


TEST REPORT

Report number: DRTTEC1804-0066(2)**Issue Date:** Apr 18, 2018

Applicant	:	Infomark Co., Ltd. 3F Humaxvillage, 216 Hwangsaetul-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13598, Korea
Equipment under test(EUT)	:	Smart Speaker
Model Name	:	NL-S200JP
Date of Test	:	2018-03-16 ~ 2018-03-30
Test Place	:	DT&C Co., Ltd. 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935
Test Results	:	PASS (Refer to attachment)

The results in this reports are applicable only to the samples tested.
This report shall not be re-produced except in full without the written approval of
DT&C Co., Ltd.

Tested Engineer;
Hyun Yong Seol**Approval Person;**
Geun Ki Son

1. Summary of Test

1. Purpose of test

Ordinance on Technical Standards Conformity Certification of Specified Radio Equipment
5.2GHz, 5.3GHz Band wide band low power data communication System

2. Standards

Certification Ordinance Article 2 Clause 1 Item19-3

1) Test Methods

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 45

2) Deviation from standards

None

3. List of applied test to the EUT

Article 88 Appendix 45	Classification of EUT	Condition	Result
1	Voltage fluctuation	Conducted	PASS
3	Frequency Tolerance	Conducted	PASS
4	Occupied Bandwidth	Conducted	PASS
5	Unwanted (Spurious) Emission Strength	Conducted	PASS
6	RF Output Power Tolerance	Conducted	PASS
7	Adjacent Channel Leakage Power and Out-of-Band Leakage Power	Conducted	PASS
8	Secondary Emitted Radio Wave Strength	Conducted	PASS
9	Interference Prevention Function	Conducted	PASS
10	Transmission Burst Length	Conducted	PASS
11	Transmission Power Control Function (TPC)	Conducted	PASS
12	Carrier Sensing Function	Conducted	PASS
14	Dynamic Frequency Selection Function(DFS)	Conducted	N/A

1) Test set up

Table-Top

2) Modification to the EUT by laboratory

None

2. Test Information

1. Applicant

Infomark Co., Ltd.

3F Humaxvillage, 216 Hwangsaoul-ro, Bundang-gu,
Seongnam-si, Gyeonggi-do, 13598, Korea

2. Equipment under test

Smart Speaker

3. Model number

NL-S200JP

4. Serial number

Identical prototype

5. Size

(W) 36.00 × (D) 36.55 × (H) 56.91 mm

6. Terminal limitation

-20°C to 50°C

7. RF Specification Frequency range

802.11a/n(HT20) : 5260 MHz ~ 5320 MHz

802.11n(HT40) : 5270 MHz ~ 5310 MHz

8. Number of RF Channels

20 MHz interval 4 Channel, 40 MHz interval 2 Channel

9. Modulation method & Data rate

802.11a: Orthogonal Frequency Division Multiplexing

(Up to 54Mbps)

802.11n(HT20): Orthogonal Frequency Division Multiplexing

(Up to 144.4Mbps)

802.11n(HT40): Orthogonal Frequency Division Multiplexing

(Up to 300Mbps)

10. Variation of the family model(s)

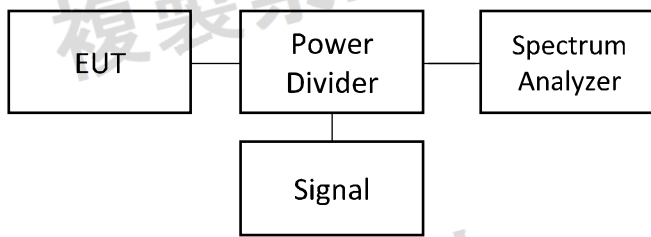
NL-S210JP, NL-S220JP, NL-S230JP

3. Configuration of equipment

1. Frequency tolerance, RF output power tolerance, Spread bandwidth, Unwanted(Spurious) emission strength, Secondary emitted radio wave strength



