RADIO TEST REPORT
MIC Public Notice 88

Test report
On Behalf of
Onion Corporation
For
Omega2
Model No.: OM-O2P, OM-O2

Prepared for : **Onion Corporation**
187 Denison Street, Markham, ON, Canada L3R 1B5

Prepared By : **Shenzhen United Testing Technology Co., Ltd.**
2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

Date of Test: **May. 08, 2018 ~ May. 15, 2018**
Date of Report: **May. 15, 2018**
Report Number: **UNIA2018042604ER-01**

TEST RESULT CERTIFICATION

Applicant's name	:	Onion Corporation
Address	:	187 Denison Street, Markham, ON, Canada L3R 1B5
Manufacture's Name	:	Shenzhen Soartek Technology Co., Ltd.
Address	:	North of 5th Floor, Building 6, Industrial Estate of Chuangjian Phase 2, Yingrenshi Community, Shiyan Block, Bao'an District, Shenzhen City, Guangdong Province, China

Product description

Trade Mark:		N/A
Product name	:	Omega2
Model and/or type reference	:	OM-O2P, OM-O2
Standards	:	MIC Public Notice 88:2004, annex 1 and annex 43 ARIB STD-T66 V3.7

Date of Test	:	
Date (s) of performance of tests	:	May. 08, 2018 ~ May. 15, 2018
Date of Issue	:	May. 15, 2018
Test Result	:	**Pass**

Prepared by: Kahn yang/Editor

Reviewer: Sherwin Qian/Supervisor

Approved & Authorized Signer: Liuze/Manager

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Part	Rule Section	Description of Test	Result
4.1	3.2	Frequency Error	Complies
4.3	3.2	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
4.4	3.2	Unwanted Emission Intensity	Complies
4.2	3.2	Antenna Power Error	Complies
4.5	3.2	Limitation of Collateral Emission of Receiver	Complies
4.6	3.2	Transmission Antenna Gain (EIRP Antenna Power)	N/A
4.7	3.2	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
4.8	3.2	Radio Interference Prevention Capability	Complies
4.9	/	Carrier Sense Capability	Complies

NOTE:

(1)” N/A” denotes test is not applicable in this Test Report

(2) MIC Public Notice 88:2004, annex 1 and annex 43

(3) MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

1.1 TEST FACILITY

Test Firm	:	Shenzhen United Testing Technology Co., Ltd. Certificated by CNAS, Registration No.: L6964
Address	:	2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	Conducted Emission Test	±3.2dB
2	Radiated Emission Test	±4.7dB
3	RF power,conducted	±0.16dB
4	Spurious emissions,conducted	±0.21dB
5	All emissions,radiated(<1G)	±4.68dB
6	All emissions,radiated(>1G)	±5.0dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Omega2
Model Name	OM-O2P
Serial No	OM-O2
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: OM-O2P.
Antenna Type	Chip Antenna
Antenna Gain	2 dBi
Operation frequency	WiFi 2.4G 802.11b/ g/ n(HT20):2412~2472 MHz WiFi 2.4G 802.11n(HT40): 2422~2462 MHz
Number of Channels	802.11b/g/ n(HT20): 13CH 802.11n(HT40): 9CH
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Power Source	DC Voltage
Power Rating	DC 3.3V with Installation for Notebook with AC 120V/60Hz
Hardware Version	V1.0
Firmware Version	V1.0

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. This report is for WIFI test report.
3.

Channel List for 802.11b/g/n(20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	13	2472
02	2417	06	2437	10	2457		
03	2422	07	2442	11	2462		
04	2427	08	2447	12	2467		

Channel List for 802.11n(40MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	06	2437	09	2452		
04	2427	07	2442	10	2457		
05	2432	08	2447	11	2462		

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Chip Antenna	N/A	2	

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	B Mode(802.11b) (CH01 CH07 CH13)
Mode 2	G Mode(802.11g) (CH01 CH07 CH13)
Mode 3	N20 Mode(802.11n) (CH01 CH07 CH13)
Mode 4	N40 Mode(802.11n) (CH03 CH07 CH11)

2.3 TEST CONDITIONS

The BT module was tested while in a continuous transmitter/receiver mode.
The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

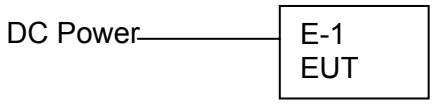
Power Supply Voltage Fluctuation Test

Voltage mode	Input Voltage	Radio Unit Voltage
DC Input	DC3.63V	3.31V
	DC3.30V	3.30V
	DC2.97V	3.30V
Note: 1 The radio unit Voltage with the module regulator IC regulator. 2 The radio unit less than 1%, so the test only rated voltage (Normal voltage) with the DC Power.		

During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Mode 1:



2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Omega2	N/A	OM-O2P	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

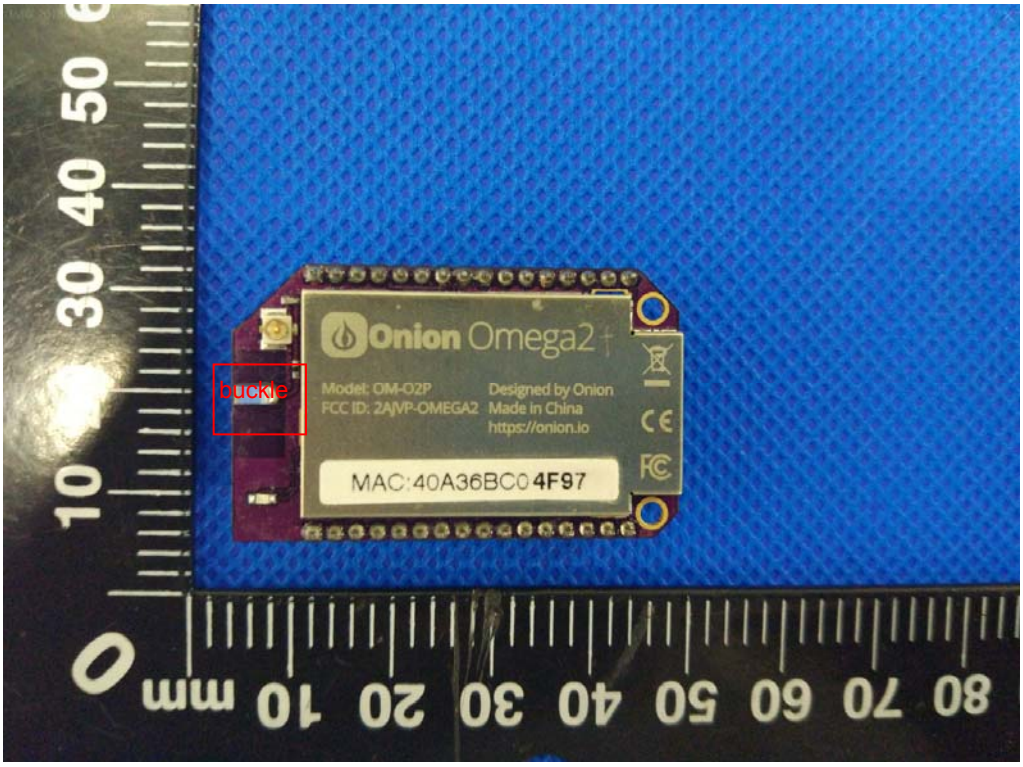
(3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 19, 2018	1 Year
2.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 19, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 19, 2018	1 Year
4.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
5.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Feb. 19, 2018	1 Year
6.	Trilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Feb. 19, 2018	1 Year
7.	Pre-amplifier	Compliance Direction	PAP-0203	22008	Feb. 19, 2018	1 Year
8.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
9.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 19, 2018	1 Year
10.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 19, 2018	1 Year
11.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 19, 2018	1 Year
12.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
13.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 19, 2018	1 Year
14.	EMI Receiver	Rohde & Schwarz	ESCI	100627	Feb. 19, 2018	1 Year
15.	LISN	SchwarzBeck	NSLK 8126	8126377	Feb. 19, 2018	1 Year
16.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Feb. 19, 2018	1 Year
17.	EMI Test Software ES-K1	Rohde & Schwarz	N/A	N/A	N/A	N/A
18.	Power Meter	R&S	NRVD	SEL0069	Feb. 19, 2018	1 Year
19.	Power Sensor	R&S	URV5-Z2	SEL0071	Feb. 19, 2018	1 Year
20.	Power Sensor	R&S	URV5-Z2	SEL0072	Feb. 19, 2018	1 Year
21.	Software EMC32	R&S	EMC32-S	SEL0082	N/A	N/A
22.	Log-periodic Antenna	Amplifier Reasearch	AIFS-IP780	SEL0073	N/A	N/A
23.	Antenna Tripod	Amplifier Reasearch	TP1000A	SEL0074	N/A	N/A
24.	High Gain Horn Antenna(0.8-5GHz)	Amplifier Reasearch	AT4002A	SEL0075	N/A	N/A
25.	Spectrum analyzer	Agilent	N9020A	MY49911048	Feb. 19, 2018	1 Year
26.	Spectrum analyzer	Agilent	E4407B	MY46184326	Feb. 19, 2018	1 Year

3. RF SHIELDING METHOD

We apply the product for Japan RF certification. RF and Modulation components are coated with buckle. It is not easily removed. Please refer to following for photo for details.
Red circle part of the RF module soldered on the PCB.



4. TEST RESULT FOR WIFI

4.1 FREQUENCY ERROR

4.1.1 LIMIT

Item	Limits
Frequency Error	+/-50ppm

4.1.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.1.3 TEST PROCEDURES

(1)In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.

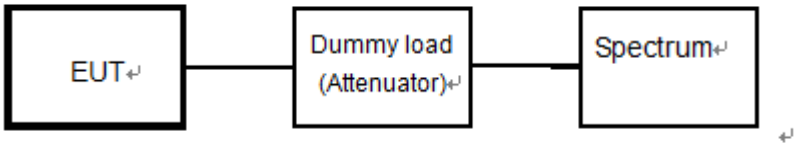
(2)In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.

(3)In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.

(4)In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

4.1.4 TEST SETUP LAYOUT



4.1.5 EUT OPERATION DURING TEST

The EUT was placed on the test table and programmed in un-modulation function.

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4.1.6 TEST RESULT

EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage- Carrier Tx Mode		

Mode	CH	Measured	Tolerance	Result	Limit
		MHz	MHz	ppm	ppm
Carrier Tx Mode IEEE 802.11b	CH1:2412MHz	2411.978	-0.022	-9.12	+/-50
	CH7:2442MHz	2441.981	-0.019	-7.78	+/-50
	CH13:2472MHz	2471.979	-0.021	-8.46	+/-50
Carrier Tx Mode IEEE 802.11g	CH1:2412MHz	2412.022	-0.022	-9.12	+/-50
	CH7:2442MHz	2442.016	-0.016	-6.55	+/-50
	CH13:2472MHz	2471.985	-0.015	-6.07	+/-50
Carrier Tx Mode IEEE802.11n/HT20	CH1:2412MHz	2412.013	-0.013	-5.39	+/-50
	CH7:2442MHz	2442.016	-0.016	-6.55	+/-50
	CH13:2472MHz	2471.984	-0.016	-6.47	+/-50
Carrier Tx Mode IEEE802.11n/HT40	CH1:2422MHz	2422.019	-0.019	-7.84	+/-50
	CH5:2442MHz	2442.021	-0.021	-8.60	+/-50
	CH9:2462MHz	2462.018	-0.018	-7.31	+/-50
Conclusion：PASS					

4.2. ANTENNA POWER

4.2.1 LIMIT

Item	Limits
Antenna Power Density	≦3mW/MHz (FH form 2427 - 2470.75 MHz) ≦10mW/MHz (OFDM,DS frOM-O2P400~2483.5MHz) ≦10mW (Other from 2400~2483.5MHz)
Antenna Power Error	+20%, -80% (Base on manufacturer declare antenna power density)

4.2.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.2.3 TEST PROCEDURES

Attenuation of the attenuator shall be set to provide an optimum input level to the spectrum analyzer.

1, Set the spectrum analyzer as follows for searching the frequency that outputs the maximum antenna power:

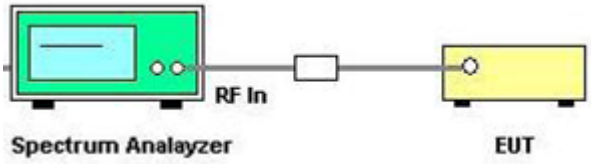
Center frequency:	Test frequency
Frequency sweep width:	Approximately twice of the occupied bandwidth
Resolution bandwidth:	1MHz
Video bandwidth:	Approximately three times of the resolution bandwidth
Y-axis scale:	10dB/Div
Sweep time:	Minimum time to ensure the measuring accuracy (In the case of burst wave, one burst shall be included per data point.)
Trigger condition:	Free run
Data points:	400 points or more
Sweep mode:	Continuous sweep
Detection mode:	Positive peak
Display mode:	Maximum hold

2, When the trace is complete, find the peak value of the power envelope and record. In the case of bandwith above RBW, connect to power meter directly.

3. Calculate antenna power density by the formula below
PT(mW/MHz) = Total Output Power (mW) / Burst Ratio / Spread Bandwidth (MHz)
Burst Ratio =ON Time / OFF Time

4. 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.

4.2.4 TEST SETUP LAYOUT



4.2.5 EST DEVIATION

There is no deviation with the original standard.

4.2.6 TEST RESULT

EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-B mode		

Test Frequency	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	8.62	9.0	-4.22%
2442MHz	8.58	9.0	-4.67%
2472MHz	8.66	9.0	-3.78%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-G mode		

Test Frequency	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	8.08	9.0	-10.22%
2442MHz	8.14	9.0	-9.56%
2472MHz	7.95	9.0	-11.67%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N20 mode		

Test Frequency	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2412MHz	7.49	9.0	-16.78%
2442MHz	7.52	9.0	-16.44%
2472MHz	7.36	9.0	-18.22%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N40 mode		

Test Frequency	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna Power Error (%)
2422MHz	4.63	5.0	-7.40%
2442MHz	4.47	5.0	-10.60%
2462MHz	4.54	5.0	-9.20%
Limit : +20%, -80% (Base on manufacturer declare antenna power density)			

4.3. OCCUPIED BANDWITH

4.3.1 LIMIT

Item	Limits
Occupied Band Width:	FH 83.5MHz; OFDM,DS ≦26MHz;Others≦26MHz
Spreading Bandwidth:	≧500 kHz (FH, DS)

4.3.2 MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	300kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3.3 TEST PROCEDURES

1. Setting of SA is following as: RB: 300kHz / VB:300kHz / SPAN: 40MHz / AT: 30dB Ref: 20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
5. Spread Spectrum Factor limit is greater than 5

4.3.4 TEST SETUP LAYOUT

4.3.5 TEST DEVIATION

There is no deviation with the original standard.

4.3.6 EUT OPERATION DURING TEST

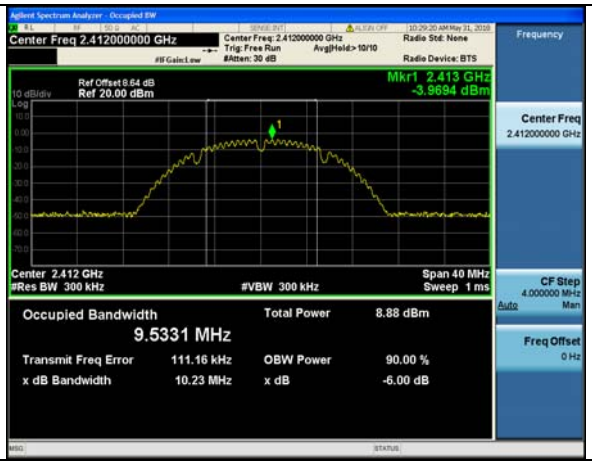
The EUT was programmed to be in continuously transmitting mode.

4.3.7 TEST RESULT

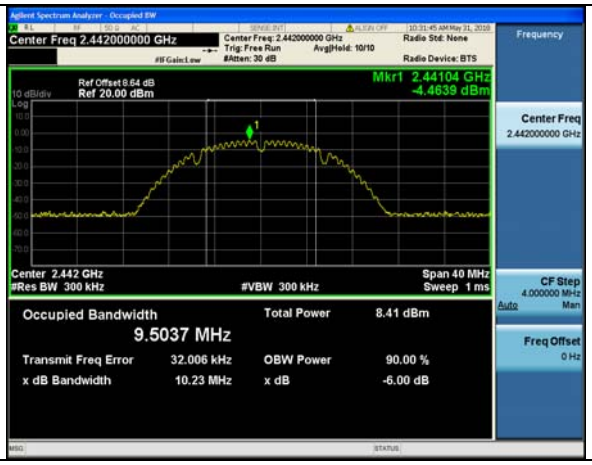
EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-B mode		

Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	14.281	9.5331
	2442	14.236	9.5037
	2472	14.274	9.5009

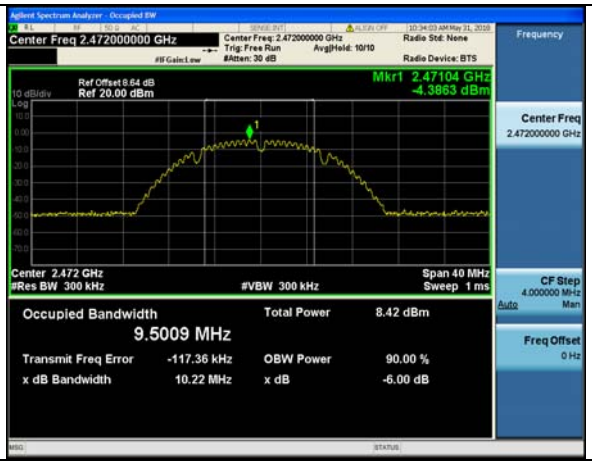
802.11 B 2412MHz



802.11 B 2442MHz



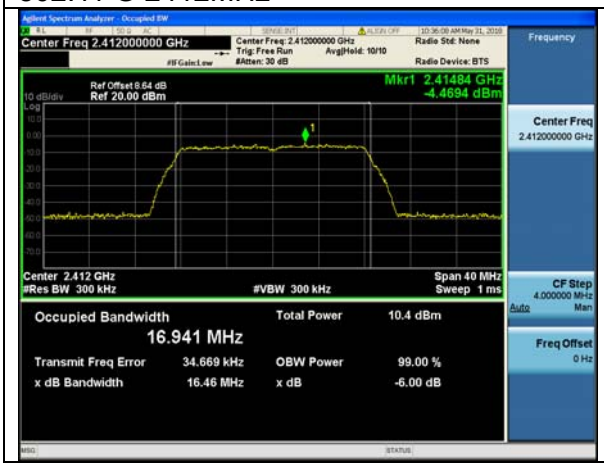
802.11 B 2472MHz

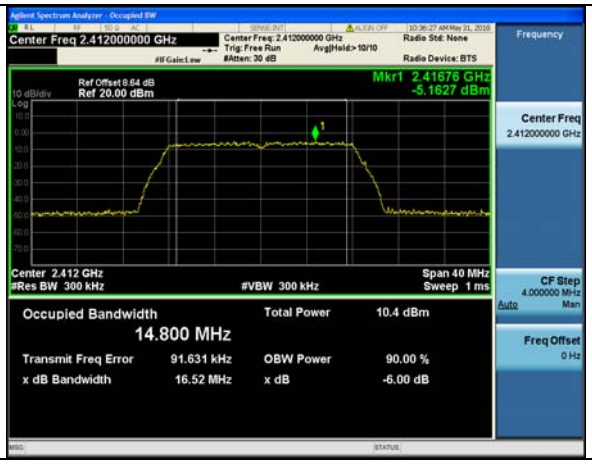


EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-G mode		

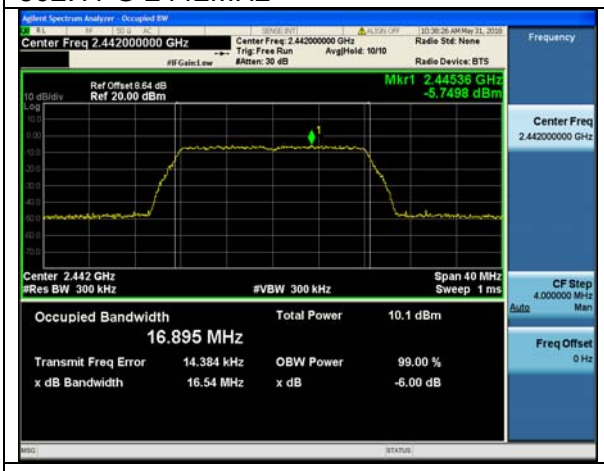
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	16.941	14.800
	2442	16.895	14.780
	2472	16.917	14.748

