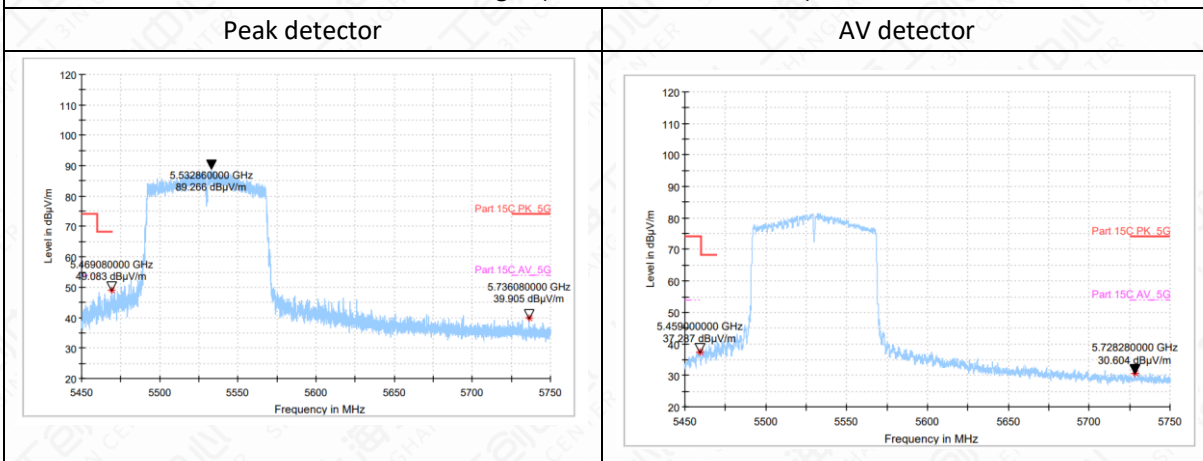
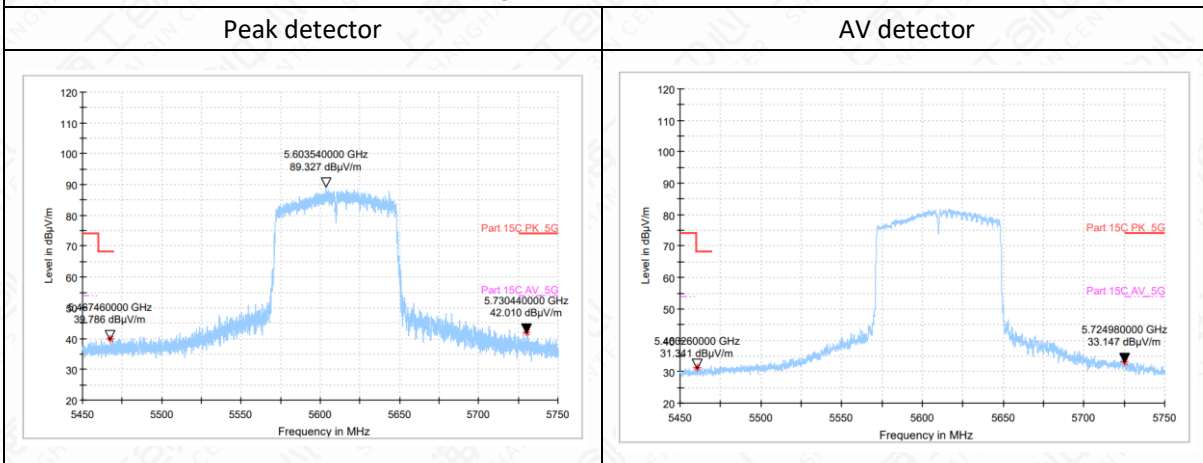


Band Edges (802.11 ac 80M, CH106)

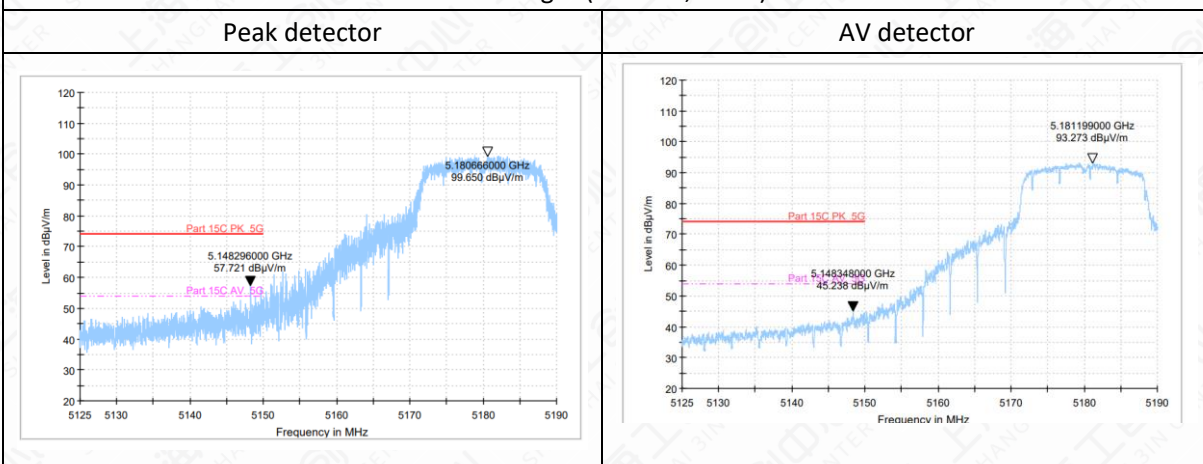


Band Edges (802.11ac 80M, CH122)

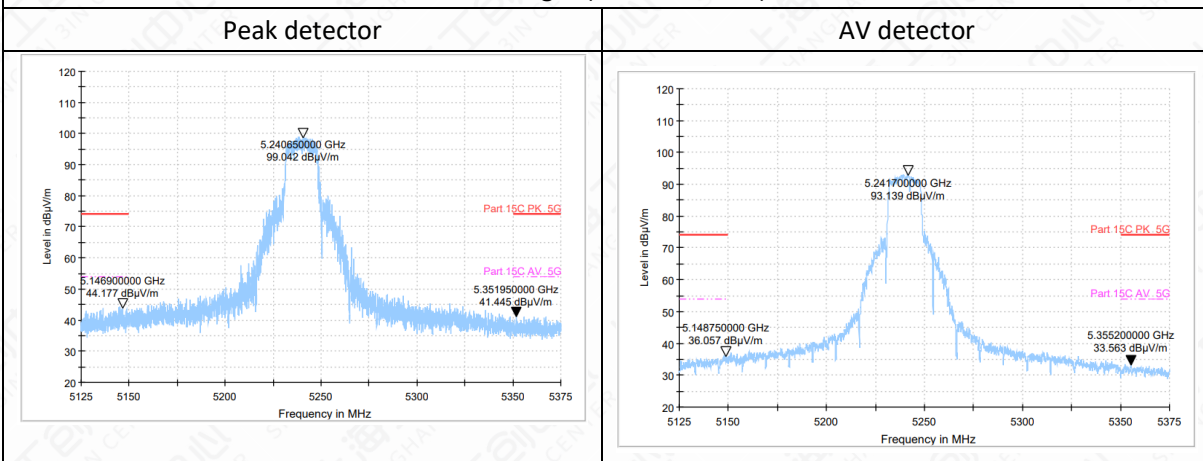


Secondary supply (S21)

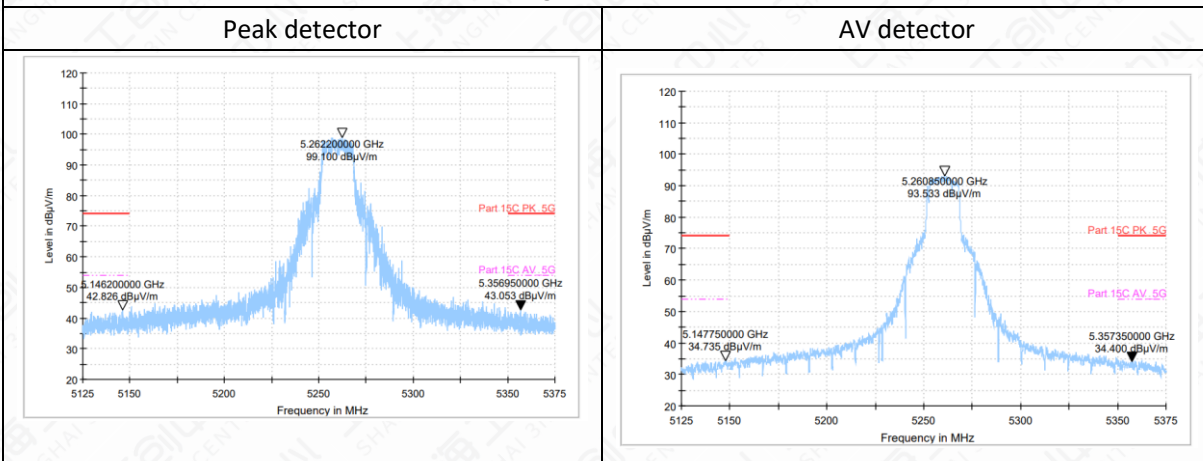
Band Edges (802.11a, CH36)



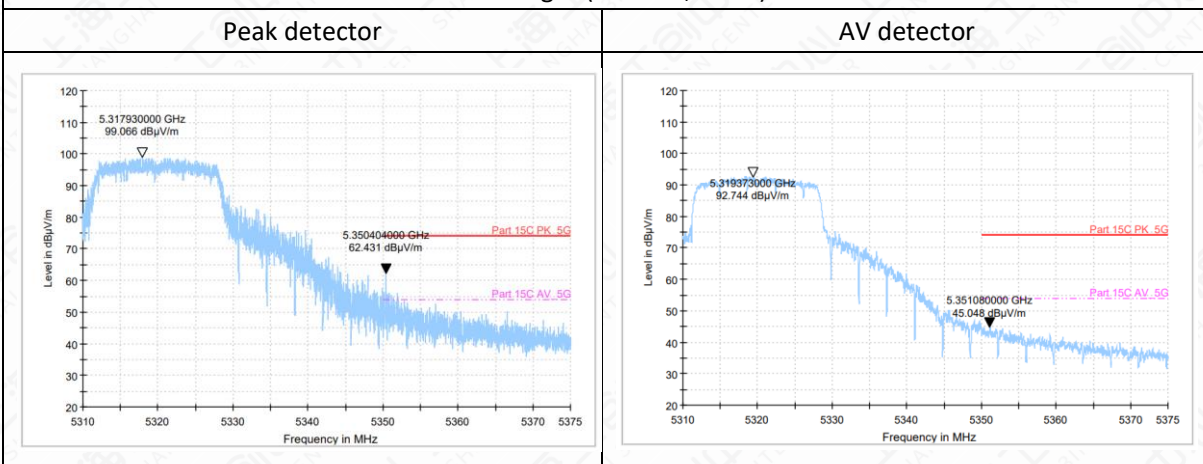
Band Edges (802.11a, CH48)



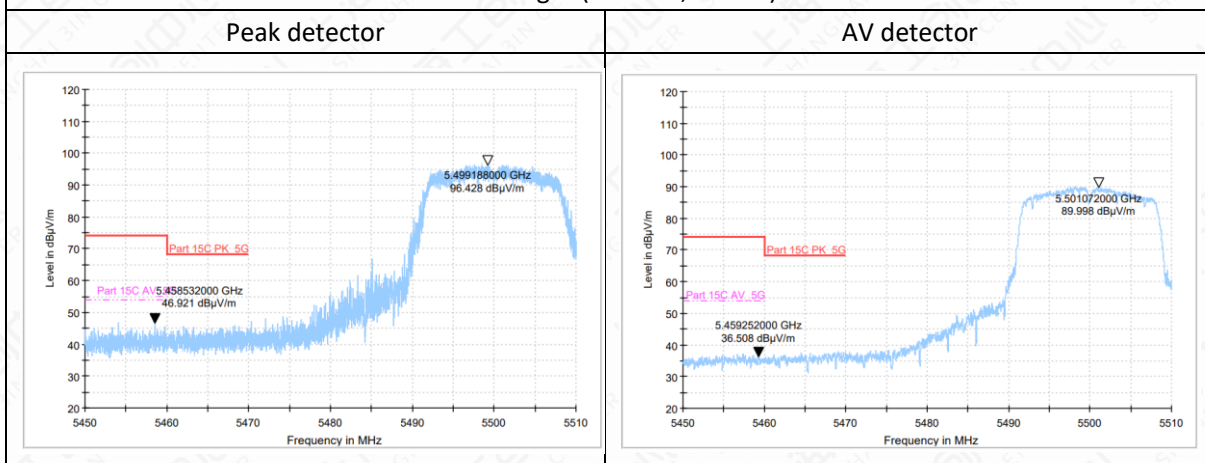
Band Edges (802.11a, CH52)



