

	Date(s) of Evaluation Jan 28-30, 2013	Test Report Serial No. 01312014K66-1264	Test Report Revision No. Rev. 1.1 (Revised Issue)	
	Test Report Issue Date Feb 5, 2014	Description of Test(s) Specific Absorption Rate	RF Exposure Category Gen. Pop. / Uncontrolled	

DECLARATION OF COMPLIANCE

SAR RF EXPOSURE EVALUATION - FCC / IC Original Filing

TEST LAB INFORMATION	Name	CELLTECH LABS INC.				
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada				
TEST LAB ACCREDITATION	Type	ISO / IEC 17025	Accreditation	A2LA Test Lab Certificate No. 2470.01		
APPLICANT INFORMATION	Name	YAESU MUSEN CO., LTD				
	Address	Tennozu Parkside Building, 2-5-8 Higashi-Shinagawa, Tokyo, 140-0002 Japan				
STANDARDS APPLIED	FCC	47 CFR §2.1093			IC	Health Canada Safety Code 6
	FCC	KDB 447498 D01v05r01, KDB 865664 D01v01r02			IC	RSS102 Issue 4
PROCEDURES APPLIED	FCC	KDB 865664 D02v01r01, KDB 643646 D01v01r01			IEC	62209-1:2005
	IEEE	IEEE 1528-2013			IEC	62209-2:2010
DEVICE CLASSIFICATION	FCC	Licensed Non-Broadcast Transmitter Held to Face (TNF) - FCC Part 87				
	IC	Land Mobile Radio Transmitter/Receiver (27.41-960 MHz) - RSS-119				
DEVICE DESCRIPTION	Portable Push-To-Talk (PTT) Multi-Band Radio Transceiver (Analog FM / Digital P25 FDMA)					
APPLICATION TYPE	Original Filing					
DATE(S) OF EVALUATION	January 28-30, 2014			SAMPLES RECEIVED		
Devices Tested						
FCC ID	IC Certification	Model	Type	Frequency Range	Manufacturer's Rated Output Power	
K6650013X20	511B-50013X20-E	FTA-550, FTA-750	System	118-137 MHz	33dBm	
Antennas Tested						
Part Number	Frequency Range (MHz)	Length (mm)	Diameter (mm)	Part Number	Output Voltage	Capacity (mAh)
SRA-13A				SBR-12LI		
Body-Worn Accessories Tested						
Part Number	Description			Part Number	Description	
SHB-11	Belt Clip					
EVALUATION RESULTS						
Maximum SAR Level Evaluated FCC	Head	0.145	W/kg	10g	50% PTT Duty Factor	General Public / Uncontrolled
	Body	0.235				
Maximum SAR Level Evaluated IC	Head	0.145	W/kg	10g	50% PTT Duty Factor	General Public / Uncontrolled
	Body	0.265				
FCC / IC Spatial Peak SAR Limit	Head /Body	1.6	W/kg	10g	50% PTT Duty Factor	General Public / Uncontrolled
<p>Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada Safety Code 6 for the General Population / Uncontrolled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 4, IEEE Standard 1528-2013 and International Standard IEC 62209-2:2010. All measurements were performed in accordance with the SAR system manufacturer recommendations.</p>						
<p>**** This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. ****</p>						
<p>The results and statements contained in this report pertain only to the device(s) evaluated</p>						
<p>I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.</p>						
Test Report Approved By		Art Voss, P.Eng.	Senior Engineer	Celltech Labs Inc.		

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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REVISION HISTORY			
REVISION NO.	DESCRIPTION	IMPLEMENTED BY	RELEASE DATE
1.0	1st Release	Art Voss	January 31, 2014
1.1	Corrected FCC Part and Application Type	Art Voss	February 6, 2014

TEST REPORT SIGN-OFF			
DEVICE TESTED BY	REPORT PREPARED BY	QA REVIEW BY	REPORT APPROVED BY
Art Voss	Cheri Frangiadakis	Art Voss	Art Voss

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
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1.0 INTRODUCTION

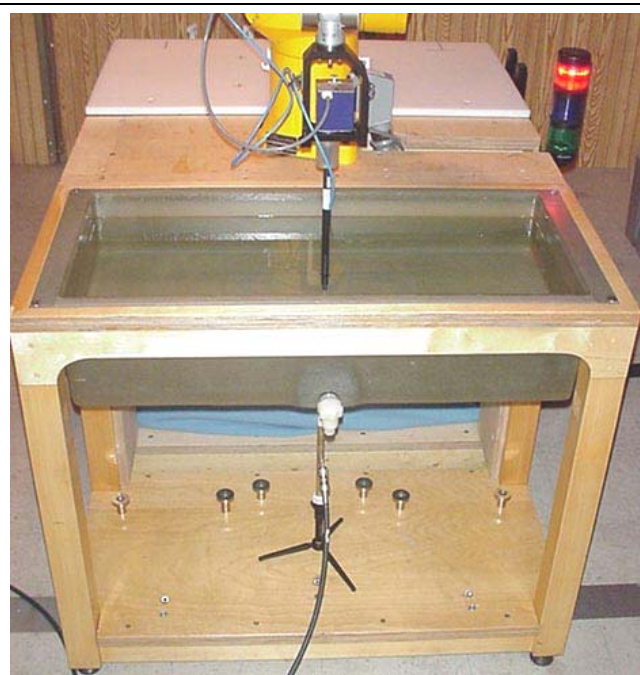
This measurement report demonstrates that the Yaesu FTA-550 and FTA-750 VHF PTT Mobile Radio comply with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population/Uncontrolled Exposure environment. The measurement procedures described in FCC KDB 447498 (see reference [8]), IC RSS-102 Issue 4 (see reference [4]), IEEE Standard 1528-2013 (see reference [5]) and IEC Standard 62209-2:2010 (see reference [6]) were employed. A description of the device, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used and the various provisions of the rules are included within this test report.

2.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for Head and/or Body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server. The DAE4 utilizes a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the DASY4 measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe-mounting device includes two different sensor systems for frontal and sidewise probe contacts. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot utilizes a controller with built in VME-bus computer.





DASY4 SAR System with Plexiglas side planar phantom



DASY4 SAR System with Barski Fiberglass Planar Phantom

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
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3.0 RF CONDUCTED OUTPUT POWER MEASUREMENT

Band	Frequency MHz	Modulation Mode	Measured Power Level		Method
			dBm	Watts	
VHF	118	AM ³	32.76	1.89	Average Conducted
VHF	127.5	AM ³	32.98	1.99	Average Conducted
VHF	136.975	AM ³	32.78	1.90	Average Conducted

Notes



- The test channels were selected in accordance with the procedures specified in FCC KDB 447498 (see reference [8]).
- The RF conducted output power levels of the DUT were measured by Celltech prior to the SAR evaluations using a Gigatronics 8652A Universal Power Meter at the external antenna connector of the radio in accordance with FCC 47 CFR §2.1046 (see reference [15]) and IC RSS-Gen (see reference [16]).
- AM modulated with a 1.0kHz audio signal to an 80% Modulation Factor (m) injected into the speaker/MIC connector per, FCC Inquiry (Tracking Number 966366) (TCB).

4.0 NO. OF TEST CHANNELS (N_c)

Device Frequency Range	Band	N_c	Test Frequencies (MHz)
118 – 136.975 MHz	VHF	3	118, 127.5, 136.975

Note: The number of test channels (N_c) were calculated in accordance with the procedures specified in FCC KDB 447498 (see reference [8]).

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio		118-137 MHz	
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6.0 ACCESSORY LISTING



Accessory ID # for Test Report	ACCESSORY CATEGORY: BODY WORN		
	Part Number	Description	SAR Evaluation
BC	SHB-11	Belt Clip	Yes
Accessory ID # for Test Report	ACCESSORY CATEGORY: BATTERY		
	Part Number	Description	SAR Evaluation
Li-Ion	SBR-12LI	Li-ion Battery	Yes
Accessory ID# for Test Report	ACCESSORY CATEGORY: AUDIO		
	Part Number	Description	SAR Evaluation
n/a	SSM-10A	Speaker / MIC	No
Accessory ID # for Test Report	ACCESSORY CATEGORY: ANTENNA		
	Part Number	Description	SAR Evaluation
Default	SRA-13A	Whip Antenna	Yes

Manufacturer's disclosed accessory listing provided by Yaesu

Notes:

1. Since the Speaker / MIC jack we used for injecting the Audio modulation signal, the Speaker / MIC accessory was not evaluated.

