

試験報告書

TEST REPORT

Report number 報告書番号 : KR0140-RJ2301-002

Issue date 発行日 : 2023-01-12

申請者 Applicant	:	InterSolutionMarketing, Inc. 150-0013 東京都渋谷区恵比寿 1-24-14 EXOS 恵比寿ビル 5F
型式又は名称 Model name	:	SP135-C
製造番号 Serial number	:	N/A
測定規格 Test procedure	:	証明規則第2条第19号の規定する特定無線設備の2.4GHz帯高度化小電力データ通信システム
測定方法 Test method	:	総務省告示第88号別表第43
測定日 Date of test	:	2023-01-10 ~ 2023-01-10
試験設備名 Name of facility	:	EMC Labs Co., Ltd.
試験結果 Test Result	:	適合

この試験報告書における測定結果は試験された装置にのみ該当します。
また、完全な複製を除き、当試験所の文書による承認なしに、報告書の一部だけを複製することを禁止します。

測定者;
Tested by;

Yong Min, Won

承認者;
Approved by;

JongMyoung, Shin

1. Summary of Test

1. Purpose of test

Ordinance on Technical Standards Conformity Certification of Specified Radio Equipment
2.4GHz Band wide band low power data communication System

2. Standards

Certification Ordinance Article 2 Clause 1 Item19

1) Test Methods

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

2) Deviation from standards

None

3. List of applied test to the EUT

Classification of EUT	Condition	Result
Frequency Tolerance	Conducted	PASS
Occupied Bandwidth	Conducted	PASS
Spurious Emission Intensity	Conducted	PASS
RF Output Power Tolerance	Conducted	PASS
Secondary Emitted Radiated Wave Strength	Conducted	PASS
Interference Prevention Function	Conducted	PASS

1) Test set up

Table-Top

2) Modification to the EUT by laboratory

None

2. Test Information

1. Applicant

InterSolutionMarketing, Inc.

150-0013 東京都渋谷区恵比寿 1-24-14 EXOS 恵比寿ビル 5F

2. Equipment under test

SFx

3. Model number

SP135-C

4. Serial number

-

5. RF Specification Frequency range

Bluetooth BLE : 2402-2480MHz 40 Channels

6. Number of RF Channels

Bluetooth BLE : 40 Channels

7. Modulation method

Bluetooth BLE : GFSK

8. Data rate

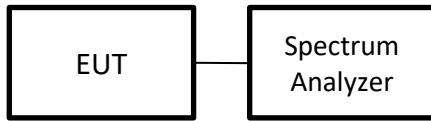
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9. Variation of the family model(s)

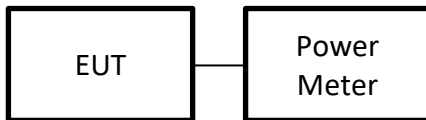
SP135-B, SP135-A

3. Configuration of equipment

1. Frequency Tolerance, Occupied Bandwidth, Unwanted(Spurious)Emission Strength, Secondary Emittted Radio Wave Strength



2. RF Output Power



4. 試驗結果

Test results

S/N:

Environment of test room	Date of test	2023-01-10
	Temperature	23.8 °C
	Humidity	49.5 %

Peak Antenna Gain	0.3	dBi
Declaration Output Power	2	mW
Declaration Output Power	3.0103	dBm
E.I.R.P.	3.3103	dBm
Input Power Voltage	3.7	VDC

Frequency equal to the Transmission rate		---	MHz
Transmission Time	ON TIME (1sec or less)	0.393	ms
	OFF TIME (0.1sec or more)	0.233	ms
	Ratio	0.6274	-
Packet Type (Mode)		---	mode
Transmit Speed		---	MHz

Test category :	2.4GHz Band Low-Power Data Communication System (GFSK/0-39ch)
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 Frequency		MHz	2402	2440	2480	Result	Limit	Note
Channel Number		Ch.	0	19	39	---	---	
Frequency Measurements		MHz	2401.970000	2439.977500	2479.972500	---	---	
Frequency Tolerance		ppm	-12.48959	-9.22131	-11.08871	PASS	±50×10 ⁻⁶ (50ppm)	
Occupied Bandwidth		MHz	1.282	1.271	1.2681	PASS	26MHz or below	
RF Output Power		mW	0.854476	0.930679	1.081932	PASS	10mW or below	
RF Output Power Tolerance		%	-57.276187	-53.466041	-45.903396		+20 to -80%	
Unwanted (Spurious) Emission Strength	30 to 2387MHz	uW/MHz	0.015066	0.000547	0.002636	PASS	2.5uW/MHz or below	
		MHz	2385.000	2309.000	2257.000	----		
	2387 to 2400MHz	uW/MHz	1.438799	0.002254	0.000336	PASS	25uW/MHz or below	
		MHz	2399.990	2397.780	2399.400	----		
	2483.5 to 2496.5MHz	uW/MHz	0.000405	0.002234	0.737904	PASS	25uW/MHz or below	
		MHz	2489.130	2484.500	2483.860	----		
	2496.5 to 12500MHz	uW/MHz	0.000889	0.008395	0.009661	PASS	2.5uW/MHz or below	
		MHz	2530.000	2600.000	2510.000	----		
Secondary Emitted Radio Wave Strength	30 to 1000MHz	nW	0.007870	0.008872	0.008831	PASS	4nW or below	
		MHz	731.300	322.900	684.800	----		
	1000 to 10000MHz	nW	0.177011	0.214289	0.159588	PASS	20nW or below	
		MHz	8146.000	8929.000	7147.000	----		
	10000 to 12500MHz	nW	0.195434	0.190108	0.173380	PASS	20nW or below	
		MHz	12470.000	12392.000	11215.000	----		
Interference Prevention Function			Good			PASS		
Transmitting antenna absolute gain			---			---	---	
Angular width of the main radiation of the transmitting antenna			---			---	---	

