RF Test Report

Applicant	:	ASUSTeK COMPUTER INC.
Product Type	:	Tablet
Trade Name	:	ASUS
Model Number	:	B3000DQ1
Applicable Standard	:	FCC 47 CFR PART 15 SUBPART C ANSI C63.10:2013
Received Date	:	Dec. 22, 2021
Test Period	:	Jan. 08 ~ Feb. 23, 2022
Issued Date	:	Feb. 25, 2022

Issued by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade District,
Taoyuan City 334025, Taiwan (R.O.C.)
Tel：+886-3-2710188 / Fax：+886-3-2710190

Taiwan Accreditation Foundation accreditation number: 1330
Frequency Range : 9 kHz to 40 GHz
Test Firm MRA designation number: TW0010

Note:
1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
2.This report shall not be reproduced except in full, without the written approval of A Test Lab Technology Corporation.
3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issued Date	Revisions	Revised By
00	Jan. 22, 2022	Initial Issue	Nicole Chu
01	Feb. 18, 2022	Update 2 chapter (P.07) Update 3 chapter (P.08) Update 4 chapter (P.19 ~ P.20) Update 5.2 chapter (P.31 ~ P.34)	Nicole Chu
02	Feb. 25, 2022	Update 2 chapter (P.07) Update 3.4 chapter (P.10) Update 5 chapter (P.25)	Nicole Chu

Verification of Compliance

Applicant	:	ASUSTeK COMPUTER INC.
Product Type	:	Tablet
Trade Name	:	ASUS
Model Number	:	B3000DQ1
FCC ID	:	MSQ-PAD-B3000DQ1
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 334025, 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 : Kai Yu Yang

(Kai Yu Yang)

TABLE OF CONTENTS

1 General Information

1.1. Summary of Test Result

Standard	Item	Result	Remark
15.207	AC Power Conducted Emission	PASS	-----
15.203	Antenna Requirement	PASS	-----
15.247(b)(1)	Max. Output Power	PASS	-----
15.247(d)	Transmitter Radiated Emissions	PASS	-----
15.247(a)(1)	20 dB RF Bandwidth	PASS	-----
15.247(a)(1)	Carrier Frequency Separation	PASS	-----
15.247(a)(1)(iii)	Number of Hopping	PASS	-----
15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	PASS	-----
15.247(d)	Out of Band Conducted Spurious Emission	PASS	-----

Decision Rule

■ Uncertainty is not included.

□ Uncertainty is included.

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
DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems

1.2. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conducted Emission	150 kHz ~ 30 MHz	2.7 dB
Radiated Emission	9 kHz ~ 30 MHz	2.2 dB
	30 MHz ~ 1000 MHz	5.1 dB
	1000 MHz ~ 18000 MHz	5.2 dB
	18000 MHz ~ 26500 MHz	4.6 dB
	26500 MHz ~ 40000 MHz	4.6 dB
Conducted Output Power	1.1 dB	
RF Bandwidth	4.7 %	
Power Spectral Density	1.1 dB	

2 EUT Description

Applicant	ASUSTeK COMPUTER INC. 1F., No. 15, Lide Rd., Beitou Dist., Taipei City 112, Taiwan
Product	Tablet
Trade Name	ASUS
Model Number	B3000DQ1
FCC ID	MSQ-PAD-B3000DQ1
Frequency Range	2402 ~ 2480 MHz
Modulation Type	GFSK for 1 Mbps
	π/4-DQPSK for 2 Mbps
	8DPSK for 3 Mbps
Operate Temp. Range	5°C ~ +35°C
EUT Power Rating	DC 15 V, 3 A
Max. RF Output Power	GFSK for 1 Mbps 0.01905 W
	π/4-DQPSK for 2 Mbps 0.01483 W
	8DPSK for 3 Mbps 0.01945 W

Antenna list：

Antenna Source	ANT	Manufacturer	Part No. (Vendor)	ASUS Part No.	Type	Frequency (MHz)	Max. Gain (dBi)
1	Main	INPAQ	WAG-F-LB-00-060	14008-04980100	PIFA Antenna	2402 - 2480	1.10

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:

Pre-Test Mode
Mode 1: Transmit mode
Mode 2: GFSK Continuous TX mode
Mode 3: π/4-DQPSK Continuous TX mode
Mode 4: 8DPSK Continuous TX mode

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.

Final-Test Mode
Mode 1: Transmit mode
Mode 2: GFSK Continuous TX mode
Mode 4: 8DPSK Continuous TX mode

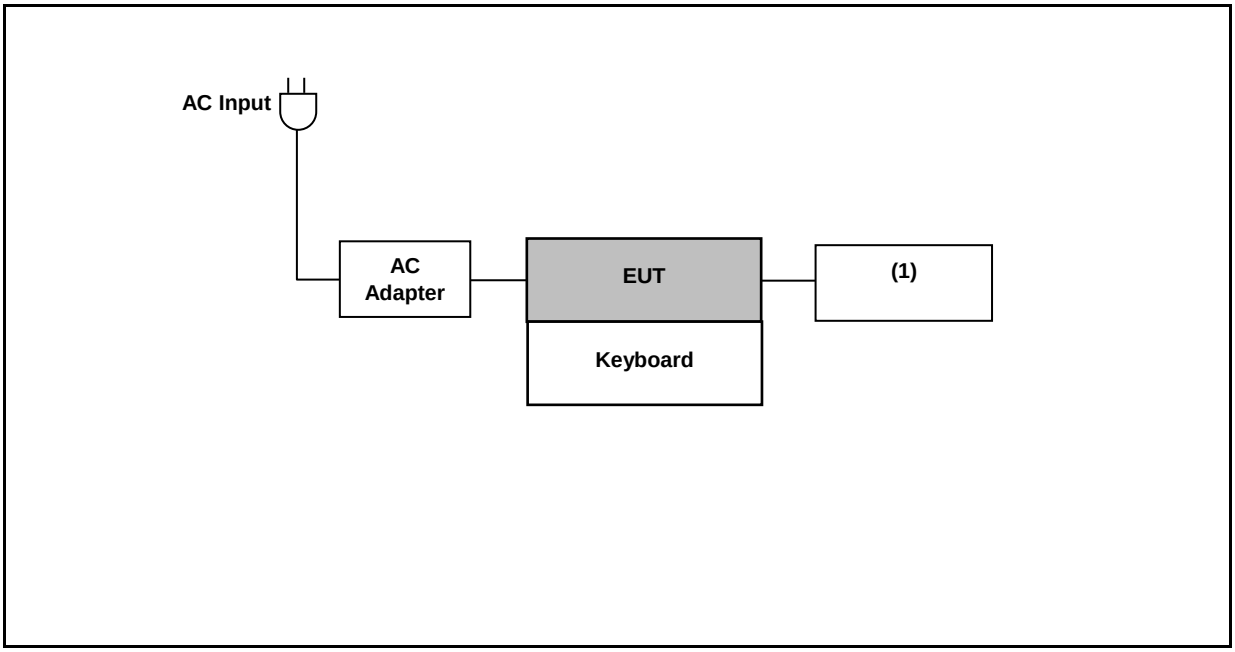
Description of Test Modes
Preliminary tests were performed in different modulation to find the worst case. The modulation has shown the worst-case in section 4.5. Investigation has been done on all the possible configurations for searching the worst cases.
Note：The device is used with adapter (number：AD10360) performing the test.

3.2. EUT Test Step

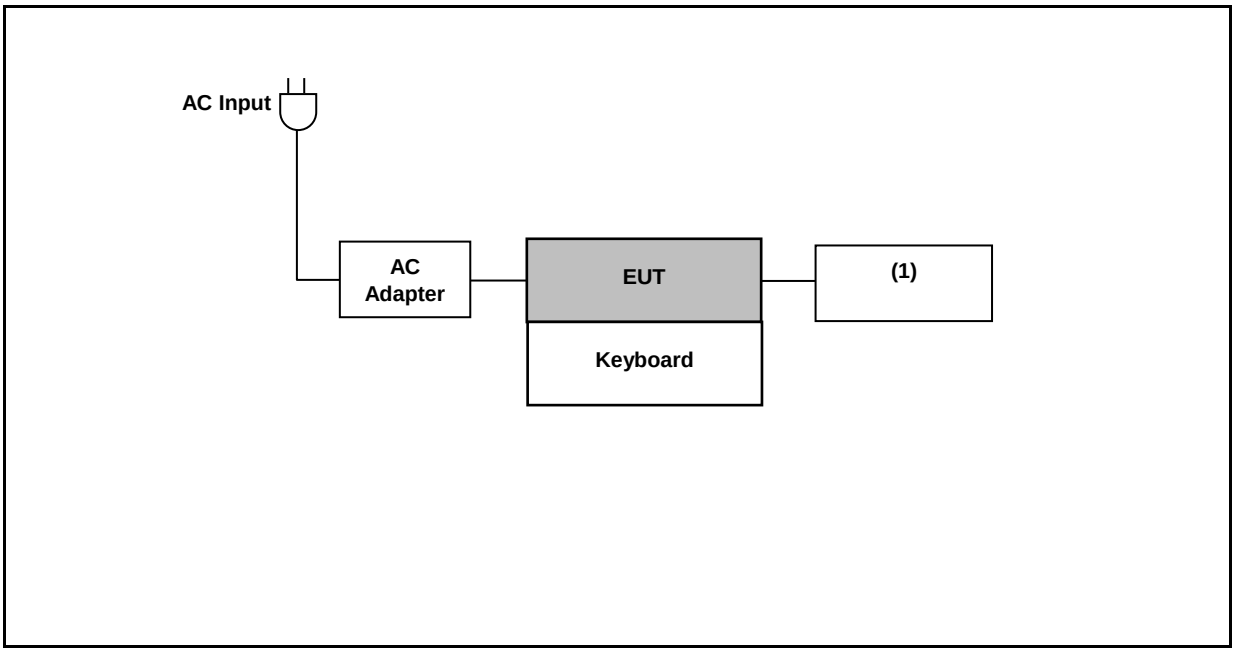
1	Setup the EUT shown on “Configuration of Test System Details.”
2	Turn on the power of all equipment.
3	Turn on TX function
4	EUT run test program.

3.3. Configuration of Test System Details

Conducted Emission



Radiated Emissions



Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
(1)	Earphone	YUJI	Y201	---	---

3.4. Test Instruments

For Conducted Emission

Test Period: Jan. 08 ~ Feb. 23, 2022

Testing Engineer: Brian Lin

Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☒	Test Receiver	R&S	ESCI	100367	May 21, 2021	1 year
☐	Test Receiver	R&S	ESCI	100722	Nov. 02, 2021	1 year
☐	Test Receiver	R&S	ESCI	101000	Nov. 26, 2021	1 year
☒	LISN	R&S	ENV216	101040	Mar. 29, 2021	1 year
☒	LISN	R&S	ENV216	101041	Apr. 08, 2021	1 year
☒	RF Cable	Woken	00100D1380194M	TE-02-03	May 28, 2021	1 year
☒	Software	EZ EMC	1.1.4.3	N/A	N.C.R.	---

For Conducted

Test Period: Jan. 15 ~ Feb. 17, 2022

Testing Engineer: Brian Lin

Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☐	Power Sensor	Anritsu	MA2411B	1126022	Sep. 03, 2021	1 year
☐	Power Meter	Anritsu	ML2495A	1135009	Sep. 03, 2021	1 year
☒	Power Sensor	Agilent	N1921A	MY45241957	Dec. 06, 2021	1 year
☒	Power Meter	Agilent	N1911A	MY45101619	Dec. 06, 2021	1 year
☒	Spectrum Analyzer (10 Hz~26.5 GHz)	Keysight	N9010B	MY59071418	Mar. 17, 2021	1 year
☐	Spectrum Analyzer (9 kHz~26.5 GHz)	Agilent	N9010A	MY48030518	Jul. 23, 2021	1 year
☐	Spectrum Analyzer (20 Hz~26.5 GHz)	Agilent	N9020A	US47520902	Sep. 09, 2021	1 year
☐	Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	Jan. 05, 2022	1 year
☐	Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	Mar. 30, 2021	1 year
☐	Signal Generator	Keysight	N5182B	MY53052569	Apr. 20, 2021	1 year
☐	Signal Generator	Keysight	N5182BX07	MY59360221	Apr. 20, 2021	1 year
☐	Bluetooth Tester	R&S	CBT	100350	Mar. 17, 2021	2 years
☐	Wireless Connectivity Tester	R&S	CMW270	102208	Jun. 02, 2021	1 year
☐	Power Supply	KEITHLEY	2303	4045290	Feb. 01, 2021	1 year
☐	RF Communication Test Set	HP	8920A	3344A03297	Aug. 10, 2021	1 year

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

For Radiated Emissions

Test Period: Jan. 12, 2022

Testing Engineer: Marc Yeh, Pink Li

Radiation test sites		Semi Anechoic Room				
Use	Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
☐	Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9010A	MY52221312	Jan. 18, 2021	1 year
☐	Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	Jan. 05, 2022	1 year
☒	Spectrum Analyzer (2 Hz~50 GHz)	Keysight	N9030B	MY57143537	Apr. 19, 2021	1 year
☒	Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	Jan. 15, 2021	1 year
☐	Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A10961	Jul. 06, 2021	1 year
☐	Broadband Amplifier (100 kHz~1 GHz)	Titan	T0910E00014330A1F	001	Jul. 23, 2021	1 year
☐	Amplifier (1 GHz~26.5 GHz)	Agilent	8449B	3008A02237	Oct. 21, 2021	1 year
☒	Broadband Amplifier (1 GHz~26.5 GHz)	Titan	T0912E01263025A1F	002	Jul. 26, 2021	1 year
☐	Preamplifier (26.5 GHz~40 GHz)	EMCI	EMC2654045	980028	Aug. 19, 2021	1 year
☒	Loop Antenna (9 kHz~30 MHz)	COM-POWER CORPORATION	AL-130	121014	Apr. 07, 2021	1 year
☒	Trilog Broadband Antenna (30 kHz~1 GHz)	Schwarzbeck Mess-Elektronik	VULB9168	01146	Jul. 19, 2021	1 year
☐	Trilog Broadband Antenna (30 kHz~1 GHz)	Schwarzbeck Mess-Elektronik	VULB9168	416	Nov. 17, 2021	1 year
☒	Broadband Horn Antenna (1 GHz~18 GHz)	Schwarzbeck Mess-Elektronik	9120D	02207	Jul. 09, 2021	1 year
☐	Broadband Horn Antenna (1 GHz~18 GHz)	Schwarzbeck Mess-Elektronik	9120D	9120D-550	Aug. 24, 2021	1 year
☒	Broadband Horn Antenna (18 GHz~40 GHz)	Schwarzbeck Mess-Elektronik	9170	9170-320	Aug. 24, 2021	1 year
☐	Horn Antenna (18 GHz~40 GHz)	ETS	3116	00086467	Dec. 03, 2021	1 year
☐	RF Cable	EMCI	EMC104-N-N-6000	TE01-1	Feb. 19, 2021	1 year
☐	Microwave Cable	EMCI	EMC104-SM-SM-13000	170814	Feb. 19, 2021	1 year
☐	Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	Feb. 19, 2021	1 year
☒	Coaxial Cable	Titan	T0710AT327A10A100	J11005	Aug. 06, 2021	1 year
☒	Coaxial Cable	Titan	T0710AT327A10A900	J11004	Aug. 06, 2021	1 year
☒	Coaxial Cable	Titan	CFD400NL-LW	001	Aug. 06, 2021	1 year
☐	Bluetooth Tester	R&S	CBT	100350	Mar. 17, 2021	2 years
☐	Wireless Connectivity Tester	R&S	CMW270	102208	Jun. 02, 2021	1 year
☐	Power Supply	KEITHLEY	2303	4045290	Feb. 01, 2021	1 year
☒	Software	EZ EMC	1.1.4.4	N/A	N.C.R.	---

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

3.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	20-30
Humidity (%RH)	25-75	45-75

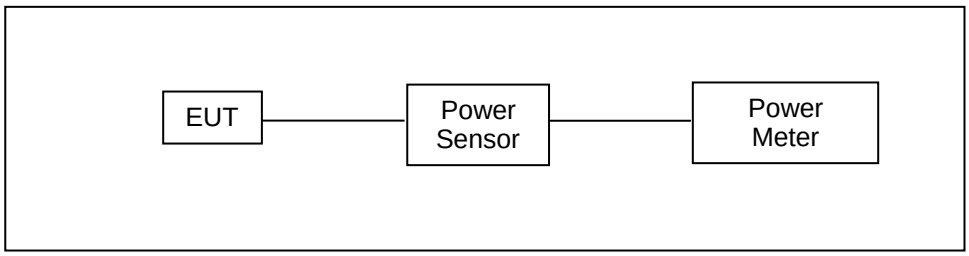
4 Measurement Procedure

4.1. Maximum Conducted Output Power Measurement

■ **Limit**

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels < 0.125 watt.

■ **Test Setup**



■ **Test Procedure**

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. 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. The maximum peak output power shall not exceed 1 watt.

Use a direct connection between the antenna port of transmitter and the power sensor, for prevent the power sensor input attenuation 40-50 dB. Set the RBW Bandwidth of the emission or use a channel power meter mode.

For antennas with gains of 6 dBi or less, maximum allowed transmitter output is 1 watt (+30 dBm). For antennas with gains greater than 6 dBi, transmitter output level must be decreased by an amount equal to (GAIN - 6)/3 dBm.

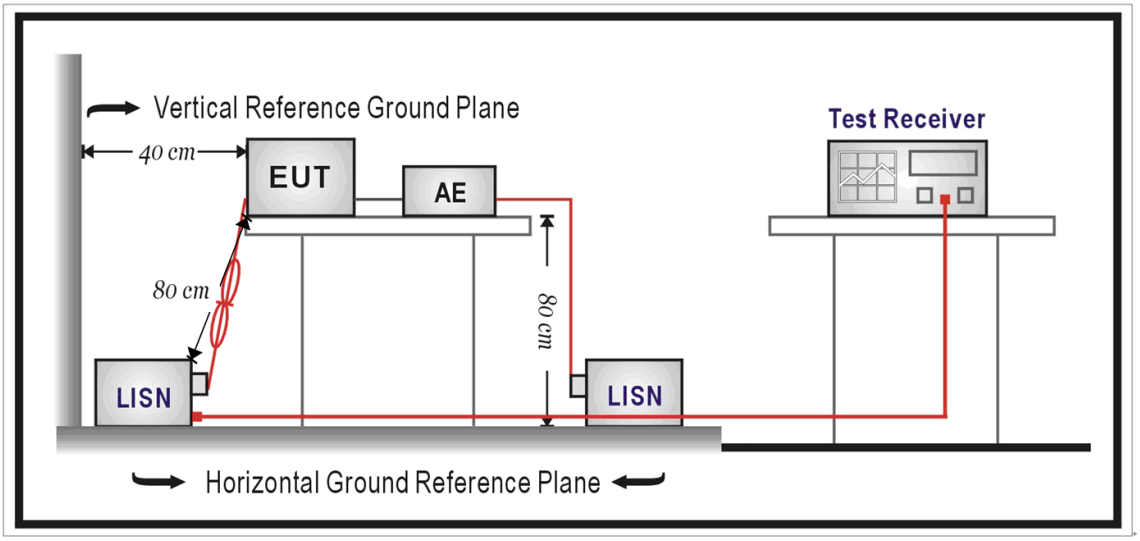
The antenna port of the EUT was connected to the input of a power sensor. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.

4.2. 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.

