

FCC - TEST REPORT

Report Number : **709502410132-00B** Date of Issue: January 15, 2025

Model : YMX800A

Product Type : Smart PV Optimizer

Applicant : Yimeixu WitChip Energy Hitech Co., Ltd.

Address : Building 2-4, No 355 Ruifeng Road, Gaozhao Street, Jiaxing,
Zhejiang, China 324000

Manufacturer : Yimeixu WitChip Energy Hitech Co., Ltd.

Address : Building 2-4, No 355 Ruifeng Road, Gaozhao Street, Jiaxing,
Zhejiang, China 324000

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including
Appendices : 36



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2 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
709502410132-00B	First Issue	01/15/2025

3 Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch
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FCC Registration No.: 820234

FCC Designation Number: CN1183

ISED CAB identifier CN0101

IC Registration No.: 31668

4 Description of the Equipment under Test

Product:	Smart PV Optimizer
Model no.:	YMX800A
FCC ID:	2A2I2YMX800A
Options and accessories:	NA
Rating:	Input: 12-80V DC; Typical:44.85V DC Output: 80 V DC Max
RF Transmission Frequency:	2460MHz
Modulation:	GFSK
Hardware Version:	V0.90-0-01-01
Software Version:	optimizer-RF-A-0-0.12-9.32.0107-1
Antenna Type:	Onboard PCB antenna
Antenna Gain:	3.34dBi
Description of the EUT:	The Equipment Under Test (EUT) is a Smart PV Optimizer which supports 2460MHz transmitting. We tested it and listed the worst data in this report.
Test sample no.:	SHA-869671-1 (RF Radiated) SHA-869671-1 (RF Conducted)

The sample's mentioned in this report is/are submitted/ supplied/ manufactured by client. The laboratory therefore assumes no responsibility for accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.



5 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2023 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.

6 Summary of Test Results

Technical Requirements						
FCC Part 15 Subpart C						
Test Condition		Pages	Test Site	Test Result		
				Pass	Fail	N/A
§15.207	Conducted emission AC power port	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247 (b) (3)	Conducted peak output power	11	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)	Carrier frequency separation	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	Number of hopping frequencies	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(1)(iii)	Dwell Time - Average Time of Occupancy	---	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.247(a)(2)	6dB bandwidth	12	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(e)	Power spectral density	13	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(e)	Spurious RF conducted emissions	14-15	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d)	Band edge	16-18	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	19-34	Site 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203	Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Remark 1: N/A – Not Applicable. This equipment that is not designed to be connected to the public utility (AC) power line and conducted emission AC power port not required.

Note 1: The EUT onboard PCB antenna, which gain is 3.34dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.

7 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2A2I2YMX800A complies with Section 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.


Sample Received Date: November 22, 2024

Testing Start Date: December 26, 2024

Testing End Date: January 8, 2025

-TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch

Reviewed by:



Hui TONG
Review Engineer

Prepared by:

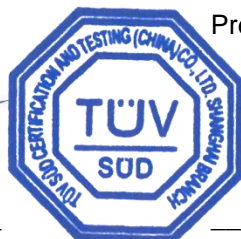


Jiaxi XU
Project Engineer

Tested by:



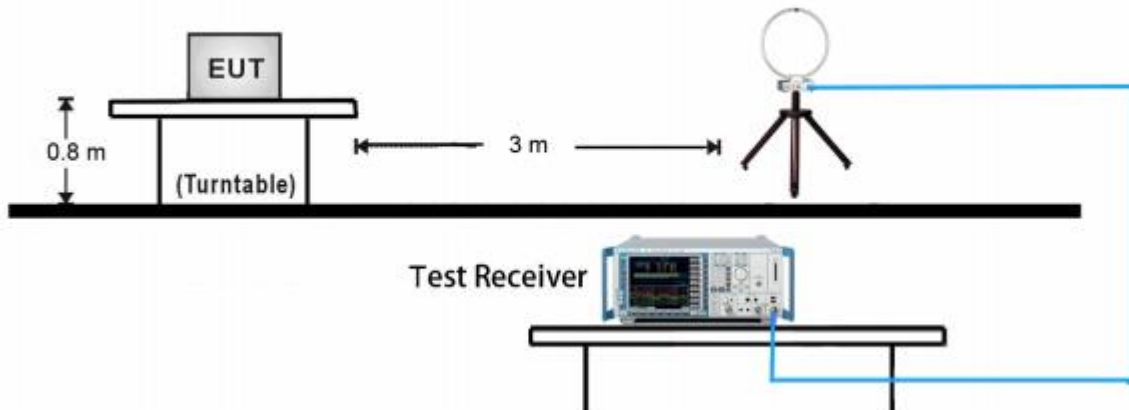
Tianji XU
Test Engineer



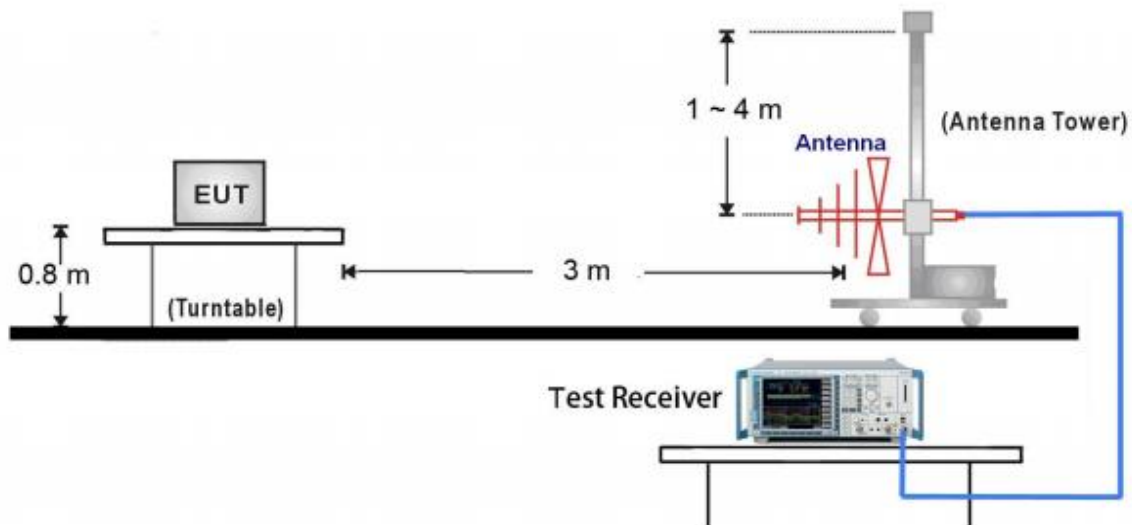
8 Test Setups

8.1 Radiated test setups

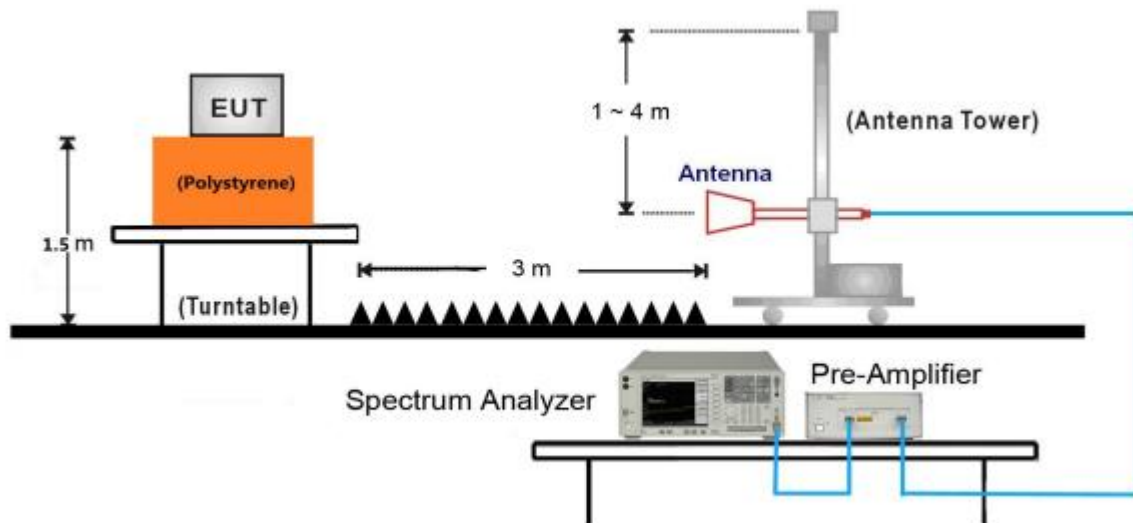
9kHz ~ 30MHz Test Setup:



