

**DIGITAL EMC CO., LTD.**

683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

Tel: +82-31-321-2664 Fax: +82-31-321-1664

<http://www.digitalemccom>**CERTIFICATION OF COMPLIANCE****Diasonic Technology Co., Ltd.**#321-43, Suksu-dong, Manan-ku, Anyang-city,  
Kyungki-do, Korea.

Dates of Tests: June 13~16, 2005

Test Report S/N: DR50110607D

Test Site : DIGITAL EMC CO., LTD.

FCC ID

**P7KDNA100**

APPLICANT

**Diasonic Technology Co., Ltd.**

**FCC Classification** : **Low Power Communication Device Transmitter**  
**Device name** : **Navigation & Multimedia Player**  
**Manufacturer** : **Diasonic Technology Co., Ltd.**  
**Model / Brand name** : **DNA-100**  
**Test Device Serial number** : **Identical prototype**  
**FCC Rule Part(s)** : **FCC Part 15 Subpart C**  
**ANSI C 63.4-2003**  
**Frequency Range** : **88.1 ~ 99.9 MHz**  
**Data of issue** : **July 20, 2005**

I attest to the accuracy of data. All measurements reported herein 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.



NVLAP LAB CODE 200559-0

## TABLE OF CONTENTS

1. GENERAL INFORMATION	-----	3
2. INFORMATION ABOUT TEST ITEM	-----	4
3. TEST REPORT	-----	6
3.1 SUMMARY OF TESTS	-----	6
3.2 TEST REQUIREMENTS	-----	7
3.2.1 FIELD STRENGTH OF FUNDAMENTAL AND EMISSIONS WITHIN PERMITTED BAND. --		7
3.2.2 RADIATED EMISSIONS	-----	8
3.2.3 AC CONDUCTED EMISSION	-----	10
3.2.4 OCCUPIED CHANNEL BANDWIDTH	-----	11
3.2.5 ANTENNA REQUIREMENT	-----	14
APPENDIX I TEST EQUIPMENT USED FOR TESTS	-----	15

## 1. General Information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080

<http://www.digitalemc.com> E-mail : demc@unitel.co.kr

Tel: +82-31-321-2664 Fax: +82-31-321-1664

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".

This laboratory is accredited by NVLAP and NVLAP Lab. Code is 200559-0.

**Test By : Engineer**

July 20, 2006

Won -Jung LEE

Data

Name

Signature

**Report Reviewed By: Manager**

July 20, 2006

Harvey Sung

Data

Name

Signature

Ordering party:

Company name : Diasonic Technology Co., Ltd.  
 Address : #321-43, Suksu-dong, Manan-ku  
 Zip code : 430-040  
 City/town : Anyang-city, Kyungki-do  
 Country : Korea  
 Date of order : April 14, 2006  
 Attention : Jin-Geun, Moon

## 2. Information about test item

### P7KDNA100

#### 2.1 Equipment information

Equipment model name	DNA-100
Type of equipment	Navigation & Multimedia Player
Frequency band	88.1 ~ 99.9 MHz
Type of antenna	Line Antenna
Power	DC 12 V

#### 2.2 Cabling Configuration

EUT	Shield	Length (m)	Connection
AV IN 1	None	1.2	Termination
AV IN 2	None	1.2	Termination
Earphone	None	1.2	Termination
USB	None	1.2	Termination
UCS(HOST)	None	1.0	Termination
DC POWER	None	0.8	DC power supply

#### 2.3 Tested environment

Temperature	: 15 ~ 35 (°C)
Relative humidity content	: 20 ~ 75 %
Air pressure	: 86 ~ 103 kPa
Details of power supply	: DC 12.0 V (powered by power supply)

P7KDNA100

**2.4 Tested frequency**

Frequency	TX	RX
Low frequency	88.1 MHz	-
Middle Frequency	94.0 MHz	-
High frequency	99.9 MHz	-

Note: Measurements were performed top and bottom location in the frequency range of operation according to the section 15.31(m)

**2.5 EMI Suppression Device(s)/Modifications**

EMI suppression device(s) added and/or modifications made during testing

➔ None.

