DFS TEST REPORT

Applicant:	Shen Zhen TPS technology Co., Ltd.
Address of Applicant:	3rd Floor, Kebixin Industrial Park, Fuyong Street, Baoan District, ShenZhen
Equipment Under Test (EUT)	
Product Name:	Tablet PC
Model No.:	S7, S8, S9, S133, Q7, Q7S, Q8, Q8S, Q9, Q101, Q102, K7, K7S, K8, K8S, K10, K10S, SC10, C10, X20, K116, K133, X785
FCC ID:	2ATPX-S7
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	27 May, 2019
Date of Test:	27 May, to 17 Jun., 2019
Date of report issued:	18 Jun., 2019
Test Result:	PASS*

***In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2 Version

Version No.	Date	Description
00	*18 Jun., 2019*	*Original*

Tested by: Mike.OU ***Date:*** *18 Jun., 2019*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *18 Jun., 2019*

Project Engineer

3 Contents

Page

1 COVER PAGE 1
2 VERSION 2
3 CONTENTS 3
4 TEST SUMMARY 4
5 GENERAL INFORMATION 5
5.1 CLIENT INFORMATION 5
5.2 GENERAL DESCRIPTION OF E.U.T. 5
5.3 TEST ENVIRONMENT AND TEST MODE 5
5.4 DESCRIPTION OF SUPPORT UNITS 5
5.5 RELATED SUBMITTAL(S) / GRANT (S) 5
5.6 LABORATORY FACILITY ..... 错误!未定义书签。
5.7 LABORATORY LOCATION ..... 错误!未定义书签。
5.8 TEST INSTRUMENTS LIST 6
6 DFS TECHNICAL REQUIREMENTS 7
6.1 DFS PARAMETERS 7
6.2 DFS TECHNICAL REQUIREMENTS 9
6.3 DFS THRESHOLD LEVEL 9
6.4 TEST SETUP BLOCK 9
6.5 EUT CONFIGURATION FOR DFS TEST 10
7 TEST RESULT 11
7.1 VERIFICATION OF RADAR TYPE AND LEVEL 11
7.2 CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME 18
7.3 NON-OCCUPANCY PERIOD 19
8 TEST SETUP PHOTO 20
9 EUT CONSTRUCTIONAL DETAILS 20

4 Test Summary

Test Items	Limit	Result
Channel Availability Check	> 60 seconds	N/A
UNII Detection Bandwidth	> 100% of the UNII 99% transmission power bandwidth	N/A
Statistical Performance Check	Radar type 1,2,3,4 ≧ 60% Aggregate Radar type 1~4 and 5 ≧ 80% Radar type 6 ≧ 70%	N/A
Channel Move Time	< 10 seconds	Pass
Channel Closing Transmission Time	< 20ms + aggregate of 60ms over remaining 10 second period	Pass
Non-Occupancy Period	> 30 minutes	Pass
Note: "Pass" means meet the requirements, "N/A" means not applicable		

5 General Information

5.1 Client Information

Applicant:	Shen Zhen TPS technology Co., Ltd.
Address:	3rd Floor, Kebixin Industrial Park, Fuyong Street, Baoan District, ShenZhen
Manufacturer:	Shen Zhen TPS technology Co., Ltd.
Address:	3rd Floor, Kebixin Industrial Park, Fuyong Street, Baoan District, ShenZhen

5.2 General Description of E.U.T.

Product Name:	Tablet PC
Model No.:	S7, S8, S9, S133, Q7, Q7S, Q8, Q8S, Q9, Q101, Q102, K7, K7S, K8, K8S, K10, K10S, SC10, C10, X20, K116, K133
Transmitter frequency range:	5150MHz~5250MHz, 5250MHz~5350MHz
Modulation type:	OFDM
WLAN Function:	802.11a/802.11n/802.11ac
Bandwidth:	20MHz/40MHz
Antenna Type:	Internal Antenna
Antenna Gain:	1.9 dBi
DFS Operation Type:	☐ Master Device ☐ Slaver Device with Radar detection function ☒ Slaver Device without Radar detection function
Power supply:	Rechargeable Li-ion Battery DC3.7V-3000mAh
Remark:	The No.: S7, S8, S9, S133, Q7, Q7S, Q8, Q8S, Q9, Q101, Q102, K7, K7S, K8, K8S, K10, K10S, SC10, C10, X20, K116, K133, X785 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name and color for different customers.
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test Environment and test mode

Data Load mode:	Keep the EUT in normal transmitting mode by WiFi
Temperature:	20 ~ 25 ℃
Humidity:	60% ~ 65%
Atmospheric pressure:	1012 kPa

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number
LENOVO	Laptop	SL510	2847A65
WAVLINK	WiFi Router	WL-WN575A2	WL1512260097

5.5 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.6 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.8 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Due date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
Spectrum Analyzer	Agilent	N9020A	MY50510123	11-10-2018	11-09-2019
Vector Signal Generator	Agilent	N5182A	MY49060014	11-10-2018	11-09-2019
RF Switch Unit	Ascentest	AT890-RFB	--	--	--
DFS Test Software	MWRFTEST	MTS 8310	Version: 2.0.0.0		
N7607B Signal Studio	KEYSIGHT	--	Version: 2.0.0.1		

6 DFS Technical Requirements

6.1 DFS Parameters

Table D.1: Applicability of DFS Requirements Prior to Use of a 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

Table D.2: Applicability of DFS requirements during normal operation		
Requirement	Operational Mode	
	Master	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

Additional requirements for devices with multiple bandwidth modes	Operational Mode	
	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.		

Table D.3: DFS Detection Thresholds	
Maximum Transmit Power	Value (See Notes 1,2, and 3)
EIRP ≧ 200 mW	-64 dBm
EIRP < 200 mW and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 mW 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. Note 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table D.4: DFS 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 ms + an aggregate of 60ms over remaining 10 second period (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the UNII 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.

