Report On

FCC CFR 47 Parts 22 and 24 Testing of the
Avantech Manufacture
Attitude E310 Mobile Phone

COMMERCIAL-IN-CONFIDENCE

FCC ID: RXXATTITUDEE310

Document 75904049 Report 03 Issue 4 August 2008

Product Service

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

FCC CFR 47 Parts 22 and 24 Testing of the
Avantech Manufacure
Attitude E310 Mobile Phone

Document 75904049 Report 03 Issue 4

August 2008

PREPARED FOR

Avantech Mobile Ltd
Rue Maurice Trintignant
72093 Le Mans
Cedex 9

PREPARED BY

N Bennett
Senior Administrator

APPROVED BY

J Adams
Authorised Signatory

M Jenkins
Authorised Signatory

DATED 11 August 2008

This report has been up-issued to Issue 4 to correct a typographical error

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: Part 22 and Part 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

A Guy

R A Blagg

UKAS TESTING 0141

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CONTENTS

Product Service

SECTION 1

REPORT SUMMARY

FCC CFR 47 Parts 22 and 24 Testing of the
Avantech Manufacture
Attitude E310 Mobile Phone

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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Avantech Manufacture Attitude E310 Mobile Phone to the requirements of FCC CFR 47 Part 22 2006 and FCC CFR 47 Part 24 2006.

Objective	To perform FCC CFR 47 Parts 22 and 24 Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Avantech Manufacture
Model Number(s)	Attitude E310
Serial Number(s)	IMEI: 352455020004495 IMEI: 352455020004065
Software Version	Not Supplied
Hardware Version	PR2
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 22 2006 and FCC CFR 47 Part 24 2006
Incoming Release Date	Declaration of Build Status 26 June 2008
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Start of Test	01 July 2008
Finish of Test	24 July 2008
Name of Engineer(s)	A Guy R A Blagg
Related Document(s)	FCC CFR 47 Part 2: 2006

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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 22: 2006, is shown below.

Configuration 1 – Mobile Handset and battery						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.3	22.913	Effective Radiated Power	824.2 MHz	0	Pass	-
			836.6 MHz	0	Pass	
			848.8 MHz	0	Pass	
2.6	22.917	Emission limitations for Cellular Equipment	824.2 MHz	0	Pass	-
			836.6 MHz	0	Pass	
			848.8 MHz	0	Pass	
Configuration 2 – Mobile Handset and battery eliminator						
2.1	2.1051, 22.905	Spurious Emissions at Band Edge	824.2 MHz	0	Pass	-
			848.8 MHz	0	Pass	
2.2	22.913 (a)	Maximum Peak Output Power – Conducted	824.2 MHz	0	Pass	-
			836.6 MHz	0	Pass	
			848.8 MHz	0	Pass	
2.4	2.1047(d)	Modulation Characteristics	836.6 MHz	0	Pass	-
2.5	2.1049, 22.917 (b)	Occupied Bandwidth	836.6 MHz	0	Pass	-

Product Service

Configuration 2 – Mobile Handset and battery eliminator						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.7	2.1051, 22.917(a)	Conducted Spurious Emissions	824.2 MHz	0	Pass	-
			836.6 MHz	0	Pass	
			848.8 MHz	0	Pass	
2.8	2.1055, 22.355	Frequency Stability Under Temperature Variations	836.6 MHz	0	Pass	-
2.9	2.1055, 22.355	Frequency Stability Under Voltage Variations	836.6 MHz	0	Pass	-

Product Service

A brief summary of results in accordance with FCC CFR 47 Part 24: 2006 is shown below.

Configuration 1 - Mobile Handset and battery						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.12	24.232(c)	EIRP Peak Power	1850.2 MHz	0	Pass	-
			1880.0 MHz	0	Pass	
			1909.8 MHz	0	Pass	
2.16	2.1051, 24.238	Emissions for broadband PCS Equipment	1850.2 MHz	0	Pass	-
			1880.0 MHz	0	Pass	
			1909.8 MHz	0	Pass	
Configuration 2 - Mobile Handset and battery eliminator						
2.10	2.1051, 24.229	Spurious Emissions at Band Edge	1850.2 MHz	0	Pass	-
			1909.8 MHz	0	Pass	
2.11	2.1046, 24.232	Maximum Peak Output Power – Conducted	1850.2 MHz	0	Pass	-
			1880.0 MHz	0	Pass	
			1909.8 MHz	0	Pass	
2.13	2.1047(d)	Modulation Characteristics	1880.0 MHz	0	Pass	-
2.14	2.1049, 24.238(b)	Occupied Bandwidth	1880.0 MHz	0	Pass	-
2.15	2.1051, 24.238(a)	Conducted Spurious Emissions	1850.2 MHz	0	Pass	-
			1880.0 MHz	0	Pass	
			1909.8 MHz	0	Pass	

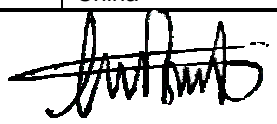
Product Service

Configuration 2 - Mobile Handset and battery eliminator						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.17	2.1055, 24.135(a)	Frequency Stability Under Temperature Variations	1880.0 MHz	0	Pass	-
2.18	2.1055, 24.135(a)	Frequency Stability Under Voltage Variations	1880.0 MHz	0	Pass	-

Product Service

1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Cellular Mobile Phone Manufacturer		
MANUFACTURER	Avantech Manufacture		
TYPE	Cellular Mobile Phone		
SERIAL NUMBER	IMEI: 352455020004255 IMEI: 352455020004065		
HARDWARE VERSION	PR2		
SOFTWARE VERSION	Not Supplied		
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	France		
INTERMEDIATE FREQUENCIES	Direct Conversion		
ITU DESIGNATION OF EMISSION	300KGXW		
HIGHEST INTERNALLY GENERATED FREQUENCY	2480MHz		
OUTPUT POWER (W or dBm)	32 dBm		
FCC ID	RXXATTITUDEE310		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	This product is the cellular mobile phone in 850/900/1800/1900 bands		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Batterie's Manufacturer		
MANUFACTURER	Xwoda		
TYPE	Lithium Ion		
PART NUMBER	BL2001		
VOLTAGE	3.7 V		
COUNTRY OF ORIGIN	China		
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION	Main Adapter		
MANUFACTURER	MLF		
TYPE	DC 5 V		
PART NUMBER	MLF-005W0500600-U		
COUNTRY OF ORIGIN	China		

Signature 

Date 26 June 2008

Declaration of Build Status Serial Number 75904049/01

Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Avantech Manufacture Attitude E310 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: UE + Battery

The EUT was configured in accordance with FCC CFR 47 Part 22 2006 and FCC CFR 47 Part 24 2006.

Configuration 2: UE + Battery Eliminator

The EUT was configured in accordance with FCC CFR 47 Part 22 2006 and FCC CFR 47 Part 24 2006.

1.4.3 Modes of Operation

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

Mode 1 - 824.2 MHz Tx

Mode 2 - 836.6 MHz Tx

Mode 3 - 848.8 MHz Tx

Mode 4 - 1850.2 MHz Tx

Mode 5 - 1880.0 MHz Tx

Mode 6 - 1909.8 MHz Tx

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

Product Service

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, or battery eliminator.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

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.

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SECTION 2

TEST DETAILS

FCC CFR 47 Parts 22 and 24 Testing of the
Avantech Manufacture
Attitude E310 Mobile Phone

Product Service

2.1 SPURIOUS EMISSIONS AT BAND EDGE

2.1.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.905, 2.1051

2.1.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.1.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

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

The reference power and path losses of all channels used for testing in each frequency block were measured. Having entered the reference level offset , the limit line was displayed, showing the -13 dBm, (43 + 10 log (P)), limit.

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

Configuration 1 - Mode 1
- Mode 3

2.1.6 Environmental Conditions

	03 July 2008
Ambient Temperature	23.5°C
Relative Humidity	46%

Product Service

2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Spurious Emissions at Band Edge.

The test results are shown below.

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

Communication Channel Pair Blocks

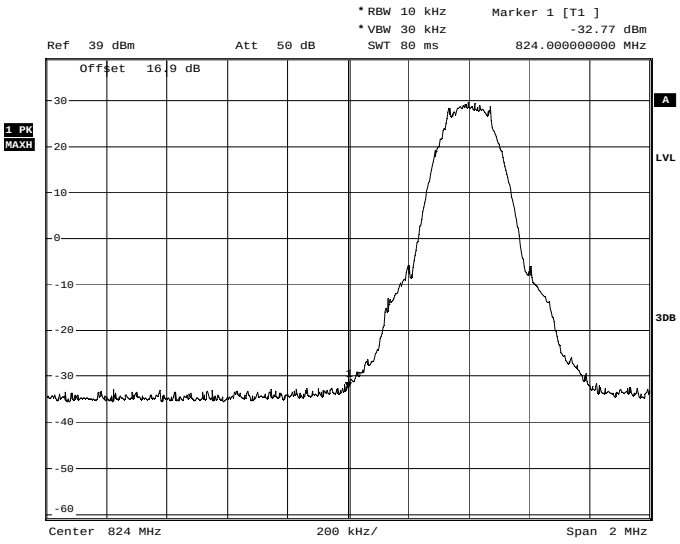
Frequency Block (MHz)	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A (824.0 – 835.0)	Channel : 129 Frequency : 824.4MHz	-
B (846.5 – 849.0)	-	Channel : 250 Frequency : 848.6MHz

Limit	≤-13dBm at Block Edge

The measurement plots are shown on the following pages.

Maximum Power – GPRS with timeslots 3, 4, 5 and 6 active

Frequency Block A



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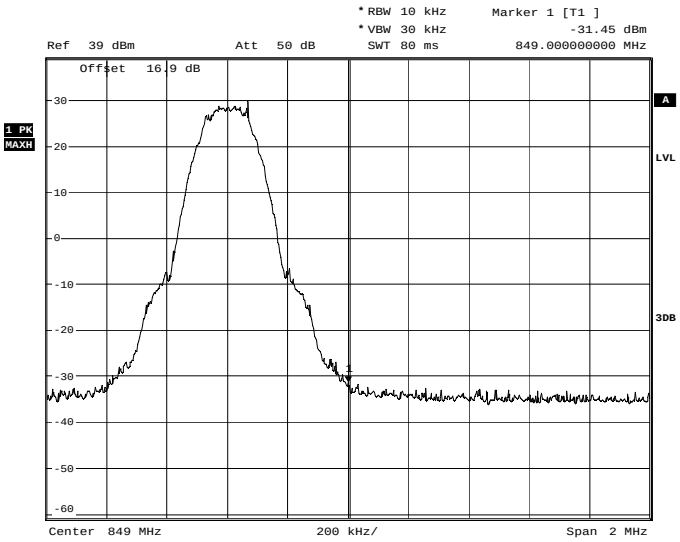
Frequency Block B



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Product Service

2.2 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.2.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.913 (a)

2.2.2 Equipment Under Test`

Attitude E310, IMEI: 352455020004065

2.2.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

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 EUT was tested in GPRS mode of operation. Testing was performed with GMSK modulation, with four timeslots active, (3 and 4) and (5 and 6). The mobile device is a class 12 device.

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

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

	03 July 2008
Ambient Temperature	22.8°C
`Relative Humidity	47.1%

Product Service

2.2.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Maximum Peak Output Power - Conducted.

The test results are shown below.

Configuration 1 - Mode 1

3.7V DC Supply

Maximum Power – GPRS

Frequency (MHz)	Result (dBm)	Result (W)
824.2	30.99	1.256
836.6	31.00	1.259
848.8	31.17	1.309

Limit	7W

Product Service

2.3 EFFECTIVE RADIATED POWER

2.3.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.913(a)

2.3.2 Equipment Under Test

Attitude E310, IMEI: 352455020004495

2.3.3 Date of Test and Modification State

24 July 2008 - Modification State 0

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 FCC CFR 47 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

2.3.6 Environmental Conditions

	24 July 2008
Ambient Temperature	19.1°C
Relative Humidity	47%
Atmospheric Pressure	1007mbar

Product Service

2.3.7 Test Results

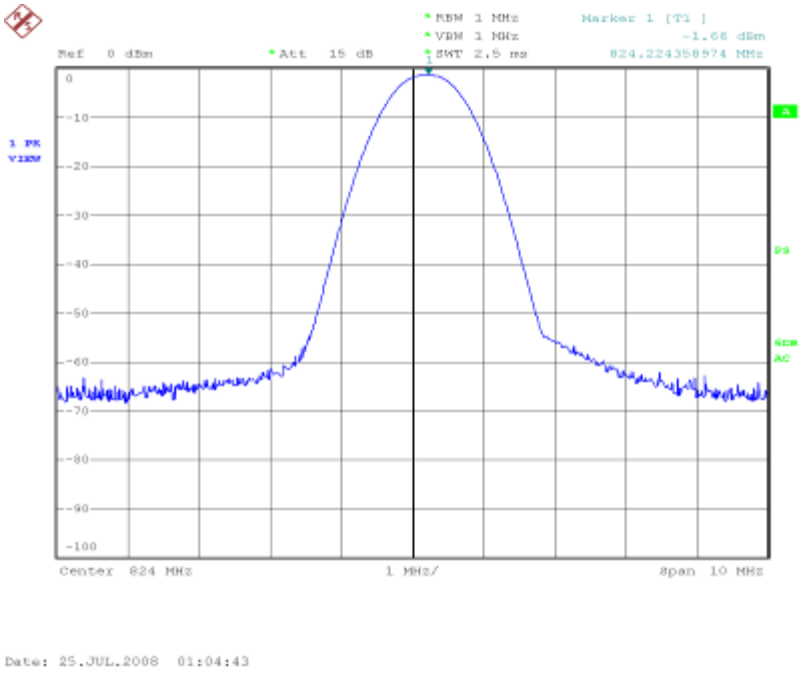
For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Effective Radiated Power.

The test results are shown below.

Configuration 1 - Mode 1

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
824.2	32.82	38.45	1.914	7.0

Configuration 1 - Mode 1 Plot

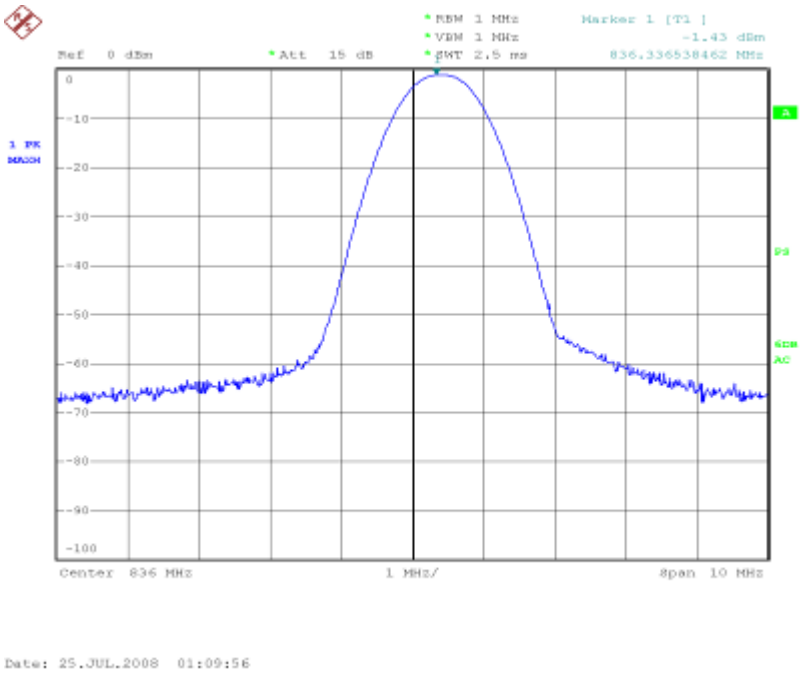


Product Service

Configuration 1 - Mode 2

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
836.4	32.66	38.45	1.845	7.0

Configuration 1 - Mode 2 Plot



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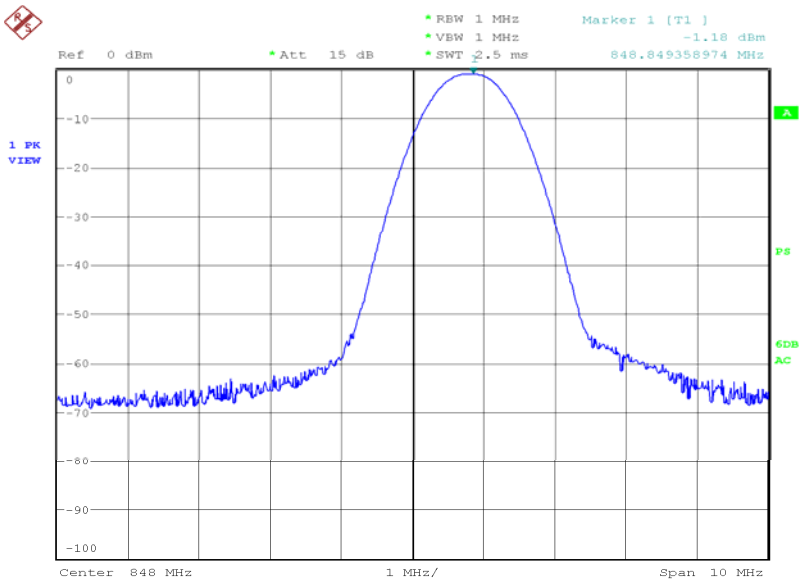
Configuration 1 - Mode 3

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
848.8	33.22	38.45	2.098	7.0



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Product Service

2.4 MODULATION CHARACTERISTICS

2.4.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.1047(d)

2.4.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.4.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

Two plots are shown on the following pages showing the EUT transmitting with the display in the time domain.

Plot 1: EUT transmitting with GMSK modulation showing timeslots 3, 4, 5 and 6.
Plot 2: EUT transmitting with GMSK modulation showing one frame with four timeslots active.

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

Configuration 1 - Mode 2

2.4.6 Environmental Conditions

	03 July 2008
Ambient Temperature	23.6°C
Relative Humidity	45.3%

Product Service

2.4.7 Modulation Description

Description Of Modulation Technique

The modulation scheme used in GSM is called Gaussian Minimum Shift Keying (GMSK). GMSK facilitates the use of narrow bandwidth and allows for both coherent and non coherent detection capabilities. It is a scheme in which the transitions from One to Zero or Zero to One do not occur quickly, but over a period of time. If pulses are transmitted quickly harmonics are transmitted. The power spectrum for a square wave is rich in harmonics, and the power within the side lobes is wasted, and can be a cause of potential interference.

A method to reduce the harmonics is to round off the edges of the pulses thus lowering the spectral components of the signal. In GSM this is done by using a Gaussian pre-filter which typically has a bandwidth of 81.25kHz. The output from the Gaussian filter then phase modulates the carrier. As there are no dramatic phase transitions of the carrier this gives a constant envelope and low spectral component output from the transmitter.

The spectral efficiency is calculated by

bit rate / Channel bandwidth = 270.83333 kbit/s / 200 kHz = 1.354 bit/s/Hz.

The bandwidth product BT = Bandwidth x bit duration = 81.25 kHz x 3.6923 micros = 0.3

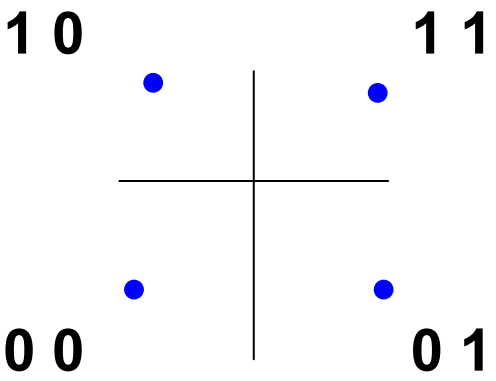
GMSK OVERVIEW

The modulation scheme used for the EUT is GMSK.

A brief overview of how GMSK works is shown below.

GMSK (Gaussian Minimum Shift Keying)

The fundamental principal behind GMSK is Phase shift keying. This splits a data stream into a series of 2-digit phase shifts, using the following phase shifts to represent data pairs.



Therefore for the BIT sequence 0 0 1 1 1 0 0 1 The corresponding phase shift will be used

BIT SEQUENCE	0 0	1 1	1 0	01
PHASE	225º	45º	135º	315º

This is called QPSK (Quadratic Phase Shift Keying)

However

There is a problem with QPSK: transition from e.g. 00 to 11 gives phase shift of 180° (π radians). This has the effect of inverting the carrier waveform and this can lead to detection errors at the receiver.

Solution: restrict phase changes to ± 90°

1. Split bitstream into 2 streams e.g.

	0 0		1 1		0 1		1 0	
I Stream	0		1		0		1	
Q stream		0		1		1		0

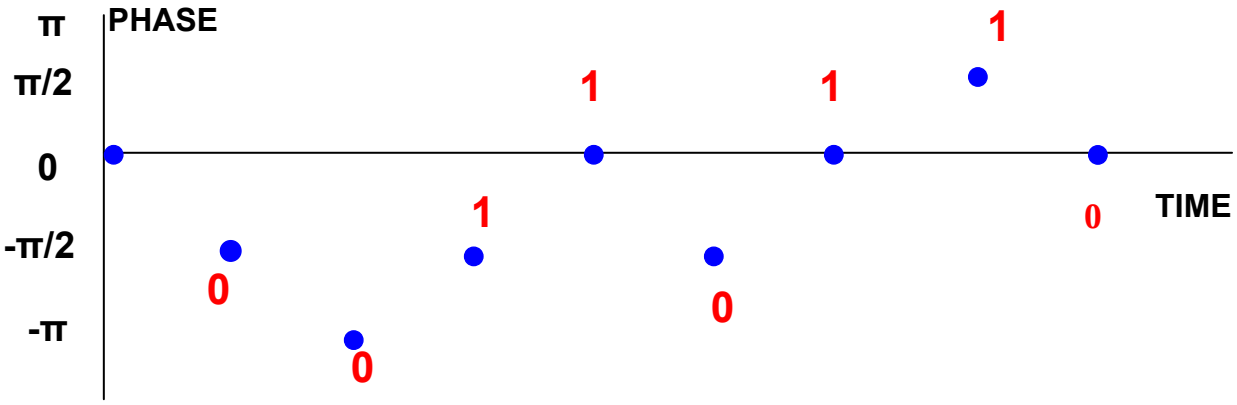
2. Modulate each stream with PSK (1 = 90° or π/2, 0 = -90° or - π/2 phase shift)

I Stream	0		1		0		1	
	-π/2		-π/2		-π/2		π/2	
Q stream		0		1		1		0
		-π/2		π/2		π/2		-π/2

3. Combine (add) the two PSK signals:

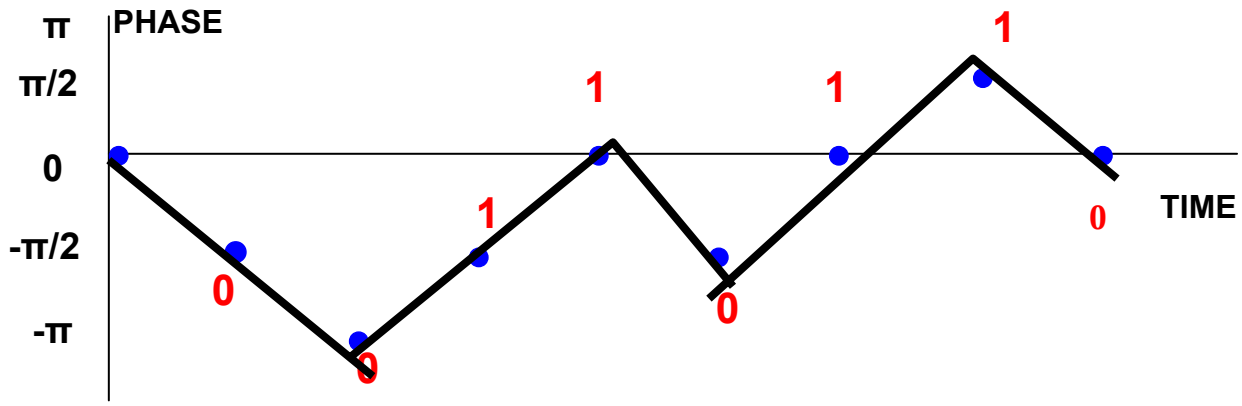
Combined Phase	-π/2	-π	-π/2	0	-π/2	0	π/2	0

Result: offset - QPSK, phase change is restricted to ± π/2 radians:



It would be preferable to have "gradual" changes in place between each pair of bits (Continuous-phase modulation). Replacing each “rectangular” shaped pulse (for 1 or 0) with a sinusoidal pulse can do this:

Result: Minimum Shift Keying (MSK):



Gaussian Minimum Shift Keying

MSK has high sidebands relative to the main lobes in the frequency domain - this can lead to interference with adjacent signals.

