Japan Radio Test Report

Project No.	:	2204C241B
Equipment	:	4MP Outdoor Full-Color Wi-Fi Bullet Network Camera
Brand Name	:	tp-link
Test Model	:	VIGI C340-W
Series Model	:	N/A
Applicant	:	TP-Link Corporation Limited
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer	:	TP-Link Corporation Limited
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Factory	:	TP-LINK Technologies Co., Ltd. Guangming Science & Technology Park Branch
Address	:	TP-LINK Guangming Science & Technology Park, Western Section, High Tech Park, Guangming District, Shenzhen, Guangdong Province, P.R.China
Date of Receipt	:	Nov. 08, 2022
Date of Test	:	Nov. 23, 2022 ~ Dec. 30, 2022
Issued Date	:	Jan. 03, 2023
Report Version	:	R00
Test Sample	:	Engineering Sample No.: DG2022112279 for carrier sense capability, DG2022112278 for others.
Standard(s)	:	Ordinance Regulating Radio Equipment General Provisions, Transmitting Equipment, Receiving Equipment, Article 49-20
Test Procedure	:	Test Method Specified Radio Equipment Article 2 Paragraph 1 of item19

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.(Dongguan).

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.
Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-JPAP-1-2204C241B	R00	This is a supplementary report to the original test report (BTL-JPAP-1-2204C241A). Based on original report, 1. Changed the CPU and sensor chip, so the worst of antenna power tolerance is verified. It is found that the original data is the worst. 2. Opened HT40 mode by modifying software, so all test items of HT40 mode are evaluated and recorded. The original test results please refer to original report.	Jan. 03, 2023	Valid

Remark: For the original report (BTL-JPAP-1-2204C241A), the test data, data evaluation, and equipment configuration contained was accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

1. SUMMARY OF TEST RESULTS

Part	Description of Test	Rule Section	Result
3.1	Frequency Tolerance	Article 5, Table 1	Pass
3.2	Occupied Bandwidth (99%) / Spread-spectrum Bandwidth (90%) / Spreading Factor (diffusion rate)	Article 6, Table 2 & Article 49-20, Item1-h & 1-i	Pass
3.3	Unwanted Emission Intensity	Article 7, Table 3	Pass
3.4	Antenna Power Tolerance	Article 14	Pass
3.5	Limitation of Collateral Emission of Receiver	Article 24, Paragraph 2	Pass
3.6	Transmission Antenna Gain (EIRP Antenna Power)	Article 49-20, Item 1-e & 1-f	N/A
3.7	Transmission Radiation Angle Width (3dB Beamwidth)	Article 49-20, Item 1-f	N/A
3.8	Radio Interference Prevention Capability	Article 9-4, Item 9-C Article 6-2, Item 3 of the Regulation for Enforcement of the Radio Law	Good
3.9	Carrier Sense Capability	Article 49-20, Item1-k	Good
3.10	Construction Protection Confirmation	Article 49-20, Item1-a	Pass

Method of measurement:	MIC Notice No.88 Appendix No.43
Test condition:	Conductive, RF test program provided by the customer was used to control the operating channel as well as the output power level.

Abbreviations used in this test report are as follows:

NC:	Normal Condition
EC:	Extreme Condition
EUT:	Equipment Under Test
DS:	Direct spreading
FH:	Frequency hopping
OFDM:	Orthogonal frequency division multiplexing

1.1. TEST FACILITY

The test facilities used to collect the test data in this report:
TR13/TR17: No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong, China.

1.2. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Frequency Tolerance / 99% & 90% Bandwidth	$\pm 6.25\times10^{-7}$	Confidence levels of 95%
Antenna Power / TX-RX Emission	±0.5dB	Confidence levels of 95%
Transmission Antenna Gain	±3.72dB	Confidence levels of 95%
Carrier Sense Capability	±0.76dB	Confidence levels of 95%

1.3. TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Frequency Tolerance	24°C	62%	AC 100V/60Hz	Nicole Chen
Occupied Bandwidth (99%)	24°C	62%	AC 100V/60Hz	Nicole Chen
Unwanted Emission Intensity	24°C	62%	AC 100V/60Hz	Nicole Chen
Antenna Power Tolerance	24°C	62%	AC 100V/60Hz	Nicole Chen
Limitation of Collateral Emission of Receiver	24°C	62%	AC 100V/60Hz	Nicole Chen
Carrier Sense Capability	26°C	67.5%	AC 100V/60Hz	Kirito Li

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Equipment	4MP Outdoor Full-Color Wi-Fi Bullet Network Camera
Brand Name	tp-link
Test Model	VIGI C340-W
Series Model	N/A
Model Difference(s)	N/A
Hardware Version	1.0
Software Version	1.0.X
Power Source	DC voltage supplied from AC adapter. Model: T120100-2B1
Power Rating	I/P: 100-240V~ 50/60Hz 0.3A O/P: 12.0V ⎓ 1.0A
Operation Frequency	2412 MHz ~ 2472 MHz
Modulation Technology	IEEE 802.11b:DSSS IEEE 802.11g:OFDM IEEE 802.11n:OFDM
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 300 Mbps
Occupied Bandwidth	36.20 MHz
Antenna Power (Rated Power)	IEEE 802.11n(HT40): 4.91 mW/MHz
Antenna Power (Max. Conducted Power)	IEEE 802.11n(HT40): 4.9091 mW/MHz

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2. Channel List:

CH01 - CH13 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20) CH03 - CH11 for IEEE 802.11n(HT40)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

3. Table for Filed Antenna:

Ant.	Brand	P/N	Antenna Type	Connector	Gain (dBi)
1	tp-link	3101504051	Dipole	Weld	2
2	tp-link	3101504051	Dipole	Weld	2

Note:

1) The EUT supports CDD (Except IEEE 802.11b mode). Physically, the EUT provides two completed transmitters and receivers (2T2R).
2) Both Ant.1 and Ant.2 had been pre-tested and found the Ant.1 power is the highest and worst, so only the data of Ant.1 with offset 3dB had been recorded
3) The antenna gain is provided by the manufacturer.

