RADIO TEST REPORT

Test Report No. : 10882638S-O

Applicant	:	**Canon Inc.**
Type of Equipment	:	**Wireless Module**
Model No.	:	**ES201**
FCC ID	:	**AZD233**
Test regulation	:	**FCC Part 15 Subpart E: 2015** **Section 15.407(DFS test only)**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
7. This test report covers Radio technical requirements.
   It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

Date of test : October 16, 2015

Representative test engineer:
Kenichi Adachi
Engineer
Consumer Technology Division

Approved by :
Toyokazu Imamura
Leader
Consumer Technology Division

RTL02610

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☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 10882638S-O

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10882638S-O	December 1, 2015	-	-

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CONTENTS **PAGE**

SECTION 1: Customer information

Company Name	:	Canon Inc.
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Contact Person	:	Takato Matsuura

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Wireless Module
Model No.	:	ES201
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	July 30, 2015
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product description

Model: ES201 (referred to as the EUT in this report) is a Wireless module.

General Specification

Clock frequency(ies) in the system	:	37.4 MHz

Radio specification:

Radio Type	:	Transceiver
Antenna type	:	Planar Inverted F Antenna
Antenna Gain	:	2 GHz Band (2400/2450/2500 MHz) : 1.95 dBi 5 GHs Band-1 (5160/5250/5340 MHz) : -1.32 dBi 5 GHs Band-2 (5480/5600/5720 MHz) : 0.3 dBi 5 GHs Band-3 (5725/5785/5845 MHz) : -0.43 dBi

	IEEE802.11b	**IEEE802.11g**	**IEEE802.11n (20 MHz band)**	**IEEE802.11n (40 MHz band)**
Frequency of operation *1), *2)	2412-2462 MHz	2412-2462 MHz	2412-2462 MHz 5180-5320 MHz 5500-5700 MHz 5745-5825 MHz	2422-2452 MHz 5190-5310 MHz 5510-5670 MHz 5755-5795 MHz
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK)	
Channel spacing			2.4 GHz band 5 MHz 5 GHz band 20 MHz	2.4 GHz band 5 MHz 5 GHz band 40 MHz
	IEEE802.11a	**IEEE802.11ac (20 MHz band)**	**IEEE802.11ac (40 MHz band)**	**IEEE802.11ac (80 MHz band)**
Frequency of operation *2)	5180-5320 MHz 5500-5700 MHz 5745-5825 MHz	5180-5320 MHz 5500-5700 MHz 5745-5825 MHz	5190-5310 MHz 5510-5670 MHz 5755-5795 MHz	5210 MHz 5290 MHz 5530-5610 MHz 5775 MHz
Type of modulation	OFDM (64QAM, 16QAM, QPSK, BPSK)			
Channel spacing	20 MHz		40 MHz	80 MHz

*1) Refer to the test reports: 10882638S-M for FCC 15.247.
*2) Refer to the test reports: 10882638S-N for FCC 15.407 except DFS test.

SECTION 3: Scope of Report

The EUT has the channels from 5180 MHz to 5320MHz and 5500 MHz to 5700MHz.
This report only covers DFS requirement subject to 5250 MHz to 5350 MHz and 5500 MHz to 5700 MHz bands, as specified by the following referenced procedures.

SECTION 4: Test specification, procedures & results

4.1 Test Specificationv

Test Specification	:	FCC Part 15 Subpart C: 2015, final revised on September 8, 2015
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices Section 15.407 General technical requirements
Test Specification		KDB 905462 D02 v01r02
Title		COMPLIANCE MEASUREMENT PROCEDURES FOR UNILICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250 - 5350 MHz AND 5470 - 5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION

4.2 Procedures and results

Table 2: Applicability of DFS Requirements

Requirement	Operating Mode Client without Radar Detection	Test Procedures & Limits	Deviation	Results
U-NII Detection Bandwidth	Not required	FCC, KDB 905462 D02 Section 7.8.1	N/A	N/A
Initial Channel Availability Check Time	Not required	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.2.1 RSS-247 6.3	N/A	N/A
Radar Burst at the Beginning of the Channel Availability Check Time	Not required	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.2.2 RSS-247 6.3	N/A	N/A
Radar Burst at the End of the Channel Availability Check Time	Not required	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.2.3 RSS-247 6.3	N/A	N/A
In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time	Yes	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.3 RSS-247 6.3	N/A	Complied
In-Service Monitoring for Non-Occupancy period	Yes *	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.3 RSS-247 6.3	N/A	Complied
Statistical Performance Check	Not required	FCC15.407 (h)(2) FCC, KDB 905462 D02 Section 7.8.4	N/A	N/A

*Although this test was not required in FCC, KDB 905462 D02, it was performed as additional test.

