NVLAP TESTING
LABORATORY CODE 600341-0

BACL Bay Area Compliance Labs Corp.

TEST REPORT

Applicant: **Amaury International Corp**

Address: **7290 NW 70th Street Miami, Florida 33166**

Product Name: **SMART WATCH**

FCC ID: **2BDSQ-NVK-R3590**

Standard(s): **47 CFR Part 15, Subpart C(15.247)**
ANSI C63.10-2013
KDB 558074 D01 15.247 Meas Guidance v05r02

Report Number: **DG1231214-75379E-RF-00**

Report Date: **2024/1/4**

The above device has been tested and found compliant with the requirement of the relative standards by Bay Area Compliance Laboratories Corp. (Dongguan).

Reviewed By: Gavin Xu
Title: RF Engineer

Approved By: Ivan Cao
Title: EMC Manager

Bay Area Compliance Laboratories Corp. (Dongguan)
No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China

Tel: +86-769-86858888
Fax: +86-769-86858891
www.baclcorp.com.cn

Note: The information marked ▲ is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested. This report cannot be reproduced except in full, without prior written approval of the Company. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0. This report may contain data that are not covered by the accreditation scope and shall be marked with ★.This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

CONTENTS

DOCUMENT REVISION HISTORY 4

1. GENERAL INFORMATION 5

1.1 GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST 5

1.2 ACCESSORY INFORMATION 5

1.3 ANTENNA INFORMATION DETAIL▲ 5

1.4 EQUIPMENT MODIFICATIONS 5

2. DESCRIPTION OF TEST CONFIGURATION 6

2.1 OPERATION FREQUENCY DETAIL 6

2.2 EUT OPERATION CONDITION 6

2.3 EUT EXERCISE SOFTWARE 6

2.4 SUPPORT EQUIPMENT LIST AND DETAILS 6

2.5 SUPPORT CABLE LIST AND DETAILS 6

2.6 BLOCK DIAGRAM OF TEST SETUP 7

2.7 TEST FACILITY 8

2.8 MEASUREMENT UNCERTAINTY 8

3. SUMMARY OF TEST RESULTS 9

4. REQUIREMENTS AND TEST PROCEDURES 10

4.1 AC LINE CONDUCTED EMISSIONS 10

4.1.1 Applicable Standard 10
4.1.2 EUT Setup 11
4.1.3 EMI Test Receiver Setup 11
4.1.4 Test Procedure 12
4.1.5 Corrected Amplitude & Margin Calculation 12
4.1.6 Test Result 12

4.2 RADIATION SPURIOUS EMISSIONS 13

3.2.1 Applicable Standard 13
4.2.2 EUT Setup 13
4.2.3 EMI Test Receiver & Spectrum Analyzer Setup 15
4.2.4 Test Procedure 15
4.2.5 Corrected Result & Margin Calculation 15
4.2.6 Test Result 15

4.3 MINIMUM 6 DB BANDWIDTH 16

4.3.1 Applicable Standard 16
4.3.2 EUT Setup 16
4.3.3 Test Procedure 16
4.3.4 Test Result 16

4.4 MAXIMUM CONDUCTED OUTPUT POWER 17

4.4.1 Applicable Standard 17
4.4.2 EUT Setup 17

4.4.3 Test Procedure 17
4.4.4 Test Result 17
4.5 MAXIMUM POWER SPECTRAL DENSITY 18
4.5.1 Applicable Standard 18
4.5.2 EUT Setup 18
4.5.3 Test Procedure 18
4.5.4 Test Result 18
4.6 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE 19
4.6.1 Applicable Standard 19
4.6.2 EUT Setup 19
4.6.3 Test Procedure 19
4.6.4 Test Result 19
4.7 DUTY CYCLE 20
4.7.1 EUT Setup 20
4.7.2 Test Procedure 20
4.7.4 Judgment 20
4.8 ANTENNA REQUIREMENT 21
4.8.1 Applicable Standard 21
4.8.2 Judgment 21
5. Test DATA AND RESULTS 22
5.1 AC LINE CONDUCTED EMISSIONS 22
5.2 RADIATION SPURIOUS EMISSIONS 25
5.3 6 DB EMISSION BANDWIDTH 44
5.4 MAXIMUM CONDUCTED OUTPUT POWER 46
5.5 MAXIMUM POWER SPECTRAL DENSITY 48
5.6 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE 50
5.7 DUTY CYCLE 51
6. RF EXPOSURE EVALUATION 52
6.1 APPLICABLE STANDARD 52
6.2 MEASUREMENT RESULT 52
7. EUT PHOTOGRAPHS 53
8. TEST SETUP PHOTOGRAPHS 54

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	DG1231214-75379E-RF-00	Original Report	2024/1/4

1. GENERAL INFORMATION

1.1 General Description Of Equipment under Test

EUT Name:	SMART WATCH
EUT Model:	NVK-R3590
Operation Frequency:	2402-2480 MHz
Maximum Peak Output Power (Conducted):	1.47 dBm
Modulation Type:	GFSK
Rated Input Voltage:	DC 3.7V from battery or DC 5V From USB Port
Serial Number:	2F84-3 (For RF Conducted Test) 2F84-1 (For For Radiated Spurious Emission/AC Line conducted Emission Test)
EUT Received Date:	2023/11/29
EUT Received Status:	Good

1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

1.3 Antenna Information Detail▲

Antenna Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
Shenzhen Qianmu Communication Technology Co., Ltd	Monopole	50	2.4~2.5GHz	0.52 dBi
The Method of §15.203 Compliance: ☒Antenna was permanently attached to the unit. ☐Antenna uses a unique type of connector to attach to the EUT. ☐Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.				

1.4 Equipment Modifications

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

2. DESCRIPTION OF TEST CONFIGURATION

2.1 Operation Frequency Detail

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	**2402**	20	2442
1	2404	…	…
…	…	…	…
…	…	…	…
..	…	38	2478
19	**2440**	39	**2480**

2.2 EUT Operation Condition

The system was configured for testing in Engineering Mode, which was provided by the manufacturer. The following summary table is showing all test modes to demonstrate in compliance with the standard:

Test Items	Test Modes
RF Conducted	Mode 1: Transmitting_1Mbps
Radiated Spurious Emission	Mode 1: Transmitting_1Mbps
AC Line Conducted Emission	Test was performed at the channel and mode with maximum output power
Note: Mode 1 was tested with the frequencies in bold in section 2.1.	

2.3 EUT Exercise Software

EUT Exercise Software:	BK32xx RF Test_V2.0.0D4.exe		
The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:			
Test Modes	Power Level Setting		
	Lowest	Middle	Highest
1Mbps	3	3	3

2.4 Support Equipment List and Details

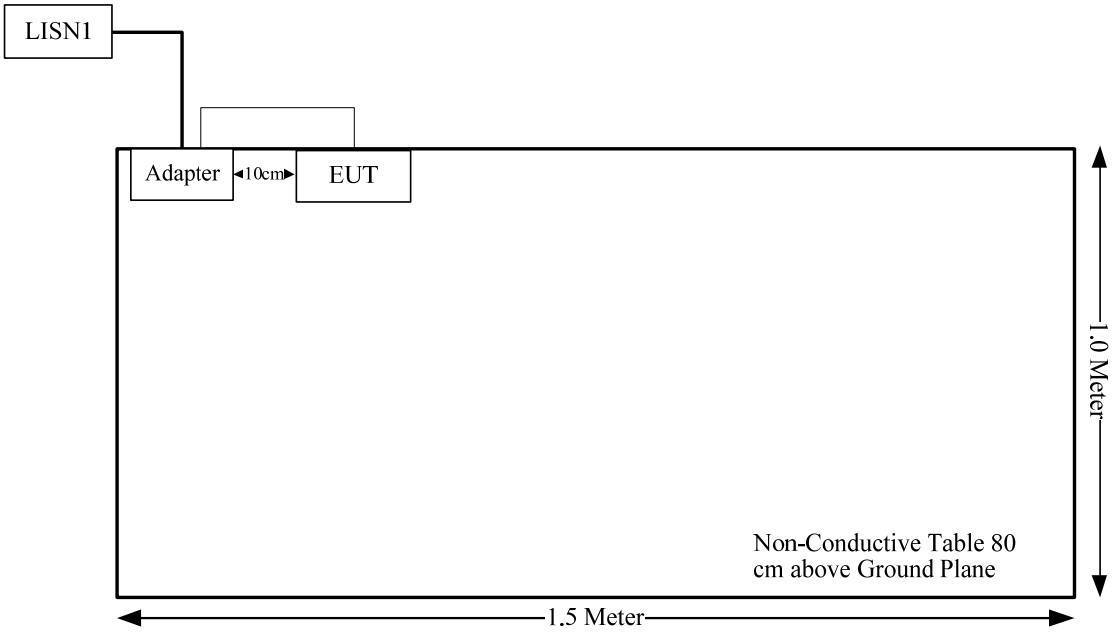
Manufacturer	Description	Model	Serial Number
Huntkey	Adapter	HKA01105021-XE	0D1805002143

2.5 Support Cable List and Details

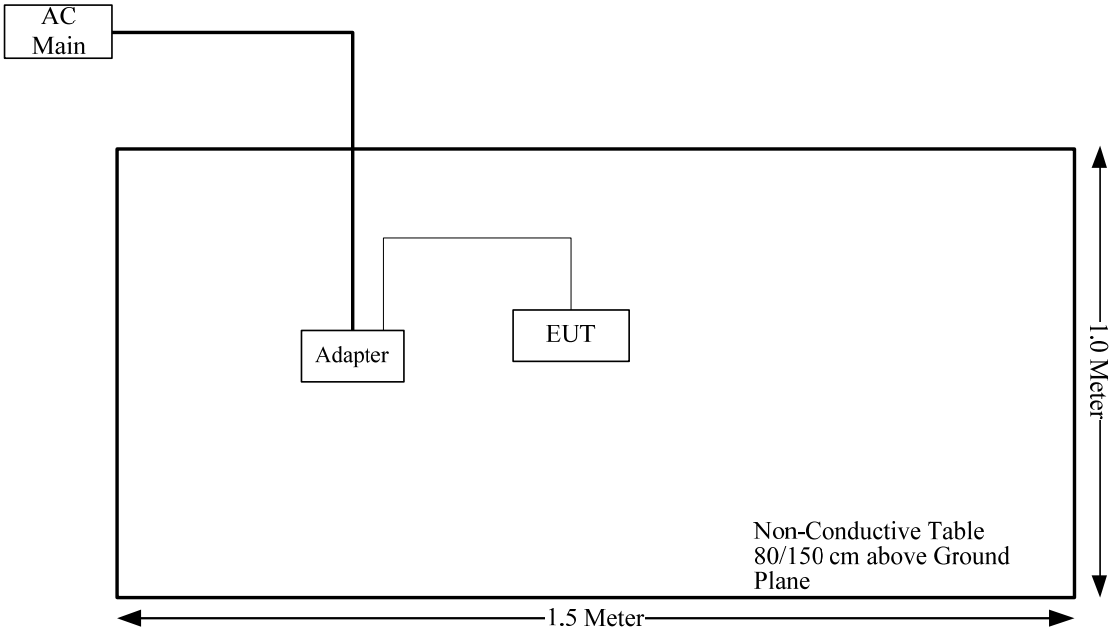
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Cable	No	No	0.6	Adapter	EUT

2.6 Block Diagram of Test Setup

AC line conducted emissions:



Radiated Spurious Emissions:



2.7 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 829273, the FCC Designation No. : CN5044.

2.8 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	9kHz~30MHz: 3.3dB, 30MHz~200MHz: 4.55 dB, 200MHz~1GHz: 5.92 dB, 1GHz~6GHz: 4.98 dB, 6GHz~18GHz: 5.89 dB, 18GHz~26.5GHz:5.47 dB, 26.5GHz~40GHz:5.63 dB
Unwanted Emissions, conducted	±2.47 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.11 dB (150 kHz to 30 MHz)

3. SUMMARY OF TEST RESULTS

Standard(s) Section	Test Items	Result
§15.207(a)	AC line conducted emissions	Compliant
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions	Compliant
§15.247 (a)(2)	Minimum 6 dB Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.203	Antenna Requirement	Compliant
FCC§15.247 (i) & §1.1310	RF Exposure Evaluation	Compliant

4. REQUIREMENTS AND TEST PROCEDURES

4.1 AC Line Conducted Emissions

4.1.1 Applicable Standard

FCC§15.207(a).

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

	Conducted limit (dBµV)	
Frequency of emission (MHz)	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.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

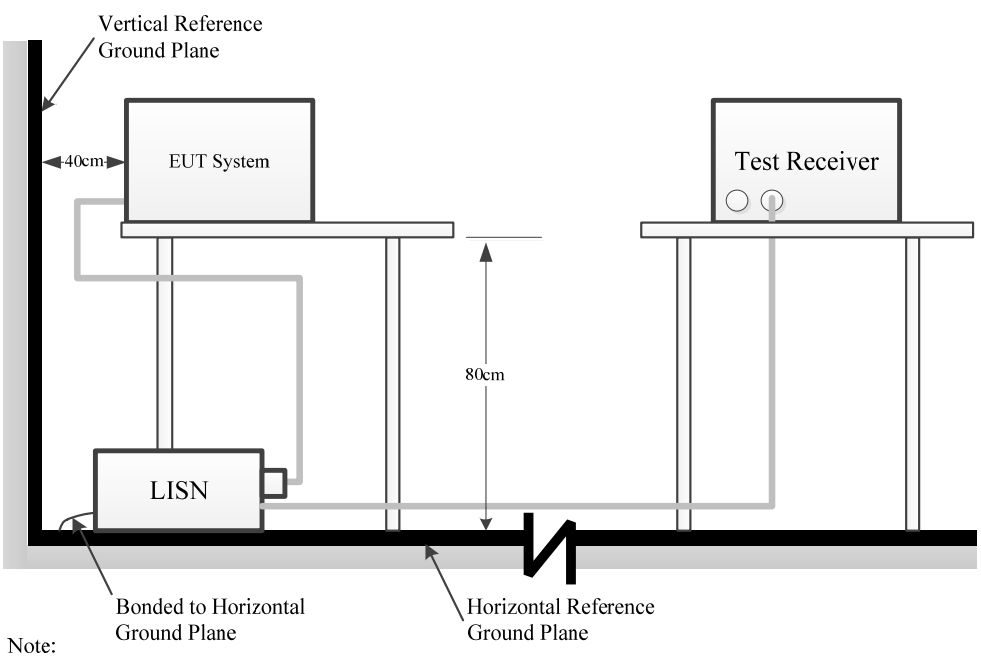
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 µV within the frequency band 535-1705 kHz, as measured using a 50 µH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

4.1.2 EUT Setup



Note:
1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at least 80 cm from other units and oter metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

4.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

4.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase ("hot") line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

4.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4.1.6 Test Result

Please refer to section 5.1.

