FCC PART 15, SUBPART C
ISEDC RSS-247, ISSUE 2, FEBRUARY 2017
LP0002-2018

TEST REPORT

For
Cisco Systems Inc.

125 West Tasman Drive,
San Jose, CA 95134 USA

FCC ID: LDKVCVER1937
IC: 2461N-VCVER1937

Report Type: Original Report	**Product Type:** Cisco Catalyst 9120AX Series
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ACCREDITED
CERTIFICATE #3297.02

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* This test report may contain data and test methods that are not covered by BACL's scope of accreditation as of the test report date shown above. These items are marked within the test report text with an asterisk "*"

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1902193-247	Original Report	2019-05-13

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Cisco Systems Inc*., and their product Brand: Cisco and model: *C9120AXI-T (Taiwan)* as referred to as EUT in this report. The product is a 4x4 Dual Band Access Point.

1.2 Mechanical Description of EUT

Length (mm)	Width (mm)	Height (mm)	Weight (g)
170	170	40	1000

1.3 Objective

This report is prepared on behalf of *Cisco Systems Inc.*, in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commission's rules, ISEDC RSS-247 Issue 2 on February 2017 and NCC LP0002-2018.

The objective is to determine compliance with FCC Part 15.247, ISEDC RSS-247 and NCC LP-0002 rules for Antenna Requirements and Radiated Spurious Emissions.

1.4 Related Submittal(s)/Grant(s)

R1902193-407

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v04: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 ^{o} C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A-1, 3062A-2, and 3062A-3.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-0027.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2005 by A2LA (Test Laboratory Accreditation Certificate Number 3279.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide

range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.03)*** to certify

- For the USA (Federal Communications Commission):
  1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  2 All Scope 2-Licensed Personal Mobile Radio Services;
  3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  5 All Scope 5-Licensed Fixed Microwave Radio Services
  6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  1 All Radio Equipment, per KHCA 10XX-series Specifications;
  2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3279.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)

- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISEDC) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v04.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The test firmware used was Tera Term and test commands, provided by *Cisco Systems Inc.*, the software is compliant with the standard requirements being tested against.

Modulation	Frequency (MHz)	Power Setting
2.4GHz XOR 802.11b	2412	17
	2442	17
	2462	17
2.4GHz XOR 802.11g	2412	17
	2442	17
	2462	17
2.4GHz XOR 802.11n	2412	17
	2442	17
	2462	17
2.4GHz XOR 802.11ax	2412	17
	2442	17
	2462	17
2.4GHz AUX 802.11g	2412	20
	2442	20
	2462	20
BLE	2402	5
	2440	5
	2480	5

Data Rates Tested:
802.11b mode: 1Mbps
802.11g mode: 6Mbps
802.11n mode: m0
802.11ax mode: m0h1

2.3 Duty Cycle Correction Factor

According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:

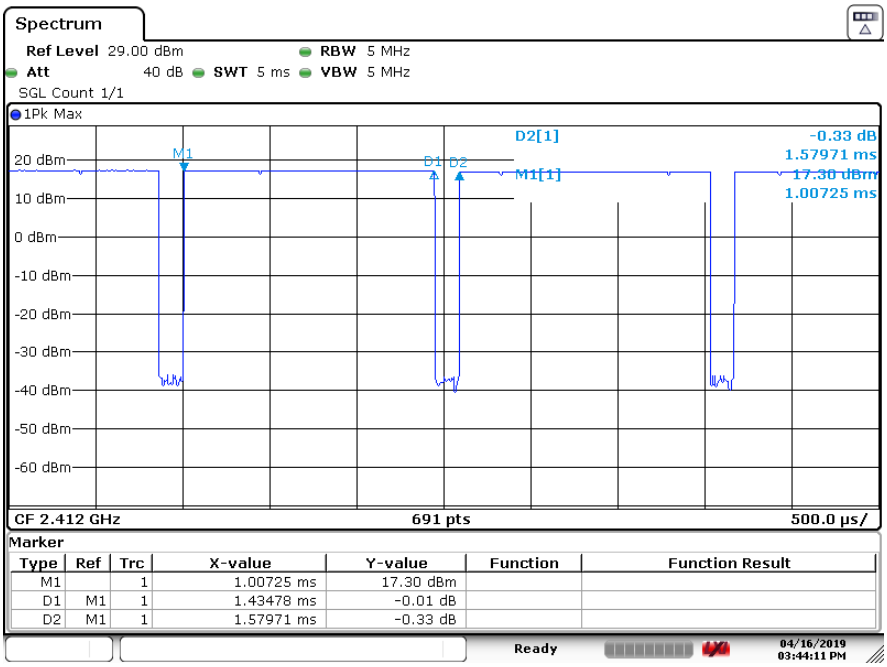
Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be utilized to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data is being acquired (i.e., no transmitter off-time is to be considered).

Radio Mode	Total On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
2.4 GHz XOR 802.11b	1.43478	1.57971	90.82	0.4181850
2.4 GHz XOR 802.11g	2.34783	2.42029	97.006	0.1320075
2.4 GHz XOR 802.11n	2.21739	2.25362	98.39	0.07038603
2.4 GHz XOR 802.11ax	2.21087	2.26957	97.41	0.1138
2.4 GHz XOR BLE	-	-	100	0
2.4 GHz AUX 802.11g	-	-	100	0

Duty Cycle = On Time (ms)/ Period (ms)
Duty Cycle Correction Factor (dB) = 10*log(1/Duty Cycle)

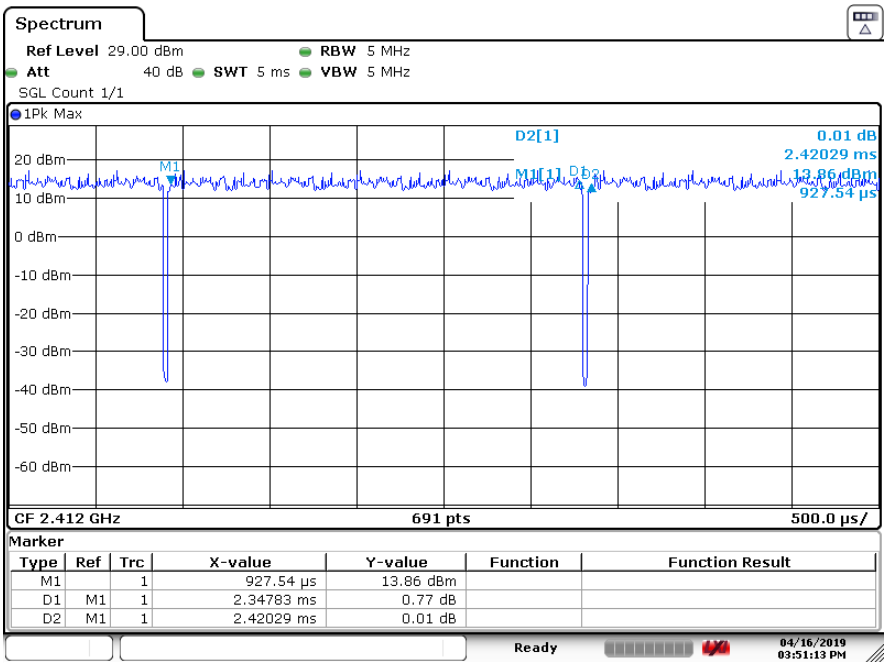
Please refer to the following plots.

802.11b mode



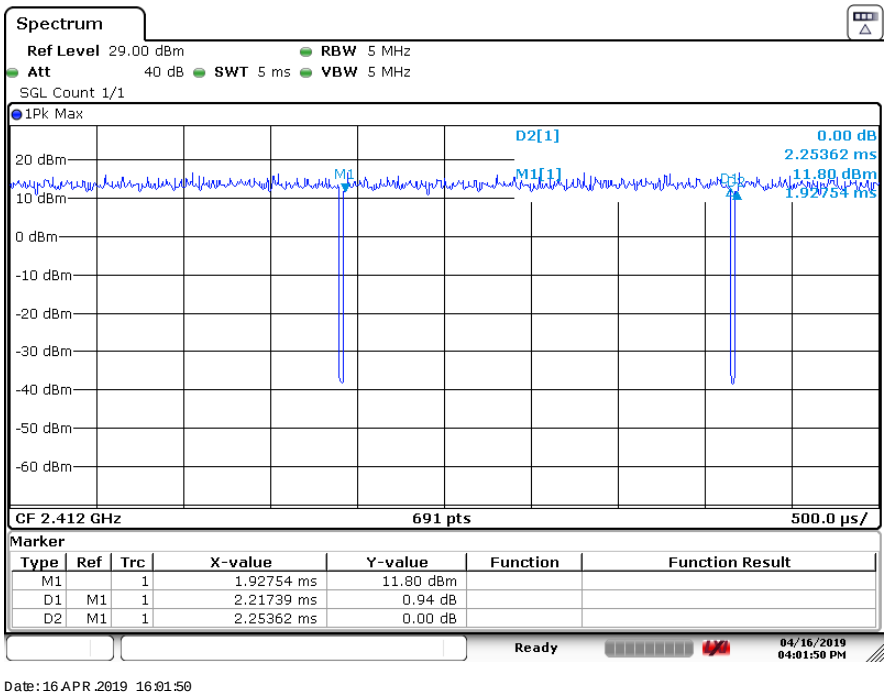
Date: 16 APR 2019 15:44:11

802.11g mode

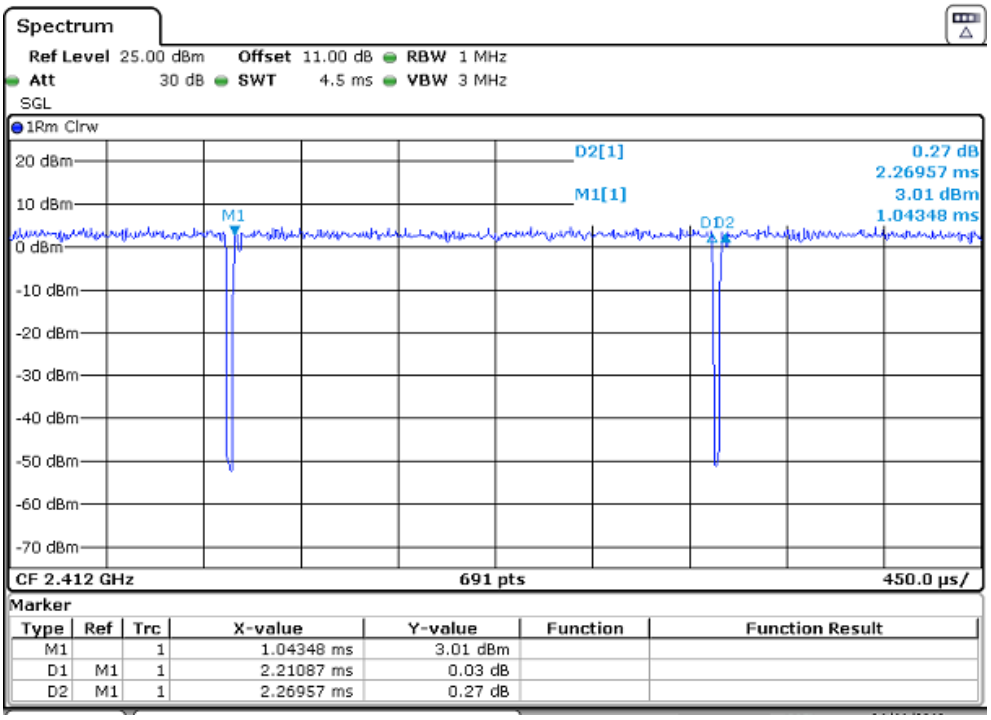


Date: 16 APR 2019 15:51:13

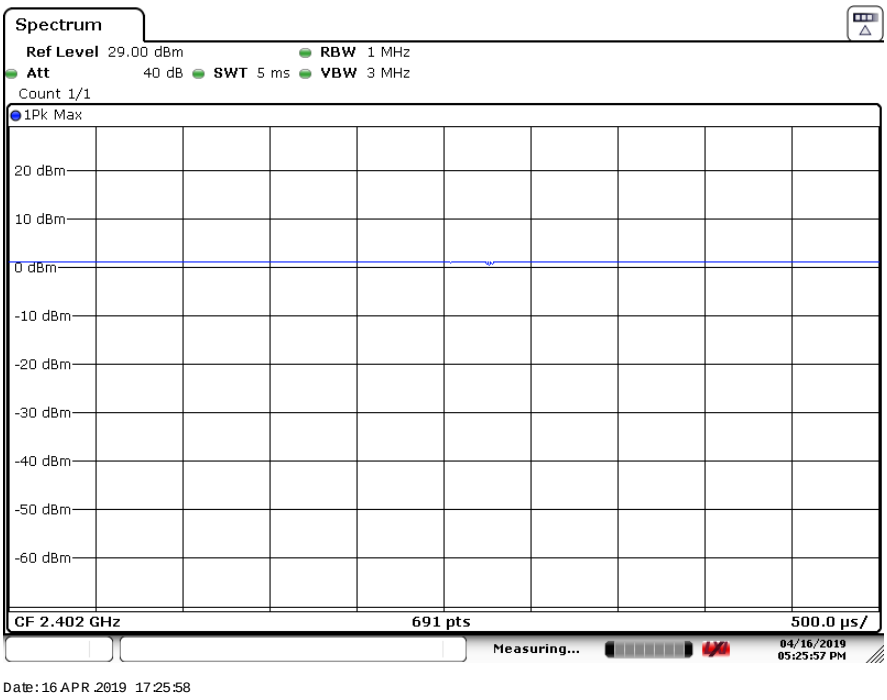
802.11n20 Mode



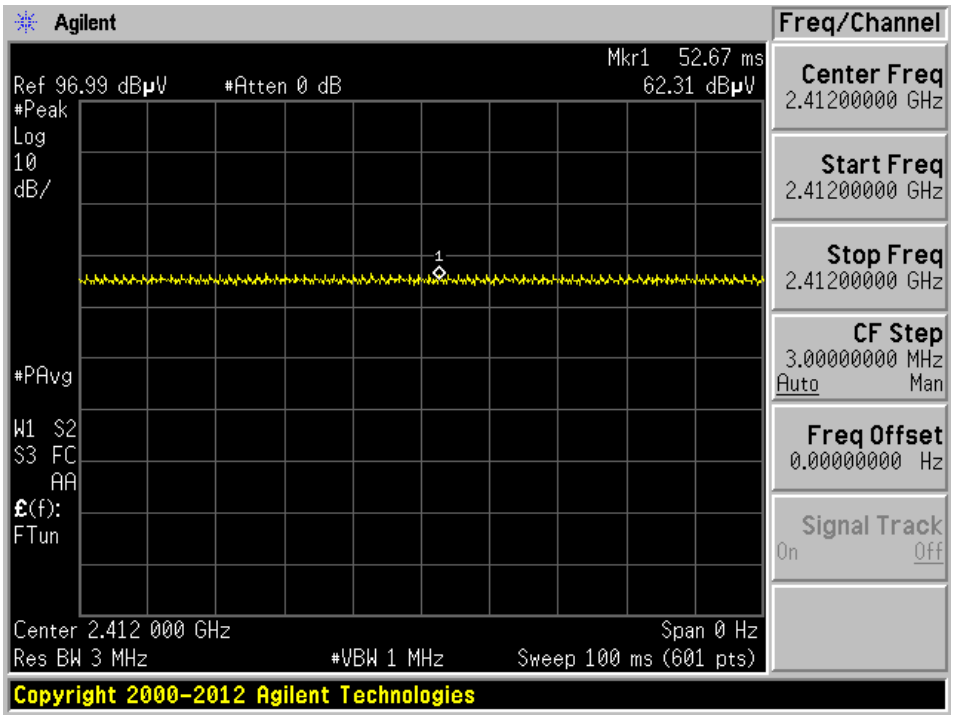
802.11ax20 Mode



BLE



2.4 GHz AUX 802.11g



2.4 Equipment Modifications

No equipment modifications are made to the EUT

2.5 Local Support Equipment

Manufacturer	Description	Model	Serial Number
Dell	Laptop	Latitude E6410	3CKRAQ1

2.6 Support Equipment

Manufacturer	Description	Model
Cisco	Power supply	AIR-PWRINJ6 V01

2.7 Interface Ports and Cabling

Cable Description	Length	To	From
Ethernet cable	2 m	PoE	EUT
Ethernet-serial-USB cable	2 m	EUT	Laptop

3 Summary of Test Results

Results reported relate only to the product tested.

FCC, ISED, & NCC Rules	Description of Test	Results
FCC §2.1091, §15.247(i) & ISEDC RSS-102 & LP0002	RF Exposure	Compliant
FCC §15.207 ISEDC RSS-Gen §8.8 LP0002-2018 §2.3	AC Power Line Conducted Emissions	Compliant
FCC §2.1053, §15.35(b), §15.205, §15.209, §15.247 (d) ISEDC RSS-247 §5.5 ISEDC RSS-Gen §8.9 and §8.10 LP0002-2018 §3.10	Radiated Spurious Emissions	Compliant

4 FCC §2.1091, §15.247(i) & ISEDC RSS-102 & LP0002– RF Exposure

4.1 Applicable Standards

According to FCC §15.247(i), §1.1307(b)(1) and LP0002 5.20.2.2, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

According to ISED RSS-102 Issue 5:

2.5.2 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz[6] and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from NCC LP0002

$$E = \frac{\sqrt{30PG}}{d}$$

E =Electric field (V/m)
P = Peak RF output power (W)
G = EUT Antenna numeric Gain (numeric)
d = Separation distance between radiator and human body (m)

4.3 MPE Results

2.4 GHz Wi-Fi Aux

Maximum output power at antenna input terminal (dBm):	19.56
Maximum output power at antenna input terminal (mW):	90.36
Prediction distance (cm):	30
Prediction frequency (MHz):	2462
Maximum Antenna Gain, typical (dBi):	3
Maximum Antenna Gain (numeric):	2
Power density of prediction frequency at 30.0 cm (mW/cm^2):	0.0160
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 30 cm is 0.016 mW/cm^2. Limit is 1.0 mW/cm^2.

2.4 GHz Wi-Fi Regular

Maximum output power at antenna input terminal (dBm):	24.1
Maximum output power at antenna input terminal (mW):	257.03
Prediction distance (cm):	30
Prediction frequency (MHz):	2437
Maximum Antenna Gain, typical (dBi):	10
Maximum Antenna Gain (numeric):	10
Power density of prediction frequency at 30.0 cm (mW/cm^2):	0.2273
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 30 cm is 0.2273 mW/cm^2. Limit is 1.0 mW/cm^2.

2.4 GHz BLE

Maximum peak output power at antenna input terminal (dBm):	3.67
Maximum peak output power at antenna input terminal (mW):	2.33
Prediction distance (cm):	30
Prediction frequency (MHz):	2426
Maximum Antenna Gain, typical (dBi):	3
Maximum Antenna Gain (numeric):	3.98
Power density of prediction frequency at 30.0 cm (mW/cm^2):	0.0004
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 30 cm is 0.0004 mW/cm^2. Limit is 1.0 mW/cm^2.

5 GHz Wi-Fi Regular

Maximum peak output power at antenna input terminal (dBm):	21.4
Maximum peak output power at antenna input terminal (mW):	138.04
Prediction distance (cm):	30
Prediction frequency (MHz):	5825
Maximum Antenna Gain, typical (dBi):	5
Maximum Antenna Gain (numeric):	3.16
Power density of prediction frequency at 30.0 cm (mW/cm^2):	0.0386
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

3.1 RF exposure evaluation exemption for ISEDC

2.4 GHz Wi-Fi Aux

19.56 + 3 dBi = 22.56dBm < $1.31\times10^{-2}f^{0.6834}$ = 2.703 W = 34.318 dBm

2.4 GHz Wi-Fi

22.9 + 10 dBi = 32.9 dBm < $1.31\times10^{-2}f^{0.6834}$ = 2.703 W = 34.318 dBm

2.4 GHz BLE

3.67 + 3 dBi = 6.67 dBm < $1.31\times10^{-2}f^{0.6834}$ = 2.695 W = 34.305 dBm

5 GHz Wi-Fi Regular

23 + 11 dBi = 34 dBm < 1.31×10-2f0.6834 = 4.880 W = 36.884 dBm

Therefore the RF exposure is not required.

4 FCC §15.207 & ISEDC RSS-Gen §8.8 and LP0002-2018 § 2.3 - AC Power Line Conducted Emissions

4.1 Applicable Standards

As per FCC §15.207, ISEDC RSS GEN §8.8 and LP0002-2018 §2.3

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note1	56 to 46 Note2
0.5-5	56	46
5-30	60	50

Note1: Decreases with the logarithm of the frequency.
Note2: A linear average detector is required

4.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.10-2013 measurement procedure. The specification used was FCC §15.207 limits and and ISEDC RSS GEN §8.8.

External I/O cables were draped along the edge of the test table and bundle when necessary.
The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

4.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1 and the power cords of support equipment were connected to LISN-2.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak, quasi-peak, and average detection mode. Quasi-Peak readings are distinguished with a “QP.” Average readings are distinguished with an “Ave”.

4.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL), the Attenuator Factor (Atten) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + CL + Atten

For example, a corrected amplitude of 46.2 dBuV = Indicated Reading (32.5 dBuV) + Cable Loss (3.7 dB) + Attenuator (10 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

4.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950K03	100338	2018-07-05	2 years
Rohde and Schwarz	Impulse Limiter	ESH3-Z2	101964	2018-07-27	1 year
Keysight Technologies	RF Limiter	11867A	MY42242931	2018-09-04	1 year
Solar Electronics Company	High Pass Filter	Type 7930-100	7930150204	2019-02-25	1 year
Suirong	30 ft conductive emission cable	LMR 400	-	N/R	N/A
FCC	LISN	FCC-LISN-50-25-2-10-CISPR16	160129	2019-04-04	1 year
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 09 June 2016) "A2LA Policy on Metrological Traceability".*

4.6 Test Environmental Conditions

Temperature:	23º C
Relative Humidity:	42 %
ATM Pressure:	101.31 kPa

The testing was performed by Giovanni Velazquez Munoz on 2019-05-02 in 5 chamber 3.

4.7 Summary of Test Results

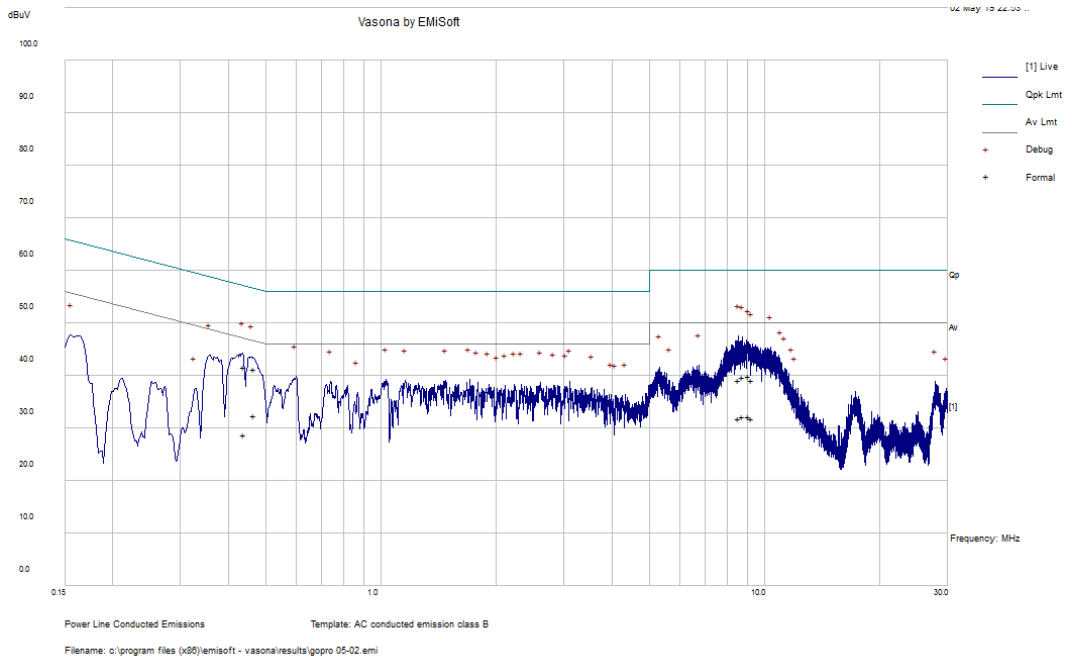
According to the recorded data in following table, the EUT complied with the FCC Part 15 and RSS-Gen standards'conducted emissions limits, with the margin reading of:

Connection: AC/DC adapter connected to 120 V/60 Hz, AC			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Live/Neutral)**	**Range (MHz)**
-14.16	0.465751	Line	0.15-30

4.8 Conducted Emissions Test Plots and Data

Worst Case Colocation, BLE 2402MHz, 2.4 GHz XOR Wi-Fi n20 mode 2462MHz, 2.4 GHz AUX Wi-Fi g mode 2412MHz and 5 GHz Wi-Fi ac160 mode 5250 MHz

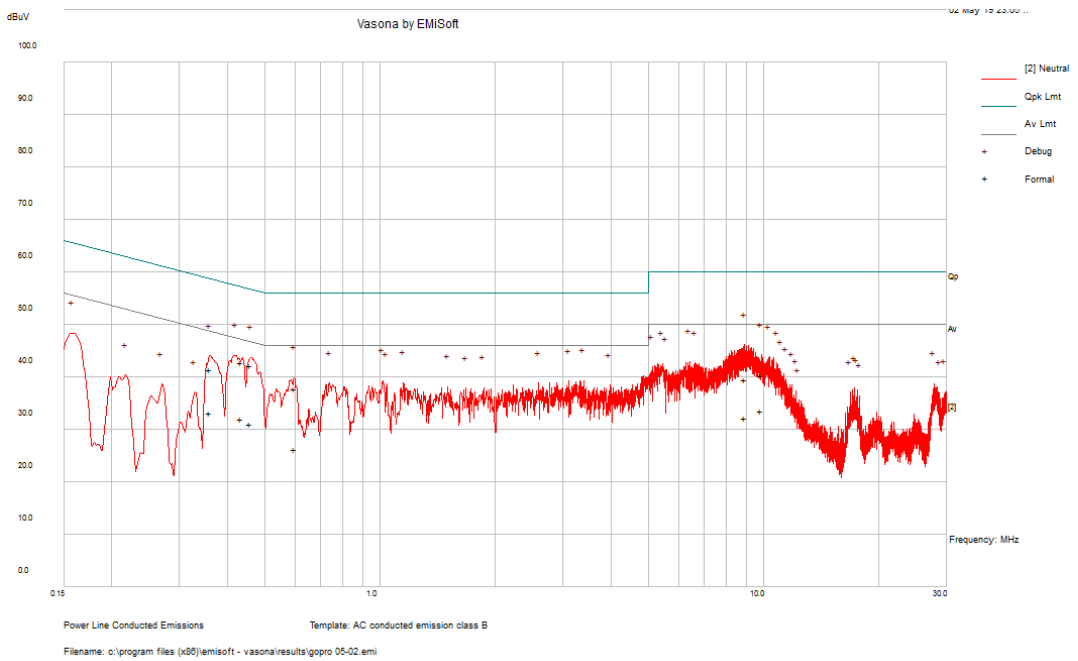
110 V, 60 Hz – Line



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
8.548244	39.23	Line	60	-20.77	QP
8.746753	39.75	Line	60	-20.25	QP
0.438212	41.65	Line	57.1	-15.45	QP
0.465751	41.21	Line	56.59	-15.38	QP
9.093119	39.89	Line	60	-20.11	QP
9.285619	39.13	Line	60	-20.87	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
8.548244	31.95	Line	50	-18.05	Ave.
8.746753	32.16	Line	50	-17.84	Ave.
0.438212	28.81	Line	47.1	-18.28	Ave.
0.465751	32.43	Line	46.59	**-14.16**	Ave.
9.093119	32.19	Line	50	-17.81	Ave.
9.285619	31.95	Line	50	-18.05	Ave.

110 V, 60 Hz – Neutral



Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.457057	42.21	Neutral	56.75	-14.53	QP
0.434592	42.75	Neutral	57.16	-14.41	QP
8.900986	39.61	Neutral	60	-20.39	QP
0.360406	41.49	Neutral	58.72	-17.22	QP
9.844824	40.26	Neutral	60	-19.74	QP
0.597054	37.75	Neutral	56	-18.25	QP

Frequency (MHz)	Corrected Amplitude (dBuV)	Conductor (Line/Neutral)	Limit (dBuV)	Margin (dB)	Detector (QP/Ave.)
0.457057	31.11	Neutral	46.75	-15.64	Ave.
0.434592	31.99	Neutral	47.16	-15.17	Ave.
8.900986	32.25	Neutral	50	-17.75	Ave.
0.360406	33.25	Neutral	48.72	-15.47	Ave.
9.844824	33.65	Neutral	50	-16.35	Ave.
0.597054	26.33	Neutral	46	-19.67	Ave.

5 FCC §15.209, §15.247(d) & ISEDC RSS-247 §5.5, RSS-Gen §8.9, §8.10 and LP0002-2018 §3.10 - Spurious Radiated Emissions

5.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz
0.090～0.110 0.490～0.510 2.172～2.198 3.013～3.033 4.115～4.198 5.670～5.690 6.200～6.300 8.230～8.400 12.265～12.600 13.340～13.430 14.965～15.020 16.700～16.755 19.965～20.020 25.500～25.700 37.475～38.275 73.500～75.400	108.00～138.00 149.90～150.05 156.70～156.90 162.01～167.17 167.72～173.20 240.00～285.00 322.00～335.40 399.90～410.00 485.00～510.00 608.00～614.00 703.00～748.00 758.00～803.00 825.00～915.00 930.00～1240.0 1300.0～1427.0 1435.0～1626.5	1660.0～1785.0 1805.0～1880.0 1885.0～1900.0 1905.0～1985.0 2010.0～2025.0 2110.0～2170.0 2200.0～2300.0 2310.0～2390.0 2483.5～2900.0 3260.0～3267.0 3332.0～3339.0 3345.8～3358.0 3500.0～4400.0 4500.0～5250.0 5350.0～5460.0 7250.0～7750.0	8025.0～8500.0 9000.0～9200.0 9300.0～9500.0 10600～12700 13250～13400 14470～14500 15350～16200 17700～21400 22010～23120 23600～24000 31200～31800 36430～36500 Above 38600

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz

However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.
As per FCC §15.247 (d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

5.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

5.3 Test Procedure

The EUT host, and all support equipment power cords were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

For radiated testing the EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meter, and the EUT was placed on a turntable, which was 0.8 meter and 1.5 meter above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = 100 ms
(2) Average: RBW = 1MHz / VBW = 3MHz / Sweep = Auto

5.4 Corrected Amplitude and Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

5.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Rohde and Schwarz	Receiver, EMI Test	ESCI 1166.5950.03	100338	2018-07-05	2 years
Agilent	Analyzer, Spectrum	E4446A	MY48250238	2018-05-08	1 year
Sunol Sciences	System Controller	SC99V	011003-1	N/R	N/A
Sunol Sciences	Antenna, Biconi-Log	JB1	A013105-3	2018-02-26	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-01	2018-02-14	2 years
Wisewave	Antenna, Horn	ARH-4223-02	10555-02	2018-02-14	2 years
Agilent	Amplifier, Pre	8447D		2019-04-11	1 year
Insulated Wire INC	2.92mm (M) X2, 1501 Armor Neoprene, 396	KPS-1501AN-3960-KPS	DC 1807	2018-03-13	2 years
-	SMA cable	-	C00011	Each time[1]	N/A
-	N-Type Cable	-	C00012	Each time[1]	N/A
-	N-Type Cable	-	C00014	Each time[1]	N/A
HP	Pre-Amplifier	8449B	3008A01978	2018-08-10	1 year
A.H. Systems	Pre-Amplifier	PAM 1840V	170	2018-09-10	1 year
Sunol Sciences	Antenna, Horn	DRH-118	A052704	2019-04-02	2 years
Vasona	Test software	V6.0 build 11	10400213	N/R	N/R

Note[1]: cable and attenuator included in the test set-up will be checked each time before testing.
***Statement of Traceability*:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with A2LA Policy P102 (dated 9 June 2016) "A2LA Policy on Metrological Traceability".

