

Luxshare Precision Industry Co.,Ltd.

TEST REPORT

SCOPE OF WORK

FCC TESTING— 33629073

REPORT NUMBER

251117047SZN-004

ISSUE DATE

Jan. 19, 2026

[REVISED DATE]

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RF Test Report

Applicant: Luxshare Precision Industry Co.,Ltd.

Address of Applicant: Floor 2, Block A, Sanyo New Industrial Area, West Haoyi
Community, Shajing Subdistrict Office, Bao an District
Shenzhen, China.

Equipment Under Test (EUT)

Product Name: WS137K4

Model No.: 33629073

Trademark: N/A

FCC ID: 2AYYS-WS137K4Y

Applicable Standards: FCC CFR Title 47 Part 15E (\$15.407)

Date of Test: Nov. 17, 2025 to Jan. 09, 2026

Test Result: PASS

Prepared and Checked by:



Tony Tang
Engineer

Approved by:



Johnny Wang
Project Engineer
Date: Jan. 19, 2026

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Intertek Testing Service Shenzhen Ltd. Longhua Branch

101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen.

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1 Revision History

Report No.	Version No.	Description	Issued Date
251117047SZN-004	01	Original	Jan. 19, 2026

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3 Summary of Test Result

TEST ITEM	FCC REFERENCE	RESULT
Antenna requirement	15.203	Pass
Duty Cycle	-	Pass
26 dB Bandwidth & 99% Occupied Bandwidth	15.407(a)	Pass
Minimum 6dB Bandwidth	15.407(e)	Pass
Maximum Conducted Output Power	15.407(a)	Pass
Power spectral density	15.407(a)	Pass
Frequency Stability	15.407(g)	Pass
Radiated Emission and Band Edge	15.407(b), 15.205, 15.209	Pass
AC Power line conducted emission	15.207	Pass
Dynamic Frequency Selection	15.407(h)	Pass

4 General Information

4.1 Client Information

Applicant:	Luxshare Precision Industry Co.,Ltd.
Address:	Floor 2, Block A, Sanyo New Industrial Area, West Haoyi Community, Shajing Subdistrict Office, Bao an District Shenzhen, China.
Manufacturer:	Luxshare Precision Industry Co.,Ltd.
Address:	Floor 2, Block A, Sanyo New Industrial Area, West Haoyi Community, Shajing Subdistrict Office, Bao an District Shenzhen, China.

4.2 Description of Equipment Under Test (EUT)

Product Name:	WS137K4
Model No.:	33629073
Description of EUT:	The EUT contains Wi-Fi 2.4G, Wi-Fi 5G, Bluetooth (dual mode) functions. This report is for Wi-Fi 5G. The worst data is listed in the report.
Radio Technology:	IEEE 802.11a/n HT20/n HT40/ac VHT20/ac VHT40/ac VHT80
Operation Frequency:	U-NII-1: 5150 MHz - 5250 MHz
	U-NII-2A: 5250 MHz - 5350 MHz
	U-NII-2C: 5470 MHz - 5725 MHz
	U-NII-3: 5725 MHz - 5850 MHz
Channel Numbers:	U-NII-1, 2A: 4, U-NII-2C: 12, U-NII-3: 5 (802.11 a/n20/ac-VHT20)
	U-NII-1, 2A, 3: 2, U-NII-2C: 6 (802.11 n40/ac-VHT40)
	U-NII-1, 2A, 3: 1, U-NII-2C: 3 (802.11 ac-VHT80)
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Type:	Internal Antenna
Antenna Gain:	Ant 1: 0.79dBi, Ant2: 2.32dBi, MIMO: 4.60dBi (This information is provided by applicant, and the applicant is responsible for the authenticity of the provided information.)
DFS Operation Type:	☐ Master Device ☐ Slaver Device with Radar detection function ☒ Slaver Device without Radar detection function
Antenna Transmit Mode:	2TX, 2RX
Power Supply:	Input: DC 5.0V, 1.0A
AC Adapter:	Adapter 1 Model: FC005A10-050010U Input: 100-240V~, 50/60Hz, 0.25A Max. Output: 5.0V=1.0A Adapter 2 Model: PS06T050K1000UD Input: 100-240V~, 50/60Hz, 0.25A Max. Output: 5.0V=1.0A

Note:

- The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
- Two different adapter types were tested. This report documents only the worst-case test results.

3. Radiation emission tests were conducted on three types of Equipment Under Test (EUT). The three units differed solely in the DDR and eMMC chips used. This report documents only the worst-case test results.

The details are as follows:

Items	Sample 1	Sample 2	Sample 3
eMMC	Model: FEMDNN008G-C9A39 Manufacturer: Shenzhen Longsys Electronics Co., Ltd.	Model: FEMDNN008G-C9A39 Manufacturer: Shenzhen Longsys Electronics Co., Ltd.	Model: FEMDNN008G-C9X08 Manufacturer: Shenzhen Longsys Electronics Co., Ltd.
DDR	Model: MT40A512M16LY-062E:E Manufacturer: Micron Technology, Inc.	Model: BWND4X16I8B-8Gb Manufacturer: BIWIN STORAGE TECHNOLOGY CO.,LTD.	Model: RS512M16ZSDD-75DT Manufacturer: Rayson HI-TECH(SZ)Co.,Ltd.

4.3 Description of Test Facility

Name:	Intertek Testing Services Shenzhen Ltd. Longhua Branch
Address:	101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen.
The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0327
	FCC Accredited Lab Designation Number: CN1188
	IC Registration Lab CAB identifier: CN0038

5 Test Specifications

5.1 Standards or Specification

FCC CFR 47 Part 15E

ANSI C63.10 (2020)

KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

5.2 Channels List

802.11a/n(HT20)/ac(VHT20)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	-	-	-	-
802.11n(HT40)/ac(VHT40)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz
802.11ac(VHT80)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
112	5610 MHz	138	5690 MHz	155	5775 MHz

5.3 Test Channels

UNII-1 Test Channel Configuration		
Mode	Test Channel Number	Frequency
802.11a	CH 36(Low Channel), CH 40(MID Channel), CH 48(High Channel)	5180 MHz, 5200 MHz, 5240 MHz
802.11n HT20	CH 36(Low Channel), CH 40(MID Channel), CH 48(High Channel)	5180 MHz, 5200 MHz, 5240 MHz
802.11n HT40	CH 38(Low Channel), CH 46(High Channel)	5190 MHz, 5230 MHz
802.11ac VHE20	CH 36(Low Channel), CH 40(MID Channel), CH 48(High Channel)	5180 MHz, 5200 MHz, 5240 MHz
802.11ac VHE40	CH 38(Low Channel), CH 46(High Channel)	5190 MHz, 5230 MHz
802.11ac VHT80	CH 42(Low Channel)	5210 MHz

UNII-2A Test Channel Configuration		
Mode	Test Channel Number	Frequency
802.11a	CH 52(Low Channel), CH 56(MID Channel), CH 64(High Channel)	5260 MHz, 5280 MHz, 5320 MHz
802.11n HT20	CH 52(Low Channel), CH 56(MID Channel), CH 64(High Channel)	5260 MHz, 5280 MHz, 5320 MHz
802.11n HT40	CH 54(Low Channel), CH 62(High Channel)	5270 MHz, 5310 MHz
802.11ac VHT20	CH 52(Low Channel), CH 56(MID Channel), CH 64(High Channel)	5260 MHz, 5280 MHz, 5320 MHz
802.11ac VHT40	CH 54(Low Channel), CH 62(High Channel)	5270 MHz, 5310 MHz
802.11ac VHT80	CH 58(Low Channel)	5290 MHz

UNII-2C Test Channel Configuration		
Mode	Test Channel Number	Frequency
802.11a	CH 100(Low Channel), CH 116(MID Channel), CH 140(High Channel)	5500 MHz, 5580 MHz, 5700 MHz
802.11n HT20	CH 100(Low Channel), CH 116(MID Channel), CH 140(High Channel)	5500 MHz, 5580 MHz, 5700 MHz
802.11n HT40	CH 102(Low Channel), CH 110(MID Channel), CH 134(High Channel)	5510 MHz, 5550 MHz, 5670 MHz
802.11ac VHT20	CH 100(Low Channel), CH 116(MID Channel), CH 140(High Channel)	5500 MHz, 5580 MHz, 5700 MHz
802.11ac VHT40	CH 102(Low Channel), CH 110(MID Channel), CH 134(High Channel)	5510 MHz, 5550 MHz, 5670 MHz
802.11ac VHT80	CH 102(Low Channel), CH 122(High Channel)	5530 MHz, 5610 MHz

UNII-3 Test Channel Configuration		
Mode	Test Channel Number	Frequency
802.11a	CH 149(Low Channel), CH 157(MID Channel), CH 165(High Channel)	5745 MHz, 5785 MHz, 5825 MHz
802.11n HT20	CH 149(Low Channel), CH 157(MID Channel), CH 165(High Channel)	5745 MHz, 5785 MHz, 5825 MHz
802.11n HT40	CH 151(Low Channel), CH 159(High Channel)	5755MHz, 5795MHz
802.11ac VHT20	CH 149(Low Channel), CH 157(MID Channel), CH 165(High Channel)	5745 MHz, 5785 MHz, 5825 MHz
802.11ac VHT40	CH 151(Low Channel), CH 159(High Channel)	5755MHz, 5795MHz
802.11ac VHT80	CH 155(Low Channel)	5775 MHz

Straddle Test Channel Configuration		
Mode	Test Channel Number	Frequency
802.11a	CH 144	5720 MHz
802.11n HT20	CH 144	5720 MHz
802.11n HT40	CH 142	5710 MHz
802.11ac VHT20	CH 144	5720 MHz
802.11ac VHT40	CH 142	5710 MHz
802.11ac VHT80	CH 138	5690 MHz

Data rate and Power setting:

The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases. After this pre-scan, we choose the following table of the data rata as the worst case.

