Intertek ETL SEMKO

EMI TEST REPORT

Report Number: 3075656.EMI
Project Number: 3075656

Testing performed on the:

RFID Reader

Model: Mercury 4

To:
FCC CFR47 Part 15 Subpart C 15.247
RSS-210 Issue 5

For:

ThingMagic, LLC

Issue Date: 4/28/2005

FCC ID: QV5MERCURY4

Test Performed by:	Test Authorized by:
Intertek – ETL SEMKO	ThingMagic, LLC
70 Codman Hill Road	One Broadway
Boxborough, MA 01719	Cambridge, MA, 02142

Prepared by: _____ Date: 4/28/05
Nicholas Abbondante

Reviewed by: _____ Date: 4-28-2005
Roland W. Gubisch

1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: ThingMagic, LLC
Contact: Rich Leiterman
Telephone: 617-758-4130
Fax: 617-225-4410
Email: rich@thingmagic.com

1.2 Equipment Under Test

Equipment Type: RFID Reader
Model Number(s): Mercury 4
Serial number(s): 4x2-3
Operating Frequency: 902-928 MHz (Channels 0 to 49)
Antennas: M/A-Com Dual Circular 5.9 dBi Antenna M/N: MAAMAT0141 S/N: 00053
Accusort 3-Patch Shelf Antenna 10 dBi M/N: 0107164001 S/N: N/L
Accusort 3-Patch Ramp Bottom Antenna 10 dBi M/N: 0107841001 S/N: N/L
Manufacturer: ThingMagic, LLC
EUT receive date: 4/21/2005
EUT received condition: Good
Test start date: 4/21/2005
Test end date: 4/22/2005

1.3 Test Plan Reference: Tested according to RSS-210, ANSI C63.4(2003), and FCC CFR47 Parts 1, 2 and 15

1.4 Test Configuration

The Mercury 4 is a modulated frequency hopping RFID reader. It contains one radio with four transmit and four receive ports to allow multiple antennas to be connected to enhance the coverage area of the RFID reader. Only one antenna can be utilized at any given moment. Conducted measurements were performed at the output of the EUT's transmit cables which will be supplied with the EUT.

1.4.1. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
Power Cable	None	Metal/360	3	1
Antenna Cables	Coaxial/Foil/Braid	Metal/360	6	2
Ethernet Cable	None	Plastic	6	1
Serial Cable	Foil	Metal/360	2	1

1.4.2. Support Equipment:

Name: Toshiba Laptop
Model No.: 1805-S207
Serial No.: 22021825PU

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC CFR47 Part 15 Subpart C 15.247 RSS-210 Issue 5 6.2.2(o)		
SUB-TEST	**TEST PARAMETER**	**COMMENT**
FCC 15.247(a)(2) FCC 1.1310 RSS-210 6.2.2(o)(a2)	RF Output Power and Exposure	Pass
FCC 15.207 RSS-210 6.6	AC Line-Conducted Emissions	Pass
FCC 15.247(c) RSS-210 6.2.2(o)(e1)	Antenna Conducted Spurious Emissions and Band Edge Compliance	Pass
FCC 15.247(c), FCC 15.209 RSS-210 6.3	Radiated Emissions in Restricted Bands	Pass

3.0 Test Results: Pass

3.1 Test Standard Section: FCC 15.247(a)(2), FCC 1.1310, RSS-210 6.2.2(o)(a2)

3.2 Test: RF Output Power and Exposure

3.3 Test Procedure: The EUT was connected to a spectrum analyzer through a cable with suitable attenuation not to overload the instrument and 1 MHz resolution bandwidth. An offset in the spectrum analyzer compensated for the cable and attenuation loss. Channels were selected for testing at the low, middle, and high end of the transmit band. RF Output power was measured at varying input voltages. Measurements of RF output power were made at the end of the transmit cables of the EUT. Two different lengths of cable can be installed with the EUT, therefore the RF output power was measured at both output power levels.

3.4 Test Requirements: The RF Power Output must be below 1 W (30 dBm) and the 20 dB bandwidth must be less than 500 kHz. RF exposure must not exceed 3 mW/cm^2 at any distance greater than 20 cm from the EUT.

Test Date: 04/21/2005 **Test Engineer Initials:** ~~ **Date:** 4/28/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** PWL **Date:** 4-28-05

3.5 Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
ROS001	Rohde & Schwarz	FSEK-30	100255	06/04/2005
-	Powerstat	3PN126	N/L	Verified with FLU3
WEI18	Weinschel, Inc.	47-20-34	BP0570	06/04/2005
FLU3	Fluke	8062A	6673001	05/04/2005

3.5 Test Results:

Frequency MHz	Max Power Reading dBm			Min Power Reading dBm		
	120V	102V	138V	120V	102V	138V
902.726 (CH0)	28.66	28.85	27.84	25.63	25.57	26.82
914.773 (CH24)	28.52	28.50	27.91	25.69	25.57	25.57
927.322 (CH49)	29.16	28.77	28.59	25.89	26.22	26.20

The maximum allowed antenna gain with no power reduction is 6 dBi. The Accusort antennas have 10 dBi of gain. The RF output power will be reduced by 4 dB at installation when this antenna is utilized. Using the maximum measured power of 29.16 dBm plus 6.00 dBi antenna gain, or the maximum power reduced by 4 dB plus 10.00 dBi of gain, the maximum possible EIRP is 35.16 dBm (3281 mW). The radius at which the EIRP/(4*Pi*r^2) is equal to 3 mW/cm^2, the occupational/controlled exposure limit, is 9.3 cm, well within 20cm.

4.0 Test Results: Pass

4.1 Test Standard Section: FCC 15.207, RSS-210 6.6

4.2 Test: Line-conducted emissions

4.3 Test Procedure: The EUT was activated at nominal power through a Line Impedance Stabilization Network (LISN) and set to transmit normally for the duration of the test. The EUT was placed at the back of the turntable and a vertical coupling plane was located at a distance 40cm behind the EUT. Measurements of AC line-conducted emissions were performed via a cable and attenuator attached to the LISN.

