

RRA-EMIESS24F158INS-02Av0

DFS Certification Radio test report

According to the standard:

CFR 47 FCC PART 15

RSS GEN – Issue 5

RSS 247 – Issue 3

Equipment under test:

ISP5261

FCC ID: 2AAQS-ISP5261

IC NUMBER: 11306A-ISP5261

Company:

INSIGHT SIP

Distribution: Mr FATTOUH

(Company: INSIGHT SIP)

Number of pages: 28 with 4 annexes

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Information in italics are declared by the manufacturer/customer and are under his responsibility

DESIGNATION OF PRODUCT: *ISP5261*

Serial number (S/N): *Prototype (identification RAD WLAN_BT_CEM)*

Reference / model (P/N): *ISP5261*

Software version: *2.0.0.20*

MANUFACTURER: *INSIGHT SIP*

COMPANY SUBMITTING THE PRODUCT:

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Person(s) present during the tests: /

DATES OF TEST: 19-Sep-25

TESTING LOCATION: EMITECH ANGERS laboratory at BEAUCOUZE (49) FRANCE

FCC Accredited under US-EU MRA Designation Number: FR0009
Test Firm Registration Number: 873677

ISED Accredited under CANADA-EU MRA Designation Number: FR0001
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TESTED BY: M. DUMESNIL

VISA:

WRITTEN BY: M. DUMESNIL



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REVISIONS HISTORY

Revision	Date	Modified pages	Modifications
0	23-Oct-25	/	Creation

1. INTRODUCTION

This report presents the results of radio test carried out on the following radio equipment: **ISP5261** in accordance with normative reference.

The equipment under test integrates:

- Thread 2.4 GHz transceiver radio function not already certified,
- WiFi 2.4 / 5 GHz transceiver radio function not already certified,
- BLE transceiver radio part function not already certified.

This report concerns only DFS radio part.

2. PRODUCT DESCRIPTION

Category of equipment (ISED):	I
Class:	B
Utilization:	Module
Antenna type and gain:	2.15 dBi (integrated antenna)
Operating frequency range:	From 5150 MHz to 5250 MHz band U-NII-1 From 5250 MHz to 5350 MHz band U-NII-2A From 5470 MHz to 5725 MHz band U-NII-2C From 5725 MHz to 5850 MHz band U-NII-3
Number of channels:	4 for band 5150 MHz to 5250 MHz 4 for band 5250 MHz to 5470 11 for band 5470 MHz to 5725 MHz 5 for band 5725 MHz to 5850 MHz
Channel spacing / bandwidth:	20 MHz
Mode tested:	802.11 a
Channel tested:	Channel 140: 5700 MHz
Modulation tested:	OFDM: BPSK
Power setting	20 dBm
Power source:	Module Input: 3.14 to 3.46 Vdc Micro USB Input (Used for measurements): 5 Vdc via powerbank

Power level, frequency range and channels characteristics are not user adjustable.
The details pictures of the product and the circuit boards are joined with this file.

3. NORMATIVE REFERENCE

The standards and testing methods related throughout this report are those listed below. They are applied on the whole test report even though the extensions (version, date and amendment) are not repeated.

CFR 47 FCC Part 15 (2025) Radio Frequency Devices

RSP-100 Issue 12, August 2019
Certification of Radio Apparatus and Broadcasting equipment

RSS-247 Issue 3, August 2023
Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs)
and Licence-Exempt Local Area Network (LE-LAN) Devices

905462 D02 UNII DFS Compliance measurement procedures for unlicensed-national information
Compliance Procedures infrastructure devices operating in the 5250-5350 MHz and 5470-5725 MHz
New Rules v02 bands incorporating dynamic frequency selection

905462 D03 UNII Clients U-NII client devices without radar detection capability
Without Radar Detection
New Rules v01r02

4. TEST METHODOLOGY

Radio performance tests procedures given in CFR 47 part 15:

Subpart E – Unlicensed national information infrastructure devices
Paragraph 407: General technical requirements

Radio performance tests procedures given in RSS-247:
Paragraph 6 - Technical requirements for licence-exempt local area network devices and
digital transmission systems operating in the 5 GHz Band

5. TEST EQUIPMENT CALIBRATION DATES

Emitech Number	Model	Type	Last calibration (DD/MM/YYYY)	Calibration interval (years)	Next calibration due (DD/MM/YYYY)
1564	Coudoint CX 520PX	Alternostat	(1)	(1)	(1)
6796	R&S FSP7	Spectrum Analyzer	08/04/2025	2	08/04/2027
7186	Emco 3115	Antenna	16/05/2025	3	15/05/2028
7566	Testo 608-H1	Meteo station	17/12/2024	2	17/12/2026
10351	R&S SMBV100A	Radiofrequency generator	27/05/2024	3	27/05/2027
10771	EMCO 3117	Antenna	30/11/2022	3	30/11/2025
10789	MATURO	Turntable and mat controller NCD	/	/	/
12590	LUCIX Corp S005180M3201	Low-noise amplifier	23/05/2025	1	23/05/2026
14903	Fluke 177	Multimeter	22/12/2023	2	21/12/2025
18877	HYTEM - N - 5m	Cable	30/08/2024	2	30/08/2026
19887	HYTEM - N - 1m	Cable	30/08/2024	2	30/08/2026
19898	HYTEM - N - 2.5m	Cable	30/08/2024	2	30/08/2026
19899	HYTEM - N - 2.5m	Cable	30/08/2024	2	30/08/2026
19902	HYTEM - N - 3m	Cable	30/08/2024	2	30/08/2026
19905	HYTEM - N - 3.5m	Cable	30/08/2024	2	30/08/2026
19907	HYTEM - N - 5.8m	Cable	30/08/2024	2	30/08/2026
19909	HYTEM - N - 4.7m	Cable	30/08/2024	2	30/08/2026
20040	COMTEST FAR-2	Anechoic chamber	/	/	/
//	RS Commander V2.4.2	Software	/	/	/
////	DFS Analys Tool	Software	/	/	/

(1) The equipment is not verified; instead, the output voltage is checked before each measurement with the calibrated multimeter.

