Report on the RF Testing of:

KYOCERA Corporation Mobile Phone, Model: EB1056 FCC ID: JOYEB1056

In accordance with FCC Part15 Subpart C

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EXECUTIVE SUMMARY – Result: Complied A sample of this product was tested and the result above was confirmed in accordance with FCC Part15 Subpart C.



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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-21029-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 15 Subpart C

1.3 Test methods

ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
15.247(a)(2)	DTS Bandwidth / Occupied Bandwidth (99%)	Conducted	PASS	-
15.247(b)(3)	Maximum conducted (average) output power	Conducted	PASS	-
15.247(d)	Band Edge Compliance of RF Conducted Emissions	Conducted	PASS	-
15.247(d)		Conducted	PASS	-
15.205	Spurious Emissions	Radiated	PASS	-
15.247(d) 15.205 15.209	Restricted Bands of Operation	Radiated	PASS	-
15.247(e)	Transmitter Power Spectral Density	Conducted	PASS	-
15.207	AC Power Line Conducted Emissions	Conducted	PASS	-

1.6 Test information

None

1.7 Test set up

Table-top

1.8 Test period

16-April-2021 - 27-April-2021



2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 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 (EUT)	Mobile Phone	
Model number	EB1056	
Serial number	350771280003635, 350771280003718, 358451750000658	
Trade name	Kyocera	
Number of sample(s)	3	
EUT condition	Pre-Production	
Power rating	Battery: DC 3.8 V	
Size	(W) 51.3 mm × (D) 112.9 mm × (H) 18.0 mm	
Environment	Indoor and Outdoor use	
Terminal limitation	-20°C to 60°C	
Hardware Version	DMT	
Software Version	0.030PR	
Firmware Version	Not applicable	
RF Specification		
Protocol	IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20),	
Frequency range	IEEE802.11b /11g /11n (HT20): 2412 MHz-2462 MHz	
Number of RF Channels	11 Channels	
Modulation type	IEEE802.11b: DSSS (DBPSK, DQPSK, CCK) IEEE802.11g / 11n (HT20): OFDM (BPSK, QPSK, 16QAM, 64QAM)	
Data rate	IEEE802.11b: 1, 2, 5.5, 11Mbps IEEE802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 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	
Channel separation	5 MHz	
Conducted power	43.053 mW (IEEE802.11b) 75.858 mW (IEEE802.11g) 76.736 mW (IEEE802.11n: HT20)	
Antenna type	Internal antenna	
Antenna gain	0.53 dBi	



2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

Modification State	Iodification State Description of Modification		Date of Modification
Model: EB1056, Serial Number: 350771280003635, 3507712800037		8, 358451750000658	
0	As supplied by the applicant	Not Applicable	Not Applicable

2.3 Variation of family model(s)

2.3.1 List of family model(s)

EB1056 has model with camera and without camera.

2.3.2 Reason for selection of EUT

Not applicable

2.4 Operating channels and frequencies

Channel	Frequency [MHz]
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462



2.5 Description of test mode

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

Tested Channel [11b, 11g, 11n(HT20)]	Frequency [MHz]
Low	2412
Middle	2437
High	2462

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

Tested Channel	Modulation Type	Data Rate
Low, Middle, High	IEEE802.11b: DSSS	1Mbps
Low, Middle, High	IEEE802.11g: OFDM	6Mbps
Low, Middle, High	IEEE802.11n (HT20 LGI): OFDM	MCS0 (6.5Mbps)

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 X-axis, Open, Without camera and the worst case recorded. Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

2.6 Operating flow

- Tx mode

- i) Test program setup to the DM tool
- ii) Select a Test mode

[IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)] Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz

iii) Start test mode

- Rx mode

- i) Test program setup to the DM tool
- Select a Test mode [IEEE802.11b, IEEE802.11g, IEEE802.11n (HT20)]
 Operating frequency: Channel Low: 2412MHz, Channel Middle: 2437MHz, Channel High: 2462MHz
- iii) Start test mode



3 Configuration of Equipment

Numbers assigned to equipment on the diagram in "3.3 System configuration" correspond to the list in "3.1 Equipment used" and "3.2 Cable(s) used".

This test configuration is based on the manufacture's instruction.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	EB1056	350771280003635, 350771280003718, 358451750000658	JOYEB1056	EUT
2	AC Adapter	KDDI	0301PQA	N/A	N/A	*

*: AC power line Conducted Emission Test.

3.2 Cable(s) used

No.	Equipment	Length[m]	Shield	Connector	Comment
а	USB cable (for AC Adapter)	1.0	Yes	Metal	*
* • • •					

*: AC power line Conducted Emission Test.

3.3 System configuration





4 Test Result

4.1 DTS Bandwidth / Occupied Bandwidth (99%)

4.1.1 Measurement procedure

[FCC 15.247(a)(2), KDB 558074 D01 v05r02, Section 8.2]

The bandwidth at 6dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) RBW = 100kHz.
- b) VBW \geq 3 x RBW.
- c) Sweep time = auto-couple.
- d) Detector = peak.
- e) Trace mode = max hold.

- Test configuration



4.1.2 Limit

The minimum permissible 6 dB bandwidth is 500 kHz.



4.1.3 Measurement result

Date	:	12-April-2021
Temperature	:	25.1 [°C]
Humidity	:	27.3 [%]
Test place	:	Shielded room No.4

Test engineer :

Taiki Watanabe

Channel	DTS Bandwidth [MHz]							
	IEEE802.11b	IEEE802.11g	IEEE802.11n (HT20)					
Low	7.128	16.369	17.580					
Middle	7.124	16.422	17.587					
High	7.529	16.350	17.327					

Channel	Occupied Bandwidth (99%) [MHz]						
	IEEE802.11b	IEEE802.11g	IEEE802.11n (HT20)				
Low	11.892	16.482	17.630				
Middle	12.049	16.534	17.687				
High	12.001	16.538	17.686				

4.1.4 Trace data

[IEEE802.11b]



Channel Middle



Transmit Freq Error 1.175 kHz x dB Bandwidth 7.124 MHz

Channel High



Transmit Freq Error -100.073 kHz x dB Bandwidth 7.529 MHz



[IEEE802.11g]