Table D.5: Short Pulse Radar Test Waveforms

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 Test B	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu sec}}\right)\right\}$	60%	30
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.

Table D.6: Long Pulse Radar Test Waveform

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

Long Pulse Radar Test Signal Wave form 12 second transmission

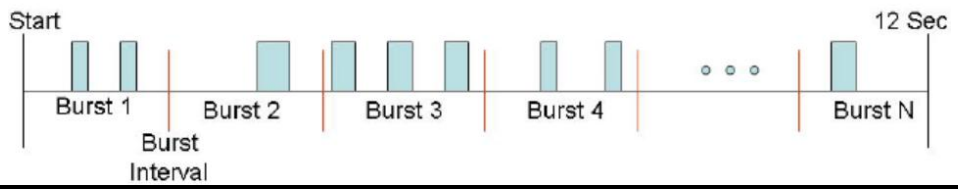


Table D.7: Frequency Hopping Radar Test Waveform

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	0	0.333	300	70%	30

6.2 DFS Technical Requirements

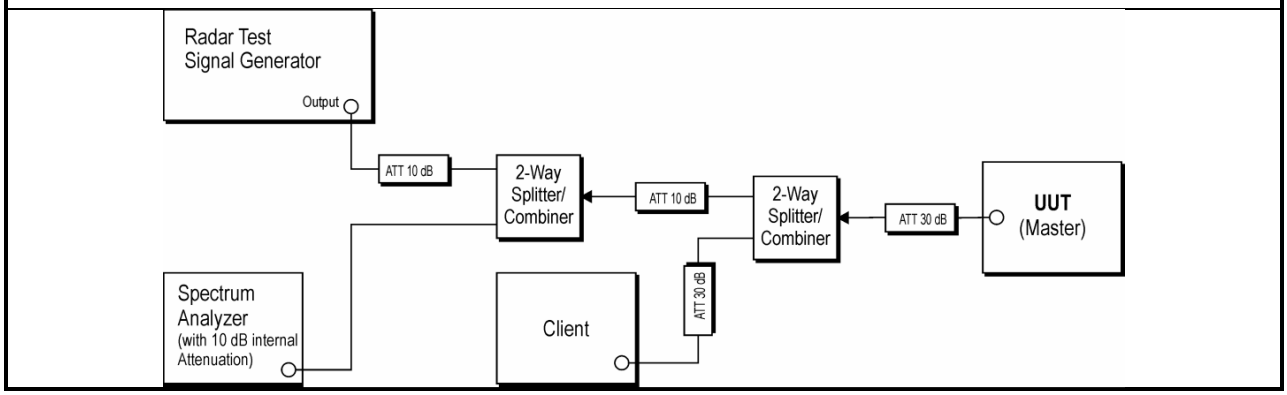
Requirement	DFS Operational mode		
	☐ Master	☒ Slave without Radar Detection	☐ Slave with Radar Detection
Channel Availability Check	√	Not Required	Not Required
UNII Detection Bandwidth	√	Not Required	√
Statistical Performance Check	√	Not Required	√
Channel Move Time	√	√	√
Channel Closing Transmission Time	√	√	√
Non-Occupancy Period	√	√	√

6.3 DFS Threshold Level

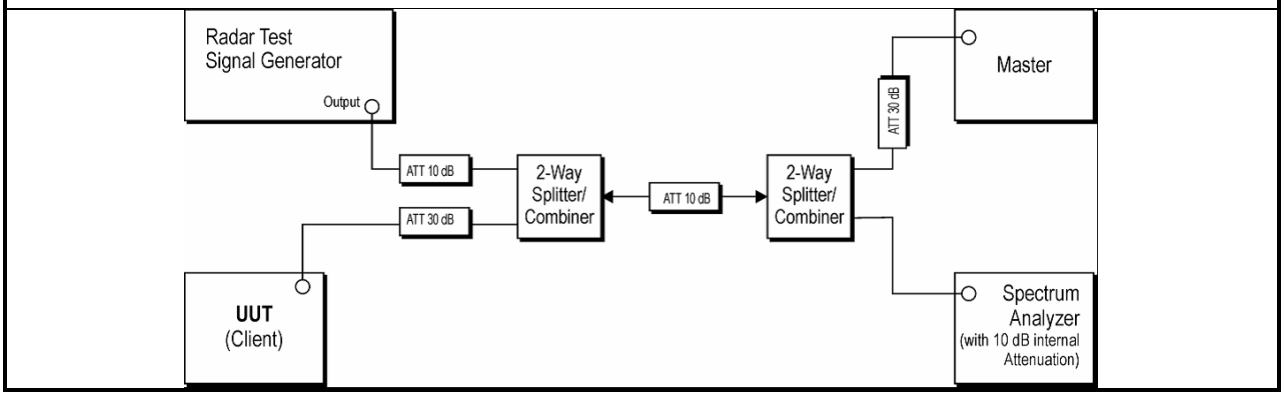
DFS Threshold Level	
5250MHz ~ 5350MHz	-62 dBm @ antenna connector
Note: The worst case level was selected to perform the test.	

