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Report On

EMC Testing of the
Philips CT9A9j

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FCC ID: RXXCT9A9J

Document 75902829 Report 03 Issue 3 March 2008

TUV Product Service Ltd, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuvps.co.uk

REPORT ON

EMC Testing of the
Philips CT9A9j

Document 75902829 Report 03 Issue 3

March 2008

PREPARED FOR

Wiz4com Technologies
Rue Maurice Trintignant
72093 Le Mans
Cedex 9
France

PREPARED BY

L Plummer
Technical Author

APPROVED BY

M J Hardy
Authorised Signatory

J Adams
Authorised Signatory

DATED

20 March 2008

20 March 2008

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Parts 22 & 24. The sample tested was found to comply with the requirements defined in the applied rules.
Test Engineer(s);

M Iqbal

This report has been up-issued to Issue 3 to correct typographical errors.

UKAS TESTING 0141

Product Service

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Product Service

SECTION 1

REPORT SUMMARY

EMC Testing of the
Philips CT9A9j

Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Philips CT9A9j to the requirements FCC Part 22: 2006 and FCC Part 24: 2006.

Objective	To perform Electromagnetic Compatibility (EMC) Qualification Approval Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Philips
Model Number(s)	867000038409
Serial Number(s)	IMEI 358233000056239 IMEI 358233000056155
Software Version	64604
Hardware Version	PR3
FCC ID	RXXCT9A9J
Number of Samples Tested	Two
Test Specification/Issue/Date	FCC Part 22: 2006 and FCC Part 24: 2006
Incoming Release Date	Not Formally Released 11 January 2007
Disposal Reference Number Date	Packing Note 75902829 24 January 2008
Order Number Date	07/0000001670 20 December 2008
Start of Test	05 February 2008
Finish of Test	11 February 2008
Name of Engineer(s)	PJ Harrison M Iqbal
Related Document(s)	Part 2: 2006 Part 22 2006 Part 24: 2006

Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC Part 22: 2006, is shown below.

Section	Spec Clause	Test Description	Mode	Result
2.1	22.913 (a)	Maximum Peak Output Power – Radiated	1, 2 and 3	Pass
2.2	22.913 (a)	Maximum Peak Output Power - Conducted	1, 2 and 3	Pass
2.3	2.1047(d)	Modulation Characteristics	2	Pass
2.4	2.1049, 22.917 (b)	Occupied Bandwidth	2	Pass
2.5	2.1051, 22.905	Spurious Emissions at Antenna Terminals	1 and 3	Pass
2.6	22.917	Radiated Emissions (Enclosure Port)	1, 2 and 3	Pass
2.7	2.1051, 22.917(a)	Conducted Spurious Emissions	1, 2 and 3	Pass
2.8	2.1055, 22.355	Frequency Stability Under Temperature Variations	2	Pass
2.9	2.1055, 22.355	Frequency Stability Under Voltage Variations	2	Pass

Product Service

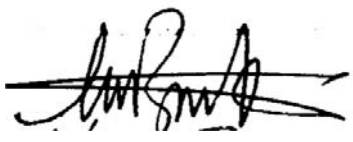
A brief summary of results for each configuration, in accordance with FCC Part 24: 2006, is shown below.

Section	Spec Clause	Test Description	Mode	Result
2.10	2.1046, 24.232	Maximum Peak Output Power - Conducted	4, 5 and 6	Pass
2.11	2.1046, 24.232	Maximum Peak Output Power - Radiated	4, 5 and 6	Pass
2.12	2.1047(d)	Modulation Characteristics	5	Pass
2.13	2.1049, 24.238(b)	Occupied Bandwidth	5	Pass
2.14	2.1051, 24.229	Spurious Emissions at Antenna Terminals	4 and 6	Pass
2.15	2.1053 and 24.238	Radiated Spurious Emissions	4, 5 and 6	Pass
2.16	2.1051, 24.238(a)	Conducted Spurious Emissions	4, 5 and 6	Pass
2.17	2.1055, 24.135(a),24.235	Frequency Stability Under Temperature Variations	5	Pass
2.18	2.1055, 24.135 (a),24.235	Frequency Stability Under Voltage Variations	5	Pass

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Cellular Mobile Phone		
MANUFACTURER	Phillips		
TYPE	Cellular Mobile Phone		
PART NUMBER	867000038409		
SERIAL NUMBER			
HARDWARE VERSION	PR3		
SOFTWARE VERSION	64604		
TRANSMITTER OPERATING RANGE	Part 22(824.2-848.8 MHz) Part 24 (1850.2-1909.8 MHz)		
RECEIVER OPERATING RANGE	Part 22(869.2-893.8 MHz) Part 24 (1930.2-1989.8 MHz)		
COUNTRY OF ORIGIN	China		
INTERMEDIATE FREQUENCIES	Direct conversion		
ITU DESIGNATION OF EMISSION	300KGXW		
HIGHEST INTERNALLY GENERATED FREQUENCY			
OUTPUT POWER (W or dBm)	32dBm		
FCC ID	RXXCT9A9J		
INDUSTRY CANADA ID	Not Applicable		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)			
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Battery		
MANUFACTURER	XWODA		
TYPE	Lithium Ion		
PART NUMBER	AB0950AWM		
VOLTAGE	3.7V		
COUNTRY OF ORIGIN	China		
MODULES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
POWER			
FCC ID			
COUNTRY OF ORIGIN			
INDUSTRY CANADA ID			
EMISSION DESIGNATOR			
DHSS/FHSS/COMBINED OR OTHER			
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
COUNTRY OF ORIGIN			

Signature 

Date 29 January 2008

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Philips CT9A9j Cellular Mobile Phone as shown in the photograph below. A full technical description can be found in the Manufacturers documentation.

Equipment Under Test

Product Service

1.4.2 Test Configuration

Configuration 1: GSM 850

The EUT was configured in accordance with FCC Part 22: 2006.

Configuration 2: GSM 1900

The EUT was configured in accordance with FCC Part 24: 2006.

1.4.3 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 - 824.2MHz Tx

Mode 2 - 836.4MHz Tx

Mode 3 - 848.8MHz Tx

Mode 4 - 1850.2MHz Tx

Mode 5 - 1880.0MHz Tx

Mode 6 - 1909.8MHz Tx

Information on the specific test modes utilised are detailed in the test procedure for each individual test.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a battery supply.

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.

Product Service

SECTION 2

TEST DETAILS

EMC Testing of the
Philips
CT9A9j

Product Service

2.1 MAXIMUM PEAK OUTPUT POWER (RADIATED)

2.1.1 Specification Reference

FCC Part 22: 2006, Clause 22.913 (a)

2.1.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056239

2.1.3 Date of Test

06 February 2008

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.1.6 Environmental Conditions

	06 February 2008
Ambient Temperature	19.2°C
Relative Humidity	34.0%

2.1.7 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Maximum Peak Output Power (Radiated).

The test results are shown below.

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
824.2	28.49	38.45	0. 706	7
836.4	28.08	38.45	0. 643	7
848.8	28.95	38.45	0. 785	7

Product Service

2.2 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.2.1 Specification Reference

FCC Part 22: 2006, Clause 22.913(a)

2.2.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.2.3 Date of Test

05 February 2008

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.2.6 Environmental Conditions

	05 February 2008
Ambient Temperature	21.1°C
Relative Humidity	45.5%

Product Service

2.2.7 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals. The EUT supports GSM and GPRS. The carrier power was measured with the EUT set to transmit in GPRS mode on timeslots 3 and 4.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.

2.2.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Maximum Peak Output Power.

The test results are shown below.

3.7 V Supply

Maximum Power -GMSK

Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
824.2	14.7	17.3	32.0	1.59
836.4	14.9	17.3	32.2	1.66
848.8	15.01	17.3	32.31	1.70

Limit	<7W or <+38.45Bm

Product Service

2.3 MODULATION CHARACTERISTICS

2.3.1 Specification Reference

FCC Part 22: 2006, Clause 2.1047 (d)

2.3.2 Equipment Under Test

CT9A9j, IMEI 358233000056155

2.3.3 Date of Test

05 February 2008

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.3.6 Environmental Conditions

	05 February 2008
Ambient Temperature	24.1°C
Relative Humidity	38.5%

Product Service

2.3.7 Test Procedure

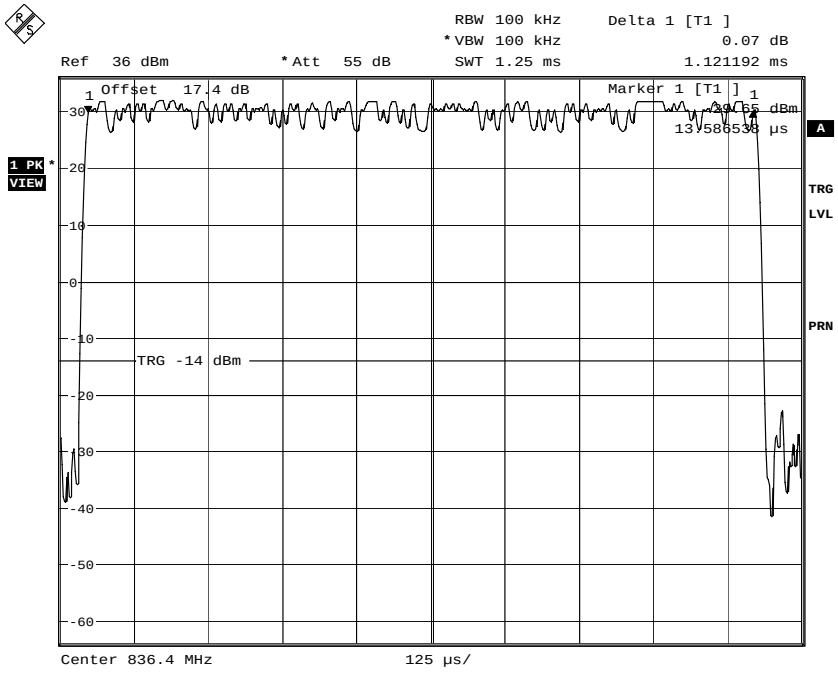
The plots included on the following pages show the EUT transmitting with the display in the time domain:

2.3.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Modulation Characteristics.

