eurofins | Product Service

RADIO DFS REPORT

FCC 47 CFR Part 15E, ISED Canada RSS-247

Unlicensed National Information Infrastructure Devices in the 5 GHz Bands

Report Reference No	G0M-1810-7783-TFC407DF-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS - Registration number : D-PL-12092-01-03 (ISED) DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Panasonic Industrial Devices Europe GmbH
Address	Zeppelinstr. 19 21337 Lüneburg GERMANY
Test Specification	According to FCC rules
Standard	47 CFR Part 15E RSS-247, Issue 2, 2017-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model(s)	ENWF9201A1EF
Additional Model(s)	ENWF9203A1EF
Brand Name(s)	PAN9026
Hardware Version(s)	05
Software Version(s)	01
Test Result	**PASSED**

Possible test case verdicts:	
required by standard but not tested	N/T
not required by standard	N/R
not applicable to EUT	N/A
test object does meet the requirement	P(PASS)
test object does not meet the requirement	F(FAIL)
Testing:	
Test Lab Temperature	20 - 23 °C
Test Lab Humidity	32 – 38 %
Date of receipt of test item	2018-09-27
Report:	
Compiled by	Toralf Jahn
Tested by (+ signature) (Responsible for Test)	Toralf Jahn
Approved by (+ signature) (Head of Lab)	Christian Weber
Date of Issue	2019-05-24
Total number of pages	164
General Remarks:	
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.	
Additional Comments:	

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	**Description**	
1	Product Type Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
	Model name	ENWF9208A1EF (multi region)
	Brand name	PAN9026
	Hardware Version	05
	Software Version	01
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2019-05-24	Initial Release	

ABBREVIATIONS AND ACRONYMS

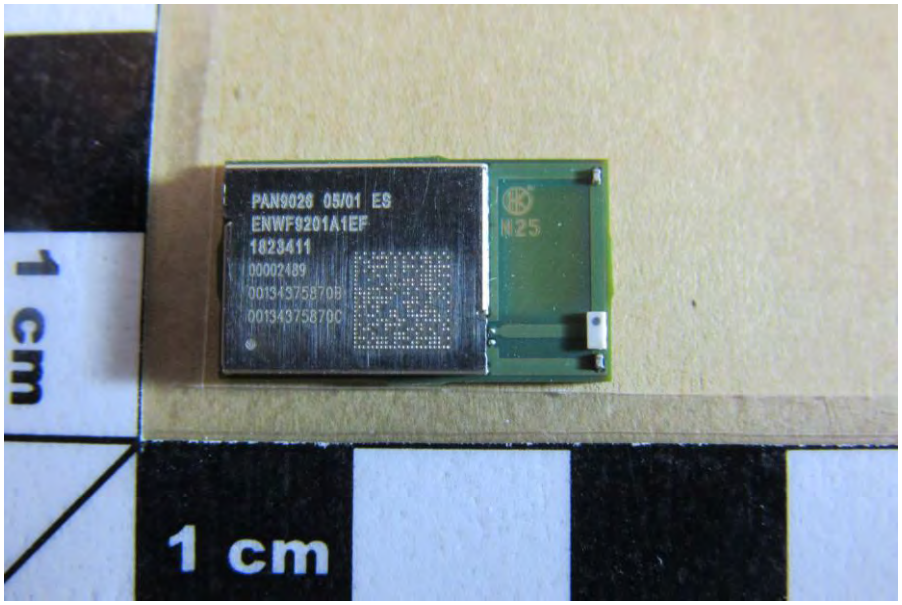
Acronyms	
Acronym	Description
BPSK	Binary Phase Shift Keying
DFS	Dynamic Frequency Selection
EIRP	Equivalent Isotropic Radiated Power
EUT	Equipment Under Test
FCC	Federal Communications Commission
HT	High Throughput
IEEE 802.11	MAC and PHY Layer for WiFi
ISED	Innovation, Science and Economic Development Canada
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
TPC	Transmit Power Control
VBW	Video bandwidth
VHT	Very High Throughput

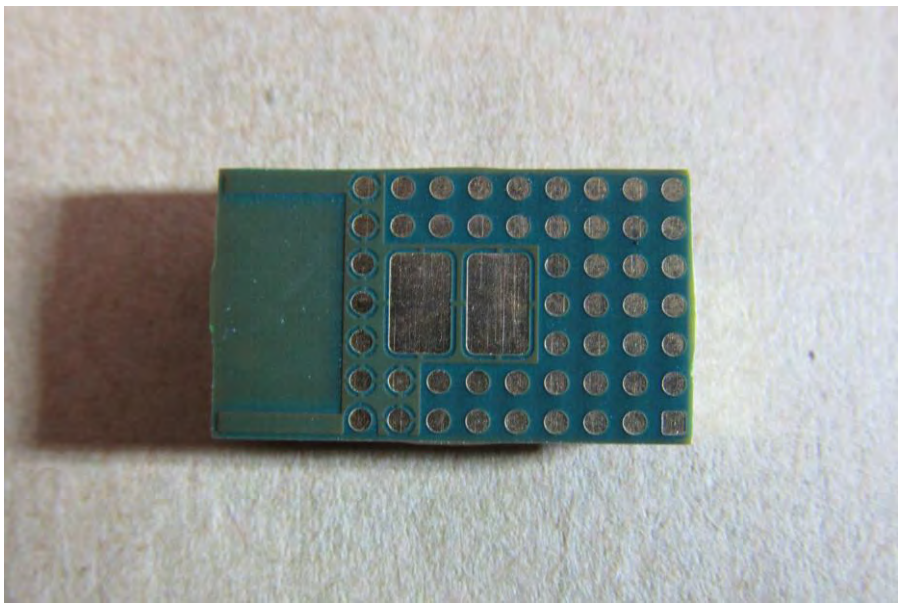
REPORT INDEX

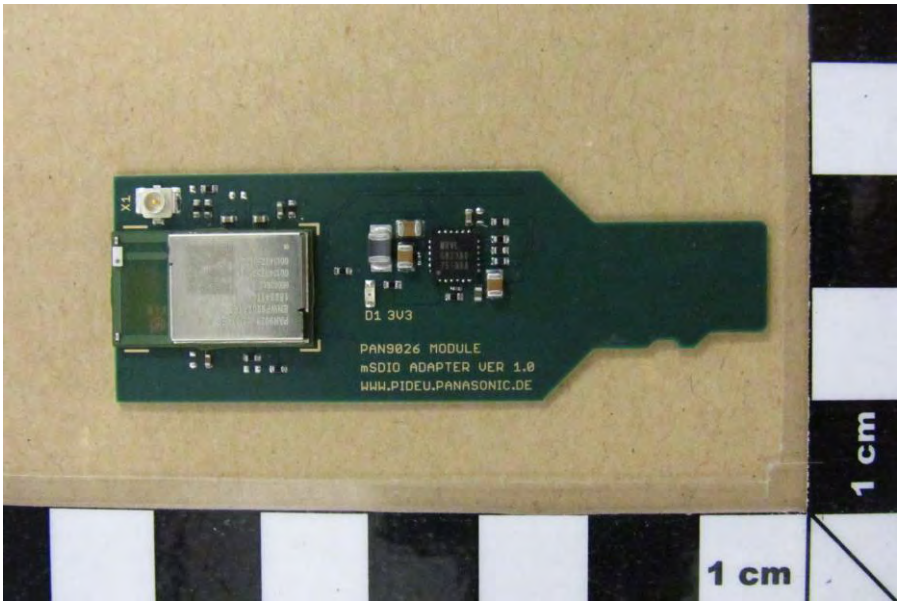
1 Equipment (Test Item) Under Test

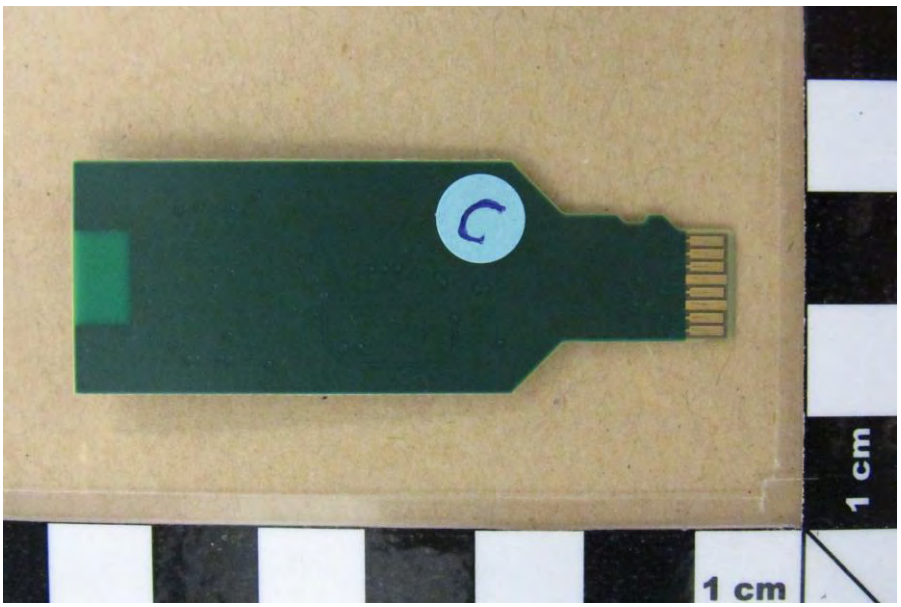
Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module	
Model	ENWF9201A1EF	
Additional Model(s)	ENWF9203A1EF	
Brand Name(s)	PAN9026	
Serial Number(s)	1807211;00001040;0013436B110D;F9201A1E;0501	
Hardware Version(s)	05	
Software Version(s)	01	
Equipment type	Radio Module	
DFS Roles	Master Client without radar detection	
Max. conducted power [dBm]	15	
Max. Antenna Gain [dBi]	1.5	
Max. power spectral density [dBm/MHz]	2.2	
Power Class	EIRP < 200 mW and PSD < 10 dBm/MHz	
Detection Threshold [dBm]	-60.5	
Radio type	Transceiver	
Assigned frequency bands	5150 - 5250 MHz 5250 - 5350 MHz 5470 - 5725 MHz	
Radio technology	IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11n (HT40)	
Modulation	BPSK, QPSK, 16-QAM, 64-QAM	
Number of antenna ports	1	
Antenna	Type	Integrated
	Model	ANT162442DT-2001A2
	Manufacturer	TDK
	Gain	+1.5
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
Battery supply	No	
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY	

1.1 Photos – Equipment External

Module Top


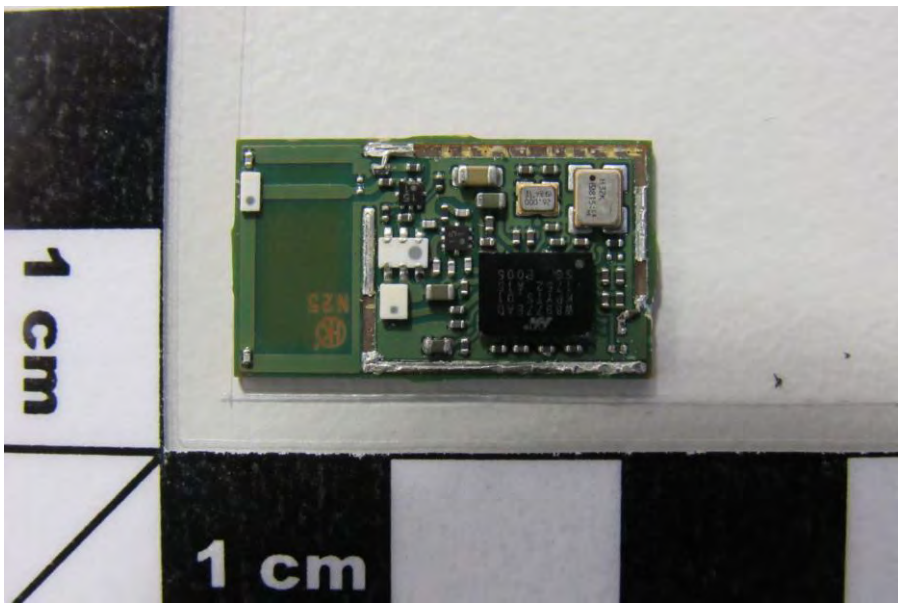
Module Bottom


Module with USB SDIO Converter Top


Module with USB SDIO Converter Bottom


Module with USB SDIO Converter and Wandboard


1.2 Photos – Equipment Internal

Module without Shielding


1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	WLAN Access Point	CISCO	AIR-CAP3702E-A-K9	FCC ID: LDK102087 For client testing
AE	Wandboard with i.MX6 Dual Core	Wandboard	WBIMX6U	
AE	USB SDIO Converter	Panasonic Industrial Devices Europe	USB_SDIO_V1.0	
CABL	USB cable		USB 2.0	
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.4 Test Modes

Mode	Description
OFDM (IEEE 802.1a)	Mode = Transmit Modulation = BPSK Spreading = OFDM Bandwidth = 20 MHz Power setting = 16 Data rate = 6 Mbps
HT40 (IEEE 802.11n)	Mode = Transmit Modulation = BPSK Spreading = OFDM Bandwidth = 40 MHz Power setting (1 Simultaneous Tx) = 14 Data rate (1 Simultaneous Tx) = 13 Mbps MCS (1 Simultaneous Tx) = 0

1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	52	5260
F2	Tx / Rx	52+56	5270
F3	Tx / Rx	100	5500
F4	Tx / Rx	100+104	5510

1.6 Normative References

References	
Designator	Reference
KDB 905462	KDB 905462 D02 v02
KDB 905462	KDB 905462 D03 v01r02
KDB 905462	KDB 905462 D04 v01
RSS-247	RSS-247 Issue 2

2 DFS Specifications

The following sections summarize the DFS requirements given in KDB 905462 D02

2.1 DFS Detection Thresholds

The DFS Detection Thresholds for Master Devices as well as Client Devices incorporating In-Service Monitoring

Maximum Transmit Power	**Value (See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 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. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

2.2 DFS Requirements prior to use of channel

The following table summaries the requirements for Master Devices and Client Devices prior to use of channel

Requirement	**Operational Mode**		
	Master	**Client Without Radar Detection**	**Client With Radar Detection**
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

2.3 DFS Requirements during normal operation

The following table summaries the requirements for Master Devices and Client Devices during normal operation

Requirement	**Operational Mode**	
	Master Device or Client with Radar Detection	**Client Without Radar Detection**
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

2.4 DFS Requirements for EUTs with multiple bandwidth modes

The following table shows the tests and operational bandwidth for EUTs that support multiple bandwidth operational modes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

2.5 DFS Response Requirements

For Master and Client Devices with radar detection the required response times are shown below

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 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **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 a *Channel* move (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 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

2.6 DFS Short Radar Waveforms

The following table shows the waveform parameters, minimum percentage of successful detection and the number of trials for the short radar waveforms Type 0 to 4

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

2.7 DFS Long Radar Waveform

The following table shows the waveform parameters, minimum percentage of successful detection and the number of trials for the long radar waveform Type 5

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length (12,000,000 / *Burst Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

2.8 DFS Hopping Radar Waveform

The following table shows the waveform parameters, minimum percentage of successful detection and the number of trials for the long radar waveform Type 6

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: [4]

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

3 Result Summary

FCC 47 CFR Part 15E, ISED RSS-247				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
FCC 15E.407 (h)(2) RSS-247 6.3	Waveform verification	KDB 905462 D02 v02 Section 7.5	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	Channel load verification	KDB 905462 D02 v02 Section 7.7	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	U-NII detection bandwidth	KDB 905462 D02 v02 Section 7.8.1	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	Initial Channel Availability Check Time	KDB 905462 D02 v02 Section 7.8.2.1	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	Radar Burst at the beginning of the Channel Availability Check Time	KDB 905462 D02 v02 Section 7.8.2.2	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	Radar Burst at the end of the Channel Availability Check Time	KDB 905462 D02 v02 Section 7.8.2.3	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	In-Service Monitoring for Channel Closing Transmission and Channel Move Time	KDB 905462 D02 v02 Section 7.8.3	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	In-Service Monitoring for Non-Occupancy Time	KDB 905462 D02 v02 Section 7.8.3	PASS	
FCC 15E.407 (h)(2) RSS-247 6.3	Statistical performance check	KDB 905462 D02 v02 Section 7.8.4	PASS	
Comment:				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

4 Test Conditions and Results

4.1 Test Conditions and Results - Waveform verification

4.1.1 Information

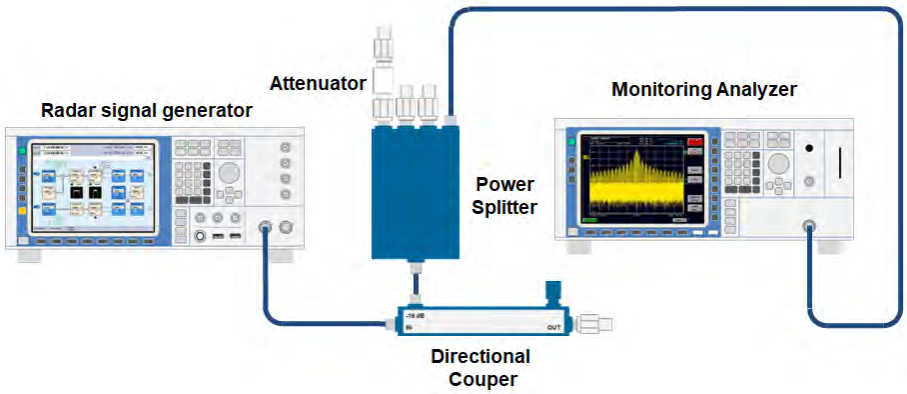
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.5
Operator	Toralf Jahn
Date	2019-02-12

