



**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/RPT1/RP73643JD01A

<b>This Test Report Is Issued Under The Authority Of Brian Watson, Operations Director</b>	
	
<b>Checked By: Nigel Davison</b>	<b>Report Copy No: PDF01</b>
	
<b>Issue Date: 30 September 2009</b>	<b>Test Dates: 13 November 2008 to 22 September 2009</b>

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**RFI GLOBAL SERVICES LTD**

**Test Report**

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## 1. Customer Information

<b>Company Name:</b>	Datalogic Mobile S.r.l
<b>Address:</b>	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)**

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

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

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

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## 2.5. Additional Information Related to Testing

<b>Technology Tested:</b>	WiFi		
<b>Power Supply Requirement:</b>	Internal battery supply 3.7 V nominal		
<b>Type of Unit:</b>	Transceiver		
<b>Modulation Type:</b>	DBPSK, BPSK, QPSK, CCK, 16QAM, 64QAM		
<b>Data Rate:</b>	802.11b (DSSS): 1, 2, 5.5, 11 Mbps 802.11g (OFDM): 6, 9, 12, 18, 24, 36, 48, 54 Mbps		
<b>Maximum RF Power Output:</b>	20.0 dBm (measured)		
<b>Transmit Frequency Range:</b>	2412 MHz to 2462 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	2412	1
	Middle	2437	6
	Top	2462	11
<b>Receive Frequency Range:</b>	2412 MHz to 2462 MHz		
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	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 and the modulations / data rates tested were:
  - 1 Mbps – DBPSK
  - 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 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**

<b>Range of Measurements</b>	<b>Specification Reference</b>	<b>Port Type</b>	<b>Result</b>
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

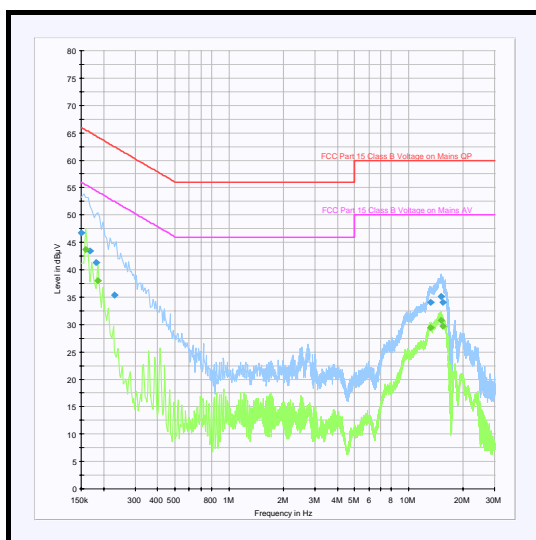
Tests were performed using the test methods detailed in ANSI C63.4 Section 7

#### Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ 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 $\mu$ V)	Limit (dB $\mu$ 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%

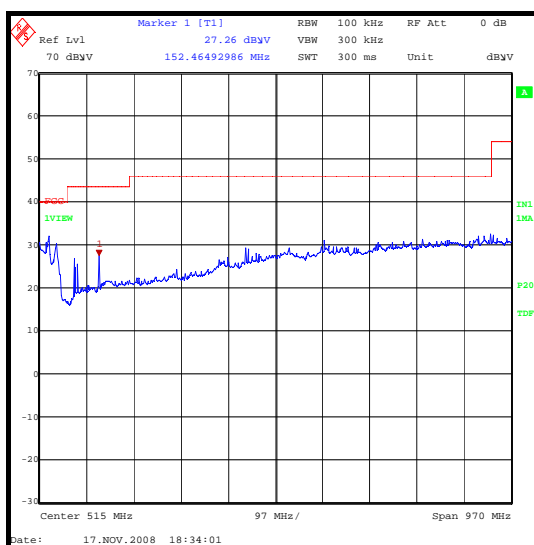
Tests were performed using the test methods detailed in ANSI C63.4 Section 8

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

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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):

- 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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
11.617	Vertical	45.1	2.4	47.5	54.0	6.5	Complied

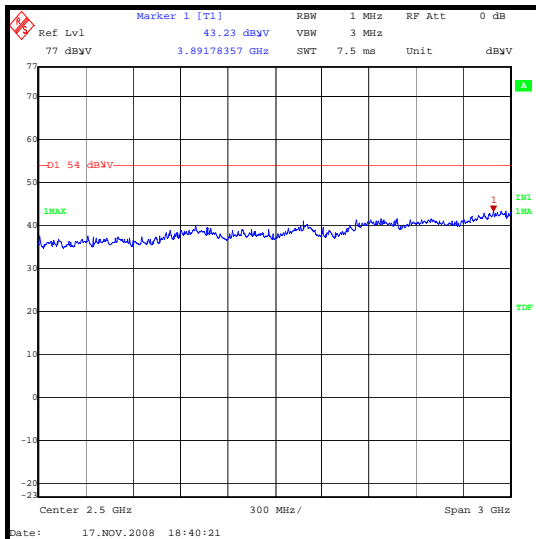
##### Note(s):

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.

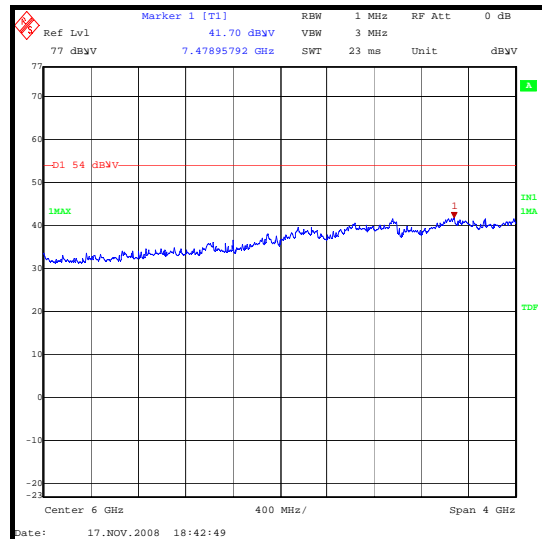
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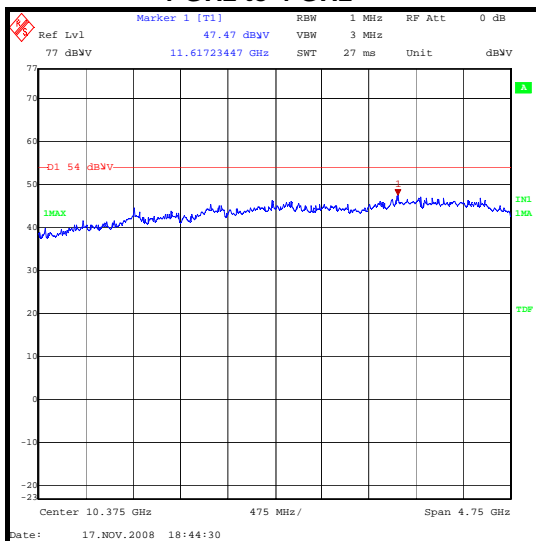
**Idle Mode Radiated Spurious Emissions (Continued)**



**1 GHz to 4 GHz**



**4 GHz to 8 GHz**



**8 GHz to 12.75 GHz**

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)**

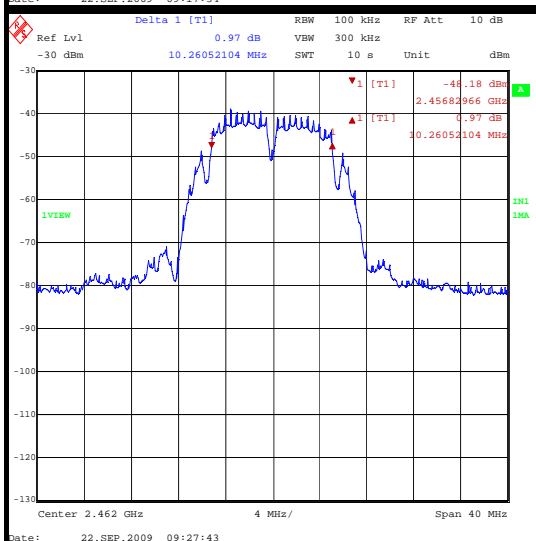
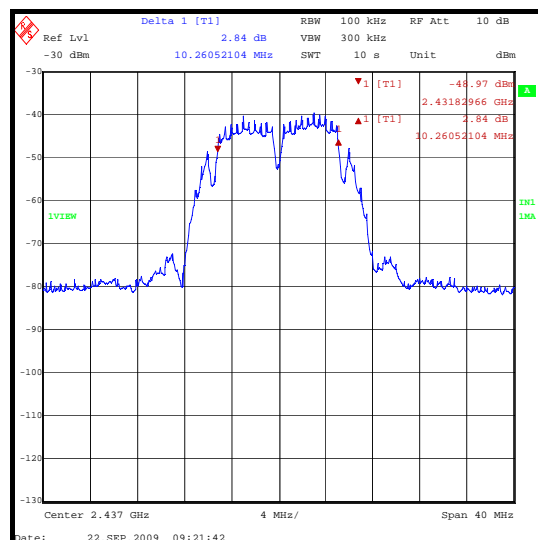
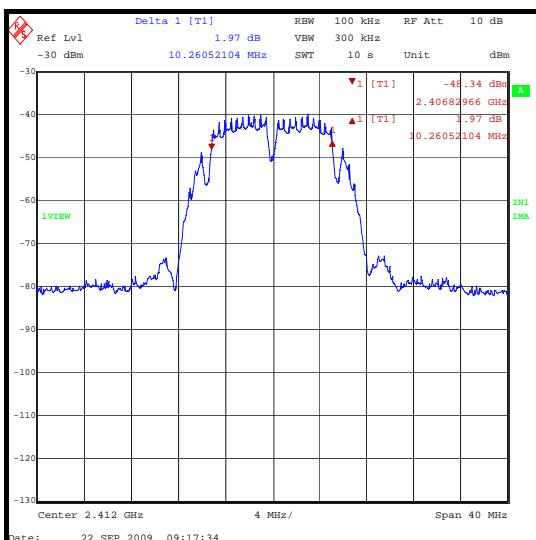
Ambient Temperature: 22°C

Relative Humidity: 42%

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

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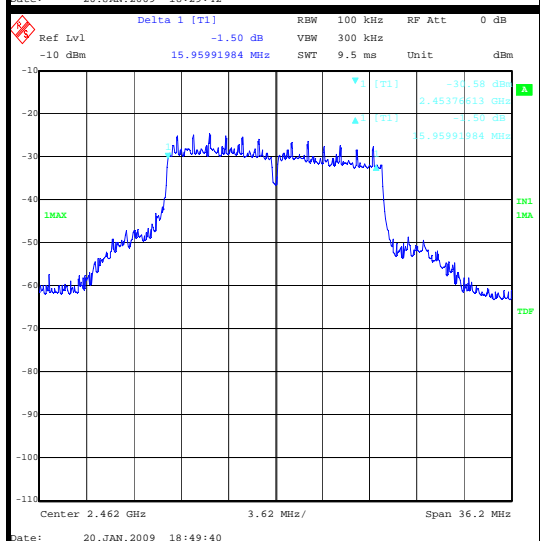
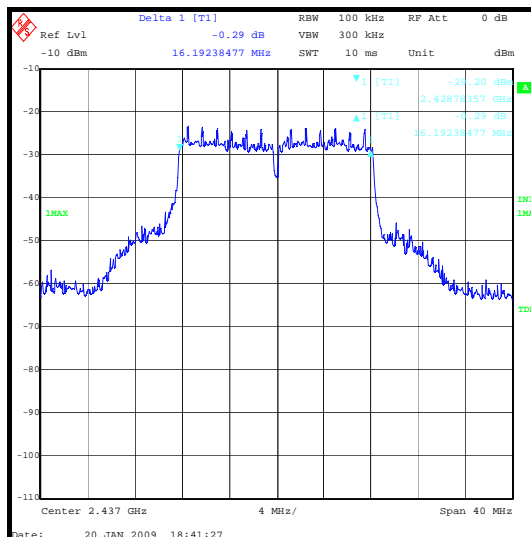
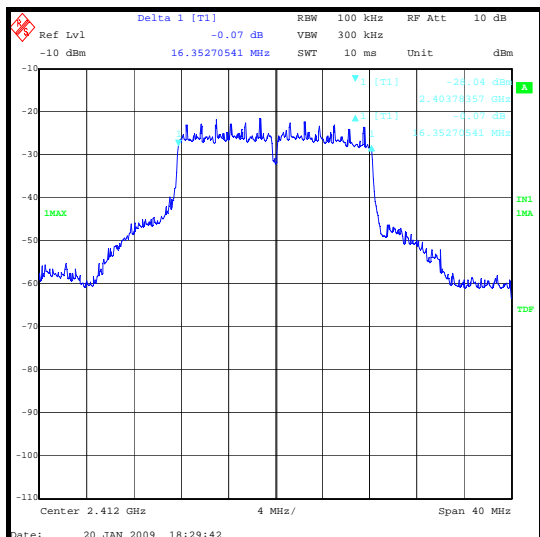
**7.2.5. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)**