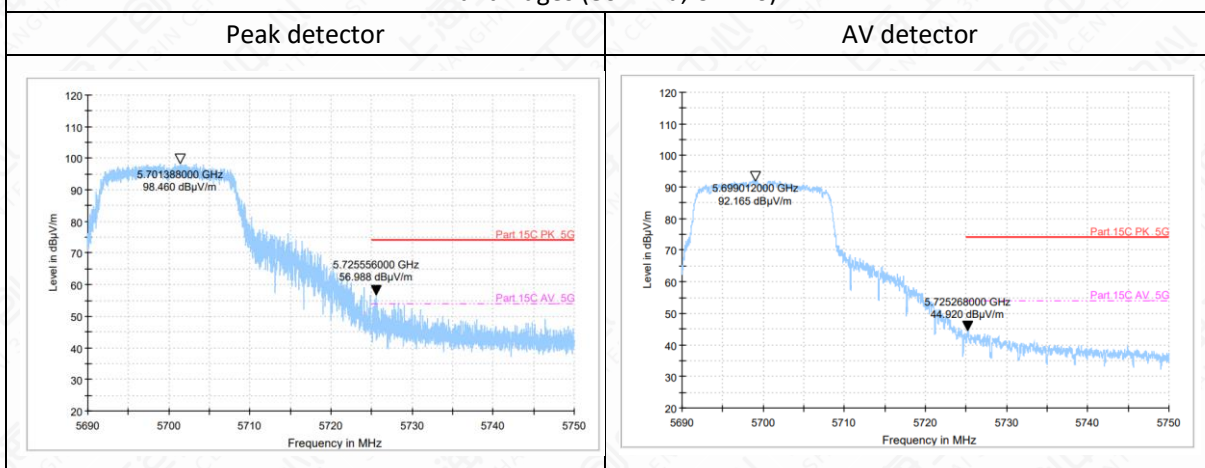
Band Edges (802.11a, CH64)



Band Edges (802.11a, CH100)



Band Edges (802.11a, CH140)



Note:

1. Only data in worst mode is provided.

6.7. Transmitter Spurious Emission

6.7.1 Measurement Limit

Below 1G Limit:

Frequency of emission (MHz)	Field strength(dBμV/m)	Measurement distance(m)
0.009-0.490	129-94	3
0.490-1.705	74-63	3
1.705-30	70	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m

Above 1G, non-restricted band

Standard	EIRP Limit
15.407(b)	-27dBm/MHz

Above 1G, Restricted band

Standard	EIRP Limit	
15.407(b)	-27dBm/MHz	
15.209	Peak	74dBμV/m
	Average	54dBμV/m

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} + 20 \log(d[\text{m}]) - 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} - 20 \log(d[\text{m}]) + 104.7$$

$$\text{E[dB}\mu\text{V/m]} = \text{EIRP[dBm]} + 95.2 = 68.2, \text{ for } d = 3\text{m}$$

6.7.2 Test Procedure

The measurement is made according to KDB 789033

Set the spectrum analyzer in the following:

Procedure for Unwanted Emissions Measurements below 1000 MHz:

- Follow the requirements in II.G.3. "General Requirements for Unwanted Emissions Measurements."
- Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

Detector: Peak and Quasi-Peak

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz:

a) Follow the requirements in II.G.3, "General Requirements for Unwanted Emissions Measurements."

b) Maximum emission levels are measured by setting the analyzer as follows:

(i) RBW = 1 MHz.

(ii) VBW \geq 3 MHz.

(iii) Detector = Peak.

(iv) Sweep time = auto.

(v) Trace mode = max hold.

(vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

Procedures for Average Unwanted Emissions Measurements above 1000 MHz:

a) Follow the requirements in section II.G.3., "General Requirements for Unwanted Emissions Measurements."

b) Average emission levels shall be measured using one of the following two methods.

c) Method AD (Average Detection): Primary method

(i) RBW = 1 MHz.

(ii) VBW \geq 3 MHz.

(iii) Detector = power averaging (rms), if $\text{span}/(\# \text{ of points in sweep}) \leq \text{RBW}/2$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.

(iv) Averaging type = power averaging (rms)

As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

(v) Sweep time = auto.

(vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of $1/x$, where x 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—rather than turning on and off with the transmit cycle, at least 100 traces shall be averaged.)

(vii) If tests are performed with the EUT transmitting at a duty cycle less than 98%, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order 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:

If power averaging (rms) mode was used in step (iv) above, the correction factor is $10 \log (1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB must be added to the measured emission levels.

If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log (1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB must be added to the measured emission levels.

If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. Below 18GHz , the measurement antenna was placed at a distance of 3 meters from the EUT. Above 18GHz , the measurement antenna was placed at a distance of 1 meter from the EUT. During the tests, the antenna height varied from 1m to 4m and the EUT azimuth were varied from 0° to 360° in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Remark:

1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level

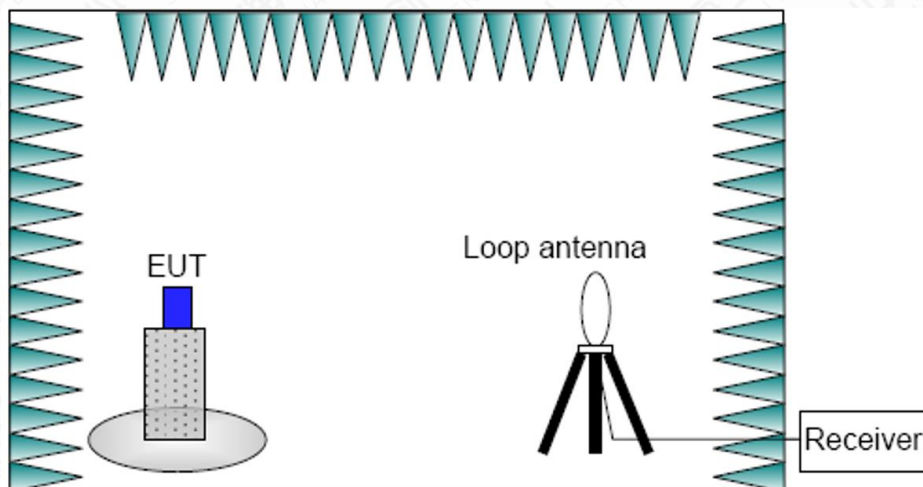
4. If the PK measured level is lower than AV limit, the AV test can be elided

Note:

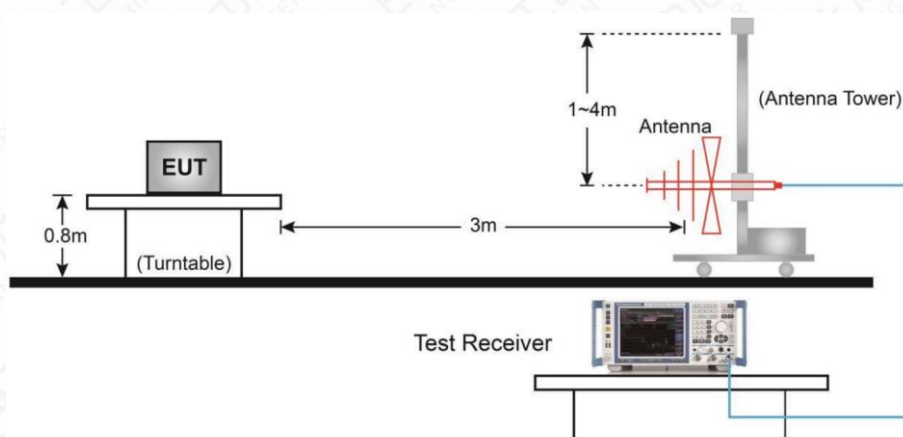
1. The out-of- limit signal in the picture is the main frequency signal.
2. Only data in worst mode is provided.
3. The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.
4. Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.

6.6.1 Test Setup

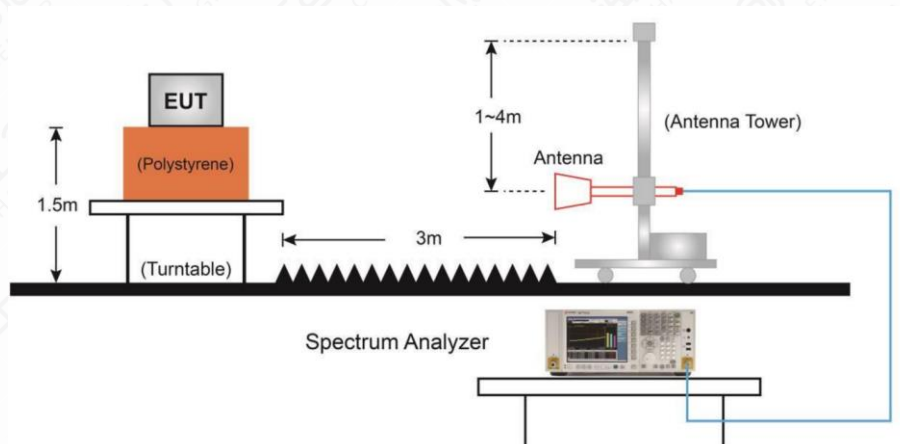
Below 30MHz Test Setup



Below 1GHz Test Setup

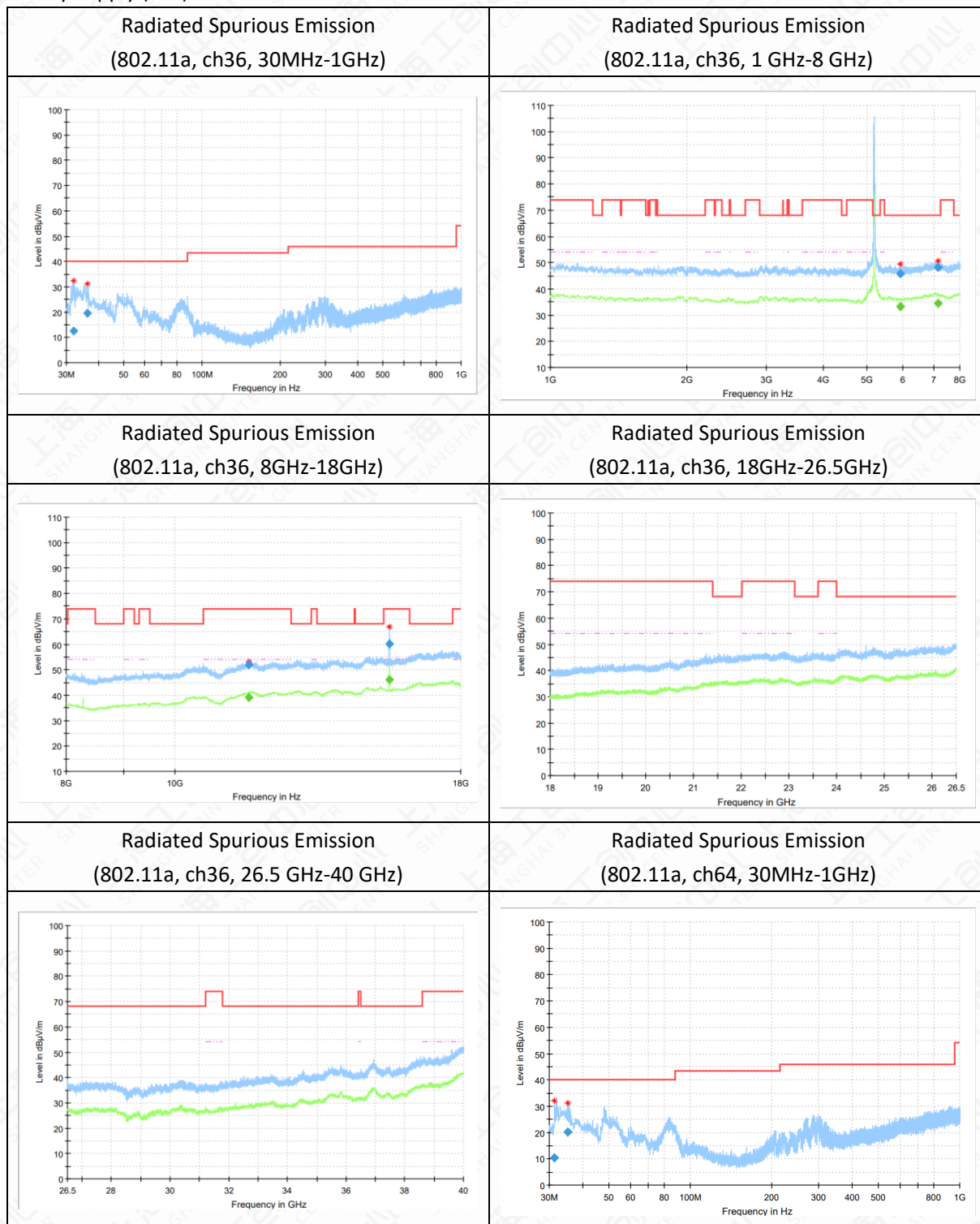


Above 1GHz Test Setup

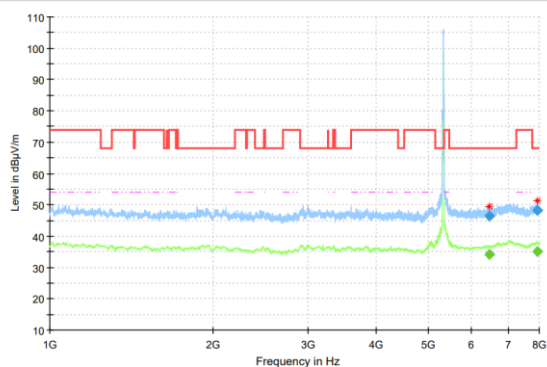


6.6.2 Measurement Results

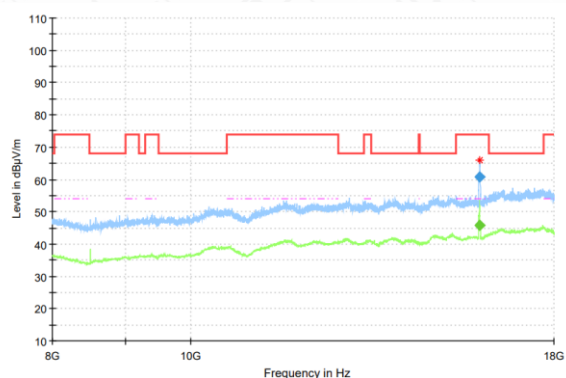
Mainly Supply (S14)