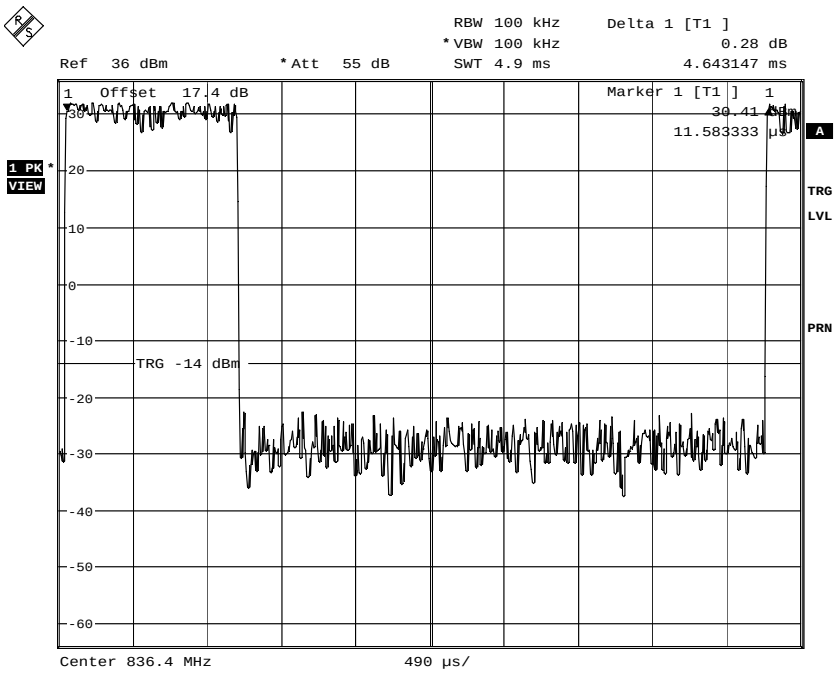
The test results are shown below.

Transmitting with GMSK Modulation showing Two Time slots



Date: 11.FEB.2008 14:48:30

Transmitting with GMSK Modulation showing One Frame with Two Time slots



Product Service

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

FCC Part 22: 2006, Clause 2.1049(h), 22.917(b)

2.4.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.4.3 Date of Test

05 February 2008

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.4.6 Environmental Conditions

	05 February 2008
Ambient Temperature	21.6°C
Relative Humidity	47.5%

2.4.7 Test Procedure

The EUT was transmitting at maximum power, and measurements were made with timeslots 3 and 4 active in GPRS mode. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the –26dBc points were established and the emission bandwidth determined.

The plot below shows the resultant display from the Spectrum Analyser.

Product Service

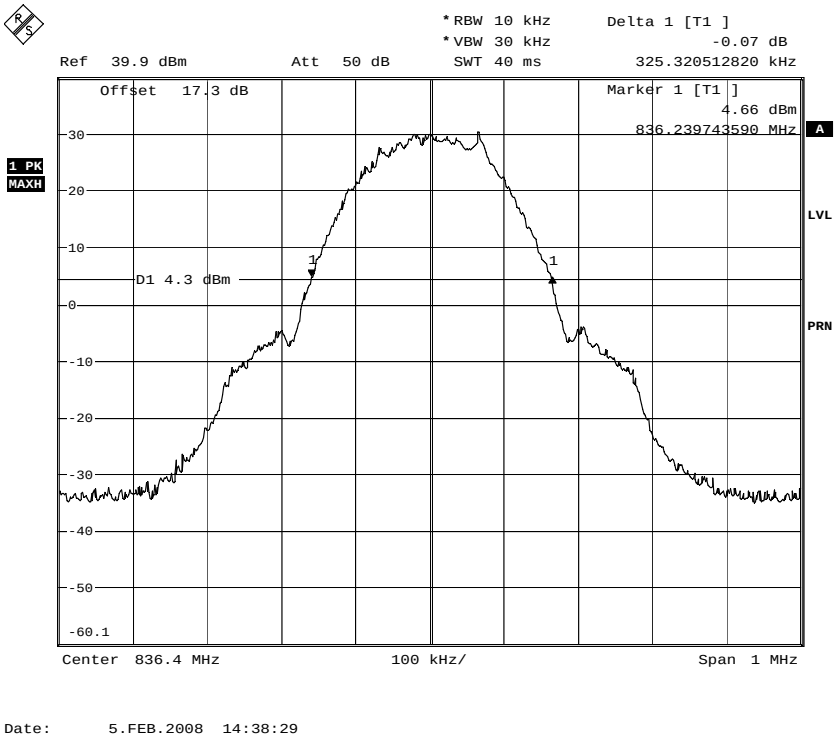
2.4.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Occupied Bandwidth.

The test results are shown below.

Occupied Bandwidth As Defined By The -26dBc Points

Maximum Power - GMSK



Date: 5.FEB.2008 14:38:29

Product Service

2.5 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

2.5.1 Specification Reference

FCC Part 22: 2006, Clause 2.1051, 22.905

2.5.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.5.3 Date of Test

11 February 2008

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 3

2.5.6 Environmental Conditions

	11 February 2008
Ambient Temperature	23.9°C
Relative Humidity	24.7%

2.5.7 Test Procedure

In accordance with 22.917(e), any emissions outside of the block edges shall be attenuated by at least 43 + 10 log(P). The measurements are shown to ±1MHz from the block edges. The plots shown under the Spurious Emissions section covers the required range of 9kHz to 9GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.5dB variation between the top and baootom channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the –13dBm, (43+10logP), limit.

The EUT was tested at it's maximum power level.

Product Service

Below are the Frequency Blocks the EUT was tested against along with the tested channels.

Communication Channel Pair Blocks

Frequency Block (MHz)	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A (824.0 – 835.0)	Channel : 129 Frequency : 824MHz	-
B (846.5 – 849.0)	-	Channel : 250 Frequency : 848MHz

2.5.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Spurious Emissions at Antenna Terminals.

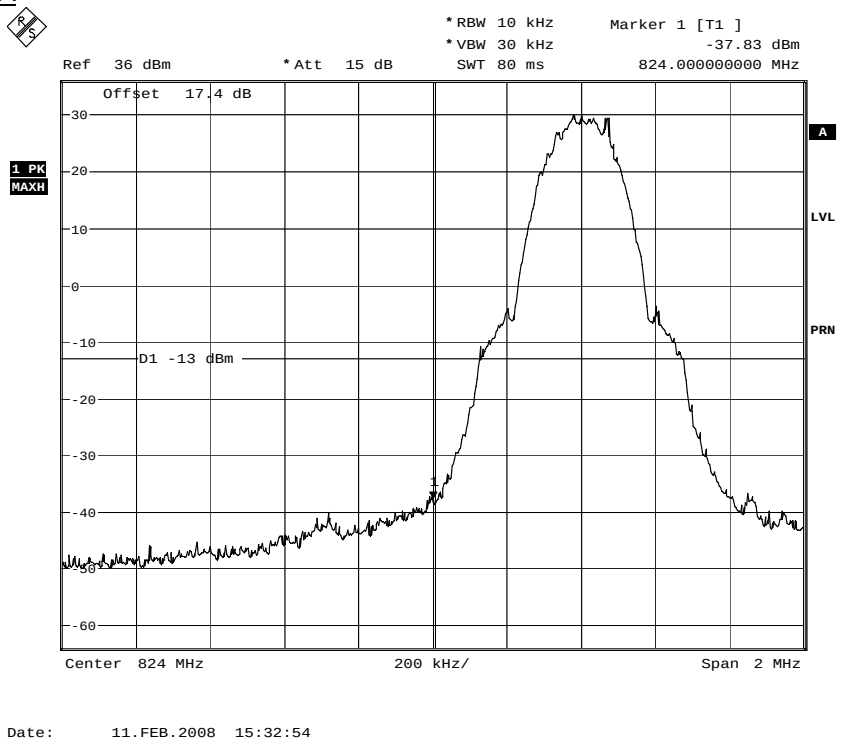
The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

The channels outside of those shown in the table above were not tested at lower power levels to determine a level at which compliance would be achieved. Therefore, to maintain compliance, only the channels shown in the table above shall be used.

The measurement plots are shown below.

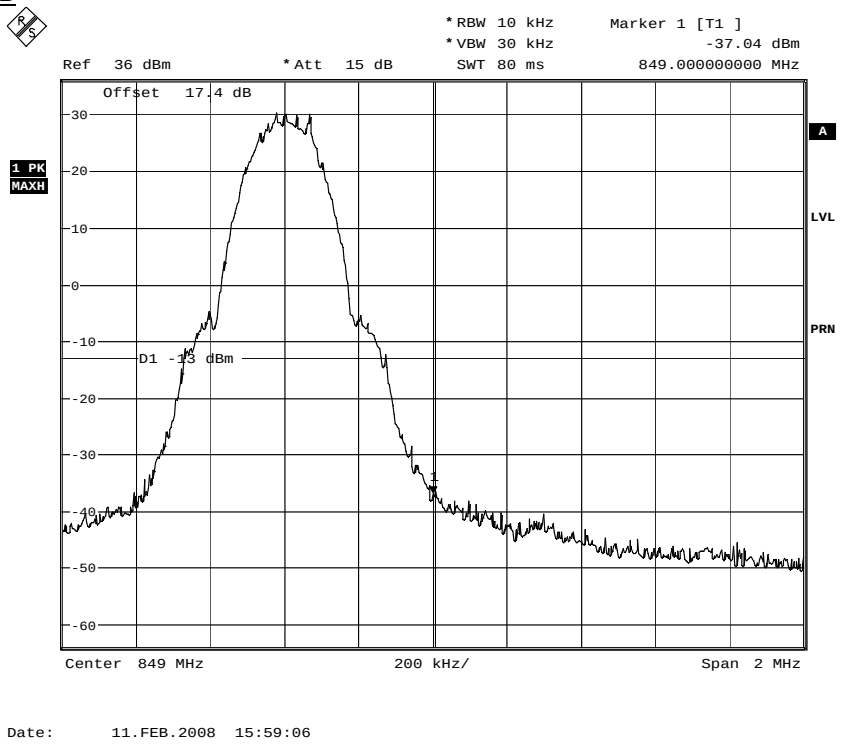
The test results are shown below.

Block Edge A



Product Service

Block Edge B



Product Service

2.6 RADIATED EMISSIONS (ENCLOSURE PORT)

2.6.1 Specification Reference

FCC Part 22: 2006, Clause 22.917

2.6.2 Equipment Under Test

CT9A9j, S/N: IMEI: 358233000056239

2.6.3 Date of Test

08 February 2008

2.6.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.6.6 Environmental Conditions

	08 February 2008
Ambient Temperature	19.2°C
Relative Humidity	34%
Atmospheric Pressure	1025mbar

Product Service

2.6.7 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1

No emissions were detected within 20dB of the noise floor. Therefore no plot is presented.

