



Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

**Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97**

Recognized by the Federal Communications Commission

Anechoic chamber registration no.: 90462 (FCC)

Anechoic chamber registration no.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

The Bluetooth word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Cetecom ICT is under license

Test report no. : 1-1121-01-18/09
Type identification : CCW9M2443
Applicant : Digi International GmbH
FCC ID : MCQ-50M1663
IC Certification no. : 1846A-50M1663
**Test Standards : FCC Part 15.407 (h)
RSS 210 Issue 7**

Table of contents

1. ADMINISTRATIVE DATA	3
1.1. ADMINISTRATIVE DATA OF THE TEST FACILITY	3
1.1.1 Identification of the testing laboratory	3
1.1.2 Organizational items.....	3
1.1.3 General	4
1.1.4 Applicant's details.....	4
1.2 ADMINISTRATIVE DATA OF MANUFACTURER	4
1.3 DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT).....	5
1.3.1 Test item.....	5
1.3.2 EUT operating modes	5
1.3.3 Extreme conditions testing values.....	5
2 TEST STANDARD & SUMMARY LIST OF ALL PERFORMED TEST CASES	6
3 §15.407 (H) – DYNAMIC FREQUENCY SELECTION.....	7
3.1 DESCRIPTION OF EUT.....	7
3.2 TEST SET-UP.....	7
3.3 DFS DETECTION THRESHOLDS.....	8
3.3.1 CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME.....	9
3.4 NON-OCCUPANCY PERIOD	10
4 TEST EQUIPMENT	13
5 PHOTOGRAPHS OF EQUIPMENT UNDER TEST	14

1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Stefan Boes Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

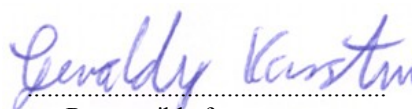


Responsible for testing laboratory
(Stefan Boes)

1.1.2 Organizational items

Reference No.:	1-1121-01-18/09
Order No.:	-/-
Responsible for test report and	Karsten Gerald
Project leader:	Johannes Pink
Receipt of EUT:	2009-09-07
Date(s) of test:	2009-09-09
Date of report:	2009-09-22
Number of report pages:	20
Number of diagram pages (annex):	0

Version of template:	1.9



Responsible for test report
(Karsten Gerald)

1.1.3 General

The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.4 Applicant's details

Applicant's name:	Digi International GmbH
Address:	Kueferstr.8 79206 Breisach Germany
Contact person:	Mr. Andreas Ortlieb andreas.ortlieb@digicom +49 7667 908 136

1.2 Administrative data of manufacturer

Manufacturer's name:	Digi International GmbH
Address:	Kueferstr.8 79206 Breisach Germany
Contact person:	Mr. Andreas Ortlieb andreas.ortlieb@digicom +49 7667 908 136

1.3 Description of the equipment under test (EUT)

1.3.1 Test item

Kind of test item	:	WLAN Module
Type identification	:	CCW9M2443
S/N serial number	:	B92834256
HW hardware status	:	-/-
SW software status	:	-/-
Frequency Band [MHz]	:	5180 MHz - 5320 MHz
Type of Modulation	:	OFDM / 64QAM
Number of channels	:	8
Antenna	:	external rod. antenna
Power Supply	:	12 Vdc via external AC/DC adapter
Temperature Range	:	-20 °C to +55 °C

Note:

The manufacturer declared that the device does not support ad-hoc mode in the DFS frequency band.

1.3.2 EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
Op. 0	normal mode	normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 3		low temperature, high power source conditions
Op. 4		high temperature, low power source conditions
Op. 5		high temperature, high power source conditions

*) EUT operating mode no. is used to simplify the test report.

