



TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Test Report Serial No:
RFI/RPT2/RP73643JD01A

Supersedes Test Report Serial No:
RFI/RPT1/RP73643JD01A

This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director 	
Checked By: Nigel Davison 	Report Copy No: PDF01
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Registered in England and Wales. Company number: 2117901

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1. Customer Information

Company Name:	Datalogic Mobile S.r.l
Address:	Via Candini, 2 Lippo di Calderara di Reno (Bologna) 40012 Italy

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2. Equipment Under Test (EUT)

2.1. Identification of Equipment Under Test (EUT)

Description:	Mobile Computer
Brand Name:	Datalogic Mobile S.r.l
Model Name or Number:	JOYA +
Serial Number:	D08X00014
Hardware Version Number:	Not stated
Software Version Number:	3.02.83.20081007
FCC ID Number:	U4G0026

2.2. Description of EUT

The equipment under test was a mobile computer with barcode scanner using WiFi technology operating in the 2.4 GHz band.

2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

2.4. Support Equipment

The following support equipment was used to support the measurement of AC mains conducted emissions from the EUT whilst its battery was being charged.

Description:	Cradle prototype with serial interface RS232 and RS232 power cable
Brand Name:	Datalogic (prototype)
Connected to Port:	Interface port

Description:	AC Power Adapter and power cord for battery charging through cradle prototype
Brand Name:	Power supply and power cable
Model Name or Number:	PW-06A2-1Y15A

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2.5. Additional Information Related to Testing

Technology Tested:	WiFi		
Power Supply Requirement:	Internal battery supply 3.7 V nominal		
Type of Unit:	Transceiver		
Modulation Type:	DBPSK, BPSK, QPSK, CCK, 16QAM, 64QAM		
Data Rate:	802.11b (DSSS): 1, 2, 5.5, 11 Mbps 802.11g (OFDM): 6, 9, 12, 18, 24, 36, 48, 54 Mbps		
Maximum EIRP Peak RF Power Output:	21.1 dBm (measured)		
Average Conducted RF Power Output	16.3 dBm (measured)		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	2412	1
	Middle	2437	6
	Top	2462	11
Receive Frequency Range:	2412 MHz to 2462 MHz		
Receive Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	2412	1
	Middle	2437	6
	Top	2462	11

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3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	FCC Part 15.247: 2008 Subpart C
Title:	Code of Federal Regulations, Part 15.247 (47CFR15) (Intentional Radiators operating within the band 2400 MHz to 2483.5 MHz)

3.2. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI C63.2 (1996)

Title: American National Standard for Instrumentation - Electromagnetic Noise and Field Strength Instrumentation, 10 Hz to 40 GHz.

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.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

3.3. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures section above. Appendix 1 contains a list of the test equipment used.

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4. Deviations from the Test Specification

None.

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5. Operation and Configuration of the EUT during Testing

5.1. Operating Modes

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

- Transmit mode operating at maximum output power with a modulated carrier. The highest data rate per modulation scheme was tested as this was found to produce the higher power of the lowest/highest data rates available. The modulations / data rates tested were:
 - 1 Mbps – DBPSK
 - 6 and 9 Mbps – BPSK
 - 18 Mbps – QPSK
 - 11 Mbps – CCK
 - 36 Mbps – 16QAM
 - 54 Mbps – 64QAM
- Idle mode.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

- For transmitter tests the EUT was tested standalone. A test mode was enabled on the EUT to allow continuous transmission with options for the different data rates / modulation schemes.
- For transmitter radiated emissions, 1Mbps data rate was selected, as this gave the highest EIRP and therefore deemed highest emission levels would be seen. Band edge was performed on all modulation schemes at the highest data rate for each scheme.
- For idle mode tests the EUT was tested standalone. A test mode was enabled on the EUT that allowed the module to be enabled and not transmitting.
AC mains conducted emissions were performed with the EUT being charged whilst sat in the cradle prototype supplied by the client.

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6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Result
Idle Mode AC Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15 Section 15.107	AC Mains	Complied
Idle Mode Radiated Spurious Emissions	C.F.R. 47 FCC Part 15 Section 15.109	Enclosure	Complied
Transmitter Minimum 6 dB Bandwidth	C.F.R. 47 FCC Part 15 Section 15.247(a)(2)	Antenna	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 2 Section 2.1049	Antenna	Complied
Transmitter Peak Power Spectral Density	C.F.R. 47 FCC Part 15 Section 15.247(e)	Antenna	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15 Section 15.247(b)(3)	Antenna	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15 Sections 15.247(d) & 15.209(a)	Antenna	Complied
Transmitter Band Edge Radiated Emissions	C.F.R. 47 FCC Part 15 Sections 15.247(d) & 15.209(a)	Antenna	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.

6.2. Site Registration Numbers

FCC: 209735

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7. Measurements, Examinations and Derived Results

7.1. General Comments

This section contains test results only.

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 8 for details of measurement uncertainties.

The calibration table at the back of this report may not show all test equipment as being in calibration over the total test period as some of the equipment may have been sent for re-calibration during this period; however, the equipment was in calibration for the respective tests.

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7.2. Test Results

7.2.1. Idle Mode AC Conducted Spurious Emissions: Section 15.107

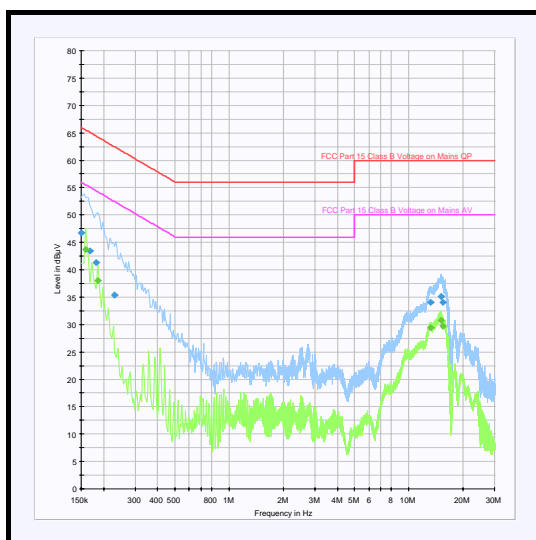
Tests were performed using the test methods detailed in ANSI C63.4 Section 7

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.1500	Live	46.7	66.0	19.3	Complied
0.1680	Live	43.4	65.1	21.7	Complied
0.1815	Live	41.3	64.4	23.1	Complied
0.2310	Neutral	35.4	62.4	27.0	Complied
13.2405	Neutral	34.1	60.0	25.9	Complied
15.2070	Live	35.2	60.0	24.8	Complied
15.5355	Neutral	34.0	60.0	26.0	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.15900	Live	43.7	55.5	11.8	Complied
0.1860	Live	38.0	54.2	16.2	Complied
13.2810	Neutral	29.4	50.0	20.6	Complied
15.0945	Live	30.7	50.0	19.3	Complied
15.4995	Live	29.7	50.0	20.3	Complied



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7.2.2. Idle Mode Radiated Spurious Emissions: Section 15.109

Ambient Temperature: 22°C

Relative Humidity: 52%

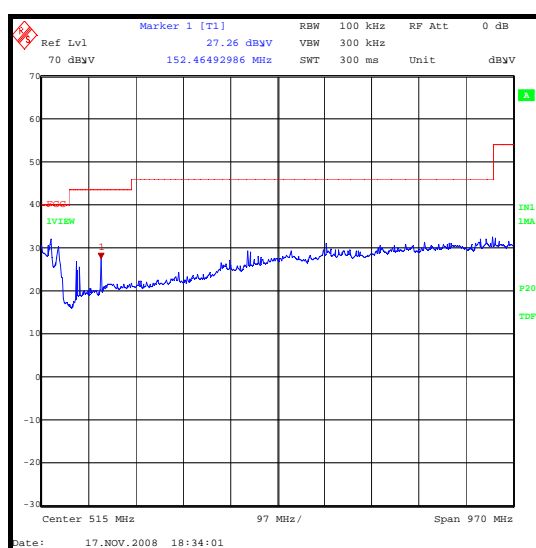
Tests were performed using the test methods detailed in ANSI C63.4 Section 8

Electric Field Strength Measurements (Frequency Range: 30 MHz to 1000 MHz)

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
101.924	Vertical	26.6	43.5	16.9	Complied
107.756	Vertical	25.4	43.5	18.1	Complied
152.465	Vertical	27.3	43.5	16.2	Complied

Note(s):

1. All other emissions were at least 20 dB below the relevant specification limit.



30 MHz to 1 GHz

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

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7.2.3. Idle Mode Radiated Spurious Emissions: Section 15.109 (Continued)

Electric Field Strength Measurements (Frequency Range: 1 GHz to 12.75 GHz)

Highest Peak Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
11.617	Vertical	45.1	2.4	47.5	54.0	6.5	Complied

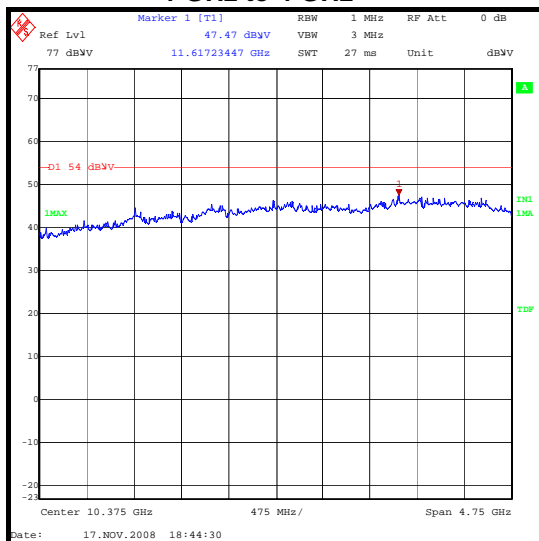
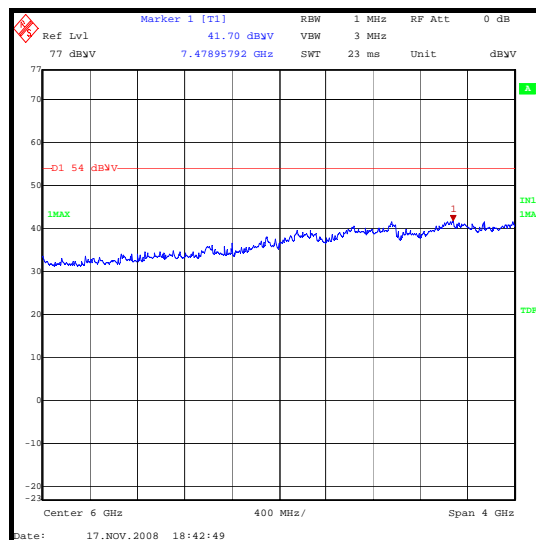
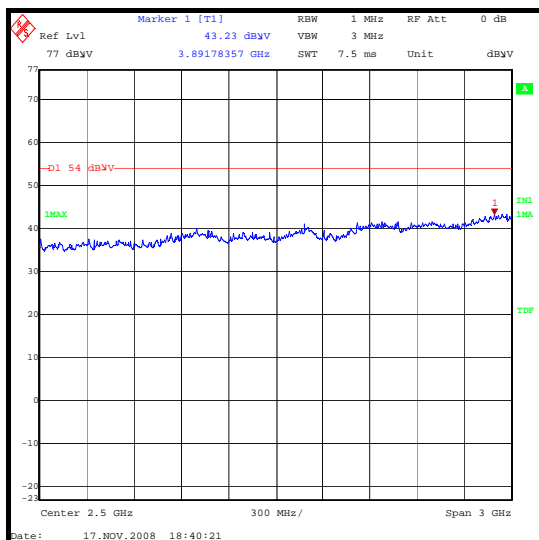
Note(s):

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.

