RADIO TEST REPORT

Test Report No. : 32JE0156-SH

Applicant	:	**KYOCERA Corporation**
Type of Equipment	:	**Mobile Phone**
Model No.	:	**KYY04**
FCC ID	:	**JOYKYY04**
Test regulation	:	**FCC Part 15 Subpart E: 2012 (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.

Date of test: May 23,2012

Tested by:

Tatsuya Arai
Engineer of WiSE Japan, UL
Verification Service

Approved by :

Go Ishiwata
Manager of WiSE Japan, UL
Verification Service

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

JAB Testing RTL02610

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

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SECTION 1: Customer information

Company Name	:	KYOCERA Corporation
Brand Name	:	KYOCERA
Address	:	2-1-1 Kagahara, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8502
Telephone Number	:	+81-45-943-6150
Facsimile Number	:	+81-45-943-6125
Contact Person	:	Ryouji Kawashima

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

2.1 Identification of E.U.T.

Type of Equipment	:	Mobile Phone
Model Number	:	KYY04
Serial Number	:	IMEI:352280050011360
Rating	:	DC 3.7V (battery) (DC 3.3 to 4.2V)
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	May 23, 2012
Modification of EUT	:	The test lab did not make the modification to the EUT supplied from the customer to have it pass the tests.

2.2 Product Description

Model: KYY04 (referred to as the EUT in this report) is a Mobile Phone.

Clock frequency(ies) in the system : 480MHz, 1.4GMHz

<Wireless LAN (IEEE802.11a, n) part>

Equipment type	:	Transceiver
Frequency of operation	:	5180 – 5320MHz and 5500 – 5700MHz
Radio part clock frequency	:	480MHz
Bandwidth	:	20MHz
Type of modulation	:	OFDM
Antenna type	:	Internal
Antenna connector type	:	None
Antenna gain	:	0dBi

SECTION 3: Scope of Report

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

SECTION 4: Test specification, procedures & results

4.1 Test Specificationv

Test Specification	:	FCC Part 15 Subpart E: 2012, final revised on March 30, 2012 and effective April 30, 2012
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart E Unlicensed National Information Infrastructure Devices Section 15.407 General technical requirements
Test Specification	:	FCC 06-96 APPENDIX
Title	:	COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION

FCC 15.31 (e)
The EUT is a battery-operated device and test was performed with the full-charged battery. Therefore, this EUT complies with the requirement.

FCC Part 15.203
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

4.2 Procedures and results

Table 1: Applicability of DFS Requirements

Requirement	Operating Mode Client without Radar Detection	Test Procedures & Limits	Deviation	Results
U-NII Detection Bandwidth	Not required	FCC 06-96 Appendix 7.8.1	N/A	N/A
Initial Channel Availability Check Time	Not required	FCC15.407 (h) FCC 06-96 Appendix 7.8.2.1 RSS-210 A9.3	N/A	N/A
Radar Burst at the Beginning of the Channel Availability Check Time	Not required	FCC15.407 (h) FCC 06-96 Appendix 7.8.2.2 RSS-210 A9.3	N/A	N/A
Radar Burst at the End of the Channel Availability Check Time	Not required	FCC15.407 (h) FCC 06-96 Appendix 7.8.2.3 RSS-210 A9.3	N/A	N/A
In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time	Yes	FCC15.407 (h) FCC 06-96 Appendix 7.8.3 RSS-210 A9.3	N/A	Complied
In-Service Monitoring for Non-Occupancy period	Yes	FCC15.407 (h) FCC 06-96 Appendix 7.8.3 RSS-210 A9.3	N/A	Complied
Statistical Performance Check	Not required	FCC15.407 (h) FCC 06-96 Appendix 7.8.4	N/A	N/A

Table 2: DFS Detection Thresholds for Master Devices and Client Devices With Radar

Maximum Transmit Power	Value (See Notes 1 and 2)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.	

Table 3 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 80% of the U-NII 99% transmission power bandwidth See Note 3

Note 1: The instant that the Channel Move Time and the Channel Closing Transmission Time begins is as follows:

- For the Short Pulse Radar Test Signals this instant is the end of the *Burst*.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar *Burst* generated
- For the Long Pulse Radar Test Signal this instant is the end of the 12 second period defining the *Radar Waveform*.

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 1 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 4 Short Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Traials
1	1	1428	18	60%	30
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

Table 5 Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chip Width (MHz)	PRI (µsec)	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 6 Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulse per Hop (kHz)	Hopping Rate (kHz)	Hopping Sequence Length (msec)	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.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).

	FCC Registration No.	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	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ 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	-

4.4 Data of DFS test, Test instruments of DFS, Test set up

Refer to APPENDIX 1 to 2.

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 - 5320MHz and 5500 -5700MHz.

