



中认信通

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)



TEST REPORT

Applicant: Earfun Technology (HK) Limited

Address: FLAT/RM A 9F, SILVERCORP INTERNATIONAL TOWER 707-713
NATHAN ROAD MONGKOK KL, HONG KONG

FCC ID: 2AVIT-TW600L

Product Name: ANC Wireless Earbuds

Standard(s): 47 CFR Part 15, Subpart C(15.247)

ANSI C63.10-2013

KDB 558074 D01 15.247 Meas Guidance v05r02

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: 2403T76722E-RF-00A

Date Of Issue: 2024/6/11

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang 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. : 442868, the FCC Designation No. : CN1314.

Declarations

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2403T76722E-RF-00A	Original Report	2024/6/11

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	ANC Wireless Earbuds
EUT Model:	TW600
Operation Frequency:	2402-2480 MHz
Maximum Peak Output Power (Conducted):	8.52 dBm
Modulation Type:	GFSK
Rated Input Voltage:	DC 5V charging from Base or DC 3.85V from battery
Serial Number:	RF: 2LLA-1, RE: 2LLA-2
EUT Received Date:	2024/5/21
EUT Received Status:	Good

Operation Frequency Detail:

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

Per section 15.31(m), the below frequencies were performed the test as below:

Test Channel	Frequency (MHz)
Lowest	2402
Middle	2440
Highest	2480

Antenna Information Detail▲:

Antenna Type	input impedance (Ohm)	Frequency Range (MHz)	Antenna Gain (dBi)
FPC	50	2400-2500	-0.67

The Method of §15.203 Compliance:

- ☒ Antenna was permanently attached to the unit.
- ☐ Antenna use 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.

Accessory Information:

Accessory Description	Manufacturer	Model
Base	Earfun	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer.		
Equipment Modifications:	No		
EUT Exercise Software:	BlueTest.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 Channel	Middle Channel	Highest Channel
1Mbps	default	default	default
2Mbps	default	default	default

1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

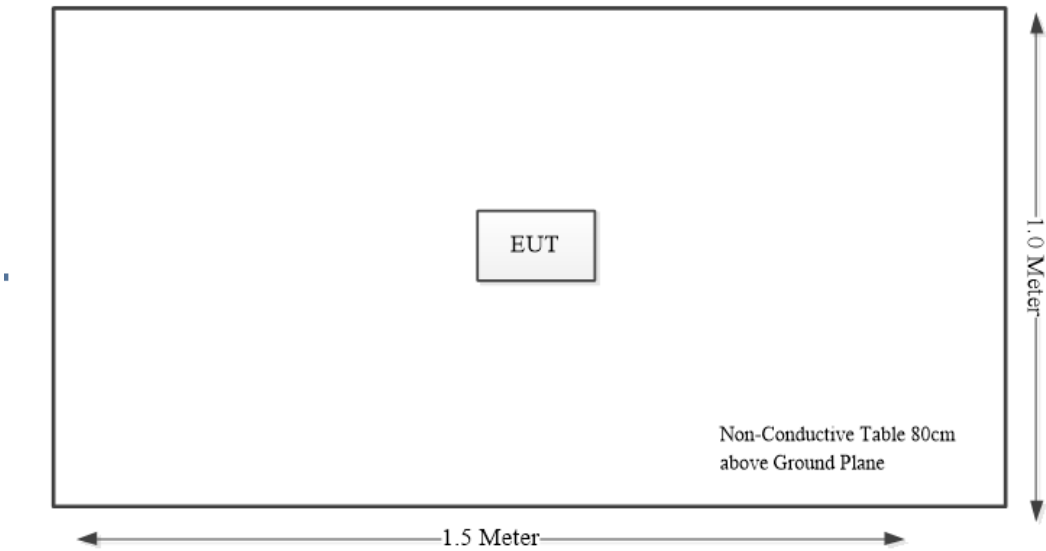
1.2.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
/	/	/	/	/	/

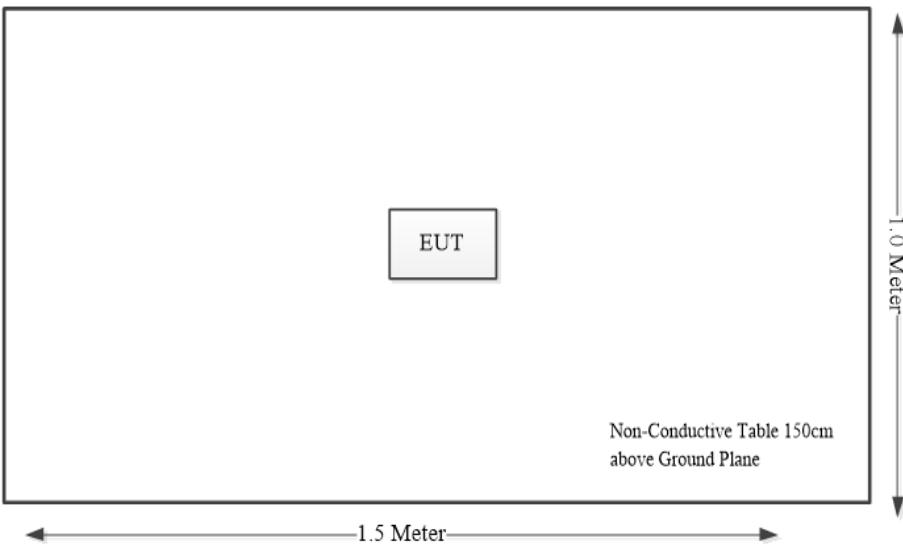
1.2.4 Block Diagram of Test Setup

Spurious Emissions:

Below 1GHz:



Above 1GHz:



1.3 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	9k~30MHz: 4.12dB, 30M~200MHz: 4.15 dB, 200M~1GHz: 5.61 dB, 1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB, 18G~26.5G:5.47 dB, 26.5G~40G:5.63 dB
Unwanted Emissions, conducted	±1.26 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

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 Emission	PASS
FCC §15.207(a)(2)	6dB Emission Bandwidth	PASS
FCC §15.247(b)(1)	Maximum Conducted Output Power	PASS
FCC §15.247(d)	100 kHz Bandwidth of Frequency Band Edge	PASS
FCC §15.247(e)	Power Spectral Density	PASS
C63.10 §11.6	Duty Cycle	PASS
FCC §15.203	Antenna Requirement	PASS
FCC §1.1307&§2.1093&§15.247 (i)	RF Exposure	PASS

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 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 μ H/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.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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:

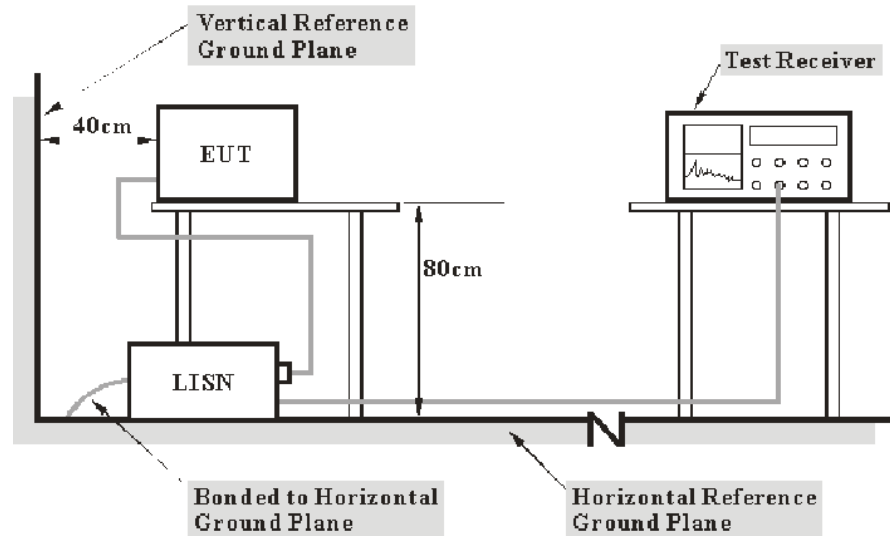
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/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, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



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

3.1.3 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

3.1.4 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.

