TEST REPORT

Report No.: SHATBL2307004W01

Applicant	:	Shenzhen Lexqi Electronic Technology Co.,Ltd
Product Name	:	smart watch
Brand Name	:	Biaoniu
Model Name	:	H23
FCC ID	:	2BB8OH23
Test Standard	:	47 CFR 15.247
Date of Test	:	2023.07.11-2023.07.19

Report Prepared by : Chris Xu

(Chris Xu)

Report Approved by : Ghost Li.

(Ghost Li)

Authorized Signatory : Terry Yang

(Terry Yang)

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REVISION HISTORY

Rev.	Issue Date	Revisions	Revised by
00	2023.07.18	Initial Release	Ghost Li

DECLARATION OF REPORT

1. The device has been tested by ATBL, and the test results show that the equipment under test (EUT) is in compliance with the requirements of 47 CFR 15.247. And it is applicable only to the tested sample identified in the report.

2. This report shall not be reproduced except in full, without the written approval of ATBL, this document only be altered or revised by ATBL, personal only, and shall be noted in the revision of the document.

3. The general information of EUT in this report is provided by the customer or manufacture, ATBL is only responsible for the test data but not for the information provided by the customer or manufacture.

4. The results in this report is only apply to the sample as tested under conditions. The customer or manufacturer is responsible for ensuring that the additional production units of this model have the same electrical and mechanical components.

5. In this report, '☐' indicates that EUT does not support content after '☐', and '☑' indicates that it supports content after '☑'

SUMMARY OF TEST RESULT

Report Section	Standard Section	Test Item	Judgment	Remark
3.1	47 CFR 15.247(b)(1)	Maximum Peak Conducted Output Power	PASS	--
3.2	47 CFR 15.247(a)(1)(iii)	Number of Hopping Frequencies	PASS	--
3.3	47 CFR 15.247(a)(1)(iii)	Duty Cycle and Dwell Time	PASS	--
3.4	47 CFR 15.247(a)(1)	20dB Bandwidth	Report only	--
3.5	47 CFR 15.247(a)(1)	Carrier Frequency Separation	PASS	--
3.6	47 CFR 15.247(d)	Conducted Band Edge	PASS	--
3.7	47 CFR 15.247(d)	Conducted Spurious Emission	PASS	--
3.8	47 CFR 15.247(d)/15.209(a)/15.205(a)	Radiated Spurious Emission and Restricted Band	PASS	--
3.9	47 CFR 15.207(a)	AC Power-Line Conducted Emission	PASS	--
3.10	47 CFR 15.203	Antenna Requirements	PASS	--

1. GENERAL DESCRIPTION

1.1. Applicant

Name	:	Shenzhen Lexqi Electronic Technology Co.,Ltd
Address	:	12F,Building D,Huilongda Industrial Park,Shilong Community,Shiyan Street,Baoan District, Shenzhen

1.2. Manufacturer

Name	:	Shenzhen Lexqi Electronic Technology Co.,Ltd
Address	:	12F,Building D,Huilongda Industrial Park,Shilong Community,Shiyan Street,Baoan District, Shenzhen

1.3. Factory

Name	:	Shenzhen Lexqi Electronic Technology Co.,Ltd
Address	:	12F,Building D,Huilongda Industrial Park,Shilong Community,Shiyan Street,Baoan District, Shenzhen

1.4. General Information of EUT

General Information	
Equipment Name	smart watch
Brand Name	Biaoniu
Model Name	H23
Series Model	H22,H26,H27,H28,H29
Model Difference	Only the appearance is different
Antenna Type	Monopole Type
Antenna Gain	2.02dBi
SN or IMEI Code	20230629001003
Power Input	5V/230mA
Hardware version	MOY.M81006.02
Software version	MOY-DHO3-2.04
Connecting I/O Port(s)	Refer to the remark below.

Remark:

The above information of EUT was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.5. Equipment Specification

Equipment Specification		
Frequency Range	2400MHz - 2483.5MHz	
Number of Channels	79	
Carrier Frequency of Each Channel	2402 + n*1 MHz; n = 0 ~ 78	
Maximum Output Power To Antenna	☑Bluetooth BR(1Mbps):	2.22dBm (0.001667W)
	☑Bluetooth EDR(2Mbps):	2.56dBm (0.001803W)
	☑Bluetooth EDR(3Mbps):	3.05dBm (0.002018W)
Type of Modulation	☑Bluetooth BR(1Mbps):	GFSK
	☑Bluetooth EDR(2Mbps):	π/4-DQPSK
	☑Bluetooth EDR(3Mbps):	8-DPSK

1.6. Modification of EUT

No modifications are made to the EUT during all test items.

1.7. Laboratory Information

Company Name	:	Shanghai ATBL Technology Co., Ltd.
Address	:	Building 8,No.160 Basheng Road, Waigaoqiao Free Trade Zone, Pudong New Area, Shanghai
Telephone	:	+86(0)21-51298625

1.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

47 CFR Part 15 Subpart C §15.247

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

Remark:

All test items were verified and recorded according to the standards and without any deviation during the test.

2. TEST CONFIGURATION OF EUT

2.1. Carrier Frequency Channel

Frequency Band	Channel	Frequency MHz	Channel	Frequency MHz	Channel	Frequency MHz
2400 - 2483.5 MHz	**00**	**2402**	27	2429	54	2456
	01	2403	28	2430	55	2457
	02	2404	29	2431	56	2458
	03	2405	30	2432	57	2459
	04	2406	31	2433	58	2460
	05	2407	32	2434	59	2461
	06	2408	33	2435	60	2462
	07	2409	34	2436	61	2463
	08	2410	35	2437	62	2464
	09	2411	36	2438	63	2465
	10	2412	37	2439	64	2466
	11	2413	38	2440	65	2467
	12	2414	**39**	**2441**	66	2468
	13	2415	40	2442	67	2469
	14	2416	41	2443	68	2470
	15	2417	42	2444	69	2471
	16	2418	43	2445	70	2472
	17	2419	44	2446	71	2473
	18	2420	45	2447	72	2474
	19	2421	46	2448	73	2475
	20	2422	47	2449	74	2476
	21	2423	48	2450	75	2477
	22	2424	49	2451	76	2478
	23	2425	50	2452	77	2479
	24	2426	51	2453	**78**	**2480**
	25	2427	52	2454	--	--
	26	2428	53	2455	--	--

Remark:

Low Channel: **CH00_2402 MHz**; Middle Channel: **CH39_2441 MHz**; High Channel: **CH78_2480 MHz**.

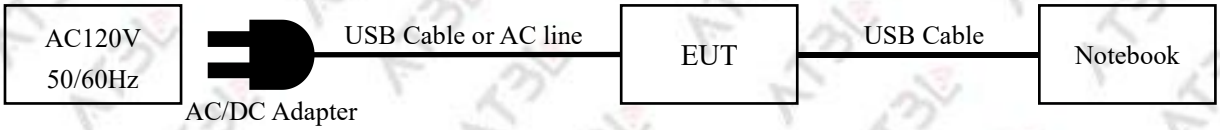
2.2. Test Modes

The table below is showing all test modes to demonstrate in compliance with the standard.

Summary Table of Test Modes			
Test Item	Data Rate / Modulation		
	Bluetooth BR(1Mbps) GFSK	Bluetooth EDR(2Mbps) π/4-DQPSK	Bluetooth EDR(3Mbps) 8-DPSK
For Conducted and Radiated Test	Mode 1: CH00_2402 MHz	Mode 2: CH00_2402 MHz	Mode 3: CH00_2402 MHz
	Mode 4: CH39_2441 MHz	Mode 5: CH39_2441 MHz	Mode 6: CH39_2441 MHz
	Mode 7: CH78_2480 MHz	Mode 8: CH78_2480 MHz	Mode 9: CH78_2480 MHz
	Mode 10: Hopping	Mode 11: Hopping	Mode 12: Hopping
For AC Power-line Conducted Emission	Mode 13: Keep Bluetooth link under the maximum output power		

2.3. Block Diagram of Test System

2.3.1. For AC Power-Line Conducted Emission



2.3.2. For Radiated Spurious Emission

2.3.3. For Conducted Test

2.4. Description of Support Units

NO.	Unit	Brand	Model	Description
1	Notebook	Lenovo	DESKTOP-USDEO09	N/A
2	USB Cable	N/A	100cm	N/A

2.5. Test Software and Power Level

During the test, the channel and power control software provided by the customer is used to control the operation channel and output power level.

2.6. EUT Operating Conditions

For AC power-line conducted emission, the EUT was connected under the large package sizes transmission.

For radiated spurious emission and conducted test, the engineering test program was provided and make the EUT to continuous transmit/receive.

2.7. Equipment List

2.7.1. For AC Power-Line Conducted Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Test Receiver	R&S	ESPI	101679	SHATBL-E012	2024.05.09
LISN	R&S	ENV216	100300	SHATBL-E013	2024.05.30
LISN	R&S	ENV216	100333	SHATBL-E041	2024.05.09
Thermometer	DeLi	N/A	N/A	SHATBL-E015	2023.09.20
Test Software	FALA	EZ-EMC	N/A	SHATBL-E046	N/A

2.7.2. For Radiated Spurious Emission

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Signal analyzer	Agilent	N9020A	MY50200811	SHATBL-E017	2024.05.09
Amplifier	JPT	JPA0118-55-303A	1910001800055000	SHATBL-E006	2024.05.09
Amplifier	JPT	JPA-10M1G32	21010100035001	SHATBL-E005	2024.05.09
Antenna/Turn table Controller	Brilliant	N/A	N/A	SHATBL-E007	N/A
Loop Antenna	Daze	ZN30900C	20077	SHATBL-E042	2024.05.09
Bilog Antenna	SCHWARZBECK	VULB 9168	01174	SHATBL-E008	2024.05.12
Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	SHATBL-E009	2024.05.12
Horn Antenna	COM-POWER	AH-1840	10100008	SHATBL-E043	2024.05.09
Thermometer	DeLi	N/A	N/A	SHATBL-E016	2023.09.20
Test Software	FALA	EMC-RI	N/A	SHATBL-E046	N/A

2.7.3. For Conducted Test

Equipment Name	Manufacturer	Model	Serial No.	Equipment No.	Calibration Until
Power meter	Anritsu	ML2496A	1935001	SHATBL-W030	2023.09.27
Power sensor	Anritsu	MA2411B	1911006	SHATBL-W031	2023.09.27
Power sensor	DARE	RPR3006W	16I00054SN016	SHATBL-W008	2023.09.27
Power sensor	DARE	RPR3006W	RPR6W-2001005	SHATBL-W032	2023.09.27
Power sensor	Rediteq	RPR3006W	RPR6W-2201002	SHATBL-W033	2023.11.15
Power sensor	Rediteq	RPR3006W	RPR6W-2201003	SHATBL-W034	2023.11.15
Power sensor	Keysight	U2021XA	MY59120004	SHATBL-W035	2023.08.14
Adjustable Attenuator	Agilent	8494B	MY42144015	SHATBL-W009	2023.09.27
Adjustable Attenuator	Agilent	8496B	MY42143776	SHATBL-W010	2023.09.27
Environmental Test Chamber	KSON	THS-B6C-150	9159K	SHATBL-W019	2024.01.16
Signal analyzer	Keysight	N9020A	MY50510136	SHATBL-W003	2023.09.27
Vector signal generator	Keysight	N5182B	MY57300196	SHATBL-W005	2023.09.27
Vector signal generator	Agilent	N5182A	MY50143555	SHATBL-W037	2024.07.16
Analog signal generator	Keysight	N5173B	MY60403026	SHATBL-W038	2024.07.16
Wideband radio communication tester	R&S	CMW500	101331	SHATBL-W007	2023.09.27
Spectrum analyzer	R&S	FSV40-N	101761	SHATBL-W036	2023.08.23
Switch Box	N/A	RFSW3003328	RFSW201019	SHATBL-W029	N/A
Thermometer	DeLi	N/A	N/A	SHATBL-W012	2023.09.20
Test Software	FALA	LZ-RF	N/A	SHATBL-W020	N/A

2.8. Measurement Uncertainty

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

No.	Item	Uncertainty
1	RF output power, conducted	±0.958dB
2	Conducted spurious emissions	±2.988dB
3	All emissions, radiated 30MHz-1GHz	±2.50dB
4	All emissions, radiated 1GHz-18GHz	±3.51dB
5	Occupied bandwidth	±23.20Hz
6	Power spectral density	±0.886dB

3. TEST RESULT

3.1. Maximum Peak Conducted Output Power

3.1.1. Limit

47 CFR 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

3.1.2. Test Procedure

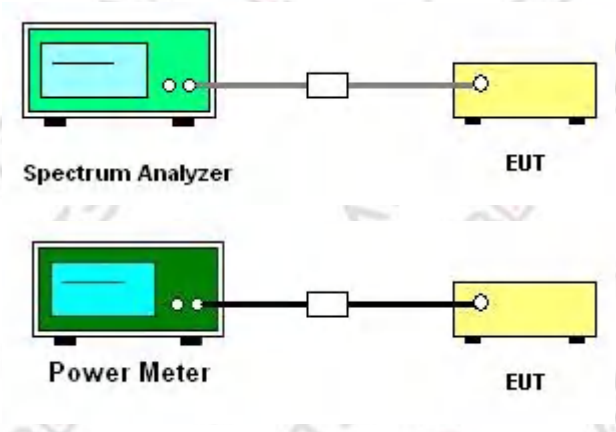
ANSI C63.10-2013 clause 7.8.5: This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

1. Use the following spectrum analyzer settings:
   ① Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   ② RBW > 20 dB bandwidth of the emission being measured.
   ③ VBW ≥ RBW.
   ④ Sweep: Auto.
   ⑤ Detector function: Peak.
   ⑥ Trace: Max hold.
2. Allow trace to stabilize.
3. Use the marker-to-peak function to set the marker to the peak of the emission.
4. The indicated level is the peak output power, after any corrections for external attenuators and cables.
5. A plot of the test results and setup description shall be included in the test report.

Remark:

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

3.1.3. Test Setup



3.1.4. Test Result of Maximum Peak Conducted Output Power

Please refer to the Appendix A.

