TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: IPWireless AAB

To: FCC Part 27: 2008 Subpart C

Test Report Serial No:
RFI/RPT2/RP73967JD01A

Supersedes Test Report Serial No:
RFI/RPT/RP73967JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director: 	
Checked By:	Nigel Davison
Signature: 	
Date of Issue:	30 April 2009

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1. Customer Information

Company Name:	IPWireless (UK) Ltd.
Address:	Unit 7 Greenways Business Park Bellinger Close Chippenham Wiltshire SN15 1BN England United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR27
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 27 Subpart C (Miscellaneous Wireless Communication Services)
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	02 February 2009 to 12 February 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
FCC Part 15.107	Idle Mode AC Conducted Spurious Emissions	AC Mains	✓
FCC Part 15.109	Idle Mode Radiated Spurious Emissions	Enclosure	✓
FCC Part 15.207	Transmitter AC Conducted Spurious Emissions	AC Mains	✓
FCC Part 2.1046 FCC Part 27.50	Transmitter Carrier Output Power	Antenna Terminals	✓
FCC Part 27.50	Transmitter Equivalent Isotropic Radiated Power (EIRP)	Enclosure	✓
FCC Part 2.1049	Transmitter Occupied Bandwidth	Antenna Terminals	✓
FCC Part 2.1055 FCC Part 27.54	Transmitter Frequency Stability (Temperature Variation)	Antenna Terminals	✓
FCC Part 2.1055 FCC Part 27.54	Transmitter Frequency Stability (Voltage Variation)	Antenna Terminals	✓
FCC Part 2.1051 FCC Part 27.53	Transmitter Conducted Emissions	Antenna Terminals	✓
FCC Part 2.1051 FCC Part 27.53	Transmitter Band Edge Conducted Emissions	Antenna Terminals	✓
FCC Part 2.1051 FCC Part 27.53	Transmitter Radiated Spurious Emissions	Enclosure	✓
FCC Part 2.1051 FCC Part 27.53	Transmitter Band Edge Radiated Emissions	Enclosure	✓

Key to Results

✓ = Complied ✗ = Did not comply

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-C-2004
Title:	Land Mobile Communications Equipment, Measurements and performance Standards
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.

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)

Description:	Wireless Broadband Modem
Brand Name:	IPWireless
Model Name or Number:	AAB
Serial Number:	AABA850000914
FCC ID Number:	PKTP1DAAB
Country of Manufacture:	UK
Date of Receipt:	20 February 2009

Description:	Power Supply
Brand Name:	PHIHONG
Model Name or Number:	PSAA10R-050
Serial Number:	16 Prototype
Country of Manufacture:	China
Date of Receipt:	20 February 2009

3.2. Description of EUT

The equipment under test was a 2.3 GHz Wireless Broadband Modem.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Type of Unit:	Wireless Broadband Modem			
Chip Rate:	3.84 Mcps			
Channel Bandwidth:	5.0 MHz			
Modulation Type:	CDMA			
Channel Spacing:	5 MHz			
Duty Cycle:	33%			
Antenna Type:	Integral			
Antenna Gain:	+2 dBi (stated)			
Transmit Frequency Range:	2305 MHz to 2315 MHz			
Transmit Channels Tested:	**Channel Bandwidth (MHz)**	**Bottom Channel Frequency (MHz)**	**Centre Channel Frequency (MHz)**	**Top Channel Frequency (MHz)**
	5.0	2307.6	N/A	2312.6
Receive Frequency Range:	2350 MHz to 2360 MHz			
Receive Channels Tested:	**Channel Bandwidth (MHz)**	**Bottom Channel Frequency (MHz)**	**Centre Channel Frequency (MHz)**	**Top Channel Frequency (MHz)**
	5.0	2352.6	N/A	2357.6
Highest Fundamental Frequency	2360 MHz (operating channel) 2082 MHz (local oscillator)			
Power Supply Requirement for Testing (V_{nom} and V_{nom} ±15%):	Nominal Voltage	3.7		
	Minimum Voltage	3.55 (Cut-off Voltage)		
	Maximum Voltage	4.2		

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Laptop PC
Brand Name:	Sony
Model Name or Number:	Vaio
Serial Number:	28200150 5303659
Cable Length and Type:	1.8m, USB
Connected to Port:	Data

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

- For all transmits tests, the EUT was transmitting at full power on bottom and top channels as per the test requirement. The 15 timeslot frame was configured at full power (+24 dBm) with a chip rate of 3.84 Mcps
- The EUT was configured in continuous transceiver mode, therefore the receiver was active during all tests

4.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- An AC/DC power adaptor was used to supply DC power to the EUT
- The data port was connected to a laptop during setup and was left connected to allow data flow to simulate normal operational use.

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

5.3. Idle Mode AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.107(a) Class B
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	34

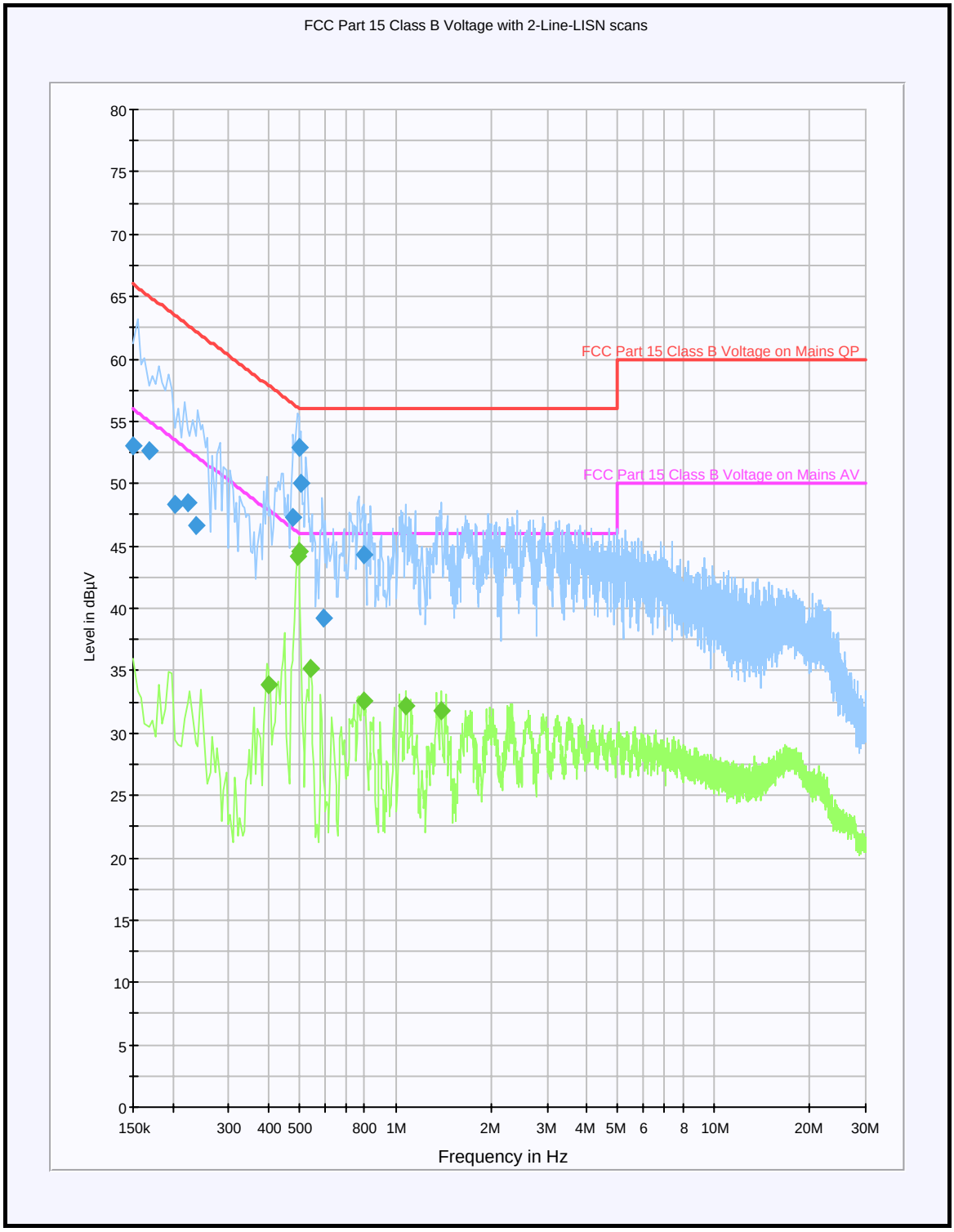
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.150000	Live 1	53.1	66.0	12.9	Complied
0.168000	Neutral	52.7	65.1	12.4	Complied
0.204000	Live 1	48.3	63.4	15.1	Complied
0.222000	Live 1	48.5	62.7	14.2	Complied
0.235500	Live 1	46.6	62.3	15.7	Complied
0.474000	Neutral	47.3	56.4	9.1	Complied
0.496500	Neutral	52.9	56.1	3.2	Complied
0.505500	Neutral	50.0	56.0	6.0	Complied
0.595500	Live 1	39.2	56.0	16.8	Complied
0.798000	Neutral	44.3	56.0	11.7	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.402000	Neutral	33.9	47.8	13.9	Complied
0.492000	Neutral	44.1	46.1	2.0	Complied
0.496500	Neutral	44.5	46.1	1.6	Complied
0.541500	Neutral	35.2	46.0	10.8	Complied
0.793500	Neutral	32.5	46.0	13.5	Complied
1.081500	Neutral	32.1	46.0	13.9	Complied
1.396500	Neutral	31.8	46.0	14.2	Complied

Idle Mode AC Conducted Spurious Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

5.4. Idle Mode Radiated Spurious Emissions

Test Summary:

FCC Part:	15.109 Class B
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):	20
Relative Humidity (%):	34

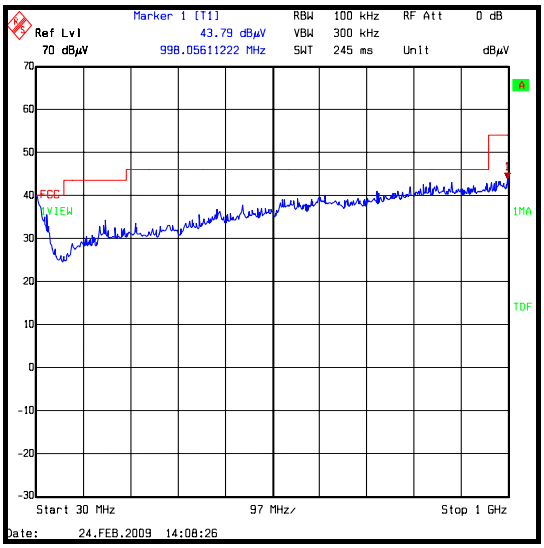
Results:

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
998.056	Vertical	43.8	54.0	10.2	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)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

FCC Part:	15.109 Class B
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1 GHz to 26.5 GHz

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	34

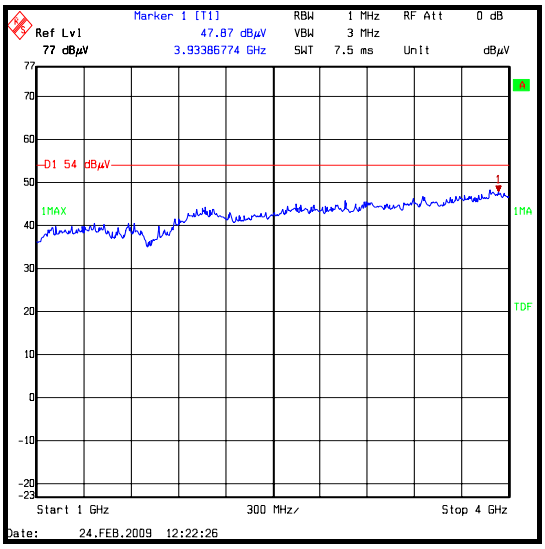
Results: Highest Peak Level

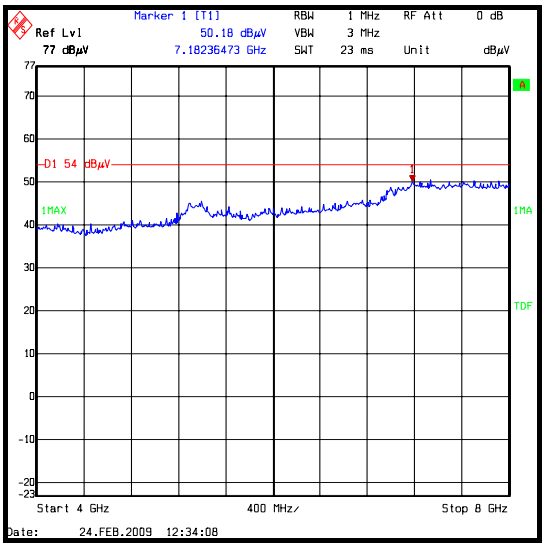
Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Note(s)
7.182	Horizontal	43.7	6.5	50.2	54.0	3.8	Complied

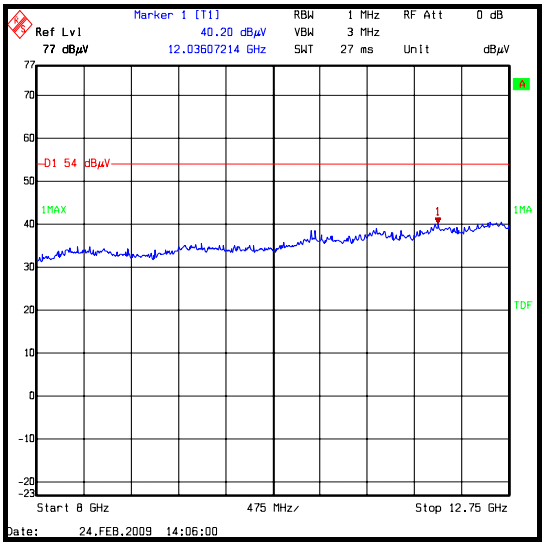
Note(s):

