 773-776, 794-797, 803-806 MHz and 806-824, 851-870 MHz. For the purpose of this evaluation the device transmit bands are grouped as follows: 764-776, 794-824 MHz, and 851-870 MHz with a rated conducted power of 3.0 watts. The maximum conducted power, as defined by the production line final test station upper limit, is 3.6 watts.

The sample unit tested for this report is an identical prototype to intended production units.

Listed below are additional batteries tested for this report.

NiCad:

NTN8295A 1525 NiCad High capacity Factory Mutual Intrinsicly Safe
HNN9031A 1525 NiCad smart
HNN9032A 1525 NiCad smart Factory Mutual Intrinsicly Safe
NTN8297A 1525 NiCad High capacity Factory Mutual Intrinsicly Safe, Rugged

NiMh:

NTN8299B 1750 NiMh ultra capacity Factory Mutual Intrinsicly Safe
NTN8923A 1800 NiMh ultra capacity
RNN4006AR 3000 NiMh
RNN4007AR 3000 NiMh Factory Mutual Intrinsicly Safe *

Li Ion:

NTN8610B 1650 Li Ion
NTN9533A 2400 Li Ion smart
NTN9862A 2000 Li Ion smart slim

Alkaline battery Holder (AA):

NTN9177A Battery holder, clamshell-Black
NTN9183A Battery holder, Clamshell-Orange*

* RNN4007AR and NTN9183A did not require test.

RNN4007AR is identical to RNN4006AR and NTN9183A is identical to NTN9177A except for label markings and/or color as described in section 5.0.

3.1 Signaling and Power test

Refer to section 3.1 and 3.2 of the original report for signaling details.

4.0 Description of Test Conditions

Motorola's EME Laboratory ambient environments are well controlled resulting in very stable simulated tissue temperature and therefore stable dielectric properties. Simulated tissue temperature is measured prior to each scan to insure it is within +/- 2°C of the temperature at which the dielectric properties were determined. Additional precautions are routinely taken to ensure the stability of the simulated tissue such as covering the phantoms when scans are not actively in process in order to minimize evaporation. The lab environments are continuously monitored and the tables below represents the environmental conditions during the SAR tests reported herein:

	CGISS EME Lab
Ambient Temperature	22.6 ± 0.1°C
Relative Humidity	47.5 ± 0.25%
Tissue Temperature	21.8 ± 2°C

	MFRL EME Lab
Ambient Temperature	24 ± 1°C
Relative Humidity	36.5 ± 2.5%
Tissue Temperature	23.2 ± 1.1°C

The EME Lab's RF environment is monitored with a Spectrum Analyzer to preclude extraneous large signal RF contaminants that could possibly affect the test results. If such unwanted signals are discovered the SAR scans are repeated. However, the lab environment is sufficiently protected such that that no SAR impacting interference has ever been experienced.

Reference Addendum S.A.R. TEST REPORT (APPENDIX A&B) FCC ID: AZ489FT5806
H18UCH9PW7AN, November 13, 2001 – Rev. O for system performance check.

Reference Addendum S.A.R. TEST REPORT (Appendix C) FCC ID: AZ489FT5806
H18UCH9PW7AN, November 13, 2001 – Rev. O for the measurement probe calibration certificates.

Reference sections 4.1 through 6.0 of S.A.R. Test Report FCC ID: AZ489FT5806
H18UCH9PW7AN, August 31, 2001 –Rev. C regarding descriptions of S.A.R. measurement, system description of phantom, target tissue parameters, probe scan procedures, and measurement uncertainty assessments.

5.0 Description of Test Procedure

All batteries listed in section 3.0, with the exception of the 2 kits listed below, were included in the S.A.R. test plan in order to determine the highest S.A.R. levels.

The transmit power of the test sample was pre-adjusted, per production alignment procedures, to the maximum transmit power, defined as the production line final test station upper limit, which in this case is 3.6 watts. Measured SAR results are scaled to 3.6 watts to account for power slump during the scan. This

scaling is described in section 7.0. The radio was always placed in continuous transmit mode (100% duty cycle) for the duration of the scan and each SAR scan was initiated with a fully charged battery. The RNN4007AR was not tested since it is identical to RNN4006AR except that it has a “Factory Mutual Intrinsically Safe” designation. The NTN9183A was not tested since it is identical to the NTN9177A except for the color.

