

Certificate of Test

NCT CO., LTD.

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do,
Korea 18511
(Tel: +82-31-323-6070 / Fax: +82-31-323-6071)

Report No.:
NW2010-J002

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**1. Client**

- Name : CPD GROUP
- Address : JST-7, 229, Seokjeong-ro, Michuhol-gu, Incheon, Republic of Korea
- Date of Receipt : 2020-09-28

2. Use of Report : Janpan MIC Approval**3. Test samle**

- Description : CAM.G Air
- Model : CAMG-A1000

4. Date of Test : 2020-09-29~ 2020-10-06**5. Test method used : Appendix No. 43JN****6. Testing Environment :**

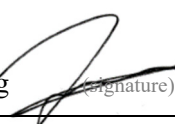

- Temperature: (25 ± 5) °C, Humidity: More than 45 % R.H. and less than 75 % R.H.
- * Unless specified otherwise in the individual methods, the tests were conducted on ambient conditions.

7. Test Results : Refer to the test results

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

This Test Report cannot be reproduced, except in full

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

Affirmation	Tested by Woo-hyoung, Jeong 	Technical Manager Kyung-Taek, Lee 
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October 29, 2020

NCT CO., LTD.



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1. General information's

1-1 Test Performed

Laboratory : NCT CO., LTD.
 Address : 211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511
 Telephone : +82-31-323-6070
 Facsimile : +82-31-323-6071

2. Information's about test item

2-1 Applicant information

Company name : CPD GROUP
 Address : JST-7, 229, Seokjeong-ro, Michuhol-gu, Incheon, Republic of Korea
 Telephone / Facsimile : +82-32-873-7307 / -

2-2 Equipment Under Test (EUT) description

Test item particulars : CAM.G Air
 Model and/or type reference : CAMG-A1000
 Additional model name : -
 Serial number : Identification
 Antenna gain : PCB Pattern Antenna with Max gain : 1.22 dBi (M/N:CAMG-A1000 Ant)
 Date (s) of performance of tests: : 2020-09-29 ~ 2020-10-06
 Date of receipt of test item : 2020-09-28
 EUT condition : Pre-production, not damaged
 Number of channel : 40
 EUT Power Source : DC 3.7 V by Battery
 Type of Modulation : GFSK
 Firmware version : 1.0
 Note : -

2-3 Tested Frequency

	Low frequency	Middle frequency	High frequency
Frequency (MHz)	2 402	2 442	2 480

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3. Test Report

3.1 Test Summary

Applied	Test items	Result
<input checked="" type="checkbox"/>	Frequency Tolerance	C
<input checked="" type="checkbox"/>	Occupied Bandwidth (99%)	C
<input checked="" type="checkbox"/>	Antenna power	C
<input checked="" type="checkbox"/>	Unwanted emission strength	C
<input checked="" type="checkbox"/>	RX spurious emission	C
<input checked="" type="checkbox"/>	Interference prevention function	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: Compliance was determined by specification limits of the applicable standard according to customer requirements.

TEST STANDARD: The measurement procedure of Certification of Conformity with Technical Regulations for Specified Radio Equipment, Item 19 of Article 2 Paragraph 1

TEST MEASUREMENT METHOD: Appendix No. 43. Compliance was determined by specification limits of the applicable standard according to customer requirements.

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3.2 Test Result

3.2.1 Frequency tolerance

Test procedure

1. The transmitter output is connected to the Spectrum analyzer(or Frequency counter)
2. Setting the spectrum analyzer is as follows.

Center frequency	Operating frequency
Resolution BW	1 kHz
Video BW	Auto
Span	150 kHz
Sweep time	Auto
Detector mode	Positive peak
Trace mode	Max. hold

Measurement data : BLE

Test voltage	Measured item	Operating frequency		
		Low frequency	Middle frequency	High frequency
3.70 (V)	Measured value (MHz)	2 402.028 317	2 442.028 809	2 480.030 540
	Tolerance (ppm)	11.79	11.80	12.31

Remark

FT (ppm) = [(Measured value(MHz)–Operating frequency(MHz))/Operating frequency(MHz)] × 10⁶

Limit:

±50×10⁻⁶(50 ppm or below)

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3.2.2 Occupied Bandwidth (99%)