Channel Middle



Transmit Freq Error -13.687 kHz x dB Bandwidth 16.422 MHz

Channel High



Transmit Freq Error -48.327 kHz x dB Bandwidth 16.350 MHz



[IEEE802.11n (HT20)]





Channel Middle



Transmit Freq Error -9.988 kHz x dB Bandwidth 17.587 MHz

Channel High

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x dB Bandwidth 17.327 MHz







4.2 Maximum Conducted Output Power

4.2.1 Measurement procedure

[FCC 15.247(b)(3), KDB 558074 D01 v05r02, Section 8.3.1.3]

The peak power is measured with a power sensor connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

- Test configuration



4.2.2 Limit

1 W (1000 mW) or less



4.2.3 **Measurement result**

Date	:	14-April-2021			
Temperature	:	23.8 [°C]			
Humidity	:	31.0 [%]	Test engineer	:	
Test place	:	Shielded room No.4	-		Taiki Watanabe

[IEEE802.11b]

Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	5.71	10.63	16.34	43.053	≦1000	PASS
Middle	2437	5.06	10.63	15.69	37.060	≦1000	PASS
High	2462	5.21	10.63	15.84	38.362	≦1000	PASS

[IEEE802.11g] Battery Full

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	8.13	10.63	18.76	75.162	≦1000	PASS
Middle	2437	8.17	10.63	18.80	75.858	≦1000	PASS
High	2462	8.16	10.63	18.79	75.683	≦1000	PASS

[IEEE802.11n (HT20)] **Battery Full**

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Output Power (mW)	Limit (mW)	Result
Low	2412	7.97	10.63	18.60	72.444	≦1000	PASS
Middle	2437	7.93	10.63	18.56	71.779	≦1000	PASS
High	2462	8.22	10.63	18.85	76.736	≦1000	PASS

Calculation;

Reading (dBm) + Factor (dB) = Level (dBm) $10\log P = Level (dBm)$ $P = 10^{(Maximum Peak Output Power / 10)} (mW)$



4.3 Band Edge Compliance of RF Conducted Emissions

4.3.1 Measurement procedure

[FCC 15.247(d), KDB 558074 D01 v05r02, Section 8.5]

The Band Edge is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = Arbitrary setting. (Setting suitable for measurement.)
- b) RBW = 100kHz.
- c) VBW \ge 3 x RBW
- d) Sweep time = auto-couple.
- e) Detector = peak.
- f) Trace mode = max hold.

- Test configuration



4.3.2 Limit

In any 100 kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.



4.3.3 Measurement result

Date	:	12-April-2021				
Temperature	:	25.1 [°C]				
Humidity	:	27.3 [%]	Test engineer	:		
Test place	:	Shielded room No.4	0		Taiki Watanabe	

[IEEE802.11b]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-6.47	2399.97	-57.34	50.87	At least 20dB below from peak of RF	PASS
High	2462.00	-6.14	2486.89	-69.44	63.30	At least 20dB below from peak of RF	PASS

[IEEE802.11g]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-13.86	2399.65	-51.75	37.89	At least 20dB below from peak of RF	PASS
High	2462.00	-12.75	2483.87	-68.82	56.07	At least 20dB below from peak of RF	PASS

[IEEE802.11n (HT20)]

Channel	Frequency (MHz)	RF Power Level (dBm)	Band-edge Frequency (MHz)	Band-edge Level (dBm)	Difference Level (dBm)	Limit (dBm)	Result
Low	2412.00	-13.66	2399.97	-51.31	37.65	At least 20dB below from peak of RF	PASS
High	2462.00	-12.77	2483.61	-67.12	54.35	At least 20dB below from peak of RF	PASS

4.3.4 Trace data

[IEEE802.11b]







[IEEE802.11g]



Channel High





[IEEE802.11n (HT20)]



Channel High







4.4 Spurious emissions - Conducted -

4.4.1 Measurement procedure

[FCC 15.247(d), KDB 558074 D01 v05r02, Section 8.5]

The spurious emissions (Conducted) are measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = wide enough to fully capture the emission being measured.
- b) RBW = 100 kHz.
- c)́ VBW ≥ RBW.
- d) Sweep time = auto-couple.
- e) Detector = peak.
- f) Trace mode = max hold.

- Test configuration



4.4.2 Limit

In any 100 kHz bandwidth outside the frequency band the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.



4.4.3 Measurement result

Date Temperature Humidity Test place	: :	12-April-2021 25.1 [°C] 27.3 [%] Shielded room No.4	Test engineer	:	Taiki Watanabe
Date Temperature Humidity Test place	: : :	14-April-2021 23.8 [°C] 31.0 [%] Shielded room No.4	Test engineer	:	Taiki Watanabe

[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]

Channel	Frequency [MHz]	Limit [dB]	Results Chart	Result
Low	2412	At least 20dB below from peak of RF	See the trace Data	PASS
Middle	2437	At least 20dB below from peak of RF	See the trace Data	PASS
High	2462	At least 20dB below from peak of RF	See the trace Data	PASS



4.4.4 **Trace data**



5GHz-10GHz

10GHz-15GHz



15GHz-20GHz

20GHz-25GHz # Agilent 🔅 Agilent Mkr1 15.026 7 GHz Mkr1 24,888 3 GHz Ref 10 dBm Peak Atten 20 dB -65.97 dBm Ref 10 dBm Atten 20 dB -64.69 dBm Log 10 dB/ Log 10 dB/ DI -27.2 dBm DI -27.2 dBm 10 Stop 20.000 0 GHz VI S2 Stop 20.000 0 GHz Start 20.000 0 GHz Sweep 478 ms (3001 pts) *Res BW 100 kHz 4a Marker Trace 1 (1) LgAv LgAv V1 S2 Start 15.000 0 GHz Stop 25.000 0 GHz •Res BW 100 kHz Marker Trace 1 (1) VBW 300 kHz VBW 300 kHz Sweep 478 ms (3001 pts) Type Freq Amplitude -65.97 dBm Type Freq X fixis 24,898 3 GHz X Axis 15.826 7 GHz Asplitude -64.69 dBa