4.1.2 Limits

Limits
Peak envelope power equal to detection threshold

4.1.3 Setup

Test Setup



4.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.1.5 Procedure

Test Procedure

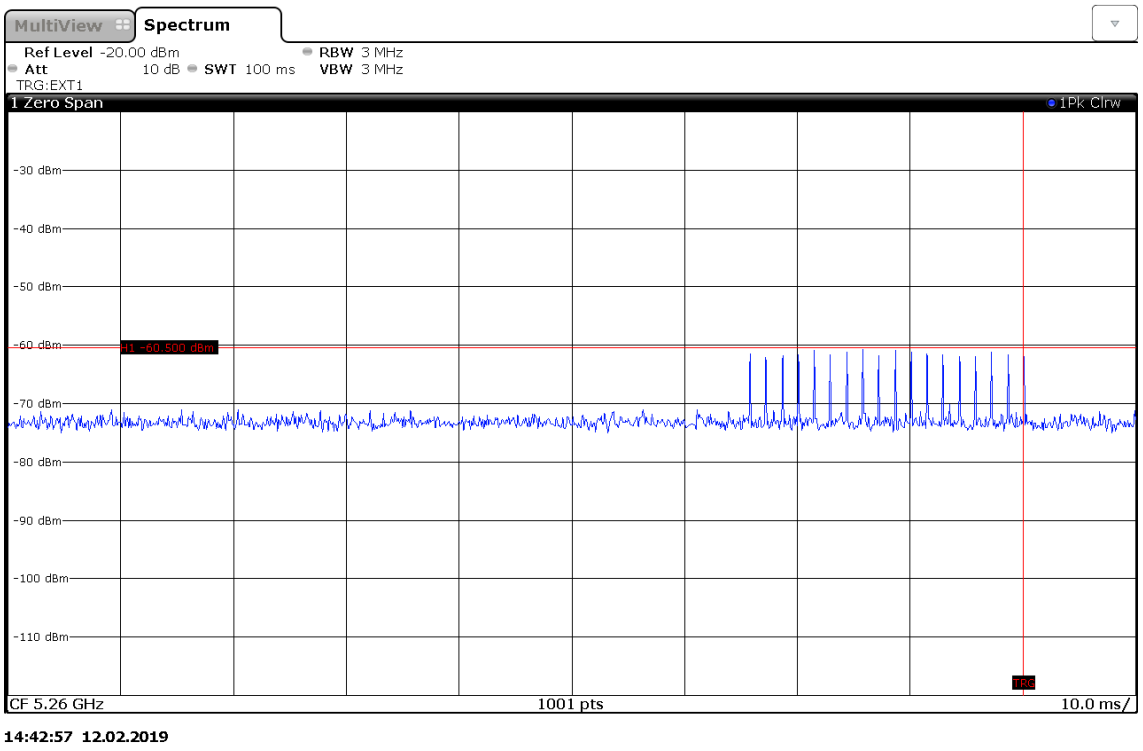
1. The signal generator and spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set long enough to capture the radar burst
4. A display line is set to the DFS detection threshold level
5. The spectrum analyzer sweep is triggered by the signal generator
6. It is verified that the peak amplitude of the radar burst pulses are at detection threshold power level
7. A screen capture of the analyzer is recorded

4.1.6 Results

Test Results		
Waveform	Threshold [dBm]	Verdict
Type 0	-60.5	PASS
Type 1	-60.5	PASS
Type 2	-60.5	PASS
Type 3	-60.5	PASS
Type 4	-60.5	PASS
Type 5	-60.5	PASS
Type 6	-60.5	PASS

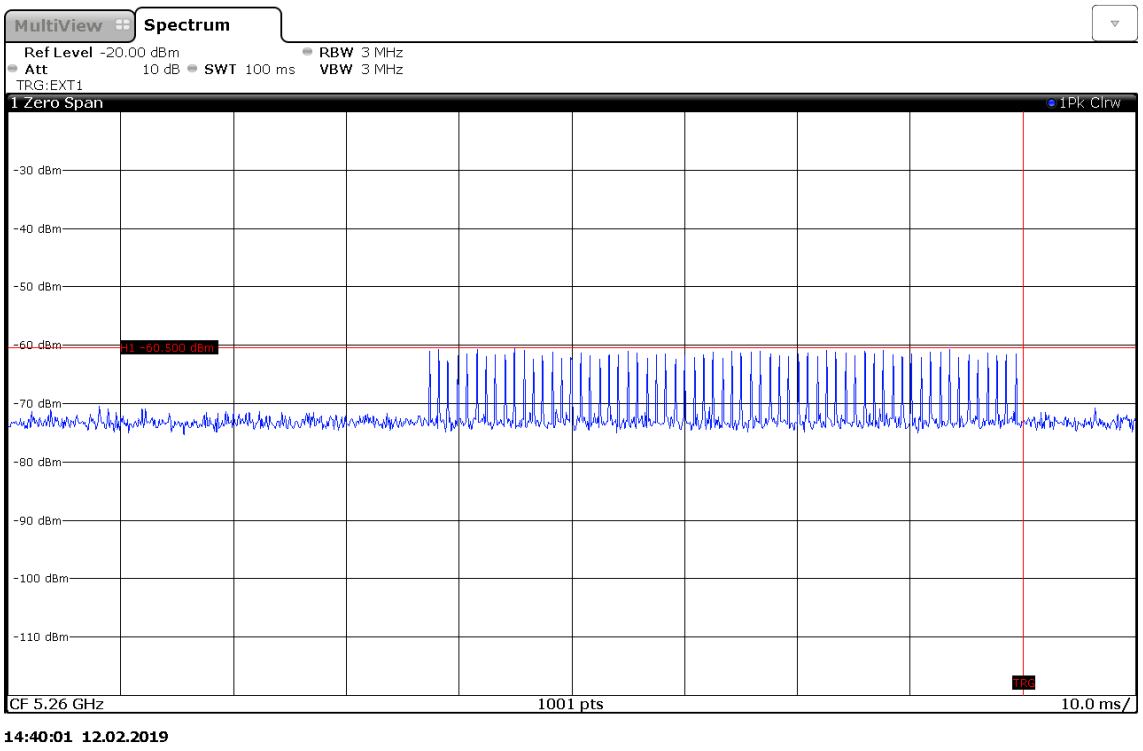
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 0



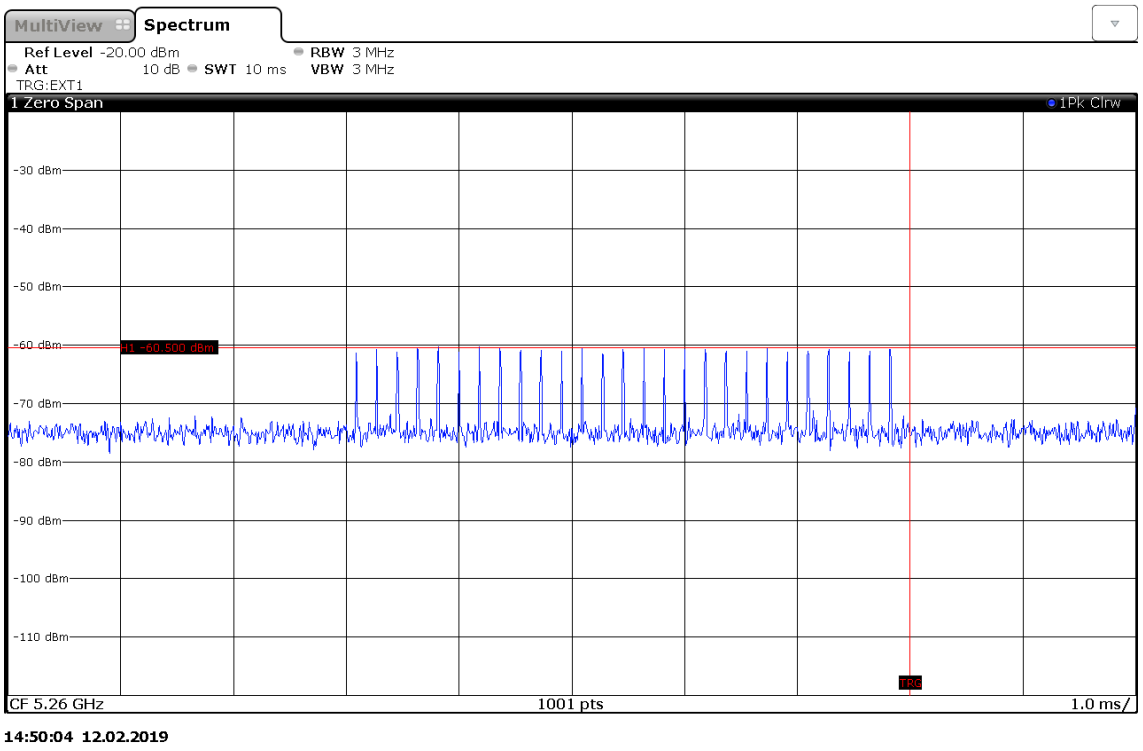
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 1



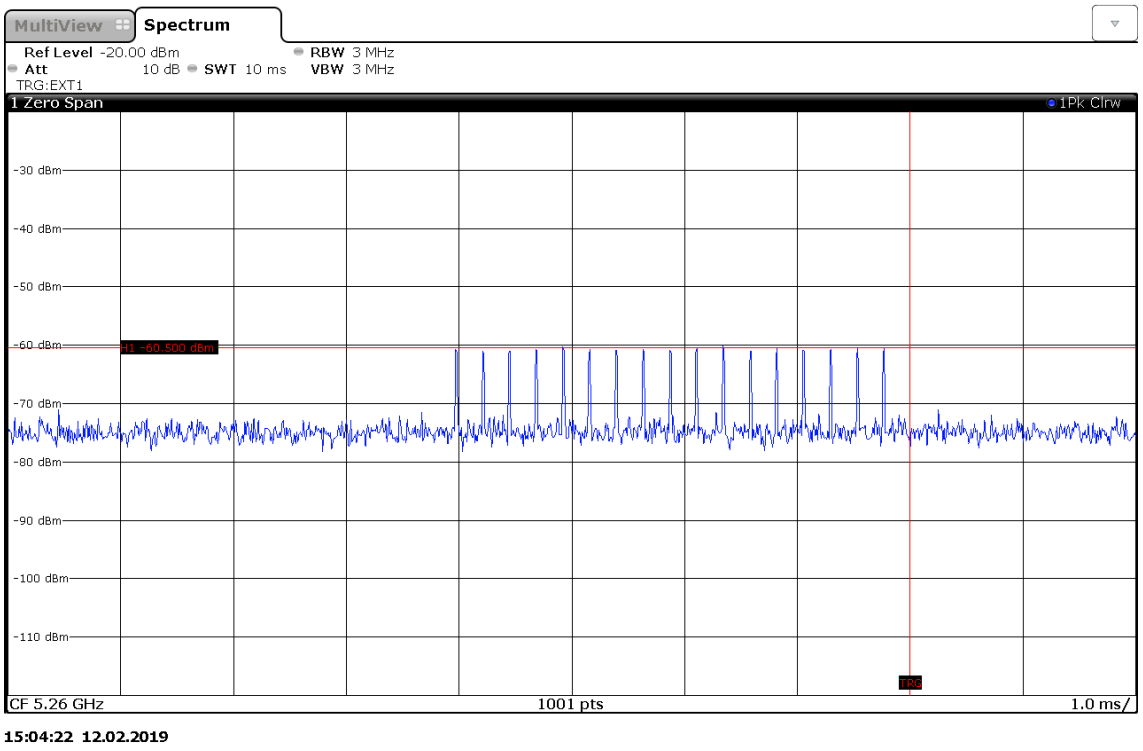
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 2



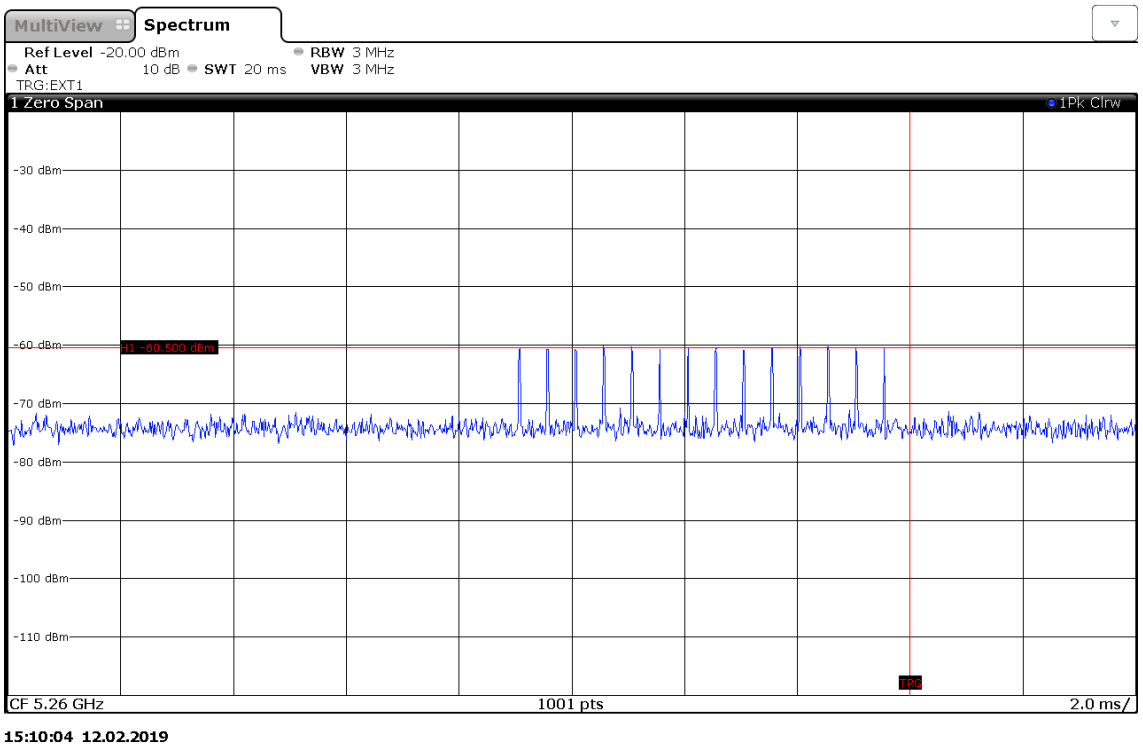
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 3



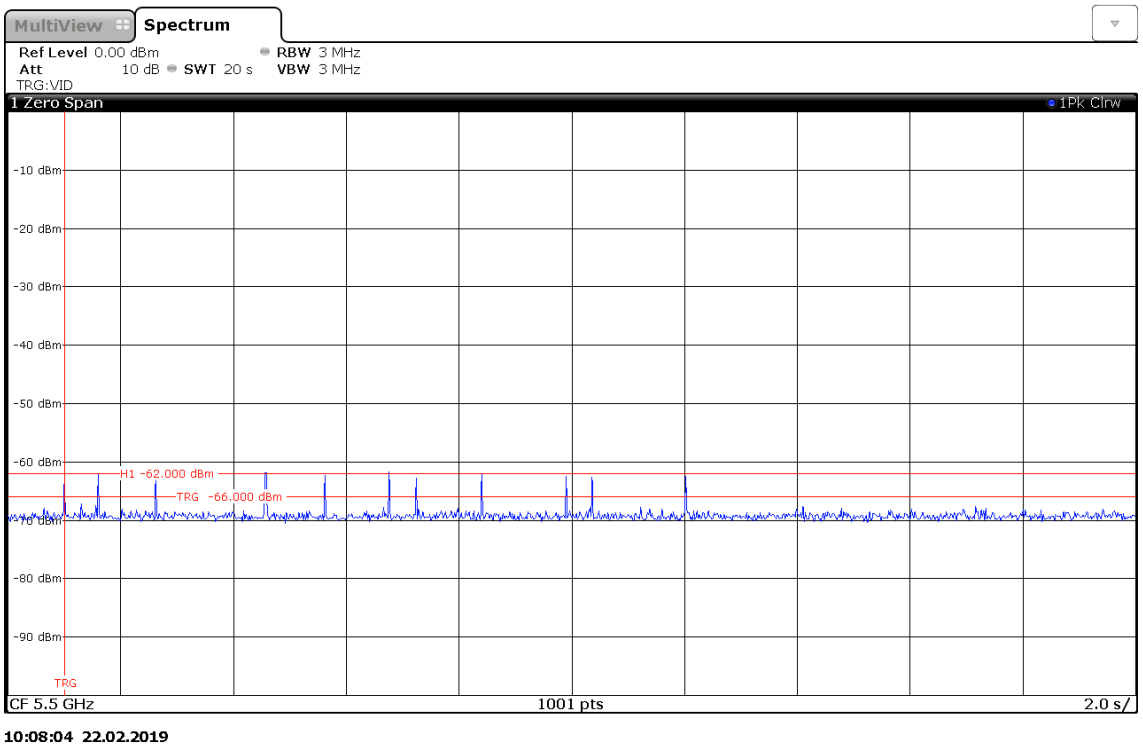
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 4



