



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.digitalemc.com>

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 |

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: Conducted emission test is not applied, because the power of the EUT is supplied from a Car battery.

Note 3: The sample was tested according to the following specification:

FCC Parts 15.239; ANSI C 63.4-2003

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) | Preamp 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 |
| 99.9 | H | 62.00 | 9.87 | 2.00 | 28.00 | 45.87 | 48 | 2.13 |

Note 1: Field Strength Calculation

Level = Read Level + Probe Factor + Cable Loss - Preamp 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 ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)

$$\text{VBW} \geq \text{RBW}$$

$\equiv 1$ MHz (1 GHz $\sim 10^{\text{th}}$ harmonic)

Trace \equiv 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 10th 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.

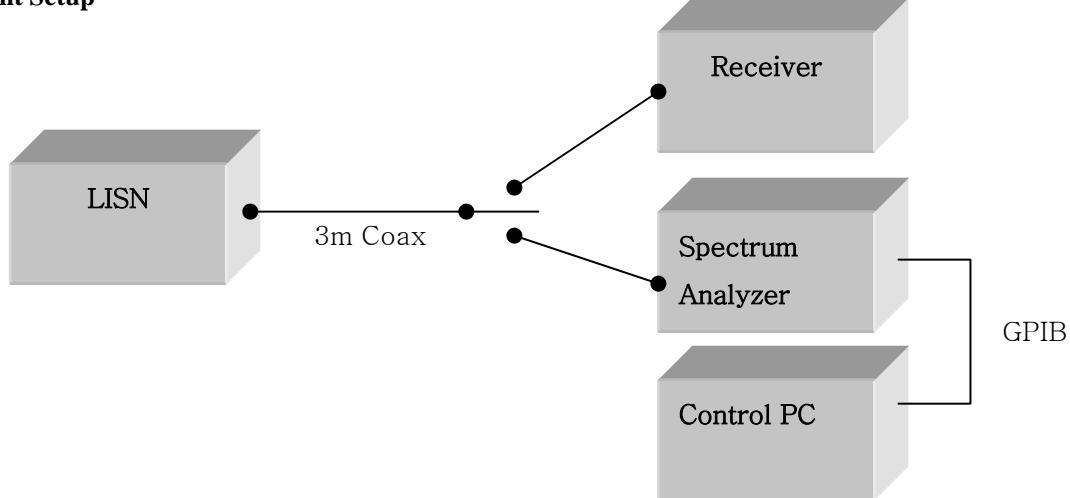
So it is not need to test this requirement,

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

VBW \geq RBW

Trace = max hold

Detector function = Peak

Sweep = auto

Span = 300 kHz

Operating Condition: Transmit 1kHz audio signal

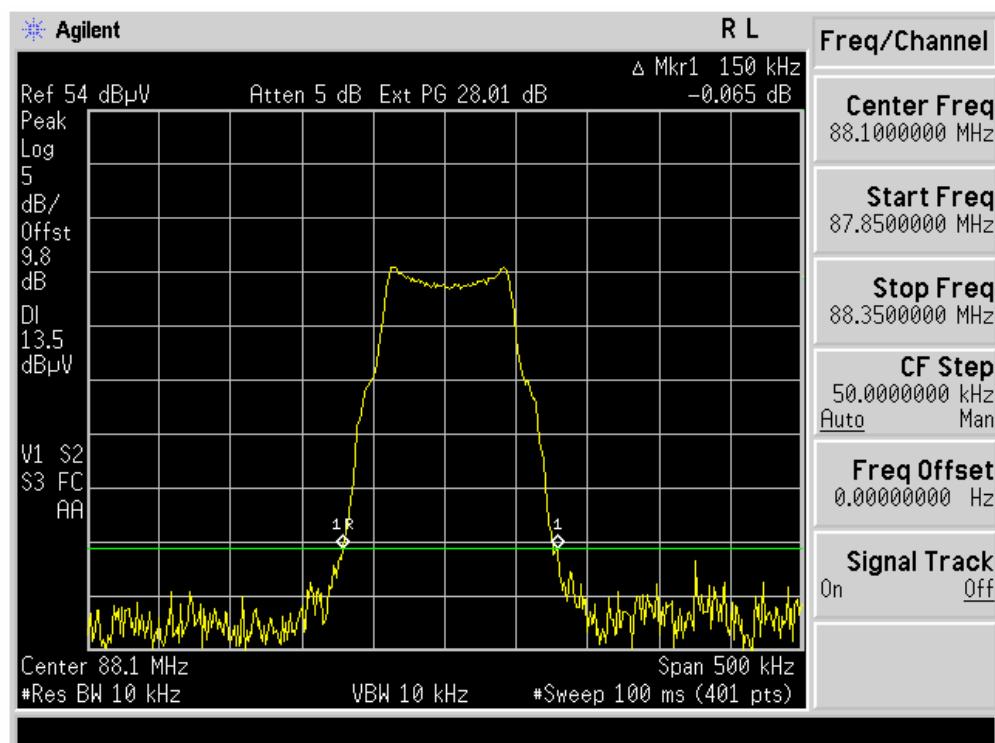
Measurement Data: **Comply**

Refer to the next page.

