

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

TEST REPORT

FOR

802.11 a/b/g/n/ac/ax 2x2 Client Device with BT and BLE

MODEL NUMBER: S39

FCC ID: SBVRM039 ISED: 5373A-RM039

REPORT NUMBER: 14093504-E9V2

ISSUE DATE: 2022-10-07

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	2022-10-05	Initial Issue	
V2	2022-10-07	Updated Section 7.1.6	Edgard Rincand

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1. ATTESTATION OF TEST RESULTS

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:	S39
SERIAL NUMBER:	F0-F6-C1-A0-09-7E
DATE TESTED:	August 15, 2022

APPLICABLE STANDARDS			
STANDARD TEST RESULTS			
DFS Portion of CFR 47 Part 15 Subpart E	Complies		
DFS Portion of ISED CANADA RSS-247 Issue 2	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.

Approved & Released For UL Verification Services Inc. By:

Coloro Minero

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

Prepared By:

Steven North Test Engineer CONSUMER TECHNOLOGY DIVISION UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the DFS portion of FCC CFR 47 Part 2, FCC CFR 47 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	None
DFS Portion of ISED CANADA RSS-247 ISSUE 2	Complies	None

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 number 14093504-E3V2.

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
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	Client	
		(without DFS)	(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	Test using widest BW mode	Test using the				
Channel Closing Transmission	available	widest BW mode				
Time		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 bl	ocks and a null frequency betwee	en 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 MIMO devices refer to KDB				
publication 662911 D01.				

Table 4: DFS Response requirement values

Value
30 minutes
60 seconds
10 seconds (See Note 1)
200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
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: Short Pulse Radar Type 0 should be used for the <i>Detection Bandwidth</i> test, <i>Channel</i>							
Move T	Move Time, and Channel Closing Time tests.							

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	
5	50-100	5-20	1000-	1-3	8-20	80%	30
			2000				

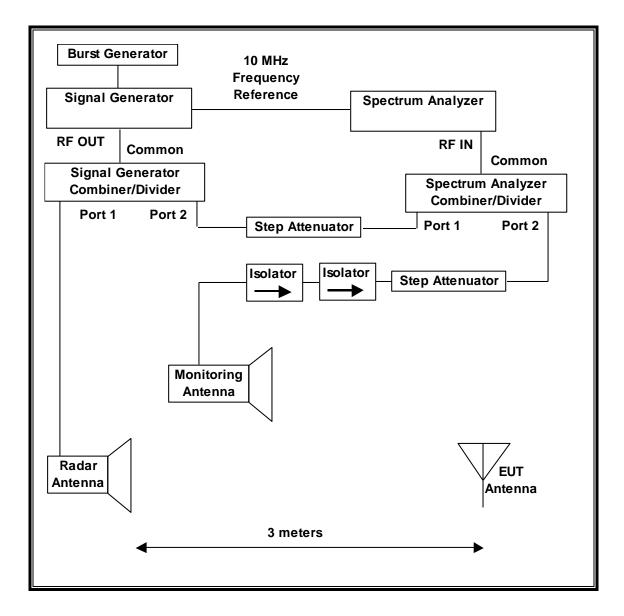
Table 7 – Frequency Hopping Radar Test Signal

		/	<u> </u>	U			
Radar	Pulse	PRI	Pulses	Hopping	Hopping	Minimum	Minimum
Waveform	Width	(µsec)	per	Rate	Sequence	Percentage of	Trials
Туре	(µsec)		Hop	(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 EQUI	PMENT LIST			
Description	Manufacturer	Model	ID No.	Cal Due
Spectrum Analyzer, PXA, 3Hz to 8.4GHz	Keysight	N9030A	150667	01/27/23
Signal Generator, MXG X-Series RF Vector	Keysight	N5182B	215999	02/08/23
Frequency Extender	Keysight	N5182BX	213906	12/29/22
Arbitrary Waveform Generator	Agilent / HP	33220A	80815	01/24/23

7.1.3. TEST AND MEASUREMENT SOFTWARE

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

Slave Device Testing

-	TEST SOF	TWARE 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).