5. 試験機器リスト

Measurement equipment list

USE	Equipment	Company	Model No.	Serial No.	Calibrated by	Cal. Method	Cal. Due	Cal. Date
	TEMP & HUMID CHAMBER	(株) 제이에프엠엔지니어링	JFMA-001	20200929-01	HCT	ハ(c)	Dec. 2023	Dec. 15, 2022
	CONTROLLER	주식회사 삼원테크놀로지	TEMI2500	S7800VK191 0707	HCT	ハ(c)	Dec. 2023	Dec. 15, 2022
X	PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	MY45304057	HCT	ハ(c)	Dec. 2023	Dec. 15, 2022
X	MXG ANALOG SIGNAL GENERATOR	AGILENT	N5183A	MY50141890	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	SYSTEM DC POWER SUPPLY	AGILENT	6674A	MY53000118	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	VECTOR SIGNAL GENERATOR	ROHDE & SCHWARZ	SMBV100A	257524	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	BLUETOOTH TESTER	TESCOM	TC-3000A	3000A480088	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	DIRECTIONAL COUPLER	AGILENT	773D	2839A01855	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	ATTENUATOR	AGILENT	8493C	73193	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	TERMINATION	HEWLETT PACKARD	909D	7492	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	POWER DIVIDER	HEWLETT PACKARD	11636A	6916	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	SLIDE-AC	대광전자	SV-1023	NONE	HCT	ハ(c)	Nov. 2023	Nov. 15, 2022
	DIGITAL MULTIMETER	휴먼테크스토어	15B+	50561541WS	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	Temperature and Humidity Datalogger	CEM	DT-172	201000251	HCT	ハ(c)	Apr. 2023	Apr. 13, 2022
	ATTENUATOR	에이스 알에프 컴	ATT SMA 20W 20dB 8G	A-0820.SM20.2	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	TERMINATION	에이스 알에프 컴	TERM SMA F 20W 8G	A-0008.SM20.2	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	ATTENUATOR	에이스 알에프 컴	ATT 2.92 2W 20dB 40G	A-4020.2902.1	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	ATTENUATOR	에이스 알에프 컴	ATT 2.92 2W 20dB 40G	A-4020.2902.1	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	ATTENUATOR	에이스 알에프 컴	ATT 2.92 2W 20dB 40G	A-4020.2902.1	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	TERMINATION	에이스 알에프 컴	TERM 2.92 F 2W 40G	A-0040.2920.2	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	TERMINATION	에이스 알에프 컴	TERM 2.92 F 2W 40G	A-0040.2920.2	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	TERMINATION	에이스 알에프 컴	TERM 2.92 F 2W 40G	A-0040.2920.2	HCT	ハ(c)	Apr. 2023	Apr. 11, 2022
	PSA SERIES SPECTRUM ANALYZER	AGILENT	E4440A	MY42510449	HCT	ハ(c)	Feb. 2023	Feb. 3, 2022
X	DC POWER SUPPLY	AGILENT	E3634A	MY40012120	HCT	ハ(c)	Feb. 2023	Feb. 3, 2022
	HIGHPASS FILTER	RAPA	3.5 GHz Highpass Filter	1	HCT	ハ(c)	Jul. 2023	Jul. 21, 2022
X	USB Peak Power Sensor	Anritsu	MA24408A	12321	HCT	ハ(c)	Nov. 2023	Nov. 15, 2022
	High Pass Filter	WT Microwave INC.	WT-A3314-HS	WT22111804-1	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022
	High Pass Filter	WT Microwave INC.	WT-A1935-HS	WT22111804-2	HCT	ハ(c)	Dec. 2023	Dec. 14, 2022

Note1: 測定機器の較正は、1年間有効です。

The calibration of measurement equipment is valid for one year period.

Note2: "X" は使用した測定機器です。

"X" used equipment.

Note3: 較正方法 ...

Cal.Method ...

イ): 独立行政法人情報通信研究機構(以下「機構」という。)又は第百二条の十八第一項の指定較正機関が行う較正

a): Calibration conducted by the National Institute of Information and Communications Technology(NICT)(hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)

ロ): 計量法(平成四年法律第五十一号)第百三十五条又は第百四十四条の規定に基づく校正

b): Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)

ハ): 外国において行う較正であつて、機構又は第百二条の十八第一項の指定較正機関が行う較正に相当するもの

c): 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)

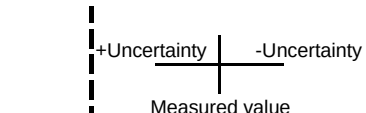
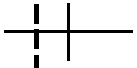
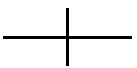
ニ): 別表第三の下欄に掲げる測定器その他の設備であつて、イからハまでのいずれかに掲げる較正等を受けたものを用いて行う較正等

d): Calibration conducted by using measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c)

