RF Test Report

Applicant	:	Rajant Corporation
Product Type	:	BreadCrumb Wireless Nodes (ES1-2450R)
Trade Name	:	VIZMONET
Model Number	:	ES1-2450R
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Receive Date	:	Dec. 06, 2018
Test Period	:	Dec. 13, 2018 ~ Jan. 07, 2019
Issue Date	:	Jul. 02, 2019

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Revision History

Rev.	Issue Date	Revisions	Revised By
00	Feb. 12, 2019	Initial Issue	Janet Chao
01	May 24, 2019	Page 7 Revised Applicant. Page 1 & 3 & 7 Revised Trade Name.	Nina Lin
02	Jul. 02, 2019	Page 7 Revised Applicant Address.	Nina Lin

Verification of Compliance

Issued Date: Jul. 02, 2019

Applicant	:	Rajant Corporation
Product Type	:	BreadCrumb Wireless Nodes (ES1-2450R)
Trade Name	:	VIZMONET
Model Number	:	ES1-2450R
FCC ID	:	VJA-ES12450R
EUT Rated Voltage	:	DC 24 V, 0.8 A
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade District, Taoyuan City 33465, Taiwan (R.O.C) Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

A Test Lab Techno Corp. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by A Test Lab Techno Corp. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Approved By	: Fly Lu	Reviewed By	: Eric Ou Yang	
(Manager)	(Fly Lu)	(Testing Engineer)	(Eric Ou Yang)	

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1 General Information

1.1 Summary of Test Result

Standard	Item	Result	Remark
FCC			
15.207	AC Power Conducted Emission	PASS	-----
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(b)(3)	Max. Output Power	PASS	-----
15.247(a)(2)	6 dB RF Bandwidth	PASS	-----
15.247(e)	Maximum Power Spectral Density	PASS	-----
15.247(d)	Out of Band Conducted Spurious Emission	PASS	-----
15.203	Antenna Requirement	PASS	Note

The test results of this report relate only to the tested sample(s) identified in this report.

Note: This device must be professionally installed.

Standard	Description
CFR47, Part 15, Subpart C	Intentional Radiators
ANSI C63. 10: 2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01 v05	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES

1.2 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9 kHz ~ 150 kHz	2.7
	150 kHz ~ 30 MHz	2.7
Radiated Emission	9 kHz ~ 30 MHz	1.7
	30 MHz ~ 1000 MHz	5.7
	1000 MHz ~ 18000 MHz	5.5
	18000 MHz ~ 26500 MHz	4.8
	26500 MHz ~ 40000 MHz	4.8
Conducted Output Power	+0.27 dB / -0.28 dB	
RF Bandwidth	4.96 %	
Power Spectral Density	+0.71 dB / -0.77 dB	

2 EUT Description

Applicant	Rajant Corporation 200 Chesterfield Parkway, Malvern, Pennsylvania 19355-3258, United States www.rajant.com				
Manufacturer	Vizmonet Pte Ltd 21, Woodlands Close, #02-07, Primz Biz Hub, Singapore 737 854 www.vizmonet.com				
Product Type	BreadCrumb Wireless Nodes (ES1-2450R)				
Trade Name	VIZMONET				
Model Number	ES1-2450R				
FCC ID	VJA-ES12450R				
Operate Freq. Band	Frequency Range (MHz)		Modulation	Channel Bandwidth	Data Rate 400 / 800 GI (ns)
IEEE 802.11b	2412 ~ 2462		DSSS	20 MHz	Up to 11 Mbps
IEEE 802.11g	2412 ~ 2462		OFDM	20 MHz	Up to 54 Mbps
IEEE 802.11n 2.4 GHz 20 MHz	2412 ~ 2462		OFDM	20 MHz	Up to 86.7 Mbps
IEEE 802.11n 2.4 GHz 40 MHz	2422 ~ 2452		OFDM	40 MHz	Up to 200 Mbps
Antenna information	Antenna	Model Number		Type	Max. Gain (dBi)
	ANT-0 / ANT-1	KMA-2400-5-NM		External type(Omni)	5
	Note: Antenna connector is N type and this device must be professionally installed.				
Antenna Delivery	See section 3.1				
Operate Temp. Range	-40 ~ +85 ℃				

Frequency Band	Max. RF Output Power (W)
IEEE 802.11b	0.537
IEEE 802.11g	0.757
IEEE 802.11n 2.4 GHz 20 MHz	0.857
IEEE 802.11n 2.4 GHz 40 MHz	0.355

3 Test Methodology

3.1. Mode of Operation

Decision of Test ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit mode
Mode 2: IEEE 802.11b Continuous TX mode
Mode 3: IEEE 802.11g Continuous TX mode
Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode
Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode
Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode
Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode

Note: ANT-0 is the worst case in Mode 2 / Mode3 / Mode4 / Mode5.

Software used to control the EUT for staying in continuous transmitting mode was programmed.
After verification, all tests were carried out with the worst case test modes.

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

Test Mode	ANT-0	ANT-1	ANT-0+1
Mode 2	V	---	---
Mode 3	V	---	---
Mode 4	V	---	---
Mode 5	V	---	---
Mode 6	V	V	V
Mode 7	V	V	V

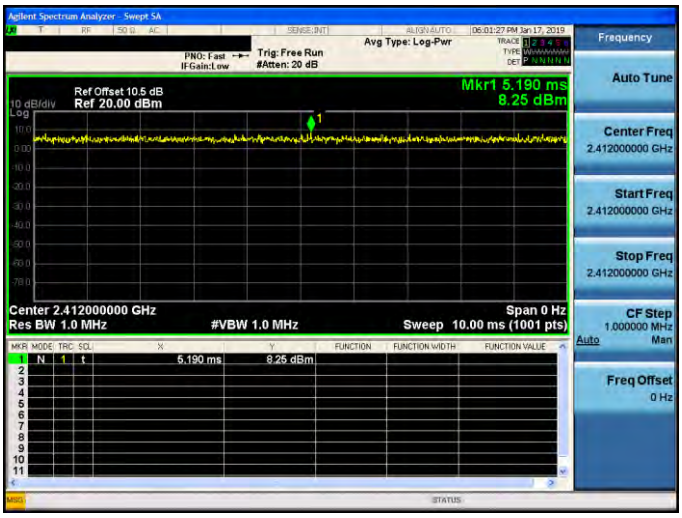
Test Mode	Antenna Delivery	Data Rate	Test Channel
Mode 2	1TX(Diversity)	1 M	1, 6, 11
Mode 3	1TX(Diversity)	6 M	1, 6, 11
Mode 4	1TX (SISO)	6.5 M	1, 6, 11
Mode 5	1TX (SISO)	13.5 M	3, 6, 9
Mode 6	2TX (STBC)	13 M	1, 6, 11
Mode 7	2TX (STBC)	27 M	3, 6, 9

Duty cycle

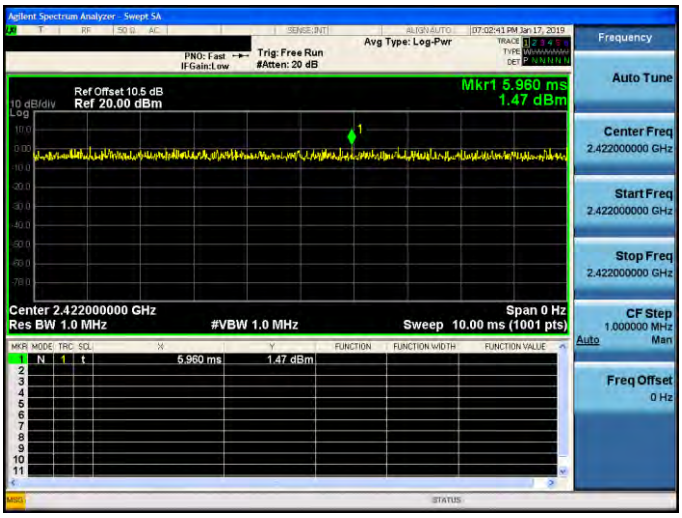
Test Mode	Frequency (MHz)	on time (ms)	on+off time (ms)	Duty cycle	Duty Factor (dB)	1/T Minimum VBW (kHz)
Mode 2	2412	5.880	5.880	1.000	0.000	0.010
Mode 3	2412	5.190	5.190	1.000	0.000	0.010
Mode 4	2412	4.250	4.250	1.000	0.000	0.010
Mode 5	2422	5.960	5.960	1.000	0.000	0.010
Mode 6	2412	1.000	1.000	1.000	0.000	0.010
Mode 7	2422	1.000	1.000	1.000	0.000	0.010

Duty Cycle Graphs

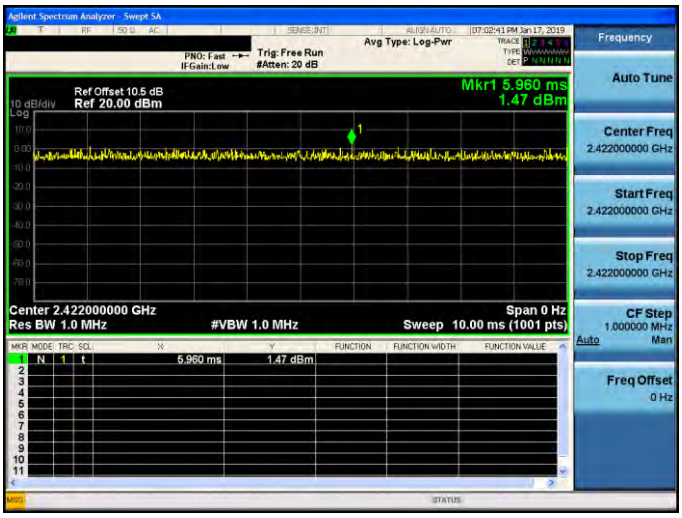
Mode 2: IEEE 802.11b Continuous TX mode


Mode 3: IEEE 802.11g Continuous TX mode


Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode


Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode


Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode


Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode


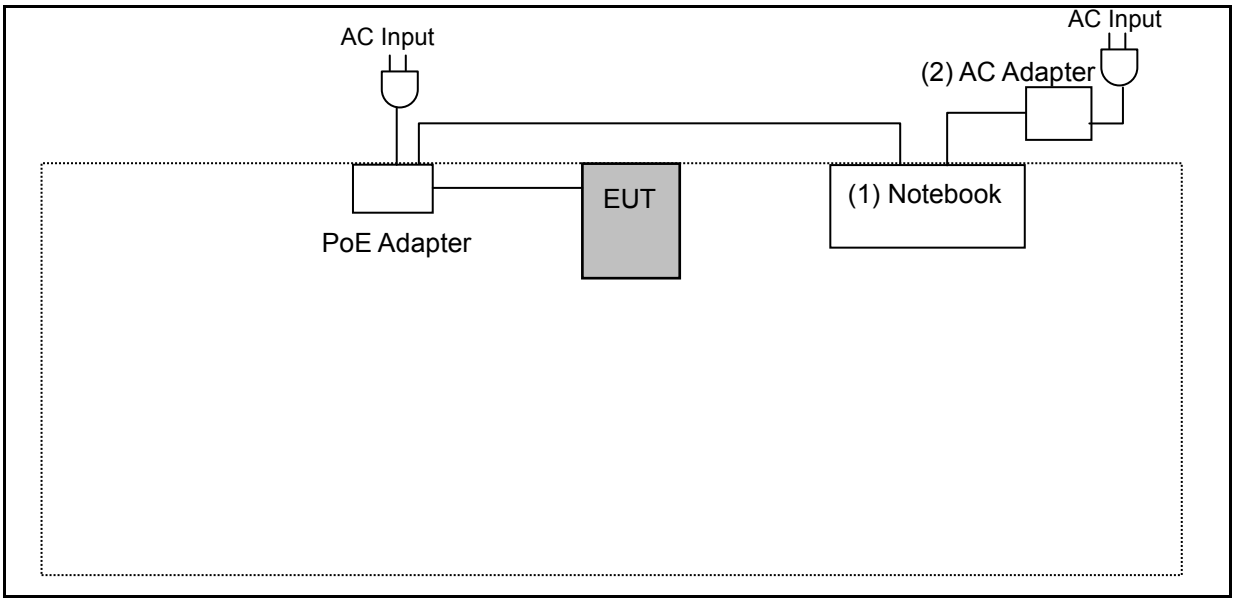
3.2. EUT Test Step

1.	Setup the EUT shown on “Configuration of Test System Details.”
2.	Turn on the power of all equipment.
3.	Turn Wi-Fi function link to Notebook.
4.	EUT run test program.

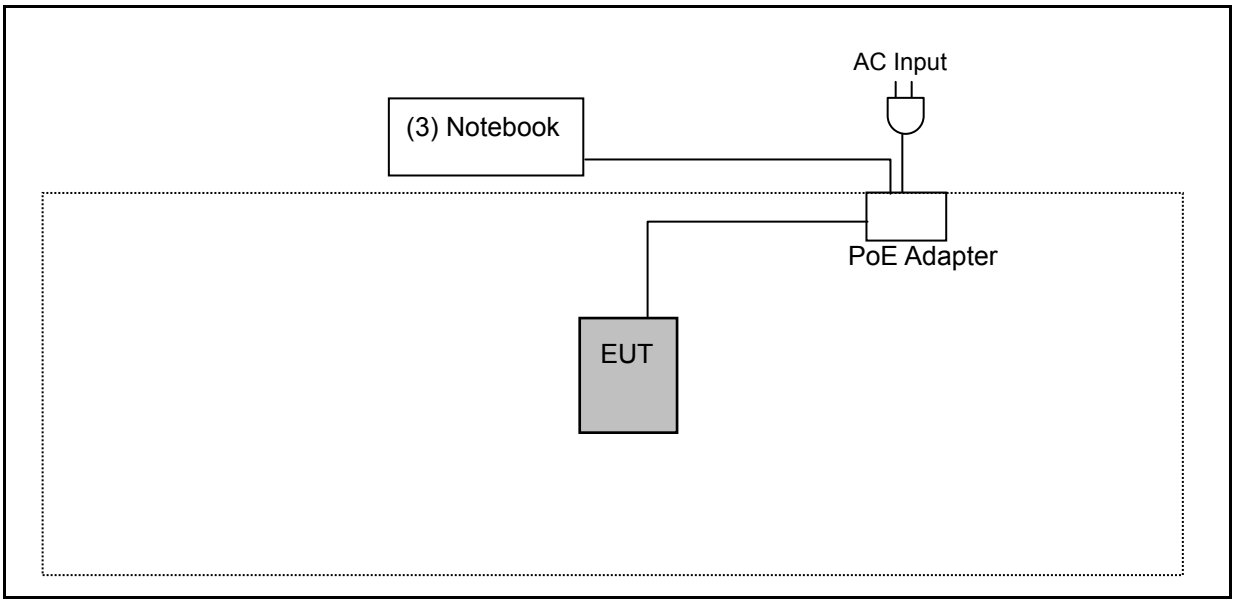
Measurement Software			
No.	Description	Software	Version
1	Conducted Emission	EZ EMC	1.1.4.3
2	Radiated Emission	EZ EMC	1.1.4.4

3.3. Configuration of Test System Details

Conducted Emissions



Radiated Emission



Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
(1)	Notebook	DELL	LATITUDE E6440	5HZBD72	---
(2)	AC Adapter	DELL	HA65NM130	---	Non-Shielded, 0.8 m
(3)	Notebook	HP	PROBOOK 4421s	CNF1182X1G	'---

3.4. Test Instruments

For Conducted Emission

Test Period: Dec. 20, 2018

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Test Receiver	R&S	ESCI	100367	05/21/2018	1 year
LISN	R&S	ENV216	101040	04/11/2018	1 year
LISN	R&S	ENV216	101041	03/23/2018	1 year
RF Cable	Woken	00100D1380194M	TE-02-03	05/17/2018	1 year

For Radiated Emissions

Test Period: Dec. 13 ~ Dec. 16, 2018

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9010A	MY52221312	01/15/2018	1 year
Pre Amplifier (1~26.5 GHz)	Agilent	8449B	MT-010	10/16/2018	1 year
Pre Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	01/10/2018	1 year
Trilog Broadband Antenna	Schwarzbeck Mess-Elektronik	VULB9168	EX-041	10/23/2018	1 year
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	08/23/2018	1 year
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	03/13/2018	1 year
RF Cable	EMCI	EMC104-N-N-6000	TE01-1	02/20/2018	1 year
Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	02/20/2018	1 year
Broadband Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	9170	9170-320	08/07/2018	1 year
Microwave Cable	EMCI	EMC104-SM-SM-13000	170814	10/30/2018	1 year

Note: N.C.R. = No Calibration Request.

For Conducted
Test Period: Jan. 07, 2019

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Power Sensor	Anritsu	MA2411B	1126022	08/29/2018	1 year
Power Meter	Anritsu	ML2495A	1135009	08/29/2018	1 year
Spectrum Analyzer (20 Hz~26.5 GHz)	Agilent	N9020A	US47520902	09/25/2018	1 year
Microwave Cable	EMCI	EMC102-SM-SM1500	001	11/21/2018	1 year

Note: N.C.R. = No Calibration Request.