1.3.3 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	22
Nominal Humidity	H _{nom}	%	54
Nominal Power Source	V _{nom}	V	115 Vac

Type of power source: 12 Vdc by external AC/DC adapter

2 Test standard & summary list of all performed test cases

- No deviations from the technical specifications were ascertained**
- There were deviations from the technical specifications ascertained

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.407 - CANADA RSS-210	passed	2009-09-21	-/-

Test Specification Clause	Test Case	Passed	Fail	Not applicable	Not performed
Frequency Range:	5180 MHz - 5320 MHz				
§15.407 (h)(2) (iii)	Channel move time and channel closing transmission time	X			
§15.407 (h)(2) (iv)	Non-Occupancy Period	X			

3 §15.407 (h) – Dynamic Frequency Selection

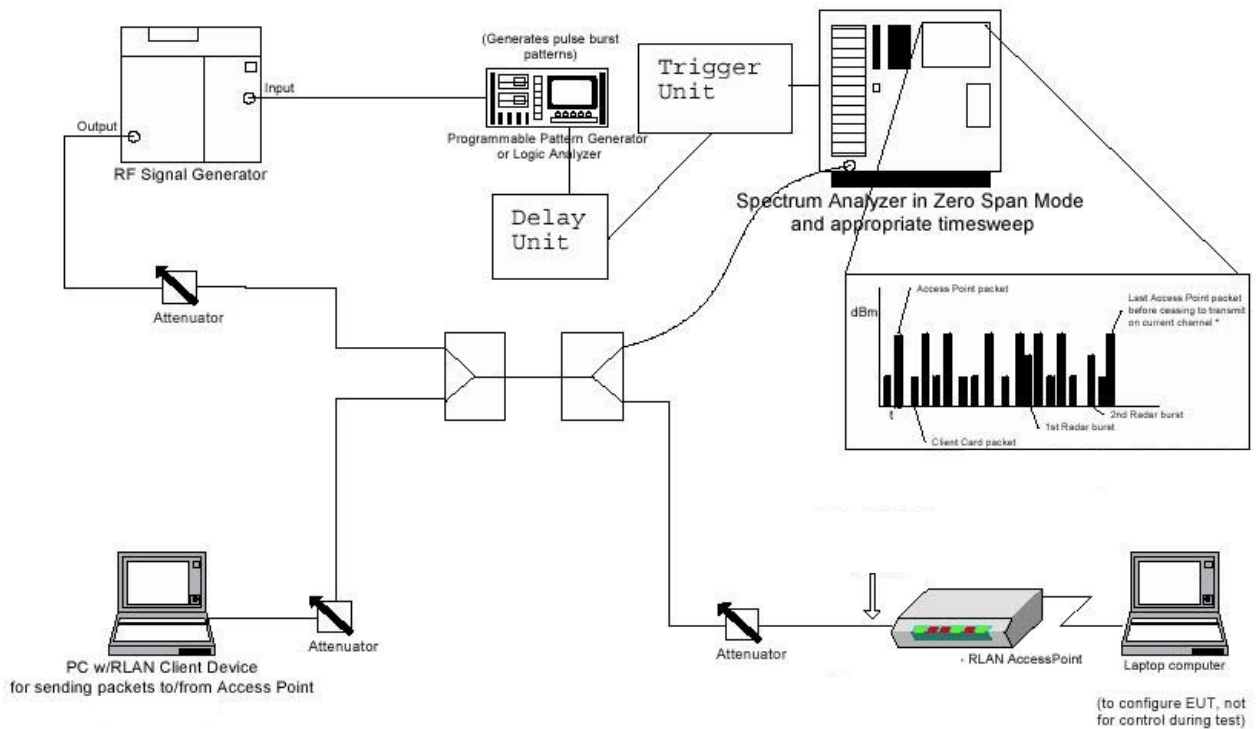
3.1 Description of EUT

The EUT operates in 5180 MHz - 5320 MHz and acts as slave device only without any radar detection functionality. The rated output power of the EUT is 23.6 dBm EIRP (see test report no. 1-1121-01-13/09).