3.1.5 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

3.2 Radiation Spurious Emissions

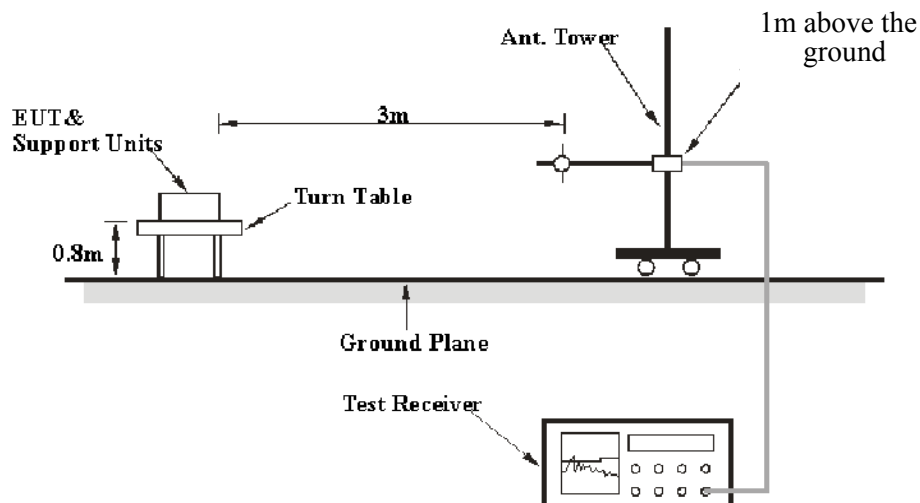
3.2.1 Applicable Standard

FCC §15.247 (d);

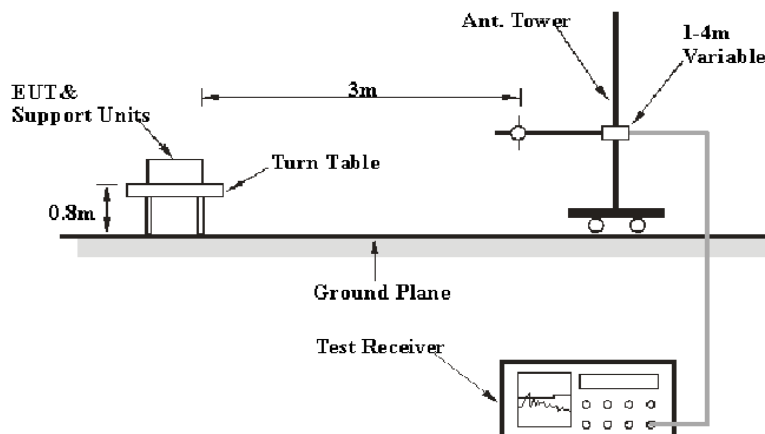
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the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

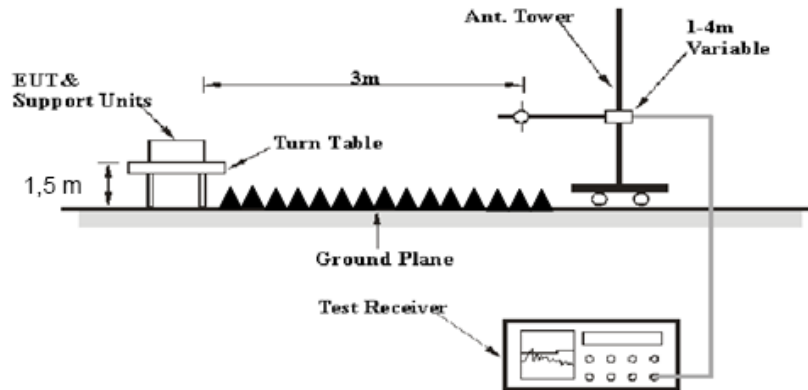
3.2.2 EUT Setup

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.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz 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	RBW	Video B/W	IF B/W	Measurement
9 kHz – 150 kHz	300 Hz	1 kHz	/	PK
	/	/	200 Hz	QP/AV
150 kHz – 30 MHz	10 kHz	30 kHz	/	PK
	/	/	9 kHz	QP/AV
30 MHz – 1000 MHz	100 kHz	300 kHz	/	PK
	/	/	120 kHz	QP

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.

The spurious emissions which below the limit more than 20dB was not be recorded.

3.2.4 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.

3.2.5 Corrected Amplitude & 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

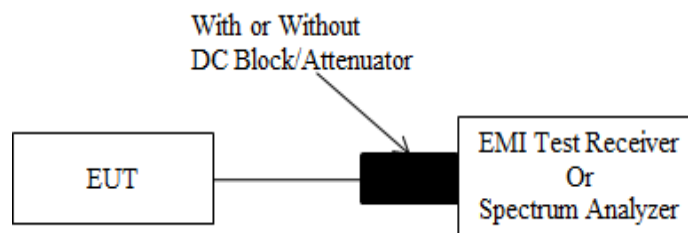
3.3 Minimum 6 dB Bandwidth

3.3.1 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.

3.3.2 EUT Setup



3.3.3 Test Procedure

According to ANSI C63.10-2013 Section 11.8

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- 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.

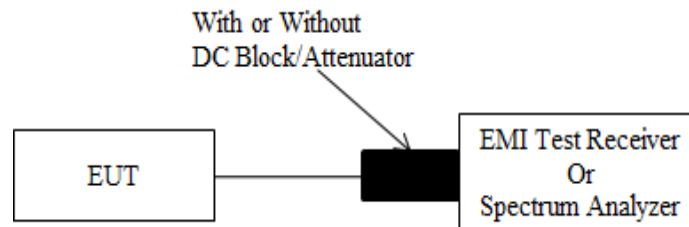
3.4 Maximum Conducted Output Power

3.4.1 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.

3.4.2 EUT Setup



3.4.3 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:

- Set the RBW $\geq$ DTS bandwidth.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Set span $\geq [3 \times \text{RBW}]$.
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

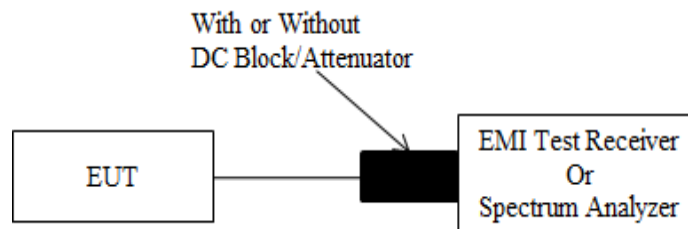
3.5 Maximum power spectral density

3.5.1 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.

3.5.2 EUT Setup



3.5.3 Test Procedure

According to ANSI C63.10-2013 Section 11.10.2

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

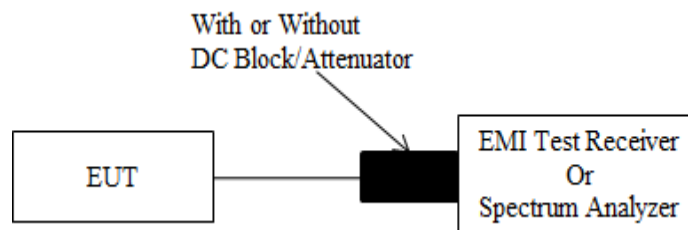
3.6 100 kHz Bandwidth of Frequency Band Edge

3.6.1 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)).

3.6.2 EUT Setup



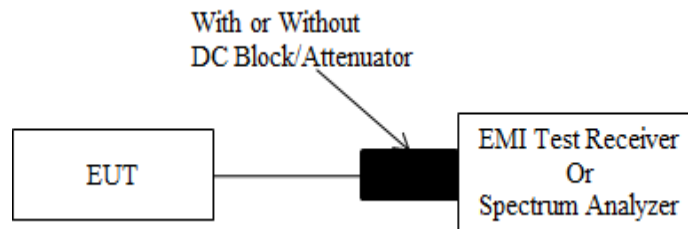
3.6.3 Test Procedure

According to ANSI C63.10-2013 Section 11.11

- Set the center frequency and span to encompass frequency range to be measured.
 - Set the RBW = 100 kHz.
 - Set the VBW $\geq [3 \times \text{RBW}]$.
 - Detector = peak.
 - Sweep time = auto couple.
 - Trace mode = max hold.
 - Allow trace to fully stabilize.
 - 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.

3.7 Duty Cycle

3.7.1 EUT Setup



3.7.2 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 $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- 3) Set $VBW \geq RBW$. 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 $T \leq 16.7 \mu s$.)

3.8 Antenna Requirement

3.8.1 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.

3.8.2 Judgment

Compliant. Please refer to the Antenna Information detail in Section 1.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Not Applicable, the device was powered by battery when operating.

4.2 Radiation Spurious Emissions

4.2.1 9 kHz – 1 GHz

Serial Number:	2LLA-2	Test Date:	2024/5/25
Test Site:	966-2	Test Mode:	Transmitting(maximum output power mode, BLE 2Mbps high channel)
Tester:	Carl Xue	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	26.4	Relative Humidity: (%)	59	ATM Pressure: (kPa)	100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2023/12/1	2026/11/30
BACL	Loop Antenna	1313-1A	3110611	2023/12/4	2026/12/3
Daruikang	Coaxial Cable	BNC-JJ-RG58	C-0300-01	2024/1/11	2025/1/10
Daruikang	Coaxial Cable	BNC-JJ-RG58	C-0500-01	2024/1/11	2025/1/10
R&S	EMI Test Receiver	ESR3	102724	2024/2/29	2025/2/28
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0100-03	2023/12/4	2024/12/3
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0370-01	2023/12/4	2024/12/3
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/12/4	2024/12/3
Sonoma	Amplifier	310N	186165	2023/12/4	2024/12/3
Audix	Test Software	E3	191218 (V9)	N/A	N/A