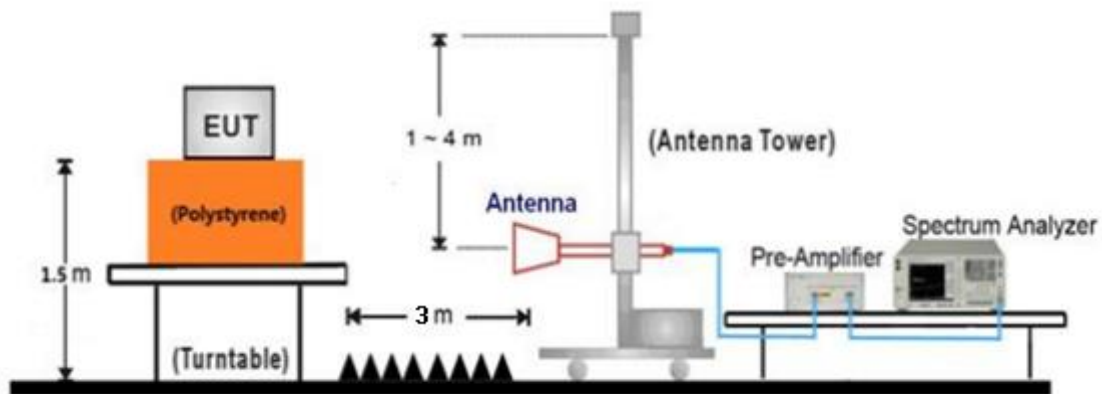
30MHz ~ 1GHz Test Setup:



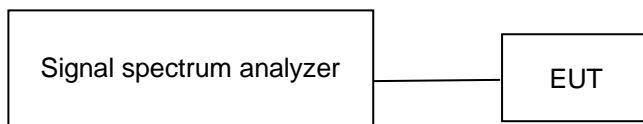
1GHz ~ 18GHz Test Setup:



18GHz ~ 25GHz Test Setup:



8.2 Conducted RF test setups



9 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	E470	PF-OU5TS7 17/09
Power supply	MS	MS-3010D	--

Test software: Debugging assistant, which used to control the EUT in continues transmitting mode.

Test Mode Applicability and Tested Channel Detail:

Frequency	Modulation	Power level setting
2460MHz	GFSK	4

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power.

10 Technical Requirement

10.1 Conducted peak output power

Test Method

1. Use the following spectrum analyzer settings:
RBW > the 6 dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW
Sweep = auto, Detector function = peak, Trace = max hold.
2. Add a correction factor to the display.
3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

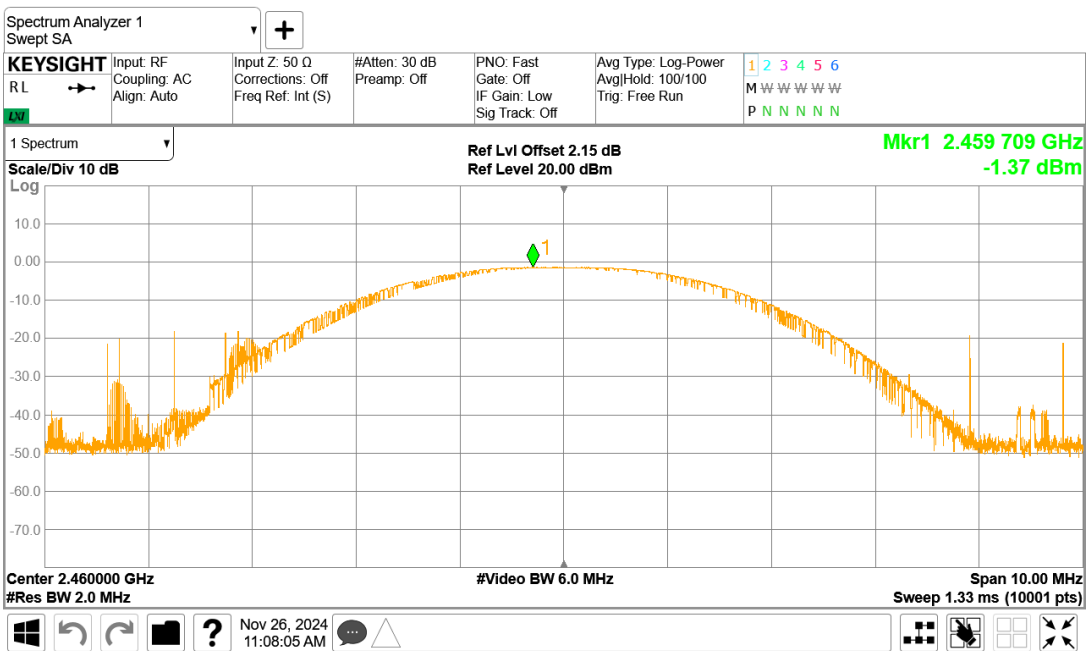
Limits

According to §15.247 (b) (3), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

Test result as below table

Data transmission rate:1Mbps		
Frequency	Conducted Peak Output Power	Result
MHz	dBm	
2460MHz	-1.37	Pass





10.26dB bandwidth

Test Method

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
RBW=100KHz, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Use the automatic bandwidth measurement capability of an instrument, use the X dB bandwidth mode with X set to 6 dB.
5. Allow the trace to stabilize, record the 6 dB Bandwidth value.

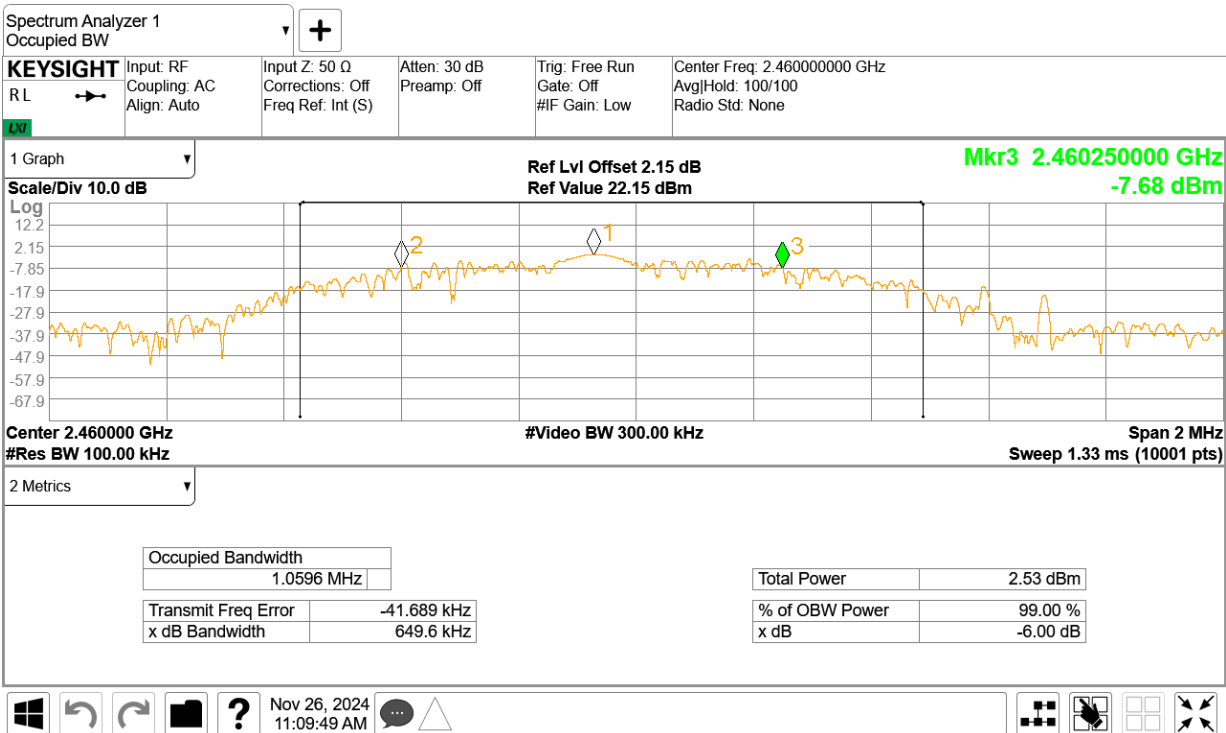
Limit

Limit [kHz]