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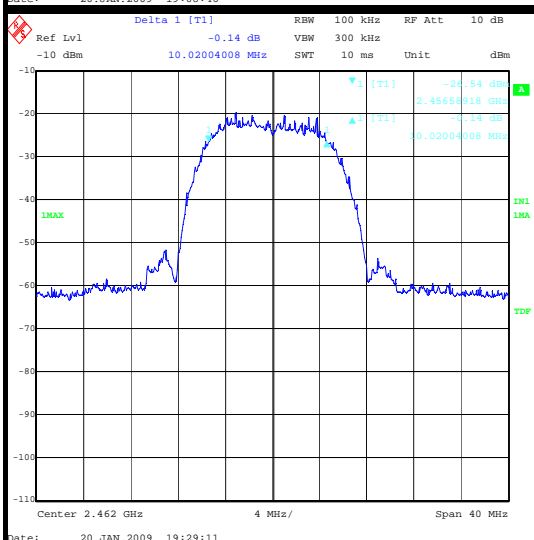
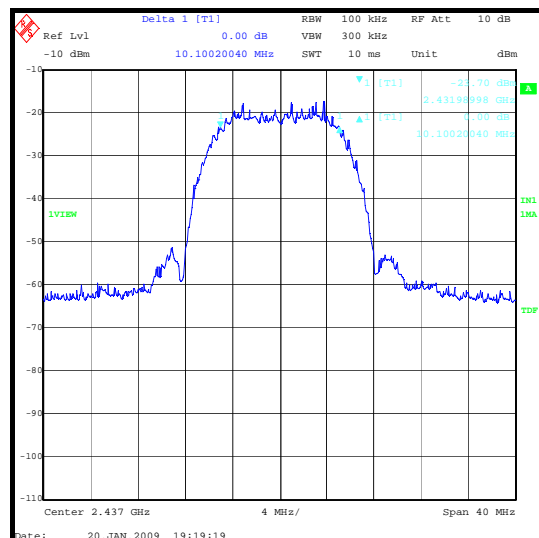
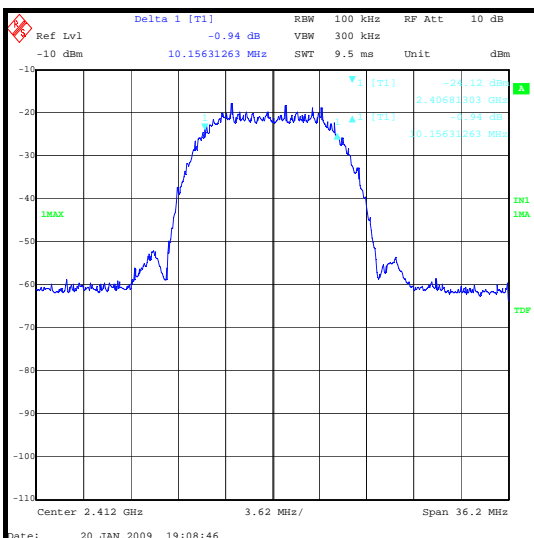
**7.2.6. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)**

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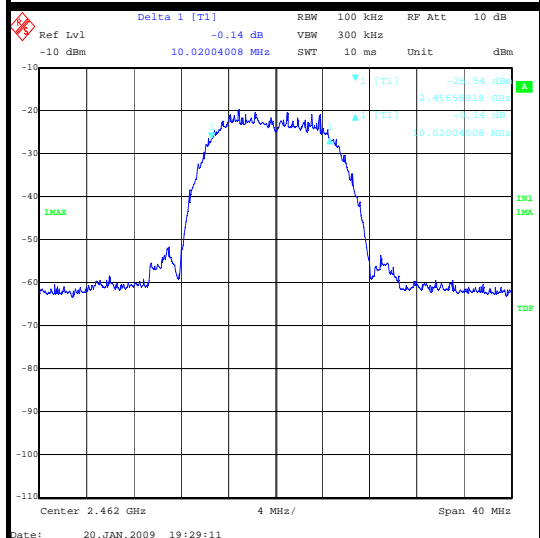
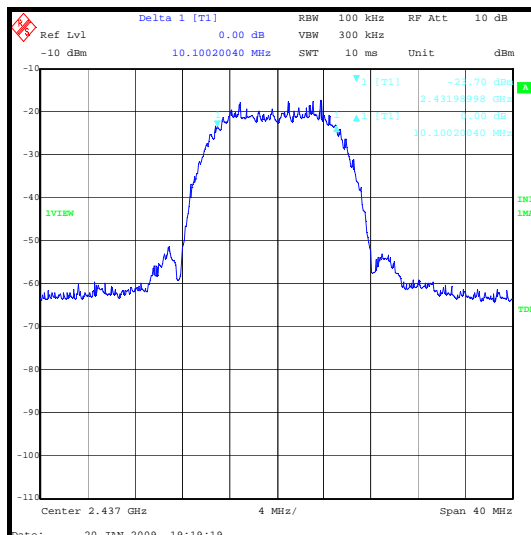
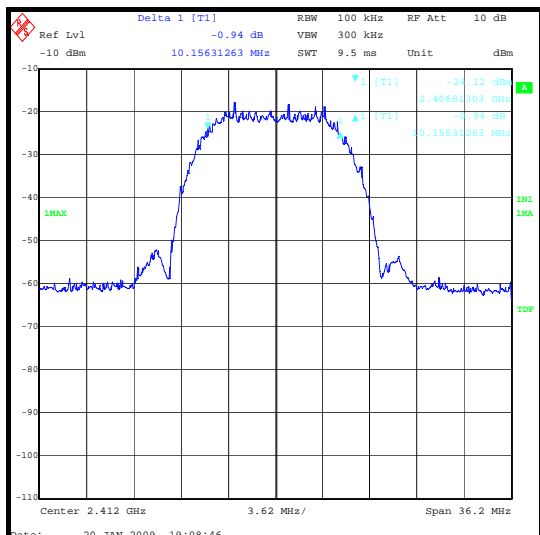
**7.2.7. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)**

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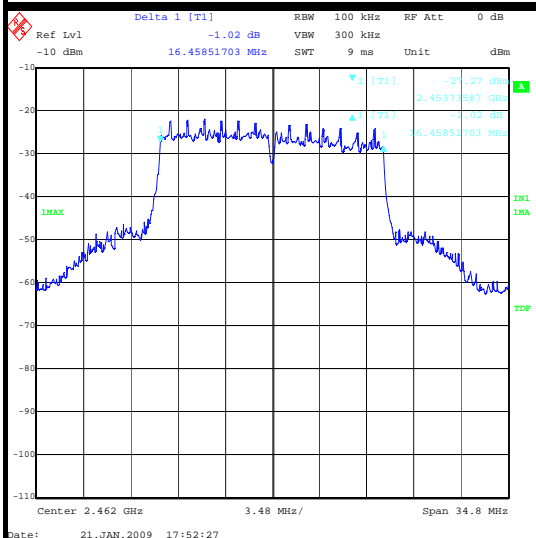
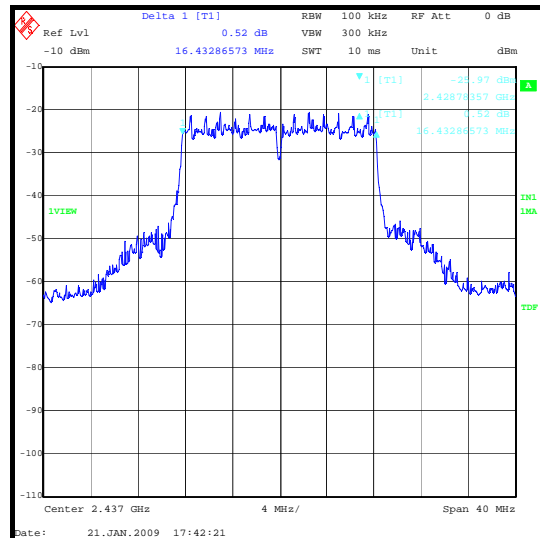
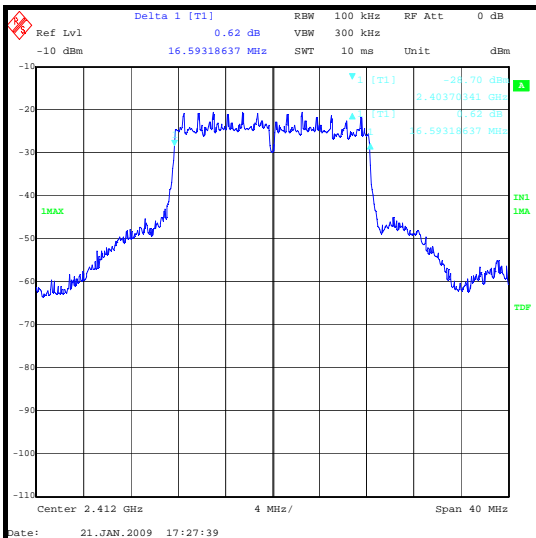
**7.2.8. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)**

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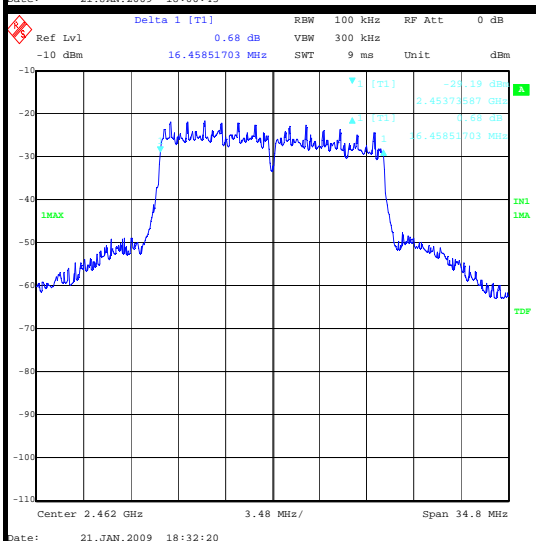
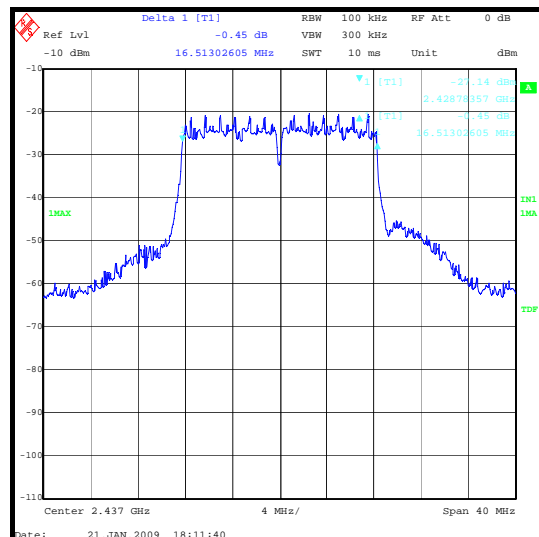
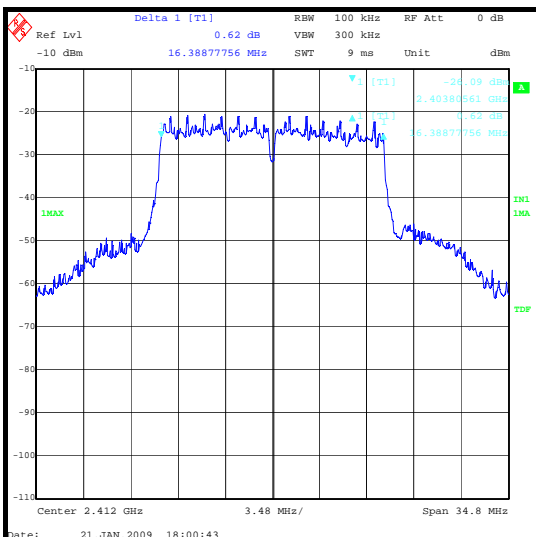
**7.2.9. Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)**

