

# DFS Annex

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## Hardware Setup: WMS Measurements\TS8997 Hardware Setup

Spectrum Analyzer: SA FSV 40 (SA FSV 40) @ VISA (ADR  
TCPIP::192.168.48.100::inst0::instr), SN 1321.3008K40/101752,  
FW 3.50

Vector Generator: VG SMBV100A (VG SMBV100A) @ VISA (ADR  
TCPIP::192.168.48.120::inst0::instr), SN 262184, FW 3.1.19.15-  
3.50.082.47

Generator: SMB100A (SMB100A) @ VISA (ADR  
TCPIP::192.168.48.110::inst0::instr), SN 180599, FW 3.20.390.24 /  
Drv:Rev 2.21.0, 07/2016, CVI 2015

OSP: OSP-B157W (OSP-B157W) @ VISA (ADR  
TCPIP::192.168.48.157::inst0::instr), SN 1527.1144. /, FW  
1.24.0.10

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## Summary

Test	Frequency (MHz)	Nominal Power (dBm)	Nominal Bandwidth (MHz)	Result
DFS In-Service Monitoring	5600.000	15.0	50.000000	PASS

# DFS In-Service Monitoring (5600 MHz; \_\_\_\_\_ (15 dBm); 50 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(h), KDB 905462 D02 U-NII DFS Compliance Procedures New Rules v02

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.

Expanded uncertainty (K=2) for Channel Closing Transmission Time in the first 200 ms: <2.338%

Expanded Uncertainty (K=2) for Channel Closing Transmission Time for the remaining channel move time period:<0.1%

Expanded Uncertainty (K=2) for Channel Move Time:<0.1%

## Measurement Summary

DUT Frequency (MHz)	Radar Type No.	Type of Measurement value	Overall Result	Overall Comment
5600.000000	0	First of all Transmitt Test	PASS	DUT is transmitting
5600.000000	0	Channel Move Time	PASS	
5600.000000	0	Channel Closing Transmission Time	PASS	
5600.000000	0	Non-occupancy period	PASS	

## Channel Move Time Detailed Results

DUT Frequency (MHz)	Radar Type No.	CMT Tx Time (s)	CMT Limit (s)	CMT Result	CMT Comment
5600.000000	0	0.000	10.000	PASS	Tx Time value is last trailing edge found within sweep. See Note 1.

## Channel Closing Transmission Time Detailed Results

DUT Frequency (MHz)	Radar Type No.	CCTT Type of Value	CCTT No. of Pulses found	CCTT Tx Time (ms)
5600.000000	0	first 200 ms	80	13.684
5600.000000	0	remaining 10.0 second(s) period	0	0.000

(continuation of the "Channel Closing Transmission Time Detailed Results" table from column 5 ...)

DUT Frequency (MHz)	CCTT Tx Time Limit (ms)	CCTT Result	CCTT Comment
5600.000000	200.000	PASS	See Note 1.
5600.000000	60.000	PASS	See Note 1.

## Non-occupancy period Detailed Results

DUT Frequency (MHz)	Radar Type No.	NOP No. of Pulses found	NOP No. of Pulses Limit	NOP Tx Time (s)	NOP Tx Time Limit (s)	NOP Result
5600.000000	0	0	0	0.000	0.000	PASS

## Transmitting Test Detailed Results

DUT Frequency (MHz)	Tx-Test Tx OnTime (μs)	Tx-Test Tx OnTime Limit	Tx-Test No. of Pulses found	Tx-Test Result	Tx-Test Comment
5600.000000	8343.333	>0.000 s	50	PASS	

