Test Report No.8412305151

For Medic4All (Israel) Ltd.

Equipment Under Test:

MiniClinic

Model: *VMW03 (915 MHz)*

From The Standards Institution
Of Israel
Industry Division
Telematics Laboratory
EMC Section

ACCREDITED

Certificate No. 1487-01

Test Report No.: 8412305151 **Page 1 of 24 Pages**

Title: Test on MiniClinic **Model: VMW03 (915 MHz)**

Order placed by:	Medic4All (Israel) Ltd.
Address:	10 Hamefalsim Str., P.O. Box 4222, Petach-Tikva 49000, Israel
Sample for test selected by:	The customer
The date of test:	31/03, 10, 12, 15/05/2004

Description of Equipment Under Test (EUT):	MiniClinic
Model:	VMW03 (915 MHz)
Manufactured by:	Medic4All (Israel) Ltd.

Reference Documents:

- CFR 47 FCC: Rules and Regulations; Part 15. "Radio frequency devices";

  Subpart B. "Unintentional Radiators".

  Section 15.109. "Radiated emission limits".

  Subpart C: "Intentional radiators" (2002),

  Section 15.205. "Restricted bands of operations",

  Section 15.209. "Radiated emission limits, general requirements".

  "Radiated Emission Limits, Additional Provisions";
  Section 15.249. "Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz".

Test Results: The EUT meets the following requirements of CFR 47 FCC Part 15:
Subpart B: Section 15.109. Radiated emission Class B
Subpart C: Section 15.209. Radiated emission
Section 15.429 (a),
Section 15.205.

This Test Report contains 24 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

Table of Contents

1. EUT Description and operation 3

1.1. General description: 3
1.2. Potential emission sources: 8
1.3. EUT setup and operation: 8

2. Measurements, examinations and derived results 9

2.1. Location of the Test Site: 9
2.2. Test condition: 9
2.3. Initial visual check and functional test: 9
2.4. Radiated emission test: 10
2.5. Test of field strength of emission from intentional radiators 12

3. Test summary 19

4. Appendix 1. Test equipment used 20

5. Appendix 2: Antenna Factor and Cable Loss 21

1. EUT Description and operation

1.1. General description:

* Note: All information in below clause was supplied by the customer.

Description of Equipment Under Test (EUT): MiniClinic
Model: VMW03 (915 MHz)
Manufactured by: Medic4All (Israel) Ltd.

The VMW03 is a medical wrist unit which performs the following measurements: panic button, ECG, heart rate, breathing rate, heart rhythm regularity and body temperature.

The VMW03 communicates with the MedicGate (VMG02) and with the MiniGate (VMG03) via RF protocol.

Tested model has carrier frequency 915 MHz.

The EUT is Transceiver based on chipset Chipcon CC1020.

The transceiver uses one channel.
Integral antenna – wire, about 8 cm length.

Output transmission power: -1 dBm (EIRP)
Bandwidth: 50 kHz
Modulation type: FSK.

The EUT"s dimensions: 26 cm x 4.5 cm x 2 cm, approx.

The EUT's powered from three 1.5V type 389 silver-oxide batteries.

The EUT's current consumption is up to 40 mA.

The EUT's block diagram and Tx-Rx block diagram are shown in Figures 1 and 2, respectively. VMW03 external and internal views are presented in Photos 1-2.