Test procedure

1. The transmitter output is connected to the Spectrum analyzer
2. Setting the spectrum analyzer is as follows.

Center frequency	Operating frequency
Resolution BW	300 kHz
Video BW	Auto
Span	20 MHz
Sweep time	Auto
Detector mode	Positive peak
Trace mode	Max. hold

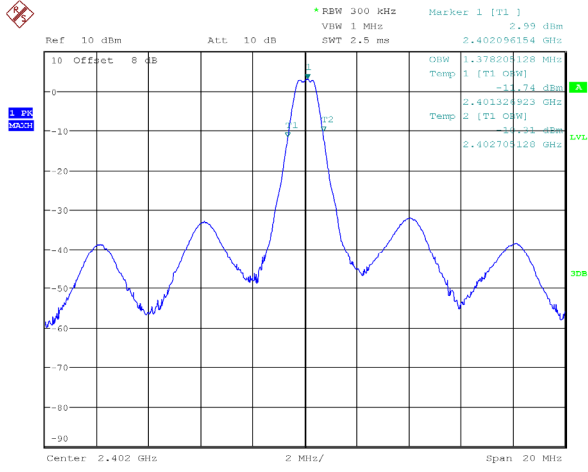
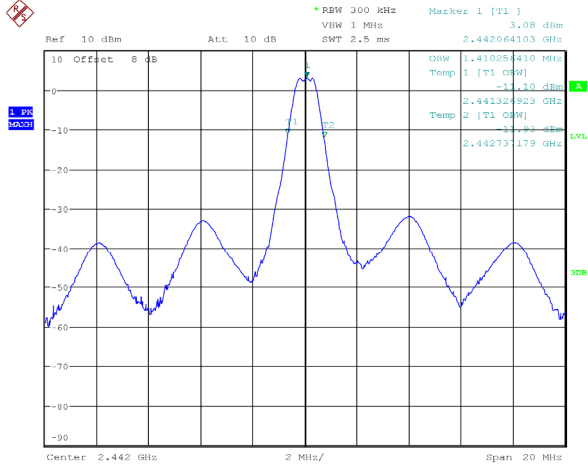
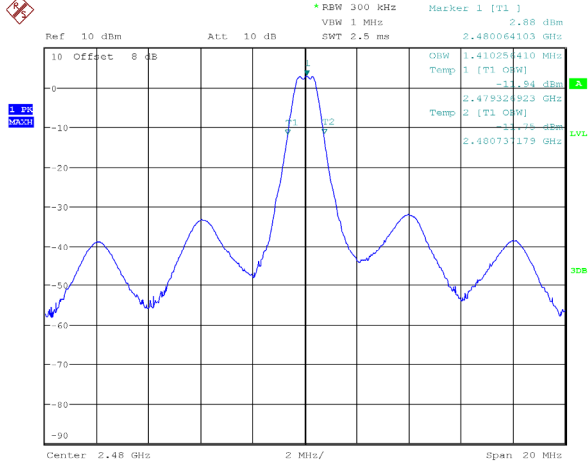
Measurement data : BLE

Test voltage	Occupied bandwidth (MHz)		
	Low frequency	Middle frequency	High frequency
3.70 (V)	1.38	1.41	1.41

Limit:

26MHz or below

Test Plot : BLE

<p>Low frequency 3.70 (V)</p>	 <p>Ref 10 dBm Att 10 dB RBW 300 kHz Marker 1 [T1] VSW 1 MHz SWT 2.5 ms 2.99 dBm 2.402096154 GHz</p> <p>10 Offset 8 dB</p> <p>1.378205128 MHz Temp 1 [T1 OSM] -11.74 dBm 2.403324923 GHz Temp 2 [T1 OSM] -11.74 dBm 2.402705128 GHz</p> <p>Center 2.402 GHz 2 MHz/ Span 20 MHz</p>
<p>Middle frequency 3.70 (V)</p>	 <p>Ref 10 dBm Att 10 dB RBW 300 kHz Marker 1 [T1] VSW 1 MHz SWT 2.5 ms 3.08 dBm 2.442064103 GHz</p> <p>10 Offset 8 dB</p> <p>1.410254410 MHz Temp 1 [T1 OSM] -11.10 dBm 2.441324923 GHz Temp 2 [T1 OSM] -11.10 dBm 2.442731179 GHz</p> <p>Center 2.442 GHz 2 MHz/ Span 20 MHz</p>
<p>High frequency 3.70 (V)</p>	 <p>Ref 10 dBm Att 10 dB RBW 300 kHz Marker 1 [T1] VSW 1 MHz SWT 2.5 ms 2.88 dBm 2.480064103 GHz</p> <p>10 Offset 8 dB</p> <p>1.410254410 MHz Temp 1 [T1 OSM] -11.84 dBm 2.479324923 GHz Temp 2 [T1 OSM] -11.76 dBm 2.480731179 GHz</p> <p>Center 2.48 GHz 2 MHz/ Span 20 MHz</p>

