

## DFS PORTION of FCC 47 CFR PART 15 SUBPART E

## **CERTIFICATION TEST REPORT**

FOR

GSM/WCDMA/LTE PHONE with BT, DTS/UNII a/b/g/n/ac and NFC

## FCC ID: PY7-24117Q

## REPORT NUMBER: 12118543-E6V1

ISSUE DATE: APRIL 27, 2018

Prepared for SONY MOBILE COMMUNICATIONS, INC. 4-12-3 HIGASHI-SHINAGAWA, SHINAGAWA -KU, TOKYO, 140-0002, JAPAN

> Prepared by UL VERIFICATION SERVICES INC. 47173 BENICIA STREET FREMONT, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888



## **Revision History**

Rev.	lssue Date	Revisions	Revised By
V1	04/27/18	Initial Issue	H. Lau

UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J TEL: (510) 771-1000 FAX: (510) 661-0888

Page 2 of 39

# TABLE OF CONTENTS

1.	ATTESTATION OF TEST RESULTS	. 4
2.	TEST METHODOLOGY	. 5
3.	REFERENCE DOCUMENTS	. 5
4.	FACILITIES AND ACCREDITATION	. 5
5.	CALIBRATION AND UNCERTAINTY	. 5
Ę	5.1. MEASURING INSTRUMENT CALIBRATION	. 5
ξ	5.2. MEASUREMENT UNCERTAINTY	. 5
6.	DYNAMIC FREQUENCY SELECTION	. 6
ť	5.1. OVERVIEW   6.1.1. LIMITS   6.1.2. TEST AND MEASUREMENT SYSTEM   6.1.3. TEST AND MEASUREMENT SOFTWARE   6.1.4. TEST ROOM ENVIRONMENT   6.1.5. SETUP OF EUT   6.1.6. DESCRIPTION OF EUT	. 6 10 12 12 13
e	6.2. RESULTS FOR 20 MHz BANDWIDTH   6.2.1. TEST CHANNEL   6.2.2. RADAR WAVEFORM AND TRAFFIC   6.2.3. OVERLAPPING CHANNEL TESTS   6.2.4. MOVE AND CLOSING TIME	16 16 19
e	6.3.RESULTS FOR 40 MHz BANDWIDTH6.3.1.TEST CHANNEL6.3.2.RADAR WAVEFORM AND TRAFFIC6.3.3.OVERLAPPING CHANNEL TESTS6.3.4.MOVE AND CLOSING TIME	23 23 26
ť	6.4.RESULTS FOR 80 MHz BANDWIDTH6.4.1.TEST CHANNEL6.4.2.RADAR WAVEFORM AND TRAFFIC6.4.3.OVERLAPPING CHANNEL TESTS6.4.4.MOVE AND CLOSING TIME6.4.5.30-MINUTE NON-OCCUPANCY PERIOD	30 30 33 33
7.	SETUP PHOTOS	38

## **1. ATTESTATION OF TEST RESULTS**

COMPANY NAME:	IE: SONY MOBILE COMMUNICATIONS, INC. 4-12-3 HIGASHI-SHINAGAWA, SHINAGAWA -KU, TOKYO, 140-0002, JAPAN				
EUT DESCRIPTION: GSM/WCDMA/LTE PHONE with BT, DTS/UNII a/b/g/n/ac and NFC					
SERIAL NUMBER:	SERIAL NUMBER: BH90001KB2				
DATE TESTED:	DATE TESTED: MARCH 21, 2018				
APPLICABLE STANDARDS					
ST	ANDARD	TEST RESULTS			
DFS Portion of CF	R 47 Part 15 Subpart E	Complies			

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. 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. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Verification Services Inc. By:

Henry men

HENRY LAU TEST ENGINEER UL Verification Services Inc.

Prepared By:

Douclas Combuser

DOUG ANDERSON EMC ENGINEER UL Verification Services Inc.