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
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7.0 FLUID DIELECTRIC PARAMETERS

FLUID DIELECTRIC PARAMETERS						
Date: 28 Jan 2014		Frequency: 150 MHz			Tissue: Body	
Freq (MHz)	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
100.000	64.52	0.76	63.13	0.76	2.20%	0.00%
110.000	60.91	0.77	62.89	0.77	-3.15%	0.00%
118.000*	60.73	0.78	62.69	0.78	-3.12%	0.00%
120.000	60.69	0.78	62.64	0.78	-3.11%	0.00%
127.500*	59.87	0.78	62.45	0.78	-4.13%	0.00%
130.000	59.60	0.78	62.39	0.78	-4.47%	0.00%
136.975*	59.60	0.78	62.39	0.78	-4.47%	0.00%
140.000	61.96	0.79	62.15	0.79	-0.31%	0.00%
150.000	60.88	0.80	61.90	0.80	-1.65%	0.00%
160.000	59.42	0.80	61.65	0.81	-3.62%	-1.23%
170.000	62.80	0.82	61.41	0.82	2.26%	0.00%
180.000	60.58	0.80	61.16	0.82	-0.95%	-2.44%
190.000	58.44	0.81	60.91	0.83	-4.06%	-2.41%
200.000	58.10	0.82	60.67	0.84	-4.24%	-2.38%

*interpolated using DASY4 software

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
28 Jan	150 Body	25°C	23.6°C	≥ 15 cm	102.8 kPa	13%	1000

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FLUID DIELECTRIC PARAMETERS						
Date: 30 Jan 2014		Frequency: 150 MHz			Tissue: Head	
Freq	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
100.000	52.37	0.71	54.63	0.72	-4.14%	-1.39%
110.000	51.32	0.74	54.17	0.73	-5.26%	1.37%
118.000*	51.42	0.72	53.79	0.74	-4.42%	-1.90%
120.000	51.44	0.72	53.70	0.74	-4.21%	-2.70%
127.500*	51.66	0.74	53.35	0.75	-3.17%	-0.67%
130.000	51.73	0.75	53.23	0.75	-2.82%	0.00%
136.975*	51.58	0.74	52.91	0.75	-2.52%	-0.93%
140.000	51.51	0.74	52.77	0.75	-2.39%	-1.33%
150.000	49.88	0.78	52.30	0.76	-4.63%	2.63%
160.000	50.36	0.77	51.83	0.77	-2.84%	0.00%
170.000	50.30	0.78	51.37	0.77	-2.08%	1.30%
180.000	49.03	0.80	50.90	0.78	-3.67%	2.56%
190.000	46.41	0.81	50.43	0.79	-7.97%	2.53%
200.000	47.58	0.80	49.97	0.80	-4.78%	0.00%

**interpolated using DASY4 software*

Test Date	Fluid Type	Ambient Temperature	Fluid Temperature	Fluid Depth	Atmospheric Pressure	Relative Humidity	ρ (Kg/m ³)
30 Jan	150 Head	25°C	23.0°C	≥ 15 cm	101.3 kPa	15%	1000

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
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8.0 SAR MEASUREMENT SUMMARY

SAR EVALUATION SUMMARY

Test Date	Plot #	Freq.	Test Mode	Modulation Index	Accessories		Spacing (cm)		Measured Conducted Power ⁷ dBm	SAR Drift During Test dB	Measured SAR (1g) W/kg	
		MHz			Body	Audio	DUT	Antenna			Duty Cycle	
											100%	50%
Jan 28	B1	127.5	Body	80%	Belt-Clip	-	15	32	32.98	0.119	0.247	0.124
Jan 28	B2	118	Body	80%	Belt-Clip	-	15	32	32.76	-0.535	0.444	0.222
Jan 28	B3	136.975	Body	80%	Belt-Clip	-	15	32	32.78	-0.037	0.093	0.046
Jan 28	B4	118	SvT	80%	Belt-Clip	-	15	32	32.76	1.260	-	-
Jan 30	F1	127.5	Face	80%	-	-	25	45	32.98	-0.472	0.133	0.066
Jan 30	F2	118	Face	80%	-	-	25	45	32.76	-0.005	0.274	0.137
Jan 30	F3	136.975	Face	80%	-	-	25	45	32.78	-0.005	0.048	0.024
Jan 30	F4	118	SvT	80%	-	-	25	45	32.76	0.218	-	-
SAR SAFETY LIMIT(S)							BODY	SPATIAL PEAK	RF EXPOSURE CATEGORY			
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1.6 W/kg	1g average	General Population / Uncontrolled			
Notes												
1.	Detailed measurement data and plot showing the maximum SAR location of the DUT is reported in Appendix A.											
2.	The SAR drift of the DUT was measured by the DASY4 system for the duration of the SAR evaluation.											
3.	The battery installed in the DUT was fully charged prior to the SAR evaluation.											
4.	The fluid temperature remained within +/-2°C from the dielectric parameter measurement to the completion of the SAR test.											
5.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).											
6.	Phantom: Elliptical Planar											
7.	The SAR and conducted power was measured while the DUT was AM modulated at an 80% Modulation Index											

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9.0 SAR SCALING (MANUFACTURER TOLERANCE)



MAXIMUM SAR SCALED TO MANUFACTURER'S TUNE-UP TOLERANCE AND DRIFT

Plot Number	Test Type	Freq	Modulation	SAR 50% Duty Cycle	Power Drift	Measured Conducted Power	Rated Conducted Power ⁵	SAR Scaled for Power Spec	SAR Scaled for Drift (IC Only)
		MHz		1g	dB	dBm	dBm	1g	1g
B2	Body	118	AM-1kHz	0.222	-0.535	32.76	33.00	0.235	0.265
F2	Face	118	AM-1kHz	0.137	-0.005	32.76	33.00	0.145	0.145

Notes:

1. Only the highest SAR values for face and body per frequency band are scaled.
2. The resulting value is the reported SAR.
3. The scaled SAR levels are below the FCC/IC Occupational SAR Limit of 8.0 W/kg.
4. IC requires that the reported SAR also be scaled for the measured drift, therefore the above table calculates the SAR separately for IC.
5. The manufacturer states a Carrier Frequency Power (Pc) of 1.50W and a Peak Envelope Power (PEP) of 5.0W. The Rated Power was calculated as follows:
Using the equation $PEP = Pc(1 + m)^2$, the Modulation Index (m) = 82%.
Using the equation $Pt = Pc(1 + m^2/2)$, the total Average Power (Pt) = 33.0dBm.

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10.0 DETAILS OF SAR EVALUATION

The DUT was compliant for localized Specific Absorption Rate (General Population / Uncontrolled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

1. Since the DUT transmitted an AM signal, a KDB inquiry was me, Tracking Number 966366 (KDB) and is summarize below:

You can proceed with the SAR measurement by injecting audio signals, as shown, using 80% modulation. You should include the test mode, audio injection, and other setup details in the SAR report to support the results. The audio wires should drop down perpendicularly from the device placed below the phantom. Also include photos of this in the SAR report. In addition, in the SAR report, the position of the antenna in reference to the connector used for audio injection needs to be clearly illustrated (very difficult to determine this from the picture). The area scan needs to cover both, the antenna and the entire part of the device.

If the peak SAR locations in any of the SAR distributions are overlapping with the connector location (peak within 2.5 cm of connector), you must respond back through this KDB with the SAR distribution plots and details for us to determine if there could be additional issues (This is a condition to qualify for TCB approval).

The 150 MHz SAR must be performed according to the SAR system verification procedures in the latest (Dec. 2013) KDB 865665 using the required current loop. If this is not done or there is no separate KDB inquiry to confirm the SAR targets, operating details and calibration certificates for the current loop, it does not qualify for TCB approval.

Aside from SAR, qualifying for operation under Occupational/Controlled SAR limits requires work-related only, training to control exposures, etc. – see provisions in 447498 etc. That means a filing must demonstrate that a device will NOT be marketed nor operated for non-work-related activities, i.e. shall exclude private/personal pilots, hobbyists, leisure, etc.

Alternatively, parties can submit compliance info under General Population/Uncontrolled SAR limits thus could forego the preceding marketing and operating restrictions.

There is insufficient information in this inquiry to determine if this device would qualify for occupational exposure limit.

In general, deployment of specific radios to law enforcement, emergency and rescue sectors can be reasonably controlled to ensure proper RF exposure training is provided to the end users.



For other occupational sectors, such as shipping and delivery, building maintenance, etc. where RF exposure training cannot be ensured, devices are required to comply with general population exposure limits.