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**

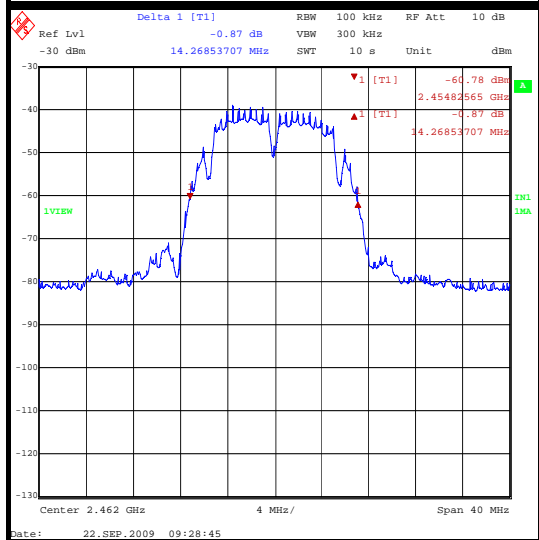
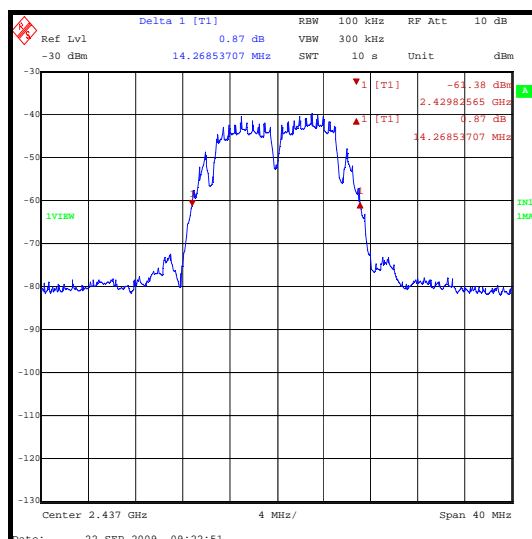
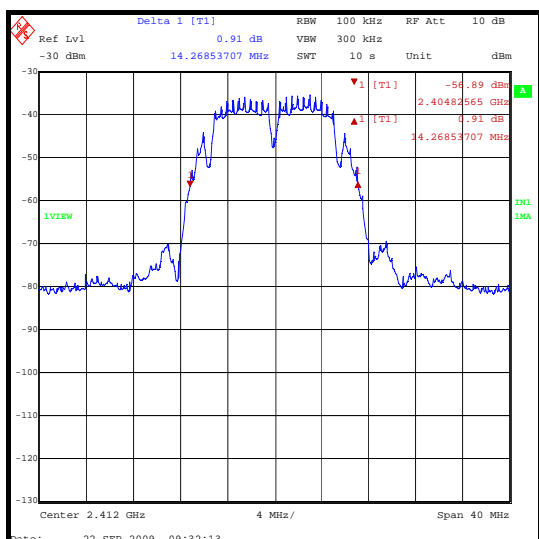
Ambient Temperature: 22°C

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**

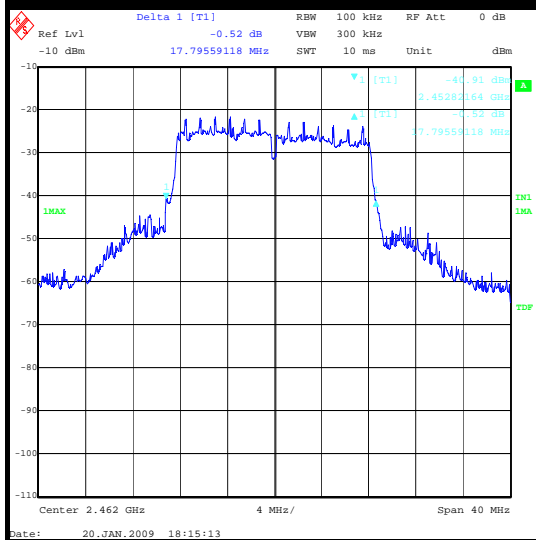
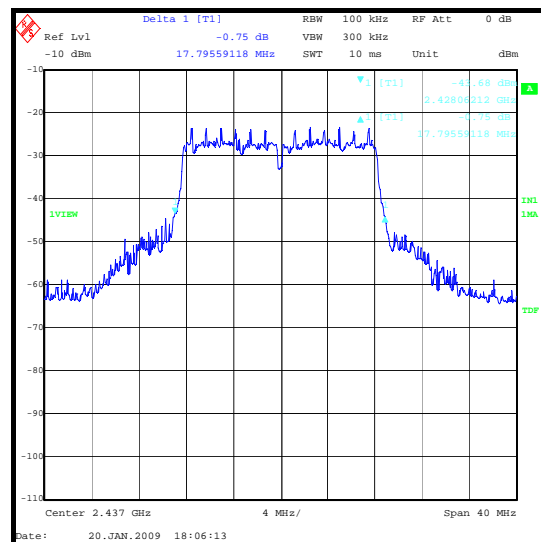
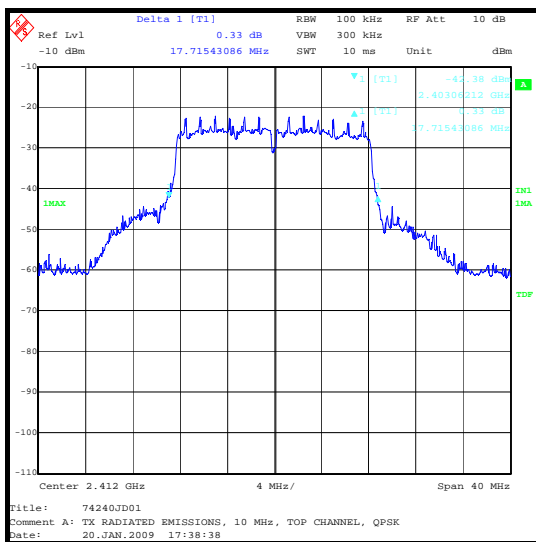
Ambient Temperature: 22°C

Relative Humidity: 42%

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

**Results: 9 Mbps - BPSK**

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



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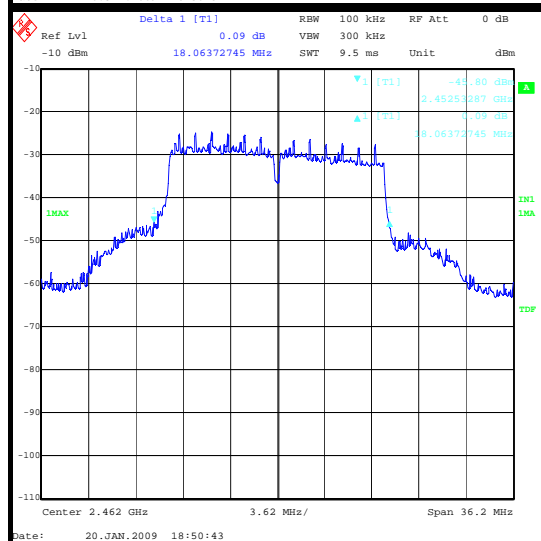
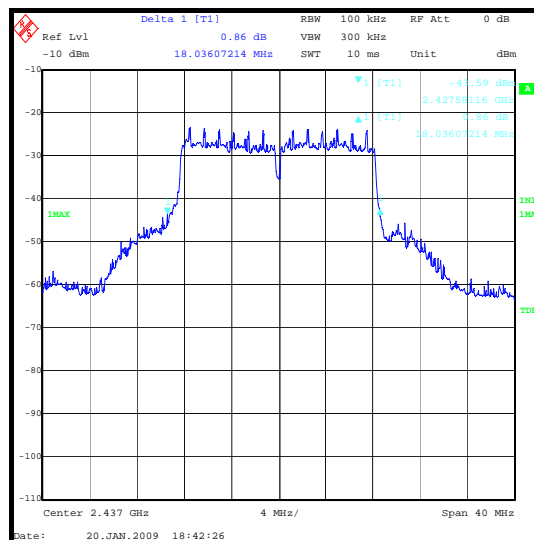
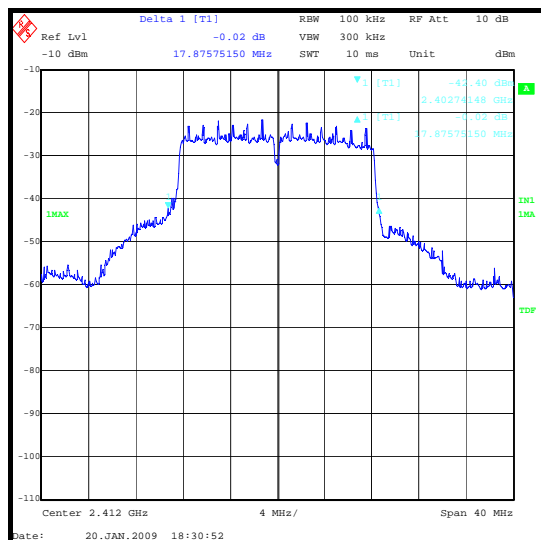
**7.2.12. Transmitter 20 dB Bandwidth: Section 2.1049**

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





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

To: FCC Part 15.247: 2008 (Subpart C)

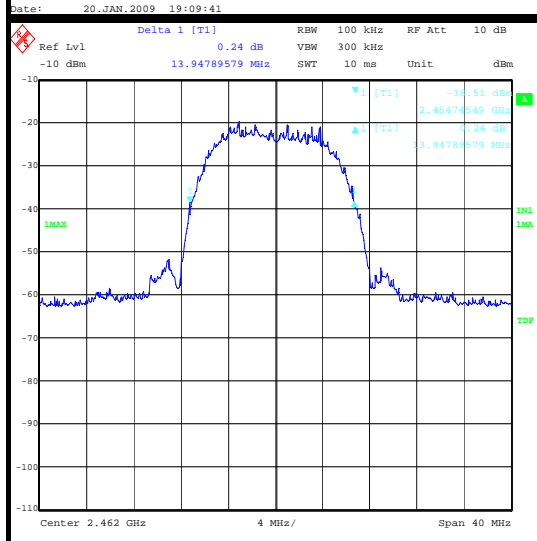
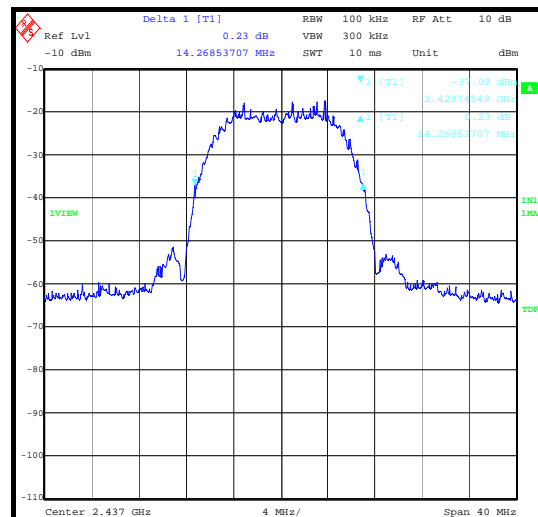
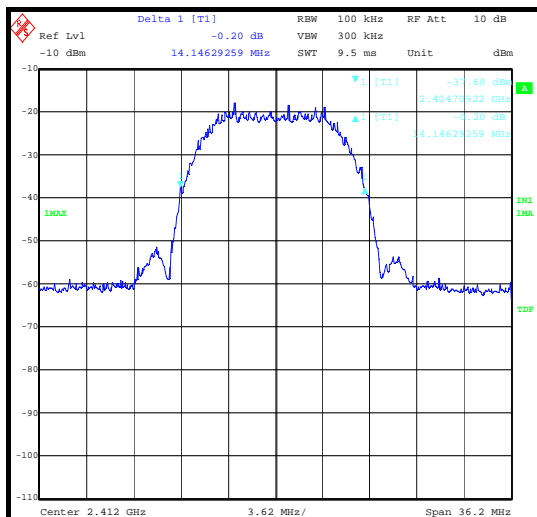
**7.2.13. Transmitter 20 dB Bandwidth: Section 2.1049**

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)

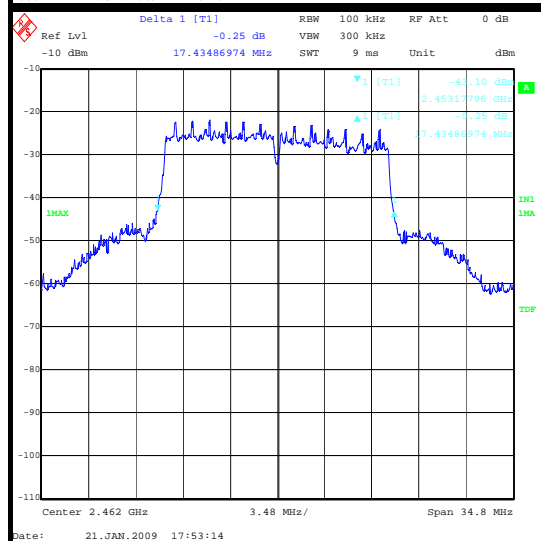
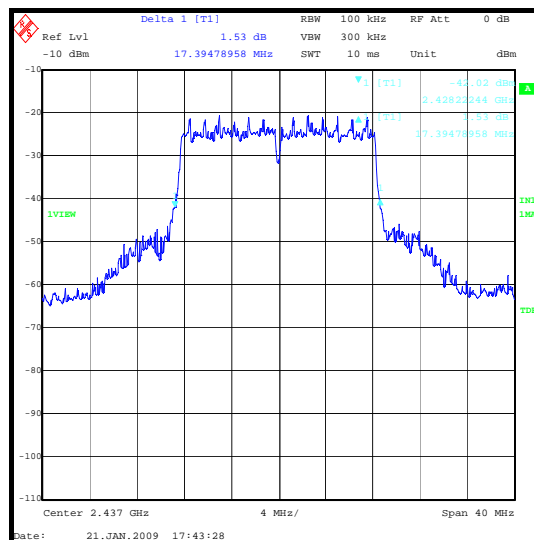
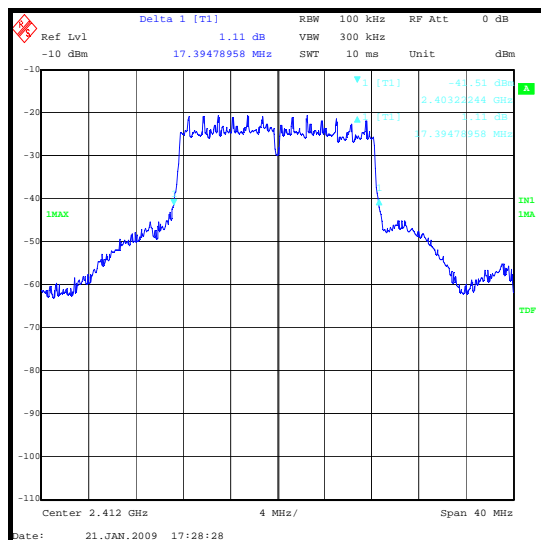
**7.2.14. Transmitter 20 dB Bandwidth: Section 2.1049**

