

DFS PORTION of FCC 47 CFR PART 15 SUBPART E DFS PORTION of ISED CANADA RSS-247 ISSUE 2

CERTIFICATION TEST REPORT

FOR

802.11 a/b/g/n/ac/ax 2x2 CLIENT DEVICE with BT and BLE

MODEL NUMBER: S44

FCC ID: SBVRM044 ISED: 5373A-RM044

REPORT NUMBER: 14516849-E9V3

ISSUE DATE: 2023-05-12

Prepared for SONOS INC. 614 CHAPALA ST. SANTA BARBARA, CA, 93101, U.S.A.

Prepared by UL VERIFICATION SERVICES INC. 47173 BENICIA STREET FREMONT, CA 94538, U.S.A. TEL: (510) 319-4000 FAX: (510) 661-0888



Revision History

Rev.	lssue Date	Revisions	Revised By
V1	2023-04-17	Initial Issue	
V2	2023-04-28	Updated per Reviewer Comments	Doug Anderson
V3	2023-05-12	Updated RF Reference report Revisions	Doug Anderson

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Complies

1. ATTESTATION OF TEST RESULTS

DFS Portion of ISED CANADA RSS-247 Issue 2

COMPANY NAME:	SONOS INC. 614 CHAPALA ST. SANTA BARBARA, CA, 93101, U.S.A.	
EUT DESCRIPTION:	802.11 a/b/g/n/ac/ax 2x2 CLIENT DEVICE with BT and BLE	
MODEL:	S44	
SERIAL NUMBER:	A100 2301 WC C4-38-75-00-0E-D6-5	
DATE TESTED:	FEBRUARY 20,2023	
APPLICABLE STANDARDS		
ST	ANDARD	TEST RESULTS
DFS Portion of 47	CFR Part 15 Subpart E	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

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REPORT NO: 14516849-E9V3 FCC ID: SBVRM044

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od Winen

Edgard Rincand Operations Leader CONSUMER TECHNOLOGY DIVISION UL Verification Services Inc. TEST METHODOLOGY

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the DFS portion of FCC 47 CFR Part 2, FCC 47 CFR Part 15, FCC KDB 789033, KDB 905462 D02 and D03 and RSS-247 Issue 2.

3. SUMMARY OF TEST RESULTS

Requirement Description	Result	Remarks
DFS Portion of FCC 47 CFR PART 15 SUBPART E	Complies	
DFS Portion of ISED CANADA RSS-247 ISSUE 2	Complies	

4. REFERENCE DOCUMENTS

Measurements of transmitter parameters as referenced in this report and all other manufacturer's declarations relevant to the RF test requirements are documented in UL Verification Services report numbers 14516849-E5V2 and 14516849-E6V3.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

5. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
\mathbf{X}	Building 1: 47173 Benicia Street,	US0104	2324A	550739
	Fremont, California, USA			
	Building 2: 47266 Benicia Street,	US0104	2324A	550739
	Fremont, California, USA			
	Building 4: 47658 Kato Rd, Fremont,	US0104	2324A	550739
	California, USA			

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6. DECISION RULES AND MEASUREMENT UNCERTAINTY

6.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

6.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

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7. DYNAMIC FREQUENCY SELECTION

7.1. OVERVIEW

7.1.1. LIMITS

INNOVATION, SCIENCE and ECONOMIC DEVELOPMENT CANADA (ISED)

ISED RSS-247 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-247 Issue 2

Note: For the band 5600–5650 MHz, no operation is permitted.

Until further notice, devices subject to this annex shall not be capable of transmitting in the band 5600–5650 MHz. This restriction is for the protection of Environment Canada weather radars operating in this band.

FCC

§15.407 (h), FCC KDB 905462 D02 "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION" and KDB 905462 D03 "U-NII CLIENT DEVICES WITHOUT RADAR DETECTION CAPABILITY".