6. TESTS RESULTS SUMMARY

6.1 unlicensed national information infrastructure device (subpart E)

Test procedure	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
FCC Part 15.407	GENERAL TECHNICAL REQUIREMENTS					
	h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS)					
	h) (1) Transmit Power Control (TPC)			X		Note
	h) (2) Dynamic Frequency Selection (DFS)	X				Client device

NAp: Not Applicable

NAs: Not Asked

Note: A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW

6.2 RSS-247 requirements

Test Procedure RSS-247	Description of test	Respected criteria?				Comment
		Yes	No	NAp	NAs	
Paragraph 6	Technical requirements for licence-exempt local area network devices and digital transmission systems operating in the 5 GHz band					
6.3	Dynamic frequency selection for devices operating in the bands 5250-5350 MHz, 5470-5600 MHz and 5650-5725 MHz	X				Client device
6.4	Additional requirements	X				

NAp: Not Applicable

NAs: Not Asked

7. MEASUREMENT UNCERTAINTY

To declare, or not, the compliance with the specifications, it was not explicitly taken into account of uncertainty associated with the result(s)

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$, which for normal distribution corresponds to a coverage probability of approximately 95%.

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Radio frequency	$\pm 1 \times 10^{-7}$	$\pm 1 \times 10^{-7}$
RF power, conducted		
RF power	$\pm 0.8\text{dB}$	$\pm 1 \text{ dB}$
RF power (EN 300328 / EN 301893)	$\pm 1.2\text{dB}$	$\pm 1.5 \text{ dB}$
Power spectral density	$\pm 2.7\text{dB}$	$\pm 3 \text{ dB}$
Occupied bandwidth		
RF power	$\pm 3.8 \%$	$\pm 5 \%$
RF power (EN 300328 / EN 301893)	$\pm 3.8 \%$	$\pm 5 \%$
Maximum frequency deviation		
300 Hz < audio frequency < 6 kHz	$\pm 1.2 \%$	$\pm 5 \%$
6 kHz < audio frequency < 25 kHz	$\pm 1.2 \%$	$\pm 3 \text{ dB}$
Adjacent channel power	$\pm 1.6 \text{ dB}$	$\pm 3 \text{ dB}$
Sensitivity of receiver (conducted)	$\pm 1.9 \text{ dB}$	$\pm 3 \text{ dB}$
Blocking	$\pm 3.9 \text{ dB}$	$\pm 4 \text{ dB}$
Transient		
Amplitude	$\pm 8.5 \%$	$\pm 20 \%$
At the frequency	$\pm 166 \text{ Hz}$	$\pm 250 \text{ Hz}$
Conducted emission (spurious)		
$f \leq 1 \text{ GHz}$	$\pm 0.8 \text{ dB}$	$\pm 3 \text{ dB}$
1 GHz - 12.75 GHz	$\pm 1.6 \text{ dB}$	
Radiated power (ERP / EIRP / spurious)		
$f \leq 62.5 \text{ MHz}$	$\pm 5.2 \text{ dB}$	$\pm 6 \text{ dB}$
62.5 MHz - 1 GHz	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
1 GHz - 18 GHz(~)	$\pm 5.2 \text{ dB}$	$\pm 6 \text{ dB}$
18 GHz – 40 GHz	$\pm 5.9 \text{ dB}$	$\pm 6 \text{ dB}$
40 GHz – 110 GHz	$\pm 5.9 \text{ dB}$	Between ± 6 to 10 dB
180-1000 MHz / 1 – 12.75 GHz (EN 301908-1)	$\pm 2.8 / 2.7 \text{ dB}$	$\pm 3 \text{ dB}$
RF power (EN 300328 / EN 301893)	$\pm 5.3 \text{ dB}$	$\pm 6 \text{ dB}$
EIRP and power spectral density with diode	$\pm 5.4 \text{ dB}$	$\pm 6 \text{ dB}$
Radiated emission (magnetic field)		
9kHz – 30MHz	$\pm 4,3 \text{ dB}$	$\pm 6 \text{ dB}$
RF level for a given BER	$\pm 0.8 \text{ dB}$	$\pm 1.5 \text{ dB}$
Supply voltages	$\pm 2,9 \%$	$\pm 3 \%$
Temperature	$\pm 0,95 \text{ }^{\circ}\text{C}$	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 4,6 \%$	$\pm 5 \%$
Time / Duty cycle (power probe)	$\pm 4.4 \%$	$\pm 5 \%$
Time (spectrum analyzer)	$\pm 0.3 \%$	/
Adaptivity	$\pm 4.2 \text{ dB}$	/

PARAMETER	MAXIMAL EMITECH UNCERTAINTY	MINIMAL STANDARD UNCERTAINTY
Conducted emission (FCC) (Artificial Mains Network) 150kHz – 30MHz	± 3.7 dB	/
Radiated emission (electric field for FCC standard) 9kHz – 30MHz	± 4.3 dB	/
30MHz – 1GHz	± 5.9 dB	/
1GHz – 18GHz	$\pm 4,8$ dB	/
18GHz – 40GHz	$\pm 5,9$ dB	/
40GHz – 140GHz	± 5.7 dB	/
Radiated power (EIRP / spurious) vehicle chamber n°19046		
1 GHz - 6 GHz	± 9.9 dB	± 6 dB
6 GHz - 18 GHz	± 5.9 dB	± 6 dB

8. DFS DETECTION THRESHOLD AND RADAR TEST WAVEFORMS

8.1-Applicability

The following table from FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 lists the applicable requirements for the DFS testing.

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.		