3.2 Test Set-up

Radar signal 1 (see annex D)

Radar Detection Test Configuration - Rev 1
 Spectrum Analyzer Method



3.3 DFS Detection Thresholds

1. Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see note)
≥ 200 mW	-64 dBm
< 200 mW	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

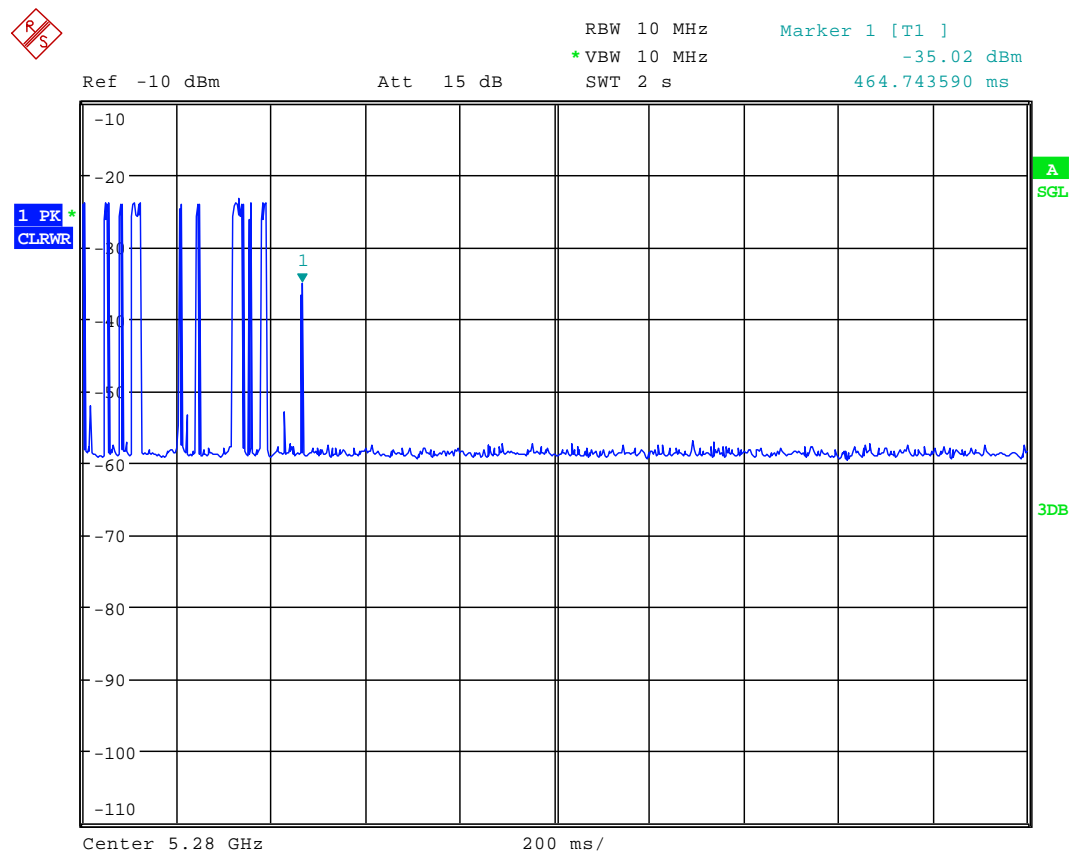
2. DFS Response requirement values

Parameter	Value
Non-occupancy period	minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 80% of the 99% transmission power bandwidth See Note 3.
Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows: <ul style="list-style-type: none"> • For the Short pulse radar Test Signals this instant is the end of the Burst. • For the Frequency Hopping radar Test Signal, this instant is the end of the last radar Burst generated. • For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission. Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate Channel changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the U-NII Detection Bandwidth detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.	

3.3.1 Channel move time and channel closing transmission time

Test Procedure:

Perform the test with one of the type 1 to type 4 short pulse radar waveforms.



Marker 1 shows the radar pulse. On the plot you can see that after sending the radar burst no transmissions occur. The time difference between the recognition of the radar burst by the AP and its last transmission is called as Channel Move Time (Limit: 10s). The accumulated transmission time after detection of a radar signal is called as channel closing transmission time (Limit: in total 260ms).