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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	Client (without DFS)	Client (with DFS)	
DFS Detection Threshold	Yes	Not required	Yes	
Channel Closing Transmission Time	Yes	Yes	Yes	
Channel Move Time	Yes	Yes	Yes	
U-NII Detection Bandwidth	Yes	Not required	Yes	

Additional requirements for	Master Device or Client with	Client			
devices with multiple bandwidth	Radar DFS	(without DFS)			
modes					
U-NII Detection Bandwidth and	All BW modes must be	Not required			
Statistical Performance Check	tested				
Channel Move Time and Channel	Test using widest BW mode	Test using the			
Closing Transmission Time	available	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 all 20					
MHz channel blocks and a null freque	ency between the bonded 20 MHz	channel blocks.			

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Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value		
	(see notes)		
E.I.R.P. ≥ 200 mill watt	-64 dBm		
E.I.R.P. < 200 mill watt and	-62 dBm		
power spectral density < 10 dBm/MHz			
E.I.R.P. < 200 mill watt that do not meet power spectral	-64 dBm		
density requirement			
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.			
Note 3: E.I.R.P. is based on the highest antenna gain. For MI	MO devices refer to KDB		

Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.

Paramatar	Malua
Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 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.

Table 5 – Short Pulse Radar Test Waveforms

Radar	Pulse	PRI	Pulses	Minimum	Minimum		
Туре	Width	(usec)		Percentage	Trials		
	(usec)			of Successful			
				Detection			
0	1	1428	18	See Note 1	See Note		
					1		
1	1	Test A: 15 unique		60%	30		
		PRI values randomly					
		selected from the list	Roundup:				
		of 23 PRI values in	{(1/360) x (19 x 10 ⁶ /PRI _{usec})}				
		table 5a					
		Test B: 15 unique					
		PRI values randomly					
		selected within the					
		range of 518-3066					
		usec. With a					
		minimum increment					
		of 1 usec, excluding					
		PRI values selected					
		in Test A					
2	1-5	150-230	23-29	60%	30		
3	6-10	200-500	16-18	60%	30		
4	11-20	200-500	12-16	60%	30		
	Aggregate (Radar Types 1-4) 80% 120						
Note 1:	Note 1: Short Pulse Radar Type 0 should be used for the Detection Bandwidth test, Channel						
Move T	<i>ime</i> , and	Channel Closing Time to	ests.				

Table 6 – Long Pulse Radar Test Signal

	Radar	Pulse	Chirp	PRI	Pulses	Number	Minimum	Minimum		
	Waveform	Width	Width	(µsec)	per	of	Percentage	Trials		
	Туре	(µsec)	(MHz)		Burst	Bursts	of Successful			
							Detection			
I	5	50-100	5-20	1000-	1-3	8-20	80%	30		
				2000						

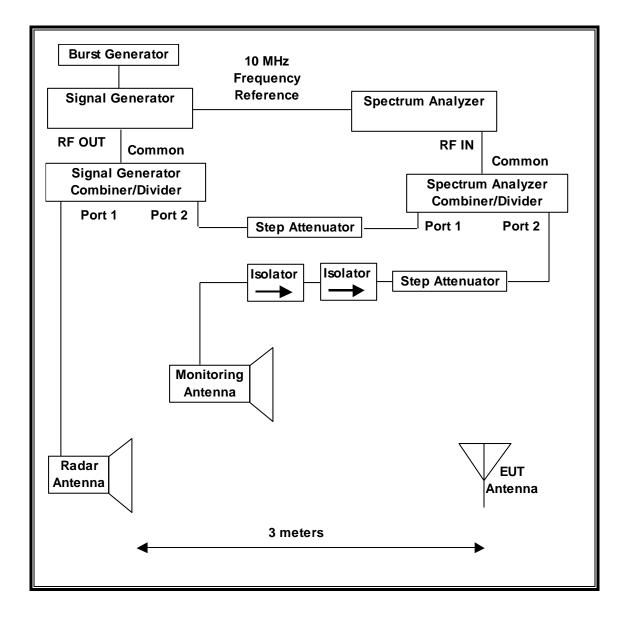
Table 7 – Frequency Hopping Radar Test Signal