3.2. Number of Hopping Frequencies

3.2.1. Limit

47 CFR 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

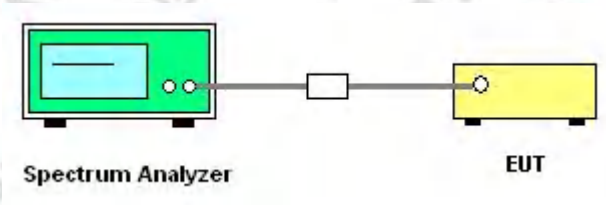
3.2.2. Test Procedure

ANSI C63.10-2013 clause 7.8.3: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW ≥ RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold.
7. Allow the trace to stabilize.

It might prove necessary to break the span up into sub ranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

3.2.3. Test Setup



3.2.4. Test Result of Number of Hopping Frequencies

Please refer to the Appendix A.

3.3. Duty Cycle and Dwell Time

3.3.1. Limit

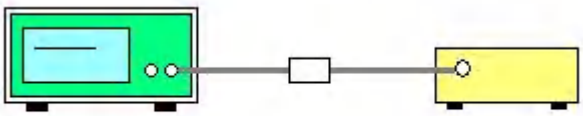
47 CFR 15.247(a)(1)(iii): The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

3.3.2. Test Procedure

ANSI C63.10-2013 clause 7.8.4: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Zero span, centered on a hopping channel.
2. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4. Detector function: Peak.
5. Trace: Max hold.
6. Use the marker-delta function to determine the transmit time per hop.
7. The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements.

3.3.3. Test Setup



3.3.4. Test Result of Duty Cycle and Dwell Time

Please refer to the Appendix A.

3.4. 20dB Bandwidth

3.4.1. Limit

There is no limit requirement for 20dB Bandwidth.

3.4.2. Test Procedure

1. The testing follows *ANSI C63.10-2013 clause 6.9.2 and 6.9.3*.

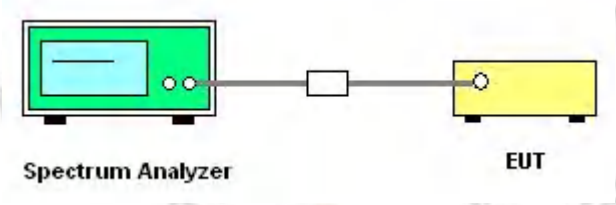
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

3. Set to the maximum power setting and enable the EUT transmit continuously.

4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW ≥ 1% of the 20 dB bandwidth; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

5. Measure and record the results in the test report.

3.4.3. Test Setup



3.4.4. Test Result of 20dB Bandwidth

Please refer to the Appendix A.

3.5. Carrier Frequency Separation

3.5.1. Limit

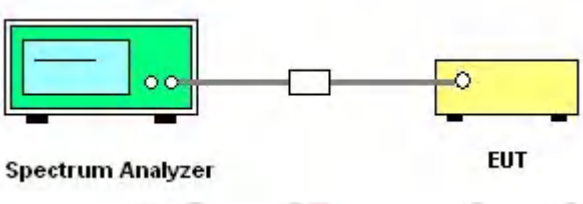
47 CFR 15.247(a)(1): Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

3.5.2. Test Procedure

ANSI C63.10-2013 clause 7.8.2: The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

1. Span: Wide enough to capture the peaks of two adjacent channels.
2. 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. VBW ≥ RBW.
4. Sweep: Auto.
5. Detector function: Peak.
6. Trace: Max hold.
7. Allow the trace to stabilize.
8. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. A plot of the data shall be included in the test report.

3.5.3. Test Setup



3.5.4. Test Result of Carrier Frequency Separation

Please refer to the Appendix A.

3.6. Conducted Band Edge

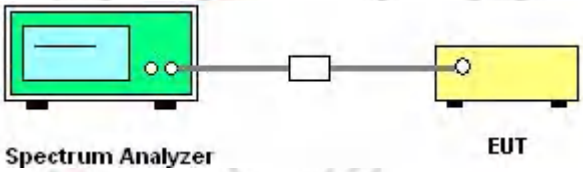
3.6.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

3.6.2. Test Procedure

1. The testing follows *ANSI C63.10-2013 clause 7.8.6*.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100kHz, VBW = 300kHz. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.
4. Enable hopping function of the EUT and then repeat step 2. and 3.
5. Measure and record the results in the test report.

3.6.3. Test Setup



3.6.4. Test Result of Conducted Band Edge

Please refer to the Appendix A.

3.7. Conducted Spurious Emission

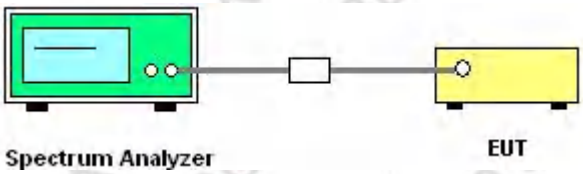
3.7.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

3.7.2. Test Procedure

1. The testing follows *ANSI C63.10-2013 clause 7.8.8*.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

3.7.3. Test Setup



3.7.4. Test Result of Conducted Spurious Emission

Please refer to the Appendix A.

3.8. Radiated Spurious Emission and Restricted Band

3.8.1. Limit

47 CFR 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

47 CFR 15.205(a): Only spurious emissions are permitted in any of the frequency bands listed below:

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
0.090-0.110	12.29-12.293	149.9-150.05	1660-1710	8.025-8.5
0.495-0.505	12.51975-12.52025	156.52475-156.52525	1718.8-1722.2	9.0-9.2
2.1735-2.1905	12.57675-12.57725	156.7-156.9	2200-2300	9.3-9.5
4.125-4.128	13.36-13.41	162.0125-167.17	2310-2390	10.6-12.7
4.17725-4.17775	16.42-16.423	167.72-173.2	2483.5-2500	13.25-13.4
4.20725-4.20775	16.69475-16.69525	240-285	2690-2900	14.47-14.5
6.215-6.218	16.80425-16.80475	322-335.4	3260-3267	15.35-16.2
6.26775-6.26825	25.5-25.67	399.9-410	3332-3339	17.7-21.4
6.31175-6.31225	37.5-38.25	608-614	3345.8-3358	22.01-23.12
8.291-8.294	73-74.6	960-1240	3600-4400	23.6-24.0
8.362-8.366	74.8-75.2	1300-1427	4500-5150	31.2-31.8
8.37625-8.38675	108-121.94	1435-1626.5	5350-5460	36.43-36.5
8.41425-8.41475	123-138	1645.5-1646.5	7250-7750	Above 38.6

47 CFR 15.209(a): The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/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

3.8.2. Test Procedure

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.

2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

4. Set to the maximum power setting and enable the EUT transmit continuously.

5. Use the following spectrum analyzer settings:

① Span shall wide enough to fully capture the emission being measured;

② Set RBW=100 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak;

③ For average measurement: use duty cycle correction factor method per 15.35(c).

Duty cycle = On time/100 milliseconds

On time = N1*L1+N2*L2+...+Nn-1*LNn-1+Nn*Ln

Where N1 is number of type 1 pulses, L1 is length of type 1 pulses, etc.

Average Emission Level = Peak Emission Level + 20*log(Duty cycle)

6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Pre-amp Factor = Level

7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.

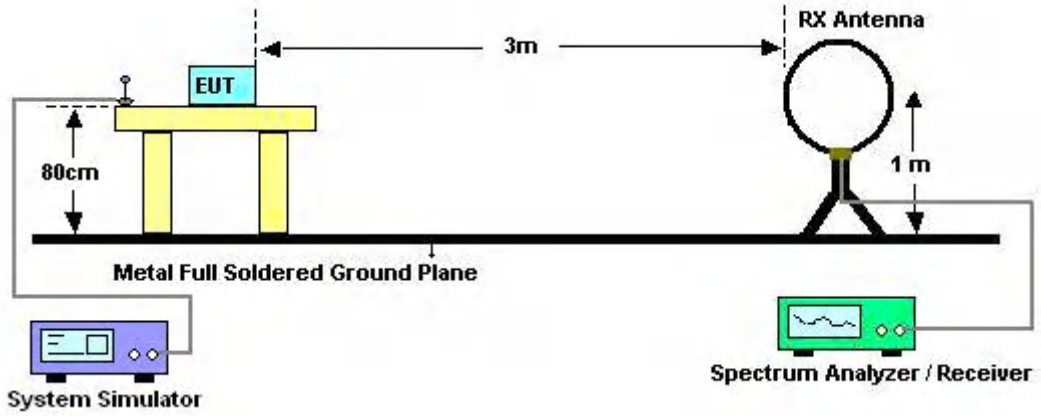
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than peak limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again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

Remark:

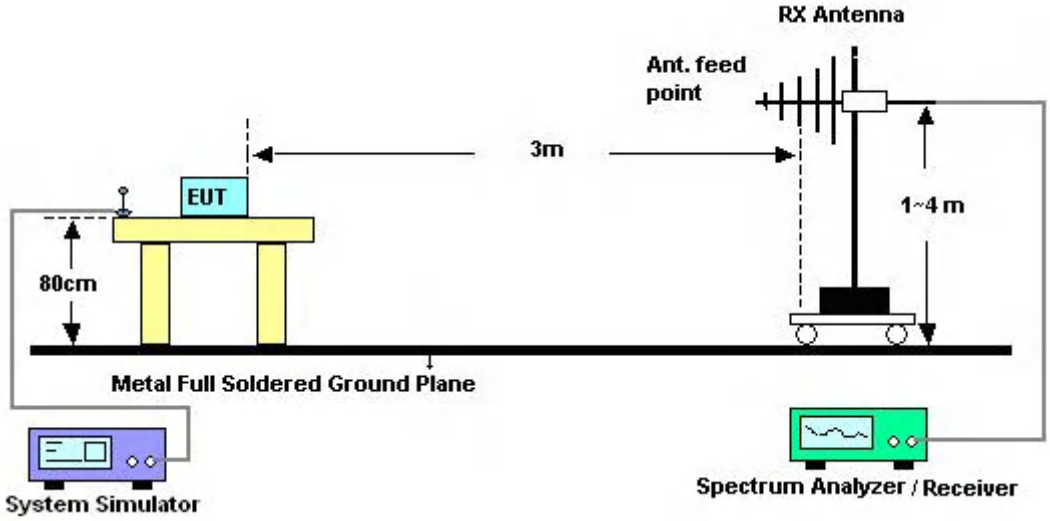
The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.70dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.8.3. Test Setup

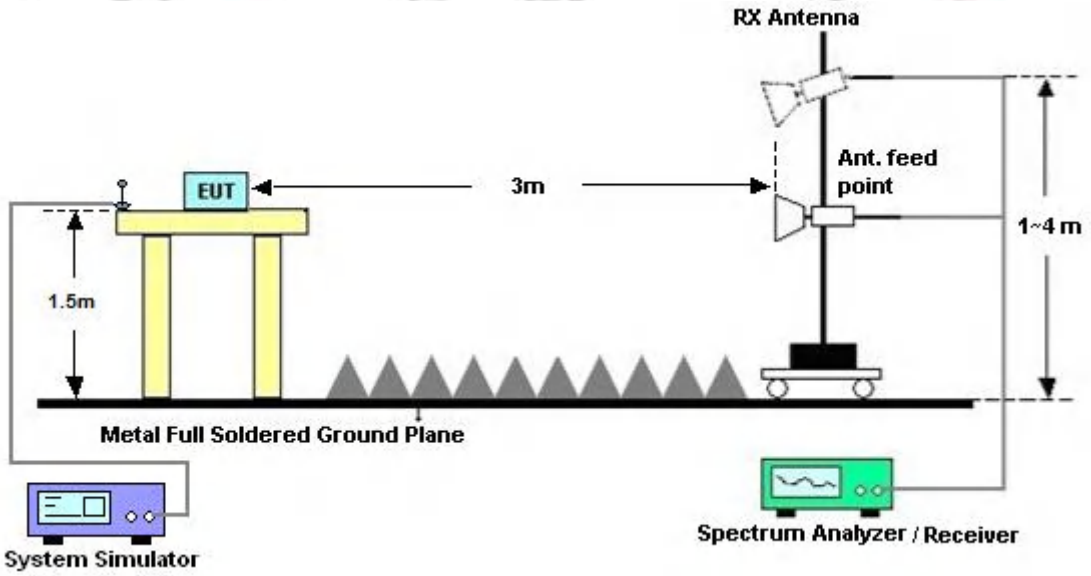
3.8.3.1. For radiated emissions below 30MHz



3.8.3.2. For radiated emissions from 30MHz to 1GHz



3.8.3.3. For radiated emissions above 1GHz



3.8.4. Test Result of Radiated Spurious Emission

3.8.4.1. For 9 kHz ~ 30 MHz

Please refer to the Appendix B.

3.8.4.2. For 30 MHz ~ 1 GHz

Please refer to the Appendix B.

3.8.4.3. For 1 GHz ~ 18GHz

Please refer to the Appendix B.

3.8.4.4. For above 18GHz

Please refer to the Appendix B.

3.8.5. Test Result of Restricted Band

Please refer to the Appendix B.

3.9. AC Power-Line Conducted Emission

3.9.1. Limit

47 CFR 15.207(a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table:

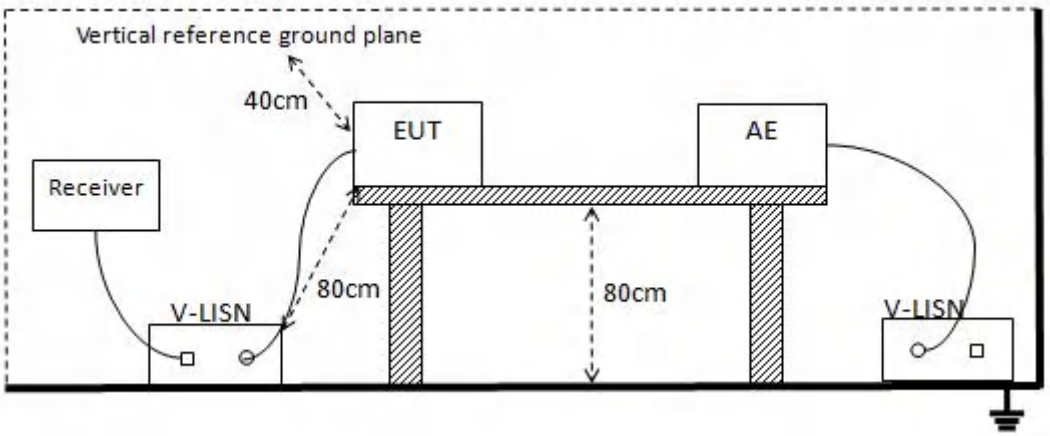
Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.9.2. Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.3. Test Setup



3.9.4. Test Result of AC Power-Line Conducted Emission

Please refer to the Appendix C.