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Idle Mode Radiated Spurious Emissions (Continued)



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

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7.2.4. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

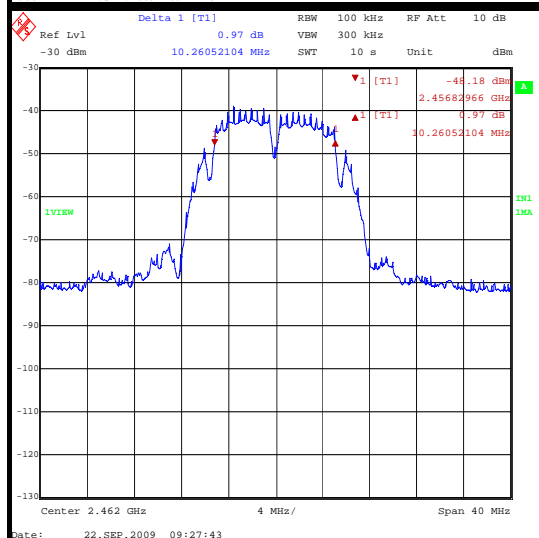
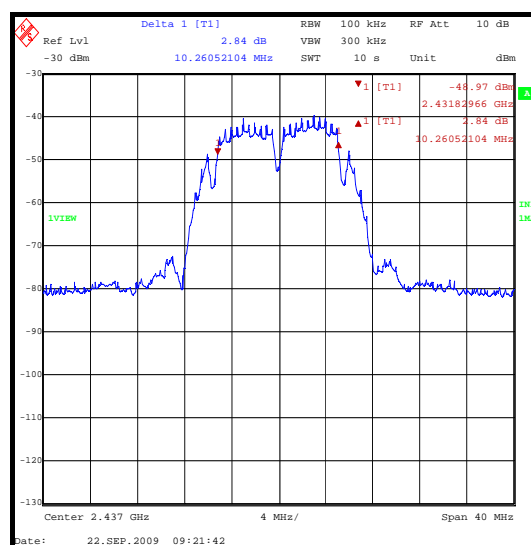
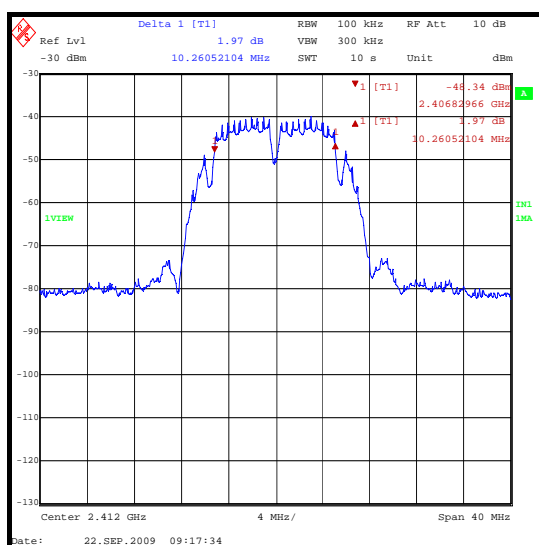
Relative Humidity: 42%

Tests were performed using the test methods detailed in ANSI C63.4 Section 13

Note that in order to protect the analyser input a 20dB attenuator was used for the DBPSK test. This explains the 20dB lower relative signal in the plots and is not indicative of the actual EUT output level.

Results: 1 Mbps - DBPSK

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.261	≥ 0.5	9.761	Complied
Middle	10.261	≥ 0.5	9.761	Complied
Top	10.261	≥ 0.5	9.761	Complied



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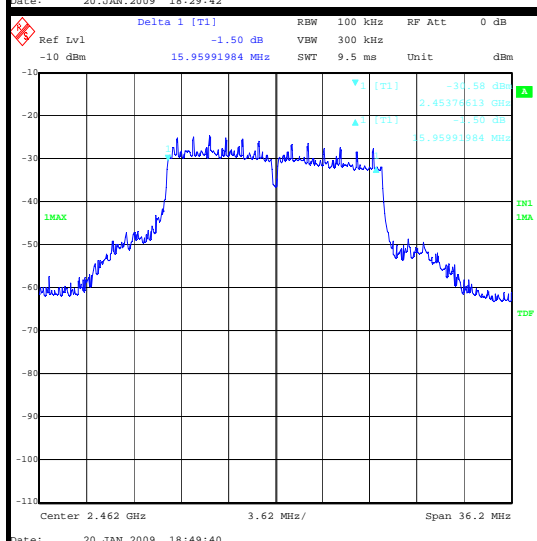
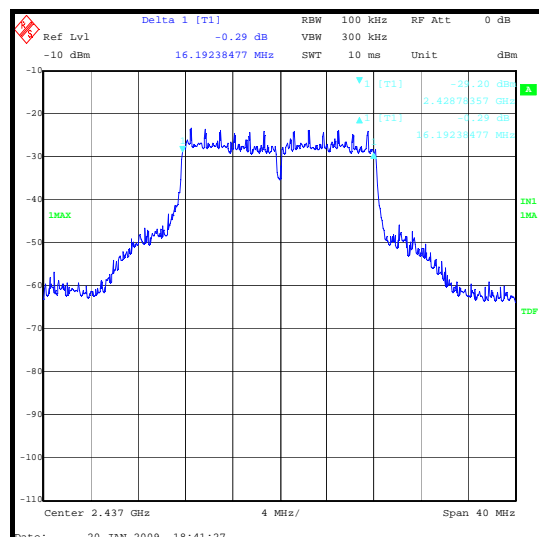
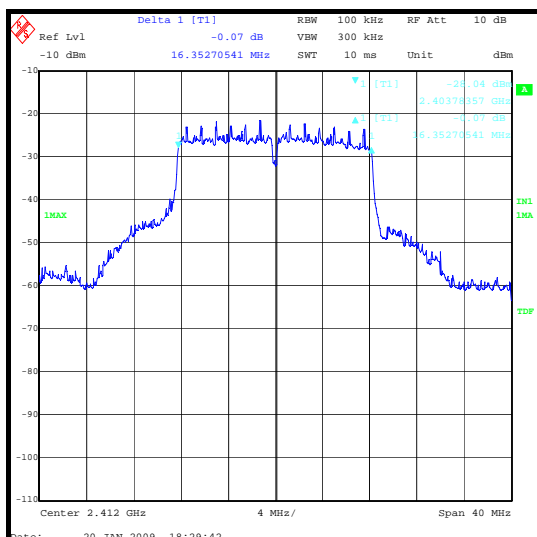
7.2.5. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 18 Mbps - QPSK

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.352	≥ 0.5	15.832	Complied
Middle	16.192	≥ 0.5	15.692	Complied
Top	15.960	≥ 0.5	15.460	Complied



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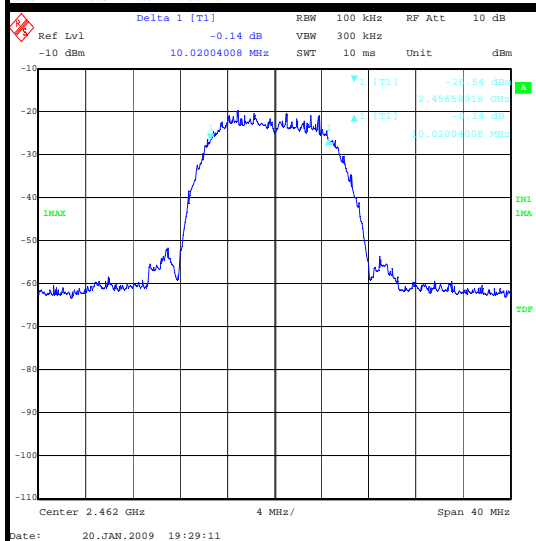
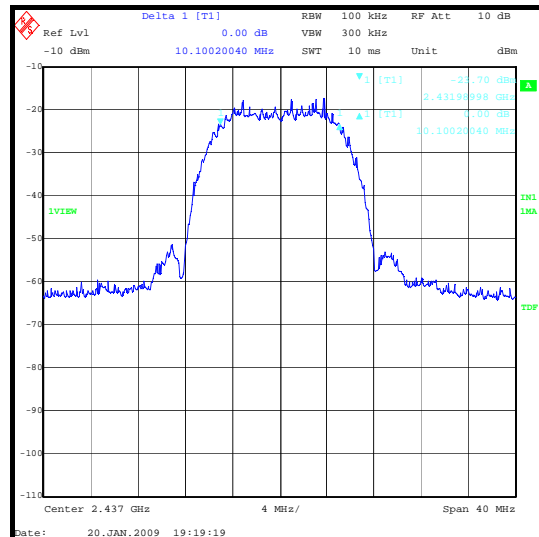
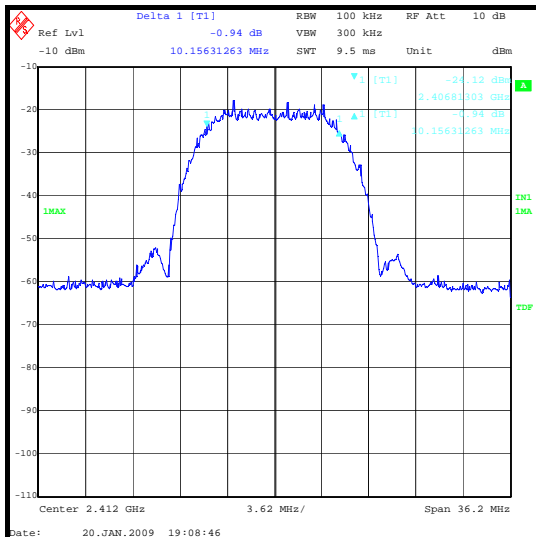
7.2.6. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 11 Mbps - CCK

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.156	≥ 0.5	9.656	Complied
Middle	10.100	≥ 0.5	9.600	Complied
Top	10.020	≥ 0.5	9.520	Complied



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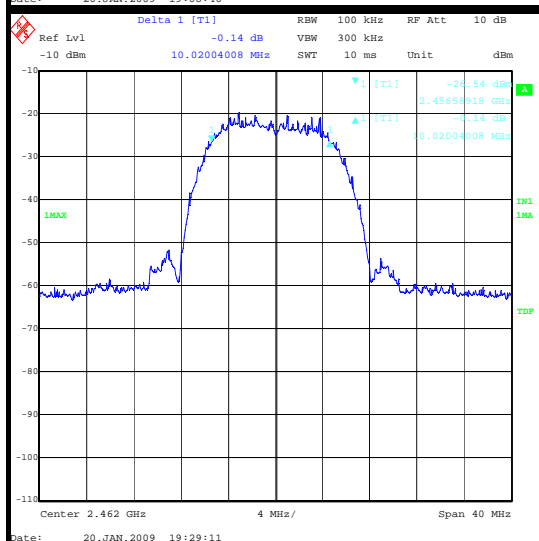
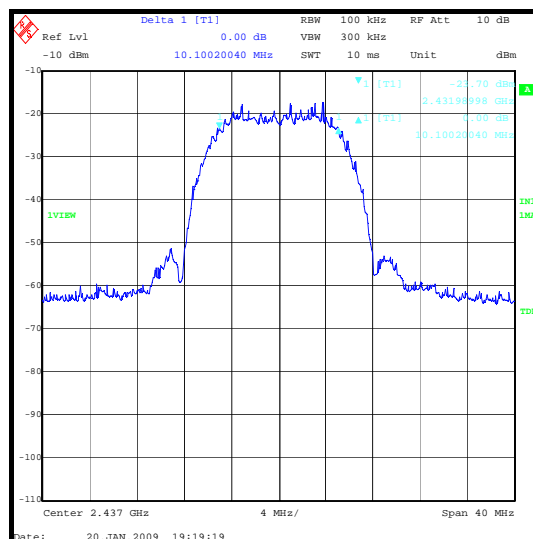
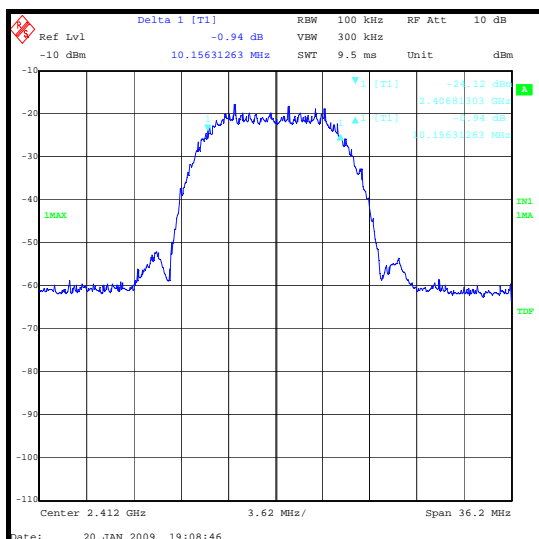
7.2.7. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 11 Mbps - CCK

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.156	≥ 0.5	9.656	Complied
Middle	10.100	≥ 0.5	9.600	Complied
Top	10.020	≥ 0.5	9.520	Complied