If the rectangular pulses corresponding to the bitstream are filtering using a Gaussian-shaped impulse response filter, we get Gaussian MSK (GMSK) - this has low sidelobes compared to MSK.

Product Service

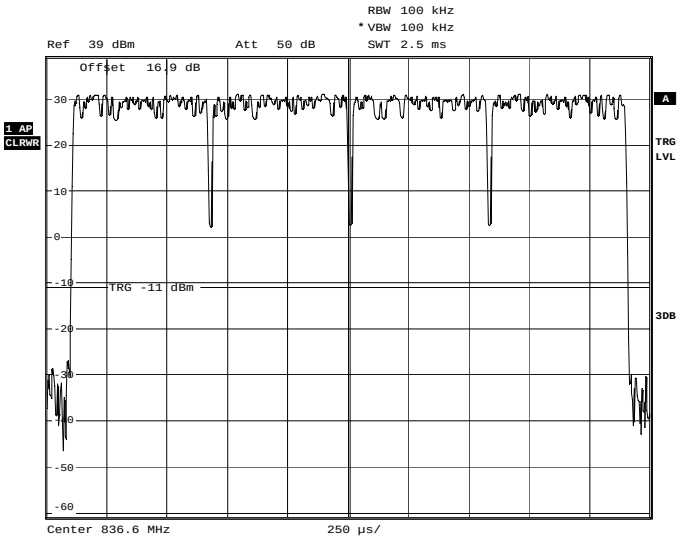
2.4.8 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Modulation Characteristics.

The test results are shown below.

Configuration 1 - Mode 1

EUT Transmitting with GMSK modulation showing timeslots 3, 4, 5 and 6



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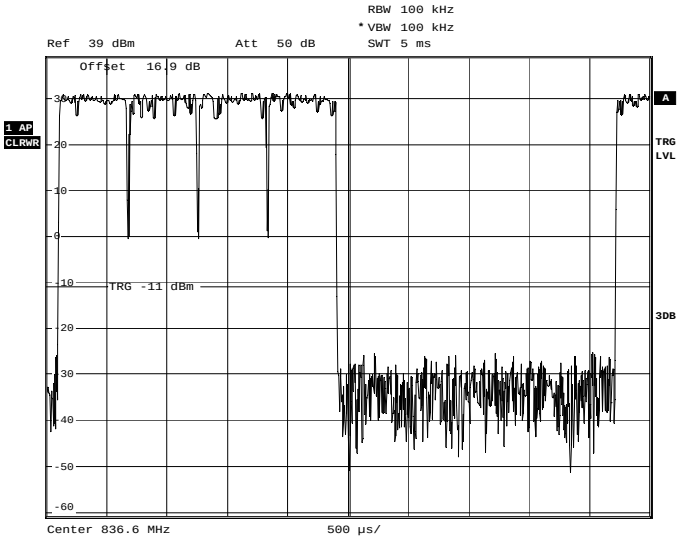
Product Service

EUT Transmitting with GMSK modulation showing one frame with four timeslots active



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Product Service

2.5 OCCUPIED BANDWIDTH

2.5.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.917(b), 2.1049(h)

2.5.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.5.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

The EUT was transmitting at maximum power, modulated with timeslots 3, 4, 5 and 6 active. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following pages shows the resultant display from the Spectrum Analyser.

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

Configuration 1 - Mode 2

2.5.6 Environmental Conditions

	03 July 2008
Ambient Temperature	23.6°C
Relative Humidity	45.3%

Product Service

2.5.7 Test Results

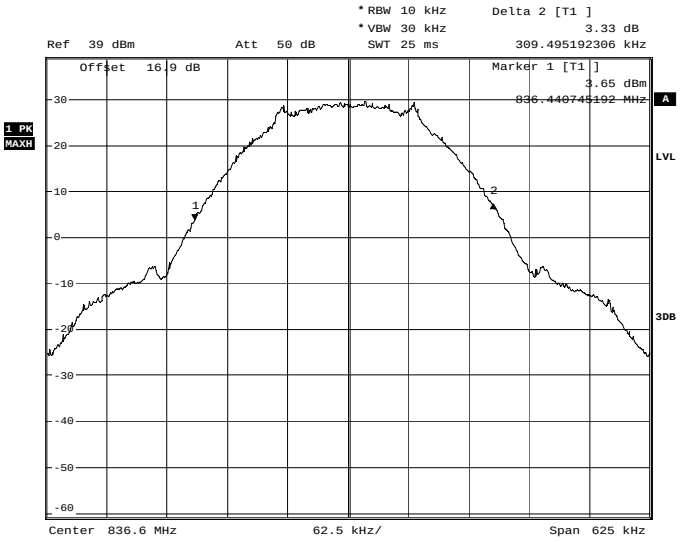
For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Occupied Bandwidth.

The test results are shown below.

Configuration 1 - Mode 2

Occupied Bandwidth As Defined By The -26dBc Points

Maximum Power – GPRS



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Product Service

2.6 EMISSION LIMITATIONS FOR CELLULAR EQUIPMENT

2.6.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.917

2.6.2 Equipment Under Test

Attitude E310, IMEI: 352455020004495

2.6.3 Date of Test and Modification State

02 July 2008 - Modification State 0

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 FCC CFR 47 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

	02 July 2008
Ambient Temperature	17.5°C
Relative Humidity	42%
Atmospheric Pressure	1005mbar

2.6.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Emission limitations for Cellular Equipment.

The test results are shown below.

Configuration 1 - Mode 1

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	ERP Limit dBm	Margin dB	Result
4121	Vertical	100	70	-47.4	-13.0	-34.4	Pass

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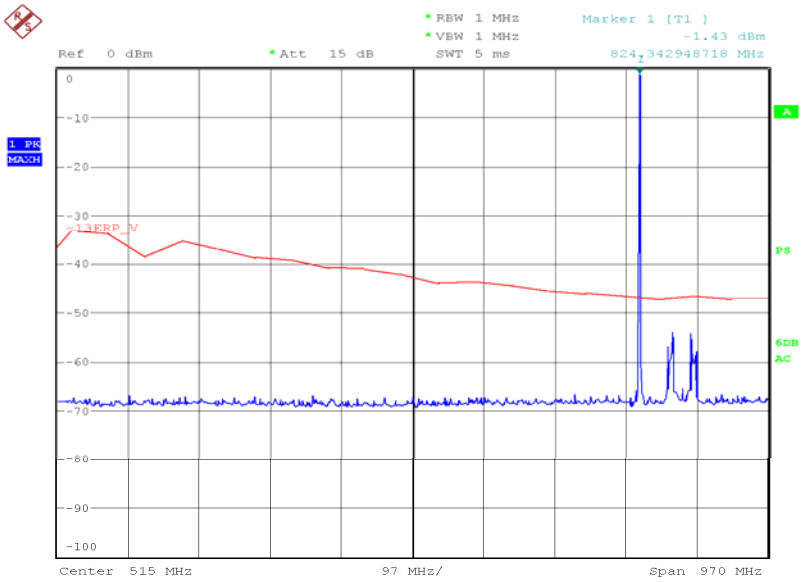
Configuration 1 - Mode 1

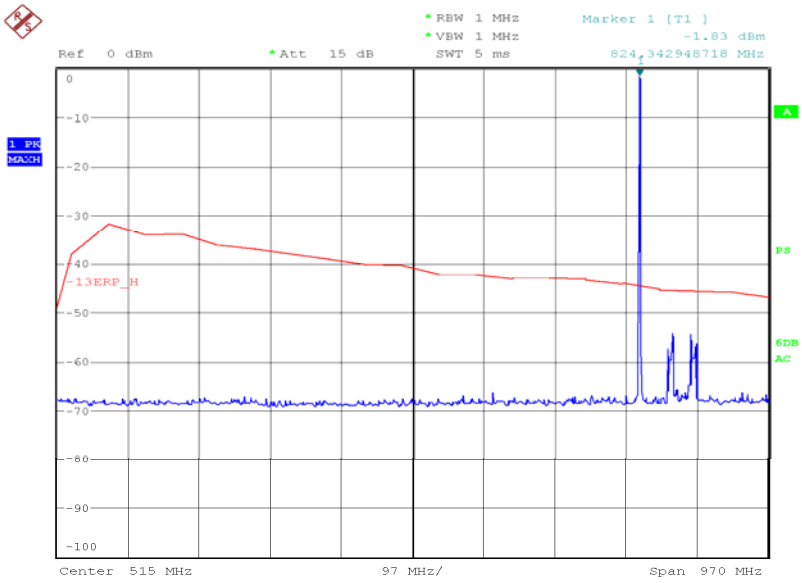
30MHz to 1GHz

Vertical Polarity



Date: 2.JUL.2008 22:06:31

Horizontal Polarity

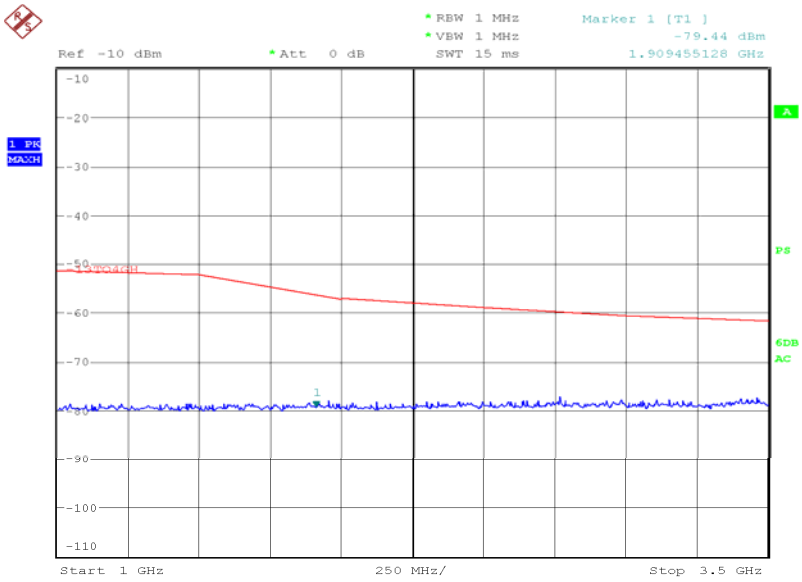


Date: 2.JUL.2008 22:04:08

Product Service

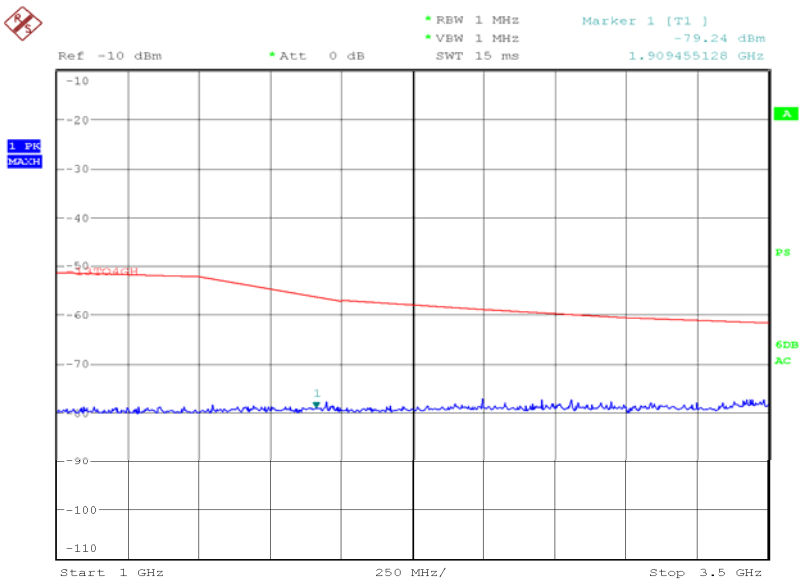
1GHz to 3.5GHz

Vertical Polarity



Date: 3.JUL.2008 02:06:29

Horizontal Polarity

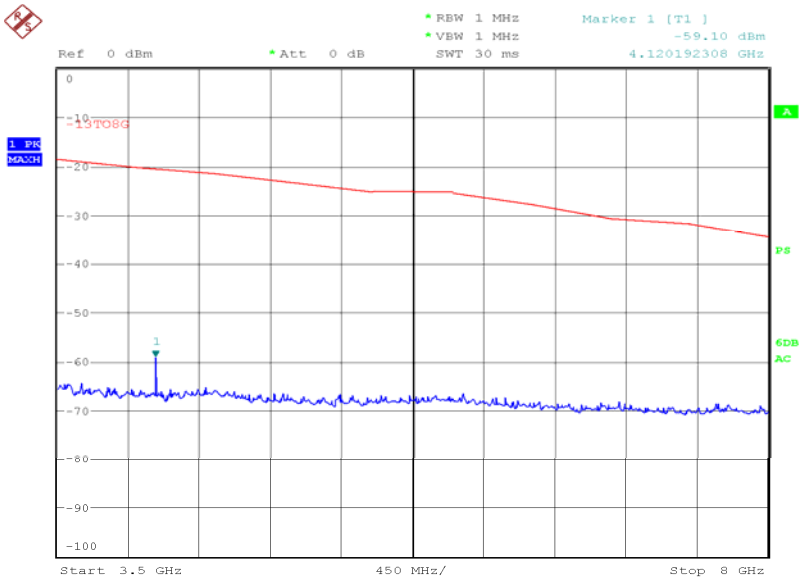


Date: 3.JUL.2008 02:00:04

Product Service

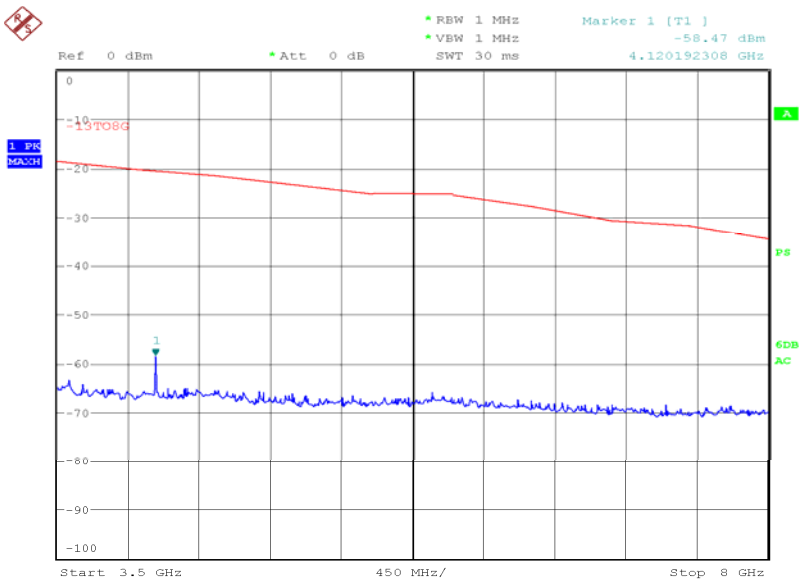
3.5GHz to 8GHz

Vertical Polarity



Date: 4.JUL.2008 00:33:53

Horizontal Polarity

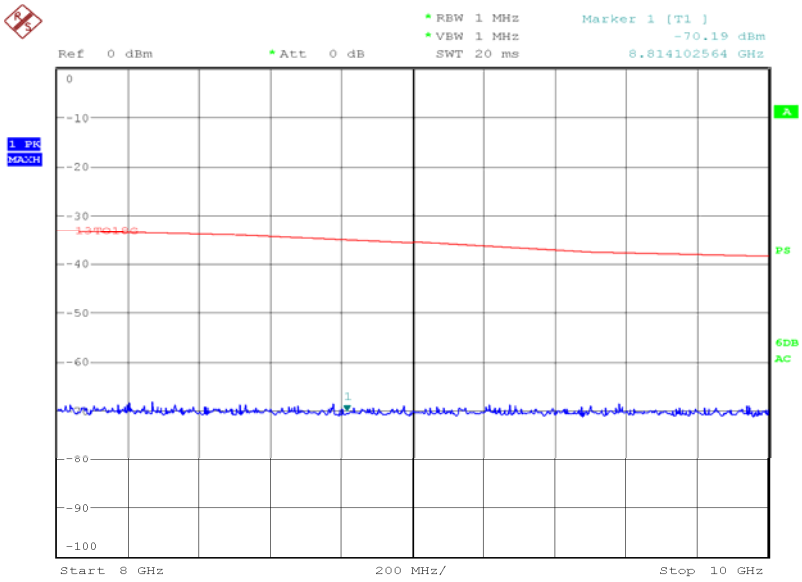


Date: 4.JUL.2008 00:48:55

Product Service

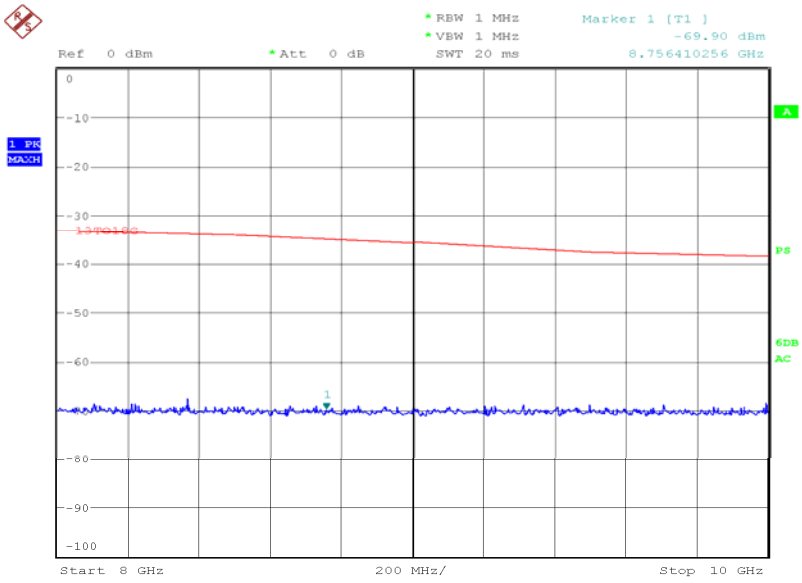
8GHz to 10GHz

Vertical Polarity



Date: 4.JUL.2008 00:06:28

Horizontal Polarity



Date: 4.JUL.2008 00:09:39

Product Service

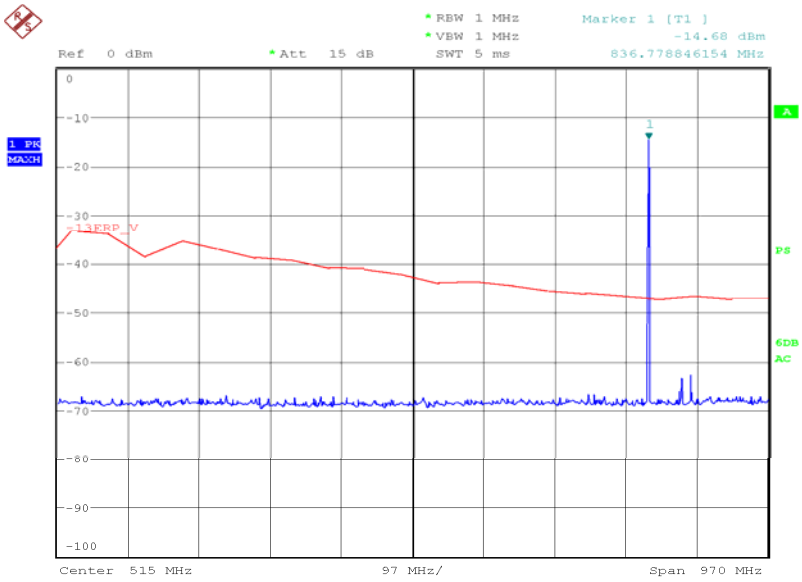
Configuration 1 - Mode 2

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	ERP Limit dBm	Margin dB	Result
4182	Vertical	100	77	-48.8	-13.0	-35.8	Pass