2. Carrier Sensing Function



4. 試驗結果*Test results*

Environment of test room	Date of test	2018-03-16 ~ 2018-03-30
	Temperature	20 ~ 23 °C
	Humidity	50 ~ 54 %

Peak Antenna Gain	3.034	dBi
Declaration Output Power	2.2	mW/MHz
	3.4242	dBm/MHz
E.I.R.P	4.4241	mW/MHz
	6.4582	dBm/MHz
Input Power Voltage	3.7	VDC

Tested Circuit Insertion	Tx1	0	dB
Transmission Time	ON TIME (1sec or less)	1.276	msec
	OFF TIME (0.1sec or more)	0.198	msec
	Ratio	87%	%
Packet Type (Mode)		OFDM	mode

Test category ;	5GHz Band Low-Power Data Communication System 802.11 n (HT 20)
The reason why the tests are performed only at rated voltage :	When the input voltage to receiver RF circuit varies below $\pm 1\%$ as the input voltage from the external power supply to the receiver varies $\pm 10\%$ (excluding power supply).

Measurement Channel	Ch.	52	56	60	64		
Measurement Frequency	MHz	5260	5280	5300	5320	Result	Limit
Frequency Measurements(Tx1)	MHz	5260.016250		5299.988750	5319.957500	----	----
Frequency Tolerance(Tx1)	ppm	3.08935		-2.12264	-7.98872	PASS	$\pm 20 \times 10^{-6}$ (20ppm)
Occupied Bandwidth(Tx1)	MHz	17.994		17.976	18.019	PASS	19MHz or below
RF Output Power(Tx1)	mW/MHz	1.561877		1.529843	1.444265	PASS	10mW/MHz or below
RF Output Power (Tx1)or(Tx1+2)or(Tx1+2+3)or(Tx1+2+3+4)	mW/MHz	1.561877		1.529843	1.444265	PASS	10mW/MHz or below
RF Output Power Tolerance (Tx1)or(Tx1+2)or(Tx1+2+3)or(Tx1+2+3+4)	%	-29.006		-30.462	-34.352	PASS	+20% to -80%

Measurement Channel		Ch.	52	56	60	64		
Measurement Frequency		MHz	5260	5280	5300	5320	Result	Limit
Unwanted (Spurious) Emission Strength(Tx1)	30MHz to 5135MHz	uW/MHz	0.023		0.020	0.020	PASS	2.5uW/MHz or below
		MHz	5063.260		5103.430	5120.930	----	----
	5365MHz to 26GHz	uW/MHz	0.066		0.070	0.067	PASS	2.5uW/MHz or below
		MHz	24884.730		24866.760	24842.990	----	----
Adjacent Channel Leakage Power (Tx1)	cf	dB	13.860		13.643	13.658	----	----
	cf-20MHz	dB	-37.670		-37.753	-37.778	PASS	-25dBc or below
	cf+20MHz	dB	-37.520		-37.813	-37.928	PASS	-25dBc or below
	cf-40MHz	dB	-48.540		-48.083	-47.938	PASS	-40dBc or below
	cf+40MHz	dB	-47.970		-47.753	-47.778	PASS	-40dBc or below

