DFS TEST REPORT

(for 5 GHz WLAN)

Project No.	:JB-Z0567-A
Client	:Sony Corporation
Client's Address	:1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan
Product Name	:Digital Media Player
Model No.	:NW-ZX507
FCC ID	:AK8NWZX500
Test Standard	:47 CFR Part 15 Subpart E (for DFS test)
Sample Receipt Date	:May 24, 2019
Test Date	:June 25, 2019
Original Report Date	:July 5, 2019
Amend Report Date	:July 26, 2019
Test Result	:Complied

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** This report replaces and supersedes all previous versions. Refer to Revision History on the following page.*

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TESTING CERT #3203.01

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Note

☒-indicates that the listed condition, standard or equipment is applicable for this report.

☐-indicates that the listed condition, standard or equipment is not applicable for this report.

Revision History

Revision	Date	Overview	Page
JB-Z0567 (Original)	July 5, 2019	-	-
JB-Z0562-A	July 26, 2019	Correction of Antenna Gain.	P.3

1. General Information

1.1. Description of Equipment Under Test (EUT)

General Specification

Test Sample Condition : ☐ Prototype ☒ Pre-production ☐ Mass-production
Product Name : Digital Media Player
Trade Name : SONY
Model No. : NW-ZX507
Serial No. : 17
Power Rating of the EUT : DC 3.7 V (Internal Battery) or DC 5 V (USB)

Similar model(s) to be covered by this report
Model No. : None

Radio Specification

Function of the Equipment : Transceiver
Operating Frequency :

IEEE Standard	Operating Frequency	Channel Spacing	Channel Bandwidth	Number of Channel
802.11a/n HT20 802.11ac VHT20	5180 - 5320 MHz, 5500 - 5720 MHz (except 5600 - 5640 MHz), 5745 - 5825 MHz	20 MHz	20 MHz	8 9 5
802.11n HT40 802.11ac VHT40	5190 - 5310 MHz, 5510 - 5710 MHz (except 5590 - 5630 MHz), 5755 - 5795 MHz	40 MHz	40 MHz	4 4 2
802.11ac VHT80	5210 - 5290 MHz, 5530 - 5690 MHz (except 5610 MHz), 5775 MHz	80 MHz	80 MHz	2 2 1

Modulation Type : OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Antenna Type : Inverted-F antenna
Antenna Connector Type : None
Antenna Gain : + 3.0 dBi
Operating Temperature : +5 to +35 deg.C

1.2. Summary of Test Result

Test Item	Test Method	Operational Mode: Client Without Radar Detection	Results	Note
U-NII Detection Bandwidth	-	Not required	N/A	-
Initial Channel Availability Check Time	-	Not required	N/A	-
Radar Burst at the Beginning of the Channel Availability Check Time	-	Not required	N/A	-
Radar Burst at the End of the Channel Availability Check Time	-	Not required	N/A	-
In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time	Conducted	Yes (See data)	Complied	-
In-Service Monitoring for Non-Occupancy Period	Conducted	Yes (See data)	Complied	-
Statistical Performance Check	-	Not required	N/A	-

Other requirements

Part 15.31(e) Supply voltage requirement
: Complied (The voltage supplied from USB or battery are converted to regulated DC voltage by the built-in power circuit of the EUT.)

Part 15.203 / 212 Antenna requirement
: Complied (The EUT has an internal antenna which cannot be replaced by users.)

1.3. Tested Methodology

Test Standard : 47 CFR Part15 Subpart E
Test Method : KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

1.4. Measurement Procedures

We performed the measurements in accordance with NV3-10, available upon the request.

☒ No deviation
☐ Deviation from the above procedure

The summary of the above procedure is mentioned below

Dynamic Frequency Selection (for Client device without radar detection)

1. As master device, Access Point AIR-CAP3702E-B-K9 (FCC ID: LDK102087) is used.
2. Master device communicates with client device (EUT) by transmitting/receiving a data packet.