8.2-Requirements

for Master Devices:

- a) The *Master Device* will use DFS in order to detect *Radar Waveforms* with received signal strength above the *DFS Detection Threshold* in the 5250 – 5350 MHz and 5470 – 5725 MHz bands. DFS is not required in the 5150 – 5250 MHz or 5725 – 5825 MHz bands.
- b) Before initiating a network on a *Channel*, the *Master Device* will perform a *Channel Availability Check* for a specified time duration (*Channel Availability Check Time*) to ensure that there is no radar system operating on the *Channel*, using DFS described under subsection a) above.
- c) The *Master Device* initiates a U-NII network by transmitting control signals that will enable other U-NII devices to *Associate* with the *Master Device*.
- d) During normal operation, the *Master Device* will monitor the *Channel (In-Service Monitoring)* to ensure that there is no radar system operating on the *Channel*, using DFS described under a).
- e) If the *Master Device* has detected a *Radar Waveform* during *In-Service Monitoring* as described under d), the *Operating Channel* of the U-NII network is no longer an *Available Channel*. The *Master Device* will instruct all associated *Client Device(s)* to stop transmitting on this *Channel* within the *Channel Move Time*. The transmissions during the *Channel Move Time* will be limited to the *Channel Closing Transmission Time*.
- f) Once the *Master Device* has detected a *Radar Waveform* it will not utilize the *Channel* for the duration of the *Non-Occupancy Period*.³
- g) If the *Master Device* delegates the *In-Service Monitoring* to a *Client Device*, then the combination will be tested to the requirements described under d) through f) above.

for client devices:

- a) A *Client Device* will not transmit before having received appropriate control signals from a *Master Device*.
- b) A *Client Device* will stop all its transmissions whenever instructed by a *Master Device* to which it is associated and will meet the *Channel Move Time* and *Channel Closing Transmission Time* requirements. The *Client Device* will not resume any transmissions until it has again received control signals from a *Master Device*.
- c) If a *Client Device* is performing *In-Service Monitoring* and detects a *Radar Waveform* above the *DFS Detection Threshold*, it will inform the *Master Device*. This is equivalent to the *Master Device* detecting the *Radar Waveform* and d) through f) of section 5.1.1 apply.
- d) Irrespective of *Client Device* or *Master Device* detection the *Channel Move Time* and *Channel Closing Transmission Time* requirements remain the same.
- e) The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes. Note: If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.

8.3-DFS Detection Threshold values

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
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.	

8.4-Response Requirements values

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.
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.	

8.5-Radar test waveforms

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 $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{PRI_{\mu sec}} \right) \right\}$	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.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

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 <i>Burst</i>	Number of <i>Bursts</i>	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 $(12,000,000 / \text{Burst Count})$ microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and $[(12,000,000 / \text{Burst Count}) - (\text{Total Burst Length}) + (\text{One Random PRI Interval})]$ 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.

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

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.

9. CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD

Temperature (°C) : 28 – 29.7

Humidity (%HR): 39.7 - 45

Date : September 19, 2025

Technician : M. DUMESNIL

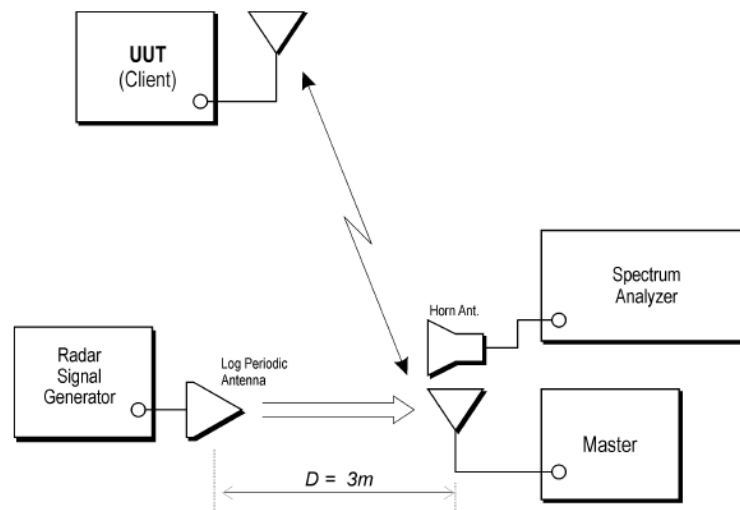
Standard: FCC Part 15
RSS-247

Test procedure:

905462 D02 UNII DFS Compliance Procedures New Rules v02: paragraph 7.8.3

Test set up:

Radiated test



The measure applies in full anechoic chamber test site, in this case the wanted signal is injected with the vertical antenna polarization that the equipment and with the orientation corresponding to the most sensitive position.

See Appendix 2.

Method:

These tests define how the following DFS parameters are verified during *In-Service Monitoring*:

- *Channel Closing Transmission Time*
- *Channel Move Time*
- *Non-Occupancy Period*

The steps below define the procedure to determine the above mentioned parameters when a radar *Burst* with a level equal to the *DFS Detection Threshold + 1dB* is generated on the *Operating Channel* of the U-NII device (*In-Service Monitoring*).

- a) One frequency will be chosen from the *Operating Channels* of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

- b) In case the UUT is a U-NII device operating as a *Client Device* (with or without DFS), a U-NII device operating as a *Master Device* will be used to allow the UUT (Client device) to *Associate* with the *Master Device*. In case the UUT is a *Master Device*, a U-NII device operating as a *Client Device* will be used and it is assumed that the Client will *Associate* with the UUT (Master). In both cases for conducted tests, the *Radar Waveform* generator will be connected to the *Master Device*. For radiated tests, the emissions of the *Radar Waveform* generator will be directed towards the *Master Device*. If the *Master Device* has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.
- c) Stream the channel loading test file from the *Master Device* to the *Client Device* on the test *Channel* for the entire period of the test.
- d) At time T_0 the *Radar Waveform* generator sends a *Burst* of pulses for one of the Radar Type 0 in Table 5 at levels defined in Table 3, on the *Operating Channel*. An additional 1 dB is added to the radar test signal to ensure it is at or above the *DFS Detection Threshold*, accounting for equipment variations/errors.
- e) Observe the transmissions of the UUT at the end of the radar *Burst* on the *Operating Channel* for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (*Channel Move Time*). Measure and record the *Channel Move Time* and *Channel Closing Transmission Time* if radar detection occurs. Figure 17 illustrates *Channel Closing Transmission Time*.
- f) When operating as a *Master Device*, monitor the UUT for more than 30 minutes following instant T_2 to verify that the UUT does not resume any transmissions on this *Channel*. Perform this test once and record the measurement result.
- g) In case the UUT is a U-NII device operating as a *Client Device* with *In-Service Monitoring*, perform steps a) to f).

