

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.:
NW1807-J001

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**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 : 2018-07-06

2. Kind of Product : 20S-EV**3. Model/ Type No. : SP38****4. Date of Test : 2018-07-09****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 Jong-Myoung, Shin  (signature)	Technical Manager Kenneth, Kim  (signature)
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July 16, 2018

NCT CO., LTD.  (seal)

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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 : 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 : 20S-EV
Model and/or type reference : SP38
Additional model name : -
Serial number : Identification
Antenna gain : PCB Pattern Antenna with Max gain : 0.6 dBi (M/N:SENA_009PATT)
Date (s) of performance of tests: : 2018-07-09
Date of receipt of test item : 2018-07-06
EUT condition : Pre-production, not damaged
Number of channel : 40
EUT Power Source : DC 3.7V 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

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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

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.

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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
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
4.07 (V)	Measured value (MHz)	2 402.003 269	2 440.003 091	2 480.004 040
	Tolerance (ppm)	1.36	1.27	1.63
3.70 (V)	Measured value (MHz)	2 402.003 360	2 440.003 070	2 480.004 164
	Tolerance (ppm)	1.40	1.26	1.68
3.33 (V)	Measured value (MHz)	2 402.003 313	2 440.003 081	2 480.004 086
	Tolerance (ppm)	1.38	1.26	1.65

※ 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

Test voltage	Occupied bandwidth (MHz)		
	Low frequency	Middle frequency	High frequency
4.07 (V)	1.33	1.33	1.33
3.70 (V)	1.33	1.33	1.33
3.33 (V)	1.33	1.33	1.33

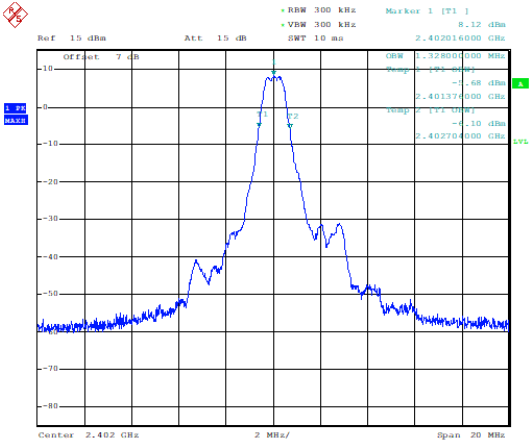
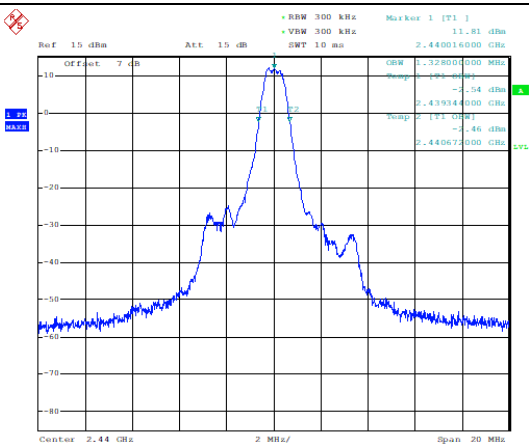
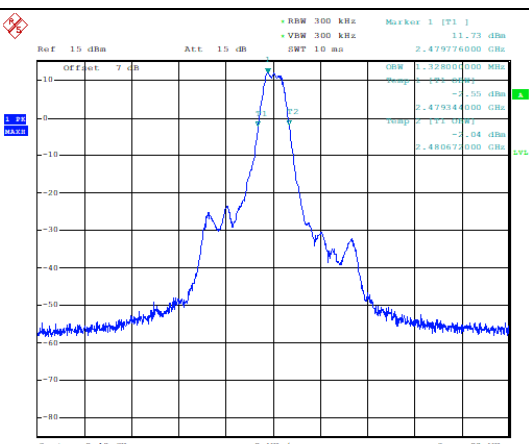
Limit:

26MHz or below

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Test Plot

<p>Low frequency 3.70 (V)</p>	 <p>Ref: 15 dBm Att: 15 dB Offset: 7 dB</p> <p>RBW 300 kHz VSW 300 kHz SWT 10 ms</p> <p>Marker 1 [T1] 8.12 dBm</p> <p>Center 2.402 GHz 2 MHz/ Span 20 MHz</p> <p>Peak 1: 8.12 dBm @ 2.402016000 GHz</p> <p>Peak 2: -0.48 dBm @ 2.401374000 GHz</p> <p>Peak 3: -0.10 dBm @ 2.402760000 GHz</p>
<p>Middle frequency 3.70 (V)</p>	 <p>Ref: 15 dBm Att: 15 dB Offset: 7 dB</p> <p>RBW 300 kHz VSW 300 kHz SWT 10 ms</p> <p>Marker 1 [T1] 11.81 dBm</p> <p>Center 2.44 GHz 2 MHz/ Span 20 MHz</p> <p>Peak 1: 11.81 dBm @ 2.440016000 GHz</p> <p>Peak 2: -0.54 dBm @ 2.439344000 GHz</p> <p>Peak 3: -0.46 dBm @ 2.440672000 GHz</p>
<p>High frequency 3.70 (V)</p>	 <p>Ref: 15 dBm Att: 15 dB Offset: 7 dB</p> <p>RBW 300 kHz VSW 300 kHz SWT 10 ms</p> <p>Marker 1 [T1] 11.73 dBm</p> <p>Center 2.48 GHz 2 MHz/ Span 20 MHz</p> <p>Peak 1: 11.73 dBm @ 2.479776000 GHz</p> <p>Peak 2: -0.50 dBm @ 2.479344000 GHz</p> <p>Peak 3: -0.04 dBm @ 2.480672000 GHz</p>

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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
4.07 (V)	Measure value (dBm)	4.38	8.99	9.13
	Antenna power (mW)	2.74	7.93	8.18
	Power tolerance (%)	-60.83	13.21	16.92
3.70 (V)	Measure value (dBm)	4.39	8.98	9.11
	Antenna power (mW)	2.75	7.91	8.15
	Power tolerance (%)	-60.74	12.95	16.39
3.33 (V)	Measure value (dBm)	4.37	8.97	9.14
	Antenna power (mW)	2.74	7.89	8.20
	Power tolerance (%)	-60.92	12.69	17.19
Declared power(mW)		7.0		
Antenna gain(dBi)		0.6		

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

	Test mode		Max. emission value (dBm)		
			Low frequency	Middle frequency	High frequency
30 MHz ~ 2 387 MHz	4.07(V)	Value(μ W)	0.187	0.189	0.174
		Frequency(MHz)	2 349.288	2 285.178	2 292.720
2 387 MHz ~ 2 400 MHz		Value(μ W)	23.227	0.233	0.204
		Frequency(MHz)	2 399.979	2 388.737	2 397.982
2 483.5 MHz ~ 2 496.5 MHz		Value(μ W)	0.258	0.237	1.466
		Frequency(MHz)	2 495.741	2 486.069	2 483.542
2 496.5 MHz ~ 12.5 GHz		Value(μ W)	0.322	0.222	0.334
		Frequency(MHz)	2 560.522	3 104.713	2 840.620
30 MHz ~ 2 387 MHz	3.70(V)	Value(μ W)	0.146	0.161	0.212
		Frequency(MHz)	2 277.635	2 249.351	2 326.661
2 387 MHz ~ 2 400 MHz		Value(μ W)	22.856	0.223	0.195
		Frequency(MHz)	2 399.979	2 396.755	2 398.783
2 483.5 MHz ~ 2 496.5 MHz		Value(μ W)	0.245	0.290	1.271
		Frequency(MHz)	2 487.317	2 484.051	2 483.573
2 496.5 MHz ~ 12.5 GHz		Value(μ W)	0.372	0.247	0.314
		Frequency(MHz)	2 560.522	3 368.805	3 064.699
30 MHz ~ 2 387 MHz	3.33(V)	Value(μ W)	0.145	0.226	0.267
		Frequency(MHz)	1 031.254	2 285.178	2 326.661
2 387 MHz ~ 2 400 MHz		Value(μ W)	23.014	0.199	0.209
		Frequency(MHz)	2 399.979	2 396.485	2 388.706
2 483.5 MHz ~ 2 496.5 MHz		Value(μ W)	0.251	0.233	1.346
		Frequency(MHz)	2 492.538	2 483.833	2 483.542
2 496.5 MHz ~ 12.5 GHz		Value(μ W)	0.407	0.334	0.338
		Frequency(MHz)	2 560.522	2 992.674	2 928.651

Limit:

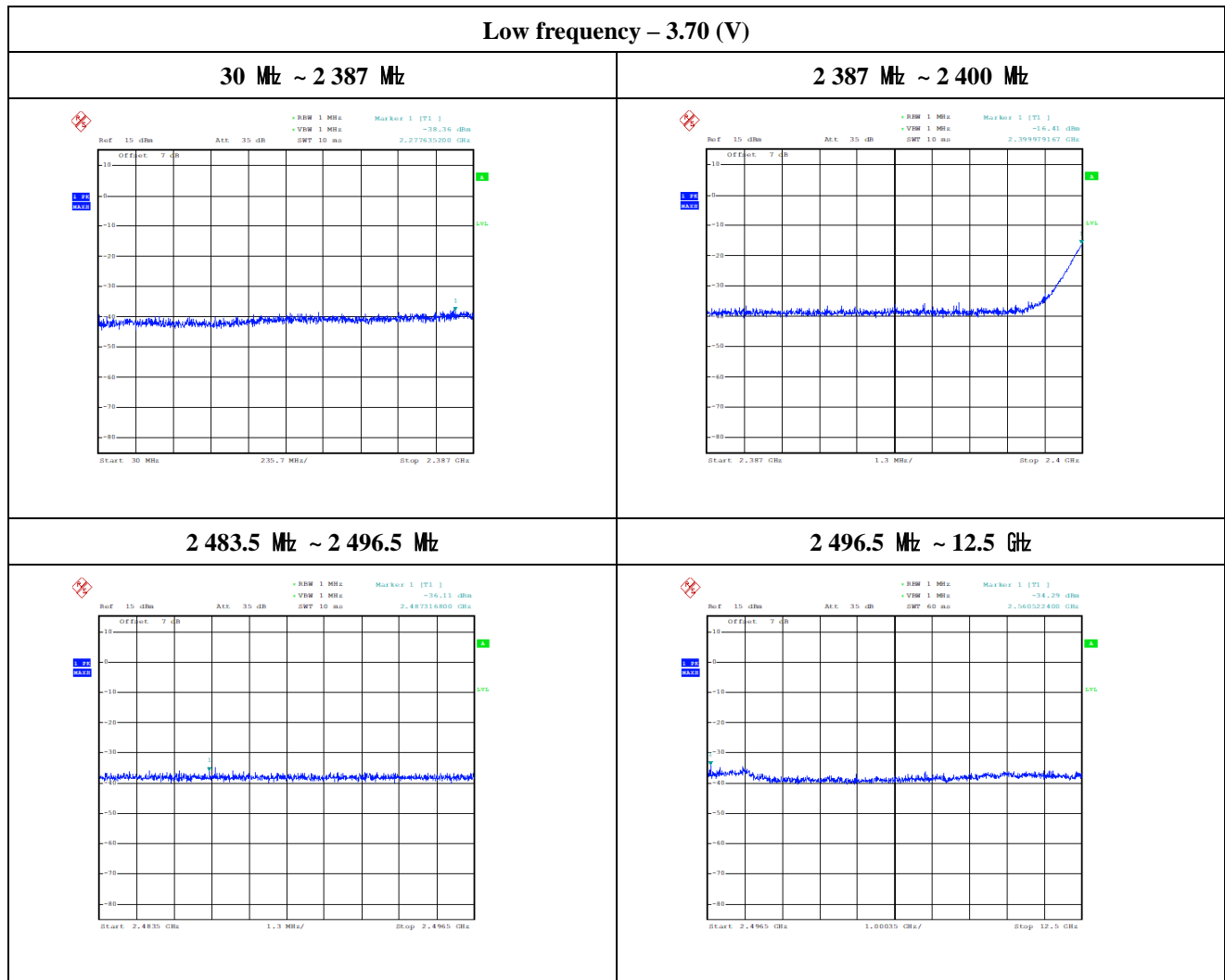
2 387 MHz $\leq f \leq$ 2 400 MHz and 2 483.5 MHz $< f \leq$ 2 496.5 MHz: 25 μ W or less

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

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Test Plot :

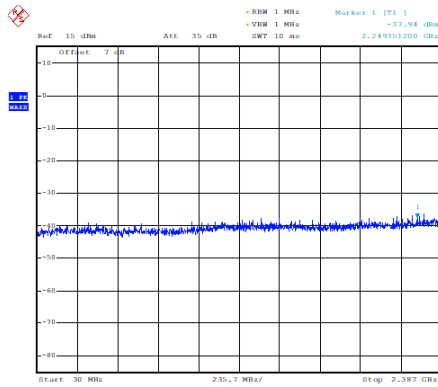


Test Report No.: NW1807-J001

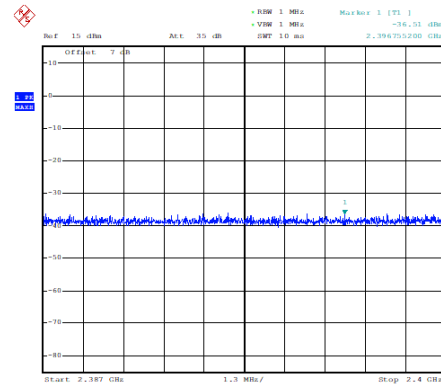
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Middle frequency – 3.70 (V)