6.4 Test Setup Block

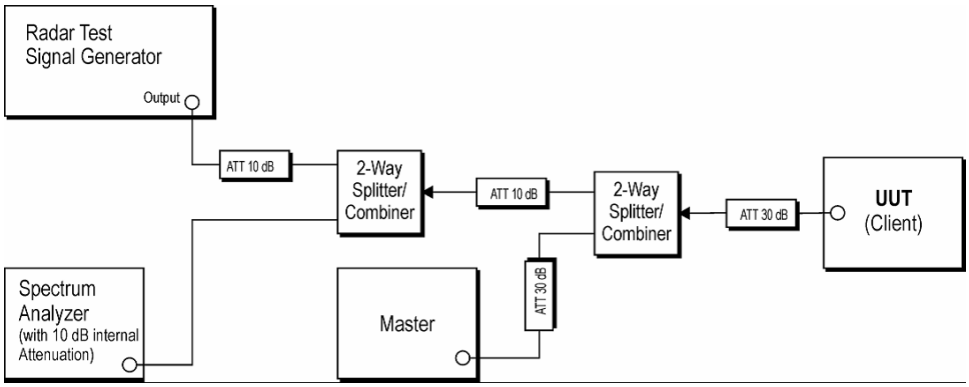
☐ **For master device**



☒ **For Slaver without radar detection function device**



☐ **For Slaver with radar detection function device**



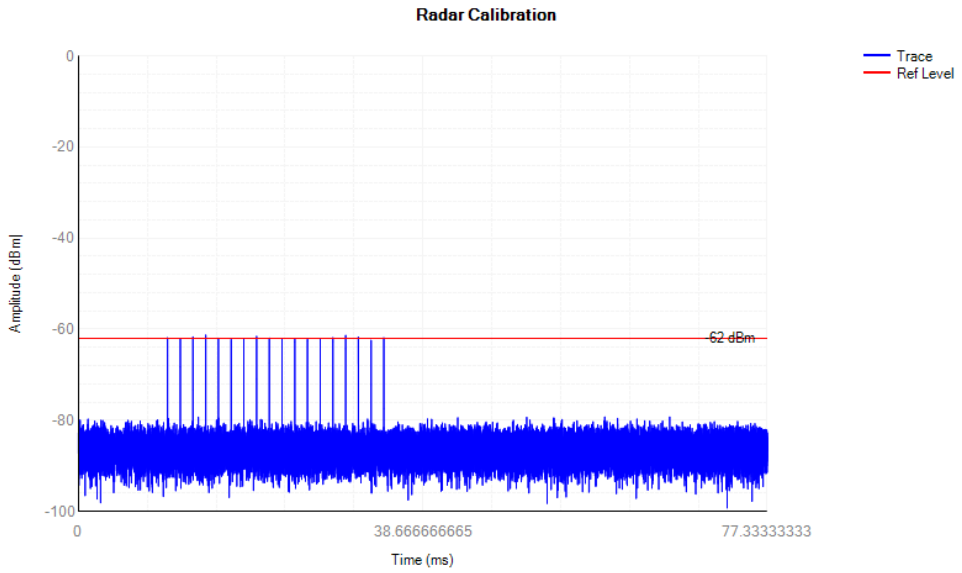
6.5 EUT Configuration for DFS Test

Test Items	Channel Frequency
Channel Move Time	5270MHz, 5310MHz
Channel Closing Transmission Time	5270MHz, 5310MHz
Non-Occupancy Period	5270MHz, 5310MHz

