Advanced
Compliance Laboratory

6 Randolph Way
Hillsborough, NJ 08844
Tel: (908) 927 9288
Fax: (908) 927 0728

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

FM TRANSMITTER
MODEL: AIR-WAVE
FCC ID: TH6AIR-WAVE

July 1, 2005

This report concerns (check one): Original grant __x__ Class II change _____
Equipment type: Low Power Intentional Radiator

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__
If yes, defer until: _____ (date)
Company agrees to notify the Commission by _____ (date)
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? yes _____ no __x__
If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision.

Report prepared for:	Zoltrix International Limited
Report prepared by:	Advanced Compliance Lab
Report number:	0048-041108-04

NVLAP®

The test result in this report IS supported and covered by the NVLAP accreditation

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1. GENERAL INFORMATION

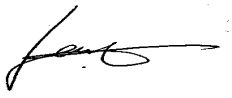
1.1 Verification of Compliance

EUT:	FM TRANSMITTER
Model:	AIR-WAVE
Applicant:	ZOLTRIX INTERNATIONAL LIMITED RM 401, Po Hing Centre, 18 Wang Chu Road Kowloon Bay, Hong Kong
Test Type:	FCC Part 15C CERTIFICATION
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	July 1, 2005
Report Number:	0048-041108-04

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	±2.36	±2.99	±1.83



Wei Li
Lab Manager
Advanced Compliance Lab

Date: July 1, 2005

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	FM TRANSMITTER AIR-WAVE (1)	TH6AIR-WAVE	
Housing	PLASTICS		
Power Supply	1.5V DC Battery / 5V DC		
Clock/OSC Freq.	98.0-107.8 MHz		
Receiver	Common FM Receiver		

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated May 19, 1997 (Refer to: 31040/PRV 1300F2). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

Manufacture	Model	Serial No.	Description	Last Cal dd/mm/yy	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	12/01/05	12/01/06
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	12/02/05	12/02/06
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	09/02/05	09/02/06
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	23/08/04	23/08/05
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	23/08/04	23/08/05
EMCO	6502	2665	10KHz-30MHz Active Loop Antenna	27/02/05	27/02/06
EMCO	3115	4945	Double Ridge Guide Horn Antenna	11/08/04	11/08/05

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING

FCC ID: TH6AIR-WAVE

This device complies with part 15 of the FCC Rules. Operating is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 2.1 FCC ID Label (Statement may be shown in its user manual)

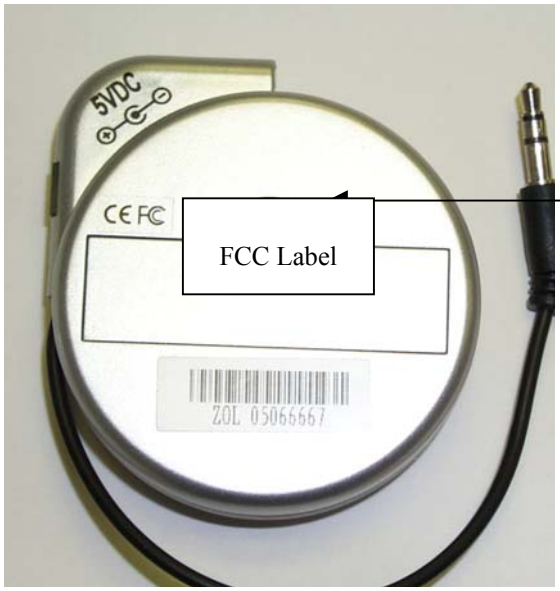


Figure 2.2 FCC ID Label Location

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT.

Testing was performed as EUT was operated at frequencies of Low, Mid, High channels: 98MHz, 103MHz and 107.8MHz with battery and AC/DC adaptor. The worst case, High Channel operation (107.8MHz) with AC/DC adaptor, was recorded as final result. During the test, the max. audio input signal was provided.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 to Figure 3.8 illustrate this system, which is tested standing along.