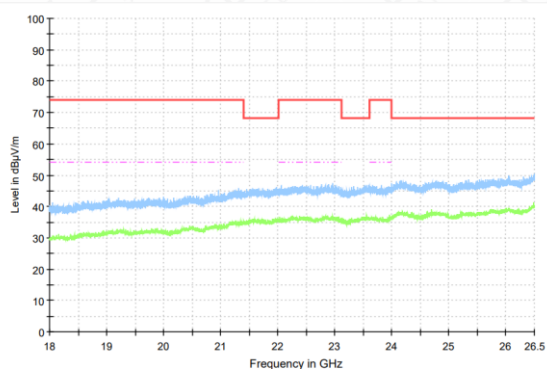
Radiated Spurious Emission
(802.11a, ch64, 1 GHz-8 GHz)



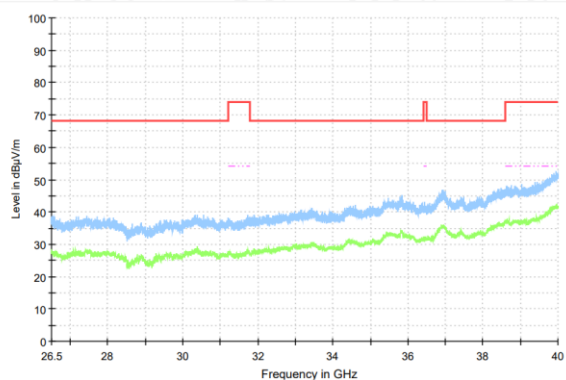
Radiated Spurious Emission
(802.11a, ch64, 8GHz-18GHz)



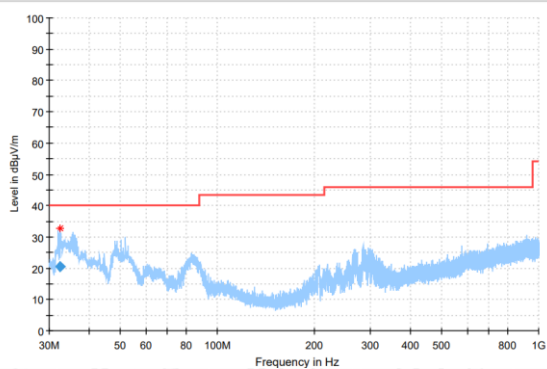
Radiated Spurious Emission
(802.11a, ch64, 18GHz-26.5GHz)



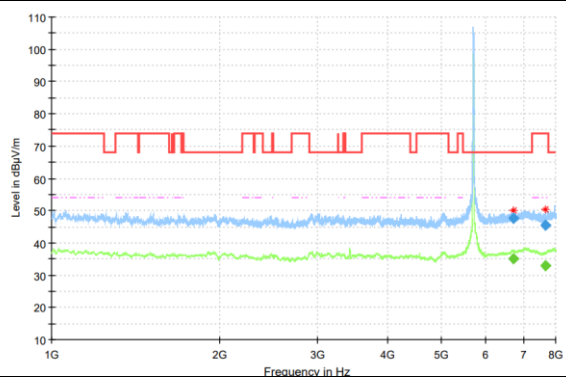
Radiated Spurious Emission
(802.11a, ch64, 26.5 GHz-40 GHz)



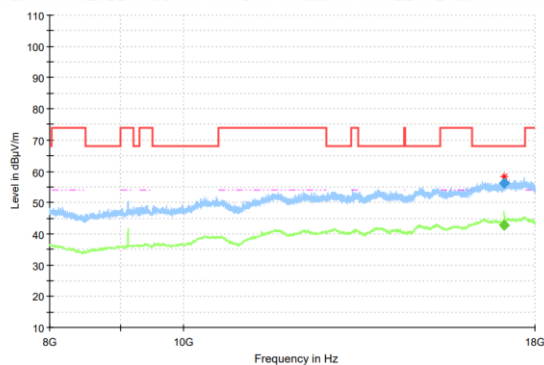
Radiated Spurious Emission
(802.11a, ch140, 30MHz-1GHz)



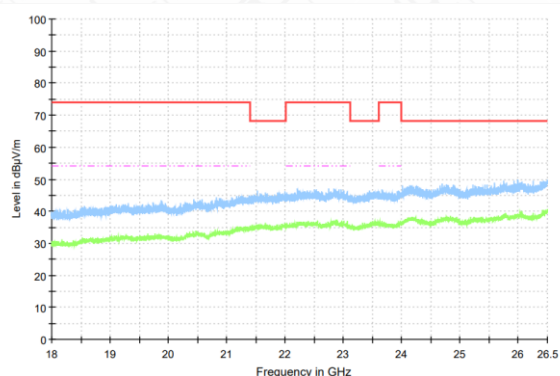
Radiated Spurious Emission
(802.11a, ch140, 1 GHz-8 GHz)



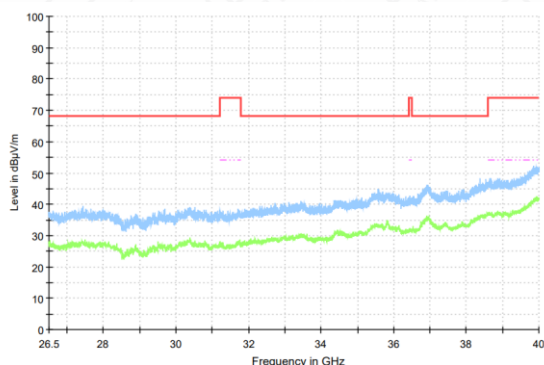
Radiated Spurious Emission
(802.11a, ch140, 8GHz-18GHz)



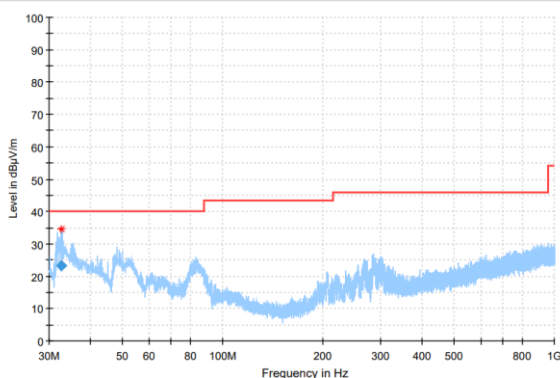
Radiated Spurious Emission
(802.11a, ch140, 18GHz-26.5GHz)



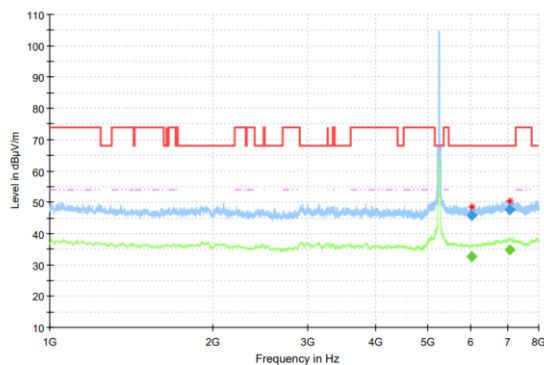
Radiated Spurious Emission
(802.11a, ch140, 26.5 GHz-40 GHz)



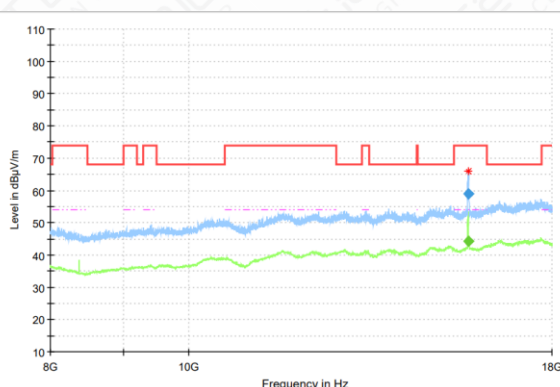
Radiated Spurious Emission
(802.11n 20m, ch48, 30MHz-1GHz)

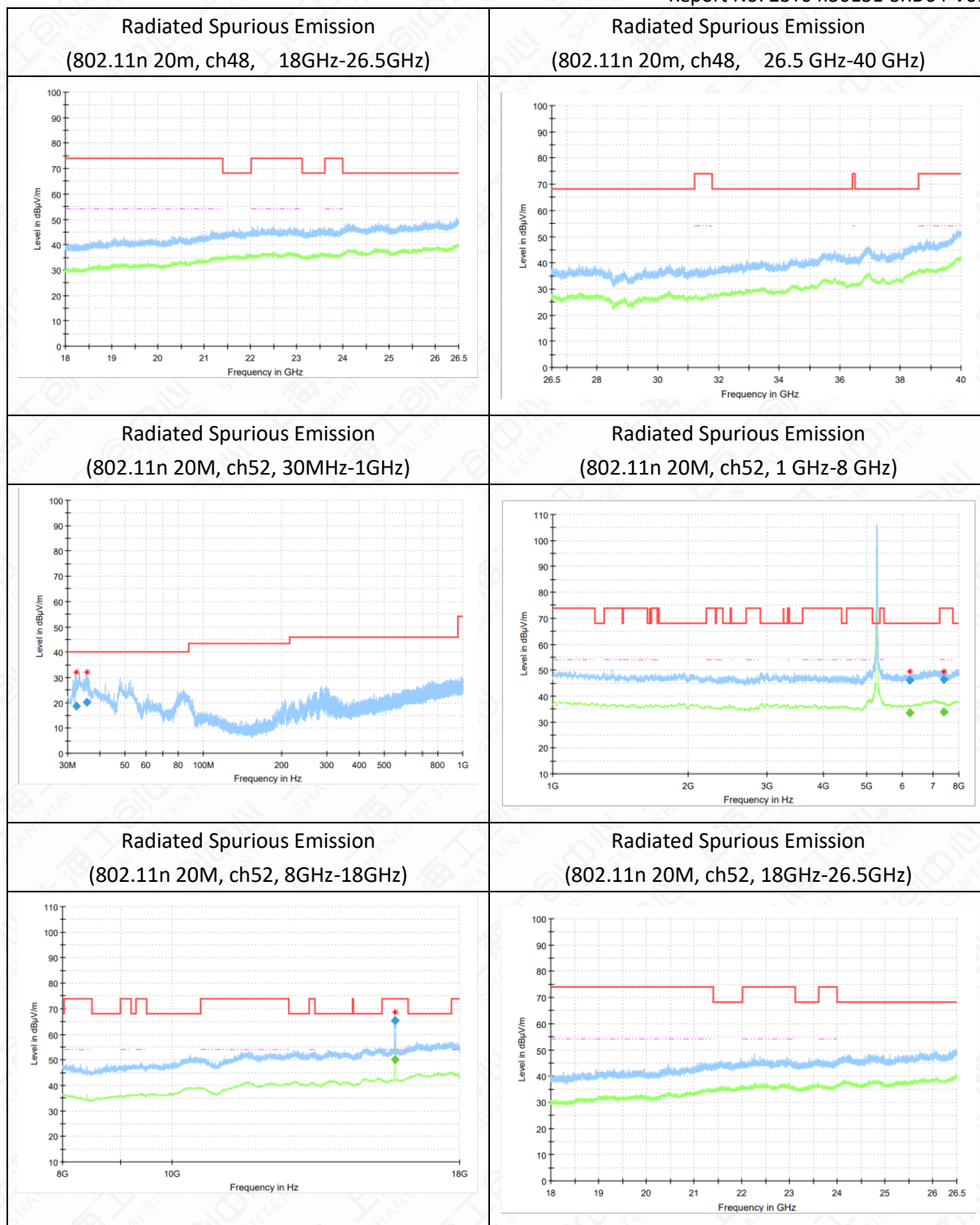


Radiated Spurious Emission
(802.11n 20m, ch48, 1 GHz-8 GHz)