Power level(EIRP) of the EUT[dBm]

5250-5350MHz Band

Output Power [dBm]	Antenna Gain [dBi]	Output Power (EIRP) [dBm]
11.76 (0.015W)	0.00	11.76

5500-5700MHz Band

Output Power [dBm]	Antenna Gain [dBi]	Output Power (EIRP) [dBm]
10.41 (0.011W)	0.00	10.41

The lowest antenna assembly gain of all available antenna assemblies is 0dBi.

The EUT uses one transmitter connected to a 50-ohm coaxial antenna port.

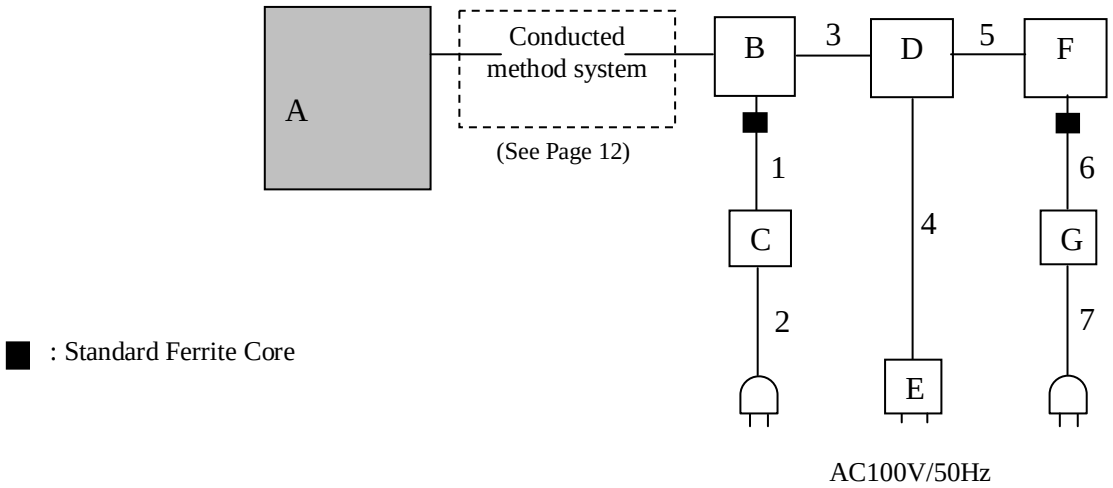
WLAN traffic is generated by streaming the MPEG Test file “6 ½ Magic Hours” from the Master to the Client in full motion video mode using the media player classic with the V2.4.8.6.

The EUT utilizes the 802.11a, 11n architecture, with a nominal channel bandwidth of 20MHz.

The FCC ID for the Master Device used with EUT for DFS testing is LDK102073.

The rated output power of the Master unit is >200mW(23dBm). 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 + 0= –63.0 dBm (threshold level + additional 1dB + antenna gain).

5.2 Configuration and peripherals



■ : Standard Ferrite Core

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Mobile Phone	KYY04	IMEI:352280050011360	KYOCERA	EUT
B	Wireless LAN access point	AIR-LAP1262N-A-K9	FTX1449E1RY	Cisco Systems	-
C	AC adaptor	AA25480L	ALD0502G455	Cisco Systems	-
D	Router	WHR-HP-AMPG	76629084708331	Buffalo	-
E	AC adaptor	US100523	807-0040996	Buffalo	-
F	Personal Computer	X201	R9-AHK61	Lenovo	-
G	AC adaptor	92P1156	11S92P1156Z1ZDXNO BLK3N	Lenovo	-

List of cables used

No.	Cable name	Length (m)	Shield	
			Cable	Connector
1	DC	1.8	Unshielded	Unshielded
2	AC	1.8	Unshielded	Unshielded
3	LAN	1.0	Unshielded	Unshielded
4	DC	1.8	Unshielded	Unshielded
5	LAN	1.4	Unshielded	Unshielded
6	DC	1.8	Unshielded	Unshielded
7	AC	0.8	Unshielded	Unshielded

5.3 Test and Measurement System

SYSTEM OVERVIEW

The measurement system is based on a conducted test method.

