



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: IPWireless 700 MHz PCI Express Mini Module Model: AEX

To: FCC Part 90: 2008 Subpart R

Test Report Serial No:
RFI/RPT1/RP75335JD01B

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director:	
	
Checked By:	Tony Henriques
Signature:	
Date of Issue:	28 January 2010

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number: 2117901

This page has been left intentionally blank.

Table of Contents

1. Customer Information 4

2. Summary of Testing 5

3. Equipment Under Test (EUT) 7

4. Operation and Monitoring of the EUT during Testing 9

5. Measurements, Examinations and Derived Results 10

6. Measurement Uncertainty 47

Appendix 1. Test Equipment Used 48

1. Customer Information



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

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR90
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2008: Part 90 Subpart R (Regulations Governing the Licensing and Use of Frequencies in the 763-775 and 793-805 MHz Bands)
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	19 October 2009 to 30 October 2009

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Port Type	Result
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	Enclosure	✓
Part 15.111	Receiver/Idle Mode Conducted Emissions	Antenna Terminals	✓
Part 90.542(a)(6)	Transmitter Effective Radiated Power (ERP)	Antenna Terminals	✓
Part 2.1049	Transmitter Occupied Bandwidth	Antenna Terminals	✓
Part 90.539(e)	Transmitter Frequency Stability (Temperature & Voltage Variation)	Antenna Terminals	✓
Part 90.210(n)	Transmitter Conducted Emissions Mask	Antenna Terminals	✓
Part 90.543(c)	Transmitter Conducted Emissions (Out of Band)	Antenna Terminals	✓
Part 90.543(c)	Transmitter Band Edge Conducted Emissions	Antenna Terminals	✓
Part 90.543(e)(2)	Transmitter Conducted Emissions (769 to 775 MHz and 799 to 805 MHz bands)	Antenna Terminals	✓
Part 90.543(f)	Transmitter Conducted Emissions (1559 MHz to 1610 MHz band)	Antenna Terminals	✓
Part 90.210(n)	Transmitter Radiated Emissions Mask	Antenna	✓
Part 90.543(c)	Transmitter Radiated Emissions (Out of Band)	Antenna	✓
Part 90.543(c)	Transmitter Band Edge Radiated Emissions	Antenna	✓
Part 90.543(e)(2)	Transmitter Radiated Emissions (769 to 775 MHz and 799 to 805 MHz bands)	Antenna	✓
Part 90.543(f)	Transmitter Radiated Emissions (1559 MHz to 1610 MHz band)	Antenna	✓
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

Testing at voltage extremes was carried out at $V_{nom} \pm 9\%$ at the request of the client and not at $V_{nom} \pm 15\%$ as required by Part 2.1055. This is because the EUT complies with the PCI Express standard which specifies the $\pm 9\%$ tolerance. A breakout point for the power supply was provided by the customer on adaptor board (Serial No. EMS 022630 0004) in order to vary the supply to the EUT as this is normally provided from the PCI Express interface on the standard adaptor board.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Description:	TD_CDMA PCI-E Mini Module
Brand Name:	IPWireless
Model Name or Number:	AEX
Serial Number:	AEXA935000T1B
IMEI Number:	358752030000263
Hardware Version Number:	Version 1
Software Version Number:	None Stated
FCC ID Number:	PKTPEMAEX

3.2. Description of EUT

The equipment under test was a PCI Express mini module. The EUT is fitted with a transmit / receive main RF port and a second receiver only diversity port.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Power Supply Requirement:	3.3 V DC \pm 9%	
Equipment Category:	Module	
Type of Unit:	PCI Express mini module	
Modulation Type:	QPSK, 16QAM, 64QAM	
Duty Cycle:	100%	
Antenna Gain:	Up to +19 dBi (stated)	
Chip Rate:	3.84 Mcps	
Channel Bandwidth:	5.0 MHz	
Transmit Operating Band:	793 MHz to 798 MHz	
Transmit Channel Tested:	Channel ID	Channel Frequency (MHz)
	Single	795.4
Receive Operating Band:	763 MHz to 768 MHz	
Receive Channel Tested:	Channel ID	Channel Frequency (MHz)
	Single	765.4

3.5. Support Equipment

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

Description:	Adaptor Board
Brand Name:	IPWireless
Model Name or Number:	AAF Pass 2
Hardware Version:	Pass 2
Software Version:	N/A
Serial Number:	EEMS 022630 004

Description:	Adaptor Board
Brand Name:	IPWireless
Model Name or Number:	AAF Pass
Hardware Version:	Pass 3
Software Version:	N/A
Serial Number:	None Stated

Description:	Laptop PC
Brand Name:	Toshiba
Model Name or Number:	PSAAPE-00H00KEN
Serial Number:	670709710
Connected to port:	USB

Description:	USB cable
Cable Length and Type:	1.8 metre / multicore
Connected to port:	USB

Description:	Bench power supply
Brand Name:	TTI
Model Name or Number:	CPX200
Serial Number:	163296
Cable Length and Type:	3 metre / 2 core
Connected to port:	Power

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- TD-CDMA idle mode on all 15 timeslots.
- TD-CDMA traffic mode on all 15 timeslots at full power (+24 dBm).
- The client configured the EUT so that residual breakthrough was present at the centre of the carrier in order to make frequency measurements.

4.2. Configuration and Peripherals

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

- No AC conducted tests were performed as the EUT is a DC powered module.
- The EUT was mounted on an adaptor board and all the testing was performed in this configuration. The adaptor board was powered from a bench power supply supplied by the client.
- Connected to a laptop PC via USB port on the adaptor board. A bespoke application on the laptop pc was used to configure the EUT during the testing via the adaptor board.
- For radiated emissions testing both RF ports were terminated with antennas and RF cables supplied by the customer.
- For radiated emissions testing, the EUT was mounted in and powered by the adaptor board, the adaptor board was powered from a bench supply at a nominal voltage of 12VDC and the adaptor board voltage regulator reduces this to 3.3 volts which is the normal supply voltage to the EUT.
- For conducted and radiated emissions out of band testing, preliminary checks were made on all three modulation schemes and the mode which exhibited the highest emissions profile (i.e. QPSK) was scanned across the required measurement frequency range. Where an emission was detected final emission measurements were performed on all three modulation schemes.

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. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

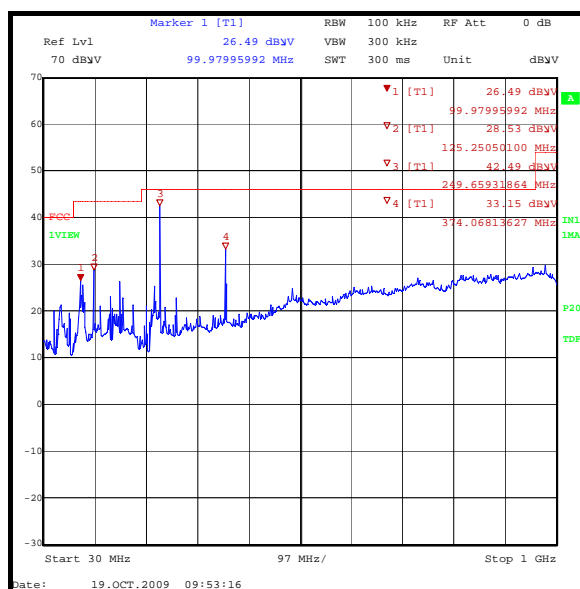
FCC Part:	15.109
Test Method:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

Results:

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
99.968	Vertical	24.8	43.5	18.7	Complied
124.976	Vertical	25.3	43.5	18.2	Complied
177.244	Vertical	23.5	43.5	20.0	Complied
249.918	Vertical	38.9	46.0	7.1	Complied
374.875	Vertical	28.4	46.0	17.6	Complied



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

Receiver/Idle Mode Radiated Spurious Emissions (continued)**Test Summary:**

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

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

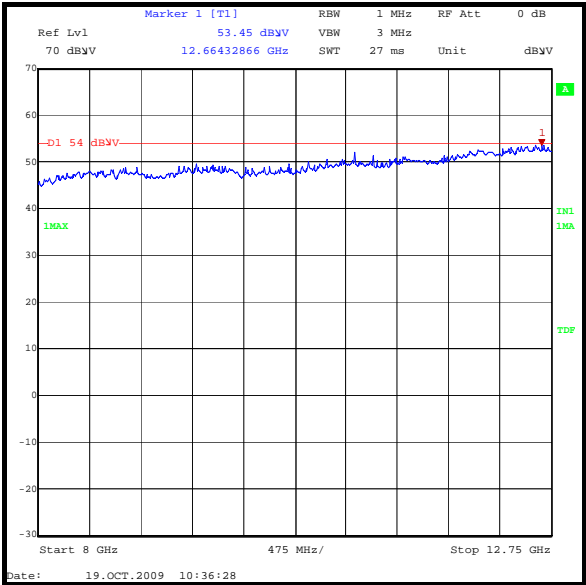
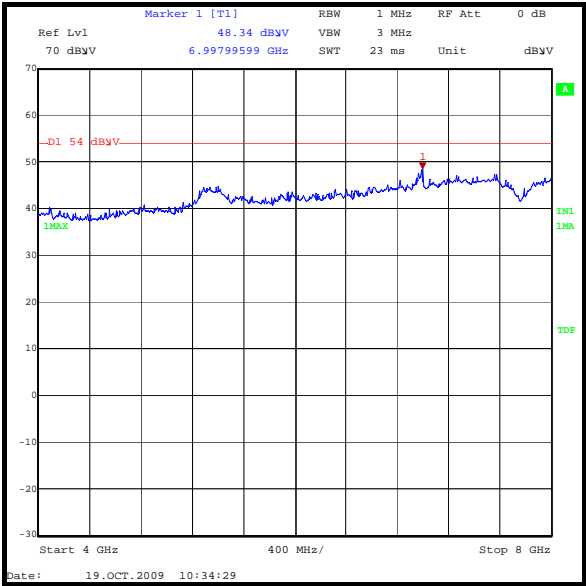
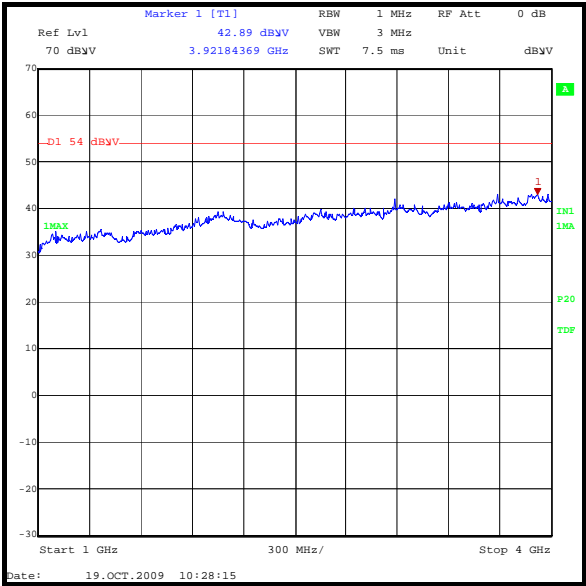
Results: Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Peak Level (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
12.664	Vertical	40.8	12.9	53.5	54.0	0.5	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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



