

## Report on the RF Testing of:

KYOCERA Corporation  
Mobile Phone, Model: EB1147  
FCC ID: JOYEB1147

## In accordance with FCC Part15 Subpart E (DFS)

Prepared for: KYOCERA Corporation  
Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku  
Yokohama-shi, Kanagawa, Japan  
Phone: +81-45-943-6253 Fax: +81-45-943-6314



Japan

**Add value.  
Inspire trust.**

## COMMERCIAL-IN-CONFIDENCE

Document Number: JPD-TR-22214-0

### SIGNATURE

| NAME           | JOB TITLE                  | RESPONSIBLE FOR    | ISSUE DATE |
|----------------|----------------------------|--------------------|------------|
| Hiroaki Suzuki | Deputy Manager of RF Group | Approved Signatory | 2022.11.28 |

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Japan Ltd. document control rules.

### EXECUTIVE SUMMARY – Result: Complied

A sample of this product was tested and the result above was confirmed in accordance with FCC Part15 Subpart E.



### DISCLAIMER AND COPYRIGHT

The results in this report are applicable only to the equipment tested.  
This report shall not be re-produced except in full without the written approval of TÜV SÜD Japan Ltd.

Client provided data, for which TÜV SÜD Japan Ltd. take no responsibility, which can affect validity of results within this report is clearly identified.

### ACCREDITATION

This test report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

TÜV SÜD Japan Ltd.  
Yonezawa Testing Center  
5-4149-7 Hachimanpara,  
Yonezawa-shi, Yamagata,  
992-1128 Japan

Phone: +81 (0) 238 28 2881  
[www.tuv-sud.com/ja-jp](http://www.tuv-sud.com/ja-jp)

## Contents

|          |                                                         |           |
|----------|---------------------------------------------------------|-----------|
| <b>1</b> | <b>Summary of Test</b>                                  | <b>3</b>  |
| 1.1      | Modification history of the test report                 | 3         |
| 1.2      | Standards                                               | 3         |
| 1.3      | Test methods                                            | 3         |
| 1.4      | Deviation from standards                                | 3         |
| 1.5      | List of applied test(s) of the EUT                      | 3         |
| 1.6      | Test information                                        | 3         |
| 1.7      | Test set up                                             | 3         |
| 1.8      | Test period                                             | 3         |
| <b>2</b> | <b>Equipment Under Test</b>                             | <b>4</b>  |
| 2.1      | EUT information                                         | 4         |
| 2.2      | Modification to the EUT                                 | 6         |
| 2.3      | Variation of family model(s)                            | 6         |
| 2.4      | Description of EUT                                      | 7         |
| 2.5      | EUT Maximum Conducted Power                             | 7         |
| 2.6      | Transmit Power Control (TPC)                            | 7         |
| 2.7      | Statement of Manufacturer                               | 8         |
| 2.8      | U-NII DFS Rule Requirements                             | 8         |
| 2.9      | Parameters of DFS Test Signals                          | 10        |
| <b>3</b> | <b>Configuration of Equipment</b>                       | <b>11</b> |
| 3.1      | Equipment used                                          | 11        |
| 3.2      | Support Unit used                                       | 11        |
| <b>4</b> | <b>Test Result</b>                                      | <b>12</b> |
| 4.1      | DFS Detection Threshold Levels                          | 12        |
| 4.2      | Channel Loading/Data Streaming                          | 14        |
| 4.3      | Channel Closing Transmission Time and Channel Move Time | 16        |
| 4.4      | Non-Occupancy Period                                    | 20        |
| <b>5</b> | <b>Measurement uncertainty</b>                          | <b>22</b> |
| <b>6</b> | <b>Laboratory Information</b>                           | <b>23</b> |
|          | <b>Appendix A. Test Equipment</b>                       | <b>24</b> |

## 1 Summary of Test

### 1.1 Modification history of the test report

| Document Number | Modification History | Issue Date              |
|-----------------|----------------------|-------------------------|
| JPD-TR-22214-0  | First Issue          | Refer to the cover page |

### 1.2 Standards

CFR47 FCC Part 15 Subpart E  
FCC 14-30

### 1.3 Test methods

ANSI C63.10-2013  
KDB905462 D02 UNII DFS Compliance Procedures New Rules v02  
KDB905462 D03 UNII Clients Without Radar Detection New Rules v01r02

### 1.4 Deviation from standards

None

### 1.5 List of applied test(s) of the EUT

| Test item section                                                          | Test item                                               | Condition | Result | Remark |
|----------------------------------------------------------------------------|---------------------------------------------------------|-----------|--------|--------|
| KDB905462 D02 (8.2)                                                        | DFS Detection Threshold Levels                          | Radiated  | N/A    | Note 1 |
| KDB905462 D02 (7.7, 8.3)                                                   | Channel Loading/Data Streaming                          | Radiated  | N/A    | Note 1 |
| KDB905462 D02 (5.1, 5.2, 5.3, 6.1, 7.3.3, 7.6.1, 7.8.3)                    | Channel Closing Transmission Time and Channel Move Time | Radiated  | PASS   | -      |
| KDB905462 D02 (5.1.2, 5.2, 5.3, 6.1, 7.3.3, 7.6.1, 7.8.3)<br>KDB905462 D03 | Non-Occupancy Period                                    | Radiated  | PASS   | -      |

Note 1. Due to the confirmation work based on the setting of the test environment, no judgment is made for applicable items.

### 1.6 Test information

None

### 1.7 Test set up

Table-top

### 1.8 Test period

21-October-2022 - 10-November-2022

## 2 Equipment Under Test

All information in this chapter was provided by the applicant.