Measurement Channel		Ch.	52	56	60	64		
Measurement Frequency		MHz	5260	5280	5300	5320	Result	Limit
Out-Band Leakage Power (Tx1)	5135 to 5233.3MHz	uW/MHz	1.350		0.026	0.039	PASS	2.5uW/MHz or below
		MHz	5232.5022		5149.3262	5135.6508	----	----
	5233.3 to 5240MHz	uW/MHz	9.213		0.016	0.005	PASS	10 ^{-1.0561} mW/MHz or below
		MHz	5238.9171		5234.1929	5235.5831	----	----
	Limit	uW/MHz	11.750		3.185	4.677	----	----
	5240 to 5249MHz	uW/MHz	28.418		0.099	0.005	PASS	10 ^{-1.0586/1.12} mW/MHz or below
		MHz	5248.8989		5247.4811	5241.0824	----	(Ch1)RBW, VBW: 30kHz
	Limit	uW/MHz	97.952		73.280	19.779	----	+15.23dB
	5249 to 5250MHz	uW/MHz	160.842		0.060	0.007	PASS	10 ^{-14.8610/15} uW/MHz or below
		MHz	5249.8716		5249.0375	5249.8004	----	(Ch1)RBW, VBW: 30kHz
	Limit	uW/MHz	744.046		109.018	631.539	----	+15.23dB
	5350 to 5365MHz	uW/MHz	0.017		0.117	0.992	PASS	2.5uW/MHz or below
		MHz	5353.1878		5351.9806	5350.5967	----	----

Measurement Channel		Ch.	52	56	60	64		
Measurement Frequency		MHz	5260	5280	5300	5320	Result	Limit
Secondary Emitted Radio Wave Strength (Rx1)	30MHz to 1000MHz	nW	0.005		0.003	0.003	PASS	4nW or below
		MHz	953.470		952.370	977.990	----	----
	1GHz to 10GHz	nW	0.137		0.068	0.052	PASS	20nW or below
		MHz	1722.830		6800.210	7034.610	----	----
	10GHz to 26GHz	nW	2.000		2.234	2.388	PASS	20nW or below
		MHz	25491.860		24833.130	25391.230	----	----
Burst Length of Transmitted Signals			Good		Good	Good	PASS	4ms or below
Carrier Sensing Function			Good		Good	Good	PASS	100mV/m
Transmission Power Control Function			Good		Good	Good	PASS	3dB
Interference Prevention Function			Good				PASS	

5. 測定機器リスト

Measurement equipment list

[illegible]

Note1: "X" は使用した測定機器です。
"X" used equipment.

Note2: 較正期限は、較正を行った日の翌月から起算して1年以内です。
The validity of measurement equipment is one year from the first day of the following month of the calibration date.

Note3: 校正方法 ...
Cal.Method ...

イ) : 国立研究開発法人情報通信研究機構（NICT）（以下「機構」という。）又は第二百二条の十八第一項の指定校正機関（TELEC, インターテックジャパン、キーサイト）が行う校正

ア) : Calibration conducted by the National Institute of Information and Communications Technology～NICT～ or a designated calibration agency under Article 102-18 paragraph (1)～ TELECOM Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc～.

ロ) : 計量法（平成四年法律第五十一号）第三十五条 又は第四十四条 の規定に基づく校正（JCSS校正）

バ) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)～Japan Calibration Service System～

ハ) : 外国において行う校正であつて、機構又は第二百二条の十八第一項の指定校正機関（TELEC, インターテックジャパン、キーサイト）が行う校正に相当するもの

シ) : Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)～ TELECOM Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc～.

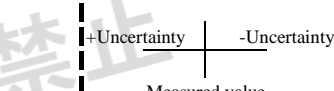
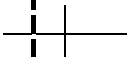
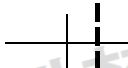
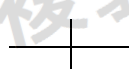
ニ) : イからハまでのいずれかに掲げる校正等を受けたものを用いて行う校正等

ド) : Calibration conducted by using other equipment that listed above from a) to c)

