

12.4 TEST RESULTS

Environment: 23.5℃/48%RH
Tested By:Lu Wei

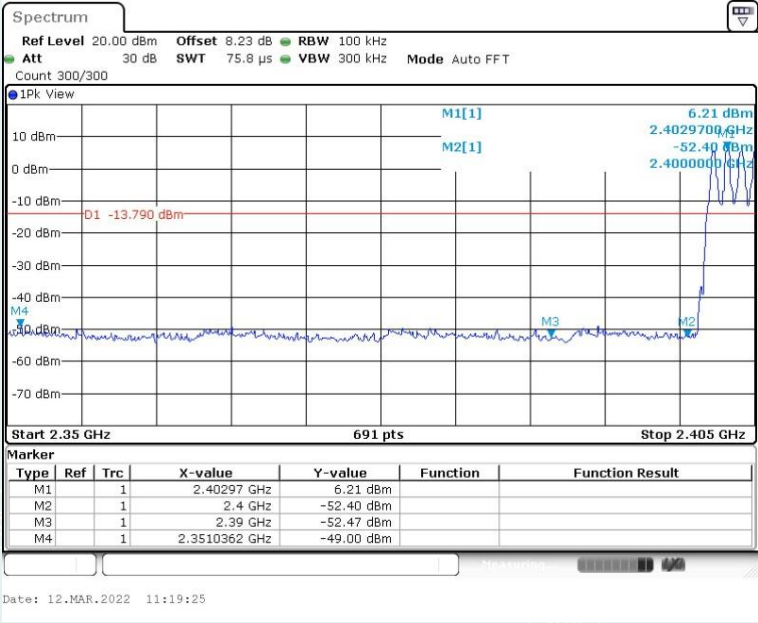
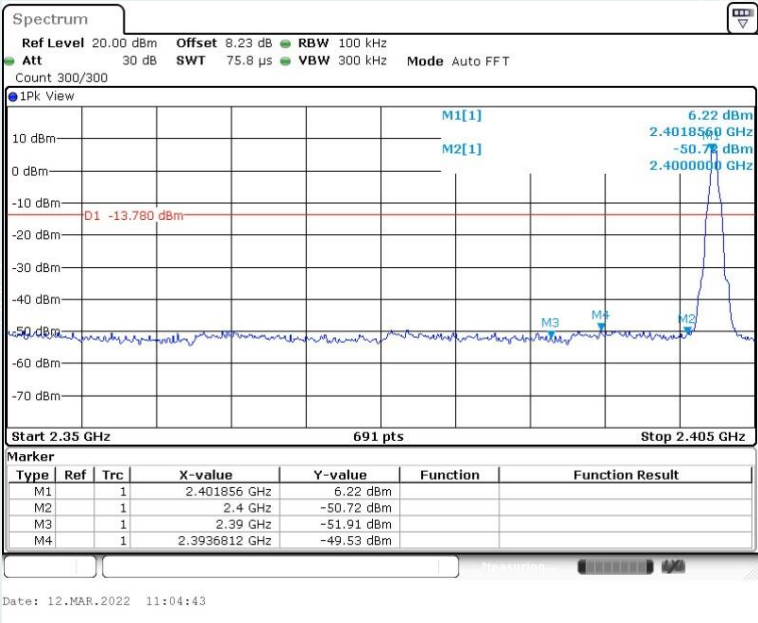
Voltage:DC 3.85V
Date: 2022-03-12

Test result plot as follows:

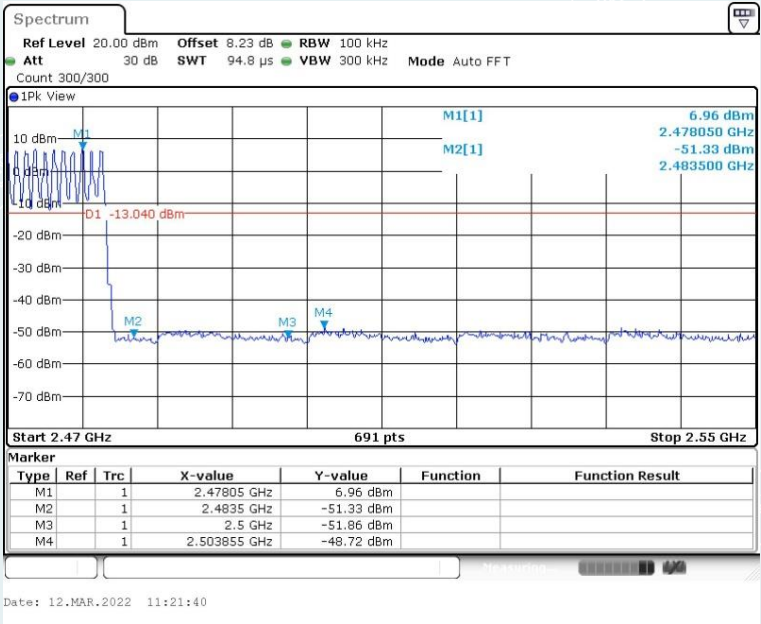
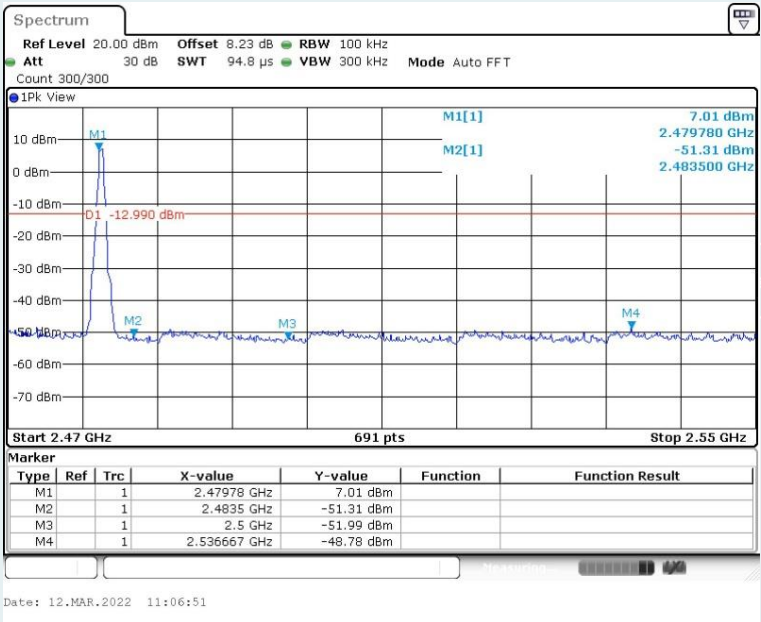
Band Edges

DH5

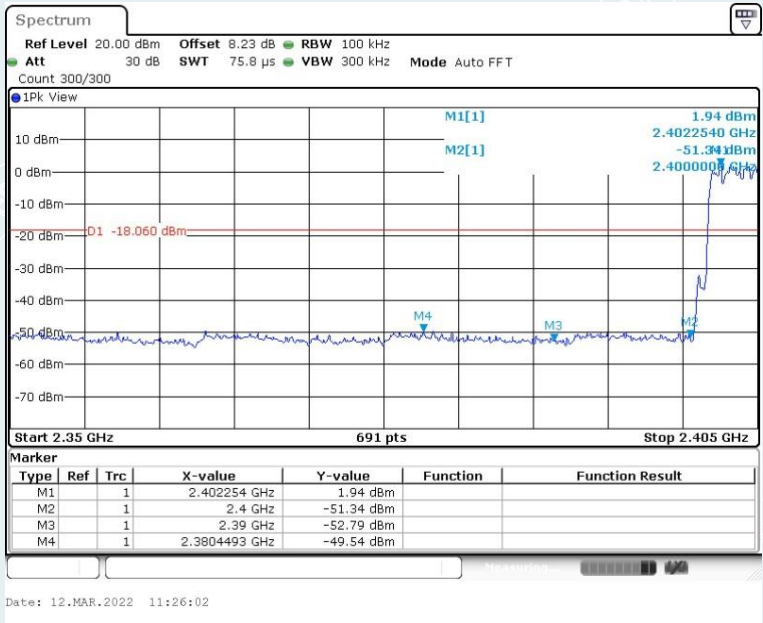
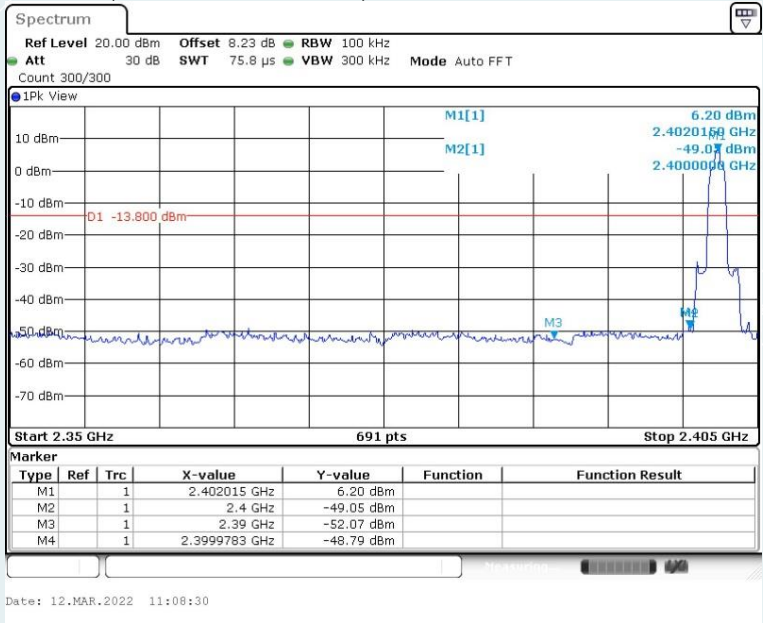
CH Low (2.35GHz ~2.405GHz)



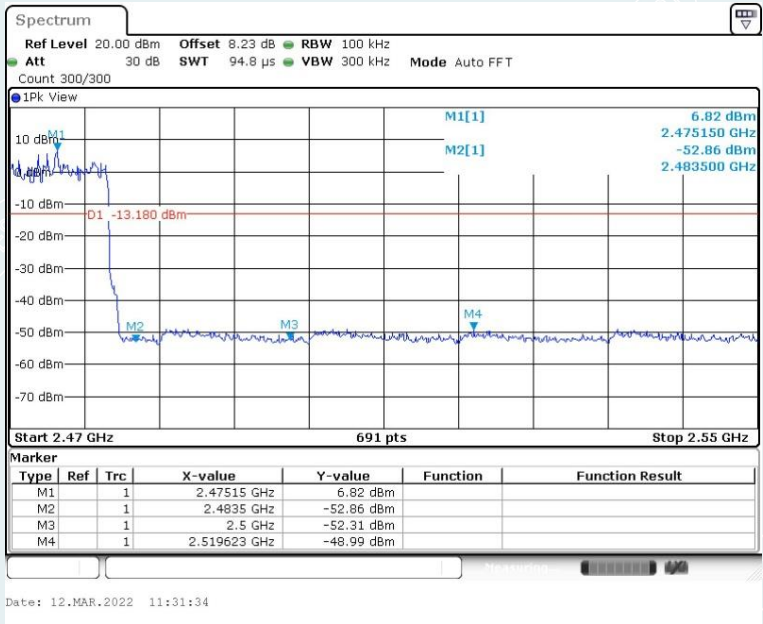
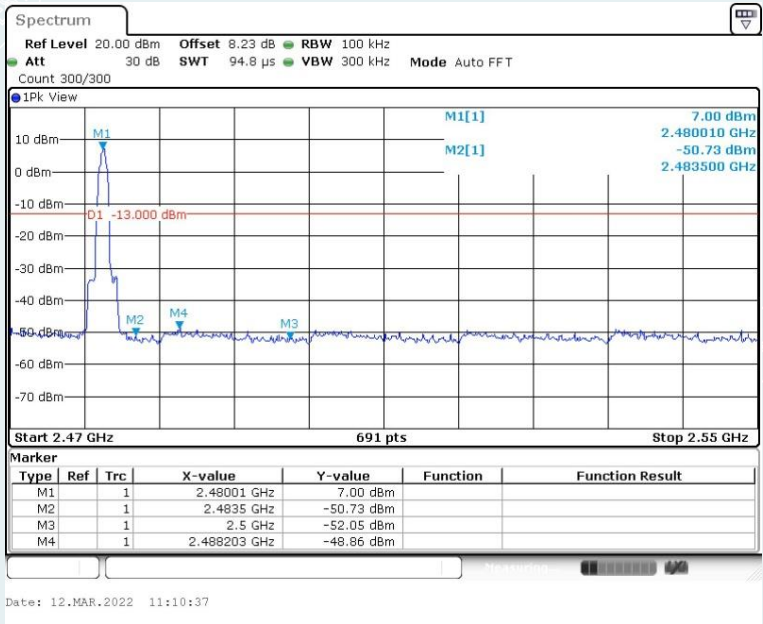
CH High (2.47GHz ~ 2.55GHz)



