

Japan Radio Test Report

Project No. : 2011C051
Equipment : Wireless Mouse
Brand Name : RAZER
Test Model : RZ01-0373
Series Model : N/A
Applicant : Razer Inc.
Address : 9 Pasteur, Suite 100, Irvine, CA92618, USA
Manufacturer : Razer (Asia-Pacific) Pte.,Ltd.
Address : 514 Chai Chee Lane, #07-01-06,Singapore 469029
Factory : RAZER TECHNOLOGY AND DEVELOPMENT (SHENZHEN) CO., LTD
Address : East Wing, 3rd Floor, Block 2, Phase 1 of Vision Shenzhen Business Park Keji South Road, Hi-Tech Industrial Park, Shenzhen 518057, China
Date of Receipt : Nov. 09, 2020
Date of Test : Nov. 11, 2020 ~ Nov. 30, 2020
Issued Date : Dec. 07, 2020
Report Version : R00
Test Sample : Sample No.: DG2020111044
Standard(s) : Article 49-20 and the relevant articles of the Ordinance Regulating Radio Equipment and MIC Notice No.88 Appendix No.43 Test method

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



Prepared by : Welly Zhou



Approved by : Ethan Ma



Certificate #5123.02

Add: No.3, Jinshagang 1st Road, Shixia, Dalang Town,Dongguan, Guangdong, China.

Tel: +86-769-8318-3000

Web: www.newbtl.com

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The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

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 Version	Description	Issued Date
R00	Original Issue.	Dec. 07, 2020

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%)	Article 6, Table 2	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	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: No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

1.2. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Frequency Tolerance / 99% Bandwidth	$\pm 6.25 \times 10^{-7}$	Confidence levels of 95%
Antenna Power / TX-RX Emission	$\pm 0.5\text{dB}$	Confidence levels of 95%
Transmission Antenna Gain	$\pm 3.72\text{dB}$	Confidence levels of 95%

1.3. TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Frequency Tolerance	24°C	56%	DC 1.5V	Jesse Wang
Occupied Bandwidth (99%)	24°C	56%	DC 1.5V	Jesse Wang
Unwanted Emission Intensity	24°C	56%	DC 1.5V	Jesse Wang
Antenna Power Tolerance	24°C	56%	DC 1.5V	Jesse Wang
Limitation of Collateral Emission of Receiver	24°C	56%	DC 1.5V	Jesse Wang

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Wireless Mouse
Brand Name	RAZER
Test Model	RZ01-0373
Series Model	N/A
Model Difference(s)	N/A
Hardware Version	v0.2
Software Version	V0.03.00
Power Source	Supplied from battery.
Power Rating	1.5V  25mA
Operation Frequency	2402MHz ~ 2480MHz
Data Rate	2Mbps
Modulation Type	GFSK
Occupied Bandwidth	2.19 MHz
Antenna Power (Rated Power)	3.25 mW
Antenna Power (Max. Conducted Power)	3.2509 mW

Note:

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

2. Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	YAGEO	ANT5320LL24R2400A	Chip	N/A	1.58

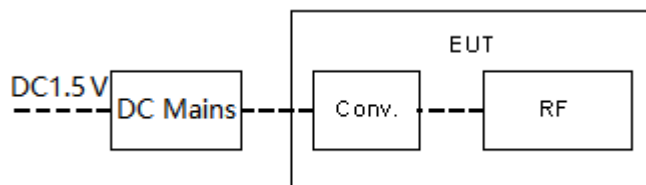
2.2. DESCRIPTION OF TEST MODES

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.

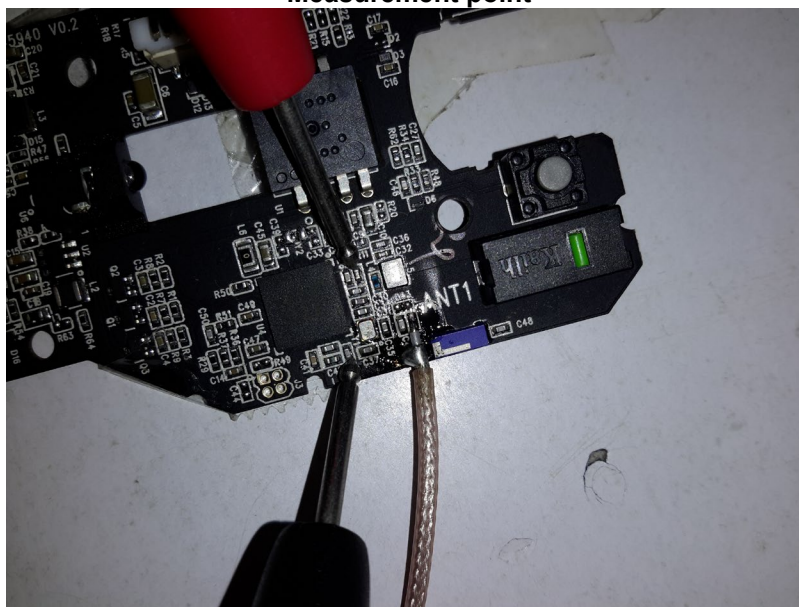
Test Mode	Description
Mode 1	CH00, CH39, CH78