4.4 Test Requirements: All AC line-conducted emissions must meet the general limits of 15.207.

Test Date: 04/21/2005 **Test Engineer Initials:** NM **Date:** 4/28/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** RWB **Date:** 4-28-05

4.5 Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
AGL001	Agilent	E7405A	US40240205	07/23/2005
BAR2	Mannix	0ABA116	BAR2	07/02/2005
DS22A	Mini Circuits	20dB, 50 Ohm	DS22A	11/17/2005
LISN11	Solar Electronics	9252-50-R-24-BNC	941713	06/06/2005
CBL022	Belden	RG-58/U	CBL022	11/17/2005

4.6 Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

4.7 Test Results:

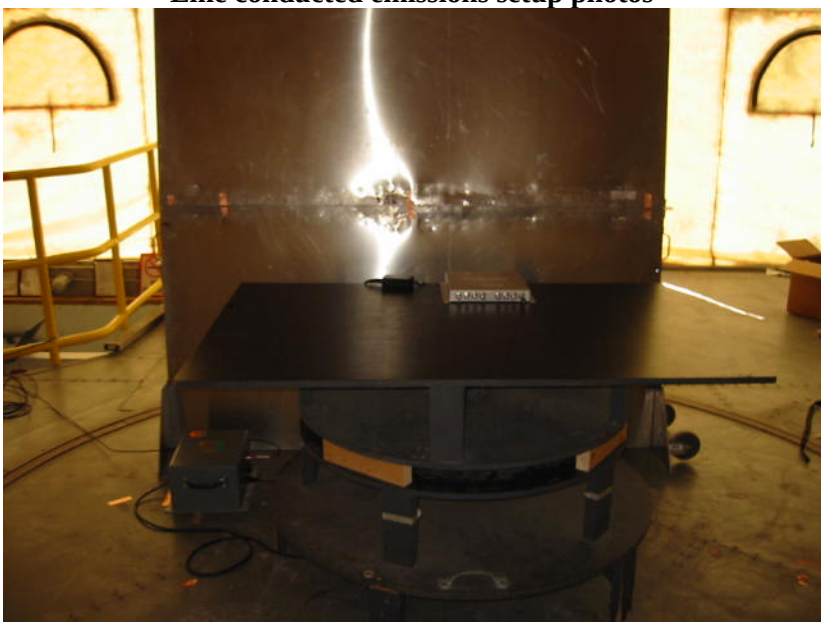
Conducted Emissions / Interference

Company: ThingMagic, LLC — Model #: Mercury 4
Engineer: Nicholas Abbondante — Barometer: BAR2 — Serial #: 4X2-3
Project #: 3075656 — Pressure: 1001mB — Receiver: Agilent E7405A (AGL001)
Date: 04/21/05 — Temp: 23c — Cable: CBL022 11-17-2005.cbl
Standard: FCC 15.207 — Humidity: 32% — LISN 1, 2: LISN11 [1] 6-06-05.lsn LISN11 [2] 6-06-05.lsn
Class: - — Group: None — LISN 3, N: NONE. NONE.
Attenuator: DS22A 11-17-2005.att Location: Site 2
Voltage/Frequency: 120V/60Hz — Frequency Range: 150 kHz - 30 MHz
Net is the sum of worst-case lisn, cable, & attenuator losses, preamp gain, and initial reading
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	QP Limit dB(uV)	Margin dB	Bandwidth
QP	0.187	21.3	9.3			43.6	64.2	-20.6	9/30 kHz
QP	3.750	8.1	7.4			28.6	56.0	-27.4	9/30 kHz
QP	9.803	6.5	8.8			29.5	60.0	-30.5	9/30 kHz
QP	12.240	16.2	15.5			36.9	60.0	-23.1	9/30 kHz
QP	16.120	32.6	31.2			53.4	60.0	-6.6	9/30 kHz
QP	23.300	22.7	25.1			46.1	60.0	-13.9	9/30 kHz

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Neutral dB(uV)	Net dB(uV)	Average Limit dB(uV)	Margin dB	Bandwidth
AVG	0.187	12.5	-5.5			34.8	54.2	-19.4	9/30 kHz
AVG	3.750	3.5	-2.4			24.0	46.0	-22.0	9/30 kHz
AVG	9.803	0.7	2.1			22.8	50.0	-27.2	9/30 kHz
AVG	12.240	9.6	7.8			30.3	50.0	-19.7	9/30 kHz
AVG	16.120	23.5	21.6			44.3	50.0	-5.7	9/30 kHz
AVG	23.300	17.1	18.9			39.9	50.0	-10.1	9/30 kHz

Line conducted emissions setup photos



Emissions Site Description:

Site 2C (Middle Site) is a 3m and 10m sheltered emissions measurement range located in a light commercial environment in Boxborough, Massachusetts. It meets the technical requirements of ANSI C63.4-1992 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal ground plane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity is provided for floor-standing equipment. A wooden table 80 cm high is used for tabletop equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the ground plane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical ground plane (2 meter X 2 meter area) is used for line-conducted measurements for tabletop equipment. The vertical ground plane is electrically connected to the reference ground plane.

Measurement Uncertainty:

Note that the measurement uncertainty contained herein is ±4.0 dB for radiated emissions and ±2.0 dB for line-conducted emissions.

5.0 Test Results: Pass

5.1 Test Standard Section: FCC 15.247(c), RSS-210 6.2.2(o)(e1)

5.2 Test: Antenna Conducted Spurious Emissions

5.3 Test Procedure: The EUT was activated at nominal power and connected to a spectrum analyzer via a cable with sufficient attenuation to prevent overloading of the analyzer. Conducted plots of emissions at the antenna port were made using a 100 kHz bandwith with the EUT in hopping mode. A display line was used to indicate the level 20 dB lower than the level of the fundamental frequency. Both transmit ports were scanned and the worst case is shown as a representative sample.

5.4 Test Requirements: All emissions in any 100 kHz bandwidth outside the frequency band of operation must be attenuated by at least 20 dB below the highest level of fundamental emission in any 100 kHz band inside the band of operation.