Channel Middle





15GHz-20GHz

20GHz-25GHz





Channel High





15GHz-20GHz 20GHz-25GHz 🔅 Agilent 🔅 Agilent 16.243 3 GF 4kr1 24,686 7 íkr1 Ref 10 dBm •Peak -65.66 dBm Ref 10 dBm Atten 20 dB •Atten 20 dB -64.47 dBm Log 10 Log 10 dB/ dB/ DI -25.8 dBm DI -25.8 dBm 1 LgAv LgAv V1 S2 Start 15.000 0 GHz •Res BW 100 kHz Marker Trace 1 (1) V1 S2 V1 S2 Stop 20,000 0 GHz Start 20,000 0 GHz Sweep 478 ms (3001 pts) •Res BW 100 kHz Stop 25,000 0 GHz •VBW 300 kHz •VBW 300 kHz Sweep 478 ms (3001 pts) Amplitude -65.66 dBm Marker 1 Trace (1) Anplitude -64,47 dBm Type Freq Type Freq X Axis 24,686 7 6Hz X Rxis 16.243 3 6Hz

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[IEEE802.11g] Channel Low 30MHz-1GHz









Channel Middle







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SUD

Japan

Channel High





15GHz-20GHz

20GHz-25GHz



TÜV SÜD Japan Ltd.

SUD

Japan



[IEEE802.11n (HT20)] Channel Low 30MHz-1GHz







Channel Middle





15GHz-20GHz 20GHz-25GHz 🔅 Agilent 🔅 Agilent 19.488 3 GH 4kr1 24,781 7 GH íkr1 Ref 10 dBm •Peak -66.32 dBm Ref 10 dBm •Peak Atten 20 dB •Atten 20 dB -64.69 dBm Log 10 Log 10 dB/ dB/ DI -33,8 dBm DI -33.8 dBm 10 LgAv LgAv V1 S2 Start 15.000 0 GHz •Res BW 100 kHz Marker Trace 1 (1) V1 S2 V1 S2 Stop 20,000 0 GHz Start 20,000 0 GHz Sweep 478 ms (3001 pts) •Res BW 100 kHz Stop 25,000 0 GHz •VBW 300 kHz •VBW 300 kHz Sweep 478 ms (3001 pts) Amplitude -66.32 dBm Marker 1 Trace (1) Anplitude -64,69 dBm Type Freq Type Freq X Axis 19.488 3 6Hz X Rxis 24.781 7 6Hz

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Japan

Channel High



5GHz-10GHz 10GHz-15GHz 🔅 Agilent 🔅 Agilent 7.000 0 GHz -67.08 dBm Ref 10 dBm •Peak 4kr1 14,291 7 641 CU Ref 10 dBm •Peak Atten 20 dB Atten 20 dB -65.22 dBm Log 10 Log 10 dB/ dB/ DI -33.2 dBm DI -33.2 dBm 1 LgAv LgAv V1 S2 Start 5.000 0 GHz •Res BW 100 kHz Marker Trace 1 (1) V1 S2 VI S2 Stop 10.000 0 GHz Start 10.000 0 GHz Sweep 478 ms (3001 pts) Hes BW 100 kHz Here Trace 1 (1) Stop 15.000 0 GHz •VBW 300 kHz •VBW 300 kHz Sweep 478 ms (3001 pts) Amplitude -67.08 d8m Amplitude -65.22 dBm Type Freq Type Freq X Axie 14.291 7 6Hz X Axie 7.000 0 6Hz







4.5 Spurious Emissions - Radiated -

4.5.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB 558074 D01 v05r02, Section 8.6]

Test was applied by following conditions.

Test method Frequency range Test place EUT was placed on	:	ANSI C63.10 9 kHz to 25 GHz 3m Semi-anechoic chamber Styrofoam table / (W) 1.0 x (D) 1.0 x (H) 0.8 m (below 1 GHz) Styrofoam table / (W) 0.6 x (D) 0.6 x(H)1.5 m (above 1 GHz)
Antenna distance	:	3 m
Test receiver setting - Detector - Bandwidth Spectrum analyzer setting - Peak - Average	::	Below 1 GHz Average (9 kHz-90 kHz, 110 kHz-490 kHz), Quasi-peak 200 Hz, 120 kHz Above 1 GHz RBW=1 MHz, VBW=3 MHz, Span=0 Hz, Sweep=auto RBW=1 MHz, VBW=10 Hz, Span=0 Hz, Sweep=auto Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T _{on} (us)	T _{off} (us)	Determined VBW Setting
IEEE802.11b	99.42	1023	6	10Hz (Duty Cycle ≥ 98%)
IEEE802.11g	99.42	1364	8	10Hz (Duty Cycle ≥ 98%)
IEEE802.11n(HT20)	99.38	1276	8	10Hz (Duty Cycle ≥ 98%)

Although these tests were performed other than open area test site, adequate comparison measurements

were confirmed against 30 m open are test site.

Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Radiated emission measurements are performed at 3m distance with the broadband antenna (Loop antenna, Biconical antenna, Log periodic 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. As for the Loop antenna, it is positioned with its plane vertical, and the center of the Loop antenna is 1m above the ground plane.

The EUT is Placed on a turntable, which is 0.8m/1.5m 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.



- Test configuration



4.5.2 Calculation method

[9 kHz to 150 kHz] Emission level = Reading + (Ant factor + Cable system loss) Margin = Limit – Emission level

[150 kHz to 25 GHz] Emission level = Reading + (Ant factor + Cable system loss - Amp. Gain) Margin = Limit – Emission level

Example:

Limit @ 4824.0 MHz: 74.0 dBuV/m (Peak Limit) S.A Reading = 49.5 dBuV Cable system loss = 8.4 dB Result = 49.5 + 8.4 = 45.1 dBuV/m Margin = 74.0 - 45.1 = 16.1 dB

4.5.3 Limit

Frequency	Field s	Distance	
[MHz]	[uV/m]	[dBuV/m]	[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 1000 MHz, 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 20 dB under any condition modulation.