### 2.1 EUT information

|                            |                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant                  | KYOCERA Corporation<br>Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi,<br>Kanagawa, Japan<br>Phone: +81-45-943-6253 Fax: +81-45-943-6314                                                                                             |
| Equipment Under Test (EUT) | Mobile Phone                                                                                                                                                                                                                                  |
| Model number               | EB1147                                                                                                                                                                                                                                        |
| Serial number              | 358067760004090                                                                                                                                                                                                                               |
| Trade name                 | Kyocera                                                                                                                                                                                                                                       |
| Number of sample(s)        | 1                                                                                                                                                                                                                                             |
| EUT condition              | Pre-Production                                                                                                                                                                                                                                |
| Power rating               | Battery: DC 3.87 V                                                                                                                                                                                                                            |
| Size                       | (W) 72 mm × (D) 156 mm × (H) 8.9 mm                                                                                                                                                                                                           |
| Environment                | Indoor and Outdoor use                                                                                                                                                                                                                        |
| Terminal limitation        | -20 °C to 60 °C                                                                                                                                                                                                                               |
| Hardware version           | DMT                                                                                                                                                                                                                                           |
| Software version           | 0.100CX.9011.a                                                                                                                                                                                                                                |
| Firmware version           | Not applicable                                                                                                                                                                                                                                |
| RF Specification           |                                                                                                                                                                                                                                               |
| Protocol                   | IEEE802.11a,<br>IEEE802.11n (HT20), IEEE802.11n (HT40)<br>IEEE802.11ac (VHT20), IEEE802.11ac (VHT40),<br>IEEE802.11ac (VHT80)                                                                                                                 |
| Frequency range            | IEEE802.11a/n (HT20) / IEEE802.11ac (VHT20): 5180 MHz-5320 MHz, 5500 MHz-5720 MHz<br>IEEE802.11n (HT40) / IEEE802.11ac (VHT40): 5190 MHz-5310 MHz, 5510 MHz-5710 MHz<br>IEEE802.11ac (VHT80): 5210 MHz, 5290 MHz, 5530 MHz, 5610 MHz, 5690MHz |
| Number of RF Channels      | IEEE802.11a/n (HT20) / IEEE802.11ac (VHT20): 20 Channels<br>IEEE802.11n (HT40) / IEEE802.11ac (VHT40): 10 Channels<br>IEEE802.11ac (VHT80): 5 Channels                                                                                        |
| Modulation type            | IEEE802.11a/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)                                                                                                                                                                                     |

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data rate                    | IEEE802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>IEEE802.11n (HT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps<br>IEEE802.11n (HT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2Mbps<br>IEEE802.11ac (VHT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 86.5Mbps<br>IEEE802.11ac (VHT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2, 86.6, 96.1Mbps<br>IEEE802.11n (HT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps<br>IEEE802.11n (HT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150Mbps<br>IEEE802.11ac (VHT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 180Mbps<br>IEEE802.11ac (VHT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150, 180, 200Mbps<br>IEEE802.11ac (VHT80 LGI): 29.3, 58.5, 87.8, 117, 175.5, 234, 263.3, 292.6, 351, 390Mbps<br>IEEE802.11ac (VHT80 SGI): 32.5, 65, 97.5, 130, 195, 260, 292.5, 325, 390, 433.3Mbps |
| Channel separation           | IEEE802.11a/n/ac (HT20/VHT20): 20 MHz<br>IEEE802.11n/ac (HT40/VHT40): 40 MHz<br>IEEE802.11ac (VHT80): 80 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Output power<br>(W53 or W56) | 17.898 mW (IEEE802.11a)<br>16.025 mW (IEEE802.11n: HT20)<br>18.587 mW (IEEE802.11n: HT40)<br>17.591 mW (IEEE802.11ac: VHT80)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DFS Function                 | Client (Without Radar Detection)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| TPC Function                 | 500mW not required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Antenna type                 | Internal antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Antenna gain                 | 5.15-5.35 GHz band: 1.0 dBi<br>5.47-5.725 GHz band: 1.0 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## 2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

| Modification State                            | Description of Modification  | Modification fitted by | Date of Modification |
|-----------------------------------------------|------------------------------|------------------------|----------------------|
| Model: EB1147, Serial Number: 358067760004090 |                              |                        |                      |
| 0                                             | As supplied by the applicant | Not Applicable         | Not Applicable       |

## 2.3 Variation of family model(s)

### 2.3.1 List of family model(s)

Not applicable

### 2.3.2 Reason for selection of EUT

Not applicable

## 2.4 Description of EUT

| Operational Mode                                  | Operational Frequency Range |              |
|---------------------------------------------------|-----------------------------|--------------|
|                                                   | 5250-5350MHz                | 5470-5725MHz |
| Client without radar detection and adhoc function | Applicable                  | Applicable   |

For FCC and IC the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges excluding the 5600-5650 MHz range.

## 2.5 EUT Maximum Conducted Power

[ANT4]

| Mode    | Frequency Band (MHz) | Maximum Conducted Output Power |                  | Maximum EIRP       |             |
|---------|----------------------|--------------------------------|------------------|--------------------|-------------|
|         |                      | Test Result (dBm)              | Test Result (mW) | Antenna Gain (dBi) | Result (mW) |
| 802.11a | 5250-5350            | 10.94                          | 12.417           | 1.0                | 15.631      |
|         | 5470-5725            | 11.93                          | 15.588           | 1.0                | 19.625      |

| Mode            | Frequency Band (MHz) | Maximum Conducted Output Power |                  | Maximum EIRP       |             |
|-----------------|----------------------|--------------------------------|------------------|--------------------|-------------|
|                 |                      | Test Result (dBm)              | Test Result (mW) | Antenna Gain (dBi) | Result (mW) |
| 802.11n (20MHz) | 5250-5350            | 10.74                          | 11.855           | 1.0                | 14.925      |
|                 | 5470-5725            | 11.45                          | 13.957           | 1.0                | 17.571      |

| Mode            | Frequency Band (MHz) | Maximum Conducted Output Power |                  | Maximum EIRP       |             |
|-----------------|----------------------|--------------------------------|------------------|--------------------|-------------|
|                 |                      | Test Result (dBm)              | Test Result (mW) | Antenna Gain (dBi) | Result (mW) |
| 802.11n (40MHz) | 5250-5350            | 10.94                          | 12.419           | 1.0                | 15.635      |
|                 | 5470-5725            | 12.09                          | 16.188           | 1.0                | 20.380      |

| Mode             | Frequency Band (MHz) | Maximum Conducted Output Power |                  | Maximum EIRP       |             |
|------------------|----------------------|--------------------------------|------------------|--------------------|-------------|
|                  |                      | Test Result (dBm)              | Test Result (mW) | Antenna Gain (dBi) | Result (mW) |
| 802.11ac (80MHz) | 5250-5350            | 10.64                          | 11.596           | 1.0                | 14.598      |
|                  | 5470-5725            | 11.85                          | 15.321           | 1.0                | 19.289      |

## 2.6 Transmit Power Control (TPC)

U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an E.I.R.P. of less than 500 mW.