6. 測定の不確かさ

About uncertainty of measured value

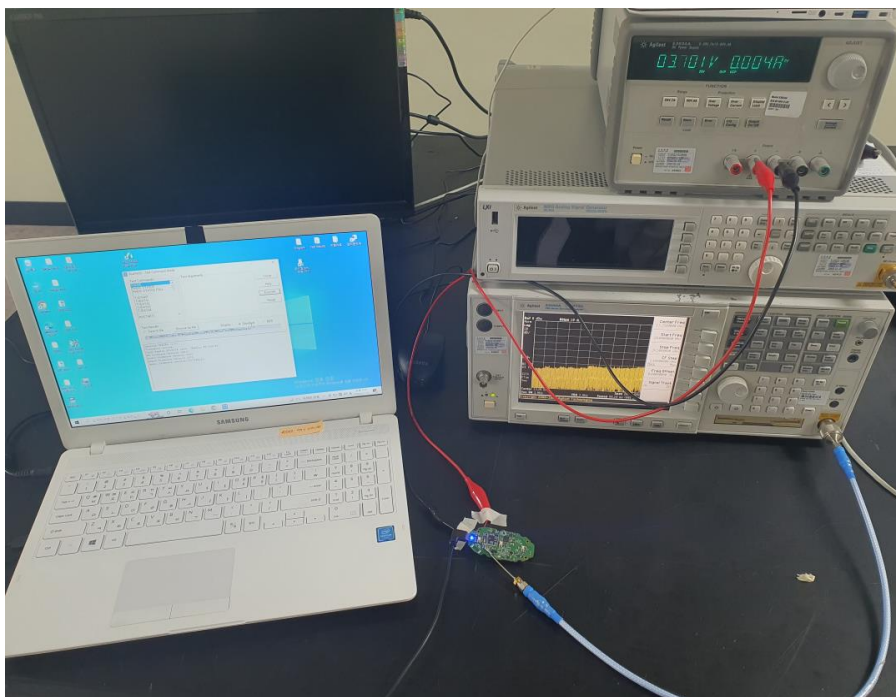
Parameter	Uncertainty
Total RF power conducted	± 0.292 dB
Spurious emissions conducted	± 0.40 dB
Temperature	$\pm 0.8^{\circ}\text{C}$
Humidity	$\pm 4.4\%$

Judge	Measured value and standard limit value	
PASS	Case1  <p>Standard limit value</p> <p>+Uncertainty -Uncertainty</p> <p>Measured value</p> <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