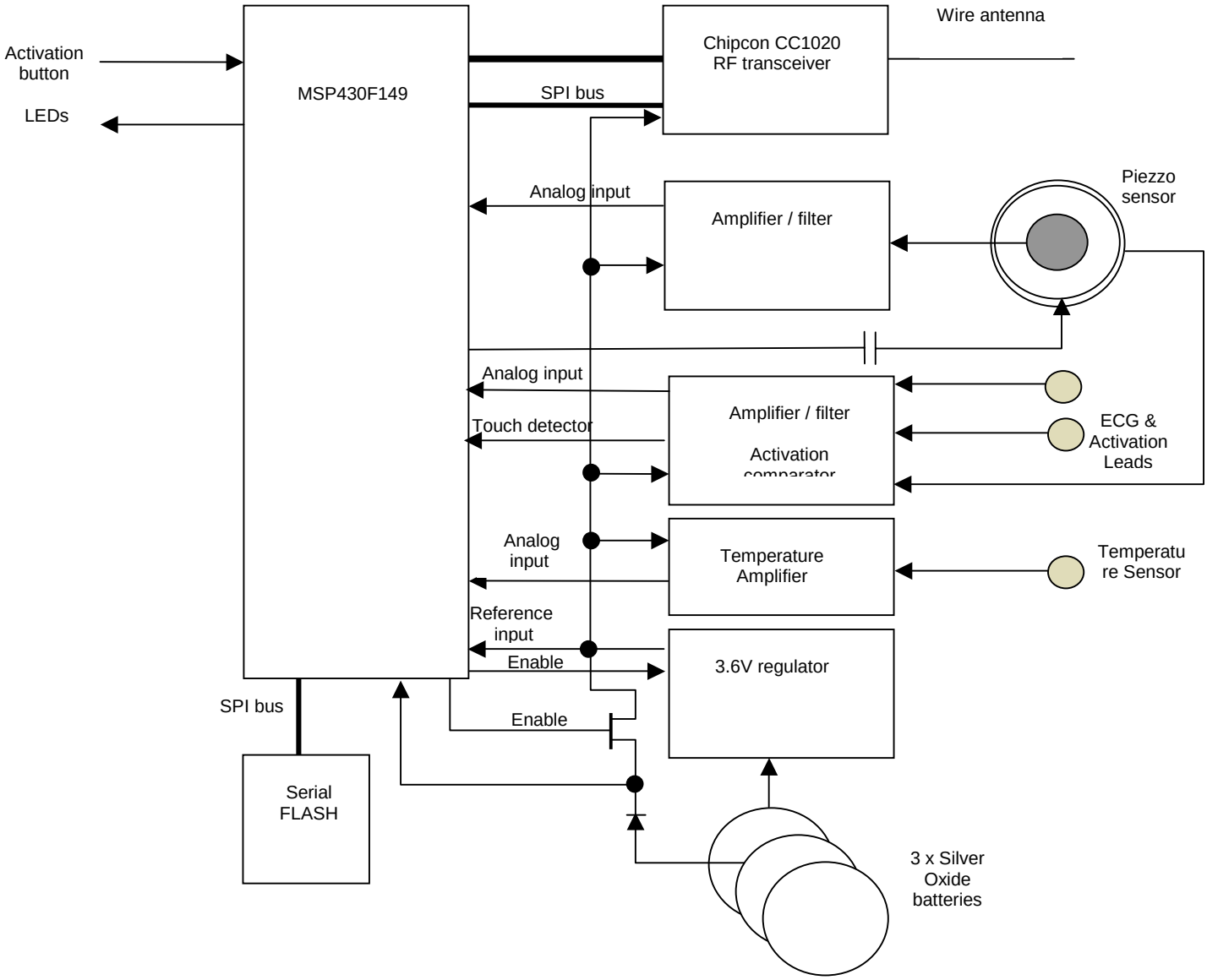
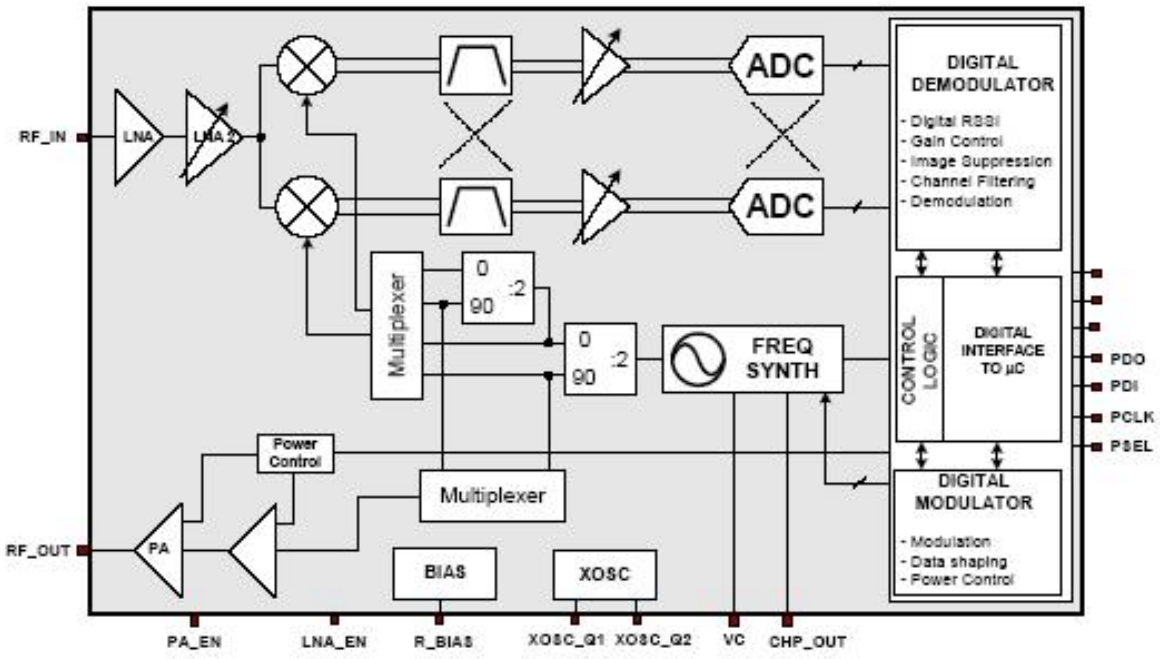


Figure 1. EUT's block diagram

Circuit Description



CC1020 simplified block diagram

Figure 2. Tx-Rx block diagram

Photo 1. EUT's overall view

Photo 2. EUT's internal views

* Information in clauses below is provided by the manufacturer.

