

TEST REPORT



CTK Co., Ltd.
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Report No.:
CTK-2024-02548
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1. Applicant

- Name : Haier US Appliance Solutions, Inc.
- Address : Appliance Park AP5-2N-65, Louisville, Kentucky, United States, 40225
- Date of Receipt : 2024-07-19

2. Manufacturer

- Name : Haier US Appliance Solutions, Inc.
- Address : Appliance Park AP5-2N-65, Louisville, Kentucky, United States, 40225

3. Use of Report : For FCC Conformance / ISED Conformance

4. Test Sample / Model : Android Board for GEA LCD products / SBC001

5. Date of Test : 2024-08-02 to 2024-09-06

6. Test Standard(method) used : FCC 47 CFR part 15 subpart E 15.407
ISED RSS-247 & RSS-Gen

7. Testing Environment : Temp.: (23 ± 1) °C, Humidity: (55 ± 3) % R.H.



8. Test Results : Compliance

9. Location of Test : Permanent Testing Lab On Site Testing

(Address : (Unhak-Dong) 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yong-in-si,
Gyeonggi-do, Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

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| | | |
|----------|--|---|
| Approval | Tested by  Ji-Hye, Kim: (Signature) | Technical Manager  Won-Jae, Hwang: (Signature) |
|----------|--|---|

Remark. This report is not related to KOLAS accreditation and relevant regulation.

2024-09-10

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REPORT REVISION HISTORY

| Date | Revision | Page No |
|------------|-------------------------|---------|
| 2024-09-10 | Issued (CTK-2024-02548) | all |
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1. General Product Description

1.1 Applicant Information

| | |
|-----------------------|--|
| Company | Haier US Appliance Solutions, Inc. |
| Contact Point | Appliance Park AP5-2N-65, Louisville, Kentucky, United States, 40225 |
| Contact Person | Name : Park, Hansung E-mail : hansung.park@geappliances.com Tel : +82-31-8094-6732 Fax : +82-31-8094-6888 |

1.2 Product Information

| | | |
|------------------------------|---|-------------------------------------|
| FCC ID | ZKJ-SBC001 | |
| ISED | 10229A-SBC001 | |
| Product Description | Android Board for GEA LCD products | |
| Model name | SBC001 | |
| Variant Model name | - | |
| Operating Frequency | UNII 1 : 5 180 MHz – 5 240 MHz (20 MHz_BW) 5 190 MHz – 5 230 MHz (40 MHz_BW) 5 210 MHz (80 MHz_BW) UNII 2A : 5 260 MHz – 5 320 MHz (20 MHz_BW) 5 270 MHz – 5 310 MHz (40 MHz_BW) 5 290 MHz (80 MHz_BW) UNII 2C : 5 500 MHz – 5 720 MHz (20 MHz_BW) 5 510 MHz – 5 710 MHz (40 MHz_BW) 5 530 MHz – 5 690 MHz (80 MHz_BW) UNII 3 : 5 745 MHz – 5 825 MHz (20 MHz_BW) 5 755 MHz – 5 795 MHz (40 MHz_BW) 5 775 MHz (80 MHz) | |
| RF Output Power | 802.11a : 17.53 dBm (56.62 mW) 802.11n_HT20 : 18.49 dBm (70.63 mW) 802.11n_HT40 : 19.53 dBm (89.74 mW) 802.11ac_VHT20 : 17.93 dBm (62.09 mW) 802.11ac_VHT40 : 19.30 dBm (85.11 mW) 802.11ac_VHT80 : 19.02 dBm (79.80 mW) | |
| Antenna Specification | Antenna type : Chip Antenna Peak Gain : 3.51 dBi (ANT1, ANT2) | |
| Type of Modulation | OFDM | |
| Data Rate | 802.11a : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n : up to 300 Mbps 802.11ac : up to 867 Mbps | |
| Power Source | DC 5 V | |
| Hardware Rev | HT-PCB-240-A2302B-C-V06 | |
| Software Rev | AOSP-1.8.0.10 | |
| DFS Mode of Operation | Master Device | <input type="checkbox"/> |
| | Client Device (No radar detection) | <input checked="" type="checkbox"/> |
| | Client Device With Radar Detection | <input type="checkbox"/> |



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1.3 Peripheral Devices

| Device | Manufacturer | Model No. | Serial No. |
|-------------------|--------------|------------|--------------|
| Note Computer | HP | 15-bs563TU | CND7253QPR |
| AC/DC Adapter | HP | HSTNN-LA40 | - |
| WLAN Access Point | ASUS | RT-AX88U | L6IKHP000005 |
| AC/DC Adapter | ASUS | ADP-65GD B | |

1.4 Model Differences

Not applicable



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2. Accreditations

2.1 Laboratory Accreditations and Listings

| Country | Agency | Registration Number |
|---------|--------|-------------------------------|
| USA | FCC | 805871 |
| CANADA | ISED | CN : 8737A CAB ID : KR0025 |
| KOREA | NRRA | KR0025 |

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Summary of tests 3.1 Summary of tests

| Requirement(s) | Limit | Status (Note 1) | Test Condition |
|---|---|-----------------|----------------|
| Channel Move Time | 10 seconds | C | Conducted |
| Channel Closing Transmission Time | 200ms + aggregate of 60ms over remaining 10 second period | C | |
| Client beacon test | Monitored for 30 minutes with no client transmission | C | |
| <p><u>Note 1</u>: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable</p> | | | |
| <p><u>Note 2</u>: The data in this test report are traceable to the national or international standards.</p> | | | |
| <p><u>Note 3</u>: The sample was tested according to the following specification: FCC Part 15.407, ANSI C63.10-2013</p> | | | |
| <p><u>Note 4</u>: The tests were performed according to the method of measurements prescribed in KDB No.905462.</p> | | | |



3.2 Description of Dynamic Frequency Selection Test

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

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

Table 2: Applicability of DFS requirements during normal operation

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

| Additional requirements for devices with multiple bandwidth modes | Master Device or Client with Radar Detection | Client Without Radar Detection |
|--|--|--|
| <i>U-NII Detection Bandwidth and Statistical Performance Check</i> | All BW modes must be tested | Not required |
| <i>Channel Move Time and Channel Closing Transmission Time</i> | Test using widest BW mode available | Test using the widest BW mode available for the link |
| <i>All other tests</i> | 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 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

| Maximum Transmit Power | Value (See Notes 1, 2, and 3) |
|---|----------------------------------|
| EIRP \geq 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 |
| <p>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.</p> | |

Table 4: DFS Response Requirement Values

| Parameter | Value |
|--|---|
| <i>Non-occupancy period</i> | Minimum 30 minutes |
| <i>Channel Availability Check Time</i> | 60 seconds |
| <i>Channel Move Time</i> | 10 seconds See Note 1. |
| <i>Channel Closing Transmission Time</i> | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2. |
| <i>U-NII Detection Bandwidth</i> | Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3. |
| <p>Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> 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.</p> | |



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Table 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: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a | Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$ | 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. | | | | | |