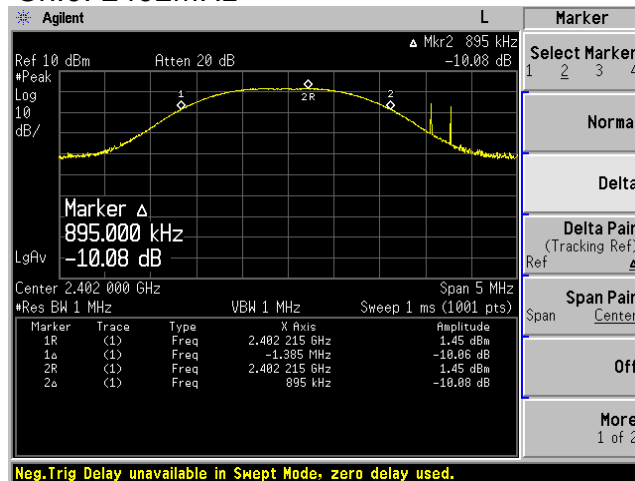
8. 測定チャート

Test chart

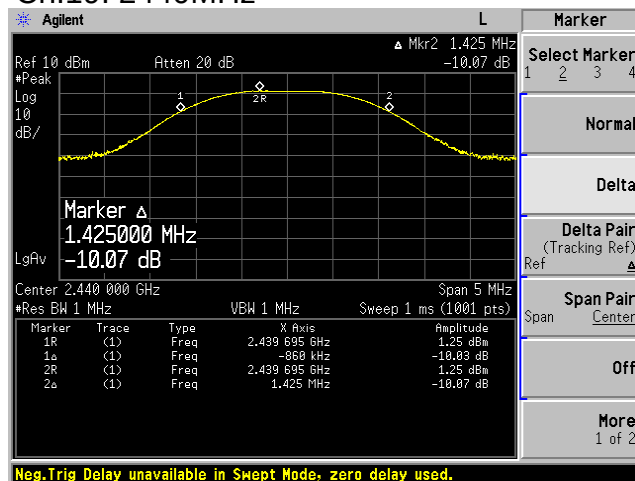
8.1 周波数の偏差

Frequency tolerance

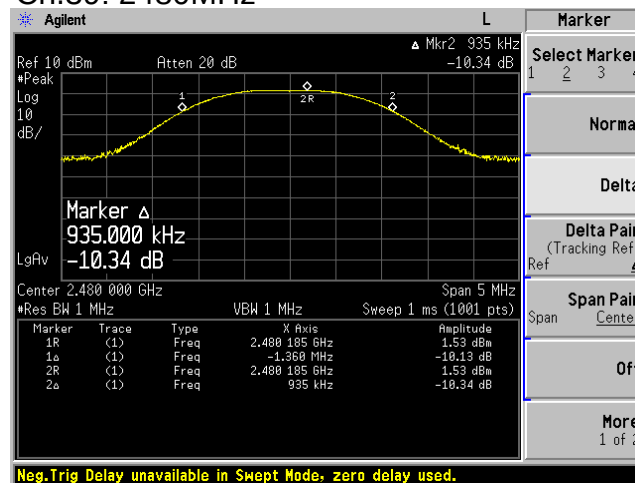
Ch.0: 2402MHz



Ch.19: 2440MHz



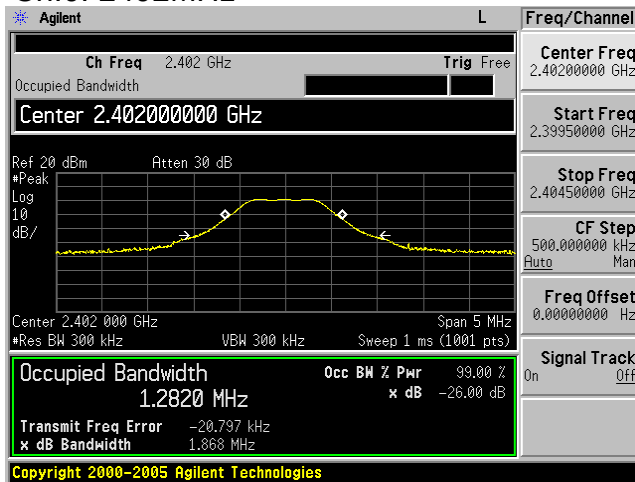
Ch.39: 2480MHz



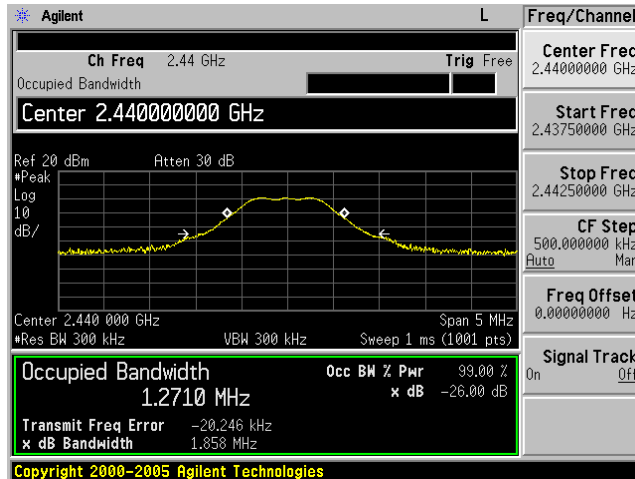
8.2 占有周波数帯幅及び拡散帯域幅

Occupied bandwidth / Spread bandwidth

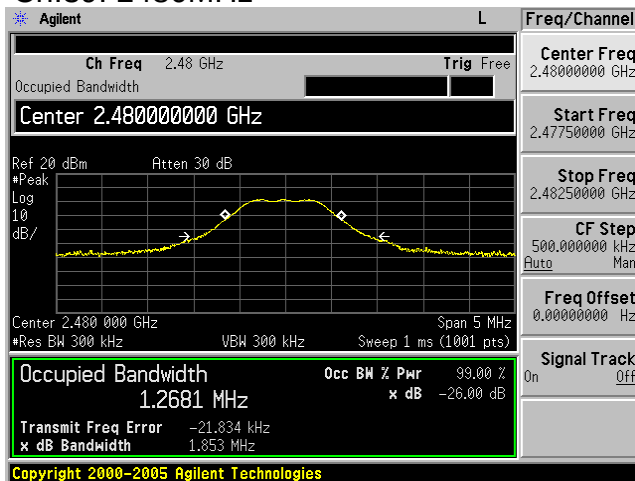
Ch.0: 2402MHz



Ch.19: 2440MHz

