NVLAP TESTING
NVLAP LAB CODE 600341-0

BACL Bay Area Compliance Labs Corp.

TEST REPORT

Applicant: **Sveaverken Software Development (Shanghai) Co., Ltd**

Address: **Room 1408-1, No. 758, Nanjing West Road, Jing'an District, Shanghai, China**

Product Name: **Auto Steer System**

FCC ID: **2BOPT-F200MAX**

Standard(s): **47 CFR Part 15, Subpart C (15.247)**
ANSI C63.10-2020
KDB 558074 D01 15.247 Meas Guidance v05r02

Report Number: **2502S52446E-RF-00A**

Report Date: **2025/6/5**

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

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2502S52446E-RF-00A	Original Report	2025/6/5

1. GENERAL INFORMATION

1.1 General Description of Equipment under Test

EUT Name:	Auto Steer System
Trade Name:	Sveaverken
EUT Model:	F200 Max
Operation Frequency:	2402-2480 MHz
Maximum Peak Output Power (Conducted):	6.44dBm
Modulation Type:	GFSK, π/4-DQPSK, 8DPSK
Rated Input Voltage:	DC9-36V Typical voltage: DC 12V
Serial Number:	314Y-1 (for Radiated Emissions Test) 314Y-2 (for RF Conducted Test)
EUT Received Date:	2025/4/9
EUT Received Status:	Good

1.2 Accessory Information

Accessory Description	Manufacturer	Model	Parameters
Control Terminal	Sveaverken	T3	Supply Voltage: 9-36VDC
GNSS Receiver	Sveaverken	G2	Operating Voltage: 9-36VDC
Electric Steering Wheel	Sveaverken	M2	Power Supply: 12VDC or 24VDC
Main Power Cable	Sveaverken	/	Unshielded without ferrite, 4.5Meter
Main Wiring Harnes (With Switch Key)	Sveaverken	/	Unshielded without ferrite, 6.0Meter
Spare Main Wiring Harness	Sveaverken	/	Unshielded without ferrite, 2.0Meter
GNSS Receiver Wiring Harness	Sveaverken	/	Unshielded without ferrite, 4.5Meter
Angle Sensor (With Wiring Harness)	Sveaverken	/	Unshielded without ferrite, 3.0Meter
Radio Antenna (With Coaxial Harness)	Sveaverken	/	Unshielded without ferrite, 4.5Meter
Camera #1 (With Wiring Harness)	Sveaverken	WC02	Unshielded without ferrite, 3.0Meter
Camera #2 (With Wiring Harness)	Sveaverken	WC03	Unshielded without ferrite, 3.0Meter

1.3 Antenna Information Detail▲

Antenna Type	Input Impedance (Ohm)	Frequency Range	Antenna Gain
FPC	50	2400-2500MHz	4.3dBi
The design of compliance with §15.203:			
☒ Unit uses a permanently attached antenna. ☐ Unit uses a unique coupling to the intentional radiator. ☐ 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. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.207(a)	AC Line Conducted Emissions	Not Applicable
FCC §15.205, §15.209, §15.247(d)	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(1)	20 dB Emission Bandwidth	Compliant
FCC §15.247(a)(1)	Channel Separation	Compliant
FCC §15.247(a)(1)(iii)	Number of Hopping Frequency	Compliant
FCC §15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliant
FCC §15.247(b)(1)	Maximum Conducted Output Power	Compliant
FCC §15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
FCC §15.203	Antenna Requirement	Compliant
Note 1: Not Applicable, the EUT is a vehicle-mounted device, not applicable for this test item. Note 2: For Radiated Spurious Emissions 9kHz~1GHz and 18~25GHz, the maximum output power mode and channel was tested.		

3. DESCRIPTION OF TEST CONFIGURATION

3.1 Operation Frequency Detail

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	**2402**	40	2442
1	2404	41	2443
…	…	…	…
…	…	…	…
…	…	78	**2480**
39	**2441**	/	/

Note: The above frequencies in bold were performed the test.

3.2 EUT Operation Condition

The EUT was configured for testing in Engineering Mode, which was provided by the manufacturer. The EUT configuration as below:

EUT Exercise Software:	CMD			
The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:				
Test Modes	Packet Type	Power Level Setting		
		Lowest Channel	Middle Channel	Highest Channel
BDR Mode (GFSK)	DH1	24	24	24
2EDR Mode (π/4-DQPSK)	2DH1	24	24	24
3EDR Mode (8DPSK)	3DH1	24	24	24

3.3 Support Equipment List and Details

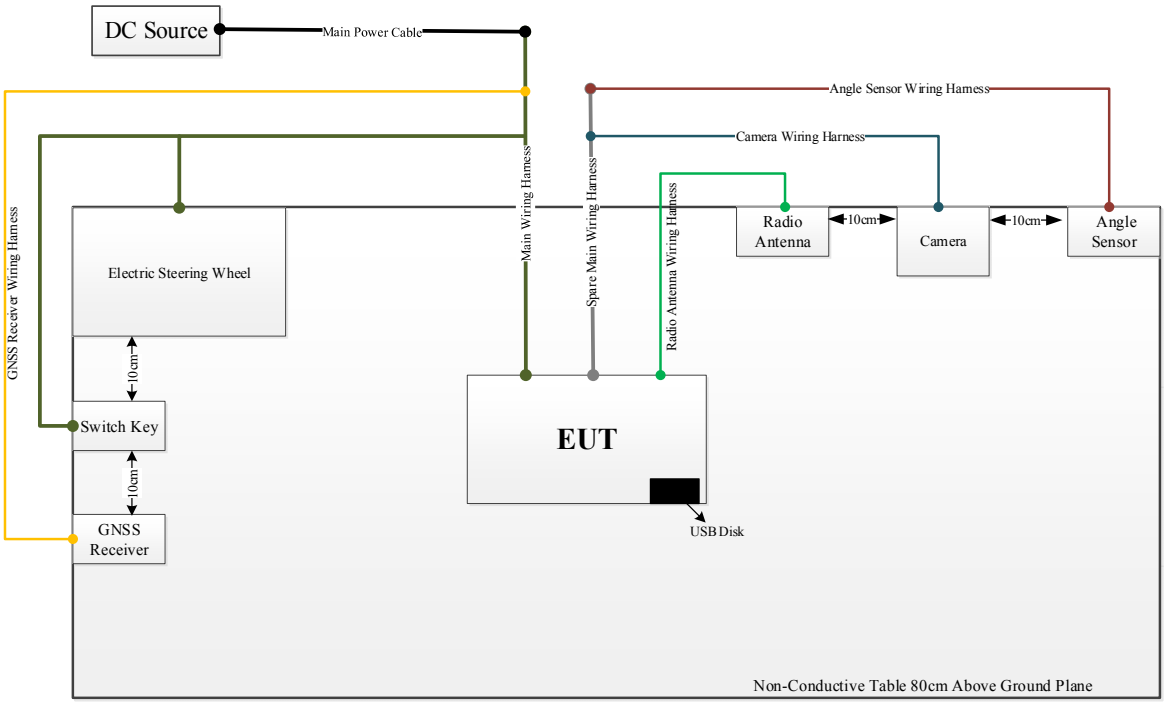
Manufacturer	Description	Model	Serial Number
DK	DC Source	DK-60V50A	T-08-EE140
SANDisk	USB Flash Disk	16G	BL201026115 B

3.4 Support Cable List and Details

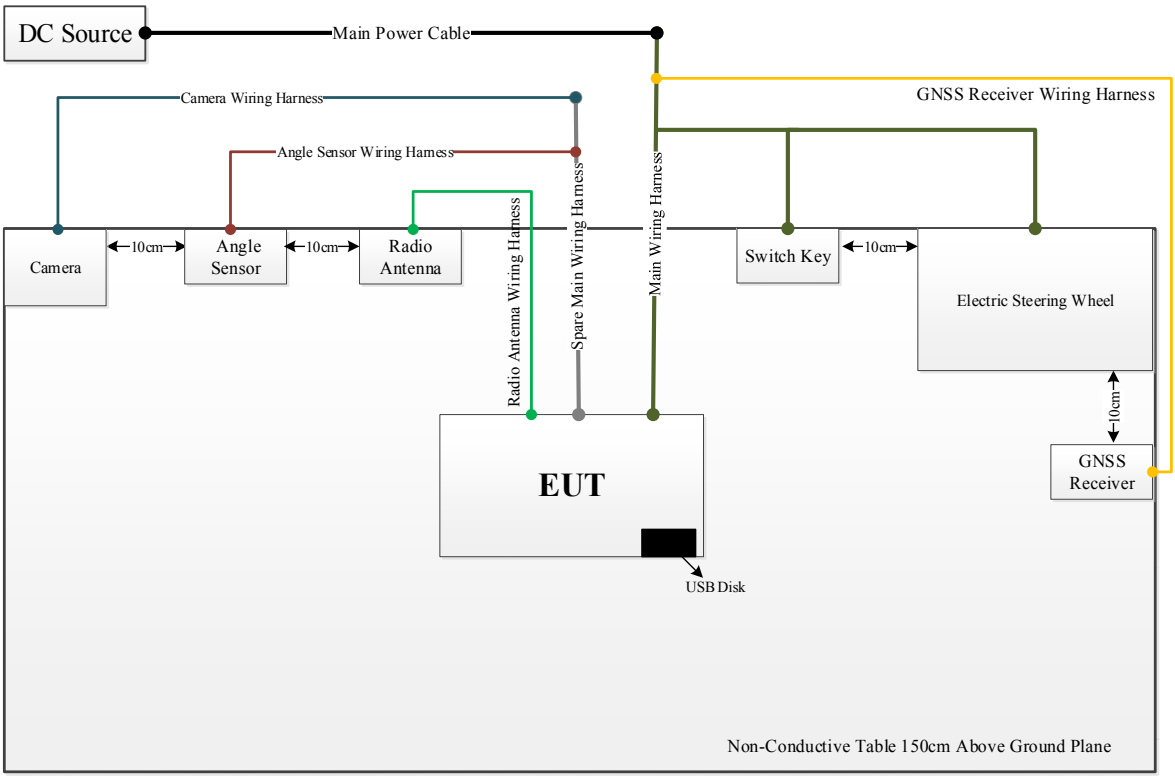
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Main Power Cable	No	No	4.5	DC Source	Main Wiring Harness
Main Wiring Harness (With Switch Key)	No	No	6	Main wiring Harness	EUT1 (Control Terminal)/Electric Steering Wheel /GNSS Receiver Wiring Harness
GNSS Receiver Wiring Harness	No	No	4.5	Main wiring Harness	EUT2 (GNSS Receiver)
Spare Main Wiring Harness	No	No	2	EUT1 (Control Terminal)	Angle Sensor Wiring Harness/Camera Wiring Harness
Angle Sensor Wiring Harness	No	No	3	Spare Main Wiring Harness	Angle Sensor
Camera Wiring Harness	No	No	3	Spare Main Wiring Harness	Camera #2
Radio Antenna Coaxial Harness	No	No	4.5	EUT1 (Control Terminal)	Radio Antenna

3.5 Block Diagram of Test Setup

Radiated Spurious Emissions Below 1GHz:



Radiated Spurious Emissions Above 1GHz:



3.6 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.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

3.7 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)

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:

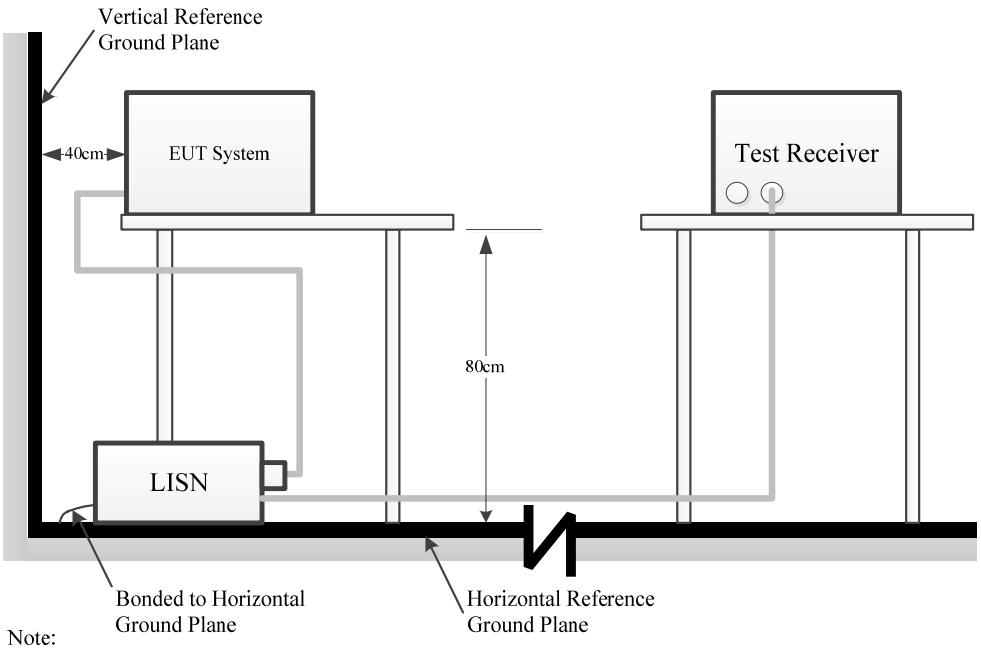
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(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 other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2020 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 Radiated Spurious Emissions