Table 5a - Pulse Repetition Intervals Values for Test A

| 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 |

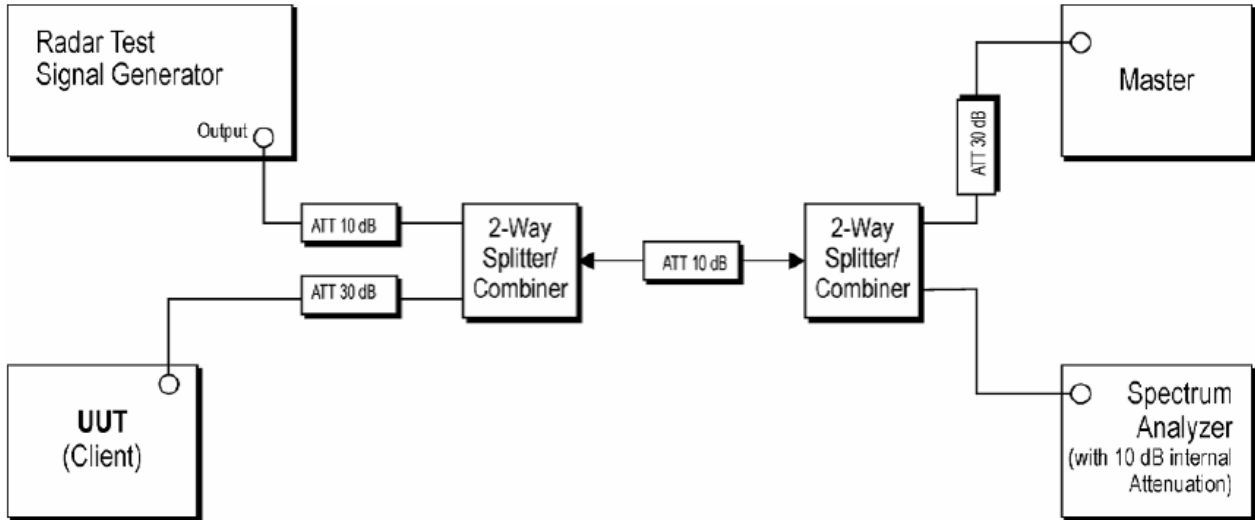
Table 6 – Long Pulse Radar Test Waveform

| 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 |

Table 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 | 9 | 0.333 | 300 | 70% | 30 |

3.3 Measuring Systematic diagram





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3.4 Description of EUT

Overview Of EUT With Respect To §15.407 (H) Requirements

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz range.
The EUT is a Client Device that does not have radar detection capability.
The Slave device associated with the EUT during these tests does not have radar detection capability.

All tests are conducted with Pulse Type 0.

A sample with temporary antenna connector was provided to perform the measurements in a conducted way.

Traffic_Gen was used to generate the required channel load (duty cycle greater than 17%).

The EUT utilizes the 802.11a/n/ac architecture, with a nominal channel bandwidth of 20/40/80 MHz.

The Master Device is a ASUS RT-AX88U 802.11a/b/g/n/ac/ax WLAN Access Point,
FCC ID: MSQ-RTAXHP00

Threshold level is lower than the required level hence it provides margin to the limit.

3.4.1 Test Channel

All test were performed at a channel center frequency of 5 320 MHz and 5 500 MHz for 20 MHz Bandwidth.

All test were performed at a channel center frequency of 5 290 MHz and 5 530 MHz for 80 MHz Bandwidth.



3.4.2 Test Result

DFS In-Service Monitoring (5320 MHz; 20.000 dBm; 20 MHz)

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

Measurement Summary

| DUT Frequency (MHz) | Radar Type No. | Type of Measurement value | Overall Result |
|---------------------|----------------|-----------------------------------|----------------|
| 5320.000000 | 0.00 | First of all Transmitt Test | --- |
| 5320.000000 | 0.00 | Channel Move Time | PASS |
| 5320.000000 | 0.00 | Channel Closing Transmission Time | PASS |
| 5320.000000 | 0.00 | Non-occupancy period | PASS |

(continuation of the "Measurement Summary" table from column 4 ...)

| DUT Frequency (MHz) | Overall Comment |
|---------------------|------------------------------|
| 5320.000000 | not performed / not finished |
| 5320.000000 | |
| 5320.000000 | |
| 5320.000000 | |

Channel Move Time Detailed Result

| DUT Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | CMT Result | CMT Comment |
|---------------------|----------------|-----------------|---------------|------------|---|
| 5320.000000 | 0.00 | 0.818 | 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) |
|---------------------|----------------|---------------------------------|--------------------------|-------------------|
| 5320.000000 | 0.00 | first 200 ms | 37 | 0.668 |
| 5320.000000 | 0.00 | remaining 10.0 second(s) period | 103 | 3.864 |

(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 |
|---------------------|-------------------------|-------------|--------------|
| 5320.000000 | 200.000 | PASS | See Note 1. |
| 5320.000000 | 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 |
|---------------------|----------------|-------------------------|-------------------------|-----------------|-----------------------|------------|
| 5320.000000 | 0.00 | 0 | 0 | 0.000 | 0.000 | PASS |

Transmitting Test Detailed Results

| DUT Frequency (MHz) | Tx-Test Result | Tx-Test Comment |
|---------------------|----------------|------------------------------|
| 5320.000000 | --- | not performed / not finished |



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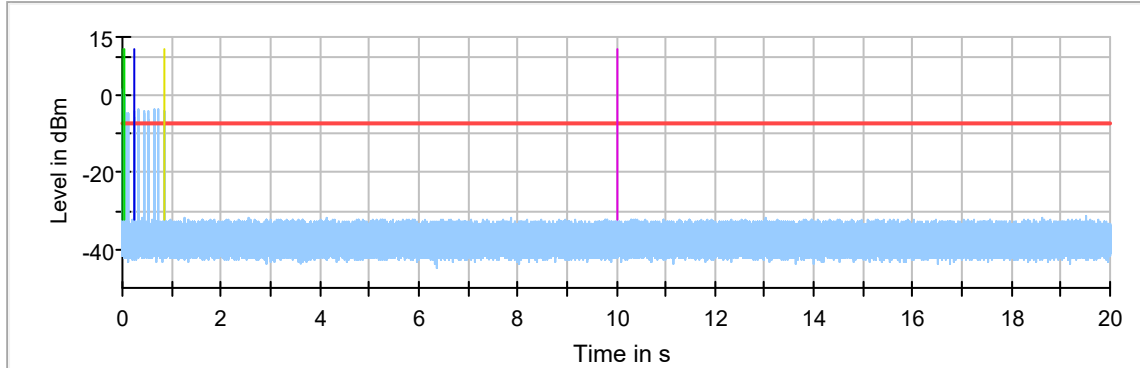
Radar level verification

| Description / Formula | 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: | 100.00 | mW |
| Configured DUT PSD: | 6.99 | 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 | 0.14 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 36.50 | 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 | -36.37 | dBm |

Additional Information

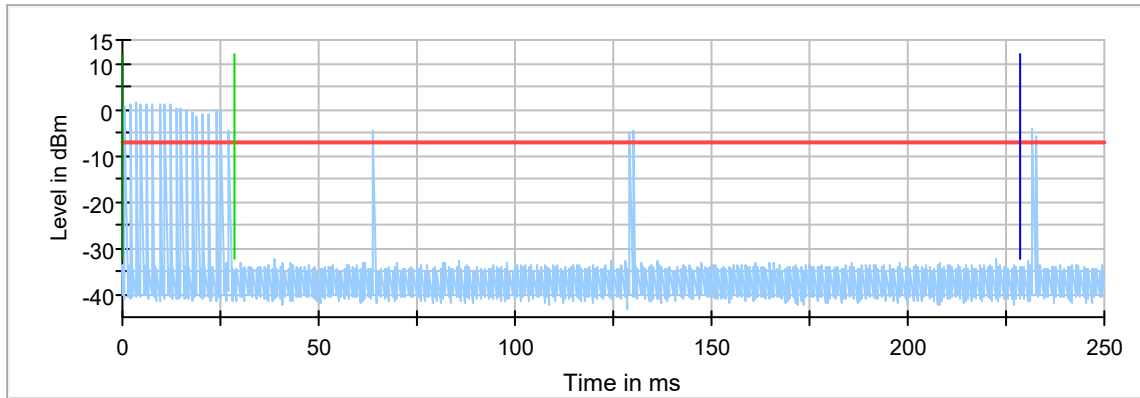
| Note | Description |
|---------|--|
| Note 1: | Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 28.7 ms conforming to the end of the Radar burst. |
| Note 2: | Channel move time (CMT) / channel closing transmission time (CCTT) measurement was 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 µs |
| 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.) |

