TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Anoto Digital Pen ADP-501

To: FCC Part 15.247: 2008 Subpart C, RSS-210 Issue 7 June 2007
& RSS-Gen Issue 2 June 2007

Test Report Serial No:
RFI/RPT1/RP75295JD06A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director: 	
Checked By:	A. Henriques
Signature: 	
Date of Issue:	15 July 2009

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Table of Contents

1. Manufacturer Information

Company Name:	Anoto AB
Address:	Emdalavägen 18 223 69 Lund SWEDEN

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart C (Radio Frequency Devices) - Section 15.247
Specification Reference:	47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 15 Subpart B (Radio Frequency Devices) - Section 15.109
Specification Reference:	RSS-210 Issue 7 June 2007
Specification Title:	Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment.
Specification Reference:	RSS-GEN Issue 2 June 2007
Specification Title:	General Requirements and Information for the Certification of Radio communication Equipment
Site Registration:	FCC: 209735; Industry Canada: 3245B-2
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	17 June 2009 to 18 June 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Port Type	Result
Part 15.109	RSS-Gen 4.10 RSS-Gen 6.0	Idle Mode Radiated Spurious Emissions	Antenna	✓
Part 15.247(a)(1)	RSS-Gen 4.6.1 RSS-210 A8.1(a)	Transmitter 20 dB Bandwidth	Antenna	✓
Part 15.247(a)(1)	RSS-210 A8.1(b)	Transmitter Carrier Frequency Separation	Antenna	✓
Part 15.247(a)(1)(iii)	RSS-210 A8.1(d)	Transmitter Average Time of Occupancy	Antenna	✓
Part 15.247(b)(3)	RSS-Gen 4.8 RSS-210 A8.4(2)	Transmitter Maximum Peak Output Power	Antenna	✓
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Radiated Emissions	Antenna	✓
Part 15.247(d) & 15.209(a)	RSS-Gen 4.9 RSS-210 A8.5	Transmitter Band Edge Radiated Emissions	Antenna	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI C63.4 (2003)
Title:	American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	DA00-705 (2000)
Title:	Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Anoto Digital Pen
Model Name or Number:	ADP-501
Serial Number:	AR6_AAA_7FY_6E
IC Number:	7776A-DP05
FCC ID:	WDNDP05

3.2. Description of EUT

The equipment under test was an advanced digital marker pen that used Anoto technology based whiteboards or flipcharts to stream pen coordinated data via *Bluetooth* to a nearby host.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Tested Technology:	*Bluetooth*		
Power Supply Requirement:	Nominal	1.5 VDC battery	
Type of Unit:	Transceiver		
Channel Spacing:	1 MHz		
Mode:	Basic Rate		
Modulation:	GFSK		
Packet Type: (Maximum Payload)	DH5		
Data Rate (Mbit/s):	1		
Maximum Transmit EIRP:	-3.7 dBm		
Transmit Frequency Range:	2402 MHz to 2480 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480
Receive Frequency Range:	2402 MHz to 2480 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

3.5. Support Equipment

No support equipment was used to exercise the EUT during testing.

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Standby Mode
- Transmit Mode with Basic Rate (DH5)

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- For transmit tests: Standalone, connected via a radio link to a Bluetooth Tester to provide a test mode and normal mode of operation for the sample.
- For standby mode tests: Standalone, with the Bluetooth mode active but not transmitting.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results

5.2.1. Idle Mode Radiated Spurious Emissions

Test Summary:

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

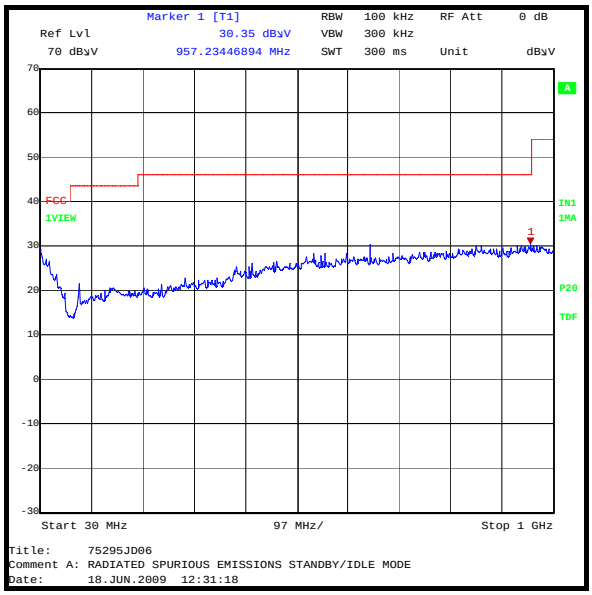
Temperature (°C):	27
Relative Humidity (%):	30

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
957.234	Vertical	30.4	46.0	15.6	Complied

Note(s):

1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.



Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1 GHz to 12.75 GHz

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

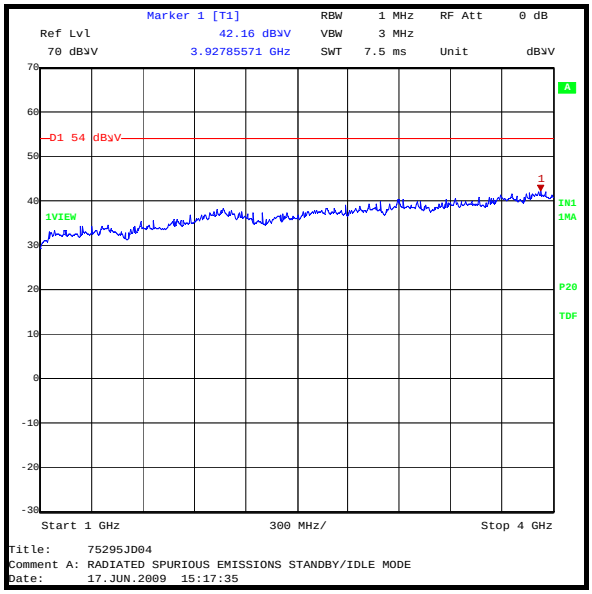
Results: Peak Level

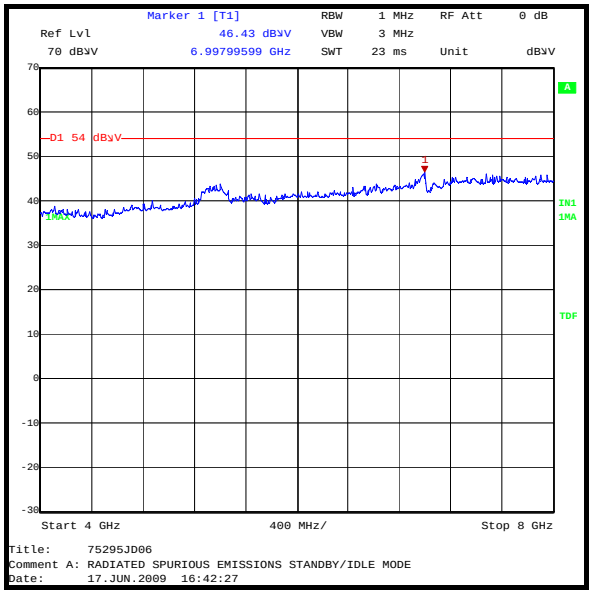
Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
12.626	Horizontal	40.9	11.8	52.7	54.0	1.3	Complied

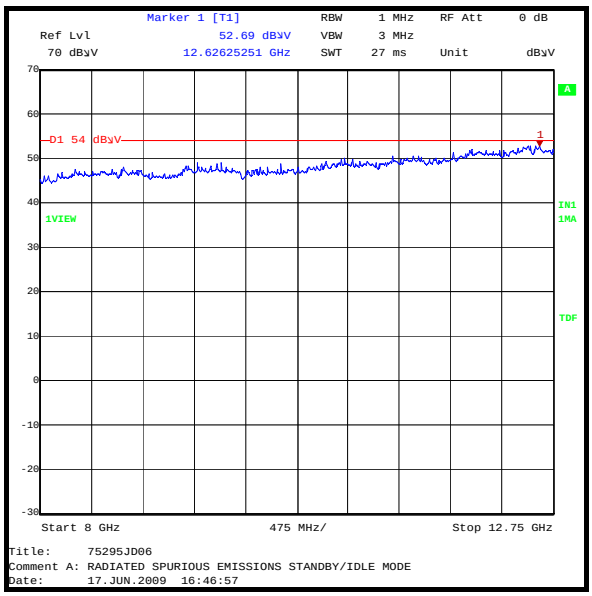
Note(s):

1. *No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.*

Idle Mode Radiated Spurious Emissions (continued)







5.2.2. Transmitter 20 dB Bandwidth

Test Summary:

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000) (see note below)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	31

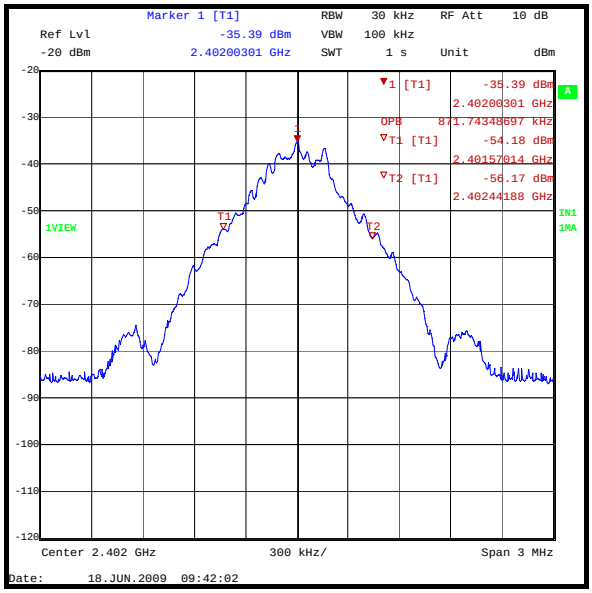
Results:

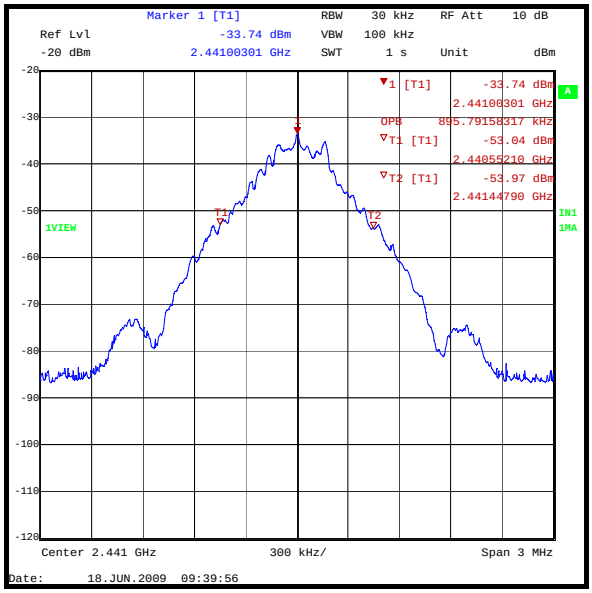
Channel	20 dB Bandwidth (kHz)
Bottom	871.743
Middle	895.792
Top	925.852

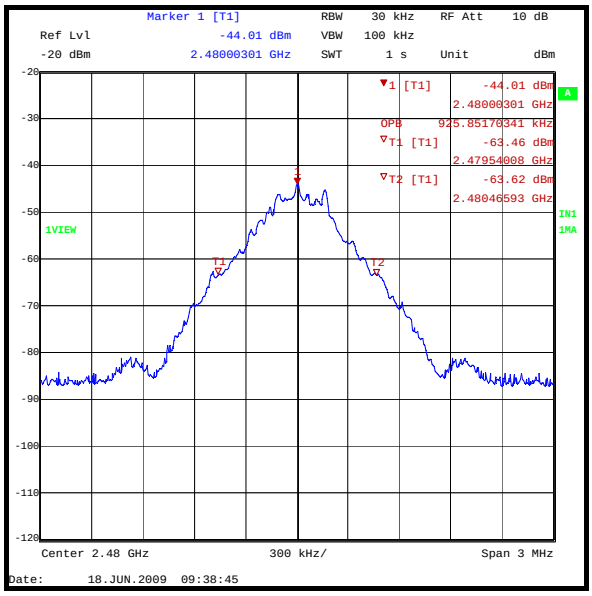
Note(s):

1. In lieu of the test method detailed in Public Notice DA-00-705 the 20dB bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.

Transmitter 20 dB Bandwidth (continued)







5.2.3. Transmitter Carrier Frequency Separation

Test Summary:

FCC Part:	15.247(a)(1)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

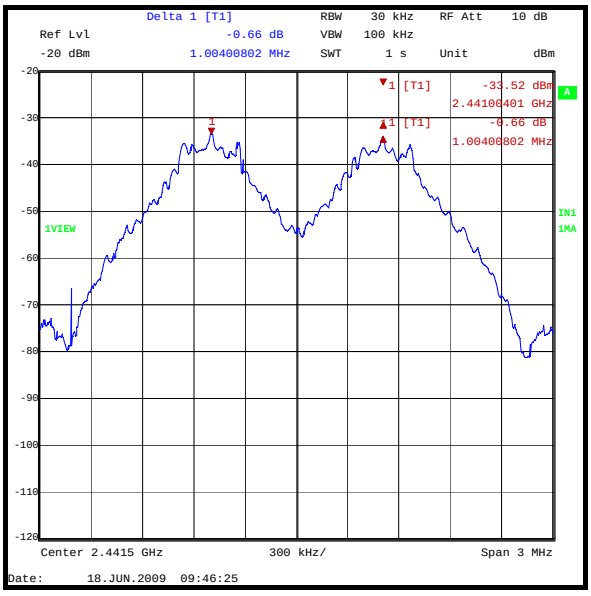
Temperature (°C):	26
Relative Humidity (%):	30

Results:

Transmitter Carrier Frequency Separation (kHz)	Limit ($^2/_3$ of 20 dB BW) (kHz)	Margin (kHz)	Result
1004.002	617.235	386.767	Complied

Note(s):

1. The 20 dB bandwidth measured for the top channel operating at 2480 MHz was used to calculate limit as this had the largest 20 dB bandwidth



5.2.4. Transmitter Average Time of Occupancy

Test Summary:

FCC Part:	15.247(a)(1)(iii)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

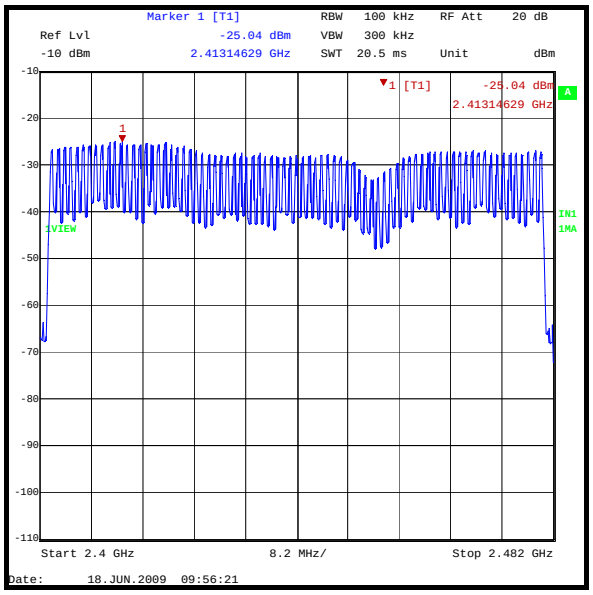
Results:

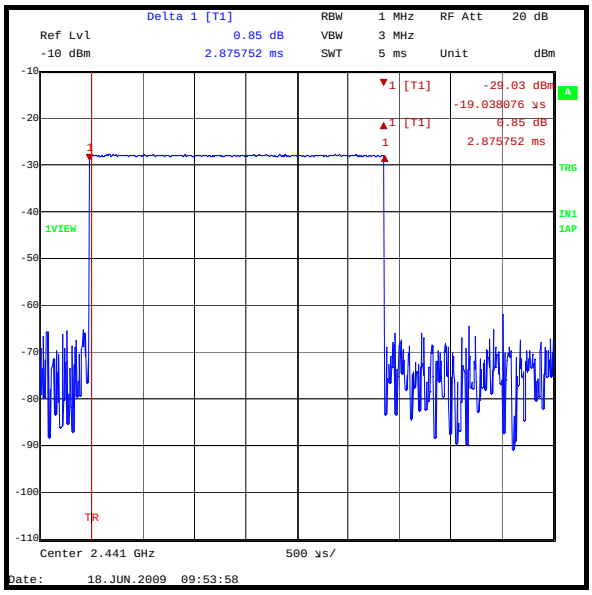
Emission Width (μs)	Number of Hops in 31.6 Seconds	Average Time of Occupancy (s)	Limit (s)	Margin (s)	Result
2875.8	61	0.175	0.4	0.225	Complied

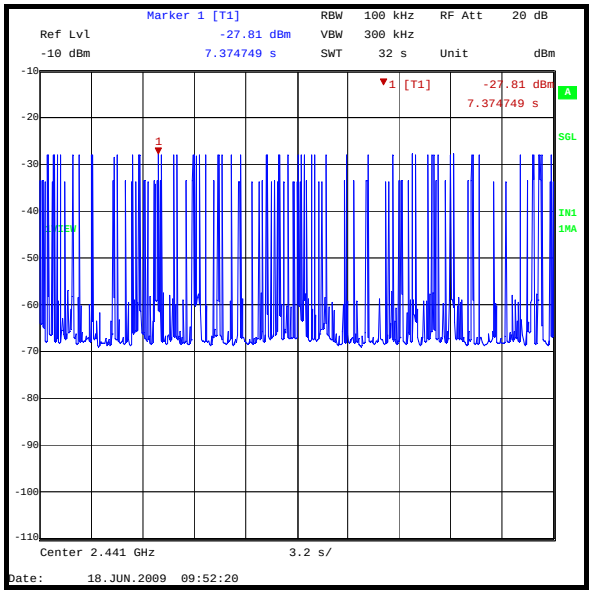
Note(s):

1. Tests were performed to identify the average time of occupancy in number of channels (79) x 0.4 seconds. The calculated period is 31.6 seconds.