6. 測定の不確かさ

About uncertainty of measured value

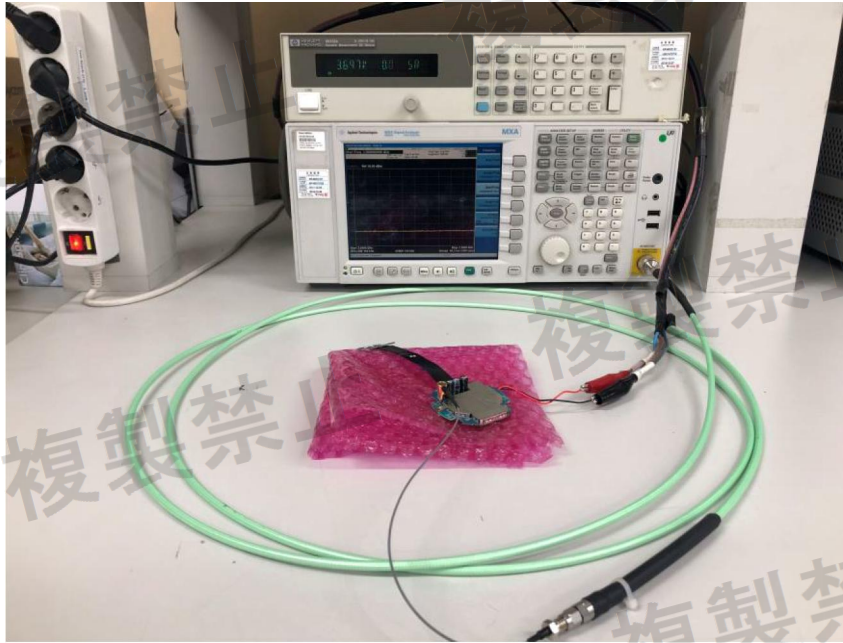
Parameter	Uncertainty
Total RF power conducted	1.5dB
Spurious emissions conducted	1.18dB
Temperature	0.4℃
Humidity	2%

Judge	Measured value and standard limit value	
PASS	Case1  <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p>	
	Case2  <p>Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.</p>	
FAIL	Case3  <p>Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.</p>	
	Case4  <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p>	

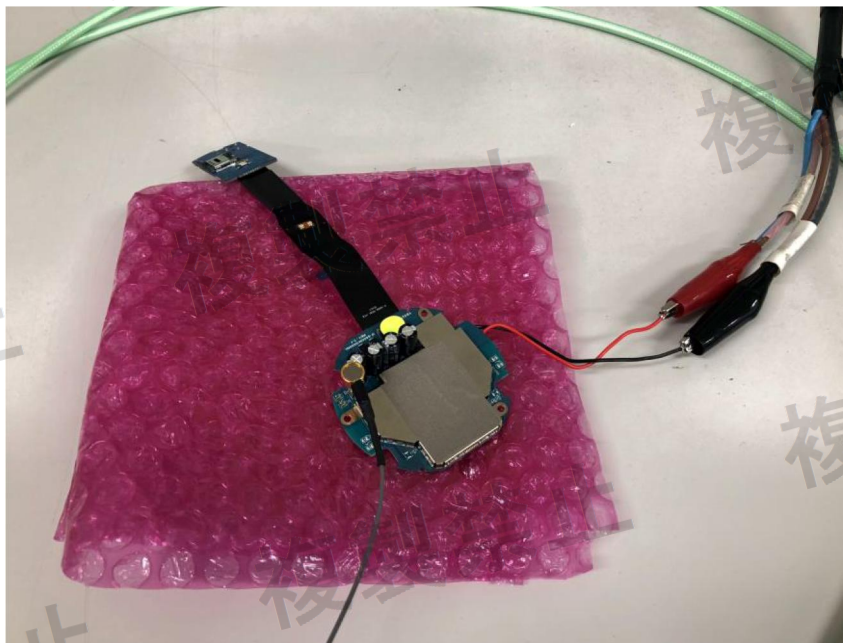
7. 測定写真

Photographs

Conducted Measurement Photo(1)



Conducted Measurement Photo(2)