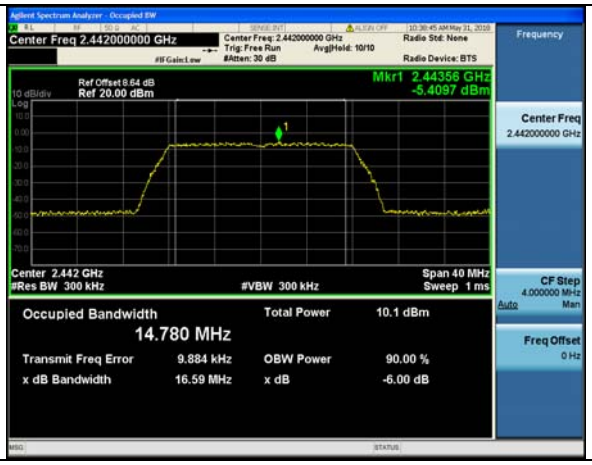
802.11 G 2412MHz



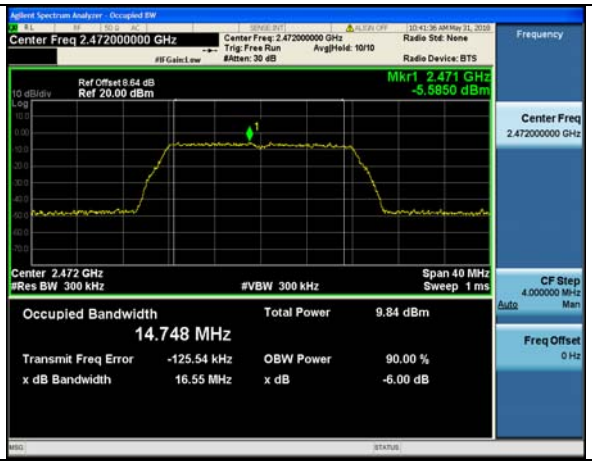


802.11 G 2442MHz





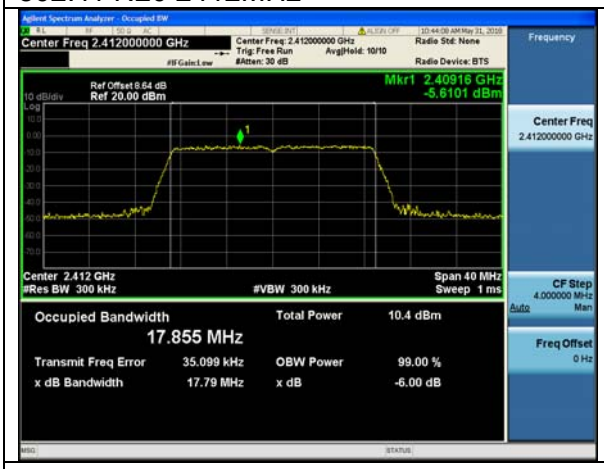
802.11 G 2472MHz

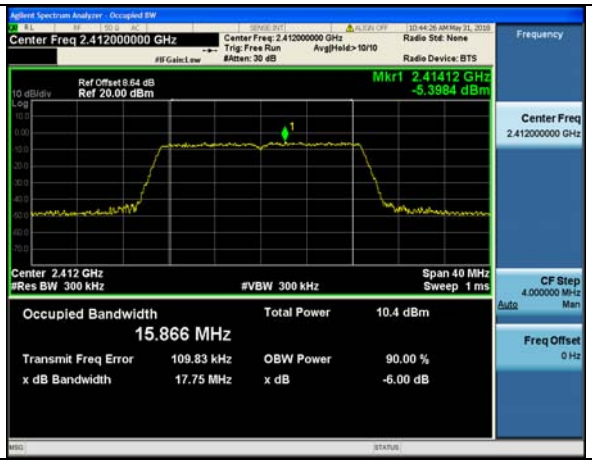


EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N20 mode		

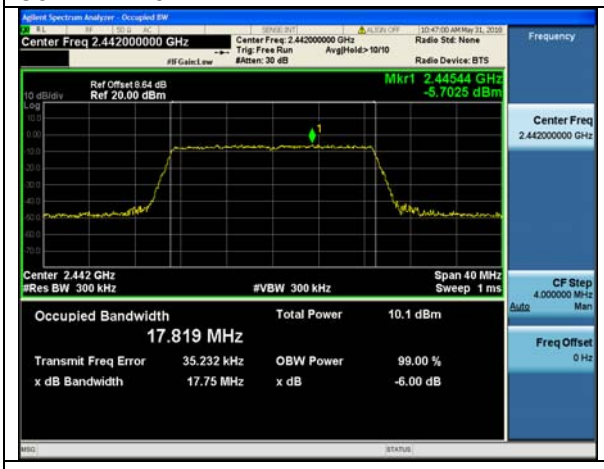
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2412	17.855	15.866
	2442	17.819	15.846
	2472	17.841	15.804

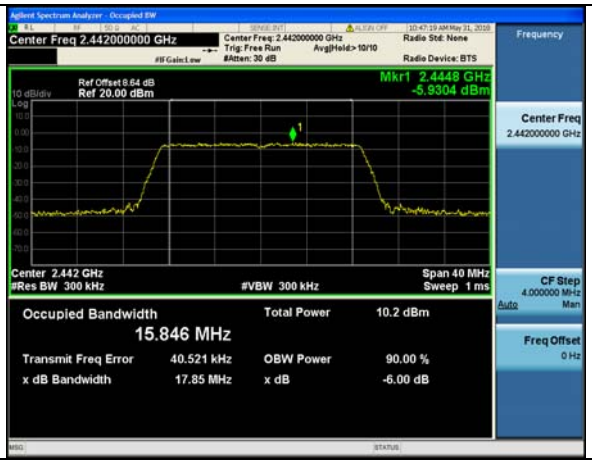
802.11 N20 2412MHz



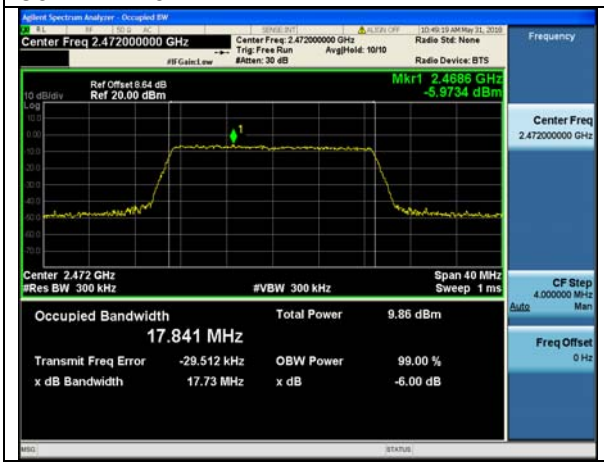


802.11 N20 2442MHz





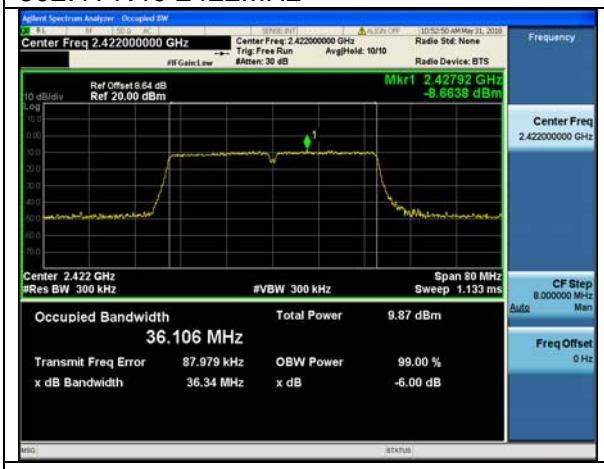
802.11 N20 2472MHz

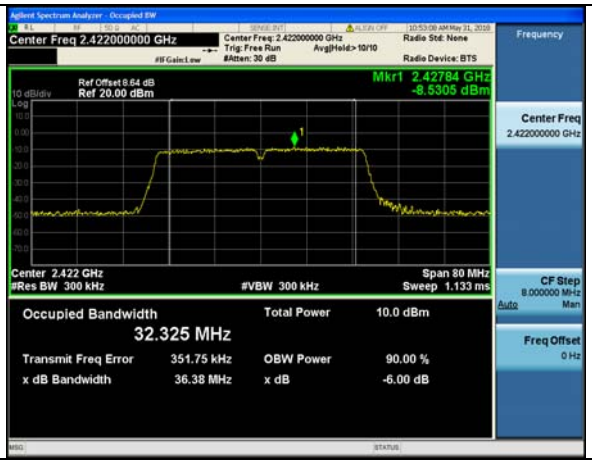


EUT：	Omega2	Test Date:	2018.05.10
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N40 mode		

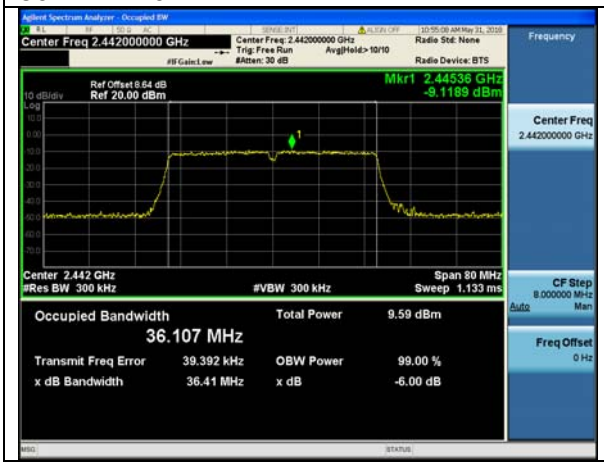
Test Voltage	Test Frequency (MHz)	Occupied Bandwidth (MHz)	Spread Bandwidth (MHz)
Normal Voltage	2422	36.106	32.325
	2442	36.107	32.465
	2462	36.084	32.160

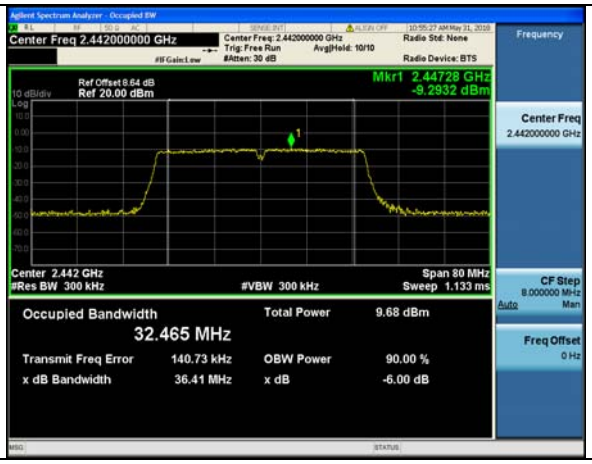
802.11 N40 2422MHz



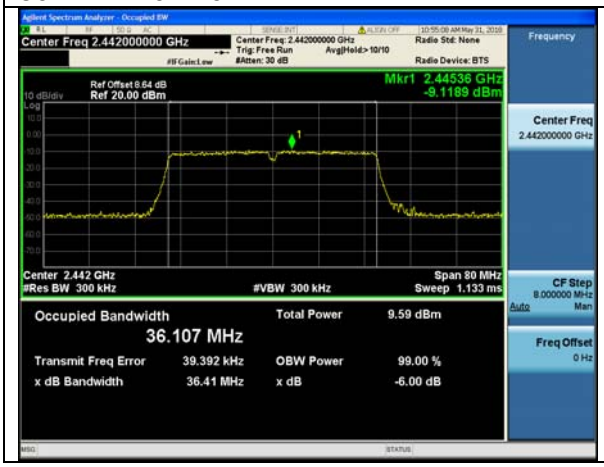


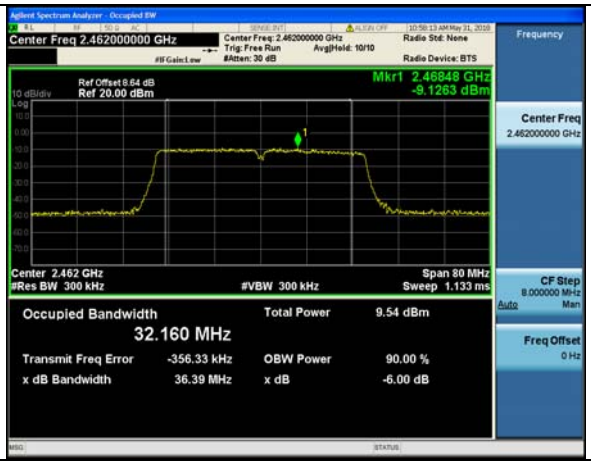
802.11 N40 2442MHz





802.11 N40 2462MHz





4.4. UNWANTED EMISSION INTENSITY MEASUREMENT

4.4.1 LIMIT

Item	Limits
TX Spurious Emission	≦ 0.25 μW (30MHz≦f≦1000MHz)
	≦2.5 μW (1000MHz<f≦2387MHz)
	≦25 μW (2387MHz<f≦2400MHz)
	≦25 μW (2483.5MHz≦f<2496.5MHz)
	≦2.5 μW (2496.5MHz≦f<12500MHz)

4.4.2. MEASURING INSTRUMENTS AND SETTING

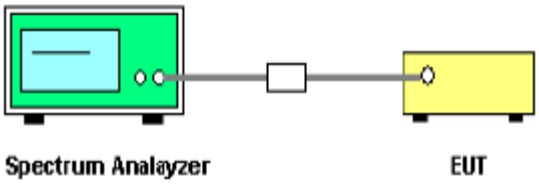
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. TEST PROCEDURES

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
   Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
   Sweep Mode: Continuous sweep / Detect mode: Positive peak
   Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Meaured_ Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

4.4.4. TEST SETUP LAYOUT



4.4.5. TEST DEVIATION

There is no deviation with the original standard.

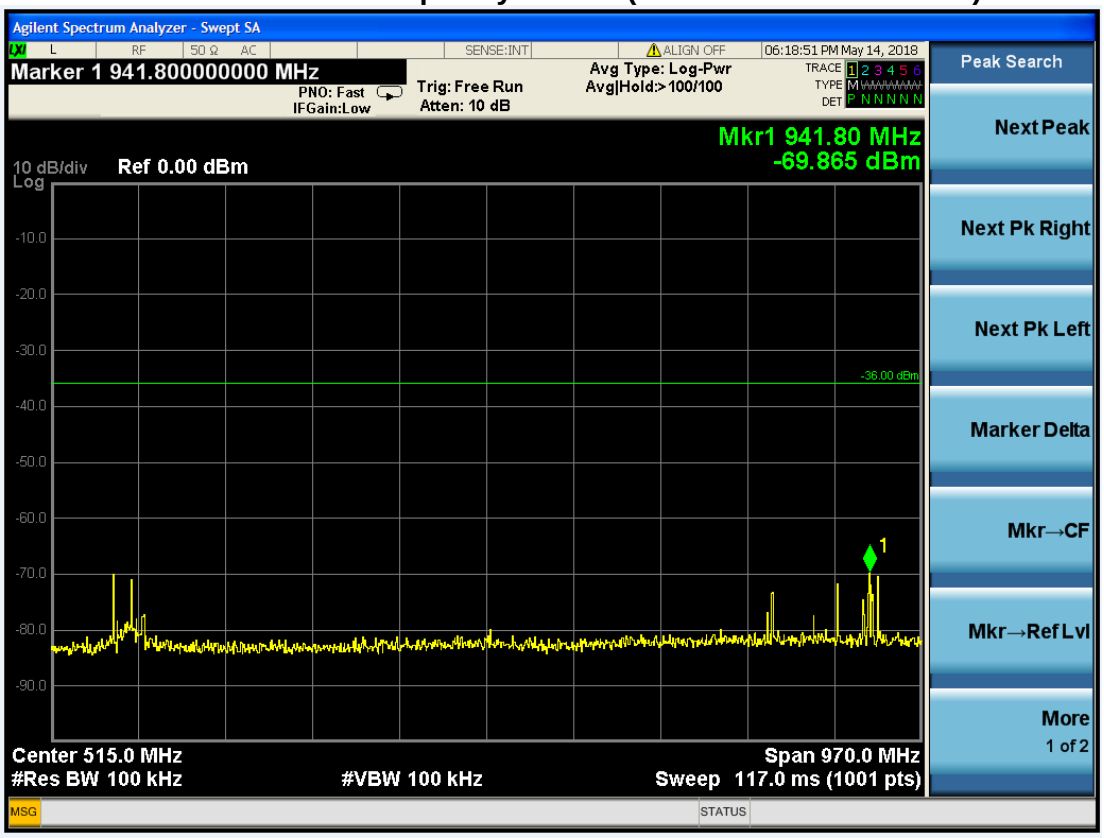
4.4.6. TEST RESULT

EUT：	Omega2	Test Date:	2018.05.14
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-B mode		

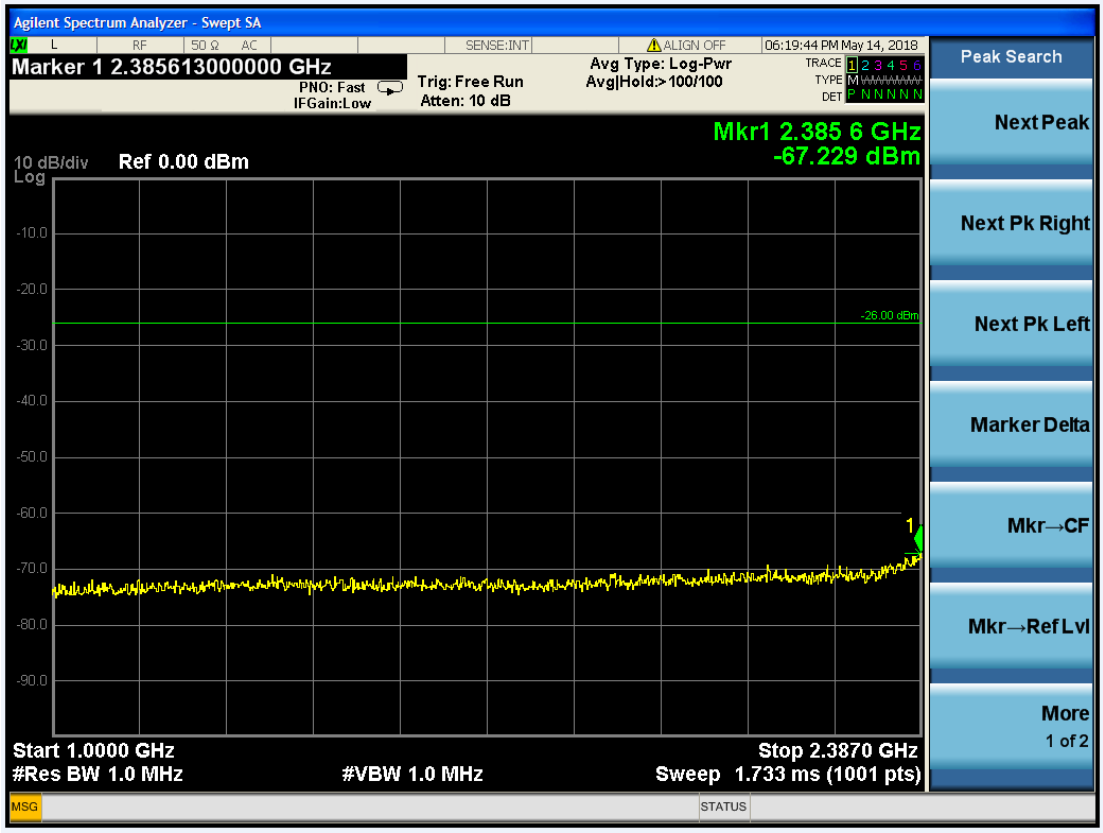
Test Mode	Test Channel	StartFre[MHz]	StopFre[MHz]	Max.Fre[MHz]	Max.Level[μW]	Limit[μW]	Verdict
11B	2412	30	1000	941.80	0.000103	<0.3	PASS
11B	2412	1000	2387	2385.6	0.000189	<2.5	PASS
11B	2412	2387	2400	2398.778	0.000782	<25	PASS
11B	2412	2483.5	2496.5	2483.54	0.000146	<25	PASS
11B	2412	2496.5	13000	12643	0.000176	<2.5	PASS
11B	2472	2496.5	13000	941.8	0.00014	<2.5	PASS
11B	2472	30	1000	2145.7	0.000119	<0.3	PASS
11B	2472	1000	2387	2394.046	0.000138	<2.5	PASS
11B	2472	2387	2400	2483	0.001128	<25	PASS
11B	2472	2483.5	2496.5	12853	0.000187	<25	PASS
11G	2412	30	1000	835.1	1.05E-05	<0.3	PASS
11G	2412	1000	2387	2037.5	0.000101	<2.5	PASS
11G	2412	2387	2400	2399.545	0.014618	<25	PASS
11G	2412	2483.5	2496.5	2484.444	0.00051	<25	PASS
11G	2412	2496.5	13000	12653	0.000229	<2.5	PASS
11G	2472	30	1000	812.79	1.1E-05	<0.3	PASS
11G	2472	1000	2387	2378.7	0.000284	<2.5	PASS
11G	2472	2387	2400	2399.597	0.000691	<25	PASS
11G	2472	2483.5	2496.5	2483	0.020701	<25	PASS
11G	2472	2496.5	13000	2497	0.000652	<2.5	PASS
11N20	2412	30	1000	746.83	1.22E-05	<0.3	PASS
11N20	2412	1000	2387	2377.3	0.000882	<2.5	PASS
11N20	2412	2387	2400	2399.61	71.58137	<25	PASS
11N20	2412	2483.5	2496.5	2483.648	0.000504	<25	PASS
11N20	2412	2496.5	13000	2497	0.00026	<2.5	PASS
11N20	2472	30	1000	937.92	1.12E-05	<0.3	PASS
11N20	2472	1000	2387	2375.9	0.000312	<2.5	PASS
11N20	2472	2387	2400	2392.252	0.00046	<25	PASS
11N20	2472	2483.5	2496.5	2483.0945	0.035851	<25	PASS
11N20	2472	2496.5	13000	2497	0.0004	<2.5	PASS