Configuration 1 - Mode 2

30MHz to 1GHz

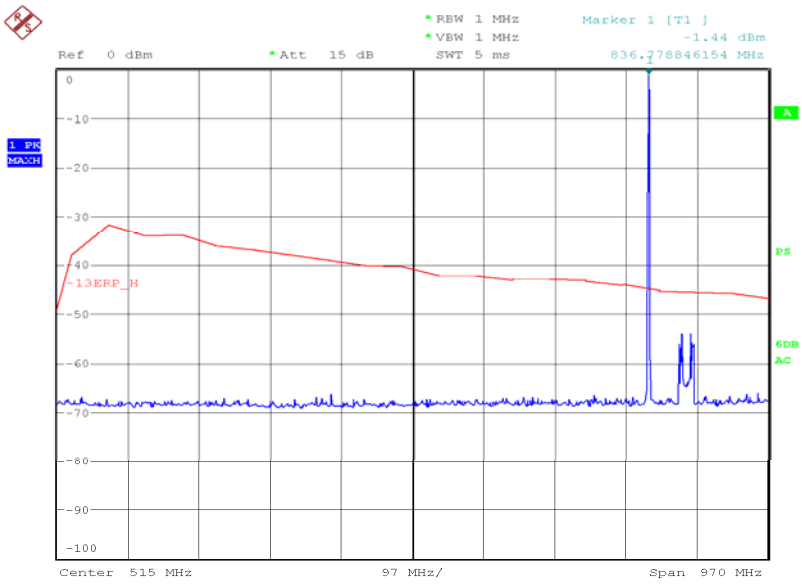
Vertical Polarity



Date: 2.JUL.2008 22:12:29

Product Service

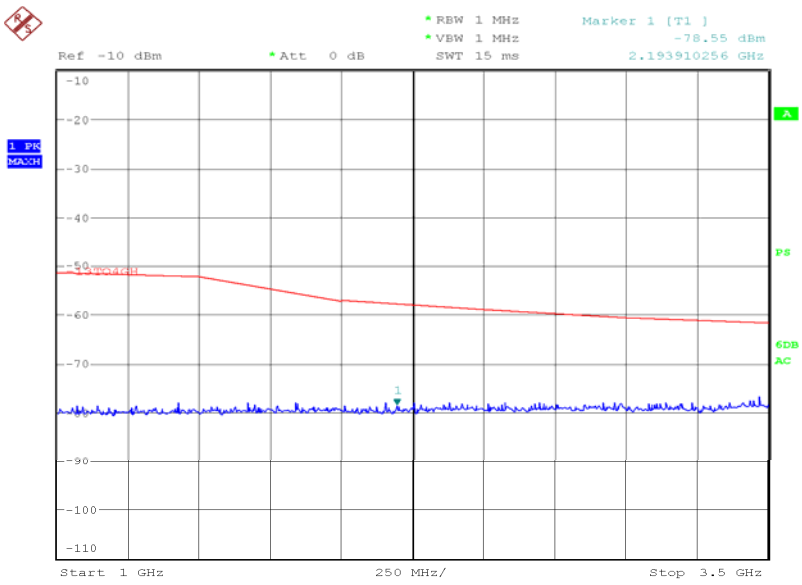
Horizontal Polarity



Date: 2.JUL.2008 22:10:25

1GHz to 3.5GHz

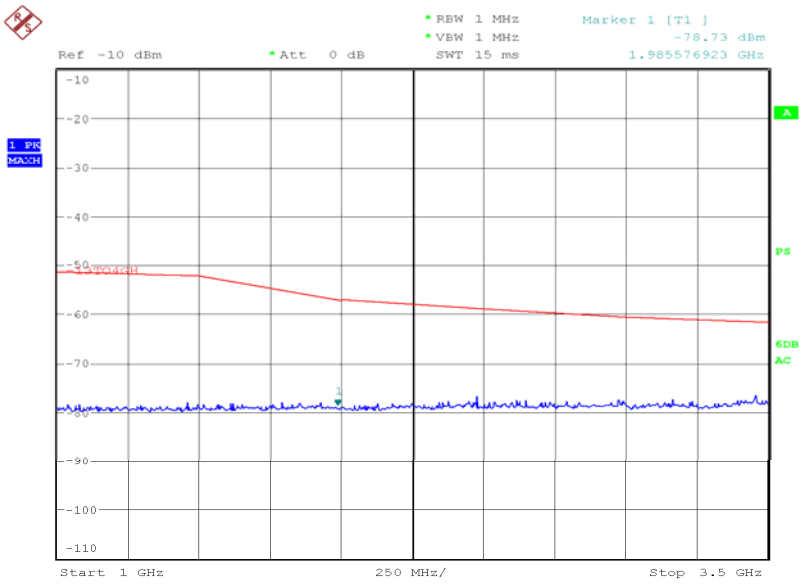
Vertical Polarity



Date: 3.JUL.2008 02:21:55

Product Service

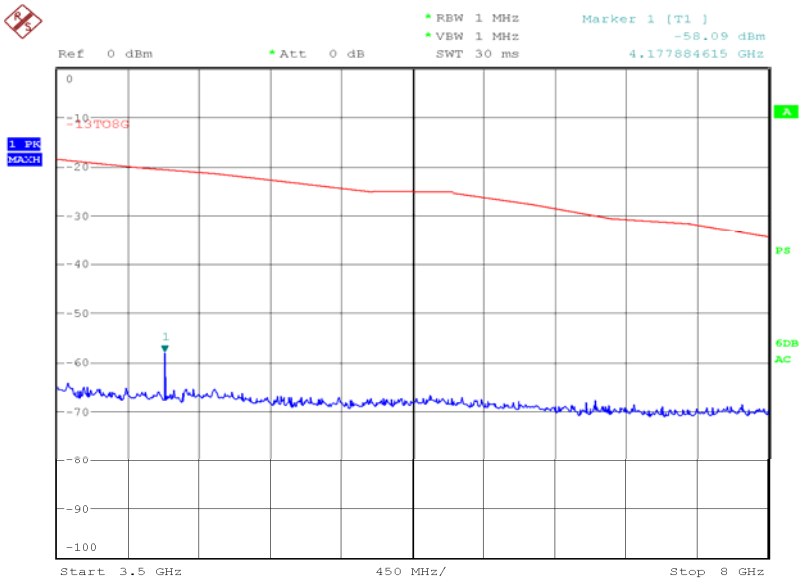
Horizontal Polarity



Date: 3.JUL.2008 02:18:39

3.5GHz to 8GHz

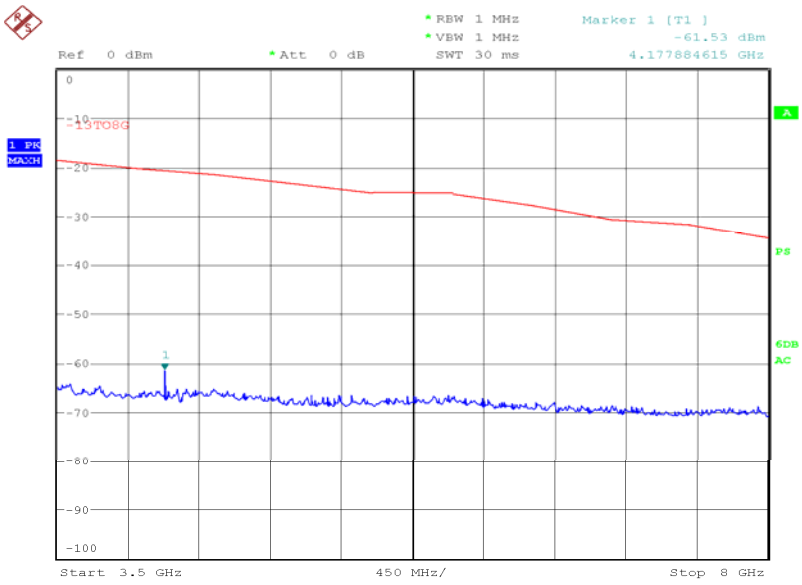
Vertical Polarity



Date: 4.JUL.2008 00:36:04

Product Service

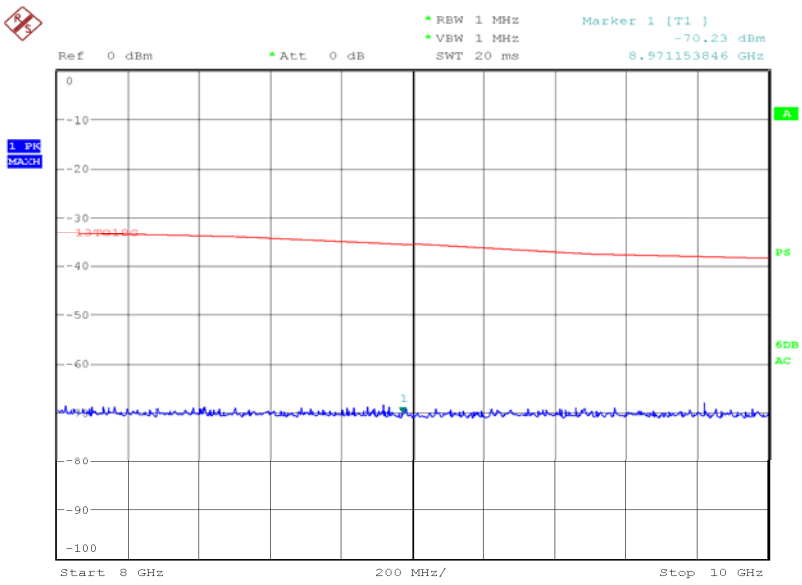
Horizontal Polarity



Date: 4.JUL.2008 00:45:54

8GHz to 10GHz

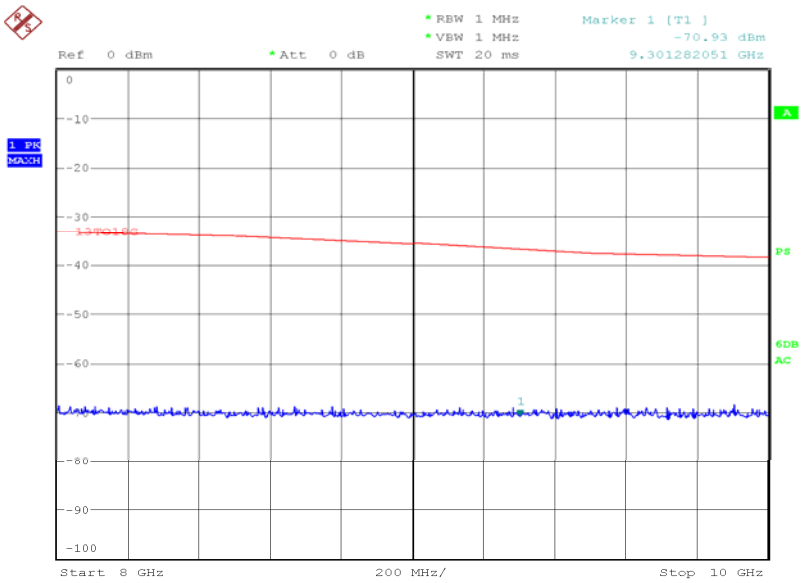
Vertical Polarity



Date: 4.JUL.2008 00:15:23

Product Service

Horizontal Polarity



Date: 4.JUL.2008 00:12:08

Product Service

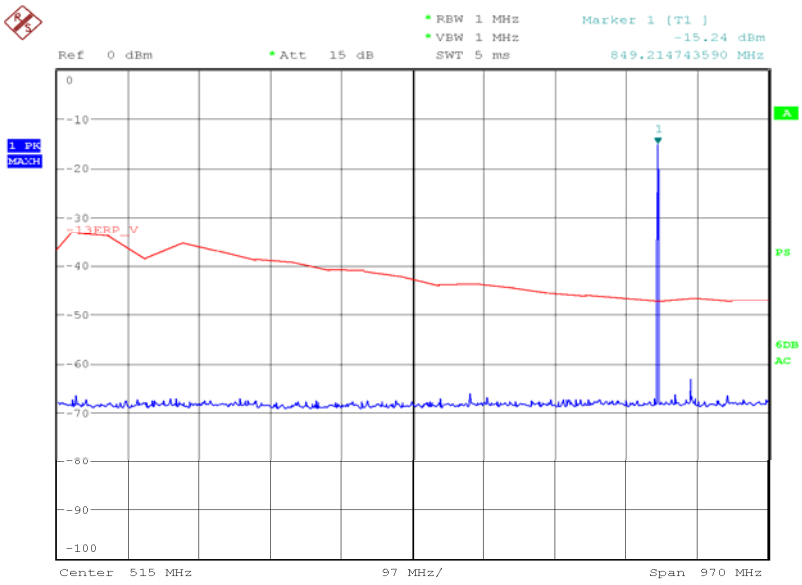
Configuration 1 - Mode 3

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	ERP Limit dBm	Margin dB	Result
4243	Vertical	100	67	-50.1	-13.0	-37.1	Pass

Configuration 1 - Mode 3

30MHz to 1GHz

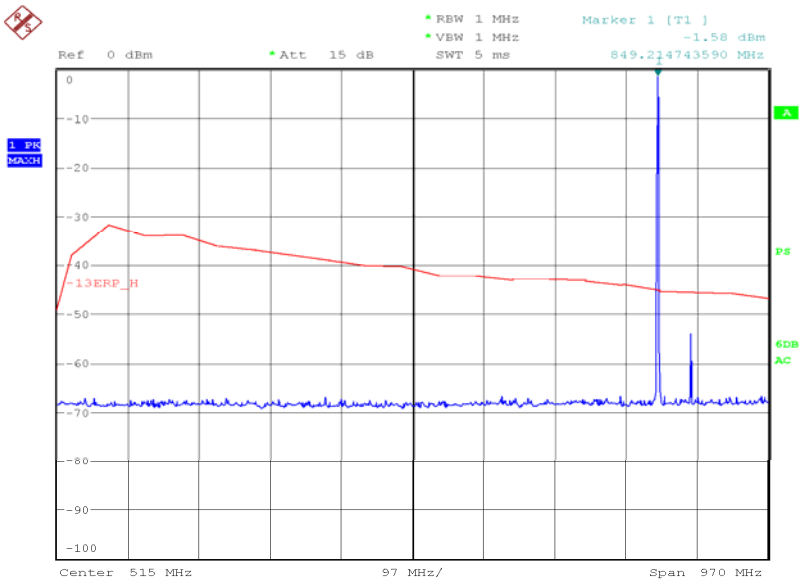
Vertical Polarity



Date: 2.JUL.2008 22:16:28

Product Service

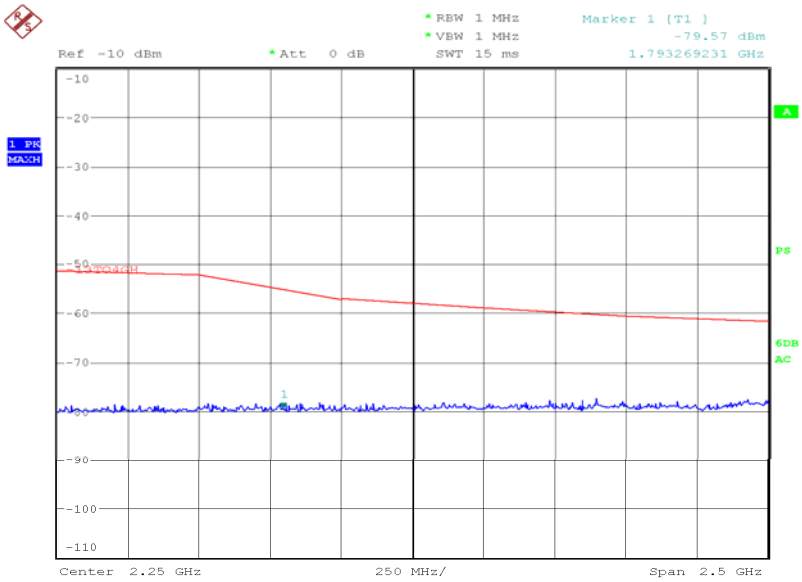
Horizontal Polarity



Date: 2.JUL.2008 22:19:45

1GHz to 3.5GHz

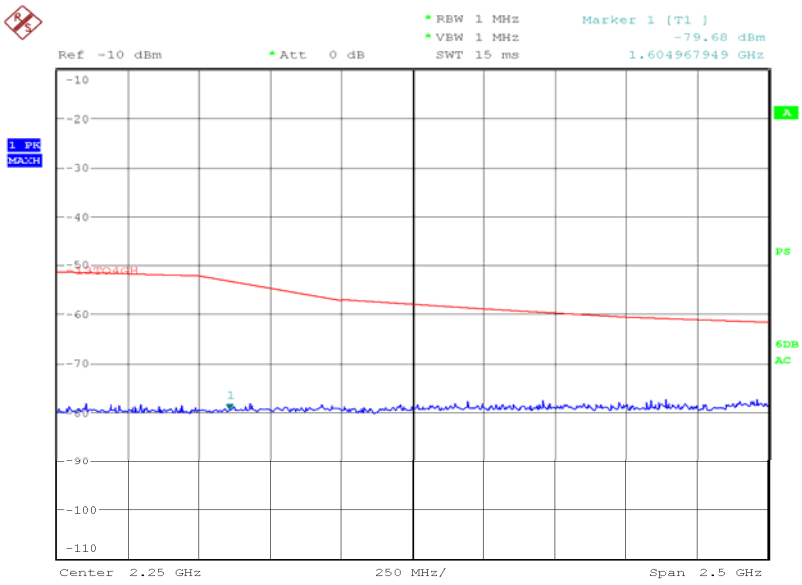
Vertical Polarity



Date: 3.JUL.2008 02:30:25

Product Service

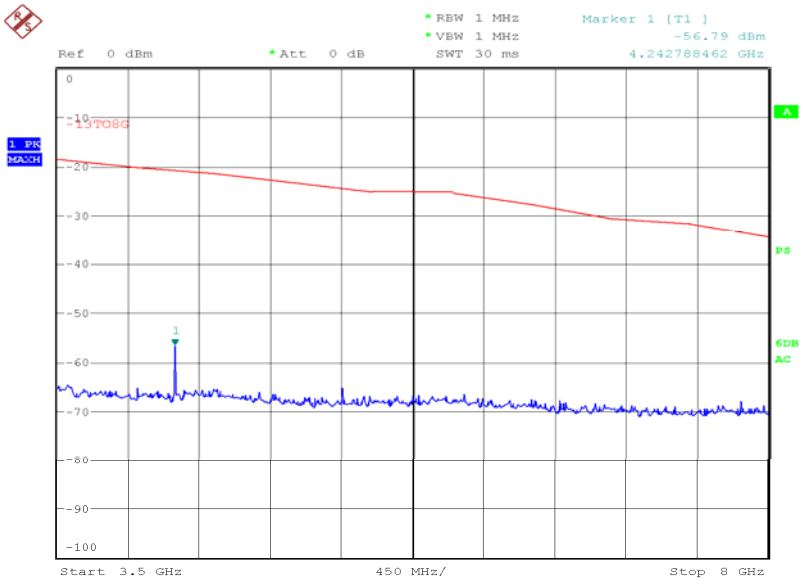
Horizontal Polarity



Date: 3.JUL.2008 02:26:29

3.5GHz to 8GHz

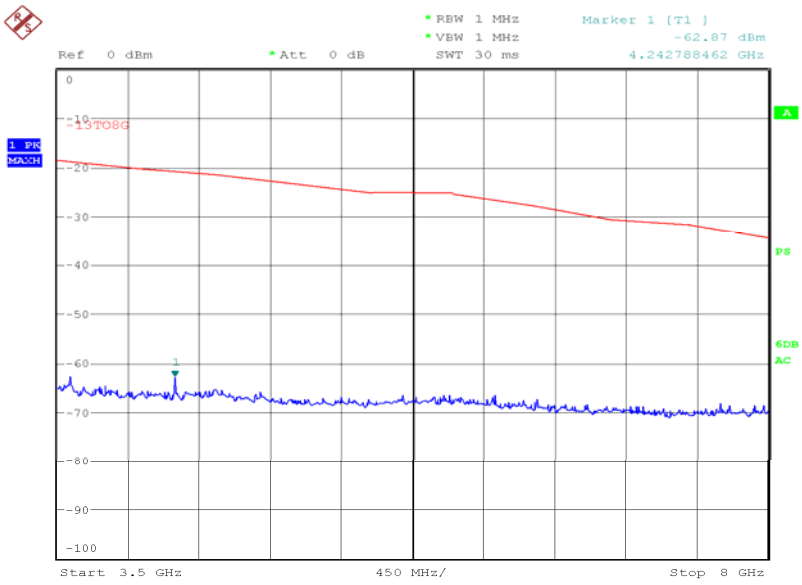
Vertical Polarity



Date: 4.JUL.2008 00:39:18

Product Service

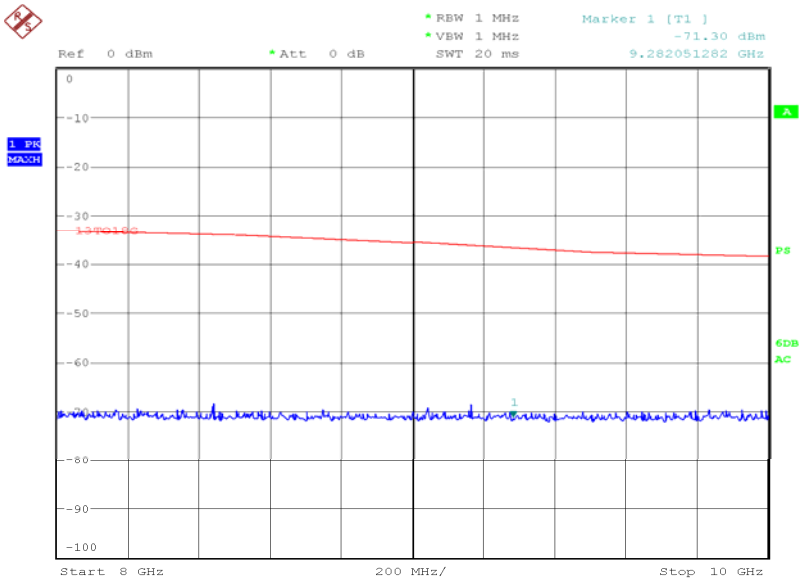
Horizontal Polarity



Date: 4.JUL.2008 00:42:41

8GHz to 10GHz

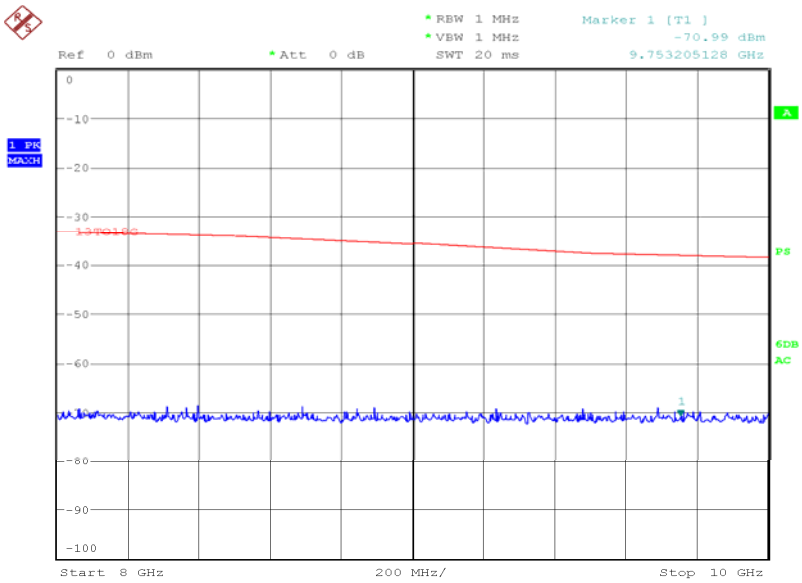
Vertical Polarity



Date: 4.JUL.2008 00:16:03

Product Service

Horizontal Polarity



Date: 4.JUL.2008 00:16:34

Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.917(a), 2.1051

2.7.2 Equipment Under Test

Attitude E310, IMEI: 3352455020004065

2.7.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

In accrodance 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 9 kHz to 9 GHz. The EUT was set to transmit on full power on timeslots 3, 4, 5 and 6. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz and 3 MHz thus meeting the requirements of Part 22.917(b). The spectrum analyser detector was set to max hold.

From 9 kHz to 4 GHz, an attenuator was used. For measuring the range 4 GHz to 9 GHz 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.

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

	03 July 2008
Ambient Temperature	23.6°C
Relative Humidity	45.7%

Product Service

2.7.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Emission limitations for Cellular Equipment.

The test results are shown below.