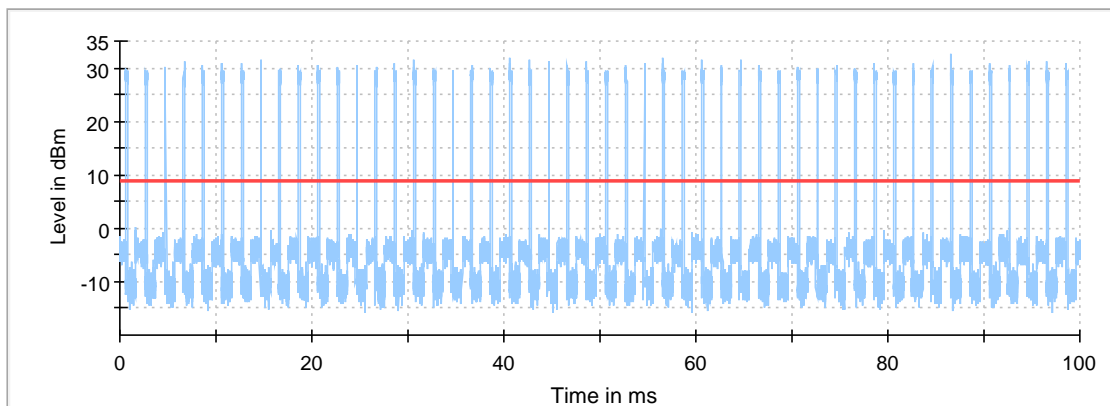
## Radar level verification

Description	Value	Unit
IF(( {DFS Mode(0/1/2)}=0)or( {DFS Mode(0/1/2)}=1) , IF((dBm2W( {Nominal Power[dBm]}>0.2) , -64 , IF( {Configured PSD[dBm]}<10) , -62 , -64))+ {Attenuation Vector Generator to DUT[dB]} , -50+ {Attenuation Vector Generator to COMP[dB]}+ {Radar Signal Level Offset[dB]})	Given setting / formula to calculate Vector Generator level	--
Configured DUT EIRP:	31.62	mW
Configured DUT PSD:	0.00	dBm/MHz
Requirement of the Detection threshold value for this given values acc. to FCC clause 5.2 / Table 3	-62	dBm
Vector Generator level setting	0.83	dBm
Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable	59.46	dB
Given additional level added to the amplitude of the waveform to account for variations in measurement equipment acc. to FCC clause 5.2 / Table 3 / Note 2	1.00	dB
This results in the following radar signal level at the DUT	-58.63	dBm

## Additional Information

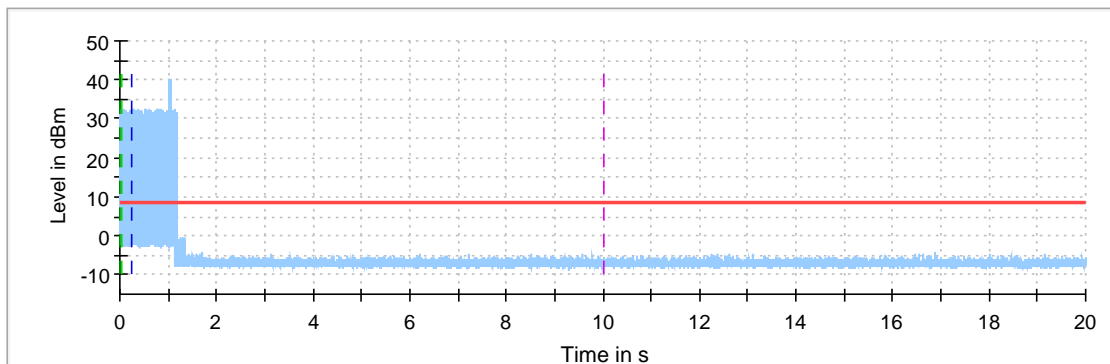
Note	Description
Note 1:	Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 26.7 ms conforming to the end of the Radar burst.
Note 2:	Channel move time (CMT) / channel closing transmission time (CCTT) measurement was made with hi resolution video sweep using OSP DAQ channel
Note 3:	Because of the substantially higher sampling rate of the video signal the results for CCTT and CMT are more accurate than in the graphics visible. Reached timing accuracy of the video trace: approx 4 $\mu$ s
Note 4:	The Non-Occupancy Period trace starts at the end of the Channel move time trace (20.000 secs.) Labeling of the x-axis (time) is relative to its beginning (0 secs.)

