TEST REPORT

The Radio Law, Article 2

Equipment under test PETICA
Model name PETICA1000
Applicant KSRM Co., Ltd
Manufacturer KSRM Co., Ltd
Date of test(s) 2019.09.10 ~ 2019.09.18
Date of issue 2019.09.18

Issued to
KSRM Co., Ltd
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Issued by
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Test and report completed by :	Report approval by :
	
Seung-yeon Lee Test engineer	Hyeon-Su Jang Technical manager

Revision History

Revision	Date of issue	Test report No.	Description
-	2019.09.18	KES-RF-19T0122	Initial

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1. General Information

Applicant:	KSRM Co., Ltd
Applicant address:	607Ho, 11-41, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea
Test site:	KES Co., Ltd.
Test site address:	3701, 40, Simin-daero 365beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea 473-21, Gayeo-ro, Yeoju-si, Gyeonggi-do, Korea
J-MIC Radio law	Article 2

1.1. EUT Description

Equipment under test	PETICA
Frequency range	2 412 ㎒ ~ 2 472 ㎒ (11b/g/n_HT20)
Model:	PETICA1000
Modulation technique	WiFi : DSSS, OFDM
Antenna specification	Antenna type : Dipole Antenna, Peak gain : -0.59 ㏈i
Power source	AC 100 V
Number of channels	2 412 ㎒ ~ 2 472 ㎒ (11b/g/n_HT20) : 13 ch

1.2. Information about derivative model

N/A

1.3. Accessory Information

Equipment	Manufacturer	Model	Serial No.	Power source
-	-	-	-	-

1.4 Worst case data rate

1. Conducted test was performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.
2. Worst-case data rates were:
   802.11b: **1 Mbps**
   802.11g: **6 Mbps**
   802.11n_HT20: **MCS0**

1.5 Frequency/channel Operations

(WiFi)

Ch.	Frequency (㎒)	Mode
01	2412	802.11b/g/n_HT20
. .	. .	. .
07	2442	802.11b/g/n_HT20
. .	. .	. .
13	2472	802.11b/g/n_HT20

Note.
1. This test report is prepared according to the requirements of ISO/IEC 17025.

2. Summary of Tests

Rule Section	Parameter	Test results
Article2, Paragraph 1, Item 19	Frequency Tolerance	Pass
	Occupied Bandwidth	Pass
	Spread Bandwidth & Factor	Pass
	RF Output Power	Pass
	Transmitter Spurious Emission	Pass
	Receiver Spurious Emission	Pass
	Anti-Interference	Pass
	Transmission Antenna Gain (EIRP Antenna Power)	N/A Note.1
	Transmission Radiation Angle Width (3dB Beam width)	N/A Note.1
	Carrier sense capability	N/A Note.2

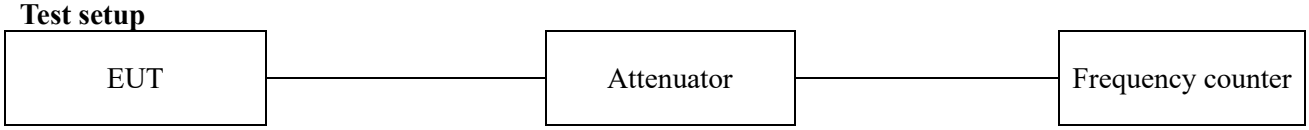
Note.

1. This test item will not be applied to the Antenna power (EIRP) of 12.14dBm/MHz or less.
2. The test only required for bandwidth more than 26MHz and less than 38MHz.

3. Test Results

3.1. Frequency Tolerance

Test setup



Limit

Permission deviation ±50 x 10^{-6}

Test results

Mode: 802.11b

Test voltage (%)	Test voltage (V)	Frequency (㎒)	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (ppm)
90	AC 90	2 412	2 412.033419	33 419	13.86
		2 442	2 442.035621	35 621	14.59
		2 472	2 472.014692	14 692	5.94
100	AC 100	2 412	2 412.034053	34 053	14.12
		2 442	2 442.036125	36 125	14.79
		2 472	2 472.014835	14 835	6.00
110	AC 110	2 412	2 412.034981	34 981	14.50
		2 442	2 442.036398	36 398	14.90
		2 472	2 472.014894	14 894	6.03

Mode: 802.11g

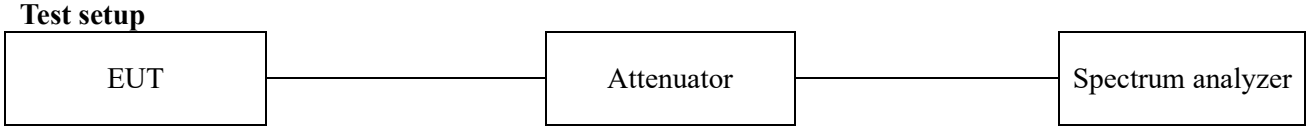
Test voltage (%)	Test voltage (V)	Frequency (㎒)	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (ppm)
90	AC 90	2 412	2 412.033672	33 672	13.96
		2 442	2 442.036791	36 791	15.07
		2 472	2 472.037619	37 619	15.22
100	AC 100	2 412	2 412.033987	33 987	14.09
		2 442	2 442.036910	36 910	15.11
		2 472	2 472.037982	37 982	15.36
110	AC 110	2 412	2 412.034075	34 075	14.13
		2 442	2 442.037279	37 279	15.27
		2 472	2 472.037193	37 193	15.05

Mode: 802.11n(HT20)

Test voltage (%)	Test voltage (V)	Frequency (㎒)	Measure frequency (㎒)	Frequency deviation (㎐)	Deviation (ppm)
90	AC 90	2 412	2 412.032841	32 841	13.62
		2 442	2 442.034459	34 459	14.11
		2 472	2 472.036814	36 814	14.89
100	AC 100	2 412	2 412.032953	32 953	13.66
		2 442	2 442.034601	34 601	14.17
		2 472	2 472.037342	37 342	15.11
110	AC 110	2 412	2 412.032681	32 681	13.55
		2 442	2 442.034586	34 586	14.16
		2 472	2 472.037781	37 781	15.28

3.2. Occupied Bandwidth

Test setup



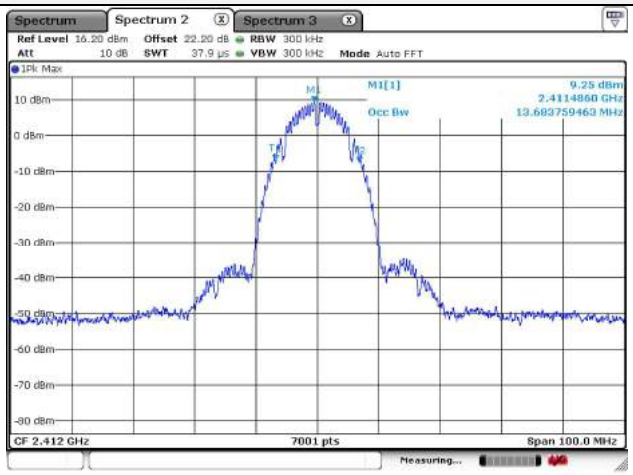
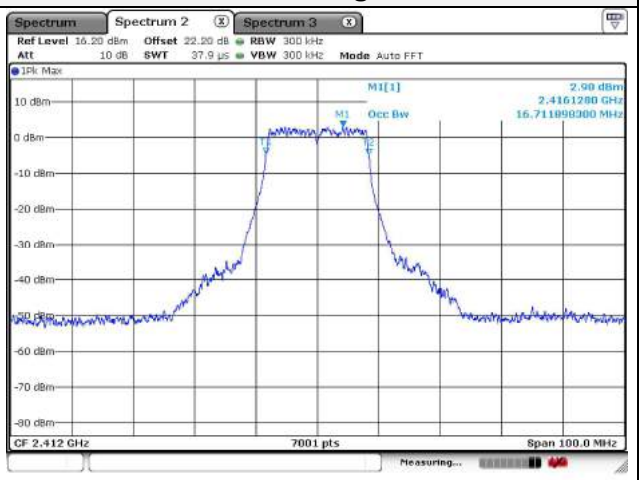
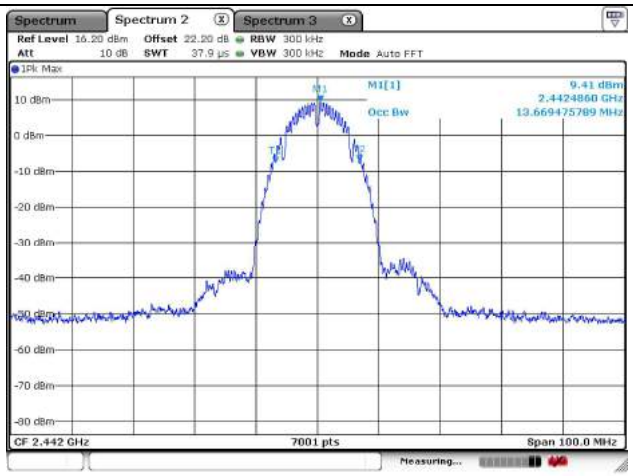
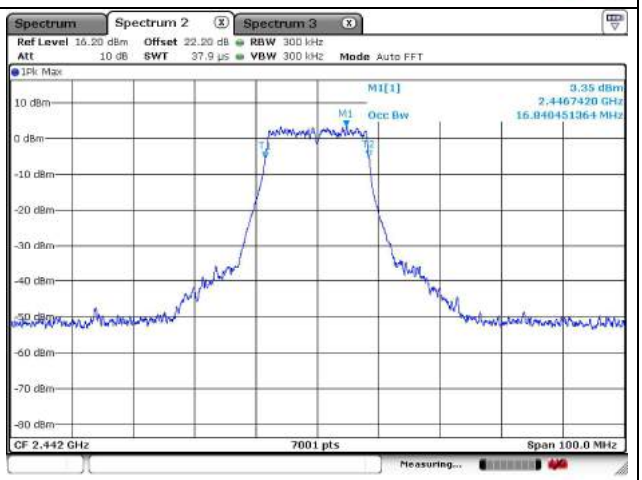
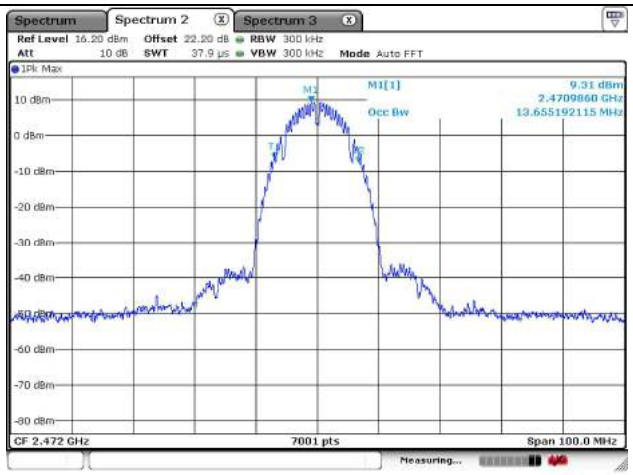
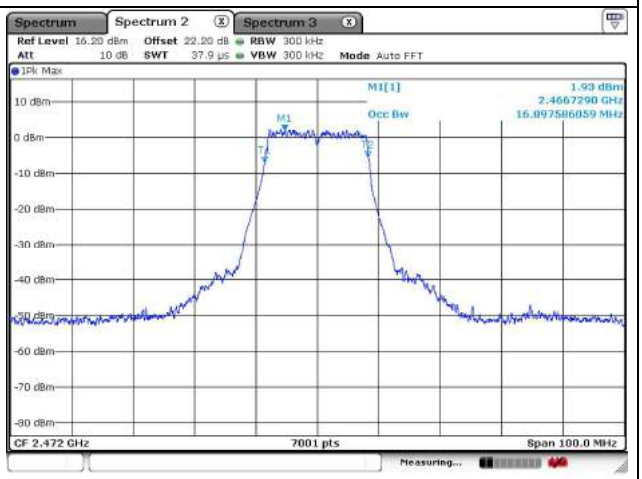
Limit