Transmitter Average Time of Occupancy (continued)







5.2.5. Transmitter Maximum Peak Output Power (EIRP)

Test Summary:

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

Results:

Channel	EIRP (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	-3.7	30.0	33.7	Complied
Middle	-7.3	30.0	37.3	Complied
Top	-5.7	30.0	35.7	Complied

Note(s):

1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

5.2.6. Transmitter Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

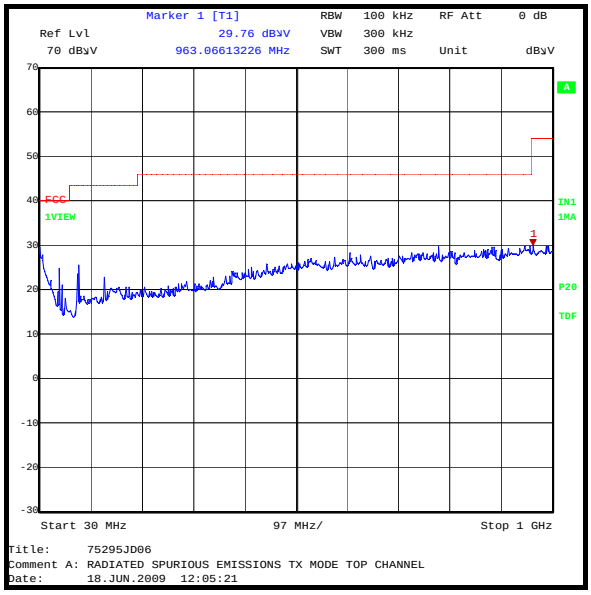
Temperature (°C):	27
Relative Humidity (%):	30

Results: Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
963.066	Horizontal	29.8	54.0	24.2	Complied

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
2. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
3. The emissions shown in the scan below were ambients that did not emanate from the equipment under test.



5.2.7. Transmitter Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)
Frequency Range	1 GHz to 26.5 GHz

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

Results: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Type	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4804.018	Horizontal	Peak	52.2	-1.8	50.4	74.0	23.6	Complied
4804.018	Horizontal	Average	42.9	-1.8	41.1	54.0	12.9	Complied

Results: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Type	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4881.822	Horizontal	Peak	52.2	-1.3	50.9	74.0	23.1	Complied
4881.822	Horizontal	Average	49.3	-1.3	39.1	54.0	14.9	Complied

Results: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Type	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4959.741	Horizontal	Peak	53.1	-1.4	51.7	74.0	22.3	Complied
4959.741	Horizontal	Average	43.0	-1.4	41.6	54.0	12.4	Complied

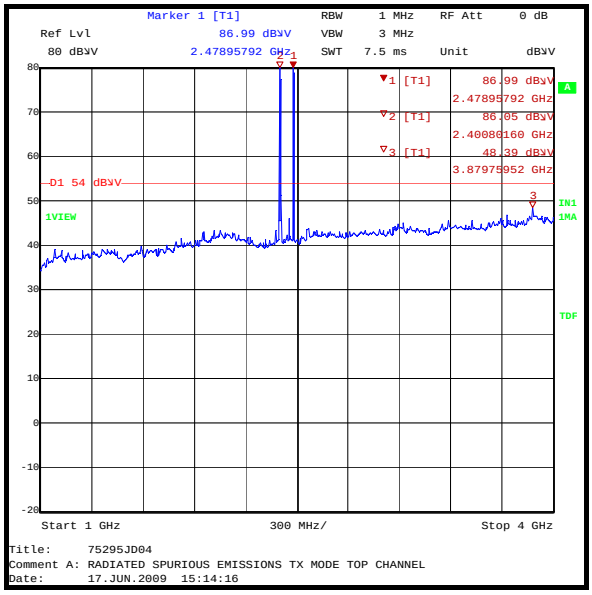
Results: Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Type	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4885.822	Horizontal	Peak	52.4	-1.2	51.2	74.0	22.8	Complied
4885.822	Horizontal	Average	46.5	-1.2	45.3	54.0	8.7	Complied

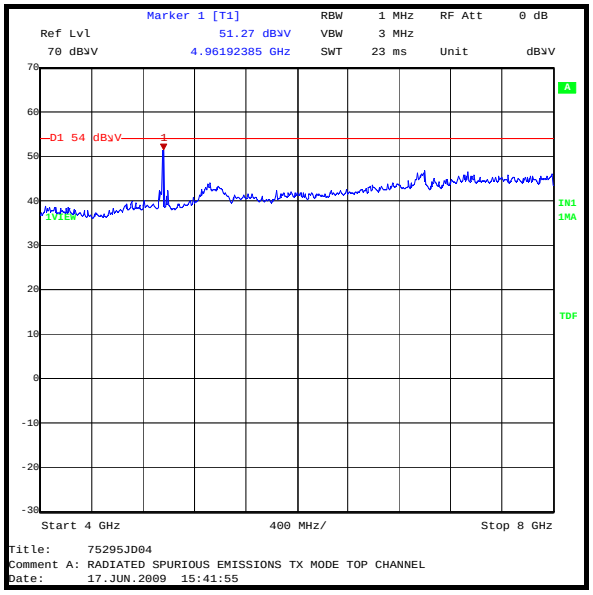
Note(s):

1. The uplink and downlink traffic channels and downlink control channel are shown on the 1 GHz to 4 GHz plot.
2. All pre-scans were performed with a peak detector apart from measurements made in the range of 12.75 to 18 GHz where pre-scans were performed with peak and average detectors and the applicable limit applied. This was due to the noise floor exceeding the average limit when using a peak detector.