4.5.4 Test data

Date Temperature Humidity Test place	:	16-April-2021 22.6 [°C] 21.6 [%] 3m Semi-anechoic chamber	Test engineer	:	Tadahiro Seino
Date Temperature Humidity Test place	:	19-April-2021 22.8 [°C] 28.1 [%] 3m Semi-anechoic chamber	Test engineer	:	Tadahiro Seino
Date Temperature Humidity Test place	:	20-April-2021 24.4 [°C] 29.1 [%] 3m Semi-anechoic chamber	Test engineer	:	Tadahiro Seino
Date Temperature Humidity Test place	:	21-April-2021 24.4 [°C] 17.8 [%] 3m Semi-anechoic chamber	Test engineer	:	Tadahiro Seino



4.5.4.1 Transmission mode

[11b] Channel Low BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle	
	[MHz]		[dB(1/m)]	[cm]	[°]	

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]

2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11b] Channel Low ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading	Reading	c. f	Result	Result	Limit	Limit	Margin	Margin	Height	Angle
1	[MHz] 4824.000	Н	[dB(μV)] 51.1	[dB(μV)] 35.5	[dB(1/m)] 11.0	[dB(µV/m)] 62.1	$[dB(\mu V/m)]$ 46.5	$[dB(\mu V/m)]$ 74.0	[dB(μV/m)] 54.0	[dB] 11.9	[dB] 7.5	[cm] 161.0	[°] 162.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]

2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11b] Channel Middle BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

Note:

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.


[11b] Channel Middle ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result	Result	Limit	Limit	Margin PK	Margin	Height	Angle
1	[MHz] 4874.000	Н	[dB(μV)] 50.1	[dB(μV)] 35.3	[dB(1/m)] 11.2	[dB(µV/m)] 61.3	[dB(µV/m)] 46.5	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.7	[dB] 7.5	[cm] 287.0	[°] 164. 0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11b] Channel High BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11b] Channel High ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result AV	Limit PK	Limit	Margin PK	Margin AV	Height	Angle
1	[MHz] 4924.000	Н	[dB(μV)] 50.7	[dB(µV)] 35.4	[dB(1/m)] 11.3	[dB(µV/m)] 62.0	[dB(µV/m)] 46.7	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.0	[dB] 7.3	[cm] 179.0	[°] 160. 0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11g] Channel Low BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle		
	[MHz]		[dB(1/m)]	[cm]	[°]		

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11g] Channel Low ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result AV	Limit PK	Limit	Margin PK	Margin AV	Height	Angle
1	[MHz] 4824.000	Н	[dB(μV)] 50.3	[dB(μV)] 35.4	[dB(1/m)] 11.0	[dB(µV/m)] 61.3	[dB(µV/m)] 46.4	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.7	[dB] 7.6	[cm] 236.0	[°] 155.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable - Amp)]

2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11g] Channel Middle BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11g] Channel Middle ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result AV	Limit PK	Limit	Margin PK	Margin AV	Height	Angle
1	[MHz] 4874.000	Н	[dB(μV)] 50.2	[dB(µV)] 35.3	[dB(1/m)] 11.2	[dB(µV/m)] 61.4	[dB(µV/m)] 46.5	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.6	[dB] 7.5	[cm] 289.0	[°] 160.0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11g] Channel High BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11g] Channel High ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result	Limit	Limit	Margin PK	Margin	Height	Angle
	[MHz]		$[dB(\mu V)]$	$[dB(\mu V)]$	[dB(1/m)]	$[dB(\mu V/m)]$	$[dB(\mu V/m)]$	$[dB(\mu V/m)]$	$[dB(\mu V/m)]$	[dB]	[dB]	[cm]	[°]
1	4924.000	Н	50.0	35.3	11.3	61.3	46.6	74.0	54.0	12.7	7.4	284.0	166.0

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]

2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11n(HT20)] Channel Low BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11n(HT20)] Channel Low ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result AV	Limit PK	Limit	Margin PK	Margin AV	Height	Angle
1	[MHz] 4824.000	Н	[dB(μV)] 50.6	[dB(μV)] 35.7	[dB(1/m)] 11.0	[dB(µV/m)] 61.6	[dB(µV/m)] 46.7	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.4	[dB] 7.3	[cm] 211.0	[°] 158.0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11n(HT20)] Channel Middle BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11n(HT20)] Channel Middle ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result AV	Limit PK	Limit AV	Margin PK	Margin AV	Height	Angle
1	[MHz] 4874.000	Н	[dB(μV)] 51.2	[dB(μV)] 35.6	[dB(1/m)] 11.2	[dB(µV/m)] 62.4	[dB(µV/m)] 46.8	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 11.6	[dB] 7.2	[cm] 187.0	[°] 160.0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



[11n(HT20)] Channel High BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz at the 3 meters distance.



[11n(HT20)] Channel High ABOVE 1GHz



Final Result

No.	Frequency	(P)	Reading PK	Reading AV	c. f	Result PK	Result	Limit PK	Limit	Margin PK	Margin AV	Height	Angle
1	[MHz] 4924.000	Н	[dB(μV)] 50.3	[dB(μV)] 35.6	[dB(1/m)] 11.3	[dB(µV/m)] 61.6	[dB(µV/m)] 46.9	[dB(µV/m)] 74.0	[dB(µV/m)] 54.0	[dB] 12.4	[dB] 7.1	[cm] 204.0	[°] 164.0

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 18GHz to 25GHz at the 3 meters distance.



4.5.4.2 Receive mode

Channel Low BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



Channel Middle BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

- 1. Emission Level (Margin) = Limit [Reading + Factor (Antenna + Cable Amp)]
- 2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



Channel High BELOW 1GHz



Final Result

No.	Frequency	(P)	c.f	Height	Angle
	[MHz]		[dB(1/m)]	[cm]	[°]

Note:

1. Emission Level (Margin) = Limit - [Reading + Factor (Antenna + Cable – Amp)]

2. No emission were detected in frequency range 9kHz to 1000MHz and 1GHz to 25GHz at the 3 meters distance.



4.6 Restricted Band of Operation

4.6.1 Measurement procedure

[FCC 15.247(d), 15.205, 15.209, KDB 558074 D01 v05r02, Section 8.6]

Test was applied by following conditions.