4.3. Radiated Emission Measurement

■ **Limit**

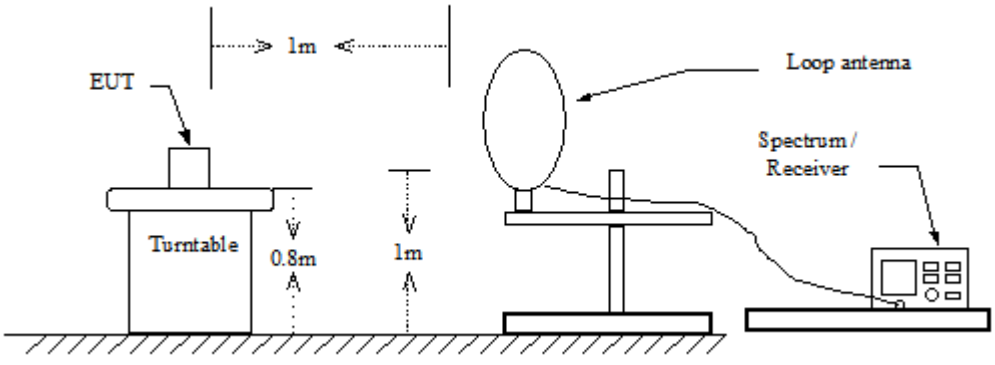
According to §15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

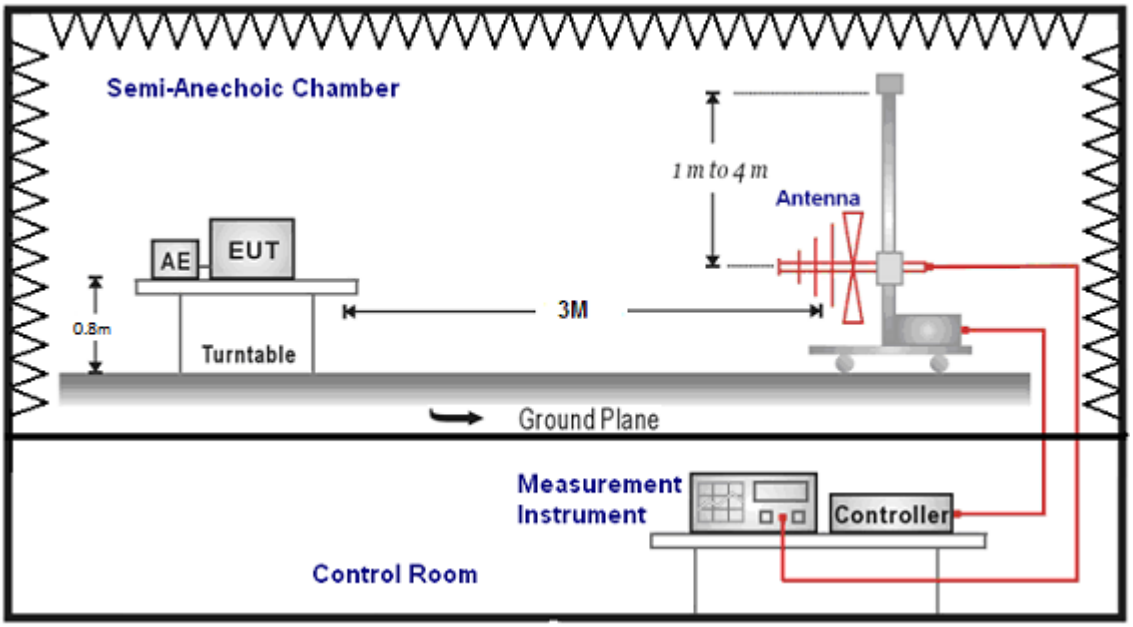
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this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

■ **Setup**

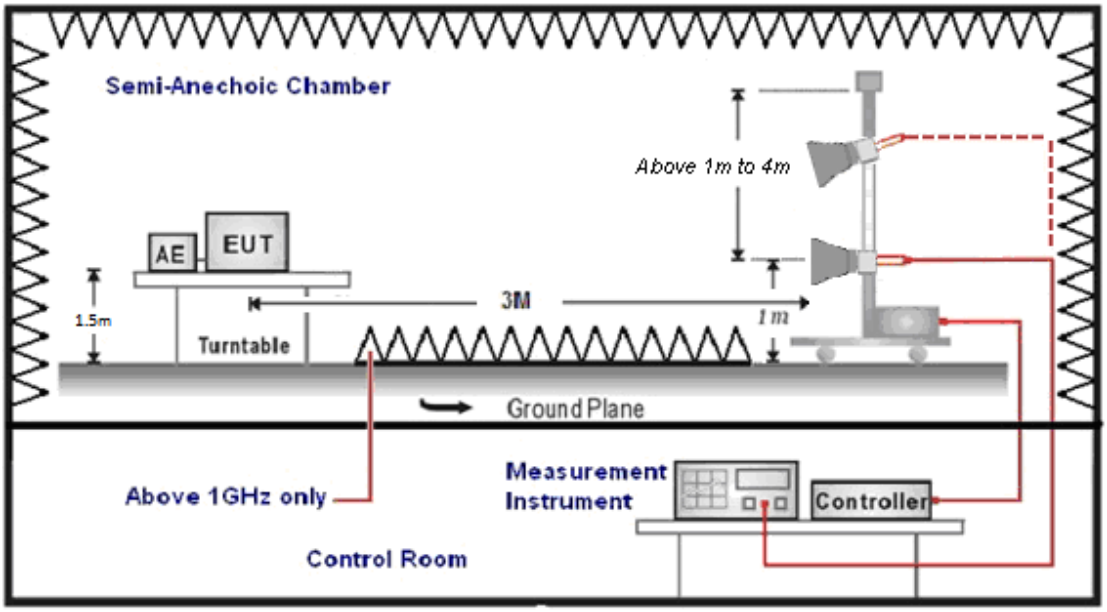
9 kHz ~ 30 MHz



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 >98 % / 1/T for average measurements when Duty cycle <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 1 meter. 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

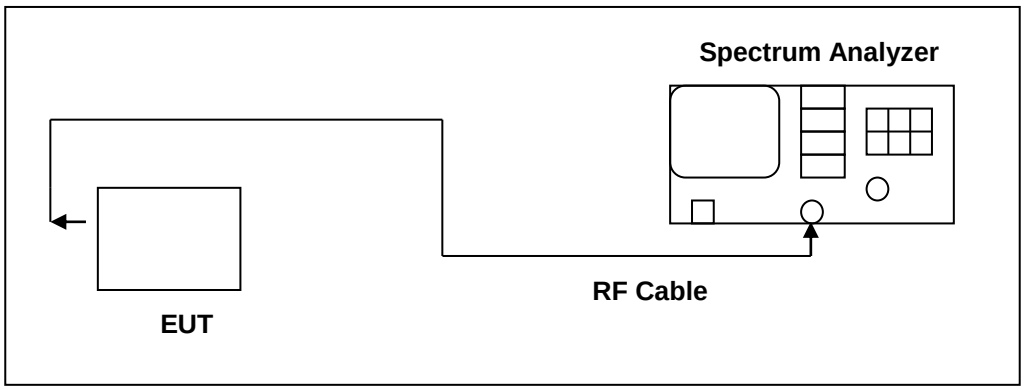
Data of measurement within this frequency range without mark in the table above means the reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.

4.4. 20 dB RF Bandwidth Measurement

■ **Limit**

N/A

■ **Test Setup**



■ **Test Procedure**

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = approx. 2 to 3 times the 20 dB bandwidth, centered on a hopping frequency
2. RBW ≥ 1 % of the 20 dB span
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

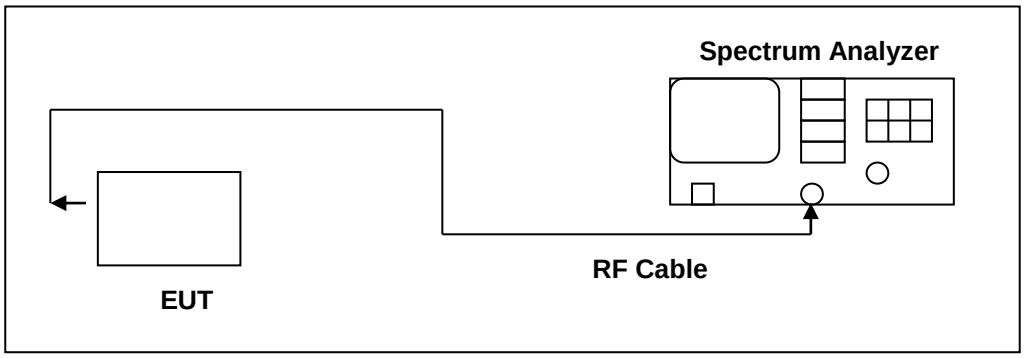
The trace was allowed to stabilize. The EUT was transmitting at its maximum data rate. The marker-to-peak function was used to set the marker to the peak of the emission. The marker-delta function was used to measure 20 dB down one side of the emission. The marker-delta function and marker was moved to the other side of the emission until it was even with the reference marker. The marker-delta reading at this point was the 20 dB bandwidth of the emission.

4.5. Carrier Frequency Separation Measurement

■ **Limit**

Title 47 of the CFR, Part 15 Subpart (c) 15.247(a)(1) requires the measurement of the bandwidth of the transmission between the -20 dB points on the transmitted spectrum. The results of this test determine the limits for channel spacing. The channel spacing shall be a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.

■ **Test Setup**



■ **Test Procedure**

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = wide enough to capture the peaks of two adjacent channels
2. Resolution (or IF) Bandwidth (RBW) = Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. Video (or Average) Bandwidth (VBW) ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

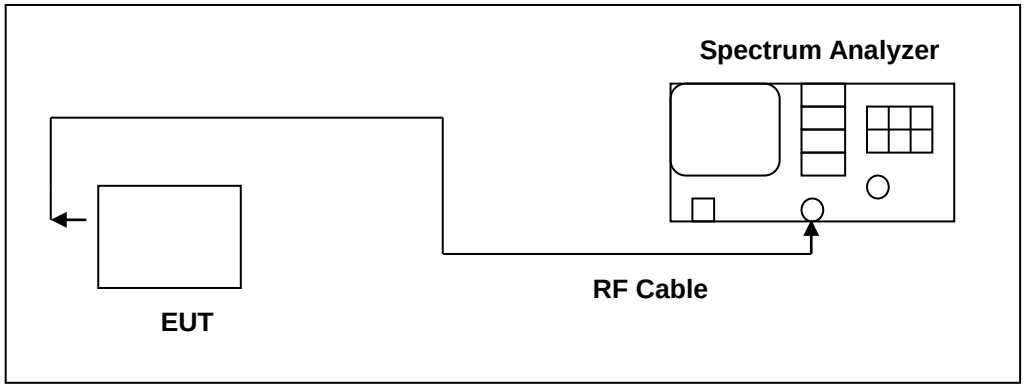
The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

4.6. Number of Hopping Measurement

■ **Limit**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

■ **Test Setup**



■ **Test Procedure**

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer used the following settings:

1. Span = the frequency band of operation
2. RBW = To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dBbandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep = auto
5. Detector function = peak
6. Trace = max hold

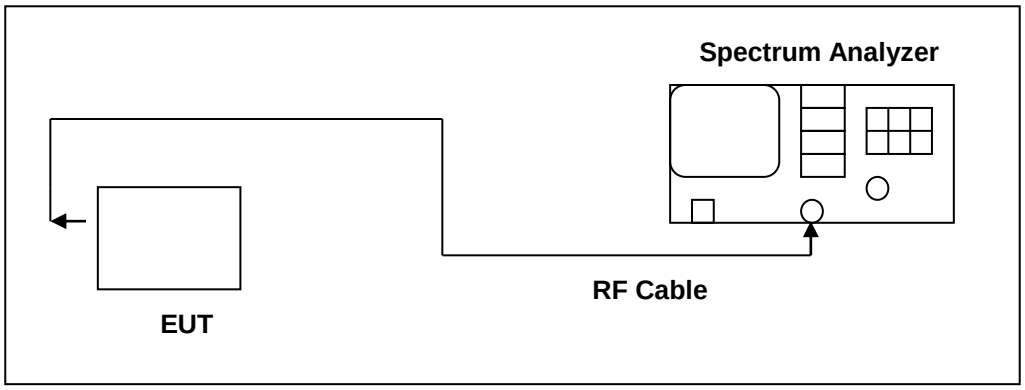
The trace was allowed to stabilize.

4.7. Time of Occupancy (Dwell Time) Measurement

■ Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

■ Test Setup



■ Test Procedure

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. The RF output port of the Equipment-Under-Test is directly coupled to the input of the spectrum through a specialized RF connector and a 10 dB passive attenuator. A fully charged battery was used for the supply voltage. The Bluetooth hopping function of the EUT was enabled. The following spectrum analyzer settings were used:

1. Span = zero span, centered on a hopping channel
2. RBW = 1 MHz
3. VBW ≥ RBW
4. Sweep = as necessary to capture the entire dwell time per hopping channel
5. Detector function = peak
6. Trace = max hold

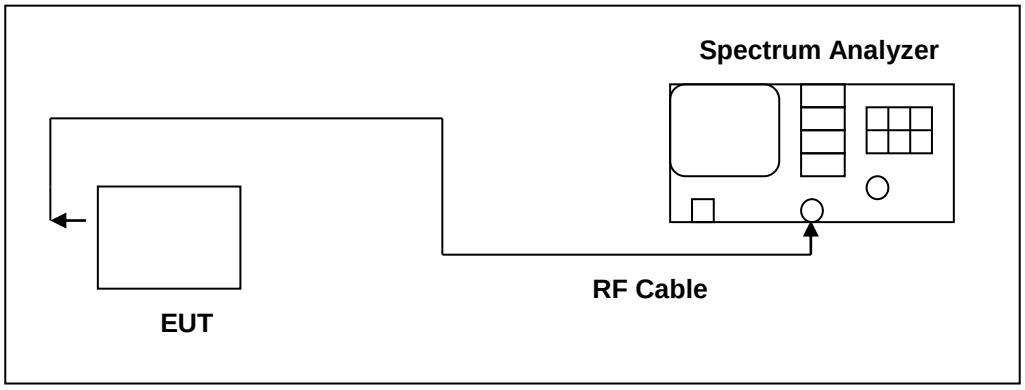
The marker-delta function was used to determine the dwell time.

4.8. 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**

Testing must be done according to this procedure, FCC Public Notice DA 00-705 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems. This is the only method recognized by the FCC. 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 (Channel 0, 39, 78)

4.9. 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)(4), 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.

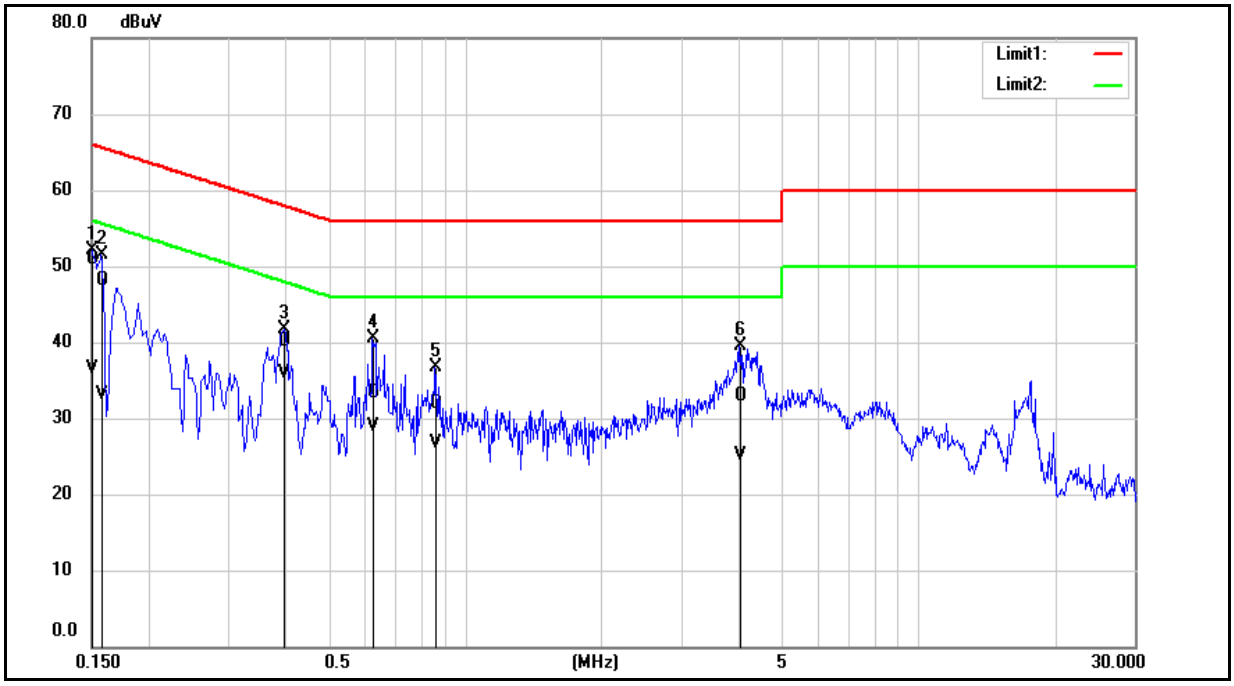
■ **Antenna Connector Construction**

See section 2 – antenna information.

5 Test Results

5.1 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:			

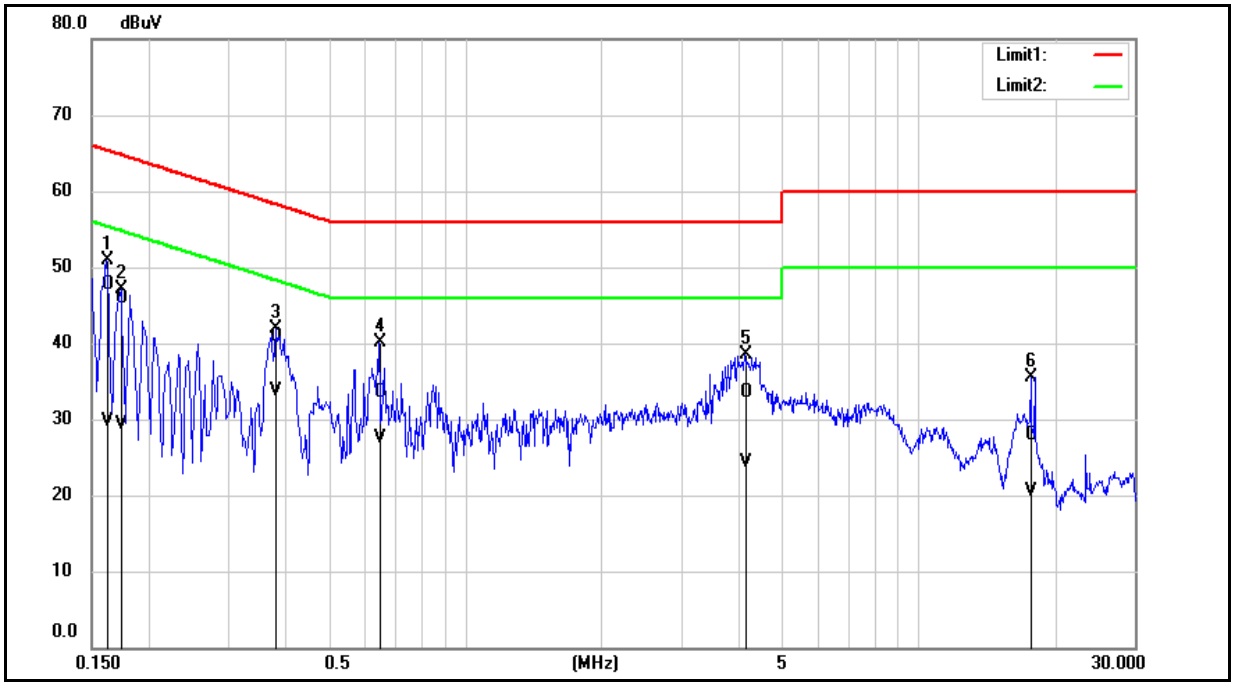


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1500	41.13	26.85	9.74	50.87	36.59	66.00	56.00	-15.13	-19.41	Pass
2	0.1580	38.43	23.41	9.74	48.17	33.15	65.57	55.57	-17.40	-22.42	Pass
3	0.3980	30.41	26.08	9.74	40.15	35.82	57.90	47.90	-17.75	-12.08	Pass
4	0.6260	23.53	19.10	9.75	33.28	28.85	56.00	46.00	-22.72	-17.15	Pass
5	0.8580	22.08	17.04	9.75	31.83	26.79	56.00	46.00	-24.17	-19.21	Pass
6	4.0380	22.98	15.24	9.84	32.82	25.08	56.00	46.00	-23.18	-20.92	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + 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:			