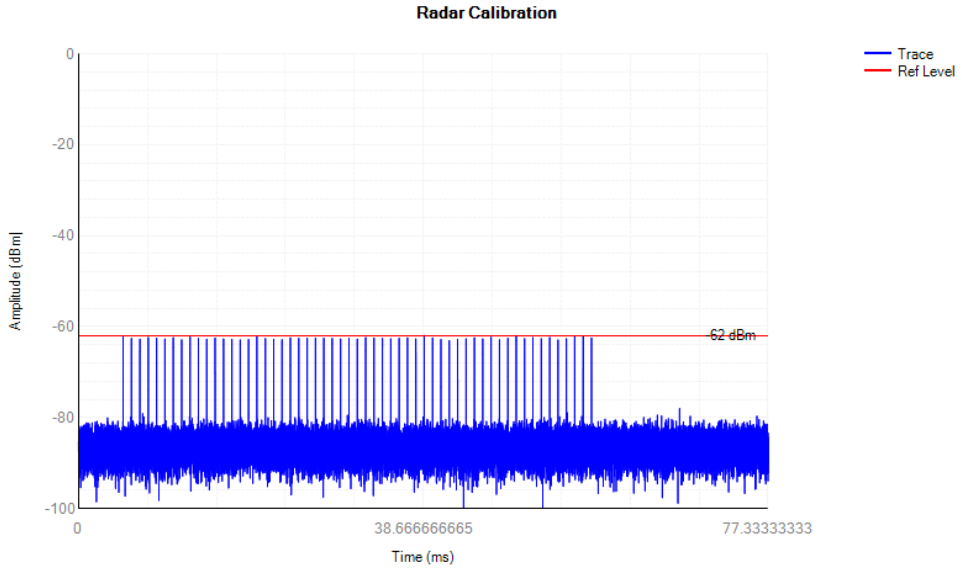
7 Test Result

7.1 Verification of Radar Type and Level

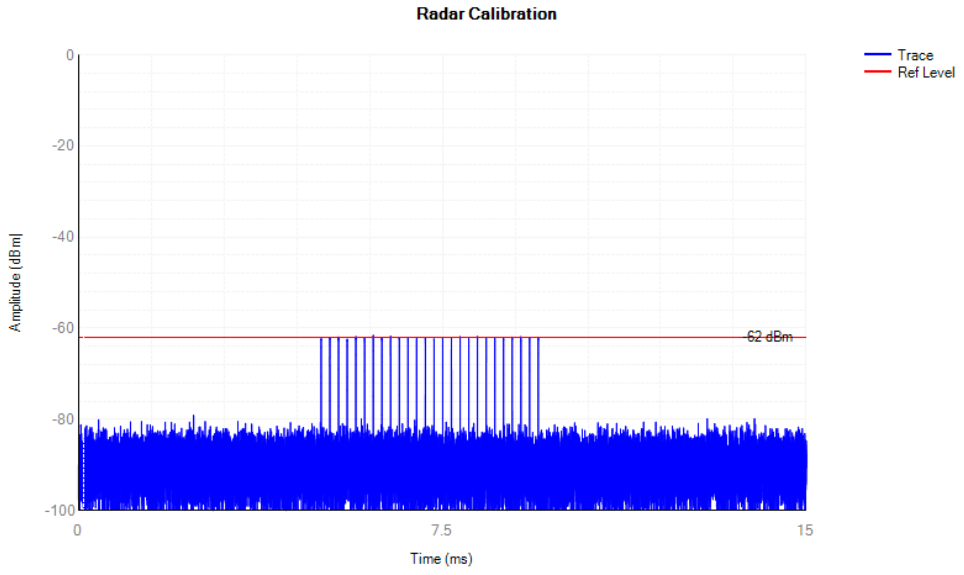
40MHz/5270MHz



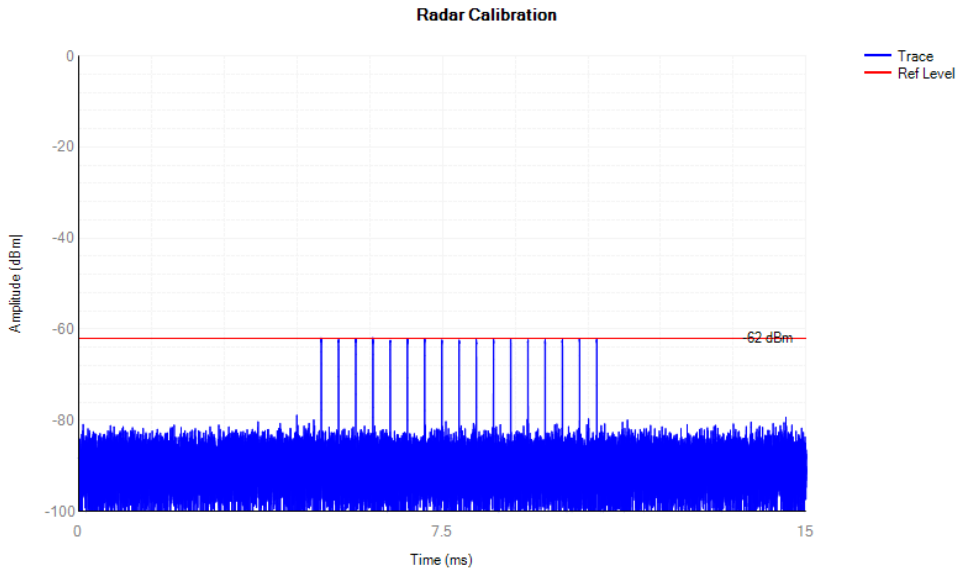
Radar Type 0



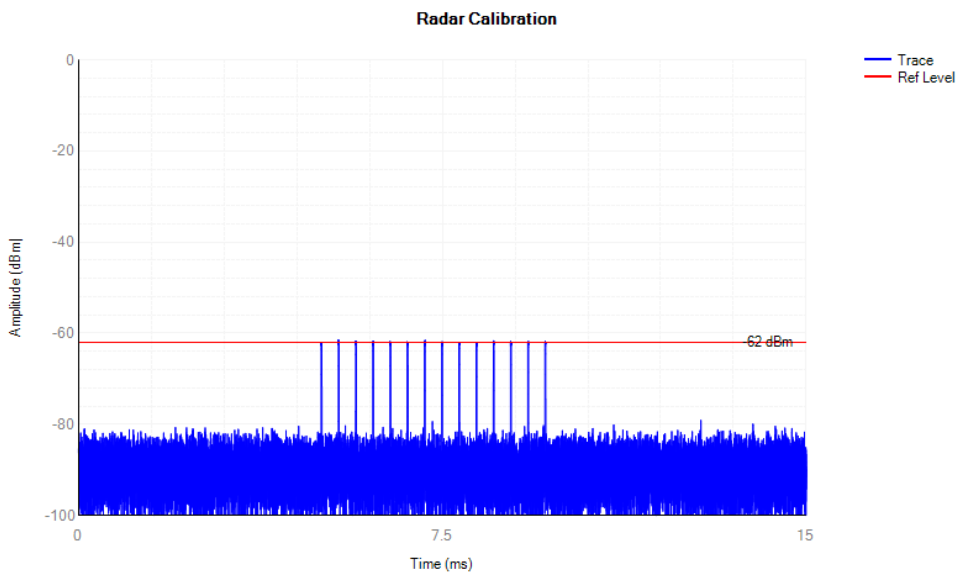
Radar Type 1



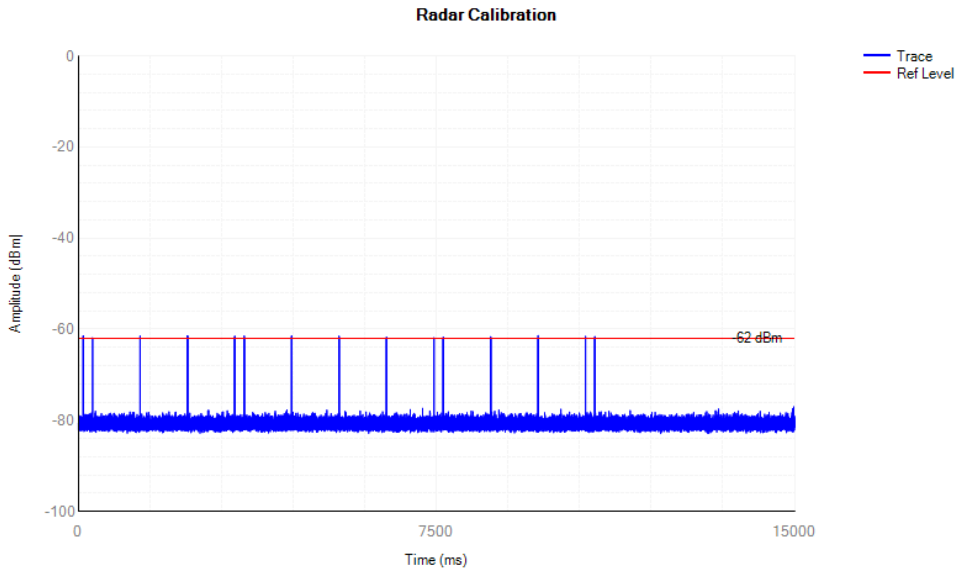