4. The worst case for 1TX/2TX as follow:

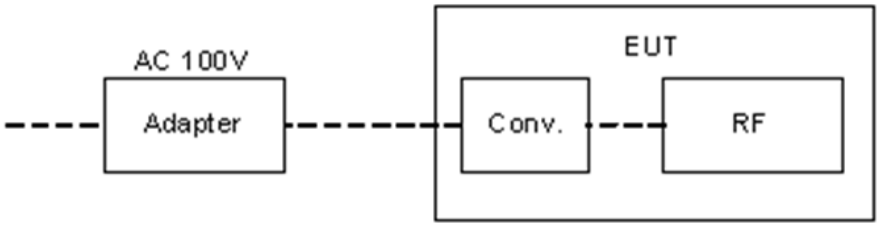
Operating Mode / TX Mode	1TX	2TX
IEEE 802.11b	V (Ant. 1/Ant. 2)	-
IEEE 802.11g	(Ant. 1/Ant. 2)	V (Ant. 1+Ant. 2)
IEEE 802.11n(HT20)	(Ant. 1/Ant. 2)	V (Ant. 1+Ant. 2)
IEEE 802.11n(HT40)	(Ant. 1/Ant. 2)	V (Ant. 1+Ant. 2)

2.2. DESCRIPTION OF TEST MODES

The EUT was tested while in a continuous transmitter / receiver mode.
The EUT was tuned to a low, middle and high channel for all tests.
The EUT continuously transmitted a modulated packet with payload, while transmitting the EUT was setup to operate at the intended maximum power output available to the end user.
For all test case pre/scans were completed in all modes to determine worst case levels.

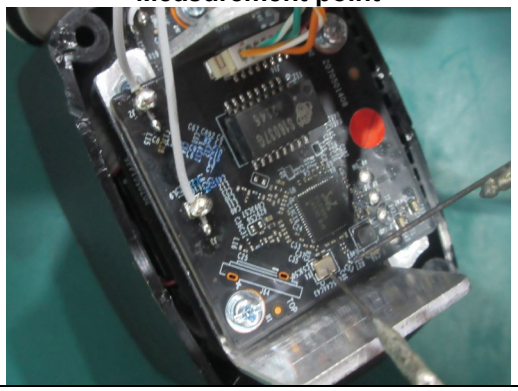
Test Mode	Description
Mode 1	IEEE 802.11n(HT40)/CH03,CH07,CH11

Power Supply Voltage Fluctuation Test



Voltage Fluctuation Test	Normal Voltage	High Voltage + 10% of Normal Voltage	Low Voltage - 10% of Normal Voltage
Input: AC Power	100V	110V	90V
Output: DC Power	1.284V	1.284V	1.284V
Voltage Variation (%)	-	0	0

Measurement point

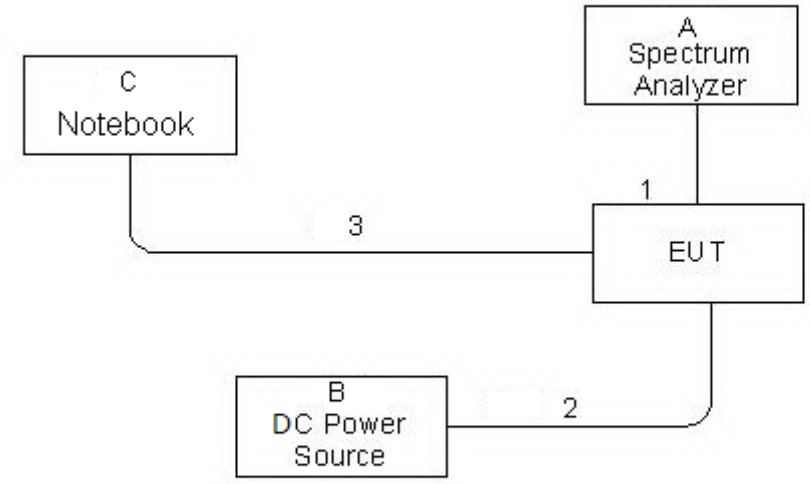


Note:

Voltage Variation (%)
= (Output High Voltage or Low Voltage - Output Normal Voltage)/Output Normal Voltage * 100

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/- 1%.
Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations.

2.3. BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	Spectrum Analyzer	R&S	FSP40	100185
B	DC Power Source	GW Instek	GPC-3030DN	EK880675
C	Notebook	DELL	N/A	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	RF Cable	YES	NO	0.1m
2	DC Power Cable	YES	NO	1.2m
3	Control Cable	NO	NO	1.1m

2.5. TABLE FOR PARAMETERS OF TEST SOFTWARE SETTING

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	IPOP_V4.0		
Frequency (MHz)	2422	2442	2462
IEEE 802.11n(HT40)	48	48	48

3. TEST RESULTS

3.1. FREQUENCY TOLERANCE MEASUREMENT

3.1.1. LIMIT

Item	Limits (See Article 5, Table1 of the Ordinance Regulating Radio Equipment)
Frequency Tolerance	≦±50ppm

3.1.2. SETTING

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Span	200kHz
RBW / VBW	10kHz / 10kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.1.3. TEST PROCEDURES

Test method which surpass to Claus 3 of Annex No.43 of MIC Notification No.88.

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm).
2. Set spectrum analyzer with condition in section 3.1.2 and tune reference level to observe receiving signal position.
3. Center Frequency: The center frequency of testing for EUT.
4. EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value, fc is declaring of channel frequency.
   Then the frequency error formula is $(fc-f)/fc\times10^6$ ppm and the limit is less than ±50ppm.

3.1.4. TEST SETUP LAYOUT

3.1.5. TEST DEVIATION

There is no deviation with the original standard.

3.1.6. EUT OPERATION DURING TEST

The EUT was programmed to be in un-modulation mode.

3.1.7. TEST RESULTS

Please refer to the Appendix A.

3.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT

3.2.1. LIMIT

Item	Limits (See Article 6, Table2 and Article 49-20, Item1-h,i of the Ordinance Regulating Radio Equipment)
Occupied Bandwidth	FHSS≦83.5MHz; OFDM, DSSS≦26MHz; Others≦26MHz 40MHz systems≦40 MHz
Spreading Bandwidth	≧500kHz (FHSS, DSSS)
Spreading Factor	≧5 , Operating Frequency 2400~2483.5MHz

3.2.2. SETTING

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Span	50MHz
RBW / VBW	300kHz / 300kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3. TEST PROCEDURES

Test method which surpass to Clause 4 of Annex No.43 of MIC Notification No.88.

1. Set spectrum analyzer with condition in section 3.2.2 and tune reference level to observe receiving signal position.
2. EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
5. Spread Spectrum Factor limit is greater than 5.