≥500

Test result

Frequency MHz	6dB bandwidth kHz	Result
2460MHz	650	Pass



10.3 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

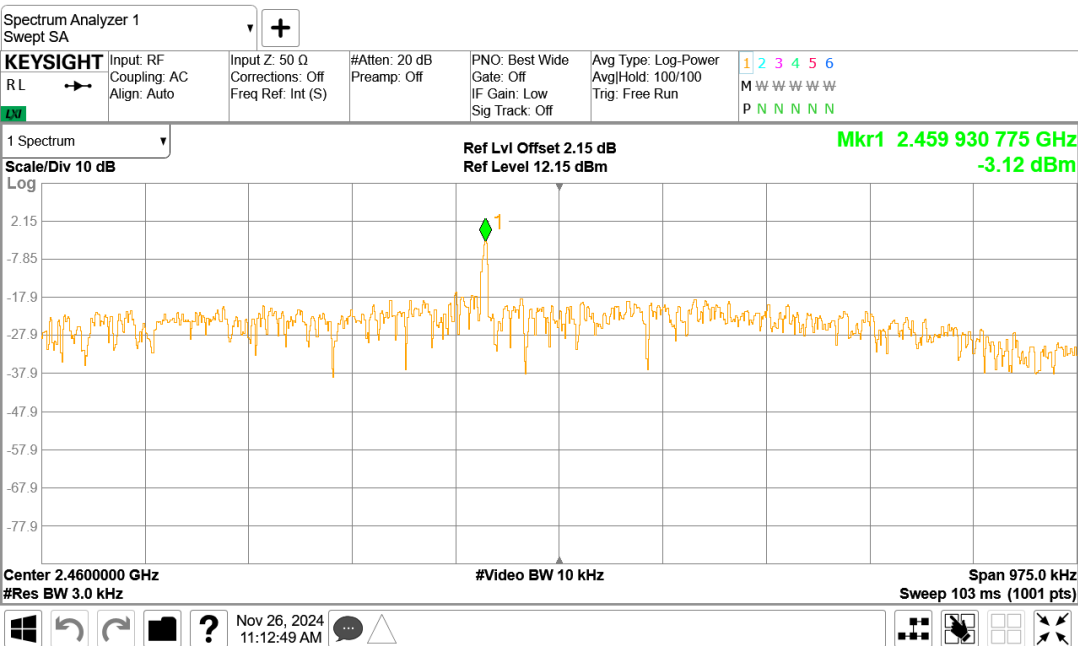
Limit

Limit [dBm/3kHz]

≤8

Test result

Frequency	Power spectral density	Result
MHz	dBm/3kHz	
2460MHz	-3.12	Pass



10.4 Spurious RF conducted emissions

Test Method

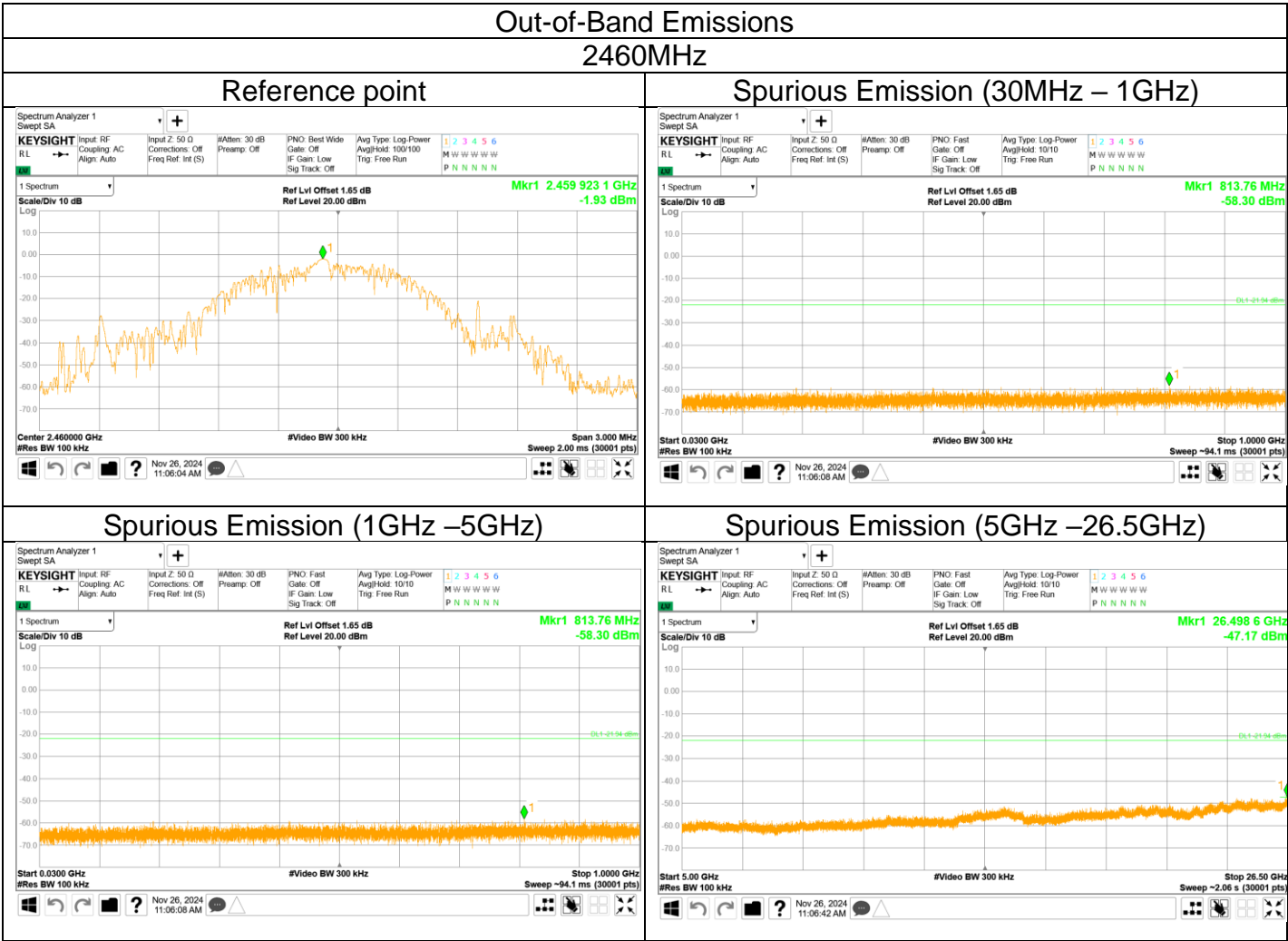
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 100 kHz, VBW \geq 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
5. The level displayed must comply with the limit specified in this Section. Submit these plots.
6. Repeat above procedures until all frequencies measured were complete.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



Spurious RF conducted emissions



10.5 Band edge

Test Method

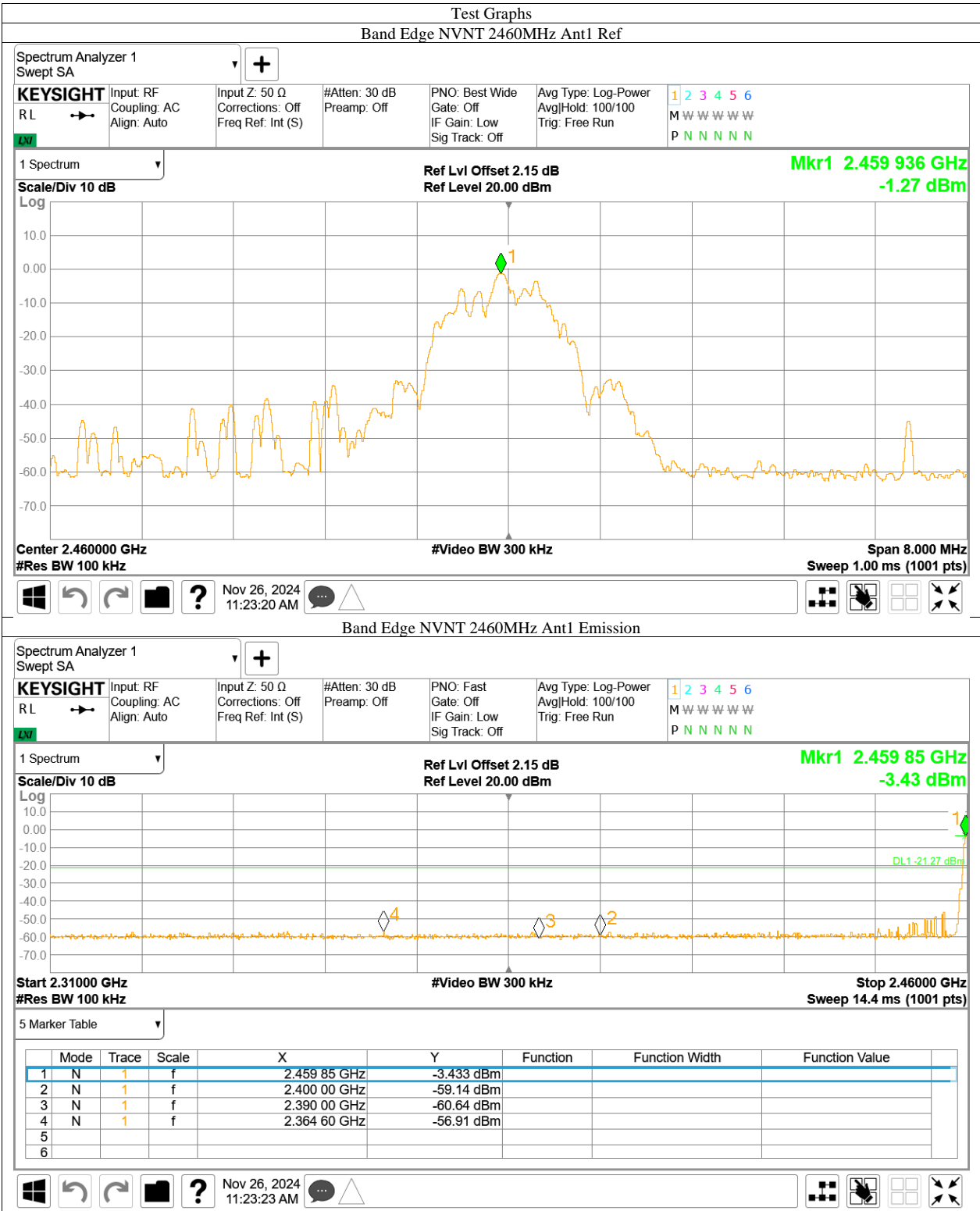
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW \geq 3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize, use the peak and delta measurement to record the result.
5. The level displayed must comply with the limit specified in this Section.
6. Repeat above procedures until all frequencies measured were complete and submit all the plots.

