

# 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.:  
NW1905-J004

Page (1) / (18)

**1. Client**



- Name : 株式会社インターソリューションマーケティング
- Address : 東京都渋谷区恵比寿1-24-14 EXOS, 恵比寿ビル5F, 150-0013
- Date of Receipt : 2019-05-03

**2. Kind of Product : R1M****3. Model/ Type No. : SP69****4. Date of Test : 2019-05-06 ~ 2019-05-14****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	<b>Tested by</b> Jong-Myoung, Shin  (signature)	<b>Technical Manager</b> Kenneth, Kim  (signature)
-------------	---	--

May 15, 2019

**NCT CO., LTD.**



## Table of contents

<b>1. General Information</b>	3
<b>2. Information's about Test Item</b>	3
<b>3. Test Report</b>	4
<b>3.1 Test Summary</b>	4
<b>3.2 Test Result</b>	
3.2.1 Frequency tolerance	5
3.2.2 Occupied bandwidth (99%)	6
3.2.3 Antenna power	8
3.2.4 Unwanted emission strength	9
3.2.5 RX spurious emission	14
3.2.6 Interference prevention function	16

## APPENDIX

<b>Attachment TEST EQUIPMENT USED FOR TESTS</b>	17
---	----

## 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 : 株式会社インターソリューションマーケティング  
Address : 東京都渋谷区恵比寿1-24-14 EXOS, 恵比寿ビル5F, 150-0013  
Telephone / Facsimile : -/-

### 2-2 Equipment Under Test (EUT) description

Test item particulars : R1M  
Model and/or type reference : SP69  
Additional model name : -  
Serial number : Identification  
Antenna gain : Chip Antenna with Max gain : 0.93 dBi (M/N:SENA\_009)  
Date (s) of performance of tests : 2019-05-06 ~ 2019-05-14  
Date of receipt of test item : 2019-05-03  
EUT condition : Pre-production, not damaged  
Number of channel : 40  
EUT Power Source : DC 3.8 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	2 440	2 480

Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 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

**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.

Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 3.2 Test Result

#### 3.2.1 Frequency tolerance

##### 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	1 kHz
Video BW	Auto
Span	150 kHz
Sweep time	Auto
Detector mode	Positive peak
Trace mode	Max. hold

##### Measurement data :

Test voltage	Measured item	Operating frequency		
		Low frequency	Middle frequency	High frequency
3.80 (V)	Measured value (MHz)	2 401.996 951	2 439.996 756	2 479.997 481
	Tolerance (ppm)	-1.27	-1.33	-1.02

##### ※ Remark

FT (ppm) = [(Measured value(MHz)–Operating frequency(MHz))/Operating frequency(MHz)] × 10<sup>6</sup>

##### Limit:

±50×10<sup>-6</sup>(50 ppm or below)

Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 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 :