Applicability of DFS requirements during normal operation;

Requirements for devices with multiple bandwidth modes	Client Without Radar Detection
Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Period	Test using the widest BW mode available for the link

3. Vector Signal Generator set to the Short Pulse Radar Type 0 and level of Detection Threshold + 1 dB at antenna port of the master device.

Radar Test Waveform;

Radar Type	Pulse Width [µsec]	PRI [µsec]	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	-	-

Note : Short Pulse Radar Type 0 is used for the channel move time, and channel closing time tests.

DFS Detection Thresholds for Master Devices;

Maximum Transmit Power	Value [dBm]
EIRP ≥ 200 [mW]	-64
EIRP < 200 [mW] and power spectral density < 10 [dBm/MHz]	-62
EIRP < 200 [mW] that do not meet the power spectral density requirement	-64

Note : This is the level at the input of the receiver assuming a 0 dBi receive antenna.
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.
EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

4. As Channel Move Time and Channel Closing Transmission Time testing, EUT transmissions are observed on spectrum analyzer from the end of radar burst until after 10 seconds.
   As Non-Occupancy Period testing, EUT transmissions are observed on spectrum analyzer more than 30 minutes after the Channel Move.

Spectrum Analyzer Settings;

Parameter	Value
RBW	3 MHz
VBW	10 MHz
Span	Zero Span
Detector	Positive Peak
Trace	Clear / Write (Single Sweep)
Sweep Point	30001

DFS Response Requirement Values;

Parameter	Value	Remark
Non-Occupancy Period	Minimum 30 [min]	-
Channel Move Time	10 [sec]	See Note 1
Channel Closing Transmission Time	200 [msec] + an aggregate of 60 [msec] over remaining 10 [sec] period	See Note 1, 2

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 msec 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 msec) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

1.5. Test Location

Test Facility Name : Sony Global Manufacturing & Operations Corporation
EMC/RF Test Laboratory, Main Lab.
Address : 8-4 Shiomi Kisarazu-shi, Chiba-ken, 292-0834, Japan
Phone : +81 438 37 2750

A2LA Certificate No. : 3203.01
Cert. Validated Date : Oct. 31, 2019

Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Period
Shielded Room
☒ 4th Site SR1

1.6. Uncertainty

Test Item	Frequency	4th Site SR1
Power Spectrum : Conducted	1 GHz to 6 GHz	± 1.25 dB
Time	-	± 3.00 %

2. Test Specification

2.1. Validation

The system was configured for testing in a typical (as a customer would normally use it).
The tests were conducted with the worst-case modes as follows.

2.2. Operating Condition

The tests have been carried out the following conditions.

Test Item	Test Channel [MHz]	Operating Mode
Channel Move Time, Channel Closing Transmission Time, Non-Occupancy Period	5290	802.11ac (VHT80)

The Software for Operating Mode

Software Name : LBEE5ZZ1PJ-331 RF Test
Software Version : 0.6

2.3. Special Accessories

Special accessories needed for connecting the EUT to achieve compliance:

Item	Manufacturer	Model No.	Serial No.	Remark
-	-	-	-	-

2.4. EUT Modifications

☒ No equipment modification to achieve compliance to the standard levels was done during the tests.
☐ Equipment was modified to achieve compliance to the standard level as below.