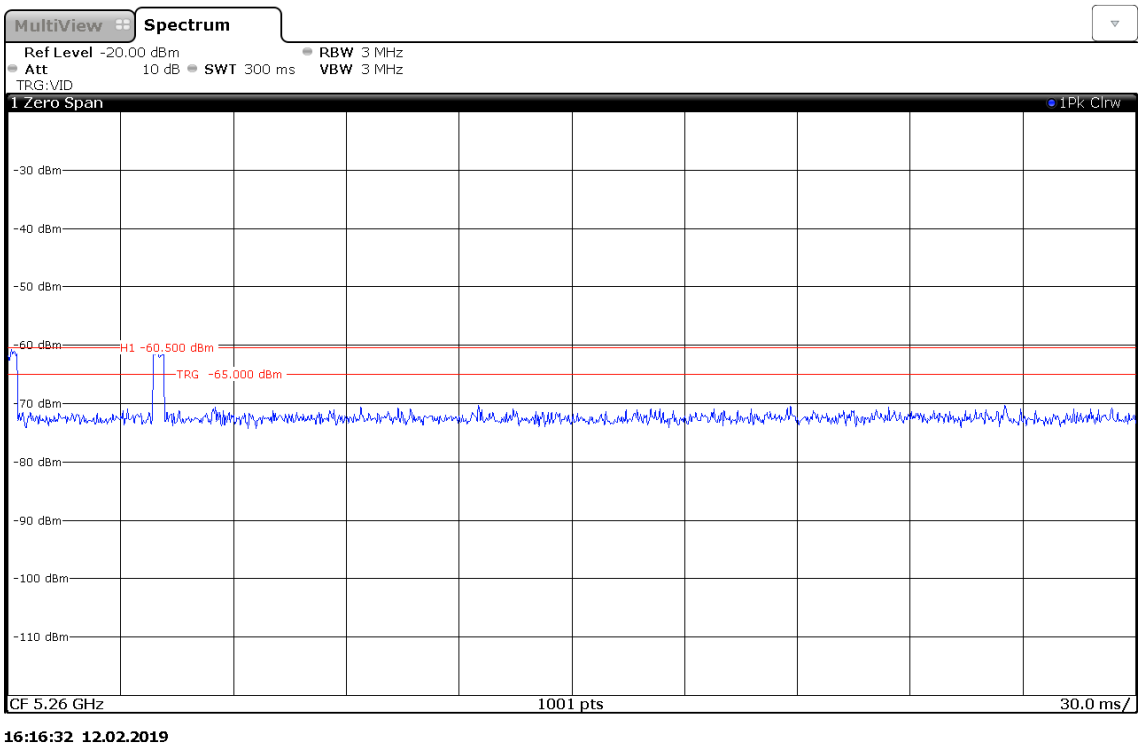
DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-22
Operating Conditions:	Tnom/Vnom
Mode:	Type 5



DFS Pulse Validation according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-12
Operating Conditions:	Tnom/Vnom
Mode:	Type 6



16:16:32 12.02.2019

4.2 Test Conditions and Results - Channel Load Verification

4.2.1 Information

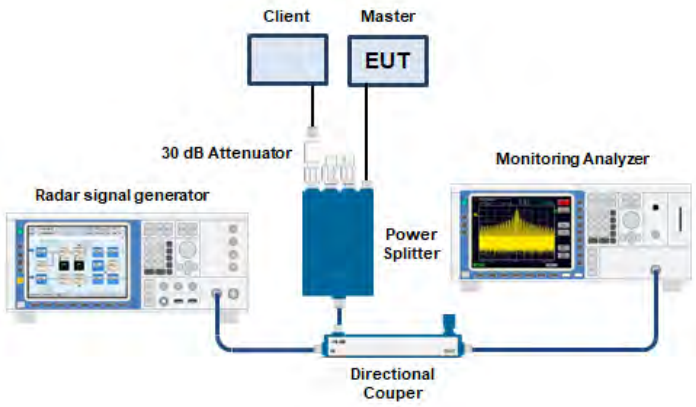
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.7
Operator	Toralf Jahn
Date	2019-02-15

4.2.2 Limits

Limits
Load ≥ 17 %

4.2.3 Setup

Test Setup



4.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.2.5 Procedure

Test Procedure

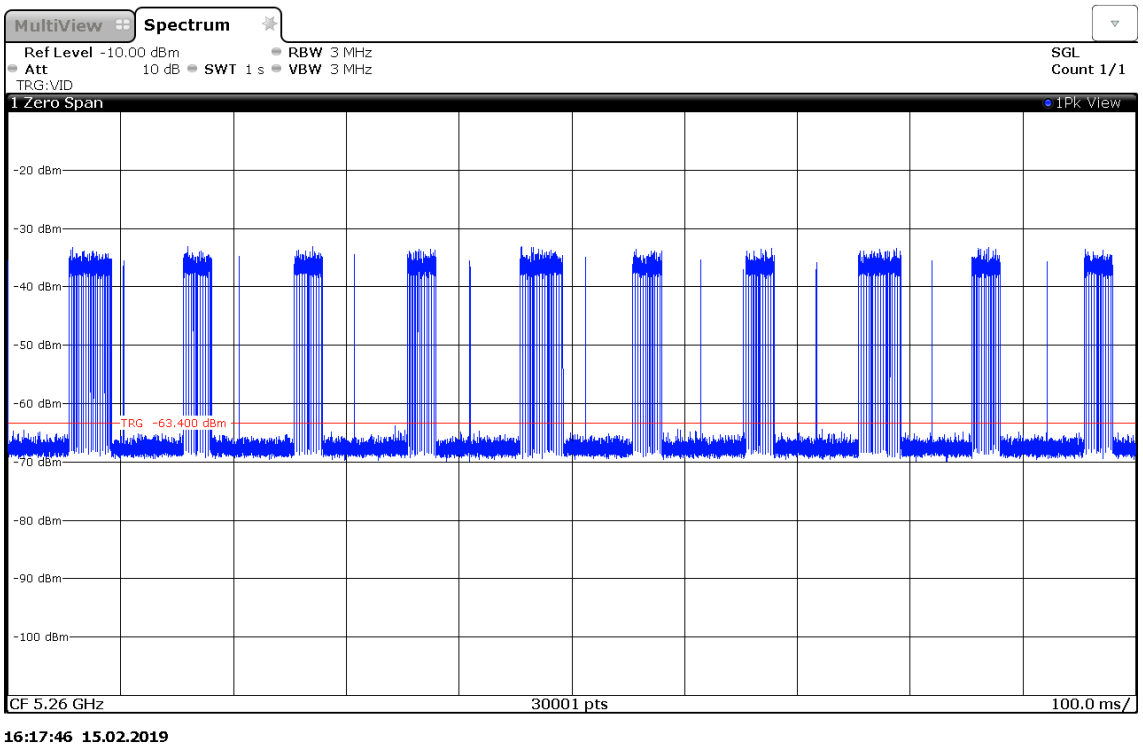
1. The waveform signal generator is switched off and the spectrum analyzer is set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 1 s
4. The test traffic between the EUT and the companion device is established
5. The traffic is recorded with the analyzer and the duty cycle is evaluated
6. It is verified that the duty cycle is larger than 17 %
7. A screen capture of the analyzer is recorded

4.2.6 Results

Test Results		
Bandwidth	Load [%]	Verdict
20 MHz	24	PASS
40 MHz	24	PASS

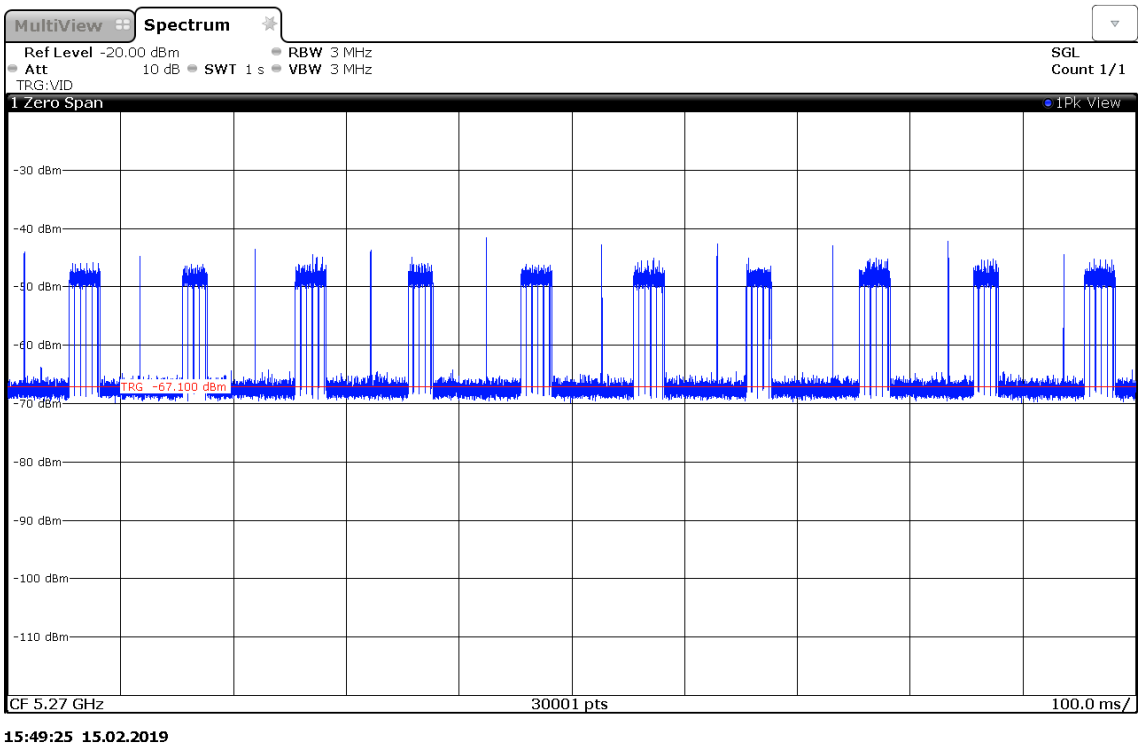
Channel Load Verification according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operating Frequency:	5270 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-15
Note:	OFDM, UDP, 1.5 Mbit/s
Duty Cycle Period:	1000 ms
Duty Cycle [%]:	24



Channel Load Verification according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operating Frequency:	5270 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-15
Note:	HT40, UDP, 3 Mbit/s
Duty Cycle Period:	1000 ms
Duty Cycle [%]:	24



15:49:25 15.02.2019

4.3 Test Conditions and Results - U-NII detection bandwidth

4.3.1 Information

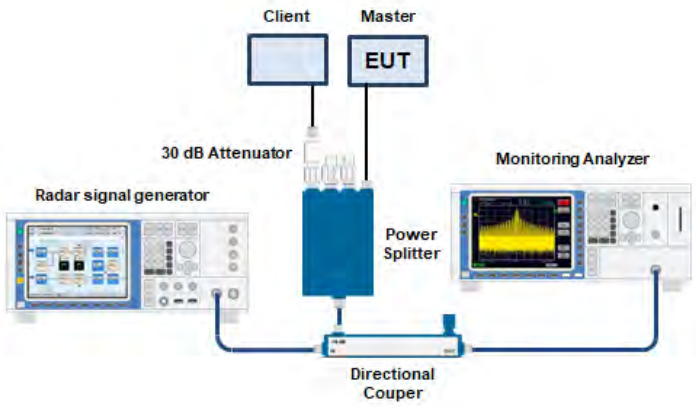
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.1
Operator	Toralf Jahn
Date	2019-02-20

4.3.2 Limits

Limits
≥ 99 % Bandwidth

4.3.3 Setup

Test Setup



4.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.3.5 Procedure

Test Procedure	
1.	The connection to the splitters for the spectrum analyzer and the client are terminated
2.	The EUT is started
3.	During the CAC time a radar burst type 0 is send to the EUT at the threshold level and channel center frequency
4.	The detection of the burst is recorded; the process is repeated for a total of 10 trials
5.	The radar burst is moved up 5 MHz and another 10 trials are processed
6.	If the detection rate is equal to or above 90 % the frequency is increased by another 5 MHz until the upper edge of the 99 % bandwidth is reached. If less than 90 % are detected the step size is reduced to 1 MHz starting 5 MHz below the last test frequency with detection rate lower than 90 %
7.	The highest frequency with 90 % detection rate is recorded as F_H
8.	The procedure is repeated with 5 MHz and 1 MHz steps below the channel center frequency
9.	The lowest frequency with 90 % detection rate is recorded as F_L
10.	The U-NII detection bandwidth is calculated as F_H - F_L and is then compared to the 99 % occupied signal bandwidth

4.3.6 Results

Test Results - 20 MHz Signal Bandwidth											
Signal Bandwidth [MHz]											20
Channel											52
Channel Frequency [MHz]											5260
Frequency [MHz]	1	2	3	4	5	6	7	8	9	10	Detection Rate [%]
5250	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5251											0
5252											0
5253											0
5254											0
5255	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5256											0
5257											0
5258											0
5259											0
5260	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5261											0
5262											0
5263											0
5264											0
5265	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5266											0
5267											0
5268											0
5269											0
5270	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Lower Frequency [MHz]											5250
Upper Frequency [MHz]											5270
U-NII Detection Bandwidth [MHz]											20
Verdict											PASS

Test Results - 40 MHz Signal Bandwidth											
Signal Bandwidth [MHz]											40
Channel											52+56
Channel Frequency [MHz]											5270
Frequency [MHz]	1	2	3	4	5	6	7	8	9	10	Detection Rate [%]
5250	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5251											0
5252											0
5253											0
5254											0
5255											0
5256											0
5257											0
5258											0
5259											0
5260	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5261											0
5262											0
5263											0
5264											0
5265											0
5266											0
5267											0
5268											0
5269											0
5270	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5271											0
5272											0
5273											0
5274											0
5275											0
5276											0
5277											0
5278											0
5279											0
5280	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
5281											0
5282											0
5283											0
5284											0
5285											0
5286											0
5287											0
5288											0
5289											0
5290	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100
Lower Frequency [MHz]											5250
Upper Frequency [MHz]											5290
U-NII Detection Bandwidth [MHz]											40
Verdict											PASS

4.4 Test Conditions and Results - Initial Channel Availability Check Time

4.4.1 Information

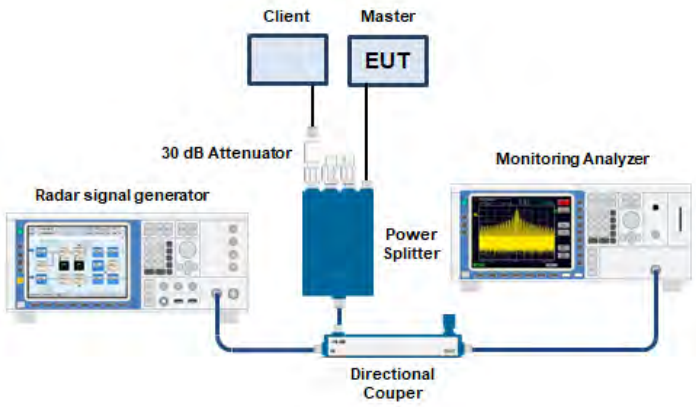
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.2.1
Operator	Toralf Jahn
Date	2019-02-14

4.4.2 Limits

Limits
No beacon, control or data signals until end of CAC time

4.4.3 Setup

Test Setup



4.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.4.5 Procedure

Test Procedure

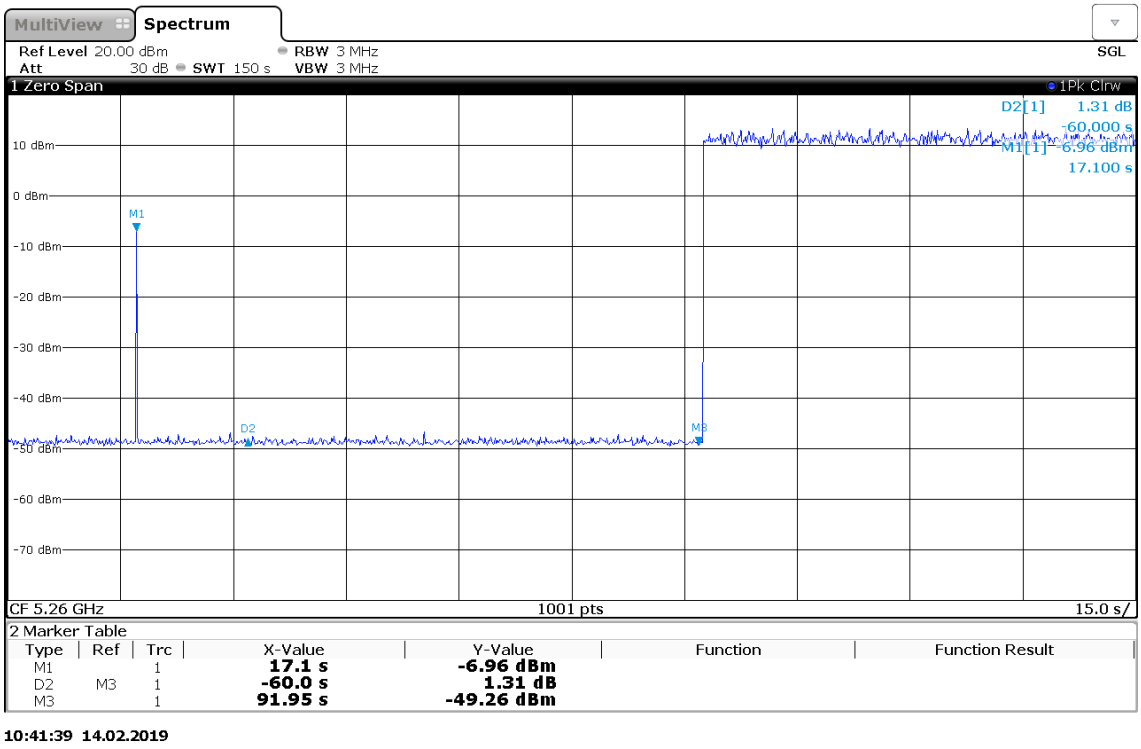
1. The waveform signal generator is switched off and the spectrum analyzer is set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 2.5 min
4. The sweep of the analyzer is started at EUT power up
5. All emissions of the EUT are recorded by the analyzer
6. The start of the CAC time and the instance in time of the first emission from the EUT are marked
7. The time between the first emission and the start of the CAC time shall be larger than CAC time

Comment: There appear emissions before the end of CAC time. These emissions appear even before start of CAC time. These emissions are about 15 dB below traffic and beacon level and the timing behavour is different. This concludes that there is no beacon or traffic before the end of CAC time.