If this radio is to be used by various employees in airport facilities, mandatory RF exposure training is generally difficult to enforce; therefore, general population exposure limit should be applied

The location of the Peak SAR with respect to the Audio Connection point is shown in Appendix A

2. The face-held SAR evaluation was performed with the front of the DUT placed parallel to the outer surface of the planar phantom. A 2.5 cm spacing was maintained between the front side of the DUT and the outer surface of the planar phantom.
3. The Body-worn SAR evaluation was performed with the belt-clip body-worn accessory attached to the back of the DUT in a parallel-touch position to the outer surface of the planar phantom.
4. Each evaluation was performed with a fully charged battery. The battery was also recharged between the area and zoom scan measurements.
5. The DUT was evaluated for SAR in an unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
6. The SAR drift of the DUT was measured by the DASY4 system for the duration of the SAR evaluation and a SAR-versus-Time power droop evaluation was performed (see Appendix A).
7. The fluid temperature remained within +/-2°C from the fluid dielectric parameter measurement to the completion of the SAR evaluation.
8. The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluation using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).



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11.0 SAR EVALUATION PROCEDURES

- a. (i) The evaluation was performed in the applicable area of the phantom depending on the type of device being tested. For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.
- b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.
An area scan was determined as follows:
 - c. Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.
 - d. A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.
A 1g and 10g spatial peak SAR was determined as follows:
 - e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
 - f. Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).
 - g. A zoom scan volume of 30 mm x 30 mm x 30 mm (5 x 5 x 7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

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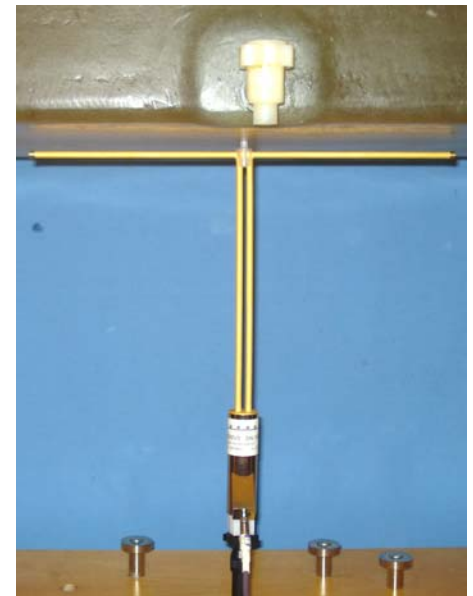
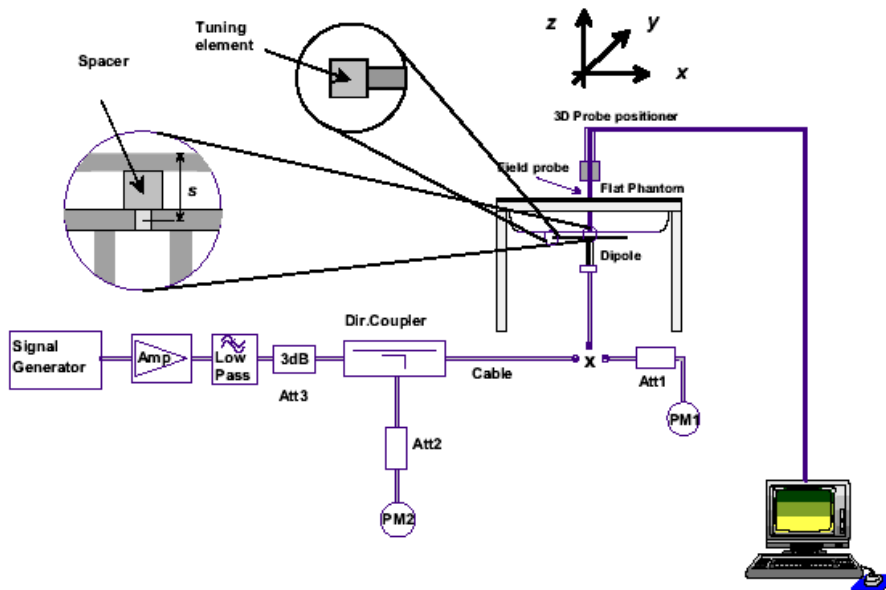
12.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations, system verifications were performed with a planar phantom and SPEAG 300 MHz dipole (see Appendix B) in accordance with the procedures described in FCC KDB 865664 (see reference [9]). The system was verified to meet the internally generated SAR target using 150MHz tissue-equivalent medium with a 300 MHz validation dipole transmitting at 300 MHz (see Appendix E). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 398 mW was applied to the dipole for 150 Head and 250 mW was applied for 150 Body.

SYSTEM PERFORMANCE CHECK EVALUATION

Test Date	Equiv. Tissue Freq. (MHz)	SAR 1g (W/kg)			Dielectric Constant ϵ_r			Conductivity σ (mho/m)			ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		Target	Meas.	Dev.	Target	Meas.	Dev.	Target	Meas.	Dev.						
28 Jan	Body 150	0.653 ±10%	0.613	-6.13%	61.9 ±5%	60.88	-1.65%	0.80 ±5%	0.8	+0.0%	1000	25	23.1	≥ 15	13	102.8
30 Jan	Head 150	0.953 ±10%	0.911	-3.51%	52.3 ±5%	49.88	-4.63%	0.76 ±5%	0.78	+2.6%	1000	25	23.0	≥ 15	15	101.3



Notes	1.	The 150MHz SAR values have a coefficient of variation < 3%.
	2.	The target fluid dielectric parameters are the nominal values from the SAR system manufacturer's probe calibration (see Appendix F)
	3.	The fluid temperature remained within +/-2°C from the fluid dielectric parameter measurement to the completion of the system performance check.
	4.	The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).



System Performance Check Measurement Setup (IEEE Standard 1528-2013)

SPEAG 300 MHz Validation Dipole Setup

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13.0 SIMULATED EQUIVALENT TISSUES



The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [13] and [14]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2013 (see reference [5]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES		
INGREDIENT	150 MHz HEAD	150 MHz BODY
Water	38.35 %	46.6 %
Sugar	55.5%	49.7 %
Salt	5.15%	2.6 %
HEC	0.9%	1.0 %
Bactericide	0.1%	0.1 %

14.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	Health Canada Safety Code 6	(General Population / Uncontrolled Exposure)	(Occupational / Controlled Exposure)
Spatial Average (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)		1.6 W/kg	8.0 W/kg
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)		4.0 W/kg	20.0 W/kg
The Spatial Average value of the SAR averaged over the whole body.			
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.			
Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.			



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15.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 80
	Postprocessing Software: SEMCAD, V1.8 Build 186
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
<u>E-Field Probe</u>	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
<u>Phantom</u>	
Type	ELI Planar Phantom
Shell Material	Fiberglass
Thickness	2.0 ±0.1 mm
Volume	Approx. 70 liters

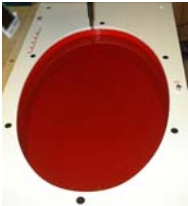
Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
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16.0 PROBE SPECIFICATION (ET3DV6)

<p>Construction: Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In Body simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in Body tissue (rotation around probe axis) ± 0.4 dB in Body tissue (rotation normal to probe axis)</p> <p>Dynamic Range: $5 \mu\text{W/g}$ to > 100 mW/g; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>Dimensions: Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm</p> <p>Application: General dosimetry up to 3 GHz Compliance tests of mobile phone</p>	
ET3DV6 E-Field Probe	



17.0 ELIANAR PHANTOM

<p>The ELI Planar phantom is a fiberglass shell phantom with a 2.0 mm (+/-0.2mm) thick device measurement area at the center of the phantom for SAR evaluations of devices with a larger surface area than the planar section of the SAM phantom. The planar phantom is integrated in a wooden table. The planar phantom was used for the DUT SAR evaluations and the system performance check evaluations. See Appendix G for dimensions and specifications of the Barski planar phantom.</p>	
ELI Planar Phantom	

18.0 DEVICE HOLDER

<p>The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Face-held SAR evaluations (PTT radios) are performed with the device holder in the body axis.</p>	
Device Holder	



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19.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
USED	DESCRIPTION				
x	Schmid & Partner DASY4 System	-	-	-	-
x	-DASY4 Measurement Server	00158	1078	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	19-Apr-12	Biennial
x	-ET3DV6 E-Field Probe	00017	1590	24-Apr-13	Annual
x	-D300V3 Validation Dipole	00216	1009	17-Apr-12 / 8-Jan-13	Triennial
x	-Barski Planar Phantom	00155	03-01	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
x	Gigatronics 8652A Power Meter	00007	1835272	03-May-12	Biennial
x	Gigatronics 80701A Power Sensor	00014	1833542	03-May-12	Biennial
x	Gigatronics 80334A Power Sensor	-	1837001	03-May-12	Biennial
x	HP 8753ET Network Analyzer	00134	US39170292	26-Apr-12	Biennial
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	02-May-12	Biennial
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