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

Maximum Transmit Power	Value (See Notes 1, 2 and 3)
E.I.R.P. ≥ 200 milliwatt	-64 dBm
E.I.R.P. < 200 milliwatt and power spectral density < 10dBm/MHz	-62 dBm
E.I.R.P. < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. 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

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1
Channel Closing Transmission Time	200 milliseconds + an aggregate of 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: The 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 signal 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 Waveform

Radar Type	Pulse Width [µs]	PRI [µs]	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Traials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup ((1 / 360) x ((19 x 10^6) / PRI [micro sec.]))	60 %	30
		Test B: 15 unique PRI values randomly selected within the range of 518 - 3066 micro sec., with a minimum increment of 1 micro sec., 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 (Rader Types 1-4)				80 %	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 5a Pulse Repetition Interval Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Micro seconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Table 6 Long Pulse Radar Test Waveform

Radar Type	Pulse Width [µs]	Chip Width [MHz]	PRI [µs]	Number of Pulses per *Burst*	Number of *Burst*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50 - 100	5 - 20	1000 - 2000	1 - 3	8 - 20	80 %	30

Table 7 Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width [µs]	PRI [µs]	Pulse per Hop [kHz]	Hopping Rate [kHz]	Hopping Sequence Length [ms]	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70 %	30

4.3 Test Location

UL Japan, Inc. Shonan EMC Lab.
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Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
☐ No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
☐ No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
☐ No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☐ No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
☒ No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

4.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.

Time Measurement uncertainty for this test was: (±) 0.012 %

4.5 Test set up, Data of DFS test, and Test instruments of DFS

Refer to APPENDIX.

SECTION 5: Operation of E.U.T. during testing

5.1 Operating Modes

The EUT, which is a Client Device without Radar detection capability, operates over the 5260 MHz - 5320 MHz and 5500 MHz - 5700 MHz.

[W53 Band]
The highest power level is 11.01 dBm EIRP in the 5250 MHz - 5350 MHz band.
The lowest power level is 6.34 dBm EIRP in the 5250 MHz - 5350 MHz band.

[W56 Band]
The highest power level is 12.42 dBm EIRP in the 5500 MHz - 5700 MHz band.
The lowest power level is 8.03 dBm EIRP in the 5500 MHz - 5700 MHz band.

Power level of the EUT [dBm]

Antenna	Band	Antenna Gain [dBi]	Output Power (Min)	Output Power(Max)
Antenna *1)	W53	-1.32	7.66	12.33
	W56	0.30	7.73	12.12

*1) Refer to 10882638S-N: FCC Part 15E (FCC 15.407) report for other parts than DFS.

The EUT uses one transmitter connected to a 50 ohm coaxial antenna ports. The antenna port is connected to the test system.

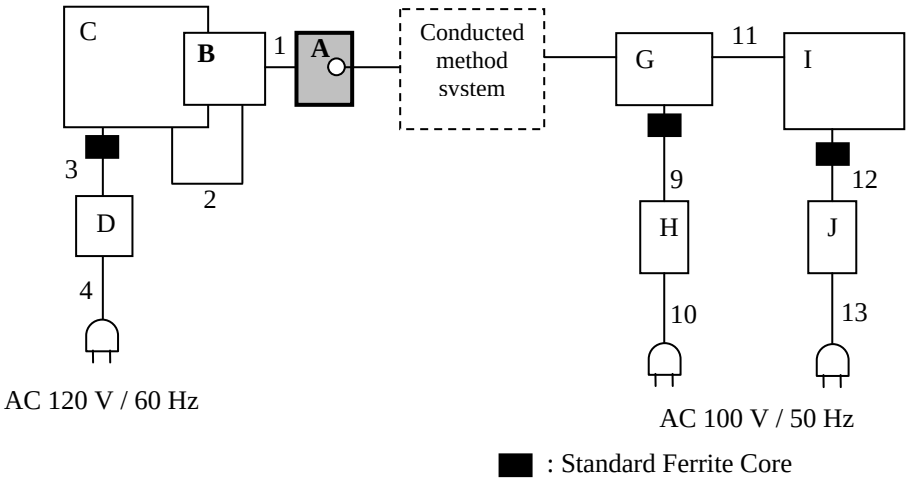
WLAN traffic is generated by the software to ping from the Master to the Client. That software has random ping intervals. (Channel loading was over 17 %)
Software name & version: ExPing Version 1.33.

The EUT utilizes the 802.11a, 802.11n and 802.11ac architecture, with a nominal channel bandwidth.
The EUT had used IEEE 802.11ac (VHT80) (widest mode).