Configuration 1 - Mode 2

No emissions were detected within 20dB of the noise floor. Therefore no plot is presented.

Configuration 1 - Mode 3

No emissions were detected within 20dB of the noise floor. Therefore no plot is presented.

Product Service

2.7 SPURIOUS CONDUCTED EMISSIONS

2.7.1 Specification Reference

FCC Part 22: 2006, Clause 2.1051, 22.917(a)

2.7.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.7.3 Date of Test

05 February 2008

2.7.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.7.6 Environmental Conditions

	05 February 2008
Ambient Temperature	23.7°C
Relative Humidity	39.7%

Product Service

2.7.7 Test Procedure

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9kHz to 9GHz. The EUT was set to transmit on full power with two timeslots 3 and 4 active in GPRS mode. The EUT was tested on Bottom, Middle and Top channels for maximum power level. The resolution and video bandwidths were set to 1MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to Max Hold.

From 9kHz to 1.5GHz, an attenuator was used. For measuring the range 1.5GHz to 9GHz, an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

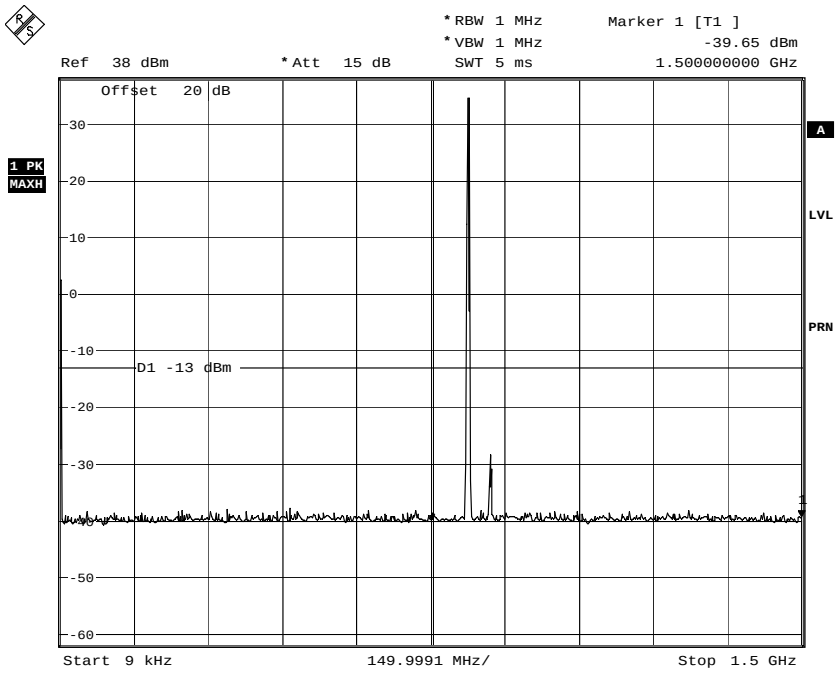
In addition, measurements were made up to the 10th harmonic of the fundamental.

2.7.8 Test Results

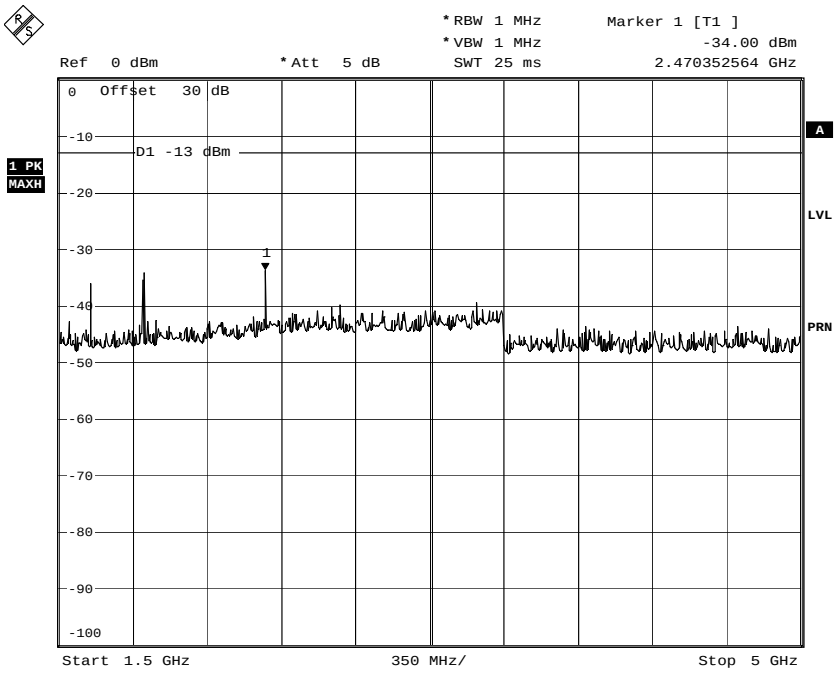
For the period of test the EUT met the requirements of FCC Part 22: 2006 for Spurious Conducted Emissions.

The test results are shown below.

Spurious Conducted Emissions Bottom Channel (9kHz – 1.5GHz)

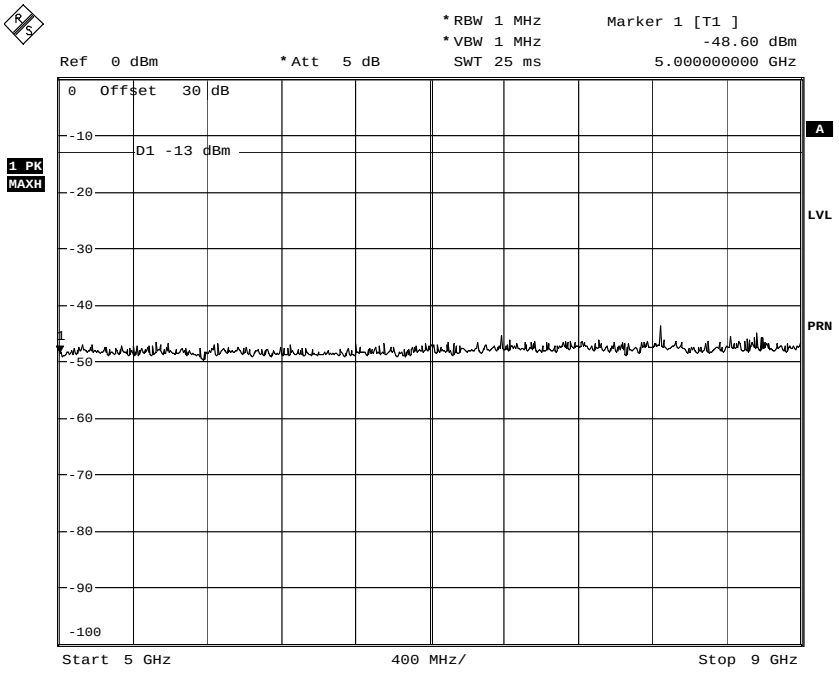


Spurious Conducted Emissions Bottom Channel (1.5GHz – 5GHz)



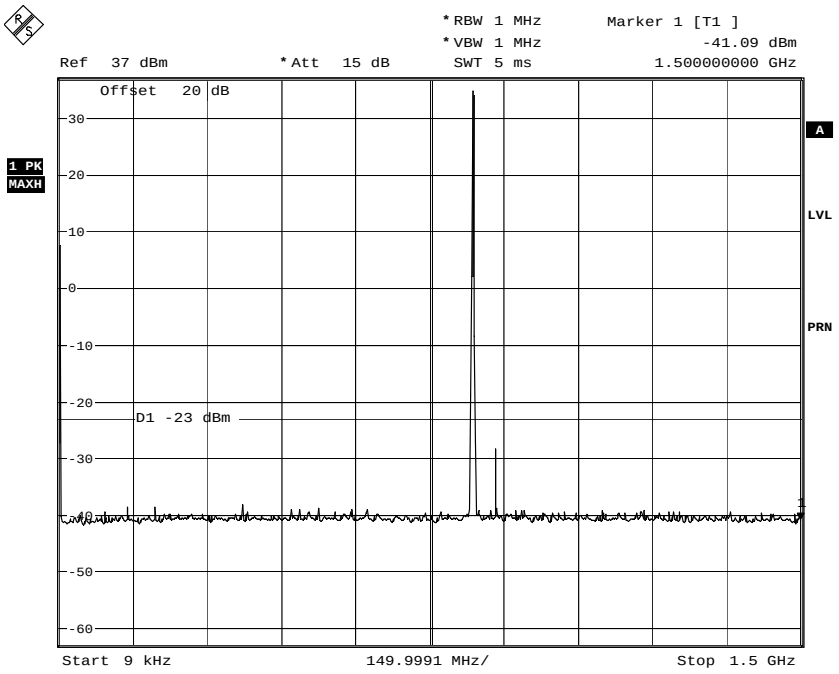
Date: 5.FEB.2008 17:58:03

Spurious Conducted Emissions Bottom Channel (5GHz – 9GHz)



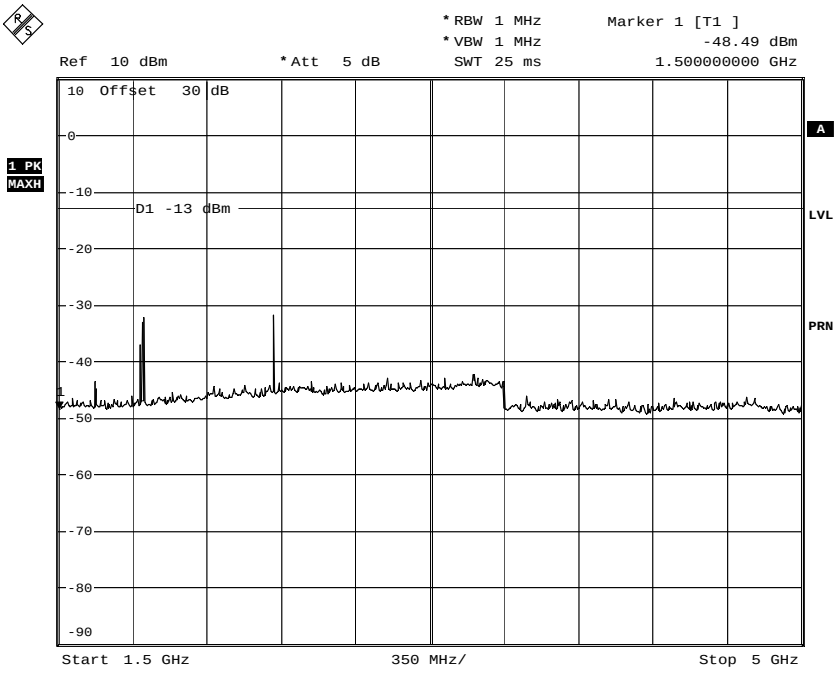
Date: 5.FEB.2008 17:59:03

Spurious Conducted Emissions Middle Channel (9kHz – 1.5GHz)



