

Qingdao Yeelink Information Technology Co., Ltd.

RF TEST REPORT

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FCC Part 15.247 RF report

Model:

TH-EFR32-MG21

REPORT NUMBER:

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FCC ID : 2ABEU-THMG21

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2023): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2020): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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Revision History

Report No.	Version	Description	Issued Date
2501B1263SHA-002	Rev. 01	Initial issue of report	May 16, 2025

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum conducted output power and e.i.r.p.	15.247(b)(3)	Pass
Power spectrum density	15.247(e)	Pass
Emission outside the frequency band	15.247(d)	Pass
Radiated Emissions in restricted frequency bands	15.247(d), 15.205&15.209	Pass
Power line conducted emission	15.207(a)	Pass
Antenna requirement	15.203	Pass

Notes: 1: NA =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	IoT Module With Thread
Type/Model:	TH-EFR32-MG21
Description of EUT:	EUT is a wireless module, it has only one model.
Rating:	DC 3.3±0.3 V
Category of EUT:	Class B
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	February 23, 2025
Date of test:	February 25, 2025 – February 27, 2025

1.2 Technical Specification

Frequency Range:	2405-2480MHz
Protocol:	IEEE 802.15.4
Channel Number:	16
Channel Separation:	5MHz
Antenna Information:	PCB antenna, 1.0dBi max

Note:

1. This information is supplied by the applicant. Any change in this value would result in different test data / conclusion.

1.3 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2023)

ANSI C63.10 (2020)

KDB 558074 D01 15.247 Meas Guidance v05r02

2.2 Mode of operation during the test

Three axes (X, Y, Z) were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded. Compare with the test results that X axis is the worst case.

The channels were tested as representatives.

Frequency Band (MHz)				2405 ~ 2480			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460	26	2480

Data rate VS Power:

The test setting software is offered by the manufactory. The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

Test software and Power Setting parameter			
Test Software	Putty		
Working Mode	Continuously transmission		
Test Channel	2405MHz	2440MHz	2480MHz
Power Setting	10dBm	10dBm	10dBm

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied. The EUT was tested together with the host device.

Radiated test mode: EUT transmitted signal with antenna;

Conducted test mode: EUT transmitted signal from RF port connected to SPA directly;

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2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	DELL 5480	-
2	RF cable	/	0.2m length; 0.5dB loss

2.5 Test environment condition:

Test items	Temperature	Humidity
Minimum 6dB Bandwidth	24°C	56% RH
Maximum conducted output power and e.i.r.p.		
Power spectrum density		
Emission outside the frequency band		
Radiated Emissions in restricted frequency bands	25°C	55% RH
Power line conducted emission	25°C	54% RH

2.6 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2025-09-14
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2025-10-23
<input checked="" type="checkbox"/>	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC5262	2025-06-10
<input checked="" type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2026-01-15
<input type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2026-03-13
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2025-07-07
<input checked="" type="checkbox"/>	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2026-03-22
<input type="checkbox"/>	Horn antenna	ETS	3116c	Ec5955	2026-01-15
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2025-09-08
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030B	EC 6078	2026-03-17
<input type="checkbox"/>	Power sensor	Agilent	U2021XA	EC 5338-1	2026-02-28
<input type="checkbox"/>	Vector Signal Generator	Agilent	N5182B	EC 5175	2026-02-28
<input type="checkbox"/>	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2026-02-28
<input type="checkbox"/>	Mobile Test System	Litepoint	lqxl	EC 5176	2026-01-08
<input type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2026-01-08
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3442	2026-01-08

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum peak output power	$\pm 0.74\text{dB}$
Radiated Emissions in restricted frequency bands below 1GHz	$\pm 4.90\text{dB}$
Radiated Emissions in restricted frequency bands above 1GHz	$\pm 5.02\text{dB}$
Emission outside the frequency band	$\pm 2.89\text{dB}$
Power line conducted emission	$\pm 3.19\text{dB}$

3 Minimum 6dB bandwidth

Test result: Pass

3.1 Limit

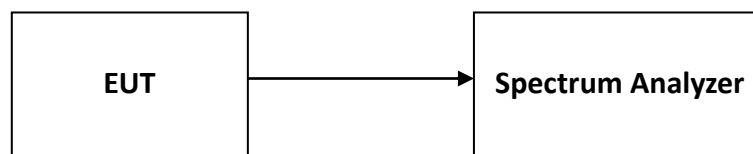
For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Measurement Procedure

The minimum 6dB bandwidth is measured using the Spectrum Analyzer according to “KDB558074 D01” (clause 8.2) for compliance requirements.

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

3.3 Test Configuration



3.4 Test Results of Minimum 6dB bandwidth

Please refer to Appendix A

TEST REPORT

4 Maximum conducted output power and e.i.r.p.

Test result: Pass

4.1 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 W. (The e.i.r.p. shall not exceed 4 W)

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

4.2 Measurement Procedure

☒ Maximum peak conducted output power

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 8.3.1) for compliance requirements.

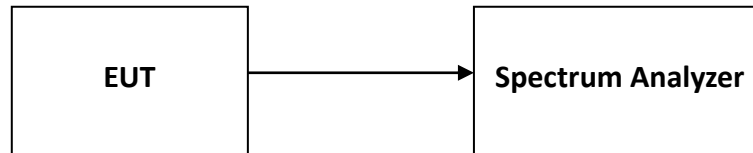
- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW $\geq 3 \times$ RBW.
- c) Set span $\geq 3 \times$ RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

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☐ Maximum conducted (average) output power

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance” (clause 8.3.2) for compliance requirements.

- a) Measure the duty cycle, x , of the transmitter output signal as described in Section 6.0.
- b) Set span to at least $1.5 \times \text{OBW}$.
- c) Set RBW = 1 % to 5 % of the OBW, not to exceed 1 MHz.
- d) Set VBW $\geq 3 \times \text{RBW}$.
- e) Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This gives bin-to-bin spacing $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to “free run”.
- i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
- j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
- k) Add $10 \log (1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on- and off-times of the transmission). For example, add $10 \log (1/0.25) = 6 \text{ dB}$ if the duty cycle is 25 %.

TEST REPORT**4.3 Test Configuration****4.4 Test Results of Maximum conducted output power**

Please refer to Appendix A

TEST REPORT

5 Power spectrum density

Test result: Pass

5.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 8dBm/MHz and $8 + (6 - \text{antenna gain} - \text{beam forming gain})$.

5.2 Measurement Procedure

☒ Method PKPSD (peak PSD)

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST REPORT☐ Method AVGPSD

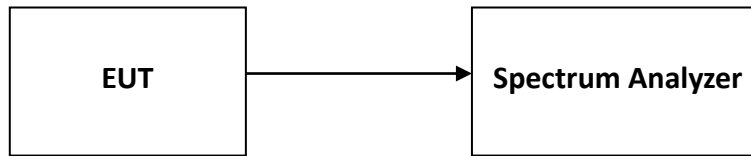
The power output was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance" (clause 8.4) for compliance requirements.

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98 %), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ± 2 %):

- a) Measure the duty cycle (x) of the transmitter output signal as described in Section 11.6.
- b) Set instrument center frequency to DTS channel center frequency.
- c) Set span to at least $1.5 \times \text{OBW}$.
- d) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- e) Set VBW $\geq 3 \times \text{RBW}$.
- f) Detector = power averaging (RMS) or sample detector (when RMS not available).
- g) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- h) Sweep time = auto couple.
- i) Do not use sweep triggering. Allow sweep to "free run".
- j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
- k) Use the peak marker function to determine the maximum amplitude level.
- l) Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

5.3 Test Configuration



5.4 Test Results of Power spectrum density

Please refer to Appendix A

TEST REPORT

6 Emission outside the frequency band

Test result: Pass

6.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

6.2 Measurement Procedure

The EUT was tested according to test procedure of "KDB558074 D01 e" (clause 11.0) for compliance requirements.