Test method Test place EUT was placed on Antenna distance	: :	ANSI C63.10 3m Semi-anechoic chamber Styrofoam table / (W) $1.0 \times (D) 1.0 \times (H) 0.8 \text{ m} (below 1 \text{ GHz})$ Styrofoam table / (W) $0.6 \times (D) 0.6 \times (H) 1.5 \text{ m} (above 1 \text{ GHz})$ 3m
Spectrum analyzer setting - Peak - Average	:	RBW=1 MHz, VBW=3 MHz, Span=Arbitrary setting, Sweep=auto RBW=1 MHz, VBW=10 Hz, Span=Arbitrary setting, Sweep=auto Display mode=Linear

Average Measurement Setting [VBW]

Mode	Duty Cycle (%)	T _{on} (us)	T _{off} (us)	Determined VBW Setting
IEEE802.11b	99.42	1023	6	10Hz (Duty Cycle ≥ 98%)
IEEE802.11g	99.42	1364	8	10Hz (Duty Cycle ≥ 98%)
IEEE802.11n(HT20)	99.38	1276	8	10Hz (Duty Cycle ≥ 98%)

Although these tests were performed other than open area test site, adequate comparison measurements

were confirmed against 30 m open are test site.

Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

Radiated emission measurements are performed at 3m distance with the broadband antenna (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/1.5m 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.

- Test configuration





4.6.2 Limit

Emission at the boundary of the restricted band provided by 15.205 shall be lower than 15.209 limit.

4.6.3 Measurement Result

[IEEE802.11b、IEEE802.11g、IEEE802.11n (HT20)]

Channel	Frequency [MHz]	Results Chart	Result
Low	2412	See the Trace Data	Pass
High	2462	See the Trace Data	Pass

4.6.4 Test data

Date	:	26-April-2021			
Temperature	:	23.1 [°C]			
Humidity	:	21.3 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber	-	-	Tadahiro Seino



44.19 dBµ\ 389250 GH: 44.16 dBµ\ 390000 GH:

Span 105.0 MHz

44.05 dBµ\ 2.387990 GH 44.05 dBµ\ 2.390000 GH

Span 105.0 MHz

CREATER D

[IEEE802.11b]

Channel Low Horizontal Peak



Vertical Poak

Peak		Average	9	
Spectrum Spectrum 2 Spectrum 2 Spectrum 2 Ref Level 110.00 dBµV Offset 6.80 dB RBV Att 15 dB SWT 40 ms VBV	Tum 3 Spectrum 4 X # 1 MHz Mode Auto Sweep Mode Auto Sweep	Spectrum Ref Level 60.0	Spectrum 2 Spectrum 3 10 dBµV Offset 6.80 dB • RBW 1 MHz 15 dB • SWT 12 s • VBW 10 Hz	Spectrum 4 Mode Auto Sweep
1Pk View		e 1Pk View		
100 d8µV-	M1[1] M2[1]	58.73 dBµV 2.379780 GHz 57.40 dBµV 2.390009-041z		M1[1] M2[1]
90 dBµV				
80 dBµV				
70 dBµV				
60 dBUV	MI MO	01 5	4.000 dBµV	
50 dBµV				
40 dBµV		50 dBµV		
30 dBµV				MiMS.
20 dBµV		40 dBµV-		
	1001	30 dBµV	1001	
CF 2.3625 GH2	1001 pts sr	Dan 105.0 MHz CF 2.3625 GHz	1001	pts
	Measuring			Measuring



44.45 dBµv 2.487700 GHz 44.40 dBµv 2.483500 GHz

105.0 MHz Spar

CONTRACTOR OF TAXABLE

Channel High Horizontal



Vertical Poak

	~						~		
Spectrum	Spectrum 2	(X) Spectr	um 3 🗵	Spectrum 4 🛛 🗴		Spectrum	Spectrum 2	Spectrum 3	Spectrum 4
Ref Level 11	l0.00 dBµV Offset	7.00 dB 👄 RBV	/ 1 MHz			Ref Level 60	.00 dBµV Offset	7.00 dB 👄 RBW 1 MH	z
Att	15 dB 🖷 SWT	40 ms 🖷 VBV	/ 3 MHz Mode	Auto Sweep		Att	15 dB 🥌 SWT	12 s 👄 VBW 10 H	z Mode Auto Sweep
1Pk View						1Pk View			
			M	1[1]	59.30 dBµV				M1[1]
100 10.01				[1]0	2.495240 GHz				M0[1]
				2[1]	2,483500 GHz				
				E E					T T
90 dBµV								••••••	
1									
80 dBµV					-				
	74.000 dB(6/								
70 dBuV	74.000 uppv	-							
1									
60 dBull	M2	M1				1	54 000 dB(4/		
00 00 00	the manufactor to have all	and the providence	mandeling poly-surveyers.	and the server and the second s	man have been and the second second second		54.000 uppy		
50 dBµV-									
40 dBµV				2		SU dBµV	N		
						v	·}		
30 dBuV							M2 M1		
							- Alimeter		
20 db W						40 d0 44			
20 06/14						40 UBUV			
						30 dBµV			
CF 2.5115 GH	7		1001 nts		Span 105 0 MHz	CE 2 5115 GHz	,	1001	nte



[IEEE802.11g]

Channel Low Horizontal Peak



Vertical Peak

cun				_	Avera	ige				6
Spectrum	Spectrum 2 (Spectrum 3	Spectrum 4 🛛 🗶		Spectrum	n Spectrum	2 🗷 Spectru	m 3 🛛 🗶 Spect	trum 4 🛛 🔊	9
Ref Level 110	0.00 dBµV Offset 6.8	30 dB 👄 RBW 1 MHz			Ref Level	60.00 dBµV Offs	et 6.80 dB 👄 RBW	L MHz		
Att	15 dB 🖷 SWT 4	0 ms 🖷 VBW 3 MHz	Mode Auto Sweep		Att	15 dB 💩 SWT	12 s 🖷 VBW	10 Hz Mode Auto S	Sweep	
1Pk View					1Pk View					
			M1[1]	59.28 dB	IV.			M1[1]		43.91 dB
00 dBuV			-M2[1]	2.380930 G	12			M2[1]		43.91 dB
				2.390000 0	iz					2.390000 GI
0 dBµV				A						
0 dBµV										· • • • • • • • • • • • • • • • • • • •
D1 7	74.000 dBuV				_					
0 dBµV					-					
			141							
i0 dBµV	Distance in a colorisation of the	and a second show	M2	mander	-	D1 54.000 dBµV				
Control Party and	will Construction that and the	and all have a short of all all	personal ends abelian endances under							
io dBµV										
					FO 40-44					<i>f</i>
0 dBµV					50 06µV					
io dBµV									1012	1
101 10 10										
20 dBµV					40 dBµV					
					30 dBµV		-	-		
										2
F 2.3625 GHz		1001 pt	5	Span 105.0 Mi	z CF 2.3625	GHz		001 pts		Span 105.0 MH



