



24th October 2001

Mr. Martin Perrine
Authorization & Evaluation Division
Federal Communications Commission Laboratory
7435 Oakland Mills Road
Columbia, MD 21046

Re: Form 731 Confirmation Number: EA102194 with FCC ID: AZ489FT4851.

Dear Mr. Perrine;

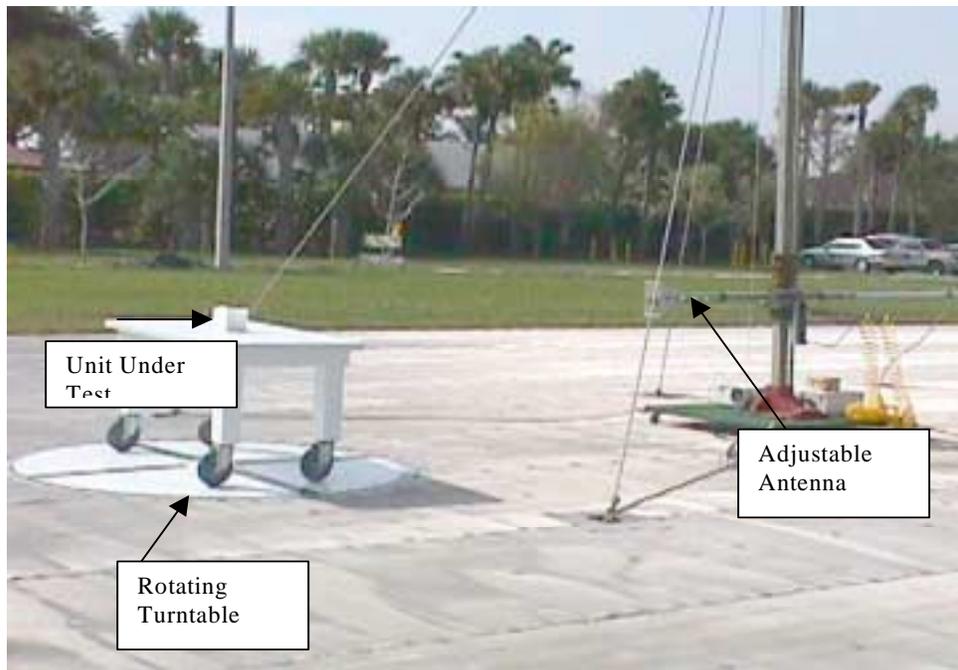
Motorola Inc., 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322, herein submits its response to the 19th October 2001 request for information in Correspondence Number 20994.

Q1.) Revised letter of confidentiality. Internal photographs cannot be held confidentially without specific and strong justification.

R1.) Attached is a corrected Confidentiality Request (Exhibit 13a) deleting Exhibit 9, Internal Photos.

Q2.) Test setup photographs for the radiated tests if available. Per Section 2.947(e).

R2.) EMC Open Air Test Site (OATS) Lab, Plantation, Florida showing Radiated Test Setup.



Q3.) Certificate stating compliance with spectral efficiency per Section 90.203(j)(3).

R3.) This radio is capable of operating in either 12.5 kHz or 25 kHz channel spacing mode depending on the frequency as specified in the frequency table on page 30 of the Users Manual. The radio meets Emission Mask "D" for 12.5 kHz and Emission Mask "B" for 25 kHz mode and are included in the original application as Exhibits 6D-1 to 6D-8. Frequencies that are specified by the FCC for only 12.5 kHz or 25 kHz operation are fixed to the prescribed bandwidth and cannot be changed by the user.

Q4.) New data for the field strength of spurious radiation. Please provide the data in the form of decibels relative to the carrier power measured in ERP (dBc) as standard using the "Substitution" method as described in TIA/EIA-603. Please include a measurement of the reference level.

R4.) It is our interpretation that spurious emissions are supposed to meet absolute minimum values, mainly that they are supposed to be below a -20 dBm limit. Exhibit 6E1 through 6E-4 in the original application show that the radiated spurious emissions are way below the -20 dbm specification. Reference level is 0dbm since these are absolute readings. Spurious emissions are measured using a non-radiating dummy load as per TIA/EIA-603 in order to insure no overloading of measuring test equipment.