Figure 3.1 Radiated Test Setup, position 1-X

Figure 3.2 Radiated Test Setup, position 2-Y

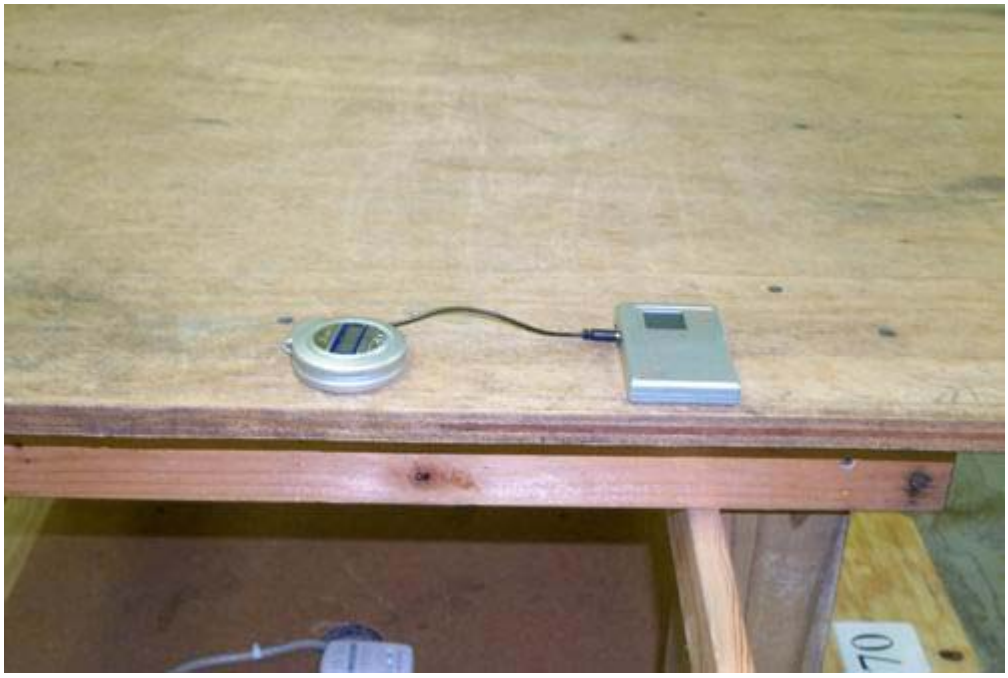


Figure 3.3 Radiated Test Setup, position 3-Z

Figure 3.4 Radiated Test Setup, position 1-X (DC Power)

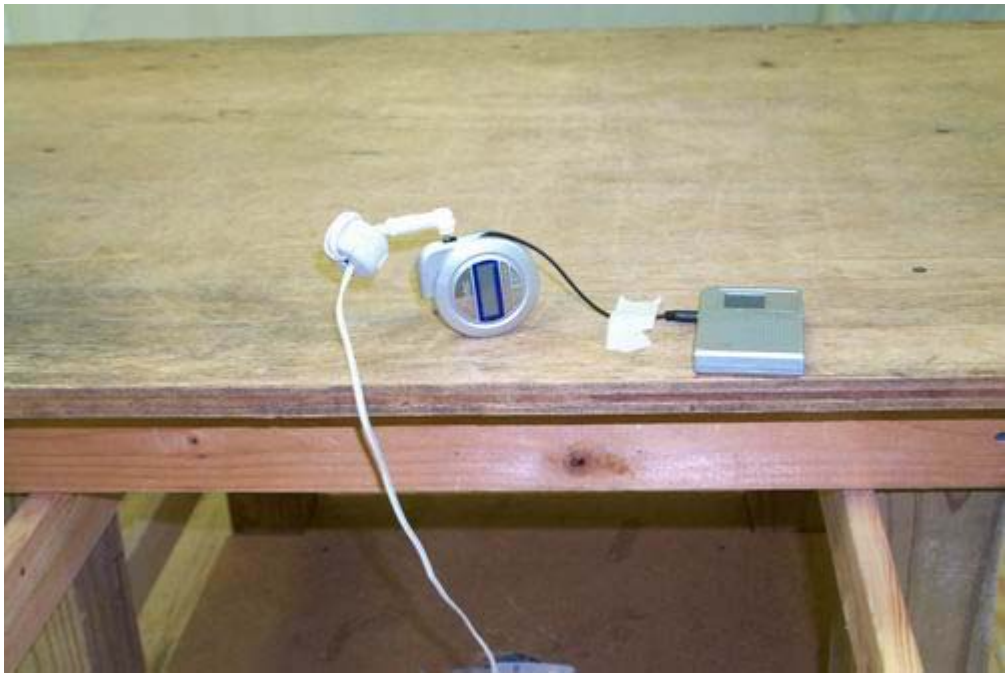


Figure 3.5 Radiated Test Setup, position 2-Y(DC Power)