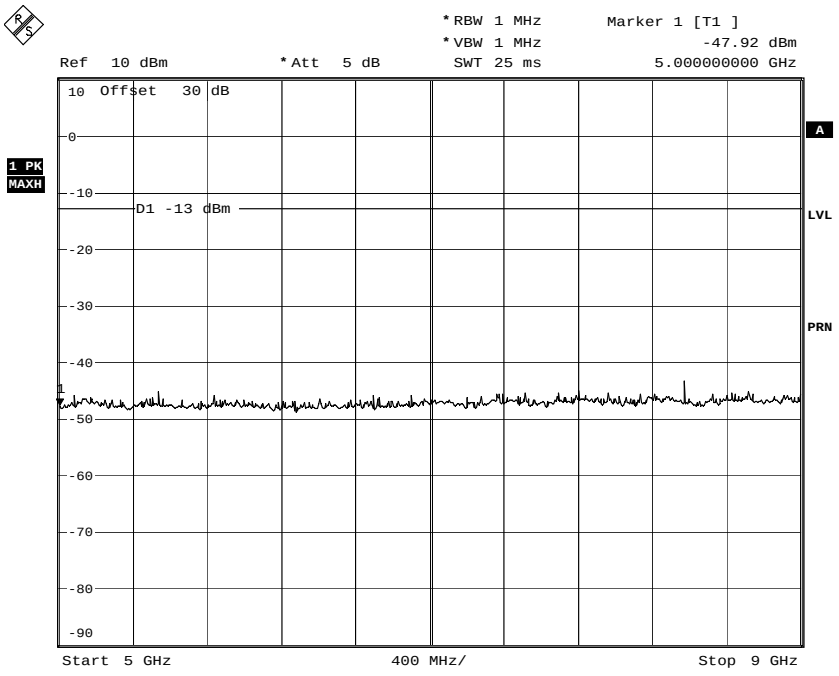
Date: 5.FEB.2008 18:04:58

Spurious Conducted Emissions Middle Channel (1.5GHz – 5GHz)



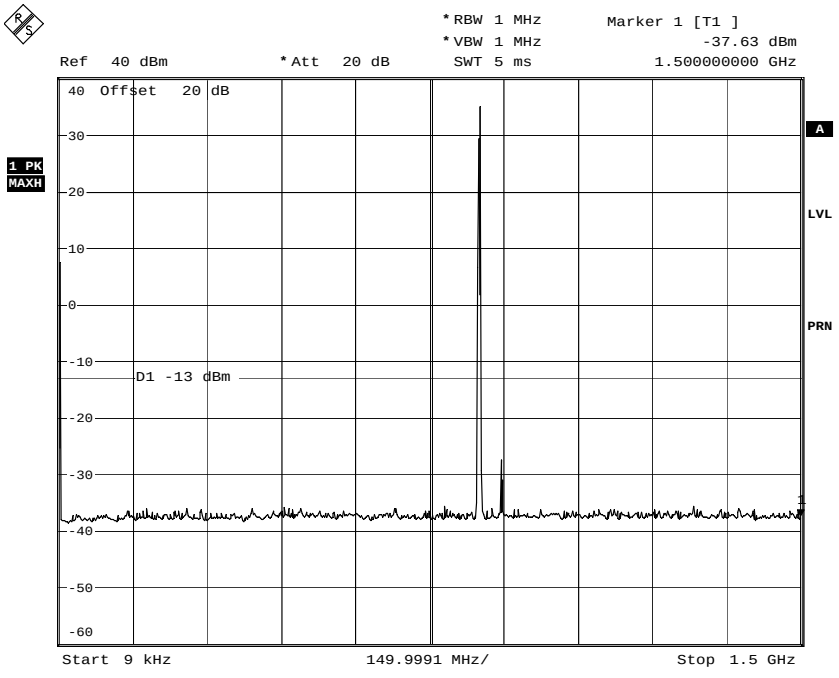
Date: 5.FEB.2008 18:08:23

Spurious Conducted Emissions Middle Channel (5GHz – 9GHz)



Date: 5.FEB.2008 18:10:21

Spurious Conducted Emissions Top Channel (9kHz – 1.5GHz)



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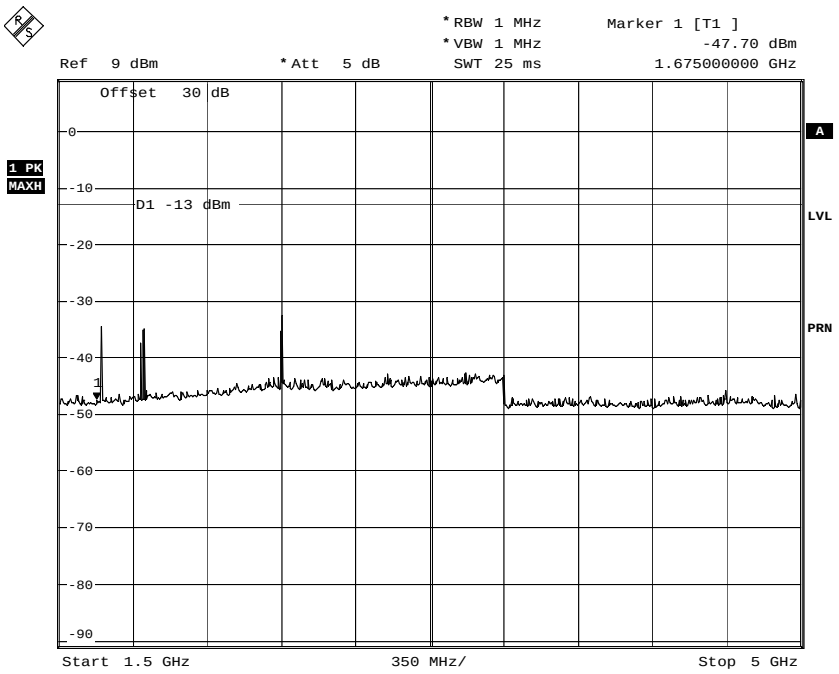
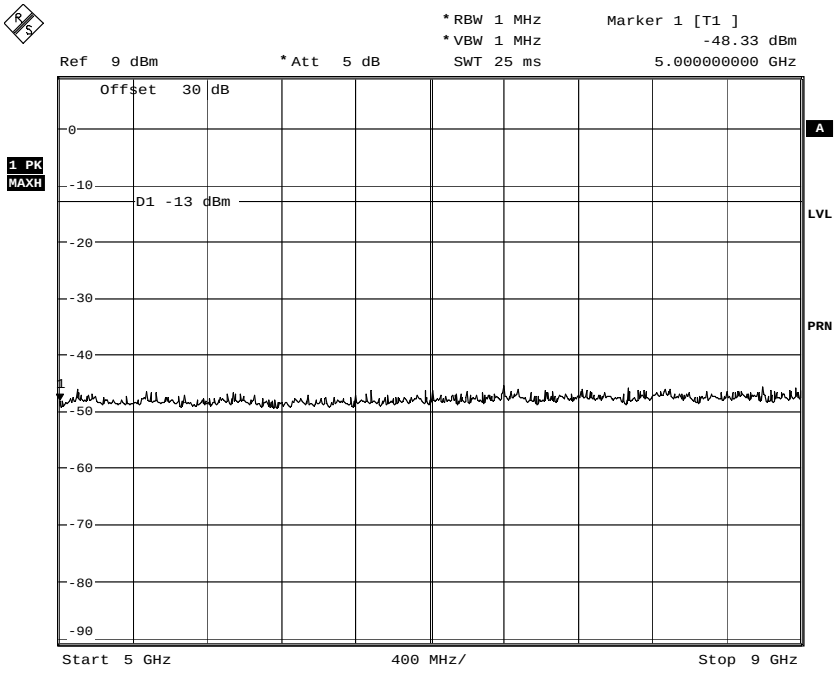
Product Service

Spurious Conducted Emissions Top Channel (1.5GHz – 5GHz)



Date: 5.FEB.2008 18:18:36

Spurious Conducted Emissions Top Channel (5GHz – 9GHz)



Date: 5.FEB.2008 18:19:18

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC Part 22: 2006, Clause 2.1055, 22.355

2.8.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.8.3 Date of Test

07 February 2008

2.8.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.8.6 Environmental Conditions

	07 February 2008
Ambient Temperature	22.2°C
Relative Humidity	41.5%

2.8.7 Test Procedure

The EUT was set to transmit on maximum power with timeslots 3 and 4 active in GPRS mode. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between –30ºC and +50ºC in 10º steps as per 2.1055.

Product Service

2.8.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 - Mode 2

3.7 V – GMSK modulation

Temperature Interval (ºC)	Test Frequency (MHz)	Deviation (Hz)	Limit (kHz)
-27.5*	836.4	-22	±2.092
-20	836.4	-13	±2.092
-10	836.4	+12	±2.092
0	836.4	-15	±2.092
+10	836.4	-14	±2.092
+20	836.4	-22	±2.092
+30	836.4	-24	±2.092
+40	836.4	-28	±2.092
+50	836.4	-20	±2.092

* The lowest temperature that the EUT operated at was -27.5ºC. The result is shown in the table above. At temperatures lower than -27.5ºC, the EUT did not operate.

Product Service

2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC Part 22: 2006, Clause 2.1055, 22.355

2.9.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.9.3 Date of Test

08 February 2008

2.9.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 22: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 2

2.9.6 Environmental Conditions

	08 February 2008
Ambient Temperature	21.8°C
Relative Humidity	35.1%

2.9.7 Test Procedure

The EUT was set to transmit on maximum power with timeslots 3 and 4 active in GPRS mode. Measurements were made on timeslot 3. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts.