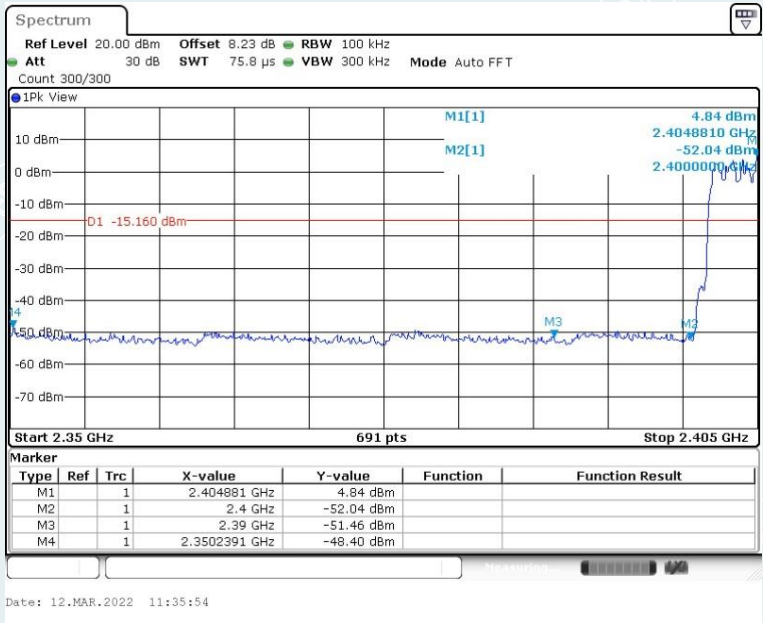
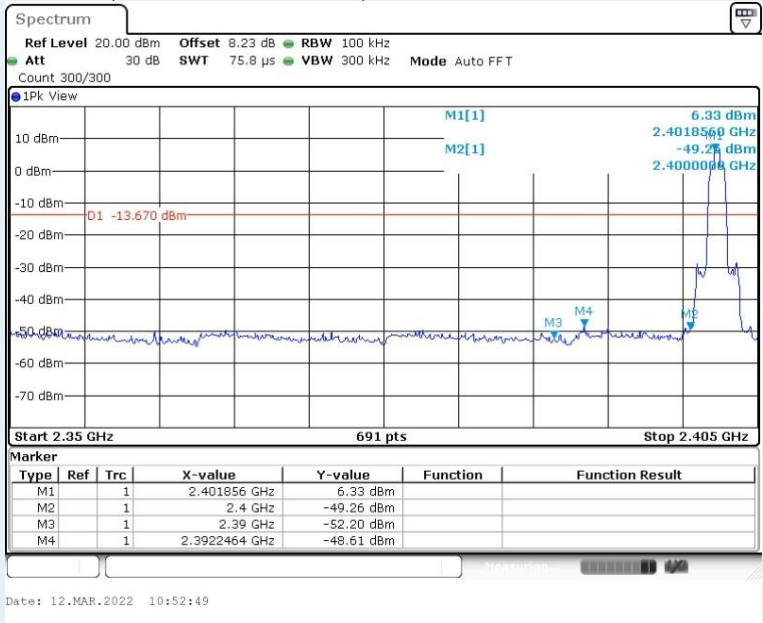
2DH5
CH Low (2.35GHz ~2.405GHz)



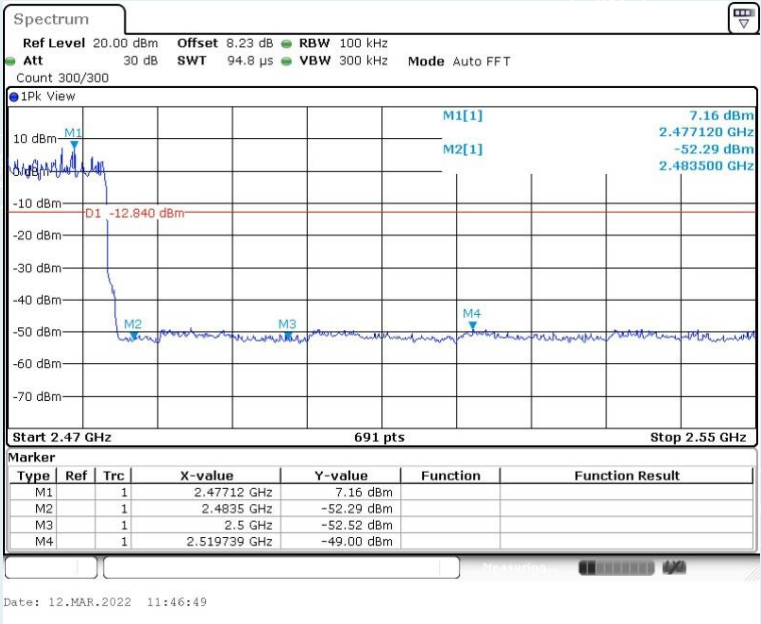
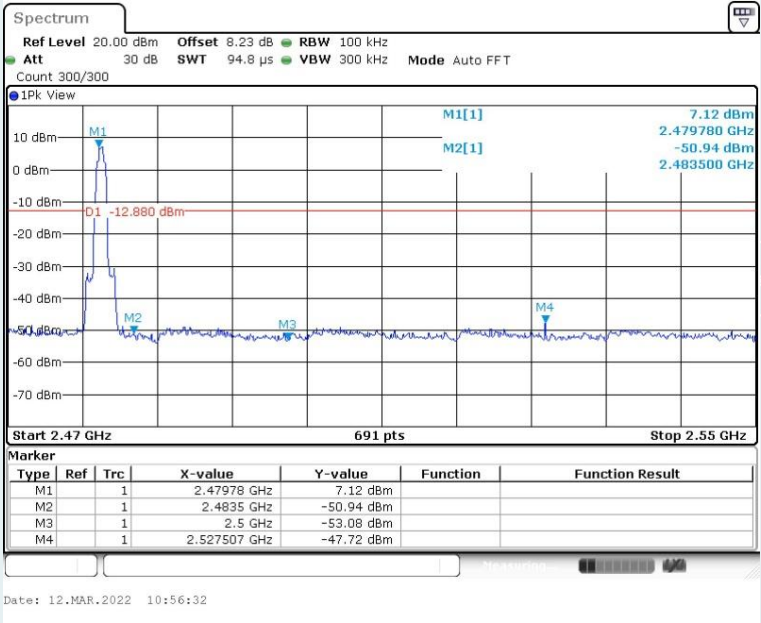
CH High (2.47GHz ~ 2.55GHz)



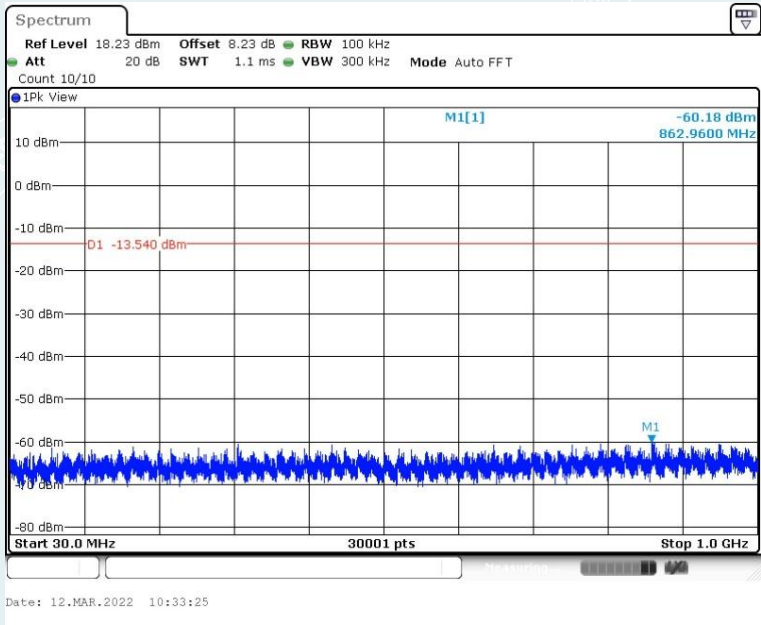
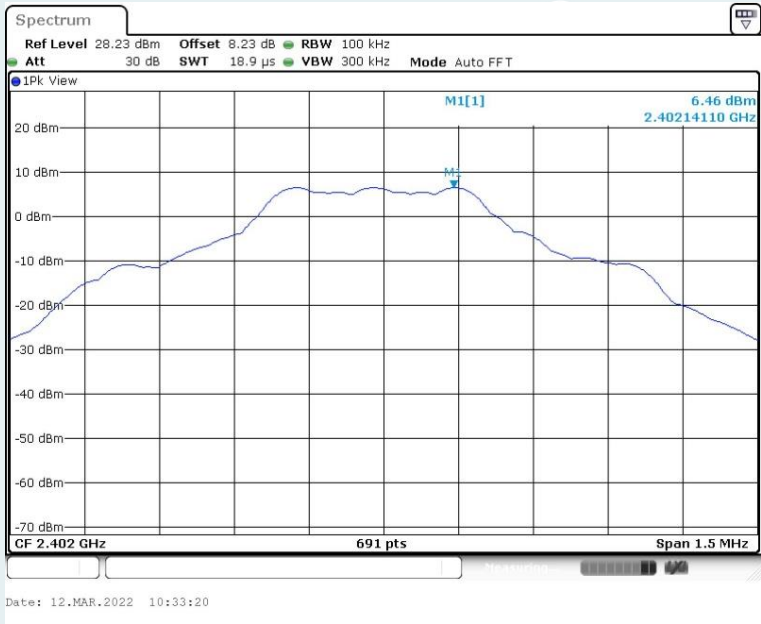
3DH5
CH Low (2.35GHz ~2.405GHz)

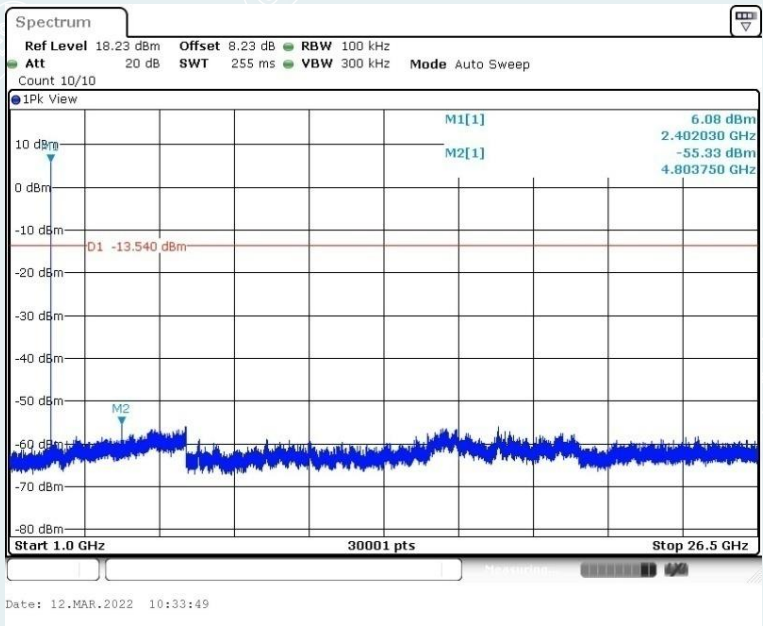


CH High (2.47GHz ~ 2.55GHz)



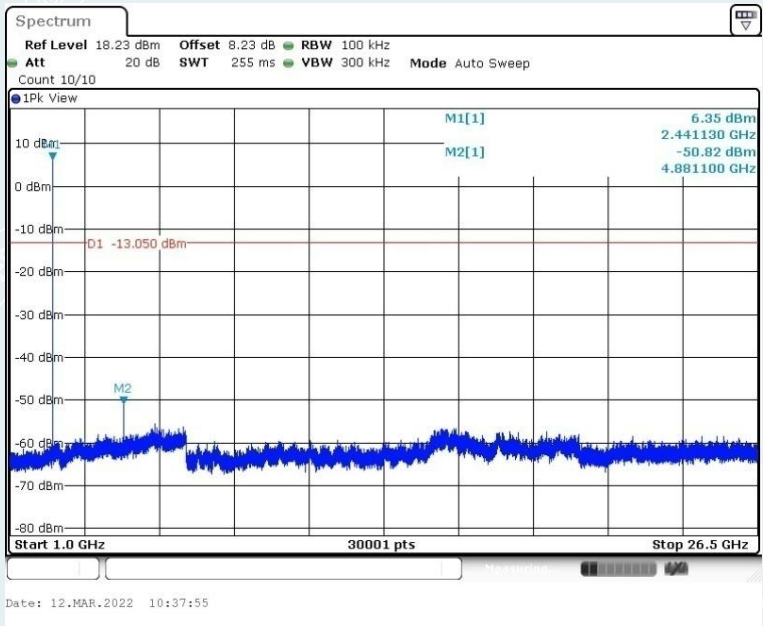
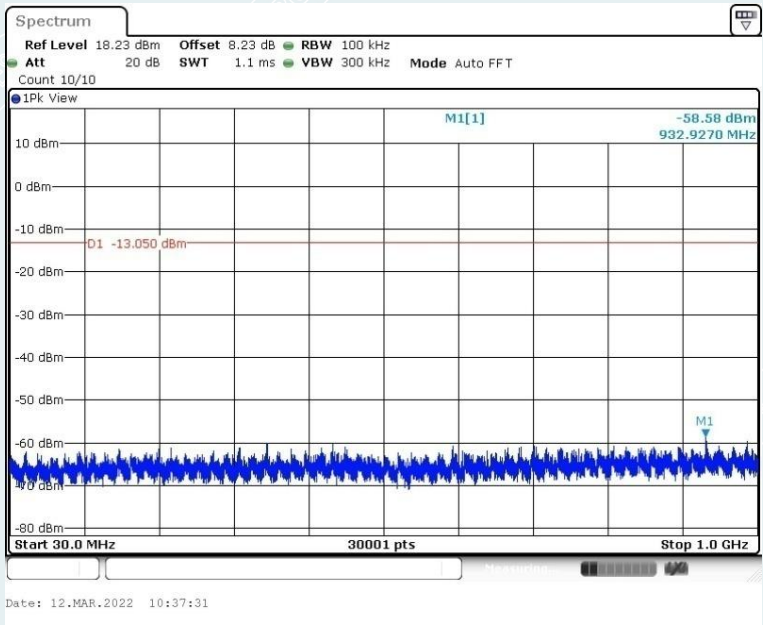
Spurious Emissions
DH5
CH Low