4.4.6 Results

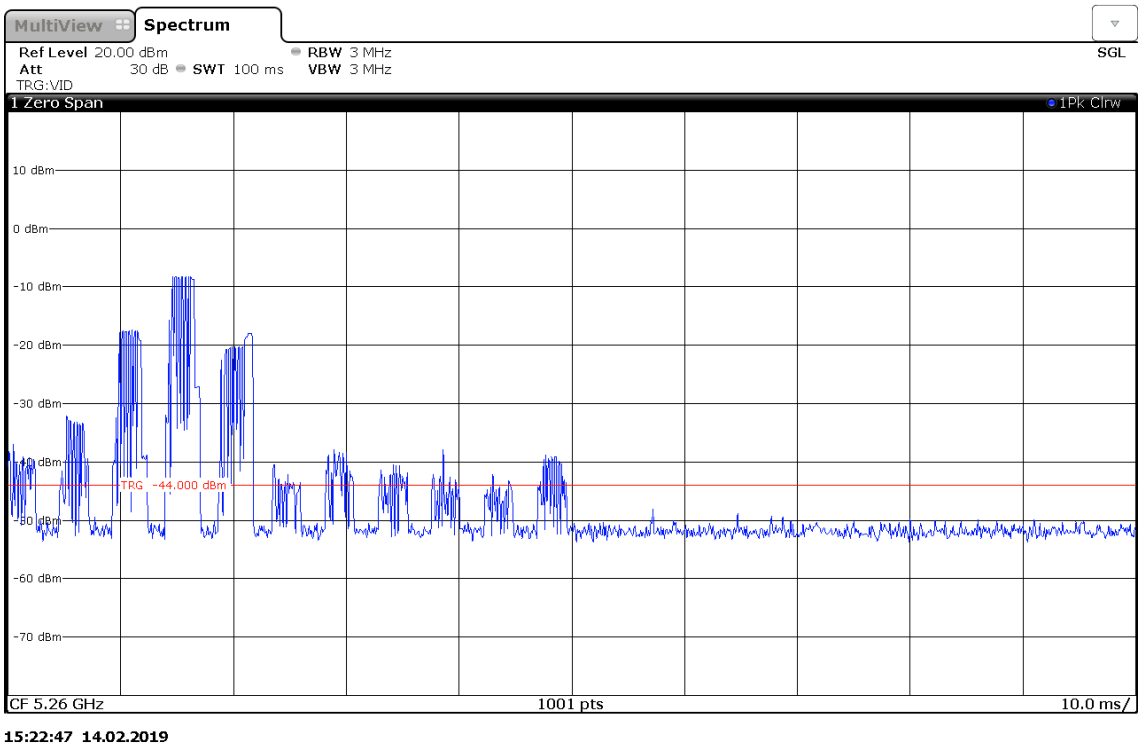
Initial Channel Availability Check Time according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-14
Operating Conditions:	Tnom/Vnom
Analyzer Start Time:	Inserting PAN-Module (power on)
Marker M1:	Pop-up window “Wait while inserting Module”
Marker D2:	Begin of CAC Time
Marker M3:	End of CAC Time



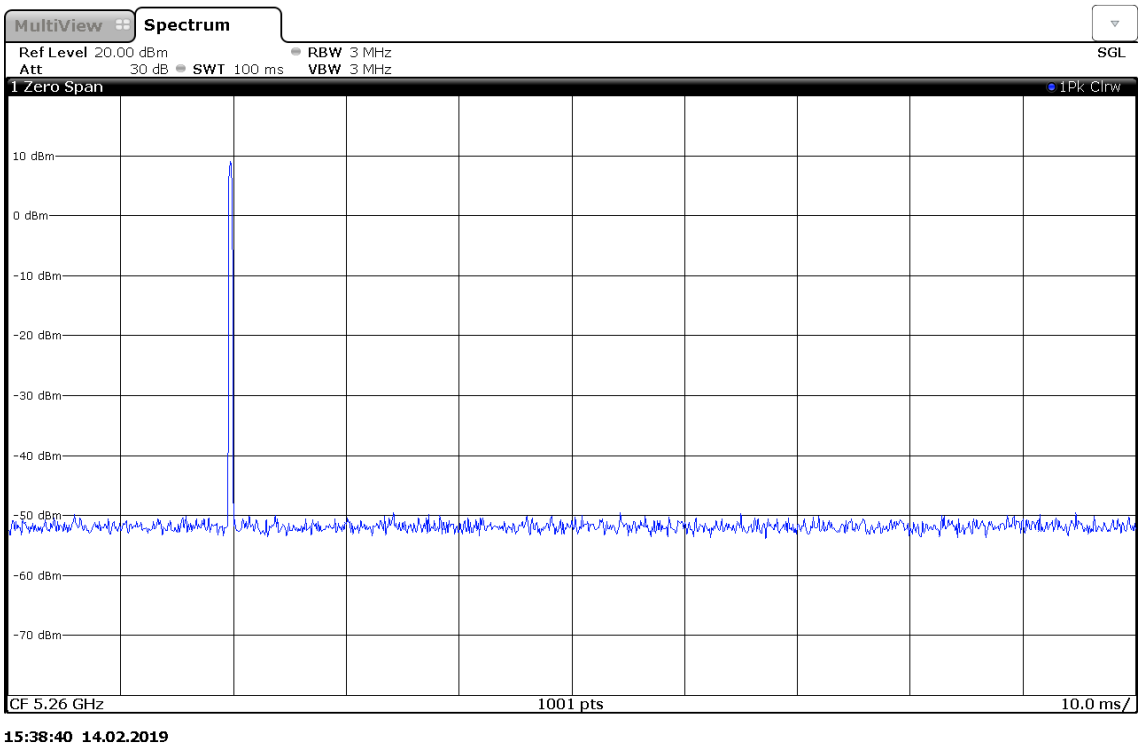
Initial Channel Availability Check Time according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-14
Operating Conditions:	Tnom/Vnom
Note 1:	Pop-up window “Wait while inserting Module”
Note 2:	Appears before "Configure and start BSS" pop-up window



Initial Channel Availability Check Time according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-14
Operating Conditions:	Tnom/Vnom
Note 1:	Beacon Signal



4.5 Test Conditions and Results - Radar Burst at the beginning of the CAC Time

4.5.1 Information

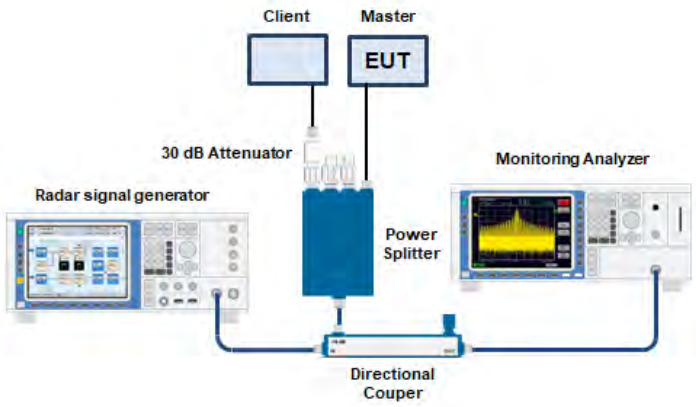
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.2.2
Operator	Toralf Jahn
Date	2019-02-18

4.5.2 Limits

Limits
No transmission on test channel

4.5.3 Setup

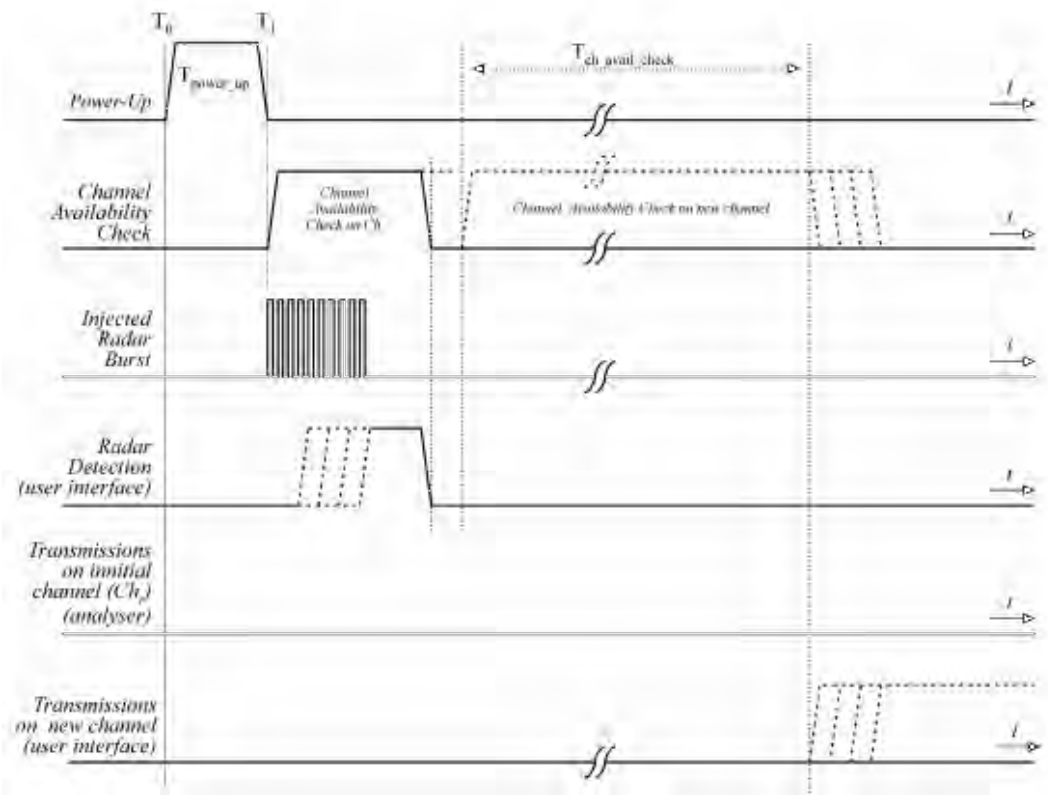
Test Setup



4.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

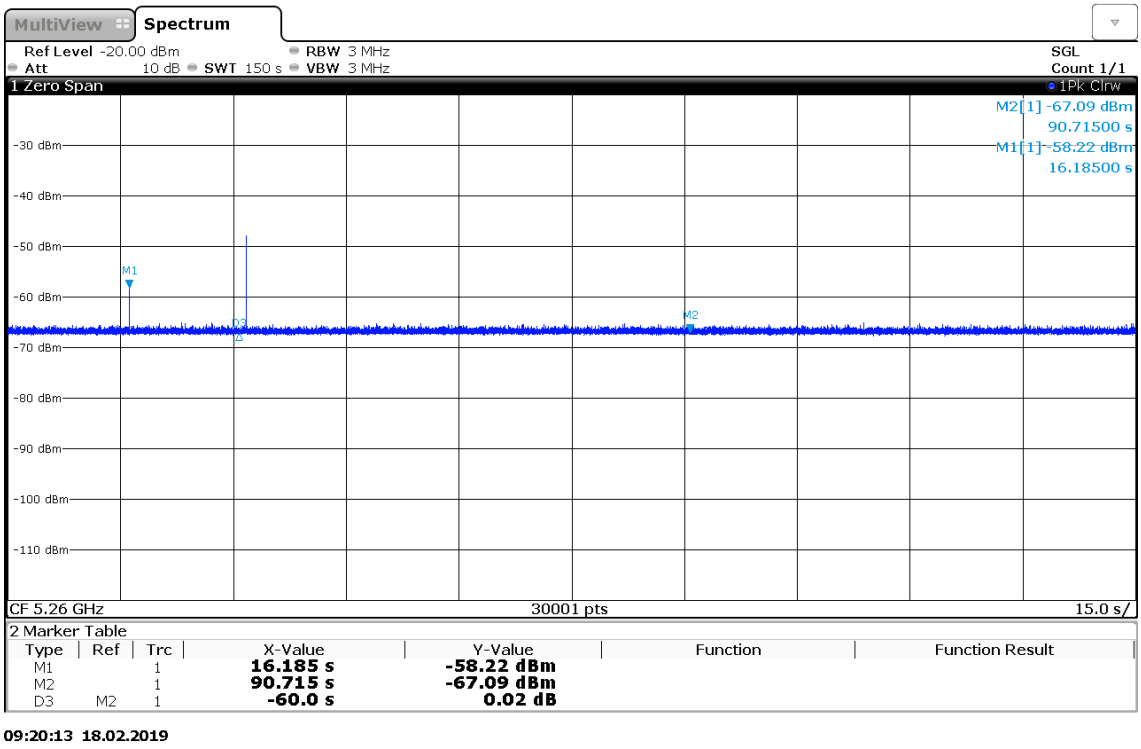
4.5.5 Procedure

Test Procedure
1. The waveform signal generator and the spectrum analyzer are set to the test frequency 2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz 3. The sweep time is set to 2.5 min 4. The EUT is switched on at T_0 and the CAC time starts at T_1 5. The analyzer sweep is started at EUT startup 6. A single type 0 radar burst is generated at DFS threshold level + 1 dB within the first 6 seconds of the CAC time 7. All emission from the EUT are measured with the analyzer 8. Detection of the burst and the emission are recorded 

4.5.6 Results

Radar Burst at Beginning of CAC Time according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-18
Operating Conditions:	Tnom/Vnom
Analyzer Start Time:	Inserting PAN-Module (power on)
Marker M1:	Pop-up window “Wait while inserting Module”
Marker D3:	Begin of CAC Time
Peak after Marker D3:	Radar Burst
Marker M2:	End of CAC Time



4.6 Test Conditions and Results - Radar Burst at the end of the CAC Time

4.6.1 Information

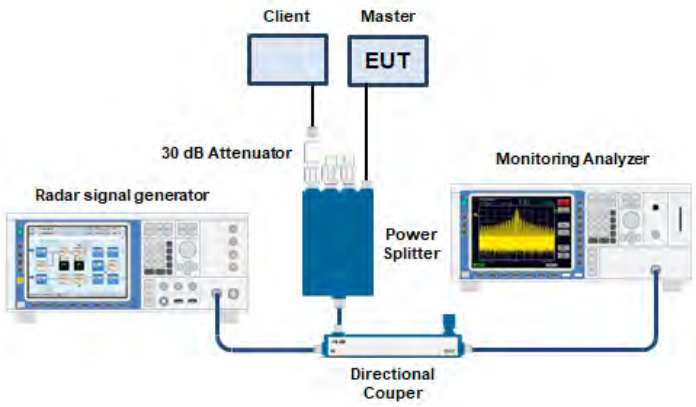
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.2.3
Operator	Toralf Jahn
Date	2019-02-18