5.2.2. Receive/Idle Mode Conducted Emissions**Test Summary:**

FCC Part:	15.111
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051

Environmental Conditions:

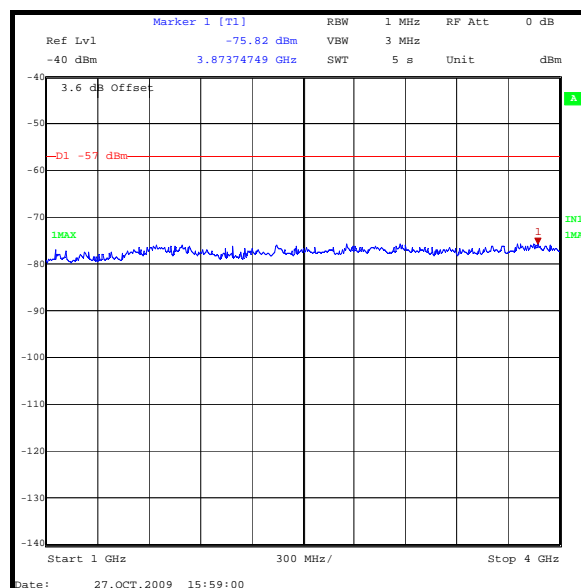
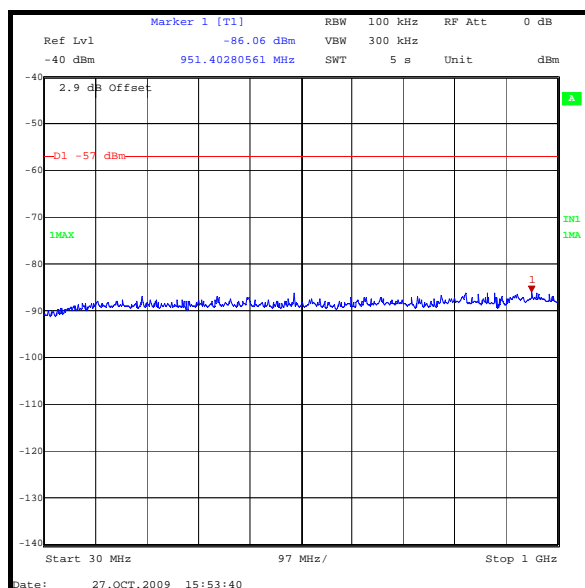
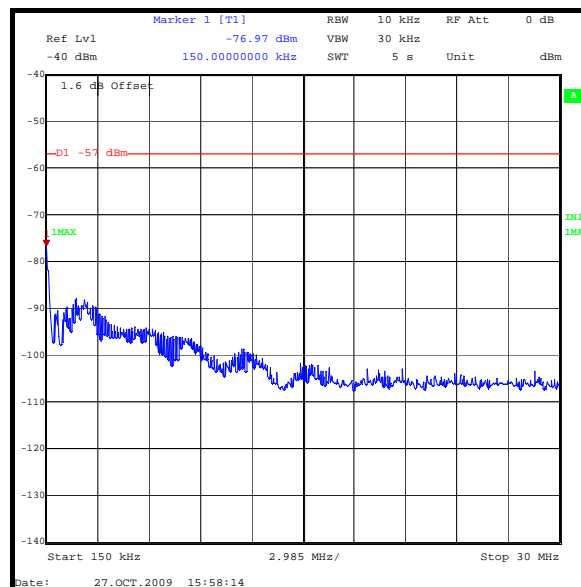
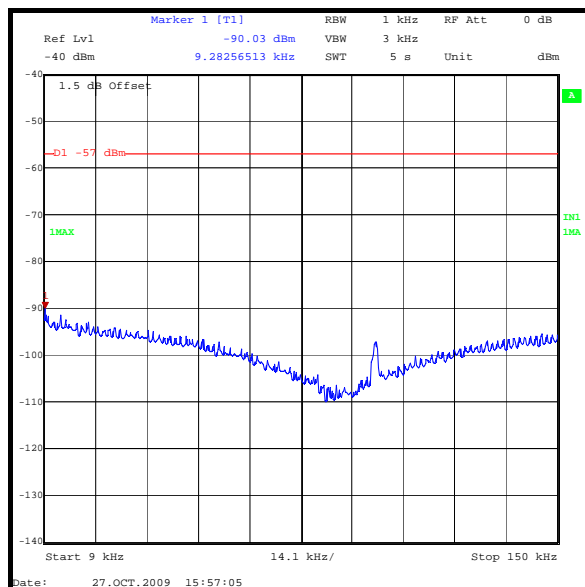
Temperature (°C):	21
Relative Humidity (%):	31

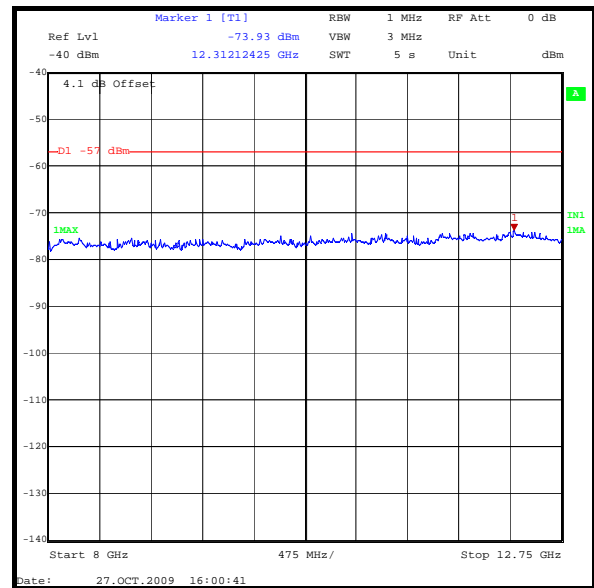
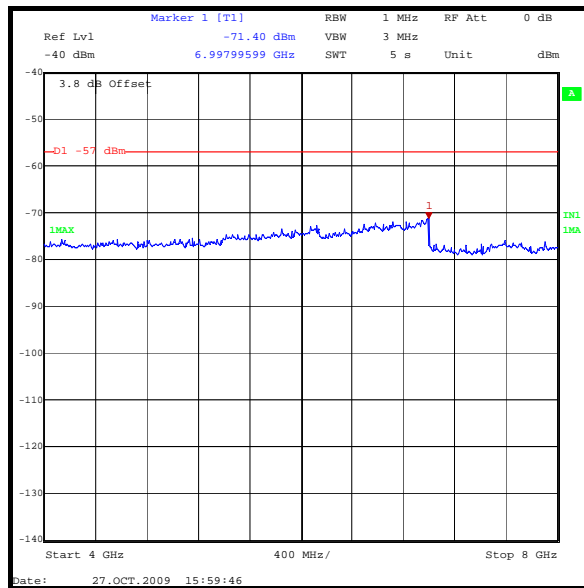
Results: Main RF Port

Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
6997.996	-71.4	-57.0	14.4	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.

Receive/Idle Mode Conducted Emissions (continued)

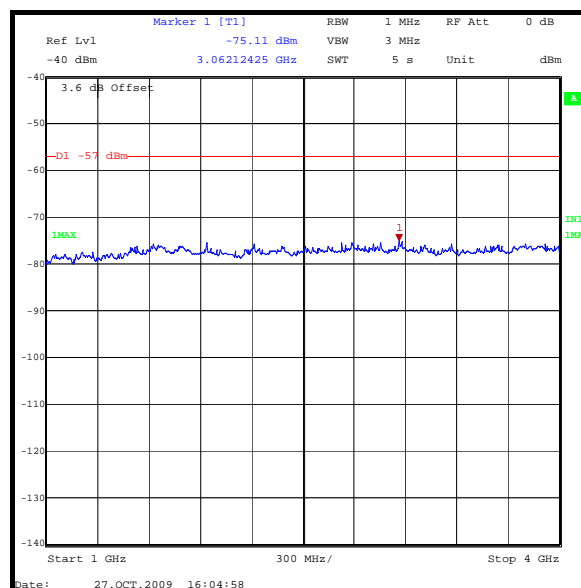
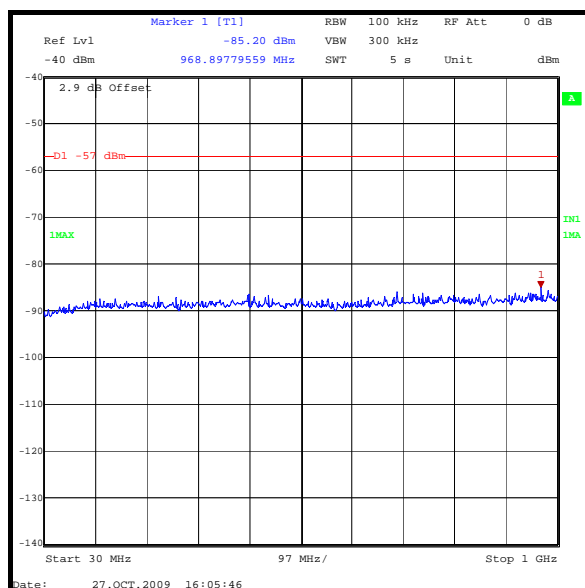
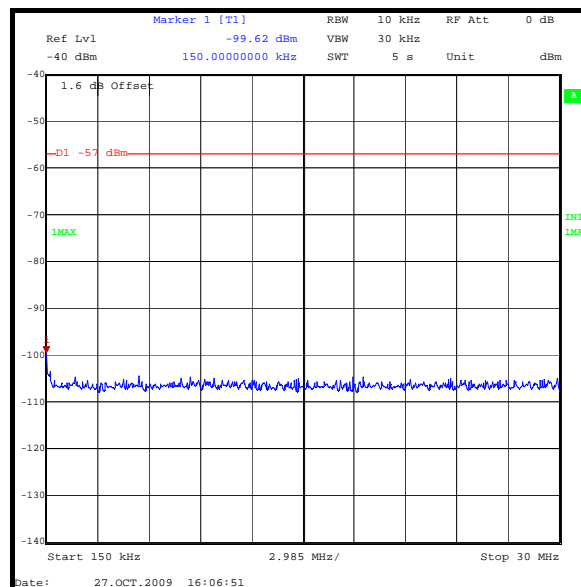
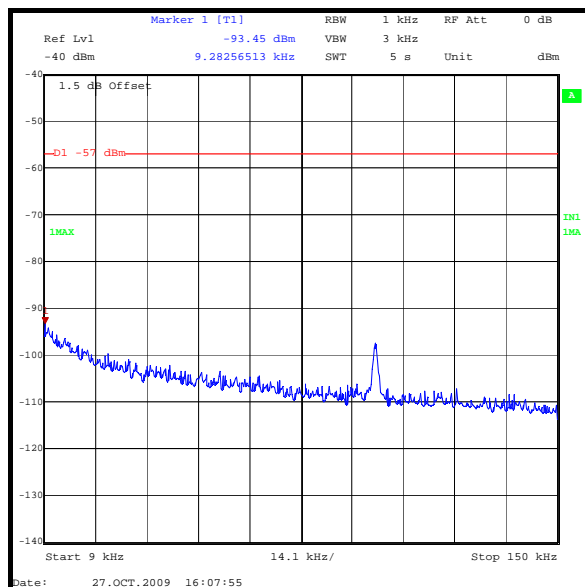
Receive/Idle Mode Conducted Emissions (continued)