5.6 Test Environmental Conditions

Temperature:	22-25 ºC
Relative Humidity:	29-30 %
ATM Pressure:	102.1 kPa

The testing was performed by Giovanni Velazquez Munoz 2019-04-15 to 2019-04-17 in 5m chamber 3.

5.7 Summary of Test Results

According to the data hereinafter, the EUT complied with FCC Title 47, Part 15C and RSS-247 standard's radiated emissions limits, and had the worst margin of:

2.4GHz XOR Wi-Fi

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, channel**
-3.82	7386	Horizontal	2462 MHz, n20

BLE

Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, channel**
-4.89	7440	Horizontal	2480 MHz, BLE

2.4GHz Wi-Fi AUX

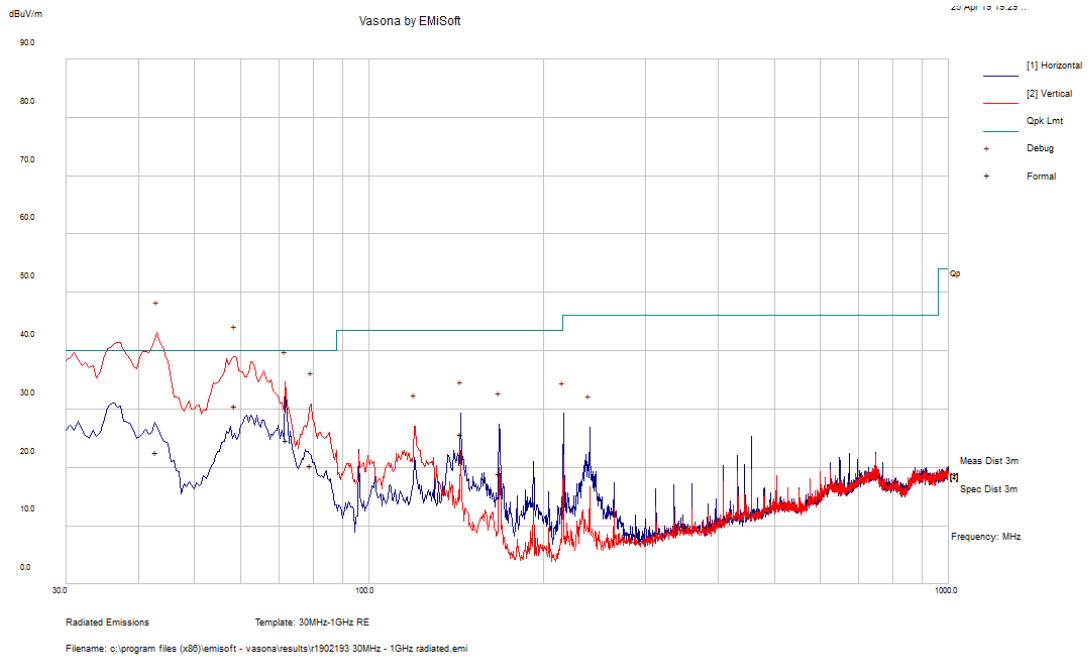
Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode, channel**
-5.00	7326	Horizontal	2442 MHz, 802.11g

Please refer to the following table and plots for specific test result details

5.8 Spurious Emissions Test Results

1) 30 MHz – 1 GHz Worst Case, Measured at 3 meters

Worst Case Colocation, BLE 2402MHz, 2.4 GHz XOR Wi-Fi n20 mode 2462MHz, 2.4 GHz AUX Wi-Fi g mode 2412MHz and 5 GHz Wi-Fi ac160 mode 5250 MHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Comment
49.92525	22.62	202	V	191	40	-17.38	Pass
58.7515	30.56	145	V	86	40	-9.44	Pass
71.913	24.63	116	V	104	40	-15.37	Pass
79.392	20.37	170	V	96	40	-19.63	Pass
144.1073	25.72	148	H	97	43.5	-17.78	Pass
167.9868	18.91	157	H	111	43.5	-24.59	Pass

2) 1 GHz-18 GHz, measured at 3 meters

2.4 GHz XOR Wi-Fi

Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz b mode power setting: 17											
4824	43.75	0	100	H	33.07	12.46	38.00	51.28	74	-22.72	PK
4824	33.30	0	100	H	33.07	12.46	38.00	40.83	54	-13.17	AV
4824	43.60	0	100	V	33.07	12.46	38.00	51.13	74	-22.87	PK
4824	33.72	0	100	V	33.07	12.46	38.00	41.25	54	-12.75	AV
7236	43.40	0	100	H	36.90	16.23	37.74	58.79	74	-15.21	PK
7236	33.21	0	100	H	35.78	16.23	37.74	47.47	54	-6.53	AV
Mid Channel 2442 MHz b mode power setting: 17											
4884	44.54	0	100	H	32.67	12.46	38.00	51.67	74	-22.33	PK
4884	33.65	0	100	H	32.67	12.46	38.00	40.78	54	-13.22	AV
4884	45.31	0	100	V	32.65	12.46	38.00	52.42	74	-21.58	PK
4884	33.68	0	100	V	32.65	12.46	38.00	40.79	54	-13.21	AV
7326	44.48	0	100	H	37.08	16.23	37.74	60.04	74	-13.96	PK
7326	33.55	0	100	H	37.08	16.23	37.74	49.12	54	-4.88	AV
High Channel 2462 MHz b mode power setting: 17											
4924	44.97	0	100	H	32.77	12.46	38.00	52.20	74	-21.80	PK
4924	33.82	0	100	H	32.77	12.46	38.00	41.05	54	-12.95	AV
4924	44.73	0	100	V	32.74	12.46	38.00	51.93	74	-22.07	PK
4924	33.22	0	100	V	32.74	12.46	38.00	40.42	54	-13.58	AV
7386	44.70	0	100	H	37.19	16.23	37.74	60.38	74	-13.62	PK
7386	33.67	0	100	H	37.19	16.23	37.74	49.35	54	-4.65	AV

Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz g mode power setting: 17											
4824	43.49	0	100	H	32.46	12.46	38.00	50.41	74	-23.59	PK
4824	33.09	0	100	H	32.46	12.46	38.00	40.01	54	-13.99	AV
4824	44.11	0	100	V	32.45	12.46	38.00	51.03	74	-22.97	PK
4824	32.33	0	100	V	32.45	12.46	38.00	39.24	54	-14.76	AV
7236	43.17	0	100	H	36.75	16.23	37.74	58.41	74	-15.59	PK
7236	33.00	0	100	H	36.75	16.23	37.74	48.24	54	-5.76	AV
Mid Channel 2442 MHz g mode power setting: 17											
4884	43.83	0	100	H	32.67	12.46	38.00	50.96	74	-23.04	PK
4884	32.80	0	100	H	32.67	12.46	38.00	39.93	54	-14.07	AV
4884	43.90	0	100	V	32.65	12.46	38.00	51.01	74	-22.99	PK
4884	32.75	0	100	V	32.65	12.46	38.00	39.86	54	-14.14	AV
7326	43.22	0	100	H	37.08	16.23	37.74	58.78	74	-15.22	PK
7326	32.19	0	100	H	37.08	16.23	37.74	47.75	54	-6.25	AV
High Channel 2462 MHz g mode power setting: 17											
4924	44.40	0	100	H	32.77	12.46	38.00	51.63	74	-22.37	PK
4924	32.35	0	100	H	32.77	12.46	38.00	39.58	54	-14.42	AV
4924	43.06	0	100	V	32.73	12.46	38.00	50.26	74	-23.75	PK
4924	32.12	0	100	V	32.73	12.46	38.00	39.31	54	-14.69	AV
7386	43.40	0	100	H	37.19	16.23	37.74	59.08	74	-14.92	PK
7386	32.42	0	100	H	37.19	16.23	37.74	48.10	54	-5.90	AV

Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz n20 mode power setting: 17											
4824	45.96	0	100	H	32.46	12.46	38.00	52.88	74	-21.12	PK
4824	34.10	0	100	H	32.46	12.46	38.00	41.02	54	-12.98	AV
4824	43.75	0	100	V	32.45	12.46	38.00	50.67	74	-23.33	PK
4824	34.30	0	100	V	32.45	12.46	38.00	41.22	54	-12.78	AV
7236	44.45	0	100	H	36.75	16.23	37.74	59.69	74	-14.31	PK
7236	34.40	0	100	H	36.75	16.23	37.74	49.64	54	-4.36	AV
Mid Channel 2442 MHz n20 mode power setting: 17											
4884	44.41	0	100	H	32.67	12.46	38.00	51.54	74	-22.46	PK
4884	34.20	0	100	H	32.67	12.46	38.00	41.33	54	-12.67	AV
4884	43.33	0	100	V	32.65	12.46	38.00	50.44	74	-23.56	PK
4884	34.40	0	100	V	32.65	12.46	38.00	41.51	54	-12.49	AV
7326	42.45	0	100	H	37.08	16.23	37.74	58.01	74	-15.99	PK
7326	32.60	0	100	H	37.08	16.23	37.74	48.16	54	-5.84	AV
High Channel 2462 MHz n20 mode power setting: 17											
4924	43.75	0	100	H	32.77	12.46	38.00	50.98	74	-23.02	PK
4924	34.30	0	100	H	32.77	12.46	38.00	41.53	54	-12.47	AV
4924	44.41	0	100	V	32.73	12.46	38.00	51.61	74	-22.40	PK
4924	34.80	0	100	V	32.73	12.46	38.00	42.00	54	-12.01	AV
7386	44.92	0	100	H	37.19	16.23	37.74	60.60	74	-13.40	PK
7386	34.50	0	100	H	37.19	16.23	37.74	50.18	54	-3.82	AV

Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz ax20 mode power setting: 17											
4824	44.53	0	100	H	32.46	12.46	38.00	51.45	74	-22.55	PK
4824	32.88	0	100	H	32.46	12.46	38.00	39.80	54	-14.20	AV
4824	44.89	0	100	V	32.45	12.46	38.00	51.81	74	-22.19	PK
4824	33.09	0	100	V	32.45	12.46	38.00	40.01	54	-13.99	AV
Mid Channel 2442 MHz ax20 mode power setting: 17											
4884	44.78	0	100	H	32.67	12.46	38.00	51.91	74	-22.09	PK
4884	33.78	0	100	H	32.67	12.46	38.00	40.91	54	-13.09	AV
4884	44.54	0	100	V	32.65	12.46	38.00	51.65	74	-22.35	PK
4884	33.03	0	100	V	32.65	12.46	38.00	40.14	54	-13.86	AV
High Channel 2462 MHz ax20 mode power setting: 17											
4924	44.32	0	100	H	32.77	12.46	38.00	51.55	74	-22.45	PK
4924	33.18	0	100	H	32.77	12.46	38.00	40.41	54	-13.59	AV
4924	44.35	0	100	V	32.73	12.46	38.00	51.55	74	-22.46	PK
4924	33.65	0	100	V	32.73	12.46	38.00	40.85	54	-13.16	AV

2.4 GHz AUX Wi-Fi, measured at 3 meters

Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2412 MHz g mode power setting: 20											
4824	45.71	0	100	H	32.46	12.46	38.00	52.63	74	-21.37	PK
4824	33.92	0	100	H	32.46	12.46	38.00	40.84	54	-13.16	AV
4824	44.95	0	100	V	32.45	12.46	38.00	51.87	74	-22.13	PK
4824	34.17	0	100	V	32.45	12.46	38.00	41.09	54	-12.91	AV
Mid Channel 2442 MHz g mode power setting: 20											
4884	44.31	0	100	H	32.67	12.46	38.00	51.44	74	-22.56	PK
4884	34.02	0	100	H	32.67	12.46	38.00	41.15	54	-12.85	AV
4884	44.27	0	100	V	32.65	12.46	38.00	51.38	74	-22.62	PK
4884	34.58	0	100	V	32.65	12.46	38.00	41.69	54	-12.31	AV
High Channel 2462 MHz g mode power setting: 20											
4924	43.58	0	100	H	32.77	12.46	38.00	50.81	74	-23.19	PK
4924	34.58	0	100	H	32.77	12.46	38.00	41.81	54	-12.19	AV
4924	44.28	0	100	V	32.73	12.46	38.00	51.48	74	-22.53	PK
4924	34.72	0	100	V	32.73	12.46	38.00	41.92	54	-12.09	AV

BLE, Measured at 3 Meter

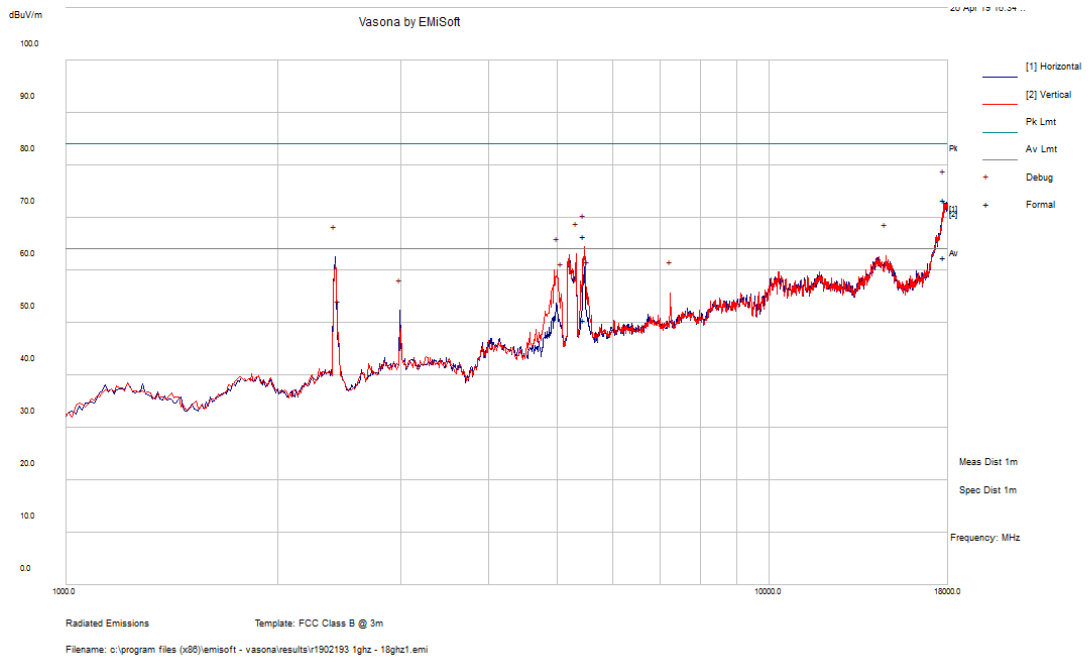
Freq. (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC/IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
Low Channel 2402 MHz											
4804	43.77	0	100	H	32.46	11.34	38.17	49.39	74	-24.61	PK
4804	32.92	0	100	H	32.46	11.34	38.17	38.54	54	-15.46	AV
4804	44.48	0	100	V	32.45	11.34	38.17	50.10	74	-23.90	PK
4804	33.03	0	100	V	32.45	11.34	38.17	38.65	54	-15.35	AV
7206	44.40	0	100	H	36.90	15.78	36.47	60.61	74	-13.39	PK
7206	32.33	0	100	H	36.90	15.78	36.47	48.54	54	-5.46	AV
7206	44.36	0	100	V	36.75	15.78	36.47	60.42	74	-13.58	PK
7206	32.62	0	100	V	36.75	15.78	36.47	48.69	54	-5.31	AV
Mid Channel 2440 MHz											
4880	44.40	0	100	H	33.29	11.99	38.17	51.51	74	-22.50	PK
4880	32.21	0	100	H	33.29	11.99	38.17	39.32	54	-14.68	AV
4880	42.45	0	100	V	33.29	11.99	38.17	49.56	74	-24.45	PK
4880	32.61	0	100	V	33.29	11.99	38.17	39.71	54	-14.29	AV
7320	44.30	0	100	H	37.53	16.44	37.41	60.85	74	-13.15	PK
7320	31.90	0	100	H	37.53	16.44	37.41	48.46	54	-5.54	AV
7320	43.72	0	100	V	37.53	16.44	37.41	60.27	74	-13.73	PK
7320	32.42	0	100	V	37.53	16.44	37.41	48.97	54	-5.03	AV
High Channel 2480 MHz											
4960	43.42	0	100	H	33.37	11.99	38.09	50.69	74	-23.31	PK
4960	32.04	0	100	H	33.37	11.99	38.09	39.30	54	-14.70	AV
4960	44.24	0	100	V	33.37	11.99	38.09	51.51	74	-22.49	PK
4960	32.31	0	100	V	33.37	11.99	38.09	39.57	54	-14.43	AV
7440	44.34	0	100	H	37.41	17.00	37.62	61.13	74	-12.87	PK
7440	32.32	0	100	H	37.41	17.00	37.62	49.11	54	-4.89	AV
7440	44.01	0	100	V	37.41	17.00	37.62	60.80	74	-13.20	PK
7440	31.91	0	100	V	37.41	17.00	37.62	48.70	54	-5.30	AV

Note: Spurious emission above 7.5GHz is the noise floor.

1) 1 GHz-18 GHz, measured at 1 meter

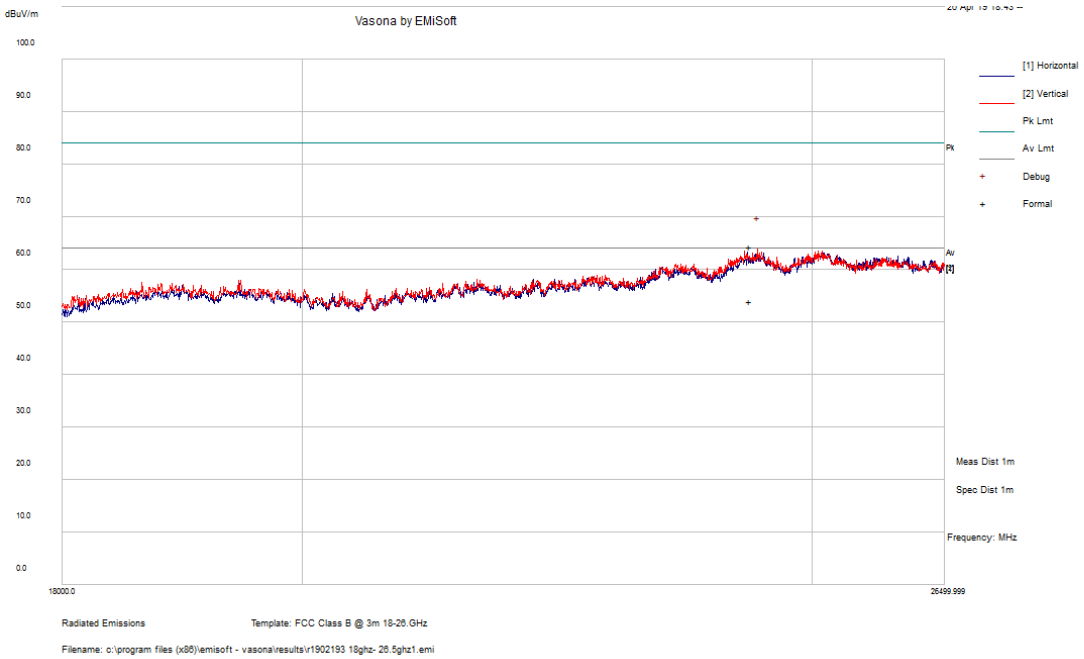
2.4GHz and 5GHz filter has added.

Worst Case Colocation, BLE 2402MHz, 2.4 GHz XOR Wi-Fi n20 mode 2462MHz, 2.4 GHz AUX Wi-Fi g mode 2412MHz and 5 GHz Wi-Fi ac160 mode 5250 MHz



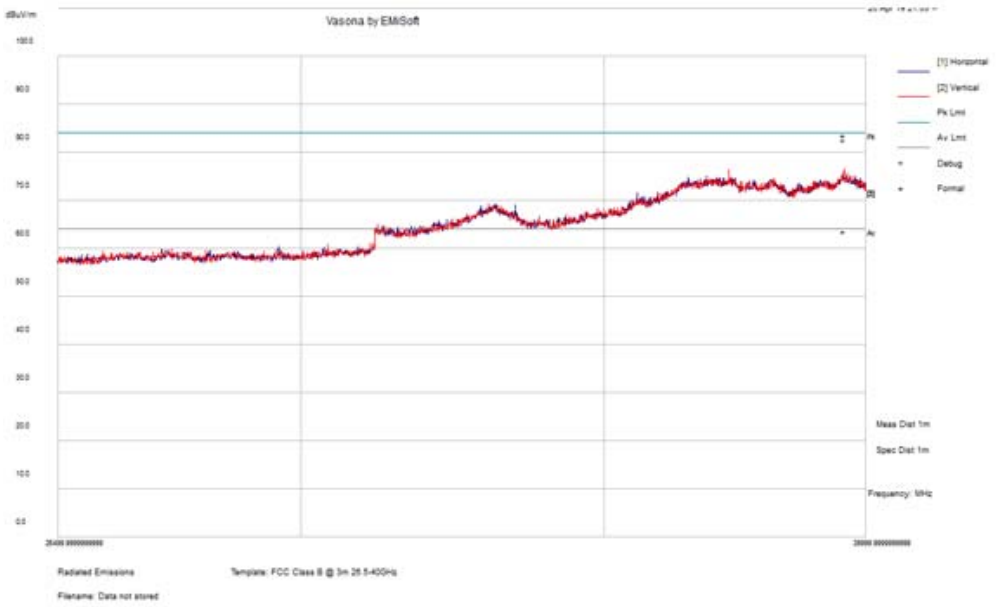
2) 18 GHz-26.5 GHz, measured at 1 meter

Worst Case Colocation, BLE 2402MHz, 2.4 GHz XOR Wi-Fi n20 mode 2462MHz, 2.4 GHz AUX Wi-Fi g mode 2412MHz and 5 GHz Wi-Fi ac160 mode 5250 MHz



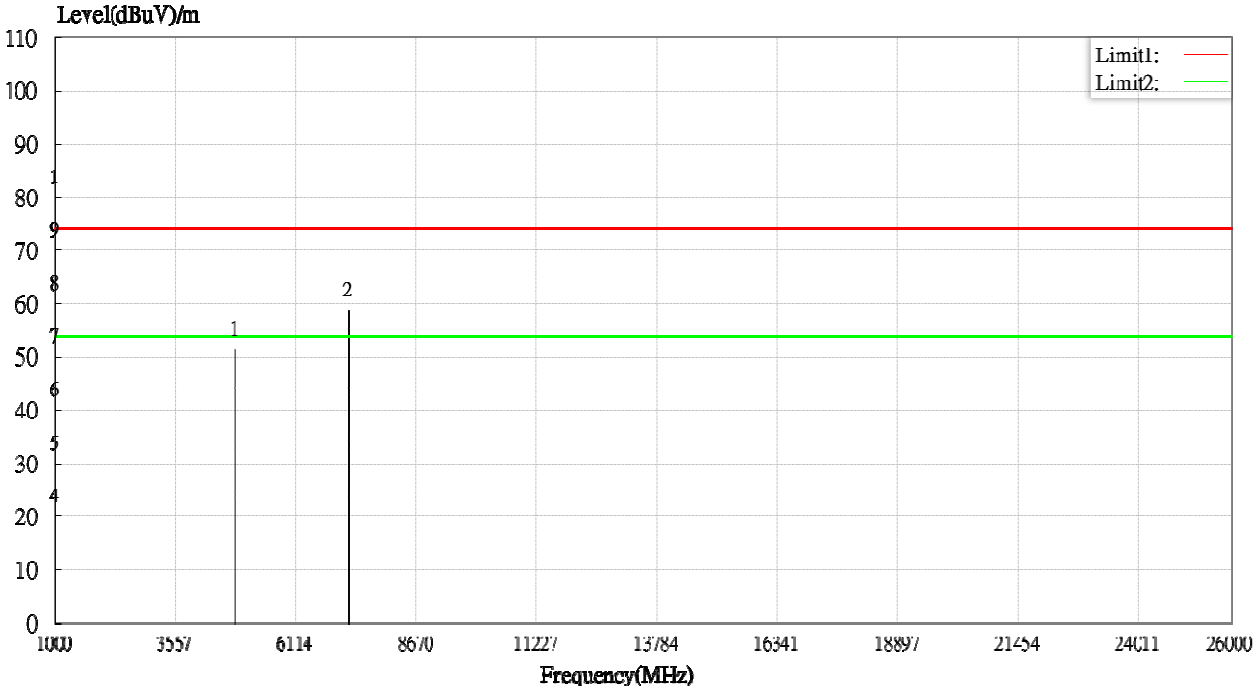
3) 26.5 GHz-40 GHz, measured at 1 meter

Worst Case Colocation, BLE 2402MHz, 2.4 GHz XOR Wi-Fi n20 mode 2462MHz, 2.4 GHz AUX Wi-Fi g mode 2412MHz and 5 GHz Wi-Fi ac160 mode 5250 MHz

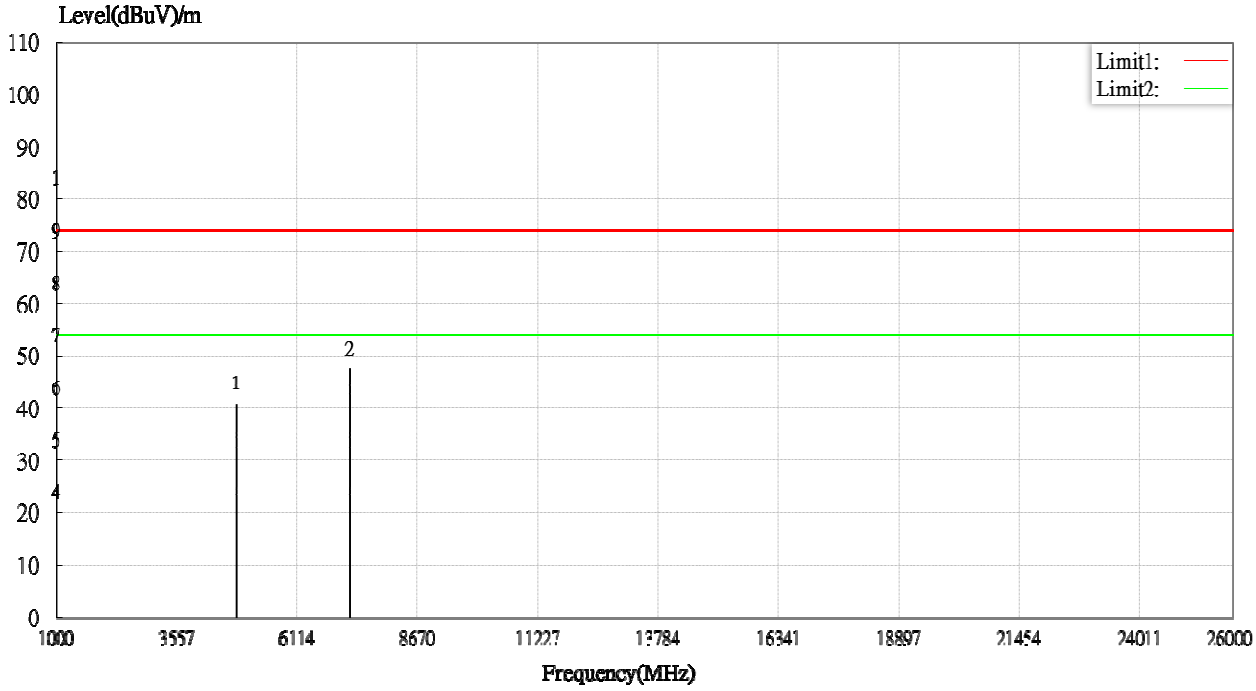


B mode 2412 MHz Horizontal XOR

PK

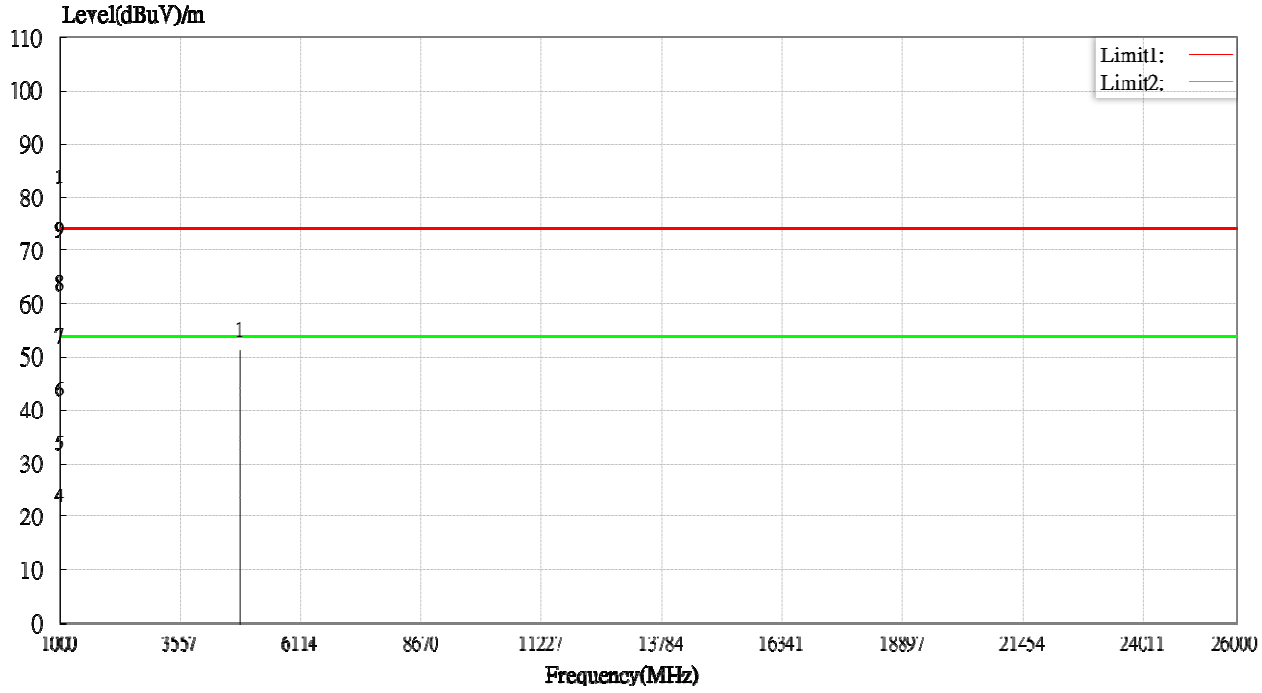


AVG



B mode 2412 MHz Vertical XOR

PK



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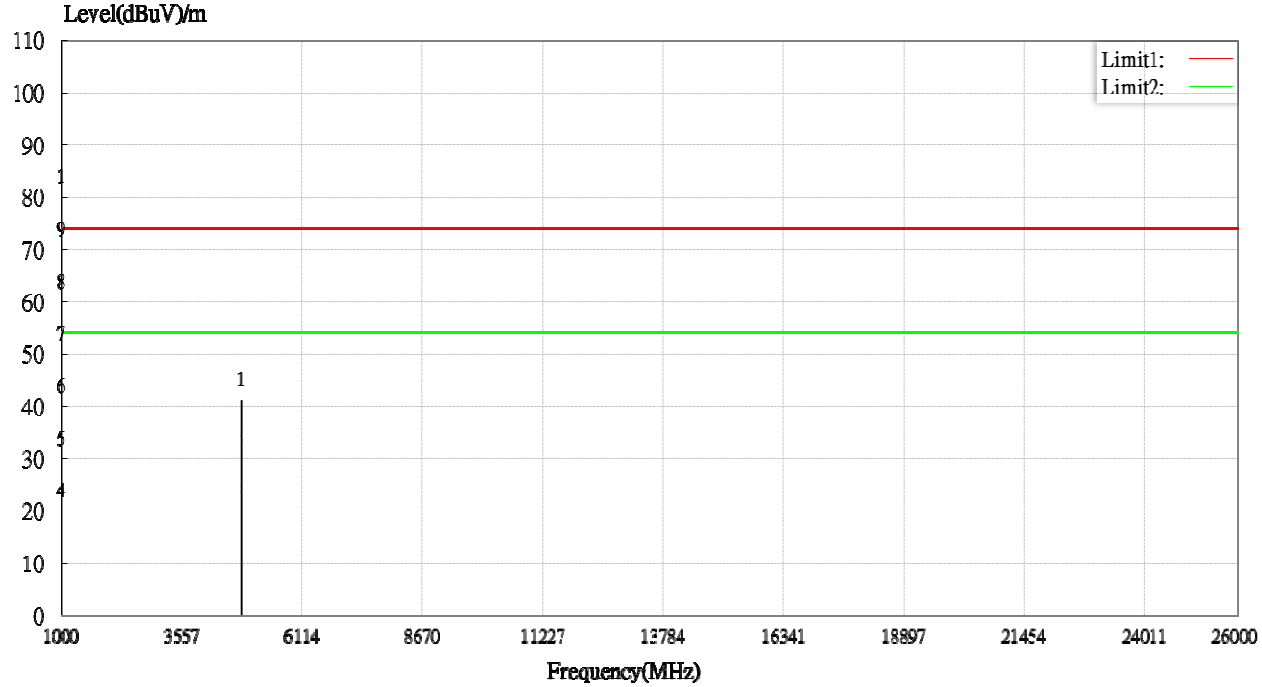
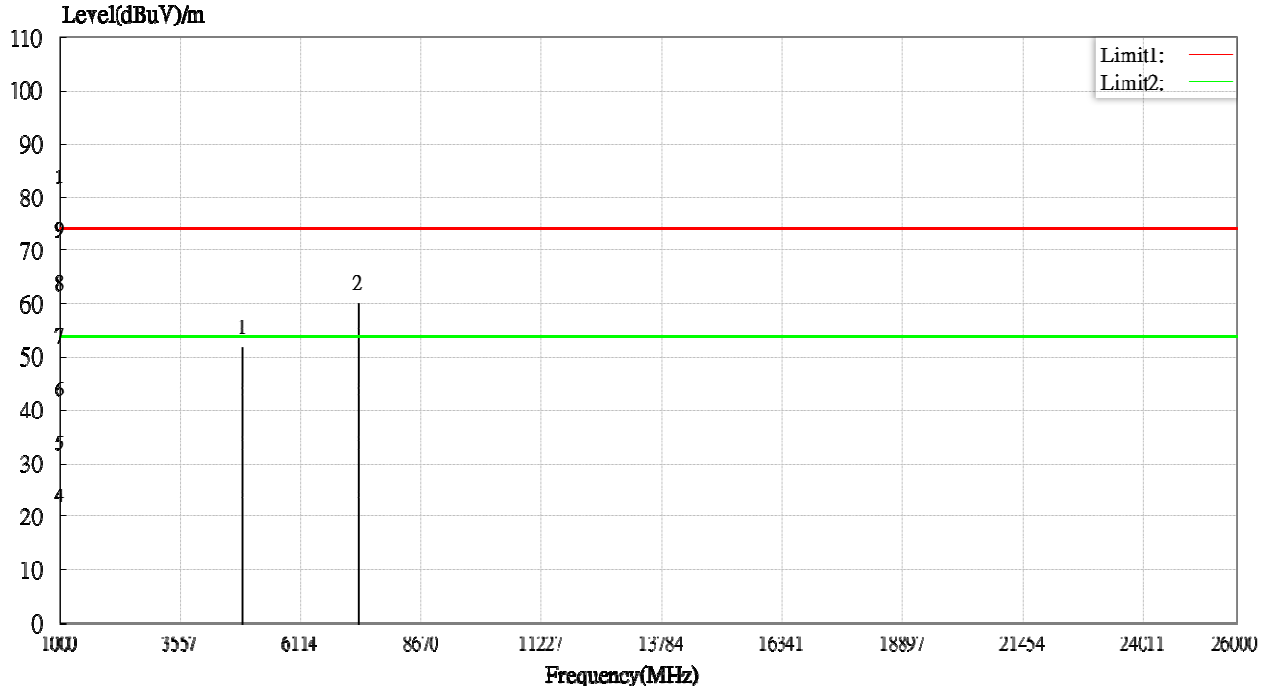