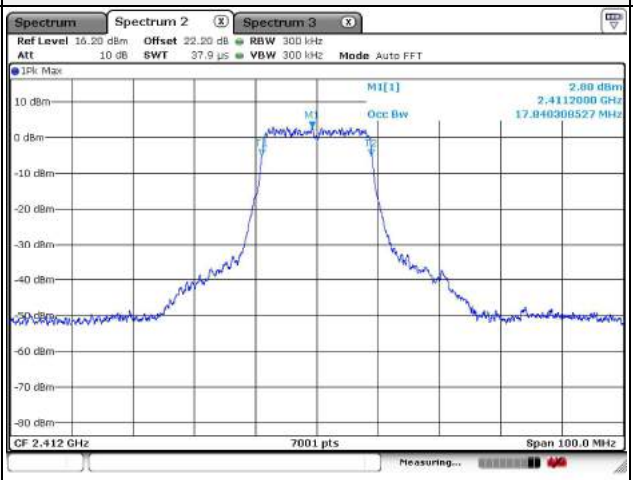
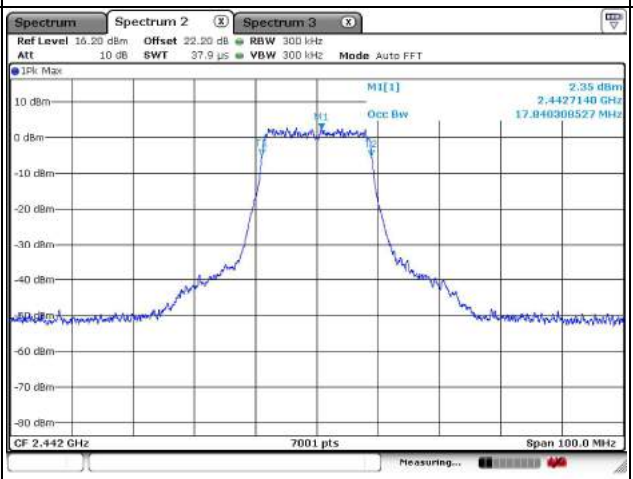
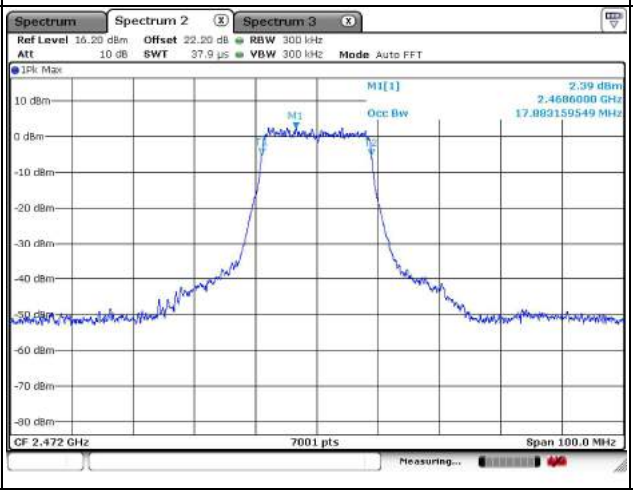
Equal or less than 26 ㎒

Test results

Test voltage (%)	Nominal Voltage(V)	Test mode	Occupied Bandwidth (㎒)		
			Frequency (2 412 ㎒)	Frequency (2 442 ㎒)	Frequency (2 472 ㎒)
90	AC 90	802.11b	13.68	13.67	13.64
		802.11g	16.70	16.81	16.90
		802.11n	17.83	17.79	17.88
100	AC 100	802.11b	13.68	13.67	13.66
		802.11g	16.71	16.84	16.90
		802.11n	17.84	17.84	17.88
110	AC 110	802.11b	13.68	13.67	13.65
		802.11g	16.69	16.84	16.89
		802.11n	17.84	17.83	17.89

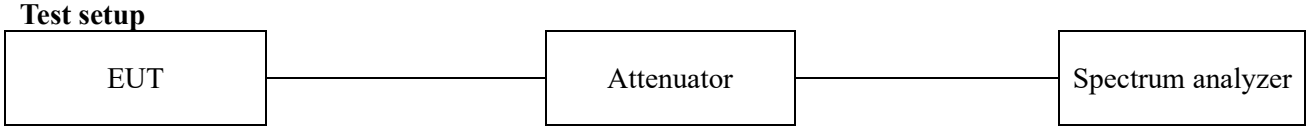
Test plots

	802.11b	802.11g
F1		
F2		
F3		

	802.11n	-
F1		-
F2		-
F3		-

3.3. Spread Bandwidth & Factor

Test setup



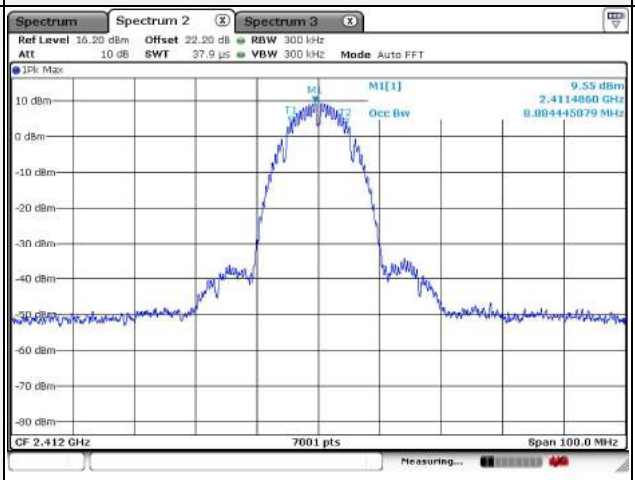
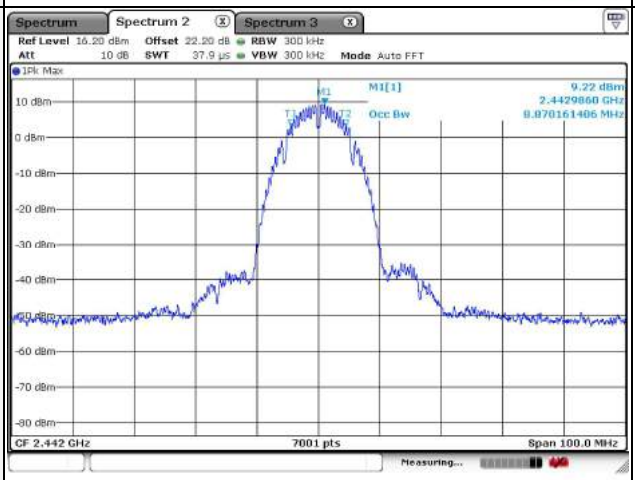
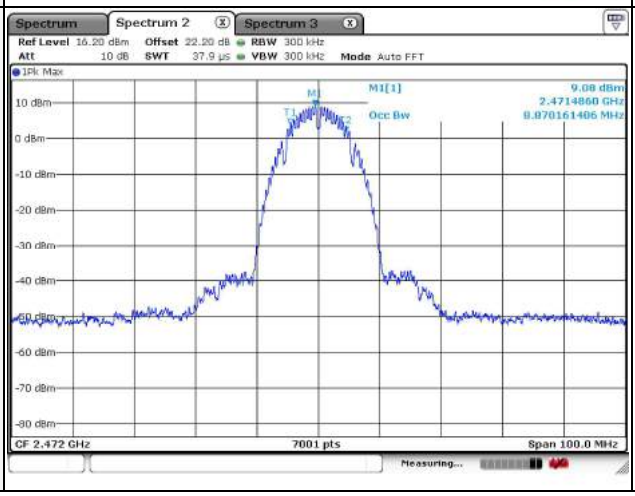
Limit
500 ㎑ or over