1.2. Potential emission sources:

The potential emission sources are detailed in Table 1.

Table 1. Potential emission sources

Frequency	Location
14.7456 MHz crystal	VMW03
32.768 kHz crystal	VMW03
915 MHz RF signal	VMW03

1.3. EUT setup and operation:

Respective tests were performed in Transmission (Tx) and Receiving (Rx) modes.

2. Measurements, examinations and derived results

2.1. Location of the Test Site:

Preliminary radiated test and immunity tests were conducted at the EMC laboratory of the Standards Institution of Israel in Tel-Aviv.

All other tests were conducted in an Open Area Test Site located at Kibbutz Native Halamed Hai in Emek HaEla, Israel.

2.2. Test condition:

Temperature: 22 °C. Humidity: 56 %. Atmospheric pressure: 1010 mbar.

2.3. Initial visual check and functional test:

Initial visual check and brief built- in- test of the EUT was performed before testing.

- No external damages were found.
- The test on the EUT passed successfully.

2.4. Radiated emission test:

2.4.1. General:

Per FCC Part 15 Subpart B Section 15.109 / Subpart C Section 15.209.

- Initial scans were made using a peak detector but still using the appropriate CISPR 16 (Quasi-Peak) detector IF bandwidth.
- A tolerance limit was set 10 dB below the specification limit. Levels above the tolerance limit were retested using the Quasi-Peak detector.
- If the result with a Quasi-Peak detector exceeds the specification limit, it is marked with "Fails" in the margin, if it is within the measurement uncertainty, it is marked with a "*".

2.4.2. Preliminary radiated emission tests:

Preliminary radiated measurements were performed in a semi-anechoic chamber at a distance of 3 meters. The EUT was setup in its typical configuration and operated in Rx mode.

The frequency spectrum was monitored. EUT configuration, cable configuration and mode of operation, which produced the maximum level of emission, were documented. A list of frequencies to be tested was prepared.

Scan of preliminary radiated emission test is presented on Plot # 1.

2.4.3. Final measurements:

The final radiated measurements were performed at the Open Area Test Site.
The EUT was operated as described in clause 1.3.

The EUT was installed on a turn- table.

All measurements at the Open Area Test Site were performed at a 10 m measurement distance.

The Biconilog 30 MHz-2 GHz antenna was used.

The EUT's configuration and mode of operation, which produced the maximum level of emissions, were selected.

The Frequency range from 30 to 1000 MHz was investigated.
The measurements were performed at each frequency found previously and at frequencies at which the signal was 10 dB below the limit or less.

All measurements at the Open Area Test Site were performed at a 10 m measurement distance from the EUT.

The levels were maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna-to-EUT polarization from vertical to horizontal.

Unless stated otherwise, the measuring equipment settings were:

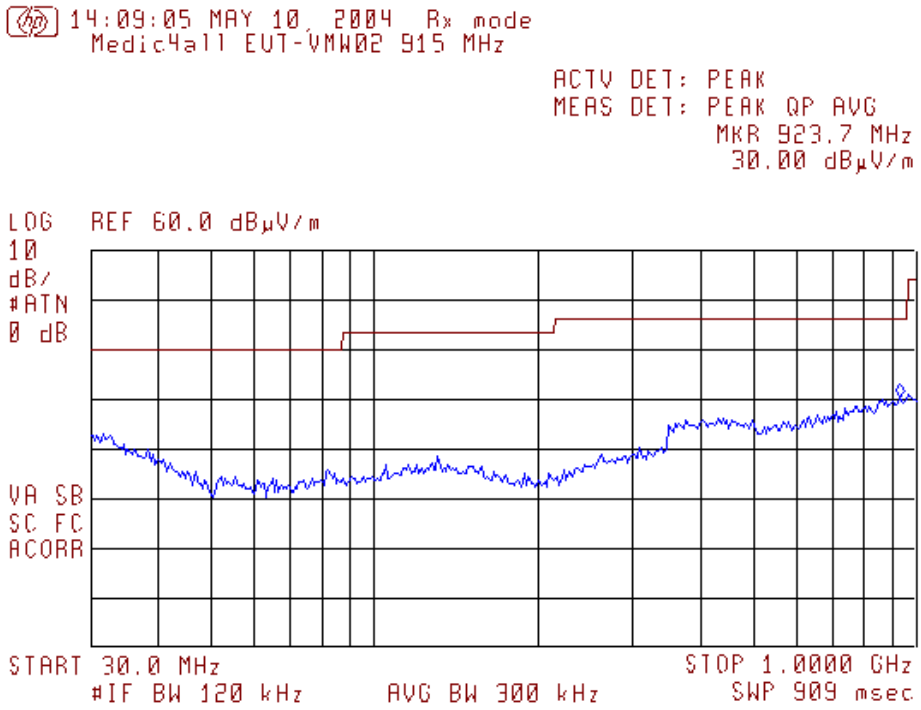
Initial scan:	
Detector type	Peak
Mode	Max hold
Bandwidth	120 kHz
Step size	Continuous sweep
Sweep time	>1 seconds/MHz

Measurements:	
Detector type	Quasi-peak (CISPR)
Bandwidth	120 kHz
Measurement time	20 seconds/MHz
Observation	>15 seconds

2.4.4. Radiated emission test results:

All received emissions from the EUT were found at least 20 dB below FCC Part 15 Subpart B Section 15.109 Class B / Subpart C Section 15.209 specified limits.