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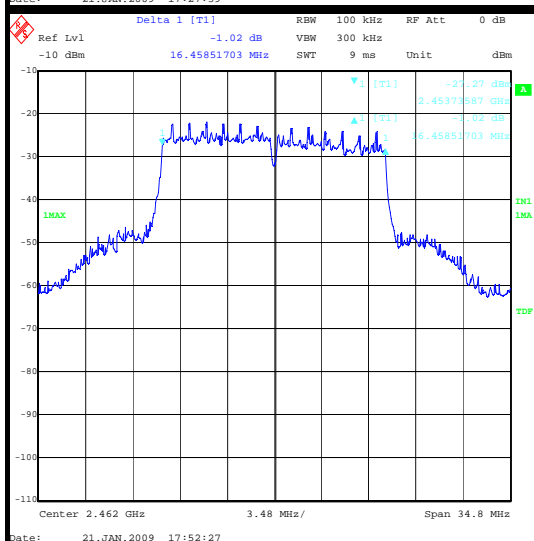
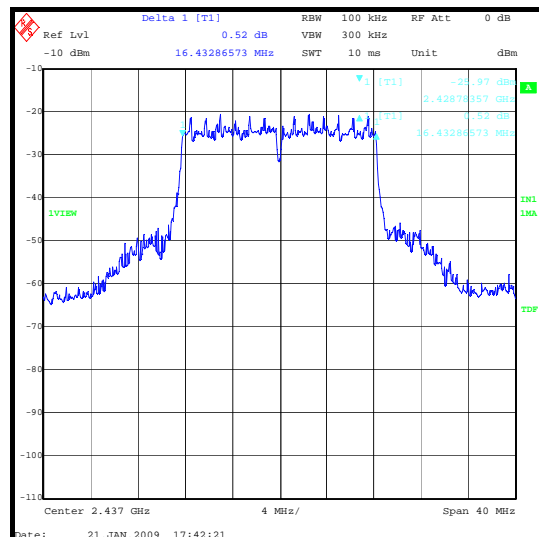
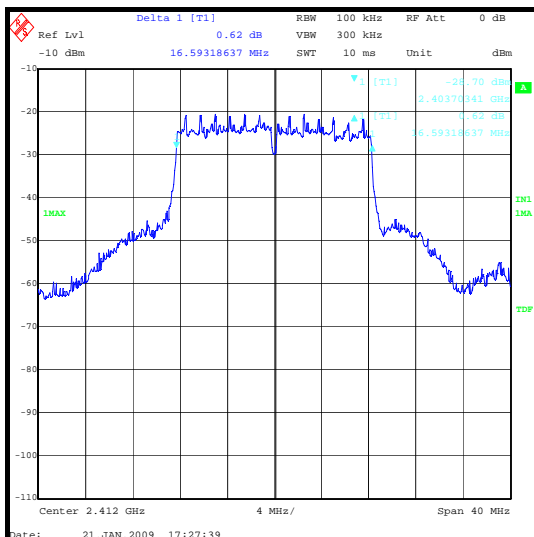
7.2.8. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 36 Mbps – 16QAM

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.593	≥ 0.5	16.093	Complied
Middle	16.433	≥ 0.5	15.933	Complied
Top	16.459	≥ 0.5	15.959	Complied



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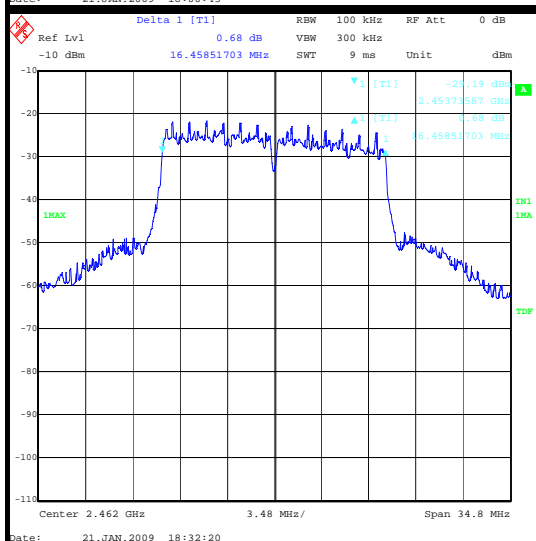
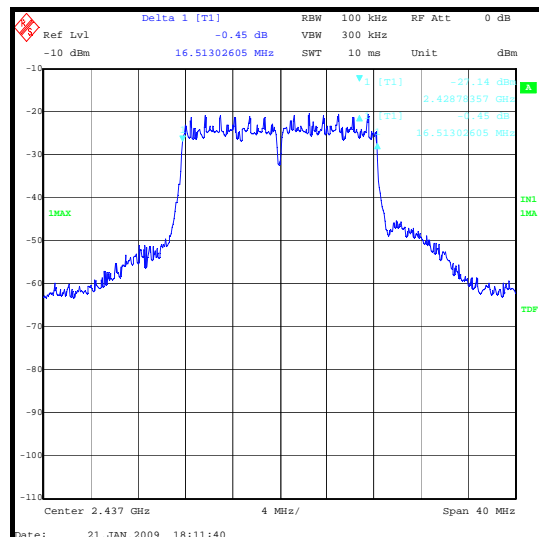
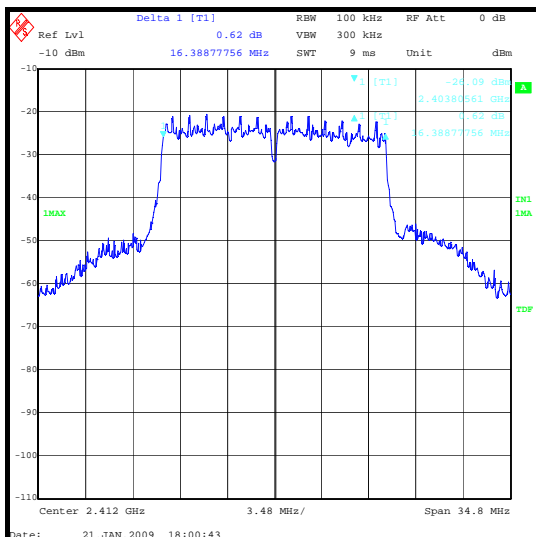
7.2.9. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 54 Mbps – 64QAM

Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.389	≥ 0.5	15.889	Complied
Middle	16.513	≥ 0.5	16.013	Complied
Top	16.459	≥ 0.5	15.959	Complied



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7.2.10. Transmitter 20 dB Bandwidth: Section 2.1049

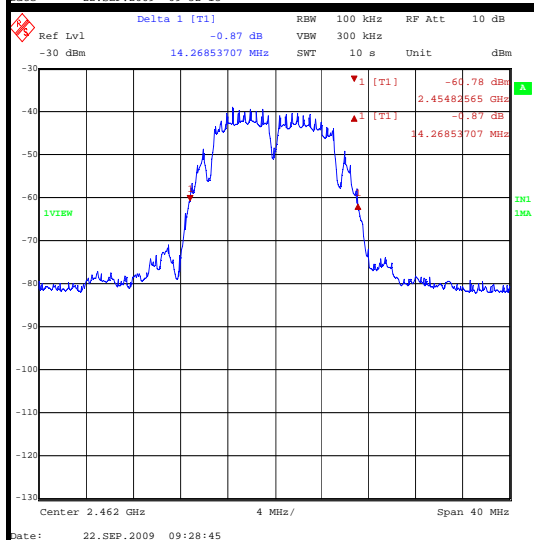
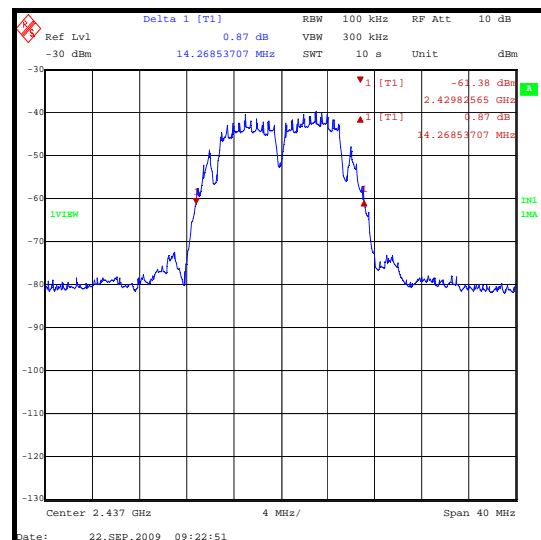
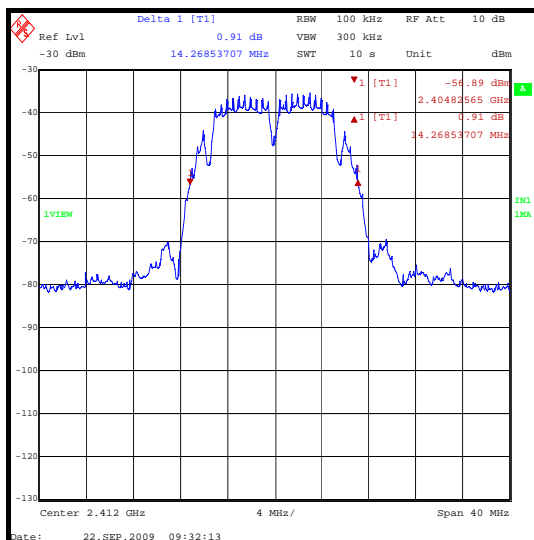
Ambient Temperature: 22°C

Relative Humidity: 42%

Tests were performed using the test methods detailed in ANSI C63.4 Section 13 and DA 00-705

Results: 1 Mbps - BPSK

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	14268.537
Middle	14268.537
Top	14268.537



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7.2.11. Transmitter 20 dB Bandwidth: Section 2.1049

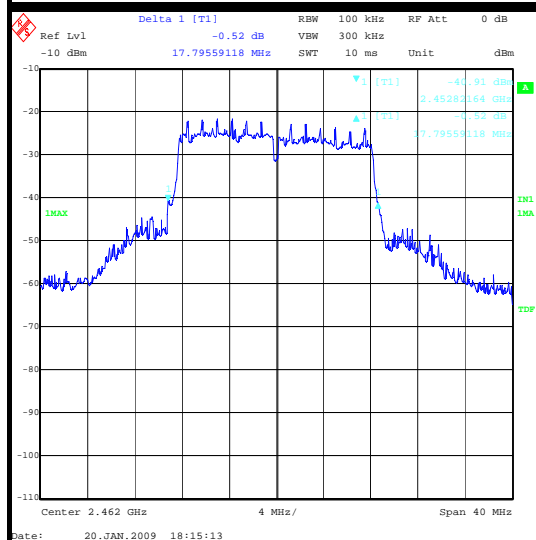
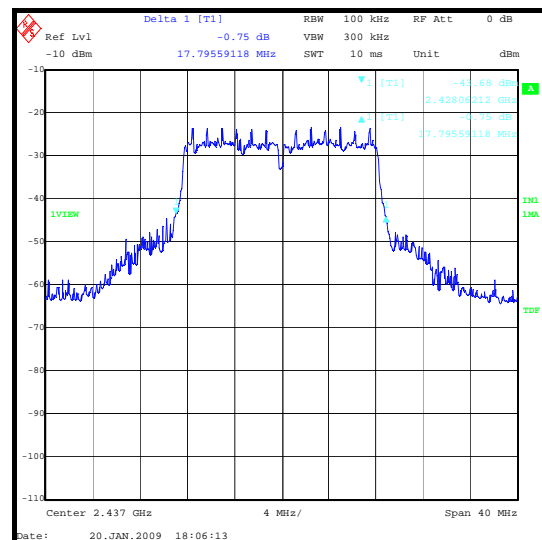
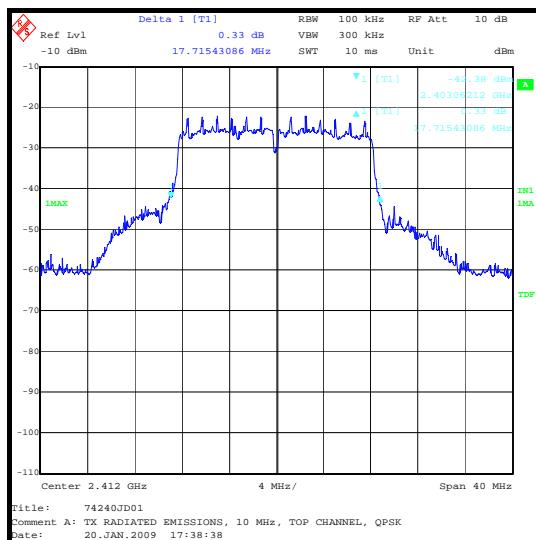
Ambient Temperature: 22°C

Relative Humidity: 42%

Tests were performed using the test methods detailed in ANSI C63.4 Section 13

Results: 9 Mbps - BPSK

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	17715.431
Middle	17795.591
Top	17795.591