Maximum EIRP of this device is 20.38 mW which less than 500mW, therefore it's not require TPC function.

## 2.7 Statement of Manufacturer

Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user. And the device doesn't have Ad Hoc mode on DFS frequency band.

## 2.8 U-NII DFS Rule Requirements

The manufacturer shall state whether the UUT is capable of operating as a Master and/or a Client. If the UUT is capable of operating in more than one operating mode then each operating mode shall be tested separately.

### DFS Requirements Prior to Use of a Channel

KDB905462 D02

Table 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                         |

### DFS requirements during normal operation

KDB905462 D02

Table 2: Applicability of DFS requirements during normal operation

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

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

## DFS Detection Thresholds

KDB905462 D02

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

| Maximum Transmit Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Value<br>(See Notes 1, 2, and 3) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| EIRP $\geq$ 200 milliwatt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -64 dBm                          |
| EIRP < 200 milliwatt and<br>power spectral density < 10 dBm/MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -62 dBm                          |
| EIRP < 200 milliwatt that do not meet the power spectral density<br>requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -64 dBm                          |
| <p><b>Note 1:</b> This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p><b>Note 2:</b> 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.</p> <p><b>Note3:</b> EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p> |                                  |

## Response Requirements

KDB905462 D02

Table 4: provides the response requirements for Master and Client Devices incorporating DFS.

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Value                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Non-occupancy period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Minimum 30 minutes                                                                                           |
| Channel Availability Check Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 60 seconds                                                                                                   |
| Channel Move Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10 seconds<br>See Note 1.                                                                                    |
| Channel Closing Transmission Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 200 milliseconds + an aggregate of 60 milliseconds<br>over remaining 10 second period.<br>See Notes 1 and 2. |
| U-NII Detection Bandwidth                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NII 99% transmission power bandwidth.<br>See Note 3.                                                         |
| <p><b>Note 1:</b> 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.</p> <p><b>Note 2:</b> 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.</p> <p><b>Note 3:</b> 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.</p> |                                                                                                              |

## 2.9 Parameters of DFS Test Signals

### Short Pulse Radar Test Waveforms

KDB905462 D02

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: $\{(1/360) \times (19 \times 10^6 \text{ PRI}_{\mu\text{sec}})\}$ | 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                      |
| <b>Note 1:</b> Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests. |                    |                                                                                                                                                               |                                                                            |                                            |                          |

### Long Pulse Radar Test Waveform

KDB905462 D02

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                       |

## Frequency Hopping Radar Test Waveform

KDB905462 D02

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 Configuration of Equipment

This test configuration is based on the manufacture's instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

### 3.1 Equipment used

| No. | Equipment    | Company | Model No. | Serial No.      | FCC ID / DoC | Comment |
|-----|--------------|---------|-----------|-----------------|--------------|---------|
| 1   | Mobile Phone | KYOCERA | EB1147    | 358067760004090 | JOYEB1147    | EUT     |

### 3.2 Support Unit used

| No. | Equipment    | Company | Model No.         | Serial No.  | FCC ID    | Comment |
|-----|--------------|---------|-------------------|-------------|-----------|---------|
| a   | Access Point | Cisco   | AIR-CAP3702E-A-K9 | FJC1938F0NV | LDK102087 | *1, *2  |

NOTE: 1. This device was functioned as a Master device during the DFS test.

NOTE: 2. The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is  $-64 + 1 = -63$  dBm.

## 4 Test Result

### 4.1 DFS Detection Threshold Levels

#### 4.1.1 Measurement procedure

##### [KDB905462 D02(8.2)]

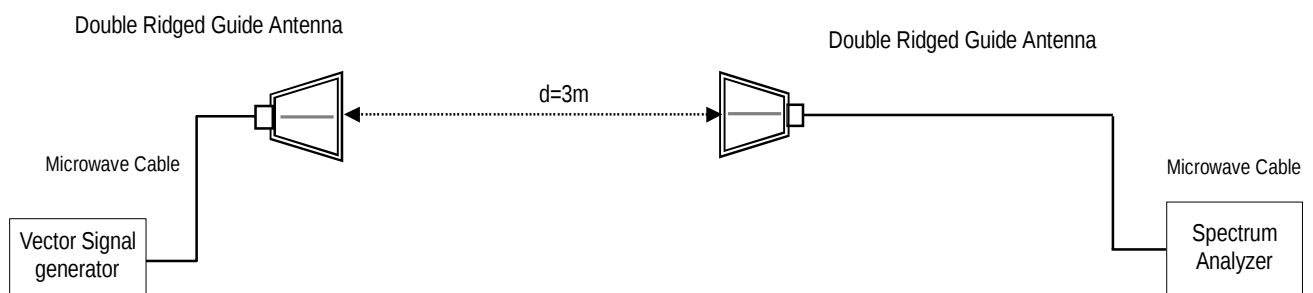
Spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain - coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of -63 dBm as measured on the spectrum analyzer.

The rated output power of the Master unit is  $> 23\text{dBm}$  (EIRP). Therefore the required interference threshold level is -64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is  $-64 + 1 = -63\text{ dBm}$ .

