TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: eqo

To: FCC Part 15.249: 2009 Subpart C

Test Report Serial No:
RFI-RPT-RP77750JD01B V2.0

Version 2.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director: 	
Checked By:	Nigel Davison
Signature:	
Date of Issue:	20 May 2010

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1. Customer Information

Company Name:	Smiths Detection Ireland Ltd
Address:	Link Road Ballincollig Co. Cork Ireland

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.249
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2009: Part 15 Subpart C (Radio Frequency Devices) - Section 15.249
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	06 May 2010 to 07 May 2010

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
FCC 15.107	Idle Mode AC Conducted Emissions	✓
FCC 15.109	Idle Mode Radiated Spurious Emissions	✓
FCC 15.207	Transmitter Mode AC Conducted Emissions	✓
FCC 15.249(a)	Transmitter Fundamental Field Strength	✓
FCC 2.1049	Transmitter 20 dB Bandwidth	✓
FCC 15.249(a)(d)(e) & 15.209	Transmitter Radiated Spurious Emissions	✓
FCC 15.249(d) & 15.209	Transmitter Band Edge Radiated Emissions	✓

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.

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:	eqo
Model Name or Number:	eqo
Serial Number:	82471
Hardware Version Number:	None Stated
Software Version Number:	None Stated
FCC ID Number:	XM7-SD-E0002

3.2. Description of EUT

The equipment under test was a full body scanner used for security screening to detect weapons, explosive, or contraband hidden under clothing using millimetre-wave technology.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Category of Equipment:	Short Range Device (SRD)		
Type of Equipment	Transceiver		
Intended Operating Environment:	Commercial		
Modulation Type:	Continuous Wave (CW)		
Duty Cycle	100%		
Channel Spacing:	40 MHz		
Antenna Connection Type:	Integral		
Power Supply Requirement:	120VAC Nominal		
Transmit Frequency Range:	24.00 GHz to 24.25 GHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (GHz)**
	Bottom	1	24.080
	Middle	3	24.160
	Top	5	24.240
Receive Frequency Range:	24.00 GHz to 24.25 GHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (GHz)**
	Bottom	1	24.080
	Middle	3	24.160
	Top	5	24.240

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Continuous transmit at maximum output power at bottom, middle, top as required.
- Idle mode

4.2. Configuration and Peripherals

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

- For all tests, the EUT was tested standalone. A test mode was enabled on the EUT to allow continuous transmissions or continuous idle mode.

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 AC Conducted Spurious Emissions

Test Summary:

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.4 Section 7 and relevant annexes

Environmental Conditions:

Temperature Range (°C):	22
Relative Humidity Range (%):	31

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
See Note Below					

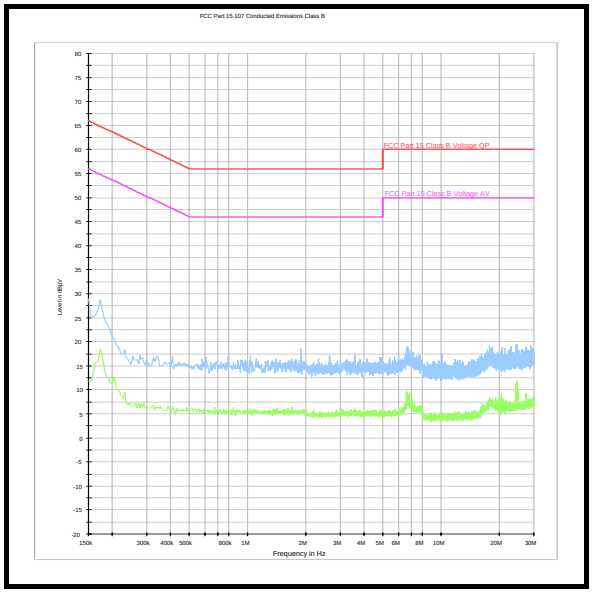
Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
See Note Below					

Note(s):

1. All emissions were investigated and found to be at least 20 dB below the specified limit.

Idle Mode AC Conducted Spurious Emissions (continued)



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

5.2.2. 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

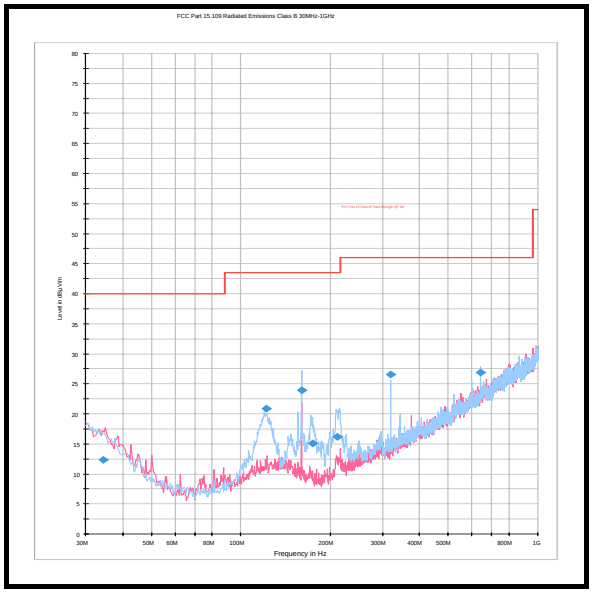
Environmental Conditions:

Temperature Range (°C):	23
Relative Humidity Range (%):	31

Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
160.003	Horizontal	23.9	43.5	19.6	Complied
320.009	Horizontal	26.6	46.0	19.4	Complied
640.001	Horizontal	26.9	46.0	19.1	Complied

Idle Mode Radiated Spurious Emissions (continued)



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

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 40 GHz

Environmental Conditions:

Temperature Range (°C):	24
Relative Humidity Range (%):	25

Results: Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
25984.880	Horizontal	64.7	80.0	15.3	Complied

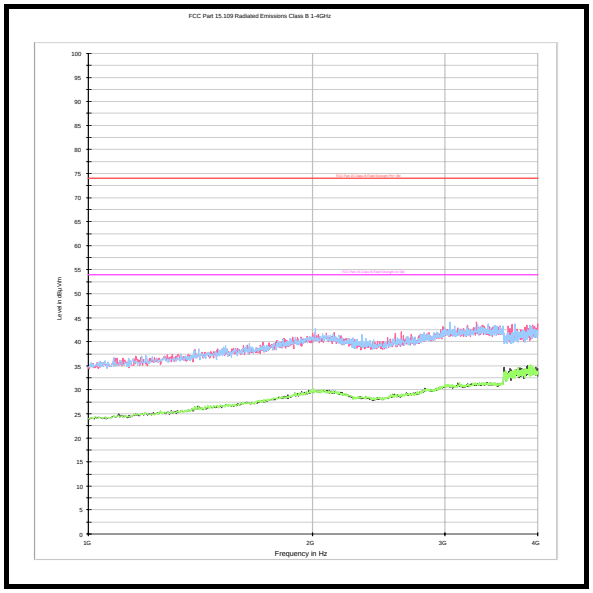
Results: Average

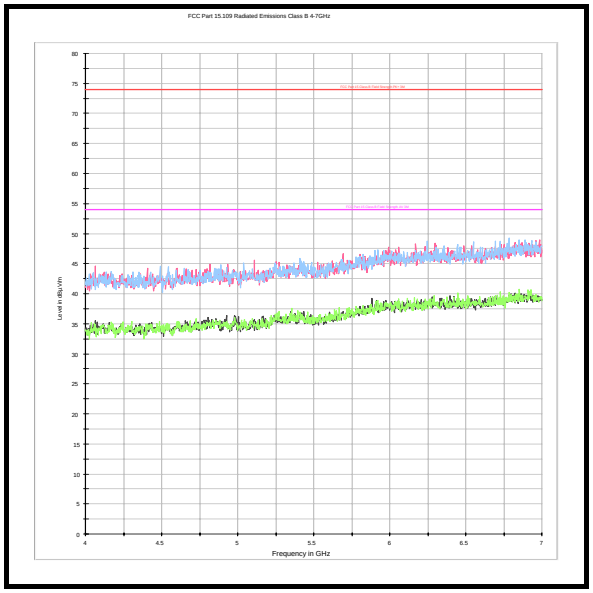
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
25984.880	Horizontal	56.4	60.0	3.6	Complied