Preliminary test results are presented in Plot # 1 below.



Plot # 1. Rx mode. Scan of preliminary radiated test

2.5. Test of field strength of emission from intentional radiators

2.5.1. General:

Per FCC Part 15 Subpart C Clauses 15.249 (a) and 15.205.

2.5.2. Requirements:

The EUT's operation frequency is within the bands 902 – 928 MHz.
The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limits that presented in table below:
.

Fundamental Frequency	Limit of Field Strength of Fundamental (millivolts/ meter)	Calculated limit Field Strength of Fundamental dBμV/m, @ 3 m	Limit of Field Strength of Harmonics (microvolts/ meter)	Calculated limit Field Strength of Harmonics dBμV/m, @3 m
902 – 928 MHz	50	94	500	54

Note: Peak field strength of Harmonics not exceed the maximum permitted AVG specified limit above by more than 20 dB.

2.5.3. Test procedure:

The test was conducted according to clause 15.249 (a).
The measurements were conducted at the normal conditions.
The Fundamental frequency was recorded (see Plot # 2).
The measurements (spurious emission) were performed in Tx mode in the frequency rage from 30 MHz to 6500 MHz (with detector QP – below 1000 MHz and AVG detector – above 1000 MHz).

2.5.4. Test results:

Recorded Fundamental frequency was 93.48 dBμV/m (see Plot # 2).
The result was found below specified limit.

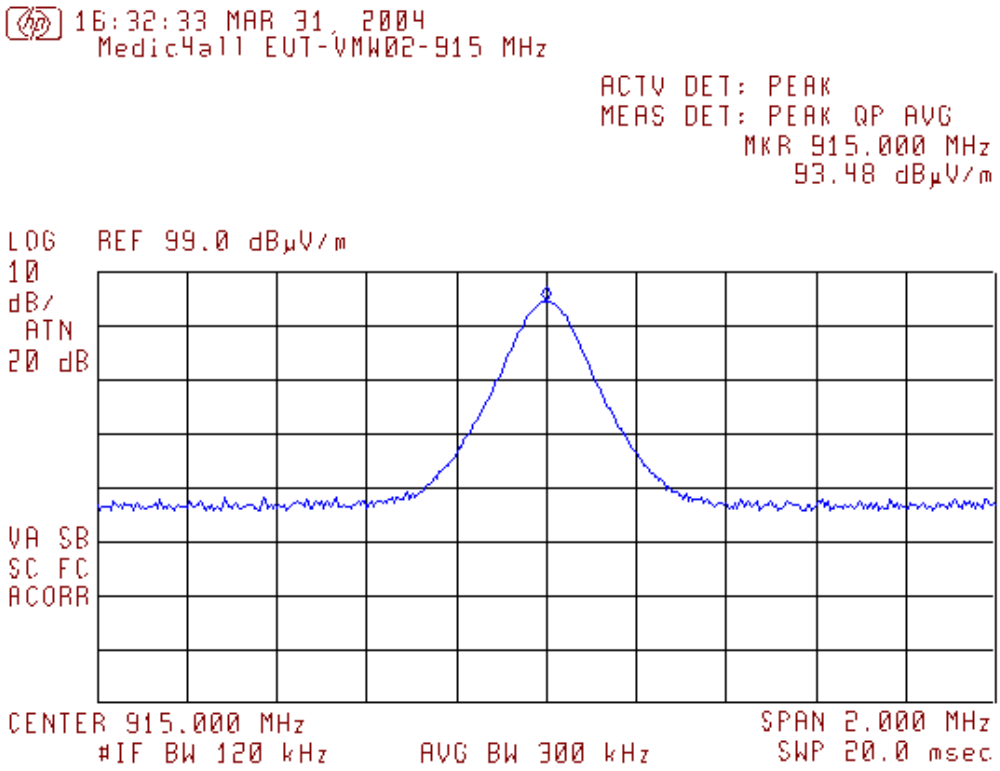
All received spurious emissions were found below specified limits.
Test results are presented in Plots #3-#5 – for Tx mode and Plot # 6 – for Rx mode.