Product Service

2.9.8 Test Results

For the period of test the EUT met the requirements of FCC Part 22: 2006 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 - Mode 2

3.33 V – GMSK modulation

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Deviation Limit (kHz)
3.33	836.4	-40	±2.092

2.10 MAXIMUM PEAK OUTPUT POWER (RADIATED)

2.10.1 Specification Reference

FCC Part 24: 2006, Clause 2.1046, 24.232

2.10.2 Equipment Under Test

CT9A9j, S/N: IMEI 823000056239

2.10.3 Date of Test

06 February 2008

2.10.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4
- Mode 5
- Mode 6

2.10.6 Environmental Conditions

	06 February 2008
Ambient Temperature	19.2°C
Relative Humidity	34.0%

2.10.7 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Maximum Peak Output Power (Radiated).

The test results are shown below.

Frequency (MHz)	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
1850.2	25.63	33.00	0.3656	2
1880.0	23.48	33.00	0.2228	2
1909.8	23.82	33.00	0.2410	2

Product Service

2.11 MAXIMUM PEAK OUTPUT POWER (CONDUCTED)

2.11.1 Specification Reference

FCC Part 24: 2006, Clause 2.1046, 24.232

2.11.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.11.3 Date of Test

05 February 2008

2.11.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.11.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4
- Mode 5
- Mode 6

2.11.6 Environmental Conditions

	05 February 2008
Ambient Temperature	21.7°C
Relative Humidity	45.5%

Product Service

2.11.7 Test Procedure

Using a spectrum analyser and attenuator(s), the output power of the EUT was measured at the antenna terminals. The EUT supports GSM and GPRS. The carrier was measured with the EUT set to transmit in GPRS mode with timeslots 3 and 4 active.

The spectrum analyser RBW and VBW were set to 1MHz and the path loss measured and entered as a reference level offset.

2.11.8 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Maximum Peak Output Power.

The test results are shown below.

3.7 V Supply

Maximum Power -GSM

Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
1850.2	10.84	18.1	28.94	0.78
1880.0	10.8	18.1	28.90	0.78
1909.8	10.72	18.1	28.82	0.76

Limit	<2W or <+33dBm

Product Service

2.12 MODULATION CHARACTERISTICS

2.12.1 Specification Reference

FCC Part 24: 2006, Clause 2.1047 (d)

2.12.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.12.3 Date of Test

05 February 2008

2.12.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.12.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4

2.12.6 Environmental Conditions

	05 February 2008
Ambient Temperature	23.4°C
Relative Humidity	44.1%

Product Service

2.12.7 Test Procedure

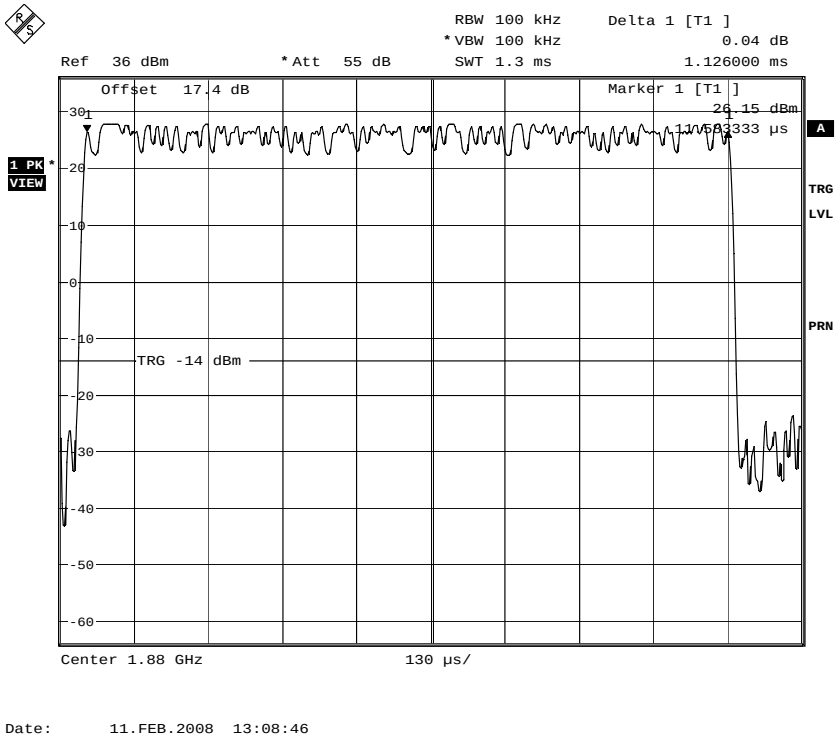
The plots included on the following pages show the EUT transmitting with the display in the time domain:

2.12.8 Test Results

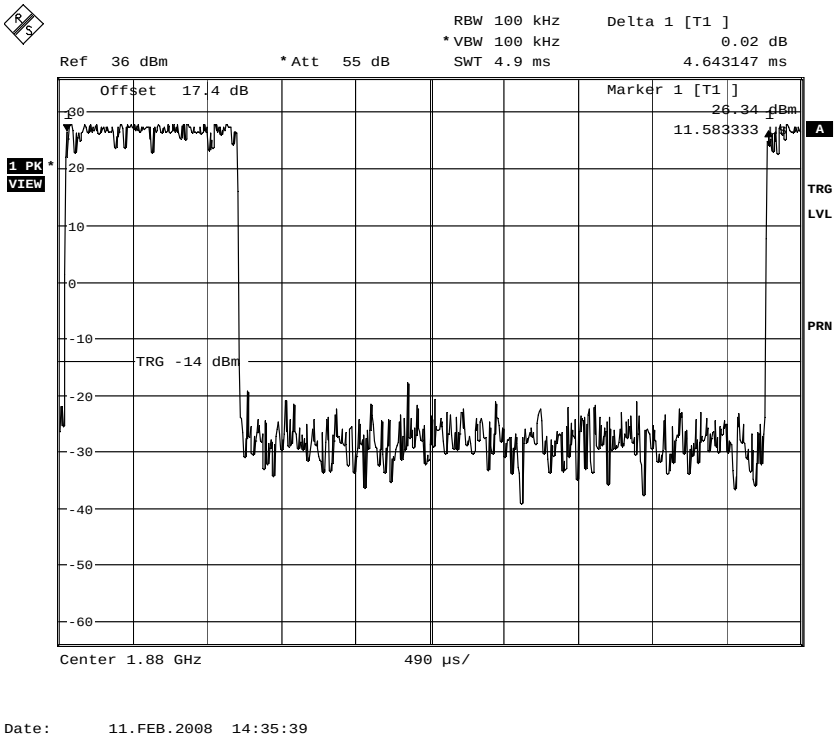
For the period of test the EUT met the requirements of FCC Part 24: 2006 for Modulation Characteristics.

The test results are shown below.

Transmitting with GMSK Modulation showing Two Time slots



Transmitting with GMSK Modulation showing One Frame with Two Time slots



Date: 11.FEB.2008 14:35:39

Product Service

2.13 OCCUPIED BANDWIDTH

2.13.1 Specification Reference

FCC Part 24: 2006, Clause 2.1049(h), 24.238(b)

2.13.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.13.3 Date of Test

05 February 2008

2.13.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.13.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4

2.13.6 Environmental Conditions

	05 February 2008
Ambient Temperature	22.6°C
Relative Humidity	45.2%

2.13.7 Test Procedure

The EUT was transmitting at maximum power, and measurements were made with timeslots 3 and 4 active in GPRS mode. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the –26dBc points were established and the emission bandwidth determined.

The plot below shows the resultant display from the Spectrum Analyser.

Product Service

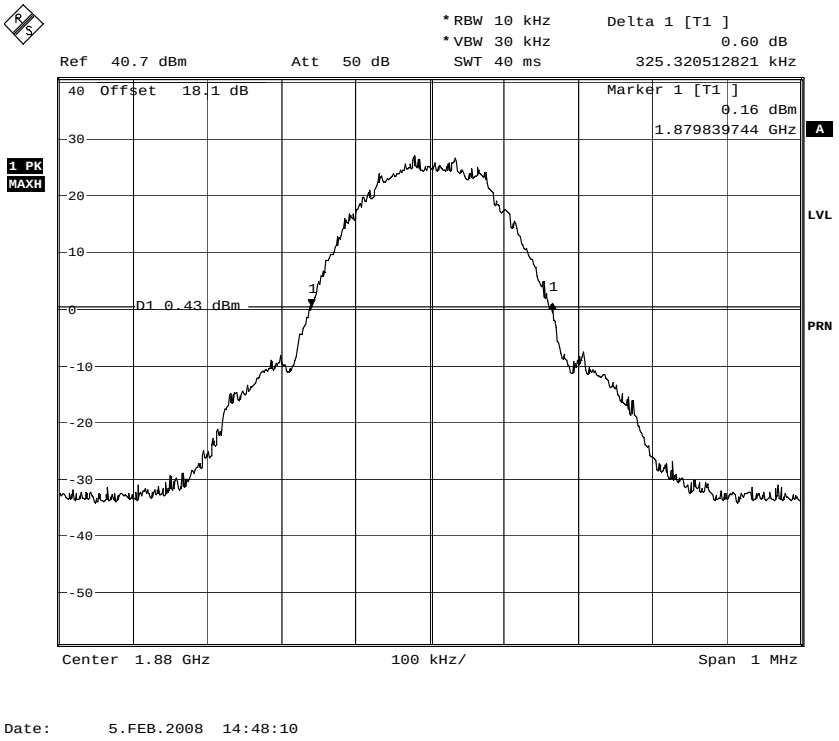
2.13.8 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Occupied Bandwidth.

The test results are shown below.

Occupied Bandwidth As Defined By The -26dBc Points

Maximum Power - GMSK



Product Service

2.14 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

2.14.1 Specification Reference

FCC Part 24: 2006, Clause 2.1051, 24.229

2.14.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.14.3 Date of Test

11 February 2008

2.14.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.14.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4
- Mode 6

2.14.6 Environmental Conditions

	11 February 2008
Ambient Temperature	25.0°C
Relative Humidity	26.9%

2.14.7 Test Procedure

In accordance with Part 24.238, at least 1% of the 26dB bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidths were increased to 1MHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. It was found that there was <0.5dB variation between top and bottom channels, thus the worst case reference level offset was used throughout. Having entered the reference level offset, the limit line was displayed, showing the –13dBm, (43+10logP), limit.

The EUT was tested at it's maximum power level.

Below are the Frequency Blocks the EUT was tested against along with the tested channels.

Communication Channel Pair Blocks

Frequency Block (MHz)	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A	Channel : 513 Frequency : 1850.4 MHz	-
B	-	Channel : 809 Frequency : 1909.6 MHz

2.14.8 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Spurious Emissions at Antenna Terminals.