Test Date: 04/21/2005
Test Engineer: Nicholas Abbondante

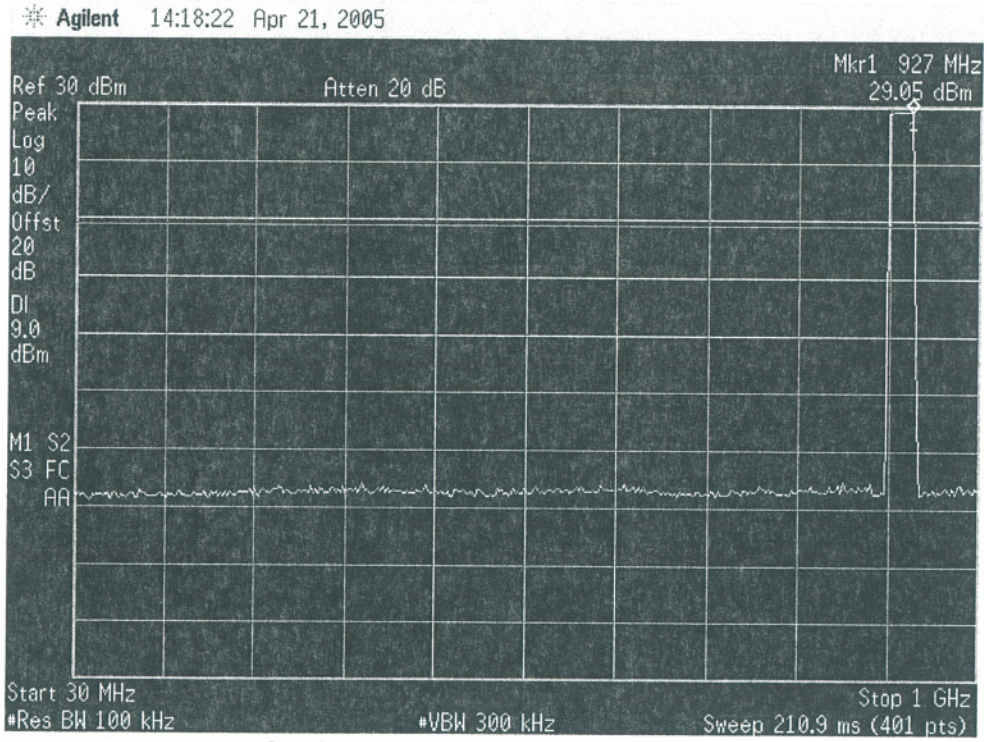
Test Engineer Initials: NNA **Date:** 4/28/05
Reviewer Initials: PWB **Date:** 4-28-05

5.5 Test Equipment Used:

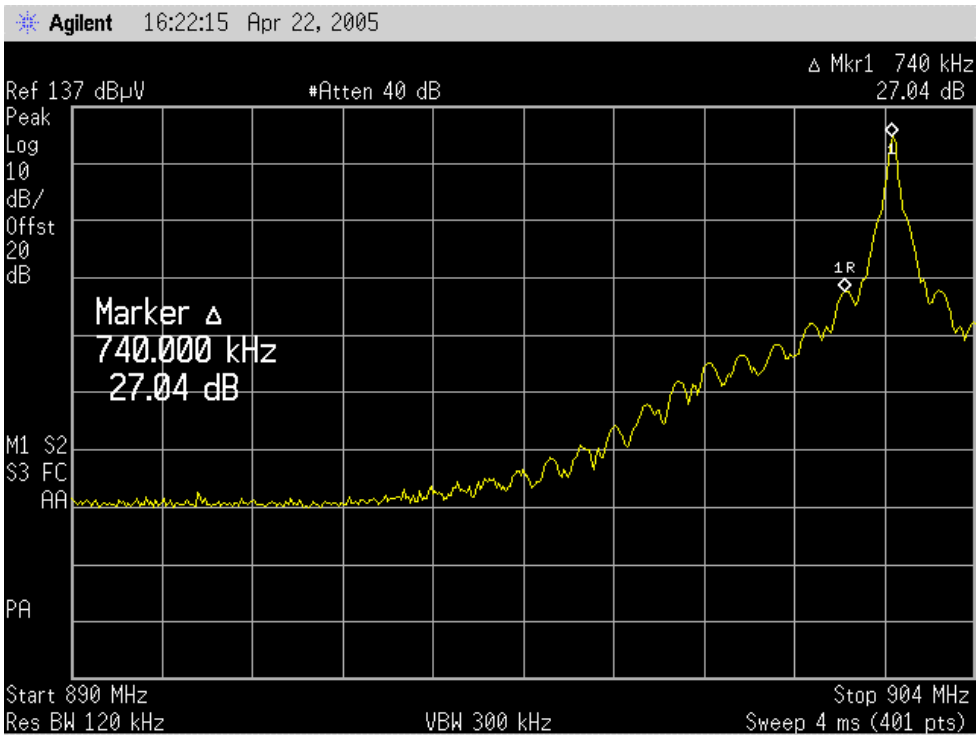
Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
AGL001	Agilent	E7405A	US40240205	07/23/2005
WEI18	Weinschel, Inc.	47-20-34	BP0570	06/04/2005