Note.
1. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
2. Spread Spectrum Factor limit is greater than 5.

Test results

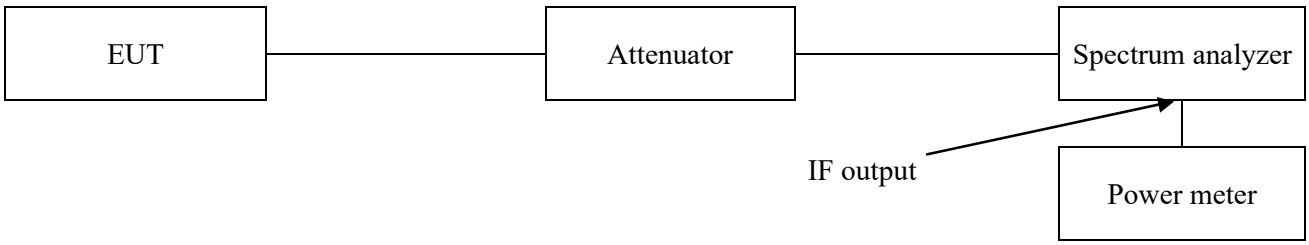
Test voltage (%)	Nominal Voltage(V)	Test mode	Spread Bandwidth (㎒)		
			Frequency (2 412 ㎒)	Frequency (2 442 ㎒)	Frequency (2 472 ㎒)
90	AC 90	802.11b	8.88	8.87	8.87
100	AC 100		8.88	8.87	8.87
110	AC 110		8.88	8.86	8.87
Spread Factor = 8.86 / 1.375 = 6.44					

Test plots

	802.11b	-
F1		-
F2		-
F3		-

3.4. RF Output Power

Test setup



Limit

Test Item	Limit
Antenna Power Density	10 ㎽/㎒
EIRP Power Density	12.14 ㏈m/㎒

Note.
Antenna Power Error : +20%, -80% ; base on manufacturer declare antenna power density

Rate power
802.11 b: 10 ㎽/㎒ (Upper : 2 ㎽/㎒, Lower : 12 ㎽/㎒)
802.11 g, n(HT20): 3 ㎽/㎒ (Upper : 0.6 ㎽/㎒, Lower : 3.6 ㎽/㎒)

Test results
Mode: 802.11b

Test voltage (%)	Nominal Voltage (V)	Frequency (㎒)	Output power (㏈m/㎒)	E.I.R.P (㏈m/㎒)	Output power (㎽/㎒)	Deviation (%)
90	AC 90	2 412	8.41	7.82	6.93	-30.66
		2 442	8.84	8.25	7.66	-23.44
		2 472	8.53	7.94	7.13	-28.71
100	AC 100	2 412	8.58	7.99	7.21	-27.89
		2 442	8.98	8.39	7.91	-20.93
		2 472	8.64	8.05	7.31	-26.89
110	AC 110	2 412	8.63	8.04	7.29	-27.05
		2 442	9.11	8.52	8.15	-18.53
		2 472	8.77	8.18	7.53	-24.66

Mode: 802.11g

Test voltage (%)	Nominal Voltage (V)	Frequency (㎒)	Output power (dBm/㎒)	E.I.R.P (dBm/㎒)	Output power (㎽/㎒)	Deviation (%)
90	AC 90	2 412	1.14	0.55	1.30	-56.66
		2 442	1.18	0.59	1.31	-56.26
		2 472	1.06	0.47	1.28	-57.45
100	AC 100	2 412	1.17	0.58	1.31	-56.36
		2 442	1.20	0.61	1.32	-56.06
		2 472	1.09	0.50	1.29	-57.16
110	AC 110	2 412	1.19	0.60	1.32	-56.16
		2 442	1.21	0.62	1.32	-55.96
		2 472	1.12	0.53	1.29	-56.86

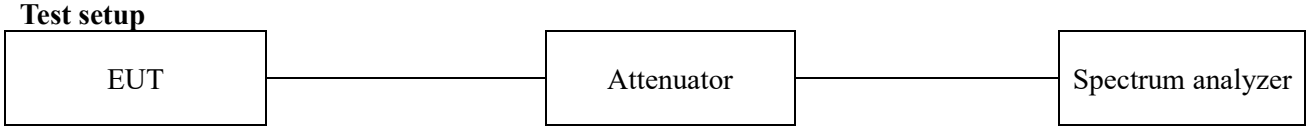
Mode: 802.11n(HT20)

Test voltage (%)	Nominal Voltage (V)	Frequency (㎒)	Output power (dBm/㎒)	E.I.R.P (dBm/㎒)	Output power (㎽/㎒)	Deviation (%)
90	AC 90	2 412	1.22	0.63	1.32	-56.00
		2 442	1.25	0.66	1.33	-55.67
		2 472	1.23	0.64	1.33	-55.67
100	AC 100	2 412	1.24	0.65	1.33	-55.67
		2 442	1.28	0.69	1.34	-55.33
		2 472	1.24	0.65	1.33	-55.67
110	AC 110	2 412	1.27	0.68	1.34	-55.33
		2 442	1.31	0.72	1.35	-55.00
		2 472	1.26	0.67	1.34	-55.33

Note.
1. Output power is the result which the Burst Ratio is calculated.
2. E.I.R.P : Output power data + Ant. Max peak gain
3. Antenna gain : -0.59 dBi

3.5. Transmitter Spurious Emissions

Test setup



Limit

1. Less than 2387 ㎒ : Equal or less than 2.5㎼/㎒ (≒ -26dBm)
2. 2387 ㎒ ~ 2400 ㎒ : Equal or less than 25㎼/㎒ (≒ -16dBm)
3. 2483.5 ㎒ ~ 2496.5 ㎒ : Equal or less than 25㎼/㎒ (≒ -16dBm)
4. More than 2496.5 ㎒ : Equal or less than 2.5㎼/㎒ (≒ -26dBm)

Test results

Test item: Less than 2387 ㎒

Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	2 385.30	-43.97
			2 442	2 364.60	-44.77
			2 472	2 357.80	-44.41
		802.11g	2 412	2 368.10	-44.56
			2 442	1 979.40	-45.12
			2 472	2 319.90	-44.33
		802.11n(HT20)	2 412	2 326.80	-44.14
			2 442	2 381.80	-44.59
			2 472	2 319.90	-45.11
100	AC 100	802.11b	2 412	2 378.40	-44.51
			2 442	2 368.10	-44.81
			2 472	2 347.40	-44.46
		802.11g	2 412	2 381.80	-45.25
			2 442	2 306.20	-44.98
			2 472	2 371.50	-45.25
		802.11n(HT20)	2 412	2 385.30	-43.14
			2 442	2 371.50	-43.91
			2 472	2 344.00	-45.17
110	AC 110	802.11b	2 412	2 381.80	-43.66
			2 442	2 361.20	-44.35
			2 472	2 354.30	-44.70
		802.11g	2 412	2 285.50	-45.04
			2 442	2 323.40	-44.60
			2 472	2 306.20	-44.97
		802.11n(HT20)	2 412	2 385.30	-44.47
			2 442	2 361.20	-44.48
			2 472	2 244.20	-44.54

Test item: 2387 ㎒ ~2400 ㎒

Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	2 399.65	-32.81
			2 442	2 390.75	-45.60
			2 472	2 389.70	-43.45
		802.11g	2 412	2 399.99	-18.83
			2 442	2 387.76	-44.33
			2 472	2 391.24	-43.85
		802.11n(HT20)	2 412	2 399.99	-18.92
			2 442	2 390.77	-44.28
			2 472	2 396.38	-43.64
100	AC 100	802.11b	2 412	2 397.33	-30.44
			2 442	2 396.49	-44.25
			2 472	2 388.78	-43.40
		802.11g	2 412	2 399.99	-18.02
			2 442	2 394.38	-43.82
			2 472	2 391.86	-43.51
		802.11n(HT20)	2 412	2 399.99	-18.10
			2 442	2 398.02	-43.32
			2 472	2 390.60	-43.89
110	AC 110	802.11b	2 412	2 399.13	-33.20
			2 442	2 395.16	-45.54
			2 472	2 389.55	-43.22
		802.11g	2 412	2 399.99	-18.55
			2 442	2 389.08	-44.80
			2 472	2 394.93	-43.64
		802.11n(HT20)	2 412	2 399.99	-19.42
			2 442	2 399.65	-44.30
			2 472	2 387.33	-43.86