B mode 2442 MHz Horizontal XOR

PK



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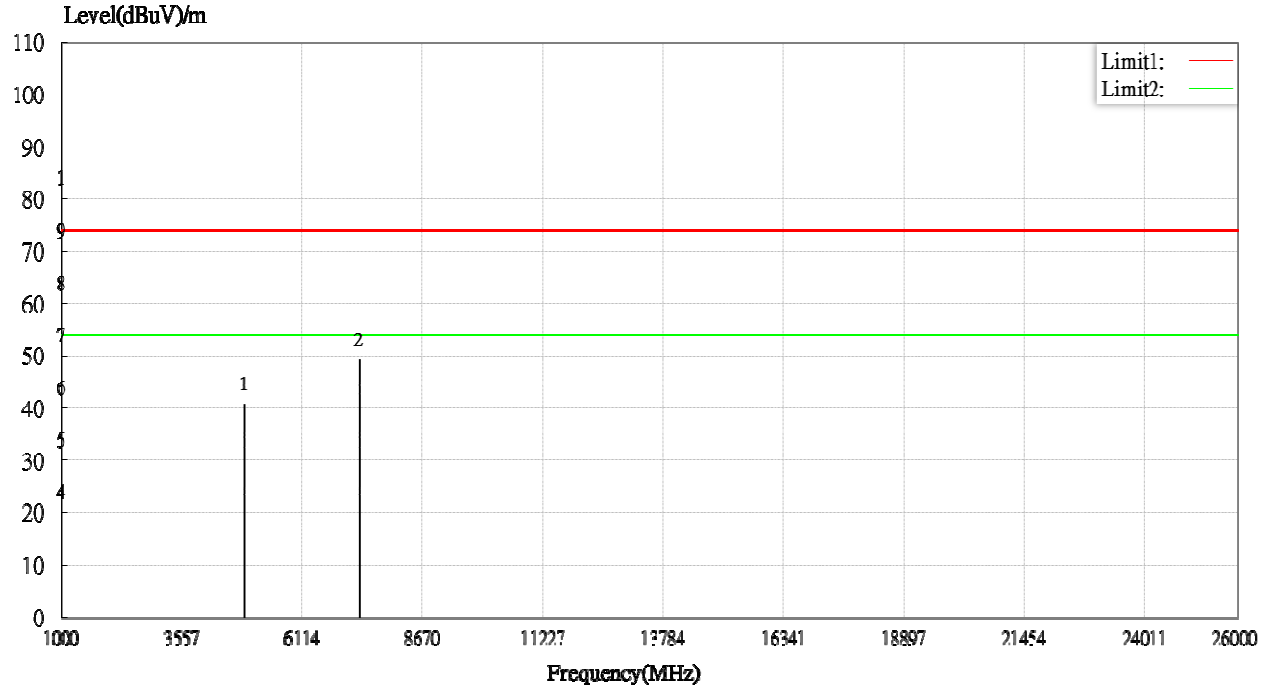
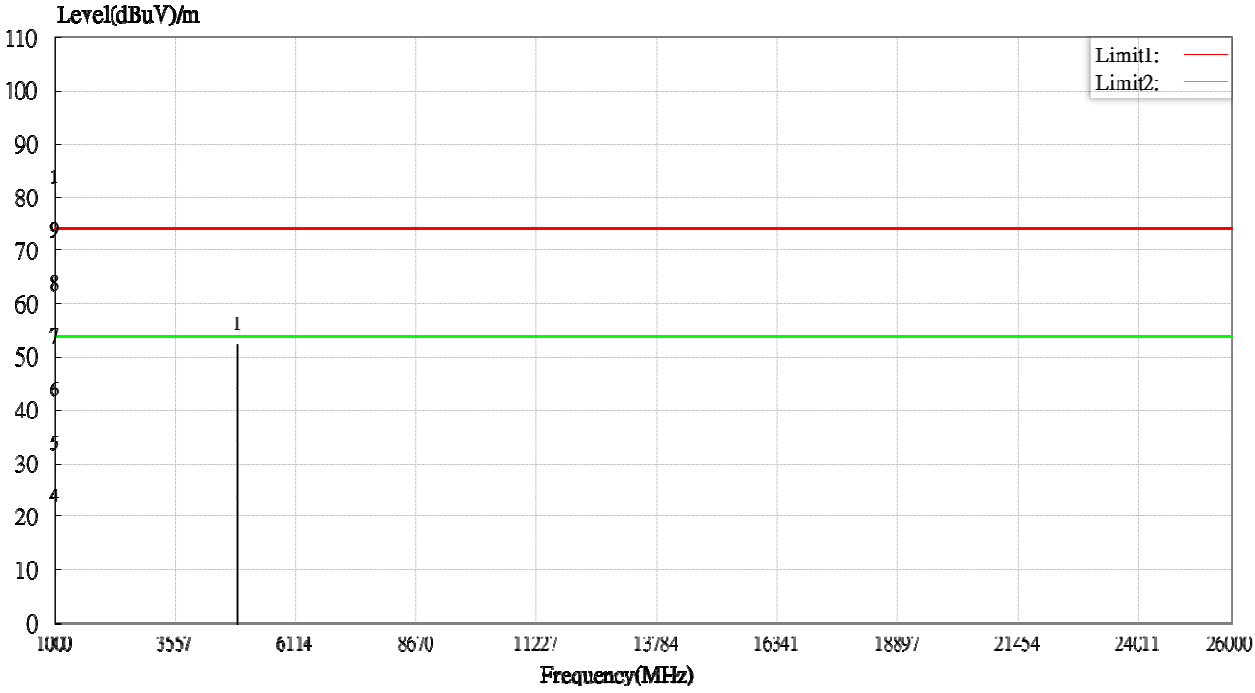


B mode 2442 MHz Vertical XOR

PK



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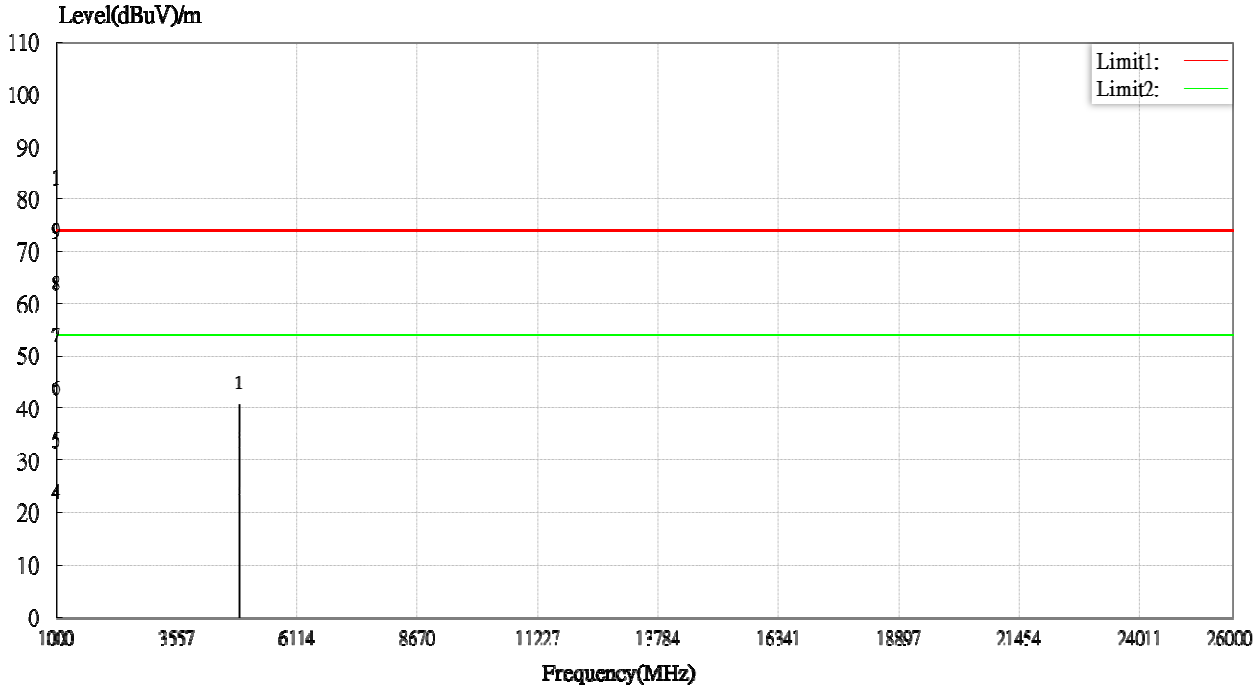
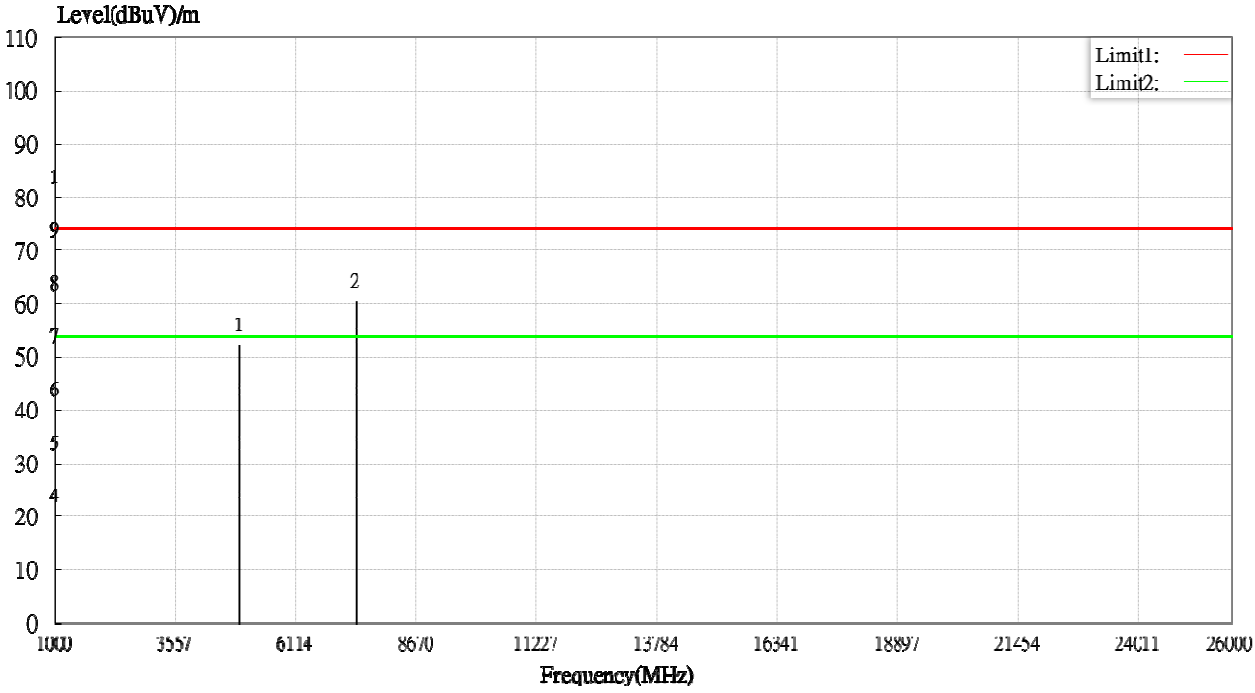


B mode 2462 MHz Horizontal XOR

PK



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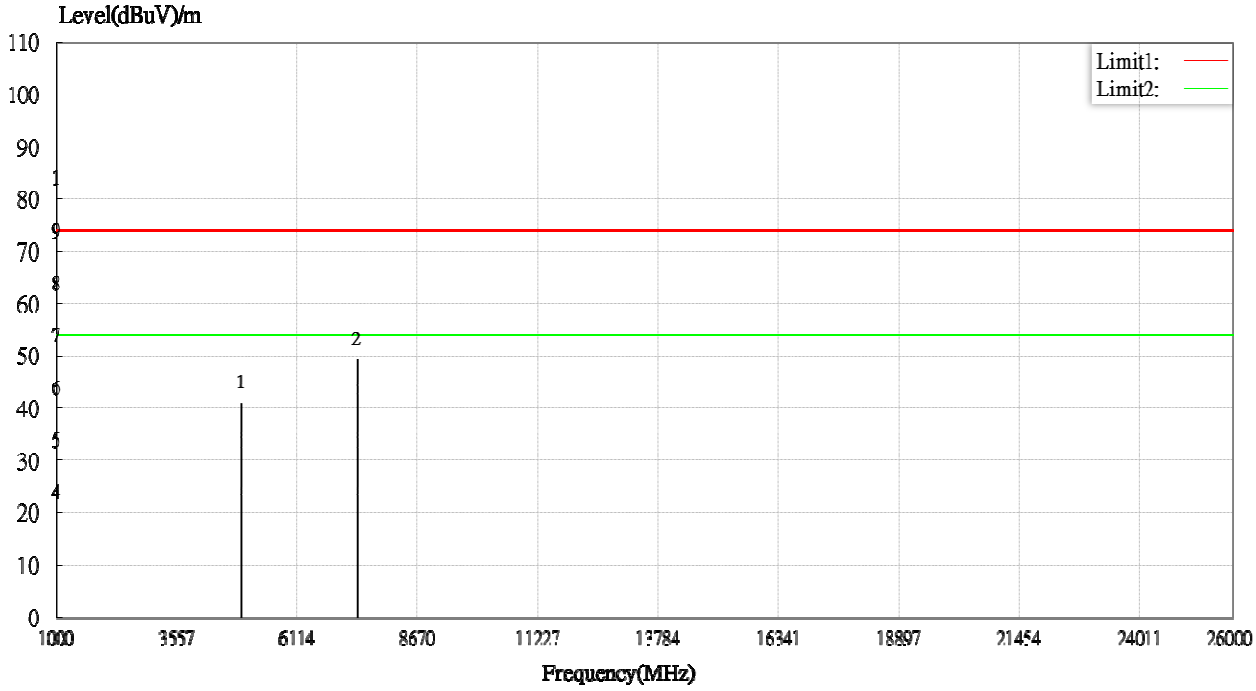
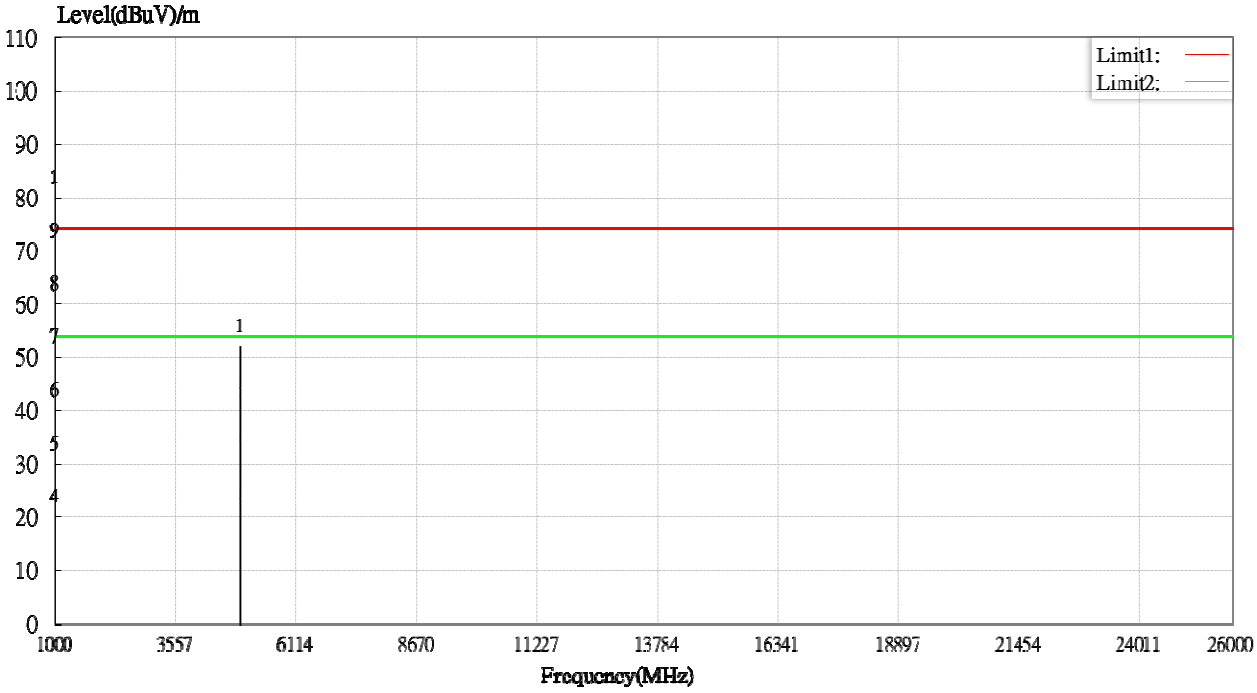


B mode 2462 MHz Vertical XOR

PK



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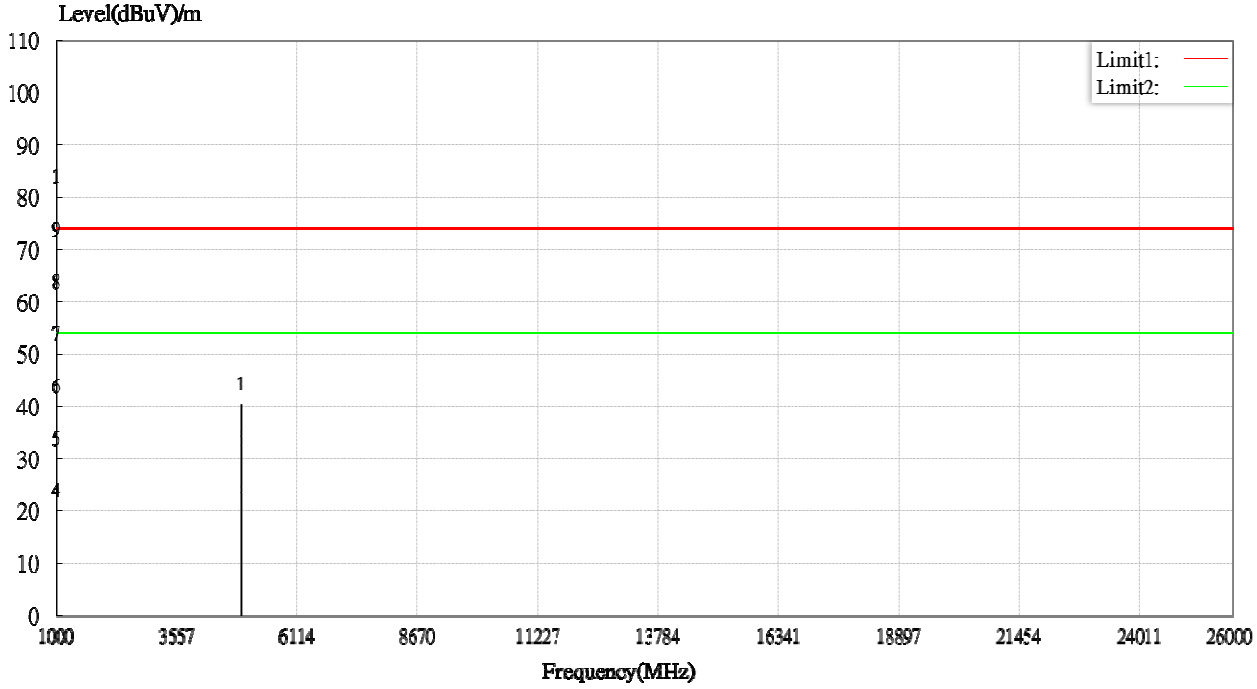
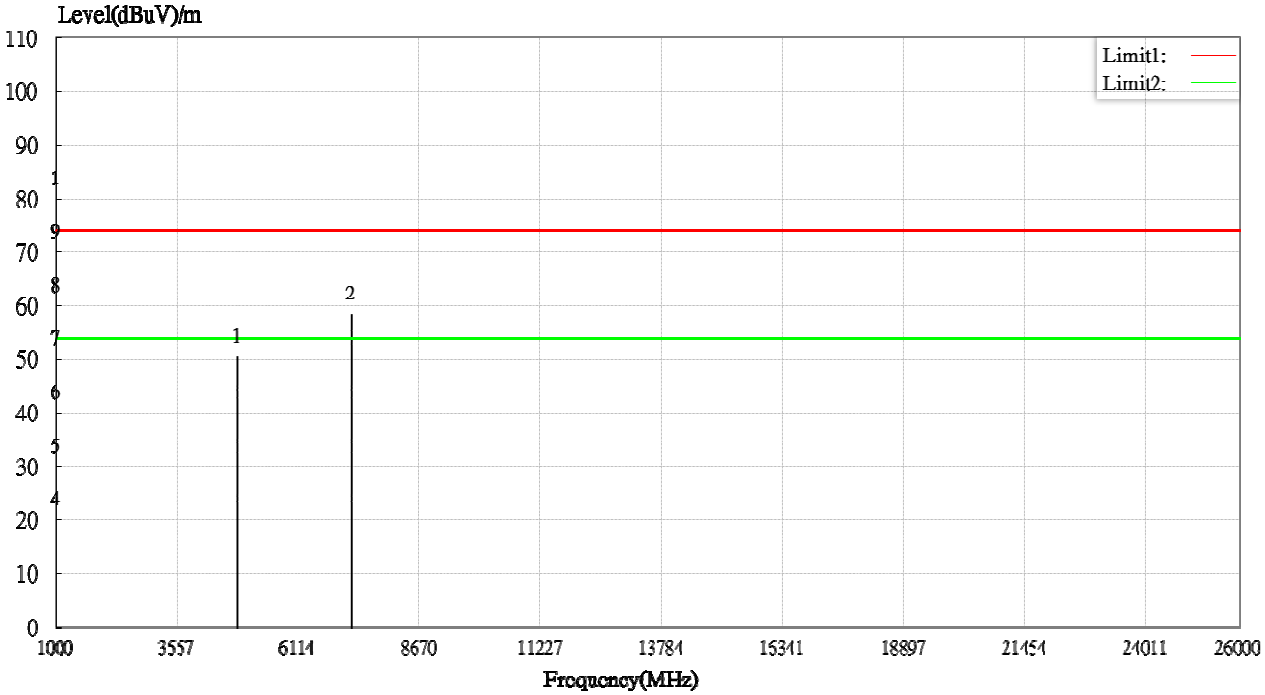


G mode 2412 MHz Horizontal XOR

PK



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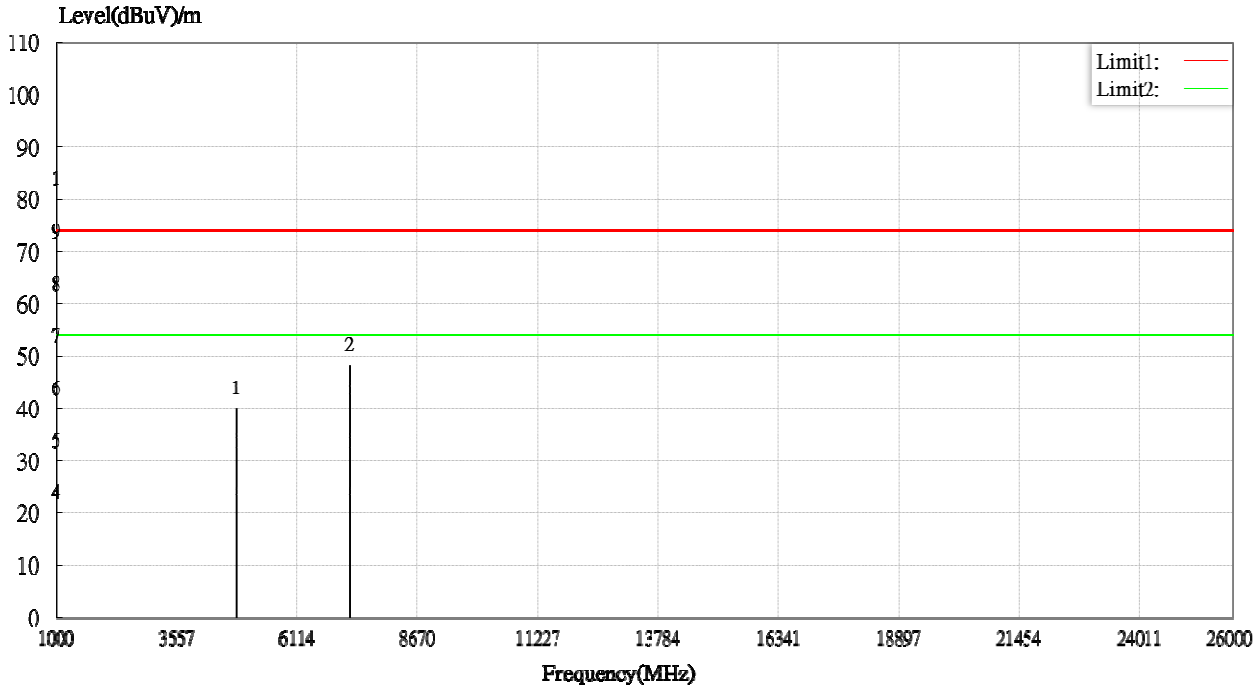
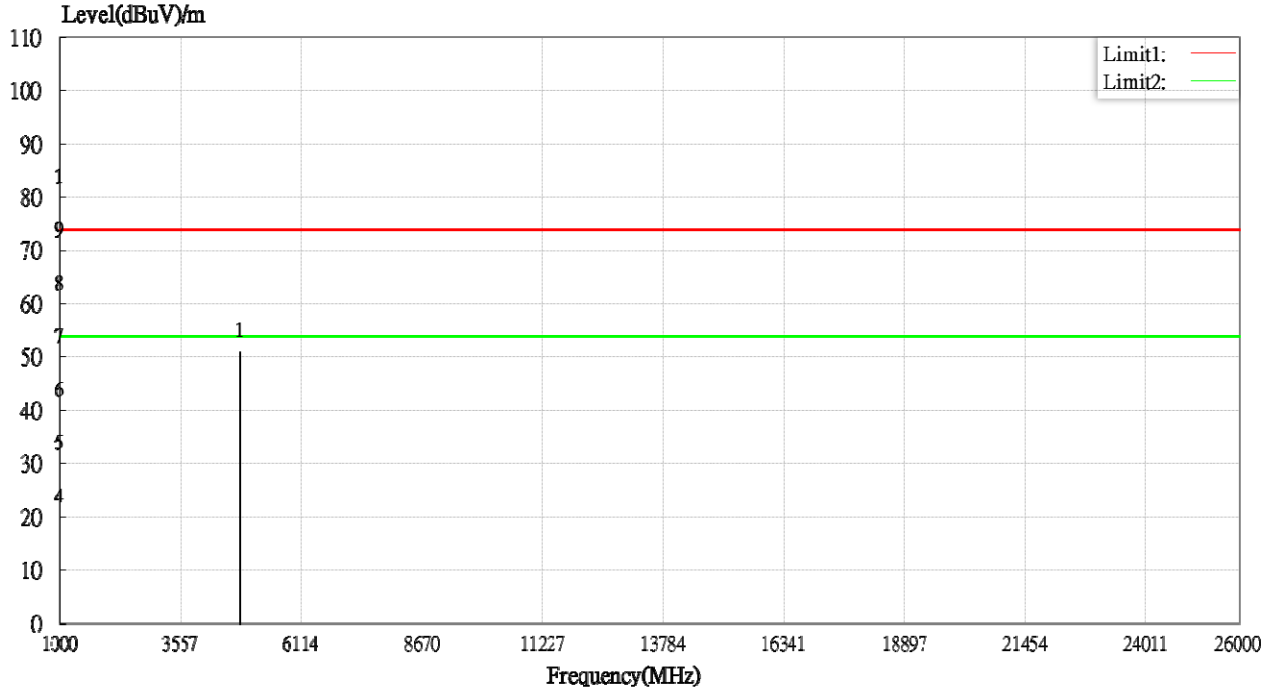