3.10. Antenna Requirement

3.10.1. Standard Requirement

According to *47 CFR 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.

3.10.2. EUT Antenna

The antenna used for the EUT is Monopole Type antenna, which meets the antenna requirements.

4. TEST SETUP PHOTOGRAPHS

Please refer to the Appendix D.

※※※※※END OF THE REPORT※※※※※

Appendix A _ Conducted Test Data

A_3.1.4. Test Result of Maximum Peak Conducted Output Power

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V		

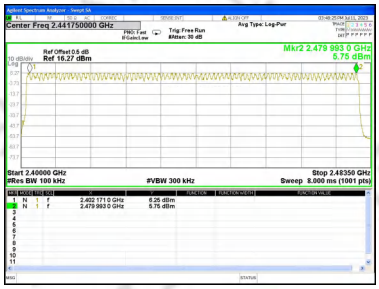
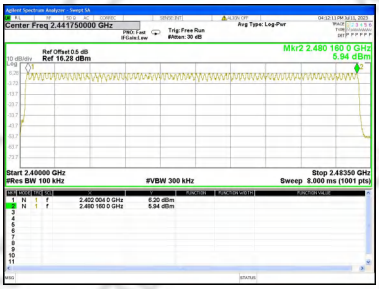
Mode	Channel Number	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
GFSK(1M)	0	2402	0.20	0.11	30.00
	39	2441	0.04	-0.10	30.00
	78	2480	-0.27	-0.55	30.00

Mode	Channel Number	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
π/4-DQPSK (2M)	0	2402	0.54	-1.44	20.97
	39	2441	0.38	-1.52	20.97
	78	2480	0.07	-1.93	20.97

Mode	Channel Number	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)
8-DPSK(3M)	0	2402	1.03	-1.79	20.97
	39	2441	0.86	-1.94	20.97
	78	2480	0.35	-1.98	20.97

A_3.2.4. Test Result of Number of Hopping Frequencies

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 10/11/12	Test Voltage:	DC 5V

GFSK(1Mbps)	π/4-DQPSK(2Mbps)	8DPSK(3Mbps)
		

A_3.3.4. Test Result of Duty Cycle and Dwell Time

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 1/4/7	Test Voltage:	DC 5V

Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
DH1	2441	0.382	0.122	0.4
DH3	2441	1.626	0.100	0.4
DH5	2441	3.730	0.360	0.4

DH1 CH39	DH3 CH39	DH5 CH39
		

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 2/5/8	Test Voltage:	DC 5V

Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
2DH1	2441	0.378	0.121	0.4
2DH3	2441	1.638	0.262	0.4
2DH5	2441	2.878	0.360	0.4

2DH1 CH39	2DH3 CH39	2DH5 CH39
		

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 3/6/9	Test Voltage:	DC 5V

Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
3DH1	2441	0.386	0.124	0.4
3DH3	2441	1.640	0.262	0.4
3DH5	2441	2.888	0.308	0.4

3DH1 CH39	3DH3 CH39	3DH5 CH39
		

Hops in Dwell time:

xDH1：(1600/2/79) * (0.4*79) = 320 hops

xDH3：(1600/4/79) * (0.4*79) = 160 hops

xDH5：(1600/6/79) * (0.4*79) = 106.67 hops

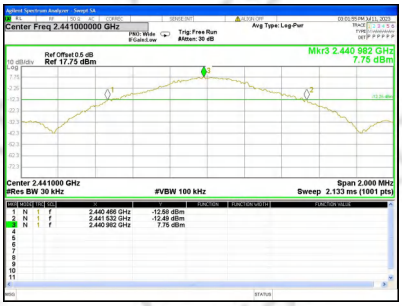
Dwell time= pulse time* Hops

A_3.4.4. Test Result of 20dB Bandwidth

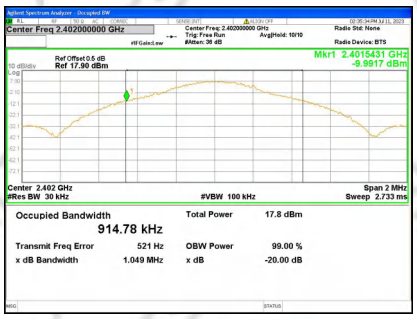
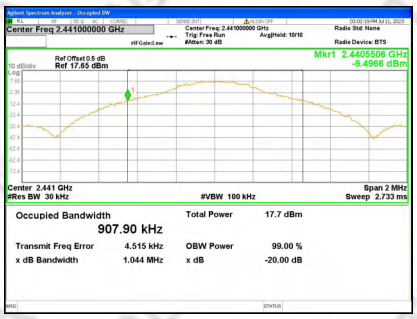
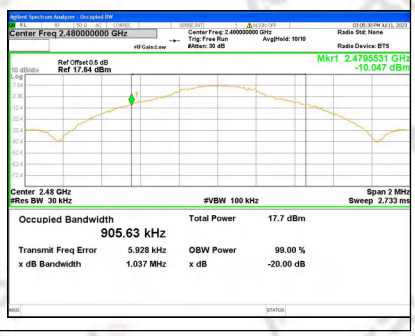
Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 1/4/7	Test Voltage:	DC 5V

Frequency	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
2402 MHz	1.040	0.915	PASS
2441 MHz	1.066	0.908	PASS
2480 MHz	1.036	0.906	PASS

20dB Bandwidth

Mode 1	Mode 4	Mode 7
		

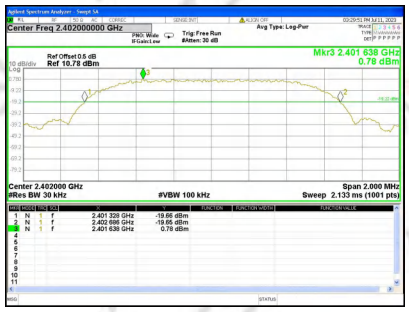
99% Bandwidth

Mode 1	Mode 4	Mode 7
		

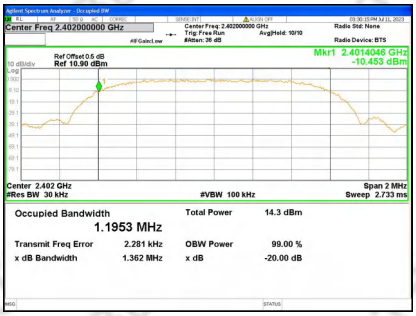
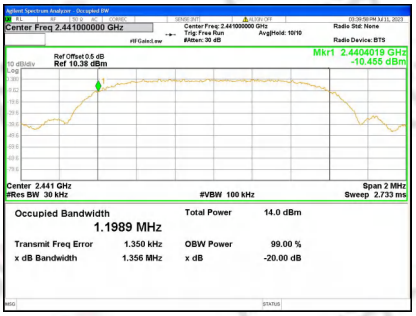
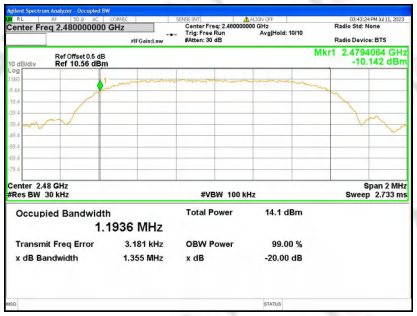
Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 2/5/8	Test Voltage:	DC 5V

Frequency	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
2402 MHz	1.358	1.195	PASS
2441 MHz	1.362	1.199	PASS
2480 MHz	1.360	1.194	PASS

20dB Bandwidth

Mode 2	Mode 5	Mode 8
		

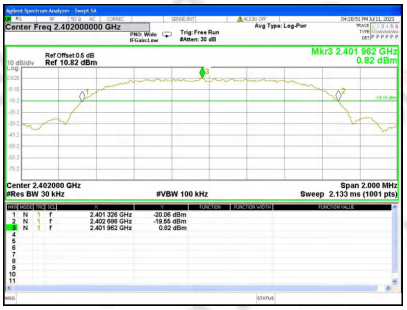
99% Bandwidth

Mode 2	Mode 5	Mode 8
		

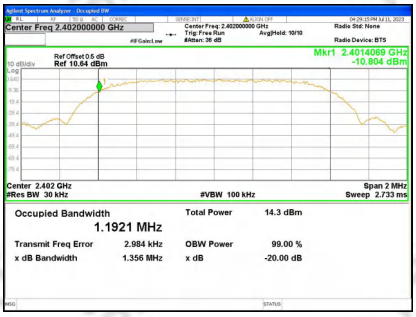
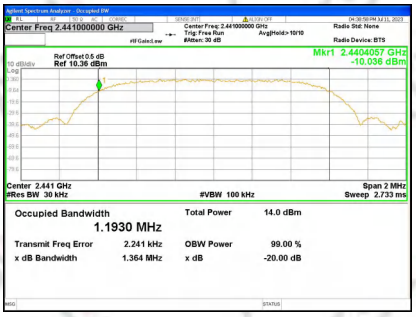
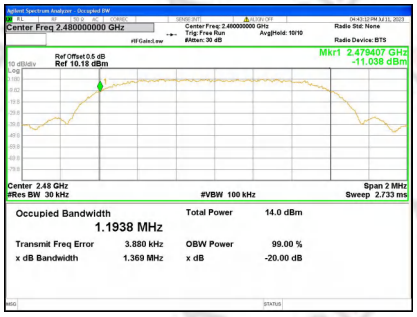
Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 3/6/9	Test Voltage:	DC 5V

Frequency	20dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
2402 MHz	1.360	1.192	PASS
2441 MHz	1.368	1.193	PASS
2480 MHz	1.360	1.194	PASS

20dB Bandwidth

Mode 3	Mode 6	Mode 9
		

99% Bandwidth

Mode 3	Mode 6	Mode 9
		

A_3.5.4. Test Result of Carrier Frequency Separation

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 1/4/7	Test Voltage:	DC 5V

Frequency	Mark1 Frequency （MHz）	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2402.018	0.968	0.693	Complies
2441 MHz	2441.006	1.040	0.711	Complies
2480 MHz	2479.170	0.802	0.691	Complies

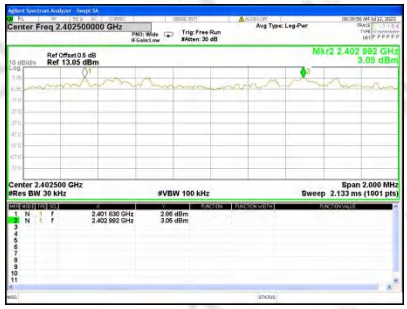
For GFSK: Ch. Separation Limits: >two-thirds 20dB bandwidth

Mode 1	Mode 4	Mode 7
		

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 2/5/8	Test Voltage:	DC 5V

Frequency	Mark1 Frequency （MHz）	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2401.830	1.162	0.905	Complies
2441 MHz	2440.826	1.164	0.908	Complies
2480 MHz	2479.154	1.000	0.907	Complies

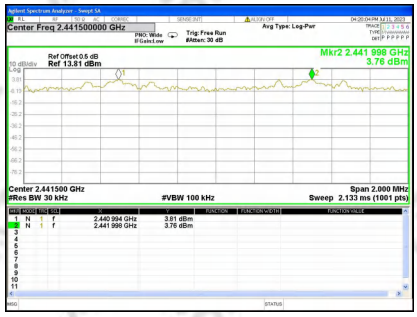
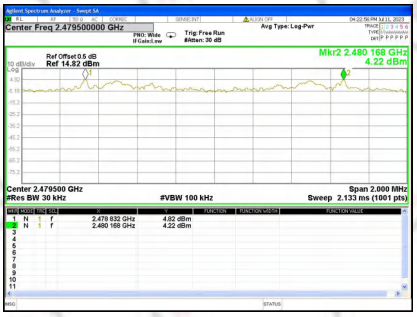
For π/4-DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth

Mode 2	Mode 5	Mode 8
		

Temperature:	22.3℃	Relative Humidity:	51%
Test Mode:	Mode 3/6/9	Test Voltage:	DC 5V

Frequency	Mark1 Frequency （MHz）	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	2401.832	1.160	0.907	Complies
2441 MHz	2440.994	1.004	0.912	Complies
2480 MHz	2478.832	1.336	0.907	Complies

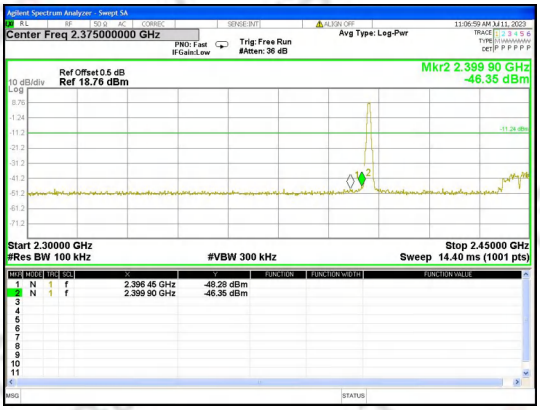
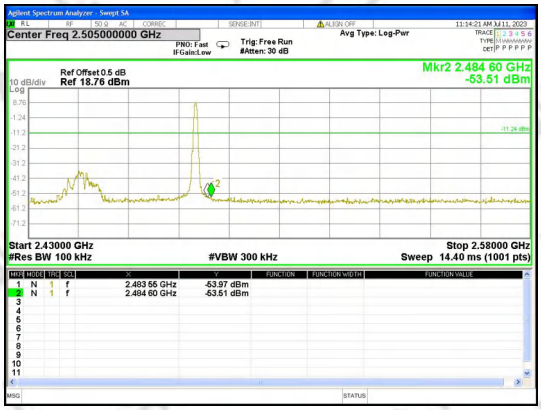
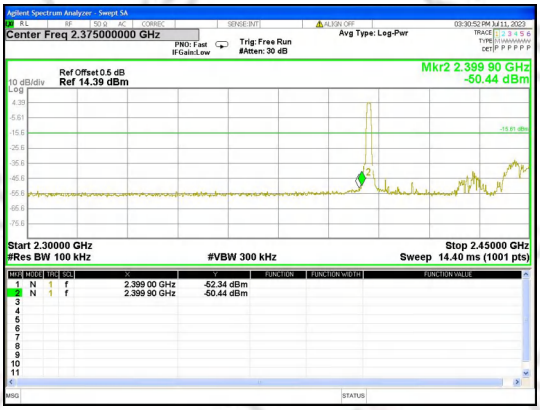
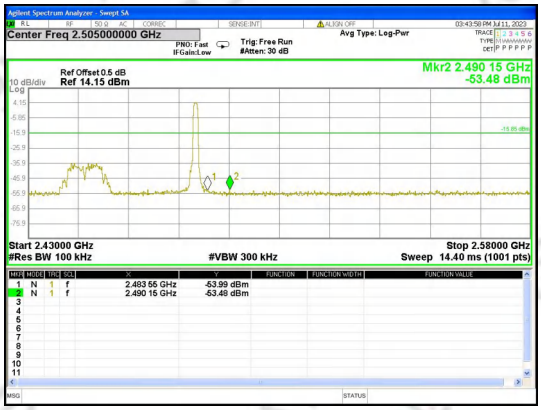
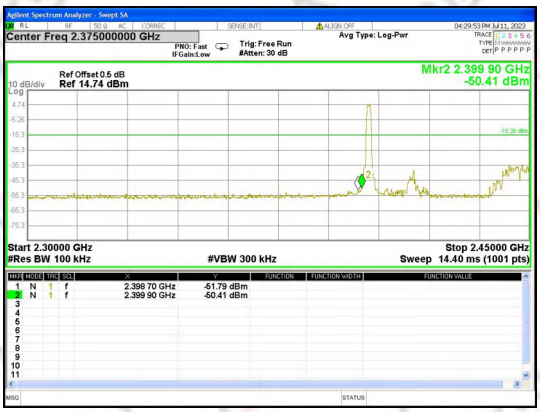
For 8DPSK(3Mbps):Ch. Separation Limits: > two-thirds 20dB bandwidth