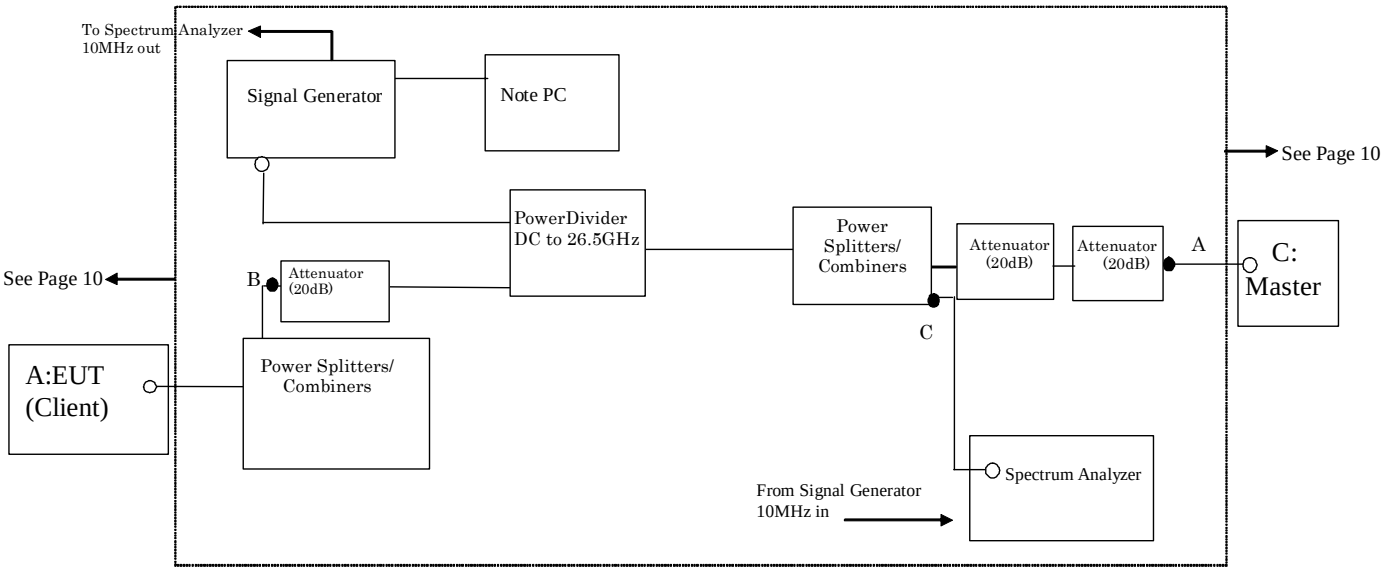
The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution. The short pulse types 2, 3, and 4, the long pulse type 5, and the frequency hopping type 6 parameters are randomized at run-time.

The signal monitoring equipment consists of a spectrum analyzer with the capacity to display 8001bins on the horizontal axis. A time-domain resolution of 2 msec/bin is achievable with a 16 second 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 msec/bin is achievable with a 24 second sweep time, meeting the 22 second 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 10MHz OUT on the signal generator to the 10MHz IN on the spectrum analyzer and set the spectrum analyzer 10MHz In to On.

SYSTEM CALIBRATION

Step 1: Set the system as shown in Figure 3 of FCC 06-96 7.2.1.

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.

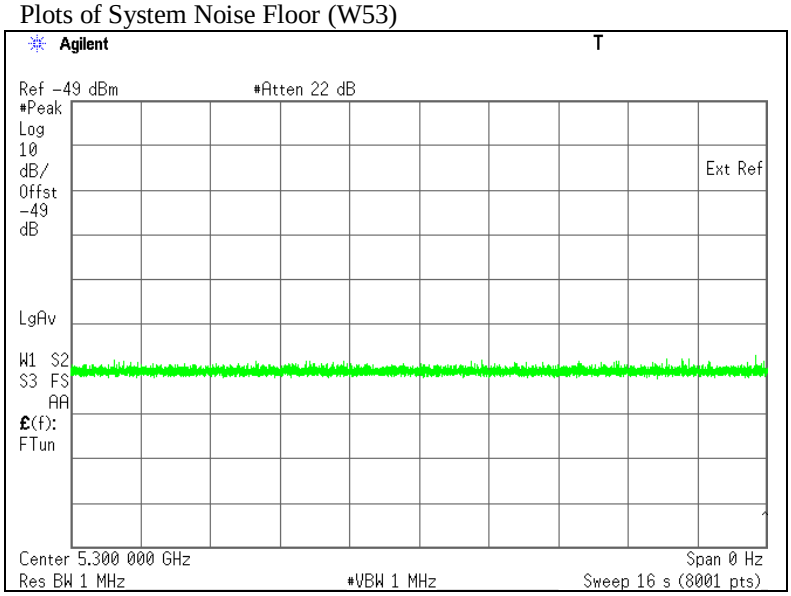
Step 4: Without changing any of the instrument settings, restore the system setting to Step 2 and adjust the Reference Level Offset of the spectrum analyzer to the level at Step 3.

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.

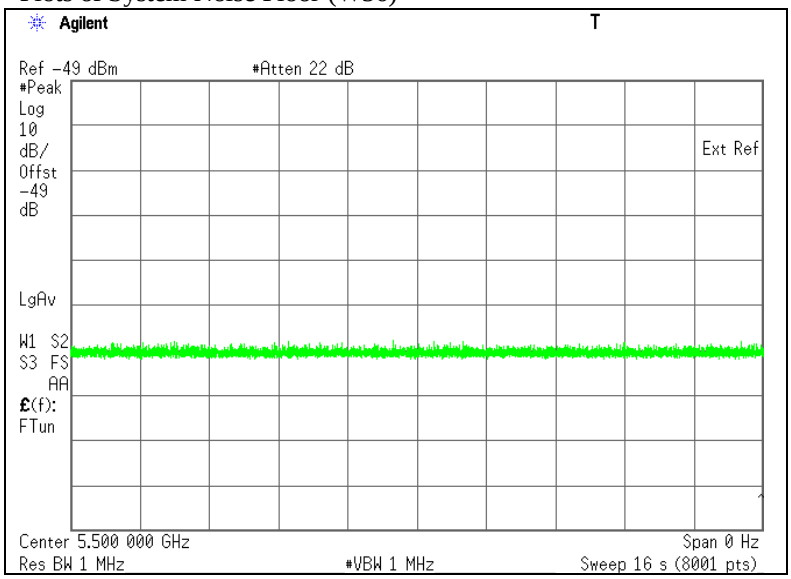
See Clause 5.4 for Plots of Noise, Rader Waveforms, and WLAN signals.