5.6 Test Results:

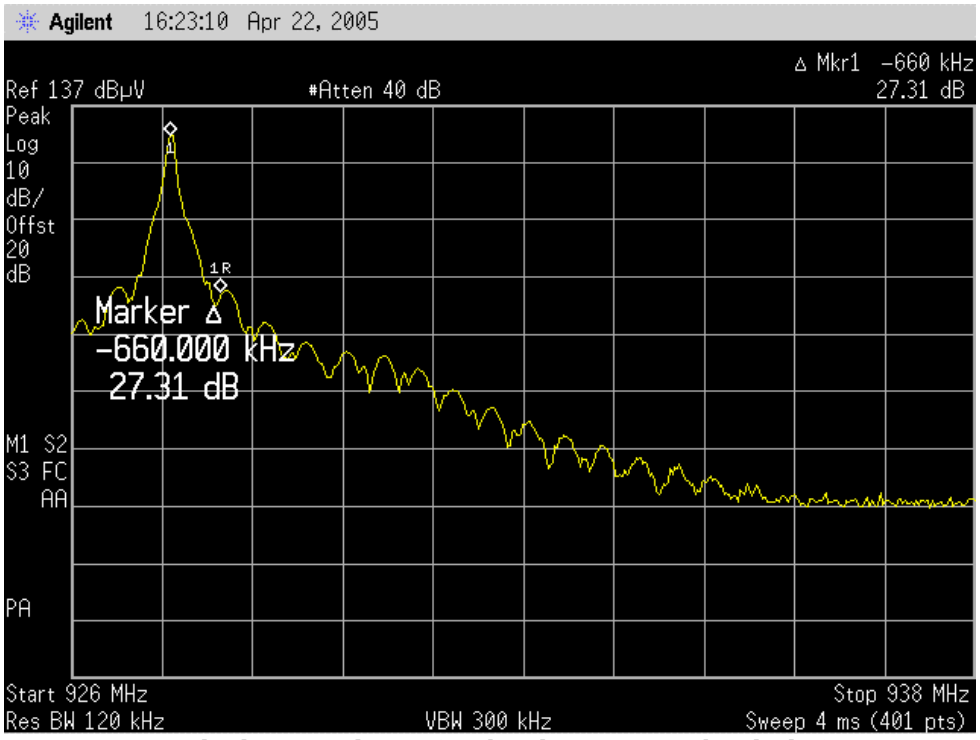
Radio Transmit Port #2



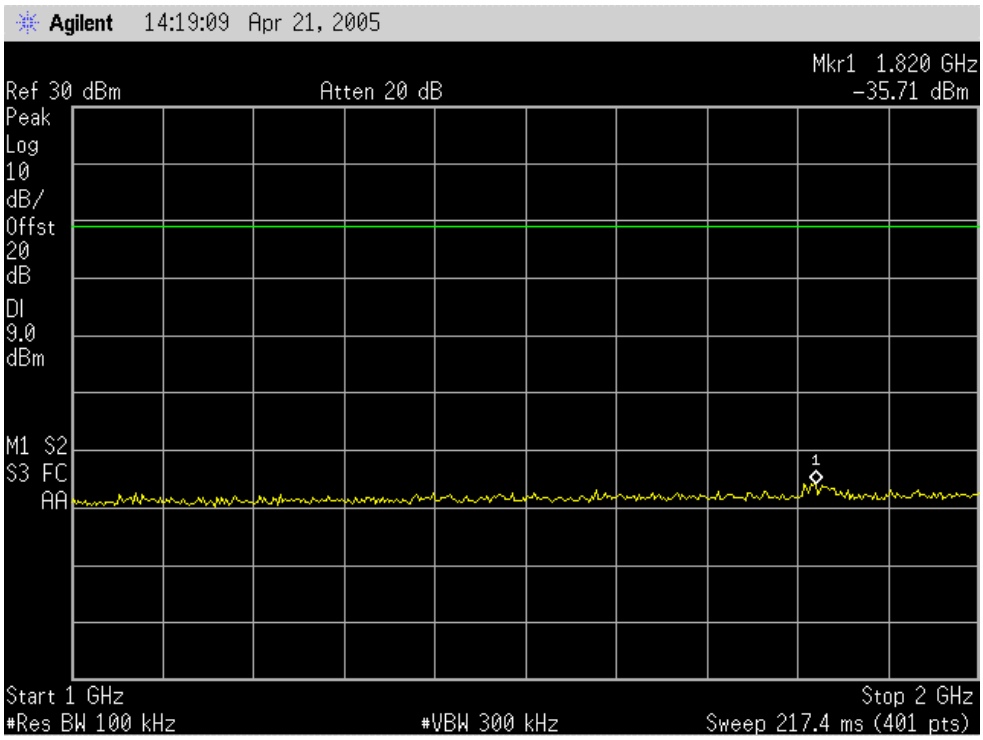
Conducted Spurious, 30 MHz – 1 GHz



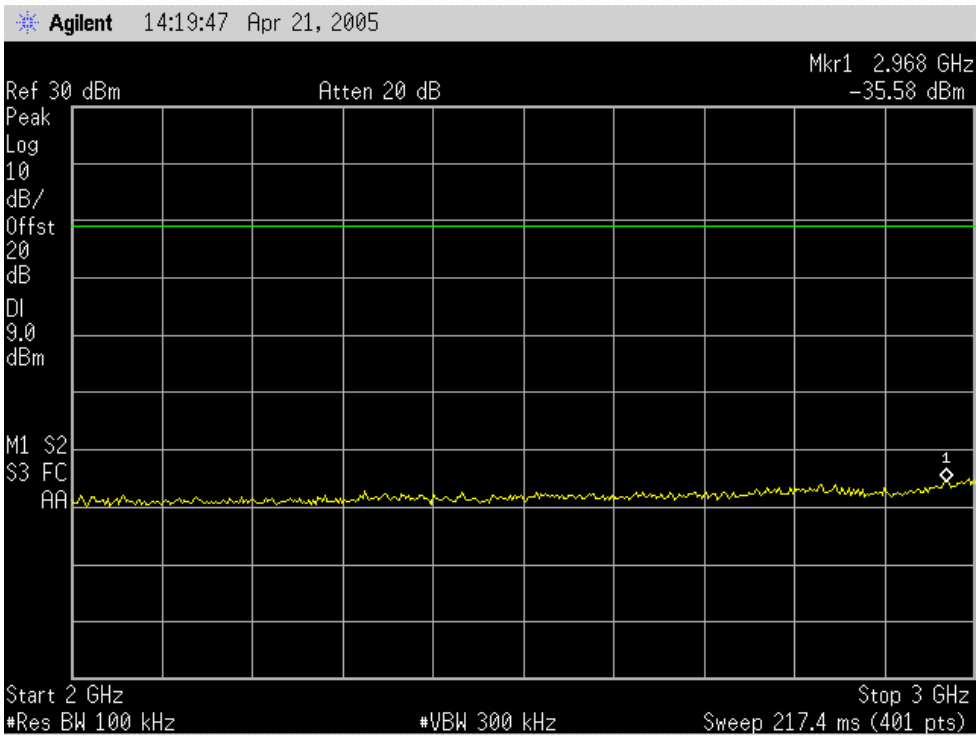
Band Edge Compliance (marker denotes lower band edge)



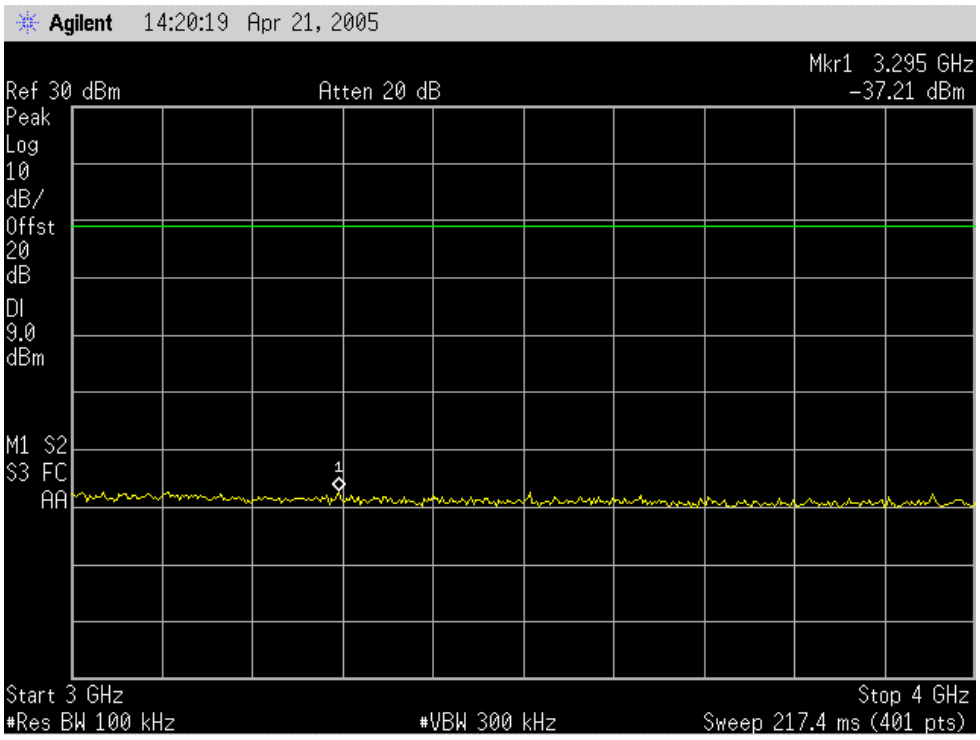
Band Edge Compliance (marker denotes upper band edge)