Mode 3	Mode 6	Mode 9
		

A_3.6.4. Test Results of Conducted Band Edge

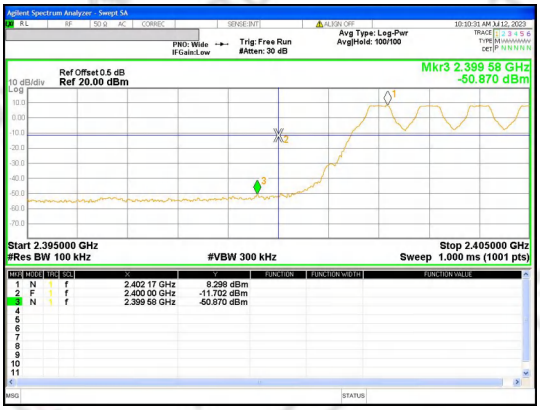
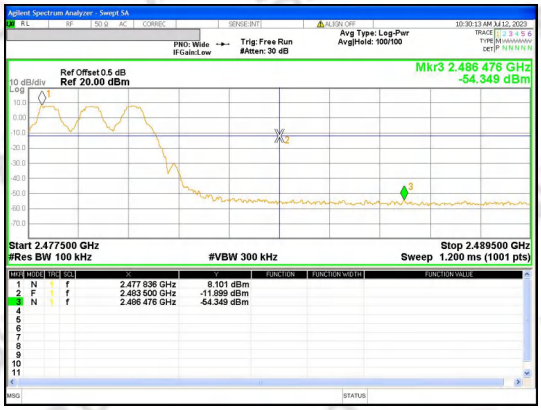
Temperature:	23.4 ℃	Relative Humidity:	55%RH
Test Voltage:	DC 5V	Test Mode:	TX Mode 1/2/3/7/8/9

For Band edge(it's also the reference level for conducted spurious emission)

Mode1 CH00	Mode7 CH78
	
Mode2 CH00	**Mode8 CH78**
	
Mode3 CH00	**Mode9 CH78**
	

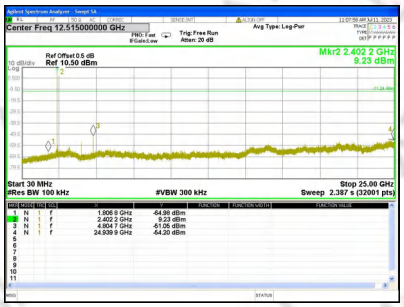
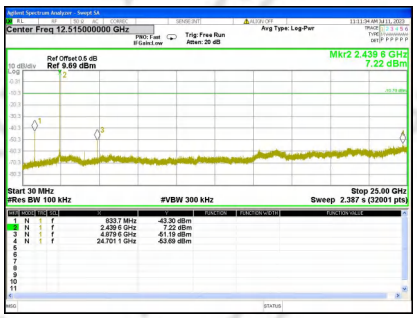
Temperature:	23.4 ℃	Relative Humidity:	55%RH
Test Voltage:	DC 5V	Test Mode:	TX Mode 1/2/3/7/8/9

For Hopping Band edge

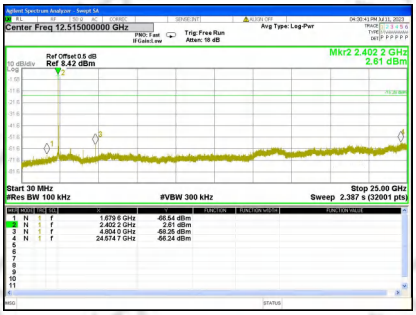
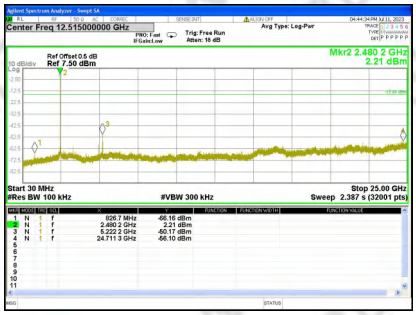
Mode1 CH00	Mode7 CH78
	
Mode2 CH00	**Mode8 CH78**
	
Mode3 CH00	**Mode9 CH78**
	

A_3.7.4. Test Result of Conducted Spurious Emission

Temperature:	23.4 ℃	Relative Humidity:	55%RH
Test Voltage:	DC 5V	Test Mode:	TX Mode 1/2/3/4/5/6/7/8/9

Mode1 CH00	Mode4 CH39	Mode7 CH78
		

Mode2 CH00	Mode5 CH39	Mode8 CH78
		

Mode3 CH00	Mode6 CH39	Mode9 CH78
		

※※※※※END OF APPENDIX A※※※※※

Appendix B _ Radiated Test Data

B_3.8.4. Test Result of Radiated Spurious Emission

3.8.4.1. For 9 kHz ~ 30 MHz

(9kHz-30MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 3.7V	Test Mode:	TX Mode

Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported
2. Distance extrapolation factor =40 log (specific distance/test distance)(dB);
3. Limit line = specific limits (dBμV) + distance extrapolation factor.

3.8.4.2. For 30 MHz ~ 1 GHz

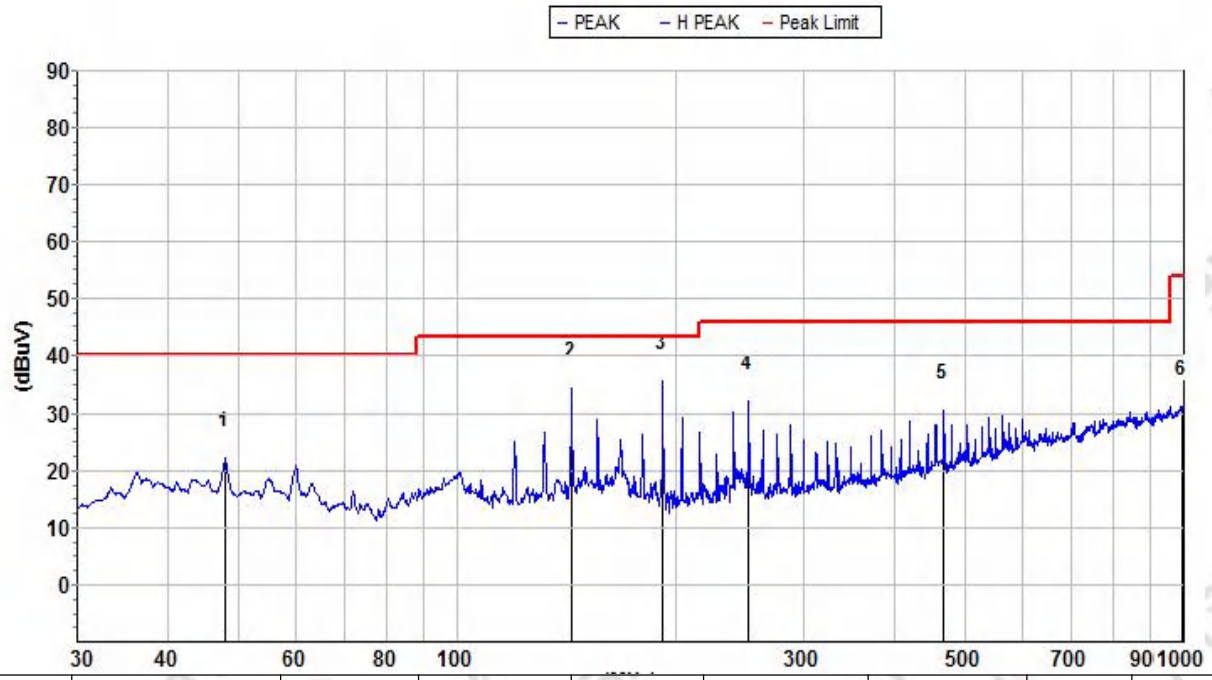
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2402 Horizontal



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	47.909933	22.0	40.0	18.0	18.5	31.8	0.9	H
2	143.829528	34.4	43.5	9.1	17.4	32.0	1.7	H
3	191.745028	35.8	43.5	7.7	15.4	31.9	1.9	H
4	252.062740	32.1	46.0	13.9	17.1	32.0	2.2	H
5	467.234940	30.4	46.0	15.6	22.1	31.6	3.0	H
6	994.753972	31.3	54.0	22.7	29.8	31.9	4.4	H

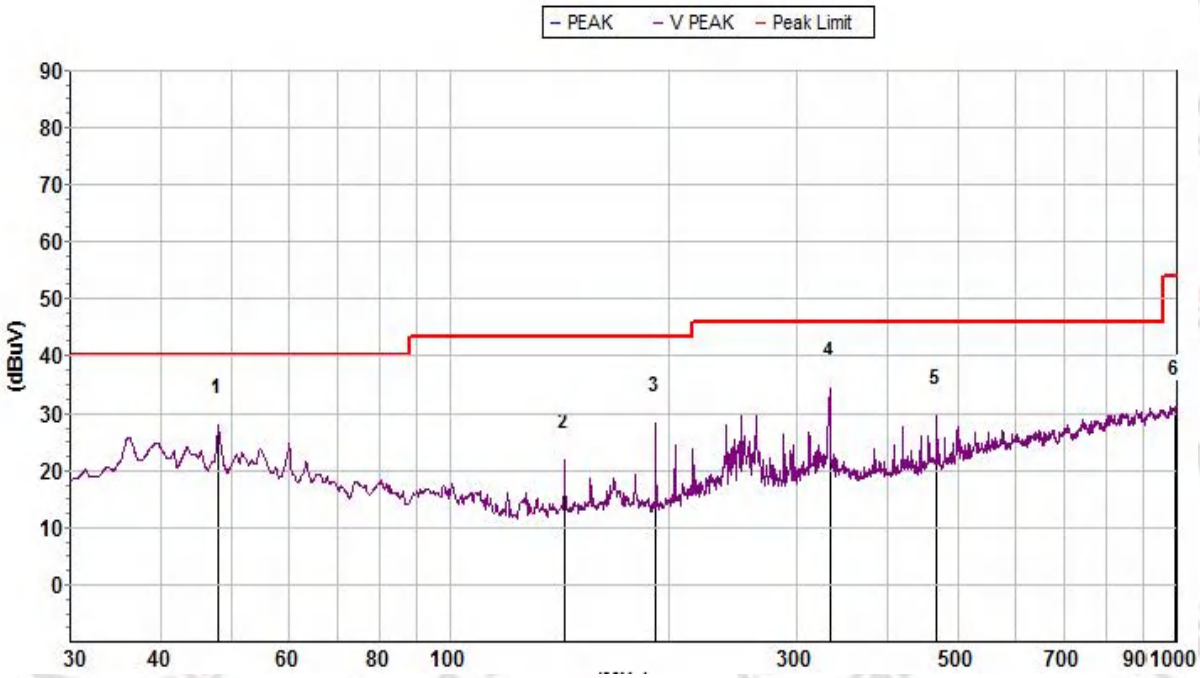
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2402 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	47.909933	27.8	40.0	12.2	18.8	31.8	0.9	V
2	143.829528	21.9	43.5	21.6	15.7	32.0	1.7	V
3	191.745028	28.3	43.5	15.2	16.5	31.9	1.9	V
4	333.102209	34.3	46.0	11.7	19.8	32.2	2.5	V
5	467.234940	29.7	46.0	16.3	22.6	31.6	3.0	V
6	996.499583	31.2	54.0	22.8	30.0	31.9	4.4	V

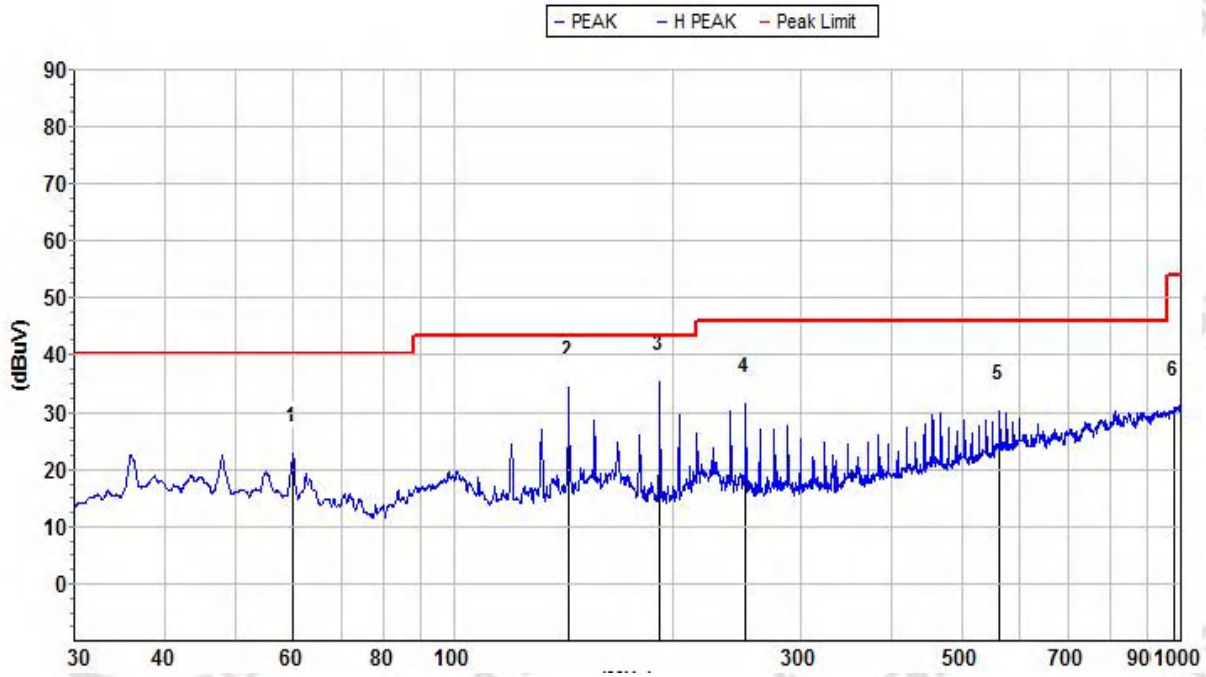
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2441 Horizontal