### 3. Test Report

#### 3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
15.239	Field Strength of Fundamental and Emissions within permitted band.	< 250 uV/m @ 3m	Radiated	C
15.209	Radiated Emission	< FCC 15.209 limits	Radiated	C
15.207	AC Conducted Emissions	< FCC 15.207 limits	Line Conducted	NA
15.239	Occupied channel bandwidth	< 200kHz	Radiated	C
15.203	Antenna Requirement	-	-	C
<p>Note 1: C=Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable</p> <p>Note 2: Conducted emission test is not applied, because the power of the EUT is supplied from a Car battery.</p> <p>Note 3: The sample was tested according to the following specification:</p> <p style="padding-left: 40px;">FCC Parts 15.239; ANSI C 63.4-2003</p>				

## 3.2 TEST requirements

### 3.2.1 Field Strength of Fundamental and Emissions within permitted band.

#### Procedure:

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part §15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded semi-anechoic chamber. An antenna was placed at 3m distance from EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed at 3m OATS.

Type of Test : Low Power Communication Device Transmitter  
 FCC ID : **P7KDNA100**  
 Operating Condition : Transmit the 1 kHz audio signal

#### Measurement Data:

Frequency (MHz)	Pol	Read Level (dBuV/m)	Probe Factor (dB)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
88.1	H	56.97	8.15	1.68	28.01	38.79	48	9.21
94.0	H	59.96	8.96	1.82	28.01	42.73	48	5.27
<b>99.9</b>	<b>H</b>	<b>62.00</b>	<b>9.87</b>	<b>2.00</b>	<b>28.00</b>	<b>45.87</b>	<b>48</b>	<b>2.13</b>

Note 1: Field Strength Calculation

Level = Read Level + Probe Factor + Cable Loss - Preamplifier Factor

Margin = Limit - Level

#### Minimum Standard:

The maximum Field Strength authorized within 200kHz is 250 uV/m@3m

### 3.2.2 Radiated Emission

**Procedure:**

The field strength of emissions from intentional radiators operated within the bands 88 ~108MHz was measured in accordance with FCC Part §15.239. The test set-up was made according to ANSI C 63.4:2003.

The EUT was placed on a 0.8m high wooden table inside a shielded semi-anechoic chamber. An antenna was placed at 3m distance from the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed at 3m OATS.

The spectrum analyzer is set to:

Frequency Range = 30 MHz ~ 10<sup>th</sup> harmonic.

RBW = 120 kHz ( 30MHz ~ 1 GHz)

VBW ≥ RBW

= 1 MHz (1 GHz ~ 10<sup>th</sup> harmonic )

Trace = max hold

Detector function = Peak

Sweep = auto

Receiver Detector = Quasi-Peak

Operating Condition: Transmit the 1 kHz audio signal from the test CD.

**Measurement Data: Comply**

- Refer to the next page.

**Minimum Standard: FCC Part 15.209(a)**

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

\*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

**Measurement Data 1 : Harmonics of the 88.1 MHz**

Frequency (MHz)	Pol	Read Level (dBuV/m)	Correction Factors (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
176.2	H	46.75	-8.45	38.3	43.5	5.2
-	-	-	-	-	-	-
-	-	-	-	-	-	-

**Measurement Data 2: Harmonics of the 94.0 MHz**

Frequency (MHz)	Pol	Read Level (dBuV/m)	Correction Factors (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
188.0	H	41.13	-8.43	32.7	43.5	10.8
-	-	-	-	-	-	-
-	-	-	-	-	-	-

**Measurement Data 3: Harmonics of the 99.9 MHz**

Frequency (MHz)	Pol	Read Level (dBuV/m)	Correction Factors (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
199.8	H	38.33	-8.53	29.8	43.5	13.7
-	-	-	-	-	-	-
-	-	-	-	-	-	-