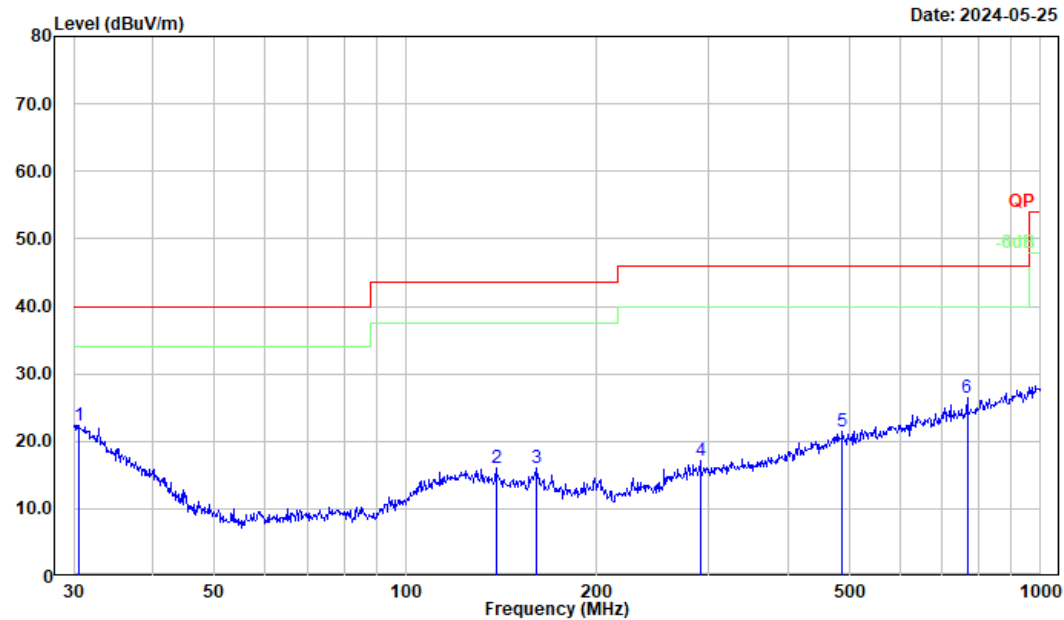
* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

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

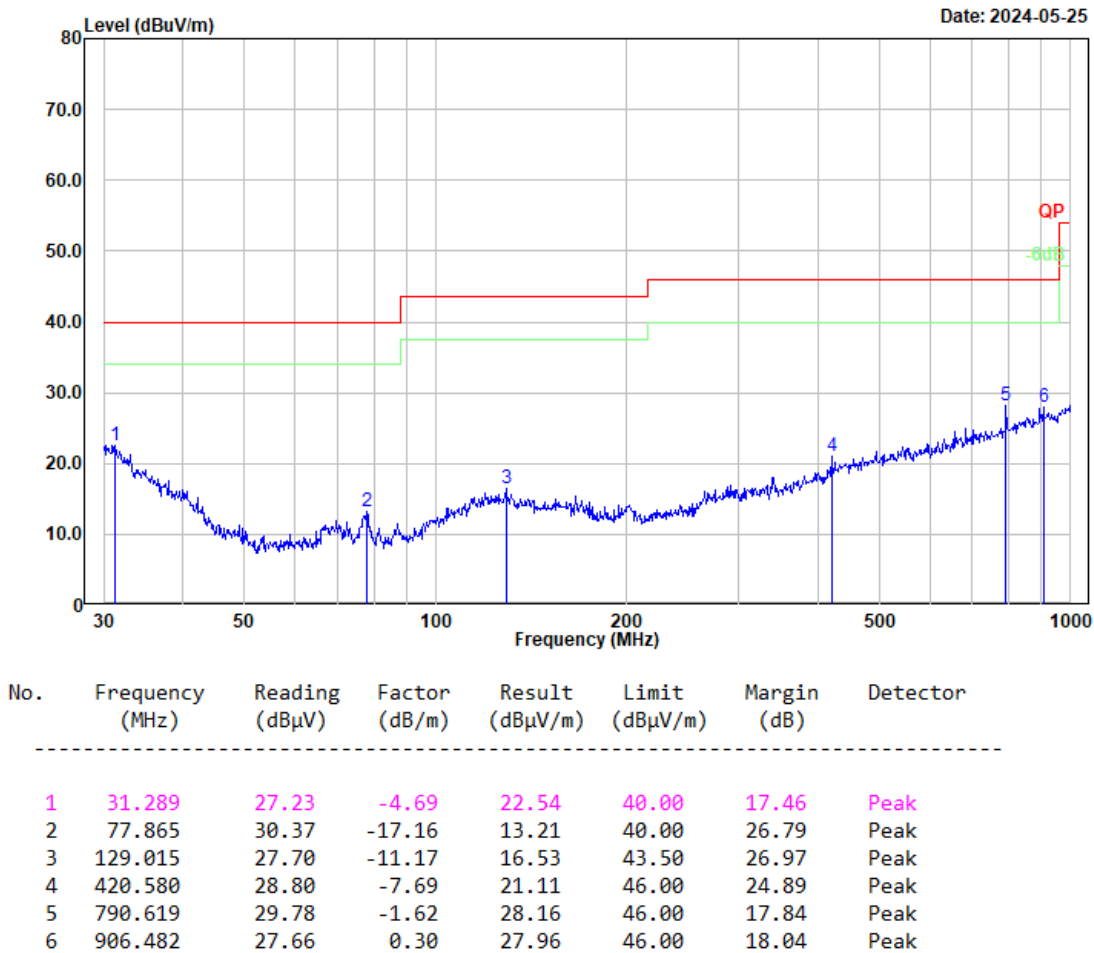
For 9kHz-30MHz, The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be reported.

Project No.: 2403T76722E-RF
Tester: Carl Xue
Polarization: horizontal
Note: Transmitting BLE



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.638	26.54	-4.24	22.30	40.00	17.70	Peak
2	138.874	27.94	-11.81	16.13	43.50	27.37	Peak
3	160.909	28.01	-11.95	16.06	43.50	27.44	Peak
4	291.036	27.42	-10.31	17.11	46.00	28.89	Peak
5	487.315	27.59	-6.03	21.56	46.00	24.44	Peak
6	766.057	28.52	-2.16	26.36	46.00	19.64	Peak

Project No.: 2403T76722E-RF
Tester: Carl Xue
Polarization: vertical
Note: Transmitting BLE



4.2.2 1GHz – 25 GHz:

Serial Number:	2LLA-2	Test Date:	2024/5/27
Test Site:	966-1	Test Mode:	Transmitting
Tester:	Mack Huang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	26.2	Relative Humidity: (%)	59	ATM Pressure: (kPa)	100.1
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ETS-Lindgren	Horn Antenna	3115	9912-5985	2023/12/6	2026/12/5
R&S	Spectrum Analyzer	FSV40	101591	2024/4/1	2025/3/31
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2024/1/15	2025/1/14
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2024/1/15	2025/1/14
BACL	Preamplifier	1313-A20M18G	4032311	2024/4/1	2025/3/31
Audix	Test Software	E3	191218 (V9)	N/A	N/A
PASTERNAK	Horn Antenna	PE9852/2F-20	112002	2024/2/4	2027/2/3
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2024/1/15	2025/1/14
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2024/1/15	2025/1/14
JD	Multiplex Switch Test Control Set	DT7220SCU	DQ77925	2023/8/6	2024/8/5
JD	Filter Switch Unit	DT7220FSU	DQ77928	2023/8/6	2024/8/5

** 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:

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

BLE 1Mbps:

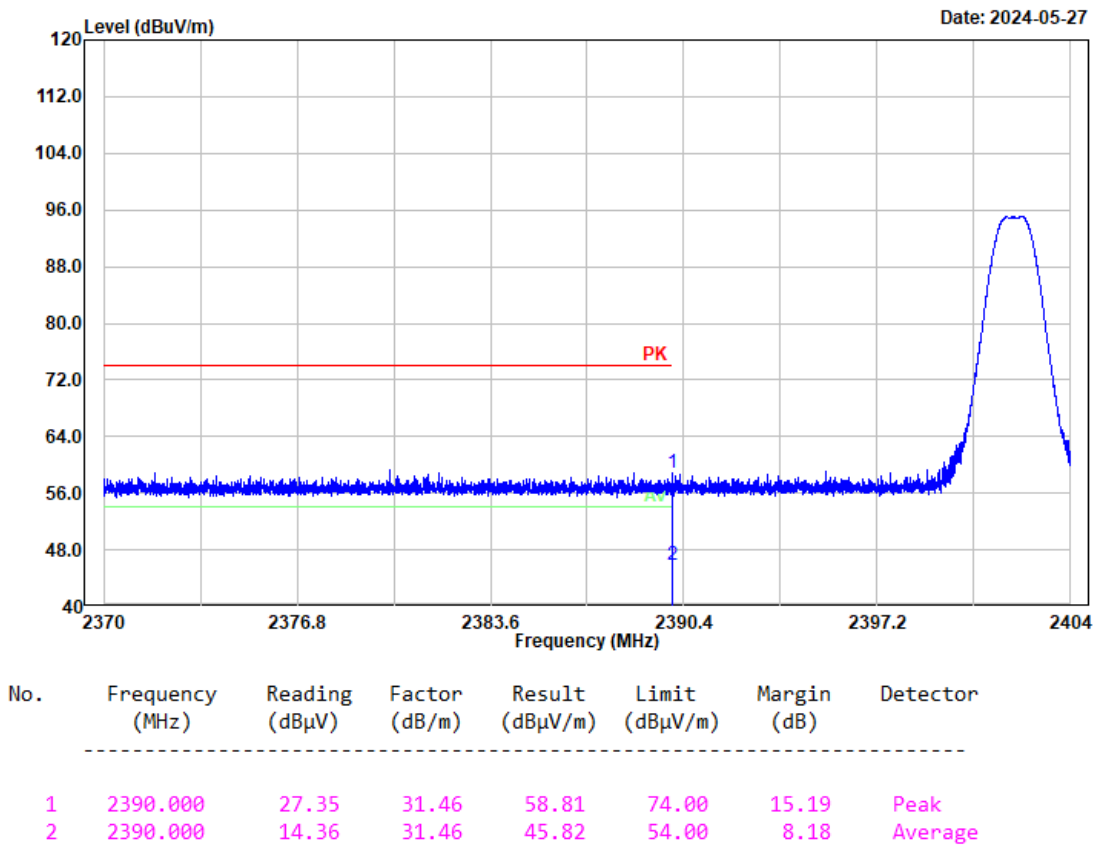
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel:				2402	MHz		
2390.000	27.35	PK	H	31.46	58.81	74.00	15.19
2390.000	14.36	AV	H	31.46	45.82	54.00	8.18
2390.000	27.08	PK	V	31.46	58.54	74.00	15.46
2390.000	13.79	AV	V	31.46	45.25	54.00	8.75
4804.000	36.41	PK	H	8.50	44.91	74.00	29.09
4804.000	24.33	AV	H	8.50	32.83	54.00	21.17
4804.000	35.71	PK	V	8.50	44.21	74.00	29.79
4804.000	23.63	AV	V	8.50	32.13	54.00	21.87
7206.000	35.20	PK	H	11.39	46.59	74.00	27.41
7206.000	23.11	AV	H	11.39	34.50	54.00	19.50
7206.000	35.88	PK	V	11.39	47.27	74.00	26.73
7206.000	23.01	AV	V	11.39	34.40	54.00	19.60
Middle Channel:				2440	MHz		
4880.000	34.12	PK	H	8.96	43.08	74.00	30.92
4880.000	22.38	AV	H	8.96	31.34	54.00	22.66
4880.000	35.05	PK	V	8.96	44.01	74.00	29.99
4880.000	23.28	AV	V	8.96	32.24	54.00	21.76
7320.000	35.10	PK	H	11.56	46.66	74.00	27.34
7320.000	23.52	AV	H	11.56	35.08	54.00	18.92
7320.000	34.96	PK	V	11.56	46.52	74.00	27.48
7320.000	22.45	AV	V	11.56	34.01	54.00	19.99
High Channel:				2480	MHz		
2483.500	26.33	PK	H	31.50	57.83	74.00	16.17
2483.500	13.77	AV	H	31.50	45.27	54.00	8.73
2483.500	27.01	PK	V	31.50	58.51	74.00	15.49
2483.500	13.86	AV	V	31.50	45.36	54.00	8.64
4960.000	35.82	PK	H	8.80	44.62	74.00	29.38
4960.000	23.44	AV	H	8.80	32.24	54.00	21.76
4960.000	35.13	PK	V	8.80	43.93	74.00	30.07
4960.000	23.08	AV	V	8.80	31.88	54.00	22.12
7440.000	36.59	PK	H	11.47	48.06	74.00	25.94
7440.000	24.53	AV	H	11.47	36.00	54.00	18.00
7440.000	35.67	PK	V	11.47	47.14	74.00	26.86
7440.000	23.51	AV	V	11.47	34.98	54.00	19.02

BLE 2Mbps:

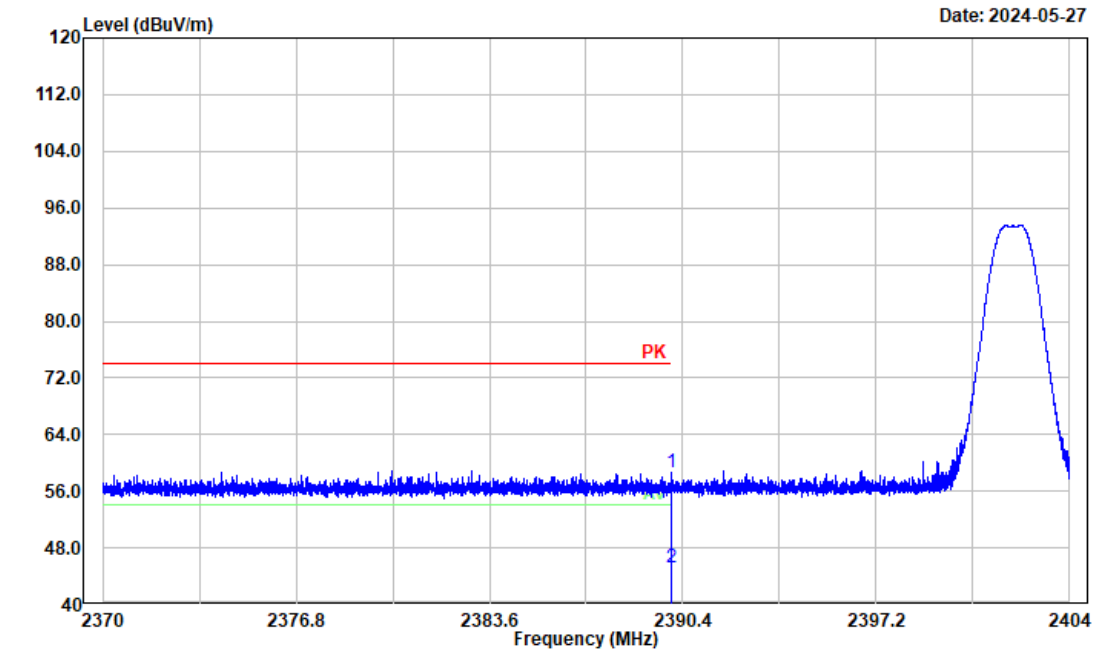
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 2402 MHz							
2390.000	27.30	PK	H	31.46	58.76	74.00	15.24
2390.000	14.20	AV	H	31.46	45.66	54.00	8.34
2390.000	26.88	PK	V	31.46	58.34	74.00	15.66
2390.000	13.87	AV	V	31.46	45.33	54.00	8.67
4804.000	35.41	PK	H	8.50	43.91	74.00	30.09
4804.000	23.17	AV	H	8.50	31.67	54.00	22.33
4804.000	35.88	PK	V	8.50	44.38	74.00	29.62
4804.000	23.31	AV	V	8.50	31.81	54.00	22.19
7206.000	35.74	PK	H	11.39	47.13	74.00	26.87
7206.000	23.11	AV	H	11.39	34.50	54.00	19.50
7206.000	34.80	PK	V	11.39	46.19	74.00	27.81
7206.000	22.54	AV	V	11.39	33.93	54.00	20.07
Middle Channel: 2440 MHz							
4880.000	35.65	PK	H	8.96	44.61	74.00	29.39
4880.000	23.07	AV	H	8.96	32.03	54.00	21.97
4880.000	35.93	PK	V	8.96	44.89	74.00	29.11
4880.000	23.43	AV	V	8.96	32.39	54.00	21.61
7320.000	36.18	PK	H	11.56	47.74	74.00	26.26
7320.000	24.20	AV	H	11.56	35.76	54.00	18.24
7320.000	35.13	PK	V	11.56	46.69	74.00	27.31
7320.000	23.36	AV	V	11.56	34.92	54.00	19.08
High Channel: 2480 MHz							
2483.500	26.85	PK	H	31.50	58.35	74.00	15.65
2483.500	13.44	AV	H	31.50	44.94	54.00	9.06
2483.500	26.89	PK	V	31.50	58.39	74.00	15.61
2483.500	13.91	AV	V	31.50	45.41	54.00	8.59
4960.000	35.41	PK	H	8.80	44.21	74.00	29.79
4960.000	23.22	AV	H	8.80	32.02	54.00	21.98
4960.000	35.07	PK	V	8.80	43.87	74.00	30.13
4960.000	23.11	AV	V	8.80	31.91	54.00	22.09
7440.000	35.45	PK	H	11.47	46.92	74.00	27.08
7440.000	23.86	AV	H	11.47	35.33	54.00	18.67
7440.000	35.37	PK	V	11.47	46.84	74.00	27.16
7440.000	23.33	AV	V	11.47	34.80	54.00	19.20

Worst band edge test plots(BLE 1Mbps low channel):

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: Horizontal
Note: BLE 1Mbps Low Channel 2402MHz