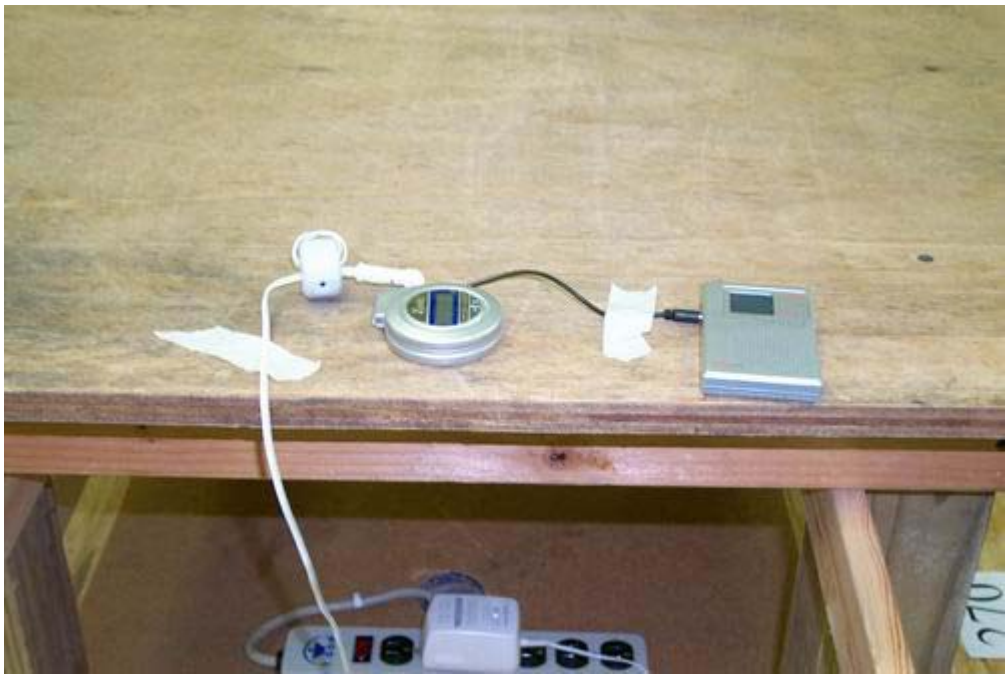


Figure 3.6 Radiated Test Setup, position 3-Z (DC Power)

Figure 3.7 Conducted Setup- Front

Figure 3.8 Conducted Setup- Rear

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. CONDUCTED EMISSION DATA

5.1 Test Methods and Conditions

The EUT was under normal operational mode during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. Recorded data was sent to the plotter to generate output in linear format. At the input of the spectrum analyzer, a HP transient limiter is inserted for protective purpose. This limiter has a 10 dB attenuation in the range of 150KHZ to 30MHZ. That factor was automatically compensated by the receiver, so the readings are the corrected readings. The reference of the plot is the FCC Class B limit 250 μV in Figure 5.1 through Figure 5.2.

5.2 Test Data

Figure 5.1 through Figure 5.2 show the neutral and line conducted emissions for the operation mode.

Test Personnel:

Tester Signature: _____ Date: July 1, 2005

Typed/Printed Name: Edward Lee

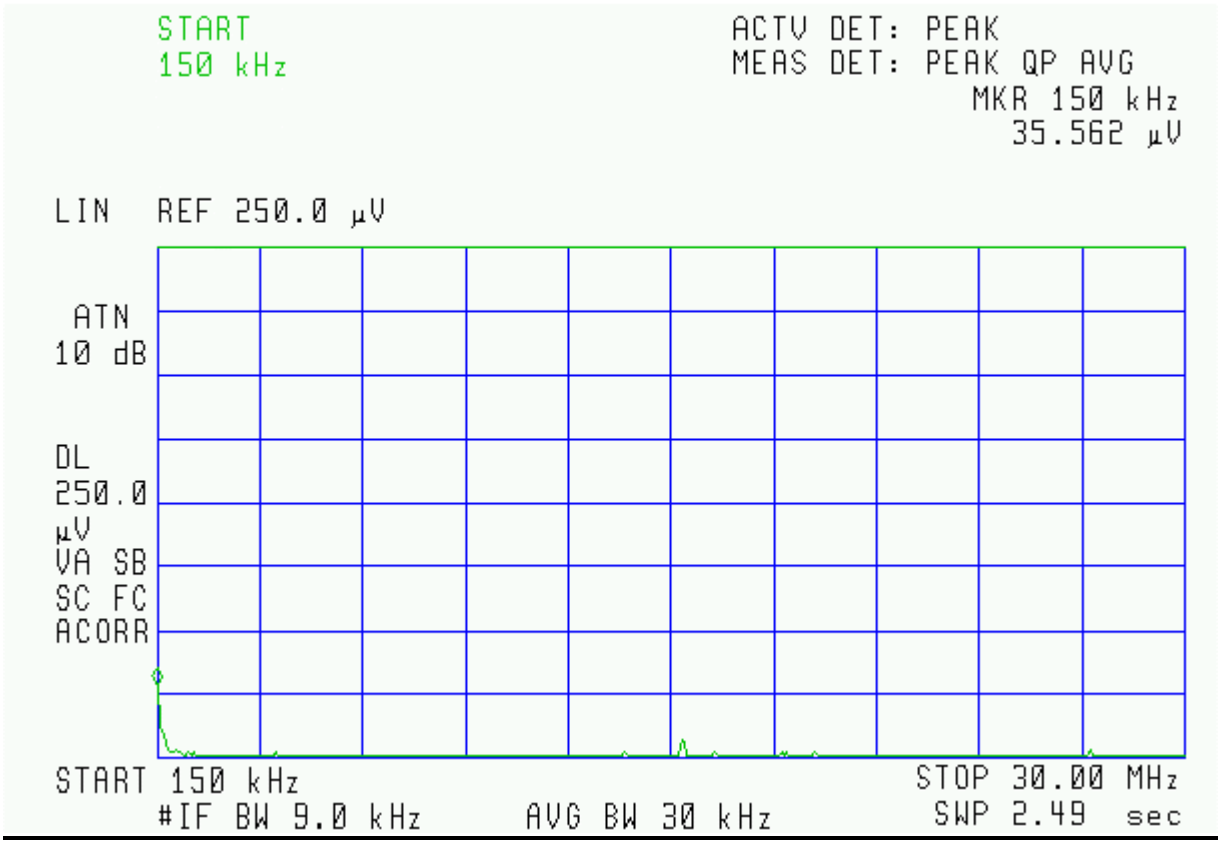


Fig. 5.1 Conducted Emission-Line

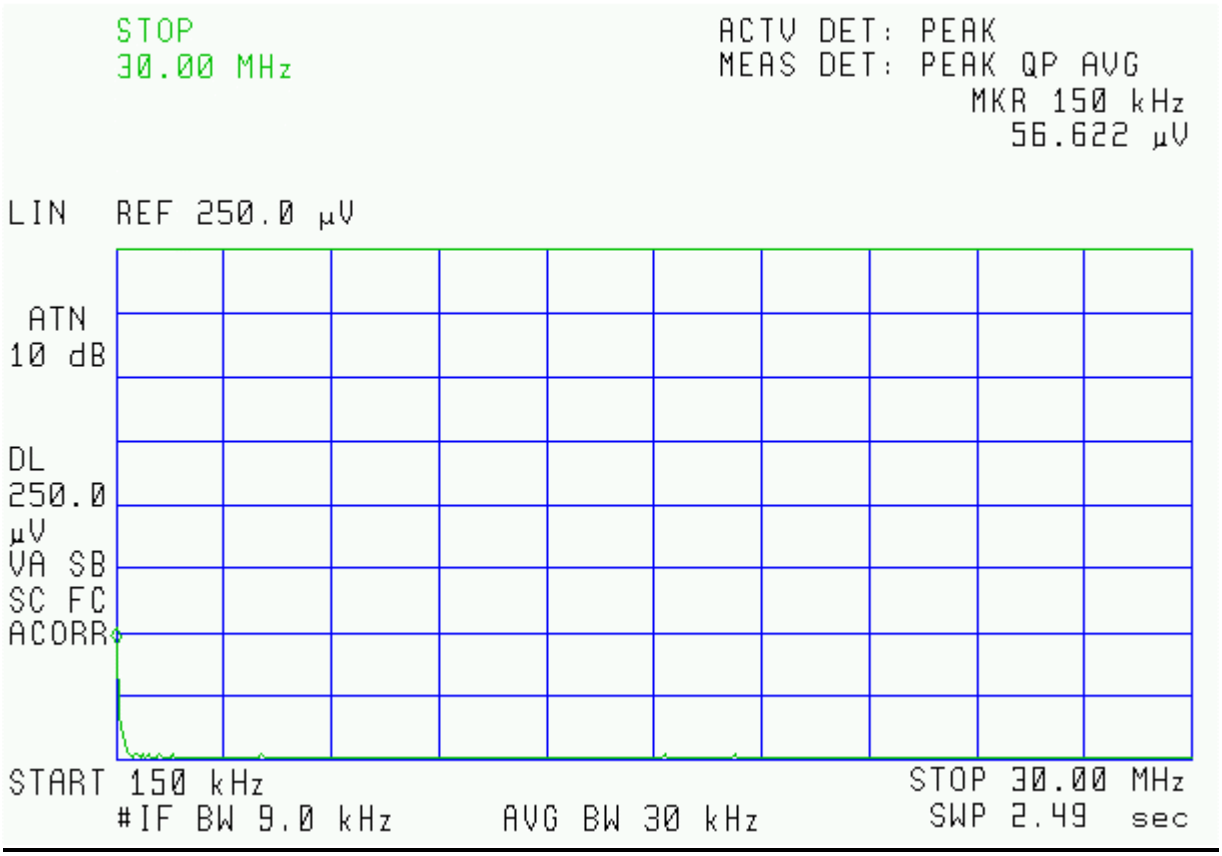


Fig. 5.2 Conducted Emission- Neutral

6. RADIATED EMISSION DATA

6.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
AF: Antenna Factor in dB/m
CF: Cable Attenuation Factor in dB
AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

6.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 120KHz IF bandwidth / 120KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10^{th} harmonics were investigated.

6.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 6.1.

Emissions at the lowest operation frequency (98.0MHz), middle frequency (103.0MHz) and highest frequency (107.8MHz) were investigated.

Test Personnel: _____

Typed/Printed Name: Edward Lee Date: July 1, 2005

Radiated Test Data @107.8MHz Operation (High Channel)

Frequency (MHz)	Polarity [H or V], Position [X,Y,Z]	Height (m)	Azimuth (Degree)	Peak Reading (dBμV/m)	FCC 3m Limit(1) (dBμV/m)	Difference from limit (dB)
107.8	H-X(2)	1.4	20	46.0*	48.0	-2
107.8	H-X	1.4	20	51.0	68.0	-19
215.6	H-X	1.4	20	39.4	43.5	-4.1
323.4	H-X	1.4	30	37.5	46.0	-8.5
107.8	V-X	1.2	10	47.2*	48.0	-0.8
107.8	V-X	1.2	10	52.0	68.0	-16
215.6	V-X	1.2	10	40.0	43.5	-3.5
323.4	V-X	1.2	20	38.9	46.0	-7.1
431.2	V-X	1.2	10	39.0	46.0	-7
107.8	H-Y	1.3	30	46.7*	48.0	-1.3