In-Service Monitoring Transmitt Test Sweep



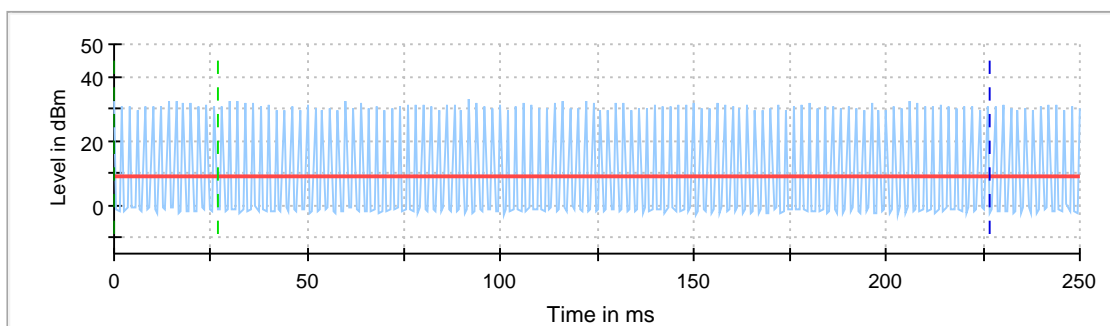
— In-Service Monitoring Transmitt Test Sweep      — Threshold

In-Service Monitoring Channel Move Time



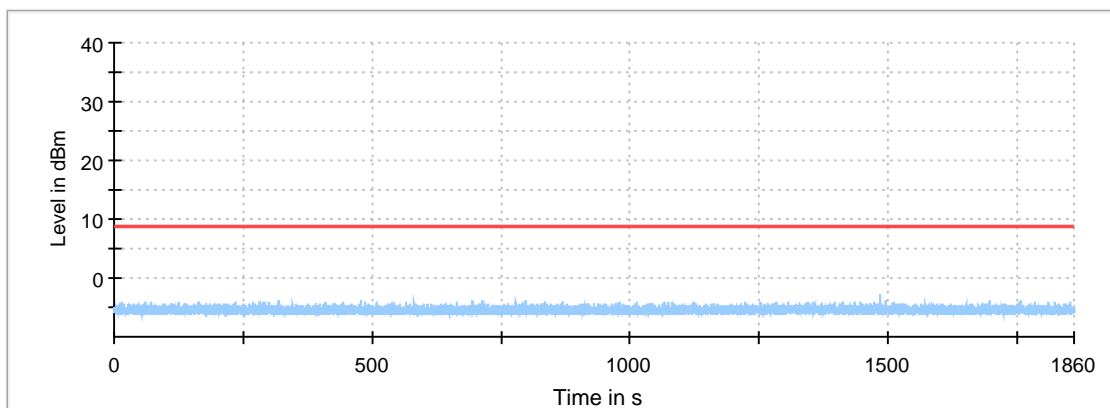
— In-Service Monitoring Channel Move Time      — Threshold  
 - - - Start of Radar      - - - Trigger at end of Radar  
 - - - First 200ms of Channel Closing Tx Time      - - - 10sec Channel Move Time Limit

In-Service Monitoring Channel Move Time first 200ms



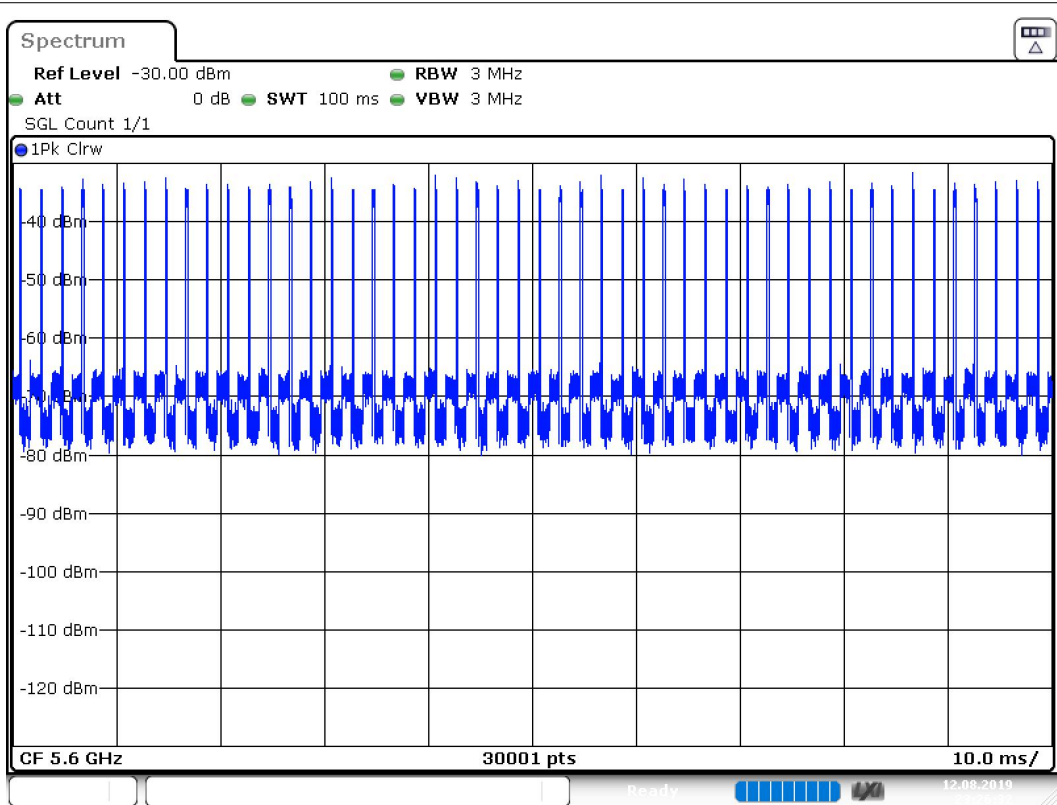
- In-Service Monitoring Channel Move Time first 200ms
- Threshold
- - - Start of Radar
- - - Trigger at end of Radar
- - - First 200ms of Channel Closing Tx Time