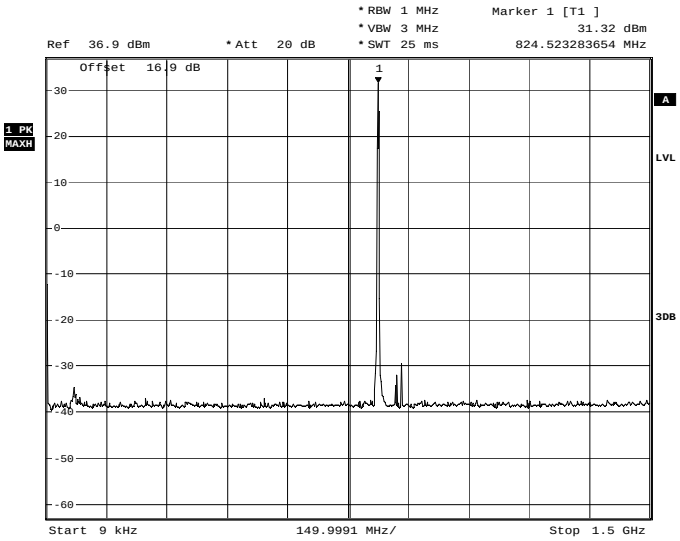
Configuration 2

3.7V Supply

Mode 1 – Maximum Power

Spurious Emissions (9kHz – 1.5GHz)

GPRS, Timeslots 3, 4, 5 and 6 active

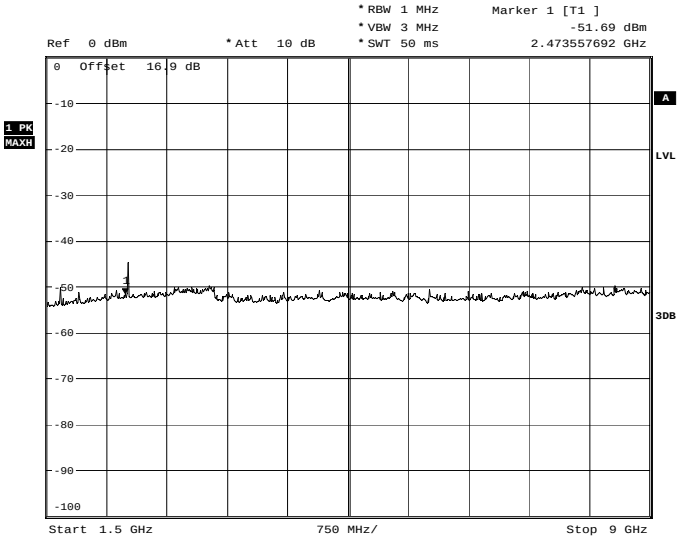


FR
Date: 3.JUL.2008 15:16:11

Mode 1 – Maximum Power

Spurious Emissions (1.5GHz – 9GHz)

GPRS, Timeslots 3, 4, 5 and 6 active

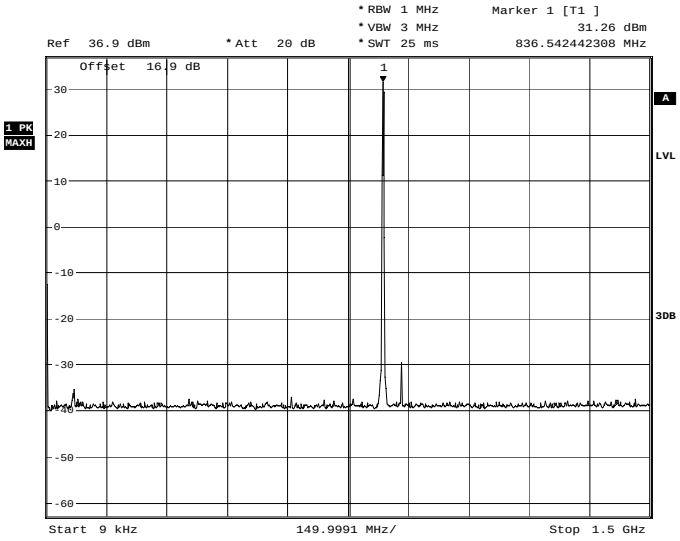


FR
Date: 3.JUL.2008 15:54:43

Mode 2 – Maximum Power

Spurious Emissions (9 kHz – 1.5 GHz)

GPRS, Timeslots 3, 4, 5 and 6 active



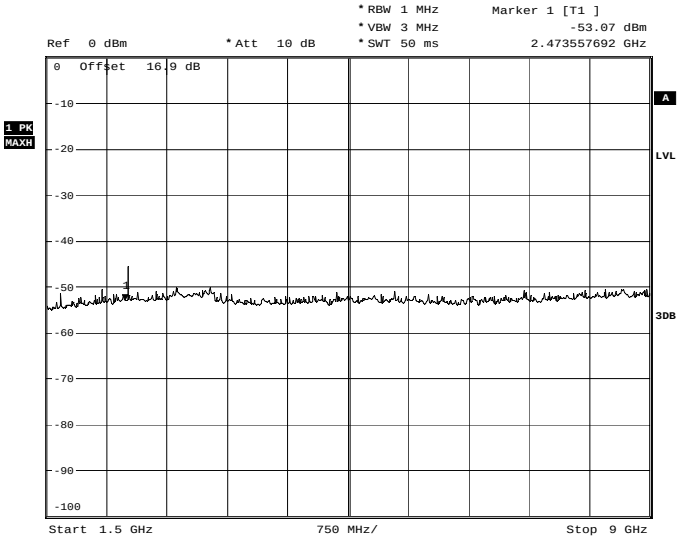
FR
Date: 3.JUL.2008 15:17:31

Product Service

Mode 2 – Maximum Power

Spurious Emissions (1.5GHz – 9GHz)

GPRS, Timeslots 3, 4, 5 and 6 active

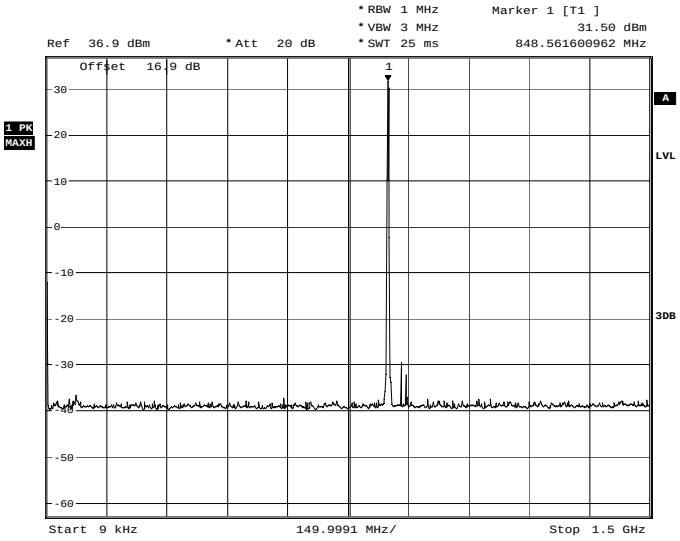


FR
Date: 3.JUL.2008 15:48:47

Mode 3 – Maximum Power

Spurious Emissions (9kHz – 1.5GHz)

GPRS, Timeslots 3, 4, 5 and 6 active

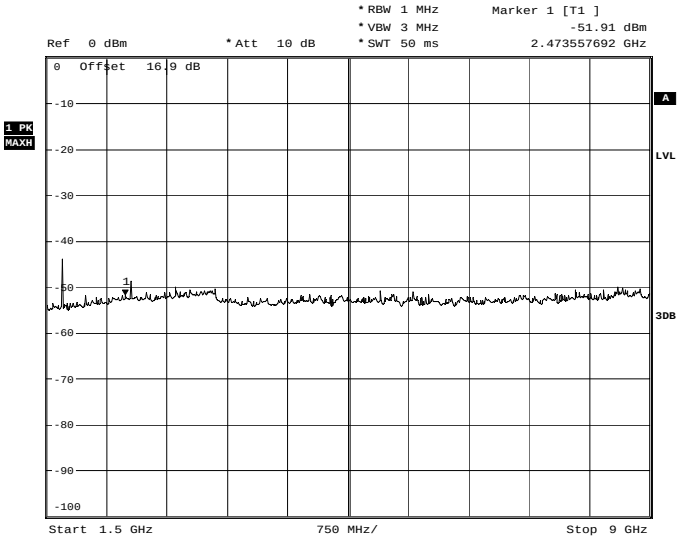


FR
Date: 3.JUL.2008 15:18:33

Mode 3 – Maximum Power

Spurious Emissions (1.5GHz – 9GHz)

GPRS, Timeslots 3, 4, 5 and 6 active



FR
Date: 3.JUL.2008 15:47:20

Product Service

2.8 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.8.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.355, 2.1055

2.8.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.8.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

The EUT was set to transmit on maximum power with timeslots 3, 4, 5 and 6 active. A digital communication analyser (CMU 200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between -30°C and +50°C in 10° steps as per 2.1055. Measurements were performed on timeslot 3.

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

Configuration 1 - Mode 2

2.8.6 Environmental Conditions

	04 July 2008
Ambient Temperature	21.8°C
Relative Humidity	56.4%

Product Service

2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 - Mode 2

3.7V Supply

GPRS

Temperature Interval (ºC)	Test Frequency (MHz)	Deviation (Hz)	Limit (kHz)
-30	836.600	+17	±2.5ppm or ±2.091
-20	836.600	+22	±2.5ppm or ±2.091
-10	836.600	+9	±2.5ppm or ±2.091
0	836.600	+12	±2.5ppm or ±2.091
+10	836.600	+8	±2.5ppm or ±2.091
+20	836.600	-11	±2.5ppm or ±2.091
+30	836.600	-11	±2.5ppm or ±2.091
+40	836.600	+7	±2.5ppm or ±2.091
+50	836.600	+10	±2.5ppm or ±2.091

Product Service

2.9 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.9.1 Specification Reference

FCC CFR 47 Part 22: 2006, Clause 22.355, 2.1055

2.9.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.9.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 22: 2006.

The EUT was set to transmit on maximum power on timeslots 3, 4, 5 and 6. Measurements were made on timeslot 3. A digital communciation anlayser (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts.

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

Configuration 1 - Mode 2

2.9.6 Environmental Conditions

	03 July 2008
Ambient Temperature	22.7°C
Relative Humidity	47.1%

Product Service

2.9.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 22: 2006 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 - Mode 2

GPRS – Circuit Switched

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Deviation Limit (kHz)
3.70	836.600	-11	±2.5ppm or ±2.091
3.35	836.600	-12	±2.5ppm or ±2.091
4.20	836.600	-10	±2.5ppm or ±2.091

Product Service

2.10 SPURIOUS EMISSIONS AT BAND EDGE

2.10.1 Specification Reference

FCC Part 24: 2006, Part 24.229(a)(b), 24.238(a)(b)

2.10.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.10.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 CFR 47 Part 24: 2006.

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

The reference power and path losses of all channels used for testing in each frequency block were measured. Having entered the reference level offset , the limit line was displayed, showing the -13 dBm, (43 + 10 log (P)), limit.

The EUT was tested at it's maximum power level with timeslots 3, 4, 5 and 6 active.

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

Configuration 1 - Mode 4
- Mode 6

2.10.6 Environmental Conditions

	04 July 2008
Ambient Temperature	23.1°C
Relative Humidity	45%

Product Service

2.10.7 Test Results

For the period of test the EUT met the requirements of FCC Part 24: 2006 for Band Edge Measurements.

The test results are shown below.

3.7V Supply

Configuration 1 - Mode 2

Maximum Power – GPRS, Timeslots 3, 4, 5 and 6

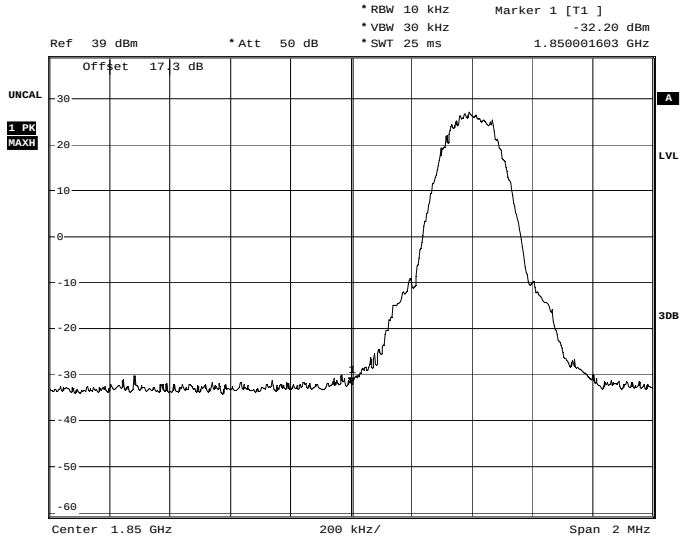
Frequency Block	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A	Channel : 512 Frequency : 1850.2 MHz	-
C	-	Channel : 809 Frequency : 1909.8 MHz

Limit	≤-13dBm at Block Edge

Product Service

Maximum Power - GPRS

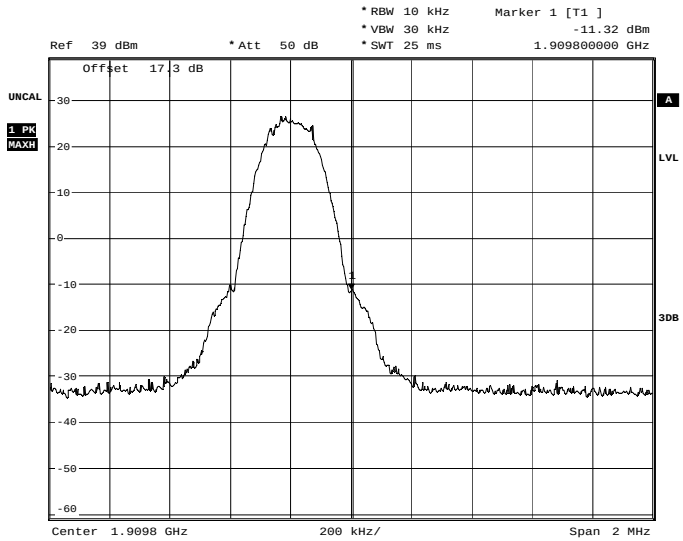
Frequency Block A



FR

Date: 4.JUL.2008 13:07:41

Frequency Block C



FR

Date: 4.JUL.2008 13:12:08

Product Service

2.11 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.11.1 Specification Reference

FCC Part 24: 2006, Part 24.232(b), 2.1046

2.11.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.11.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 CFR 47 Part 24: 2006.

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 EUT was tested in GPRS mode of operation. Testing was performed with GMSK modulation, with four timeslots active, (3 and 4) and (5 and 6). The mobile device is a class 12 device.

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

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

Configuration 1 - Mode 4
- Mode 5
- Mode 6

2.11.6 Environmental Conditions

	04 July 2008
Ambient Temperature	22.7°C
Relative Humidity	45.6%

Product Service

2.11.7 Test Results

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

The test results are shown below.

3.7V Supply

Configuration 1 – Modes 4, 5 and 6

Maximum Power – GSM

Frequency (MHz)	Result (dBm)	Result (mW)
1850.2	28.68	0.738
1880.0	28.30	0.676
1909.8	28.09	0.644

Limit	<2W or <+33dBm

Product Service

2.12 EIRP PEAK POWER

2.12.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 24.232 (c)

2.12.2 Equipment Under Test

Attitude E310, IMEI: 352455020004495

2.12.3 Date of Test and Modification State

03 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006.

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

Configuration 1 - Mode 4
- Mode 5
- Mode 6

2.12.6 Environmental Conditions

	03 July 2008
Ambient Temperature	17.2°C
Relative Humidity	45%
Atmospheric Pressure	1005mbar

Product Service

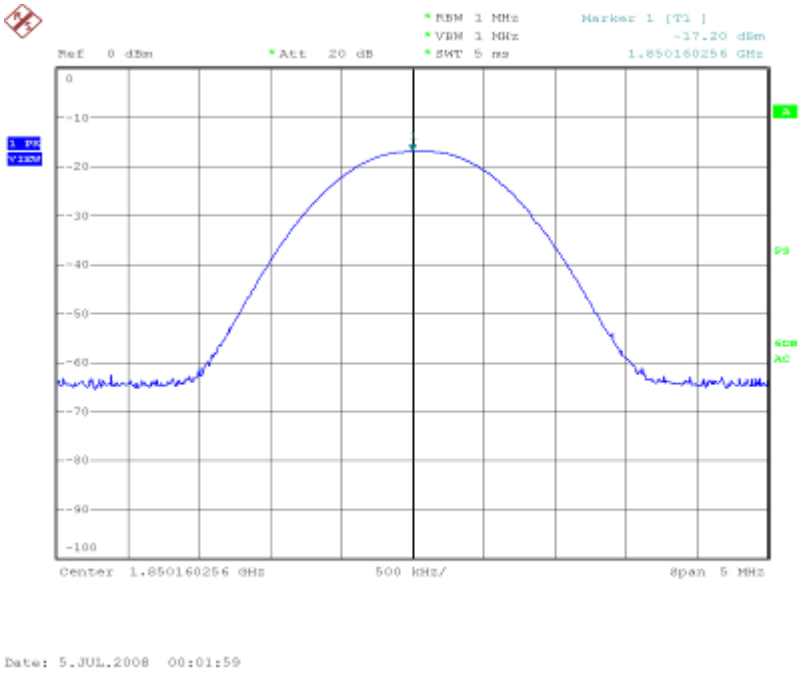
2.12.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for EIRP Peak Power.

The test results are shown below.

Configuration 1 - Mode 4

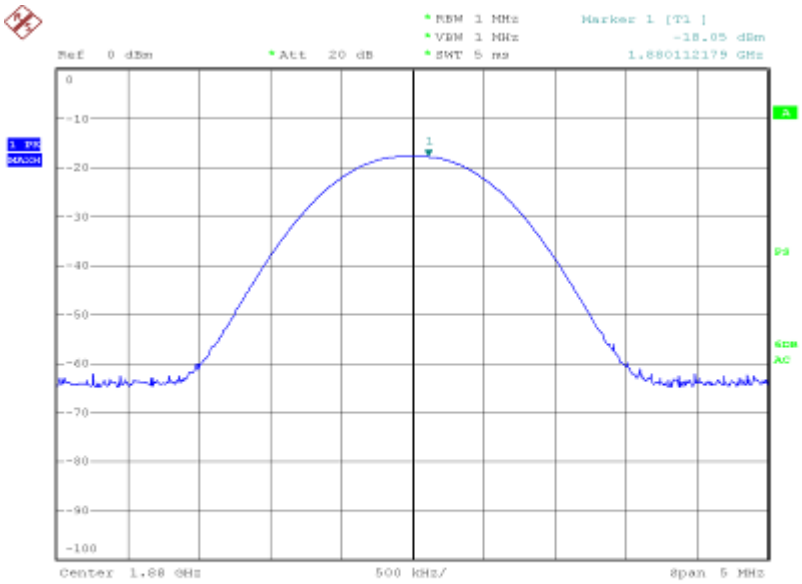
Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
1850	30.7	33.0	1.174	2.0



Product Service

Configuration 1 - Mode 5

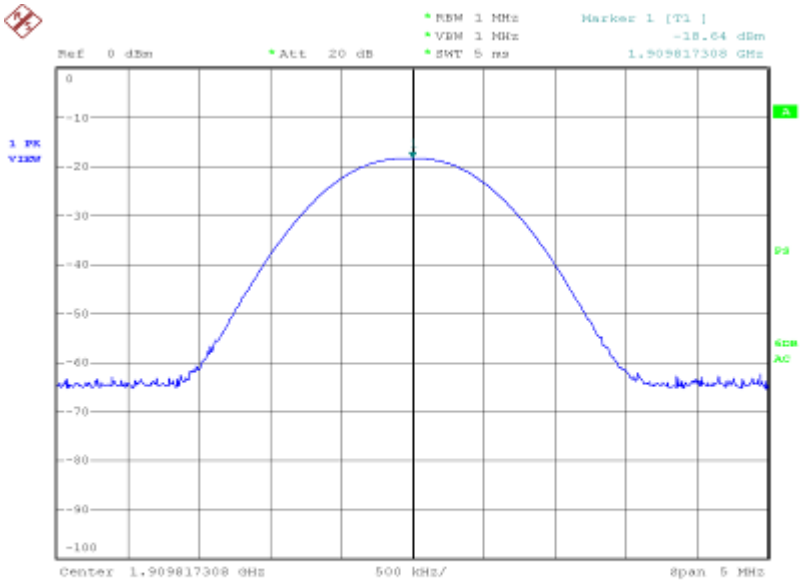
Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
1880	29.5	33.0	0.891	2.0



Product Service

Configuration 1 - Mode 6

Frequency	Result (dBm)	Limit (dBm)	Result (W)	Limit (W)
1.909	29.0	33.0	0.794	2.0



Product Service

2.13 MODULATION CHARACTERISTICS

2.13.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 2.1047(d)

2.13.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.13.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 CFR 47 Part 24: 2006.

Two plots are shown on the following pages showing the EUT transmitting with the display in the time domain.

Plot 1: EUT transmitting with GPRS modulation showing timeslots 3, 4, 5 and 6.
Plot 2: EUT transmitting with GPRS modulation showing one frame with four timeslots active.

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

Configuration 1 - Mode 5

2.13.6 Environmental Conditions

	04 July 2008
Ambient Temperature	22.8°C
Relative Humidity	45.5%

Product Service

2.13.7 Modulation Characteristics

For a description of the modulation techniques see section 2.4.7.

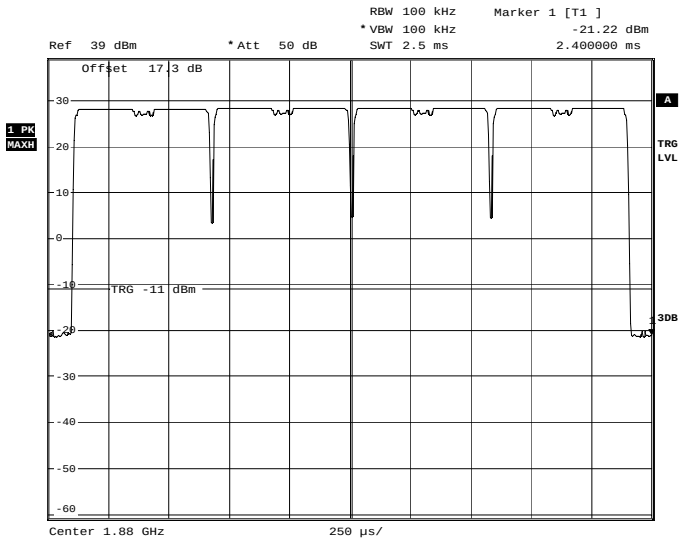
2.13.8 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Modulation Characteristics.

The test results are shown below.

Configuration 1 - Mode 5

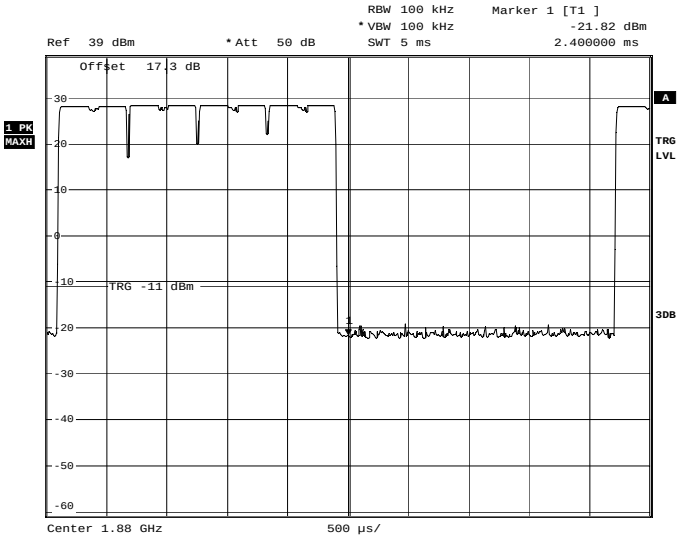
EUT Transmitting with GPRS modulation showing timeslots 3, 4, 5 and 6 active



FR
Date: 4.JUL.2008 12:48:13

Product Service

EUT Transmitting with GPRS modulation showing one frame with timeslots 3, 4, 5 and 6 active



FR
Date: 4.JUL.2008 12:50:50

Product Service

2.14 OCCUPIED BANDWIDTH

2.14.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 24.238(b), 2.1049

2.14.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.14.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006.

The EUT was transmitting at maximum power, modulated with timeslots 3, 4, 5 and 6 active. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following page shows the resultant display from the Spectrum Analyser.

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

Configuration 1 - Mode 5

2.14.6 Environmental Conditions

	04 July 2008
Ambient Temperature	23°C
Relative Humidity	45.8%

Product Service

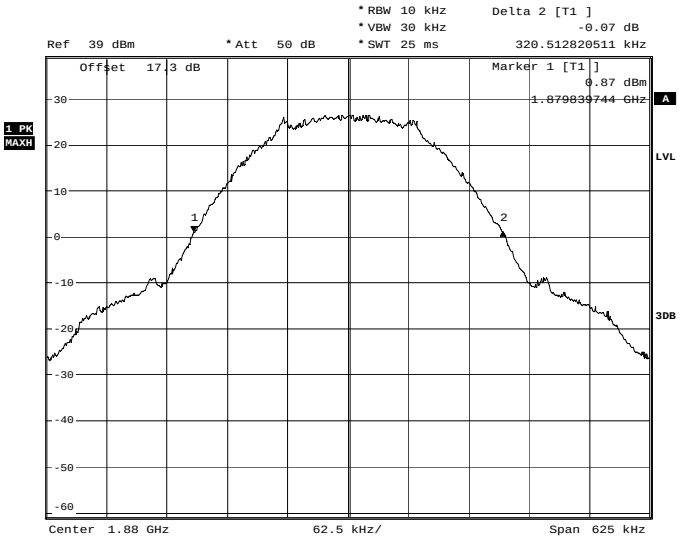
2.14.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Occupied Bandwidth.

The test results are shown below.

Configuration 1 - Mode 5

Occupied Bandwidth As Defined By The -26dBc Points



FR
Date: 4.JUL.2008 13:00:53

Product Service

2.15 CONDUCTED SPURIOUS EMISSIONS

2.15.1 Specification Reference

FCC CFR 47 Part 24: 2006, Part 24.238(a), 2.1051

2.15.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.15.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006.

In accrodance 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 9 kHz to 20 GHz. The EUT was set to transmit on full power on timeslots 3, 4, 5 and 6. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz in accordance with Part 24.238. The spectrum analyser detector was set to max hold.

For meauring the range 9 kHz to 4 GHz, on maximum power, a 20dB attenuator was used. From 4 GHz to 20GHz, attenuators and a high pass filter were used.