107.8	H-Y	1.3	30	51.8	68.0	-16.2
215.6	H-Y	1.3	30	40.2	43.5	-3.3
323.4	H-Y	1.3	30	39.6	46.0	-6.4
431.2	H-Y	1.3	20	39.1	46.0	-6.9
431.2	H-Y	1.3	20	39.1	46.0	-6.9
107.8	V-Y	1.2	20	45.0*	48.0	-3
107.8	V-Y	1.2	20	50.0	68.0	-18
215.6	V-Y	1.2	20	38.7	43.5	-4.8
323.4	V-Y	1.1	30	39.5	46.0	-6.5
107.8	H-Z	1.4	30	45.6*	48.0	-2.4
107.8	H-Z	1.4	30	50.1	68.0	-17.9
215.6	H-Z	1.3	40	40.4	43.5	-3.1
323.4	H-Z	1.3	30	37.3	46.0	-8.7
107.8	V-Z	1.2	20	46.8*	48.0	-1.2
107.8	V-Z	1.2	20	50.9	68.0	-17.1
215.6	V-Z	1.2	10	39.8	43.5	-3.7
323.4	V-Z	1.1	20	38.0	46.0	-8
431.2	V-Z	1.1	10	38.7	46.0	-7.3

(1) The average limit of emission strength within permitted 200kHz band is 250uV/m @3m (48dBuV/m) between 88-108MHz per Section 15.239 (b). In this case, maximum peak reading of the emissions is under the limit.
(2) See Figure 3.1, 3.2 and 3.3 for definition of position X, Y, Z.

*-----Average reading

Radiated Test Data @103.0MHz Operation (Mid Channel)
(only the worst emission at each frequency is recorded)

Frequency (MHz)	Polarity [H or V], Position [X,Y,Z]	Height (m)	Azimuth (Degree)	Peak Reading (dBμV/m)	FCC 3m Limit[1] (dBμV/m)	Difference from limit (dB)
103.0	H-X[2]	1.3	30	46.0*	48.0	-2
103.0	H-X	1.3	30	.50.8	68.0	-17.2
206.0	H-X	1.3	30	40.2	43.5	-3.3
309.0	H-X	1.3	20	37.6	46.0	-8.4
103.0	V-X	1.2	20	46.1*	48.0	-1.9
103.0	V-X	1.2	20	51.1	68.0	-16.9
206.0	V-X	1.2	10	39.4	43.5	-4.1
309.0	V-X	1.2	20	38.7	46.0	-7.3
412.0	V-X	1.2	20	39.0	46.0	-7