Test software: CMD

Power Setting SISO											
Mode	Freq (MHz)	SISO ANT1	SISO ANT2	Mode	Freq (MHz)	SISO ANT1	SISO ANT2	Mode	Freq (MHz)	SISO ANT1	SISO ANT2
802.11a	5180	104	108	802.11n 20M	5180	100	100	802.11ac 20M	5180	90	90
	5200	104	108		5200	100	100		5200	90	90
	5240	104	108		5240	100	100		5240	86	90
	5260	108	108		5260	86	100		5260	92	90
	5280	108	108		5280	96	100		5280	92	90
	5320	104	108		5320	96	100		5320	92	90
	5500	86	96		5500	86	86		5500	82	82
	5580	76	82		5580	72	76		5580	68	68
	5700	72	76		5700	72	72		5700	66	62
	5720-2C	72	76		5720-2C	72	72		5720-2c	66	62
	5720-3	72	76		5720-3	72	72		5720-3	66	62
	5745	72	76		5745	66	72		5745	68	62
	5785	72	76		5785	66	68		5785	68	62
	5825	72	76		5825	66	68		5825	68	60
802.11n 40M	5190	100	100	802.11ac 40M	5190	90	90	802.11ac 80M	5210	86	90
	5230	100	100		5230	90	90		5290	96	90
	5270	100	100		5270	96	90		5530	96	90
	5310	100	100		5310	96	90		5610	96	68
	5510	82	86		5510	104	78		5690-2C	66	68
	5550	76	82		5550	104	72		5690-3	66	68
	5670	72	72		5670	76	68		5775	66	60
	5710-2C	72	72		5710-2C	66	62				
	5710-3	72	72		5710-3	66	62				
	5755	68	72		5755	66	62				
	5795	68	70		5795	66	62				

Power Setting MIMO					
Mode	Freq (MHz)	MIMO	Mode	Freq (MHz)	MIMO
802.11n 20M	5180	90	802.11ac 20M	5180	82
	5200	90		5200	82
	5240	90		5240	82
	5260	90		5260	82
	5280	90		5280	82
	5320	90		5320	82
	5500	74		5500	68
	5580	62		5580	58
	5700	62		5700	52
	5720-2C	62		5720-2c	52
	5720-3	62		5720-3	52
	5745	58		5745	52
	5785	58		5785	52
	5825	58		5825	52
802.11n 40M	5190	86	802.11ac 40M	5190	82
	5230	86		5230	82
	5270	86		5270	82
	5310	86		5310	82
	5510	72		5510	68
	5550	66		5550	62
	5670	58		5670	58
	5710-2C	58		5710-2C	58
	5710-3	58		5710-3	58
	5755	58		5755	52
	5795	58		5795	52
802.11ac 80M	5210	82			
	5290	82			
	5530	62			
	5610	58			
	5690-2C	58			
	5690-3	58			
	5775	58			

5.4 Support Equipment List and Description

Description	Manufacturer	Model No.
-	-	-

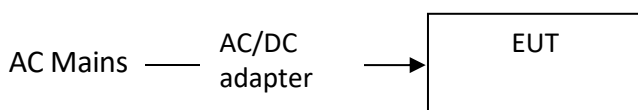
5.5 Test environment condition:

Operating Environment:	
Temperature:	Normal: 15°C ~ 35°C, Extreme: 0°C ~ 40°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 102Vac, Extreme: Low 120Vac, High 138Vac
Test Engineer:	Tony Tang

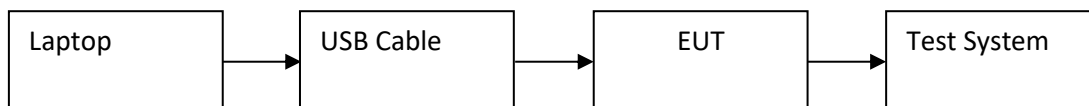
Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
NT/NV	+15 to +35	120	20 to 75
Remark:			
1) NV: Normal Voltage; NT: Normal Temperature			

5.6 Block Diagram Showing the Configuration of System Tested

Conducted Test & Radiated Test



Conducted Measurements Test



This example is connection diagram of EUT Test Setups.

For detail, please refer to test mode configuration and setup photographs for each test item.

5.7 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	2025-04-21	2026-04-21
SZ182-02-01	Pulse Power Sensor	Anritsu	MA2411B	1207429	2025-04-21	2026-04-21
SZ070-20	Combiner	Mini-Circuits	ZN2PD-63-S+	--	2025-04-21	2026-04-21
SZ070-21	Combiner	Mini-Circuits	ZN2PD-63-S+	--	2025-04-21	2026-04-21
SZ180-13	MXG Vector Signal Generator	Keysight	N5182B	MY53051328	2025-09-15	2026-09-15
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	2024-12-06 2025-12-01	2025-12-06 2026-12-01
SZ061-13	BiConiLog Antenna	ETS	3142E	00217919	2025-05-29	2028-05-29
SZ061-08	Horn Antenna	ETS	3115	00092346	2024-09-13	2027-09-13
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	2024-05-05	2027-05-05
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	2025-09-11	2028-09-11
SZ185-03	EMI Receiver	R&S	ESR7	101975	2025-04-13	2026-04-13
SZ056-05	Signal Analyzer	R&S	FSV 40	101101	2024-12-05 2025-12-01	2025-12-05 2026-12-01
SZ181-08	Microwave System Amplifier	keysight	83017A	MY57280108	2025-07-30	2026-07-30
SZ188-05	Anechoic Chamber	ETS	FACT 3-2.0	CT001880-Q13914102	2025-06-18	2028-06-18
SZ062-23	RF Cable	HUBER+SUHNER	SF104PE-1M	MY4262/4PE	2025-09-15	2026-09-15
SZ062-40	RF Cable	Talent Microwave	A50-3.5M3.5M-4.5M	22012932	2025-09-15	2026-09-15
SZ062-38	RF Cable	Talent Microwave	A50-3.5M3.5M-8M	21051695	2025-09-15	2026-09-15
SZ067-25	Notch Filter	Micro-Tronics	BRM50716	076	2025-02-22	2026-02-22
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	015	2025-04-21	2026-04-21
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	2025-06-30	2026-06-30
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	2025-04-25	2026-04-25
SZ062-16	RF Cable	HUBER+SUHNER	CBL2-BN-1m	110127-2231000	2025-06-30	2026-06-30
SZ016-12	Programmable Temperature & Humidity Chamber	Taili	MHK-120NK	AB0105	2025-12-04 2025-12-01	2025-12-04 2026-12-01

5.8 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Parameter	Expanded Uncertainty (Confidence of 95% (U = 2Uc(y)))
Channel Bandwidth	±3.46%
RF Output Power	±0.31dB
Power Spectral Density	±1.19dB
Frequency Stability	+/-0.64kHz
Conducted Unwanted Emission	±0.55dB
Spurious emission (above 18GHz)	±5.3dB
Spurious emission (6GHz to 18GHz)	±5.1dB
Radiated emission (1GHz to 6GHz)	±4.8dB
Radiated emission (Up to 1GHz)	±4.8dB
AC Power line conducted emission	±3.2 dB
Temperature	±1°C
Humidity	±5%

6 Antenna Requirement

6.1 Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the party responsible is used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

1. The antennas of the EUT are permanently attached.
2. There are no provisions for connection to an external antenna.

6.2 Conclusion:

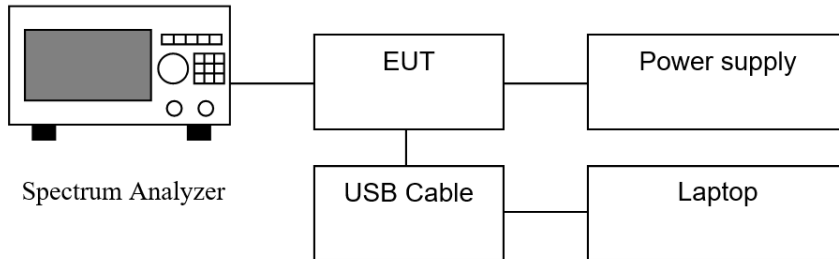
Therefore, this E.U.T complies with the requirement of Part 15.203

7 Duty Cycle

7.1 Limit

None; for reporting purposes only.

7.2 Test Setup



7.3 Test Procedure

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.B.

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq EBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.).

7.4 Test Results of Duty Cycle

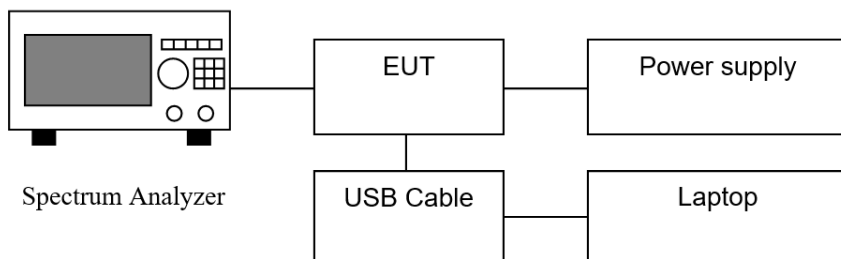
The more detail please refer to "Appendix of 251117047SZN-004".