4.2 Radiation Spurious Emissions

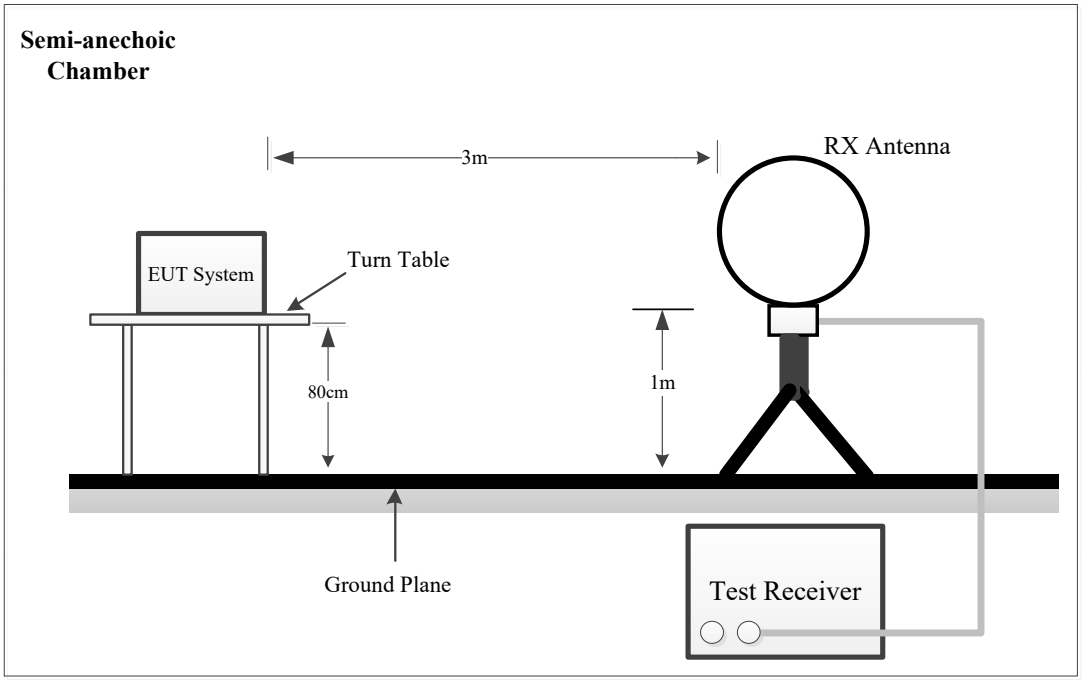
3.2.1 Applicable Standard

FCC §15.247 (d);

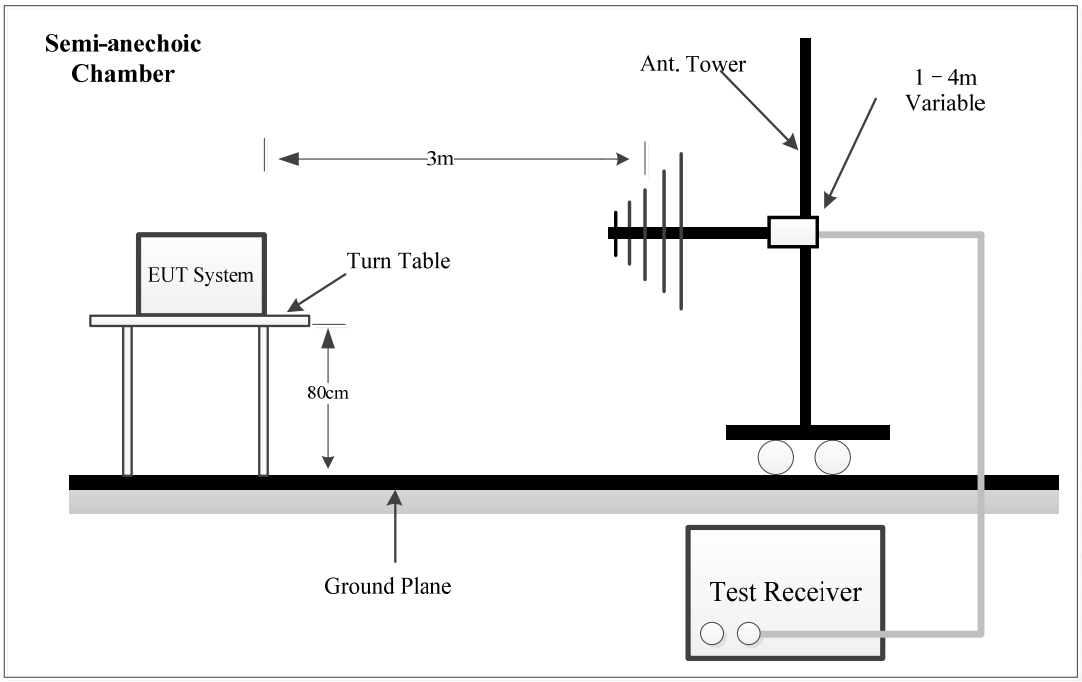
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

4.2.2 EUT Setup

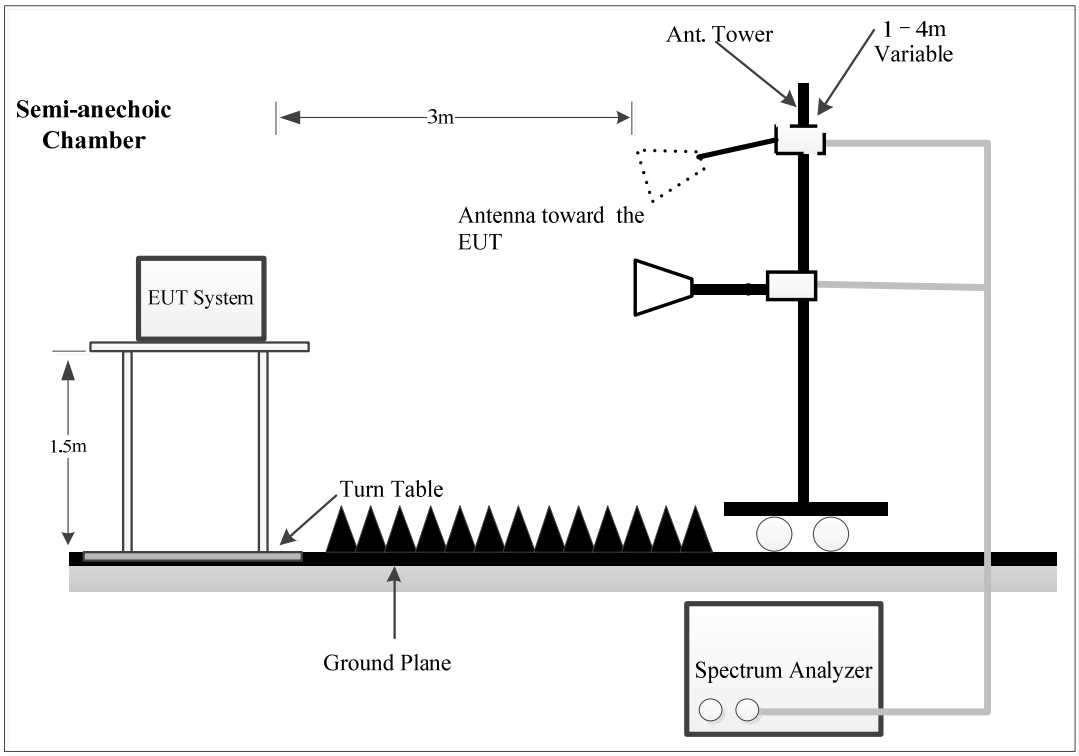
9kHz-30MHz:



30MHz~1GHz:



Above 1GHz:



The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

4.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9kHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

9kHz-1000MHz:

Frequency Range	Measurement	RBW	Video B/W	IF B/W
9 kHz – 150 kHz	QP/AV	200 Hz	1 kHz	200 Hz
150 kHz – 30 MHz	QP/AV	9 kHz	30 kHz	9 kHz
30 MHz – 1000 MHz	PK	100 kHz	300 kHz	/
	QP	/	/	120 kHz

1GHz- 25GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
Ave.	>98%	1MHz	10 Hz
	<98%	1MHz	⩾1/T

Note: T is minimum transmission duration

If the maximized peak measured value is under the QP/Average limit by more than 6dB, then it is unnecessary to perform an QP/Average measurement.

4.2.4 Test Procedure

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

Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9 – 90 kHz, 110 – 490 kHz, employing an average detector, peak and Average detection modes for frequencies above 1 GHz.

All emissions under the average limit and under the noise floor have not recorded in the report.

4.2.5 Corrected Result & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4.2.6 Test Result

Please refer to section 5.2.

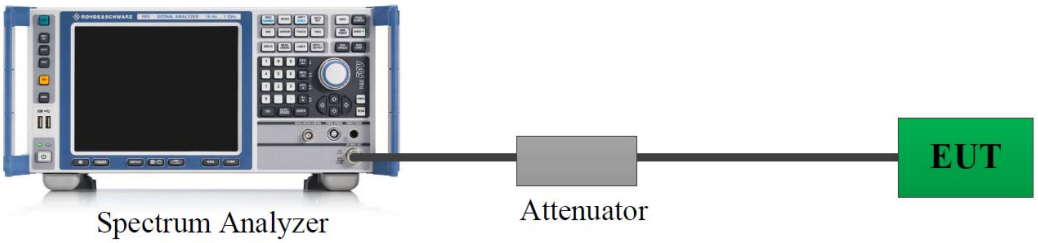
4.3 Minimum 6 dB Bandwidth

4.3.1 Applicable Standard

FCC §15.247 (a)(2)

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

4.3.2 EUT Setup



4.3.3 Test Procedure

According to ANSI C63.10-2013 Section 11.8

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3×RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.3.4 Test Result

Please refer to section 5.3.

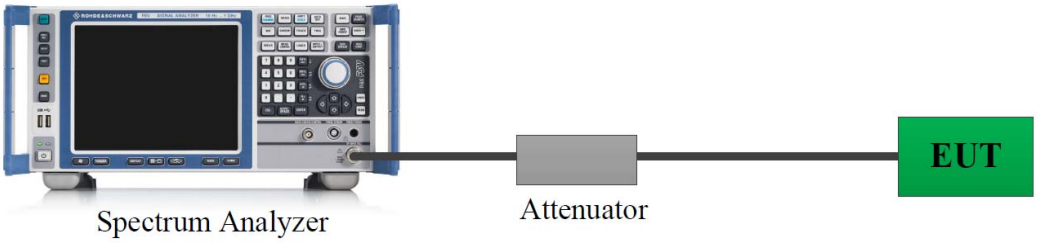
4.4 Maximum Conducted Output Power

4.4.1 Applicable Standard

FCC §15.247 (b)(3)

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

4.4.2 EUT Setup



4.4.3 Test Procedure

According to ANSI C63.10-2013 Section 11.9.1.1

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:
a) Set the RBW ≥ DTS bandwidth.
b) Set VBW ≥ [3 × RBW].
c) Set span ≥ [3 × RBW].
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

4.4.4 Test Result

Please refer to section 5.4.

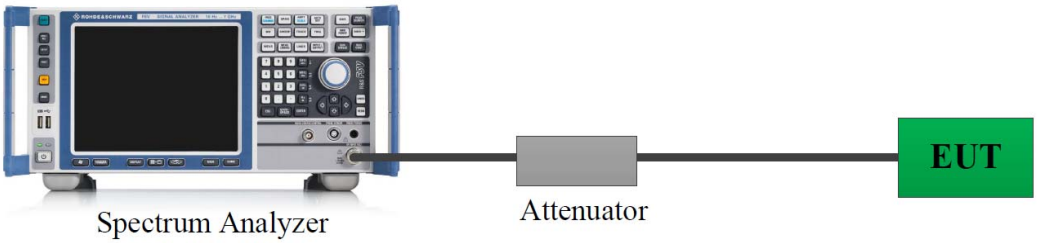
4.5 Maximum power spectral density

4.5.1 Applicable Standard

FCC §15.247 (e)

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

4.5.2 EUT Setup



4.5.3 Test Procedure

According to ANSI C63.10-2013 Section 11.10.2

a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ [3 × RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

4.5.4 Test Result

Please refer to section 5.5.

