Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC3462C-1 (IC)
TCB ID: DE 0001

Accredited by the
German Accreditation Council
DAR–Registration Number
DAT-P-176/94-D1

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**1-0685-01-23/08**
Applicant	**:**	**Philips Medizin Systeme Böblingen GmbH**
Type	**:**	**MMS+WLAN a/b/g Modul für Monitore**
Test Standard	**:**	**FCC Part 15.407 (h)**
		RSS 210 Issue 7
FCC ID	**:**	**PQC-WLANBV1**
IC Certification No.	**:**	**3549C-WLANBV1**

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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:	Michael Berg Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

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Responsible for testing laboratory
(Michael Berg)

1.1.2 Organizational items

Reference No.:	1-0685-01-23/08
Order No.:	-/-
Responsible for test report and Project leader:	Karsten Geraldy / Marco Bertolino
Receipt of EUT:	2008-10-01
Date(s) of test:	2009-02-25
Date of report:	2009-02-25
Number of report pages:	24
Number of diagram pages (annex):	0
Version of template: 1.9	

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Responsible for test report
(Karsten Geraldy)

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Responsible for test report
(Marco Bertolino)

Note:

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.

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

1.1.3 Applicant´s details

Applicant´s name:	**Philips Medizin Systeme Böblingen GmbH**
Address:	**Hewlett-Packard-Strasse 2** **71034 Böblingen** **Germany**
Contact person:	**Herrn Stefan Breuer** **stefan.breuer@philips.com** **+49-7031-463 2321**

1.2 Administrative data of manufacturer / member

Manufacturer´s name:	**Philips Medizin Systeme Böblingen GmbH**
Address:	**Hewlett-Packard-Strasse 2** **71034 Böblingen** **Germany**
Contact person:	**Herrn Stefan Breuer** **stefan.breuer@philips.com** **+49-7031-463 2321**

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Product name		Description	S/N serial number	HW hardware status	SW software status
MMS+WLAN a/b/g Modul		Modul for healthcare monitoring systems	FH 830 000187	0839	-/-
Frequency Band [MHz]	**Type of Modulation**	**Number of channels**	**Antenna**	**Power Supply**	**Temperature Range**
ISM 5250 – 5350 MHz	OFDM	4	2 PCB antennas 1 rod antenna	Nom. 5 V DC by power supply	0 °C to 55 °C

1.3.2 If RF component testing only, description of additional used HW/SW

	Product name	Product ID	Description	S/N serial number	HW hardware status	SW software status
1	--	--	--	--	--	--
2	--	--	--	--	--	--

1.3.3 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.

1.3.4 Extreme conditions testing values

Description	**Shortcut**	**Unit**	**Value**
Nominal Temperature	T_{nom}	°C	**20**
Nominal Humidity	H_{nom}	%	**54**
Nominal Power Source	V_{nom}	V	**5 V / 500 mA DC**

Type of power source: **DC by power supply**

Deviations from these values are reported in chapter 2

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	2009-02-26	-/-

Test Specification Clause	Test Case	Passed	Fail	Not applicable	Not performed
Range:	5.250 to 5.350 GHz				
§15.407 (h)(2) (ii)	Channel Availability Check Time (CAC)			Yes	
§15.407 (h)(2) (iii)	Channel Move time and channel closing transmission time	Yes			
§15.407 (h)(2) (iv)	Non-Occupancy Period	Yes			
	Detection Bandwidth			Yes	
	Service Monitoring			Yes	