8 26 dB Bandwidth & 99% Occupied Bandwidth

8.1 Limit

None

8.2 Test Setup



8.3 Test Procedure

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.C1. for 26 dB Emission Bandwidth; section II.D. for 99 %

26 dB Bandwidth

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

99% Occupied Bandwidth

- Set center frequency to the nominal EUT channel center frequency.
- Set span = 1.5 times to 5.0 times the OBW.
- Set RBW = 1 % to 5 % of the OBW
- Set VBW $\geq 3 \times$ RBW
- Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- Use the 99 % power bandwidth function of the instrument (if available).
- If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Note: For devices that use channel aggregation refer to III.A and III.C for determining 99% bandwidth.

8.4 Test Results of 26 dB Bandwidth & 99% Occupied Bandwidth

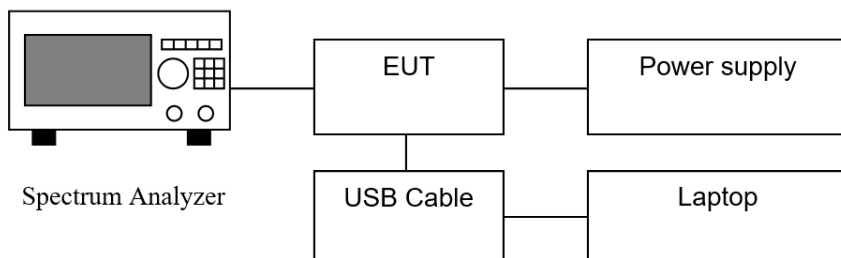
The more detail please refer to "Appendix of 251117047SZN-004".

9 Minimum 6dB bandwidth

9.1 Limit

For systems using digital modulation techniques that may operate in the 5725 - 5850 MHz band, the minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 Test Setup



9.3 Test Procedure

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.C2. for 6 dB Emission Bandwidth

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

9.4 Test Results of Minimum 6dB bandwidth

The more detail please refer to "Appendix of 251117047SZN-004".

10 Maximum Conducted Output Power

10.1 Limit

Frequency range (MHz)	Max Conducted TX Power
5150~5250	30dBm (1W) for master device
	24dBm (250mW) for client device
5250~5350	24dBm (250mW) or 11dBm+ 10logB*
5470~5725	24dBm (250mW) or 11dBm+ 10logB*
5725~5850	30dBm (1W)

Remark:

- *Where B is the 26dB emission Bandwidth in MHz.
- The device was declared as Slave device.
- The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

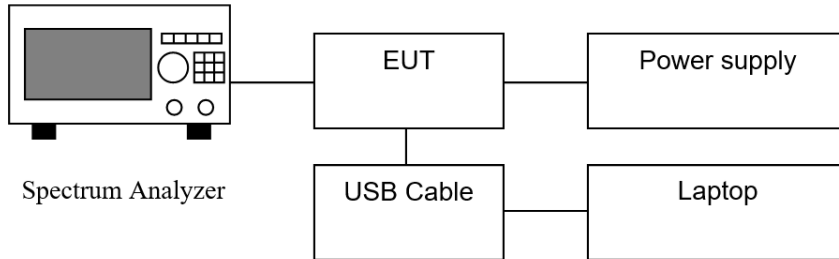
10.2 Test Procedure

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.E.

Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

- Measure the duty cycle, x , of the transmitter output signal as described in II.B.
- Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- Set RBW = 1 MHz.
- Set VBW $\geq$ 3 MHz.
- Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto.
- Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
- Do not use sweep triggering. Allow the sweep to "free run."
- Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
- Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times

10.3 Test Setup



10.4 Test Results of Maximum conducted output power

Max Conducted Average output power

The more detail please refer to “Appendix of 251117047SZN-004”.

11 Power spectrum density

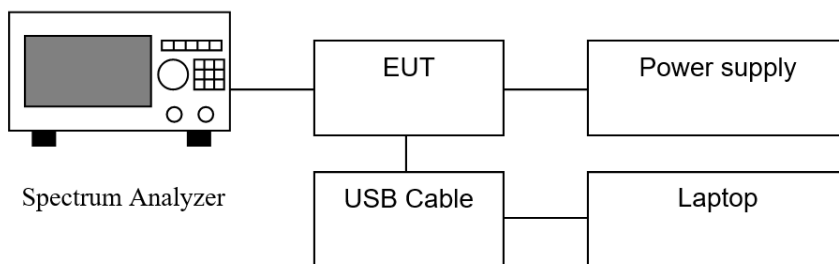
11.1 Limit

Frequency range (MHz)	Max Conducted Power Spectral Density
5150~5250	*17dBm/MHz for master device
	11dBm/MHz for mobile/portable client device
5250~5350	11dBm/MHz
5470~5725	11dBm/MHz
5725~5850	30dBm/500kHz

Remark:

- 1) *The device was declared as Slave device.
- 2) Tx Power Reduction (dBm-by-dBi) required when antenna exceeds 6dBi.

11.2 Test Setup



11.3 Test Procedure

Refer to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 section II.F.

Connect the EUT to the spectrum analyzer and use the following settings:

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz for U-NII 1, 2A, 2C, 500kHz for U-NII 3
4. VBW $\geq$ 3MHz for U-NII 1, 2A, 2C, $\geq 3 \times$ RBW for U-NII 3
5. Number of sweep points $> 2 \times$ (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

11.4 Test Results of Power spectrum density

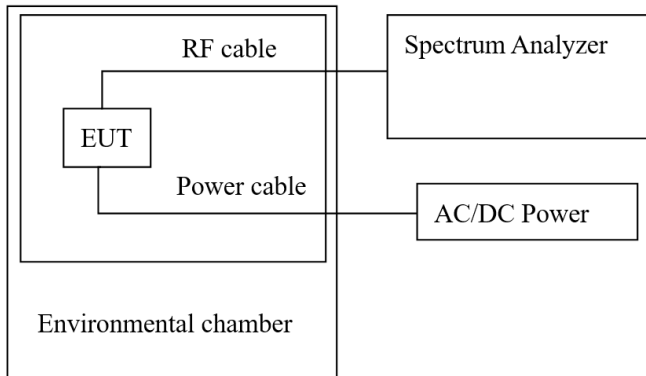
The more detail please refer to "Appendix of 251117047SZN-004".

12 Frequency Stability

12.1 Limit

The frequency stability shall be sufficient to ensure that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

12.2 Test Setup



12.3 Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between 0 °C ~ 40 °C (declared by customer).
2. The temperature was incremented by 10 °C intervals and the unit allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
3. The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

12.4 Test Results of Frequency Stability

The more detail please refer to "Appendix of 251117047SZN-004".

14 Radiated Emission

14.1 Limit

Part 15.247(d), Part 15.205, Part 15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of Part 15.247 the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Part 15.209

Frequency (MHz)	FCC Limit (uV/m)	Measurement Distance (m)
0.009 – 0.490	2 400 / F (kHz)	300
0.490 – 1.705	24 000 / F (kHz)	30
1.705 – 30.0	30	30

Frequency (MHz)	FCC Limit (uV/m)	Measurement Distance (m)
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §15.231 and 15.241.

FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

Limits of unwanted/undesirable emission out of the restricted bands refer to CFR 47 FCC §15.407 (b)

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1GHz)		
Frequency Range (MHz)	EIRP Limit	Field Strength Limit (dBuV/m) at 3 m
5150~5250 MHz	PK: -27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz		
5470~5725 MHz		
5725~5850 MHz	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK: 105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK: 122.2 (dBμV/m) *4

Note:

*1 beyond 75 MHz or more above the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

14.2 Test Procedure

For Radiated emission below 30MHz:

- a) The EUT was placed on the top of a rotating table 0.8 meters (0.1 meters for floor-standing device) above the ground at a 3 meters chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, the lowest height of the magnetic antenna was 1 m above the ground.
- c) Both X and Y axes of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to peak or quasi-peak detect function and specified bandwidth with maximum hold mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz).