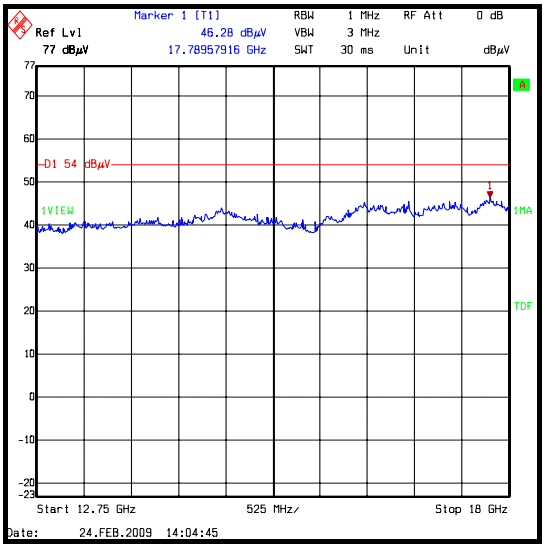
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
2. The peak level was compared to the average limit as opposed to being compared to the peak limit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

Idle Mode Radiated Spurious Emissions (continued)



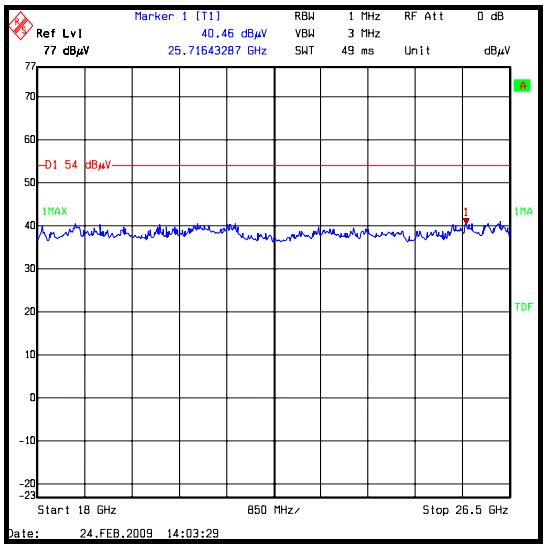






Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Idle Mode Radiated Spurious Emissions (continued)



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

5.5. Transmitter AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.207(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	34

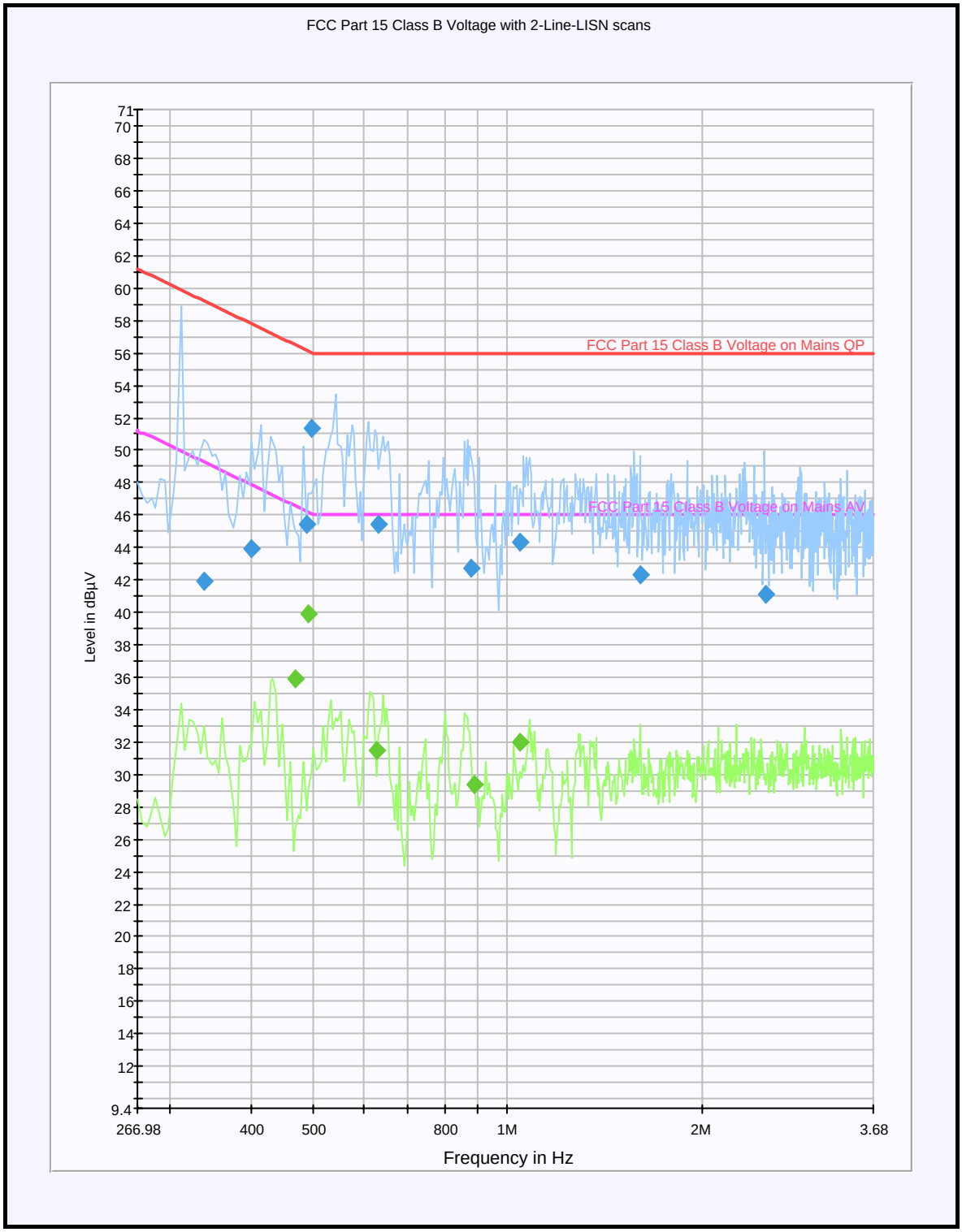
Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.339000	Neutral	41.9	59.2	17.3	Complied
0.402000	Neutral	43.9	57.8	13.9	Complied
0.487500	Live 1	45.5	56.2	10.7	Complied
0.496500	Neutral	51.3	56.1	4.8	Complied
0.631500	Neutral	45.4	56.0	10.6	Complied
0.879000	Neutral	42.7	56.0	13.3	Complied
1.045500	Neutral	44.3	56.0	11.7	Complied
1.608000	Neutral	42.3	56.0	13.7	Complied
2.517000	Neutral	41.1	56.0	14.9	Complied

Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.469500	Neutral	35.9	46.5	10.6	Complied
0.492000	Neutral	39.9	46.1	6.2	Complied
0.627000	Neutral	31.5	46.0	14.5	Complied
0.888000	Neutral	29.4	46.0	16.6	Complied
1.045500	Neutral	32.0	46.0	14.0	Complied

Transmitter AC Conducted Spurious Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

5.6. Transmitter Carrier Output Power

Test Summary:

FCC Part:	2.1046 and 27.50(h)(2)
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

Results:

Channel	Frequency (MHz)	Conducted RF O/P Power (dBm)*	Antenna Gain (dBi)	EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	2307.6	24.6	2.0	26.6	33.0	6.4	Complied
Top	2312.6	23.6	2.0	25.6	33.0	7.4	Complied

Note(s):

1. Measurements were performed on both channels.
2. An average power meter and associated thermal power sensor were used to perform power measurements.
3. EIRP was calculated by adding the customers declared antenna gain to the measured conducted RF output power.

5.7. Transmitter Equivalent Isotropic Radiated Power (EIRP)

Test Summary:

FCC Part:	27.50 (h)(2)
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

Results: GSM

Channel	Frequency (MHz)	EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	2307.6	21.8	33.0	11.2	Complied
Top	2312.6	22.6	33.0	10.4	Complied

Note(s):

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

5.8. Transmitter Occupied Bandwidth

Test Summary:

FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes referencing FCC CFR Part 2.1049 (see note below)

Environmental Conditions:

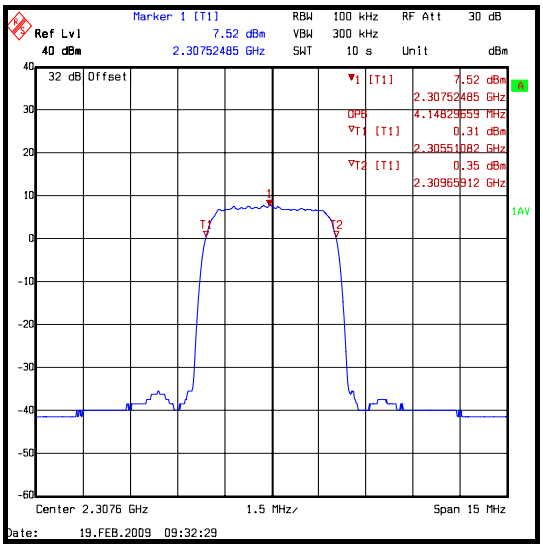
Temperature (°C):	26
Relative Humidity (%):	34

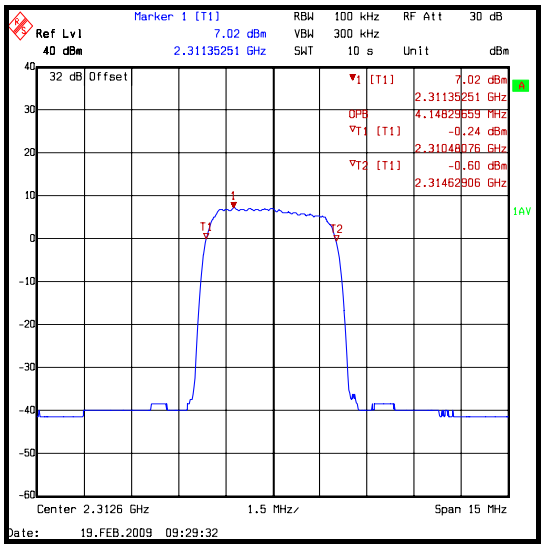
Results:

Channel	Frequency	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
Bottom	2307.6	100	300	4.148
Top	2312.6	100	300	4.148

Note(s):

1. In lieu of the test method detailed in ANSI C63.4 Section 13.1.7 the 99% occupied bandwidth was measured using the Occupied Bandwidth function of the spectrum analyser.
2. The EUT was configured to transmit on 5 timeslots at maximum power.
3. Tests were performed on both channels and both ports.





5.9. Transmitter Frequency Stability (Temperature Variation)

Test Summary:

FCC Part:	2.1055(a)(1) and 27.54
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

Environmental Conditions:

Temperature Variation (°C):	23 to 24
Relative Humidity (%):	34

Results: Bottom channel / Block A / 2305 to 2310 MHz

Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	∆ Lower block edge to lower -20 dB point (kHz)	∆ Upper block edge to upper -20 dB point (kHz)	Result
-30	2305.26283	2309.87705	262.83	122.95	Complied
-20	2305.26533	2309.87455	265.33	125.45	Complied
-10	2305.26533	2309.89459	265.33	105.41	Complied
0	2305.26533	2309.89459	265.33	105.41	Complied
10	2305.26679	2309.87601	266.79	123.99	Complied
20	2305.26533	2309.87455	265.33	125.45	Complied
30	2305.28537	2309.87455	285.37	125.45	Complied
40	2305.28537	2309.87455	285.37	125.45	Complied
50	2305.26533	2309.87455	265.33	125.45	Complied

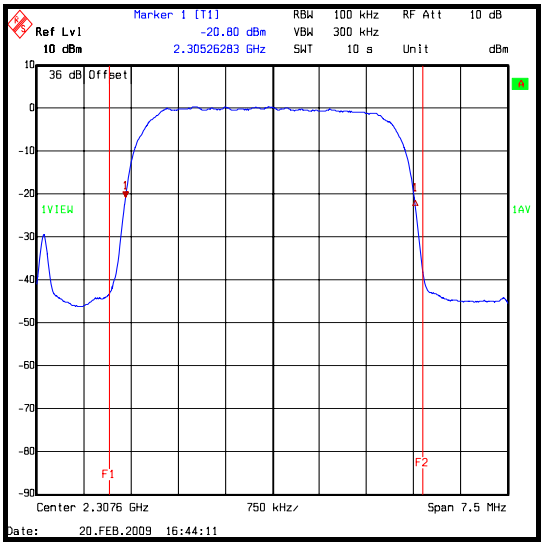
Transmitter Frequency Stability - Temperature Variation (continued)

Results: Top channel / Block B / 2310 to 2315 MHz

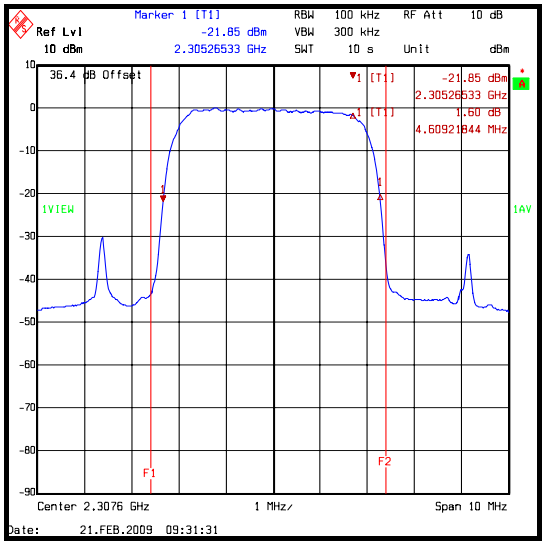
Temp (ºC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
-30	2310.22545	2314.91483	225.45	85.17	Complied
-20	2310.26533	2314.87455	265.33	125.45	Complied
-10	2310.26533	2314.87455	265.33	125.45	Complied
0	2310.26533	2314.87455	265.33	125.45	Complied
10	2310.26553	2314.87549	265.53	124.51	Complied
20	2310.26533	2314.87455	265.33	125.45	Complied
30	2310.26533	2314.87455	265.33	125.45	Complied
40	2310.26533	2314.87455	265.33	125.45	Complied
50	2310.26533	2314.87455	265.33	125.45	Complied

Transmitter Frequency Stability - Temperature Variation (continued)