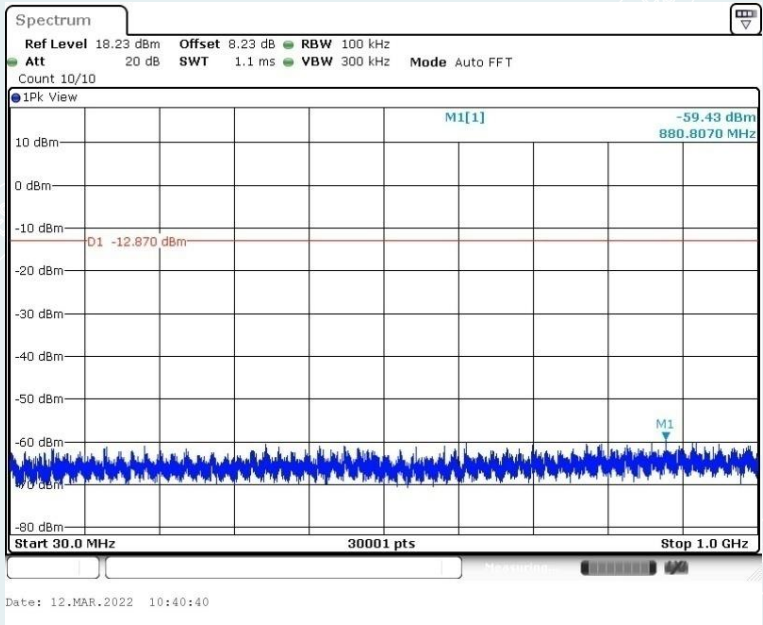


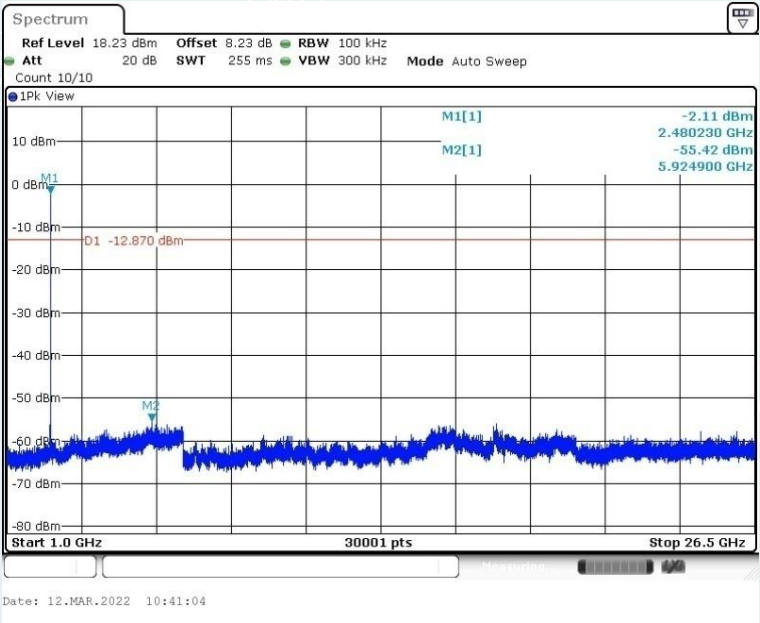
CH Mid





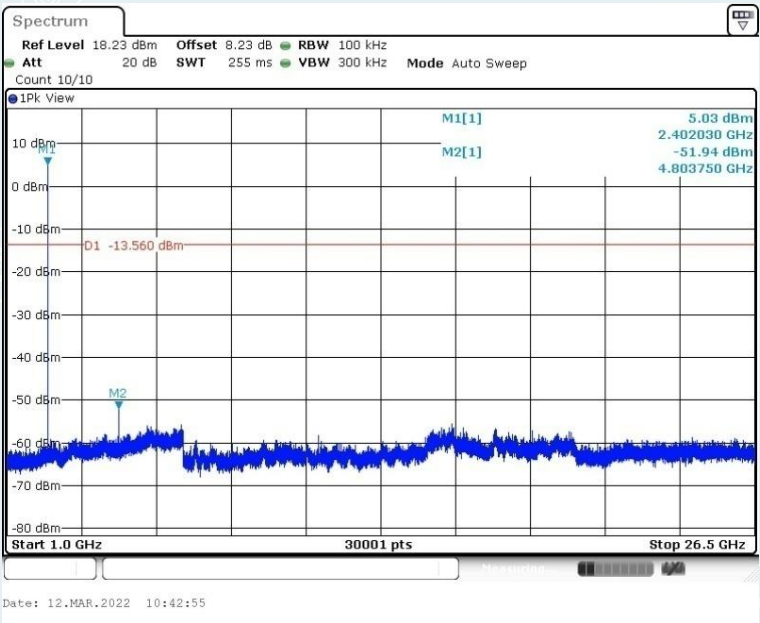
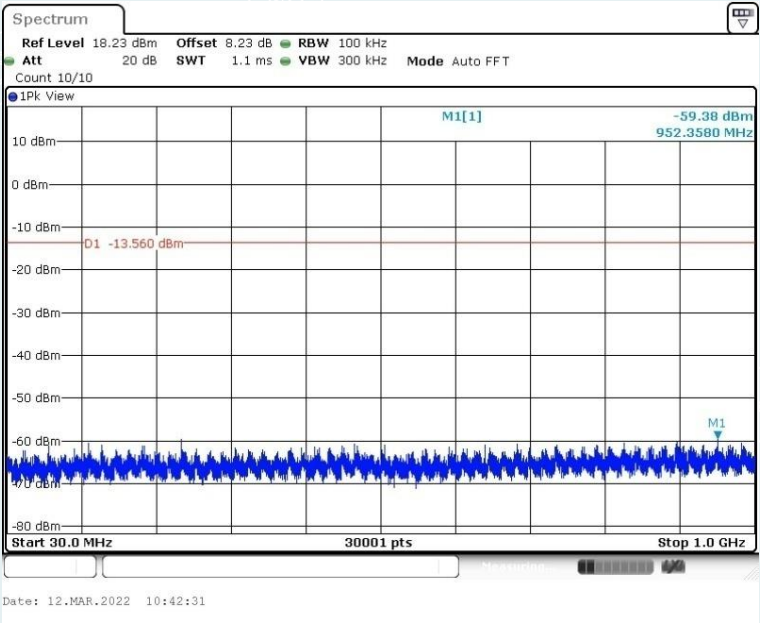
CH High



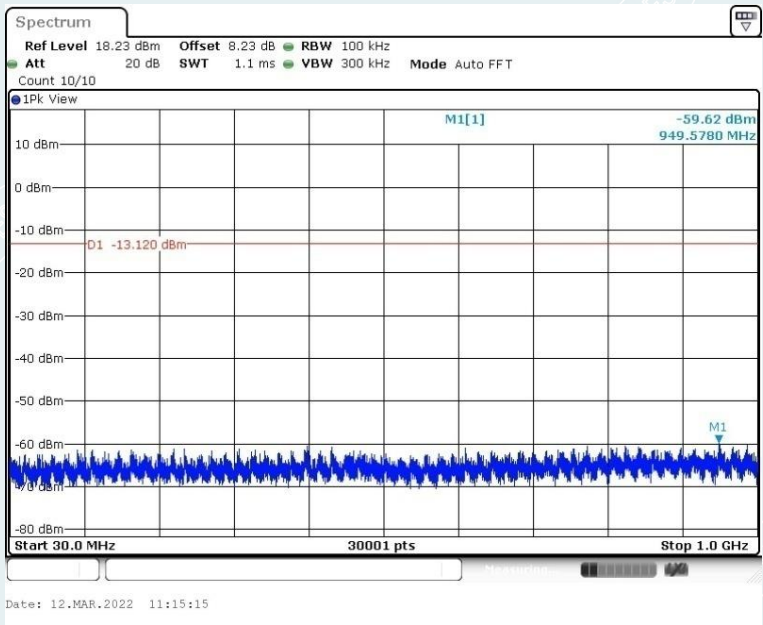


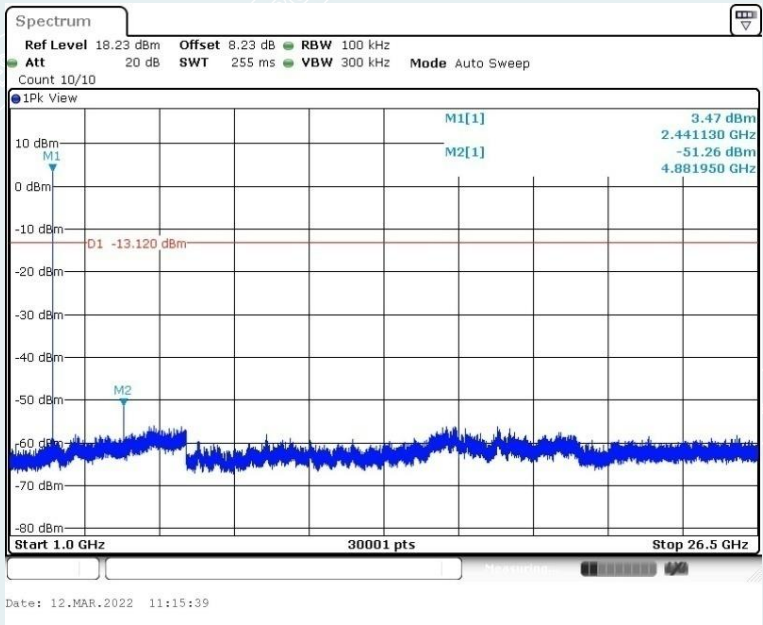
2DH5
CH Low





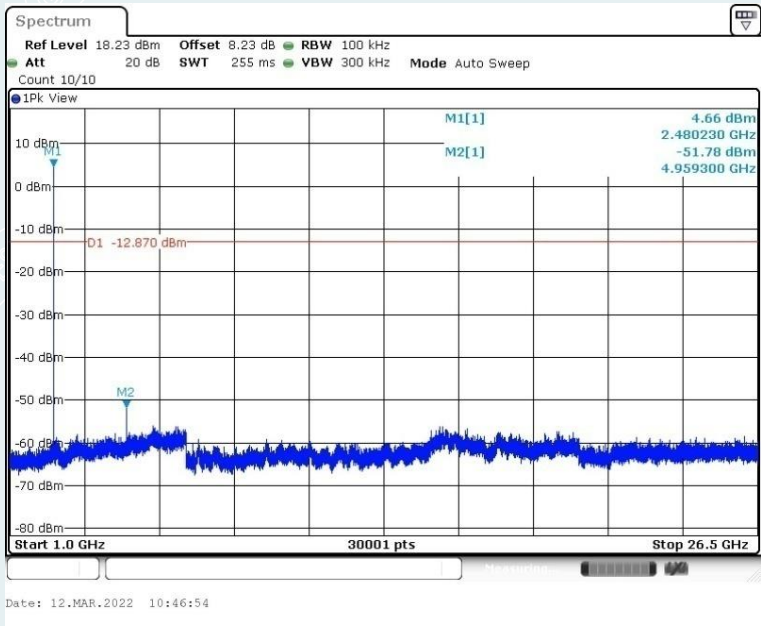
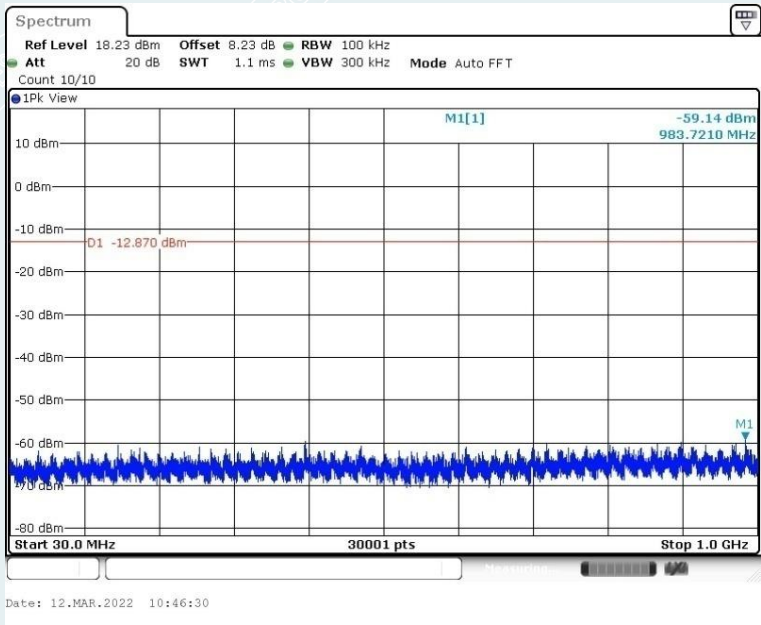
CH Mid



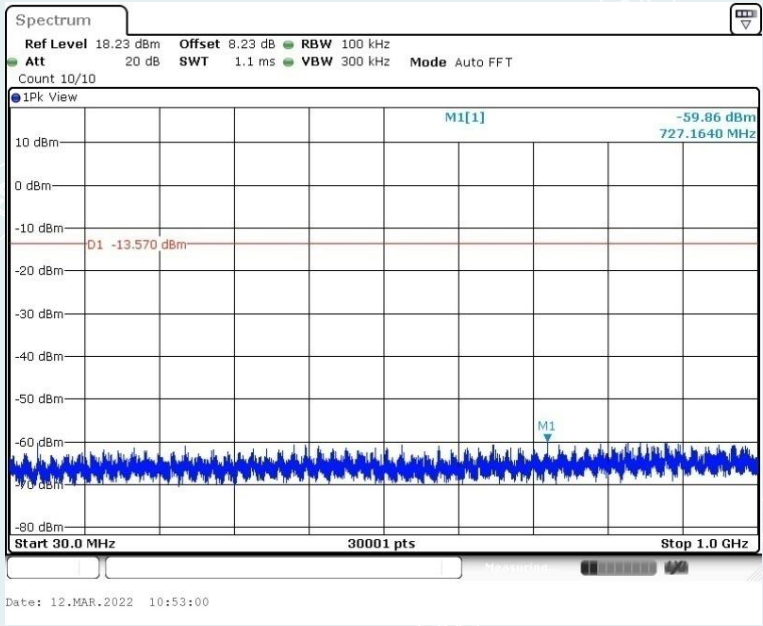
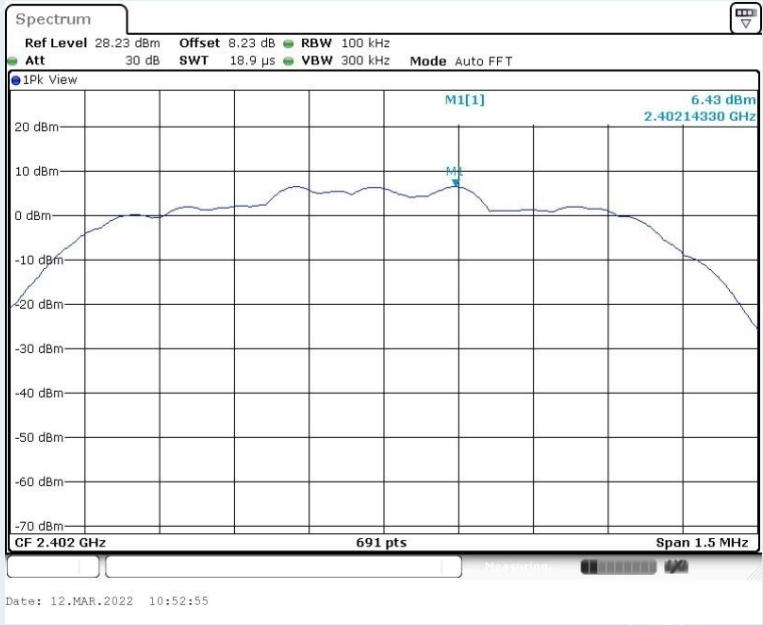