Channel Move Time



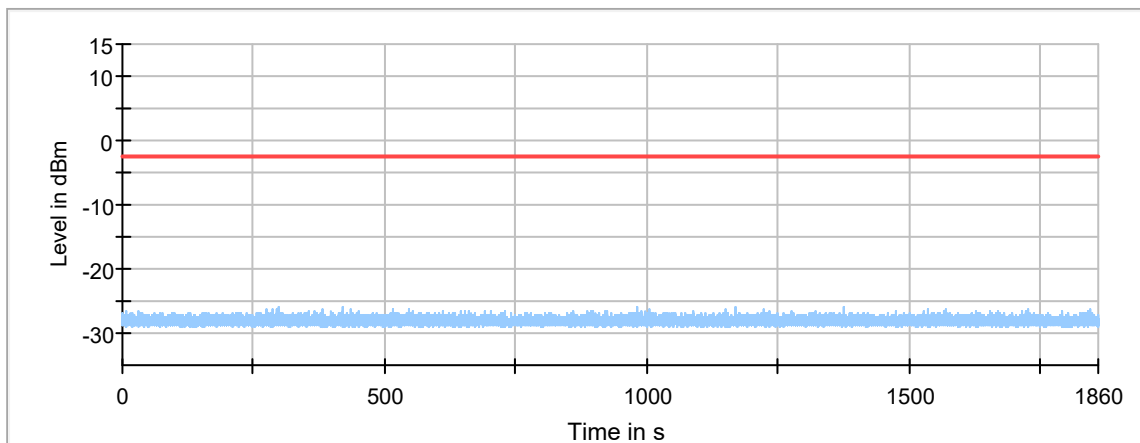
- Channel Move Time
- Start of Radar
- First 200ms of Channel Closing Tx Time
- Last measured edge of Channel Closing Tx Time
- Threshold
- Trigger at end of Radar
- 10sec Channel Move Time Limit

Channel Move Time first 200ms



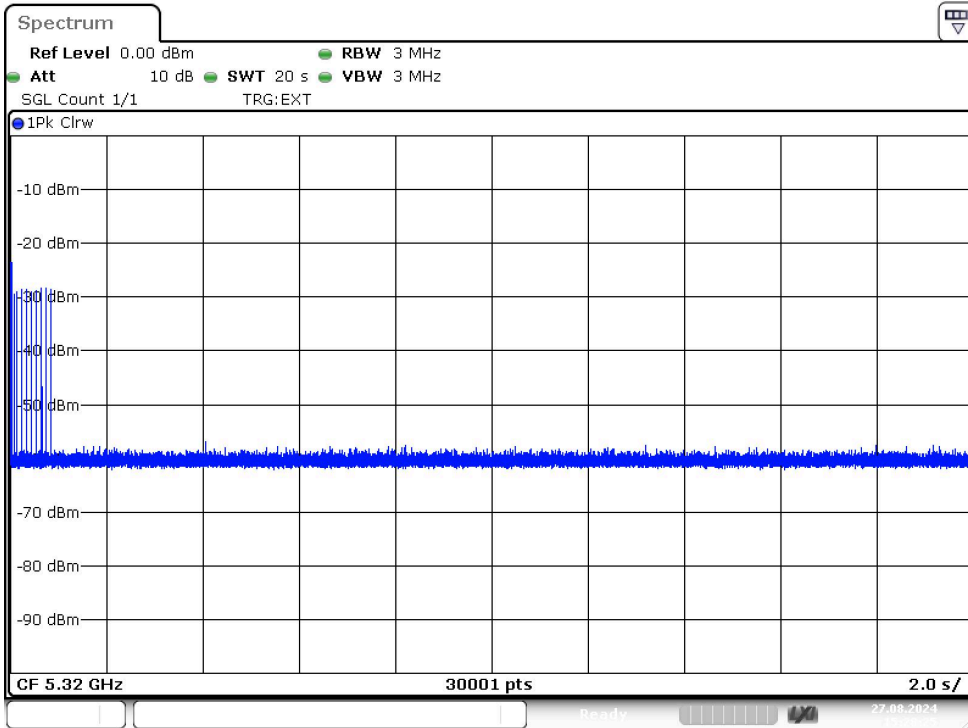
- Channel Move Time first 200ms
- Start of Radar
- First 200ms of Channel Closing Tx Time
- Threshold
- Trigger at end of Radar

Non-occupancy period

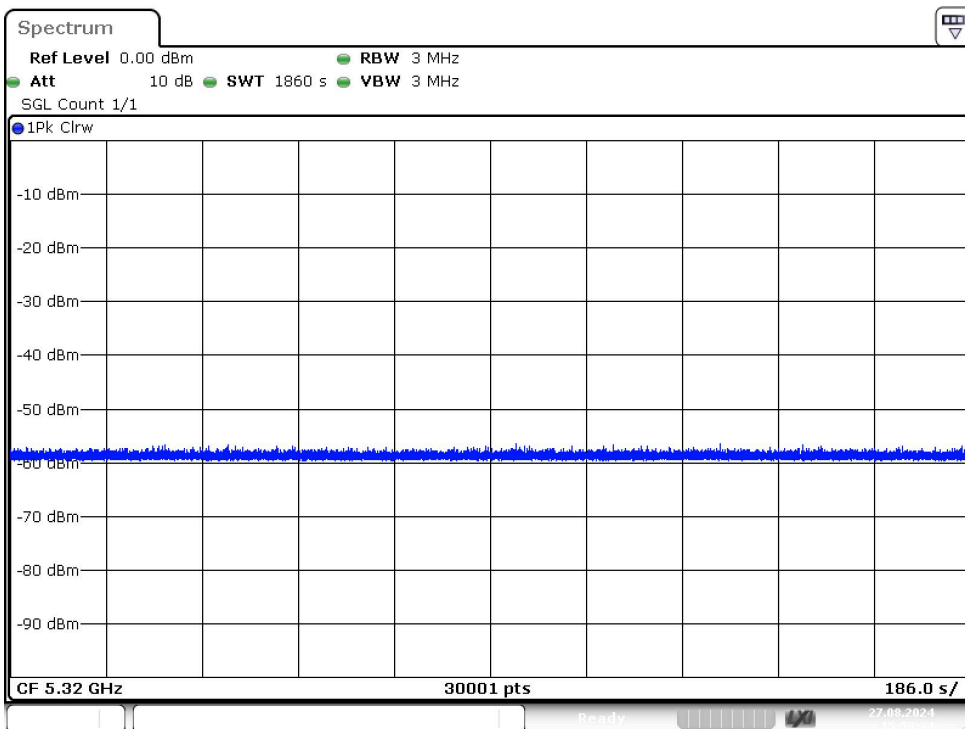


- Non-occupancy period
- Threshold

Channel Move Time



Non-occupancy period





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DFS In-Service Monitoring (5500 MHz; 20.000 dBm; 20 MHz)