11N40	2422	30	1000	967.99	9.46E-06	<0.3	PASS
11N40	2422	1000	2387	2387	0.000424	<2.5	PASS
11N40	2422	2387	2400	2399.909	0.009473	<25	PASS
11N40	2422	2483.5	2496.5	2488.3595	0.000401	<25	PASS
11N40	2422	2496.5	13000	12790	0.000188	<2.5	PASS
11N40	2462	30	1000	884.57	1.03E-05	<0.3	PASS
11N40	2462	1000	2387	2387	0.000233	<2.5	PASS
11N40	2462	2387	2400	2398.83	0.00032	<25	PASS
11N40	2462	2483.5	2496.5	2483.0135	0.069807	<25	PASS
11N40	2462	2496.5	13000	2497	0.000272	<2.5	PASS

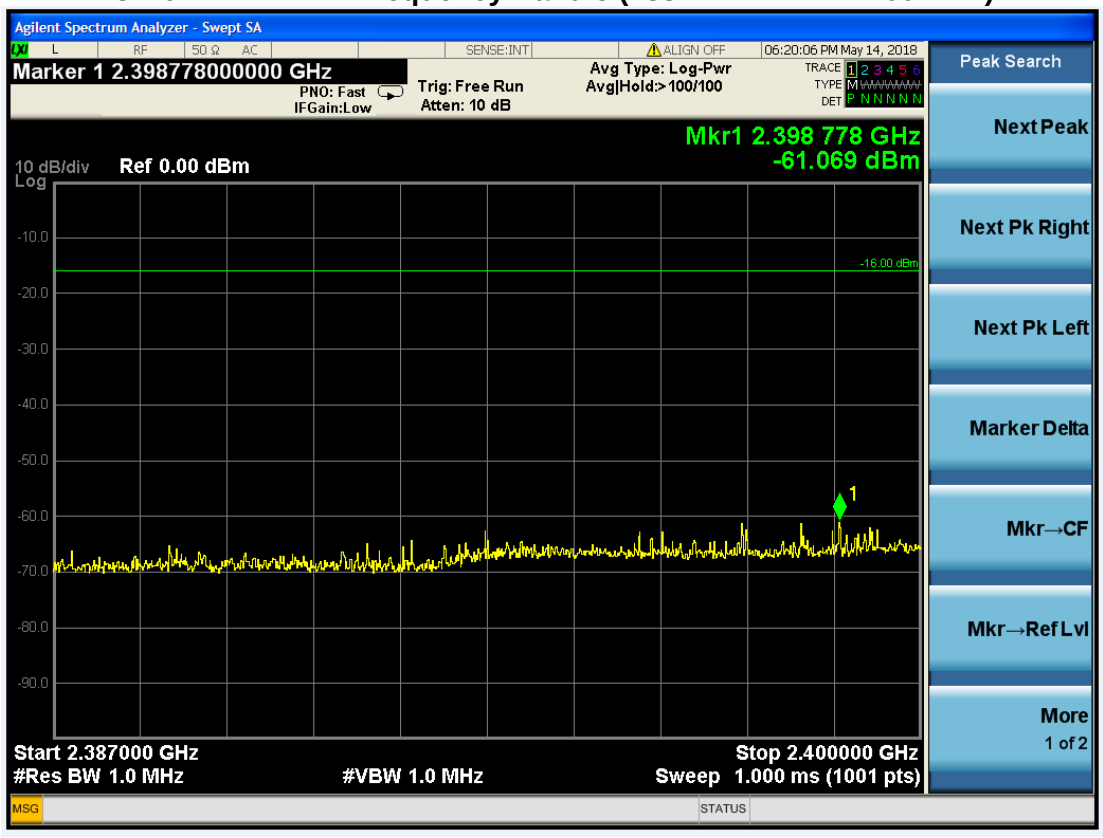
CH 01:2412MHz - Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



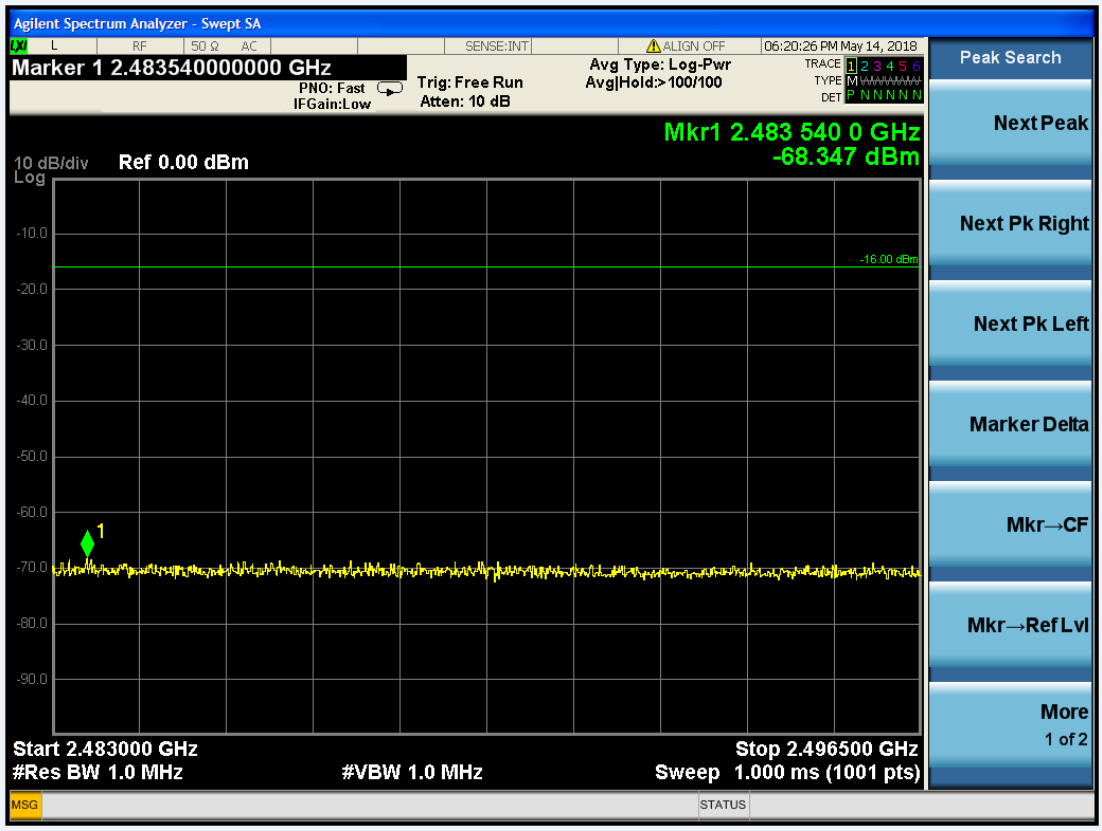
CH 01:2412MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



CH 01:2412MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)

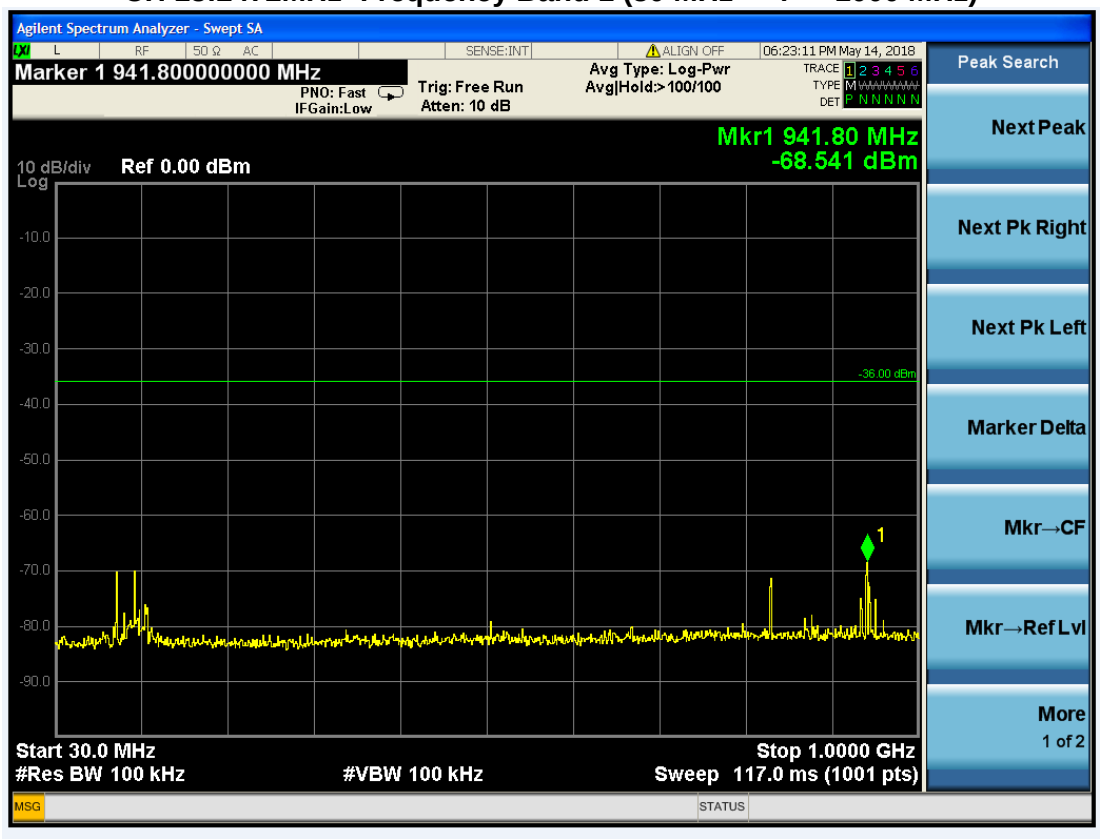


CH 01:2412MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)

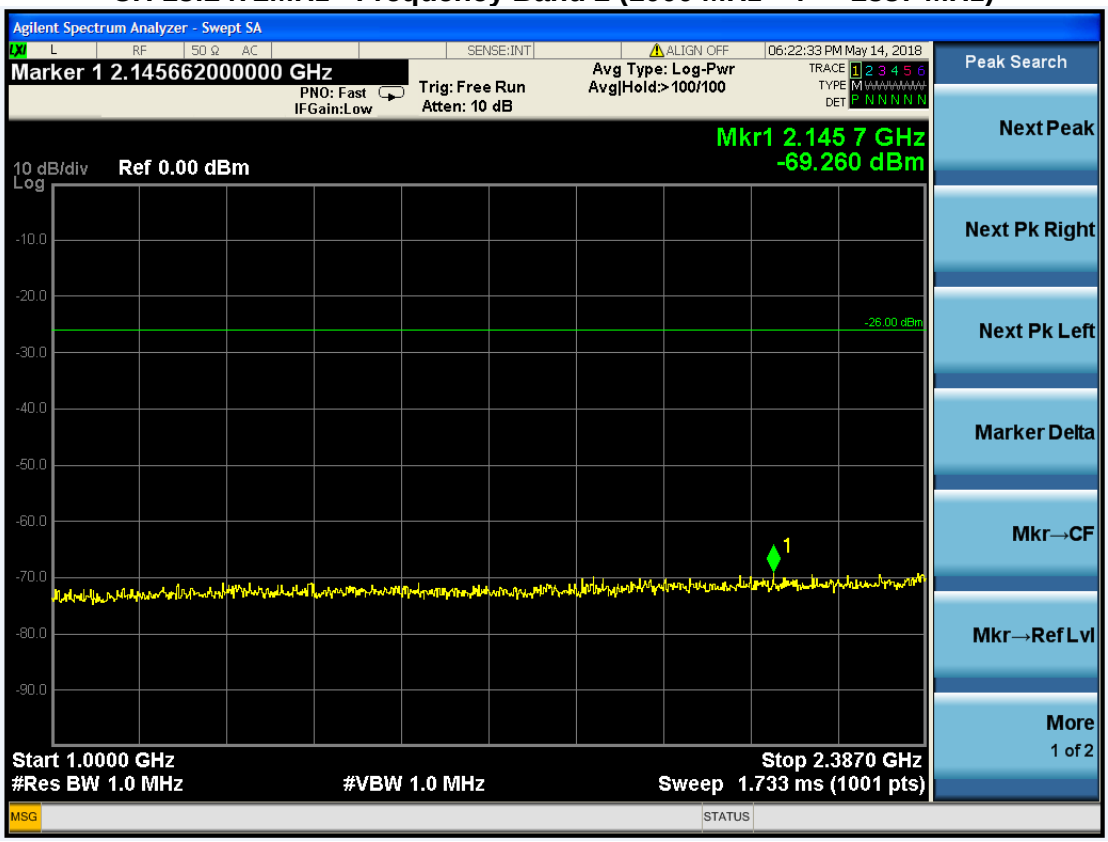


CH 01:2412MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)

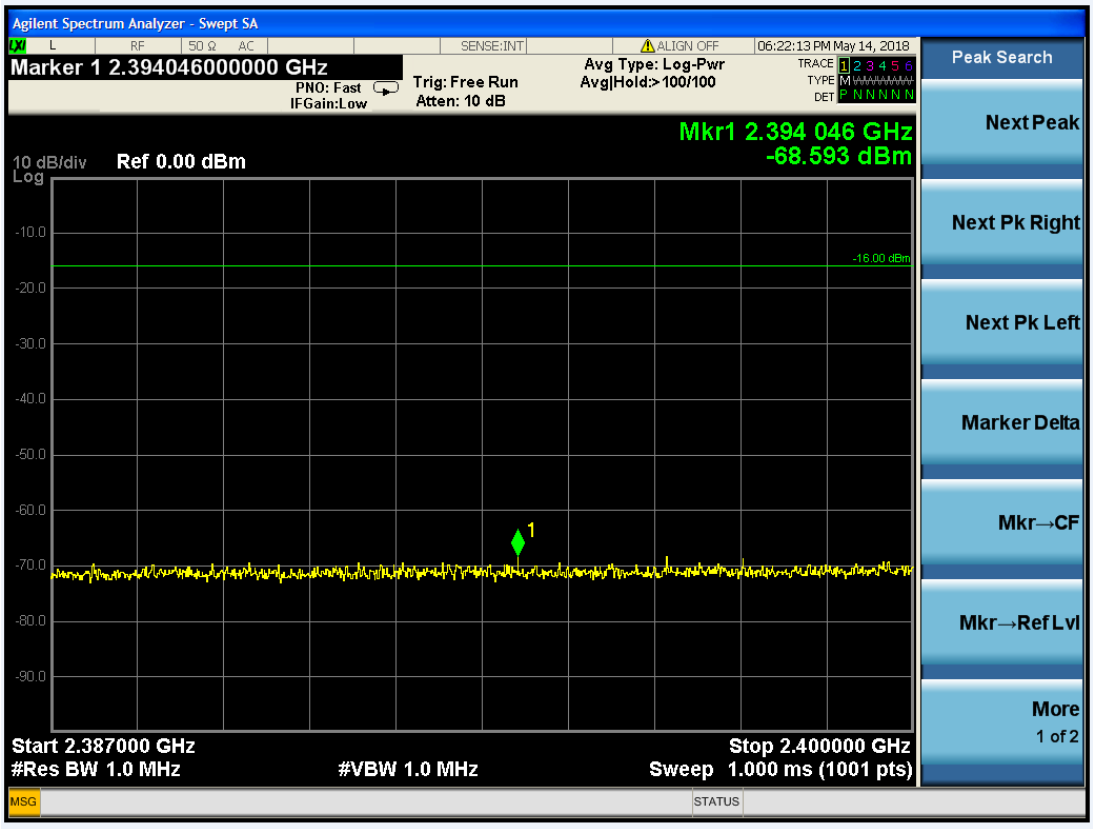
CH 13:2472MHz- Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



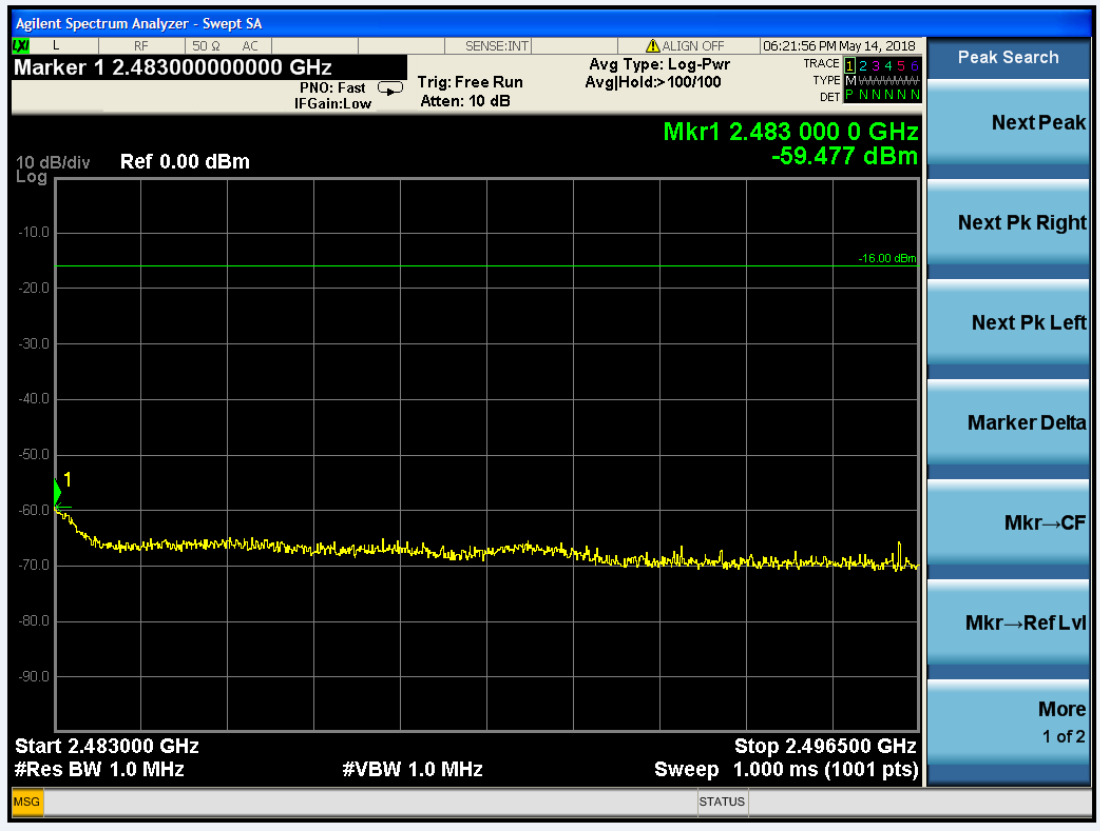
CH 13:2472MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



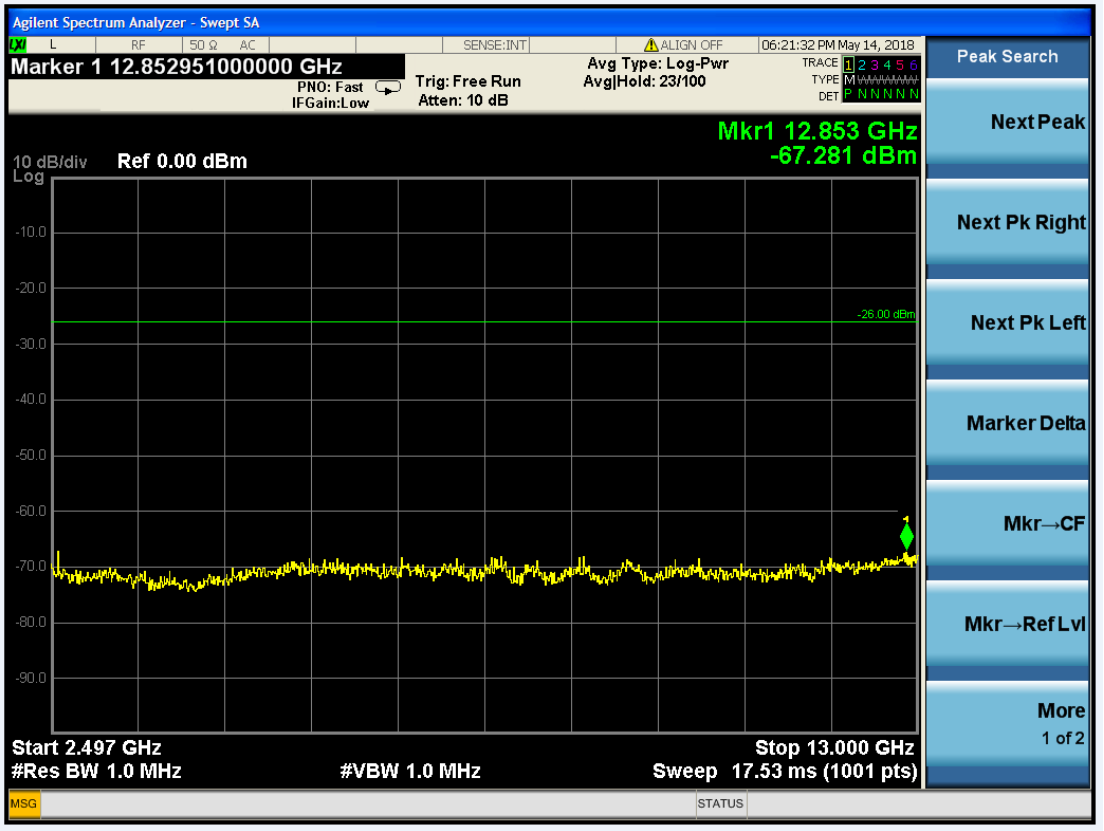
CH 13:2472MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