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

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

Configuration 1 - Mode 4
- Mode 5
- Mode 6

2.15.6 Environmental Conditions

	04 July 2008
Ambient Temperature	23.5°C
Relative Humidity	42.6%

Product Service

2.15.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Conducted Spurious Emissions.

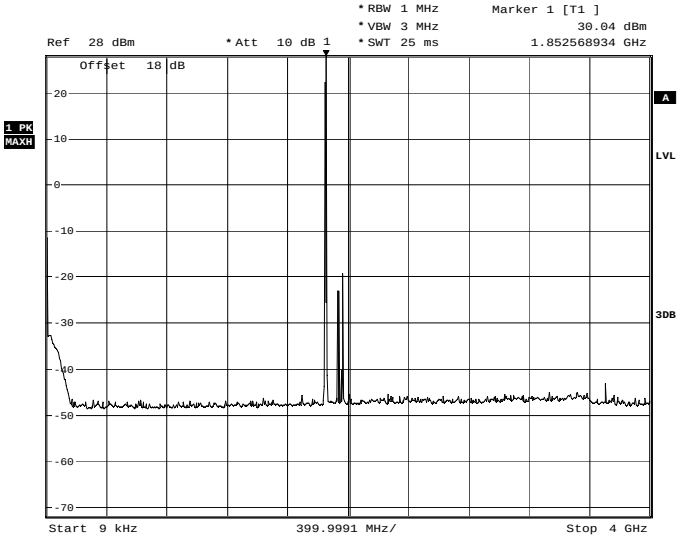
The test results are shown below.

3.7V Supply

Mode 4 – Maximum Power

Spurious Emissions (9kHz – 4GHz)

GPRS, Timeslots 3, 4, 5 and 6



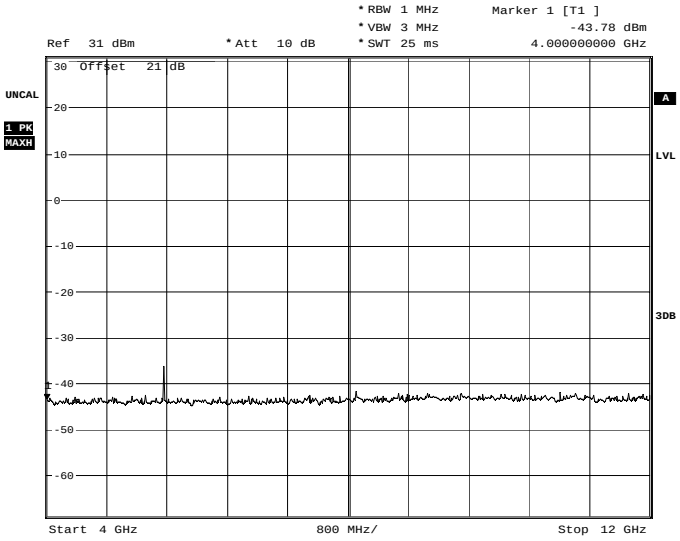
FR
Date: 4.JUL.2008 13:31:44

Product Service

Spurious Emissions (4GHz – 12GHz)

Mode 4 – Maximum Power

GPRS . Timeslots 3, 4, 5 and 6

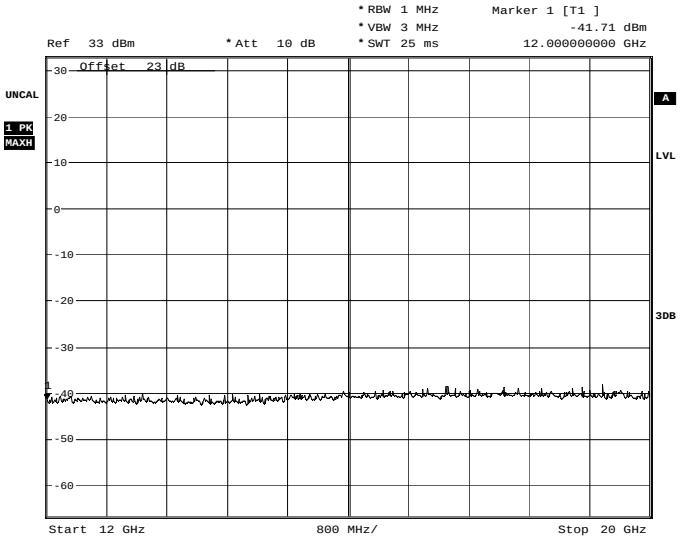


FR
Date: 4.JUL.2008 13:42:08

Spurious Emissions (12GHz – 20GHz)

Mode 4 – Maximum Power

GPRS, Timeslots 3, 4, 5 and 6

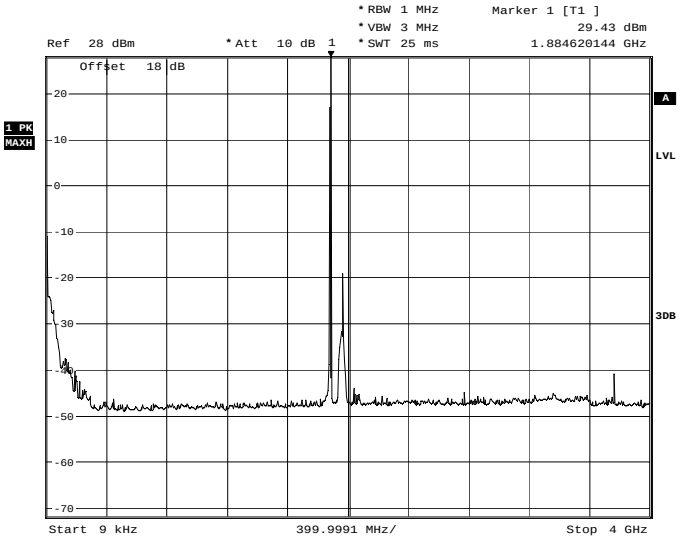


FR
Date: 4.JUL.2008 13:44:03

Mode 5 – Maximum Power

Spurious Emissions (9kHz – 4GHz)

GPRS, Timeslots 3, 4, 5 and 6

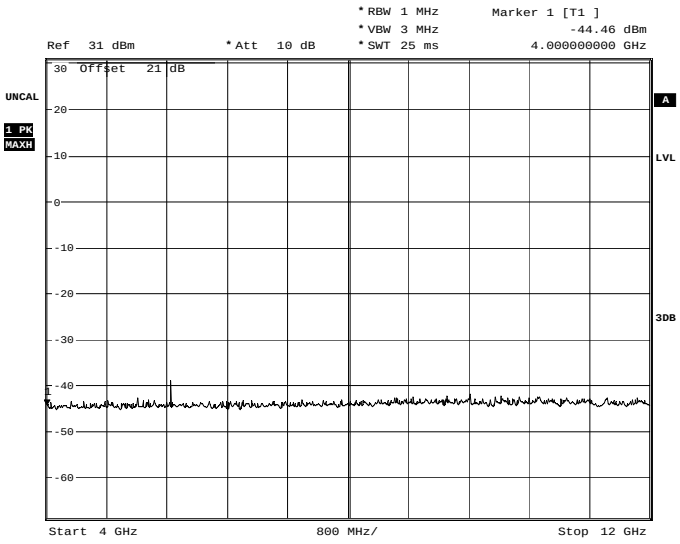


FR
Date: 4.JUL.2008 13:29:36

Spurious Emissions (4GHz – 12GHz)

Mode 5– Maximum Power

GPRS, Timeslots 3, 4, 5 and 6

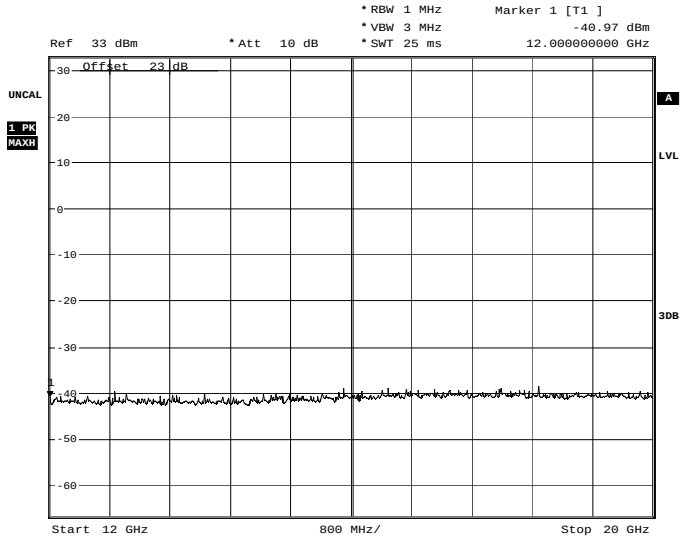


FR
Date: 4.JUL.2008 13:37:09

Spurious Emissions (12GHz – 20GHz)

Mode 5– Maximum Power

GPRS, Timeslots 3, 4, 5 and 6

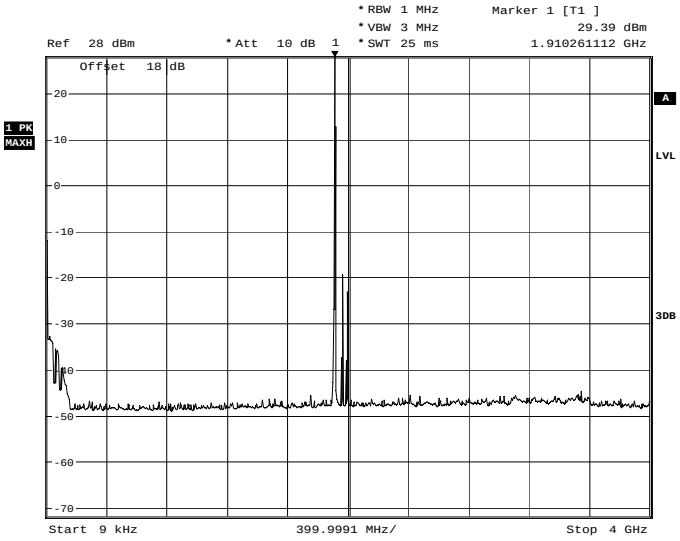


FR
Date: 4.JUL.2008 13:45:07

Spurious Emissions (9kHz – 4GHz)

Mode 6 – Maximum Power

GPRS , Timeslots, 3, 4, 5 and 6

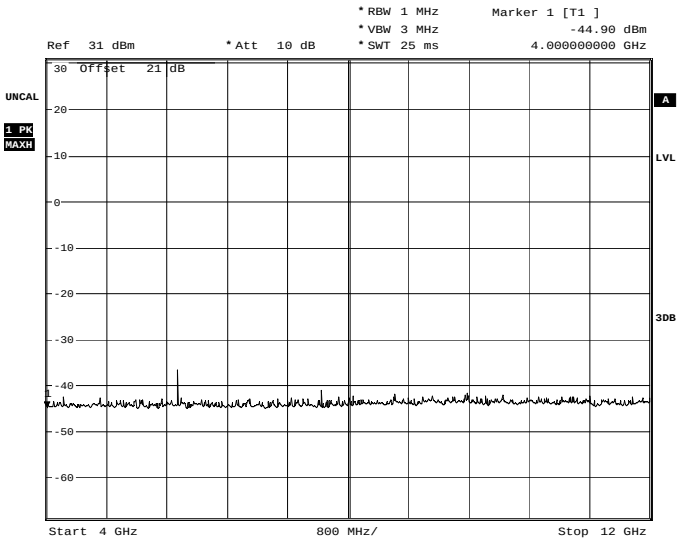


FR
Date: 4.JUL.2008 13:33:04

Spurious Emissions (4GHz – 12GHz)

Mode 6 – Maximum Power

GPRS, Timeslots 3, 4, 5 and 6

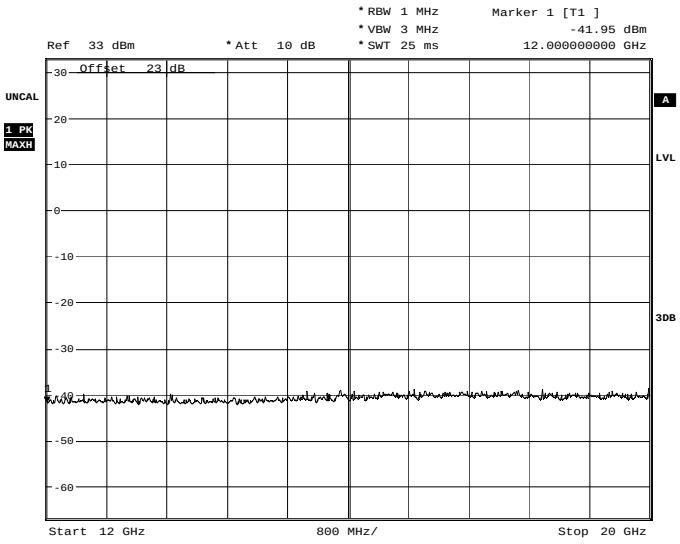


FR
Date: 4.JUL.2008 13:35:36

Spurious Emissions (12GHz – 20GHz)

Mode 6 – Maximum Power

GPRS, Timeslots 3, 4, 5 and 6



FR
Date: 4.JUL.2008 13:47:38

Product Service

2.16 EMISSIONS FOR BROADBAND PCS EQUIPMENT

2.16.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 24.238

2.16.2 Equipment Under Test

Attitude E310, IMEI: 352455020004495

2.16.3 Date of Test and Modification State

02 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006.

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

Configuration 1 - Mode 4
- Mode 5
- Mode 6

2.16.6 Environmental Conditions

	02 July 2008
Ambient Temperature	17.5°C
Relative Humidity	42%
Atmospheric Pressure	1005mbar

2.16.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Emissions for Broadband PCS Equipment.

The test results are shown below.

Configuration 1 - Mode 4

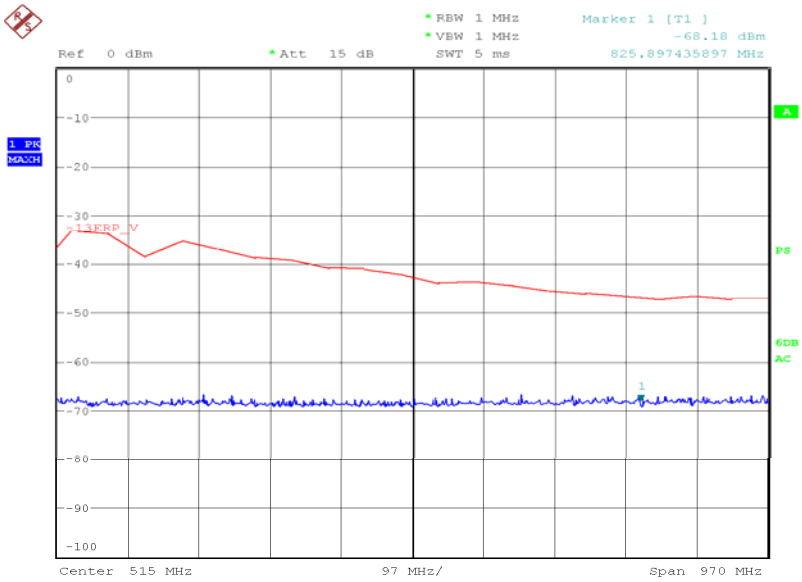
Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	ERP Limit dBm	Margin dB	Result
5480	Horizontal	106	317	-38.8	-13.0	-25.8	Pass