Radar Type 2



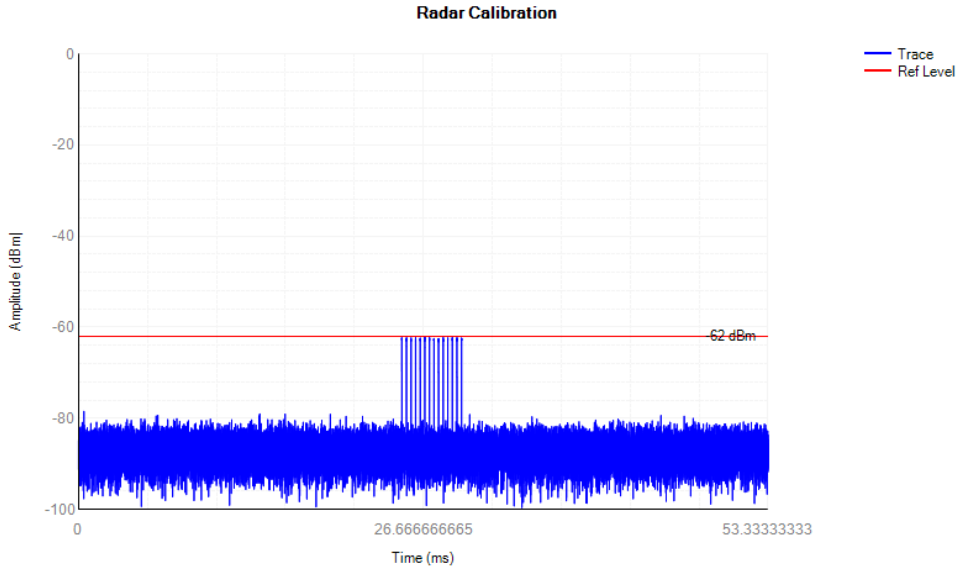
Radar Type 3



Radar Type 4

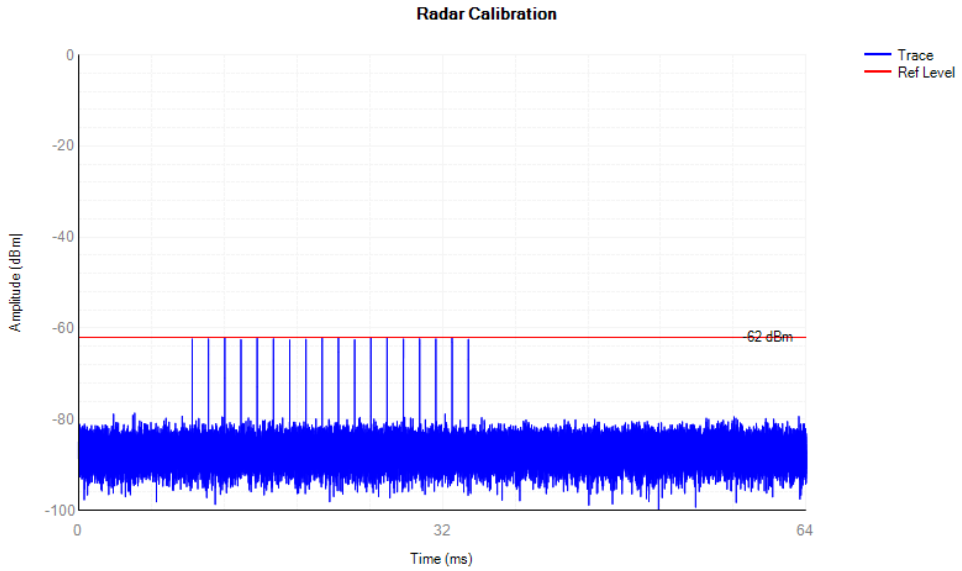


Radar Type 5

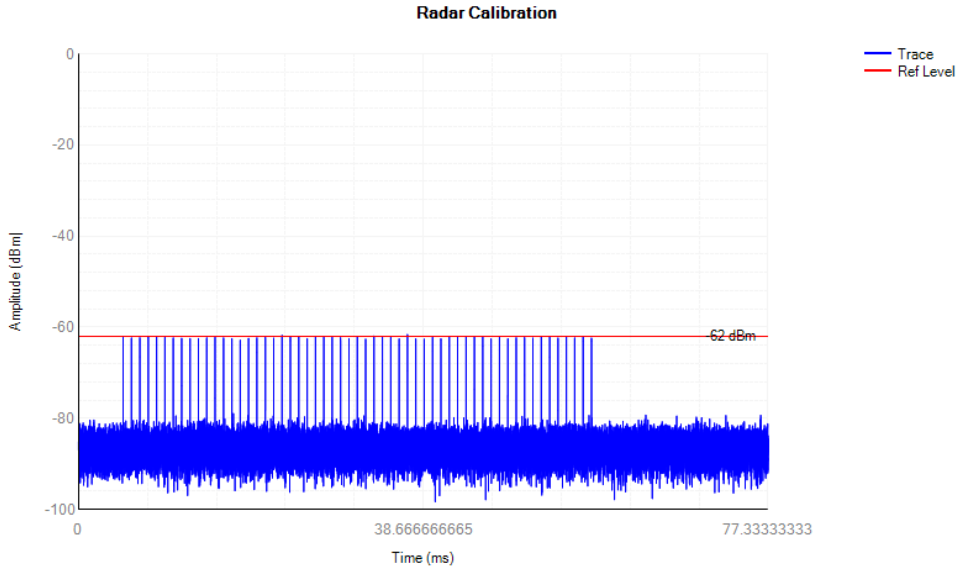


Radar Type 6

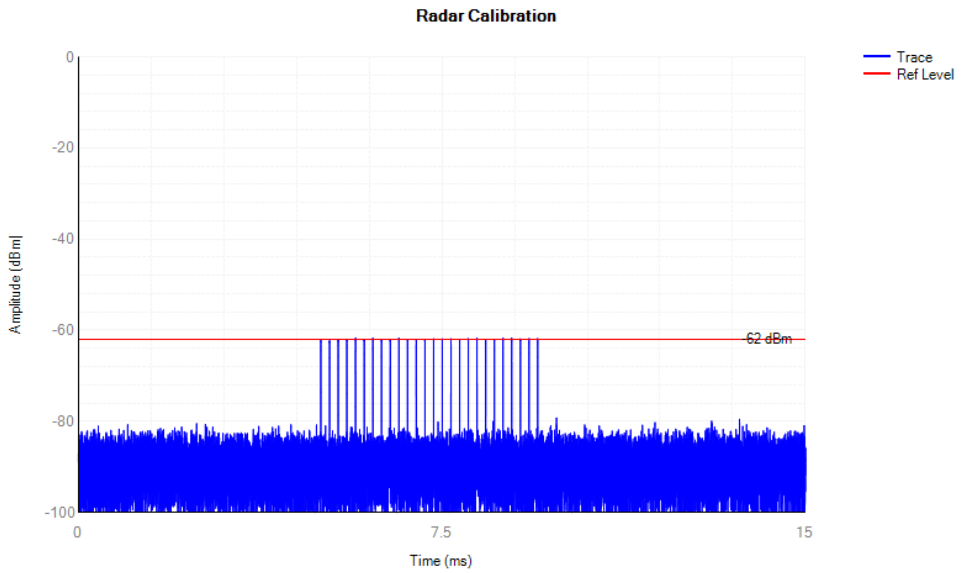
40MHz@5310MHz



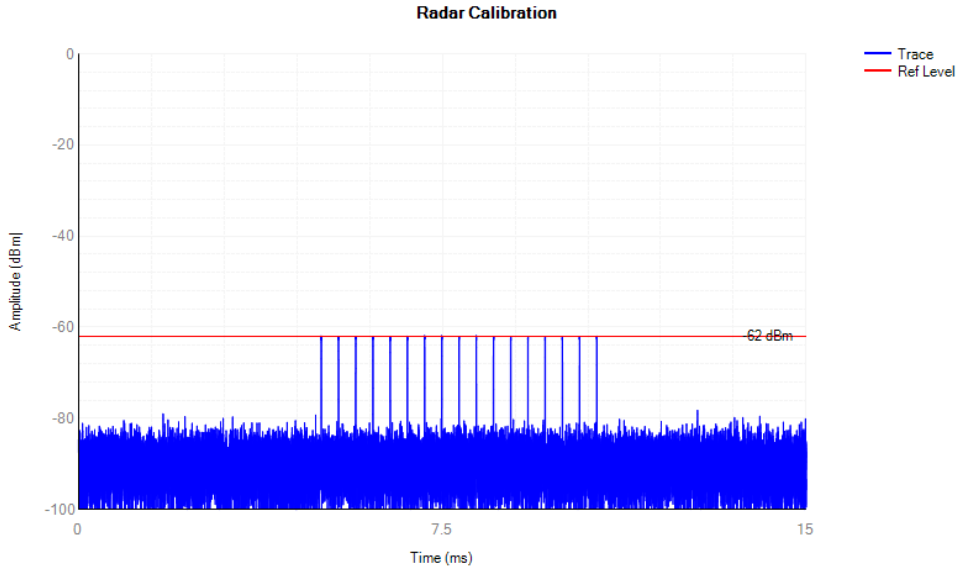
Radar Type 0