Page 4 of 39

# 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 06-96, FCC KDB 789033, KDB 905462 D02 and D03.

# 3. REFERENCE DOCUMENTS

Measurements of transmitter parameters as referenced in this report are documented in UL Verification Services report number 12118543-E5V1 FCC Report UNII WLAN.

# 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services, Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <u>http://ts.nist.gov/standards/scopes/2000650.htm</u>.

# 5. CALIBRATION AND UNCERTAINTY

## 5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

# 5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty level has been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY		
Time	± 0.02 %		

The Uncertainty figure is valid to a confidence level of 95%.

# 6. DYNAMIC FREQUENCY SELECTION

## 6.1. OVERVIEW

## 6.1.1. LIMITS

#### <u>FCC</u>

§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".

Page 6 of 39

## 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	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 devices with multiple bandwidth	Master Device or Client with Radar DFS	Client (without DFS)					
modes		(without br c)					
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 widest BW mode					
Closing Transmission Time	available						
		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.					

Page 7 of 39

# Table 3: Interference Threshold values, Master or Client incorporating In-ServiceMonitoring

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.

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 <sup>6</sup> PRI <sub>usec</sub> )}						
		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 Time, and Channel Closing Time tests.									

Table 6 – Long Pulse Radar Test Signal

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

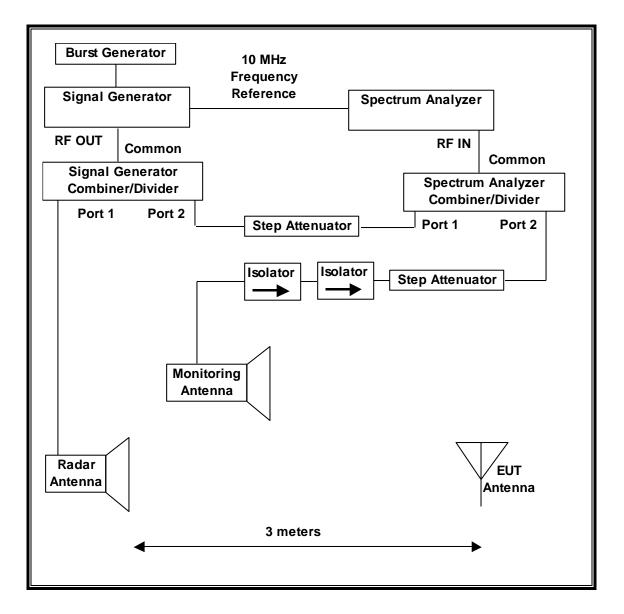
#### Table 7 – Frequency Hopping Radar Test Signal

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		

Page 9 of 39

## 6.1.2. TEST AND MEASUREMENT SYSTEM

#### RADIATED METHOD SYSTEM BLOCK DIAGRAM



Page 10 of 39

#### 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.

Page 11 of 39

#### 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. A data stream from the Master Device to the Slave Device using iPerf version 2.0.5 software package is initiated to generate WLAN traffic. The monitoring antenna attenuator 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 DFS tests documented in this report:

TEST EQUIPMENT LIST									
Description	Manufacturer	Model	T No.	Cal Date	Cal Due				
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	459	06/22/17	06/22/18				
Signal Generator, MXG X-Series RF Vector	Agilent	N5182B	1134	04/21/17	04/21/18				

## 6.1.3. TEST AND MEASUREMENT SOFTWARE

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

TEST SOFTWARE LIST								
Version	Test / Function							
3.0	Channel Loading and Aggregate Closing Time							
3.0.0.9	Signal Generator Screen Capture							
1.7	Radar Waveform Generation and Download							
	Version 3.0 3.0.0.9							