Receive/Idle Mode Conducted Emissions (continued)**Results: Diversity RF Port**

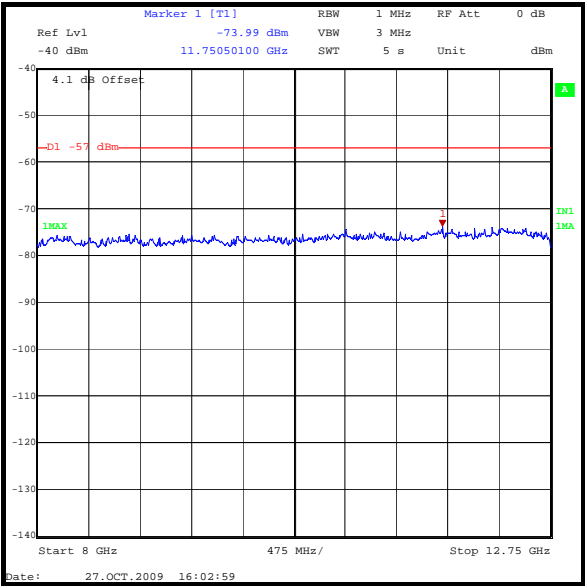
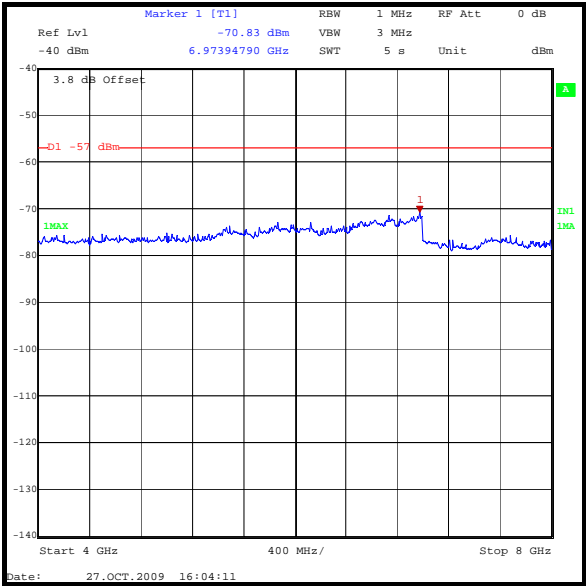
Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
6973.948	-70.8	-57.0	13.8	Complied

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.

Receive/Idle Mode Conducted Emissions (continued)

Receive/Idle Mode Conducted Emissions (continued)



5.2.3. Transmitter Effective Radiated Power (ERP)**Test Summary:**

FCC Part:	90.542(a)(6)
Test Method:	As detailed in ANSI TIA-603-C-2004 Section 2.2.1

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	40

Results:

Modulation	Frequency (MHz)	Conducted RF Power (dBm)	Antenna Gain (dBi)	ERP (dBm)	ERP Limit (dBm)	Margin (dB)	Result
QPSK	795.4	24.9	16.9	43.9	44.8	0.9	Complied
16QAM	795.4	24.7	16.9	43.7	44.8	1.1	Complied
64QAM	795.4	24.8	16.9	43.8	44.8	1.0	Complied

5.2.4. Transmitter Occupied Bandwidth**Test Summary:**

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

Environmental Conditions:

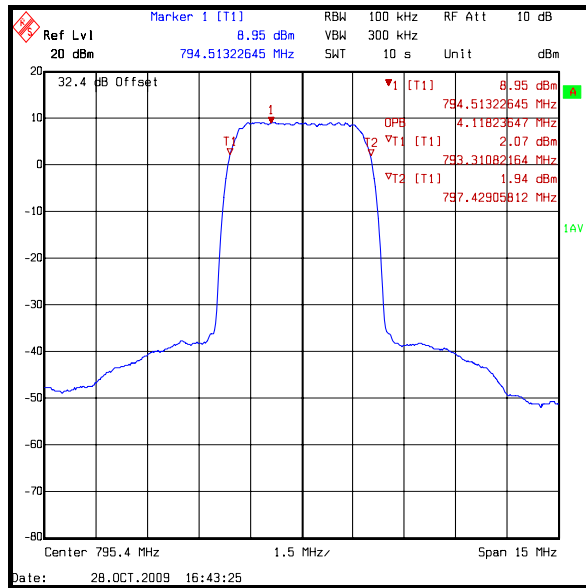
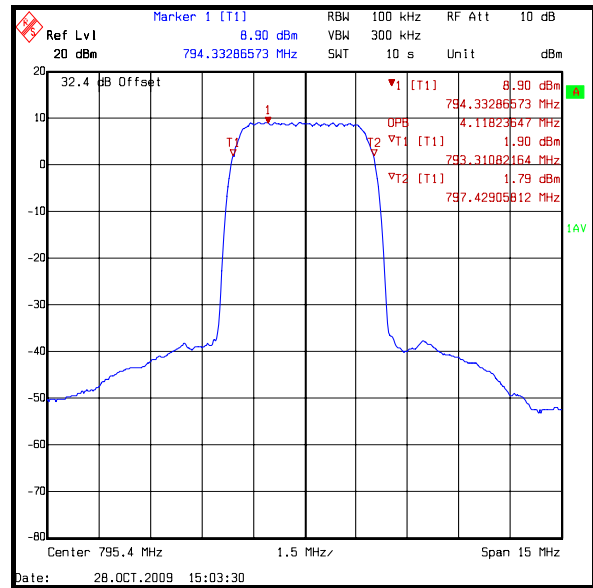
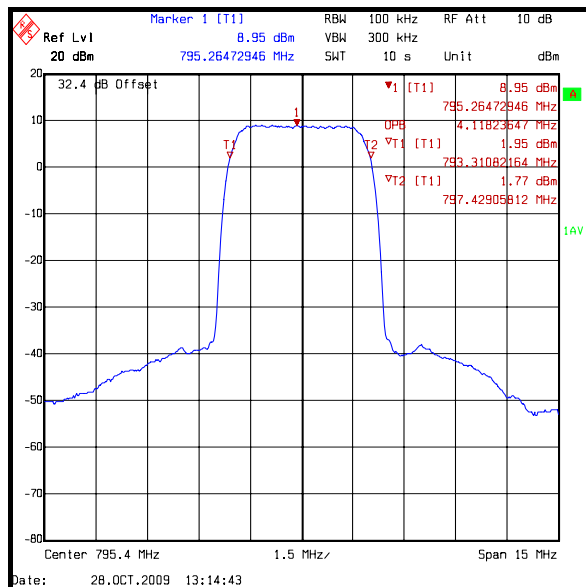
Temperature (°C):	26
Relative Humidity (%):	36

Results:

Modulation	Frequency (MHz)	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Occupied Bandwidth (MHz)
QPSK	795.4	100	300	4.118
16QAM	795.4	100	300	4.118
64QAM	795.4	100	300	4.118

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.

Transmitter Occupied Bandwidth (continued)**QPSK****16QAM****64QAM**

5.2.5. Transmitter Frequency Stability (Temperature Variation)**Test Summary:**

FCC Part:	90.539(c)
Test Method:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC Part 2.1055

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	36

Results:

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin
-30	795.403018	3018	3.79	5.0	1.21
-20	795.402959	2959	3.72	5.0	1.28
-10	795.403006	3006	3.78	5.0	1.22
0	795.402664	2664	3.35	5.0	1.65
10	795.402549	2549	3.20	5.0	1.80
20	795.402630	2630	3.31	5.0	1.69
30	795.402856	2856	3.59	5.0	1.41
40	795.400180	180	0.23	5.0	4.77
50	795.400180	180	0.23	5.0	4.77

5.2.6. Transmitter Frequency Stability (Voltage Variation)**Test Summary:**

FCC Part:	90.539(e)
Test Method:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC Part 2.1055

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	36

Results:

Supply Voltage (V)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin
3.0	795.403733	3733	4.69	5.0	0.31
3.3	795.403822	3822	4.81	5.0	0.19
3.6	795.403820	3820	4.80	5.0	0.20