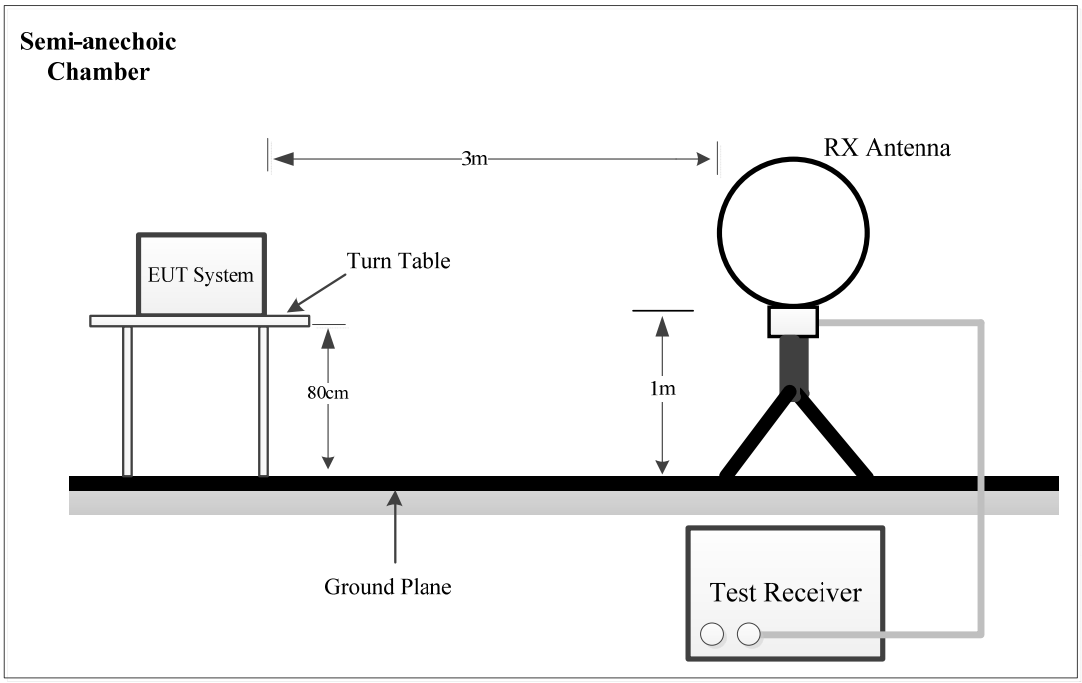
4.2.1 Applicable Standard

FCC §15.247 (d);

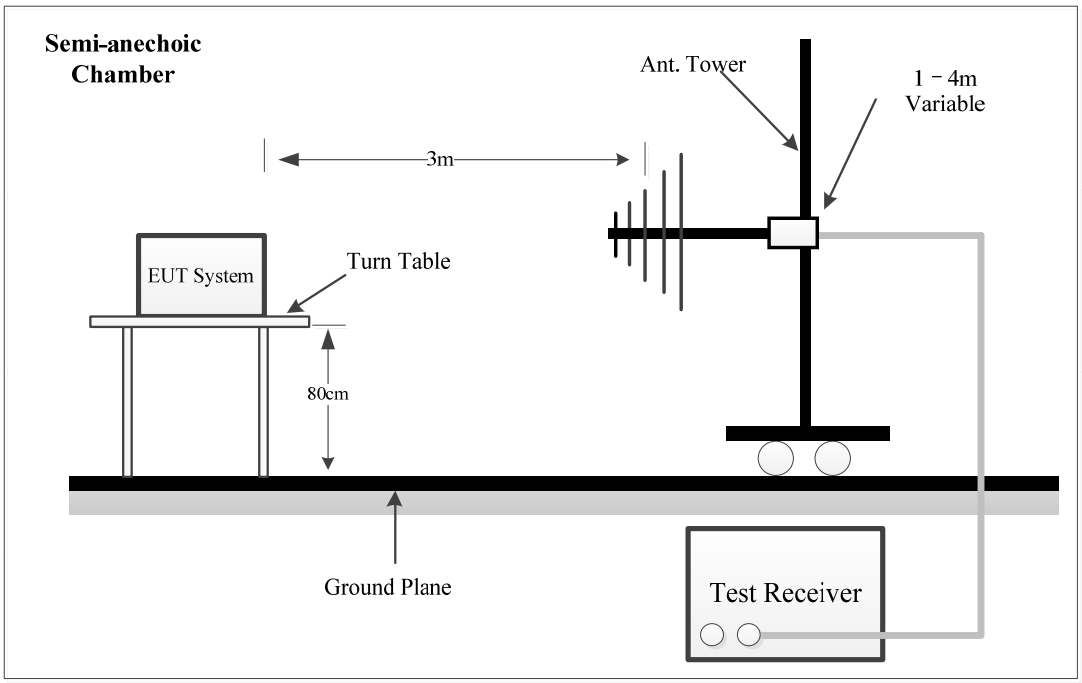
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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

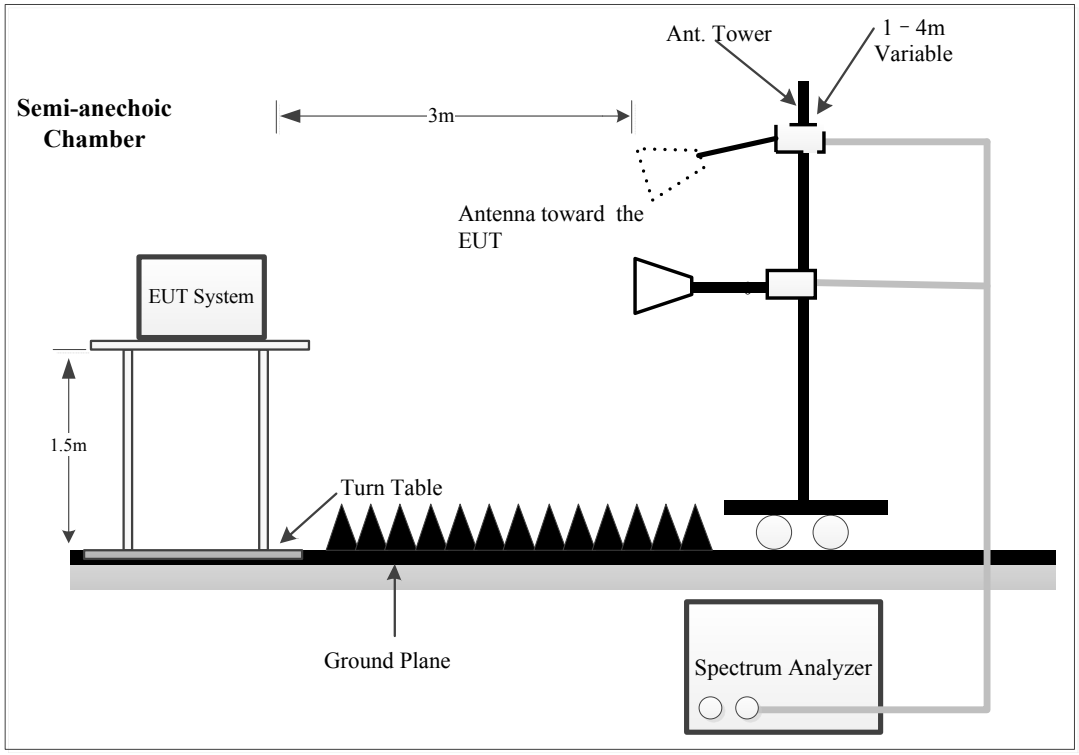
9kHz~30MHz:



30MHz~1GHz:



Above 1GHz:



The radiated emissions were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2020. 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

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	Detector
9 kHz – 150 kHz	QP/AV	300 Hz	1 kHz	200 Hz	QP/AV
150 kHz – 30 MHz	QP/AV	10 kHz	30 kHz	9 kHz	QP/AV
30 MHz – 1000 MHz	PK	100 kHz	300 kHz	/	PK
	QP	/	/	120 kHz	QP

1GHz- 25GHz:
Pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3 MHz	PK
Ave.	1MHz	5kHz	PK

Final measurement for emission identified during the pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3 MHz	PK
Ave.	1MHz	10 Hz	PK

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.

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

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.

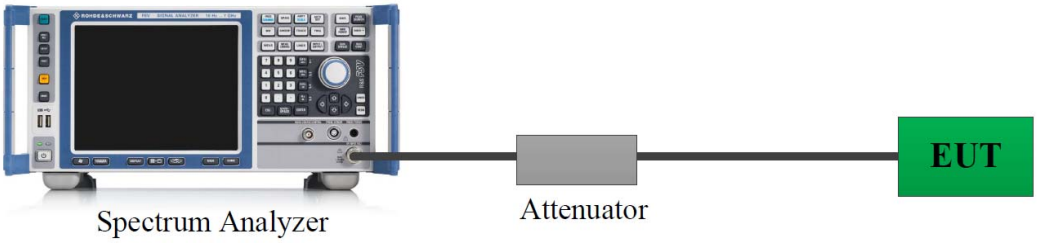
4.3 20 dB Emission Bandwidth

4.3.1 Applicable Standard

FCC §15.247 (a)(1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

4.3.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.3.3 Test Procedure

According to ANSI C63.10-2020 Section 6.9.2

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).

j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "−xx dB down amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "−xx dB down
amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3.4 Test Result

Please refer to section 5.3.

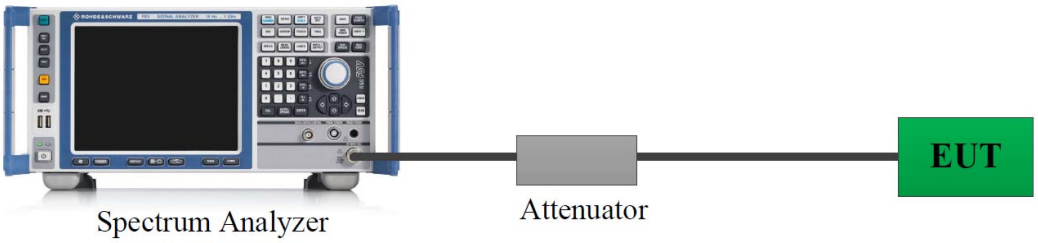
4.4 Channel Separation

4.4.1 Applicable Standard

FCC §15.247 (a)(1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

4.4.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.4.3 Test Procedure

According to ANSI C63.10-2020 Section 7.8.2

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) Span: Wide enough to capture the peaks of two adjacent channels.
b) 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.
c) Video (or average) bandwidth (VBW) ≥ RBW.
d) Sweep: No faster than coupled (auto) time.
e) Detector function: Peak.
f) Trace: Max hold.
g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

4.4.4 Test Result

Please refer to section 5.4.

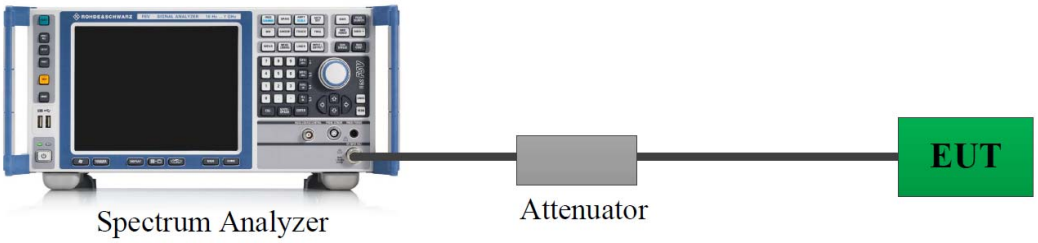
4.5 Number of Hopping Frequency

4.5.1 Applicable Standard

FCC §15.247 (a)(1)(iii)

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

4.5.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.5.3 Test Procedure

According to ANSI C63.10-2020 Section 7.8.3

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

a) 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.
b) 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.
c) VBW ≥ RBW.
d) Sweep: No faster than coupled (auto) time.
e) Detector function: Peak.
f) Trace: Max hold.
g) Allow the trace to stabilize

It might prove necessary to break the span up into subranges 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 spectral plot of the data shall be included in the test report.

4.5.4 Test Result

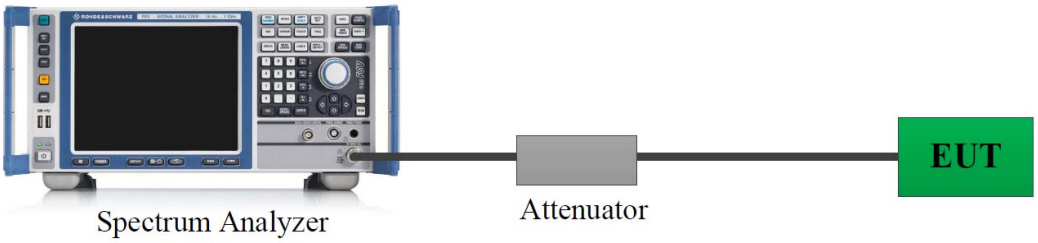
Please refer to section 5.5.

4.6 Time of Occupancy (Dwell Time)

4.6.1 Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

4.6.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.6.3 Test Procedure

According to ANSI C63.10-2020 Section 7.8.4
The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:
a) Span: Zero span, centered on a hopping channel.
b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop.
c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this.
d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel.
e) Detector function: Peak.
f) Trace: Clear-write, single sweep.
g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers.

To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time.

The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops.

The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

Where the device shares the same hopping algorithms (dwell time, channel selection) across multiple data rates or modulation schemes then the time of occupancy need only be measured for one of those modulation schemes or data rates. If the dwell time value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in dwell time.