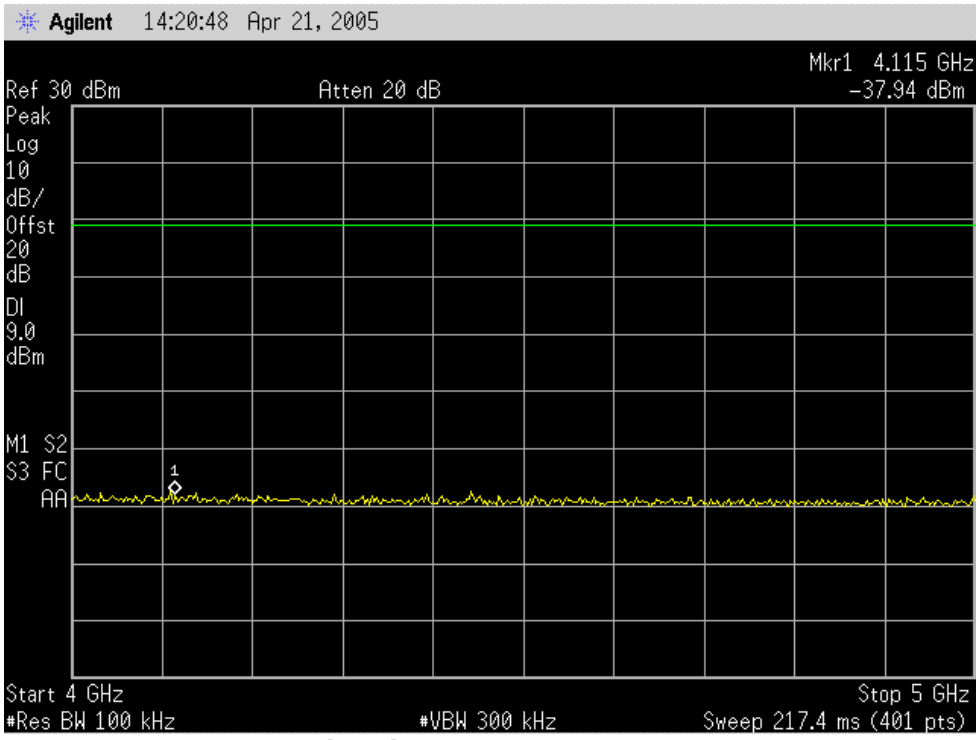
Conducted Spurious, 1 GHz – 2 GHz



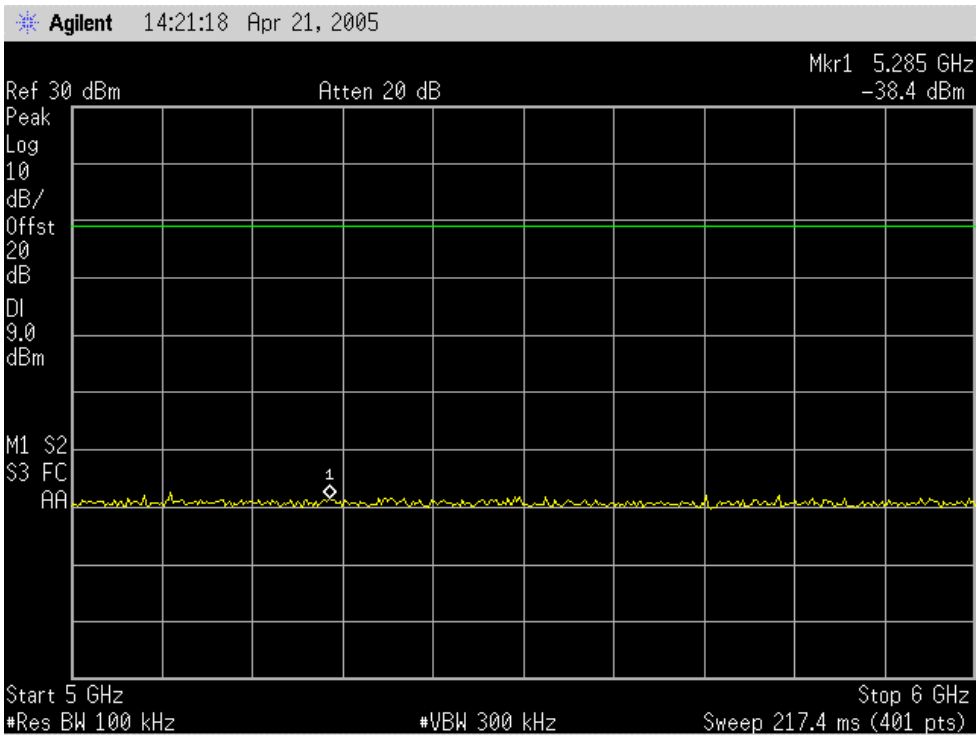
Conducted Spurious, 2 GHz – 3 GHz



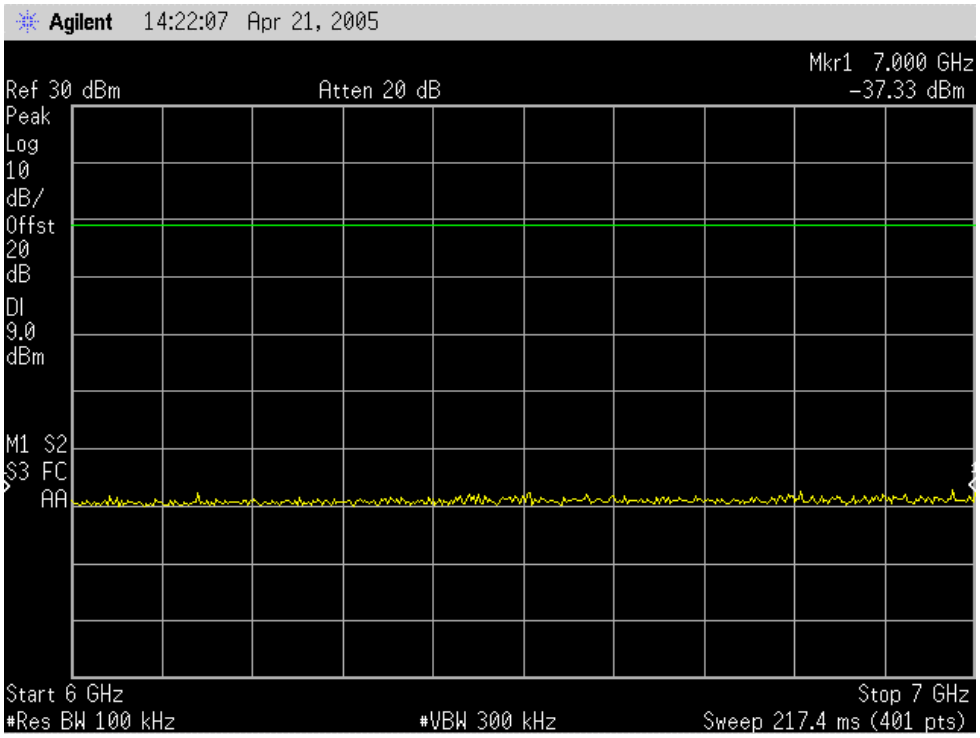
Conducted Spurious, 3 GHz – 4 GHz



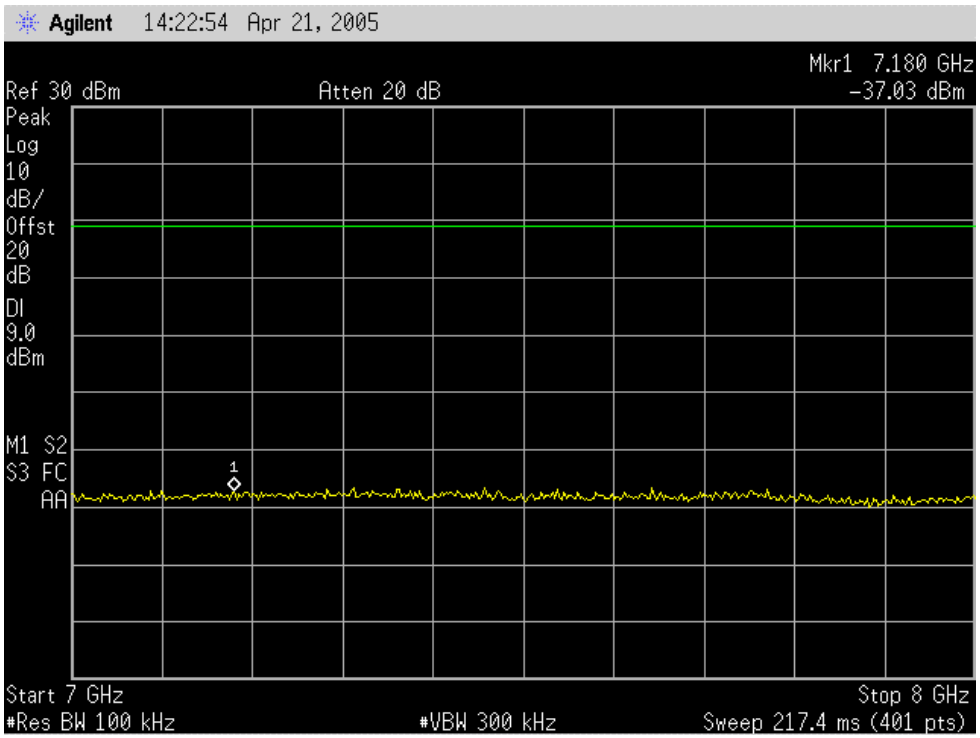
Conducted Spurious, 4 GHz – 5 GHz



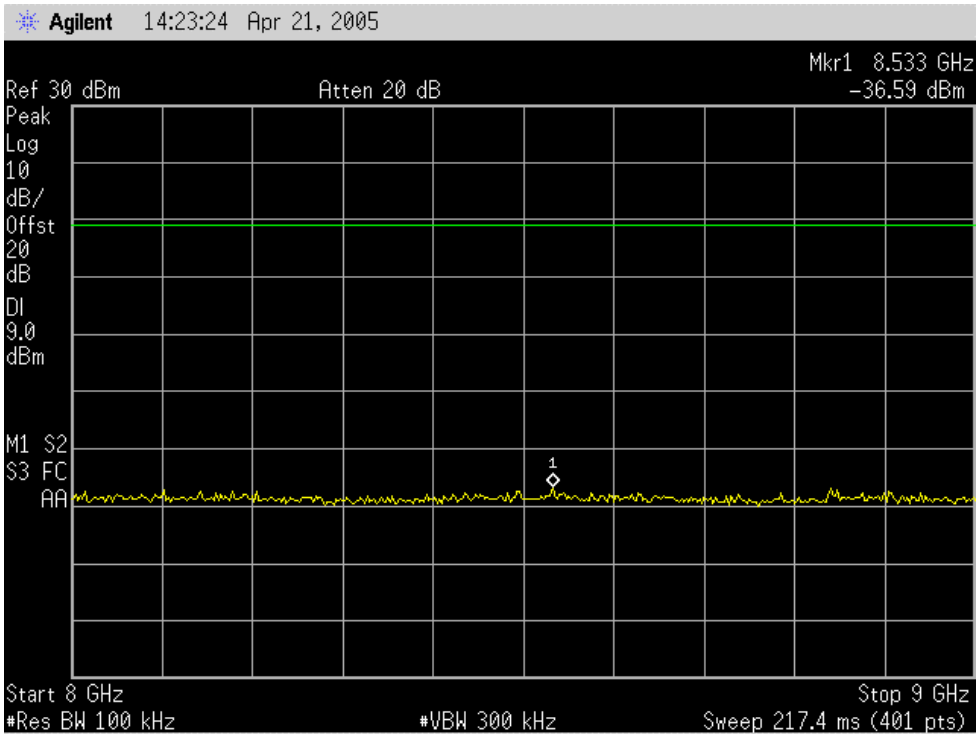
Conducted Spurious, 5 GHz – 6 GHz



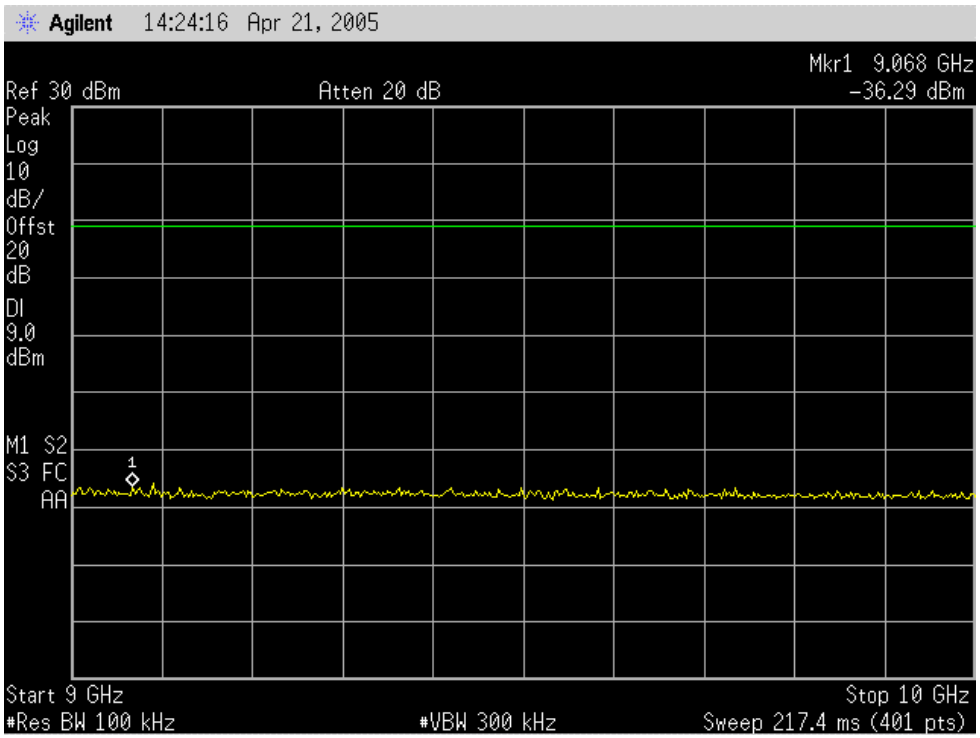
Conducted Spurious, 6 GHz – 7 GHz



Conducted Spurious, 7 GHz – 8 GHz



Conducted Spurious, 8 GHz – 9 GHz



Conducted Spurious, 9 GHz – 10 GHz

6.0 Test Results: Pass

6.1 Test Standard Section: FCC 15.247(c), FCC 15.209, RSS-210 6.3

6.2 Test: Radiated Emissions in Restricted Bands **Pretest Verification Performed:** ✓

6.3 Test Procedure: Spectrum Analyzer Resolution Bandwidth was set to 1 MHz readings were taken with a peak and an average detector. The three highest harmonics are shown; additional harmonics in the restricted bands beyond those included in this report were not detected.

The EUT is placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst-case emissions. The signal is maximized through rotation and manipulation of the EUT in 3 orthogonal axes and the antenna through 2 polarizations. Radiated emissions are taken at 3 m unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

6.4 Test Requirements: Radiated emissions in restricted bands must meet the general limits of 15.209.

Test Date: 04/22/2005 **Test Engineer Initials:** NNA **Date:** 4/28/05