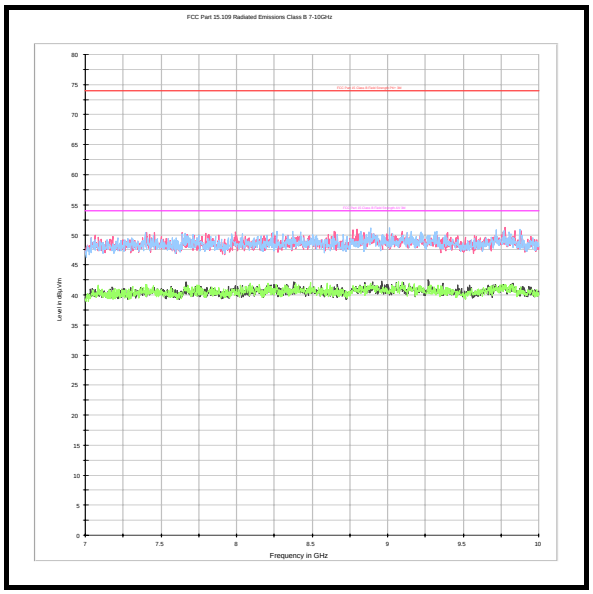
Note(s):

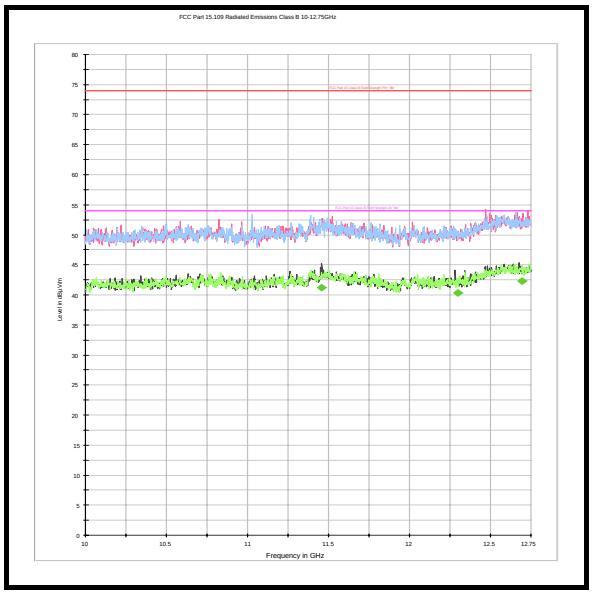
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.
2. Pre-scans for measurements made in the range of 12.75 GHz to 26.5 GHz were performed at 1.5 meter measurement distance instead of 3 meters. The limit has been corrected for measurements at this frequency range.

Idle Mode Radiated Spurious Emissions (continued)