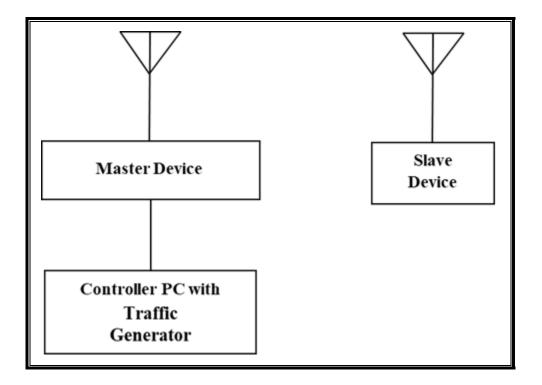
ENVIRONMENT CONDITION

Parameter	Value
Temperature	21.7 °C
Humidity	55 %

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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:

P	ERIPHERAL SU	JPPORT EQUIPME	INT LIST	
Description	Manufacturer	Model	Serial Number	FCC ID
802.11ac Dual Band Wireless		AIR-CAP3702E-A-		
Access Point	Cisco	K9	FTX181570A6	LDK102087
P.O.E. Injector	Phihong	POE30U-560(G)	PHI170102N2	DoC
Notebook PC				
(Controller/Server)	Lenovo	Туре 4236-В92	PB-HEX04 12/05	DoC
AC Adapter (Controller/Server			11S42T4418Z1ZGWG08	
PC)	Lenovo	42T4418	R90M	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 20 dBm EIRP in the 5250-5350 MHz band and 20 dBm EIRP in the 5470-5725 MHz band.

The manufacturer has declared that highest gain antenna assembly utilized with the EUT has a gain of 4.4 dBi in the 5250-5350 MHz band and 5.1 dBi in the 5470-5725 MHz band. The manufacturer has declared that lowest gain antenna assembly utilized with the EUT has a gain of 2.9 dBi in the 5250-5350 MHz band and 4.3 dBi in the 5470-5725 MHz band.

Four antennas 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 802.11ac and 802.11ax architecture. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz, 80 MHz.

Channel puncturing is not supported.

The software installed in the EUT is 70.2-32110-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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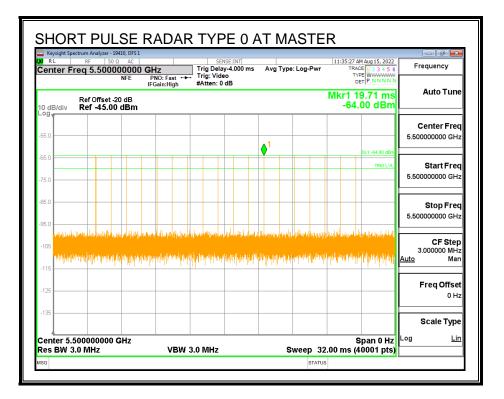
7.2. RESULTS FOR 20 MHz BANDWIDTH

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



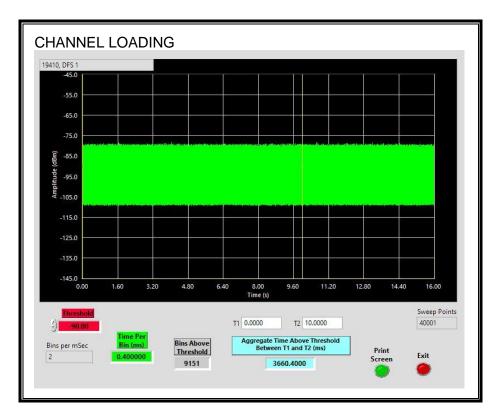
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TRAFFIC

	ectrum Analyzer - 19410, D	FS1							- ē 💌
enter F	RF 50 Ω A Treq 5.5000000 NFE	00 GHz	t +++ Trig: Fr		Avg Type:	Log-Pwr	11:47:52 AM Aug TRACE 1 TYPE W	15, 2022 2 3 4 5 6 N N N N N N	Frequency
0 dB/div	Ref Offset -20 dB Ref -45.00 dB		jh #Atten:	0 dB			Mkr1 4.0 -78.24	052 s	Auto Tune
.og								64.00 dBm	Center Freq 5.50000000 GHz
75.0		↓1							Start Freq 5.500000000 GHz
95.0									Stop Freq 5.500000000 GHz
105		dije se				991 A. I. M. A. A. M. A.		Aut	CF Step 3.000000 MHz to Man
125									Freq Offsel 0 Hz
135									Scale Type
	500000000 GHz 3.0 MHz		BW 3.0 MHz			Sween	Spai 16.00 s (4000	n 0 Hz	g <u>Lin</u>

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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 36.60%

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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).