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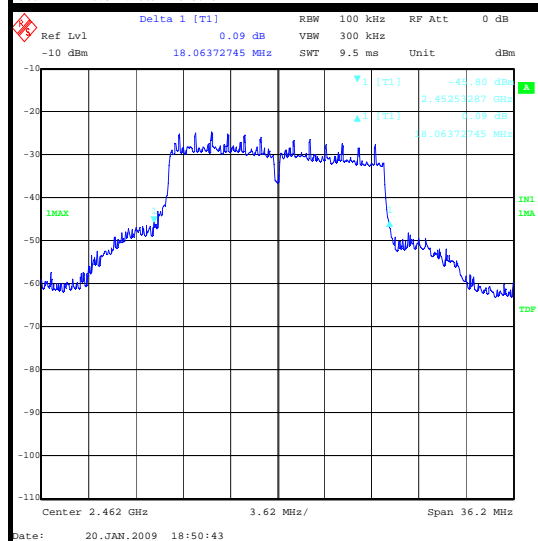
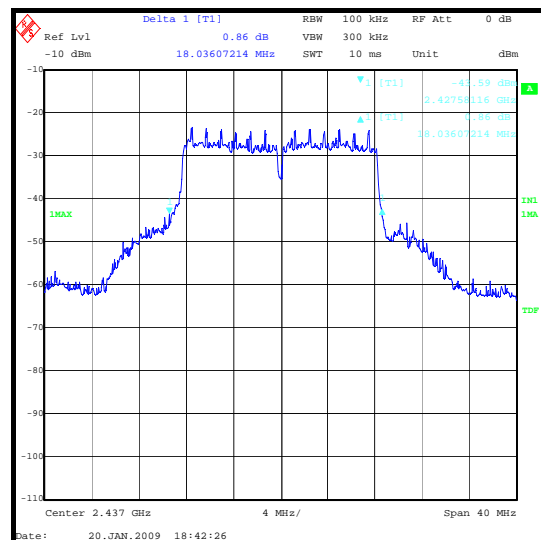
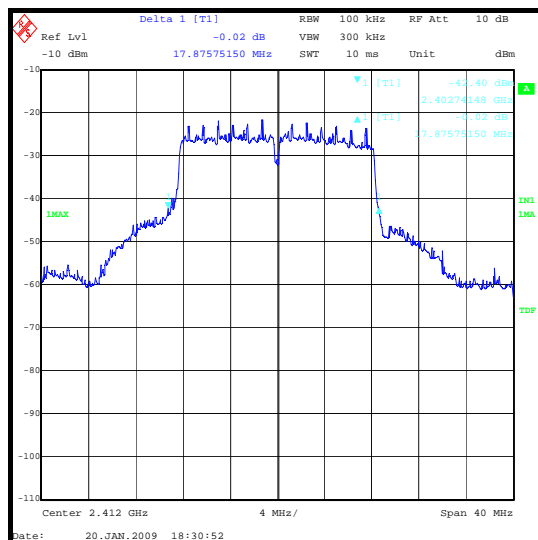
7.2.12. Transmitter 20 dB Bandwidth: Section 2.1049

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 18 Mbps - QPSK

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	17875.752
Middle	18036.072
Top	18063.728



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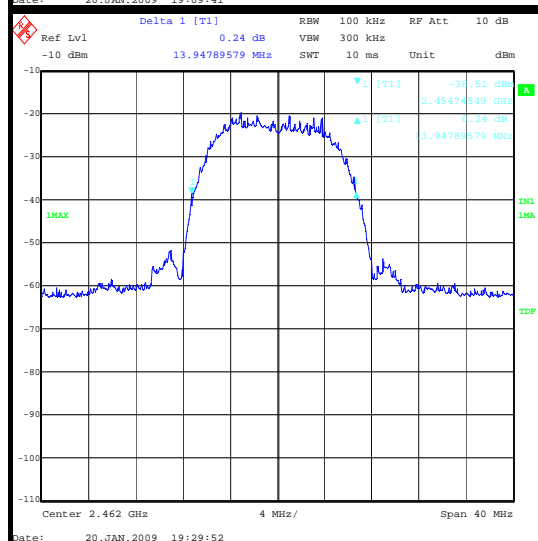
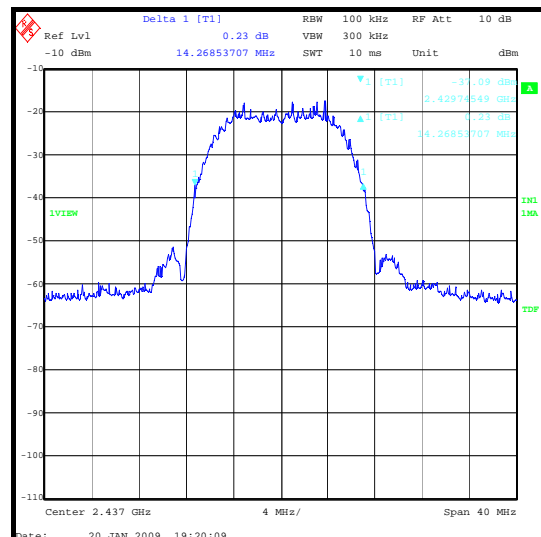
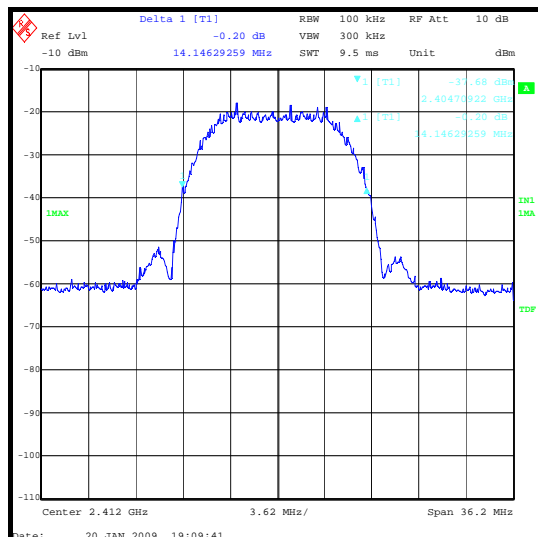
7.2.13. Transmitter 20 dB Bandwidth: Section 2.1049

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 11 Mbps - CCK

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	14146.293
Middle	14268.537
Top	13947.896



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

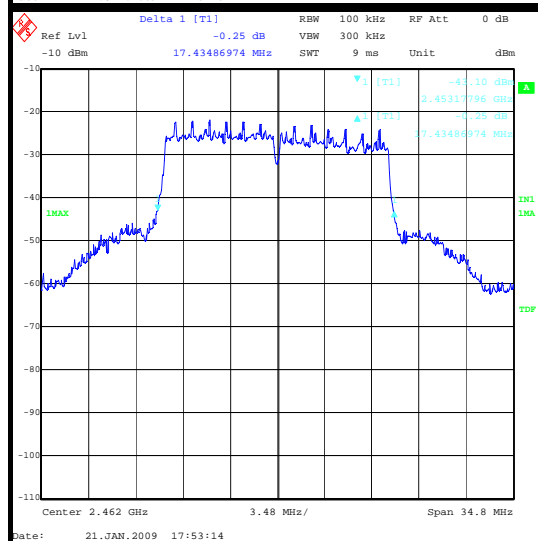
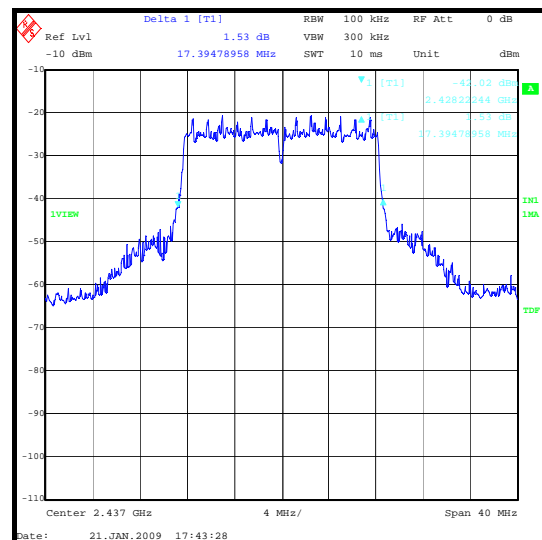
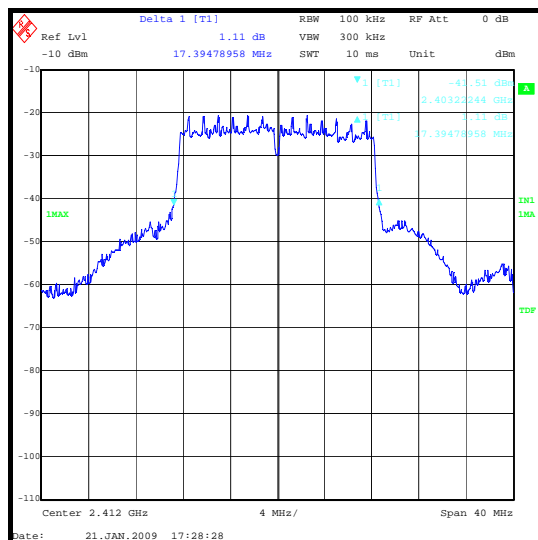
7.2.14. Transmitter 20 dB Bandwidth: Section 2.1049

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 36 Mbps – 16QAM

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	17394.786
Middle	17394.790
Top	17434.870



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

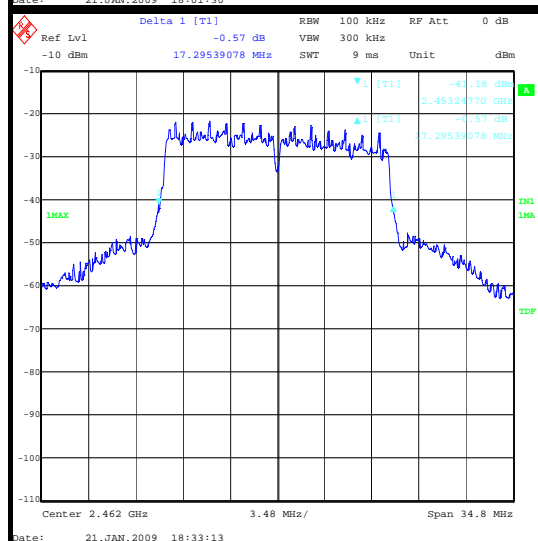
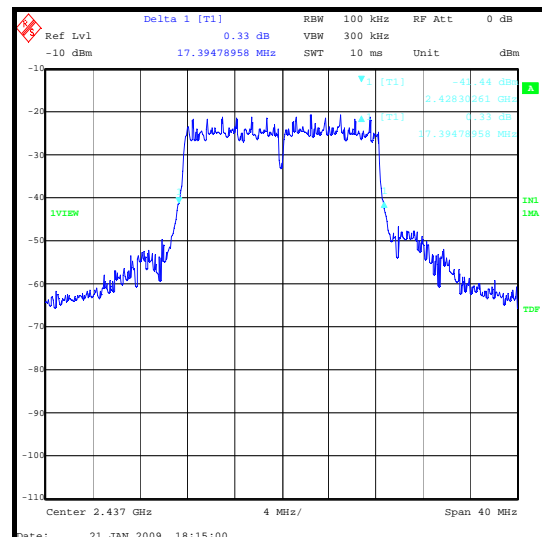
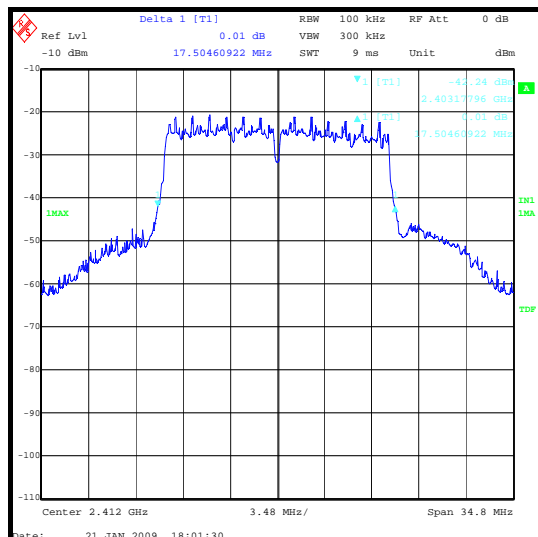
7.2.15. Transmitter 20 dB Bandwidth: Section 2.1049

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 54 Mbps – 64QAM

Channel	Transmitter 20 dB Bandwidth (kHz)
Bottom	17504.609
Middle	17394.790
Top	17295.391



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.16. Transmitter Peak Power Spectral Density: Section 15.247(e)

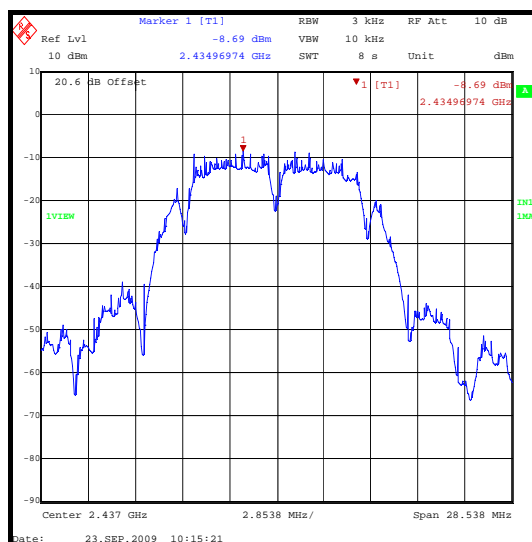
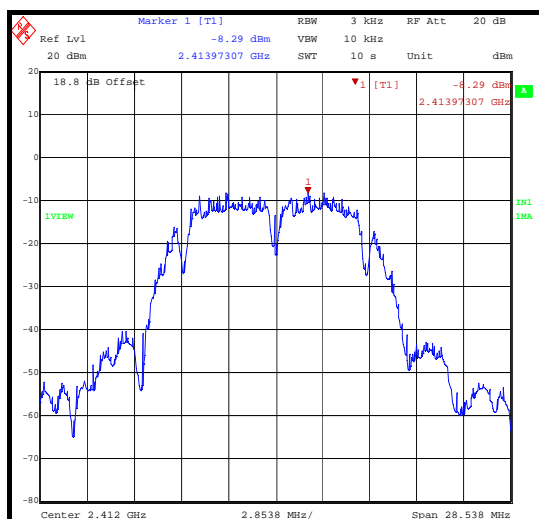
Ambient Temperature: 22°C