5.2.7. Transmitter Conducted Emissions Mask

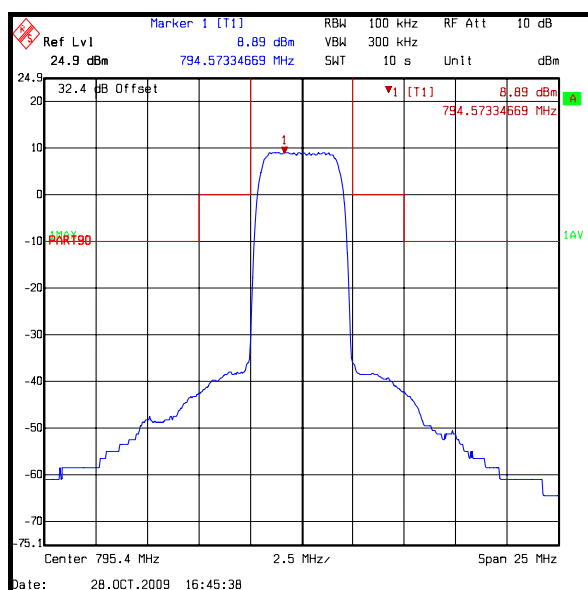
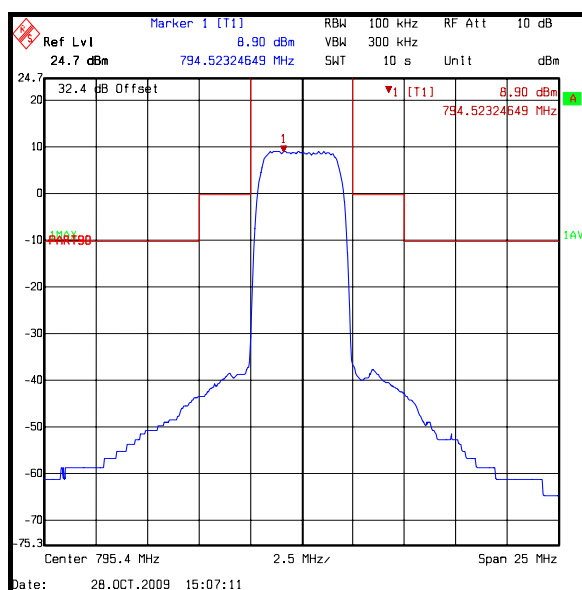
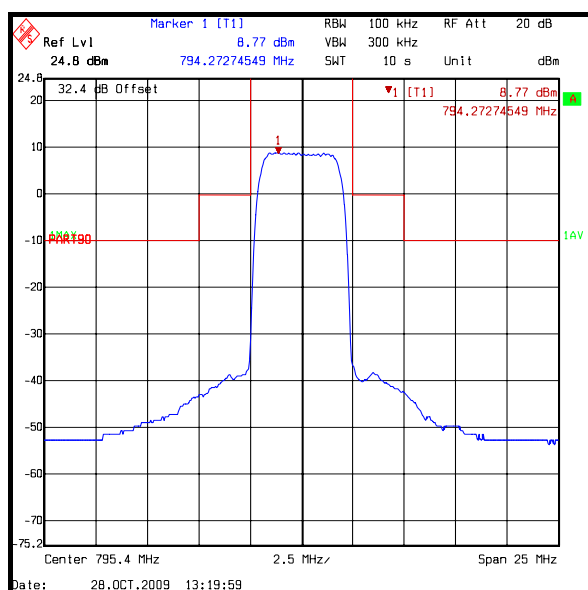
Test Summary:

FCC Part:	90.210(n) referencing Emissions Mask B as specified in 90.210(b)
Test Method Used	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

Results:

**QPSK****16QAM****64QAM**

Transmitter Conducted Emissions Mask (continued)**Note(s):**

1. It was not possible to supply an unmodulated carrier at maximum peak power due to the design of the EUT therefore the mask was relative to the modulated maximum conducted carrier power measured.

5.2.8. Transmitter Conducted Emissions (Out of Band)**Test Summary:**

FCC Part:	90.543(c)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051
Frequency Range:	9 kHz to 12.75 GHz

Environmental Conditions:

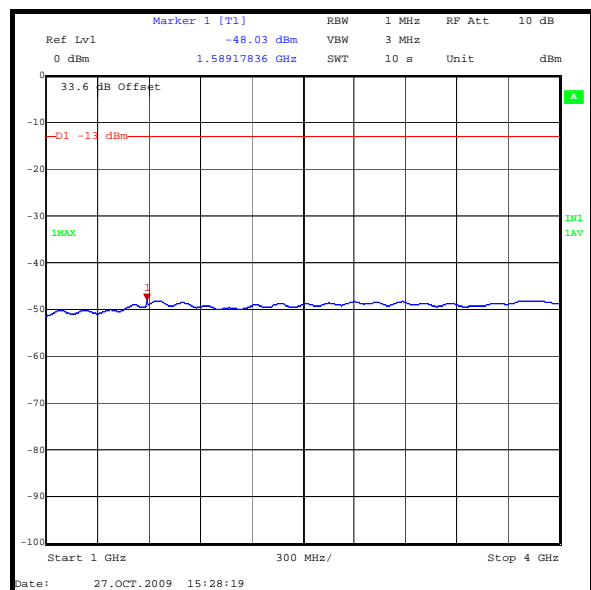
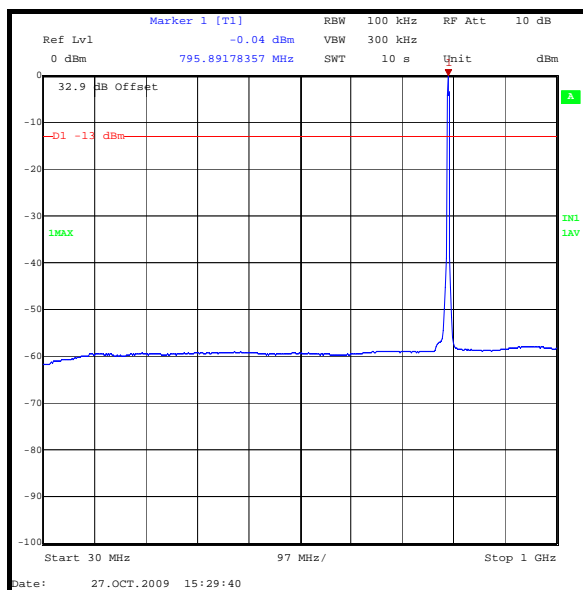
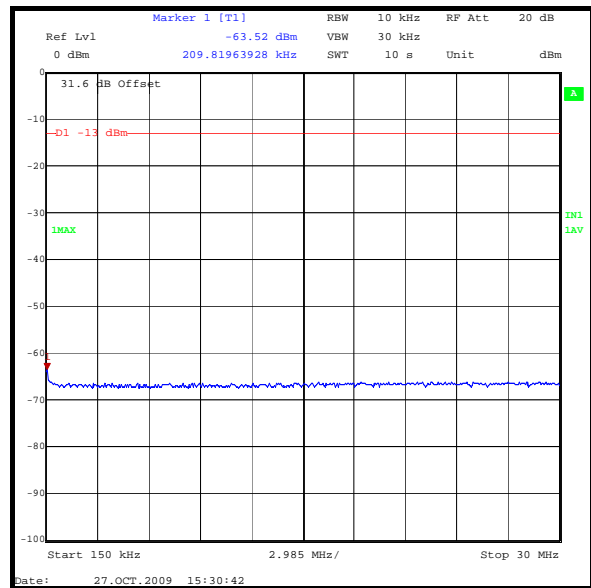
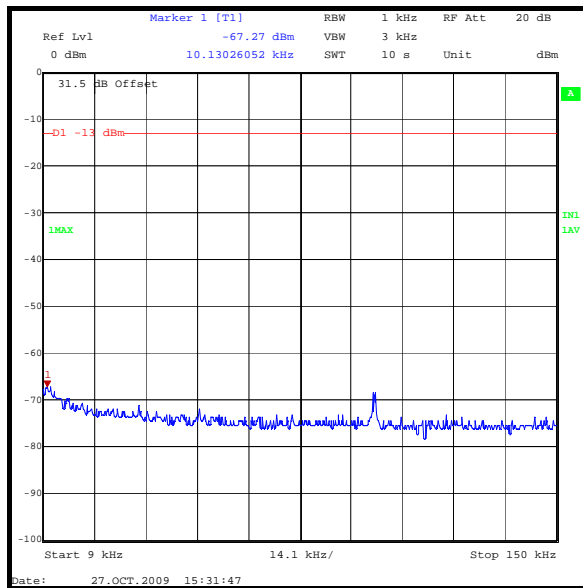
Temperature (°C):	21
Relative Humidity (%):	31

Results:

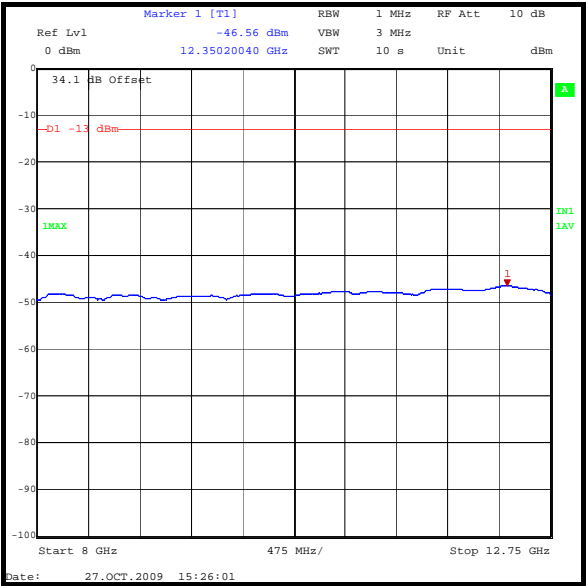
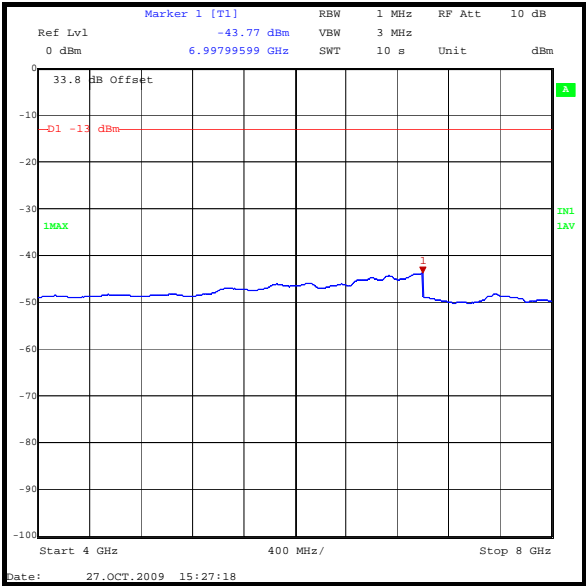
Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
Note 1				