G mode 2412 MHz Vertical XOR

PK



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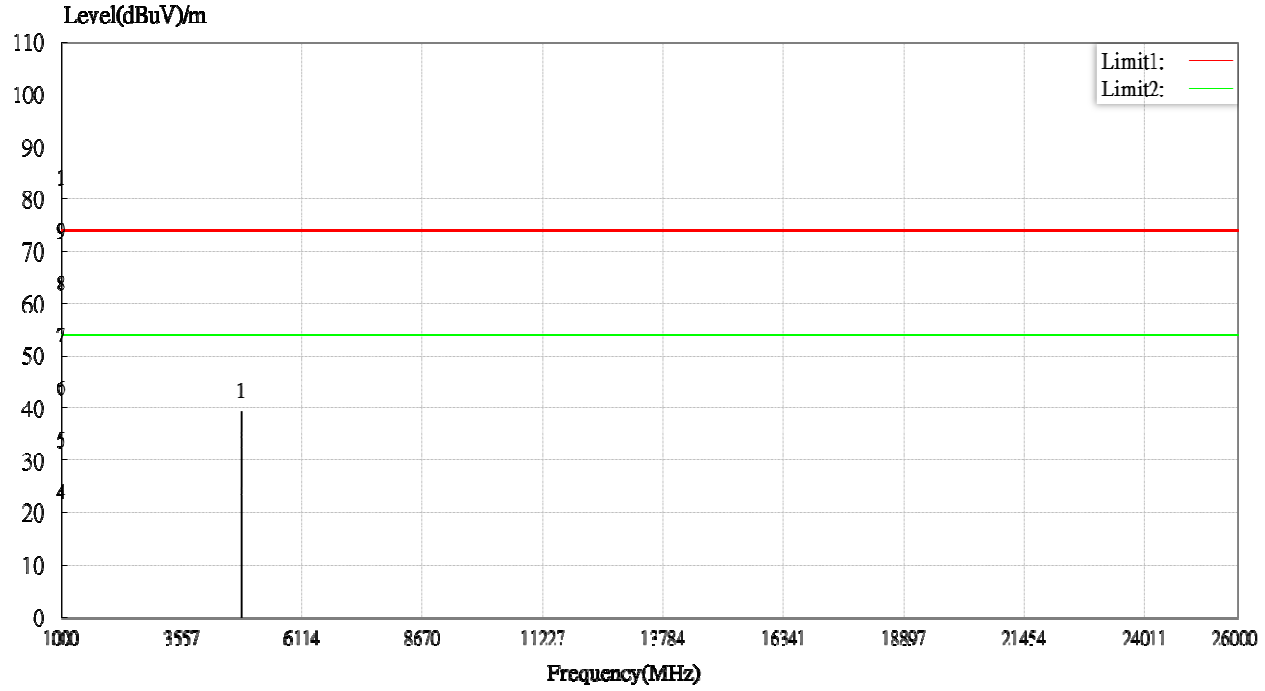
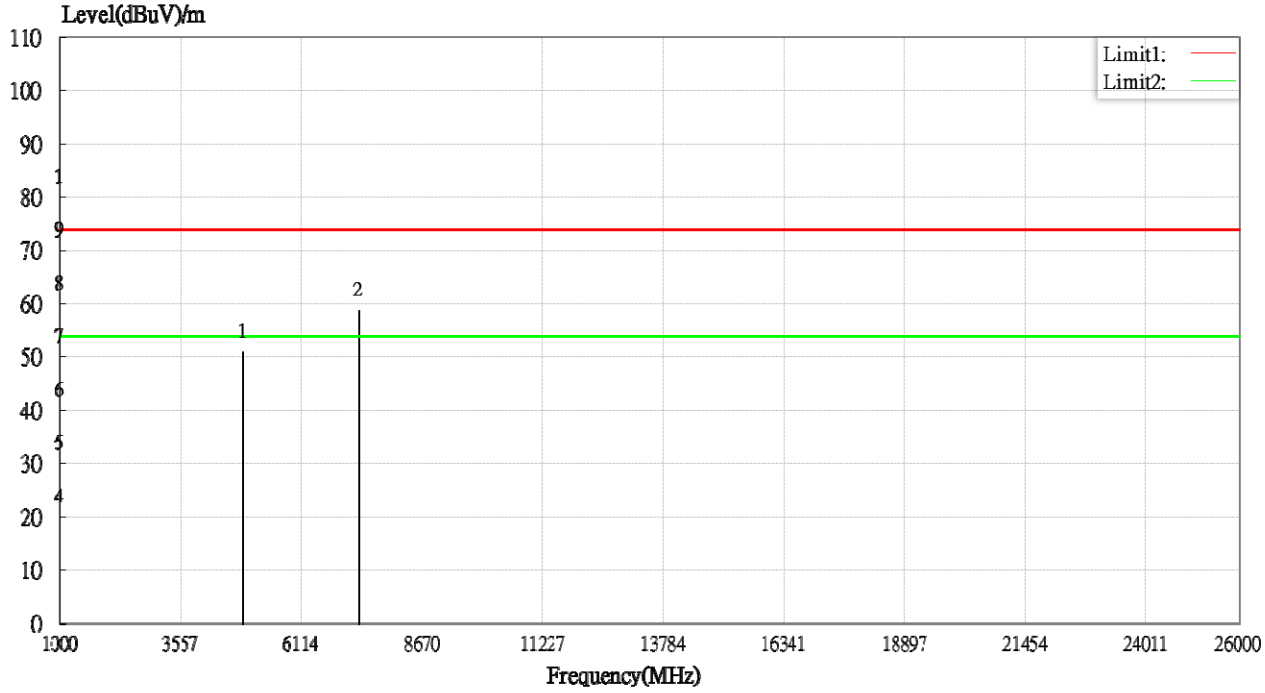


G mode 2442 MHz Horizontal XOR

PK



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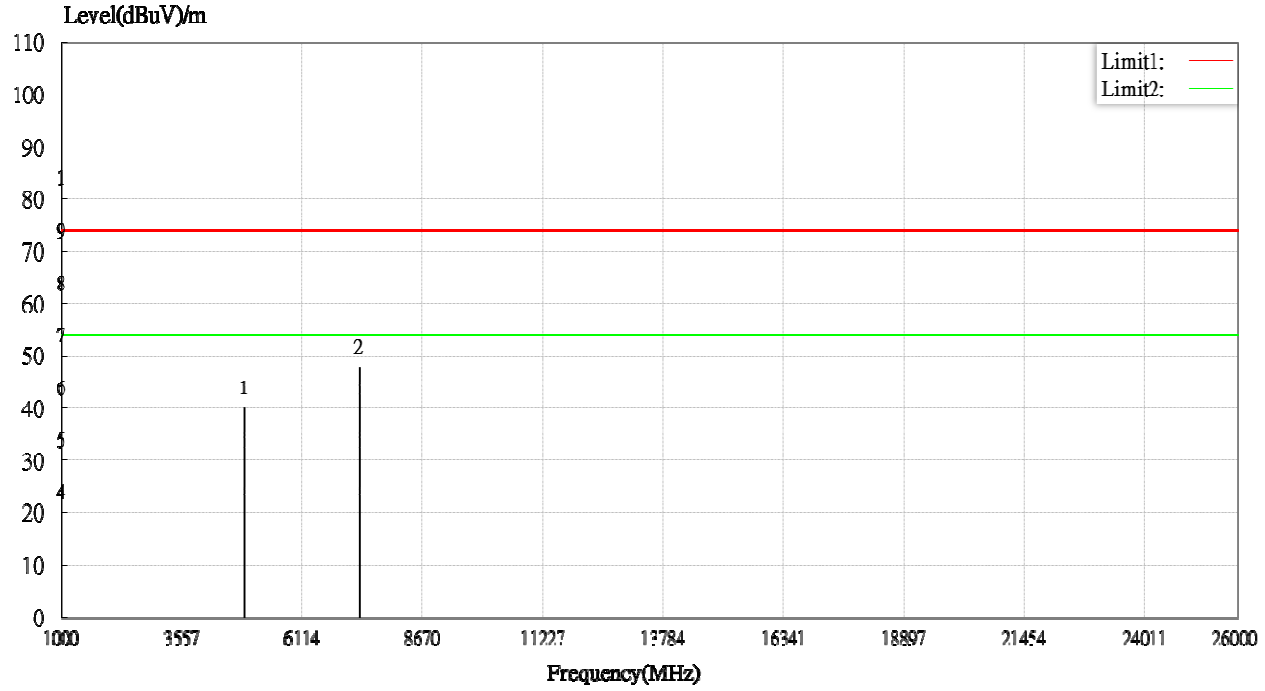
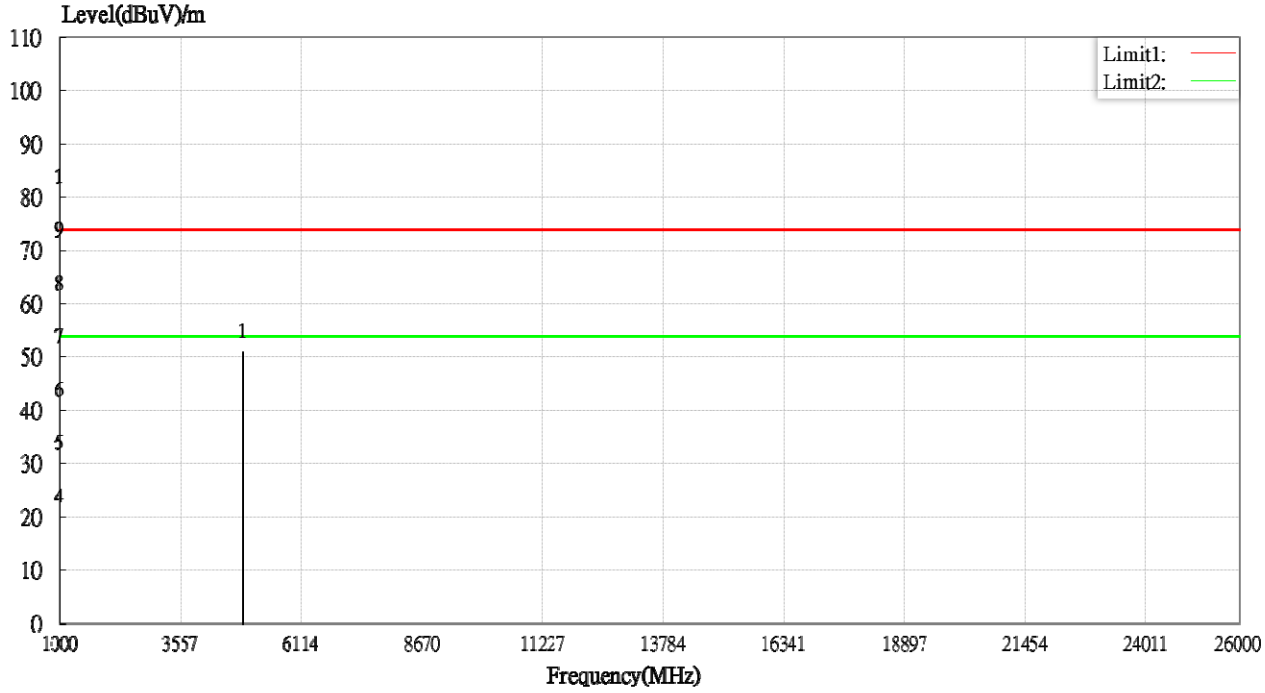


G mode 2442 MHz Vertical XOR

PK



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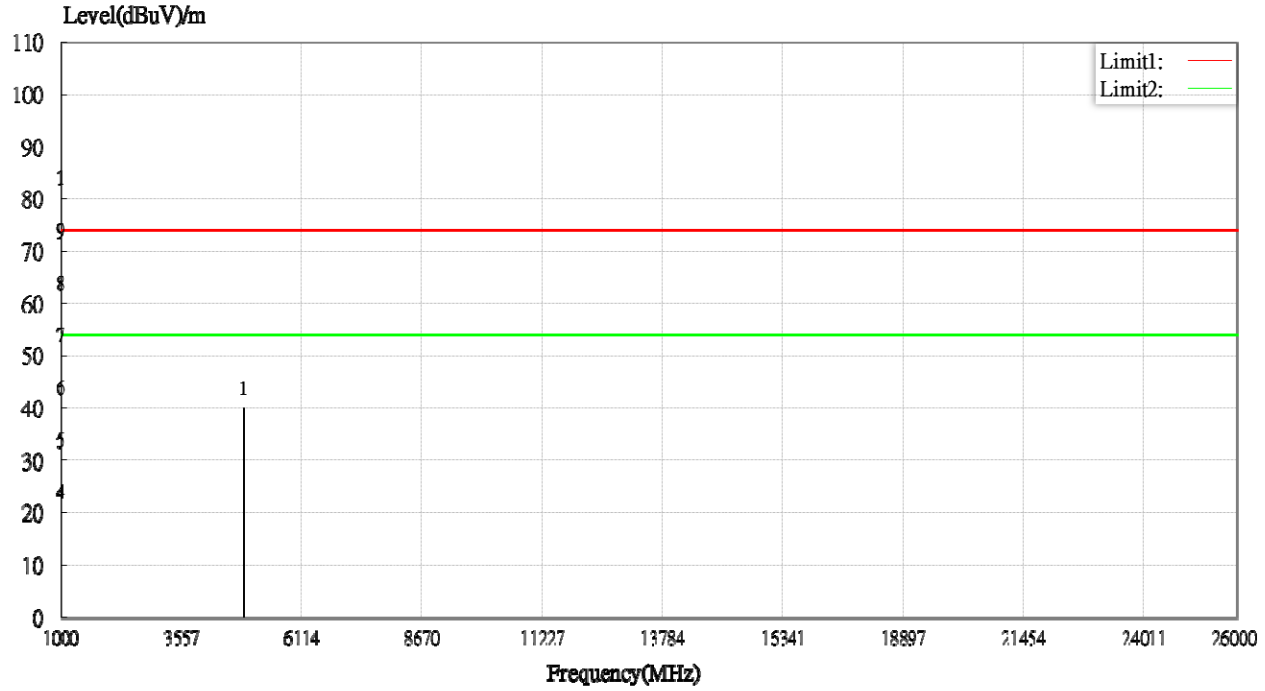
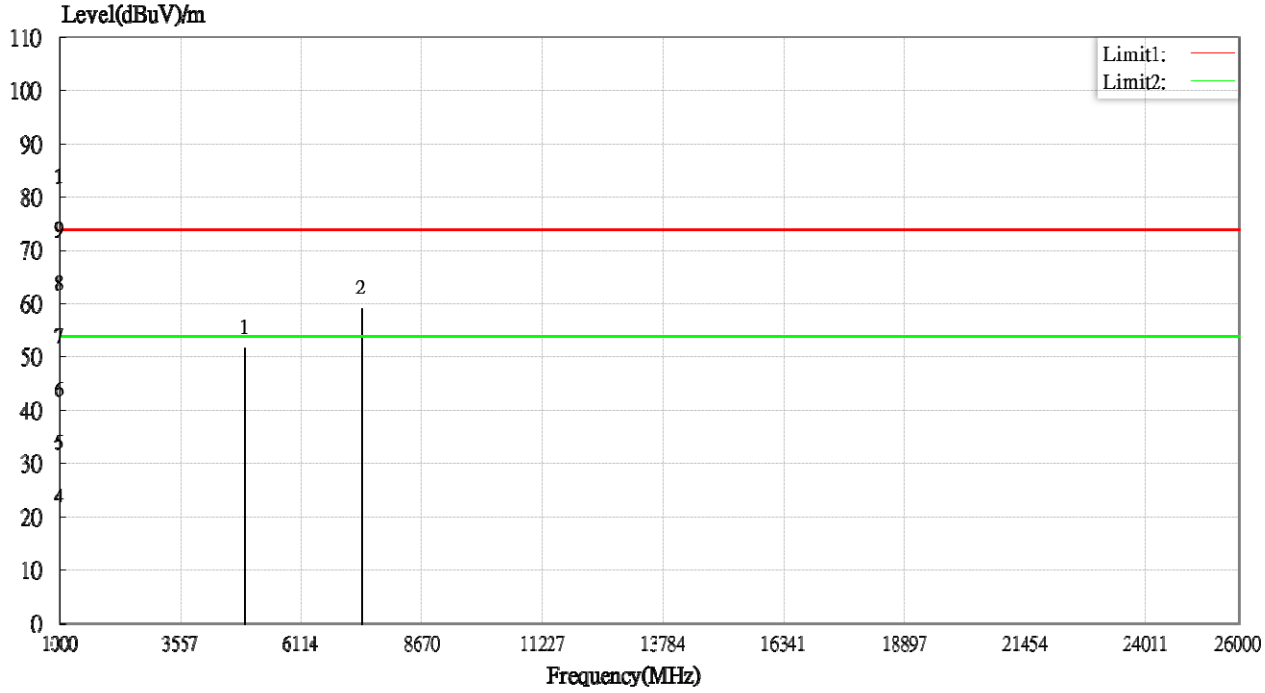


G mode 2462 MHz Horizontal XOR

PK



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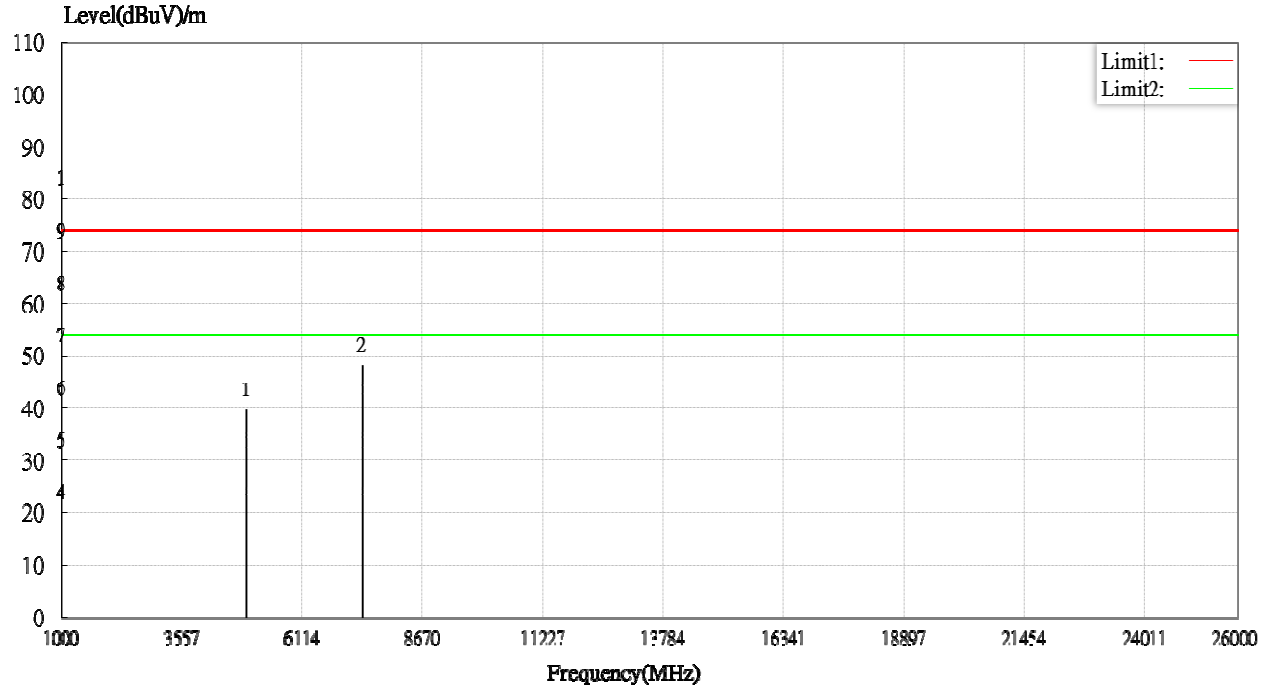
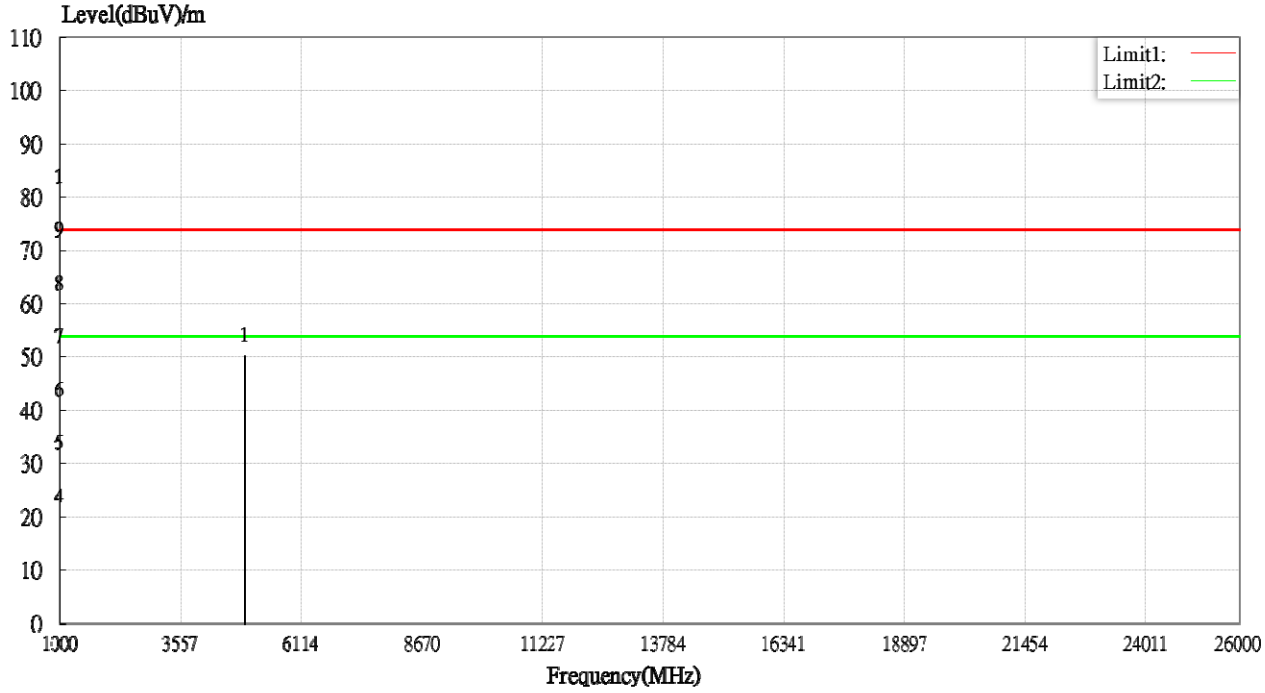


G mode 2462 MHz Vertical XOR

PK



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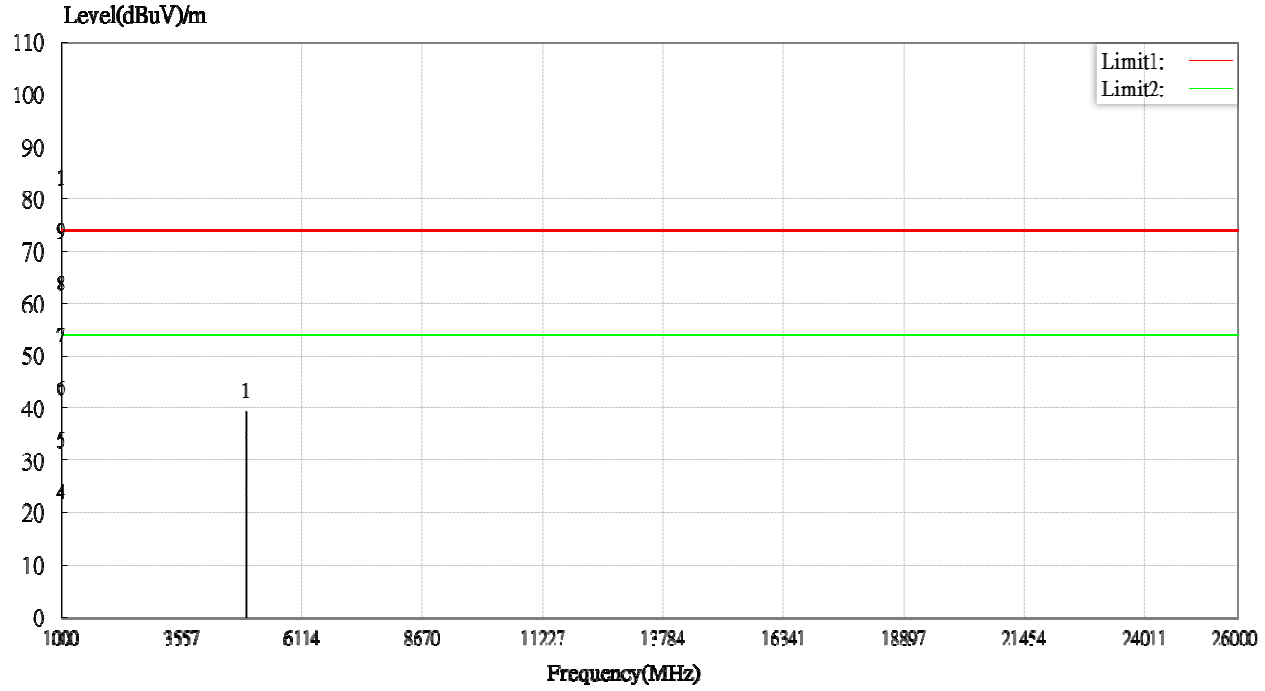
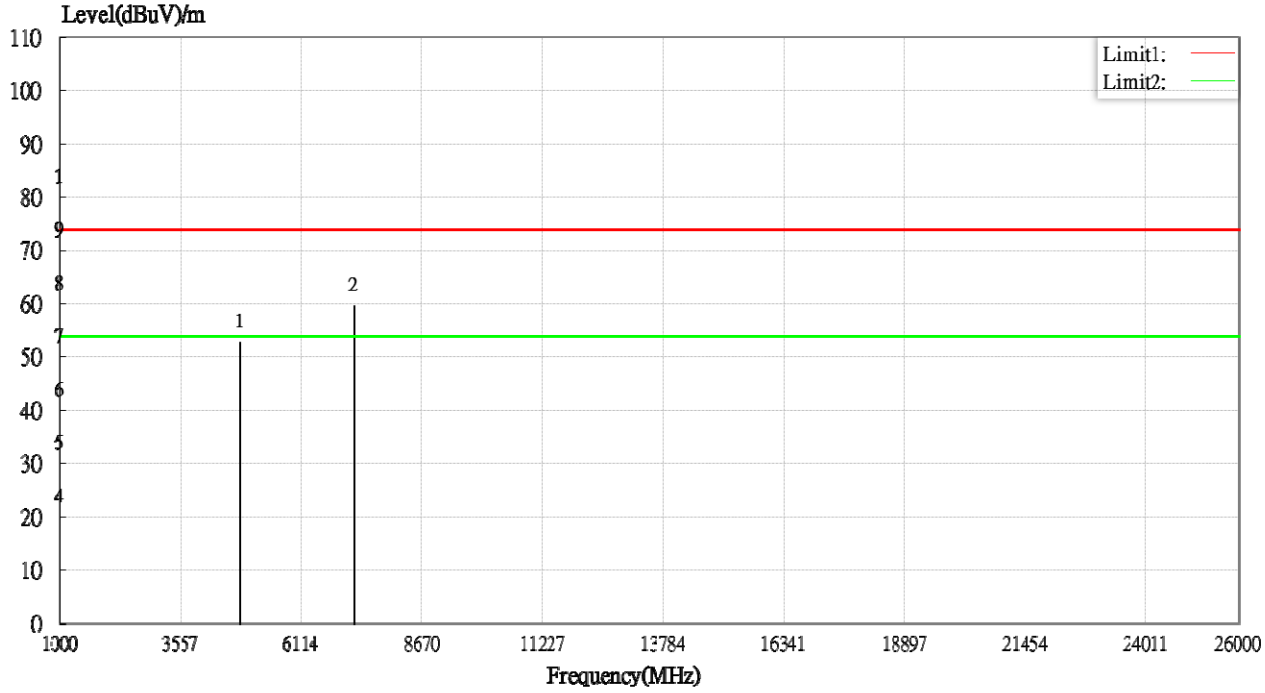
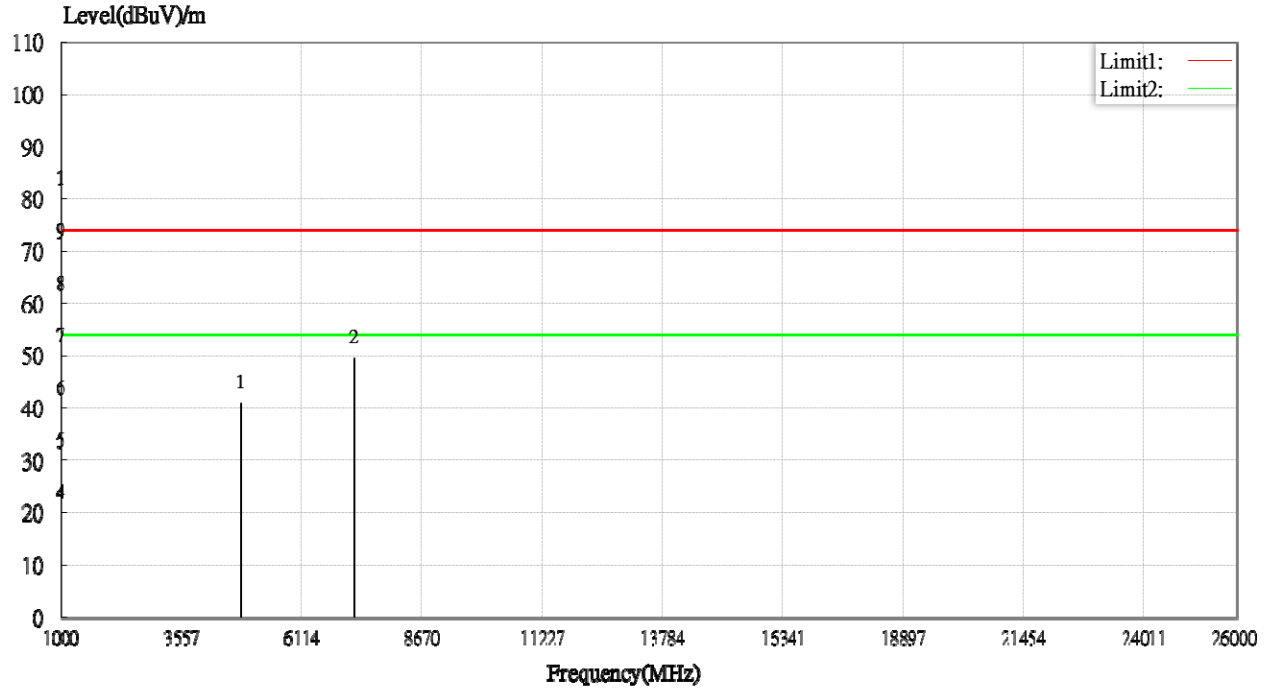