Radar	Pulse	PRI	Pulses	Hopping	Hopping	Minimum	Minimum			
Waveform	Width	(µsec)	per	Rate	Sequence	Percentage of	Trials			
Туре	(µsec)		Нор	(kHz)	Length	Successful				
					(msec)	Detection				
6	1	333	9	0.333	300	70%	30			

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7.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



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SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 1, 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of KDB 905462 D02. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the 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 –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

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ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. Traffic that meets or exceed the minimum loading requirement is streamed from the Master device to the Slave Device. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST									
Description	Manufacturer	Model	ID No.	Cal Due					
Spectrum Analyzer, PXA, 3Hz to 8.4GHz	Keysight	N9030A	150667	01/31/24					
Signal Generator, MXG X-Series RF Vector	Keysight	N5182B	215999	02/07/24					
Frequency Extender	Keysight	N5182BX	213906	02/06/24					

Note: An MXG series Signal Generator and separate external Frequency Extender module are shown in the preceding test system block diagram as a stand-alone Signal Generator.

7.1.3. TEST AND MEASUREMENT SOFTWARE

The following test and measurement software was utilized for the tests documented in this report:

TEST SOFTWARE LIST							
Name Version Test / Function							
Aggregate Time-PXA	3.1	Channel Loading and Aggregate Closing Time					
PXA Read	3.1	Signal Generator Screen Capture					
SGXProject.exe	1.7	Radar Waveform Generation and Download					

7.1.4. TEST ROOM ENVIRONMENT

The test room temperature and humidity shall be maintained within normal temperature of 15~35 °C and normal humidity 20~75% (relative humidity).

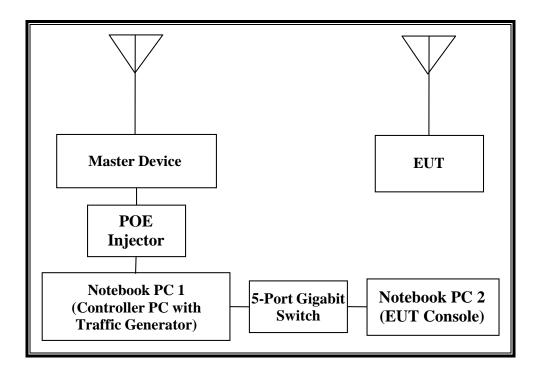
ENVIRONMENT CONDITION

Parameter	Value
Temperature	25.0 °C
Humidity	28 %

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7.1.5. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the tests documented in this report:

PE	ERIPHERAL SU	IPPORT EQUIPMENT	LIST	
Description	Manufacturer	Model	Serial Number	FCC ID
802.11ac Dual Band Wireless	Cisco	AIR-CAP3702E-A-	FTX181570A6	LDK102087
Access Point (Master Device)		K9		
P.O.E. Injector (Master)	Phihong	POE30U-560(G)	PHI170102N2	DoC
Notebook PC 1 (Controller)	Lenovo	Type 4236-B92	PB-HEX04 12/05	DoC
AC Adapter 1 (Controller PC)	Lenovo	42T4418	11S42T4418Z1ZGW	DoC
			G08R90M	
Notebook PC 2 (EUT Console)	Lenovo	Type 10HG-S7KH00	PC-OPFBX 18/05	DoC
AC Adapter 2 (Console PC)	Lenovo	ADLX90NLC2A	11S45N0247Z1ZS9B	DoC
			48WP7M	
5-Port Gigabit Switch	TP-Link	TL-SG1005D	214C037000114	DoC
AC Adapter 3 (Switch)	TP-Link	T090060-2B1	No Serial Number	DoC
AC Adapter 4 (EUT)	Sonos	CPS045180250U	EVT-2 #3	DoC

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7.1.6. DESCRIPTION OF EUT

For FCC the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

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

The EUT is a Slave Device without Radar Detection.