Power Supply Voltage Fluctuation Test



Voltage Fluctuation Test	Normal Voltage	High Voltage + 10% of Normal Voltage	Low Voltage - 10% of Normal Voltage
Input: DC Power	1.5V	1.65V	1.35V
Output: DC Power	1.210V	1.210V	1.210V
Voltage Variation (%)	--	0.0	0.0

Measurement point



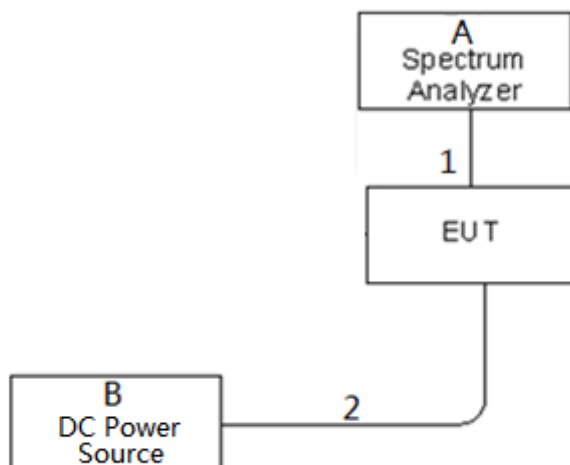
Note:

$$\text{Voltage Variation (\%)} = (\text{Output High Voltage or Low Voltage} - \text{Output Normal Voltage}) / \text{Output Normal Voltage} * 100$$

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

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	RF Cable	YES	N/A	0.1m
2	DC Power Cable	N/A	N/A	2m

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. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software Version	N/A		
Frequency (MHz)	2402	2441	2480
2Mbps	N/A	N/A	N/A

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	$\leq \pm 50\text{ppm}$

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.

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

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 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 $\leq$ 83.5MHz; OFDM, DSSS $\leq$ 26MHz; Others $\leq$ 26MHz

3.2.2. SETTING

The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Span	4MHz
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).

3.2.4. 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	$\leq 0.25 \mu\text{W}/100\text{kHz}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
Spurious	$\leq 2.5 \mu\text{W}/\text{MHz}$ ($1000\text{MHz} \leq f < 2387\text{MHz}$; $2496.5\text{MHz} < f$)
Emission	$\leq 25 \mu\text{W}/\text{MHz}$ ($2387\text{MHz} \leq f < 2400\text{MHz}$) and ($2483.5\text{MHz} < f \leq 2496.5\text{MHz}$)
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	RMS
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.

- EUT have transmitted the maximum modulation signal and fixed channelize.
- Set spectrum analyzer with condition in section 3.3.2 and tune reference level to observe receiving signal position.
- SA adjusted to start frequency 30MHz and stop frequency 1000MHz. Then to mark peak reading value + cable loss shall be less than $0.25\mu\text{W}/100\text{kHz}$.
- SA adjusted to start frequency 1000MHz and stop frequency 2387MHz. Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}/\text{MHz}$.
- SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}/\text{MHz}$.
- SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz. Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}/\text{MHz}$.
- SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz. Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}/\text{MHz}$.
- 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 ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
- ※ 2: Frequency Band 2 ($1000\text{MHz} \leq f < 2387\text{MHz}$)
- ※ 3: Frequency Band 3 ($2387\text{MHz} \leq f < 2400\text{MHz}$)
- ※ 4: Frequency Band 4 ($2483.5\text{MHz} < f \leq 2496.5\text{MHz}$)
- ※ 5: Frequency Band 5 ($2496.5\text{MHz} < f$)

Band	1	2	3	4	5
Cable Loss(dB)	11.5	11.5	11.5	11.5	11.5

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	$\leq 3\text{mW/MHz}$ (FHSS 2427~2470.75MHz) $\leq 10\text{mW/MHz}$ (OFDM, DSSS 2400~2483.5MHz) $\leq 10\text{mW}$ (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.

