TEST REPORT

Applicant:	**Renesas Design Korea Inc.**
Address:	**7th SiliconPark, 35 Pangyo-ro 255 beon-gil Bundang-gu, Seongnam-si, Gyeonggi-do, 13486 Republic of Korea**
Product Name:	**RRQ61051 Module**
Model Name:	**RRQ61051-009, RRQ61051-010**
Type of Equipment:	**Certification Ordinance Article 2, Paragraph 1, Item 19-3**
Test method(s):	DSPR ５ＧＨｚ帯小電力データ通信システムの特性試験方法
Report Number:	**2502Q45198E-RF-07E**
Report Date:	**2025/8/21**

The above device has been tested and found compliant with the requirement of the relevant standards by Bay Area Compliance Laboratories Corp. (Dongguan).

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2502Q45198E-RF-07E	Original Report	2025/8/21

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Product Name:	RRQ61051 Module
Test Model:	RRQ61051-009
Multiple Models:	RRQ61051-010
Model Difference:	Please refer to the DOS
Rated Input Voltage:	1.8~3.6Vdc (Typical:3.3Vdc)
Serial Number:	2YVE-1
EUT Received Date:	2025/2/25
EUT Received Status:	Good

Technical Specification

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

Technical Specification

Operation Frequency Range :		802.11 a/n20/ac20: 5260-5320 MHz,5500-5720MHz 802.11 n40/ac40: 5270/5310 MHz,5510-5710MHz 802.11 ac80: 5290/5530/5610/5690MHz
Nominal RF Output Power (Conducted, mW/MHz):		W53(5260-5320 MHz): 802.11a: 1.1 802.11n 20: 1.0 802.11ac 20: 1.1 802.11ax20: 1.0 W56(5500-5720MHz): 802.11a: 0.9 802.11n 20: 0.8 802.11ac 20: 1.1 802.11ax20: 0.9
Number of Chains	**Transmit:**	1
	Receive:	1
5.3G, Antenna Gain (dBi)▲:		4.4
5.6G, Antenna Gain (dBi)▲:		4.4
Modulation Type:		OFDM, OFDMA
Emission Type		G1D, D1D

Objective

The objective of this current document is to demonstrate the EUT, as equipment type in Certification Ordinance Article 2-1-19-3 of Specific Radio Equipment Specified in Article 38-2-2 Paragraph 1 Item 1of the Radio Low, compliant with Article 49-20 of Radio equipment regulations.

Test Methodology

All measurements contained in this report were conducted with "５ＧＨｚ帯小電力データ通信システムの特性試験方法", released by DSP Research, Inc. on Nov 10, 2022, which was formulated in accordance with the technical regulations of MIC Notice No.88 of 2004 (Version: MIC Notice No.409 of 2023).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

SUMMARY OF TEST RESULTS

Items	Description of Test	Result
Performance Requirements Check	Initial Channel Availability Check Time (CAC)	Not Applicable
	Radar Burst at the Beginning of the CAC	Not Applicable
	Radar Burst at the End of the CAC	Not Applicable
Channel shutdown	Channel Move Time	Compliant
	Channel Closing Transmission Time	Compliant
	Non-Occupancy Period	Compliant
Radar Detection	Statistical Performance Check	Not Applicable

Note: EUT is client device without radar detection.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing in engineering mode which was provided by the manufacturer.

EUT Exercise Software

No Software was used in test.

Equipment Modifications

No modification was made.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	T430	AA887-03
EROADCOM	Router	AR5344	840112-840112000323

External Cable

Cable Description	Shielding Type	Ferrite Core	Length(m)	From Port	To
/	/	/	/	/	/

APPLICABLE STANDARDS

DFS Requirement

Table 1: Applicability of DFS requirements

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
Uniform Spreading	Yes	Not Required	Not Required
DFS Detection Threshold	Yes	Not Required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 2: DFS Response requirement values

Parameter	Value
Non-Occupancy Period (NOP)	≥ 30 minutes
Channel Availability Check Time (CAC)	≥ 60 seconds
Channel Move Time (CMT)	≤ 10 seconds
Channel Closing Transmission Time (CCTT)	≤ 260 milliseconds