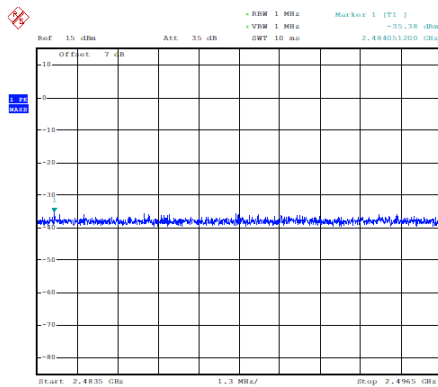
30 MHz ~ 2 387 MHz



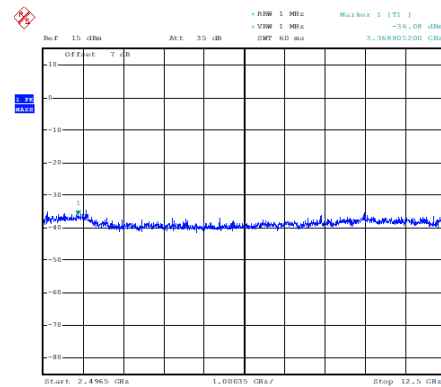
2 387 MHz ~ 2 400 MHz



2 483.5 MHz ~ 2 496.5 MHz

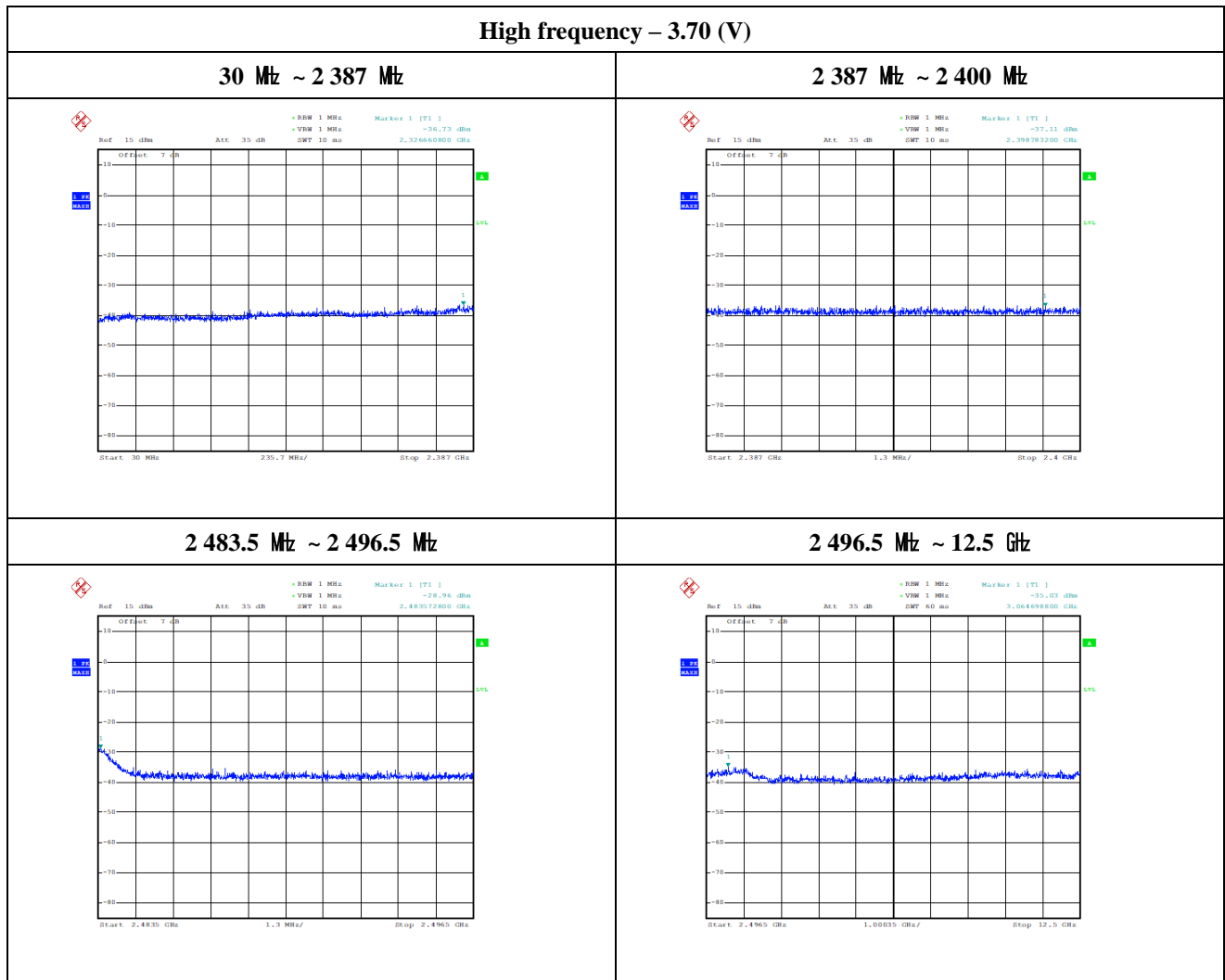


2 496.5 MHz ~ 12.5 GHz



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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 (dBm)		
			Low frequency	Middle frequency	High frequency
30 MHz ~ 1 000 MHz	4.07(V)	Value(nW)	0.015	0.014	0.018
		Frequency(MHz)	844.800	980.600	213.136
1 000 MHz ~ 10 GHz		Value(nW)	0.218	0.310	0.244
		Frequency(MHz)	2 951.200	3 030.400	2 598.400
10 GHz ~ 12.5 GHz		Value(nW)	0.238	0.261	0.225
		Frequency(MHz)	10 532.000	12 386.000	10 428.000
30 MHz ~ 1 000 MHz	3.70(V)	Value(nW)	0.017	0.014	0.016
		Frequency(MHz)	741.592	707.448	213.912
1 000 MHz ~ 10 GHz		Value(nW)	0.299	0.245	0.314
		Frequency(MHz)	3 520.000	3 275.200	3 174.400
10 GHz ~ 12.5 GHz		Value(nW)	0.208	0.190	0.258
		Frequency(MHz)	10 432.000	12 410.000	10 760.000
30 MHz ~ 1 000 MHz	3.33(V)	Value(nW)	0.016	0.015	0.014
		Frequency(MHz)	818.416	368.336	220.120
1 000 MHz ~ 10 GHz		Value(nW)	0.252	0.261	0.214
		Frequency(MHz)	3 368.800	3 592.000	3 275.200