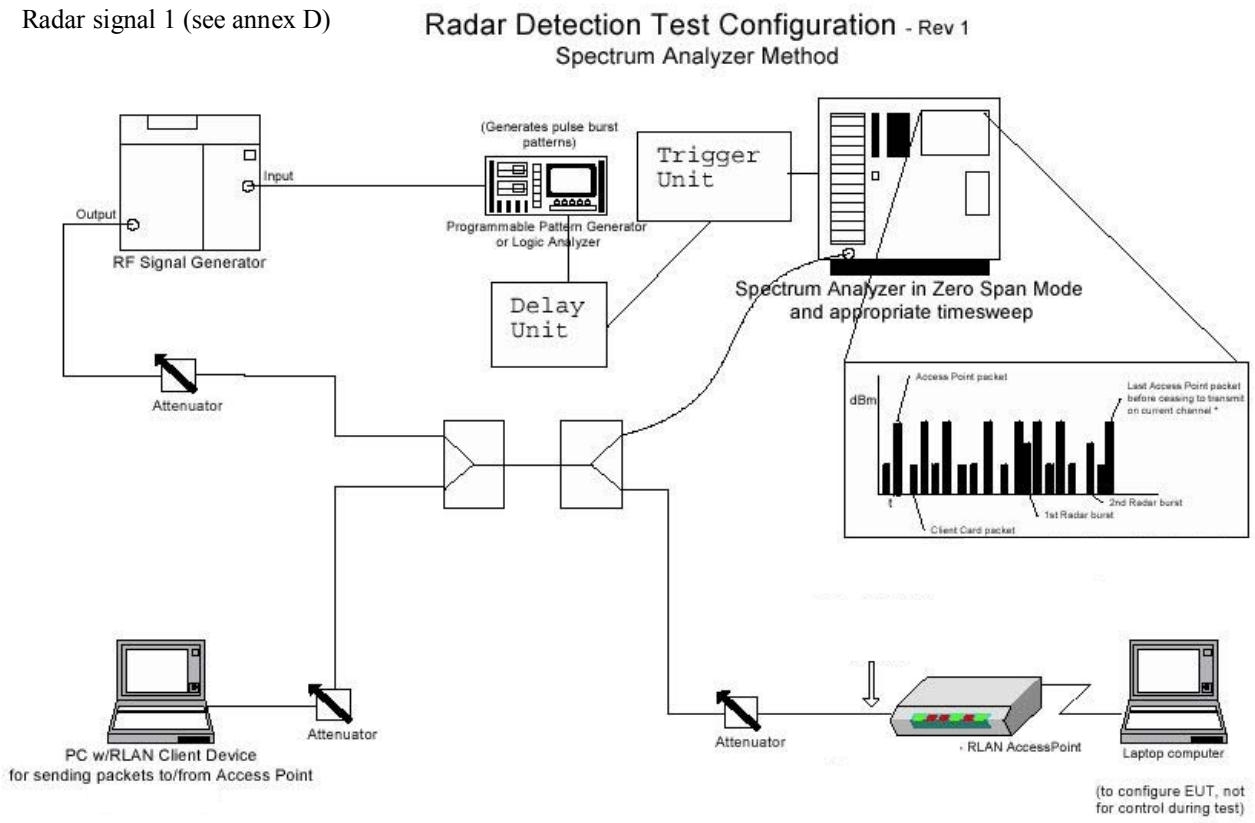
3 §15.407 (h) – Dynamic Frequency Selection

3.1 Description of EUT

The EUT operates in 5250-5350 MHz and acts as slave device only without radar detection function.
The rated output power of the EUT is 20.11 dBm (EIRP).

3.2 Test Set-up

Radar signal 1 (see annex D)



3.3 DFS Detection Thresholds

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

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dbm
< 200 milliwatt	-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 4 dB has been added to the amplitude of the test transmission waveforms to account for the gain of the smallest antenna (6dbi) with a 2db margin. 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% power bandwidth See Note 3.
Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows: • 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.	

3.4 Channel Availability Check Time (CAC)

Test Procedure

1) Measure the initial power-up time of EUT

2) With link established on channel, apply a radar signal within 0-6 seconds after the initial power-up period, monitor the transmissions on channel from the spectrum analyzer.

3) Reboot EUT, with a link established on channel, apply a radar signal within 54-60 seconds after the initial power-up period, monitor the transmission on channel from the spectrum analyzer.

EUT Initial power-up Cycle Time

EUT initial Power-up cycle (second)
/

Results: Not Required

Timing of Radar Burst	Spectrum Analyzer Display
No Radar Triggered	/
Within 6 seconds of the CAC starting	/
Within the last 6 seconds of the CAC	/

