



FCC LISTED,  
REGISTRATION  
NUMBER: 905266

IC LISTED,  
REGISTRATION  
NUMBER: IC 4621

**CENTRO DE  
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## TEST REPORT

**Report No.: 23714RET**

**TEST NAME:** FCC PART 22 & PART 24

**Product** : GSM MOBILE PHONE  
**Trade Mark** : GRUNDIG  
**Model/type Ref.** : A155  
**Manufacturer** : VITELCOM MOBILE TECHNOLOGY, S.A.  
**Requested by** : VITELCOM MOBILE TECHNOLOGY, S.A.  
**Other identification of the product** : FCC ID: TKH-A155  
**Standard(s)** : USA FCC Part 22 & 24

This test report includes 3 annexes and therefore the total number of pages is 36.

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Date: 2006-04-10	Test operator A. Llamas 	Revised by: Date: 2006-04-10 J.C. Soler Consultant 	Approved by: Date: 2006-04-10 A. Rojas Technical Director 	Page: 1 of 7
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## 1. COMPETENCE AND GUARANTEES

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 905266.

Centro de Tecnología de las Comunicaciones (CETECOM), S.A. is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621.

In order to assure the traceability to other national and international laboratories, CETECOM has a calibration and maintenance programme for its measuring equipment.

CETECOM guarantees the reliability of the data presented in this report, which is the result of measurements and tests performed to the item under test on the date and under the conditions stated on the report and is based on the knowledge and technical facilities available at CETECOM at the time of execution of the test.

CETECOM is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the item under test and the results of the test.

## 2. GENERAL CONDITIONS

1. This report only refers to the item that has undergone the test.
2. This report does not constitute or imply by its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without written approval of CETECOM.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of CETECOM and the Accreditation Bodies.

## 3. CHARACTERISTICS OF THE TEST

### 3.1 TEST REQUESTED

Measurements for PCS 850 and PCS 1900 devices according to FCC parts 22 and 24:

-RF Output power.

-Radiated emissions.

### 3.2 REQUIREMENTS AND METHOD

The test has been carried out according to FCC parts 22 and 24.

Radiated testing was performed in Cetecom's semi-anechoic chamber. This site has been fully described in a report submitted to the FCC and was accepted in a letter dated July 25, 2002. Radiated measurements were made in accordance with the general procedures of ANSI C63.4 and substitution method according to TIA/EIA 603.

The instrumentation used to perform the testing is listed below:

1. Semianechoic Absorber Lined Chamber IR 11. BS.
2. Control Chamber IR 12.BC.
3. Spectrum Analyzer Agilent E4440A.
4. Bilog antenna CHASE CBL6111.
5. Antenna tripod EMCO 11968C.
6. Antenna mast EM 1072 NMT.
7. Rotating table EM 1084-4. ON.
8. Double-ridge Guide Horn antenna 1-18 GHz HP 11966E.
9. Double-ridge Guide Horn antenna 18-40 GHz Agilent 119665J.
10. RF pre-amplifier Miteq AFS5-04001300-15-10P-6.
11. RF pre-amplifier Miteq JS4-12002600-30-5A.
12. EMI Test Receiver R&S ESIB26.
13. Universal Radio communication Tester R&S CMU200.
14. 10 dB attenuator HP 8491B.
15. Multi Device Controller EMCO 2090.

#### **4. IDENTIFICATION DATA SUPPLIED BY THE APPLICANT**

Identification data in this section has been supplied by the client.

##### **4.1 APPLICANT**

**Name or Company:** VITELCOM MOBILE TECHNOLOGY, S.A.

**V.A.T.:** ES A 922553137

**Address:** Parque Tecnológico de Andalucía. Avda. Juan López Peñalver, 7,

**City:** Campanillas (MALAGA)

**Postal code:** E-29590

**Country:** SPAIN

**Telephone:** +34 952028686

**Fax:** +34 952367590

##### **4.2 REPRESENTATIVE**

**Name:** Rafael Abad Cano.

### 4.3 TEST SAMPLES SUPPLIER

**Name or Company:** SKYSPRING & VITELCOM INC.

**V.A.T.:** -----

**Address:** Dongsan Bldg., Yangjae-dong, 283-4 Seocho-gu **City:** Seoul

**Postal code:** 137-895

**Country:** SOUTH KOREA

**Telephone:** +822 34978432

**Fax:** +822 5788604

Samples undergoing test have been selected by: **the test samples supplier.**

### 4.4 IDENTIFICATION OF ITEM/ITEMS TESTED

**Product:** GSM MOBILE PHONE

**Trade mark:** GRUNDIG

**Model:** A155

**Other identification of the product:** FCC ID: TKH-A155

**HW Version:** Rev. 0.1

**SW Version:** Rev. 0.1

**Manufacturer:** VITELCOM MOBILE TECHNOLOGY, S.A.

**Country of manufacture:** SPAIN

**Manufacture site:** Parque Tecnológico de Andalucía. Avda. Juan López Peñalver, 7, Campanillas (MALAGA) SPAIN

**Description:** Mobile phone with support of bands 850, 900, 1800 and 1900 MHz

## 5. USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS

### 5.1 USAGE OF SAMPLES

Sample M/01 is formed by the following elements:

<u>Control No.</u>	<u>Description</u>	<u>Model</u>	<u>Serial No.</u>	<u>Date of reception</u>
23714/07	GSM mobile phone with integral antenna	A155	---	03/03/2006

1. Sample M/01 has undergone following test(s).  
Radiated output power and Radiated emissions measurements indicated in annex A and B.

### 5.2 PERIOD OF TESTING

The performed test started on 2006-03-17 and finished on the same day.

The tests as detailed in this report have been performed at CETECOM.

### 5.3 ENVIROMENTAL CONDITIONS

In the control chamber the following limits were not exceeded during the test:

Temperature	Min. = 22 °C Max. = 22 °C
Relative humidity	Min. = 38 % Max. = 38 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters) the following limits were no exceeded during the test.

Temperature	Min. = 25 °C Max. = 25 °C
Relative humidity	Min. = 51 % Max. = 51 %
Air pressure	Min. = 1010 mbar Max. = 1010 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

## 6. TEST RESULTS

Abbreviations used in the VERDICT column of the following tables are:

<b>P</b>	Pass
<b>F</b>	Fail
<b>NA</b>	not applicable
<b>NM</b>	not measured

FCC PART 22 PARAGRAPH	VERDICT			
	NA	P	F	NM
Clause 22.913: RF output power		P		
Clause 22.917: Radiated emissions		P		

FCC PART 24 PARAGRAPH	VERDICT			
	NA	P	F	NM
Clause 24.232: RF output power		P		
Clause 24.238: Radiated emissions		P		

## 7. REMARKS AND COMMENTS

None.

## 8. SUMMARY

Based on the results of the performed test, stated in annex A the item under test is **IN COMPLIANCE** with the specifications listed in section 3.1 “TEST REQUESTED”.

NOTE: The results presented in this Test Report apply only to the particular item under test declared in section 4.4 “IDENTIFICATION OF ITEM/ITEMS TESTED” of this document, as presented for test on the date(s) declared in section 5, “USAGE OF SAMPLES, PERIOD OF TESTING AND ENVIRONMENTAL CONDITIONS”.