8. 測定チャート

Test chart

8.1 周波数偏差

Frequency tolerance

Tx1

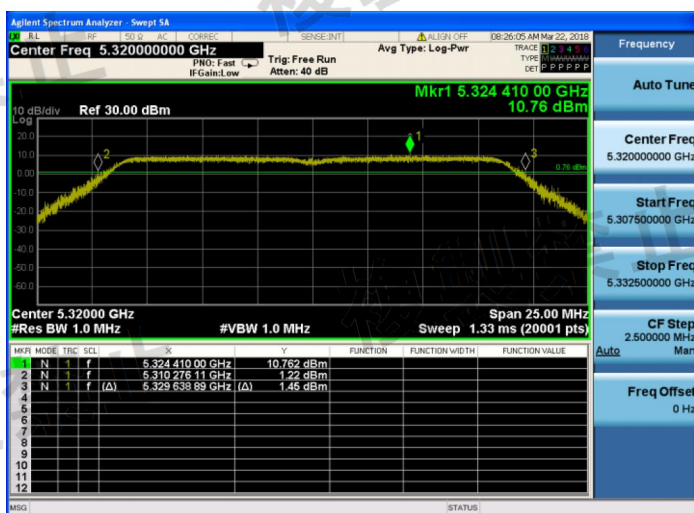
Ch.52: 5260MHz



Ch.60: 5300MHz

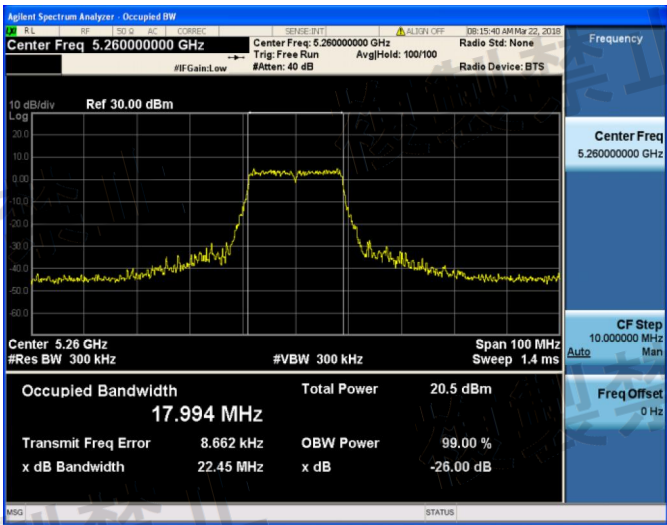


Ch.64: 5320MHz

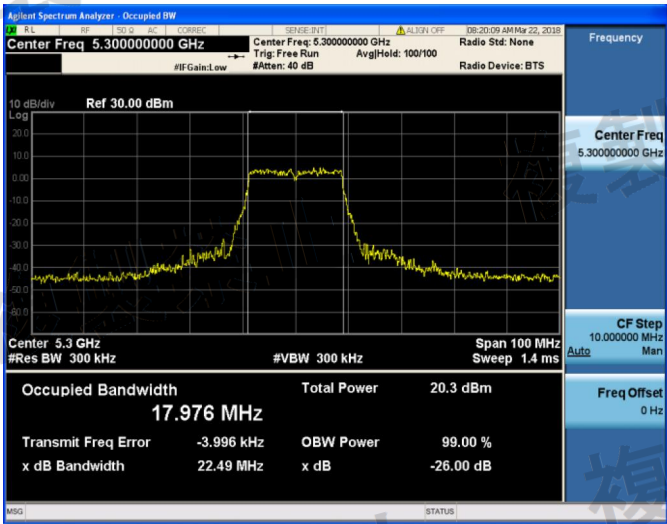


8.2 占有周波数帯幅
Occupied bandwidth

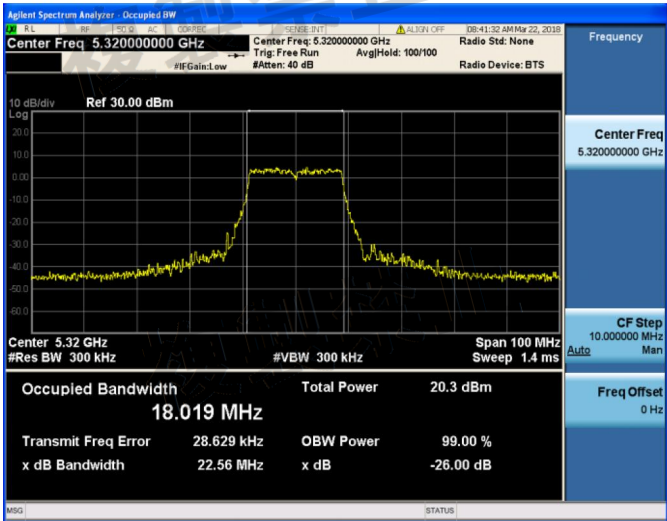