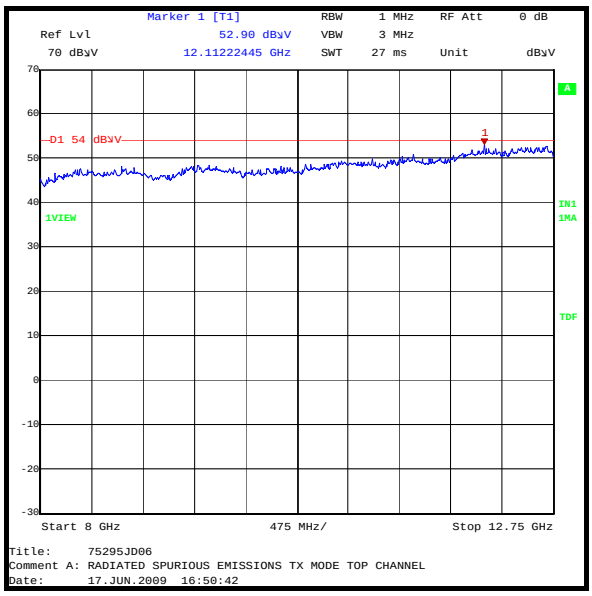
Transmitter Radiated Emissions (continued)



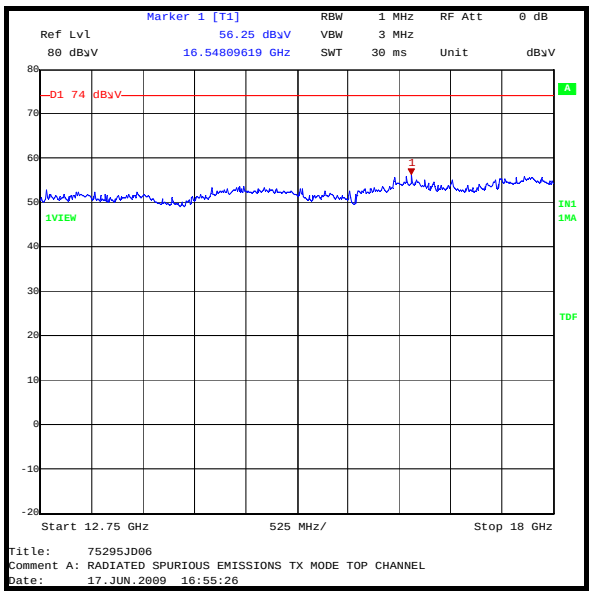
Peak Measurement



Peak Measurement



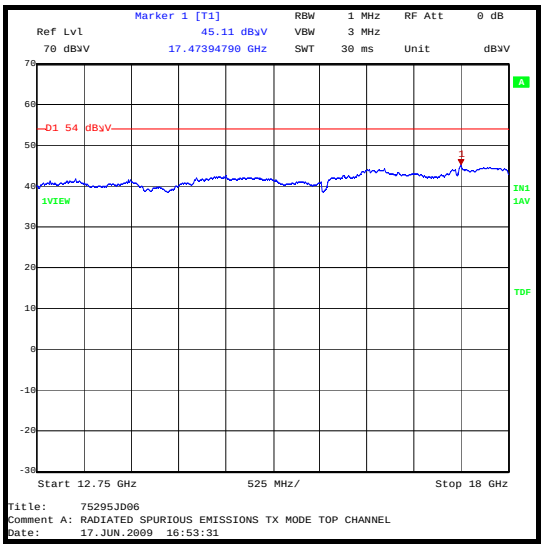
Peak Measurement



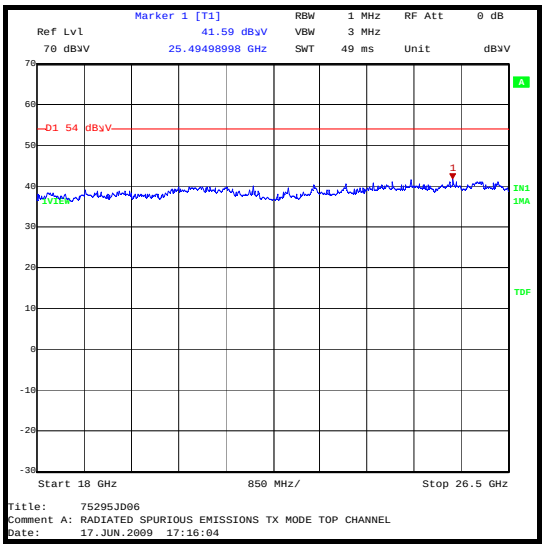
Peak Measurement

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)