Spectral plots of the channel occupancy shall be included in the report.

4.6.4 Test Result

Please refer to section 5.6.

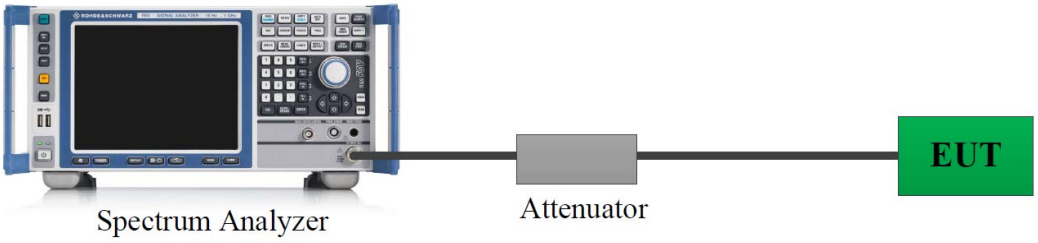
4.7 Maximum Conducted Output Power

4.7.1 Applicable Standard

FCC §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

4.7.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.7.3 Test Procedure

According to ANSI C63.10-2020 Section 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. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings:

a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
b) RBW > 20 dB bandwidth of the emission being measured.
c) VBW ≥ RBW.
d) Sweep: No faster than coupled (auto) time.
e) Detector function: Peak.
f) Trace: Max-hold.
g) Allow trace to stabilize.
h) Use the marker-to-peak function to set the marker to the peak of the emission.
i) The indicated level is the peak output power, after any corrections for external attenuators and cables.
j) A spectral plot of the test results and setup description shall be included in the test report.

NOTE—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.

4.7.4 Test Result

Please refer to section 5.7.

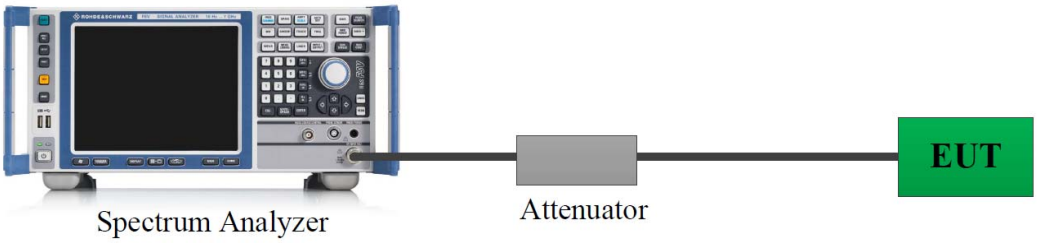
4.8 100 kHz Bandwidth of Frequency Band Edge

4.8.1 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)).

4.8.2 EUT Setup



A short RF cable with low cable loss connected to the EUT antenna port, which was provided by manufacturer. The insert loss of this RF cable/attenuator was offset into the setting of test equipment.

4.8.3 Test Procedure

According to ANSI C63.10-2020 Section 7.8.7.2

Compliance with a relative limit at the band-edges (e.g., -20dBc) shall be made on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels.

For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge.

For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.

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. Report the three highest emissions relative to the limit.

4.8.4 Test Result

Please refer to section 5.8.

4.9 Antenna Requirement

4.9.1 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.

4.9.2 Judgment

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

5. TEST DATA AND RESULTS

5.1 AC Line Conducted Emissions

Not Applicable, the EUT is a vehicle-mounted device, not applicable for this test item.

5.2 Radiated Spurious Emissions

1) 9kHz - 1GHz

Serial Number:	314Y-1	Test Date:	2025/4/24
Test Site:	Chamber10m	Test Mode:	Transmitting
Tester:	Willem Qiu	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.3	Relative Humidity: (%)	51	ATM Pressure: (kPa)	100.3

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
EMCO	Passive Loop Antenna	6512	9706-1206	2023/10/25	2026/10/24
Sunol Sciences	Hybrid Antenna	JB3	A060611-1	2023/9/6	2026/9/5
Narda	Coaxial Attenuator	779-6dB	04269	2023/9/6	2026/9/5
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-04	2024/7/1	2025/6/30
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2024/7/1	2025/6/30
Sonoma	Amplifier	310N	185914	2024/8/26	2025/8/25
R&S	EMI Test Receiver	ESCI	100224	2024/8/26	2025/8/25
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:

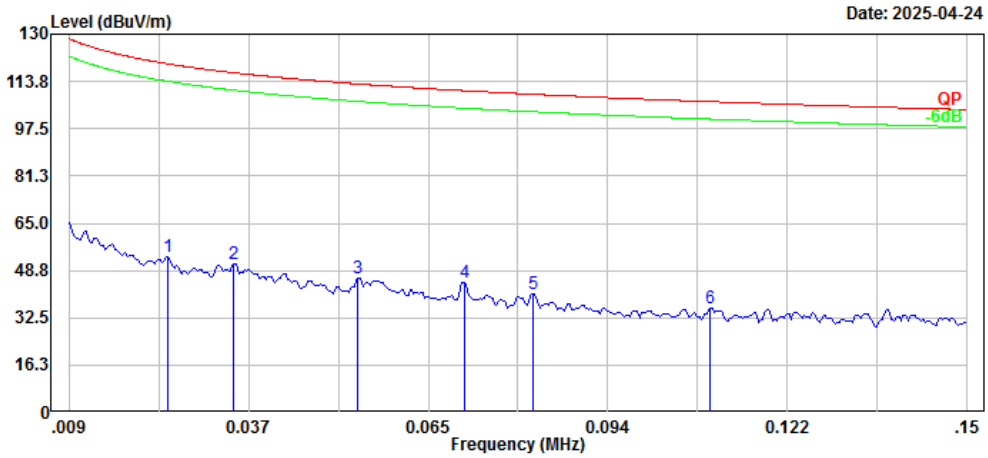
Please refer to the below table and plots.
After pre-scan in the X, Y and Z axes of orientation, the worst case is referred to table and plots.

Note: The maximum output power mode and channel: 3DH1(3EDR) mode Middle Channel was tested.

9kHz~30MHz:
Three antenna orientations (parallel, perpendicular, and ground-parallel) were measured, the worst orientations were below:

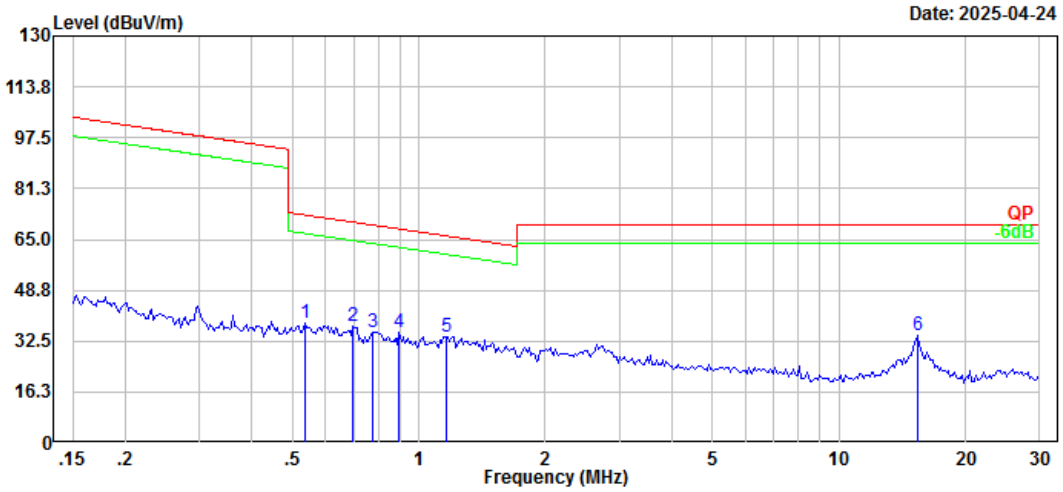
Project No.: 2502S52446E-RF
Polarization: Parallel
Test Mode: Transmitting
Note:
RBW:300Hz VBW:1kHz

Serial No.: 314Y-1
Tester: Willem Qiu



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measurement
1	0.025	4.55	48.91	53.46	119.82	66.36	Peak
2	0.035	4.49	46.67	51.16	116.74	65.58	Peak
3	0.054	2.95	43.30	46.25	112.89	66.64	Peak
4	0.071	4.43	40.41	44.84	110.57	65.73	Peak
5	0.082	2.33	38.61	40.94	109.35	68.41	Peak
6	0.110	0.94	34.86	35.80	106.80	71.00	Peak

Project No.: 2502S52446E-RF
Serial No.: 314Y-1
Polarization: Parallel
Tester: Willem Qiu
Test Mode: Transmitting
Note:
RBW:10kHz VBW:30kHz

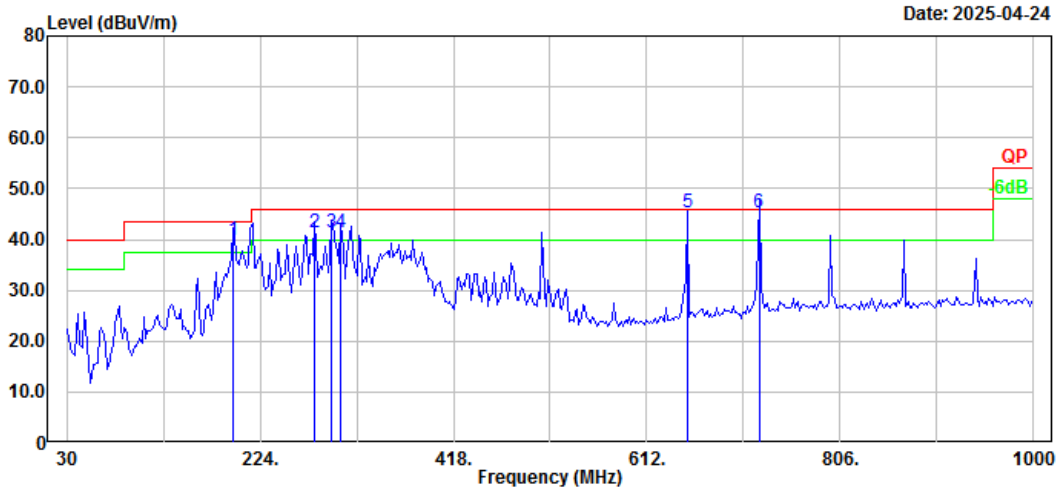


No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measurement
1	0.535	15.23	23.16	38.39	73.02	34.63	Peak
2	0.697	15.94	21.49	37.43	70.67	33.24	Peak
3	0.775	14.77	20.78	35.55	69.73	34.18	Peak
4	0.899	16.70	18.58	35.28	68.42	33.14	Peak
5	1.160	18.15	15.85	34.00	66.16	32.16	Peak
6	15.388	29.78	4.46	34.24	69.54	35.30	Peak

30MHz-1GHz:

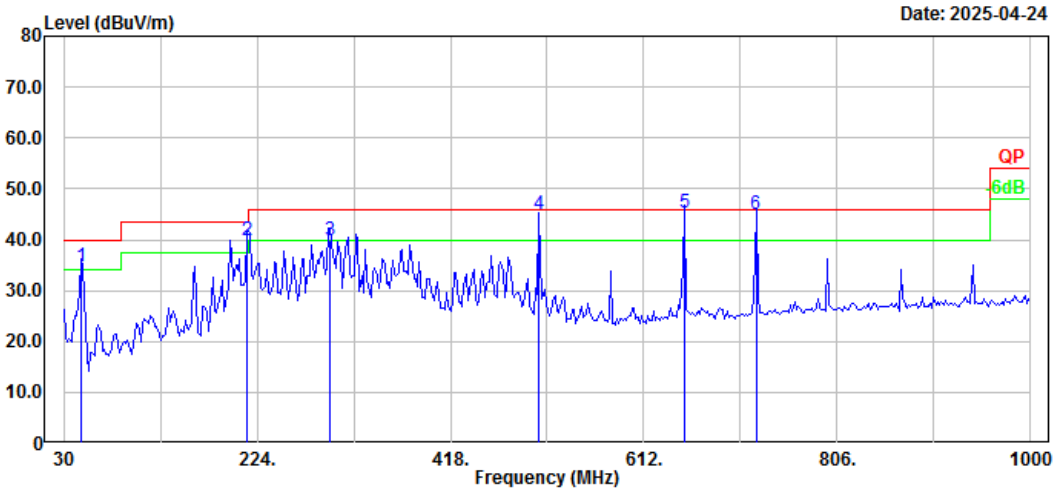
Project No.: 2502S52446E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note:
RBW:100kHz VBW:300kHz

Serial No.: 314Y-1
Tester: Willem Qiu



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measurement
1	196.84	51.50	-11.72	39.78	43.50	3.72	QP
2	278.32	51.20	-9.79	41.41	46.00	4.59	QP
3	295.78	50.81	-9.55	41.26	46.00	4.74	QP
4	305.48	50.79	-9.39	41.40	46.00	4.60	QP
5	652.74	47.00	-1.84	45.16	46.00	0.84	QP
6	724.52	46.21	-0.82	45.39	46.00	0.61	QP

Project No.: 2502S52446E-RF
Serial No.: 314Y-1
Polarization: Vertical
Tester: Willem Qiu
Test Mode: Transmitting
Note:
RBW:100kHz VBW:300kHz



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Measurement
1	47.46	49.70	-15.04	34.66	40.00	5.34	QP
2	214.30	52.50	-12.54	39.96	43.50	3.54	QP
3	297.72	49.30	-9.53	39.77	46.00	6.23	QP
4	507.24	49.00	-4.16	44.84	46.00	1.16	QP
5	652.74	47.20	-1.84	45.36	46.00	0.64	QP
6	724.52	45.81	-0.82	44.99	46.00	1.01	QP

2) 1GHz-25GHz

Serial Number:	314Y-1	Test Date:	2025/4/18
Test Site:	Chamber B	Test Mode:	Transmitting
Tester:	Leo Xiao	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.4	Relative Humidity: (%)	44	ATM Pressure: (kPa)	100.4

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ETS-Lindgren	Horn Antenna	3115	000 527 35	2023/9/7	2026/9/6
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	2024/11/17	2025/11/16
Xinhang Macrowave	Coaxial Cable	XH360A-2.92/J-2.92/J-6M-A	20231208001 #0001	2024/12/9	2025/12/8
AH	Preamplifier	PAM-0118P	469	2025/4/11	2026/4/10
AH	Preamplifier	PAM-1840VH	191	2024/9/5	2025/9/4
R&S	Spectrum Analyzer	FSV40	101589	2024/9/5	2025/9/4
Audix	Test Software	E3	191218 V9	N/A	N/A
Decentest	Multiplex Switch Test Control Set & Filter Switch Unit	DT7220SCU & DT7220FCU	DC79902 & DC79905	2024/8/27	2025/8/26

** 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 referred to table and plots.

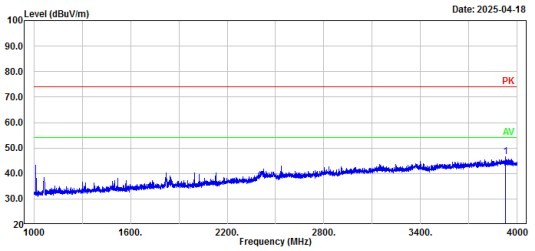
1-18GHz:

Note: The maximum output power mode: 3DH1(3EDR) mode was tested.