Test Engineer: Nicholas Abbondante **Reviewer Initials:** DWH **Date:** 4-28-2005

6.5 Test Equipment Used:

Intertek ID	Manufacturer	Model	Serial Number	Cal. Due
AGL001	Agilent	E7405A	US40240205	07/23/2005
PRE8	Miteq	NSP4000-NF	507145	11/16/2005
HORN2	EMCO	3115	9602-4675	09/20/2005
CBL028	Megaphase	TM40 K1K1 197	CBL028	12/01/2005
CBL030	Megaphase	TM40 K1K1 80	CBL030	12/01/2005
BAR2	Mannix	0ABA116	BAR2	07/02/2005

6.6 Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	2/07/05 Revision

6.7 Test Results:

Radiated Emissions / Interference

Company: ThingMagic, LLC — Model #: Mercury 4
Engineer: Nicholas Abbondante — Barometer: BAR2 — Serial #: 4X2-3
Project #: 3075656 — Pressure: 1007mB — Receiver: Agilent E7405A (AGL001)
Date: 04/21/05 — Temp: 21c — Antenna: HORN2 9-20-05 V3m.ant HORN2 9-20-05 H3m.ant
Standard: FCC 15.209 — Humidity: 32% — PreAmp: PRE8 11-16-05.amp
Class: - — Group: None — Cable(s): CBL028 12-1-2005.cbl CBL030 12-1-2005.cbl
Limit Distance: 3 meters — Test Distance: 3 meters — Location: Site 2
Voltage/Frequency: 120V/60Hz — Frequency Range: Restricted Bands
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Filter Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
M/A-Com Dual Circular 5.9 dBi Gain Antenna M/N: MAAMAT0141 S/N: 00053											
AVG	H	2708.178	18.0	30.4	4.5	20.1	-2.0	34.9	54.0	-19.1	1/3 MHz
AVG	V	3610.904	21.3	32.3	5.4	20.4	-1.5	40.0	54.0	-14.0	1/3 MHz
AVG	V	4513.630	18.6	32.9	6.1	21.0	-1.4	38.0	54.0	-16.0	1/3 MHz
AVG	V	2744.319	18.4	30.2	4.5	20.1	-2.0	35.0	54.0	-19.0	1/3 MHz
AVG	V	3659.092	22.9	32.4	5.4	20.4	-1.5	41.7	54.0	-12.3	1/3 MHz