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)

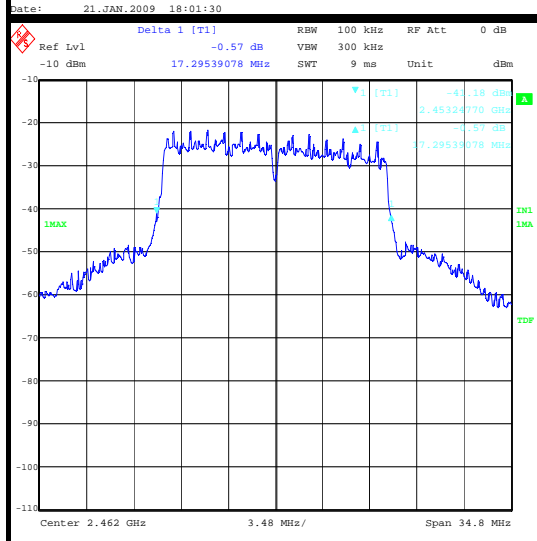
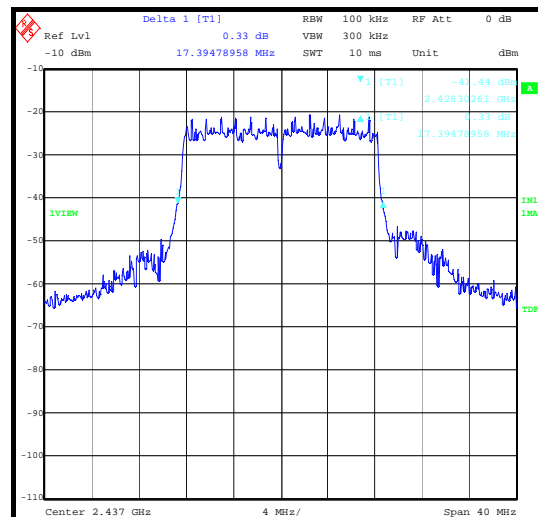
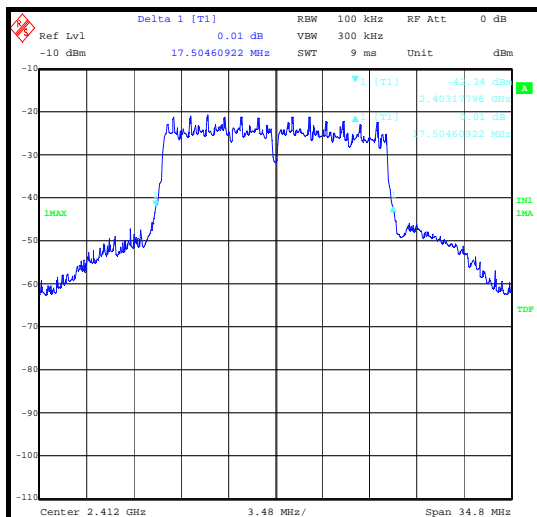
**7.2.15. Transmitter 20 dB Bandwidth: Section 2.1049**

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)**

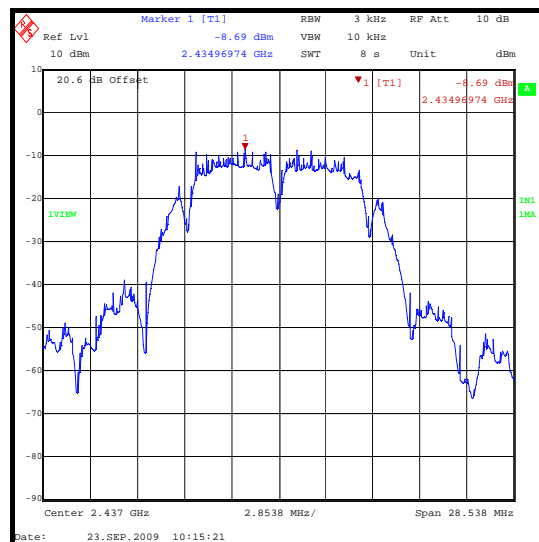
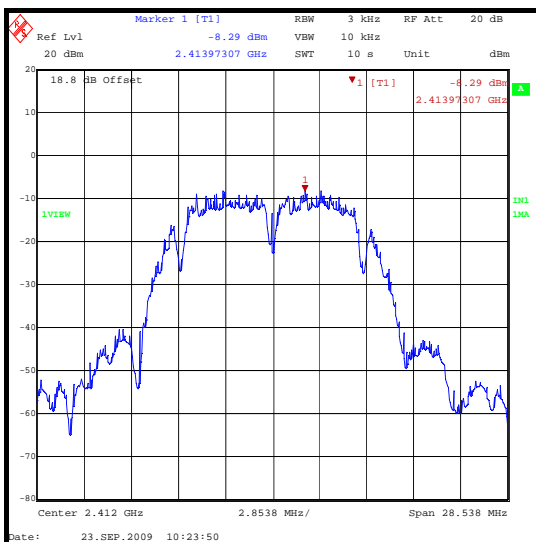
Ambient Temperature: 22°C

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)**

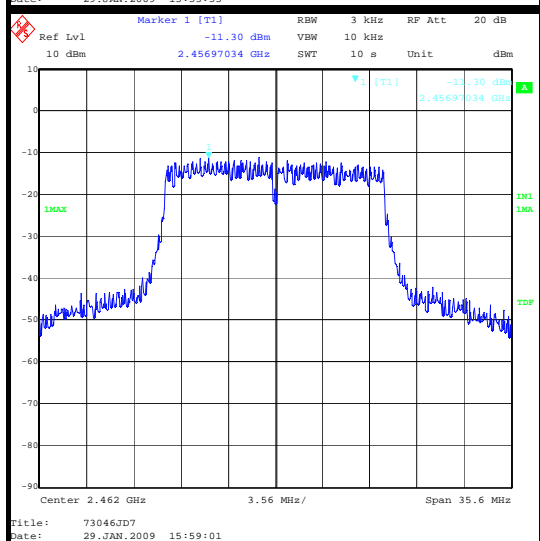
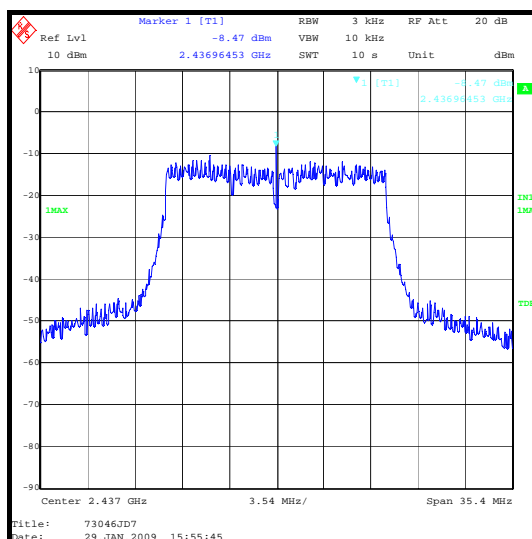
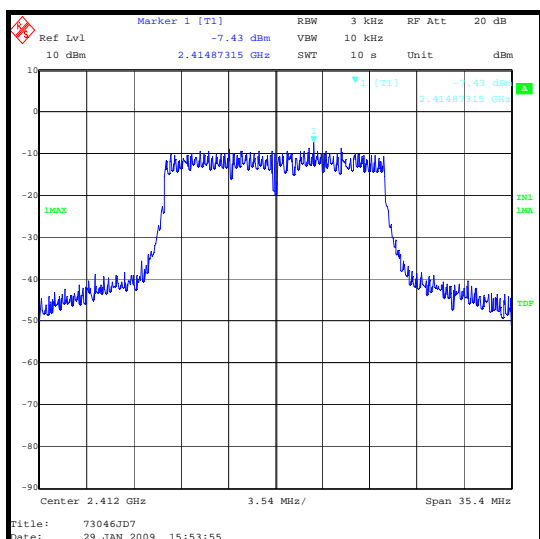
Ambient Temperature: 22°C

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



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

To: FCC Part 15.247: 2008 (Subpart C)

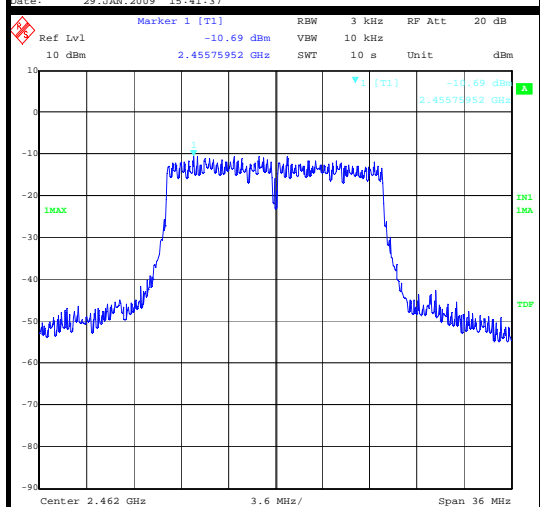
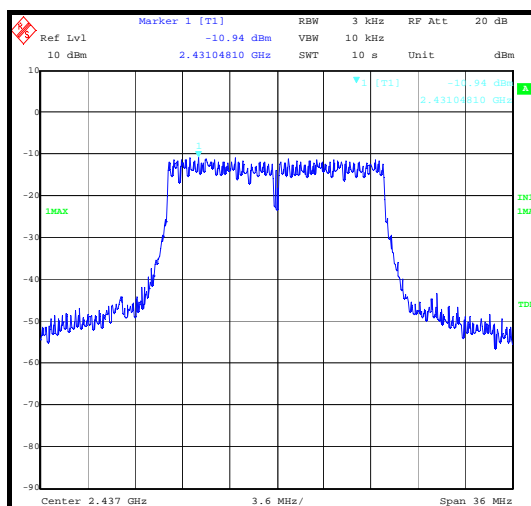
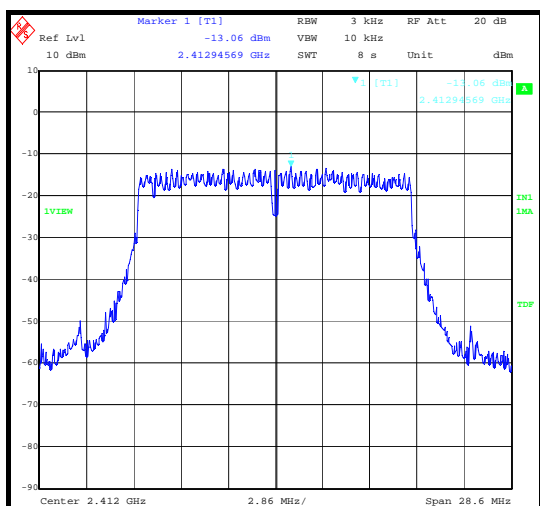
**7.2.18. Transmitter Peak Power Spectral Density: Section 15.247(e)**

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



Title: 73046JD7  
Date: 29.JAN.2009 15:50:11

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

To: FCC Part 15.247: 2008 (Subpart C)