Test item: 2483.5 ㎒ ~ 2496.5 ㎒

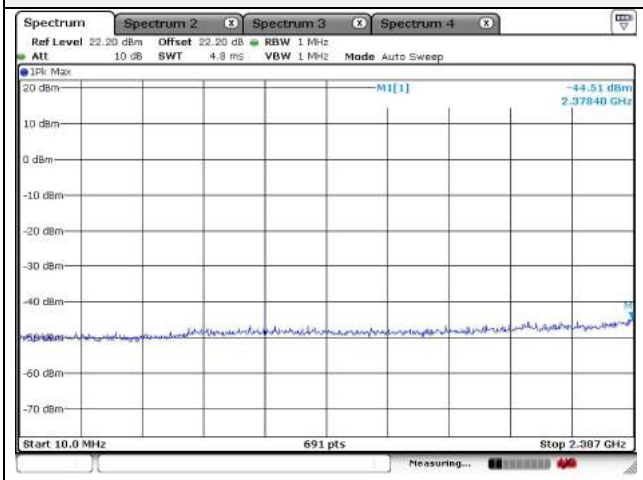
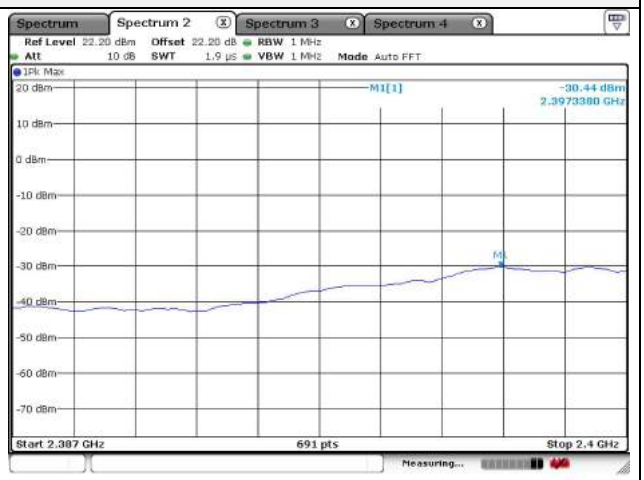
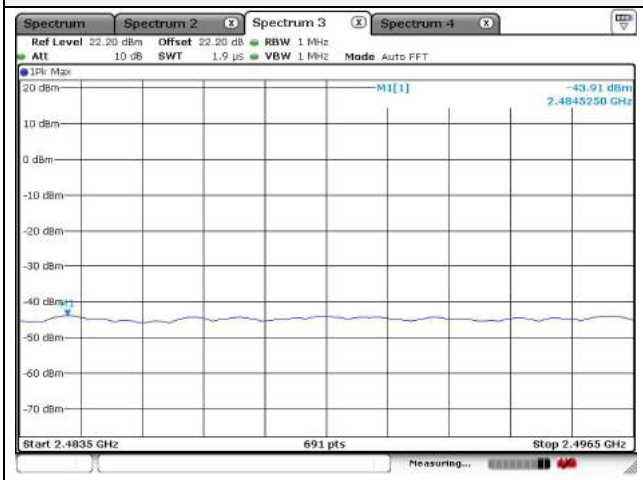
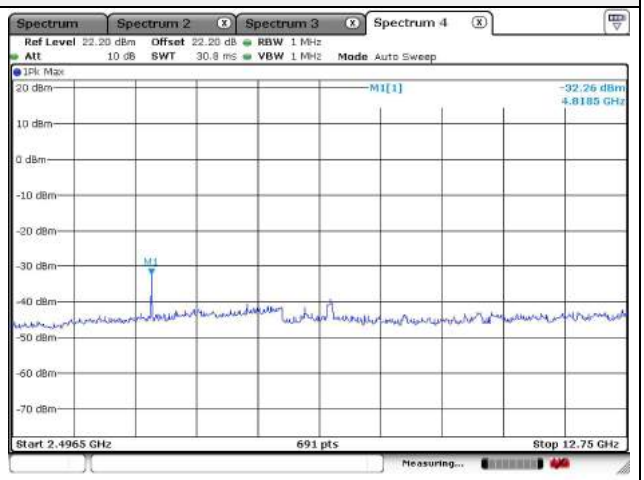
Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	2 487.16	-43.84
			2 442	2 393.44	-44.56
			2 472	2 483.96	-33.79
		802.11g	2 412	2 485.58	-43.28
			2 442	2 484.92	-44.42
			2 472	2 483.51	-20.64
		802.11n(HT20)	2 412	2 492.33	-43.91
			2 442	2 484.19	-43.27
			2 472	2 483.51	-18.58
100	AC 100	802.11b	2 412	2 484.53	-43.91
			2 442	2 490.41	-44.44
			2 472	2 486.14	-33.66
		802.11g	2 412	2 490.75	-43.05
			2 442	2 484.04	-44.19
			2 472	2 483.51	-20.12
		802.11n(HT20)	2 412	2 484.51	-43.82
			2 442	2 489.57	-43.44
			2 472	2 483.51	-18.01
110	AC 110	802.11b	2 412	2 492.09	-43.27
			2 442	2 391.83	-43.58
			2 472	2 483.51	-33.44
		802.11g	2 412	2 395.14	-44.14
			2 442	2 484.92	-44.35
			2 472	2 483.51	-20.28
		802.11n(HT20)	2 412	2 484.68	-43.70
			2 442	2 483.87	-44.46
			2 472	2 483.51	-18.27

Test item: More than 2496.5 ㎒

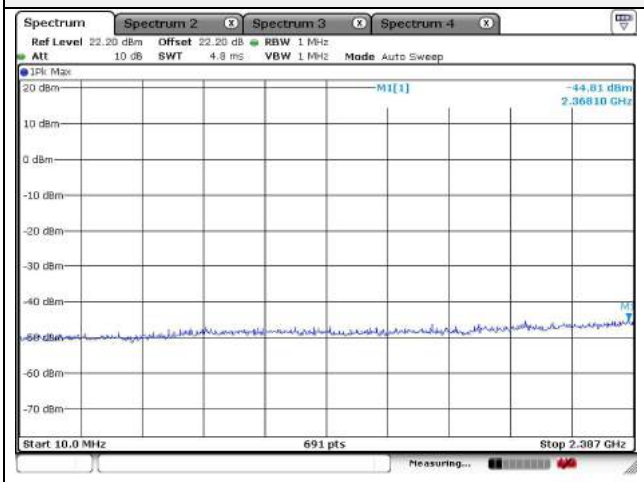
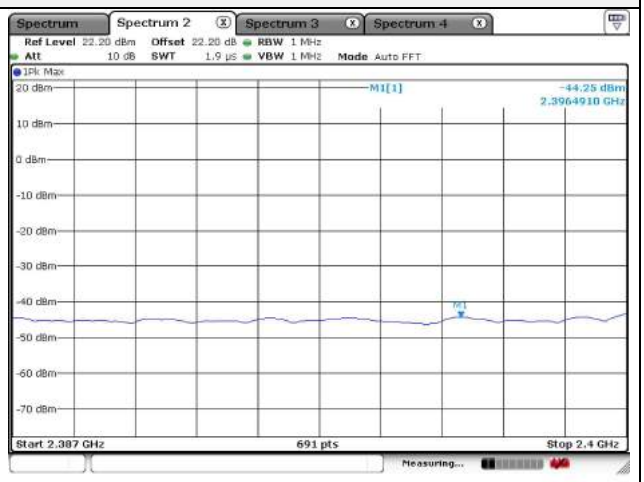
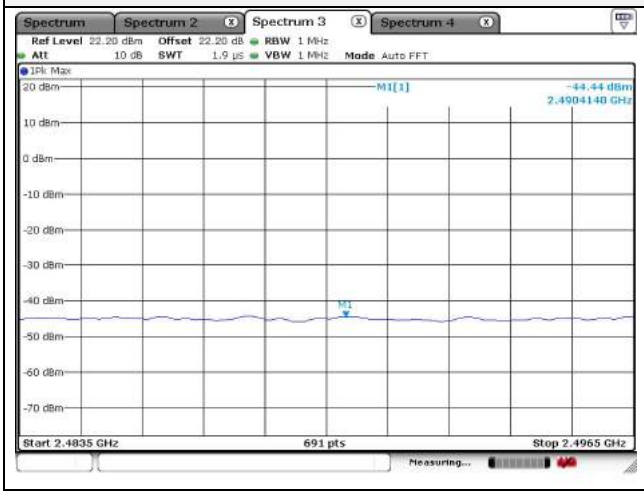
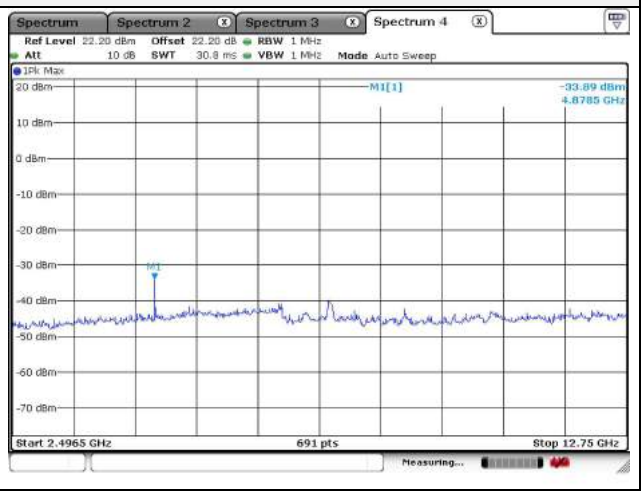
Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	4 818.50	-31.94
			2 442	4 878.50	-34.16
			2 472	4 937.50	-36.28
		802.11g	2 412	7 786.50	-39.85
			2 442	7 786.50	-38.52
			2 472	7 771.50	-40.30
		802.11n(HT20)	2 412	4 818.50	-39.80
			2 442	7 816.50	-39.96
			2 472	7 816.50	-40.17
100	AC 100	802.11b	2 412	4 818.50	-32.26
			2 442	4 878.50	-33.89
			2 472	4 937.50	-35.57
		802.11g	2 412	7 786.50	-39.41
			2 442	7 786.50	-39.32
			2 472	7 786.50	-39.59
		802.11n(HT20)	2 412	4 818.50	-39.38
			2 442	7 801.50	-40.10
			2 472	7 830.50	-39.97
110	AC 110	802.11b	2 412	4 818.50	-32.89
			2 442	4 878.50	-33.88
			2 472	4 937.50	-35.96
		802.11g	2 412	7 786.50	-39.60
			2 442	7 816.50	-39.62
			2 472	7 786.50	-39.59
		802.11n(HT20)	2 412	4 818.50	-39.54
			2 442	7 830.50	-39.48
			2 472	7 816.50	-40.95