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3.2.3 Antenna power

Test procedure

1. The transmitter output is connected to the Power meter

Measurement data : BLE

Test voltage	Measured item	Antenna power		
		Low frequency	Middle frequency	High frequency
3.70 (V)	Measure value (dBm)	-0.34	-0.23	-0.69
	Antenna power (mW)	0.92	0.95	0.85
	Power tolerance (%)	-42.21	-40.72	-46.68
Declared power(mW)		1.60		
Antenna gain(dBi)		1.22		

Limit:

Output power: 10 mW or Below

Output power tolerance: Maximum +20 %, Minimum -80 %

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3.2.4 Unwanted emission strength

Test procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. The EUT should be transmitting at low, middle and high channel.
3. Unwanted emission strength is measured by following setting:
4. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep time: auto, Start: 30 MHz, Stop: 2 387 MHz.
5. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep time: auto, Start: 2 387 MHz, Stop: 2 400 MHz.
6. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep time: auto, Start: 2 483.5 MHz, Stop: 2 496.5 MHz.
7. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep time: auto, Start: 2 496.5 MHz, Stop: 12.5 GHz.
8. Detector mode: Peak mode.

Measurement data : BLE

		Test mode	Max. emission value		
			Low frequency	Middle frequency	High frequency
30 MHz ~ 2 387 MHz	3.70 (V)	Value(μW)	0.185	0.024	0.014
		Frequency(MHz)	2 383.223	2 383.223	2 371.891
2 387 MHz ~ 2 400 MHz		Value(μW)	7.194	0.043	0.021
		Frequency(MHz)	2 399.979	2 397.563	2 392.875
2 483.5 MHz ~ 2 496.5 MHz		Value(μW)	0.017	0.027	3.214
		Frequency(MHz)	2 485.354	2 486.458	2 483.854
2 496.5 MHz ~ 12.5 GHz		Value(μW)	0.216	0.211	0.297
		Frequency(MHz)	4 805.000	7 321.906	7 450.156

Limit:

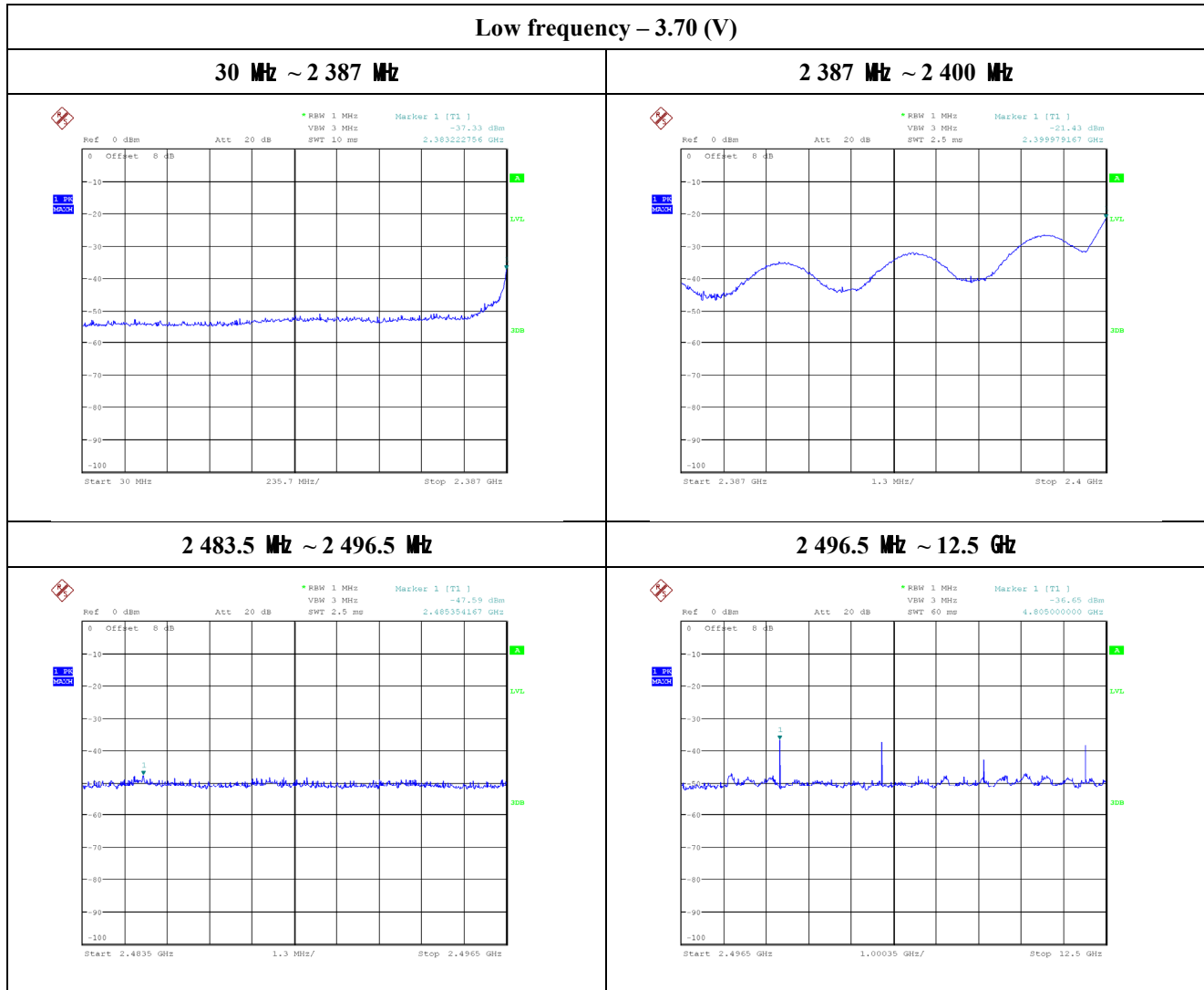
2 387 MHz \leq f \leq 2 400 MHz and 2 483.5 MHz < f \leq 2 496.5 MHz: 25 μ W or less

2 387 MHz > f and 2 496.5 MHz < f: 2.5 μ W or less

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Test Plot : BLE

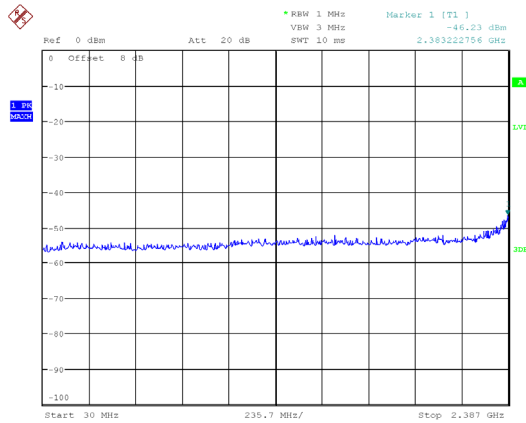


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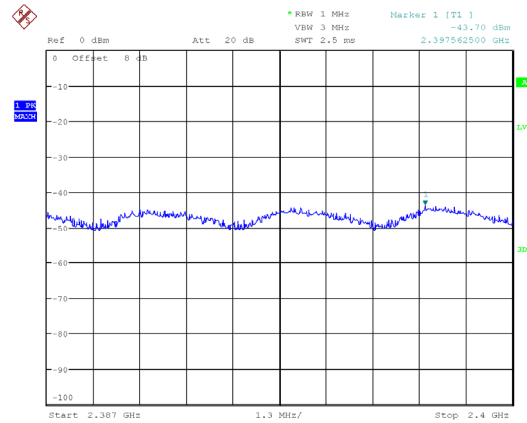
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Middle frequency – 3.70 (V)