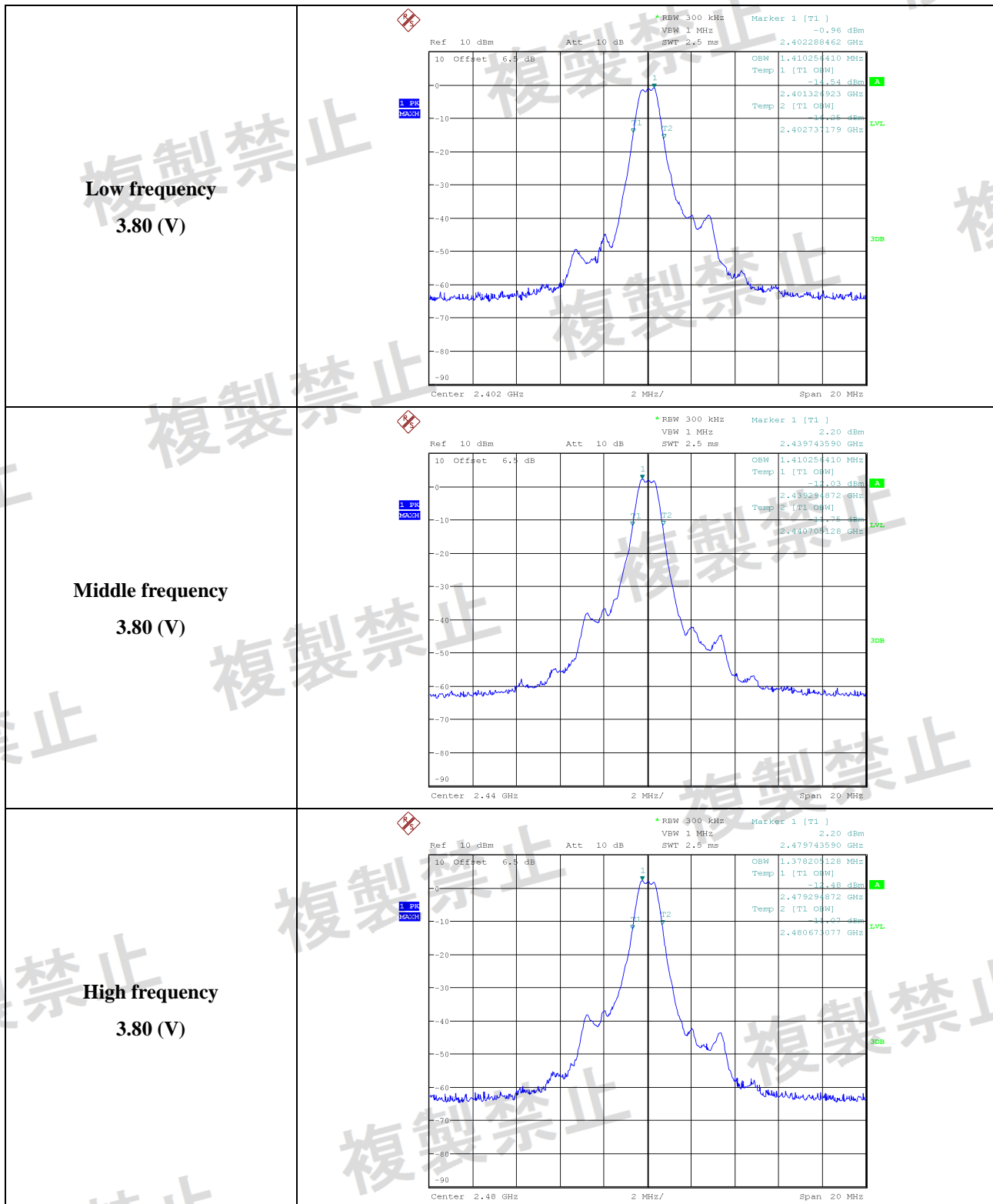
Test voltage	Occupied bandwidth (MHz)		
	Low frequency	Middle frequency	High frequency
3.80 (V)	1.41	1.41	1.38

#### Limit:

26MHz or below



**Test Plot :**



**Test Report No.: NW1905-J004**

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 3.2.3 Antenna power

#### Test procedure

1. The transmitter output is connected to the Power meter

#### Measurement data :

Test voltage	Measured item	Antenna power		
		Low frequency	Middle frequency	High frequency
3.80 (V)	Measure value (dBm)	-3.79	-0.64	-0.63
	Antenna power (mW)	0.42	0.86	0.86
	Power tolerance (%)	-67.86	-33.62	-33.46
Declared power(mW)		1.30		
Antenna gain(dBi)		0.93		

#### Limit:

Output power: 10 mW or Below

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



### 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 :**

	Test mode	Max. emission value		
		Low frequency	Middle frequency	High frequency
30 MHz ~ 2 387 MHz	Value( $\mu$ W)	0.006	0.011	0.014
	Frequency(MHz)	2 247.242	2 285.014	1 737.314
2 387 MHz ~ 2 400 MHz	Value( $\mu$ W)	3.459	0.007	0.007
	Frequency(MHz)	2 399.979	2 399.417	2 397.813
2 483.5 MHz ~ 2 496.5 MHz	Value( $\mu$ W)	0.008	0.008	0.188
	Frequency(MHz)	2 495.458	2 491.167	2 483.521
2 496.5 MHz ~ 12.5 GHz	Value( $\mu$ W)	0.017	0.012	0.011
	Frequency(MHz)	2 544.594	11 089.250	3 602.656