Test operating condition of the equipment:

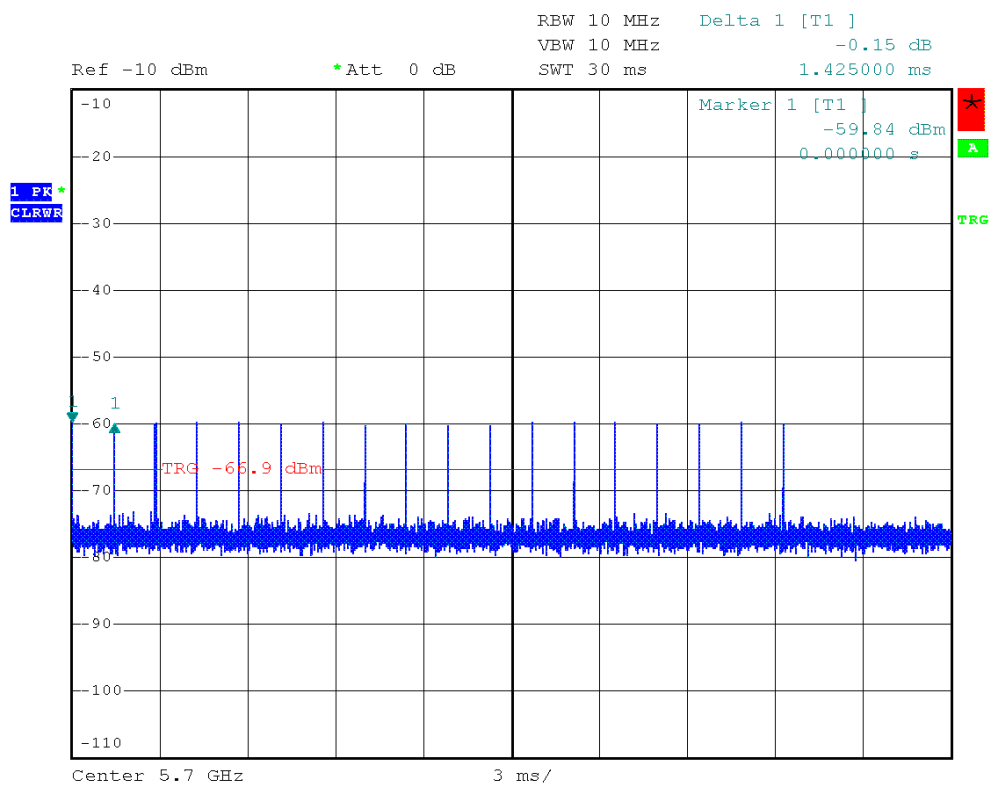
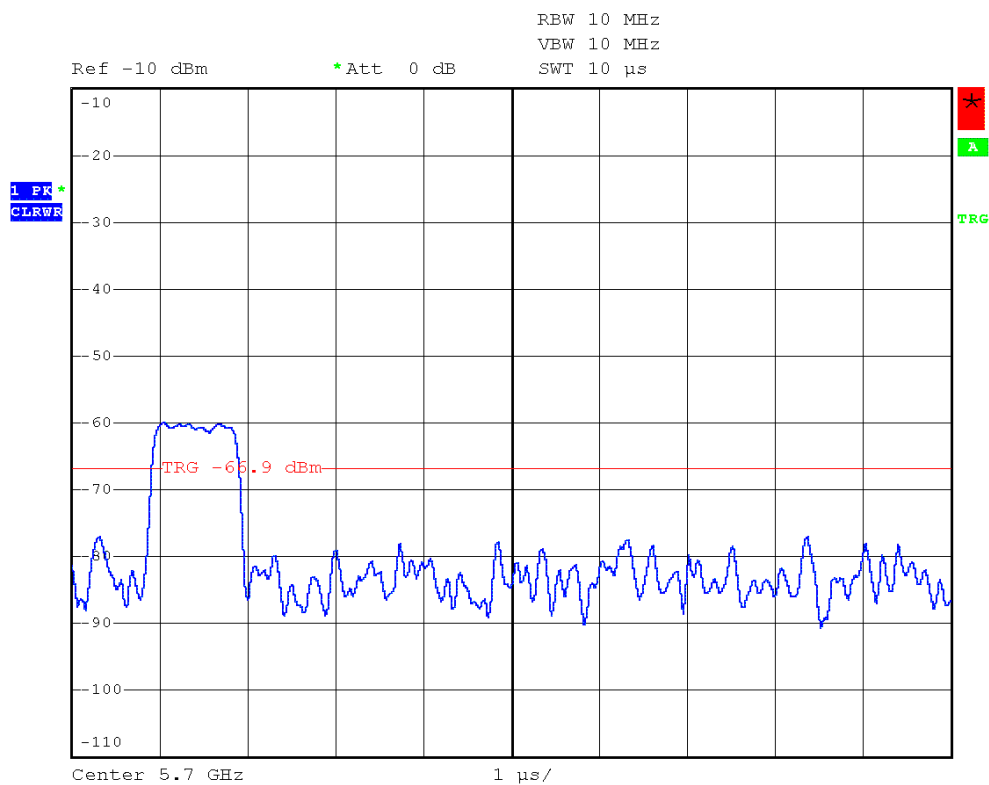
The master is an access point Model Number: NWA220AX-6E from ZYXEL (See Appendix 1).

A connection is established with the equipment under test (Client) is blocked in modulated transmission mode, at the highest output power level at which the transmitter is intended to operate in 802.11a - BW 20 MHz – 6Mbps.