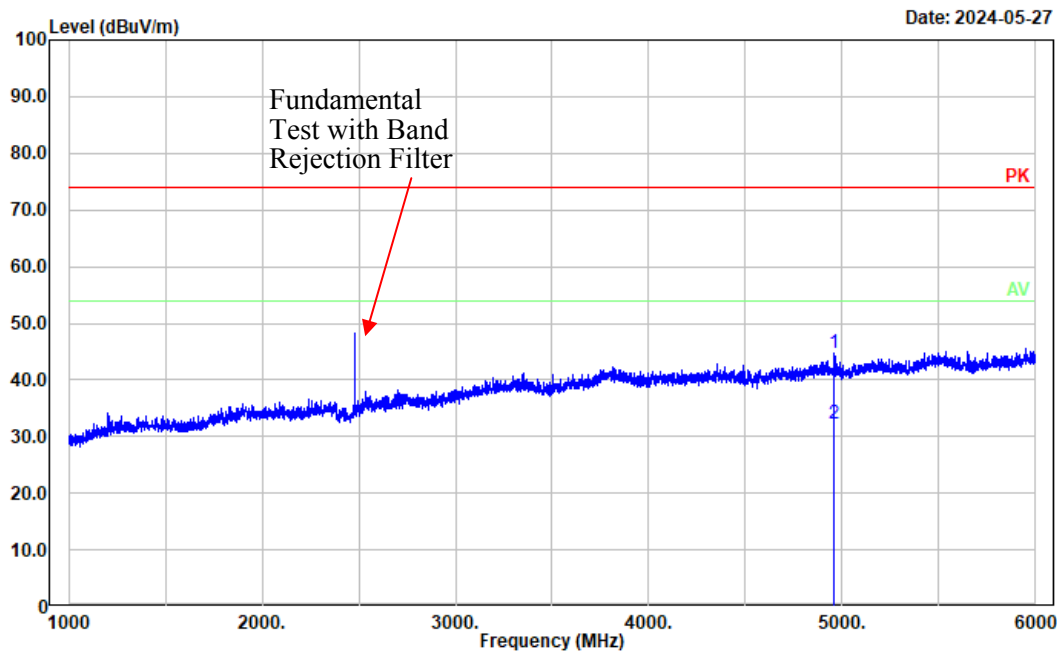
Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: Vertical
Note: BLE 1Mbps Low Channel 2402MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	2390.000	27.08	31.46	58.54	74.00	15.46	Peak
2	2390.000	13.79	31.46	45.25	54.00	8.75	Average

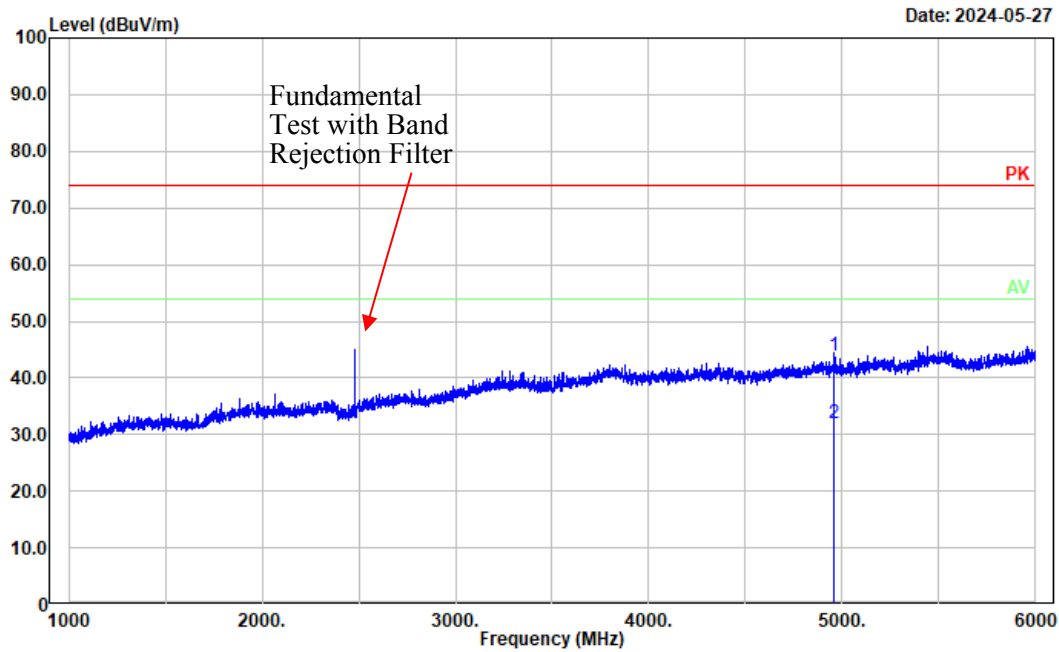
Worst radiation spurious emissions margin test plots(BLE 1Mbps high channel):

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: horizontal
Note: BLE 1Mbps High Channel 2480MHz



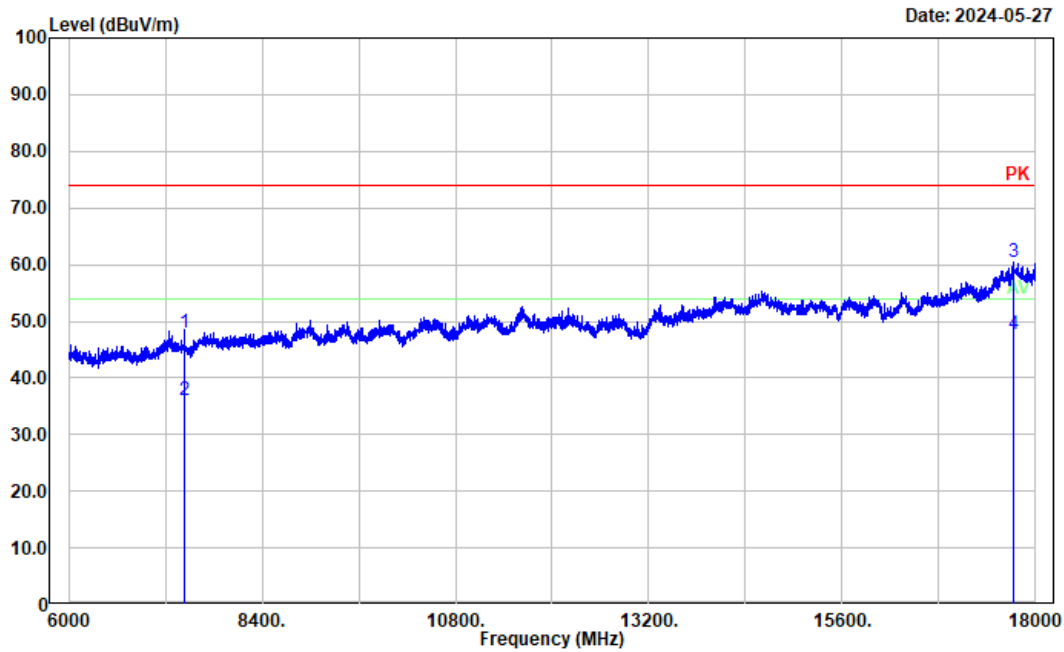
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4960.000	35.82	8.80	44.62	74.00	29.38	Peak
2	4960.000	23.44	8.80	32.24	54.00	21.76	Average

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: vertical
Note: BLE 1Mbps High Channel 2480MHz



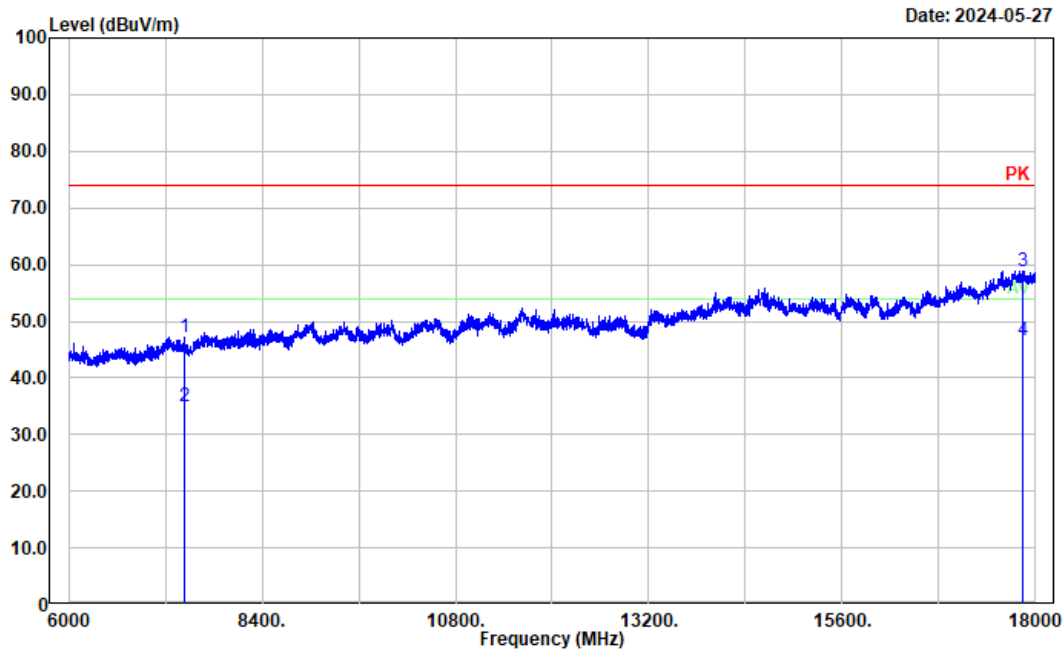
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	4960.000	35.13	8.80	43.93	74.00	30.07	Peak
2	4960.000	23.08	8.80	31.88	54.00	22.12	Average

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: horizontal
Note: BLE 1Mbps High Channel 2480MHz