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**ANNEX A**

**TEST RESULTS FOR FCC PART 22**

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Annex A



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Annex A

## TEST CONDITIONS

Power supply (V):

$$V_{\text{nom}} = 3.6\text{Vdc}$$

$$V_{\text{max}} = \text{N/A}$$

$$V_{\text{min}} = \text{N/A}$$

The subscripts nom, min and max indicates voltage test conditions (nominal, minimum and maximum respectively, as declared by the applicant).

N/A: Not applicable

Type of power supply = DC Voltage from rechargeable Li-Ion battery

Type of antenna = Integral antenna

## TEST FREQUENCIES:

Lowest channel (128): 824.2 MHz

Middle channel (190): 836.6 MHz

Highest channel (251): 848.8 MHz

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## RF Output Power (E.R.P.)

### SPECIFICATION

§2.1046 and 22.913

### METHOD

For radiated measurements the EUT was placed on a 1 m high non-conductive stand inside an anechoic chamber. The measuring antenna was placed at 3 m distance and the maximum field strength was measured for the three channels. The EUT was controlled via the Universal Radio Communication tester R&S CMU200 selecting maximum transmission power of the EUT and GMSK modulated signal.

The Effective Radiated Power (E.R.P.) is obtained by using the Substitution Method according to ANSI/TIA/EIA-603-A.

### RESULTS

MAXIMUM EFFECTIVE RADIATED POWER E.R.P. (RADIATED).

Channel	Lowest	Middle	Highest
Maximum peak power (dBm)	35.57	36.31	35.02
Maximum peak power (W)	3.60	4.27	3.18
Measurement uncertainty (dB)	$\pm 3.8$		

Verdict: PASS

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## **Radiated emissions**

### SPECIFICATION

§ 22.917

### METHOD

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a 1 meter high non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded. The radiated emissions were measured with peak detector and 1 MHz bandwidth.

Each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603 .

#### **Measurement Limit:**

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB, P in watts.

At  $P_o$  transmitting power, the specified minimum attenuation becomes  $43 + 10 \log (P_o)$ , and the level in dBm relative  $P_o$  becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) + 30] = -13 \text{ dBm}$$

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## RESULTS

1. CHANNEL: LOWEST (824.2MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-12.75 GHz.**

Carrier level (dBm) = 35.57

Spurious frequency (MHz)	Level (dBm)	Polarization	Attenuation below carrier (dBc)
1648.550	-36.56	Vertical	72.13

2. CHANNEL: MIDDLE (836.6 MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-12.75 GHz.**

Carrier level (dBm) = 36.31

Spurious frequency (MHz)	Level (dBm)	Polarization	Attenuation below carrier (dBc)
1673.092	-36.49	Vertical	72.80

3. CHANNEL: HIGHEST (848.8 MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-12.75 GHz.**

Carrier level (dBm) = 35.02

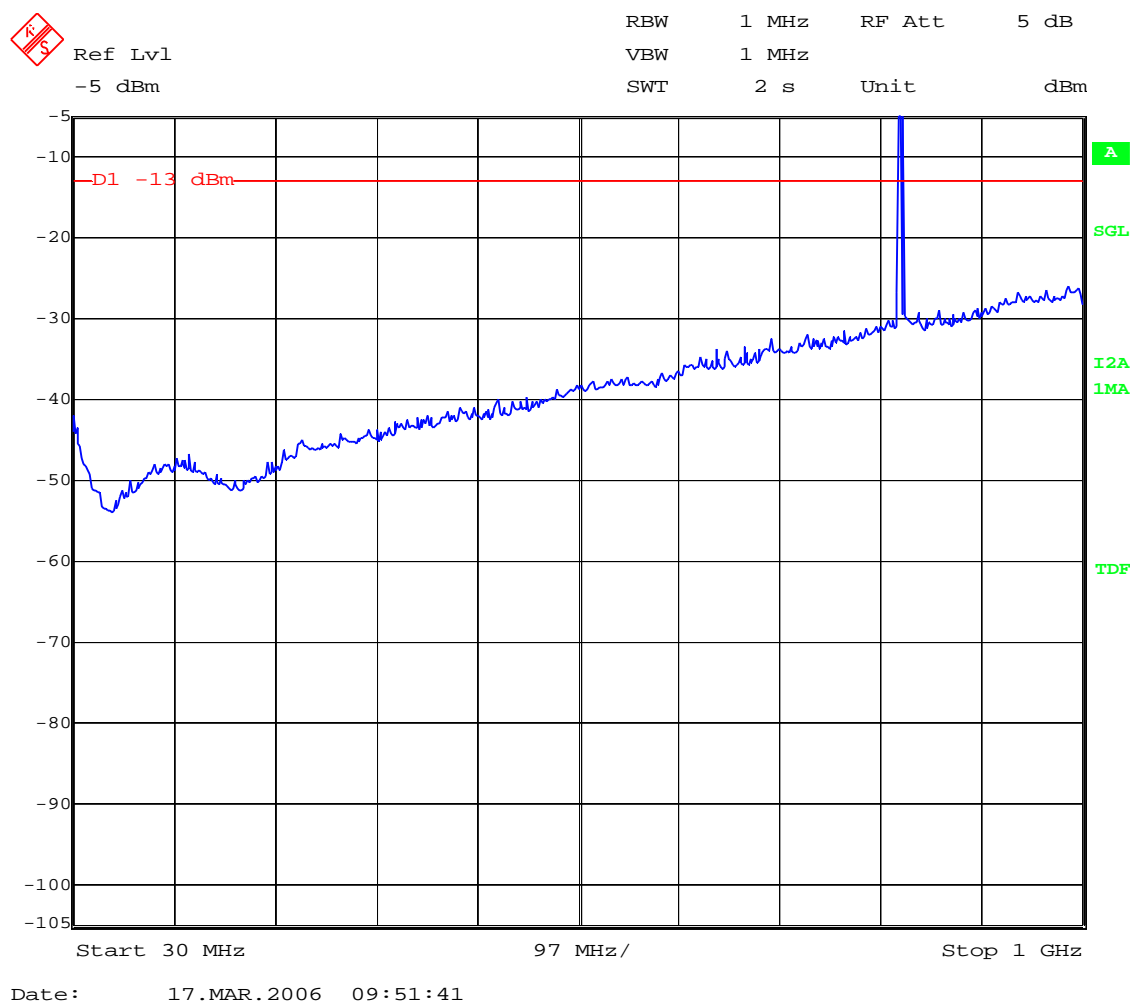
Spurious frequency (MHz)	Level (dBm)	Polarization	Attenuation below carrier (dBc)
1697.745	-35.32	Vertical	70.34

Verdict: PASS

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FREQUENCY RANGE 30 MHz-1000 MHz.