Tx1
Ch.52: 5260MHz



Ch.60: 5300MHz



Ch.64: 5320MHz



8.3 空中線電力の偏差 RF output power tolerance

Tx1

Ch.52: 5260MHz



Ch.60: 5300MHz



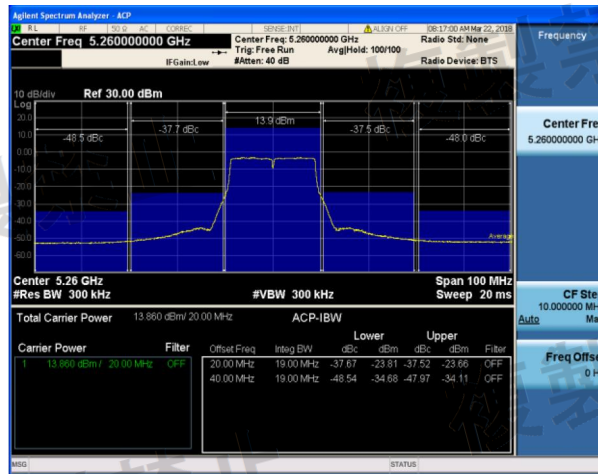
Ch.64: 5320MHz



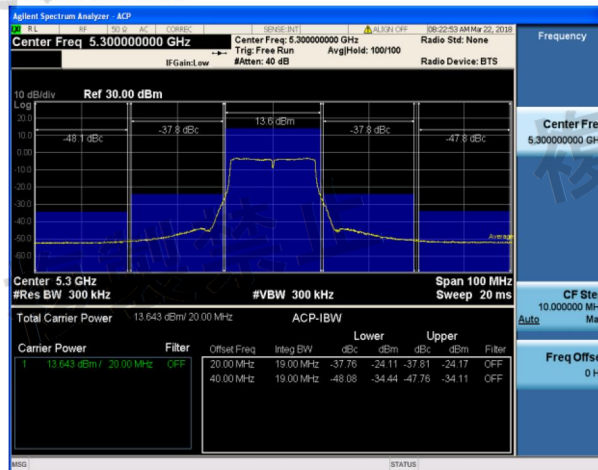
8.4 隣接チャネル漏洩電力 Adjacent Channel Leakage Power