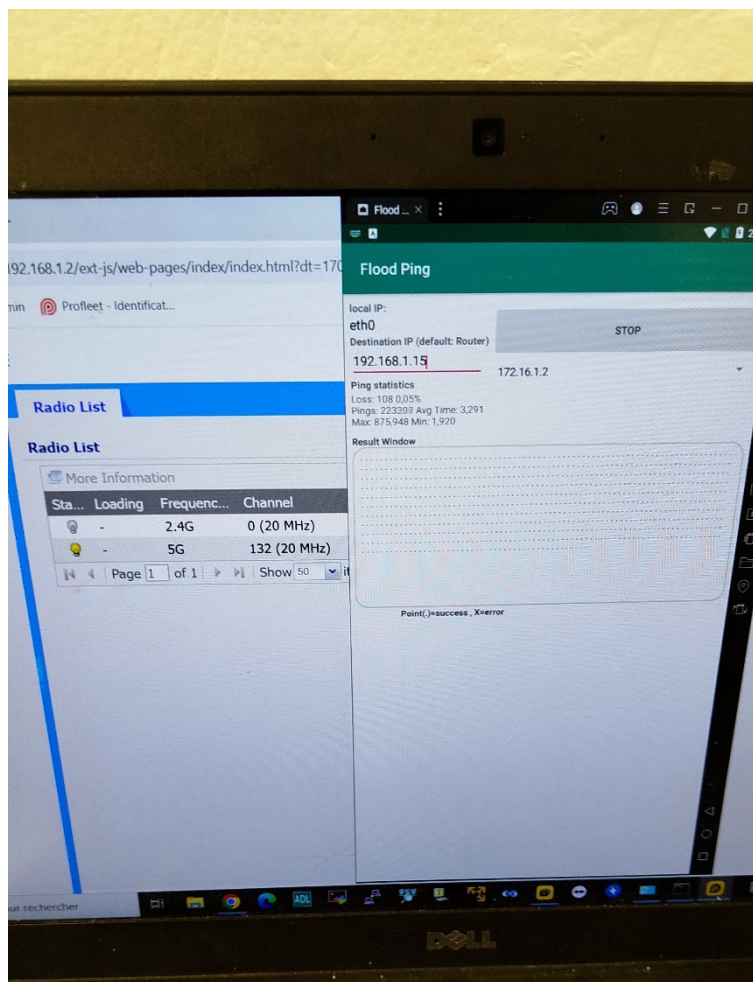
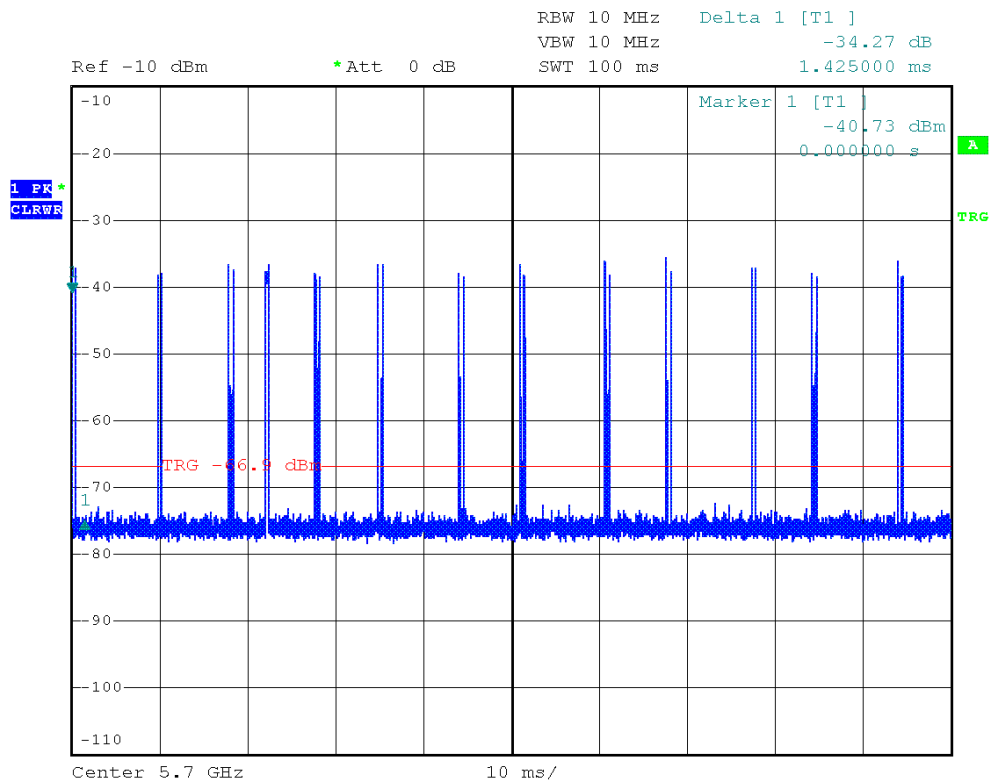
Threshold : According a master with eirp ≥ 23 dBm the level is adjusted according antenna gain to obtain -64 dBm at the input of the receiver.
Next an additional 1 dB has been added.

Power source: 5Vdc by Power bank

Pulse type 0 used for test.



Traffic used for the tests



Results :

Sample N° 1 Channel 140 (F = 5700 MHz) – Mode 802.11.a– BW 20 MHz – 6Mbps

Note: At time T0, the device under test is powered on.

After a period corresponding to the startup time called Tpower_up, the device begins its channel availability verification phase at time T1.

This verification lasts 1 minute until time T2. (T2 = T1 + Tch_avail_check)

If no radar signal is detected, the device begins transmitting.

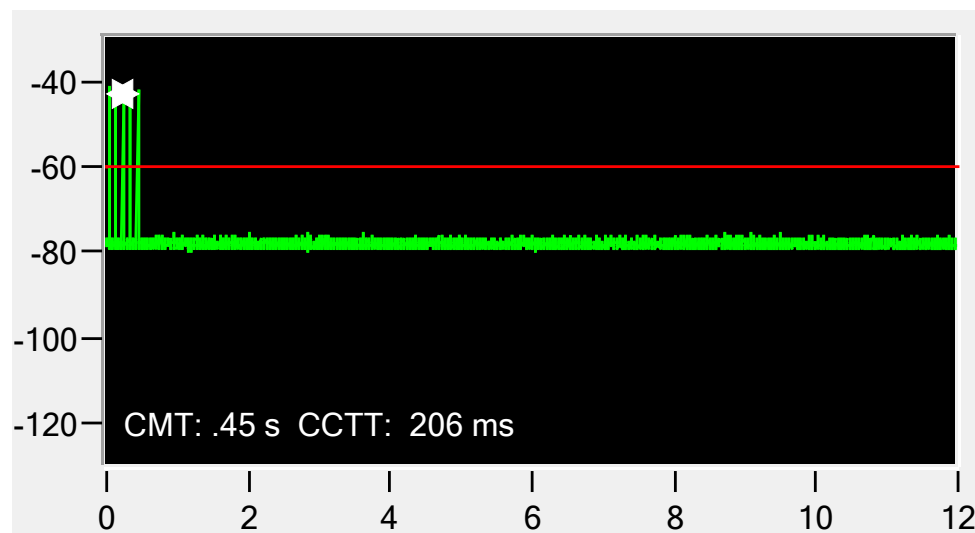
Threshold level + 1 dB:

Channel Closing Transmission Time

Time of sending the disturbance (s)	Measured duration (s)	Specified limit (s)
> T2	0.206	< 1

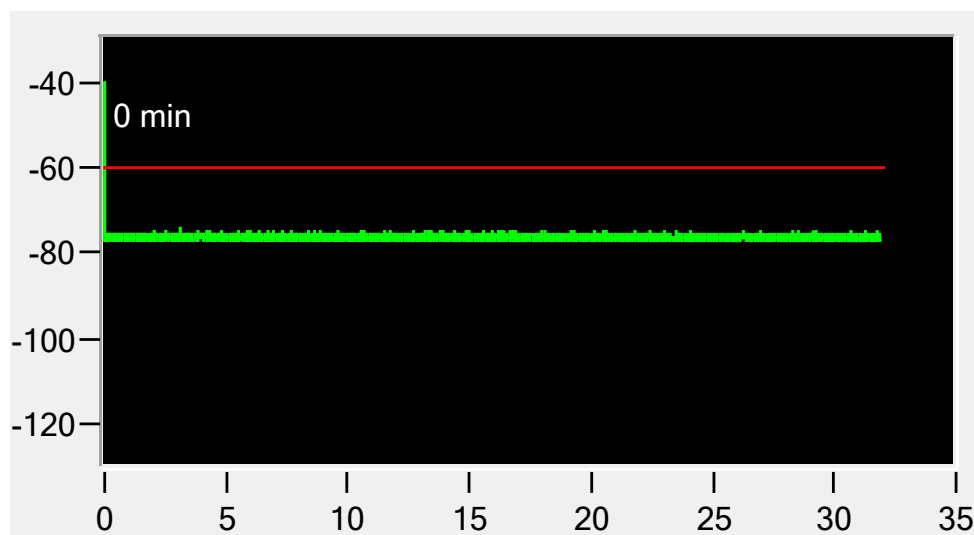
Channel Move Time

Time of sending the disturbance (s)	Measured duration (s)	Specified limit (s)
> T2	0.45	< 10



Non-Occupancy Period

Time of sending the disturbance (s)	Time measured after channel closure (min)	Specified limit (min)
> T2	> 32	> 30

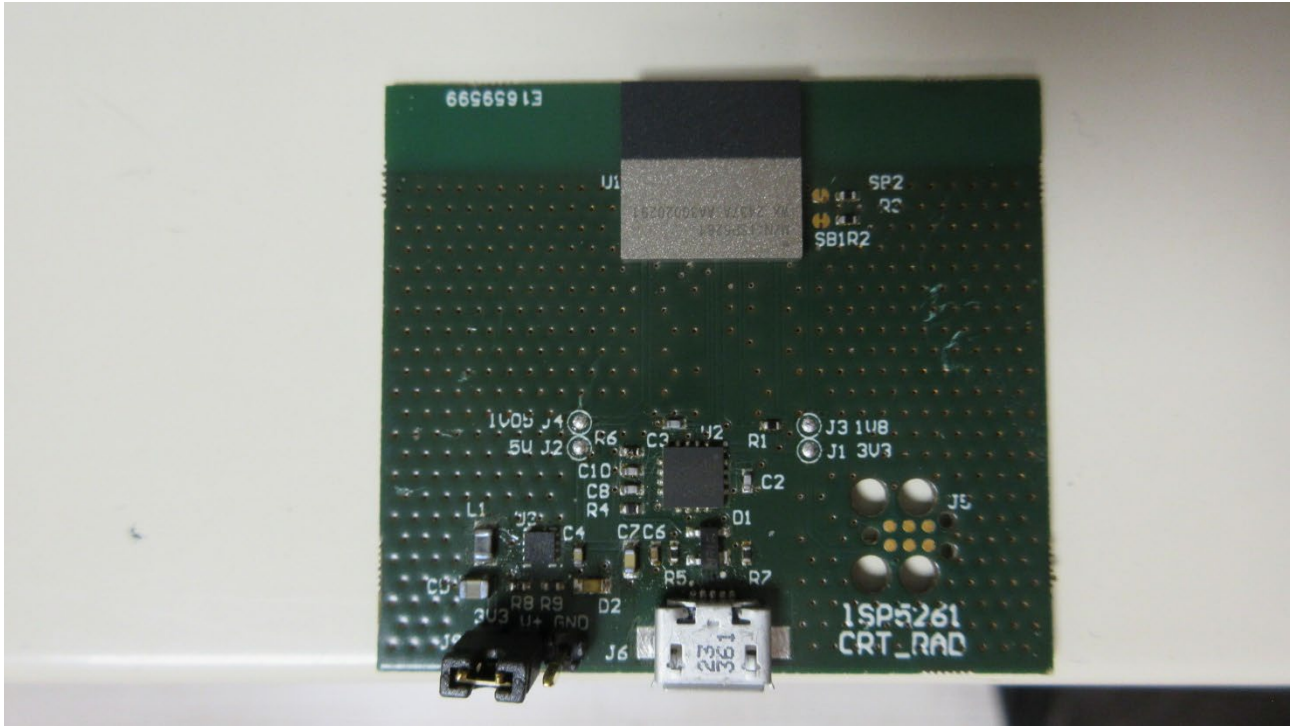


Note: a change of frequency on the channel 120 at 5600 MHz was observed.