4.6.2 Limits

Limits
No transmission on test channel

4.6.3 Setup

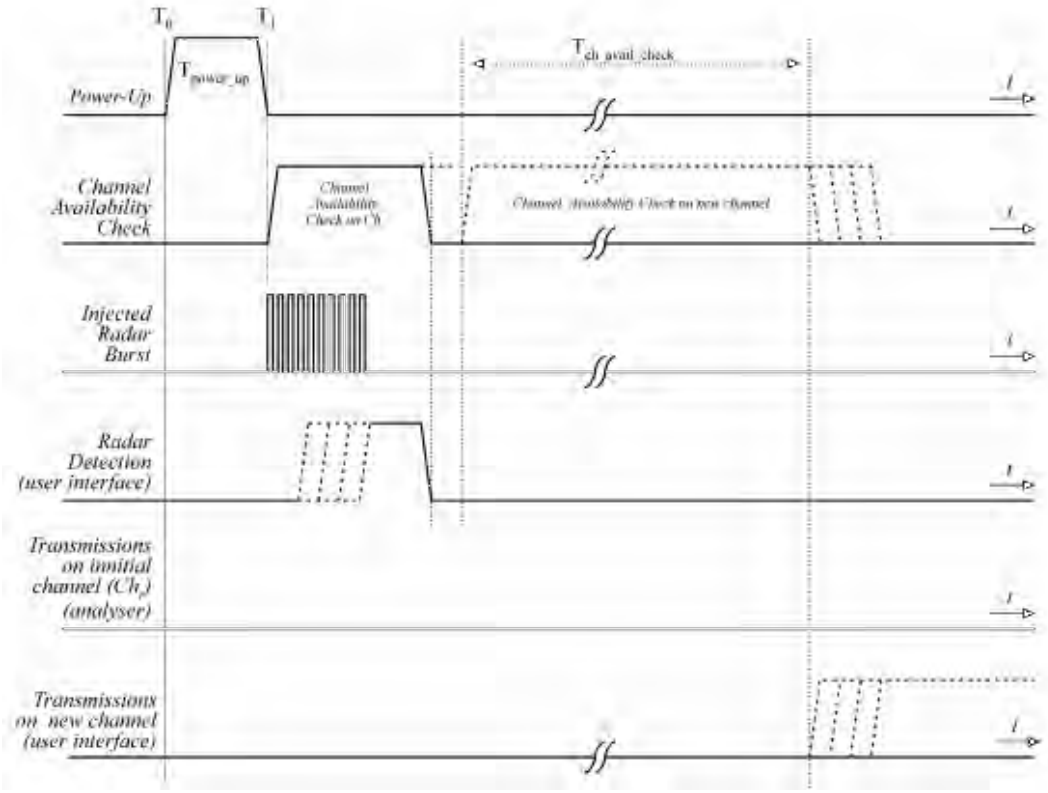
Test Setup



4.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

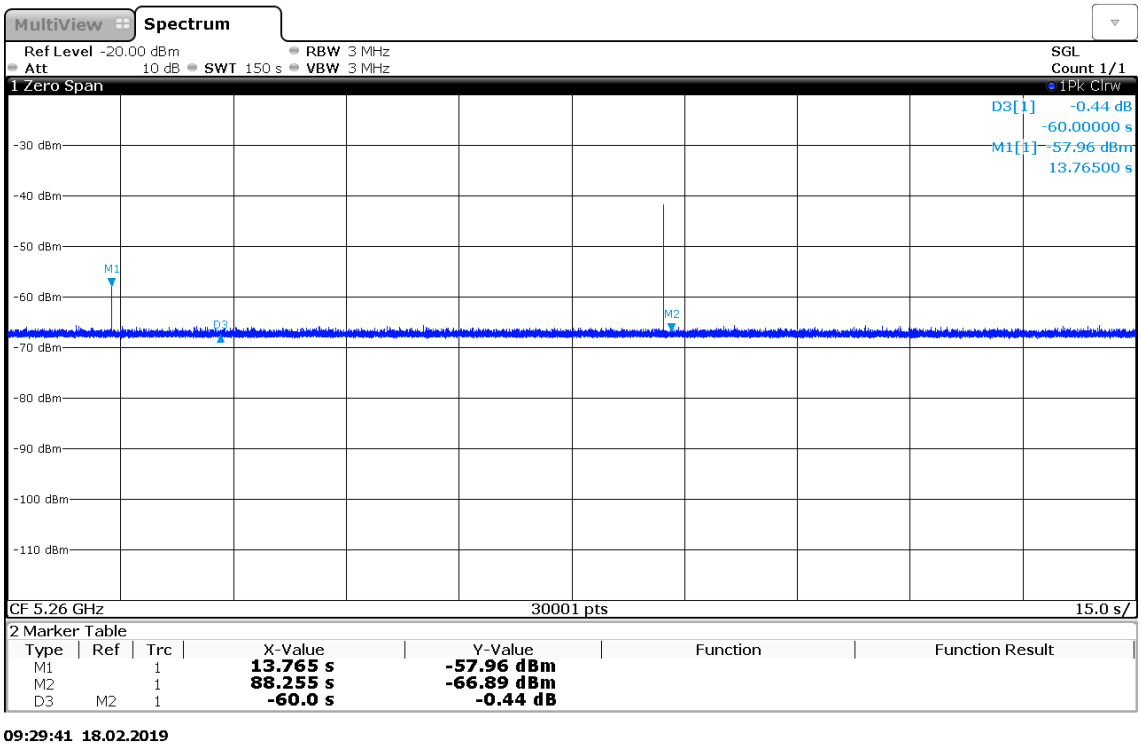
4.6.5 Procedure

Test Procedure
1. The waveform signal generator and the spectrum analyzer are set to the test frequency 2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz 3. The sweep time is set to 2.5 min 4. The EUT is switched on at T_0 and the CAC time starts at T_1 5. The analyzer sweep is started at EUT startup 6. A single type 0 radar burst is generated at DFS threshold level + 1 dB within the last 6 seconds of the CAC time 7. All emission from the EUT are measured with the analyzer 8. Detection of the burst and the emission are recorded 

4.6.6 Results

Radar Burst at End of CAC Time according to KDB 789033 D02

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-18
Operating Conditions:	Tnom/Vnom
Analyzer Start Time:	Inserting PAN-Module (power on)
Marker M1:	Pop-up window “Wait while inserting Module”
Marker D3:	Begin of CAC Time
Marker M2:	End of CAC Time
Peak before Marker M2:	Radar Burst



4.7 Test Conditions and Results - Channel Closing Transmission and Channel Move Time

4.7.1 Information

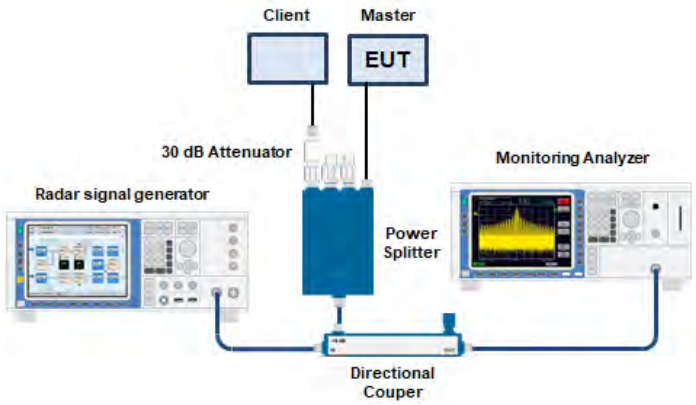
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.3
Operator	Toralf Jahn
Date	2019-02-15

4.7.2 Limits

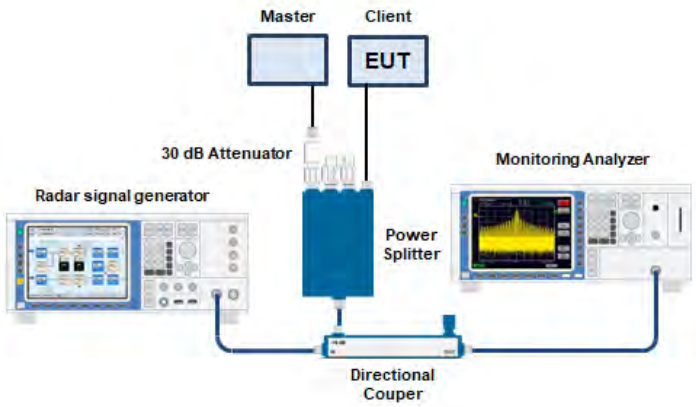
Limits	
Maximum channel move time	10 s
Maximum channel closing transmission time	200 ms + aggregate of 60 ms

4.7.3 Setup

Test Setup - Master device



Test Setup - Client device



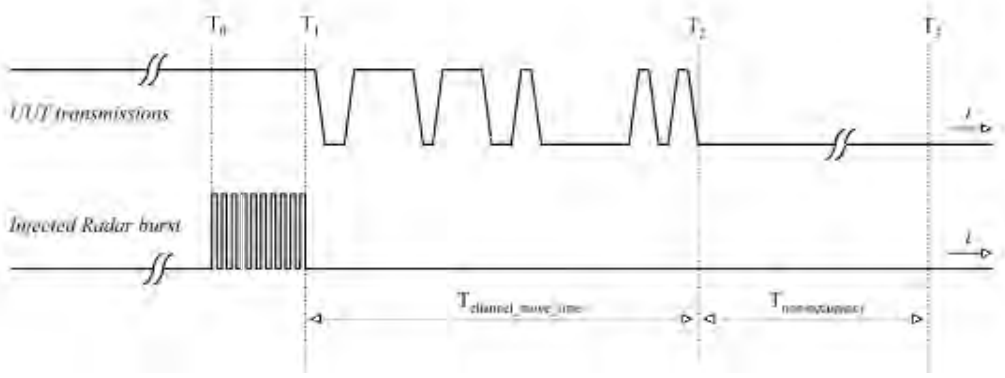
4.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.7.5 Procedure

Test Procedure

1. The waveform signal generator and the spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 16 s
4. A channel loading stream is established between master and client
5. At time T_0 a single radar burst of type 0 is send to the master with power level 1 dB above the DFS threshold level
6. With the end of the burst the analyzer sweep is triggered and all emissions are recorded
7. The analyzer trace is analyzed in order to determine the instance in time when all transmissions on the channel are stopped
8. The result is recorded as channel move time
9. The analyzer trace is analyzed in order to determine the accumulated transmission time between the end of the burst and the channel move time
10. The result is recorded as channel closing transmission time



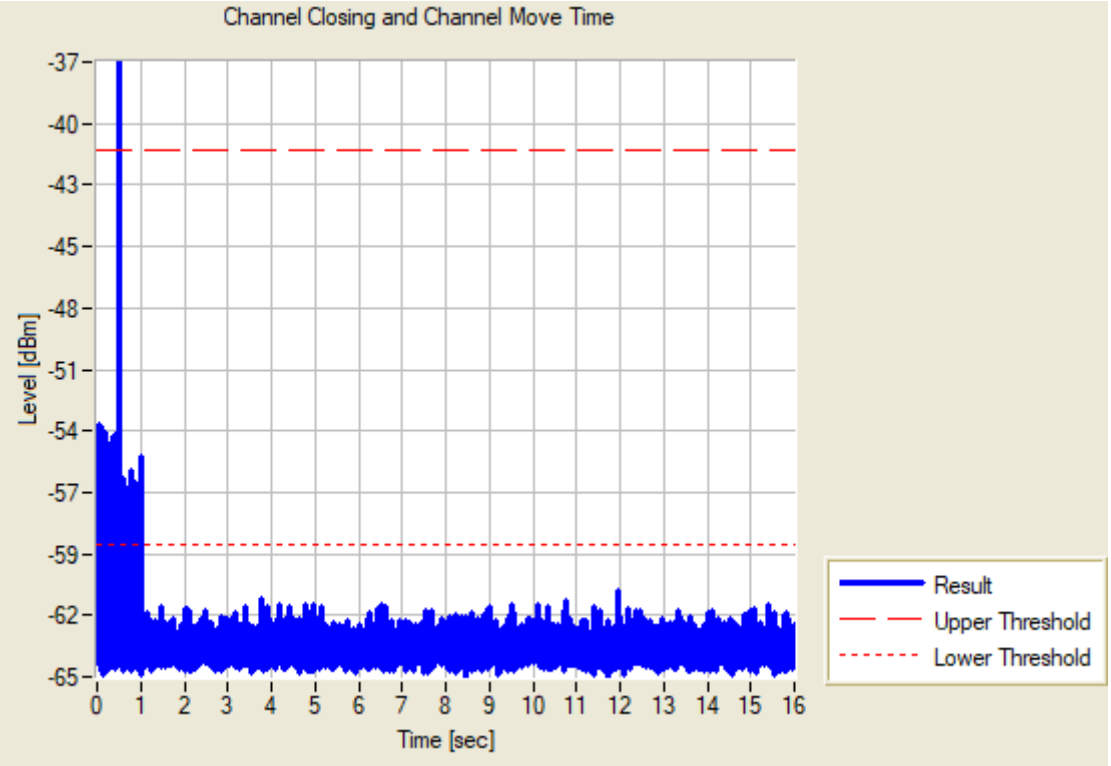
4.7.6 Results

Test Results - Master				
Channel	Frequency [MHz]	Channel move time [s]	Channel closing transmission time [ms]	Verdict
52+56	5270	0.466	6 + 0	PASS

Test Results - Client without radar detection				
Channel	Frequency [MHz]	Channel move time [s]	Channel closing transmission time [ms]	Verdict
52+56	5270	0.792	76 + 24	PASS

Channel Closing Time and Channel Move Time - Access Point

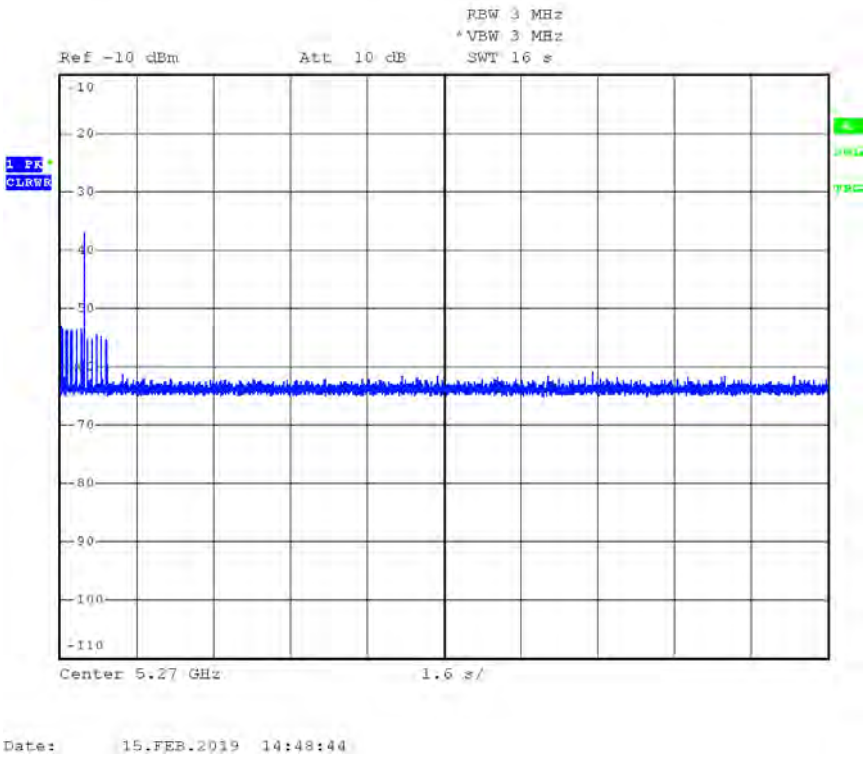
EUT	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model	ENWF9201A1EF
Approval Holder	Panasonic Industrial Devices Europe GmbH
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Jahn
Test Date / Time	15.Feb.2019
Test Specification	KDB 905462 D02 v02 sub-clause 7.8.3
Frequency / Mode	5270 MHz / HT40 / Acess Point
Radar Type:	0
Plot Type:	Evaluation Software



	Limit	Result	Verdict
Channel Closing Time until 200 msec after last Radar Signal	≤ 200 msec	6 msec	PASS
Channel Closing Time in the remainder of the 10 seconds period	≤ 60 msec	6 msec	PASS
Channel Move Time	≤ 10.0 sec	0.466 sec	PASS

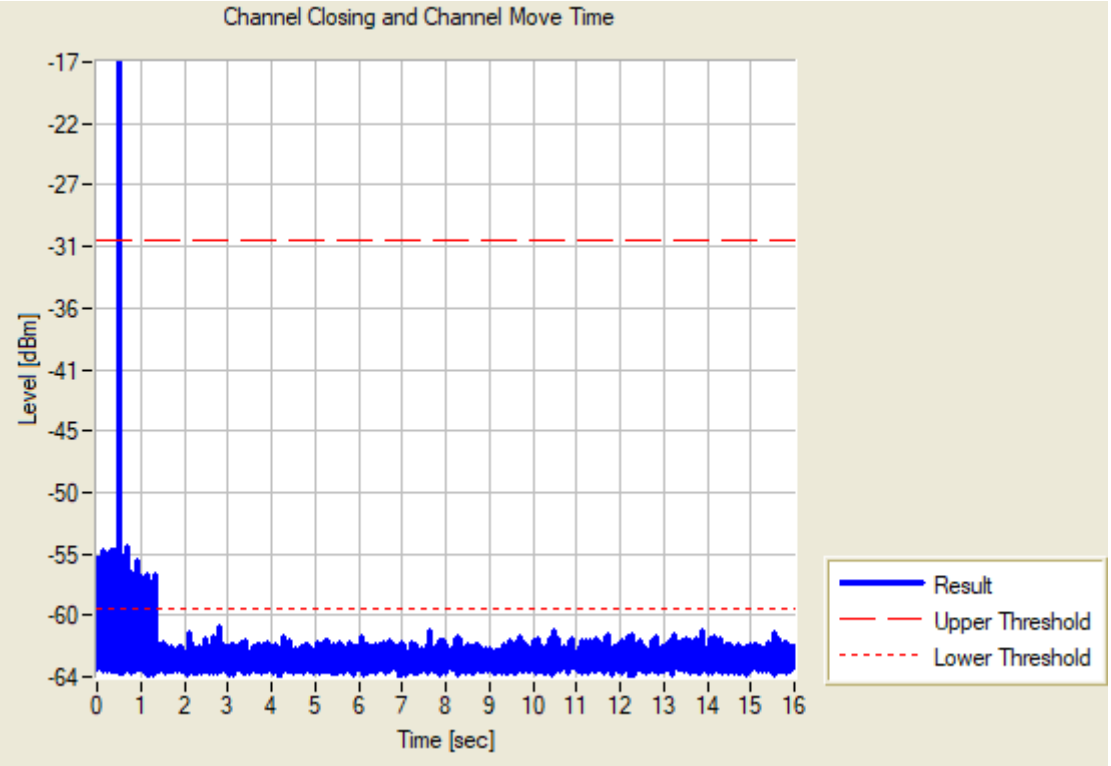
Channel Closing Time and Channel Move Time - Access Point