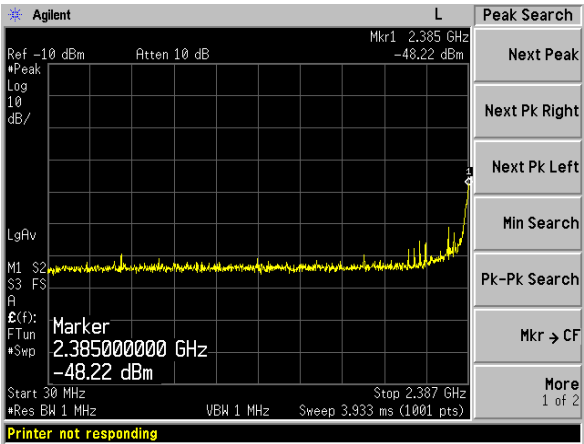


Ch.39: 2480MHz

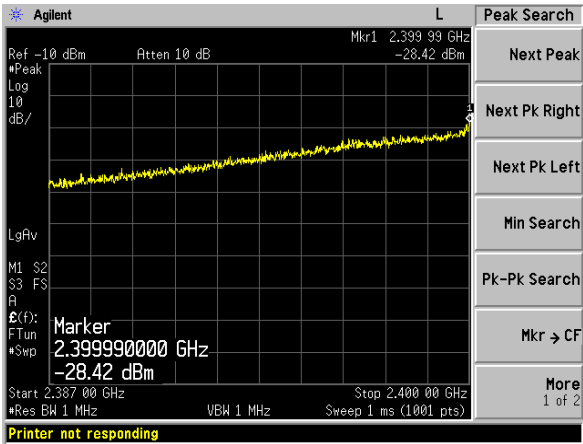


8.3 スプリアス発射又は不要発射の限度
Unwanted(Spurious) emission strength

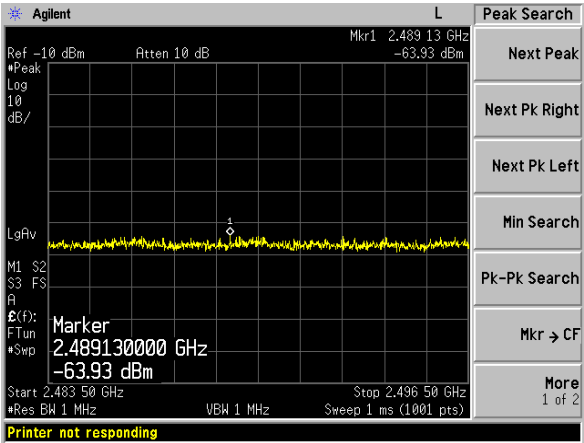
Ch.0: 2402MHz
30-2387MHz



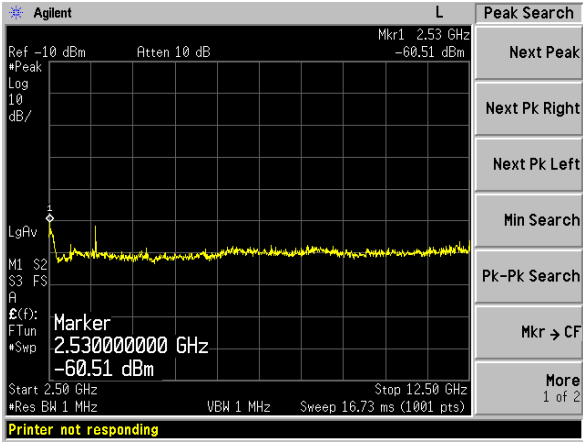
2387-2400MHz



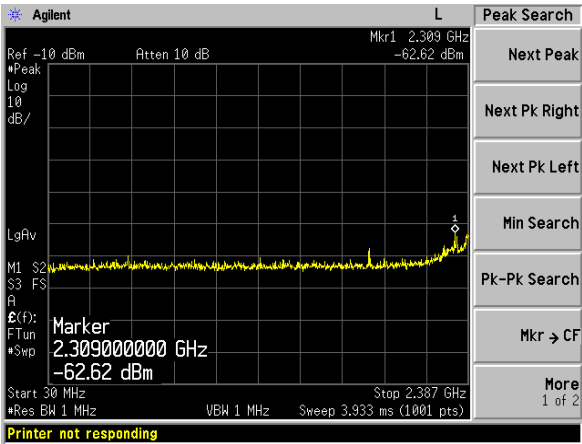
2483.5-2496.5MHz



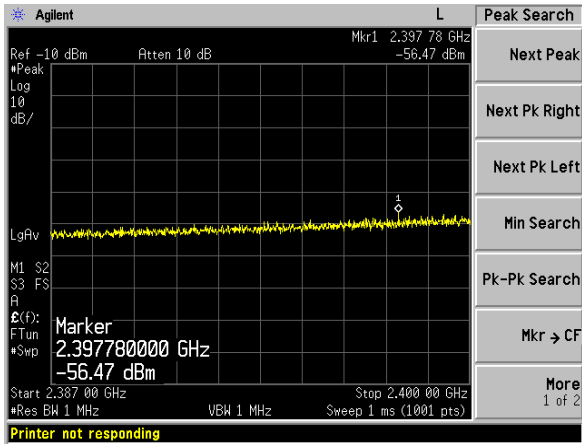
2496.5-12500MHz



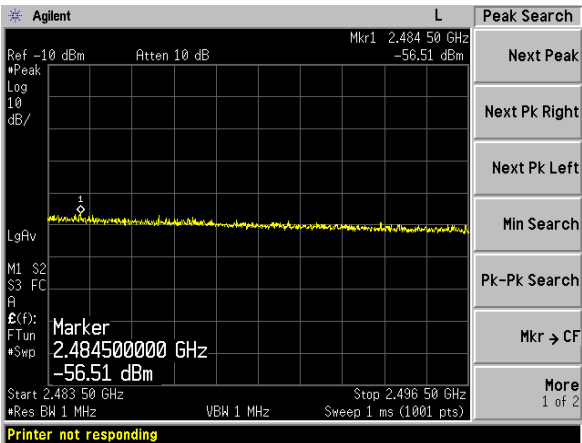