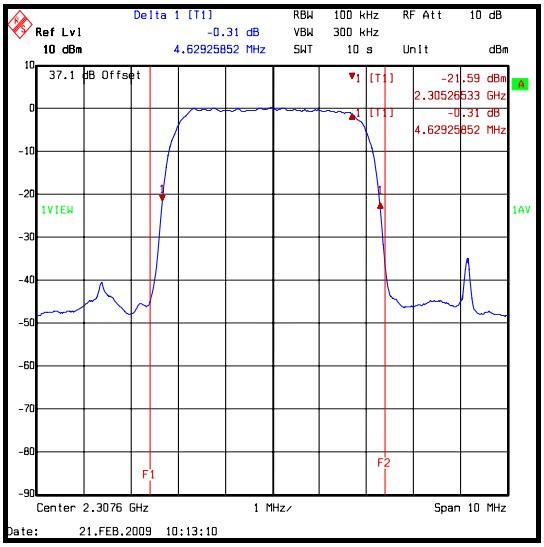
Bottom channel / Block A / 2305 to 2310 MHz



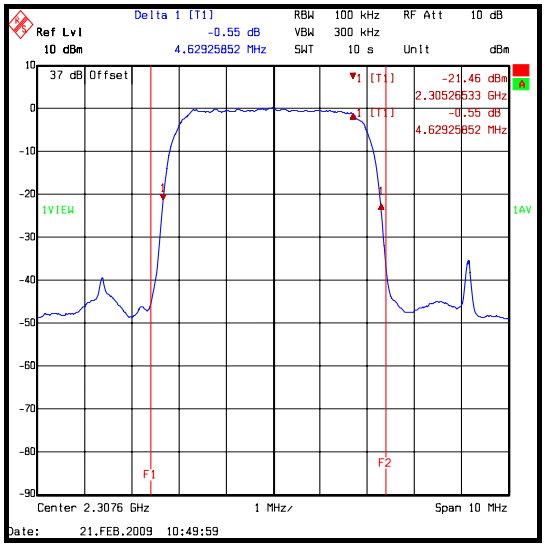
-30°C



-20°C



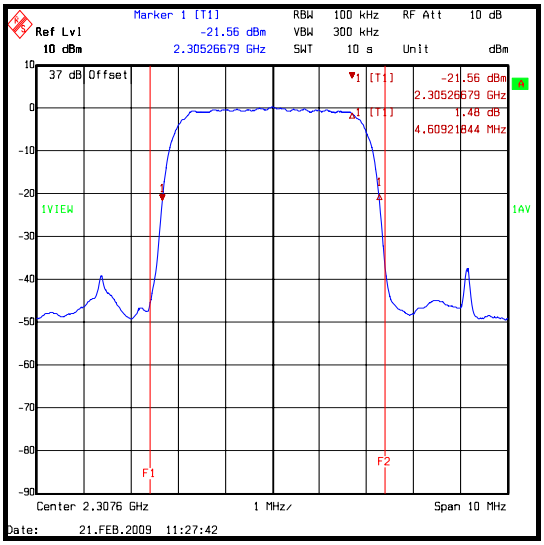
-10°C



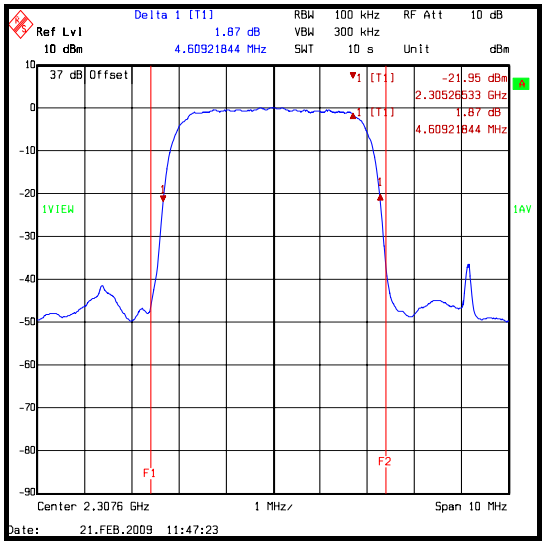
0°C

Transmitter Frequency Stability - Temperature Variation (continued)

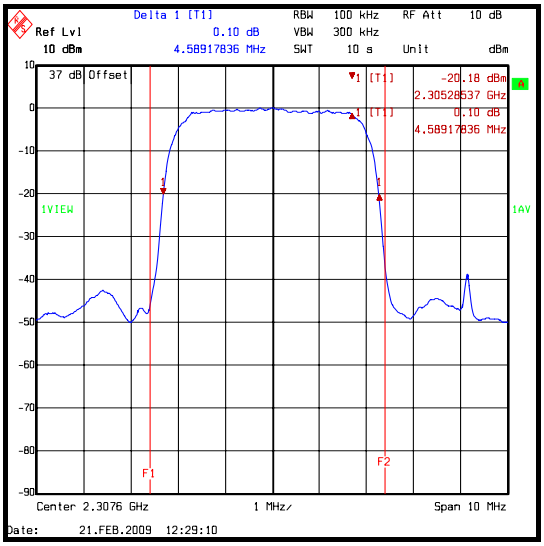
Bottom channel / Block A / 2305 to 2310 MHz



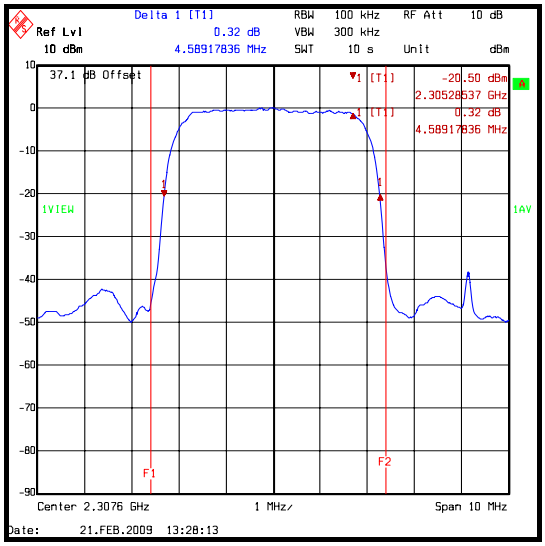
10°C



20°C



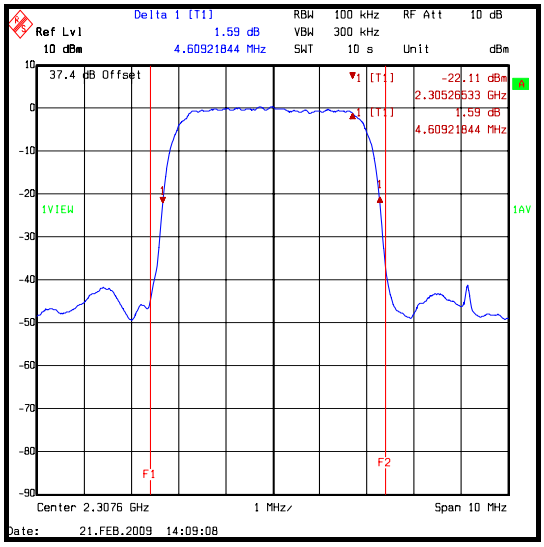
30°C



40°C

Transmitter Frequency Stability - Temperature Variation (continued)

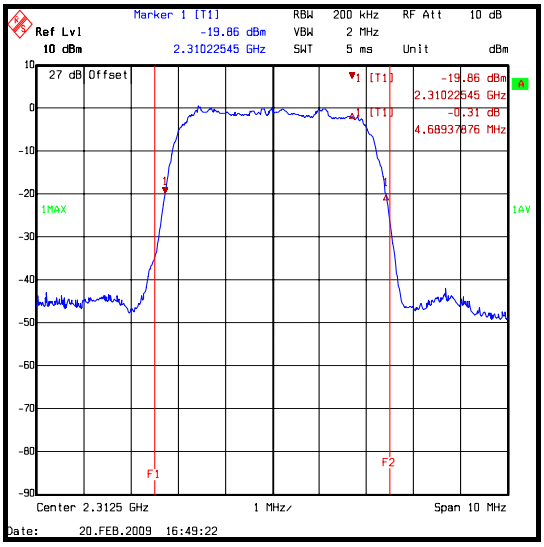
Bottom channel / Block A / 2305 to 2310 MHz



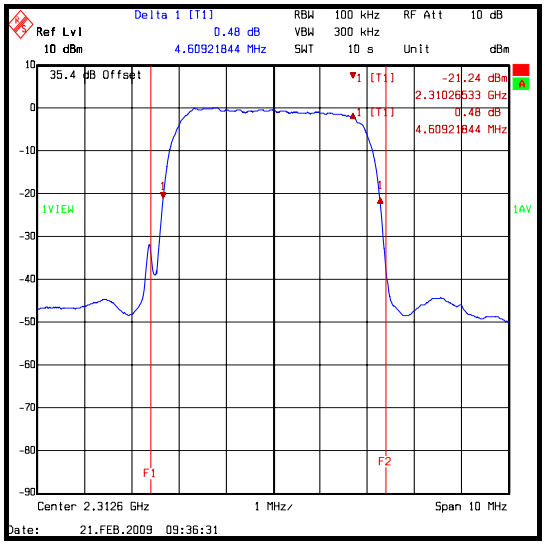
50°C

Transmitter Frequency Stability - Temperature Variation (continued)

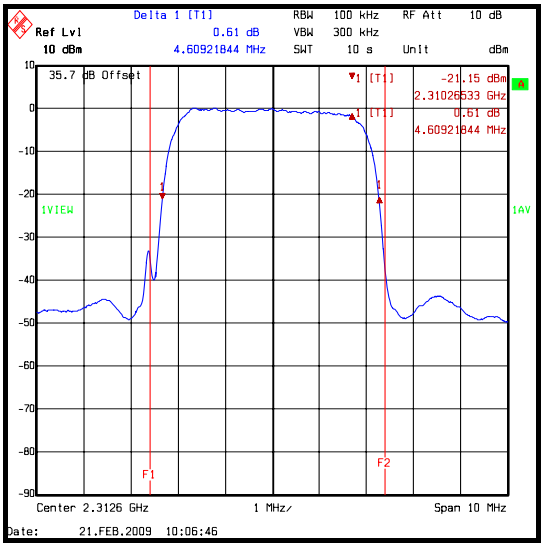
Top channel / Block B / 2310 to 2315 MHz



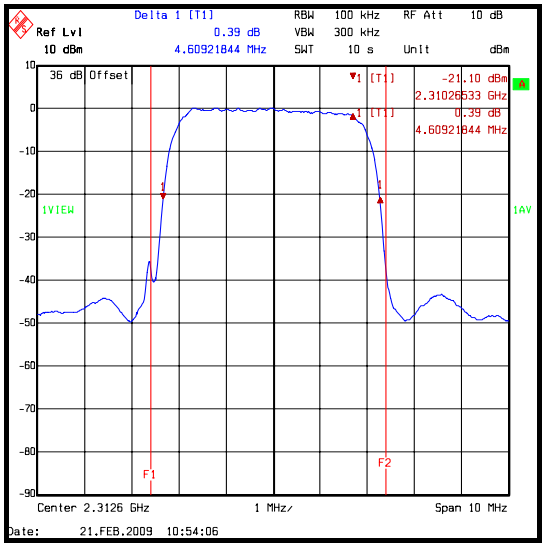
-30°C



-20°C



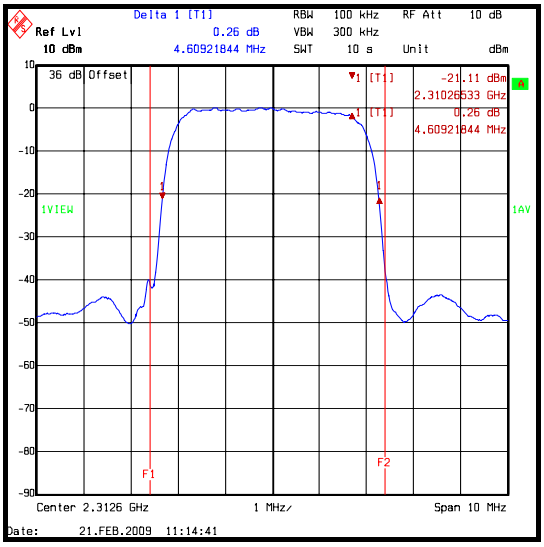
-10°C



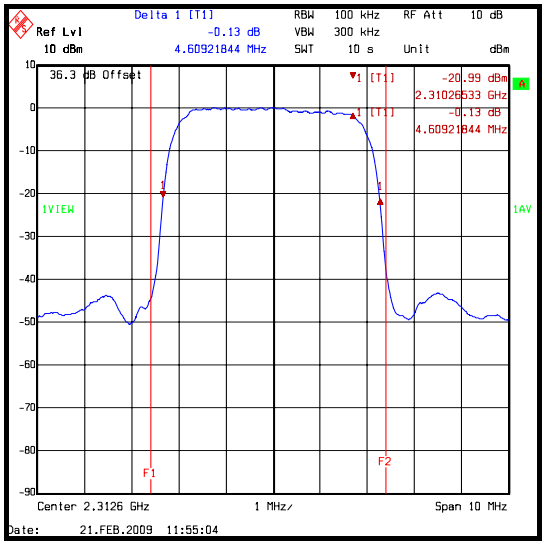
0°C

Transmitter Frequency Stability - Temperature Variation (continued)

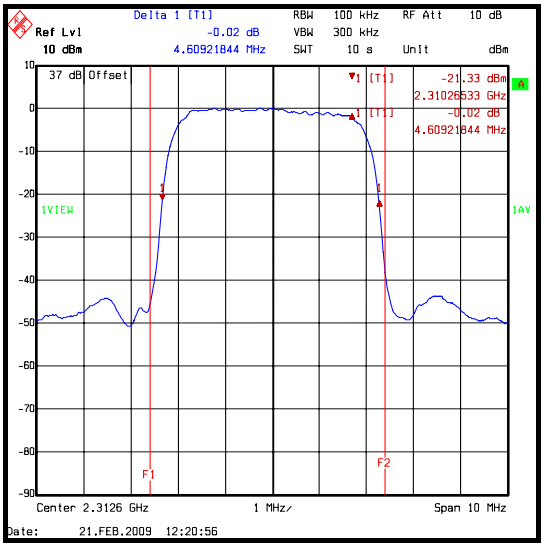
Top channel / Block B / 2310 to 2315 MHz