For Radiated emission above 30MHz:

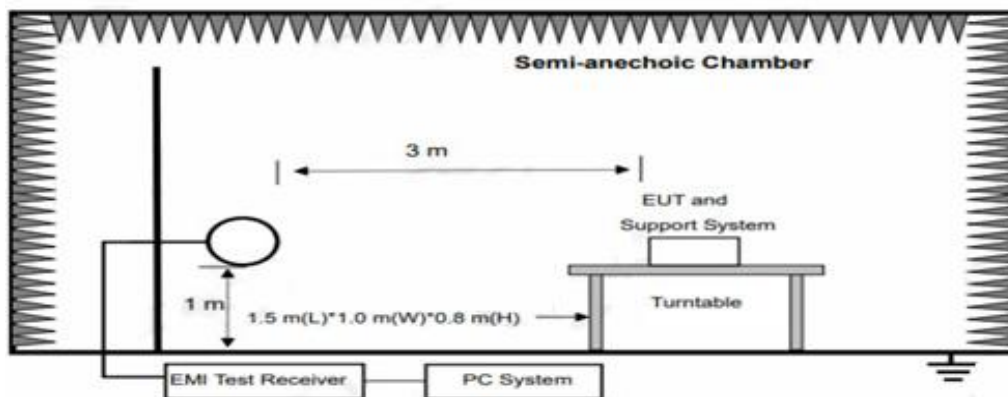
- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) or 0.1 meters (for floor-standing device) above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to peak or quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

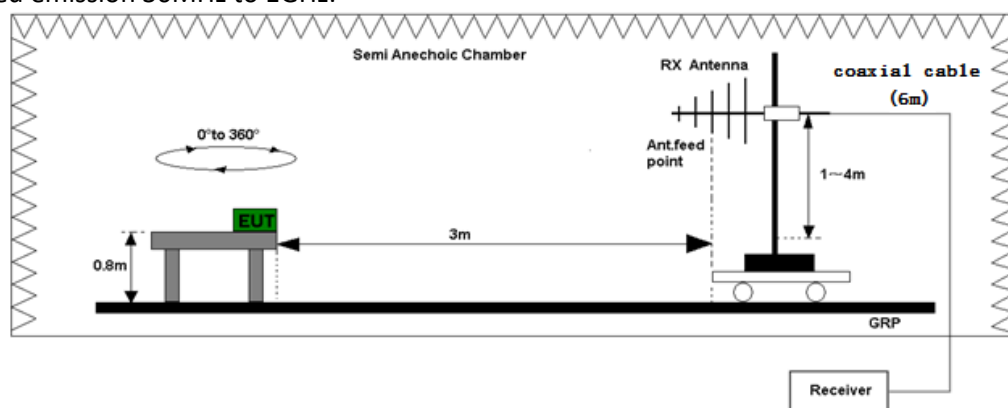
1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for peak or quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz at frequency above 1GHz for peak detection above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or $3 \times \text{RBW}$ (Duty cycle $\geq 98\%$) for average detection (AV) at frequency above 1GHz.
4. All modes have been tested, but only the worst data was recorded in the report.

14.3 Test Setup

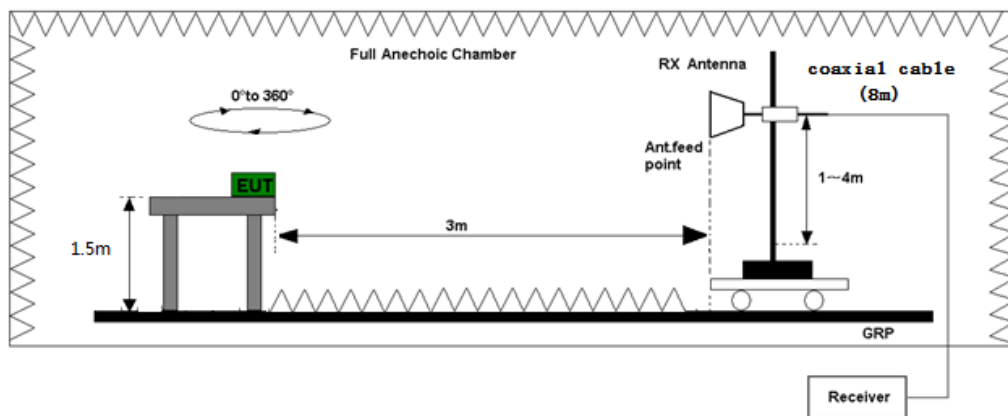
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:

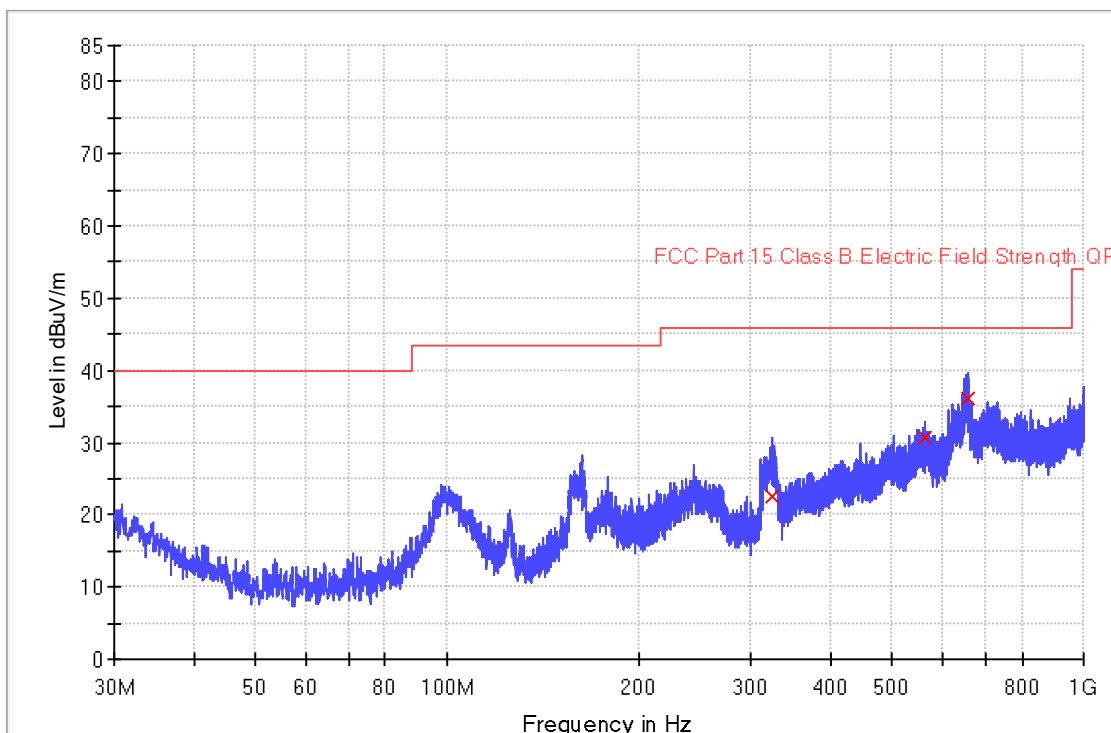


14.4 Test Results of Radiated Emissions

Below 1GHz:

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

Product Name:	WS137K4	Product Model:	33629073
Test By:	Tony Tang	Test mode:	5G Wi-Fi mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120V, 60Hz		



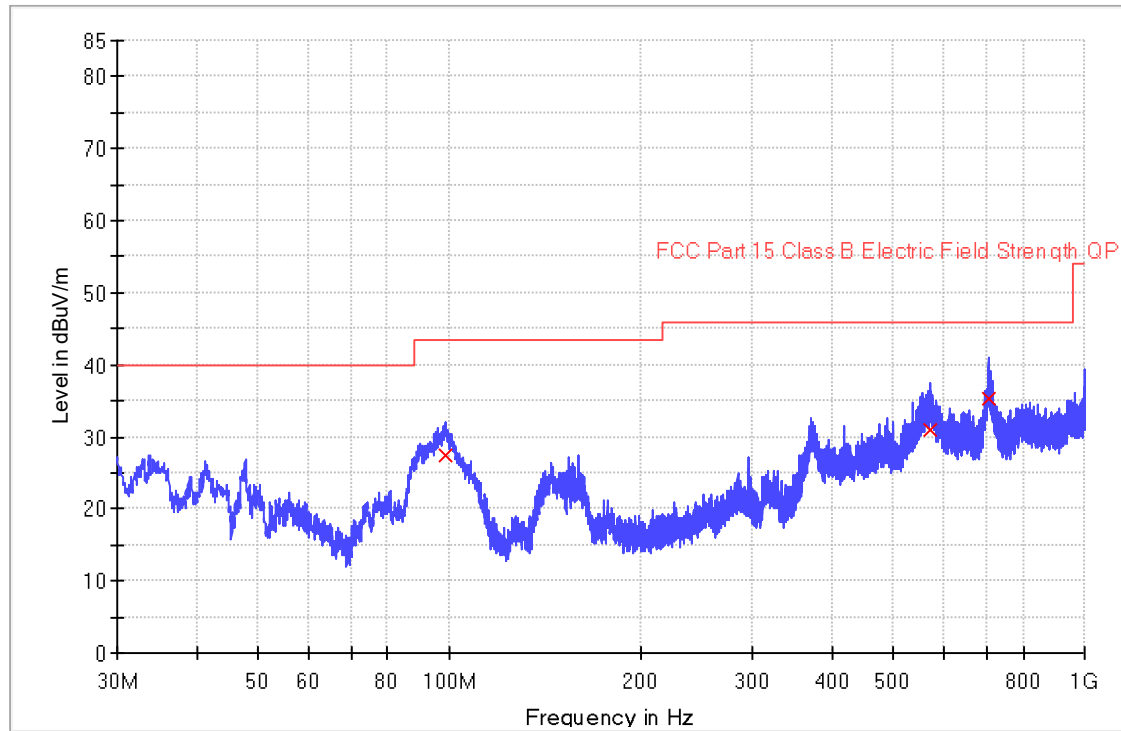
Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
325.106333	22.6	1000.0	120.000	H	21.6	23.4	46.0
563.597000	30.8	1000.0	120.000	H	29.0	15.2	46.0
658.851000	36.0	1000.0	120.000	H	29.8	10.0	46.0

Remark:

1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBμV/m) = Corr. (dB/m) + Read Level (dBμV)
3. Margin (dB) = Limit QPK (dBμV/m) – Quasi Peak (dBμV/m)