Test plots

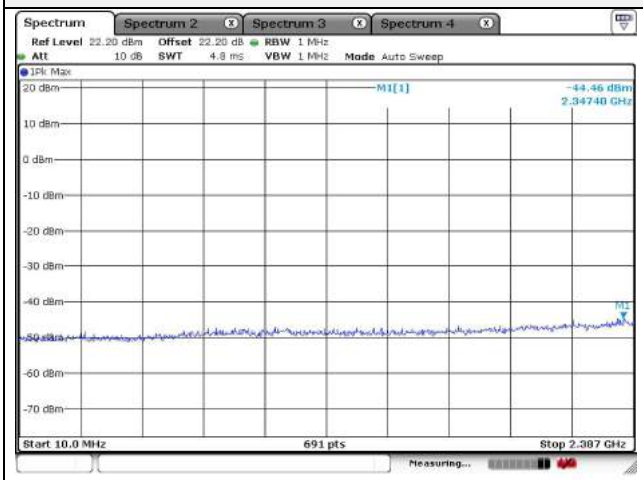
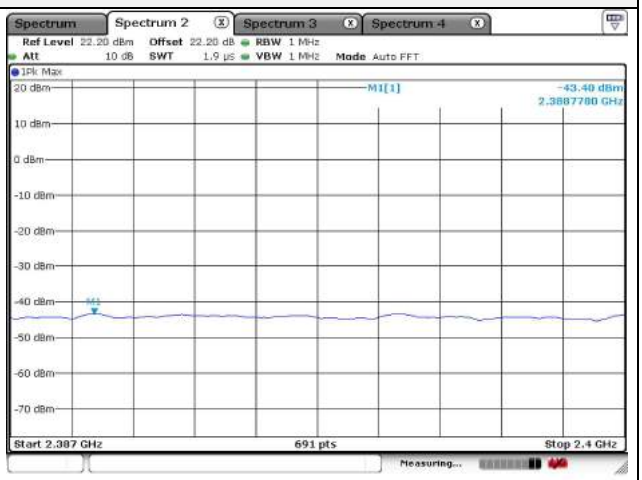
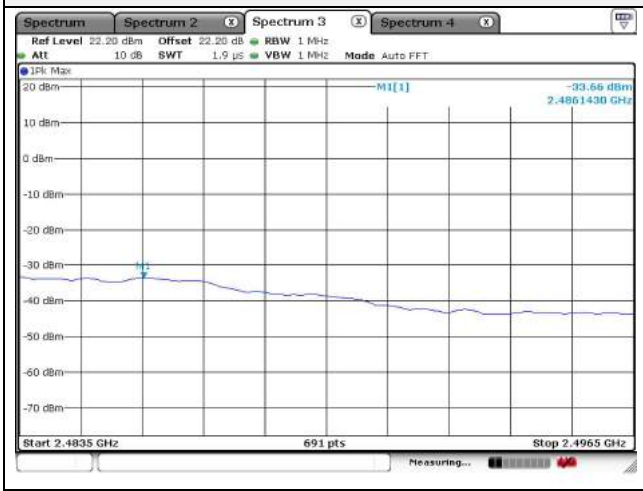
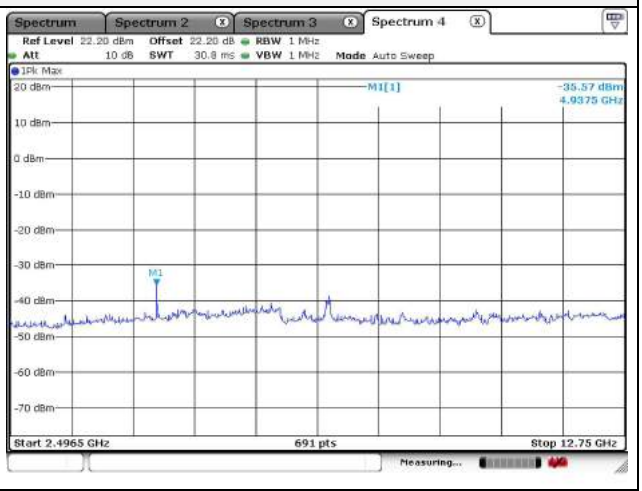
802.11b – F1

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

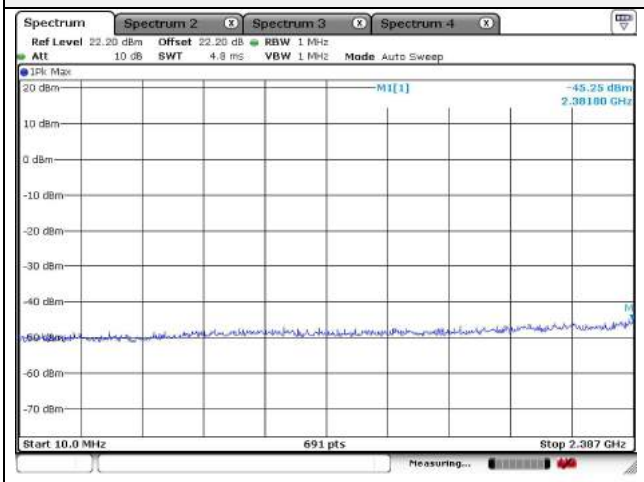
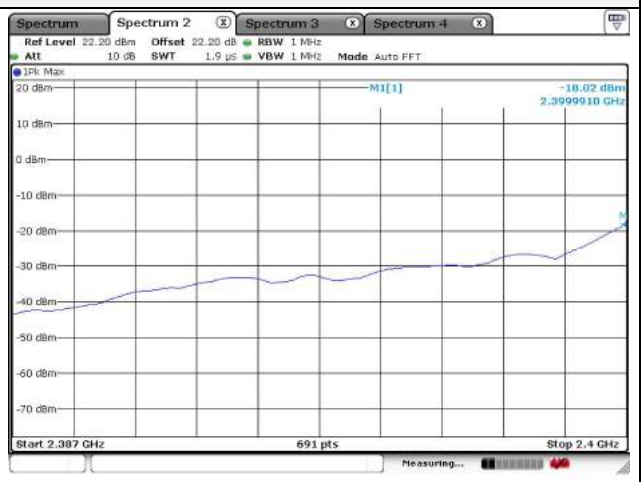
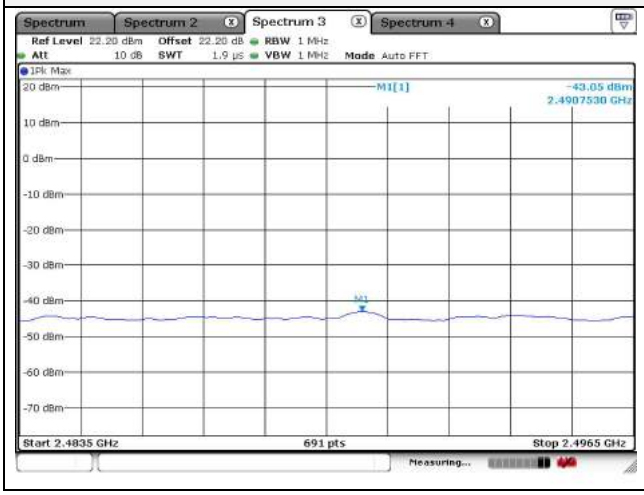
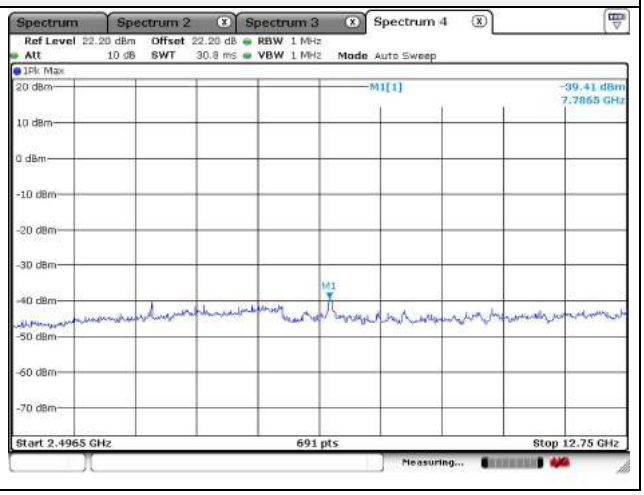
802.11b – F2