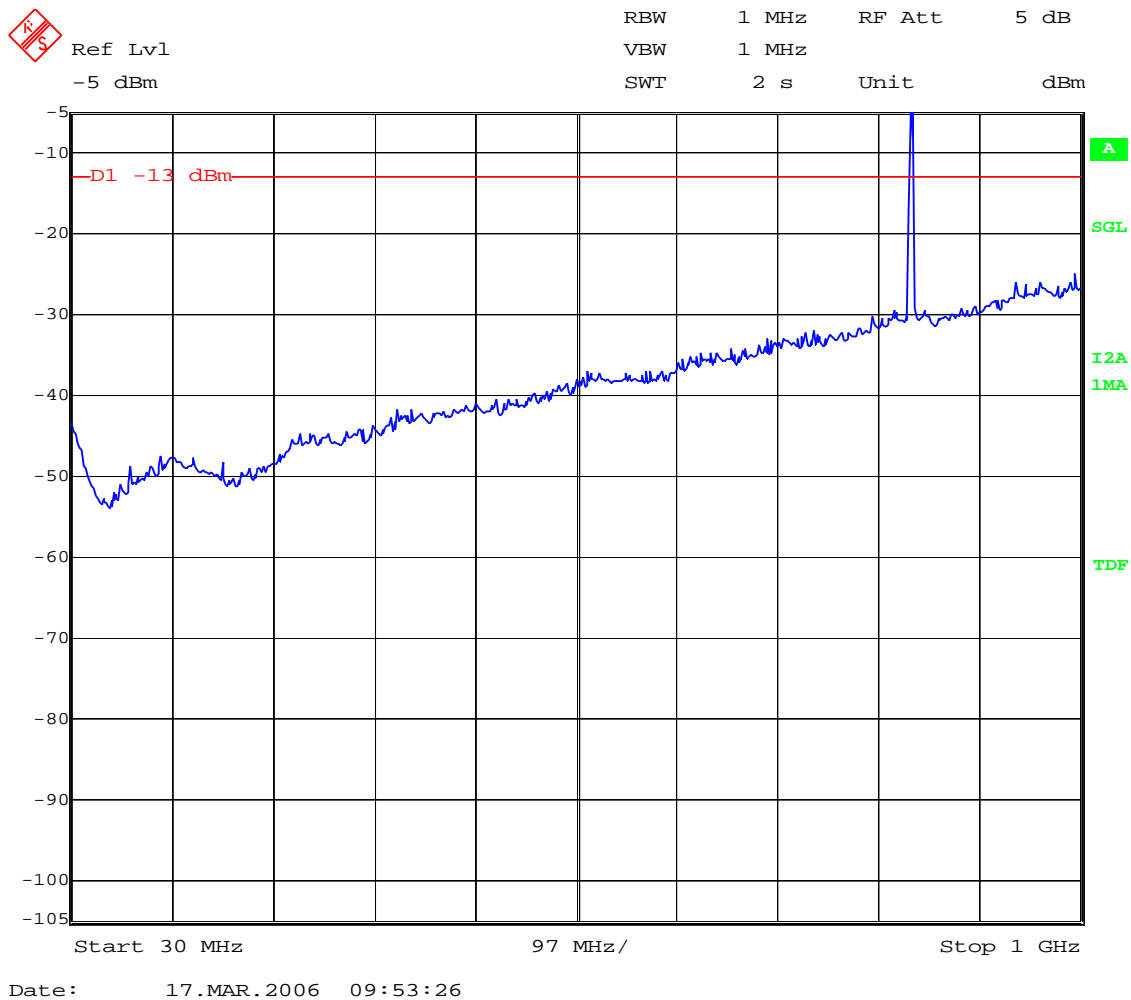
CHANNEL: LOWEST (824.2 MHz)



Note: The peak above the limit is the carrier frequency.

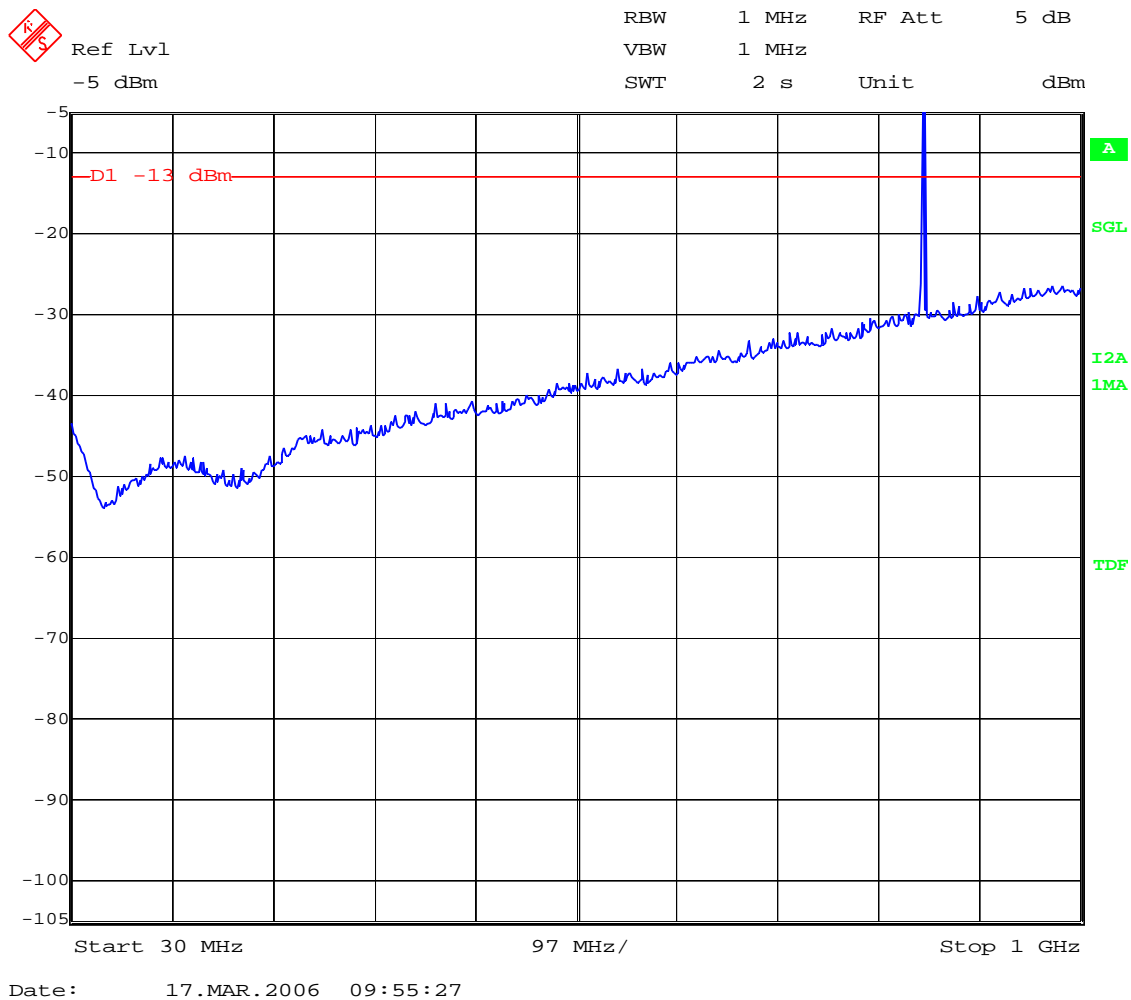
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CHANNEL: MIDDLE (836.6 MHz)



Note: The peak above the limit is the carrier frequency.