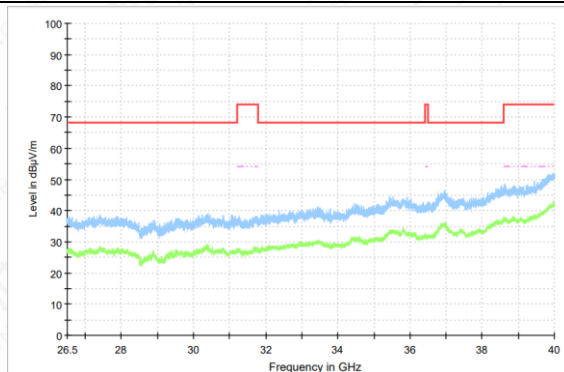


Radiated Spurious Emission
(802.11n 20m, ch48, 8GHz-18GHz)

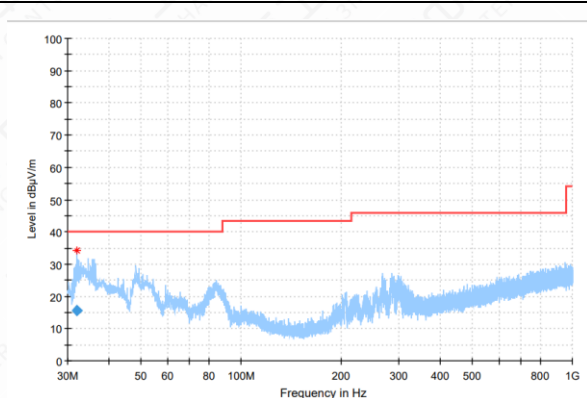




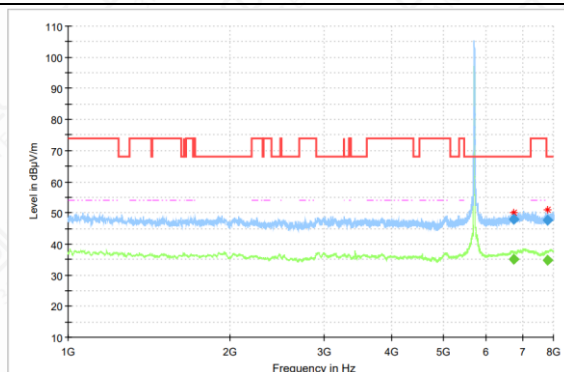
Radiated Spurious Emission
(802.11n 20M, ch52, 26.5 GHz-40 GHz)



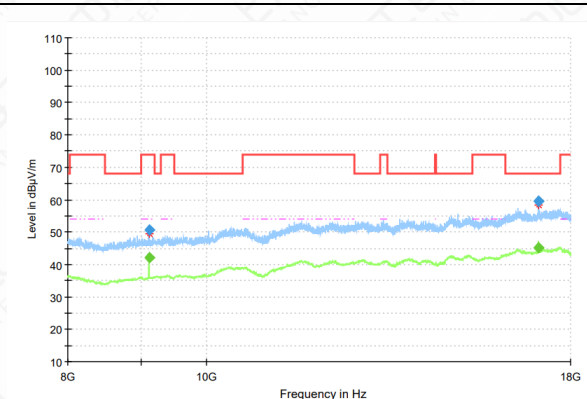
Radiated Spurious Emission
(802.11n 20M, ch140, 30MHz-1GHz)



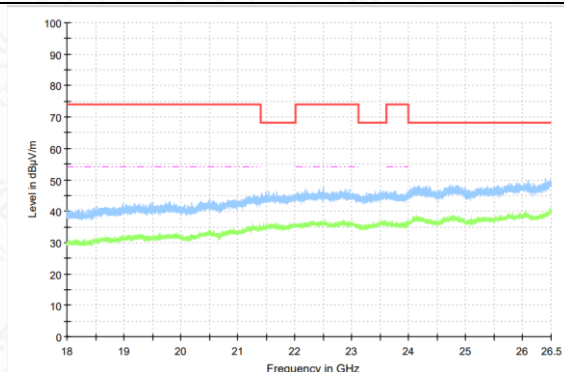
Radiated Spurious Emission
(802.11n 20M, ch140, 1 GHz-8 GHz)



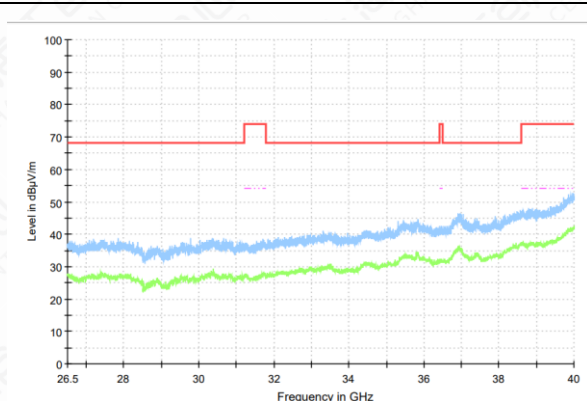
Radiated Spurious Emission
(802.11n 20M, ch140, 8GHz-18GHz)

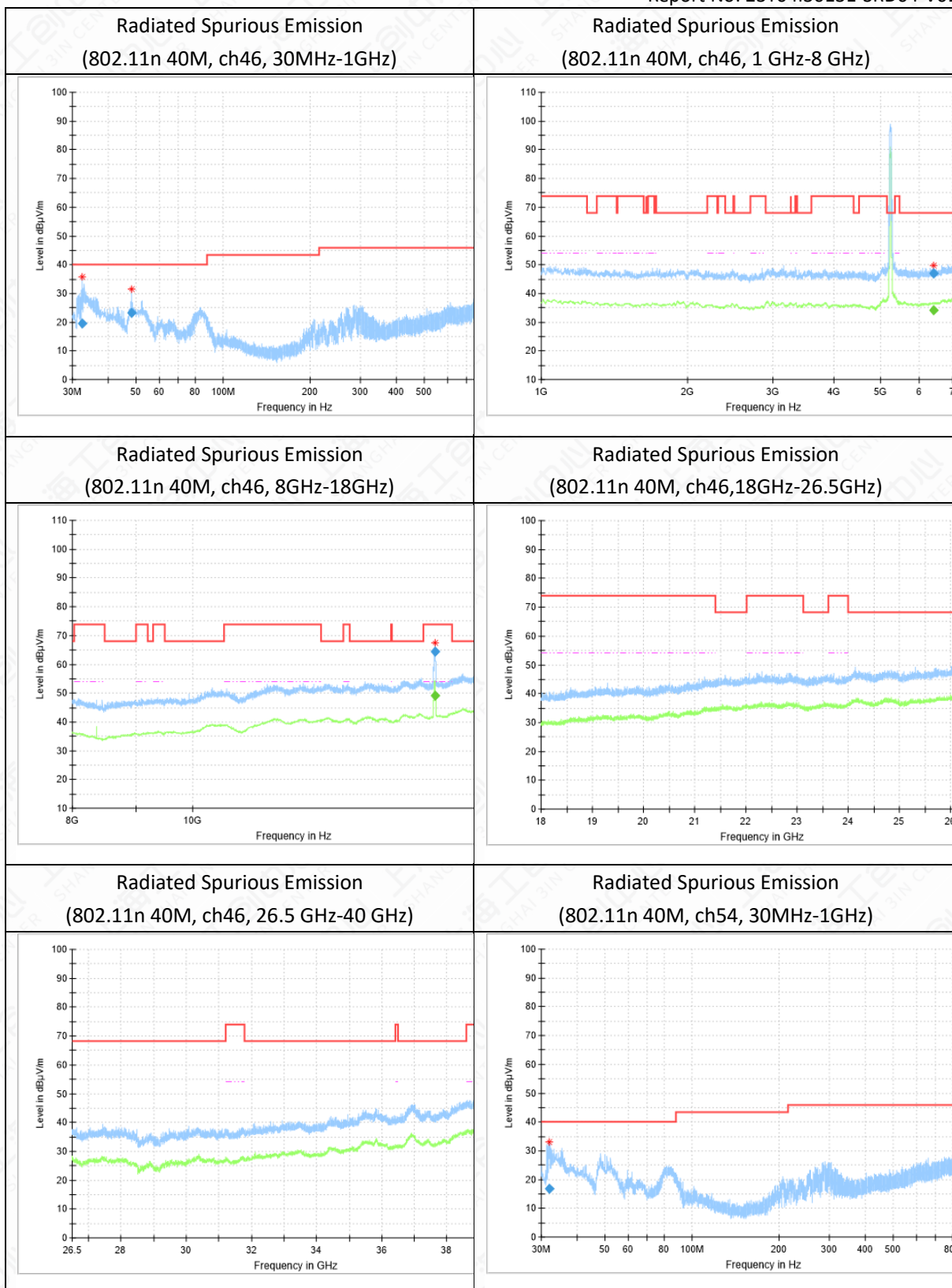


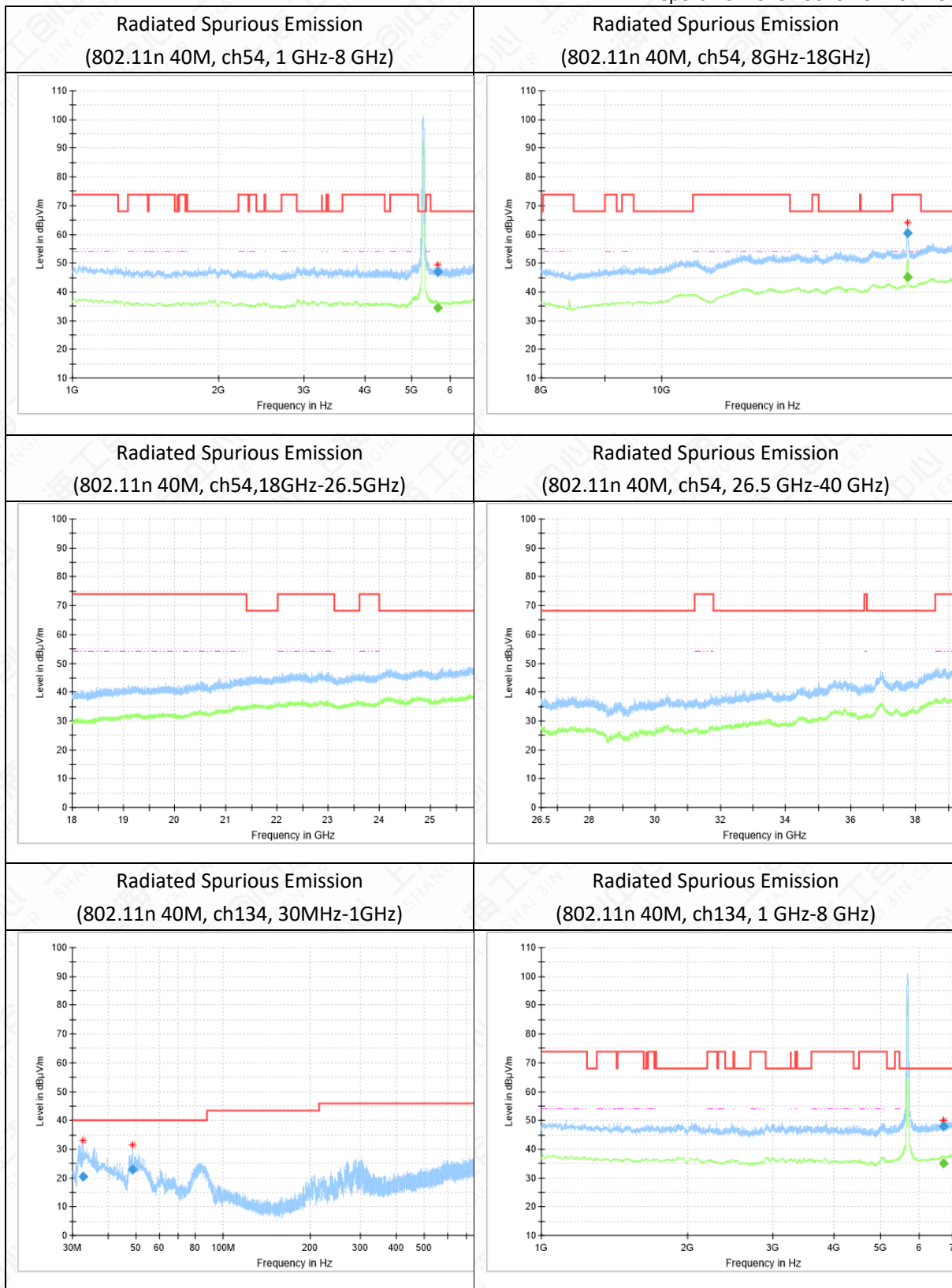
Radiated Spurious Emission
(802.11n 20M, ch140, 18GHz-26.5GHz)