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	990

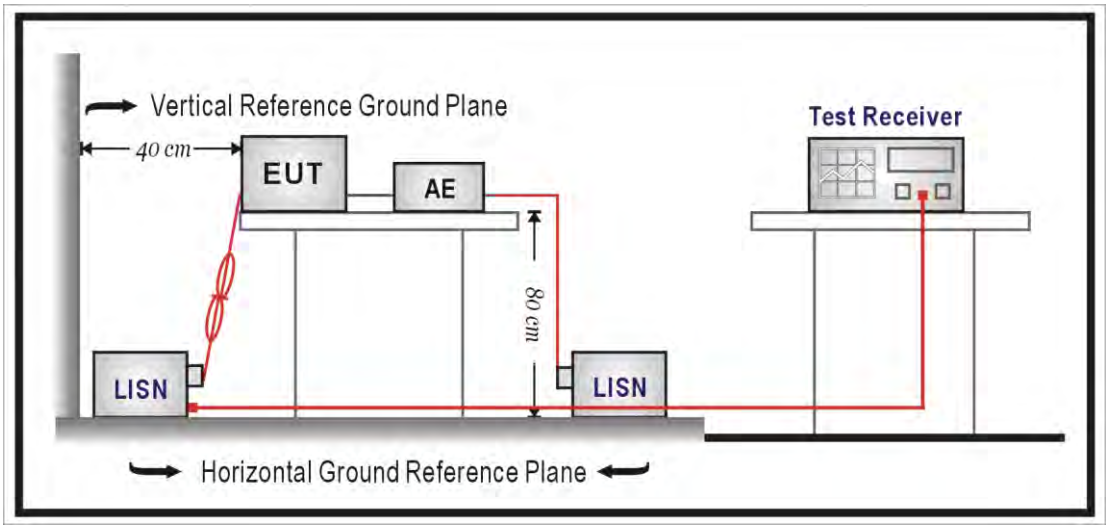
4 Measurement Procedure

4.1. AC Power Line Conducted Emission Measurement

■ **Limit**

Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

■ **Test Setup**



■ **Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 Ω// 50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 Ω// 50 uH coupling impedance with 50 ohm termination.

Tabletop device shall be placed on a non-conducting platform, of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The wall of screened room shall be located 40 cm to the rear of the EUT. Other surfaces of tabletop or floor standing EUT shall be at least 80 cm from any other ground conducting surface including one or more LISNs. For floor-standing device shall be placed under the EUT with a 12 mm insulating material.

Conducted emissions were investigated over the frequency range from 0.15 MHz to 30 MHz using a resolution bandwidth of 9 kHz. The equipment under test (EUT) shall be meet the limits in section 4.1, as applicable, including the average limit and the quasi-peak limit when using respectively, an average detector and quasi-peak detector measured in accordance with the methods described of related standard. When all of peak value were complied with quasi-peak and average limit from 150 kHz to 30 MHz then quasi-peak and average measurement was unnecessary.

The AMN shall be placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for AMNs mounted on top of the ground reference plane. This distance is between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8 m from the AMN. If the mains power cable is longer than 1 m then the cable shall be folded back and forth at the centre of the lead to form a bundle no longer than 0.4 m. All of interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long. All of EUT and AE shall be separate place more than 0.1 m. All 50 Ω ports of the LISN shall be resistively terminated into 50 Ω loads when not connected to the measuring instrument.

If the reading of the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the higher reading shall be recorded with the exception of any brief isolated high reading which shall be ignored.

4.2. Radiated Emission Measurement

■ **Limit**

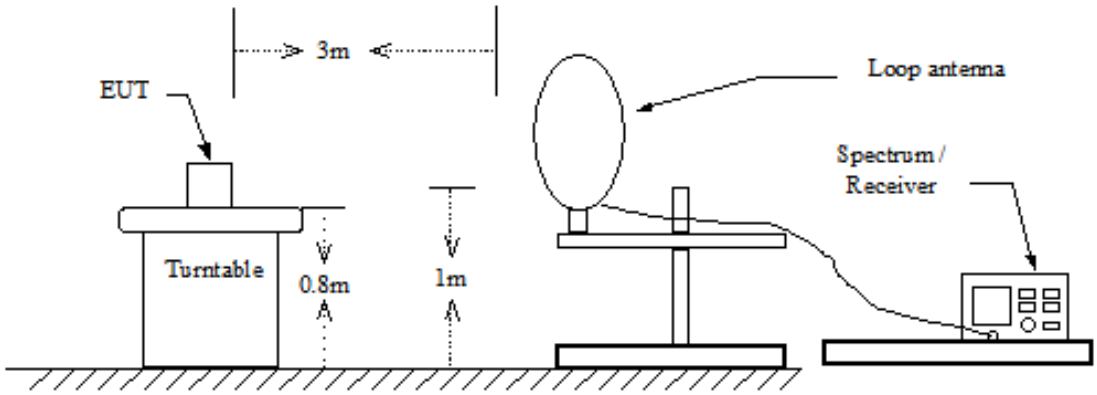
According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m at 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

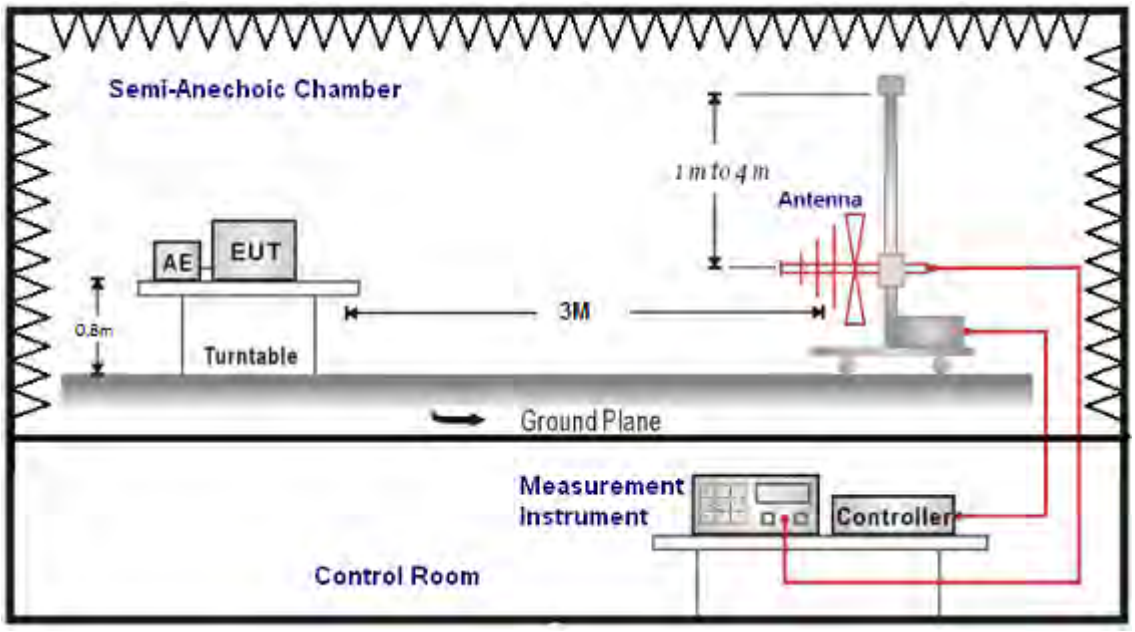
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

■ **Setup**

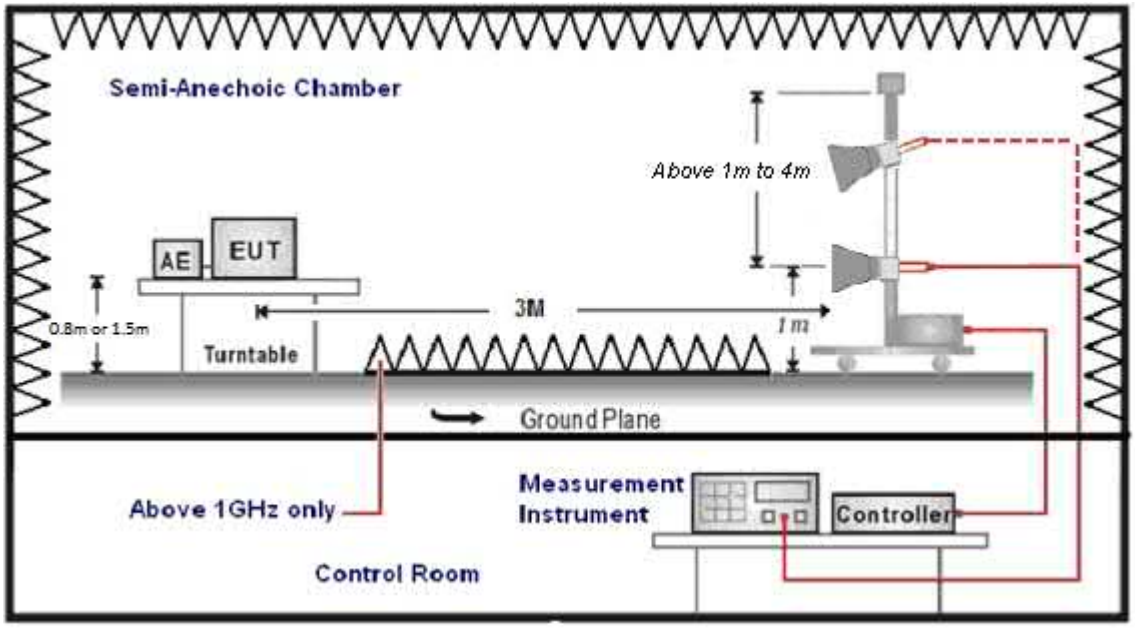
9 kHz ~ 30 MHz



Below 1 GHz



Above 1 GHz



■ **Test Procedure**

Final radiation measurements were made on a three-meter, Semi Anechoic Chamber. The EUT system was placed on a nonconductive turntable which is 0.8 or 1.5 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 9 kHz to 26.5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, and then the video bandwidth is set to 3 MHz for peak measurements and 10 Hz for average measurements when Duty cycle >0.98 / 1/T for average measurements when Duty cycle <0.98. A nonconductive material surrounded the EUT to supporting the EUT for standing on tree orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

SCHWARZBECK MESS-ELEKTRONIK Biconilog Antenna at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna was used in frequencies 1 –26.5 GHz at a distance of 3 meter. The antenna at an angle toward the source of the emission. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20 dB/decade).

For testing above 1 GHz, the emission level of the EUT in peak mode was 20 dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The following procedures were used to convert the emission levels measured in decibels referenced to 1 microvolt (dBuV) into field intensity in micro volts pre meter (uV/m).

The actual field intensity in decibels referenced to 1 microvolt in to field intensity in micro colts per meter (dBuV/m).

The actual field is intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

(1) Amplitude (dBuV/m) = FI (dBuV) +AF (dBuV) +CL (dBuV)-Gain (dB)
FI= Reading of the field intensity.
AF= Antenna factor.
CL= Cable loss.
P.S Amplitude is auto calculate in spectrum analyzer.

(2) Actual Amplitude (dBuV/m) = Amplitude (dBuV)-Dis(dB)
The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:
(a) For fundamental frequency : Transmitter Output < +30 dBm
(b) For spurious frequency : Spurious emission limits = fundamental emission limit /10

Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

4.3. Maximum Conducted Output Power Measurement

■ **Limit**

For systems using digital modulation in the 2400-2483.5 MHz, the limit for maximum output power is 30 dBm.

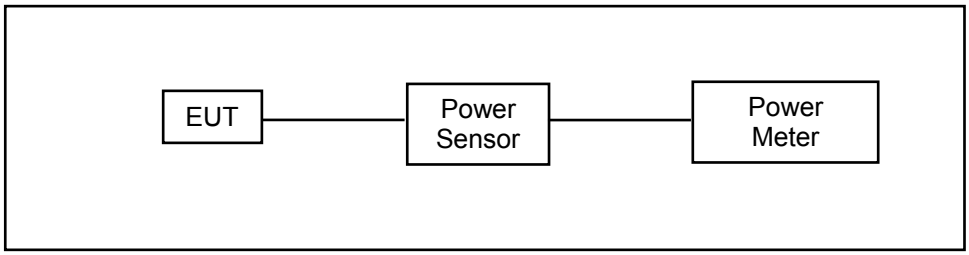
And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

＊ Diversity mode：Directional Gain = Max. Gain = 5 dBi < 6 dBi.

＊ SISO mode：Directional Gain = Max. Gain = 5 dBi < 6 dBi.

＊ STBC mode：Directional Gain = Directional Gain= 10*log{[10^(G1/10)+10^(G2/10)+…+10^(Gn/10)]/NANT}
= 5 dBi < 6dBi

■ **Test Setup**



■ **Test Procedure**

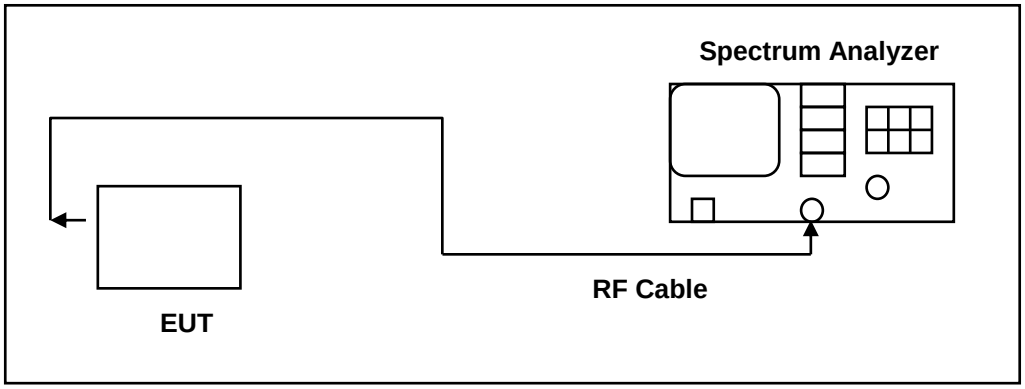
The tests below are run with the EUT's transmitter set at high power in TX mode. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. Remove the Subjective device's antenna and connect the RF output port to power sensor.

4.4. 6 dB RF Bandwidth Measurement

■ **Limit**

6 dB RF Bandwidth: Systems using digital modulation techniques may operate in the 2400–2483.5 MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

■ **Test Setup**



■ **Test Procedure**

The EUT tested to DTS test procedure of ANSI C63.10:2013 section 11.8.2 option2 for compliance to FCC 47CFR 15.247 requirements.

6 dB RF Bandwidth: The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels (Channel low, middle, high)

4.5. Maximum Power Density Measurement

■ **Limit**

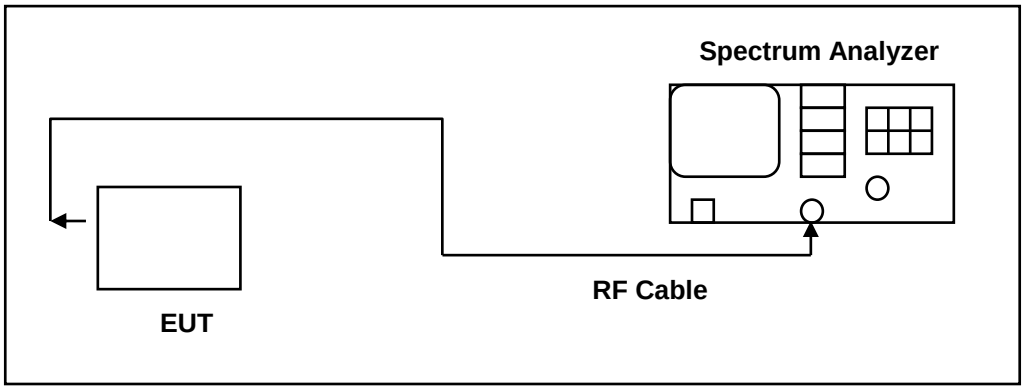
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

∗ Diversity mode：Directional Gain = Max. Gain = 5 dBi < 6 dBi.

∗ SISO mode：Directional Gain = Max. Gain = 5 dBi < 6 dBi.

∗ STBC mode：Directional Gain = Directional Gain= 10*log{[10^(G1/10)+10^(G2/10)+…+10^(Gn/10)]/NANT}
= 5 dBi < 6dBi

■ **Test Setup**



■ **Test Procedure**

The EUT tested to DTS test procedure of ANSI C63.10:2013 section 11.10.2 for compliance to FCC 47CFR 15.247 requirements.

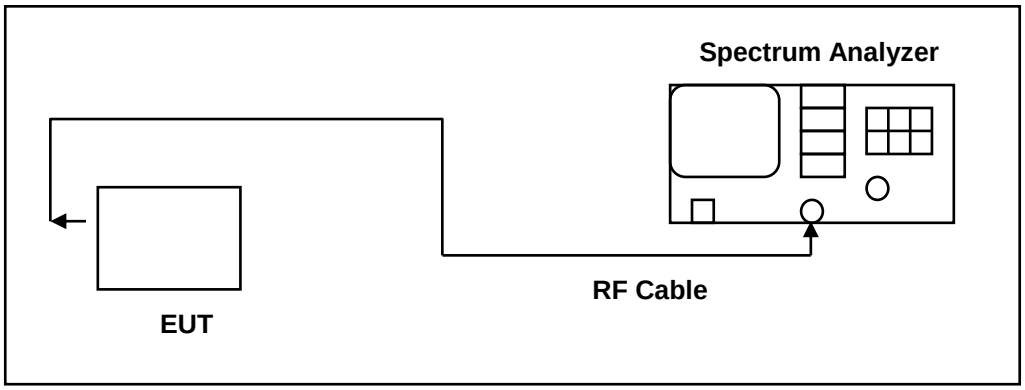
1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 × RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

4.6. Out of Band Conducted Emissions Measurement

■ **Limit**

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

■ **Test Setup**



■ **Test Procedure**

In any 100 kHz bandwidth outside the EUT pass band, the RF power produced by the modulation products of the spreading sequence, the information sequence, and the carrier frequency shall be at least 20 dB below that of the maximum in-band 100 kHz emission, antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.
All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the pass band.
The test was performed at 3 channels.