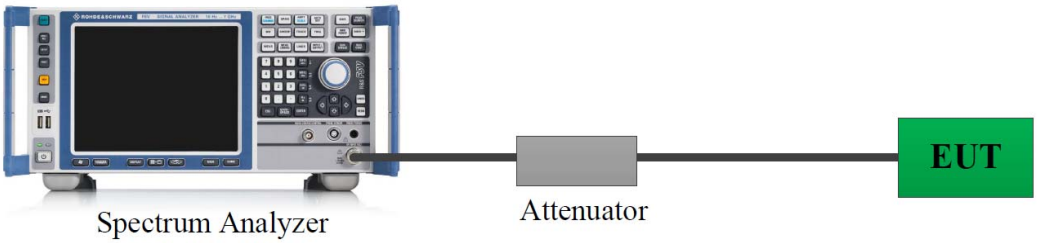
4.6 100 kHz Bandwidth of Frequency Band Edge

4.6.1 Applicable Standard

FCC §15.247 (d);

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

4.6.2 EUT Setup



4.6.3 Test Procedure

According to ANSI C63.10-2013 Section 11.11

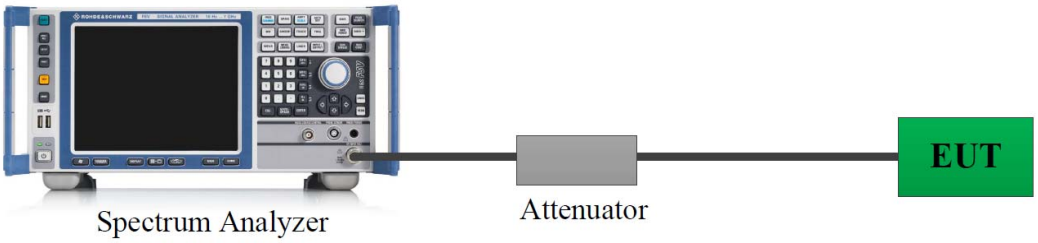
a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ [3 × RBW].
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

4.6.4 Test Result

Please refer to section 5.6.

4.7 Duty Cycle

4.7.1 EUT Setup



4.7.2 Test Procedure

According to ANSI C63.10-2013 Section 11.6

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
1) Set the center frequency of the instrument to the center frequency of the transmission.
2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
3) Set VBW ≥ RBW. Set detector = peak or average.
4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 µs.)

4.7.4 Judgment

Report Only.

4.8 Antenna Requirement

4.8.1 Applicable Standard

FCC §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

4.8.2 Judgment

Compliant. Please refer to the Antenna Information detail in Section 1.3.

5. Test DATA AND RESULTS

5.1 AC Line Conducted Emissions

Serial Number:	2F84-1	Test Date:	2023/12/20
Test Site:	CE	Test Mode:	Transmitting (Low Channel)
Tester:	Lane Sun	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	18.6	Relative Humidity: (%)	39	ATM Pressure: (kPa)	101.8

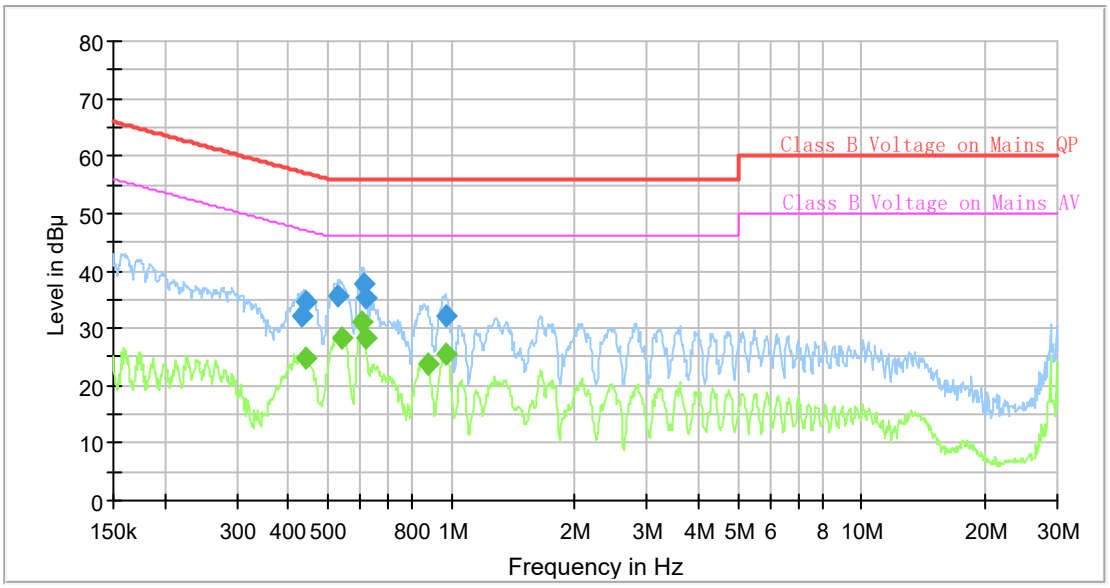
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101614	2023/10/18	2024/10/17
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2023/9/5	2024/9/4
R&S	EMI Test Receiver	ESCI	100035	2023/8/18	2024/8/17
R&S	Test Software	EMC32	V9.10.00	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

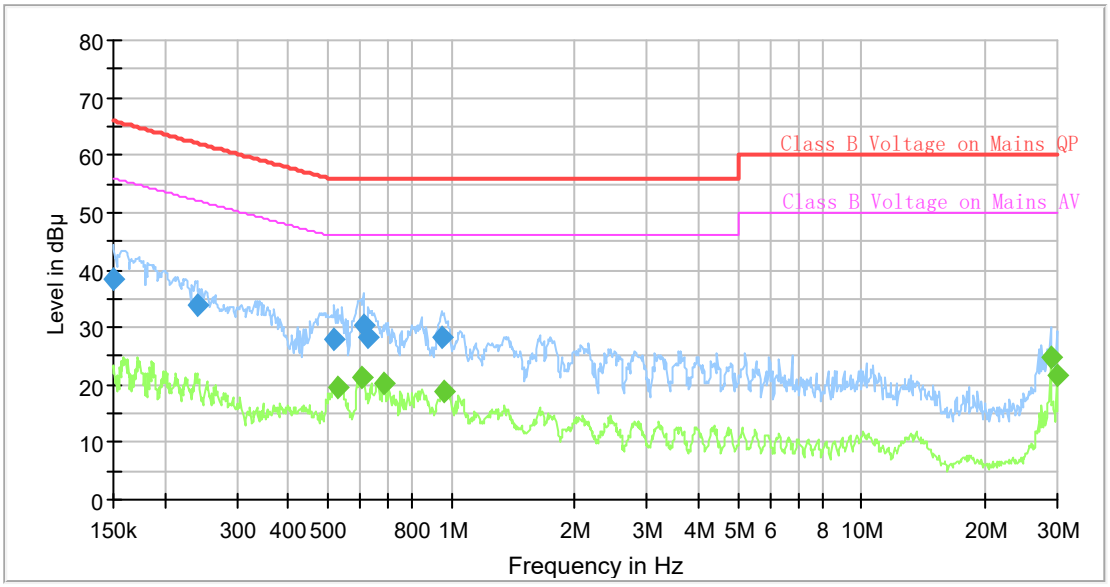
Project No:	DG1231214-75379E-RF
Test Engineer:	Lane Sun
Test Date:	2023-12-20
Port:	L
Test Mode:	Transmitting
Power Source:	AC 120V/60Hz
Note:	Low Channel



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.431814	32.24	---	57.22	24.98	9.000	L1	10.8
0.442717	---	24.83	47.01	22.18	9.000	L1	10.8
0.442717	34.64	---	57.01	22.37	9.000	L1	10.8
0.529791	35.49	---	56.00	20.51	9.000	L1	10.8
0.543169	---	28.46	46.00	17.54	9.000	L1	10.8
0.606162	---	31.01	46.00	14.99	9.000	L1	10.8
0.609193	37.70	---	56.00	18.30	9.000	L1	10.8
0.618376	---	28.14	46.00	17.86	9.000	L1	10.8
0.618376	35.11	---	56.00	20.89	9.000	L1	10.8
0.872391	---	23.92	46.00	22.08	9.000	L1	10.9
0.968720	---	25.40	46.00	20.60	9.000	L1	10.9
0.968720	32.06	---	56.00	23.94	9.000	L1	10.9

Project No:	DG1231214-75379E-RF
Test Engineer:	Lane Sun
Test Date:	2023-12-20
Port:	N
Test Mode:	Transmitting
Power Source:	AC 120V/60Hz
Note:	Low Channel



Final_Result

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.150750	38.39	---	65.96	27.57	9.000	N	10.9
0.239718	33.79	---	62.11	28.32	9.000	N	10.8
0.519327	28.12	---	56.00	27.88	9.000	N	10.7
0.529791	---	19.44	46.00	26.56	9.000	N	10.7
0.603146	---	21.33	46.00	24.67	9.000	N	10.7
0.609193	30.22	---	56.00	25.78	9.000	N	10.7
0.627698	28.43	---	56.00	27.57	9.000	N	10.7
0.686657	---	20.21	46.00	25.79	9.000	N	10.8
0.944861	28.24	---	56.00	27.76	9.000	N	10.8
0.963901	---	18.93	46.00	27.07	9.000	N	10.8
28.925869	---	24.77	50.00	25.23	9.000	N	11.0
29.953587	---	21.49	50.00	28.51	9.000	N	11.0

5.2 Radiation Spurious Emissions

Serial Number:	2F84-1	Test Date:	Below 1GHz: 2023/12/22~2023/12/29 Above 1GHz: 2023/12/26~2024/1/4
Test Site:	Chamber 10m, Chamber B	Test Mode:	Transmitting
Tester:	Zoo Zou, Leesin Xiang, Colin Yang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	17.2~22.2	Relative Humidity: (%)	32~46	ATM Pressure: (kPa)	101.5~102.6

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
9kHz~1000MHz					
EMCO	Passive Loop Antenna	6512	9706-1206	2021/3/5	2024/3/5
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2024/9/5
Narda	Attenuator	779-6dB	04269	2023/9/6	2024/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2023/8/1	2024/7/31
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2023/8/1	2024/7/31
Sonoma	Amplifier	310N	185914	2023/8/1	2024/7/31
R&S	EMI Test Receiver	ESCI	100224	2023/8/18	2024/8/17
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2023/9/7	2024/9/6
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2023/2/22	2026/2/21
Xinhang Macrowave	Coaxial Cable	XH750A-N/J-SMA/J-10M	20231117004 #0001	2023/11/18	2024/11/17
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2023/12/11	2024/12/10
AH	Preamplifier	PAM-0118P	469	2023/8/19	2024/8/18
AH	Preamplifier	PAM-1840VH	191	2023/9/7	2024/9/6
R&S	Spectrum Analyzer	FSV40	101944	2023/10/18	2024/10/17
E-Microwave	Band Rejection Filter	OBSF-2400-2483.5-S	OE01601525	2023/6/16	2024/6/15
Mini Circuits	High Pass Filter	VHF-6010+	31118	2023/6/16	2024/6/15
Audix	Test Software	E3	191218 (V9)	N/A	N/A

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

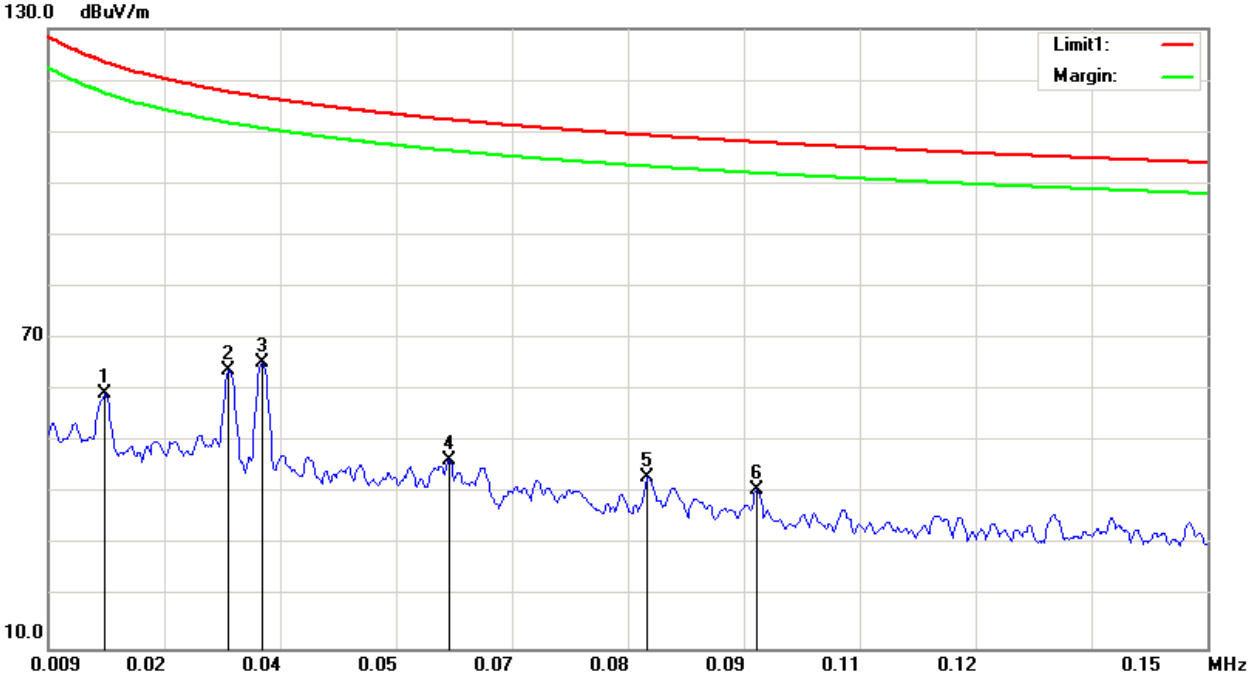
Test Data:

Please refer to the below table and plots.