3.5 Channel Move time and channel closing transmission time

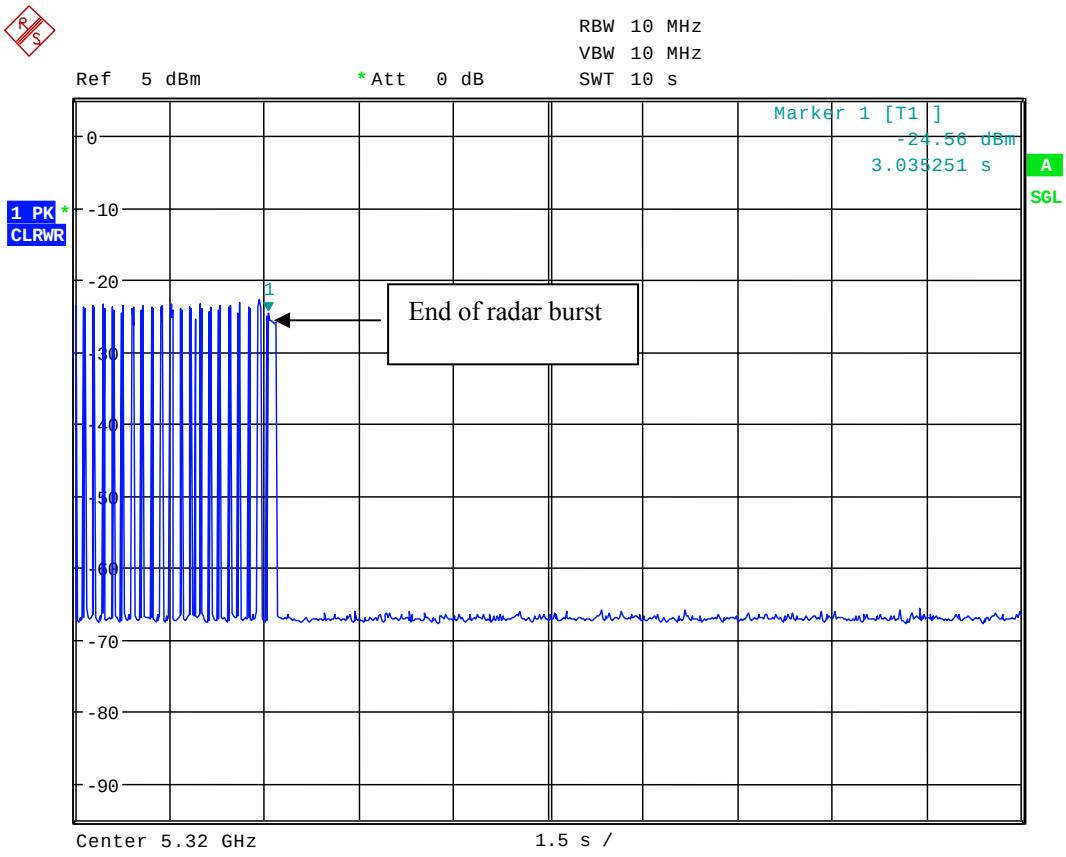
Test Procedure:

Perform one of the type 1 to type 4 short pulse radar waveform, BACL use type 1 radar signal, repeat using a long pulse radar type 5 waveform.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = N * Dwell Time

N is the number of spectrum analyzer bins showing a device transmission
Dwell Time is the dwell time per bin (i.e. Dwell Time = S/B, S is the sweep time and B is the number of bin, i.e. 8192 , here 1.5s/30001 = 0.05ms)