Table 3: Parameters of DFS Test Signals for 5250-5350 MHz

Annex 1-a (Radar classification & detection probability) : 5250～5350MHz

The radio wave which a radar transmits						Detection probability
Classification	Pulse width		Repetition frequency		Minimum number of consecutive pulses	
	minimum value	maximum value	minimum value	maximum value		
1	0.5 μs	5 μs	200 Hz	1000 Hz	10	60% or more
2	0.5 μs	15 μs	200 Hz	1600 Hz	15	60% or more
3	0.5 μs	5 μs	200 Hz	1000 Hz	"Repetition frequency x 0.026" (Round up to less than 1), or "22", whichever is larger, or "30", whichever is smaller	60% or more
4	0.5 μs	15 μs	200 Hz	1600 Hz	"Repetition frequency x 0.026" (Round up to less than 1), or "22", whichever is larger, or "30", whichever is smaller	60% or more
5	0.5 μs	1.5 μs	1114 Hz	1118 Hz	30	60% or more
6	0.5 μs	1.5 μs	928 Hz	932 Hz	25	60% or more
7	0.5 μs	1.5 μs	886 Hz	890 Hz	24	60% or more
8	0.5 μs	1.5 μs	738 Hz	742 Hz	20	60% or more

Table 4: Parameters of DFS Test Signals for 5470-5730 MHz

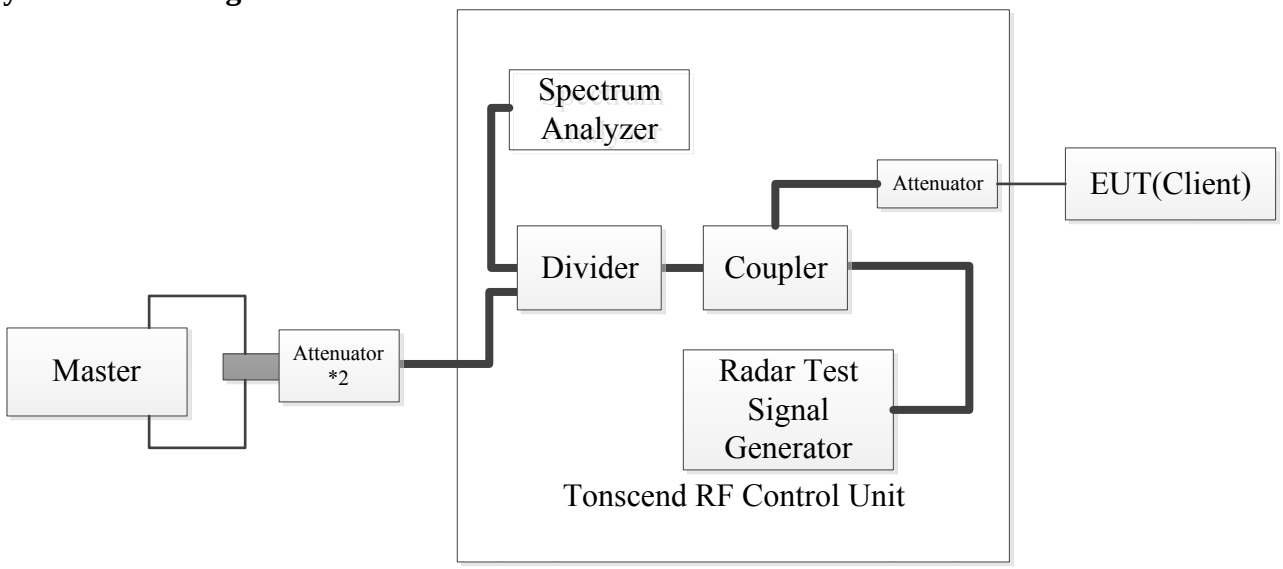
Annex 1-b (Radar classification & detection probability) : 5470～5730MHz