4.7. Antenna Measurement

■ **Limit**

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.247 (b), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

■ **Antenna Description**

See section 2 – antenna information.

■ **Antenna Connector Construction**

KDB 353028 D01 Antennas Part 15 Transmitters v01

II. BASIC RULE AND POLICY REQUIREMENTS FOR ANTENNAS USED WITH PART 15 TRANSMITTERS A. ANTENNA REQUIREMENTS—Section 15.203

2) The following describes the three ways that can be used to demonstrate compliance to Section 15.203:

c) Professional installation

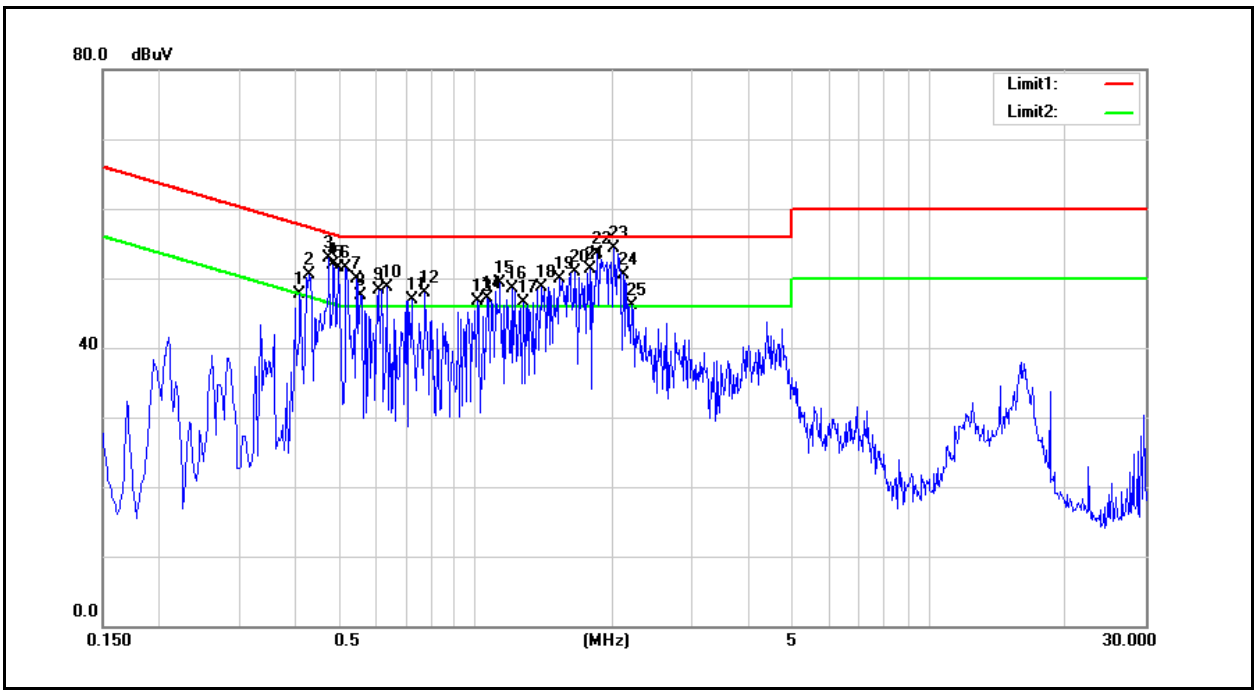
■ **Directional Gain Calculated**

Operate Freq. Band	Directional Gain (dBi)
IEEE 802.11b	5
IEEE 802.11g	5
IEEE 802.11n 2.4 GHz 20 MHz	5
IEEE 802.11n 2.4 GHz 40 MHz	5

5 Test Results

Annex A. Conducted Emission

Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Description:			



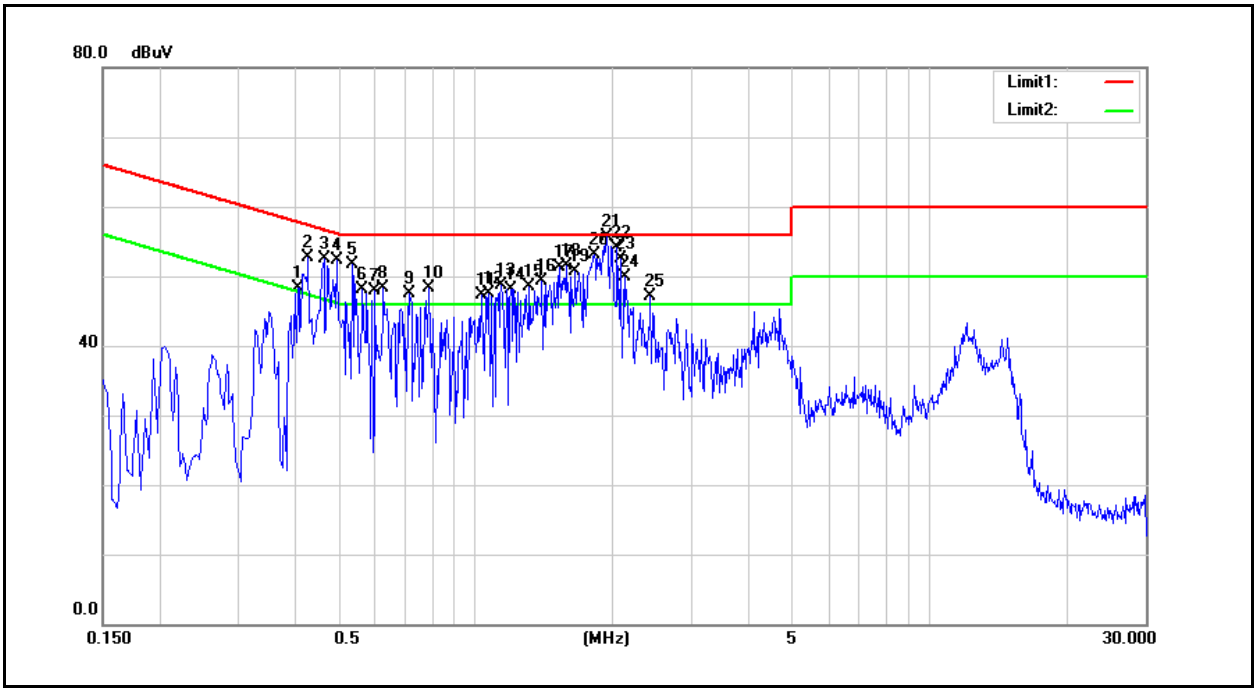
Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Description:			

No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.4100	37.27	20.41	9.60	46.87	30.01	57.65	47.65	-10.78	-17.64	Pass
2	0.4300	39.52	20.88	9.60	49.12	30.48	57.25	47.25	-8.13	-16.77	Pass
3	0.4740	40.57	25.02	9.60	50.17	34.62	56.44	46.44	-6.27	-11.82	Pass
4	0.4860	40.04	23.99	9.60	49.64	33.59	56.24	46.24	-6.60	-12.65	Pass
5	0.4980	39.69	22.65	9.60	49.29	32.25	56.03	46.03	-6.74	-13.78	Pass
6	0.5180	36.54	17.43	9.60	46.14	27.03	56.00	46.00	-9.86	-18.97	Pass
7	0.5460	37.42	18.91	9.60	47.02	28.51	56.00	46.00	-8.98	-17.49	Pass
8	0.5580	36.32	17.47	9.60	45.92	27.07	56.00	46.00	-10.08	-18.93	Pass
9	0.6100	35.43	16.91	9.60	45.03	26.51	56.00	46.00	-10.97	-19.49	Pass
10	0.6340	36.09	17.99	9.61	45.70	27.60	56.00	46.00	-10.30	-18.40	Pass
11	0.7220	32.71	16.91	9.62	42.33	26.53	56.00	46.00	-13.67	-19.47	Pass
12	0.7740	33.42	16.09	9.62	43.04	25.71	56.00	46.00	-12.96	-20.29	Pass
13	1.0100	32.85	14.59	9.63	42.48	24.22	56.00	46.00	-13.52	-21.78	Pass
14	1.0620	33.79	17.09	9.63	43.42	26.72	56.00	46.00	-12.58	-19.28	Pass
15	1.1340	34.98	17.61	9.63	44.61	27.24	56.00	46.00	-11.39	-18.76	Pass
16	1.1980	33.91	16.45	9.64	43.55	26.09	56.00	46.00	-12.45	-19.91	Pass
17	1.2740	32.82	16.16	9.64	42.46	25.80	56.00	46.00	-13.54	-20.20	Pass
18	1.4020	33.40	16.56	9.64	43.04	26.20	56.00	46.00	-12.96	-19.80	Pass
19	1.5300	35.50	18.10	9.66	45.16	27.76	56.00	46.00	-10.84	-18.24	Pass
20	1.6460	36.35	19.11	9.66	46.01	28.77	56.00	46.00	-9.99	-17.23	Pass
21	1.7860	36.04	19.49	9.66	45.70	29.15	56.00	46.00	-10.30	-16.85	Pass
22	1.8540	37.78	20.50	9.67	47.45	30.17	56.00	46.00	-8.55	-15.83	Pass
23	2.0140	38.50	21.29	9.67	48.17	30.96	56.00	46.00	-7.83	-15.04	Pass
24	2.1140	33.22	16.33	9.67	42.89	26.00	56.00	46.00	-13.11	-20.00	Pass
25	2.2060	30.62	15.40	9.67	40.29	25.07	56.00	46.00	-15.71	-20.93	Pass

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Description:			



Standard:	FCC Part 15.247	Line:	N
Test item:	Conducted Emission	Power:	AC 120 V/60 Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Description:			

No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.4060	36.81	20.14	9.71	46.52	29.85	57.73	47.73	-11.21	-17.88	Pass
2	0.4260	39.38	21.90	9.71	49.09	31.61	57.33	47.33	-8.24	-15.72	Pass
3	0.4620	40.74	24.65	9.71	50.45	34.36	56.66	46.66	-6.21	-12.30	Pass
4	0.4940	39.58	22.98	9.71	49.29	32.69	56.10	46.10	-6.81	-13.41	Pass
5	0.5340	38.75	20.94	9.71	48.46	30.65	56.00	46.00	-7.54	-15.35	Pass
6	0.5620	36.09	17.11	9.71	45.80	26.82	56.00	46.00	-10.20	-19.18	Pass
7	0.5980	34.78	16.48	9.71	44.49	26.19	56.00	46.00	-11.51	-19.81	Pass
8	0.6260	36.09	17.68	9.72	45.81	27.40	56.00	46.00	-10.19	-18.60	Pass
9	0.7140	34.69	17.99	9.72	44.41	27.71	56.00	46.00	-11.59	-18.29	Pass
10	0.7900	35.13	17.49	9.72	44.85	27.21	56.00	46.00	-11.15	-18.79	Pass
11	1.0300	32.80	13.72	9.73	42.53	23.45	56.00	46.00	-13.47	-22.55	Pass
12	1.0700	34.38	17.61	9.73	44.11	27.34	56.00	46.00	-11.89	-18.66	Pass
13	1.1380	35.15	18.08	9.73	44.88	27.81	56.00	46.00	-11.12	-18.19	Pass
14	1.1940	34.16	16.53	9.74	43.90	26.27	56.00	46.00	-12.10	-19.73	Pass
15	1.3140	33.74	16.70	9.74	43.48	26.44	56.00	46.00	-12.52	-19.56	Pass
16	1.3980	33.11	16.44	9.74	42.85	26.18	56.00	46.00	-13.15	-19.82	Pass
17	1.5340	35.70	18.36	9.76	45.46	28.12	56.00	46.00	-10.54	-17.88	Pass
18	1.5820	36.94	19.64	9.76	46.70	29.40	56.00	46.00	-9.30	-16.60	Pass
19	1.6620	34.63	17.90	9.76	44.39	27.66	56.00	46.00	-11.61	-18.34	Pass
20	1.8220	38.09	20.60	9.76	47.85	30.36	56.00	46.00	-8.15	-15.64	Pass
21	1.9460	38.90	22.43	9.77	48.67	32.20	56.00	46.00	-7.33	-13.80	Pass
22	2.0500	37.19	19.74	9.77	46.96	29.51	56.00	46.00	-9.04	-16.49	Pass
23	2.0780	36.42	19.78	9.77	46.19	29.55	56.00	46.00	-9.81	-16.45	Pass
24	2.1260	33.56	16.92	9.77	43.33	26.69	56.00	46.00	-12.67	-19.31	Pass
25	2.4300	28.03	13.56	9.78	37.81	23.34	56.00	46.00	-18.19	-22.66	Pass

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2. Correction factor (dB) = Cable loss (dB) + L.I.S.N. factor (dB).

Annex B. Conducted Test Results

Maximum Conducted Output Power Measurement

ANT-0							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 2	2412	1 M	19.98	0.100	22.35	0.172	≤ 30
	2437		25.88	0.387	**27.30**	**0.537**	≤ 30
	2462		18.60	0.072	21.06	0.128	≤ 30
	2437	2 M	25.80	0.380	27.22	0.527	≤ 30
	2437	5.5 M	25.85	0.385	27.25	0.531	≤ 30
	2437	11 M	25.84	0.384	27.24	0.530	≤ 30
Mode 3	2412	6 M	16.06	0.040	26.14	0.411	≤ 30
	2437		23.74	0.237	**28.79**	**0.757**	≤ 30
	2462		18.03	0.064	26.55	0.452	≤ 30
	2437	9 M	23.70	0.234	28.76	0.752	≤ 30
	2437	12 M	23.71	0.235	28.74	0.748	≤ 30
	2437	18 M	23.69	0.234	28.73	0.746	≤ 30
	2437	24 M	23.68	0.233	28.75	0.750	≤ 30
	2437	36 M	23.71	0.235	28.76	0.752	≤ 30
	2437	48 M	23.70	0.234	28.74	0.748	≤ 30
	2437	54 M	23.72	0.236	28.71	0.743	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-0							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 4	2412	6.5M	15.15	0.033	25.36	0.344	≤ 30
	2437		22.74	0.188	28.70	0.741	≤ 30
	2462		14.41	0.028	24.59	0.288	≤ 30
	2437	14.4M	22.70	0.186	28.60	0.724	≤ 30
	2437	21.7M	22.68	0.185	28.59	0.723	≤ 30
	2437	28.9M	22.69	0.186	28.61	0.726	≤ 30
	2437	43.3M	22.71	0.187	28.63	0.729	≤ 30
	2437	57.8M	22.70	0.186	28.59	0.723	≤ 30
	2437	65M	22.67	0.185	28.65	0.733	≤ 30
	2437	72.2M	22.69	0.186	28.64	0.731	≤ 30
Mode 5	2422	13.5M	12.25	0.017	22.78	0.190	≤ 30
	2437		14.85	0.031	**25.50**	**0.355**	≤ 30
	2452		12.60	0.018	22.65	0.184	≤ 30
	2437	30M	14.80	0.030	25.39	0.346	≤ 30
	2437	45M	14.82	0.030	25.42	0.348	≤ 30
	2437	60M	14.79	0.030	25.43	0.349	≤ 30
	2437	90M	14.77	0.030	25.45	0.351	≤ 30
	2437	120M	14.80	0.030	25.39	0.346	≤ 30
	2437	135M	14.78	0.030	25.40	0.347	≤ 30
	2437	150M	14.82	0.030	25.44	0.350	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-0							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 6	2412	13M	11.22	0.013	21.53	0.142	≤ 30
	2437		16.42	0.044	26.56	0.453	≤ 30
	2462		13.36	0.022	24.44	0.278	≤ 30
	2437	28.8M	16.34	0.043	26.50	0.447	≤ 30
	2437	43.4M	16.30	0.043	26.45	0.442	≤ 30
	2437	57.8M	16.33	0.043	26.53	0.450	≤ 30
	2437	86.6M	16.36	0.043	26.51	0.448	≤ 30
	2437	115.6M	16.34	0.043	26.48	0.445	≤ 30
	2437	130M	16.35	0.043	26.53	0.450	≤ 30
	2437	144.4M	16.36	0.043	26.55	0.452	≤ 30
Mode 7	2422	27M	9.15	0.008	19.33	0.086	≤ 30
	2437		12.03	0.016	23.28	0.213	≤ 30
	2452		9.25	0.008	19.36	0.086	≤ 30
	2437	60M	12.00	0.016	23.20	0.209	≤ 30
	2437	90M	11.99	0.016	23.22	0.210	≤ 30
	2437	120M	11.98	0.016	23.23	0.210	≤ 30
	2437	180M	12.00	0.016	23.21	0.209	≤ 30
	2437	240M	11.96	0.016	23.24	0.211	≤ 30
	2437	270M	11.97	0.016	23.25	0.211	≤ 30
	2437	300M	11.99	0.016	23.24	0.211	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 2	2412	1 M	19.01	0.080	21.41	0.138	≤ 30
	2437		24.88	0.308	27.08	0.511	≤ 30
	2462		17.26	0.053	19.85	0.097	≤ 30
	2437	2 M	24.80	0.302	27.02	0.504	≤ 30
	2437	5.5 M	24.85	0.305	27.01	0.502	≤ 30
	2437	11 M	24.84	0.305	27.04	0.506	≤ 30
Mode 3	2412	6 M	15.06	0.032	25.35	0.343	≤ 30
	2437		22.54	0.179	28.41	0.693	≤ 30
	2462		16.06	0.040	26.15	0.412	≤ 30
	2437	9 M	22.50	0.178	28.35	0.684	≤ 30
	2437	12 M	22.46	0.176	28.36	0.685	≤ 30
	2437	18 M	22.48	0.177	28.38	0.689	≤ 30
	2437	24 M	22.52	0.179	28.35	0.684	≤ 30
	2437	36 M	22.50	0.178	28.36	0.685	≤ 30
	2437	48 M	22.49	0.177	28.39	0.690	≤ 30
	2437	54 M	22.51	0.178	28.37	0.687	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 4	2412	6.5M	14.21	0.026	24.22	0.264	≤ 30
	2437		21.63	0.146	28.36	0.685	≤ 30
	2462		15.12	0.033	24.96	0.313	≤ 30
	2437	14.4M	21.58	0.144	28.30	0.676	≤ 30
	2437	21.7M	21.60	0.145	28.32	0.679	≤ 30
	2437	28.9M	21.59	0.144	28.29	0.675	≤ 30
	2437	43.3M	21.57	0.144	28.30	0.676	≤ 30
	2437	57.8M	21.59	0.144	28.32	0.679	≤ 30
	2437	65M	21.61	0.145	28.30	0.676	≤ 30
	2437	72.2M	21.60	0.145	28.29	0.675	≤ 30
Mode 5	2422	13.5M	11.41	0.014	21.93	0.156	≤ 30
	2437		13.69	0.023	24.10	0.257	≤ 30
	2452		10.96	0.012	21.20	0.132	≤ 30
	2437	30M	13.65	0.023	24.02	0.252	≤ 30
	2437	45M	13.64	0.023	24.05	0.254	≤ 30
	2437	60M	13.62	0.023	23.99	0.251	≤ 30
	2437	90M	13.65	0.023	23.98	0.250	≤ 30
	2437	120M	13.60	0.023	24.02	0.252	≤ 30
	2437	135M	13.65	0.023	24.03	0.253	≤ 30
	2437	150M	13.64	0.023	24.05	0.254	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 6	2412	13M	9.01	0.008	19.60	0.091	≤ 30
	2437		15.56	0.036	26.06	0.404	≤ 30
	2462		11.33	0.014	21.52	0.142	≤ 30
	2437	28.8M	15.50	0.035	26.00	0.398	≤ 30
	2437	43.4M	15.48	0.035	25.98	0.396	≤ 30
	2437	57.8M	15.46	0.035	25.99	0.397	≤ 30
	2437	86.6M	15.51	0.036	26.02	0.400	≤ 30
	2437	115.6M	15.53	0.036	26.04	0.402	≤ 30
	2437	130M	15.49	0.035	25.99	0.397	≤ 30
	2437	144.4M	15.53	0.036	26.03	0.401	≤ 30
Mode 7	2422	27M	7.42	0.006	17.68	0.059	≤ 30
	2437		10.09	0.010	20.93	0.124	≤ 30
	2452		7.55	0.006	17.55	0.057	≤ 30
	2437	60M	10.16	0.010	20.90	0.123	≤ 30
	2437	90M	10.15	0.010	20.89	0.123	≤ 30
	2437	120M	10.12	0.010	20.88	0.122	≤ 30
	2437	180M	10.18	0.010	20.91	0.123	≤ 30
	2437	240M	10.15	0.010	20.88	0.122	≤ 30
	2437	270M	10.14	0.010	20.91	0.123	≤ 30
	2437	300M	10.13	0.010	20.89	0.123	≤ 30