**Limit:**

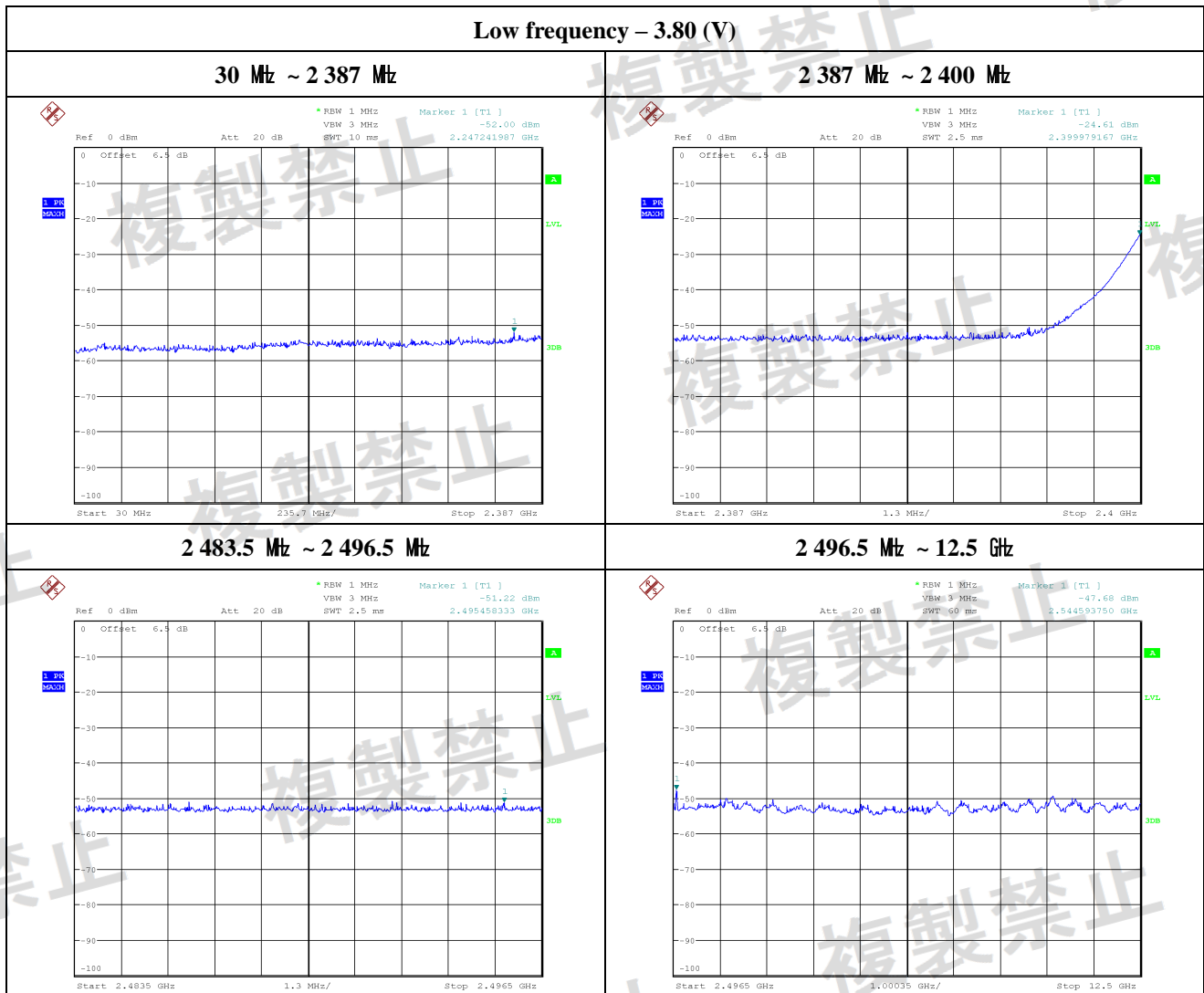
2 387 MHz  $\leq$  f  $\leq$  2 400 MHz and 2 483.5 MHz < f  $\leq$  2 496.5 MHz: 25  $\mu$ W or less

2 387 MHz > f and 2 496.5 MHz < f: 2.5  $\mu$ W or less

**Test Report No.: NW1905-J004**

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

**Test Plot :**

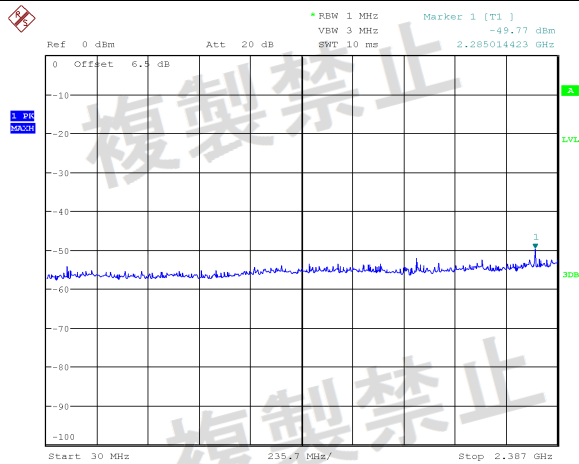


**Test Report No.: NW1905-J004**

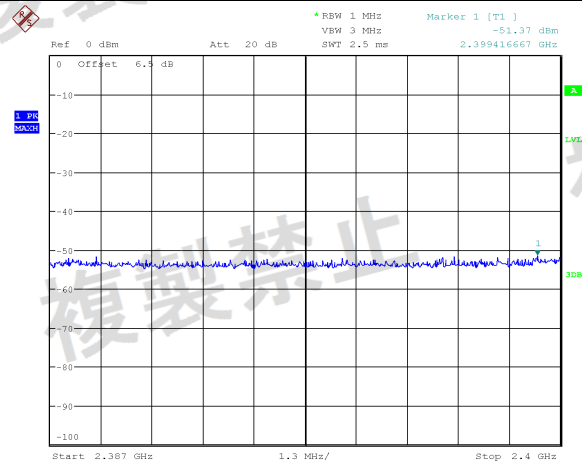
211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