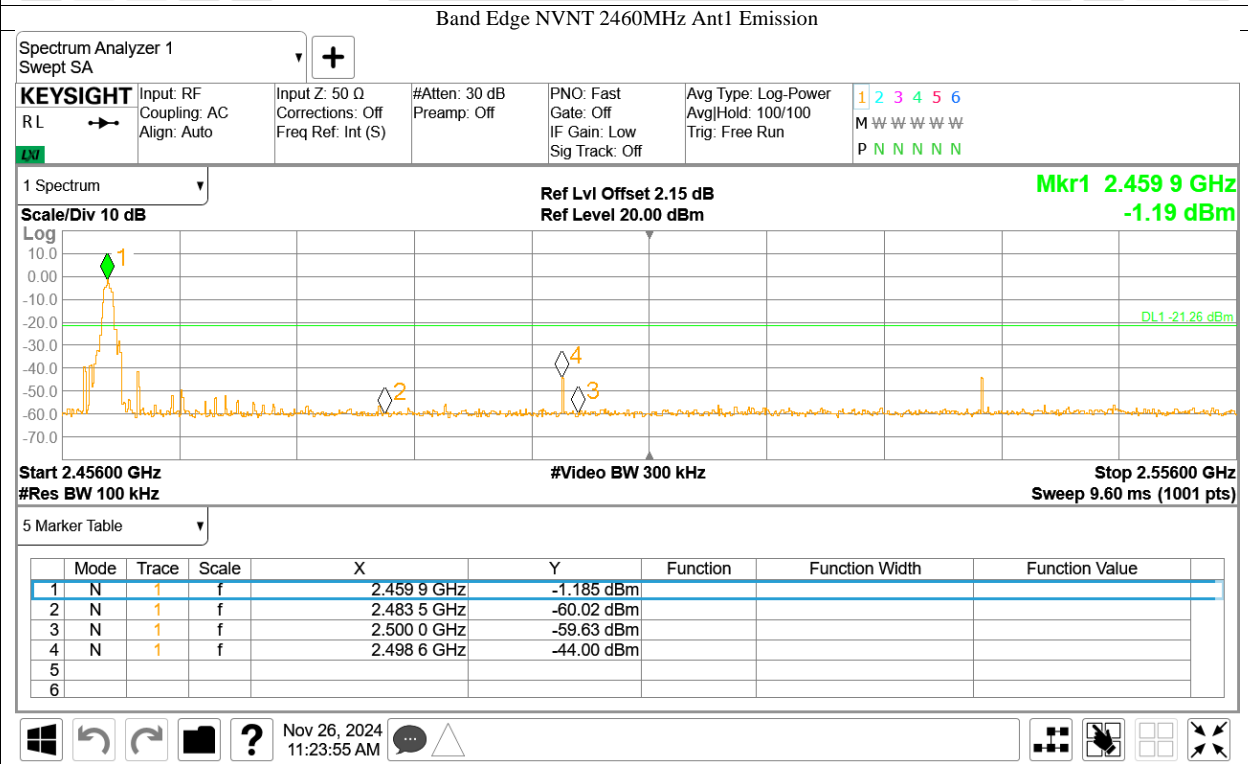
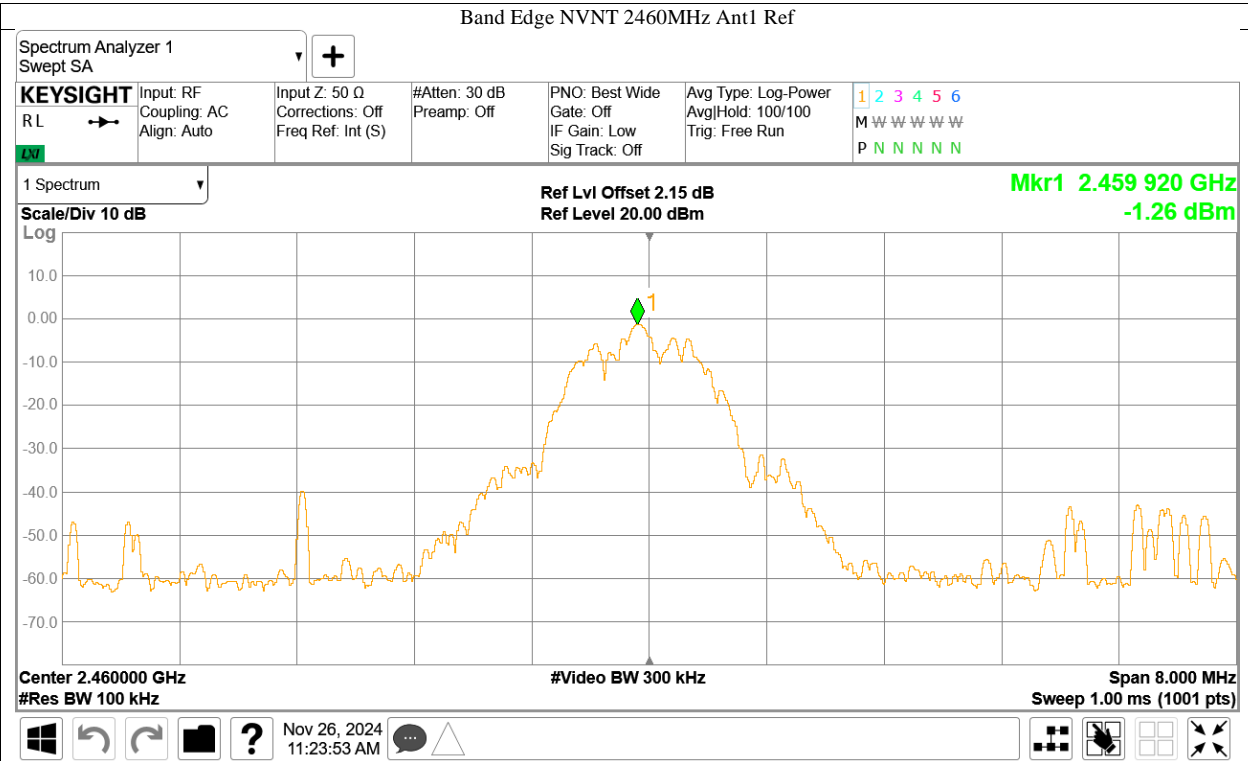
Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that 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 § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB.



Test result





10.6 Spurious radiated emissions for transmitter

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. 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.
4. 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.
5. Use the following spectrum analyzer settings According to C63.10
 - 1) Procedure for Unwanted Emissions Measurements Below 1000 MHz
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz to 120kHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.
 - 2) For Peak unwanted emissions Above 1GHz:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW ≥ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1GHz

 - a) RBW = 1MHz.
 - b) $VBW \setminus [3 \times RBW]$.
 - c) Detector = AV (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \setminus RBW / 2$. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
 - d) Averaging type = power (i.e., AV) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
 - e) Sweep time = auto.
 - f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
 - g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (AV) mode was used in the preceding step e), then the correction factor is $[10 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is $[20 \log (1 / D)]$, where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission (AV) at frequency above 1GHz.

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of AV averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength 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).

Frequency MHz	Field Strength uV/m	Measured Distance Meters
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30	30	30

Frequency MHz	Field Strength uV/m	Field Strength dBuV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Test result

The worst case of Radiated Emission below 30MHz: Only the worst case listed as below.