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

Measurement Summary

| DUT Frequency (MHz) | Radar Type No. | Type of Measurement value | Overall Result |
|---------------------|----------------|-----------------------------------|----------------|
| 5500.000000 | 0.00 | First of all Transmitt Test | --- |
| 5500.000000 | 0.00 | Channel Move Time | PASS |
| 5500.000000 | 0.00 | Channel Closing Transmission Time | PASS |
| 5500.000000 | 0.00 | Non-occupancy period | PASS |

(continuation of the "Measurement Summary" table from column 4 ...)

| DUT Frequency (MHz) | Overall Comment |
|---------------------|------------------------------|
| 5500.000000 | not performed / not finished |
| 5500.000000 | |
| 5500.000000 | |
| 5500.000000 | |

Channel Move Time Detailed Result

| DUT Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | CMT Result | CMT Comment |
|---------------------|----------------|-----------------|---------------|------------|---|
| 5500.000000 | 0.00 | 0.893 | 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) |
|---------------------|----------------|---------------------------------|--------------------------|-------------------|
| 5500.000000 | 0.00 | first 200 ms | 123 | 2.956 |
| 5500.000000 | 0.00 | remaining 10.0 second(s) period | 209 | 3.556 |

(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 |
|---------------------|-------------------------|-------------|--------------|
| 5500.000000 | 200.000 | PASS | See Note 1. |
| 5500.000000 | 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 |
|---------------------|----------------|-------------------------|-------------------------|-----------------|-----------------------|------------|
| 5500.000000 | 0.00 | 0 | 0 | 0.000 | 0.000 | PASS |

Transmitting Test Detailed Results

| DUT Frequency (MHz) | Tx-Test Result | Tx-Test Comment |
|---------------------|----------------|------------------------------|
| 5500.000000 | --- | not performed / not finished |



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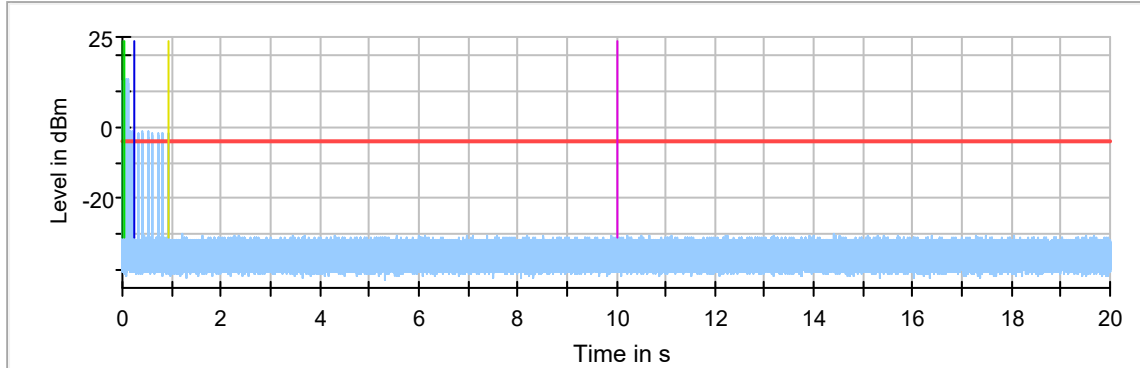
Radar level verification

| Description / Formula | 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: | 100.00 | mW |
| Configured DUT PSD: | 6.99 | 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 | 1.27 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 37.44 | 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 | -36.17 | dBm |

Additional Information

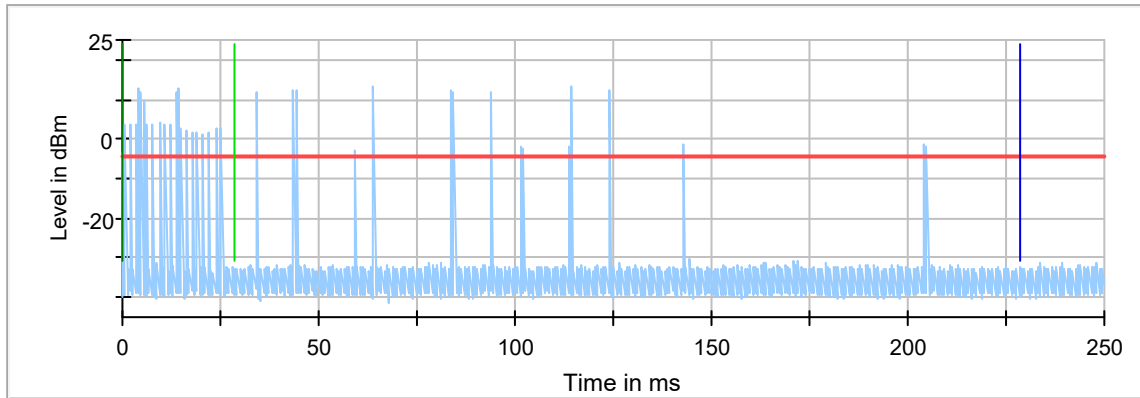
| Note | Description |
|---------|--|
| Note 1: | Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 28.7 ms conforming to the end of the Radar burst. |
| Note 2: | Channel move time (CMT) / channel closing transmission time (CCTT) measurement was 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 μs |
| 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.) |

Channel Move Time



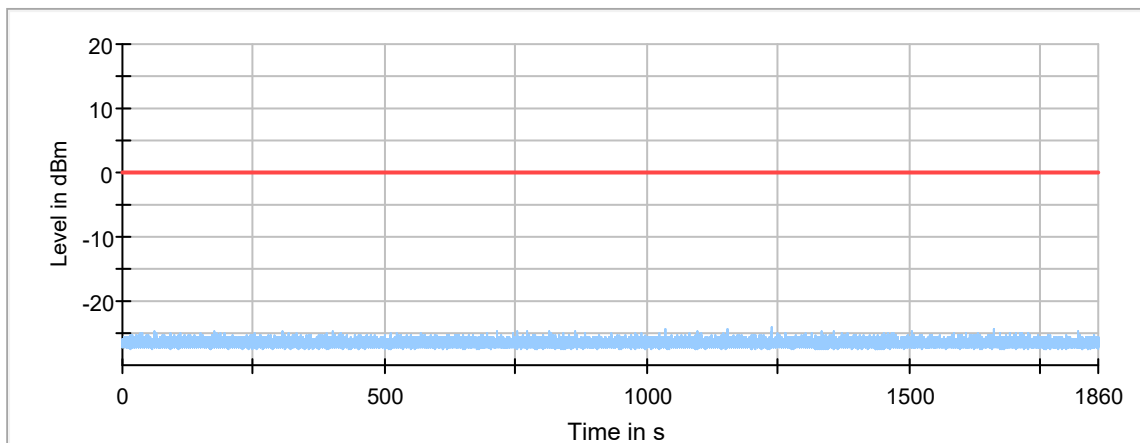
- Channel Move Time
- Start of Radar
- First 200ms of Channel Closing Tx Time
- Last measured edge of Channel Closing Tx Time
- Threshold
- Trigger at end of Radar
- 10sec Channel Move Time Limit