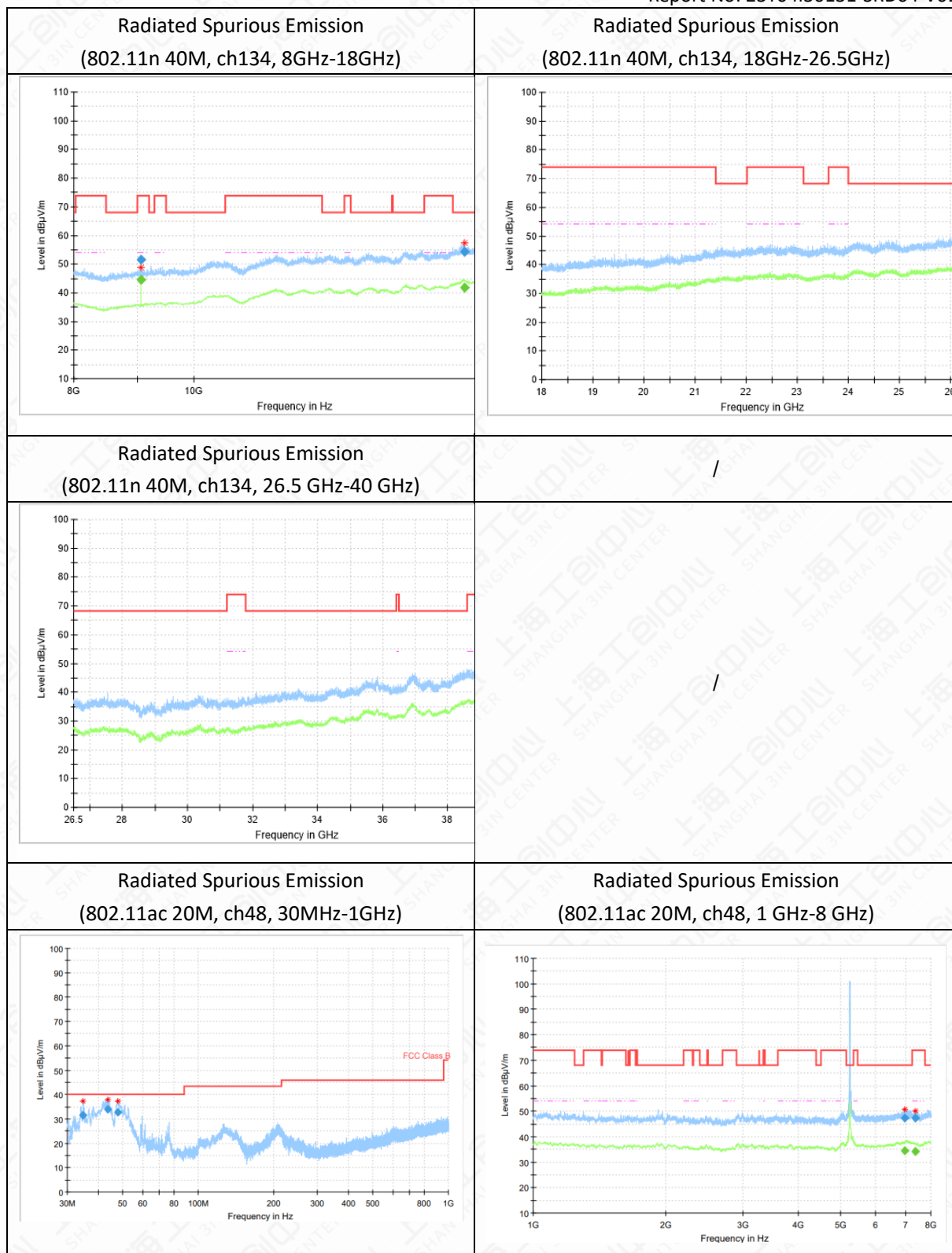


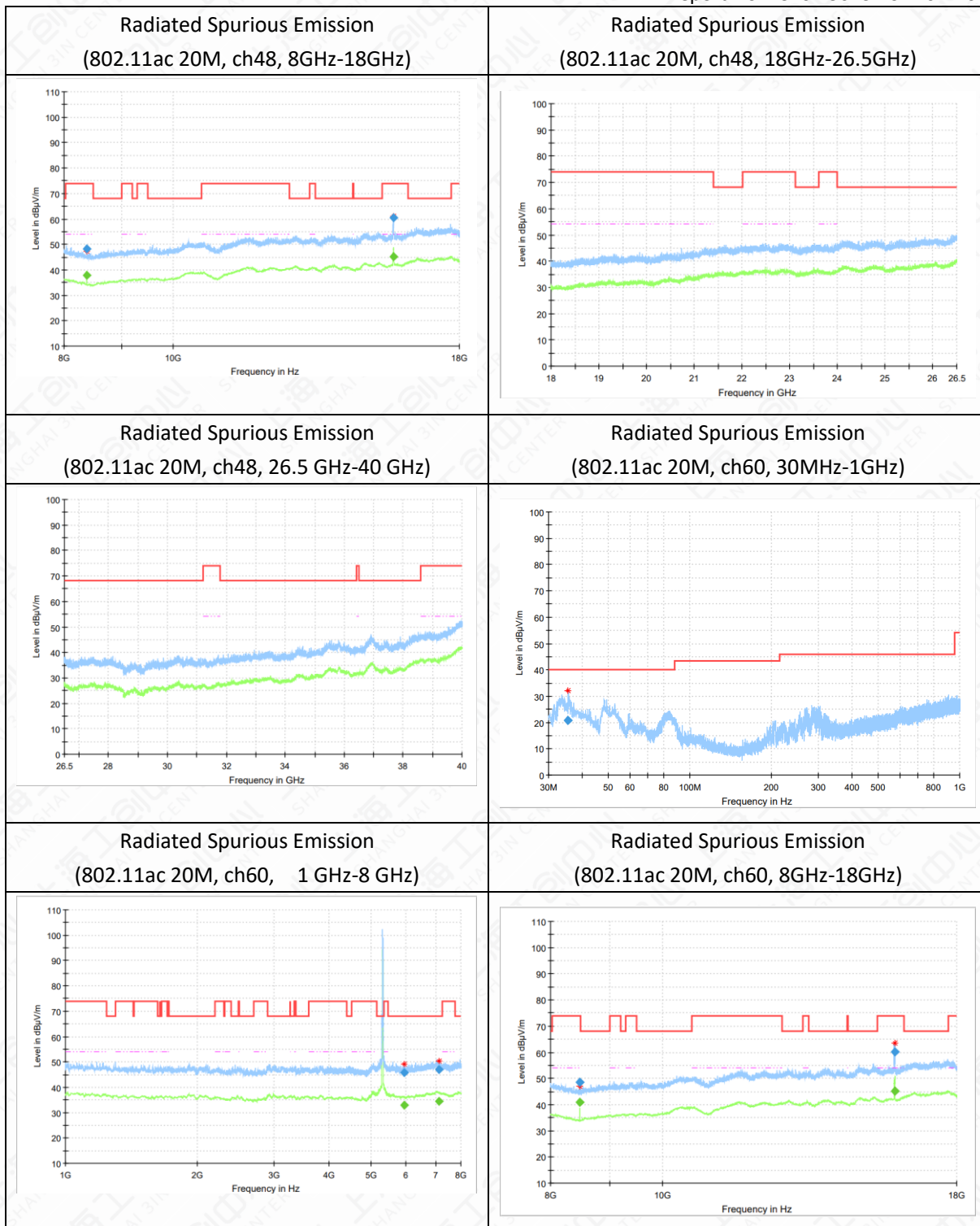
Radiated Spurious Emission
(802.11n 20M, ch140, 26.5 GHz-40 GHz)