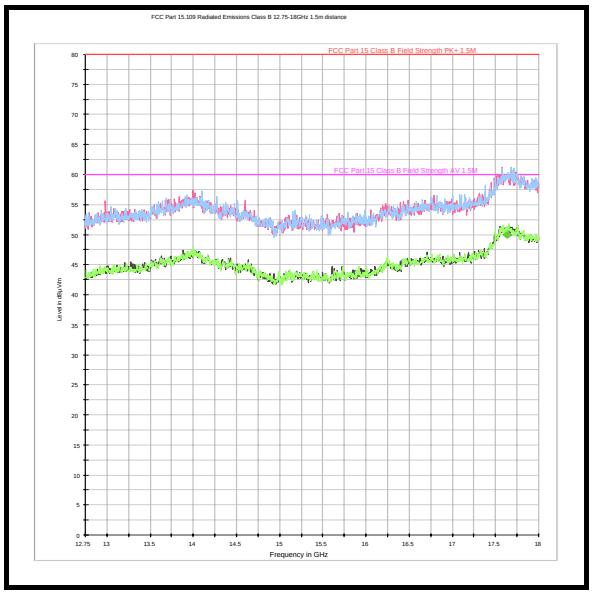


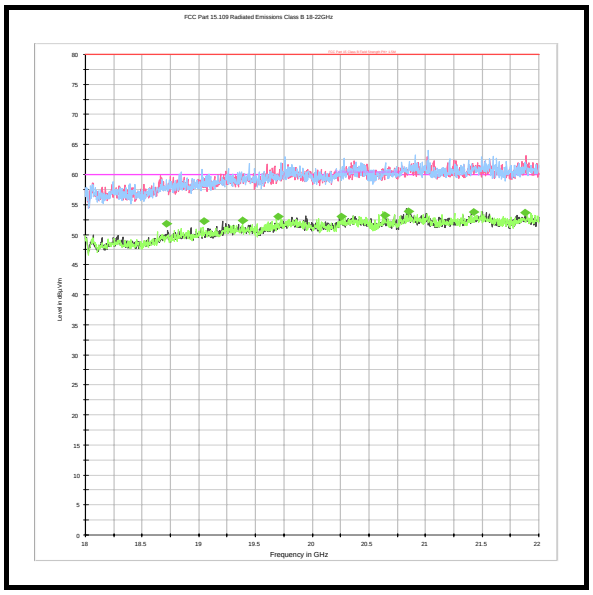


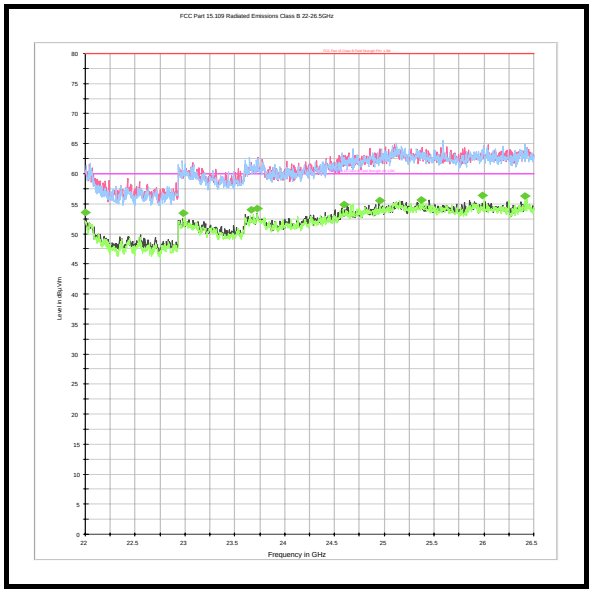


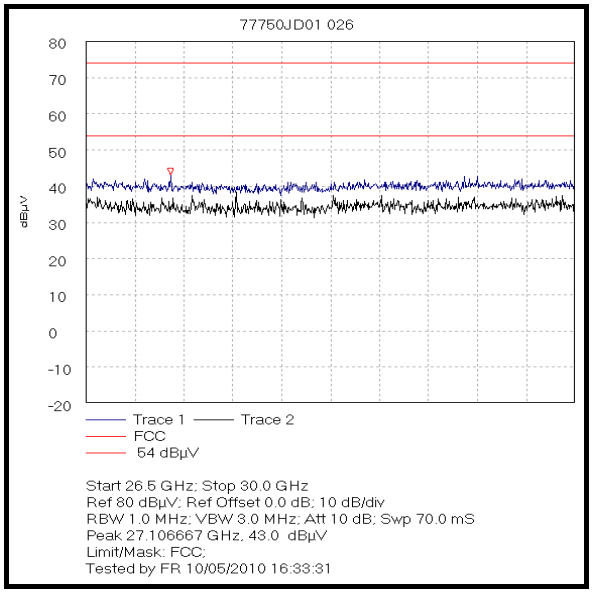
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Idle Mode Radiated Spurious Emissions (continued)



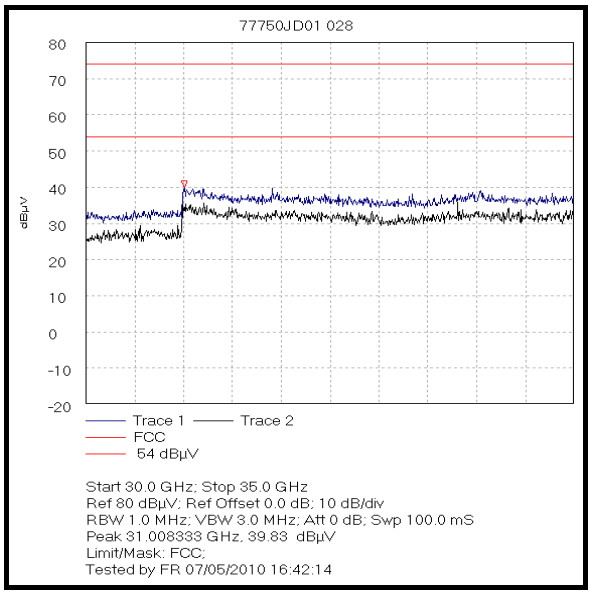


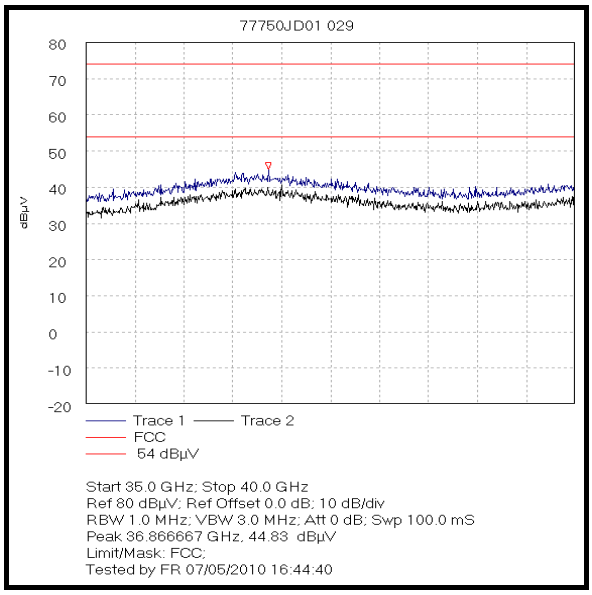




Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Idle Mode Radiated Spurious Emissions (continued)





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

5.2.3. Transmitter Mode AC Conducted Spurious Emissions

Test Summary:

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

Environmental Conditions:

Temperature Range (°C):	22
Relative Humidity Range (%):	31

Results: Quasi Peak Detector Measurements

Frequency (MHz)	Line	Quasi Peak Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
See Note Below					

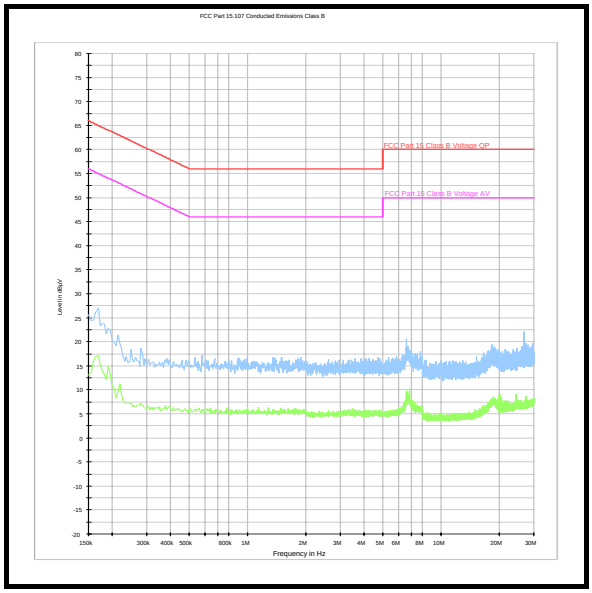
Results: Average Detector Measurements

Frequency (MHz)	Line	Average Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
See Note Below					

Note(s):

1. All emissions were investigated and found to be at least 20 dB below the specified limit.

Transmitter Mode AC Conducted Spurious Emissions (continued)



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

5.2.4. Transmitter Fundamental Field Strength

Test Summary:

FCC Part:	Section 15.249(a)
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes.

Environmental Conditions:

Temperature Range (°C):	24
Relative Humidity Range (%):	25

Results: Peak Level

Channel	Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
Bottom	24080	Horizontal	102.4	128.0	25.6	Complied
Middle	24160	Horizontal	103.3	128.0	24.7	Complied
Top	24240	Horizontal	100.7	128.0	27.3	Complied

Results: Average Level

Channel	Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
Bottom	24080	Horizontal	103.3	108.0	4.7	Complied
Middle	24160	Horizontal	103.0	108.0	5.0	Complied
Top	24240	Horizontal	100.8	108.0	7.2	Complied

5.2.5. Transmitter 20 dB Bandwidth

Test Summary:

FCC Part:	2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.1.7 and relevant annexes

Environmental Conditions:

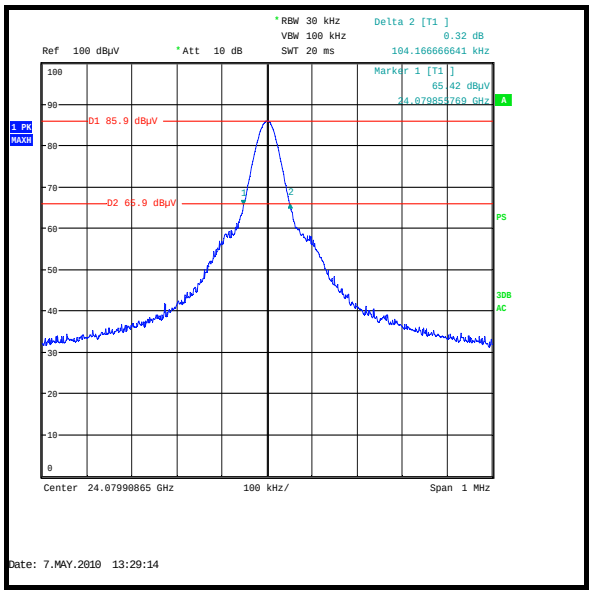
Temperature (°C):	24
Relative Humidity (%):	25