3EDR, Low Channel, Horizontal

Project No.: 2502S52446E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: 3EDR Mode low channel 2402MHz
Peak:RBW:1MHz,VBW:3MHz

Serial No.: 314Y-1
Tester: Leo Xiao

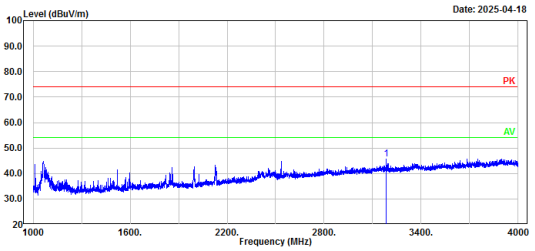


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3926.20	50.28	-3.76	46.52	74.00	27.48	Peak

3EDR, Low Channel, Vertical

Project No.: 2502S52446E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: 3EDR Mode low channel 2402MHz
Peak:RBW:1MHz,VBW:3MHz

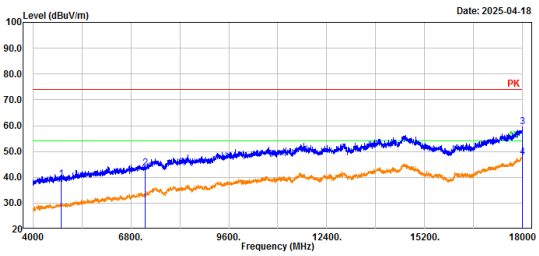
Serial No.: 314Y-1
Tester: Leo Xiao



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3185.80	51.69	-5.99	45.70	74.00	28.30	Peak

Project No.: 2502S52446E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: 3EDR Mode low channel 2402MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

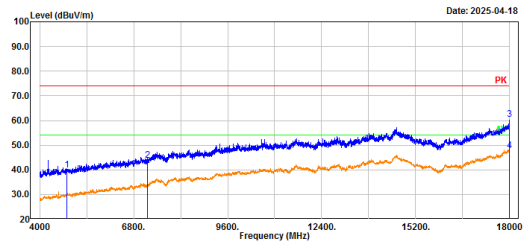
Serial No.: 314Y-1
Tester: Leo Xiao



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4804.00	47.87	-8.62	39.25	74.00	34.75	Peak
2	7206.00	47.30	-3.81	43.49	74.00	30.51	Peak
3	17997.20	48.17	11.38	59.55	74.00	14.45	Peak
4	17997.20	36.35	11.38	47.73	54.00	6.27	Average

Project No.: 2502S52446E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: 3EDR Mode low channel 2402MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

Serial No.: 314Y-1
Tester: Leo Xiao

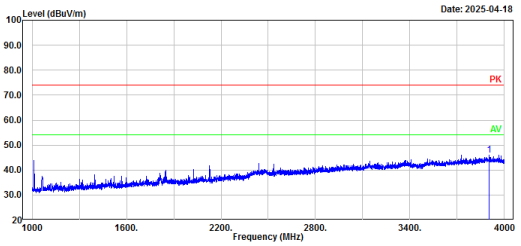


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4804.00	48.41	-8.62	39.79	74.00	34.21	Peak
2	7206.00	47.66	-3.81	43.85	74.00	30.15	Peak
3	17999.00	49.11	11.38	60.49	74.00	13.51	Peak
4	17999.00	36.48	11.38	47.86	54.00	6.14	Average

3EDR, Middle Channel, Horizontal

Project No.: 2502S52446E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: 3EDR Mode middle channel 2441MHz
Peak:RBW:1MHz,VBW:3MHz

Serial No.: 314Y-1
Tester: Leo Xiao

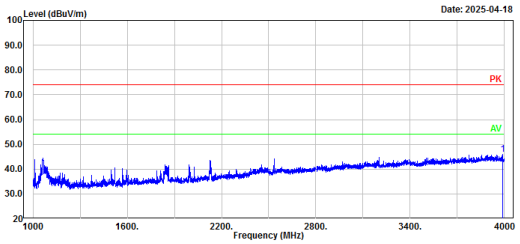


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3902.80	49.68	-3.63	46.05	74.00	27.95	Peak

3EDR, Middle Channel, Vertical

Project No.: 2502S52446E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: 3EDR Mode middle channel 2441MHz
Peak:RBW:1MHz,VBW:3MHz

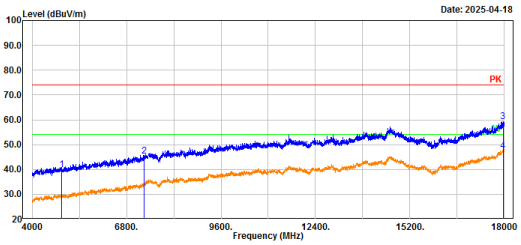
Serial No.: 314Y-1
Tester: Leo Xiao



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3989.20	49.63	-3.80	45.83	74.00	28.17	Peak

Project No.: 2502S52446E-RF
Polarization: Horizontal
Test Mode: Transmitting
Note: 3EDR Mode middle channel 2441MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

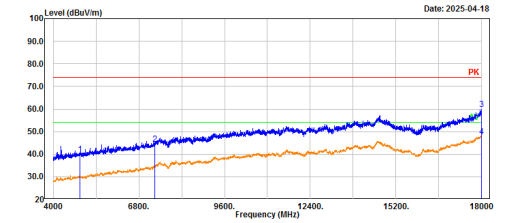
Serial No.: 314Y-1
Tester: Leo Xiao



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4882.00	48.40	-8.47	39.93	74.00	34.07	Peak
2	7323.00	48.51	-3.19	45.32	74.00	28.68	Peak
3	17958.00	48.13	11.14	59.27	74.00	14.73	Peak
4	17958.00	36.30	11.14	47.44	54.00	6.56	Average

Project No.: 2502S52446E-RF
Polarization: Vertical
Test Mode: Transmitting
Note: 3EDR Mode middle channel 2441MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz

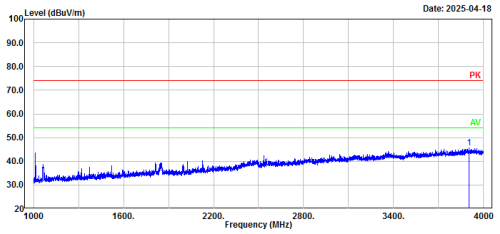
Serial No.: 314Y-1
Tester: Leo Xiao



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4882.00	48.39	-8.47	39.92	74.00	34.08	Peak
2	7323.00	47.73	-3.19	44.54	74.00	29.46	Peak
3	17994.40	48.60	11.37	59.97	74.00	14.03	Peak
4	17994.40	36.38	11.37	47.75	54.00	6.25	Average

3EDR, High Channel, Horizontal

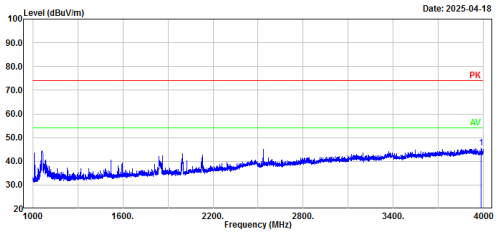
Project No.: 2502S52446E-RF Serial No.: 314Y-1
Polarization: Horizontal Tester: Leo Xiao
Test Mode: Transmitting
Note: 3EDR Mode high channel 2480MHz
Peak:RBW:1MHz,VBW:3MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3904.00	49.23	-3.64	45.59	74.00	28.41	Peak

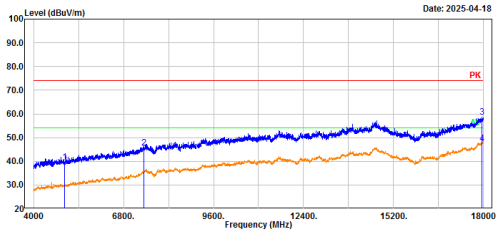
3EDR, High Channel, Vertical

Project No.: 2502S52446E-RF Serial No.: 314Y-1
Polarization: Vertical Tester: Leo Xiao
Test Mode: Transmitting
Note: 3EDR Mode high channel 2480MHz
Peak:RBW:1MHz,VBW:3MHz



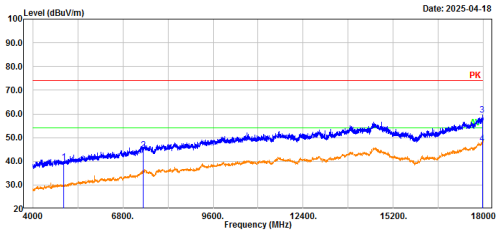
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	3984.40	49.55	-3.78	45.77	74.00	28.23	Peak

Project No.: 2502S52446E-RF Serial No.: 314Y-1
Polarization: Horizontal Tester: Leo Xiao
Test Mode: Transmitting
Note: 3EDR Mode high channel 2480MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4960.00	48.15	-8.48	39.67	74.00	34.33	Peak
2	7440.00	48.38	-2.62	45.76	74.00	28.24	Peak
3	17938.40	47.67	11.01	58.68	74.00	15.32	Peak
4	17938.40	36.43	11.01	47.44	54.00	6.56	Average

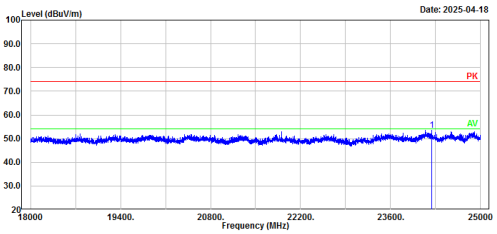
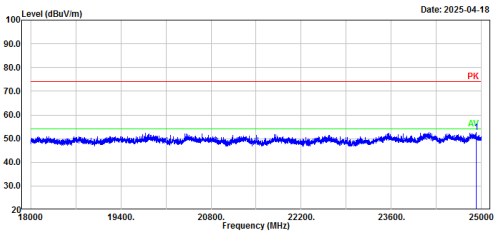
Project No.: 2502S52446E-RF Serial No.: 314Y-1
Polarization: Vertical Tester: Leo Xiao
Test Mode: Transmitting
Note: 3EDR Mode high channel 2480MHz
Peak:RBW:1MHz,VBW:3MHz Ave:RBW:1MHz,VBW:5kHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4960.00	48.01	-8.48	39.53	74.00	34.47	Peak
2	7440.00	47.38	-2.62	44.76	74.00	29.24	Peak
3	17958.00	48.50	11.14	59.64	74.00	14.36	Peak
4	17958.00	36.47	11.14	47.61	54.00	6.39	Average

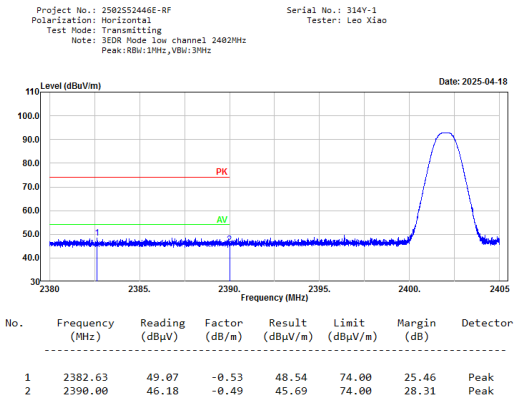
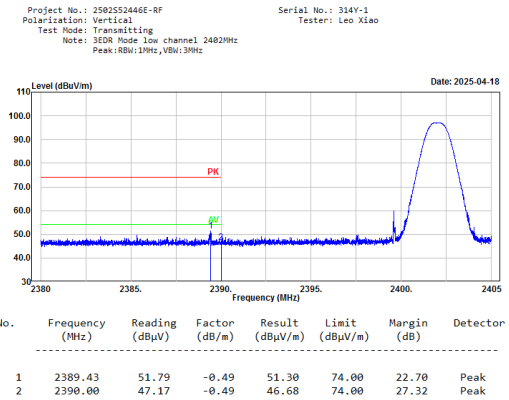
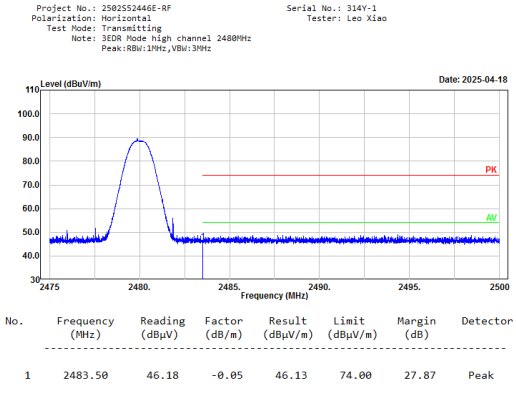
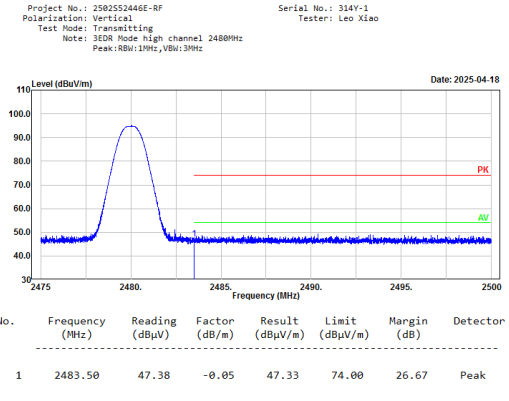
18-25GHz:

Note: No Emission was detected in the range 18-25GHz, the maximum output power mode and channel: 3DH1(3EDR) mode Middle Channel was tested.