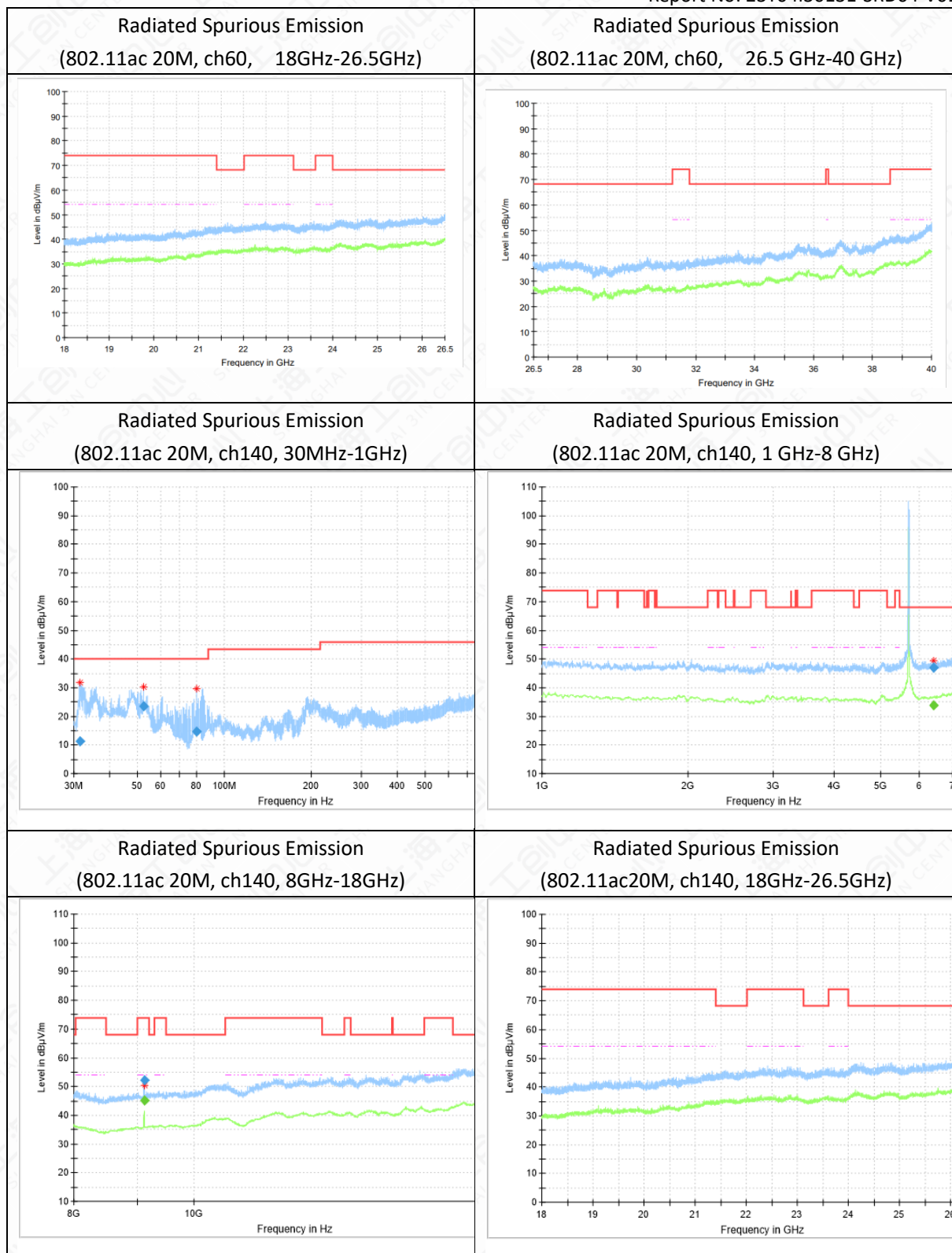


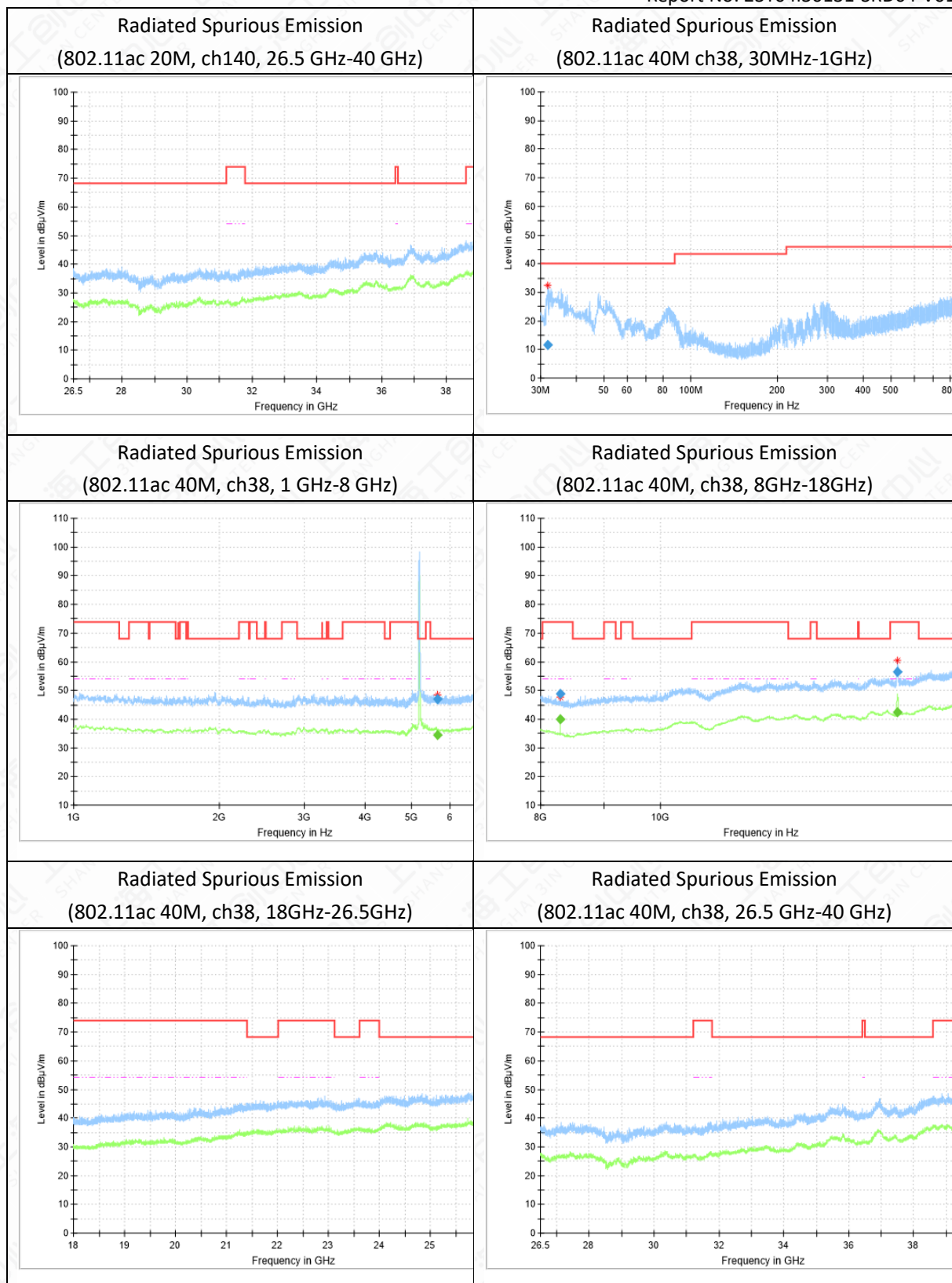


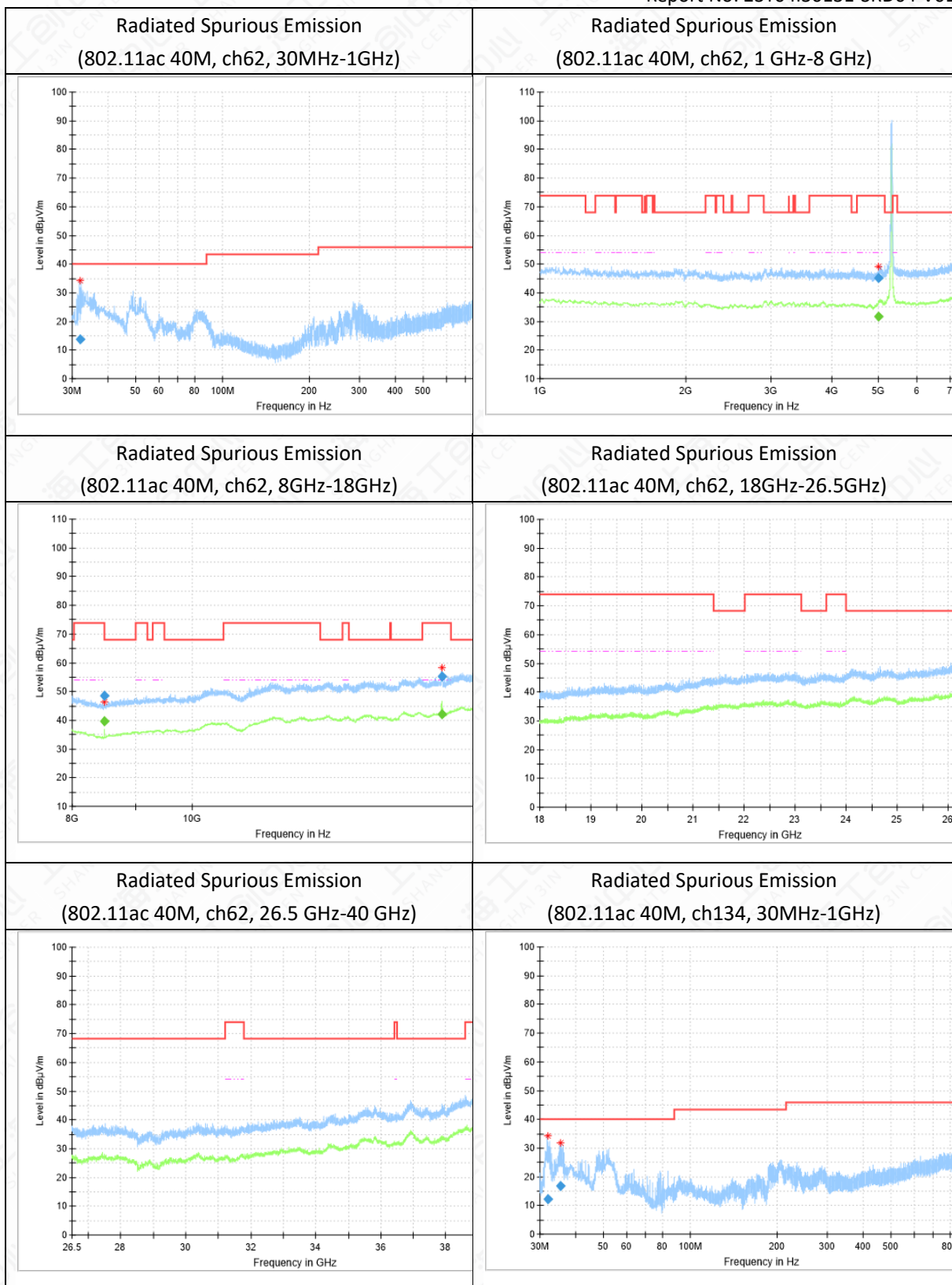


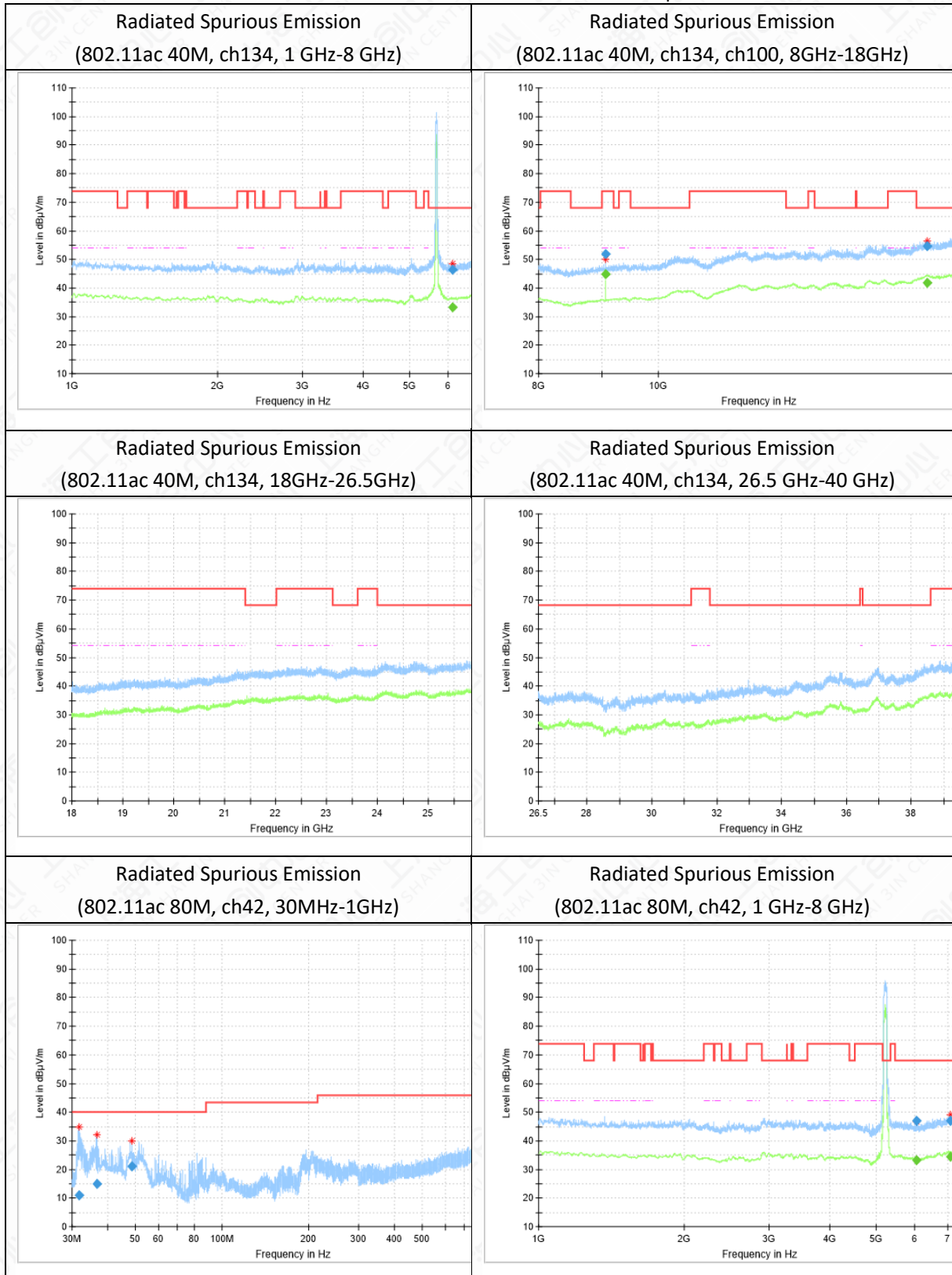


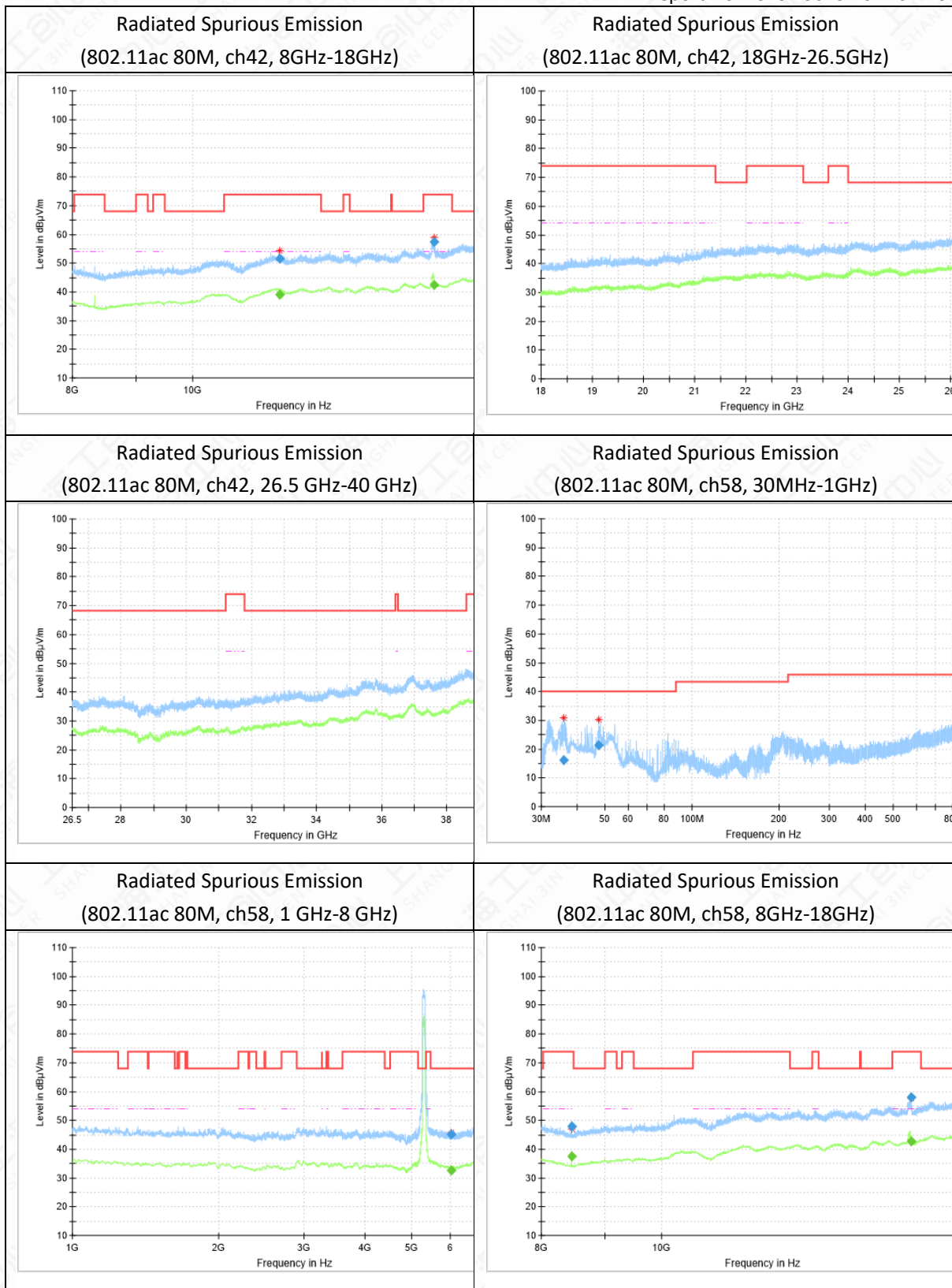