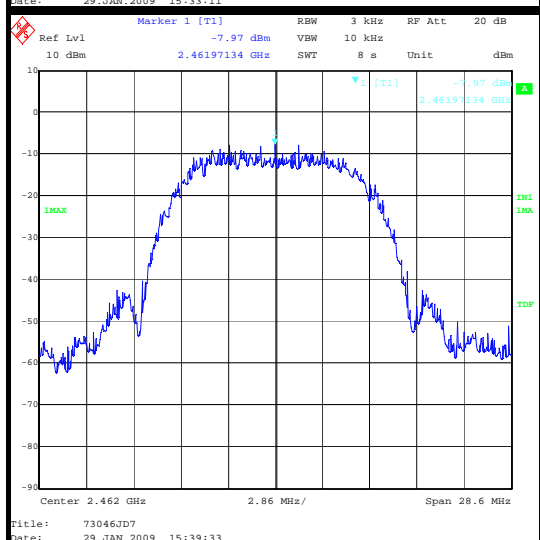
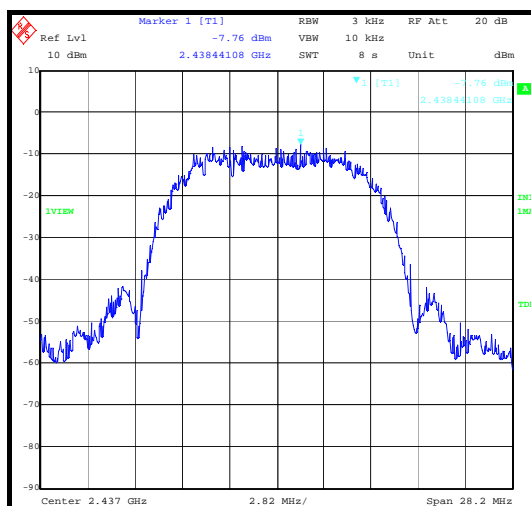
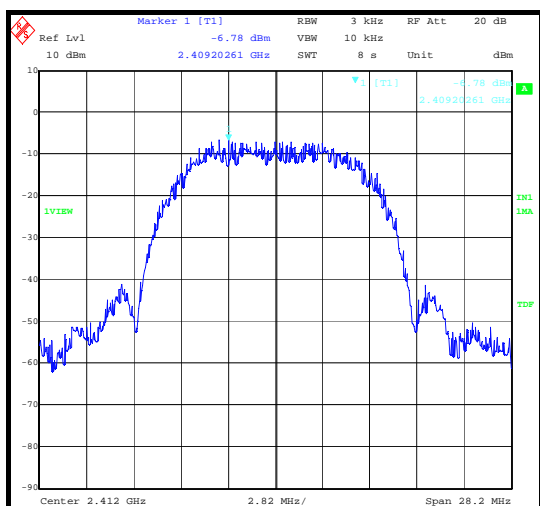
**7.2.19. Transmitter Peak Power Spectral Density: Section 15.247(e)**

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 15:33:33

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

To: FCC Part 15.247: 2008 (Subpart C)

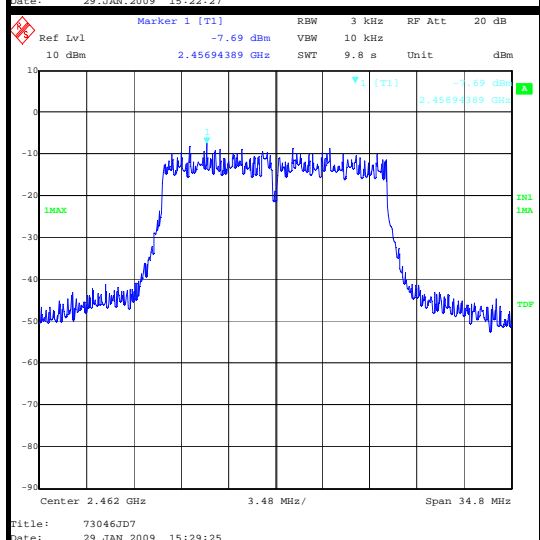
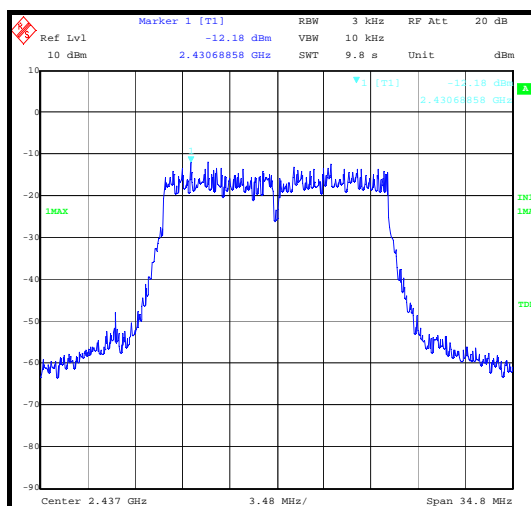
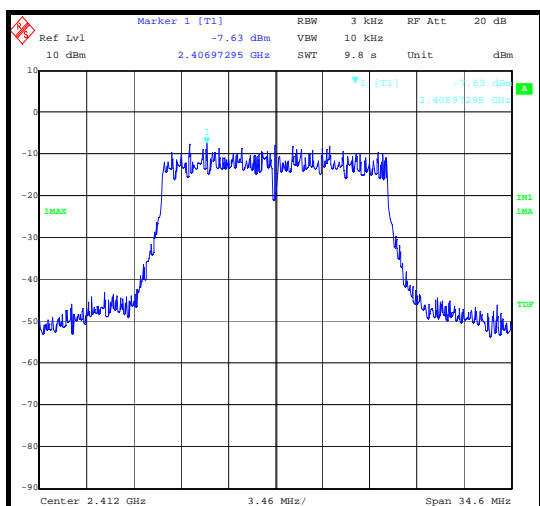
**7.2.20. Transmitter Peak Power Spectral Density: Section 15.247(e)**

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



Title: 73046JD7  
Date: 29.JAN.2009 15:29:25



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

To: FCC Part 15.247: 2008 (Subpart C)

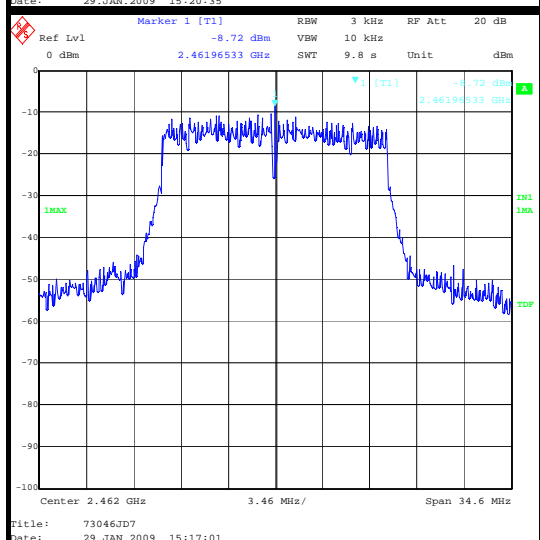
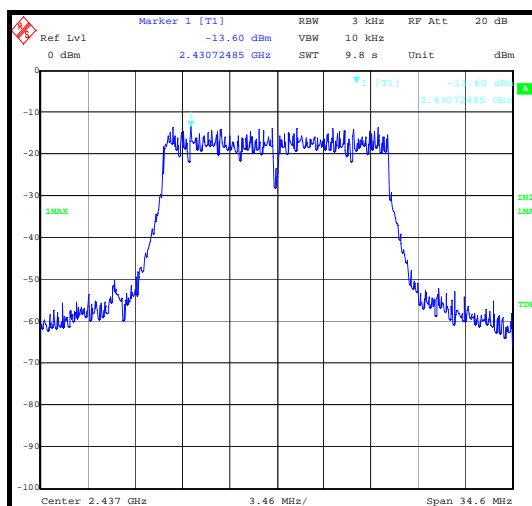
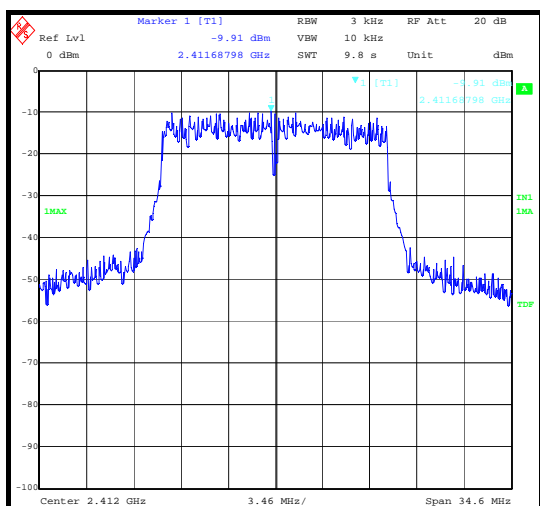
**7.2.21. Transmitter Peak Power Spectral Density: Section 15.247(e)**

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)

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**7.2.22. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

Tests were performed using the channel power function of the spectrum analyser

**Results: 1 Mbps – DBPSK**

Channel	EIRP (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

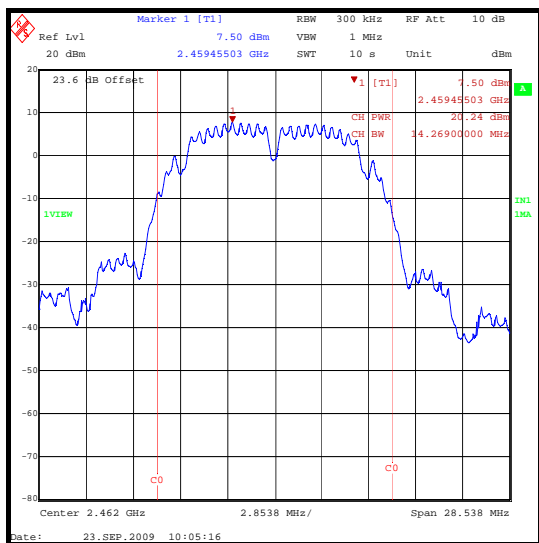
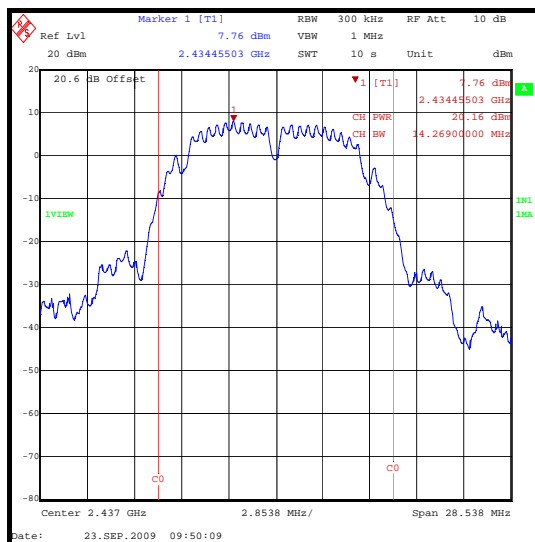
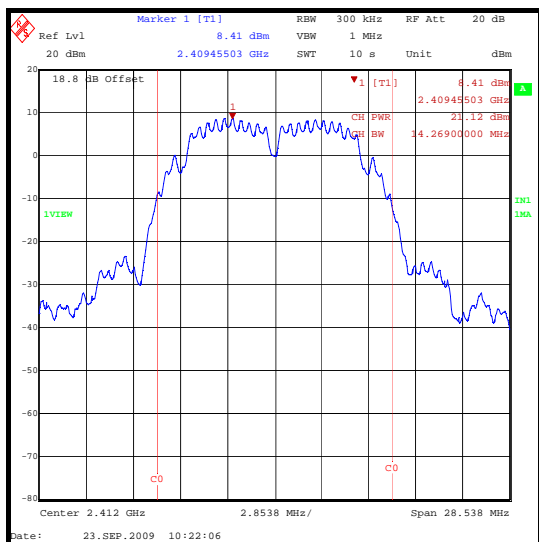
**Note(s):**

1. These 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)

**Transmitter Maximum Peak Output Power: (EIRP) (Continued)**



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

To: FCC Part 15.247: 2008 (Subpart C)

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**Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

**Results: 9 Mbps – BPSK**

Channel	EIRP (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

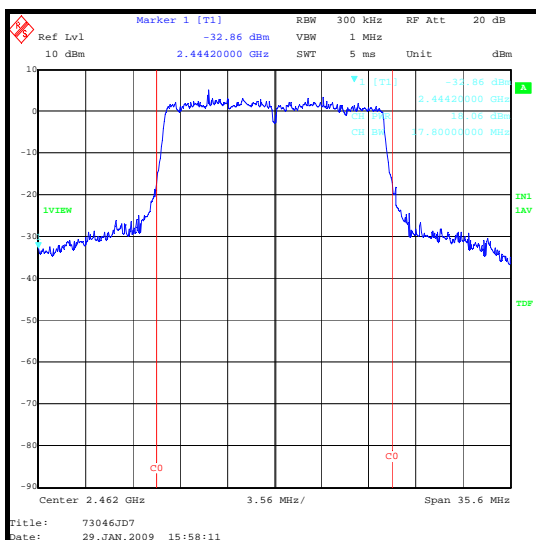
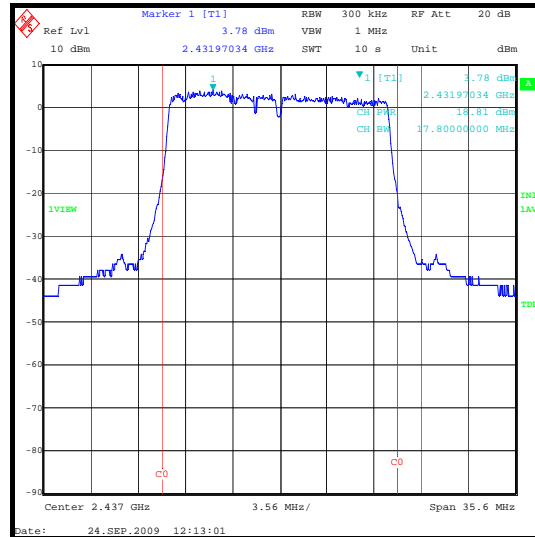
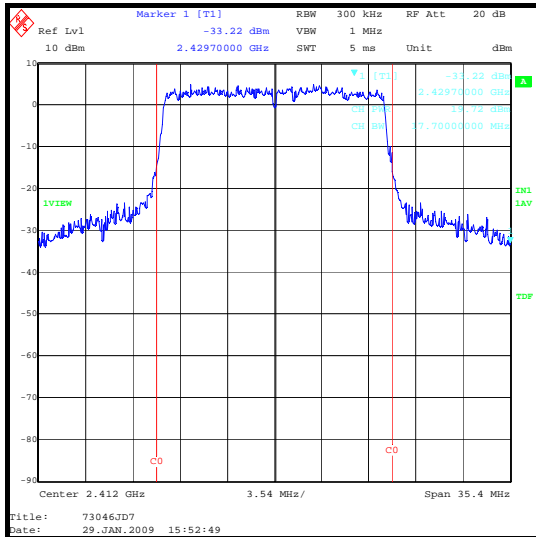
**Note(s):**