The manufacturer has declared that the highest power level within these bands is 25.66 dBm EIRP in the 5250-5350 MHz band and 26.08 dBm EIRP in the 5470-5725 MHz band.

The manufacturer has declared that the highest gain antenna assembly utilized with the EUT has a gain of 3.3 dBi in the 5250-5350 MHz band and 3.4 dBi in the 5470-5725 MHz band. The manufacturer has declared that the lowest gain antenna assembly utilized with the EUT has a gain of 2.4 dBi in the 5250-5350 MHz band and 2.2 dBi in the 5470-5725 MHz band.

Two sets of two antennas, one set per chain, are utilized to meet the diversity and MIMO operational requirements.

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.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The EUT uses two transmitter/receiver chains, each connected to an antenna to perform radiated tests.

WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the Master Device to the Slave Device using iPerf version 2.0.5 software package.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11ax architecture. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz.

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Channel puncturing is not supported by the EUT.

The software installed in the EUT is version 73.0-38190-main.

The software installed in the access point is AP3G2-K9W7-M Version 15.3(3)JAB.

UNIFORM CHANNEL SPREADING

This is requirement not applicable to Slave Devices.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102087. The minimum antenna gain for the Master Device is 6 dBi.

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.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The software installed in the access point is AP3G2-K9W7-M Version 15.3(3)JAB.

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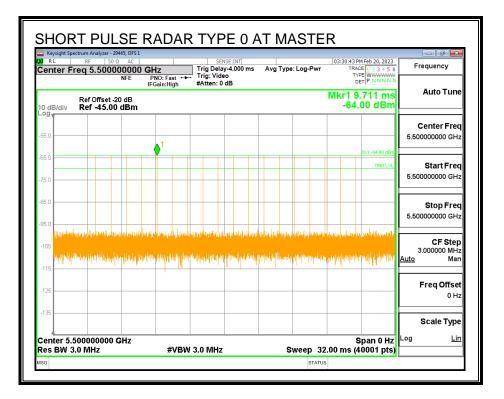
7.2. RESULTS FOR 20 MHz BANDWIDTH

7.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

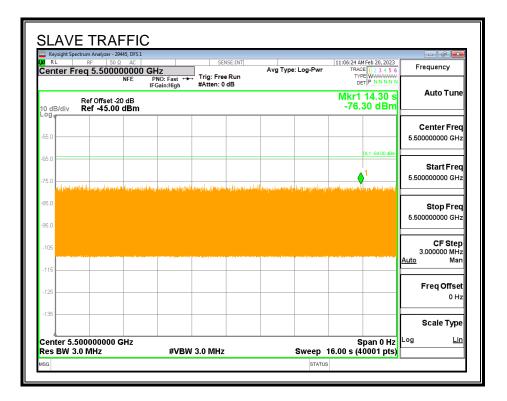
7.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



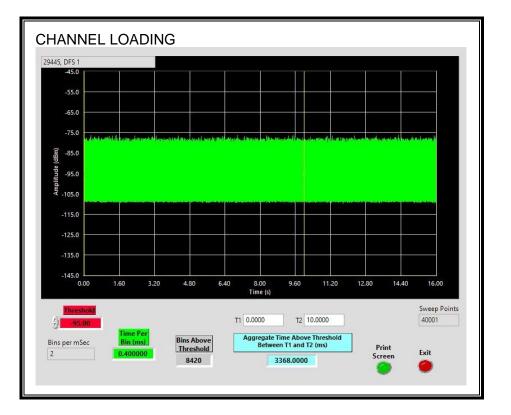
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TRAFFIC



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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 33.68%

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7.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

7.2.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time	Limit
(sec)	(sec)
0.0836	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0.0	60