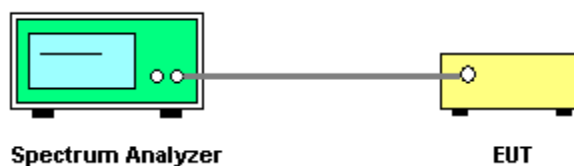
Spectrum Parameter	Setting
Span	4MHz
RBW	1MHz
VBW	3MHz
Detector	Positive peak
Trace	Max Hold
Sweep Time	60s

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 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 power density.

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	$\leq 4 \text{ nW (-54 dBm) (f < 1GHz)}$
	$\leq 20 \text{ nW (-47 dBm) (1GHz} \leq \text{f)}$
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	RMS
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 $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), 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



3.5.6. 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 ($f < 1\text{GHz}$)
- ※ 7: Frequency Band 7 ($1\text{GHz} \leq f$)

Band	6	7
Cable Loss(dB)	11.5	11.5

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: $\leq 6.91\text{dBm/MHz}$ (FHSS 2427~2470.75MHz) $\leq 12.14\text{dBm/MHz}$ (OFDM, DSSS 2400~2483.5MHz) (20MHz systems) $\leq 12.14\text{dBm/MHz}$ (Others 2400~2483.5MHz)
	☐	For a directional antenna: $\leq 16.91\text{dBm/MHz}$ (FHSS 2427~2470.75MHz) $\leq 22.14\text{dBm/MHz}$ (OFDM, DSSS 2400~2483.5MHz) (20MHz systems) $\leq 22.14\text{dBm/MHz}$ (Others 2400~2483.5MHz)
Note: This test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.		

3.6.2. SETTING

The following table is the setting of spectrum analyzer.

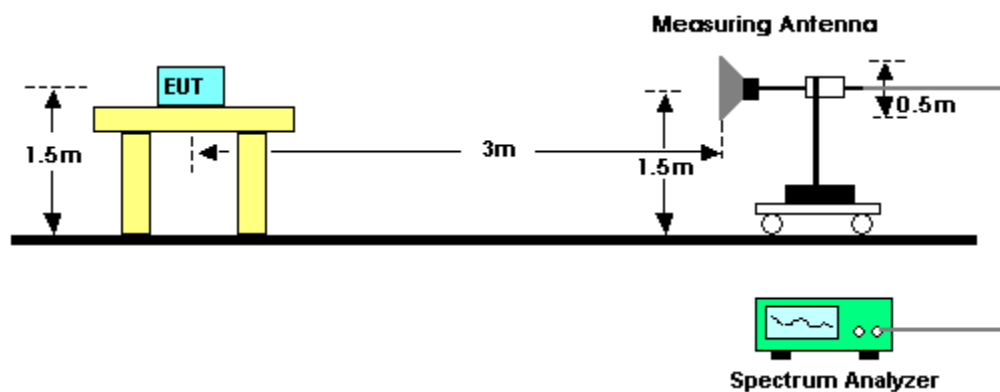
Spectrum Analyzer	Setting
Span	4MHz
RBW	1MHz
VBW	3MHz
Detector	Positive peak
Trace	Max Hold
Sweep Time	60s

3.6.3. TEST PROCEDURES

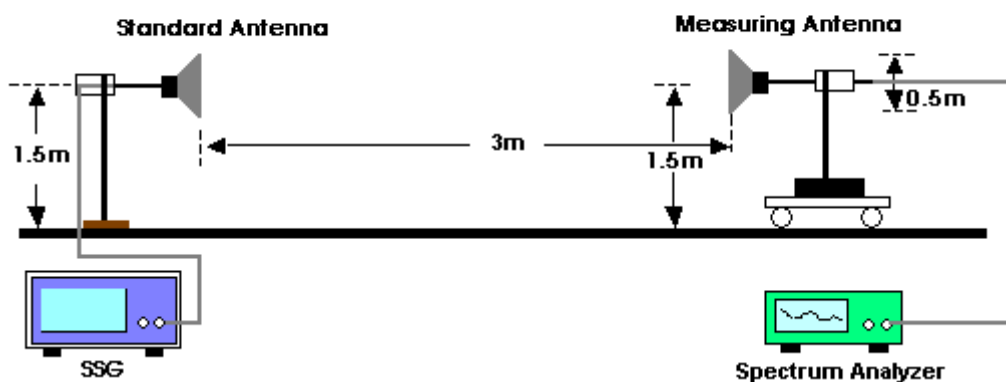
Please refer to 3.4.3 and the EIRP= Power Density+Gain.