Frequency MHz	AVG Ampl. dBμV/m	AVG limit, dBμV/m	Margin, dB	Reference Plot
1829.995	44.9	53.9	.-9.0	Plot # 5
2745.01	45.1	54.0*	-7.9	Plot # 5

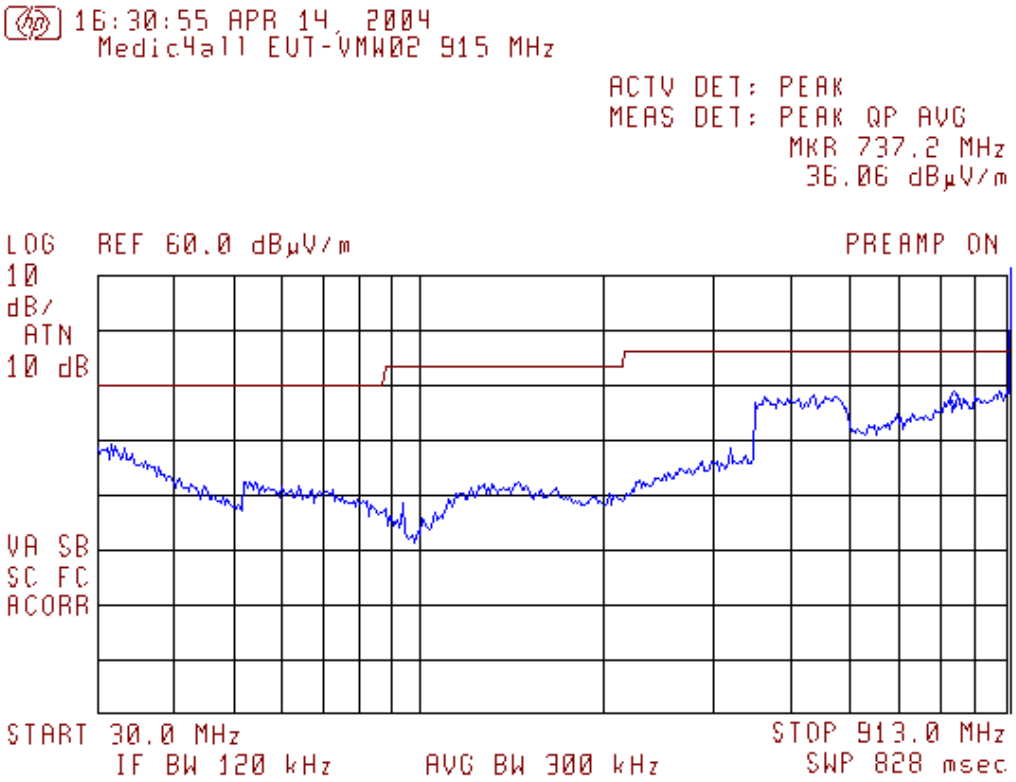
* Limit specified per FCC Subpart C Section 15.205: “Restricted bands of operation”.

2.5.5. Test summery:

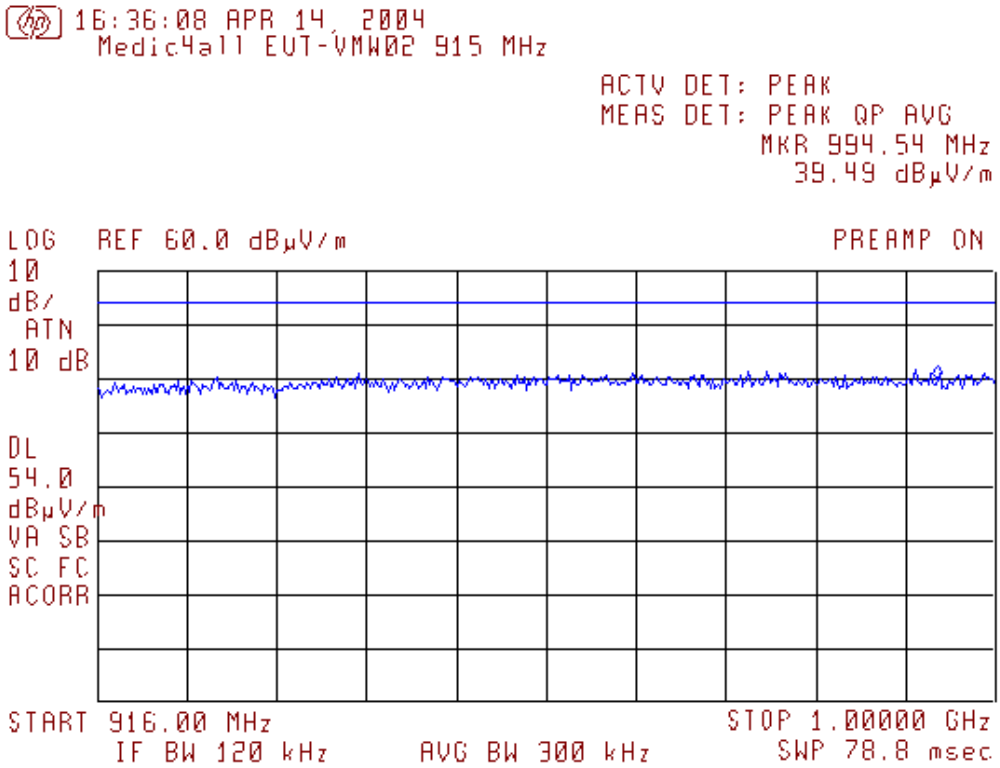
The tested unit meets the standard requirement.