CH 13:2472MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)

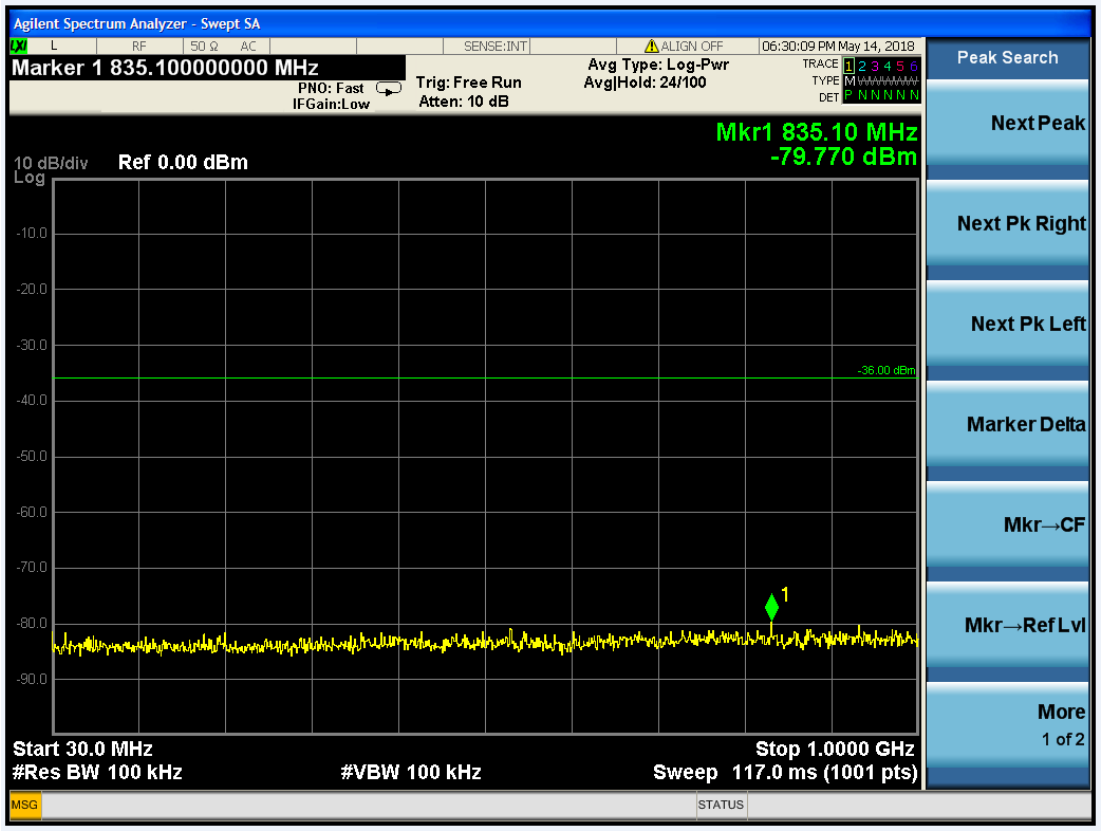


CH 13:2472MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)

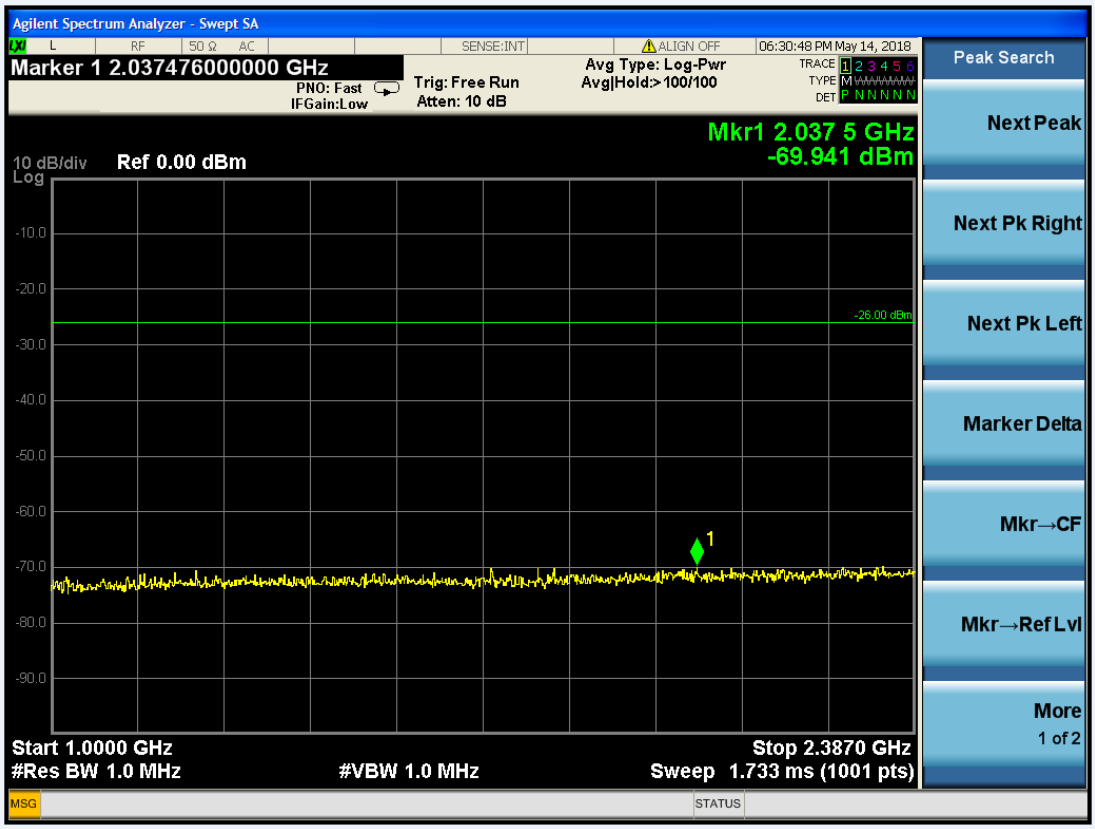


EUT：	Omega2	Test Date:	2018.05.14
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-G mode		

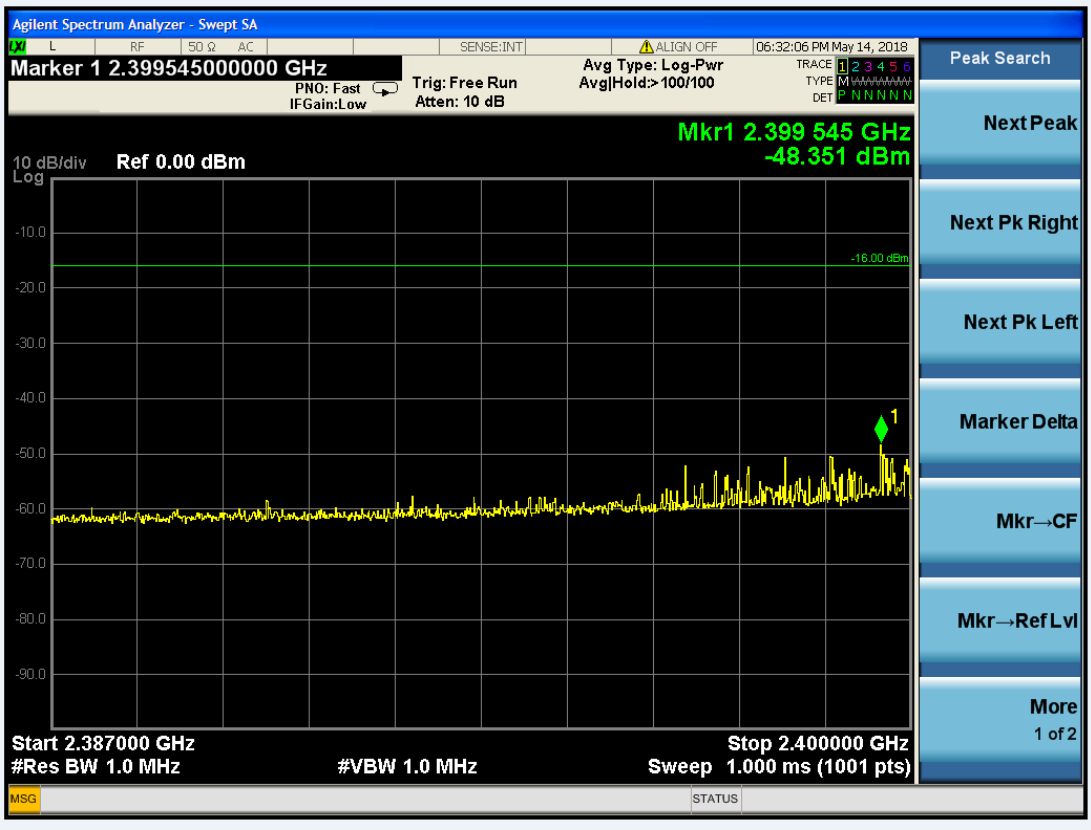
CH 01:2412MHz - Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



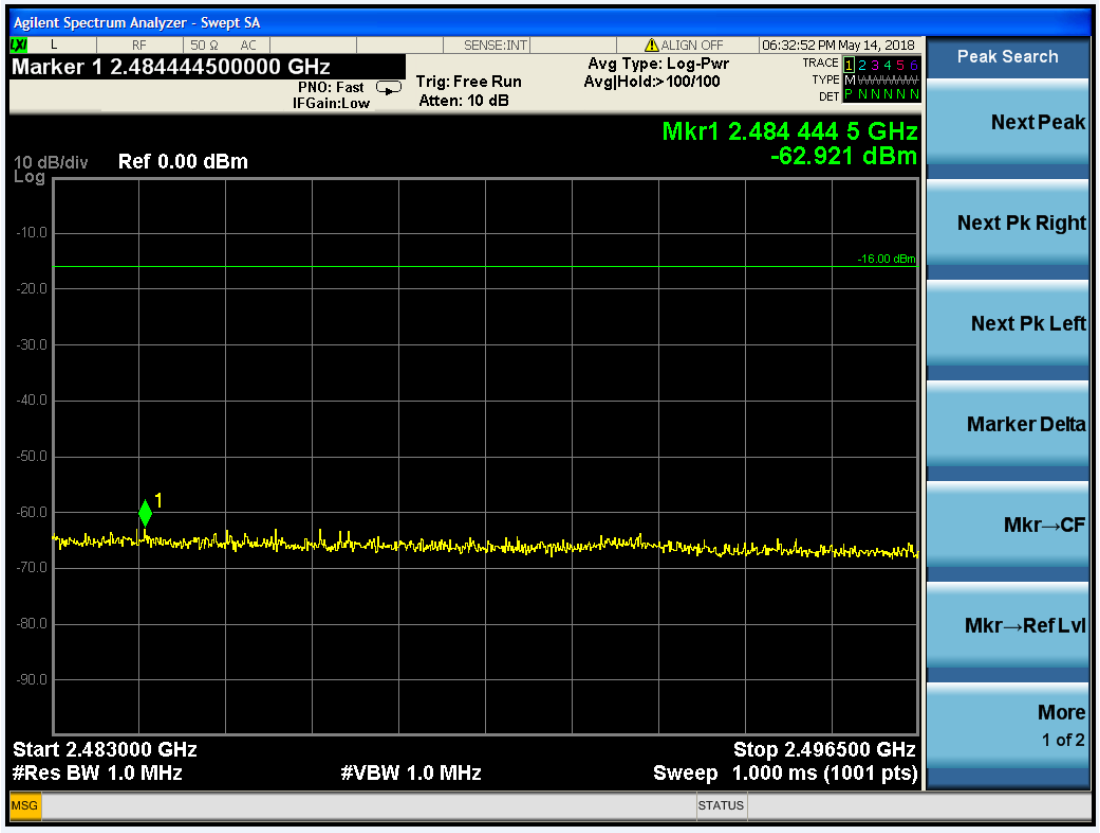
CH 01:2412MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



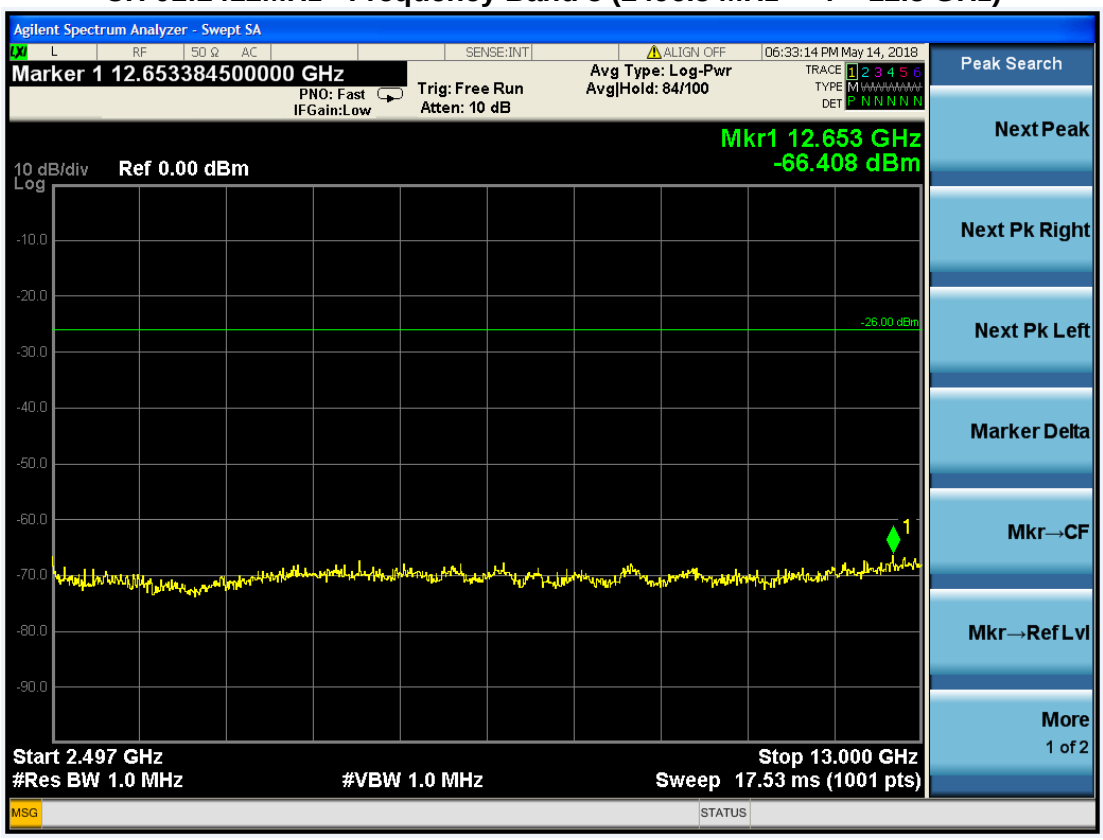
CH 01:2412MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



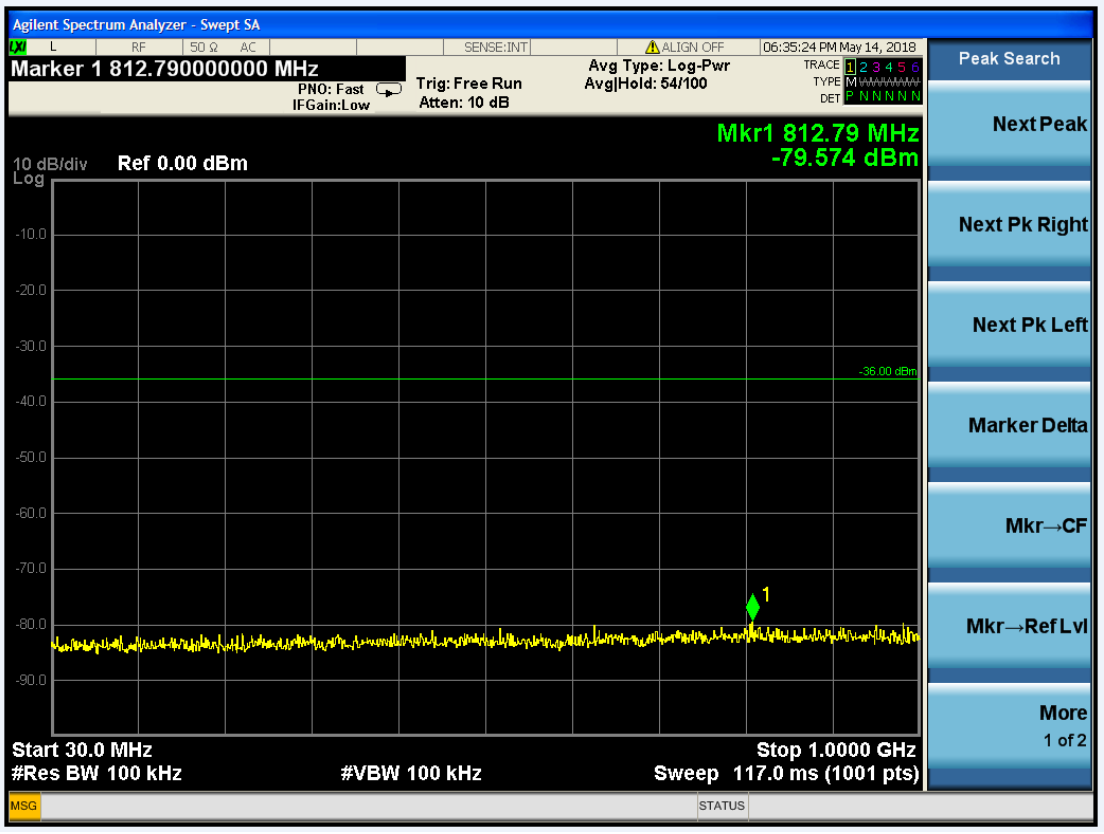
CH 01:2412MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)



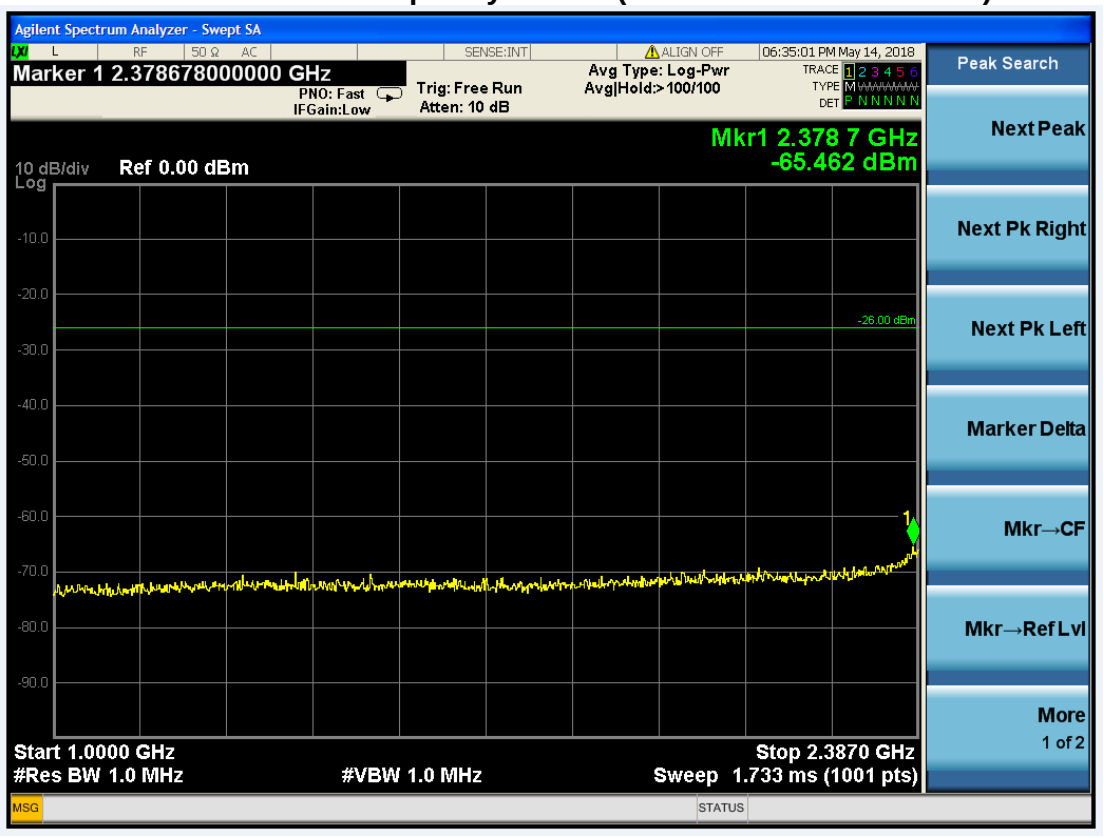
CH 01:2412MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)