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20.0 MEASUREMENT UNCERTAINTIES (IC ONLY)



UNCERTAINTY BUDGET FOR DEVICE EVALUATION (IEC 62209-2:2010)

Source of Uncertainty	IEC 62209-2 Section	Tolerance / Uncertainty ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Standard Uncertainty ±% (1g)	Standard Uncertainty ±% (10g)	V _i or V _{eff}
Measurement System									
Probe Calibration (150 MHz)	7.2.2.1	10.0	Normal	1	1	1	10.0	10.0	∞
Isotropy	7.2.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
Boundary Effect	7.2.2.6	2.5	Rectangular	1.732050808	1	1	1.4	1.4	∞
Linearity	7.2.2.3	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
Detection Limits	7.2.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	7.2.2.7	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	7.2.2.8	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	7.2.2.9	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	7.2.4.5	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Restrictions	7.2.3.1	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	7.2.3.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Post-processing	7.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	7.2.3.4.3	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	7.2.3.4.2	3.6	Normal	1	1	1	3.6	3.6	8
Drift of Output Power (meas. SAR drift)	7.2.2.10	0	Rectangular	1.732050808	1	1	0.0	0.0	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	7.2.3.2	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
SAR Correction Algorithm for deviations in permittivity and conductivity	7.2.4.3	1.2	Normal	1	1	0.81	1.2	0.97	∞
Liquid Conductivity (measured)	7.2.4.3	5.26	Normal	1	0.78	0.71	4.1	3.7	∞
Liquid Permittivity (measured)	7.2.4.3	3.82	Normal	1	0.23	0.26	0.9	1.0	∞
Liquid Permittivity - temp. uncertainty	7.2.4.4	1.04	Rectangular	1.732050808	0.78	0.71	0.5	0.4	∞
Liquid Conductivity - temp. uncertainty	7.2.4.4	1.97	Rectangular	1.732050808	0.23	0.26	0.3	0.3	∞
Combined Standard Uncertainty	7.3.1		RSS				13.11	12.99	
Expanded Uncertainty (95% Confidence Interval)	7.3.2		k=2				26.22	25.98	

Measurement Uncertainty Table in accordance with International Standard IEC 62209-2:2010

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2



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21.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices"; Rule Part 47 CFR §2.1093.
- [2] Health Canada - "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz", Safety Code 6: 1999.
- [4] Industry Canada - "Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 4: March 2010.
- [5] IEEE Standard 1528-2013 - "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": June 2013.
- [6] IEC International Standard 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [7] International Standard IEC 62209-2 Edition 1.0 2010-03 - "Human exposure to radio frequency fields from hand-held & body-mounted wireless communication devices - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)".
- [8] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v05: October 2012.
- [9] Federal Communications Commission, Office of Engineering and Technology - "SAR Measurement Requirements for 100 MHz to 6 GHz"; KDB 865664 D01v01: October 2012.
- [10] Federal Communications Commission, Office of Engineering and Technology - "SAR Test Reduction Considerations for Occupational PTT Radios", KDB 643646 D01v01: December 2010.
- [12] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [13] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.
- [14] ISO/IEC 17025 - "General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)."
- [15] Federal Communications Commission - "Measurements Required: RF Power Output"; Rule Part 47 CFR §2.1046.
- [16] Industry Canada - "General Requirements and Information for the Certification of Radiocommunication Equipment", Radio Standards Specification RSS-Gen Issue 3: December 2010.

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APPENDIX A - SAR MEASUREMENT PLOTS

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Plot B1

Date/Time: 28/01/2014 1:46:39 PM

1264 - Body SAR - Jan 28

DUT: Yaesu; Type: PTT; Serial: Not Specified

Program Notes: 28 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.6C; Barometric Pressure: 102.8kPa; Humidity: 13%

Procedure Notes:

Communication System: CW

Frequency: 127.5 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used (interpolated): $f = 127.5 \text{ MHz}$; $\sigma = 0.78 \text{ mho/m}$; $\epsilon_r = 60.1$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body 127.5MHz, m=80%, Belt Clip/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.237 mW/g

Body 127.5MHz, m=80%, Belt Clip/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

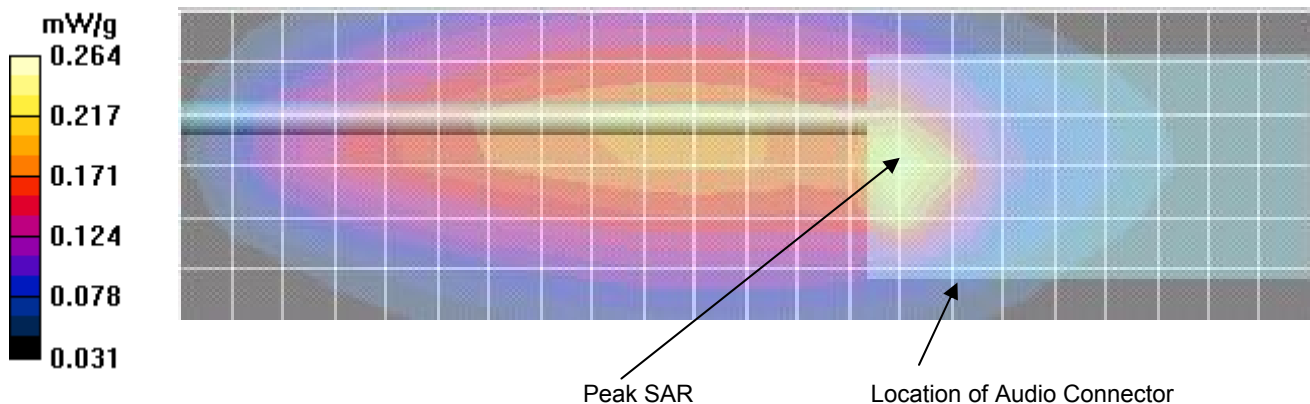
Reference Value = 16.1 V/m; Power Drift = 0.119 dB

Peak SAR (extrapolated) = 0.721 W/kg

SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.165 mW/g



[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.264 mW/g



Distance from Audio Connector to Peak SAR is Greater than 2.5cm (Typical)

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Plot B2

Date/Time: 28/01/2014 2:38:20 PM

1264 - Body SAR - Jan 28

DUT: Yaesu; Type: PTT; Serial: **Not Specified**

Program Notes: 28 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.6C; Barometric Pressure: 102.8kPa; Humidity: 13%

Procedure Notes:

Communication System: CW

Frequency: 118 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used (interpolated): $f = 118 \text{ MHz}$; $\sigma = 0.778 \text{ mho/m}$; $\epsilon_r = 60.7$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body 118MHz, m=80%, Belt Clip/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.377 mW/g

Body 118MHz, m=80%, Belt Clip/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

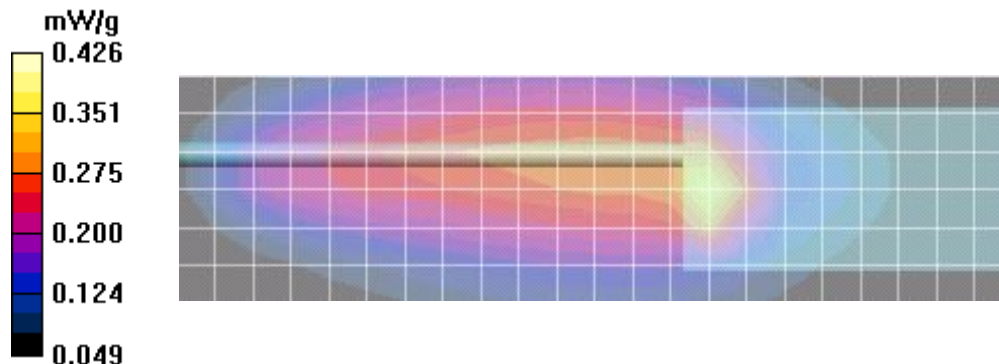
Reference Value = 20.7 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 1.21 W/kg