Radiated Test Data @98.0MHz Operation (Low Channel)
(only the worst emission at each frequency is recorded)

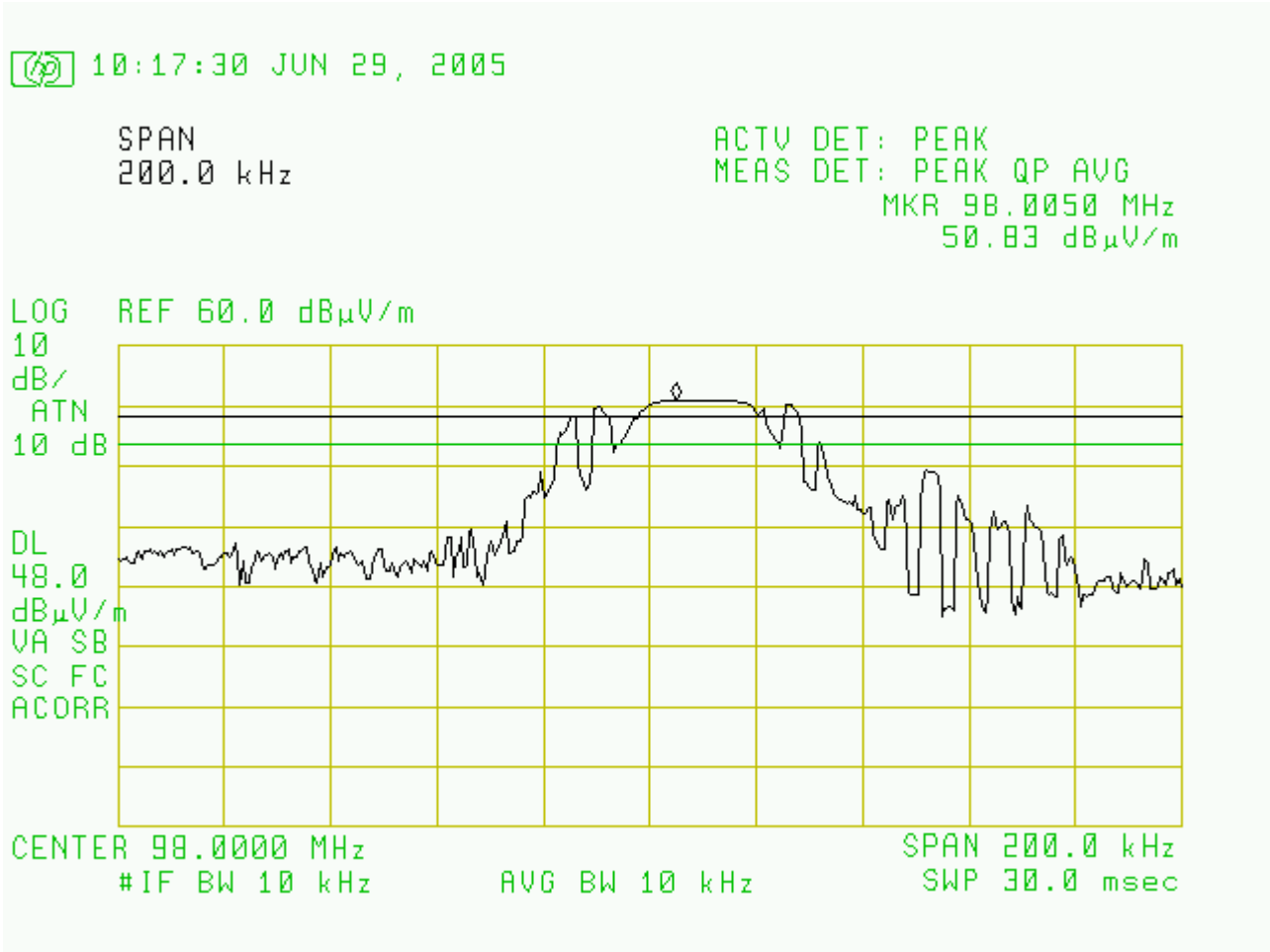
Frequency (MHz)	Polarity [H or V], Position [X,Y,Z]	Height (m)	Azimuth (Degree)	Peak Reading (dBμV/m)	FCC 3m Limit[1] (dBμV/m)	Difference from limit (dB)
98.0	H-Y[2]	1.4	20	45.8*	48.0	-2.2
98.0	H-Y	1.4	20	50.6	68.0	-17.4
196.0	H-Y	1.3	30	39.5	43.5	-4
294.0	H-Y	1.2	30	37.6	46.0	-8.4
98.0	V-X	1.2	20	46.0*	48.0	-2
98.0	V-X	1.2	20	50.9	68.0	-17.1
196.0	V-X	1.2	10	40.0	43.5	-3.5
294.0	V-X	1.1	10	37.5	46.0	-8.5

6.4 Occupied Bandwidth

Emissions from the EUT shall be confined within a band 200 kHz wide centered on the operating frequency. The 200kHz band shall lie wholly within the frequency range of 88-108MHz.

