Report No.: GTS201903000200M01

Test Report

Applicant:	ShenZhen FLYSKY Technology Co.,Ltd
Address of Applicant:	16F, Huafeng Building, No. 6006 Shennan Road, Futian District, Shenzhen, Guangdong, China
Manufacturer:	ShenZhen FLYSKY Technology Co.,Ltd
Address of Manufacturer:	16F, Huafeng Building, No. 6006 Shennan Road, Futian District, Shenzhen, Guangdong, China
Factory:	Dongguan Flysky RC Model technology Co.,Ltd
Address of Factory:	West building 3, Huangjinyuan Ind Park, Qiaoli North Gate, Changping Town, Dongguan ,China

Equipment Under Test (EUT)

Product Name:	Noble(NB4)
Model No.:	FG4, NB4
Trade Mark:	FLYSKY
Applicable standards:	Article 2, Paragraph 1, Item19 MIC Notice No.88 Annex 1 MIC Notice No.88 Annex 43
Date of sample receipt:	March 26, 2019
Date of Test:	March 27-April 16, 2019
Date of report issued:	April 17, 2019
Test Result :	PASS *

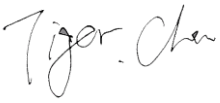
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*April 17, 2019*	*Original*

Prepared By:  ***Date:*** *April 17, 2019*

Project Engineer

Check By:  ***Date:*** *April 17, 2019*

Reviewer

3 Contents

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4 Test Summary

Test Item	Test Requirement	Result
RF shielding method	ARIB STD T-66 Clause 3.7	Pass
Frequency Error	ARIB STD T-66 Clause 3.2(4)	Pass
Antenna Power	ARIB STD T-66 Clause 3.2(2)	Pass
99% Occupied bandwidth	ARIB STD T-66 Clause 3.2(7)	Pass
Spread spectrum bandwidth	ARIB STD T-66 Clause 3.2(8)	Pass
Dwell time	ARIB STD T-66 Clause 3.2(11)	Pass
Spurious Emissions Intensity	ARIB STD T-66 Clause 3.2(6)	Pass
Limit of secondary radiated emissions	ARIB STD T-66 Clause 3.3(1)	Pass
Interference suppression	ARIB STD T-66 Clause 3.4.1	Pass
Transmission Antenna Gain	ARIB STD T-66 Clause 3.6	N/A*
Transmission Radiation Angle Width(3dB Beam width)	ARIB STD T-66 Clause 3.6	N/A*

Pass: The EUT complies with the carrier sense capability and radio interference prevention capability.
**Remark: Not applicable due to the antenna gain is less than 2.14dBi.*

5 General Information

5.1 General Description of EUT

Product Name:	Noble(NB4)
Model No.:	FG4, NB4
Test Model No:	FG4
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are color and model name for commercial purpose.	
Hardware Version:	FG4-V1.4
Software Version:	Flysky Noble V1.0.3.6
Operation Frequency:	2402MHz~2467.5MHz
Channel numbers:	132
Modulation technology:	CSS, GMSK
Rated power:	0.7W/MHz
Antenna Type:	Integral Antenna
Antenna gain:	2.11dBi
Power supply:	DC 3.7-4.2V 2600mAh Rechargeable Battery Or DC 5V 1A 4300mAh by external Battery

Remark: The system works in the frequency range of 2402MHz to 2467.5MHz. This band has been divided to 132 independent channels. Each radio system uses 32 different channels; the minimum channel separation is ≥1.25MHz. By using various switch-on times, hopping scheme and channel frequencies, the system can guarantee a jamming free radio transmission. The channel list is below.

Operation Frequency each of channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402.00	34	2418.50	67	2435.00	100	2451.50
2	2402.50	35	2419.00	68	2435.50	101	2452.00
3	2403.00	36	2419.50	69	2436.00	102	2452.50
4	2403.50	37	2420.00	70	2436.50	103	2453.00
5	2404.00	38	2420.50	71	2437.00	104	2453.50
6	2404.50	39	2421.00	72	2437.50	105	2454.00
7	2405.00	40	2421.50	73	2438.00	106	2454.50
8	2405.50	41	2422.00	74	2438.50	107	2455.00
9	2406.00	42	2422.50	75	2439.00	108	2455.50
10	2406.50	43	2423.00	76	2439.50	109	2456.00
11	2407.00	44	2423.50	77	2440.00	110	2456.50
12	2407.50	45	2424.00	78	2440.50	111	2457.00
13	2408.00	46	2424.50	79	2441.00	112	2457.50
14	2408.50	47	2425.00	80	2441.50	113	2458.00
15	2409.00	48	2425.50	81	2442.00	114	2458.50
16	2409.50	49	2426.00	82	2442.50	115	2459.00
17	2410.00	50	2426.50	83	2443.00	116	2459.50
18	2410.50	51	2427.00	84	2443.50	117	2460.00
19	2411.00	52	2427.50	85	2444.00	118	2460.50
20	2411.50	53	2428.00	86	2444.50	119	2461.00
21	2412.00	54	2428.50	87	2445.00	120	2461.50
22	2412.50	55	2429.00	88	2445.50	121	2462.00
23	2413.00	56	2429.50	89	2446.00	122	2462.50
24	2413.50	57	2430.00	90	2446.50	123	2463.00
25	2414.00	58	2430.50	91	2447.00	124	2463.50
26	2414.50	59	2431.00	92	2447.50	125	2464.00
27	2415.00	60	2431.50	93	2448.00	126	2464.50
28	2415.50	61	2432.00	94	2448.50	127	2465.00
29	2416.00	62	2432.50	95	2449.00	128	2465.50
30	2416.50	63	2433.00	96	2449.50	129	2466.00
31	2417.00	64	2433.50	97	2450.00	130	2466.50
32	2417.50	65	2434.00	98	2450.50	131	2467.00
33	2418.00	66	2434.50	99	2451.00	132	2467.50

Test Channel

1	2402.00MHz
67	2435.00MHz
132	2467.50MHz

5.2 Test mode

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

5.3 Test condition

Normal voltage	High voltage +10% of Normal voltage	Low voltage -10% of Normal voltage
3.70V	4.07V	3.33V

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China Tel: 0755-27798480 Fax: 0755-27798960

5.6 Other Information Requested by the Customer

None.

5.7 Test Instruments list

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Spectrum Analysis	Agilent	E4440A	GTS205	June. 27 2018	June. 26 2019
2	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
3	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
4	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
5	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
6	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
7	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
8	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
9	Signal Generator	Rohde & Schwarz	SML02	GTS235	June. 27 2018	June. 26 2019
10	DC Power Supply	Agilent	E3640A	MY40005293	June. 27 2018	June. 26 2019
11	USB RF Power Sensor	DARE	RPR3006W	16I00054SNO18	June. 27 2018	June. 26 2019
12	Programmable Constant Temp&Humi Test Chamber	WEWON	WH7H-150L-40-880	WH20170602001	June. 27 2018	June. 26 2019

Remark: all above equipments were calibrated by CEPREI calibration and testing center.

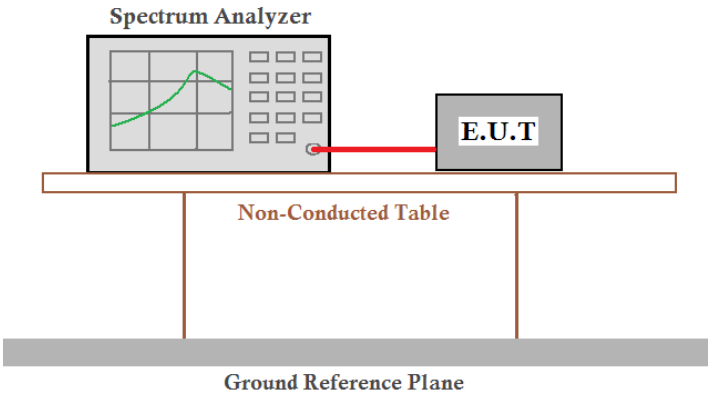
5.8 Measurement uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR100028-1 [2] and shall correspond to an expansion factor (coverage factor) K=1.96 or K=2 (which provide confidence levels of respectively 95% and 95.5% in the case where the distributions characterizing the actual measurement uncertainties are normal.