Note(s):

1. There were no emissions within 20 dB of the limit.
2. The emissions shown at approximately 795.892 MHz on the 30 MHz to 1 GHz plot is the carrier

Transmitter Conducted Emissions (Out of Band) (continued)

Transmitter Conducted Emissions (Out of Band) (continued)



5.2.9. Transmitter Band Edge Conducted Emissions**Test Summary:**

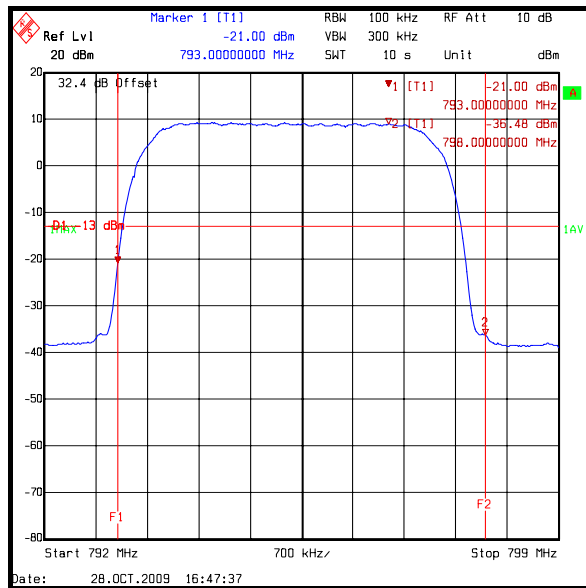
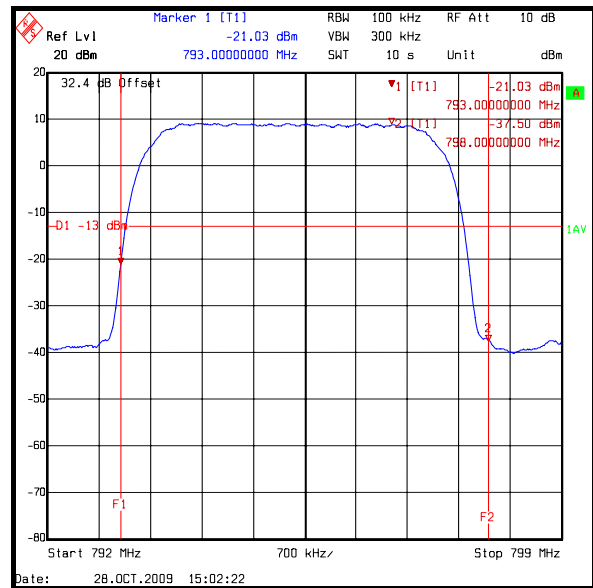
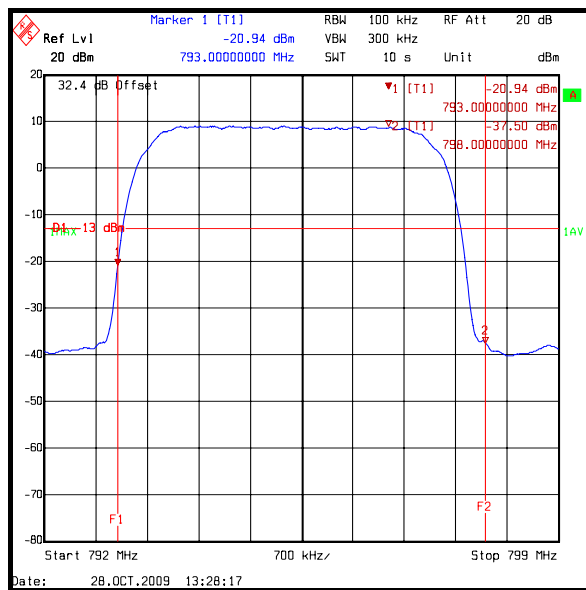
FCC Part:	90.543(c)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

Results:

Modulation	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	793	-21.0	-13.0	8.0	Complied
QPSK	798	-36.5	-13.0	23.5	Complied
16QAM	793	-21.0	-13.0	8.0	Complied
16QAM	798	-37.5	-13.0	24.5	Complied
64QAM	793	-20.9	-13.0	7.9	Complied
64QAM	798	-37.5	-13.0	24.5	Complied

Transmitter Band Edge Conducted Emissions (continued)**QPSK****16QAM****64QAM**

5.2.10. Transmitter Conducted Emissions (769 MHz to 775 MHz and 799 MHz to 805 MHz bands)**Test Summary:**

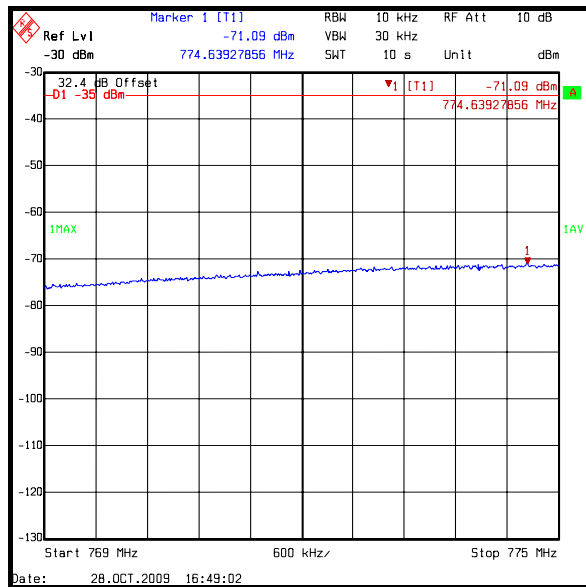
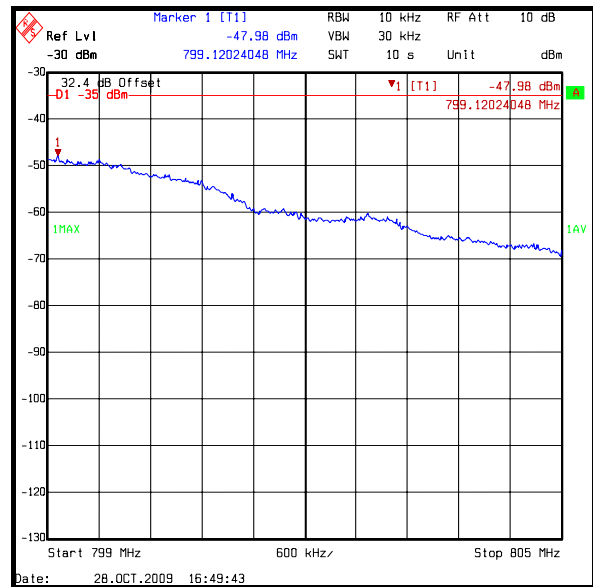
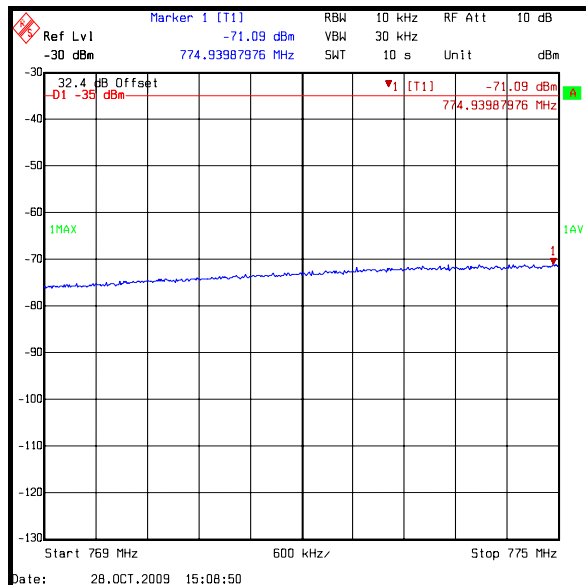
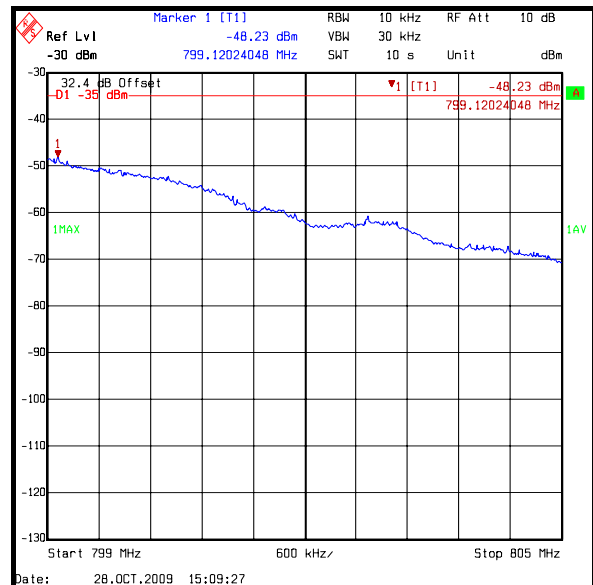
FCC Part:	90.543(e)(2)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051
Frequency Range:	769 MHz to 775 MHz and 799 MHz to 805 MHz

Environmental Conditions:

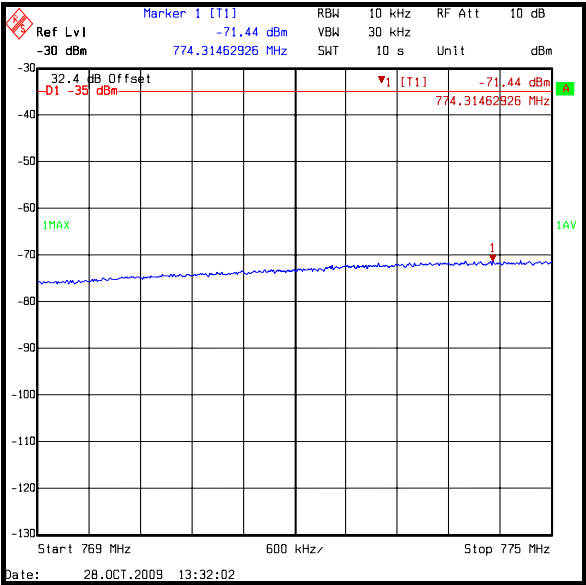
Temperature (°C):	21
Relative Humidity (%):	31

Results:

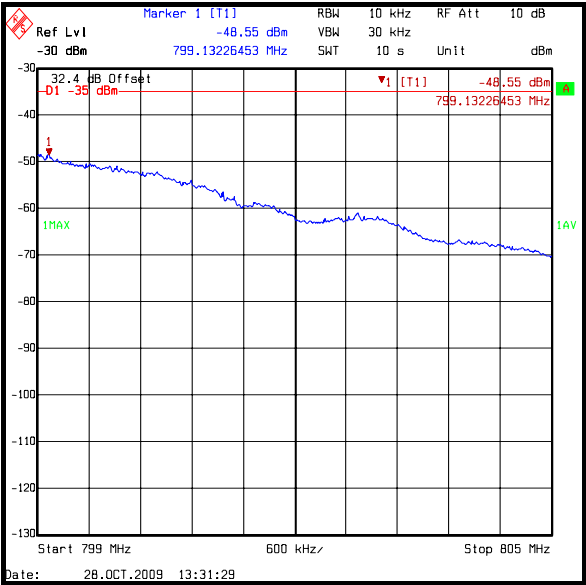
Modulation	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	774.639	-71.1	-35.0	36.1	Complied
QPSK	799.120	-48.0	-35.0	13.0	Complied
16QAM	774.940	-71.1	-35.0	36.1	Complied
16QAM	799.120	-48.2	-35.0	13.2	Complied
64QAM	774.315	-71.4	-35.0	36.4	Complied
64QAM	799.132	-48.6	-35.0	13.6	Complied

**Transmitter Conducted Emissions (769 MHz to 775 MHz and 799 MHz to 805 MHz bands)
(continued)****QPSK****QPSK****16QAM****16QAM**

**Transmitter Conducted Emissions (769 MHz to 775 MHz and 799 MHz to 805 MHz bands)
(continued)**



64QAM



64QAM

5.2.11. Transmitter Conducted Emissions (1559 MHz to 1610 MHz band)**Test Summary:**

FCC Part:	90.543(f)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051
Frequency Range:	1559 MHz to 1610 MHz

Environmental Conditions:

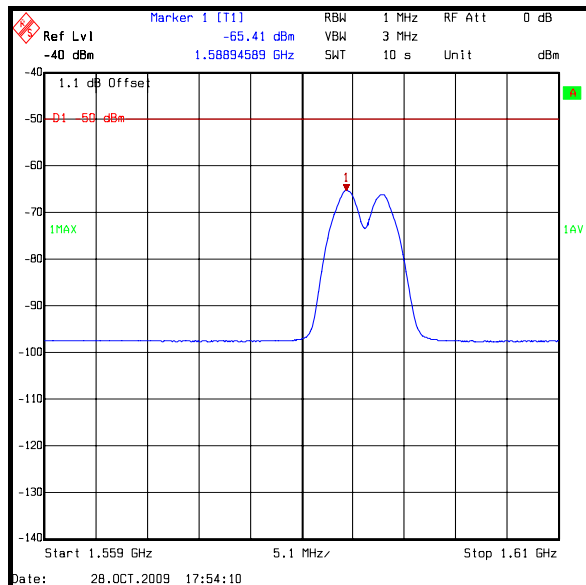
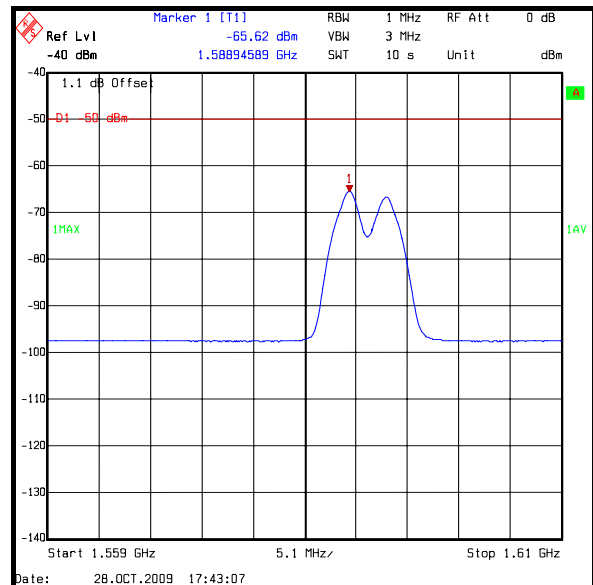
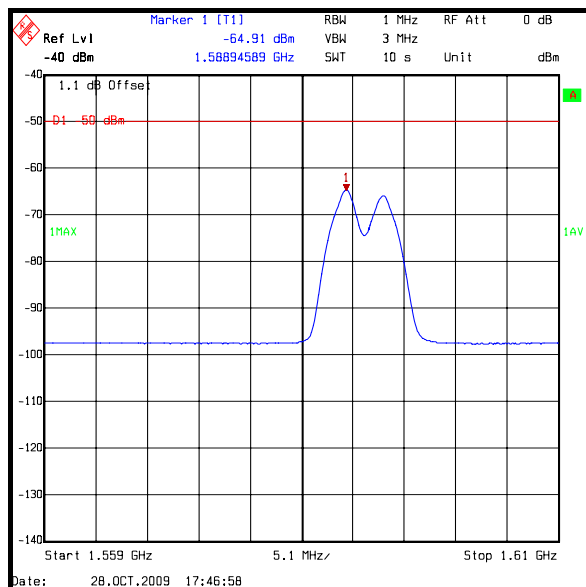
Temperature (°C):	21
Relative Humidity (%):	31

Results:

Modulation	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	1588.91884	-65.7	-50.0	15.5	Complied
16QAM	1588.95992	-65.6	-50.0	15.6	Complied
64QAM	1588.96092	-65.4	-50.0	15.4	Complied

Note(s):

1. -80 dBW/MHz \equiv -50 dBm in a 1 MHz measurement bandwidth

Transmitter Conducted Emissions (1559 MHz to 1610 MHz band) (continued)**QPSK****16QAM****64QAM**

5.2.12. Transmitter Radiated Emissions Mask

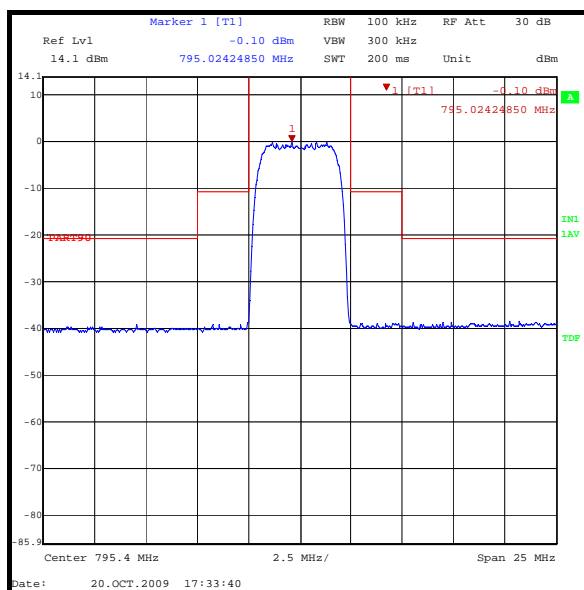
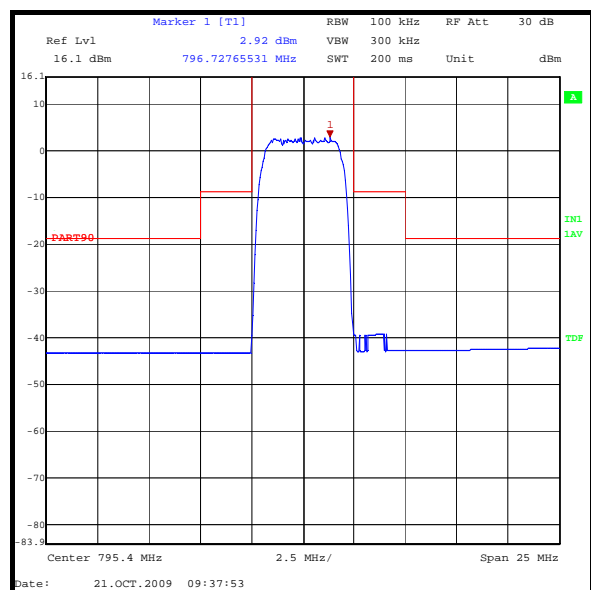
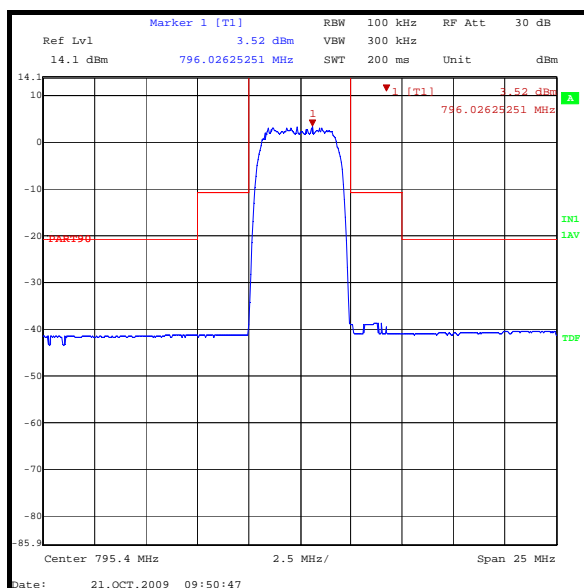
Test Summary:

FCC Part:	90.210(n) referencing Emissions Mask B as specified in 90.210(b)
Test Method Used	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

Results:

**QPSK****16QAM**

5.2.13. Transmitter Radiated Emissions (Out of Band)**Test Summary:**

FCC Part:	90.543(c)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12. referencing FCC Part 2.1053
Frequency Range:	30 MHz to 12.75 GHz

Environmental Conditions:

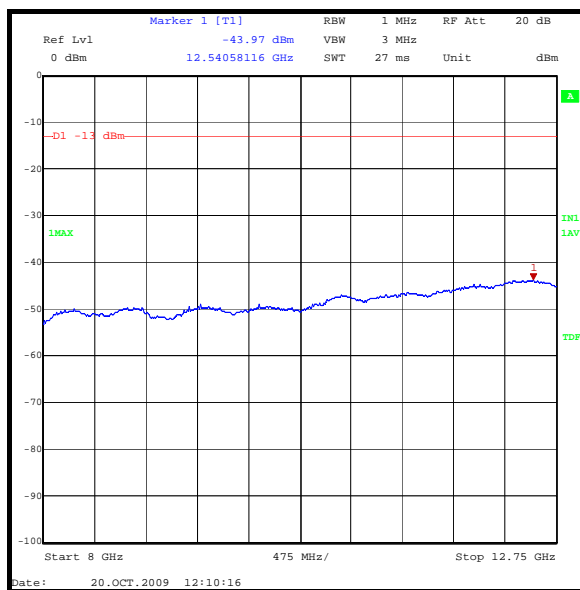
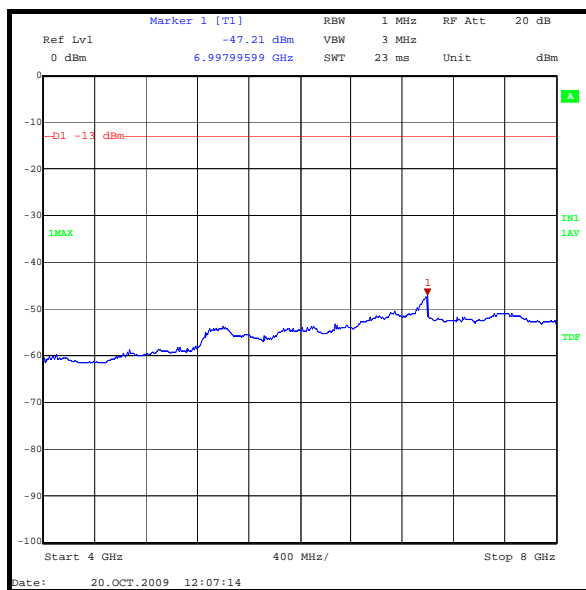
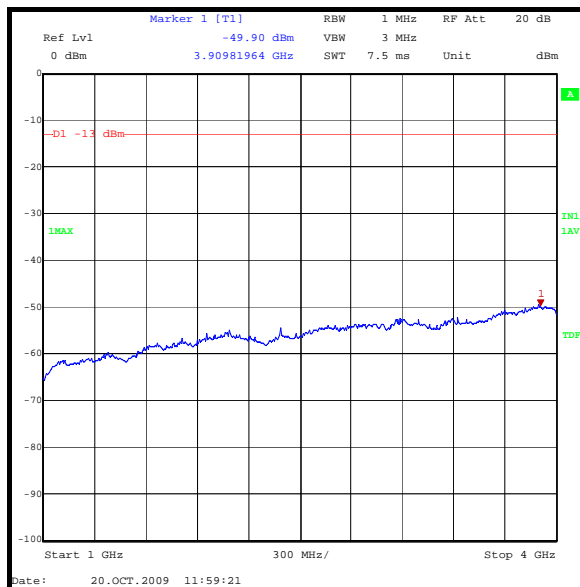
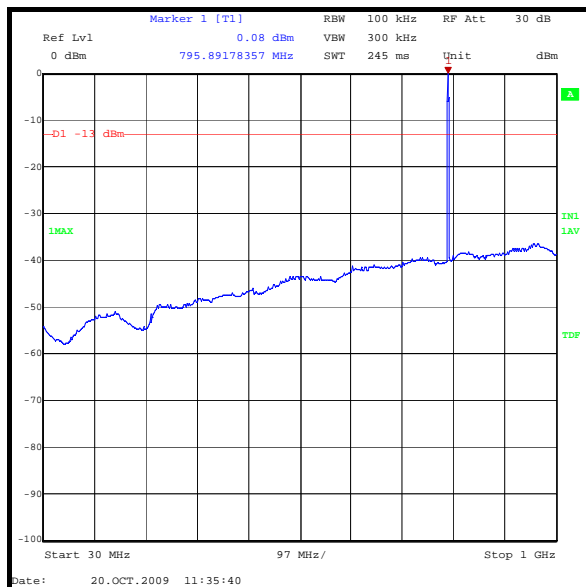
Temperature (°C):	21
Relative Humidity (%):	31

Results:

Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
Note 1				

Note(s):

1. There were no emissions within 20 dB of the limit.
2. The emissions shown at approximately 795.892 MHz on the 30 MHz to 1 GHz plot is the carrier

Transmitter Radiated Emissions (Out of Band) (continued)

5.2.14. Transmitter Band Edge Radiated Emissions**Test Summary:**

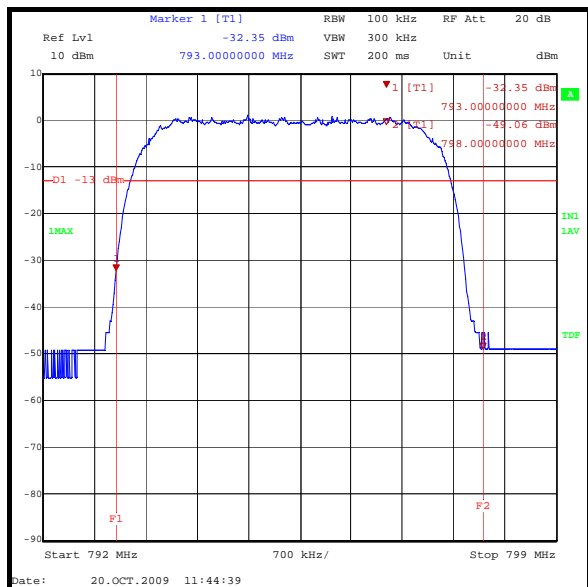
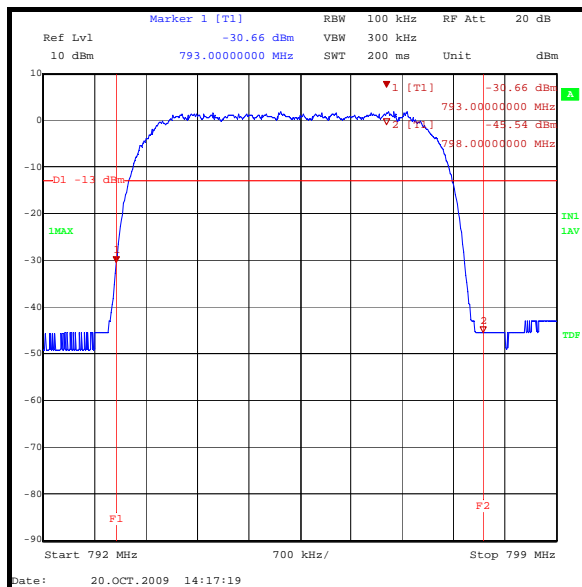
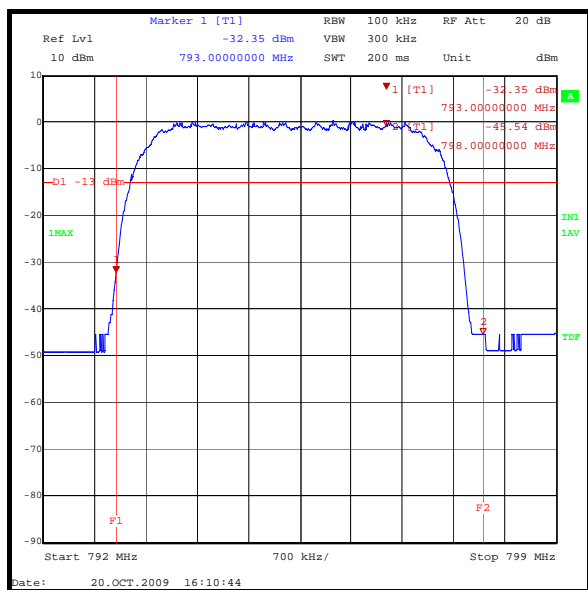
FCC Part:	90.543(c)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12. referencing FCC Part 2.1053

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

Results:

Modulation	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	793	-32.4	-13.0	19.4	Complied
QPSK	798	-49.1	-13.0	36.1	Complied
16QAM	793	-30.7	-13.0	17.7	Complied
16QAM	798	-45.5	-13.0	32.5	Complied
64QAM	793	-32.4	-13.0	19.4	Complied
64QAM	798	-45.5	-13.0	32.5	Complied

Transmitter Radiated Spurious Emissions at Band Edges (continued)**QPSK****16QAM****64QAM**