The FCC ID for the Master Device used with EUT for DFS testing is LDK102087.

The rated output power of the Master unit is > 200 mW (23 dBm). Therefore the required interference threshold level is –64 dBm. After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is –64 + 1 + 4 = -59 dBm (threshold level + additional 1 dB + antenna gain).

5.2 Configuration and peripherals



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Module	ES201	5I43	Canon	EUT
B	Jig System	-	-	Canon	-
C	Notebook Computer	PC-VK27MCZDM	59000111A	NEC	-
D	AC Adapter	PC-VP-BP103	5605540DA	NEC	-
G	Wireless LAN access point (Master Device)	AIR-CAP3702E-A-K9	FTX18227609	Cisco Systems	FCC ID: LDK102087
H	AC Adapter	EADP-18MB	DAB1528MANP	Cisco Systems	-
I	Notebook Computer	DELL Vostro V1510	29090510205	Dell	-
J	ACAdapter	LA65NS1-00	71615-93B-385D	Dell	-

List of cables used

No.	Cable Name	Length (m)	Shield	
			Cable	Connector
1	Jig	0.1	Unshielded	Unshielded
2	USB	1.5	Shielded	Shielded
3	DC	1.7	Unshielded	Unshielded
4	AC	0.8	Unshielded	Unshielded
9	Access Point DC Power	1.8	Unshielded	Unshielded
10	Access Point AC Power	2.0	Unshielded	Unshielded
11	LAN	3.0	Unshielded	Unshielded
12	DELL PC DC Power	1.8	Unshielded	Unshielded
13	DELL PC AC Power	0.7	Unshielded	Unshielded

5.3 Test and Measurement System

SYSTEM OVERVIEW

The measurement system is based on a conducted test method.

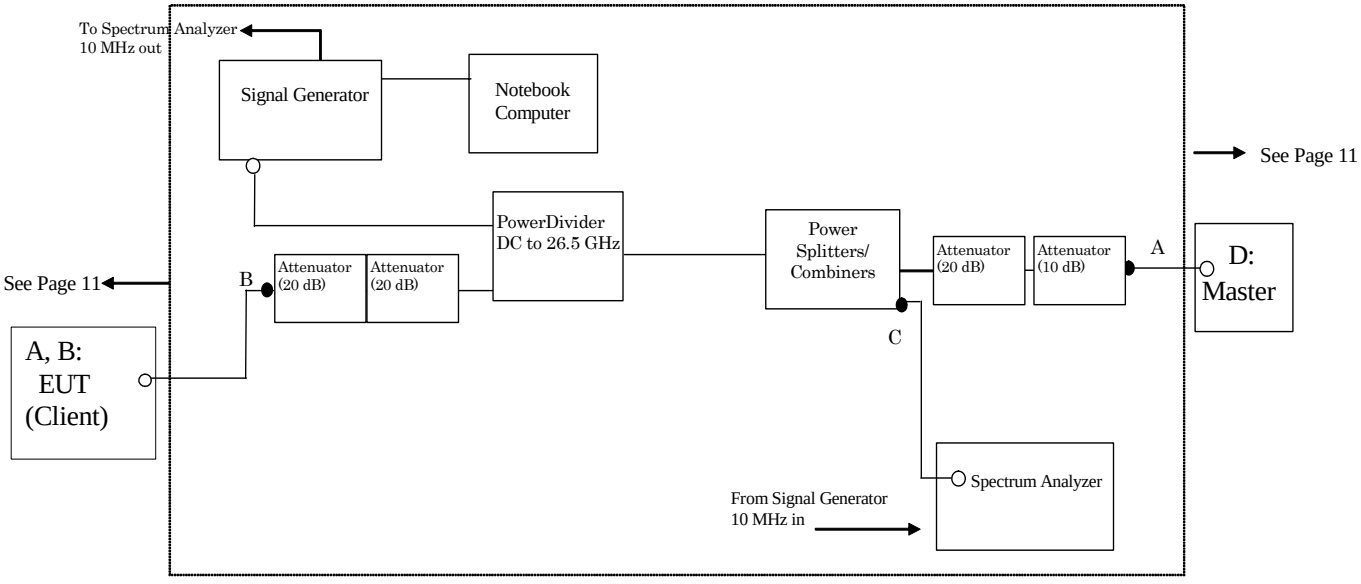
The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution. The short pulse types 2, 3, and 4, the long pulse type 5, and the frequency hopping type 6 parameters are randomized at run-time.