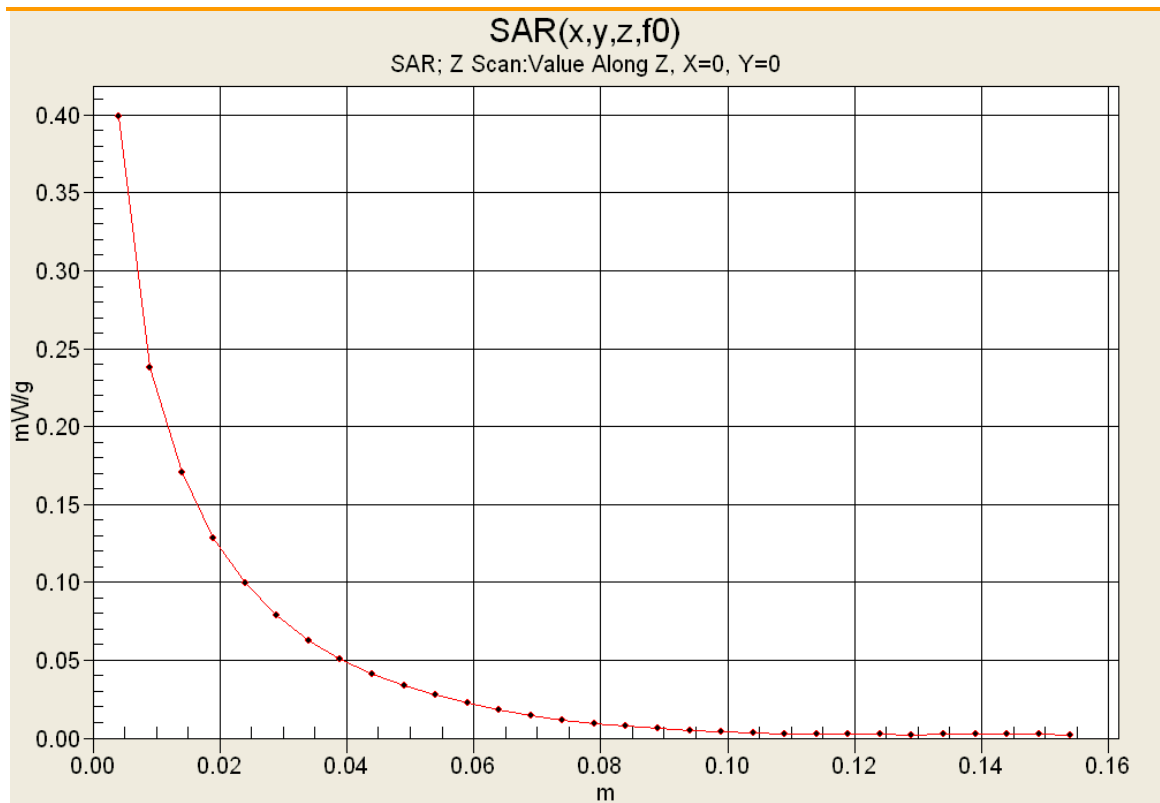
SAR(1 g) = 0.444 mW/g; SAR(10 g) = 0.265 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)



Maximum value of SAR (measured) = 0.426 mW/g



Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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Plot B2 Z-Scan

	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Plot B3

Date/Time: 28/01/2014 3:06:09 PM

1264 - Body SAR - Jan 28

DUT: Yaesu; Type: PTT; Serial: Not Specified

Program Notes: 28 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.6C; Barometric Pressure: 102.8kPa; Humidity: 13%

Procedure Notes:

Communication System: CW

Frequency: 136.975 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used (interpolated): $f = 136.975 \text{ MHz}$; $\sigma = 0.787 \text{ mho/m}$; $\epsilon_r = 61.1$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body 136.975MHz, m=80%, Belt Clip/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.094 mW/g

Body 136.975MHz, m=80%, Belt Clip/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

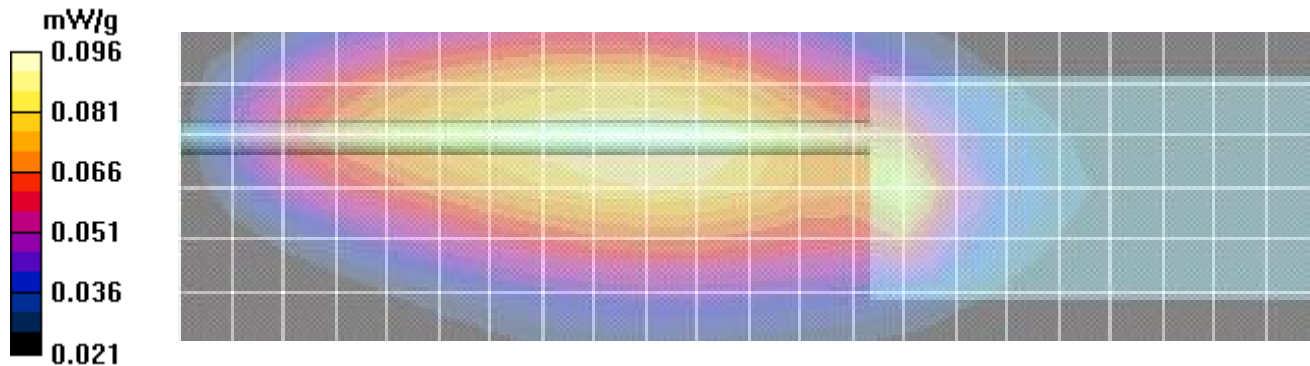
Reference Value = 10.2 V/m; Power Drift = -0.037 dB

Peak SAR (extrapolated) = 0.140 W/kg

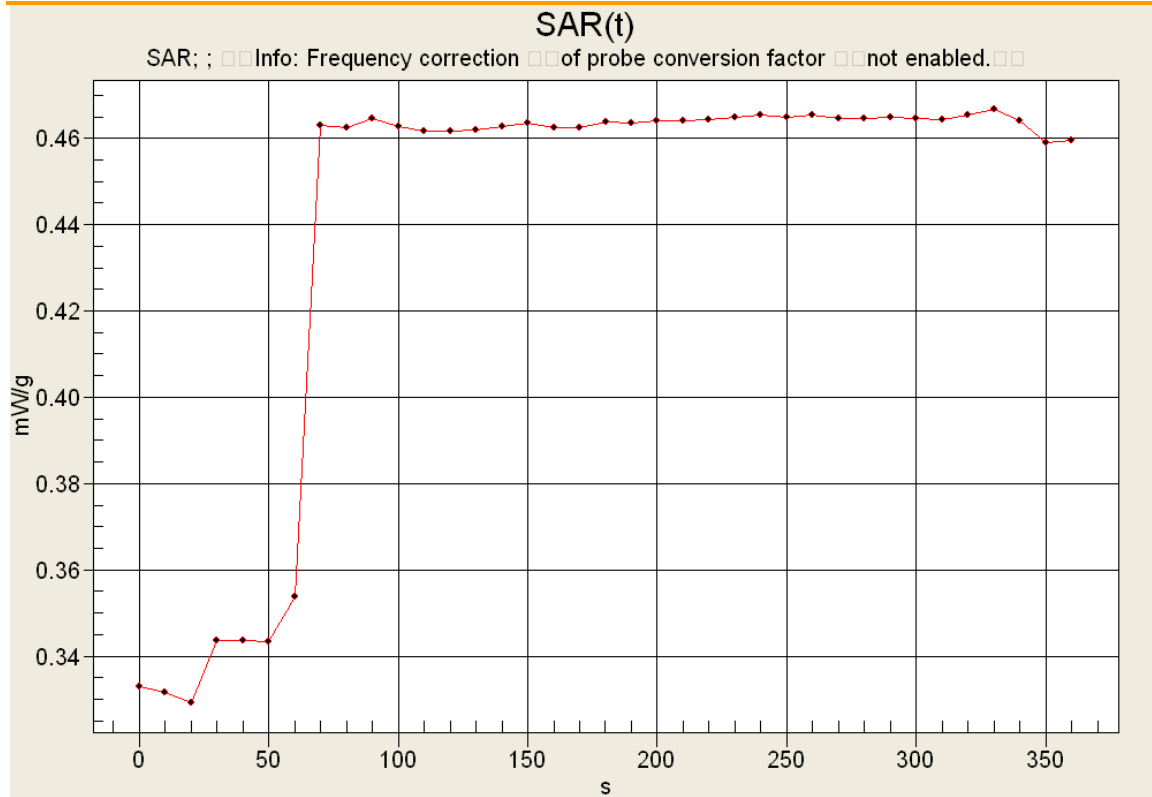
SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.069 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)



Maximum value of SAR (measured) = 0.096 mW/g



Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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Plot B4 SAR vs Time

	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Plot F1

Date/Time: 30/01/2014 10:47:10 AM

1264 - Head SAR - Jan 30

DUT: Yaesu; Type: PTT; Serial: **Not Specified**

Program Notes: 30 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.0C; Barometric Pressure: 101.3kPa; Humidity: 15%