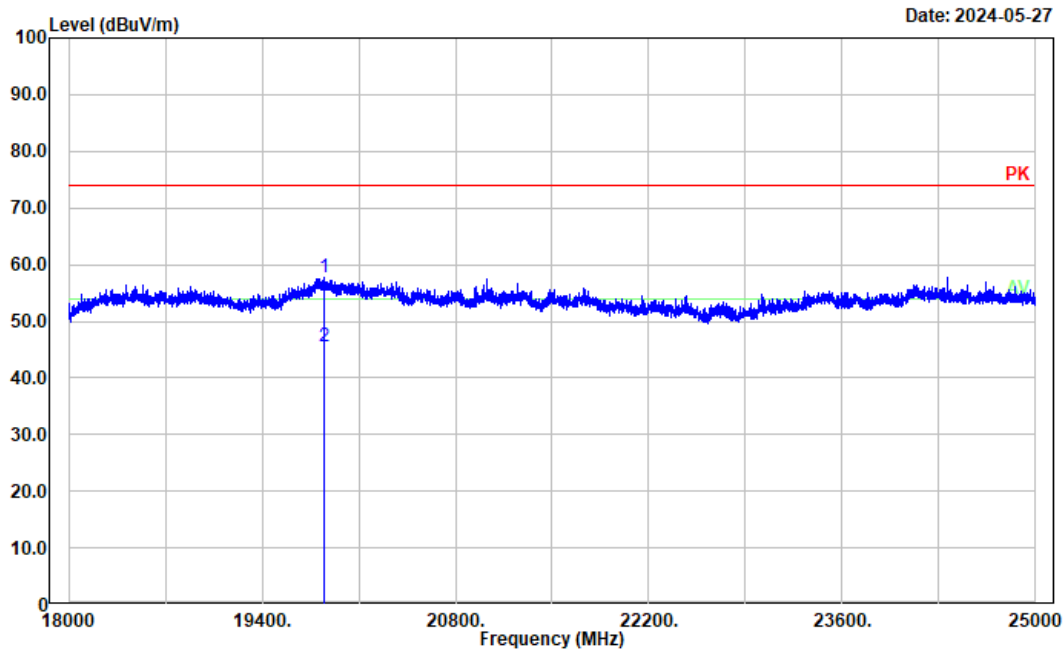
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7440.000	36.59	11.47	48.06	74.00	25.94	Peak
2	7440.000	24.53	11.47	36.00	54.00	18.00	Average
3	17728.800	34.46	25.87	60.33	74.00	13.67	Peak
4	17728.800	21.76	25.87	47.63	54.00	6.37	Average

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: vertical
Note: BLE 1Mbps High Channel 2480MHz



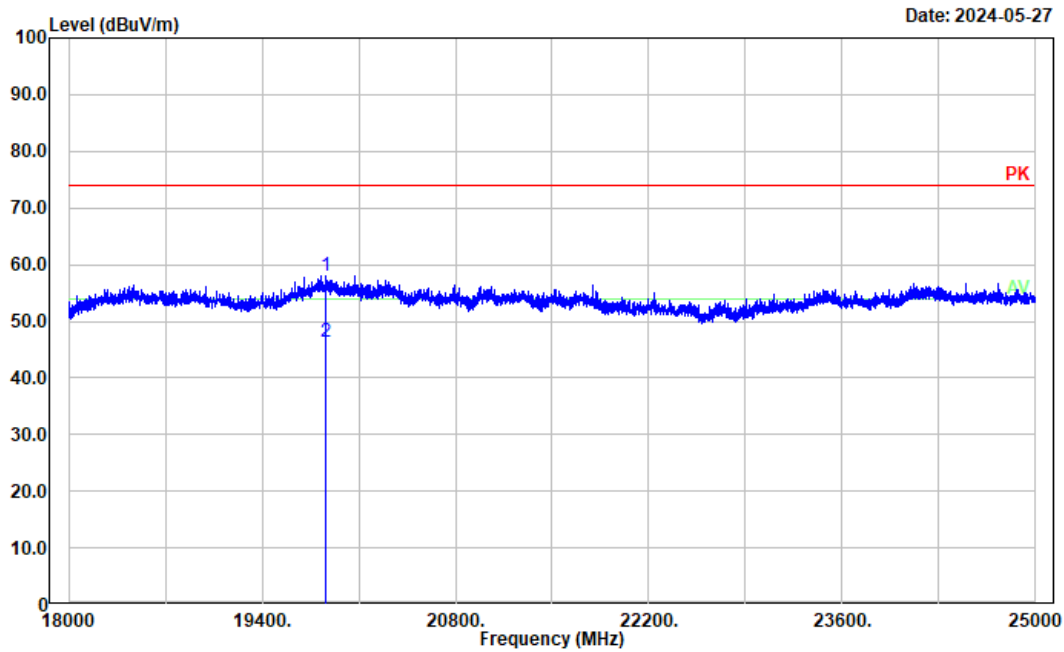
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	7440.000	35.67	11.47	47.14	74.00	26.86	Peak
2	7440.000	23.51	11.47	34.98	54.00	19.02	Average
3	17832.000	33.18	25.71	58.89	74.00	15.11	Peak
4	17832.000	20.84	25.71	46.55	54.00	7.45	Average

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: Horizontal
Note: BLE 1Mbps High Channel 2480MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	19845.200	49.89	7.96	57.85	74.00	16.15	Peak
2	19845.200	37.70	7.96	45.66	54.00	8.34	Average

Project No.: 2403T76722E-RF
Tester: Mack Huang
Polarization: Vertical
Note: BLE 1Mbps High Channel 2480MHz



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	19864.800	50.07	7.96	58.03	74.00	15.97	Peak
2	19864.800	38.43	7.96	46.39	54.00	7.61	Average

4.3 6dB Emission Bandwidth

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).

BLE 1M

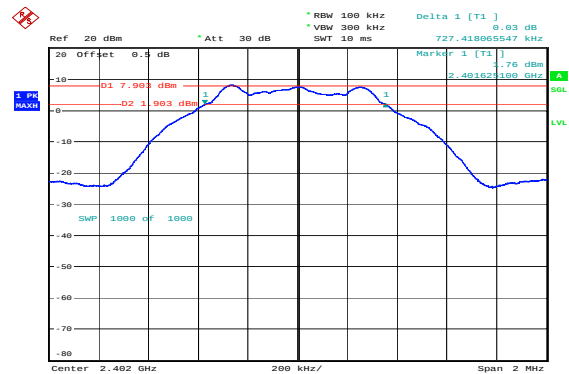
Mode	Value (MHz)	Limit (MHz)	Result
Low	0.727	0.500	Pass
Middle	0.724	0.500	Pass
High	0.723	0.500	Pass

BLE 2M

Mode	Value (MHz)	Limit (MHz)	Result
Low	1.267	0.500	Pass
Middle	1.271	0.500	Pass
High	1.259	0.500	Pass

BLE 1M

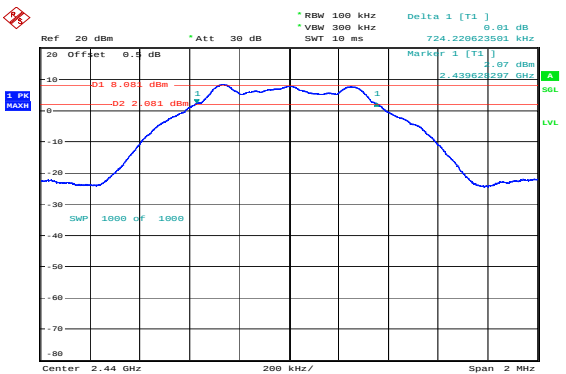
Low 0.727MHz



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 25.MAY.2024 14:48:29

Middle 0.724MHz

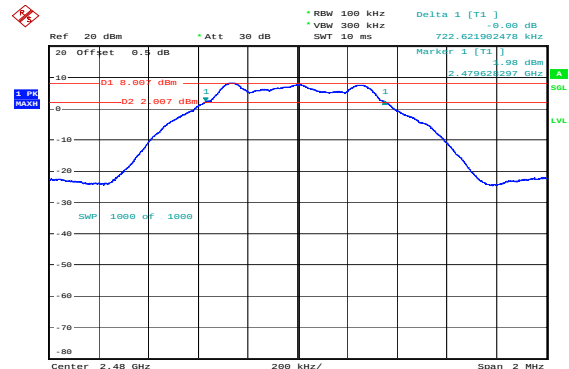


Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 25.MAY.2024 14:55:01

BLE 2M

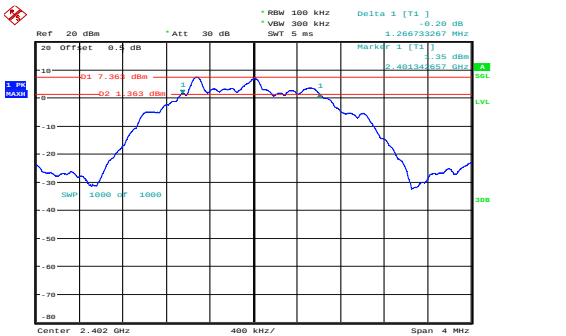
High 0.723MHz



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 25.MAY.2024 15:03:24

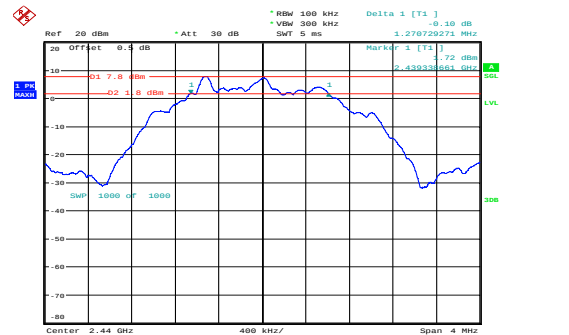
Low 1.267MHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 30.MAY.2024 23:54:04