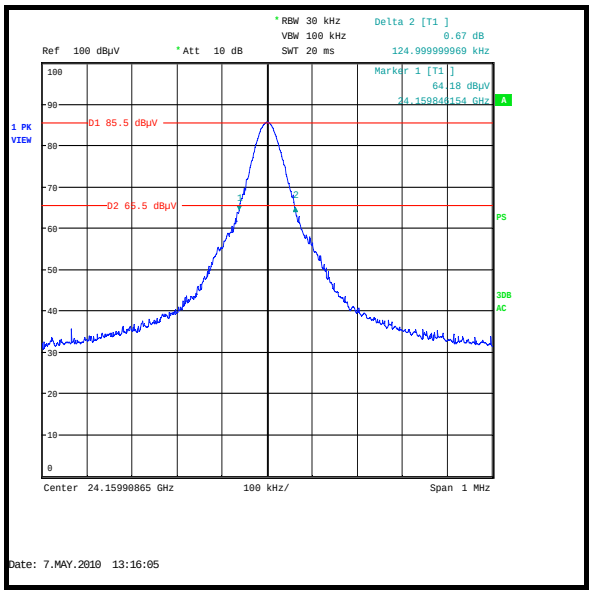
Results:

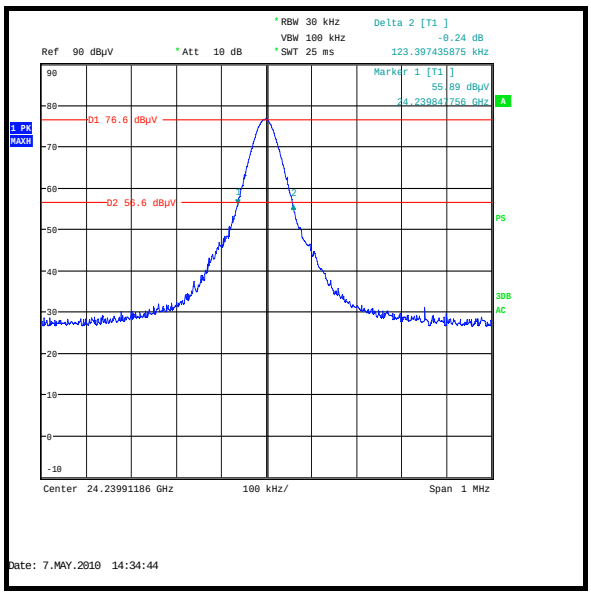
Channel	20 dB Bandwidth (MHz)
Bottom	0.104
Middle	0.125
Top	0.123

Designated Frequency Band	
Band (MHz)	**Bandwidth (MHz)**
24000 to 242500	2500.0

Transmitter 20 dB Bandwidth (continued)







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

5.2.6. Transmitter Radiated Spurious Emissions

Test Summary:

FCC Part:	15.249(a)(d)(e) & 15.209
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):	24
Relative Humidity (%):	25

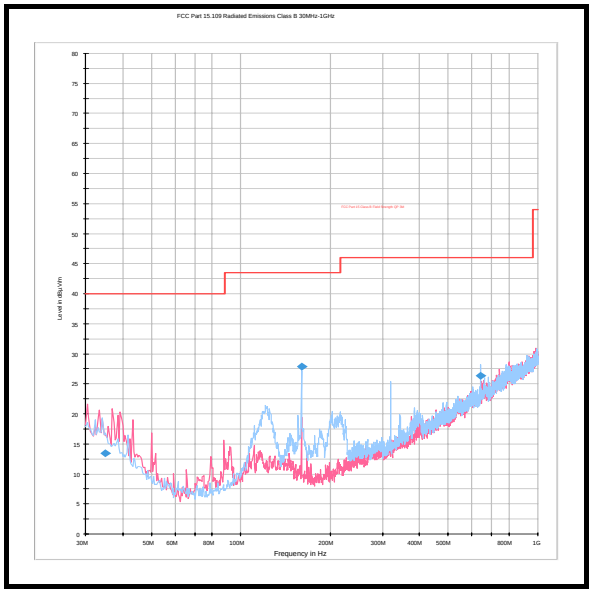
Results:

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
159.999	Horizontal	27.9	43.5	15.6	Complied
639.990	Horizontal	26.4	46.0	19.6	Complied

Note(s):

1. FCC Part 15.209 general limits are shown on the pre-scan plots.

Transmitter Radiated Spurious Emissions (continued)



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

Transmitter Radiated Spurious Emissions (continued)

Test Summary:

FCC Part:	15.249(a)(d)(e) & 15.209
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes
Frequency Range:	1 GHz to 100 GHz

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	25

Results: Peak Level

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
21298.496	Vertical	61.0	80.0	19.0	Complied

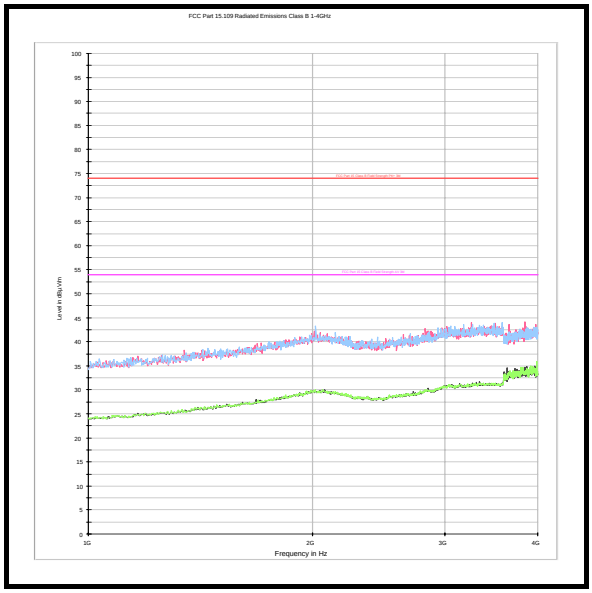
Results: Average Level

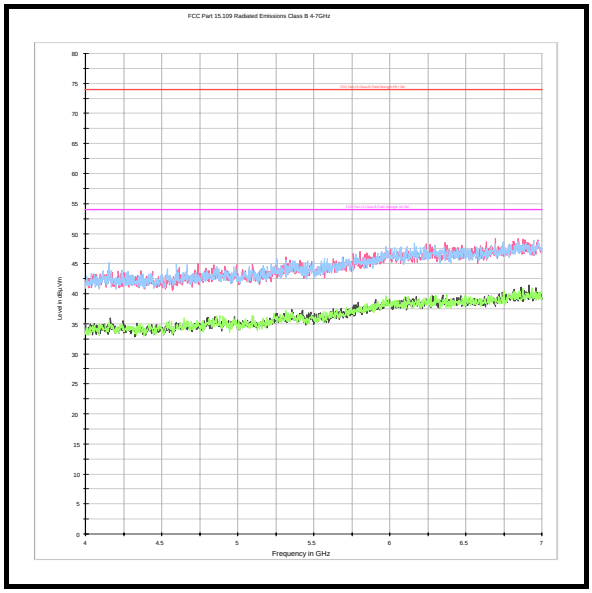
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
21298.496	Vertical	52.5	60.0	7.5	Complied