## 6.1.4. 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).

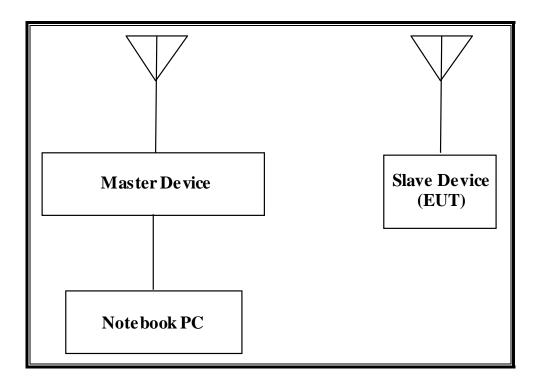
#### ENVIRONMENT CONDITION

Parameter	Value
Temperature	25.9 °C
Humidity	39 %

Page 12 of 39

## 6.1.5. SETUP OF EUT

#### RADIATED METHOD EUT TEST SETUP



#### SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT 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 Device)	Phihong	POE30U-560(G)	PHI170102N2	DoC					
Notebook PC (Controller/Console)	Lenovo	Type 4236-B92	PB-HEX04 12/05	DoC					
AC Adapter (Notebook PC)	Lenovo	42T4418	11S42T4418Z1ZGWG08 R90M	DoC					

Page 13 of 39

## 6.1.6. DESCRIPTION OF EUT

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

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 11.39 dBm EIRP in the 5250-5350 MHz band and 10.25 dBm EIRP in the 5470-5725 MHz band.

Two antenna assemblies utilized with the EUT have a gain of -2.1 dBi & -4.3 dBi in the 5250-5350 MHz band and -0.8 dBi & -5.4 dBi in the 5470-5725 MHz band.

Two 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 architecture. Three nominal channel bandwidths are implemented: 20 MHz, 40 MHz and 80 MHz.

The software installed in the EUT is Android revision 8.0.0, build 0.299.

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

Page 14 of 39

#### UNIFORM CHANNEL SPREADING

This function is not required per KDB 905462.

#### 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.

Page 15 of 39

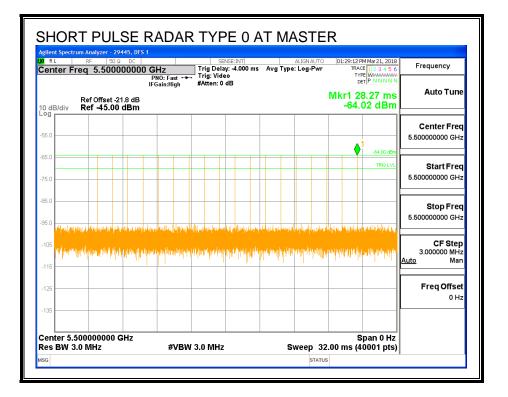
## 6.2. RESULTS FOR 20 MHz BANDWIDTH

## 6.2.1. TEST CHANNEL

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

## 6.2.2. RADAR WAVEFORM AND TRAFFIC

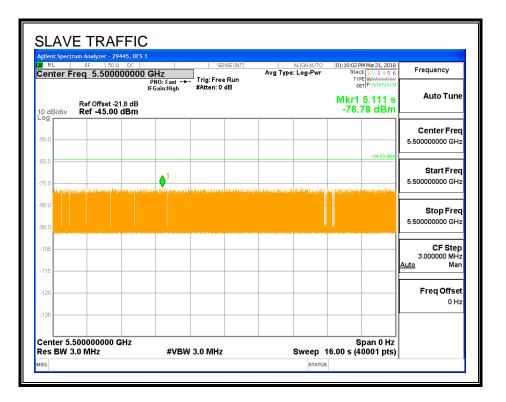
#### RADAR WAVEFORM



UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J TEL: (510) 771-1000 FAX: (510) 661-0888

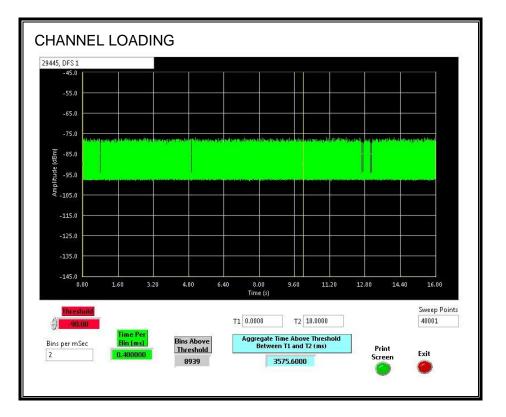
Page 16 of 39

#### **TRAFFIC**



Page 17 of 39

#### **CHANNEL LOADING**



The level of traffic loading on the channel by the EUT is 35.75%.