Reference level measurement

Establish a reference level by using the following procedure:

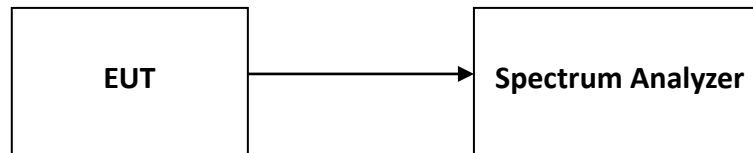
- a) Set instrument center frequency to channel center frequency.
- b) Set the span to ≥ 1.5 times the 6dB bandwidth.
- c) Set the RBW = 100 kHz.
- d) Set the VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum PSD level.

Emission level measurement

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW $\geq 3 \times$ 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) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

6.3 Test Configuration



6.4 The results of Emission outside the frequency band

Please refer to Appendix A

7 Radiated Emissions in restricted frequency bands

Test result: Pass

7.1 Limit

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

7.2 Measurement Procedure

For Radiated emission below 30MHz:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

TEST REPORT**For Radiated emission above 30MHz:**

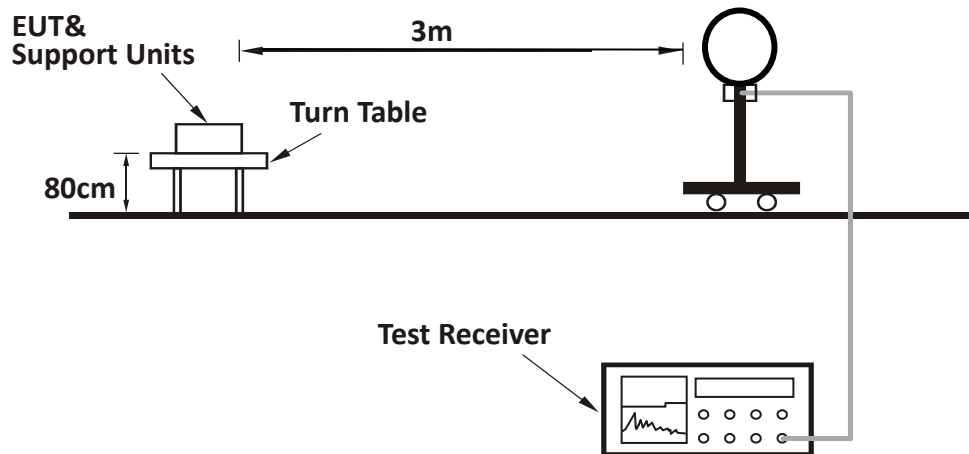
- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

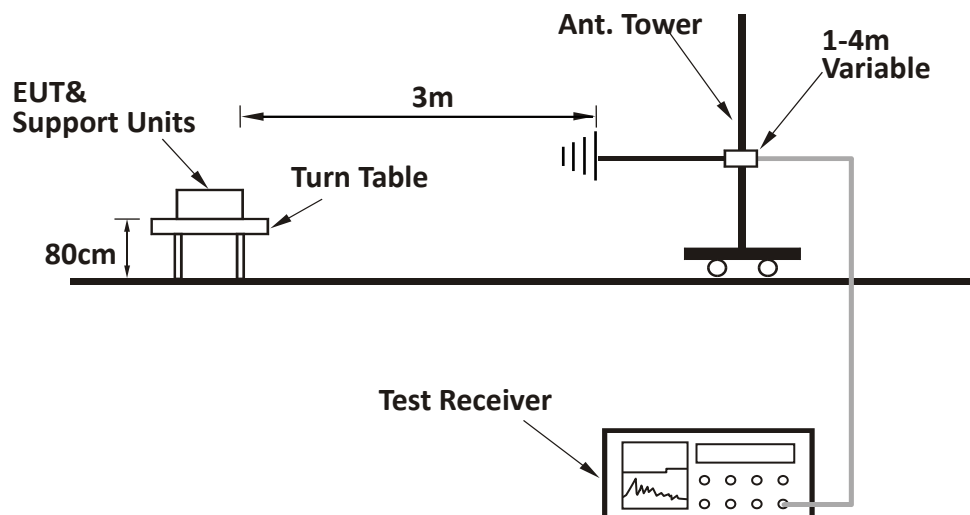
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%), peak detector or 3 x RBW (Duty cycle $\geq 98\%$), RMS detector, trace average for AV data measurement at frequency above 1GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

7.3 Test Configuration

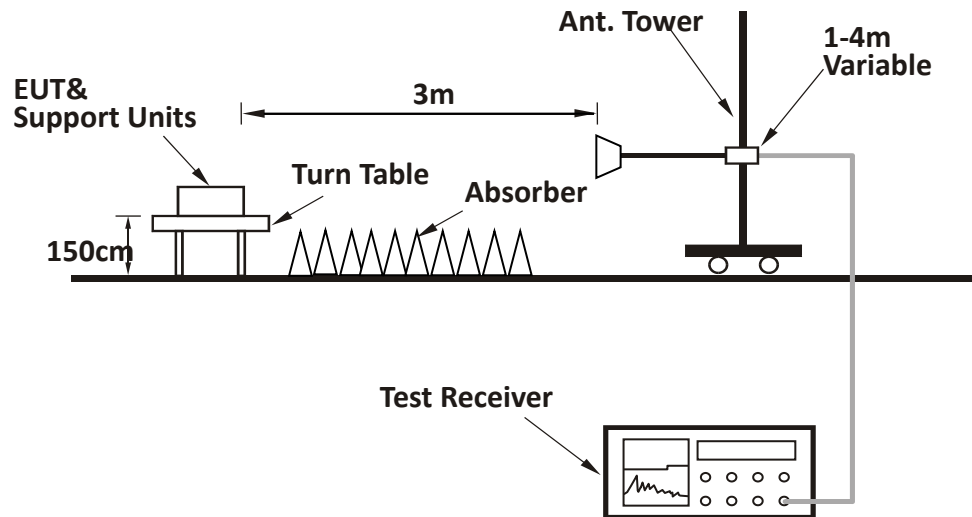
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:

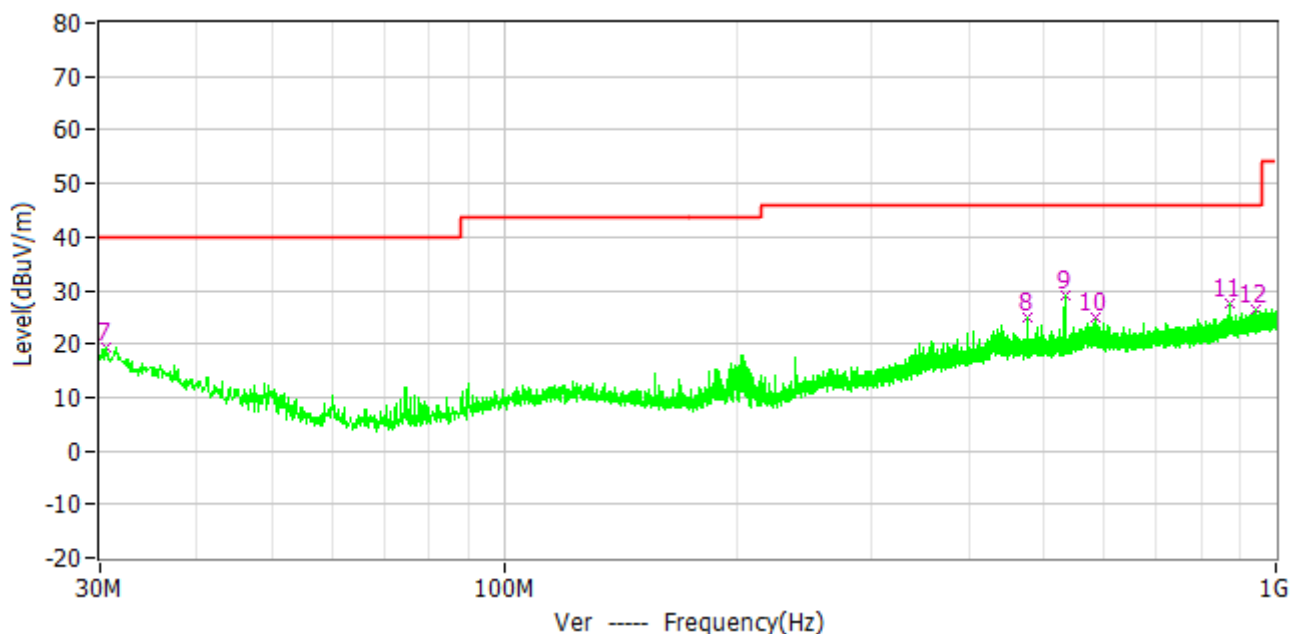
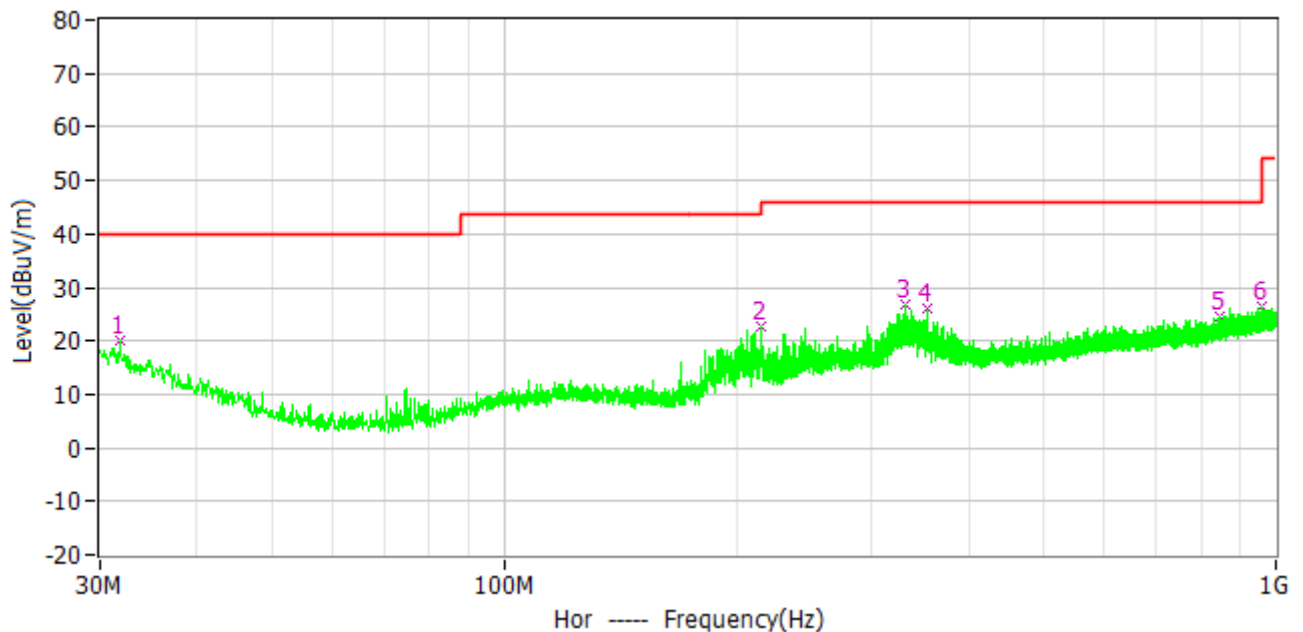


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7.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

The worst waveform from 30MHz to 1000MHz is listed as below:



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
-----	-----------	-----------------	-----------------	-------------	-----------------	----------------	----------	-------

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No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1*	31.843MHz	40.0	20.1	-19.9	1.3	18.8	PK	Hor
2*	215.949MHz	43.5	22.6	-20.9	11.7	10.9	PK	Hor
3*	331.379MHz	46.0	26.8	-19.2	10.7	16.1	PK	Hor
4*	353.980MHz	46.0	25.9	-20.1	9.2	16.7	PK	Hor
5*	844.121MHz	46.0	24.7	-21.3	1.4	23.3	PK	Hor
6*	959.745MHz	46.0	26.3	-19.7	1.6	24.7	PK	Hor
7*	30.582MHz	40.0	19.2	-20.8	-0.3	19.5	PK	Ver
8*	475.812MHz	46.0	24.9	-21.1	5.4	19.5	PK	Ver
9*	532.751MHz	46.0	28.9	-17.1	8.5	20.4	PK	Ver
10*	584.258MHz	46.0	24.8	-21.2	3.6	21.2	PK	Ver
11*	869.050MHz	46.0	27.4	-18.6	3.7	23.7	PK	Ver
12*	941.024MHz	46.0	26.3	-19.7	1.8	24.5	PK	Ver

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.

2. Level = Original Receiver Reading + Correct Factor

3. Delta = Level - Limit

4. If the PK Level is lower than AV limit, the AV test can be elided.

TEST REPORT

Test result above 1GHz:

The emission was conducted from 1GHz to 25GHz

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2390	45.90	74.00	28.10	PK
	V	2390	46.30	74.00	27.70	PK
	H	4804	46.00	74.00	28.00	PK
	V	4804	46.40	74.00	27.60	PK
M	H	4880	45.70	74.00	28.30	PK
	V	4880	45.90	74.00	28.10	PK
H	H	2483.5	52.50	74.00	21.50	PK
	V	2483.5	52.70	74.00	21.30	PK
	H	4960	45.50	74.00	28.50	PK
	V	4960	45.60	74.00	28.40	PK

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
 2. Corrected Reading = Original Receiver Reading + Correct Factor
 3. Margin = Limit - Corrected Reading
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
 Limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
 Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
 Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

8 Power line conducted emission

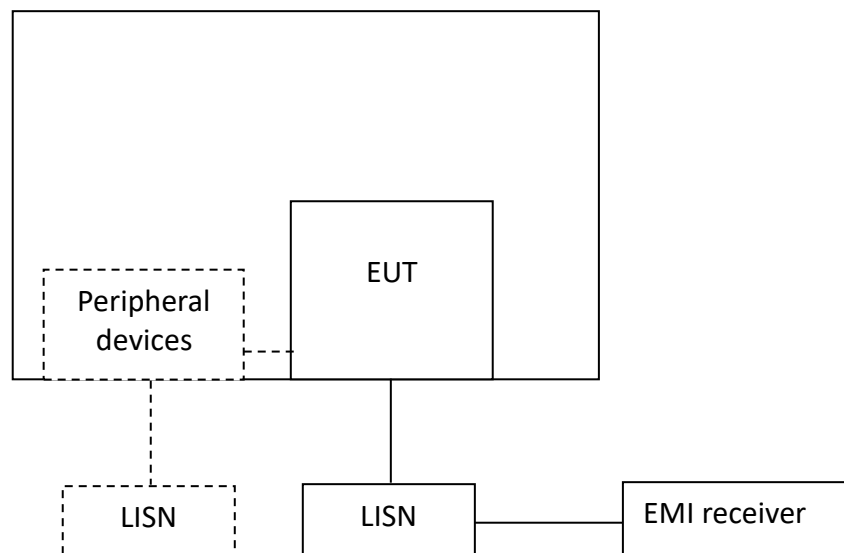
Test result: Pass

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.