For reference only, we measured ERP of a 2 Watt radio. The results are shown below:

Average Radiated Output Power

Technician: Bill Quigley

s/n: 158ABQ0834

Date: 10/23/2001

model: XU2600

Frequency: 464.5625 MHz

Receive Ant:

Sig. Gen Out (dBm): 0

Sub. Ant:

Cable Loss (dB): 7.54

Tx Ant. Gain Vpol (dBd): -1.05

Horizontal Polarization

Vertical Polarization

Tx Output (dBm): -8.59

Azimuth	Amplitude	Corrected	Azimuth	Amplitude	Corrected	Analyzer Reading (dBm):	-40.06
(Deg)	(dBm)	(dB)	(Deg)	(dBm)	(dB)	Tx Pathloss (dB)	-31.47

0	-10.03	139.32	0	-8.15	214.78
45	-13.99	55.976	45	-6.13	341.98
90	-24.45	5.035	90	-6.89	287.08
135	-11.5	99.312	135	-6.4	321.37
180	-9.52	156.68	180	-8.48	199.07
225	-13.89	57.28	225	-6.37	323.59
270	-30.03	1.3932	270	-7.04	277.33
315	-12.4	80.724	315	-6.17	338.84

Hpol

Avg. Rad. Pow. (dBm): 27.75034

Vpol

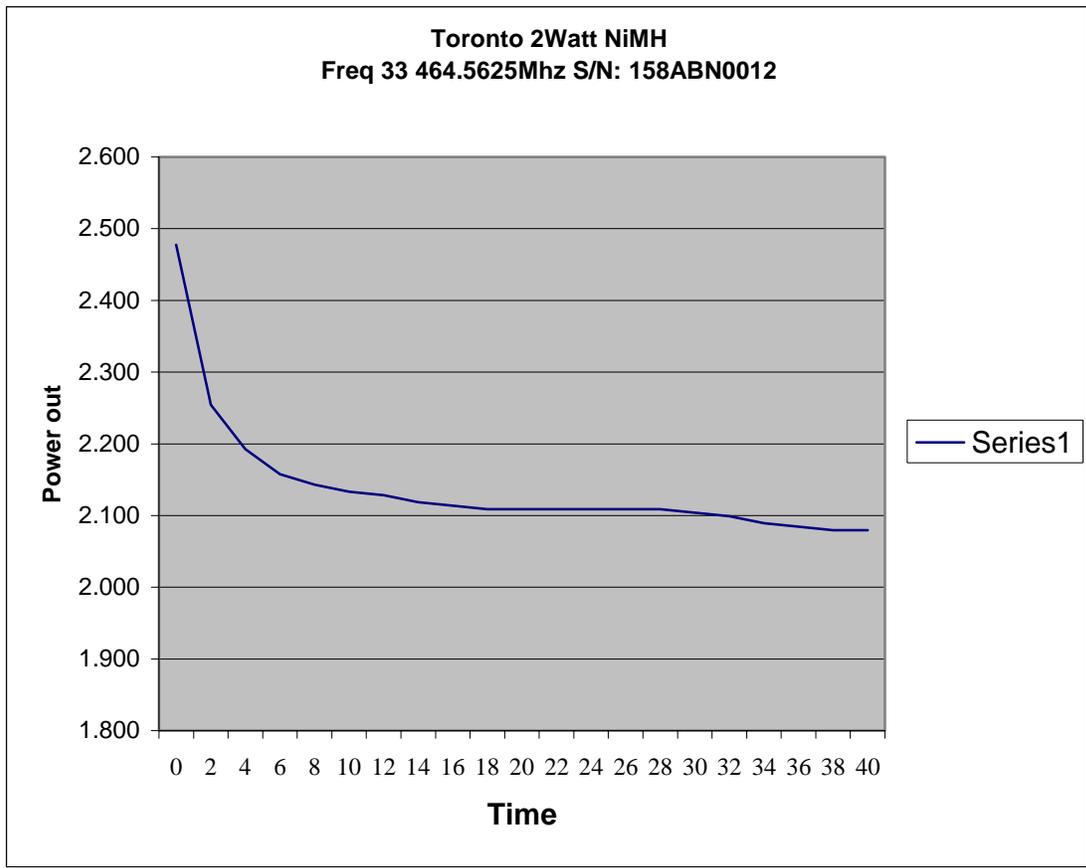
Avg. Rad. Pow. (dBm): 33.62491

j. Rad. Power (dBm) 27.75 Rad. Power (dBm) 33.625

Q5.) Clarification of the units maximum power. Page 9 of the SAR report states that with the NiMH battery the maximum power is 2.48 W. The maximum power mentioned in the EMC report is 2.2 W. Please provide additional test data if needed to reflect the units maximum power.

R5.) The EMC RF POWER OUTPUT DATA of exhibit 6A represents a production radio which 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 2.2 Watts. The Transmitter Radiated Spurious Emissions data are taken with the same radio using a fully charged NiMH battery. However, due to the higher than nominal initial voltage typical with a fully charged NiMH battery, and the difference in series impedance based on the battery chemistry, the maximum transmit power used is based on the maximum power achievable with each individual battery type. In this case, the maximum transmit power of the XCU2600 radio with the NiMH 53871 rechargeable battery is 2.48 Watts.