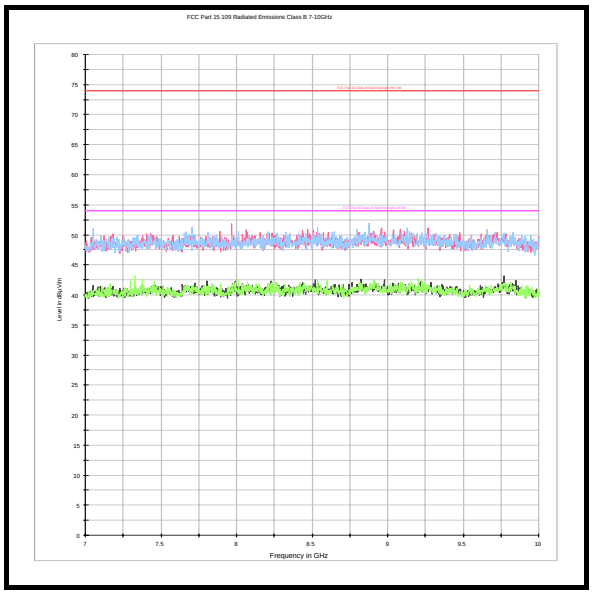
Note(s):

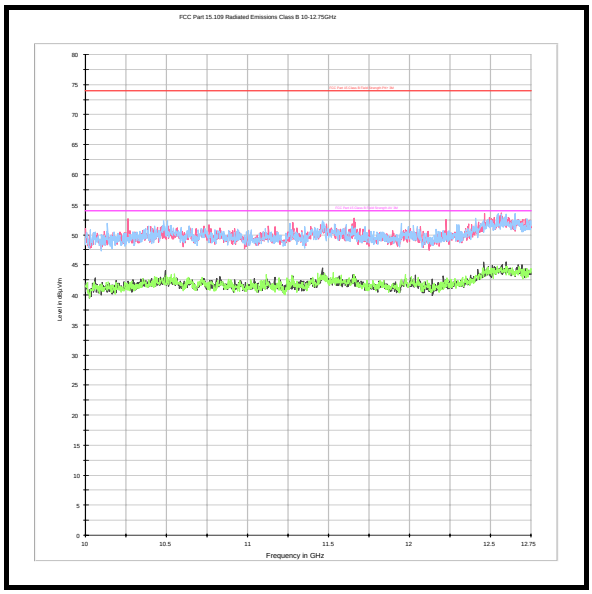
1. FCC Part 15.209 general limits are shown on the pre-scan plots.
2. Pre-scans for measurements made in the range of 12.75 GHz to 26.5 GHz were performed at 1.5 meter test distance instead of 3 meters. Therefore the limits have been corrected for measurements at this frequency range.
3. Emission shown at approximately 24.239 GHz on the 22 GHz to 26.5 GHz plot is the carrier.

Transmitter Radiated Spurious Emissions (continued)



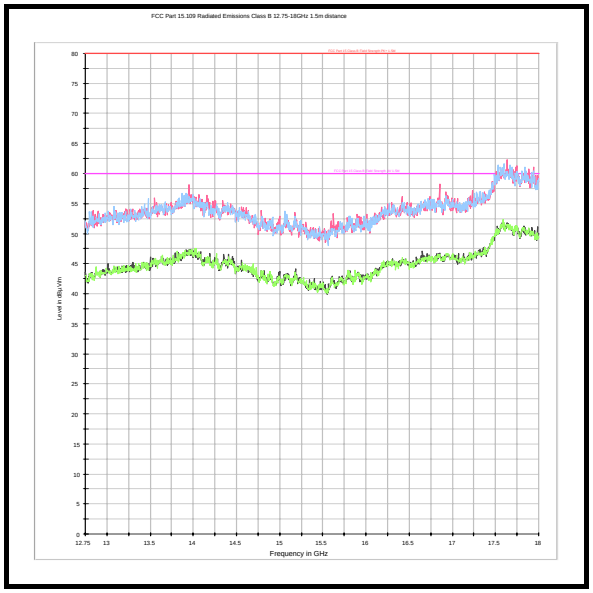


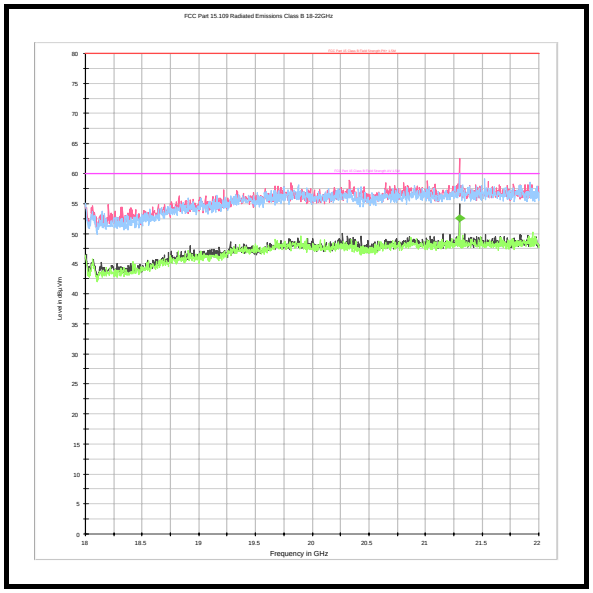


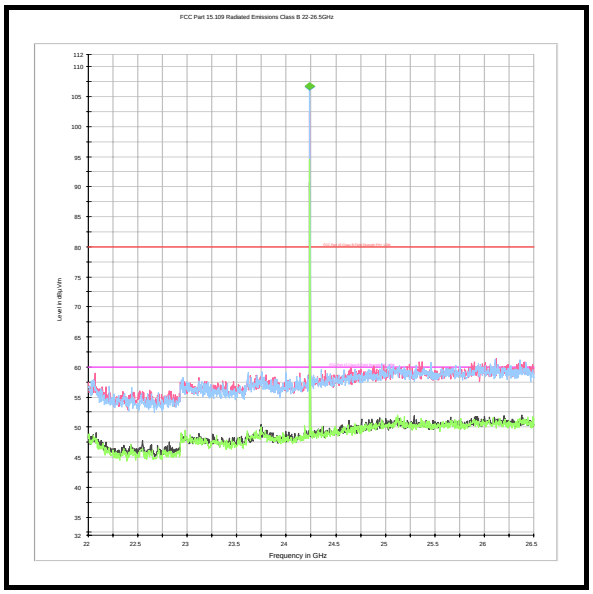


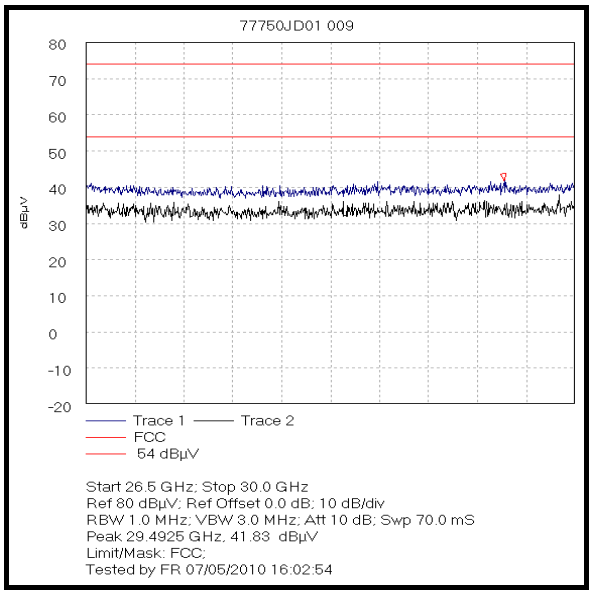
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Spurious Emissions (continued)