0.009-30MHz Radiated Emission

EUT Information

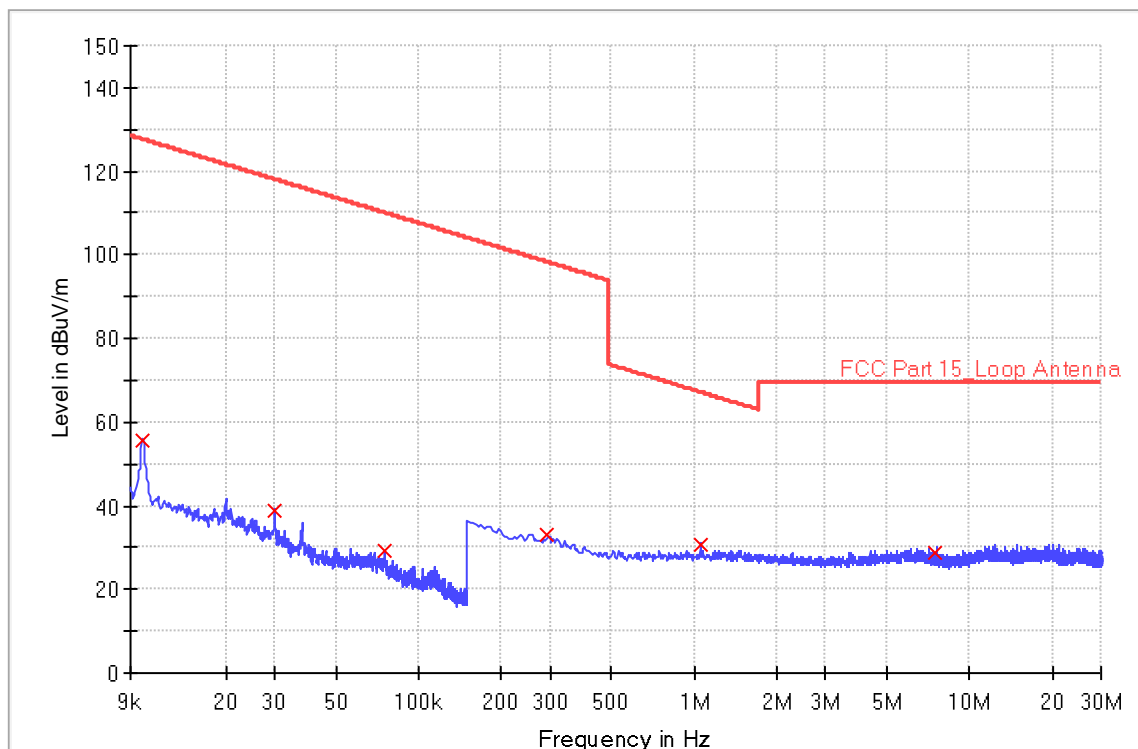
EUT Name:	Smart PV Optimizer
Model:	YMX800A
Client:	Yimeixu WitChip Energy Hitech Co., Ltd.
Op Cond:	DC 44.85V power on and transmitting at 2460MHz
Operator:	Tianji XU
Test Spec:	FCC Part 15.209(a)
Comment:	Horizontal
Sample No:	SHA-869671-1

Sweep Setup: RE_Loop E_pre [EMI radiated]

Hardware Setup:	RE_Loop Antenna V
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
9 kHz - 150 kHz	70.5 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	3.731 kHz	PK+	9 kHz	0.01 s	0 dB

RE_Loop E_pre





Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin (dB)	Limit - (dBuV/m)
0.009960	55.6	1000.0	0.200	100.0	H	331.0	19.6	72.039	127.639
0.029960	38.8	1000.0	0.200	100.0	H	112.0	18.9	79.273	118.073
0.075720	29.1	1000.0	0.200	100.0	H	25.0	18.8	80.920	110.020
0.294000	33.2	1000.0	9.000	100.0	H	22.0	18.7	65.037	98.237
1.054000	30.5	1000.0	9.000	100.0	H	301.0	18.8	36.647	67.147
7.506000	28.9	1000.0	9.000	100.0	H	14.0	18.8	40.642	69.542

0.009-30MHz Radiated Emission

EUT Information

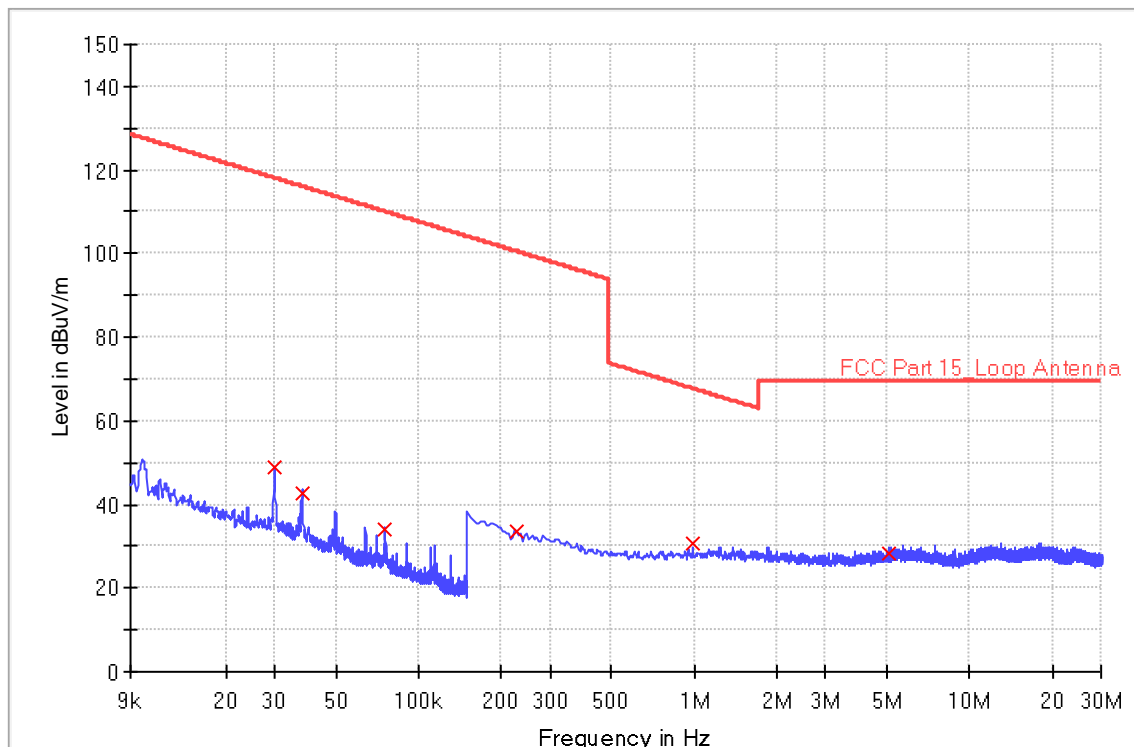
EUT Name: Smart PV Optimizer
Model: YMX800A
Client: Yimeixu WitChip Energy Hitech Co., Ltd.
Op Cond: DC 44.85V power on and transmitting at 2460MHz
Operator: Tianji XU
Test Spec: FCC Part 15.209(a)
Comment: Vertical
Sample No: SHA-869671-1

Sweep Setup: RE_Loop E_pre [EMI radiated]

Hardware Setup: RE_Loop Antenna V
Receiver: [ESR 3]
Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
9 kHz - 150 kHz	70.5 Hz	PK+	200 Hz	0.01 s	0 dB
150 kHz - 30 MHz	3.731 kHz	PK+	9 kHz	0.01 s	0 dB

RE_Loop E_pre





Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin (dB)	Limit - (dBuV/m)
0.029960	48.7	1000.0	0.200	100.0	V	43.0	18.9	69.373	118.073
0.037800	42.5	1000.0	0.200	100.0	V	22.0	18.9	73.554	116.054
0.075800	33.8	1000.0	0.200	100.0	V	114.0	18.8	76.211	110.011
0.226000	33.4	1000.0	9.000	100.0	V	186.0	18.7	67.122	100.522
0.990000	30.5	1000.0	9.000	100.0	V	258.0	18.8	37.192	67.692
5.090000	28.5	1000.0	9.000	100.0	V	301.0	19.1	41.042	69.542

The worst case of Radiated Emission below 1GHz: Only the worst case listed as below.

