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**Cardiac Rhythm Management**

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**Effectivity**

Upon Approval

**Location/ Document #**

**Revision**

A

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**Title**

2490 COMPLIANCE TEST REPORT FOR ETSI EN 301 839-1  
SECTION 10

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**Change History**

**Revision**

**Description of Change**

A

Initial Version



## 1.0 EXECUTIVE SUMMARY

The intent of this testing is to collect data and compare the functionality of the 2490 to identified regulatory requirements as described in ETSI EN 301 839-1 Section 10. The 2490 successfully completed this protocol testing and met all requirements identified to the end that both the capabilities and limitations comply with the rules of this standard.

## 2.0 APPLICABLE REFERENCE DOCUMENTS

### 2.1 ETSI EN 301 839-1 SECTION 10

This document outlines the requirements governing the internationally allocated MICS frequency band. Section 10 within this document feed directly into the monitoring requirements tested in this document, to the end that both the capabilities and limitations comply with the rules of this standard. The version used was 1.1.1 dated June 2002.

### 2.2 2490 COMPLIANCE TEST PROCEDURE

The 2490 Compliance Test Procedure is under document management control located in:

*documentum\Docbases\pulse\Patient Management Business\Project File: In-Progress\2490W\.....\2490 Compliance Test Procedure For ETSI EN 301 839-1 Section 10.doc*

Note: When the project is completed the path will change to: Project File: Final

*documentum\Docbases\pulse\Patient Management Business\Project File: Final\2490W\.....\2490 Compliance Test Procedure For ETSI EN 301 839-1 Section 10.doc*

## 3.0 TESTS DESCRIPTION

The tests performed verify system protocol operation compliance of the 2490 verses the identified regulatory requirements. The tests were performed using various test setups identified in the test procedure.



## 4.0 SUMMARY OF REQUIREMENTS VS RESULTS

ETSI EN 301 839-1 Section Number	Requirement Description	Units	Requirement Limits		Measured results		Test Result
			Min	Max	Min	Max	
10.1	Monitoring system threshold power level	dBm	$\infty$	-94	N/A	-105.1	PASS
10.2	Monitoring system bandwidth	KHz	200	$\infty$	340	370	PASS
10.3.1.1	Monitoring system scan cycle time	Sec	0	5	1.08	2.69	PASS
10.3.1.2	Monitoring system channel monitor period	ms	10	$\infty$	Pass	Pass	PASS
10.4	Channel access related to threshold	N/A					
10.5	Discontinuation of session with a 5 s silent period	Sec	0	5	0.662	0.791	PASS
10.6	Use of pre-scanned alternate channel	N/A					

## 5.0 TEST RESULTS

### 5.1 SECTION 10.1 MONITORING SYSTEM THRESHOLD POWER LEVEL

#### 5.1.1 DATA

Channel Number	Monitor Sensitivity in dBm
2	-105.5
5	-105.1
9	-105.1



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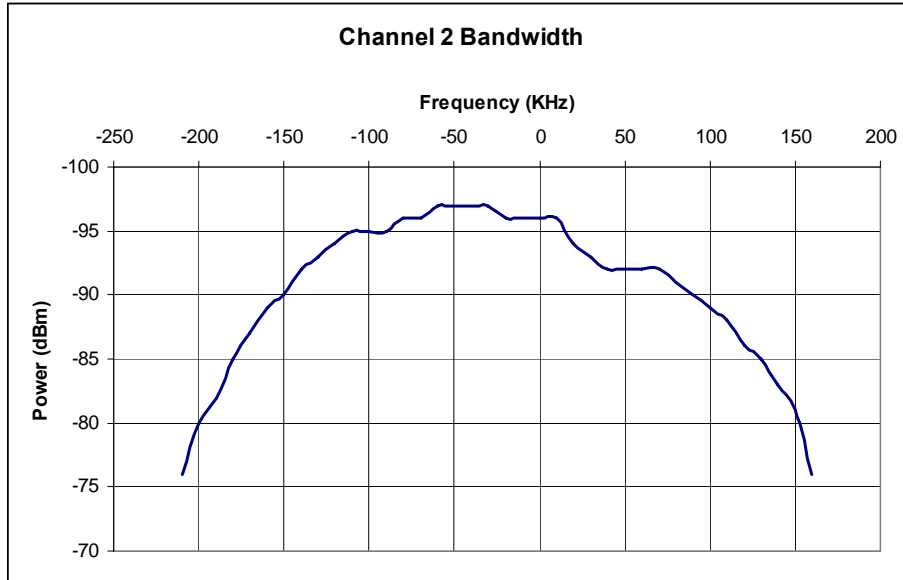
## 5.2 SECTION 10.2 MONITORING SYSTEM BANDWIDTH