The spectrum analyzer is set to;

- RBW=3 MHz, VBW=3 MHz, Span=Zero span
- Sweep=10ms, Detector=Peak, Trace mode=Clear / write

- Test configuration



#### 4.1.2 Limit

None

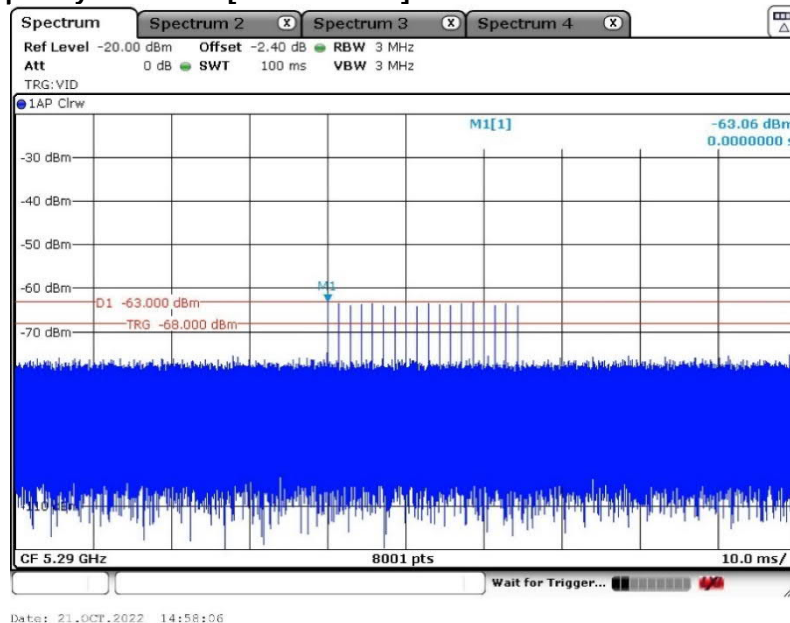
### 4.1.3 Radar Waveform

Date : 21-October-2022  
 Temperature : 23.1 [°C]  
 Humidity : 33.9 [%]  
 Test place : 3m Semi-anechoic chamber

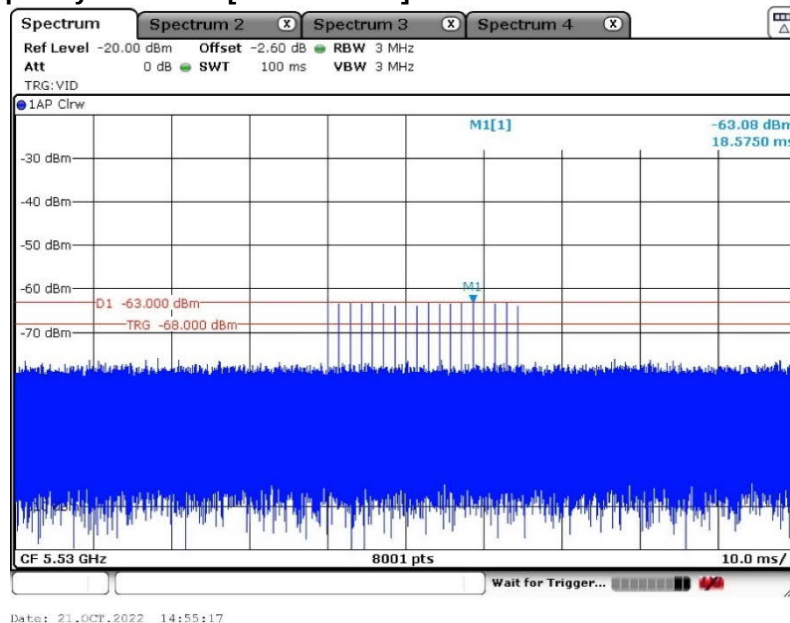
Test engineer : Tadahiro Seino

#### Radar Type 0 Calibration Plot

##### Frequency: 5290MHz [5.3GHz Band]



##### Frequency: 5530MHz [5.6GHz Band]



## 4.2 Channel Loading/Data Streaming

### 4.2.1 Measurement procedure

#### [KDB905462 D02(7.7, 8.3)]

System testing will be performed with channel-loading using means appropriate to the data types that are used by the unlicensed device. The following requirements apply:

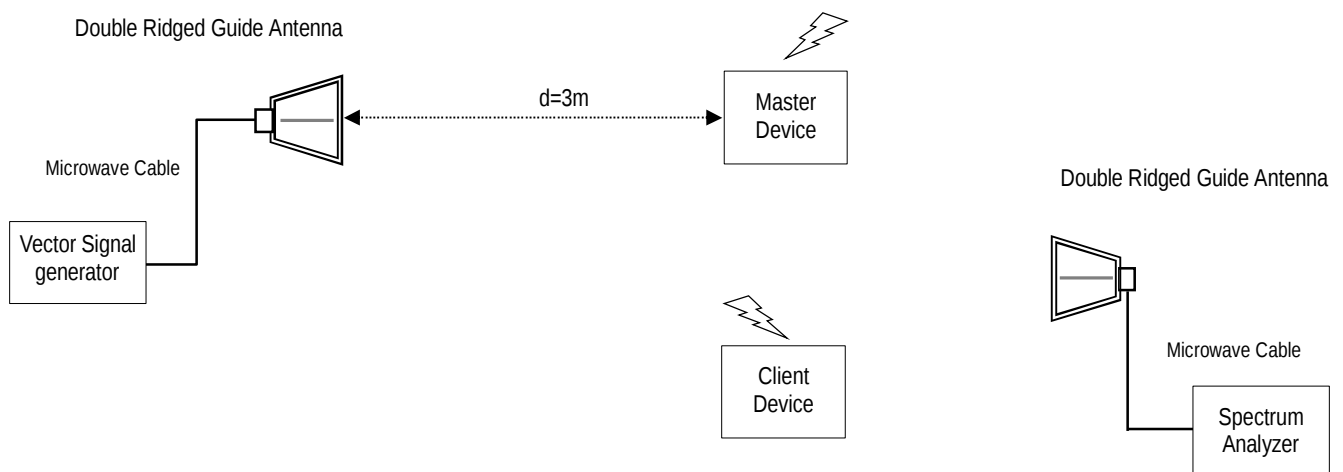
-The data file must be of a type that is typical for the device (i.e., MPEG-2, MPEG-4, WAV, MP3, MP4, AVI, etc.) and must generally be transmitting in a streaming mode.

-Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17% or greater.