After pre-scan in the X, Y and Z axes of orientation, the worst case is below:

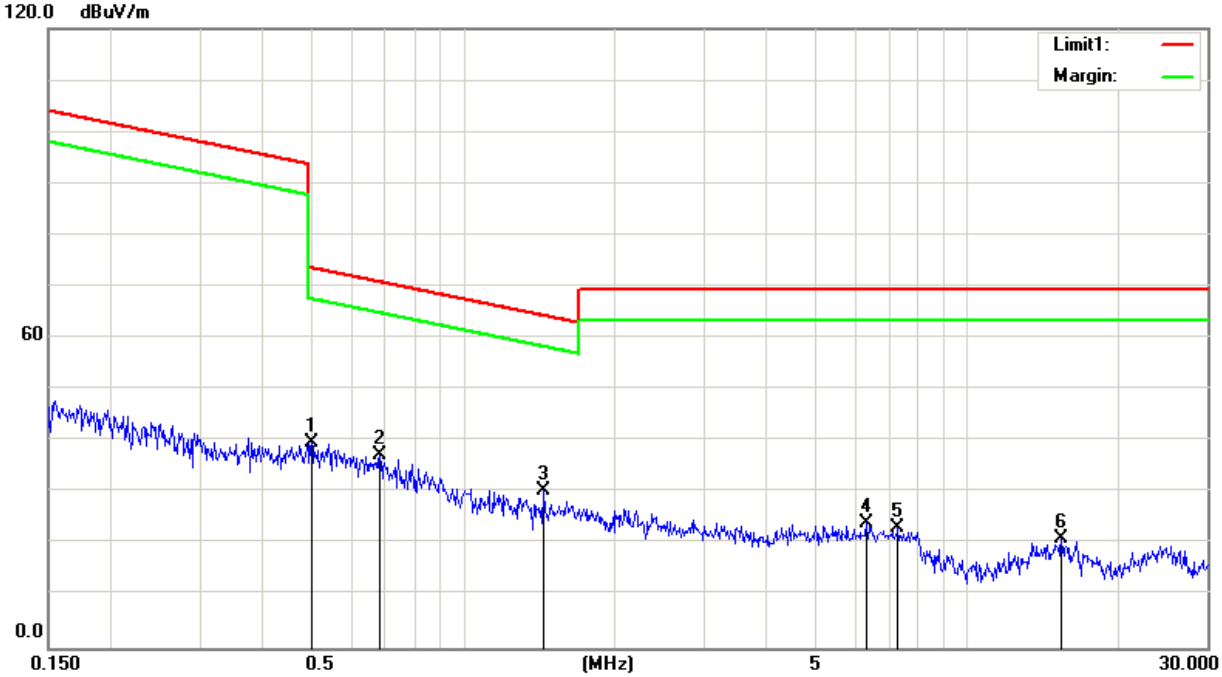
1) 9kHz~30MHz (The worst is Parallel)

Project No:	DG1231214-75379E-RF
Test Engineer:	Leesin Xiang
Test Date:	2023-12-29
Polarization:	Parallel
Test Mode:	Transmitting_Low channel
Power Source:	AC 120V/60Hz



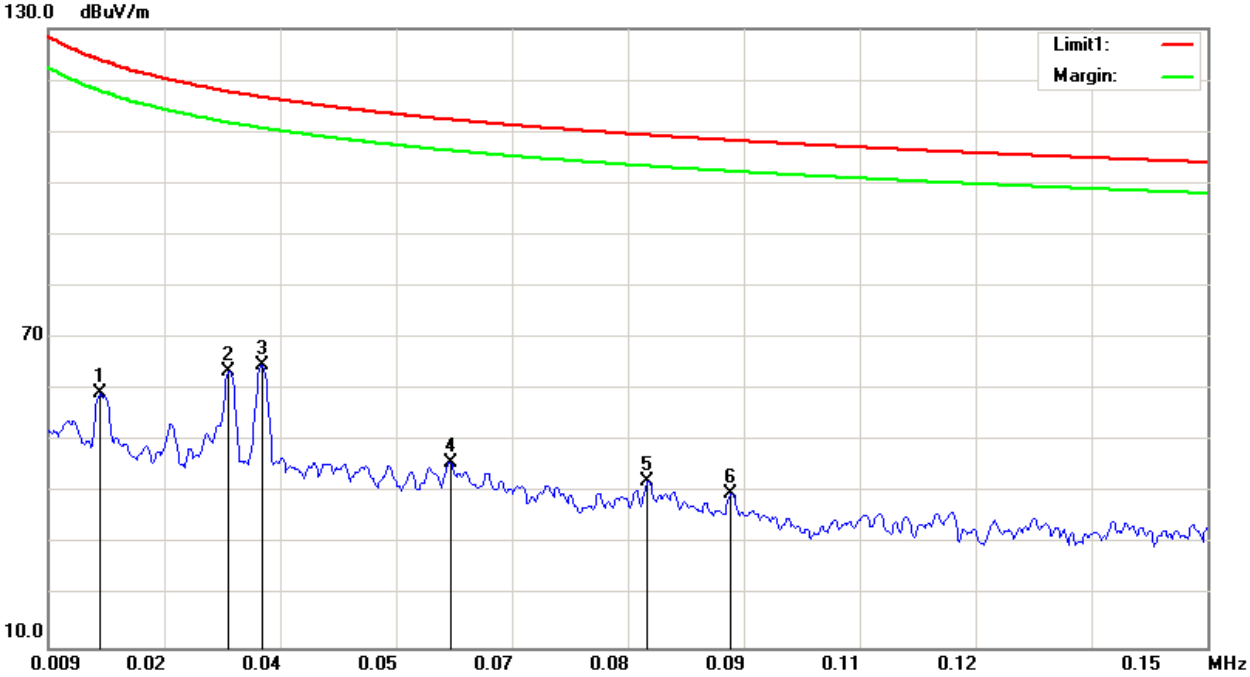
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.0160	8.06	peak	51.16	59.22	123.52	64.30
2	0.0310	16.56	peak	47.37	63.93	117.78	53.85
3	0.0350	18.73	peak	46.66	65.39	116.72	51.33
4	0.0578	3.76	peak	42.71	46.47	112.36	65.89
5	0.0820	4.70	peak	38.57	43.27	109.33	66.06
6	0.0952	4.39	peak	36.24	40.63	108.03	67.40

Project No: DG1231214-75379E-RF
Test Engineer: Leesin Xiang
Test Date: 2023-12-29
Polarization: Parallel
Test Mode: Transmitting_Low channel
Power Source: AC 120V/60Hz



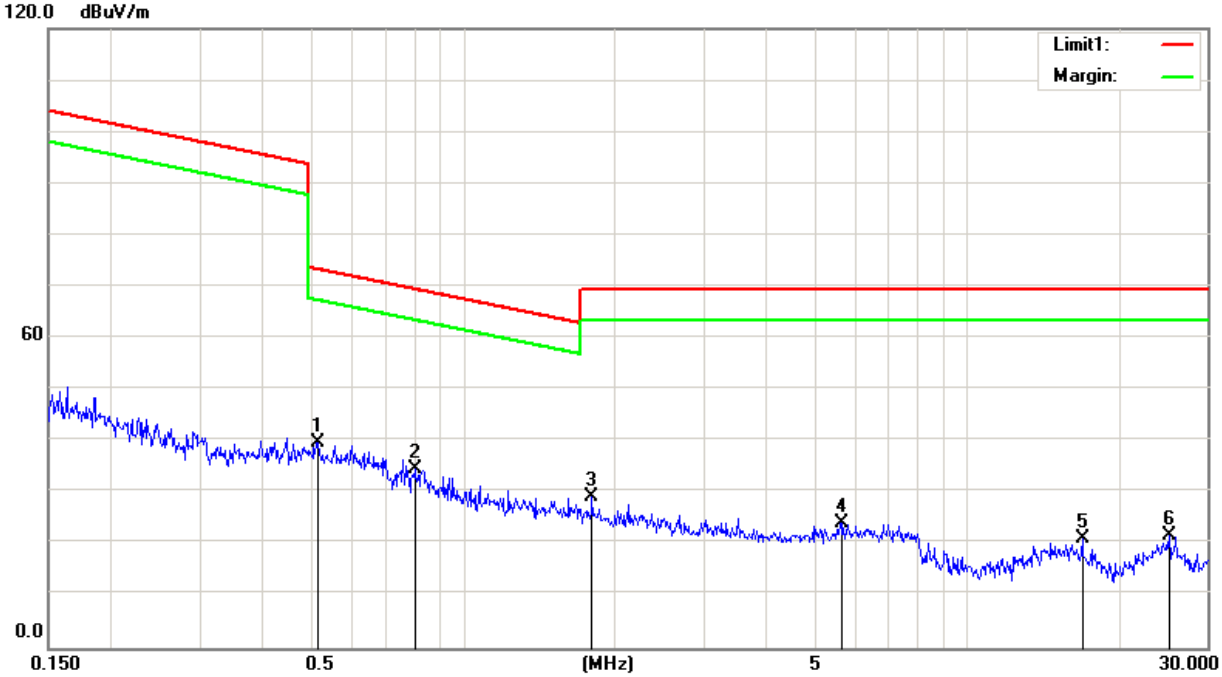
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.4994	16.24	peak	23.53	39.77	73.63	33.86
2	0.6826	15.76	peak	21.64	37.40	70.91	33.51
3	1.4410	15.90	peak	14.61	30.51	64.39	33.88
4	6.3186	18.37	peak	5.75	24.12	69.54	45.42
5	7.2903	17.77	peak	5.37	23.14	69.54	46.40
6	15.3883	16.55	peak	4.46	21.01	69.54	48.53

Project No:	DG1231214-75379E-RF
Test Engineer:	Leesin Xiang
Test Date:	2023-12-29
Polarization:	Parallel
Test Mode:	Transmitting_Middle channel
Power Source:	AC 120V/60Hz



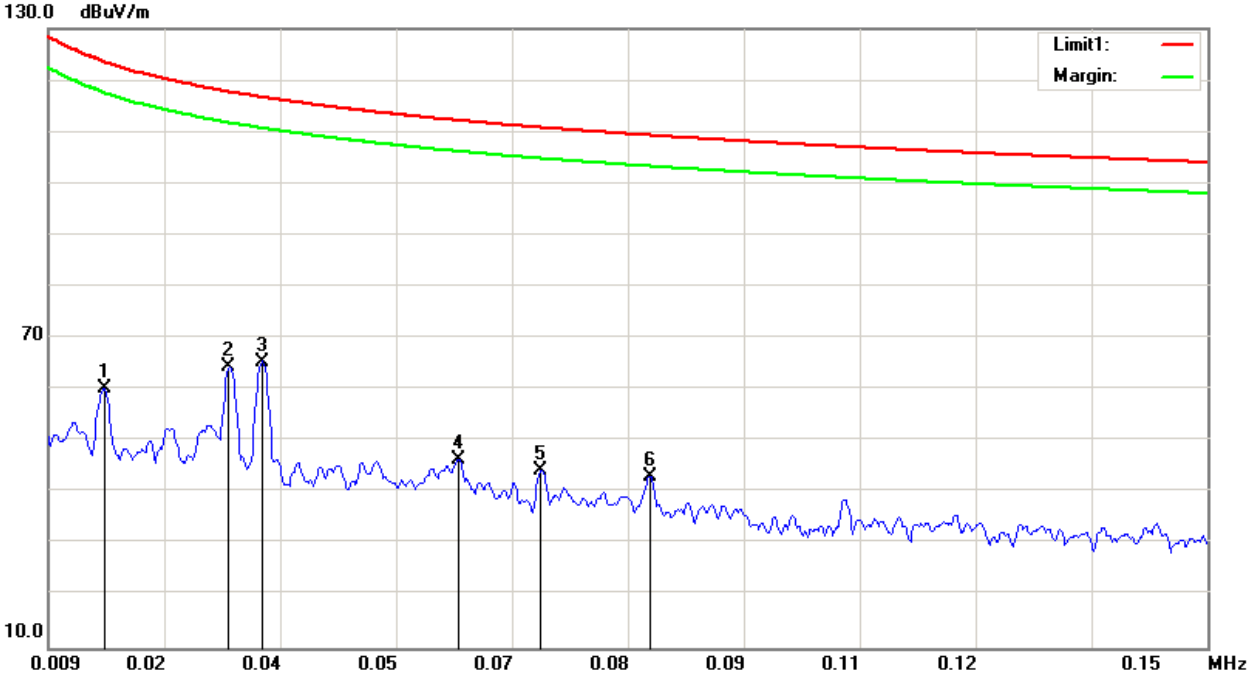
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.0153	7.86	peak	51.36	59.22	123.91	64.69
2	0.0310	16.31	peak	47.37	63.68	117.78	54.10
3	0.0350	18.09	peak	46.66	64.75	116.72	51.97
4	0.0578	3.04	peak	42.71	45.75	112.36	66.61
5	0.0820	3.76	peak	38.57	42.33	109.33	67.00
6	0.0920	3.02	peak	36.79	39.81	108.33	68.52

Project No:	DG1231214-75379E-RF
Test Engineer:	Leesin Xiang
Test Date:	2023-12-29
Polarization:	Parallel
Test Mode:	Transmitting_Middle channel
Power Source:	AC 120V/60Hz