3EDR, Middle Channel, Horizontal	3EDR, Middle Channel, Vertical
Project No.: 2502S52446E-RF Polarization: Horizontal Test Mode: Transmitting Note: 3EDR Mode middle channel 2441MHz Peak:RBW:1MHz,VBW:3MHz Serial No.: 314Y-1 Tester: Leo Xiao  No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 24237.00 44.25 9.32 53.57 74.00 20.43 Peak	Project No.: 2502S52446E-RF Polarization: Vertical Test Mode: Transmitting Note: 3EDR Mode middle channel 2441MHz Peak:RBW:1MHz,VBW:3MHz Serial No.: 314Y-1 Tester: Leo Xiao  No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Measurement 1 24914.60 43.00 9.75 52.75 74.00 21.25 Peak

Bandedge:

Note: The maximum output power mode: 3DH1(3EDR) mode was tested.

3EDR, Low Channel, Bandedge, Horizontal	3EDR, Low Channel, Bandedge, Vertical
 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Detector 1 2382.63 49.07 -0.53 48.54 74.00 25.46 Peak 2 2390.00 46.18 -0.49 45.69 74.00 28.31 Peak	 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Detector 1 2389.43 51.79 -0.49 51.30 74.00 22.70 Peak 2 2390.00 47.17 -0.49 46.68 74.00 27.32 Peak
3EDR, High Channel, Bandedge, Horizontal	**3EDR, High Channel, Bandedge, Vertical**
 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Detector 1 2483.50 46.18 -0.05 46.13 74.00 27.87 Peak	 No. Frequency (MHz) Reading (dBμV) Factor (dB/m) Result (dBμV/m) Limit (dBμV/m) Margin (dB) Detector 1 2483.50 47.38 -0.05 47.33 74.00 26.67 Peak

5.3 20 dB Emission Bandwidth

Serial Number:	314Y-2	Test Date:	2025-04-17~2025-4-18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	N/A

Environmental Conditions:

Temperature: (℃)	24.8~25.1	Relative Humidity: (%)	54~56	ATM Pressure: (kPa)	100.4~101.2

Test Equipment List and Details:

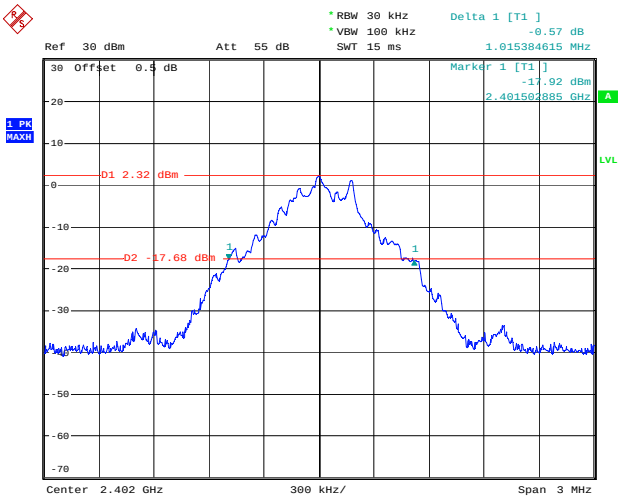
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025/3/31	2026/3/30

** 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:

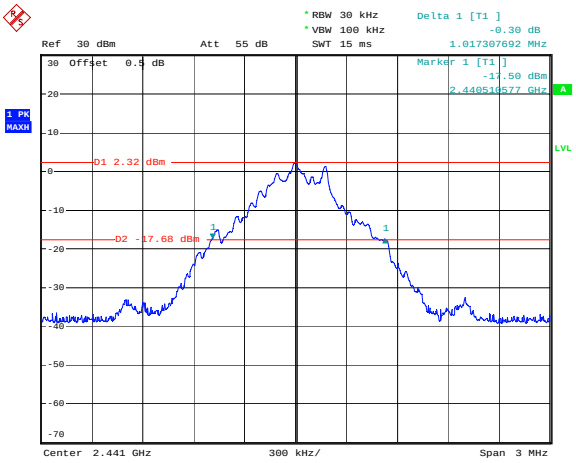
Test Modes	Test Channel	Test Frequency (MHz)	20 dB Bandwidth (MHz)
BDR Mode (GFSK)	Lowest	2402	1.015
	Middle	2441	1.017
	Highest	2480	1.022
2EDR Mode (π/4-DQPSK)	Lowest	2402	1.272
	Middle	2441	1.277
	Highest	2480	1.277
3EDR Mode (8DPSK)	Lowest	2402	1.276
	Middle	2441	1.263
	Highest	2480	1.263

DH1_Low



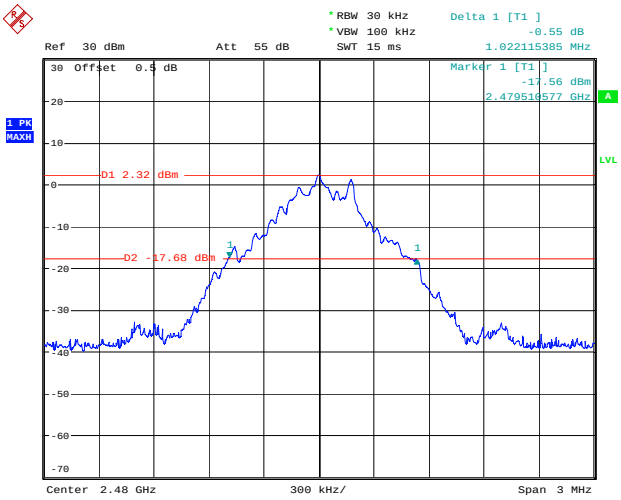
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 14:59:35

DH1_Middle



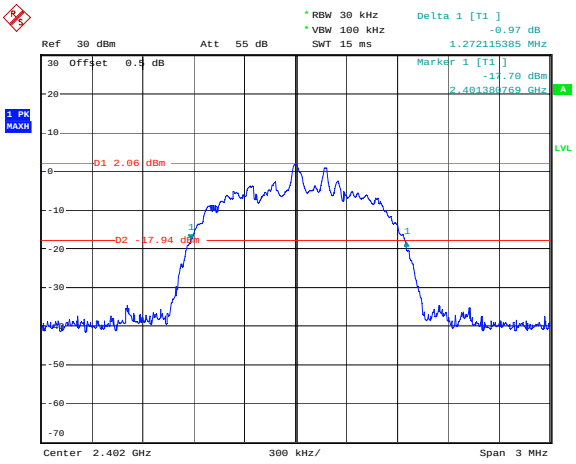
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 15:03:19

DH1_High



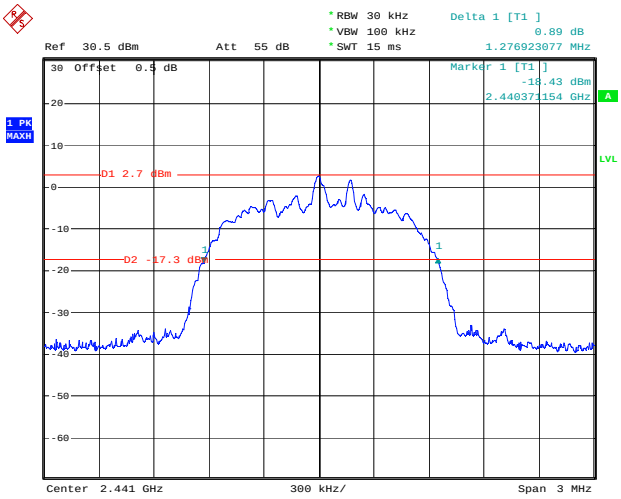
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 15:05:52

2DH1_Low



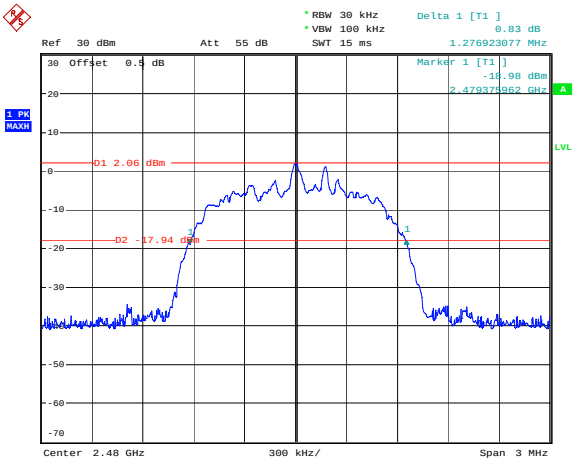
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 15:24:02

2DH1_Middle



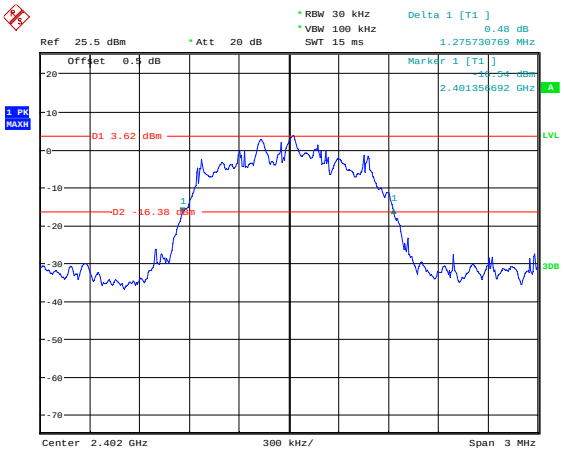
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:26:20

2DH1_High



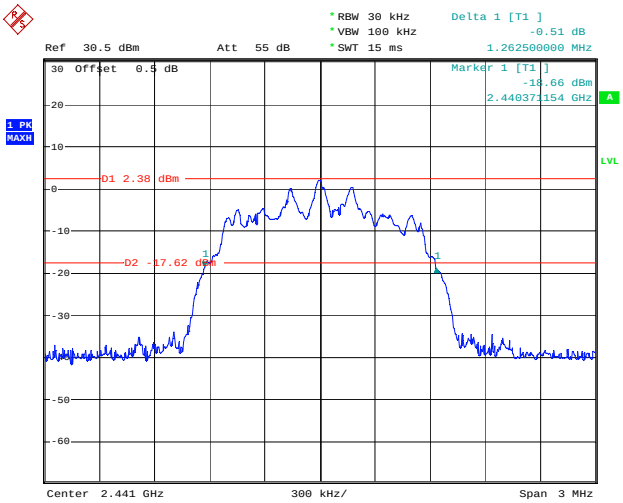
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 15:21:14

3DH1_Low



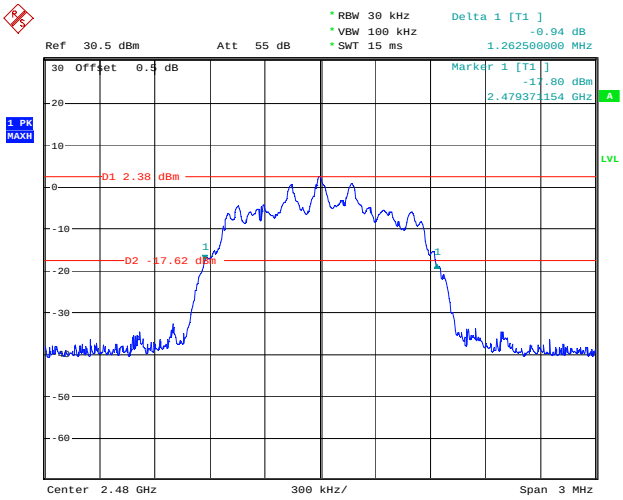
ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:40:52