The radio wave which a radar transmits *Un-modulated pulse				Detection probability
Classification	Pulse width	Repetition frequency	The number of continuous pulses	
1	0.5 μs	720 Hz	18	60% or more
2	1 μs	700 Hz	18	60% or more
3	2.0 μs	250 Hz	18	60% or more
4	1 μs ≦ X ≦ 5 μs ("1μs"or"width which added the integral multiple of 1μs to 1μs")	4,347Hz ≦ X ≦ 6,667Hz (arbitrary frequency of 1)	23 ≦ X ≦29 (arbitrary integer of 1)	60% or more
5	6 μs ≦ X ≦ 10 μs ("6μs"or"width which added the integral multiple of 1μs to 6μs")	2,000Hz ≦ X ≦ 5,000Hz (arbitrary frequency of 1)	16 ≦ X ≦18 (arbitrary integer of 1)	60% or more
6	11 μs ≦ X ≦ 20 μs ("11μs"or"width which added the integral multiple of 1μs to 11μs")	2,000Hz ≦ X ≦ 5,000Hz (arbitrary frequency of 1)	12 ≦ X ≦16 (arbitrary integer of 1)	60% or more

DFS Measurement System

BACL DFS measurement system consists of two subsystems: (1) The radar signal generating subsystem and (2) the traffic monitoring subsystem.

System Block Diagram



Test Procedure

A spectrum analyzer is used as a monitor verifies that the EUT status including Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the diction and Channel move.

TEST RESULTS

Description of EUT

The EUT operates in 5250-5350MHz and 5470-5730MHz range.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	Calibration Agency	Calibration Method Note
Keysight	MXA Signal Analyzer	N9020A	MY48490106	2024/9/5	2025/9/4	BACL Metrology	C
Agilent	MXG Vector Signal Generator	N5182A	MY49060274	2024/9/5	2025/9/4	BACL Metrology	C
Tonscend	RF Control Unit	JS0806-2	19G8060171	2024/9/5	2025/9/4	BACL Metrology	C
Eastsheep	Coaxial Attenuator	2W-SMA-JK-6G-10dB	F-08-EM509	2024/6/7	2025/6/6	BACL(DG)	D
Eastsheep	Coaxial Attenuator	2W-SMA-JK-6G-10dB	F-08-EM510	2024/6/7	2025/6/6	BACL(DG)	D
HUBER+SUHNER	Coaxial Attenuator	6610_SMA-50-1	0064	2024/6/13	2025/6/12	BACL(DG)	D
HUBER+SUHNER	Coaxial Attenuator	6610_SMA-50-1	0069	2024/6/13	2025/6/12	BACL(DG)	D

**** Statement of Traceability:*** *Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Note:

A. Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1).

B. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992).

C. Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

D. Calibration conducted by using measuring instruments and other equipment which shall have been given any of calibration, etc. listed above from a) to c)

Test Environmental Conditions

Temperature:	24.9℃
Relative Humidity:	66%
ATM Pressure:	100.0 kPa
Tester:	Harper Shen
Test Date:	2025/3/27