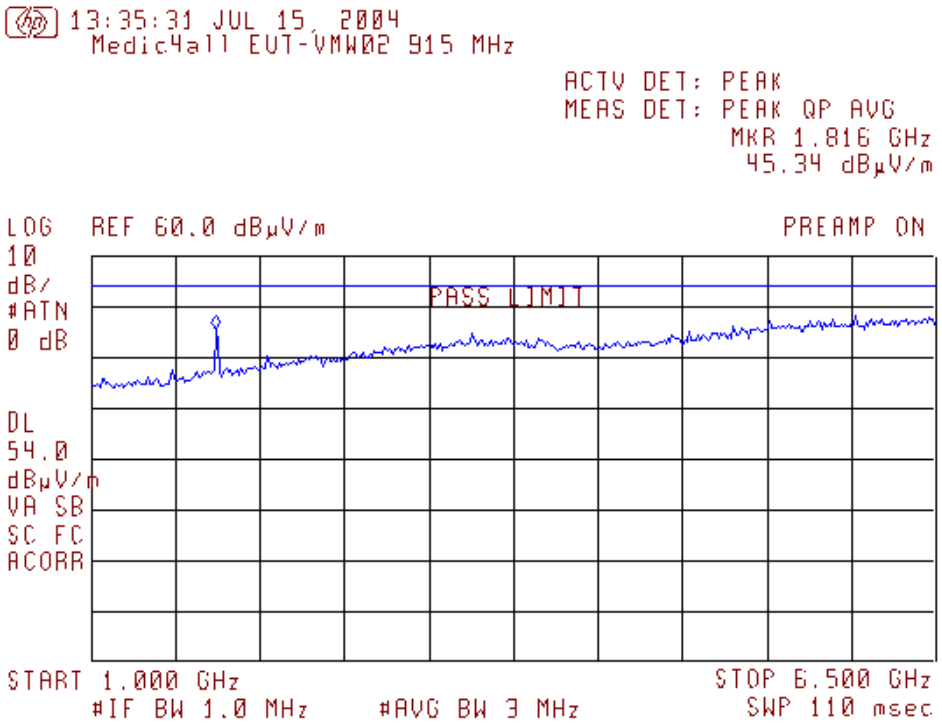
Plot # 2. Scan of Fundamental frequency



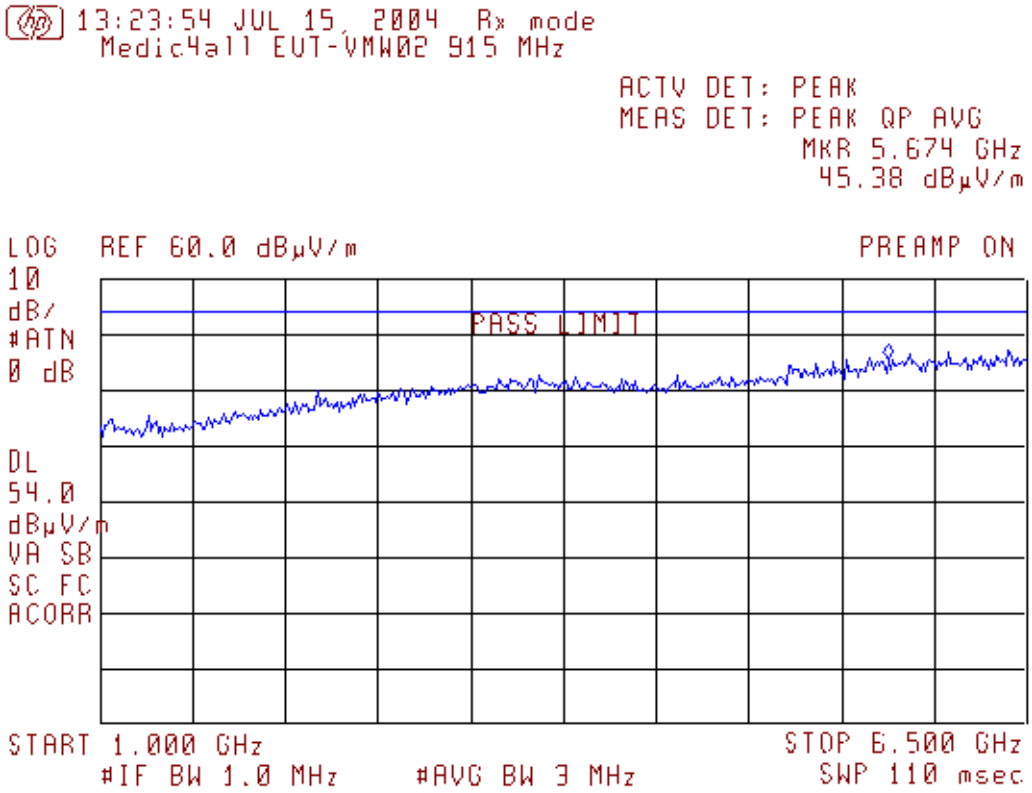
Plot # 3. Tx mode. Spurious emissions
Frequency range from 30.0 MHz to 913.0 MHz