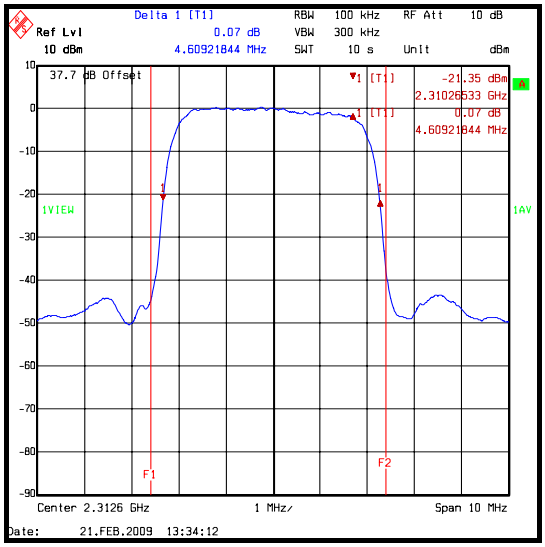
10°C



20°C



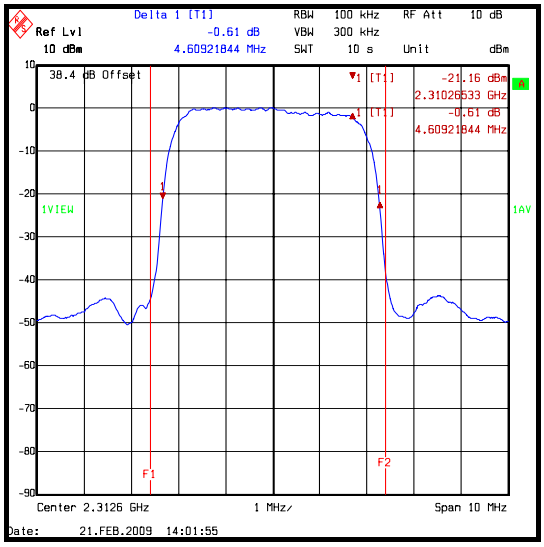
30°C



40°C

Transmitter Frequency Stability - Temperature Variation (continued)

Top channel / Block B / 2310 to 2315 MHz



50°C

Transmitter Frequency Stability - Temperature Variation (continued)

Results: Bottom channel / Block A / Carrier accuracy

Temperature (ºC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-30	2307.600721	0.3124	2307.576924	2307.623076	Complied
-20	2307.600830	0.3597	2307.576924	2307.623076	Complied
-10	2307.601531	0.6635	2307.576924	2307.623076	Complied
0	2307.601562	0.6769	2307.576924	2307.623076	Complied
10	2307.601478	0.6405	2307.576924	2307.623076	Complied
20	2307.601778	0.7705	2307.576924	2307.623076	Complied
30	2307.602569	1.1133	2307.576924	2307.623076	Complied
40	2307.602938	1.2732	2307.576924	2307.623076	Complied
50	2307.601739	0.7536	2307.576924	2307.623076	Complied

Transmitter Frequency Stability - Temperature Variation (continued)

Results: Top channel / Block B / Carrier accuracy

Temperature (ºC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
-30	2312.600725	0.3135	2312.576874	2312.623526	Complied
-20	2312.600931	0.4026	2312.576874	2312.623526	Complied
-10	2312.601582	0.6841	2312.576874	2312.623526	Complied
0	2312.601543	0.6672	2312.576874	2312.623526	Complied
10	2312.601485	0.6421	2312.576874	2312.623526	Complied
20	2312.601793	0.7753	2312.576874	2312.623526	Complied
30	2312.602578	1.1148	2312.576874	2312.623526	Complied
40	2312.602938	1.2704	2312.576874	2312.623526	Complied
50	2312.601774	0.7671	2312.576874	2312.623526	Complied

Note(s):

1. Temperature extremes - Full testing was performed on antenna port, all numerical and graphical results are shown.
2. Voltage extremes - Full testing was performed on antenna port, all numerical and graphical results are shown.
3. A spectrum analyser was used to perform frequency measurements.
4. Markers were placed at the upper and lower -20 dB points to identify the distance from the block/band edge. The frequencies of the -20 dB points were recorded.
5. Measurements were also performed with a reduced resolution bandwidth to determine absolute accuracy. This technique identifies the carrier breakthrough. A marker was placed on the carrier breakthrough point and the frequency recorded.

Limits:

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Block A maximum frequency error is 0.001% of the carrier = 23076 Hz. Lower limit is 2307.576924 MHz, upper limit is 2307.623076 MHz.

Block B maximum frequency error is 0.001% of the carrier = 23126 Hz. Lower limit is 2312.576874 MHz, upper limit is 2312.623526 MHz.

5.10. Transmitter Frequency Stability (Voltage Variation)

Test Summary:

FCC Part:	2.1055 and 27.54
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

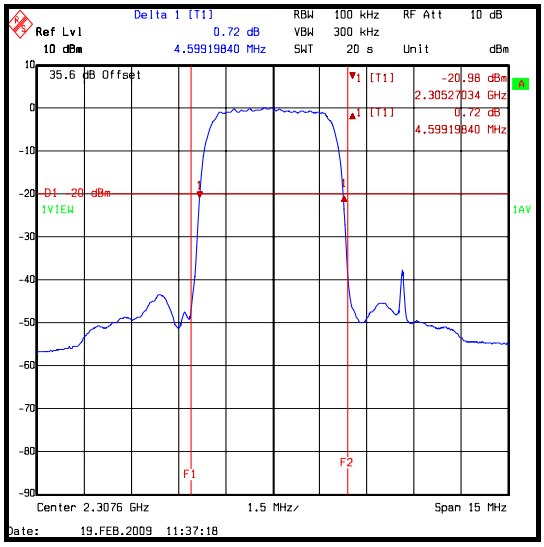
Environmental Conditions:

Temperature Variation (°C):	23 to 24
Relative Humidity (%):	34

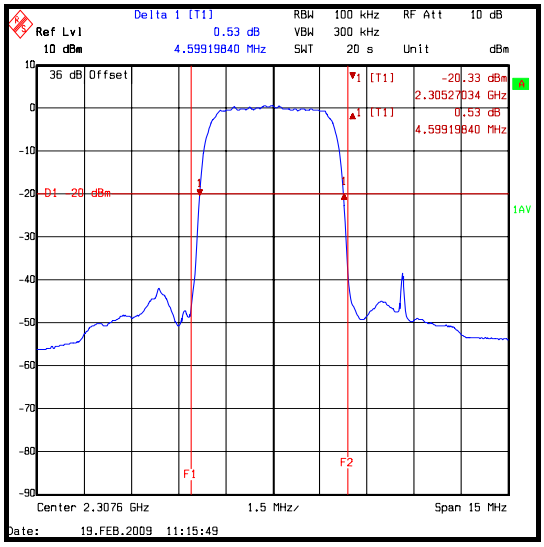
Results: Bottom channel / Block A / 2305 to 2310 MHz

Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	∆ Lower band edge to lower -20 dB point (kHz)	∆ Upper band edge to upper -20 dB point (kHz)	Result
3.55	2305.270341	2309.869539	270341	130461	Complied
3.7	2305.270341	2309.869539	270341	130461	Complied
4.2	2305.270341	2309.869539	270341	130461	Complied

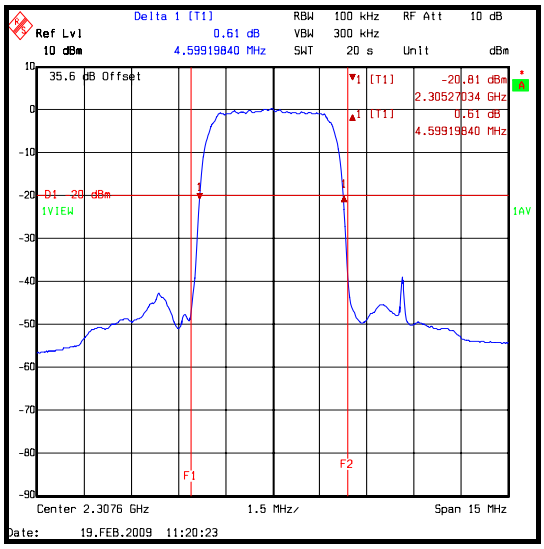
Transmitter Frequency Stability - Voltage Variation (continued)



3.55VDC



3.7VDC

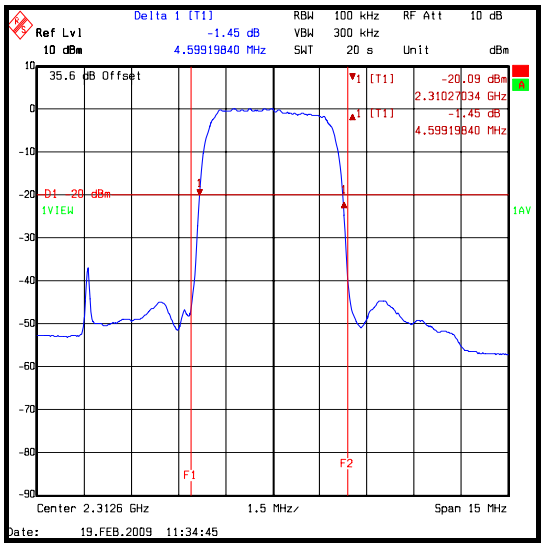


4.2VDC

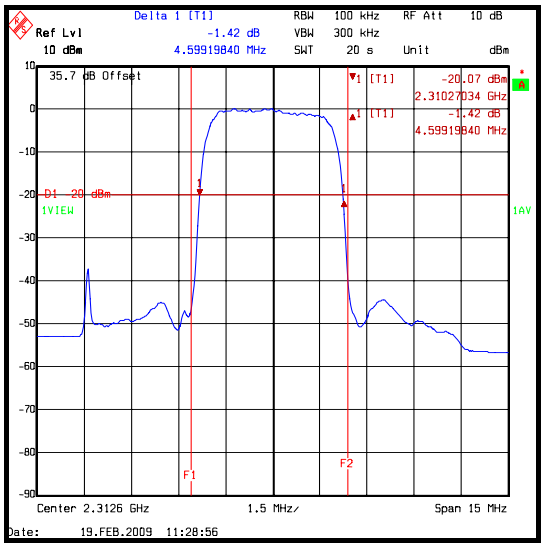
Transmitter Frequency Stability - Voltage Variation (continued)

Results: Top channel / Block B / 2310 to 2315 MHz

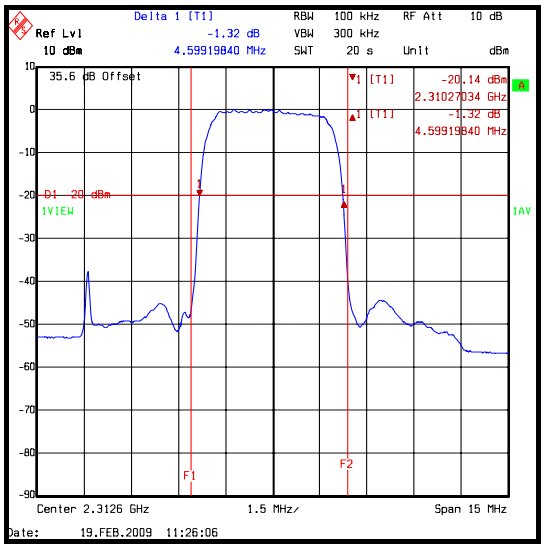
Supply voltage (VDC)	Measured Frequency (MHz) at lower -20 dB point	Measured Frequency (MHz) at upper -20 dB point	Δ Lower band edge to lower -20 dB point (kHz)	Δ Upper band edge to upper -20 dB point (kHz)	Result
3.55	2310.270341	2314.869539	270341	130461	Complied
3.7	2310.270341	2314.869539	270341	130461	Complied
4.2	2310.270341	2314.869539	270341	130461	Complied



3.55VDC



3.7VDC



4.2VDC

Transmitter Frequency Stability - Voltage Variation (continued)

Results: Bottom channel / Block A / Carrier accuracy

Supply voltage (VDC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
3.55	2307.601740	0.7540	2307.576924	2307.623076	Complied
3.7	2307.602750	1.1917	2307.576924	2307.623076	Complied
4.2	2307.602610	1.1310	2307.576924	2307.623076	Complied

Results: Top channel / Block B / Carrier accuracy

Supply voltage (VDC)	Measured Carrier Frequency (MHz)	Frequency Error (ppm)	Lower Limit (MHz)	Upper Limit (MHz)	Result
3.55	2312.602080	0.8994	2312.576874	2312.623526	Complied
3.7	2312.602730	1.1805	2312.576874	2312.623526	Complied
4.2	2312.602776	1.2004	2312.576874	2312.623526	Complied

5.11. Transmitter Conducted Emissions

Test Summary:

FCC Part:	2.1051, 27.53
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

Environmental Conditions:

Temperature (°C):	26
Relative Humidity (%):	34

Results: Bottom channel / Block A

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2190.581	-43.8	-40.0	3.8	Complied
2434.389	-42.8	-40.0	2.8	Complied

Results: Top channel / Block B

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
2184.684	-43.9	-40.0	3.9	Complied
2430.441	-43.5	-40.0	3.5	Complied

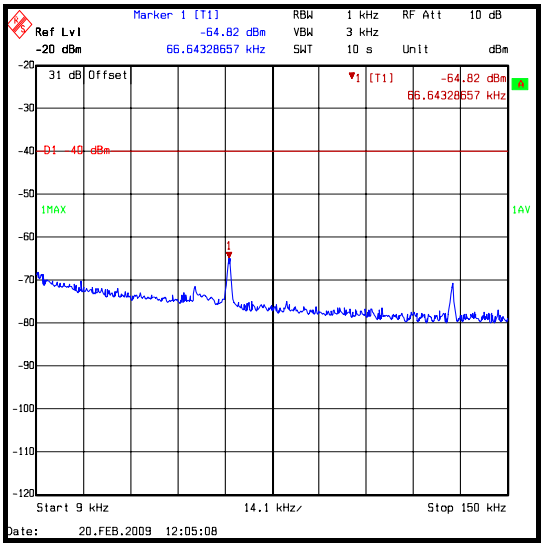
Note(s):

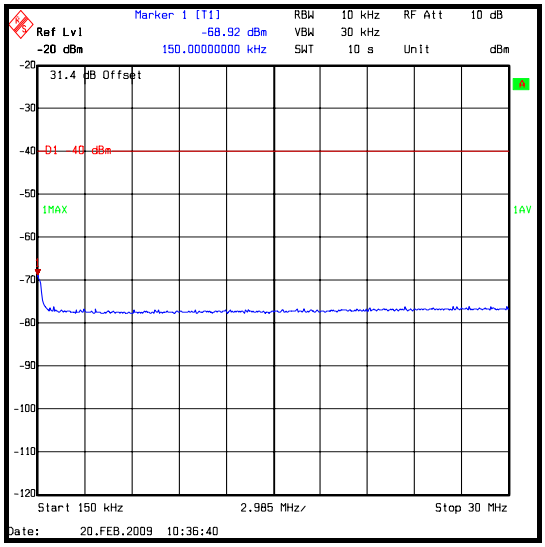
1. The EUT was configured to transmit at maximum power on bottom and top channels.
2. Preliminary measurements were performed on the top channel, in the frequency ranges 9 kHz to 2.3 GHz and 2.37 GHz to 26.5 GHz. Final measurements were made on both channels.
3. Measurements were performed on both channels in the frequency range 2.3 GHz to 2.37 GHz.

