

TEST REPORT

Report number : Z101C-14069

Issue date : October 14, 2014

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

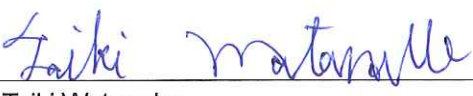
FCC Part15 Subpart E

The test results are traceable to the international or national standards.

Applicant	: KYOCERA Corporation
Equipment under test (EUT)	: Mobile Phone
Model number	: KYV31
FCC ID	: JOYKYV31

Date of test : September 11, 12, 13, 20, 23, 2014
Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan
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Test results : Complied

The results in this report are applicable only to the equipment tested.
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Tested by : 
Taiki Watanabe

Authorized by : 
Eiji Akiba
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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 15 Subpart E.

1.2 Standards

CFR47 FCC Part 15 Subpart E

1.2.1 Test Methods

ANSI C63.4-2003, KDB789033

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
15.407(a)	26dB Bandwidth	Conducted	N/A *
15.407(a)	Maximum Conducted Output Power	Conducted	N/A *
15.407(a)	Peak Power Spectral Density	Conducted	N/A *
15.407(a)	Peak Excursion	Conducted	N/A *
15.407(b) 15.205 15.209	Radiated emissions (Restricted Bands of Operation)	Radiated	PASS
15.407(g)	Frequency Stability	Conducted	N/A *
15.207	AC Power Line Conducted Emissions	Conducted	N/A *

*: Since there is no change in Module from FCC ID: JOYKYY23, only the Radiated test items were performed.

1.3.1 Test set up

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1.4 Modification to the EUT by laboratory

None

2. Equipment Under Test

2.1 General Description of equipment

EUT is the Mobile Phone.

2.2 EUT information

Applicant	: KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment under test	: Mobile Phone
Trade name	: Kyocera
Model number	: KYV31
Serial number	: N/A
EUT condition	: Pre-Production
Power ratings	: Battery: DC 3.8V
Size	: (W) 70.4 × (D) 9.9 × (H) 141.0 mm
Environment	: Indoor and Outdoor use
Terminal limitation	: -20°C to 60°C
RF Specification Protocol	: IEEE802.11a, IEEE802.11n (HT20), IEEE802.11n (HT40) IEEE802.11ac (HT20), IEEE802.11ac (HT40), IEEE802.11ac (HT80)
Frequency range	: IEEE802.11a/n/ac (HT20): 5180MHz-5320MHz, 5500MHz-5700MHz IEEE802.11n/ac(HT40): 5190MHz-5310MHz, 5510MHz-5670MHz IEEE802.11ac(HT80): 5210MHz, 5290MHz, 5530MHz
Number of RF Channels	: IEEE802.11a/n/ac (HT20): 16 Channels IEEE802.11n/ac(HT40): 7 Channels IEEE802.11ac(HT80): 3 Channels
Modulation type	: IEEE802.11a/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Data rate	: IEEE802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE802.11n (HT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps IEEE802.11n (HT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2Mbps IEEE802.11ac (HT20 LGI): 6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 86.5Mbps IEEE802.11ac (HT20 SGI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2, 86.6, 96.1Mbps IEEE802.11n (HT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135Mbps IEEE802.11n (HT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150Mbps IEEE802.11ac (HT40 LGI): 13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 180Mbps IEEE802.11ac (HT40 SGI): 15, 30, 45, 60, 90, 120, 135, 150, 180, 200Mbps IEEE802.11ac (HT80 LGI): 29.3, 58.5, 87.8, 117, 175.5, 234, 263.3, 292.6, 351, 390Mbps IEEE802.11ac (HT80 SGI): 32.5, 65, 97.5, 130, 195, 260, 292.5, 325, 390, 433.3Mbps

Channel separation : IEEE802.11a/n/ac (HT20): 20MHz
 IEEE802.11n/ac (HT40): 40MHz
 IEEE802.11ac (HT80): 80MHz

Antenna type : Internal antenna

Antenna gain : 5180MHz-5320MHz: -0.5dBi
 5500MHz-5700MHz: -0.3dBi

2.3 Variation of the family model(s)

Not applicable

2.4 Operating channels and frequencies

[IEEE802.11a/n/ac (HT20)]

Channel	Frequency [MHz]
36	5180
40	5200
44	5220
48	5240
52	5260
56	5280
60	5300
64	5320
100	5500
104	5520
108	5540
112	5560
116	5580
132	5660
136	5680
140	5700

[IEEE802.11n/ac (HT40)]

Channel	Frequency [MHz]
38	5190
46	5230
54	5270
62	5310
102	5510
110	5550
134	5670

[IEEE802.11ac (HT80)]

Channel	Frequency [MHz]
42	5210
58	5290
106	5530

2.5 Operating mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Band	IEEE802.11a/n/ac (HT20)		IEEE802.11n/ac (HT40)		IEEE802.11ac (HT80)	
	Channel	Frequency [MHz]	Channel	Frequency [MHz]	Channel	Frequency [MHz]
5.2GHz Band	36	5180	38	5190	42	5210
	40	5200	-	-	-	-
	48	5240	46	5230	-	-
5.3GHz Band	52	5260	54	5270	58	5290
	56	5280	-	-	-	-
	64	5320	62	5310	-	-
5.6GHz Band	100	5500	102	5510	106	5530
	116	5580	110	5550	-	-
	140	5700	134	5670	-	-

The pre-test has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates.