8.2 Test Configuration



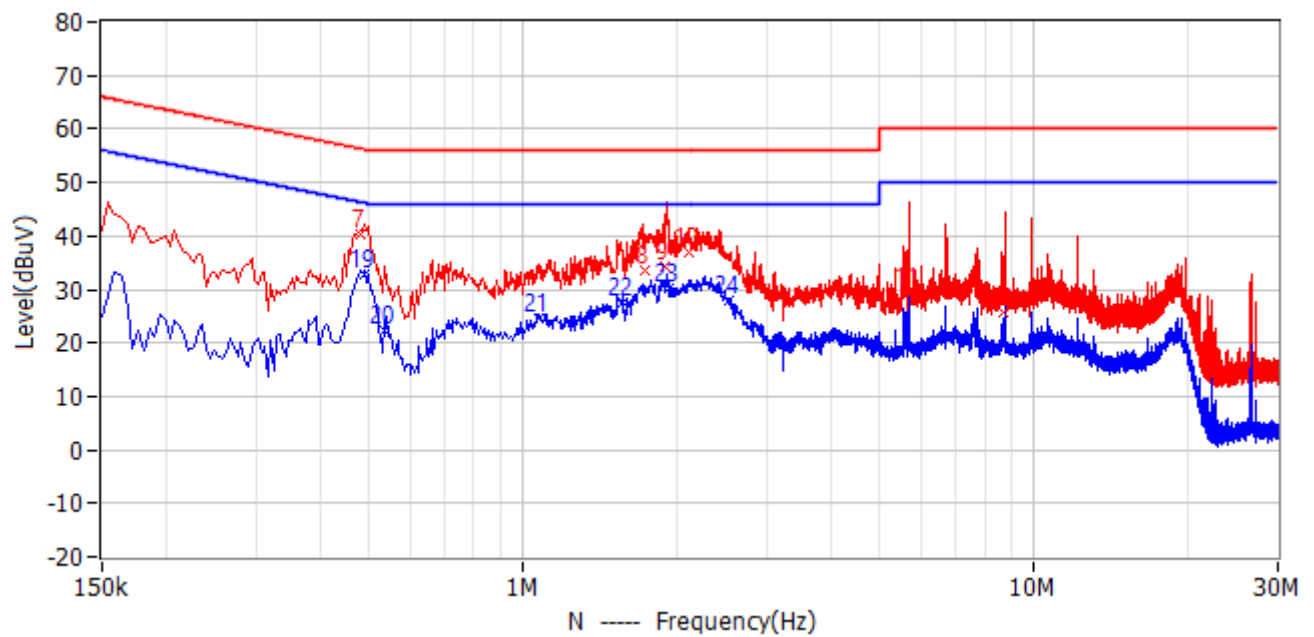
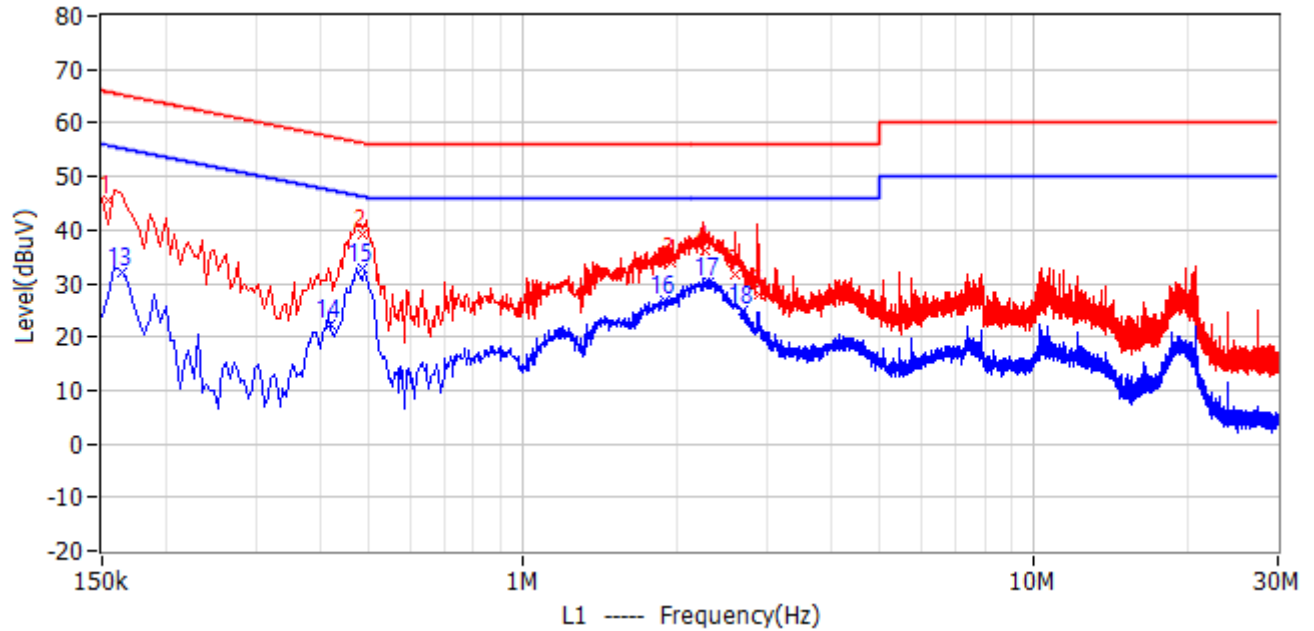
TEST REPORT**8.3 Measurement Procedure**

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

8.4 Test Results of Power line conducted emission



No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
1	154.500kHz	65.75	45.69	-20.06	39.49	6.20	QP	L1
2	483.000kHz	56.29	39.22	-17.07	33.02	6.20	QP	L1
3	1.950MHz	56.00	33.83	-22.17	27.63	6.20	QP	L1
4	2.261MHz	56.00	36.04	-19.96	29.84	6.20	QP	L1

TEST REPORT

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
5	2.598MHz	56.00	31.84	-24.16	25.64	6.20	QP	L1
6	2.900MHz	56.00	28.01	-27.99	21.71	6.30	QP	L1
7	478.500kHz	56.37	40.28	-16.09	34.08	6.20	QP	N
8	1.730MHz	56.00	33.72	-22.28	27.52	6.20	QP	N
9	1.896MHz	56.00	34.18	-21.82	27.98	6.20	QP	N
10	2.108MHz	56.00	36.92	-19.08	30.72	6.20	QP	N
11	5.703MHz	60.00	29.59	-30.41	23.19	6.40	QP	N
12	8.750MHz	60.00	25.64	-34.36	19.04	6.60	QP	N
13	163.500kHz	55.28	31.91	-23.37	25.71	6.20	CAV	L1
14	420.000kHz	47.45	22.14	-25.31	15.94	6.20	CAV	L1
15	483.000kHz	46.29	32.63	-13.66	26.43	6.20	CAV	L1
16	1.887MHz	46.00	26.83	-19.17	20.63	6.20	CAV	L1
17	2.306MHz	46.00	30.18	-15.82	23.98	6.20	CAV	L1
18	2.702MHz	46.00	24.79	-21.21	18.59	6.20	CAV	L1
19	487.500kHz	46.21	32.94	-13.27	26.74	6.20	CAV	N
20	537.000kHz	46.00	22.33	-23.67	16.13	6.20	CAV	N
21	1.073MHz	46.00	24.51	-21.49	18.31	6.20	CAV	N
22	1.572MHz	46.00	27.67	-18.33	21.47	6.20	CAV	N
23	1.932MHz	46.00	30.18	-15.82	23.98	6.20	CAV	N
24	2.535MHz	46.00	27.97	-18.03	21.77	6.20	CAV	N

Remark: 1. Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Level = Original Receiver Reading + Factor

3. Delta= Level - Limit

4. If the PK Level is lower than AV limit, the AV test can be elided.

Example: Assuming LISN Factor = 10.00dB, Cable Loss = 2.00dB,
Original Receiver Reading = 10.00dBuV, Limit = 66.00dBuV.
Then Factor = 10.00 + 2.00 = 12.00dB;
Level = 10dBuV + 12.00dB = 22.00dBuV;
Delta = 22.00dBuV - 66.00dBuV = -44.00dB.

9 Antenna requirement

Requirement:

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.

Result:

EUT use of a permanently attached antenna and unique coupling to the intentional radiator, so it can comply with the provisions of this section.