Procedure Notes:

Communication System: CW

Frequency: 127.5 MHz; Duty Cycle: 1:1

Medium: HSL150 Medium parameters used (interpolated): $f = 127.5 \text{ MHz}$; $\sigma = 0.742 \text{ mho/m}$; $\epsilon_r = 51.7$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.31, 9.31, 9.31); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head 127.5MHz, m=80%/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.117 mW/g

Head 127.5MHz, m=80%/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

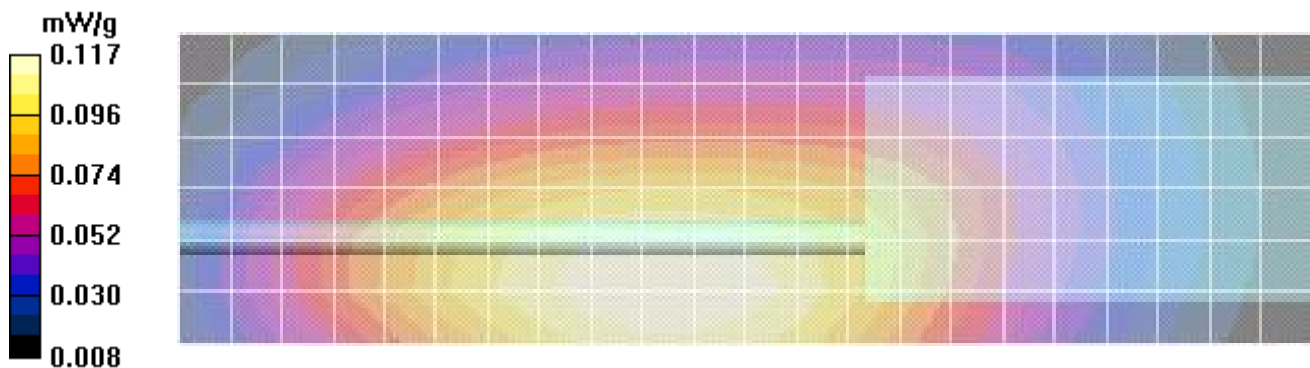
Reference Value = 11.6 V/m; Power Drift = -0.472 dB

Peak SAR (extrapolated) = 0.171 W/kg



SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.092 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.123 mW/g



Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Plot F2

Date/Time: 30/01/2014 11:26:44 AM

1264 - Head SAR - Jan 30

DUT: Yaesu; Type: PTT; Serial: Not Specified

Program Notes: 30 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.0C; Barometric Pressure: 101.3kPa; Humidity: 15%

Procedure Notes:

Communication System: CW

Frequency: 118 MHz; Duty Cycle: 1:1

Medium: HSL150 Medium parameters used (interpolated): $f = 118 \text{ MHz}$; $\sigma = 0.724 \text{ mho/m}$; $\epsilon_r = 51.4$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.31, 9.31, 9.31); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head 118.0MHz, m=80%/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.265 mW/g

Head 118.0MHz, m=80%/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

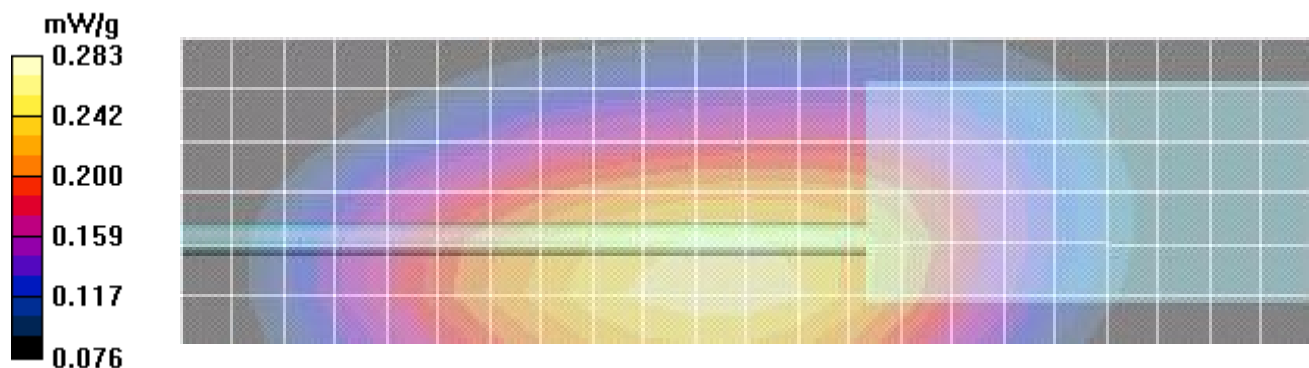
Reference Value = 17.7 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 0.391 W/kg



SAR(1 g) = 0.274 mW/g; SAR(10 g) = 0.212 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.283 mW/g



Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Plot F3

Date/Time: 30/01/2014 2:06:47 PM

1264 - Head SAR - Jan 30

DUT: Yaesu; Type: PTT; Serial: **Not Specified**

Program Notes: 30 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.0C; Barometric Pressure: 101.3kPa; Humidity: 15%

Procedure Notes:

Communication System: CW

Frequency: 136.975 MHz; Duty Cycle: 1:1

Medium: HSL150 Medium parameters used (interpolated): $f = 136.975 \text{ MHz}$; $\sigma = 0.743 \text{ mho/m}$; $\epsilon_r = 51.6$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.31, 9.31, 9.31); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head 136.975.0MHz, m=80%/Area Scan (7x23x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.047 mW/g

Head 136.975.0MHz, m=80%/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

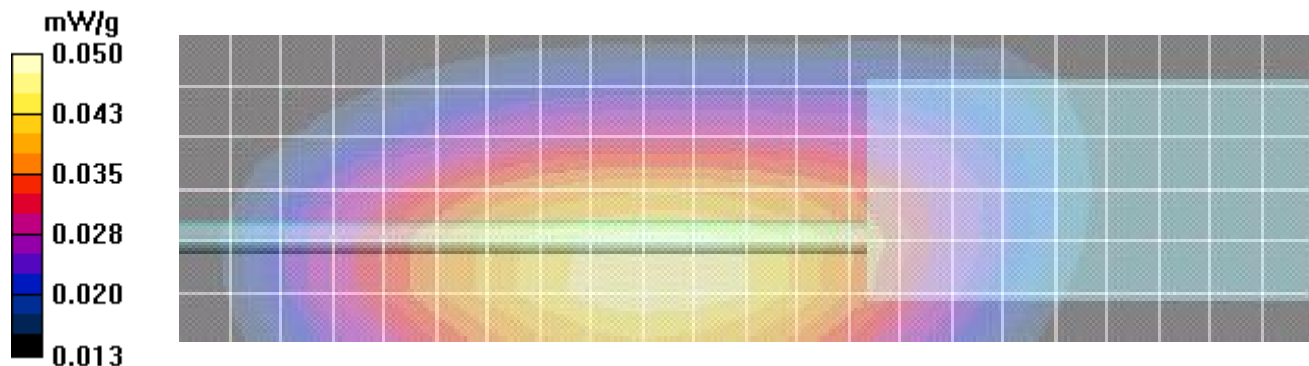
Reference Value = 6.97 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 0.069 W/kg