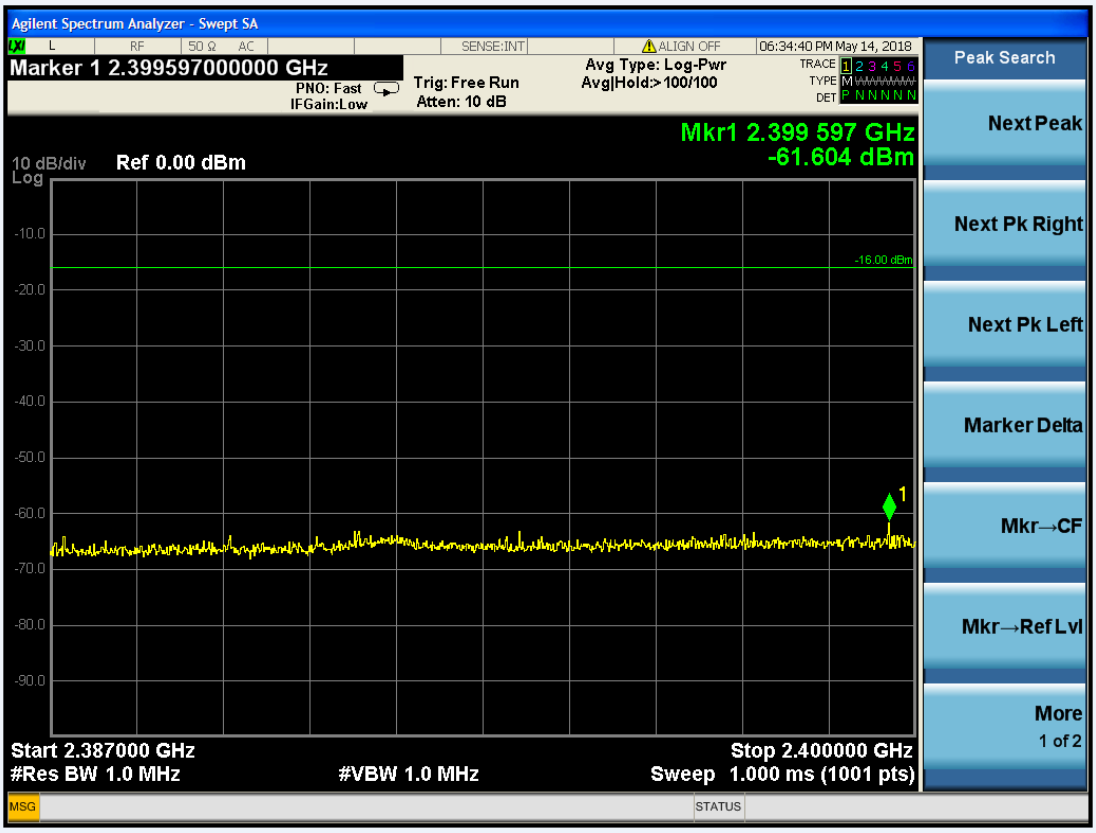
CH 13:2472MHz- Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



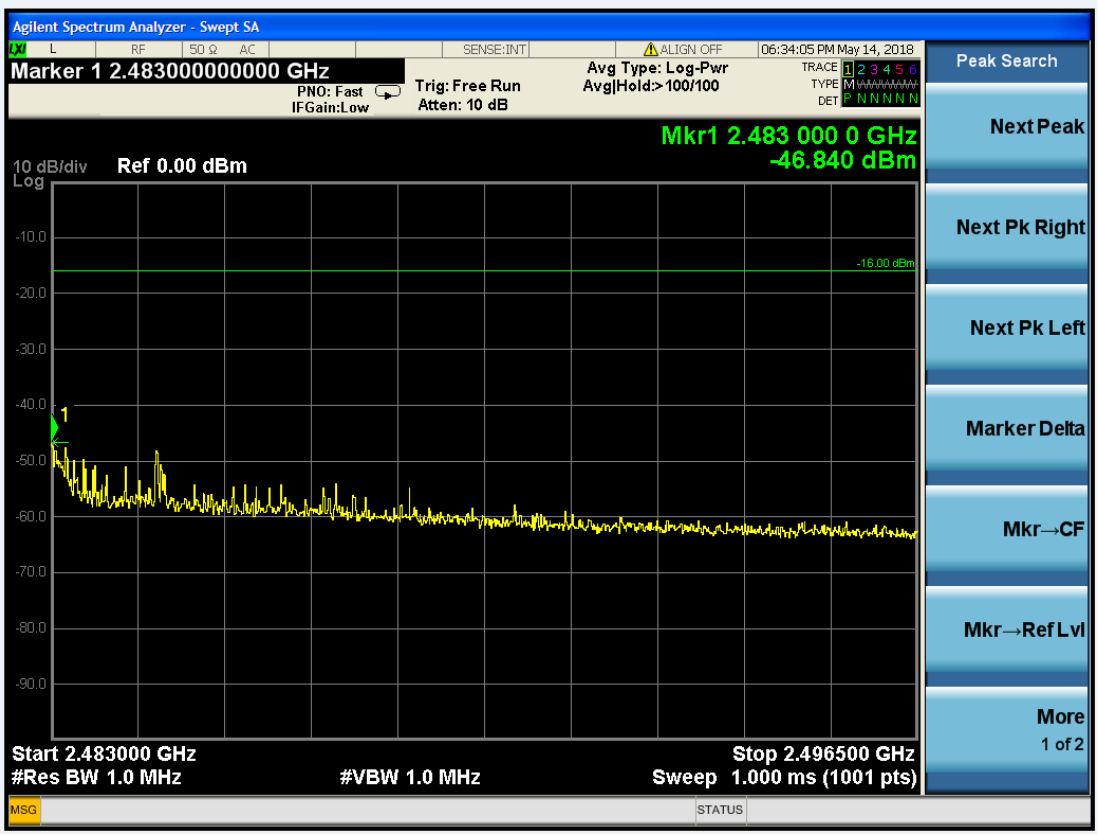
CH 13:2472MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



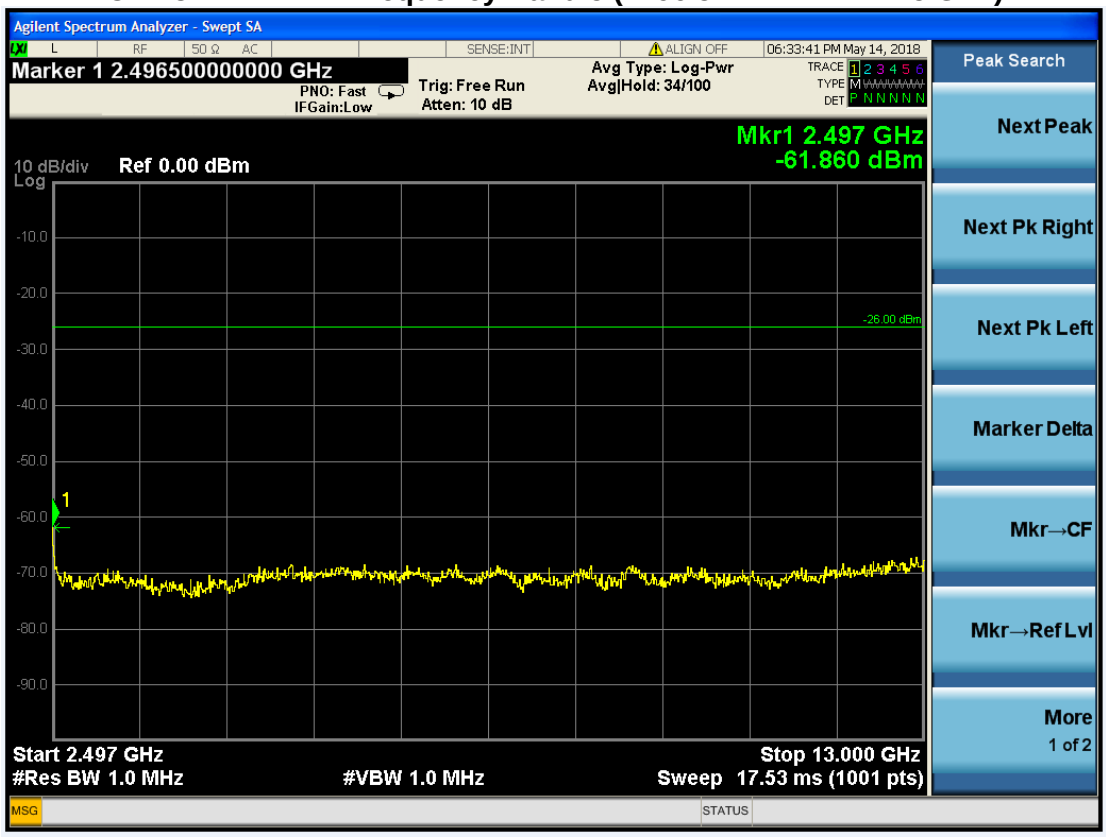
CH 13:2472MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



CH 13:2472MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)

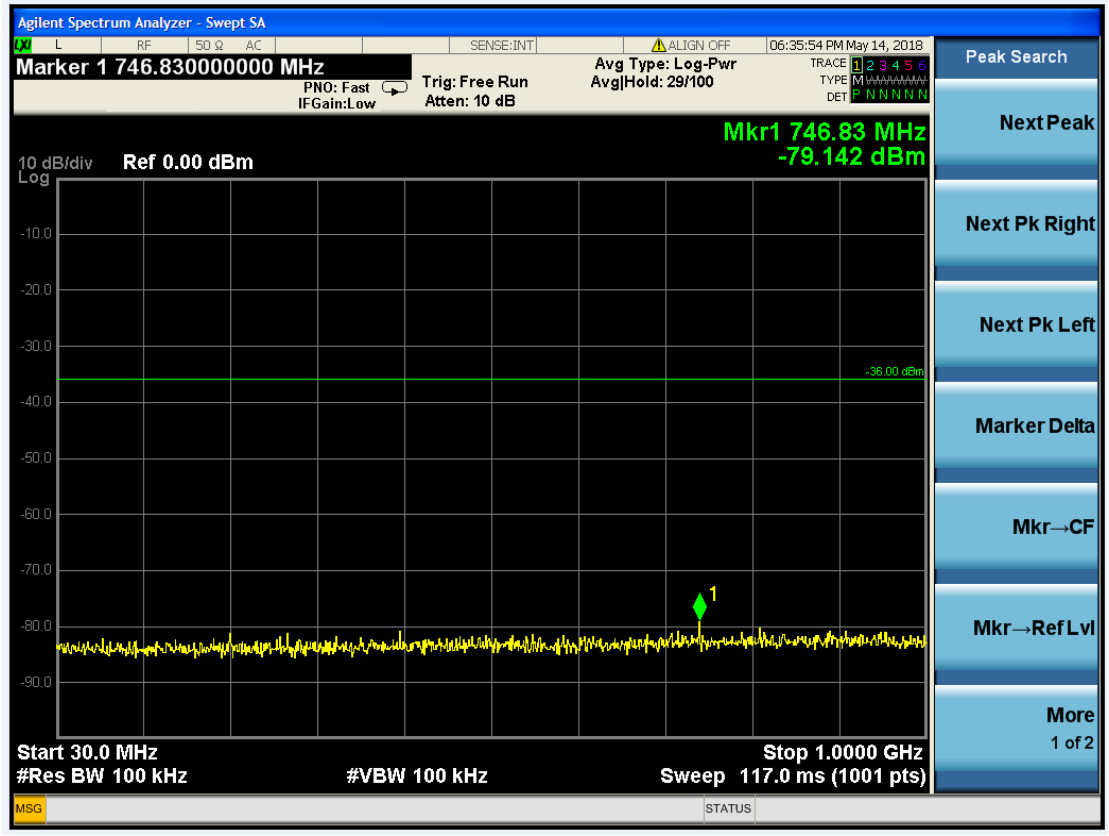


CH 13:2472MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)

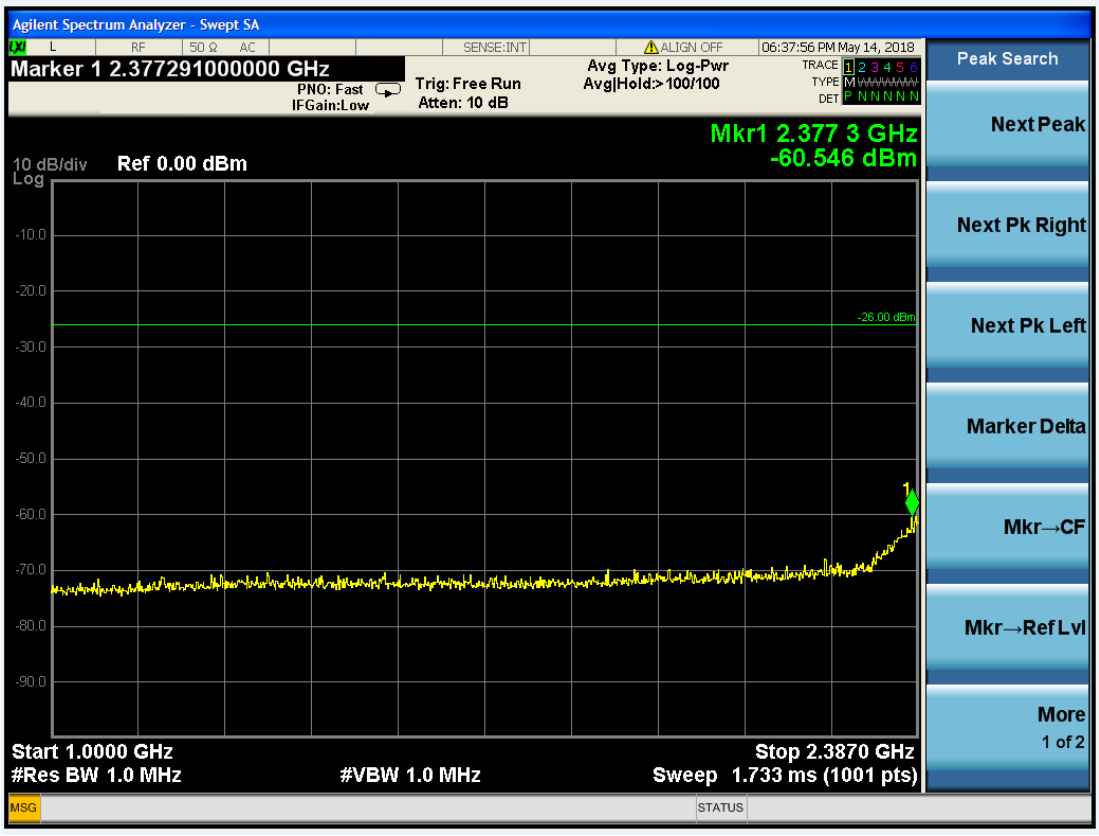


EUT：	Omega2	Test Date:	2018.05.14
Temperature:	250C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N20 mode		

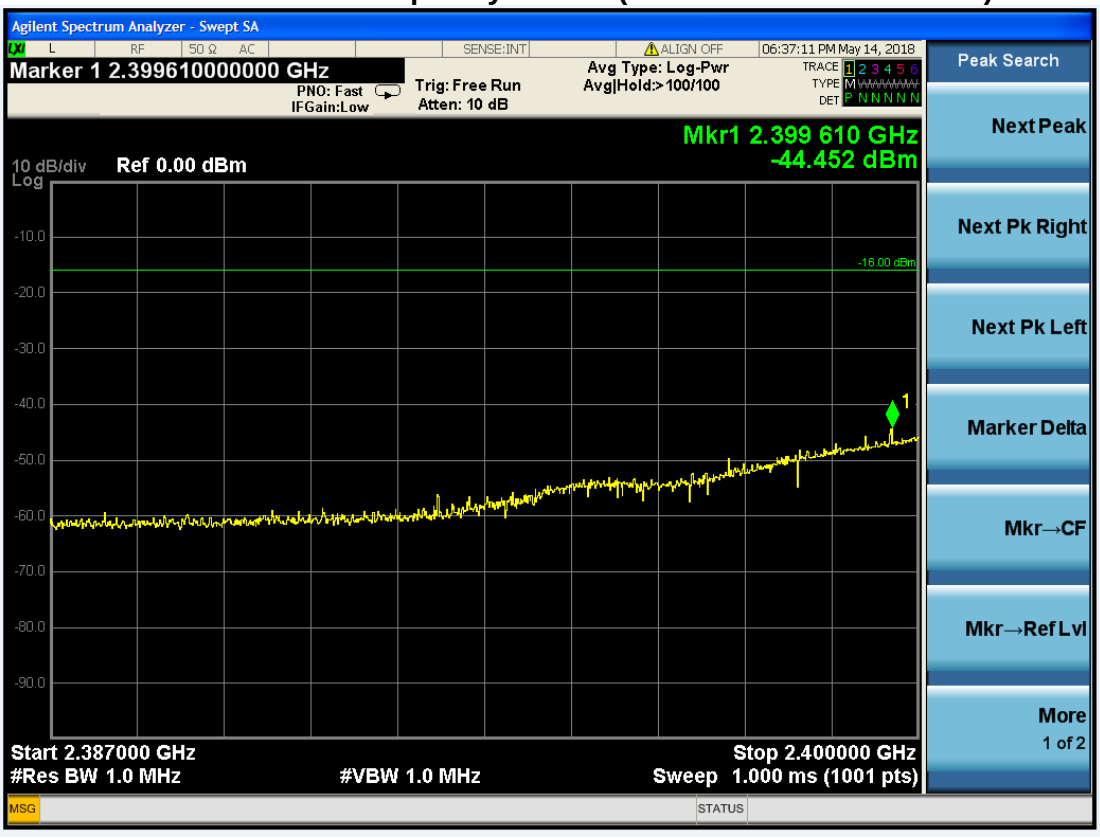
CH 01:2412MHz - Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



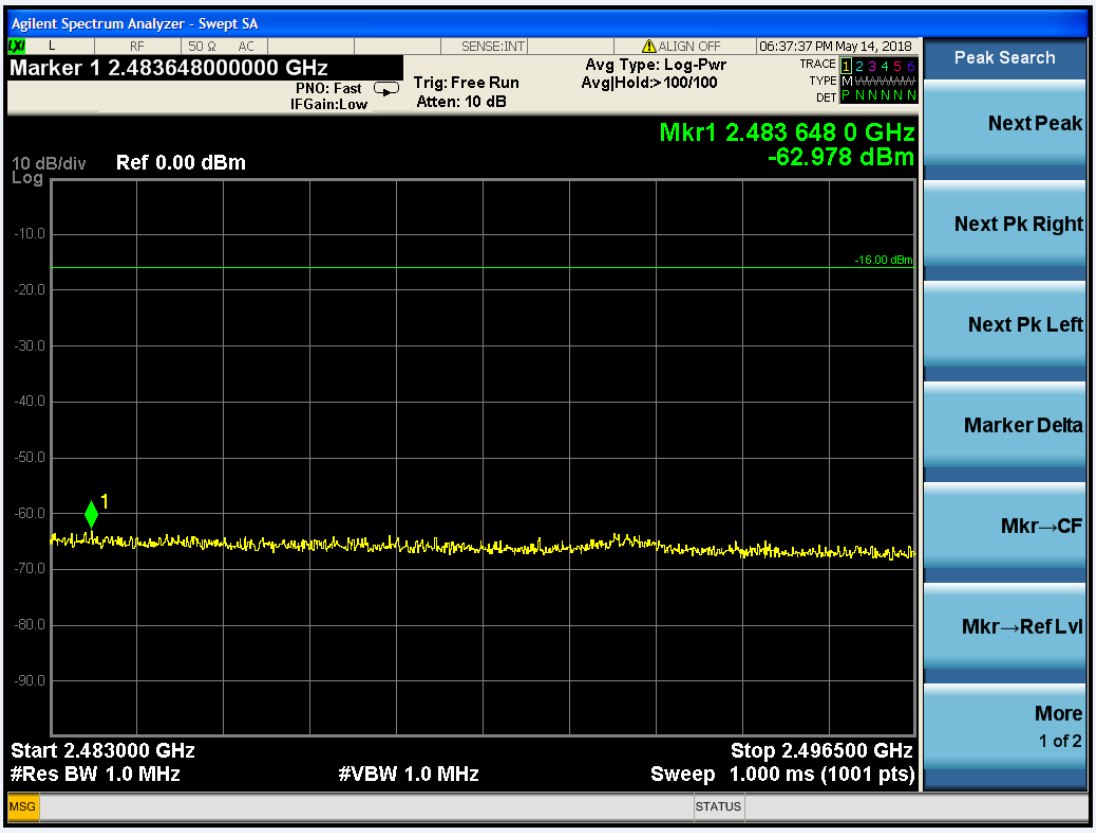
CH 01:2412MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