N20 mode 2412 MHz Horizontal XOR

PK

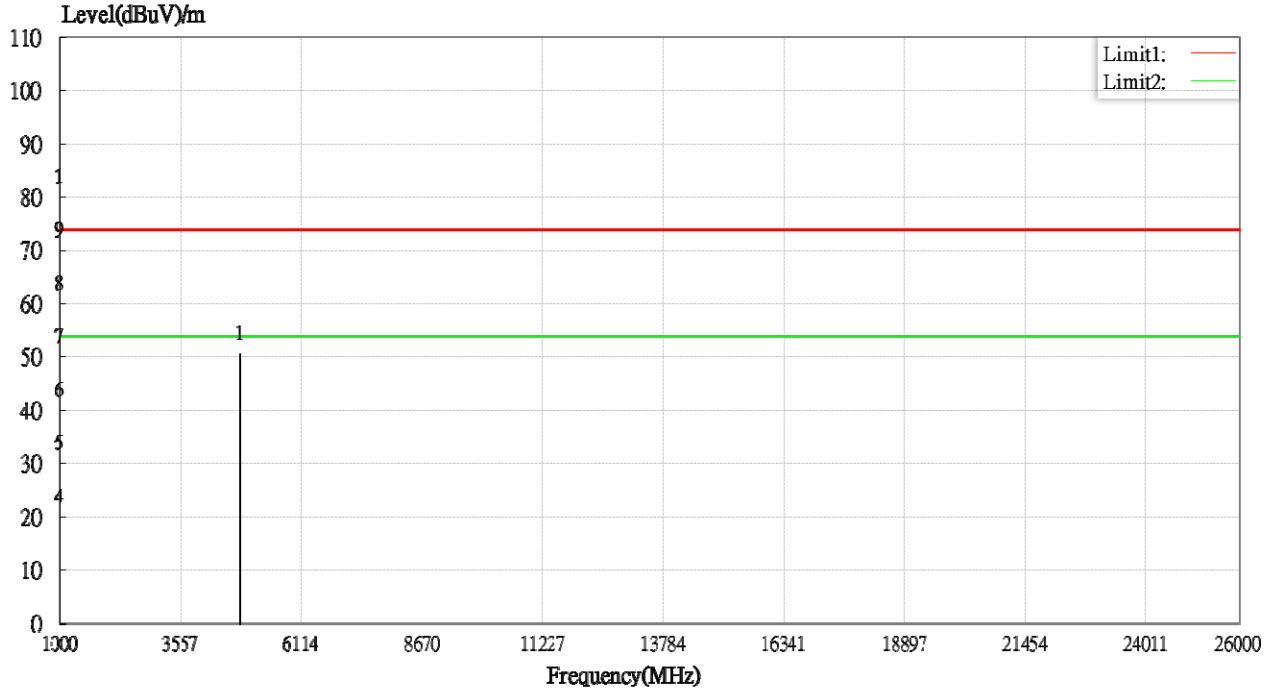


AVG



N20 mode 2412 MHz Vertical XOR

PK



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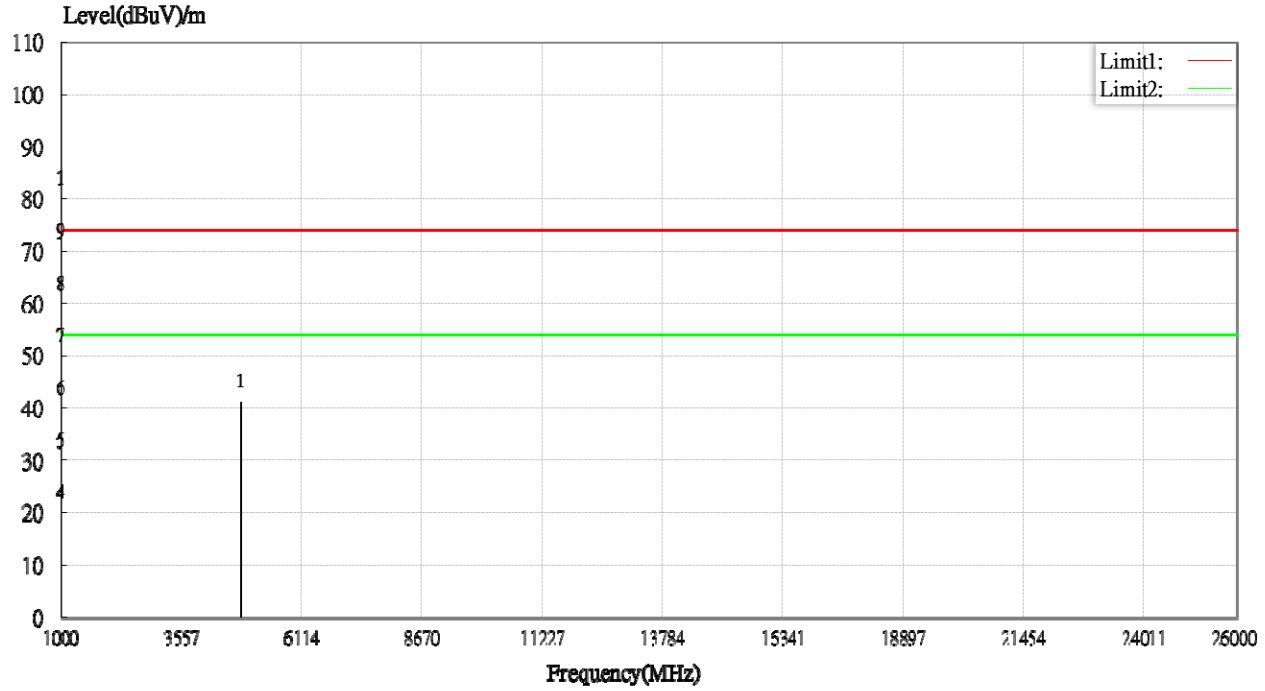

N20 mode 2442 MHz Horizontal XOR

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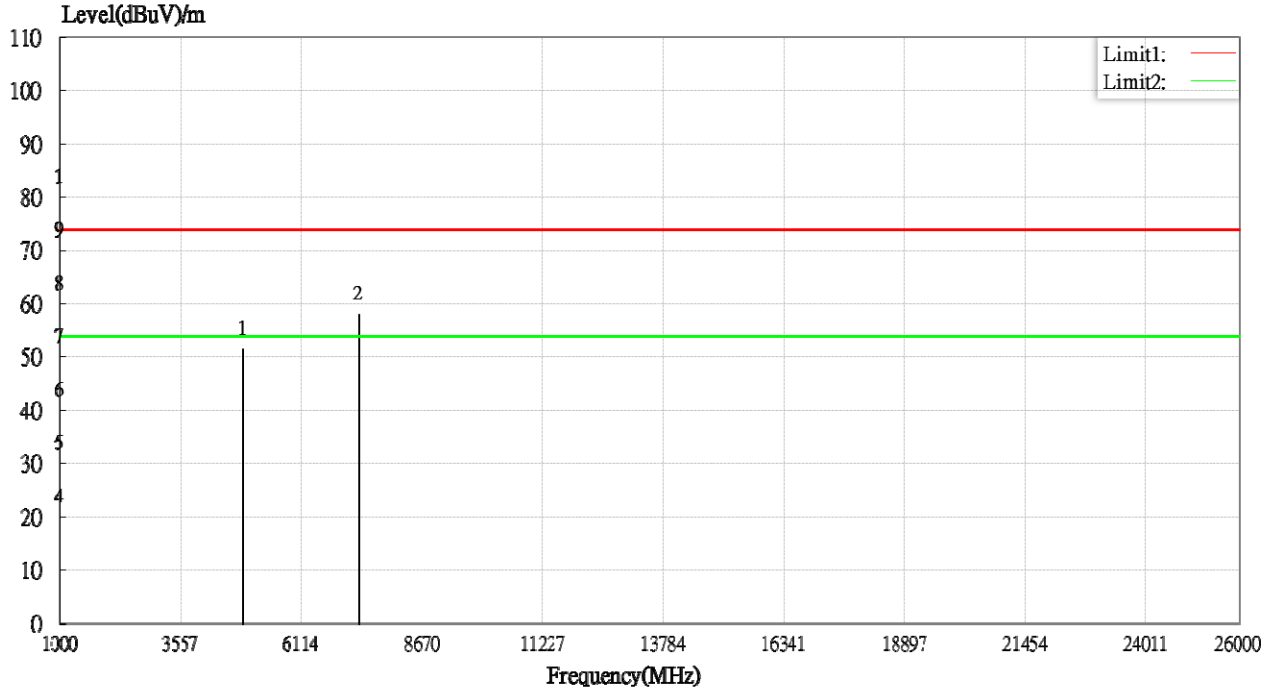

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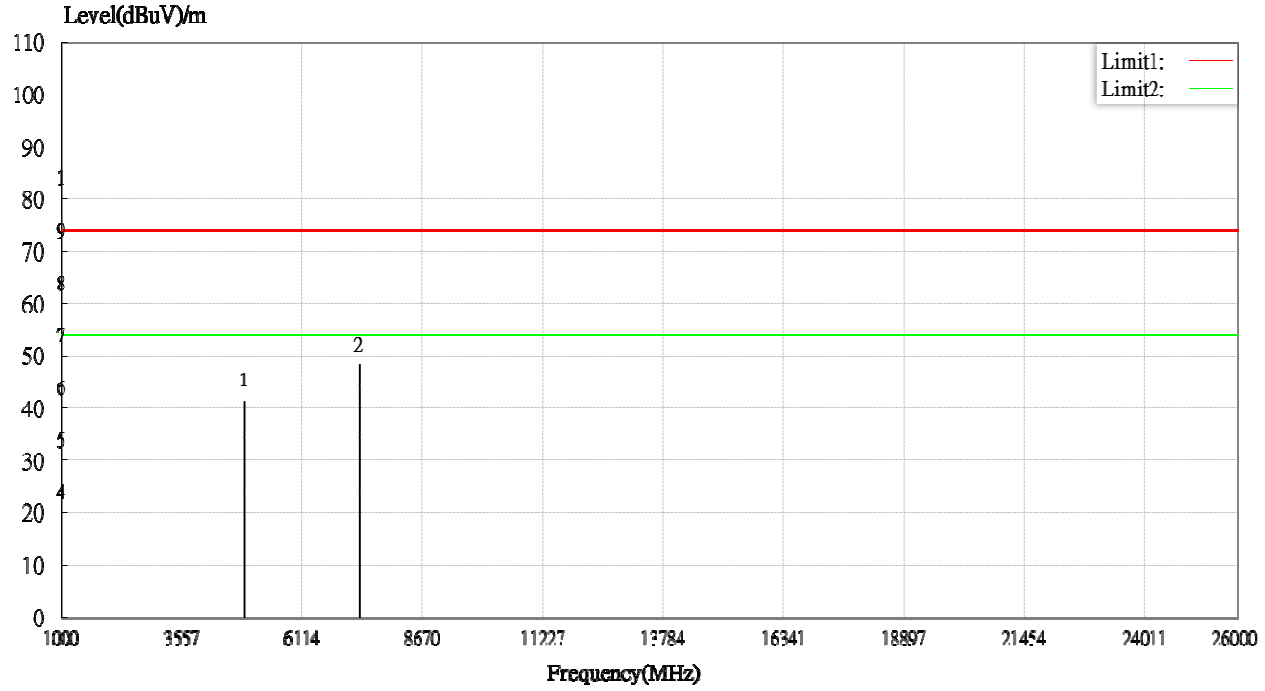

N20 mode 2442 MHz Vertical XOR

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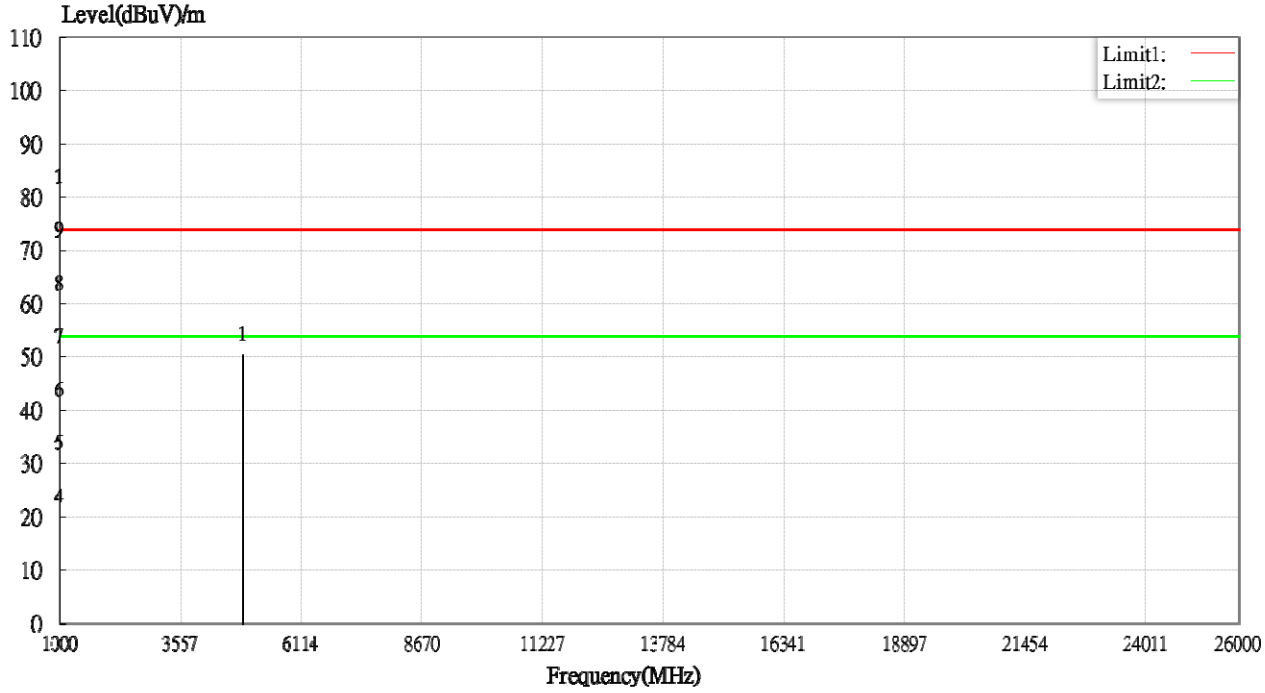

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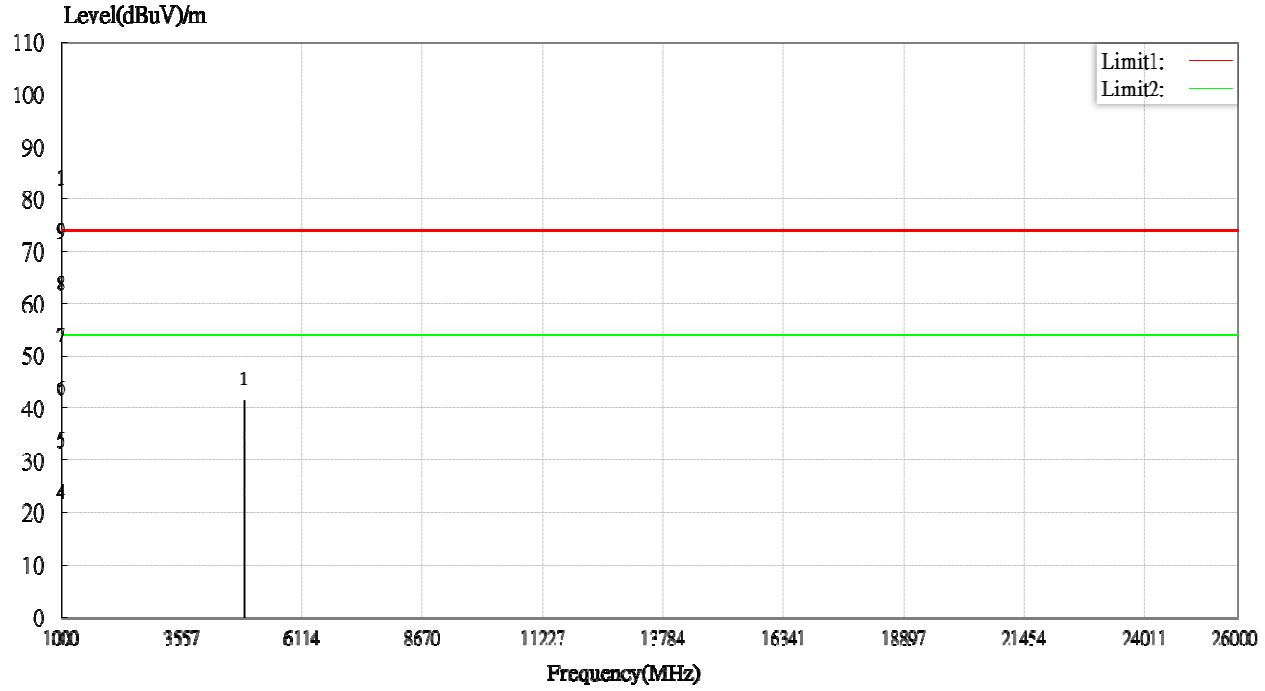

N20 mode 2462 MHz Horizontal XOR

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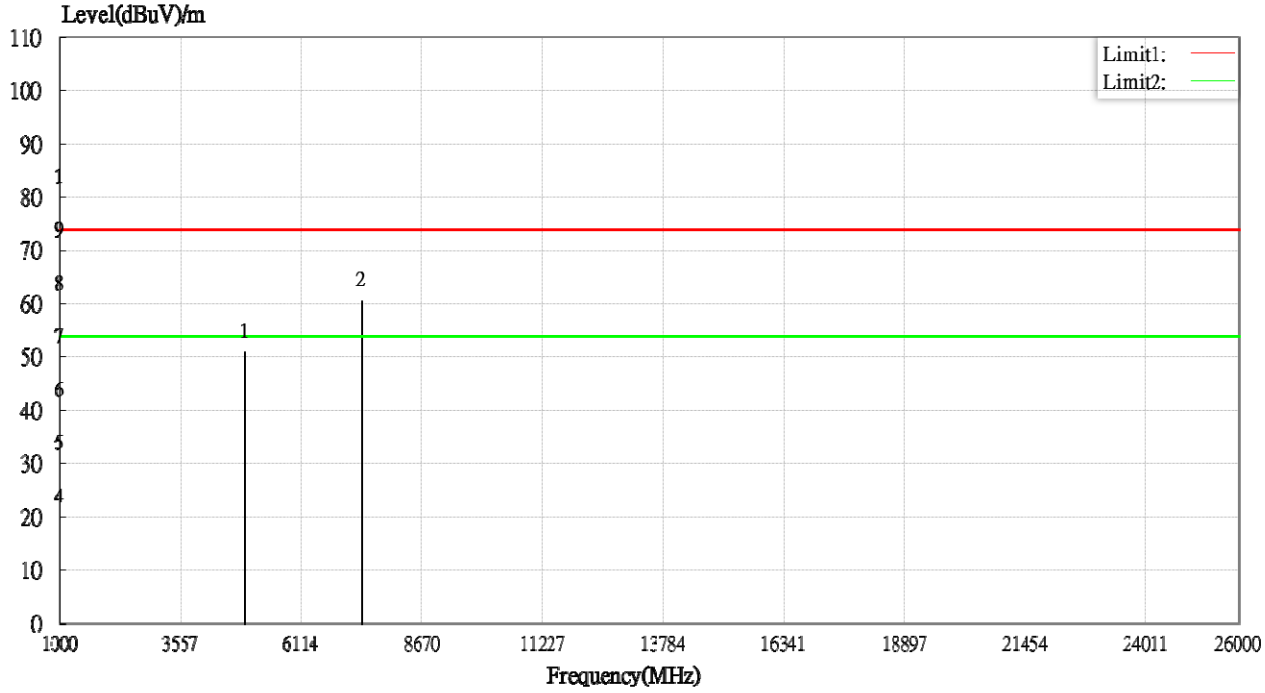

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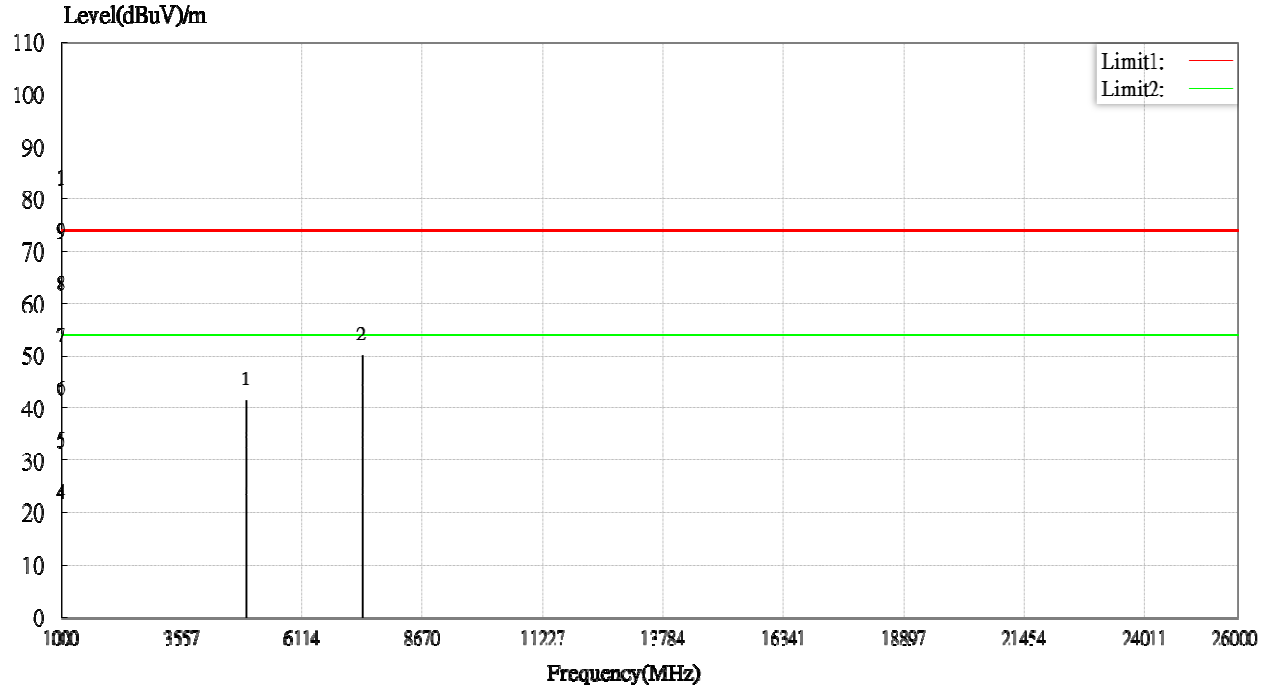

N20 mode 2462 MHz Vertical XOR

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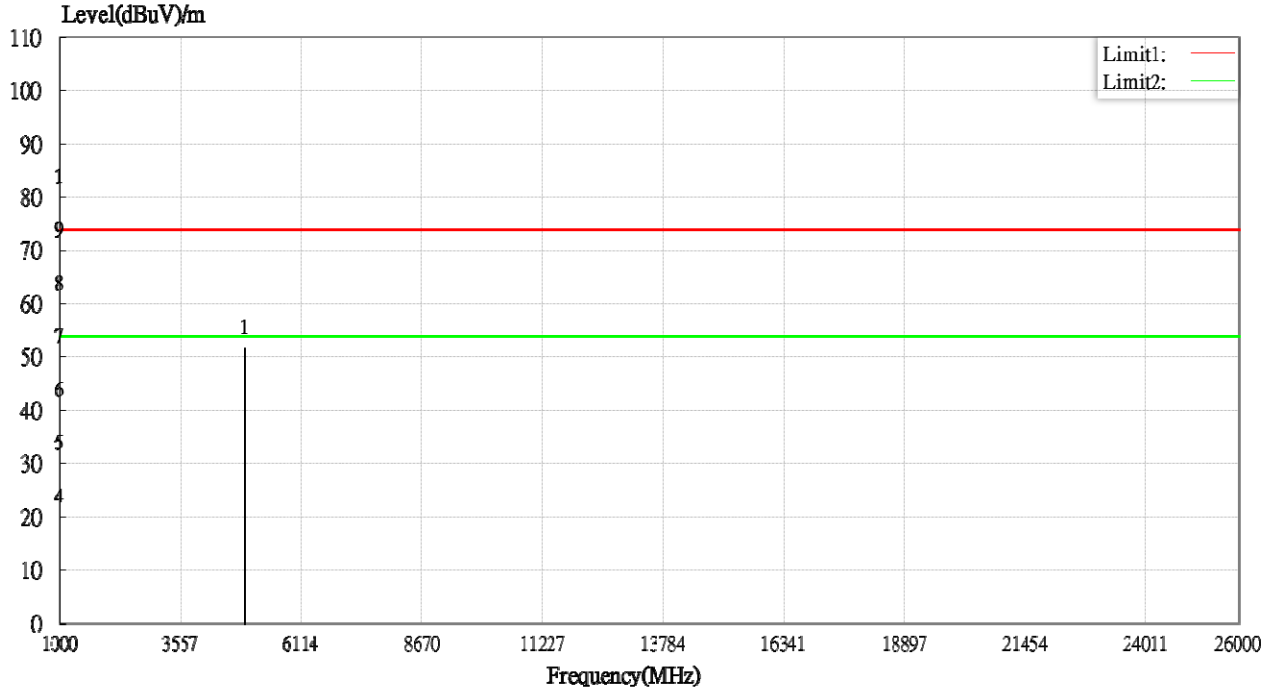

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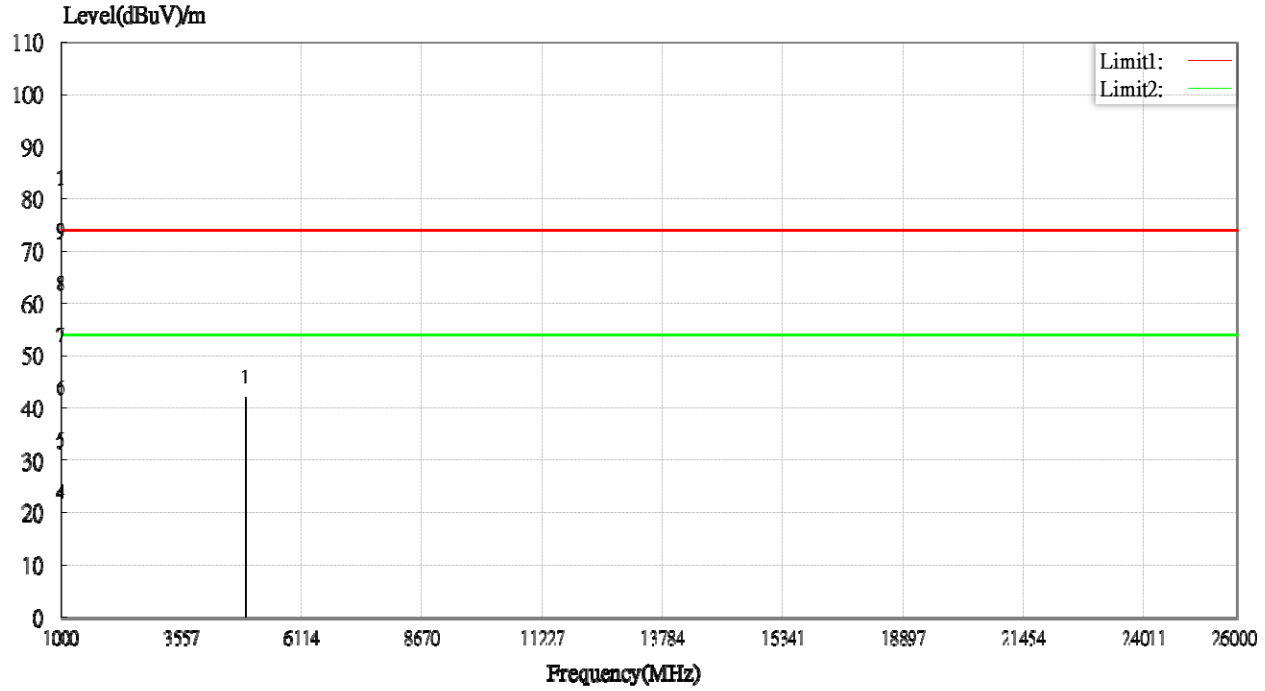

Ax20 mode 2412 MHz Horizontal XOR

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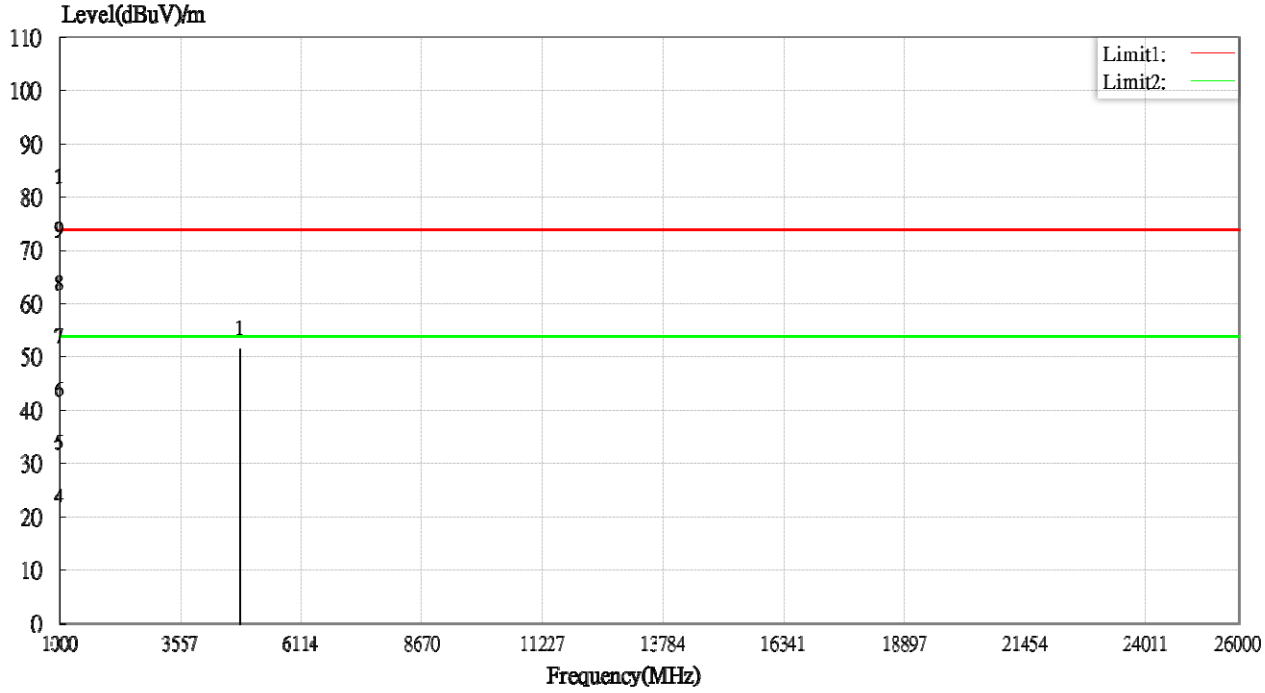

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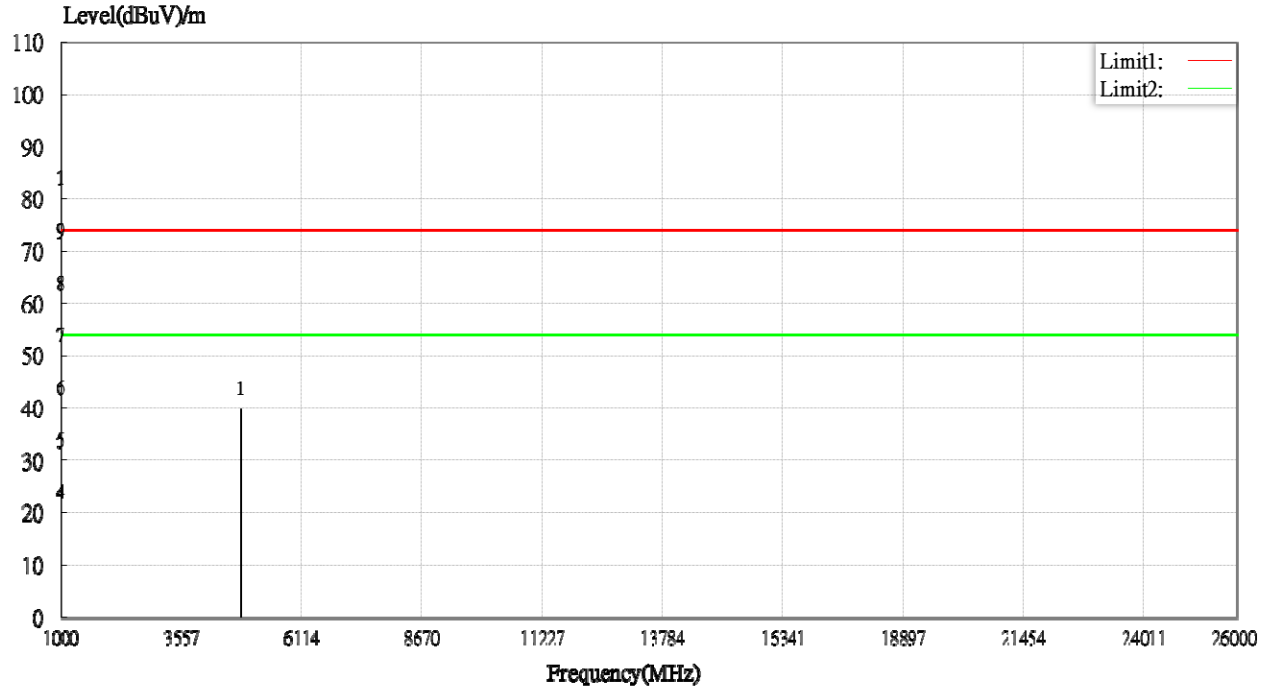