3DH1_Middle



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:36:35

3DH1_High



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:38:59

5.5 Channel Separation

Serial Number:	314Y-2	Test Date:	2025/4/18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	Pass

Environmental Conditions:

Temperature: (℃)	24.8	Relative Humidity: (%)	56	ATM Pressure: (kPa)	100.4

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025/3/31	2026/3/30

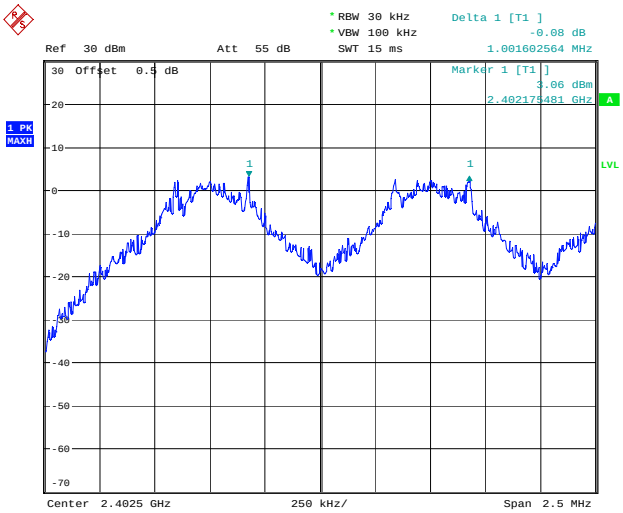
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Test Frequency (MHz)	Channel Separation (MHz)	Limits (MHz)	**Verdict**
BDR Mode (GFSK)	2402	1.002	0.851	Pass
	2441	1.004	0.851	Pass
	2480	0.998	0.851	Pass

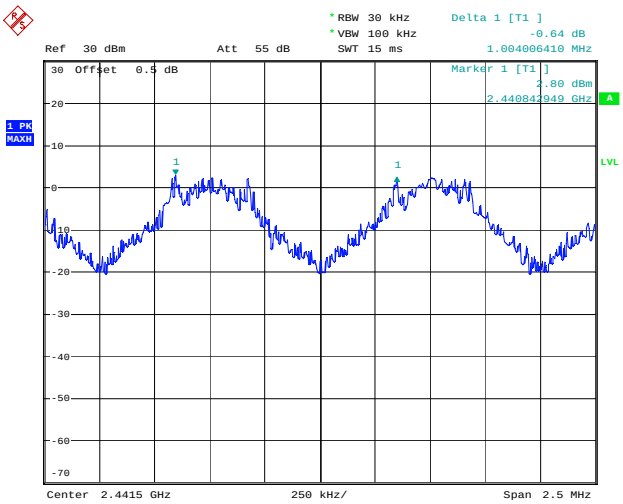
Note:
1.Only GFSK mode result is reported since EDR (π/4-DQPSK, 8DPSK) has the exact same channel plan.
*2.The limit is maximum 20dB bandwidth*2/3.*

DH1_Low



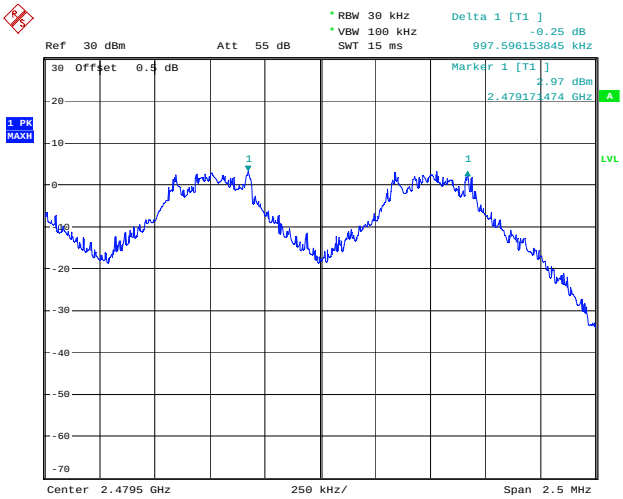
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:34:30

DH1_Middle



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:45:27

DH1_High



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:57:10

5.6 Number of Hopping Frequency

Serial Number:	314Y-2	Test Date:	2025/4/17
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	Pass

Environmental Conditions:

Temperature: (℃)	25.1	Relative Humidity: (%)	54	ATM Pressure: (kPa)	101.2

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025/3/31	2026/3/30

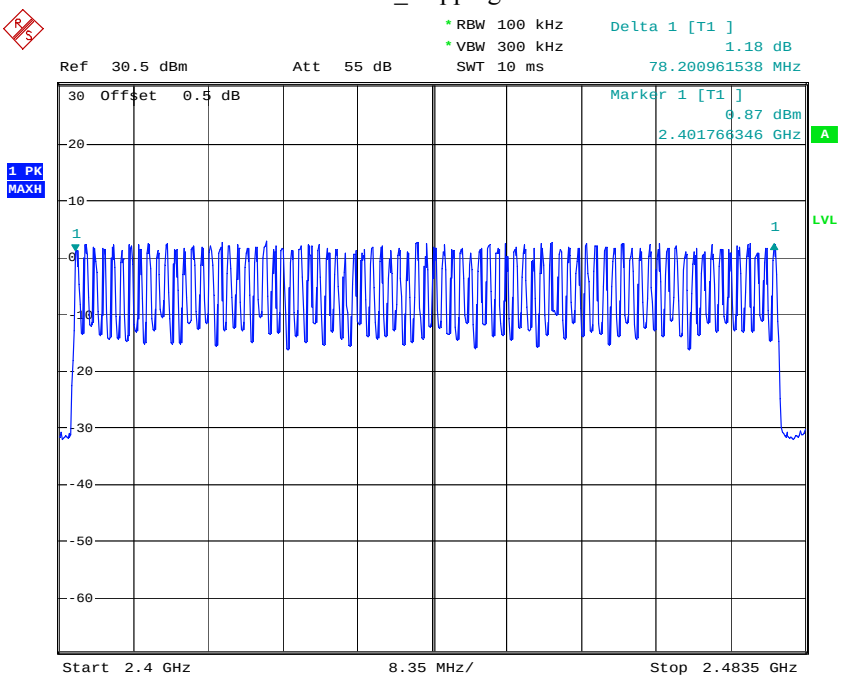
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Frequency Range (MHz)	Number of Hopping Channel	Limits	Verdict
BDR Mode (GFSK)_Hopping_DH1	2400-2483.5	79	≥15	Pass

Note:
1.Only GFSK mode result is reported since EDR (π/4-DQPSK, 8DPSK) has the exact same channel plan.

DH1_Hopping



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:50:26

5.7 Time of Occupancy (Dwell Time)

Serial Number:	314Y-2	Test Date:	2025/4/17
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	Pass

Environmental Conditions:

Temperature: (℃)	25.1	Relative Humidity: (%)	54	ATM Pressure: (kPa)	101.2

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025-03-31	2026-03-30

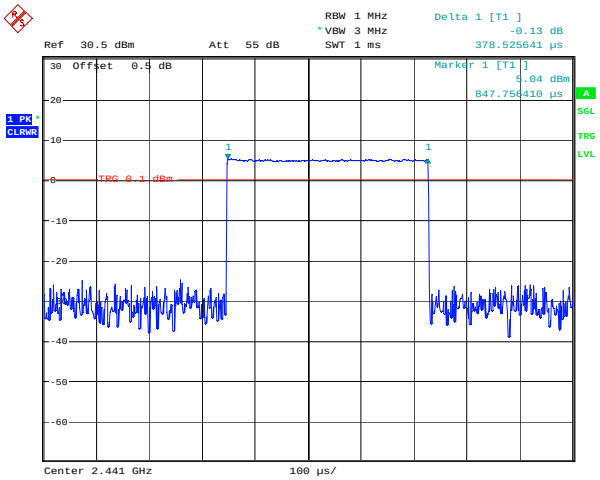
** Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Modes	Test Frequency (MHz)	Pulse width (ms)	Result (s)	Limit (s)	Verdict
GFSK_Hopping_DH1	2441	0.379	0.121	0.400	Pass
GFSK_Hopping_DH3	2441	1.645	0.263	0.400	Pass
GFSK_Hopping_DH5	2441	2.896	0.309	0.400	Pass
π/4-DQPSK_Hopping_2DH1	2441	0.385	0.123	0.400	Pass
π/4-DQPSK_Hopping_2DH3	2441	1.639	0.262	1.639	Pass
π/4-DQPSK_Hopping_2DH5	2441	2.894	0.309	0.400	Pass
8DPSK_Hopping_3DH1	2441	0.385	0.123	0.400	Pass
8DPSK_Hopping_3DH3	2441	1.639	0.262	0.400	Pass
8DPSK_Hopping_3DH5	2441	2.894	0.309	0.400	Pass

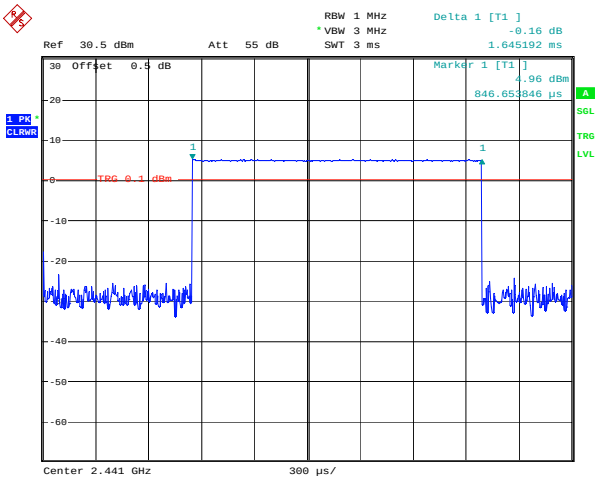
Note:
DH1: Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s
DH3: Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s
DH5: Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s
2DH1: Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s
2DH3: Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s
2DH5: Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s
3DH1: Dwell time=Pulse width (ms) × (1600/2/79) ×31.6 s
3DH3: Dwell time=Pulse width (ms) × (1600/4/79) ×31.6 s
3DH5: Dwell time=Pulse width (ms) × (1600/6/79) ×31.6 s

DH1_Hopping



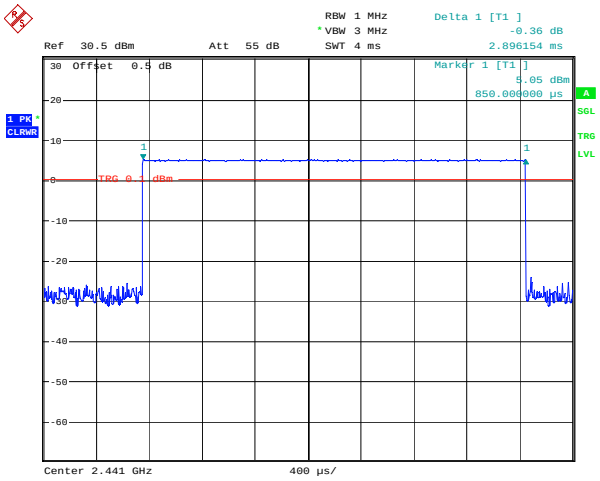
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:01:33

DH3_Hopping



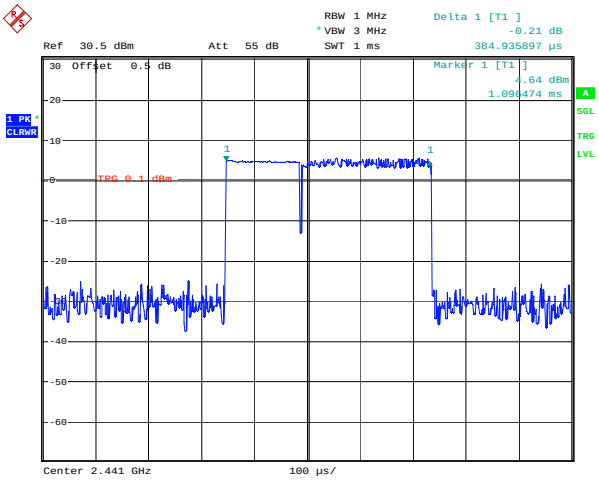
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:23:15

DH5_Hopping



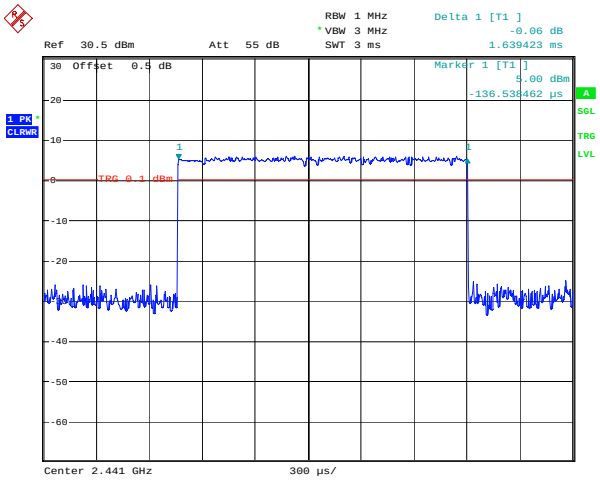
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:33:53