<u>RESULTS</u>

Channel Move Time	Limit
(sec)	(sec)
0.0368	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0	60

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MOVE TIME

Keysight Spi R L	ectrum Analyzer - 19410, RF 50 Ω	DFS1 AC	SENSE:INT		11:51:01 AM Aug 15, 2022	
enter F	req 5.500000	E PNO: Fast ←	Trig: Free Run	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N	Frequency
	Ref Offset -20 c		#Atten: 0 dB		∆Mkr1 36.80 ms -15.97 dB	Auto Tune
0 dB/div	Ref -45.00 dl	3m			-10.57 dB	
55.0 55.0 75.0	142				DL1 -64.00 dBm	Center Fred 5.500000000 GH;
85.0 95.0	Landhalata an ba	a	ndeleti, ategrideligi eterrit	danaya kata a	di la mana di Mana di dala da	Start Free 5.50000000 GH:
-115 -125 -135						Stop Free 5.500000000 GH;
les BW 3			3.0 MHz	Sweep	Span 0 Hz 16.00 s (40001 pts)	CF Step 3.000000 MH; Auto Mar
IKR MODE TE	t (Δ)	x 36.80 ms (Δ		FUNCTION FUNCTION WIDTH	H FUNCTION VALUE	
2 F 1 3 4 5	t	1.580 s	-63.47 dBm		E	Freq Offse 0 Ha
6 7 8 9						Scale Type
9 10 11						Log <u>Lir</u>

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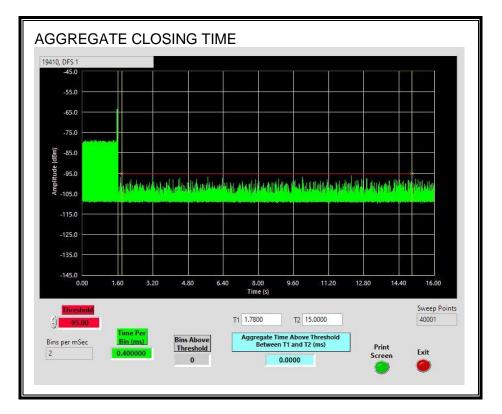
CHANNEL CLOSING TIME

Frequency	12:00:57 PM Aug 15, 2022 TRACE 1 2 3 4 5 6	Type: Log-Pwr	EINT		Hz	alyzer - 19410, DFS 1 50 Ω AC 50000000 G	RF
ns Auto Tur	Mkr1 200.0 ms -39.46 dB	۵	3	↓ Trig: Vide #Atten: 0	PNO: Fast ↔ FGain:High		
Center Fre 5.500000000 GH							
_	DL1 -64.00 dBm TRIG LVL						×2
Stop Fre 5.50000000 GH							e e standard yr bly
CF Ste 3.000000 MH Auto Ma	essaya (a dina isa di ba <mark>daya) k</mark> iti a postike a Minishi (a postike a dina isa hini di sharata o	Ully of some ways of the set waters , set each of south advect	Alar aller pilos da ana	∆2 shiin kasan wanalatina wika	landitan <mark>g 1</mark> 2		
Freq Offs 0 H							
Scale Typ	Span 0 Hz						er 5.50000

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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



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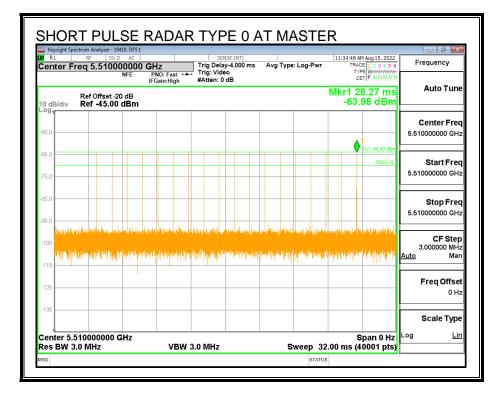
7.3. RESULTS FOR 40 MHz BANDWIDTH