3.2.4. TEST SETUP LAYOUT

3.2.5. TEST DEVIATION

There is no deviation with the original standard.

3.2.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.2.7. TEST RESULTS

Please refer to the Appendix B.

3.3. UNWANTED EMISSION INTENSITY MEASUREMENT

3.3.1. LIMIT

Item	Limits (See Article 7, Table 3 of the Ordinance Regulating Radio Equipment)
TX Spurious Emission	≦0.25 μW/100kHz (30MHz≦f≦1000MHz)
	≦2.5 μW/MHz (1000MHz≦f<2387MHz; 2496.5MHz<f)
	≦25 μW/MHz (2387MHz≦f<2400MHz) and (2483.5MHz<f≦2496.5MHz)
Measurement range: 30MHz~5th harmonics	

3.3.2. SETTING

The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
RBW / VBW	100kHz / 100kHz (30~1000MHz) 1 MHz / 1 MHz (Above1000MHz)
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 TEST PROCEDURES

Test method which surpass to Clause 5 of Annex No.43 of MIC Notification No.88.

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Set spectrum analyzer with condition in section 3.3.2 and tune reference level to observe receiving signal position.
3. SA adjusted to start frequency 30MHz and stop frequency 1000MHz. Then to mark peak reading value + cable loss shall be less than 0.25μW/100kHz.
4. SA adjusted to start frequency 1000MHz and stop frequency 2387MHz. Then to mark peak reading value + cable loss shall be less than 2.5μW/MHz.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW/MHz.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz. Then to mark peak reading value + cable loss shall be less than 25μW/MHz.
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz. Then to mark peak reading value + cable loss shall be less than 2.5μW/MHz.
8. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like time domain power measurement as Result_Value.

3.3.4. TEST SETUP LAYOUT

3.3.5. TEST DEVIATION

There is no deviation with the original standard.

3.3.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

Note:
※ 1: Frequency Band 1 (30MHz≦f≦1000MHz)
※ 2: Frequency Band 2 (1000MHz≦f<2387MHz)
※ 3: Frequency Band 3 (2387MHz≦f<2400MHz)
※ 4: Frequency Band 4 (2483.5MHz<f≦2496.5MHz)
※ 5: Frequency Band 5 (2496.5MHz<f)

Band	1	2	3	4	5
Cable Loss(dB)	11	11	11	11	11

3.3.7. TEST RESULTS

Please refer to the Appendix C.

3.4. ANTENNA POWER TOLERANCE MEASUREMENT

3.4.1. LIMIT

Item	Limits (See Article 14 and 49-20 Item1-e of the Ordinance Regulating Radio Equipment)
Antenna Power Density	≦3mW/MHz (FHSS 2427~2470.75MHz) ≦10mW/MHz (OFDM, DSSS 2400~2483.5MHz) (20MHz systems) ≦5mW/MHz (OFDM, DSSS 2400~2483.5MHz) (40MHz systems) ≦10mW (Others 2400~2483.5MHz)
Antenna Power Tolerance	+20%, -80% (Base on manufacturer declare antenna power density)

3.4.2. SETTING

The following table is the setting of the spectrum analyzer.

Step 1:

Spectrum Parameter	Setting
Span	50MHz
RBW / VBW	1MHz / 3MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

Step 3:

Spectrum Parameter	Setting
Span	0MHz
RBW / VBW	1MHz / 1MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	60s

3.4.3. TEST PROCEDURES

Test method which surpass to Clause 6 of Annex No.43 of MIC Notification No.88.

1. Set spectrum analyzer with condition in section 3.4.2 Step 1 and tune reference level to observe receiving signal position.
2. When the trace is complete, find the peak value of the power envelope and record the frequency.
3. Set spectrum analyzer with condition in section 3.4.2 Step 3 and tune reference level to observe receiving signal position.
4. When the trace is complete, capture the trace, for example using the "View" option on the spectrum analyser. Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as the highest mean power (spectral power density) in a 1 MHz band.

3.4.4. TEST SETUP LAYOUT

3.4.5. TEST DEVIATION

There is no deviation with the original standard.

3.4.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.4.7. TEST RESULTS

Please refer to the Appendix D.

3.5. LIMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

3.5.1. LIMIT

Item	Limits (See Article 24, Paragraph 2 of the Ordinance Regulating Radio Equipment)
RX Spurious Emission	≦4 nW (-54 dBm) (f<1GHz)
	≦20 nW (-47 dBm) (1GHz≦f)
Measurement range: 30MHz~5th harmonics	

3.5.2. SETTING

The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
RBW / VBW	100kHz / 100kHz (30~1000MHz) 1 MHz / 1 MHz (Above1000MHz)
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

3.5.3 TEST PROCEDURES

Test method which surpass to Clause 7 of Annex No.43 of MIC Notification No.88.

1. EUT have the continuous reception mode and fixed only one channelize.
2. Set spectrum analyzer with condition in section 3.5.2 and tune reference level to observe receiving signal position.
3. SA set RBW: 100kHz and VBW: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW.
4. SA set RBW: 1MHz and VBW: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW.
5. If power level of lower emissions are more than 1/10 of limit (0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

3.5.4. TEST SETUP LAYOUT

3.5.5. TEST DEVIATION

There is no deviation with the original standard.

3.5.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously receiving mode.

Note:
※ 6: Frequency Band 6 (f<1GHz)
※ 7: Frequency Band 7 (1GHz≦f)

Band	6	7
Cable Loss(dB)	1	1

3.5.7. TEST RESULTS

Please refer to the Appendix E.

3.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

3.6.1. LIMIT

Item	Limits (See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)	
EIRP Power Density	☒	For an Omni-directional antenna: ≦6.91dBm/MHz (FHSS 2427~2470.75MHz) ≦12.14dBm/MHz (OFDM, DSSS 2400~2483.5MHz) (20MHz systems) ≦9.14dBm/MHz (OFDM 2400~2483.5MHz) (40MHz systems) ≦12.14dBm/MHz (Others 2400~2483.5MHz)
	☐	For a directional antenna: ≦16.91dBm/MHz (FHSS 2427~2470.75MHz) ≦22.14dBm/MHz (OFDM, DSSS 2400~2483.5MHz) (20MHz systems) ≦19.14dBm/MHz (OFDM 2400~2483.5MHz) (40MHz systems) ≦22.14dBm/MHz (Others 2400~2483.5MHz)

3.6.2. SETTING

The following table is the setting of spectrum analyzer.