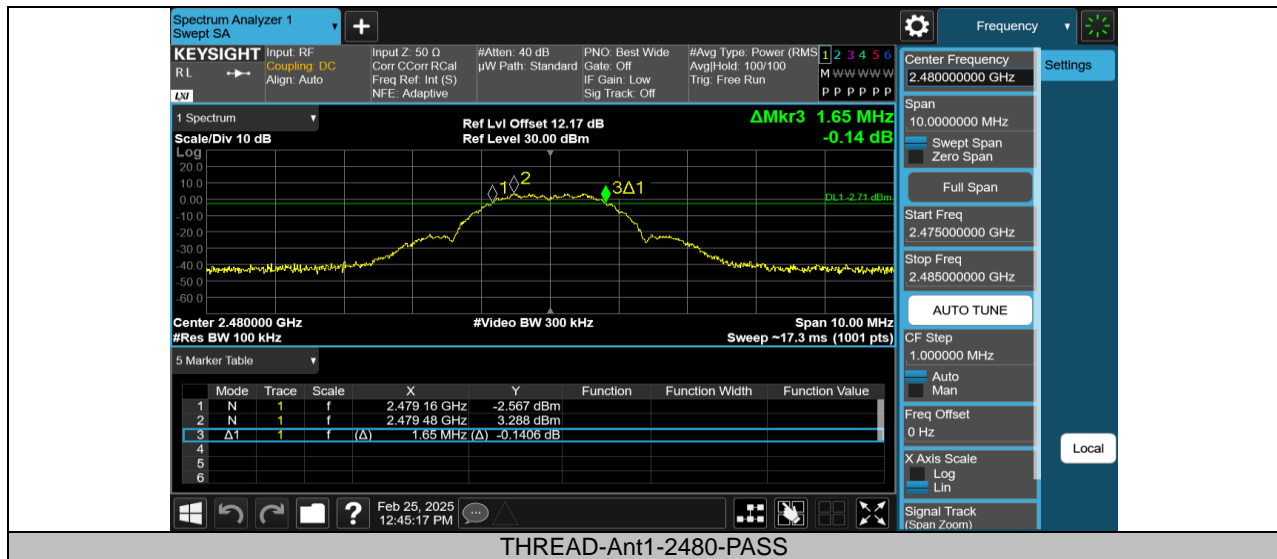
Appendix A: Test results

DTS Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
THREAD	Ant1	2405	1.630	2404.170	2405.800	0.5	PASS
THREAD	Ant1	2440	1.630	2439.170	2440.800	0.5	PASS
THREAD	Ant1	2480	1.650	2479.160	2480.810	0.5	PASS

Test Graphs





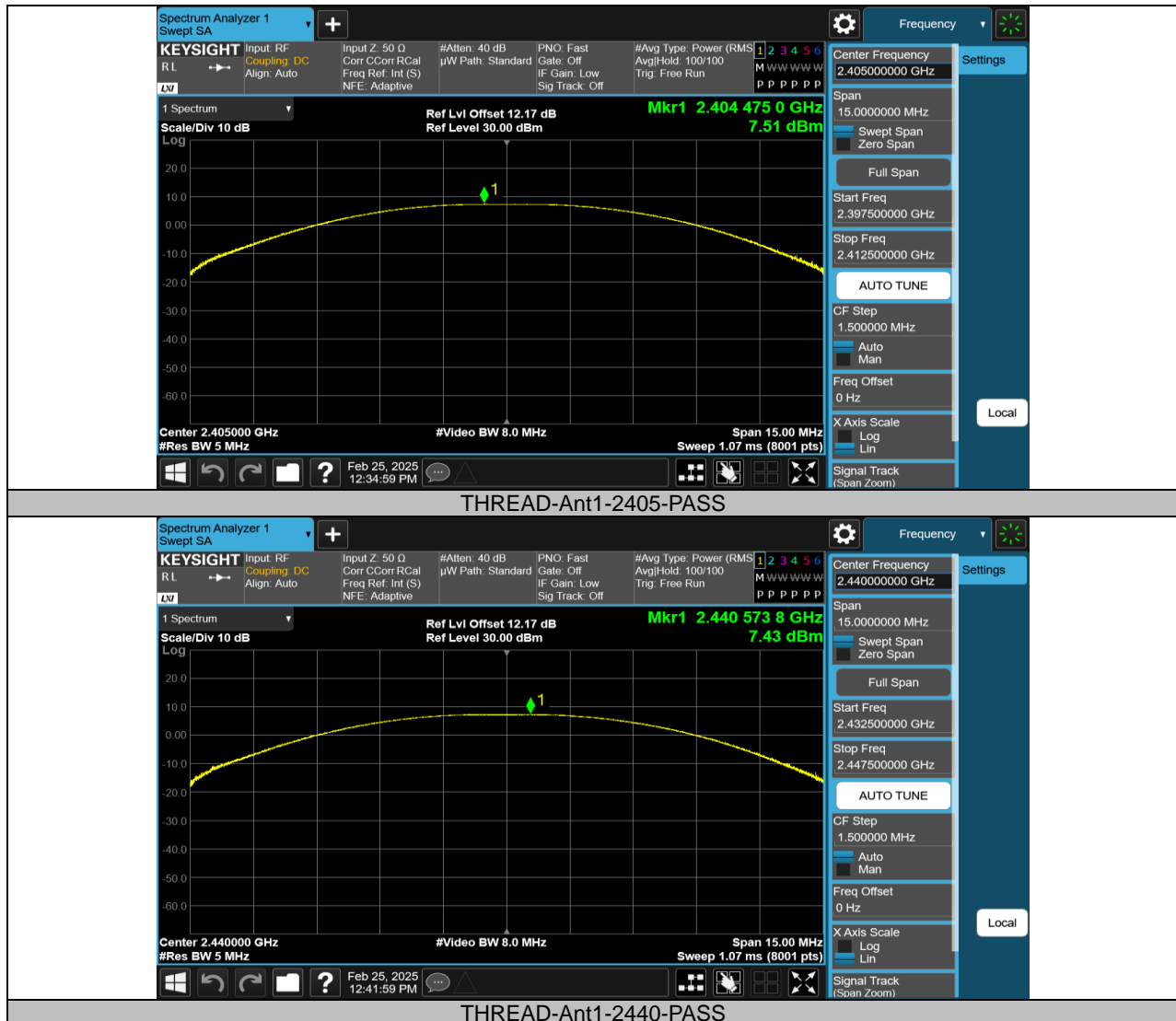
THREAD-Ant1-2480-PASS

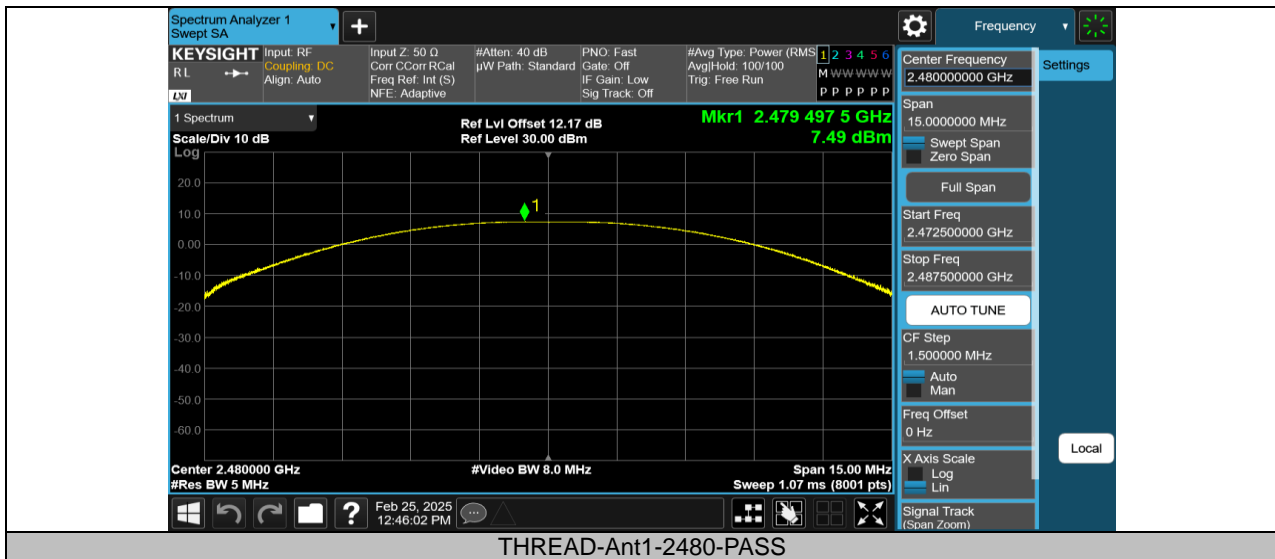
Maximum conducted output power

Test Result

TestMode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	EIRP[dBm]	EIRP Limit[dBm]	Verdict
THREAD	Ant1	2405	7.51	≤30	8.51	≤36	PASS
THREAD	Ant1	2440	7.43	≤30	8.43	≤36	PASS
THREAD	Ant1	2480	7.50	≤30	8.50	≤36	PASS