Product Name:	WS137K4	Product Model:	33629073
Test By:	Tony Tang	Test mode:	5G Wi-Fi mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	AC 120V, 60Hz		



Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
98.514333	27.4	1000.0	120.000	V	14.6	16.1	43.5
571.324667	30.9	1000.0	120.000	V	29.0	15.1	46.0
708.127000	35.3	1000.0	120.000	V	31.1	10.7	46.0

Remark:

1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Quasi Peak (dBuV/m) = Corr. (dB/m) + Read Level (dBuV)
3. Margin (dB) = Limit QPK (dBuV/m) – Quasi Peak (dBuV/m)

Above 1GHz:

Worst-case Results:

The worst case occurred at 802.11ac-HT40 MIMO

Channel 38

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10380.000	45.7	36.3	38.9	48.3	68.2	-19.9
Horizontal	15570.000	46.5	34.7	41.0	52.8	68.2	-15.4
Horizontal	5150.000	62.9	33.5	32.9	62.3	68.2	-5.9

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10380.000	36.6	36.3	38.9	39.2	54.0	-14.8
Horizontal	15570.000	39.4	34.7	41.0	45.7	54.0	-8.3
Horizontal	5150.000	49.8	33.5	32.9	49.2	54.0	-4.8

Channel 46

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10460.000	48.9	36.3	38.9	51.5	68.2	-16.7
Horizontal	15690.000	47.3	34.7	41.0	53.6	68.2	-14.6
Horizontal	5350.000	50.6	33.6	33.2	50.2	68.2	-18.0

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10460.000	37.0	36.3	38.9	39.6	54.0	-14.4
Horizontal	15690.000	35.2	34.7	41.0	41.5	54.0	-12.5
Horizontal	5350.000	42.5	33.6	33.2	42.1	54.0	-11.9

Channel 54

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10540.000	51.3	36.3	38.9	53.9	68.2	-14.3
Horizontal	15810.000	51.2	34.7	41.0	57.5	68.2	-10.7

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10540.000	40.3	36.3	38.9	42.9	54.0	-11.1
Horizontal	15810.000	40.1	34.7	41.0	46.4	54.0	-7.6

Channel 62

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10620.000	50.1	36.3	38.9	52.7	68.2	-15.5
Horizontal	15930.000	49.1	34.7	41.0	55.4	68.2	-12.8
Horizontal	5350.000	56.7	33.6	33.2	56.3	68.2	-11.9

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	10620.000	39.7	36.3	38.9	42.3	54.0	-11.7
Horizontal	15930.000	40.6	34.7	41.0	46.9	54.0	-7.1
Horizontal	5350.000	51.3	33.6	33.2	50.9	54.0	-3.1

Channel 102

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11020.000	50.5	36.3	38.9	53.1	68.2	-15.1
Horizontal	16530.000	51.2	34.7	41.0	57.5	68.2	-10.7
Horizontal	5470.000	58.9	33.1	33.5	59.3	68.2	-8.9

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11020.000	39.5	36.3	38.9	42.1	54.0	-11.9
Horizontal	16530.000	41.5	34.7	41.0	47.8	54.0	-6.2
Horizontal	5470.000	49.9	33.1	33.5	50.3	54.0	-3.7

Channel 110

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11100.000	51.9	36.3	38.9	54.5	68.2	-13.7
Horizontal	16650.000	52.3	34.7	41.0	58.6	68.2	-9.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11100.000	40.8	36.3	38.9	43.4	54.0	-10.6
Horizontal	16650.000	41.9	34.7	41.0	48.2	54.0	-5.8

Channel 134

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11340.000	52.9	36.3	39.0	55.6	68.2	-12.6
Horizontal	17010.000	50.3	34.7	41.2	56.8	68.2	-11.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11340.000	40.2	36.3	39.0	42.9	54.0	-11.1
Horizontal	17010.000	42.3	34.7	41.2	48.8	54.0	-5.2

Channel 151

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11510.000	52.5	36.3	39.0	55.2	68.2	-13.0
Horizontal	17265.000	50.9	34.7	41.2	57.4	68.2	-10.8
Horizontal	5725.000	75.7	33.9	32.9	74.7	122.2	-47.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11510.000	43.3	36.3	39.0	46.0	54.0	-8.0
Horizontal	17265.000	41.3	34.7	41.2	47.8	54.0	-6.2

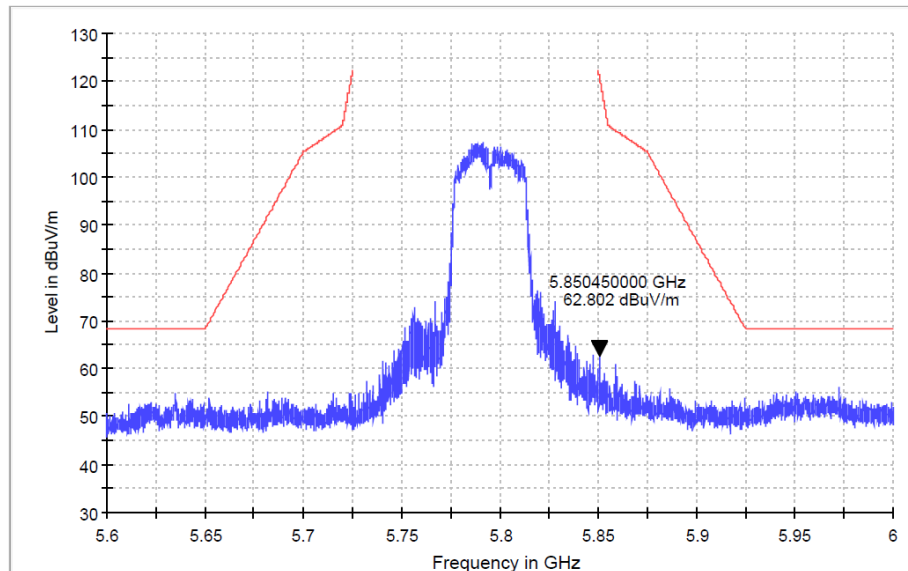
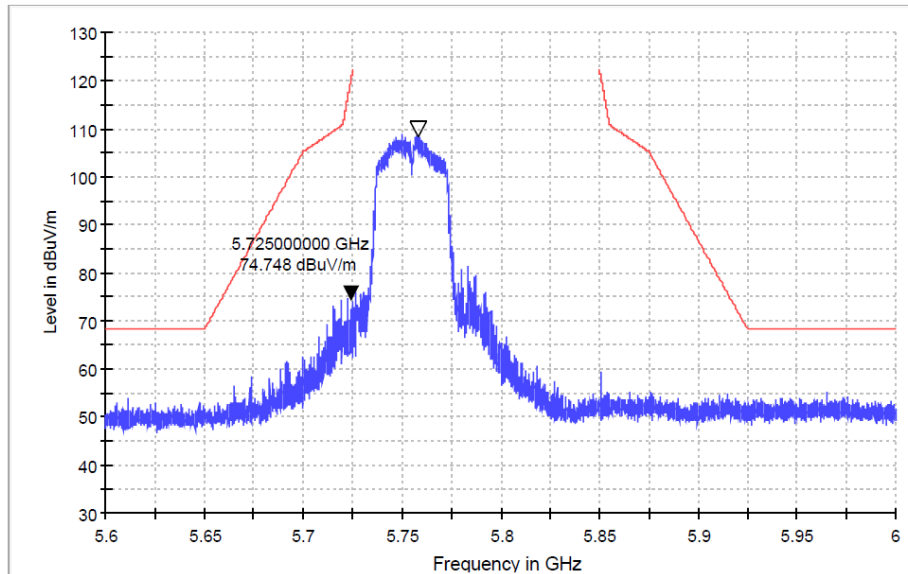
Channel 159

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11590.000	50.9	36.3	39.0	53.6	68.2	-14.6
Horizontal	17385.000	53.2	34.7	41.2	59.7	68.2	-8.5
Horizontal	5850.000	61.7	33.4	34.5	62.8	122.2	-59.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	11590.000	43.2	36.3	39.0	45.9	54.0	-8.1
Horizontal	17385.000	41.2	34.7	41.2	47.7	54.0	-6.3

U-NII-3(5725MHz-5850MHz)

Worst case mode 802.11ac-HT40 MIMO result:



Note:

1. Negative value in the margin column shows emission below limit.
2. Horn antenna used for the emission over 1000MHz.
3. All modes have been tested, but only the worst data was recorded in the report.
4. Tests were conducted in both the horizontal and vertical directions, but only worst-case data record in report.
5. Emission within the restricted band meets the requirement. The corresponding limit are based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function. All unwanted emissions outside of the 5.15-5.35GHz & 5.47-5.725GHz & 5725-5850 bands are complied with the limit.

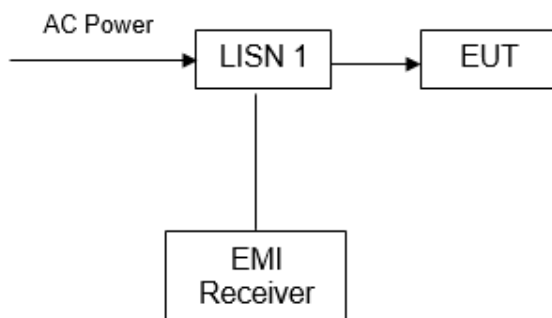
15 AC Power line Conducted Emission

15.1 Limit

Freq. (MHz)	Conducted Limit (dB μ V)	
	Q.P.	Ave.
0.15~0.5	66 – 56*	56 – 46*
0.50~5.0	56	46
5.00~30.0	60	50

* Decreases with the logarithm of the frequency.