The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 8001 bins on the horizontal axis. A time-domain resolution of 2 ms/bin is achievable with a 16 seconds sweep time, meeting the 10 seconds short pulse reporting criteria. 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. A time-domain resolution of 3 ms/bin is achievable with a 24 seconds sweep time, meeting the 22 seconds long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

FREQUENCY HOPPING RADAR WAVEFORM GENERATING SUBSYSTEM

The first 100 frequencies are selected out of the hopping sequence of the randomized 475 hop frequencies.
Only a *Burst* that has the frequency falling within the receiver bandwidth of the tested U-NII device is selected among those frequencies. (Frequency-domain simulation). The radar waveform generated at the start time of the selected *Burst* (Time-domain simulation) is download to the Signal Generator.
If all of the randomly selected 100 frequencies do not fall within the receiver bandwidth of the U-NII device, the radar waveform is not used for the test.

CONDUCTED METHODS SYSTEM BLOCK DIAGRM



MEASUREMENT SYSTEM FREQUENCY REFERENCE

Lock the signal generator and the spectrum analyzer to the same reference sources as follows: Connect the 10 MHz OUT on the signal generator to the 10 MHz IN on the spectrum analyzer and set the spectrum analyzer 10 MHz In to On.

SYSTEM CALIBRATION

Step 1: Set the system as shown in Figure 3 of KDB 905462 D02 7.2.2.

Step 2: Adjust each attenuator to fulfill the following three conditions:
- WLAN can be communicated, and
- Rader detection threshold level is bigger than Client Device traffic level on the spectrum analyzer, and
- Master Device traffic level is not displayed on the spectrum analyzer.

Step 3: Terminate 50 ohm at B and C points, and connect the spectrum analyzer to the point A.
(See the figure on page 12)
At the point A, adjust the signal generator and spectrum analyzer to the center frequency of the channel to be measured. Download the applicable radar waveforms to the signal generator. Select the radar waveform, trigger a burst manually and measure the amplitude on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

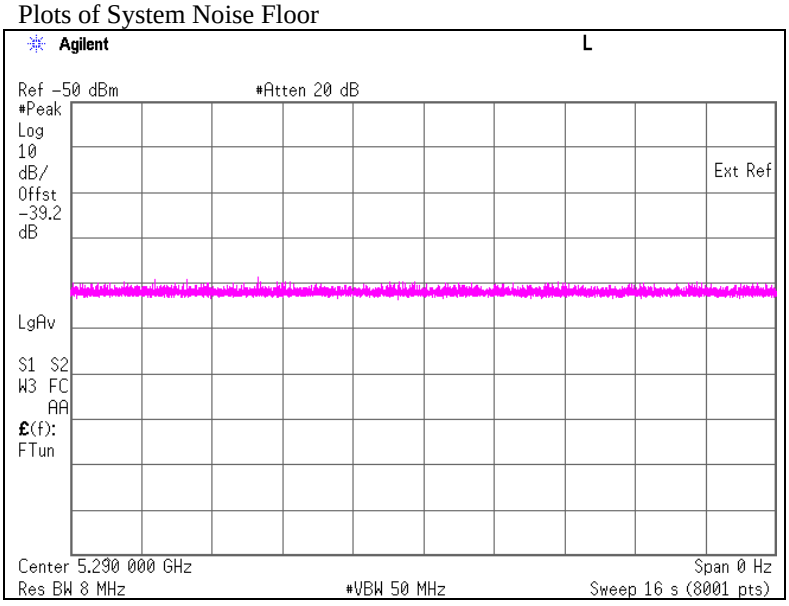
Step 4: Without changing any of the instrument settings, restore the system setting to Step 2 and adjust the Reference Level Offset of the spectrum analyzer to the level at Step 3.

By taking the above steps 1 to 4, the spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device.

See Clause 5.4 for Plots of Noise, Rader Waveforms, and WLAN signals.