Band	Modulation Type	Data Rate
5.2GHz Band	IEEE802.11a: OFDM	6Mbps
	IEEE802.11n (HT20): OFDM	MCS0 (6.5Mbps)
	IEEE802.11n (HT40): OFDM	MCS0 (13.5Mbps)
	IEEE802.11ac (HT80): OFDM	MCS0 (29.3Mbps)
5.3GHz Band	IEEE802.11a: OFDM	6Mbps
	IEEE802.11n (HT20): OFDM	MCS0 (6.5Mbps)
	IEEE802.11n (HT40): OFDM	MCS0 (13.5Mbps)
	IEEE802.11ac (HT80): OFDM	MCS0 (29.3Mbps)
5.6GHz Band	IEEE802.11a: OFDM	6Mbps
	IEEE802.11n (HT20): OFDM	MCS0 (6.5Mbps)
	IEEE802.11n (HT40): OFDM	MCS0 (13.5Mbps)
	IEEE802.11ac (HT80): OFDM	MCS0 (29.3Mbps)

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.

The worst emission was found in Y axis and the worst case recorded.

2.6 Operating mode

[Tx mode]

- Test program setup to the DM tool
- Select a Test mode
Operating frequency: 5.2GHz Band, 5.3GHz Band, 5.6GHz Band
- Start test mode

[Rx mode]

- Test program setup to the DM tool
- Select a Test mode
Operating frequency: 5.2GHz Band, 5.3GHz Band, 5.6GHz Band
- Start test mode



Zacta

3. Configuration of equipment

3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	Mobile Phone	KYOCERA	KYV31	N/A	JOYKYV31	EUT

3.2 System configuration

1. Mobile Phone
(EUT)

Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in "3.1 Equipment(s) used".

4. Radiated Emissions (Restricted Bands of Operation)

4.1 Measurement procedure

[FCC 15.407(b), 15.205, 15.209, KDB789033]

Test was applied by following conditions.

Frequency range	: 30MHz to 40GHz
Test place	: 3m Semi-anechoic chamber
EUT was placed on	: FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Antenna distance	: 3m
Test receiver setting	Below 1GHz
- Detector	: Quasi-peak
- Bandwidth	: 120kHz
Spectrum analyzer setting	Above 1GHz
- Peak	: RBW=1MHz, VBW=1MHz, Span=0Hz, Sweep=auto
- Average	: RBW=1MHz, VBW=10Hz, Span=0Hz, Sweep=auto
	Display mode=Linear

Radiated emission measurements are performed at 3m distance with the broadband antenna (TRILOG antenna and Double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1m to 4m and stopped at height producing the maximum emission.

The EUT is Placed on a turntable, which is 0.8m above ground plane. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. The test results represent the worst case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation. Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

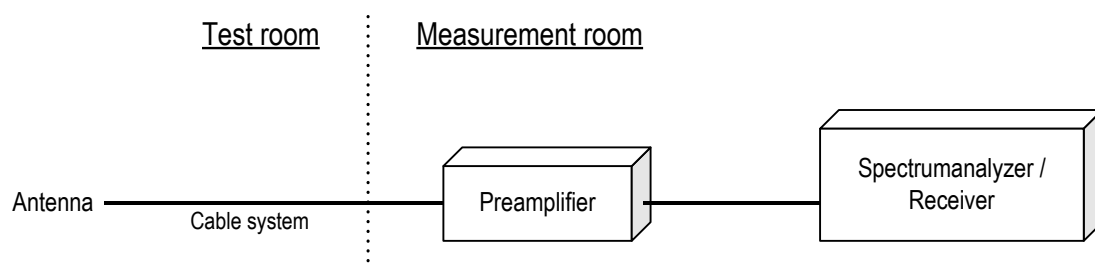
The EUT was set to operate with following conditions.

- 5.2GHz Band, 5.3GHz Band, 5.6GHz Band

The test mode of EUT is as follows.