Parameter	Uncertainty
RF frequency	+/-6*10^{-7}
Total RF power, conducted	+/-0.8dB
Spurious emissions, conducted	+/-0.8dB
DC and low frequency voltages	+/-3%
Humidity	+/-5%
Temperature	+/-1˚C

6 Test results and Measurement Data

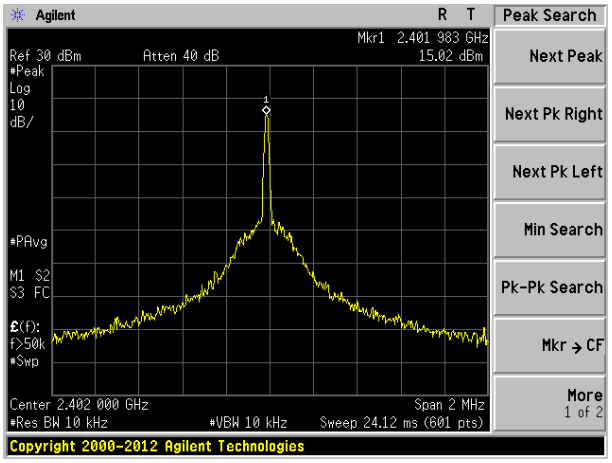
6.1 Frequency Error

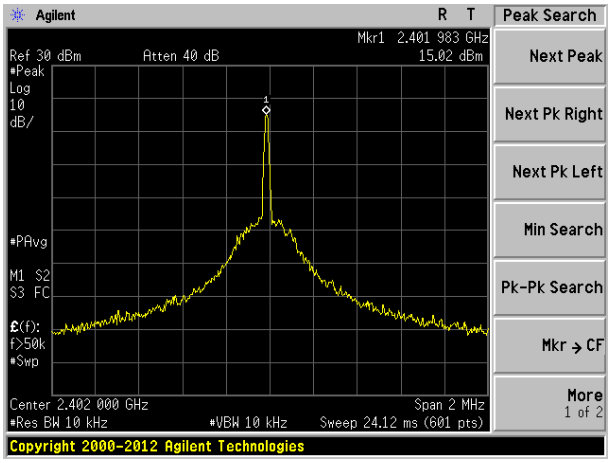
Test condition:	Without modulation, continuously transmitting.
Spectrum set:	Test Frequency: test channel, RBW=VBW=10KHz, Span=1MHz, Sweep time=Auto, Detector mode=Positive peak
Limit:	±50ppm
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Measurement Data

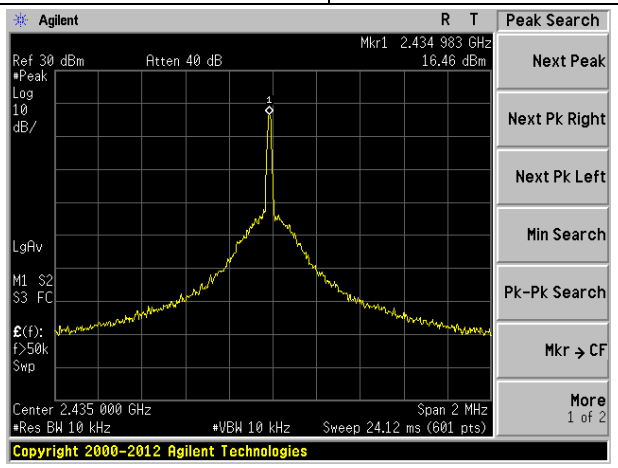
Test mode	Test voltage	Frequency (MHz)	Read (MHz)	Deviation (KHz)	Tolerance (ppm)	Limit (KHz)	Limit (ppm)	Result
Un-modulation mode	Low	2402.0	2401.983	-17.00	-7.08	±120.10	±50.00	Pass
		2435.0	2434.983	-17.00	-6.98	±122.00		
		2467.5	2467.483	-17.00	-6.89	±124.00		
	Mid	2402.0	2401.983	-17.00	-7.08	±120.10		
		2435.0	2434.983	-17.00	-6.98	±122.00		
		2467.5	2467.483	-17.00	-6.89	±124.00		
	High	2402.0	2401.983	-17.00	-7.08	±120.10		
		2435.0	2434.983	-17.00	-6.98	±122.00		
		2467.5	2467.483	-17.00	-6.89	±124.00		

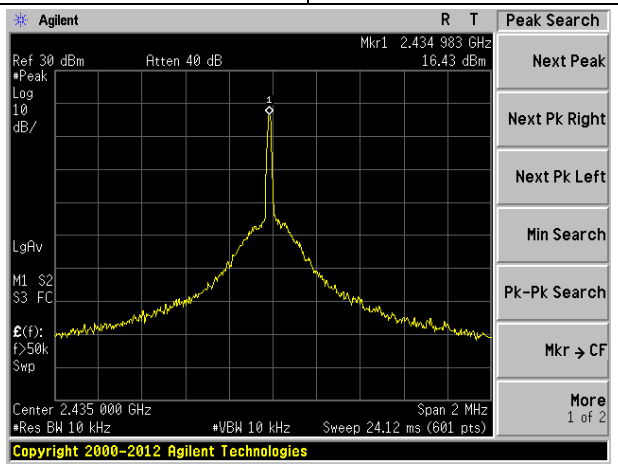
Lowest Channel	Low voltage:	Lowest Channel	Mid voltage:



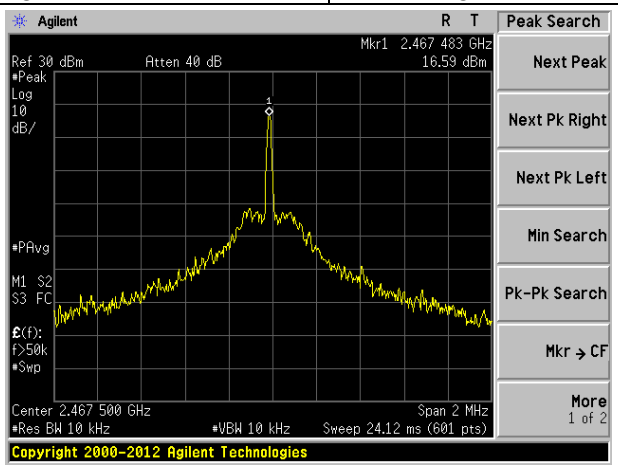


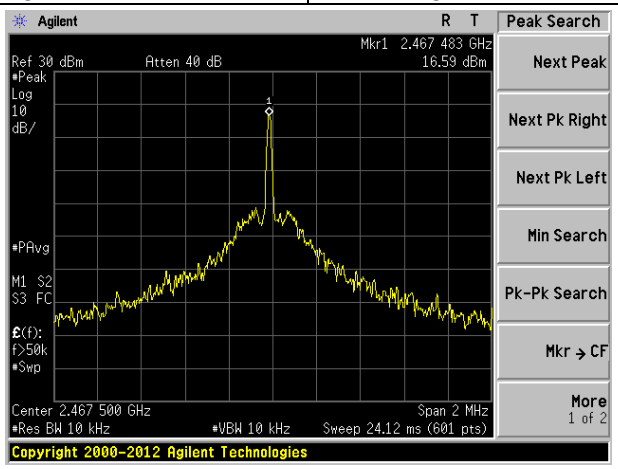
Middle Channel	Low voltage:	Middle Channel	Mid voltage:



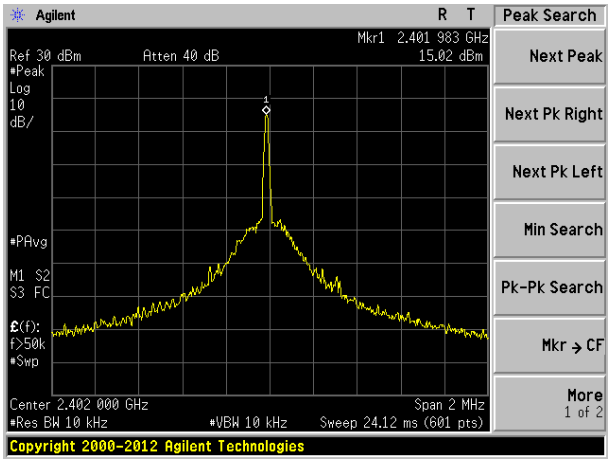


Highest Channel	Low voltage:	Highest Channel	Mid voltage:

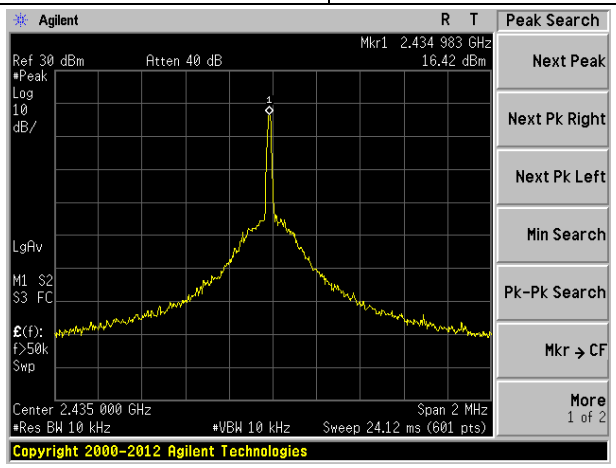




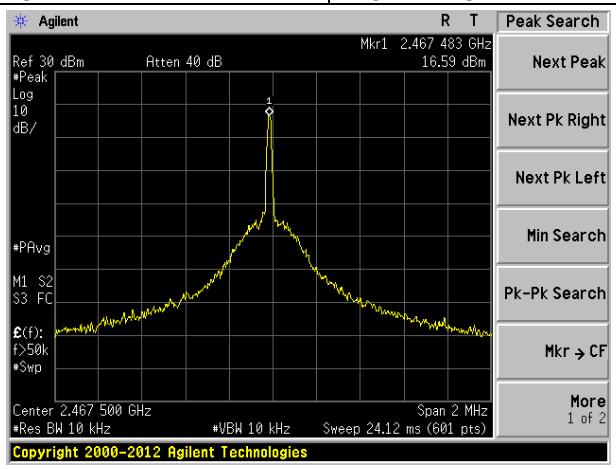
Lowest Channel	High voltage:		



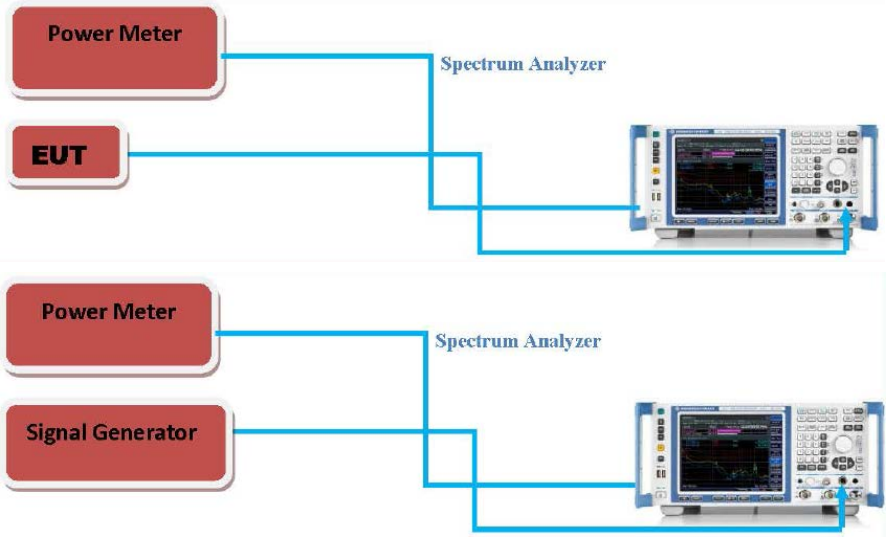
Middle Channel	High voltage:		



Highest Channel	High voltage:		



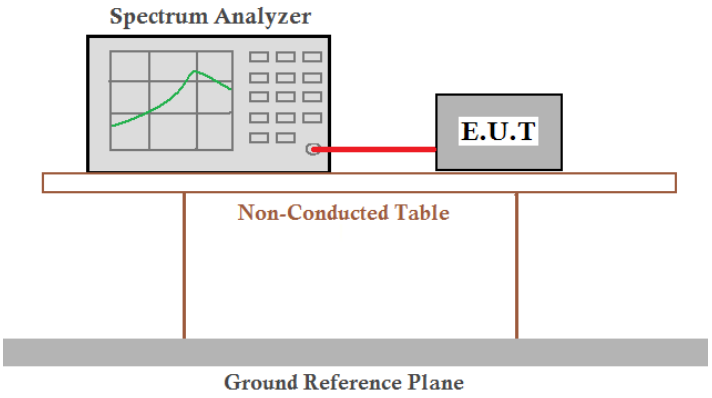
6.2 Antenna Power

Test condition:	Test diffusion code and modulate with standard coding test signal
Test Procedure:	a) A power meter is connected on the IF output port of the spectrum analyzer. b) Connect the equipment to be measured. Using the following settings of the spectrum analyzer in combination with “max hold” function, find the frequency of highest power output in the power envelope: center frequency equal to operating frequency; RBW=1MHz,VBW=3MHz; detector mode: positive peak; averaging: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument’s range. The frequency found shall be record. c) Set the center frequency of the spectrum analyzer to the found frequency and switch to zero span. The power meter indicates the measured power density “E”. d) Remove the EUT and put the replacing standard signal generator (SSG). Set the standard signal generator (SSG) at same frequency and transmit on, the set SSG output power at Pt to give the equivalent output level of “E”. e) Calculate antenna power density by the formula below PD=Pt+10*log(1/x). x: The duty cycle of the EUT in continuously transmitting mode Pt: Output power of the SSG f) Antenna Power Error is definition that actual measure antenna power tolerance between+20% to -80% power range that base on manufacturer declare the conducted power density.
Rating power:	0.7W/MHz
Limit:	3mW/MHz
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Measurement Data

Modulation type	Test voltage	Channel (MHz)	Average Burst Power (mW)	Spread bandwidth (MHz)	Antenna Power (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit
CSS, GMSK	Low	2402.0	37.76	59.7588	0.63	0.7	-9.73	-80%~20%
		2435.0	46.56	59.5847	0.78	0.7	11.63	
		2467.5	48.42	59.8151	0.81	0.7	15.64	
	Mid	2402.0	37.67	59.7588	0.63	0.7	-9.95	
		2435.0	46.67	59.5847	0.78	0.7	11.89	
		2467.5	48.64	59.8151	0.81	0.7	16.17	
	High	2402.0	37.67	59.7588	0.63	0.7	-9.95	
		2435.0	46.67	59.5847	0.78	0.7	11.89	
		2467.5	48.87	59.8151	0.82	0.7	16.72	

6.3 Occupy Bandwidth (99%)

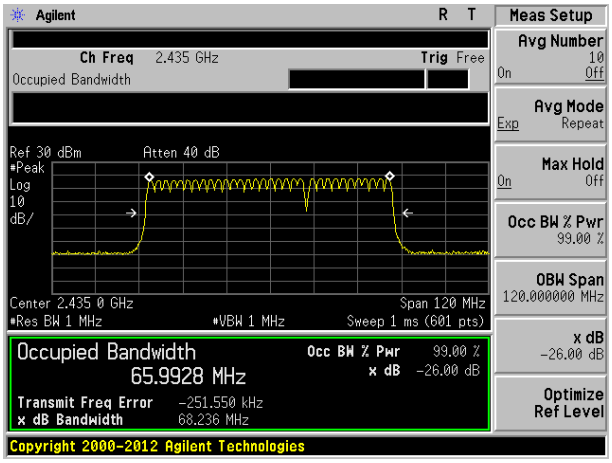
Test condition:	■ Hopping on ■ Test diffusion code and modulate with standard coding test signal
Spectrum set:	Test Frequency: test channel, RBW=VBW=1MHz, Span=120MHz, Sweep time=Auto, Detector mode=Positive peak
Limit:	83.5MHz or less
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test mode:	Transmitting mode
Test results:	Pass