5.4 Plots of Noise, Rader Waveforms, and WLAN signals

Plots of System Noise Floor (W53)



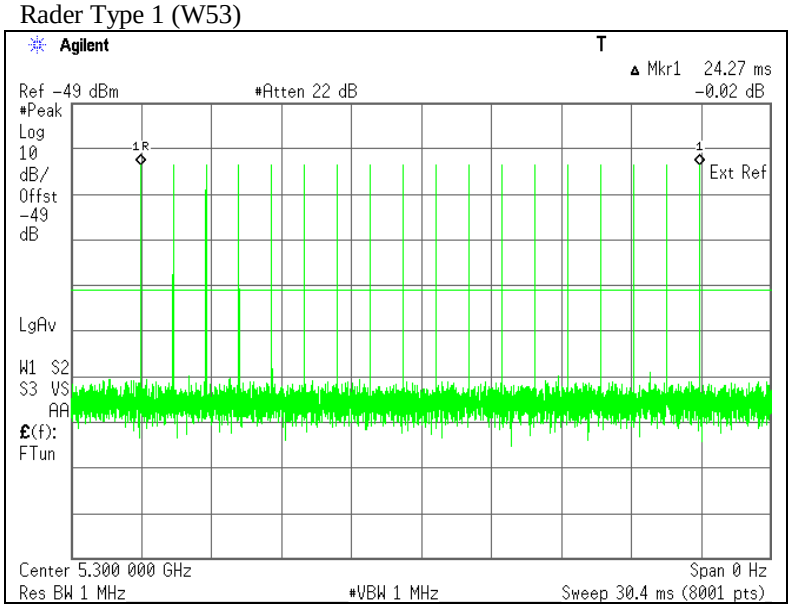
Plots of System Noise Floor (W56)



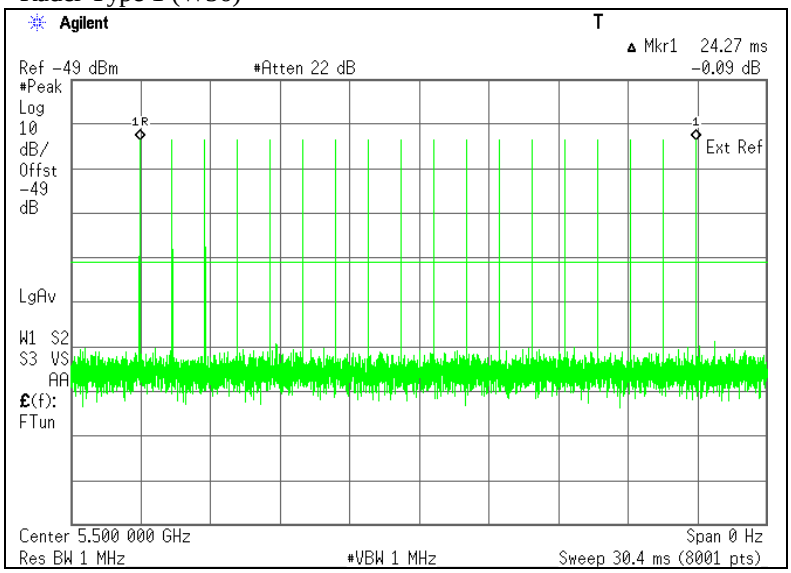
It was confirmed that the EUT did not transmit before having received appropriate control signals from a Master Device.

Plots of Radar Waveforms

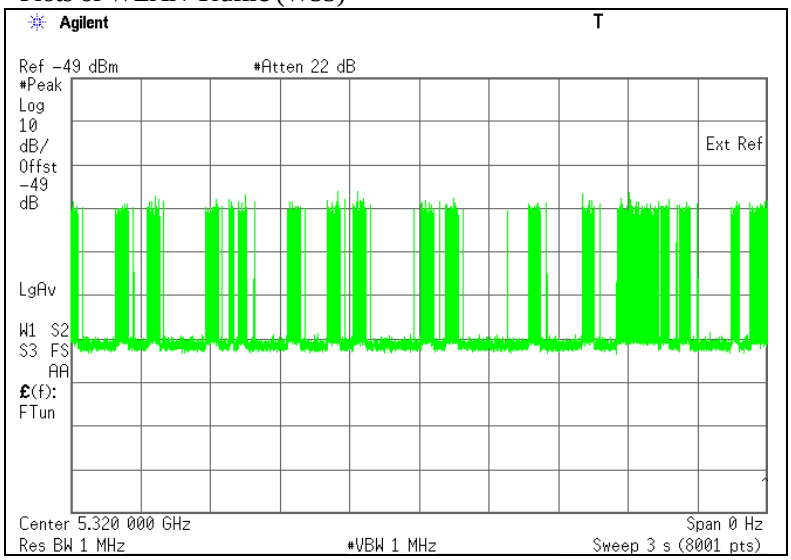
Rader Type 1 (W53)