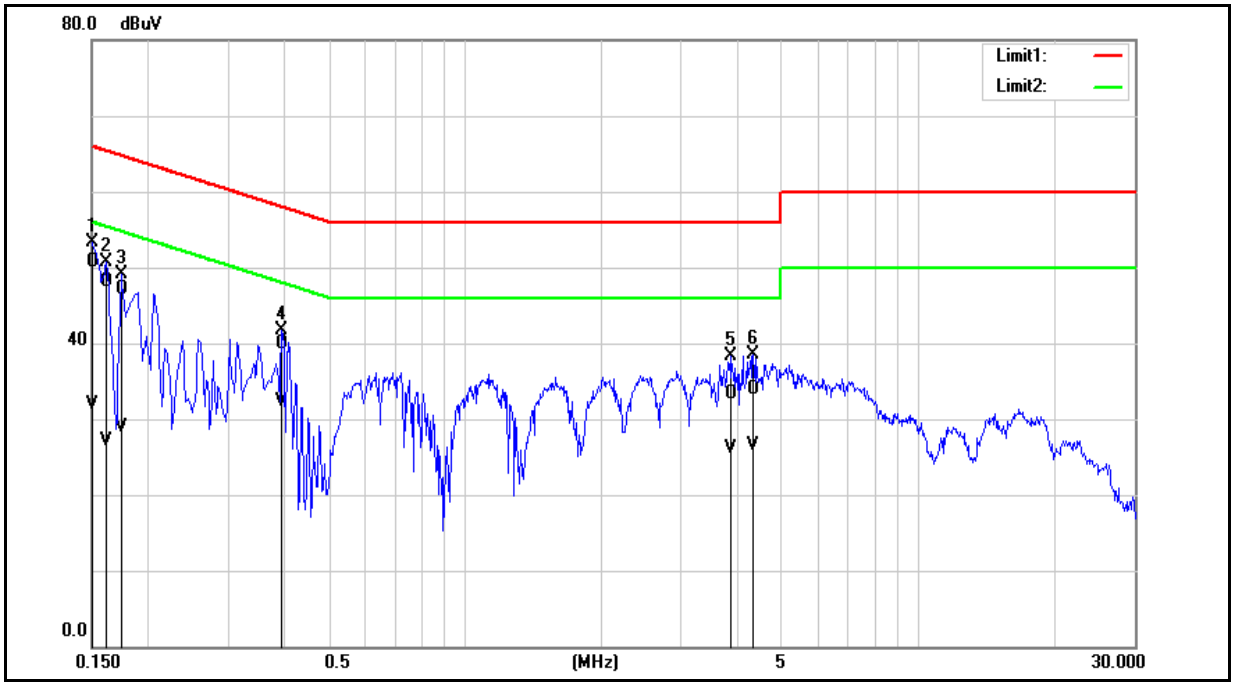


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1620	37.90	20.02	9.74	47.64	29.76	65.36	55.36	-17.72	-25.60	Pass
2	0.1740	36.07	19.65	9.74	45.81	29.39	64.77	54.77	-18.96	-25.38	Pass
3	0.3820	31.13	24.03	9.73	40.86	33.76	58.24	48.24	-17.38	-14.48	Pass
4	0.6460	23.71	17.84	9.74	33.45	27.58	56.00	46.00	-22.55	-18.42	Pass
5	4.1500	23.62	14.44	9.86	33.48	24.30	56.00	46.00	-22.52	-21.70	Pass
6	17.6700	17.75	10.44	10.15	27.90	20.59	60.00	50.00	-32.10	-29.41	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

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

Standard:	FCC Part 15.247	Line:	L1
Test item:	Conducted Emission	Power:	AC 240V/50Hz
Mode:	Mode 1	Temp.(℃)/Hum.(%RH):	26(℃)/60 %RH
Description:			

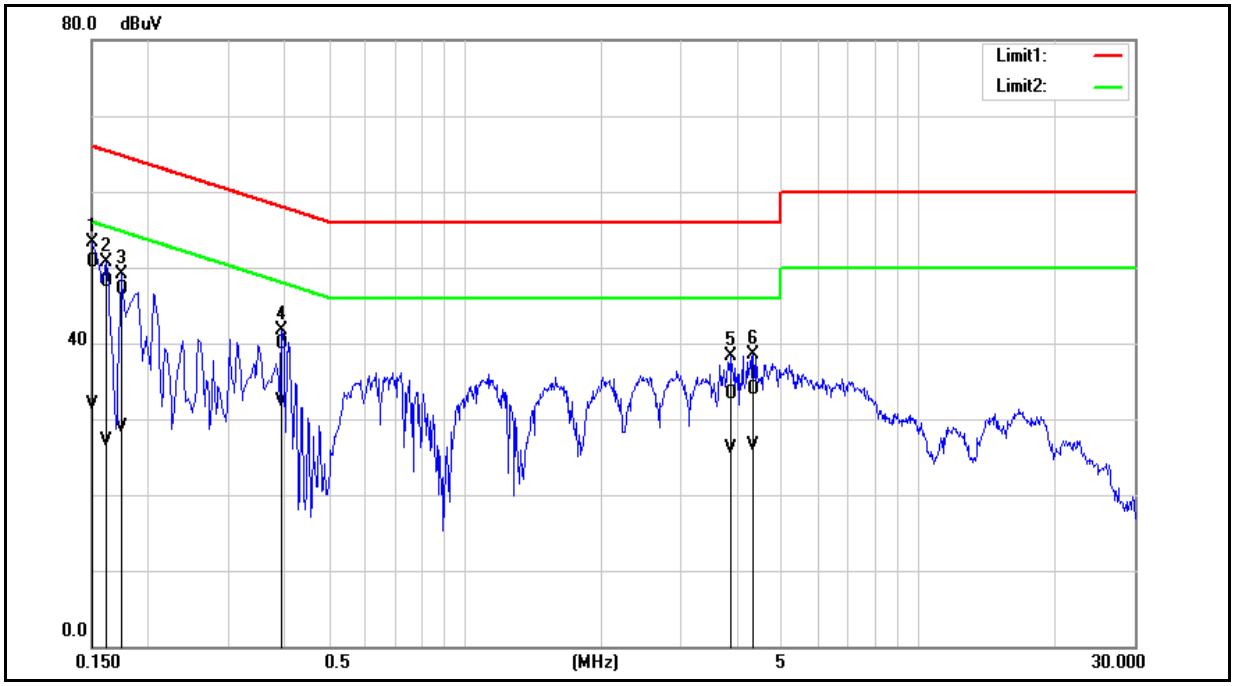


No.	Frequency (MHz)	QP reading (dBuV)	AVG reading (dBuV)	Correction factor (dB)	QP result (dBuV)	AVG result (dBuV)	QP limit (dBuV)	AVG limit (dBuV)	QP margin (dB)	AVG margin (dB)	Remark
1	0.1500	41.00	22.12	9.74	50.74	31.86	66.00	56.00	-15.26	-24.14	Pass
2	0.1620	38.27	17.40	9.74	48.01	27.14	65.36	55.36	-17.35	-28.22	Pass
3	0.1740	37.38	19.24	9.74	47.12	28.98	64.77	54.77	-17.65	-25.79	Pass
4	0.3940	30.20	22.47	9.74	39.94	32.21	57.98	47.98	-18.04	-15.77	Pass
5	3.8420	23.49	16.23	9.84	33.33	26.07	56.00	46.00	-22.67	-19.93	Pass
6	4.3340	24.12	16.57	9.85	33.97	26.42	56.00	46.00	-22.03	-19.58	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + 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 240V/50Hz
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	0.1500	41.00	22.12	9.74	50.74	31.86	66.00	56.00	-15.26	-24.14	Pass
2	0.1620	38.27	17.40	9.74	48.01	27.14	65.36	55.36	-17.35	-28.22	Pass
3	0.1740	37.38	19.24	9.74	47.12	28.98	64.77	54.77	-17.65	-25.79	Pass
4	0.3940	30.20	22.47	9.74	39.94	32.21	57.98	47.98	-18.04	-15.77	Pass
5	3.8420	23.49	16.23	9.84	33.33	26.07	56.00	46.00	-22.67	-19.93	Pass
6	4.3340	24.12	16.57	9.85	33.97	26.42	56.00	46.00	-22.03	-19.58	Pass

Note: 1. Result (dBuV) = Correction factor (dB) + Reading(dBuV).

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

5.2 Conducted Test Results

Maximum Conducted Output Power Measurement

Test Mode	Frequency (MHz)	RF Power setting in Test Software	Test Software Version
Mode 2	2402	10	QRCT Toolkit v4.0 Version 4.0.00175.0
	2441	10	
	2480	10	
Mode 3	2402	10	
	2441	10	
	2480	10	
Mode 4	2402	10	
	2441	10	
	2480	10	

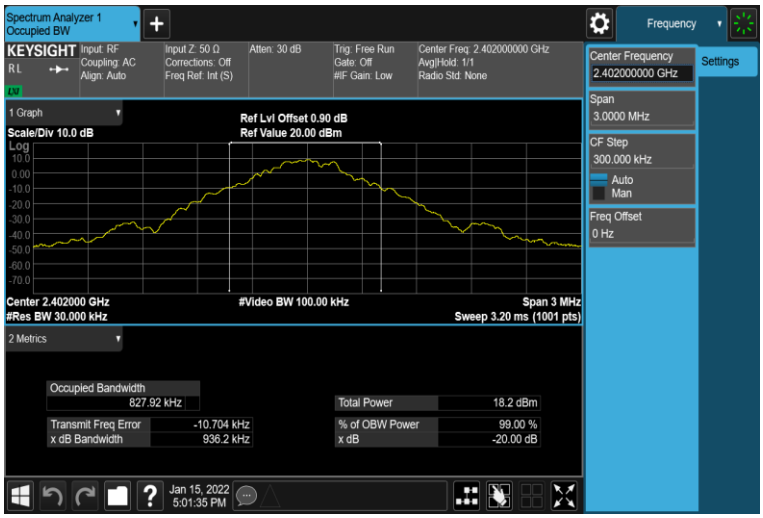
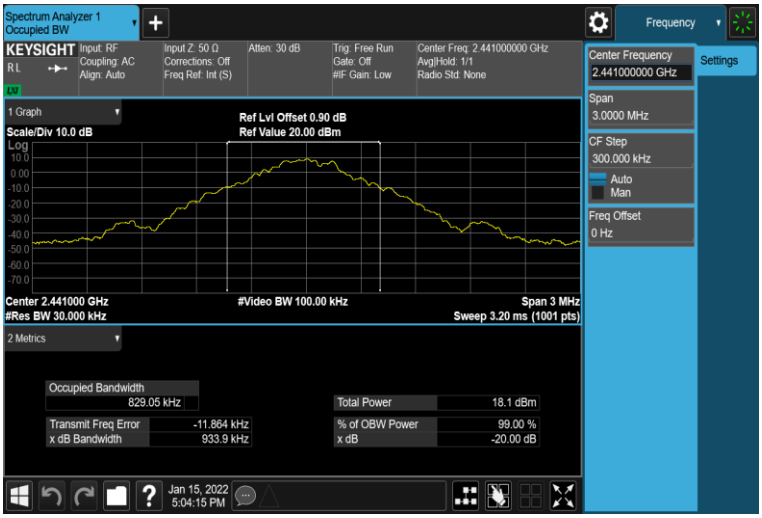
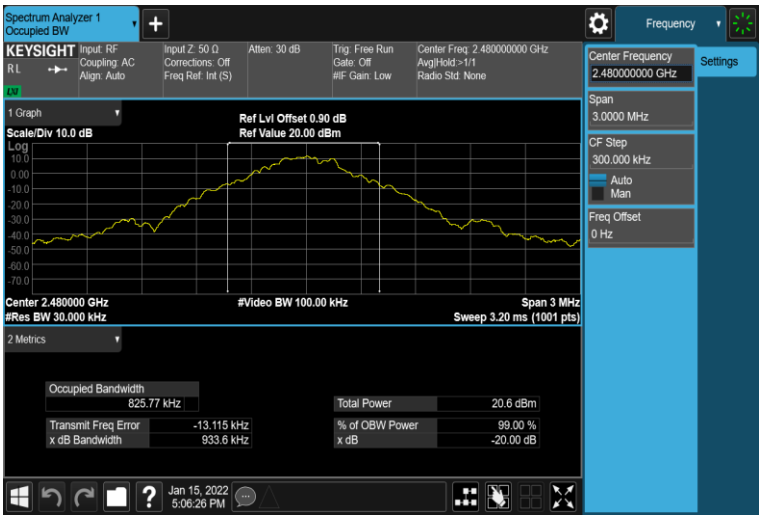
Test Mode	Frequency (MHz)	Packet Type	Average Power		Peak Power		Limit (W)
			(dBm)	(W)	(dBm)	(W)	
Mode 2	2402	DH1	9.93	0.00984	10.16	0.01038	≤ 0.125
		DH3	9.97	0.00993	10.18	0.01042	≤ 0.125
		DH5	10.07	0.01016	10.29	0.01069	≤ 0.125
	2441	DH1	10.11	0.01026	10.35	0.01084	≤ 0.125
		DH3	10.18	0.01042	10.43	0.01104	≤ 0.125
		DH5	10.28	0.01067	10.52	0.01127	≤ 0.125
	2480	DH1	12.42	0.01746	12.65	0.01841	≤ 0.125
		DH3	12.49	0.01774	12.68	0.01854	≤ 0.125
		DH5	12.61	0.01824	12.80	0.01905	≤ 0.125
Mode 3	2402	2DH1	8.36	0.00685	10.42	0.01102	≤ 0.125
		2DH3	8.41	0.00693	10.60	0.01148	≤ 0.125
		2DH5	8.69	0.00740	10.62	0.01153	≤ 0.125
	2441	2DH1	8.83	0.00764	10.26	0.01062	≤ 0.125
		2DH3	8.89	0.00774	10.56	0.01138	≤ 0.125
		2DH5	8.96	0.00787	10.80	0.01202	≤ 0.125
	2480	2DH1	11.08	0.01282	11.59	0.01442	≤ 0.125
		2DH3	11.12	0.01294	11.69	0.01476	≤ 0.125
		2DH5	11.51	0.01416	11.71	0.01483	≤ 0.125
Mode 4	2402	3DH1	8.38	0.00689	10.51	0.01125	≤ 0.125
		3DH3	8.43	0.00697	10.78	0.01197	≤ 0.125
		3DH5	8.73	0.00746	10.89	0.01227	≤ 0.125
	2441	3DH1	8.89	0.00774	10.58	0.01143	≤ 0.125
		3DH3	8.96	0.00787	10.89	0.01227	≤ 0.125
		3DH5	9.01	0.00796	10.93	0.01239	≤ 0.125
	2480	3DH1	11.11	0.01291	11.96	0.01570	≤ 0.125
		3DH3	11.16	0.01306	12.63	0.01832	≤ 0.125
		3DH5	11.73	0.01489	12.89	0.01945	≤ 0.125

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

20 dB RF Bandwidth Measurement

Test Mode	Frequency (MHz)	Measurement Results (MHz)
Mode 2	2402	0.936
	2441	0.934
	2480	0.934
Mode 4	2402	1.296
	2441	1.296
	2480	1.297

■ Test Graphs

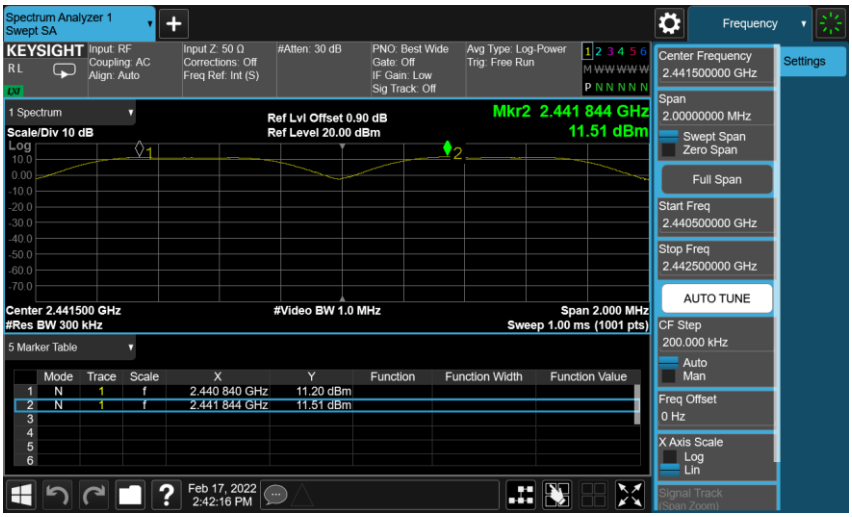
Mode 2: GFSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

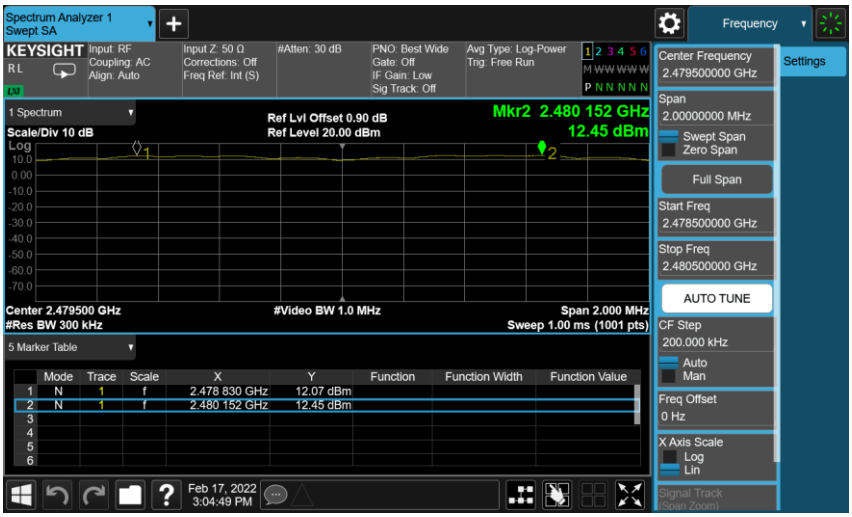
Mode 4: 8DPSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

Carrier Frequency Separation Measurement

Test Mode	Frequency (MHz)	Measurement Results (MHz)	Limit (MHz)
Mode 2	2402	1.008	≥ 0.624
	2441	1.004	≥ 0.623
	2480	1.000	≥ 0.622
Mode 4	2402	0.982	≥ 0.864
	2441	1.148	≥ 0.864
	2480	1.322	≥ 0.865

■ Test Graphs

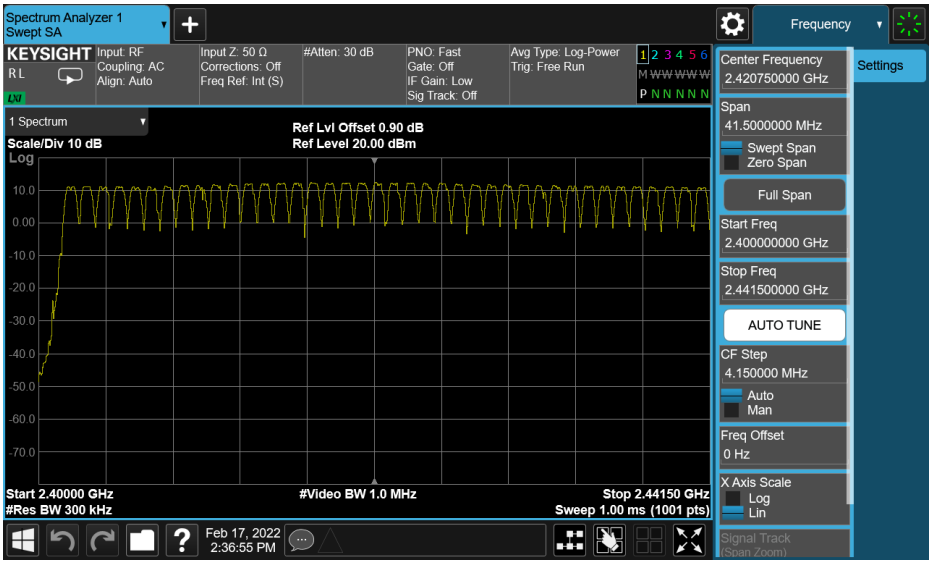
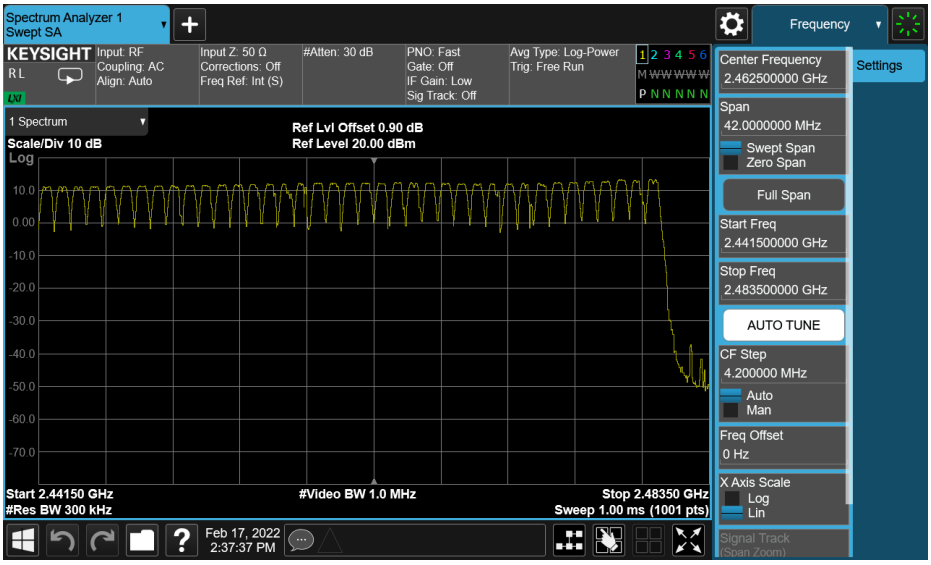
Mode 2: GFSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