Note: The relevant measured result has the offset with cable loss already.

ANT-0+1							
Test Mode	Frequency (MHz)	Data Rate	Average Output Power		Peak Output Power		
			Measurement Results		Measurement Results		Limit
			dBm	W	dBm	W	dBm
Mode 6	2412	13M	13.26	0.021	23.68	0.233	≤ 30
	2437		19.02	0.080	**29.33**	**0.857**	≤ 30
	2462		15.47	0.035	26.23	0.420	≤ 30
	2437	28.8M	18.95	0.079	29.27	0.845	≤ 30
	2437	43.4M	18.92	0.078	29.23	0.838	≤ 30
	2437	57.8M	18.93	0.078	29.28	0.847	≤ 30
	2437	86.6M	18.97	0.079	29.28	0.848	≤ 30
	2437	115.6M	18.96	0.079	29.28	0.846	≤ 30
	2437	130M	18.95	0.079	29.28	0.847	≤ 30
	2437	144.4M	18.98	0.079	29.31	0.853	≤ 30
Mode 7	2422	27M	11.38	0.014	21.59	0.144	≤ 30
	2437		14.18	0.026	25.27	0.337	≤ 30
	2452		11.49	0.014	21.56	0.143	≤ 30
	2437	60M	14.19	0.026	25.21	0.332	≤ 30
	2437	90M	14.18	0.026	25.22	0.333	≤ 30
	2437	120M	14.16	0.026	25.22	0.333	≤ 30
	2437	180M	14.19	0.026	25.22	0.333	≤ 30
	2437	240M	14.16	0.026	25.23	0.333	≤ 30
	2437	270M	14.16	0.026	25.25	0.335	≤ 30
	2437	300M	14.17	0.026	25.23	0.334	≤ 30

Note: The relevant measured result has the offset with cable loss already.

6 dB RF Bandwidth Measurement

Test Mode	Frequency (MHz)	Measurement (kHz)	Limit (kHz)
		ANT-0	
Mode 2	2412	10110	≥ 500
	2437	9637	≥ 500
	2462	9639	≥ 500
Mode 3	2412	16600	≥ 500
	2437	16500	≥ 500
	2462	16500	≥ 500
Mode 4	2412	17830	≥ 500
	2437	17720	≥ 500
	2462	17730	≥ 500
Mode 5	2422	36440	≥ 500
	2437	36180	≥ 500
	2452	36610	≥ 500

Test Mode	Frequency (MHz)	Measurement (kHz)		Limit (kHz)
		ANT-0	ANT-1	
Mode 6	2412	17840	17780	≥ 500
	2437	17720	17420	≥ 500
	2462	17720	17630	≥ 500
Mode 7	2422	36430	36350	≥ 500
	2437	36070	33250	≥ 500
	2452	36570	36520	≥ 500

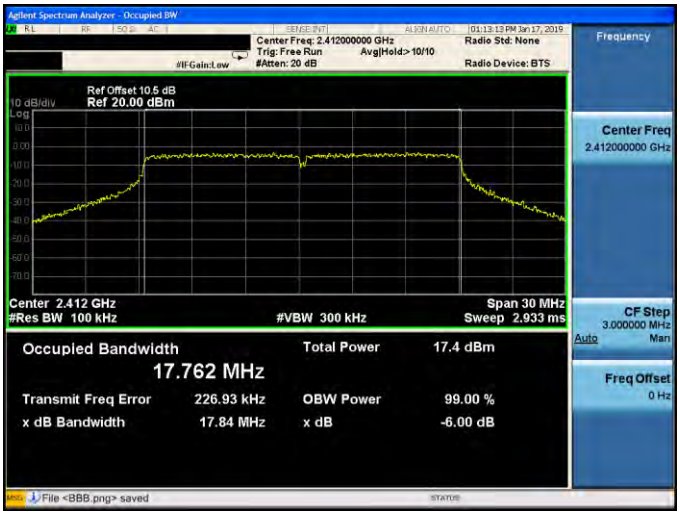
■ **Test Graphs**

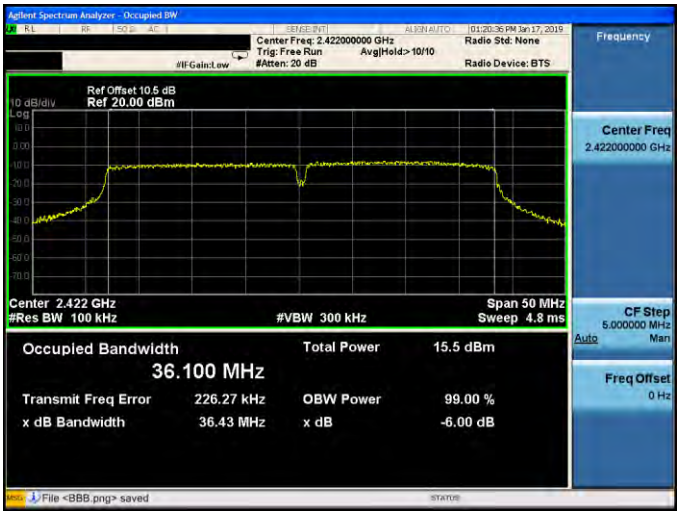
Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-1	
2412 MHz	
2437 MHz	
2462 MHz	

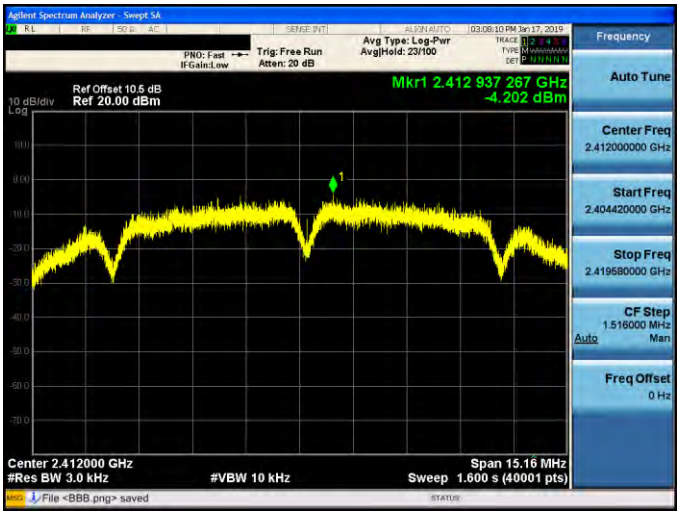
Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-1	
2422 MHz	
2437 MHz	
2452 MHz	

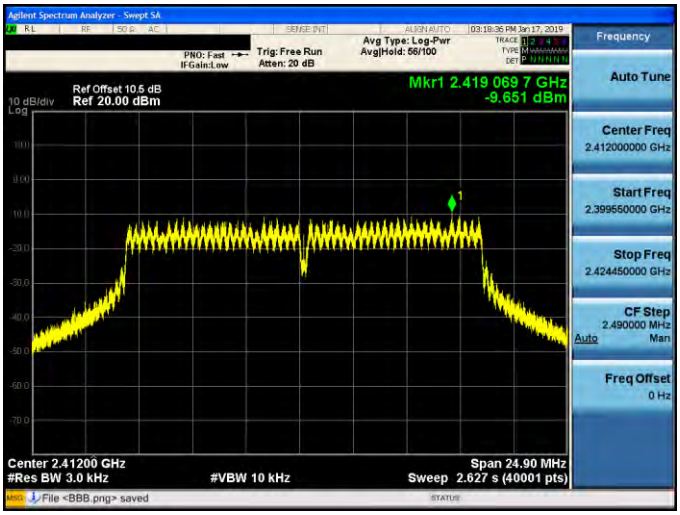
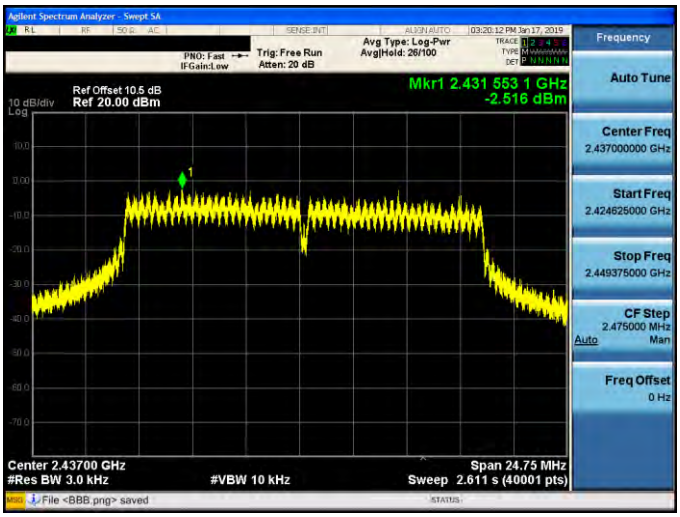
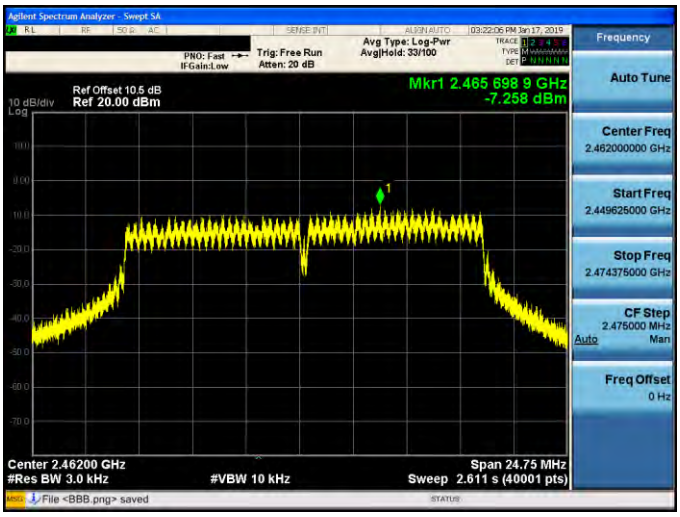
Maximum Power Density Measurement

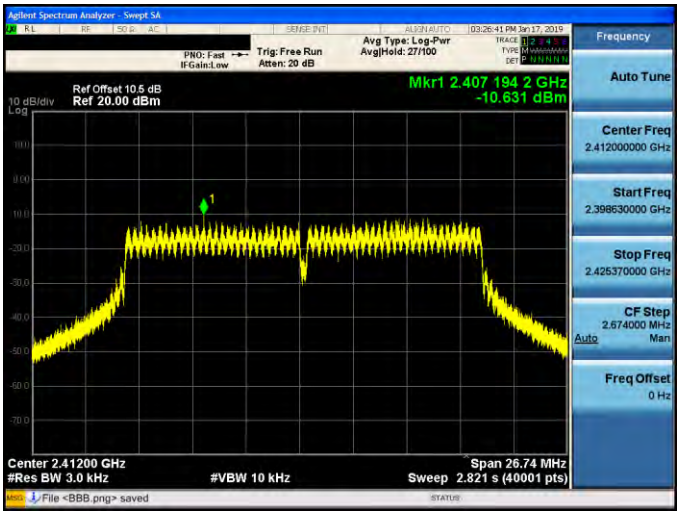
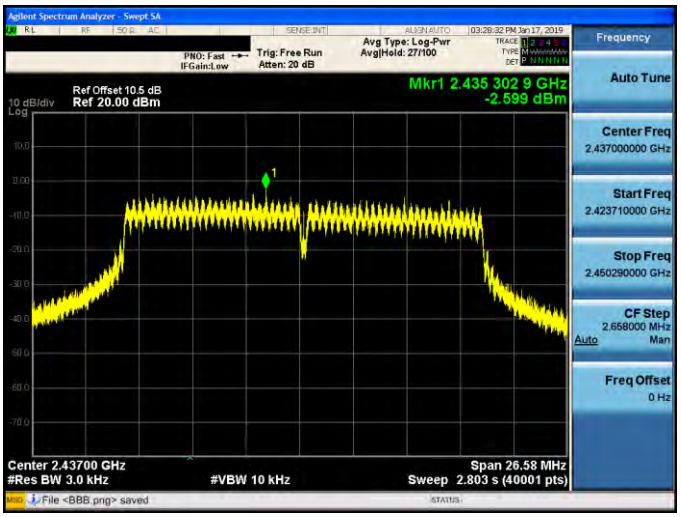
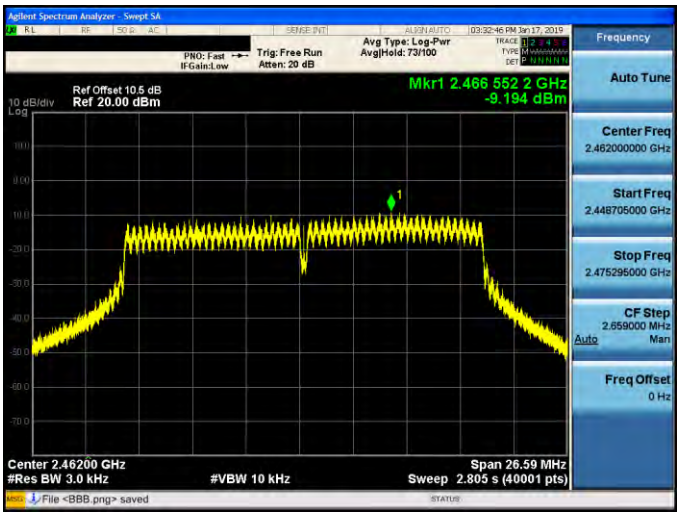
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)	Limit (dBm/3 kHz)
		ANT-0	
Mode 2	2412	-4.202	≤ 8
	2437	1.613	≤ 8
	2462	1.445	≤ 8
Mode 3	2412	-9.651	≤ 8
	2437	-2.516	≤ 8
	2462	-7.258	≤ 8
Mode 4	2412	-10.631	≤ 8
	2437	-2.599	≤ 8
	2462	-9.194	≤ 8
Mode 5	2422	-12.368	≤ 8
	2437	-13.152	≤ 8
	2452	-14.027	≤ 8