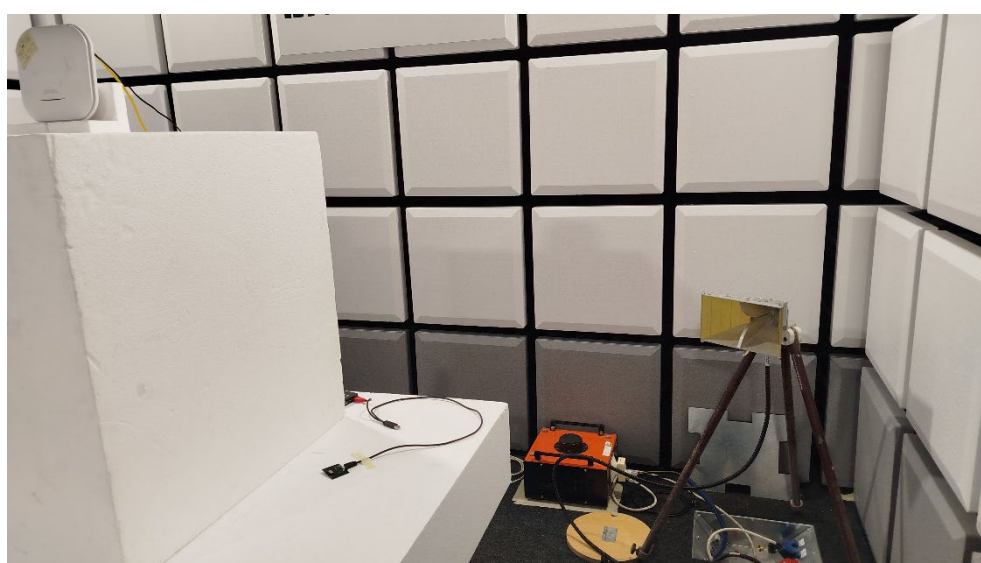
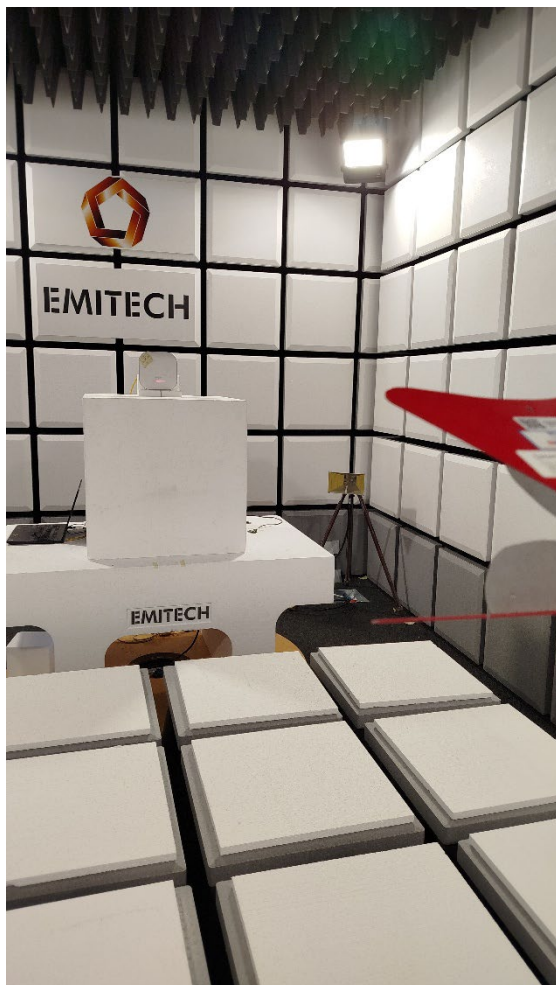
□□□ End of report, 4 appendixes to be forwarded □□□