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

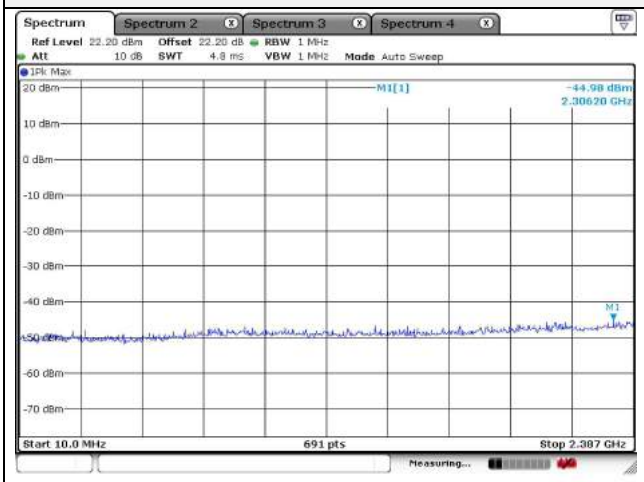
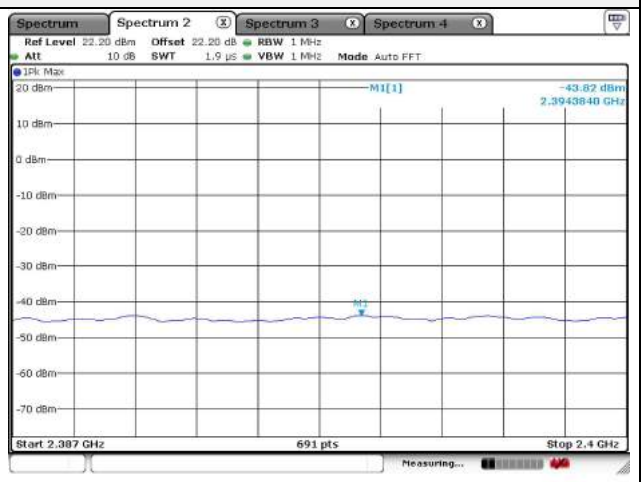
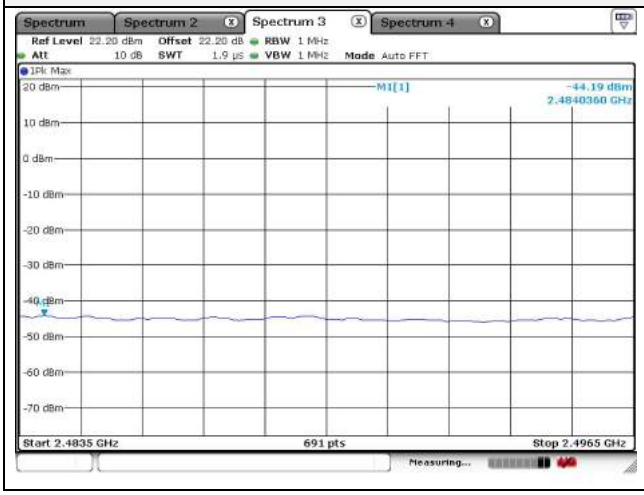
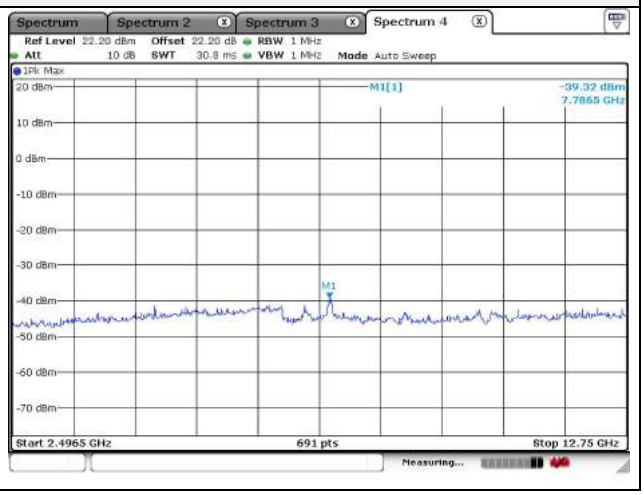
802.11b – F3

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

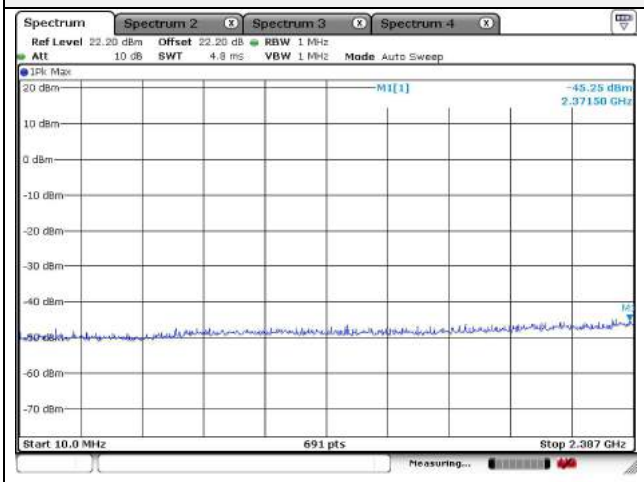
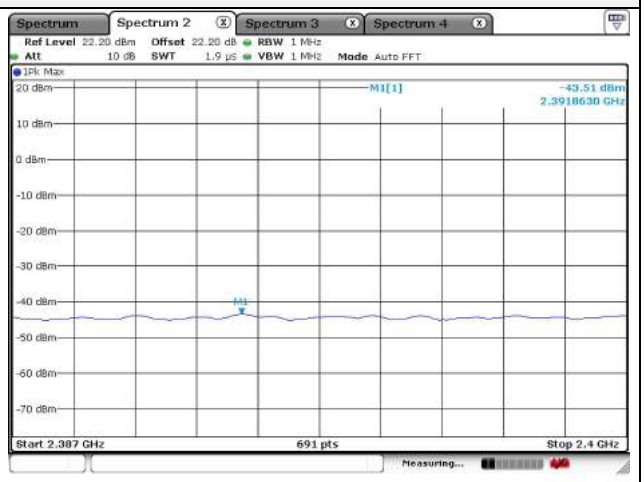
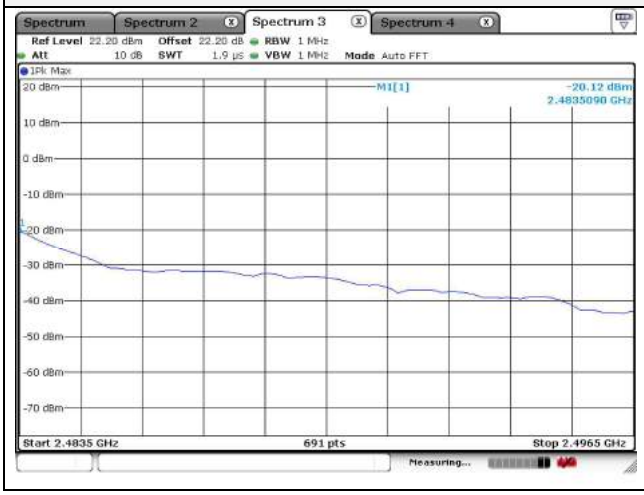
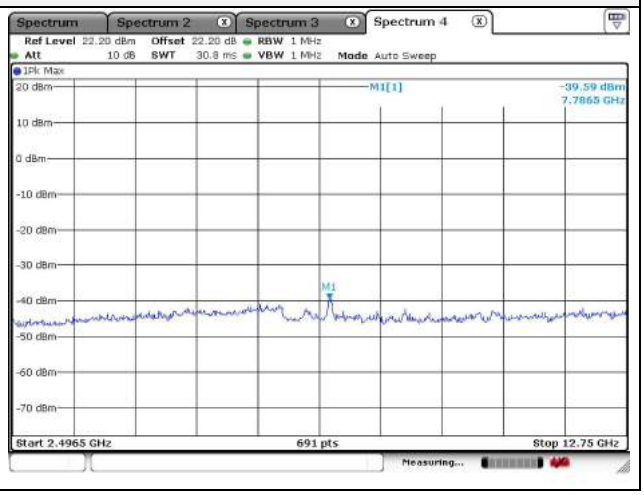
802.11g – F1