Ch.19: 2440MHz
30-2387MHz



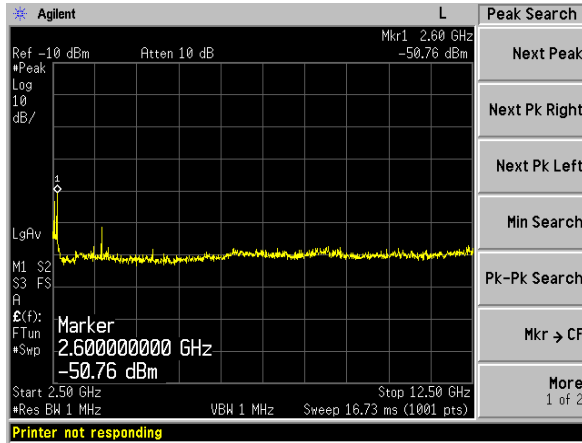
2387-2400MHz



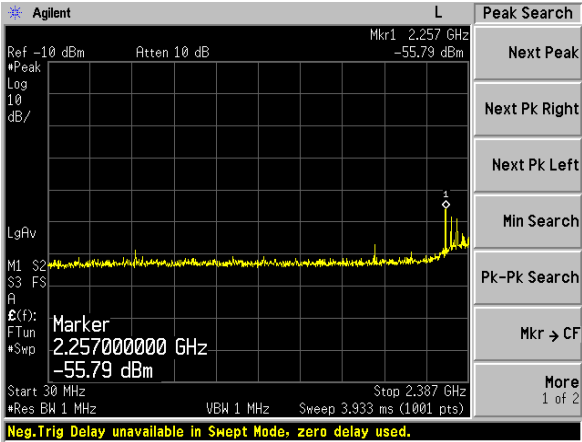
2483.5-2496.5MHz



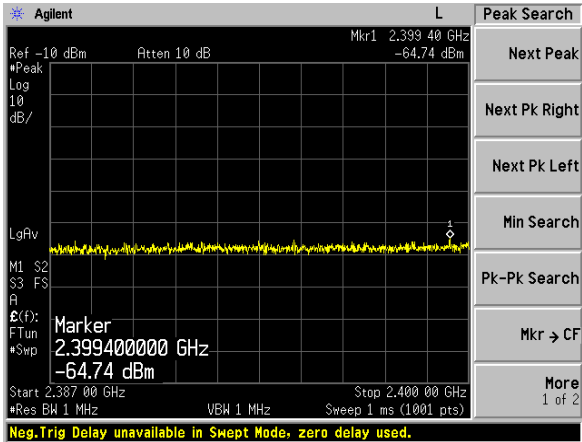
2496.5-12500MHz



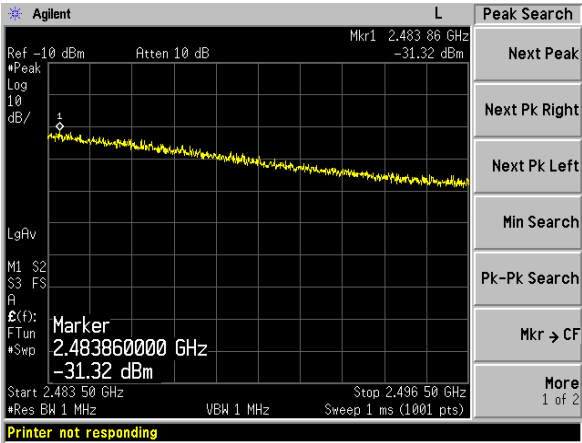
Ch.39: 2480MHz
30-2387MHz



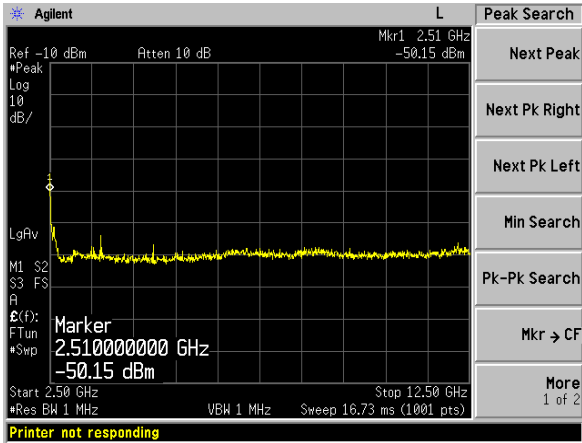
2387-2400MHz



2483.5-2496.5MHz



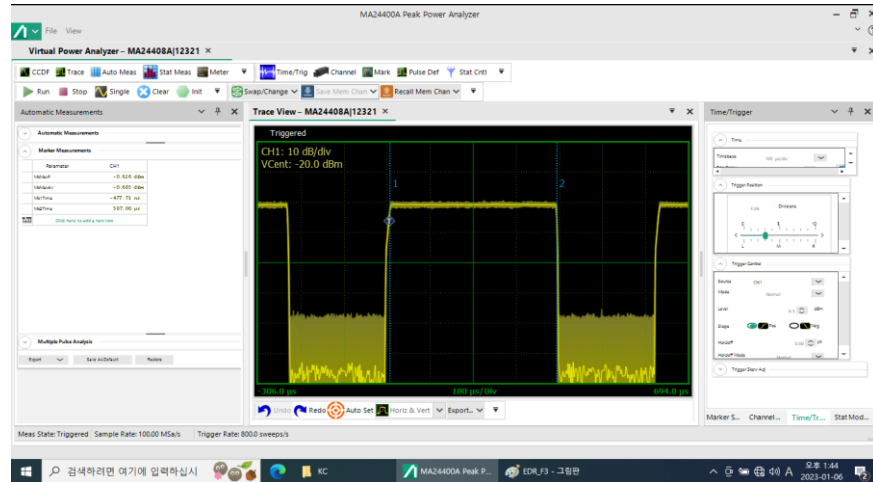
2496.5-12500MHz



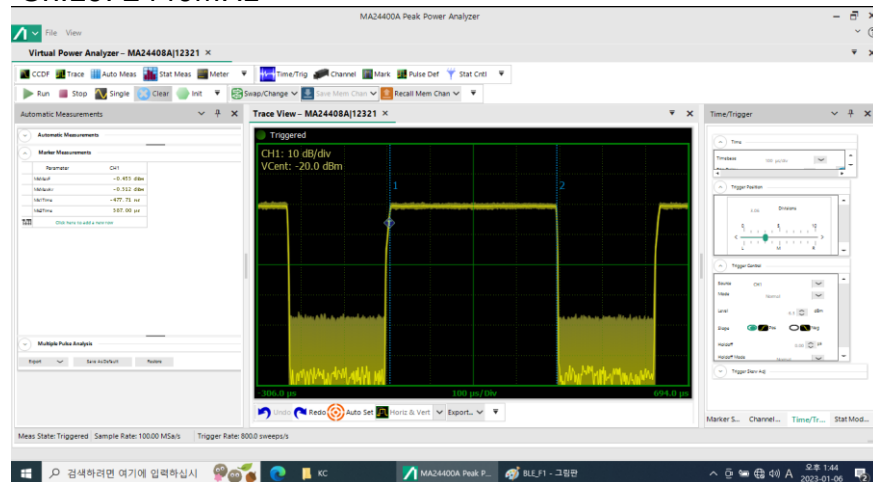