Final verdict: Pass

3.4 Non-Occupancy Period

Test Procedure

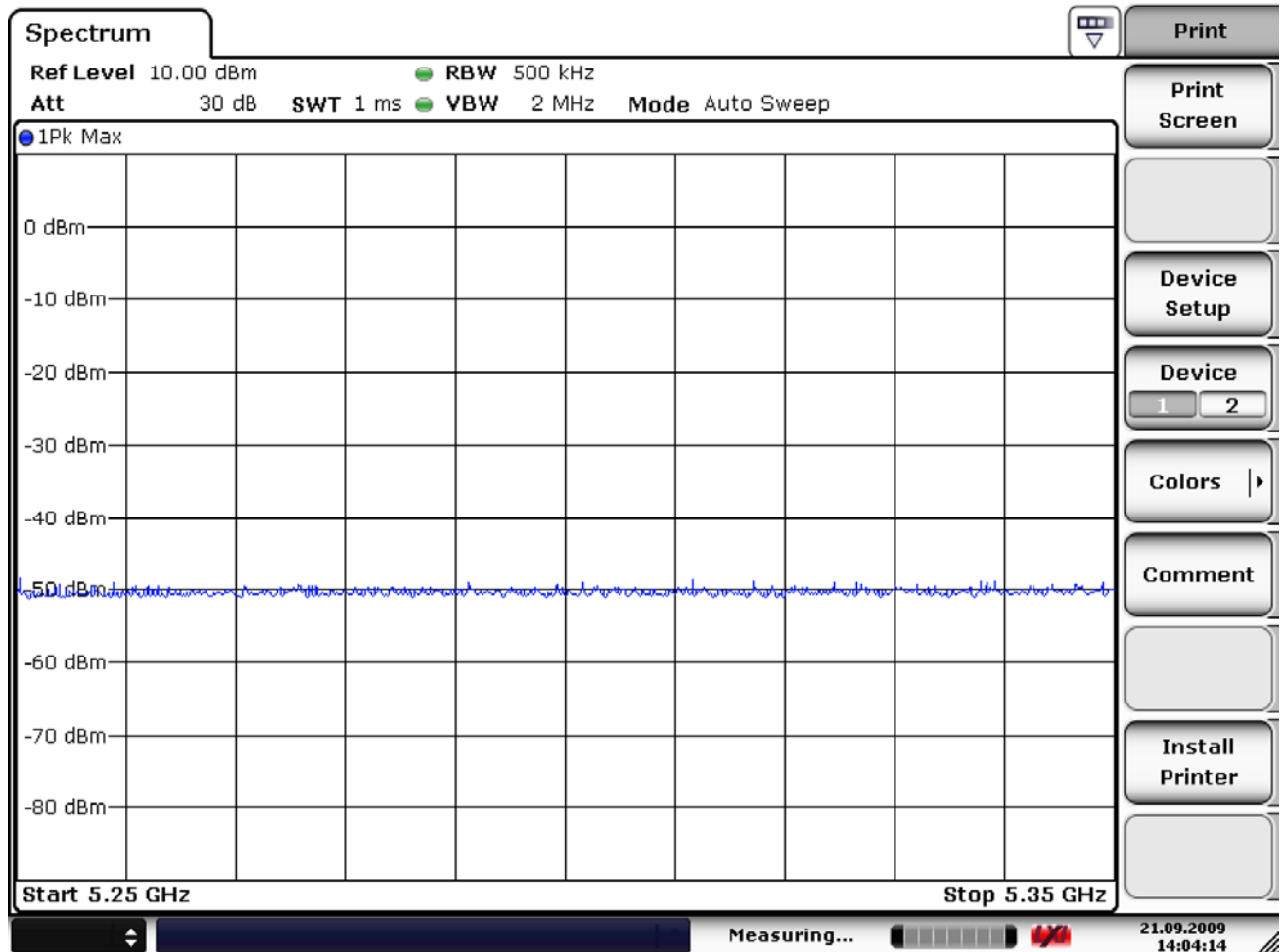
Client device is not permitted to transmit beacons on DFS frequencies.

- 1) Non-associated test:
The master has been off, monitor the analyzer on the test mode frequency that have been selected for testing, power up the client for 30 minutes to make sure no beacons have been transmitted.
- 2) Associated test:
Associate the master and client and stream the movie as specified for non- occupancy test. Transmit Radar type 1; monitor the test frequency to make sure no beacons have been transmitted for 30 minutes.