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	60.069117	22.7	40.0	17.3	17.7	31.9	1.1	H
2	143.829528	34.3	43.5	9.2	17.4	32.0	1.7	H
3	191.745028	35.3	43.5	8.2	15.4	31.9	1.9	H
4	252.062740	31.4	46.0	14.6	17.1	32.0	2.2	H
5	563.649758	30.3	46.0	15.7	24.5	31.1	3.3	H
6	980.898718	30.8	54.0	23.2	29.7	31.9	4.4	H

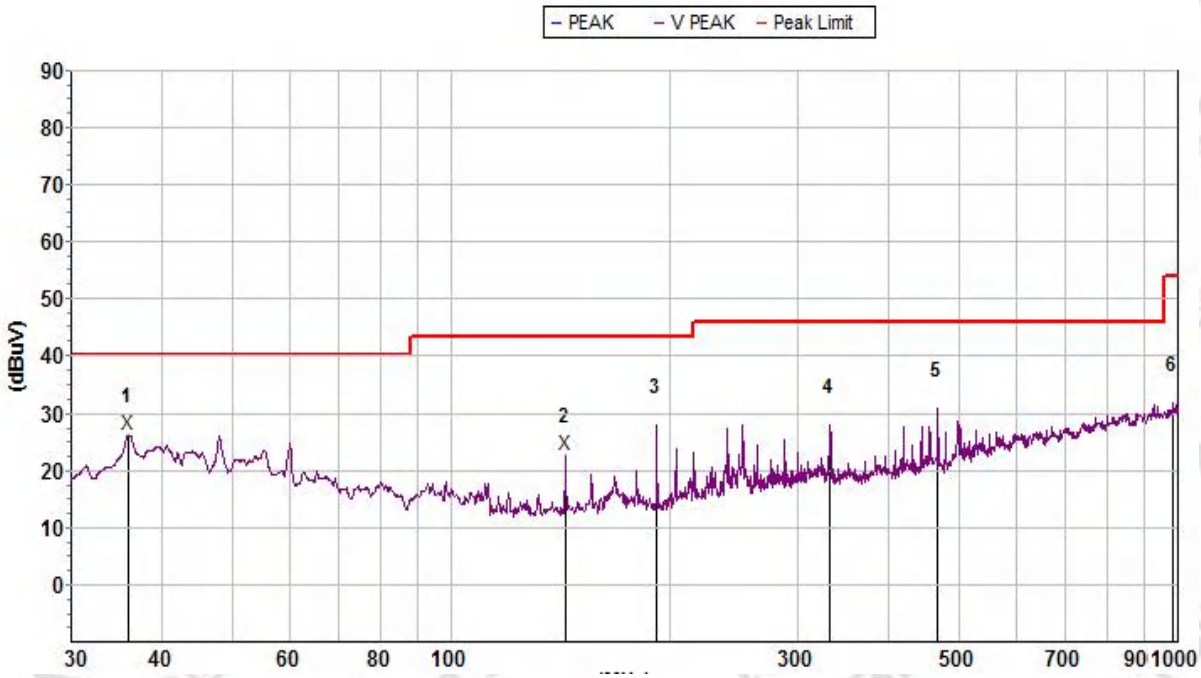
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2441 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	35.937636	26.2	40.0	13.8	18.8	31.7	0.8	V
2	143.829528	22.7	43.5	20.8	15.7	32.0	1.7	V
3	191.745028	27.8	43.5	15.7	16.5	31.9	1.9	V
4	331.936213	28.0	46.0	18.0	19.8	32.2	2.5	V
5	467.234940	30.9	46.0	15.1	22.6	31.6	3.0	V
6	984.344334	31.9	54.0	22.1	29.8	31.9	4.4	V

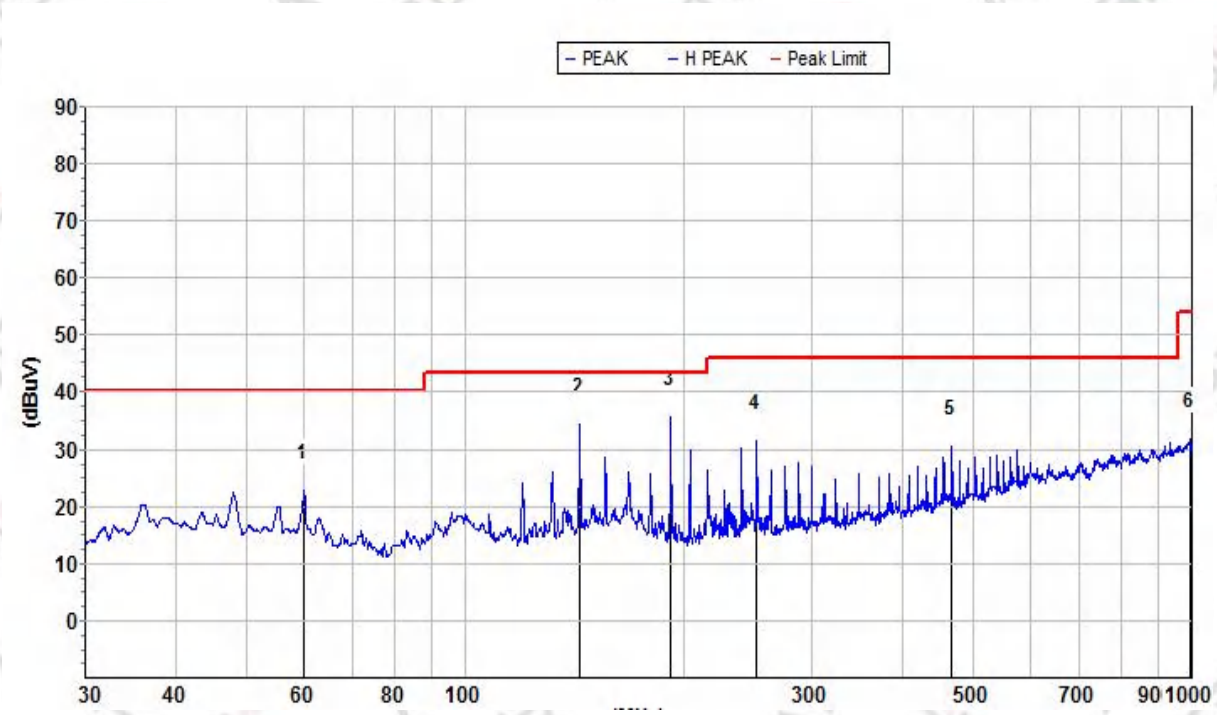
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2480 Horizontal



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	60.069117	22.8	40.0	17.2	17.7	31.9	1.1	H
2	143.829528	34.4	43.5	9.1	17.4	32.0	1.7	H
3	191.745028	35.8	43.5	7.7	15.4	31.9	1.9	H
4	252.062740	31.5	46.0	14.5	17.1	32.0	2.2	H
5	467.234940	30.6	46.0	15.4	22.1	31.6	3.0	H
6	993.011419	31.8	54.0	22.2	29.8	31.9	4.4	H

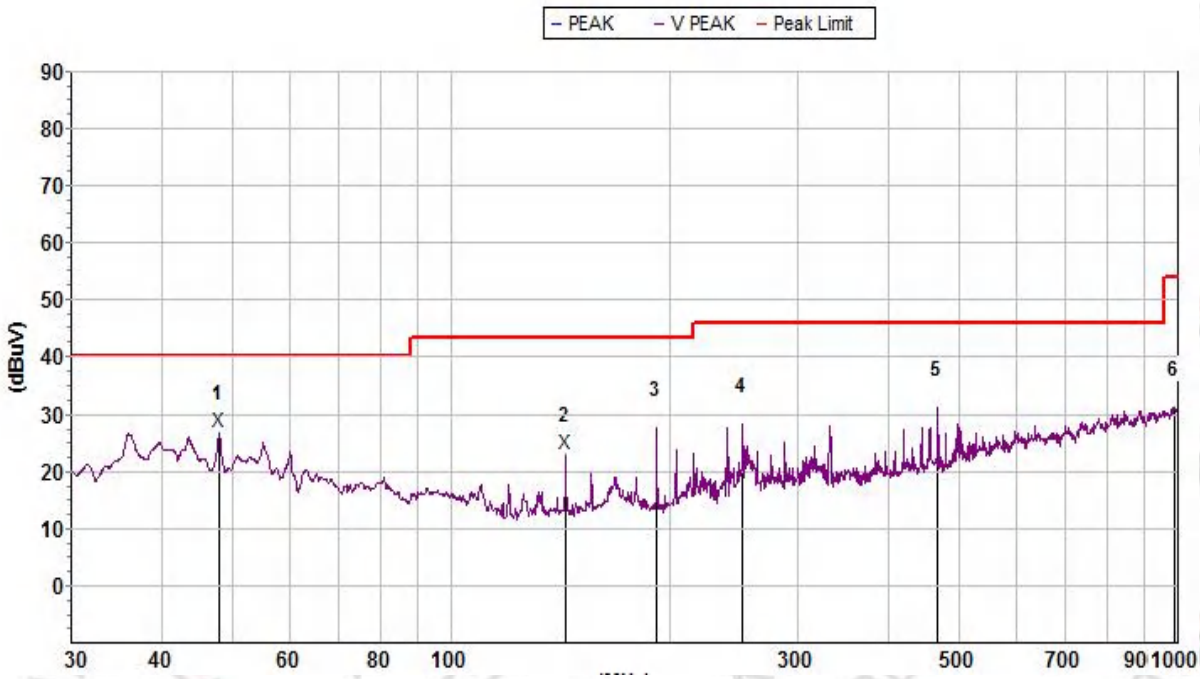
(30MHz-1000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2480 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
1	47.909933	27.0	40.0	13.0	18.8	31.8	0.9	V
2	143.829528	23.0	43.5	20.5	15.7	32.0	1.7	V
3	191.745028	27.6	43.5	15.9	16.5	31.9	1.9	V
4	252.062740	28.3	46.0	17.7	17.7	32.0	2.2	V
5	467.234940	31.1	46.0	14.9	22.6	31.6	3.0	V
6	991.271918	31.3	54.0	22.7	29.9	31.9	4.4	V

3.8.4.3. For 1 GHz ~ 18GHz

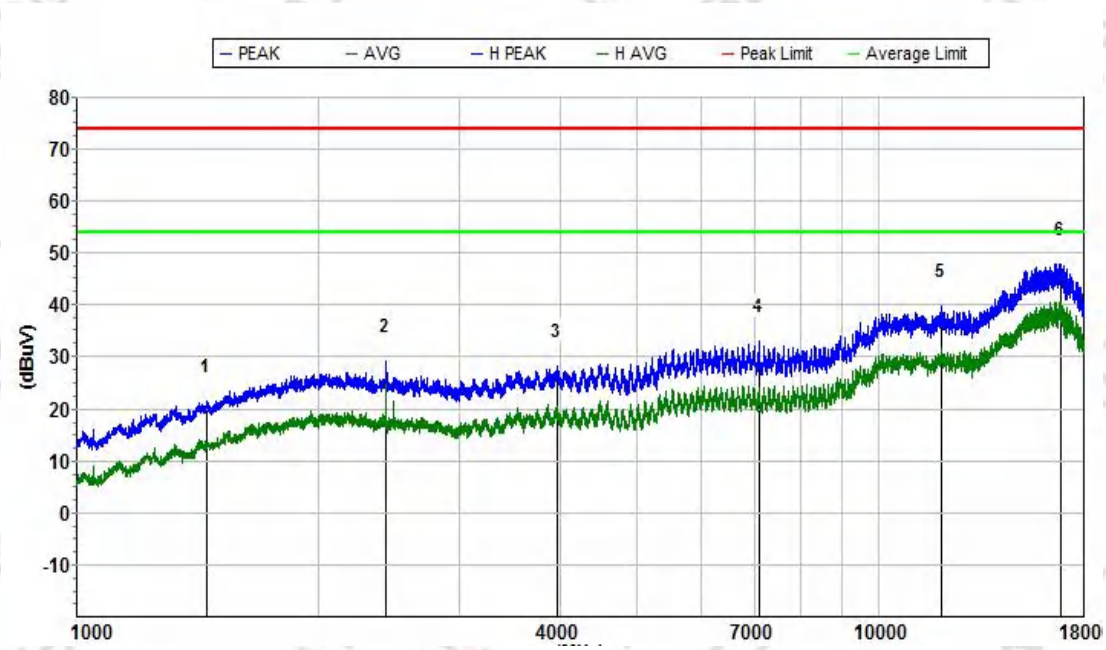
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2402 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak:								
1	1453.050000	21.6	74.0	52.4	8.2	57.8	5.3	H
2	2426.300000	29.3	74.0	44.7	11.0	57.0	6.8	H
3	3965.650000	28.2	74.0	45.8	11.9	57.3	8.8	H
4	7086.850000	32.9	74.0	41.1	11.3	56.9	12.1	H
5	11972.650000	39.8	74.0	34.2	13.2	56.3	15.7	H
6	16841.450000	48.0	74.0	26.0	16.8	56.2	18.9	H
Avg								
1	1453.050000	13.5	54.0	40.5	8.2	57.8	5.3	H
2	2426.300000	22.8	54.0	31.2	11.0	57.0	6.8	H
3	3965.650000	19.3	54.0	34.7	11.9	57.3	8.8	H
4	7086.850000	23.9	54.0	30.1	11.3	56.9	12.1	H
5	11972.650000	31.4	54.0	22.6	13.2	56.3	15.7	H
6	16841.450000	38.5	54.0	15.5	16.8	56.2	18.9	H