15.2 Test Setup

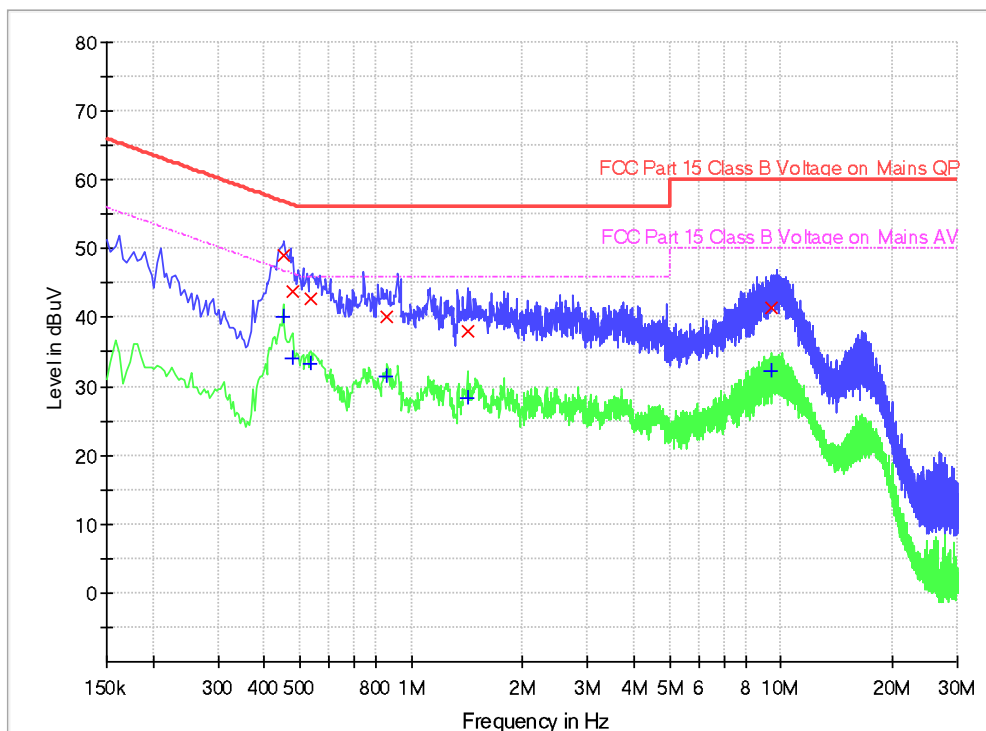


15.3 Test Procedure

The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESCI) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

15.4 Test Results of AC Power line conducted emission

Product Name:	WS137K4	Product Model:	33629073
Test By:	Tony Tang	Test mode:	5G Wi-Fi mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Line
Test voltage:	AC 120V, 60Hz		



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.450000	49.1	9.000	L1	9.6	7.8	56.9
0.478000	43.7	9.000	L1	9.6	12.7	56.4
0.534000	42.6	9.000	L1	9.6	13.4	56.0
0.862000	40.0	9.000	L1	9.6	16.0	56.0
1.418000	38.0	9.000	L1	9.6	18.0	56.0
9.442000	41.5	9.000	L1	9.8	18.5	60.0

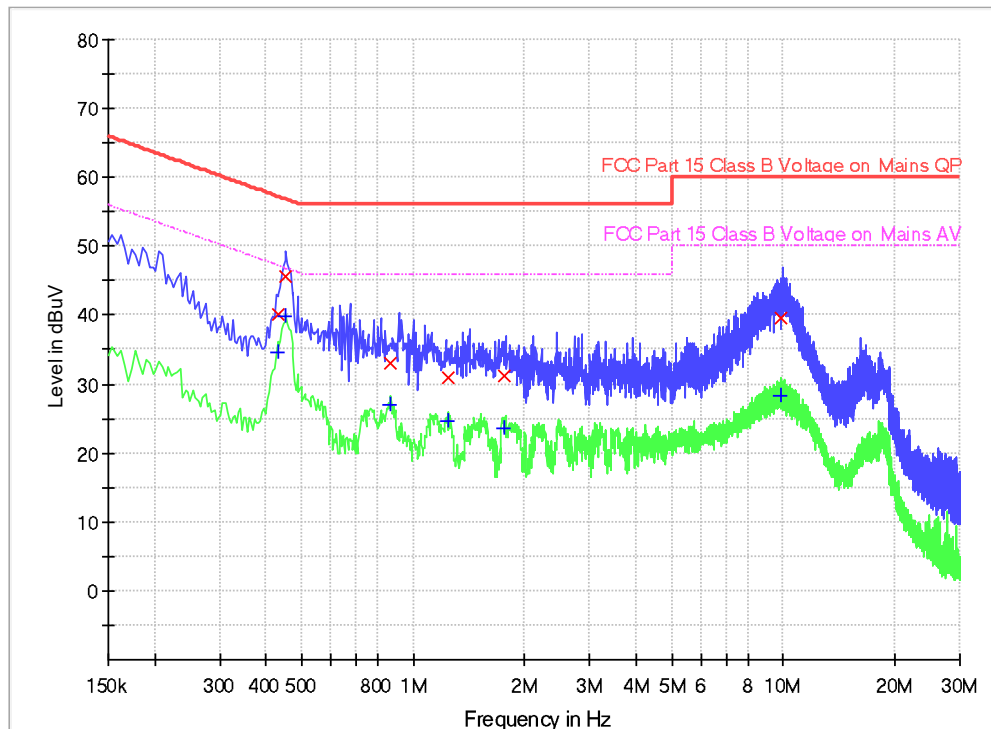
Limit and Margin AV

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.450000	40.0	9.000	L1	9.6	6.9	46.9
0.478000	34.1	9.000	L1	9.6	12.3	46.4
0.534000	33.4	9.000	L1	9.6	12.6	46.0
0.862000	31.5	9.000	L1	9.6	14.5	46.0
1.418000	28.4	9.000	L1	9.6	17.6	46.0
9.442000	32.1	9.000	L1	9.8	17.9	50.0

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBμV) – Quasi Peak/Average (dBμV)

Product Name:	WS137K4	Product Model:	33629073
Test By:	Tony Tang	Test mode:	5G Wi-Fi mode
Test frequency:	150 kHz ~ 30 MHz	Phase:	Neutral
Test voltage:	AC 120V, 60Hz		



Limit and Margin QP

Frequency (MHz)	Quasi Peak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.430000	40.2	9.000	N	9.6	17.1	57.3
0.454000	45.6	9.000	N	9.6	11.2	56.8
0.870000	33.0	9.000	N	9.5	23.0	56.0
1.238000	31.1	9.000	N	9.5	24.9	56.0
1.770000	31.1	9.000	N	9.6	24.9	56.0
9.798000	39.6	9.000	N	9.9	20.4	60.0

Limit and Margin AV

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.430000	34.7	9.000	N	9.6	12.6	47.3
0.454000	39.9	9.000	N	9.6	6.9	46.8
0.870000	27.1	9.000	N	9.5	18.9	46.0
1.238000	24.5	9.000	N	9.5	21.5	46.0
1.770000	23.5	9.000	N	9.6	22.5	46.0
9.798000	28.2	9.000	N	9.9	21.8	50.0

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBμV) – Quasi Peak/Average (dBμV)

16 Dynamic Frequency Selection (DFS)

16.1 LIMITS

DFS Detection Thresholds

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

Maximum Transmit Power	Values (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.	

DFS Response Requirements

Table 4: DFS Response Requirement Values

Parameter	Value
Non-Occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 Seconds
Channel Move Time	10 seconds (see note 1)
Channel Closing Transmission Time	200 ms + an aggregate of 60 ms over remaining 10 Second period. (see note 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (see note 3)
Note 1: 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. Note 2: 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. Note 3: 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.	

APPLICABILITY OF DFS REQUIREMENTS

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.

Within the context of the operation of the DFS function, a U-NII device will operate in either Master Mode or Client Mode. U-NII devices operating in Client Mode can only operate in a network controlled by a U-NII device operating in Master Mode.

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

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 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.