Product Service

Configuration 1 - Mode 4

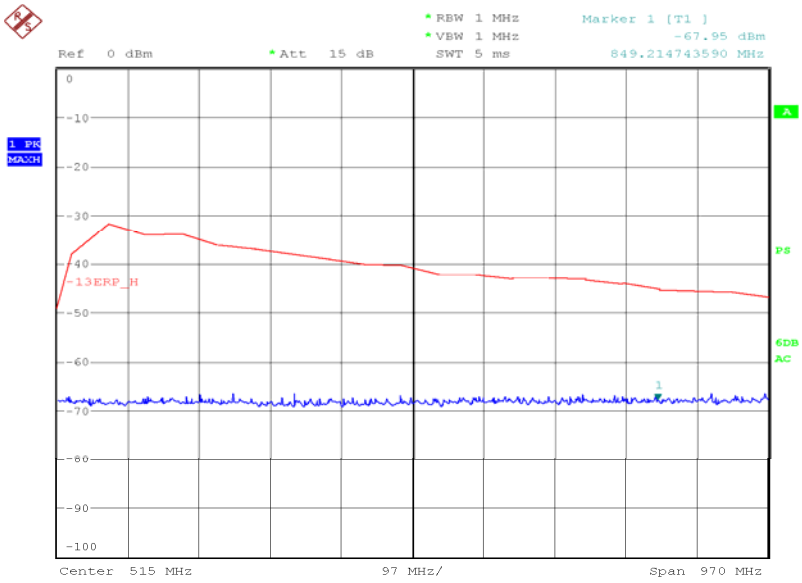
30MHz to 1GHz

Vertical Polarity



Date: 2.JUL.2008 22:59:08

Horizontal Polarity

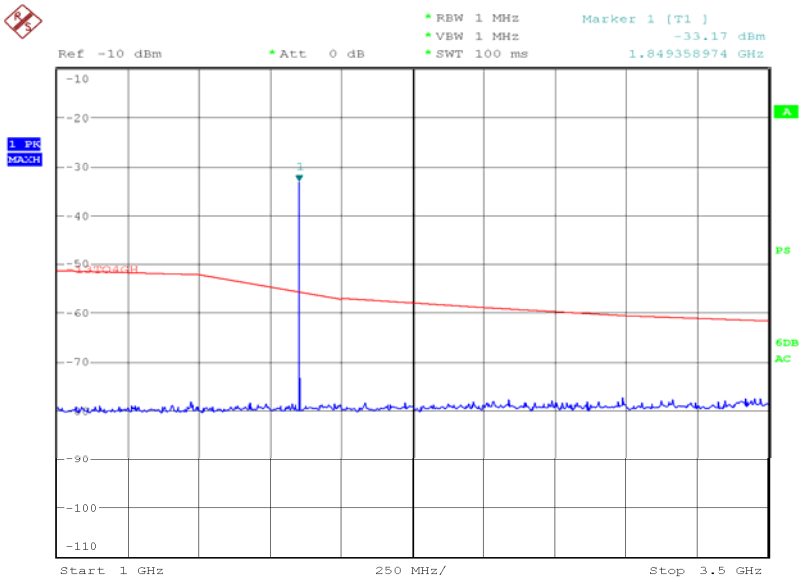


Date: 2.JUL.2008 22:56:49

Product Service

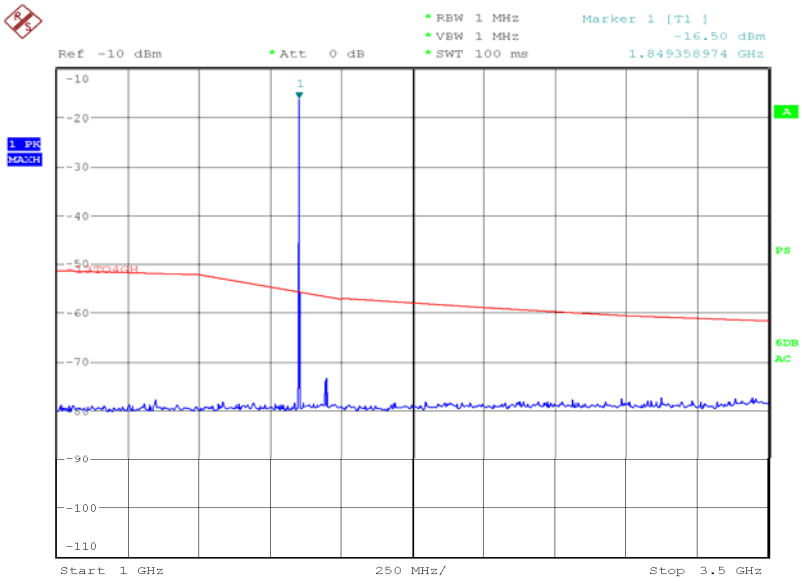
1GHz to 3.5GHz

Vertical Polarity



Date: 3.JUL.2008 01:41:25

Horizontal Polarity

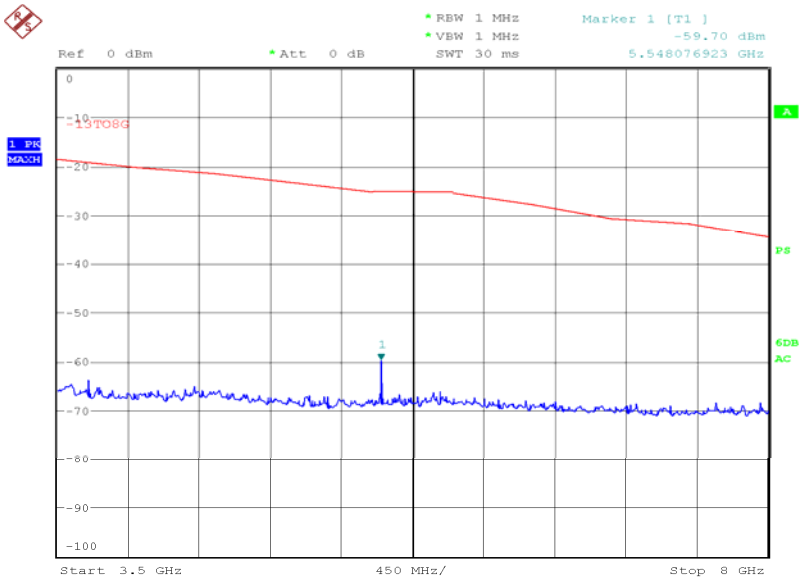


Date: 3.JUL.2008 01:38:31

Product Service

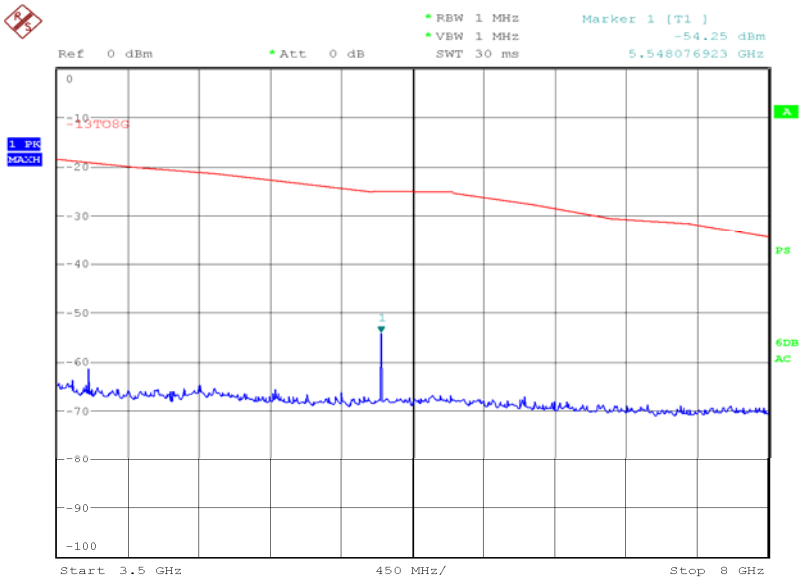
3.5GHz to 8GHz

Vertical Polarity



Date: 4.JUL.2008 01:07:16

Horizontal Polarity

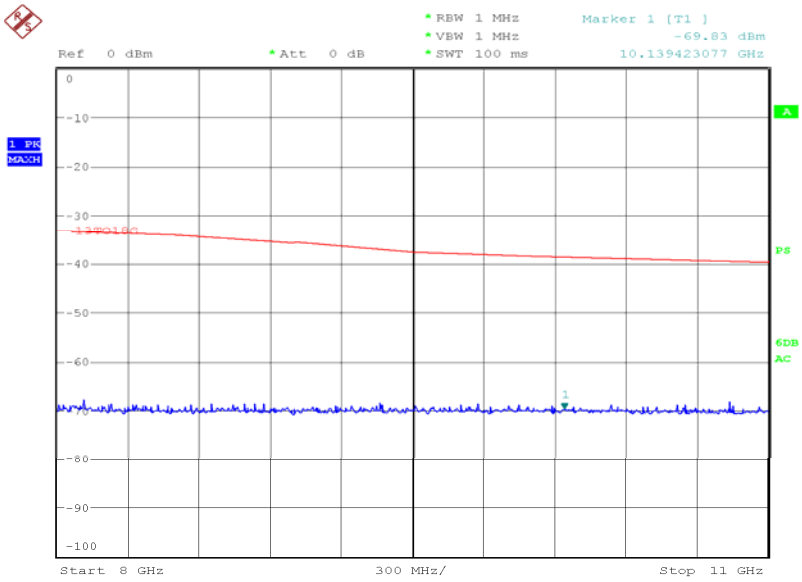


Date: 4.JUL.2008 00:53:05

Product Service

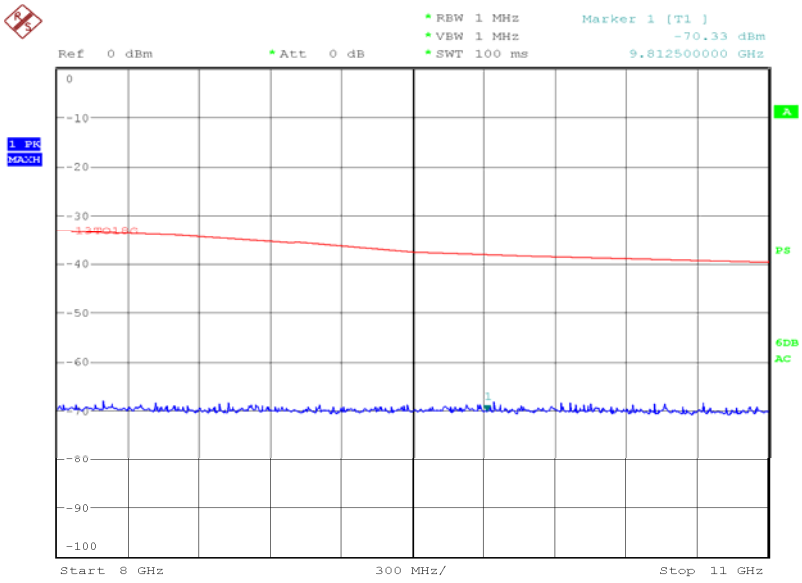
8GHz to 11GHz

Vertical Polarity



Date: 3.JUL.2008 22:40:41

Horizontal Polarity

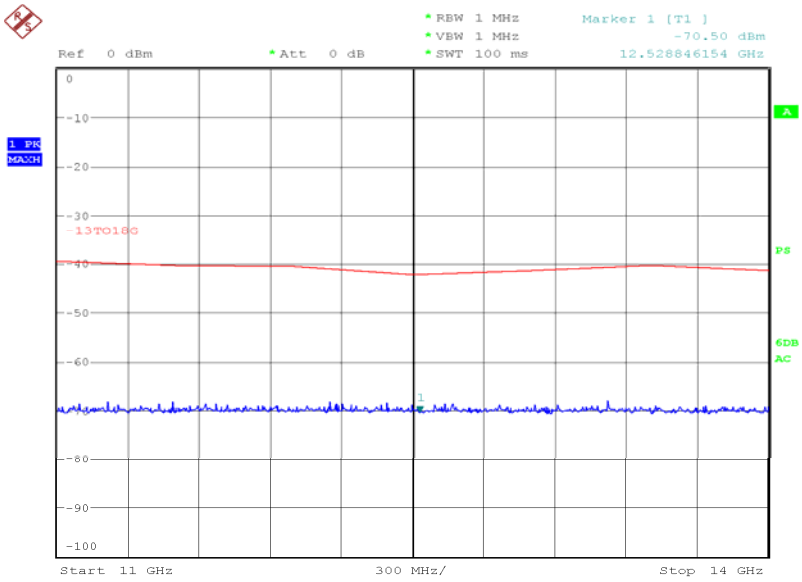


Date: 3.JUL.2008 22:52:04

Product Service

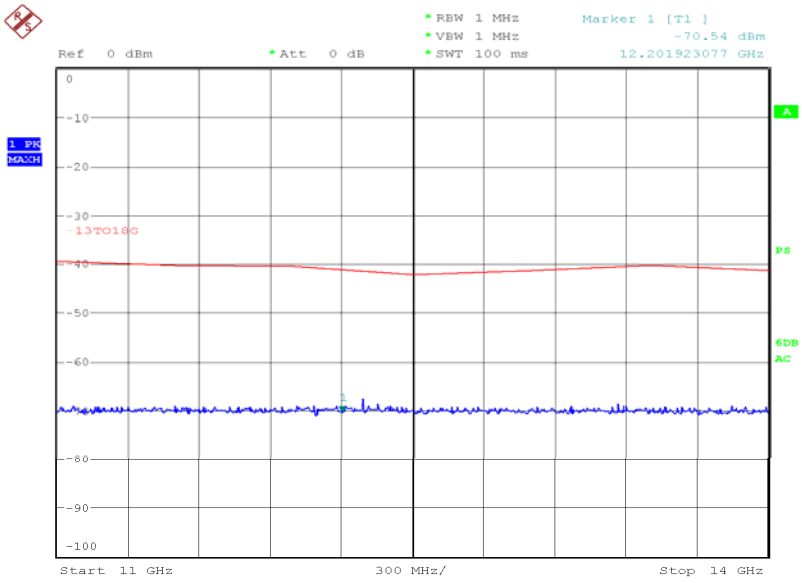
11GHz to 14GHz

Vertical Polarity



Date: 3.JUL.2008 22:44:34

Horizontal Polarity

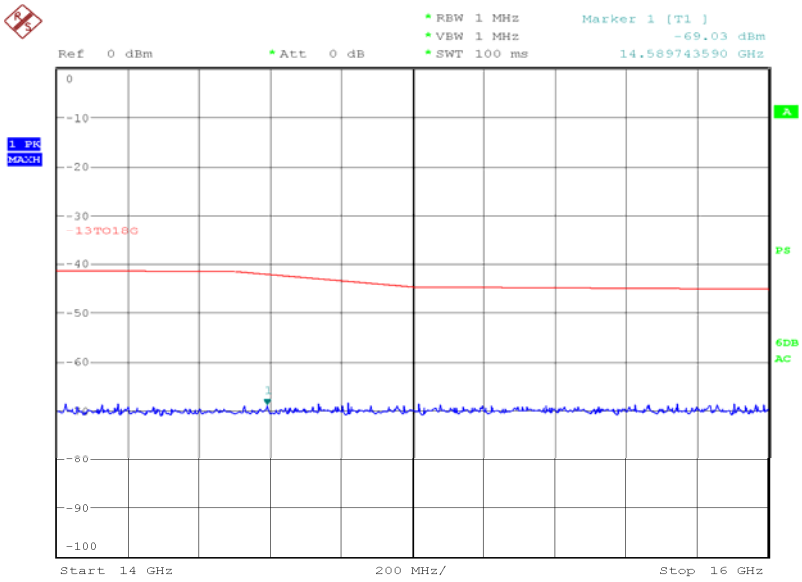


Date: 3.JUL.2008 22:54:38

Product Service

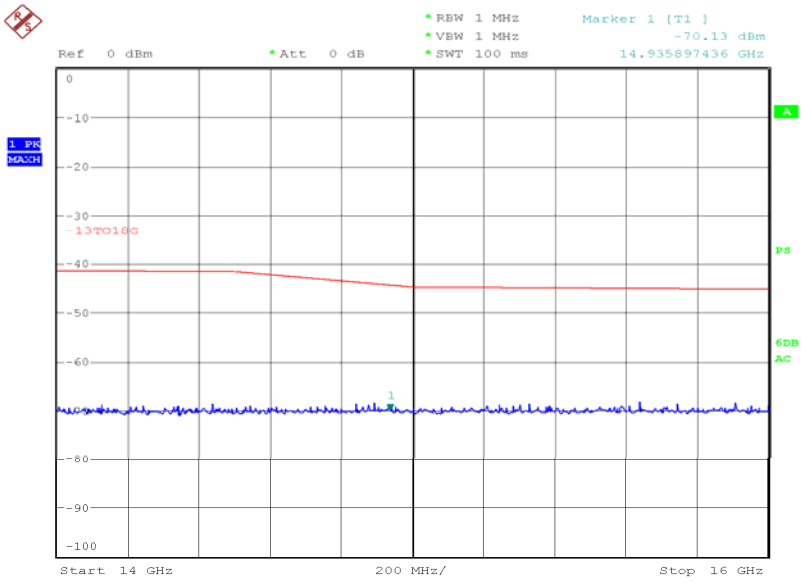
14GHz to 16GHz

Vertical Polarity



Date: 3.JUL.2008 22:46:53

Horizontal Polarity

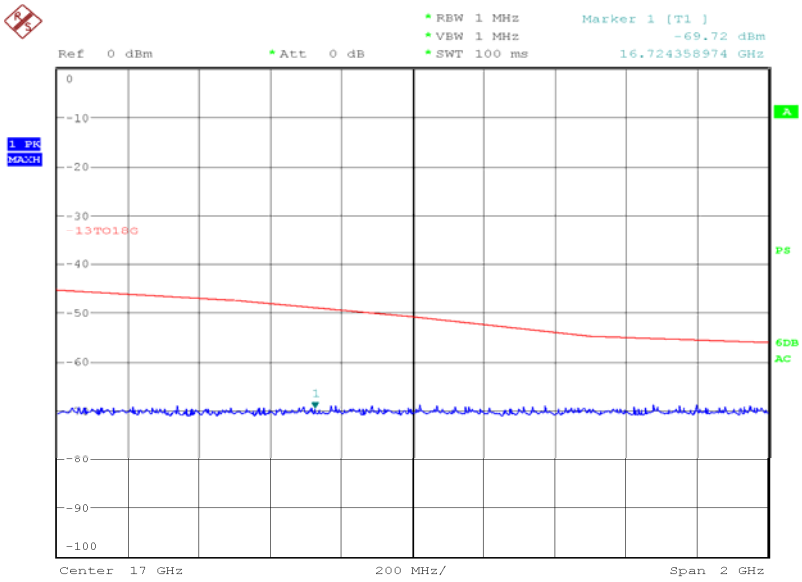


Date: 3.JUL.2008 22:56:48

Product Service

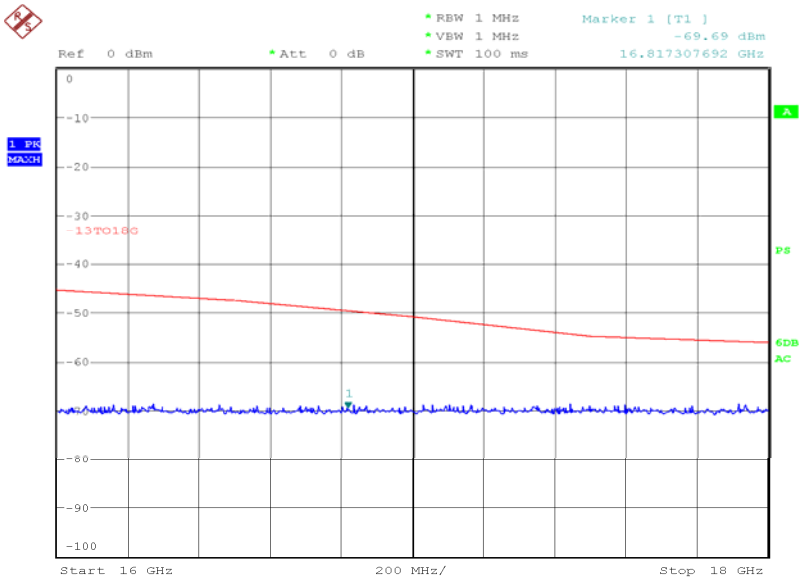
16GHz to 18GHz

Vertical Polarity



Date: 3.JUL.2008 22:48:53

Horizontal Polarity

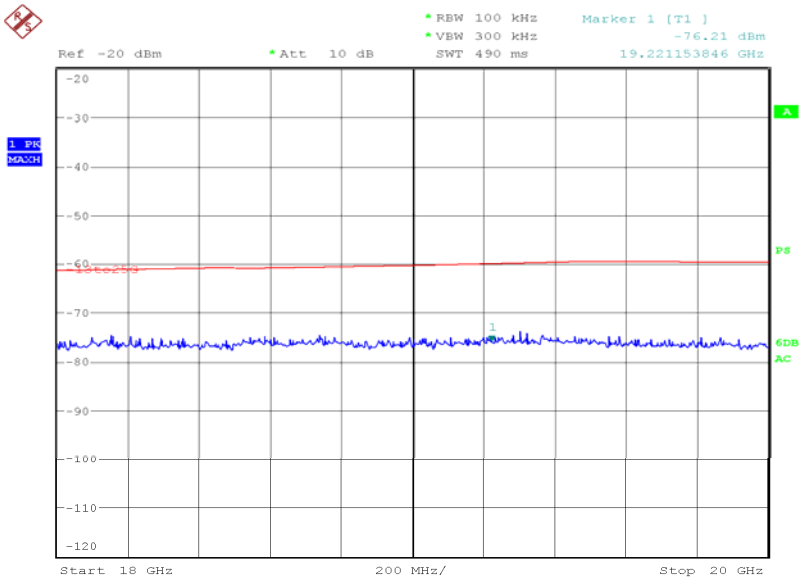


Date: 3.JUL.2008 22:59:37

Product Service

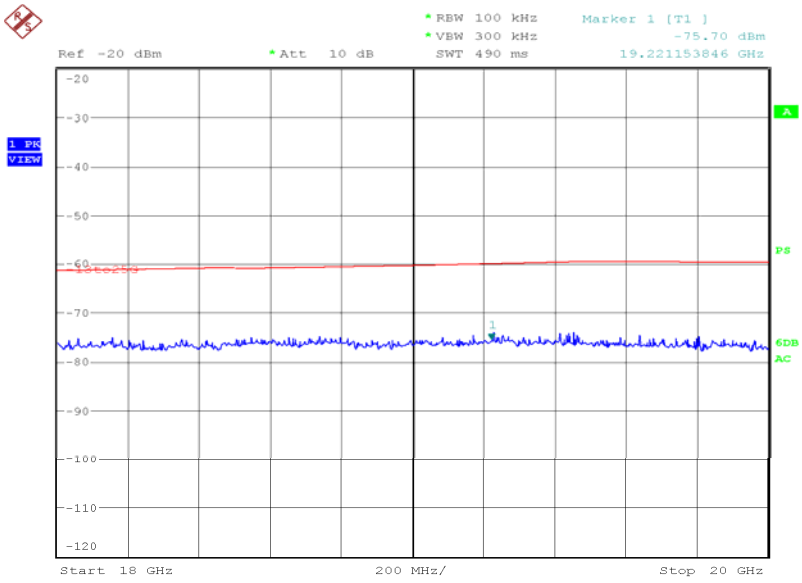
18GHz to 20GHz

Vertical Polarity



Date: 5.JUL.2008 17:13:28

Horizontal Polarity



Date: 5.JUL.2008 17:10:17

Product Service

Configuration 1 - Mode 5

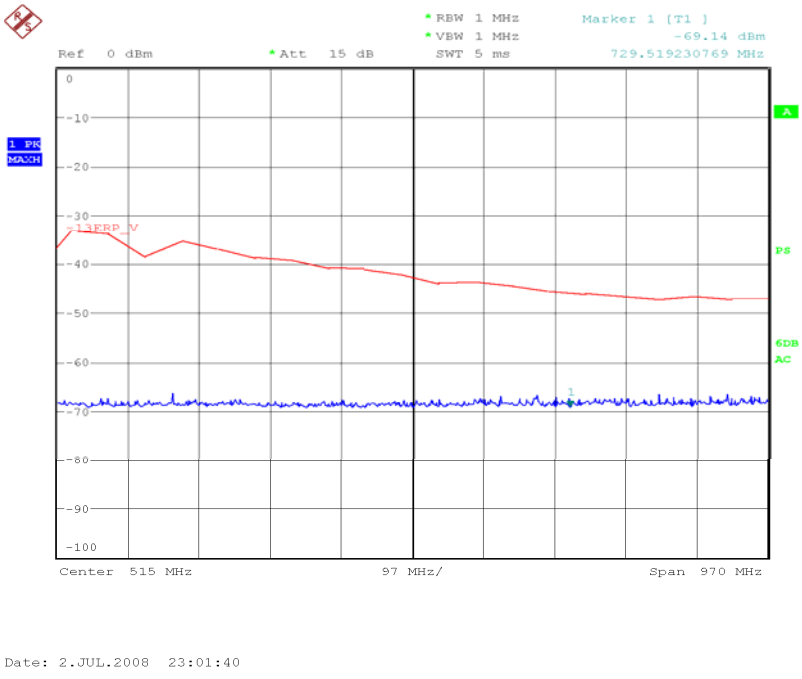
Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	EIRP Limit dBm	Margin dB	Result
5640	Horizontal	100	17	-33.7	-13.0	-20.7	Pass

.