30-1000MHz Radiated Emission

EUT Information

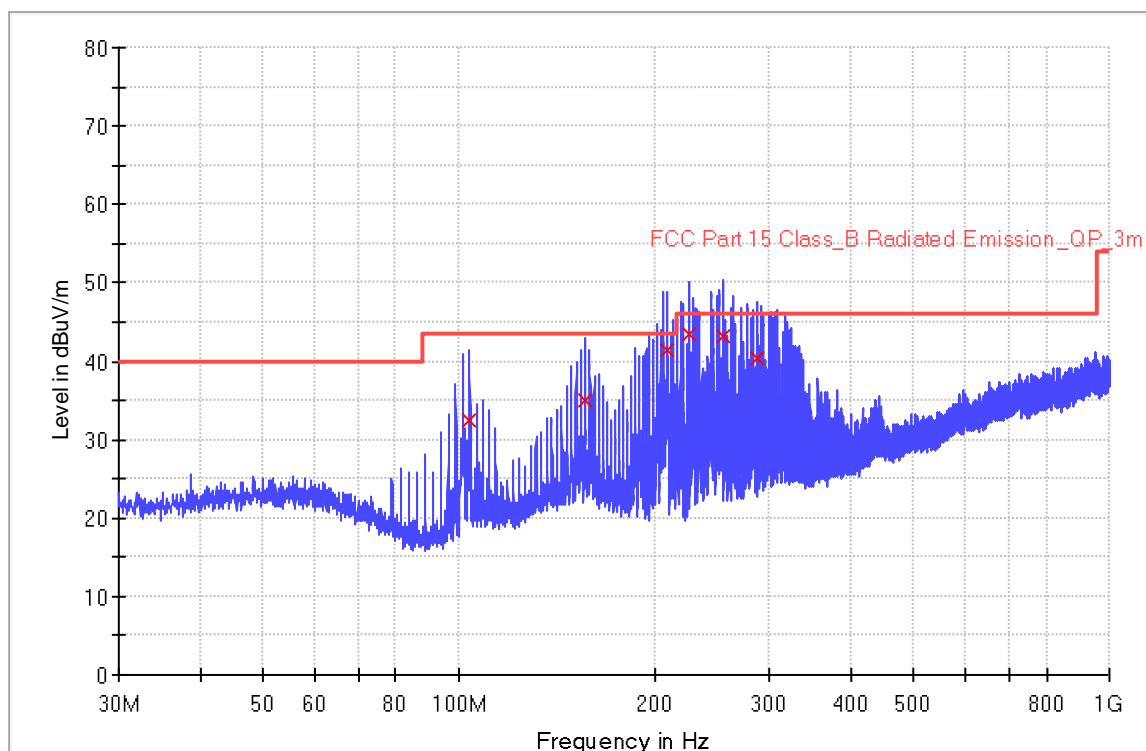
EUT Name:	Smart PV Optimizer
Model:	YMX800A
Client:	Yimeixu WitChip Energy Hitech Co., Ltd.
Op Cond:	DC 44.85V power on and transmitting at 2460MHz
Operator:	Tianji XU
Test Spec:	FCC Part 15.209(a)
Comment:	Horizontal
Sample No:	SHA-869671-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup:	RE_VULB9168
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE_VULB9168_pre_Cont_30-1000





Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
103.920000	32.5	1000.0	120.000	200.0	H	224.0	17.0	11.0	43.5
156.480000	35.1	1000.0	120.000	122.0	H	180.0	21.1	8.4	43.5
208.960000	41.4	1000.0	120.000	200.0	H	22.0	17.7	2.1	43.5
226.520000	43.4	1000.0	120.000	100.0	H	332.0	18.1	2.6	46.0
254.080000	43.2	1000.0	120.000	200.0	H	17.0	20.2	2.8	46.0
286.600000	40.5	1000.0	120.000	150.0	H	113.0	21.5	5.5	46.0

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

30-1000MHz Radiated Emission

EUT Information

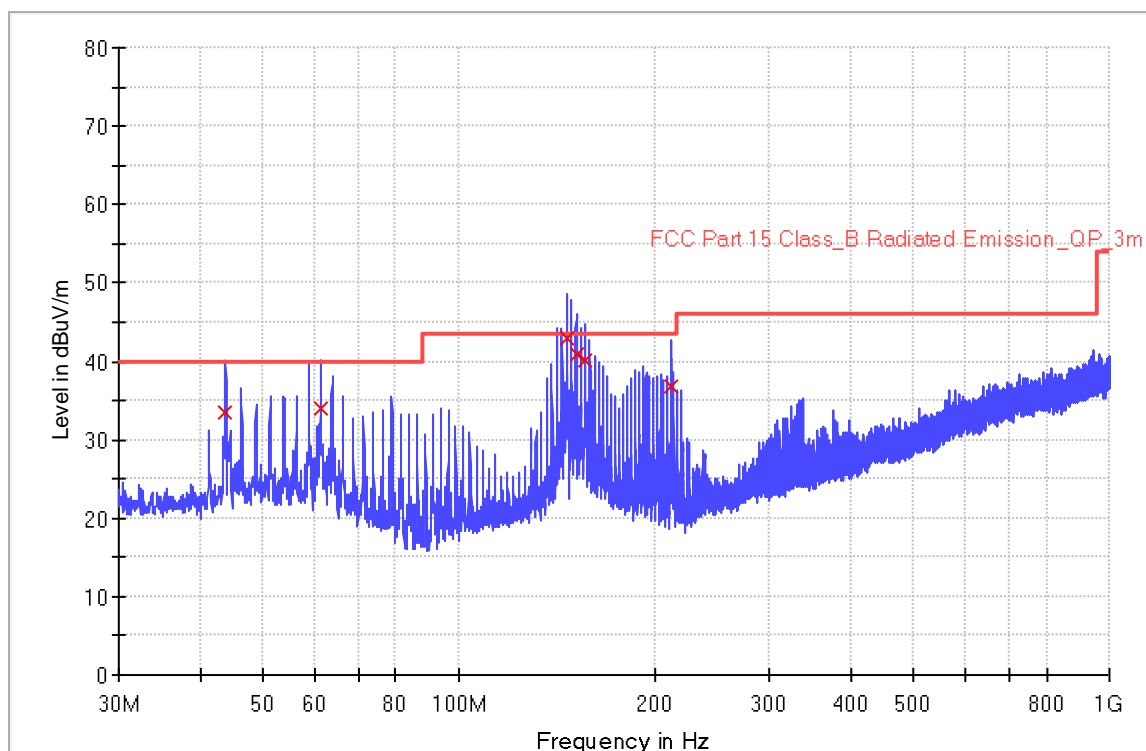
EUT Name:	Smart PV Optimizer
Model:	YMX800A
Client:	Yimeixu WitChip Energy Hitech Co., Ltd.
Op Cond:	DC 44.85V power on and transmitting at 2460MHz
Operator:	Tianji XU
Test Spec:	FCC Part 15.209(a)
Comment:	Vertical
Sample No:	SHA-869671-1

Sweep Setup: RE_VULB9168_pre_Cont_30-1000 [EMI radiated]

Hardware Setup:	RE_VULB9168
Receiver:	[ESR 3]
Level Unit:	dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamplifier
30 MHz - 1 GHz	48.5 kHz	PK+	120 kHz	0.2 s	20 dB

RE_VULB9168_pre_Cont_30-1000





Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
43.760000	33.5	1000.0	120.000	123.0	V	12.0	20.3	6.5	40.0
61.320000	34.1	1000.0	120.000	100.0	V	35.0	20.4	5.9	40.0
146.400000	42.9	1000.0	120.000	200.0	V	193.0	21.0	0.6	43.5
151.440000	41.0	1000.0	120.000	172.0	V	144.0	21.0	2.5	43.5
156.480000	40.2	1000.0	120.000	225.0	V	12.0	21.0	3.3	43.5
211.600000	36.7	1000.0	120.000	150.0	V	223.0	17.7	6.8	43.5

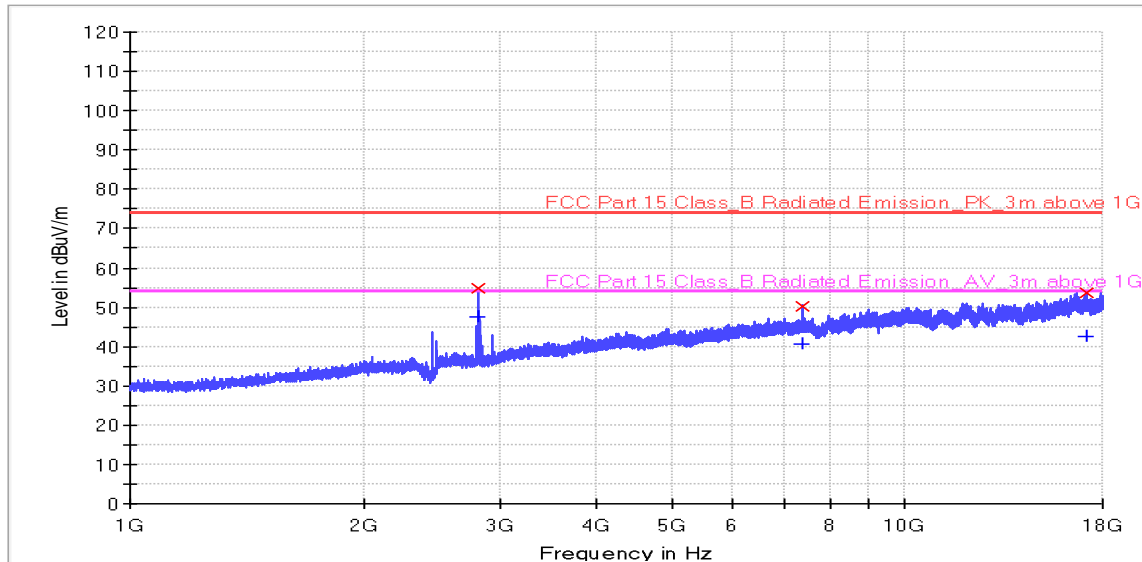
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Radiated Emission 1-18 GHz