CHANNEL: HIGHEST (848.8 MHz)



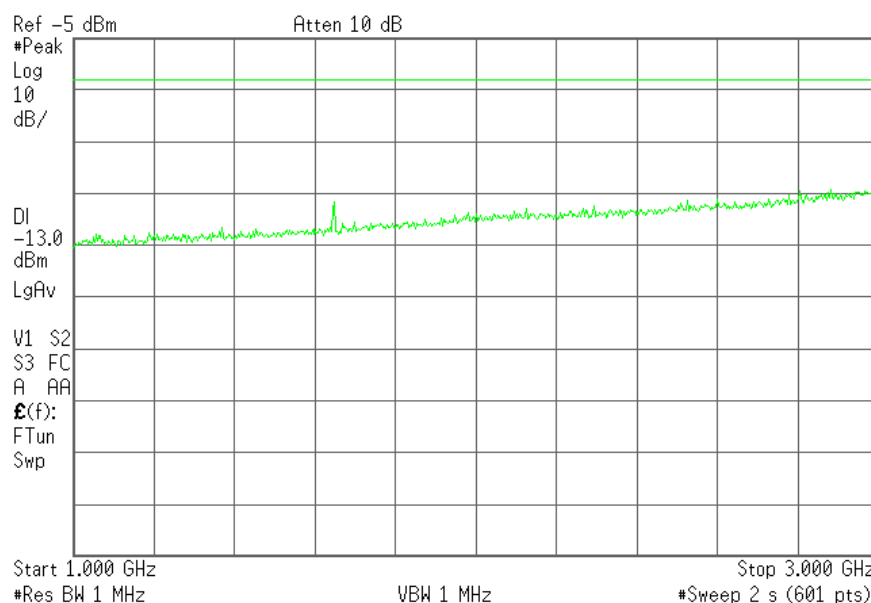
Note: The peak above the limit is the carrier frequency.



FREQUENCY RANGE 1 GHz to 3 GHz.

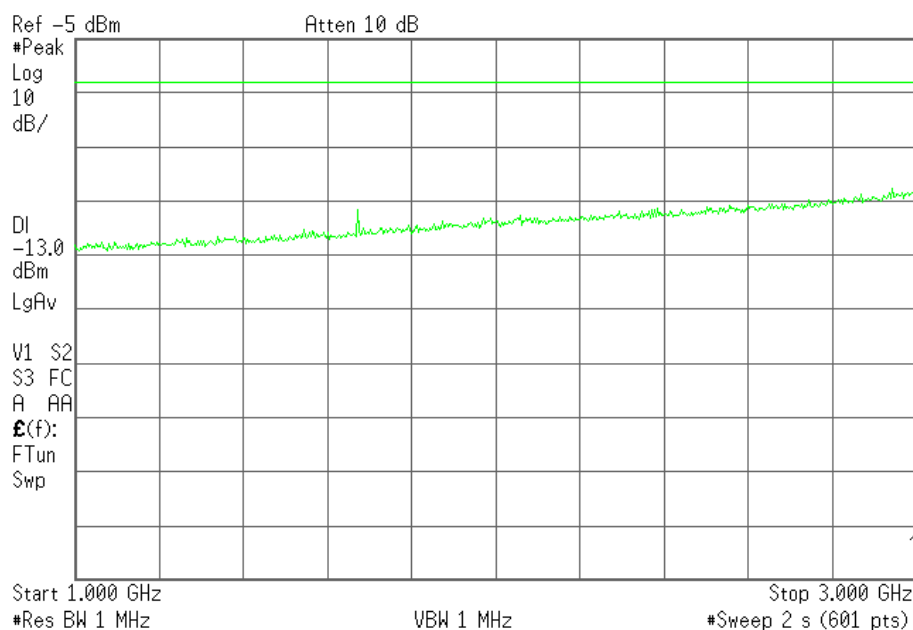
CHANNEL: LOWEST (824.2 MHz)

Agilent 16:52:35 Mar 17, 2006



CHANNEL: MIDDLE (836.6 MHz)

Agilent 16:46:49 Mar 17, 2006



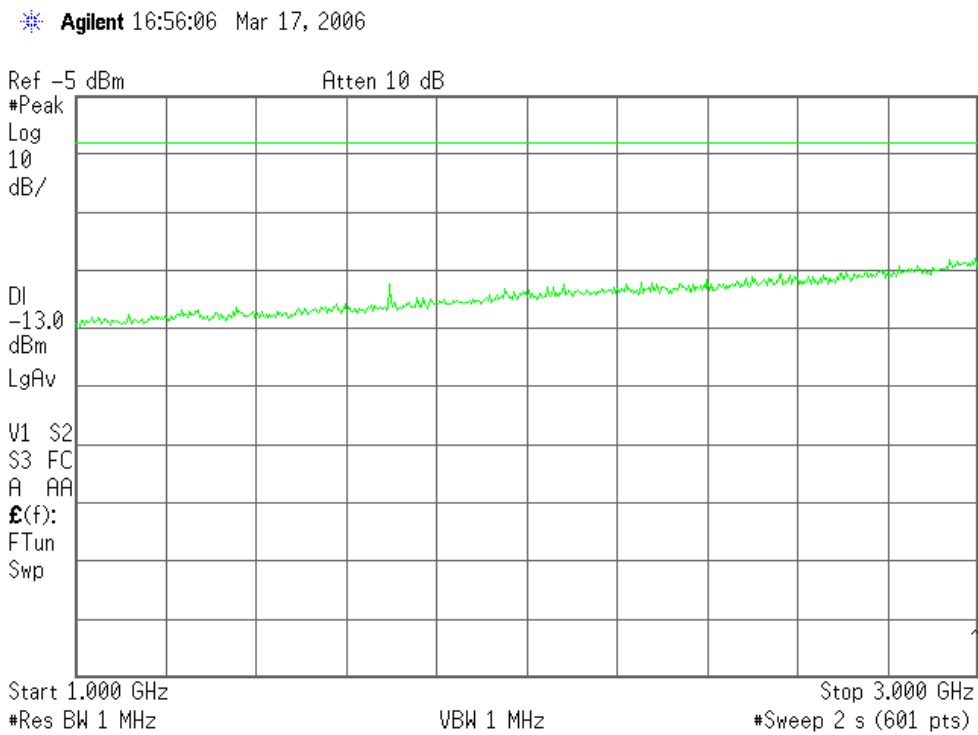
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CHANNEL: HIGHEST (848.8 MHz)



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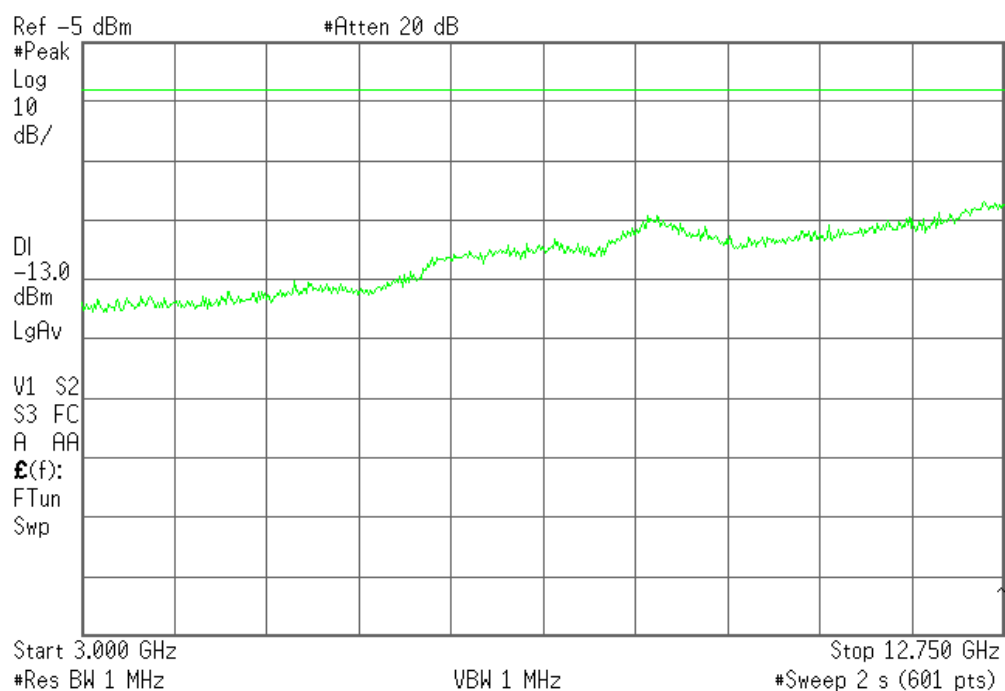
FET45\_00.DOC