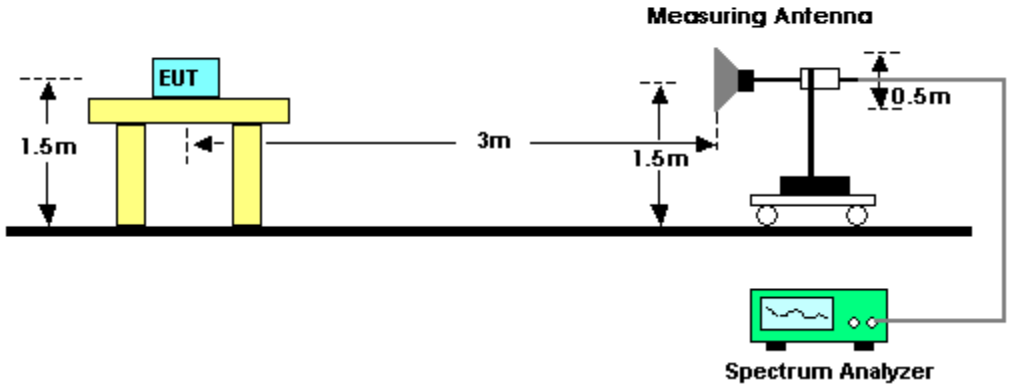
Spectrum Analyzer	Setting
Span	0MHz
RBW	1MHz
VBW	1MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	60s

3.6.3. TEST PROCEDURES

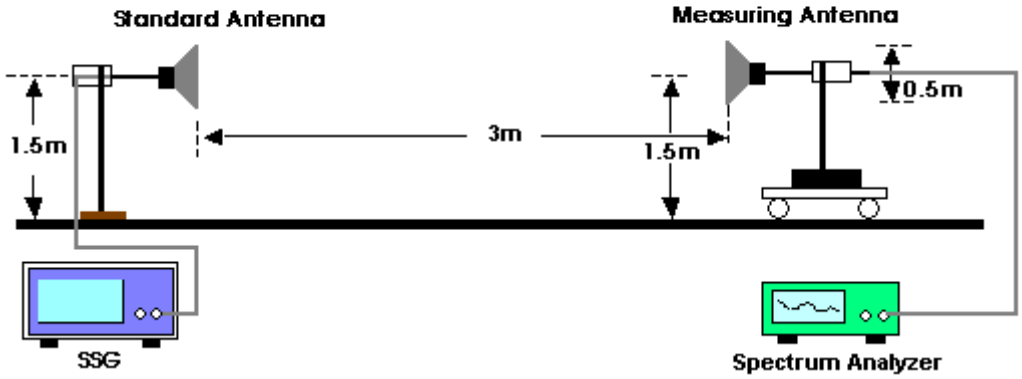
Please refer to 3.4.3 and the EIRP = Power Density + Gain.

3.6.4. TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



3.6.5. TEST DEVIATION

There is no deviation with the original standard.

3.6.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.6.7. RESULTS OF TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER)

Method of measurement:	See MIC Notice No.88 Appendix No.43 Clause 10
Results:	N/A

3.7. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

3.7.1. LIMIT

Item	Limits (See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)
3dB antenna beam width	360/A (if A<1; then A=1) A= {EIRP Power [mW]/16.36 for DSSS, OFDM}

3.7.2. SETTING

The following table is the setting of the spectrum analyzer.

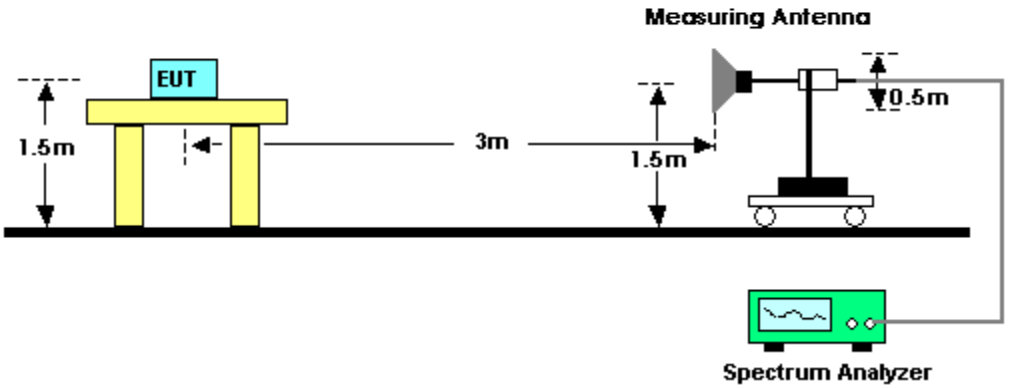
Spectrum Parameter	Setting
Span	0MHz
RBW	1MHz
VBW	1kHz
Y scale	5dB
Detector	Peak
Trace	Max Hold

3.7.3 TEST PROCEDURES

Test method which surpass to Clause 22 of Annex No.43 of MIC Notification No.88.

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 3.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”.
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).
   A = {EIRP Power [mW] / 16.36 for DSSS, OFDM}

3.7.4. TEST SETUP LAYOUT



3.7.5. TEST DEVIATION

There is no deviation with the original standard.

3.7.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.7.7. TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

Method of measurement:	See MIC Notice No.88 Appendix No.43 Clause 22
Results:	N/A

3.8. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

3.8.1. LIMIT

Item	Limits (See Article 9-4, Item9-C of the Ordinance Regulating Radio Equipment)
Identification code	≧48 bits

3.8.2. MEASURING ID CODE SOFTWARE

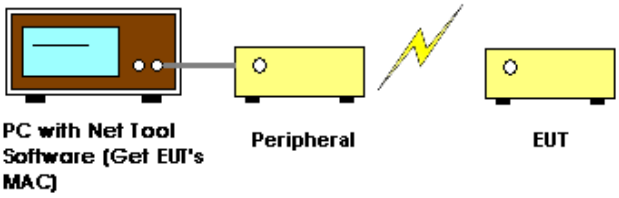
PC with Net Tool	Setting
MAC IP List	MAC Scan

3.8.3. TEST PROCEDURES

Test method which surpass to Clause 23 of Annex No.43 of MIC Notification No.88.

1. In the case that the EUT has the function of automatically transmitting the identification code:
   a. Transmit the predetermined identification codes form EUT.
   b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code:
   a. Transmit the predetermined identification codes form the counterpart.
   b. Check if communication is normal.
   c. Transmit the signals other than predetermined ID codes form the counterpart.
   d. Check if the EUT stops the transmission, or if it displays that idnetification codes are different from the predetermined ones.