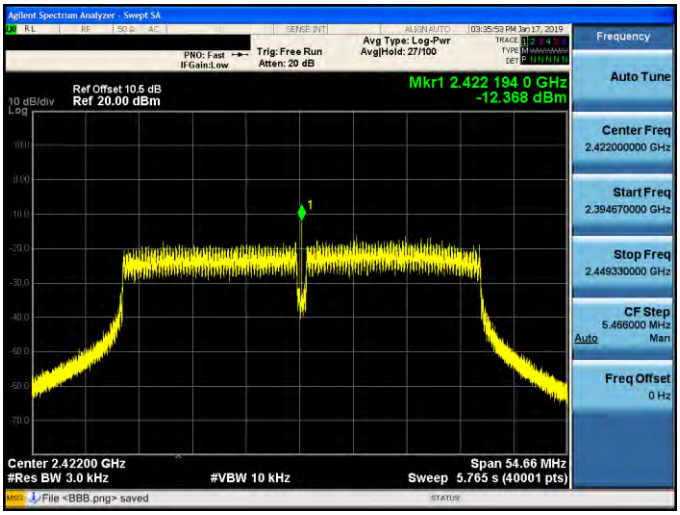
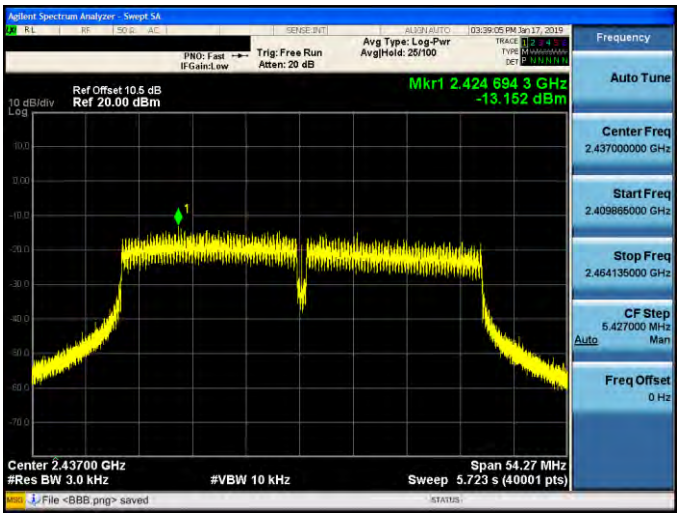
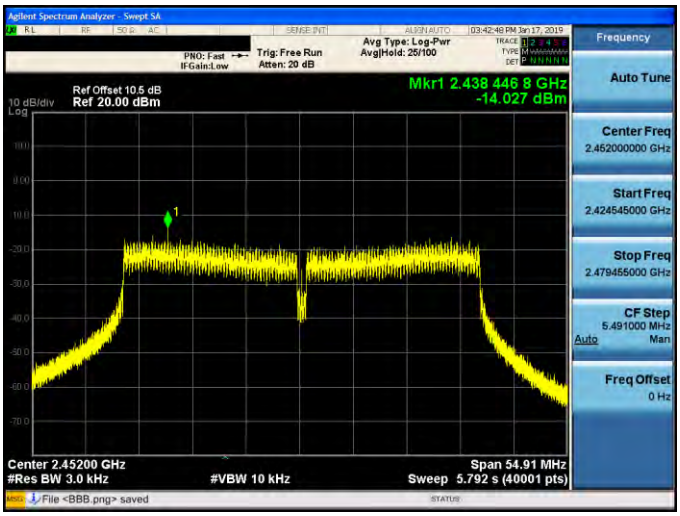
Test Mode	Frequency (MHz)	Measurement (dBm/3 kHz)			Limit (dBm/3 kHz)
		ANT-0	ANT-1	ANT-0+1	
Mode 6	2412	-14.753	-15.348	-12.030	≤ 8
	2437	-4.549	-4.397	-1.462	≤ 8
	2462	-12.287	-13.845	-9.986	≤ 8
Mode 7	2422	-19.926	-20.306	-17.102	≤ 8
	2437	-15.780	-17.170	-13.409	≤ 8
	2452	-15.538	-20.621	-14.364	≤ 8

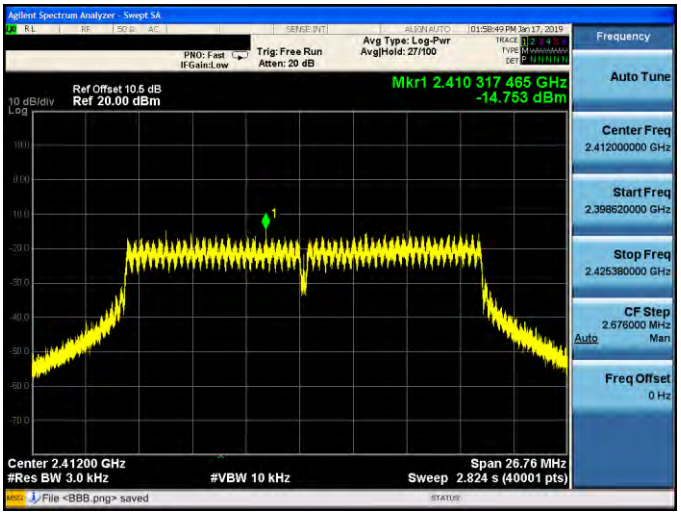
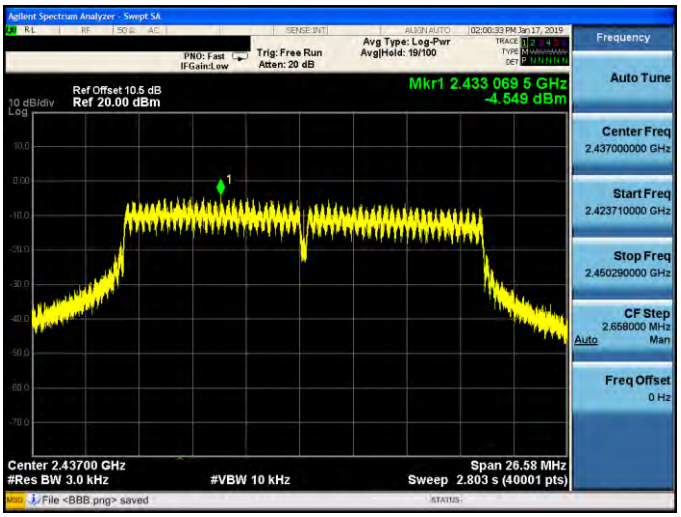
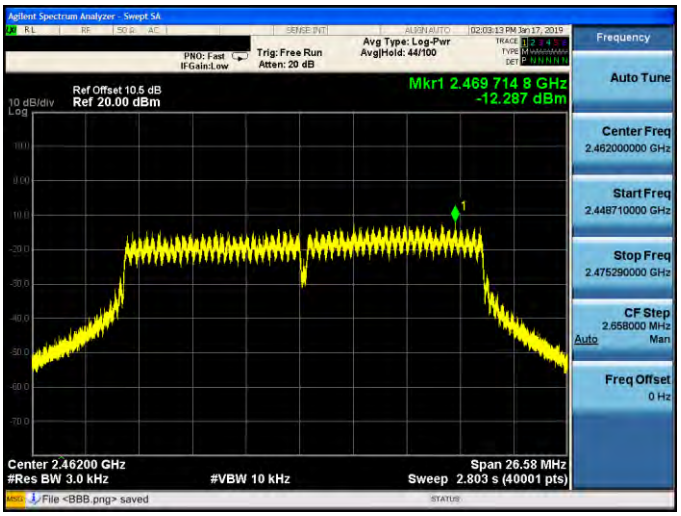
■ **Test Graphs**

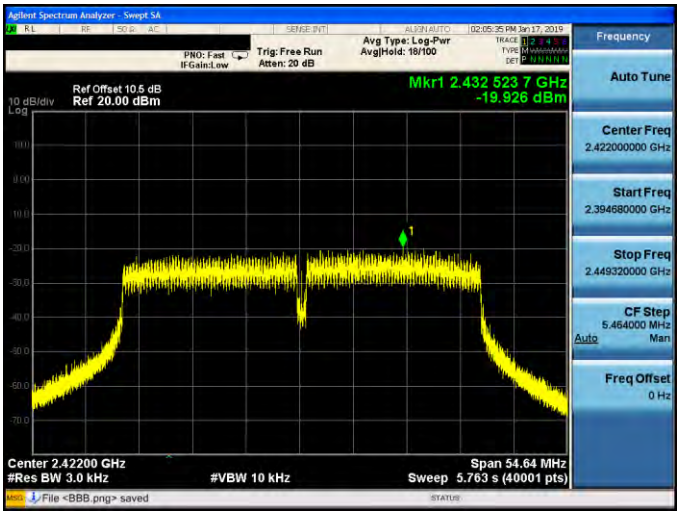
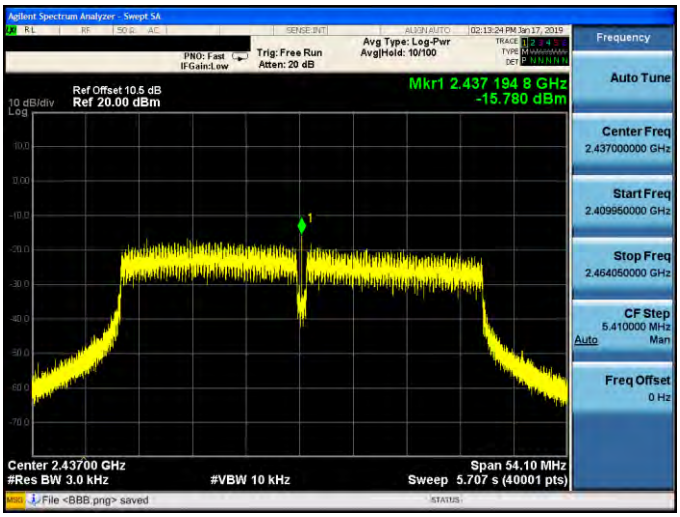
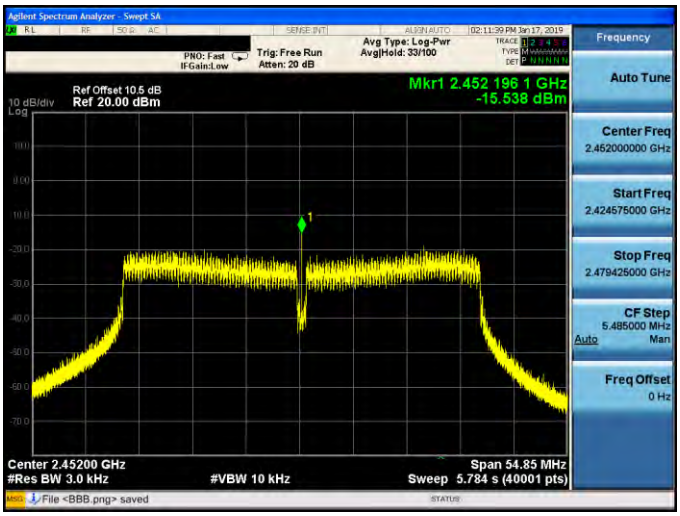
Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

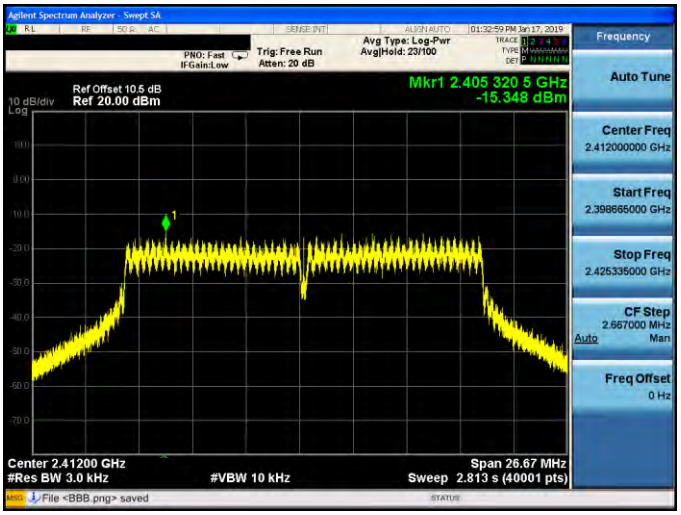
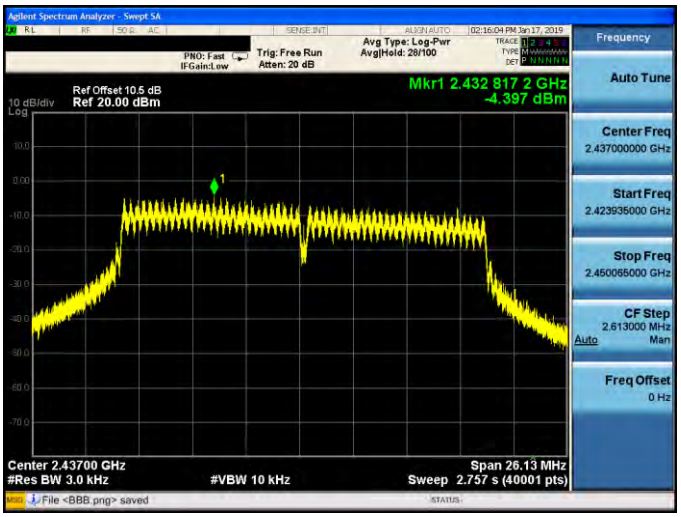
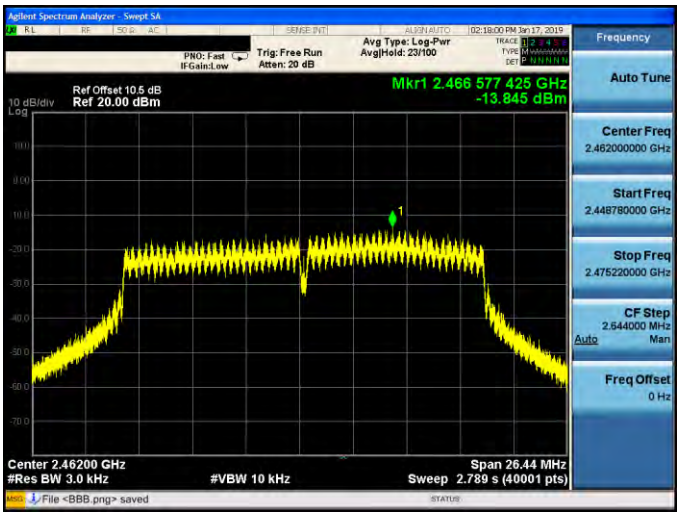
Mode 3: IEEE 802.11g Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

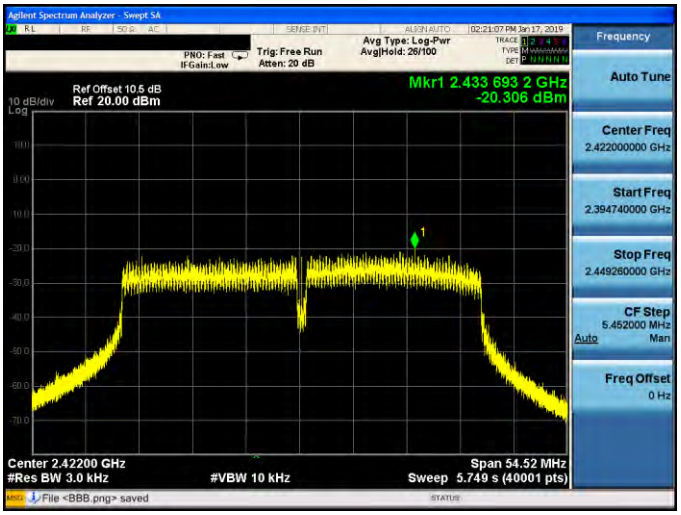
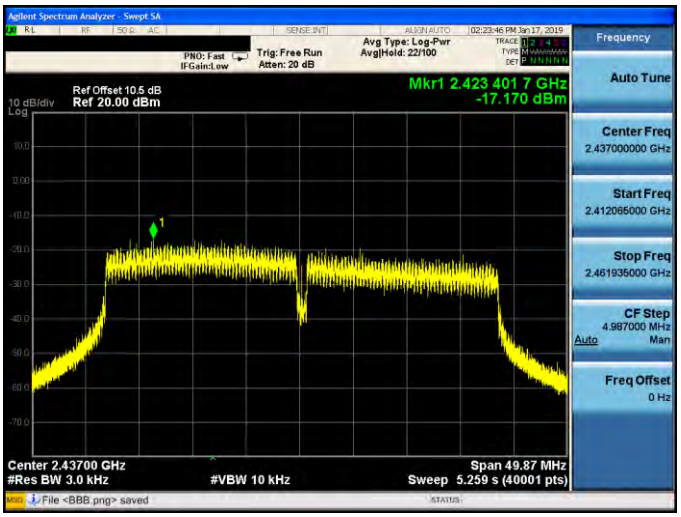
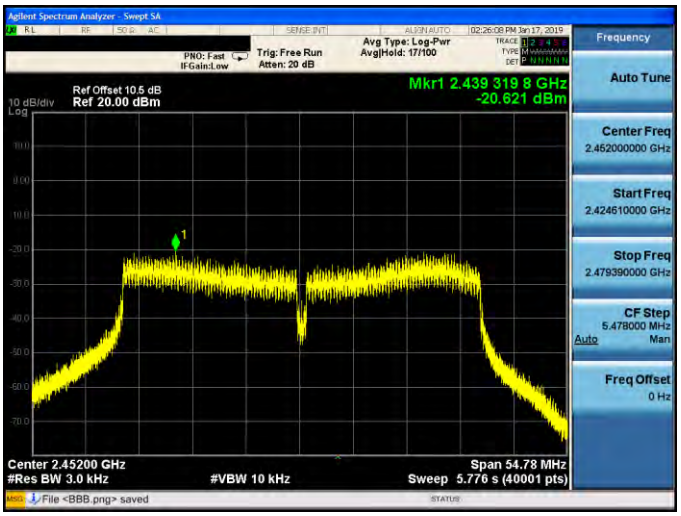
Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-1	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-1	
2422 MHz	
2437 MHz	
2452 MHz	