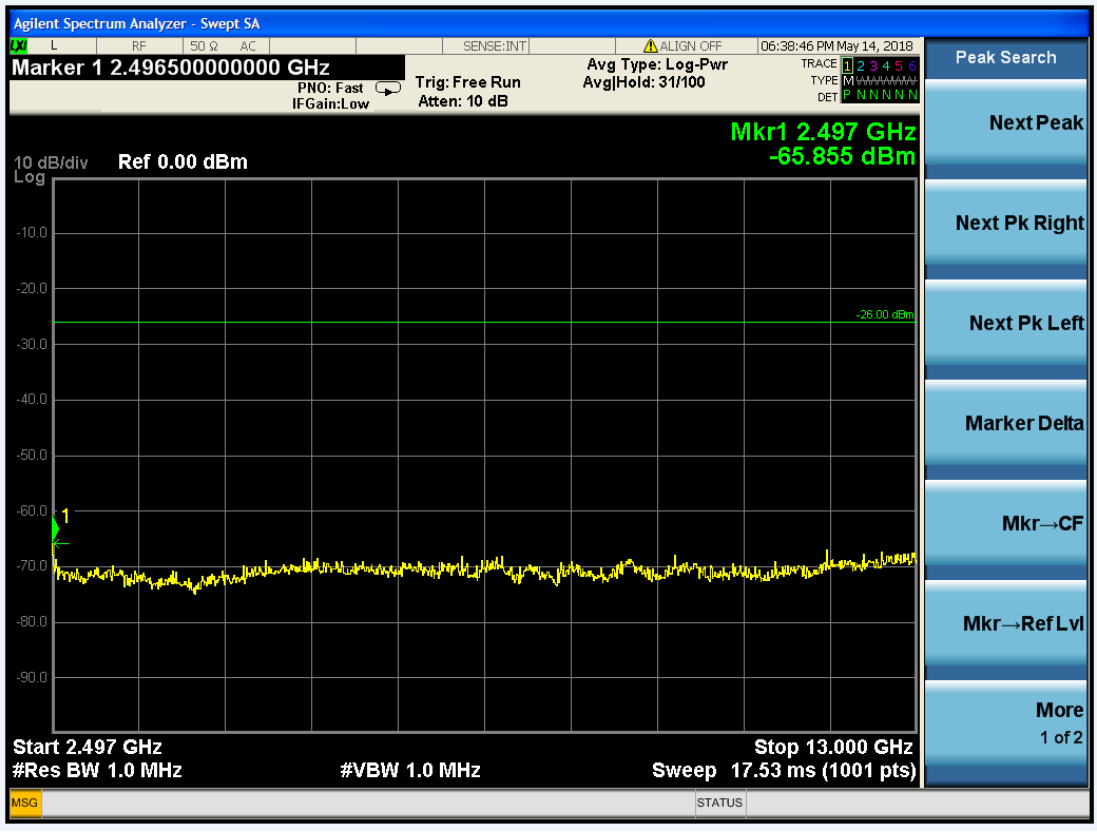
CH 01:2412MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



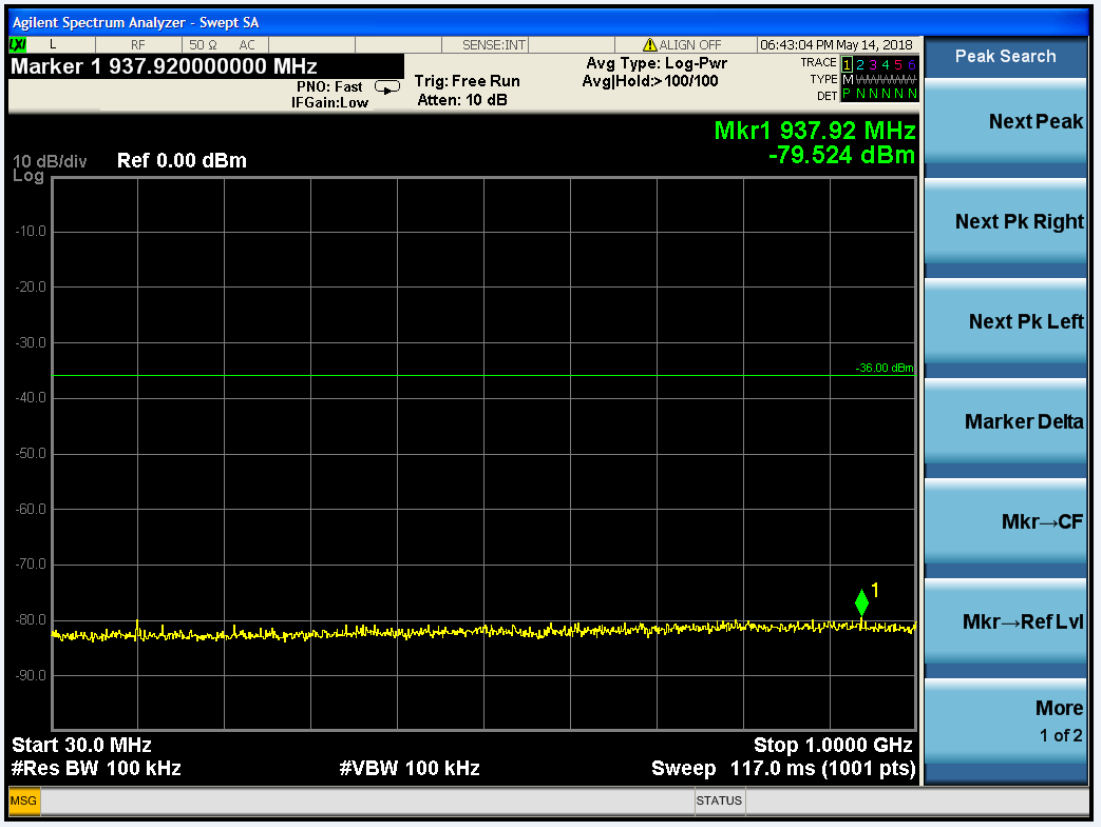
CH 01:2412MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)



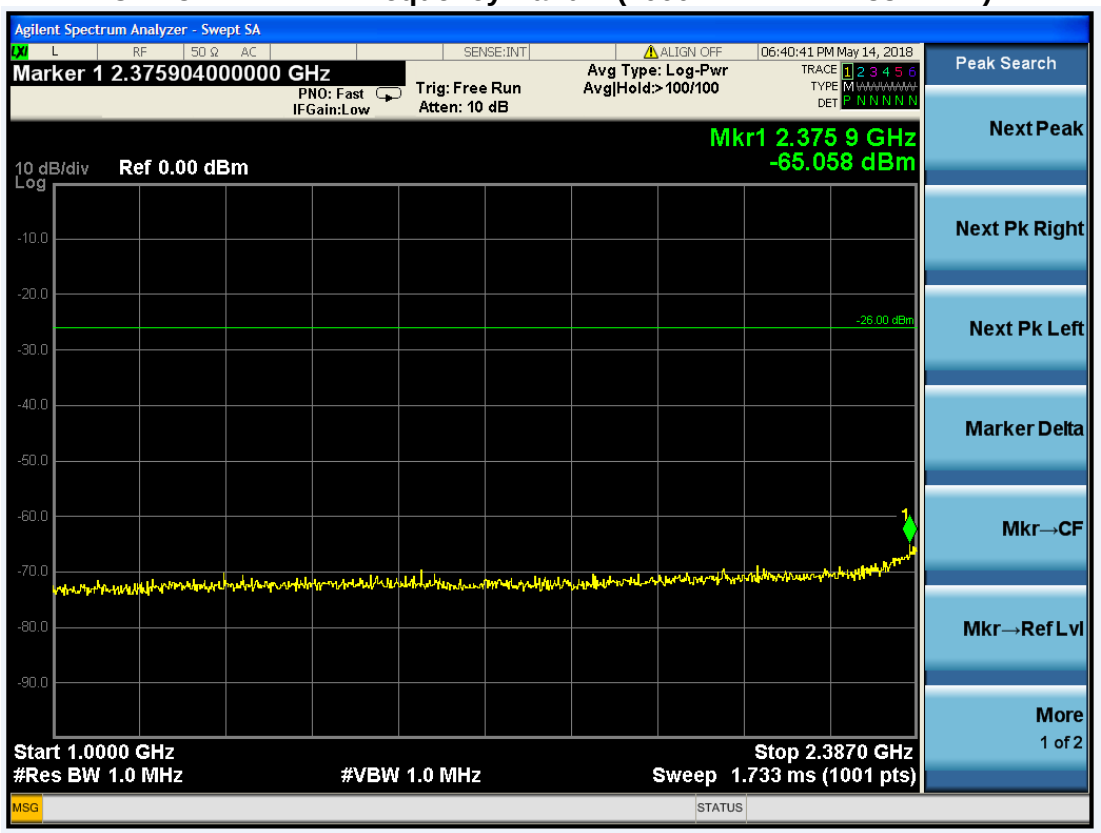
CH 01:2412MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)



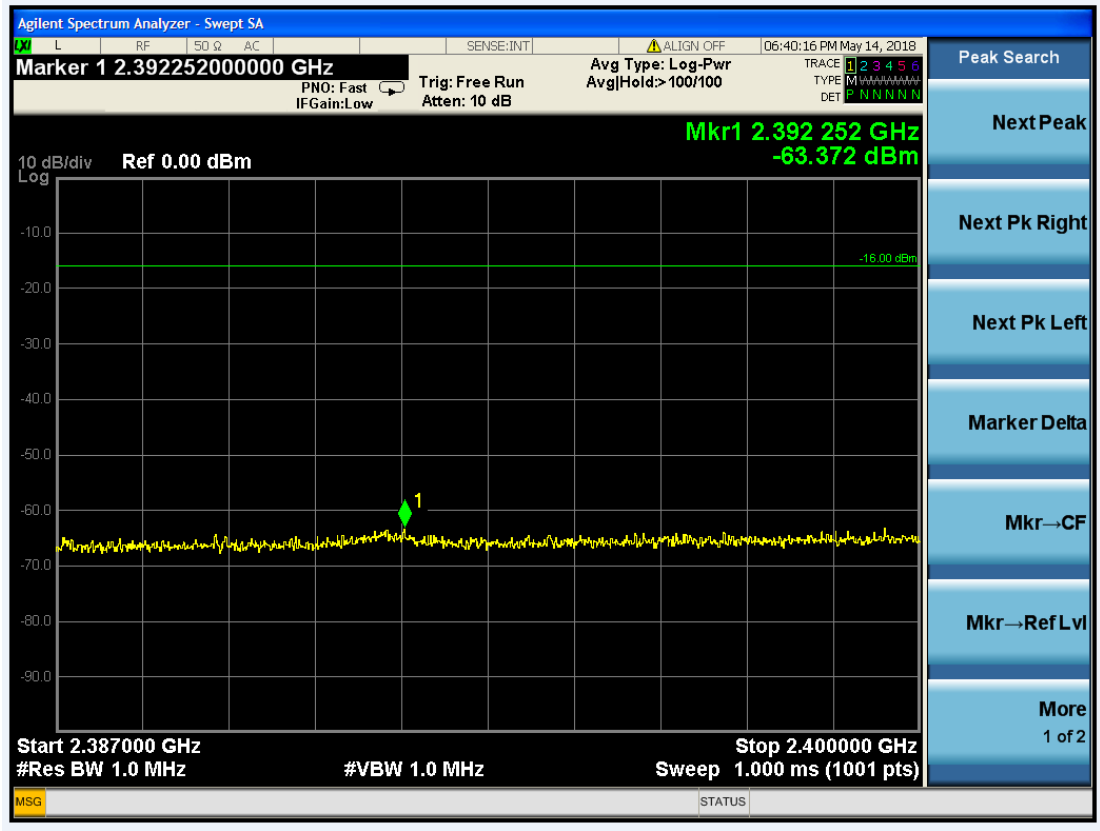
CH 13:2472MHz- Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



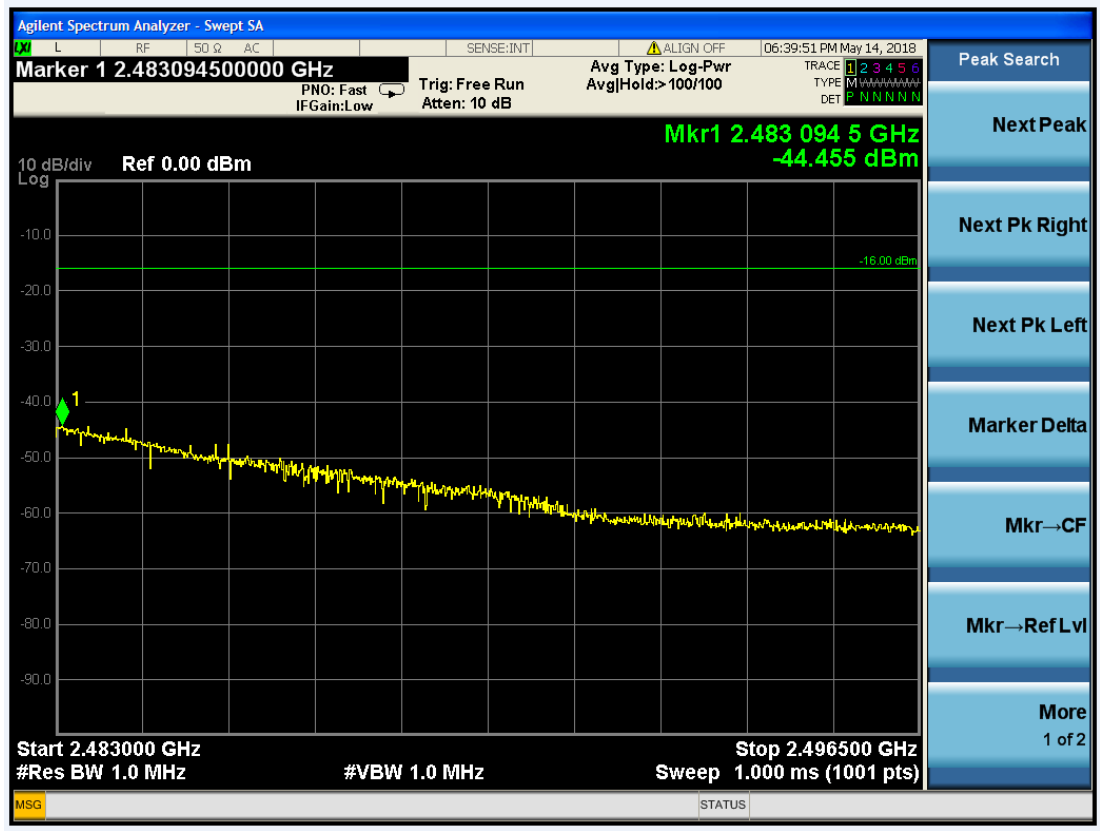
CH 13:2472MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



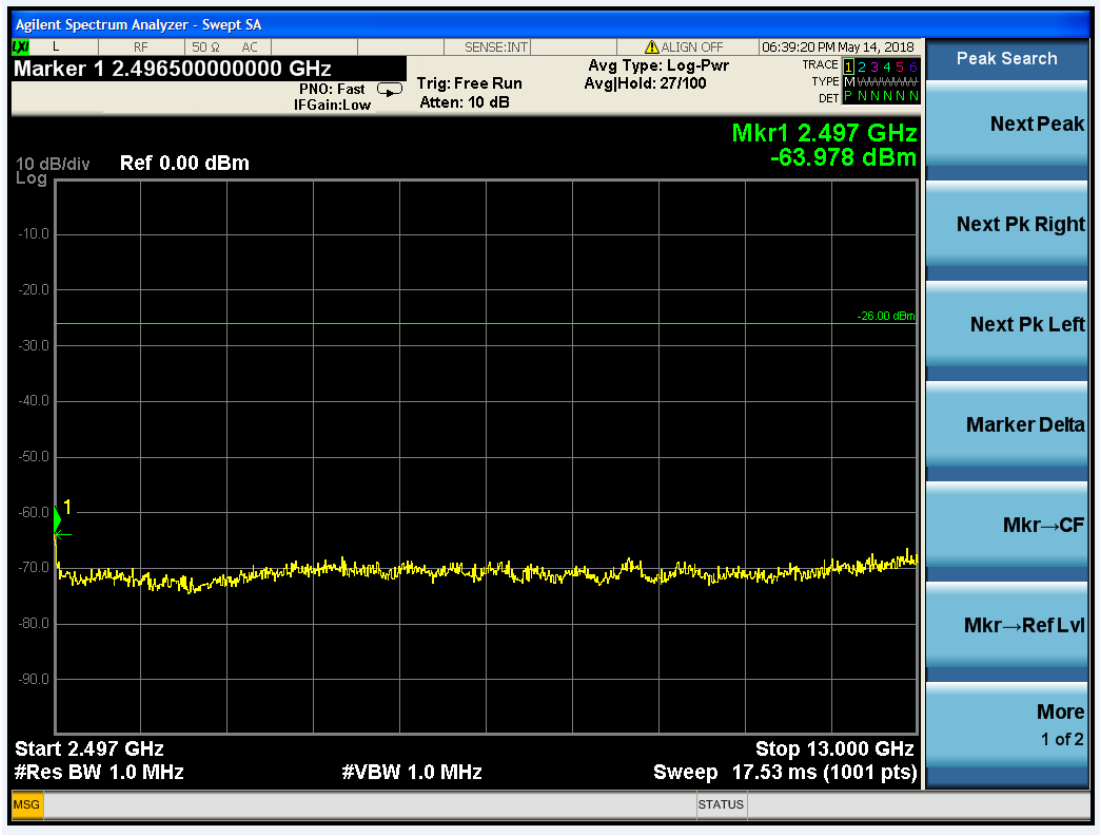
CH 13:2472MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



CH 13:2472MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)

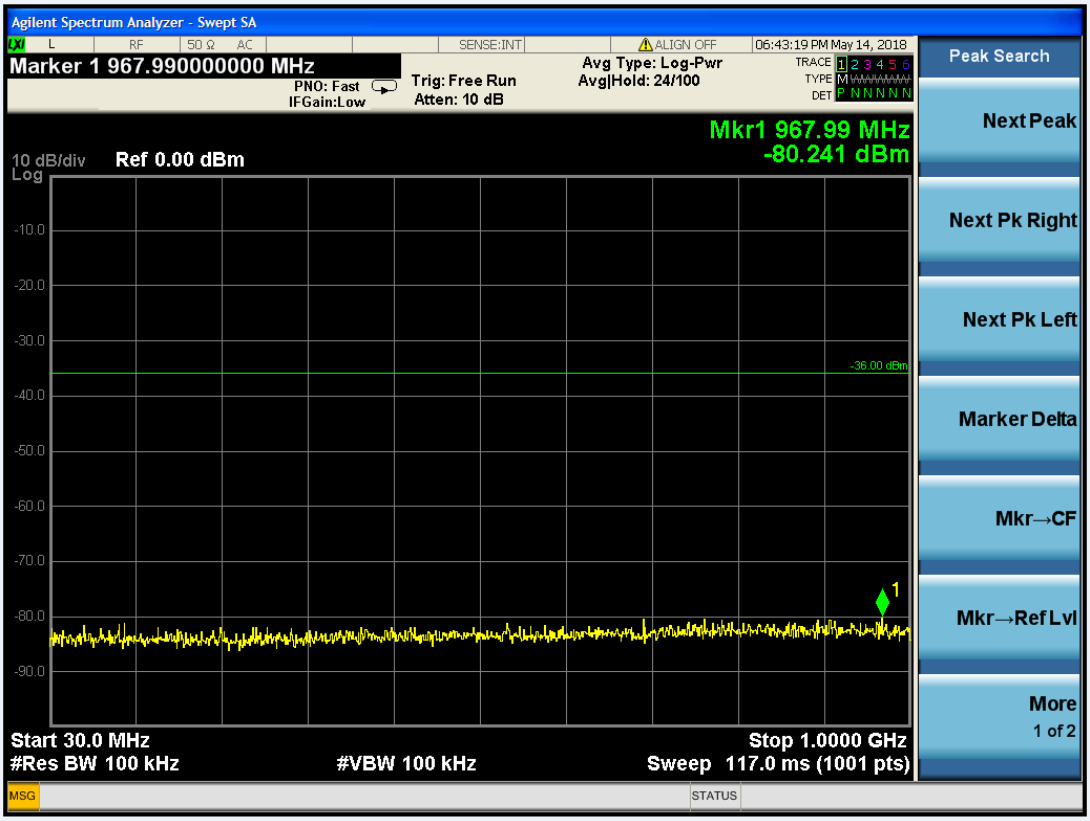


CH 13:2472MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)