**Measurement Data 4 : other emissions**

Frequency (MHz)	Pol	Read Level (dBuV/m)	Correction Factors (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
119.72	H	45.0	-13.16	31.84	43.5	11.66
158.52	H	38.0	-9.97	28.03	43.5	15.47
219.15	H	45.5	-7.67	37.83	46.0	8.17
-	-	-	-	-	-	-

**Note 1: Field Strength Calculation**

- Correction Factors = Antenna Factor + Cable Loss - AMP Gain
- Level = Read Level + Correction Factors
- Margin = Limit - Level

Note 2.: Up to the 10<sup>th</sup> harmonics were investigated according to 15.239 and the worst-case emissions are reported.

### 3.2.3 AC Conducted Emissions

#### Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its normal operating function. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

#### Measurement Data: Not Applicable

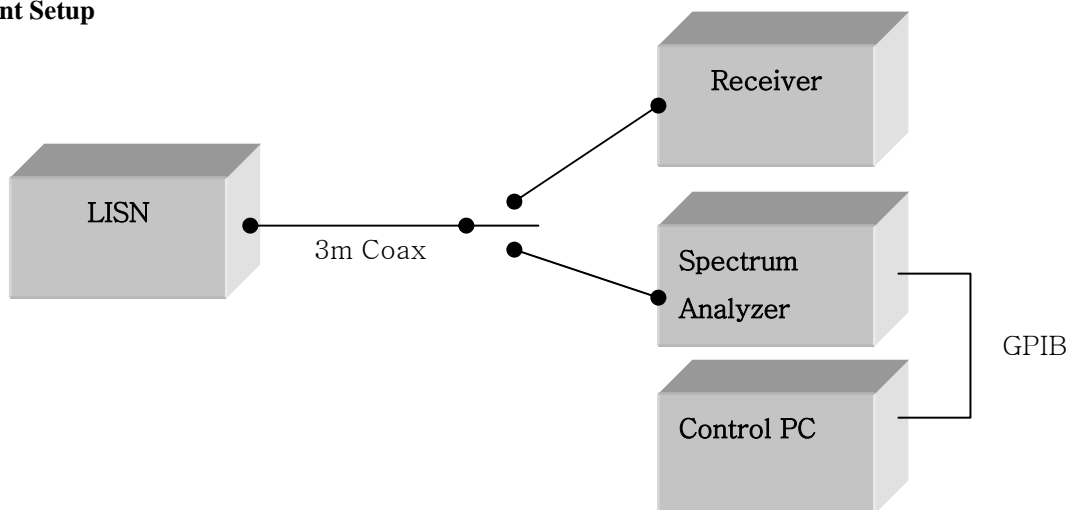
Conducted emission test is not applied because the power of the EUT is supplied from a Car battery. So it is not need to test this requirement,

#### Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

\* Decreases with the logarithm of the frequency

#### Measurement Setup



Measurement setup for AC Conducted Emission

### 3.2.4 Occupied Channel Bandwidth

**Procedure:**

The occupied channel Bandwidth is defined as the minimum declared bandwidth within which the transmitter's necessary bandwidth can be contained. The transmitter was adjusted to work at the selected channels. The occupied channel BW was measured at an amplitude level reduced from the reference level by the 26dB.

The plot is taken at 30kHz/division frequency span, 10kHz resolution bandwidth and 5dB/division amplitude logarithmic display from a spectrum analyzer.