Plot # 4. Tx mode. Spurious emissions
Frequency range from 916.8 MHz to 1000 MHz



Plot # 5. Tx mode. Spurious emissions
Frequency range from 1000 MHz to 6500 MHz



Plot # 6. Rx mode. Spurious emissions
Frequency range from 1000 MHz to 6500 MHz

3. Test summary

Parameter	FCC Part 15 Reference paragraph	Comply/not comply with the requirements
Radiated emission Frequencies range of 30 -1000 MHz	Subpart B Section 15.109 Class B	Comply
	Subpart C Section 15.209	Comply
Test of field strength of emission from intentional radiators	"Radiated Emission Limits, Additional Provisions"; Section 15.249(a).	Comply
Test of field strength of emission from intentional radiators, restricted bands	Subpart C Section 15.205	Comply

Telematics Laboratory

22 July 2004

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch

Name: Michael Feldman
Position: Test Technician

Written by: Rotenfeld Mariya

Position: Technical Writer

4. Appendix 1. Test equipment used

All measurements equipment is on SII calibration schedule with a recalibration interval not exceeding one year.

FCC Part 15 Subpart B Section 15.109 / Subpart C Section 15.209

Instrument	MFR	Model	Serial No.	Last calibration date	Next calibration date
EMI Receiver	HP	8546A+85460A	SII 4068	11/03	11/04
LISN 9 kHz – 30 MHz	FCC	LISN-50/250-32-4-16	SII 5023	05/04	05/05
Transient limiter 0.009-200 MHz	HP	11947A	31074A3105	05/04	05/05
Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 2531	12/03	12/04
Antenna Mast	R&S	HCM	100002	N/A	N/A
Metallic turntable	R&S	HCT12	100001	N/A	N/A
Positioning controller	R&S	HCC	100002	N/A	N/A

FCC Part 15 Subpart C Sections 15.249 and 15.205

Instrument	MFR	Model	Serial No.	Last calibration date	Next calibration date
EMI Receiver 10 kHz - 26.5 GHz	HP	E7405A	SII 4944	01/04	01/05
Antenna Bilog 30-2000 MHz	Schaffner-Chase	CBL6112B	SII5119	10/03	10/04
Antenna Double Ridge, 1-18 GHz	EMCO	3115	SII4873	10/03	10/04

5. Appendix 2: Antenna Factor and Cable Loss

Cable Loss (10m cable + Mast)

Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.53	21	1000	3.68
2	50	0.75	22	1100	3.82
3	100	1.08	23	1200	4.07
4	150	1.39	24	1300	4.24
5	200	1.61	25	1400	4.43
6	250	1.752	26	1500	4.6
7	300	2.00	27	1600	4.7
8	350	2.15	28	1700	4.85
9	400	2.26	29	1800	4.98
10	450	2.383	30	1900	5.19
11	500	2.52	31	2000	5.34
12	550	2.606	32	2100	5.51
13	600	2.75	33	2200	5.69
14	650	2.856	34	2300	5.89
15	700	3.06	35	2400	6.07
16	750	3.201	36	2500	6.22
17	800	3.27	37	2600	6.28
18	850	3.38	38	2700	6.41
19	900	3.46	39	2800	6.53
20	950	3.55	40	2900	6.84

Table 2. Antenna Factor

For Biconilog Antenna, Model Number: CBL-6112B, S/N: 2531
10 m Calibration

Horizontal Polarization				Vertical Polarization			
Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)
30	19.7	725	19.7	30	17.6	725	19.8
40	13.8	750	20.1	40	16.1	750	20.0
50	8.5	775	20.1	50	8.2	775	20.0
60	6.3	800	20.1	60	6.0	800	20.1
70	6.4	825	20.3	70	6.2	825	20.3
80	7.2	850	20.5	80	7.7	850	20.6
90	9.1	875	20.7	90	9.2	875	20.8
100	10.8	900	20.7	100	10.6	900	20.9
110	11.7	925	20.9	110	11.4	925	21.0
120	12.0	950	21.0	120	11.7	950	21.2
130	11.8	975	21.4	130	11.8	975	21.3
140	11.3	1000	21.5	140	11.3	1000	21.4
150	10.5	1050	22.0	150	10.4	1050	21.9
160	10.0	1100	22.2	160	9.8	1100	22.2
170	9.6	1150	22.7	170	9.4	1150	22.6
180	9.2	1200	23.2	180	9.4	1200	23.1
190	9.0	1250	23.6	190	9.6	1250	23.5
200	9.3	1300	24.0	200	9.9	1300	23.8
225	9.8	1350	24.1	225	10.5	1350	24.0
250	12.7	1400	24.6	250	12.6	1400	24.3
275	12.9	1450	24.9	275	13.2	1450	24.7
300	13.3	1500	25.1	300	13.4	1500	25.0
325	13.8	1550	25.2	325	13.8	1550	25.2
350	14.6	1600	25.4	350	14.6	1600	25.3
375	15.0	1650	25.9	375	15.1	1650	25.8
400	15.9	1700	26.1	400	16.0	1700	26.0
425	16.6	1750	26.4	425	16.7	1750	26.2
450	16.8	1800	26.4	450	16.7	1800	26.4
475	17.5	1850	26.7	475	17.4	1850	26.7
500	17.7	1900	27.3	500	17.7	1900	27.3
525	18.0	1950	27.6	525	18.0	1950	27.3
550	19.3	2000	27.6	550	19.1	2000	27.7
575	19.4			575	19.1		
600	19.3			600	19.3		
625	19.7			625	19.5		
650	19.6			650	19.5		
675	19.5			675	19.5		
700	19.4			700	19.5		