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



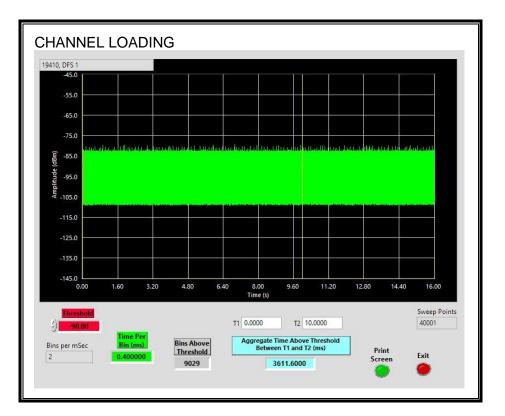
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TRAFFIC

	pectrum Analyzer - 1	.9410, DFS 1									d X
enter F	RF 50		GHz PNO: Fast ++		NSE:INT	Avg Type:	Log-Pwr	TRAC	M Aug 15, 2022 DE 1 2 3 4 5 6 PE W	Frequ	ency
0 dB/div	Ref Offset⊰ Ref -45.00	20 dB	IFGain:High	#Atten: 0				Mkr1	6.937 s 44 dBm	Au	to Tune
.og									DL1 -64.00 dBm		ter Freq 0000 GHz
65.0		-							Del 104.00 della		art Freq
				_ ∮ ¹						5.510000	0000 GHz
85.0 <mark>J. B. J. B. J. B. J. B. B.</mark>	աներուներուներուներուներու	ka ana padal.	utaataaabaa	1	Natural tana	an hunada	und, david, da	natanatan	ratikolaroti		op Freq
35.0 Hittlef 35.0 105 <mark>Hittlef</mark>	diana di Uniona di U	le, la constale	และเสาะสุดภาพที่สาม	1 		an daga sa dag	n pelu i na tata t	ti alcalcia da d		St 5.510000	op Freq 0000 GHz CF Step 0000 MHz
75.0 4.10				1 Jandon polat						St 5.510000 3.000 <u>Auto</u>	op Freq 0000 GHz CF Step 0000 MHz Man q Offset
85.0 Jubba 95.0 105 Jubba 115										St 5.510000 3.000 Auto Fre	op Freq

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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 36.11%

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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).

<u>RESULTS</u>

Channel Move Time	Limit
(sec)	(sec)
0.0592	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0	60

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MOVE TIME

Keysight Spectrum Analyzer - 194 RL RF 50 Ω	10, DFS1 AC	SENSE:INT		11:07:00 AM Aug 15, 2022	
enter Freq 5.51000	NFE PNO: Fast ++	Trig: Free Run	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE WWWWW DET P N N N N N	Frequency
Ref Offset -20 0 dB/div Ref -45.00		#Atten: 0 dB	Δ	Mkr1 59.20 ms -15.83 dB	Auto Tune
og 99				10.00 02	
65.0 75.0				DL1 -64.00 dBm	Center Fred 5.510000000 GHz
95.0 105	ang na thibhad dan ta alban	nalikola serinta dasartatisen	len kelender gedeste beide verden verden	hanna dallan maddalan.	Start Fred 5.510000000 GHz
115					Stop Fred 5.510000000 GHz
enter 5.510000000 G es BW 3.0 MHz	VBW	3.0 MHz	•	Span 0 Hz 6.00 s (40001 pts)	CF Step 3.000000 MHz Auto Mar
$\frac{1}{1} \Delta 2 \frac{1}{1} t (\Delta)$	× 59.20 ms (Δ)	-15.83 dB	JNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 F 1 t 3 4 5	1.480 s	-63.81 dBm		E	Freq Offset 0 Hz
6 7 8					Scale Type
9 0 1					Log <u>Lir</u>