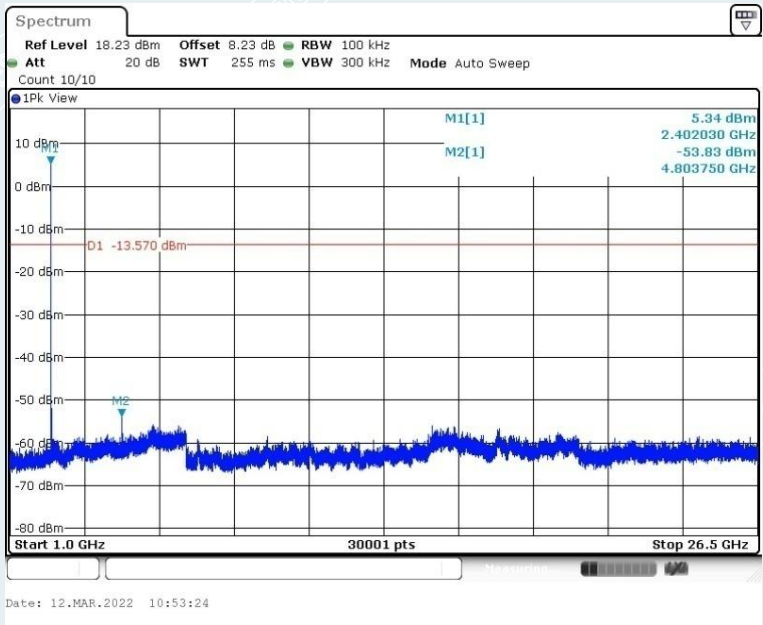
CH High



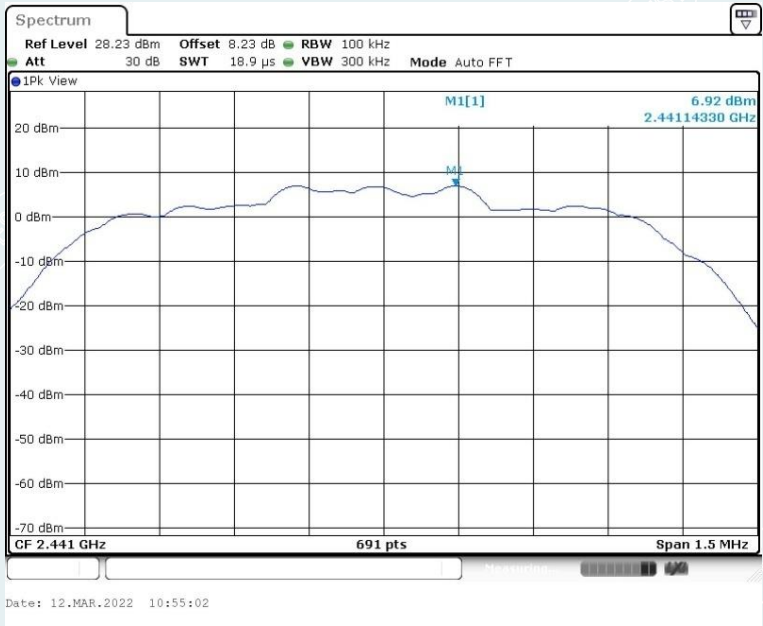


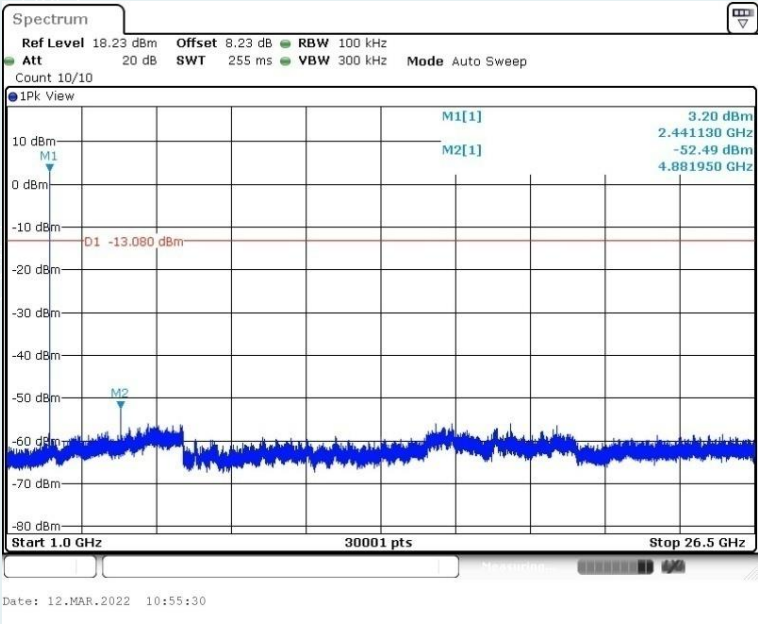
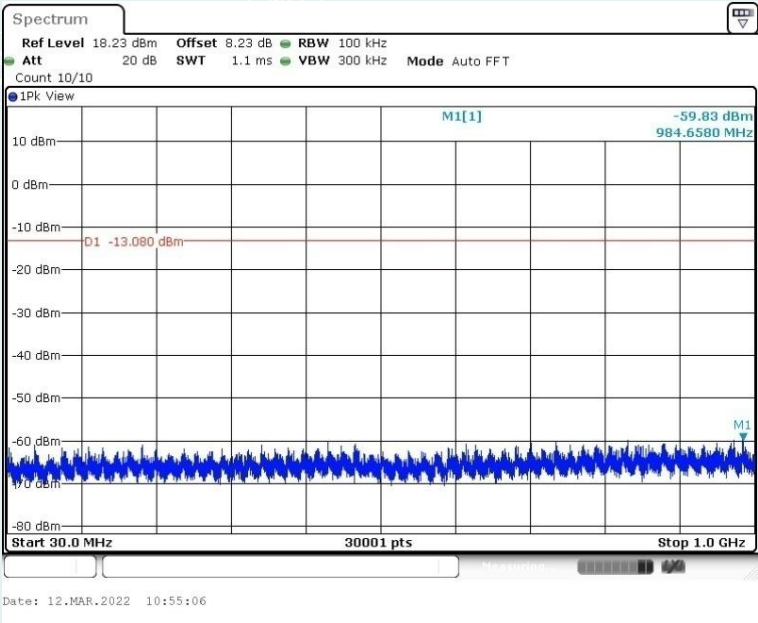
3DH5
CH Low



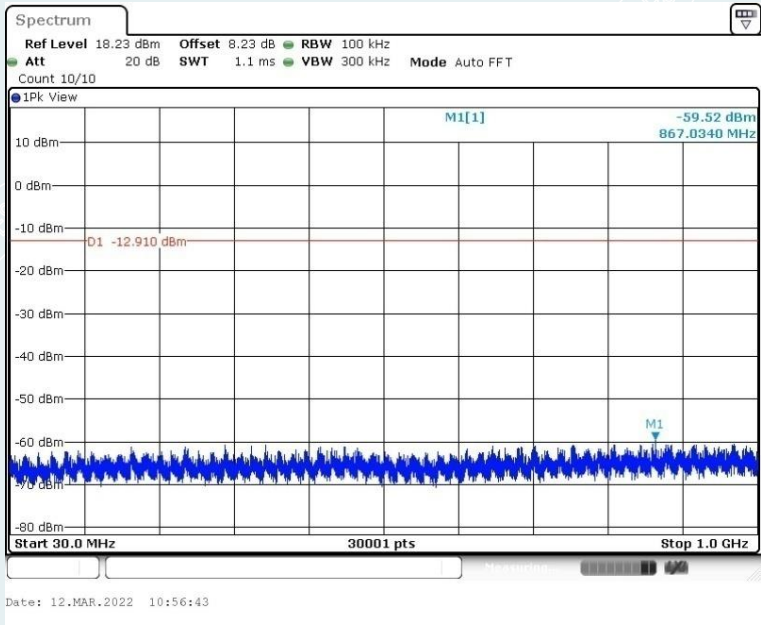
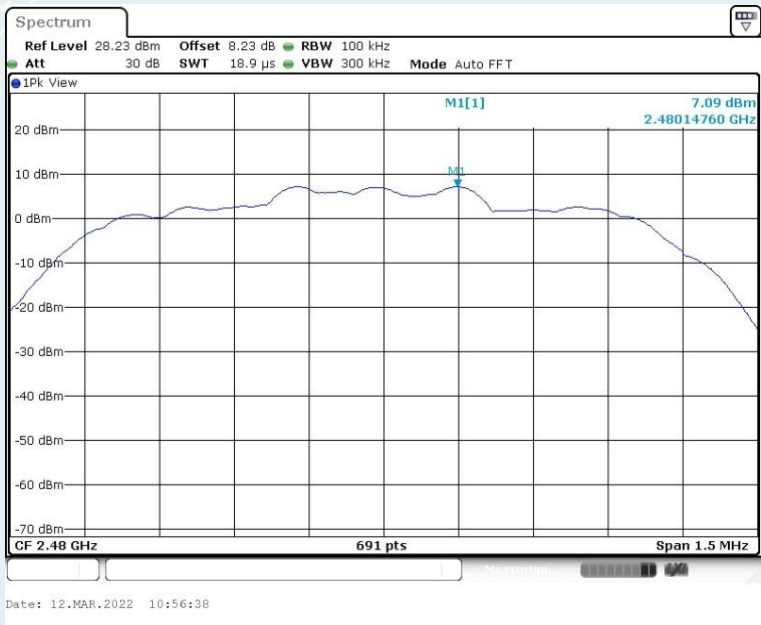


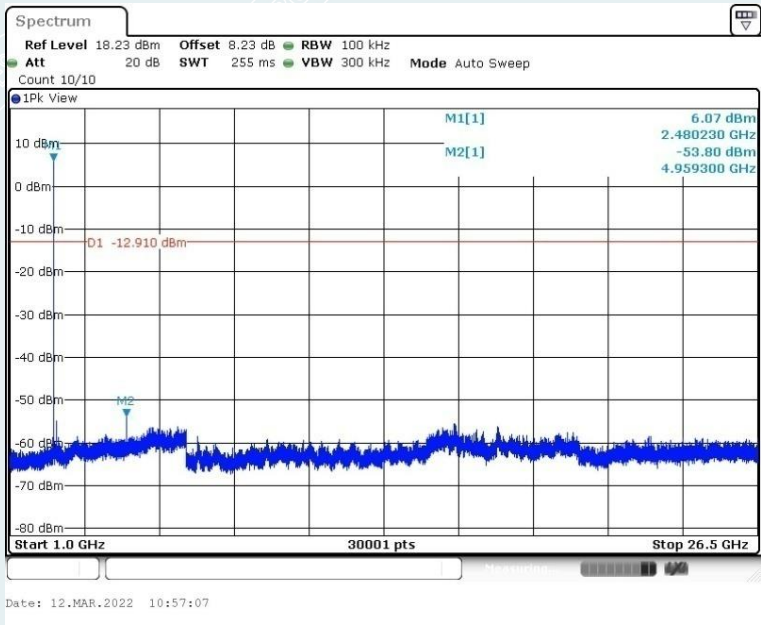
CH Mid





CH High





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13. RADIATED SPURIOUS EMISSIONS

13.1 LIMITS

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required.

Frequency (MHz)	Quasi-peak(μ V/m)	Measurement distance(m)	Quasi-peak(dB μ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE:

- (1) The emission limits for the ranges 9-90kHz and 110-490kHz are based on measurements employing a linear average detector.
- (2) The lower limit shall apply at the transition frequencies.

13.2 TEST PROCEDURES

1) Sequence of testing 9kHz to 30MHz

Setup:

- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- If the EUT is a floor standing device, it is placed on the ground.
- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- The EUT was set into operation.

Pre measurement:

- The turntable rotates from 0 °to 360 °.
- The antenna height is 1.0 meter.
- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0 °to 360 °) and by rotating the elevation axes (0 °to 360 °).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30MHz to 1GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0 °to 360 °and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1GHz to 18GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 4 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0 °to 360 °and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

NOTE:

(a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak&AVG), RBW=300Hz(for Peak&AVG). the frequency from 150kHz to 30MHz, Set RBW=9kHz, RBW=9kHz, (for QP Detector).

(b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, RBW=300kHz, (for QP Detector).

(c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz, RBW=3MHz.

(d).The frequency above 1GHz, for Avg detector: Set RBW=1MHz, if the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e., 10kHz) but not less than 10 Hz. if the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.8.