AVG	V	4573.865	22.7	33.0	6.2	21.1	-1.4	42.3	54.0	-11.7	1/3 MHz
AVG	V	2781.966	19.7	30.4	4.6	20.2	-2.0	36.6	54.0	-17.4	1/3 MHz
AVG	V	3709.288	25.9	32.5	5.4	20.4	-1.5	44.9	54.0	-9.1	1/3 MHz
AVG	V	4636.610	20.8	33.2	6.2	21.2	-1.4	40.5	54.0	-13.5	1/3 MHz
Accusort 3-Patch Shelf Antenna 10 dBi M/N: 0107164001 S/N: N/L											
AVG	H	2708.178	16.8	30.4	4.5	20.1	-2.0	33.6	54.0	-20.4	1/3 MHz
AVG	V	3610.904	17.3	32.3	5.4	20.4	-1.5	35.9	54.0	-18.1	1/3 MHz
AVG	V	4513.630	17.1	32.9	6.1	21.0	-1.4	36.5	54.0	-17.5	1/3 MHz
AVG	V	2744.319	15.0	30.2	4.5	20.1	-2.0	31.7	54.0	-22.3	1/3 MHz
AVG	V	3659.092	17.7	32.4	5.4	20.4	-1.5	36.5	54.0	-17.5	1/3 MHz
AVG	V	4573.865	18.4	33.0	6.2	21.1	-1.4	37.9	54.0	-16.1	1/3 MHz
AVG	H	2781.966	16.0	30.7	4.6	20.2	-2.0	33.1	54.0	-20.9	1/3 MHz
AVG	V	3709.288	20.1	32.5	5.4	20.4	-1.5	39.1	54.0	-14.9	1/3 MHz
AVG	H	4636.610	17.1	34.0	6.2	21.2	-1.4	37.6	54.0	-16.4	1/3 MHz
Accusort 3-Patch Ramp Bottom Antenna 10 dBi M/N: 0107841001 S/N: N/L											
AVG	V	2708.178	16.8	30.1	4.5	20.1	-2.0	33.3	54.0	-20.7	1/3 MHz
AVG	V	3610.904	17.3	32.3	5.4	20.4	-1.5	36.0	54.0	-18.0	1/3 MHz
AVG	V	4513.630	17.0	32.9	6.1	21.0	-1.4	36.4	54.0	-17.6	1/3 MHz
AVG	V	2744.319	14.4	30.2	4.5	20.1	-2.0	31.1	54.0	-22.9	1/3 MHz
AVG	V	3659.092	16.9	32.4	5.4	20.4	-1.5	35.8	54.0	-18.2	1/3 MHz
AVG	V	4573.865	16.5	33.0	6.2	21.1	-1.4	36.1	54.0	-17.9	1/3 MHz
AVG	V	2781.966	15.0	30.4	4.6	20.2	-2.0	31.8	54.0	-22.2	1/3 MHz
AVG	V	3709.288	16.9	32.5	5.4	20.4	-1.5	35.9	54.0	-18.1	1/3 MHz
AVG	V	4636.610	17.0	33.2	6.2	21.2	-1.4	36.6	54.0	-17.4	1/3 MHz