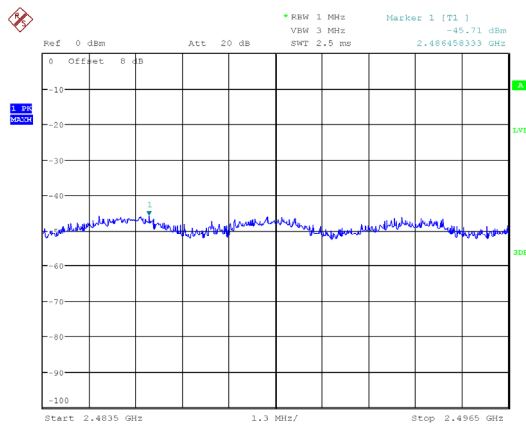
30 MHz ~ 2 387 MHz



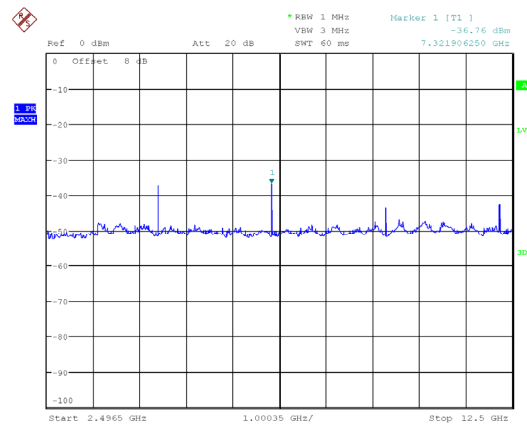
2 387 MHz ~ 2 400 MHz



2 483.5 MHz ~ 2 496.5 MHz



2 496.5 MHz ~ 12.5 GHz

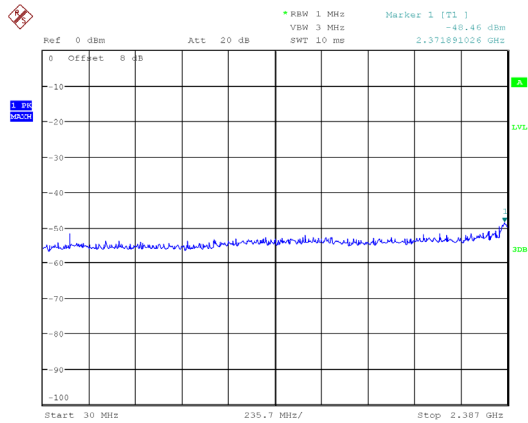


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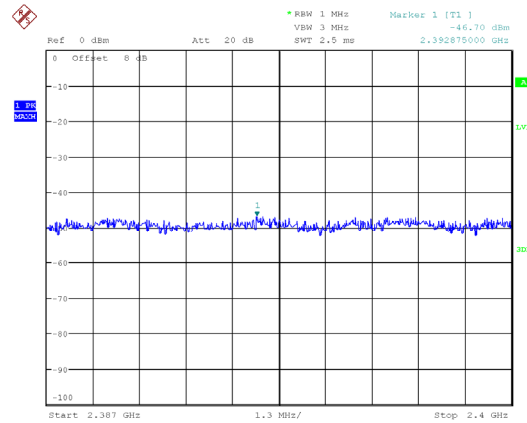
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High frequency – 3.70 (V)