Relative Humidity: 42%

Tests were performed using the test methods detailed in ANSI C63.4 Section 8 and Part 15.247(e)

Results: 1 Mbps - DBPSK

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-8.3	8.0	16.3	Complied
Middle	-8.7	8.0	16.7	Complied
Top	-8.4	8.0	16.4	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.17. Transmitter Peak Power Spectral Density: Section 15.247(e)

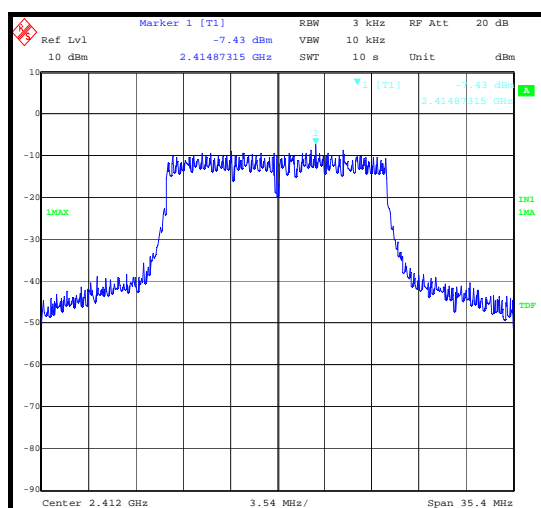
Ambient Temperature: 22°C

Relative Humidity: 42%

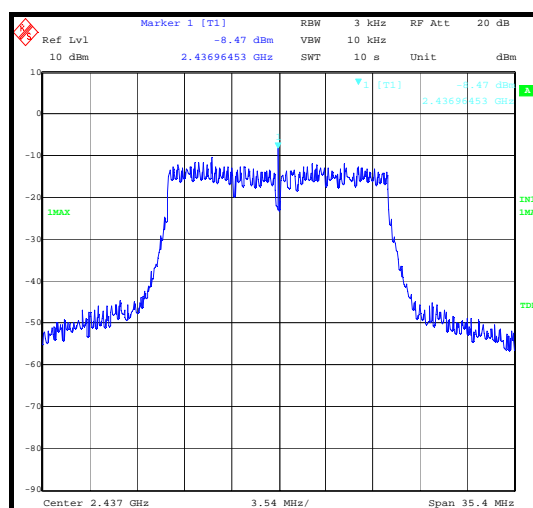
Tests were performed using the test methods detailed in ANSI C63.4 Section 8 and Part 15.247(e)

Results: 9 Mbps - BPSK

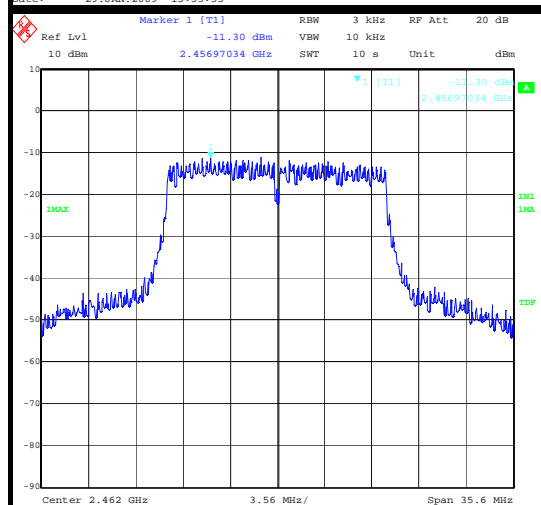
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-7.4	8.0	15.4	Complied
Middle	-8.5	8.0	16.5	Complied
Top	-11.3	8.0	19.3	Complied



Title: 73046JD7
Date: 29.JAN.2009 15:53:55



Title: 73046JD7
Date: 29.JAN.2009 15:55:45



Title: 73046JD7
Date: 29.JAN.2009 15:59:01

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

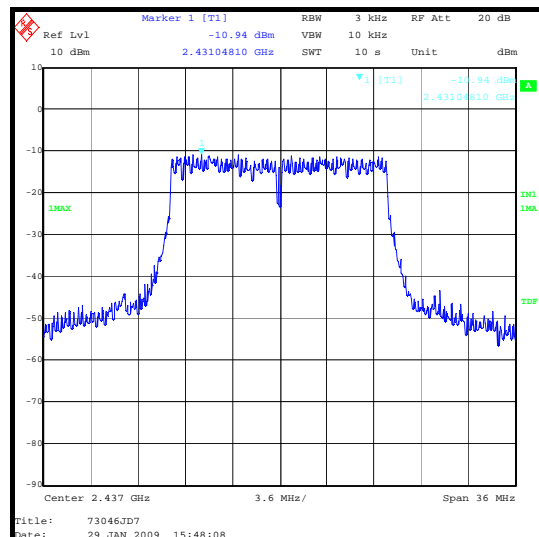
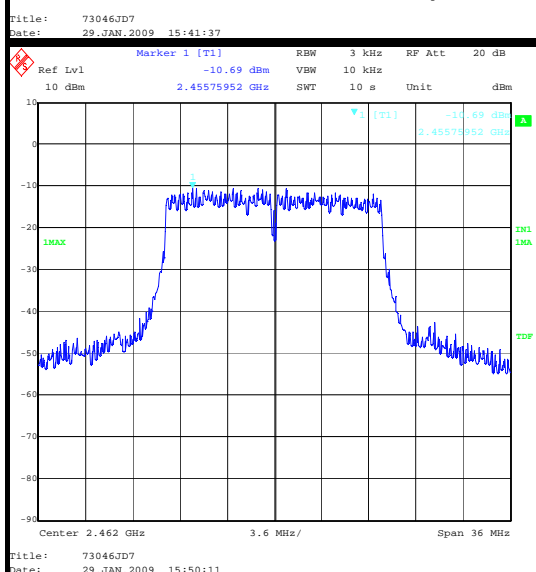
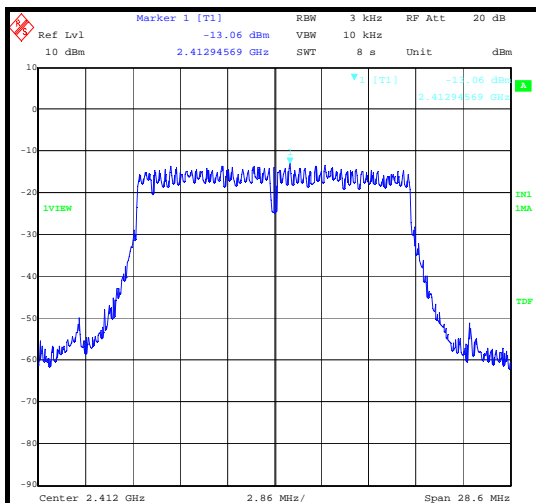
7.2.18. Transmitter Peak Power Spectral Density: Section 15.247(e)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 18 Mbps - QPSK

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-13.1	8.0	21.1	Complied
Middle	-10.9	8.0	18.9	Complied
Top	-10.7	8.0	18.7	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

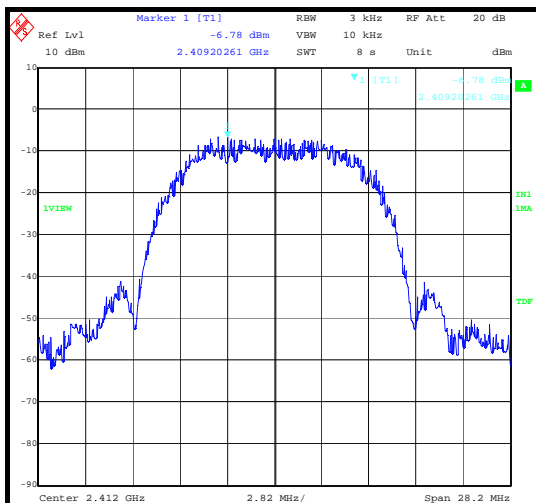
7.2.19. Transmitter Peak Power Spectral Density: Section 15.247(e)

Ambient Temperature: 22°C

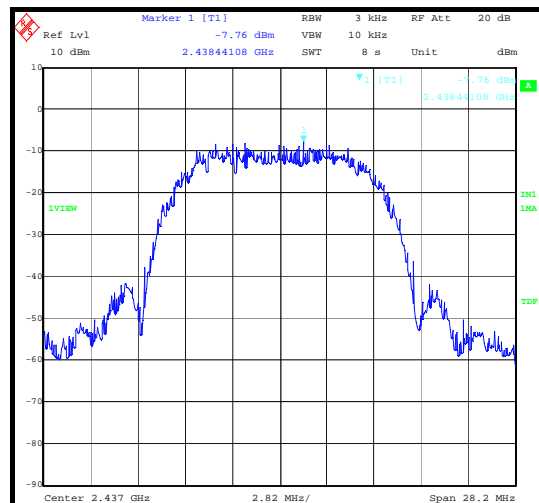
Relative Humidity: 42%

Results: 11 Mbps - CCK

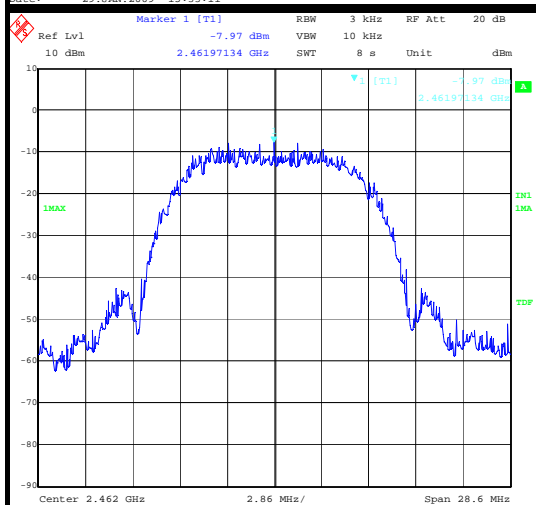
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-6.8	8.0	14.8	Complied
Middle	-7.8	8.0	15.8	Complied
Top	-8.0	8.0	16.0	Complied



Title: 73046JD7
Date: 29.JAN.2009 15:33:11



Title: 73046JD7
Date: 29.JAN.2009 15:35:18



Title: 73046JD7
Date: 29.JAN.2009 15:39:33

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

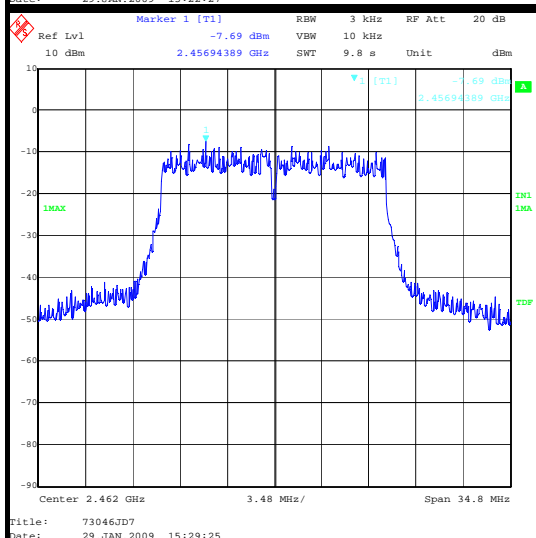
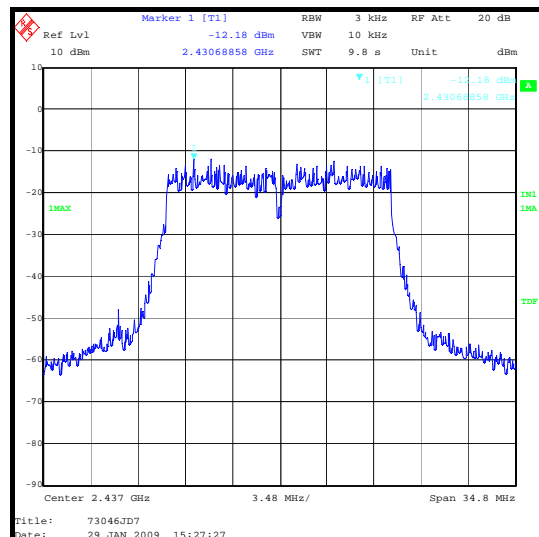
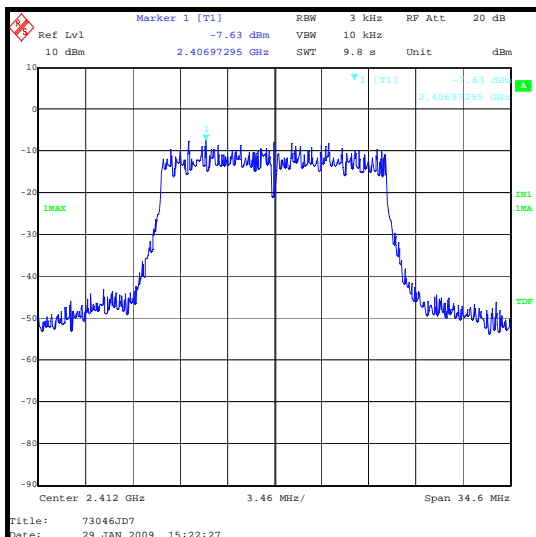
7.2.20. Transmitter Peak Power Spectral Density: Section 15.247(e)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 36 Mbps – 16QAM