EUT	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model	ENWF9201A1EF
Approval Holder	Panasonic Industrial Devices Europe GmbH
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Jahn
Test Date / Time	15.Feb.2019
Test Specification	KDB 905462 D02 v02 sub-clause 7.8.3
Frequency / Mode	5270 MHz / HT40 / Acess Point
Radar Type:	0
Plot Type:	Plot Type: Detail view from analyzer



Channel Closing Time and Channel Move Time - Client

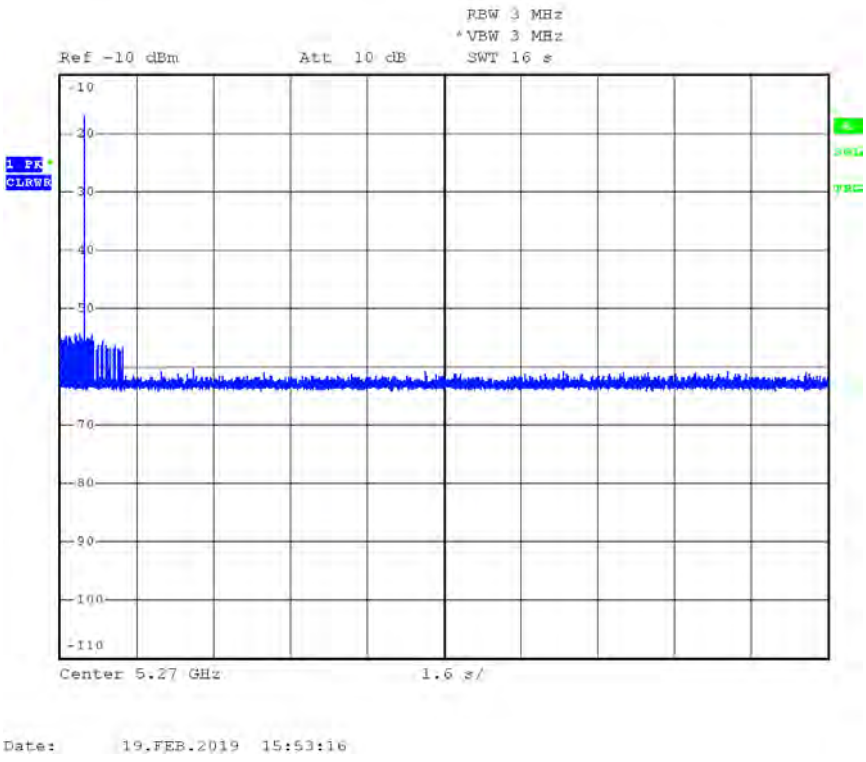
EUT	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model	ENWF9201A1EF
Approval Holder	Panasonic Industrial Devices Europe GmbH
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Jahn
Test Date / Time	19.Feb.2019
Test Specification	KDB 905462 D02 v02 sub-clause 7.8.3
Frequency / Mode	5270 MHz / HT40 / Client
Radar Type:	0
Plot Type:	Evaluation Software



	Limit	Result	Verdict
Channel Closing Time until 200 msec after last Radar Signal	≤ 200 msec	76 msec	PASS
Channel Closing Time in the remainder of the 10 seconds period	≤ 60 msec	24 msec	PASS
Channel Move Time	≤ 10.0 sec	0.792 sec	PASS

Channel Closing Time and Channel Move Time - Client

EUT	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model	ENWF9201A1EF
Approval Holder	Panasonic Industrial Devices Europe GmbH
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Jahn
Test Date / Time	19.Feb.2019
Test Specification	KDB 905462 D02 v02 sub-clause 7.8.3
Frequency / Mode	5270 MHz / HT40 / Client
Radar Type:	0
Plot Type:	Detail view from analyzer



4.8 Test Conditions and Results - Non-Occupancy Time

4.8.1 Information

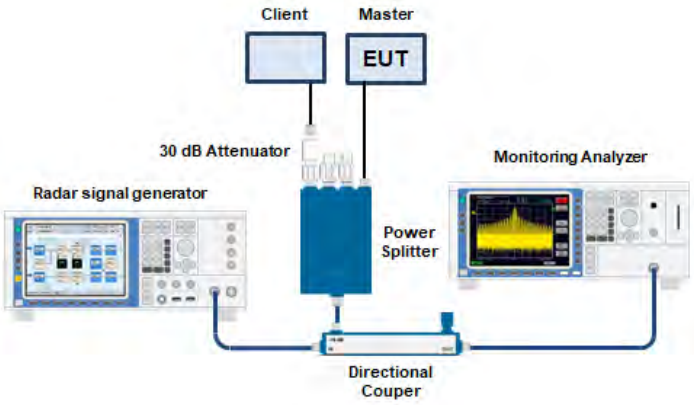
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.3
Operator	Toralf Jahn
Date	2019-02-18

4.8.2 Limits

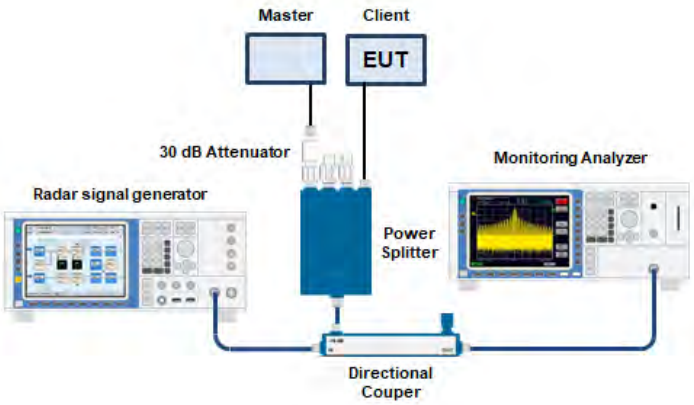
Limits
30 min

4.8.3 Setup

Test Setup - Master device



Test Setup - Client device



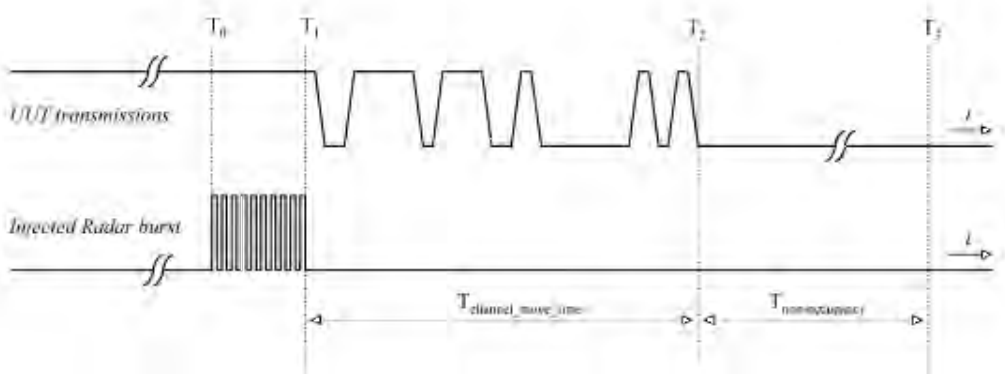
4.8.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.8.5 Procedure

Test Procedure

1. The waveform signal generator and the spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 2000 s
4. A channel loading stream is established between master and client
5. At time T_0 a single radar burst of type 0 is send to the master with a power level 1 dB above the DFS threshold level
6. With the end of the burst the analyzer sweep is triggered and all emissions are recorded
7. The analyzer trace is analyzed in order to determine the end of the channel move time T_2
8. The time after between the end of the channel move time is analyzed in order to determine whether the non-occupancy period is preserved
9. The duration of the silent period after the end of the end of the channel move time is recorded and compared to the limit



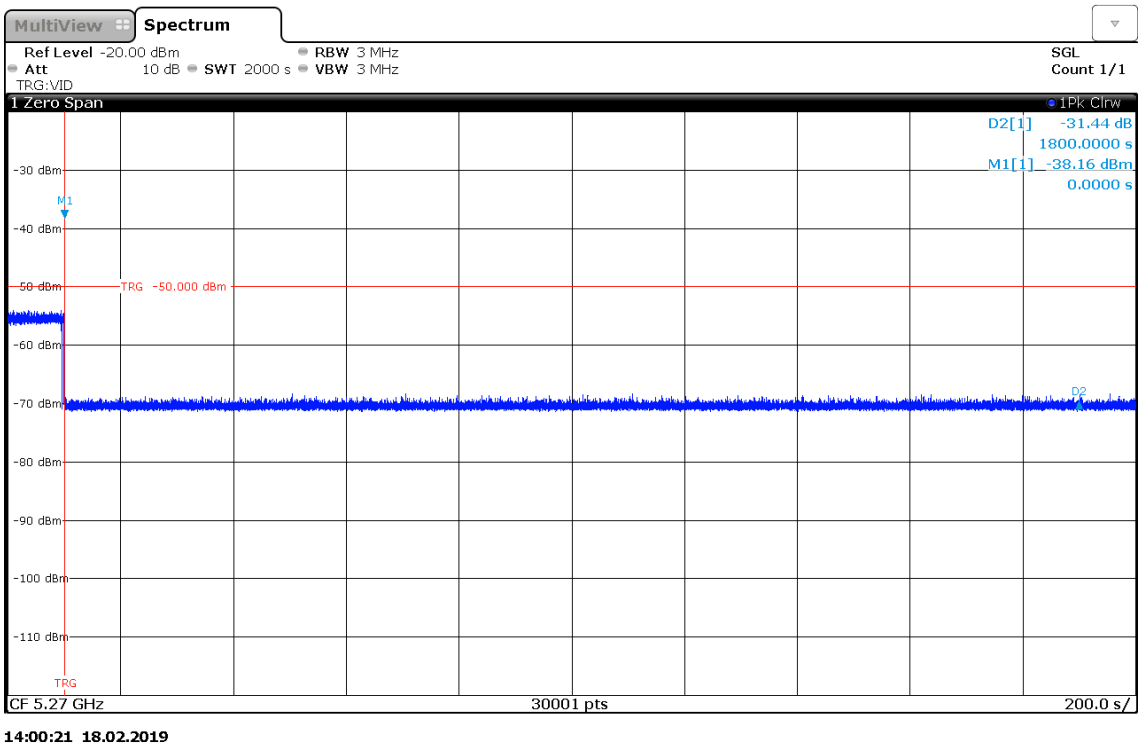
4.8.6 Results

Test Results - Master			
Channel	Frequency [MHz]	Non-occupancy period [s]	Verdict
52+56	5270	> 1800	PASS

Test Results - Client without radar detection			
Channel	Frequency [MHz]	Non-occupancy period [s]	Verdict
52+56	5270	> 1800	PASS

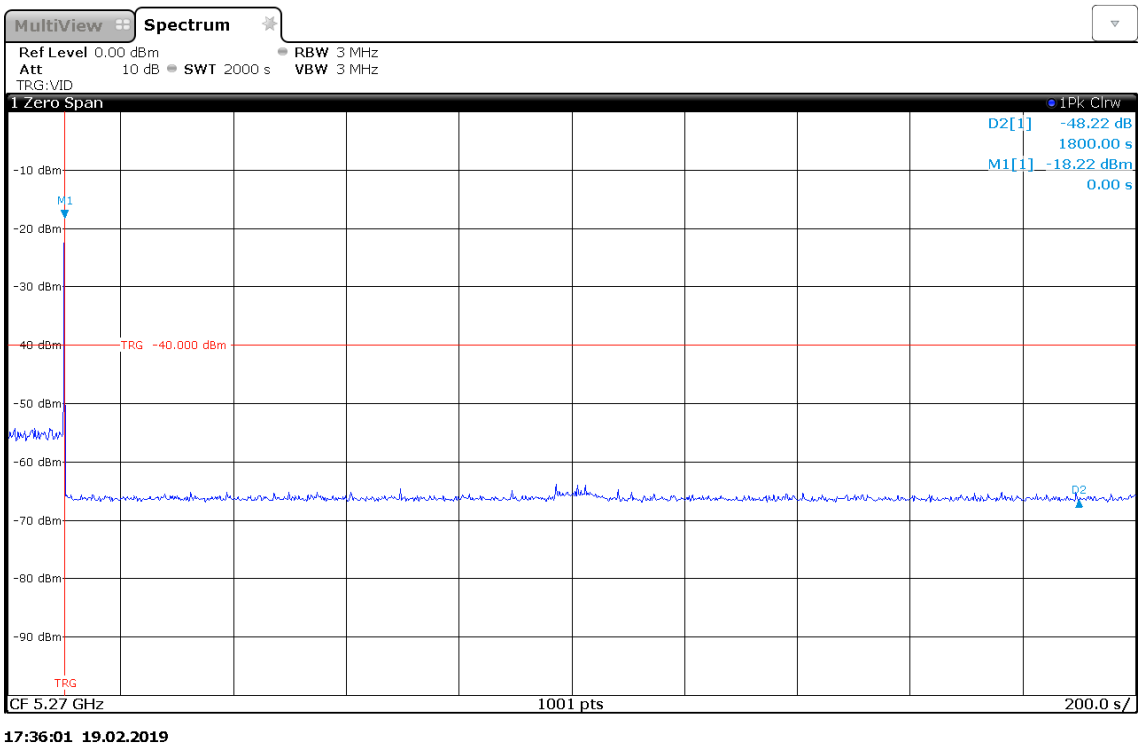
Non Occupancy Period - Access Point

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-18
Operating Conditions:	Tnom/Vnom
Mode:	Access Point HT40
Marker 1:	Beginning of Non Occupancy Period
Marker D2:	30 min



Non Occupancy Period - Client

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
Operator:	Toralf Jahn
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-02-18
Operating Conditions:	Tnom/Vnom
Mode:	Client HT40
Marker 1:	Beginning of Non Occupancy Period
Marker D2:	30 min



4.9 Test Conditions and Results - Statistical Performance Check

4.9.1 Information

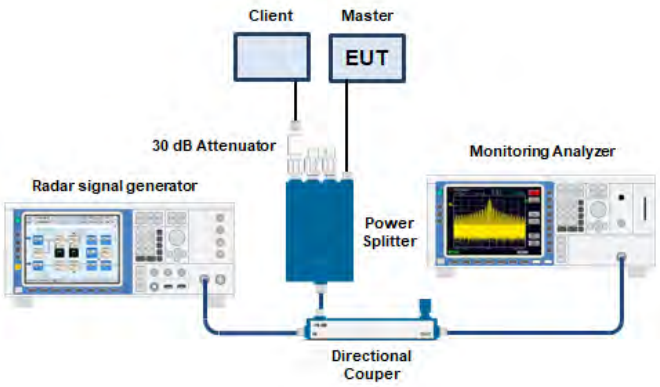
Test Information	
Reference	FCC 15E.407 (h)(2), RSS-247 6.3
Measurement Method	KDB 905462 D02 v02 Section 7.8.4
Operator	Toralf Jahn
Date	2019-02-20

4.9.2 Limits

Limits	
Waveform	Minimum Detection Rate
Short Pulses (Type 1-4)	60 %
Short Pulses (Type 1-4), Aggregate	80 %
Long Pulse (Type 5)	80 %
Frequency Hopping (Type 6)	70 %