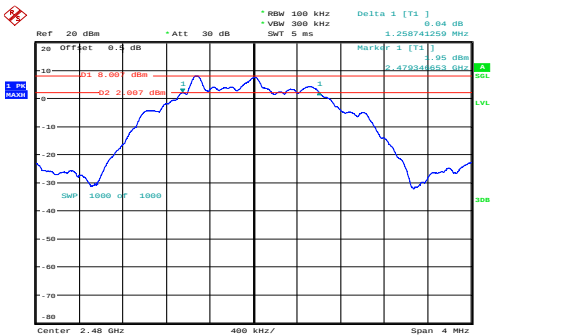
Middle 1.271MHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 31.MAY.2024 08:02:27

High 1.259MHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin

Date: 31.MAY.2024 08:12:28

4.4 99% Occupied Bandwidth

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	N/A

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).*

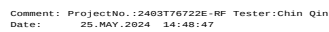
BLE 1M

Mode	99% OBW (MHz)
Low	1.039
Middle	1.039
High	1.037

BLE 2M

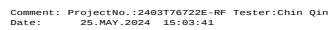
Mode	99% OBW (MHz)
Low	2.052
Middle	2.052
High	2.052

Low 1.039MHz



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:55:18

High 1.037MHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 30.MAY.2024 23:54:28

ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:02:49

ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:12:52

4.5 Maximum Conducted Output Power

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).

BLE 1M

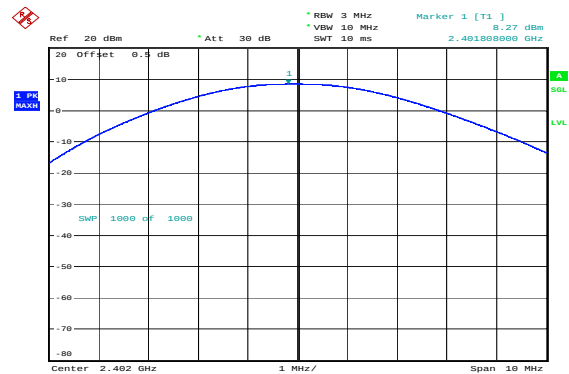
Mode	Value (dBm)	Limit (dBm)	Result
Low	8.27	30.00	Pass
Middle	8.44	30.00	Pass
High	8.41	30.00	Pass

BLE 2M

Mode	Value (dBm)	Limit (dBm)	Result
Low	7.90	30.00	Pass
Middle	8.32	30.00	Pass
High	8.52	30.00	Pass

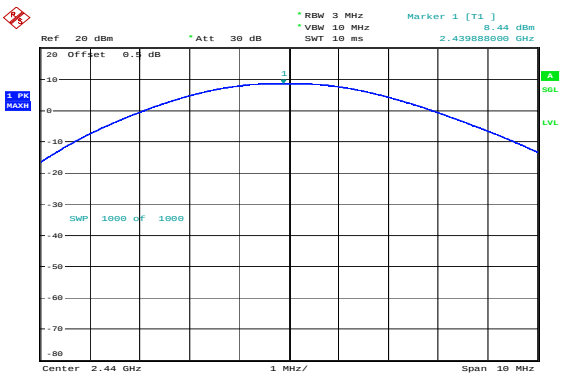
BLE 1M

Low 8.27dBm



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:51:06

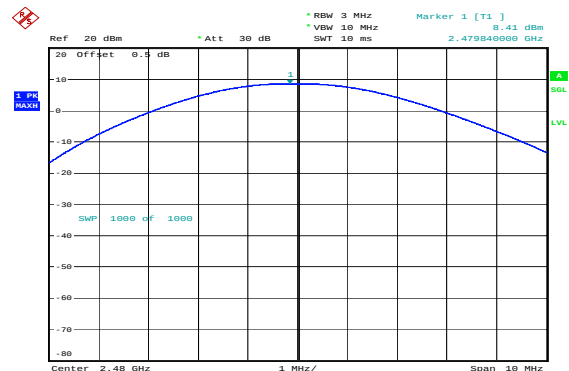
Middle 8.44dBm



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:58:08

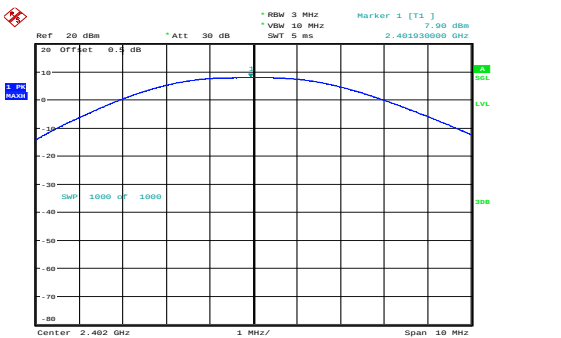
BLE 2M

High 8.41dBm



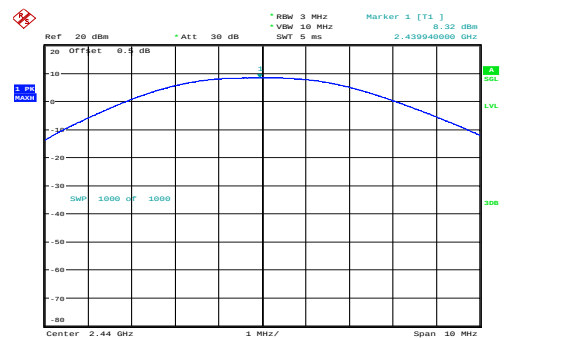
Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 15:05:58

Low 7.90dBm



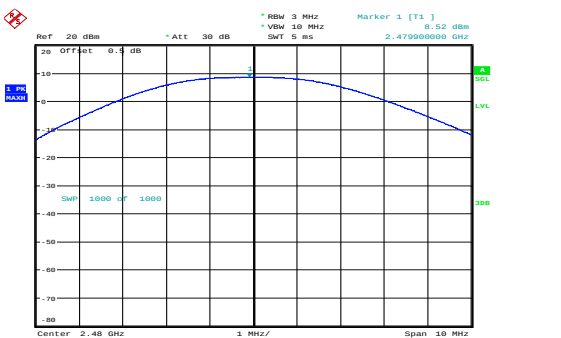
ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 30.MAY.2024 23:56:42

Middle 8.32dBm



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 08:05:19

High 8.52dBm



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 08:15:48

4.6 100 kHz Bandwidth of Frequency Band Edge

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).

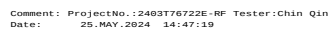
BLE 1M

Mode	Value (dB)	Limit (dB)	Result
Low	51.90	20.00	Pass
High	57.01	20.00	Pass

BLE 2M

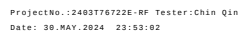
Mode	Value (dB)	Limit (dB)	Result
Low	31.28	20.00	Pass
High	55.63	20.00	Pass

Low 51.90dB



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 15:02:17

Low 31.28dB



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:11:04

4.7 Power Spectral Density

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	Pass

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).

BLE 1M

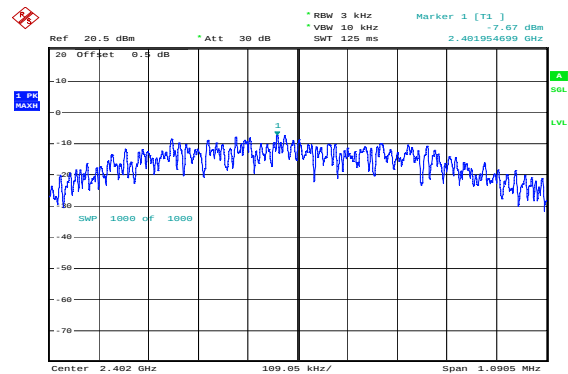
Mode	Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low	-7.67	8.00	Pass
Middle	-7.45	8.00	Pass
High	-7.47	8.00	Pass

BLE 2M

Mode	Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low	-11.73	8.00	Pass
Middle	-11.29	8.00	Pass
High	-11.07	8.00	Pass