5.1 Abdomen

Among the additional batteries tested, NTN9862A (2000 smart slim Li Ion), and accessory NTN8266B exhibits the closest spatial distance for abdomen S.A.R. measurements. S.A.R. measurements were performed as follows:

The combination NTN9862A/NTN8266B/NMN6193C was tested with the radio across its operating bands using the NAF5080A antenna to determine the frequency at which the highest S.A.R. performance exists. Each of the additional batteries was then substituted for the NTN9862A battery and tested at the highest S.A.R. performance frequency. The same procedure was followed for NAF5042A and NAF5037A antennas. 2.5cm S.A.R. measurements were performed at the back and front of the radio using the highest S.A.R. combination and frequency from the tests above. The combination of NAF5042A antenna and NTN9862A battery exhibited the highest S.A.R. performance. 2.5cm S.A.R. performance is presented in section 6.1 along with the NAF5042A antenna results.

5.2 Face

The NTN9862A battery (highest S.A.R. observed at the abdomen) was tested with each antenna (NAF5080A, NAF5042A, NAF5037A) across the bands of frequencies applicable to each antenna. The antenna and frequency that produced the highest S.A.R. was then used to measure S.A.R. performance of the additional batteries.

6.0 S.A.R. Results:

The DASYSTM measurement system’s output files for bolded data indicated in tables below are provided in Addendum S.A.R. TEST REPORT (APPENDIX A&B) FCC ID: AZ489FT5806 H18UCH9PW7AN, November 13, 2001 – Rev. O for system performance check.

6.1 S.A.R. results at the Abdomen:

Antenna/ Run Number	Freq. (MHz)	Battery	Carry Acc	Audio Acc	Initial Power (W)	End Power (W)	Measured 1g-SAR 100% duty cycle (mW/g)	Max Cal 1g-SAR 50% duty cycle (mW/g)
NAF5080A/ 010913-11	764	NTN9862A	NTN8266B	NMN6193C	3.58	3.24	5.21	2.89
NAF5080A/ 010912-05	773	NTN9862A	NTN8266B	NMN6193C	3.55	3.31	6.08	3.31
NAF5080A/ 010914-01	776	NTN9862A	NTN8266B	NMN6193C	3.61	3.23	5.37	2.99
NAF5080A/ 010913-10	794	NTN9862A	NTN8266B	NMN6193C	3.5	3.23	7.68	4.28
NAF5080A/ 010912-06	809	NTN9862A	NTN8266B	NMN6193C	3.5	3.34	7.31	3.94
NAF5080A/ 010913-09	824	NTN9862A	NTN8266B	NMN6193C	3.55	3.33	5.97	3.23
NAF5080A/ 010914-02	851	NTN9862A	NTN8266B	NMN6193C	3.58	3.43	3.44	1.81
NAF5080A/ 010912-07	860	NTN9862A	NTN8266B	NMN6193C	3.58	3.34	3.97	2.14
NAF5080A/ 010913-12	869	NTN9862A	NTN8266B	NMN6193C	3.52	3.4	3.86	2.04
NAF5080A/ 1082215	794	NTN8295A	NTN8266B	NMN6193C	3.5	3.29	7.08	3.87
NAF5080A/ 010925-01	794	NTN8297A	NTN8266B	NMN6193C	3.48	3.35	5.99	3.22
NAF5080A/ 1083002	794	HTN9031A	NTN8266B	NMN6193C	3.58	3.31	7.2	3.92
NAF5080A/ 1090504	794	HTN9032A	NTN8266B	NMN6193C	3.59	3.29	7.08	3.87
NAF5080A/ 010925-02	794	NTN8299B	NTN8266B	NMN6193C	3.5	3.32	5.89	3.19
NAF5080A/ 010925-03	794	NTN8923A	NTN8266B	NMN6193C	3.47	3.3	6.19	3.38
NAF5080A/ 1091302	794	NTN8610B	NTN8266B	NMN6193C	3.51	3.37	6.51	3.48
NAF5080A/ 010925-04	794	NTN9533A	NTN8266B	NMN6193C	3.46	3.26	6.88	3.80
NAF5080A/ 010925-05	794	RNN4006AR	NTN8266B	NMN6193C	3.48	3.31	5.97	3.25
NAF5080A/ 010925-06	794	NTN9177A	NTN8266B	NMN6193C	3.5	3.25	2.85	1.58