Note that the Accusort antennas were tested with the 20' + circulator + 2' cable set which has the highest loss, requiring the highest power at the reader. The power at the end of the cable into the 10 dBi antenna was 26 dBm. The M/A-Com antenna was tested with 30 dBm at the end of the long cable set as specified in the user's manual.

Radiated Emissions / Interference

Company: ThingMagic, LLC
Engineer: Nicholas Abbondante
Project #: 3075656
Date: 04/21/05
Standard: FCC 15.209
Class: B
Limit Distance: 3 meters
Voltage/Frequency: 120V/60Hz
Barometer: BAR2
Pressure: 1007mB
Temp: 21c
Humidity: 32%
Group: None
Test Distance: 3 meters
Frequency Range: Restricted Bands
Model #: Mercury 4
Serial #: 4X2-3
Receiver: Agilent E7405A (AGL001)
Antenna: HORN2 9-20-05 V3m.ant HORN2 9-20-05 H3m.ant
PreAmp: PRE8 11-16-05.amp
Cable(s): CBL028 12-1-2005.cbl CBL030 12-1-2005.cbl
Location: Site 2

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
M/A-Com Dual Circular 5.9 dBi Gain Antenna M/N: MAAMAT0141 S/N: 00053											
PK	H	2708.178	29.4	30.4	4.5	20.1	-2.0	46.2	74.0	-27.8	1/3 MHz
PK	V	3610.904	31.0	32.3	5.4	20.4	-1.5	49.7	74.0	-24.3	1/3 MHz
PK	V	4513.630	28.2	32.9	6.1	21.0	-1.4	47.7	74.0	-26.3	1/3 MHz
PK	V	2744.319	28.9	30.2	4.5	20.1	-2.0	45.5	74.0	-28.5	1/3 MHz
PK	V	3659.092	31.0	32.4	5.4	20.4	-1.5	49.8	74.0	-24.2	1/3 MHz
PK	V	4573.865	31.1	33.0	6.2	21.1	-1.4	50.6	74.0	-23.4	1/3 MHz
PK	V	2781.966	29.8	30.4	4.6	20.2	-2.0	46.6	74.0	-27.4	1/3 MHz
PK	V	3709.288	32.9	32.5	5.4	20.4	-1.5	51.9	74.0	-22.1	1/3 MHz
PK	V	4636.610	30.1	33.2	6.2	21.2	-1.4	49.8	74.0	-24.2	1/3 MHz
Accusort 3-Patch Shelf Antenna 10 dBi M/N: 0107164001 S/N: N/L											
PK	H	2708.178	28.2	30.4	4.5	20.1	-2.0	45.0	74.0	-29.0	1/3 MHz
PK	V	3610.904	29.3	32.3	5.4	20.4	-1.5	48.0	74.0	-26.0	1/3 MHz
PK	V	4513.630	27.5	32.9	6.1	21.0	-1.4	47.0	74.0	-27.0	1/3 MHz
PK	V	2744.319	28.4	30.2	4.5	20.1	-2.0	45.1	74.0	-28.9	1/3 MHz
PK	V	3659.092	29.2	32.4	5.4	20.4	-1.5	48.0	74.0	-26.0	1/3 MHz
PK	V	4573.865	29.4	33.0	6.2	21.1	-1.4	48.9	74.0	-25.1	1/3 MHz
PK	H	2781.966	28.5	30.7	4.6	20.2	-2.0	45.6	74.0	-28.4	1/3 MHz
PK	V	3709.288	30.0	32.5	5.4	20.4	-1.5	49.0	74.0	-25.0	1/3 MHz
PK	H	4636.610	29.1	34.0	6.2	21.2	-1.4	49.6	74.0	-24.4	1/3 MHz
Accusort 3-Patch Ramp Bottom Antenna 10 dBi M/N: 0107841001 S/N: N/L											
PK	V	2708.178	28.0	30.1	4.5	20.1	-2.0	44.5	74.0	-29.5	1/3 MHz
PK	V	3610.904	28.3	32.3	5.4	20.4	-1.5	47.0	74.0	-27.0	1/3 MHz
PK	V	4513.630	27.5	32.9	6.1	21.0	-1.4	47.0	74.0	-27.0	1/3 MHz
PK	V	2744.319	27.5	30.2	4.5	20.1	-2.0	44.2	74.0	-29.8	1/3 MHz
PK	V	3659.092	28.3	32.4	5.4	20.4	-1.5	47.1	74.0	-26.9	1/3 MHz
PK	V	4573.865	27.5	33.0	6.2	21.1	-1.4	47.0	74.0	-27.0	1/3 MHz
PK	V	2781.966	27.4	30.4	4.6	20.2	-2.0	44.2	74.0	-29.8	1/3 MHz
PK	V	3709.288	28.2	32.5	5.4	20.4	-1.5	47.2	74.0	-26.8	1/3 MHz
PK	V	4636.610	27.4	33.2	6.2	21.2	-1.4	47.1	74.0	-26.9	1/3 MHz

Note that the Accusort antennas were tested with the 20' + circulator + 2' cable set which has the highest loss, requiring the highest power at the reader. The power at the end of the cable into the 10 dBi antenna was 26 dBm. The M/A-Com antenna was tested with 30 dBm at the end of the long cable set as specified in the user's manual.

Radiated Emissions in Restricted Bands Setup Photos