Frequency: 2460MHz

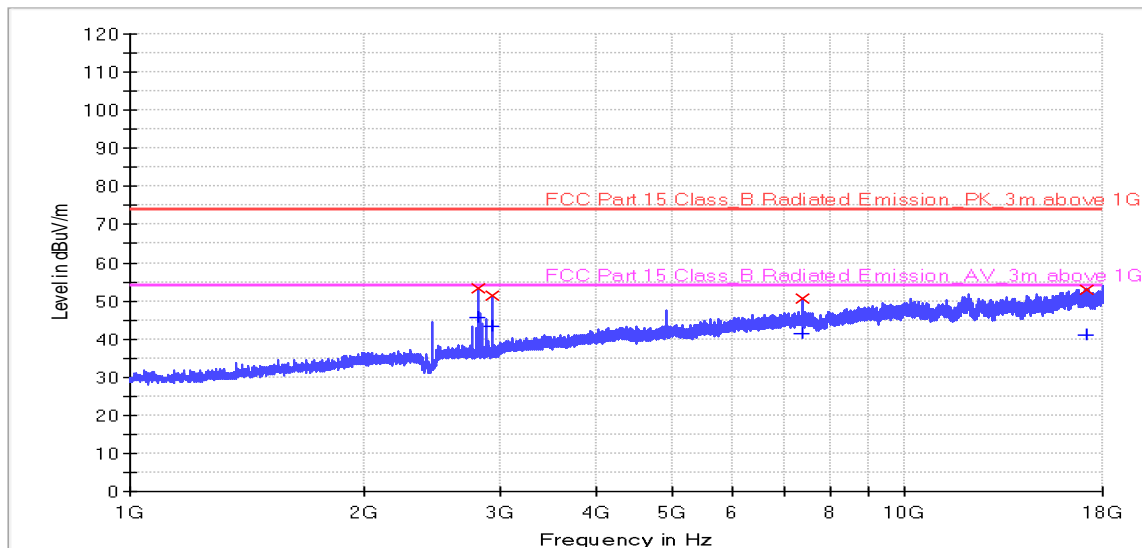
RE_HF907_BRF_Pre



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	AV (dBuV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+	Limit - PK+	Margin - AV	Limit - AV
2813.200000	54.7	47.4	1000.000	150.0	H	32.0	-9.4	19.3	74.0	6.6	54.0
7380.400000	50.2	40.5	1000.000	148.0	H	112.0	0.8	23.8	74.0	13.5	54.0
17133.100000	53.8	42.7	1000.000	231.0	H	0.0	7.3	20.2	74.0	11.3	54.0

RE_HF907_BRF_Pre

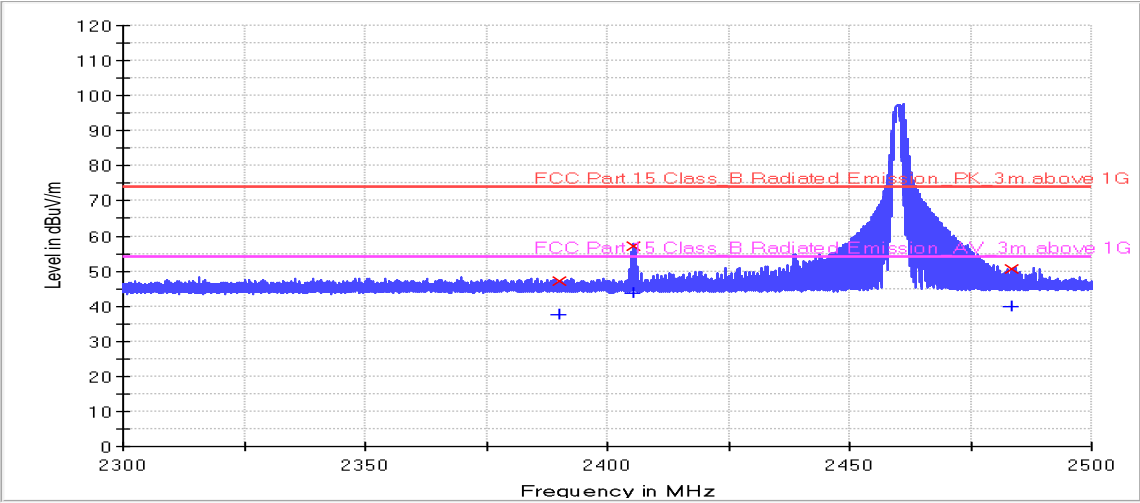


Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	AV (dBuV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+	Limit - PK+	Margin - AV	Limit - AV
2813.200000	53.1	45.8	1000.000	110.0	H	33.0	-9.4	20.9	74.0	8.2	54.0
2940.700000	51.4	43.5	1000.000	150.0	H	125.0	-8.7	22.6	74.0	10.5	54.0
7379.800000	50.6	41.5	1000.000	189.0	H	22.0	0.8	23.4	74.0	12.5	54.0
17149.600000	53.0	41.2	1000.000	150.0	H	13.0	7.3	21.0	74.0	12.8	54.0



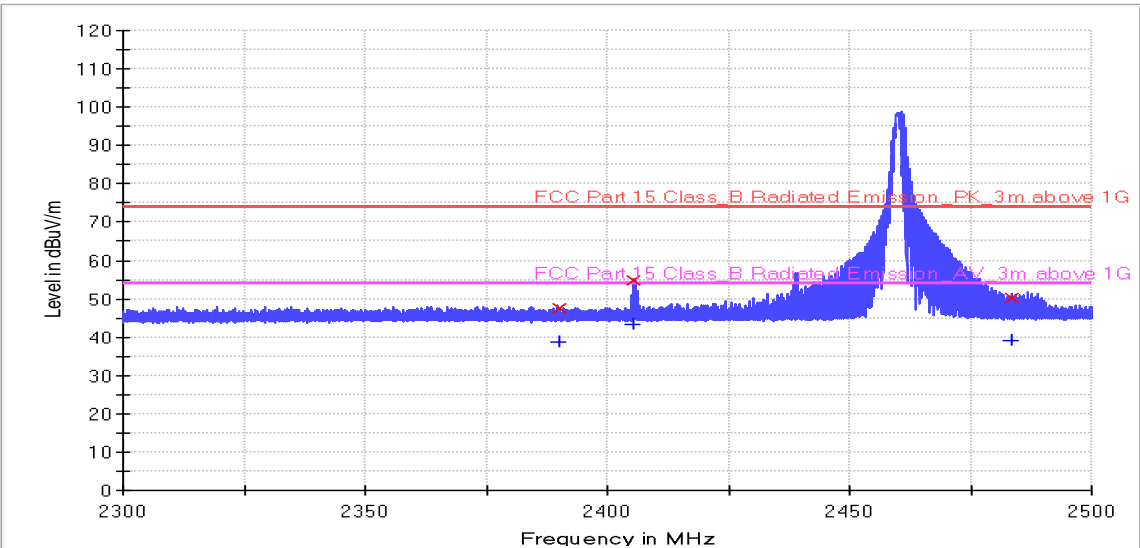
RE_HF907_BRF_Pre



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	AV (dBuV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBuV/)	Margin - AV (dB)	Limit - AV (dBuV/)
2390.000000	47.1	37.5	1000.000	170.0	H	331.0	-10.8	26.9	74.0	16.5	54.0
2405.500000	57.2	43.8	1000.000	250.0	H	25.0	-10.8	16.8	74.0	10.2	54.0
2483.500000	50.5	39.9	1000.000	230.0	H	241.0	-10.3	23.5	74.0	14.1	54.0

RE_HF907_BRF_Pre



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	AV (dBuV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Margin - PK+ (dB)	Limit - PK+ (dBuV/)	Margin - AV (dB)	Limit - AV (dBuV/)
2390.000000	47.5	38.8	1000.000	180.0	H	33.0	-0.8	26.5	74.0	15.2	54.0
2405.500000	54.7	43.5	1000.000	210.0	H	122.0	-10.8	19.3	74.0	10.5	54.0
2483.500000	50.4	39.2	1000.000	150.0	H	125.0	-0.3	23.6	74.0	14.8	54.0