1. These 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)

**Transmitter Maximum Peak Output Power: (EIRP) (Continued)**



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

To: FCC Part 15.247: 2008 (Subpart C)

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**Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

**Results: 18 Mbps - QPSK**

Channel	EIRP (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

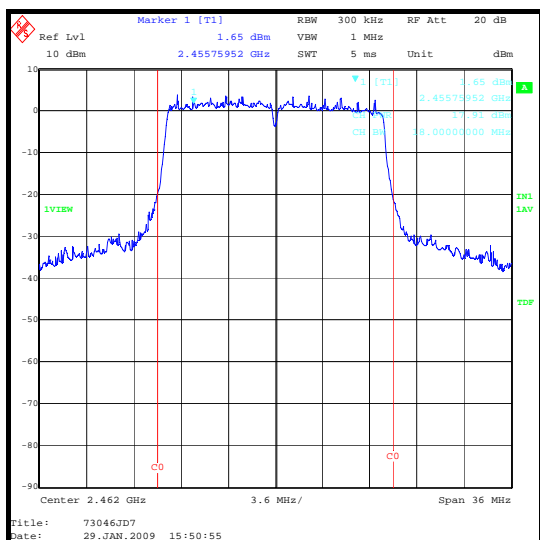
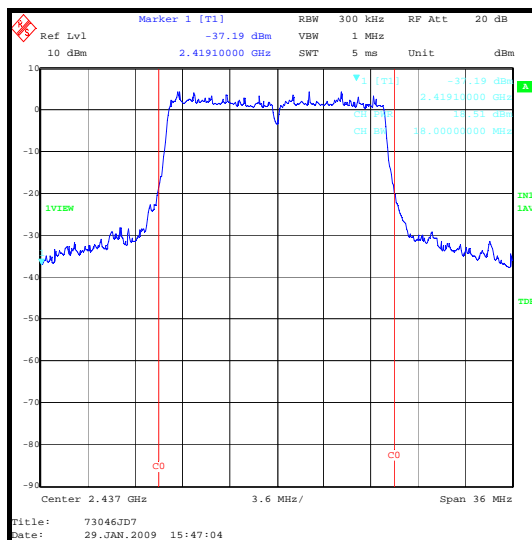
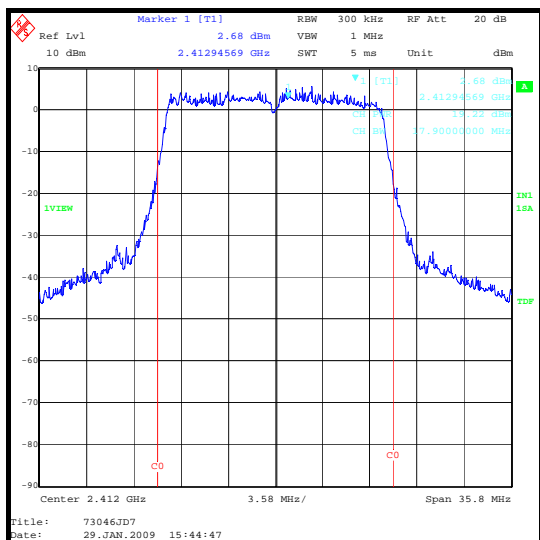
**Note(s):**

1. These 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)

**Transmitter Maximum Peak Output Power: (EIRP) (Continued)**



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

To: FCC Part 15.247: 2008 (Subpart C)

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**7.2.23. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

**Results: 11 Mbps - CCK**

Channel	EIRP (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

**Note(s):**

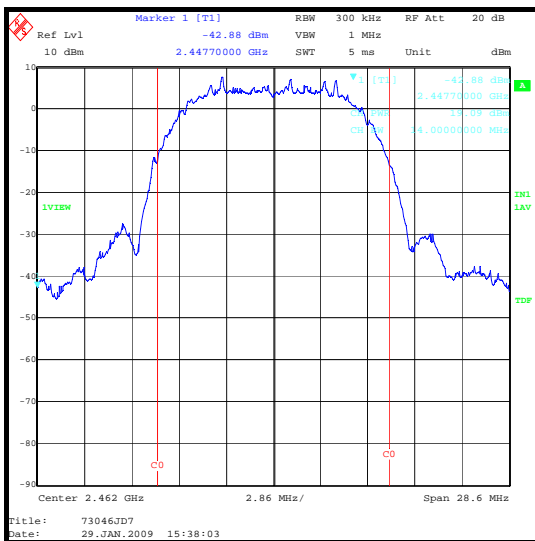
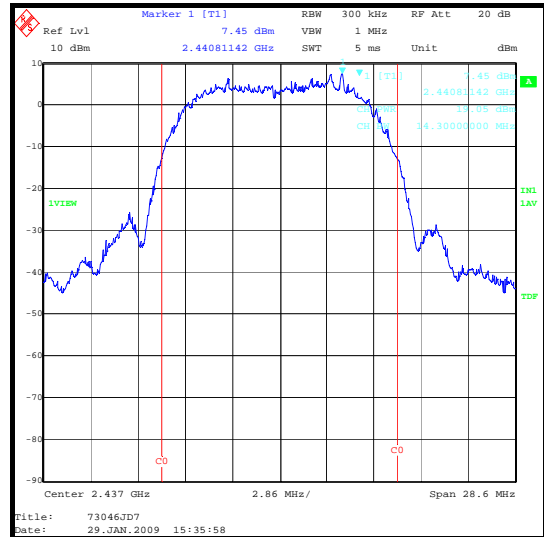
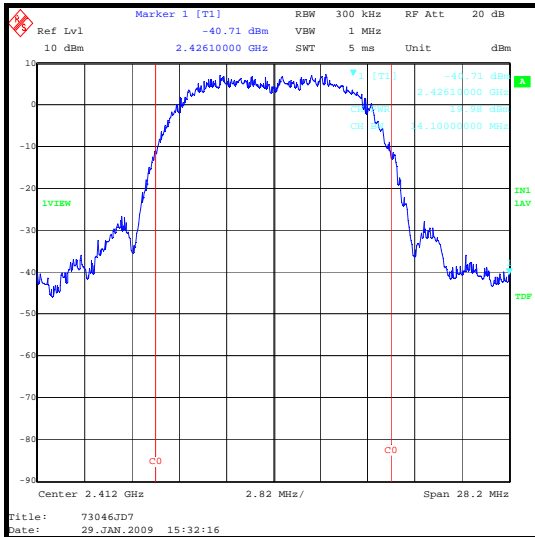
1. These tests were performed radiated; therefore the EUT antenna gain is encompassed in the final result and not measurable.



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

To: FCC Part 15.247: 2008 (Subpart C)

**Transmitter Maximum Peak Output Power: (EIRP) (Continued)**



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

To: FCC Part 15.247: 2008 (Subpart C)

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**7.2.24. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

**Results: 36 Mbps – 16QAM**

Channel	EIRP (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

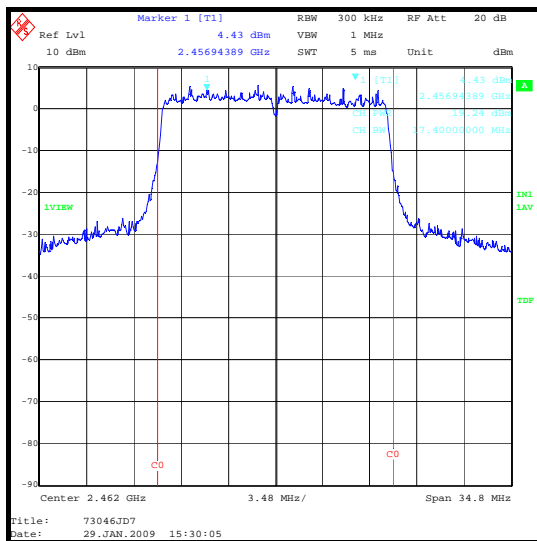
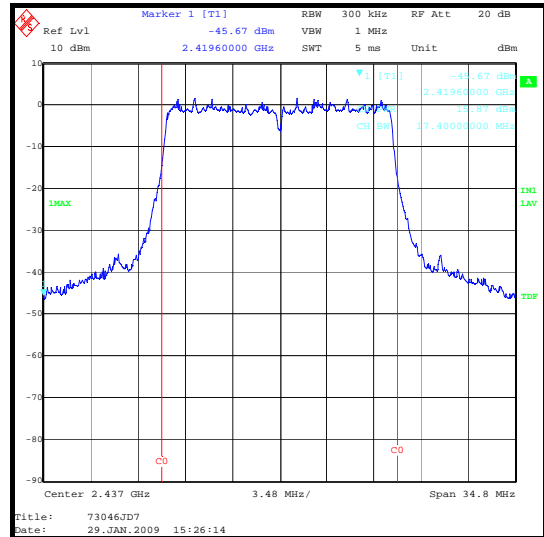
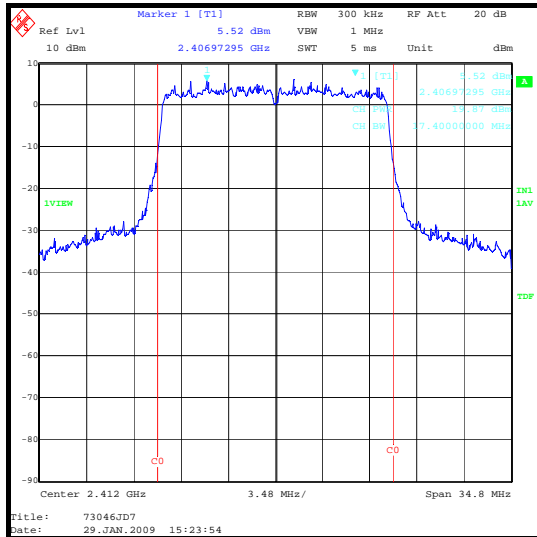
**Note(s):**

1. These 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)

Transmitter Maximum Peak Output Power: (EIRP) (Continued)



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

To: FCC Part 15.247: 2008 (Subpart C)

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**7.2.25. Transmitter Maximum Peak Output Power: (EIRP) Section 15.247(b)(3)**

Ambient Temperature: 22°C

Relative Humidity: 42%

**Results: 54 Mbps – 64QAM**

Channel	EIRP (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

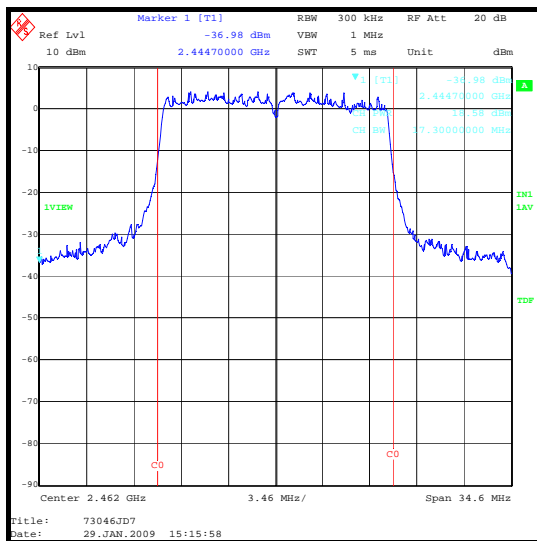
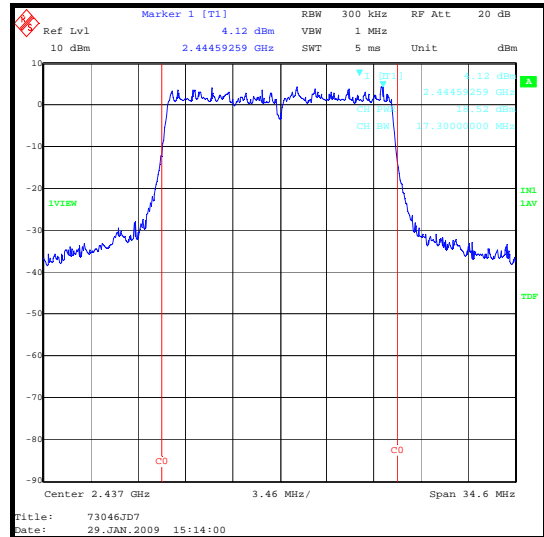
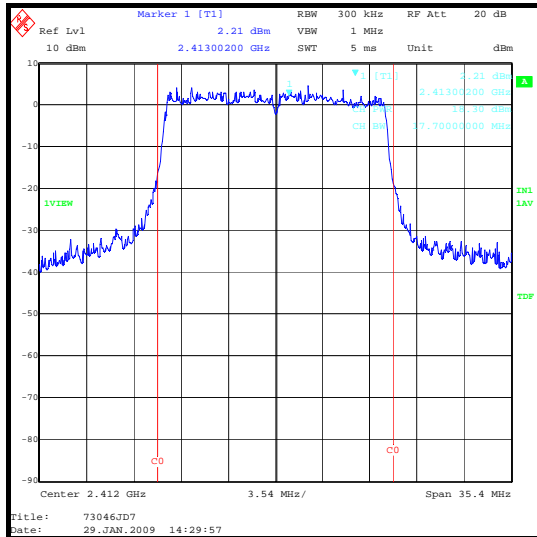
**Note(s):**