APPENDIX 1: Photographies of the equipment under test

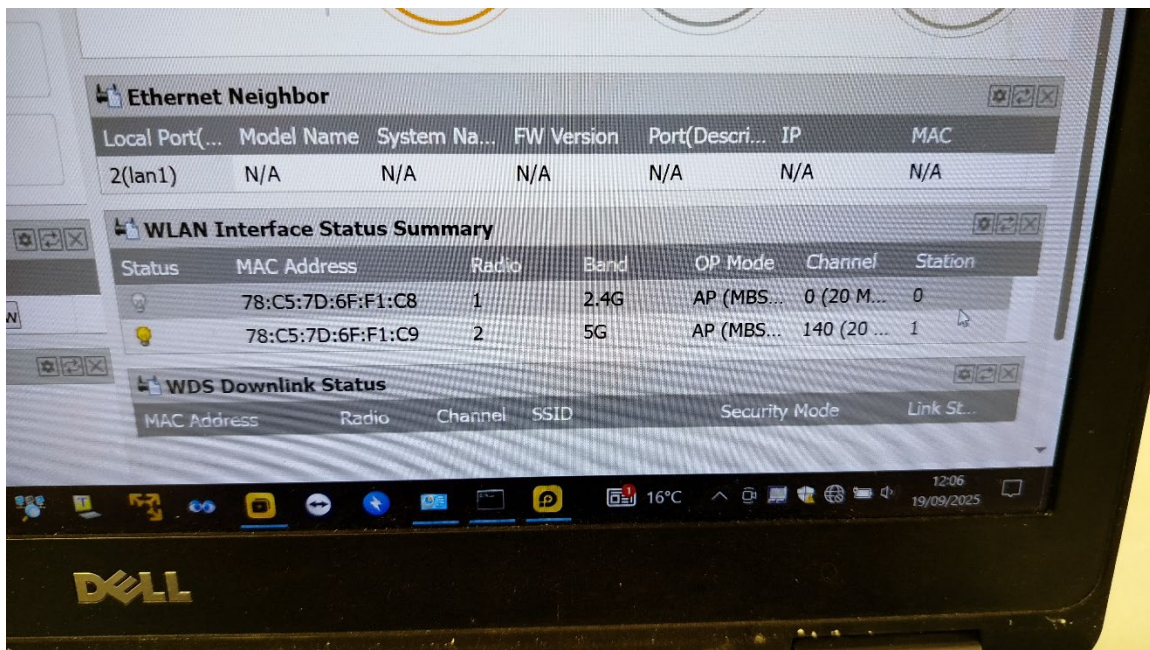
General view



APPENDIX 2: Test set up



Master device



APPENDIX 3: Test equipment list

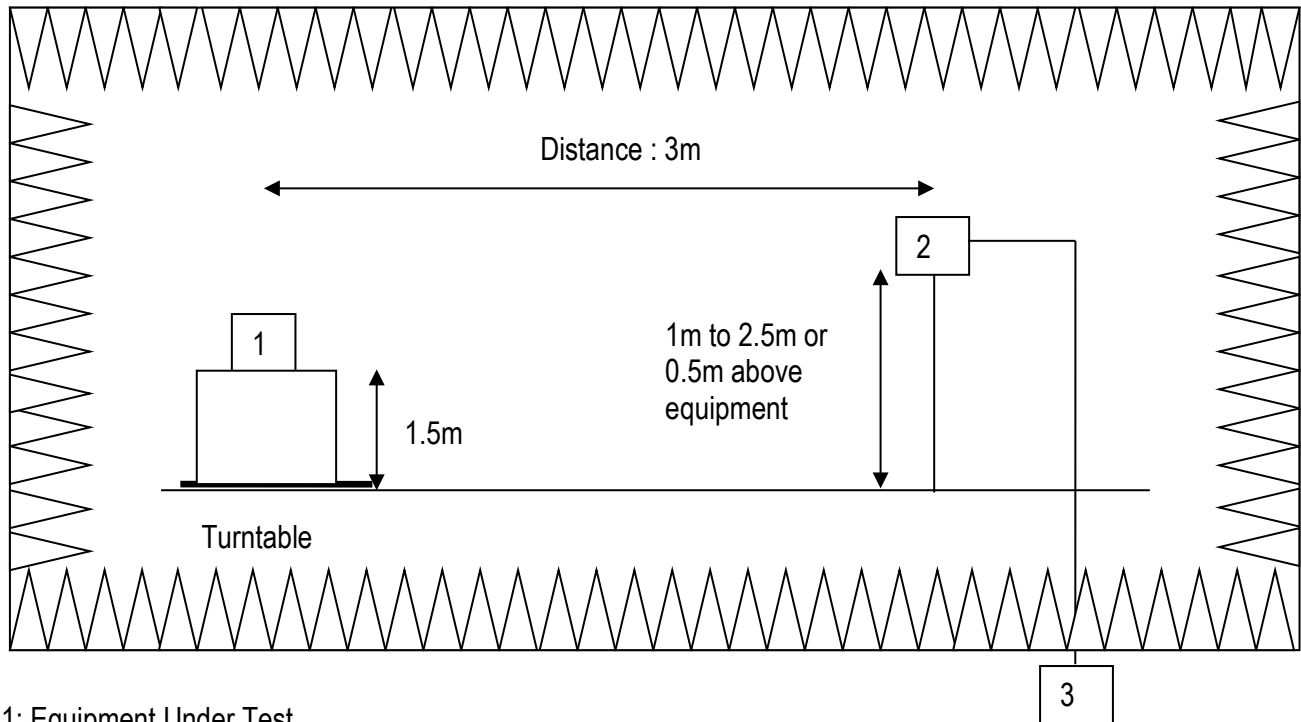
Channel move time, channel closing transmission time and non-occupancy period

TYPE	MANUFACTURER	EMITECH NUMBER
Full anechoic chamber	EMITECH	20040
Turntable and mat controller NCD	MATURO	10789
Spectrum Analyzer FSP7	Rohde & Schwarz	6796
Generator SMBV 100A	Rohde et Schwarz	10351
Antenna 3115	EMCO	7186
Antenna 3117	ETS-Lindgren	10771
Low-noise amplifier S005180M3201	LUCIX Corp.	12590
Alternostat CX 520PX	Coudoint	1564
Cable N 2.5m	HYTEM	19898
Cable N 5.8m	HYTEM	19907
Cable N 5m	HYTEM	19877
Cable N 2.5m	HYTEM	19899
Cable N 4.7m	HYTEM	19909
Cable N 1m	HYTEM	19887
Cable N 3m	HYTEM	19902
Cable N 3.5m	HYTEM	19905
Multimeter 177	Fluke	14903
Meteo station 608-H1	Testo	7566
Software RS Commander V2.4.2	Rohde et Schwarz	//
Software DFS Analys Tool	Rohde et Schwarz	////

APPENDIX 4: Radiated Test Setup

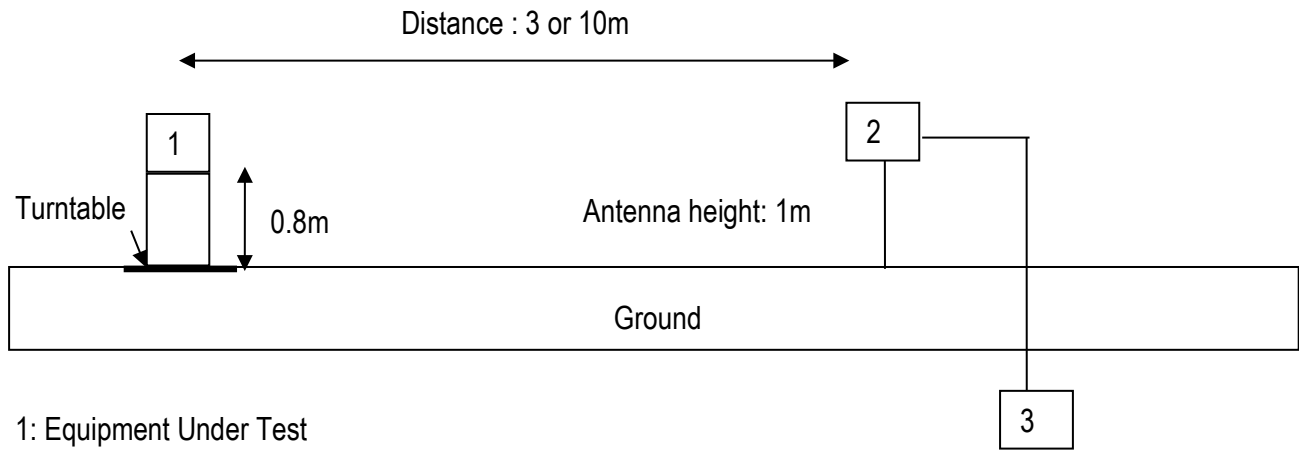
Anechoic chamber setup

Above 1 GHz



- 1: Equipment Under Test
- 2: Measurement antenna with tilt for variation from 1 to 2.5m or 0.5m above top of equipment
- 3: Measurement equipment

Open area setup

Below 30 MHz

- 1: Equipment Under Test
- 2: Measurement antenna
- 3: Measurement equipment

Semi anechoic chamber setup

Between 30 MHz and 1 GHz