- Tx mode, Rx mode

- Test configuration



4.2 Calculation method

Emission level = Reading + (Ant. factor + Cable system loss – Amp. Gain)

Margin = Limit – Emission level

4.3 Limit

- (1) For transmitters operating in the 5.15-5.25GHz band: all emissions outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35GHz band: all emissions outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz.
Devices operating in the 5.25-5.35GHz band that generate emissions in the 5.15-5.25GHz band must meet all applicable technical requirements for operation in the 5.15-5.25GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27dBm/MHz in the 5.15-5.25GHz band.
- (3) For transmitters operating in the 5.47-5.725GHz band: all emissions outside of the 5.47 5-5.725GHz band shall not exceed an EIRP of -27dBm/MHz.
- (4) For transmitters operating in the 5.725-5.825GHz band: all emissions within the frequency range from the band edge to 10MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490-1.705	24000 / F [kHz]	20logE [uV/m]	30
1.705-30	30	29.5	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20log Emission [uV/m]
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition modulation.

4.4 Test data

Date	: Sep. 11, 2014		
Temperature	: 25.0 [°C]		
Humidity	: 60.8 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Taiki Watanabe</u>
Date	: Sep. 12, 2014		
Temperature	: 24.9 [°C]		
Humidity	: 49.4 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Taiki Watanabe</u>
Date	: Sep. 13, 2014		
Temperature	: 24.9 [°C]		
Humidity	: 47.8 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Taiki Watanabe</u>
Date	: Sep. 20, 2014		
Temperature	: 21.6 [°C]		
Humidity	: 46.7 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Taiki Watanabe</u>
Date	: Sep. 23, 2014		
Temperature	: 24.1 [°C]		
Humidity	: 40.1 [%]	Test engineer	:
Test place	: 3m Semi-anechoic chamber		<u>Taiki Watanabe</u>

**[IEEE802.11a]
(5.2GHz Band)**

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11a	36	5180	5127.72	V	PK	43.5	14.5		58.0	74.0	16.0
			5127.72	V	AV	31.9	14.5		46.4	54.0	7.6
			10360.00	V	PK	39.2	24.9		64.1	68.2	4.1
	40	5200	5147.20	V	PK	43.0	14.5		57.5	74.0	16.5
			5147.20	V	AV	30.7	14.5		45.2	54.0	8.8
			10400.00	V	PK	38.0	25.0		63.0	68.2	5.2
	48	5240	10480.00	V	PK	38.8	25.0		63.8	68.2	4.4

(5.3GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11a	52	5260	10520.00	V	PK	39.2	25.1		64.3	68.2	3.9
	56	5280	10560.00	V	PK	38.5	25.1		63.6	68.2	4.6
	64	5320	10640.00	V	PK	39.4	25.3		64.7	74.0	9.3

(5.6GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11a	100	5500	5467.65	V	PK	51.7	15.4		67.1	74.0	6.9
			5467.65	V	AV	28.4	15.4		43.8	54.0	10.2
			11000.00	H	PK	37.6	26.1		63.7	68.2	4.5
			11000.00	V	PK	40.3	26.1		66.4	68.2	1.8
	116	5580	11160.00	H	PK	38.0	26.5		64.5	68.2	3.7
			11160.00	V	PK	37.6	26.5		64.1	68.2	4.1
			5728.30	V	PK	51.9	16.0		67.9	74.0	6.1
	140	5700	5728.30	V	AV	29.4	16.0		45.4	54.0	8.6
			11400.00	H	PK	37.6	26.8		64.4	68.2	3.8
			11400.00	V	PK	36.9	26.8		63.7	68.2	4.5

Note:

1. Emission Level (Margin) = Limit - [Reading + C.F (Antenna + Cable – Amp)] + DCF (If transmit duty cycle < 98 percent)
2. DCF = 20log (1/x) , x = On time / (On + Off time)
3. No emission were detected in frequency range 30MHz to 1000MHz at the 3 meters distance.
4. No emission was detected in the receive mode.

[IEEE802.11n (HT20)] **(5.2GHz Band)**

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (20MHz)	36	5180	5127.85	V	PK	43.7	14.5		58.2	74.0	15.8
			5127.85	V	AV	31.1	14.5		45.6	54.0	8.4
			10360.00	V	PK	38.7	24.9		63.6	68.2	4.6
	40	5200	5147.20	V	PK	44.0	14.5		58.5	74.0	15.5
			5147.20	V	AV	31.5	14.5		46.0	54.0	8.0
			10400.00	V	PK	38.7	25.0		63.7	68.2	4.5
	48	5240	10480.00	V	PK	37.8	25.0		62.8	68.2	5.4

(5.3GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (20MHz)	52	5260	10520.00	V	PK	38.5	25.1		63.6	68.2	4.6
	56	5280	10560.00	V	PK	39.1	25.1		64.2	68.2	4.0
	64	5320	10640.00	V	PK	38.4	25.3		63.7	68.2	4.5