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-7.6	8.0	15.6	Complied
Middle	-12.2	8.0	20.2	Complied
Top	-7.7	8.0	15.7	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

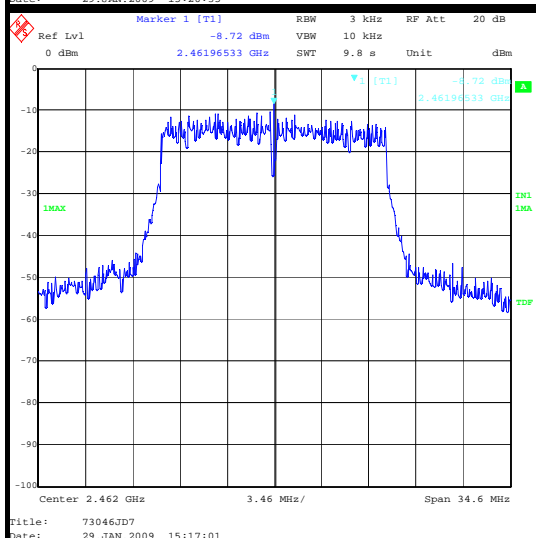
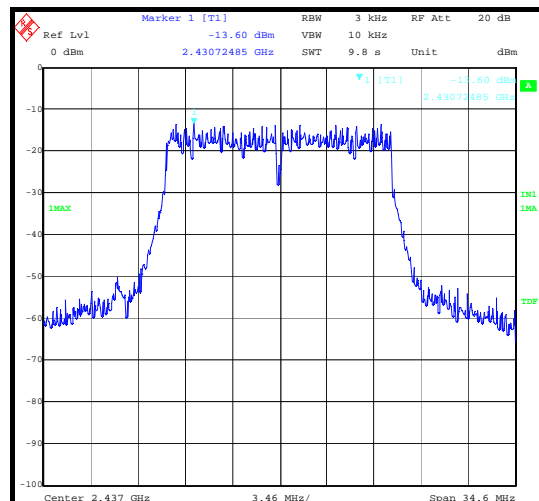
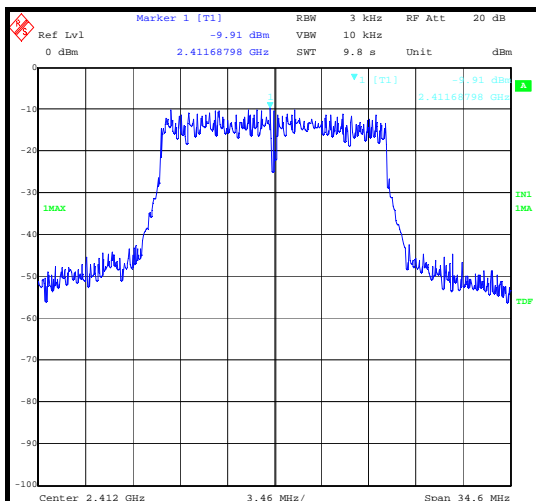
7.2.21. Transmitter Peak Power Spectral Density: Section 15.247(e)

Ambient Temperature: 22°C

Relative Humidity: 42%

Results: 54 Mbps – 64QAM

Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-9.9	8.0	17.9	Complied
Middle	-13.6	8.0	21.6	Complied
Top	-8.7	8.0	16.7	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.22. Transmitter Maximum Peak Output Power: (EIRP) and Conducted Average Power Section 15.247(b)(3)

Ambient Temperature: 22°C

Relative Humidity: 42%

Tests were performed using the channel power function of the spectrum analyser For the EIRP measurements and an Average Power Sensor for the conducted power measurements. The RF port of the device was connected to an average power sensor for the conducted power measurement via a 20dB attenuator. The power sensor was a Rohde and Schwarz NRZ1 (high sensitivity diode power sensor) and it was connected to a Rohde and Schwarz NRVD power meter. The filter setting (measurement time) was altered but had little effect on the measured level. The measurements were corrected for both the 20dB attenuator between the RF port and the sensor and for the >95% duty cycle.

EIRP Peak Results: 1 Mbps – DBPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	21.1	30.0	8.9	Complied
Middle	20.2	30.0	9.8	Complied
Top	20.2	30.0	9.8	Complied

Conducted Average Results: 1 Mbps – DBPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	15.4	30.0	14.6	Complied
Middle	16.3	30.0	13.7	Complied
Top	16.2	30.0	13.8	Complied

Note(s):

1. For the purpose of the RF Exposure test the conducted power measurement of 802.11b/g modes were measured using the Lowest and highest Data rate and modulation. For 802.11b the average conducted power for data rate of 1 Mbps and 11 Mbps were measured. For 802.11g the average conducted power for data rate of 6 Mbps and 54 Mbps were measured.

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

EIPR Peak Results: 6 Mbps - BPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	17.2	30.0	12.8	Complied
Middle	18.0	30.0	12.0	Complied
Top	18.5	30.0	11.5	Complied

Conducted Average Results: 6 Mbps – BPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	9.6	30.0	20.4	Complied
Middle	10.4	30.0	19.6	Complied
Top	10.9	30.0	19.1	Complied

Note(s):

1. For the purpose of the RF Exposure test the conducted power measurement of 802.11b/g modes were measured using the lowest and highest data rate and modulation. For 802.11b the average conducted power for data rate of 1 Mbps and 11 Mbps were measured. For 802.11g the average conducted power for data rate of 6 Mbps and 54 Mbps were measured.

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Maximum Peak Output Power: (EIRP) and Conducted Average Power Section
15.247(b)(3) (Continue)

EIRP Peak Results: 9 Mbps – BPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.7	30.0	10.3	Complied
Middle	18.8	30.0	12.5	Complied
Top	18.1	30.0	11.9	Complied

EIRP Peak Results: 18 Mbps - QPSK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.2	30.0	10.8	Complied
Middle	18.5	30.0	11.5	Complied
Top	17.9	30.0	12.1	Complied

EIRP Peak Results: 36 Mbps – 16QAM

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.9	30.0	10.1	Complied
Middle	15.9	30.0	14.1	Complied
Top	19.2	30.0	10.8	Complied

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Maximum Peak Output Power: (EIRP) and Conducted Average Power Section 15.247(b)(3) (Continue)

EIRP Peak Results: 11 Mbps - CCK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	20.0	30.0	10.0	Complied
Middle	19.1	30.0	10.9	Complied
Top	19.1	30.0	10.9	Complied

Conducted Average Results: 11 Mbps – CCK

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	10.5	30.0	19.5	Complied
Middle	10.9	30.0	19.1	Complied
Top	10.7	30.0	19.3	Complied

Note(s):

1. For the purpose of the RF Exposure test the conducted power measurement of 802.11b/g modes were measured using the Lowest and highest Data rate and modulation. For 802.11b the average conducted power for data rate of 1 Mbps and 11 Mbps were measured. For 802.11g the average conducted power for data rate of 6 Mbps and 54 Mbps were measured.

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

EIRP Peak Results: 54 Mbps – 64QAM

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	18.3	30.0	11.7	Complied
Middle	18.5	30.0	11.5	Complied
Top	18.6	30.0	11.4	Complied

Conducted Average Results: 54 Mbps – 64QAM

Channel	Measured Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	8.6	30.0	21.4	Complied
Middle	8.0	30.0	22.0	Complied
Top	6.6	30.0	23.4	Complied

Note(s):

1. For the purpose of the RF Exposure test the conducted power measurement of 802.11b/g modes were measured using the Lowest and highest Data rate and modulation. For 802.11b the average conducted power for the minimum and maximum data rate of 1 Mbps and 11 Mbps respectively. For 802.11g the average conducted power for the minimum and maximum data rate of 6 Mbps and 54 Mbps respectively.
2. For EIRP measurements tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.23. Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a)

Ambient Temperature: 22°C

Relative Humidity: 52%

Tests were performed using the test methods detailed in ANSI C63.4 Section 8

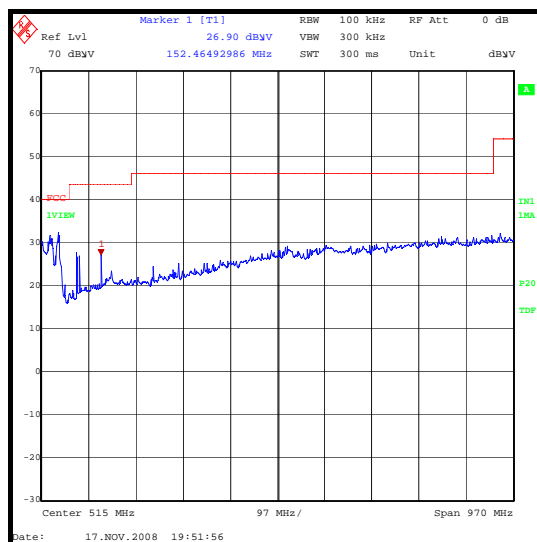
Electric Field Strength Measurements: 30 MHz to 1000 MHz

Top Channel

Frequency (MHz)	Antenna Polarity	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
101.924	Vertical	27.4	85.6	58.2	Complied
107.756	Vertical	26.7	85.6	58.9	Complied
152.465	Vertical	26.9	85.6	58.7	Complied

Note(s):

1. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
2. All other emissions were at least 20 dB below the relevant specification limit.



30 MHz to 1 GHz

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

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)

Electric Field Strength Measurements (Frequency Range: 1 GHz to 26.5 GHz)
(Emissions Occurring in the Restricted Bands)

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.824	Horizontal	54.4	-10.3	44.1	74.0	29.9	Complied
7.236	Horizontal	45.5	-1.9	43.6	74.0	30.4	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.824	Horizontal	54.4	-10.3	44.1	54.0	9.9	Complied
7.236	Horizontal	45.5	-1.9	43.6	54.0	10.4	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.874	Horizontal	60.6	-10.3	50.3	74.0	23.7	Complied
7.311	Horizontal	48.7	-1.9	46.8	74.0	27.2	Complied

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.874	Horizontal	60.6	-10.3	50.3	54.0	3.7	Complied
7.311	Horizontal	48.7	-1.9	46.8	54.0	7.2	Complied

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Radiated Emissions (Continued)**Highest Peak Level: Top Channel**

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.924	Horizontal	61.4	-10.3	51.1	74.0	22.9	Complied
7.386	Horizontal	48.4	-1.1	47.3	74.0	26.7	Complied

Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
4.924	Horizontal	61.4	-10.3	51.1	54.0	2.9	Complied
7.386	Horizontal	48.4	-1.1	47.3	54.0	6.7	Complied

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Radiated Emissions (Continued)

Electric Field Strength Measurements (Frequency Range: 1 to 26.5 GHz) (emissions outside the restricted bands)

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
2.63471	Horizontal	59.2	-6.9	52.3	85.3	33.0	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
2.65351	Horizontal	62.7	-6.9	55.8	88.3	32.5	Complied

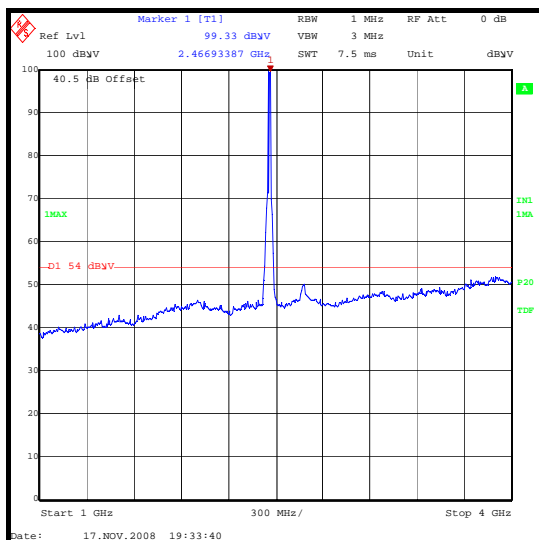
Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	-20 dBc Limit (dBμV/m)	Margin (dB)	Result
2.68337	Horizontal	63.6	-6.9	56.7	85.6	28.9	Complied