Measurement Data

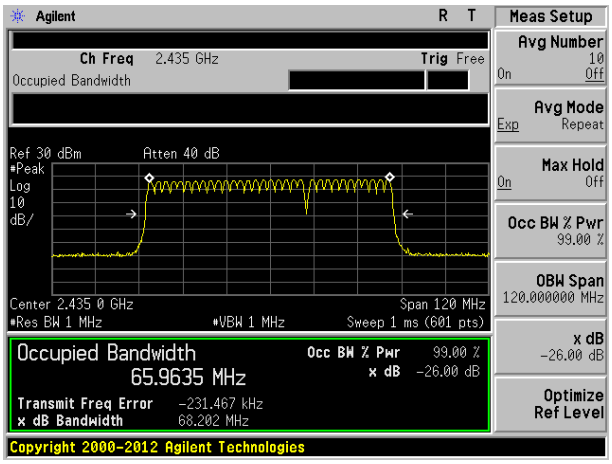
Modulation type	Test voltage	99% occupy bandwidth (MHz)	Limit (MHz)	Result
CSS, GMSK	Low	65.9928	<83.50	Pass
	Mid	65.9635		
	High	65.9846		

Test plot as follows:

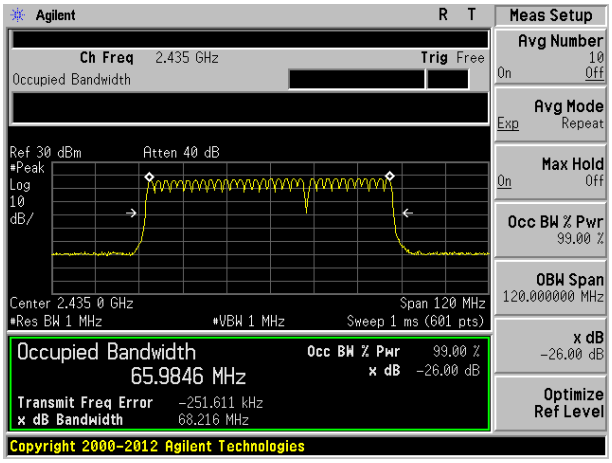
Modulation Type:	CSS, GMSK	Test voltage:	Low



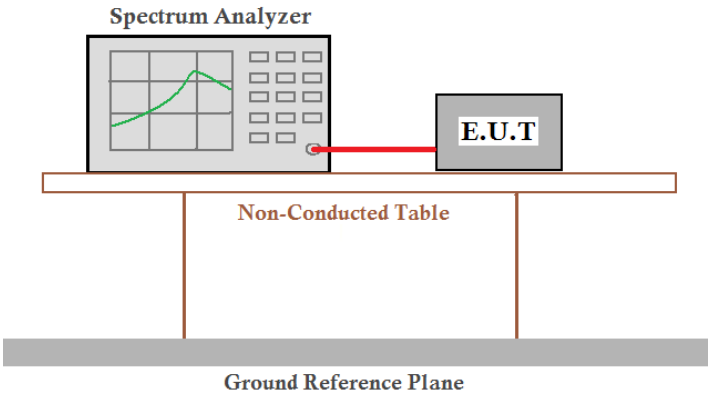
Modulation Type:	CSS, GMSK	Test voltage:	Mid



Modulation Type:	CSS, GMSK	Test voltage:	High



6.4 Spread spectrum bandwidth (90%)

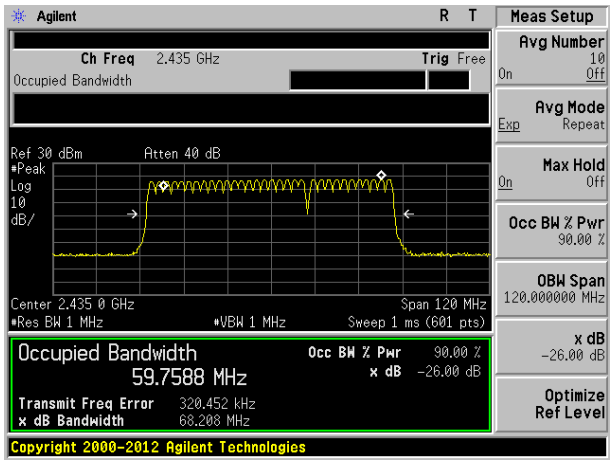
Test condition:	■ Hopping on ■ Test diffusion code and modulate with standard coding test signal
Spectrum set:	Test Frequency: test channel, RBW=VBW=1MHz, Span=120MHz, Sweep time=Auto, Detector mode=Positive peak
Limit:	500KHz or more
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Measurement Data

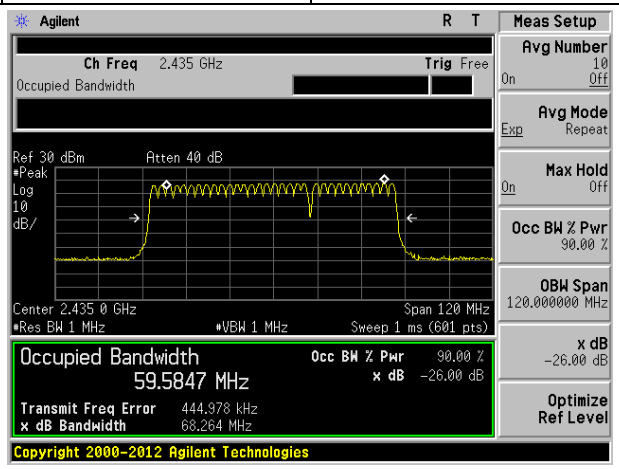
Modulation type	Test voltage	Spread spectrum bandwidth (MHz)	Limit (kHz)	Result
CSS, GMSK	Low	59.7588	>500	Pass
	Mid	59.5847		
	High	59.8151		

Test plot as follows:

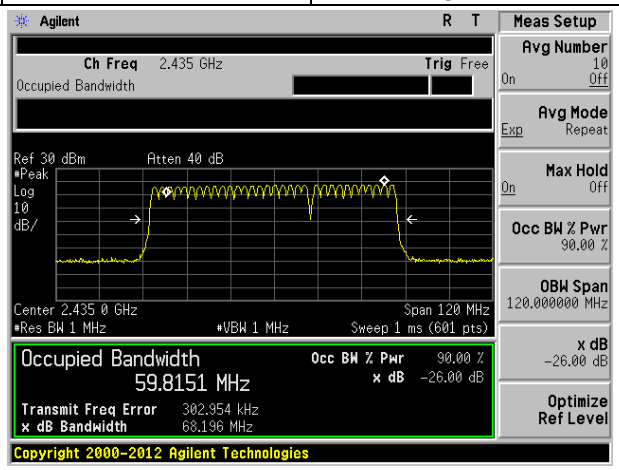
Modulation Type:	CSS, GMSK	Test voltage:	Low



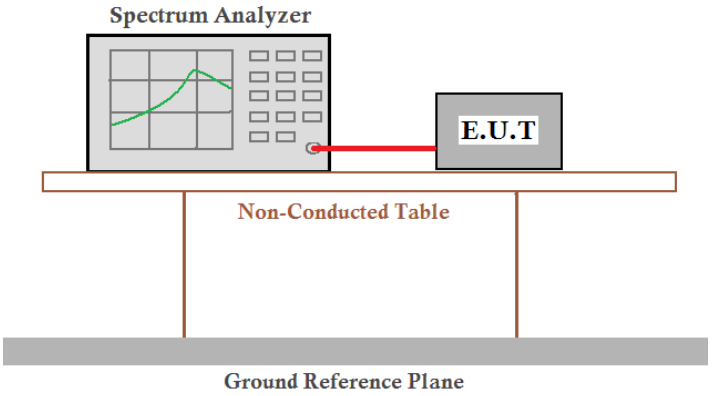
Modulation Type:	CSS, GMSK	Test voltage:	Mid