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13.3 TEST SETUP

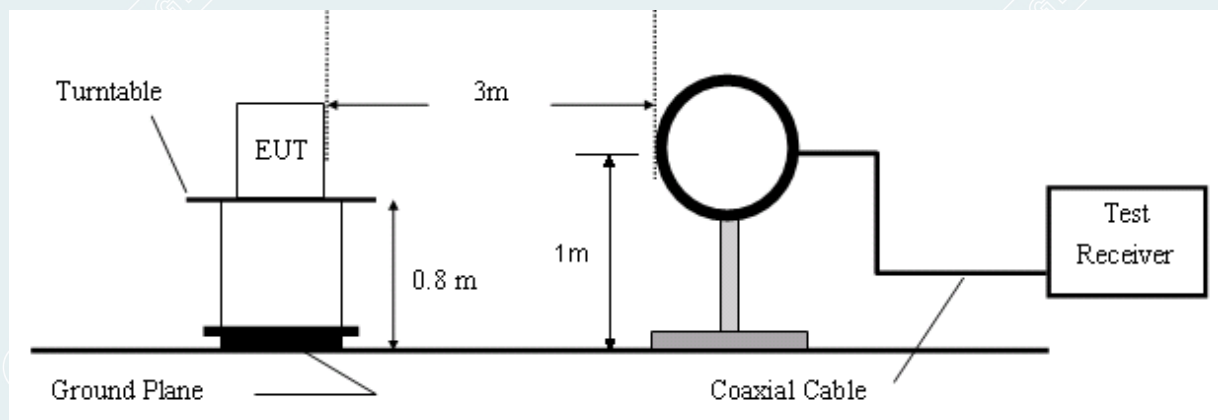


Figure 1. 9kHz to 30MHz radiated emissions test configuration

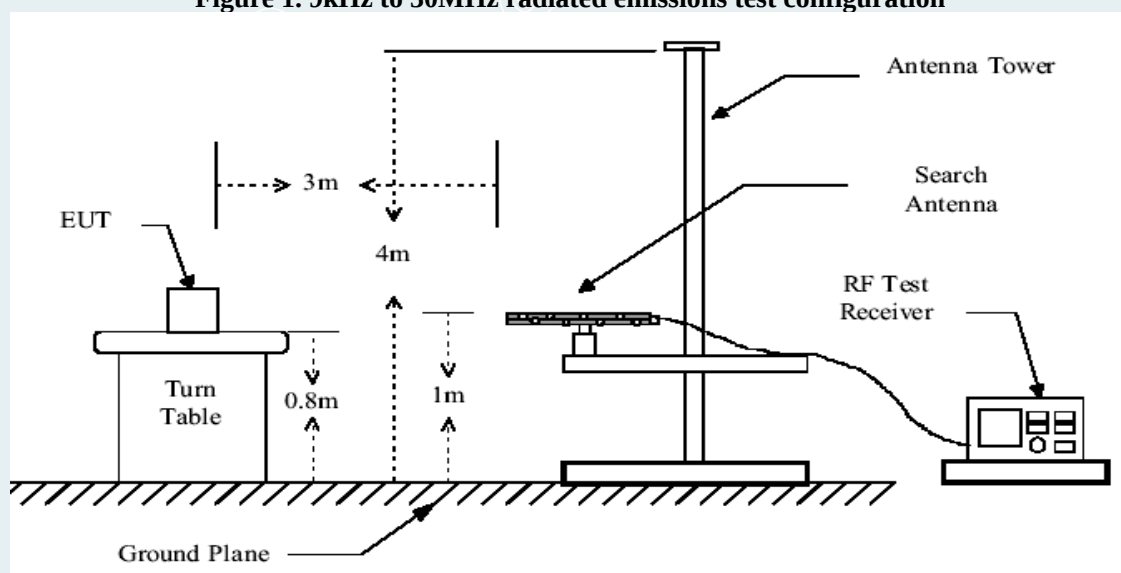


Figure 2. 30MHz to 1GHz radiated emissions test configuration

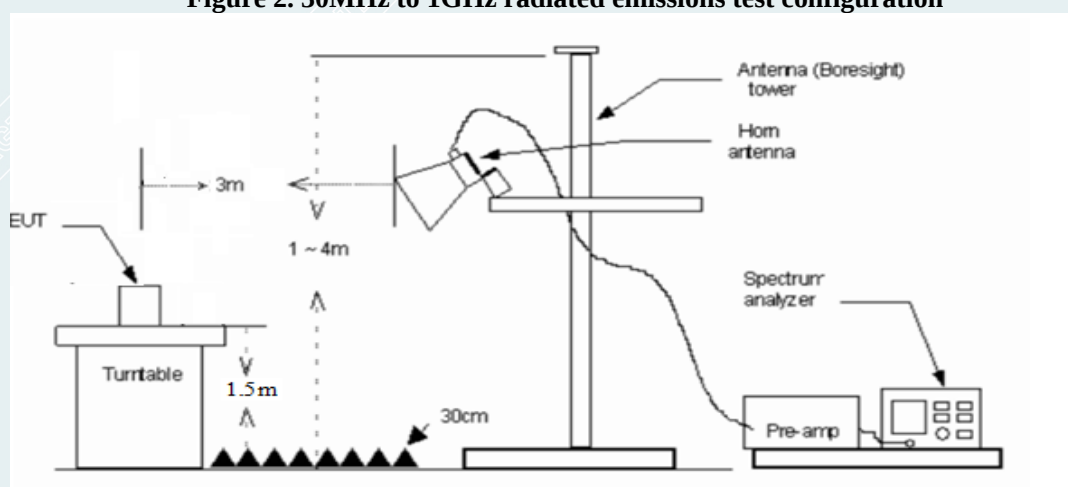


Figure 3. 1GHz to 18GHz radiated emissions test configuration

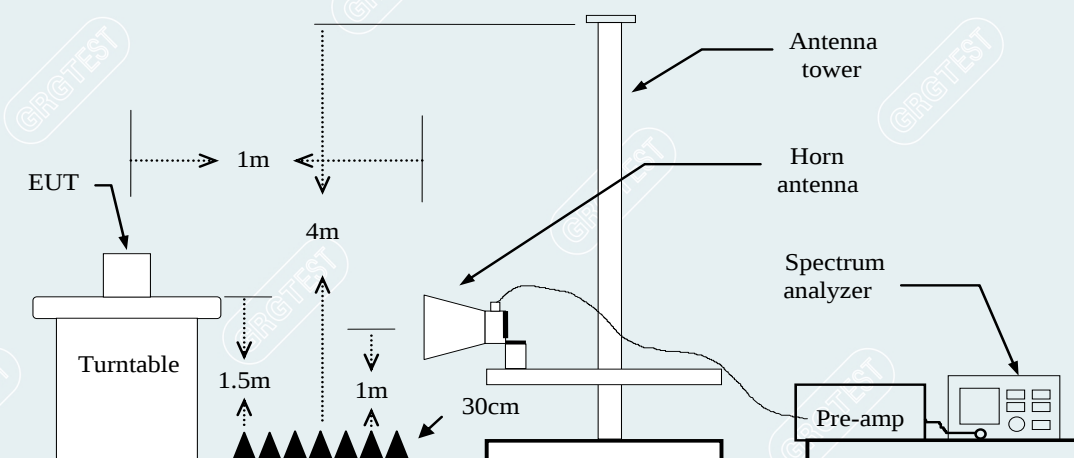


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

13.4 DATA SAMPLE

30MHz to 1GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	37.06	-15.48	21.58	40.00	-18.42	QP	Vertical

1GHz-18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	65.45	-11.12	54.33	74.00	-19.67	peak	Vertical
xxx	xxx	63.00	-11.12	51.88	54.00	-2.12	AVG	Vertical

Above 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	68.86	57.66	-11.20	83.54	25.88	peak	Vertical
xxx	xxx	68.89	-11.20	57.69	63.54	5.85	AVG	Vertical

Frequency (MHz) = Emission frequency in MHz

Ant.Pol. (H/V) = Antenna polarization

Reading (dBuV) = Uncorrected Analyzer / Receiver reading

Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain

Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)

Limit (dBuV/m) = Limit stated in standard

Margin (dB) = Remark Result (dBuV/m) – Limit (dBuV/m)

Peak = Peak Reading

QP = Quasi-peak Reading

AVG = Average Reading

13.5 TEST RESULTS

Below 1GHz:

All models were pretested and only the worst modes and channels were recorded in this report(3DH5-2402MHz).

Pre-scanned in three orthogonal panels,X,Y,Z.The worst cases mode (Z plane) were recorded in this report.

Mode: 3DH5

LowFrequency (2402MHz)

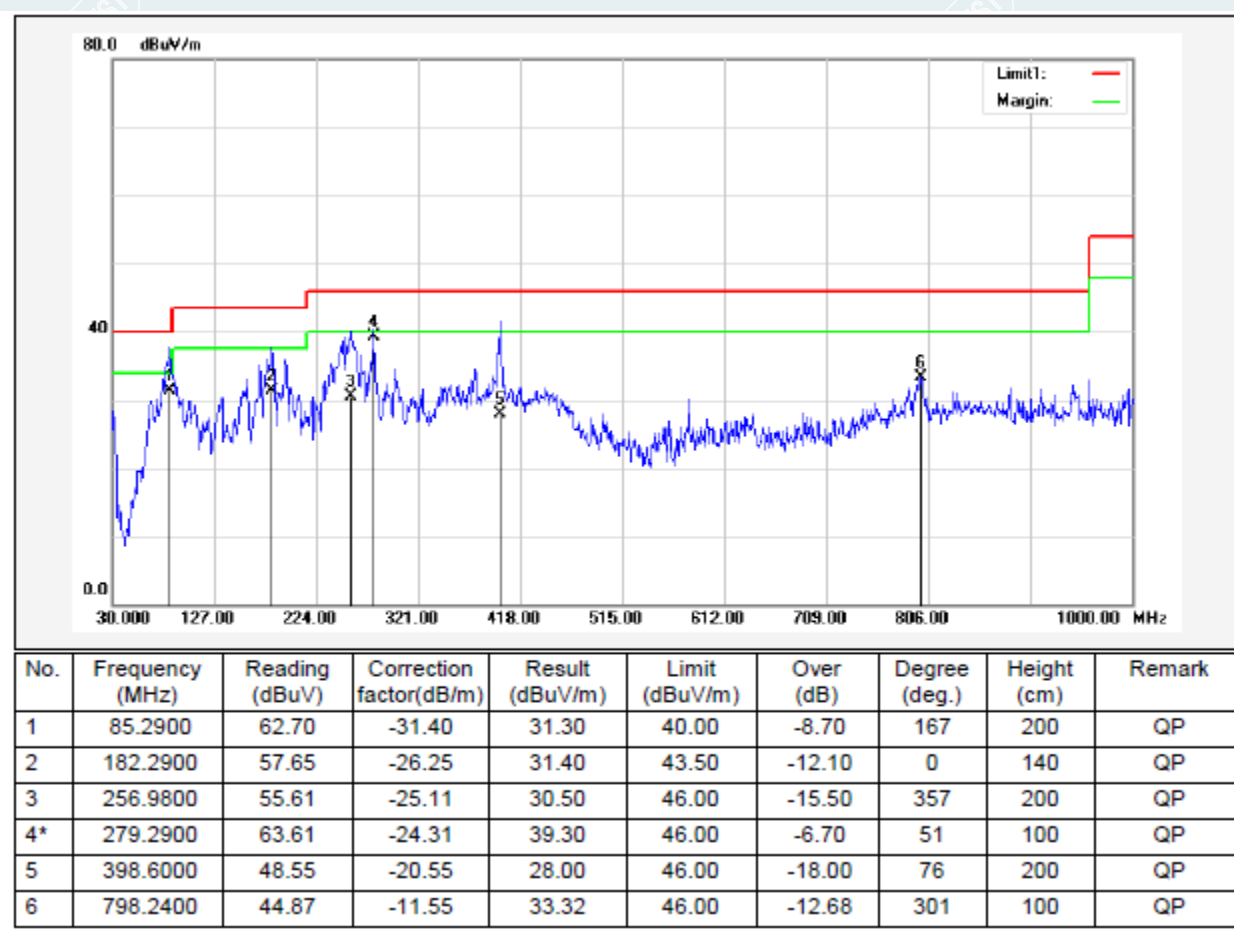
Environment:23.7°C/45%RH

Test Engineer:Tang Shenghui

Date: 2022-03-26

Test Voltage: AC 120V/60Hz

Polarity:Horizontal



Mode: 3DH5

Low Frequency (2402MHz)

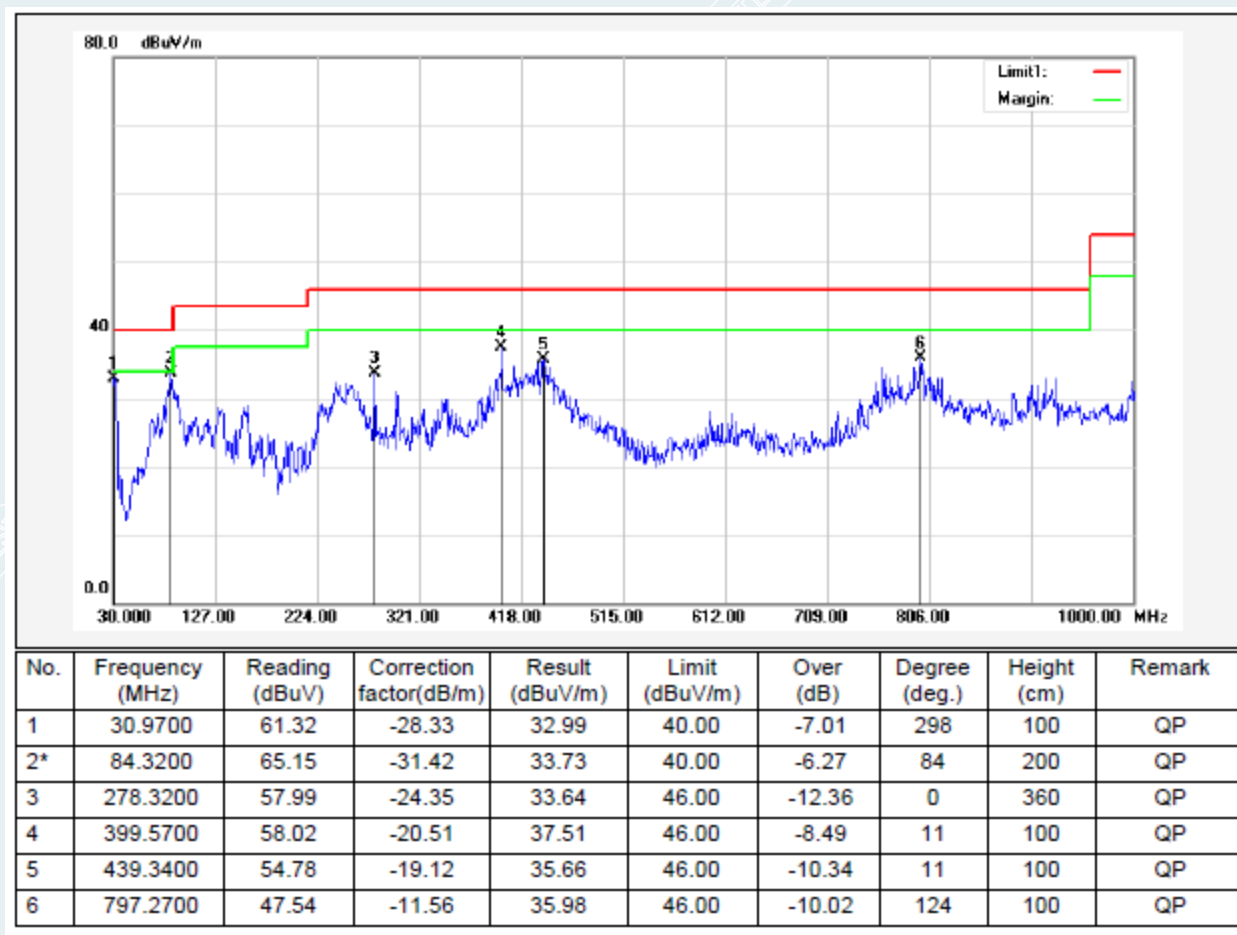
Environment:23.7°C/45%RH

Test Engineer: Tang Shenghui

Date: 2022-03-26

Test Voltage: AC 120V/60Hz

Polarity: Vertical

**Remark:**

- 1 No emission found between lowest internal used/generated frequency to 30MHz.
- 2 Pre-scan all mode and recorded the worst case results in this report (TX-Low Channel(3Mbps))
- 3 Measuring frequencies from 9kHz to the 1GHz.
- 4 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Peak/Quasi-peak detector mode.
- 5 Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 6 The IF bandwidth of SPA between 30MHz to 1GHz was 120kHz.