Tx1

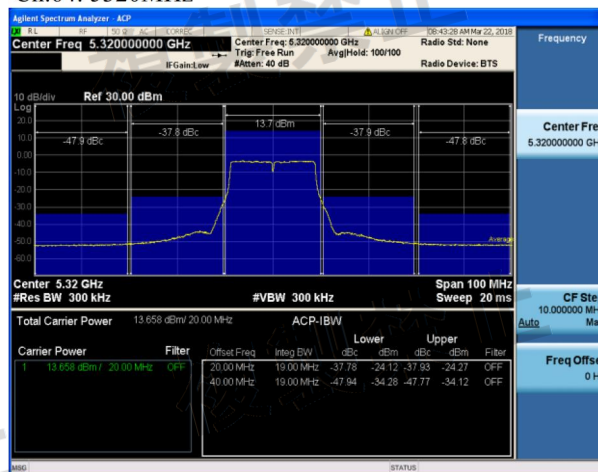
Ch.52: 5260MHz



Ch.60: 5300MHz



Ch.64: 5320MHz



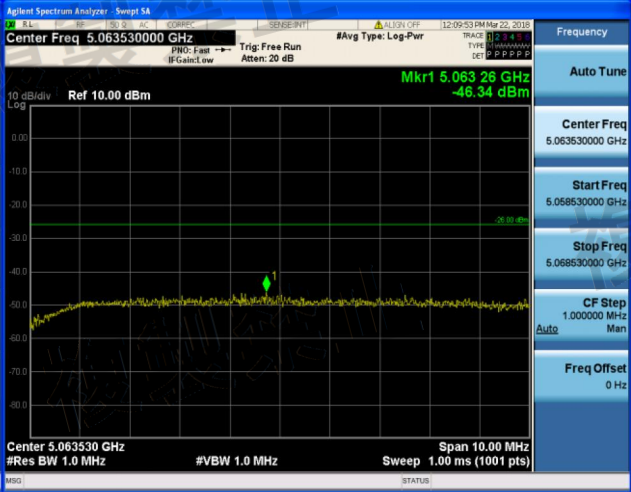
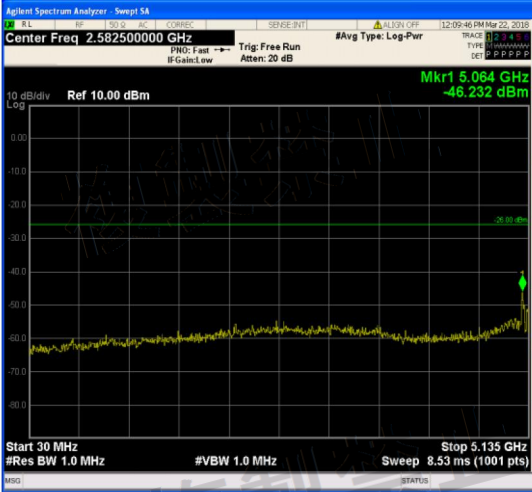
8.5 スプリアス発射又は不要発射の強度
Unwanted(Spurious) emission strength

1x1

Ch.52: 5260MHz

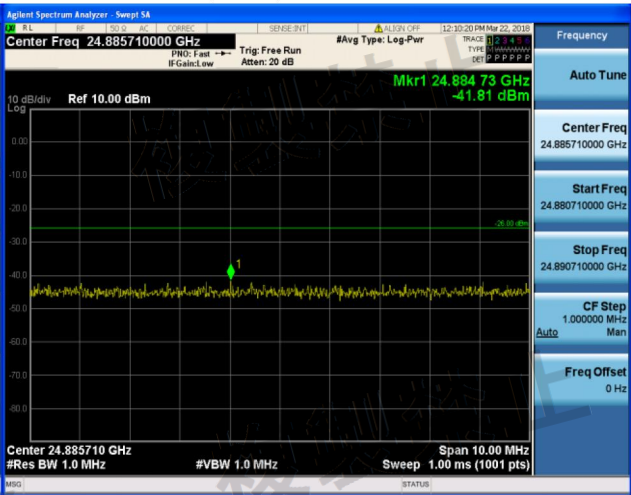
30MHz-5135MHz(Search)

30MHz-5135MHz(Detail)

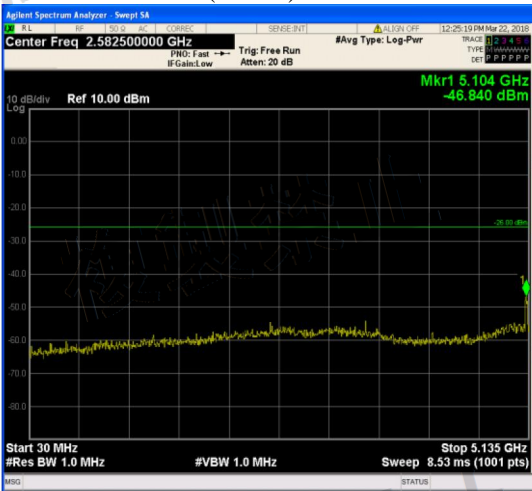


5365MHz-26GHz(Search)