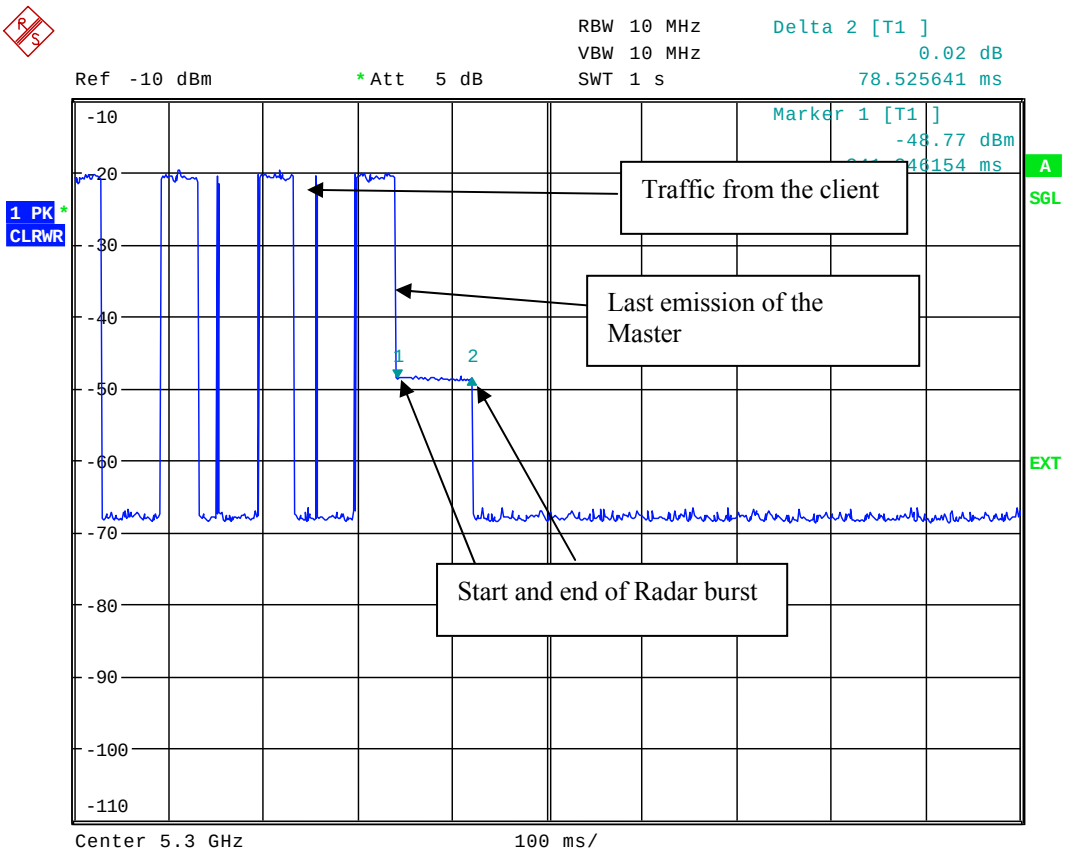


We used the same resolution of the analyzer. (30001 point in horizontal resolution)
The marker 1 is the start of the radar burst. There is no emission within 10 seconds after the last emission.
We repeated this tests with Radar type 1 (short pulse) and Radar type 5 (long pulse).
In both cases the test sample shows the same behaviour.

Final verdict: Pass

Type 1 radar channel move time result:

Channel Move Time (sec.)	Limit (sec.)
< 100 ms	10



No emissions from client after radar burst.

Type 1 radar channel closing transmission time result:

Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0	60	60

There are no transmissions after having received the “Stop transmit” order from AP. (no bins on analyzer)

3.6 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.