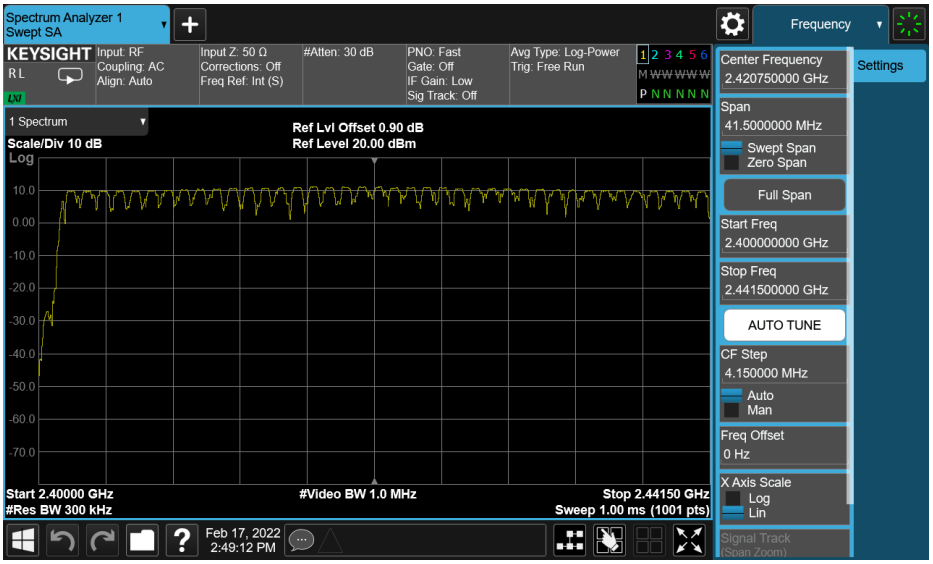
Mode 4: 8DPSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

Number of Hopping Measurement

Test Mode	Frequency Range (MHz)	Measurement Results (Ch)	Limit (ch)
Mode 2	2402 - 2480	79	≥ 15
Mode 4	2402 - 2480	79	≥ 15

■ Test Graphs

Mode 2: GFSK Continuous TX mode	
CH0~CH39	
CH40~CH78	

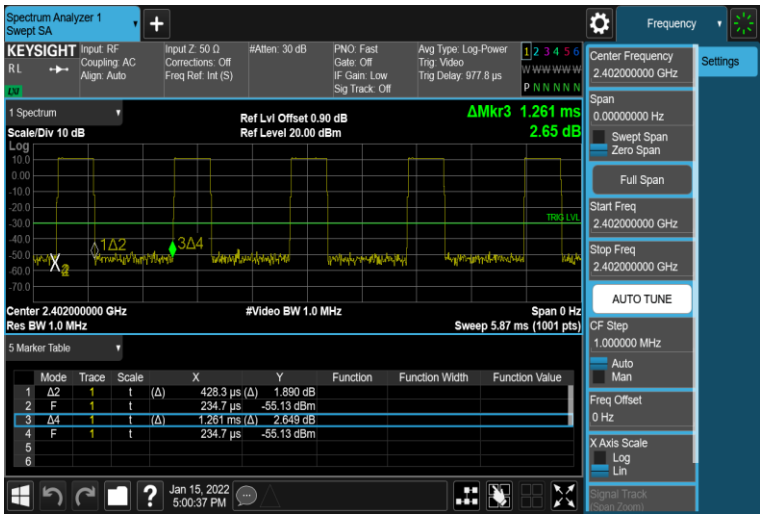
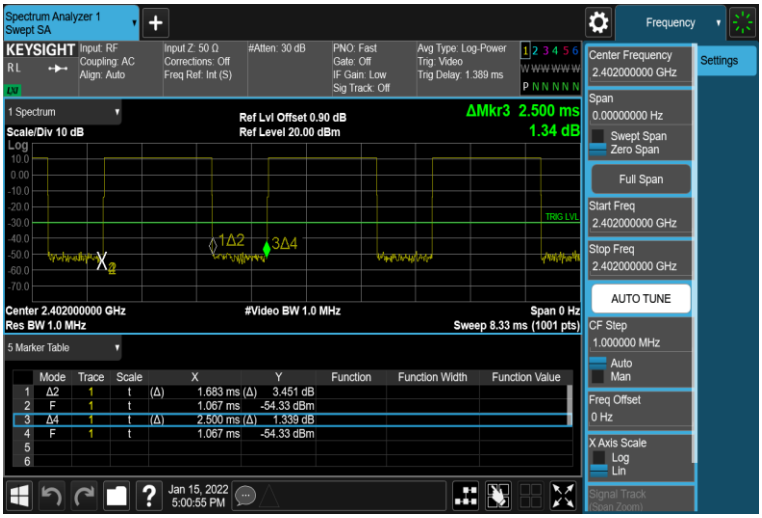
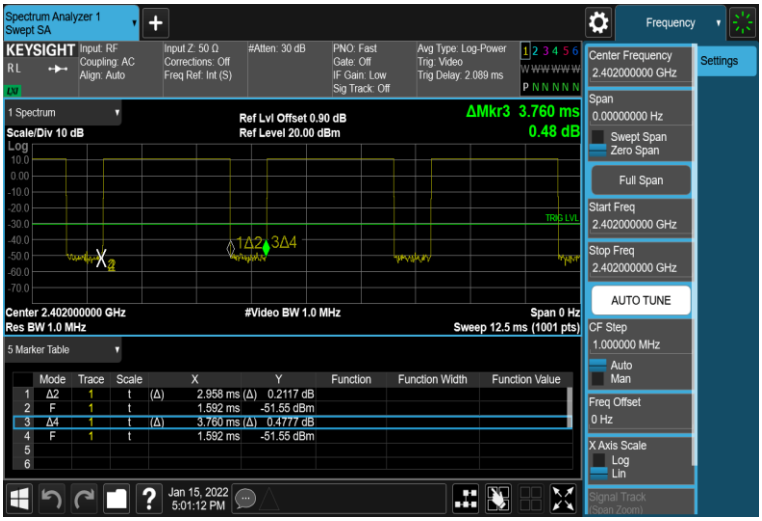
Mode 4: 8DPSK Continuous TX mode	
CH0~CH39	
CH40~CH78	

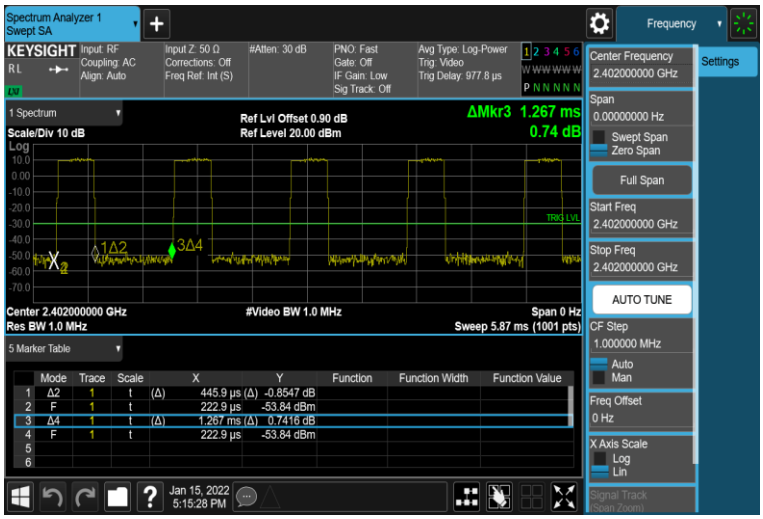
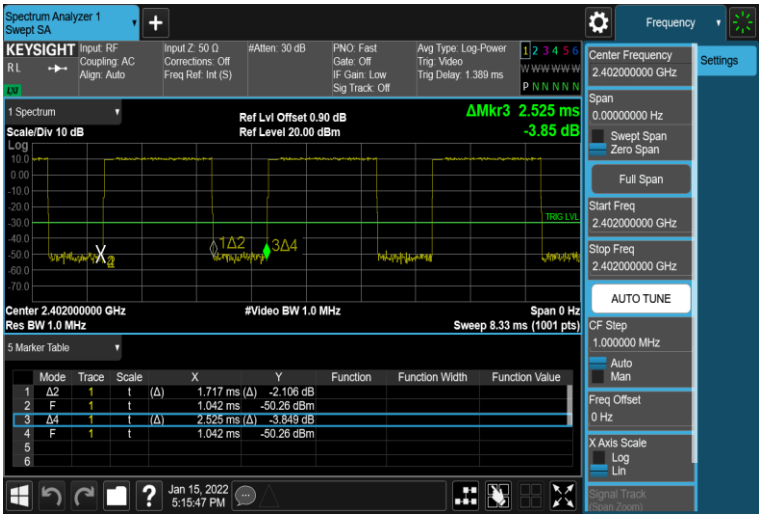
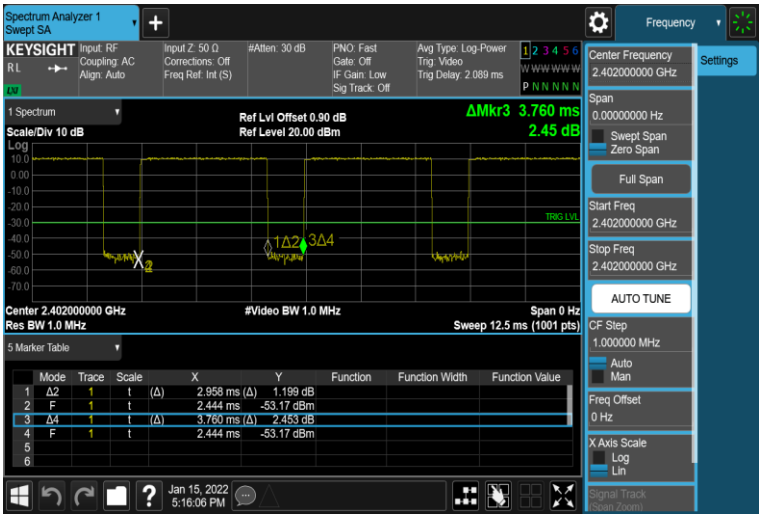
Time of Occupancy (Dwell Time) Measurement

Mode 2: GFSK Continuous TX mode	
DH1	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	800/79CH = 10.13(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 10.13 = 320.108(times)
Each Channel Dwell Times (2)	0.428 ms (sec)
Dwell Times on Cycle (1) * (2)	137.092 ms (sec)
LIMIT(msec)	< = 400
DH3	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	400/79CH = 5.1(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 5.1 = 161.16(times)
Each Channel Dwell Times (2)	1.683 ms (sec)
Dwell Times on Cycle (1) * (2)	269.158 ms (sec)
LIMIT(msec)	< = 400
DH5	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	266.7/79CH = 3.37(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 3.37 = 106.492(times)
Each Channel Dwell Times (2)	2.958 ms (sec)
Dwell Times on Cycle (1) * (2)	315.924 ms (sec)
LIMIT(msec)	< = 400

Mode 4: 8DPSK Continuous TX mode	
3DH1	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	800/79CH = 10.13(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 10.13 = 320.108(times)
Each Channel Dwell Times (2)	0.446 ms (sec)
Dwell Times on Cycle (1) * (2)	142.725 ms (sec)
LIMIT(msec)	< = 400
3DH3	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	400/79CH = 5.1(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 5.1 = 161.16(times)
Each Channel Dwell Times (2)	1.717 ms (sec)
Dwell Times on Cycle (1) * (2)	274.488 ms (sec)
LIMIT(msec)	< = 400
3DH5	
Cycle Calculate	79CH * 0.4 = 31.6 (sec)
The EUT Hopping Number per Sec	1600 times/sec
Each Channel Dwell Times per Sec	266.7/79CH = 3.37(times/sec)
Each Channel Dwell Times on Cycle(1)	31.6 * 3.37 = 106.492(times)
Each Channel Dwell Times (2)	2.958 ms (sec)
Dwell Times on Cycle (1) * (2)	315.924 ms (sec)
LIMIT(msec)	< = 400

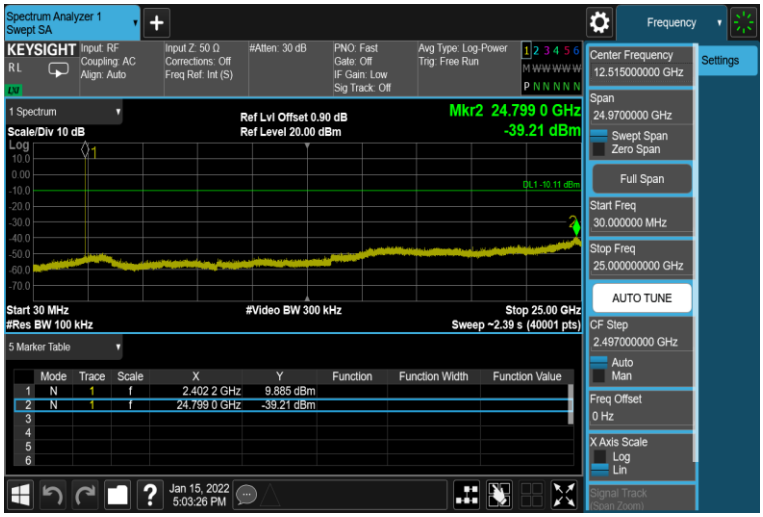
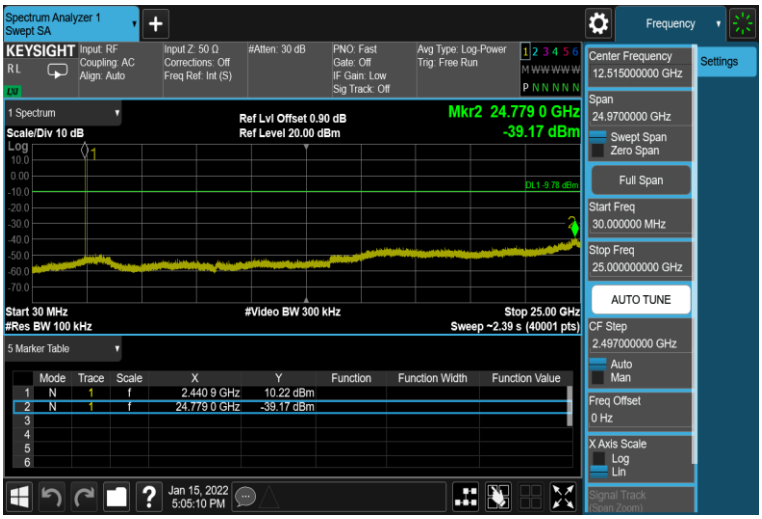
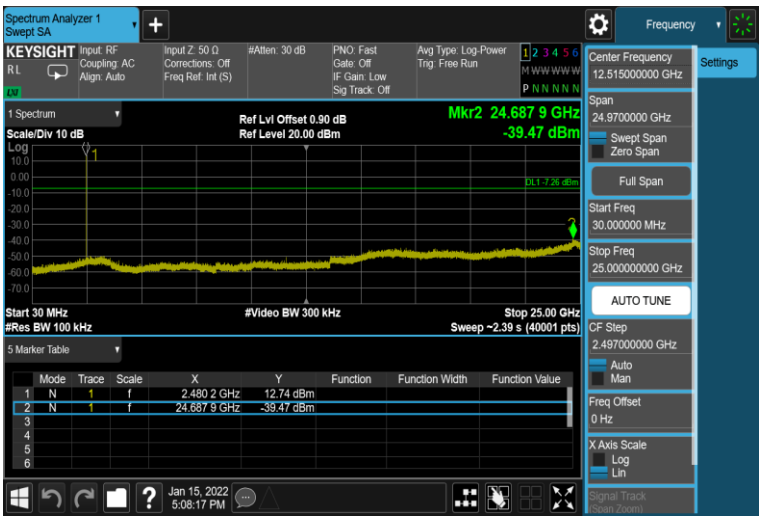
■ Test Graphs

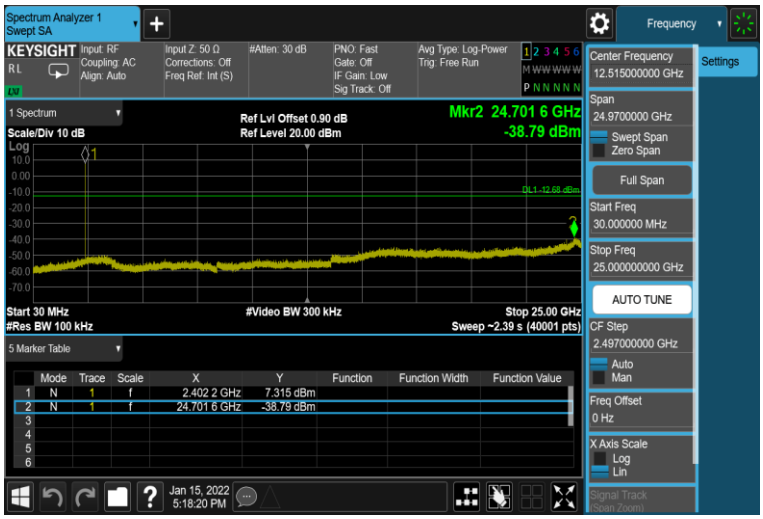
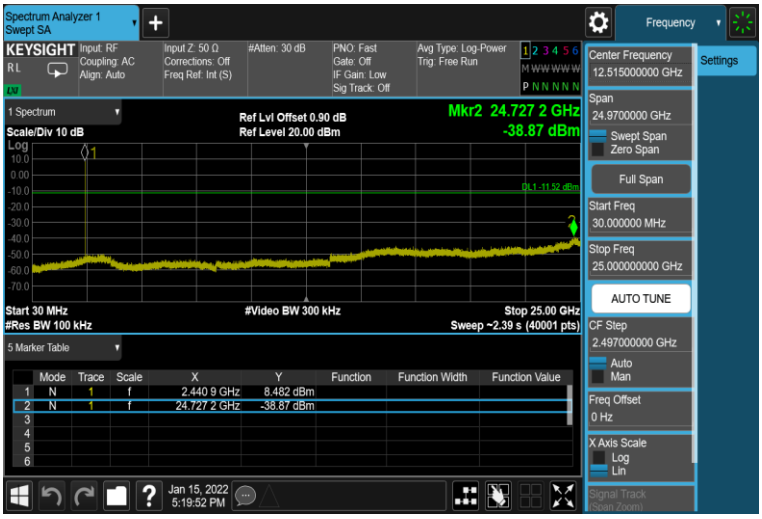
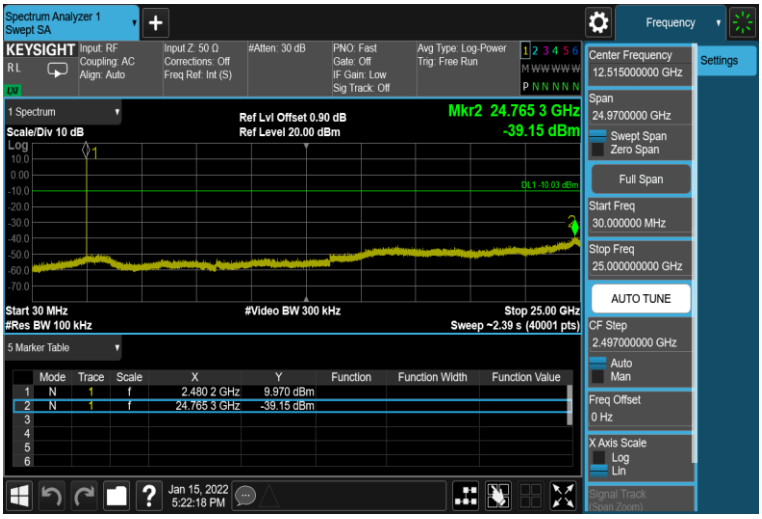
Mode 2: GFSK Continuous TX mode	
DH1	
DH3	
DH5	