Above 1GHz:

All models were pretested and only the worst modes were recorded in this report.

Pre-scanned in three orthogonal panels,X,Y,Z.The worst cases mode (Z plane) were recorded in this report.

Mode: DH5

Lowest Frequency (2402MHz)

Environment:25°C/60%RH

Test Engineer: Lu Qiang

Date: 2022-03-21

Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1272.4000	56.60	34.73	-21.87	68.30	33.57	200	134	Horizontal
2	3202.6000	55.13	38.92	-16.21	68.30	29.38	200	112	Horizontal
3	4804.0000	62.26	51.90	-10.36	74.00	22.10	200	139	Horizontal
4	5882.2000	50.45	47.83	-2.62	68.30	20.47	200	22	Horizontal
5	9244.0000	46.44	46.71	0.27	68.30	21.59	200	175	Horizontal
6	10888.5000	44.31	48.21	3.90	74.00	25.79	200	308	Horizontal

AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Polarity
1	4803.9760	-10.36	54.15	43.79	54.00	10.21	200	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1394.2000	56.36	35.28	-21.08	74.00	38.72	100	170	Vertical
2	3671.2000	53.97	39.15	-14.82	74.00	34.85	100	333	Vertical
3	4803.4000	60.88	50.23	-10.65	74.00	23.77	200	80	Vertical
4	5891.2000	50.92	48.39	-2.53	68.30	19.91	100	124	Vertical
5	10388.0000	44.62	47.30	2.68	68.30	21.00	200	344	Vertical
6	14625.2000	41.78	49.59	7.81	68.30	18.71	200	46	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4804.0004	-10.66	53.47	42.81	54.00	11.19	199	115.7	Vertical

Mode: DH5
 Middle Frequency (2441MHz)
 Environment:25°C/60%RH
 Test Engineer: Lu Qiang

Date: 2022-03-21
 Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1908.4000	55.52	35.23	-20.29	68.30	33.07	200	284	Horizontal
2	3679.6000	54.03	38.92	-15.11	74.00	35.08	200	359	Horizontal
3	4882.0000	64.40	54.28	-10.12	74.00	19.72	200	133	Horizontal
4	5893.6000	50.47	47.90	-2.57	68.30	20.40	200	65	Horizontal
5	9253.9000	46.88	46.99	0.11	68.30	21.31	200	213	Horizontal
6	10891.8000	44.66	48.59	3.93	74.00	25.41	200	29	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4882.0000	-10.12	58.17	48.05	54.00	5.95	200	1.1	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1989.4000	56.20	36.36	-19.84	68.30	31.94	100	281	Vertical
2	3254.2000	55.39	38.92	-16.47	68.30	29.38	100	358	Vertical
3	4882.0000	63.28	53.21	-10.07	74.00	20.79	200	72	Vertical
4	5885.8000	51.05	48.46	-2.59	68.30	19.84	100	309	Vertical
5	8894.2000	47.35	45.68	-1.67	68.30	22.62	100	223	Vertical
6	11456.1000	44.90	48.78	3.88	74.00	25.22	200	18	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4882.0244	-10.07	58.52	48.45	54.00	5.55	200	94.7	Vertical

Mode: DH5
 Highest Frequency (2480MHz)
 Environment:25°C/60%RH
 Test Engineer: Lu Qiang

Date: 2022-03-21
 Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1263.4000	57.32	35.55	-21.77	68.30	32.75	200	118	Horizontal
2	2287.0000	55.89	37.29	-18.60	74.00	36.71	200	215	Horizontal
3	3546.4000	53.85	38.55	-15.30	68.30	29.75	100	299	Horizontal
4	4960.0000	63.37	54.38	-8.99	74.00	19.62	200	136	Horizontal
5	5901.4000	51.09	48.42	-2.67	68.30	19.88	200	71	Horizontal
6	10866.5000	44.32	48.00	3.68	74.00	26.00	100	110	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	-8.99	59.66	50.67	54.00	3.33	200	1.4	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1396.0000	57.34	36.27	-21.07	74.00	37.73	200	332	Vertical
2	2254.6000	55.91	37.11	-18.80	74.00	36.89	200	324	Vertical
3	3306.4000	54.91	39.15	-15.76	68.30	29.15	200	106	Vertical
4	4960.0000	62.55	53.88	-8.67	74.00	20.12	200	76	Vertical
5	5897.8000	50.74	48.28	-2.46	68.30	20.02	100	336	Vertical
6	8844.7000	47.65	46.40	-1.25	68.30	21.90	100	300	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	-8.67	57.03	48.36	54.00	5.64	199	98.1	Vertical

Mode: 3DH5
 Lowest Frequency (2402MHz)
 Environment:25°C/60%RH
 Test Engineer: Lu Qiang

Date: 2022-03-21
 Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1234.6000	56.61	34.57	-22.04	74.00	39.43	200	344	Horizontal
2	1987.6000	55.30	35.10	-20.20	68.30	33.20	100	347	Horizontal
3	3202.6000	55.95	39.74	-16.21	68.30	28.56	100	145	Horizontal
4	4804.0000	61.29	50.93	-10.36	74.00	23.07	200	132	Horizontal
5	5873.8000	50.59	47.93	-2.66	68.30	20.37	200	76	Horizontal
6	6755.8000	51.46	45.81	-5.65	68.30	22.49	100	227	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4803.0632	-10.36	45.61	35.25	54.00	18.75	200	1.1	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1357.0000	56.62	35.35	-21.27	74.00	38.65	200	71	Vertical
2	3069.4000	55.34	39.41	-15.93	68.30	28.89	200	246	Vertical
3	4804.0000	60.03	49.38	-10.65	74.00	24.62	200	63	Vertical
4	5899.0000	50.89	48.44	-2.45	68.30	19.86	200	360	Vertical
5	6616.0000	50.27	45.96	-4.31	68.30	22.34	100	246	Vertical
6	11305.4000	44.29	48.55	4.26	74.00	25.45	100	51	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4804.0240	-10.65	50.16	39.51	54.00	14.49	199	114.4	Vertical

Mode: 3DH5
 Middle Frequency (2441MHz)
 Environment:25°C/60%RH
 Test Engineer: Lu Qiang

Date: 2022-03-21
 Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1237.0000	57.06	35.09	-21.97	74.00	38.91	200	156	Horizontal
2	2228.2000	55.95	37.69	-18.26	74.00	36.31	100	279	Horizontal
3	4882.6000	64.35	54.23	-10.12	74.00	19.77	200	134	Horizontal
4	5887.0000	50.40	47.80	-2.60	68.30	20.50	100	271	Horizontal
5	7000.0000	49.24	46.50	-2.74	68.30	21.80	200	99	Horizontal
6	11254.8000	44.26	48.37	4.11	74.00	25.63	100	98	Horizontal

AV Final Data List								
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Polarity
1	4870.6620	-10.12	39.35	29.23	54.00	24.77	200	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1079.2000	57.14	35.11	-22.03	74.00	38.89	200	66	Vertical
2	1348.6000	57.07	35.72	-21.35	74.00	38.28	100	47	Vertical
3	4882.0000	62.57	52.50	-10.07	74.00	21.50	200	74	Vertical
4	5887.6000	51.22	48.65	-2.57	68.30	19.65	200	205	Vertical
5	6614.2000	50.73	46.42	-4.31	68.30	21.88	200	331	Vertical
6	11319.7000	44.67	48.83	4.16	74.00	25.17	100	305	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4882.0488	-10.07	54.71	44.64	54.00	9.36	200	95.6	Vertical

Mode: 3DH5
 Highest Frequency (2480MHz)
 Environment:25°C/60%RH
 Test Engineer: Lu Qiang

Date: 2022-03-21
 Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1241.2000	56.61	34.75	-21.86	68.30	33.55	100	334	Horizontal
2	1942.0000	55.16	35.39	-19.77	68.30	32.91	100	353	Horizontal
3	3743.2000	54.45	39.59	-14.86	74.00	34.41	200	82	Horizontal
4	4960.0000	63.33	54.34	-8.99	74.00	19.66	200	131	Horizontal
5	5888.2000	52.35	49.76	-2.59	68.30	18.54	200	302	Horizontal
6	10187.8000	45.17	47.03	1.86	68.30	21.27	100	80	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	-8.99	55.50	46.51	54.00	7.49	200	1.7	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1116.4000	57.77	35.63	-22.14	74.00	38.37	200	175	Vertical
2	1393.0000	56.51	35.42	-21.09	74.00	38.58	100	61	Vertical
3	3606.4000	54.94	39.34	-15.60	74.00	34.66	200	151	Vertical
4	4960.0000	62.78	54.11	-8.67	74.00	19.89	200	66	Vertical
5	5891.2000	50.33	47.80	-2.53	68.30	20.50	100	80	Vertical
6	9172.5000	45.54	46.51	0.97	74.00	27.49	100	32	Vertical

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	-8.67	52.01	43.34	54.00	10.66	190	97	Vertical

Remark:

- 1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2 The amplitude of 18GHz to 26.5GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
- 3 Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 4 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

- 5 Spectrum setting:
- a. Peak Setting 1GHz–26.5GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.
 - b. AV Setting 1GHz–26.5GHz, Set RBW=1MHz, if the EUT is configured to transmit with duty cycle $\geq 98\%$, set $VBW \leq RBW/100$ (i.e., 10kHz) but not less than 10 Hz. if the EUT duty cycle is $< 98\%$, set $VBW \geq 1/T$, Where T is defined in section 2.8.

Test result: The unit does meet the requirements.

----- The following blanks -----

Above 18GHz:

All models were pretested and only the worst modes were recorded in this report(3DH5).

Pre-scanned in three orthogonal panels,X,Y,Z.The worst cases mode (Z plane) were recorded in this report.

Mode: 3DH5

Lowest Frequency (2402MHz)

Environment:25°C/60%RH

Test Engineer: Lu Qiang

Date: 2022-03-26

Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18357.4250	57.93	46.39	-11.54	83.54	37.15	150	211	Horizontal
2	19452.2250	57.30	46.35	-10.95	83.54	37.19	150	116	Horizontal
3	21657.9750	55.29	45.36	-9.93	83.54	38.18	150	265	Horizontal
4	22884.1000	54.26	45.25	-9.01	83.54	38.29	150	339	Horizontal
5	24418.7750	53.91	45.75	-8.16	83.54	37.79	150	317	Horizontal
6	26118.7750	53.80	45.70	-8.10	83.54	37.84	150	328	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18470.9000	56.53	45.04	-11.49	83.54	38.50	150	251	Vertical
2	18946.9000	56.37	45.22	-11.15	83.54	38.32	150	101	Vertical
3	19980.9250	55.77	44.91	-10.86	83.54	38.63	150	340	Vertical
4	21662.2250	54.41	44.48	-9.93	83.54	39.06	150	318	Vertical
5	22897.7000	54.30	45.30	-9.00	83.54	38.24	150	221	Vertical
6	25635.9750	53.34	45.41	-7.93	83.54	38.13	150	318	Vertical

Mode: 3DH5
Lowest Frequency (2441MHz)
Environment:25°C/60%RH
Test Engineer: Lu Qiang

Date: 2022-03-26
Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18566.1000	56.77	45.34	-11.43	83.54	38.20	150	2	Horizontal
2	20552.1250	55.57	45.11	-10.46	83.54	38.43	150	180	Horizontal
3	21854.7500	54.46	44.51	-9.95	83.54	39.03	150	2	Horizontal
4	22748.5250	54.12	45.00	-9.12	83.54	38.54	150	54	Horizontal
5	23756.6250	54.30	45.79	-8.51	83.54	37.75	150	307	Horizontal
6	25425.6000	53.38	45.60	-7.78	83.54	37.94	150	73	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18308.9750	57.15	45.59	-11.56	83.54	37.95	150	339	Vertical
2	20066.3500	55.24	44.43	-10.81	83.54	39.11	150	223	Vertical
3	21166.6750	55.90	45.62	-10.28	83.54	37.92	150	149	Vertical
4	22595.1000	54.46	45.18	-9.28	83.54	38.36	150	74	Vertical
5	23417.0500	53.99	45.24	-8.75	83.54	38.30	150	32	Vertical
6	26279.8500	54.30	46.56	-7.74	83.54	36.98	150	318	Vertical

Mode: 3DH5
Lowest Frequency (2480MHz)
Environment:25°C/60%RH
Test Engineer: Lu Qiang

Date: 2022-03-26
Test Voltage: AC 120V/60Hz

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18287.7250	56.98	45.41	-11.57	83.54	38.13	150	253	Horizontal
2	19496.8500	56.60	45.68	-10.92	83.54	37.86	150	72	Horizontal
3	20909.1250	54.89	44.58	-10.31	83.54	38.96	150	359	Horizontal
4	22116.9750	54.37	44.54	-9.83	83.54	39.00	150	317	Horizontal
5	24146.7750	54.19	45.97	-8.22	83.54	37.57	150	201	Horizontal
6	26281.1250	53.36	45.62	-7.74	83.54	37.92	150	72	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	18468.7750	56.78	45.29	-11.49	83.54	38.25	150	95	Vertical
2	19802.8500	55.87	45.01	-10.86	83.54	38.53	150	10	Vertical
3	21447.6000	54.78	44.72	-10.06	83.54	38.82	150	19	Vertical
4	23373.7000	54.14	45.37	-8.77	83.54	38.17	150	287	Vertical
5	24882.8750	54.00	46.00	-8.00	83.54	37.54	150	201	Vertical
6	26295.1500	53.63	45.92	-7.71	83.54	37.62	150	158	Vertical