Channel Move Time first 200ms



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

Non-occupancy period



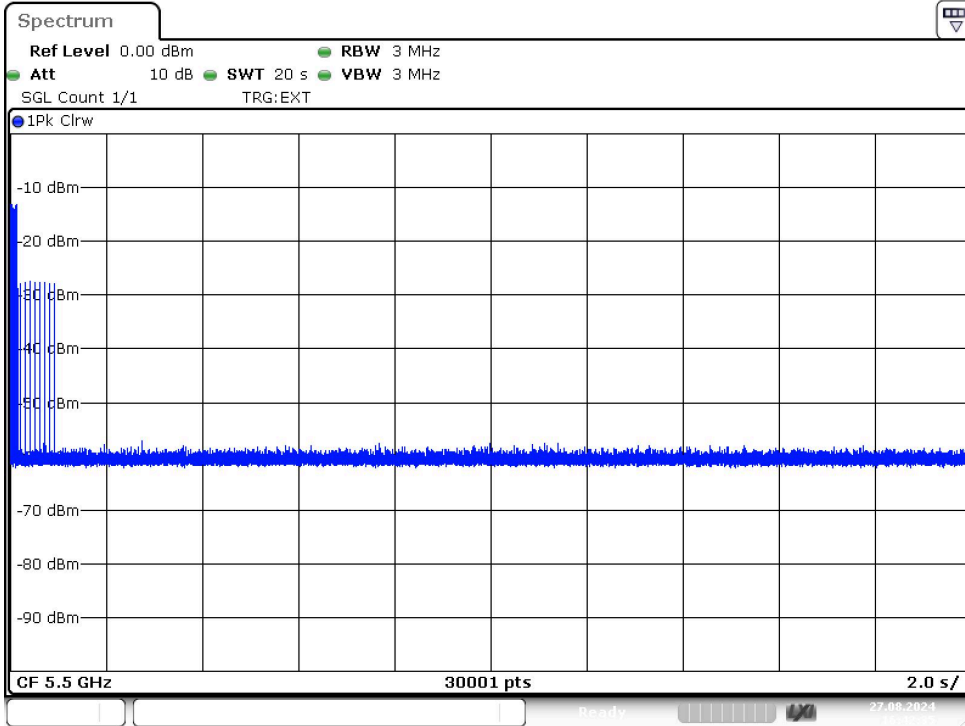
- Non-occupancy period
- Threshold



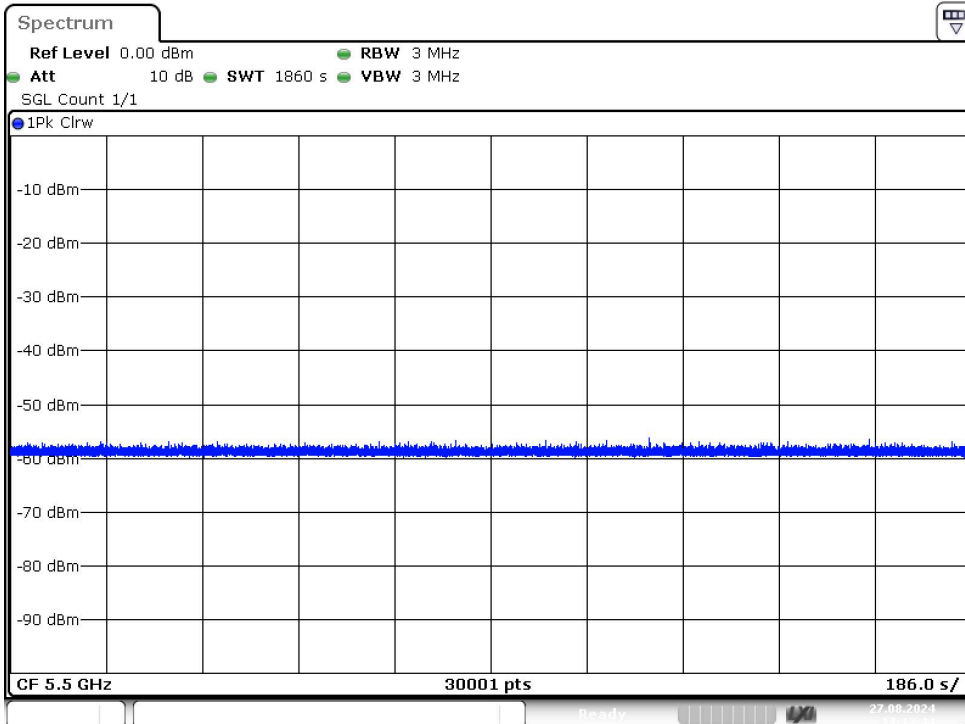
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Channel Move Time



Non-occupancy period





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DFS In-Service Monitoring (5290 MHz; 20.000 dBm; 80 MHz)

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

Measurement Summary

| DUT Frequency (MHz) | Radar Type No. | Type of Measurement value | Overall Result |
|---------------------|----------------|-----------------------------------|----------------|
| 5290.000000 | 0.00 | First of all Transmitt Test | --- |
| 5290.000000 | 0.00 | Channel Move Time | PASS |
| 5290.000000 | 0.00 | Channel Closing Transmission Time | PASS |
| 5290.000000 | 0.00 | Non-occupancy period | PASS |

(continuation of the "Measurement Summary" table from column 4 ...)

| DUT Frequency (MHz) | Overall Comment |
|---------------------|------------------------------|
| 5290.000000 | not performed / not finished |
| 5290.000000 | |
| 5290.000000 | |
| 5290.000000 | |

Channel Move Time Detailed Result

| DUT Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | CMT Result | CMT Comment |
|---------------------|----------------|-----------------|---------------|------------|---|
| 5290.000000 | 0.00 | 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) |
|---------------------|----------------|---------------------------------|--------------------------|-------------------|
| 5290.000000 | 0.00 | first 200 ms | 16 | 0.472 |
| 5290.000000 | 0.00 | 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 |
|---------------------|-------------------------|-------------|--------------|
| 5290.000000 | 200.000 | PASS | See Note 1. |
| 5290.000000 | 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 |
|---------------------|----------------|-------------------------|-------------------------|-----------------|-----------------------|------------|
| 5290.000000 | 0.00 | 0 | 0 | 0.000 | 0.000 | PASS |

Transmitting Test Detailed Results

| DUT Frequency (MHz) | Tx-Test Result | Tx-Test Comment |
|---------------------|----------------|------------------------------|
| 5290.000000 | --- | not performed / not finished |



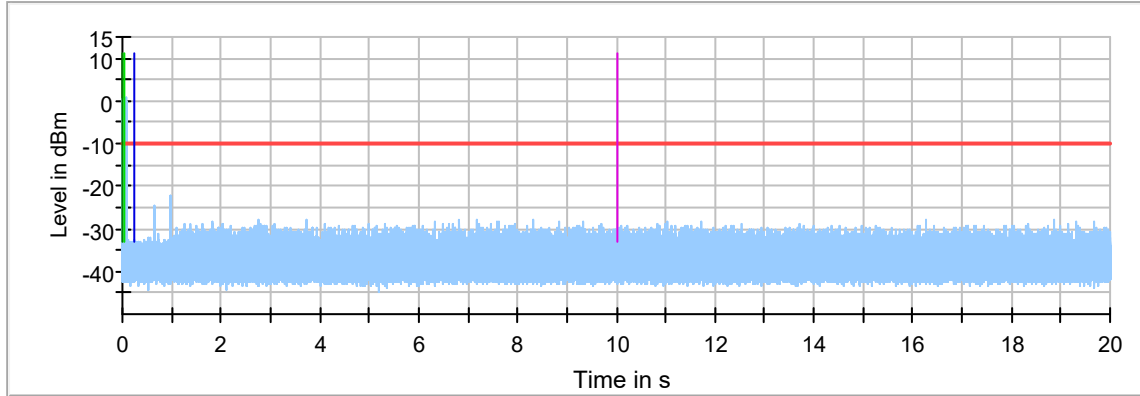
Radar level verification

| Description / Formula | 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: | 100.00 | mW |
| Configured DUT PSD: | 0.97 | 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 | -0.68 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 36.61 | 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 | -37.29 | dBm |