(5.6GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (20MHz)	100	5500	5469.53	H	PK	51.9	13.0		64.9	74.0	9.1
			5469.53	H	AV	30.1	13.0		43.1	54.0	10.9
			5469.53	V	PK	55.6	13.0		68.6	74.0	5.4
			5469.53	V	AV	32.8	13.0		45.8	54.0	8.2
			11000.00	H	PK	41.4	22.4		63.8	68.2	4.4
			11000.00	V	PK	40.0	22.4		62.4	68.2	5.8
	110	5580	11160.00	H	PK	41.7	22.7		64.4	68.2	3.8
			11160.00	V	PK	39.8	22.7		62.5	68.2	5.7
	140	5700	5725.50	H	PK	51.0	13.0		64.0	74.0	10.0
			5725.50	H	AV	30.9	13.0		43.9	54.0	10.1
			5725.50	V	PK	57.7	13.0		70.7	74.0	3.3
			5725.50	V	AV	34.2	13.0		47.2	54.0	6.8
			11400.00	V	PK	38.8	23.0		61.8	68.2	6.4

Note:

1. Emission Level (Margin) = Limit - [Reading + C.F (Antenna + Cable – Amp)] + DCF (If transmit duty cycle < 98 percent)
2. DCF = 20log (1/x) , x = On time / (On + Off time)
3. No emission were detected in frequency range 30MHz to 1000MHz at the 3 meters distance.
4. No emission was detected in the receive mode.

[IEEE802.11n (HT40)]
(5.2GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (40MHz)	38	5190	5149.40	V	PK	48.5	14.5		63.0	74.0	11.0
			5149.40	V	AV	29.0	14.5		43.5	54.0	10.5
			10380.00	V	PK	38.4	25.0		63.4	68.2	4.8
	46	5230	10460.00	V	PK	38.4	25.0		63.4	68.2	4.8

(5.3GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (40MHz)	54	5270	10540.00	V	PK	38.3	25.1		63.4	68.2	4.8
	62	5310	10620.00	V	PK	38.4	25.3		63.7	68.2	4.5

(5.6GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11n (40MHz)	102	5510	5468.12	V	PK	51.8	13.0		64.8	74.0	9.2
			5468.12	V	AV	31.2	13.0		44.2	54.0	9.8
			11020.00	V	PK	40.6	22.4		63.0	68.2	5.2
	110	5590	11100.00	H	PK	42.1	22.6		64.7	68.2	3.5
			11100.00	V	PK	42.0	22.6		64.6	68.2	3.6
	134	5670	11340.00	V	PK	40.9	23.0		63.9	68.2	4.3

Note:

1. Emission Level (Margin) = Limit - [Reading + C.F (Antenna + Cable – Amp)] + DCF (If transmit duty cycle < 98 percent)
2. DCF = 20log (1/x) , x = On time / (On + Off time)
3. No emission were detected in frequency range 30MHz to 1000MHz at the 3 meters distance.
4. No emission was detected in the receive mode.

[IEEE802.11n (HT80)]
(5.2GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11ac (80MHz)	42	5210	5140.40	V	PK	47.3	14.5	0.343	61.8	74.0	12.2
			5140.40	V	AV	30.5	14.5		45.3	54.0	8.7
			10420.00	V	PK	37.6	25.0		62.6	68.2	5.6

(5.3GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11ac (80MHz)	58	5290	5357.04	V	PK	43.2	15.2	0.378	58.4	74.0	15.6
			5357.04	V	AV	28.4	15.2		44.0	54.0	10.0
			10580.00	V	PK	38.3	25.2		63.5	68.2	4.7

(5.6GHz Band)

Mode	Channel	Frequency (MHz)	Frequency (MHz)	ANT H/V	Detector PK/AV	Reading (dBμV)	C.F (dB)	DCF (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11ac (80MHz)	106	5530	5469.50	V	PK	49.6	13.0	0.343	62.6	74.0	11.4
			5469.50	V	AV	32.6	13.0		45.9	54.0	8.1
			11060.00	V	PK	40.8	22.5		63.3	68.2	4.9

Note:

1. Emission Level (Margin) = Limit - [Reading + C.F (Antenna + Cable – Amp)] + DCF (If transmit duty cycle < 98 percent)
2. DCF = 20log (1/x) , x = On time / (On + Off time)
3. No emission were detected in frequency range 30MHz to 1000MHz at the 3 meters distance.
4. No emission was detected in the receive mode.



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5. Antenna requirement

According to FCC section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The antenna is a special antenna mounted inside of the EUT. Therefore, the EUT complies with the antenna requirement of FCC section 15.203.

6. Uncertainty of measurement

Expanded uncertainties stated are calculated with a coverage Factor $k=2$.

Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission at mains port	$\pm 3.0\text{dB}$
Radiated emission (9kHz – 30MHz)	$\pm 4.4\text{dB}$
Radiated emission (30MHz – 1000MHz)	$\pm 4.5\text{dB}$
Radiated emission (1000MHz – 26GHz)	$\pm 3.9\text{dB}$

7. Laboratory description

1. Location:

TÜV SÜD Zacta Ltd. Yonezawa Testing Center
 4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
 Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. Facility filing information:

1) NVLAP accreditation: NVLAP Lab. code: 200306-0

2) VLAC accreditation: Lab. code: VLAC-013

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Radiated emission (CMAD)	Expiry Date
3m Semi-anechoic chamber	VLAC-013	VLAC-013	VLAC-013	-	Jul. 3, 2015
10m Semi-anechoic chamber No.1				VLAC-013	
10m Semi-anechoic chamber No.2				VLAC-013	
Shielded room No.1	-	VLAC-013	-	-	

3) FCC filing:

Site name	Registration Number	Expiry Date
Site 3	91065	Oct.31, 2014
3m Semi-anechoic chamber	540072	Feb. 20, 2017
10m Semi-anechoic chamber No.1		
10m Semi-anechoic chamber No.2		
Shielded room No.1		

4) Industry Canada Oats site filing:

Site name	Sites on file: Oats 3m/10m	Expiry Date
Site 3	4224A-3	Jan. 23, 2015
3m Semi-anechoic chamber	4224A-4	
10m Semi-anechoic chamber No.1	4224A-5	
10m Semi-anechoic chamber No.2	4224A-6	Jan. 15, 2017

5) VCCI site filing:

Site name	Radiated emission	Conducted emission for mains port	Conducted emission for telecom port	Expiry Date
Site 3	R-138	C-134	T-1222	Nov. 16, 2014 Nov. 28, 2014* (*:Telecom port)
3m Semi-anechoic chamber	A-0166	A-0166	A-0166	Jul. 3, 2015
10m Semi-anechoic chamber No.1				
10m Semi-anechoic chamber No.2				
Shielded room No.1	-	A-0166		

6) TÜV SÜD PS authorization:

Authorized as an EMC test laboratory

7) TÜV Rheinland authorization:

Authorized as an EMC test laboratory

Appendix A. Test equipment

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ECSI	100451	Nov. 30, 2014	Nov. 16, 2013
Preamplifier	ANRITSU	MH648A	M96057	Jun. 30, 2015	Jun. 12, 2014
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	892246/010	Oct. 31, 2014	Oct. 5, 2013
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2125	May 31, 2015	May 7, 2014
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	May 31, 2015	May 7, 2014
Attenuator	TME	CFA-01NPJ-6	N/A (S275)	Jun. 30, 2015	Jun. 9, 2014
Attenuator	TME	CFA-01NPJ-3	N/A (S272)	Jun. 30, 2015	Jun. 9, 2014
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	May 31, 2015	May 30, 2014
Preamplifier	Agilent Technologies	8449B	3008A1008	Dec. 31, 2014	Dec. 9, 2013
Dipole antenna	Schwarzbeck	VHAP	1021	Sep. 30, 2014	Sep. 19, 2013
Dipole antenna	Schwarzbeck	UHAP	993	Sep. 30, 2014	Sep. 19, 2013
Double ridged guide antenna	EMCO	3115	5205	Dec. 31, 2014	Dec. 10, 2013
Attenuator	Agilent Technologies	8491B	MY39268633	Jan. 31, 2015	Jan. 15, 2013
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170189	May 31, 2015	May 2, 2013
Preamplifier	TSJ	MLA-1840-B03-35	1240332	May 31, 2015	May 2, 2013
Notch filter	Micro-Tronics	BRM50716	006	Jul. 31, 2015	Jul. 12, 2014
Microwave cable	SUHNER	SUCOFLEX104/9m	346316/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1m	322084/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/1.5m	317226/4	Oct. 31, 2015	Oct. 31, 2014
		SUCOFLEX104/7m	41625/6	Oct. 31, 2015	Oct. 31, 2014
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.3.61	N/A	N/A
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-NSA)	May 31, 2015	May 6, 2014
3m Semi-anechoic chamber	TOKIN	N/A	N/A (9002-SVSWR)	May 31, 2015	May 6, 2014

*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.

Appendix B. Duty Cycle

[Data & Plot]

Mode	Channel	Frequency (MHz)	Duty Cycle			DCF (dB) 10log(1/x)	DCF (dB) 20log(1/x)
			On Time(ms)	On+Off Time(ms)	X		
802.11a	36	5180	1.362	1.372	0.993	0.032	0.064
	40	5200					
	58	5240					
	52	5260	1.364	1.372	0.994	0.025	0.051
	56	5280					
	64	5320					
	100	5500	1.362	1.372	0.993	0.032	0.064
	116	5580					
	140	5700					

Note: X = On time / (On + Off time)

Mode	Channel	Frequency (MHz)	Duty Cycle			DCF (dB) 10log(1/x)	DCF (dB) 20log(1/x)
			On Time(ms)	On+Off Time(ms)	X		
802.11n (20MHz)	36	5180	1.274	1.284	0.992	0.034	0.068
	40	5200					
	58	5240					
	52	5260	1.276	1.284	0.994	0.027	0.054
	56	5280					
	64	5320					
	100	5500	1.272	1.284	0.991	0.041	0.082
	116	5580					
	140	5700					

Note: X = On time / (On + Off time)