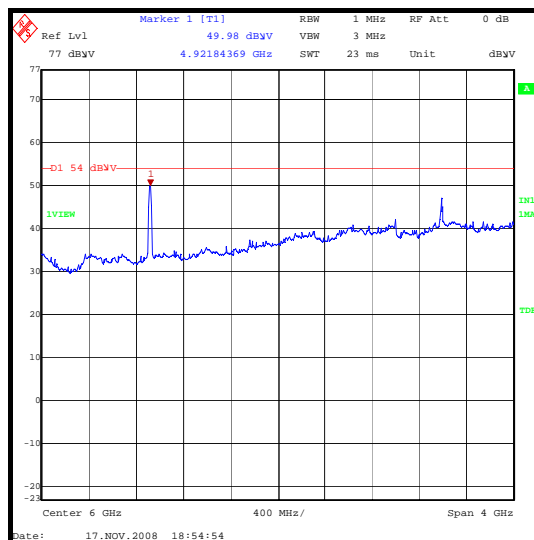
Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

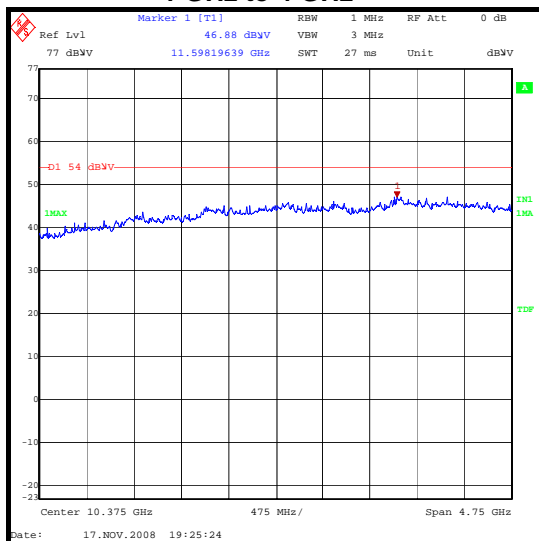
Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)



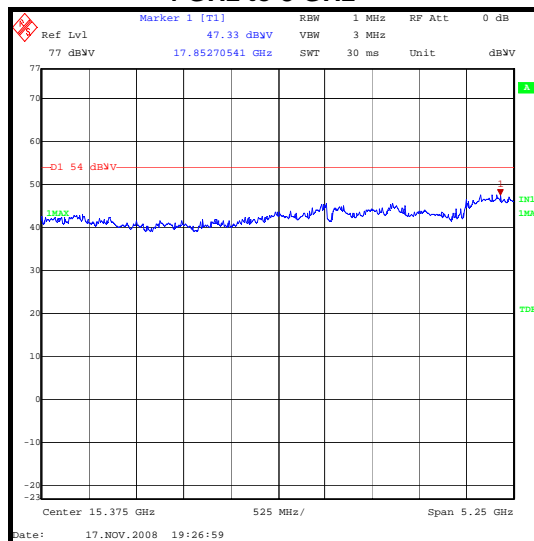
1 GHz to 4 GHz



4 GHz to 8 GHz



8 GHz to 12.75 GHz



12.75 GHz to 18 GHz

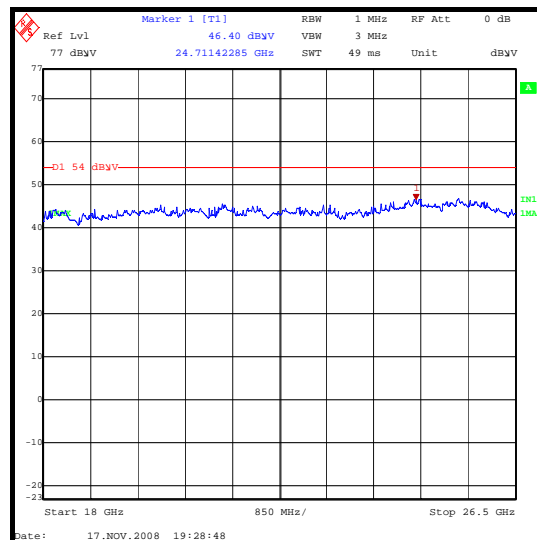
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Note: The emission shown in the 1 GHz to 4 GHz plot is the fundamental transmit frequency

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Radiated Emissions (Continued)



18 GHz to 26.5 GHz

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

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.24. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 22°C

Relative Humidity: 42%

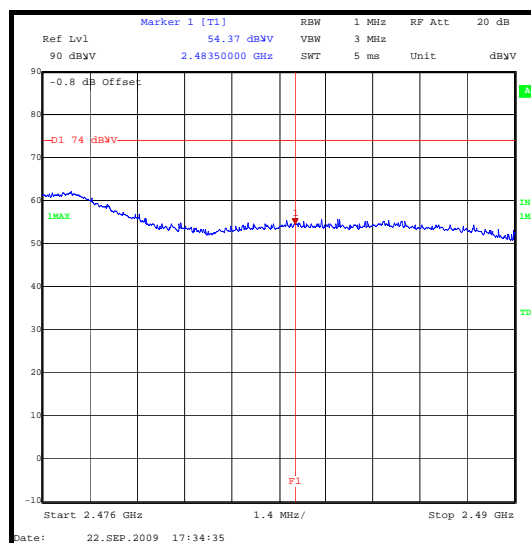
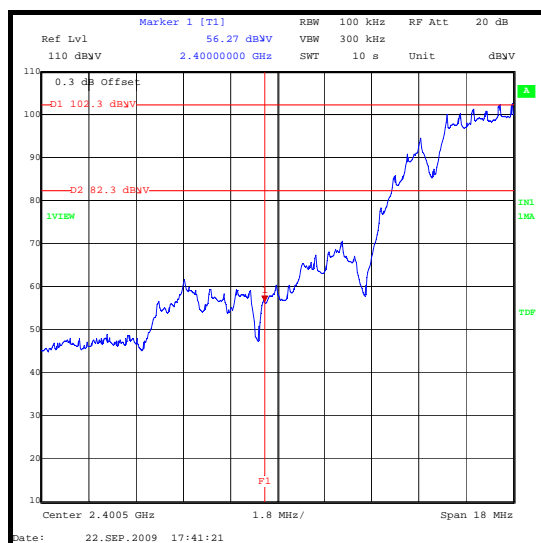
Tests were performed using the test methods detailed in ANSI C63.4 Section 8

Results: 1 Mbps - DBPSK

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	56.5	-0.2	56.3	82.3*	26.0	Complied
2.4835	Horizontal	54.6	-0.2	54.4	74.0	19.6	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

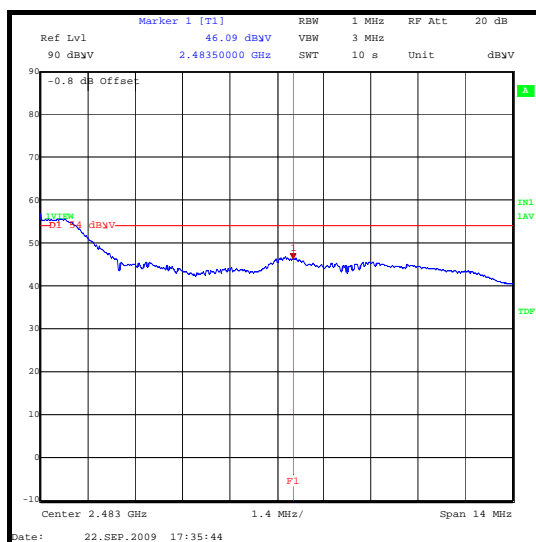
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 1 Mbps - DBPSK

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	46.3	-0.2	46.1	54.0	7.9	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

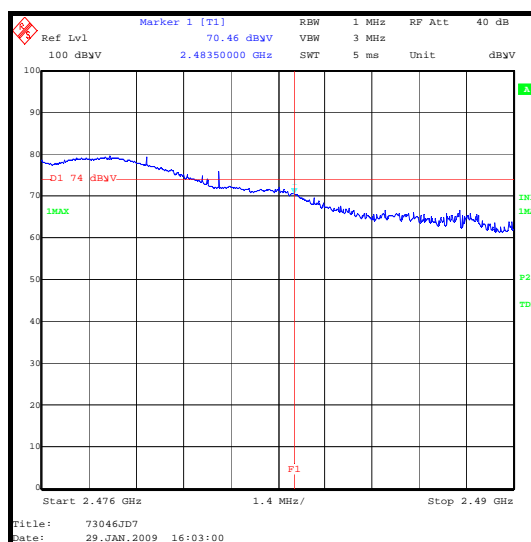
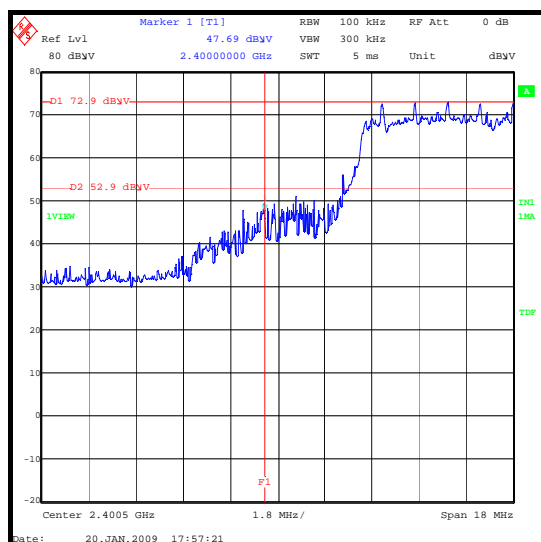
Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 9 Mbps - BPSK

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Horizontal	47.9	-0.2	47.7	52.9*	5.2	Complied
2.4835	Horizontal	70.7	-0.2	70.5	74.0	3.5	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

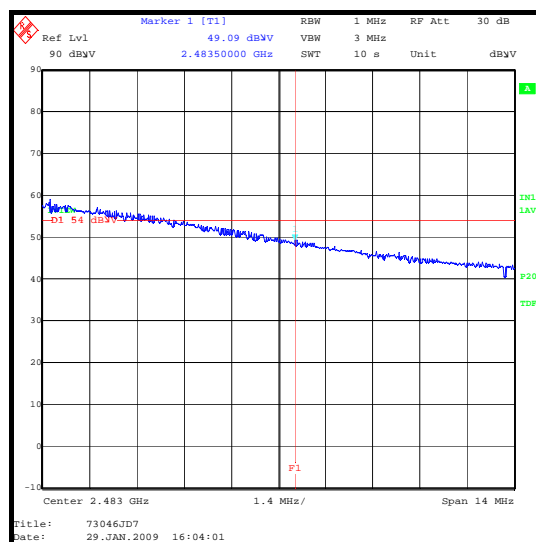
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 9 Mbps - BPSK

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	49.3	-0.2	49.1	54.0	4.9	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.25. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 22°C

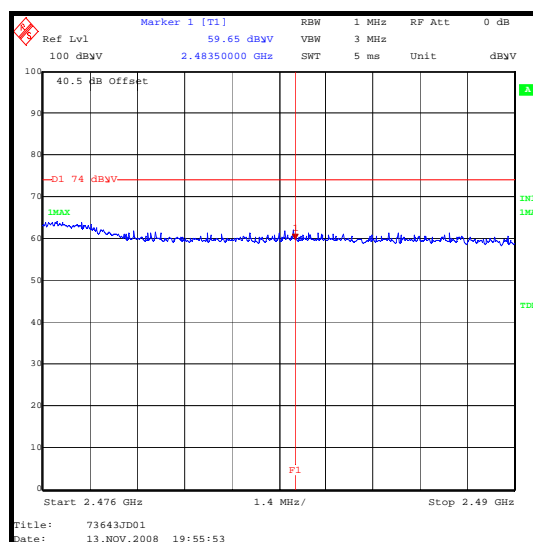
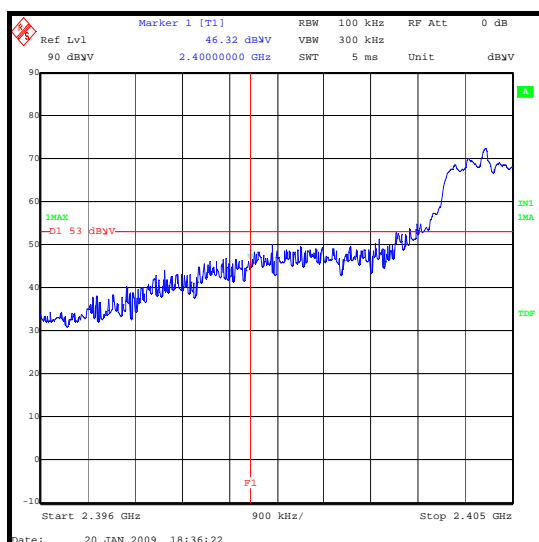
Relative Humidity: 42%

Results: 18 Mbps – QPSK

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Horizontal	46.5	-0.2	46.3	53.0*	6.7	Complied
2.4835	Horizontal	59.9	-0.2	59.7	74.0	14.3	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