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. TEST RESULT 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 $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DSSS, OFDM}\}$

3.7.2. SETTING

The following table is the setting of the spectrum analyzer.

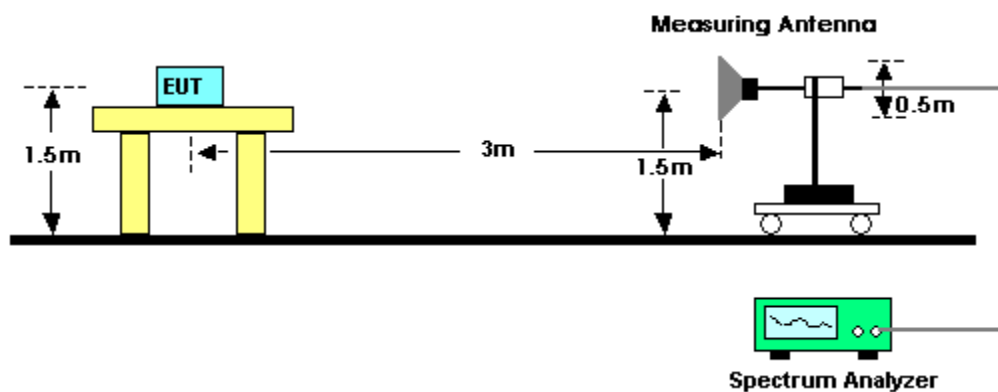
Spectrum Parameter	Setting
Span	0MHz
RBW	1MHz
VBW	1kHz
Y scale	5dB
Detector	Peak
Trace	Max Hold

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 receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring 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 $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DSSS, OFDM}\}.$

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

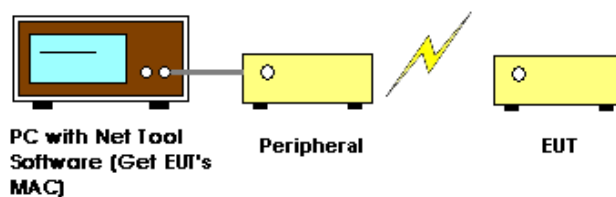
PC with Net Tool	Setting
MAC IP List	MAC Scan

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:	2Mbps
Test Result:	Good

Note: Our customer explained that his product before factory process has a pairing process, USB dongle built-in with a set of 16-bit ID code, paired with the wireless keyboard will remember one of the ID code.

3.9. CONSTRUCTION PROTECTION CONFIRMATION METHOD

3.9.1. 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.

3.9.2. 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 glued with a non-transparent laminating agent.
X	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. 25, 2021	CHINA CEPREI LABORATORY	(c)
*Multi-output DC Power Supply	GW Instek	GPC-3030DN	EK880675	Jul. 25, 2023	CEPREI Calibration and Testing Center	-
Signal Generator	R&S	SMR40	100504	Mar. 01, 2021	CEPREI Calibration and Testing Center	(c)
Attenuator	WOKEN	6SM3502	VAS1214NL	Feb. 11, 2021	CEPREI Calibration and Testing Center	(c)

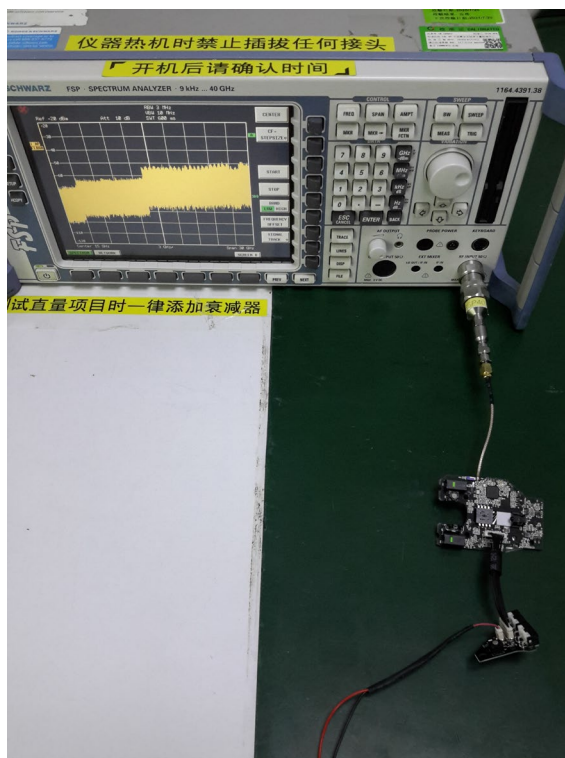
Remark:

- 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.
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No.51 of 1992).
- Calibration conducted in countries except Japan, which shall be equivalent to the calibration Conducted by the NITC or a designation agency under Article 102-18 paragraph (1).
- Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No.3, which 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:

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

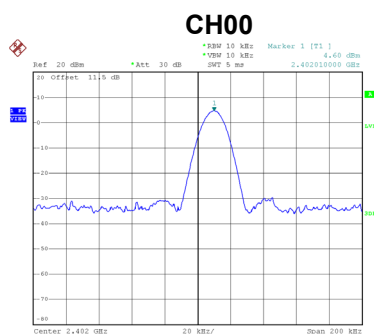
5. EUT TEST PHOTO



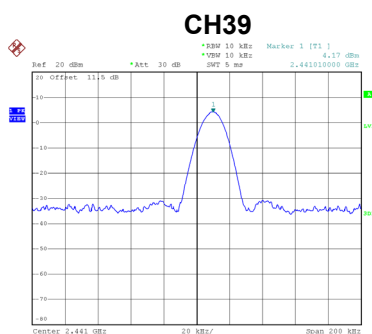
APPENDIX A - FREQUENCY TOLERANCE

Test Mode: TX Mode

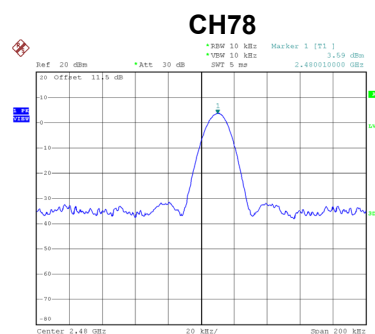
Test Voltage	Normal Voltage			Remarks
Test Frequency (MHz)	2402	2441	2480	Low/Mid/High of test frequency range
Measured Frequency (MHz)	2402.0100	2441.0100	2480.0100	-
Frequency Tolerance (ppm)	4.16	4.10	4.03	Limit $\leq \pm 50$ ppm



Date: 30.NOV.2020 17:14:00



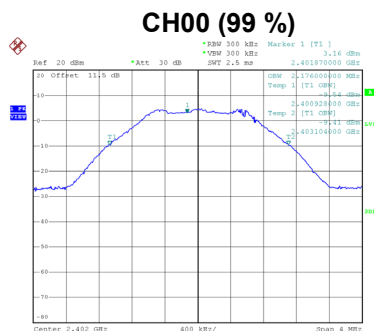
Date: 30.NOV.2020 17:14:52



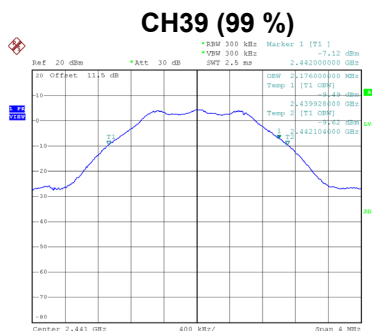
Date: 30.NOV.2020 17:15:02

APPENDIX B - OCCUPIED BANDWIDTH

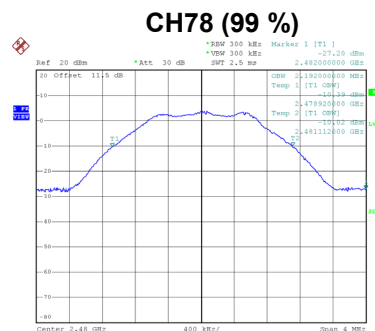
Test Mode:	TX Mode			
Test Voltage	Normal Voltage			Remarks
Test Frequency (MHz)	2402	2441	2480	Low/Mid/High of test frequency range
Occupied Bandwidth (MHz)	2.18	2.18	2.19	Limit $\leq$ 26 MHz