Mode	Channel	Frequency (MHz)	Duty Cycle			DCF (dB) 10log(1/x)	DCF (dB) 20log(1/x)
			On Time(ms)	On+Off Time(ms)	X		
802.11n (40MHz)	38	5190	0.635	0.645	0.984	0.068	0.136
	46	5230					
	54	5270	0.635	0.645	0.984	0.068	0.136
	62	5310					
	102	5510	0.635	0.645	0.984	0.068	0.136
	110	5550					
	134	5670					

Note: X = On time / (On + Off time)

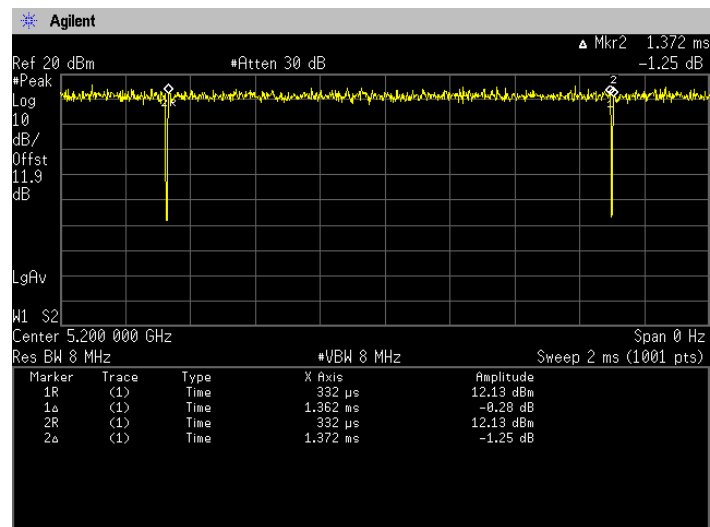


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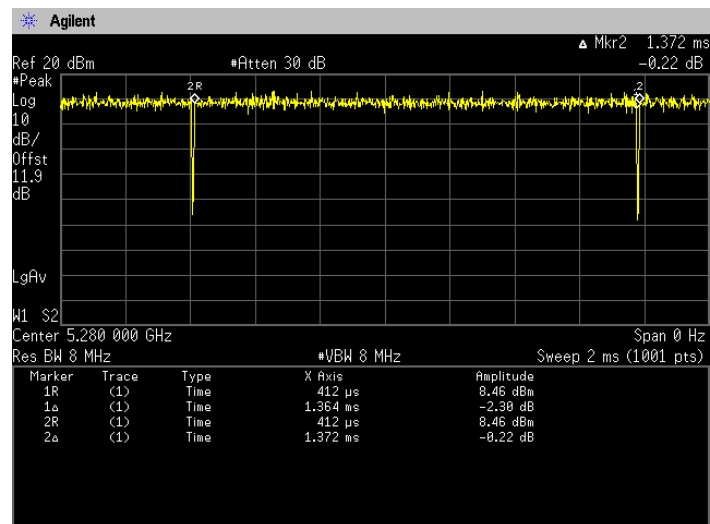
Mode	Channel	Frequency (MHz)	Duty Cycle			DCF (dB) 10log(1/x)	DCF (dB) 20log(1/x)
			On Time(ms)	On+Off Time(ms)	X		
802.11ac (80MHz)	42	5210	0.248	0.258	0.961	0.172	0.343
	58	5290	0.247	0.258	0.957	0.189	0.378
	106	5530	0.248	0.258	0.961	0.172	0.343