4.9.3 Setup

Test Setup - Master device



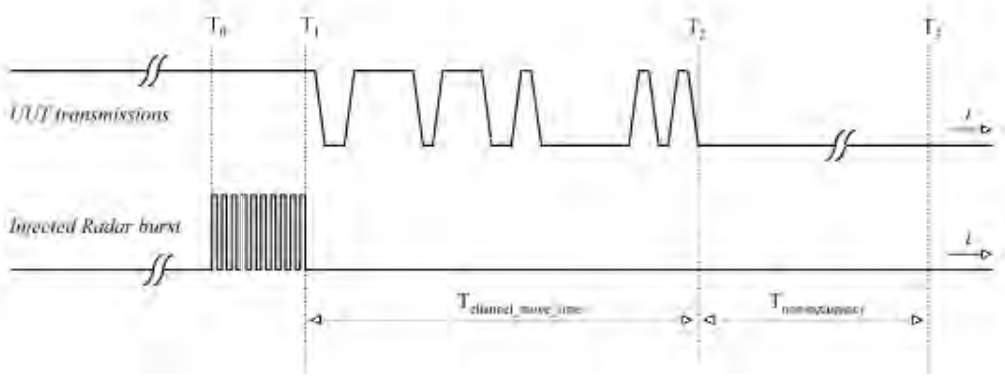
4.9.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	R&S	FSW43	EF00896	2018-07	2019-07
Signal Generator	R&S	SMW 200A	EF01163	2018-08	2019-08

4.9.5 Procedure

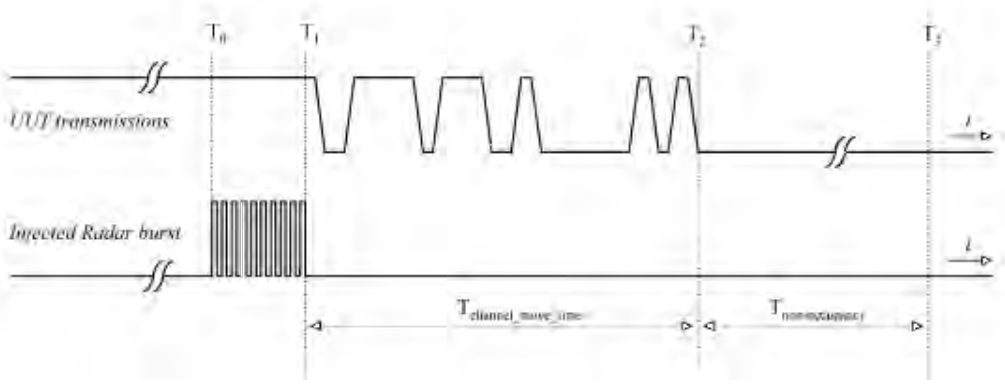
Test Procedure - Short Pulse Waveforms (Type 1-4)

1. The waveform signal generator and the spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 10 s
4. A channel loading stream is established between master and client
5. At time T_0 an individual waveform for each type of radar types 1-4 are send to the master or client with power level equal to DFS threshold level + 1 dB
6. With the end of the burst the analyzer sweep is triggered and all emissions are recorded
7. It is verified that the transmissions on the test channel are stopped to ensure that detection has occurred
8. The detection probability is calculated for each waveform type and compared to the limit
9. The aggregated detection probability is calculated for all waveforms type 1-4 and compared to the limit



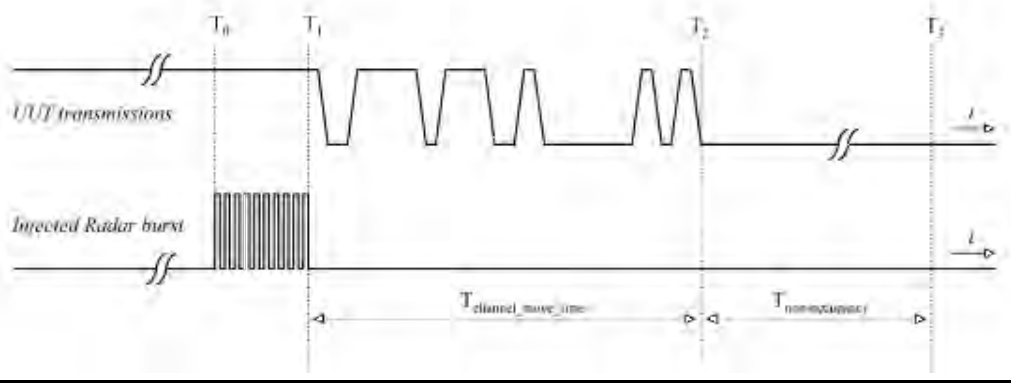
Test Procedure - Long Pulse Waveform (Type 5)

1. The waveform signal generator and the spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 22 s
4. A channel loading stream is established between master and client
5. At time T_0 an individual waveform of radar types 5 is send to the master or client with power level equal to DFS threshold level + 1 dB
6. With the end of the burst the analyzer sweep is triggered and all emissions are recorded
7. It is verified that the transmissions on the test channel are stopped to ensure that detection has occurred
8. The detection probability is calculated for the waveform type and compared to the limit



Test Procedure - Frequency Hopping Waveform (Type 6)

1. The waveform signal generator and the spectrum analyzer are set to the test frequency
2. The spectrum analyzer is set to zero span with RBW = VBW = 3 MHz
3. The sweep time is set to 10 s
4. A channel loading stream is established between master and client
5. At time T_0 an individual waveform of radar types 6 is send to the master or client with power level equal to DFS threshold level + 1 dB
6. With the end of the burst the analyzer sweep is triggered and all emissions are recorded
7. It is verified that the transmissions on the test channel are stopped to ensure that detection has occurred
8. The detection probability is calculated for the waveform type and compared to the limit



4.9.6 Results

Test Results - Master - Waveform Type 1-4, 20 MHz							
Bandwidth [MHz]						20	
Channel						52	
Channel Frequency [MHz]						5260	
Radar Frequency [MHz]						5260	
Type 1		Type 2		Type 3		Type 4	
Trial	Detected	Trial	Detected	Trial	Detected	Trial	Detected
1	Y	1	Y	1	Y	1	Y
2	Y	2	Y	2	Y	2	Y
3	Y	3	Y	3	Y	3	Y
4	Y	4	Y	4	Y	4	Y
5	Y	5	Y	5	Y	5	Y
6	Y	6	Y	6	Y	6	Y
7	Y	7	Y	7	Y	7	Y
8	Y	8	Y	8	Y	8	Y
9	Y	9	Y	9	Y	9	Y
10	Y	10	Y	10	Y	10	Y
11	Y	11	Y	11	Y	11	Y
12	Y	12	Y	12	Y	12	Y
13	Y	13	Y	13	Y	13	Y
14	Y	14	Y	14	Y	14	Y
15	Y	15	Y	15	Y	15	Y
16	Y	16	Y	16	Y	16	Y
17	Y	17	Y	17	Y	17	Y
18	Y	18	Y	18	Y	18	Y
19	Y	19	Y	19	Y	19	Y
20	Y	20	Y	20	Y	20	Y
21	Y	21	Y	21	Y	21	Y
22	Y	22	Y	22	Y	22	Y
23	Y	23	Y	23	Y	23	Y
24	Y	24	Y	24	Y	24	Y
25	Y	25	Y	25	Y	25	Y
26	Y	26	Y	26	Y	26	Y
27	Y	27	Y	27	Y	27	Y
28	Y	28	Y	28	Y	28	Y
29	Y	29	Y	29	Y	29	Y
30	Y	30	Y	30	Y	30	Y
Sum [%]	100	Sum [%]	100	Sum [%]	100	Sum [%]	100
Verdict	PASS	Verdict	PASS	Verdict	PASS	Verdict	PASS
Aggregate Detection Rate [%]							100
Verdict							PASS

Test Results - Master - Waveform Type 5-6, 20 MHz				
Bandwidth [MHz]		20	Bandwidth [MHz]	20
Channel		100	Channel	52
Channel Frequency [MHz]		5500	Channel Frequency [MHz]	5260
Type 5			Type 6	
Trial	Subset	Detected	Trial	Detected
1	1	Y	1	Y
2	1	Y	2	Y
3	1	Y	3	Y
4	1	Y	4	Y
5	1	Y	5	Y
6	1	Y	6	Y
7	1	Y	7	Y
8	1	Y	8	Y
9	1	Y	9	Y
10	1	Y	10	Y
11	2	Y	11	Y
12	2	Y	12	Y
13	2	Y	13	Y
14	2	Y	14	Y
15	2	Y	15	Y
16	2	Y	16	Y
17	2	Y	17	Y
18	2	Y	18	Y
19	2	Y	19	Y
20	2	Y	20	Y
21	3	Y	21	Y
22	3	Y	22	Y
23	3	Y	23	Y
24	3	Y	24	Y
25	3	Y	25	Y
26	3	Y	26	Y
27	3	Y	27	Y
28	3	Y	28	Y
29	3	Y	29	Y
30	3	Y	30	Y
Sum [%]		100	Sum [%]	100
Verdict		PASS	Verdict	PASS

Test Results - Master - Waveform Type 1-4, 40 MHz							
Bandwidth [MHz]						40	
Channel						52+56	
Channel Frequency [MHz]						5260+5280	
Radar Frequency [MHz]						5270	
Type 1		Type 2		Type 3		Type 4	
Trial	Detected	Trial	Detected	Trial	Detected	Trial	Detected
1	Y	1	Y	1	Y	1	Y
2	Y	2	Y	2	Y	2	Y
3	Y	3	Y	3	Y	3	Y
4	Y	4	Y	4	Y	4	Y
5	Y	5	Y	5	Y	5	Y
6	Y	6	Y	6	Y	6	Y
7	Y	7	Y	7	Y	7	Y
8	Y	8	Y	8	Y	8	Y
9	Y	9	Y	9	Y	9	Y
10	Y	10	Y	10	Y	10	Y
11	Y	11	Y	11	Y	11	Y
12	Y	12	Y	12	Y	12	Y
13	Y	13	Y	13	Y	13	Y
14	Y	14	Y	14	Y	14	Y
15	Y	15	Y	15	Y	15	Y
16	Y	16	Y	16	Y	16	Y
17	Y	17	Y	17	Y	17	Y
18	Y	18	Y	18	Y	18	Y
19	Y	19	Y	19	Y	19	Y
20	Y	20	Y	20	Y	20	Y
21	Y	21	Y	21	Y	21	Y
22	Y	22	Y	22	Y	22	Y
23	Y	23	Y	23	Y	23	Y
24	Y	24	Y	24	Y	24	Y
25	Y	25	Y	25	Y	25	Y
26	Y	26	Y	26	Y	26	Y
27	Y	27	Y	27	Y	27	Y
28	Y	28	Y	28	Y	28	Y
29	Y	29	Y	29	Y	29	Y
30	Y	30	Y	30	Y	30	Y
Sum [%]	100	Sum [%]	100	Sum [%]	100	Sum [%]	100
Verdict	PASS	Verdict	PASS	Verdict	PASS	Verdict	PASS
Aggregate Detection Rate [%]							100
Verdict							PASS

Test Results - Master - Waveform Type 5-6, 40 MHz				
Bandwidth [MHz]		40	Bandwidth [MHz]	40
Channel		100+104	Channel	52+56
Channel Frequency [MHz]		5500	Channel Frequency [MHz]	5260+5280
Type 5			Type 6	
Trial	Subset	Detected	Trial	Detected
1	1	Y	1	Y
2	1	Y	2	Y
3	1	Y	3	N
4	1	Y	4	Y
5	1	Y	5	Y
6	1	Y	6	Y
7	1	Y	7	Y
8	1	Y	8	Y
9	1	Y	9	Y
10	1	Y	10	Y
11	2	Y	11	Y
12	2	Y	12	Y
13	2	Y	13	N
14	2	Y	14	Y
15	2	Y	15	Y
16	2	Y	16	Y
17	2	Y	17	Y
18	2	Y	18	Y
19	2	Y	19	Y
20	2	Y	20	Y
21	3	Y	21	Y
22	3	Y	22	Y
23	3	Y	23	Y
24	3	Y	24	Y
25	3	Y	25	Y
26	3	Y	26	Y
27	3	Y	27	Y
28	3	Y	28	Y
29	3	Y	29	Y
30	3	Y	30	Y
Sum [%]		100	Sum [%]	93
Verdict		PASS	Verdict	PASS

ANNEX A Waveform Specifications - Master Testing - 20 MHz - Type 1-4

RADAR TYPE 1			
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**
1	59	1	898
2	63	1	838
3	62	1	858
4	86	1	618
5	65	1	818
6	92	1	578
7	83	1	638
8	81	1	658
9	98	1	538
10	57	1	938
11	18	1	3066
12	61	1	878
13	67	1	798
14	68	1	778
15	72	1	738
16	62	1	853
17	70	1	760
18	21	1	2560
19	59	1	908
20	38	1	1421
21	20	1	2728
22	20	1	2660
23	18	1	2950
24	63	1	842
25	57	1	925
26	32	1	1658
27	26	1	2090
28	46	1	1166
29	19	1	2822
30	71	1	746

RADAR TYPE 2			
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**
1	24	2.7	175
2	28	4.6	218
3	26	2.2	169
4	24	2.5	218
5	24	4.4	186
6	24	4.5	201
7	23	5	172
8	28	4.3	216
9	24	4.7	152
10	28	3.8	168
11	27	3.2	224
12	26	3.3	204
13	27	1.3	201
14	29	3	184
15	27	2.1	207
16	27	4.2	182
17	28	3.9	162
18	29	4.5	157
19	25	3.7	216
20	29	2.7	208
21	25	1.9	150
22	24	3.2	155
23	29	3.7	172
24	23	3.1	183
25	24	4.9	210
26	28	3.7	197
27	25	4.9	230
28	27	2.3	172
29	27	1.8	218
30	28	2.2	198

RADAR TYPE 3			
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**
1	17	9.8	452
2	16	6.3	308
3	17	6.3	251
4	17	8.8	418
5	17	9.8	414
6	18	6.8	321
7	18	6.8	352
8	18	9.4	487
9	17	7.5	253
10	18	7.1	350
11	17	7.7	349
12	17	8.2	438
13	18	8.8	331
14	17	6	201
15	18	8.1	457
16	17	6.8	427
17	17	6.8	367
18	16	6.9	349
19	17	7.2	201
20	18	6.1	306
21	17	6.8	322
22	17	7.9	407
23	16	8.9	270
24	18	6.6	237
25	16	7.9	239
26	18	8.5	240
27	17	7	425
28	17	7.2	322
29	17	7.1	310
30	17	8.1	296

RADAR TYPE 4			
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**
1	14	11	396
2	14	18.2	353
3	12	18.2	278
4	14	11.3	272
5	15	16.4	220
6	12	12.2	291
7	15	16.1	485
8	16	12.6	487
9	12	15.4	488
10	15	17.5	402
11	14	13.7	211
12	13	18.4	476
13	13	19.4	497
14	13	18.3	395
15	14	11.9	262
16	13	14.9	301
17	14	17	333
18	14	11.5	235
19	16	17.3	442
20	14	13.3	360
21	12	15.8	218
22	15	11.8	344
23	12	16.1	363
24	15	14.5	413
25	14	15	240
26	13	12.5	449
27	13	17.5	455
28	15	16.7	350
29	15	19.7	466
30	14	19	215

ANNEX B Waveform Specifications - Master Testing - 20 MHz - Type 5

TYPE 5			
Trial #	**Chirp Width (MHz)**	**Subset**	**Fc**
1	11	1	5500
2	20	1	5500
3	5	1	5500
4	8	1	5500
5	6	1	5500
6	8	1	5500
7	5	1	5500
8	11	1	5500
9	8	1	5500
10	6	1	5500
11	18	2	5498.2
12	16	2	5497.4
13	12	2	5495.8
14	11	2	5495.4
15	16	2	5497.4
16	20	2	5499
17	7	2	5493.8
18	5	2	5493
19	7	2	5493.8
20	18	2	5498.2
21	11	3	5504.6
22	11	3	5504.6
23	9	3	5505.4
24	13	3	5503.8
25	19	3	5501.4
26	19	3	5501.4
27	5	3	5507
28	5	3	5507
29	6	3	5506.6
30	6	3	5506.6

Trial Number : 1						
Bursts in Trial: 11						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	57	11			631.707
2	2	62.2	11	1456		145.771
3	3	86.6	11	1609	1489	75.782
4	3	91.9	11	1893	1769	931.813
5	2	97.6	11	1378		886.674
6	1	50.2	11			948.355
7	3	56.3	11	1242	1881	321.935
8	1	69.8	11			402.566
9	2	88.2	11	1708		794.507
10	2	50.2	11	1795		174.708
11	2	50.2	11	1671		741.009

Trial Number : 2						
Bursts in Trial: 9						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	85.5	20			186.957
2	1	95.2	20			542.117
3	1	61.7	20			1321.213
4	3	85.3	20	1273	1194	1048.96
5	1	92	20			157.467
6	2	61.1	20	1534		651.653
7	1	50.2	20			995.78
8	2	98.8	20	1052		849.467
9	1	88.3	20			1232.133

Trial Number : 3						
Bursts in Trial: 17						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	75.6	5	1050		557.914
2	1	84	5			110.082
3	2	78	5	1163		364.875
4	3	60.8	5	1124	1481	83.363
5	1	81.6	5			648.421
6	2	92.1	5	1339		395.268
7	3	61.8	5	1748	1671	322.186
8	1	61.3	5			187.804
9	2	60.6	5	1067		295.371
10	1	98.3	5			71.439
11	1	83.6	5			60.816
12	2	68.3	5	1377		4.484
13	2	81.6	5	1548		178.432
14	1	93.6	5			178.639
15	3	71.8	5	1151	1095	250.147
16	2	68.2	5	1595		236.865
17	2	75.5	5	1847		568.482