2DH1_Hopping



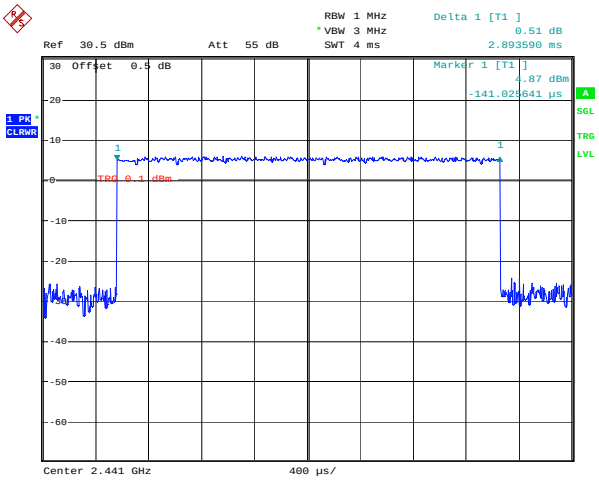
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:18:55

2DH3_Hopping



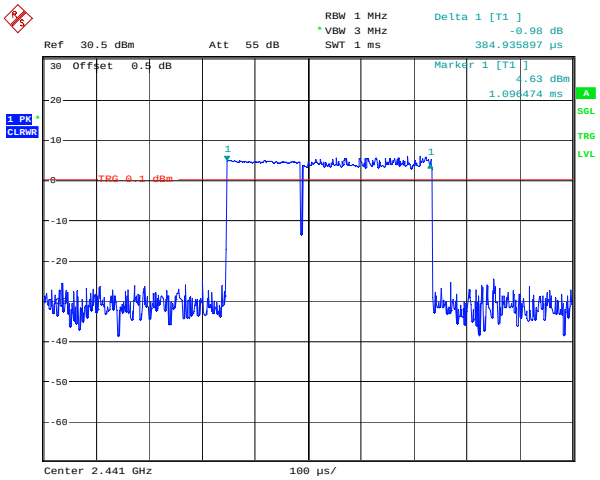
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:29:50

2DH5_Hopping



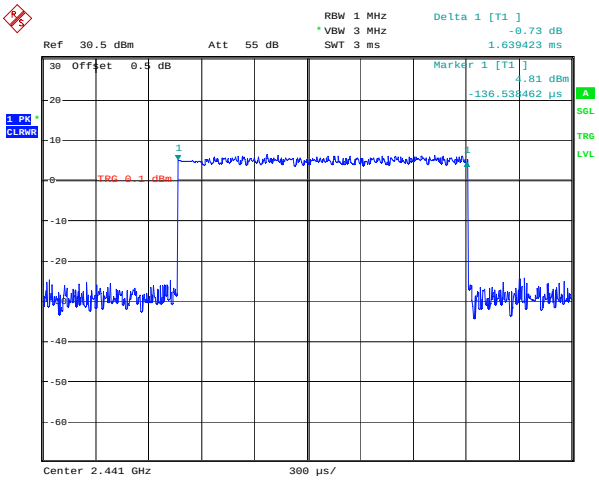
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:36:57

3DH1_Hopping



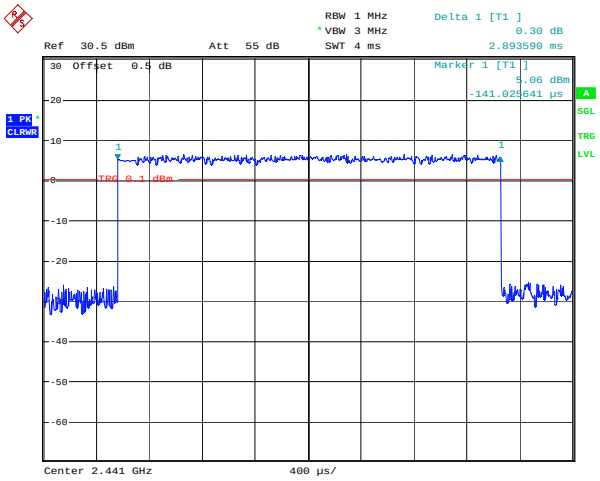
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:20:05

3DH3_Hopping



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:30:51

3DH5_Hopping



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 16:37:50

5.8 Maximum Conducted Output Power

Serial Number:	314Y-2	Test Date:	2025-04-17~2025-4-18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.8~25.1	Relative Humidity: (%)	54~56	ATM Pressure: (kPa)	100.4~101.2

Test Equipment List and Details:

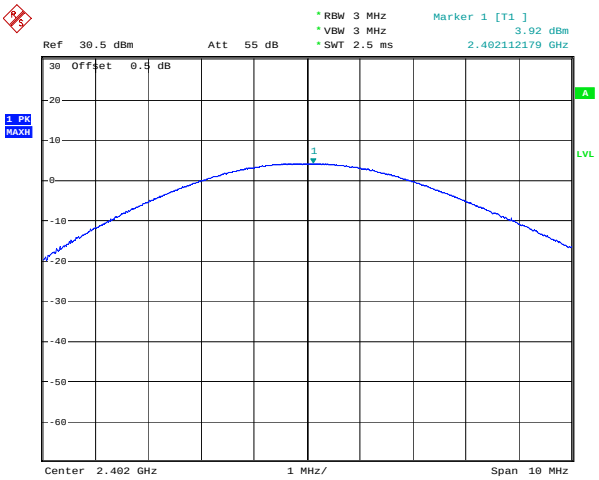
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025/3/31	2026/3/30

** 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:

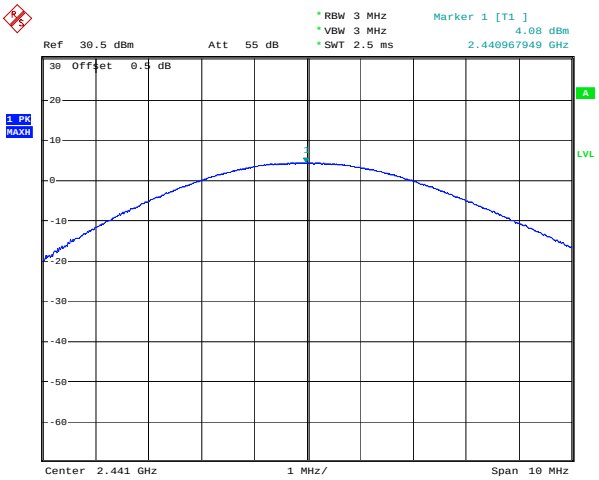
Mode	Channel	Result (dBm)	Limit (dBm)	Verdict
BDR Mode (GFSK)	Low	3.92	21.00	Pass
	Middle	4.08	21.00	Pass
	High	3.60	21.00	Pass
2EDR Mode (π/4-DQPSK)	Low	6.11	21.00	Pass
	Middle	6.28	21.00	Pass
	High	5.63	21.00	Pass
3EDR Mode (8DPSK)	Low	6.17	21.00	Pass
	Middle	**6.44**	21.00	Pass
	High	6.40	21.00	Pass

DH1_Low



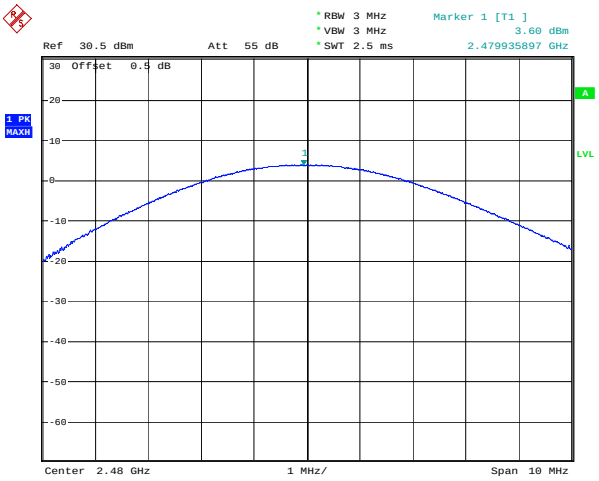
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 14:55:09

DH1_Middle



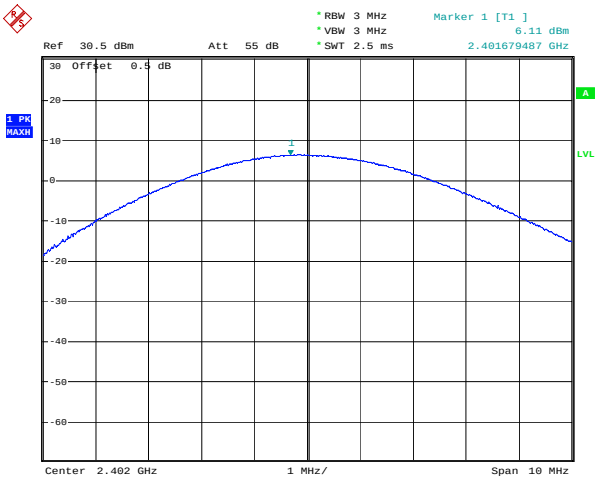
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 14:56:57

DH1_High



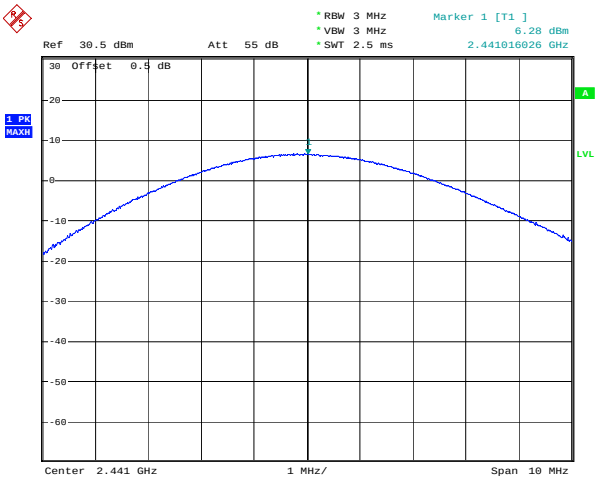
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 14:58:21

2DH1_Low



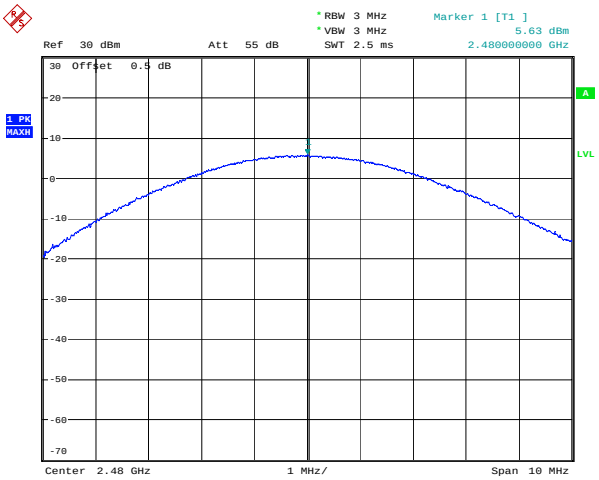
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:00:34

2DH1_Middle



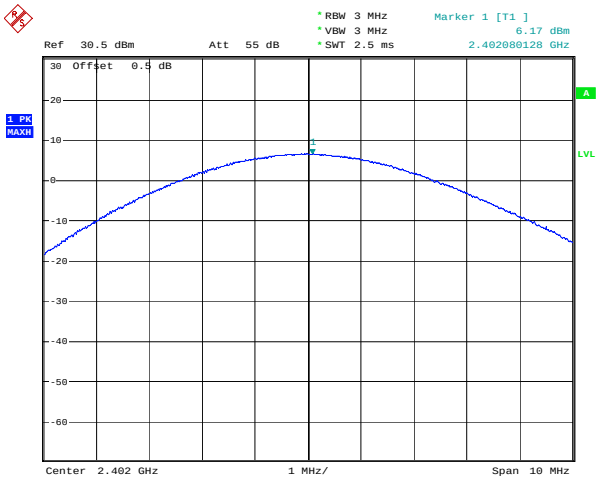
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:02:04

2DH1_High



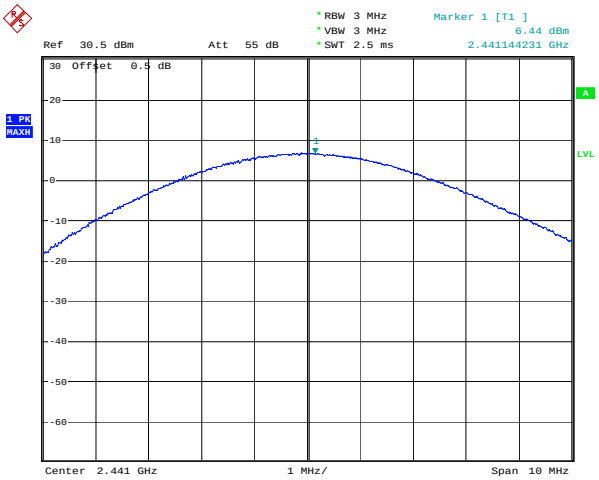
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 15:14:57

3DH1_Low



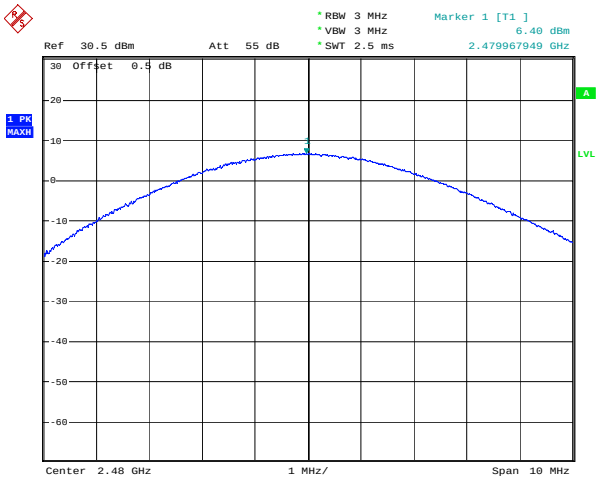
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:06:34