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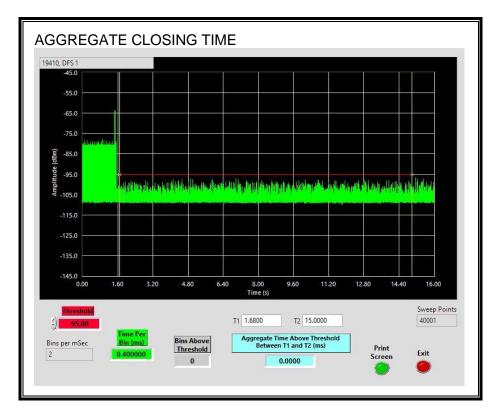
CHANNEL CLOSING TIME

eysight Spectrum Analyzer - 19410, DFS 1 RL RF 50 Ω AC 1ter Freq 5.510000000	CHa	SENSE:INT	Avg Type: Log-Pwr	11:27:34 AM Aug 15, 2022 TRACE 1 2 3 4 5 6	Frequency
NFE	PNO: Fast +++ Trig: \	Video n: 0 dB	ang type. Log t m	DET P NNNN	
Ref Offset -20 dB dB/div Ref -45.00 dBm			Δ	Mkr1 200.0 ms -38.32 dB	Auto Tun
g					Center Fre
.0				DL1 -64.00 dBm	5.510000000 GH
.0				TRIG LVL	Start Fre
5.0					5.510000000 GH
					Stop Fre
5.0	142				5.510000000 GH
n (n. 1937), and a second s Second second		land, parter educid for each		n, and - Specific Developer Helper Manual Content of Content and Content	CF Ste
15					3.000000 MH <u>Auto</u> Ma
					Freq Offse
25					он
25					Scale Typ
enter 5.510000000 GHz es BW 3.0 MHz	VBW 3.0 MH			Span 0 Hz 0.0 ms (40001 pts)	Log <u>Li</u>

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AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



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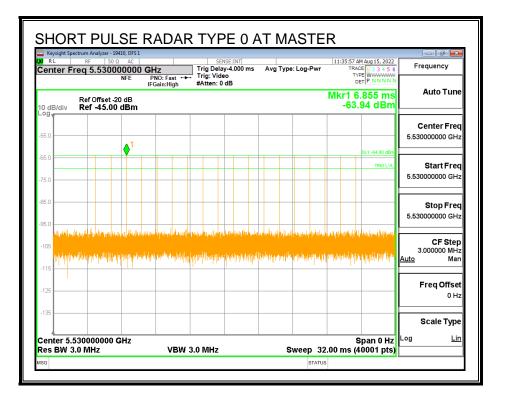
7.4. RESULTS FOR 80 MHz BANDWIDTH

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



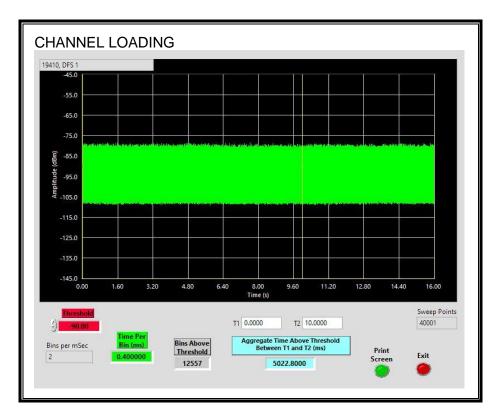
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TRAFFIC

	pectrum Analyzer - 194									- 0
enter F	RF 50 Ω Freq 5.53000		PNO: Fast 🔸			Avg Type	: Log-Pwr	TRAC TYL	MAug 15, 2022 DE 1 2 3 4 5 6 DE WWWWWWW T P N N N N N	Frequency
0 dB/div	Ref Offset -20 Ref -45.00		IFGain:High	#Atten: 0	ав			Mkr1	7.641 s 54 dBm	Auto Tui
.og									DL1 -64.00 dBm	Center Fr 5.530000000 G
75.0	aktille, tak basalarada aanti takatari			¹		(and a constraint for the second				Start Fr 5.530000000 G
85.0 95.0								a ant and a con-		Stop Fr 5.53000000 G
105	barrar an abarrar barakan	n de la cel francia	en atter posteren solet på Helft	the last one which a	ulation of the second	in a sha selan it da sa a shi da sa) / entre all a fin ministrations	t i den skine i De pie		CF Ste 3.000000 MI <u>Auto</u> M
125										Freq Offs 0
135										Scale Ty
_	.530000000 G								pan 0 Hz	Log L

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CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 50.22%

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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).