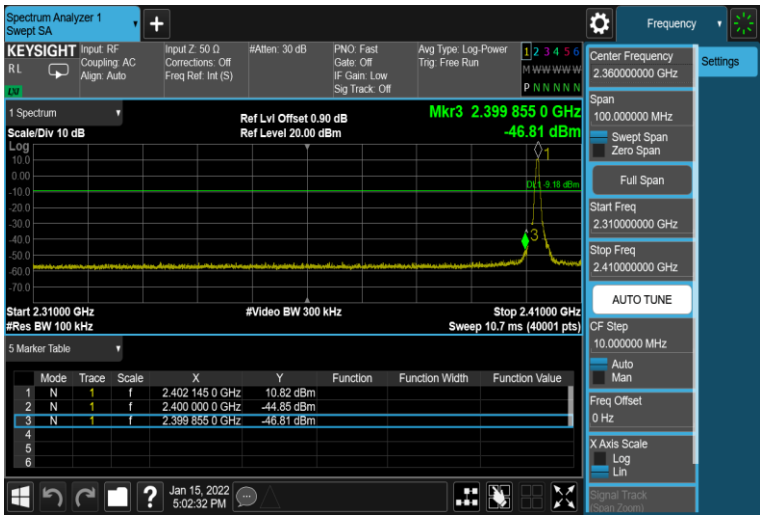
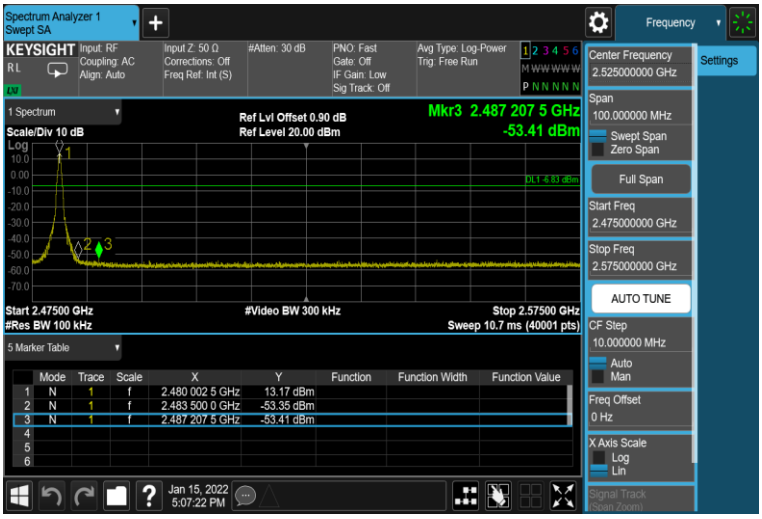
Mode 4: 8DPSK Continuous TX mode	
3DH1	
3DH3	
3DH5	

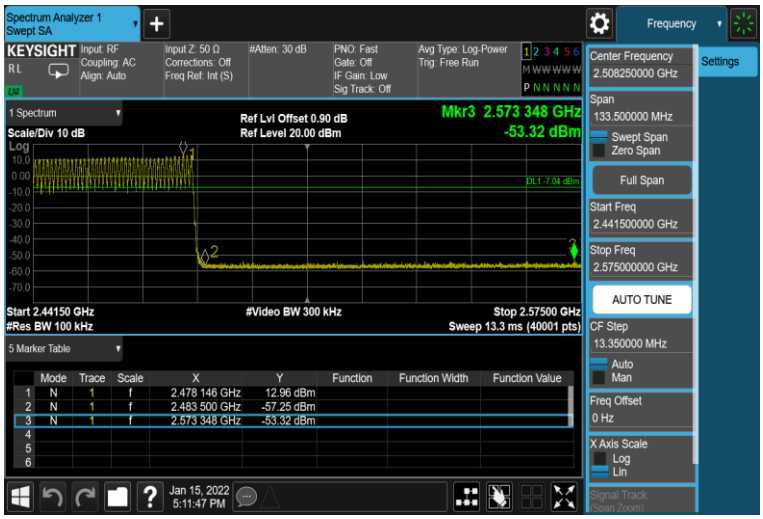
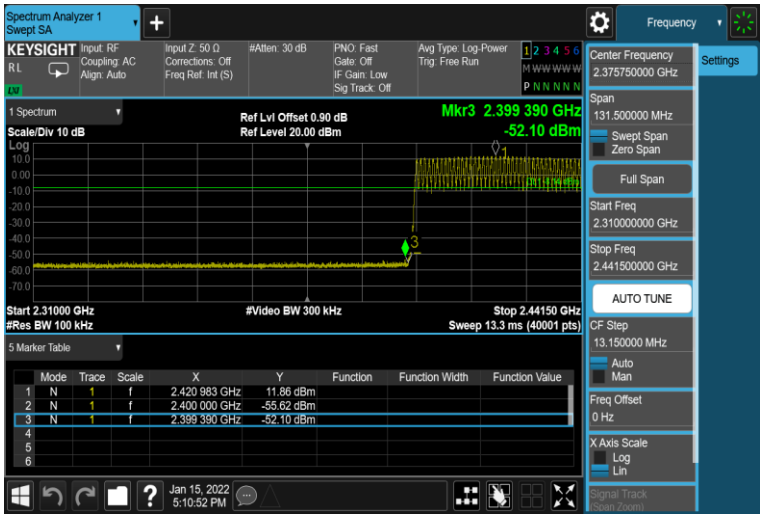
Out of Band Conducted Emissions Measurement

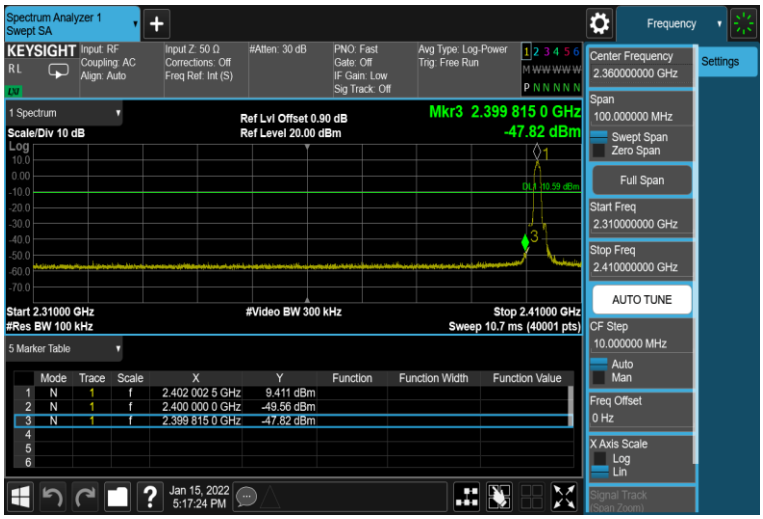
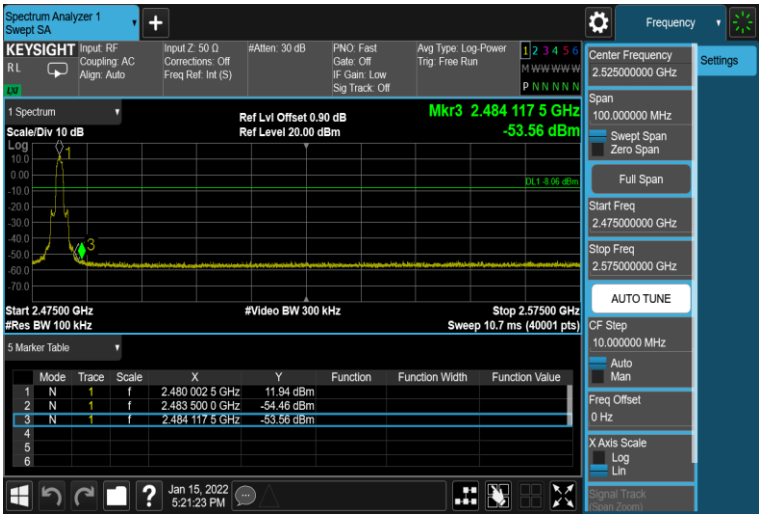
■ Test Graphs

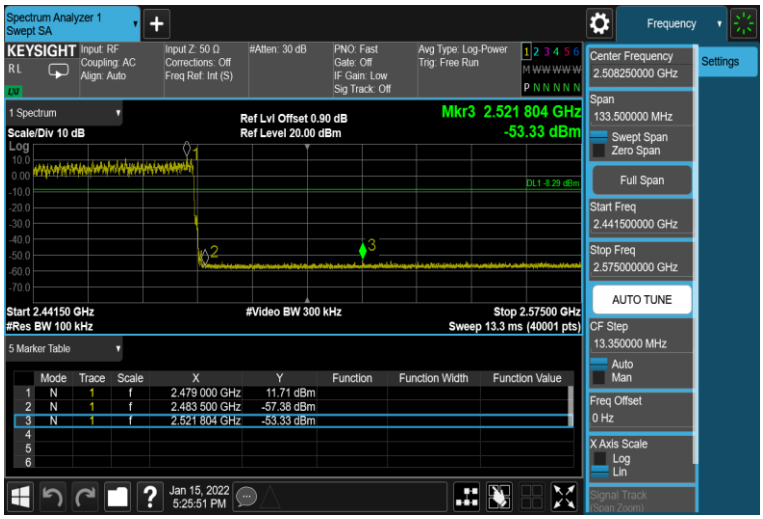
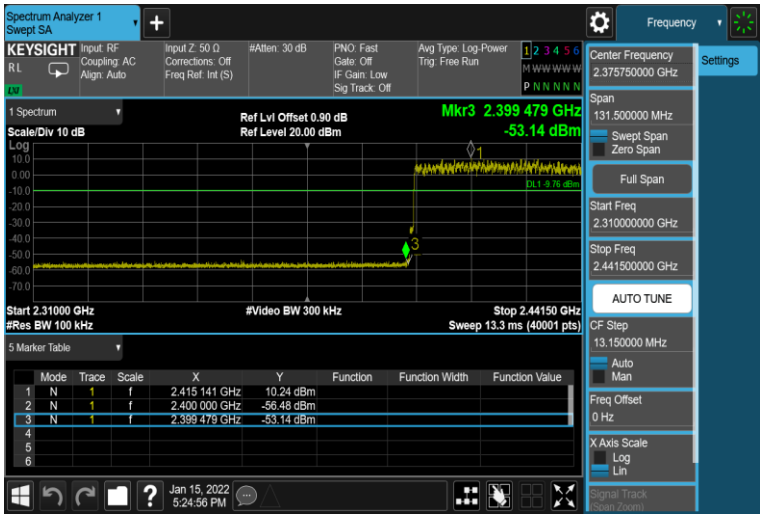
Mode 2: GFSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

Mode 4: 8DPSK Continuous TX mode	
2402 MHz	
2441 MHz	
2480 MHz	

Mode 2: GFSK Continuous TX mode _ Un-hopping	
2402 MHz	
2480 MHz	

Mode 2: GFSK Continuous TX mode _ Hopping	
2402 ~ 2480 MHz	
	

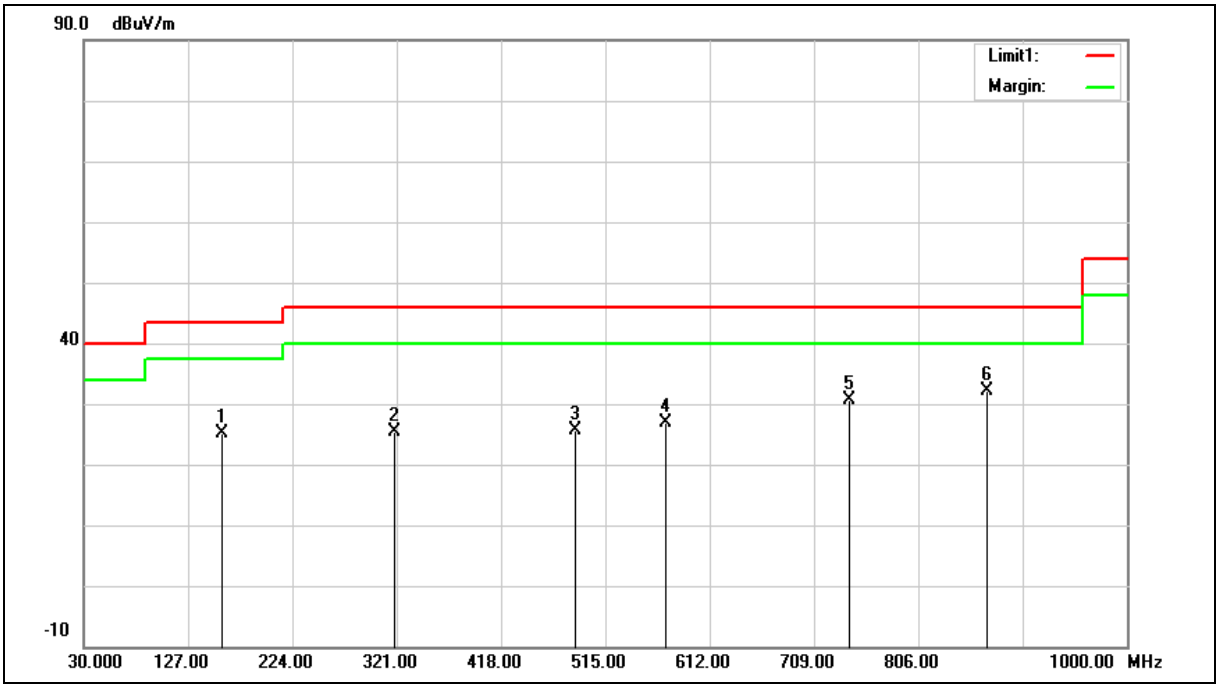
Mode 4: 8DPSK Continuous TX mode _ Un-hopping	
2402 MHz	
2480 MHz	

Mode 4: 8DPSK Continuous TX mode _ Hopping	
2402 ~ 2480 MHz	
	

5.3 Radiated Emission Measurement

Below 1 GHz

Standard:	FCC Part 15.247	Test Distance:	3m
Frequency:	2402 MHz		
Mode:	Mode 1		
Ant.Polar.:	Horizontal		



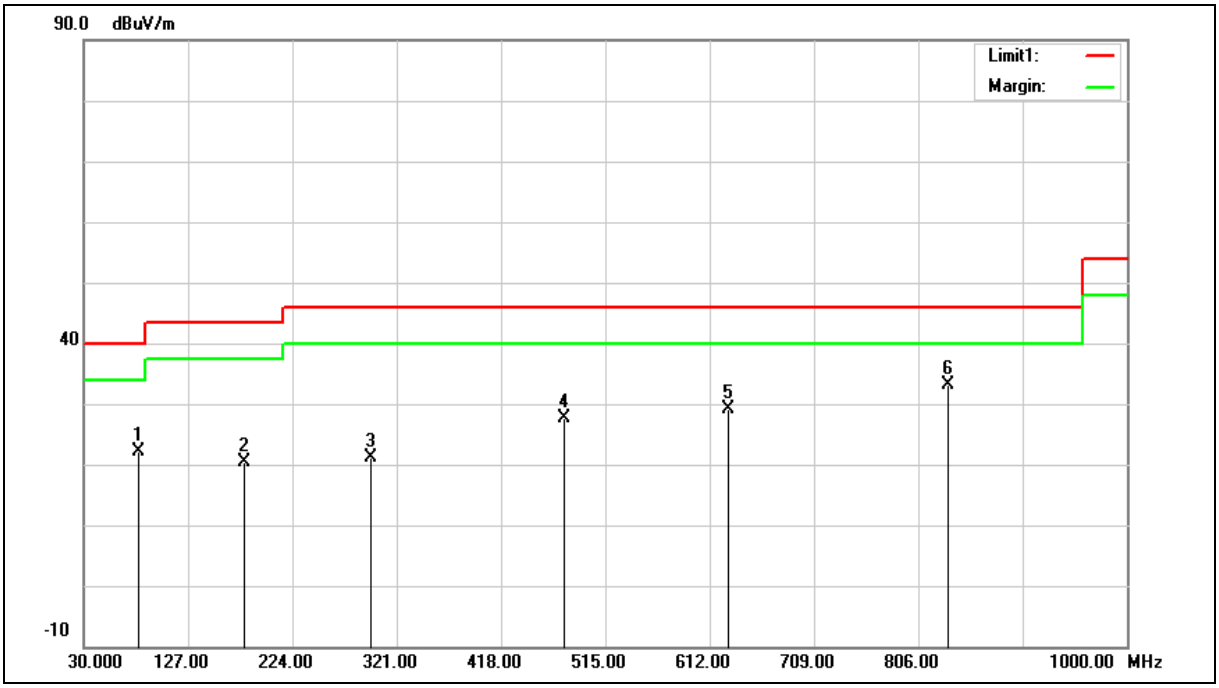
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	159.0100	31.47	-6.44	25.03	43.50	-18.47	QP
2	319.0600	30.50	-5.15	25.35	46.00	-20.65	QP
3	486.8700	27.62	-2.07	25.55	46.00	-20.45	QP
4	571.2600	27.25	-0.27	26.98	46.00	-19.02	QP
5	741.9800	27.89	2.75	30.64	46.00	-15.36	QP
6	870.0200	27.12	4.92	32.04	46.00	-13.96	QP

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:	3m
Frequency:	2402 MHz		
Mode:	Mode 1		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	81.4100	34.23	-12.10	22.13	40.00	-17.87	QP
2	179.3800	28.18	-7.79	20.39	43.50	-23.11	QP
3	296.7500	26.53	-5.50	21.03	46.00	-24.97	QP
4	477.1700	29.83	-2.19	27.64	46.00	-18.36	QP
5	629.4600	28.21	0.88	29.09	46.00	-16.91	QP
6	834.1300	28.68	4.39	33.07	46.00	-12.93	QP

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

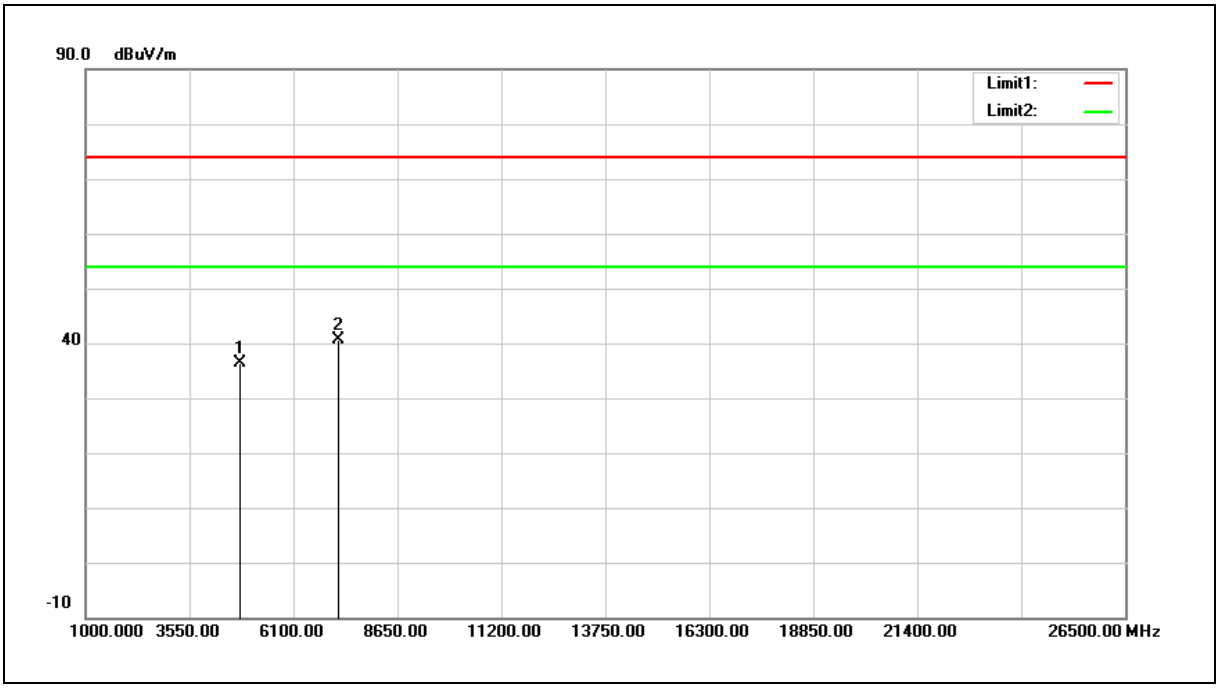
2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

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

Harmonic

Above 1 GHz

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Harmonic		
Frequency:	2402 MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