The spectrum analyzer is set to;

- RBW=3 MHz, VBW=3 MHz, Span=Zero span
- Sweep=10ms, Detector=Peak, Trace mode=Clear / write

- Test configuration



### 4.2.2 Limit

Timing plot duty cycle greater than 17%

### 4.2.3 Measurement result

Date : 21-October-2022

Temperature : 23.1 [°C]

Humidity : 33.9 [%]

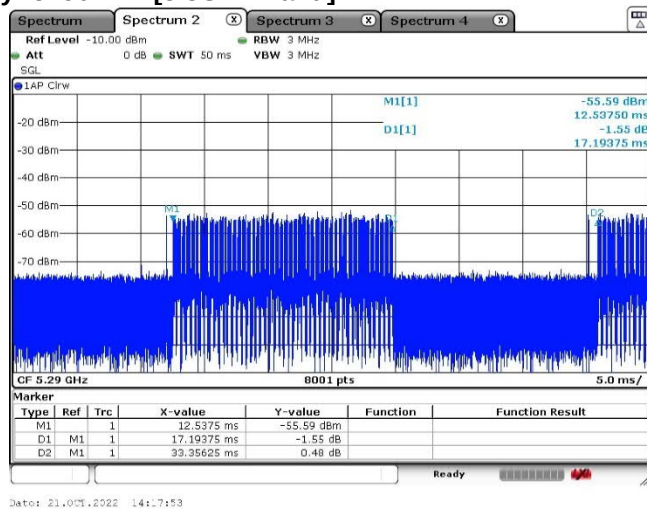
Test place : 3m Semi-anechoic chamber

Test engineer :

Tadahiro Seino

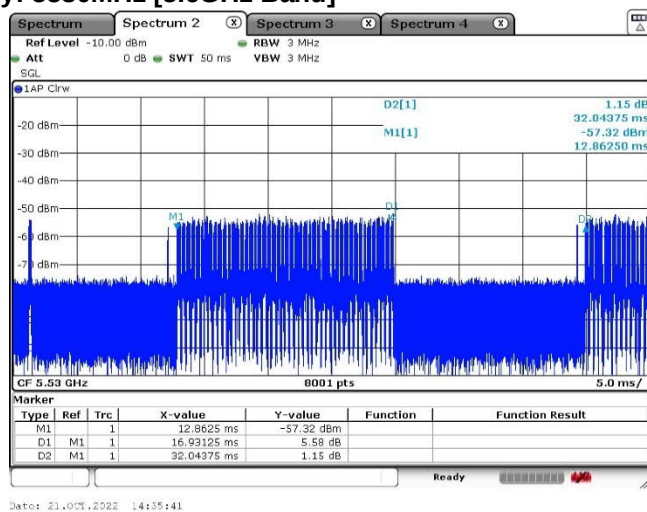
### Client device Data Traffic Plot

**Frequency: 5290MHz [5.3GHz Band]**



| ON Time<br>[ms] | ON+OFF Time<br>[ms] | Duty Cycle<br>[%] |
|-----------------|---------------------|-------------------|
| 17.19375        | 33.35625            | 51.55             |

**Frequency: 5530MHz [5.6GHz Band]**



| ON Time<br>[ms] | ON+OFF Time<br>[ms] | Duty Cycle<br>[%] |
|-----------------|---------------------|-------------------|
| 16.93125        | 32.04375            | 52.84             |

### 4.3 Channel Closing Transmission Time and Channel Move Time

#### 4.3.1 Measurement procedure

**[KDB905462 D02(5.1, 5.2, 5.3, 6.1, 7.3.3, 7.6.1, 7.8.3)]**

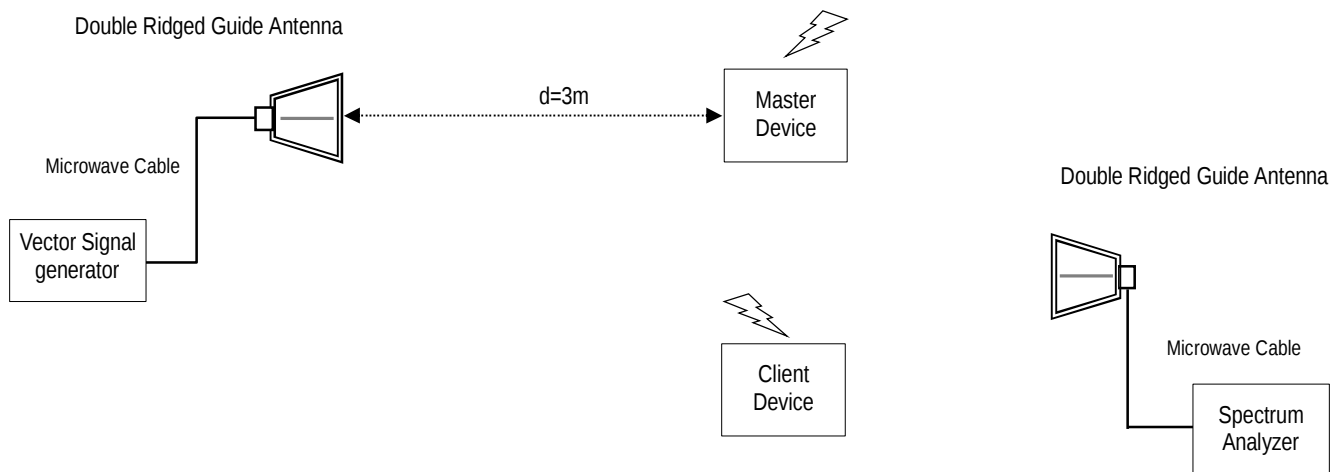
Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

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.

The spectrum analyzer is set to;

- RBW=3 MHz, VBW=3 MHz, Span=Zero span
- Sweep=30 s, Detector=Peak, Trace mode=Clear / write

- Test configuration



#### 4.3.2 Limit

(1) Channel Closing Transmission Time: The Aggregate Transmission Time is within 60ms within the Channel Move Time range excluding 200ms after the radar waveform is detected.

(2) Channel Move Time: The time to stop all transmissions on the current channel within 10 seconds when a radar waveform above the DFS detection threshold is detected.

#### 4.3.3 Calculation method

Measurement of the aggregate duration of the Channel Closing Transmission Time method.

$$\text{Dwell[ms]} = \text{S[ms]} / \text{B[points]}$$

- Dwell is the dwell time per spectrum analyzer sampling bin.
- S is the sweep time.
- B is the number of spectrum analyzer sampling bins.

An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by:

$$\text{C[ms]} = \text{N[bins]} \times \text{Dwell[ms]}$$

- C is the Closing Time.
- N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and Dwell is the dwell time per bin.