3.8.4. TEST SETUP LAYOUT



3.8.5. TEST DEVIATION

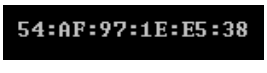
There is no deviation with the original standard.

3.8.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal mode.

3.8.7. TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

Test Power:	Normal Voltage
Test Mode:	IEEE 802.11b
Test Result:	Good (identification code: [54:AF:97:1E:E5:38])



3.9. CARRIER SENSE CAPABILITY MEASUREMENT

3.9.1. LIMIT

Item	Limits (See Article 49-20, Item1-k of the Ordinance Regulating Radio Equipment)
Carrier Sense	Good - EUT stop RF transmission signal after carrier inject to EUT. (On 22.79+Gr-20*log(f)[dBm] (Gr: dBi; f: MHz) or 100mV/m)
Remarks	This test item will be applied to OFDM, 40MHz systems

3.9.2. SETTING

The following table is the setting of the spectrum analyzer.

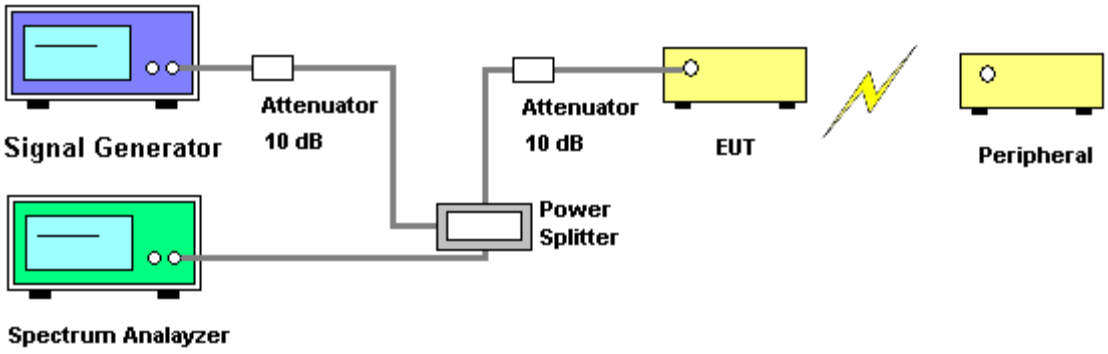
Spectrum Parameter	Setting
RBW / VBW	1MHz / 1MHz
Span	0MHz
Sweep	Continuous
Detector	Peak
Trigger mode	Video

3.9.3. TEST PROCEDURES

Test method which surpass to Clause 8 of Annex No.43 of MIC Notification No.88.

1. SSG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SSG and power level is (On 22.79+Gr-20*log(f) [dBm] (Gr: dBi; f: MHz). Then turn off the RF signal of SSG.
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. Set spectrum analyzer with condition in section 3.9.2 and tune reference level to observe receving signal position.
4. SSG RF Signal On.
5. EUT shall be stop the transmitted any signal and SSG RF Signal Off. Then EUT will be continuous transmitted signal.

3.9.4. TEST SETUP LAYOUT



3.9.5. TEST DEVIATION

There is no deviation with the original standard.

3.9.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

3.9.7. TEST RESULT OF CARRIER SENSE CAPABILITY

Test Power:	Normal Voltage
Test Mode:	IEEE 802.11n-HT40
Test Result:	Good

3.10. CONSTRUCTION PROTECTION CONFIRMATION METHOD

3.10.1. LIMIT

(See Article 49-20, Item1-a of the Ordinance Regulating Radio Equipment)

The high-frequency section and modulation section of the radio equipment except for

the antenna system shall not be capable of being opened easily.

3.10.2. CONFIRMATION METHOD

The RF and modulation portions are protected against illegal modification as following method:

Tick the appropriate box	
	1. Sealed with special screws.
	2. Plastic chassis is being welded using ultrasonic waves.
	3. Chassis is glued using a special adhesive.
	4. Metal covers are spot-fused.
	5. Cover is specially interlocked.
	6. RF and Modulation components are covered with shielding case and this shielding case is soldered.
	7. Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
	8. Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
	9. Shield case is welded at RF and modulation parts, and ID-ROM is guled with a non-transparent laminating agent.
√	10. RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable part on PCB or adjustable parts are not exposed.

4. LIST OF MEASURING EQUIPMENTS

Kind of Equipment	Manufacturer	Model No.	Serial No.	Validity Date	Calibration Agency	Class Information
Spectrum Analyzer	R&S	FSP40	100185	Jul. 03, 2023	CHINA CEPREI LABORATORY	(c)
MXG Vector Signal Generator	Agilent	N5182A	MY49060447	Jan. 22, 2023	CEPREI Calibration and Testing Center	(c)
Attenuator	WOKEN	6SM3502	VAS1214NL	N/A	N/A	-
*Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023	CEPREI Calibration and Testing Center	-
Wi-Fi Router	tp-link	Archer AX6000	N/A	N/A	N/A	-

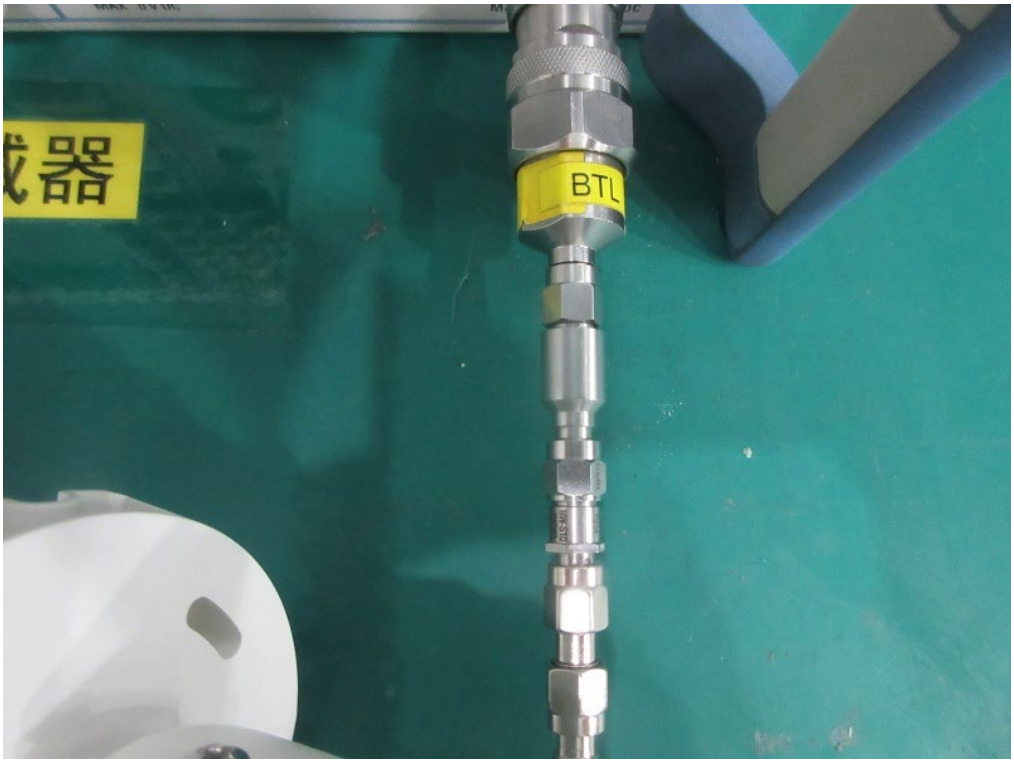
Remark:

a. Calibration conducted by the National Institute of Information and Communications Technology (NITC) in Japan (hereinafter referred to as “NITC”) or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
b. Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No.51 of 1992).
c. Calibration conducted in conturies except Japan, whice shall be equivalent to the calibration Conducted by the NITC or a designation agency under Article 102-18 paragraph (1).
d. Calibration, etc. conducted by using measuring instruments and other epuipment listed in the night column of appended table No.3, whice shall have been given any type of calibration, etc. listed above from (a) to (c). From JRL Article 24-2, paragraph 4, item 2.

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 36 months and the calibrations are traceable to NML/ROC and NIST/USA.

5. EUT TEST PHOTO

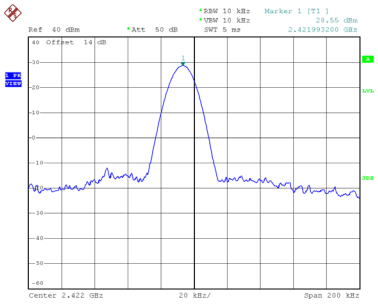


APPENDIX A - FREQUENCY TOLERANCE

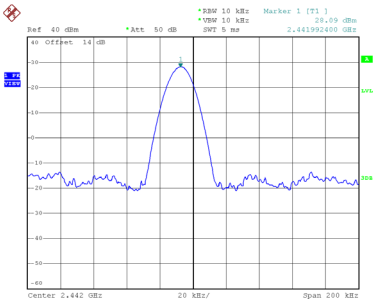
Test Mode:	TX Mode_IEEE 802.11n(HT40)

Test Voltage	Normal Voltage			Remarks
Test Frequency (MHz)	2422	2442	2462	Low/Mid/High of test frequency range
Measured Frequency (MHz)	2421.9932	2441.9924	2461.9932	-
Frequency Tolerance (ppm)	-2.81	-3.11	-2.76	Limit ≦ ±50 ppm

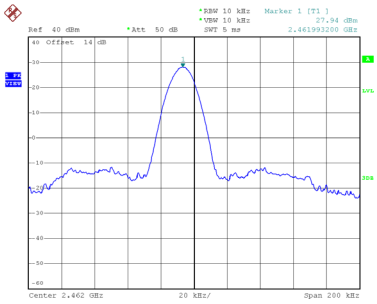
CH03



CH07



CH11

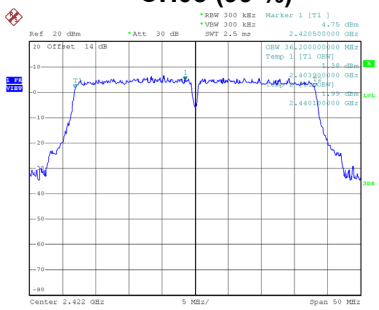


APPENDIX B - OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH

Test Mode:	TX Mode_IEEE 802.11n(HT40)

Test Voltage	Normal Voltage			Remarks
Test Frequency (MHz)	2422	2442	2462	Low/Mid/High of test frequency range
Occupied Bandwidth (MHz)	36.20	36.20	36.20	Limit ≦ 40 MHz

CH03 (99 %)



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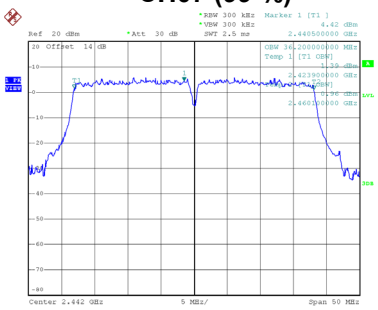
CH07 (99 %)



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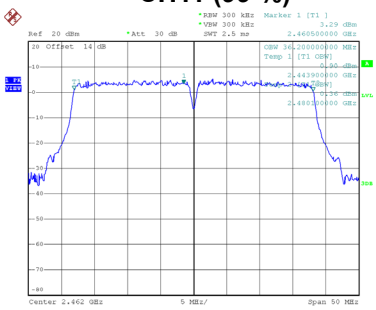
CH11 (99 %)



Date: 29.NOV.2022 11:42:09

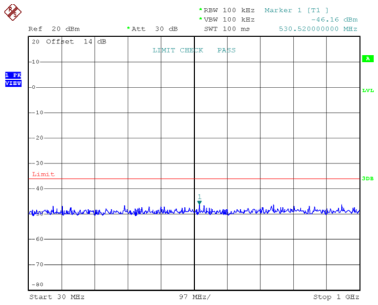
APPENDIX C - UNWANTED EMISSION INTENSITY

Test Mode:	TX Mode_IEEE 802.11n(HT40)

Test Voltage			Normal Voltage			Remarks
Test Frequency		MHz	2422	2442	2462	Low/Mid/High of test frequency range
Unwanted Emission Intensity (Power emission within1MHz bandwidth)	※1	MHz	530.52	402.48	691.54	30MHz~1000MHz Limit ≤ 0.25 μW/100kHz (-36 dBm/100kHz)
		μW/100kHz	0.0242	0.0233	0.0259	
	※2	MHz	2381.45	2387.00	2259.40	1000MHz~2387MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		μW/MHz	1.3772	0.1306	0.1161	
	※3	MHz	2399.90	2398.47	2399.61	2387MHz~2400MHz Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		μW/MHz	11.2720	0.8770	0.1690	
	※4	MHz	2488.52	2483.92	2483.50	2483.5MHz~2496.5MHz Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		μW/MHz	0.2831	0.6295	1.2794	
	※5	MHz	3076.70	3136.72	2496.50	2496.5MHz~12500MHz Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		μW/MHz	0.6081	0.4943	1.0304	