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MOVE TIME

U RL	pectrum Analyzer - 2 RF 50	Ω AC		SENSE:				M Feb 20, 2023	Frequency
Center F	req 5.5000		: D:Fast ↔ in:High	HAtten: 0 dB		ype: Log-Pwr	TY	DE 1 2 3 4 5 6 PE WWWWWWW ET P NNNNN	
0 dB/div	Ref Offset Ref -45.0					Δ		3.60 ms 3.50 dB	Auto Tune
.og									Center Fred
65.0	142							DL1 -64.00 dBm	5.500000000 GHz
15.0	htig parent t								Start Free
95.0 105	Indeteritor	in an	himboria	1460 Palestander Per	udailhdy hoarbaile	kan di kara di Kana di	y land	ndunanarilat	5.500000000 GH
115									Stop Fred
-125									5.50000000 GH
	.500000000 3.0 MHz	GHz	#VBV	V 3.0 MHz		Sweep '		Span 0 Hz 0001 pts)	CF Step 3.000000 MH Auto Mar
	1 t (Δ)		0 ms (Δ)		FUNCTION	FUNCTION WIDTH	FUNCTI		<u>Auto</u> Mai
2 F 3	1 t	1.6	616 s	-64.26 dBm					Freq Offse
4 5 6								Ξ	0 H:
7 8 9									Scale Type
10									Log <u>Lir</u>

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CHANNEL CLOSING TIME

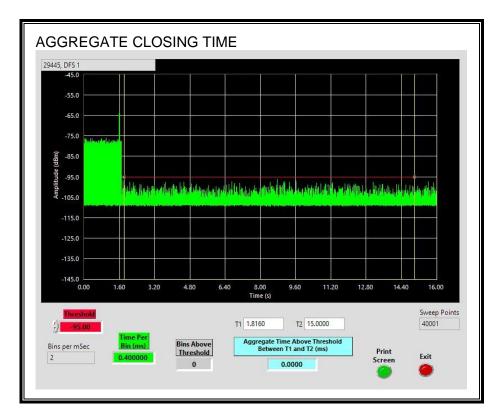
RL RF 50 enter Freg 5.500	29445, DFS1	Hz	SENSE:INT		e: Log-Pwr	12:24:38 PM Feb 20, 2023 TRACE 1 2 3 4 5 (Frequency
	NFE	PNO: Fast	Trig: Video #Atten: 0 dB			DET P N N N N	4
Ref Offset D dB/div Ref -45.0					Δ	Mkr1 200.0 ms -36.88 dB	
og							Center Free
5.0							5.500000000 GH;
i5.0 2						DL1 -64.00 dBm	
5.0							Start Fred 5.500000000 GH:
5.0 							Stop Fred 5.500000000 GH:
W Los per let die her h						ومالك وبالألارية أومعم والمسي	
105 105 105 105 105 105 105 105 105 105	h yadı yaş biləsi bilə asimi ya		Lately () is a locar to a Million (al den bie and a second	a, tini karafating da kara tana, tala in	annan gan dhadan anakke sa al da di di ai ka a ka a ka di g	CF Step 3.000000 MH <u>Auto</u> Mar
125							Freq Offse 0 Hi
135							Scale Type
enter 5.50000000						Span 0 Hz	Log Lir

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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



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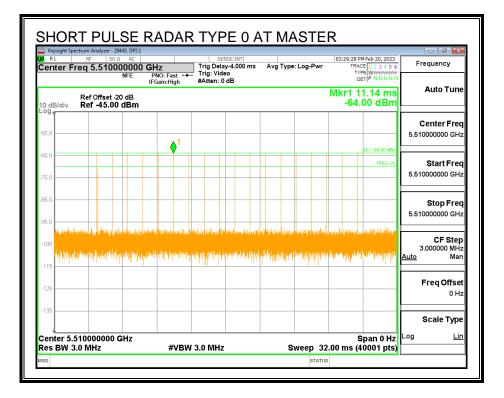
7.3. RESULTS FOR 40 MHz BANDWIDTH