# Middle frequency – 3.80 (V)

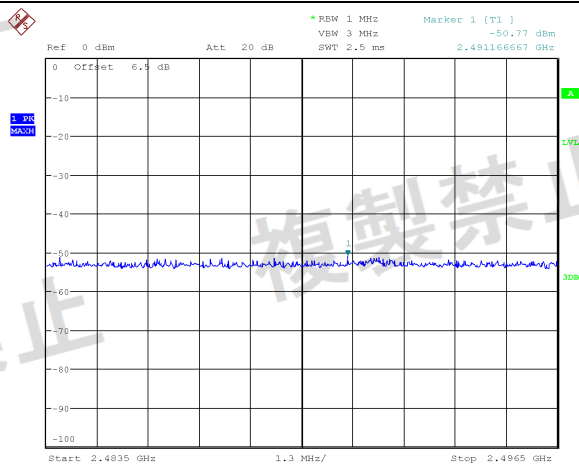
30 MHz ~ 2 387 MHz



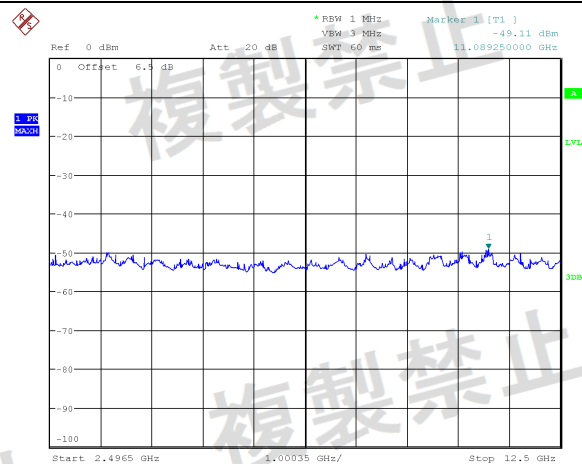
2 387 MHz ~ 2 400 MHz



2 483.5 MHz ~ 2 496.5 MHz



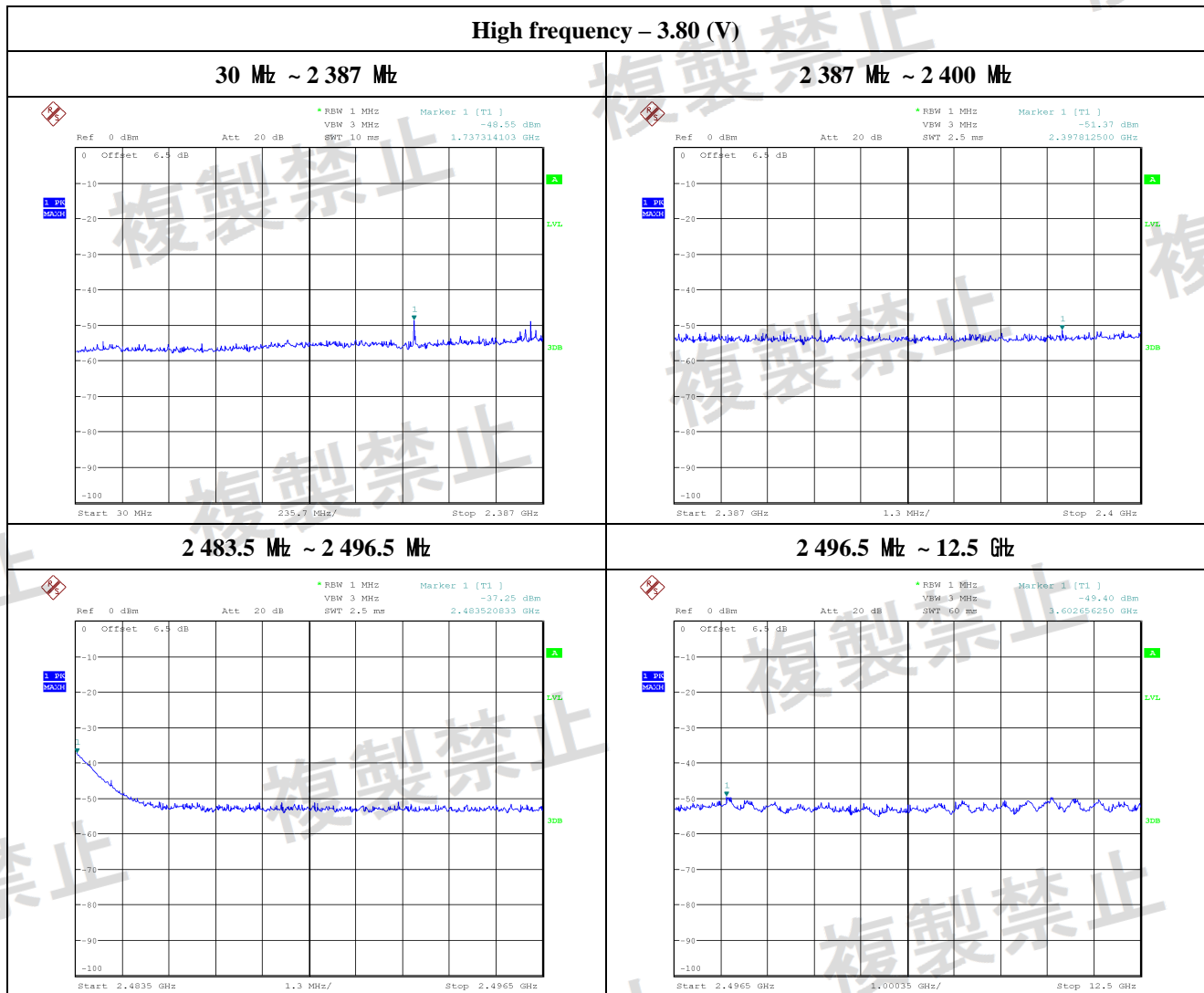
2 496.5 MHz ~ 12.5 GHz



Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511

www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071



Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 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 :**

	Test mode		Max. emission value		
			Low frequency	Middle frequency	High frequency
30 MHz ~ 1 000 MHz	3.80 (V)	Value(nW)	0.010	0.010	0.010
		Frequency(MHz)	875.641	665.785	639.359
1 000 MHz ~ 10 GHz		Value(nW)	0.092	0.098	0.108
		Frequency(MHz)	3 596.154	3 596.154	3 639.423
10 GHz ~ 12.5 GHz		Value(nW)	0.124	0.135	0.126
		Frequency(MHz)	11 486.378	10 649.038	10 629.006

**Limit:**

Below 1GHz: 4 nW or less

Above 1 GHz: 20 nW or less

**Test Report No.: NW1905-J004**

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

### 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
3.80 (V)	Pass	Pass	Pass

#### Limit:

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