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FREQUENCY RANGE 3 GHz to 12.75 GHz.

✧ Agilent 17:15:11 Mar 17, 2006



(This plot is valid for all three channels).

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**ANNEX B**  
**TEST RESULTS FOR FCC PART 24**

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**TEST CONDITIONS**

Power supply (V):

$$V_{\text{nom}} = 3.6 \text{ Vdc}$$

$$V_{\text{max}} = \text{N/A}$$

$$V_{\text{min}} = \text{N/A}$$

The subscripts nom, min and max indicates voltage test conditions (nominal, minimum and maximum respectively, as declared by the applicant).

N/A: Not applicable

Type of power supply = DC Voltage from rechargeable Li-Ion battery.

Type of antenna = Integral Antenna

**TEST FREQUENCIES:**

Lowest channel (512): 1850.2 MHz

Middle channel (662): 1880.2 MHz

Highest channel (810): 1909.8 MHz

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## RF Output Power (E.I.R.P.)

### SPECIFICATION

§2.1046 and 24.232

### METHOD

For radiated measurements the EUT was placed on a 1 m high non-conductive stand inside an anechoic chamber. The measuring antenna was placed at 1 m distance and the maximum field strength was measured for the three channels. The EUT was controlled via the Universal Radio Communication tester R&S CMU200 selecting maximum transmission power of the EUT and GMSK modulated signal.

The Effective Isotropic Radiated Power (E.I.R.P.) is obtained by using the Substitution Method according to ANSI/TIA/EIA-603-A.

### RESULTS

MAXIMUM EQUIVALENT ISOTROPIC RADIATED POWER E.I.R.P. (RADIATED).

Channel	Lowest	Middle	Highest
Maximum peak power (dBm)	27.13	28.15	27.09
Maximum peak power (W)	0.52	0.65	0.51
Measurement uncertainty (dB)	$\pm 4.0$		

Verdict: PASS

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## **Radiated emissions**

### SPECIFICATION

§ 24.238

### METHOD

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment.

The EUT was placed on a 1 meter high non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded. The radiated emissions were measured with peak detector and 1 MHz bandwidth.

Each detected emissions were substituted by the Substitution method, in accordance with the TIA/EIA 603 .

#### **Measurement Limit:**

According to specification, the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least  $43 + 10 \log (P)$  dB, P in watts.

At  $P_o$  transmitting power, the specified minimum attenuation becomes  $43 + 10 \log (P_o)$ , and the level in dBm relative  $P_o$  becomes:

$$P_o \text{ (dBm)} - [43 + 10 \log (P_o \text{ in mwatts}) + 30] = - 13 \text{ dBm}$$

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## RESULTS

1. CHANNEL: LOWEST (1850.2MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-20 GHz.**

No spurious signals were found in all the range.

2. CHANNEL: MIDDLE (1880.2 MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-20 GHz.**

No spurious signals were found in all the range.

3. CHANNEL: HIGHEST (1909.8 MHz).

**Frequency range 30 MHz-1000 MHz.**

No spurious signals were found in all the range.

**Frequency range 1 GHz-20 GHz.**

No spurious signals were found in all the range.

Verdict: PASS

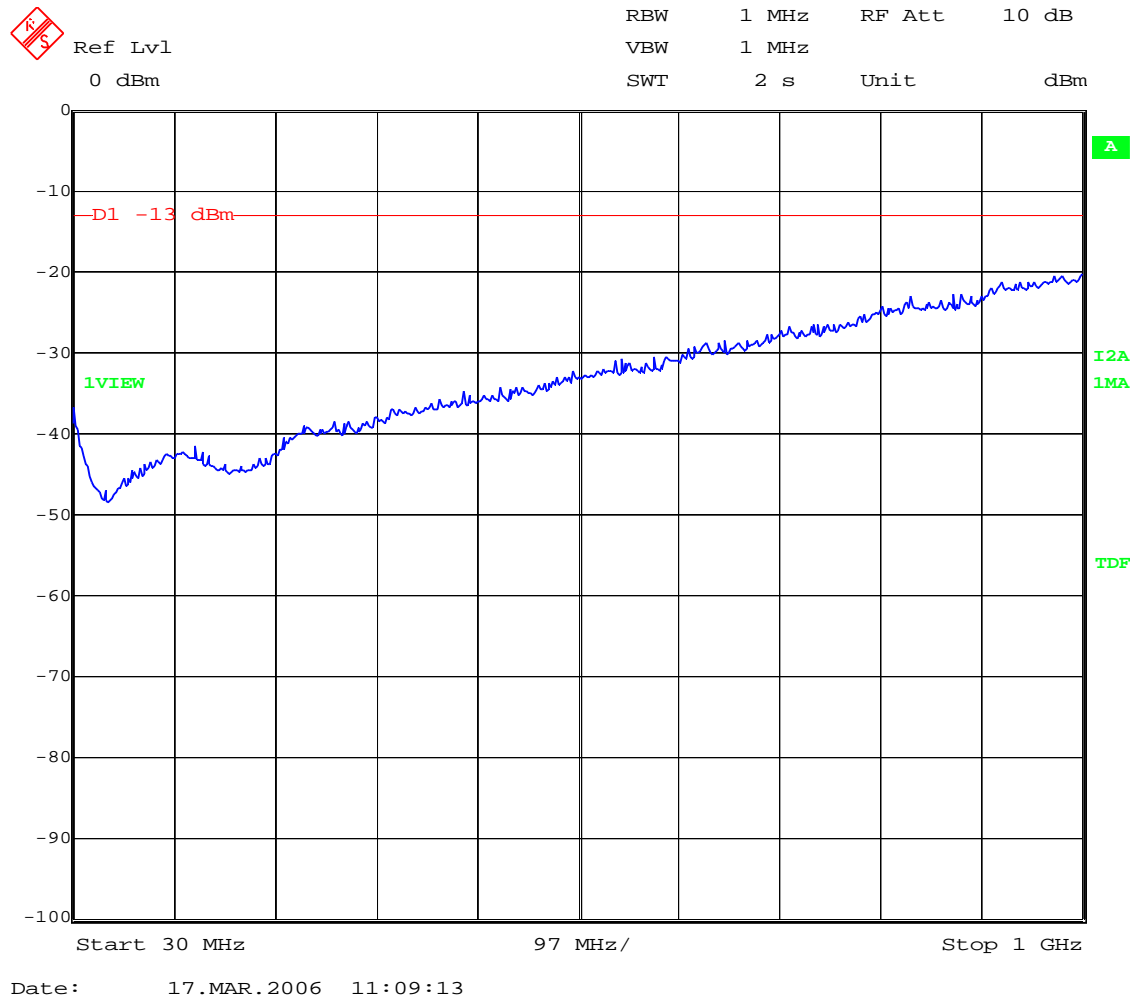
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FREQUENCY RANGE 30 MHz-1000 MHz.