Out of Band Conducted Emissions Measurement

■ **Test Graphs**

Reference level

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-1	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-1	
2422 MHz	
2437 MHz	
2452 MHz	

Out of Band Conducted Emissions

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2437 MHz	
2462 MHz	

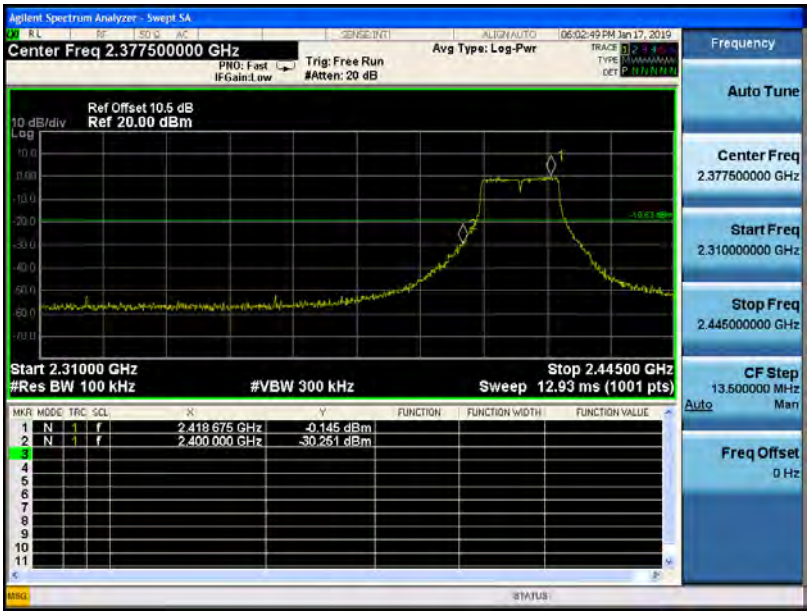
Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2437 MHz	
2452 MHz	

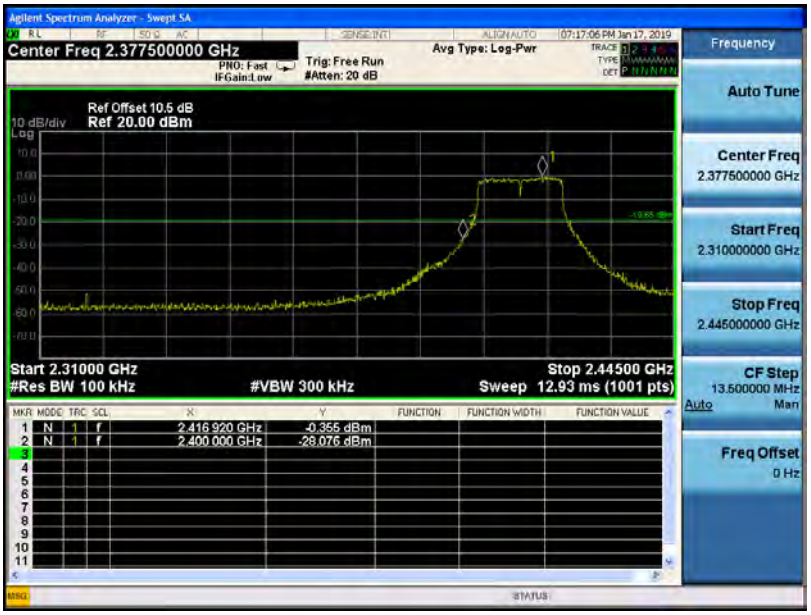
Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-1	
2412 MHz	
2437 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-1	
2422 MHz	
2437 MHz	
2452 MHz	

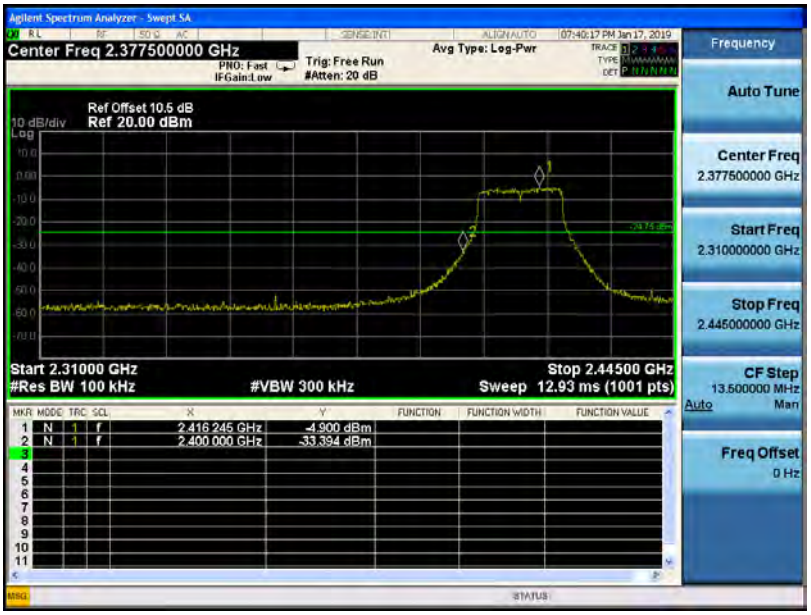
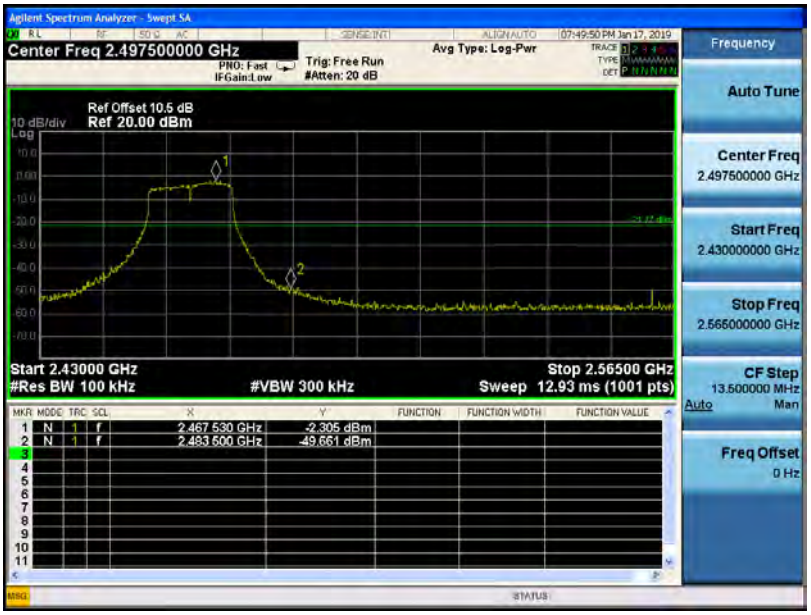
Conducted Band Edge

Mode 2: IEEE 802.11b Continuous TX mode_ANT-0	
2412 MHz	
2462 MHz	

Mode 3: IEEE 802.11g Continuous TX mode_ANT-0	
2412 MHz	
2462 MHz	

Mode 4: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2462 MHz	

Mode 5: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-0	
2412 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-0	
2422 MHz	
2452 MHz	

Mode 6: IEEE 802.11n 2.4 GHz 20 MHz Continuous TX mode_ANT-1	
2412 MHz	
2462 MHz	

Mode 7: IEEE 802.11n 2.4 GHz 40 MHz Continuous TX mode_ANT-1	
2422 MHz	
2452 MHz	

Annex C. Radiated Emission Measurement

Harmonic

Below 1 GHz

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
110.5000	40.68	-10.35	30.33	43.50	-13.17	QP	H
117.0000	47.63	-9.57	38.06	43.50	-5.44	QP	H
132.0000	36.91	-7.72	29.19	43.50	-14.31	QP	H
169.7000	37.56	-6.88	30.68	43.50	-12.82	QP	H
255.8000	34.54	-7.06	27.48	46.00	-18.52	QP	H
613.0000	25.36	0.49	25.85	46.00	-20.15	QP	H
115.0000	38.73	-9.81	28.92	43.50	-14.58	QP	V
130.0000	35.26	-7.83	27.43	43.50	-16.07	QP	V
171.0000	42.16	-7.02	35.14	43.50	-8.36	QP	V
245.0000	34.05	-7.39	26.66	46.00	-19.34	QP	V
279.0000	39.04	-6.00	33.04	46.00	-12.96	QP	V
609.7000	26.08	0.45	26.53	46.00	-19.47	QP	V

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

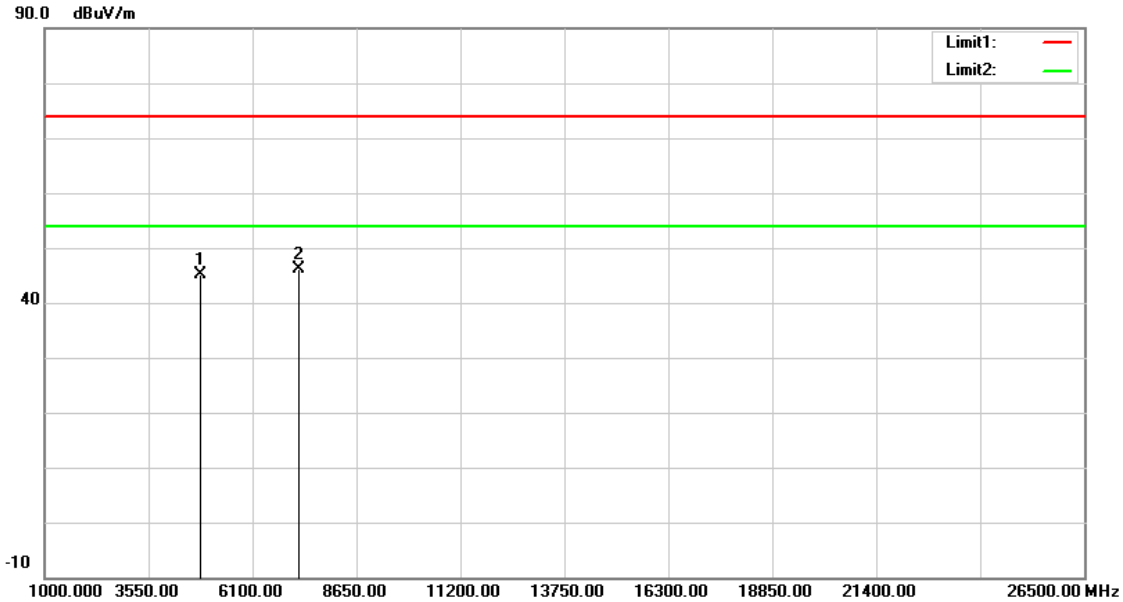
Example: 30.33= -10.35+40.68

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Above 1 GHz

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	39.67	5.37	45.04	74.00	-28.96	peak
2	7236.000	34.22	11.90	46.12	74.00	-27.88	peak

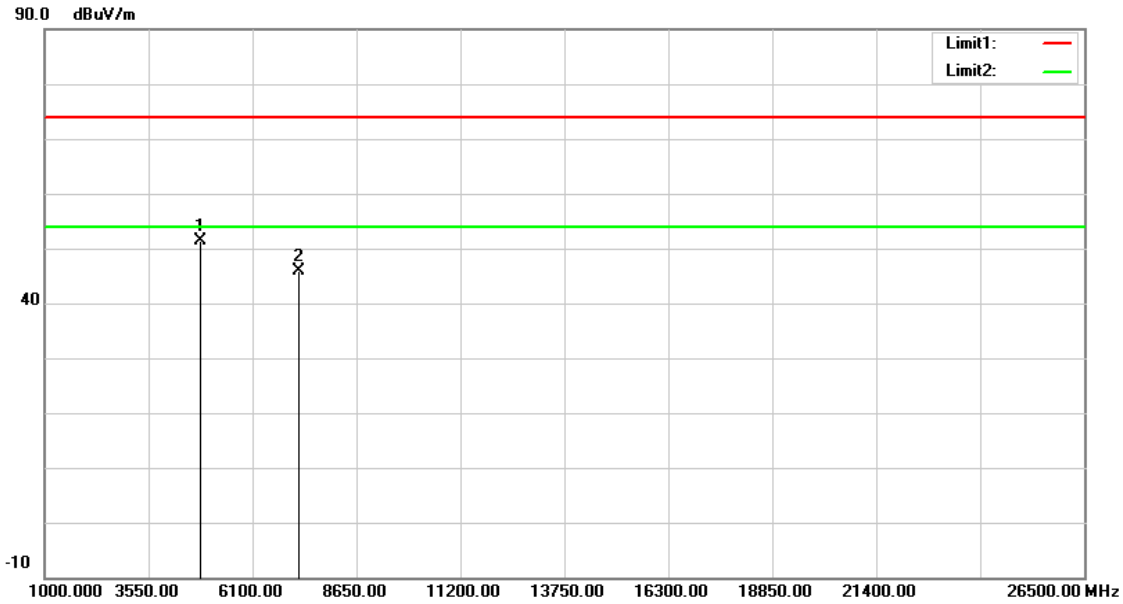
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 45.04=5.37+39.67

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	45.90	5.37	51.27	74.00	-22.73	peak
2	7236.000	34.08	11.90	45.98	74.00	-28.02	peak

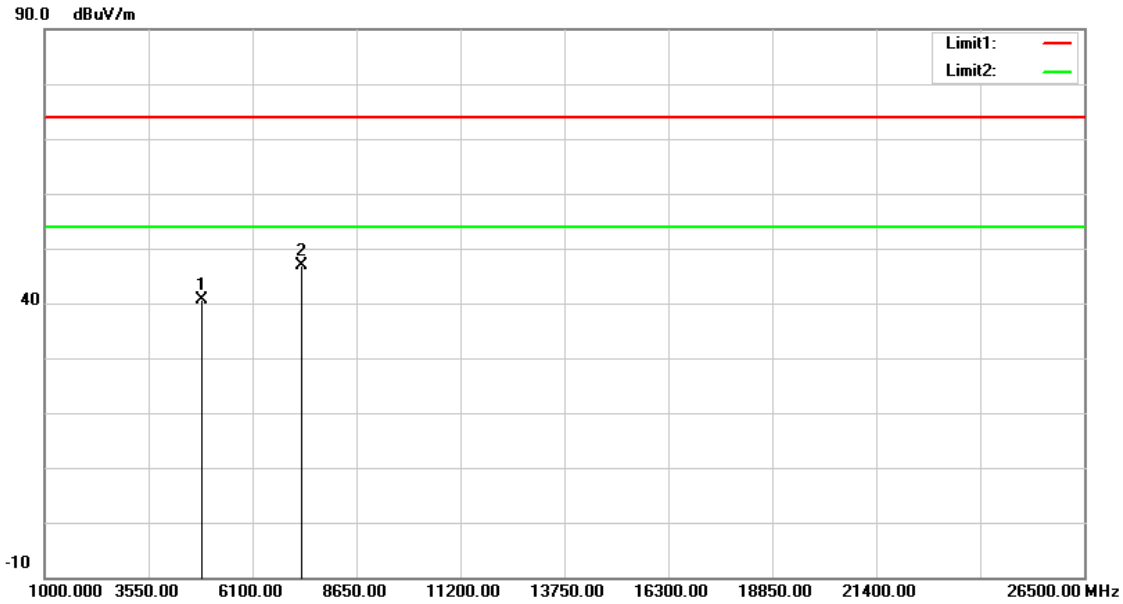
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 51.27=5.37+45.90