Modulation Type:	CSS, GMSK	Test voltage:	High



6.5 Dwell time

Test condition:	■ Hopping on ■ Test diffusion code and modulate with standard coding test signal
Spectrum set:	Test Frequency: test channel, RBW=VBW=1MHz, Span=0Hz, Detector mode=Positive peak
Limit:	0.4 second or less
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Dwell time=0.4 x (Spread Spectrum Factor) x (transmission time of 1 burst) / [(burst cycle) x (No. of hopping channels)]
Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT

Modulation rate of EUT is below:
CSS, GMSK modulation: 0.0375Mbps

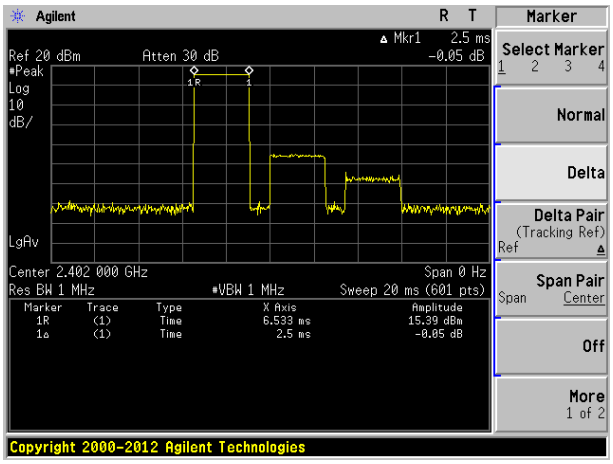
Spread Spectrum Factor = Spread Spectrum Bandwidth / Modulation Rate= Spread Spectrum Bandwidth

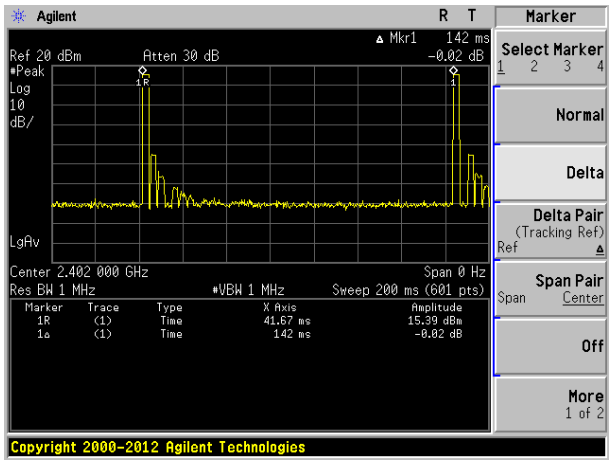
Modulation Type	Test Voltage	Spread Spectrum Bandwidth (MHz)	Modulation Rate (Mbps)	Spread Spectrum Factor
CSS, GMSK	Low	59.7588	0.0375	1593.568
	Mid	59.5847	0.0375	1588.925
	High	59.8151	0.0375	1595.069

Measurement Data

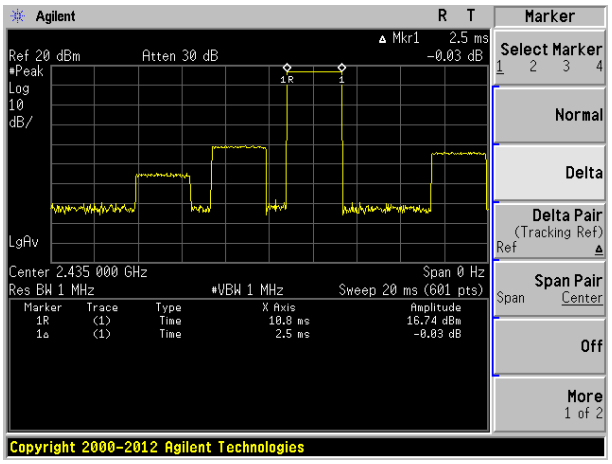
Modulation type	Test voltage	Frequency (MHz)	Spread Spectrum Factor	transmission time of 1 burst (ms)	burst cycle (ms)	Channel numbers	Dwell time (second)
CSS, GMSK	Low	2402.0	1593.568	2.5	142	32	0.351
		2435.0		2.5	142	32	0.351
		2467.5		2.5	142	32	0.351
	Mid	2402.0	1588.925	2.5	142	32	0.350
		2435.0		2.5	142	32	0.350
		2467.5		2.5	142	32	0.350
	High	2402.0	1595.069	2.5	142	32	0.351
		2435.0		2.5	142	32	0.351
		2467.5		2.5	142	32	0.351

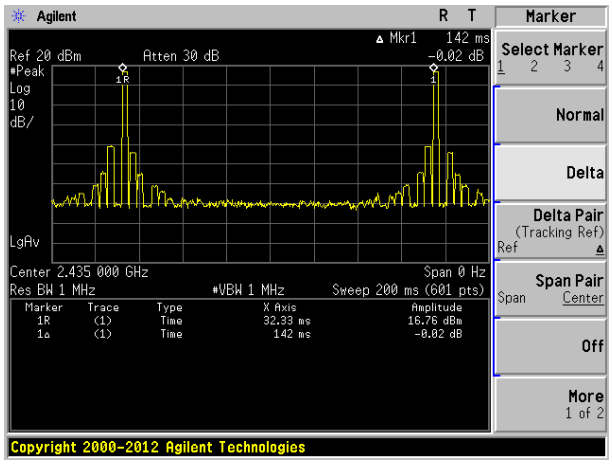
Modulation type:	CSS, GMSK	Test voltage:	Mid