In the SAR report, the max power reported is the initial maximum power seen during power slump measurements taken with a NiMH battery. The typical power is 2.1 Watts as can be seen in the figure below. This maximum power is within the maximum allowable power variation (20%).



Q6.) A discussion about the expected variation in unit performance for both the NiMH and Alkaline battery options discussed in the User Manual. Please address expected frequency stability over the usable range of the battery voltage.

R6.) The radio has two internal regulators and a voltage clamp circuit that address variations on input supply voltage. The regulators are labeled as VCC and Dig_VCC, the clamped voltage is labeled VCLAMP on the schematics included in Section V. The regulators have a temperature and voltage compensated output voltage of 2.5 Volts. These regulators are used to supply the frequency generation unit (reference oscillator, VCO, Synthesizer).

Since two battery sources are possible, NIMH or Alkaline, the clamp circuit is used to limit the high voltage seen by the regulators (4.0 Volts in Tx and 4.5 Volts in Rx), this is mainly needed when Alkaline batteries are used. On the low side the batteries can potentially be used to 3.6 Volts (0.9 Volts per cell). However to minimize possible pre-mature battery death due to deep discharges (which can happen if the radio is left on and unattended for extended periods of time), the radio software automatically shuts down the radio when the battery voltage drops below 4.0 Volts.

Exhibit 6G-2 and 6G-3 show Frequency Stability Vs Power Supply Voltage. The power supply is varied from 5.5 Volts down to 4.0 Volts. The 5.5Volts is what the radio would see in Transmit mode when fully charged alkaline batteries are used (internal resistance under high current draw condition lowers the battery voltage considerably), while the 4.0 Volts is where the radio is automatically shut down by the software of the radio.

Q7.) A statement of both batteries voltage end points. The frequency stability tests were made down to 4.1 Volts however the plot provided in exhibit 6G2 states that the radio resets at 2.7 Volts. Frequency stability tests should be made to the battery end point.

R7.) Even though the radio hardware is designed to operate down to 2.7 Volts out of a power supply, the radio software limits the lower voltage of operation to be at 4.0 Volts. The radio automatically turns off and cannot be turned on for battery voltages lower or equal to 4.0 Volts, thus operation to 2.7 Volts is something a user would never be able to accomplish.

The voltage extremes for alkaline batteries under no load conditions are 6.4Volts (1.6V/cell x 4) for the high side, and 3.6Volts (0.9V/cell x 4) on the low side. However, under load conditions and specifically in transmit mode (typical 1.0 Amp draw) the maximum voltage of the batteries to the radio is approximately 5.0 Volts. This drop is due to the internal series resistance of the batteries. This is why we do measurements with a power supply (ideal source) to 5.5Volts. The data on the low end is taken to 4.0 Volts due to the automatic shutdown feature explained above.

Q8.) A statement describing control of the power level. Please include what conditions determines the selection of output power.

R8.) The radio comes in either 1 Watt output power or 2 Watts output power depending on the Model of the radio. This is not a user selectable setting. The respective 1 Watt and 2 Watt models are built as such in the factory and are tuned as specified in section 5.2 of the Tune-up procedures included in the filing.

Q9.) A statement of clarification. The cover letter in exhibit 13 states that the unit's operating frequencies cannot be selected by the operator using external controls. However, page 9 and 10 of the User Manual appears to state that the channel and frequency can be selected by simply entering the units programming mode via external buttons/controls.

R9.) The radio can operate in any of the 56 frequencies specified on page 26 of the Users Manual. The radio allows selection from the list through the programming mode as specified in the Users Manual. Depending on the model, the end user will only have access to 1 or 6 of the frequencies mentioned. Normal operation is then limited to the 1 (or 6) frequencies selected during programming. Exhibit 13 is indicating that no other frequency (other than those listed on page 26) can be programmed into the radio.

Q10.) A discussion of the effects the digital private line codes mentioned in the users manual page 58. Please address what this mode is, how it is implemented, and how this information is transmitted.

R10.) Digital Private Line (DPL) codes are an extension of sub-audible frequencies that are used to set a radio sub-channel in the same fashion as the Continuous Tone Coded Squelch Standards (CTCSS) or Private Line (PL). This sub-audible code is sent continuously with the audio information (same as PL) and only a receiver that is set to the same corresponding code will un-mute. DPL, as with PL, does not interfere with the audio transmission nor does carry any additional information other than that used to maintain communication with a similarly enabled unit.

Contact me at (954) 723-5793 if you require any additional information.

Regards,

/s/ Mike Ramnath

FCC Liaison

Email: mike.ramnath@motorola.com