The spectrum analyzer is set to:

Frequency Range =

RBW = 10 kHz

Trace = max hold

Sweep = auto

Operating Condition: Transmit 1kHz audio signal

VBW  $\geq$  RBW

Detector function = Peak

Span = 300 kHz

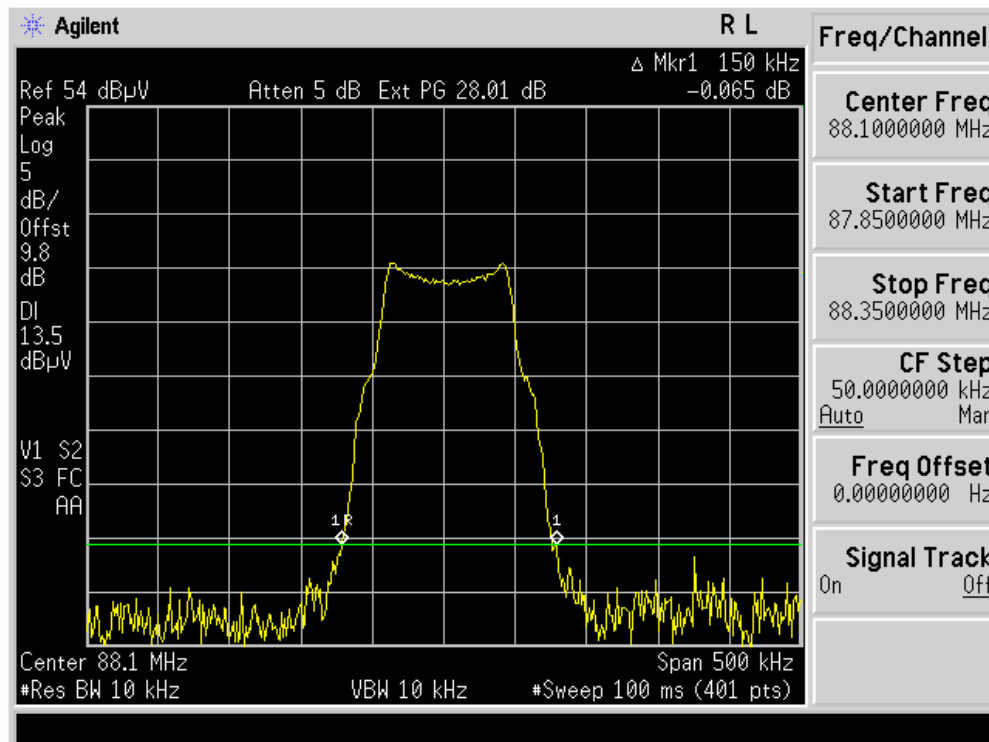
**Measurement Data:**     **Comply**

Refer to the next page.