Note: $X = \text{On time} / (\text{On} + \text{Off time})$

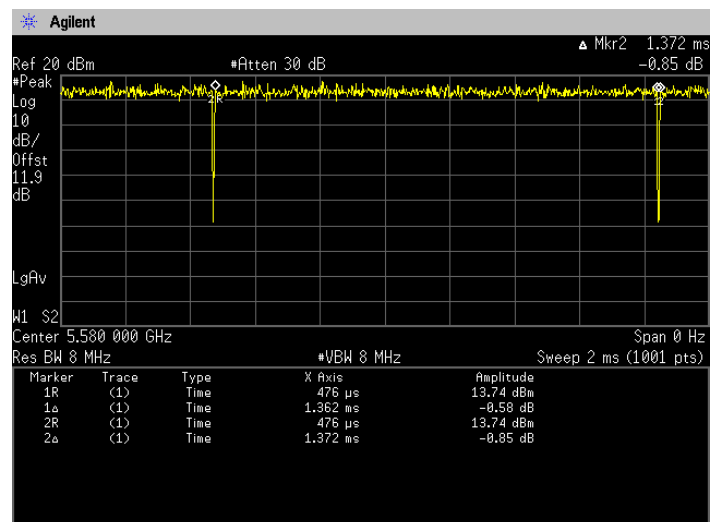
IEEE802.11a Channel: 40



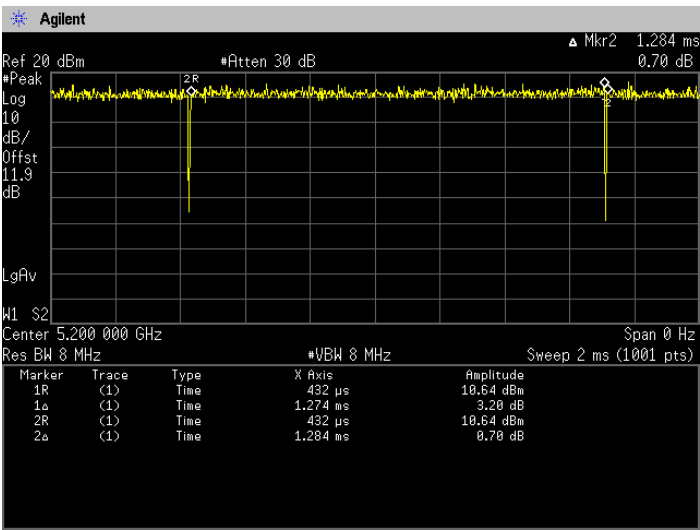
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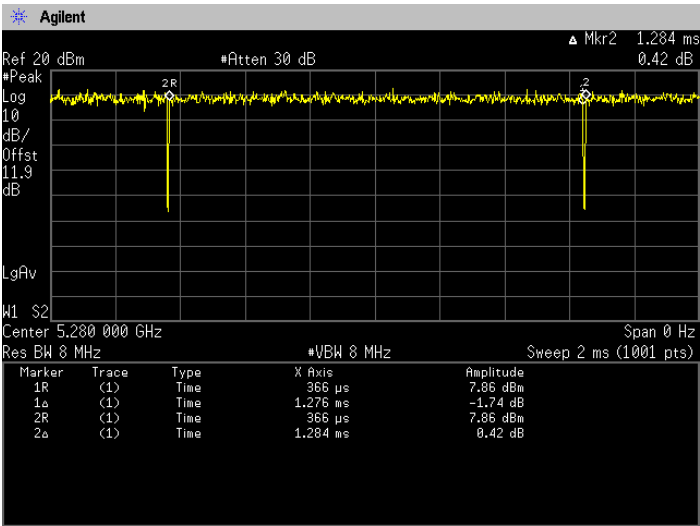
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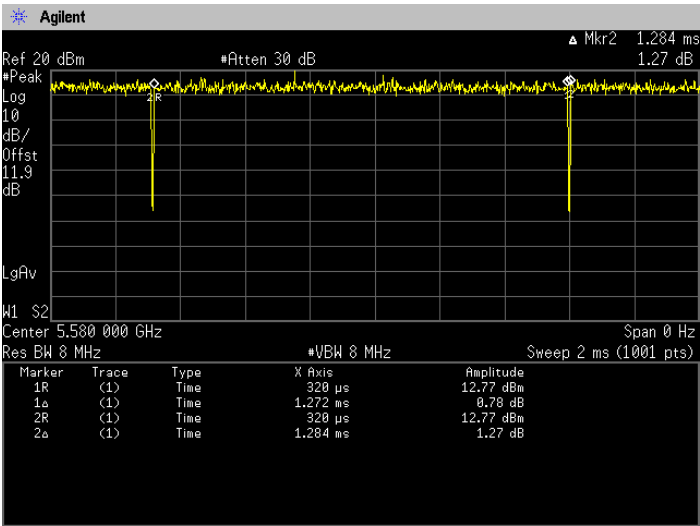
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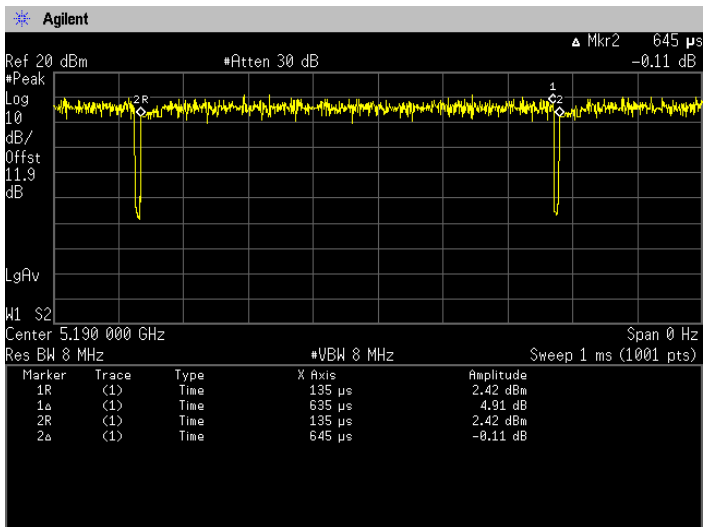