PARAMETERS OF RADAR TEST WAVEFORMS

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Table D.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 Test B	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table D.6: Long Pulse Radar Test Waveform

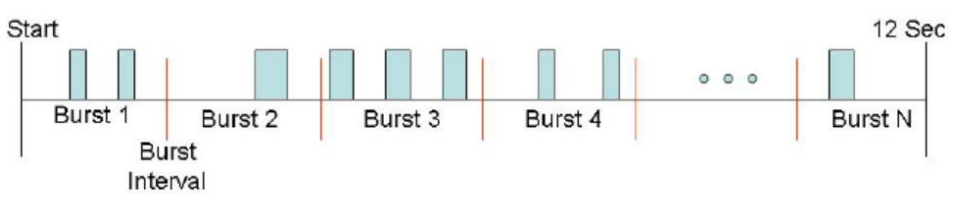
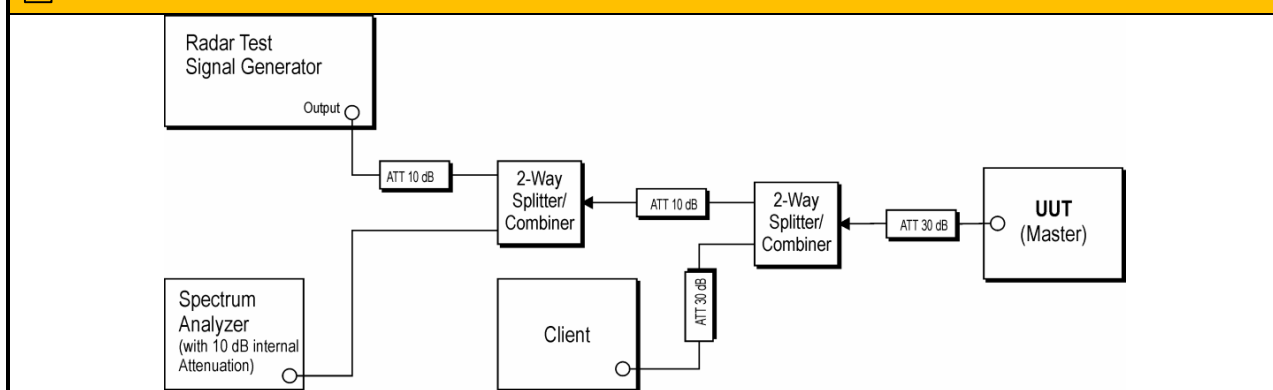
Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30
Long Pulse Radar Test Signal Wave form 12 second transmission							
							

Table D.7: Frequency Hopping Radar Test Waveform

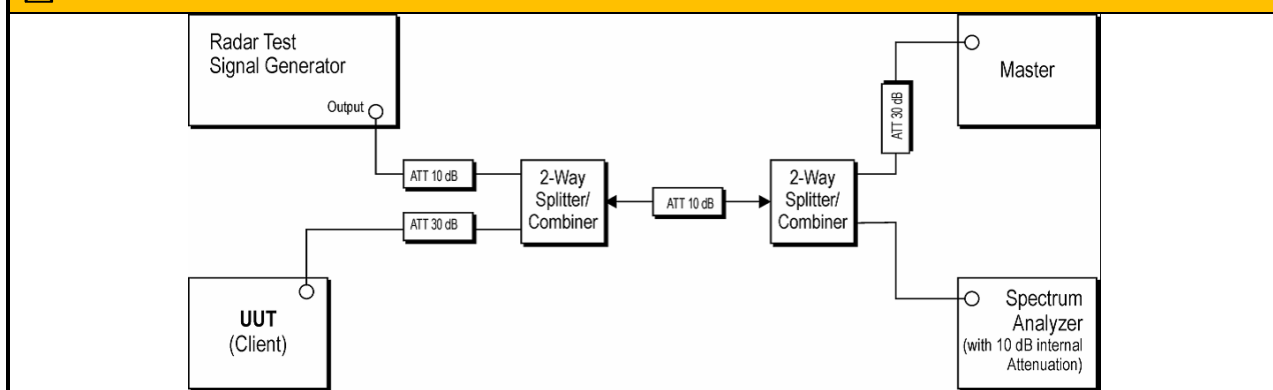
Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	0	0.333	300	70%	30

16.2 Test Procedure

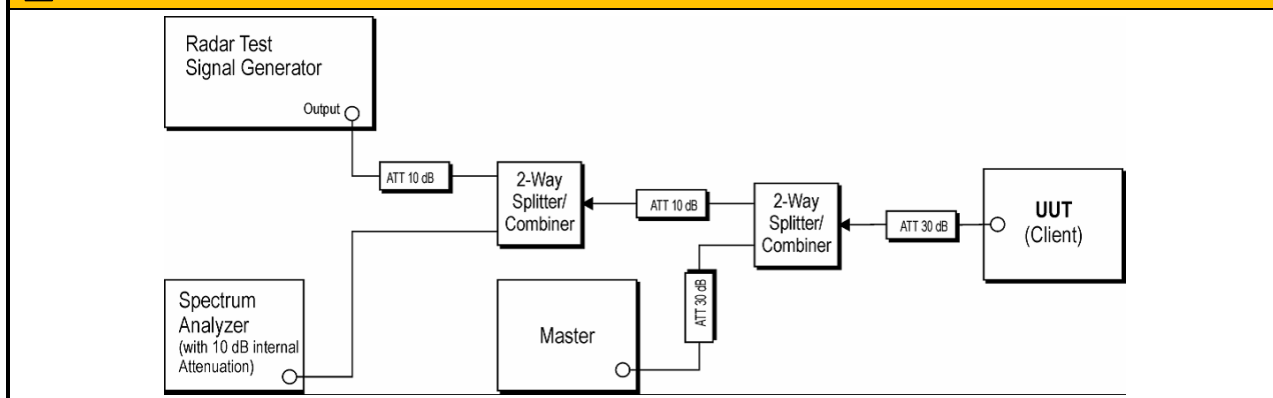
☐ For master device



☒ For Slaver without radar detection function device



☐ For Slaver with radar detection function device



DFS Device Requirements

With reference to KDB905462 D02, Section 8, the required information for the EUT is provided as follows:

1. Frequency Range of Operation:

U-NII-1 Band: 5150 - 5250 MHz, U-NII-2A Band: 5250 - 5350 MHz, U-NII-2C Band: 5470 - 5725 MHz,

U-NII-3 Band: 5725 - 5850 MHz

(Note: The operational channels tested are within these bands.)

2. Device Type and Operating Mode(s):

Device Type: Client Device (Slave) without Radar Detection Capability.

Operating Mode: The EUT operates as a client in a network. The Master Device (with Radar Detection), FCC ID: PY324100620, IC:4054A-24100620, Model: RS500, was used to control the EUT during DFS testing.

3. Maximum and Minimum EIRP:

Please refer to Section 10 & 11 of the test report for detailed conducted output power and power spectral density measurements.

The maximum antenna gain is Ant 1: 0.79dBi, Ant2: 2.32dBi, MIMO: 4.60dBi (The final EIRP values, incorporating this gain, are calculated and presented in the referenced section.

4. Channel Loading Method / Test Traffic:

The test traffic for channel loading was generated by streaming data from the Master Device to the EUT (Client Device). This method is consistent with the requirements for IP-based systems that dynamically manage traffic load.

5. Device Boot-Up & Initialization Time:

The total time required for the system (Master and Client) to fully boot up, synchronize, and be ready for normal operation is 120 seconds.

6. Manufacturer's Declaration on Radar Waveform Parameters:

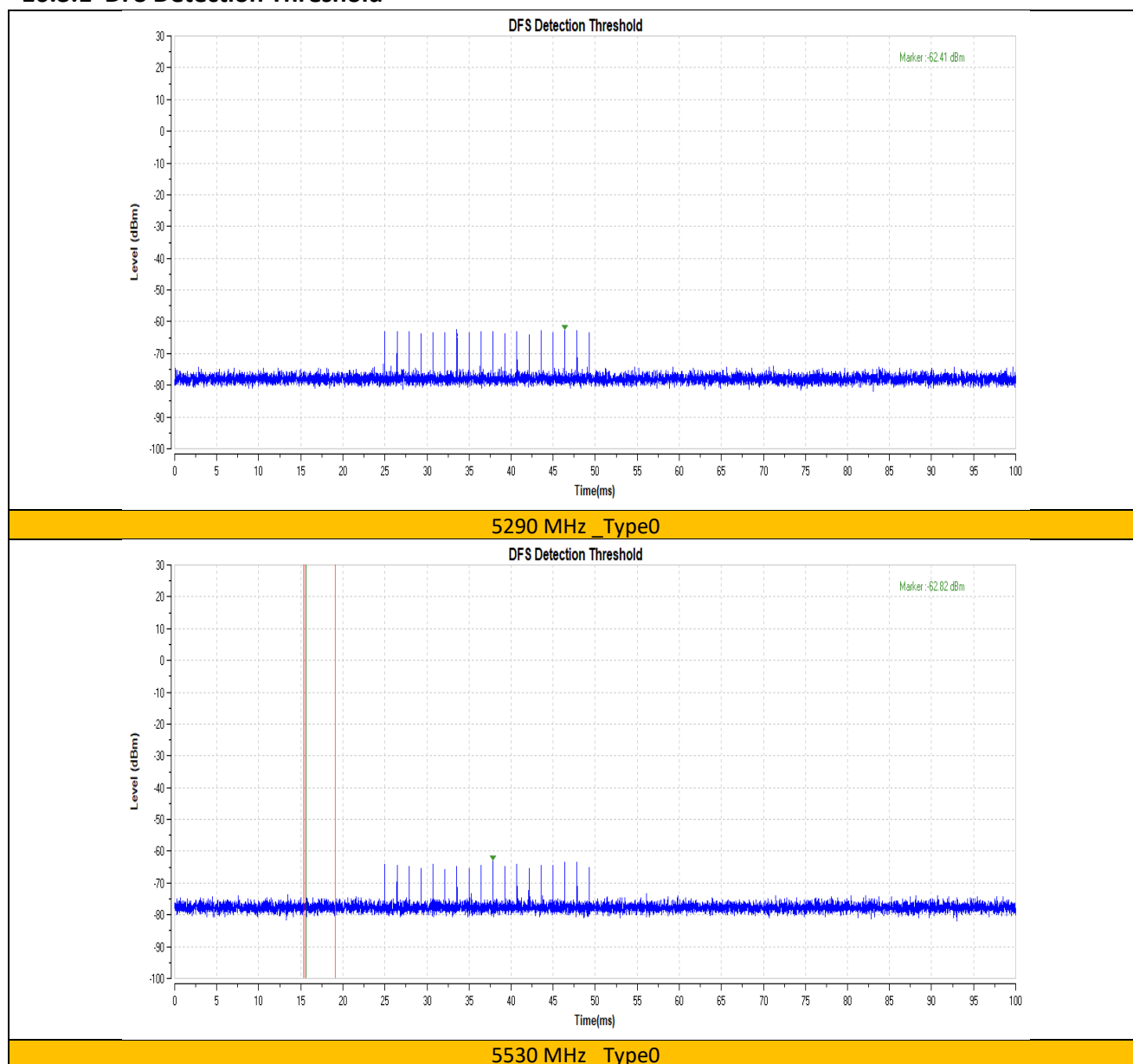
The manufacturer hereby confirms that information regarding the parameters of the detected radar waveforms is not available to the end user or any party outside the control of the manufacturer, in compliance with the relevant FCC rules.