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

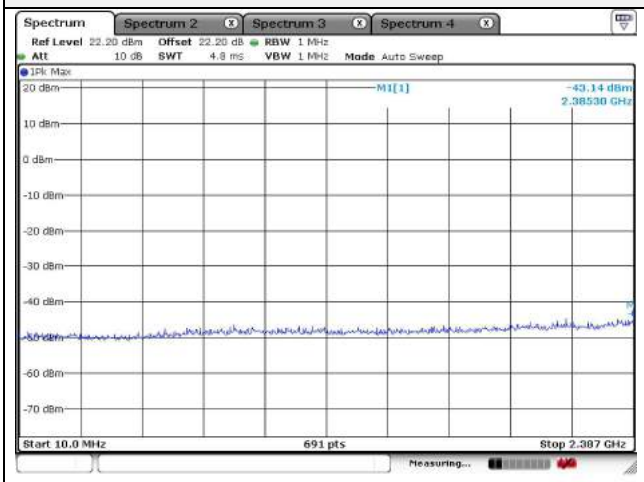
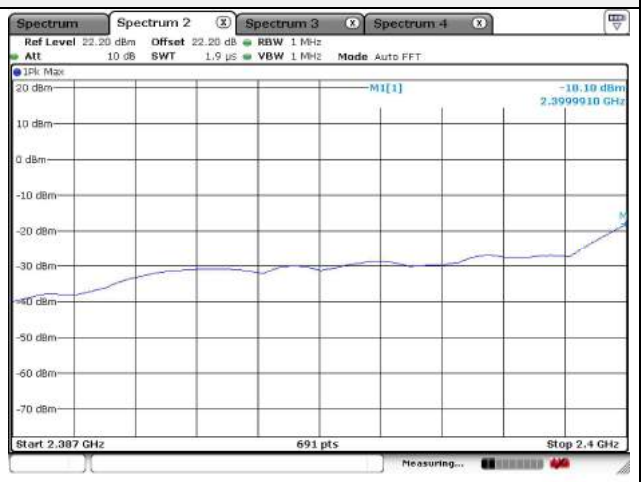
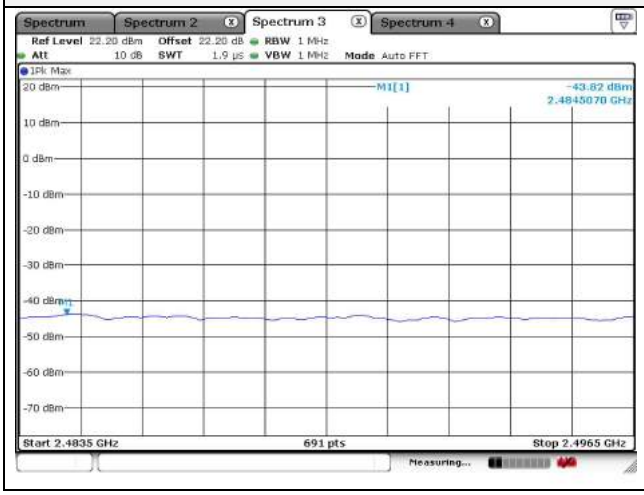
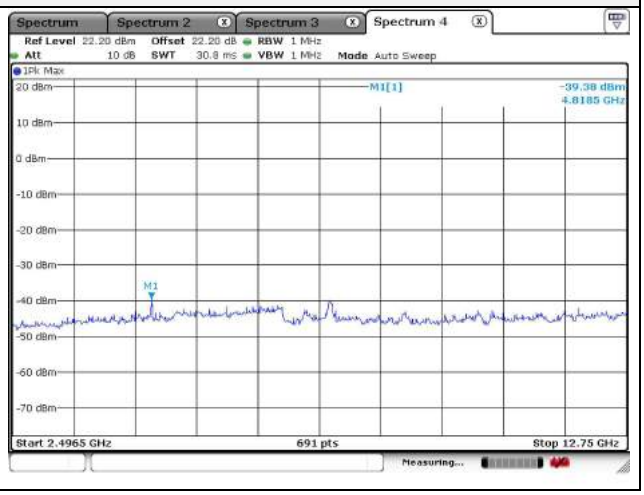
802.11g – F2

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

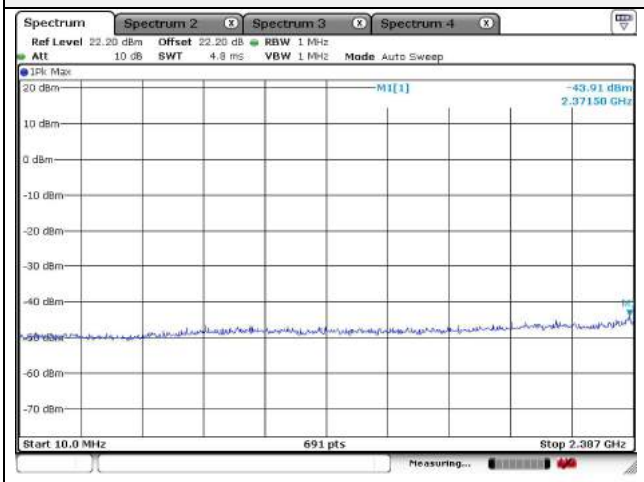
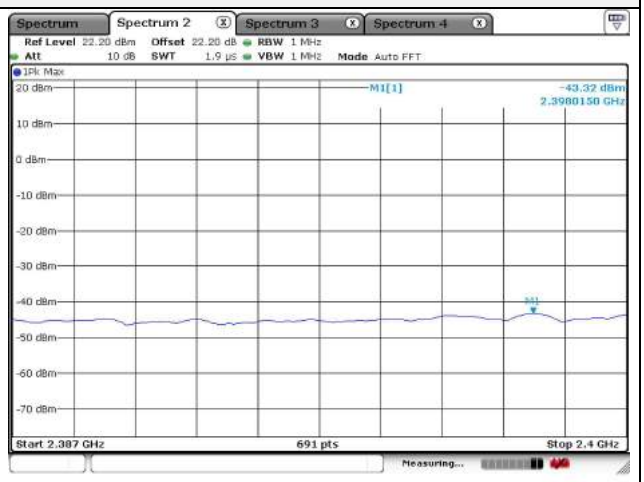
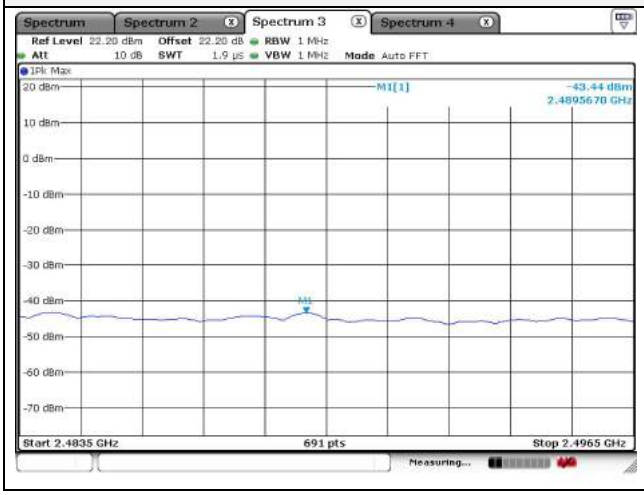
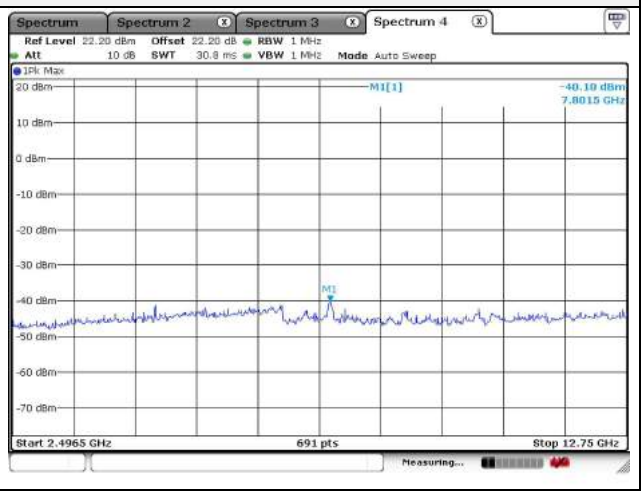
802.11g – F3