In-Service Monitoring Non-occupancy period



- In-Service Monitoring Non-occupancy period
- Threshold

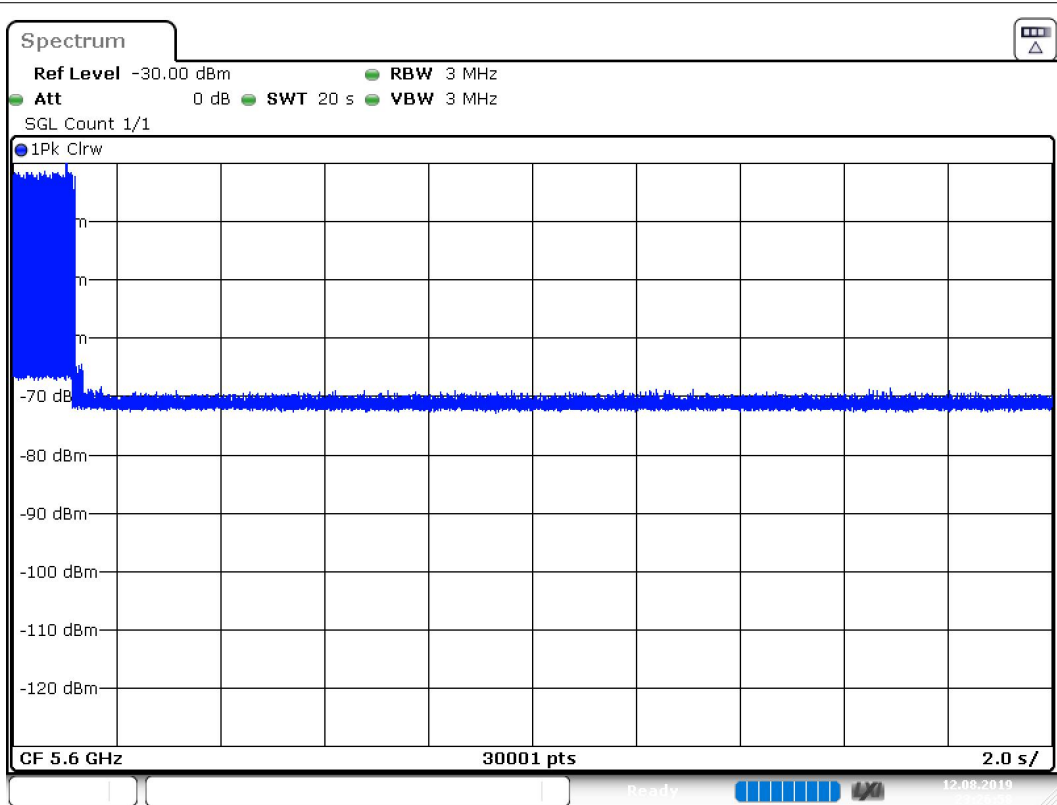
### In-Service Monitoring Transmitt Test Sweep