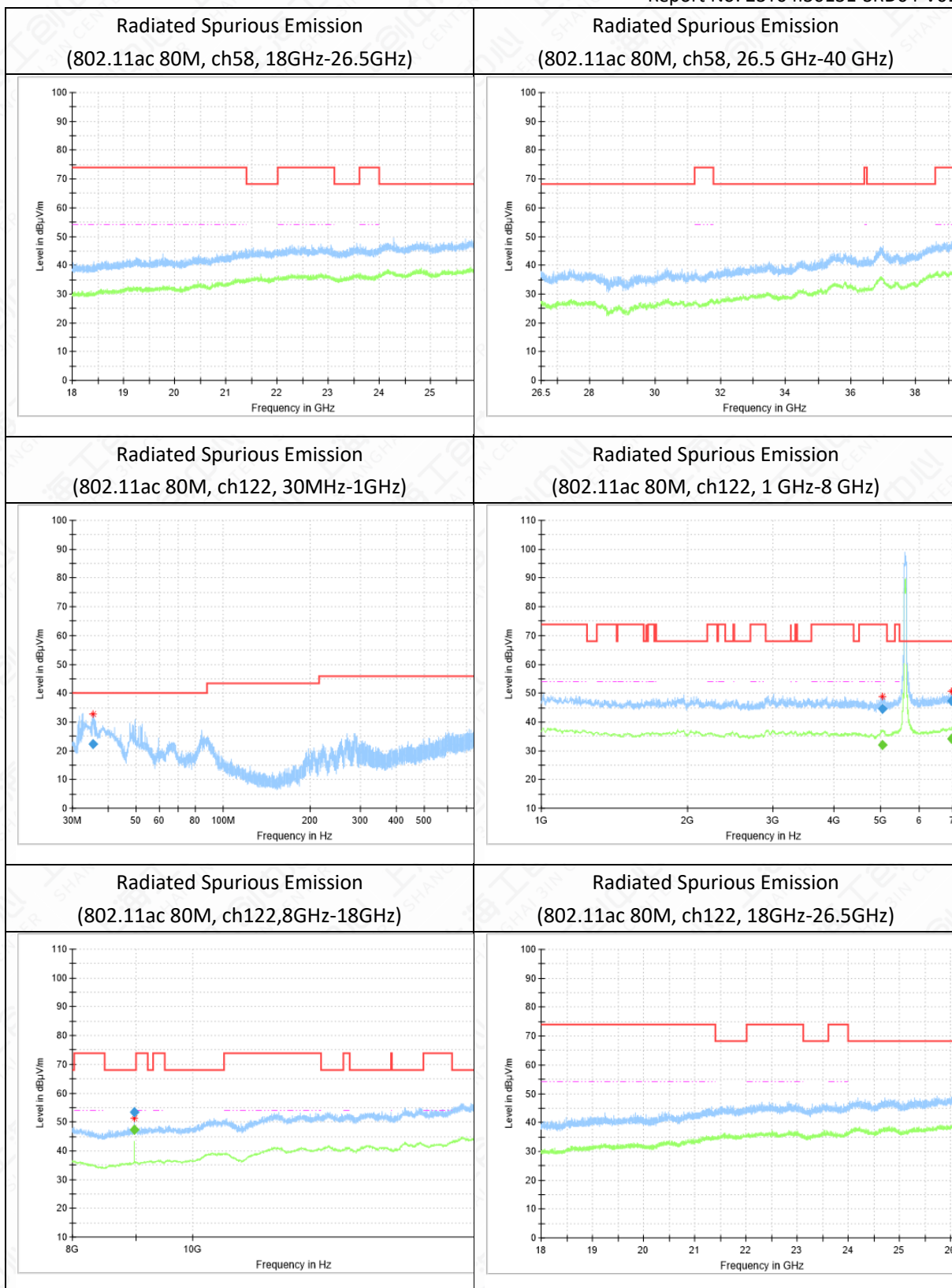


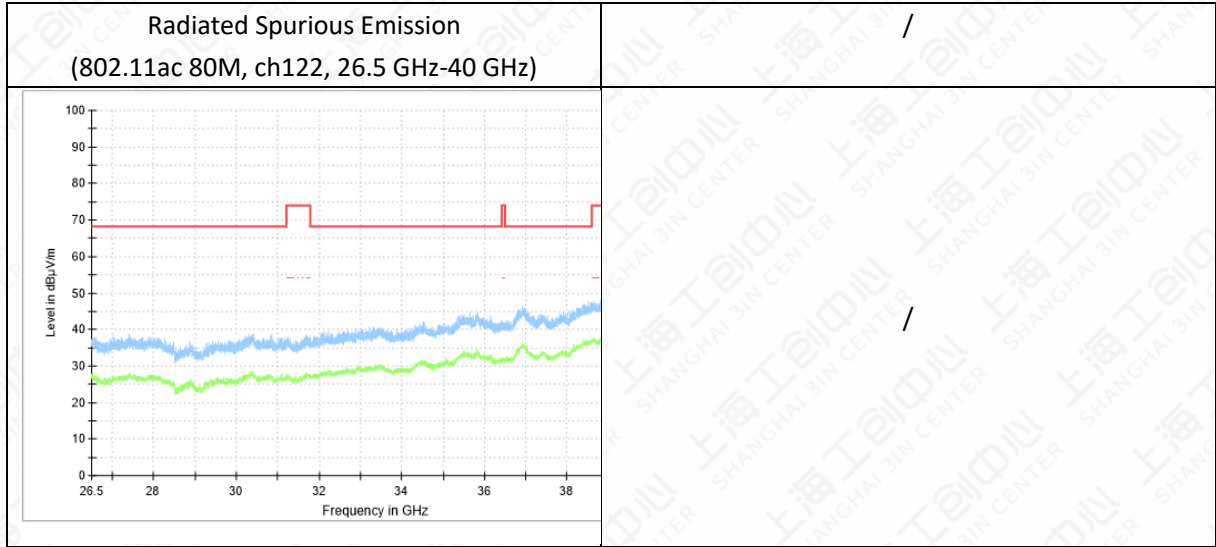




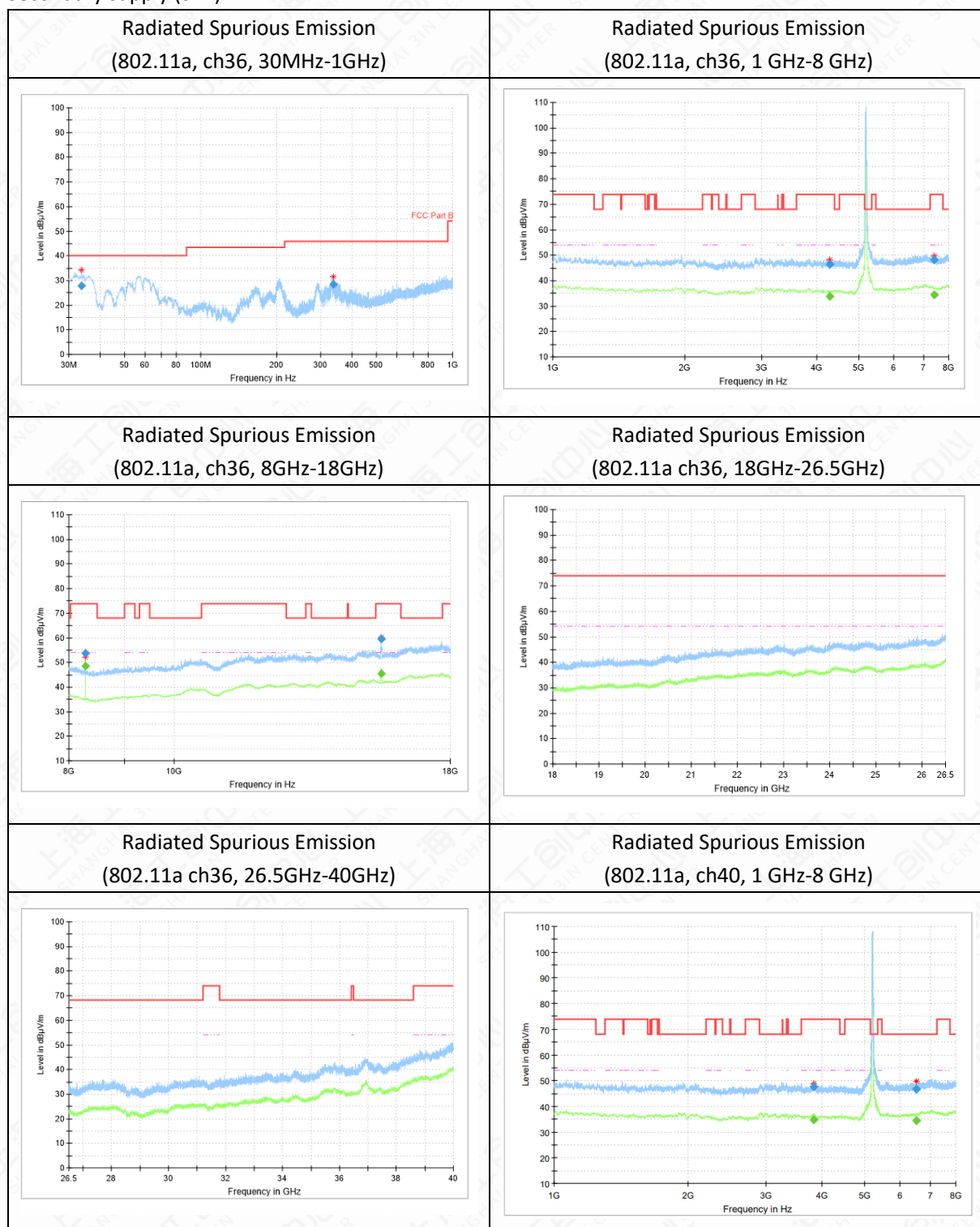




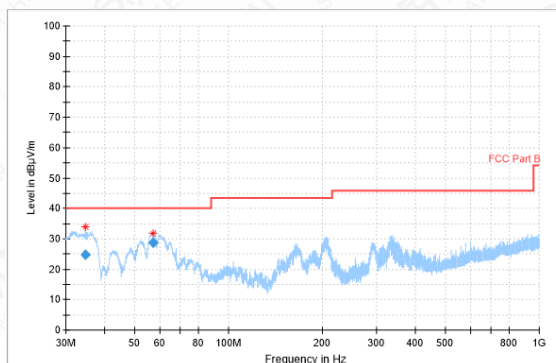




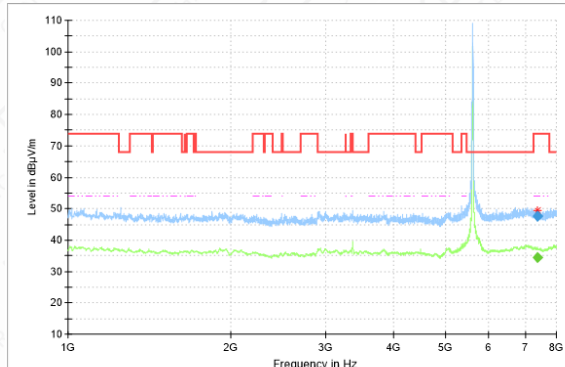
Secondary supply (S21)