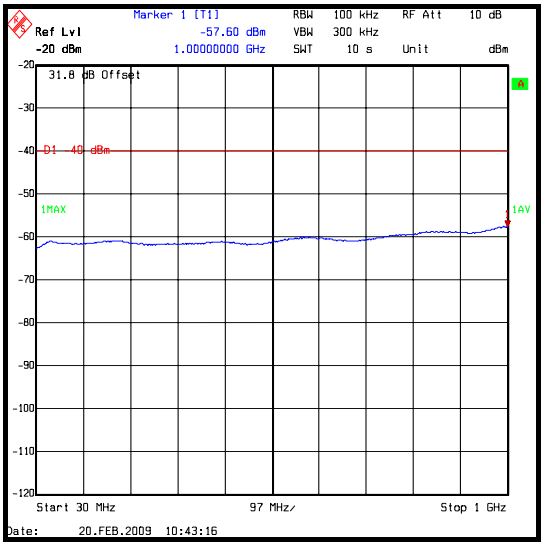
Limits:

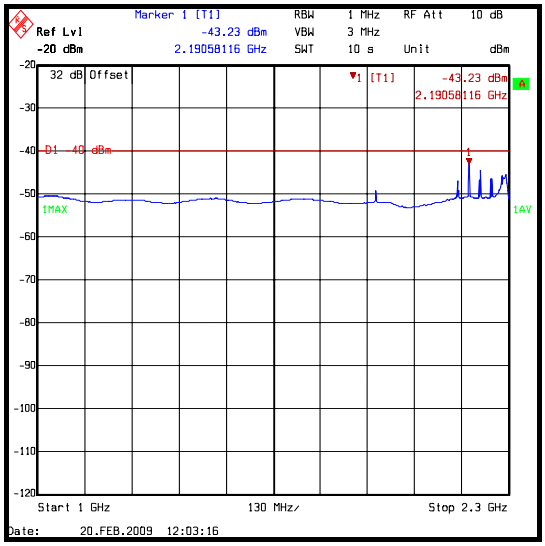
Frequency Range	Applicable limit	Limit (dBm)
9 kHz to 2300 MHz	70 + 10 log (P)	-40
2300 MHz to 2320 MHz	43 + 10 log (P)	-13
2320 MHz to 2345 MHz	80 + 10 log (P)	-50
2345 MHz to 2370 MHz	43 + 10 log (P)	-13
2370 MHz to 26.5 GHz	70 + 10 log (P)	-40

Transmitter Conducted Emissions (continued)

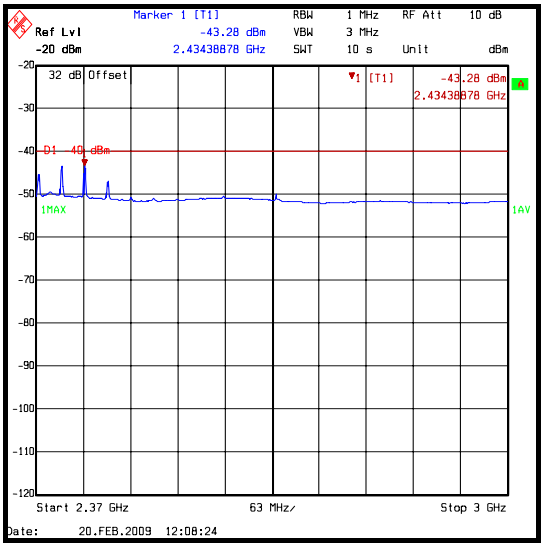


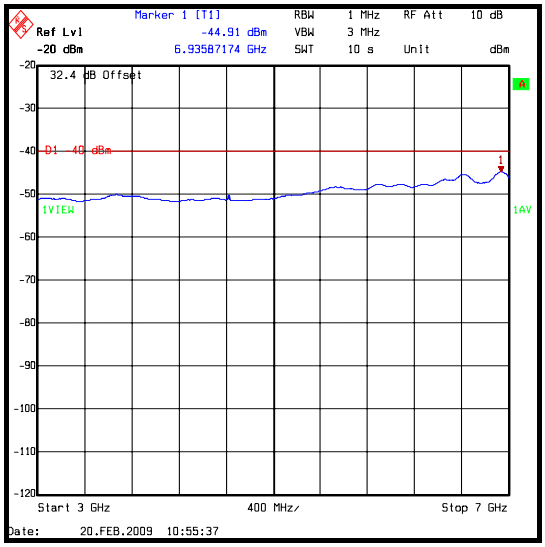


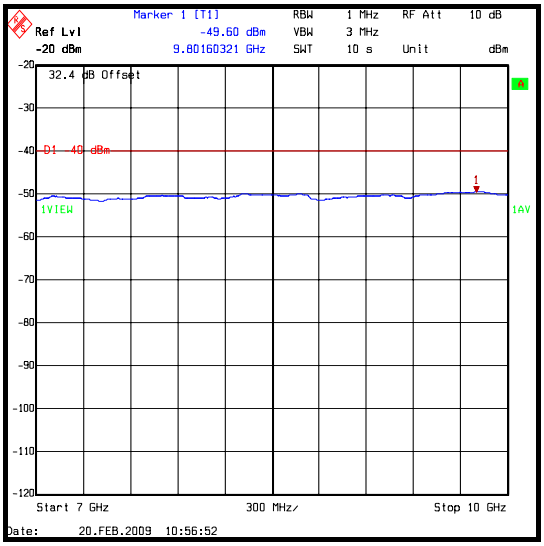


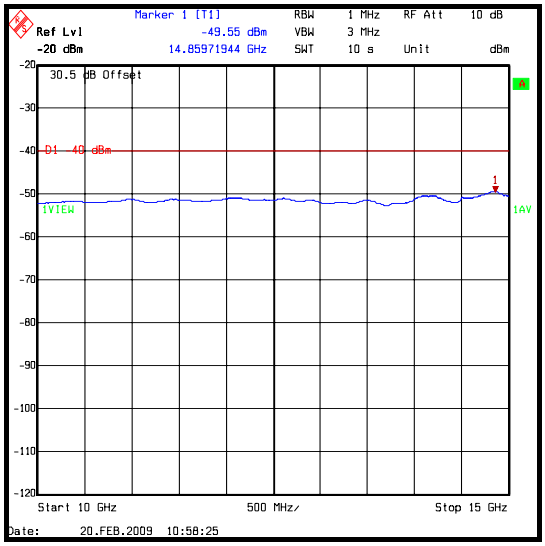


Transmitter Conducted Emissions (continued)

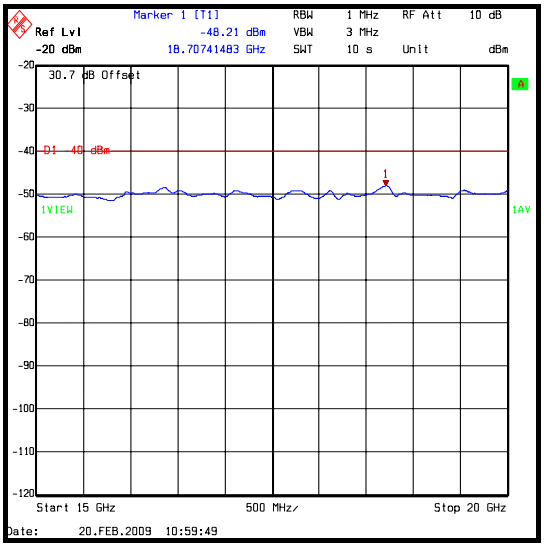


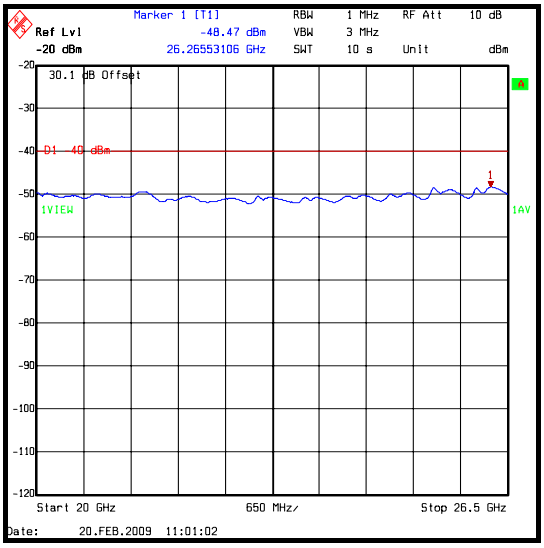






Transmitter Conducted Emissions (continued)





Transmitter Conducted Emissions (continued)

Results: Bottom channel / Block A / Transmit Frequency 2307.6 MHz

Frequency of First 1 MHz strip adjacent to block edge	Level in first 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2304.5	-28.7	-13.0	15.7	Complied
2310.5	-30.4	-13.0	17.4	Complied

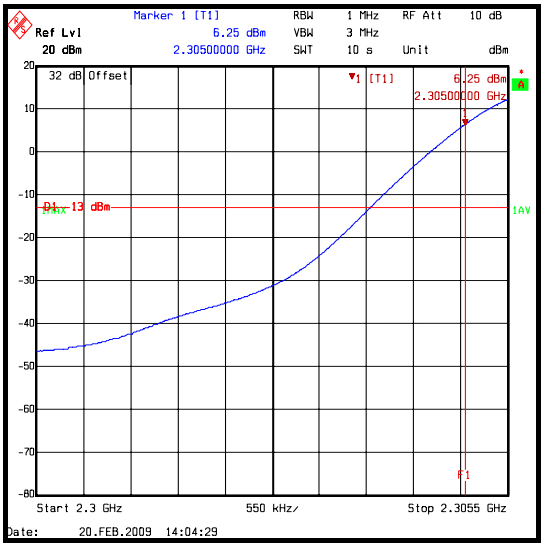
Frequency of second 1 MHz strip adjacent to block edge	Level in second 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2303.5	-29.2	-13.0	16.2	Complied
2311.5	-30.8	-13.0	17.8	Complied

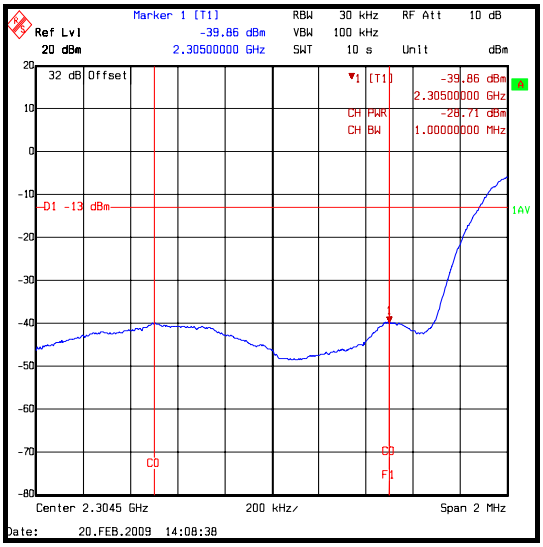
Note(s):

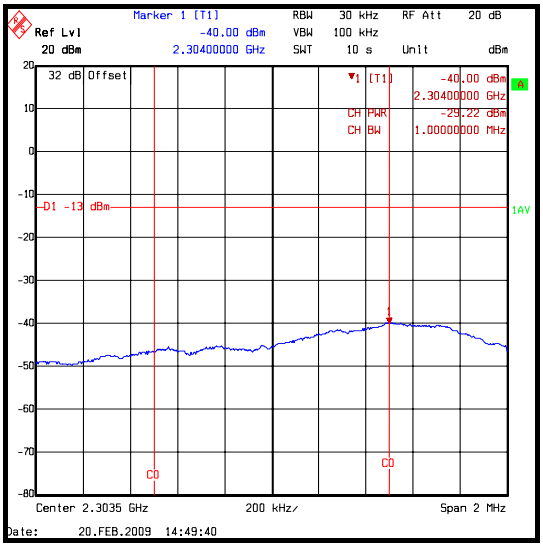
1. Conducted spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2305-2310 MHz) in accordance with Part 27.53(a)(3).