14. RESTRICTED BANDS OF OPERATION

14.1 LIMITS

Section 15.247(d) In addition, Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

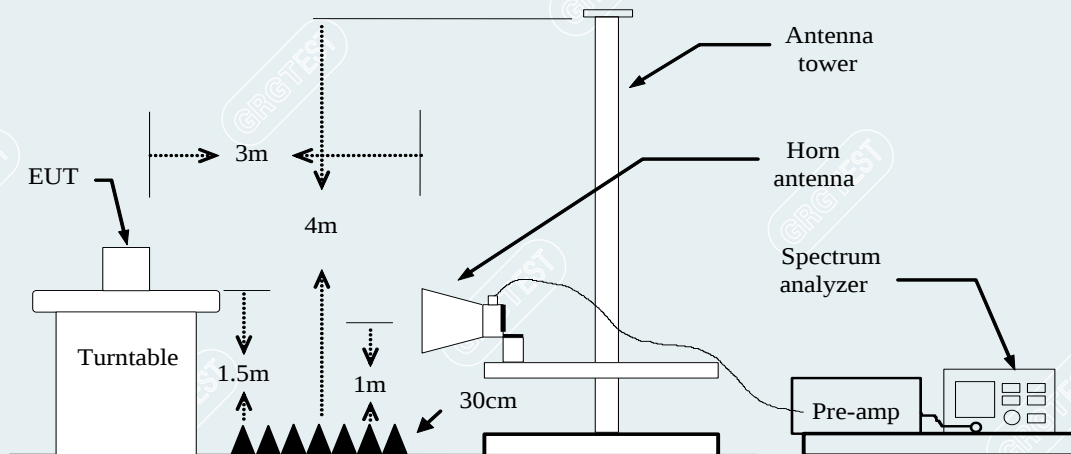
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

Frequency (MHz)	Quasi-peak(μ V/m)	Measurement distance(m)	Quasi-peak(dB μ V/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5~93.8
0.490-1.705	24000/F(kHz)	30	73.8~63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

14.2 TEST PROCEDURES

- 1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
- 2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - a) PEAK: RBW=1MHz / VBW=1MHz / Sweep=AUTO.
 - b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO.
- 5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

14.3 TEST SETUP



----- The following blanks -----

14.4 TEST RESULTS

All models were pretested and only the worst modes were recorded in this report.

Pre-scanned in three orthogonal panels,X,Y,Z.The worst cases mode (Z plane) were recorded in this report.

DH5

Lowest Channel

Frequency 2402MHz

Environment: 25℃/60%RH

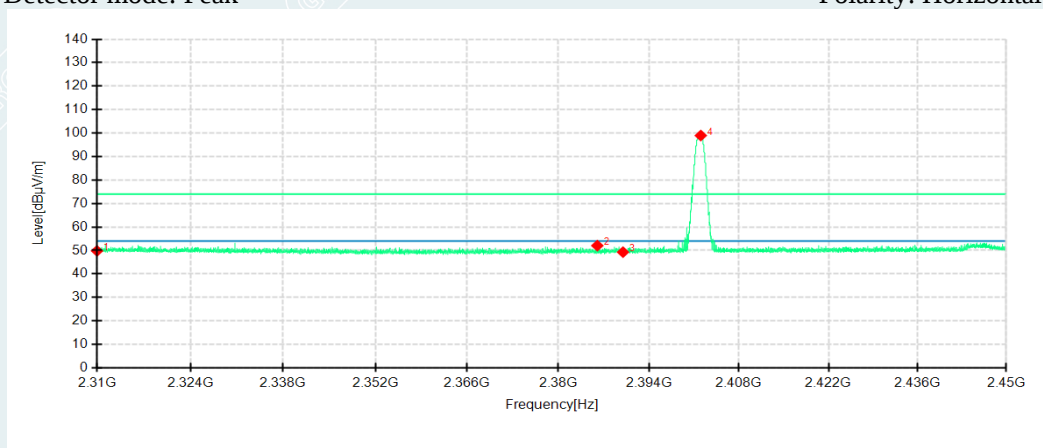
Tested By: Lu Qiang

Detector mode: Peak

Voltage: DC 3.85V

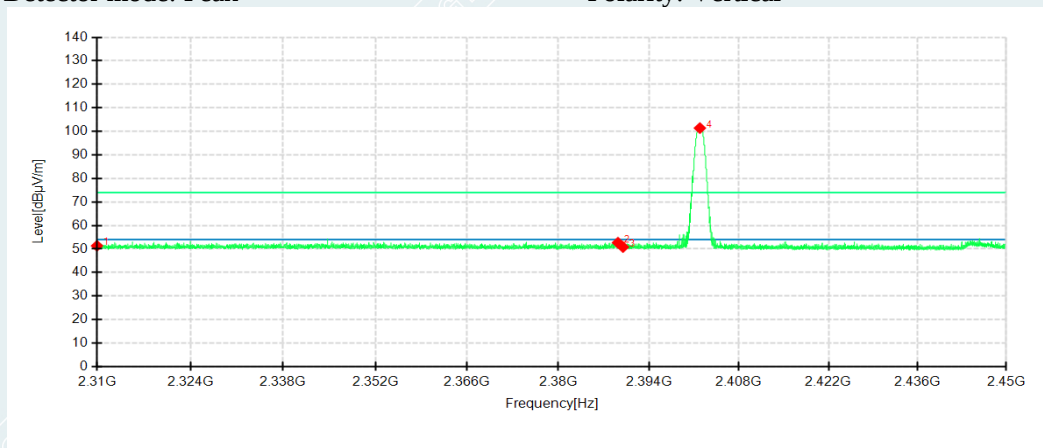
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	45.88	49.81	3.93	74.00	24.19	100	215	Horizontal	/
2	2386.0340	48.93	52.05	3.12	74.00	21.95	200	141	Horizontal	/
3	2390.0000	46.14	49.27	3.13	74.00	24.73	100	80	Horizontal	/
4	2402.0640	95.76	98.96	3.20	74.00	-24.96	200	215	Horizontal	No limit
1	2310.0000	46.83	51.34	4.51	74.00	22.66	100	30	Vertical	/
2	2389.2260	48.40	52.68	4.28	74.00	21.32	200	113	Vertical	/
3	2390.0000	46.54	50.81	4.27	74.00	23.19	200	215	Vertical	/
4	2401.9240	97.23	101.39	4.16	74.00	-27.39	200	113	Vertical	No limit

Lowest Channel

Frequency 2402MHz

Environment: 25°C/60%RH

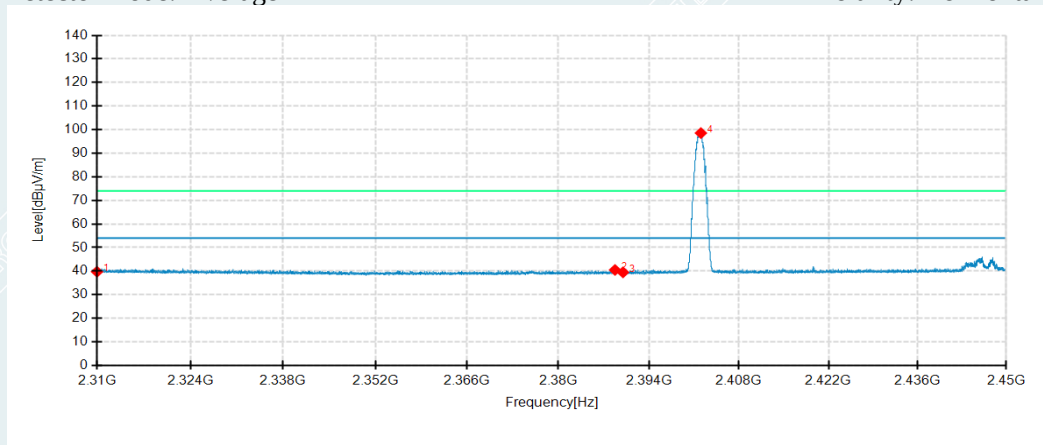
Tested By: Lu Qiang

Detector mode: Average

Voltage: DC 3.85V

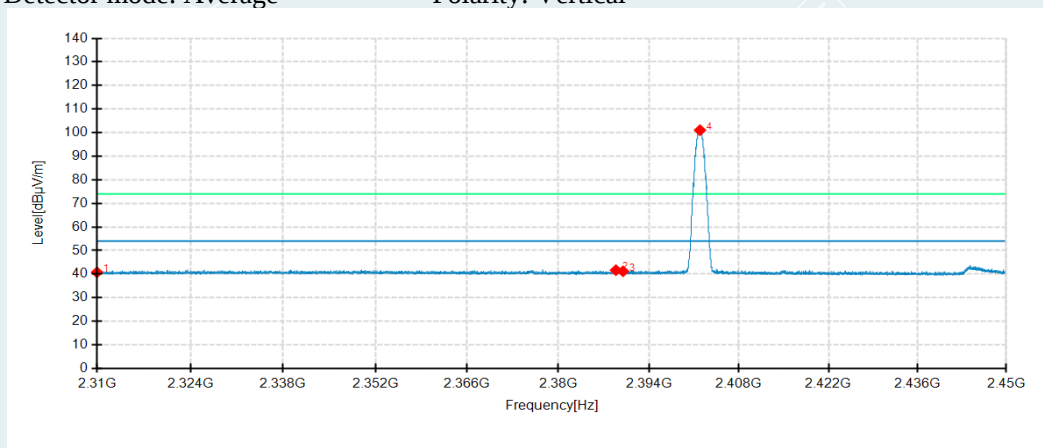
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	35.79	39.72	3.93	54.00	14.28	200	5	Horizontal	/
2	2388.7640	37.36	40.49	3.13	54.00	13.51	200	280	Horizontal	/
3	2390.0000	36.35	39.48	3.13	54.00	14.52	100	80	Horizontal	/
4	2402.0780	95.34	98.54	3.20	54.00	-44.54	200	212	Horizontal	No limit
1	2310.0000	36.23	40.74	4.51	54.00	13.26	200	81	Vertical	/
2	2388.9040	37.40	41.68	4.28	54.00	12.32	200	121	Vertical	/
3	2390.0000	36.91	41.18	4.27	54.00	12.82	200	299	Vertical	/
4	2401.9380	96.88	101.04	4.16	54.00	-47.04	200	112	Vertical	No limit

Highest Channel

Frequency 2480MHz

Environment: 25°C/60%RH

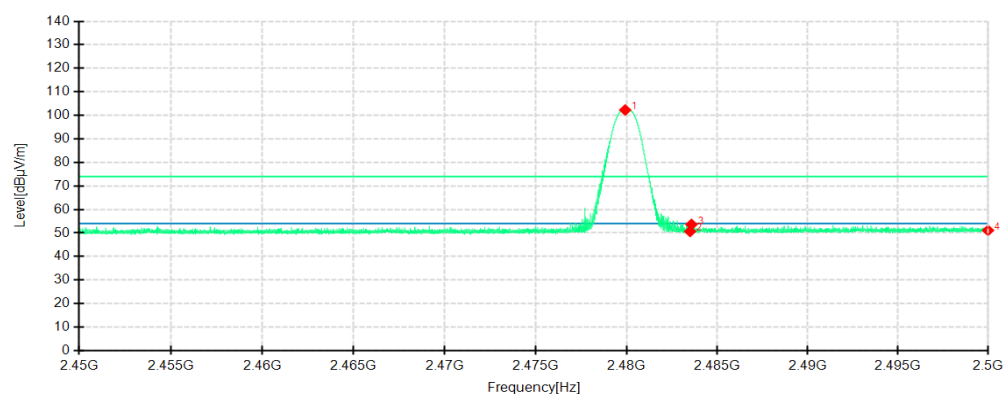
Tested By: Lu Qiang

Detector mode: Peak

Voltage: DC 3.85V

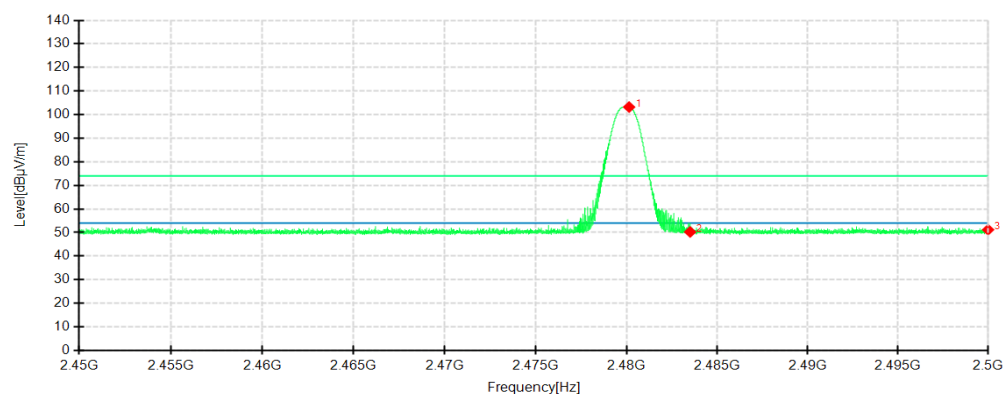
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.9200	98.02	102.28	4.26	74.00	-28.28	200	231	Horizontal	No limit
2	2483.5000	46.32	50.65	4.33	74.00	23.35	100	327	Horizontal	/
3	2483.5750	49.30	53.63	4.33	74.00	20.37	200	280	Horizontal	/
4	2500.0000	46.45	51.10	4.65	74.00	22.90	100	80	Horizontal	/
1	2480.1350	99.53	103.21	3.68	74.00	-29.21	200	108	Vertical	No limit
2	2483.5000	46.56	50.25	3.69	74.00	23.75	100	280	Vertical	/
3	2500.0000	47.43	51.18	3.75	74.00	22.82	200	80	Vertical	/