Date: 12.AUG.2019 23:26:32

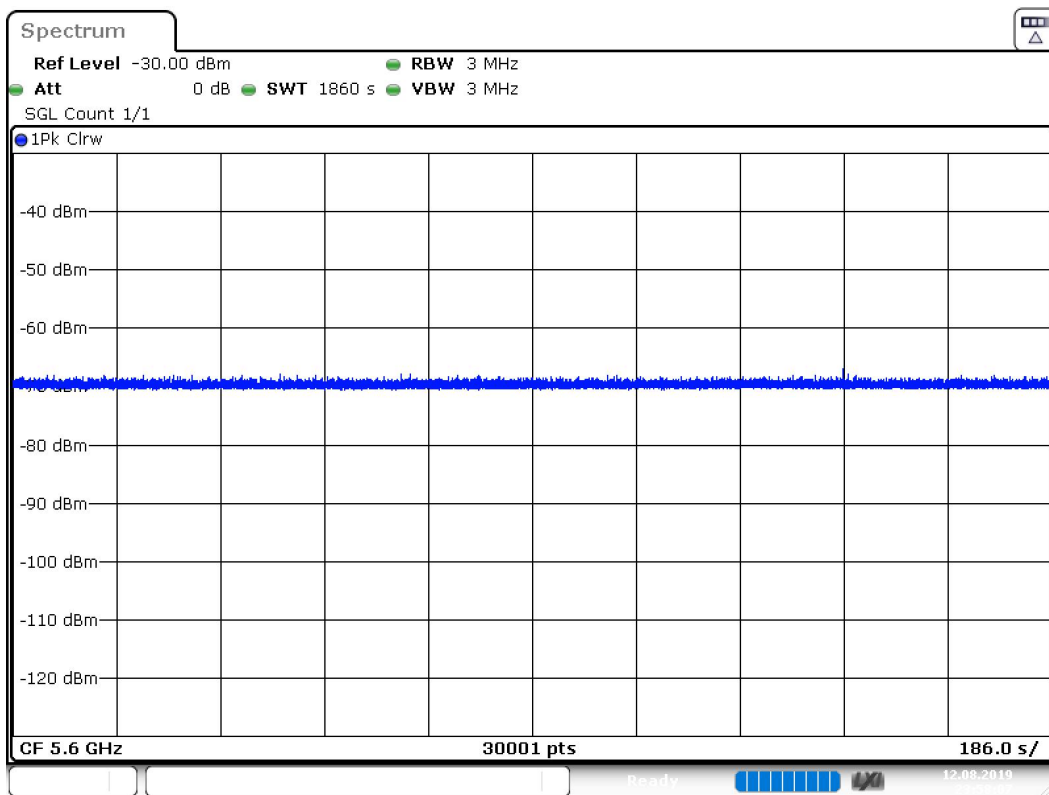
### In-Service Monitoring Channel Move Time





Date: 12.AUG.2019 23:26:58

In-Service Monitoring Non-occupancy period



Date: 12.AUG.2019 23:58:07

## DUT Checkup

Setting	Instrument Value	Target Value
Center Frequency	5.60000 GHz	5.60000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
SweepTime	100.000 ms	100.000 ms
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off

## Channel Move Time; Channel Closing Transmission Time

Setting	Instrument Value	Target Value
Center Frequency	5.60000 GHz	5.60000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
SweepTime	20.000 s	20.000 s
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak

Setting	Instrument Value	Target Value
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off

## Non-occupancy period

Setting	Instrument Value	Target Value
Center Frequency	5.60000 GHz	5.60000 GHz
Span	ZeroSpan	ZeroSpan
RBW	3.000 MHz	>= 3.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	30001	~ 30001
SweepTime	1.860 ks	1.860 ks
Reference Level	-30.000 dBm	-30.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off

## OSP Video Detector

Setting	Instrument Value	Target Value
Measurement Time	20.000 s	20.000 s
Samplerate	2500 kHz	2500 kHz
Tracepoints	50000000	50000000
Time resolution	4.000 µs	4.000 µs
Detector	Peak	Peak