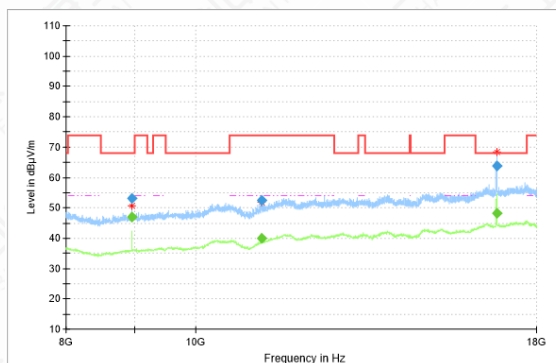
Radiated Spurious Emission
(802.11a, ch52, 30MHz-1GHz)



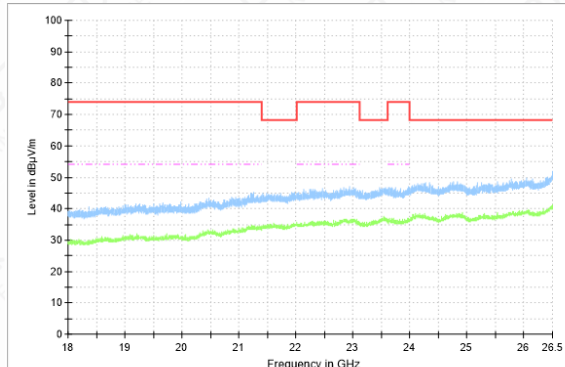
Radiated Spurious Emission
(802.11a, ch52, 1 GHz-8 GHz)



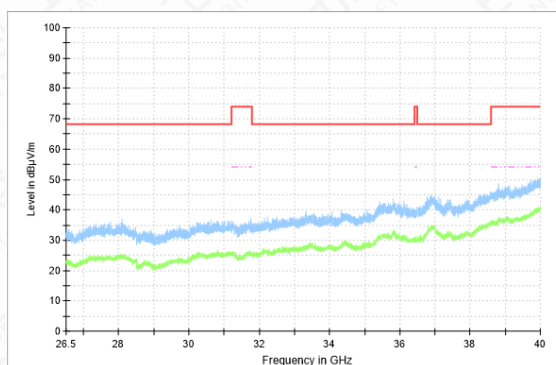
Radiated Spurious Emission
(802.11a, ch52, 8GHz-18GHz)



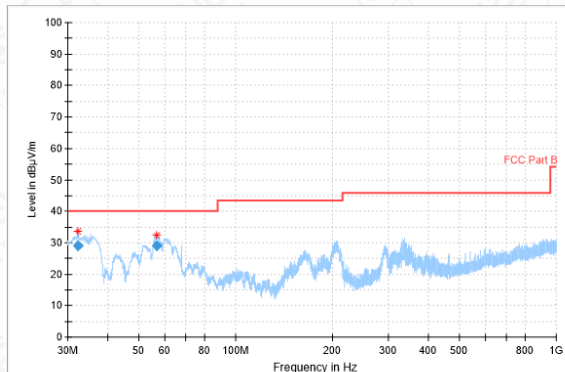
Radiated Spurious Emission
(802.11a ch52, 18GHz-26.5GHz)



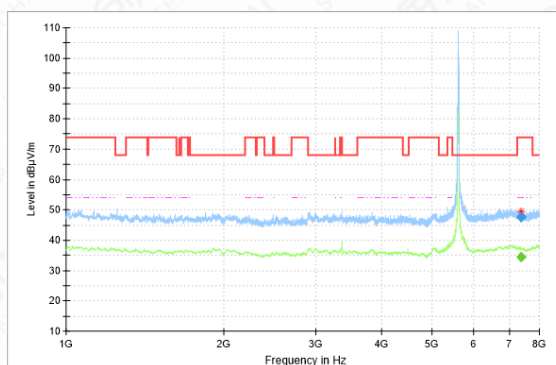
Radiated Spurious Emission
(802.11a ch52, 26.5GHz-40GHz)



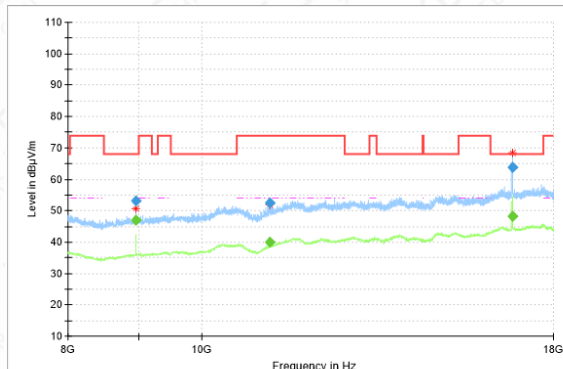
Radiated Spurious Emission
(802.11a, ch120, 30MHz-1GHz)



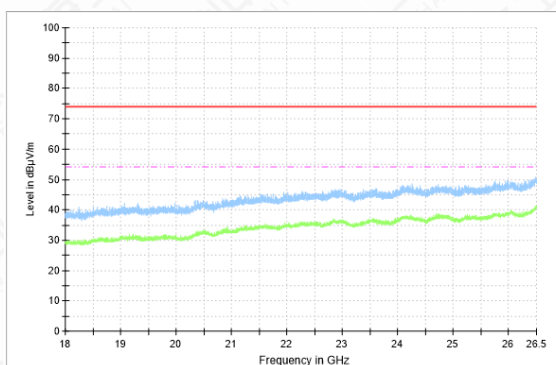
Radiated Spurious Emission
(802.11a, ch120, 1 GHz-8 GHz)



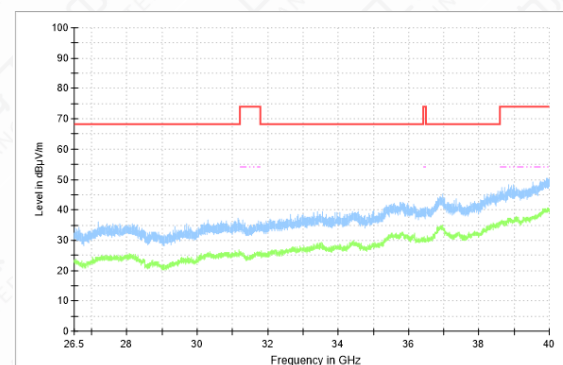
Radiated Spurious Emission
(802.11a, ch120, 8GHz-18GHz)



Radiated Spurious Emission
(802.11a ch120, 18GHz-26.5GHz)



Radiated Spurious Emission
(802.11a ch120, 26.5GHz-40GHz)



Note:

1. The out-of- limit signal in the picture is the main frequency signal.
2. Only data in worst mode is provided.
3. The test data below 30MHz is more than 20dB lower than the limit value, so it is not provided in the report.

Mainly Supply (S14)

RSE-11A-CH36-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time(ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.000176	12.61	40.00	27.39	1000.0	120.000	99.0	V	23.0
36.153837	19.60	40.00	20.40	1000.0	120.000	100.0	V	64.0

RSE-11A-CH36-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time(ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5907.000000	---	33.16	---	---	500.0	1000.000	100.0	H	340.0
5907.000000	45.75	---	68.20	22.45	500.0	1000.000	100.0	H	340.0
7169.750000	---	34.49	---	---	500.0	1000.000	100.0	V	9.0
7169.750000	48.31	---	68.20	19.89	500.0	1000.000	100.0	V	9.0

RSE-11A-CH36-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time(ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
11646.750000	51.94	---	74.00	22.06	500.0	1000.000	100.0	V	276.0
11646.750000	---	39.05	54.00	14.95	500.0	1000.000	100.0	V	276.0
15542.000000	60.27	---	74.00	13.73	500.0	1000.000	100.0	H	208.0
15542.000000	---	46.00	54.00	8.00	500.0	1000.000	100.0	H	208.0

RSE-11A-CH64-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
31.309147	10.42	40.00	29.58	1000.0	120.000	100.0	V	257.0
35.218181	20.03	40.00	19.97	1000.0	120.000	99.0	V	35.0

RSE-11A-CH64-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
6454.000000	---	34.01	---	---	500.0	1000.000	100.0	H	139.0
6454.000000	46.52	---	68.20	21.68	500.0	1000.000	100.0	H	139.0
7927.250000	---	34.95	---	---	500.0	1000.000	100.0	V	189.0
7927.250000	48.11	---	68.20	20.09	500.0	1000.000	100.0	V	189.0

RSE-11A-CH64-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
15956.500000	---	45.73	54.00	8.27	500.0	1000.000	100.0	H	246.0
15956.500000	60.85	---	74.00	13.15	500.0	1000.000	100.0	H	246.0

RSE-11A-CH140-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.494363	20.61	40.00	19.39	1000.0	120.000	104.0	V	202.0

RSE-11A-CH140-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
6714.250000	---	35.22	---	---	500.0	1000.000	100.0	H	51.0
6714.250000	47.74	---	68.20	20.46	500.0	1000.000	100.0	H	51.0
7672.000000	---	32.99	54.00	21.01	500.0	1000.000	100.0	H	71.0
7672.000000	45.40	---	74.00	28.60	500.0	1000.000	100.0	H	71.0

RSE-11A-CH140-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
17103.000000	---	42.69	---	---	500.0	1000.000	100.0	H	207.0
17103.000000	56.07	---	68.20	12.13	500.0	1000.000	100.0	H	207.0

RSE-11AC-CH48-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
34.631117	31.56	40.00	8.44	1000.0	120.000	102.0	V	249.0
43.459629	33.99	40.00	6.01	1000.0	120.000	103.0	V	152.0
47.677901	32.72	40.00	7.28	1000.0	120.000	106.0	V	275.0

RSE-11AC-CH48-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
6992.875000	---	34.40	---	---	500.0	1000.000	100.0	H	295.0
6992.875000	47.17	---	68.20	21.03	500.0	1000.000	100.0	H	295.0
7388.875000	---	34.22	54.00	19.78	500.0	1000.000	100.0	V	31.0
7388.875000	47.19	---	74.00	26.81	500.0	1000.000	100.0	V	31.0

RSE-11AC-CH48-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
8384.250000	48.29	---	74.00	25.71	500.0	1000.000	100.0	V	0.0
8384.250000	---	37.80	54.00	16.20	500.0	1000.000	100.0	V	0.0
15718.500000	60.58	---	74.00	13.42	500.0	1000.000	100.0	H	152.0
15718.500000	---	45.04	54.00	8.96	500.0	1000.000	100.0	H	152.0

RSE-11AC-CH60-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
35.397003	20.68	40.00	19.32	1000.0	120.000	105.0	V	177.0

RSE-11AC-CH60-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5945.875000	---	33.06	---	---	500.0	1000.000	100.0	H	308.0
5945.875000	45.70	---	68.20	22.50	500.0	1000.000	100.0	H	308.0
7138.250000	---	34.35	---	---	500.0	1000.000	100.0	V	10.0
7138.250000	46.99	---	68.20	21.21	500.0	1000.000	100.0	V	10.0

RSE-11AC-CH60-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
8480.000000	48.59	---	74.00	25.41	500.0	1000.000	100.0	V	44.0
8480.000000	---	40.80	54.00	13.20	500.0	1000.000	100.0	V	44.0
15899.500000	60.09	---	74.00	13.91	500.0	1000.000	100.0	H	127.0
15899.500000	---	45.10	54.00	8.90	500.0	1000.000	100.0	H	127.0

RSE-11AC-CH140-30M-1G

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
31.522752	11.35	40.00	28.65	1000.0	120.000	104.0	V	183.0
52.482019	23.53	40.00	16.47	1000.0	120.000	99.0	V	89.0
80.377533	14.74	40.00	25.26	1000.0	120.000	213.0	H	332.0

RSE-11AC-CH140-1G-8G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
6404.000000	---	34.01	---	---	500.0	1000.000	100.0	V	23.0
6404.000000	46.99	---	68.20	21.21	500.0	1000.000	100.0	V	23.0
7155.125000	---	34.52	---	---	500.0	1000.000	200.0	V	254.0
7155.125000	46.96	---	68.20	21.24	500.0	1000.000	200.0	V	254.0

RSE-11AC-CH140-8G-18G

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
9120.000000	---	45.24	54.00	8.76	500.0	1000.000	100.0	H	207.0
9120.000000	52.19	---	74.00	21.81	500.0	1000.000	100.0	H	207.0
17261.750000	---	42.78	---	---	500.0	1000.000	100.0	V	193.0