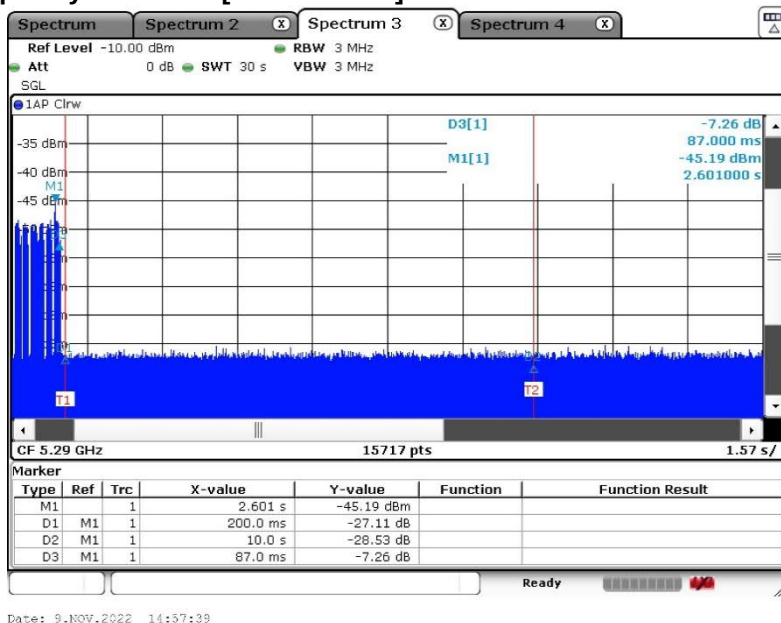
#### 4.3.4 Measurement result

Date : 9-November-2022  
Temperature : 20.4 [°C]  
Humidity : 35.5 [%]  
Test place : 3m Semi-anechoic chamber

Test engineer : Tadahiro Seino

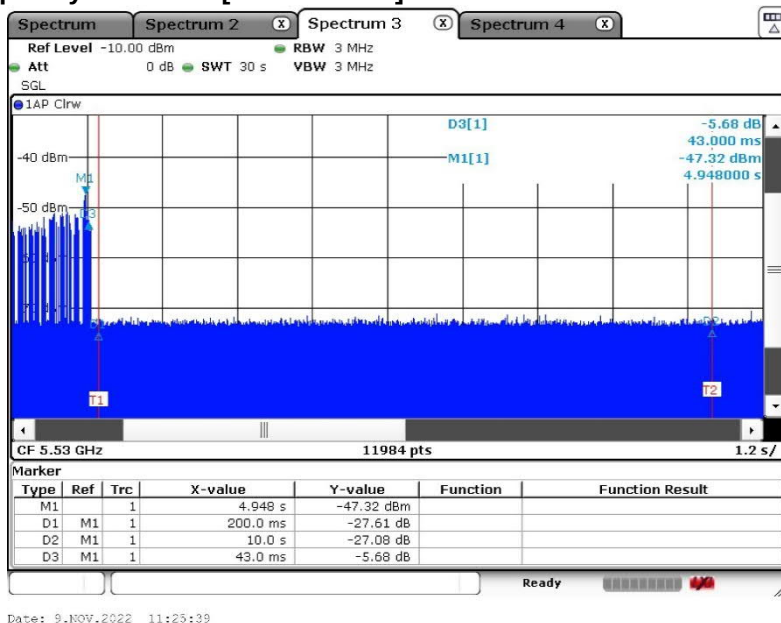
## Channel Closing Transmission Time Plot

## Frequency: 5290MHz [5.3GHz Band]



| S<br>[ms] | B<br>[points] | Dwell<br>[ms] | N<br>[bins] | Aggregate Channel Closing Transmission Time<br>[ms] | Limit<br>[ms] |
|-----------|---------------|---------------|-------------|-----------------------------------------------------|---------------|
| 15700     | 15717         | 0.998918      | 0           | 0                                                   | 60            |

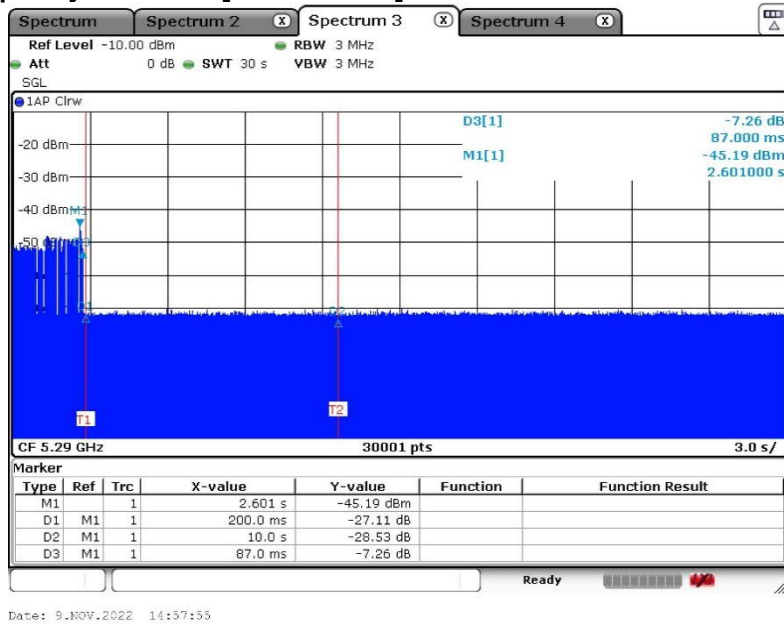
## Frequency: 5530MHz [5.6GHz Band]



| S<br>[ms] | B<br>[points] | Dwell<br>[ms] | N<br>[bins] | Aggregate Channel Closing Transmission Time<br>[ms] | Limit<br>[ms] |
|-----------|---------------|---------------|-------------|-----------------------------------------------------|---------------|
| 12000     | 11984         | 1.001335      | 0           | 0                                                   | 60            |