Date: 30.NOV.2020 17:01:58



Date: 30.NOV.2020 17:07:10



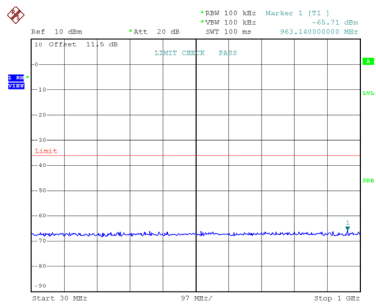
Date: 30.NOV.2020 17:10:44

APPENDIX C - UNWANTED EMISSION INTENSITY

Test Mode:	TX Mode
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Test Voltage			Normal Voltage			Remarks
Test Frequency		MHz	2402	2441	2480	Low/Mid/High of test frequency range
Unwanted Emission Intensity (Power emission within1MHz bandwidth)	※ 1	μW/100kHz	0.0003	0.0003	0.0003	Limit ≧ 0.25 μW/100kHz (-36 dBm/100kHz)
	※ 2	μW/MHz	0.0034	0.0044	0.0026	Limit ≧ 2.5 μW/MHz (-26 dBm/MHz)
	※ 3	μW/MHz	5.1523	0.0047	0.0035	Limit ≧ 25 μW/MHz (-16 dBm/MHz)
	※ 4	μW/MHz	0.0026	0.0036	0.6516	Limit ≧ 25 μW/MHz (-16 dBm/MHz)
	※ 5	μW/MHz	0.0067	0.0059	0.0048	Limit ≧ 2.5 μW/MHz (-26 dBm/MHz)

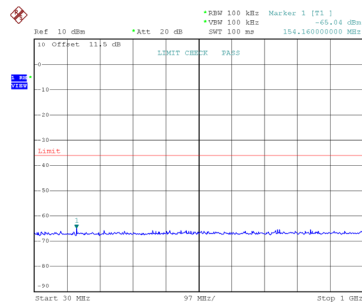
CH00



Date: 30.NOV.2020 16:56:47

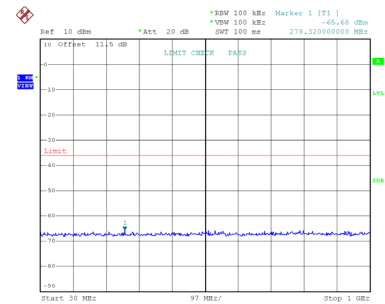
CH39

※1: $30\text{MHz} \leq f \leq 1000\text{MHz}$



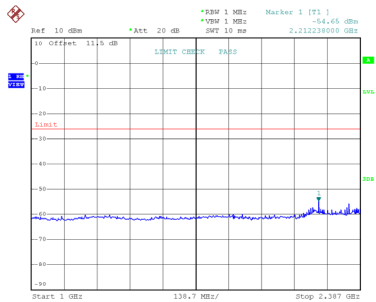
Date: 30.NOV.2020 17:06:00

CH78

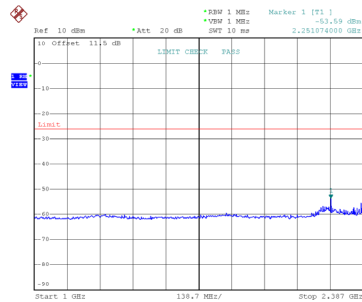


Date: 30.NOV.2020 17:09:54

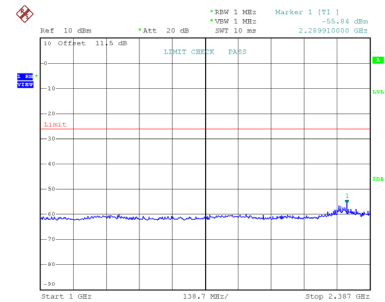
※2: $1000\text{MHz} \leq f < 2387\text{MHz}$



Date: 30.NOV.2020 16:56:58

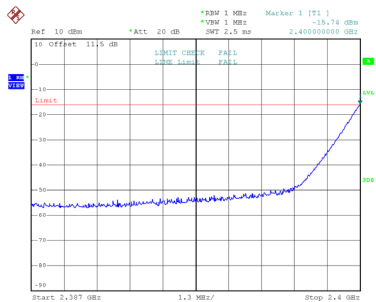


Date: 30.NOV.2020 17:06:20

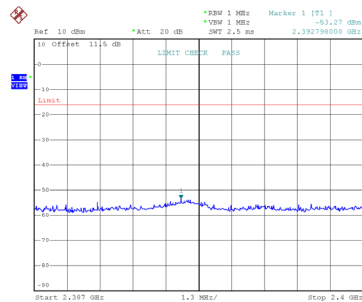


Date: 30.NOV.2020 17:10:05

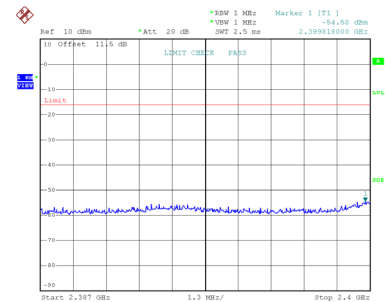
※3: $2387\text{MHz} \leq f < 2400\text{MHz}$