Additional Information

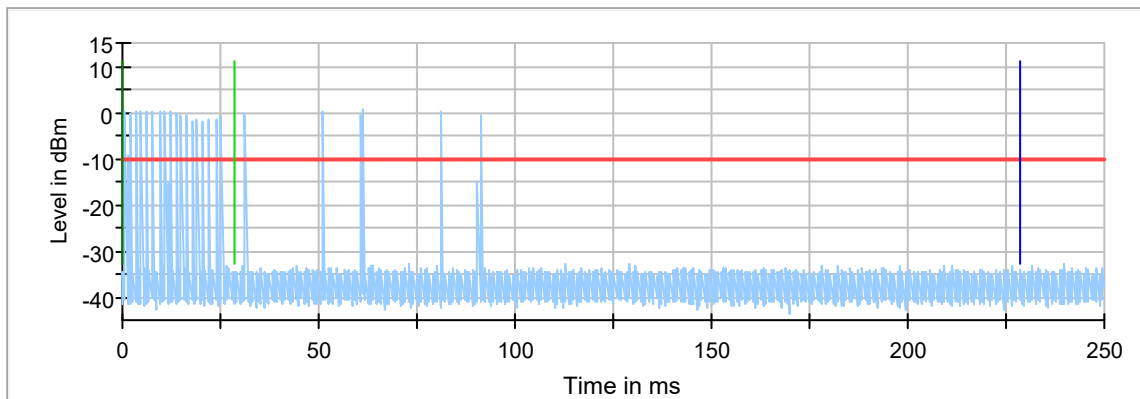
| Note | Description |
|---------|--|
| Note 1: | Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 28.7 ms conforming to the end of the Radar burst. |
| Note 2: | Channel move time (CMT) / channel closing transmission time (CCTT) measurement was 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 μs |
| 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.) |

Channel Move Time



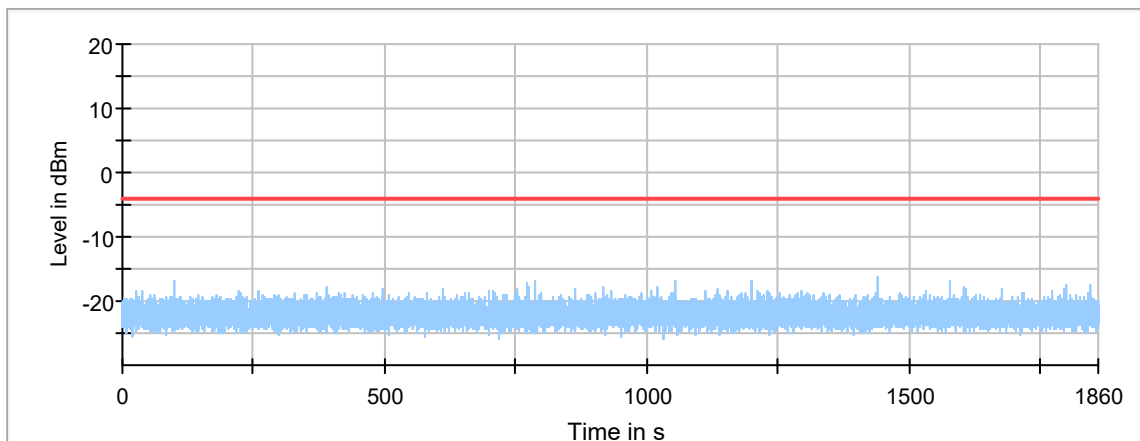
- Channel Move Time
- Start of Radar
- First 200ms of Channel Closing Tx Time
- Threshold
- Trigger at end of Radar
- 10sec Channel Move Time Limit