5.2.15. Transmitter Radiated Emissions (769 MHz to 775 MHz and 799 MHz to 805 MHz bands)**Test Summary:**

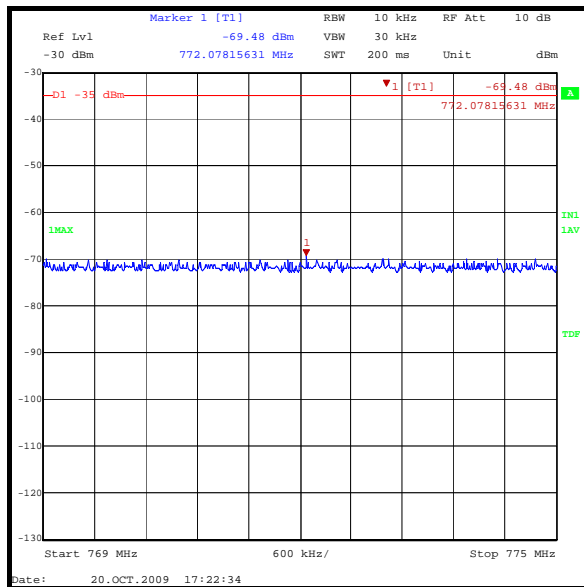
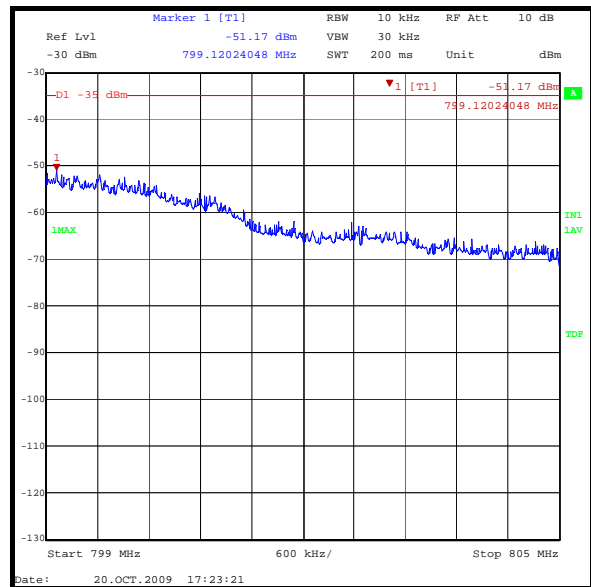
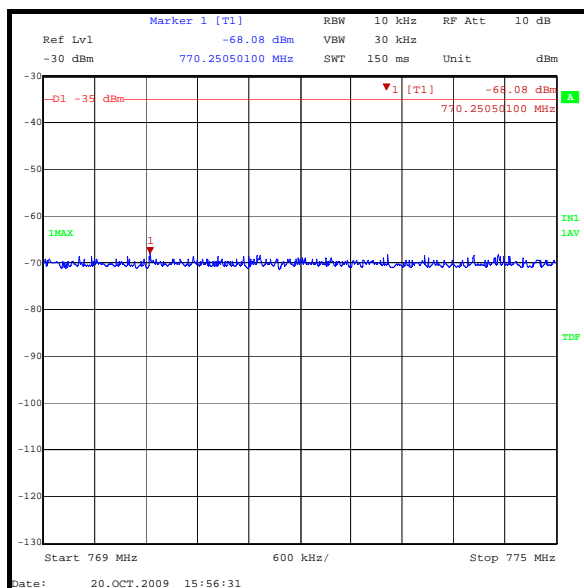
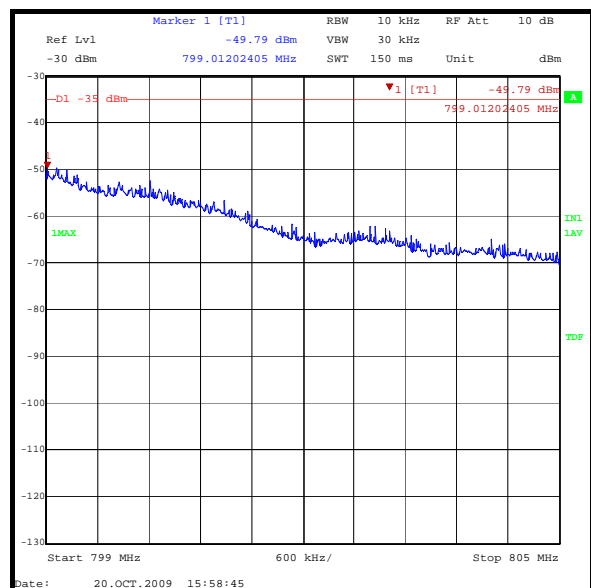
FCC Part:	90.543(e)(2)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC Part 2.1051
Frequency Range:	769 MHz to 775 MHz and 799 MHz to 805 MHz

Environmental Conditions:

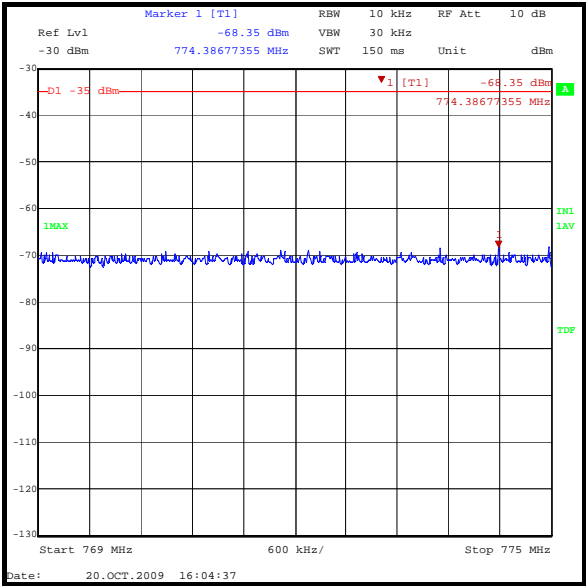
Temperature (°C):	21
Relative Humidity (%):	31

Results:

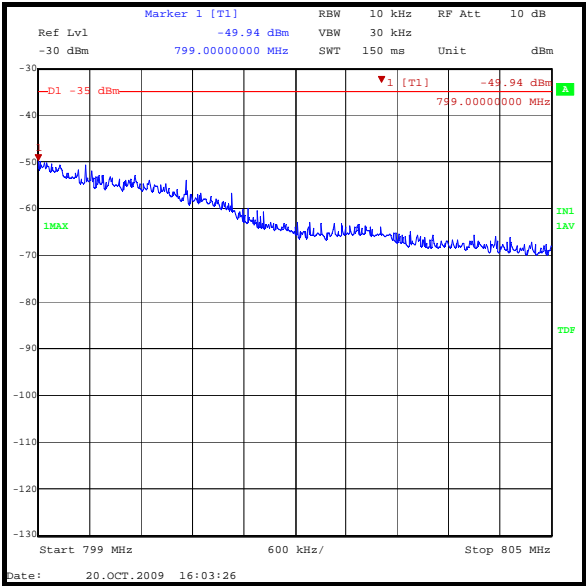
Modulation	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	772.078	-69.5	-35.0	34.5	Complied
QPSK	799.120	-51.2	-35.0	16.2	Complied
16QAM	770.251	-68.1	-35.0	33.1	Complied
16QAM	799.012	-49.8	-35.0	14.8	Complied
64QAM	774.387	-68.4	-35.0	33.4	Complied
64QAM	799.000	-49.9	-35.0	14.9	Complied

Transmitter Radiated Emissions (769 MHz to 775 MHz and 799 MHz to 805 MHz bands)
(continued)**QPSK****QPSK****16QAM****16QAM**

Transmitter Radiated Emission Limitations (continued)



64QAM



64QAM

5.2.16. Transmitter Radiated Emissions (1559 MHz to 1610 MHz band)**Test Summary:**

FCC Part:	90.543(f)
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12. referencing FCC Part 2.1053
Frequency Ranges:	1559 MHz to 1610 MHz

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	31

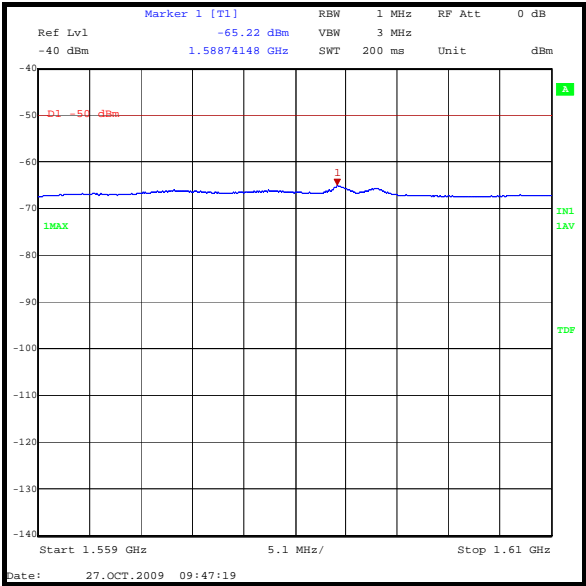
Results:

Modulation	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
QPSK	1588.91884	-65.7	-50.0	15.7	Complied
16QAM	1588.95992	-65.6	-50.0	15.6	Complied
64QAM	1588.96092	-65.4	-50.0	15.4	Complied

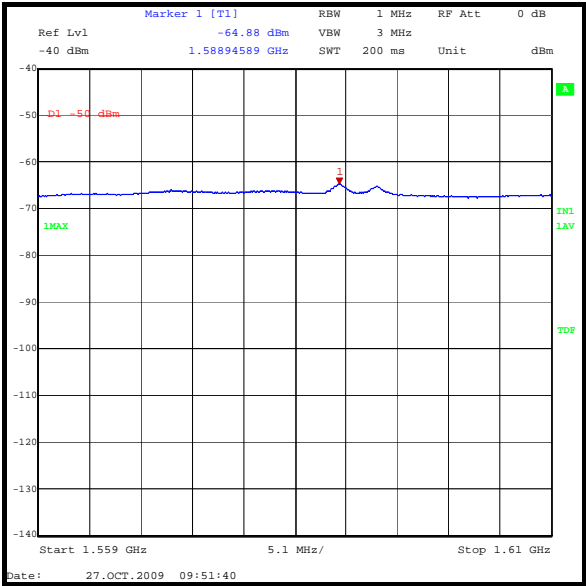
Note(s):

1. -80 dBW/MHz \equiv -50 dBm in a 1 MHz measurement bandwidth

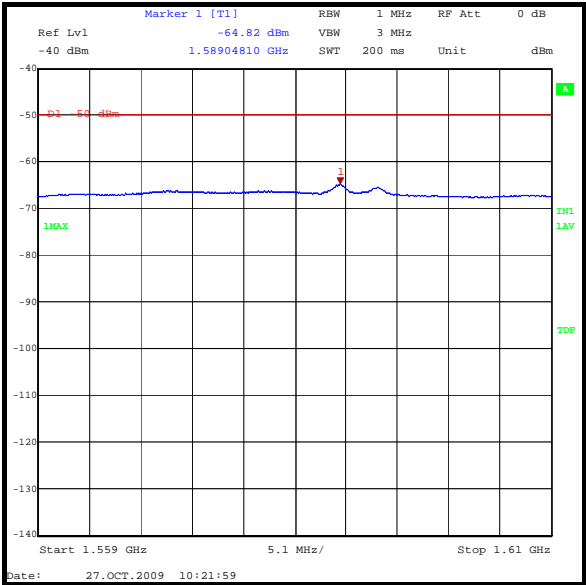
Transmitter Radiated Emissions (1559 MHz to 1610 MHz band) (continued)



QPSK



16QAM



64QAM

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	Confidence Level (%)	Calculated Uncertainty
Maximum Output Power	95%	±0.27 dB
Occupied Bandwidth	95%	±0.92 ppm
Frequency Stability	95%	±0.92 ppm
Conducted Emissions - Antenna Port	95%	±2.62 dB
Radiated Emissions	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)
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A288	Antenna	Chase	CBL6111A	1589	13 Mar 2009	12
A390	Attenuator	Suhner	6830.17.B	None	Calibrated before use	-
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
M1068	Thermometer	Iso-Tech	RS55	93102884	09 Jul 2009	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M1223	Environmental Chamber	Votsch	VT4002	58566072720 010	Calibrated before use	-
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	09 Mar 2009	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	21 Aug 2009	12
M1347	Digital Multimeter	Fluke	73III	90680080	23 Jun 2009	-
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	14 May 2009	12
S021	DC Power Supply	Thurlby Thandar	CPX200	061034	Calibrated before use	-

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