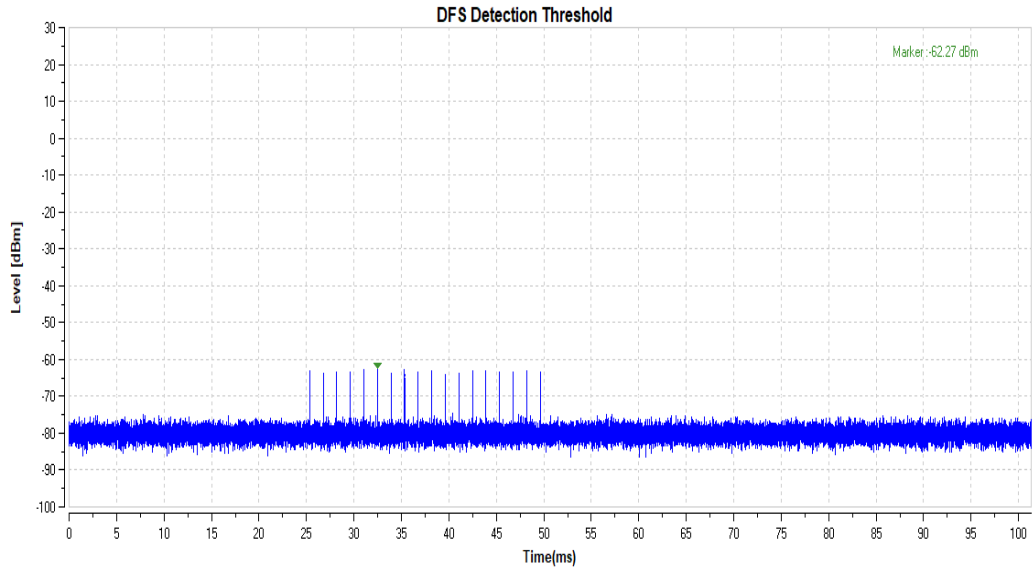
Plots of Radar Waveforms

Test Result

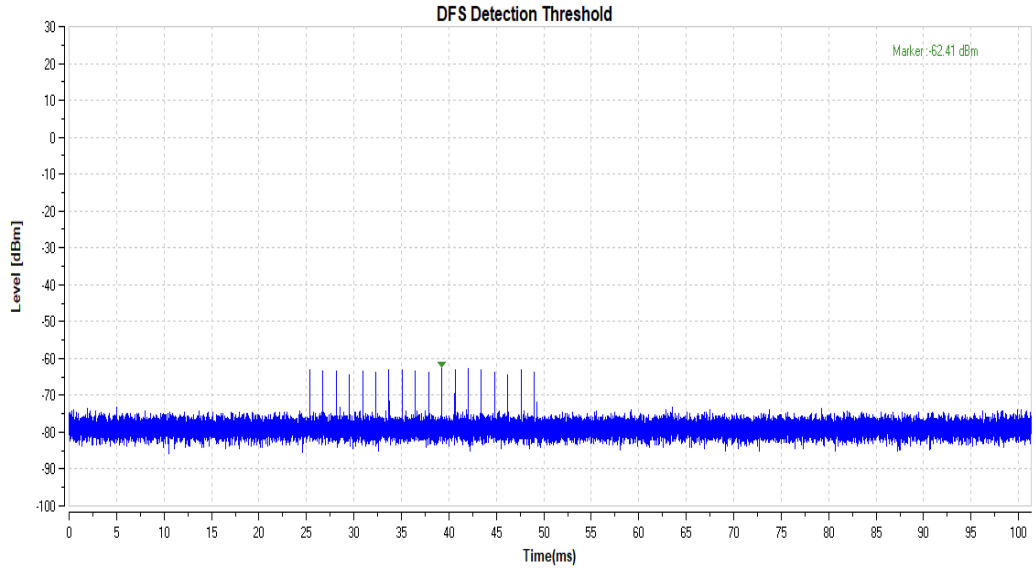
Test Mode	Channel	Radar Type	Result (dBm)
20M	5320	Type1	-62.27
	5500	Type1	-62.41

Test Graphs

20M_5320_Type1



20M_5500_Type1



CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

Test Procedure

Perform the type 1 pulse radar waveform for testing.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = N * Dwell Time

N is the number of spectrum analyzer bins showing a device transmission Dwell Time is the dwell time per bin (i.e. Dwell Time = S/B, S is the sweep time and B is the number of bin, i.e. 8192)