1. These 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)

**Transmitter Maximum Peak Output Power: (EIRP) (Continued)**



Test of: Datalogic Mobile S.r.l  
 JOYA +  
 To: FCC Part 15.247: 2008 (Subpart C)

**7.2.26. 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 and DA 00-705

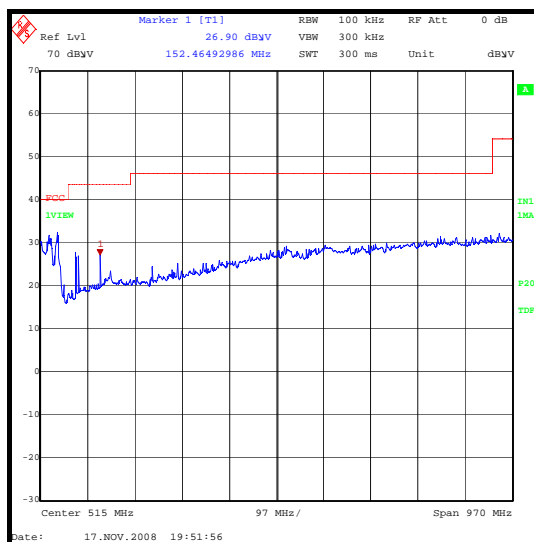
**Electric Field Strength Measurements: 30 MHz to 1000 MHz**

**Top Channel**

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/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):**

- 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.
- 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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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)

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

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

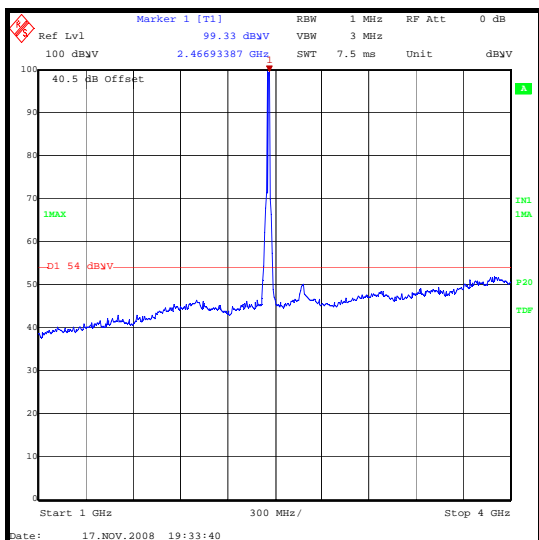
##### Highest Peak Level: Top Channel

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

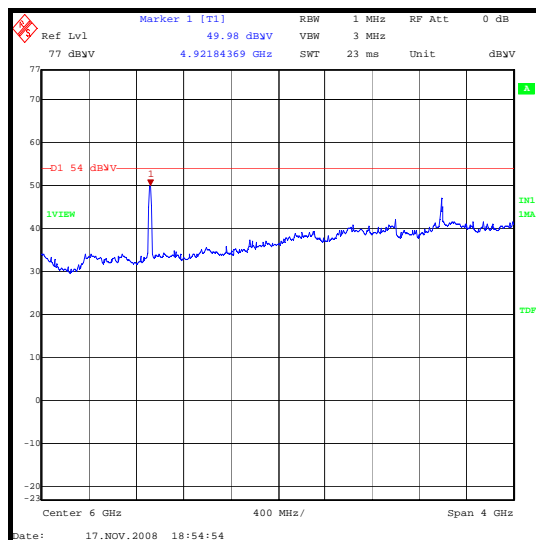
Test of: Datalogic Mobile S.r.l  
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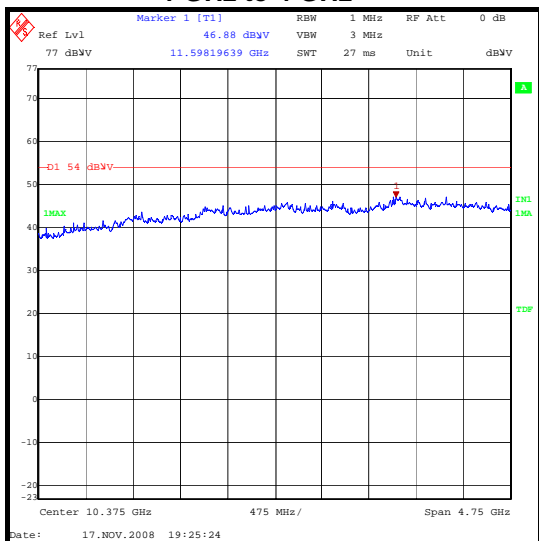
**Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**



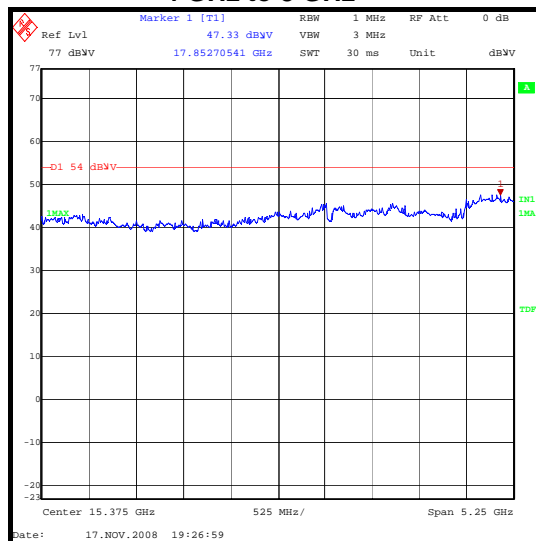
**1 GHz to 4 GHz**



**4 GHz to 8 GHz**



**8 GHz to 12.75 GHz**



**12.75 GHz to 18 GHz**

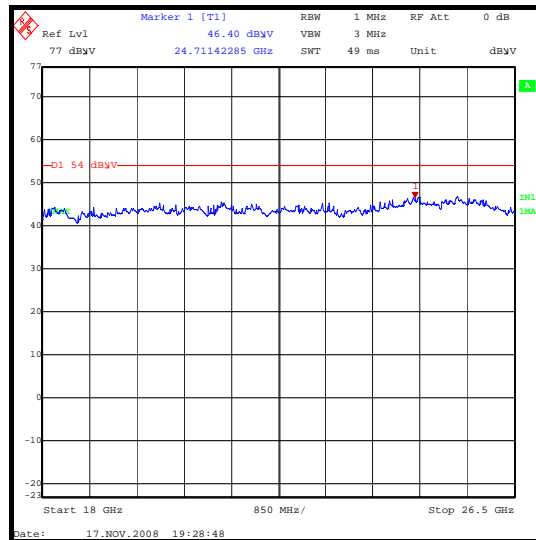
Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

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

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**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  
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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%

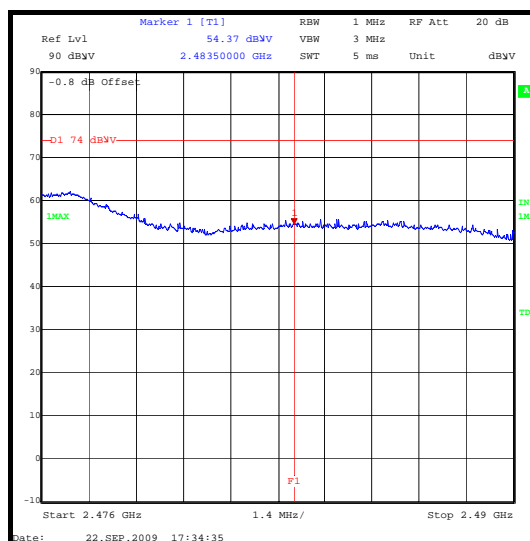
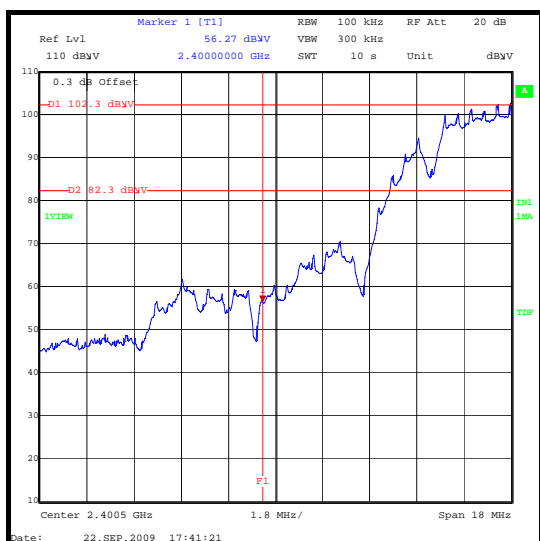
Tests were performed using the test methods detailed in ANSI C63.4 Section 8 and DA 00-705

**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 +

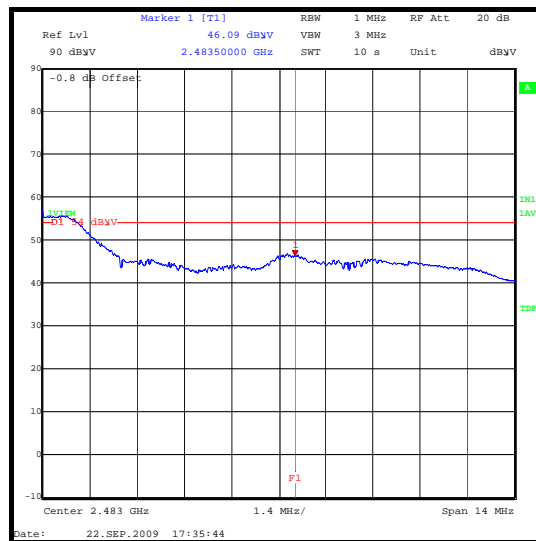
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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  
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To: FCC Part 15.247: 2008 (Subpart C)

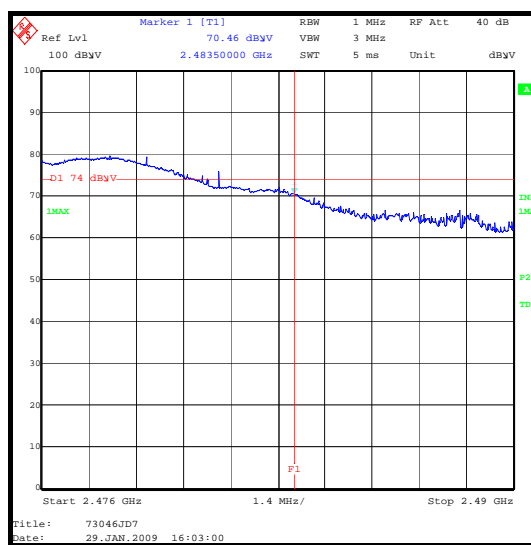
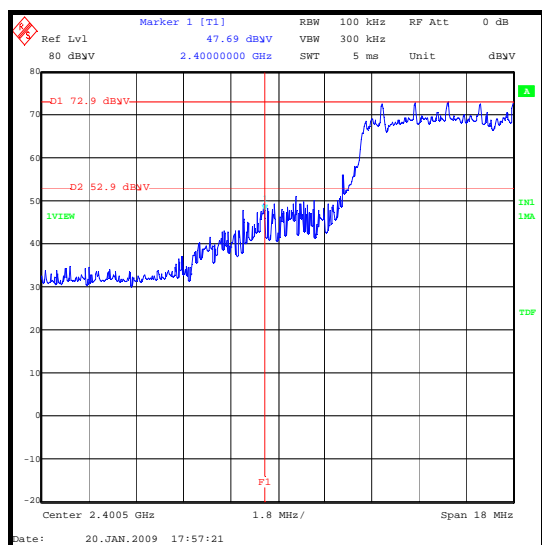
**Transmitter Band Edge Radiated Emissions: Section 15.247(d) & 15.209(a) (Continued)**

**Results: 9 Mbps - BPSK**

**Peak Power Level**

Frequency (MHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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 +

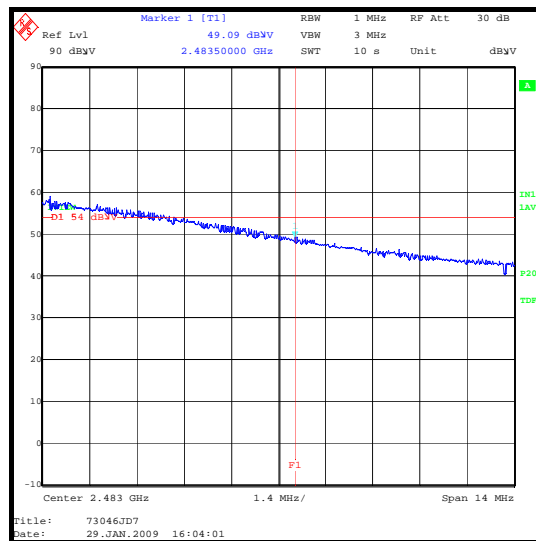
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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