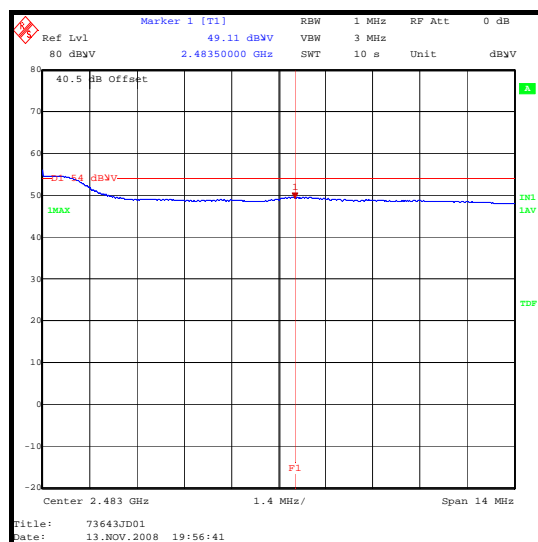
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 18 Mbps – QPSK

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	49.3	-0.2	49.1	54.0	4.9	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.26. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 22°C

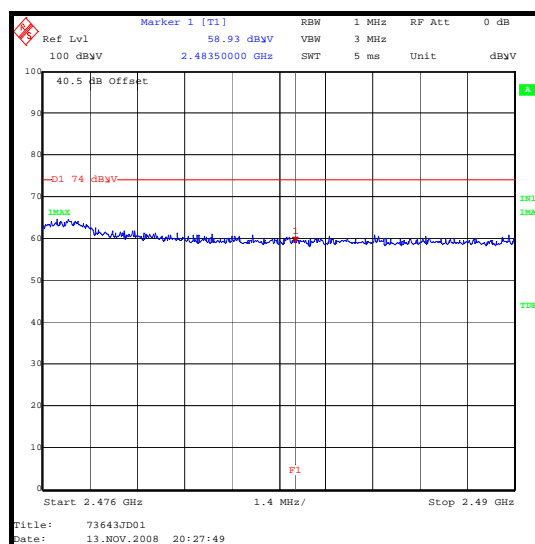
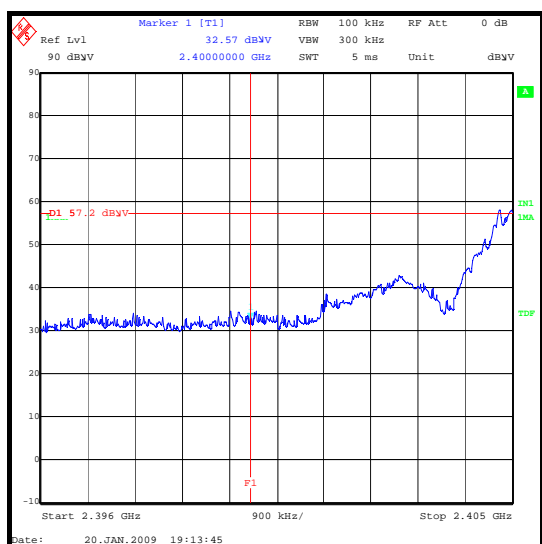
Relative Humidity: 42%

Results: 11 Mbps - CCK

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	32.8	-0.2	32.6	57.2*	24.6	Complied
2.4835	Horizontal	59.1	-0.2	58.9	74.0	15.1	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

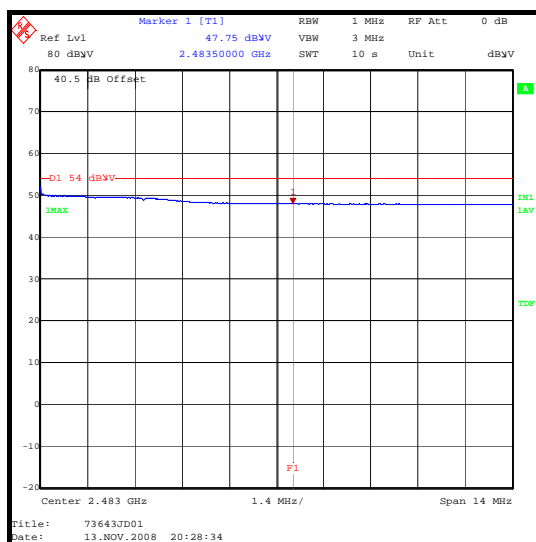
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 11 Mbps - CCK

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	48.0	-0.2	47.8	54.0	6.2	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.27. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 22°C

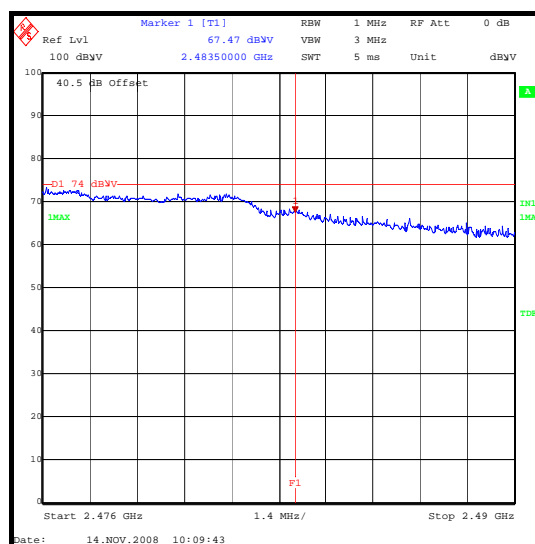
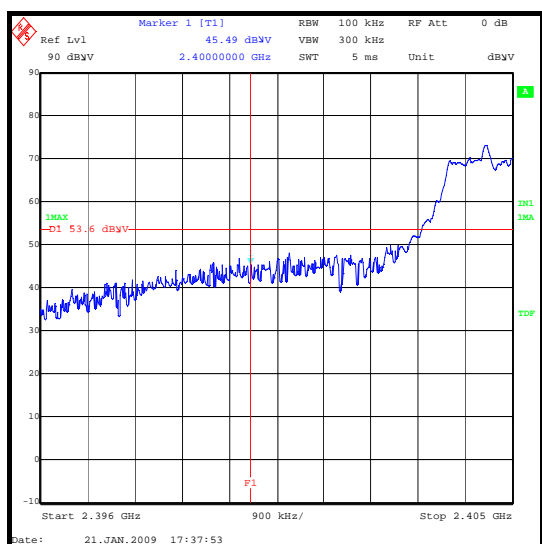
Relative Humidity: 42%

Results: 36 Mbps – 16QAM

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2.4000	Horizontal	45.7	-0.2	45.5	53.6*	8.1	Complied
2.4835	Horizontal	67.7	-0.2	67.5	74.0	6.5	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

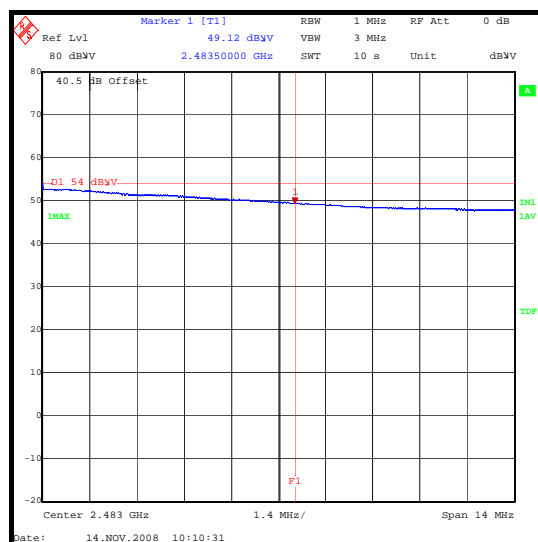
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: 36 Mbps – 16QAM

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	49.3	-0.2	49.1	54.0	4.9	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

7.2.28. Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a)

Ambient Temperature: 22°C

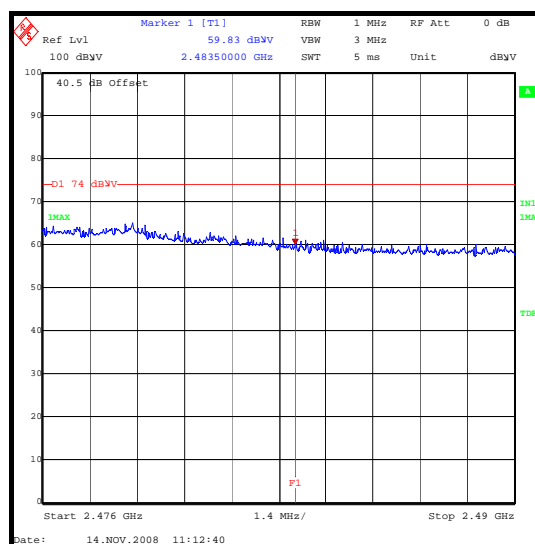
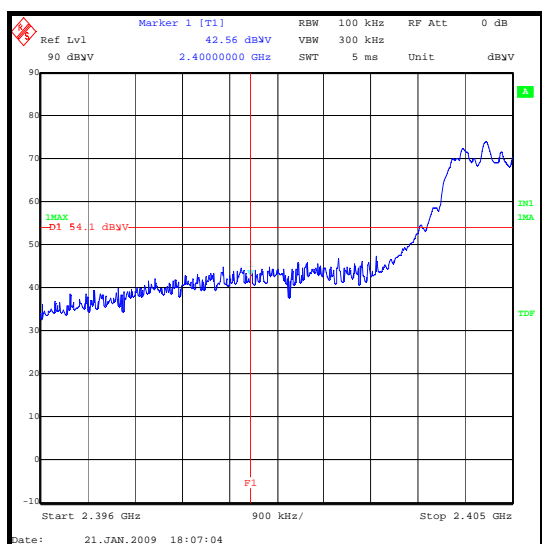
Relative Humidity: 42%

Results: 54 Mbps – 64QAM

Peak Power Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4000	Horizontal	42.8	-0.2	42.6	54.1*	11.5	Complied
2.4835	Horizontal	60.0	-0.2	59.8	74.0	14.2	Complied

* -20 dBc limit



Test of: Datalogic Mobile S.r.l
JOYA +

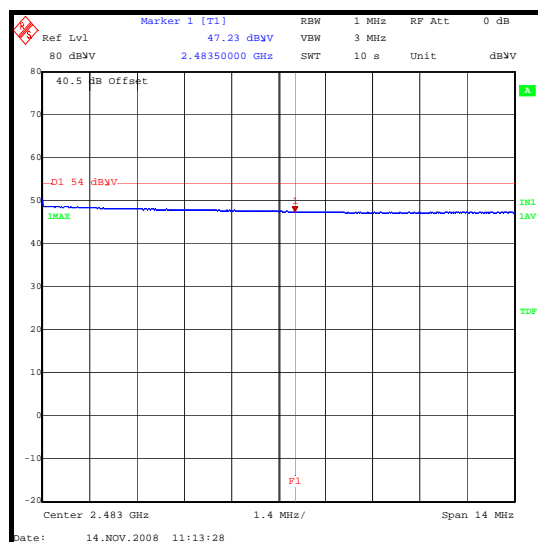
To: FCC Part 15.247: 2008 (Subpart C)

Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)

Results: - 54 Mbps – 64QAM

Average Level

Frequency (MHz)	Antenna Polarity	Detector Level (dB μ V)	Transducer Factor (dB)	Actual Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
2.4835	Horizontal	47.4	-0.2	47.2	54.0	6.8	Complied



Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

8. 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 MHz	95%	+/- 3.25 dB
Transmitter Maximum Peak Output Power	Not applicable	95%	+/- 2.94 dB
Spectral Power Density	Not applicable	95%	+/- 2.94 dB
6 dB/20 dB Bandwidth	Not applicable	95%	±11.4 ppm
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±4.64 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	±2.94 dB

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

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Appendix 1. Test Equipment Used

Test equipment used for the testing performed in 2009.

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A1227	Pre Amplifier	Agilent	8449B	3008A01566	01 Oct 2008	12
A1299	Antenna	Schaffner	CBL6143	5094	28 Jul 2008	12
A1818	Antenna	EMCO	3115	00075692	25 Oct 2008	12
K0002	3 m RSE chamber	Rainford EMC	N/A	N/A	26 Aug 2008	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESIB26	100046K	19 Feb 2008	12
M166	Thermometer	EuroCom	None	None	18 Jun 2008	12
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
C1164	Cable	Rosenberger Micro-Coax	FA210A1 0150070 70	43188-1	20 Apr 2008	12
K0008	Site Reference 4422	RFI Global Services Ltd	N/A	N/A	26 Aug 2009	12

Note: The calibration table above may not show all test equipment as being in calibration over the total test period as some of the equipment may have been sent for re-calibration during this period; however, the equipment was in calibration for the respective tests.

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

Test of: Datalogic Mobile S.r.l
JOYA +

To: FCC Part 15.247: 2008 (Subpart C)

Test equipment used for the testing performed in 2010.

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	-
A1818	Antenna	EMCO	3115	00075692	27 Nov 2009	12
A288	Antenna	Chase	CBL6111 A	1589	16 Mar 2010	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	01 Sep 2009	12
M1138	CMU 200	Rohde & Schwarz	CMU200 - 1100.000 8.02	836202/093	Calibration not required	-
M1239	N4010A	Agilent	N4010A	GB45140361	Calibration not required	-
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	08 Apr 2010	12

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