10 GHz ~ 12.5 GHz		Value(nW)	0.197	0.249	0.237
		Frequency(MHz)	10 564.000	10 730.000	11 794.000

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
4.07 (V)	Pass	Pass	Pass
3.70 (V)	Pass	Pass	Pass
3.33 (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

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	Description	Model No.	Manufacturer	Cal. Data	Calibration body.	Calibration method.
1	ATTENUATOR	8493C	Agilent	2018-04-11	HCT	24-2 paragraph4 「ハ」
2	POWER DIVIDER	11636B	Agilent	2018-04-11	HCT	24-2 paragraph4 「ハ」
3	SPECTRUM ANALYZER	FSU26	R&S	2018-04-11	HCT	24-2 paragraph4 「ハ」
4	Power supply	PST-3202	GWInstsk	2018-04-10	HCT	24-2 paragraph4 「ハ」
5	USB Power sensor	U2021XA	Agilent	2018-04-11	HCT	24-2 paragraph4 「ハ」
6	ATTENUATOR	WA/41-30-12	Weinschel	2018-04-20	HCT	24-2 paragraph4 「ハ」
7	ATTENUATOR	WA-9-10-21	Weinschel	2018-04-20	HCT	24-2 paragraph4 「ハ」
8	Vector SG	SMBV100A	R&S	2018-04-13	HCT	24-2 paragraph4 「ハ」
9	SIGNAL GENERATOR	83630L	HP	2018-03-14	HCT	24-2 paragraph4 「ハ」
10	Frequency Counter	53181A	Agilent	2018-03-14	HCT	24-2 paragraph4 「ハ」
11	BLUETOOTH TESTER	TC-3000A	TESCOM	2018-03-15	HCT	24-2 paragraph4 「ハ」

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