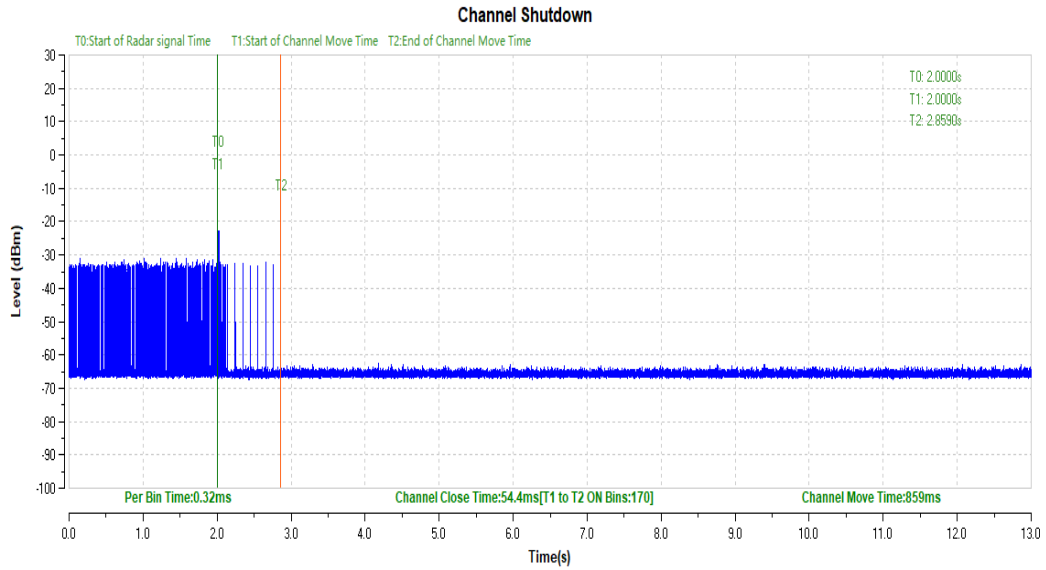
Test Results

Test Mode	Channel	Radar Type	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC20SISO	5320	Type1	54.4	260	859	10000	PASS
	5500	Type1	35.84	260	787.2	10000	PASS

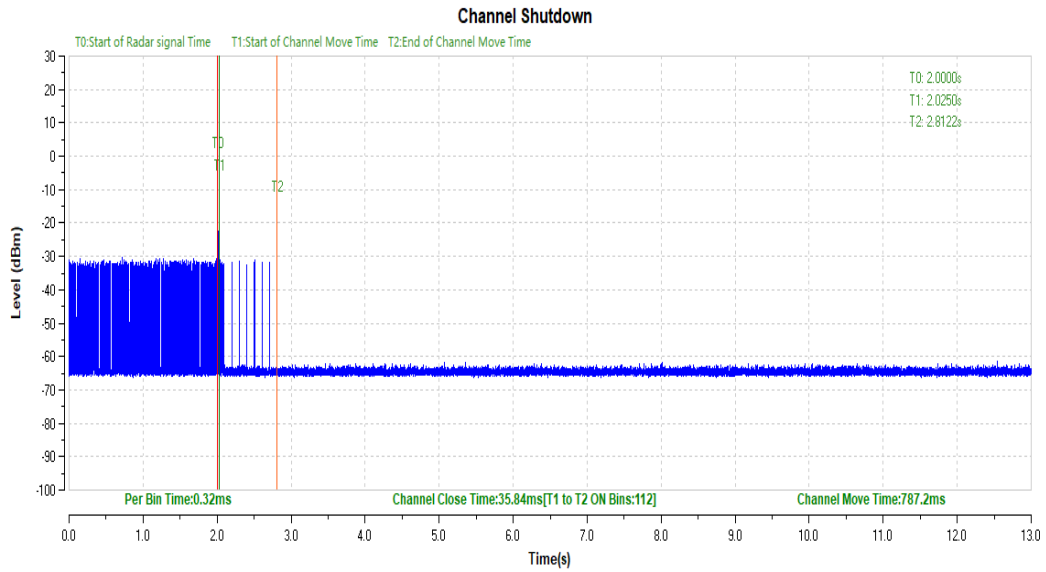
Please refer to the following tables and plots.

Test Graphs

11AC20SISO_5320



11AC20SISO_5500



NON-OCCUPANCY PERIOD

Test Procedure

Measure the EUT for more than 30 minutes following the channel close/move time to very that the EUT does not resume any transmissions on this channel. Provide one plot to demonstrate no transmission on the channel for the non-occupancy period (30 minutes observation time)