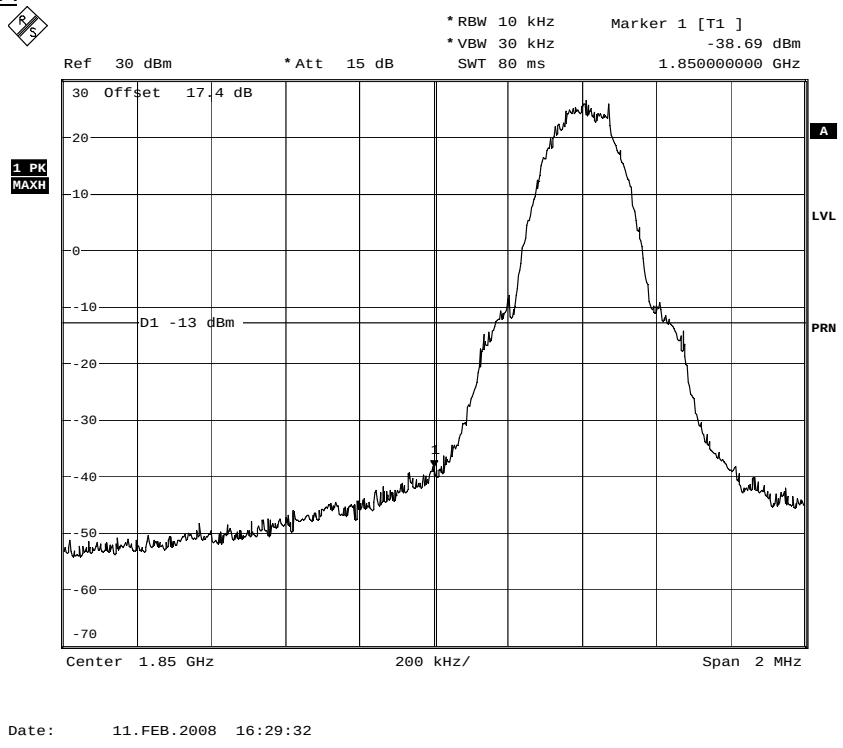
The channels shown in the table above are the minimum and maximum channels that can be used in each block to maintain compliance. Channels used outside of those stated in the table exceed the specification limits, thus they cannot be used.

The channels outside of those shown in the table above were not tested at lower power levels to determine a level at which compliance would be achieved. Therefore, to maintain compliance, only the channels shown in the table above shall be used.

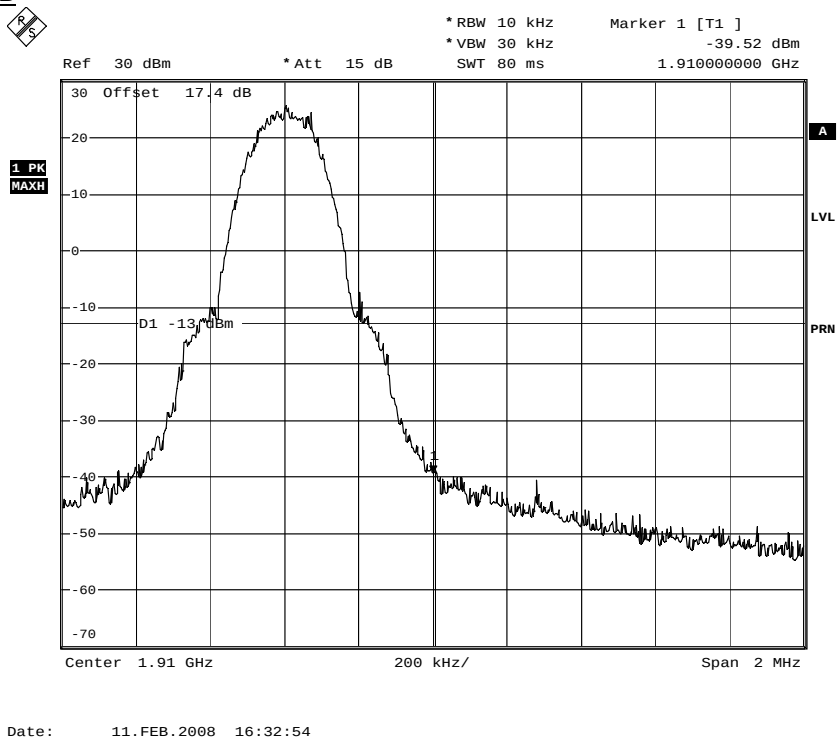
The measurement plots are shown below.

The test results are shown below.

Block Edge A



Block Edge B


*RBW 10 kHz
*VBW 30 kHz
SWT 80 ms
Marker 1 [T1]
-39.52 dBm
1.910000000 GHz
Ref 30 dBm
*Att 15 dB
30 Offset 17.4 dB
1 PK
MAXH
A
LVL
PRN
D1 -13 dBm
Center 1.91 GHz
200 kHz/
Span 2 MHz
Date: 11.FEB.2008 16:32:54

Product Service

2.15 RADIATED EMISSIONS (ENCLOSURE PORT)

2.15.1 Specification Reference

FCC Part 24: 2006, Clause 2.1053, 24.238

2.15.2 Equipment Under Test

CT9A9j, S/N: IMEI: 358233000056239

2.15.3 Date of Test

08 February 2008

2.15.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.15.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4
- Mode 5
- Mode 6

2.15.6 Environmental Conditions

	08 February 2008
Ambient Temperature	19.2°C
Relative Humidity	34%
Atmospheric Pressure	1025mbar

Product Service

2.15.7 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 2 - Mode 4

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	Limit dBm	Margin dB
3700.4	Vertical	100	35	-19.25	-13	-6.25
5550.3	Vertical	100	340	-34.18	-13	-21.18
7400.8	Vertical	100	120	-41.49	-13	-28.49

Configuration 2 - Mode 5

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	Limit dBm	Margin dB
3760.08	Vertical	100	35.0	-20.98	-13	-7.98
5641.0	Vertical	100	315.0	-26.67	-13	-13.67
7525.6	Vertical	100	120	-43.04	-13	-30.04

Configuration 2 - Mode 6

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	Limit dBm	Margin dB
3819.6	Vertical	100	35	-21.27	-13	-8.27
5729.4	Vertical	130	0	-34.53	-13	-21.53
7639.2	Vertical	130	257	-40.71	-13	-27.71

Product Service

2.16 SPURIOUS CONDUCTED EMISSIONS

2.16.1 Specification Reference

FCC Part 24: 2006, Clause 2.1051, 24.238(a)

2.16.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.16.3 Date of Test

05 February 2008

2.16.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.16.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 4
- Mode 5
- Mode 6

2.16.6 Environmental Conditions

	05 February 2008
Ambient Temperature	23.6°C
Relative Humidity	38.9%

Product Service

2.16.7 Test Procedure

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9kHz to 20GHz. The EUT was set to transmit on full power with two timeslots 3 and 4 active in GPRS mode. The EUT was tested on Bottom, Middle and Top channels for maximum power level. The resolution and video bandwidths were set to 1MHz in accordance with Part 24.238. The spectrum analyser detector was set to Max Hold.

For measuring the range 9kHz to 4GHz, on maximum power, a 10dB attenuator was used. From 4 to 20GHz, attenuators and a high pass filter were used. This was to reduce the saturation effects in the spectrum analyser.

The maximum path loss across the measurement band was used as the reference level offset to ensure worst case.

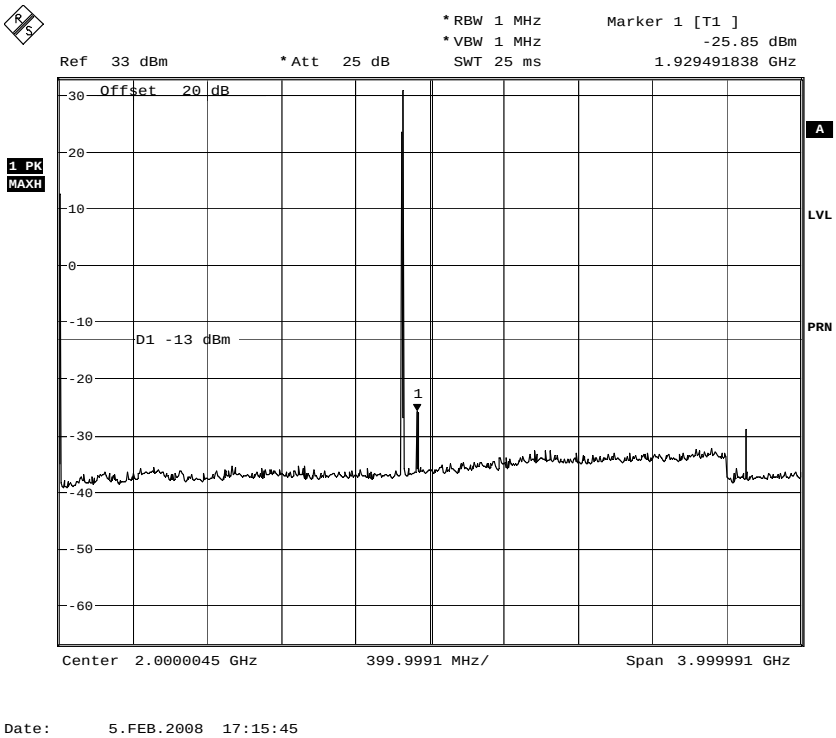
In addition, measurements were made up to the 10th harmonic of the fundamental.

2.16.8 Test Results

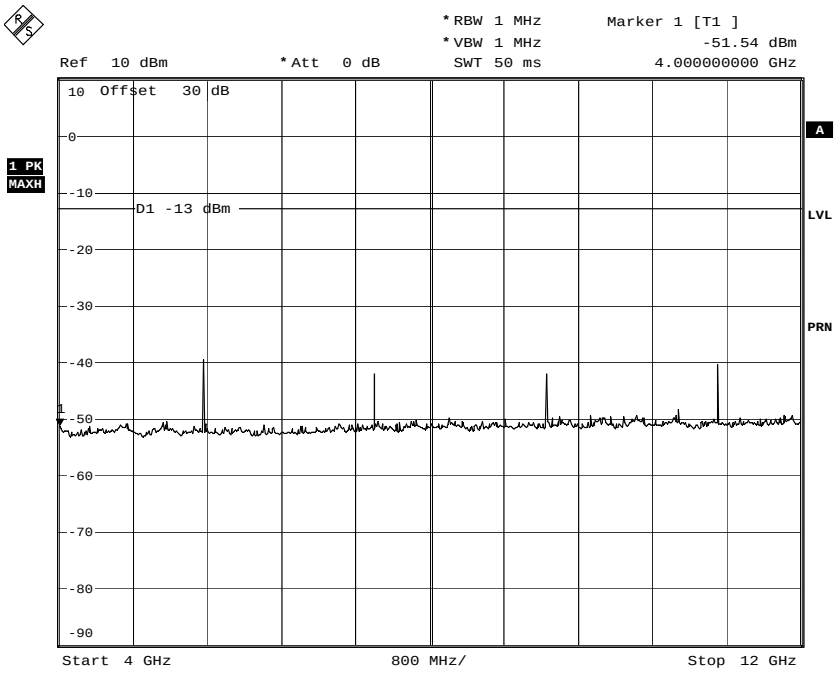
For the period of test the EUT met the requirements of FCC Part 24: 2006 for Spurious Conducted Emissions.