Configuration 1 - Mode 5

30MHz to 1GHz

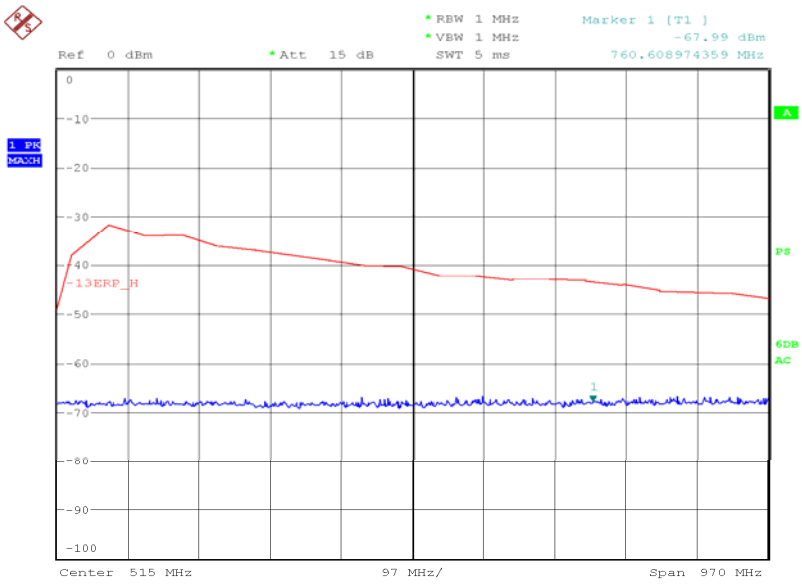
Vertical Polarity



Date: 2.JUL.2008 23:01:40

Product Service

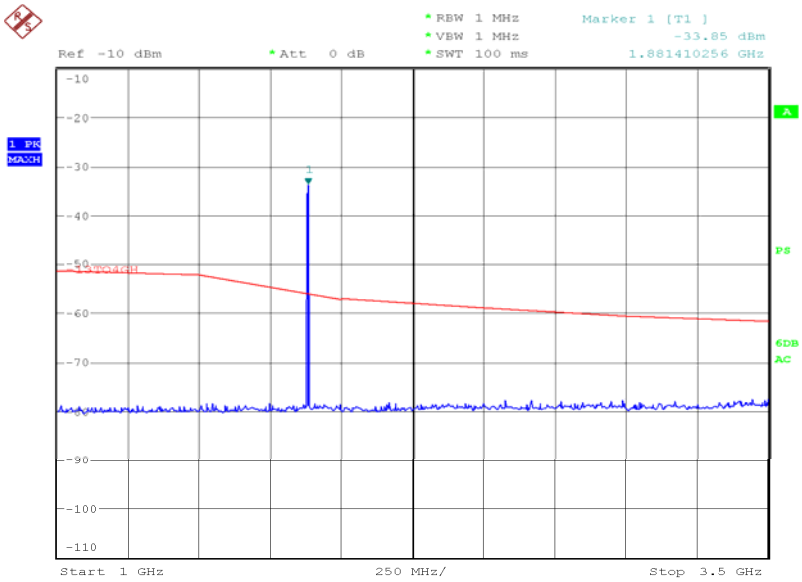
Horizontal Polarity



Date: 2.JUL.2008 23:05:27

1GHz to 3.5GHz

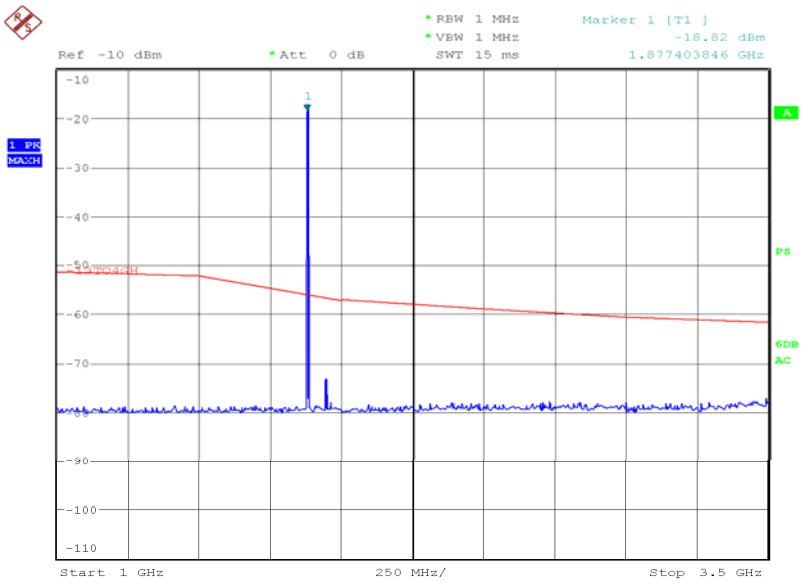
Vertical Polarity



Date: 3.JUL.2008 01:44:37

Product Service

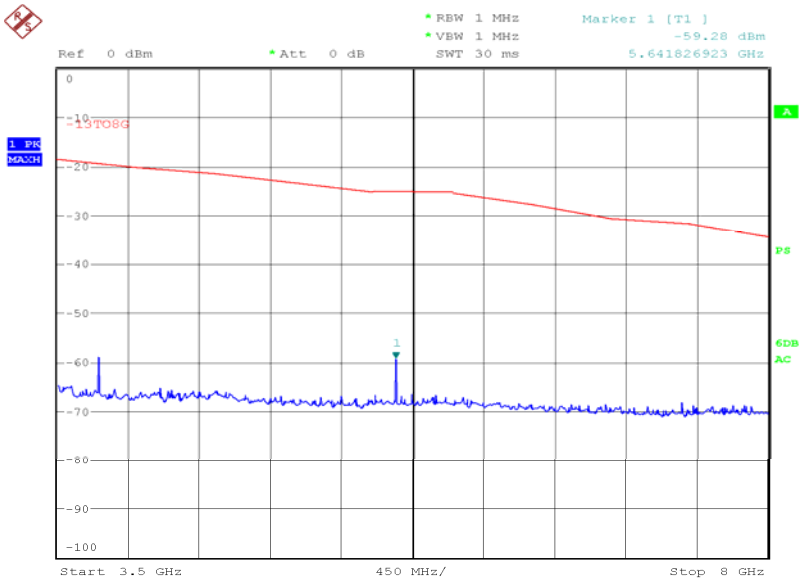
Horizontal Polarity



Date: 3.JUL.2008 01:48:56

3.5GHz to 8GHz

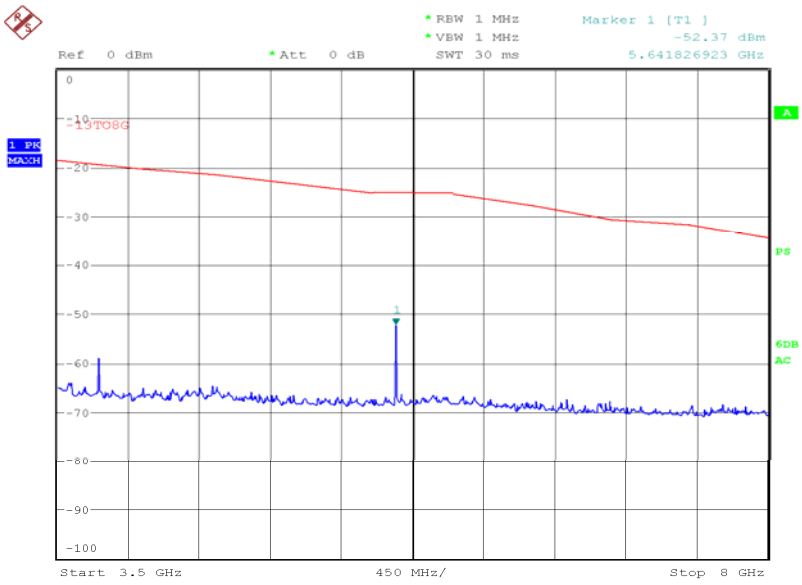
Vertical Polarity



Date: 4.JUL.2008 01:04:43

Product Service

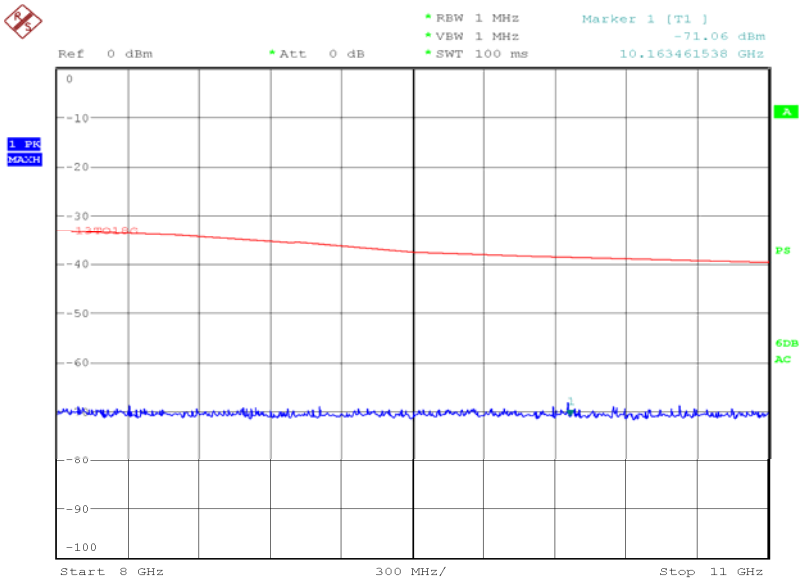
Horizontal Polarity



Date: 4.JUL.2008 00:56:13

8GHz to 11GHz

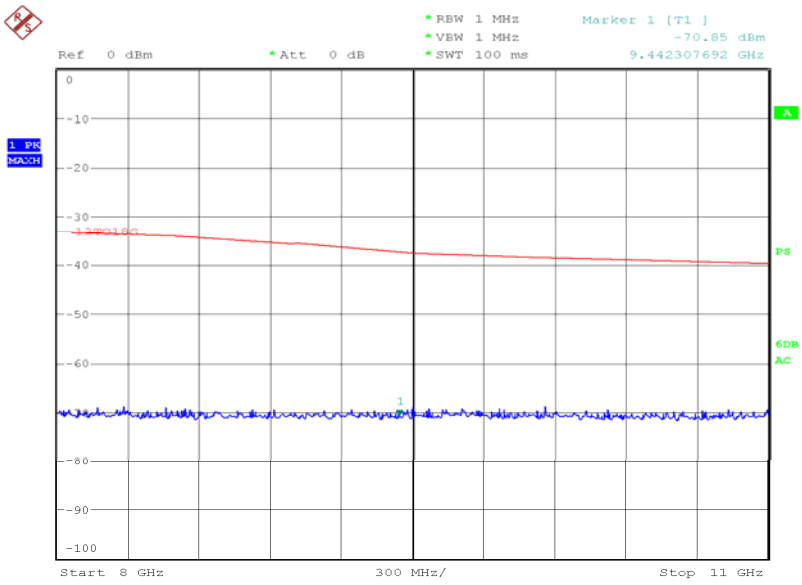
Vertical Polarity



Date: 3.JUL.2008 23:20:06

Product Service

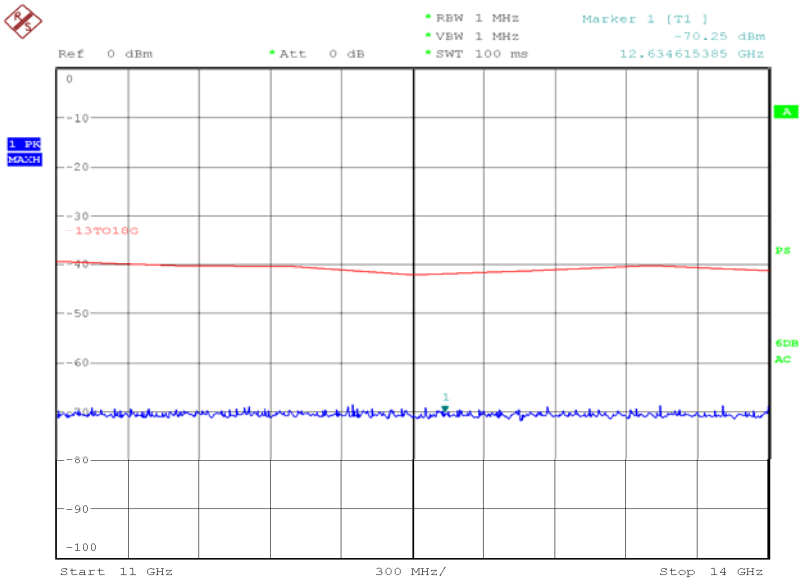
Horizontal Polarity



Date: 3.JUL.2008 23:22:38

11GHz to 14GHz

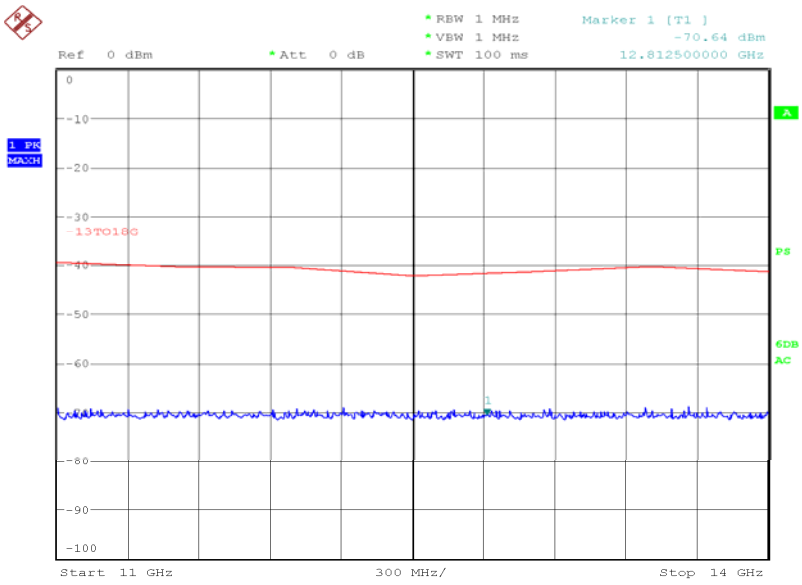
Vertical Polarity



Date: 3.JUL.2008 23:20:43

Product Service

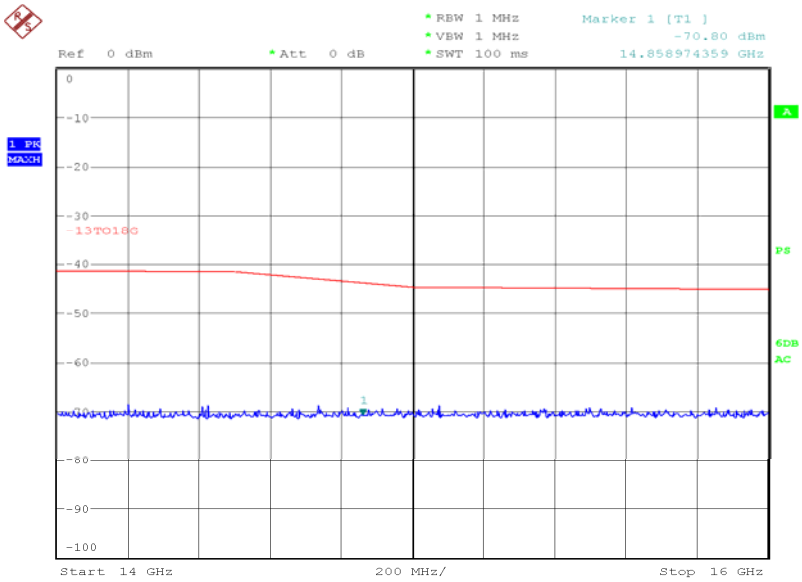
Horizontal Polarity



Date: 3.JUL.2008 23:28:00

14GHz to 16GHz

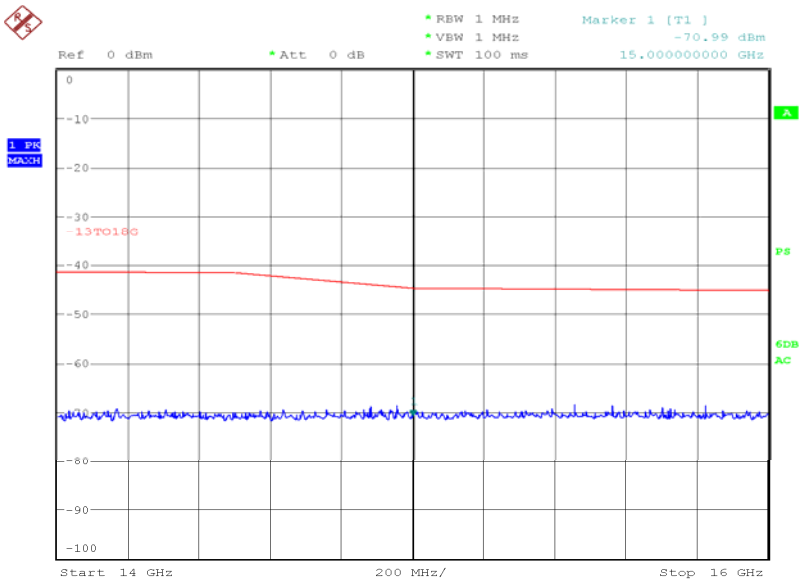
Vertical Polarity



Date: 3.JUL.2008 23:21:25

Product Service

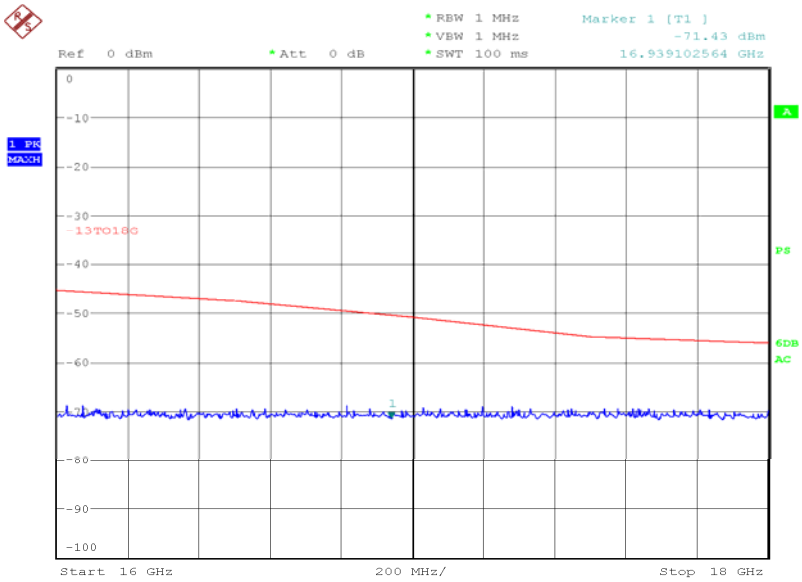
Horizontal Polarity



Date: 3.JUL.2008 23:23:42

16GHz to 18GHz

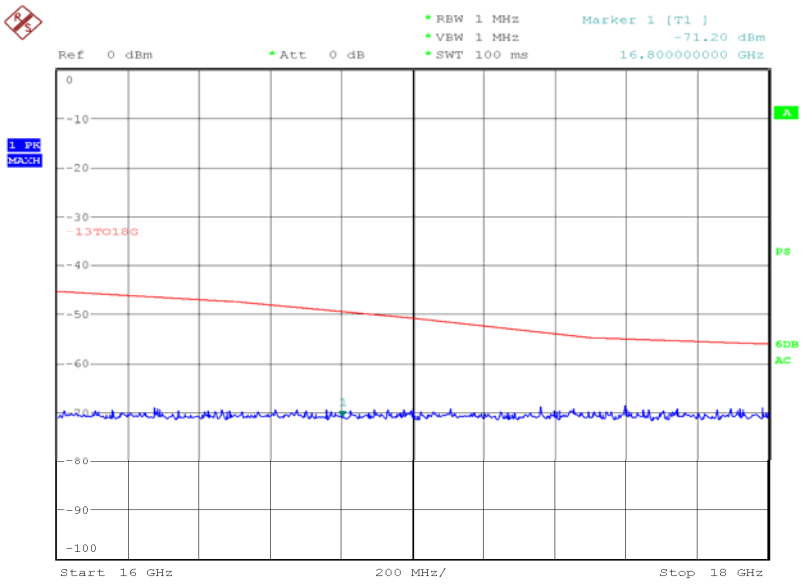
Vertical Polarity



Date: 3.JUL.2008 23:22:00

Product Service

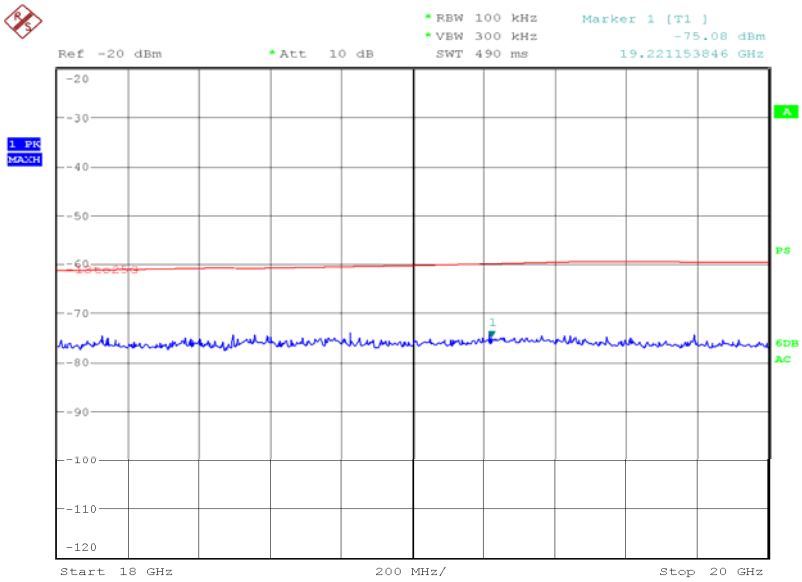
Horizontal Polarity



Date: 3.JUL.2008 23:24:16

18GHz to 20GHz

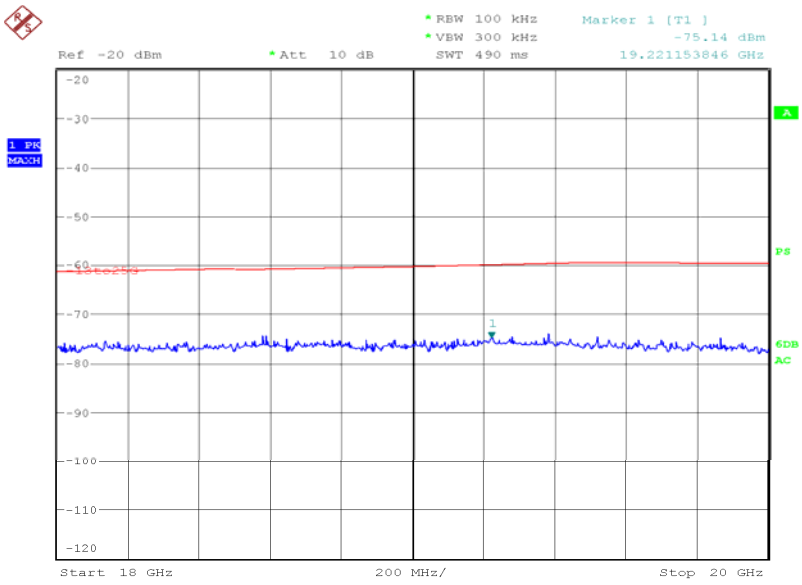
Vertical Polarity



Date: 5.JUL.2008 17:17:32

Product Service

Horizontal Polarity



Date: 5.JUL.2008 17:19:46

Product Service

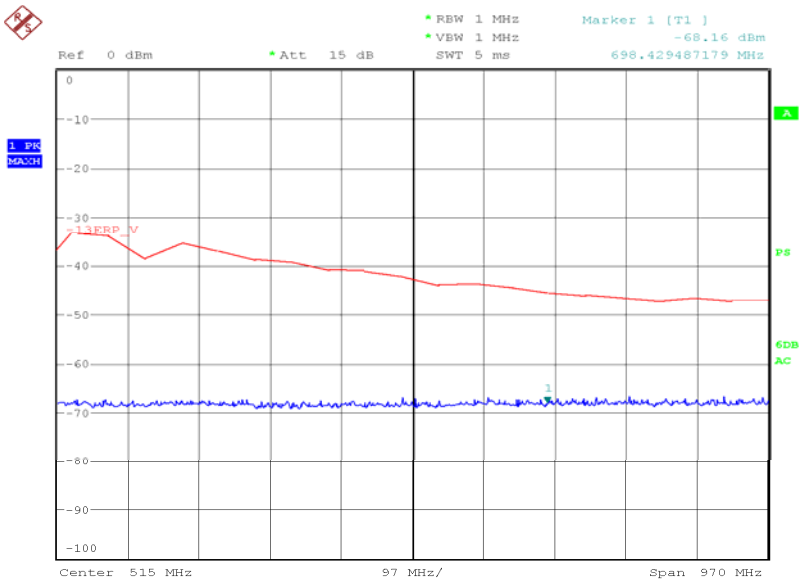
Configuration 1 - Mode 6

Frequency MHz	Antenna Polarisation	Antenna Height cm	EUT Arc degrees	Result Peak dBm	ERP Limit dBm	Margin dB	Result
5728	Horizontal	100	326	-30.7	-13.0	-17.7	Pass