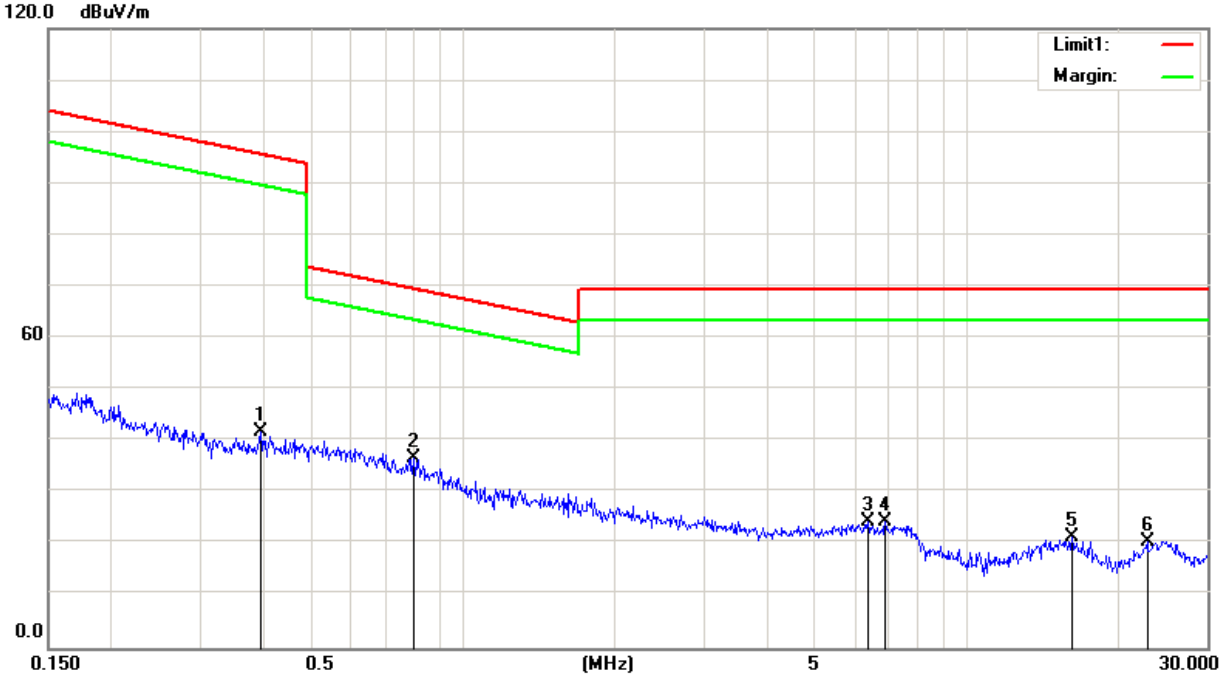
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.5155	16.48	peak	23.36	39.84	73.36	33.52
2	0.8002	14.03	peak	20.56	34.59	69.52	34.93
3	1.8000	16.25	peak	13.01	29.26	69.54	40.28
4	5.6531	18.02	peak	6.13	24.15	69.54	45.39
5	16.9282	16.67	peak	4.36	21.03	69.54	48.51
6	25.1876	17.54	peak	4.19	21.73	69.54	47.81

Project No:	DG1231214-75379E-RF
Test Engineer:	Leesin Xiang
Test Date:	2023-12-29
Polarization:	Parallel
Test Mode:	Transmitting_High channel
Power Source:	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.0158	8.93	peak	51.22	60.15	123.63	63.48
2	0.0310	17.20	peak	47.37	64.57	117.78	53.21
3	0.0350	18.84	peak	46.66	65.50	116.72	51.22
4	0.0590	3.96	peak	42.51	46.47	112.19	65.72
5	0.0690	3.48	peak	40.76	44.24	110.83	66.59
6	0.0821	4.66	peak	38.55	43.21	109.32	66.11

Project No:	DG1231214-75379E-RF
Test Engineer:	Leesin Xiang
Test Date:	2023-12-29
Polarization:	Parallel
Test Mode:	Transmitting_High channel
Power Source:	AC 120V/60Hz

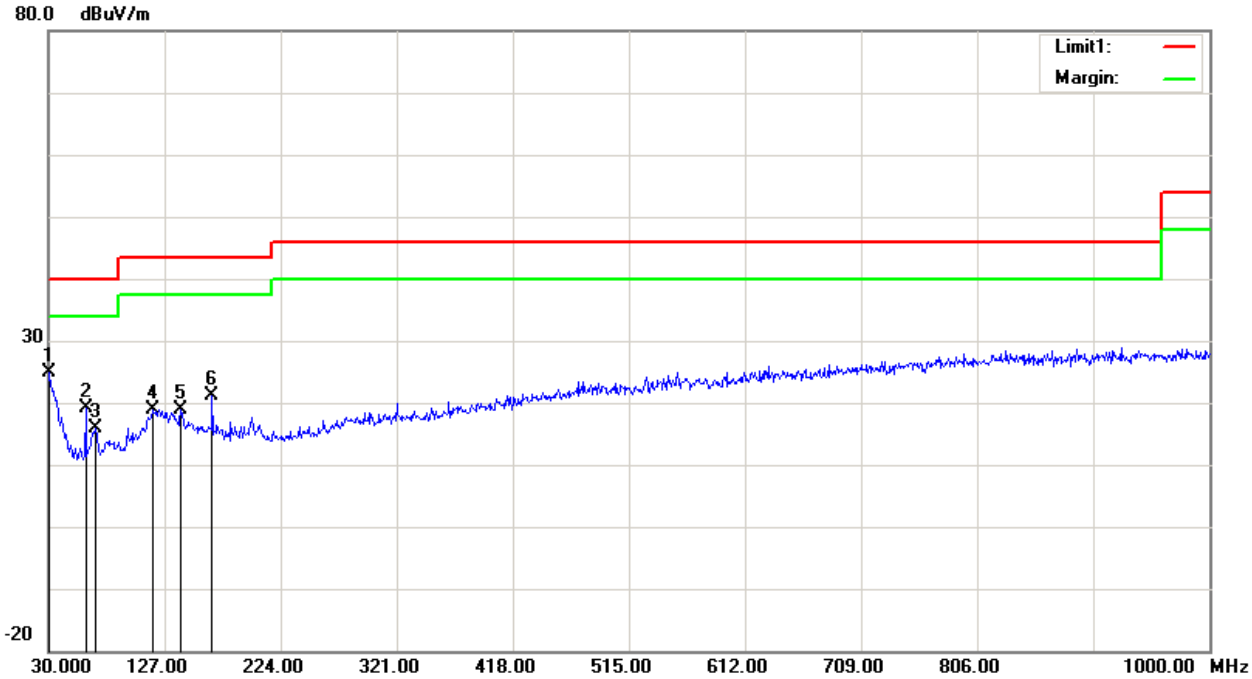


No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	0.3955	17.91	peak	23.81	41.72	95.66	53.94
2	0.7960	16.00	peak	20.60	36.60	69.57	32.97
3	6.3520	18.83	peak	5.74	24.57	69.54	44.97
4	6.8776	18.86	peak	5.54	24.40	69.54	45.14
5	16.1400	17.03	peak	4.46	21.49	69.54	48.05
6	22.7755	16.50	peak	4.17	20.67	69.54	48.87

The amplitude of spurious emissions is attenuated more than 20 dB below the permissible value.

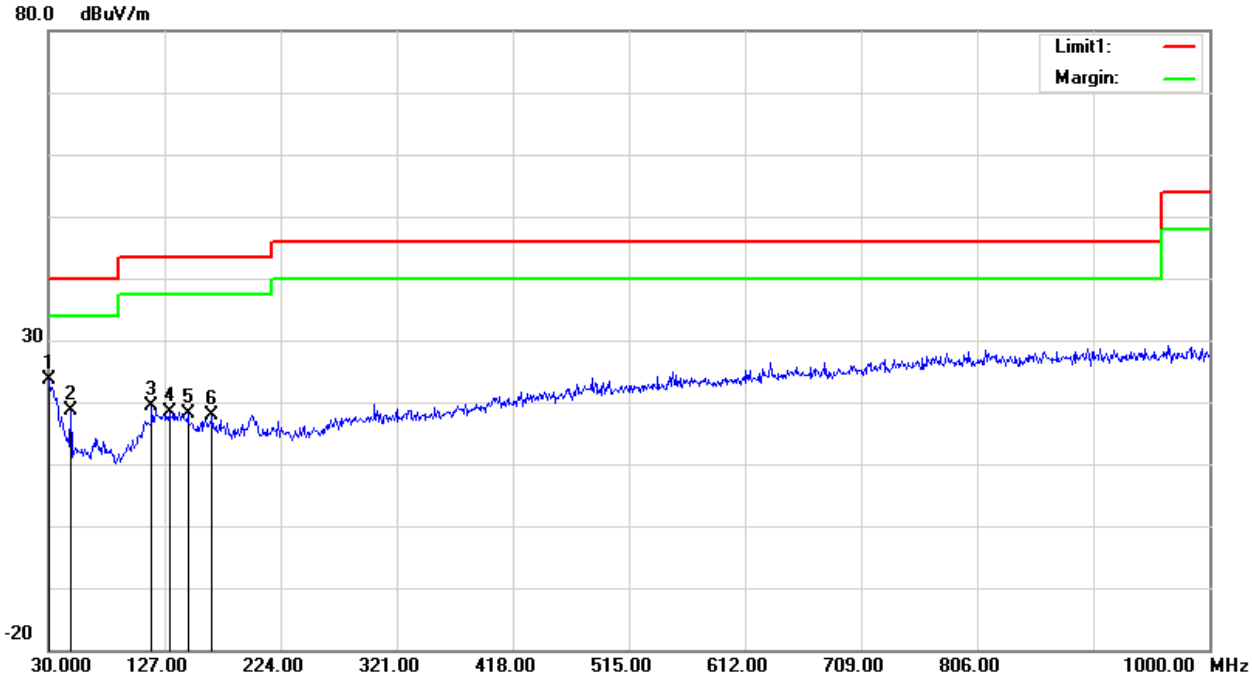
2) 30MHz-1GHz

Project No:	DG1231214-75379E-RF
Test Engineer:	Zoo Zou
Test Date:	2023-12-22
Polarization:	Horizontal
Test Mode:	Transmitting_Low channel
Power Source:	AC 120V/60Hz



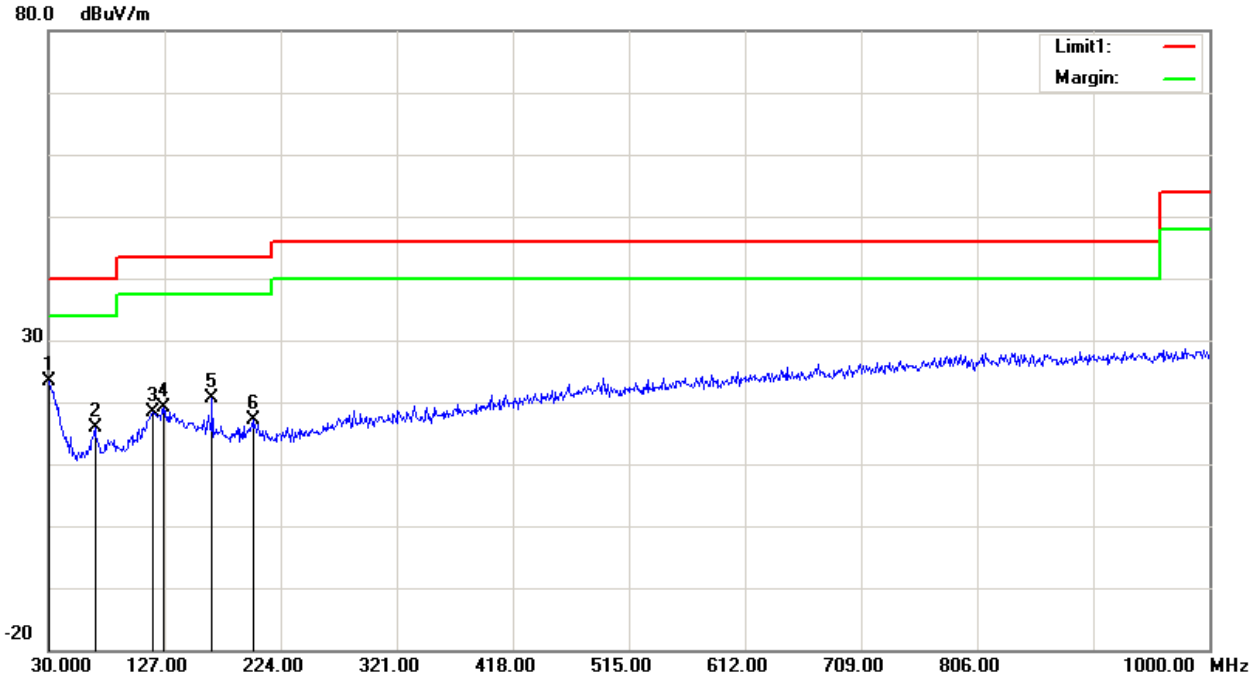
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.9700	29.10	peak	-4.31	24.79	40.00	15.21
2	61.0400	35.81	peak	-16.61	19.20	40.00	20.80
3	69.7700	32.24	peak	-16.28	15.96	40.00	24.04
4	117.3000	29.00	peak	-10.16	18.84	43.50	24.66
5	140.5800	29.40	peak	-10.52	18.88	43.50	24.62
6	166.7700	32.54	peak	-11.47	21.07	43.50	22.43

Project No: DG1231214-75379E-RF
Test Engineer: Zoo Zou
Test Date: 2023-12-22
Polarization: Vertical
Test Mode: Transmitting_Low channel
Power Source: AC 120V/60Hz