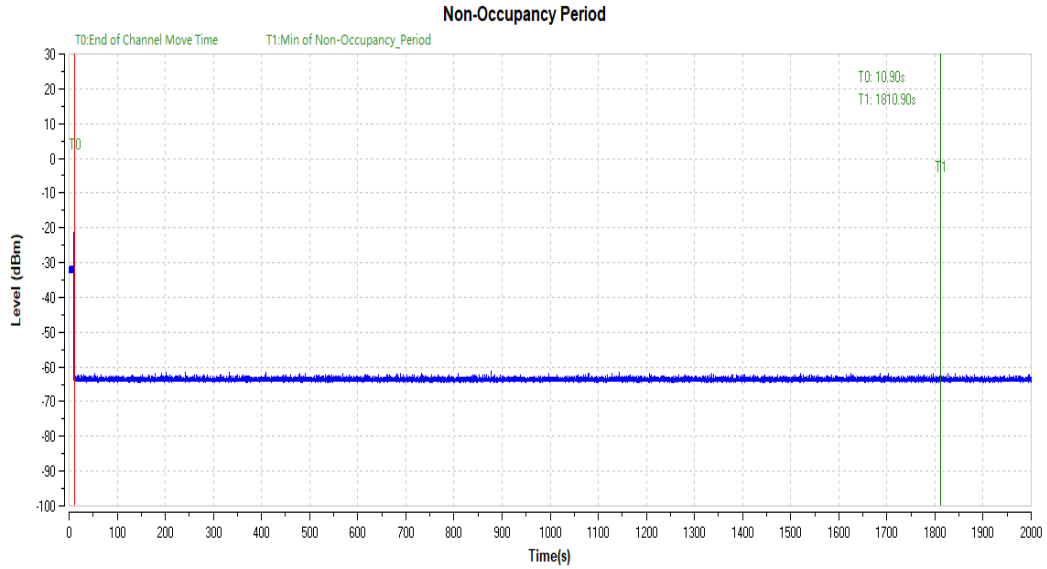
Results

Test Mode	Channel	Radar Type	Result	Limit[s]	Verdict
11AC20SISO	5320	Type1	see test graph	≥1800	PASS
	5500	Type1	see test graph	≥1800	PASS

Please refer to the following plots.

Test Graphs

11AC20SISO_5320_Type1



11AC20SISO_5500_Type1

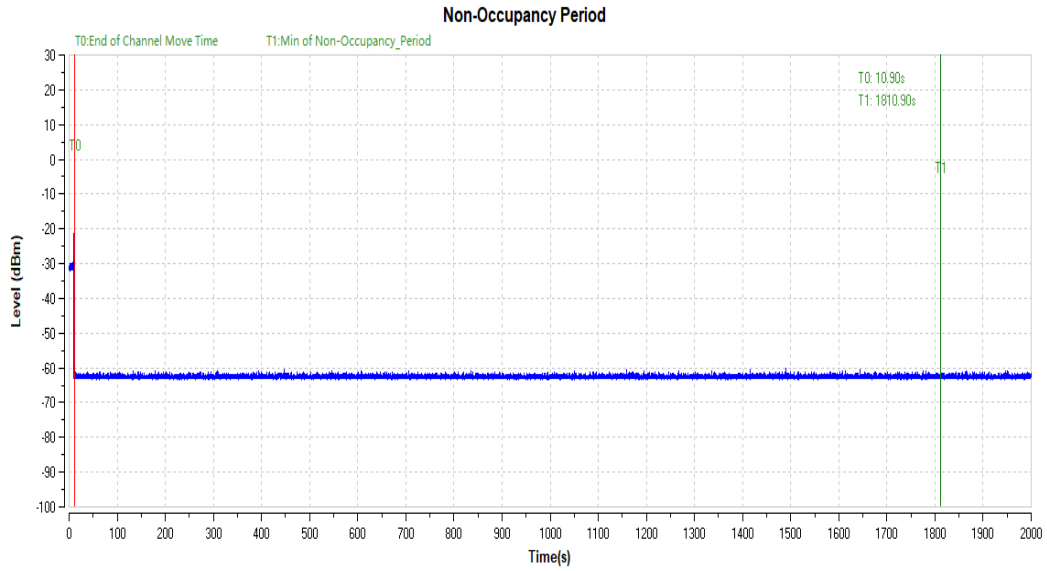


EXHIBIT A – EUT PHOTOGRAPHS

Please refer to the attachment 2502Q45198E-RF-EXP EUT External photos and 2502Q45198E-RF-INP EUT Internal photos.

EXHIBIT B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2502Q45198E-RF-TSP Test Setup Photos.

******END OF REPORT******