### 5.2.1 DATA

Chan 2 @ 402.45MHz			
(20 dB BW = 160 + 210 = 370 KHz)			
PA+(_)KHz	dBm	PA -(_)KHz	dBm
0	-96	0	-96
10	-96	-10	-96
20	-94	-20	-96
30	-93	-30	-97
40	-92	-40	-97
50	-92	-50	-97
60	-92	-60	-97
70	-92	-70	-96
80	-91	-80	-96
90	-90	-90	-95
100	-89	-100	-95
110	-88	-110	-95
120	-86	-120	-94
130	-85	-130	-93
140	-83	-140	-92
150	-81	-150	-90
160	-76	-160	-89
170		-170	-87
180		-180	-85
190		-190	-82
200		-200	-80
210		-210	-76



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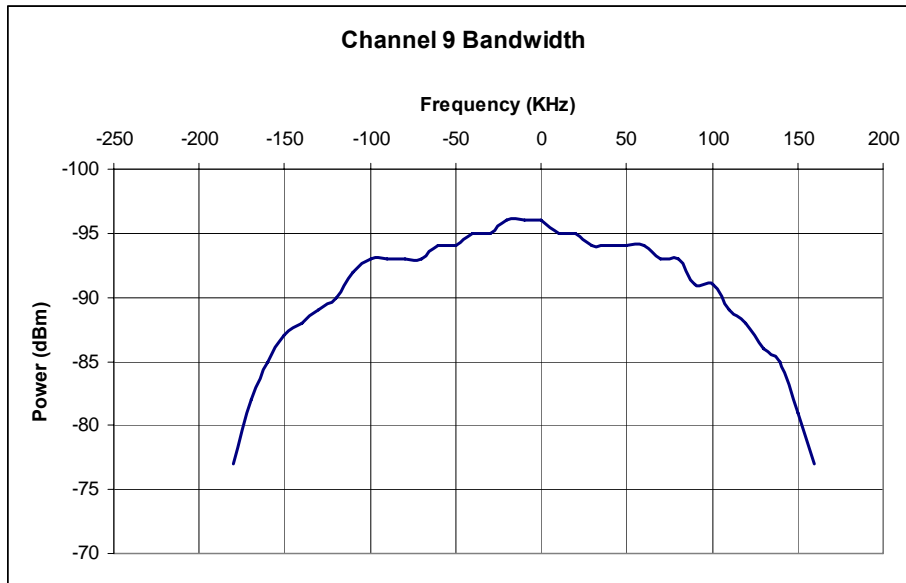


<b>Chan 9 @ 404.55MHz</b>			
<b>(20 dB BW = 160 + 180 = 340 KHz)</b>			
<b>PA+(_)KHz</b>	<b>dBm</b>	<b>PA -(_)KHz</b>	<b>dBm</b>
0	-96	0	-96
10	-95	-10	-96
20	-95	-20	-96
30	-94	-30	-95
40	-94	-40	-95
50	-94	-50	-94
60	-94	-60	-94
70	-93	-70	-93
80	-93	-80	-93
90	-91	-90	-93
100	-91	-100	-93
110	-89	-110	-92
120	-88	-120	-90
130	-86	-130	-89
140	-85	-140	-88
150	-81	-150	-87
160	-77	-160	-85
170		-170	-82



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180		-180	-77
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### 5.3 SECTION 10.3.1.1 MONITORING SYSTEM SCAN CYCLE TIME