Ax20 mode 2412 MHz Vertical XOR

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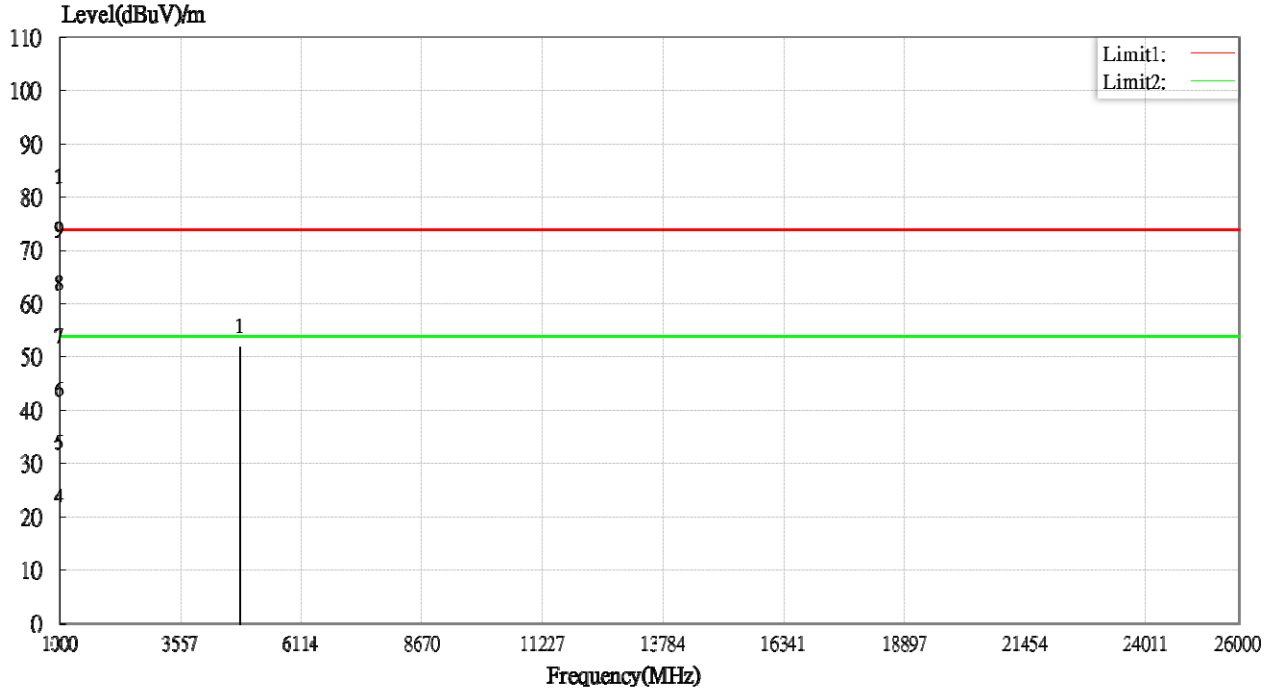

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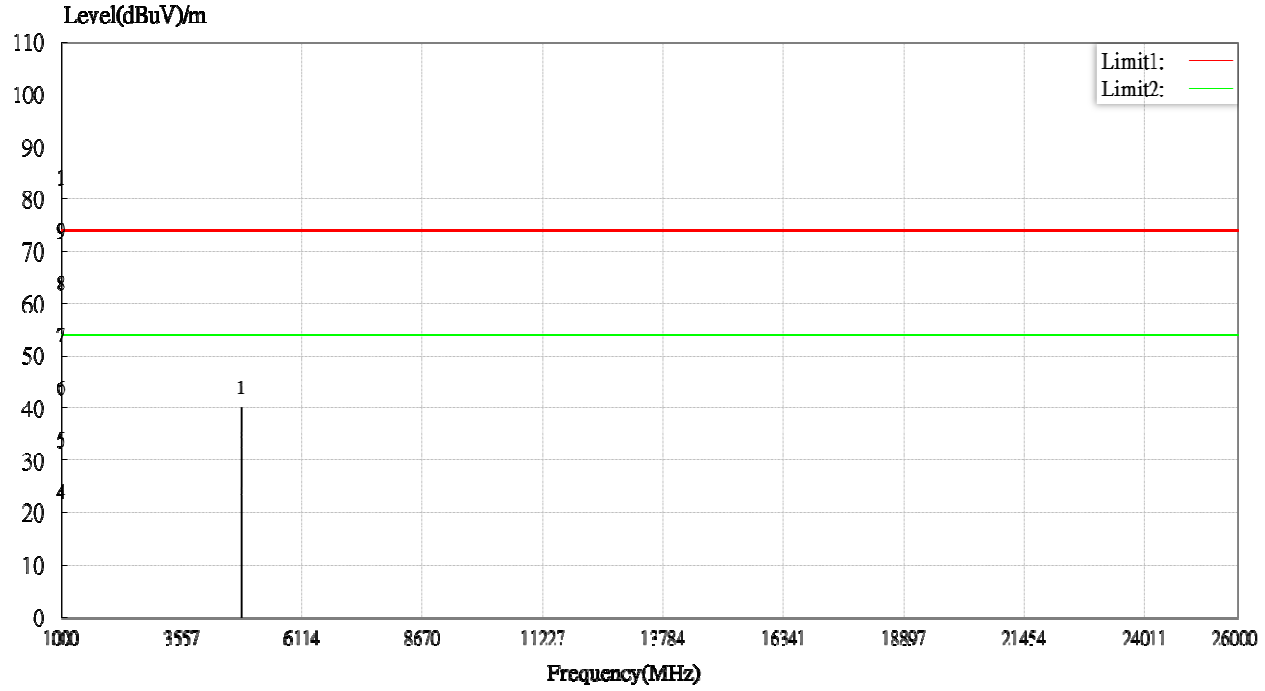
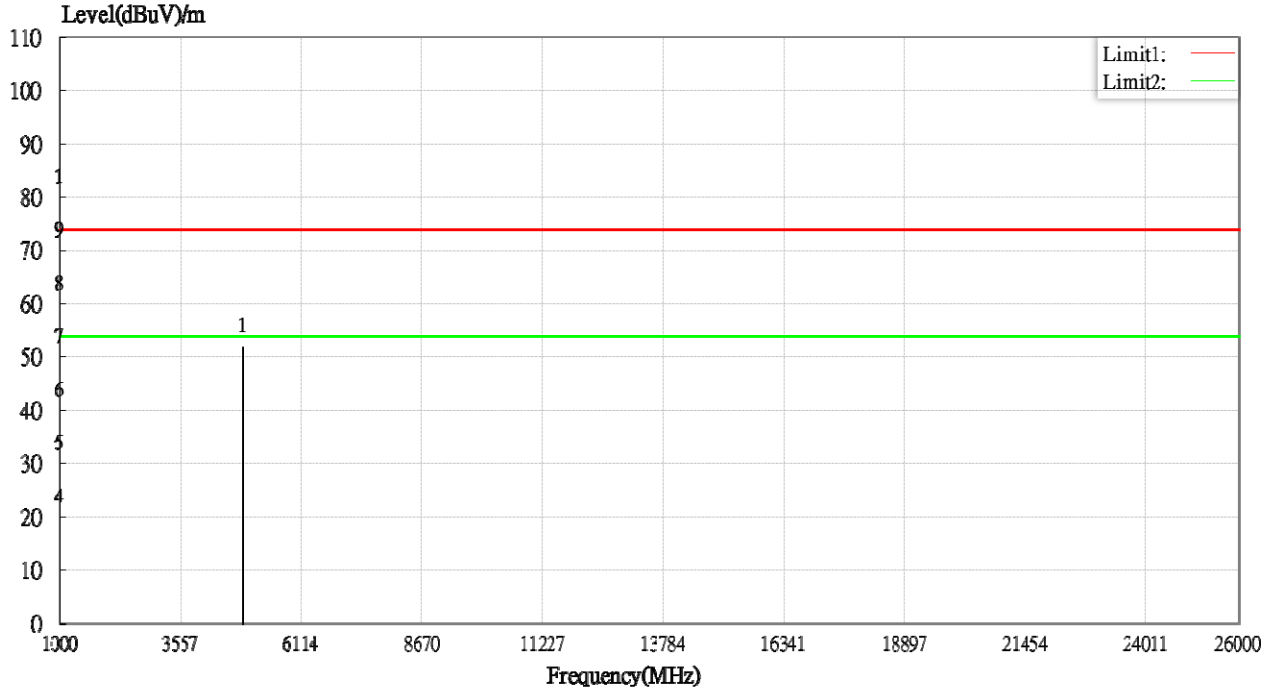
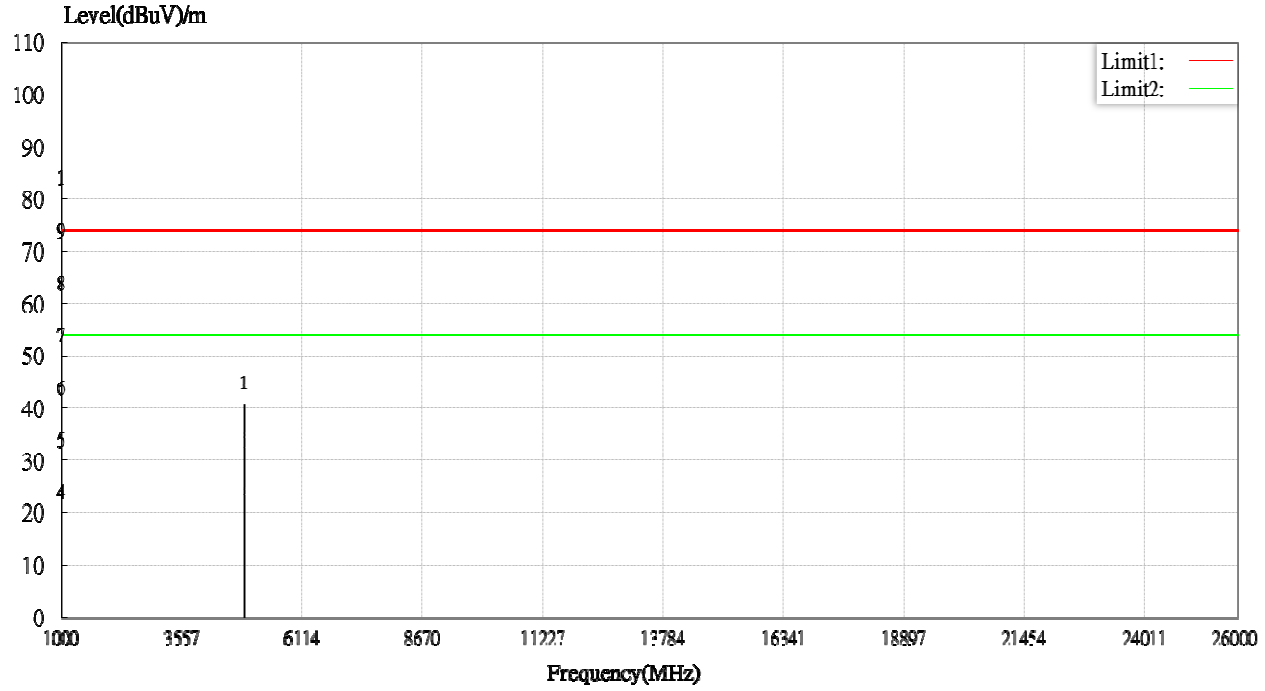


Ax20 mode 2442 MHz Horizontal XOR

PK

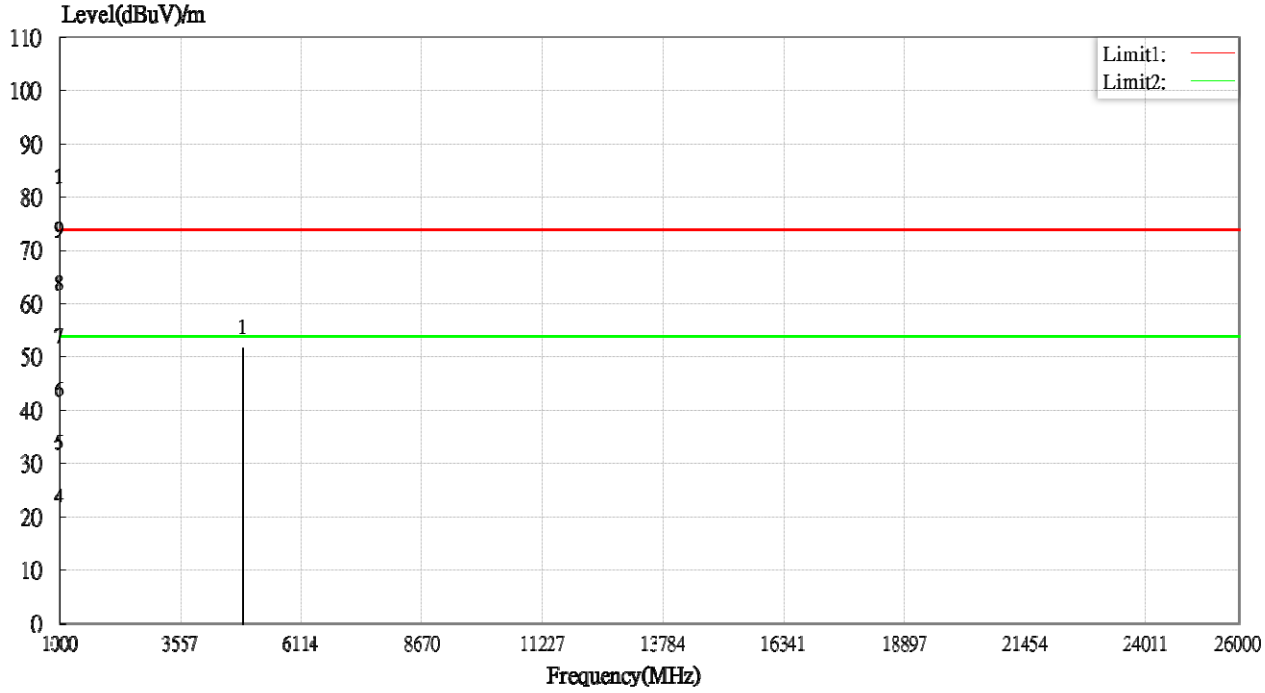


AVG

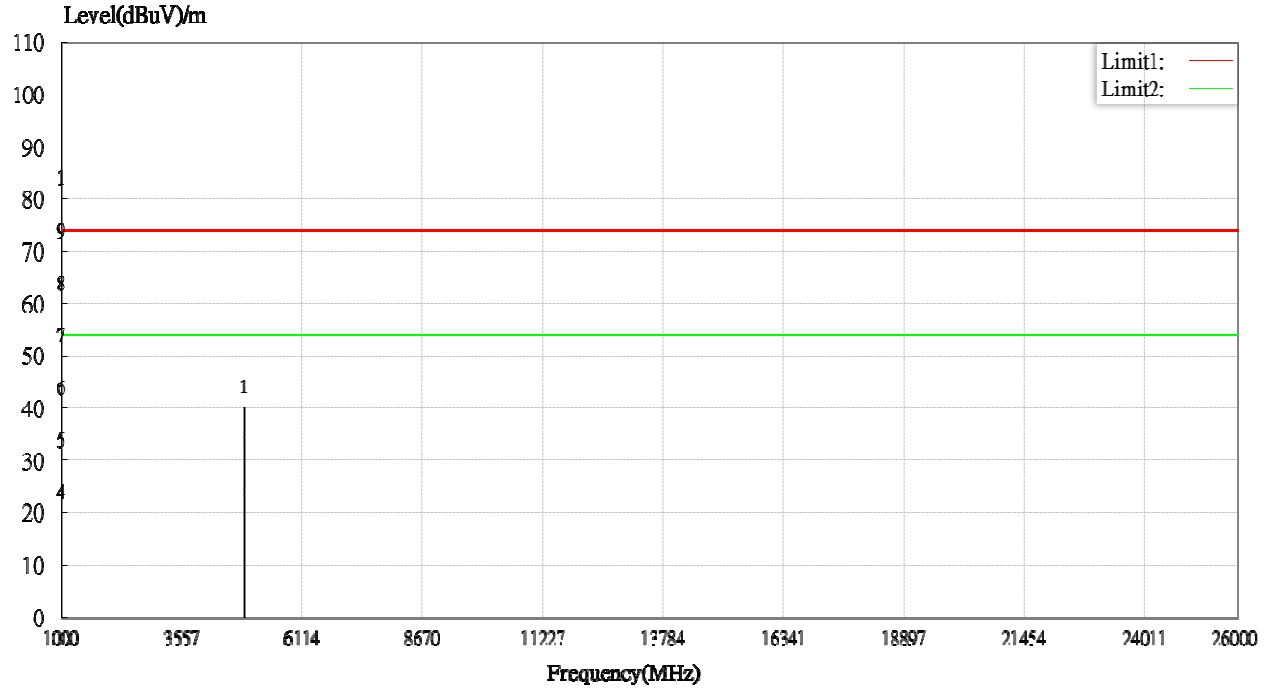


Ax20 mode 2442 MHz Vertical XOR

PK



AVG



Ax20 mode 2462 MHz Horizontal XOR

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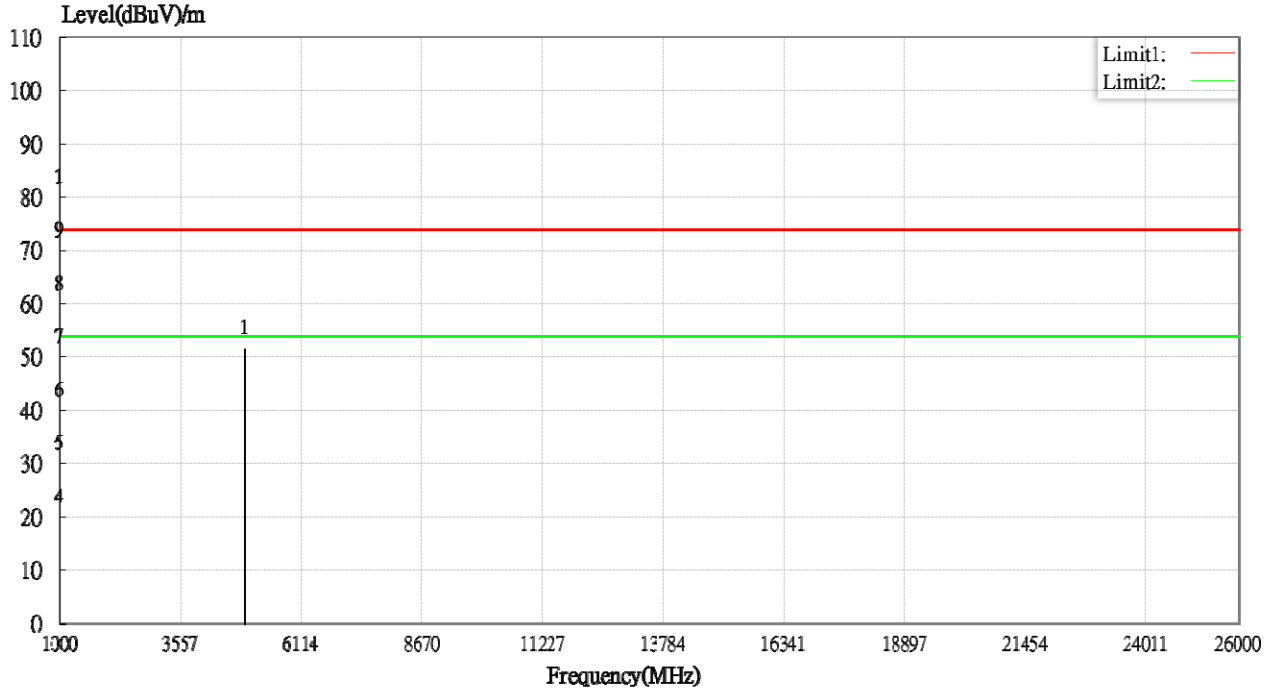

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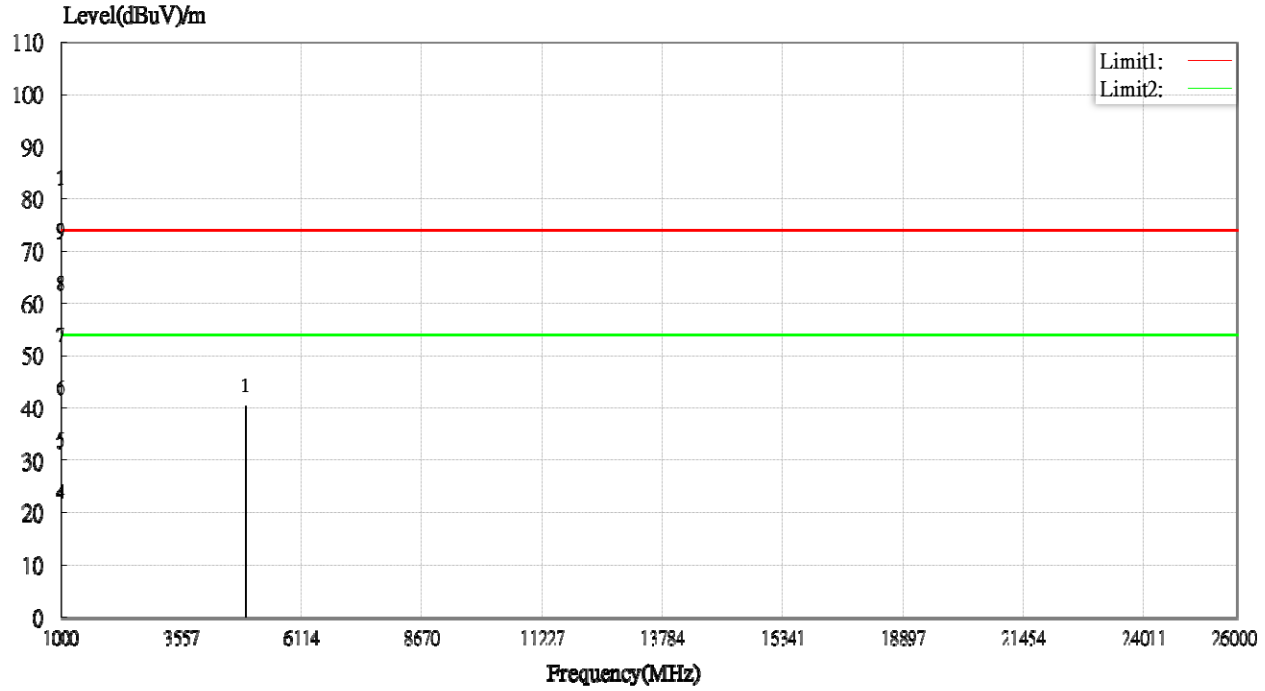

Ax20 mode 2462 MHz Vertical XOR

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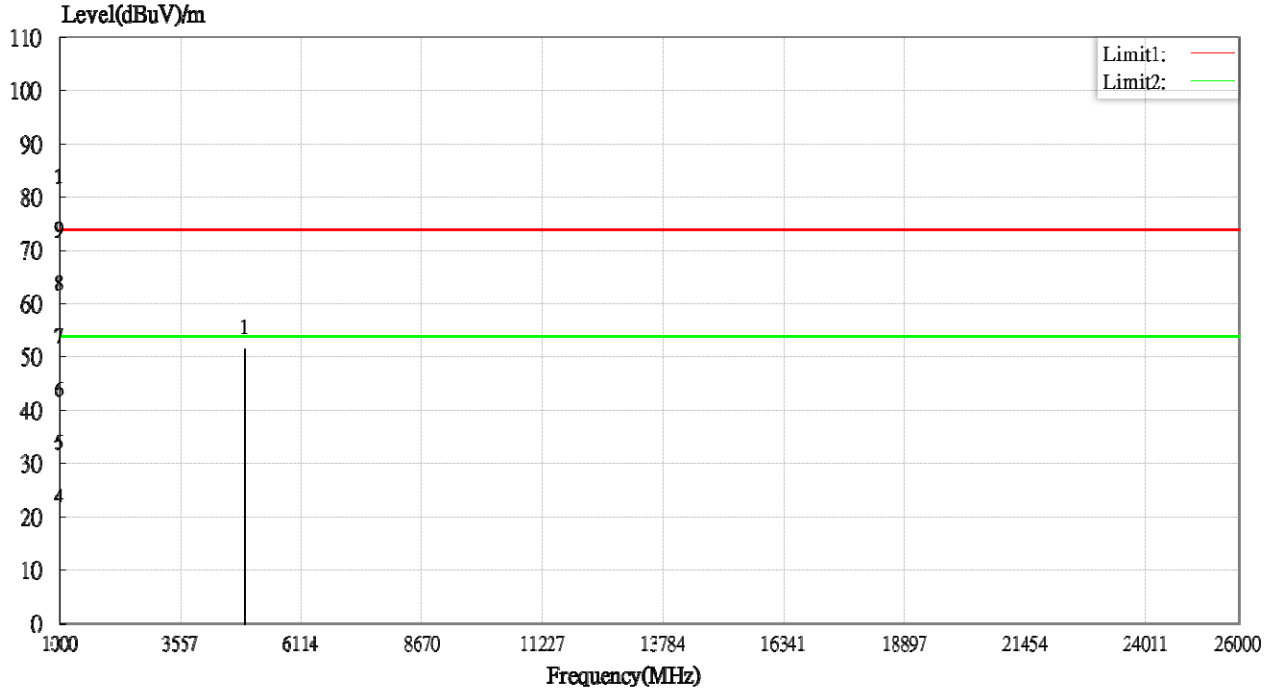

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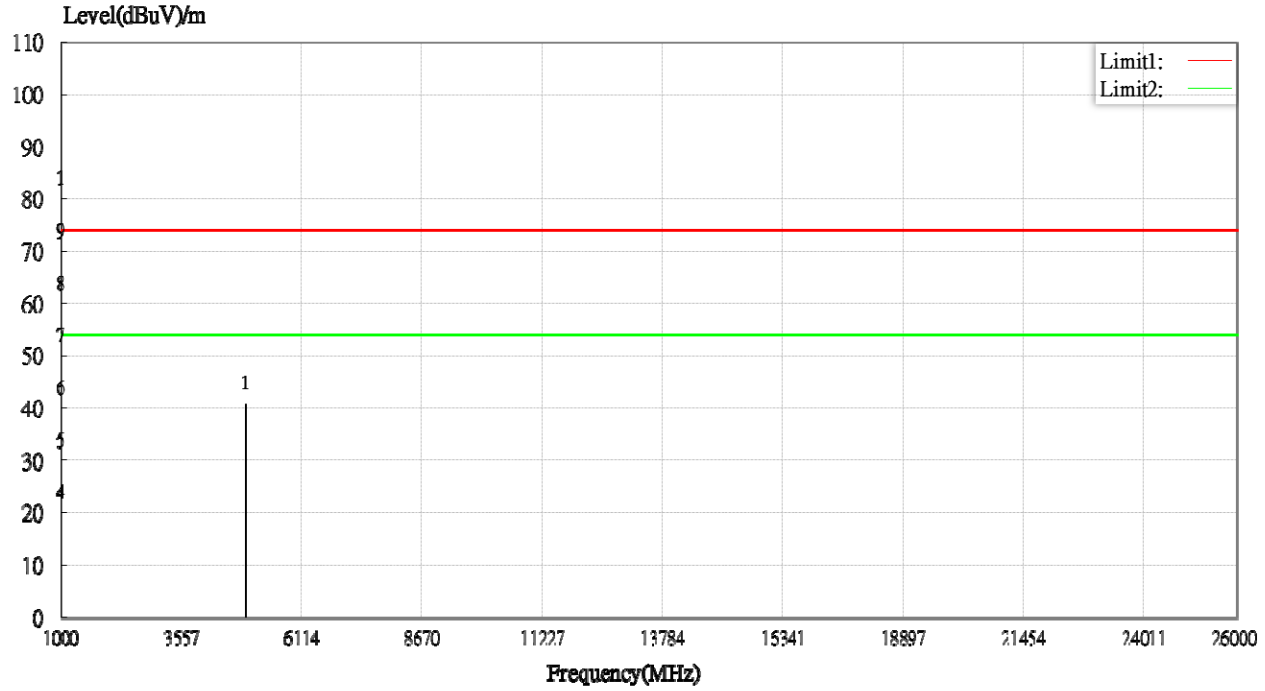
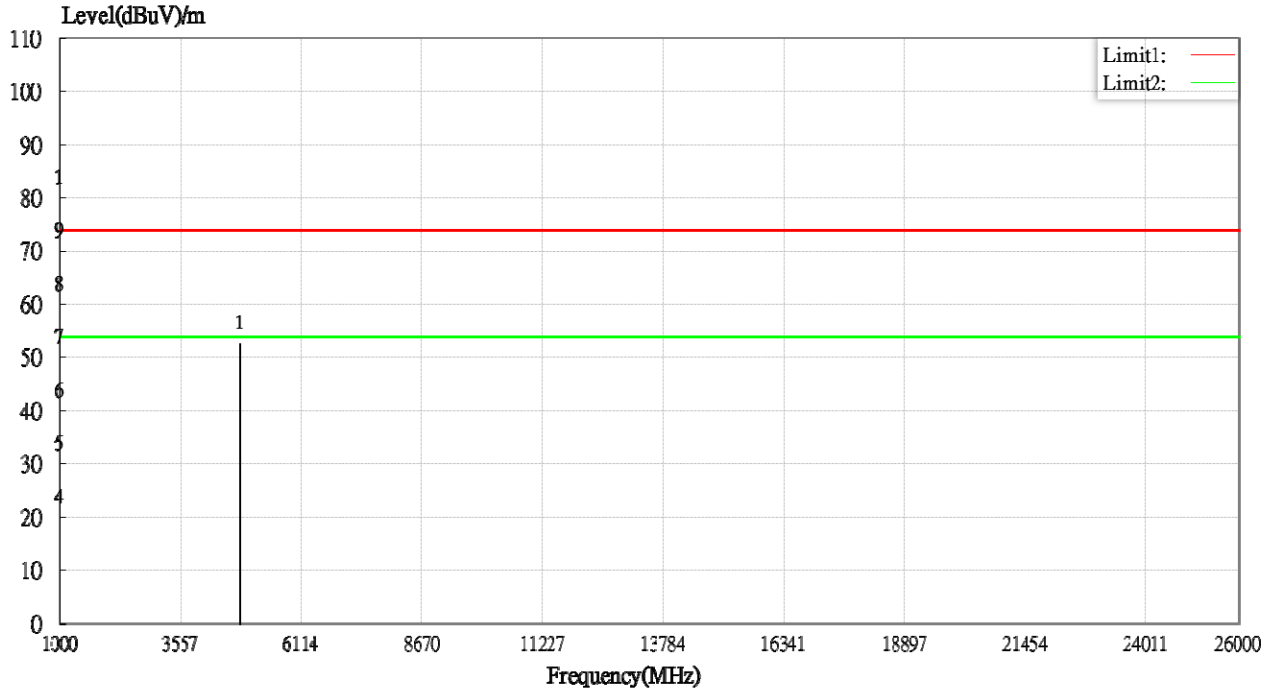