Trial Number : 4						
Bursts in Trial: 11						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	53.2	8			130.414
2	1	92.6	8			245.541
3	3	97.3	8	1528	1177	577.562
4	3	85.8	8	1495	1474	360.523
5	2	96.9	8	1333		391.514
6	2	88.7	8	1496		701.865
7	1	87.2	8			922.545
8	1	73.4	8			974.756
9	2	93.5	8	1127		215.027
10	2	78.9	8	1300		67.878
11	1	82.6	8			1027.009

Trial Number : 5						
Bursts in Trial: 18						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	78.5	6	1083		162.637
2	3	64.2	6	1551	1092	229.205
3	2	55.2	6	1817		112.687
4	3	52.2	6	1193	1365	485.86
5	1	87.2	6			36.673
6	2	59.9	6	1314		435.167
7	2	94	6	1342		241.59
8	2	76.9	6	1216		395.733
9	1	51.4	6			627.487
10	2	94.8	6	1256		235.67
11	3	65.8	6	1894	1338	409.793
12	1	89.4	6			1.587
13	2	98.4	6	1107		324.63
14	3	92.1	6	1928	1528	478.273
15	3	85.7	6	1136	1094	570.267
16	2	59.1	6	2000		380.8
17	3	53.6	6	1683	1171	196.033
18	3	85.1	6	1045	1751	116.567

Trial Number : 6						
Bursts in Trial: 10						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	73.6	8			491.077
2	3	64.7	8	1925	1783	979.11
3	2	53	8	1935		49.46
4	1	79.7	8			108.22
5	2	79.4	8	1216		573.65
6	3	65.6	8	1259	1508	845.49
7	3	82.1	8	1244	1423	942.14
8	2	85.1	8	1229		701.88
9	2	83.4	8	1806		642.6
10	3	80.3	8	1380	1673	319.9

Trial Number : 7						
Bursts in Trial: 17						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	95.6	5	1500		325.168
2	1	89.9	5			30.354
3	3	72.4	5	1621	1495	397.065
4	2	67.8	5	1916		191.933
5	2	50.2	5	1517		669.001
6	2	83.6	5	1145		685.648
7	3	84.9	5	1139	1117	229.896
8	2	84.1	5	1746		567.344
9	3	52.8	5	1139	1222	477.821
10	1	59	5			407.879
11	2	79.9	5	1218		126.096
12	1	67.3	5			573.254
13	2	99.4	5	1298		363.972
14	2	74.5	5	1143		344.059
15	1	73.6	5			422.847
16	2	68.7	5	1467		71.665
17	3	97.7	5	1068	1507	288.382

Trial Number : 8						
Bursts in Trial: 13						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 Spacing (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	3	86.7	11	1142	1388	290.203
2	2	57.7	11	1094		634.003
3	2	80.5	11	1968		269.386
4	2	89.2	11	1301		611.339
5	2	75.6	11	1907		346.592
6	3	73.1	11	1131	1253	253.205
7	2	98.1	11	1880		204.578
8	1	88.8	11			812.412
9	1	87.2	11			464.805
10	3	76	11	1808	1879	450.608
11	1	64.7	11			893.431
12	2	98.4	11	1630		311.654
13	2	67.4	11	1556		691.477

Trial Number : 9						
Bursts in Trial: 18						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	52.3	8			375.597
2	3	89.3	8	1585	1087	308.505
3	3	99.8	8	1062	1332	442.947
4	2	75.5	8	1950		370.37
5	3	81.9	8	1116	1867	182.093
6	2	72.4	8	1336		612.227
7	2	99.2	8	1649		172.12
8	3	70.6	8	1624	1258	90.803
9	2	66.8	8	1593		136.037
10	2	53	8	1035		13.59
11	3	69.7	8	1458	1901	448.883
12	3	67.9	8	1626	1202	329.717
13	2	69.8	8	1269		142.47
14	2	93.7	8	1823		75.633
15	1	80.3	8			631.717
16	2	85.5	8	1227		497.8
17	2	64.6	8	1521		27.033
18	1	90	8			349.067

Trial Number : 10						
Bursts in Trial: 16						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	93.5	6	1890		591.32
2	3	60.8	6	1923	1183	402.58
3	3	91.8	6	1940	1332	385.94
4	1	69.8	6			286.47
5	1	82	6			703.34
6	2	95.1	6	1853		70.33
7	2	55.8	6	1506		465.29
8	1	97.7	6			542.74
9	2	61.4	6	1600		576.74
10	3	60	6	1933	1407	370.98
11	3	84.1	6	1514	1508	741.08
12	2	74.2	6	1360		268.68
13	3	52.6	6	1958	1219	444.69
14	1	86.4	6			364.9
15	1	70.3	6			16.8
16	2	53	6	1686		600.1

Trial Number : 11						
Bursts in Trial: 18						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	3	91.4	18	1587	1324	569.054
2	2	70	18	1767		345.213
3	3	90.8	18	1161	1717	409.107
4	1	75.1	18			426.76
5	2	74.9	18	1547		274.013
6	3	81.3	18	1901	1463	532.907
7	1	69.4	18			132.19
8	2	75.4	18	1654		431.833
9	2	78.1	18	1340		50.347
10	2	94.4	18	1351		624.08
11	2	63.9	18	1988		25.663
12	3	78.6	18	1525	1759	247.137
13	2	87	18	1983		643.33
14	3	82.5	18	1948	1206	259.063
15	2	84.6	18	1361		143.807
16	2	67.8	18	1524		98
17	3	53.3	18	1066	1180	137.933
18	3	79	18	1539	1854	126.067

Trial Number : 12						
Bursts in Trial: 8						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	75.8	16			708.04
2	1	93.9	16			44.76
3	1	85.7	16			241.45
4	2	67.5	16	1733		1323.43
5	2	58.4	16	1503		246.15
6	2	82.7	16	1082		352.64
7	1	97.3	16			573.74
8	1	98.8	16			431.3

Trial Number : 13						
Bursts in Trial: 17						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	61.2	12			624.68
2	3	98.9	12	1851	1736	687.668
3	2	69.1	12	1350		416.165
4	2	96.2	12	1112		302.603
5	2	63.5	12	1674		118.171
6	2	92.4	12	1370		527.198
7	3	86.9	12	1033	1371	263.296
8	1	79.9	12			439.594
9	2	88.1	12	1126		623.211
10	1	74	12			443.979
11	2	88	12	1057		109.106
12	1	71.6	12			97.404
13	2	89.3	12	1589		603.752
14	2	62.5	12	1291		653.749
15	3	97.6	12	1589	1209	456.047
16	2	66.4	12	1386		516.765
17	3	67.2	12	1312	1661	685.182

Trial Number : 14						
Bursts in Trial: 17						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	92.2	11	1647		136.685
2	1	61.8	11			556.848
3	3	60.5	11	1431	1521	390.805
4	2	99.2	11	1789		179.423
5	2	64.3	11	1059		612.431
6	3	73.7	11	1140	1055	573.108
7	2	86.7	11	1792		487.876
8	2	90.9	11	1235		104.514
9	1	99.6	11			3.331
10	1	55.9	11			41.289
11	2	57.9	11	1475		473.376
12	3	79.5	11	1713	1552	663.104
13	3	64.2	11	1124	1070	47.922
14	3	51.5	11	1354	1898	194.429
15	3	83.5	11	1991	1143	632.647
16	1	74.1	11			20.765
17	2	92	11	1028		51.882

Trial Number : 15						
Bursts in Trial: 10						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	99.2	16	1969		655.132
2	2	91.3	16	1887		506.93
3	2	85.9	16	1211		1192.14
4	2	63.8	16	1037		1087.53
5	2	64.9	16	1952		425.67
6	2	54.3	16	1573		410.11
7	1	57.4	16			138.53
8	3	97.5	16	1356	1073	704.72
9	2	67.8	16	1706		330.43
10	2	83.6	16	1078		246.6

Trial Number : 16						
Bursts in Trial: 8						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	53.4	20			508.348
2	1	94.7	20			135.04
3	1	51.2	20			337.63
4	2	88	20	1188		1431.32
5	1	90.2	20			70.24
6	2	95	20	1867		975.02
7	3	66.6	20	1573	1525	1475.8
8	2	66.6	20	1456		775.4

Trial Number : 17						
Bursts in Trial: 10						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	83.9	7	1230		164.488
2	1	91.5	7			1108.83
3	2	59.4	7	1342		753.64
4	2	96.3	7	1519		945.31
5	1	76.5	7			814.77
6	2	83.9	7	1312		886.37
7	2	84.5	7	1148		149.31
8	3	87.9	7	1127	1089	499.52
9	3	68.2	7	1917	1928	1154.5
10	2	90.1	7	1689		493.6

Trial Number : 18						
Bursts in Trial: 8						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	69.5	5	1618		1354.52
2	2	77.3	5	1146		180.55
3	2	51.4	5	1109		887.42
4	3	59.3	5	1871	1459	543.76
5	2	88.3	5	1449		1284.32
6	2	56.7	5	1746		1108.75
7	1	85.6	5			254.57
8	3	72.2	5	1456	1289	710.9

Trial Number : 19						
Bursts in Trial: 16						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	78.2	7	1426		729.358
2	2	61.3	7	1972		270
3	2	68.1	7	1723		313.43
4	2	87.3	7	1891		522.93
5	3	97.7	7	1816	1482	157.8
6	1	62.1	7			47.36
7	3	79.4	7	1291	1878	600.25
8	3	96.3	7	1483	1962	221.75
9	2	69.8	7	1126		654.31
10	2	86.6	7	1080		447.45
11	3	77.7	7	1556	1829	726.22
12	2	57.9	7	1753		314.21
13	2	52	7	1826		527.79
14	2	71.1	7	1118		368.1
15	1	68.1	7			710
16	2	56.3	7	1783		526.7

Trial Number : 20						
Bursts in Trial: 18						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	61.4	18	1027		150.252
2	2	77.3	18	1649		18.019
3	3	84.2	18	1654	1752	170.917
4	3	83.4	18	1464	1784	268.43
5	3	52.5	18	1225	1527	583.863
6	2	53.4	18	1095		104.627
7	3	90.7	18	1149	1859	545.95
8	2	87.5	18	1116		242.733
9	3	67.9	18	1250	1237	369.107
10	3	72.3	18	1670	1978	263.09
11	2	57.2	18	1275		430.643
12	2	78.9	18	1516		68.767
13	1	76.7	18			111.27
14	2	81.6	18	1398		406.443
15	3	54.2	18	1556	1424	232.077
16	3	89.6	18	1921	1849	14.7
17	3	70.7	18	1918	1840	22.433
18	2	65.9	18	1897		295.467

Trial Number : 21						
Bursts in Trial: 12						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	3	92.5	11	1960	1201	741.867
2	2	99.6	11	1120		622.98
3	2	92	11	1444		987.98
4	3	59.6	11	1061	1128	29.63
5	2	51.7	11	1083		140.02
6	1	81.9	11			922.44
7	1	71.9	11			230.58
8	2	85.1	11	1047		822.73
9	1	62.4	11			148.06
10	3	98.9	11	1352	1923	485.43
11	1	96.2	11			13.5
12	1	90.9	11			677.8

Trial Number : 22						
Bursts in Trial: 18						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	88	11			315.383
2	1	76.6	11			236.704
3	2	68.7	11	1855		91.737
4	3	61.3	11	1483	1787	79.86
5	3	94.6	11	1000	1730	516.373
6	2	52.1	11	1412		486.507
7	1	72.8	11			599.85
8	2	79.6	11	1736		483.673
9	2	96.2	11	1011		117.257
10	3	51.6	11	1071	1039	111.73
11	3	81.1	11	1176	1994	27.943
12	2	95.5	11	1620		633.687
13	2	51.2	11	1132		164.79
14	3	54	11	1094	1777	271.603
15	2	69.9	11	1942		318.707
16	2	79.3	11	1546		17.7
17	2	68.9	11	1751		168.233
18	1	87.6	11			643.767

Trial Number : 23						
Bursts in Trial: 16						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	66	9			183.95
2	1	89.5	9			299.72
3	3	57.9	9	1697	1274	728.94
4	2	61.9	9	1654		216.9
5	2	98	9	1179		7.24
6	2	88	9	1194		301.15
7	2	91.1	9	1479		276.26
8	1	70.2	9			514.85
9	3	85.2	9	1584	1032	257.08
10	2	50.2	9	1670		702.68
11	2	89.3	9	1381		123.43
12	3	56.7	9	1887	1291	543.5
13	1	61.5	9			47.46
14	2	84.3	9	1568		693
15	2	89.9	9	1690		294.6
16	2	89	9	1769		626.1

Trial Number : 24						
Bursts in Trial: 16						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	72.3	13	1708		478.677
2	2	85	13	1949		441.64
3	2	69.6	13	1921		270.44
4	2	56.2	13	1031		734.8
5	2	56.7	13	1337		743.89
6	2	95.9	13	1874		163.05
7	2	73.4	13	1142		414.45
8	2	89.9	13	1063		171.56
9	3	74.9	13	1794	1885	394.05
10	1	74.6	13			485.89
11	3	92.1	13	1205	1969	675.34
12	2	69.8	13	1559		583.32
13	3	56.3	13	1366	1970	562.04
14	3	78.8	13	1772	1351	519.3
15	3	76.4	13	1573	1040	589.1
16	1	60.8	13			136

Trial Number : 25						
Bursts in Trial: 15						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	82.2	19			146.176
2	2	95.5	19	1167		430.64
3	3	64.1	19	1912	1592	349.99
4	3	65.4	19	1313	1146	544.19
5	2	55.6	19	1210		297.71
6	1	74.7	19			551.95
7	1	50	19			672.45
8	2	72.1	19	1741		531.48
9	1	67.6	19			721.92
10	1	61	19			784.78
11	2	90.1	19	1255		105.75
12	1	88	19			224.86
13	1	97	19			380.04
14	1	80.3	19			288.8
15	2	91.7	19	1228		277.7

Trial Number : 26						
Bursts in Trial: 11						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	67.5	19	1957		833.547
2	2	59.2	19	1789		199.361
3	3	81.1	19	1865	1209	862.742
4	2	74.5	19	1574		105.313
5	2	98.8	19	1208		189.884
6	3	98.8	19	1161	1770	719.365
7	1	84.3	19			306.825
8	1	60.8	19			870.576
9	2	71.2	19	1562		146.867
10	2	75.3	19	1810		673.118
11	2	89.1	19	1676		787.009

Trial Number : 27						
Bursts in Trial: 19						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	57.2	5	1418		620.815
2	1	62.6	5			174.278
3	1	99.5	5			384.322
4	3	53.6	5	1678	1927	304.723
5	2	96.6	5	1860		108.184
6	2	80.6	5	1038		311.385
7	2	94.8	5	1905		181.326
8	2	51.1	5	1143		618.317
9	2	51.1	5	1389		200.648
10	3	55.7	5	1520	1515	106.979
11	3	88.7	5	1012	1529	149.491
12	1	56.8	5			494.582
13	2	54.7	5	1876		35.223
14	2	91.2	5	1270		590.684
15	1	95.4	5			278.545
16	2	70.1	5	1236		215.976
17	1	84.5	5			73.737
18	1	52.4	5			152.058
19	1	65.4	5			185.179

Trial Number : 28						
Bursts in Trial: 11						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	60.8	5	1434		384.202
2	3	52	5	1264	1150	434.511
3	2	92.8	5	1358		650.242
4	2	84.5	5	1841		82.623
5	3	80	5	1677	1068	868.554
6	2	62.8	5	1132		769.885
7	3	89.3	5	1706	1275	142.435
8	1	54.2	5			962.436
9	1	91.9	5			36.817
10	2	82.1	5	1767		320.318
11	3	83.9	5	1291	1528	219.109

Trial Number : 29						
Bursts in Trial: 16						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	1	66.6	6			248.592
2	2	70.6	6	1308		464.24
3	2	91.5	6	1918		310.79
4	1	53.7	6			699.07
5	2	87.2	6	1709		95.31
6	2	98.2	6	1737		442.49
7	2	90.6	6	1444		4.73
8	2	59.8	6	1422		451.33
9	3	68	6	1759	1889	592.25
10	1	85	6			554.43
11	1	83	6			248.65
12	1	93.5	6			117.41
13	1	61.1	6			113.23
14	3	56.3	6	1441	1820	266
15	2	100	6	1796		432.5
16	2	68	6	1661		661.9

Trial Number : 30						
Bursts in Trial: 13						
Burst	**Number of Pulses**	**Pulse Width (µsec)**	**Chirp Width (MHz)**	**Pulse 1-to-2 PRI (µsec)**	**Pulse 2-to-3 PRI (µsec)**	**Start Location Within Interval (msec)**
1	2	82.9	6	1462		431.378
2	2	50.6	6	1592		610.843
3	2	78.7	6	1826		96.606
4	1	92.7	6			140.529
5	2	89.6	6	1740		490.092
6	2	62.2	6	1824		796.865
7	2	52.2	6	1863		597.298
8	1	50.9	6			331.082
9	3	69.9	6	1231	1277	402.775
10	2	76.1	6	1209		460.718
11	1	85.6	6			303.911
12	2	79.6	6	1784		296.754
13	2	96.7	6	1361		620.077