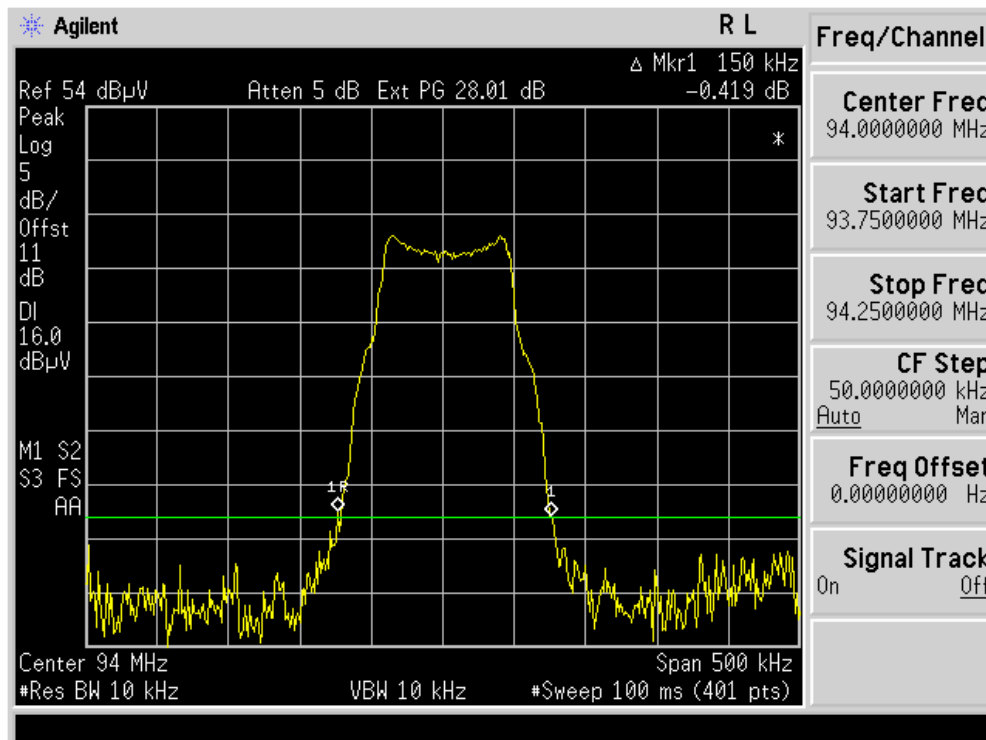
**Minimum Standard:**

Occupied Channel Bandwidth < 200kHz.
--------------------------------------

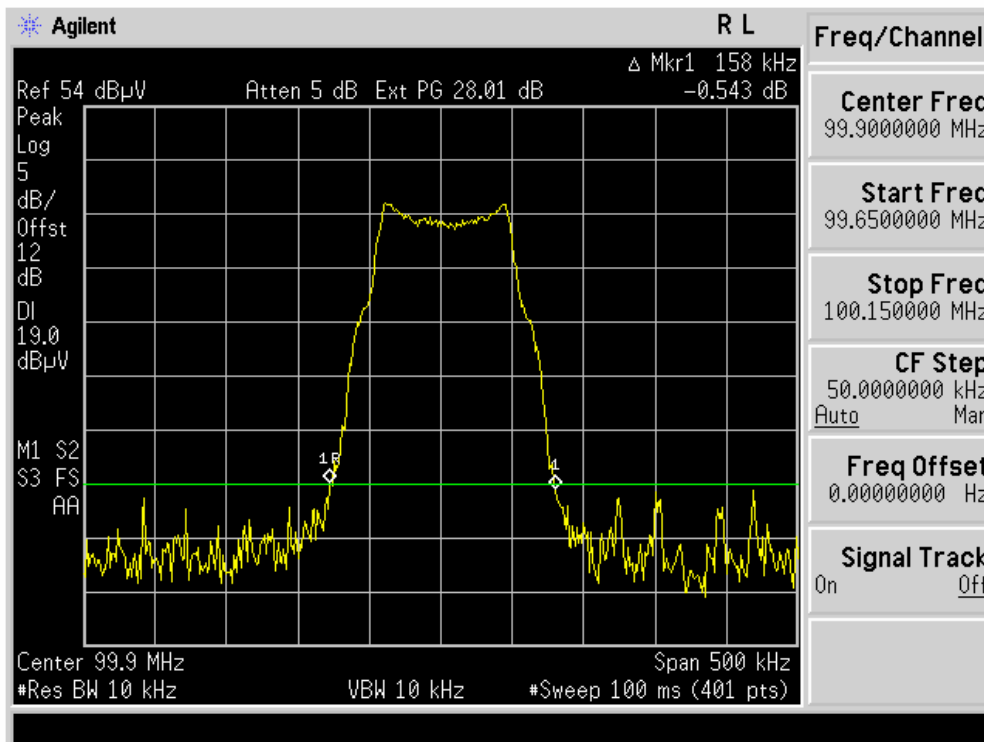
### Occupied Channel Bandwidth plot (88.1 MHz)



### Occupied Channel Bandwidth plot (94.0 MHz)



### Occupied Channel Bandwidth plot (99.9 MHz)



### 3.2.5 Antenna Requirement

**Define:**

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

--- **The antenna Type** : Line Antenna in the Cigar Jack cable.