In this case, maximum peak reading of the emissions for outside of 88-108MHz is under the limit in Section 15.209.

The "green" limit lines in the plots are to demonstrate the compliance for frequency range outside 88-108MHz only. Within 88-108MHz, the "black" limit lines were used for demonstrating the compliance with the limit in 15.239(b), 48dBuV/m (average reading).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MEAS DET: PEAK QP AVG
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50.83 dBµV/m
LOG REF 60.0 dBµV/m
10
dB/
ATN
10 dB
DL
48.0
dBµV/m
VA SB
SC FC
ACORR
CENTER 98.0000 MHz
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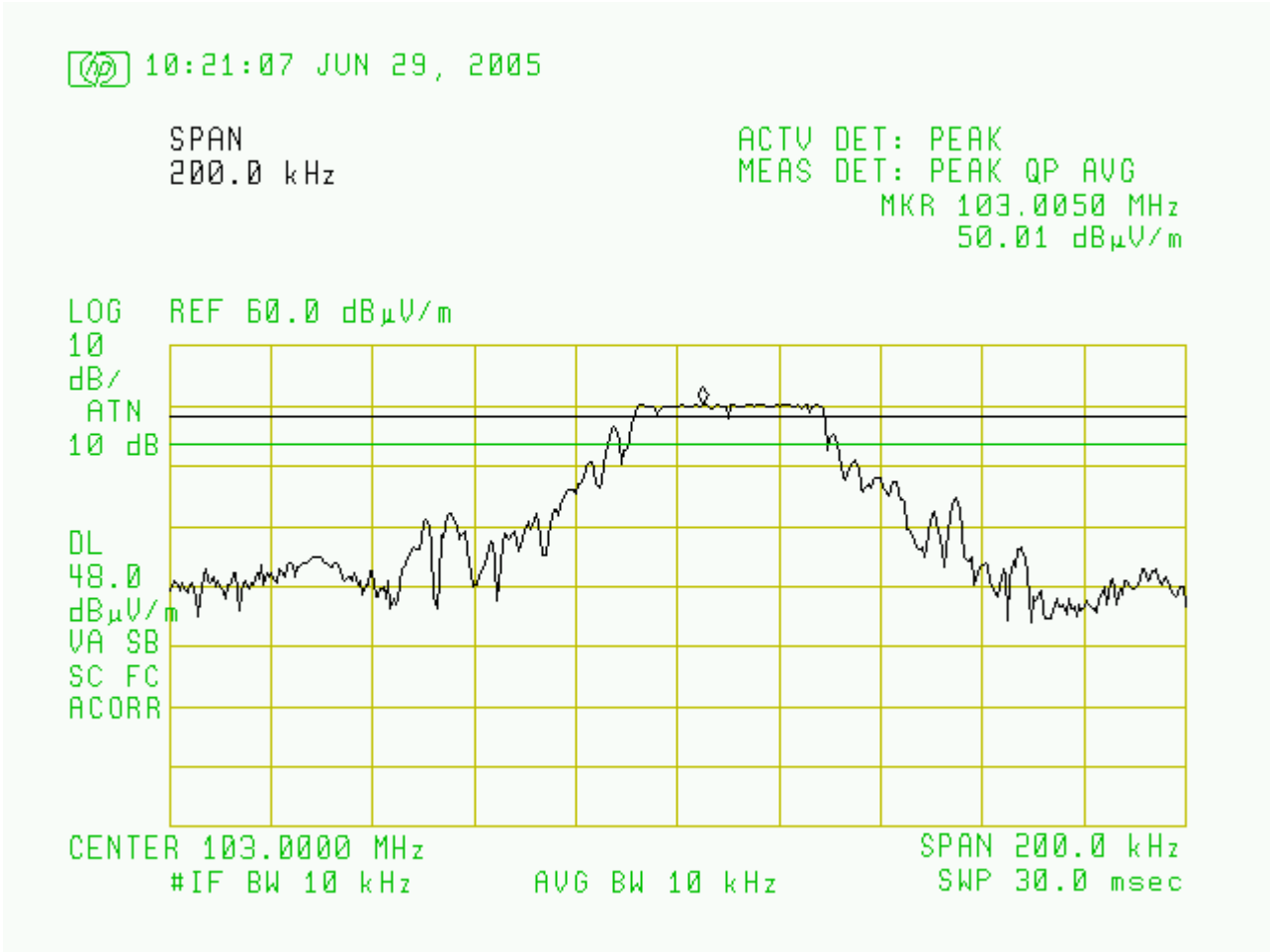
AVG BW 10 kHz
SPAN 200.0 kHz
SWP 30.0 msec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dB/
ATN
10 dB
DL
48.0
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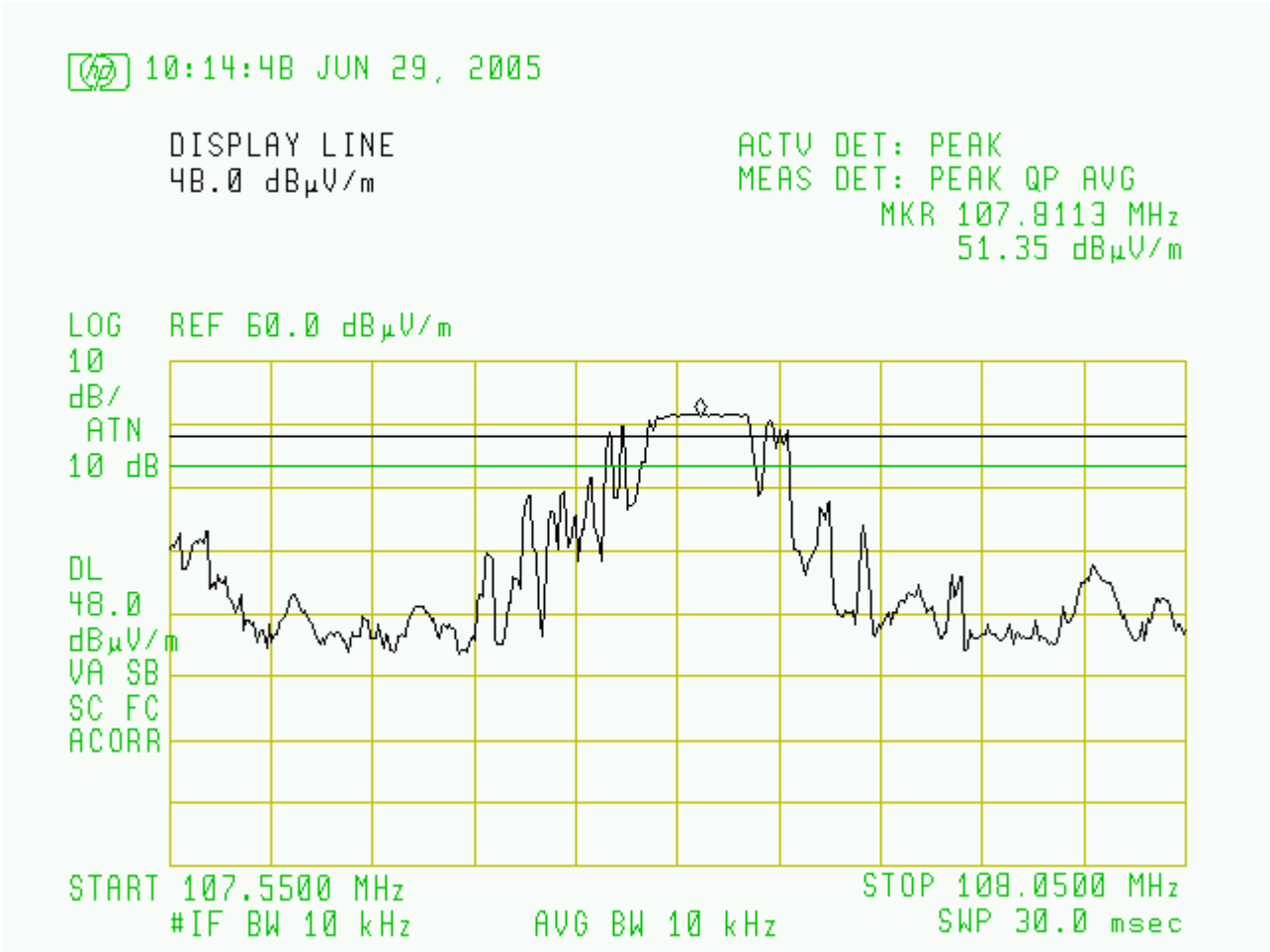

Figure 6.1 Occupied Bandwidth (Low, Mid, High channels)

7. PHOTOS OF TESTED EUT

The following photos show the inside details of the EUT.