44.31 dBµV 2.483490 GHz 44.31 dBµV 2.483500 GHz

Span 105.0 MHz

44.12 dBμ\ 483700 GH 44.08 dBμ\ 483500 GH

105.0 MHz

M1[1]

M2[1]

Measuring

Channel High Horizontal



Vertical

Peak				Average	е			
Spectrum Spectrum 2	Spectrum 3 (🗴 Spectrum 4 🛛 🗶		Spectrum	Spectrum 2	Spectrum 3	Spectrum 4	×
RefLevel 110.00 dBµV Offset 7.0 ■ Att 15 dB ■ SWT 4	00 dB 👄 RBW 1 MHz -0 ms 👄 VBW 3 MHz 1	Mode Auto Sweep		Ref Level 60.1	00 dBµV Offset 3 15 dB ● SWT	7.00 dB • RBW 1 MHz 12 s • VBW 10 Hz	Mode Auto Sweep	
Pk View				1Pk View				
100 dBUV		M1[1] —M2[1]	58.75 dBµV 2.498420 GHz 57.69 dBµV 2.483500 GHz				M1[1] M2[1]	T
90 dBµV 80 dBµV 70 dBµV 20 dBµV								
60 dBuV	interesterations	n Yan makala kata kata dalar majalika ka	oberaturanan anton atauton it	D1 5	54.000 dBµV			
40 dBµV				50 dBµV				
30 dBµV				40 dBµV				
	1001 ptc		Span 105 0 MHz	30 dBµV		1001 m	at c	Sn



[IEEE802.11n (HT20)]

Channel Low Horizontal Peak



Vertical Peak

eak	_							Avera	age_									
Spectrum	Spectrum 2	🗶 Spe	ctrum 3	Spectro	um 4 🗷		(₩)	Spectrur	n Sp	ectrum 2	× s	pectrum 3	× 5	Spectrum	4 🗶			1
Ref Level 110	0.00 dBµV Offset	6.80 dB 👄 F	RBW 1 MHz					Ref Leve	1 60.00 dBµ	V Offse	t 6.80 dB 🖷	RBW 1 MHz						
Att	15 dB 🖷 SWT	40 ms 🖷 🛚	BW 3 MHz	Mode Auto S	weep			Att	15 d	ib 💩 SWT	12 s 🖷	VBW 10 Hz	Mode /	Auto Sweep				
1Pk View								1Pk View										
				M1[1]			59.11 dBµV						M	1[1]			43.	65 dBµ
100 db w				LEJ6M		3	56 76 dBuy						M	1110			2.389	370 GH
100 0800				m2[1]			2.390000 GHz			******				2[1]			2.390	000 GH
				1	1	1	Justimeraborde						- 1	ľ	· · · · · ·	1		
10 dBµV							1					++						
							1											
30 dBµV				-			0 0											
D1 7	74.000 dBµV					1												
70 dBµV					-													
						1												
50 dBµV	201771 101.00 Vol. 11	the second second		terror	M2 M2	U.U.U.			D1 54.000	dBµV								
endedyeashipping	non-contractions	unhumuland	inderved advictory.	بالأبالج والمستعمل المستعمل المالي	seeded which and the state	L. KUHW												
50 dBuV							-											
Sector Se																	J	
40 dB10/								50 dBµV								+ +		
io obpi												±				1		
												+				· · · · · · ·		
					5										N842			
100 IS 10																		
20 dBµV-			-		-		-	40 dBµV						-			1	
								30 dBµV			-	-		-		-	-	
CE 2.3625 GHz			1001 pts	s		Spa	n 105.0 MHz	CE 2.3625	GHz		1	1001	nts		L	So	an 105	0 MHz
The second secon			2.502 per	- 	audea and	Contraction of the	1.10	1. 10010	1			1001		Manager		Cope	4.44	
				ried	suring	IN NO. OF TAXABLE	n li	L						ricasuri	ng	THE R. P. LEWIS CO., LANSING MICH.	-	6



Channel High Horizontal



Vertical - - |

Peak			Average	9			
Spectrum 2 🛞	Spectrum 3 🛞 Spectrum 4	₩ (₩	Spectrum	Spectrum 2	Spectrum 3	Spectrum 4	× (***
Ref Level 110.00 dBµV Offset 7.00 dB	RBW 1 MHz		Ref Level 60.0	0 dBµV Offset 7.0	0 dB 👄 RBW 1 MHz	_	
Att 15 dB SWT 40 ms	VBW 3 MHz Mode Auto Sweep		Att	15 dB 🥌 SWT	12 s 👄 VBW 10 Hz	Mode Auto Sweep	
• 1Pk View			1Pk View				
	M1[1]	58.26 dBµV 2.498180 GHz				M1[1]	43.97 dBµ 2.490100 GH
100 dBµV		57.64 dBµV				M2[1]	43.95 dBµ
Mansonalda		2.483500 GHz					2.483500 GH
90 dBµV							
80 dBuV							
01 /4.000 dbpv			·				
10 dbpt							
AD dawn M1			01 54	1 000 dBus/			
West Structure and a structure of the st	weiselingengenhaltstationserveralistationserver	astrona planeter and a far for a second s	01.54	1.000 ubpv			
SU dBµV							
			50 dBuly				
40 dBµV			30 00pV				
			·····				
30 dBµV				M2 MI			
20 dBµV			40 dBµV				
			20 - 10 - 14				
	1001	0.000			1001		0
GF 2.3113 GHZ	1001 prs	span 105.0 MHz	CF 2.5115 GH2		1001 pts		span 105.0 MH2
	Measuring					Measuring	······································



4.7 Transmitter Power Spectral Density

4.7.1 Measurement procedure

[FCC 15.247(e), KDB 558074 D01 v05r02, Section 8.4]

The peak power is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.