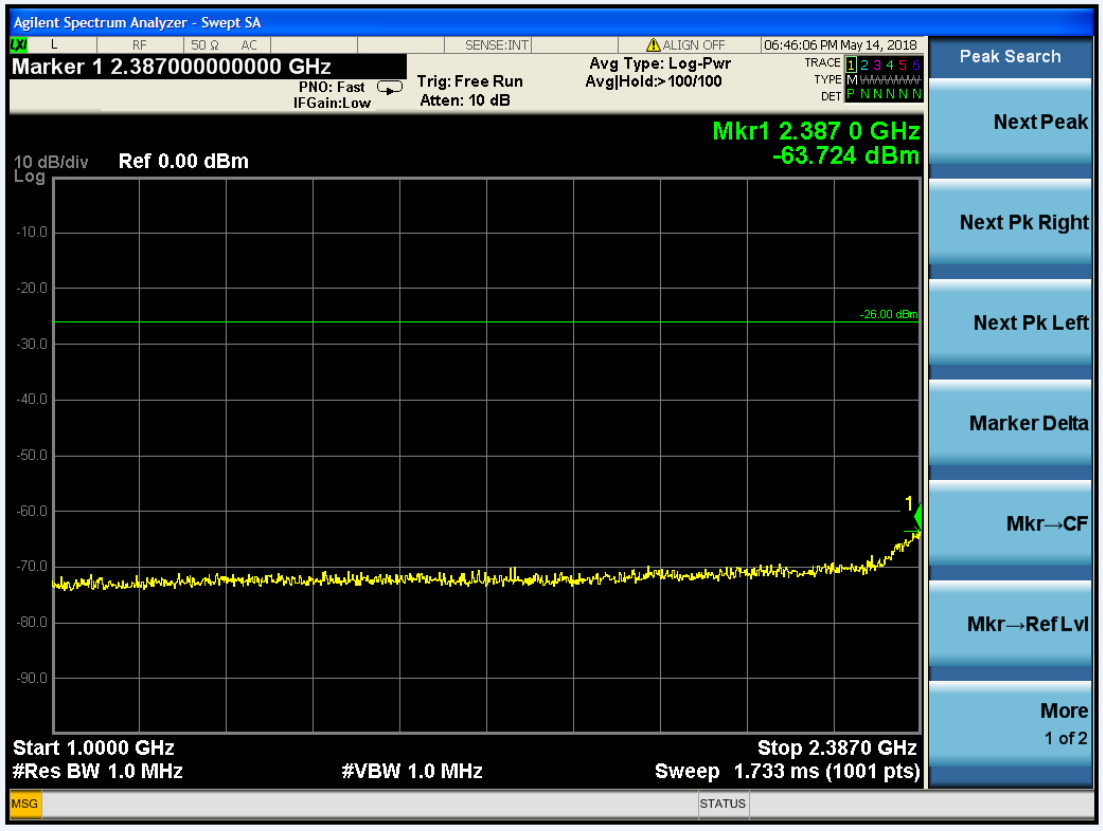


EUT：	Omega2	Test Date:	2018.05.14
Temperature:	250C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage-N40mode		

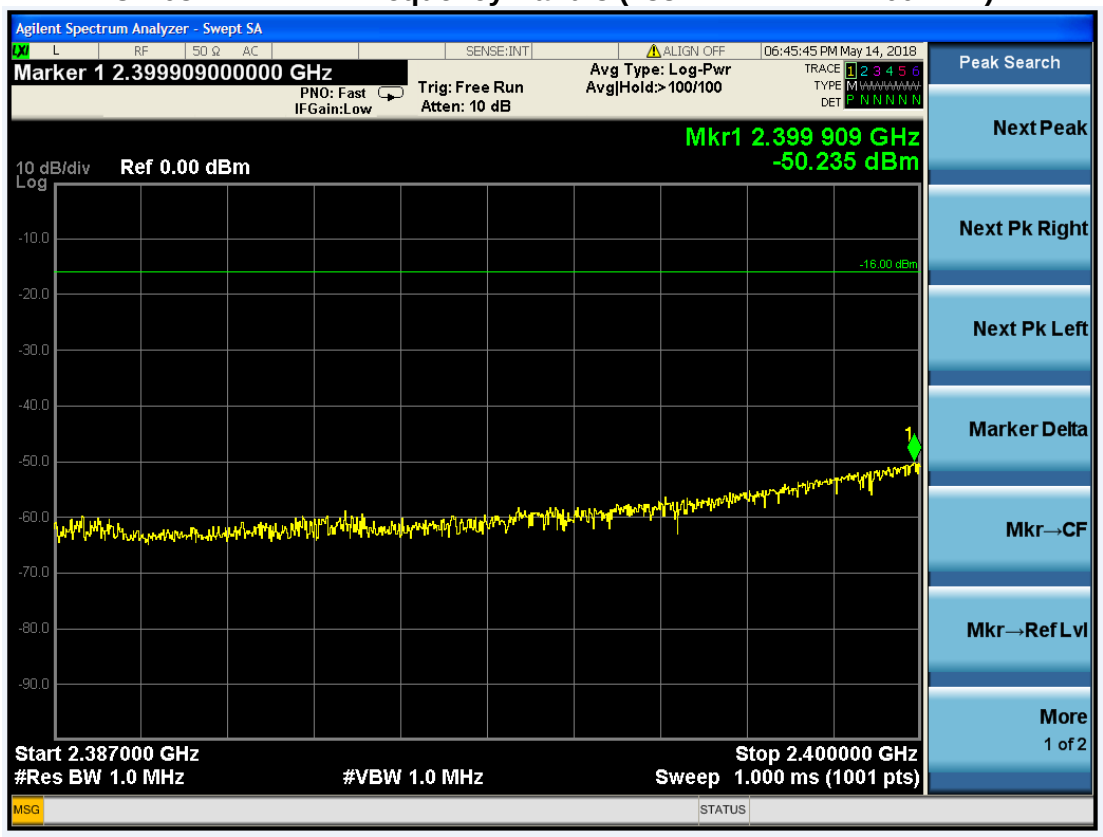
CH 03:2422MHz - Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



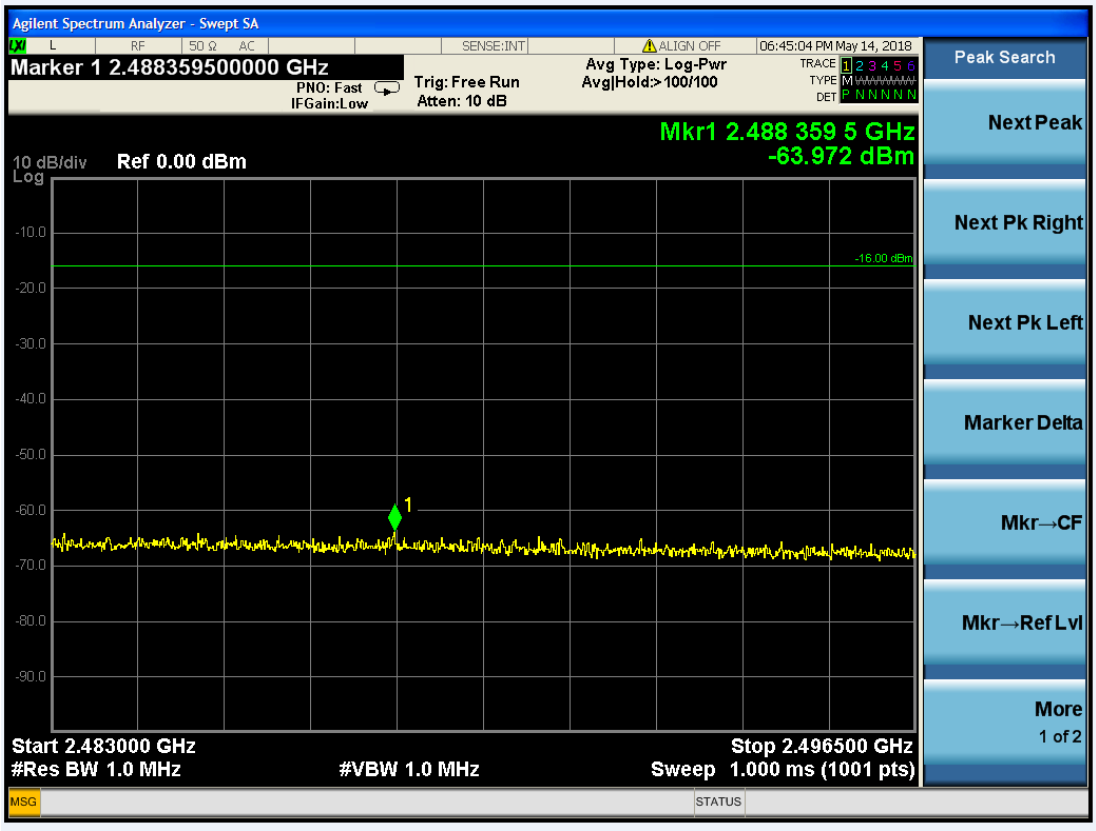
CH 03:2422MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



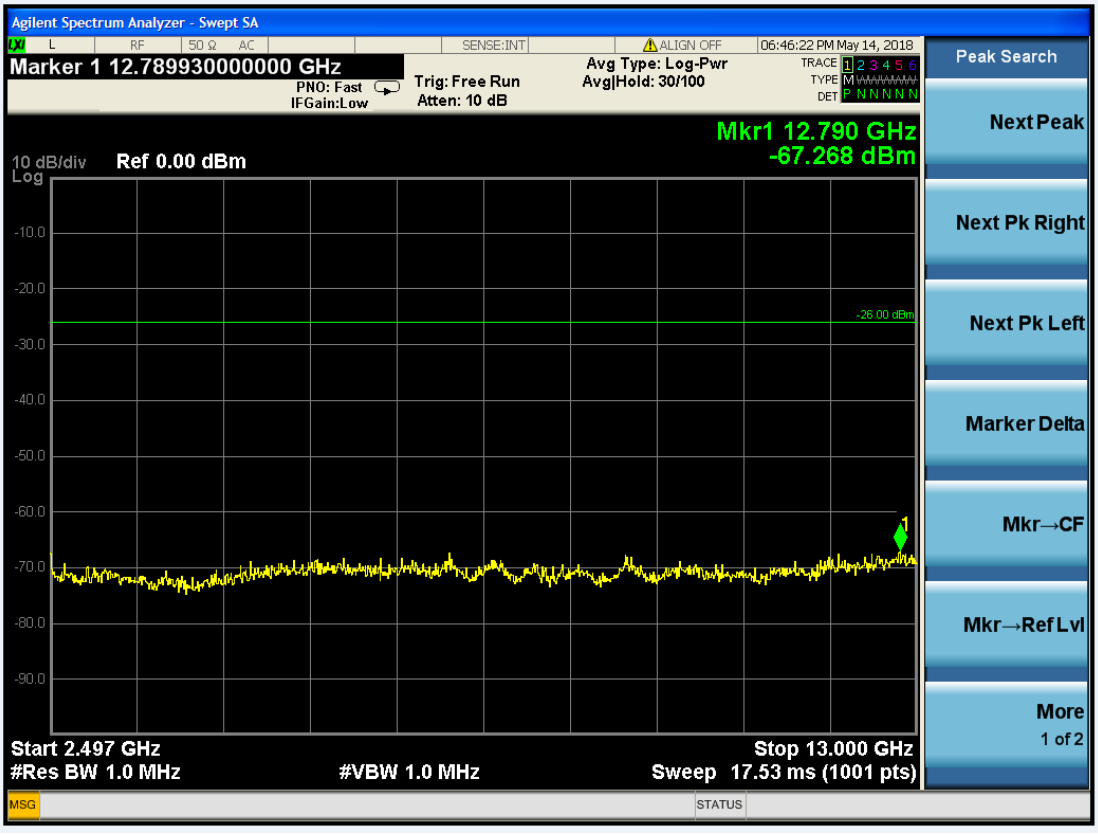
CH 03:2422MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



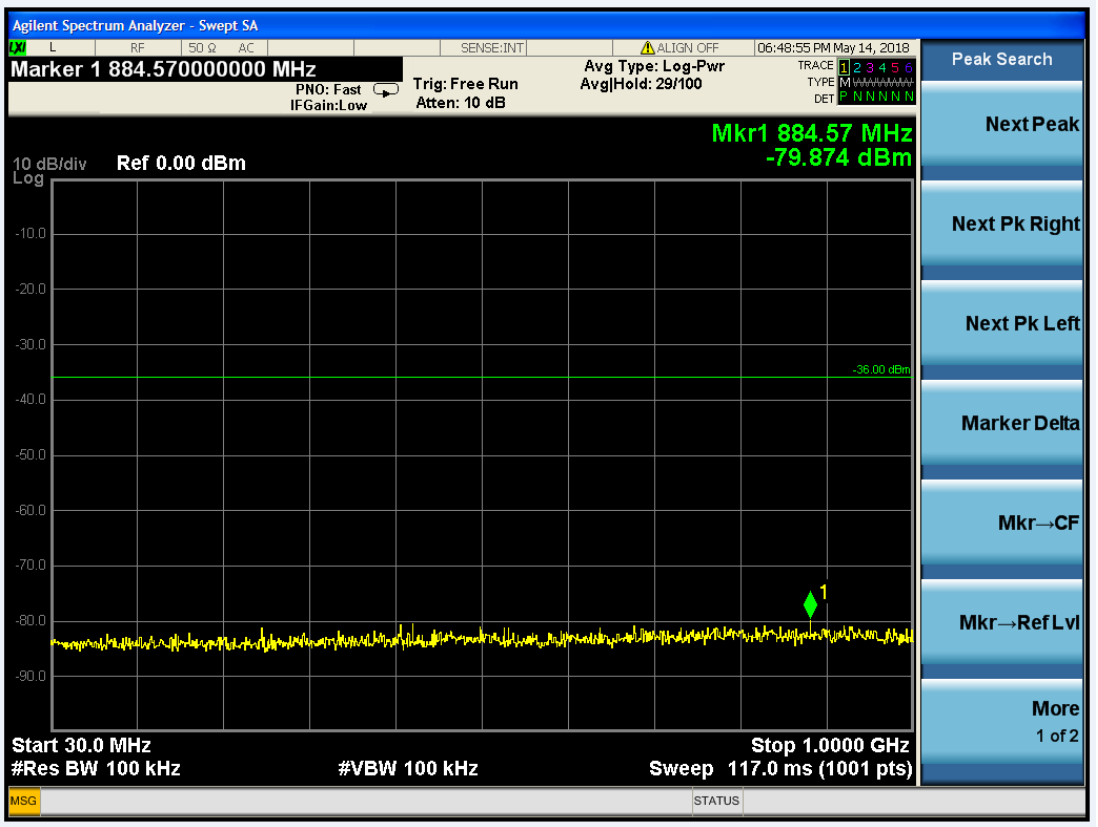
CH 03:2422MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)



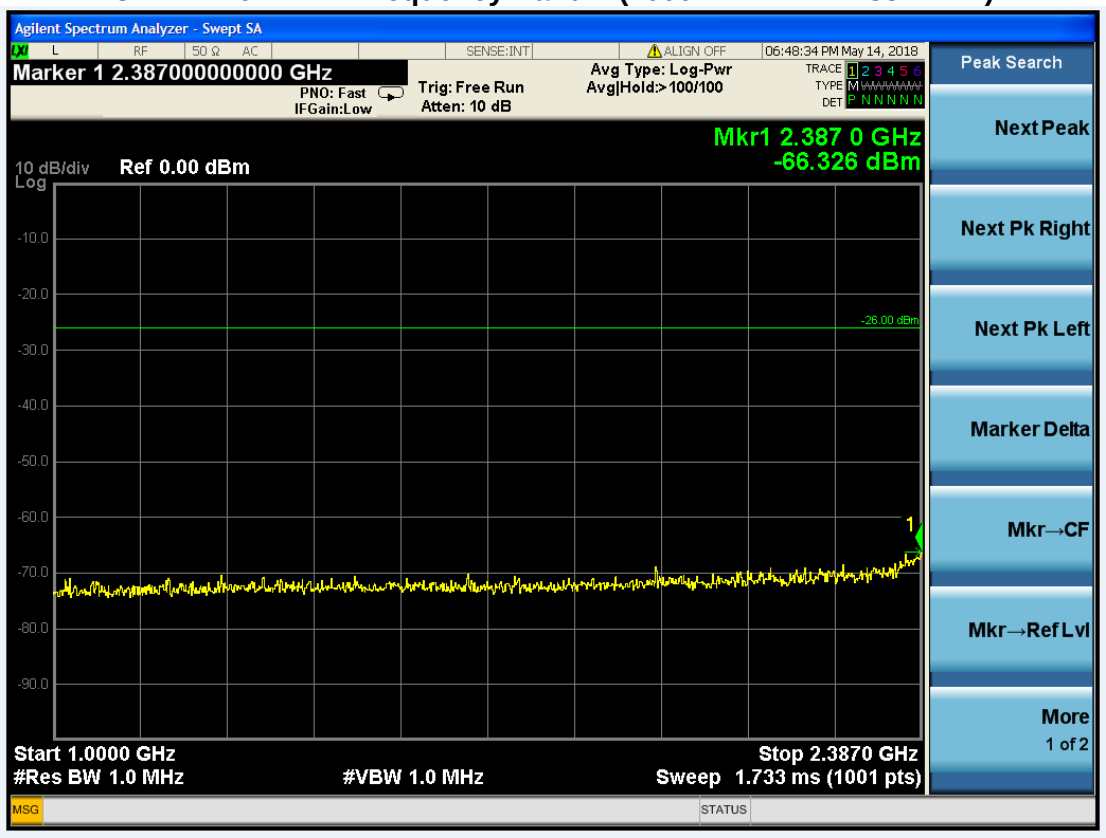
CH 03:2422MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)



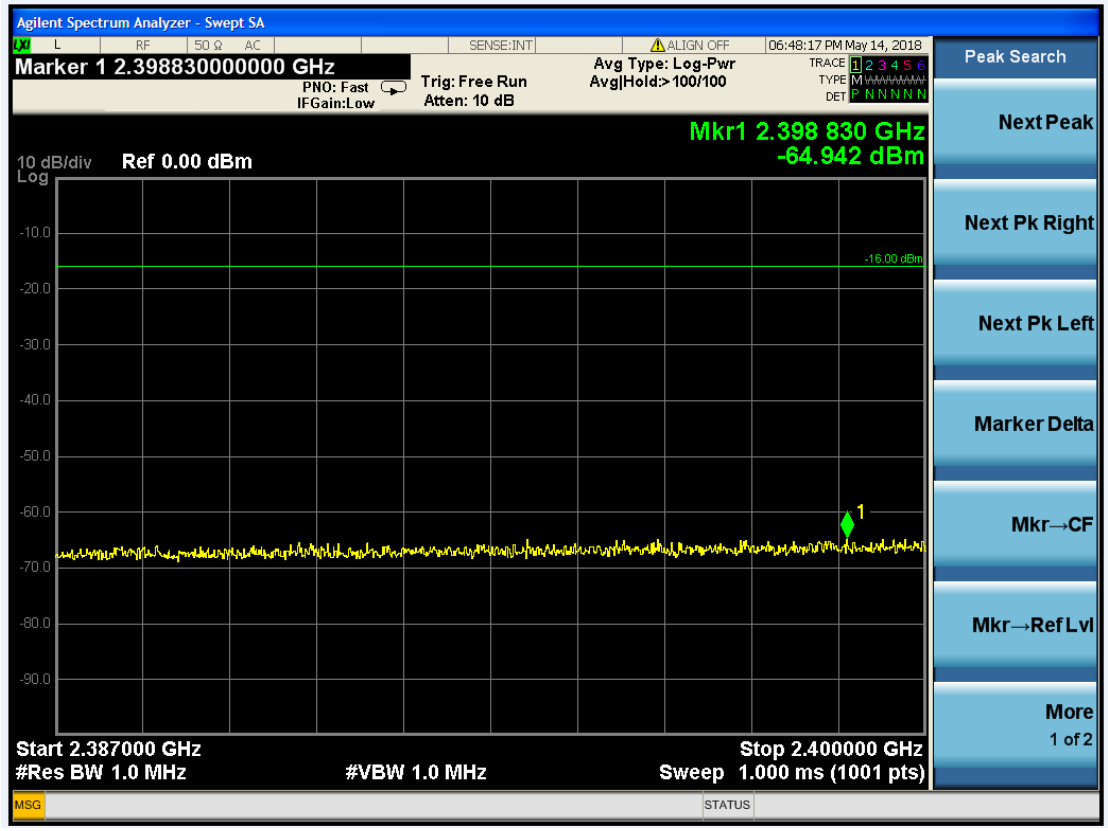
CH 11:2462MHz - Frequency Band 1 (30 MHz ≦ f ≦ 1000 MHz)