Page 18 of 39

## 6.2.3. OVERLAPPING CHANNEL TESTS

#### **RESULTS**

These tests are not applicable.

## 6.2.4. 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)
0.0492	10

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

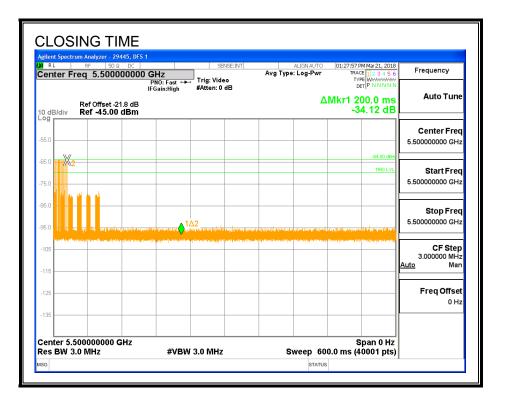
Page 19 of 39

## MOVE TIME

enter F	RF 50 Ω req 5.500000	0000 GHz PN0: Fast ↔	SENSE:INT Trig: Free Run #Atten: 0 dB	ALIGNAUTO Avg Type: Log-Pwr	01:22:43 PM Mar 21, 2018 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N	Frequency
) dB/div	Ref Offset -21.8 Ref -45.00 di		#Atten: 0 dB	Δ	Mkr1 49.20 ms -17.39 dB	Auto Tune
	Rei -45.00 a	BIII				0
5.0	142				-64.00 dBm	Center Fred 5.500000000 GH;
5.0						Start Free
105						5.500000000 GH
115						Stop Free
135						5.50000000 GH
enter 5. es BW 3	500000000 GH 3.0 MHz		V 3.0 MHz	Sweep 1	Span 0 Hz 6.00 s (40001 pts)	CF Step 3.000000 MH
KRIMODEIT 1 Δ2 2 F	RC SCL t (Δ) t	× 49.20 ms (Δ 1.594 s		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
3 4 5 6		1.054 5	-04.10 0.011			Freq Offse 0 Ha
7 8						

Page 20 of 39

#### **CHANNEL CLOSING TIME**

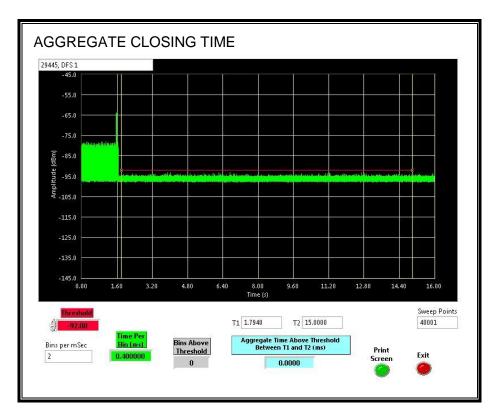


UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Page 21 of 39

#### AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



Page 22 of 39

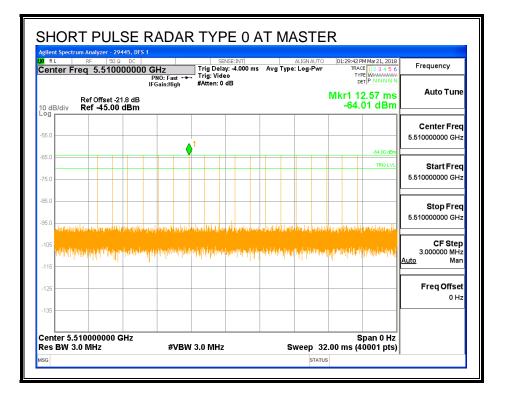
## 6.3. **RESULTS FOR 40 MHz BANDWIDTH**