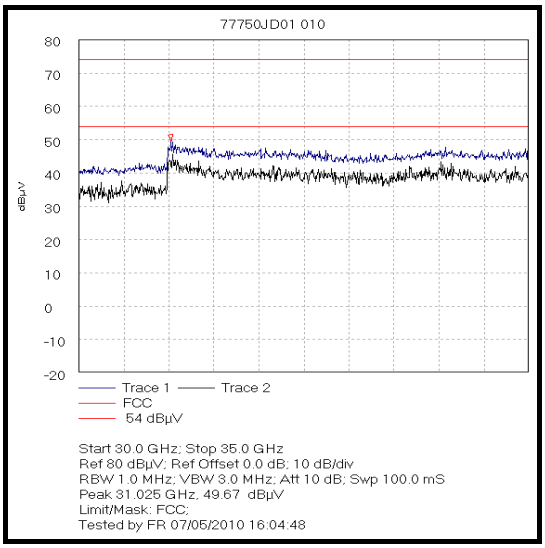


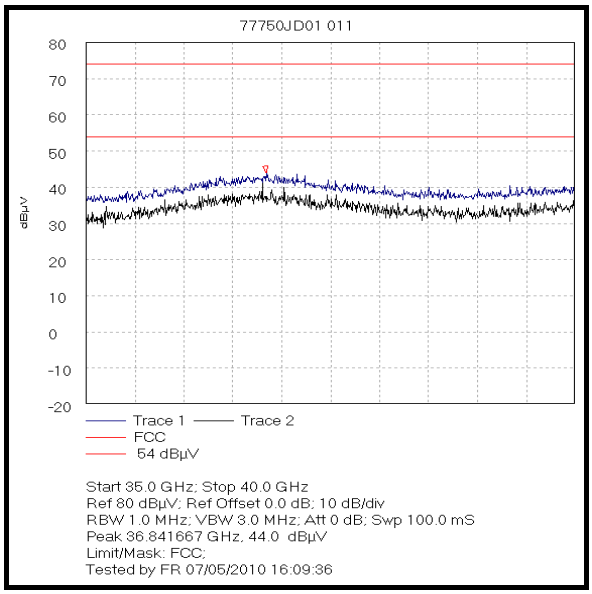


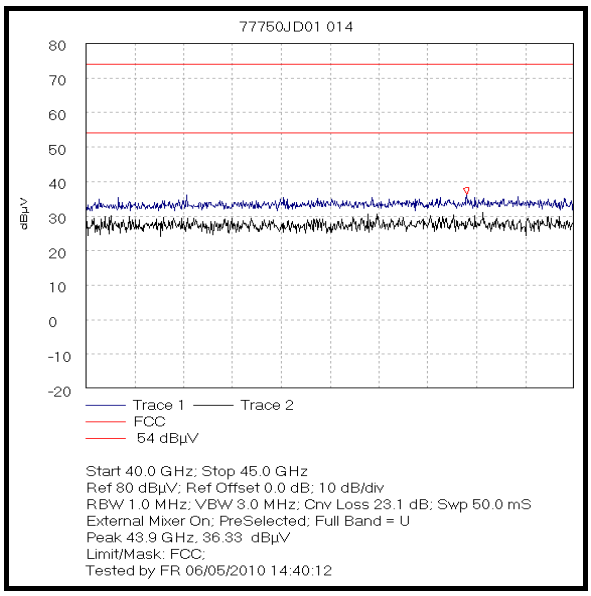


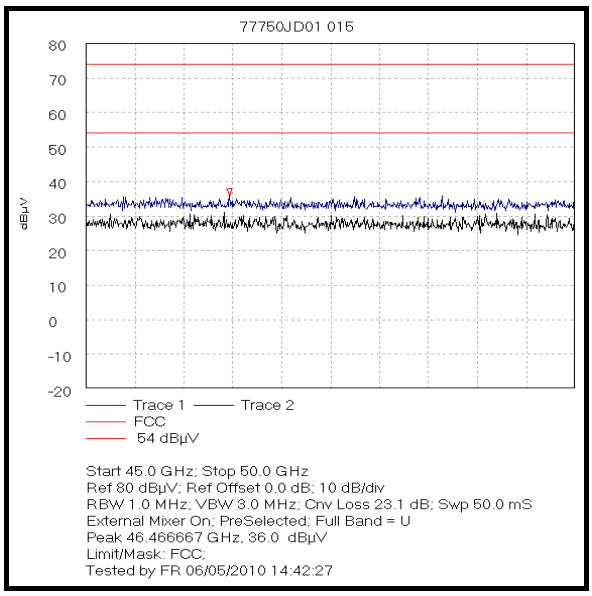
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Spurious Emissions (continued)