7.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

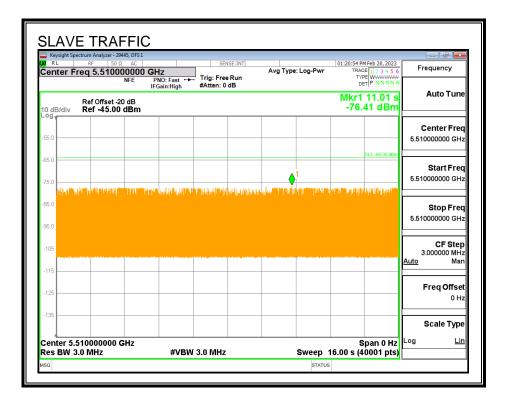
7.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



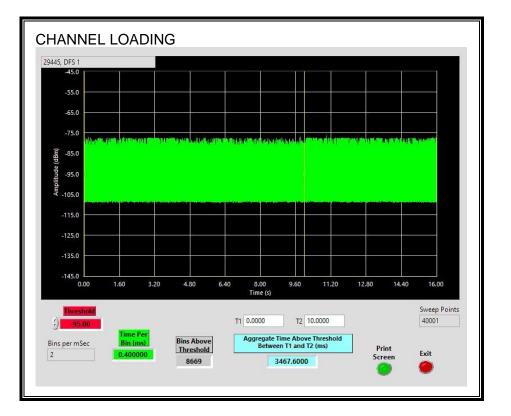
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TRAFFIC



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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 34.67%

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7.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

7.3.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time	Limit
(sec)	(sec)
0.0964	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0.0	60

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MOVE TIME

Keysight S	pectrum Analyzer - 2944. RF 50 Ω	5, DFS 1 AC	SENSE:IN	π	01:29:05 PM Feb 20, 2023	
	Freq 5.51000			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
		IFE PNO: Fast IFGain:Hig		1	DET P N N N N	
	Ref Offset -20	dB		Δ	Mkr1 96.40 ms	Auto Tune
0 dB/div	Ref -45.00 c				-14.13 dB	
55.0						Center Fred
65.0					DL1 -64.00 dBm	5.510000000 GH
75.0	1∆2 uuulumu					
85.0						Start Free
95.0		and the second second	Alter and the second	and the stand state of the state of	and the state	5.51000000 GH;
-105	anahah Prost	and the second secon	andra an suit la suit a suit a	prilling and enablished a source the	terrent in the line line terrent	
-115						Stop Free
-125						5.510000000 GH
-135						
Center 5	.510000000 G	Hz			Span 0 Hz	CF Ster
Res BW	3.0 MHz	#V	BW 3.0 MHz	Sweep 1	16.00 s (40001 pts)	3.000000 MH
NKR MODE		х	Y	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
1 Δ2 2 F	1 t (Δ) 1 t	96.40 ms 1.618 s	(Δ) -14.13 dB -64.26 dBm			
3						Freq Offse
5					E	
7						Scale Type
9 10						Scale Type
						Log <u>Lir</u>

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CHANNEL CLOSING TIME

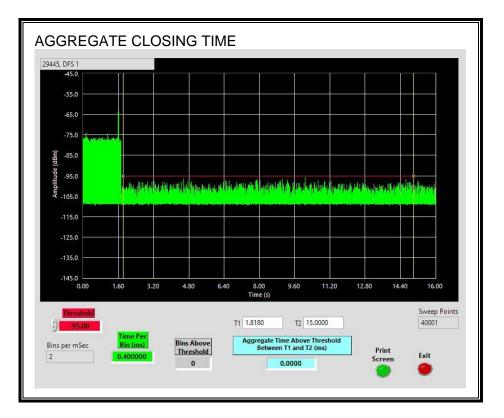
Keysight Spectrum Analyzer - 29445, DFS 1 RL RF 50 Ω AC	SENSE		01:36:47 PM Feb 20, 2023	Frequency
enter Freq 5.510000000 NFE	GHz PNO: Fast ↔→ IFGain:High #Atten: 0 dB	Avg Type: Log-P	WT TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N	
Ref Offset -20 dB 0 dB/div Ref -45.00 dBm			ΔMkr1 200.0 ms -39.23 dB	Auto Tune
og				Center Fred
55.0				5.510000000 GH
6.0 			DL1 -64.00 dBm	
75.0			TRIG LVL	Start Free 5.510000000 GH;
35.0				Stop Fred 5.510000000 GHz
85.0		ter en en anter anter de la ser en	a line contanta to a contrata a co	
				CF Step 3.000000 MHz <u>Auto</u> Mar
125				Freq Offset 0 Hz
135				Scale Type
enter 5.510000000 GHz			Span 0 Hz	Log <u>Lir</u>