Antenna/ Run Number	Freq. (MHz)	Battery	Carry Acc	Audio Acc	Initial Power (W)	End Power (W)	Measured 1g-SAR 100% duty cycle (mW/g)	Max Cal 1g-SAR 50% duty cycle (mW/g)
NAF5042A/ 010912-08	809	NTN9862A	NTN8266B	NMN6193C	3.55	3.34	11.9	6.41
NAF5042A/ 010913-08	824	NTN9862A	NTN8266B	NMN6193C	3.52	3.41	11	5.81
NAF5042A/ 010914-03	851	NTN9862A	NTN8266B	NMN6193C	3.5	3.44	10.4	5.44
NAF5042A/ 010912-09	860	NTN9862A	NTN8266B	NMN6193C	3.57	3.51	10.8	5.54
NAF5042A/ 010929-03	869	NTN9862A	NTN8266B	NMN6193C	3.6	3.46	9.16	4.77
NAF5042A/ 011112-04	809	NTN9862A	Back 2.5cm	NMN6193C	3.50	3.33	4.04	2.18
NAF5042A/ 011112-06	809	NTN9862A	Front 2.5cm	NMN6193C	3.49	3.23	3.18	1.77
NAF5042A/ 1082109	809	NTN8295A	NTN8266B	NMN6193C	3.6	3.4	11.7	6.19
NAF5080A/ 010926-01	809	NTN8297A	NTN8266B	NMN6193C	3.55	3.36	9.52	5.10
NAF5042A/ 1082708	809	HTN9031A	NTN8266B	NMN6193C	3.51	3.36	11.8	6.32
NAF5042A/ 1083103	809	HTN9032A	NTN8266B	NMN6193C	3.52	3.35	11.5	6.18
NAF5042A/ 010926-02	809	NTN8299B	NTN8266B	NMN6193C	3.53	3.37	9.34	4.99
NAF5042A/ 010926-03	809	NTN8923A	NTN8266B	NMN6193C	3.5	3.36	10.1	5.41
NAF5042A/ 1091102	809	NTN8610B	NTN8266B	NMN6193C	3.52	3.39	10.1	5.36
NAF5042A/ 010926-04	809	NTN9533A	NTN8266B	NMN6193C	3.55	3.37	11.6	6.20
NAF5042A/ 010926-05	809	RNN4006AR	NTN8266B	NMN6193C	3.53	3.33	9.27	5.01
NAF5042A/ 010926-07	809	NTN9177A	NTN8266B	NMN6193C	3.54	3.36	5.72	3.06

Antenna/ Run Number	Freq. (MHz)	Battery	Carry Acc	Audio Acc	Initial Power (W)	End Power (W)	Measured 1g-SAR 100% duty cycle (mW/g)	Max Cal 1g-SAR 50% duty cycle (mW/g)
NAF5037A/ 1110201	809	NTN9862A	NTN8266B	NMN6193C	3.58	3.35	7.79	4.19
NAF5037A/ 1110202	824	NTN9862A	NTN8266B	NMN6193C	3.51	3.34	7.01	3.78
NAF5037A/ 1110702	851	NTN9862A	NTN8266B	NMN6193C	3.57	3.41	4.17	2.20
NAF5037A/ 011112-08	860	NTN9862A	NTN8266B	NMN6193C	3.58	3.43	5.47	1.82
NAF5037A/ 1110703	869	NTN9862A	NTN8266B	NMN6193C	3.57	3.4	4.43	2.35
NAF5037A/ 011106-10	809	NTN8295A	NTN8266B	NMN6193C	3.5	3.24	6.24	3.47
NAF5080A/ 011106-11	809	NTN8297A	NTN8266B	NMN6193C	3.53	3.29	5.98	3.27
NAF5037A/ 011106-01	809	HNN9031A	NTN8266B	NMN6193C	3.6	3.34	7.64	4.12
NAF5037A/ 011106-12	809	HNN9032A	NTN8266B	NMN6193C	3.5	3.26	6.5	3.59
NAF5037A/ 011106-08	809	NTN8299B	NTN8266B	NMN6193C	3.47	3.31	5.87	3.19
NAF5037A/ 011106-09	809	NTN8923A	NTN8266B	NMN6193C	3.55	3.3	6.52	3.56
NAF5037A/ 011106-07	809	NTN8610B	NTN8266B	NMN6193C	3.45	3.29	7.34	4.02
NAF5037A/ 011106-05	809	NTN9533A	NTN8266B	NMN6193C	3.49	3.3	8.02	4.37
NAF5037A/ 011106-04	809	RNN4006AR	NTN8266B	NMN6193C	3.61	3.34	6.96	3.75
NAF5037A/ 011106-02	809	NTN9177A	NTN8266B	NMN6193C	3.6	3.27	4.54	2.50