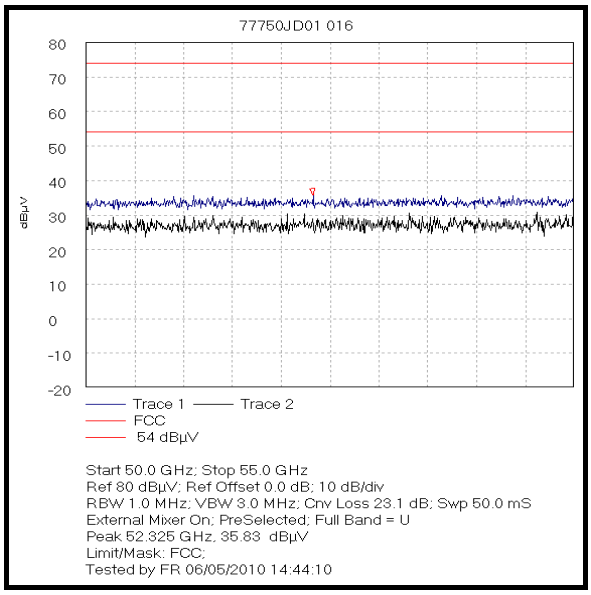


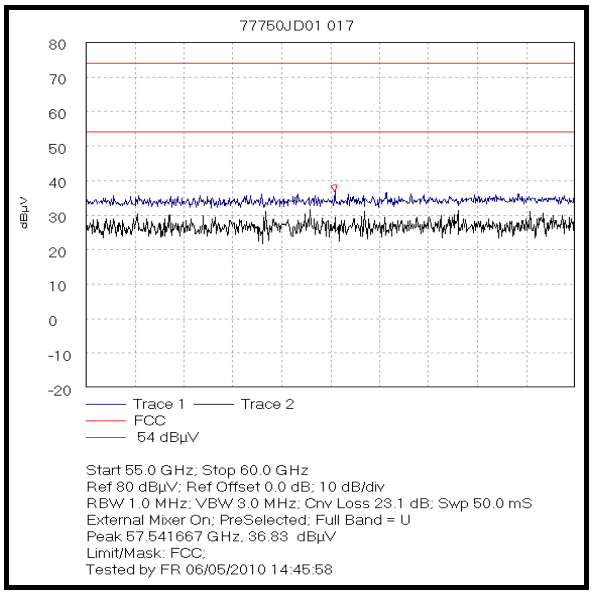


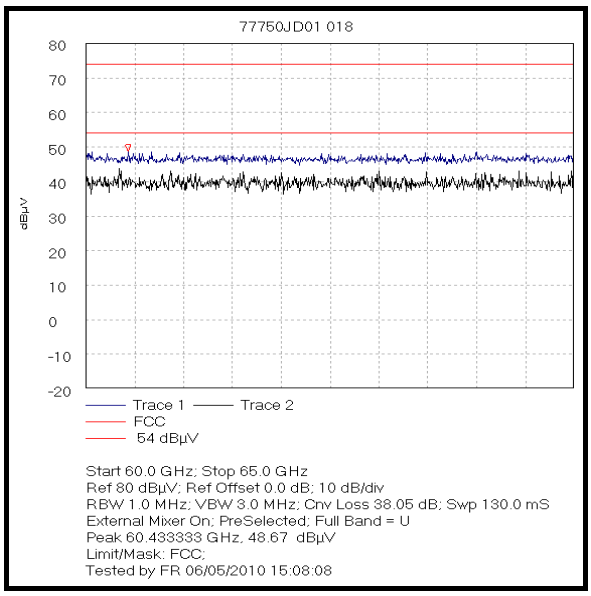


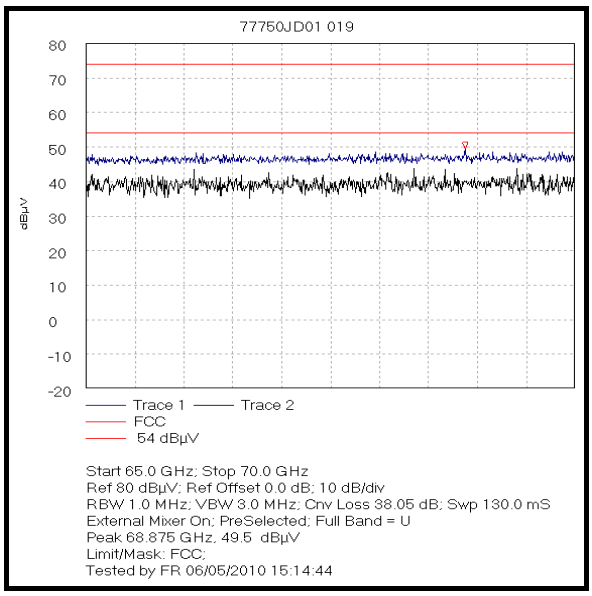
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)



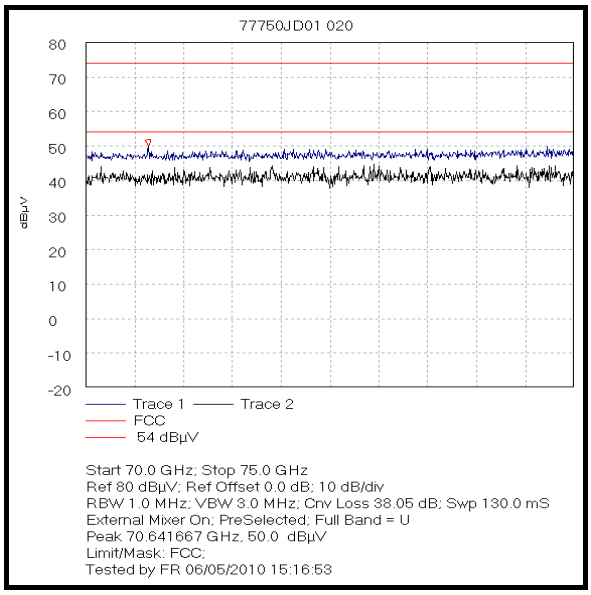


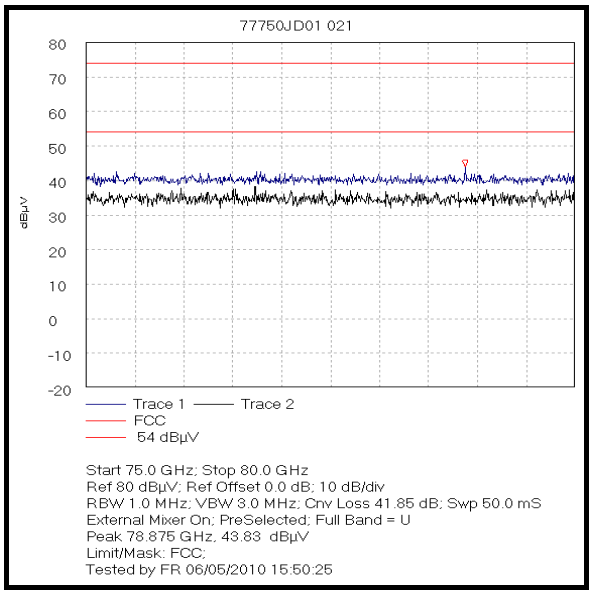


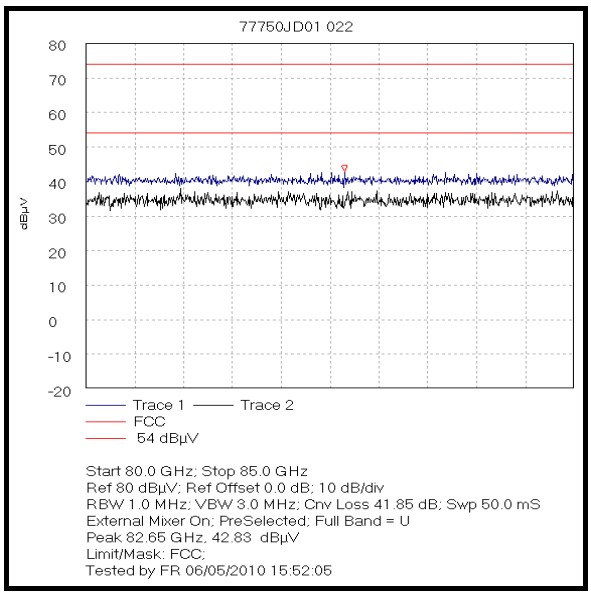


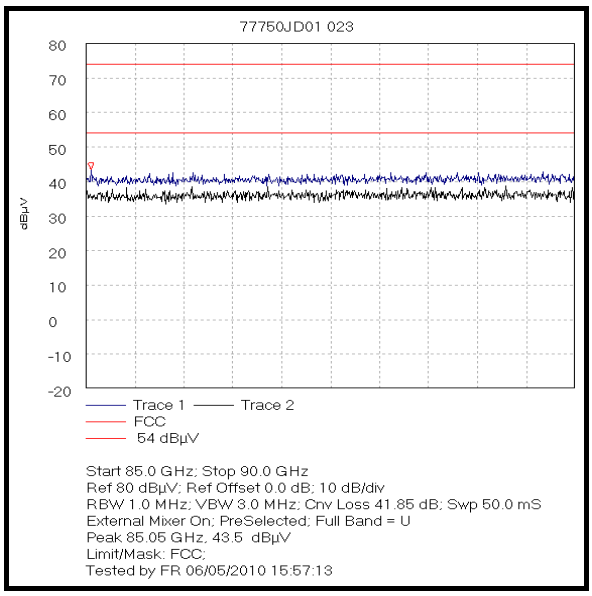
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)