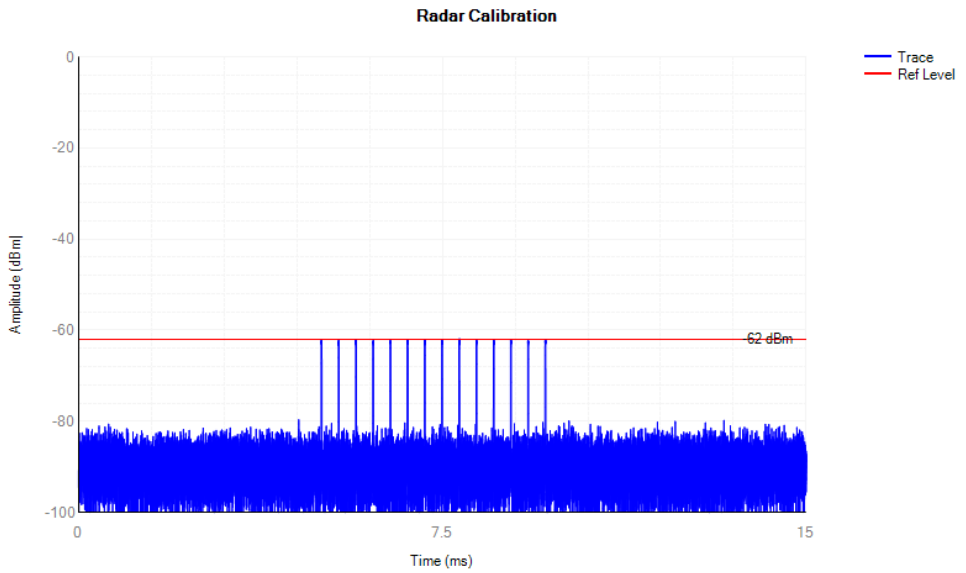
Radar Type 1



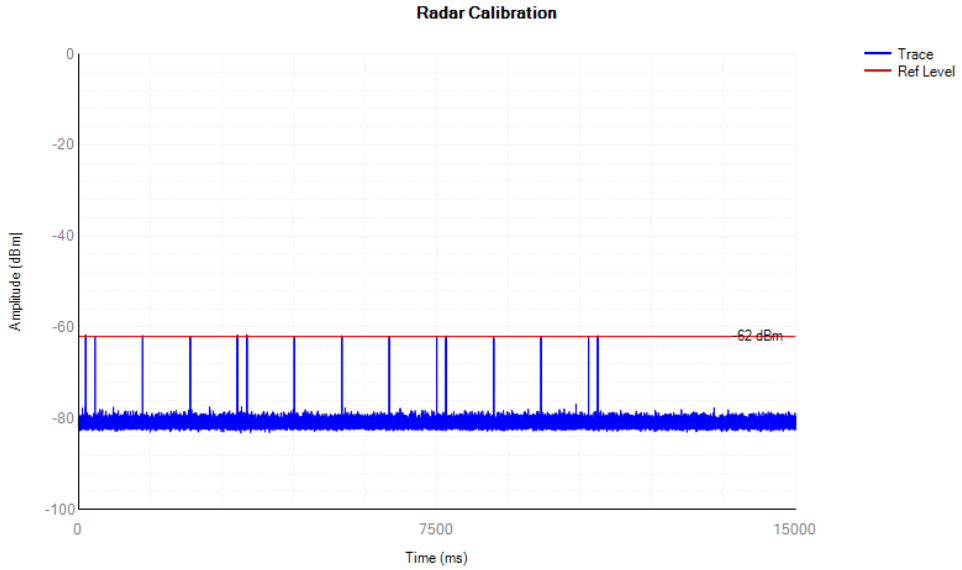
Radar Type 2



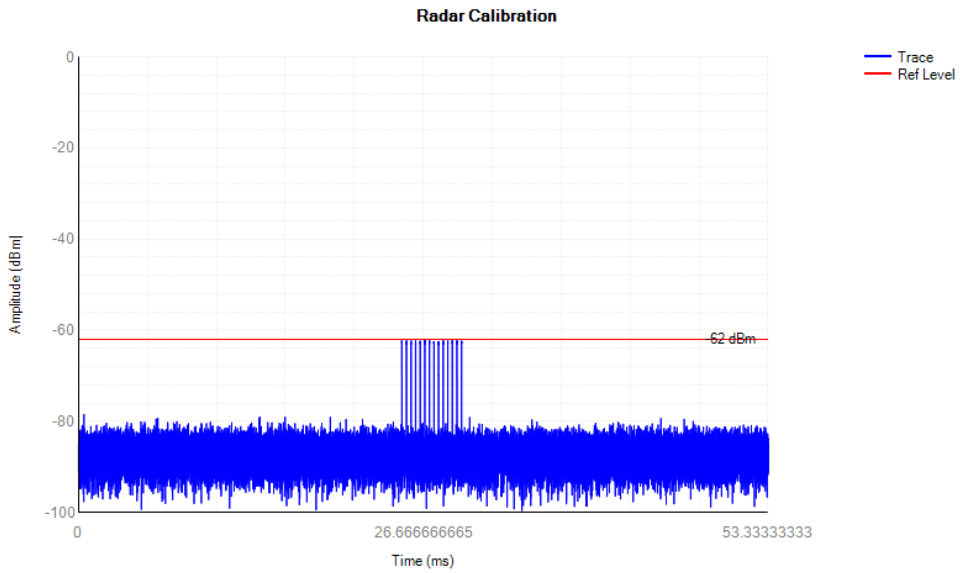
Radar Type 3



Radar Type 4



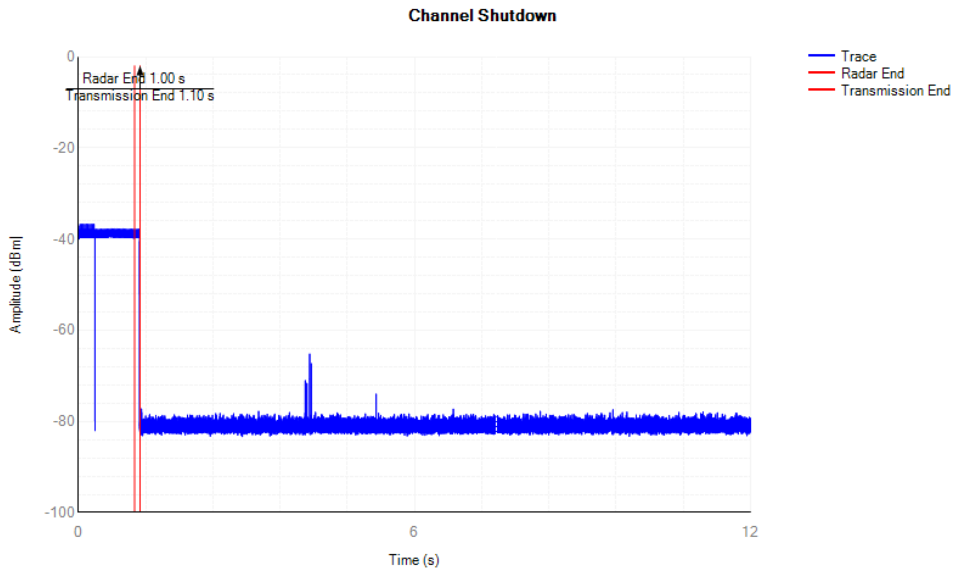
Radar Type 5



Radar Type 6

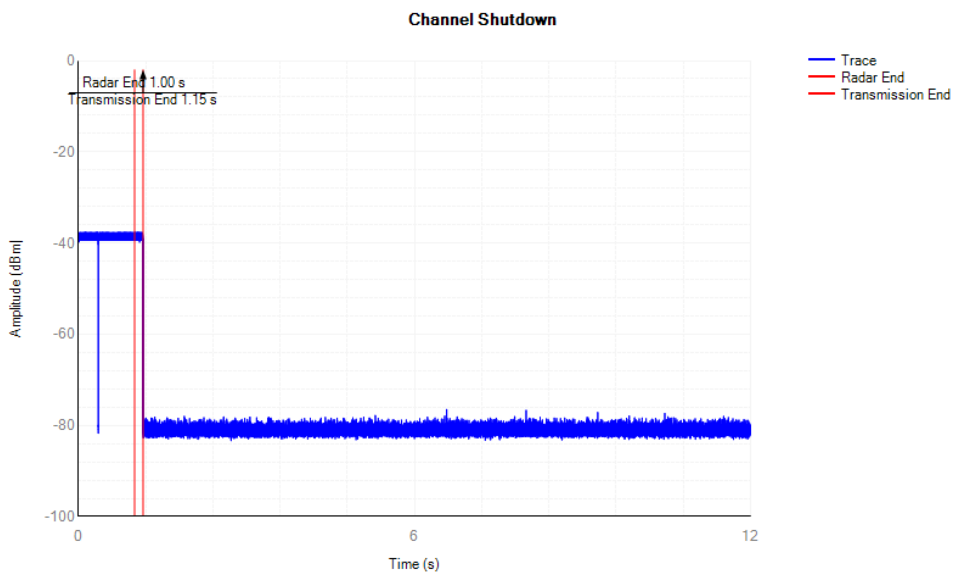