7. Channel Selection Method:

The Master Device can be manually configured to select the initial operating channel. For testing purposes, the first channel was manually set to 5290 MHz.

16.3 Test Result

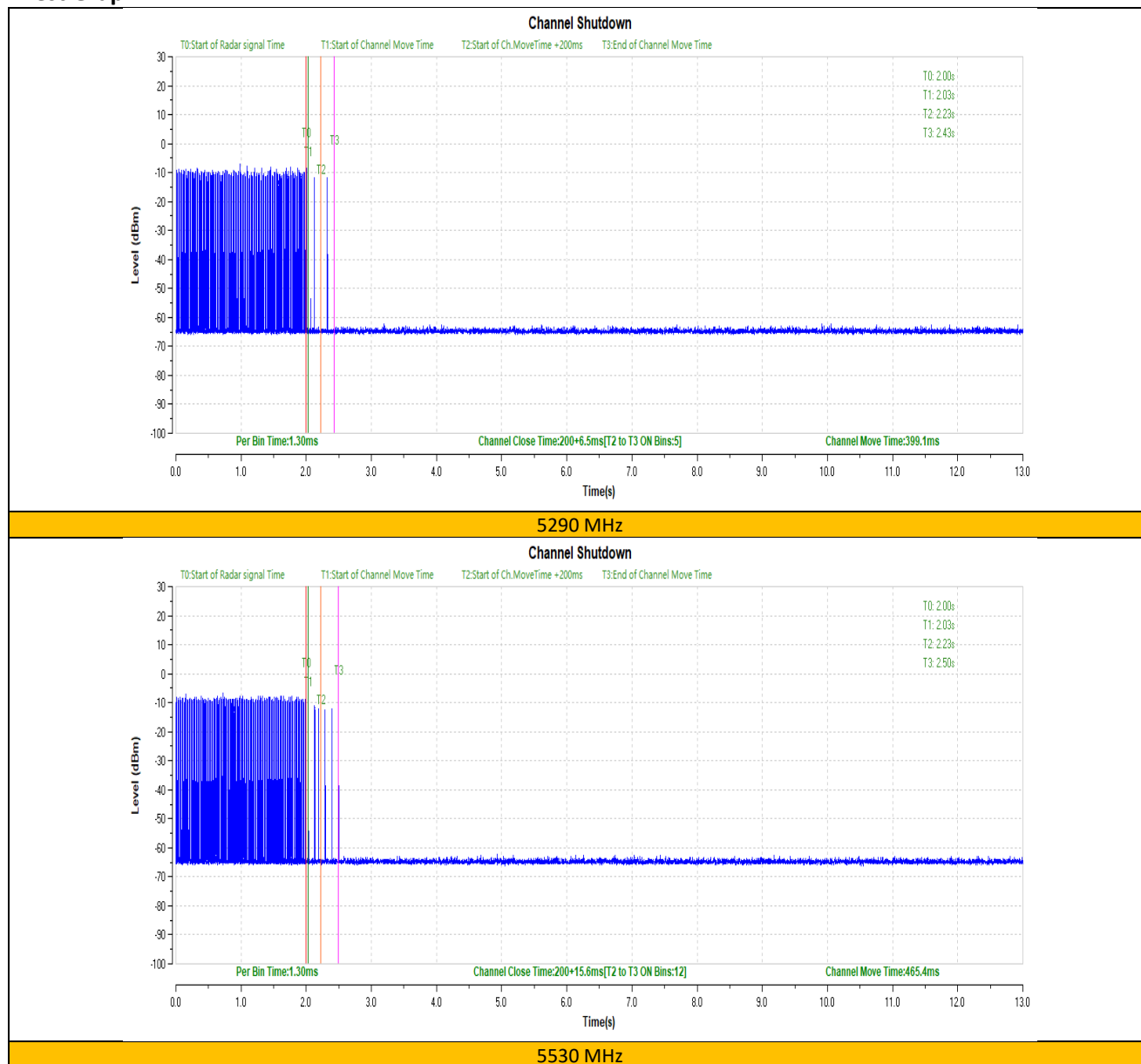
16.3.1 DFS Detection Threshold



16.3.2 Channel Move time and Channel Closing Transmission Time

Frequency [MHz]	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
5290	200+6.5	200+60	399.1	10000	PASS
5530	200+15.6	200+60	465.4	10000	PASS

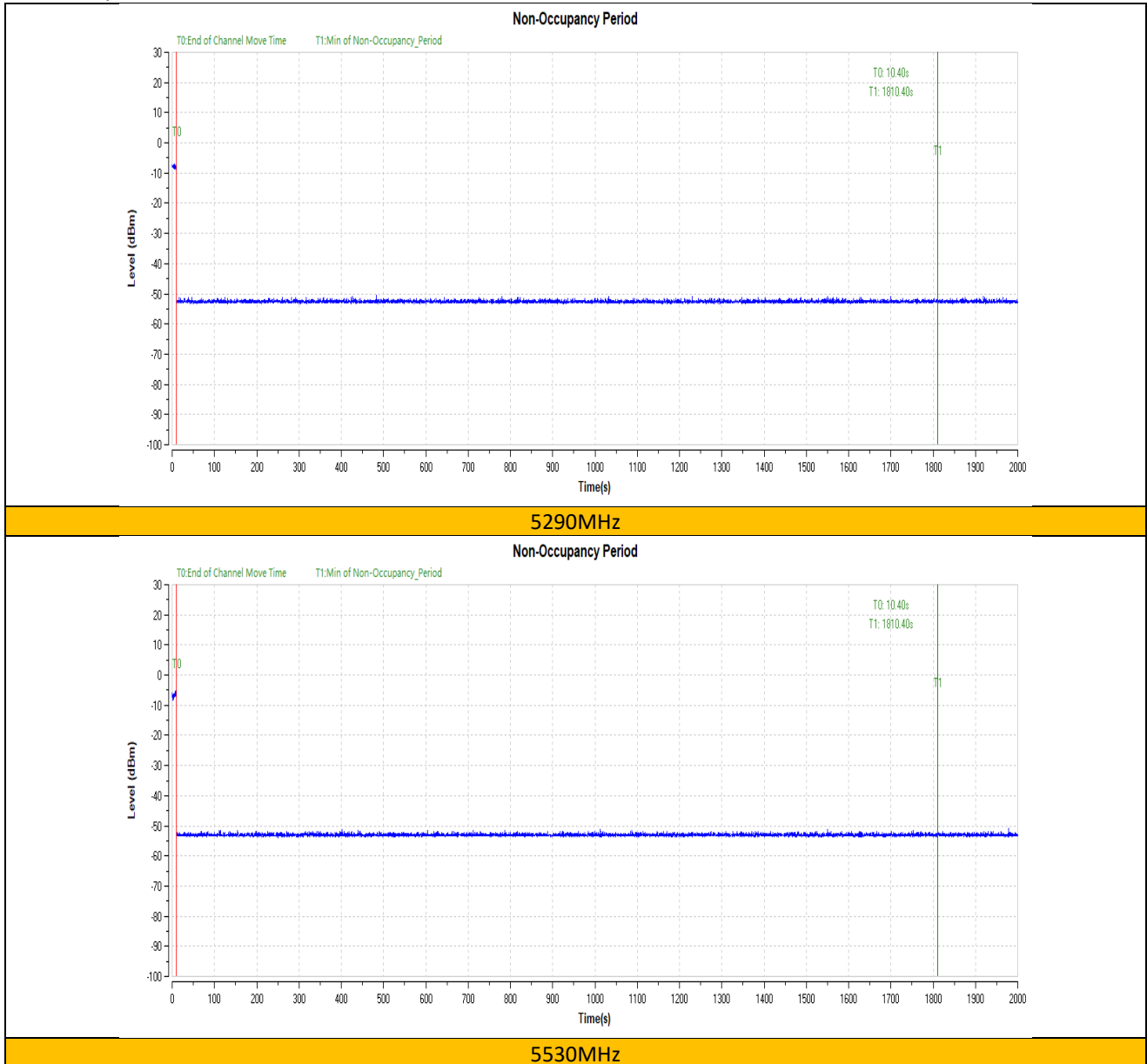
Test Graph:



16.3.3 Non-Occupancy Period Test Results

Frequency [MHz]	Result	Limit[s]	Verdict
5290	see test graph	≥ 1800	PASS
5530	see test graph	≥ 1800	PASS

Test Graph:



***** End of Report *****