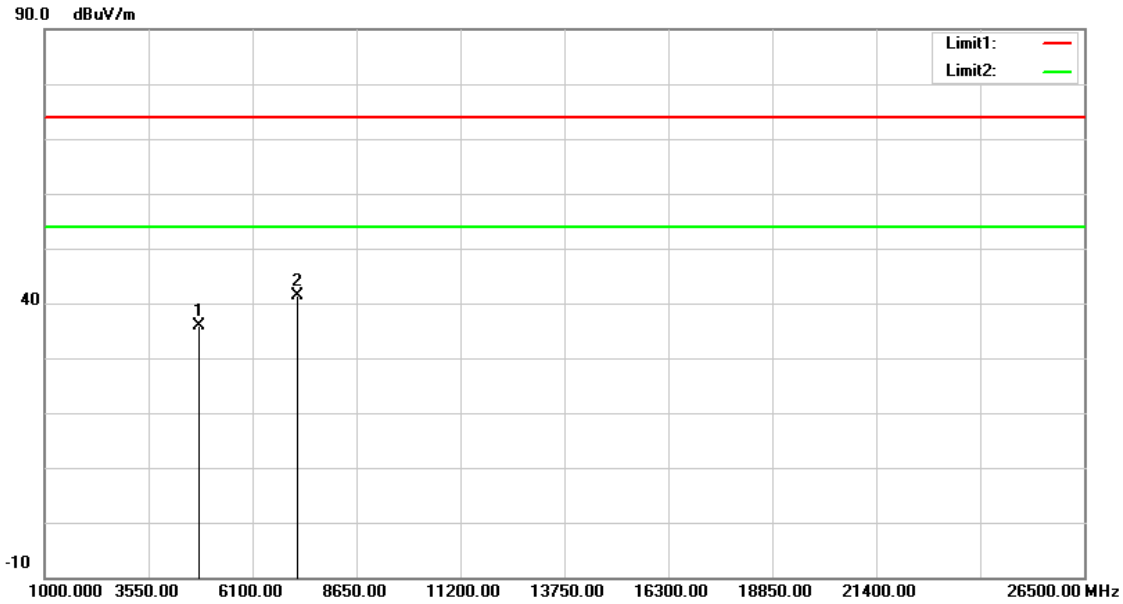
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	37.31	-1.04	36.27	74.00	-37.73	peak
2	7206.000	34.62	6.04	40.66	74.00	-33.34	peak

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:	3m
Test item:	Harmonic		
Frequency:	2402 MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



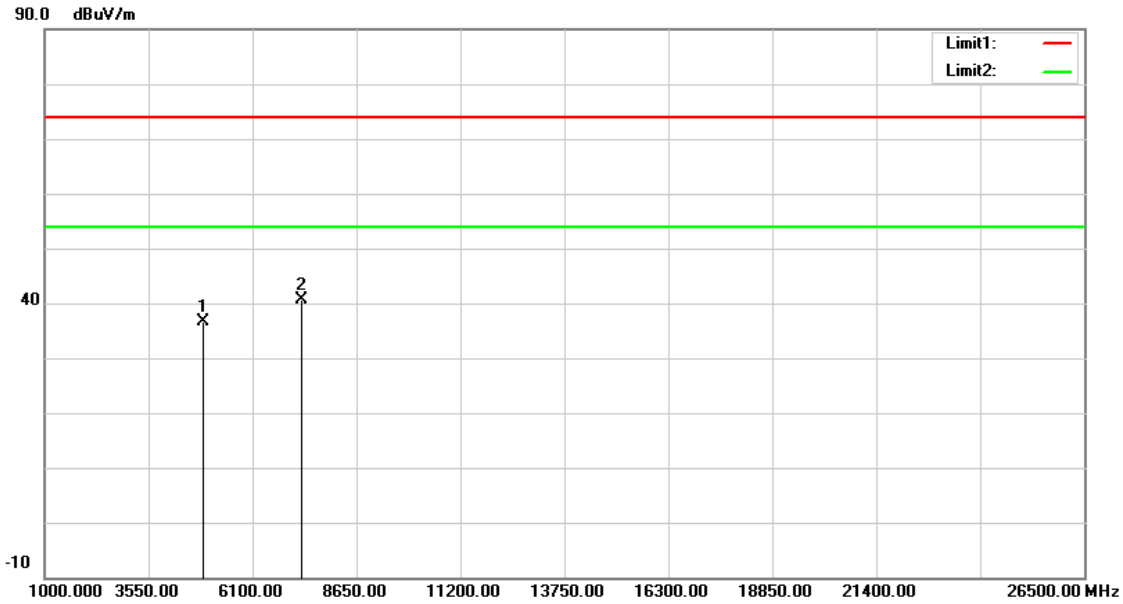
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	36.82	-1.04	35.78	74.00	-38.22	peak
2	7206.000	35.39	6.04	41.43	74.00	-32.57	peak

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:	3m
Test item:	Harmonic		
Frequency:	2441 MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



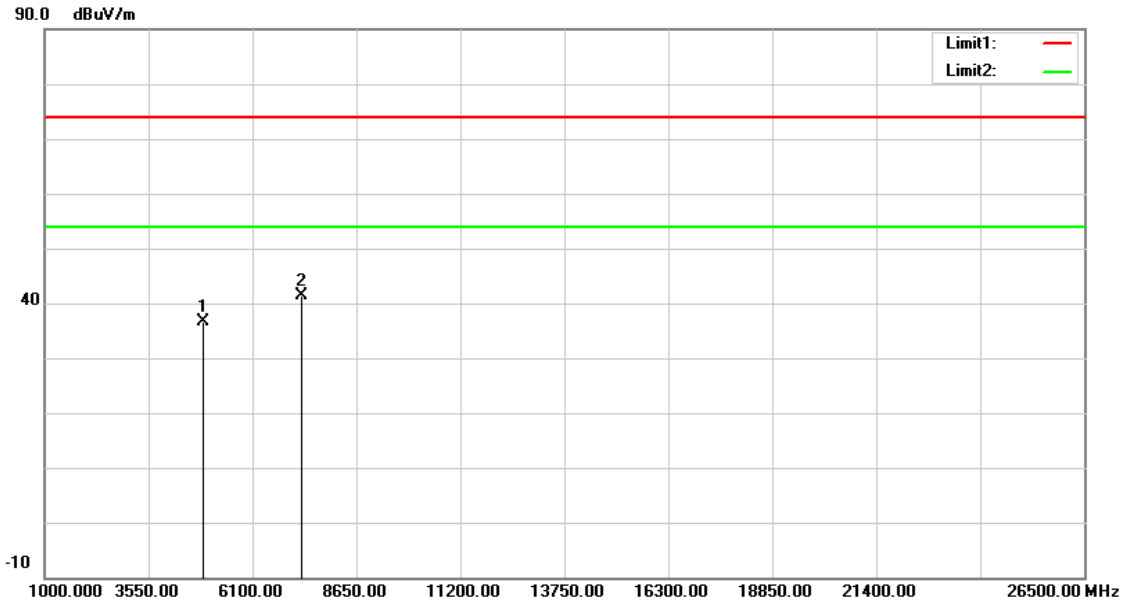
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	37.52	-0.77	36.75	74.00	-37.25	peak
2	7323.000	34.05	6.50	40.55	74.00	-33.45	peak

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:	3m
Test item:	Harmonic		
Frequency:	2441 MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



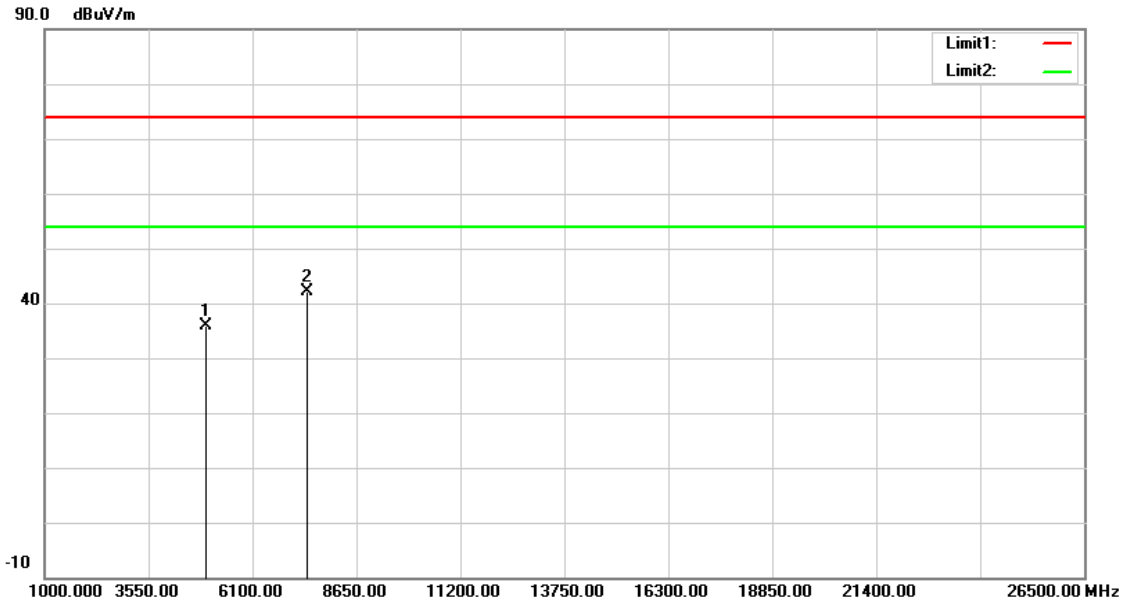
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	37.50	-0.77	36.73	74.00	-37.27	peak
2	7323.000	34.80	6.50	41.30	74.00	-32.70	peak

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:	3m
Test item:	Harmonic		
Frequency:	2480 MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



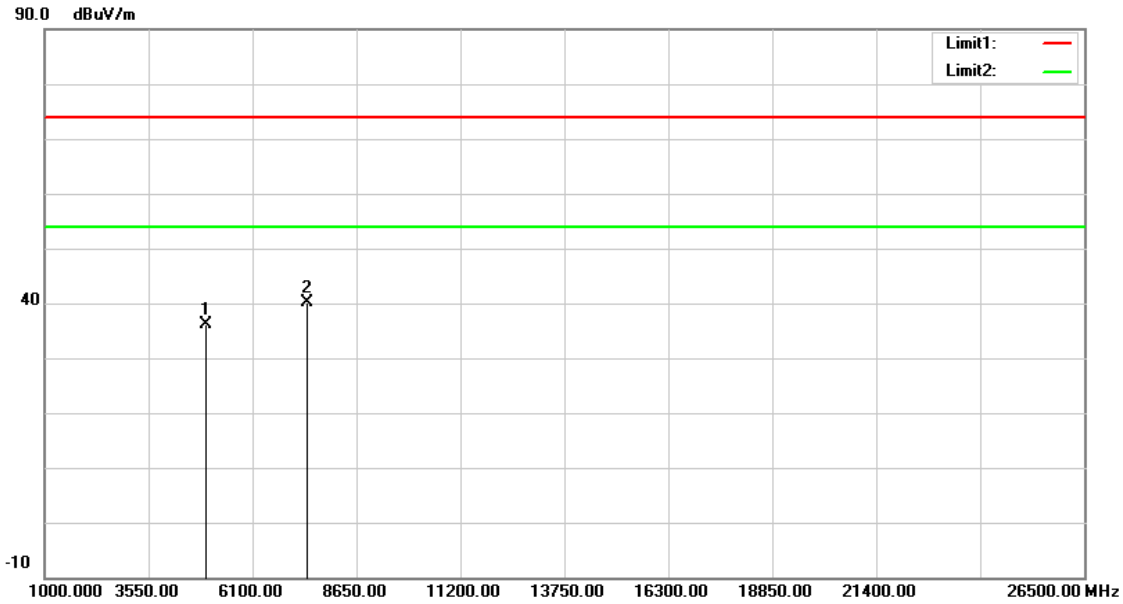
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	36.46	-0.50	35.96	74.00	-38.04	peak
2	7440.000	35.14	6.95	42.09	74.00	-31.91	peak

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:	3m
Test item:	Harmonic		
Frequency:	2480 MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



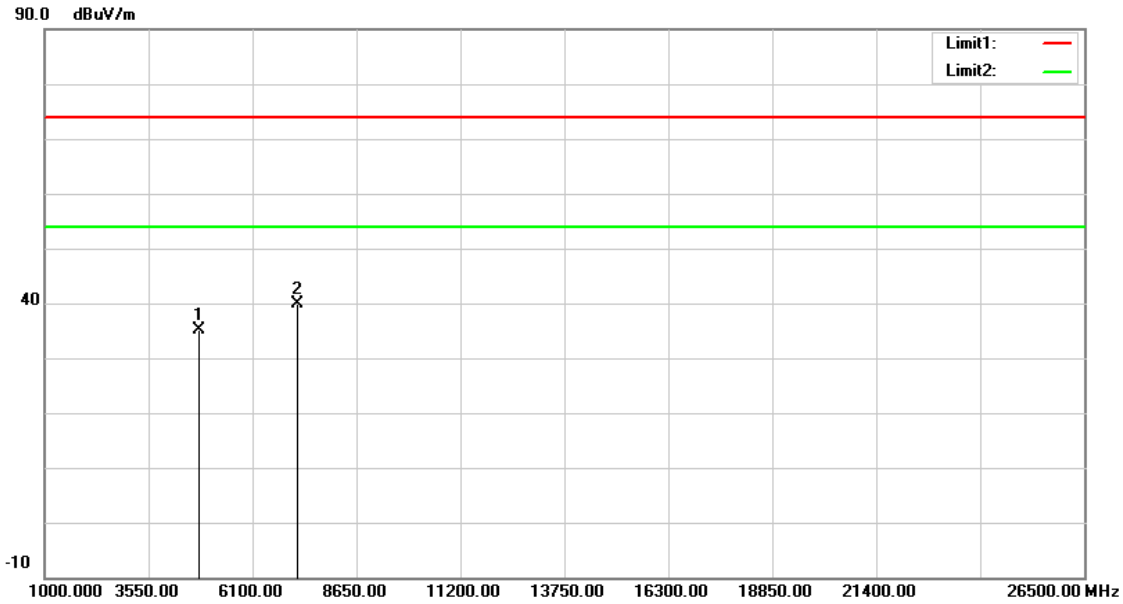
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	36.56	-0.50	36.06	74.00	-37.94	peak
2	7440.000	33.09	6.95	40.04	74.00	-33.96	peak

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:	3m
Test item:	Harmonic		
Frequency:	2402 MHz		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



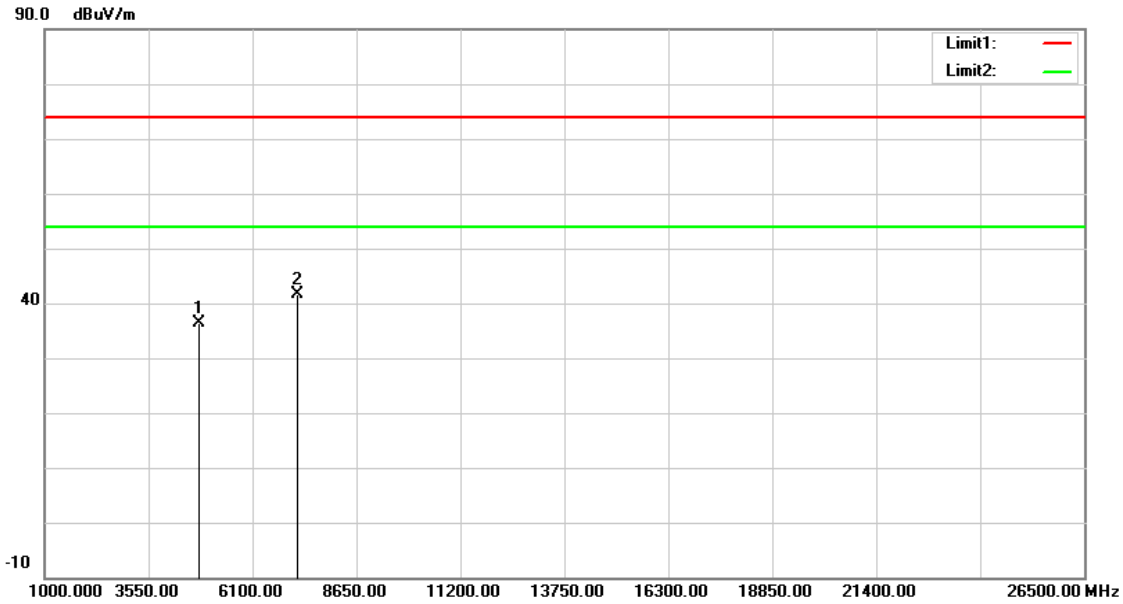
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	36.10	-1.04	35.06	74.00	-38.94	peak
2	7206.000	33.80	6.04	39.84	74.00	-34.16	peak

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:	3m
Test item:	Harmonic		
Frequency:	2402 MHz		
Mode:	Mode 4		
Ant.Polar.:	Vertical		



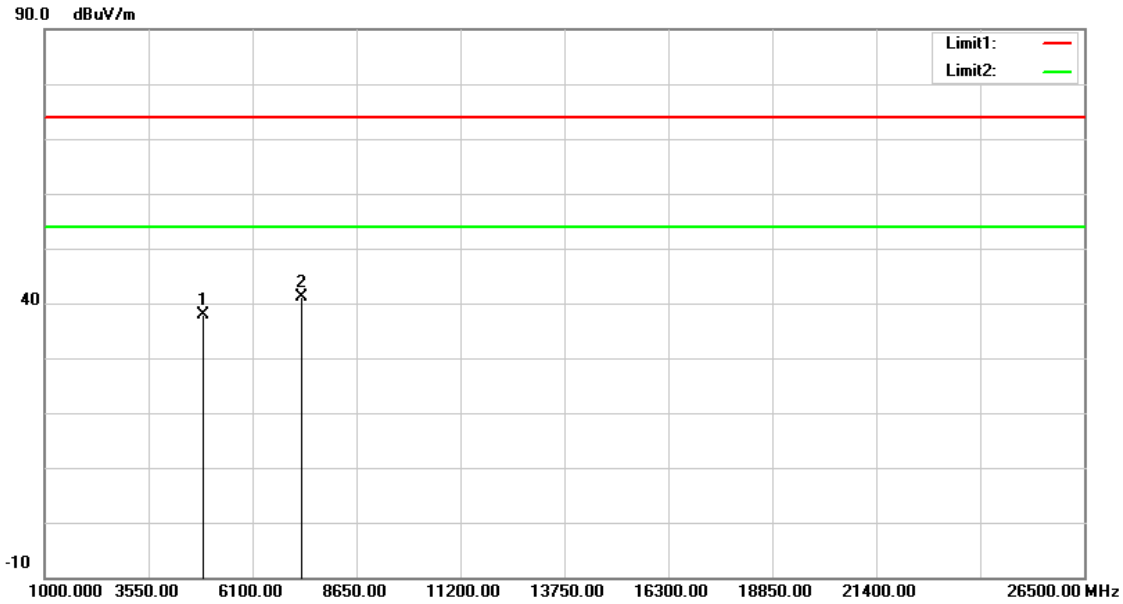
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4804.000	37.47	-1.04	36.43	74.00	-37.57	peak
2	7206.000	35.62	6.04	41.66	74.00	-32.34	peak

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:	3m
Test item:	Harmonic		
Frequency:	2441 MHz		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



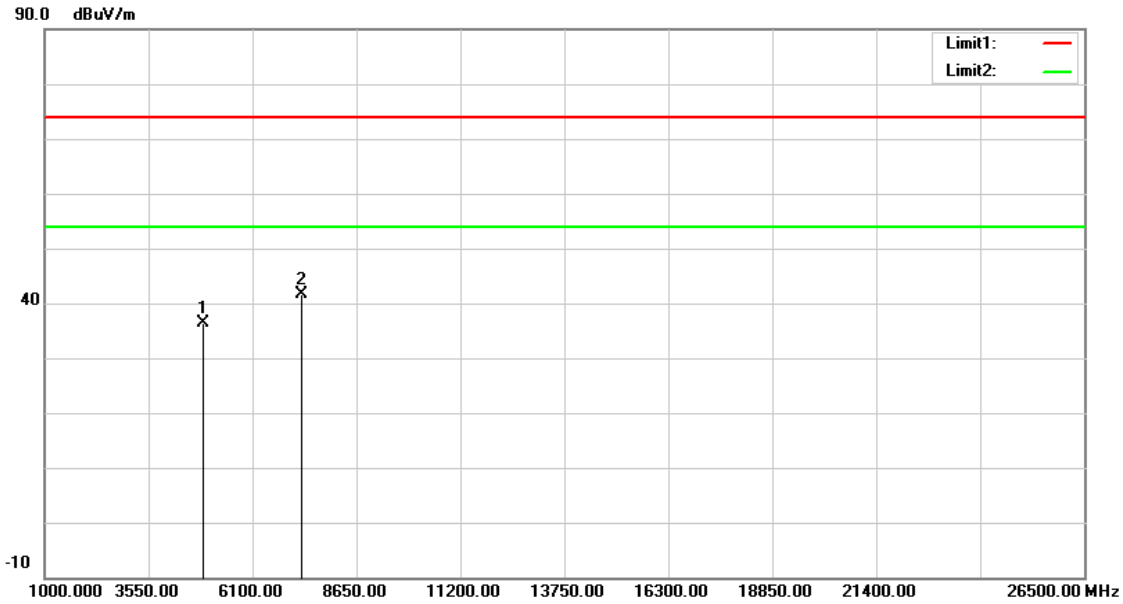
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	38.74	-0.77	37.97	74.00	-36.03	peak
2	7323.000	34.75	6.50	41.25	74.00	-32.75	peak