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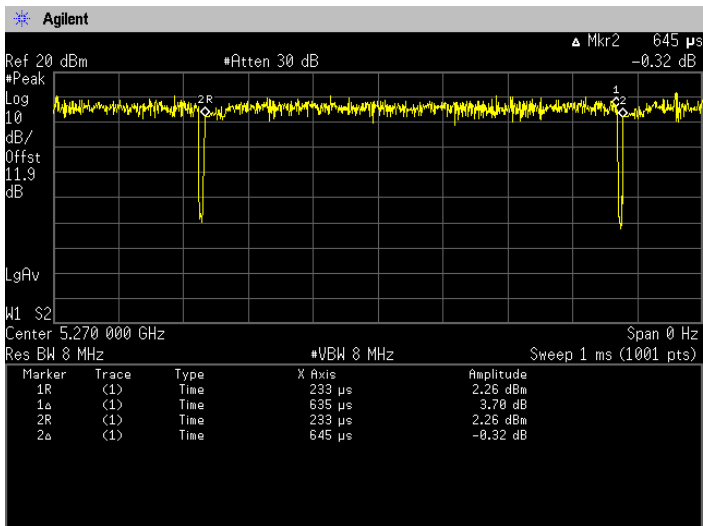
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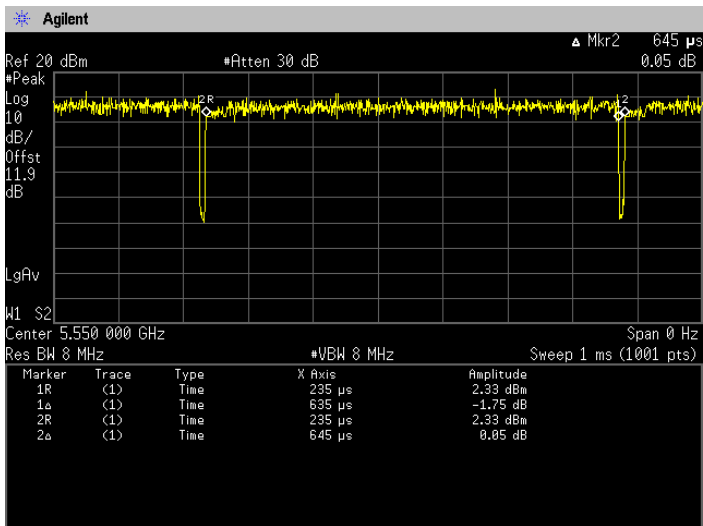
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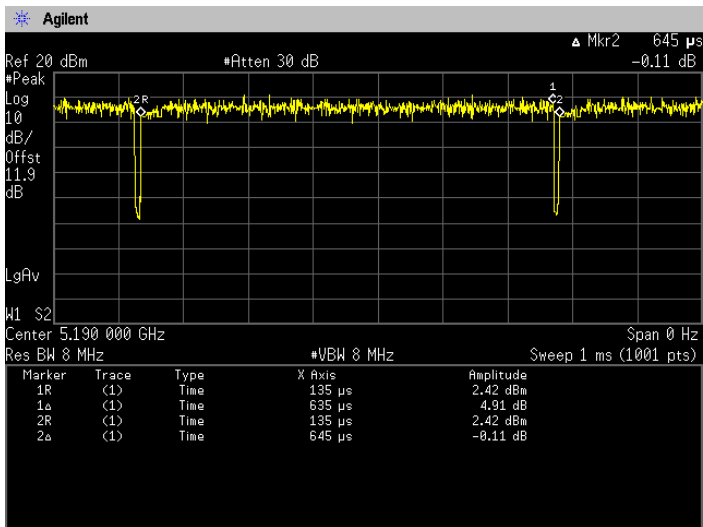
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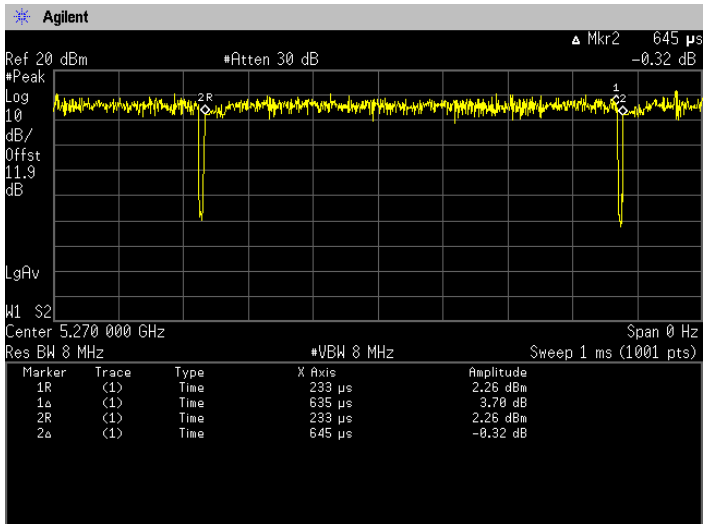
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IEEE802.11ac (HT80)
Channel: 42



Channel: 58



Channel: 106