5.4 Plots of Noise, Rader Waveforms, and WLAN signals

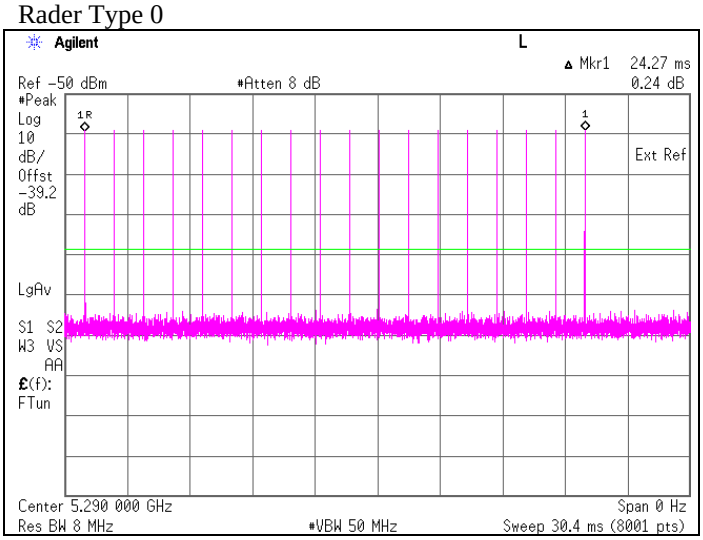
Plots of System Noise Floor



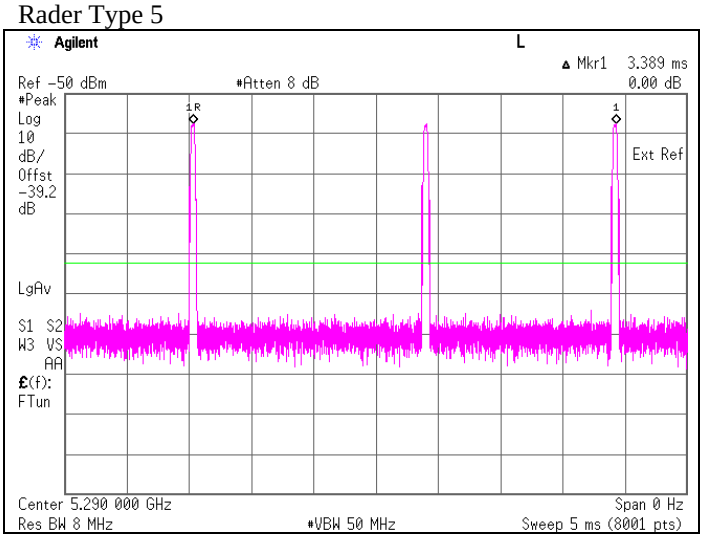
It was confirmed that the EUT did not transmit before having received appropriate control signals from a Master Device.

Plots of Radar Waveforms

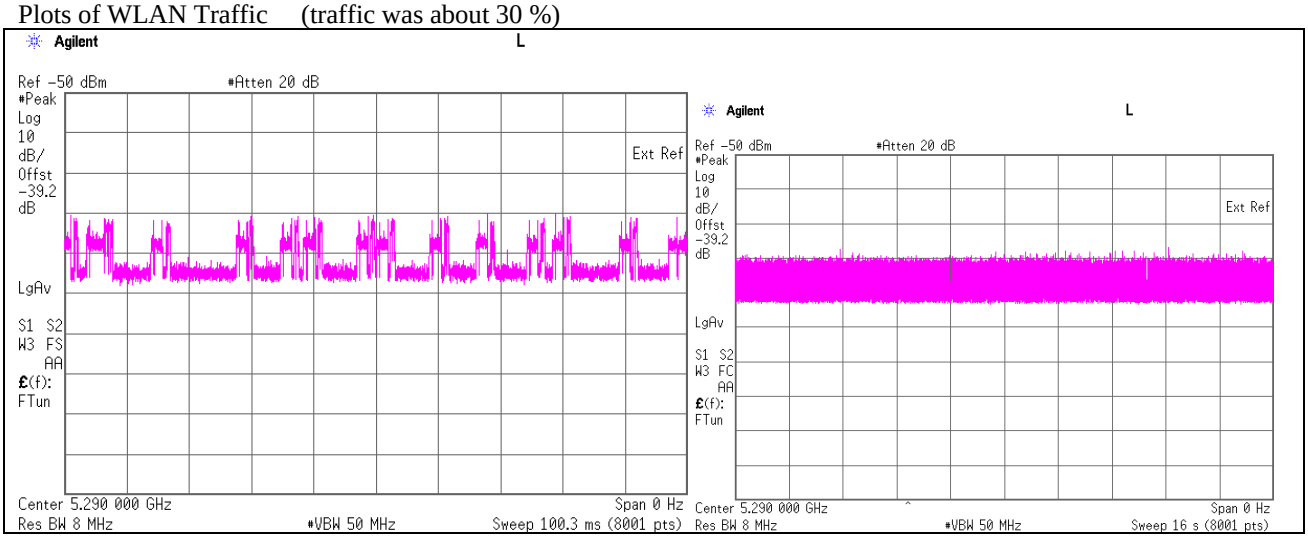
Rader Type 0



Rader Type 5



Plots of WLAN Traffic (traffic was about 30 %)



SECTION 6: In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time

6.1 Operating environment

Test place : No.1 Measurement room
Temperature : 25 deg.C
Humidity : 55 %RH

6.2 Test Procedure

Transfer files from the Master Device to the Client Device on the tested channel during the entire period of the test.
The Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 0 - 4 at levels defined , on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds.