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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



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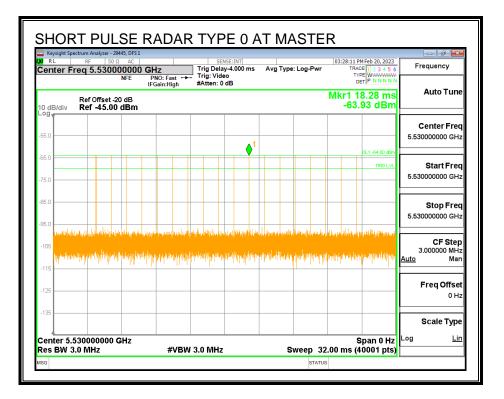
7.4. RESULTS FOR 80 MHz BANDWIDTH

7.4.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5530 MHz.

7.4.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



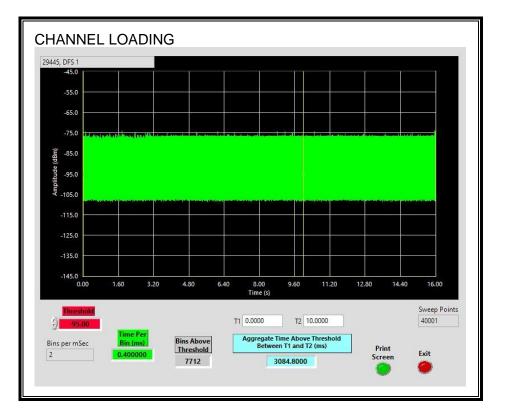
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TRAFFIC

	ectrum Analyzer -								,	- 6 🗾
Center F	RF 50 req 5.530			1	ISE:INT	Avg Type	e: Log-Pwr	TRAC	E 1 2 3 4 5 6	Frequency
		NFE	PNO: Fast ↔→ IFGain:High	#Atten: 0				DE	T P NNNNN	Auto Tune
0 dB/div	Ref Offset Ref -45.0								15.98 s 90 dBm	Auto Tulle
-og										Center Fred
55.0										5.530000000 GHz
65.0									DL1 -64.00 dBm	
75.0									1	Start Fred 5.53000000 GHz
Halandy	er fog til stære det so	All closed to	unite and a survey of the	in destand	ali in ann an far hi lair f	hland and built and				
85.0										Stop Fred
95.0										5.530000000 GHz
105										CF Step
section _{ent}	delaged (Marchinesona)	tation of the Longer Dec	hite pite her part be billed ock as	and an algorithm to a state of the	an a	f shana franskalari	n - na seriek in alik	a da basha ka ka ka sa	an a	3.000000 MH: <u>Auto</u> Mar
115										
125										Freq Offset 0 Hz
135										
										Scale Type
4	530000000	GHZ						S	pan 0 Hz	Log <u>Lir</u>

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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 30.84%

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7.4.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

7.4.4. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time	Limit
(sec)	(sec)
0.050	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0.0	60