The spectrum analyzer is set to;

- a) Span = 1.5 times the 6 dB bandwidth.
- b) RBW = 3kHz 100kHz.
- c) VBW \geq 3 x RBW.
- d) Sweep time = auto-couple.
- e) Detector = peak.
- f) Trace mode = max hold.

- Test configuration



4.7.2 Limit

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band.

4.7.3 Measurement result

Date	:	14-April-2021				
Temperature	:	23.8 [°C]				
Humidity	:	31.0 [%]	Test engineer	:		
Test place	:	Shielded room No.4			Taiki Watanabe	

[IEEE802.11b]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412	-19.00	10.63	-8.37	8.00	16.37	PASS
Middle	2437	-19.47	10.63	-8.84	8.00	16.84	PASS
High	2462	-19.05	10.63	-8.42	8.00	16.42	PASS

Calculation;

Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

[IEEE802.11g]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412	-26.94	10.63	-16.31	8.00	24.31	PASS
Middle	2437	-26.75	10.63	-16.12	8.00	24.12	PASS
High	2462	-26.07	10.63	-15.44	8.00	23.44	PASS

Calculation;

Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)

[IEEE802.11n (HT20)]

Channel	Center Frequency (MHz)	Reading (dBm)	Factor (dB)	Level (dBm)	Limit (dBm)	Margin (dBm)	Result
Low	2412	-26.05	10.63	-15.42	8.00	23.42	PASS
Middle	2437	-26.06	10.63	-15.43	8.00	23.43	PASS
High	2462	-26.74	10.63	-16.11	8.00	24.11	PASS

Calculation;

Transmitter Power Spectral Density Level (Margin) = Limit – (Reading + Factor)



4.7.4 Trace data

[IEEE802.11b]

Channel Low___



Channel Middle



Channel High





[IEEE802.11g]



Channel Middle



Channel High







[IEEE802.11n (HT20)]



Channel Middle



Channel High



Japan



4.8 AC Power Line Conducted Emissions

4.8.1 Measurement procedure

[FCC 15.207]

Test was applied by following conditions.

Test method	:	ANSI C63.10
Frequency range	:	0.15 MHz to 30 MHz
Test place	:	3m Semi-anechoic chamber
EUT was placed on	:	FRP table / (W) 2.0 × (D) 1.0 × (H) 0.8 m
Vertical Metal Reference Plane	:	(W) 2.0 x (H) 2.0 m, 0.4 m away from EUT
Test receiver setting		
- Detector	:	Quasi-peak, Average
- Bandwidth	:	9 kHz

EUT and peripherals are connected to $50\Omega/50 \mu$ H Line Impedance Stabilization Network (LISN) which are connected to reference ground plane, and are placed 80cm away from EUT. Excess of AC power cable is bundled in center.

LISN for peripheral is terminated in 50Ω .

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, peripherals, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits.

- Test configuration



4.8.2 Calculation method

Emission level = Reading + (LISN. Factor + Cable system loss) Margin = Limit – Emission level

Example: Limit @ 0.403 MHz: 57.8 dB μ V(Quasi-peak) : 47.8 dB μ V(Average) (Quasi peak)Reading = 22.7 dB μ V c.f. = 10.4 dB Emission level = 22.7 + 10.4 = 33.1 dB μ V Margin = 57.8 - 33.1 = 24.7 dB (Average) Reading = 6.5 dB μ V c.f. = 10.4 dB Emission level = 6.5 + 10.4 = 16.9 dB μ V Margin = 47.8 - 16.9 = 30.9 dB



4.8.3 Limit

Frequency	Lir	nit
[MHz]	QP [dBuV]	AV [dBuV]
0.15-0.5	66-56*	56-46*
0.5-5	56	46
5-30	60	50

*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.



4.8.4 Test data

Date Temperature Humidity Test place	: 27-April-2021 : 23.7 [°C] : 18.1 [%] : 3m Semi-anechoic chamber	Test engineer : 	adahiro Seino
Company Name EUT Model No. Serial No. Test mode	: KYOCERA Corporation : Mobile Phone : EB1056 : N/A : WLAN_11b_Tx	Standard : FCC Part.1 Operator : T.Seino Temp,Hum,Atm : 23.7[°C] 18. Note1 : Without Car Note2 :	5 Class C 1[%] nera
[dB(µV)] 80 70 60 50 40 30 10 0 0.150	0.500 1.000	5.000 10.000 30	<pre></pre>

Final Result

	L1 Phase	-								
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin
		QP	AV		QP	AV	QP	AV	QP	AV
	[MHz]	$[dB(\mu V)]$	$[dB(\mu V)]$	[dB]	$[dB(\mu V)]$	$[dB(\mu V)]$	$[dB(\mu V)]$	$[dB(\mu V)]$	[dB]	[dB]
1	0.394	31.0	14.1	10.4	41.4	24.5	58.0	48.0	16.6	23.5
2	0.483	30.6	11.3	10.4	41.0	21.7	56.3	46.3	15.3	24.6
3	0.743	30.9	11.2	10.4	41.3	21.6	56.0	46.0	14.7	24.4
4	1.920	40.4	14.4	10.5	50.9	24.9	56.0	46.0	5.1	21.1
5	2.305	35.0	18.7	10.5	45.5	29.2	56.0	46.0	10.5	16.8
6	5.173	6.8	0.3	10.7	17.5	11.0	60.0	50.0	42.5	39.0
	L2 Phase	_								
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin
		QP	AV		QP	AV	QP	AV	QP	AŬ
	[MHz]	$[dB(\mu V)]$	$[dB(\mu V)]$	[dB]	$[dB(\mu V)]$	$[dB(\mu V)]$	$[dB(\mu V)]$	$[dB(\mu V)]$	[dB]	[dB]
1	0.392	35.3	21.1	10.4	45.7	31.5	58.0	48.0	12.3	16.5
2	0.481	32.1	17.5	10.4	42.5	27.9	56.3	46.3	13.8	18.4
3	0.748	32.2	16.6	10.4	42.6	27.0	56.0	46.0	13.4	19.0
4	1.830	33.1	18.1	10.5	43.6	28.6	56.0	46.0	12.4	17.4
5	2.266	30.8	18.0	10.5	41.3	28.5	56.0	46.0	14.7	17.5
6	10,830	18.3	6.3	11.3	29.6	17.6	60.0	50.0	30.4	32.4



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 Measurement Uncertainty

Expanded uncertainties stated are calculated with a coverage Factor k=2. Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028 Parts 1 and 2 determining compliance or non-compliance with test result.