The test results are shown below.

Spurious Conducted Emissions Bottom Channel (9kHz – 4GHz)

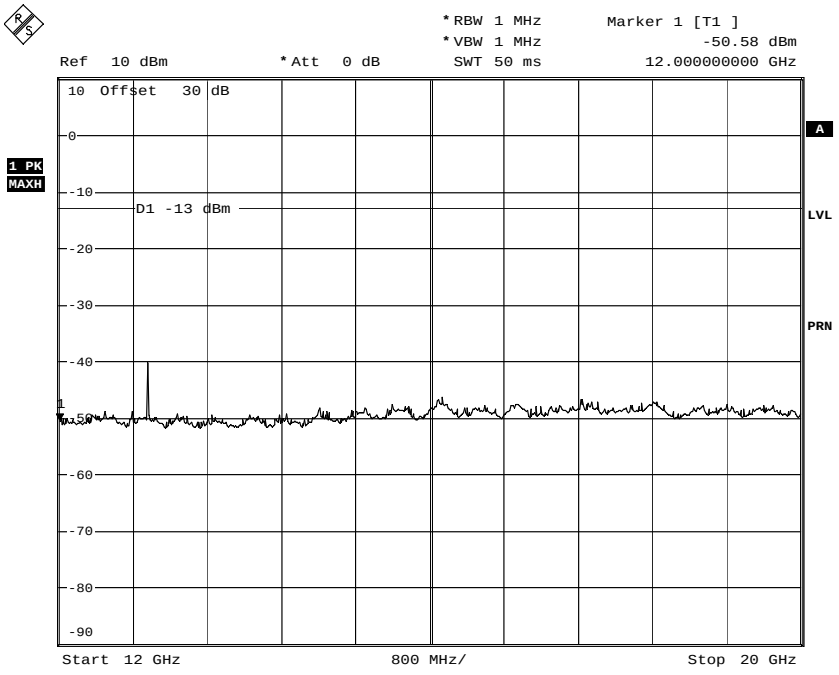


Spurious Conducted Emissions Bottom Channel (4GHz – 12GHz)



Date: 5.FEB.2008 17:19:32

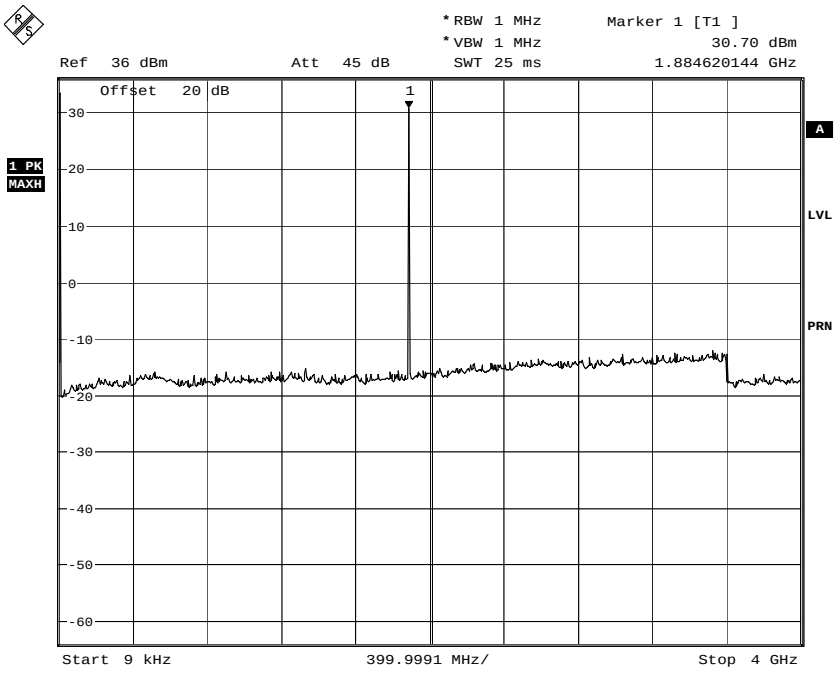
Spurious Conducted Emissions Bottom Channel (12GHz – 20GHz)



Date: 5.FEB.2008 17:21:10

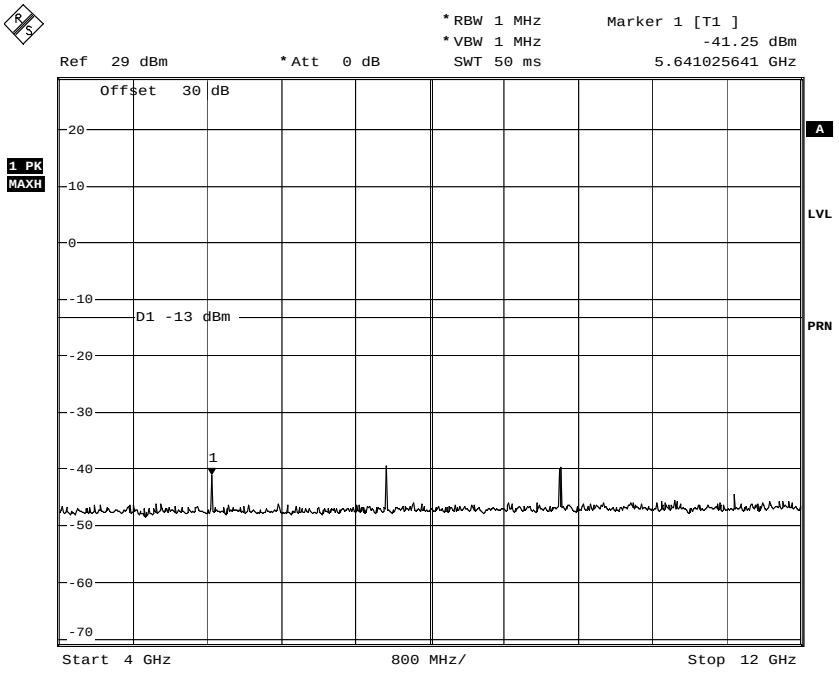
Product Service

Spurious Conducted Emissions Middle Channel (9kHz – 4GHz)



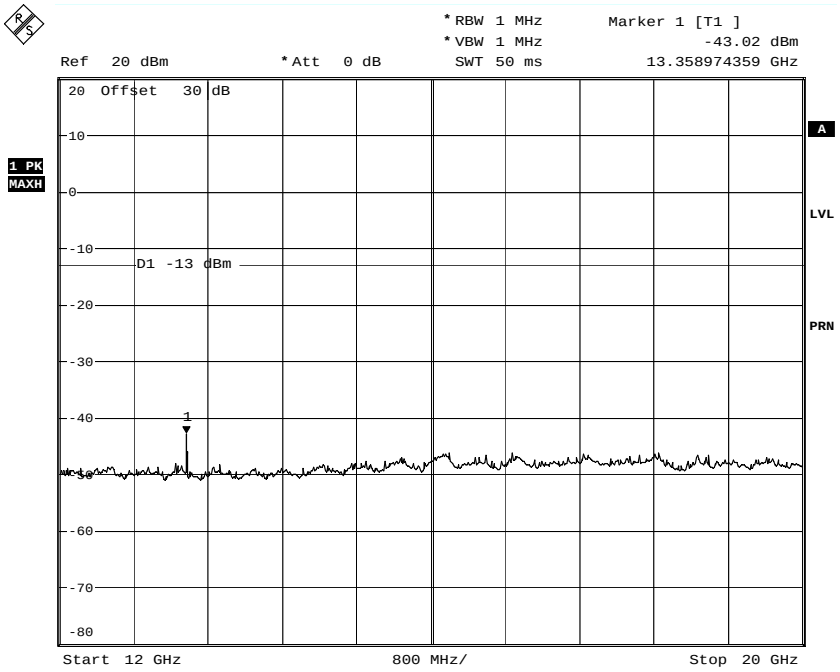
Date: 5.FEB.2008 16:32:42

Spurious Conducted Emissions Middle Channel (4GHz – 12GHz)



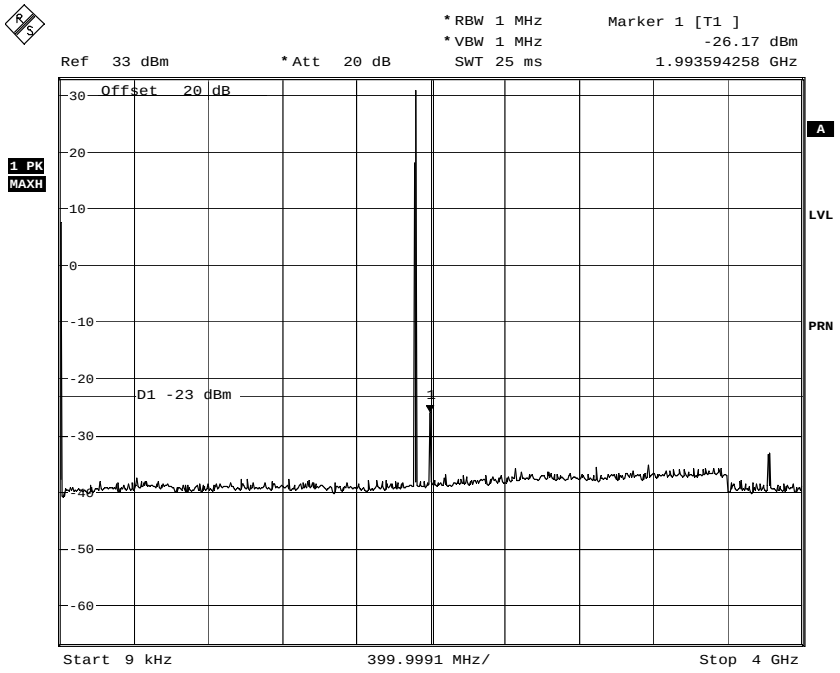
Date: 5.FEB.2008 17:06:06

Spurious Conducted Emissions Middle Channel (12GHz – 20GHz)