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MOVE TIME

RL	pectrum Analyzer - 29445, I RF 50 Ω 4	DFS 1 AC	oraion tait			
	Freg 5.5300000		SENSE:INT	Avg Type: Log-Pwr	02:41:54 PM Feb 20, 2023 TRACE 1 2 3 4 5 6	Frequency
	NFI		Trig: Free Run #Atten: 0 dB		DET P N N N N	
	Ref Offset -20 d			Δ	Mkr1 50.00 ms	Auto Tune
0 dB/div	Ref -45.00 dE				-12.88 dB	
55.0						Center Free
65.0					DL1 -64.00 dBm	5.530000000 GH
75.0						
85.0						Start Free
95.0		out- la constru		kan katalea a ta da a t		5.53000000 GH
-105	and the states of the states o	natus dalama da Alina	u h ja ja ka	երկնախեստեստեստեսի	united and the state of the sta	
115						
125						Stop Free 5.53000000 GH
-135						5.53000000 GH
Contor 6	5.530000000 GH	-			Span 0 Hz	CF Ster
	3.0 MHz		W 3.0 MHz	Sweep 1	6.00 s (40001 pts)	3.000000 MH
IKR MODE	TRC SCL	×	Y FI	JNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
1 Δ2 2 F	1 t (Δ) 1 t	50.00 ms (/ 1.537 s	A) -12.88 dB -63.85 dBm			
	•••	1.557 3	-03.05 0.511			Freq Offse
3					E	0 H
4 5						
4						Scale Type
4 5 6 7 8						
4 5 6 7						Log <u>Lir</u>

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CHANNEL CLOSING TIME

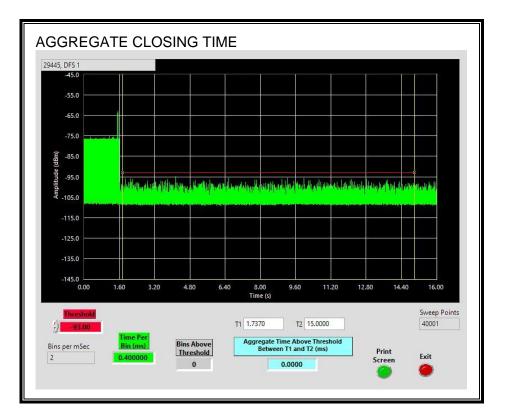
Reysight Spectrum Analyzer - 29445, DF RL RF 50 Ω AC enter Freq 5.53000000	D0 GHz	SENSE:INT	Avg Type: Log-Pwr	02:48:29 PM Feb 20, 2023 TRACE 1 2 3 4 5 6 TYPE WWWWWW	Frequency
Ref Offset -20 dB	IFGain:High	#Atten: 0 dB	Δ	Mkr1 200.0 ms -36.61 dB	Auto Tune
6g					Center Fred 5.530000000 GH;
i5.0 2				DL1 -64.00 dBm	
75.0					Start Fred 5.530000000 GH
35.0 ··· ···	102				Stop Fred 5.530000000 GH;
the second s			and the strange of the second s		CF Step
		Allowing and the final second s	al dan pana positis miki (), par e competence (parte certification et al free	at Berne and Berne (a failed and f	3.000000 MH: <u>Auto</u> Mar
125					Freq Offse 0 H;
135					Scale Type
enter 5.530000000 GHz				Span 0 Hz	Log <u>Lir</u>

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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



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7.4.5. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.

Key RL		ectrum R		- 29445, Ε 50 Ω Α			1	ENSE:INT			03:25:44	PM Feb 20, 2023	
					00 GI	NO:Fast ←		ee Run	Avg Type	: Log-Pwr	TR. T	ACE 1 2 3 4 5 6 YPE WWWWWW DET P NNNN	Frequency
Ref Offset -20 dB ΔMkr1 1.800 ks 0 dB/div Ref -45.00 dBm -30.05 dB										Auto Tune			
og 55.0													Center Free
												DL1 -64.00 dBm	5.530000000 GH
5.0 5.0	.												Start Free 5.530000000 GH
35.0	//\2												Stop Free
95.0													5.530000000 GH
105		(Julip)	a philite	ephiliate 1	n l'ul h	adijbedab	helen allah	l dipperturbation	n ha ^{lle} an din hall	allaghad	al an	Hill ide I	CF Stej 3.000000 MH <u>Auto</u> Ma
115													Freq Offse
													0 H
135													Scale Type
oni	ter 5.	5300	0000	0 GHz								Span 0 Hz	Log <u>Lir</u>

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