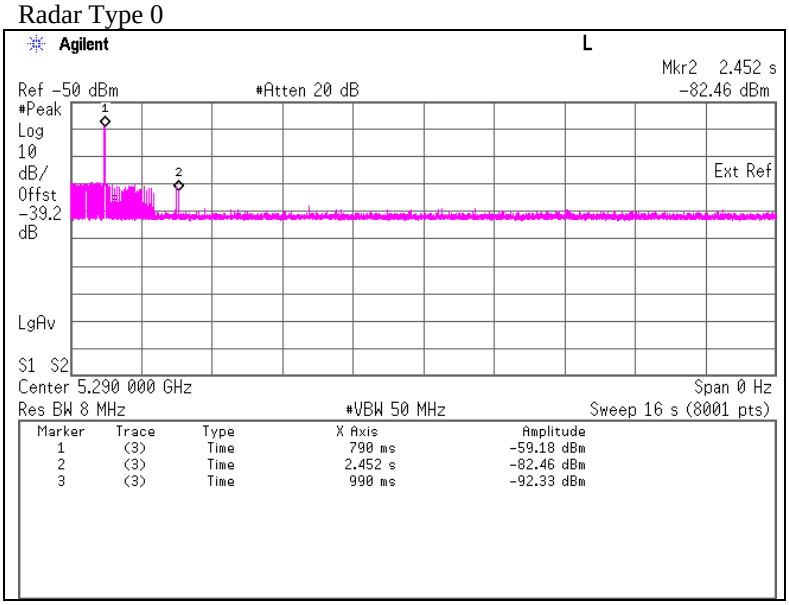
6.3 Test data

Test Item	Unit	Measurement Time	Limit	Results
Channel Move Time *1)	[s]	1.662	10.000	Pass
Channel Closing Transmission Time *2)	[ms]	70	60	Pass

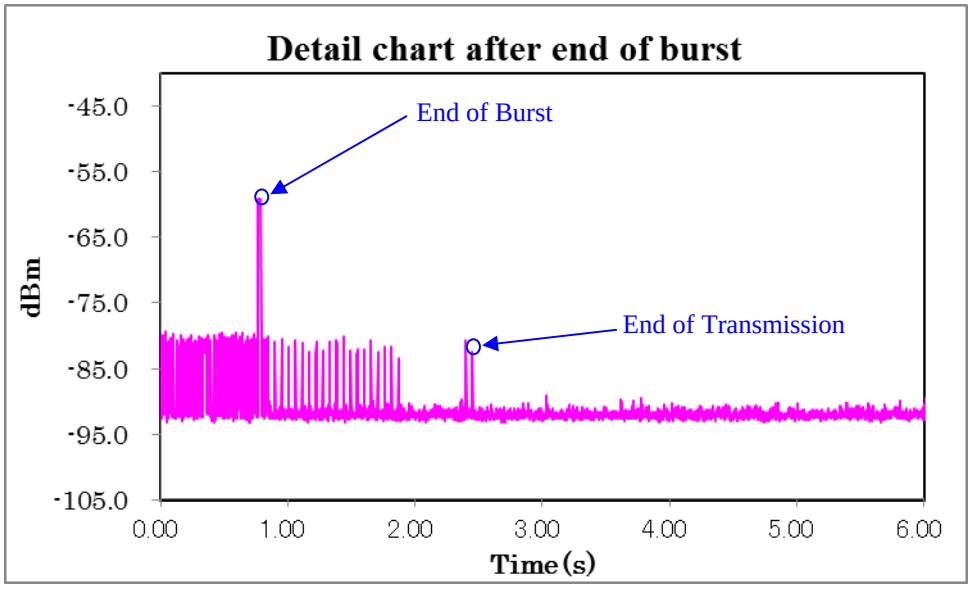
*1) Channel Move Time is calculated as follows:
(Channel Move Time) = (End of Transmission) - (End of Burst) = 2.452 – 0.790

*2) Channel Closing Transmission Time is calculated from (End of Burst + 200 ms) to (End of Burst + 10 s)
(Channel Closing Transmission Time) = (Number of analyzer bins showing transmission) x (dwell time per bin)
= 35 x 2 [ms]