<u>RESULTS</u>

Channel Move Time	Limit
(sec)	(sec)
0.0636	10

Aggregate Channel Closing Transmission Time	Limit
(msec)	(msec)
0	60

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MOVE TIME

Keysight Spectrum Analyzer - 194 RL RF 50 Ω		SENSE:INT		02:01:29 PM Aug 15, 2022					
enter Freq 5.53000			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency				
	IFGain:High	#Atten: 0 dB		DET P NNNNN	Auto Tune				
Ref Offset -20 dB ΔΜkr1 63.60 ms 0 dB/div Ref -45.00 dBm -16.48 dB									
og					Center Fred				
5.0 75.0 1∆2				DL1 -64.00 dBm	5.53000000 GH				
5.0					Start Free				
95.0 105	human palanta dan palam	ang allo hay sayshin	ngalaanaydin biy dhaaddalay ar	naata tagang ti Noolij hat dhaty	5.53000000 GH				
115					Stop Fred				
125					5.53000000 GH				
enter 5.530000000 C		3.0 MHz	Swoon 1	Span 0 Hz 6.00 s (40001 pts)	CF Step 3.000000 MH;				
KR MODE TRC SCL	×			FUNCTION VALUE	Auto Mar				
1 Δ2 1 t (Δ) 2 F 1 t	63.60 ms (Δ) 1.497 s								
3 4 5	1.407 0	-02.00 0.011		E	Freq Offse 0 Ha				
6 7 8					Scale Type				
9 0 1					Log Lir				

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CHANNEL CLOSING TIME

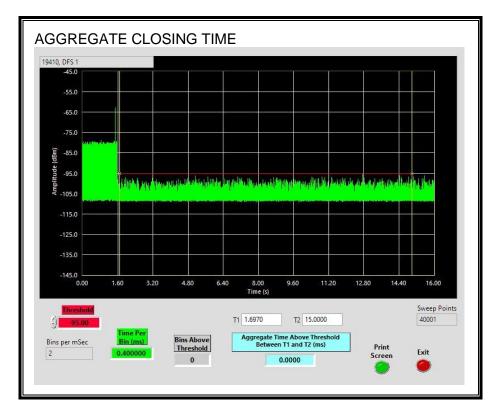
eysight Spectrum Analyzer - 19410, DFS 1 RL RF 50 Ω AC 1ter Freq 5.5300000000 C NFF	GHz		e: Log-Pwr	02:05:59 PM Aug 15, 2022 TRACE 1 2 3 4 5 6 TYPE WWWWWW	Frequency
Ref Offset -20 dB dB/div Ref -45.00 dBm	PNO: Fast +++ Trig: Vic IFGain:High #Atten: (Mkr1 24.24 ms -64.08 dBm	Auto Tune
g .0					Center Fred 5.530000000 GH;
5.0				DL1 -64.00 dBm	Start Fred
5.0					5.530000000 GH;
					Stop Fred 5.530000000 GH;
UUU (III) Amplitume Arrentation	and been also the television of the provident of the second second second second second second second second s				CF Ster
05 and see and the particular sector and and the sector of		a ya a kata kata kata kata kata kata kat			3.000000 MH: <u>Auto</u> Mar
25					Freq Offse 0 Hi
35					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. 30-MINUTE NON-OCCUPANCY PERIOD

RESULTS

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

X/ RL	RF	lyzer - 19410, DFS 1 50 Ω AC		SEI	NSE:INT			02:48:54 P	M Aug 15, 2022	- 8 -
Center	Freq 5.	530000000 NEF	GHz PNO: Fast ↔	Trig: Free	e Run	Avg Type	: Log-Pwr	TRAI TY	PEWWWWW	Frequency
			IFGain:High	#Atten: 0	dB			-		Auto Tune
10 dB/di		fset -20 dB 15.00 dBm							1.800 ks 4.74 dB	
Log										Center Free
-55.0										5.530000000 GH
-65.0	×2								DL1 -64.00 dBm	
-75.0										Start Fred 5.530000000 GH;
-85.0									[Stop Fred
-95.0										5.53000000 GH
-105	ylundiliyu	the Harborn ph	upplanadde	ell-planter phil	had Payme	he apple the	Hillippet	(headhaigh		CF Step 3.000000 MH
-115					1		i de la constanti de la constante			<u>Auto</u> Mar
-125 —										Freq Offse 0 Ha
-135										Scale Type
		000 GHz						<u> </u>	Span 0 Hz	Log <u>Lir</u>

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