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:	3m
Test item:	Harmonic		
Frequency:	2441 MHz		
Mode:	Mode 4		
Ant.Polar.:	Vertical		



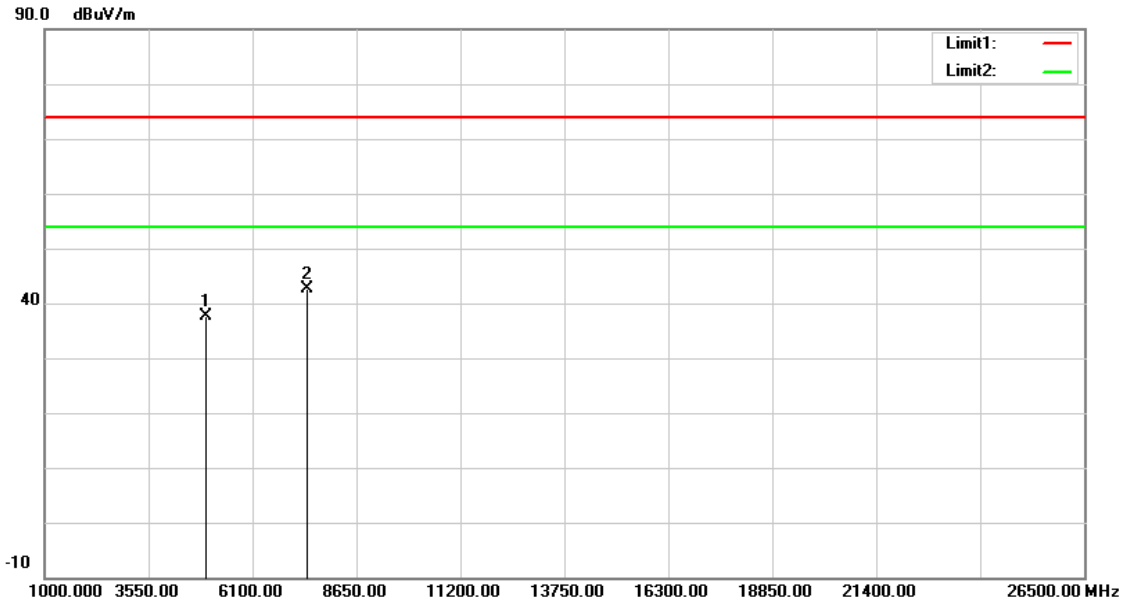
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4882.000	37.21	-0.77	36.44	74.00	-37.56	peak
2	7323.000	35.03	6.50	41.53	74.00	-32.47	peak

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:	3m
Test item:	Harmonic		
Frequency:	2480 MHz		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



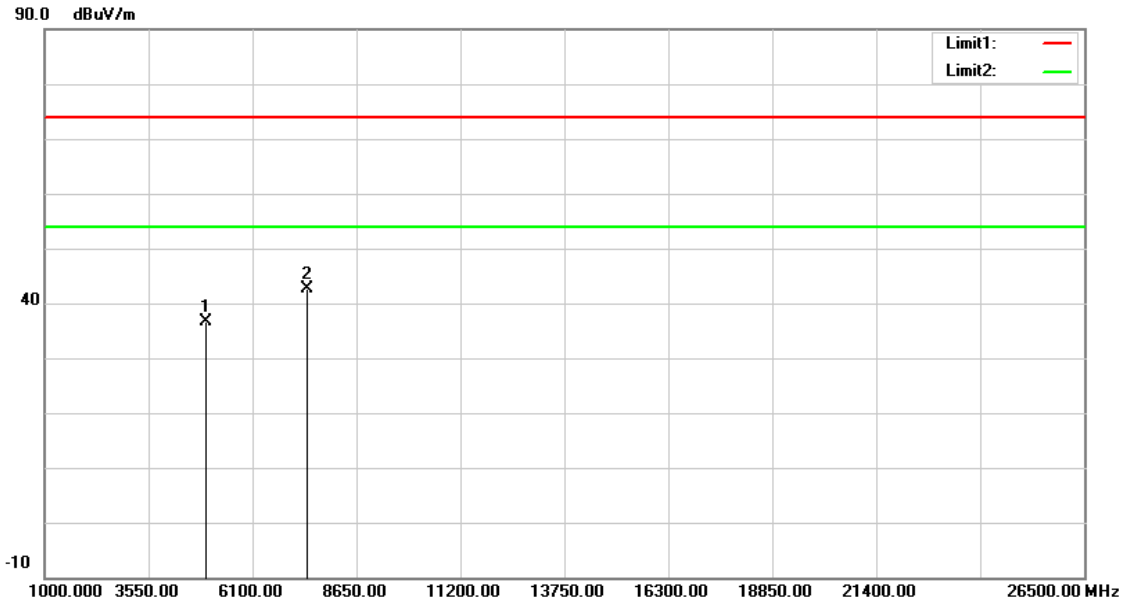
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	38.21	-0.50	37.71	74.00	-36.29	peak
2	7440.000	35.57	6.95	42.52	74.00	-31.48	peak

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:	3m
Test item:	Harmonic		
Frequency:	2480 MHz		
Mode:	Mode 4		
Ant.Polar.:	Vertical		



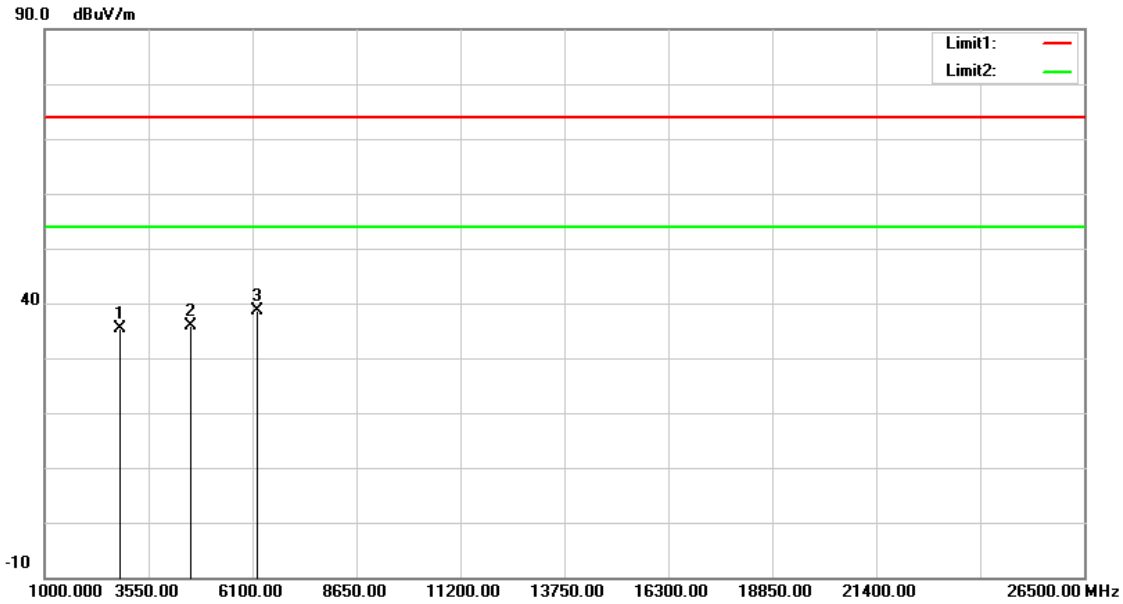
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	37.02	-0.50	36.52	74.00	-37.48	peak
2	7440.000	35.64	6.95	42.59	74.00	-31.41	peak

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:	3m
Test item:	Simultaneous Transmitting		
Mode:	WLAN 2.4 G + Bluetooth		
Ant.Polar.:	Horizontal		
Description:			



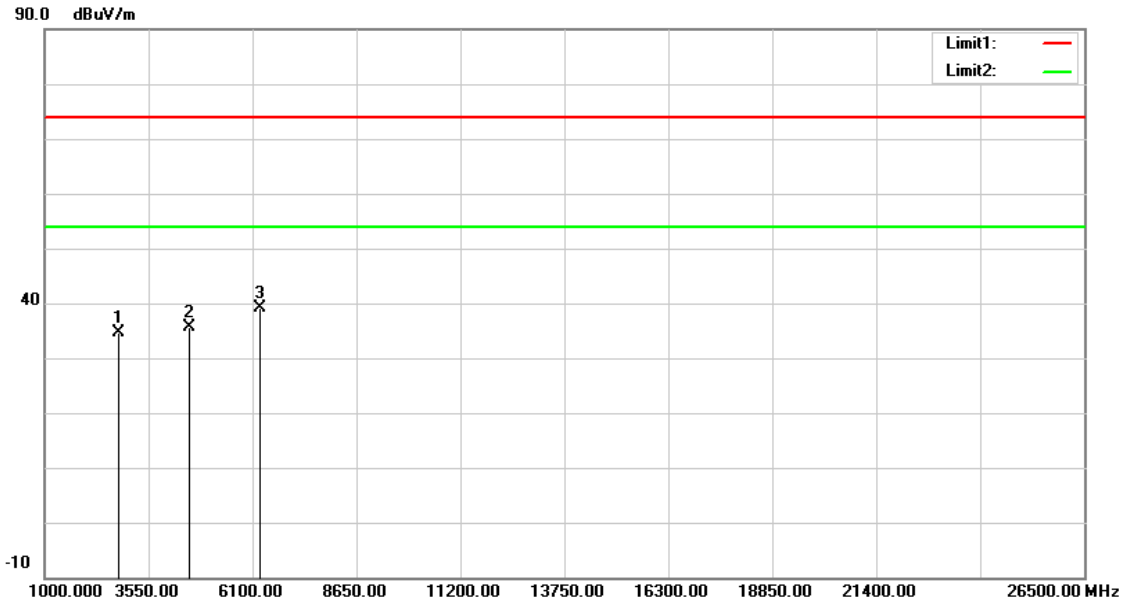
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2819.000	41.20	-5.89	35.31	74.00	-38.69	peak
2	4570.000	37.80	-1.85	35.95	74.00	-38.05	peak
3	6202.000	35.82	2.70	38.52	74.00	-35.48	peak

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:	3m
Test item:	Simultaneous Transmitting		
Mode:	WLAN 2.4 G + Bluetooth		
Ant.Polar.:	Vertical		
Description:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2819.000	40.56	-5.89	34.67	74.00	-39.33	peak
2	4553.000	37.44	-1.91	35.53	74.00	-38.47	peak
3	6270.000	36.19	2.95	39.14	74.00	-34.86	peak

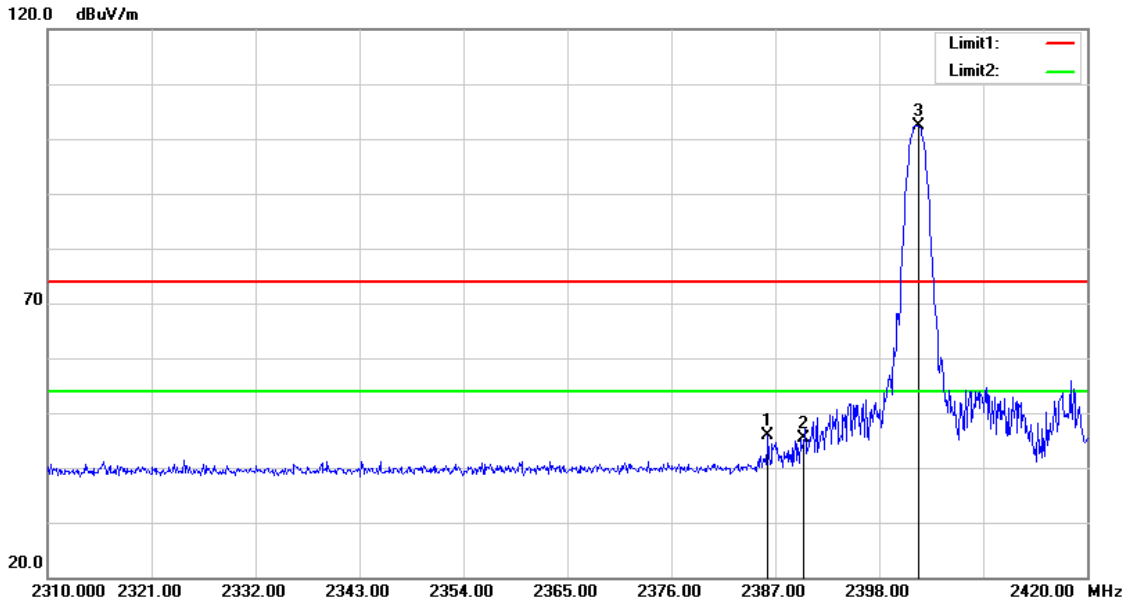
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

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.

Band Edge

Standard:	FCC Part 15.247	Test Distance:	3m
Test item:	Band edge		
Frequency:	2402 MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



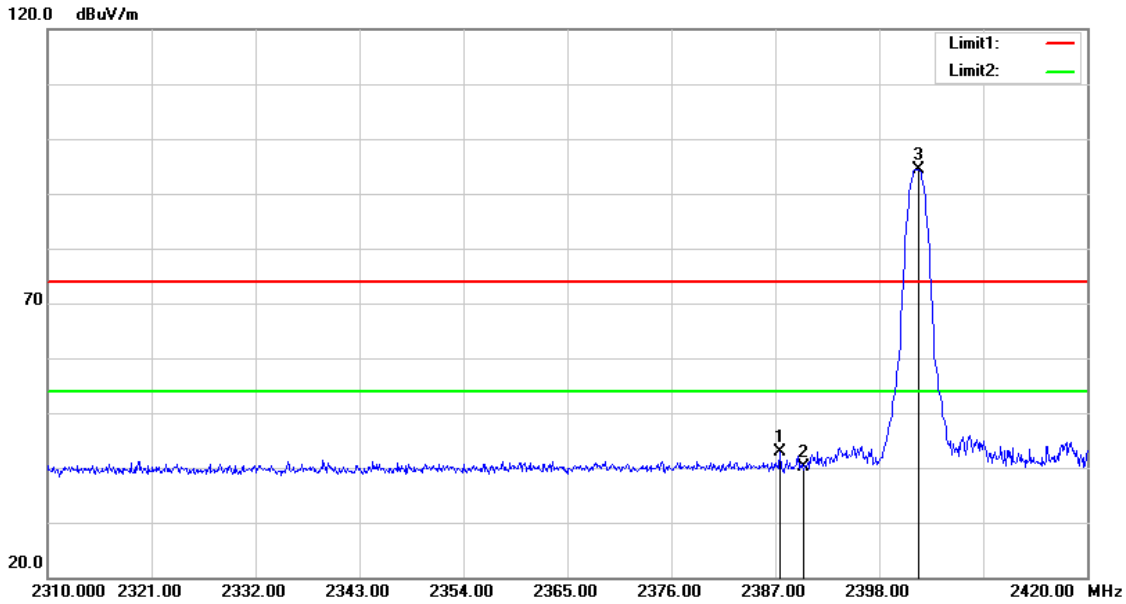
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.230	53.14	-7.33	45.81	74.00	-28.19	peak
2	2390.000	52.79	-7.30	45.49	74.00	-28.51	peak
3	2402.180	109.62	-7.25	102.37	74.00	28.37	peak

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:	3m
Test item:	Band edge		
Frequency:	2402 MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



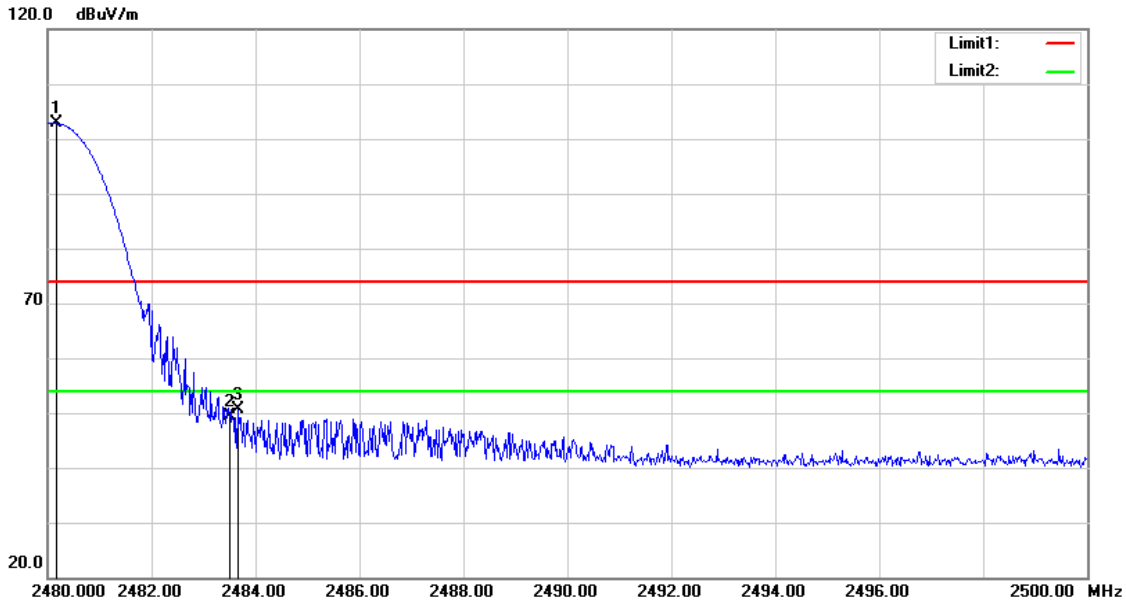
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2387.440	50.15	-7.33	42.82	74.00	-31.18	peak
2	2390.000	47.47	-7.30	40.17	74.00	-33.83	peak
3	2402.180	101.57	-7.25	94.32	74.00	20.32	peak

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:	3m
Test item:	Band edge		
Frequency:	2480 MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



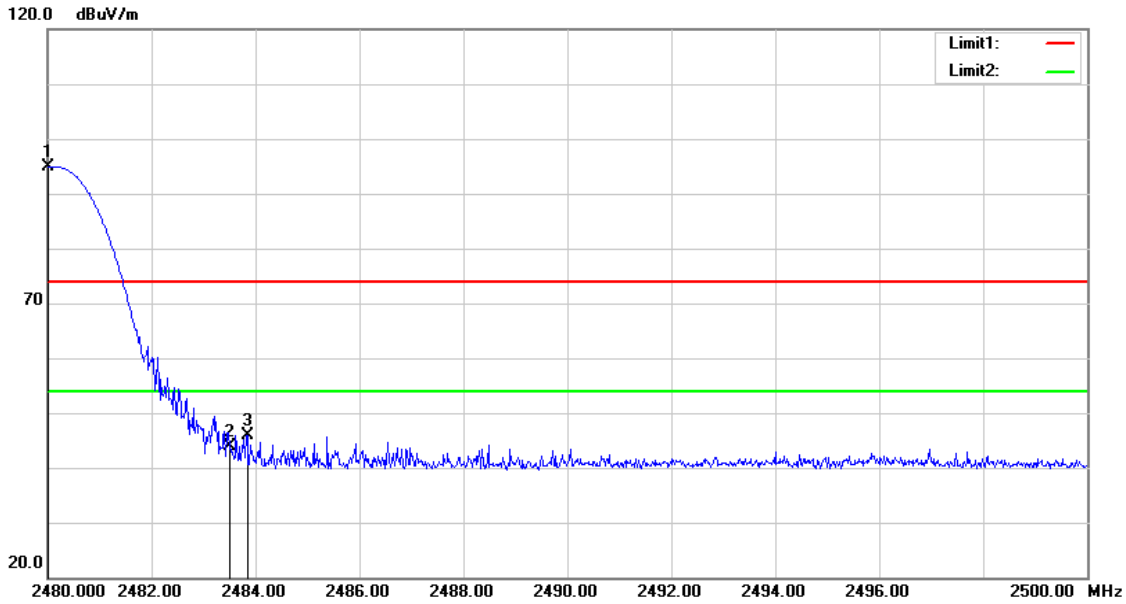
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.160	109.74	-6.95	102.79	74.00	28.79	peak
2	2483.500	56.23	-6.94	49.29	74.00	-24.71	peak
3	2483.660	57.45	-6.94	50.51	74.00	-23.49	peak

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:	3m
Test item:	Band edge		
Frequency:	2480 MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