7.2 Channel Move Time and Channel Closing Transmission Time

40MHz/5270MHz



Test Items	Value	Limit
Channel Closing Transmission Time	94.2ms	260 ms
Channel Move Time	97.1 ms	10 s

40MHz/5310MHz

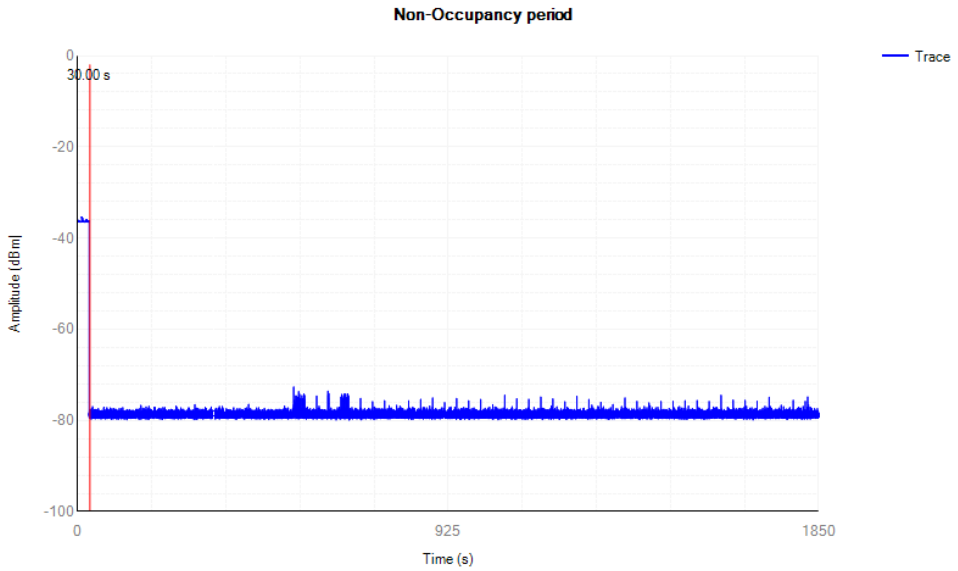


Test Items	Value	Limit
Channel Closing Transmission Time	150.9 ms	260 ms