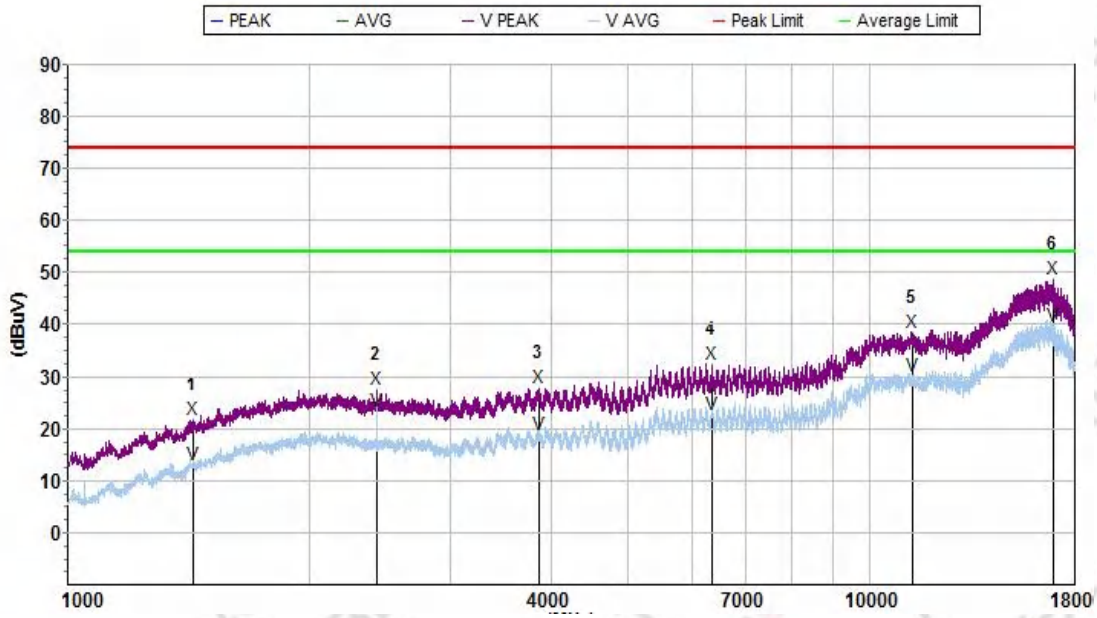
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2402 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak:								
1	1430.839850	21.8	74.0	52.2	8.0	57.9	5.2	V
2	2426.215169	27.7	74.0	46.3	10.7	57.0	6.9	V
3	3860.571545	27.8	74.0	46.2	11.8	57.2	8.7	V
4	6363.385315	32.4	74.0	41.6	11.8	56.9	11.4	V
5	11284.523672	38.7	74.0	35.3	12.6	56.7	15.0	V
6	16959.533086	48.9	74.0	25.1	16.8	56.2	19.0	V
Avg								
1	1430.839850	13.1	54.0	40.9	8.0	57.9	5.2	V
2	2426.215169	23.5	54.0	30.5	10.7	57.0	6.9	V
3	3860.571545	18.9	54.0	35.1	11.8	57.2	8.7	V
4	6363.385315	22.7	54.0	31.3	11.8	56.9	11.4	V
5	11284.523672	30.3	54.0	23.7	12.6	56.7	15.0	V
6	16959.533086	39.7	54.0	14.3	16.8	56.2	19.0	V

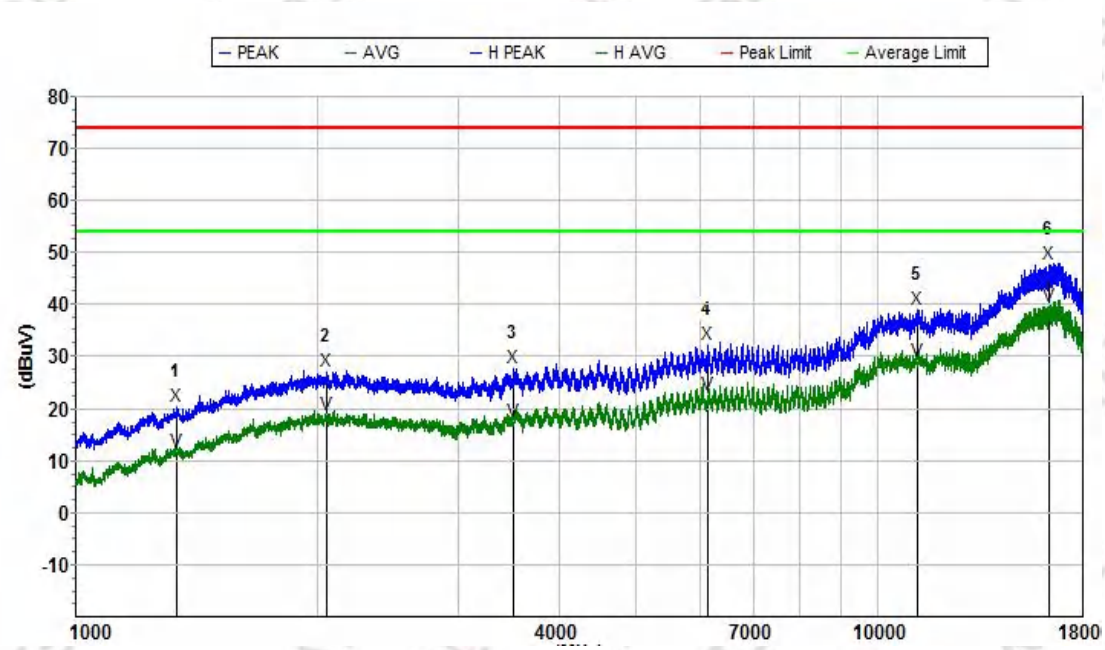
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2441 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak								
1	1334.900000	20.5	74.0	53.5	7.4	58.4	5.0	H
2	2054.850000	27.4	74.0	46.6	10.9	56.3	6.3	H
3	3508.350000	28.0	74.0	46.0	12.0	57.3	8.2	H
4	6146.750000	32.3	74.0	41.7	11.9	57.0	11.0	H
5	11222.100000	39.1	74.0	34.9	12.4	56.7	15.0	H
6	16345.050000	47.9	74.0	26.1	16.8	56.1	18.6	H
Avg								
1	1334.900000	11.7	54.0	42.3	7.4	58.4	5.0	H
2	2054.850000	18.8	54.0	35.2	10.9	56.3	6.3	H
3	3508.350000	17.5	54.0	36.5	12.0	57.3	8.2	H
4	6146.750000	22.8	54.0	31.2	11.9	57.0	11.0	H
5	11222.100000	29.3	54.0	24.7	12.4	56.7	15.0	H
6	16345.050000	39.8	54.0	14.2	16.8	56.1	18.6	H

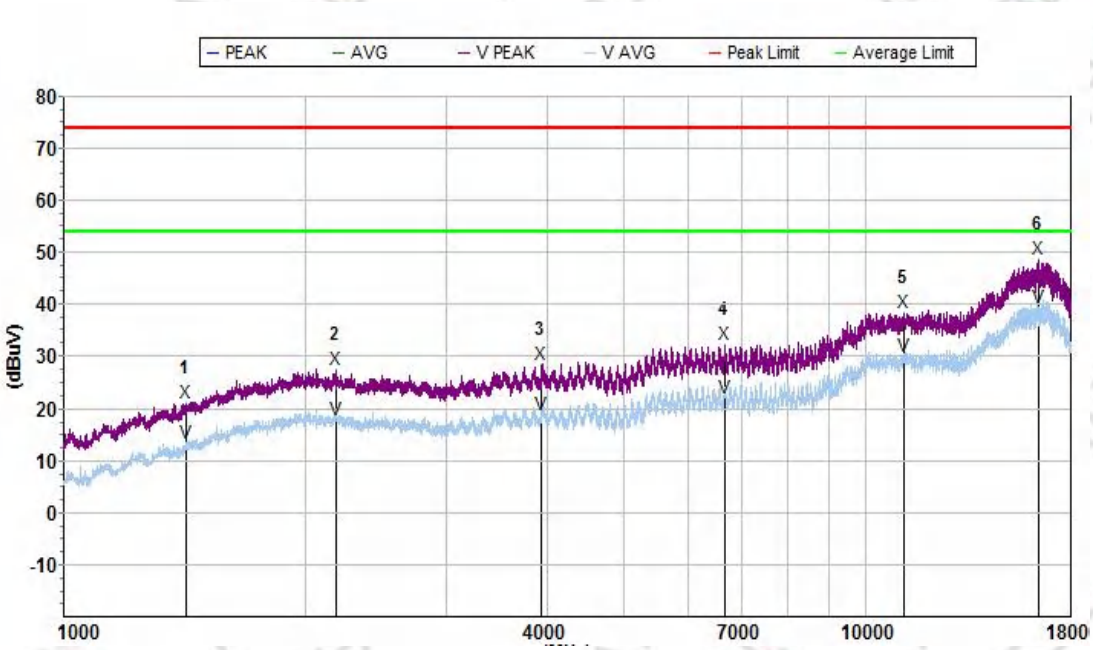
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2441 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak								
1	1420.743276	21.1	74.0	52.9	7.9	58.0	5.2	V
2	2182.976717	27.7	74.0	46.3	11.0	56.4	6.5	V
3	3945.173879	28.4	74.0	45.6	11.8	57.3	8.8	V
4	6681.936232	32.5	74.0	41.5	11.7	56.9	11.8	V
5	11153.197129	38.5	74.0	35.5	12.5	56.7	14.9	V
6	16440.677567	48.7	74.0	25.3	16.8	56.1	18.7	V
Avg								
1	1420.743276	13.3	54.0	40.7	7.9	58.0	5.2	V
2	2182.976717	17.9	54.0	36.1	11.0	56.4	6.5	V
3	3945.173879	18.8	54.0	35.2	11.8	57.3	8.8	V
4	6681.936232	22.1	54.0	31.9	11.7	56.9	11.8	V
5	11153.197129	30.3	54.0	23.7	12.5	56.7	14.9	V
6	16440.677567	39.5	54.0	14.5	16.8	56.1	18.7	V

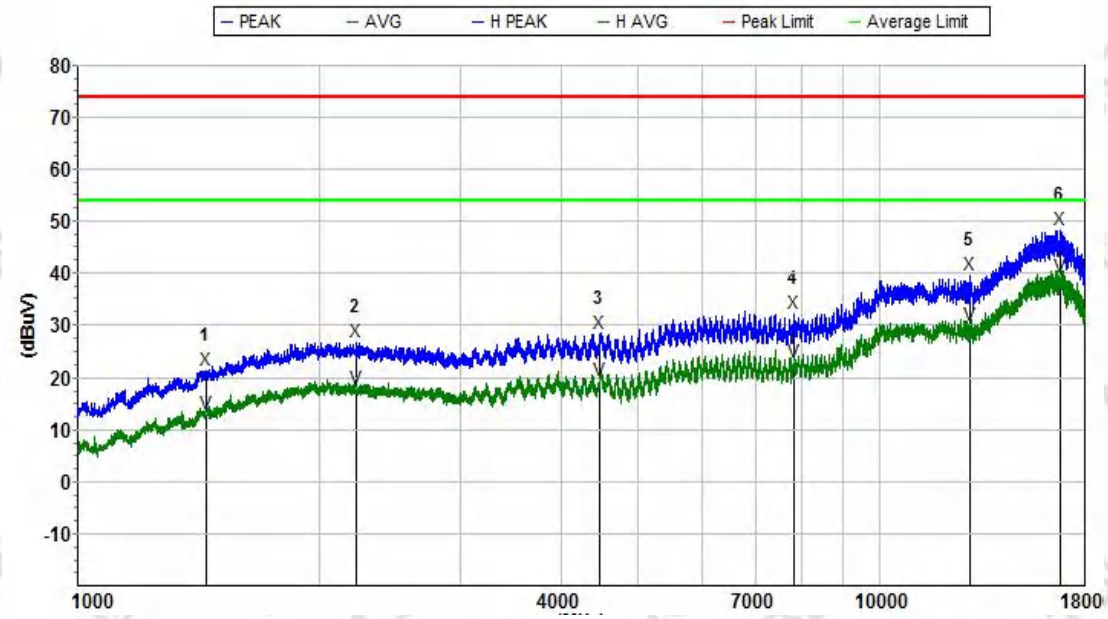
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2480 Horizontal



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak:								
1	1447.060170	21.4	74.0	52.6	8.2	57.9	5.3	H
2	2223.091409	26.9	74.0	47.1	11.0	56.4	6.5	H
3	4477.618464	28.6	74.0	45.4	12.1	57.4	9.4	H
4	7805.005688	32.5	74.0	41.5	11.6	57.1	12.3	H
5	12928.370908	39.7	74.0	34.3	12.9	56.6	16.1	H
6	16759.739894	48.6	74.0	25.4	16.8	56.2	18.8	H
Avg								
1	1447.060170	13.1	54.0	40.9	8.2	57.9	5.3	H
2	2223.091409	17.8	54.0	36.2	11.0	56.4	6.5	H
3	4477.618464	19.6	54.0	34.4	12.1	57.4	9.4	H
4	7805.005688	23.2	54.0	30.8	11.6	57.1	12.3	H
5	12928.370908	30.2	54.0	23.8	12.9	56.6	16.1	H
6	16759.739894	39.5	54.0	14.5	16.8	56.2	18.8	H