Transmitter Conducted Emissions (continued)

Bottom channel / Block A / 2307.6 MHz



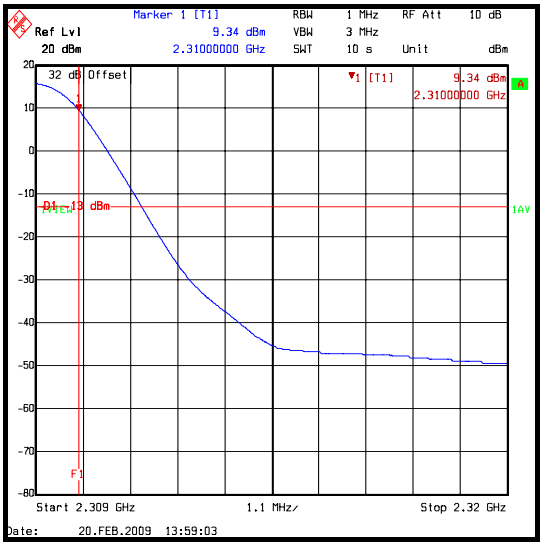


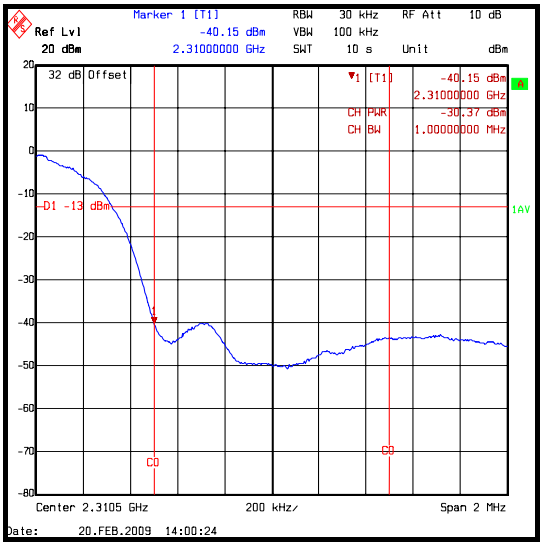


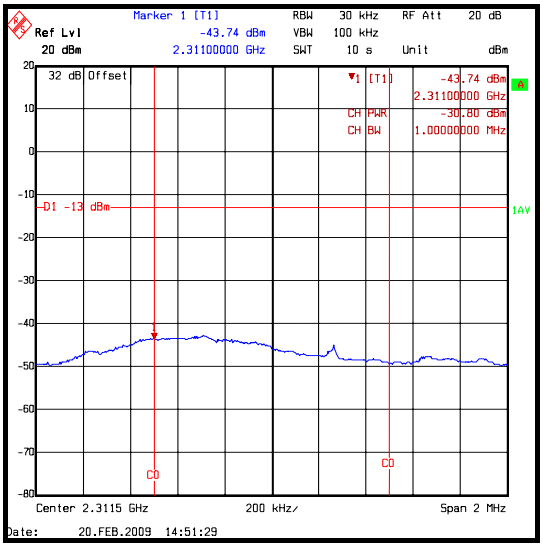
Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

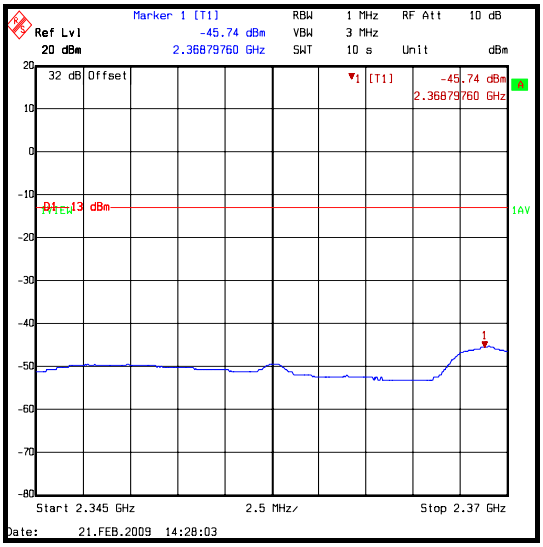
Transmitter Conducted Emissions (continued)

Bottom channel /Block A / 2307.6 MHz









Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

Transmitter Conducted Emissions (continued)

Results: Top channel / Block B / Transmit Frequency 2312.6 MHz

Frequency of first 1 MHz strip adjacent to block edge	Level in first 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2309.5	-32.8	-13.0	19.8	Complied
2315.5	-32.1	-13.0	19.1	Complied

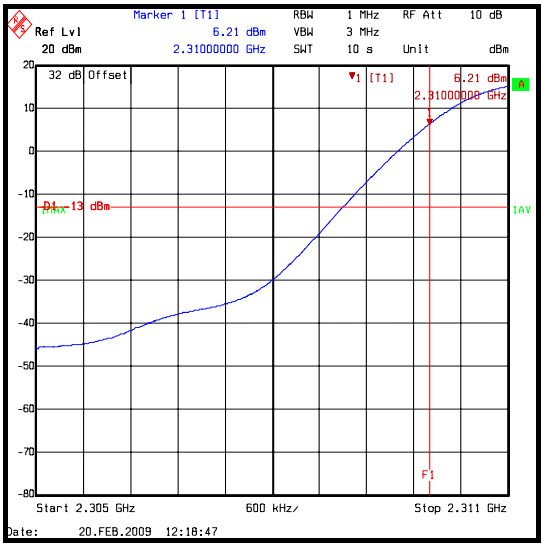
Frequency of second 1 MHz strip adjacent to block edge	Level in second 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2308.5	-35.3	-13.0	22.3	Complied
2316.5	-32.8	-13.0	19.8	Complied

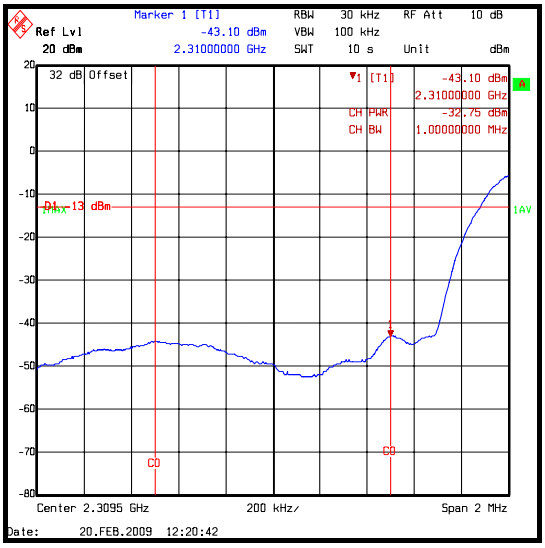
Note(s):

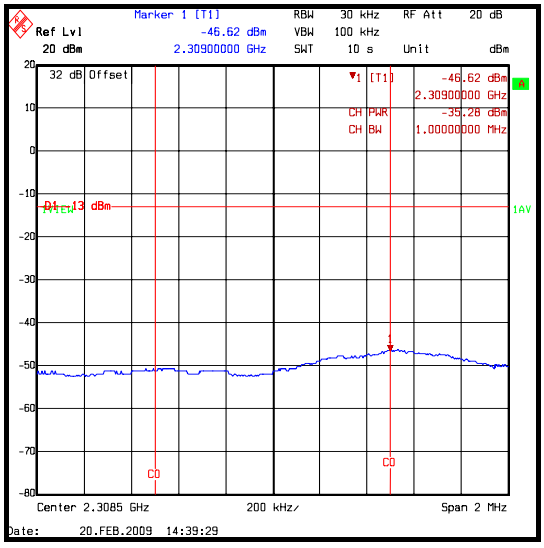
1. Conducted spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2305-2310 MHz) in accordance with Part 27.53(a)(3).

Transmitter Conducted Emissions (continued)

Top channel / Block B / 2312.6 MHz



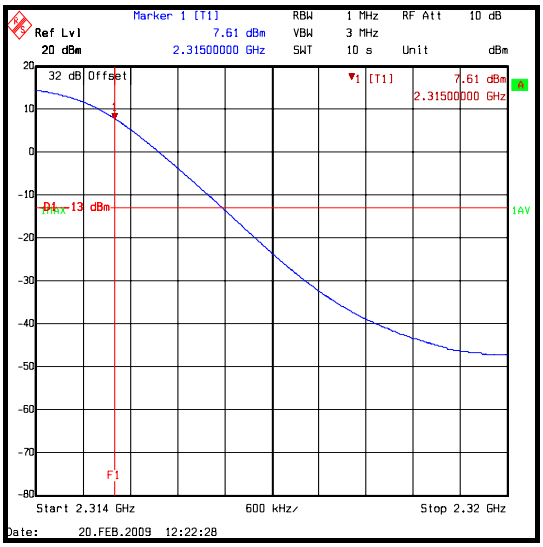


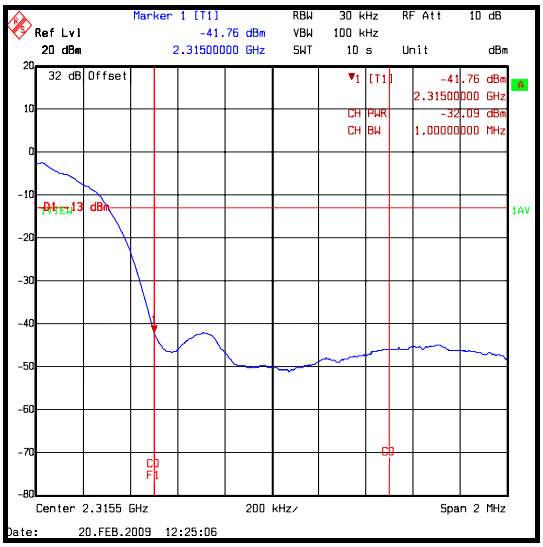


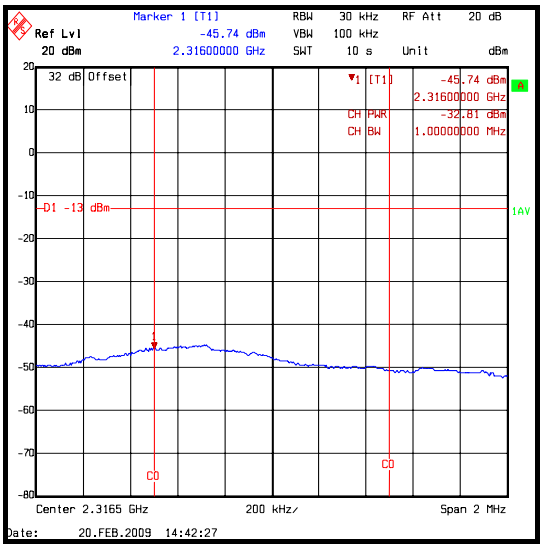
Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

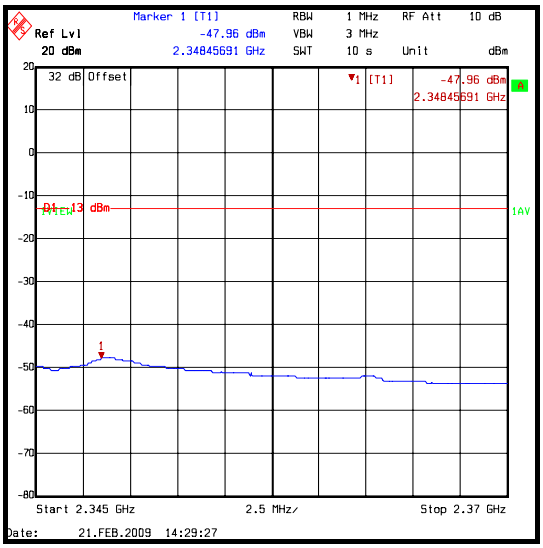
Transmitter Conducted Emissions (continued)

Top channel / Block B / 2312.6 MHz









Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

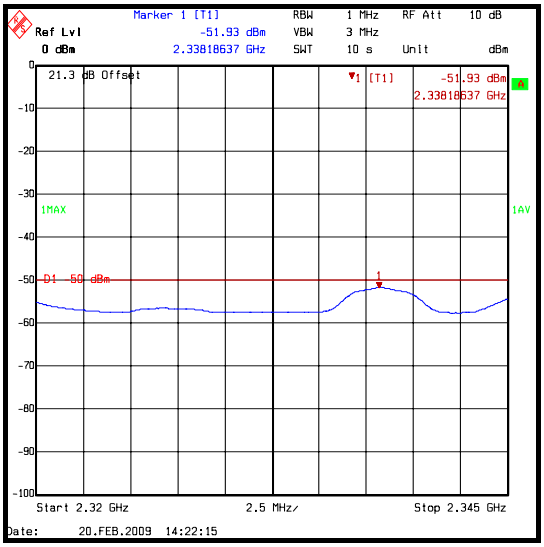
Transmitter Conducted Emissions (continued)

Results:

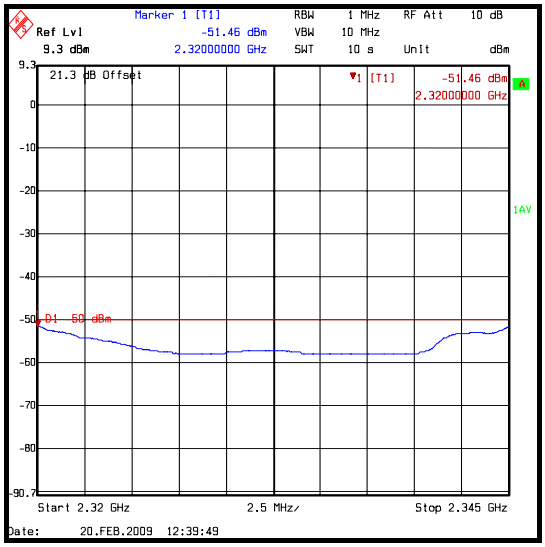
Channel	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	2338.186	-51.9	-50.0	1.9	Complied
Top	2320.000	-51.5	-50.0	1.5	Complied

Note(s):

1. Conducted spurious emission measurements in the frequency ranges 2320-2345 MHz in accordance with Part 27.53(a)(1) for fixed service.