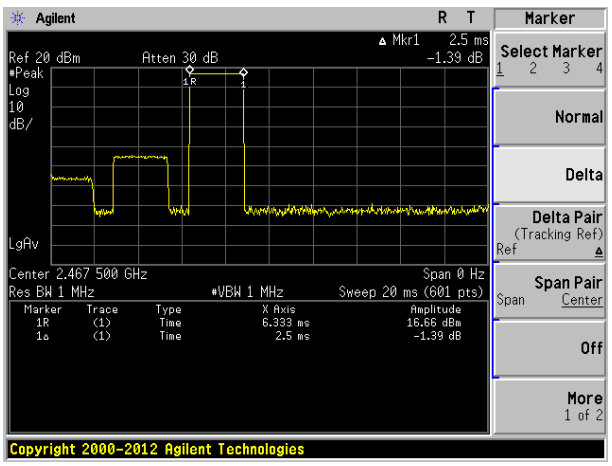


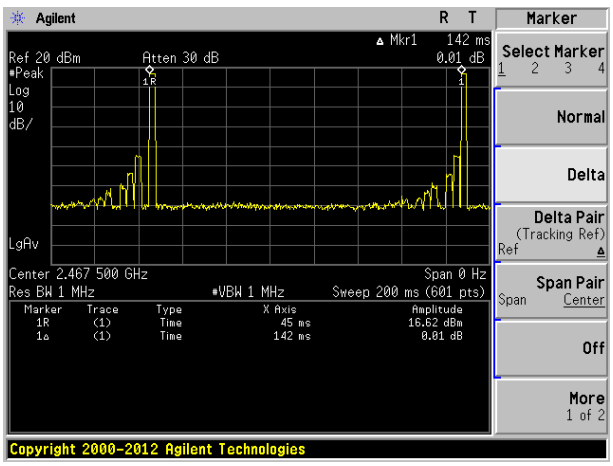
Lowest channel





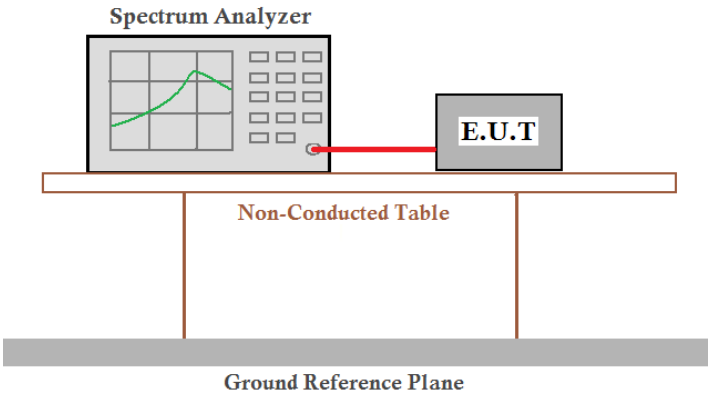
Middle channel





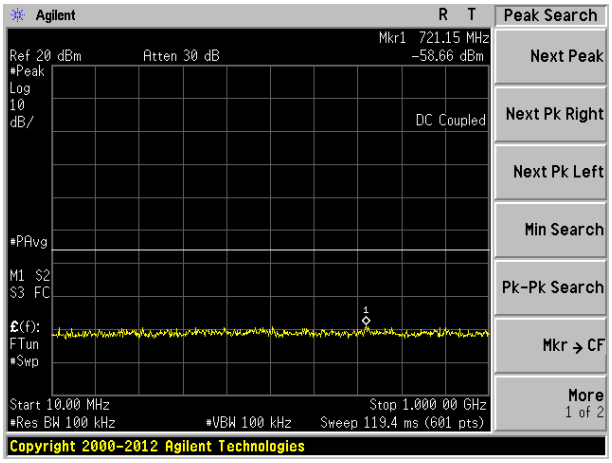
Highest channel

6.6 Spurious emission intensity

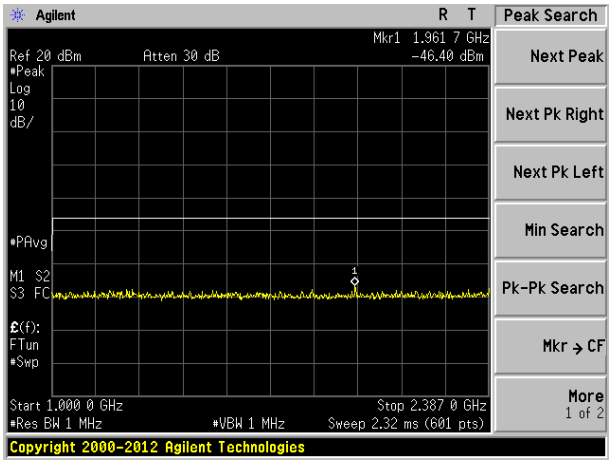
Test condition:	■ Hopping on ■ Test diffusion code and modulate with standard coding test signal
Measurement procedure:	**Step 1** All spurious are measured from 30MHz to 13GHz by peak mode. **Step 2** If the value measured by Step1 is 3dB or less to the limit, measure in average mode.
Spectrum set:	**Step 1:** Test Frequency: test channel, RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Positive peak **Step 2:** Test Frequency: spurious frequency RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Sample, Span=0Hz
Limit:	Below 2387 MHz: 2.5μW/MHz or less 2387 to 2400 MHz: 25μW/MHz or less 2483.5 through 2496.5 MHz: 25μW/MHz or less Over 2496.5 MHz: 2.5μW/MHz or less
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Test plot as follows:

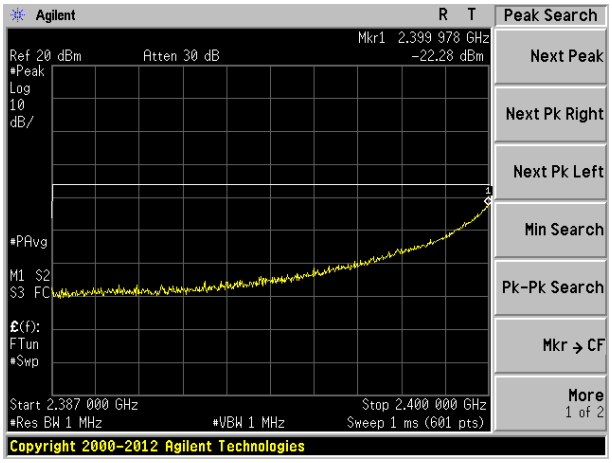
Test voltage	Mid	Channel	Lowest



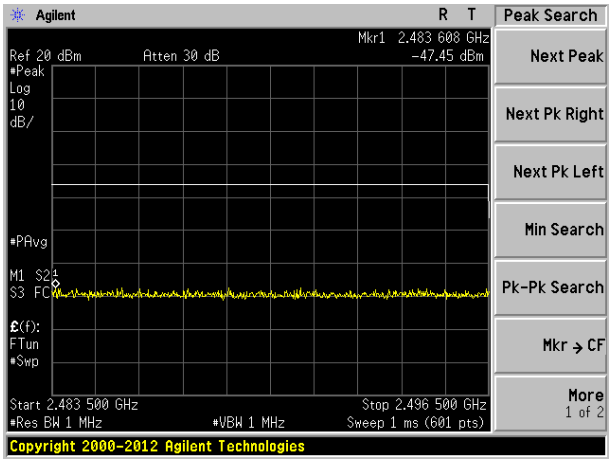
10MHz~1GHz



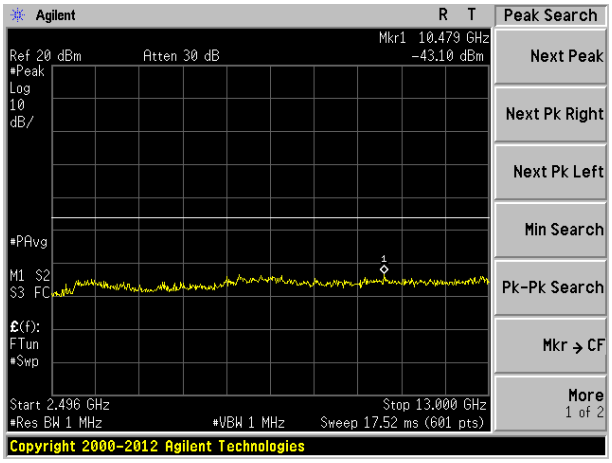
1GHz~2.387GHz



2.387GHz~2.4GHz

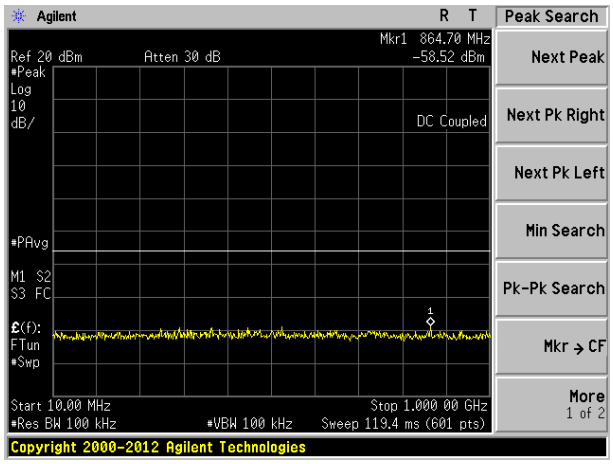


2.4835GHz~2.4965GHz

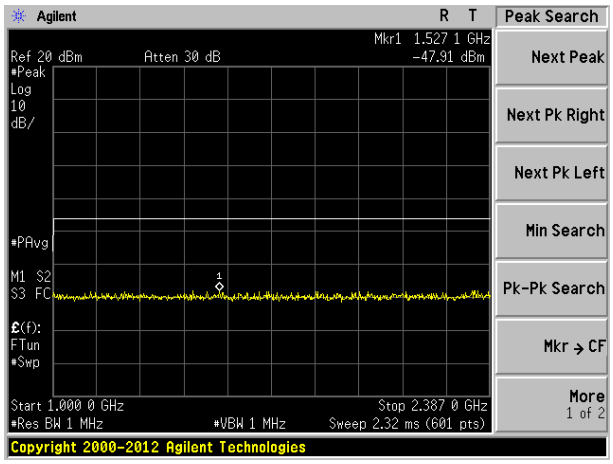


2.4965GHz~13GHz

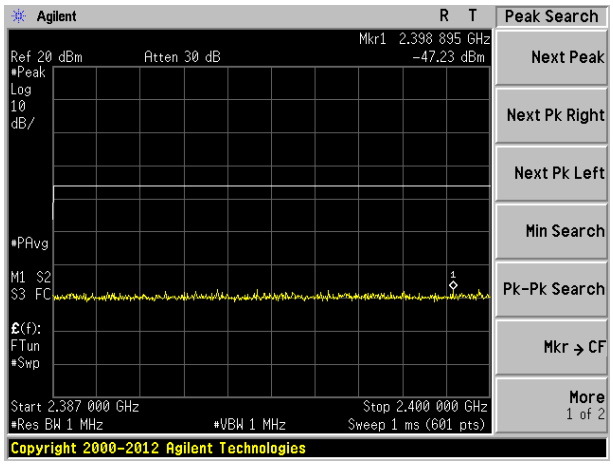
Test voltage	Mid	Channel	Middle



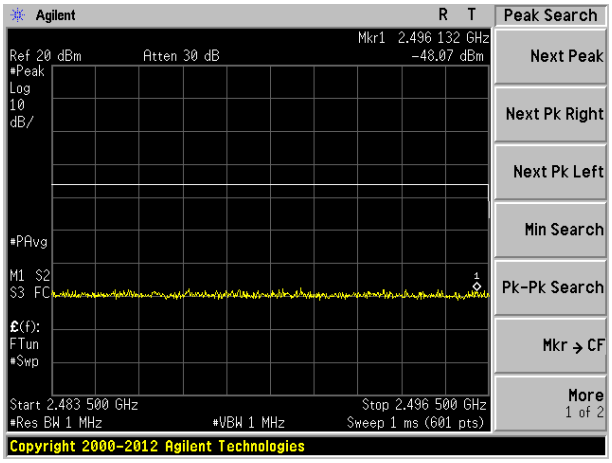
10MHz~1GHz



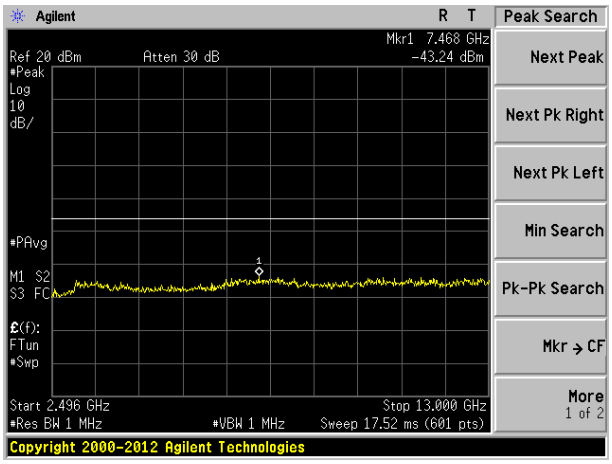
1GHz~2.387GHz



2.387GHz~2.4GHz

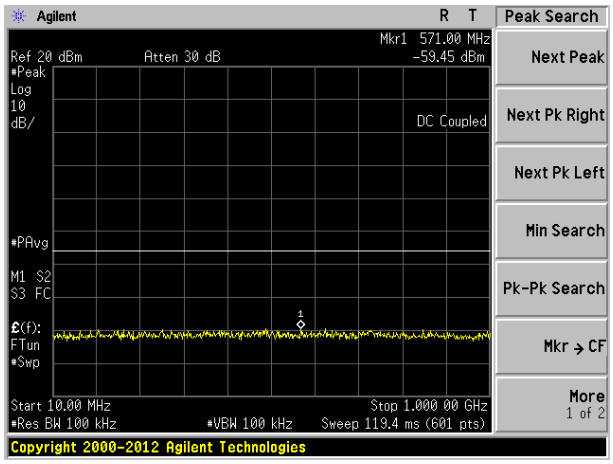


2.4835GHz~2.4965GHz

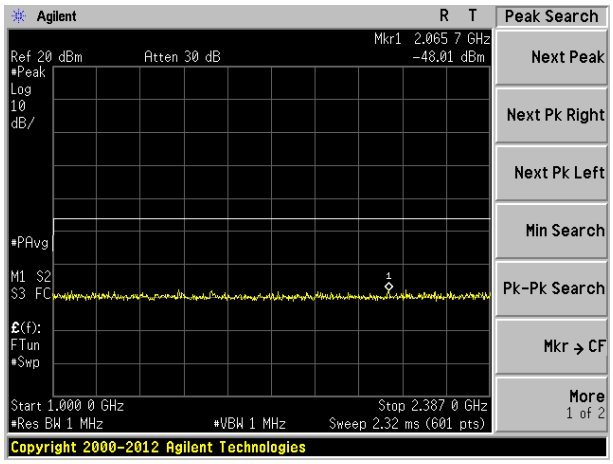


2.4965GHz~13GHz

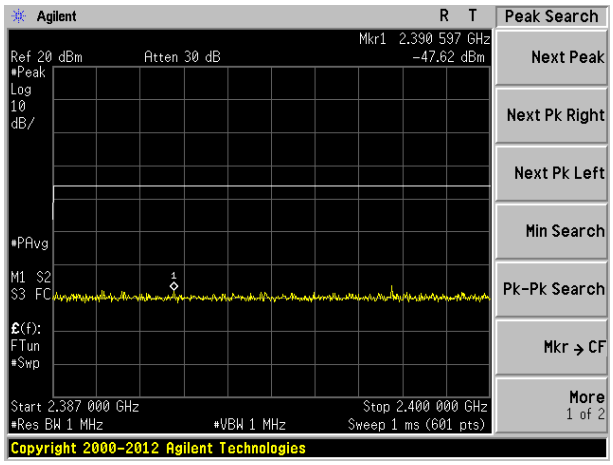
Test voltage	Mid	Channel	Highest



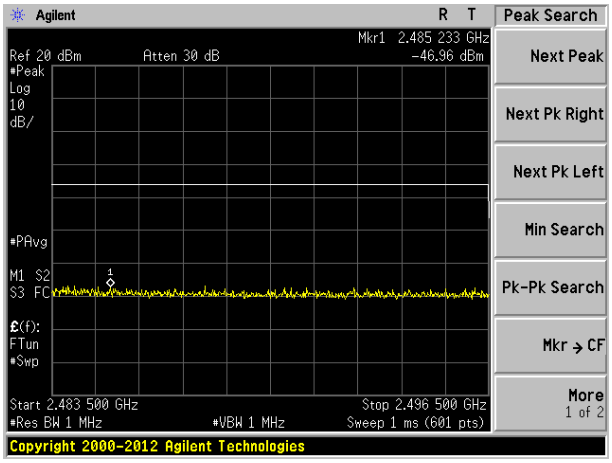
10MHz~1GHz



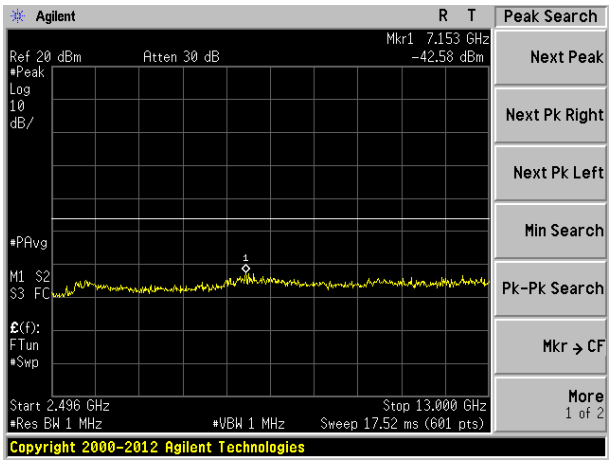
1GHz~2.387GHz



2.387GHz~2.4GHz

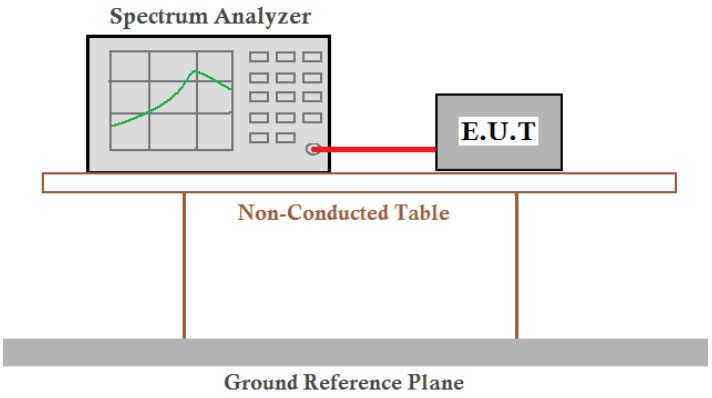


2.4835GHz~2.4965GHz



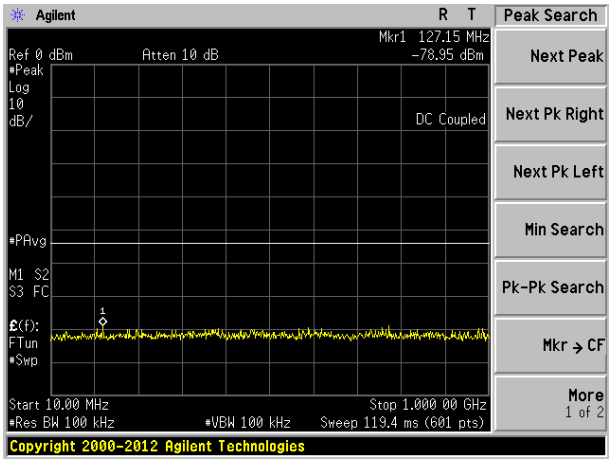
2.4965GHz~13GHz

6.7 Limit of secondary radiated emissions

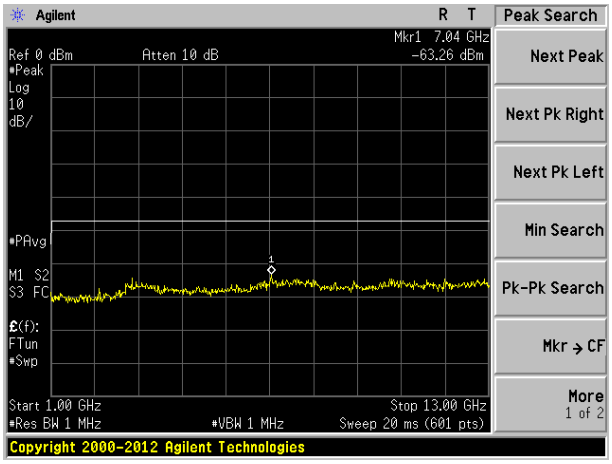
Test condition:	Receiving mode
Measurement procedure:	**Step 1** All spurious are measured from 30MHz to 13GHz by peak mode. **Step 2** If the value measured by Step1 is 3dB or less to the limit, measure in average mode.
Spectrum set:	**Step 1:** Test Frequency: test channel, Below 1GHz, RBW=VBW=100KHz; Above 1GHz, RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Positive peak **Step 2:** Test Frequency: spurious frequency Test Frequency: test channel, Below 1GHz, RBW=VBW=100KHz; Above 1GHz, RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Sample, Span=0Hz