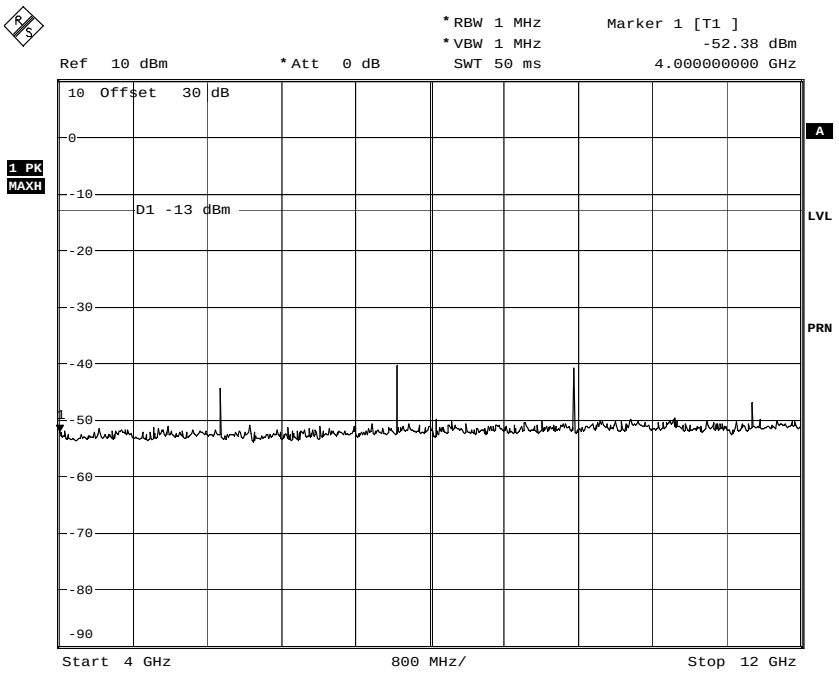
Date: 14.FEB.2008 17:01:20

Spurious Conducted Emissions Top Channel (9kHz – 4GHz)



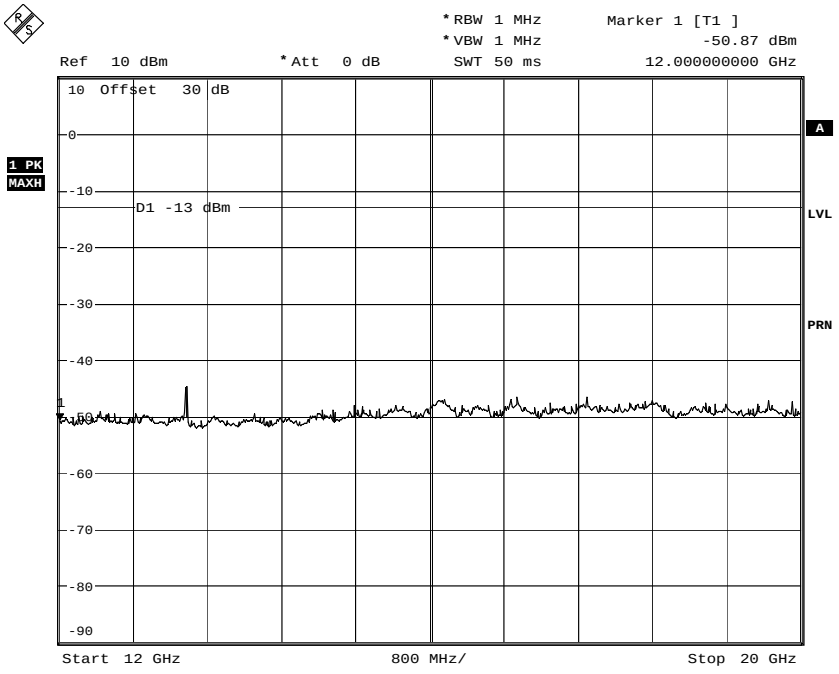
Date: 5.FEB.2008 17:26:23

Spurious Conducted Emissions Top Channel (4GHz – 12GHz)



Date: 5.FEB.2008 17:28:25

Spurious Conducted Emissions Top Channel (12GHz – 20GHz)



Date: 5.FEB.2008 17:29:32

2.17 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.17.1 Specification Reference

FCC Part 24: 2006, Clause 2.1055, 24.135(a), 24.235

2.17.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.17.3 Date of Test

07 February 2008

2.17.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.17.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 5

2.17.6 Environmental Conditions

	07 February 2008
Ambient Temperature	23.1°C
Relative Humidity	38.2%

2.17.7 Test Procedure

The EUT was set to transmit on maximum power and measurements were made with Timeslots 3 and 4 active in GPRS mode. Measurements were made on Timeslot 3. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between –30ºC and +50ºC in 10º steps as per 2.1055.

Product Service

2.17.8 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 2 - Mode 5

3.7 V – GMSK modulation

Temperature Interval (ºC)	Test Frequency (GHz)	Deviation (Hz)	Limit (kHz)
-27.5*	1.88	+26	±1.88
-20	1.88	+21	±1.88
-10	1.88	+18	±1.88
0	1.88	+21	±1.88
+10	1.88	+25	±1.88
+20	1.88	+30	±1.88
+30	1.88	+12	±1.88
+40	1.88	-14	±1.88
+50	1.88	-27	±1.88

* The lowest temperature that the EUT operated at was -27.5ºC. The result is shown in the table above. At temperatures lower than -27.5ºC, the EUT did not operate.

Product Service

2.18 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.18.1 Specification Reference

FCC Part 24: 2006, Clause 2.1055, 24.235, 24.135(a)

2.18.2 Equipment Under Test

CT9A9j, S/N: IMEI 358233000056155

2.18.3 Date of Test

08 February 2008

2.18.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.18.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of Part 24: 2006.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 2 - Mode 5

2.18.6 Environmental Conditions

	08 February 2008
Ambient Temperature	21.6°C
Relative Humidity	35.8%

2.18.7 Test Procedure

The EUT was set to transmit on maximum power and measurements were made with timeslots 3 and 4 active in GPRS mode. Measurements were made on timeslot 3. A Digital Communication Analyser, (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts.

Product Service

2.18.8 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 2 - Mode 5

3.33 V – GMSK modulation

DC Voltage (V)	Test Frequency (GHz)	Deviation (Hz)	Deviation Limit (kHz)
3.33	1.88	-68	±1.88

Product Service

SECTION 3

TEST EQUIPMENT USED

Product Service

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Sections 2.1, 2.6, 2.11 and 2.15 EMC - Radiated Emissions				
Signal Generator 10kHz to 2.7GHz	Marconi	2031	19	17-Jan-2009
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	27-Oct-2008
Signal Generator	Hewlett Packard	8672A	223	22-Feb-2008
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	22-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	29-Jun-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	29-Jun-2008
Pre-Amplifier	Phase One	PS04-0086	1533	TU
Pre-Amplifier	Phase One	PSO4-0087	1534	TU
Mast Controller	Inn-Co GmbH	CO 1000	1606	TU
Turntable/Mast Controller	EMCO	2090	1607	TU
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	21-May-2008
Antenna (Bilog)	Chase	CBL6143	2904	28-Nov-2009
Antenna (Log Periodic)	Schaffner	UPA6108	3108	31-Mar-2008
Compliance 3 Emissions	Schaffner	C3e Software V.4.00.00	3274	N/A - Software
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	28-Jan-2009
Sections 2.5 and 2.14 Radio (Tx) - Block Edge				
Dual Power Supply Unit	Hewlett Packard	6253A	271	O/P Mon
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Broadband Resistive Power Divider	Weinschel	1506A	601	18-Aug-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Multimeter	Iso-tech	Iso Tech IDM101	2424	13-Aug-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	29-May-2008

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.7 and 2.16 Radio (Tx) - Conducted Spurious Emissions				
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Filter (High Pass, 4GHz)	RLC Electronics	F-100-4000-5-R	564	21-May-2008
Broadband Resistive Power Divider	Weinschel	1506A	601	18-Aug-2008
Power Splitter	Weinschel	1506A	606	29-Nov-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Filter (Hi Pass)	RLC Electronics	F-100-1500-5-R	2777	21-May-2008
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	29-May-2008
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	11-Jul-2008
Section 2.8, 2.9, 2.17 and 2.18 Radio (Tx) - Frequency Deviation				
Climatic Chamber	Votsch	VT4002	161	O/P Mon
Dual Power Supply Unit	Hewlett Packard	6253A	271	O/P Mon
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Digital Temperature Indicator	Fluke	51	2267	1-Jun-2008
Multimeter	Iso-tech	Iso Tech IDM101	2424	13-Aug-2008
Attenuator (20dB, 50W)	Aeroflex / Weinschel	47-20-34	3165	29-May-2008
Section 2.2 and 2.10 Radio (Tx) - Maximum Peak Output Power				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	27-Oct-2008
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Broadband Resistive Power Divider	Weinschel	1506A	601	18-Aug-2008
Power Splitter	Weinschel	1506A	606	29-Nov-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	29-May-2008
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	11-Jul-2008

Instrument	Manufacturer	Type No	TE Number	Calibration Due
Section 2.3 and 2.12 Radio (Tx) - Modulation Characteristics				
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Broadband Resistive Power Divider	Weinschel	1506A	601	18-Aug-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	29-May-2008
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	11-Jul-2008
Sections 2.4 and 2.13 Radio (Tx) - Occupied Bandwidth				
Radiocommunications Tester	Rohde & Schwarz	CMU 200	39	27-Oct-2008
Attenuator 10dB 25W	Weinschel	46-10-43	400	13-Apr-2008
Communications Tester	Rohde & Schwarz	CMU 200	442	21-Jun-2008
Broadband Resistive Power Divider	Weinschel	1506A	601	18-Aug-2008
Power Splitter	Weinschel	1506A	606	29-Nov-2008
Hygromer	Rotronic	A1	1945	22-Jun-2008
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	24-Jul-2008
Attenuator (10dB, 50W)	Aeroflex / Weinschel	47-10-34	3166	29-May-2008
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	11-Jul-2008

TU – Traceability Unscheduled

Product Service

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10^6.

* In accordance with CISPR 16-4
† In accordance with UKAS Lab 34

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA (Not UKAS Accredited).