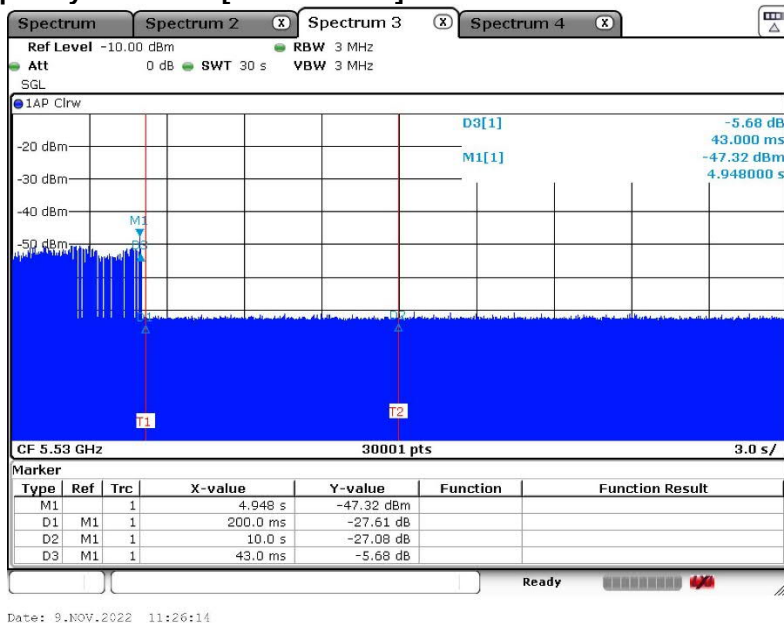
## Channel Move Time Plot

## Frequency: 5290MHz [5.3GHz Band]



| Channel Move Time [s] | Limit [s] |
|-----------------------|-----------|
| 0.087                 | 10        |

## Frequency: 5530MHz [5.6GHz Band]



| Channel Move Time [s] | Limit [s] |
|-----------------------|-----------|
| 0.043                 | 10        |

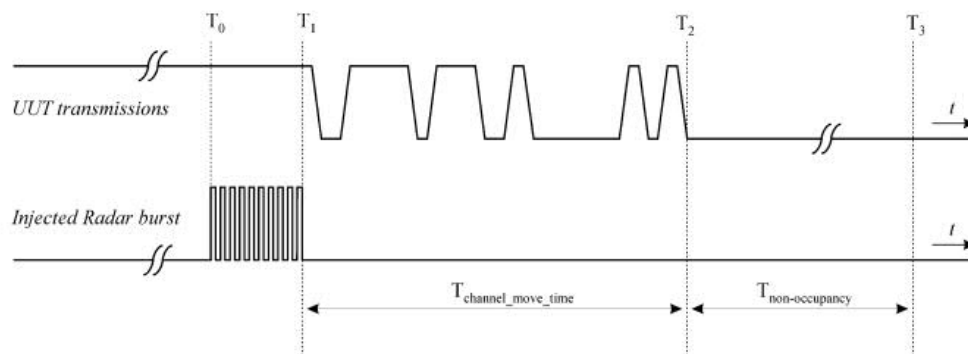
#### 4.4 Non-Occupancy Period

##### 4.4.1 Measurement procedure

[KDB905462 D02(5.1.2, 5.2, 5.3, 6.1, 7.3.3, 7.6.1, 7.8.3), KDB905462 D03]

The client test frequency must be monitored to ensure no transmission of any type has occurred for 30 minutes.

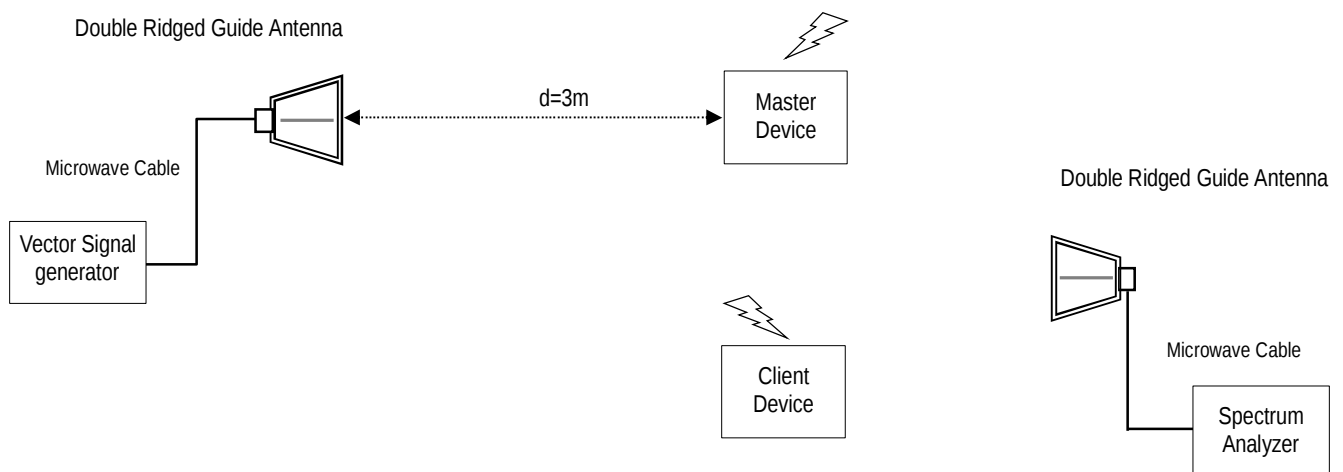
If the client moves with the master, the device is considered compliant if nothing appears in the client non-occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear.



The spectrum analyzer is set to;

- RBW=3 MHz, VBW=3 MHz, Span=Zero span  
Sweep=2000 s, Detector=Peak, Trace mode=Clear / write

- Test configuration



##### 4.4.2 Limit

The client has vacated the Channel in the specified time (Channel Closing Transmission Time and Channel Move Time) and does not transmit on a Channel for 30 minutes after the detection and Channel move (Non-Occupancy Period).