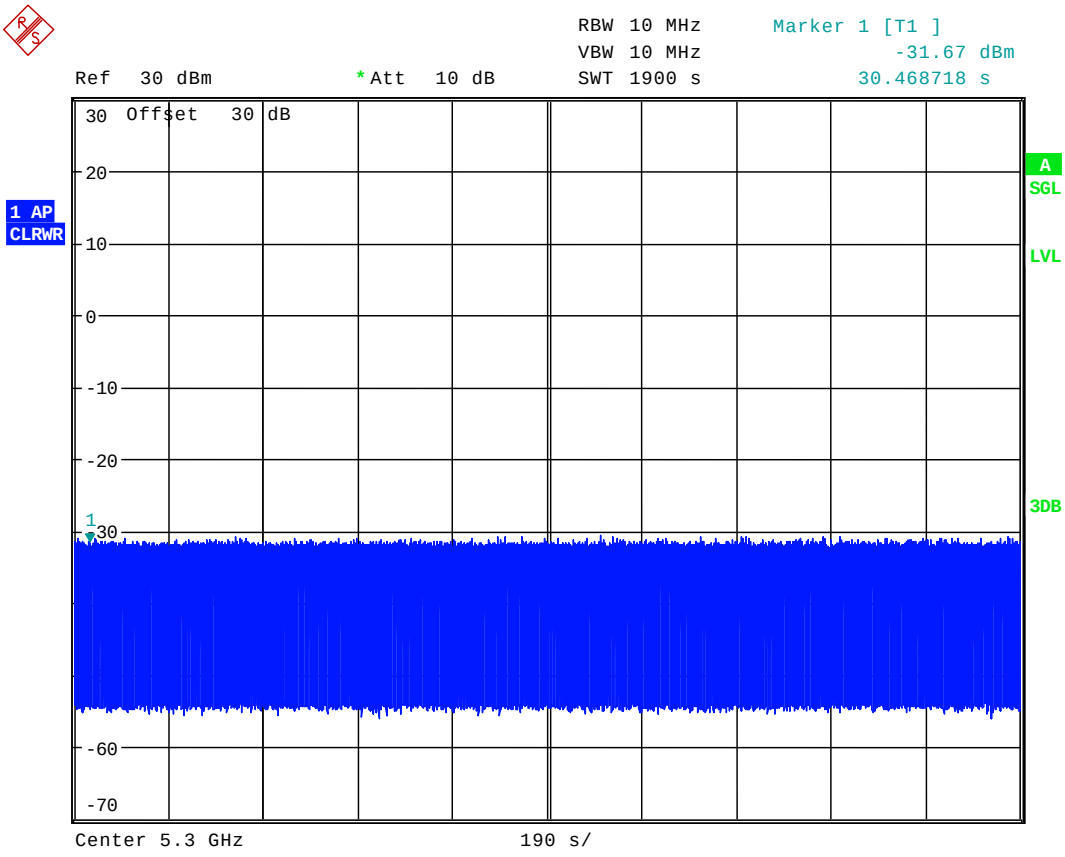
Result: Pass

Mode	Results
Non-Associated	No Beacons transmit
Associated	No transmissions

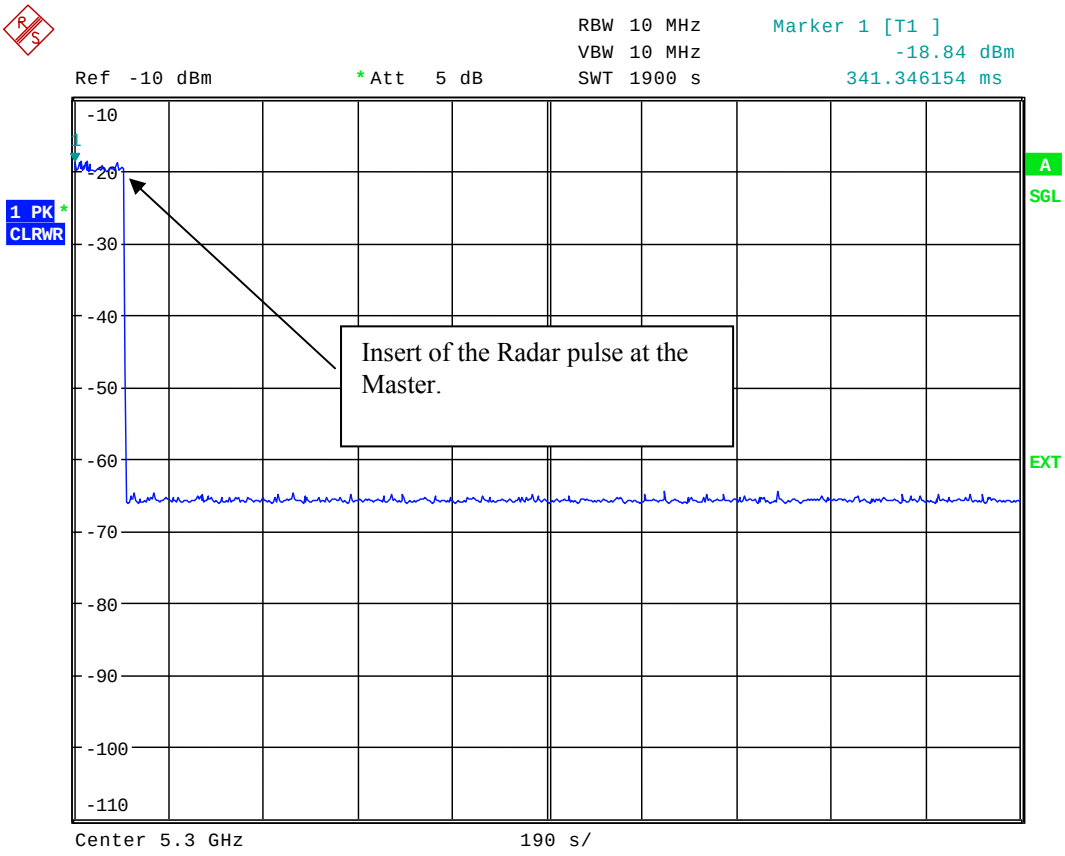
Please refer to the following plots.

5300 MHz:

1) Non-associated:



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)

3.7 Detection Bandwidth

Procedure:

Performed with any one of the short pulse radar waveforms (type 1, 2, 3 or 4)

Start with radar generator frequency set to the center of the channel (Fc)
Perform at least 10 trials and confirm at least 90% detected
Increment radar generator frequency by 1 MHz and repeat
Perform at least 10 trials and confirm at least 90% detected
Continue incrementing the radar frequency until detection rate falls below 90%

Starting at Fc – 1 MHz, repeat the process, this time decrementing the radar frequency by 1 MHz

F_L is the lowest frequency at which detection was 80% or better
F_H is the highest frequency at which detection was 80% or better

UNII Detection Bandwidth = F_H - F_L

Result: Not Required

3.8 Service Monitoring

Procedure:

Stream MPEG file from master to slave
Generate radar waveform
Record whether or not the waveform was detected
At least 30 trials are applied for each radar type
For radar types with randomized parameters, each trial uses a unique waveform
Perform with each of the radar types 1-6

Confirm that the detection rate for each radar type meets the minimum requirement

Type 1, 2, 3, 4: 60% each
Type 5: 50%
Type 6: 70%

Confirm that the mean of the rates for radar types 1 through 4 meets the requirement of 80%

Detection Ratio = Total Waveform Detections / Total Waveform Trials x 100

Result: Not Required

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