8.4 空中線電力の編座

RF output power tolerance

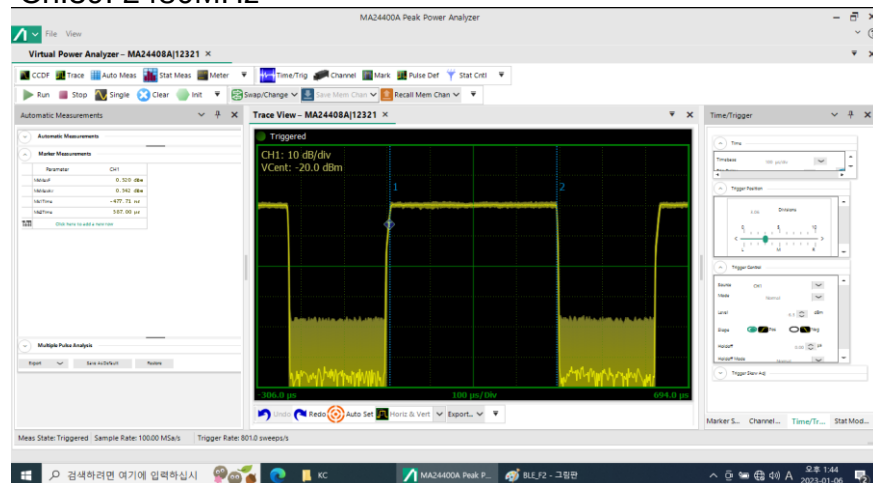
Ch.0: 2402MHz



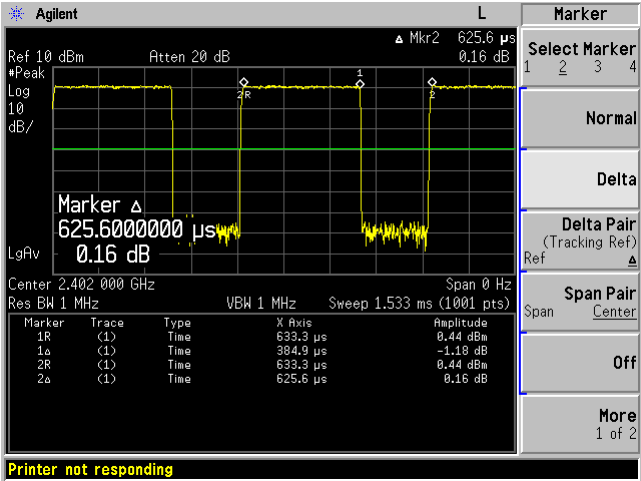
Ch.19: 2440MHz



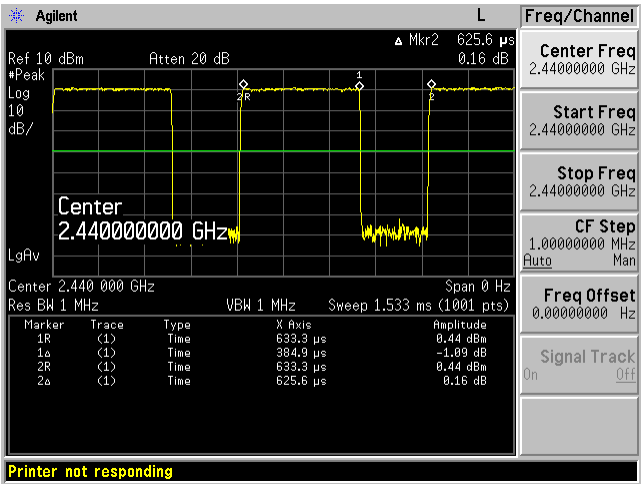
Ch.39: 2480MHz



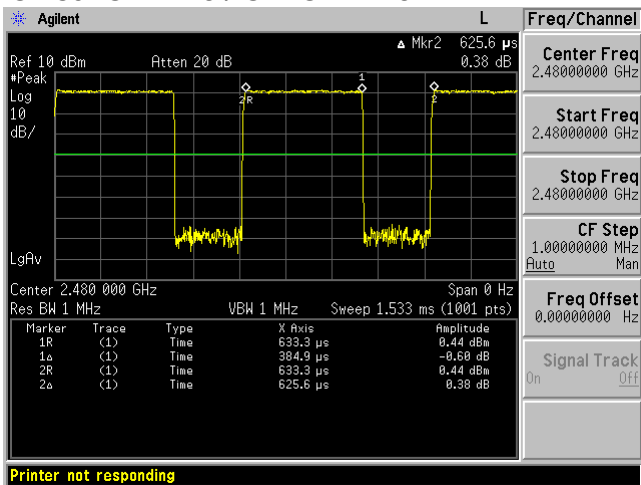
Ch.0: On Time / On+Off Time



Ch.19: On Time / On+Off Time



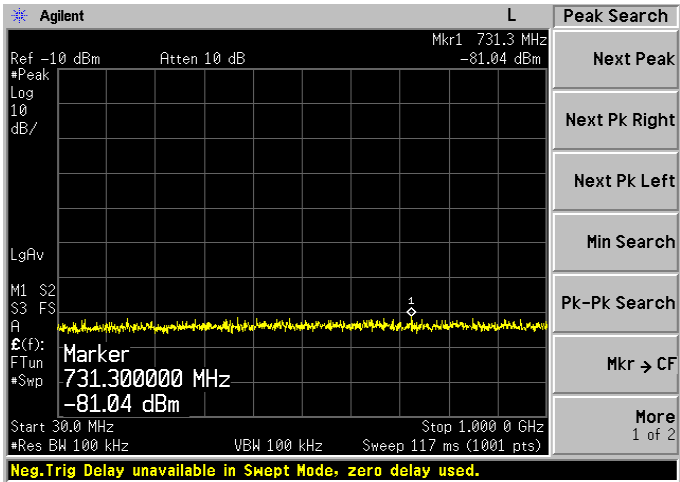
Ch.39: On Time / On+Off Time



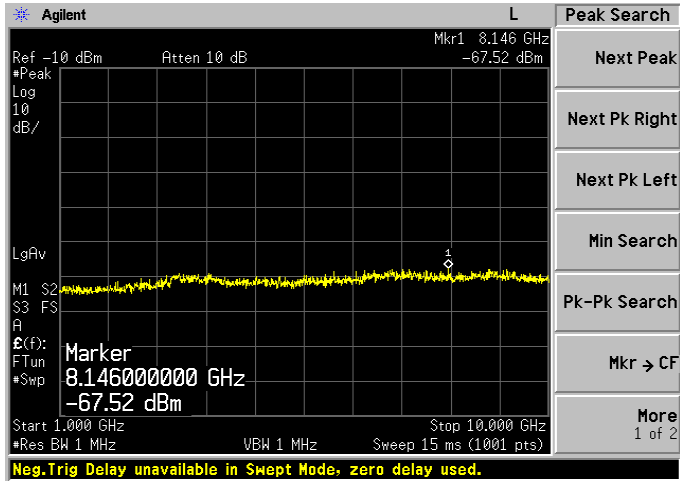
8.5 副次的に発する電波等の限度