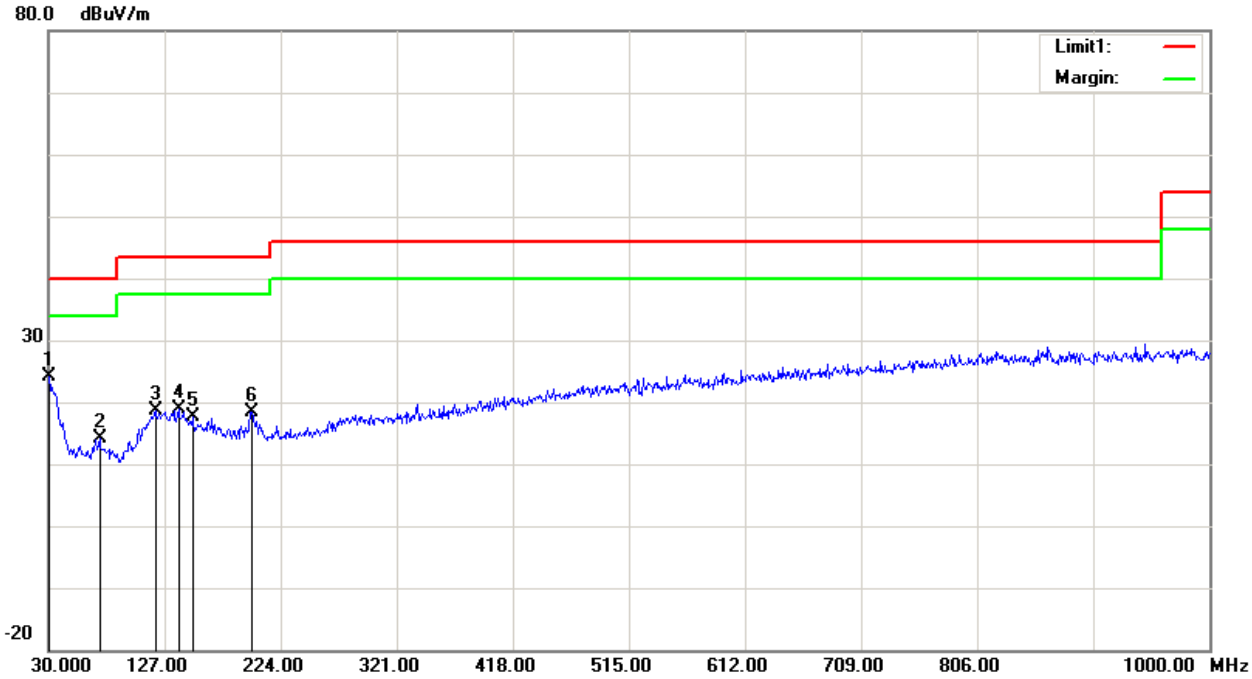
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.40	peak	-3.80	23.60	40.00	16.40
2	48.4300	34.67	peak	-16.11	18.56	40.00	21.44
3	116.3300	29.79	peak	-10.30	19.49	43.50	24.01
4	130.8800	28.15	peak	-9.85	18.30	43.50	25.20
5	146.4000	28.87	peak	-10.78	18.09	43.50	25.41
6	166.7700	29.33	peak	-11.47	17.86	43.50	25.64

Project No: DG1231214-75379E-RF
Test Engineer: Zoo Zou
Test Date: 2023-12-22
Polarization: Horizontal
Test Mode: Transmitting_Middle channel
Power Source: AC 120V/60Hz



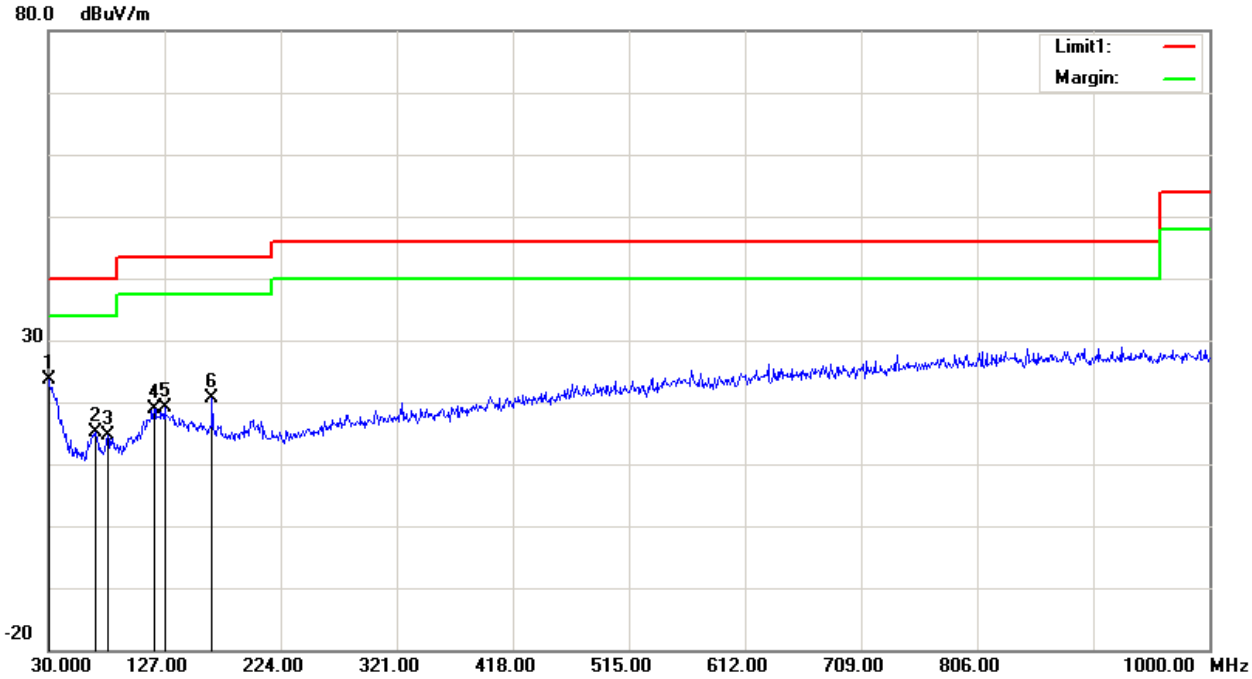
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.23	peak	-3.80	23.43	40.00	16.57
2	68.8000	32.19	peak	-16.28	15.91	40.00	24.09
3	117.3000	28.46	peak	-10.16	18.30	43.50	25.20
4	126.0300	28.84	peak	-9.61	19.23	43.50	24.27
5	166.7700	32.19	peak	-11.47	20.72	43.50	22.78
6	200.7200	28.75	peak	-11.59	17.16	43.50	26.34

Project No: DG1231214-75379E-RF
Test Engineer: Zoo Zou
Test Date: 2023-12-22
Polarization: Vertical
Test Mode: Transmitting_Middle channel
Power Source: AC 120V/60Hz



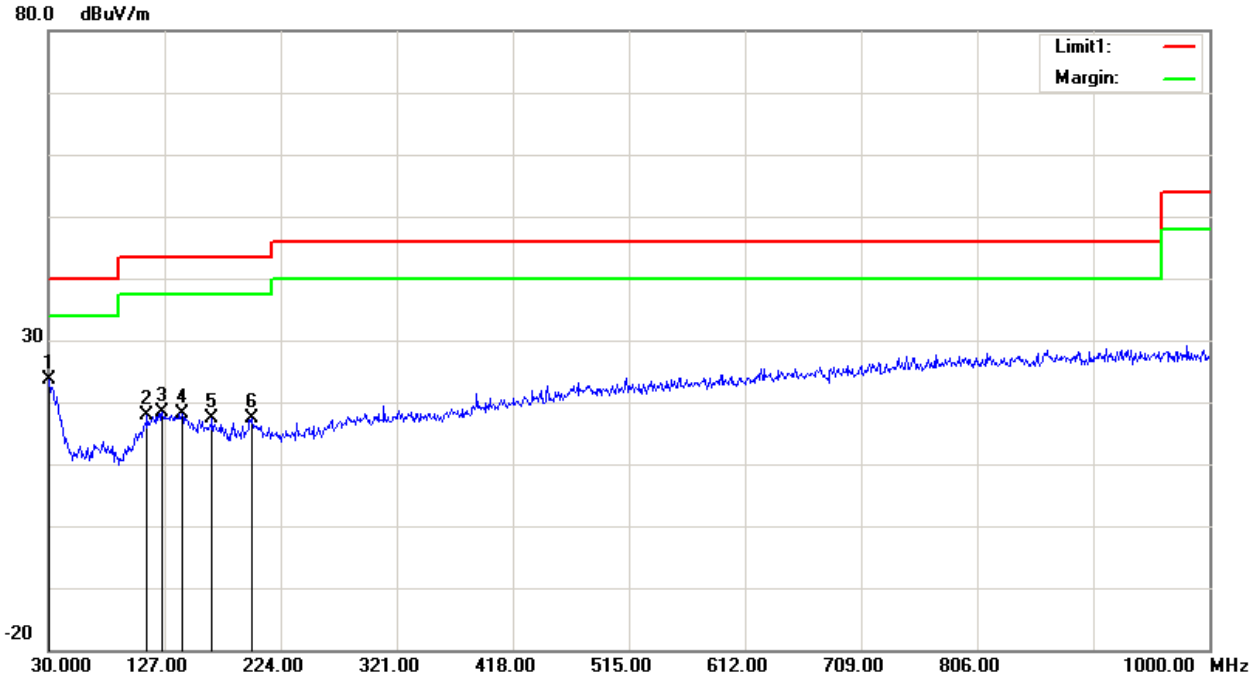
No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.9700	28.47	peak	-4.31	24.16	40.00	15.84
2	72.6800	30.42	peak	-16.25	14.17	40.00	25.83
3	119.2400	28.71	peak	-9.98	18.73	43.50	24.77
4	138.6400	29.32	peak	-10.41	18.91	43.50	24.59
5	150.2800	28.65	peak	-11.05	17.60	43.50	25.90
6	199.7500	29.96	peak	-11.53	18.43	43.50	25.07

Project No: DG1231214-75379E-RF
Test Engineer: Zoo Zou
Test Date: 2023-12-22
Polarization: Horizontal
Test Mode: Transmitting_High Channel
Power Source: AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	27.49	peak	-3.80	23.69	40.00	16.31
2	68.8000	31.47	peak	-16.28	15.19	40.00	24.81
3	79.4700	30.98	peak	-16.44	14.54	40.00	25.46
4	118.2700	29.03	peak	-10.03	19.00	43.50	24.50
5	127.0000	28.65	peak	-9.62	19.03	43.50	24.47
6	166.7700	32.14	peak	-11.47	20.67	43.50	22.83

Project No: DG1231214-75379E-RF
Test Engineer: Zoo Zou
Test Date: 2023-12-22
Polarization: Vertical
Test Mode: Transmitting_High Channel
Power Source: AC 120V/60Hz

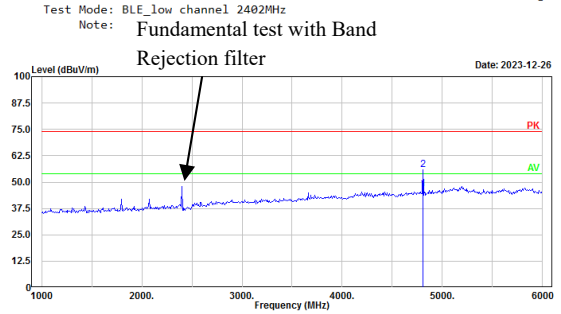


No.	Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.9700	28.01	peak	-4.31	23.70	40.00	16.30
2	112.4500	28.93	peak	-10.97	17.96	43.50	25.54
3	125.0600	27.91	peak	-9.61	18.30	43.50	25.20
4	141.5500	28.79	peak	-10.62	18.17	43.50	25.33
5	166.7700	28.94	peak	-11.47	17.47	43.50	26.03
6	199.7500	28.82	peak	-11.53	17.29	43.50	26.21

3) 1-18GHz:

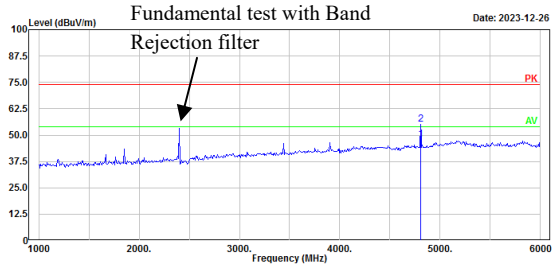
Low Channel, Horizontal	Low Channel, Vertical

Project No.: DG1231214-75379E-RF
Polarization: Horizontal
Test Mode: BLE_low channel 2402MHz
Note:
Serial No.: 2F84-1
Tester: Colin Yang



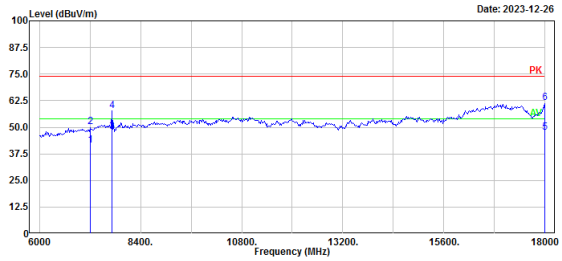
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4804.00	49.72	-3.08	46.64	54.00	7.36	Average
2	4804.00	58.95	-3.08	55.87	74.00	18.13	Peak

Project No.: DG1231214-75379E-RF
Polarization: Vertical
Test Mode: BLE_low channel 2402MHz
Note:
Serial No.: 2F84-1
Tester: Colin Yang



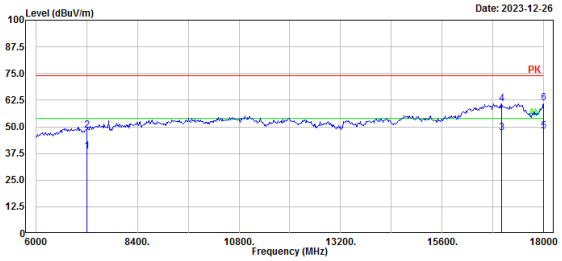
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4804.00	51.14	-3.08	48.06	54.00	5.94	Average
2	4804.00	58.08	-3.08	55.00	74.00	19.00	Peak

Project No.: DG1231214-75379E-RF
Polarization: Horizontal
Test Mode: BLE_low channel 2402MHz
Note:
Serial No.: 2F84-1
Tester: Colin Yang