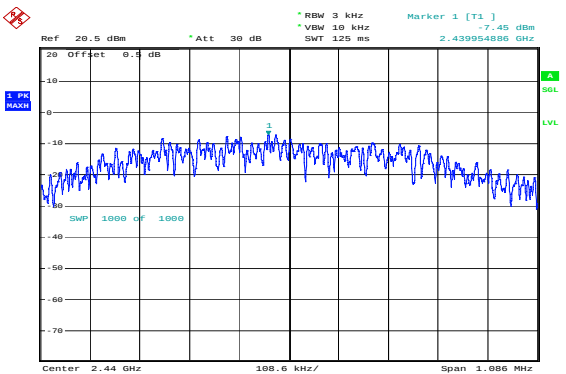
BLE 1M

Low -7.67dBm/3kHz



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:53:36

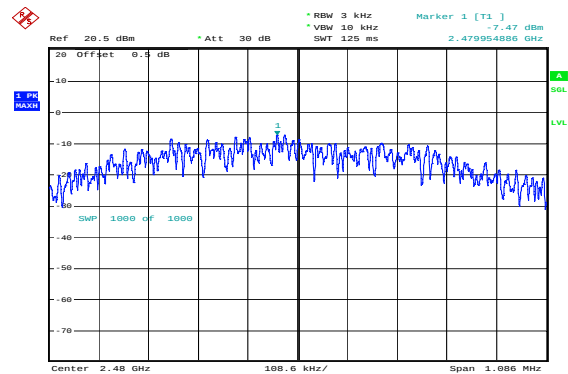
Middle -7.45dBm/3kHz



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 15:00:36

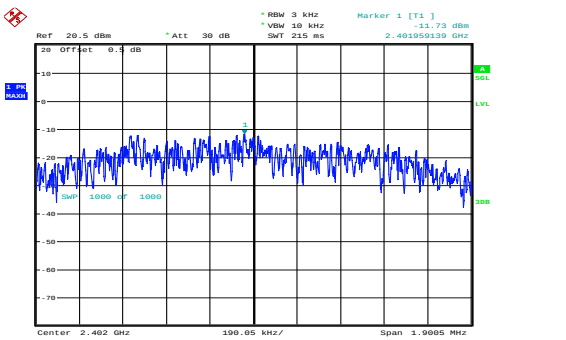
BLE 2M

High -7.47dBm/3kHz



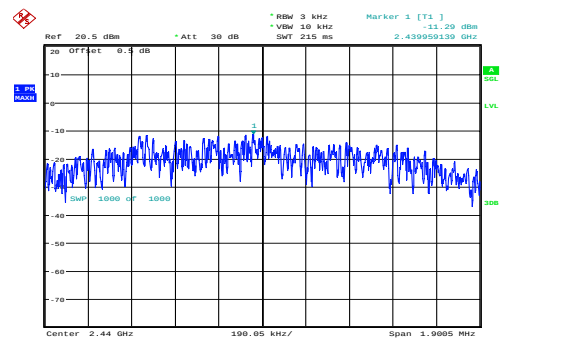
Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 15:08:28

Low -11.73dBm/3kHz



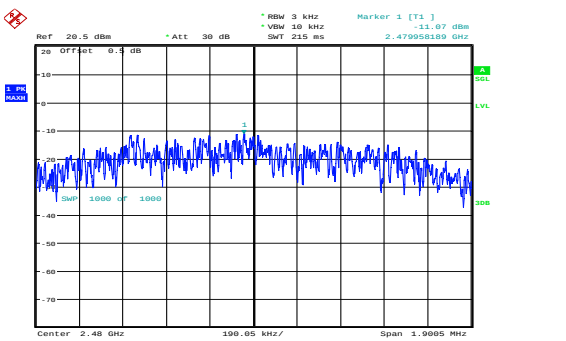
ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:00:39

Middle -11.29dBm/3kHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:09:14

High -11.07dBm/3kHz



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 00:19:35

4.8 Duty Cycle

Test Information:

Serial No.:	2LLA-1	Test Date:	2024/5/25~2024/5/31
Test Site:	RF	Test Mode:	Transmitting
Tester:	Chin Qin	Test Result:	N/A

Environmental Conditions:

Temperature: (°C):	26.3~26.4	Relative Humidity: (%)	49~51	ATM Pressure: (kPa)	100.1~100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU26	200256	2024/04/01	2025/03/31
R&S	Spectrum Analyzer	FSU26	100147	2024/04/01	2025/03/31
zhuoxiang	Coaxial Cable	SMA-178	211001	Each Time	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).

BLE 1M

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	1/T (Hz)	VBW Setting (kHz)
Low	0.414	0.625	66.24	2415	3.000
Middle	0.414	0.620	66.77	2415	3.000
High	0.424	0.625	67.84	2358	3.000

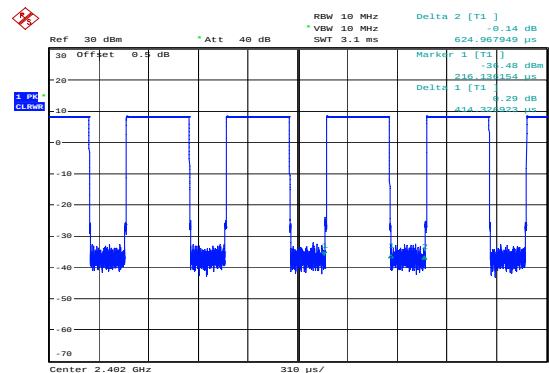
BLE 2M

Mode	Ton (ms)	Ton+Toff (ms)	Duty Cycle (%)	1/T (Hz)	VBW Setting (kHz)
Low	1.107	1.881	58.85	903	1.000
Middle	1.107	1.881	58.85	903	1.000
High	1.106	1.880	58.83	904	1.000

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

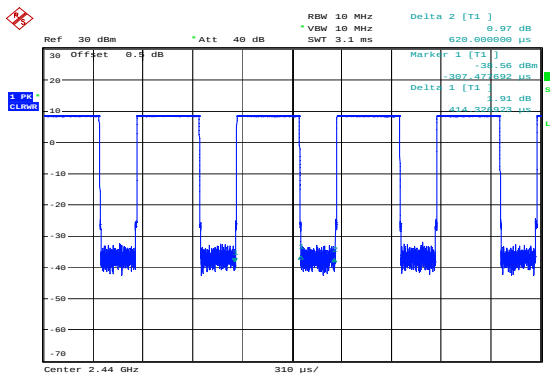
BLE 1M

Low
0.414ms,0.625ms



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:50:01

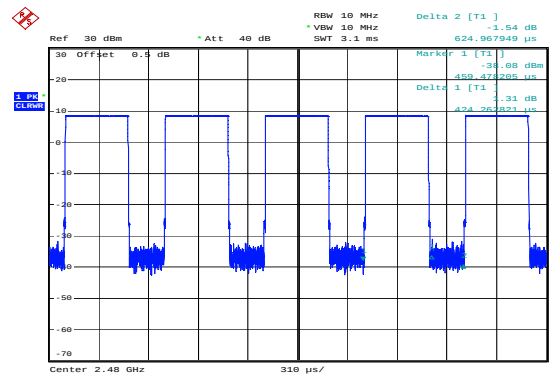
Middle
0.414ms,0.620ms



Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 14:57:02

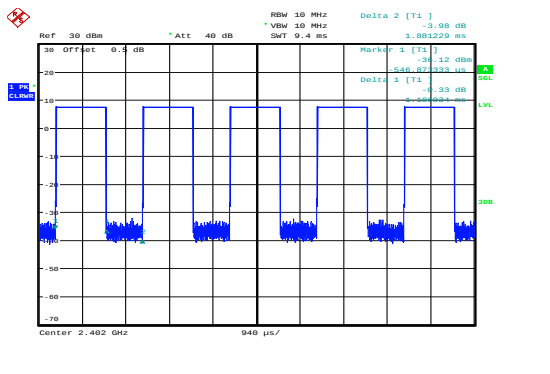
BLE 2M

High
0.424ms,0.625ms



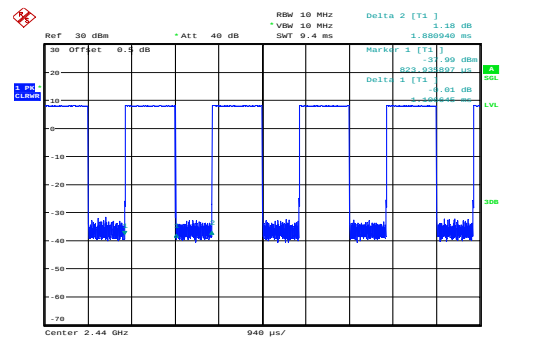
Comment: ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 25.MAY.2024 15:04:53

Low
1.107ms,1.881ms



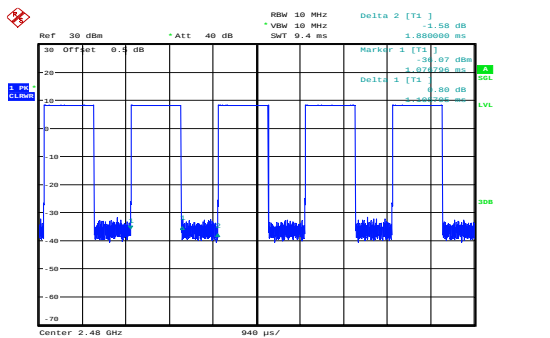
ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 08:24:08

Middle
1.107ms,1.881ms



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 09:25:40

High
1.106ms,1.880ms



ProjectNo.:2403T76722E-RF Tester:Chin Qin
Date: 31.MAY.2024 09:27:10

5. RF EXPOSURE EVALUATION

5.1 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:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ 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.

5.2 Measurement Result

The max conducted power including tune-up tolerance is 9 dBm (7.94mW).

$[(\text{max. power of channel, mW})/(\text{min. test separation distance, mm})][\sqrt{f(\text{GHz})}]$
 $= 7.94/5 \cdot (\sqrt{2.480}) = 2.5 < 3.0$

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

6. EUT PHOTOGRAPHS

Please refer to the attachment 2403T76722E-RF-EXP EUT EXTERNAL PHOTOGRAPHS and 2403T76722E-RF-INP EUT INTERNAL PHOTOGRAPHS

7. TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2403T76722E-RF-00A-TSP TEST SETUP PHOTOGRAPHS.

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