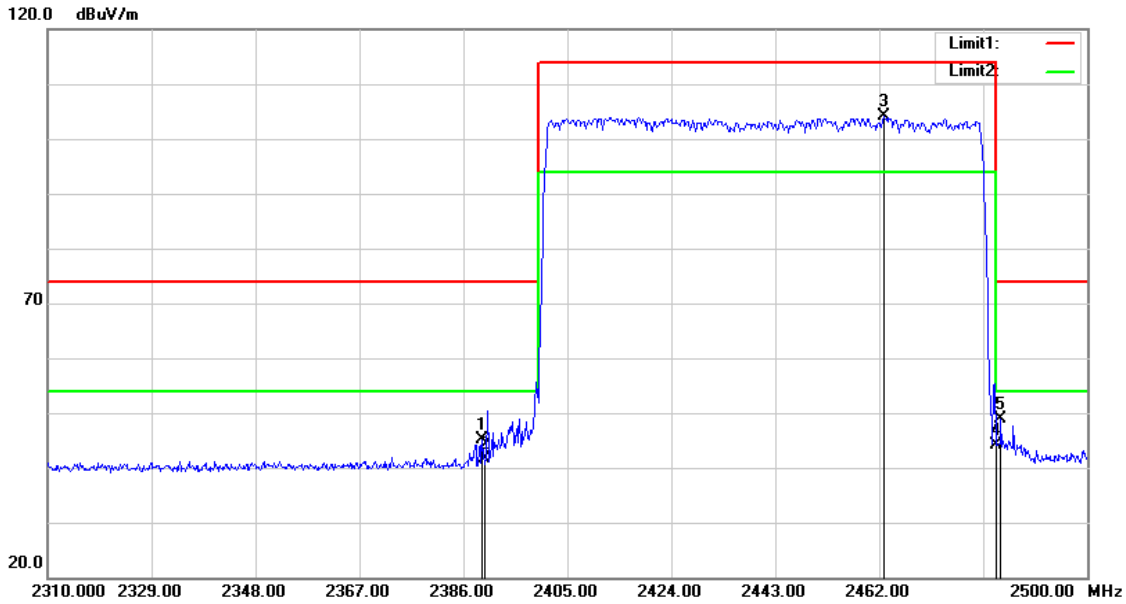
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	101.94	-6.95	94.99	74.00	20.99	peak
2	2483.500	50.70	-6.94	43.76	74.00	-30.24	peak
3	2483.840	52.90	-6.94	45.96	74.00	-28.04	peak

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:	3m
Test item:	Band edge		
Frequency:	Hopping		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



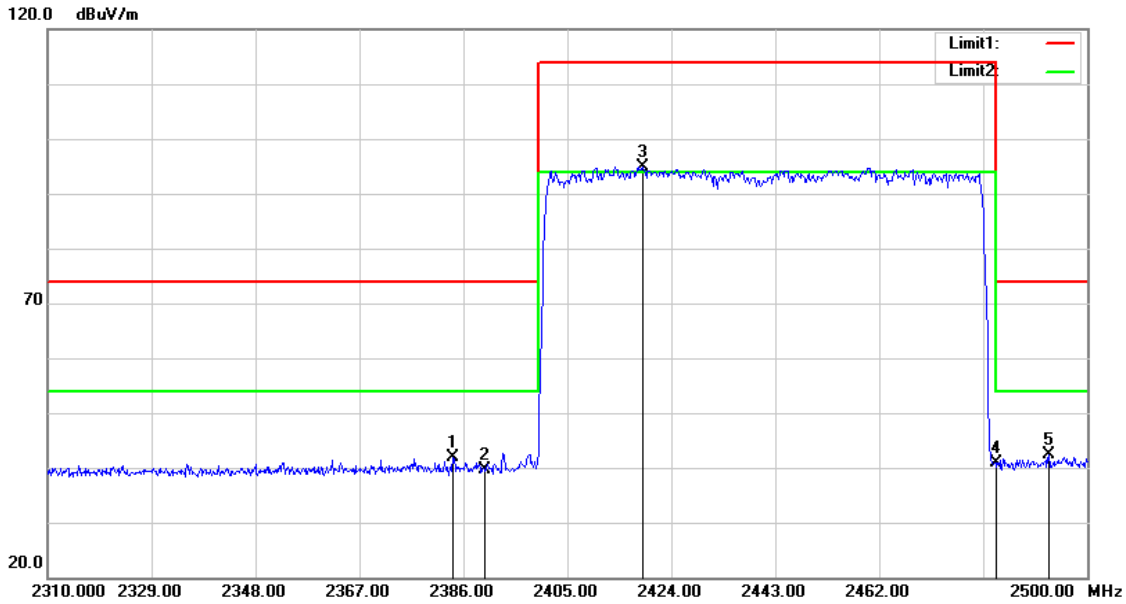
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.420	52.52	-7.30	45.22	74.00	-28.78	peak
2	2390.000	48.94	-7.30	41.64	74.00	-32.36	peak
3	2462.950	111.22	-7.01	104.21	114.00	-9.79	peak
4	2483.500	51.13	-6.94	44.19	74.00	-29.81	peak
5	2484.230	55.81	-6.92	48.89	74.00	-25.11	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:	3m
Test item:	Band edge		
Frequency:	Hopping		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



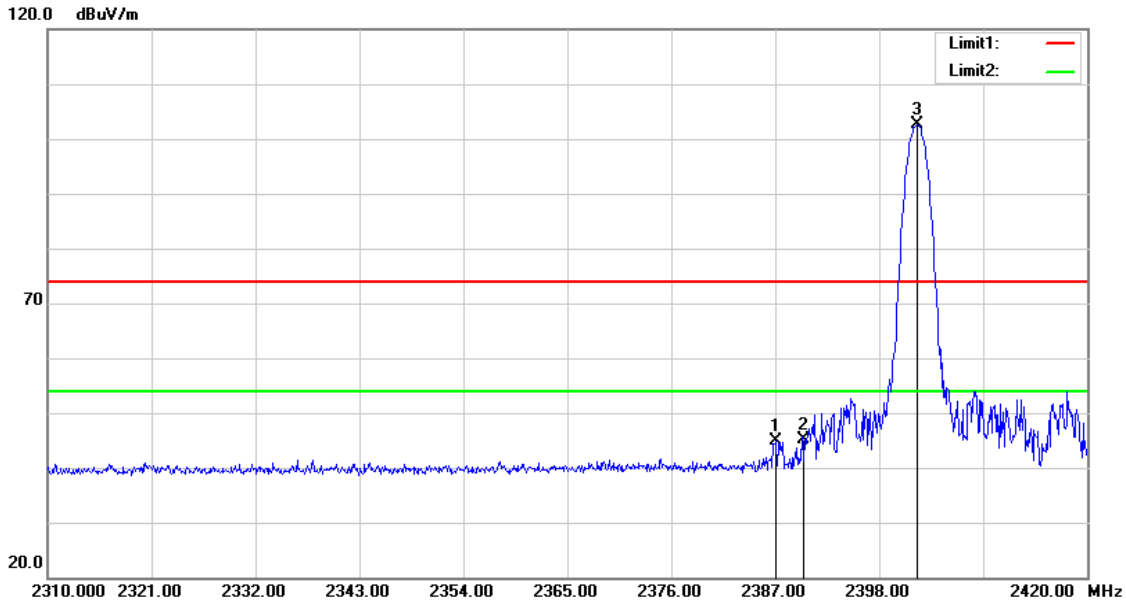
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2384.100	49.29	-7.33	41.96	74.00	-32.04	peak
2	2390.000	46.83	-7.30	39.53	74.00	-34.47	peak
3	2418.870	102.19	-7.20	94.99	114.00	-19.01	peak
4	2483.500	47.82	-6.94	40.88	74.00	-33.12	peak
5	2492.970	49.17	-6.90	42.27	74.00	-31.73	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:	3m
Test item:	Band edge		
Frequency:	2402 MHz		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



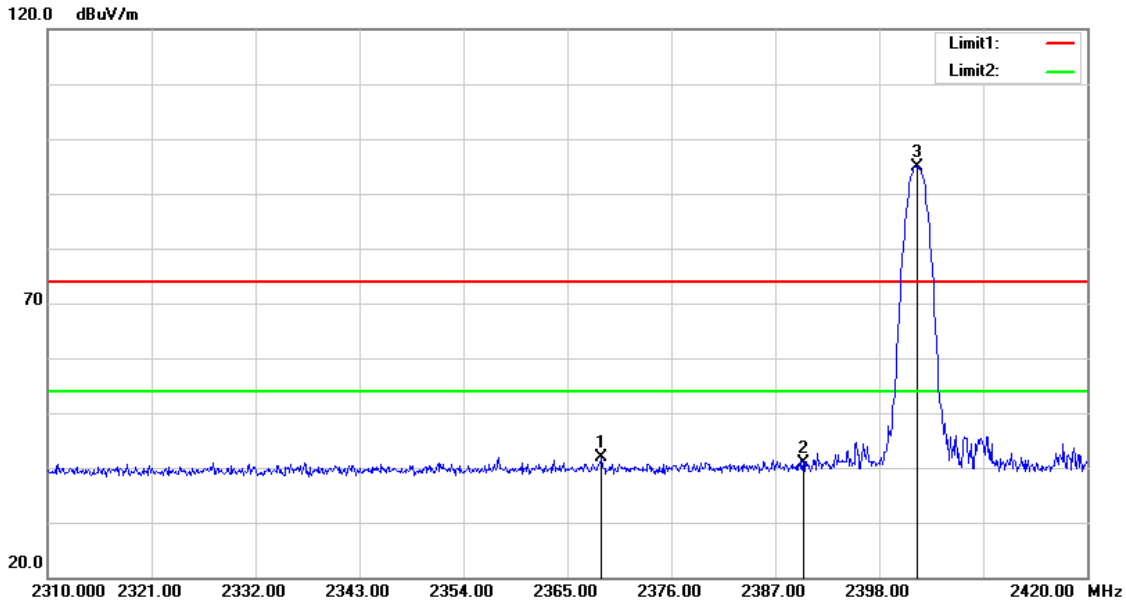
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2387.110	52.16	-7.33	44.83	74.00	-29.17	peak
2	2390.000	52.36	-7.30	45.06	74.00	-28.94	peak
3	2402.070	109.90	-7.25	102.65	74.00	28.65	peak

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:	3m
Test item:	Band edge		
Frequency:	2402 MHz		
Mode:	Mode 4		
Ant.Polar.:	Vertical		



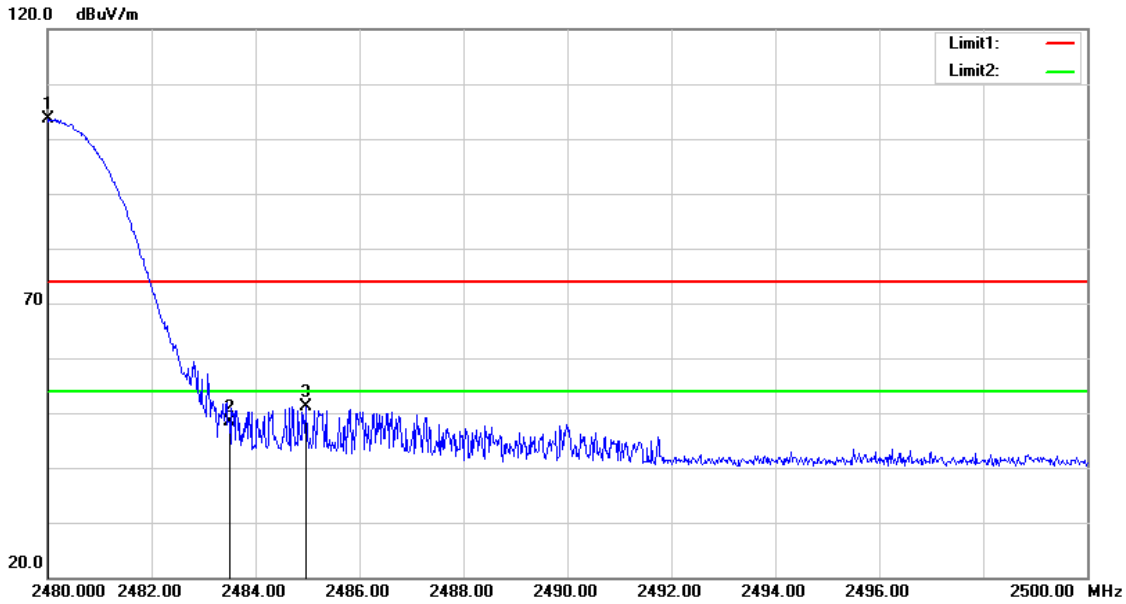
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2368.630	49.20	-7.39	41.81	74.00	-32.19	peak
2	2390.000	48.18	-7.30	40.88	74.00	-33.12	peak
3	2401.960	102.16	-7.25	94.91	74.00	20.91	peak

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:	3m
Test item:	Band edge		
Frequency:	2480 MHz		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



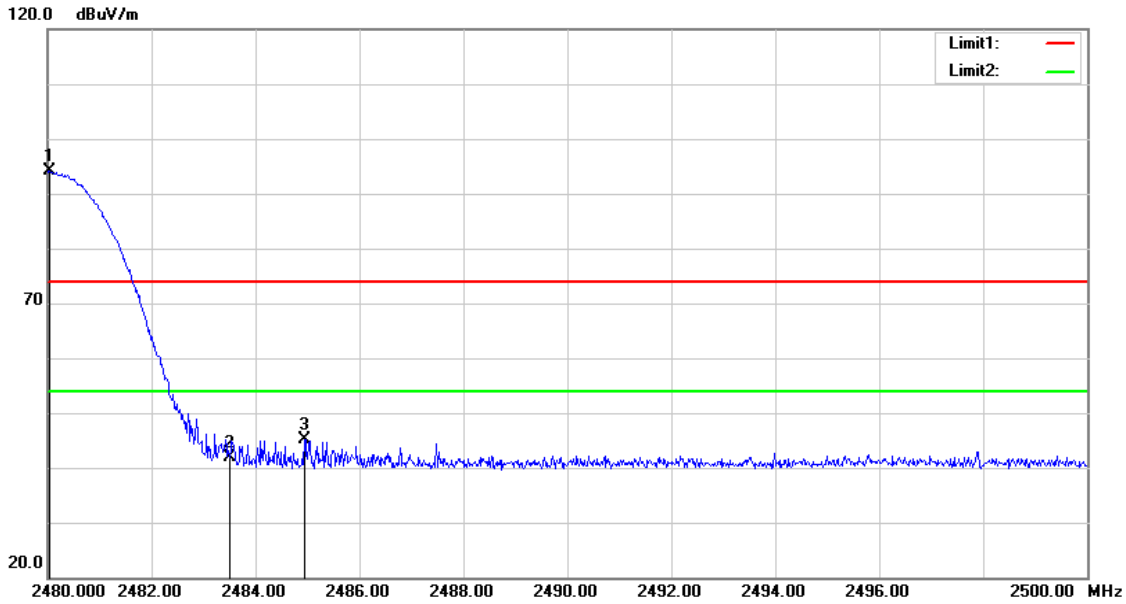
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.000	110.51	-6.95	103.56	74.00	29.56	peak
2	2483.500	55.37	-6.94	48.43	74.00	-25.57	peak
3	2484.960	58.15	-6.92	51.23	74.00	-22.77	peak

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:	3m
Test item:	Band edge		
Frequency:	2480 MHz		
Mode:	Mode 4		
Ant.Polar.:	Vertical		



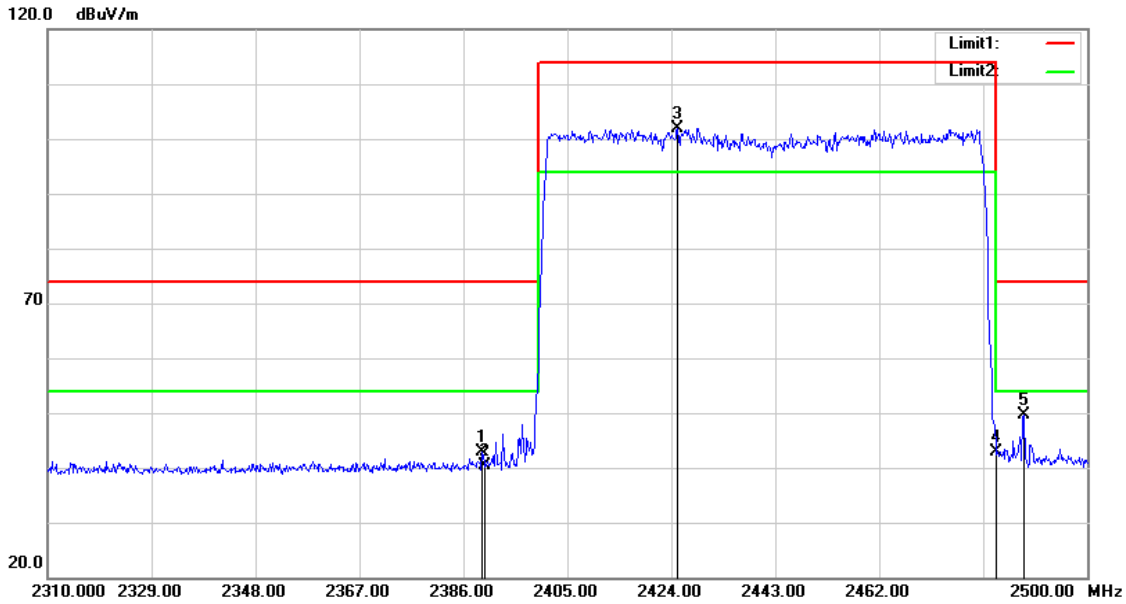
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.040	100.96	-6.95	94.01	74.00	20.01	peak
2	2483.500	48.70	-6.94	41.76	74.00	-32.24	peak
3	2484.940	51.99	-6.92	45.07	74.00	-28.93	peak

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:	3m
Test item:	Band edge		
Frequency:	Hopping		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		



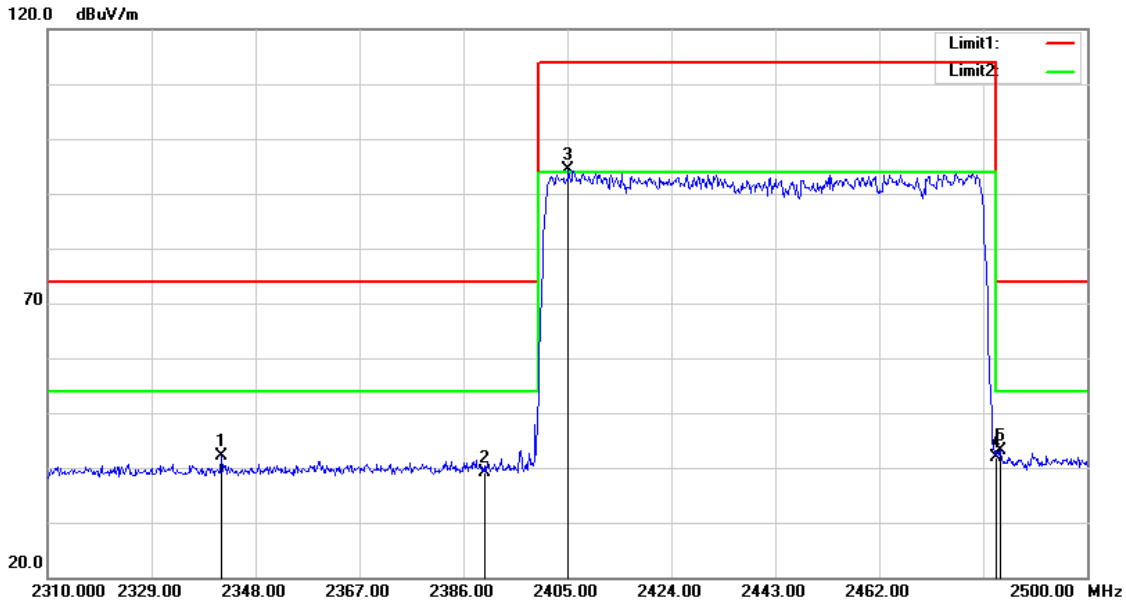
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.420	50.16	-7.30	42.86	74.00	-31.14	peak
2	2390.000	47.70	-7.30	40.40	74.00	-33.60	peak
3	2425.140	109.13	-7.17	101.96	114.00	-12.04	peak
4	2483.500	49.86	-6.94	42.92	74.00	-31.08	peak
5	2488.410	56.52	-6.91	49.61	74.00	-24.39	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:	3m
Test item:	Band edge		
Frequency:	Hopping		
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	2341.730	49.54	-7.50	42.04	74.00	-31.96	peak
2	2390.000	46.45	-7.30	39.15	74.00	-34.85	peak
3	2405.190	101.71	-7.25	94.46	114.00	-19.54	peak
4	2483.500	48.92	-6.94	41.98	74.00	-32.02	peak
5	2484.040	50.18	-6.93	43.25	74.00	-30.75	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.

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