## 6.3.1. TEST CHANNEL

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

## 6.3.2. RADAR WAVEFORM AND TRAFFIC

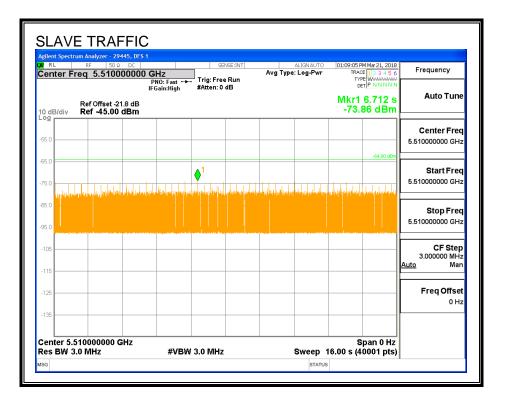
#### RADAR WAVEFORM



UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J TEL: (510) 771-1000 FAX: (510) 661-0888

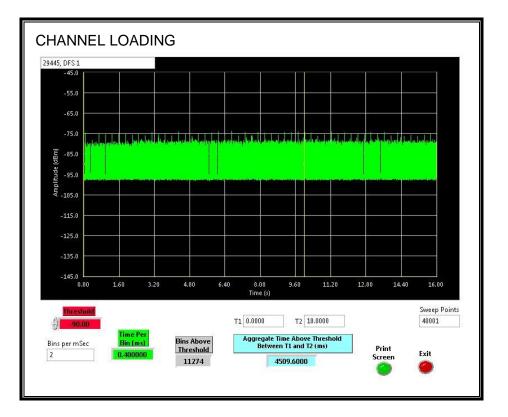
Page 23 of 39

#### **TRAFFIC**



Page 24 of 39

#### **CHANNEL LOADING**



The level of traffic loading on the channel by the EUT is 45.09%.

Page 25 of 39

## 6.3.3. OVERLAPPING CHANNEL TESTS

#### **RESULTS**

These tests are not applicable.

## 6.3.4. 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)
0.0716	10

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

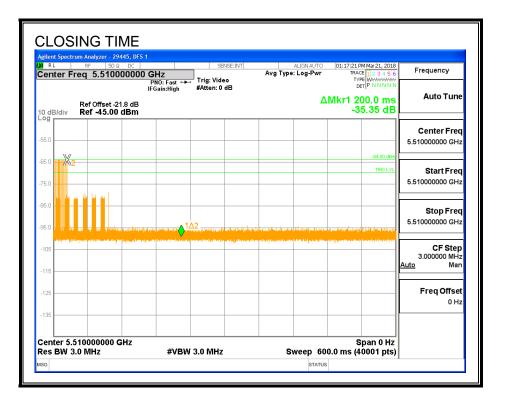
Page 26 of 39

## MOVE TIME

RL enter F	<sub>RF</sub> Freq 5.	50 Ω DC 51000000	DO GHz PNO: Fast ← IFGain:High	SENSE:IN ► Trig: Free Run #Atten: 0 dB	Avg	ALIGNAUTO Type: Log-Pwr	TYPE	Mar 21, 2018 1 2 3 4 5 6 W M M M M P N N N N N	Frequency
) dB/div		fset -21.8 dE 1 <b>5.00 dBm</b>	3	whiteh. • 4B		Δ	Mkr1 71. -15.	60 ms 72 dB	Auto Tune
5.0 5.0 5.0								-64.00 dBm	Center Free 5.510000000 GH:
5.0 5.0									Start Free 5.510000000 GH:
115 125 135									<b>Stop Fred</b> 5.510000000 GH:
es BW	3.0 MHz	×		W 3.0 MHz	FUNCTION	Sweep 1	Sp: 6.00 s (400 FUNCTION		CF Step 3.000000 MH: uto Mar
1 Δ2 2 F 3 4 5 6 7	1 t (2)	)	1.438 s	-64.01 dBm					Freq Offse 0 H
8 9 0 1									