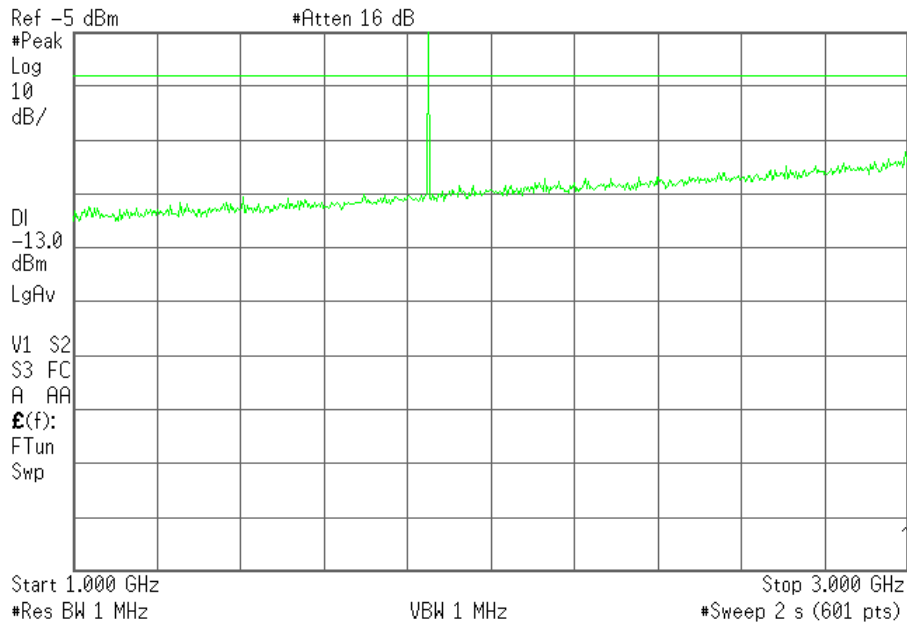
(This plot is valid for all three channels).

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# FREQUENCY RANGE 1 GHz to 3 GHz.

CHANNEL: LOWEST (1850.2 MHz)

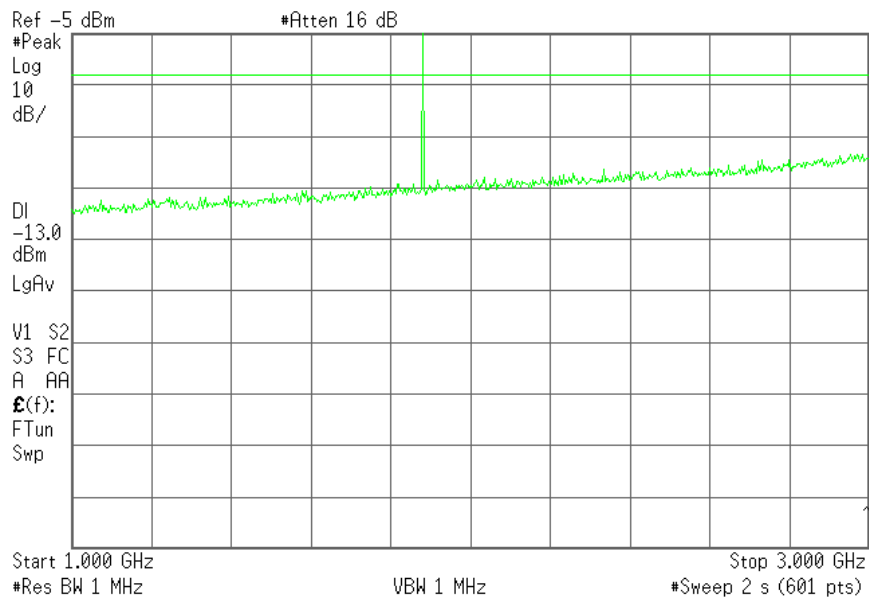
✱ Agilent 18:17:47 Mar 17, 2006



Note: The peak above the limit is the carrier frequency.

CHANNEL: MIDDLE (1880.2 MHz)

✱ Agilent 18:16:53 Mar 17, 2006



Note: The peak above the limit is the carrier frequency.

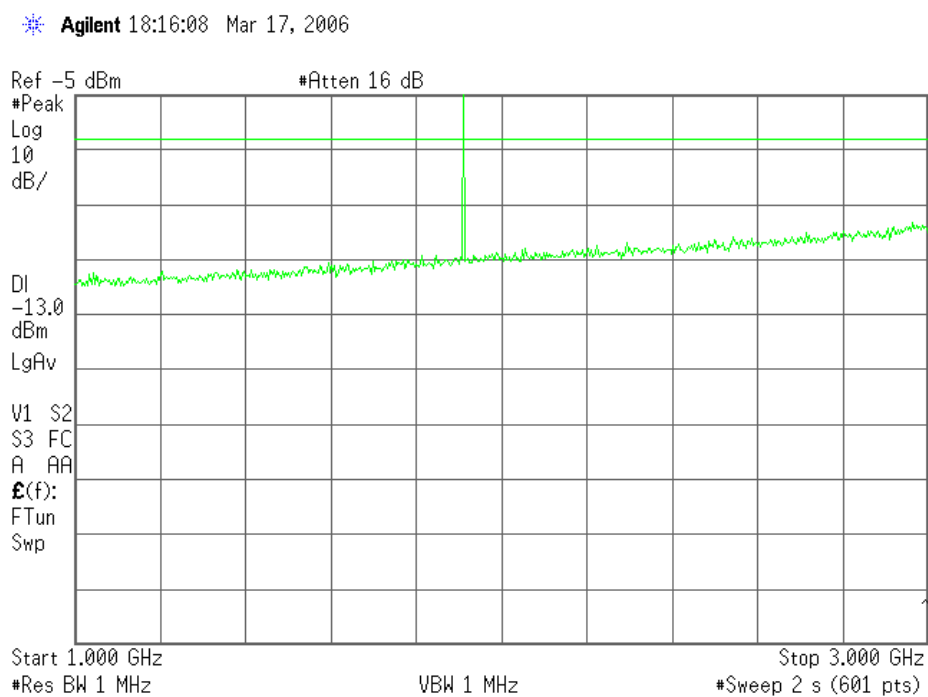
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CHANNEL: HIGHEST (1909.8 MHz)



Note: The peak above the limit is the carrier frequency.