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

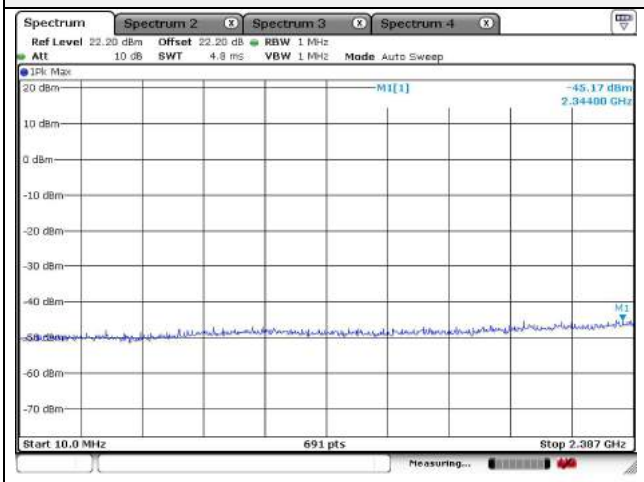
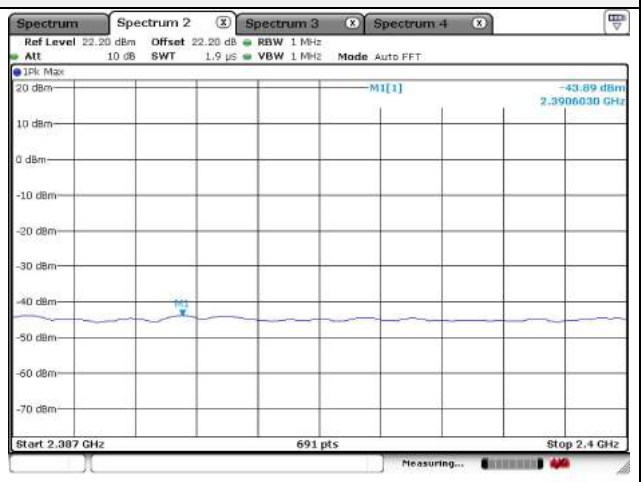
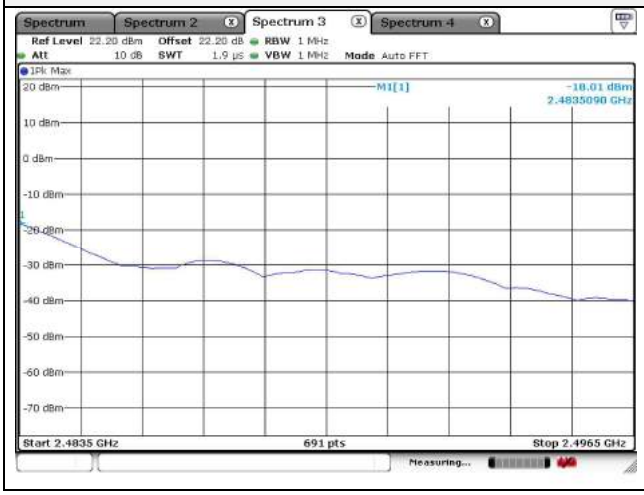
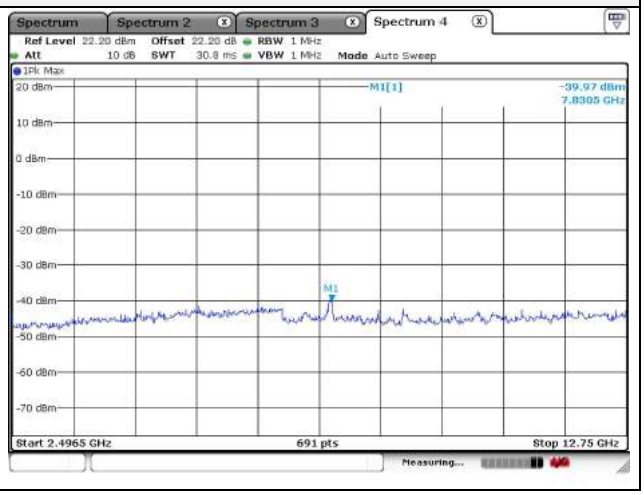
802.11n_HT20 – F1

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

802.11n_HT20 – F2

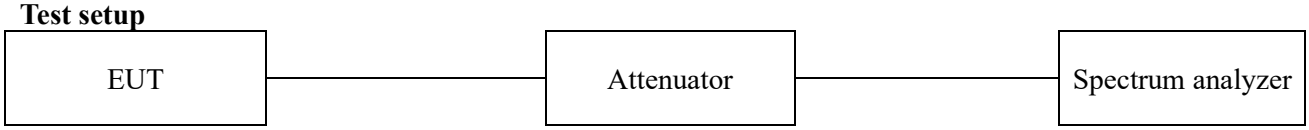
Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

802.11n_HT20 – F3

Less than 2387 MHz	2387 MHz ~ 2400 MHz
	
2483.5 MHz ~ 2496.5 MHz	**More than 2496.5 MHz**
	

3.6. Receiver Spurious Emissions

Test setup



Limit

1. Less than 1㎓ : Equal or less than 4 ㎼(≒ -53.98 dBm)
2. 1㎓ ~ less than 12.75 ㎓ : Equal or less than 20 ㎼(≒ -46.99 dBm)

Test results

Test item: Less than ~ 1 ㎓

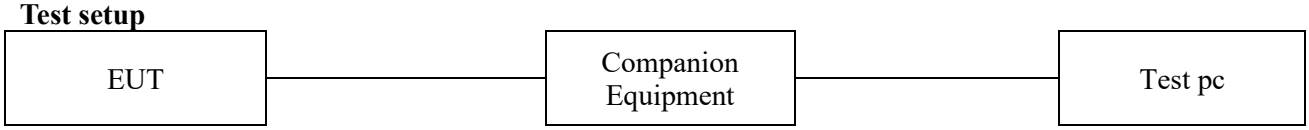
Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	23.60	-66.18
			2 442	23.60	-66.23
			2 472	23.60	-65.37
		802.11g	2 412	23.60	-66.47
			2 442	23.60	-67.23
			2 472	23.60	-67.07
		802.11n(HT20)	2 412	23.60	-66.37
			2 442	23.60	-67.11
			2 472	23.60	-66.44
100	AC 100	802.11b	2 412	23.60	-66.42
			2 442	23.60	-66.91
			2 472	23.60	-66.00
		802.11g	2 412	23.60	-67.29
			2 442	23.60	-67.49
			2 472	23.60	-67.01
		802.11n(HT20)	2 412	23.60	-66.76
			2 442	23.60	-66.29
			2 472	23.60	-66.40
110	AC 110	802.11b	2 412	23.60	-67.39
			2 442	23.60	-67.23
			2 472	23.60	-67.43
		802.11g	2 412	23.60	-67.17
			2 442	23.60	-68.20
			2 472	23.60	-66.68
		802.11n(HT20)	2 412	23.60	-67.55
			2 442	23.60	-66.17
			2 472	23.60	-66.74

Test item: 1 ㎓ ~ less than 12.75 ㎓

Test voltage (%)	Nominal Voltage (V)	Mode	Frequency (㎒)	Measure frequency (㎒)	Level (dBm)
90	AC 90	802.11b	2 412	7 817.10	-72.43
			2 442	7 809.60	-72.70
			2 472	7 801.00	-72.62
		802.11g	2 412	7 820.30	-71.35
			2 442	7 817.10	-72.42
			2 472	7 801.00	-72.00
		802.11n(HT20)	2 412	7 789.30	-72.37
			2 442	7 806.40	-72.16
			2 472	7 778.60	-72.90
100	AC 100	802.11b	2 412	7 803.20	-72.45
			2 442	7 807.40	-72.85
			2 472	7 788.20	-72.58
		802.11g	2 412	7 801.00	-72.29
			2 442	7 807.40	-72.91
			2 472	7 803.20	-71.95
		802.11n(HT20)	2 412	7 807.40	-73.07
			2 442	7 794.60	-71.43
			2 472	7 808.50	-73.09
110	AC 110	802.11b	2 412	7 803.20	-72.54
			2 442	7 805.30	-72.08
			2 472	7 791.40	-72.45
		802.11g	2 412	7 817.10	-71.19
			2 442	7 814.90	-73.29
			2 472	7 809.60	-72.27
		802.11n(HT20)	2 412	7 793.60	-71.96
			2 442	7 821.30	-73.04
			2 472	7 807.40	-72.36

3.7. Anti-Interference Function

Test setup



Limit

The identification code shall be 48 bits long.

Test results

Test voltage (%)	Nominal Voltage (V)	Mode	Identification code	Verdict
100	AC 100	WiFi	48:46:C1:80:CC:50	Pass

Appendix A. Measurement Equipment

Equipment 24-2 paragraph4「ハ」	Manufacturer	Model	Serial No.	Calibration interval	Calibration due.
Spectrum Analyzer	R&S	FSV30	101389	1 year	2020.01.16
8360B Series Swept Signal Generator	HP	83630B	3844A00786	1 year	2020.01.15
Power Meter	Anritsu	ML2495A	1438001	1 year	2020.01.15
Pulse Power Sensor	Anritsu	MA2411B	1339205	1 year	2020.01.15
Attenuator	HP	8495B	110504721	1 year	2020.01.15
Frequency Counter	HP	5352B	3049A01336	1 year	2020.01.15
AC Power Supply	HP	6813A	3729A00754	1 year	2020.01.15

Peripheral devices

Device	Manufacturer	Model No.	Serial No.
Notebook Computer	Samsung Electronics Co., Ltd.	NP-QX411-W01UB	HJV993BB905283V