Channel Move Time first 200ms



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

Non-occupancy period



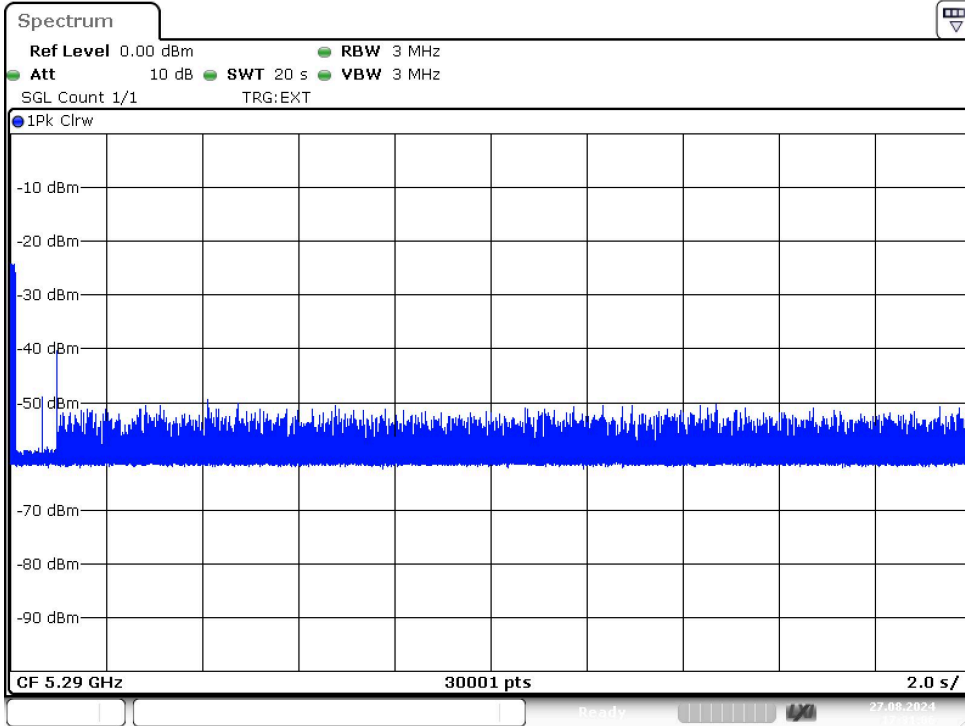
- Non-occupancy period
- Threshold



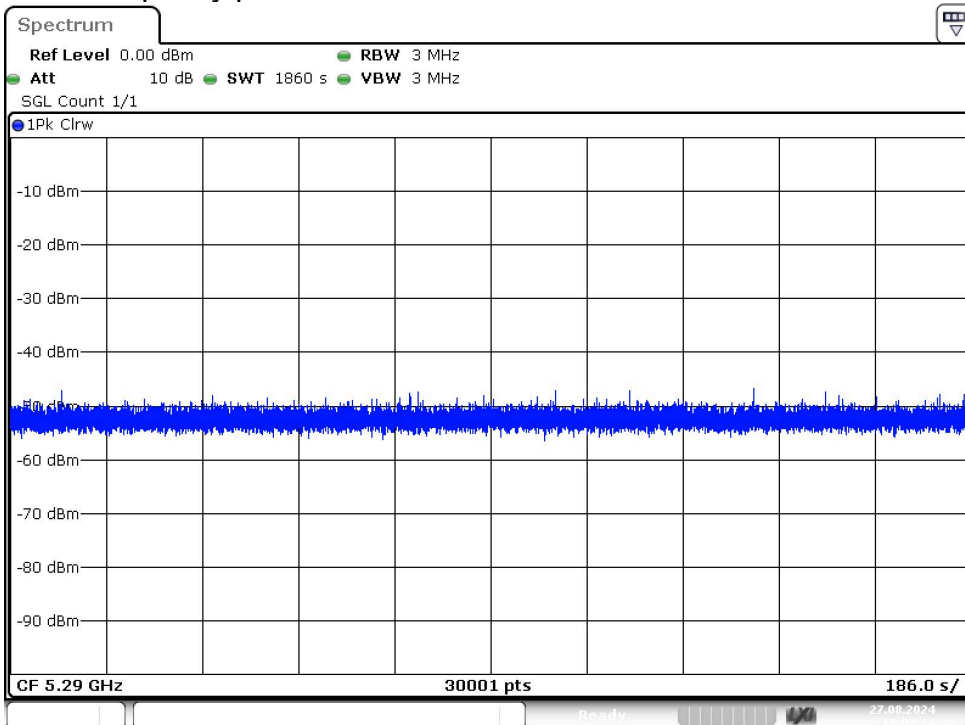
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Channel Move Time



Non-occupancy period





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DFS In-Service Monitoring (5530 MHz; 20.000 dBm; 80 MHz)

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

Measurement Summary

| DUT Frequency (MHz) | Radar Type No. | Type of Measurement value | Overall Result |
|---------------------|----------------|-----------------------------------|----------------|
| 5530.000000 | 0.00 | First of all Transmitt Test | --- |
| 5530.000000 | 0.00 | Channel Move Time | PASS |
| 5530.000000 | 0.00 | Channel Closing Transmission Time | PASS |
| 5530.000000 | 0.00 | Non-occupancy period | PASS |

(continuation of the "Measurement Summary" table from column 4 ...)

| DUT Frequency (MHz) | Overall Comment |
|---------------------|------------------------------|
| 5530.000000 | not performed / not finished |
| 5530.000000 | |
| 5530.000000 | |
| 5530.000000 | |

Channel Move Time Detailed Result

| DUT Frequency (MHz) | Radar Type No. | CMT Tx Time (s) | CMT Limit (s) | CMT Result | CMT Comment |
|---------------------|----------------|-----------------|---------------|------------|---|
| 5530.000000 | 0.00 | 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) |
|---------------------|----------------|---------------------------------|--------------------------|-------------------|
| 5530.000000 | 0.00 | first 200 ms | 16 | 0.524 |
| 5530.000000 | 0.00 | 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 |
|---------------------|-------------------------|-------------|--------------|
| 5530.000000 | 200.000 | PASS | See Note 1. |
| 5530.000000 | 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 |
|---------------------|----------------|-------------------------|-------------------------|-----------------|-----------------------|------------|
| 5530.000000 | 0.00 | 0 | 0 | 0.000 | 0.000 | PASS |

Transmitting Test Detailed Results

| DUT Frequency (MHz) | Tx-Test Result | Tx-Test Comment |
|---------------------|----------------|------------------------------|
| 5530.000000 | --- | not performed / not finished |



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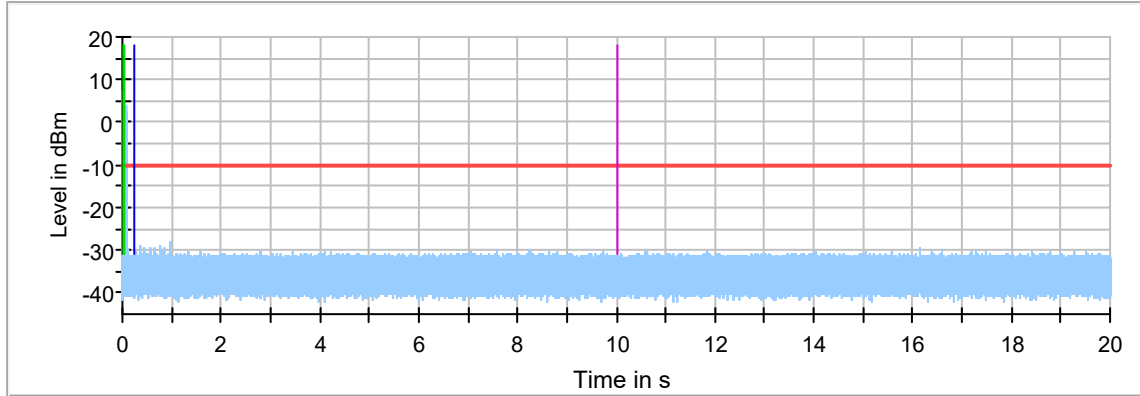
Radar level verification

| Description / Formula | 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: | 100.00 | mW |
| Configured DUT PSD: | 0.97 | 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 | 0.97 | dBm |
| Configured overall pathloss from Vector Generator RF out to DUT connector of 'DUT to OSP'-cable | 37.58 | 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 | -36.61 | dBm |

Additional Information

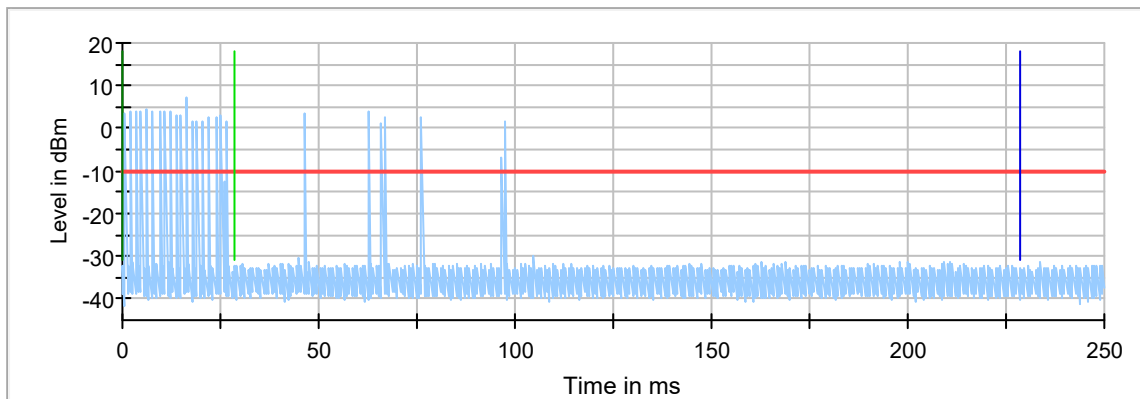
| Note | Description |
|---------|--|
| Note 1: | Because of the radar pulse event at the beginning, the investigation of the trace begins with an offset of 28.7 ms conforming to the end of the Radar burst. |
| Note 2: | Channel move time (CMT) / channel closing transmission time (CCTT) measurement was 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 μs |
| 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.) |