Radiated Emission 18-25 GHz

18-25GHz Radiated Emission

EUT Information

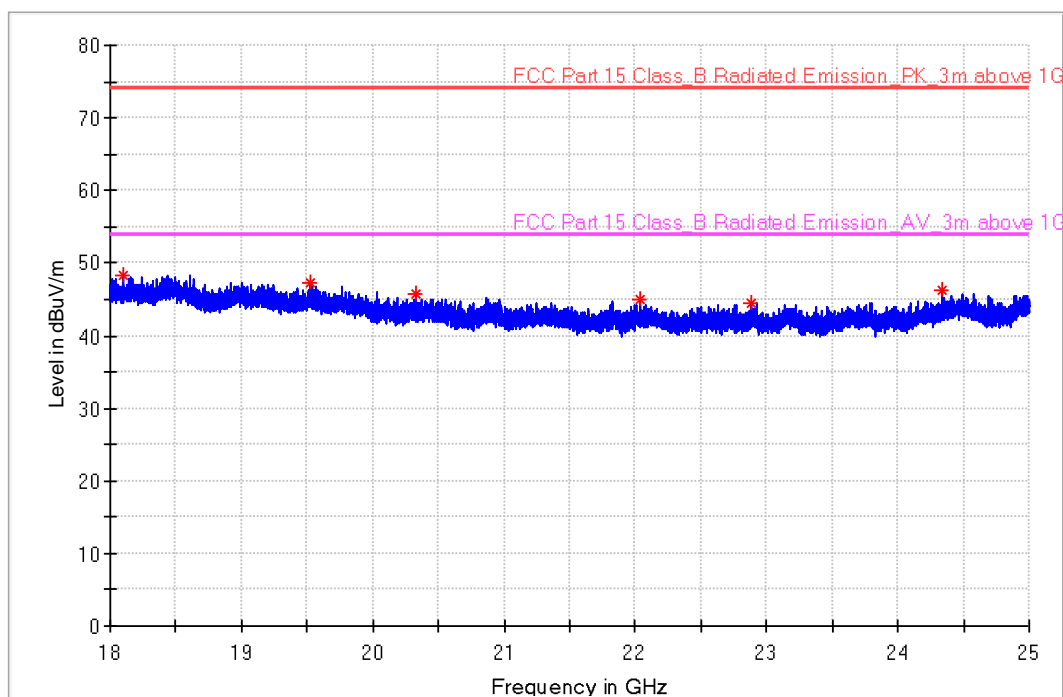
EUT Name: Smart PV Optimizer
 Model: YMX800A
 Client: Yimeixu WitChip Energy Hitech Co., Ltd.
 Op Cond: DC 44.85V power on and transmitting at 2460MHz
 Operator: Tianji XU
 Test Spec: FCC Part 15.209(a)
 Comment: Horizontal
 Sample No: SHA-869671-1

Sweep Setup: RE_3116C_pre [EMI radiated]

Hardware Setup: RE_3116C
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
18 GHz - 25 GHz	500 kHz	PK+ ; AVG	1 MHz	0.05 s	0 dB

Full Spectrum



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18105.000000	48.42	74.00	25.58	100.0	H	292.0	8.1
19524.500000	47.25	74.00	26.75	100.0	H	96.0	8.4
20322.500000	45.76	74.00	28.24	100.0	H	25.0	8.3
22034.000000	45.07	74.00	28.93	100.0	H	331.0	8.8
22889.500000	44.51	74.00	29.49	100.0	H	281.0	8.9
24342.500000	46.16	74.00	27.84	100.0	H	74.0	9.0

18-25GHz Radiated Emission

EUT Information

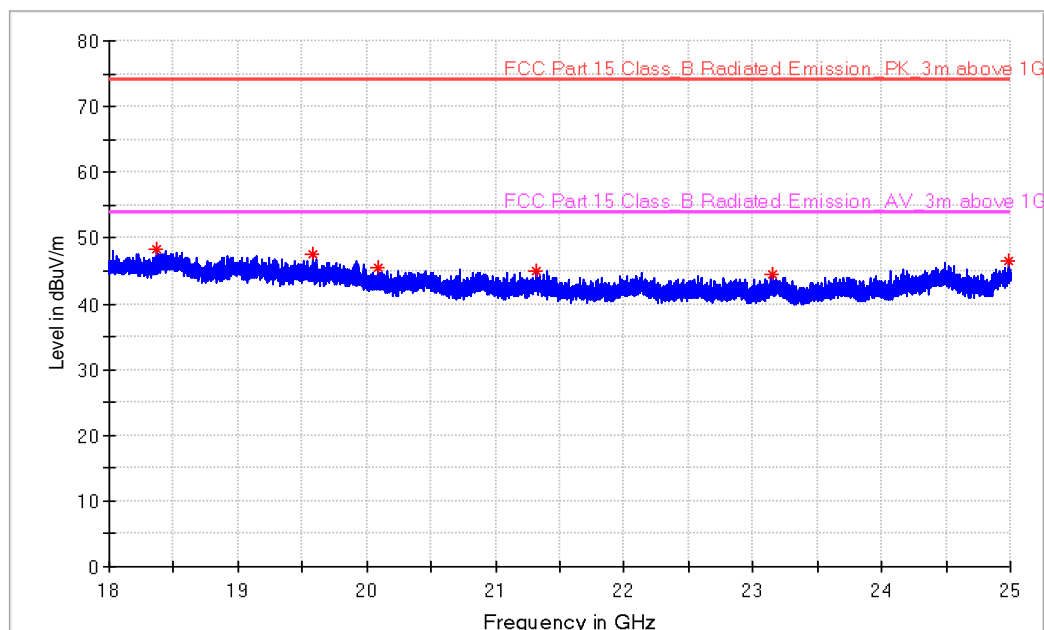
EUT Name: Smart PV Optimizer
 Model: YMX800A
 Client: Yimeixu WitChip Energy Hitech Co., Ltd.
 Op Cond: DC 44.85V power on and transmitting at 2460MHz
 Operator: Tianji XU
 Test Spec: FCC Part 15.209(a)
 Comment: Vertical
 Sample No: SHA-869671-1

Sweep Setup: RE_3116C_pre [EMI radiated]

Hardware Setup: RE_3116C
 Receiver: [FSV 40]
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
18 GHz - 25 GHz	500 kHz	PK+ ; AVG	1 MHz	0.05 s	0 dB

Full Spectrum



Limit and Margin

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
18369.500000	48.29	74.00	25.71	100.0	V	156.0	8.1
19581.500000	47.61	74.00	26.39	100.0	V	257.0	8.4
20089.500000	45.37	74.00	28.63	100.0	V	225.0	8.3
21319.000000	44.89	74.00	29.11	100.0	V	268.0	8.6
23152.500000	44.59	74.00	29.41	100.0	V	200.0	8.9
24984.000000	46.44	74.00	27.56	100.0	V	125.0	9.0

Remark:

- (1) Emission level= Original Receiver Reading + Correct Factor
- (2) Correct Factor = Antenna Factor + Cable Loss -Amplifier gain
- (3) Margin = limit – Corrected Reading

11 Test Equipment List

List of Test Instruments
Test Site1

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL. DUE DATE
C	Signal spectrum analyzer	Agilent	N9020B	MY59050168	2024-2-19	2025-2-18
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2024-8-1	2025-7-31
	Signal Analyzer	Rohde & Schwarz	FSV40	101091	2024-8-1	2025-7-31
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9168	961	2024-8-30	2025-8-29
	Double-ridged waveguide horn antenna	Rohde & Schwarz	HF907	102868	2024-4-14	2025-4-13
	Pre-amplifier	Shenzhen HzEMC	HPA-081843	HYP A23026	2024-4-16	2025-4-15
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2024-6-26	2025-6-25
	Double Ridged Horn Antenna	ETS-Lindgren	3116C	00246076	2023-7-7	2026-7-6
	3m Semi-anechoic chamber	TDK	9X6X6	----	2024-5-8	2027-5-7

Measurement Software Information			
Test Item	Software	Manufacturer	Version
C	MTS 8310	MWRFTtest	3.0.0.0
RE	EMC 32	Rohde & Schwarz	V10.50.40

C - Conducted RF tests

- Conducted peak output power
- 6dB bandwidth and 99% Occupied Bandwidth
- Power spectral density
- Spurious RF conducted emissions
- Band edge



12 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Items	Extended Uncertainty
Conducted Disturbance at Mains Terminals	150kHz to 30MHz, LISN, 3.16dB
Radiated Disturbance	9kHz to 30MHz, 3.52dB 30MHz to 1GHz, 5.03dB (Horizontal) 5.12dB (Vertical) 1GHz to 18GHz, 5.49dB 18GHz to 40GHz, 5.63dB
RF Conducted Measurement	Power related: 1.16dB Frequency related: 6.00×10^{-8}

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.3.3.



13 Photographs of Test Set-ups

Refer to the < Test Setup photos >.



14 Photographs of EUT

Refer to the < External Photos > & < Internal Photos >.

-----End of Test Report-----