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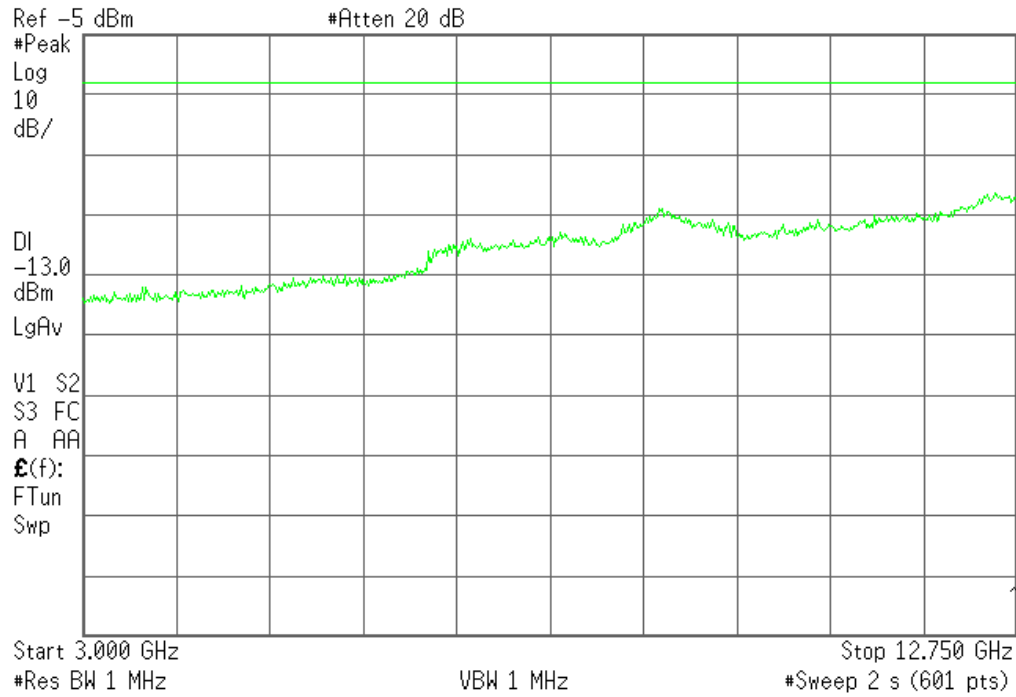
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FREQUENCY RANGE 3 GHz to 12.75 GHz.

\* Agilent 18:08:37 Mar 17, 2006



(This plot is valid for all three channels).

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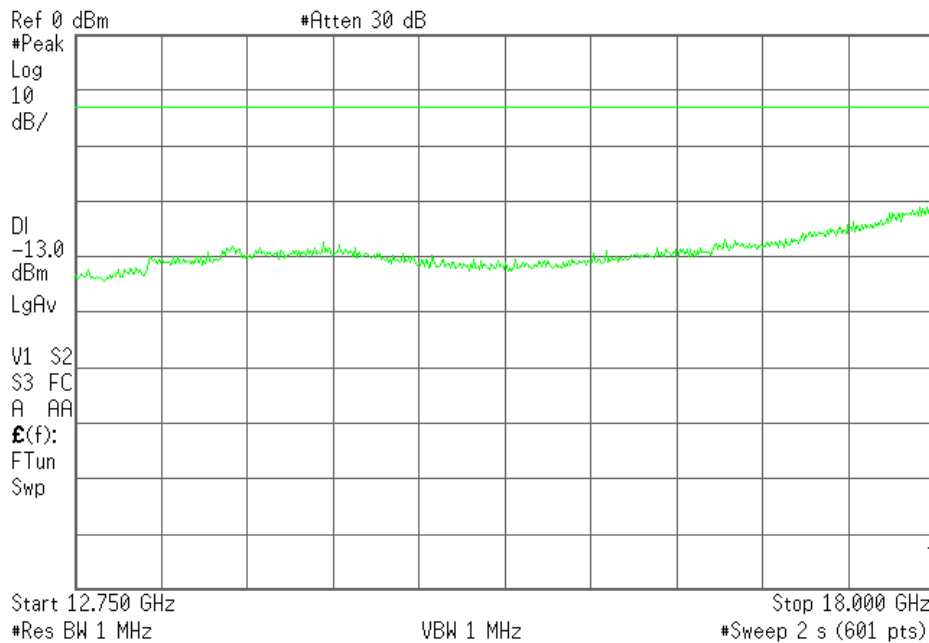
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# FREQUENCY RANGE 12.75 GHz TO 18 GHz.

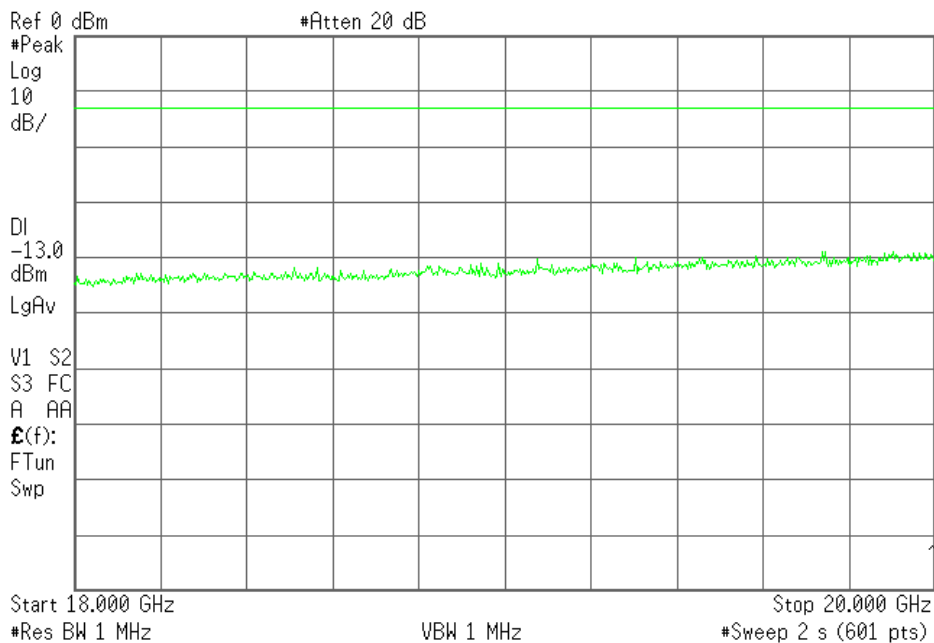
✧ Agilent 18:45:52 Mar 17, 2006



(This plot is valid for all three channels).

# FREQUENCY RANGE 18 GHz TO 20 GHz.

✧ Agilent 18:48:57 Mar 17, 2006



(This plot is valid for all three channels).