Configuration 1 - Mode 6

30MHz to 1GHz

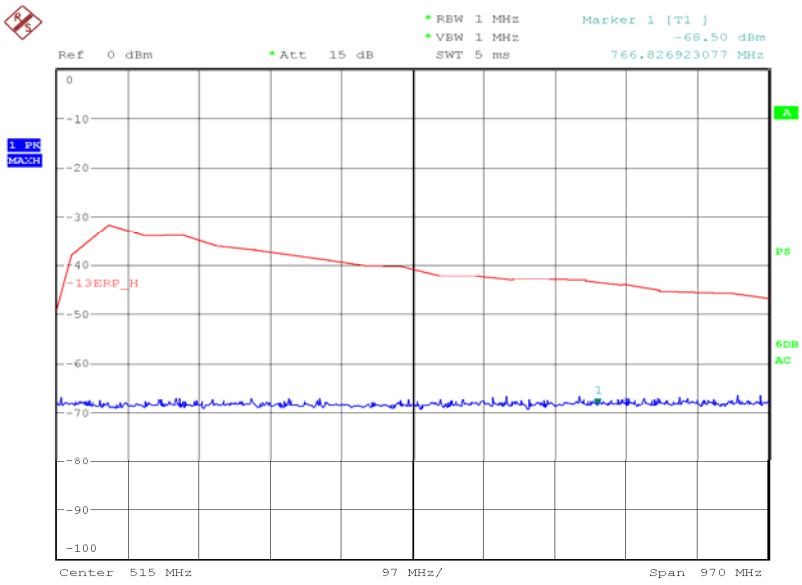
Vertical Polarity



Date: 2.JUL.2008 23:12:08

Product Service

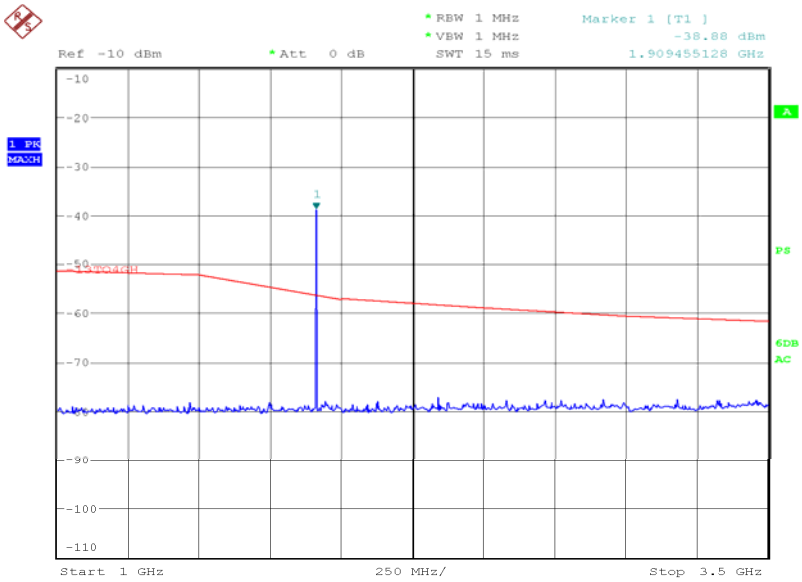
Horizontal Polarity



Date: 2.JUL.2008 23:08:20

1GHz to 3.5GHz

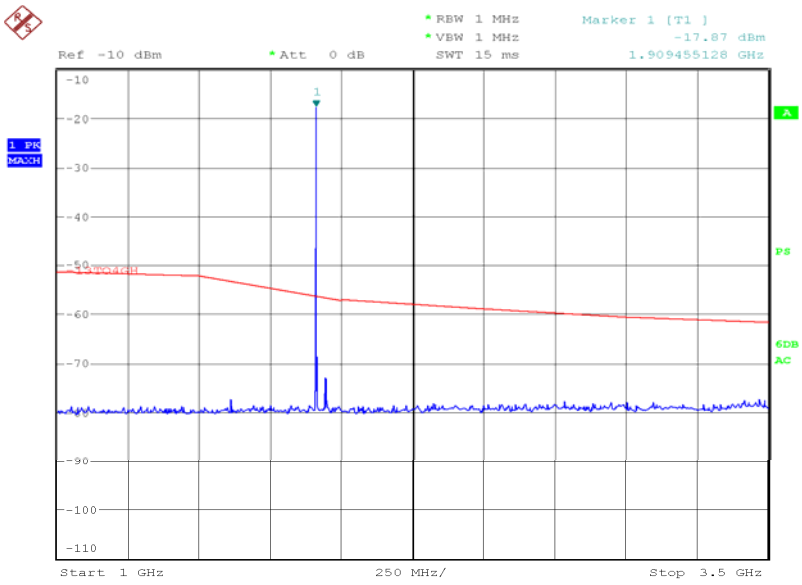
Vertical Polarity



Date: 3.JUL.2008 01:54:41

Product Service

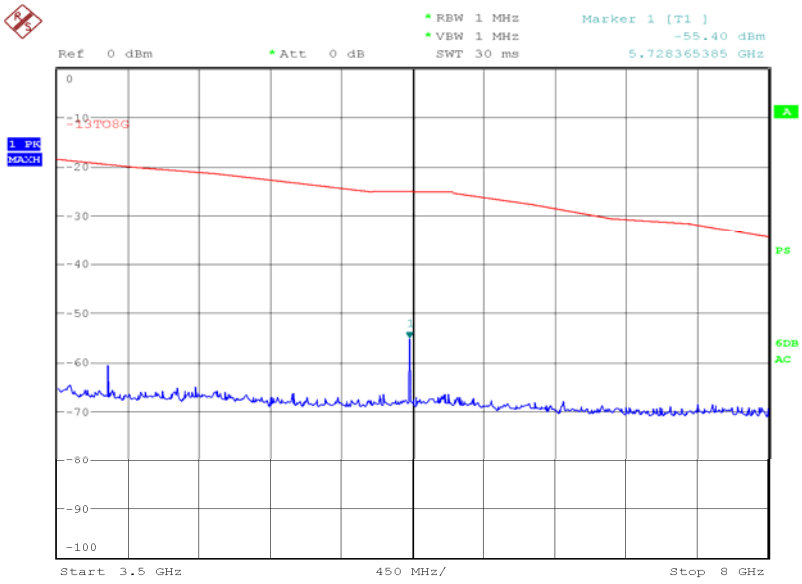
Horizontal Polarity



Date: 3.JUL.2008 01:51:45

3.5GHz to 8GHz

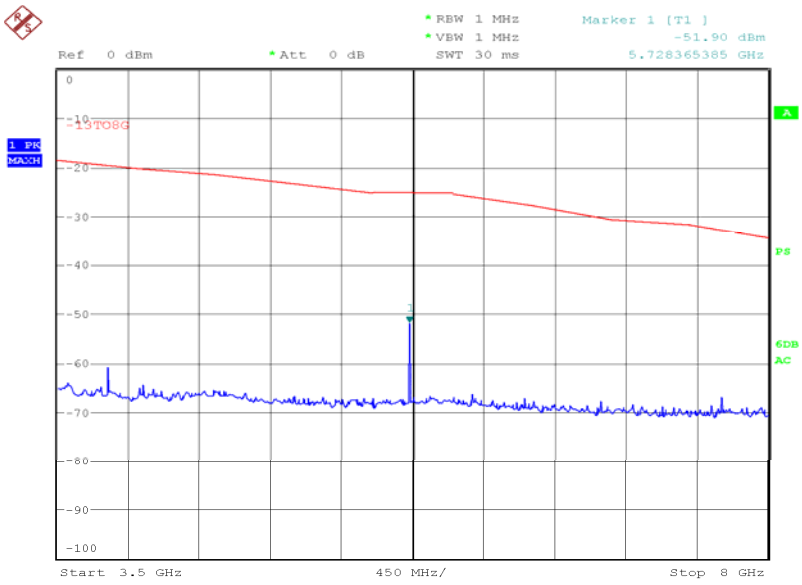
Vertical Polarity



Date: 4.JUL.2008 01:02:03

Product Service

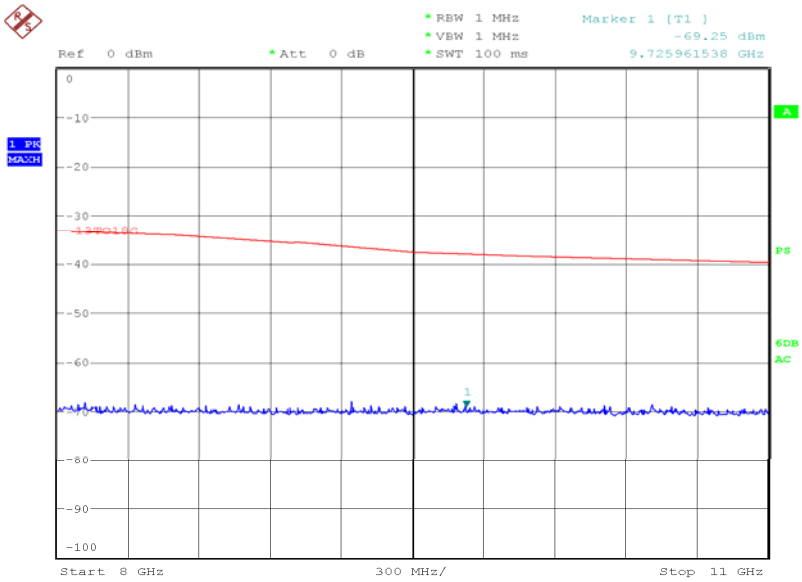
Horizontal Polarity



Date: 4.JUL.2008 00:58:46

8GHz to 11GHz

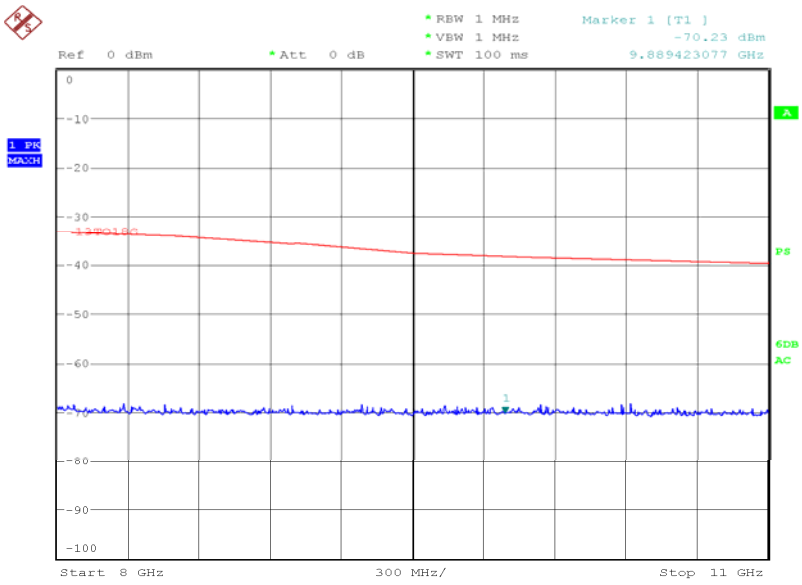
Vertical Polarity



Date: 3.JUL.2008 23:11:33

Product Service

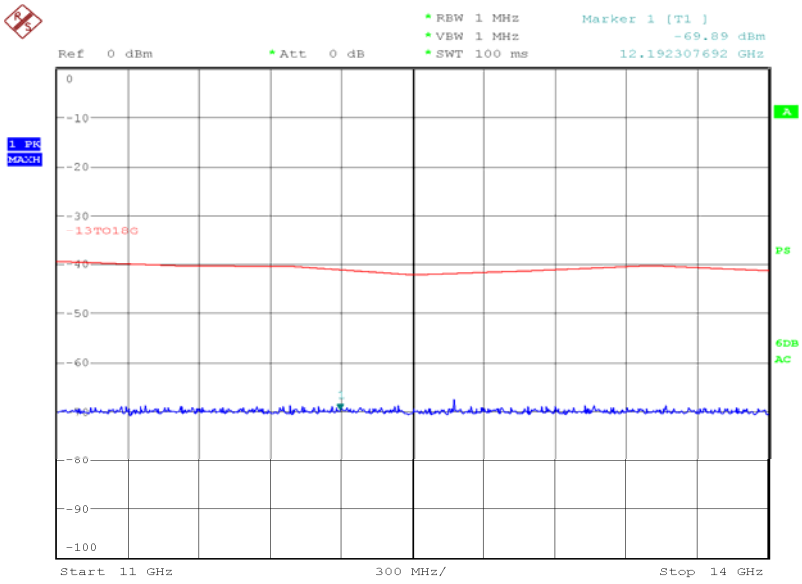
Horizontal Polarity



Date: 3.JUL.2008 23:01:47

11GHz to 14GHz

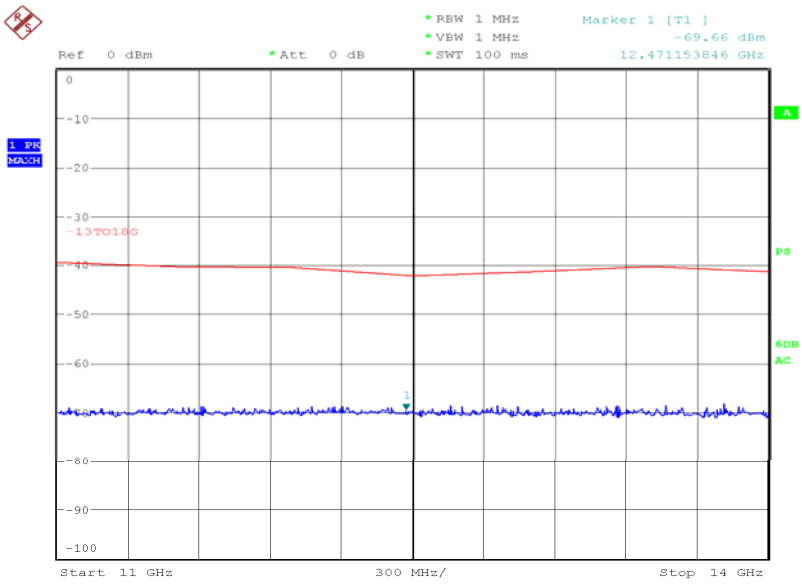
Vertical Polarity



Date: 3.JUL.2008 23:14:28

Product Service

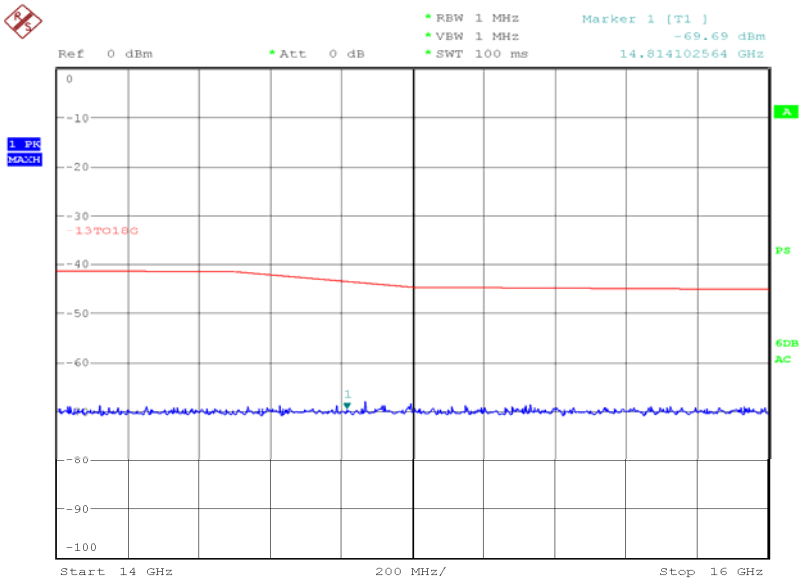
Horizontal Polarity



Date: 3.JUL.2008 23:03:47

14GHz to 16GHz

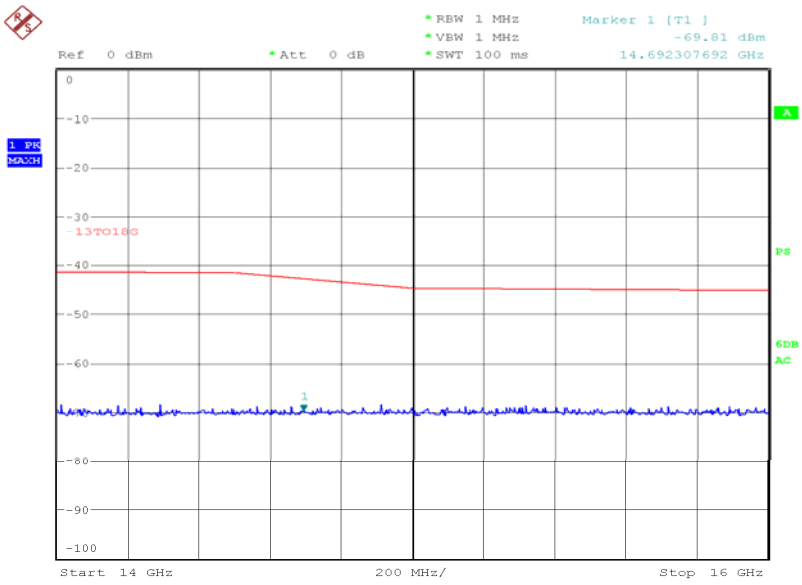
Vertical Polarity



Date: 3.JUL.2008 23:16:49

Product Service

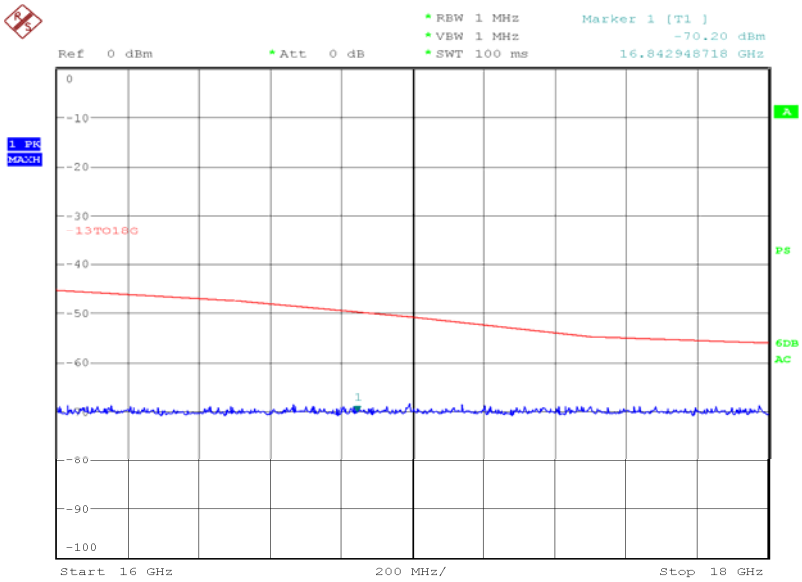
Horizontal Polarity



Date: 3.JUL.2008 23:06:31

16GHz to 18GHz

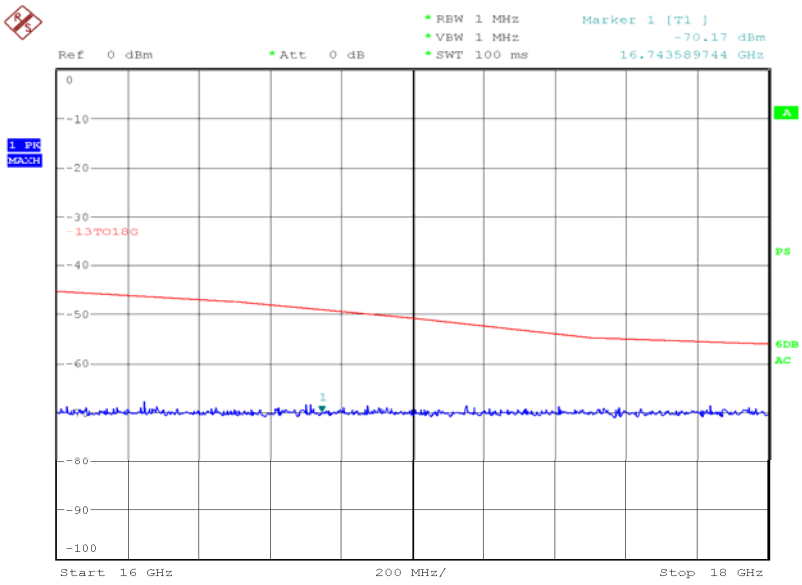
Vertical Polarity



Date: 3.JUL.2008 23:19:23

Product Service

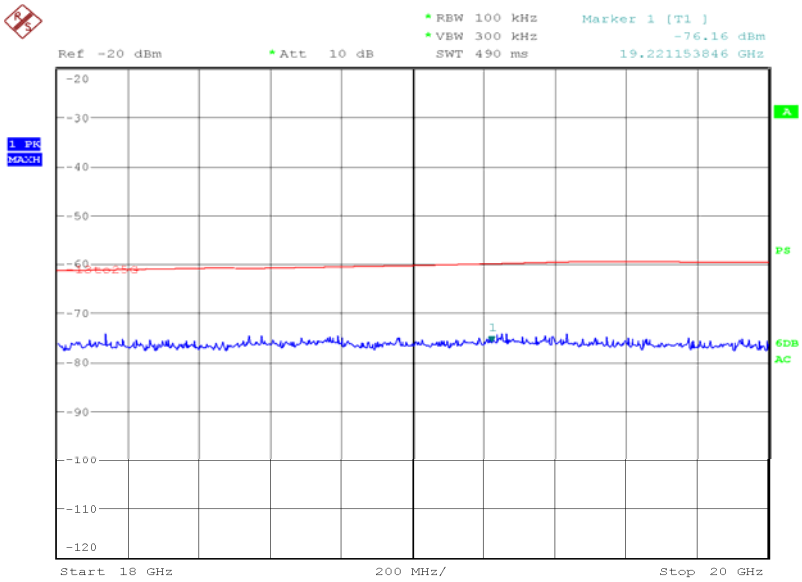
Horizontal Polarity



Date: 3.JUL.2008 23:08:50

18GHz to 20GHz

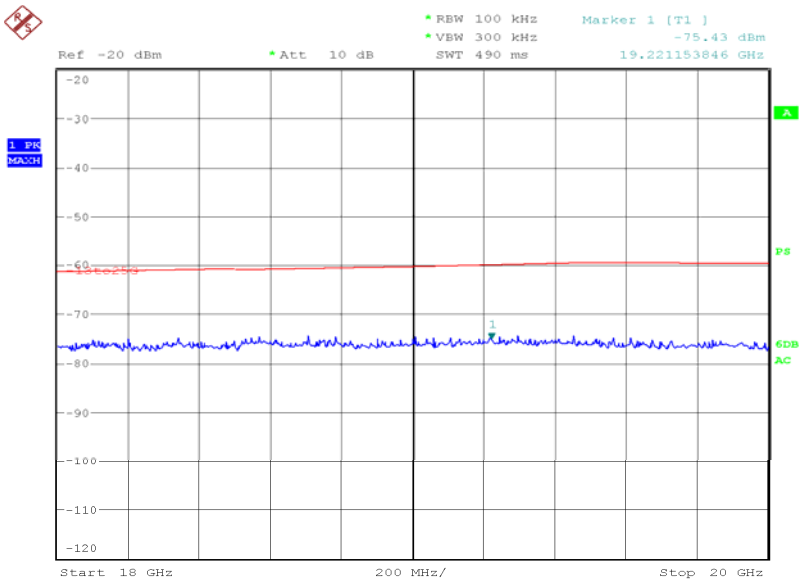
Vertical Polarity



Date: 5.JUL.2008 17:26:36

Product Service

Horizontal Polarity



Date: 5.JUL.2008 17:23:40

Product Service

2.17 FREQUENCY STABILITY UNDER TEMPERATURE VARIATIONS

2.17.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 24.135(a), 2.1055

2.17.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.17.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006

The EUT was set to transmit on maximum power on timeslots 3, 4, 5 and 6. Measurements were made on timeslot 3. A digital communication anlayser (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was varied over the range -30°C to +50°C.

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

Configuration 1 - Mode 5

2.17.6 Environmental Conditions

	04 July 2008
Ambient Temperature	21.8°C
Relative Humidity	56.4%

Product Service

2.17.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Frequency Stability Under Temperature Variations.

The test results are shown below.

Configuration 1 - Mode 5

3.7V Supply

GPRS

Temperature Interval (ºC)	Test Frequency (GHz)	Deviation (Hz)	Limit (kHz)
-30	1.880	+25	±1.88
-20	1.880	+19	±1.88
-10	1.880	-23	±1.88
0	1.880	-17	±1.88
+10	1.880	-20	±1.88
+20	1.880	-36	±1.88
+30	1.880	-29	±1.88
+40	1.880	-17	±1.88
+50	1.880	+10	±1.88

Limit	±0.0001% or 1ppm

Product Service

2.18 FREQUENCY STABILITY UNDER VOLTAGE VARIATIONS

2.18.1 Specification Reference

FCC CFR 47 Part 24: 2006, Clause 24.135(a), 2.1055

2.18.2 Equipment Under Test

Attitude E310, IMEI: 352455020004065

2.18.3 Date of Test and Modification State

04 July 2008 - Modification State 0

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 FCC CFR 47 Part 24: 2006.

The EUT was set to transmit on maximum power on timeslots 3, 4, 5 and 6. A digital communication anlayser (CMU200), was used to measure the frequency error. The maximum result was taken over 200 bursts. The voltage was varied to the end point voltage as declared by the manufacturer.

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

Configuration 1 - Mode 5

2.18.6 Environmental Conditions

	04 July 2008
Ambient Temperature	23.5°C
Relative Humidity	42.8%

Product Service

2.18.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 24: 2006 for Frequency Stability Under Voltage Variations.

The test results are shown below.

Configuration 1 - Mode 5

3.7V Supply

GPRS– Circuit Switched

DC Voltage (V)	Test Frequency (GHz)	Deviation (Hz)	Deviation Limit (kHz)
3.70	1.880	-19	±1.88
3.35	1.880	-23	±1.88
4.20	1.880	-21	±1.88

Limit	±0.0001% or 1ppm

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 No.	Calibration Period (months)	Calibration Due
Section 2.3 and 2.12 EMC - Maximum Output Power					
Modulation Analyser	Hewlett Packard	8901B	45	12	4-Jul-2008
Antenna (Bilog)	Schaffner	CBL6143	287	24	21-Jan-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	15-Mar-2009
Section 2.6 and 2.16 EMC - Radiated Emissions					
Antenna (Double Ridge Guide)	Link Microtek Ltd	AM180HA-K-TU2	230	24	24-Aug-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	2-Sep-2008
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	2-Sep-2008
Dual Power Supply Unit	Thurlby	PL320	288	-	TU
Termination (8ohm)	Rohde & Schwarz	Rt = 8	1522	-	TU
Pre-Amplifier	Phase One	PS04-0085	1532	-	TU
Pre-Amplifier	Phase One	PS04-0086	1533	-	TU
Pre-Amplifier	Phase One	PSO4-0087	1534	-	TU
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Signal Generator	Rohde & Schwarz	SMR40	1589	12	22-Oct-2008
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	-	TU
GSM Test Set	Rohde & Schwarz	CMU 200	2809	12	21-Apr-2009
Filter (Hi Pass)	Lorch	9HP7-7000-SR	2833	12	31-Oct-2008
Filter (High Pass)	RLC Electronics	RLC-F100-1500-S-R	2843	-	TU
Antenna (Bilog)	Chase	CBL6143	2904	24	28-Nov-2009
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Antenna (DRG Horn)	ETS-LINDGREN	3115	3125	12	23-Apr-2009
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	11-Jul-2008
Compliance 3 Emissions	Schaffner	C3e Software V.4.00.00	3274	-	N/A - Software
High Pass Filter (3GHz)	RLC Electronics	F-100-3000-5-R	3349	12	23-May-2009
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	15-Mar-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 and 2.10 – Spurious Emissions at Band Edge					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.7 and 2.15 - Conducted Spurious Emissions					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Filter (Hi Pass)	RLC Electronics	F-100-1500-5-R	2777	12	23-May-2009
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.8 and 2.17 - Frequency Characteristics					
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Digital Temperature Indicator	Fluke	51	1385	12	16-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
GSM Test Set	Rohde & Schwarz	CMU 200	2809	12	21-Apr-2009
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	16-Apr-2009

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.9 and 2.18 Radio (Tx) - Frequency Deviation					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.4 and 2.13 - Modulation Characteristics					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.5 and 2.14 - Occupied Bandwidth					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009
Section 2.2 and 2.11 – Maximum Peak Output Power - Conducted					
Attenuator (10dB)	Weinschel	47-10-34	481	12	20-Mar-2009
Broadband Resistive Power Divider	Weinschel	1506A	601	12	18-Aug-2008
Cable (1m, sma(m) - sma(m))	Reynolds	262-0248-1000	2408	12	17-Sep-2008
Multimeter	Iso-tech	Iso Tech	2419	12	13-Aug-2008
Power Supply Unit	Weir	460	2754	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	9-Jun-2009
Hygrometer	Rotronic	I-1000	3220	12	9-Apr-2009
Signal Analyser	Rohde & Schwarz	FSQ 26	3545	12	21-May-2009

TU – Traceability Unscheduled / OP MON – Output Monitored with Calibrated Equipment

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

* In accordance with CISPR 16-4

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).