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7206.00	39.75	1.62	41.37	54.00	12.63	Average
2	7206.00	48.38	1.62	50.00	74.00	24.00	Peak
3	7721.74	44.90	2.99	47.89	54.00	6.11	Average
4	7721.74	54.64	2.99	57.63	74.00	16.37	Peak
5	18000.00	29.58	18.15	47.73	54.00	6.27	Average
6	18000.00	43.39	18.15	61.54	74.00	12.46	Peak

Project No.: DG1231214-75379E-RF
Polarization: Vertical
Test Mode: BLE_low channel 2402MHz
Note:
Serial No.: 2F84-1
Tester: Colin Yang

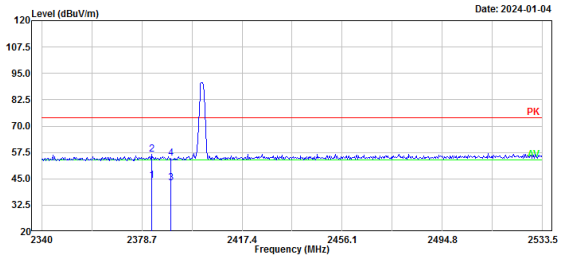


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7206.00	36.92	1.62	38.54	54.00	15.46	Average
2	7206.00	46.75	1.62	48.37	74.00	25.63	Peak
3	17008.70	35.15	11.97	47.12	54.00	6.88	Average
4	17008.70	48.69	11.97	60.66	74.00	13.34	Peak
5	18000.00	29.68	18.15	47.83	54.00	6.17	Average
6	18000.00	43.03	18.15	61.18	74.00	12.82	Peak

Low Channel, Bandedge, Horizontal

Project No.: DG1231214-75379E-RF
Polarization: Horizontal
Test Mode: BLE_low channel 2402MHz
Note:

Serial No.: 2F84-1
Tester: Colin Yang

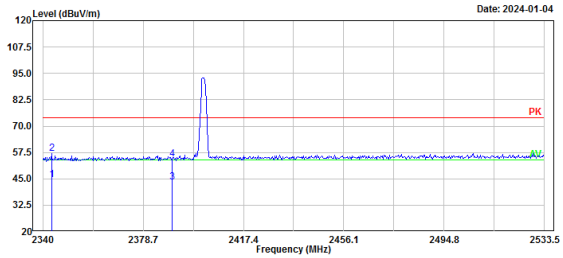


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2382.63	15.69	28.54	44.23	54.00	9.77	Average
2	2382.63	27.98	28.54	56.52	74.00	17.48	Peak
3	2390.00	14.52	28.57	43.09	54.00	10.91	Average
4	2390.00	26.14	28.57	54.71	74.00	19.29	Peak

Low Channel, Bandedge, Vertical

Project No.: DG1231214-75379E-RF
Polarization: Vertical
Test Mode: BLE_low channel 2402MHz
Note:

Serial No.: 2F84-1
Tester: Colin Yang

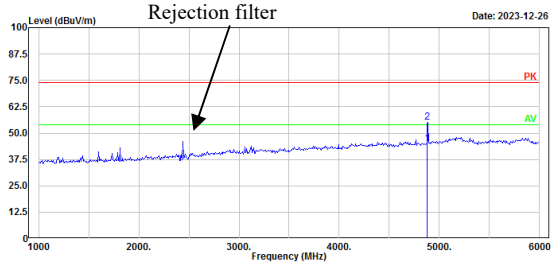


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2343.37	16.27	28.37	44.64	54.00	9.36	Average
2	2343.37	28.44	28.37	56.81	74.00	17.19	Peak
3	2390.00	14.74	28.57	43.31	54.00	10.69	Average
4	2390.00	25.81	28.57	54.38	74.00	19.62	Peak

Middle Channel, Horizontal

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Horizontal Tester: Colin Yang
Test Mode: BLE_middle channel 2440MHz
Note:

Fundamental test with Band Rejection filter

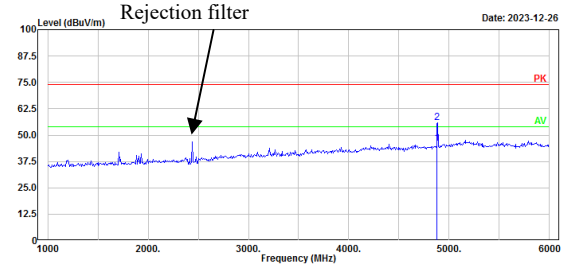


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4880.00	47.60	-2.73	44.87	54.00	9.13	Average
2	4880.00	57.95	-2.73	55.22	74.00	18.78	Peak

Middle Channel, Vertical

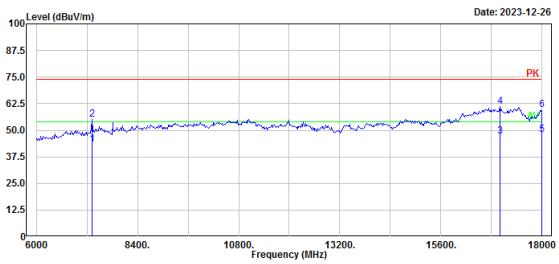
Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Vertical Tester: Colin Yang
Test Mode: BLE_middle channel 2440MHz
Note:

Fundamental test with Band Rejection filter



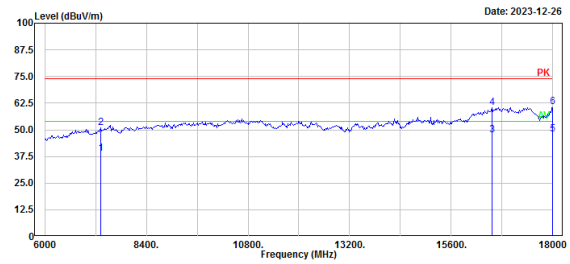
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4880.00	48.71	-2.73	45.98	54.00	8.02	Average
2	4880.00	58.69	-2.73	55.96	74.00	18.04	Peak

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Horizontal Tester: Colin Yang
Test Mode: BLE_middle channel 2440MHz
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7320.00	41.18	2.10	43.28	54.00	10.72	Average
2	7320.00	53.15	2.10	55.25	74.00	18.75	Peak
3	17008.70	35.25	11.97	47.22	54.00	6.78	Average
4	17008.70	48.98	11.97	60.95	74.00	13.05	Peak
5	18000.00	29.79	18.15	47.94	54.00	6.06	Average
6	18000.00	41.64	18.15	59.79	74.00	14.21	Peak

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Vertical Tester: Colin Yang
Test Mode: BLE_middle channel 2440MHz
Note:

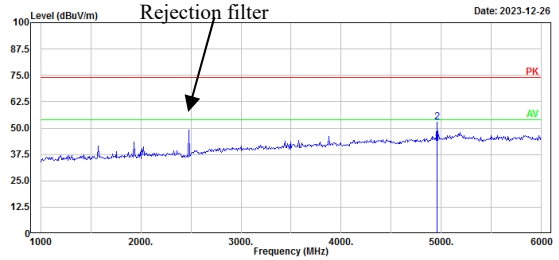


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7320.00	36.69	2.10	38.79	54.00	15.21	Average
2	7320.00	48.97	2.10	51.07	74.00	22.93	Peak
3	16556.52	38.01	9.70	47.71	54.00	6.29	Average
4	16556.52	50.75	9.70	60.45	74.00	13.55	Peak
5	18000.00	29.64	18.15	47.79	54.00	6.21	Average
6	18000.00	42.52	18.15	60.67	74.00	13.33	Peak

High Channel, Horizontal

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Horizontal Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:

Fundamental test with Band Rejection filter

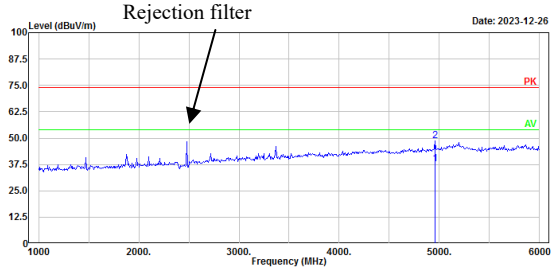


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4960.00	45.04	-2.35	42.69	54.00	11.31	Average
2	4960.00	55.19	-2.35	52.84	74.00	21.16	Peak

High Channel, Vertical

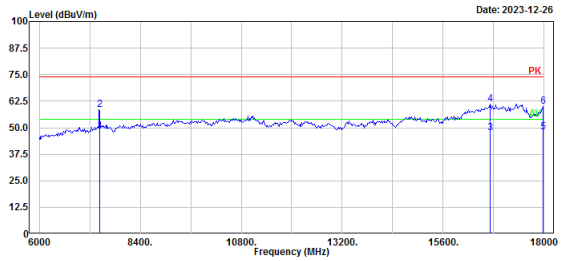
Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Vertical Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:

Fundamental test with Band Rejection filter



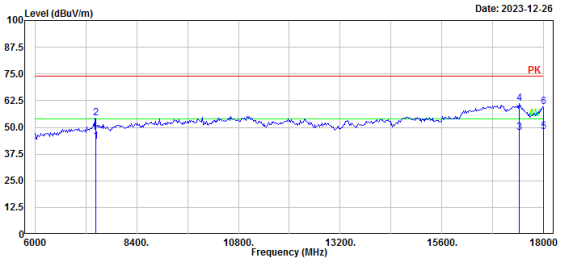
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4960.00	40.10	-2.35	37.75	54.00	16.25	Average
2	4960.00	51.11	-2.35	48.76	74.00	25.24	Peak

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Horizontal Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7440.00	45.66	2.47	48.13	54.00	5.87	Average
2	7440.00	56.11	2.47	58.58	74.00	15.42	Peak
3	16713.04	37.12	10.49	47.61	54.00	6.39	Average
4	16713.04	50.59	10.49	61.08	74.00	12.92	Peak
5	17965.22	29.88	18.01	47.89	54.00	6.11	Average
6	17965.22	41.87	18.01	59.88	74.00	14.12	Peak

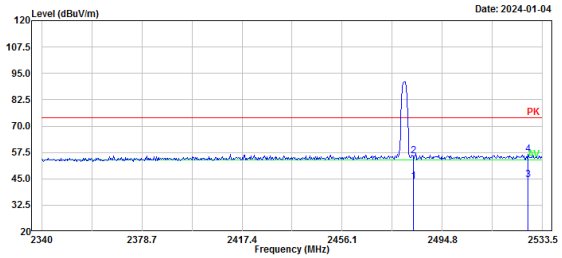
Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Vertical Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7440.00	40.82	2.47	43.29	54.00	10.71	Average
2	7440.00	51.77	2.47	54.24	74.00	19.76	Peak
3	17426.09	32.12	15.28	47.40	54.00	6.60	Average
4	17426.09	45.95	15.28	61.23	74.00	12.77	Peak
5	18000.00	29.81	18.15	47.96	54.00	6.04	Average
6	18000.00	41.62	18.15	59.77	74.00	14.23	Peak

High Channel, Bandedge, Horizontal

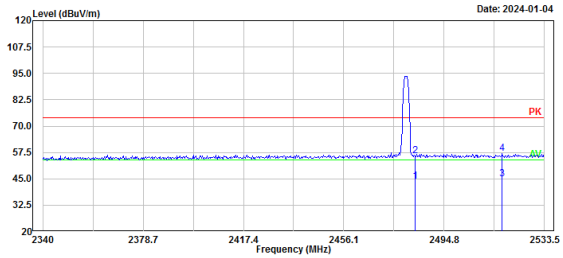
Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Horizontal Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2483.50	14.86	28.95	43.81	54.00	10.19	Average
2	2483.50	26.95	28.95	55.90	74.00	18.10	Peak
3	2527.89	15.27	29.13	44.40	54.00	9.60	Average
4	2527.89	27.46	29.13	56.59	74.00	17.41	Peak

High Channel, Bandedge, Vertical

Project No.: DG1231214-75379E-RF Serial No.: 2F84-1
Polarization: Vertical Tester: Colin Yang
Test Mode: BLE_high channel 2480MHz
Note:

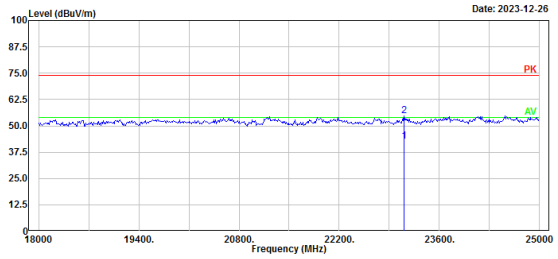


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2483.50	14.87	28.95	43.82	54.00	10.18	Average
2	2483.50	26.96	28.95	55.91	74.00	18.09	Peak
3	2517.24	15.69	29.08	44.77	54.00	9.23	Average
4	2517.24	27.98	29.08	57.06	74.00	16.94	Peak

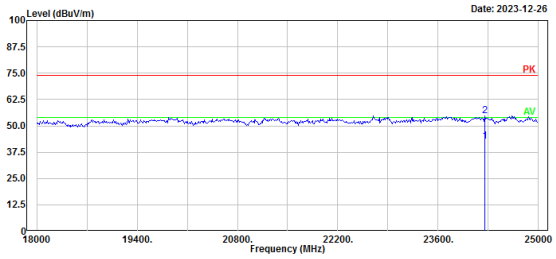
18-25GHz:

No Emission was detected in the range 18-25GHz, test was performed on the mode and channel which with the maximum power.