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## **ANNEX C**

### **PHOTOGRAPHS (Number of photographs: 5)**

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## 1. Equipment (front view)



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## 2. Equipment (back view)



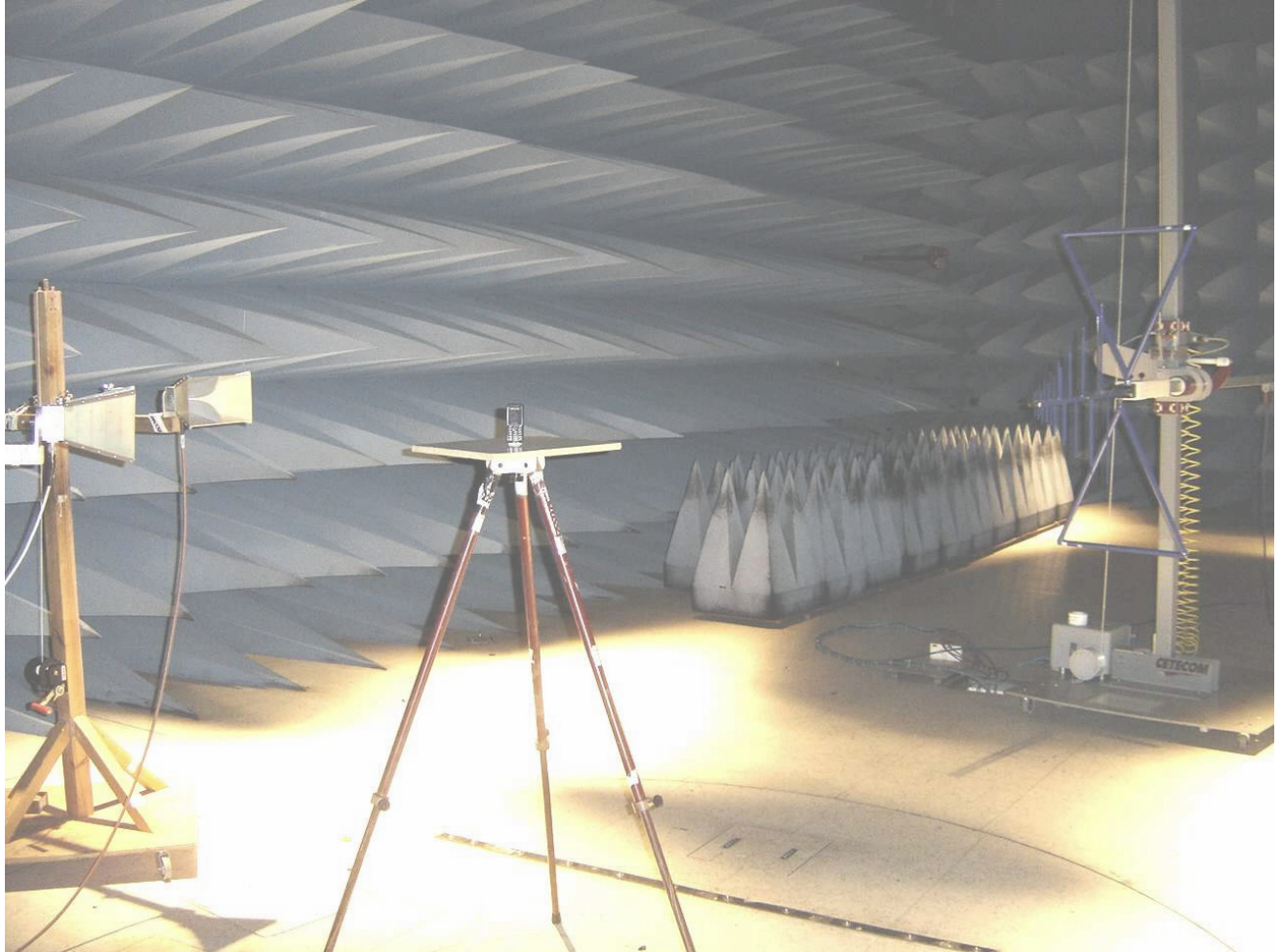
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### 3. General test set-up for radiated measurements.



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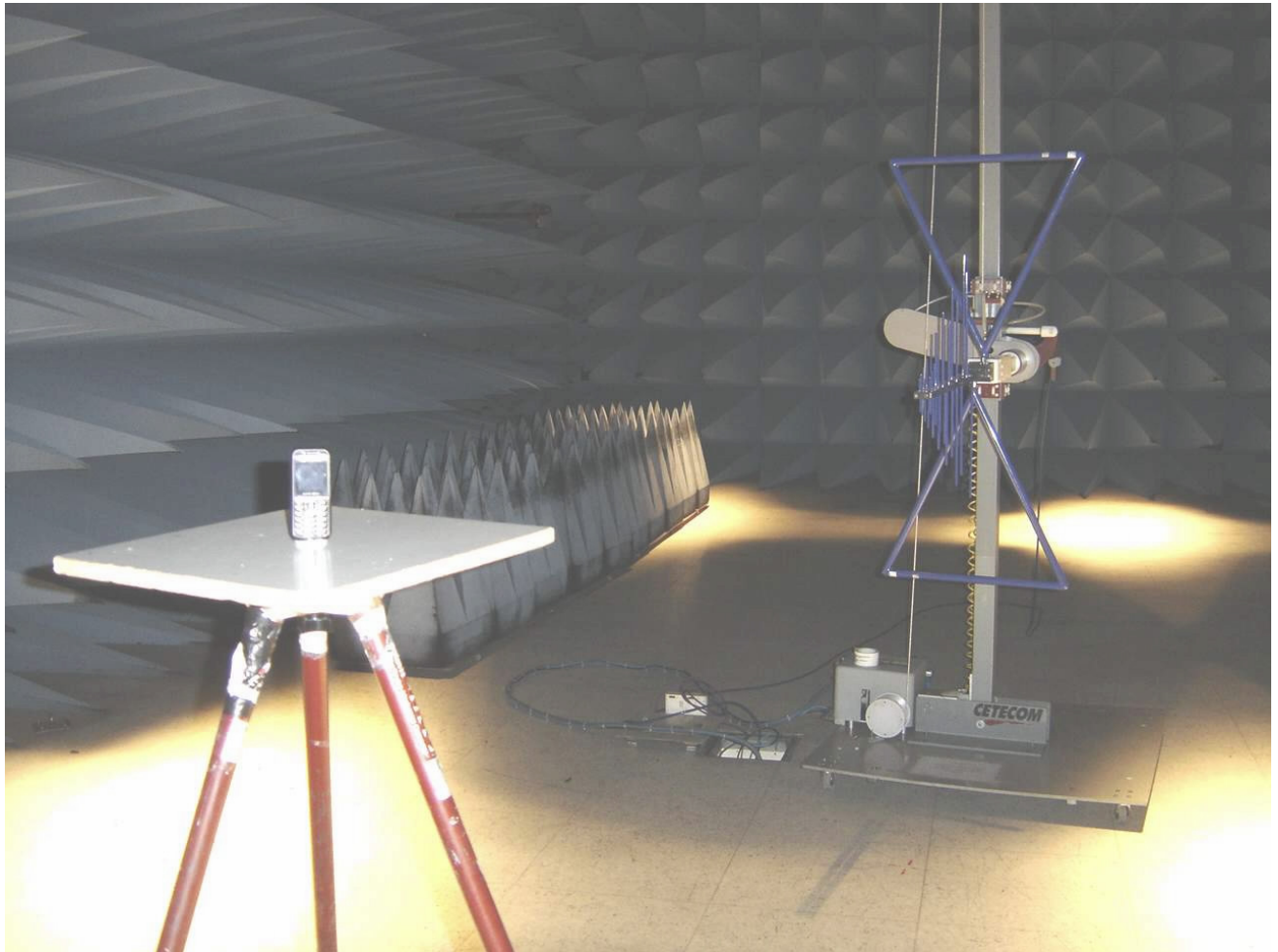
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#### 4. Test set-up for radiated measurements below 1 GHz.



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5. Test set-up for radiated measurements above 1 GHz.



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