Avg Measurement



Peak Measurement

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.8. Transmitter Band Edge Radiated Emissions

Test Summary:

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000)

Environmental Conditions:

Temperature (°C):	27
Relative Humidity (%):	30

Results: Peak Power Level Hopping Mode

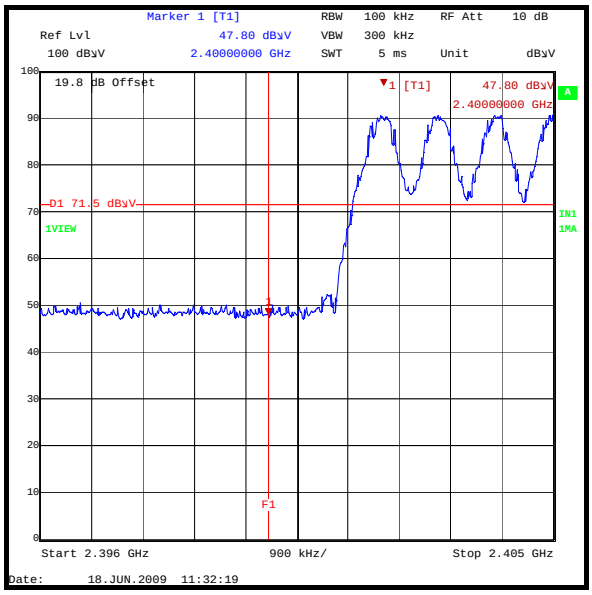
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	48.0	-0.2	47.8	71.5*	24.0	Complied
2.4835	Horizontal	54.0	-0.3	54.0	74.0	20.0	Complied

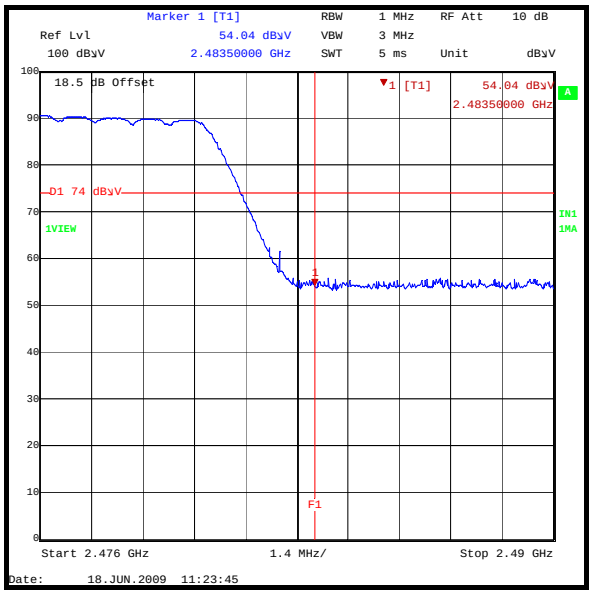
** -20 dBc limit*

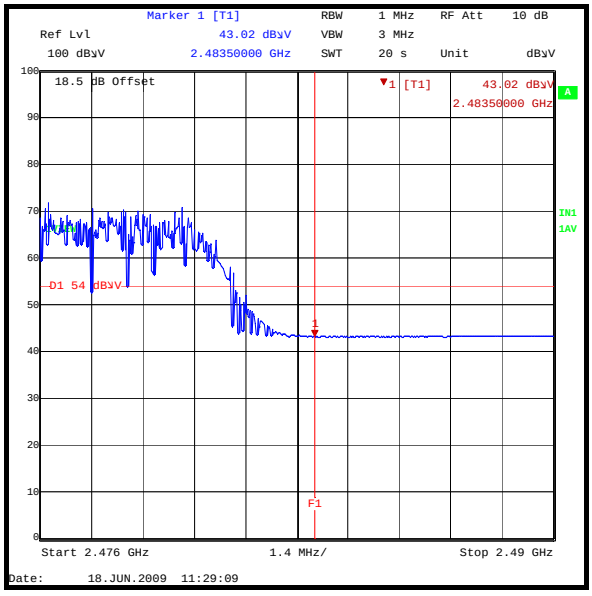
Results: Average Power Level Hopping Mode

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4835	Horizontal	43.3	-0.3	43.0	54.0	11.0	Complied