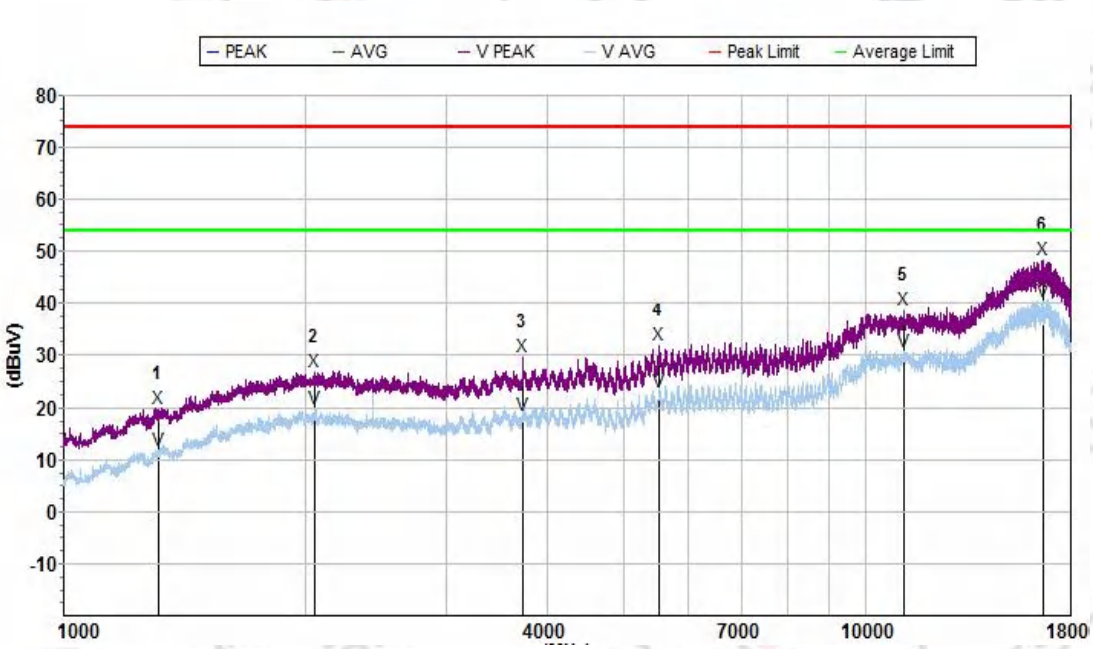
(1000MHz-18000MHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	TX Mode		

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

DH5 2480 Vertical



Mk.	Freq.(MHz)	Level(dBμV/m)	Limit(dBμV/m)	Margin(dB)	Ant.F/G.(dB/m)	Amp.G.(dB)	Cbl.L.(dB)	Pol.
Peak								
1	1311.950000	20.0	74.0	54.0	7.3	58.5	5.0	V
2	2057.400000	27.1	74.0	46.9	10.9	56.3	6.3	V
3	3739.550000	29.7	74.0	44.3	11.9	57.3	8.6	V
4	5527.950000	32.1	74.0	41.9	12.7	57.3	10.4	V
5	11158.350000	38.8	74.0	35.2	12.5	56.7	14.9	V
6	16653.600000	48.5	74.0	25.5	16.8	56.1	18.8	V
Avg								
1	1311.950000	11.8	54.0	42.2	7.3	58.5	5.0	V
2	2057.400000	19.9	54.0	34.1	10.9	56.3	6.3	V
3	3739.550000	18.7	54.0	35.3	11.9	57.3	8.6	V
4	5527.950000	23.0	54.0	31.0	12.7	57.3	10.4	V
5	11158.350000	30.7	54.0	23.3	12.5	56.7	14.9	V
6	16653.600000	40.3	54.0	13.7	16.8	56.1	18.8	V

Note:

1.All TX Mode, the worst case is mode1,2&3, only show the worst case.

3.8.4.4. For above 18GHz

(above 18GHz)

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	DC 3.7V	Test Mode:	TX Mode

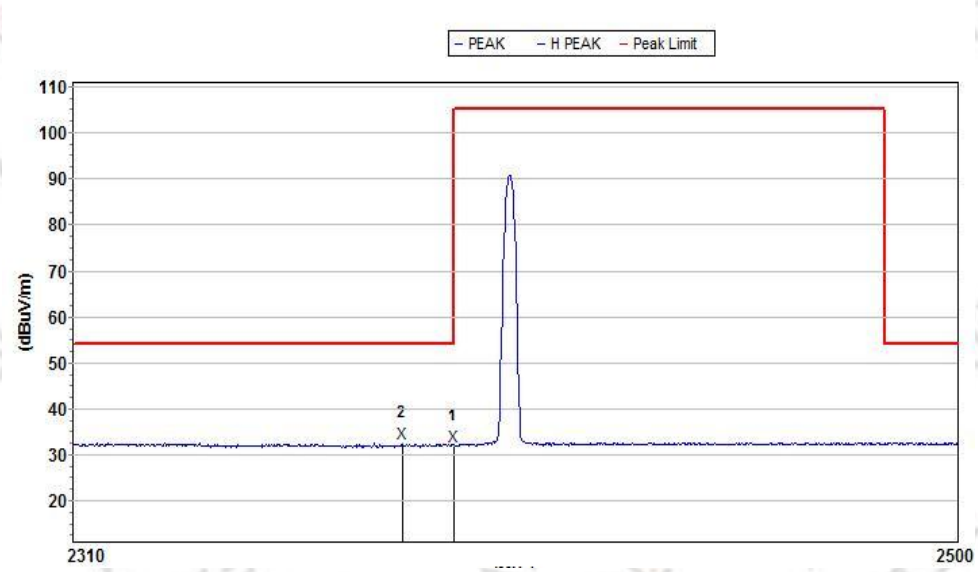
Note:

1. Other 18G-25G Emission detected are more than 20dB below the limit.

B_3.8.5. Test Result of Restricted Band

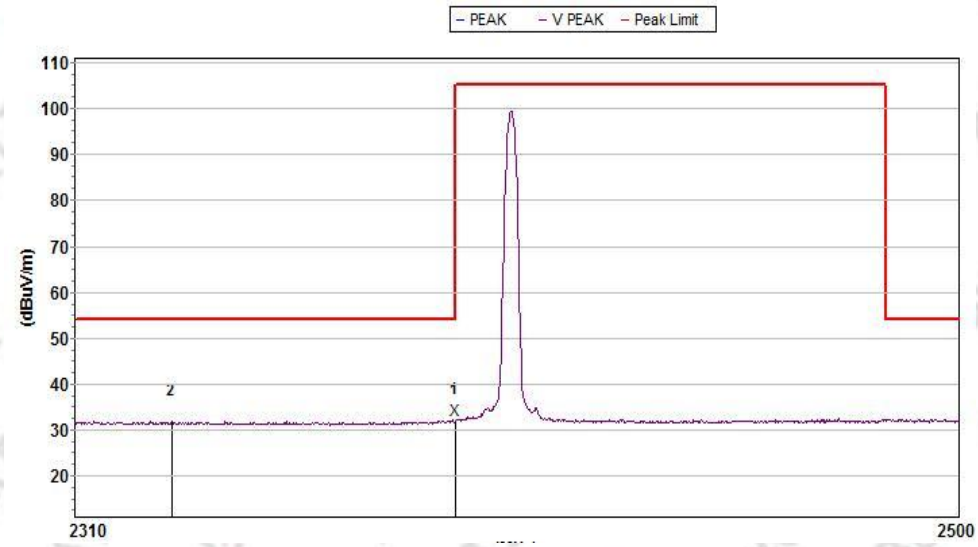
DH5-Low

Horizontal



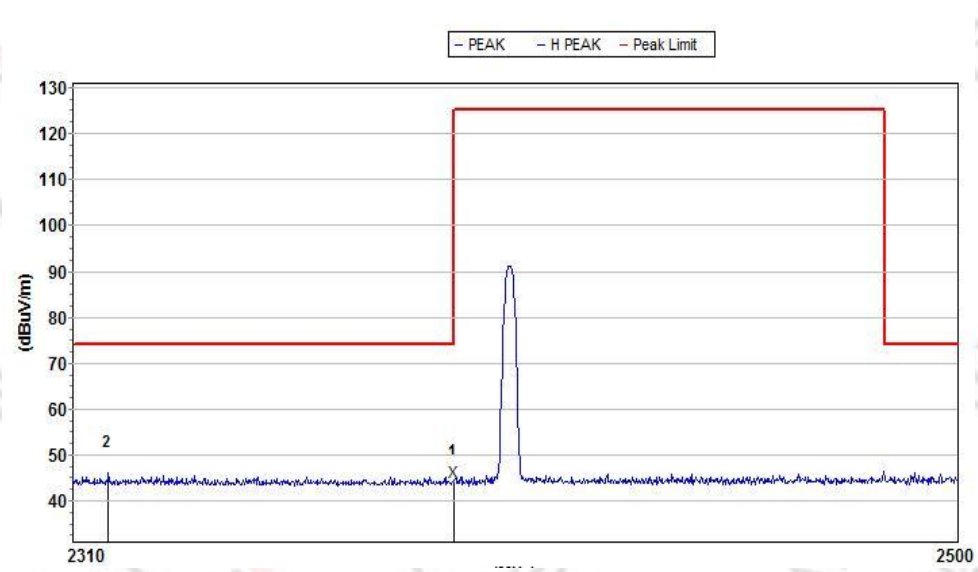
Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB/m)	(dB)	(dB)	
AVG								
1	2390.000000	31.9	54.0	22.1	27.4	56.9	6.8	H
2	2378.931882	32.6	54.0	21.4	27.3	56.8	6.8	H

Vertical



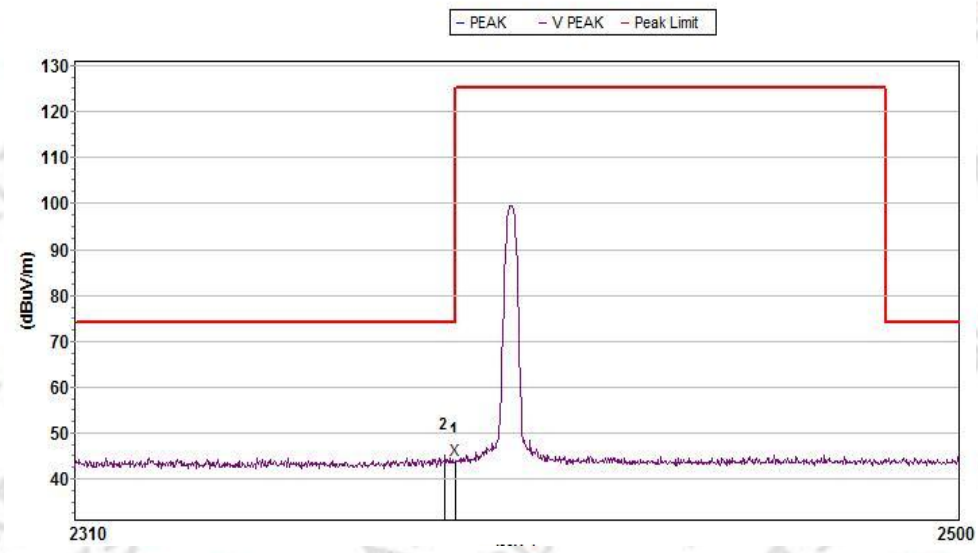
Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB/m)	(dB)	(dB)	
AVG								
1	2390.000000	32.2	54.0	21.8	27.1	56.9	6.8	V
2	2330.172449	31.9	54.0	22.1	26.8	56.6	6.7	V

Horizontal



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB/m)	(dB)	(dB)	
Peak								
1	2390.000000	44.2	74.0	29.8	27.4	56.9	6.8	H
2	2317.315151	46.2	74.0	27.8	27.2	56.6	6.7	H

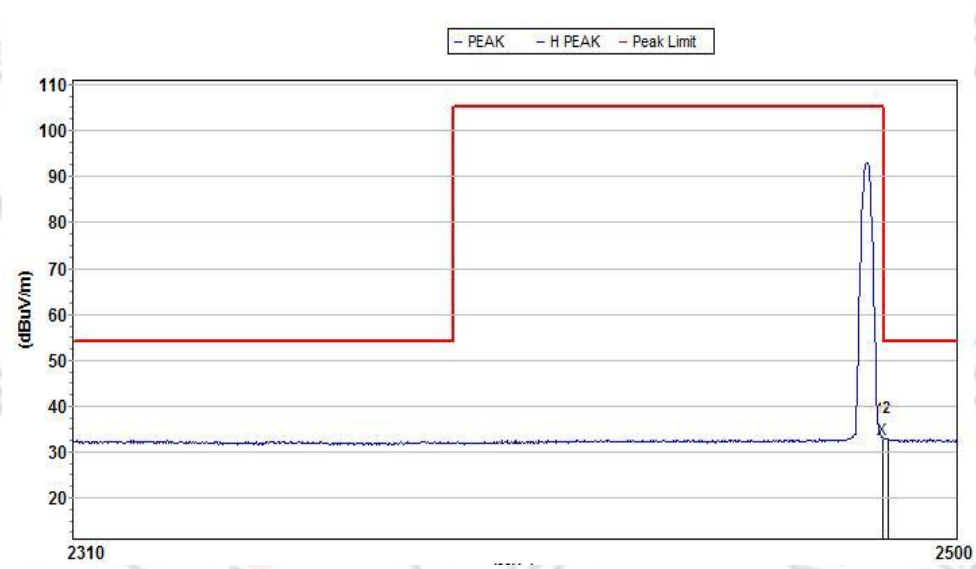
Vertical



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB/m)	(dB)	(dB)	
Peak								
1	2390.000000	44.3	74.0	29.7	27.1	56.9	6.8	V
2	2387.786123	45.2	74.0	28.8	27.0	56.9	6.8	V