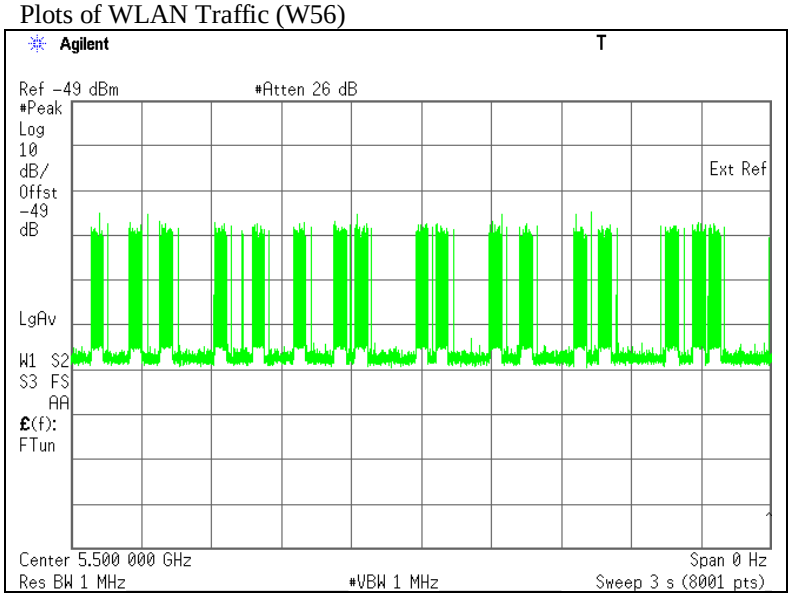
Rader Type 1 (W56)



Plots of WLAN Traffic (W53)



Plots of WLAN Traffic (W56)



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

6.1 Operating environment

Test place : No.6 shielded room
Temperature : 24 deg.C
Humidity : 51 %RH

6.2 Test Procedure

Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.
The Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 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.

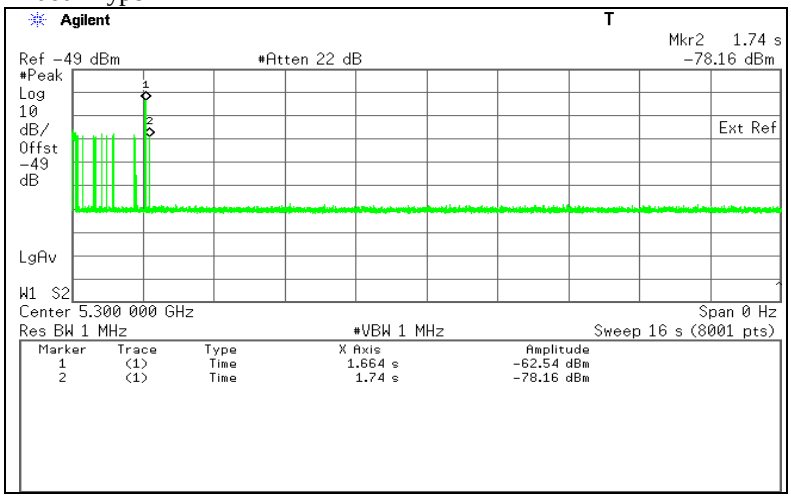
6.3 Test data

W53

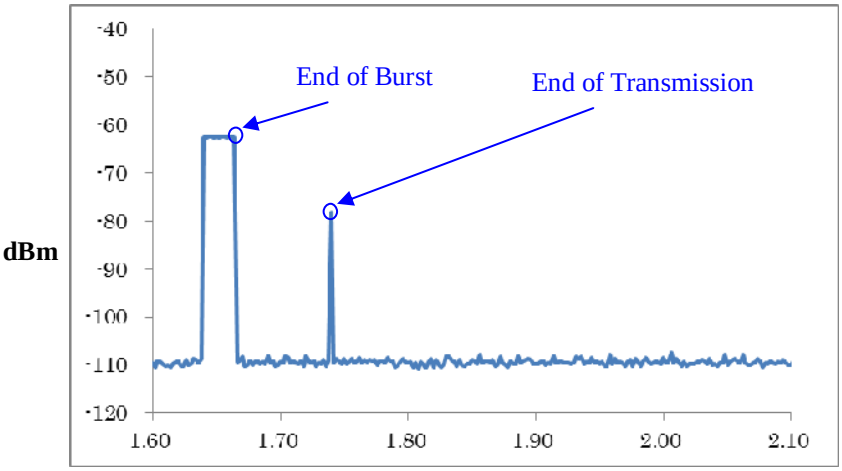
Test Item	Unit	Measurement Time	Limit	Results
Channel Move Time *1)	[sec]	0.076	10.000	Pass
Channel Closing Transmission Time *2)	[msec]	0	60	Pass