Channel Move Time	151.7 ms	10 s

Test Result: Pass

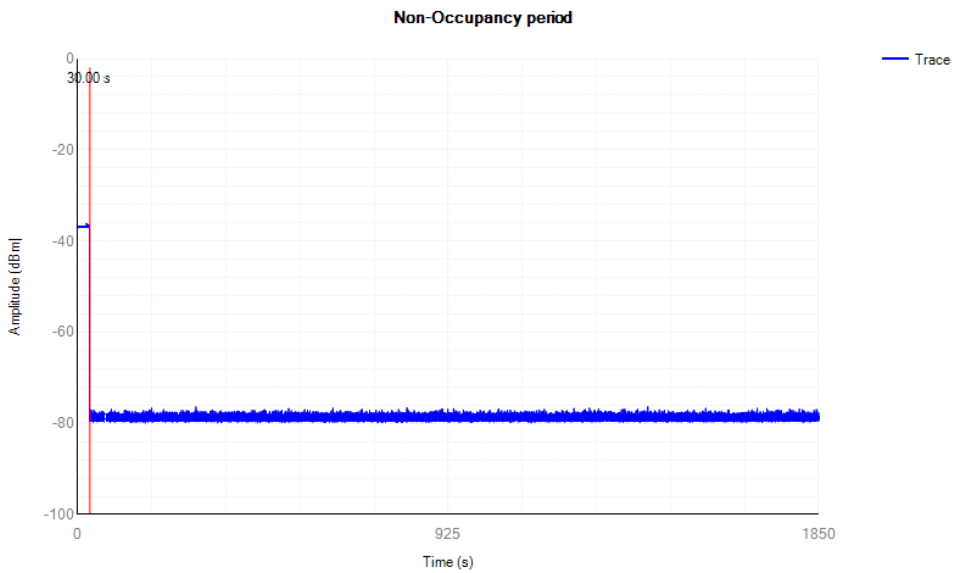
7.3 Non-Occupancy Period

40MHz/5270MHz



Test Items	Value	Limit
Non-Occupancy Period	1820 s	30 minutes (1800 s)

40MHz/5310MHz



Test Items	Value	Limit
Non-Occupancy Period	1820 s	30 minutes (1800 s)

Test Result: Pass