## APPENDIX

### TEST EQUIPMENT USED FOR TESTS

---

Test Report No.: NW1905-J004

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071

	Description	Model No.	Manufacturer	Cal. Data	Calibration body.	Calibration method.
1	ATTENUATOR	8493C	Agilent	2019-03-13	HCT	24-2 paragraph4 「ハ」
2	POWER DIVIDER	11636B	Agilent	2019-03-13	HCT	24-2 paragraph4 「ハ」
3	SPECTRUM ANALYZER	FSU26	R&S	2019-03-11	HCT	24-2 paragraph4 「ハ」
4	Power supply	PST-3202	GWInstsk	2019-03-11	HCT	24-2 paragraph4 「ハ」
5	USB Power sensor	U2021XA	Agilent	2019-03-11	HCT	24-2 paragraph4 「ハ」
6	ATTENUATOR	WA/41-30-12	Weinschel	2019-03-11	HCT	24-2 paragraph4 「ハ」
7	ATTENUATOR	WA-9-10-21	Weinschel	2019-04-11	HCT	24-2 paragraph4 「ハ」
8	Vector SG	SMBV100A	R&S	2019-03-11	HCT	24-2 paragraph4 「ハ」
9	SIGNAL GENERATOR	83630L	HP	2019-03-11	HCT	24-2 paragraph4 「ハ」
10	Frequency Counter	53181A	Agilent	2019-03-13	HCT	24-2 paragraph4 「ハ」
11	BLUETOOTH TESTER	TC-3000A	TESCOM	2019-03-11	HCT	24-2 paragraph4 「ハ」

**Test Report No.: NW1905-J004**

211-71, Geumgok-ro, Hwaseong-si, Gyeonggi-do, Korea 18511  
www.nct.re.kr TEL: +82-31-323-6070 FAX: +82-31-323-6071