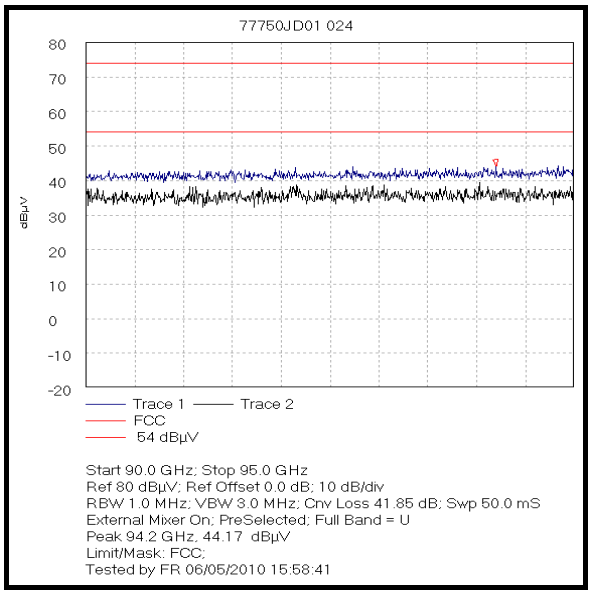


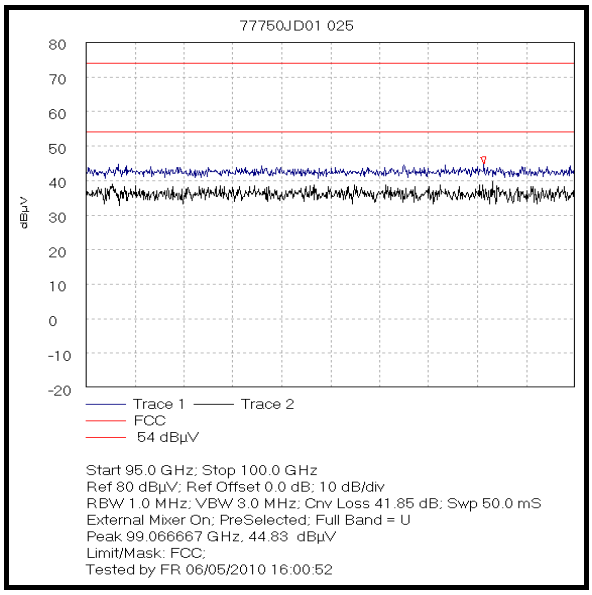




Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Spurious Emissions (continued)





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

5.2.7. Transmitter Radiated Emissions at Band Edges

Test Summary:

FCC Part:	15.249(d) & 15.209
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	26

Peak Power Level:

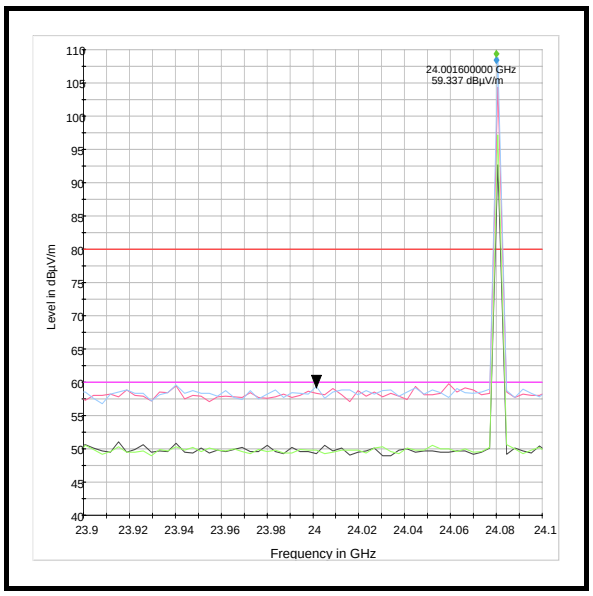
Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
24.000	Horizontal	35.9	23.4	59.3	80.0	20.7	Complied
24.250	Horizontal	33.5	23.5	57.0	80.0	23.0	Complied

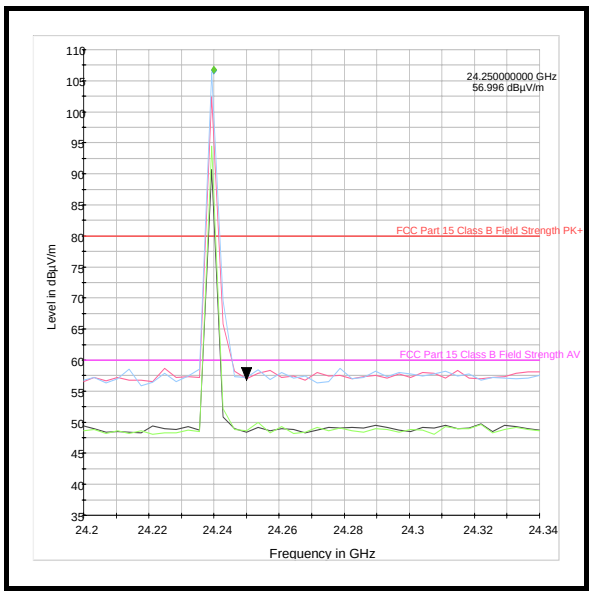
Average Power Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dBµV)	Transducer Factor (dB)	Actual Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
24.000	Horizontal	26.4	23.4	49.8	60.0	10.2	Complied
24.250	Horizontal	25.1	23.5	48.6	60.0	11.4	Complied

Note(s):

1. Measurements were made at 1.5 meter test distance instead of 3 meters. Therefore the limits have been corrected for measurements at this test distance.





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

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
20 dB Bandwidth	N/A	95%	±0.92 ppm
Radiated Spurious Emissions	9 kHz to 1000 MHz	95%	±3.53 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB
Transmitter Fundamental Field Strength	30 MHz to 1000 MHz	95%	±4.64 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)
A1033	Harmonic Mixer	Hewlett Packard	11970W	2521A01380	09 Jun 2009	12
A1245	Antenna	Dorado international corp	GH-10-25	200010	Calibrated before use	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1817	Antenna	EMCO	3115	00075694	27 Nov 2009	12
A1829	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100671	25 Oct 2009	12
A1916	Waveguide Horn Antenna	Flann Ltd.	25240-25	166399	11 May 2010	12
A1970	Pre-Amp	RFI	N/A	N/A	26 Apr 2010	3
A203	Antenna	Flann Microwave Ltd	22240-20	343	11 May 2010	36
A360	Waveguide Transition	Flann	22093-KF20	778	Calibrated before use	-
A425	Antenna	EMCO	3116	9611-2330	18 Mar 2010	36
A553	Antenna	Chase	CBL6111A	1593	16 Mar 2010	12
A649	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	825562/008	16 Mar 2010	12
G0543	Amplifier	Sonoma Instrument Co.	310N	230801	04 Jun 2009	12
K0001	5m Semi-Anechoic Chamber	Rainford EMC	N/A	N/A	25 Apr 2010	12
L1001	ESU26	ROHDE & SCHWARZ	ESU26	100239	28 Jan 2010	12
M1253	Spectrum Analyser	HP	8564E	3442A00262	26 Jan 2010	12
M194	Harmonic Mixer	Hewlett Packard	11970V	2521A01005	30 Jun 2009	12
M197	Mixer	Hewlett Packard	11970U	2332A00782	13 Jun 2009	12

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