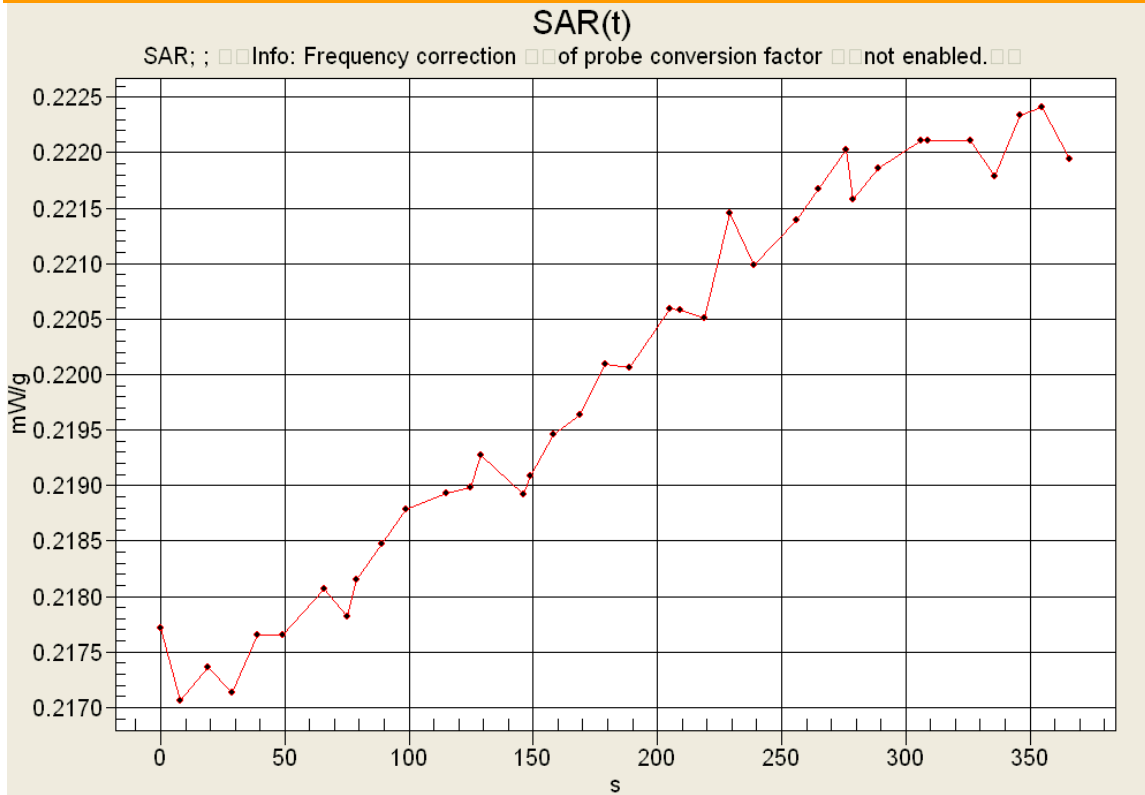
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.037 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

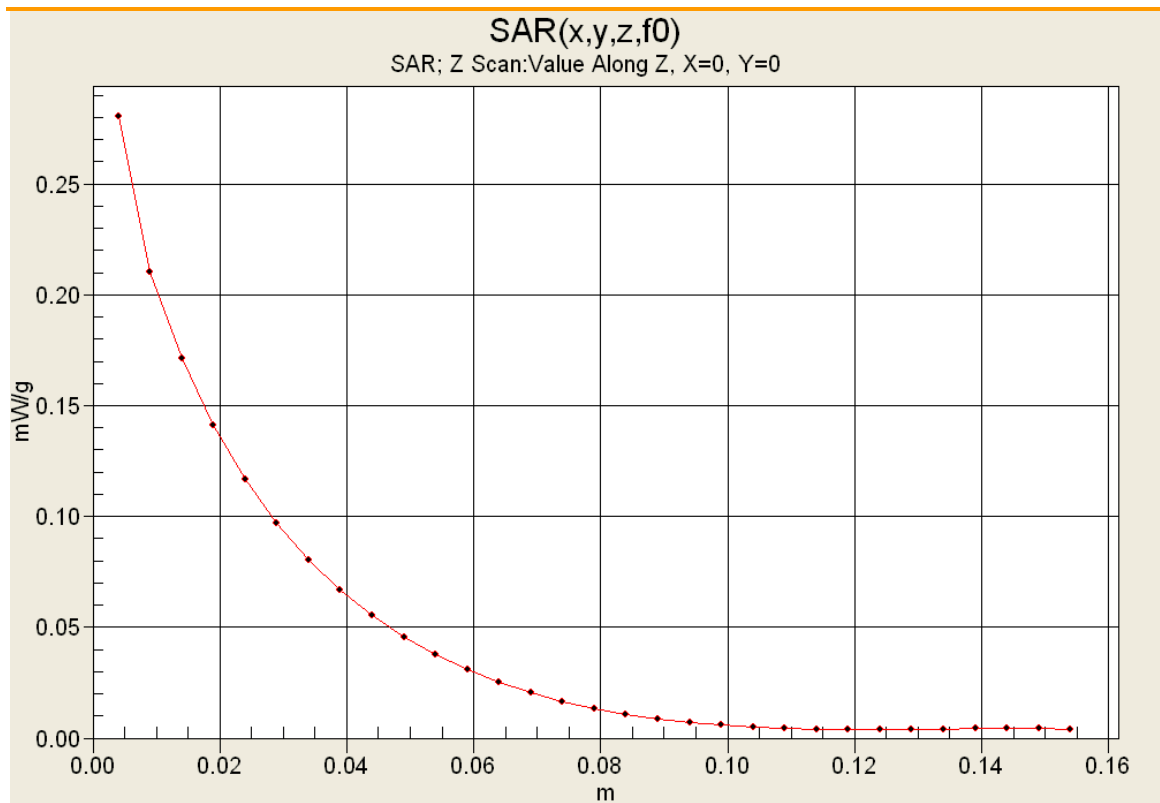
Maximum value of SAR (measured) = 0.050 mW/g





Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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Plot F4 SAR vs Time



Plot F2 Z-Scan

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	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX B - SYSTEM PERFORMANCE CHECK PLOTS

Date/Time: 28/01/2014 9:49:41 AM

SPC - 300 MHz Dipole (150 body) - Jan 28

DUT: Dipole 300 MHz Body; Type: D300V3; Serial: 1009; Calibrated: 01/08/2013

Program Notes: 28 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23.1C; Barometric Pressure: 102.8kPa; Humidity: 13%

Procedure Notes: 300 MHz Dipole transmitting at 300 MHz using 150 MHz SAR probe calibration and 150 MHz tissue dielectric parameters

Communication System: CW

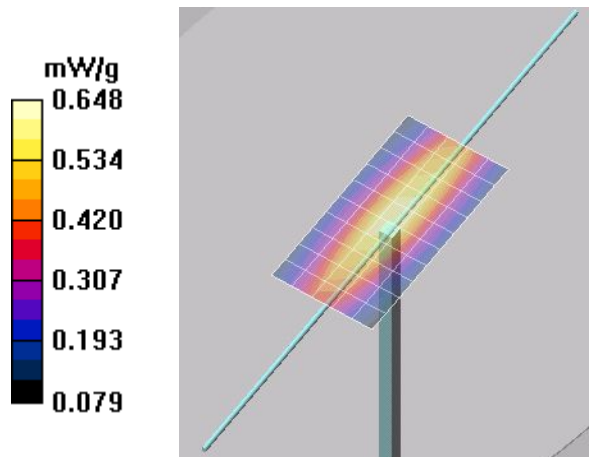
Frequency: 150 MHz; Duty Cycle: 1:1

Medium: M150 Medium parameters used: $f = 150 \text{ MHz}$; $\sigma = 0.8 \text{ mho/m}$; $\epsilon_r = 60.9$; $\rho = 1000 \text{ kg/m}^3$

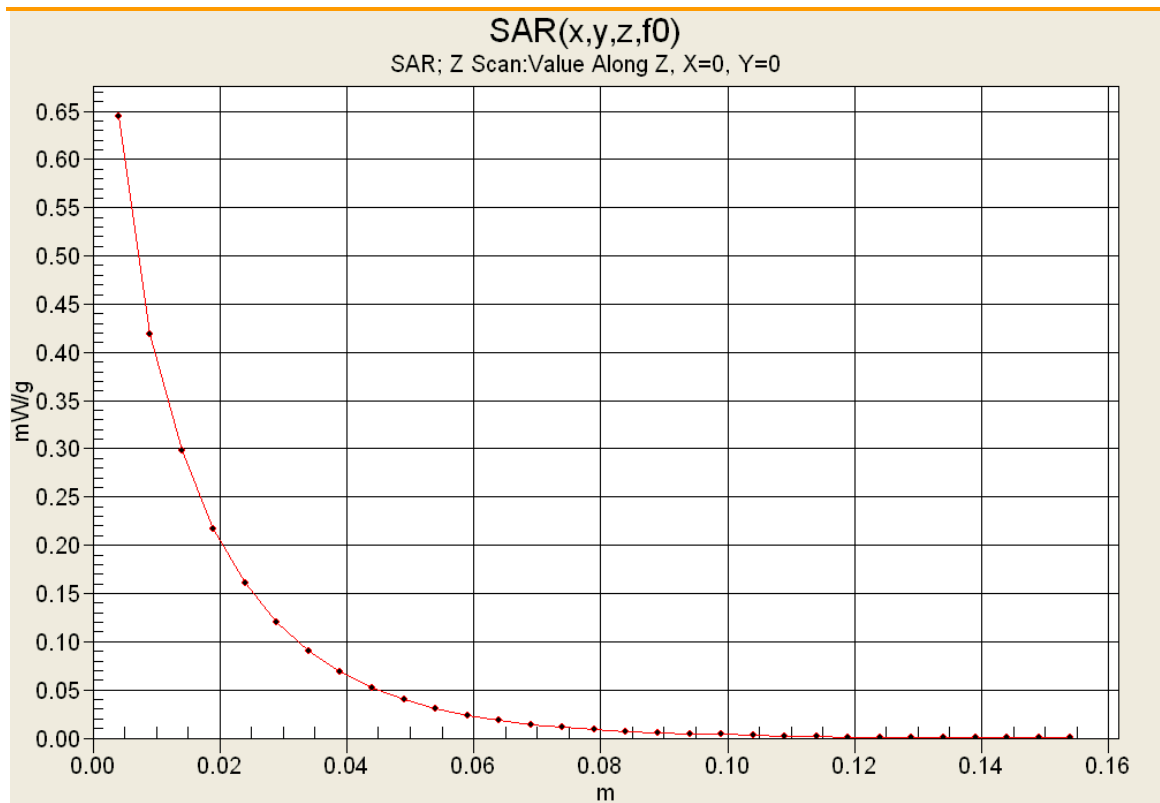
- Probe: ET3DV6 - SN1590; ConvF(8.65, 8.65, 8.65); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186