*1) Channel Move Time is calculated as follows:
(Channel Move Time) = (End of Transmission) - (End of Burst) = 1.740-1.664
*2) Channel Closing Transmission Time is calculated from (End of Burst + 200msec) to (End of Burst + 10sec)
(Channel Closing Transmission Time) = (Number of analyzer bins showing transmission)＊(dwell time per bin)
= 0＊2(msec)

Radar Type 1



Marker 1 : End of Burst : 1664 ms
Marker 2 : End of Transmission : 1740 ms

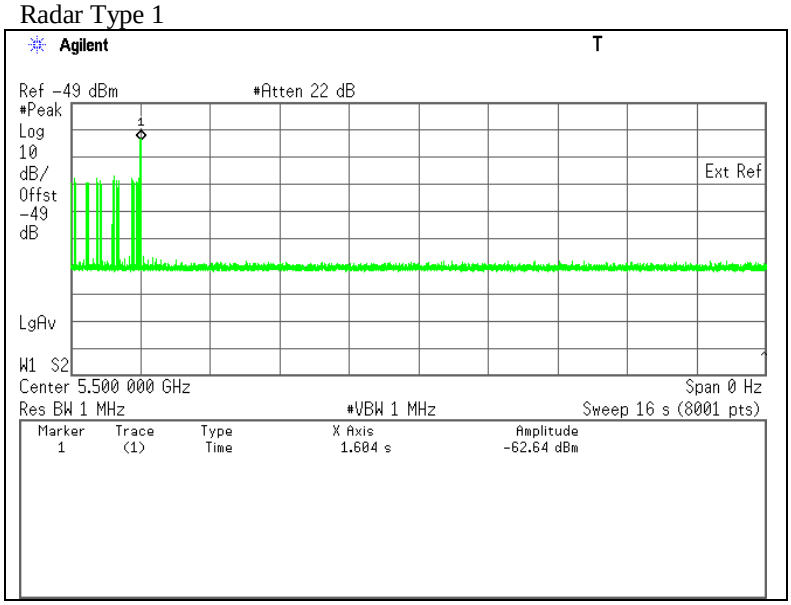


W56

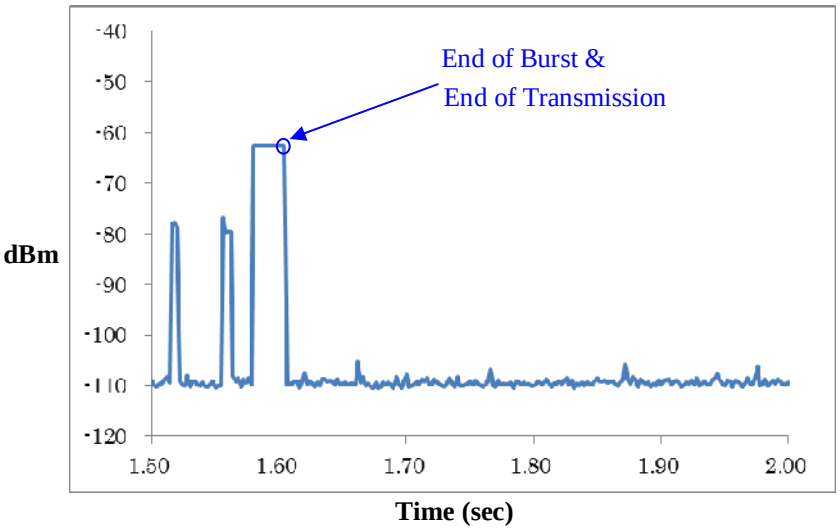
Test Item	Unit	Measurement Time	Limit	Results
Channel Move Time *1)	[sec]	0.000	10.000	Pass
Channel Closing Transmission Time *2)	[msec]	0	60	Pass

*1) Channel Move Time is calculated as follows:
(Channel Move Time) = (End of Transmission) - (End of Burst) = 1.604-1.604
*2) Channel Closing Transmission Time is calculated from (End of Burst + 200msec) to (End of Burst + 10sec)
(Channel Closing Transmission Time) = (Number of analyzer bins showing transmission) * (dwell time per bin)
= 0 * 2(msec)