Test Graphs



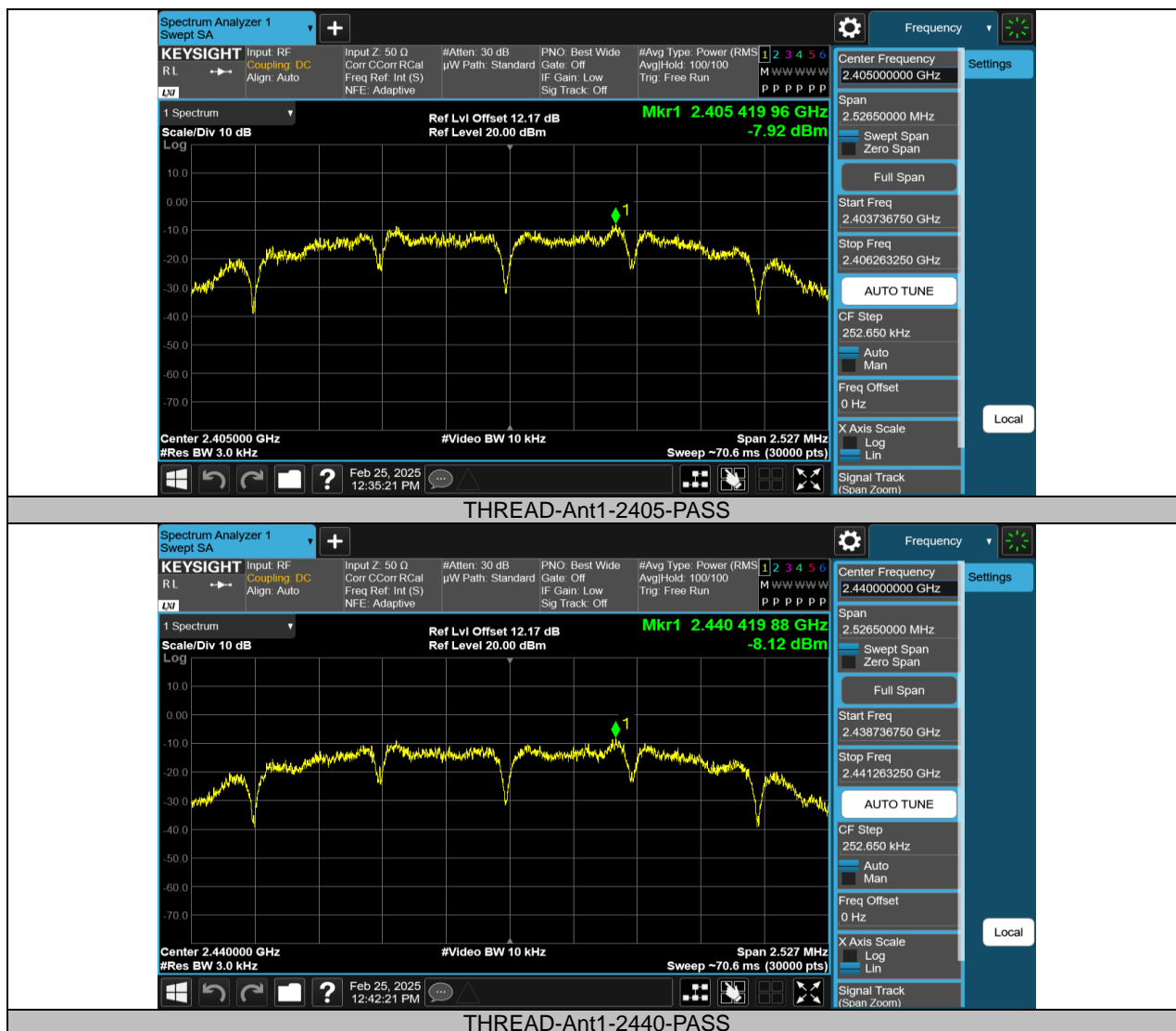


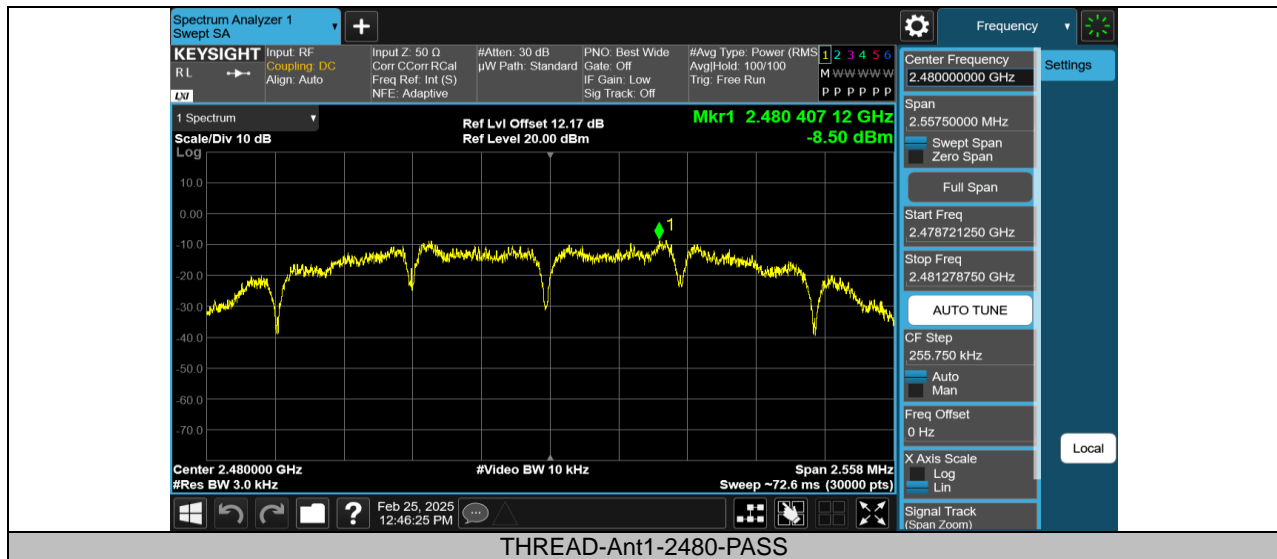
Maximum power spectral density

Test Result

TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
THREAD	Ant1	2405	-7.92	≤8.00	PASS
THREAD	Ant1	2440	-8.12	≤8.00	PASS
THREAD	Ant1	2480	-8.50	≤8.00	PASS