G mode 2412 MHz Horizontal AUX

PK



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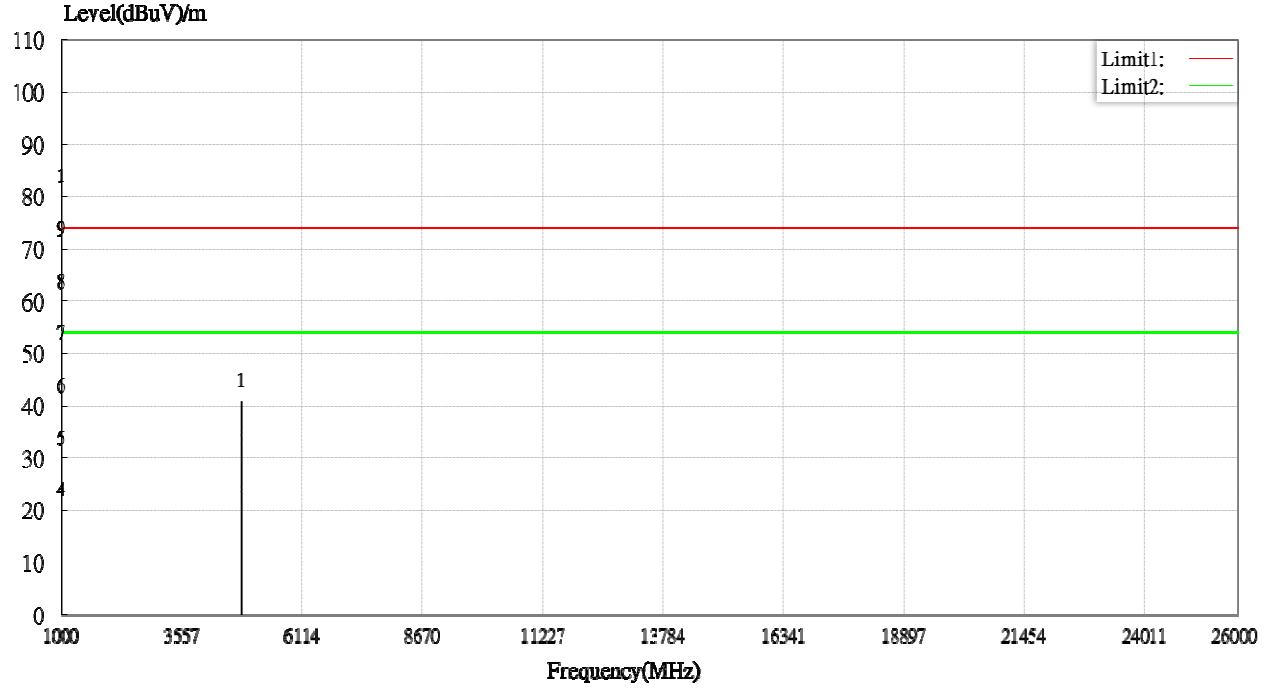

G mode 2412 MHz Vertical AUX

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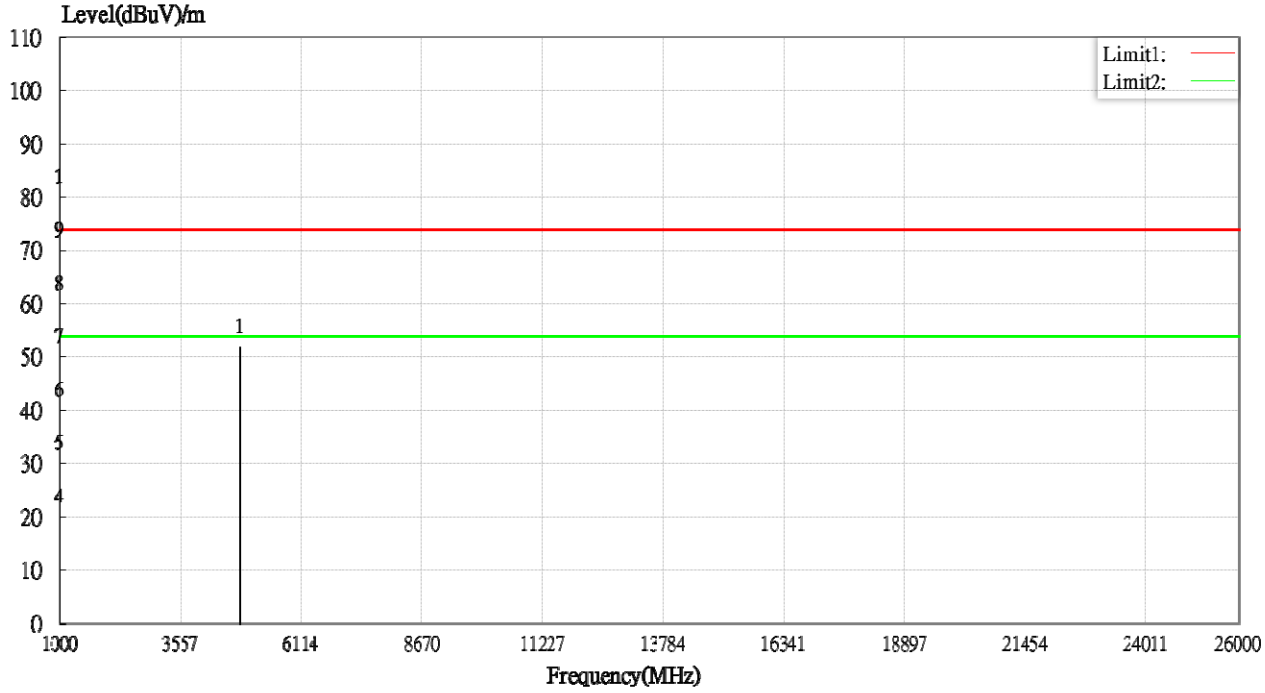

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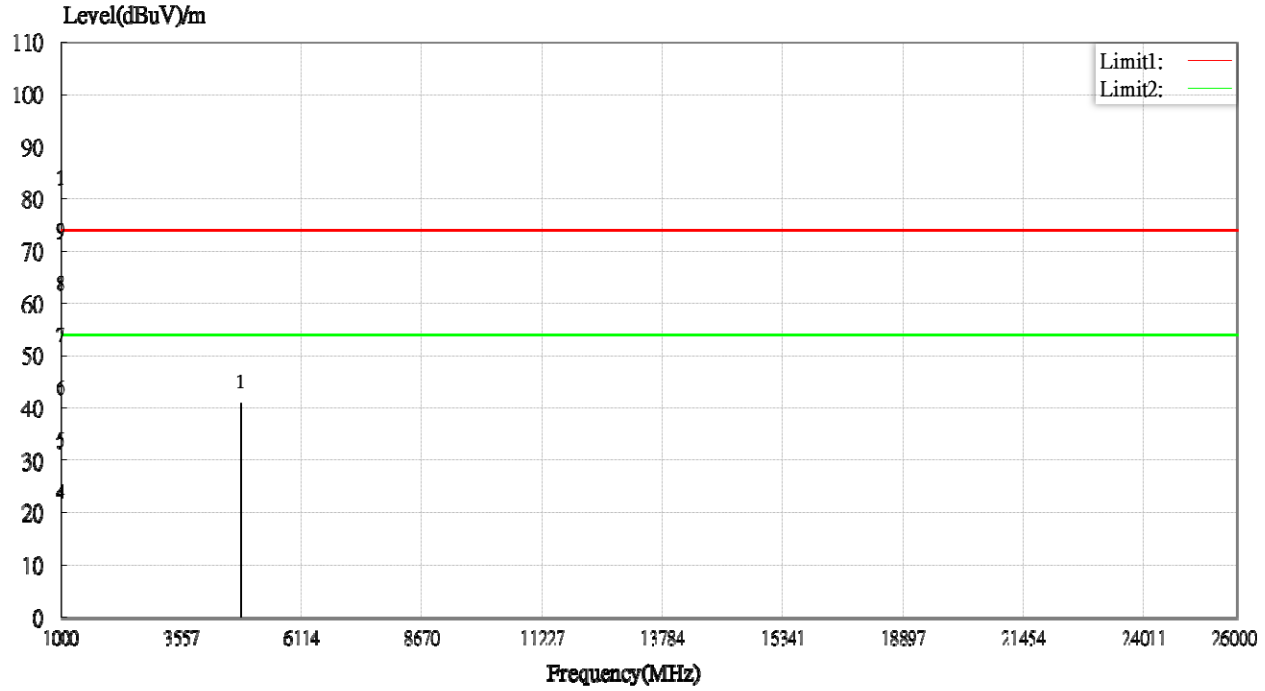

G mode 2442 MHz Horizontal AUX

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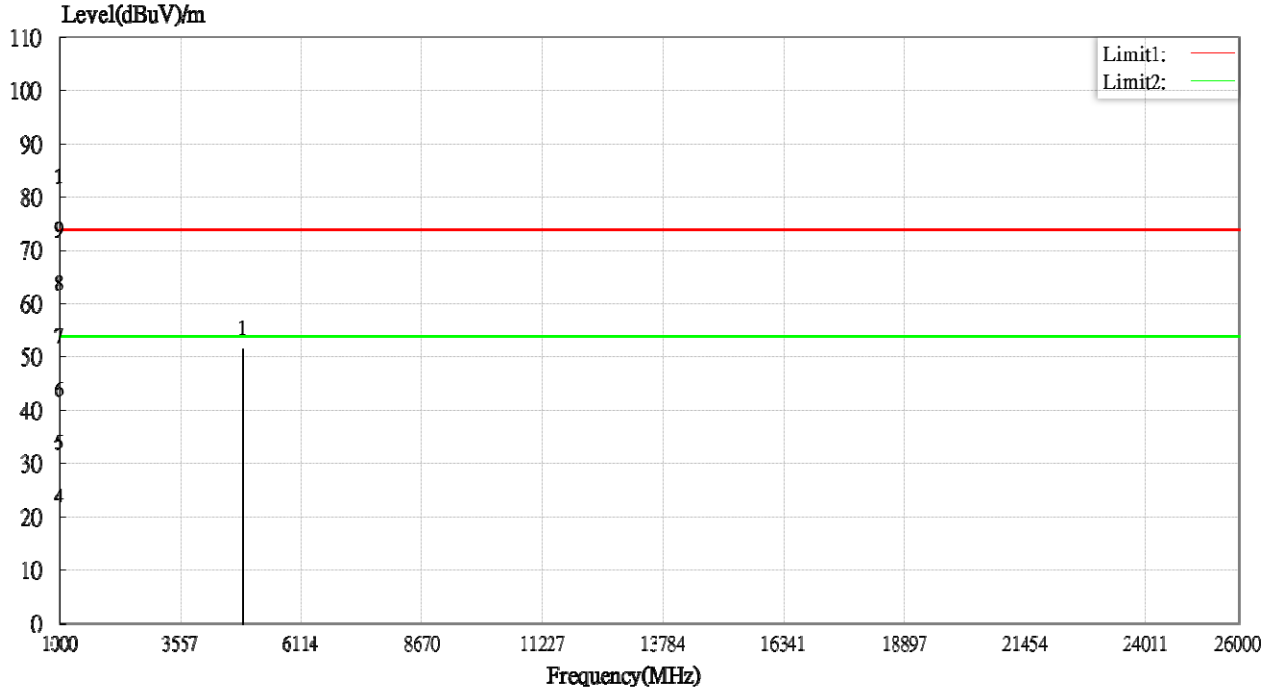

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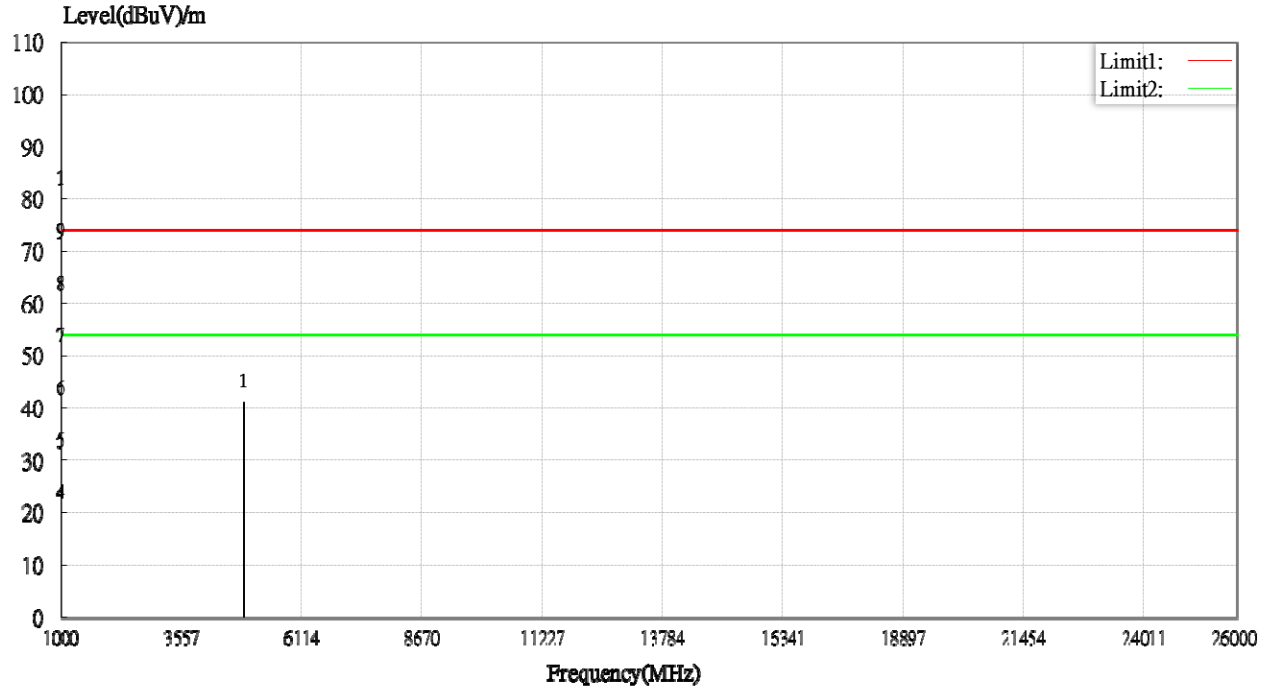

G mode 2442 MHz Vertical AUX

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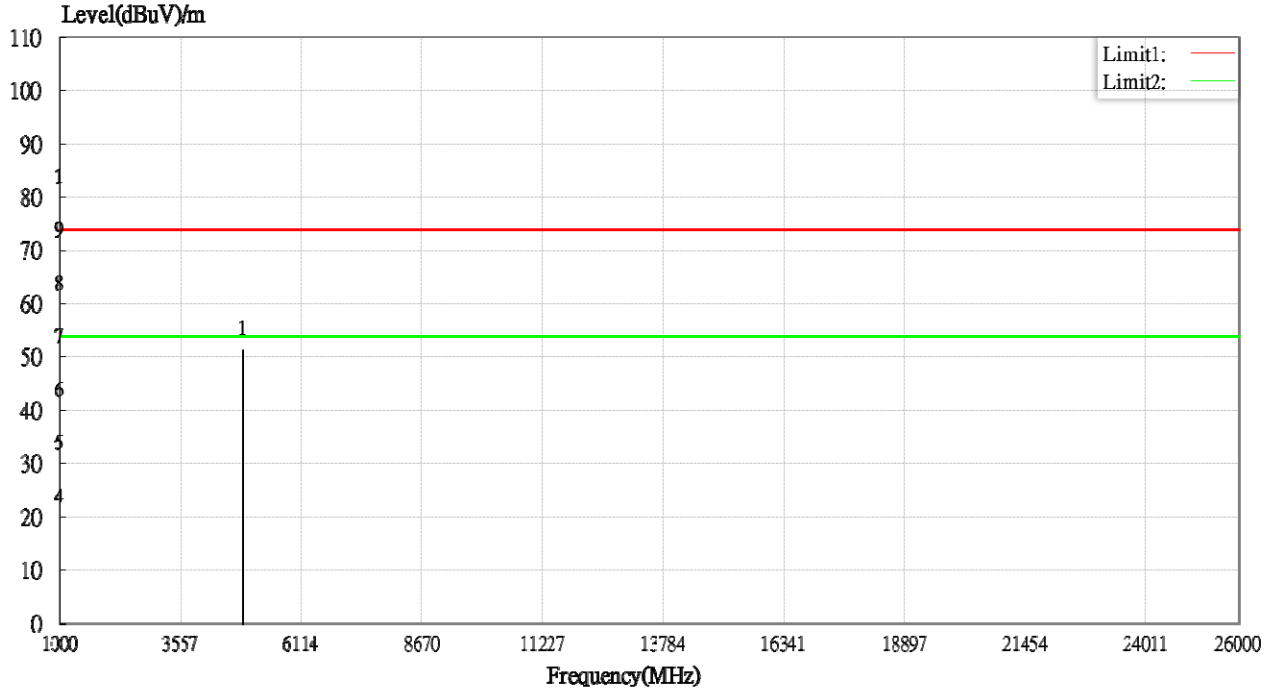

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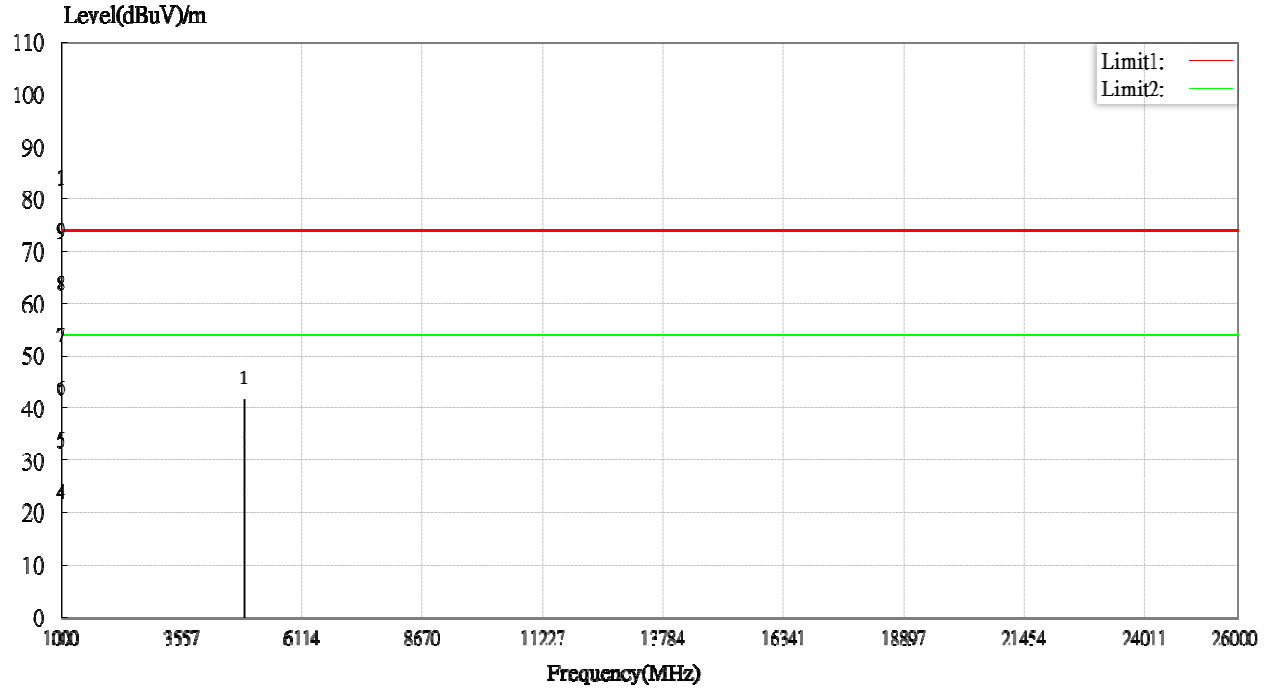
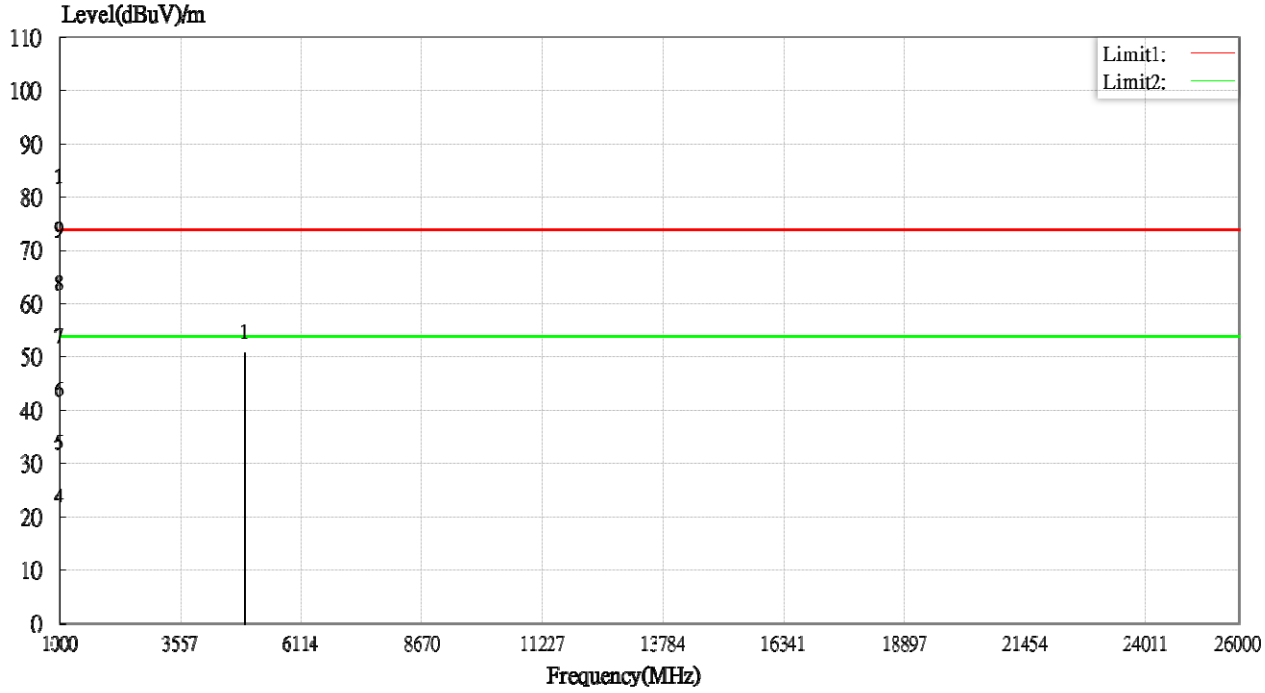


G mode 2462 MHz Horizontal AUX

PK



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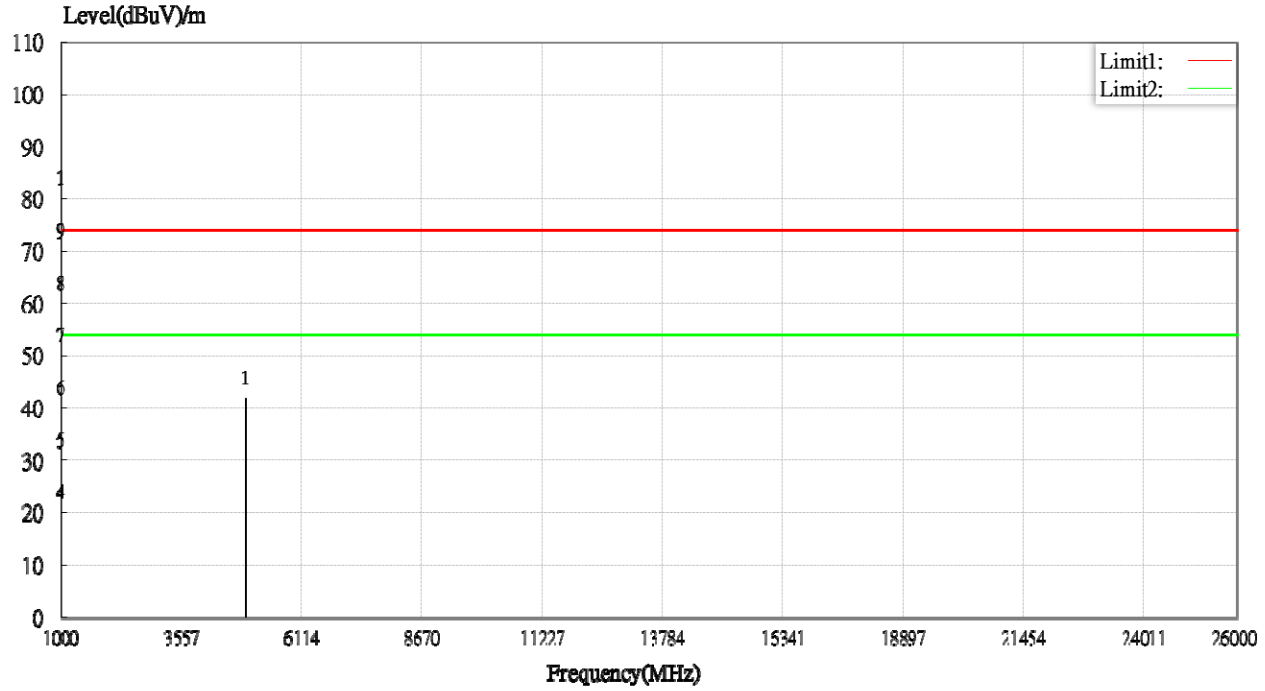
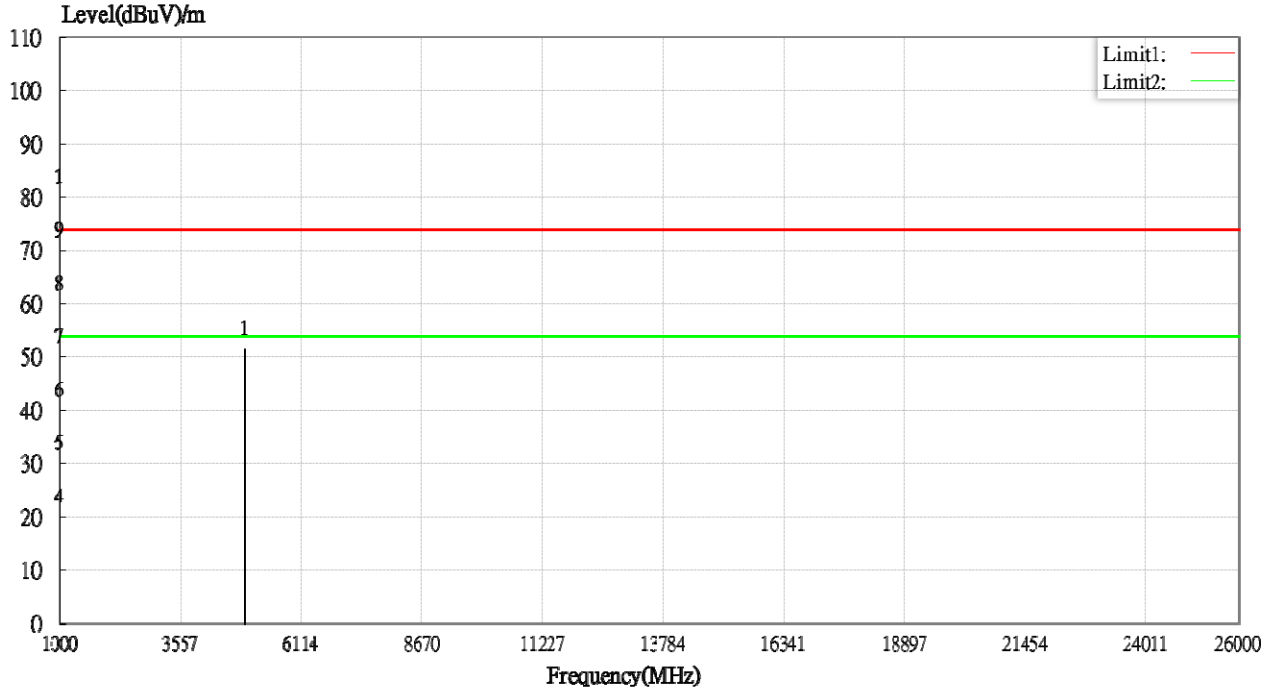


G mode 2462 MHz Vertical AUX

PK



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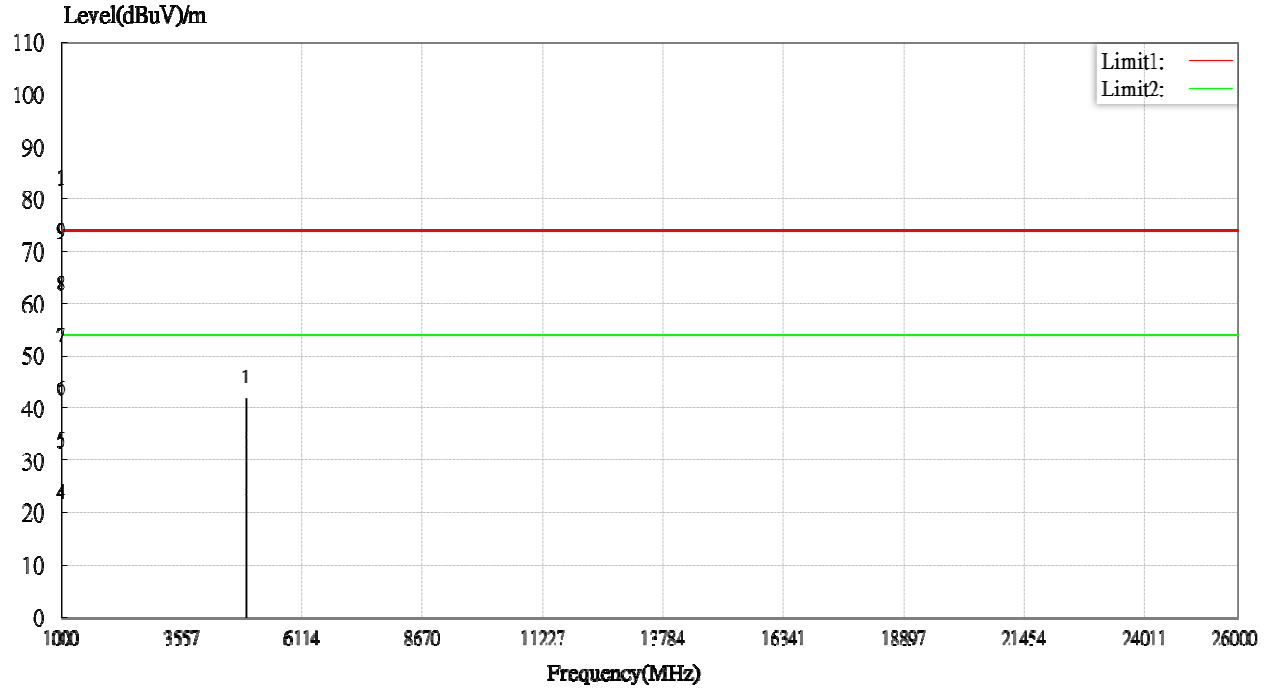
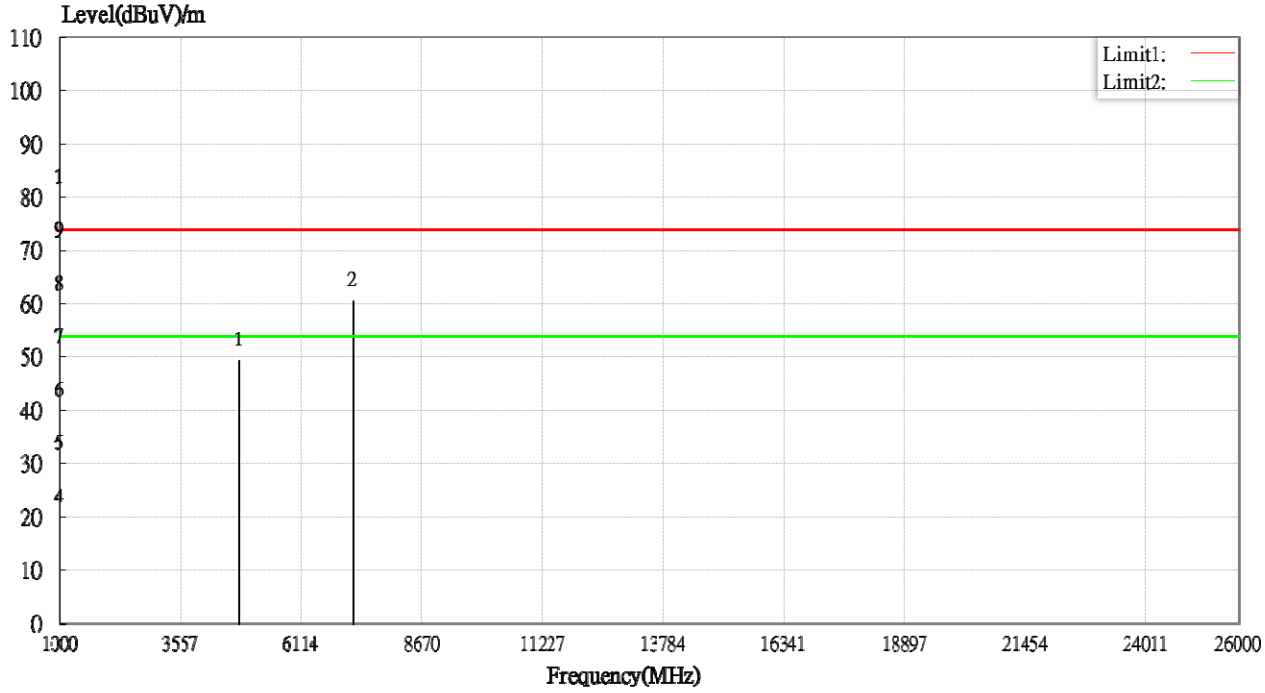