Date: 30.NOV.2020 16:57:09

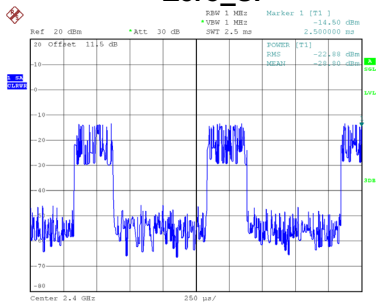


Date: 30.NOV.2020 17:06:31



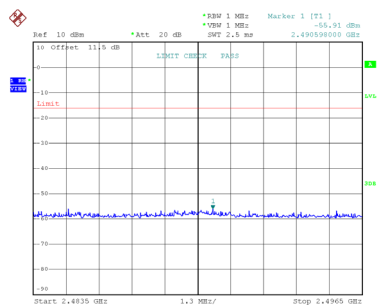
Date: 30.NOV.2020 17:10:16

Zero_SP



Date: 30.NOV.2020 16:57:14

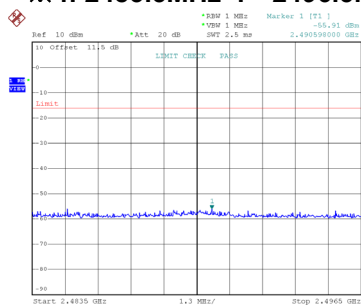
CH00



Date: 30.NOV.2020 16:57:25

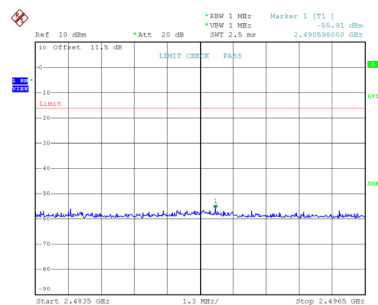
CH39

※4: 2483.5MHz<f≤2496.5MHz



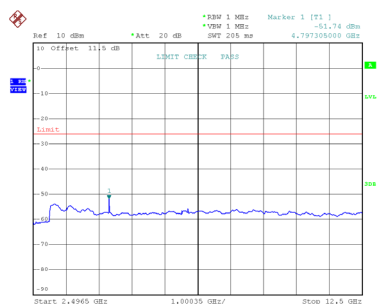
Date: 30.NOV.2020 16:57:25

CH78

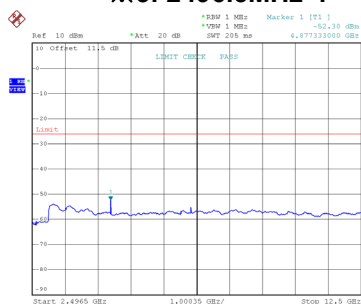


Date: 30.NOV.2020 16:57:25

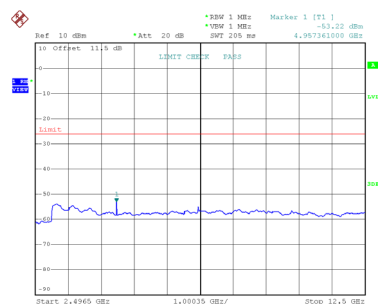
※5: 2496.5MHz<f



Date: 30.NOV.2020 16:57:36



Date: 30.NOV.2020 17:06:52



Date: 30.NOV.2020 17:10:37

APPENDIX D - ANTENNA POWER TOLERANCE

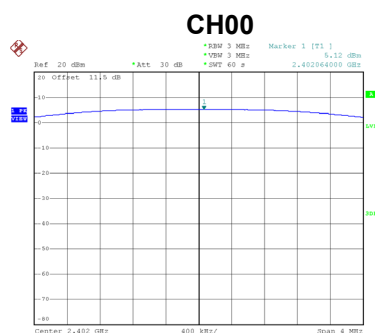
Test Mode:	TX Mode
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Normal Voltage