Radar Type 1



Marker 1 : End of Burst : 1604ms
Marker 2 : End of Transmission : 1604 ms



6.4 Test result

Test result: Pass

Date : May 23, 2012 Test engineer : Tatsuya Arai

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

7.1 Operating environment

Test place : No.6 shielded room
Temperature : 24 deg.C
Humidity : 51 %RH

7.2 Test Procedure

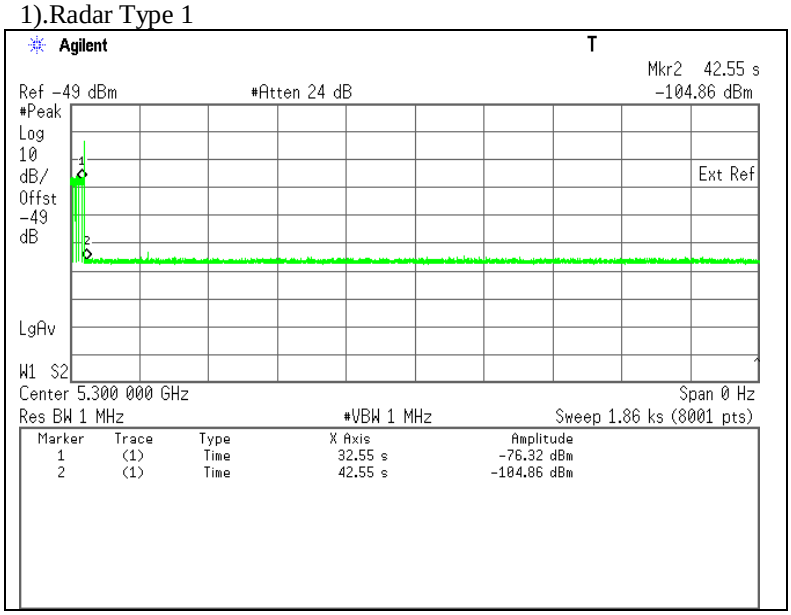
The following two tests are performed:

Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.
The Radar Waveform generator sends a Burst of pulses for one of the Radar Types 1-6 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.

7.3 Test data

W53

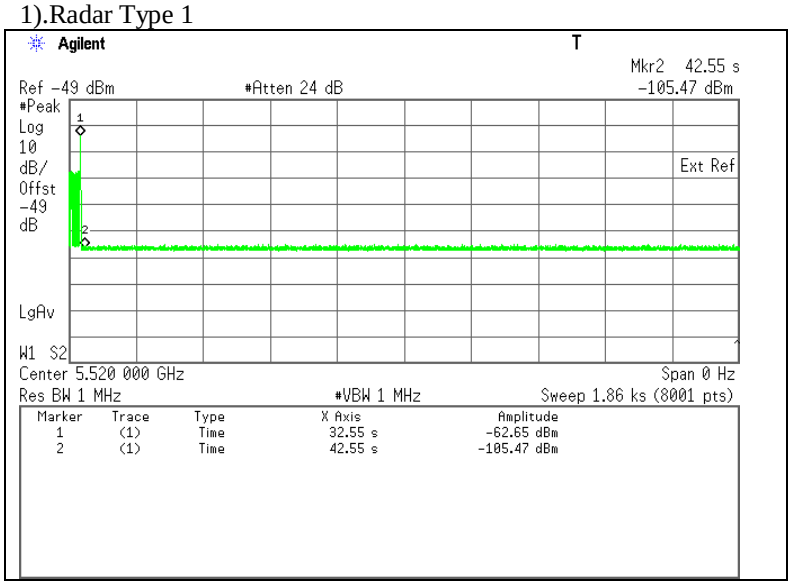
1).Radar Type 1



Marker 1 : End of Burst : 32.55 sec
Marker 2 : End of Burst +10sec : 42.55 sec

W56

1).Radar Type 1



Marker 1 : End of Burst : 32.55 sec
Marker 2 : End of Burst +10sec : 42.55 sec

7.4 Test result

Test result: Pass

Date : May 23, 2012 Test engineer : Tatsuya Arai

APPENDIX 1: Test instruments

EMI Test Equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SCC-G11	Coaxial Cable	Suhner	SUCOFLEX 102	31595/2	DFS	2012/03/12 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	DFS	2012/03/12 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	DFS	2012/03/12 * 12
SCC-G24	Coaxial Cable	Suhner	141PE	-	DFS	2011/07/27 * 12
SCC-G25	Coaxial Cable	Suhner	141PE	-	DFS	2011/07/27 * 12
SCC-G26	Coaxial Cable	Suhner	141PE	-	DFS	2011/07/27 * 12
STM-G3	Terminator	Weinschel	M1459A	U6569	DFS	2011/07/27 * 12
SPSC-05	Power Splitters/Combiners	Mini-Circuit	ZN4PD1-63-S+	-	DFS	2011/07/27 * 12
SAT20-05	Attenuator	Weinschel Corp.	54A-20	Y5649	DFS	2011/11/09 * 12
SAT20-02	Attenuator	Agilent	8493C-020	74890	DFS	2012/03/12 * 12
SAT20-03	Attenuator	Agilent	8493C-020	74891	DFS	2012/03/12 * 12
SPD-01	Power Divider	Agilent	11636B	56998	DFS	2012/04/19 * 12
SPSC-03	Power Splitters/Combiners	Mini-Circuit	ZFSC-2-10G	-	DFS	2012/04/19 * 12
SPSC-05	Power Splitters/Combiners	Mini-Circuit	ZN4PD1-63-S+	-	DFS	2011/07/27 * 12
SSG-01	Signal Generator	Agilent	E4438C	MY47271584	DFS	2012/02/15 * 12
SPC-S10	Personal Computer	Dell	DELL Vostro V1510	29090510205	DFS	-
COTS-SDFS-01	Signal Studio Software for DFS	Agilent	N7620A-101	5010-7739	DFS	-
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	DFS	2012/02/06 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