APPENDIX I

**TEST EQUIPMENT USED FOR TESTS**

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	Agilent	E4404B	21/03/07	US41061134
02	Spectrum Analyzer	Agilent	E4440A	05/10/07	MY45304199
03	Spectrum Analyzer	H.P	8563E	06/10/07	3551A04634
04	Power Meter	H.P	EMP-442A	06/07/07	GB37170413
05	Power Sensor	H.P	8481A	23/03/07	3318A96566
06	Frequency Counter	H.P	5342A	21/10/06	2119A04450
07	Multifunction Synthesizer	H.P	8904A	21/10/06	3633A08404
08	Signal Generator	Rohde Schwarz	SMR20	22/03/07	101251
09	Signal Generator	H.P	ESG-3000A	06/07/07	US37230529
10	Audio Analyzer	H.P	8903B	06/07/07	3011A09448
11	Modulation Analyzer	H.P	8901B	10/07/07	3028A03029
12	Oscilloscope	Tektronix	TDS3052	01/10/06	B016821
13	CDMA Mobile Station Test Set	H.P	8924C	21/10/06	US35360688
14	Universal Radio Communication tester	Rohde Schwarz	CMU200	21/03/07	107631
15	Bluetooth Tester	TESCOM	TC-3000A	21/10/06	3000A4A0121
16	Multisystem Ue Tester	Japan Radio Co.,Ltd	NJZ-2000	14/11/06	ET00095
17	Power Splitter	WEINSCHEL	1593	21/10/06	332
18	BAND Reject Filter	Microwave Circuits	N0308372	21/10/06	3125-01DC0312
19	BAND Reject Filter	Wainwright	WRCG1750	21/10/06	SN2
20	AC Power supply	DAEKWANG	5KVA	20/03/07	N/A
21	DC Power Supply	H.P	6622A	21/03/07	465487
22	Attenuator (30dB)	H.P	8498A	21/10/06	50101
23	Attenuator (10dB)	WEINSCHEL	23-10-34	21/10/06	BP4387
24	HORN ANT	EMCO	3115	06/03/07	6419
25	HORN ANT	EMCO	3115	25/04/07	21097
26	HORN ANT	A.H.Systems	SAS-574	09/11/06	154
27	HORN ANT	A.H.Systems	SAS-574	09/11/06	155
28	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2116
29	Dipole Antenna	Schwarzbeck	VHA9103	18/10/06	2117
30	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2261
31	Dipole Antenna	Schwarzbeck	UHA9105	18/10/06	2262

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
32	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	07/07/07	SN-161-4
33	Frequency Converter	Kyorits	KCV-604C	07/07/07	4-230-3
34	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	13/09/06	021031
35	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	29/09/06	1098
36	Biconical Antenna	Schwarzbeck	VHA9103	04/04/07	2233
37	Digital Multimeter	H.P	34401A	20/03/07	3146A13475
38	Attenuator (10dB)	WEINSCHTEL	23-10-34	21/10/06	BP4386
39	High-Pass Filter	ANRITSU	MP526D	21/10/06	MP27756
40	Attenuator (3dB)	Agilent	8491B	21/10/06	58177
41	Amplifier (25dB)	Agilent	8447D	12/04/07	2944A10144
42	Amplifier (30dB)	Agilent	8449B	21/10/06	3008A01590
43	Position Controller	TOKIN	5901T	N/A	14173
44	Driver	TOKIN	5902T2	N/A	14174
45	Spectrum Analyzer	H.P	8591E	21/03/07	3649A05889
46	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	11/07/07	4N-170-3
47	LISN	Kyorits	KNW-407	11/08/06	8-317-8
48	LISN	Kyorits	KNW-242	27/09/06	8-654-15
49	CVCF	NF Electronic	4400	N/A	344536 4420064
50	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
51	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
52	Software	AUDIX	e3	N/A	Ver 3.0
53	Software	Agilent	Benchlink	N/A	A.01.09 021211