Transmitter Band Edge Radiated Emissions (continued)







Transmitter Band Edge Radiated Emissions (continued)

Results: Peak Power Level Static Mode

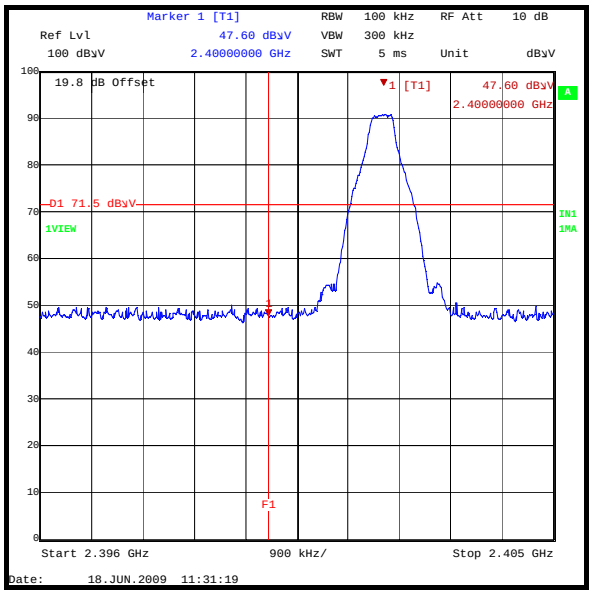
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	47.8	-0.2	47.6	71.5*	23.9	Complied
2.4835	Horizontal	62.6	-0.3	62.3	74.0	11.7	Complied

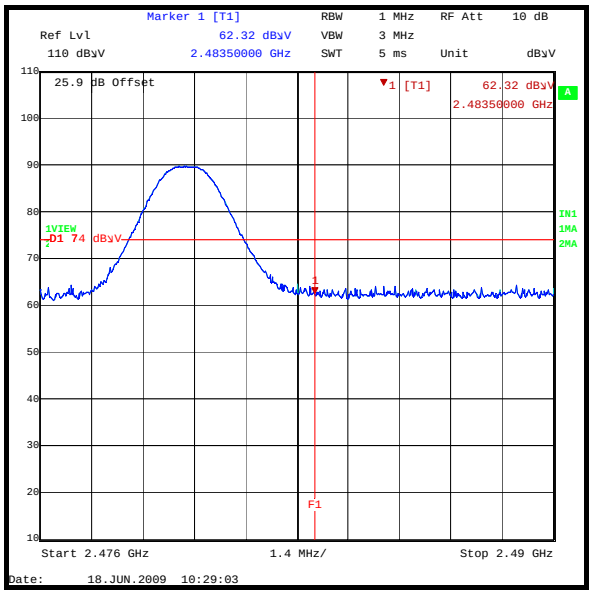
** -20 dBc limit*

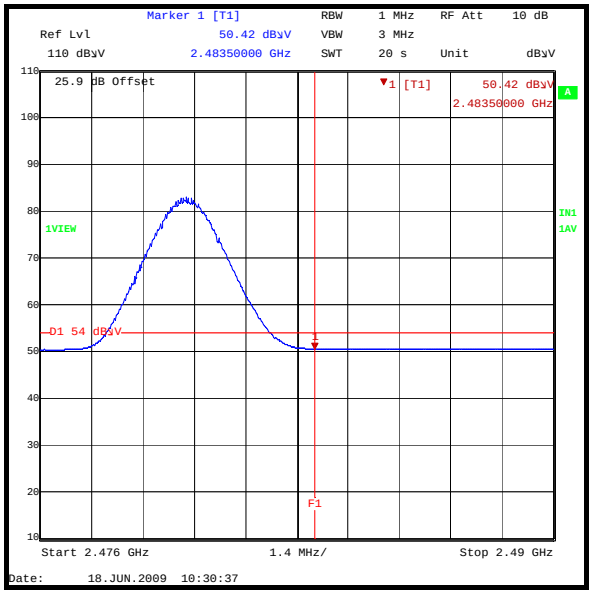
Results: Average Power Level Static Mode

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4835	Horizontal	50.7	-0.3	50.4	54.0	3.6	Complied

Transmitter Band Edge Radiated Emissions (continued)







6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Maximum Peak Output Power	Not Applicable	95%	±2.94 dB
Carrier Frequency Separation	Not Applicable	95%	±0.92 ppm
Average Time of Occupancy	Not Applicable	95%	±0.3 ns
20 dB Bandwidth	Not Applicable	95%	±11.4 ppm
Radiated Spurious Emissions	30 MHz to 40 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	26 Feb 2009	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1149	Bluetooth Test Set	Anritsu	MT8852A	6K00001529	Calibration not required	-

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.