DFS: Dynamic Frequency Selection

APPENDIX 2: Photographs of test setup

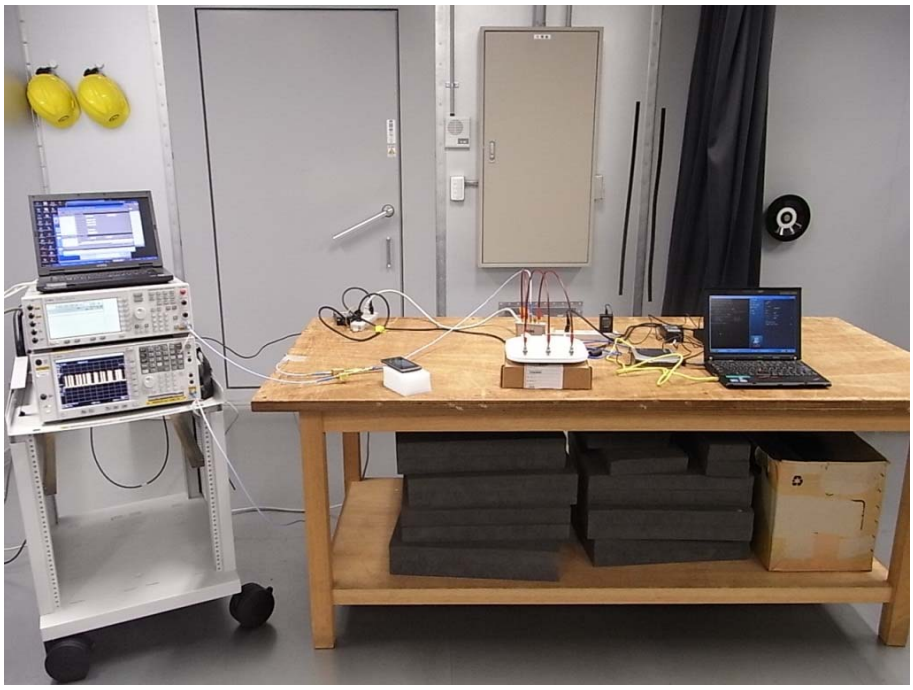


Photo 1

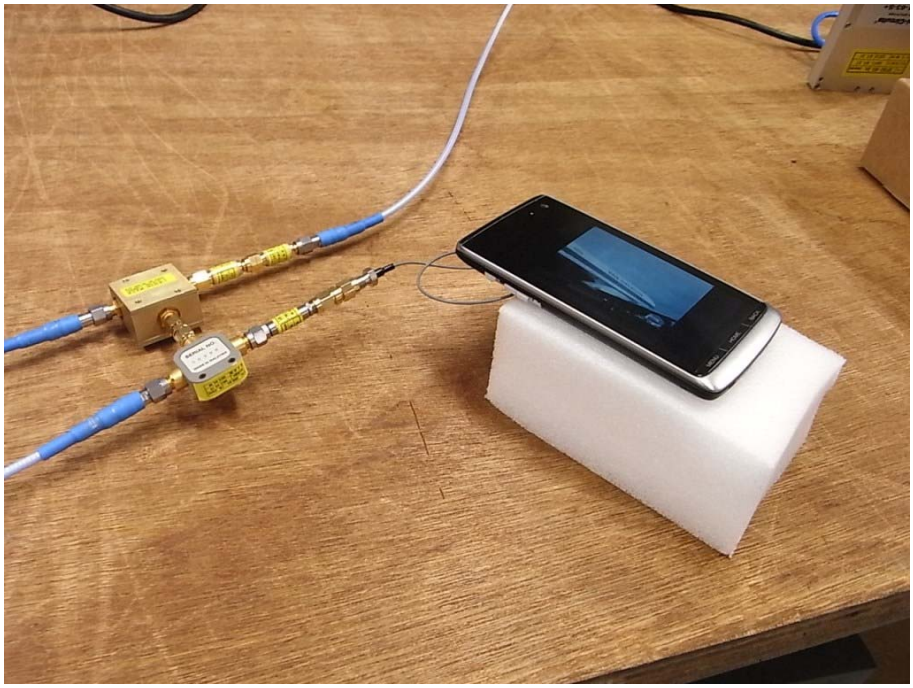


Photo 2

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401