Mode	Results
Non-Associated	No Beacons transmit
Associated	No transmissions

Please refer to the following plots.

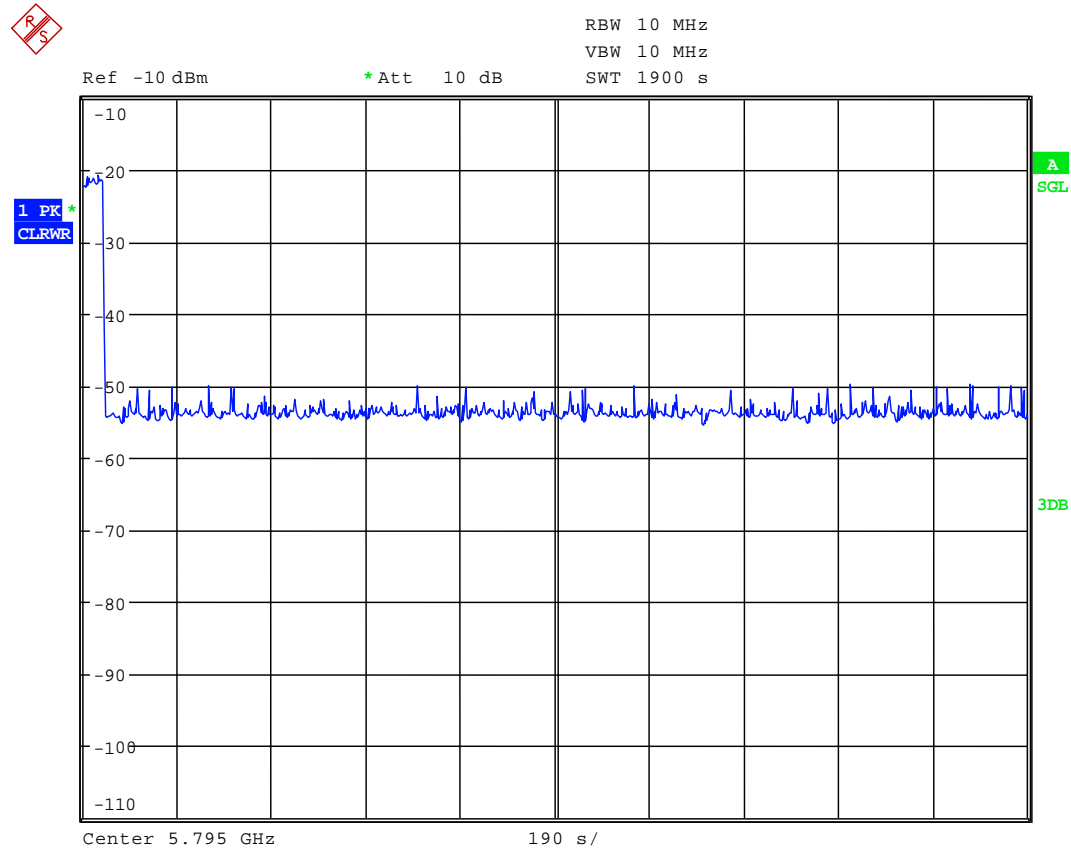
1) Non-associated:



Date: 21.SEP.2009 14:04:13

The plot shows no transmissions over a 30 minutes period within the DFS-band 5250 MHz - 5350 MHz.

2) Associated:



In the plot above you can see, that the client does not transmit any emission within 30 minutes after having received the “stop transmit” order from the Access Point (Master)

Final verdict: Pass

4 Test equipment

To simplify the identification on each page of the test report, used item(s) of test equipment and ancillaries such as cables are identified (see list below).

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	FSU50	Rohde & Schwarz	200012
02	Signal Generator	SMU200A	Rohde & Schwarz	101633
03	Power-Splitter	11667B	Hewlett Packard	00616
04	Power-Splitter	DMS 211	Technical Research Manufacturing Inc.	9321
05	Cables	Sucotest 18	Huber & Suhner	div.
06	Step Attenuator	8494G / 8495G	Hewlett Packard	2813A13650 / 2822A05607
07	Attenuator / Switch driver	11713A	Hewlett Packard	2508A06633