Note:
Emission value = SA measurement value + Directional gain + cable loss
Directional gain = 10 log (Ant X)
X = the total number of antennas

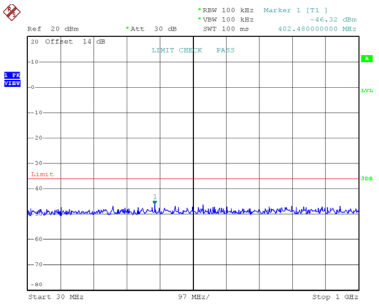
CH03



Date: 29.NOV.2022 11:44:15

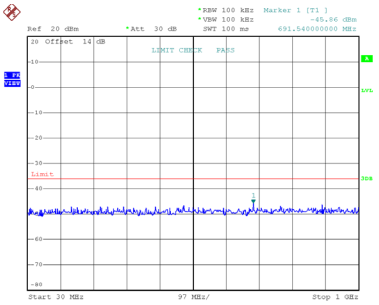
CH07

※1: 30MHz≦f≦1000MHz



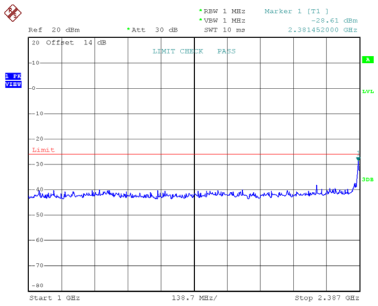
Date: 29.NOV.2022 11:45:18

CH11



Date: 29.NOV.2022 11:46:20

※2: 1000MHz≦f<2387MHz



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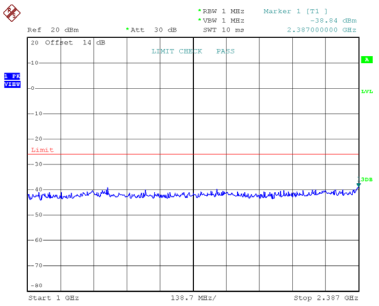

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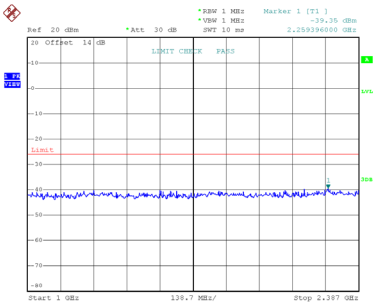
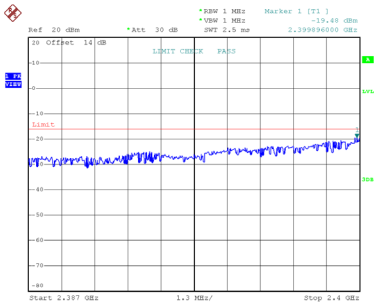


Date: 29.NOV.2022 11:46:30

※3: 2387MHz≦f<2400MHz



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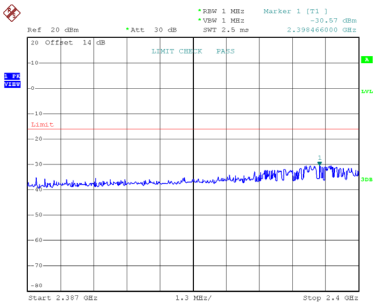

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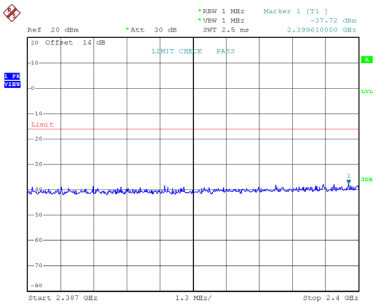

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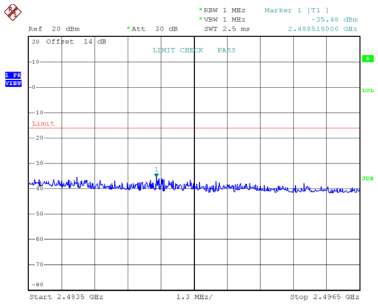
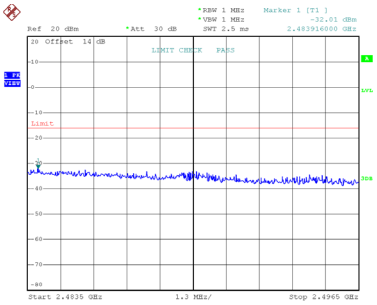
CH03



Date: 29.NOV.2022 11:44:45

CH07

※4: 2483.5MHz<f≦2496.5MHz



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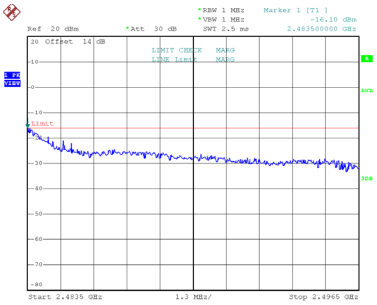
CH11



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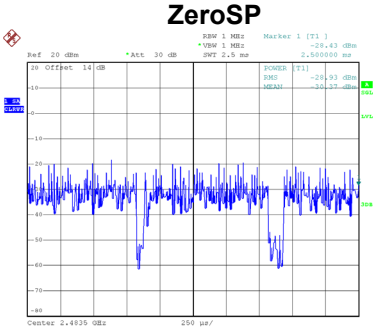
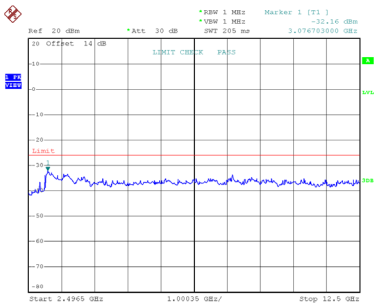
ZeroSP