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



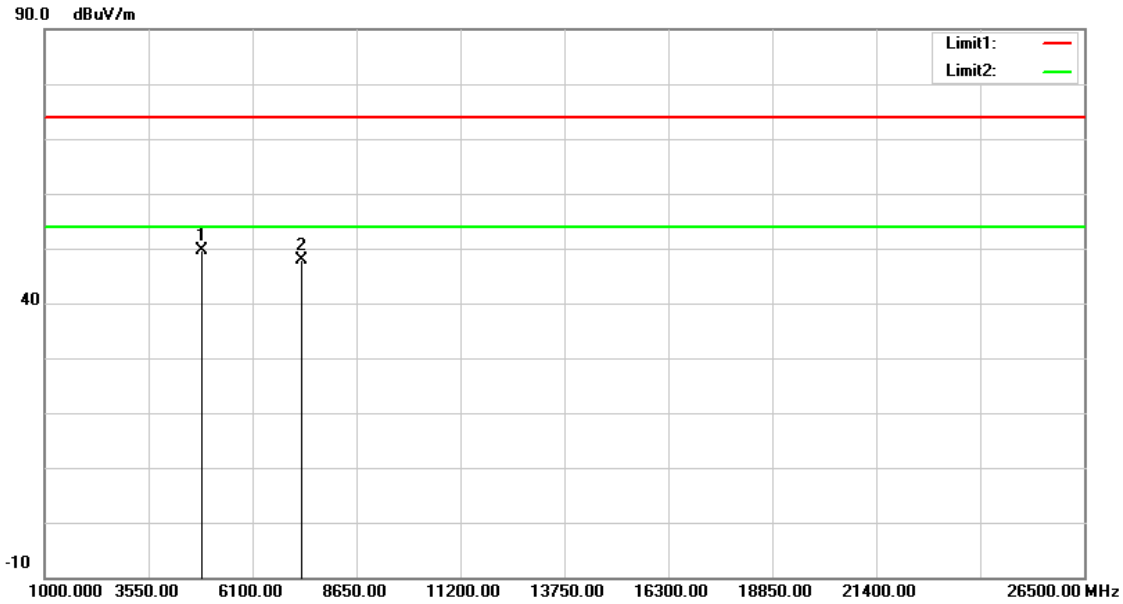
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	35.11	5.47	40.58	74.00	-33.42	peak
2	7311.000	34.78	12.13	46.91	74.00	-27.09	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



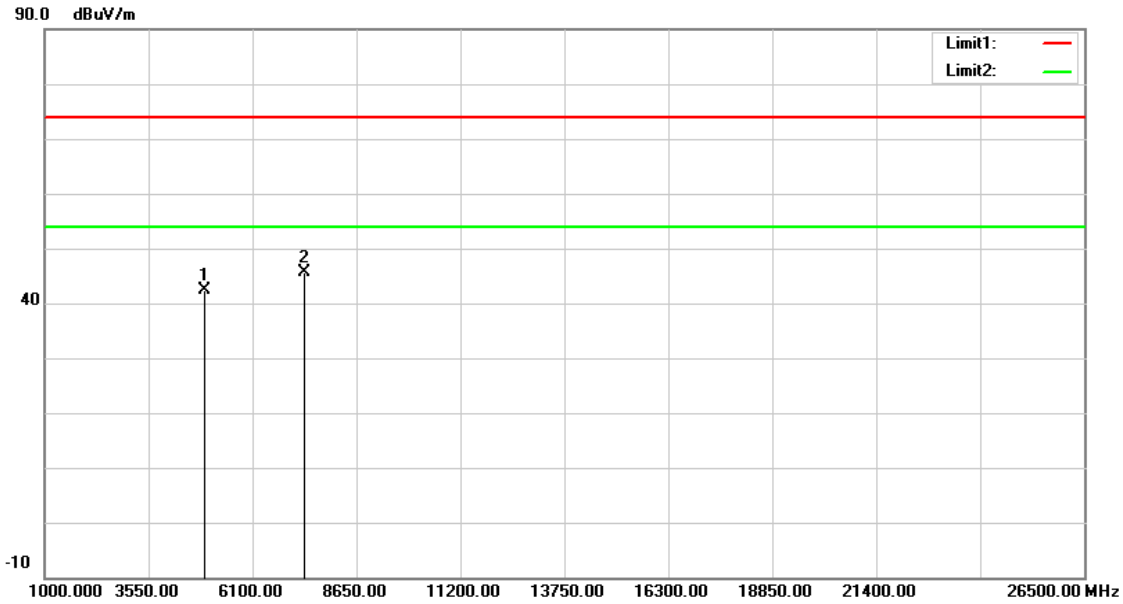
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	44.08	5.47	49.55	74.00	-24.45	peak
2	7311.000	35.86	12.13	47.99	74.00	-26.01	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



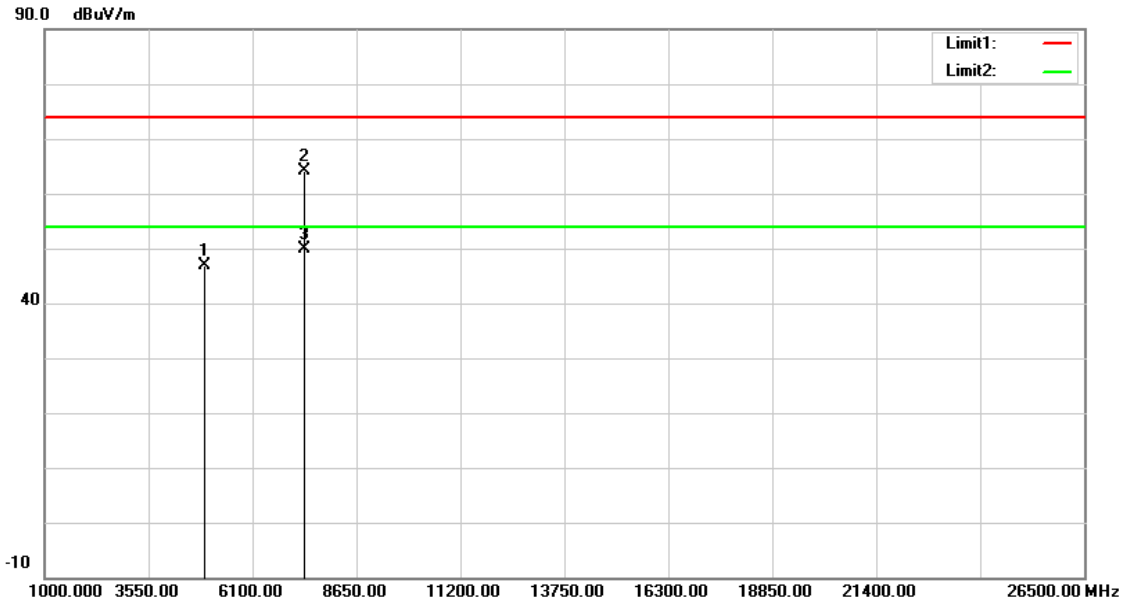
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	36.73	5.58	42.31	74.00	-31.69	peak
2	7386.000	33.18	12.36	45.54	74.00	-28.46	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



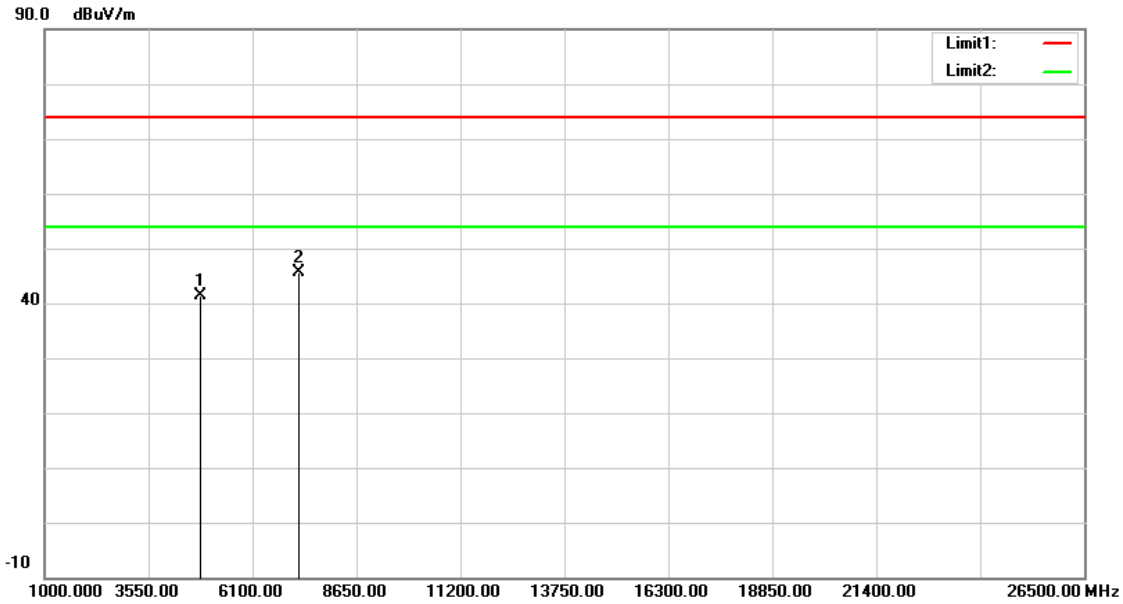
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	41.34	5.58	46.92	74.00	-27.08	peak
2	7386.000	51.66	12.36	64.02	74.00	-9.98	peak
3	7386.000	37.46	12.36	49.82	54.00	-4.18	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



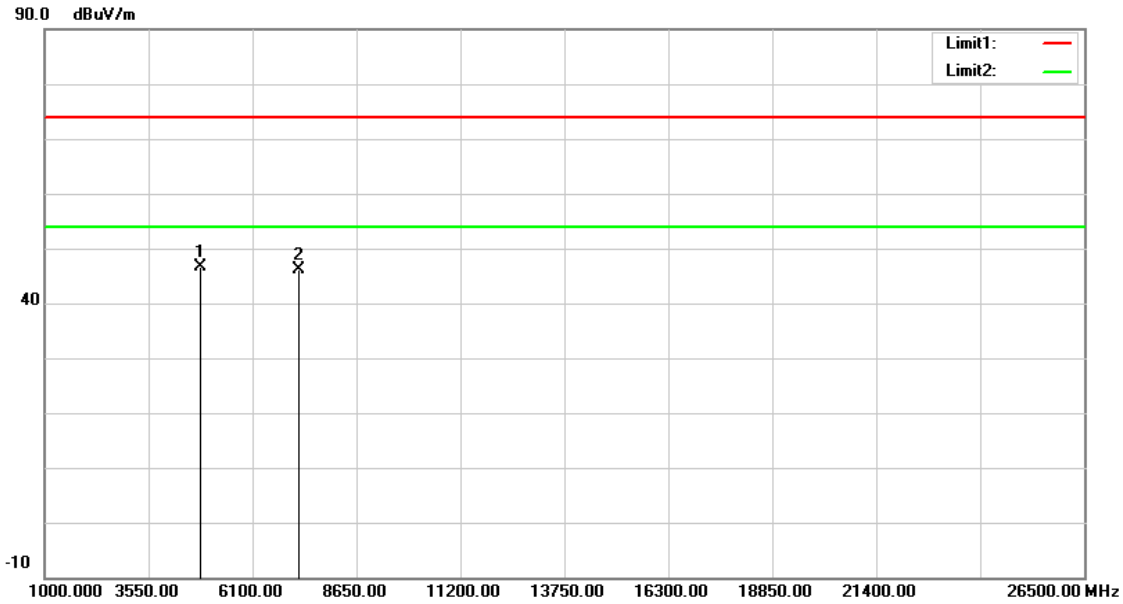
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	36.07	5.37	41.44	74.00	-32.56	peak
2	7236.000	33.67	11.90	45.57	74.00	-28.43	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Vertical		



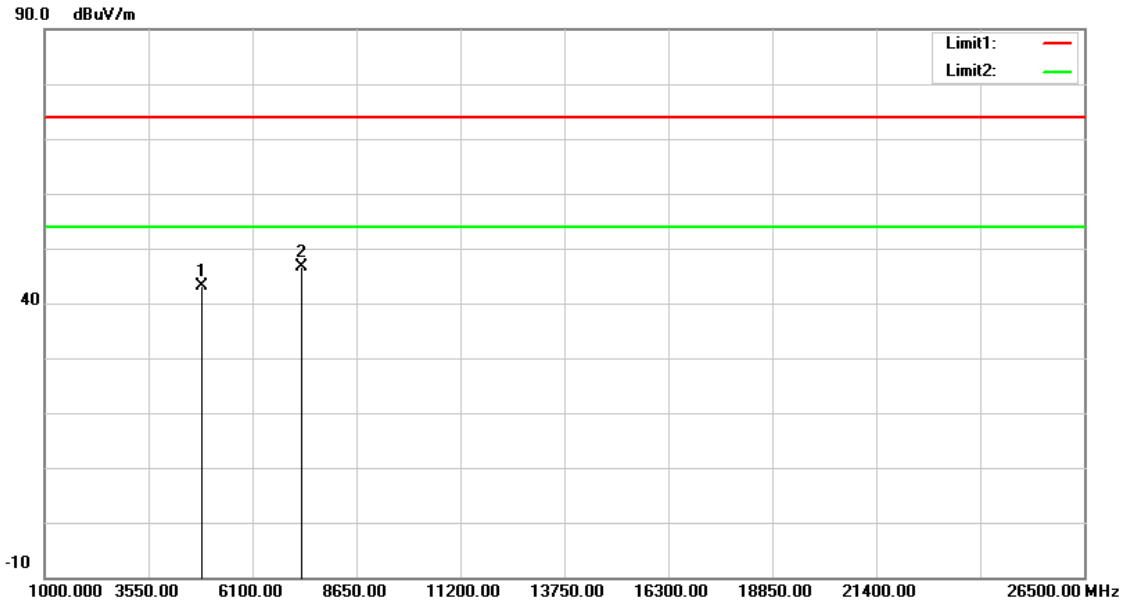
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	41.22	5.37	46.59	74.00	-27.41	peak
2	7236.000	34.19	11.90	46.09	74.00	-27.91	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



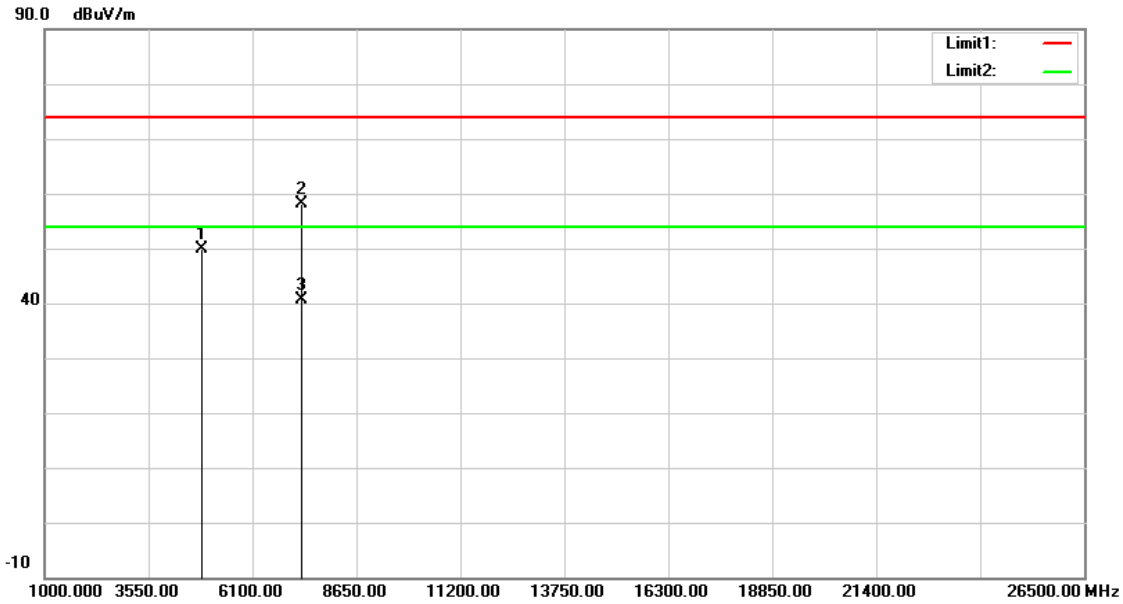
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	37.55	5.47	43.02	74.00	-30.98	peak
2	7311.000	34.41	12.13	46.54	74.00	-27.46	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Vertical		



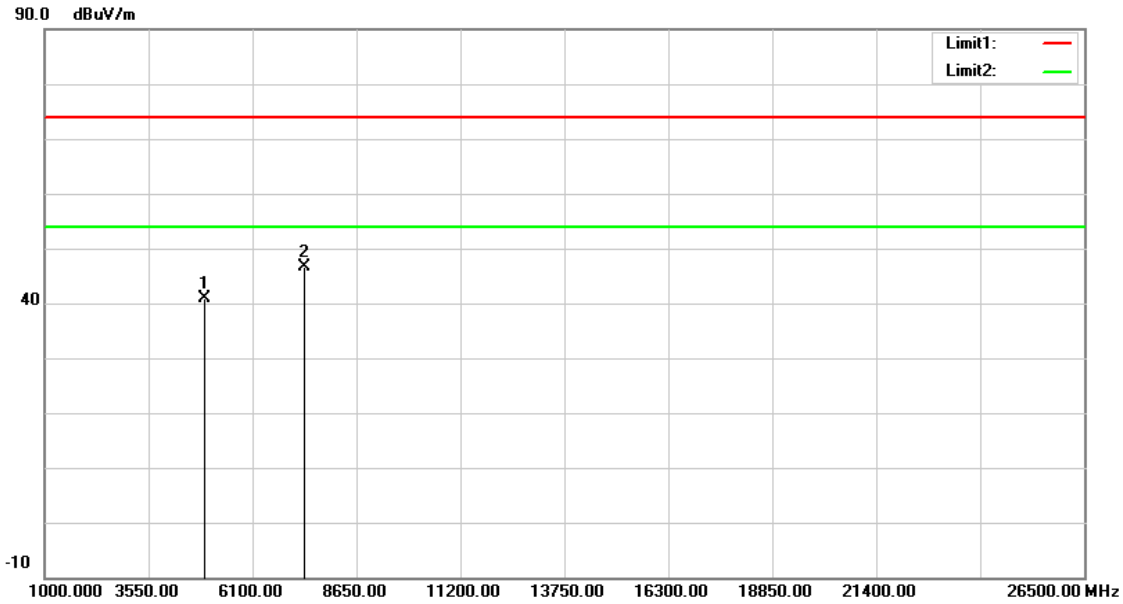
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	44.31	5.47	49.78	74.00	-24.22	peak
2	7311.000	45.99	12.13	58.12	74.00	-15.88	peak
3	7311.000	28.41	12.13	40.54	54.00	-13.46	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