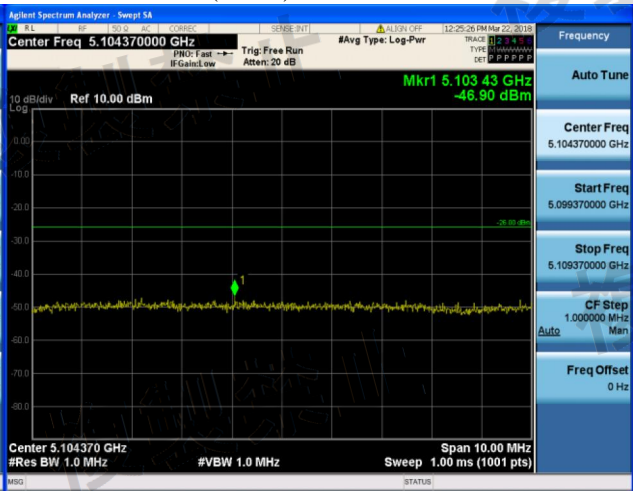
5365MHz-26GHz(Detail)



Ch.60: 5300MHz
30MHz-5135MHz(Search)



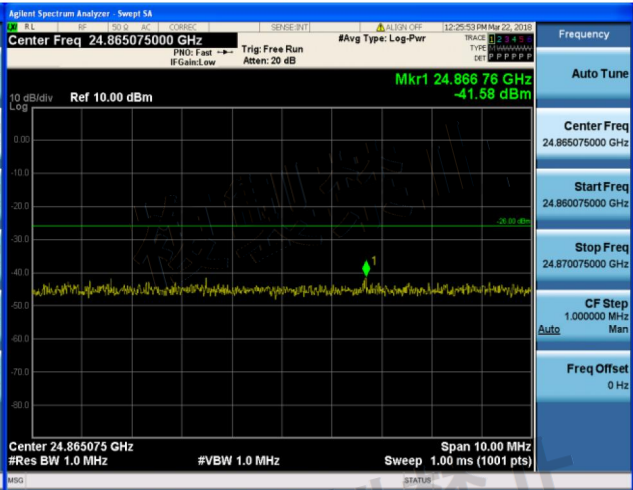
30MHz-5135MHz(Detail)



5365MHz-26GHz(Search)



5365MHz-26GHz(Detail)

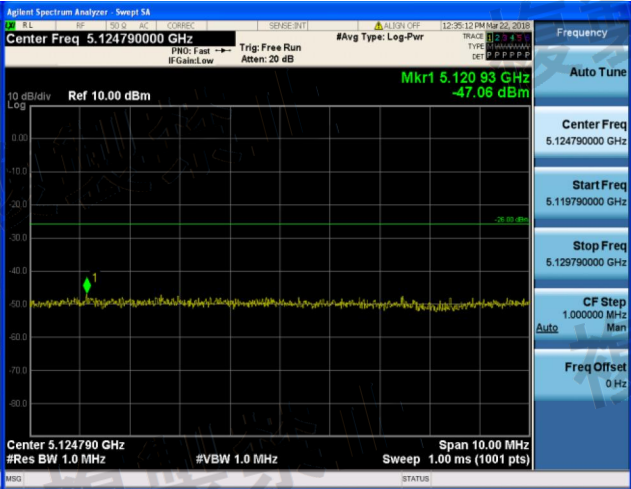


Ch.64: 5320MHz

30MHz-5135MHz(Search)



30MHz-5135MHz(Detail)



5365MHz-26GHz(Search)



5365MHz-26GHz(Detail)