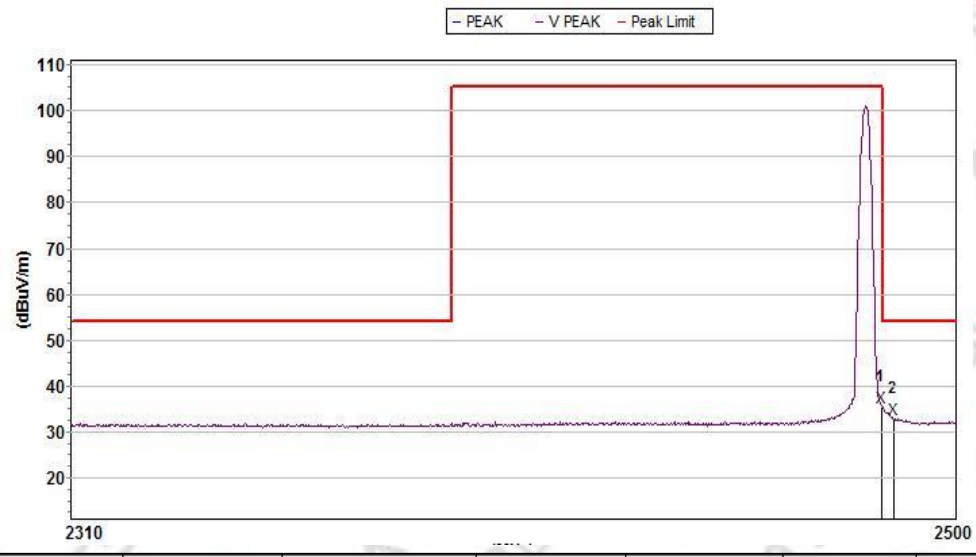
DH5-High

Horizontal



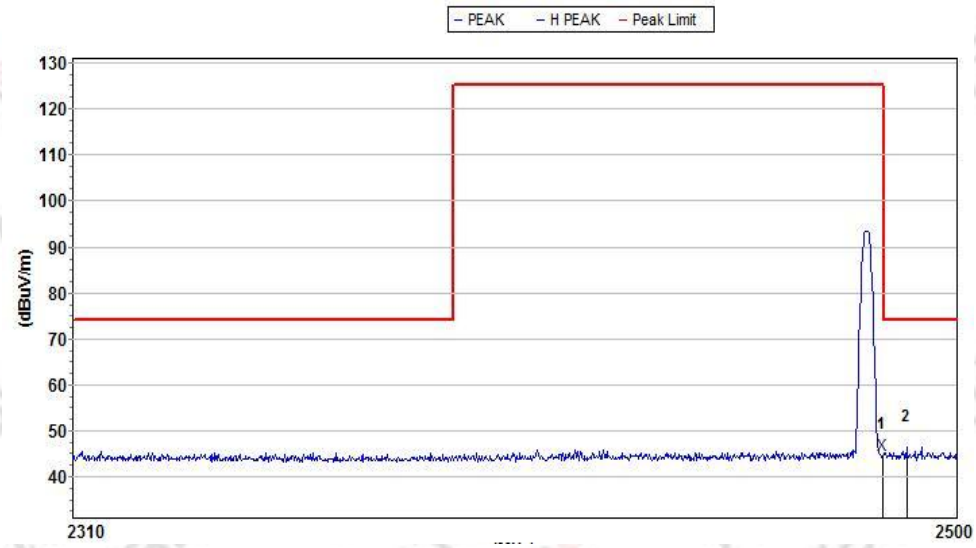
Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB/m)	(dB)	(dB)	
AVG								
1	2483.501000	32.9	54.0	21.1	27.6	57.1	6.9	H
2	2484.633992	32.9	54.0	21.1	27.6	57.1	6.9	H

Vertical



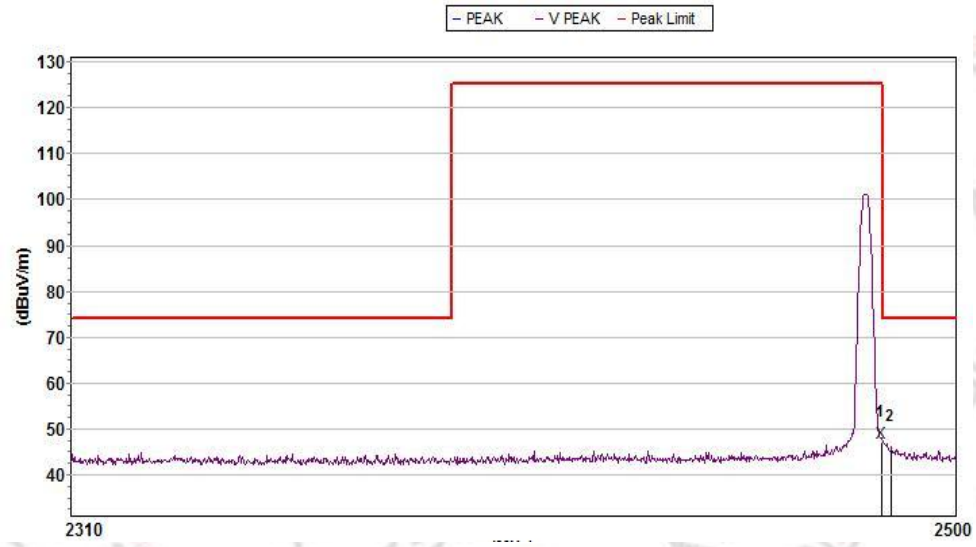
Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB/m)	(dB)	(dB)	
AVG								
1	2483.501000	35.4	54.0	18.6	27.4	57.1	6.9	V
2	2486.205636	32.9	54.0	21.1	27.4	57.1	6.9	V

Horizontal



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB/m)	(dB)	(dB)	
Peak								
1	2483.501000	44.8	74.0	29.2	27.6	57.1	6.9	H
2	2488.761679	46.5	74.0	27.5	27.6	57.1	6.9	H

Vertical



Mk.	Frequency	Level	Limit	Margin	Ant.F/G.	Amp.G.	Cbl.L.	Pol.
	(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dB/m)	(dB)	(dB)	
Peak								
1	2483.501000	47.2	74.0	26.8	27.4	57.1	6.9	V
2	2485.616153	46.0	74.0	28.0	27.4	57.1	6.9	V

Note:

1.All mode all have been tested, the worst case is DH5, only show the worst case.

2.Other 18G-25G Emission detected are more than 20dB below the limit.

※※※※※END OF APPENDIX B※※※※※

Appendix C _ AC Power-Line Conducted Emission Test Data

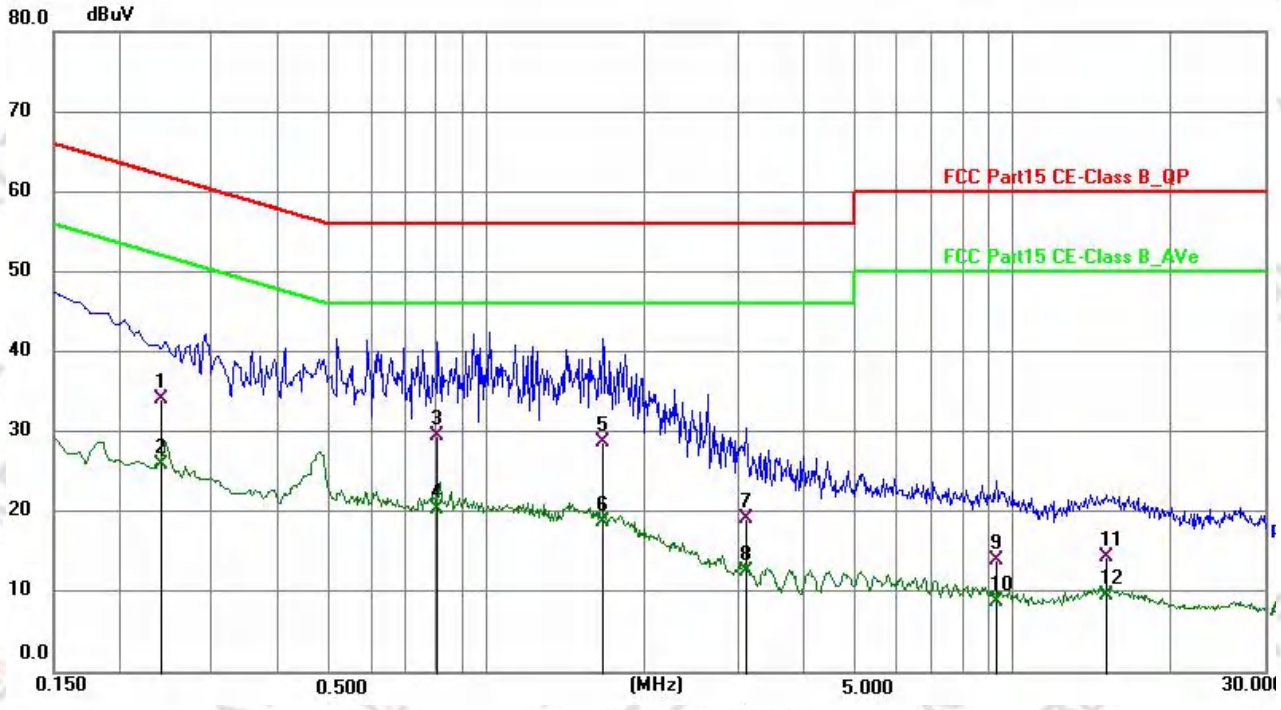
C_3.9.4. Test Result of AC Power-Line Conducted Emission

Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 13		

No.	Frequency (MHz)	Reading (dBμV)	Correct Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.2401	24.26	9.84	34.10	62.09	-27.99	QP
2	0.2401	16.12	9.84	25.96	52.09	-26.13	AVG
3	0.8057	19.63	9.88	29.51	56.00	-26.49	QP
4	0.8057	10.47	9.88	20.35	46.00	-25.65	AVG
5	1.6673	18.83	9.95	28.78	56.00	-27.22	QP
6	1.6673	8.81	9.95	18.76	46.00	-27.24	AVG
7	3.1122	9.13	10.02	19.15	56.00	-36.85	QP
8	3.1122	2.69	10.02	12.71	46.00	-33.29	AVG
9	9.2702	3.87	10.13	14.00	60.00	-46.00	QP
10	9.2702	-1.24	10.13	8.89	50.00	-41.11	AVG
11	15.0465	3.97	10.37	14.34	60.00	-45.66	QP
12	15.0465	-0.80	10.37	9.57	50.00	-40.43	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor=LISN factor+Cable loss+Limiter (10dB)

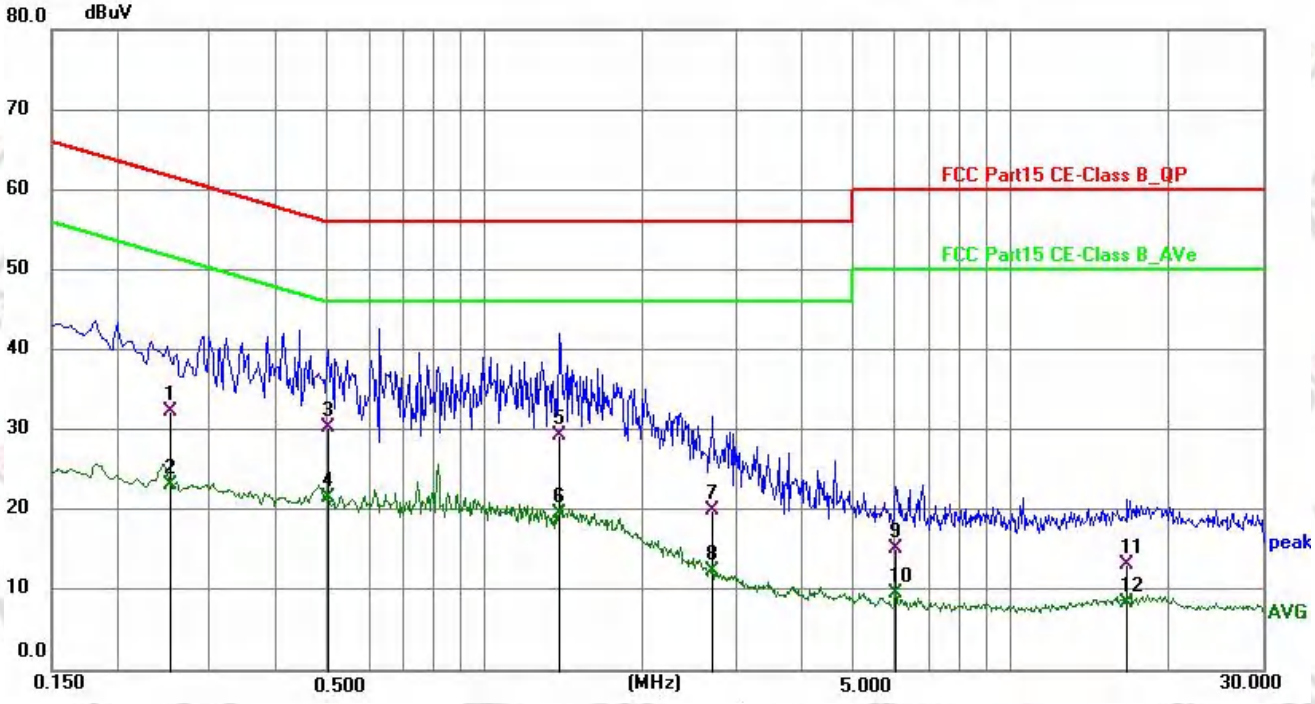


Temperature:	22.3℃	Relative Humidity:	51%
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 13		

No.	Frequency (MHz)	Reading (dBμV)	Correct Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.2525	22.60	9.79	32.39	61.67	-29.28	QP
2	0.2525	13.49	9.79	23.28	51.67	-28.39	AVG
3	0.5030	20.55	9.77	30.32	56.00	-25.68	QP
4	0.5030	11.82	9.77	21.59	46.00	-24.41	AVG
5	1.3900	19.54	9.83	29.37	56.00	-26.63	QP
6	1.3900	9.77	9.83	19.60	46.00	-26.40	AVG
7	2.7208	10.12	9.97	20.09	56.00	-35.91	QP
8	2.7208	2.47	9.97	12.44	46.00	-33.56	AVG
9	6.0317	5.25	10.00	15.25	60.00	-44.75	QP
10	6.0317	-0.42	10.00	9.58	50.00	-40.42	AVG
11	16.6474	2.90	10.33	13.23	60.00	-46.77	QP
12	16.6474	-1.86	10.33	8.47	50.00	-41.53	AVG

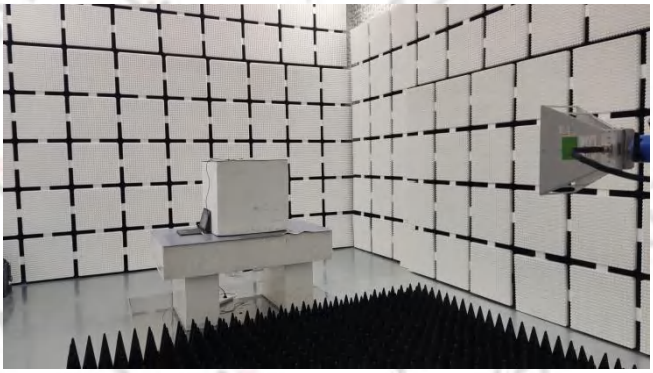
Remark:

1. All readings are Quasi-Peak and Average values.
2. Margin = Result (Result =Reading + Factor)–Limit.
3. Factor=LISN factor+Cable loss+Limiter (10dB)



※※※※※END OF APPENDIX C※※※※※

Appendix D _ Test Setup

AC Power Line Conducted Emissions	Radiated Emissions for 9kHz~30MHz
	
Radiated Emissions for 30MHz~1GHz	Radiated Emissions for 1GHz~18GHz
	
Radiated Emissions for above 18GHz	Conducted for RF
	

※※※※※END OF APPENDIX D※※※※※