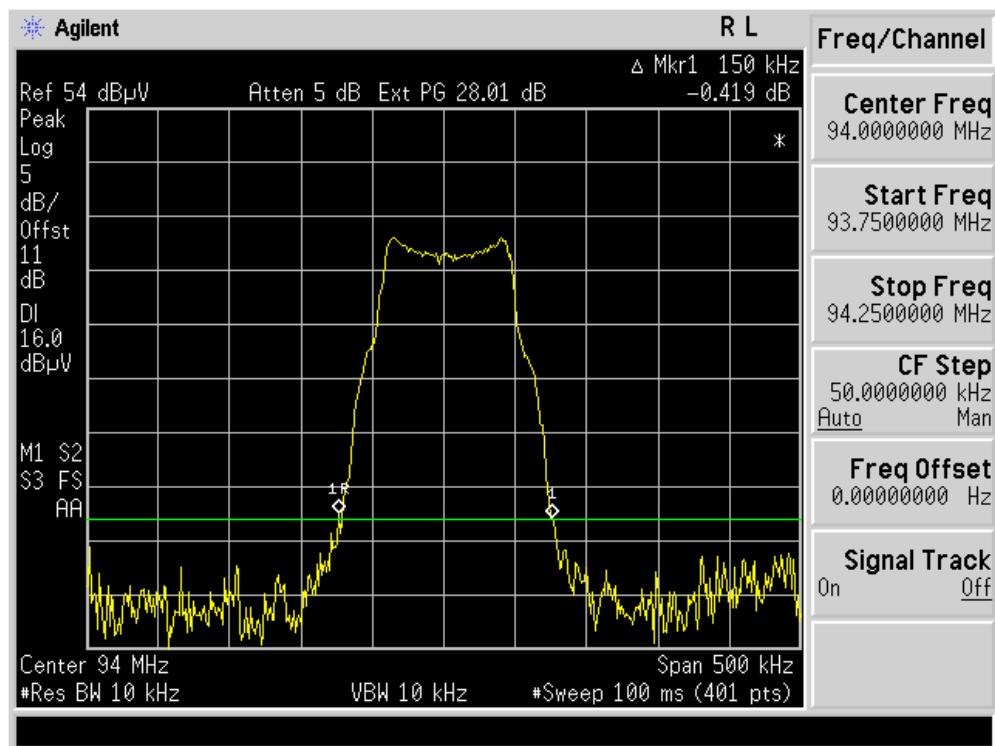
Minimum Standard:

Occupied Channel Bandwidth < 200kHz.

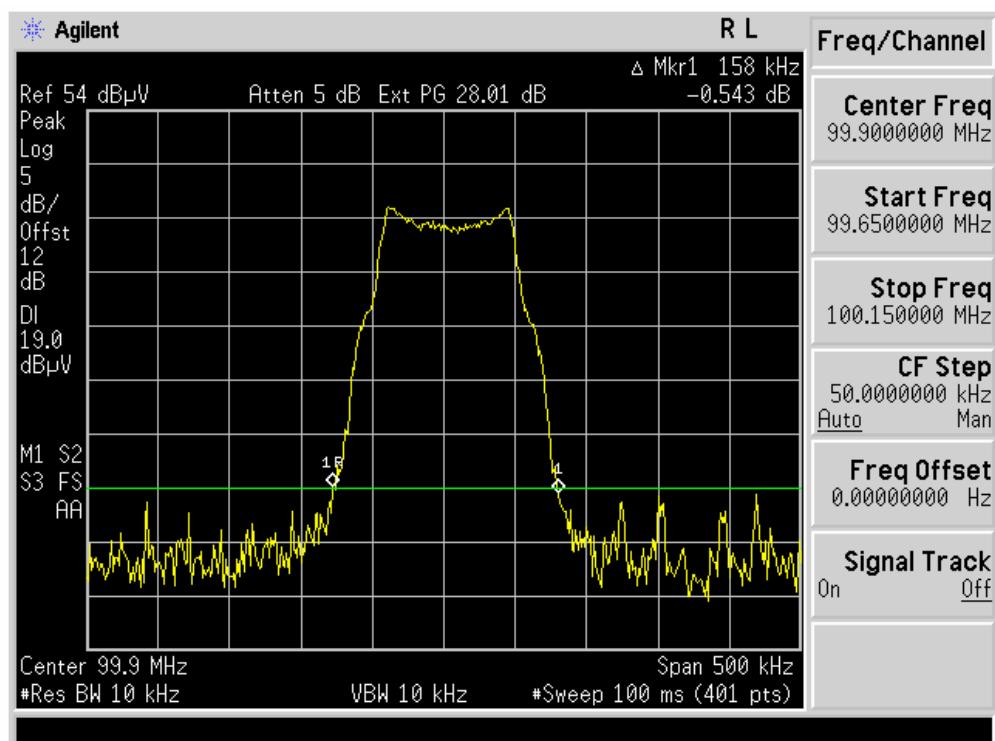
Occupied Channel Bandwidth plot (88.1 MHz)



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 | WRG1750 | 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) | WEINSCHEL | 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 |