Date: 29.NOV.2022 11:46:55

※5: 2496.5MHz<f



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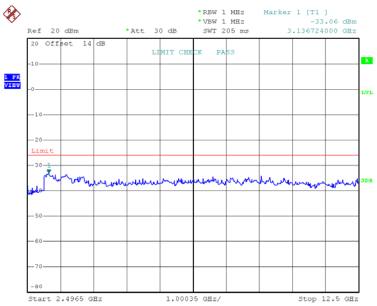

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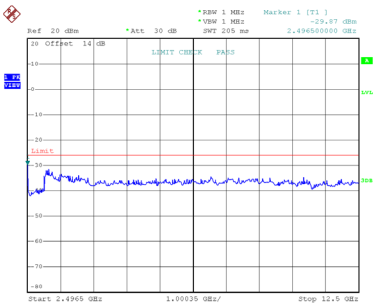


Date: 29.NOV.2022 11:47:06

APPENDIX D - ANTENNA POWER TOLERANCE

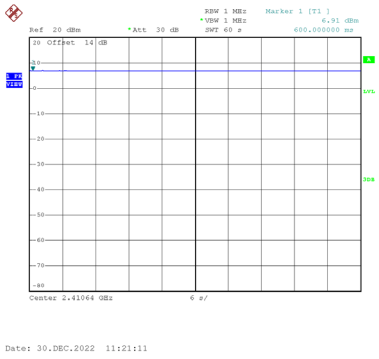
Test Mode:	TX Mode_IEEE 802.11n(HT40)

Normal Voltage

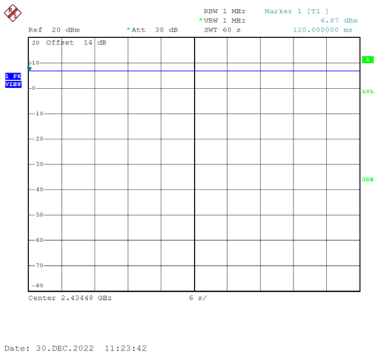
Test Frequency (MHz)	Conducted RF output power density		Rated RF output power density	Conducted RF output power density Limit	Antenna Power Tolerance in Limit	
	(dBm/MHz)	(mW/MHz)	(mW/MHz)	(mW/MHz)	(+20%, -80%)	
2422	6.91	4.9091	4.91	5	-0.02	%
2442	6.87	4.8641	4.91	5	-0.94	%
2462	6.90	4.8978	4.91	5	-0.25	%

Note:
1. Antenna power tolerance = {(conducted power density–rated power density)/rated power density}
3. Antenna Power value = SA measurement value + Directional gain + cable loss
   Directional gain = 10 log (Ant X)
   X = the total number of antennas

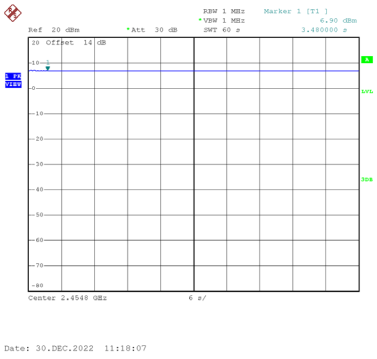
CH03



CH07



CH11



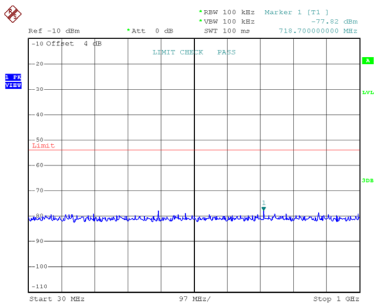
APPENDIX E - LIMITATION OF COLLATERAL EMISSION OF RECEIVER

Test Mode:	RX Mode_IEEE 802.11n(HT40)

Test Voltage			Normal Voltage			Remarks
Test Frequency		MHz	2422	2442	2462	Low/Mid/High of test frequency range
Limitation of Collateral Emission of Receiver	※6	MHz	718.70	947.62	798.24	30MHz~1000MHz Limit ≤ 4 nW (-54 dBm)
		nW	0.0165	0.0151	0.0171	
	※7	MHz	3139.00	3070.00	3070.00	1000MHz~12500MHz Limit ≤ 20 nW (-47 dBm)
		nW	0.0505	0.0542	0.0607	

Note:
Emission value = SA measurement value + Directional gain + cable loss
Directional gain = 10 log (Ant X)
X = the total number of antennas

CH03



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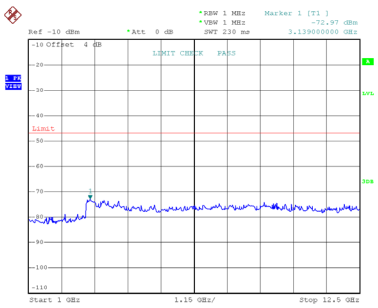
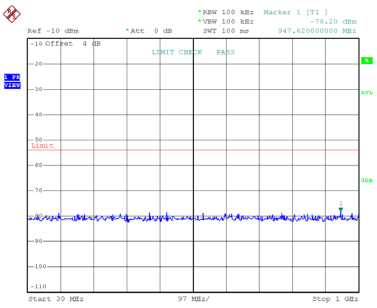


Date: 29.NOV.2022 11:52:00

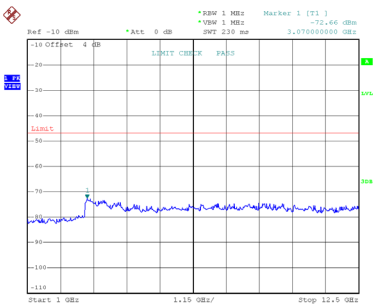
CH07

※6: f<1GHz



Date: 29.NOV.2022 11:52:12

※7: 1GHz≦f



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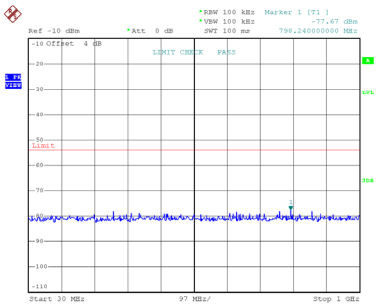
CH11



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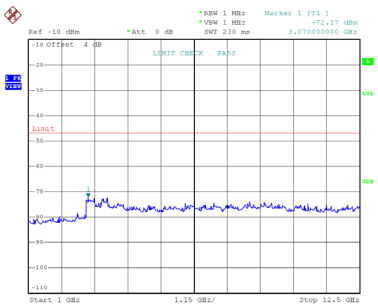

Date: 29.NOV.2022 11:52:44

End of Test Report