Secondary emitted radio wave strength

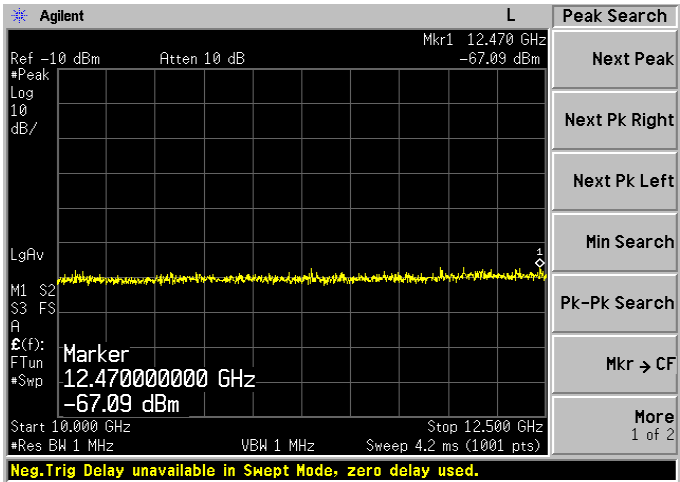
Ch.0: 2402MHz
30MHz-1GHz



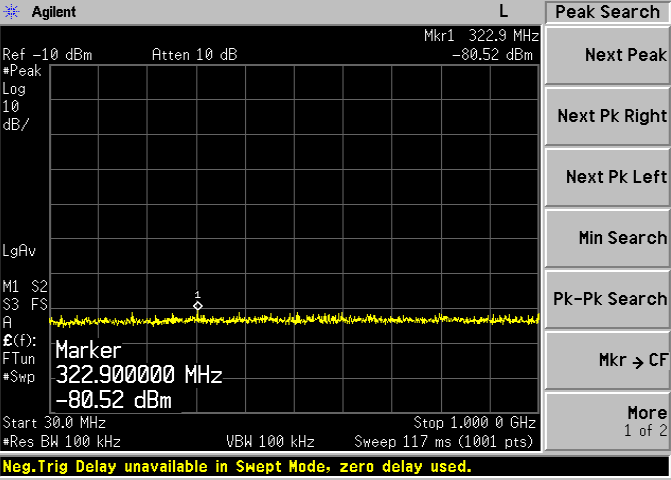
1-10GHz



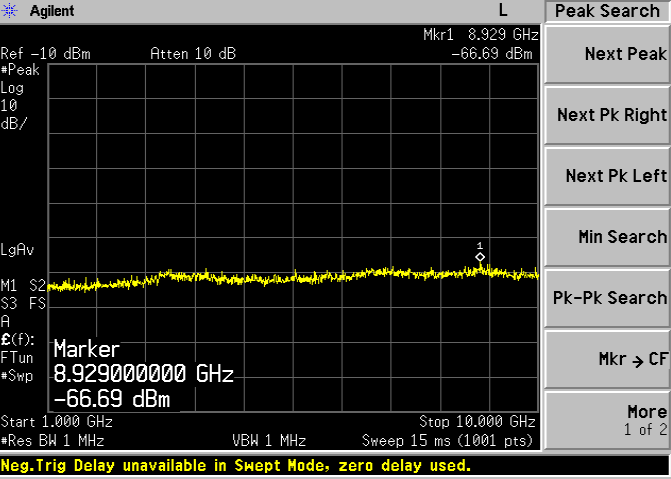
10-12.5GHz



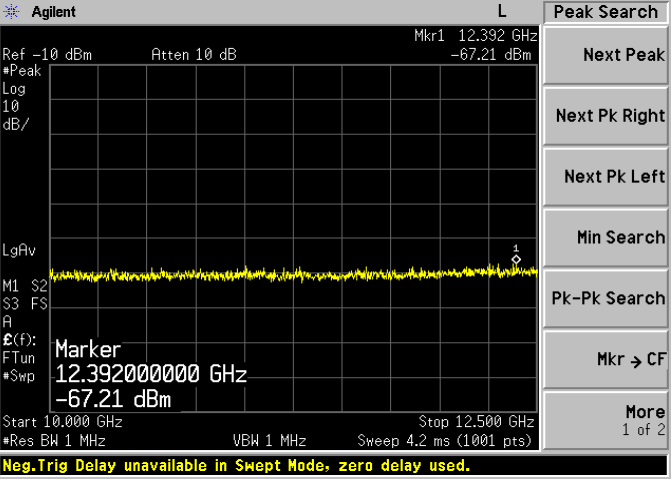
Ch.19: 2440MHz
30MHz-1GHz



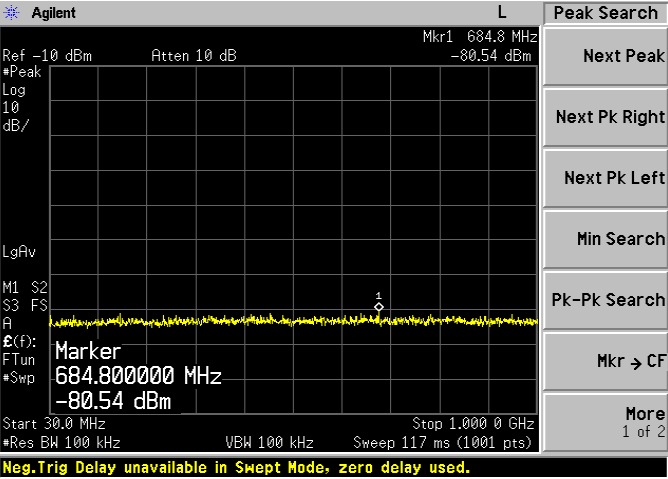
1-10GHz



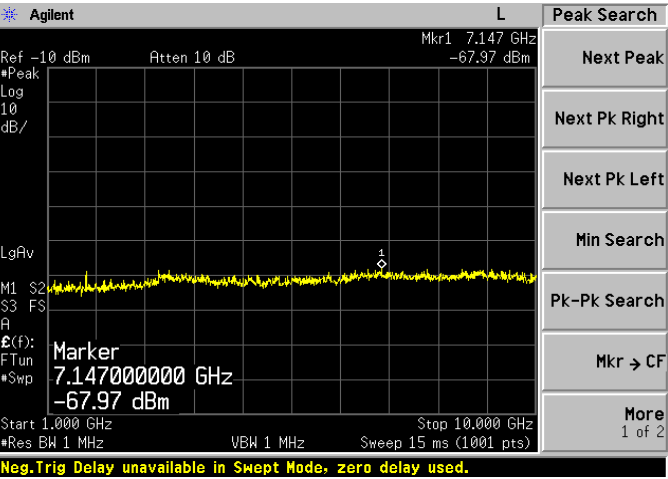
10-12.5GHz



Ch.39: 2480MHz
30MHz-1GHz



1-10GHz



10-12.5GHz