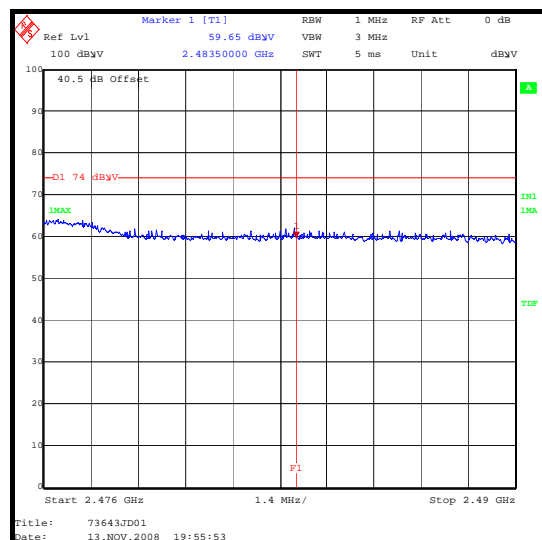
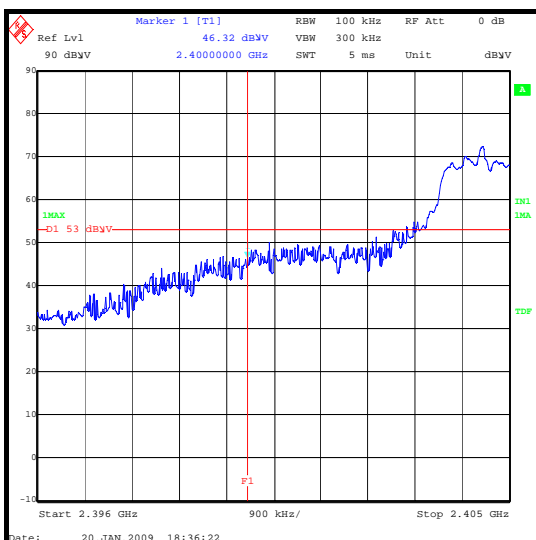
Relative Humidity: 42%

**Results: 18 Mbps – QPSK**

**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	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 +

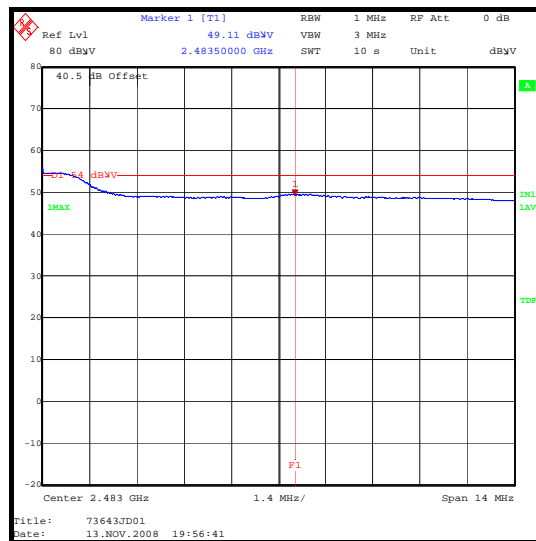
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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)

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

Ambient Temperature: 22°C

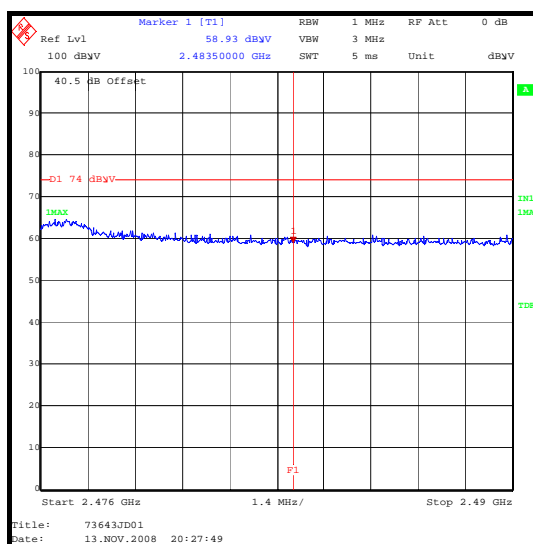
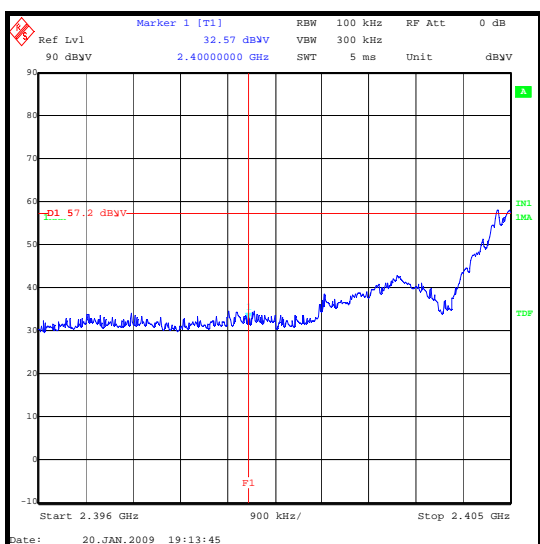
Relative Humidity: 42%

**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 +

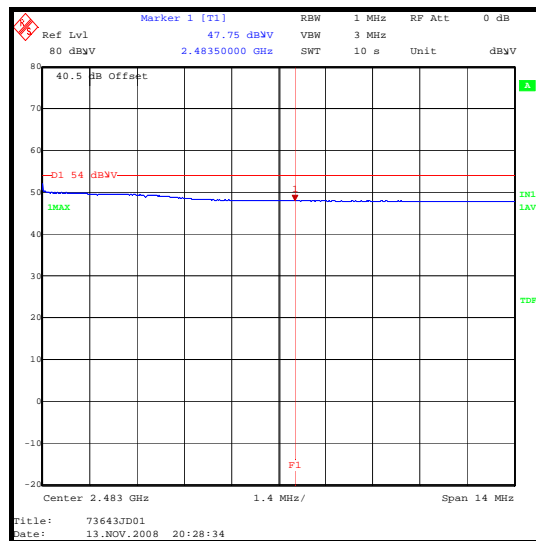
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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)

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

Ambient Temperature: 22°C

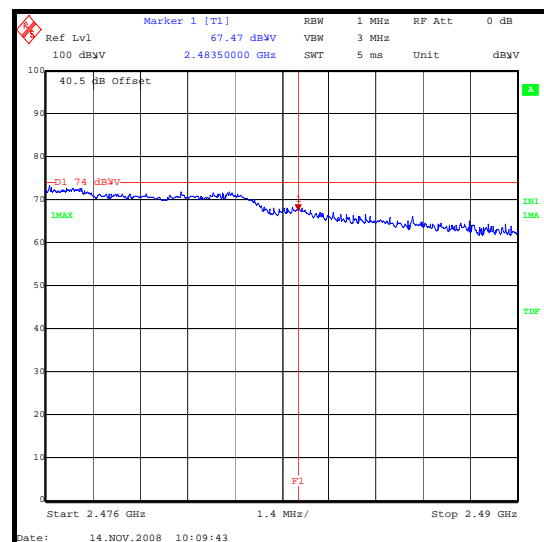
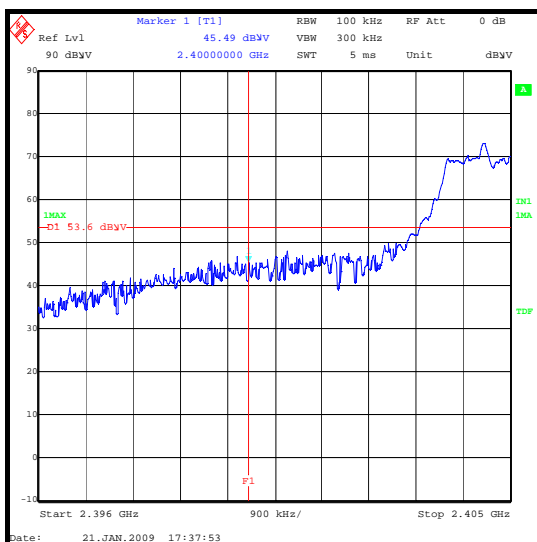
Relative Humidity: 42%

**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 +

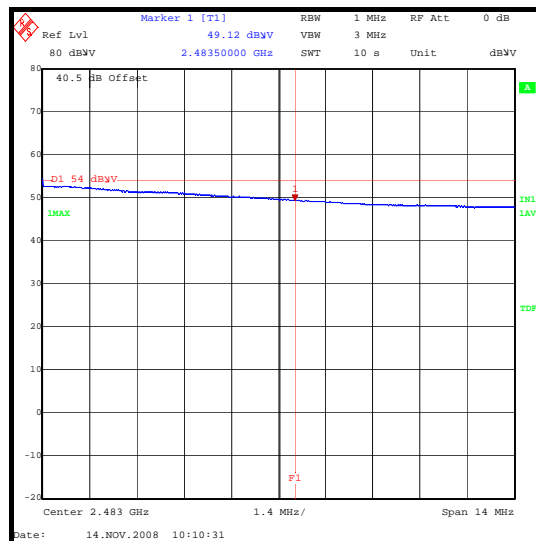
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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)

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

Ambient Temperature: 22°C

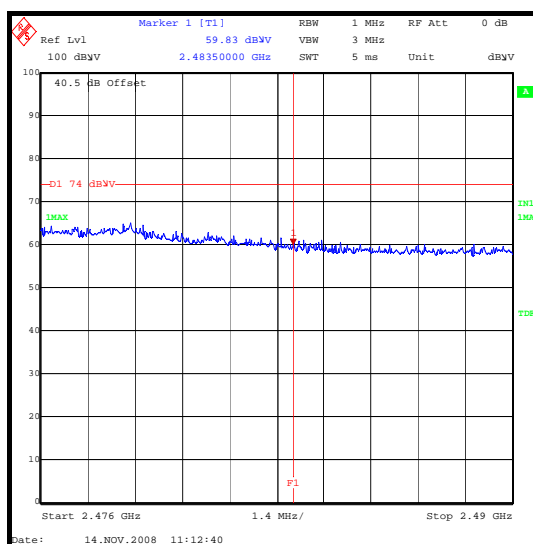
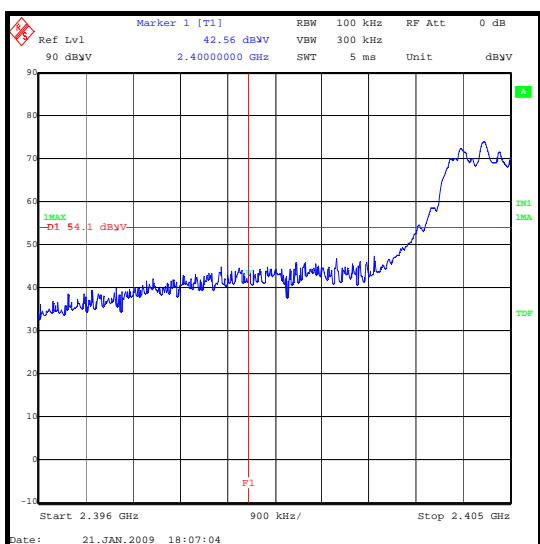
Relative Humidity: 42%

**Results: 54 Mbps – 64QAM**

**Peak Power Level**

Frequency (MHz)	Antenna Polarity	Detector Level (dBμV)	Transducer Factor (dB)	Actual Level (dBμV/m)	Limit (dBμV/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  
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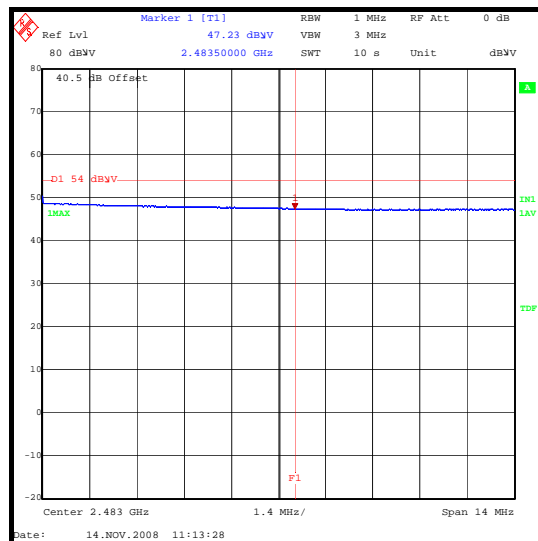
To: FCC Part 15.247: 2008 (Subpart C)

**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 $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ 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  
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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  
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To: FCC Part 15.247: 2008 (Subpart C)

### Appendix 1. Test Equipment Used

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.