Page 27 of 39

#### **CHANNEL CLOSING TIME**

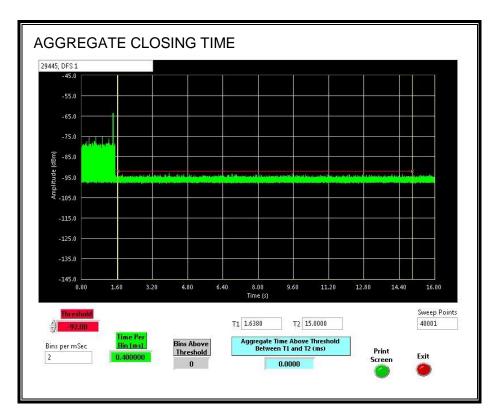


UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Page 28 of 39

#### AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc. FORM NO: CCSUP4701J FAX: (510) 661-0888

Page 29 of 39

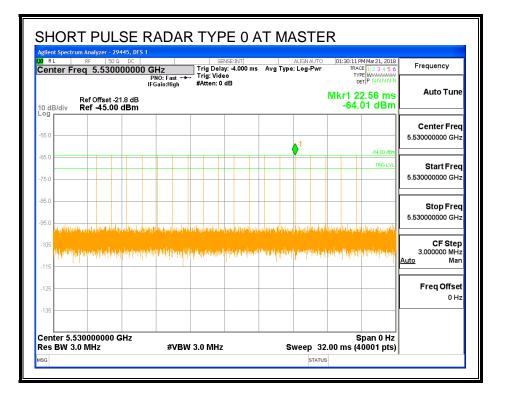
## 6.4. **RESULTS FOR 80 MHz BANDWIDTH**

## 6.4.1. TEST CHANNEL

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

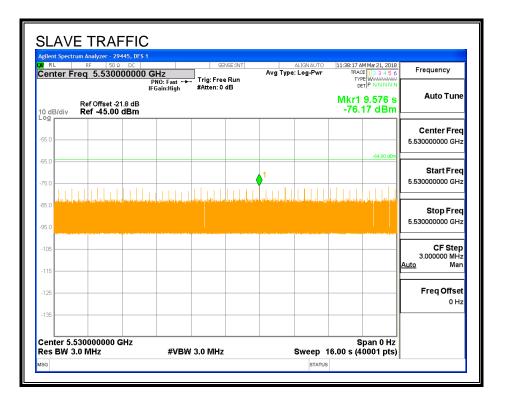
## 6.4.2. RADAR WAVEFORM AND TRAFFIC

#### RADAR WAVEFORM



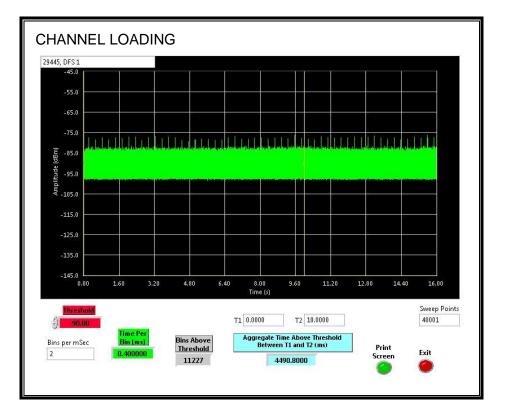
Page 30 of 39

#### **TRAFFIC**



Page 31 of 39

#### **CHANNEL LOADING**



The level of traffic loading on the channel by the EUT is 44.9%.

Page 32 of 39

## 6.4.3. OVERLAPPING CHANNEL TESTS

#### **RESULTS**

These tests are not applicable.