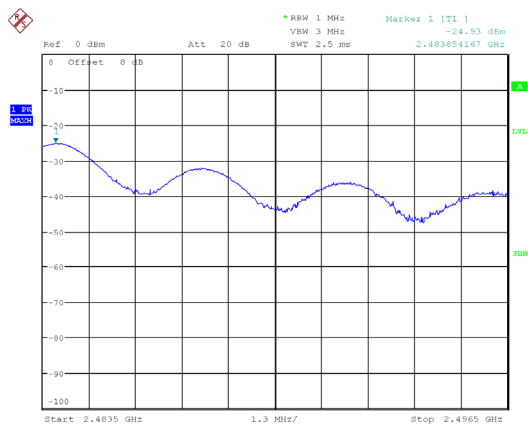
30 MHz ~ 2 387 MHz



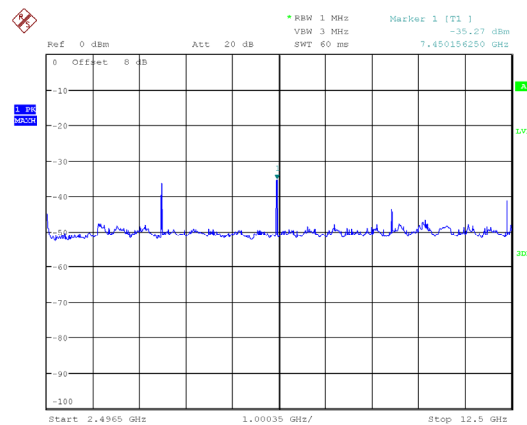
2 387 MHz ~ 2 400 MHz



2 483.5 MHz ~ 2 496.5 MHz



2 496.5 MHz ~ 12.5 GHz



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3.2.5 RX spurious emission

Test procedure

1. Connect transmitter output to the spectrum analyzer input port.
2. The EUT should be receiving at low, middle and high channel.
3. RX spurious emission is measured by following setting:
4. Set the spectrum analyzer RBW: 100 kHz, VBW: Auto, Sweep: Auto, Start: 30 MHz, Stop: 1 000 MHz.
5. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep: Auto, Start: 1 000 MHz, Stop: 10 GHz.
6. Set the spectrum analyzer RBW: 1 MHz, VBW: Auto, Sweep: Auto, Start: 10 GHz, Stop: 12.5 GHz.
7. Detector mode: Peak mode.

Measurement data : BLE

		Test mode	Max. emission value		
			Low frequency	Middle frequency	High frequency
30 MHz ~ 1 000 MHz	3.70 (V)	Value(nW)	0.012	0.014	0.014
		Frequency(MHz)	550.753	880.304	173.013
1 000 MHz ~ 10 GHz		Value(nW)	0.207	0.236	0.184
		Frequency(MHz)	3 711.538	3 625.000	3 596.154
10 GHz ~ 12.5 GHz		Value(nW)	0.205	0.284	0.218
		Frequency(MHz)	10 576.923	10 568.910	10 120.192

Limit:

Below 1GHz: 4 nW or less

Above 1 GHz: 20 nW or less

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3.2.6 Interference prevention function

Test procedure

1. The transmitter output is connected to the Power meter
2. Setting the EUT is operating frequency(hopping mode).

Measurement data :

Test voltage	Low frequency	Middle frequency	High frequency
3.70 (V)	Pass	Pass	Pass

Limit:

Radio equipment used mainly on the same premised and automatically transmits or receives identification code

APPENDIX

TEST EQUIPMENT USED FOR TESTS

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	Description	Model No.	Manufacturer	Cal. Data	Cal. Due	Calibration body.	Calibration method.
1	ATTENUATOR	8493C	Agilent	2020-03-11	2021-03-11	HCT	24-2 paragraph4 「 J \ 」
2	POWER DIVIDER	11636B	Agilent	2020-03-11	2021-03-11	HCT	24-2 paragraph4 「 J \ 」
3	SPECTRUM ANALYZER	FSU26	R&S	2020-09-22	2021-09-22	HCT	24-2 paragraph4 「 J \ 」
4	Power supply	PST-3202	GWInstsk	2020-03-10	2021-03-10	HCT	24-2 paragraph4 「 J \ 」
5	USB Power sensor	U2021XA	Agilent	2020-03-10	2021-03-10	HCT	24-2 paragraph4 「 J \ 」
6	ATTENUATOR	WA/41-30-12	Weinschel	2020-03-10	2021-03-10	HCT	24-2 paragraph4 「 J \ 」
7	ATTENUATOR	WA-9-10-21	Weinschel	2020-03-11	2021-03-11	HCT	24-2 paragraph4 「 J \ 」
8	Vector SG	SMBV100A	R&S	2020-03-10	2021-03-10	HCT	24-2 paragraph4 「 J \ 」
9	8360B SERIES SWEPT SIGNAL GENERATOR	83640B	HP	2019-11-22	2020-11-22	HCT	24-2 paragraph4 「 J \ 」
10	Frequency Counter	53181A	Agilent	2020-03-11	2021-03-11	HCT	24-2 paragraph4 「 J \ 」
11	BLUETOOTH TESTER	TC-3000A	TESCOM	2020-03-10	2021-03-10	HCT	24-2 paragraph4 「 J \ 」

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