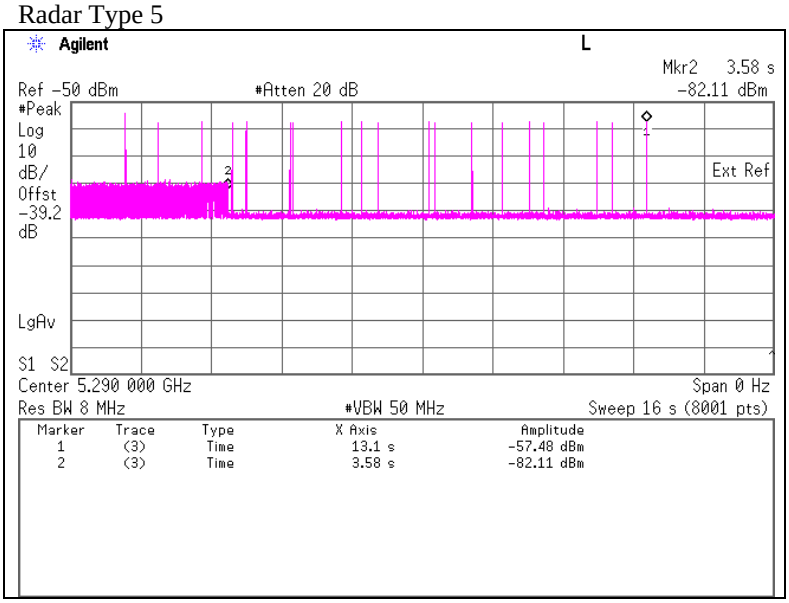
Radar Type 0



Marker 1: - End of Burst : 790 ms
Marker 2: - End of Transmission : 2452 ms



Radar Type 5



Marker 1 : End of Burst **: 13100 ms**
Marker 2 : End of Transmission **: 3580 ms**

6.4 Test result

Test result: Pass

Date: October 16, 2015 Test engineer: Kenichi Adachi

SECTION 7: In-Service Monitoring for Non-Occupancy Period

7.1 Operating environment

Test place : No.1 Measurement room
Temperature : 25 deg.C
Humidity : 55 %RH

7.2 Test Procedure

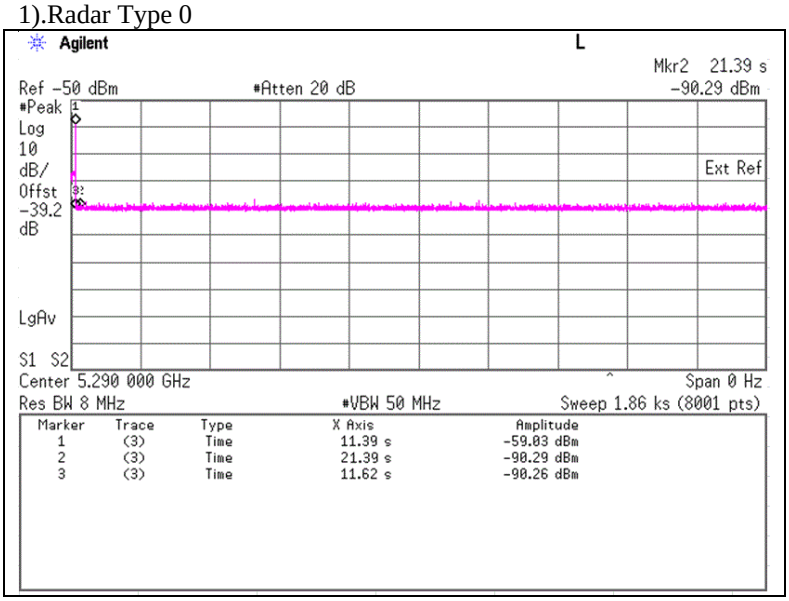
The following two tests are performed:

1). Transfer files from the Master Device to the Client Device on the tested channel during the entire period of the test. The Radar Waveform generator sends a Burst of pulses for one of the Radar Types 0 - 6 at levels defined on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.
Observe the transmissions of the EUT after the Channel Move Time on the Operating Channel for duration greater than 30 minutes.

2). Transfer files from the Master Device to the Client Device on the tested channel during the entire period of the test. Observe the transmissions of the EUT on the Operating Channel for duration greater than 30 minutes after the Master Device is shut off.