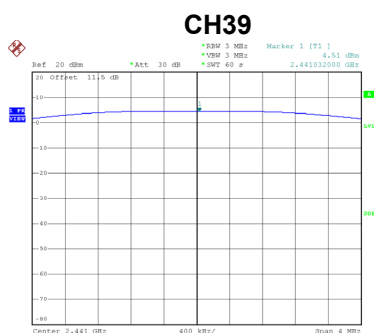
Test Frequency (MHz)	Conducted RF output power density		Rated RF output power density	Conducted RF output power density Limit	Antenna Power Tolerance in Limit	
	(dBm)	(mW)	(mW)	(mW)	(+20%, -80%)	
2402	5.12	3.2509	3.25	10	0.03	%
2441	4.51	2.8249	3.25	10	-13.08	%
2480	3.96	2.4889	3.25	10	-23.42	%

Note:

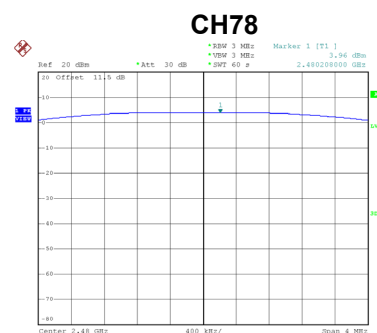
1. Antenna power tolerance = {(conducted power density–rated power density)/rated power density}



Date: 30.NOV.2020 17:39:12



Date: 30.NOV.2020 17:41:22



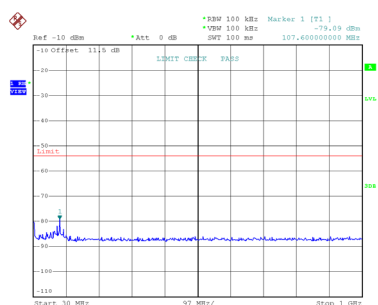
Date: 30.NOV.2020 17:43:32

APPENDIX E - LIMITATION OF COLLATERAL EMISSION OF RECEIVER

Test Mode:	RX Mode
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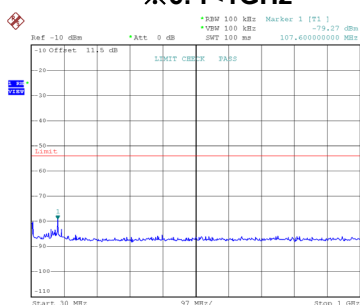
Test Voltage			Normal Voltage			Remarks
Test Frequency	MHz		2402	2441	2480	Low/Mid/High of test frequency range
Limitation of Collateral	※6	nW	0.0123	0.0118	0.0117	Limit $\leq$ 4 nW (-54 dBm)
Emission of Receiver	※7	nW	0.0431	0.0431	0.0417	Limit $\leq$ 20 nW (-47 dBm)

CH00



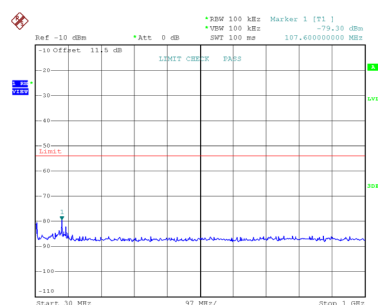
Date: 30.NOV.2020 17:12:04

CH39

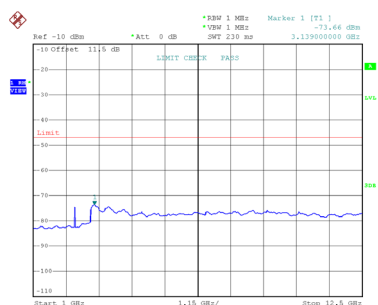
※6: $f < 1\text{GHz}$


Date: 30.NOV.2020 17:12:29

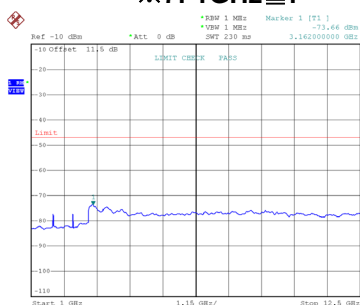
CH78



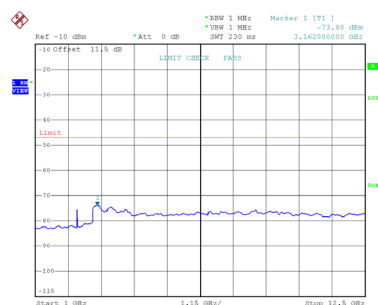
Date: 30.NOV.2020 17:12:58

※7: $1\text{GHz} \leq f$


Date: 30.NOV.2020 17:12:15



Date: 30.NOV.2020 17:12:40



Date: 30.NOV.2020 17:13:09

End of Test Report