Responsible Party Signature

Typed/ Print Name :
Responsible Party :
Position :
Date :

2.5. Configuration of EUT System

Channel Move Time, Channel Closing Transmit Time, Non-occupancy Period Measurements

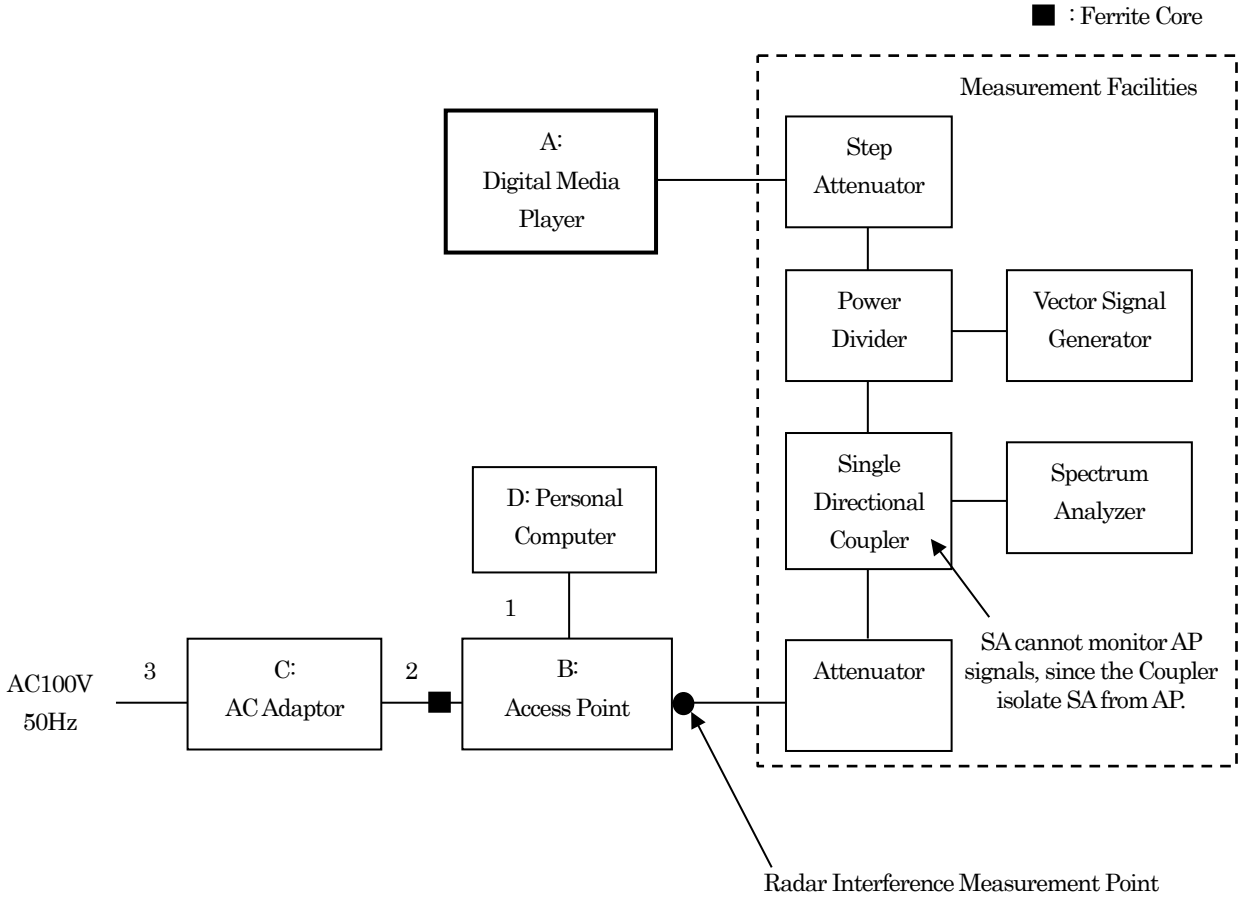
[EUT and Associated Equipment (AE)]

Symbol	EUT/ AE	Item	Manufacturer	Model No.	Serial No.
A	EUT	Digital Media Player	SONY	NW-ZX507	17
B	AE	Access Point	Cisco	AIR-CAP3702E-B-K9	FJC2105M41N
C	AE	AC Adaptor	Cisco	EADP-18MBB	DAB1445M1XV
D	AE	Personal Computer	SONY	SVS1311ADZB	27554083 1002141