Horizontal	Vertical
Project No.: DG1231214-75379E-RF Polarization: Horizontal Test Mode: BLE_low channel 2402MHz Note: Serial No.: 2F84-1 Tester: Colin Yang	Project No.: DG1231214-75379E-RF Polarization: Vertical Test Mode: BLE_low channel 2402MHz Note: Serial No.: 2F84-1 Tester: Colin Yang



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	23102.90	33.11	9.47	42.58	54.00	11.42	Average
2	23102.90	45.25	9.47	54.72	74.00	19.28	Peak



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	24249.28	32.06	10.62	42.68	54.00	11.32	Average
2	24249.28	44.27	10.62	54.89	74.00	19.11	Peak

5.3 6 dB Emission Bandwidth

Serial No.:	2F84-3	**Test Date:**	2023/12/27
Test Site:	RF	**Test Mode:**	Transmitting
Tester:	Stu Song	**Test Result:**	Pass

Environmental Conditions:

Temperature: (℃)	21.3	**Relative Humidity: (%)**	38	**ATM Pressure: (kPa)**	101.9

Test Equipment List and Details:

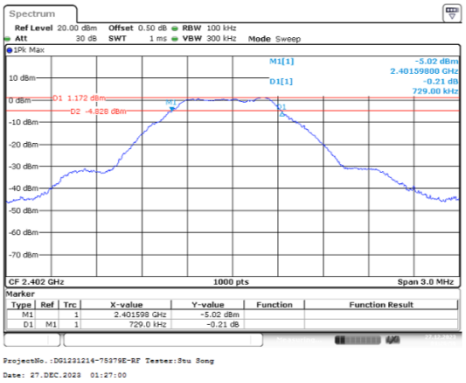
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2023/05-06	2024/05/05
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	2023/09/01	2024/08/31

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

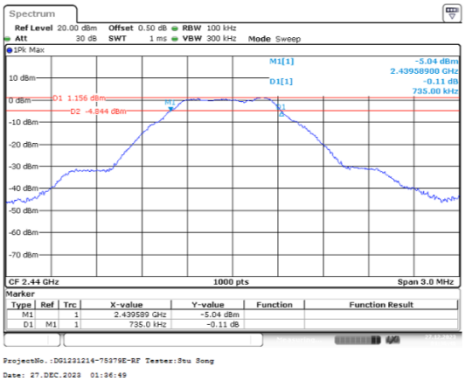
Test Data:

Mode	Value (MHz)	Limit (MHz)	Result
Low	0.729	0.5	Pass
Mid	0.735	0.5	Pass
High	0.771	0.5	Pass

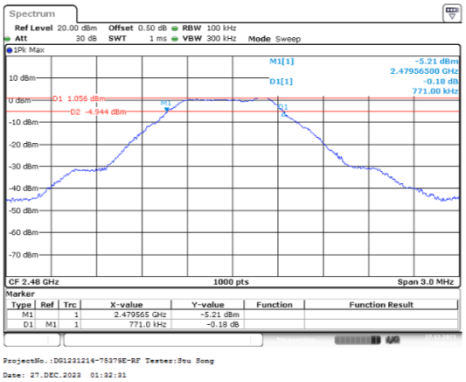
Low


Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 1 ms VBW 300 kHz Mode Sweep
1Pk Max
M1[1] -5.02 dBm 2.40159800 GHz
D1[1] -0.21 dB 729.00 kHz
D1 1.172 dBm
D2 -4.828 dBm
CF 2.402 GHz 1000 pts Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.401598 GHz -5.02 dBm
D1 M1 1 729.0 kHz -0.21 dB
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:27:00

Mid


Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 1 ms VBW 300 kHz Mode Sweep
1Pk Max
M1[1] -5.04 dBm 2.43958900 GHz
D1[1] -0.11 dB 735.00 kHz
D1 1.156 dBm
D2 -4.844 dBm
CF 2.44 GHz 1000 pts Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.439589 GHz -5.04 dBm
D1 M1 1 735.0 kHz -0.11 dB
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:36:49

High


Spectrum
Ref Level 20.00 dBm Offset 0.50 dB RBW 100 kHz
Att 30 dB SWT 1 ms VBW 300 kHz Mode Sweep
1Pk Max
M1[1] -5.21 dBm 2.47956500 GHz
D1[1] -0.18 dB 771.00 kHz
D1 1.056 dBm
D2 -4.944 dBm
CF 2.48 GHz 1000 pts Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.479565 GHz -5.21 dBm
D1 M1 1 771.0 kHz -0.18 dB
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:32:31

5.4 Maximum Conducted Output Power

Serial No.:	2F84-3	**Test Date:**	2023/12/27
Test Site:	RF	**Test Mode:**	Transmitting
Tester:	Stu Song	**Test Result:**	Pass

Environmental Conditions:

Temperature: (℃)	21.3	**Relative Humidity: (%)**	38	**ATM Pressure: (kPa)**	101.9

Test Equipment List and Details:

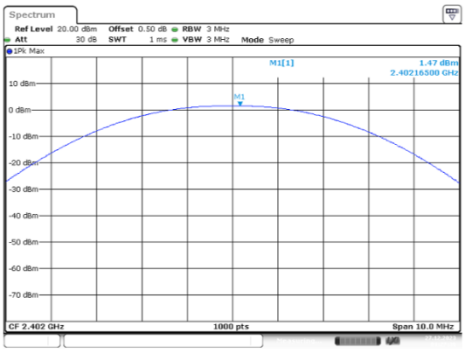
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2023/05/06	2024/05/05
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	2023/09/01	2024/08/31

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

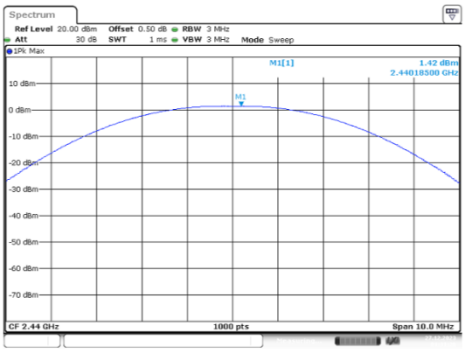
Mode	Value (dBm)	Limit (dBm)	Result
Low	1.47	30.00	Pass
Mid	1.42	30.00	Pass
High	1.36	30.00	Pass

Low



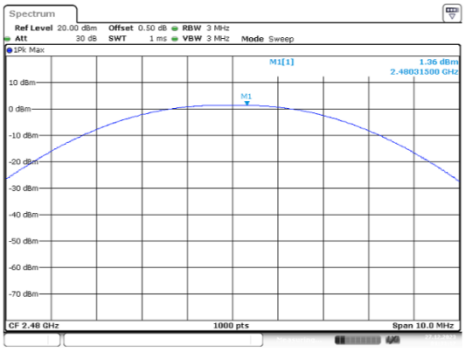
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:27:39

Mid



ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:31:21

High



ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:33:18

5.5 Maximum power spectral density

Serial No.:	2F84-3	**Test Date:**	2023/12/27
Test Site:	RF	**Test Mode:**	Transmitting
Tester:	Stu Song	**Test Result:**	Pass

Environmental Conditions:

Temperature: (℃)	21.3	**Relative Humidity: (%)**	38	**ATM Pressure: (kPa)**	101.9

Test Equipment List and Details:

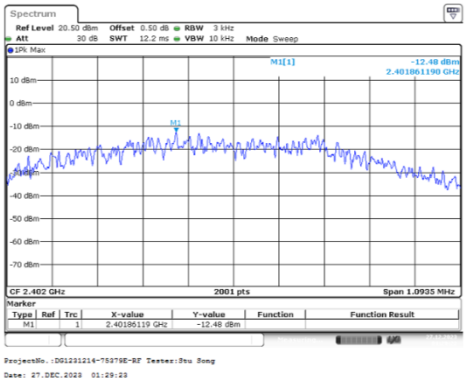
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2023/05/06	2024/05/05
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	2023/09/01	2024/08/31

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

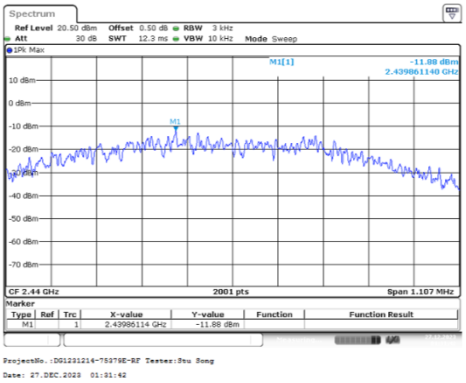
Test Data:

Mode	Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low	-12.48	8.00	Pass
Mid	-11.88	8.00	Pass
High	-11.92	8.00	Pass

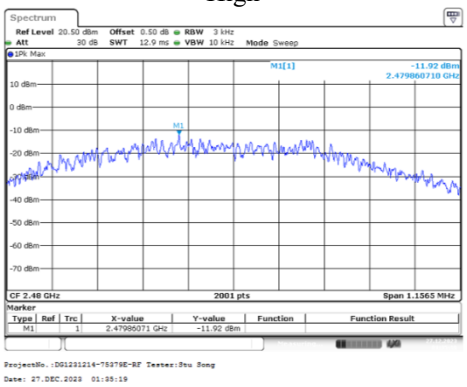
Low


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 12.2 ms VBW 10 kHz Mode Sweep
1Pk Max
M1[1] -12.48 dBm
2.401861190 GHz
CF 2.402 GHz 2001 pts Span 1.0935 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.40186119 GHz -12.48 dBm
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:29:23

Mid


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 12.3 ms VBW 10 kHz Mode Sweep
1Pk Max
M1[1] -11.88 dBm
2.439861140 GHz
CF 2.44 GHz 2001 pts Span 1.107 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.43986114 GHz -11.88 dBm
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:31:42

High


Spectrum
Ref Level 20.50 dBm Offset 0.50 dB RBW 3 kHz
Att 30 dB SWT 12.9 ms VBW 10 kHz Mode Sweep
1Pk Max
M1[1] -11.92 dBm
2.479860710 GHz
CF 2.48 GHz 2001 pts Span 1.1565 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.47986071 GHz -11.92 dBm
ProjectNo.:DG1231214-75379E-RF Tester:Stu Song
Date: 27.DEC.2023 01:35:19

5.6 100 kHz Bandwidth of Frequency Band Edge

Serial No.:	2F84-3	**Test Date:**	2023/12/27
Test Site:	RF	**Test Mode:**	Transmitting
Tester:	Stu Song	**Test Result:**	Pass

Environmental Conditions:

Temperature: (℃)	21.3	**Relative Humidity: (%)**	38	**ATM Pressure: (kPa)**	101.9

Test Equipment List and Details:

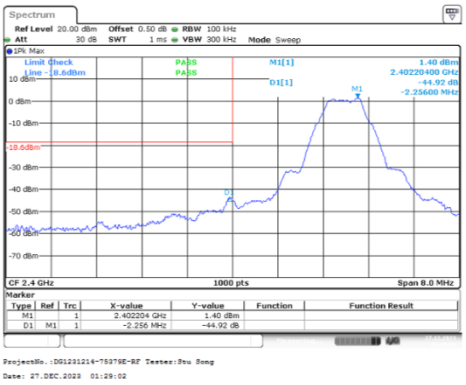
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2023/05/06	2024/05/05
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	2023/09/01	2024/08/31

** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

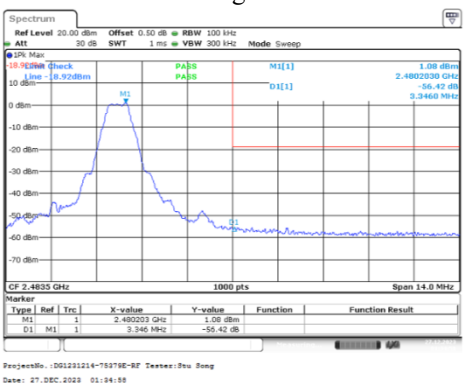
Test Data:

Please refer to the below plots:

Low



High



5.7 Duty Cycle

Serial No.:	2F84-3	**Test Date:**	2023/12/27
Test Site:	RF	**Test Mode:**	Transmitting
Tester:	Stu Song	**Test Result:**	N/A

Environmental Conditions:

Temperature: (℃)	21.3	**Relative Humidity: (%)**	38	**ATM Pressure: (kPa)**	101.9

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101589	2023/10/18	2024/10/17
E-Microwave	Blocking Control	EMDCB-00036	OE01201047	2023/05/06	2024/05/05
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	2023/09/01	2024/08/31

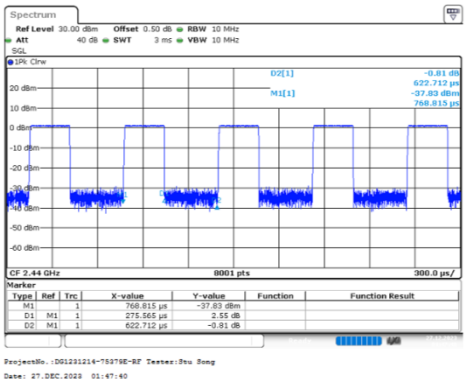
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	1/T (Hz)	VBW Setting (kHz)
Mid	0.276	0.623	44.250	3623	10

Duty Cycle = Ton/(Ton+Toff)*100%

Mid



6. RF EXPOSURE EVALUATION

6.1 Applicable Standard

According to§15.247(i) and §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB447498 D01 General RF Exposure Guidance v06:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

6.2 Measurement Result

The max conducted power including tune-up tolerance is 2.0 dBm (1.58 mW).
[(max. power of channel, mW)/(min. test separation distance, mm)][√f(GHz)]
=1.58/5*(√2.480) = 0.5< 3.0

Result: Compliant. The stand-alone SAR evaluation is not necessary.

7. EUT PHOTOGRAPHS

Please refer to the attachment DG1231214-75379E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and DG1231214-75379E-RF-INP EUT INTERNAL PHOTOGRAPHS

8. TEST SETUP PHOTOGRAPHS

Please refer to the attachment DG1231214-75379E-RF-00-TSP TEST SETUP PHOTOGRAPHS.

===== END OF REPORT ====