Body d=15mm, Pin = 250mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.598 mW/g

Body d=15mm, Pin = 250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 28.3 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.613 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.648 mW/g



Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

Date/Time: 30/01/2014 9:51:36 AM

SPC - 300 MHz Dipole (150 head) - Jan 29 2014

DUT: Dipole 300 MHz; Type: D300V3; Serial: 1009; Calibrated: 17/04/2012

Program Notes: 30 Jan 2014, Ambient Temp: 25C; Fluid Temp: 23C; Barometric Pressure: 101.3 kPa; Humidity: 15%

Procedure Notes: 300 MHz Dipole transmitting at 300 MHz using 150 MHz SAR probe calibration and 150 MHz tissue dielectric parameters

Communication System: CW

Frequency: 150 MHz; Duty Cycle: 1:1

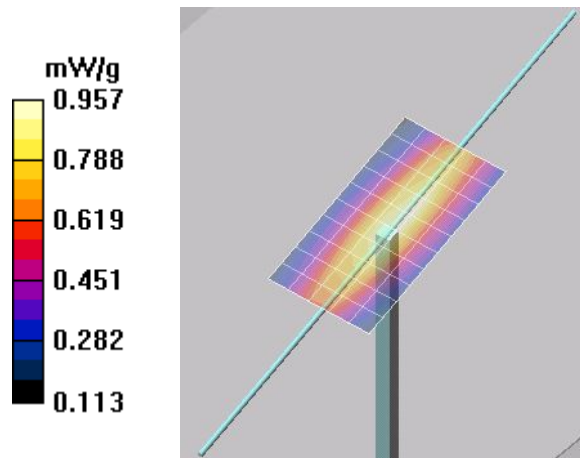
Medium: HSL150 Medium parameters used: $f = 150 \text{ MHz}$; $\sigma = 0.78 \text{ mho/m}$; $\epsilon_r = 49.9$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(9.31, 9.31, 9.31); Calibrated: 24/04/2013
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 19/04/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head d=15mm, Pin = 398mW/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (measured) = 0.944 mW/g

Head d=15mm, Pin = 398mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
 Reference Value = 35.8 V/m; Power Drift = -0.231 dB
 Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.911 mW/g; SAR(10 g) = 0.605 mW/g

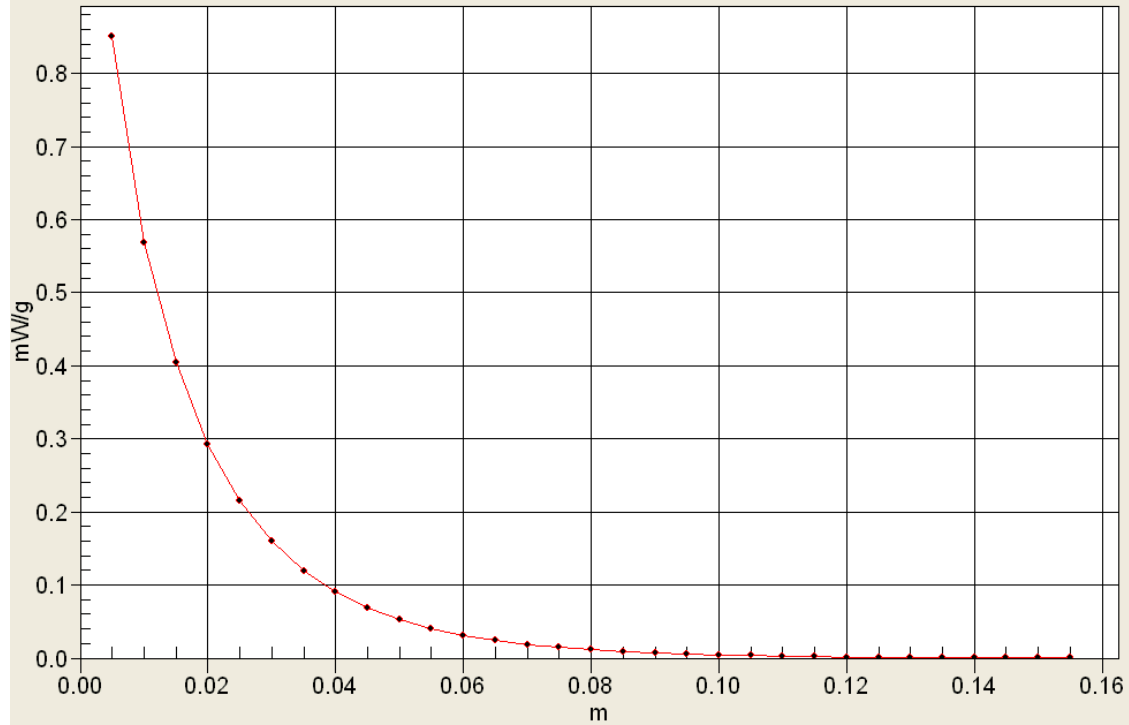
Maximum value of SAR (measured) = 0.957 mW/g





Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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SAR(x,y,z,f0)



SAR; Z Scan: Value Along Z, X=0, Y=0



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	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

150 MHz Body

Aprel Laboratory
 Test Result for UIM Dielectric Parameter
 Mon 27/Jan/2014 16:25:22
 Freq Frequency(GHz)
 FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
 FCC_eB FCC Limits for Body Epsilon
 FCC_sB FCC Limits for Body Sigma
 Test_e Epsilon of UIM
 Test_s Sigma of UIM

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.1000	63.13	0.76	64.52	0.76
0.1100	62.89	0.77	60.91	0.77
0.1200	62.64	0.78	60.69	0.78
0.1300	62.39	0.78	59.60	0.78
0.1400	62.15	0.79	61.96	0.79
0.1500	61.90	0.80	60.88	0.80
0.1600	61.65	0.81	59.42	0.80
0.1700	61.41	0.82	62.80	0.82
0.1800	61.16	0.82	60.58	0.80
0.1900	60.91	0.83	58.44	0.81
0.2000	60.67	0.84	58.10	0.82

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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	<u>Date(s) of Evaluation</u> Jan 28-30, 2013	<u>Test Report Serial No.</u> 01312014K66-1264	<u>Test Report Revision No.</u> Rev. 1.1 (Revised Issue)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> Feb 5, 2014	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> Gen. Pop. / Uncontrolled	

150 MHz Head

Aprel Laboratory
 Test Result for UIM Dielectric Parameter
 Wed 29/Jan/2014 15:41:31
 Freq Frequency(GHz)
 FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
 Test_e Epsilon of UIM
 Test_s Sigma of UIM

Freq	FCC_eHFCC_sH	Test_e	Test_s
0.1000	54.63 0.72	52.37	0.71
0.1100	54.17 0.73	51.32	0.74
0.1200	53.70 0.74	51.44	0.72
0.1300	53.23 0.75	51.73	0.75
0.1400	52.77 0.75	51.51	0.74
0.1500	52.30 0.76	49.88	0.78
0.1600	51.83 0.77	50.36	0.77
0.1700	51.37 0.77	50.30	0.78
0.1800	50.90 0.78	49.03	0.80
0.1900	50.43 0.79	46.41	0.81
0.2000	49.97 0.80	47.58	0.80

Applicant:	Yaesu Musen Co., Ltd	FCC ID:	K6650013X20	IC:	511B-50013X20	
Model(s):	FTA-550, FTA-750	DUT Type:	VHF Digital Mobile Radio	118-137 MHz		
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