[Type of Cable]

Symbol	Description	Identification (Manufacturer etc.)	Shielded Yes / No	Ferrite Core	Length (m)	Bundled
1	LAN Cable	MCO	No	No	5.0	-
2	DC Cable	-	No	Fixed x1	1.85	-
3	AC Cable	HEWTECH	No	No	1.9	-

[Connecting Diagram]



3. Test Data

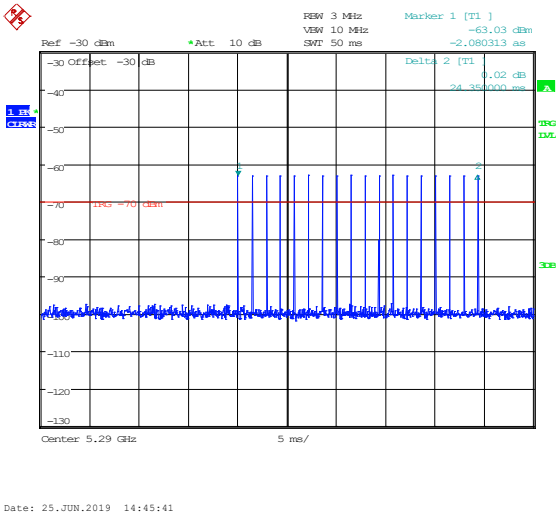
3.1 Channel Move Time, Channel Closing Transmit Time, Non-occupancy Period

1) Ambient temperature : 21.7 deg.C
2) Relative humidity : 68.3 %
3) Date of measurement : June 25, 2019
4) Measured by : H.WAKI

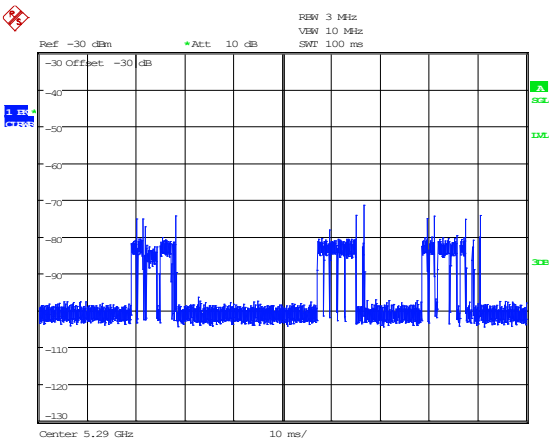
Test Parameter Settings;
Radar interference level : -63 dBm (-64 dBm Detection Threshold + 1 dB, at antenna gain 0 dBi)
Channel loading : More than approximately 17%
Sweep point of the spectrum analyzer : 30001 (Dwell time per sampling bin is 0.5 msec in sweep time 15 sec)

Test Item		Transmission bins	Tested Time	Limit	Results
Channel Move Time		-	0.1310 sec	10 sec	Complied
Channel Closing Transmission Time	Data Transmission	79 pts.	39.5 msec	200 msec	Complied
	aggregate of control signals	0 pts.	0.0 msec	60 msec	Complied
Non-Occupancy Period		0 pts.	-	30 min	Complied

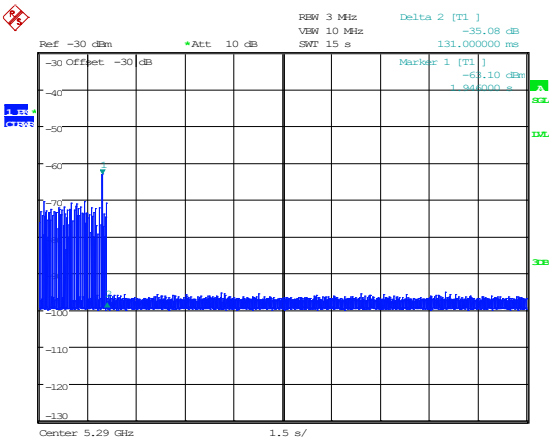
[Radar Interference Level Plot]