Test Graphs



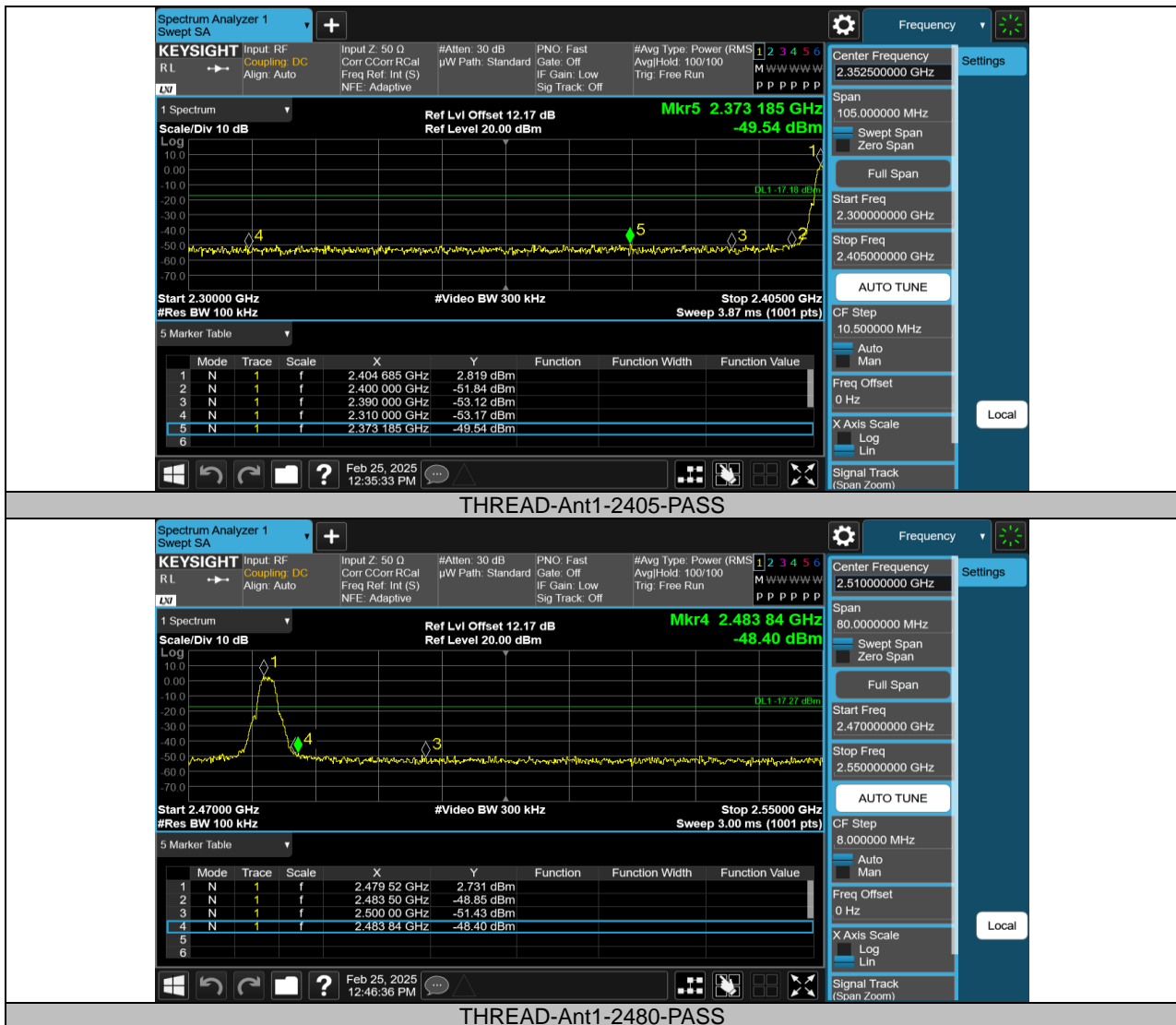


Band edge measurements

Test Result

TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
THREAD	Ant1	Low	2405	2.82	-49.54	≤-17.18	PASS
THREAD	Ant1	High	2480	2.73	-48.4	≤-17.27	PASS