3DH1_Middle



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:05:38

3DH1_High



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 15:04:40

5.9 100 kHz Bandwidth of Frequency Band Edge

Serial Number:	314Y-2	Test Date:	2025-04-17~2025-4-18
Test Site:	RF	Test Mode:	Transmitting
Tester:	Rini Yan	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.8~25.1	Relative Humidity: (%)	54~56	ATM Pressure: (kPa)	100.4~101.2

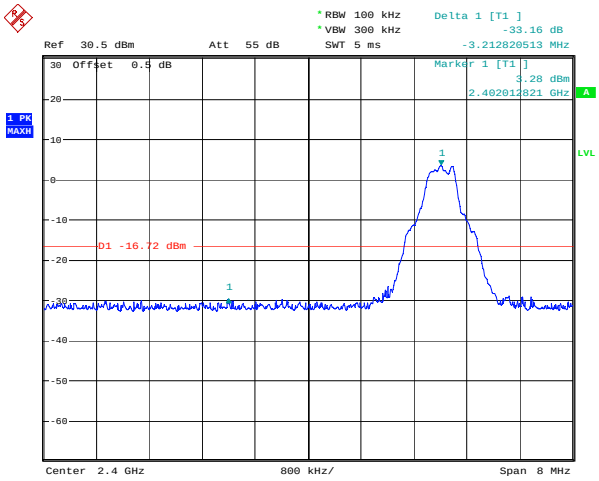
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	100152	2025/3/31	2026/3/30

** 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).*

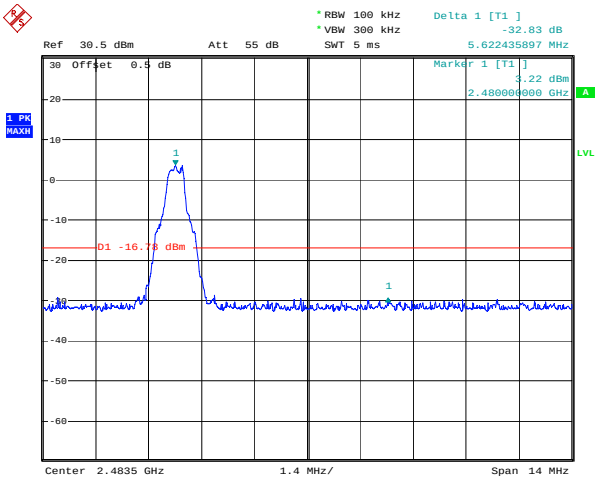
Test Data:

DH1_Low



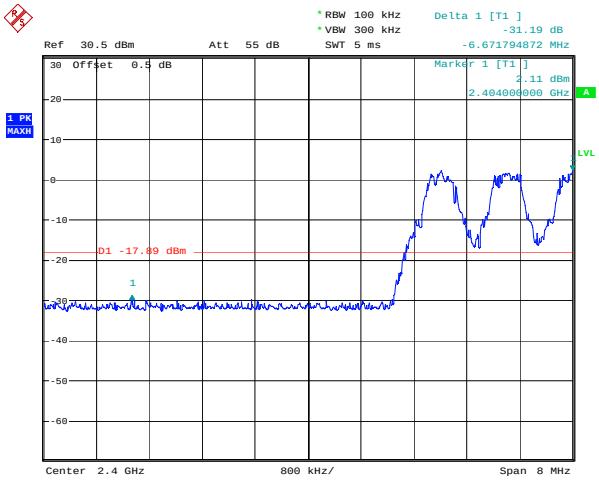
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:48:50

DH1_High



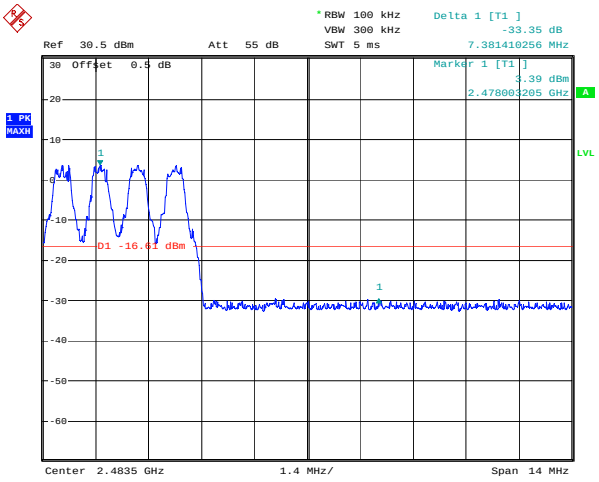
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:56:45

DH1_Hopping_Lower



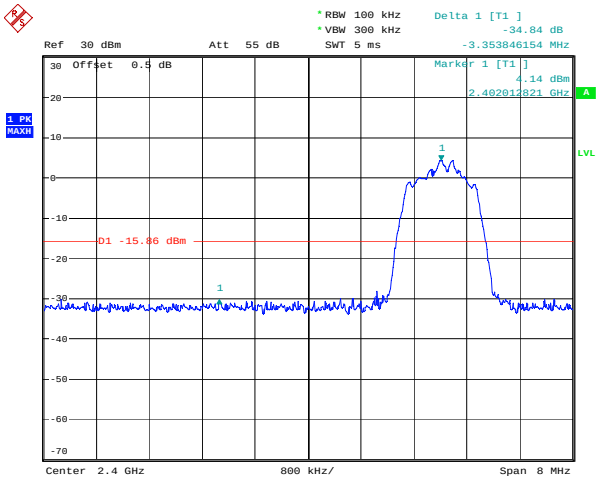
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 17:07:47

DH1_Hopping_Upper



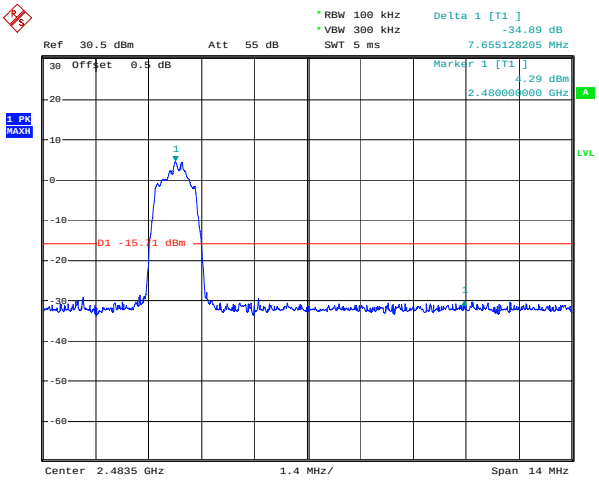
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:24:21

2DH1_Low



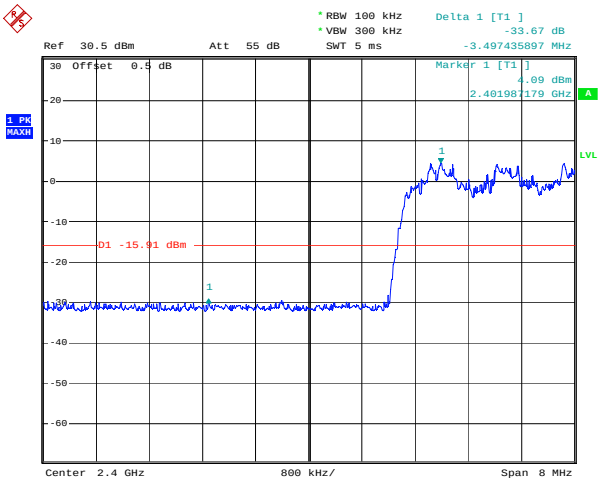
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:07:14

2DH1_High



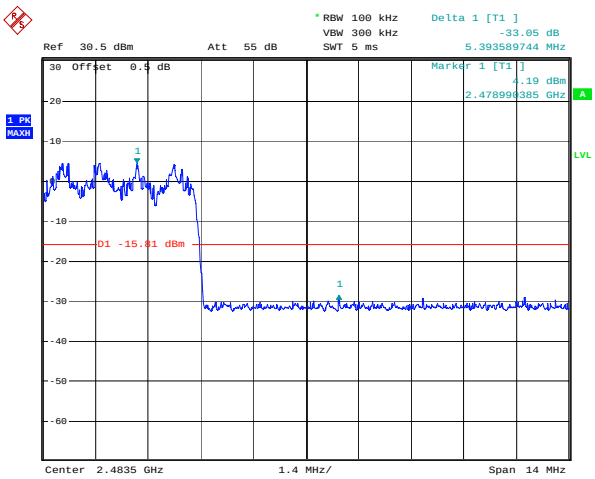
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:59:15

2DH1_Hopping_Lower



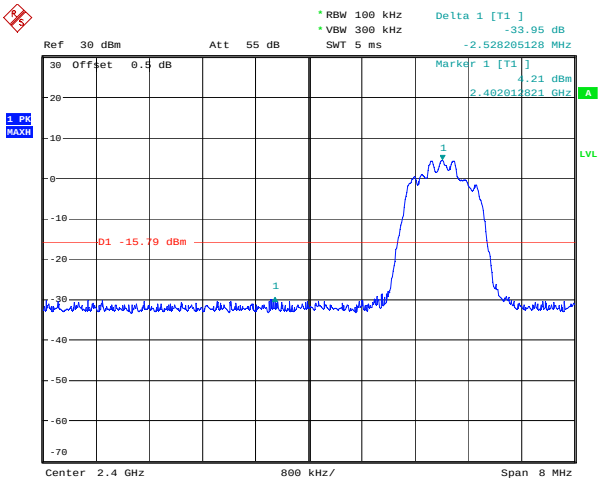
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 17.APR.2025 17:14:55

2DH1_Hopping_Upper



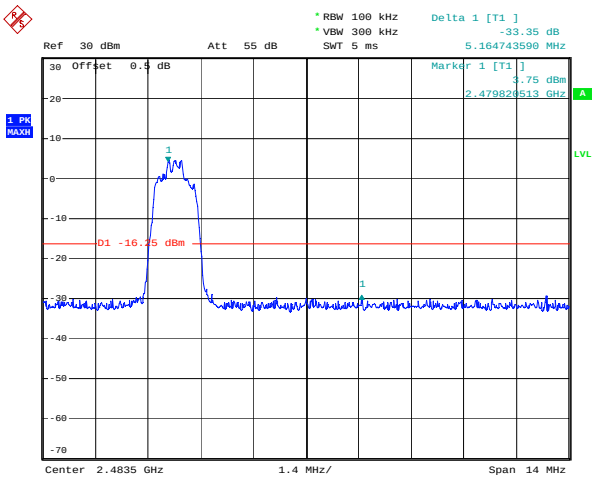
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:29:21

3DH1_Low



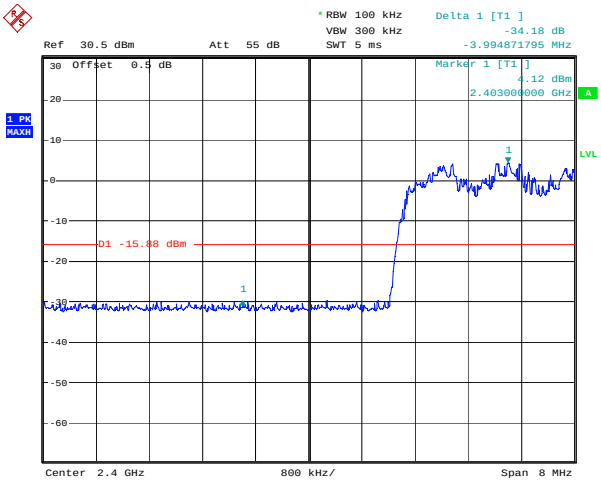
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:05:44

3DH1_High



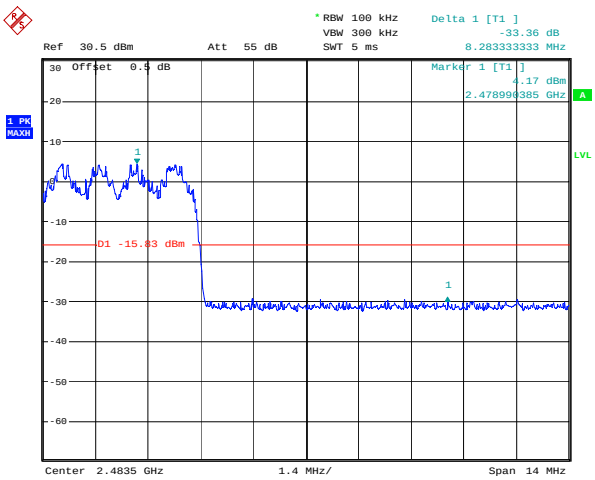
Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 10:01:59

3DH1_Hopping_Lower



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:15:21

3DH1_Hopping_Upper



Comment: ProjectNo.:2502S52446E-RF Tester:Rini Yan
Date: 18.APR.2025 09:35:06

EXHIBIT A - EUT PHOTOGRAPHS

Please refer to the attachment 2502S52446E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and 2502S52446E-RF-INP EUT INTERNAL PHOTOGRAPHS.

EXHIBIT B - TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2502S52446E-RF-00A-TSP TEST SETUP PHOTOGRAPHS.

******* END OF REPORT *******