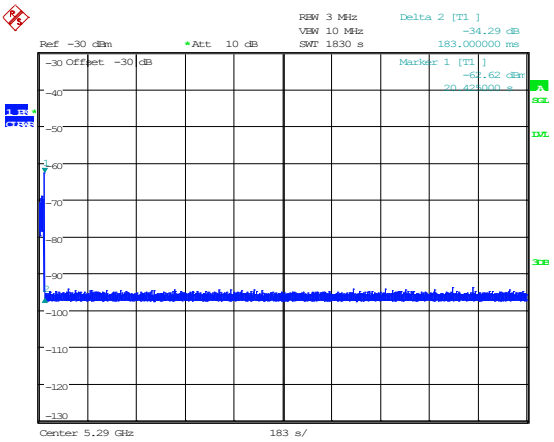
[EUT Transmit Level / Channel Loading Plot]



[Channel Move Time/ Channel Closing Transmission Time]



[Non-Occupancy Period Plot]



4. Method of Calculation

4.1. Channel Move Time, Channel Closing Transmit Time, Non-occupancy Period

Method of calculation : Software
Software Name : SW-0304
Software Version : Ver.3

Channel Closing Transmission Time
Dwell [msec] = S [msec] / B [point]
Tested Time [msec] = N [point] * Dwell [msec]

Note (a) Dwell : Dwell time per spectrum analyzer sampling bin.
(b) S : Sweep time settings on the spectrum analyzer.
(c) B : Number of spectrum analyzer sampling bins.
(d) N : Number of spectrum analyzer sampling bins showing a U-NII transmission.

5. List of Test Equipment

All test results are traceable to the national and/ or international standards.

5.1. Channel Move Time, Channel Closing Transmit Time, Non-occupancy Period

	Ctrl.#	Equipment	Model No.	Serial No.	Manufacturer	Cal.Interval	Last Cal.
x	W0099	Signal Generator	MG3710A	6201371416	Anritsu	12 months	19.05.09
-	W0100	Spectrum Analyzer	MS2692A	6201338954	Anritsu	12 months	19.05.09
x	W0140	Spectrum Analyzer	FSU26	200717	Rohde & Schwarz	12 months	18.09.01
-	W0110	10dB Attenuator	6610_SK-50-1	0002	HUBER + SUHNER	12 months	18.09.01
x	WC0002	RF Cable	SUCOFLEX 102	34124/2	HUBER + SUHNER	12 months	18.09.01
x	WC0003	RF Cable	SUCOFLEX 102	34127/2	HUBER + SUHNER	12 months	18.09.01
-	WC0004	RF Cable	SUCOFLEX 102	34288/2	HUBER + SUHNER	12 months	18.09.01
x	WC0005	RF Cable	SUCOFLEX 102	34287/2	HUBER + SUHNER	12 months	18.09.01
x	WC0006	RF Cable	SUCOFLEX 102	34289/2	HUBER + SUHNER	12 months	18.09.01
x	WC0007	RF Cable	SUCOFLEX 102	34286/2	HUBER + SUHNER	12 months	18.09.01
x	W0060	Directional Coupler	4244-20	03926	Narda	12 months	19.05.09
x	W0021	Power Divider	11636B	57395	Agilent Technologies	12 months	18.09.01
x	W0029	ATT (10dB、SMA)	8493C	76549	Agilent Technologies	12 months	18.09.01
x	W0138	Step Attenuator	8496H	MY42147804	Agilent Technologies	12 months	18.09.01
x	M0421	Step Attenuator	8494H	3837M01145	Hewlett-Packard	12 months	18.09.01
x	M0720	Thermo Meter	TH-321	140036	AS ONE	12 months	18.07.20

About calibration interval

Valid until the end of the month listed in “Cal. Int.” column.