Channel Move Time



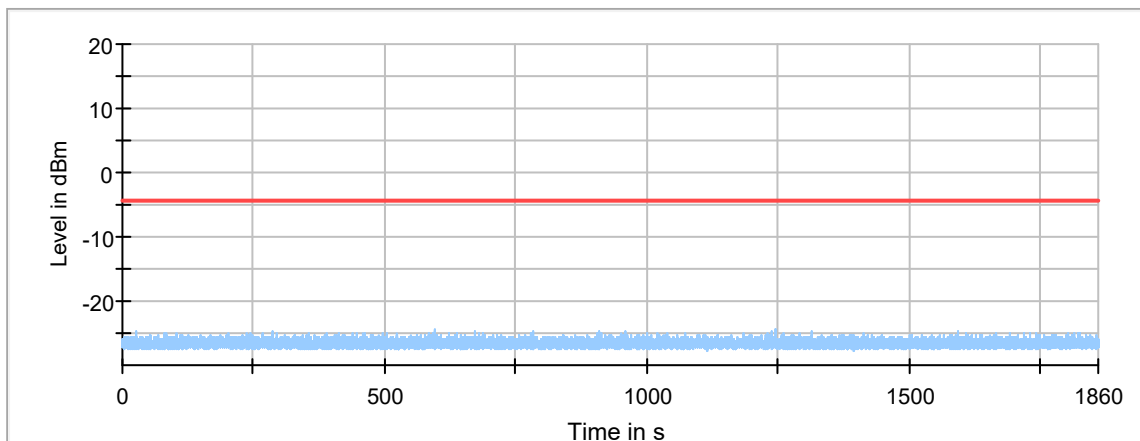
- Channel Move Time
- Start of Radar
- First 200ms of Channel Closing Tx Time
- Threshold
- Trigger at end of Radar
- 10sec Channel Move Time Limit

Channel Move Time first 200ms



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

Non-occupancy period



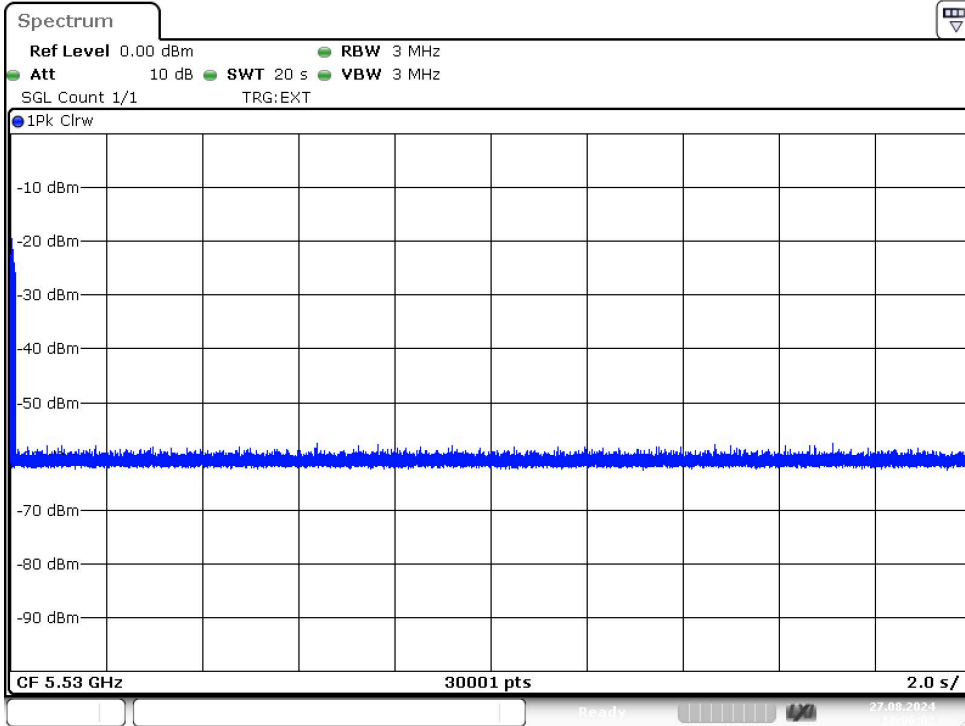
- Non-occupancy period
- Threshold



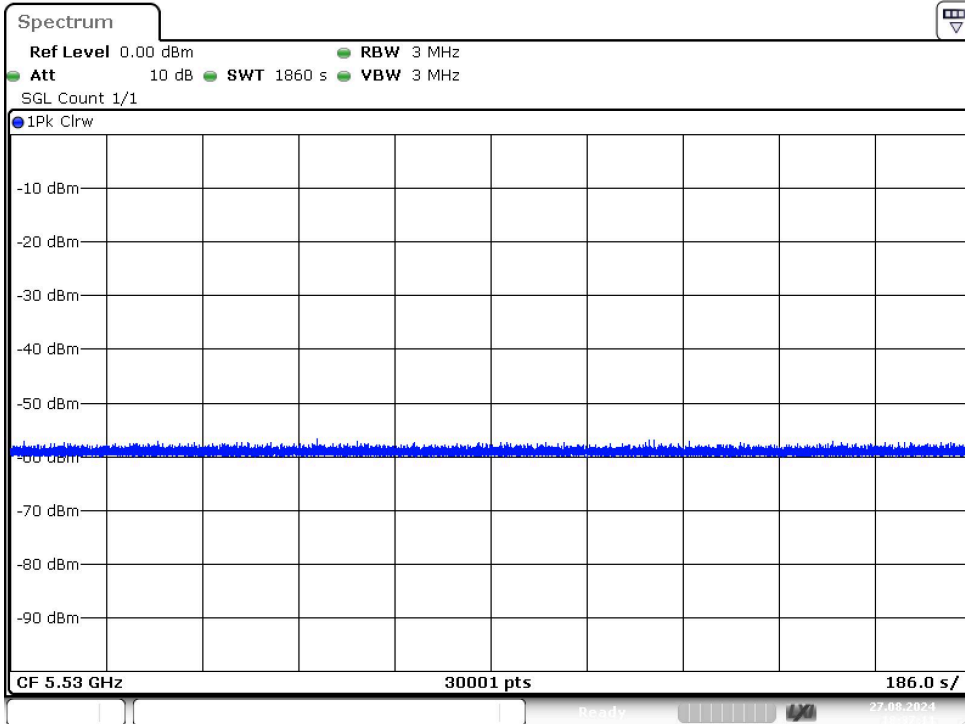
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Channel Move Time



Non-occupancy period





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APPENDIX A – Test Equipment Used For Tests

| | Name of Equipment | Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date |
|---|-------------------------|-----------------|------------|------------|---------------------|------------|
| 1 | Signal Analyzer | Rohde & Schwarz | FSV-30 | 100925 | 2023-12-05 | 2024-12-05 |
| 2 | Signal Generator | Rohde & Schwarz | SMB100A | 175528 | 2024-03-21 | 2025-03-21 |
| 3 | Vector Signal Generator | Rohde & Schwarz | SMW200A | 112267 | 2024-07-04 | 2025-07-04 |
| 4 | OSP-B157W8 8 PORT | Rohde & Schwarz | OSP-B157W8 | 101051 | 2024-01-11 | 2025-01-11 |

| | Cable | Manufacturer | Model No. | Serial No. | Check Date |
|---|----------|---------------|-----------|-----------------|------------|
| 1 | RF Cable | Junkosha Inc. | MWX221 | 2008S243 | 2024-08-02 |
| 2 | RF Cable | Junkosha Inc. | MWX221 | 2008S249 | 2024-08-02 |
| 3 | RF Cable | Junkosha Inc. | MWX221 | 1802S129 | 2023-09-24 |
| 4 | RF Cable | Junkosha Inc. | MWX221 | 1802S137 | 2023-09-24 |
| 5 | RF Cable | Junkosha Inc. | MWX221 | 1802S138 | 2023-09-24 |
| 6 | RF Cable | Junkosha Inc. | MWX221 | J12J102248-00-4 | 2023-09-24 |

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