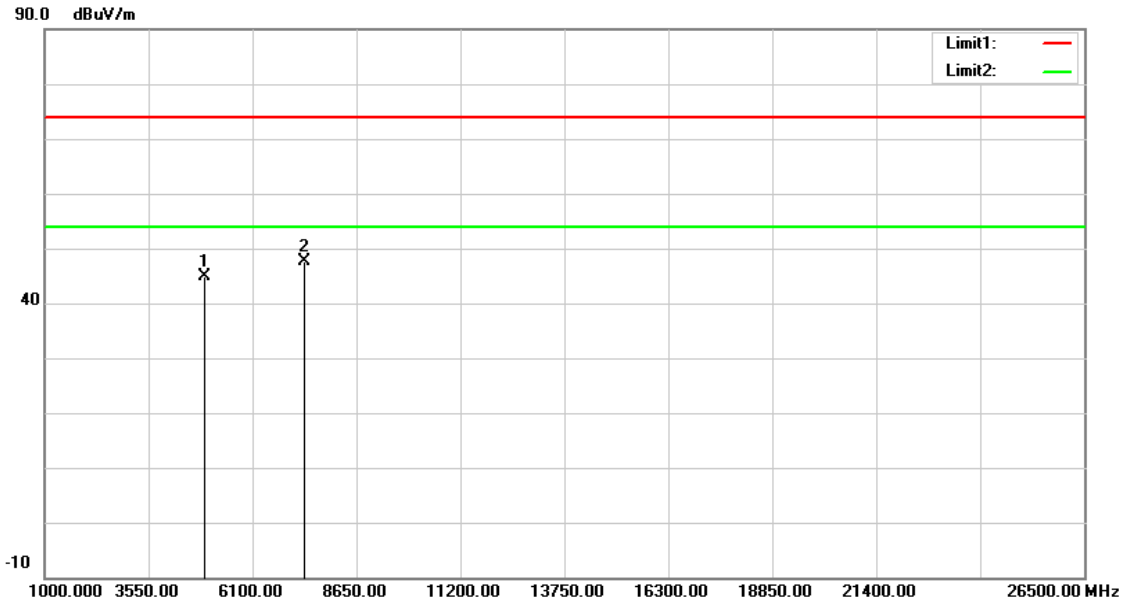
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	35.40	5.58	40.98	74.00	-33.02	peak
2	7386.000	34.28	12.36	46.64	74.00	-27.36	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 3		
Ant.Polar.:	Vertical		



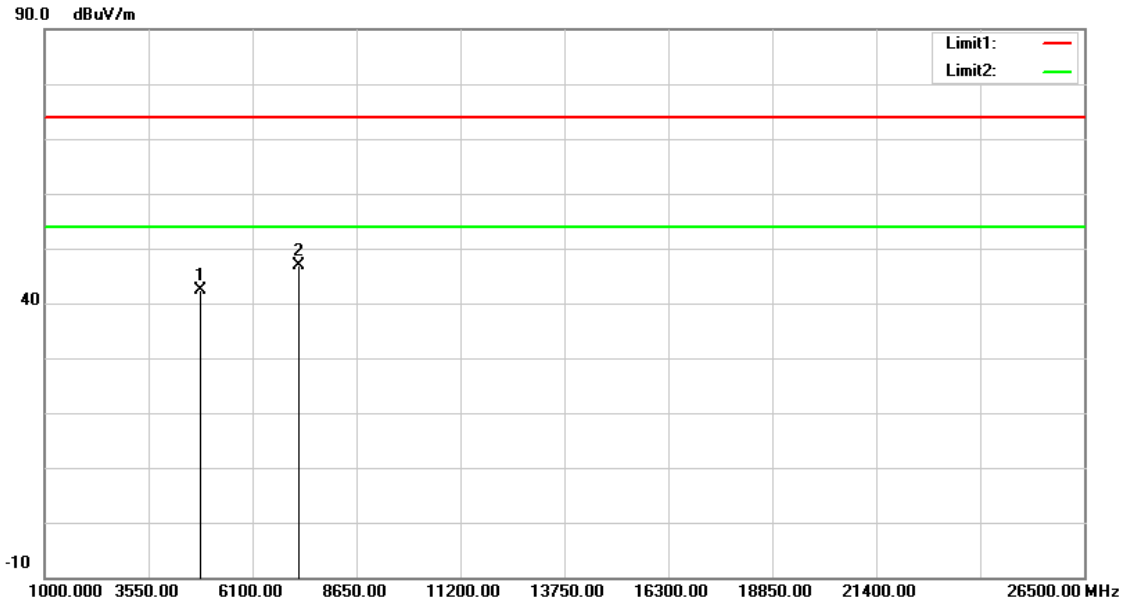
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	39.26	5.58	44.84	74.00	-29.16	peak
2	7386.000	35.16	12.36	47.52	74.00	-26.48	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



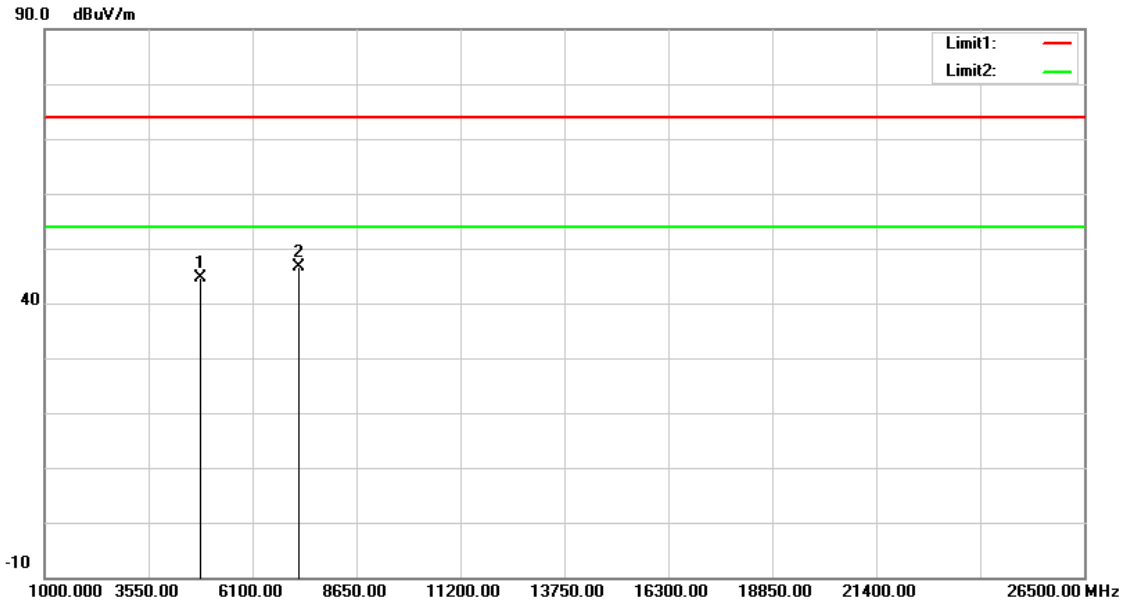
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	36.90	5.37	42.27	74.00	-31.73	peak
2	7236.000	34.87	11.90	46.77	74.00	-27.23	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2412 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Vertical		



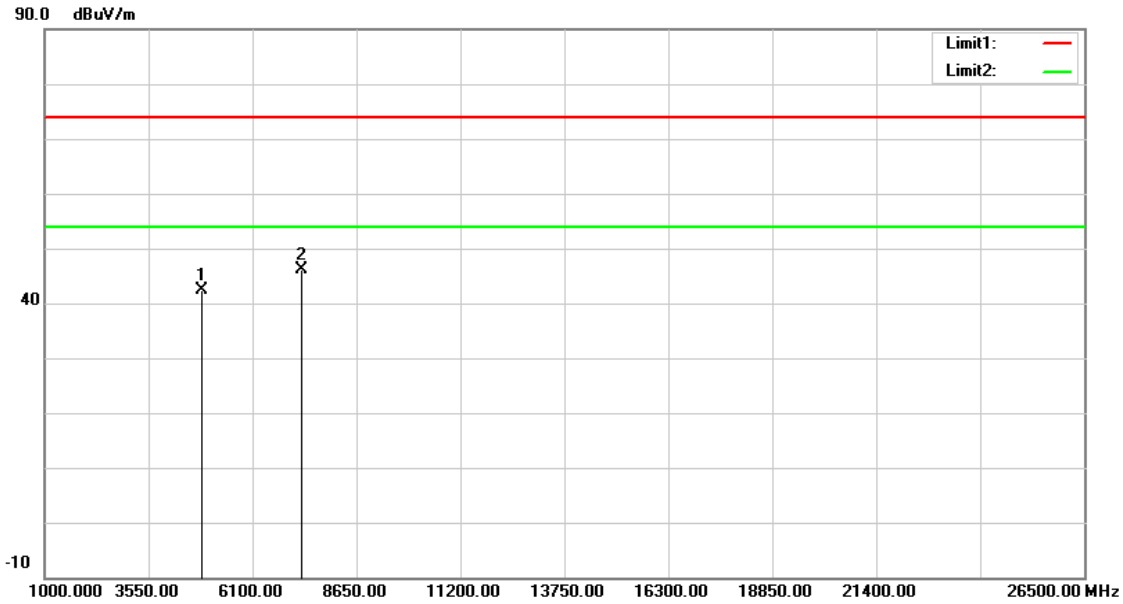
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	39.18	5.37	44.55	74.00	-29.45	peak
2	7236.000	34.77	11.90	46.67	74.00	-27.33	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



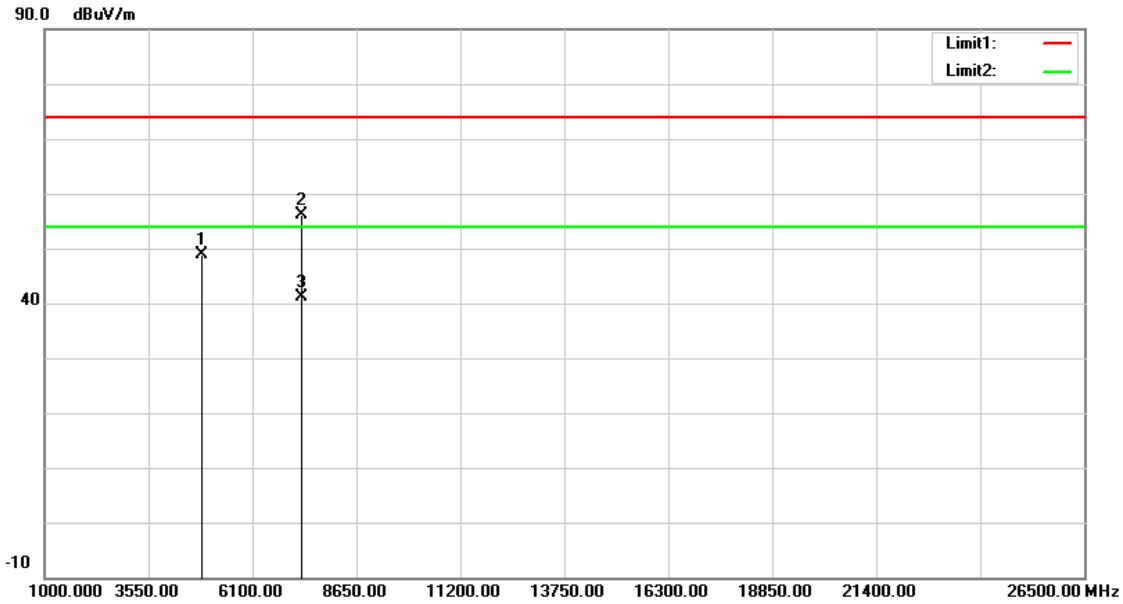
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	36.91	5.47	42.38	74.00	-31.62	peak
2	7311.000	34.12	12.13	46.25	74.00	-27.75	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2437 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Vertical		



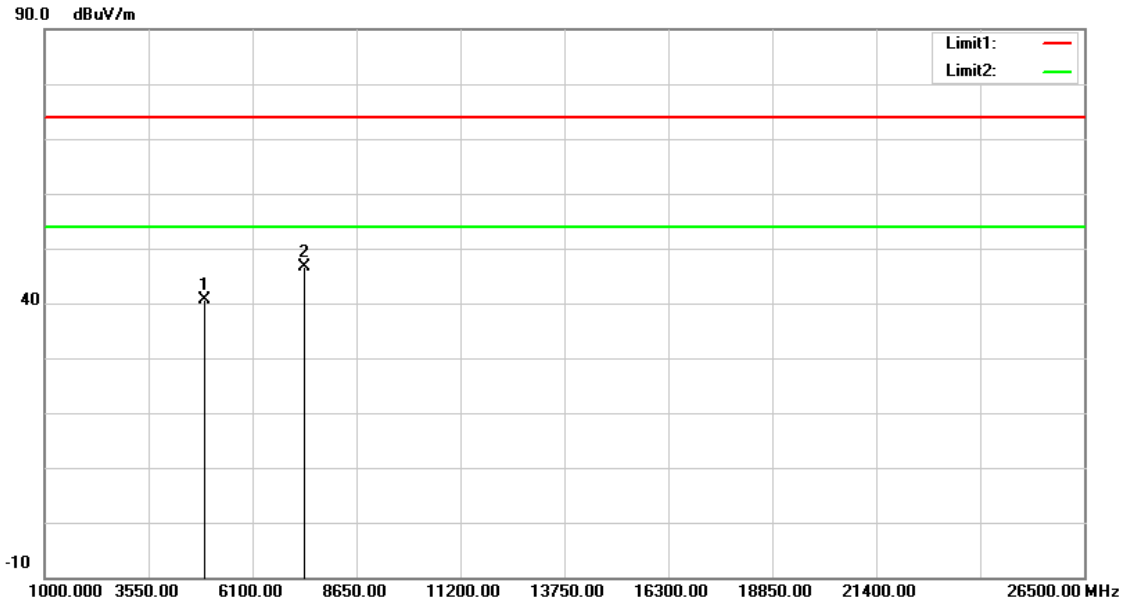
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	43.34	5.47	48.81	74.00	-25.19	peak
2	7311.000	43.88	12.13	56.01	74.00	-17.99	peak
3	7311.000	29.01	12.13	41.14	54.00	-12.86	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



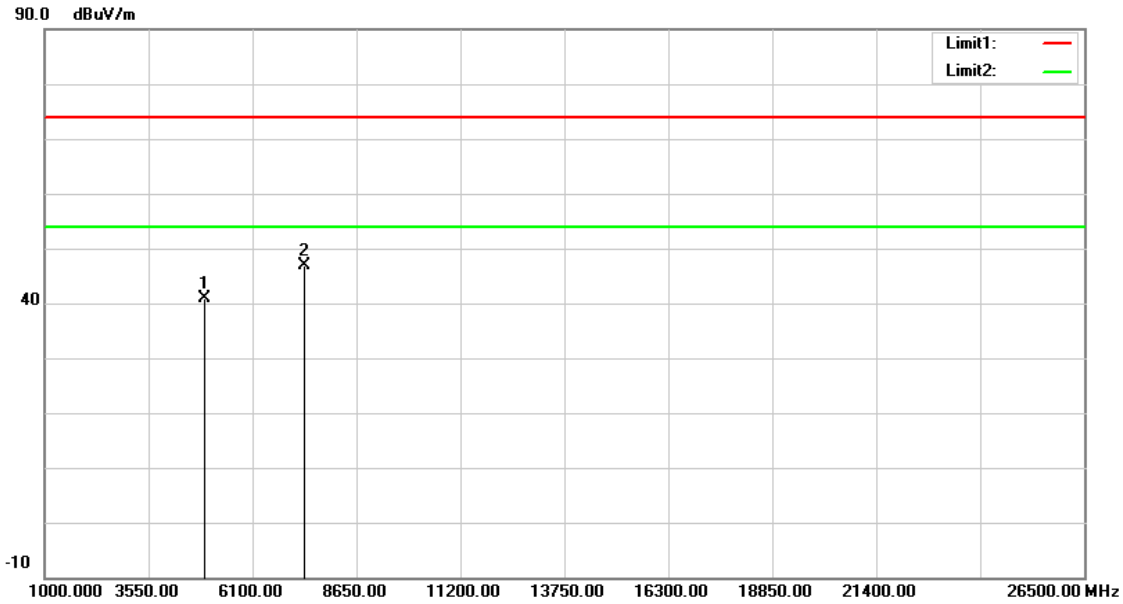
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	35.17	5.58	40.75	74.00	-33.25	peak
2	7386.000	34.23	12.36	46.59	74.00	-27.41	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.247	Test Distance:	3 m
Test item:	Harmonic	Power:	AC 120 V/60 Hz
Frequency:	2462 MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Mode:	Mode 4		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	35.20	5.58	40.78	74.00	-33.22	peak
2	7386.000	34.59	12.36	46.95	74.00	-27.05	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.