## 6.4.4. 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)
0.0532	10

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

Page 33 of 39

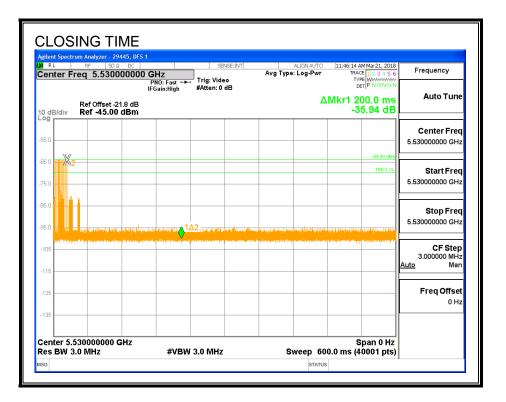
## MOVE TIME

enter Fre				SENSE:IP Trig: Free Rur #Atten: 0 dB	Avg	ALIGNAUTO Type: Log-Pwr	TYPE	Mar 21, 2018 1 2 3 4 5 6 W N N N N	Frequency
IF Gain:High   #Atten: 0 dB   Description     Ref Offset. 21.8 dB   ΔMkr1 53.20 ms   ΔMkr1 53.20 ms     10 dB/div   Ref -45.00 dBm   -22.41 dB									
5.0 5.0 5.0	¥2							-64.00 dBm	Center Frec 5.53000000 GHz
5.0 5.0 105									<b>Start Fred</b> 5.530000000 GHz
115 125 135									Stop Fred 5.53000000 GH2
es BW 3.4	SCL	+ *		3.0 MHz	FUNCTION	Sweep 1	Sp 6.00 s (40 FUNCTION		CF Step 3.000000 MH: .uto Mar
1 Δ2 1 2 F 1 3 4 5 6 7	t (Δ) t	53.20 m 1.588		-22.41 dB -64.15 dBm					Freq Offse 0 Ha
9 0									

UL VERIFICATION SERVICES INC. 47173 BENICIA STREET, FREMONT, CA 94538, USA This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Page 34 of 39

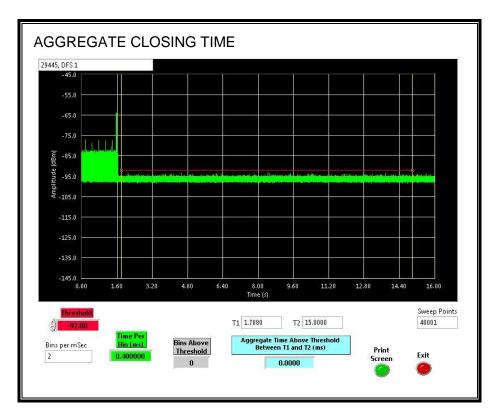
#### **CHANNEL CLOSING TIME**



Page 35 of 39

#### AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



Page 36 of 39

## 6.4.5. 30-MINUTE NON-OCCUPANCY PERIOD

#### **RESULTS**

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

gilent Spectrum Analy RL RF Center Freq 5.	50 Ω DC 530000000 G	NO: East +++ Trig:	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency			
PRO: hast   Trg: rectain   Der PNNNN     IFGain:High   #Atten: 0 dB   ΔMkr1 1.800 ks     0 dB/div   Ref offset-21.8 dB   -16.18 dB     0 dB/div   Ref -45.00 dBm   -16.18 dB									
55.0						Center Free 5.530000000 GH:			
5.0					-64.00 dBm	Start Free 5.530000000 GH			
5.0				e dade e la constitue dade e dade e		<b>Stop Fre</b> 5.530000000 GH			
105						CF Step 3.000000 MH <u>Auto</u> Ma			
125						Freq Offse 0 H			
center 5.530000		#VBW 3.0 M	107	Sween 2	Span 0 Hz .000 ks (40001 pts)				

Page 37 of 39