#### 5.3.1 DATA

<b>Gated Channel</b>	6
<b>Off Channel</b>	2
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.48
2	1.47
3	1.53
4	1.57
5	1.6
6	1.57
7	1.58
8	1.57
9	1.56
10	1.56

<b>Gated Channel</b>	6
<b>Off Channel</b>	3
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.33
2	1.35
3	1.31
4	1.33
5	1.35
6	1.3
7	1.32
8	1.26
9	1.3
10	1.32



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<b>Gated Channel</b>	1
<b>Off Channel</b>	7
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.42
2	1.37
3	1.47
4	1.42
5	1.41
6	1.39
7	1.42
8	1.48
9	1.39
10	1.43

<b>Gated Channel</b>	9
<b>Off Channel</b>	2
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.26
2	1.23
3	1.21
4	1.24
5	1.23
6	1.18
7	1.2
8	1.24
9	1.2
10	1.16

<b>Gated Channel</b>	3
<b>Off Channel</b>	5
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.64
2	1.62
3	1.61
4	1.62
5	1.6
6	1.63
7	1.67
8	1.65
9	1.62
10	1.63

<b>Gated Channel</b>	8
<b>Off Channel</b>	1
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.37
2	1.35
3	1.37
4	1.33
5	1.35
6	1.37
7	1.33
8	1.34
9	1.35
10	1.3

<b>Gated Channel</b>	4
<b>Off Channel</b>	8
<b>Test #</b>	<b>Tp1 (sec)</b>
1	2.57
2	2.13
3	2.12

<b>Gated Channel</b>	7
<b>Off Channel</b>	10
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.53
2	1.59
3	1.55



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4	2.13
5	2.03
6	2.04
7	2.69
8	2.52
9	2.16
10	2.12

4	1.57
5	1.58
6	1.54
7	1.5
8	1.53
9	1.49
10	1.54

<b>Gated Channel</b>	5
<b>Off Channel</b>	4
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.08
2	1.15
3	1.12
4	1.1
5	1.16
6	1.09
7	1.1
8	1.15
9	1.13
10	1.15

<b>Gated Channel</b>	10
<b>Off Channel</b>	9
<b>Test #</b>	<b>Tp1 (sec)</b>
1	1.99
2	2.02
3	2.04
4	2.01
5	2.1
6	2.09
7	2.58
8	2.01
9	2.09
10	2.33

<b>Maximum Tp1 Value</b>	2.69
<b>Minimum Tp1 Value</b>	1.08

## 5.4 SECTION 10.3.1.2 MONITORING SYSTEM CHANNEL MONITOR PERIOD

### 5.4.1 DATA

Using the test method identified in section 5.4 of the test procedure titled *2490 Compliance Test Procedure For ETSI EN301 839-1 Section 10*, it was determined the 2490 meets the 10 mS Monitoring Period requirement defined.





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## 5.5 SECTION 10.4 CHANNEL ACCESS RELATIVE TO THRESHOLD

### 5.5.1 DATA

The EUT does not employ the threshold power provision or use a predetermined channeling plan, so this requirement does not need to be met and thus no testing was done or resulting data was created, per the test procedure.

## 5.6 SECTION 10.5 DISCONTINUATION OF SESSION WITH 5 S SILENT PERIOD

### 5.6.1 DATA

Test #	Discontiuie Period (sec)
1	0.791
2	0.662
3	0.779
4	0.667
5	0.779
6	0.665
7	0.668
8	0.782
9	0.789
10	0.67

Minimum Period	0.662
Maximum Period	0.791

## 5.7 SECTION 10.6 USE OF PRE-SCANNED ALTERNATE CHANNEL

### 5.7.1 DATA

The EUT does not employ the provision for a pre-scanned alternate channel, so this requirement does not need to be met and thus no testing was done or resulting data was created, per the test procedure.



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## 6.0 CONCLUSION

The 2490 successfully completed testing and met all applicable regulatory requirements called out in ETSI EN 301 839-1 Section 10.

## 7.0 END OF REPORT

This paragraph concludes this document.