Test item	Measurement uncertainty	
Conducted emission, AMN (9 kHz – 150 kHz)	±3.7 dB	
Conducted emission, AMN (150 kHz – 30 MHz)	±3.3 dB	
Radiated emission (9kHz – 30 MHz)	±3.2 dB	
Radiated emission (30 MHz – 1000 MHz)	±5.3 dB	
Radiated emission (1 GHz – 6 GHz)	±4.8 dB	
Radiated emission (6 GHz – 18 GHz)	±4.5 dB	
Radiated emission (18 GHz – 40 GHz)	±6.4 dB	
Radio Frequency	±1.4 * 10 ⁻⁸	
RF power, conducted	±0.8 dB	
Adjacent channel power	±2.4 dB	
Temperature	±0.6 °C	
Humidity	±1.2 %	
Voltage (DC)	±0.4 %	
Voltage (AC, <10kHz)	±0.2 %	

Judge	Measured value and standard limit value		
PASS	Case1	ty -Uncertainty Even if it takes uncertainty into consideration, sured value a standard limit value is fulfilled. Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.	
FAIL	Case3	Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.	
		Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.	


7 Laboratory Information

Testing was performed and the report was issued at:

TÜV SÜD Japan Ltd. Yonezawa Testing Center

 Address:
 5-4149-7 Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan

 Phone:
 +81-238-28-2881

 Fax:
 +81-238-28-2888

Accreditation and Registration

A2LA Certificate #3686.03

VLAC Accreditation No.: VLAC-013

BSMI

Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

Innovation, Science and Economic Development Canada ISED#: 4224A

VCCI Council

Registration number	Expiration date
A-0166	03-July-2021



Appendix A. Test Equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	31-Aug-2021	20-Aug-2020
Attenuator	Weinschel	56-10	J4993	31-Dec-2021	14-Dec-2020
Power meter	ROHDE&SCHWARZ	NRP2	103269	31-Mar-2022	10-Mar-2021
Power sensor	ROHDE&SCHWARZ	NRP-Z81	102467	31-Mar-2022	10-Mar-2021

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	30-Sep-2021	28-Sep-2020
Spectrum analyzer	Agilent Technologies	E4447A	MY46180188	31-Mar-2022	11-Mar-2021
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	31-Dec-2021	11-Dec-2020
Spectrum analyzer	ROHDE&SCHWARZ	FSV40	101731	30-Jun-2021	22-Jun-2020
Preamplifier	SONOMA	310	372170	30-Sep-2021	29-Sep-2020
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	100515	30-Apr-2021	15-Apr-2020
Biconical antenna	Schwarzbeck	VHBB9124/BBA9106	1333	31-Dec-2021	15-Dec-2020
Log periodic antenna	Schwarzbeck	VUSLP9111B	344	30-Apr-2021	17-Apr-2020
Attenuator	TOYO Connector	NA-PJ-6/6dB	N/A(S541)	30-Sep-2021	29-Sep-2020
Attenuator	TAMAGAWA.ELEC	CFA-10/3dB	N/A(S503)	31-Jul-2021	20-Jul-2020
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	31-Dec-2021	15-Dec-2020
Attenuator	AEROFLEX	26A-10	081217-08	31-Dec-2021	14-Dec-2020
Double ridged guide antenna	ETS LINDGREN	3117	00052315	30-Apr-2021	08-Apr-2020
Attenuator	HUBER+SUHNER	6803.17.B	N/A(2340)	31-Dec-2021	15-Dec-2020
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	30-Sep-2021	02-Sep-2020
Preamplifier	TSJ	MLA-1840-B03-35	1240332	30-Sep-2021	02-Sep-2020
Band rejection filter	Micro-Tronics	BRC50702	G433	30-Sep-2021	29-Sep-2020
	HUBER+SUHNER	SUCOFLEX104/9m	MY30037/4	31-Dec-2021	15-Dec-2020
Microwave cable		SUCOFLEX104/1m	my24610/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/8m	SN MY30033/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104	MY32976/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/1.5m	SN MY28404/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/7m	41625/6	31-Dec-2021	15-Dec-2020
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V6.0.140	N/A	N/A
Absorber	RIKEN	PFP30	N/A	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	31-May-2021	29-May-2020
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	31-May-2021	28-May-2020

Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	30-Sep-2021	28-Sep-2020
Attenuator	HUBER+SUHNER	6810.01.A	N/A (S411)	31-Dec-2021	15-Dec-2020
Line impedance stabilization network	Kyoritsu Electrical Works, Ltd.	TNW-407F2	12-17-110-2	30-Jun-2021	03-Jun-2020
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S350)	31-Dec-2021	15-Dec-2020
Coaxial cable	FUJIKURA	5D-2W/1m	N/A (S193)	31-Dec-2021	15-Dec-2020
Coaxial cable	HUBER+SUHNER	RG214/U/10m	N/A (S194)	31-Dec-2021	15-Dec-2020
PC	DELL	DIMENSION	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/CE-AJ	0611193/V5.4.11	N/A	N/A

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

TÜV SÜD Japan Ltd.



Appendix B. Duty Cycle

[Plot & Calculation]

11b



Duty Cycle = Ton / (Ton + Toff) = 1023[µs] / (1023[µs] + 6[µs]) =99.42[%]

11g



Duty Cycle = Ton / (Ton + Toff) = 1364[µs] / (1364[µs] + 8[µs]) =99.42[%]

11n (HT20)



Duty Cycle = Ton / (Ton + Toff) = 1276[µs] / (1276[µs] + 8[µs]) =99.38[%]

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