Bottom Channel



Top Channel

5.12. Transmitter Radiated Emissions

Test Summary:

FCC Part:	2.1051, 27.53
Test Method Used:	Tests were performed using the test methods detailed in ANSI TIA-603-C-2004

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	29

Results: Bottom Channel

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1927.695	-46.0	-40.0	6.0	Complied
2184.595	-47.0	-40.0	7.0	Complied
2215.199	-47.7	-40.0	7.7	Complied
2245.990	-48.6	-40.0	8.6	Complied
2288.156	-51.4	-40.0	11.4	Complied
2369.042	-46.3	-40.0	6.3	Complied
2399.868	-45.3	-40.0	5.3	Complied
2430.362	-43.5	-40.0	3.5	Complied
2459.919	-53.9	-40.0	13.9	Complied
4613.313	-44.0	-40.0	4.0	Complied
4617.086	-44.6	-40.0	4.6	Complied

Results: Top Channel

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
1932.665	-50.1	-40.0	10.1	Complied
2189.538	-51.4	-40.0	11.4	Complied
2220.109	-52.2	-40.0	12.2	Complied
2251.043	-52.9	-40.0	12.9	Complied
2290.898	-51.9	-40.0	11.9	Complied
2373.962	-51.3	-40.0	11.3	Complied
2404.828	-50.6	-40.0	10.6	Complied
2435.312	-49.4	-40.0	9.4	Complied
2465.992	-51.6	-40.0	11.6	Complied
4623.364	-52.0	-40.0	12.0	Complied
4627.137	-52.7	-40.0	12.7	Complied

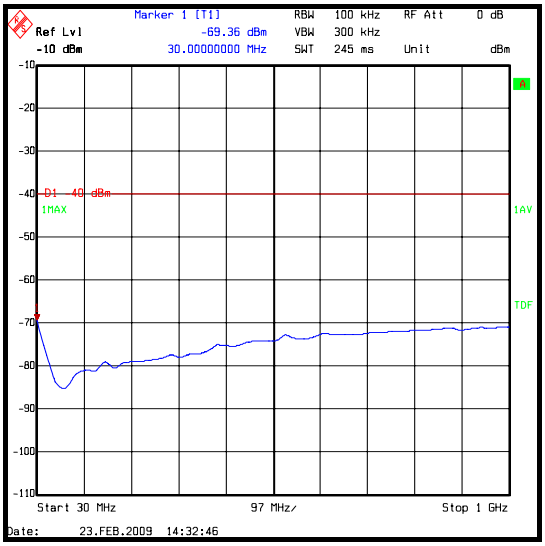
Note(s):

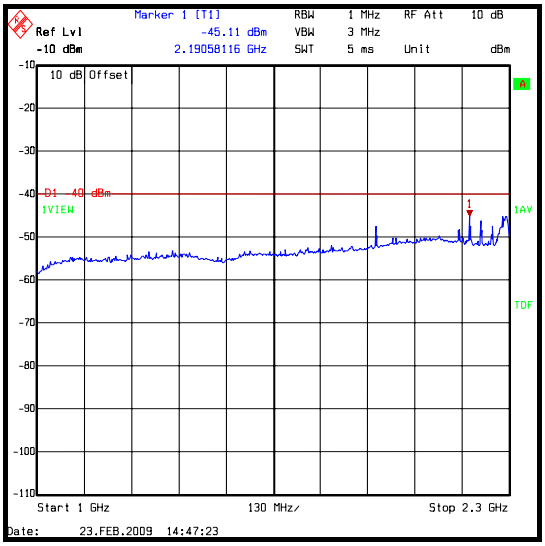
1. Radiated spurious emissions measurements in the frequency ranges 9 kHz to 2.3 GHz and 2.37 GHz to 26.5 GHz in accordance to Part 27.53(a)(3)
2. Prescans were performed with the EUT transmitting on the top channel, apart from the frequency range 2345MHz to 2370 MHz where the prescan was also performed with the EUT transmitting on the bottom channel. Final measurements were performed on the bottom and top channels.
3. The EUT was configured to transmit at maximum power on bottom and top channels.
4. Measurements were performed with the test system antenna polarised in the vertical and horizontal planes, the highest level was recorded.
5. All other emissions were >20 dB below the applicable limit or below the level of the noise floor.

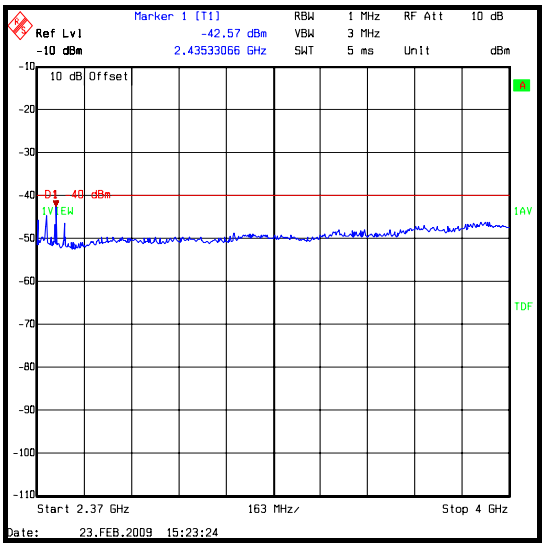
Limits:

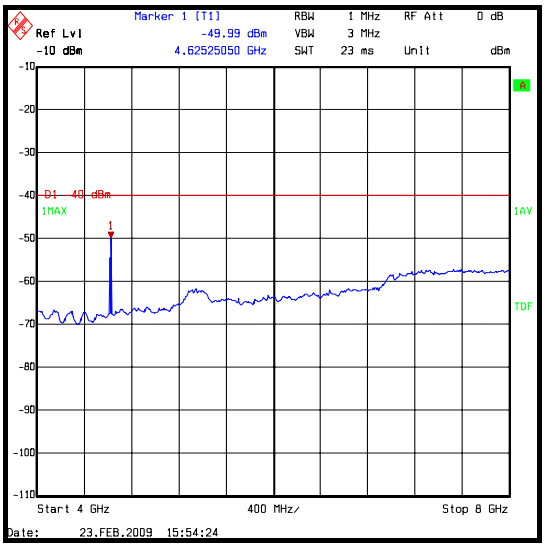
Frequency Range	Applicable limit	Limit (dBm)
9 kHz to 2300 MHz	70 + 10 log (P)	-40
2300 MHz to 2320 MHz	43 + 10 log (P)	-13
2320 MHz to 2345 MHz	80 + 10 log (P)	-50
2345 MHz to 2370 MHz	43 + 10 log (P)	-13
2370 MHz to 26.5 GHz	70 + 10 log (P)	-40

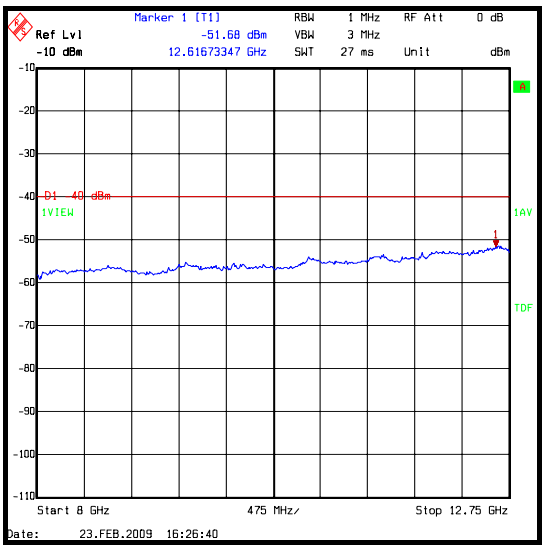
Transmitter Radiated Emissions (continued)

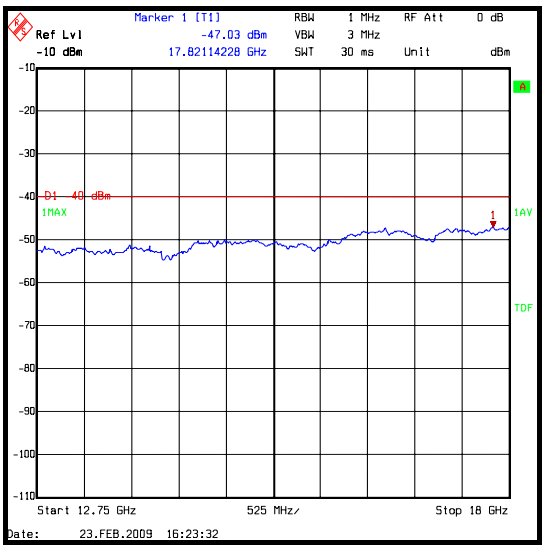




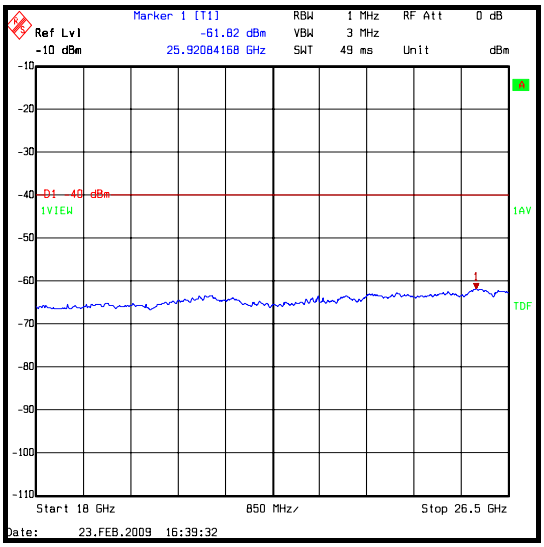








Transmitter Radiated Emissions (continued)



Transmitter Radiated Emissions (continued)

Results: Bottom Channel / Block A / Transmit Frequency 2307.6

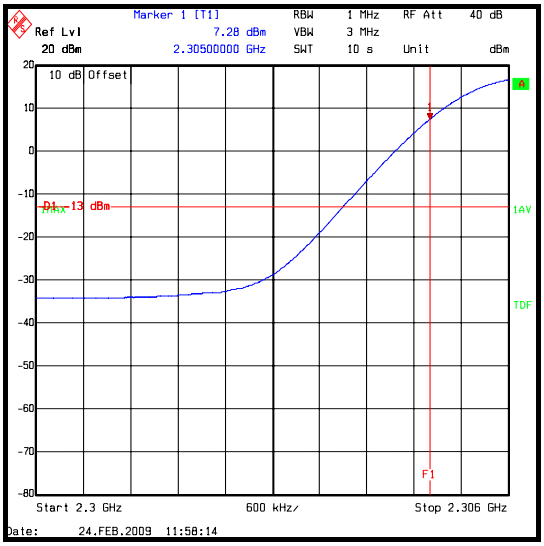
Frequency of first 1 MHz strip adjacent to block edge	Level in first 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2304.5	-30.6	-13.0	17.6	Complied
2310.5	-28.4	-13.0	15.4	Complied

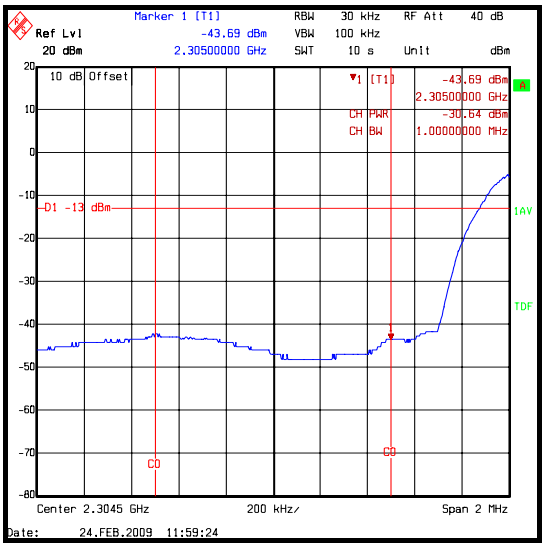
Frequency of second 1 MHz strip adjacent to block edge	Level in second 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2303.5	-30.5	-13.0	17.5	Complied
2311.5	-28.9	-13.0	15.9	Complied

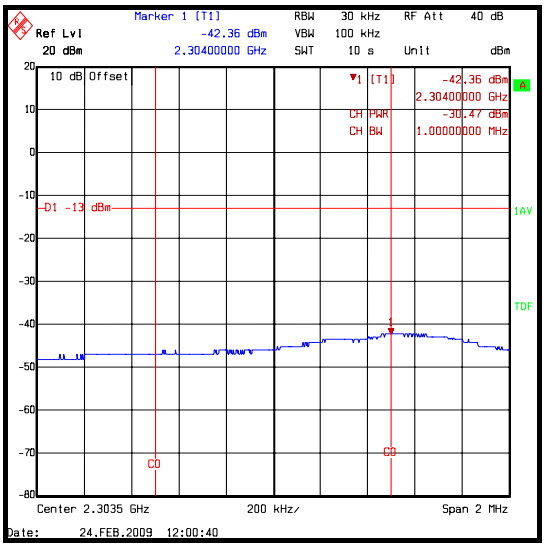
Note(s):

1. Radiated spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2305-2310 MHz) in accordance with Part 27.53(a)(3)

Transmitter Radiated Emissions (continued)

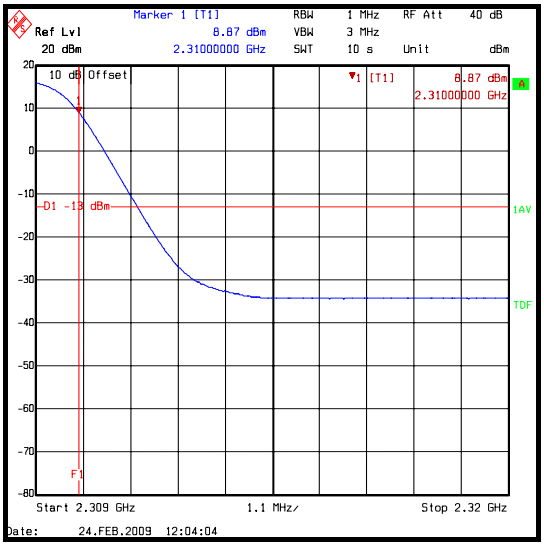


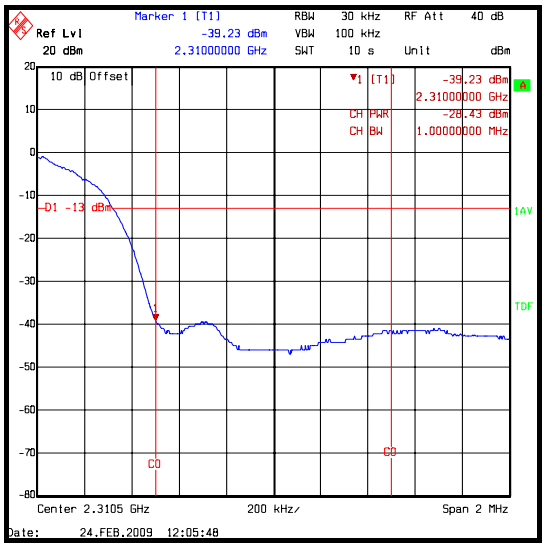


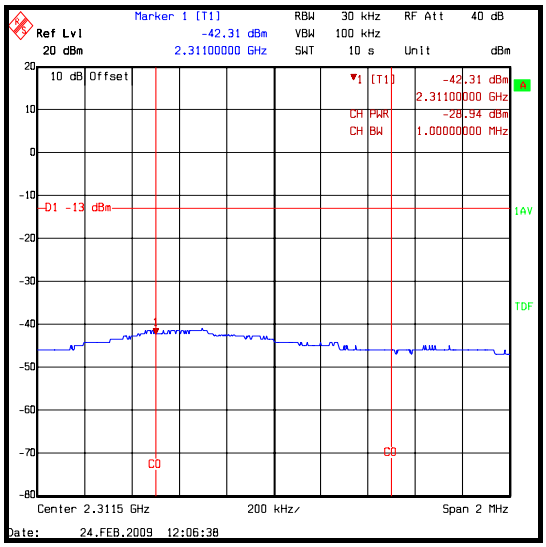


Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

Transmitter Radiated Emissions (continued)







Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

Transmitter Radiated Emissions (continued)

Results: Top Channel / Block B / Transmit Frequency 2312.6 MHz

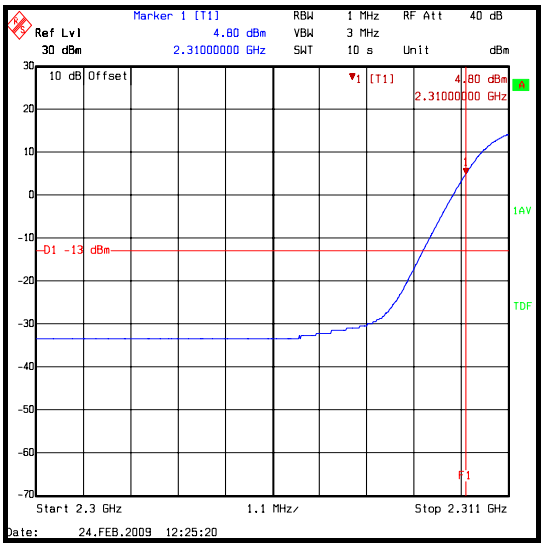
Frequency of first 1 MHz strip adjacent to block edge	Level in first 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2309.5	-30.5	-13.0	17.5	Complied
2315.5	-31.5	-13.0	18.5	Complied

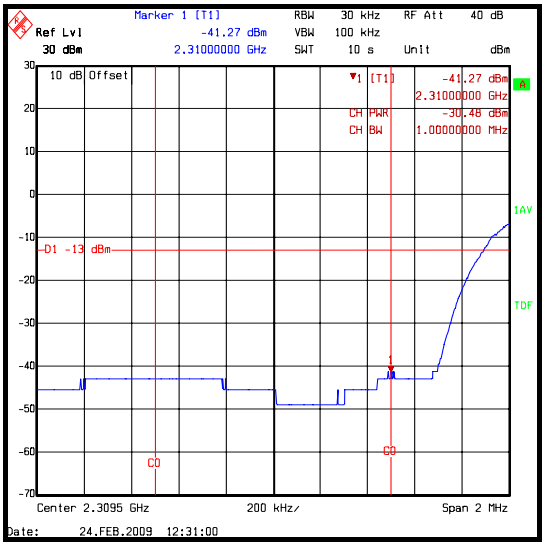
Frequency of second 1 MHz strip adjacent to block edge	Level in second 1 MHz strip adjacent to block edge (dBm)	Band edge limit (dBm)	Margin (dB)	Result
2308.5	-30.4	-13.0	17.4	Complied
2316.5	-32.2	-13.0	19.2	Complied

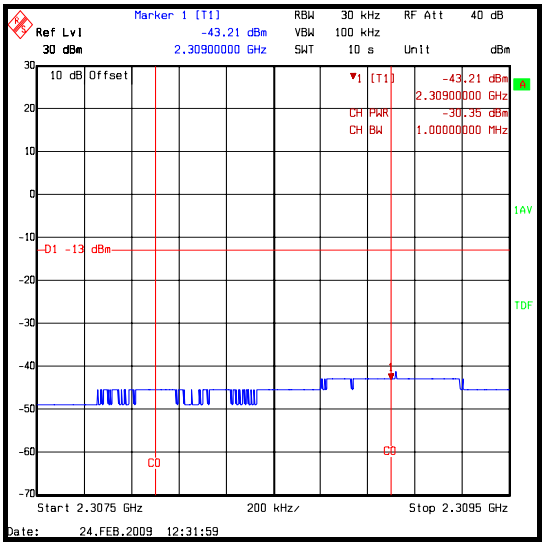
Note(s):

1. Radiated spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2305-2310 MHz) in accordance with Part 27.53(a)(3)

Transmitter Radiated Emissions (continued)

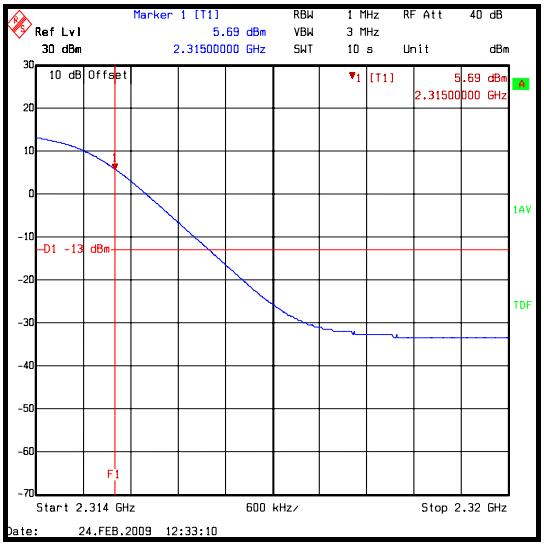


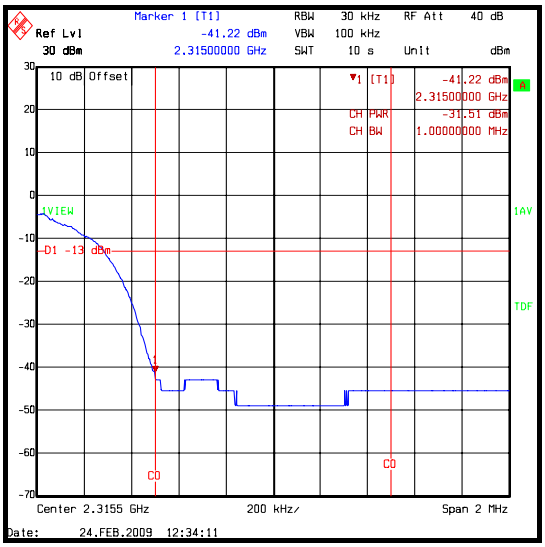


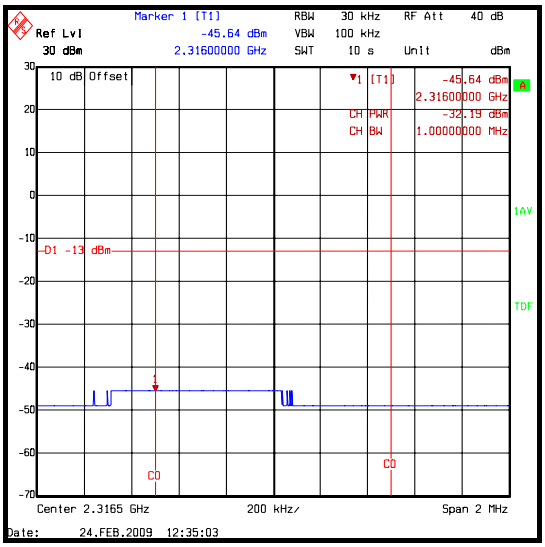


Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

Transmitter Radiated Emissions (continued)

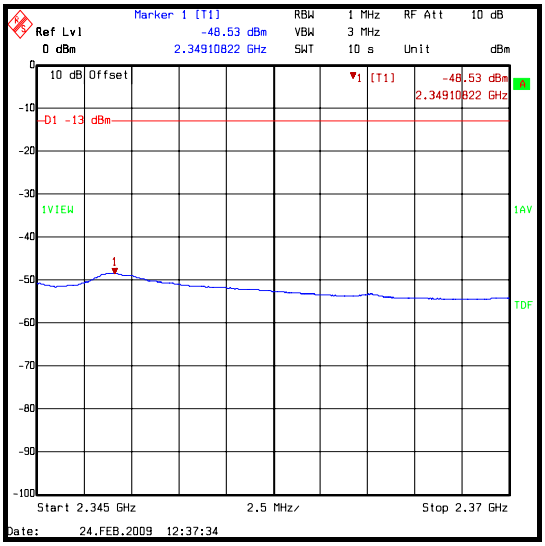






Note: Measurements were made in the 1 MHz bands immediately outside and adjacent to the band edges. Initially the RBW was set to 1MHz but as expected, it caused the carrier bandwidth to be greater then it actually was. Therefore these measurements were made using the channel power function of the spectrum analyser.

Transmitter Radiated Emissions (continued)



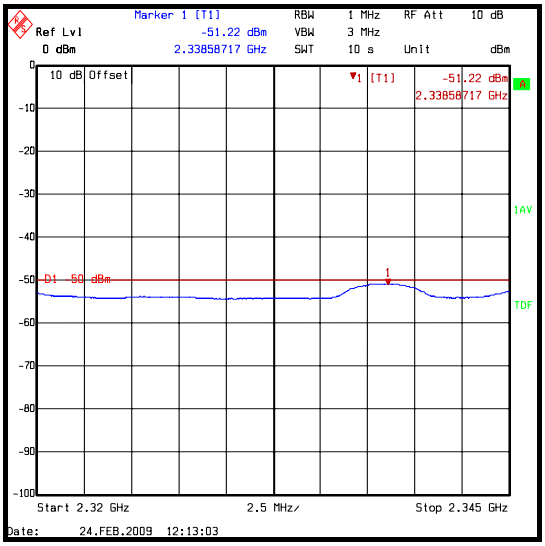
Transmitter Conducted Emissions (continued)

Results:

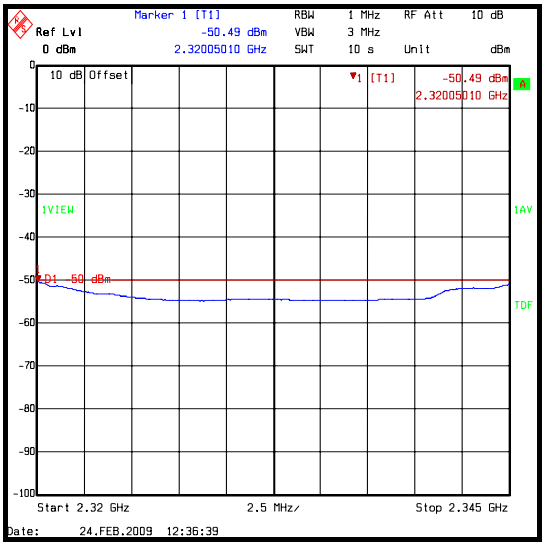
Channel	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	2338.587	-51.2	-50.0	1.2	Complied
Top	2320.050	-50.5	-50.0	0.5	Complied

Note(s):

1. Radiated spurious emission measurements in the frequency ranges 2300-2320 MHz and 2345-2370 MHz, but excluding Block A (2305-2310 MHz) in accordance with Part 27.53(a)(3)



Bottom Channel



Top Channel

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
AC Conducted Spurious Emissions	0.15 MHz to 30.0 MHz	95%	+/- 3.25 dB
Conducted Carrier Output Power	2350 MHz to 2360 MHz	95%	+/- 1.2 dB
Carrier Output Power (EIRP)	2350 MHz to 2360 MHz	95%	+/- 1.78 dB
Occupied Bandwidth	2350 MHz to 2360 MHz	95%	+/- 0.92 ppm
Conducted Emissions Antenna Port	9 kHz to 26.5 GHz	95%	+/- 1.2 dB
Frequency Stability	2350 MHz to 2360 MHz	95%	+/- 0.92 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 26.5 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
A004	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890604/027	19 May 2008	12
A1011	Waveguide Transition	Flann	14094-SF40	41	Calibrated before use	-
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1391	Attenuator	HUBER + SUHNER AG	757987	6810.17.B	Calibrated before use	-
A1392	Attenuator	HUBER + SUHNER AG	757456	6820.17.B	Calibrated before use	-
A1396	Attenuator	HUBER + SUHNER AG	757987	6810.17.B	Calibrated before use	-
A1441	Waveguide Transition	unknown	MFR 01456	42AC206	Calibrated before use	-
A1463	Waveguide Transition	N/A	1442-1	6L254	Calibrated before use	-
A1470	Waveguide Transition	Marconi Instruments	6237-1	1266	Calibrated before use	-
A1494	Attenuator	MCL	MCL BW -230W2	9935	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1579	Waveguide Transition	Shuner	3102	Unknown	Calibrated before use	-
A1582	Waveguide Transition	Marconi Instruments	6237/1	1293	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	05 Jan 2009	12
A1898	Waveguide Adaptor	Flann	Unknown	2689	Calibrated before use	-
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
E013	Environmental Chamber	Sanyo	ATMOS chamber	None	Calibration not required	-
K0002	Site Reference 4421	Rainford EMC	N/A	N/A	Calibration not required	-
K0004	Site Reference 4428	RFI Global Services Ltd	N/A	N/A	Calibration not required	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	09 Dec 2008	12
M1252	Signal Generator	HP	83640A	3119A00489	02 Oct 2008	12

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
M1269	Multimeter	Fluke	179	90250210	09 Apr 2008	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	21 Aug 2008	12
M1379	Test Receiver	Rohde and Schwarz	ESIB7	100330	14 Aug 2008	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	19 Mar 2007	12
S021	Dual DC Power Supply Unit	Thurlby Thandar Instruments	CPX200	061034	Calibration not required	-

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