#### 4.4.3 Measurement result

Date : 9-November-2022  
 Temperature : 20.4 [°C]  
 Humidity : 35.5 [%]  
 Test place : 3m Semi-anechoic chamber

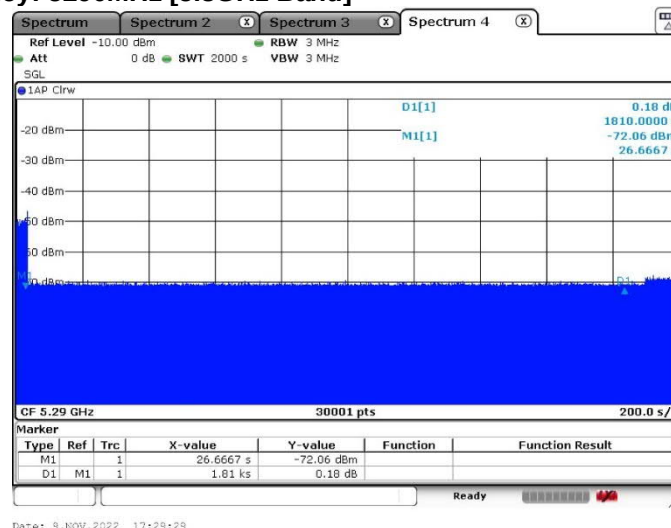
Test engineer : Tadahiro Seino

Date : 10-November-2022  
 Temperature : 20.6 [°C]  
 Humidity : 28.7 [%]  
 Test place : 3m Semi-anechoic chamber

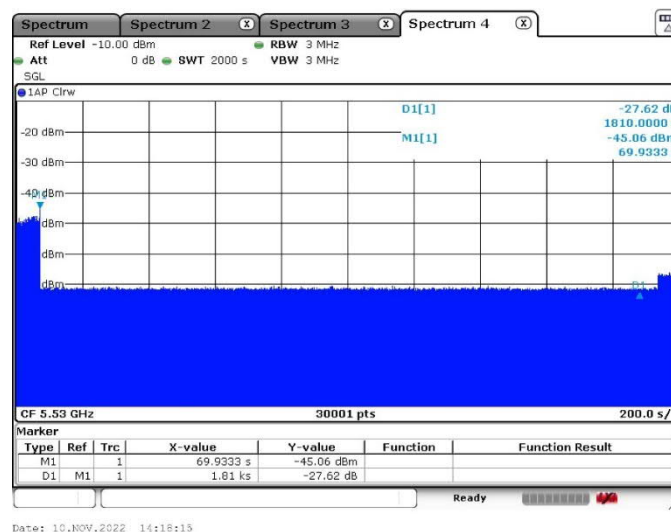
Test engineer : Tadahiro Seino

#### Non-Occupancy Period Plot

##### Frequency: 5290MHz [5.3GHz Band]



##### Frequency: 5530MHz [5.6GHz Band]



## 5 Measurement uncertainty

Expanded uncertainties stated are calculated with a coverage Factor  $k=2$ .  
Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028 Parts 1 and 2 determining compliance or non-compliance with test result.

| Test item                                  | Measurement uncertainty |
|--------------------------------------------|-------------------------|
| Conducted emission, AMN (9 kHz – 150 kHz)  | $\pm 3.7$ dB            |
| Conducted emission, AMN (150 kHz – 30 MHz) | $\pm 3.3$ dB            |
| Radiated emission ( 9kHz – 30 MHz)         | $\pm 3.7$ dB            |
| Radiated emission (30 MHz – 1000 MHz)      | $\pm 5.3$ dB            |
| Radiated emission (1 GHz – 6 GHz)          | $\pm 4.4$ dB            |
| Radiated emission (6 GHz – 18 GHz)         | $\pm 4.7$ dB            |
| Radiated emission (18 GHz – 40 GHz)        | $\pm 5.8$ dB            |
| Radio Frequency                            | $\pm 1.4 \cdot 10^{-8}$ |
| RF power, conducted                        | $\pm 0.8$ dB            |
| Temperature                                | $\pm 0.6$ °C            |
| Humidity                                   | $\pm 1.2$ %             |
| Voltage (DC)                               | $\pm 0.4$ %             |
| Voltage (AC, <10kHz)                       | $\pm 0.2$ %             |

| Judge | Measured value and standard limit value                                                                                                                                                                                                                                                                               |  |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| PASS  | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case1</p> <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p> </div> </div>                                               |  |
|       | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case2</p> <p>Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.</p> </div> </div>  |  |
| FAIL  | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case3</p> <p>Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.</p> </div> </div> |  |
|       | <div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Case4</p> <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p> </div> </div>                                            |  |



Japan

## 6 Laboratory Information

Testing was performed and the report was issued at:

**TÜV SÜD Japan Ltd. Yonezawa Testing Center**

Address: 5-4149-7 Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan

Phone: +81-238-28-2881

**Accreditation and Registration**

A2LA

Certificate #3686.03

VLAC

Accreditation No.: VLAC-013

BSMI

Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

Innovation, Science and Economic Development Canada

ISED#: 4224A

VCCI Council

Registration number: A-0166

## Appendix A. Test Equipment

### Radiated

| Equipment                   | Company       | Model No.               | Serial No.      | Cal. Due    | Cal. Date   |
|-----------------------------|---------------|-------------------------|-----------------|-------------|-------------|
| Spectrum analyzer           | ROHDE&SCHWARZ | FSV40                   | 101731          | 31-Jul-2023 | 19-Jul-2022 |
| Vector Signal Generator     | ROHDE&SCHWARZ | SMBV100A                | 257406          | 31-Mar-2023 | 14-Mar-2022 |
| Double ridged guide antenna | ETS LINDGREN  | 3117                    | 00052315        | 30-Jun-2023 | 22-Jun-2022 |
| Attenuator                  | HUBER+SUHNER  | 6803.17.B               | N/A(2340)       | 31-Dec-2022 | 23-Dec-2021 |
| Double ridged guide antenna | ETS LINDGREN  | 3117                    | 00218815        | 31-Dec-2022 | 06-Dec-2021 |
| Micro wave cable            | HUBER+SUHNER  | Sucoflex 102/2m         | 31648           | 31-Mar-2023 | 02-Mar-2022 |
| Micro wave cable            | HUBER+SUHNER  | SUCOFLEX104/8m          | SN MY30033/4    | 28-Feb-2023 | 02-Feb-2022 |
| PC                          | HP            | HP ProBook 450 G2       | JPA524M85J      | N/A         | N/A         |
| Software                    | ROHDE&SCHWARZ | R&S Pulse Sequencer DFS | V1.4 Build:6130 | N/A         | N/A         |
| 3m Semi an-echoic Chamber   | TOKIN         | N/A                     | N/A(9002-NSA)   | 31-May-2023 | 28-May-2022 |
| 3m Semi an-echoic Chamber   | TOKIN         | N/A                     | N/A(9002-SVSWR) | 31-May-2023 | 28-May-2022 |

\*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.