BLE 2402 MHz Horizontal

PK



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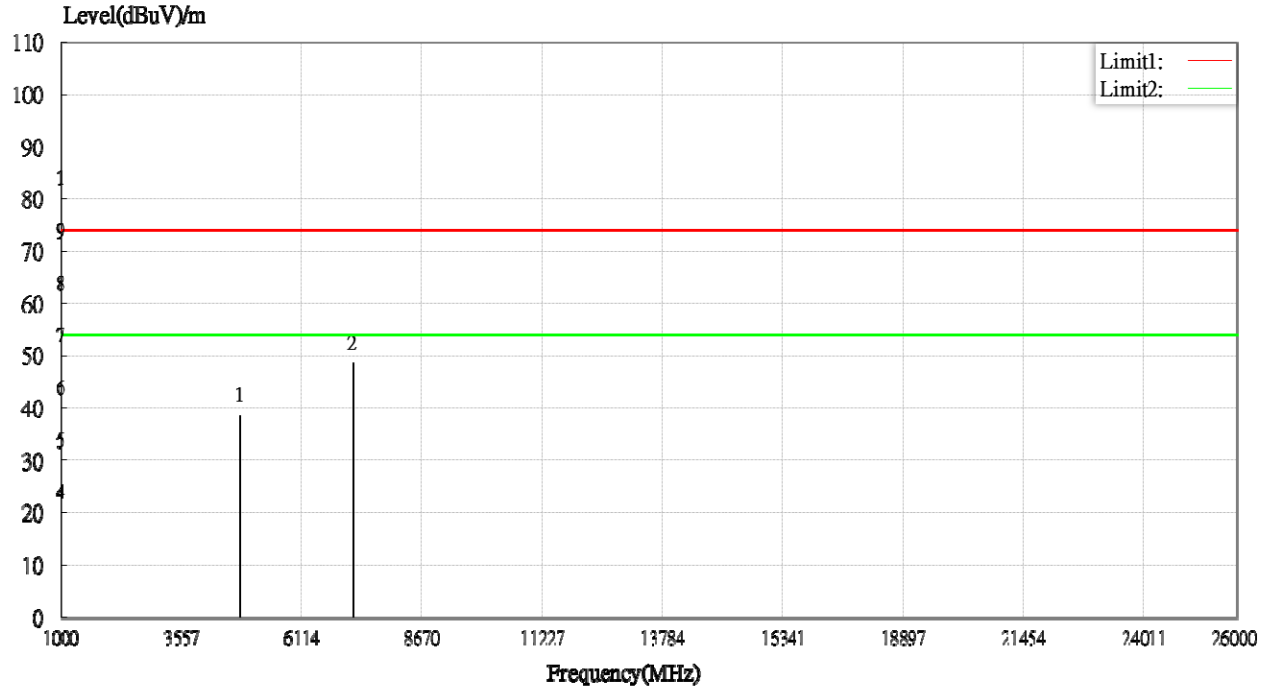
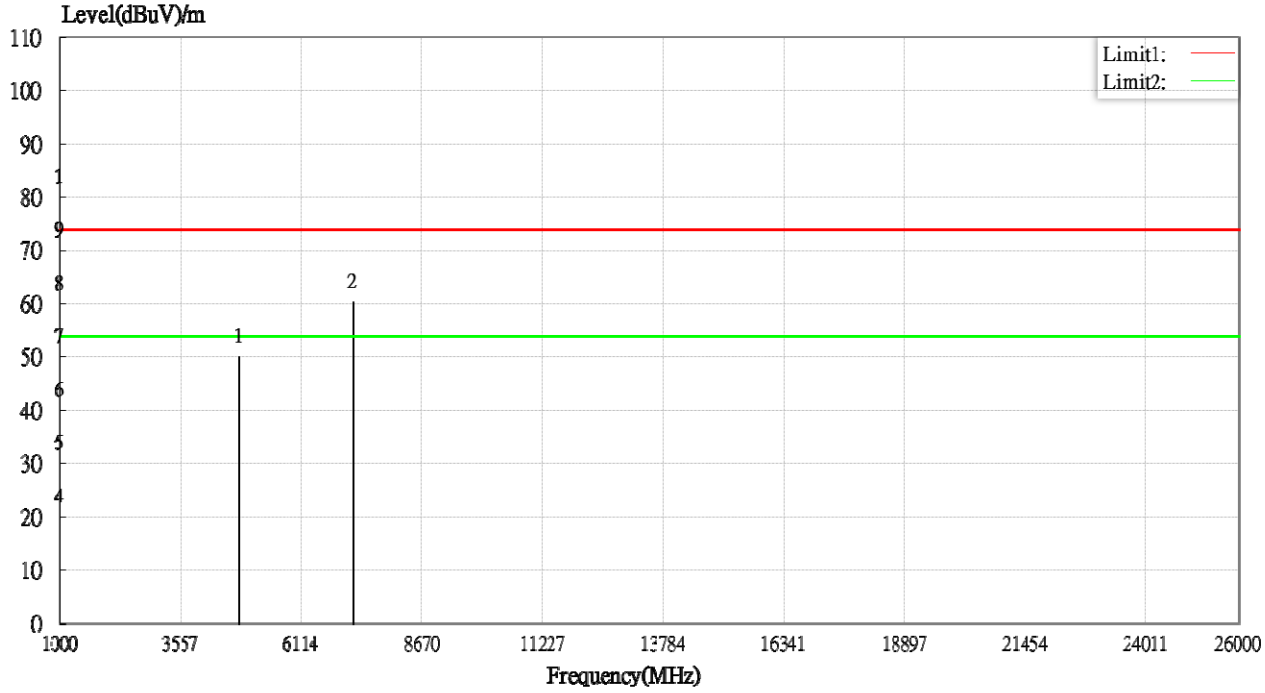


BLE 2402 MHz Vertical

PK



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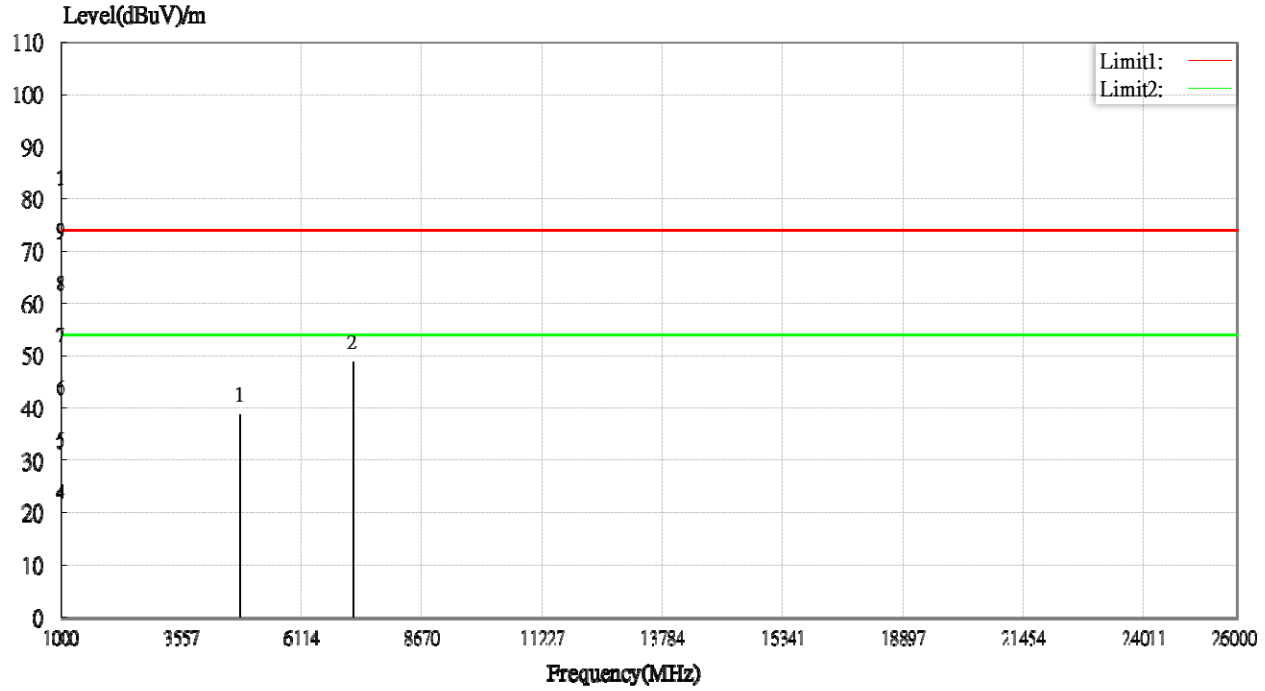

BLE 2440 MHz Horizontal

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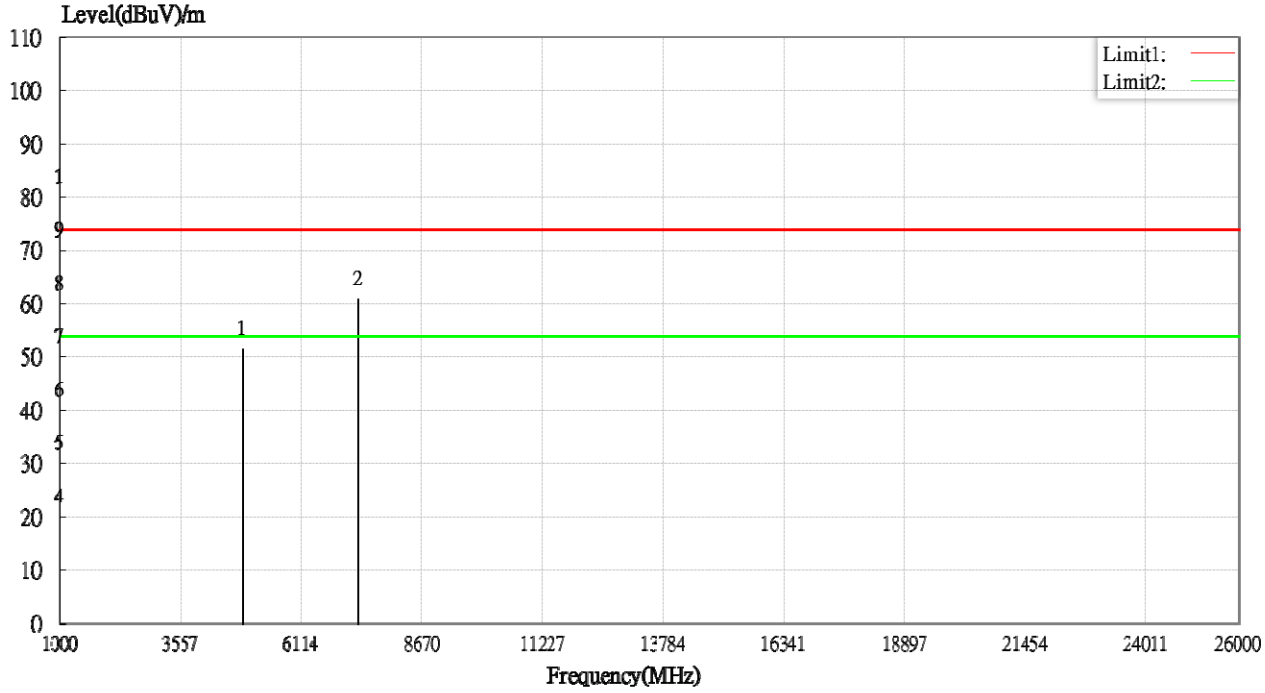

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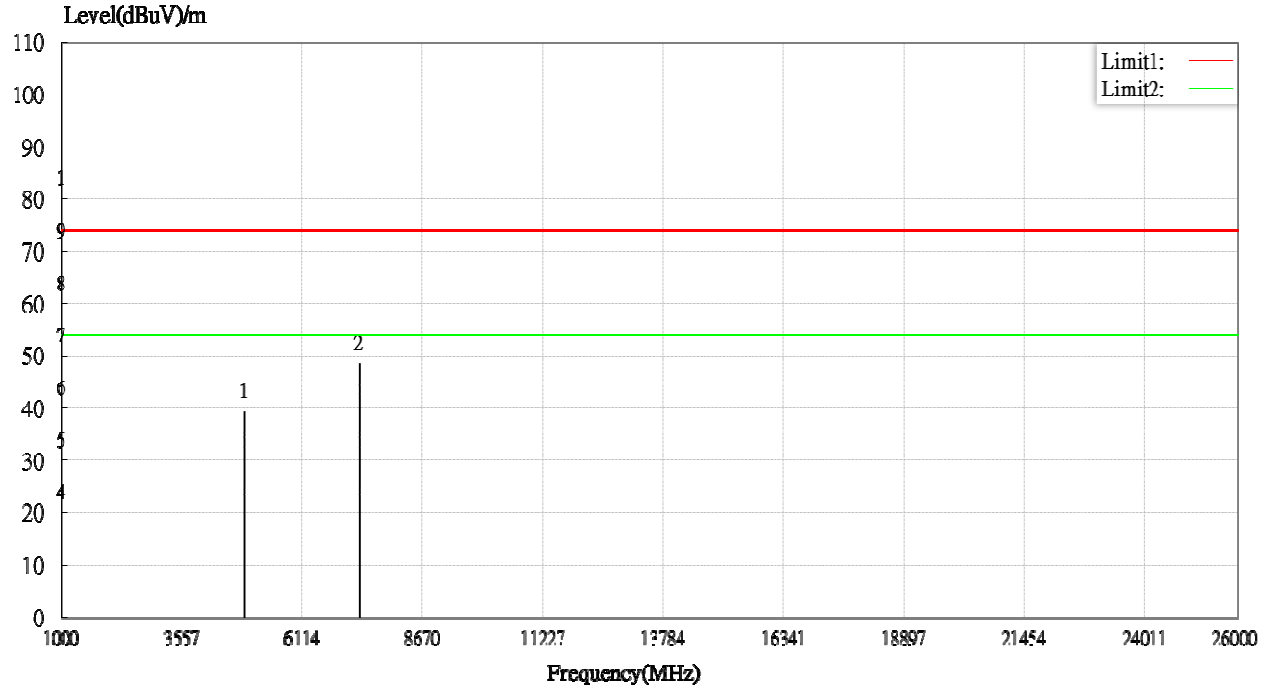
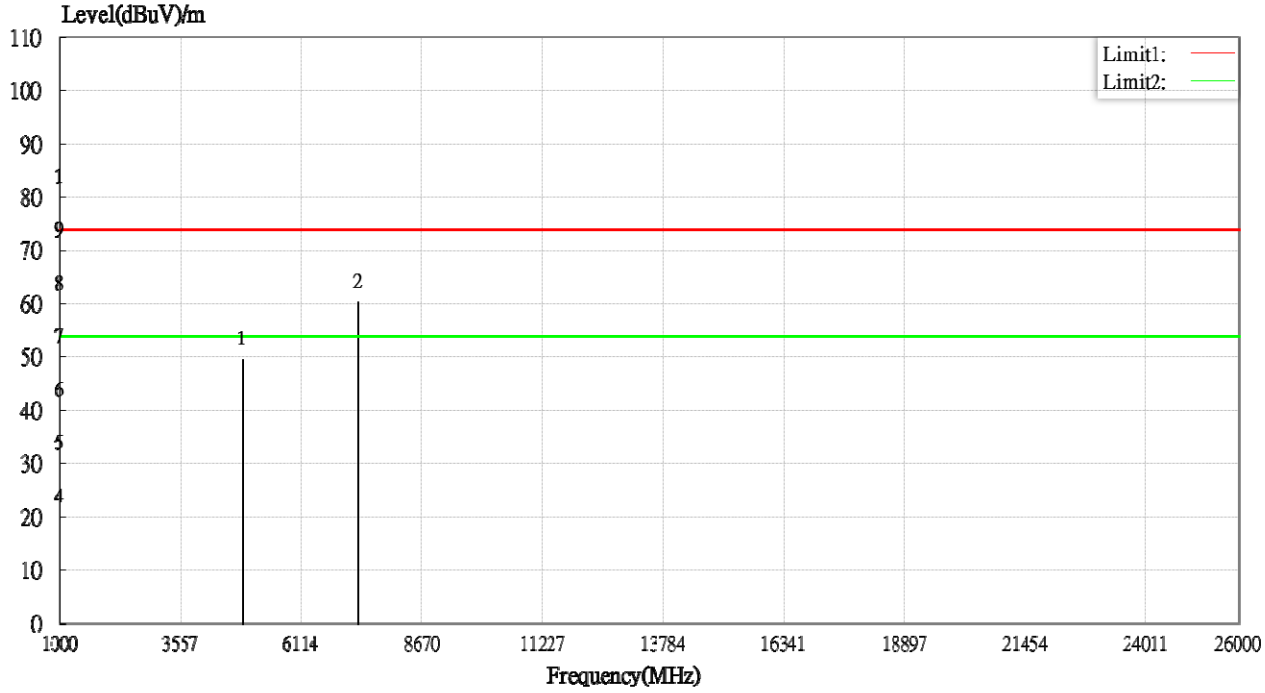


BLE 2440 MHz Vertical

PK



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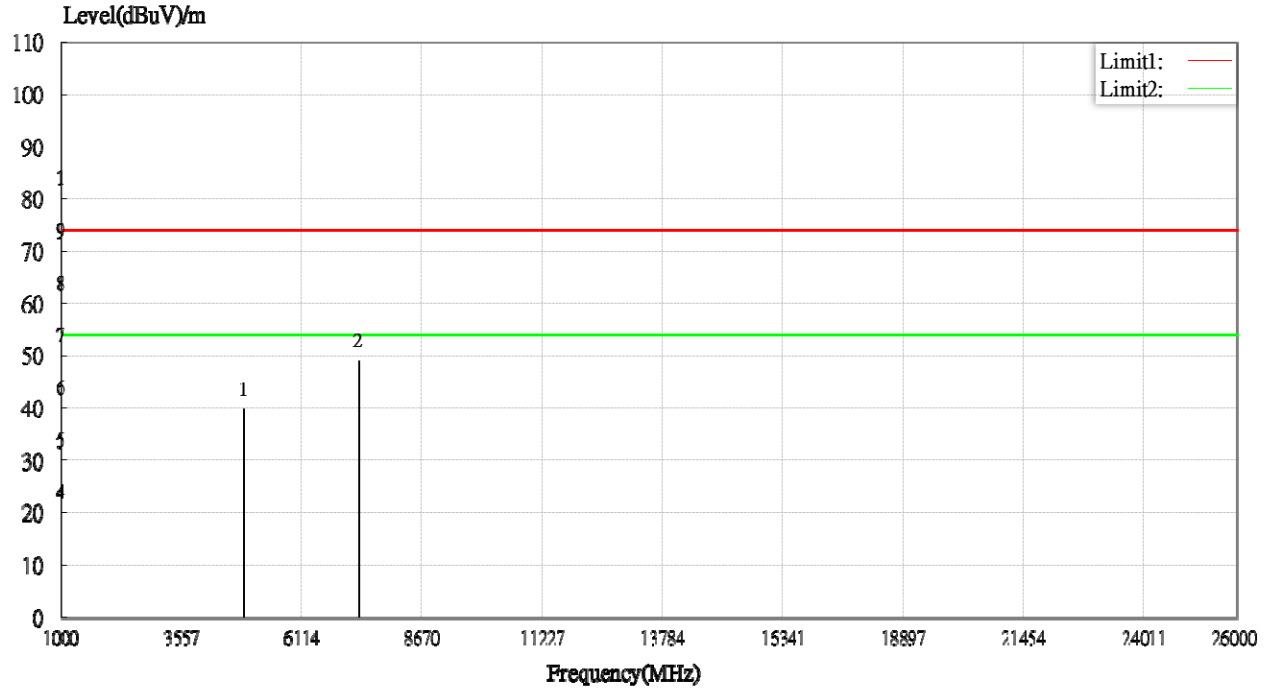
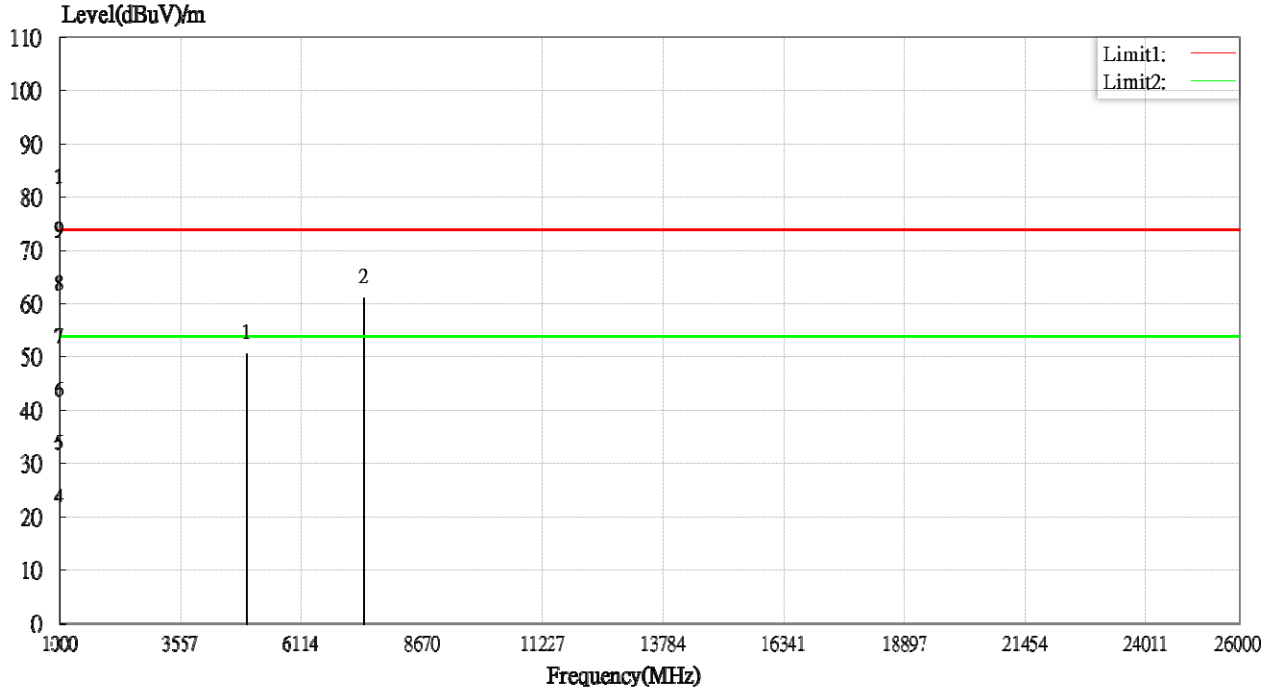


BLE 2480 MHz Horizontal

PK



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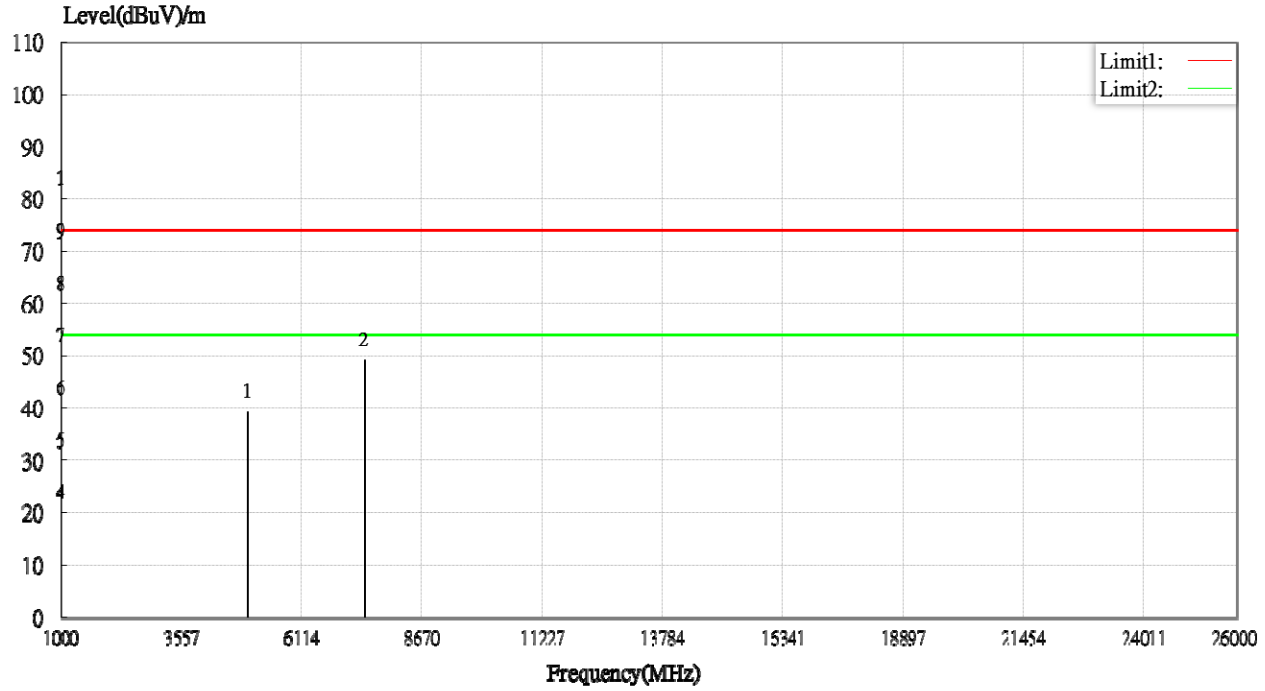
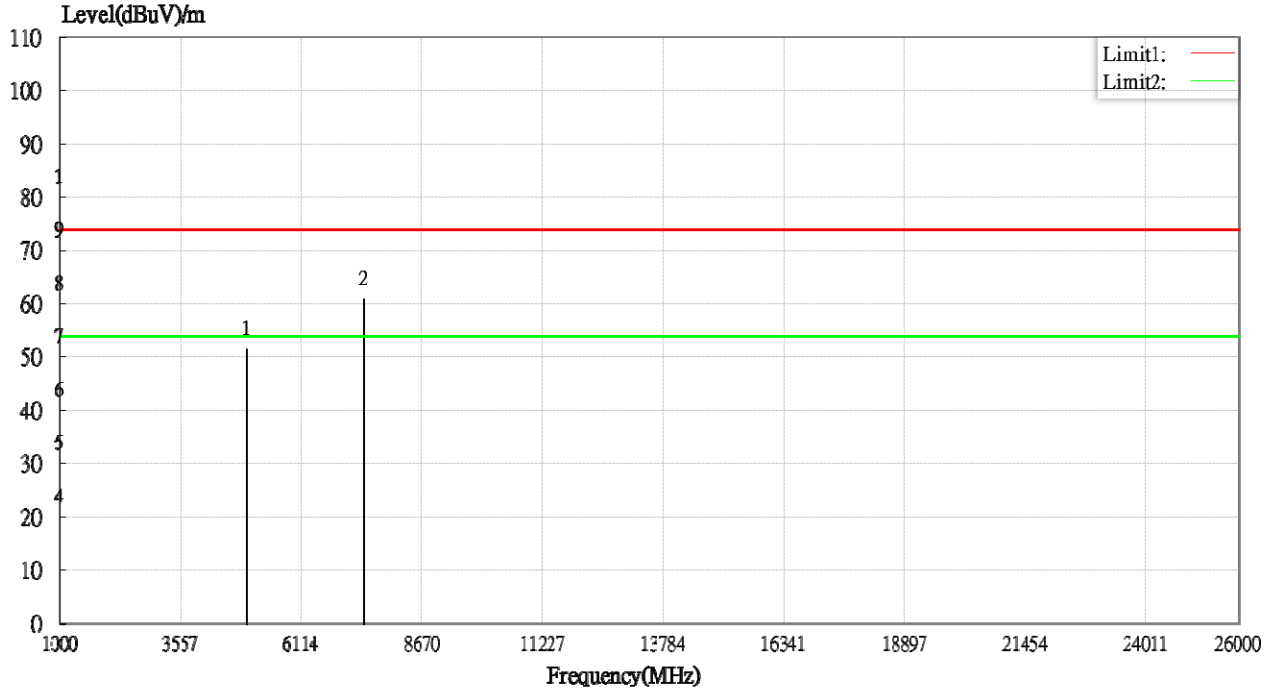


BLE 2480 MHz Vertical

PK



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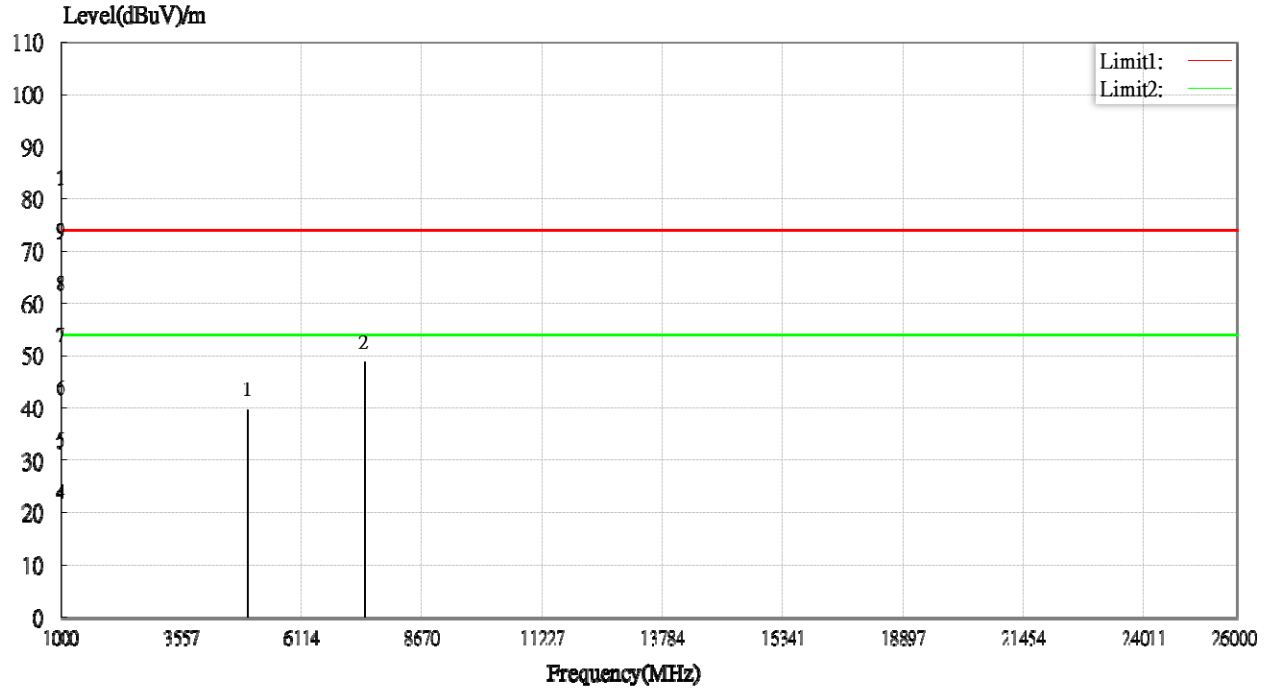

6 Appendix A – Test Setup Photographs

Please refer to the attachment

7 Appendix B- EUT External Photographs

Please refer to the attachment

8 Appendix C- EUT Internal Photographs

Please refer to the attachment

9 Appendix D (Normative) – A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA *R222 - Specific Requirements EPA ENERGY STAR Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 2nd day of October 2018.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2020
Revised February 21, 2019

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

--- END OF REPORT ---