7.3 Test data

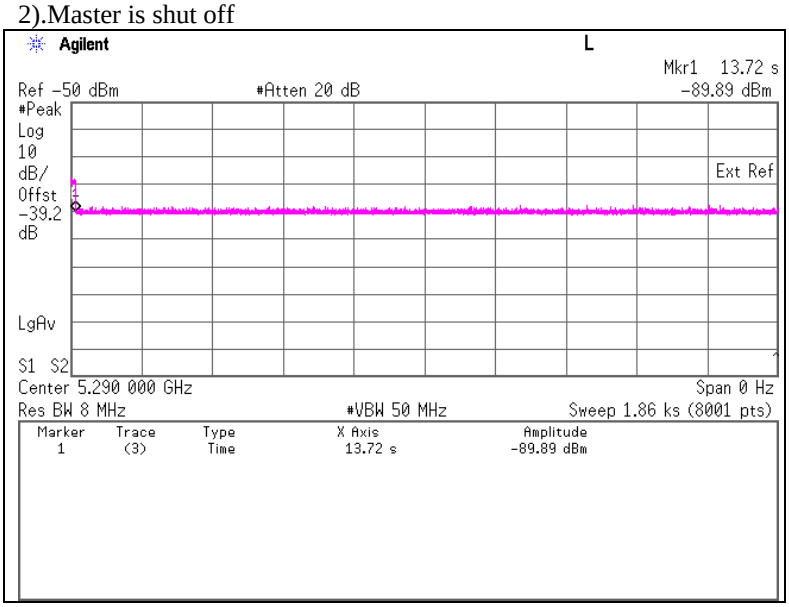
1).Radar Type 0



Marker 1 : End of Burst : 11.39 s
Marker 2 : End of Burst + 10 s : 21.39 s
Marker 3 : End of transmission : 11.62 s

* Measurement non-occupancy period: 30.64 minutes or more (1860 [s] – 21.39 [s] = 1838.61[s] = 30.64 [minutes])

2).Master is shut off



Marker 1 : End of transmission : 13.72 s

* Measurement non-occupancy period: 30.77 minutes or more (1860 [s]– 13.72 [s] = 1846.28 [s] = 30.77 [minutes])

7.4 Test result

Test result: Pass

Date: October 16, 2015 Test engineer: Kenichi Adachi

APPENDIX 1: Data of DFS test

Parameter Data for Radar Type 5

Trial Number	Burst	Number of Pulses	Pulse Width [us]	Chirp Width [MHz]	Pulse 1-to-2 Spacing [us]	Pulse 2-to-3 Spacing [us]	Starting Location Within Interval [us]
1	1	1	70	14			472
1	2	2	72	12	1705		112630
1	3	2	54	8	1098		462126
1	4	1	96	17			526182
1	5	1	83	15			216576
1	6	2	72	11	1781		582071
1	7	1	87	12			22516
1	8	1	72	12			497176
1	9	1	89	13			304426
1	10	1	86	17			61840
1	11	1	55	10			583415
1	12	3	75	12	1538	1189	93127
1	13	3	86	8	1377	1756	295533
1	14	2	66	10	1359		352977
1	15	2	85	7	1521		344293
1	16	3	62	16	1869	1520	26087
1	17	1	56	19			614533
1	18	2	86	6	1012		333062
1	19	3	59	20	1038	1517	480541

APPENDIX 2: Test instruments

EMI Test Equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSG-01	Signal Generator	Agilent	E4438C	MY47271584	DFS	2015/03/04 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	DFS	2015/03/11 * 12
SPSC-07	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	DFS	2015/07/31 * 12
SAT20-06	Attenuator	Weinschel Corp.	54A-20	31506	DFS	2015/04/09 * 12
SAT20-07	Attenuator	Weinschel Corp.	54A-20	31484	DFS	2015/04/09 * 12
SPSC-08	Power Splitters/Combiners	Mini-Circuits	ZFSC-2-10G+	-	DFS	2015/07/31 * 12
SCC-G31	Coaxial Cable	Junkosha	MWX241-01000KMSKMS	OCT-08-13-046	DFS	2015/04/09 * 12
SRENT-05	Spectrum Analyzer	KEYSIGHT	E4440A	MY46187752	DFS	2015/10/05 * 12
SAT20-03	Attenuator	Agilent	8493C-020	74891	DFS	2015/03/11 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	DFS	2014/11/21 * 12
SCC-G32	Coaxial Cable	Junkosha	MWX241-02000KMSKMS	OCT-09-13-005	DFS	2014/10/23 * 12
SPSC-04	Power Splitters/Combiners	Mini-Circuits	ZN4PD1-63-S+	-	DFS	2015/07/31 * 12
SCC-G24	Coaxial Cable	Suhner	141PE	-	DFS	2015/07/14 * 12
SCC-G25	Coaxial Cable	Suhner	141PE	-	DFS	2015/07/14 * 12
SCC-G26	Coaxial Cable	Suhner	141PE	-	DFS	2015/07/14 * 12
STM-G3	Terminator	Weinschel	M1459A	U6569	DFS	2015/07/14 * 12
SRE-157	Wireless LAN access point	Cisco Systems	AIR-CAP3702E-A-K9	FTX18227609	DFS	
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	DFS	2015/04/28 * 12
COTS-SDFS-01	Signal Studio Software for DFS	Agilent	N7620A-101	5010-7739	DFS	-
COTS-SDFS-02	Radar Generating Software for DFS	Agilent	-	-	DFS	-

The expiration date of the calibration is the end of the expired month.
As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test Item:

DFS: Dynamic Frequency Selection