6.2 S.A.R. results at the Face:

Antenna/ Run Number	Freq.	Battery	Initial Power (W)	End Power (W)	Measured 1g-SAR 100% duty cycle (mW/g)	Max Cal 1g-SAR 50% duty cycle (mW/g)
NAF5080A/ 1100111	764	NTN9862A	3.8	3.2	2.39	1.34
NAF5080A/ 100112	773	NTN9862A	3.55	3.3	2.65	1.45
NAF5080A/ 100113	776	NTN9862A	3.51	3.1	2.66	1.54
NAF5080A/ 01100114	794	NTN9862A	3.52	3.16	2.86	1.63
NAF5080A/ 100115	809	NTN9862A	3.4	3.22	2.66	1.49
NAF5080A/ 100116	824	NTN9862A	3.4	3.23	2.02	1.13
NAF5080A/ 100117	851	NTN9862A	3.46	3.32	1.56	0.85
NAF5080A/ 100118	860	NTN9862A	3.55	3.37	1.5	0.80
NAF5080A/ 100119	869	NTN9862A	3.6	3.45	1.5	0.78
NAF5042A/ 1092904	809	NTN9862A	3.58	3.32	5.46	2.96
NAF5042A/ 1092905	824	NTN9862A	3.48	3.25	5.26	2.91
NAF5042A/ 1092906	851	NTN9862A	3.53	3.37	5.08	2.71
NAF5042A/ 1092907	860	NTN9862A	3.55	3.43	4.76	2.50
NAF5042A/ 1092908	869	NTN9862A	3.57	3.41	4.42	2.33
NAF5037A/ 1100101	809	NTN9862A	3.59	3.33	3.55	1.92
NAF5037A/ 1100102	824	NTN9862A	3.49	3.34	3.05	1.64
NAF5037A/ 1100103	851	NTN9862A	3.52	3.42	2.24	1.18
NAF5037A/ 1100104	860	NTN9862A	3.6	3.46	2.13	1.11
NAF5037A/ 1100105	869	NTN9862A	3.59	3.43	1.97	1.03

NAF5042A/ 1102306	809	NTN8295A	3.57	3.42	4.31	2.27
NAF5042A/ 1102309	809	NTN8297A	3.57	3.4	3.94	2.09
NAF5042A/ 1102302	809	HTN9031A	3.61	3.4	4.26	2.26
NAF5042A/ 1102303	809	HTN9032A	3.58	3.37	4.03	2.15
NAF5042A/ 1102307	809	NTN8299B	3.6	3.42	3.87	2.04
NAF5042A/ 1102305	809	NTN8923A	3.57	3.41	4.05	2.14
NAF5042A/ 1102403	809	NTN8610B	3.51	3.39	4.54	2.41
NAF5042A/ 1102304	809	NTN9533A	3.61	3.39	4.8	2.55
NAF5042A/ 1102402	809	RNN4006AR	3.61	3.39	4.03	2.14
NAF5042A/ 1102404	809	NTN9177A	3.6	3.38	4.02	2.14

7.0 Maximum Calculated SAR

The calculated maximum 1-gram averaged SAR value is determined by scaling up the measured SAR to adjust for (1) imperfect power leveling and power slump during the SAR scan below the maximum power and (2) duty cycle differences between test mode and normal operation. Therefore the Maximum Calculated 1-gram averaged peak SAR becomes:

$$\text{Maximum Calculated 1-gram Average Peak SAR} = \frac{P_{\max}}{P_{\text{end}}} \times (D1 \times D2) \times \text{SAR}_{\text{meas.}}$$

$$\begin{array}{l} \text{Abdomen} \\ \text{Maximum} \\ \text{Calculated 1-gram} \\ \text{Average Peak SAR} \end{array} = \frac{3.6}{3.34} \times (1 \times 0.5) \times 11.9 = 6.41 \text{ mW/g}$$

$$\begin{array}{l} \text{Face} \\ \text{Maximum} \\ \text{Calculated 1-gram} \\ \text{Average Peak SAR} \end{array} = \frac{3.6}{3.32} \times (1 \times 0.5) \times 5.46 = 2.96 \text{ mW/g}$$

P_{\max} = Maximum Power (Factory upper limit)

P_{end} = Lowest measured power at end of SAR

$\text{SAR}_{\text{meas.}}$ = Measured 1 gram averaged peak SAR

D1 = the transmission mode duty cycle, i.e., the ratio of the service mode and the tested mode.

D2 = the Push To Talk duty cycle.
For two-way radio (dispatch) = 0.5,
For data and telephony = 1.

8.0 Conclusion

With the additional battery offerings for the portable radio model number H18UCH9PW7AN, the highest Operational Maximum Calculated 1-gram average SAR values found were:

At the abdomen: 6.41 mW/g

At the face: 2.96 mW/g

These new values replace the previously reported values of 5.74 mW/g at the abdomen and 1.92 mW/g at the face.

These test results clearly demonstrate compliance with FCC Occupational/Controlled RF Exposure limits of 8.0 W/kg per the requirements of 47 CFR 2.1093(d).