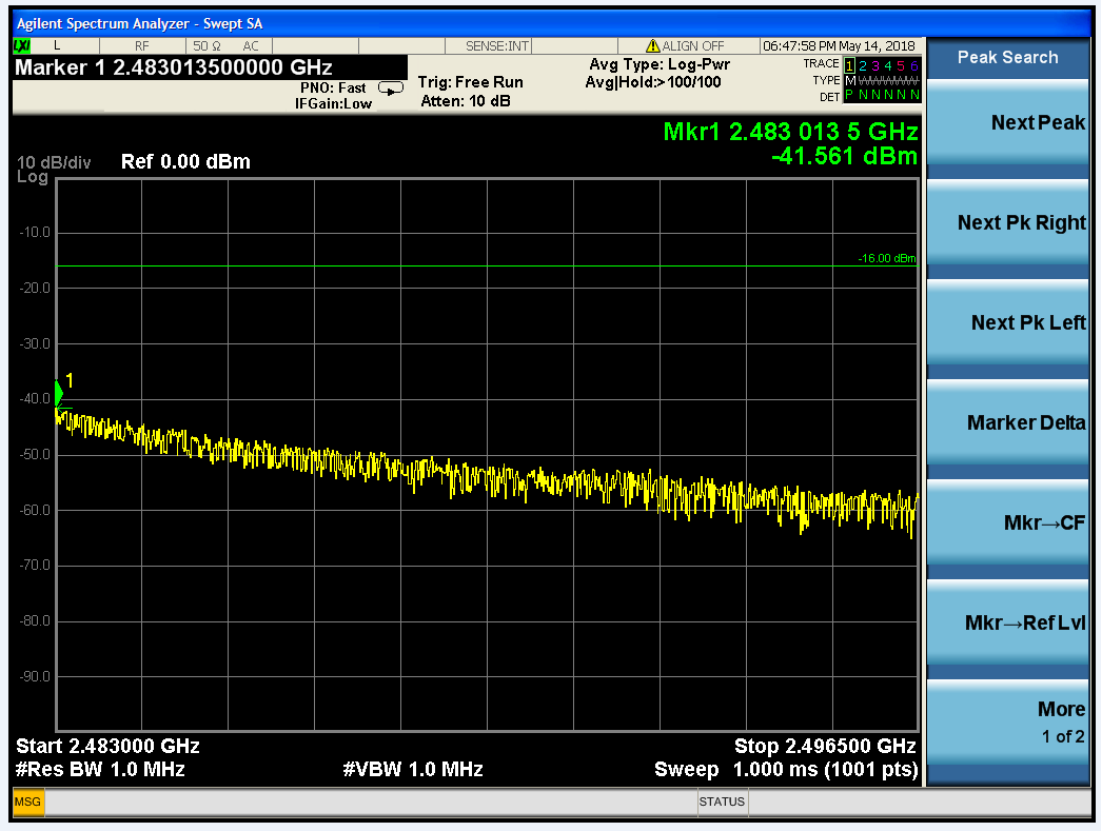
CH 11:2462MHz - Frequency Band 2 (1000 MHz < f ≦ 2387 MHz)



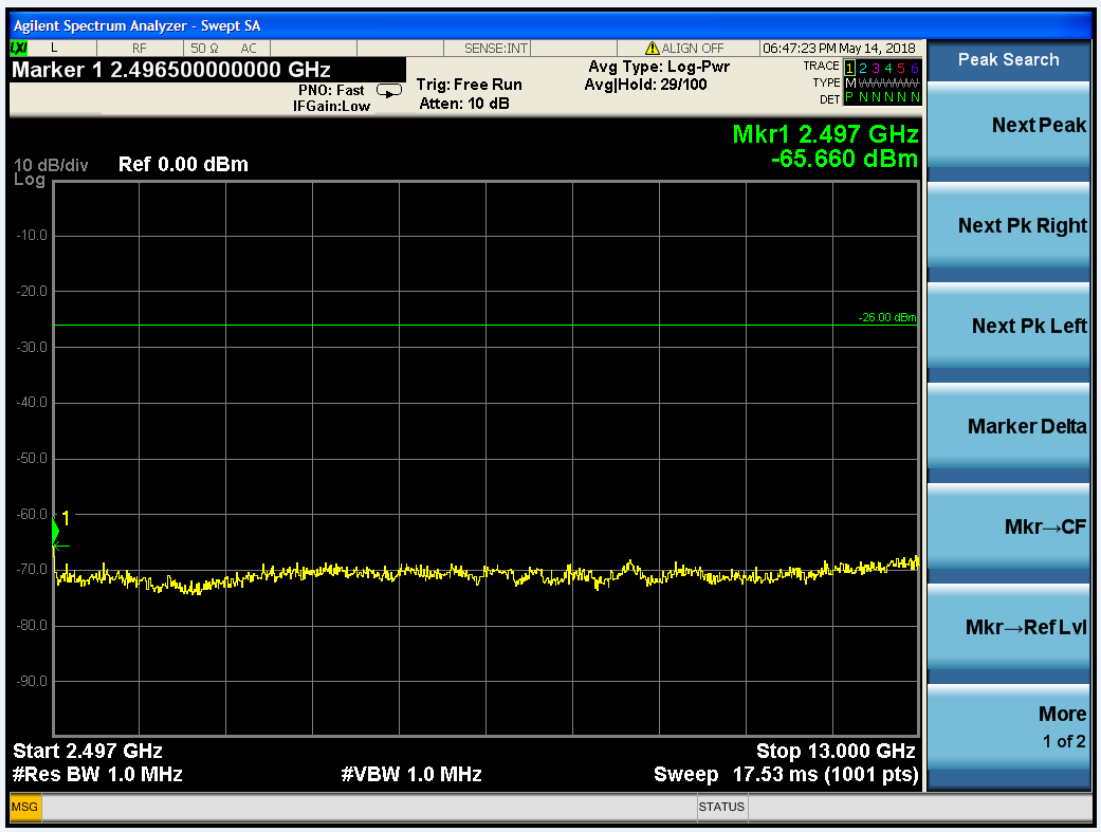
CH 11:2462MHz - Frequency Band 3 (2387 MHz < f ≦ 2400 MHz)



CH 11:2462MHz - Frequency Band 4 (2483.5 MHz ≦ f < 2496.5 MHz)



CH 11:2462MHz - Frequency Band 5 (2496.5 MHz ≦ f < 12.5 GHz)



4.5. IMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

4.5.1 LIMIT

Item	Limits
RX Spurious Emission:	≦4nW (f<1GHz)
	≦20nW (1GHz≦f)

4.5.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.5.3 TEST PROCEDURES

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
   AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

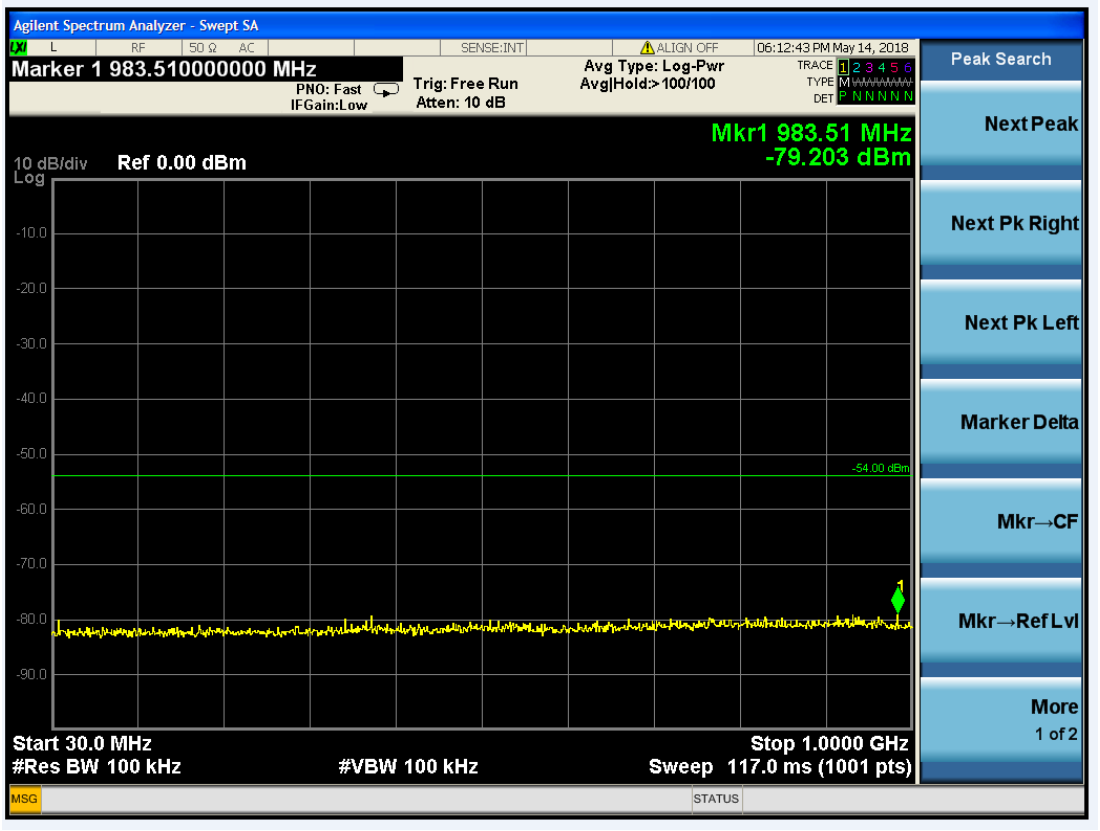
4.5.4 TEST RESULT

EUT：	Omega2	Test Date:	2018.05.14
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH	Test Voltage	Normal Voltage
Operation Mode:	Normal Voltage		

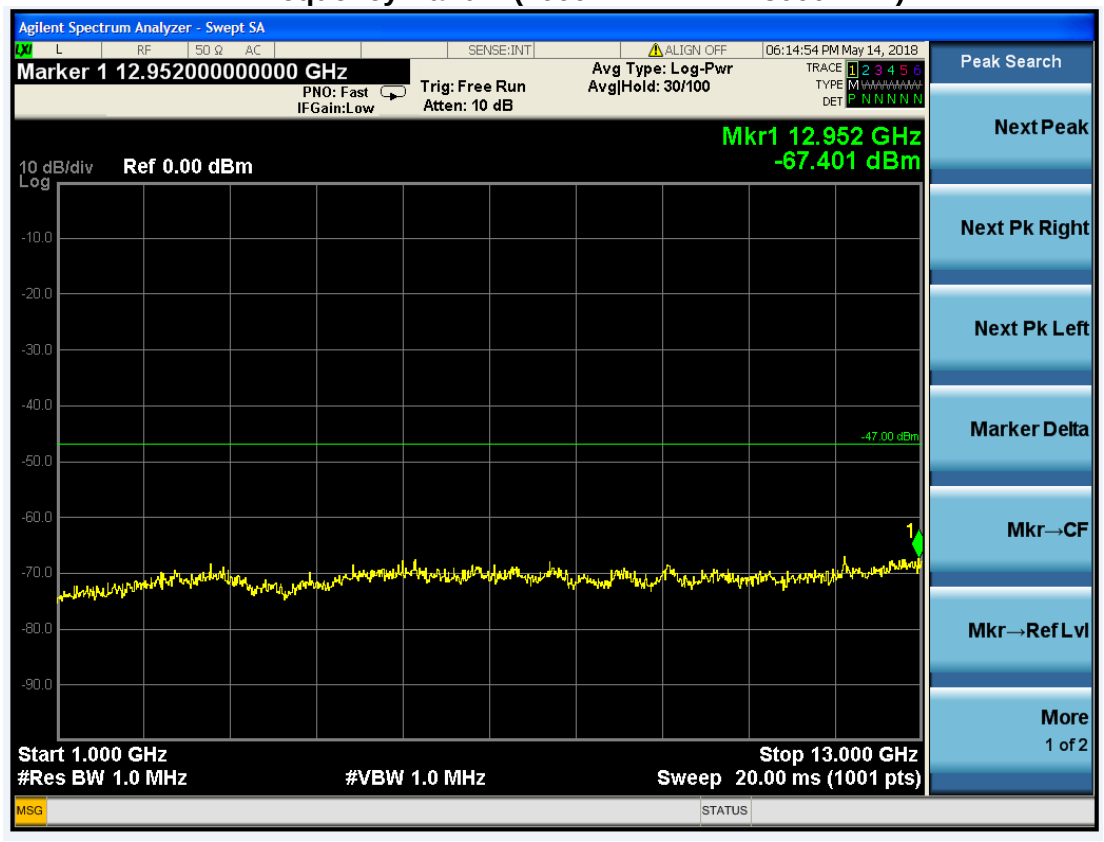
The worst test channel of all channels was showed as the follow:

Test Mode	Test Channel	StartFre[MHz]	StopFre[MHz]	Max.Fre[MHz]	Max.Level[nW]	Limit[nW]	Verdict
11B	Band 1	30	1000	983.51	1.2E-05	<4	PASS
11B	Band 2	1000	13000	12952	0.000182	<20	PASS

RX-Frequency Band 1 (30 MHz ≦ f < 1000 MHz)



RX-Frequency Band 2 (1000 MHz ≦ f < 13000 MHz)



4.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

4.6.1 LIMIT

Item	Limits
EIRP Power Density	≦16.91dBm/MHz (FH form 2427 - 2470.75 MHz) ≦22.14dBm/MHz (OFDM,DS from 2400~2483.5MHz) ≦22.14dBm (Other from 2400~2483.5MHz)
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

4.6.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

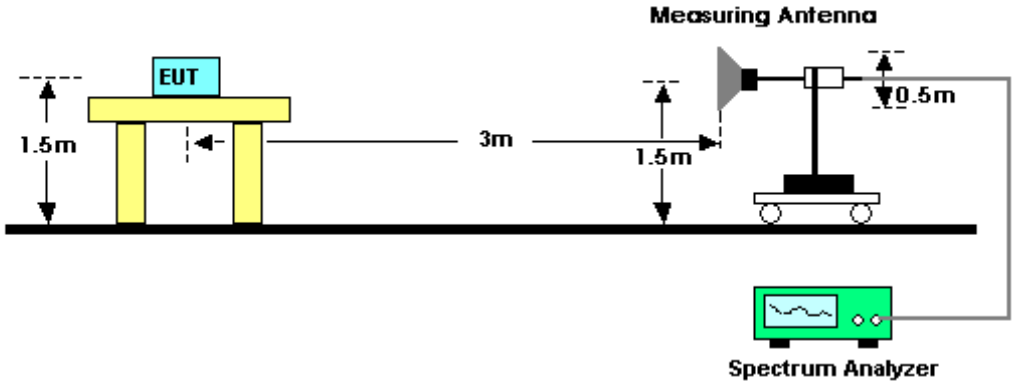
Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.6.3 TEST PROCEDURES

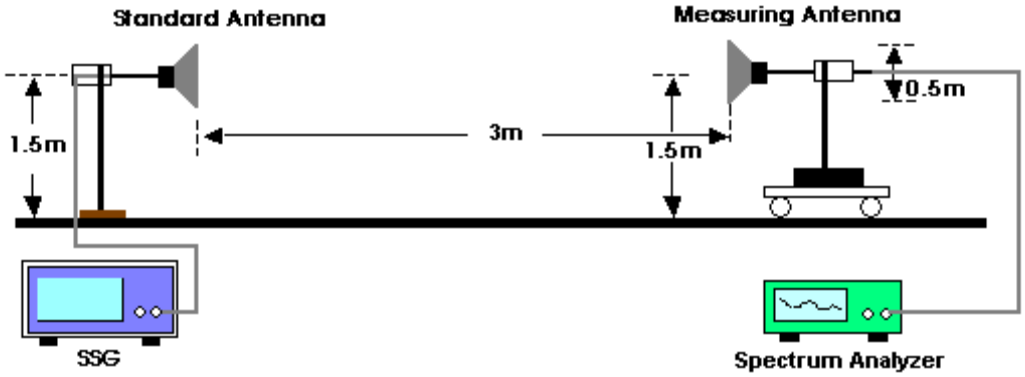
1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt.
   Gt: gain of replacing antenna (dBi)
   L: feeder loss between SSG and replacing antenna
   Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

4.6.4 TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



4.6.5 TEST DEVIATION

There is no deviation with the original standard.

4.6.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

4.6.7 RESULTS OF TRANSMISSION ANTENNA GAIN

Note: This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less

4.7. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

4.7.1 LIMIT

Item	Limits
3dB antenna beam width	360/A (If A<1; then A=1) A = {EIRP Power [mW] / 16.36 for DS, OFDM} or A = {EIRP Power [mW] / 4.9 for FH}
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

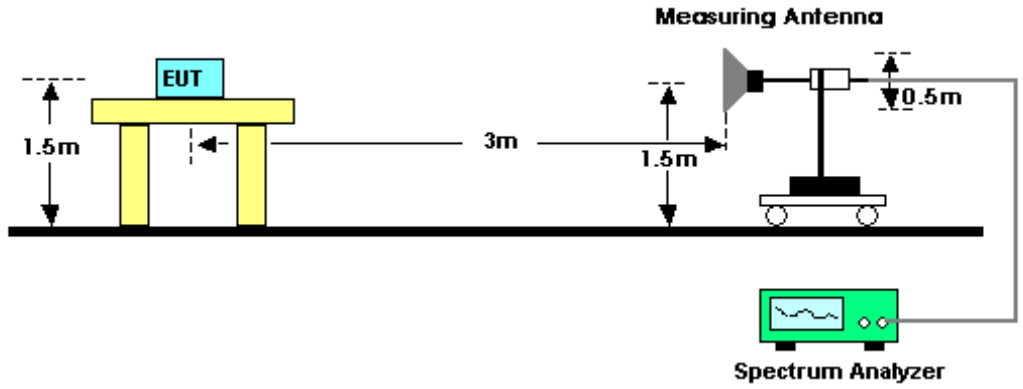
4.7.2 MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.7.3 TEST PROCEDURES

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”
5. Caluate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1).
   A = {EIRP Power [mW] / 16.36 for DS, OFDM} or
   A = {EIRP Power [mW] / 4.9 for FH}

4.7.4 TEST SETUP LAYOUT



4.7.5 TEST DEVIATION

There is no deviation with the original standard.

4.7.6 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

4.7.7 TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

The test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less

4.8. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

4.8.1 LIMIT

Item	Limits
Identification code	≧48 bits

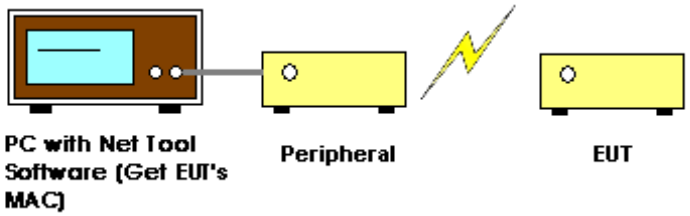
4.8.2 MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

4.8.3 TEST PROCEDURES

1. In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes form EUT. b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification ocde: a. Transmit the predetermined identification codes form the counterpart. b . Check if communication is normal. c. Transmit the signals other than predetermined ID codes form the counterpart. d. check if the EUT stops the transmission, or if it displays that idnetification codes are different from the predetermined ones.

4.8.4 TEST SETUP LAYOUT



4.8.5 TEST DEVIATION

There is no deviation with the original standard.

4.8.6 EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

4.8.7 TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

EUT：	Omega2	Test Date:	2018.05.14
Temperature:	25^0C	Tested by:	Kahn yang
Humidity:	55 % RH		
Test result:	CONFORM		

4.9. CARRIER SENSING FUNCTION

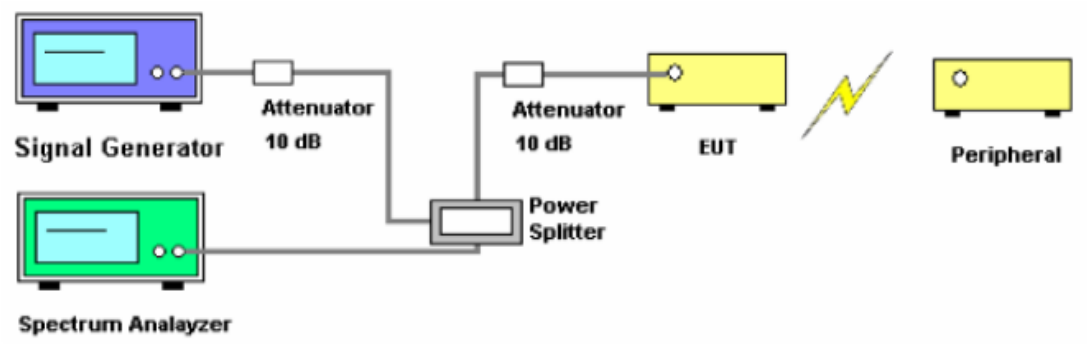
4.9.1 TEST REQUIREMENT

MIC Notice No.88 Appendix No.43

Article 2, Paragraph 1, Item 19 Rules Section 10

4.9.2 BLOCK DIAGRAM OF TEST SETUP

❖ Measurement System Diagram



❖ Conditions of Application Equipment (EUT)

- The EUT state shall be "normal mode link with wireless router".

4.9.3 TEST PRECEDURE

1 SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is (on 22.79+G-20*log(f)dBm)(G is the antenna gain,f is the test frequency).

2. turn off the RF signal of the SG.

3. EUT have transmitted the maximum modulation signal and fixed channelize.

4. Setting of SA :RBW/VBW=1MHz/1MHz,Span=50MHz,Sweep time=auto,Sweep mode=continuous, Detect mode=positive peak

5. SG RF signal on.

6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous

4.9.4 TEST RESULT

EUT:	Omega2	Test Date:	2018.05.14
Temperature:	25^{0}C	Tested by:	Kahn yang
Humidity:	55 % RH		
Test result:	CONFORM for IEE 802.11 N/HT40		
Note: The Tablet cannot transmit radio when the field strength at maximal gain direction of receiving antenna power is over 100mV/m; and The Tablet can start to transmit after carrier sensing.			

5. EUT TEST PHOTO

Measurement Photos