Test Graphs

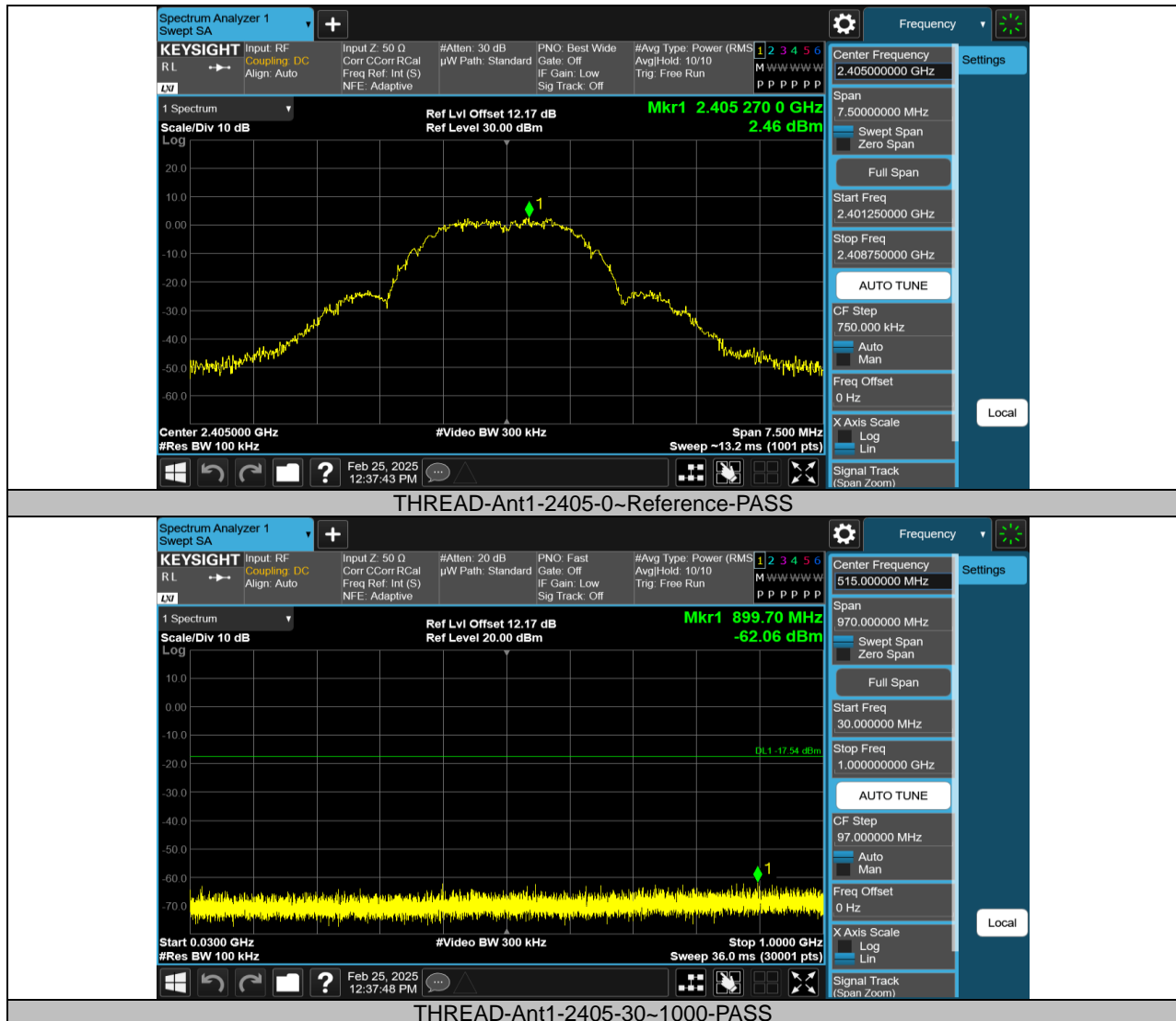


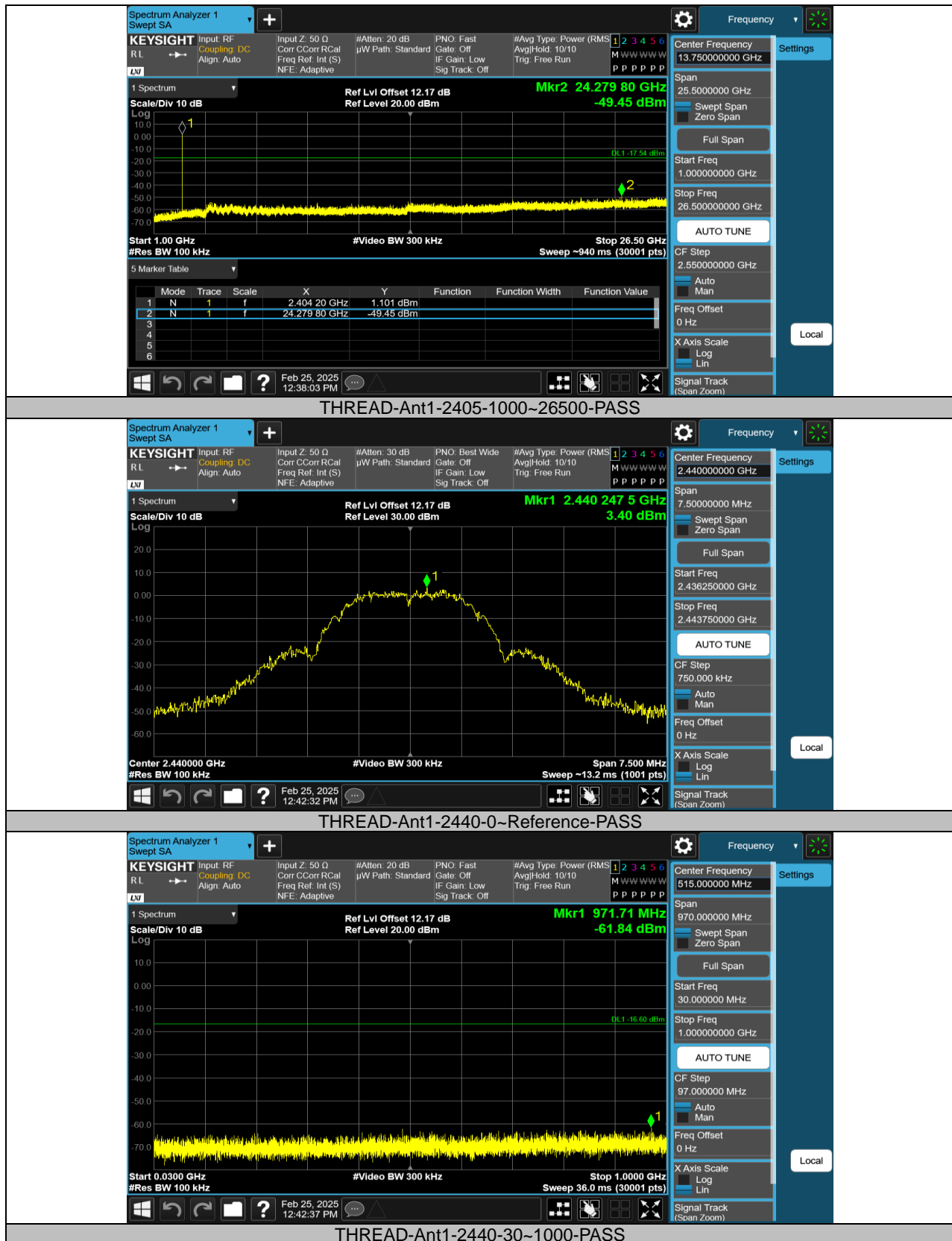
TEST REPORT

Conducted Spurious Emission Test Result

TestMode	Antenna	Frequency[MHz]	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
THREAD	Ant1	2405	0~Reference	2.46	2.46	---	PASS
THREAD	Ant1	2405	30~1000	2.46	-62.06	≤-17.54	PASS
THREAD	Ant1	2405	1000~26500	2.46	-49.45	≤-17.54	PASS
THREAD	Ant1	2440	0~Reference	3.40	3.40	---	PASS
THREAD	Ant1	2440	30~1000	3.40	-61.84	≤-16.6	PASS
THREAD	Ant1	2440	1000~26500	3.40	-49.11	≤-16.6	PASS
THREAD	Ant1	2480	0~Reference	2.80	2.80	---	PASS
THREAD	Ant1	2480	30~1000	2.80	-61.24	≤-17.2	PASS
THREAD	Ant1	2480	1000~26500	2.80	-49.52	≤-17.2	PASS

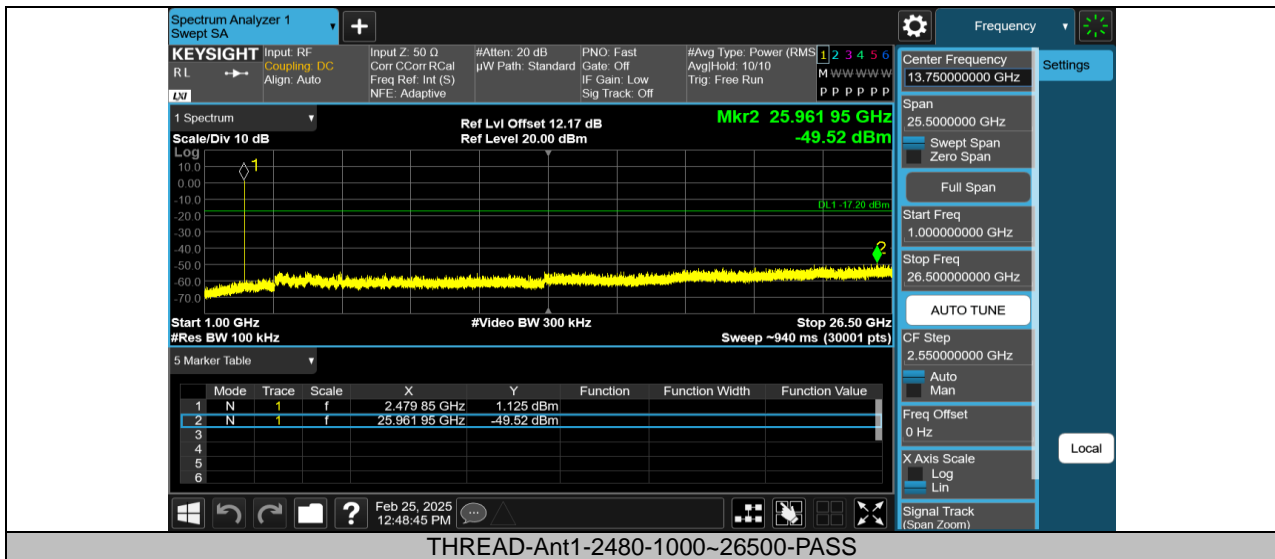
Test Graphs







TEST REPORT



Duty Cycle

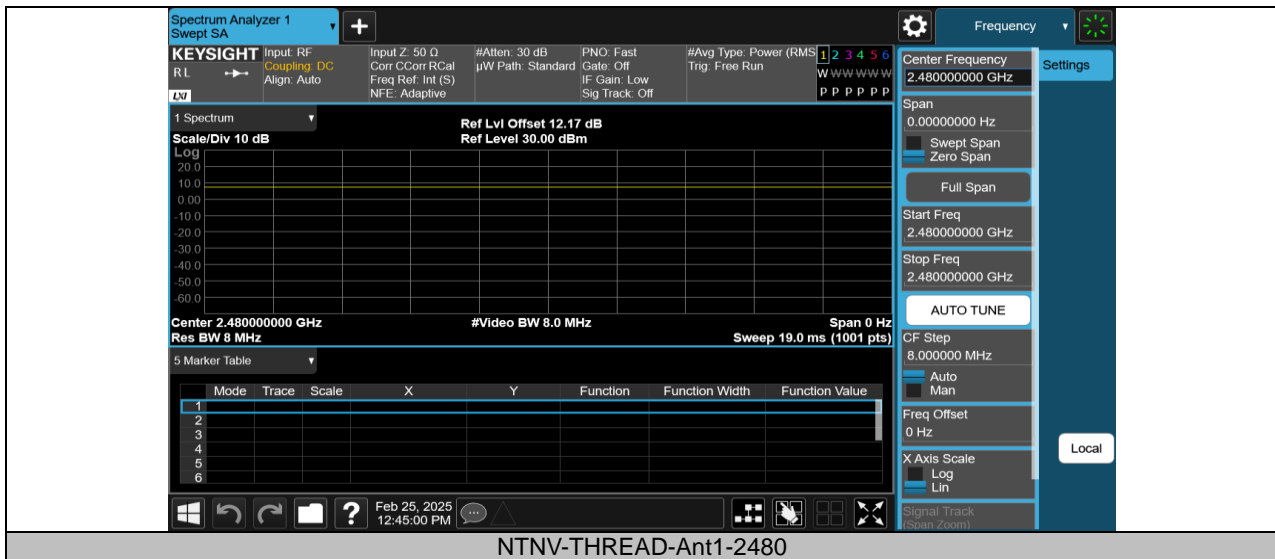
Test Result

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Limit	Verdict
THREAD	Ant1	2405	0.00	0.00	100	---	---
THREAD	Ant1	2440	0.00	0.00	100	---	---
THREAD	Ant1	2480	17.00	17.00	100.00	---	---

Test Graphs



TEST REPORT



***** END *****