Limit:	Below 1GHz: 4.0nW or less Above 1GHz: 20nW or less
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Test plot as follows:

Test voltage	Mid	Channel	Lowest

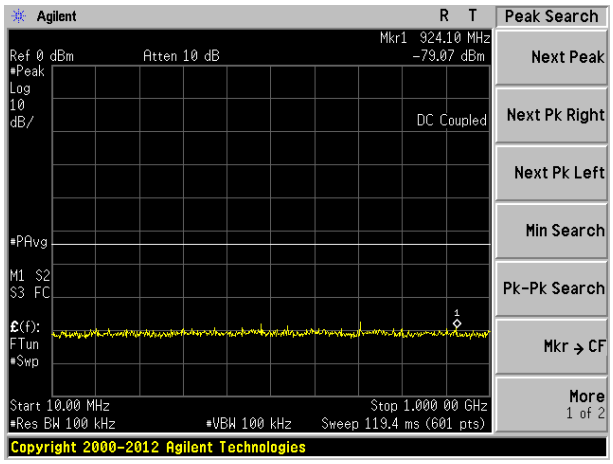


10MHz~1GHz

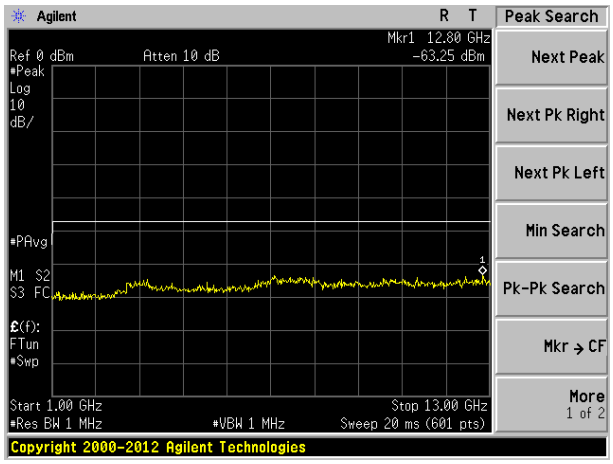


1GHz~13GHz

Test voltage	Mid	Channel	Middle

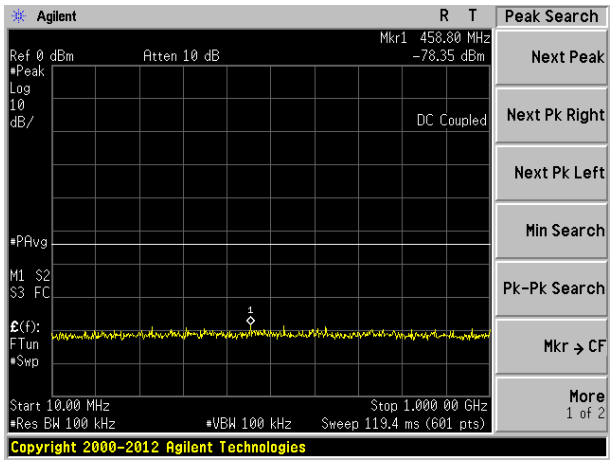


10MHz~1GHz

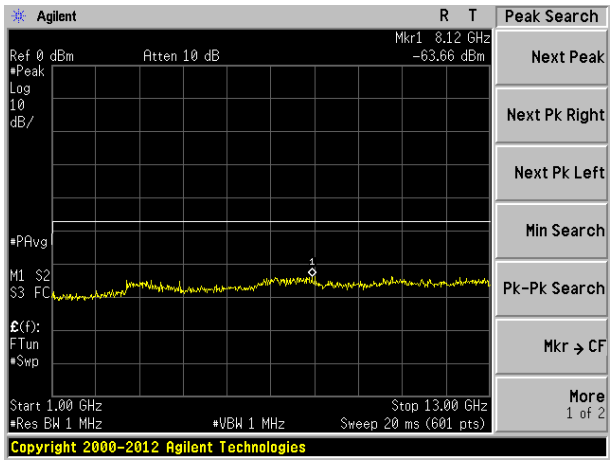


1GHz~13GHz

Test voltage	Mid	Channel	Highest

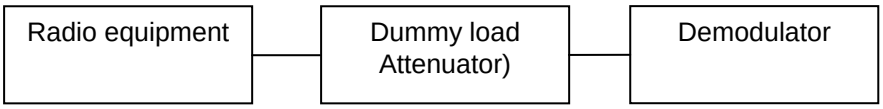


10MHz~1GHz



1GHz~13GHz

6.8 Interference suppression

Measurement procedure:	(1) The radio equipment with automatic transmitting function of identification code a) Transmit the assigned identification code from the radio equipment. b) Confirm the identification code received by the demodulator. (2) The radio equipment with automatic receiving function of identification code a) Transmit the assigned identification code from the opposite equipment. b) Confirm that the usual communication is available. c) Transmit the identification code distinct from the assigned one from the opposite equipment. d) Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different.
Test setup:	
Test Instruments:	Refer to section 5.7 for details
Test results:	Pass

Measurement data:

Identification function:	Good

7 Test Setup Photo

Reference to the **appendix I** for details.

8 EUT Constructional Details

Reference to the **appendix II** for details.

------End------