Gain and Antenna Factor for Double Ridged Guide Antenna

Model Number: 3115, S/N 5802, manufactured by EMC Test Systems

1.0 meter calibration, Polarization: Horizontal, Calibrated on 30/Dec/03

Frequency (MHz)	Antenna Factor (dB/m)	Gain Numeric	Gain (dBi)
1,000.00	24.30	3.90	5.91
1,500.00	25.50	6.65	8.23
2,000.00	27.77	7.01	8.46
2,500.00	28.83	8.59	9.34
3,000.00	30.68	8.08	9.07
3,500.00	31.84	8.41	9.25
4,000.00	33.14	8.14	9.11
4,500.00	32.61	11.66	10.67
5,000.00	34.17	10.04	10.02
5,500.00	34.63	10.92	10.38
6,000.00	35.15	11.54	10.62
6,500.00	35.14	13.59	11.33
7,000.00	35.86	13.34	11.25
7,500.00	37.21	11.22	10.50
8,000.00	37.64	11.57	10.63
8,500.00	38.18	11.52	10.62
9,000.00	38.17	12.96	11.13
9,500.00	38.37	13.77	11.39
10,000.00	38.73	14.05	11.48
10,500.00	38.79	15.30	11.85
11,000.00	38.98	16.06	12.06
11,500.00	39.77	14.63	11.65
12,000.00	39.58	16.64	12.21
12,500.00	39.51	18.36	12.64
13,000.00	40.87	14.50	11.61
13,500.00	41.46	13.65	11.35
14,000.00	42.04	12.85	11.09
14,500.00	41.42	15.90	12.01
15,000.00	39.78	24.84	13.95
15,500.00	38.55	35.25	15.47
16,000.00	38.90	34.65	15.40
16,500.00	39.84	29.65	14.72
17,000.00	42.09	18.76	12.73
17,500.00	45.12	9.89	9.95
18,000.00	46.90	6.94	8.42

Gain and Antenna Factor for Double Ridged Guide Antenna

Model Number: 3115, S/N 5802, manufactured by EMC Test Systems
1.0 meter calibration, Polarization: Vertical, Calibrated on 30/Dec/03

Frequency (MHz)	Antenna Factor (dB/m)	Gain Numeric	Gain (dBi)
1,000.00	24.08	4.10	6.13
1,500.00	25.63	6.46	8.10
2,000.00	27.88	6.85	8.35
2,500.00	29.01	8.23	9.15
3,000.00	30.65	8.12	9.10
3,500.00	32.01	8.09	9.08
4,000.00	33.07	8.28	9.18
4,500.00	32.81	11.14	10.47
5,000.00	34.09	10.22	10.10
5,500.00	34.84	10.43	10.18
6,000.00	34.97	12.02	10.80
6,500.00	35.34	12.98	11.13
7,000.00	36.33	11.98	10.78
7,500.00	37.54	10.41	10.17
8,000.00	37.82	11.11	10.46
8,500.00	38.28	11.28	10.52
9,000.00	38.33	12.48	10.96
9,500.00	38.55	13.22	11.21
10,000.00	38.76	13.98	11.45
10,500.00	38.65	15.79	11.98
11,000.00	39.06	15.76	11.97
11,500.00	39.63	15.10	11.79
12,000.00	39.52	16.87	12.27
12,500.00	39.57	18.09	12.57
13,000.00	40.80	14.74	11.69
13,500.00	41.76	12.77	11.06
14,000.00	42.10	12.67	11.03
14,500.00	41.49	15.66	11.95
15,000.00	40.02	23.49	13.71
15,500.00	38.40	36.41	15.61
16,000.00	38.23	40.40	16.06
16,500.00	39.71	30.55	14.85
17,000.00	41.86	19.75	12.96
17,500.00	44.89	10.42	10.18
18,000.00	46.26	8.05	9.06