Highest Channel

Frequency 2480MHz

Environment: 25°C/60%RH

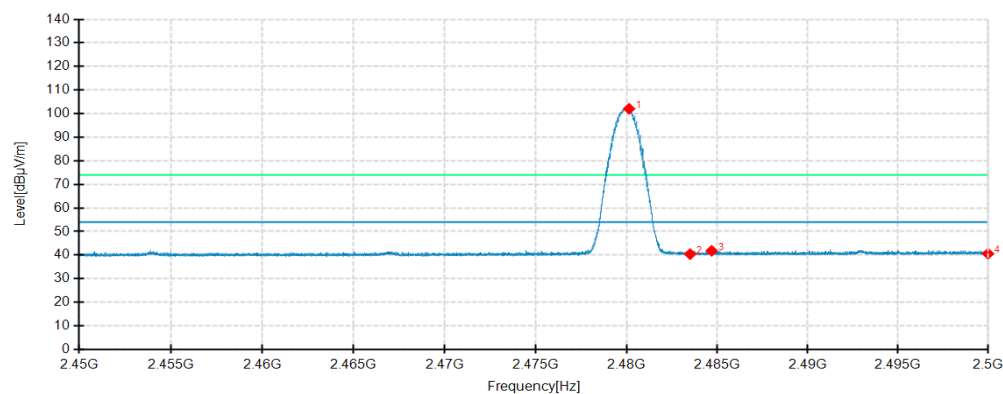
Tested By: Lu Qiang

Detector mode: Average

Voltage: DC 3.85V

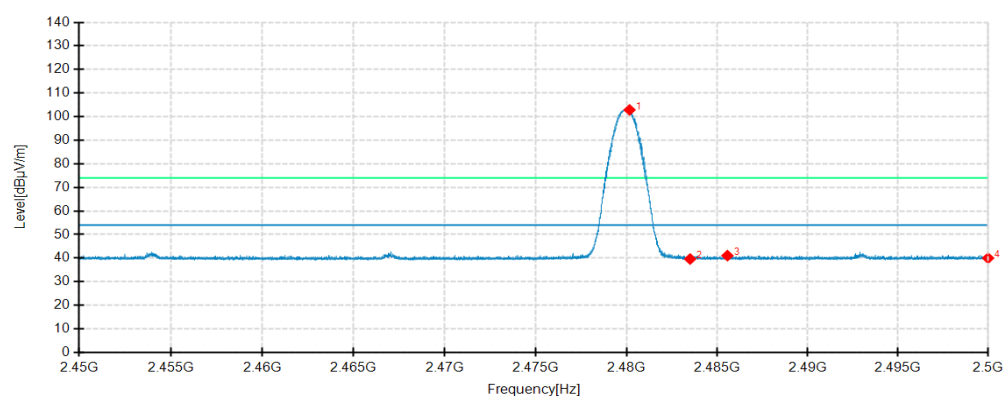
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2480.1350	97.80	102.06	4.26	54.00	-48.06	200	228	Horizontal	No limit
2	2483.5000	36.09	40.42	4.33	54.00	13.58	100	181	Horizontal	/
3	2484.6900	37.47	41.82	4.35	54.00	12.18	200	149	Horizontal	/
4	2500.0000	35.93	40.58	4.65	54.00	13.42	100	137	Horizontal	/
1	2480.1600	99.18	102.86	3.68	54.00	-48.86	200	112	Vertical	No limit
2	2483.5000	35.93	39.62	3.69	54.00	14.38	200	243	Vertical	/
3	2485.5600	37.34	41.04	3.70	54.00	12.96	100	87	Vertical	/
4	2500.0000	36.25	40.00	3.75	54.00	14.00	200	177	Vertical	/

3DH5**Lowest Channel**

Frequency 2402MHz

Environment: 25°C/60%RH

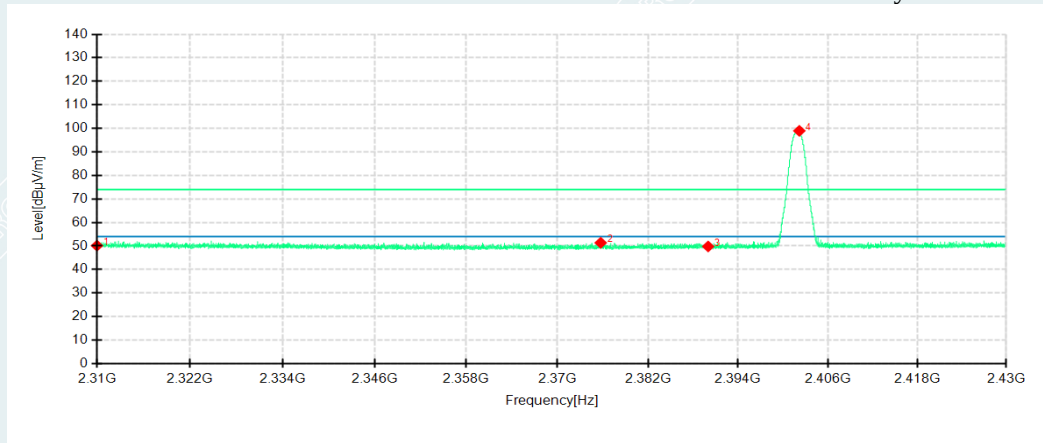
Tested By: Lu Qiang

Detector mode: Peak

Voltage: DC 3.85V

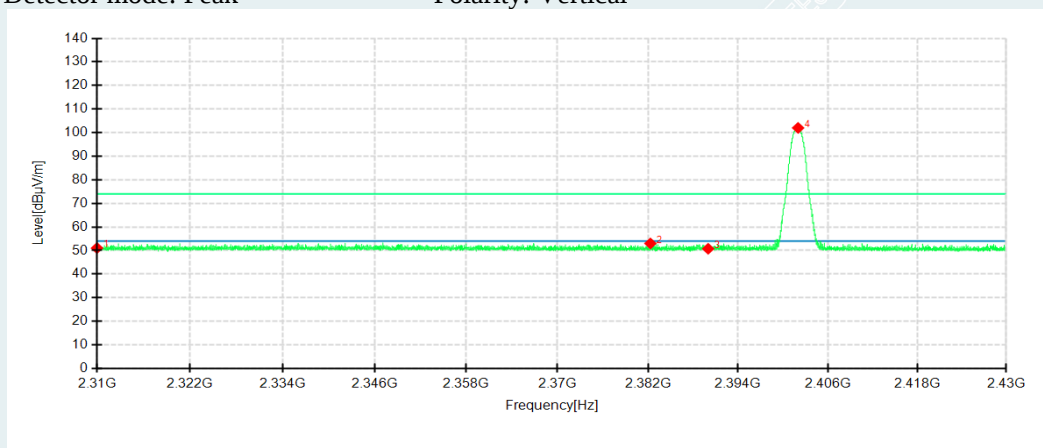
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	46.20	50.13	3.93	74.00	23.87	200	233	Horizontal	/
2	2375.7360	48.29	51.36	3.07	74.00	22.64	200	242	Horizontal	/
3	2390.0000	46.66	49.79	3.13	74.00	24.21	200	236	Horizontal	/
4	2402.1720	95.74	98.94	3.20	74.00	-24.94	200	225	Horizontal	No limit
1	2310.0000	46.54	51.05	4.51	74.00	22.95	100	4	Vertical	/
2	2382.3240	48.66	53.01	4.35	74.00	20.99	200	249	Vertical	/
3	2390.0000	46.49	50.76	4.27	74.00	23.24	200	80	Vertical	/
4	2402.0040	97.84	102.00	4.16	74.00	-28.00	200	113	Vertical	No limit

Lowest Channel

Frequency 2402MHz

Environment: 25°C/60%RH

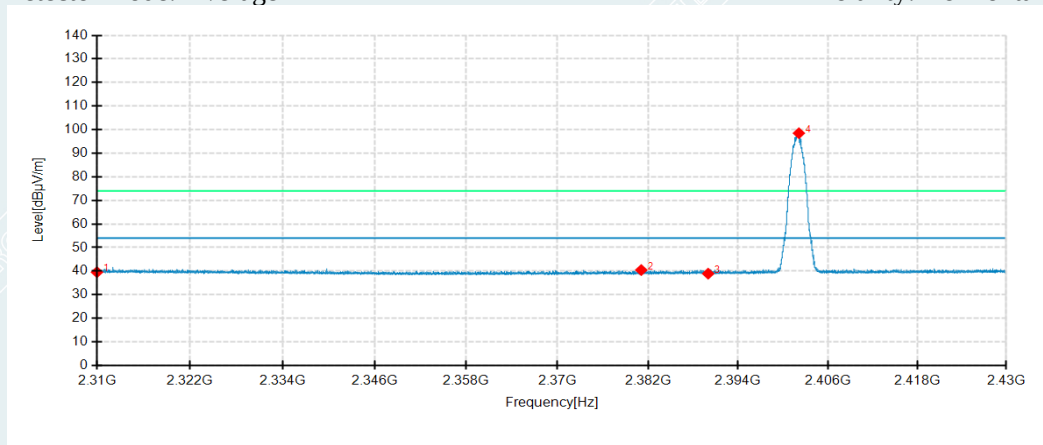
Tested By: Lu Qiang

Detector mode: Average

Voltage: DC 3.85V

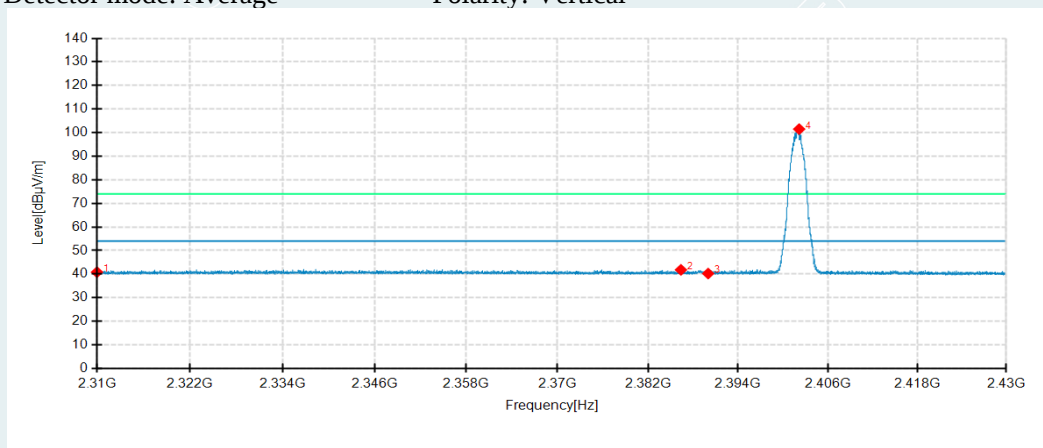
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	35.61	39.54	3.93	54.00	14.46	100	192	Horizontal	/
2	2381.1120	37.37	40.46	3.09	54.00	13.54	200	159	Horizontal	/
3	2390.0000	35.78	38.91	3.13	54.00	15.09	200	60	Horizontal	/
4	2402.1120	95.28	98.48	3.20	54.00	-44.48	200	221	Horizontal	No limit
1	2310.0000	36.32	40.83	4.51	54.00	13.17	200	144	Vertical	/
2	2386.3800	37.49	41.80	4.31	54.00	12.20	100	141	Vertical	/
3	2390.0000	35.97	40.24	4.27	54.00	13.76	200	302	Vertical	/
4	2402.1480	97.34	101.49	4.15	54.00	-47.49	200	122	Vertical	No limit

Highest Channel

Frequency 2480MHz

Environment: 25°C/60%RH

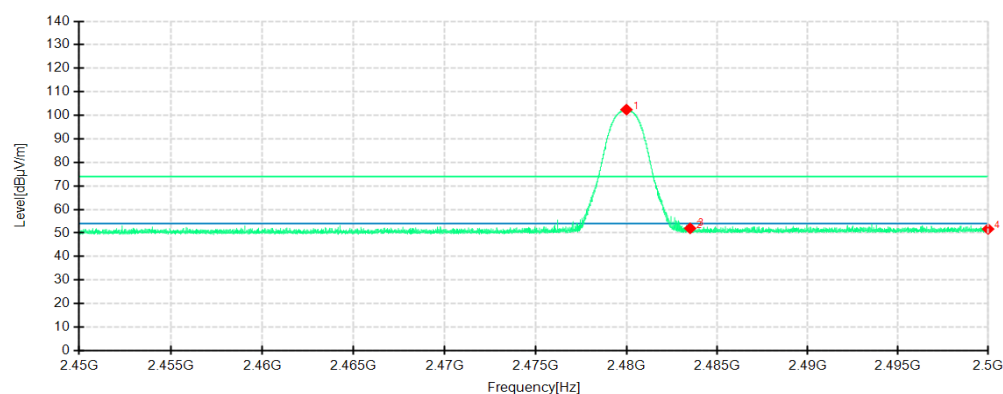
Tested By: Lu Qiang

Detector mode: Peak

Voltage: DC 3.85V

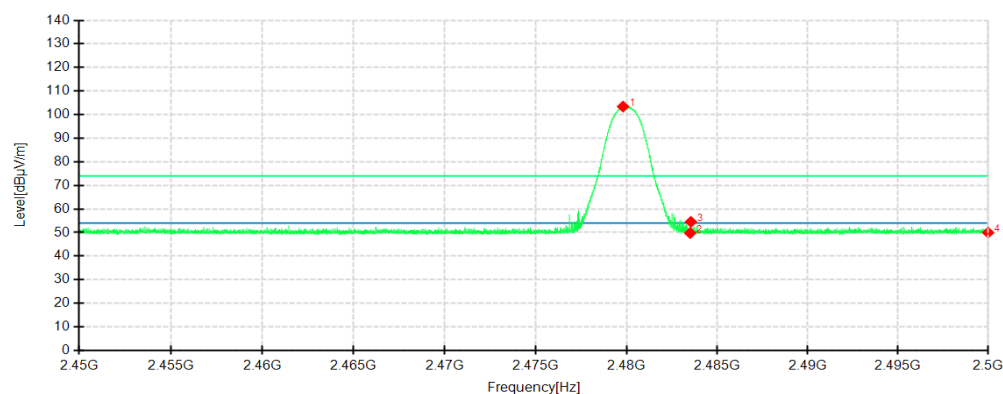
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Peak

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2479.9900	98.17	102.43	4.26	74.00	-28.43	200	230	Horizontal	No limit
2	2483.5000	47.65	51.98	4.33	74.00	22.02	100	333	Horizontal	/
3	2483.5650	48.52	52.85	4.33	74.00	21.15	200	223	Horizontal	
4	2500.0000	47.04	51.69	4.65	74.00	22.31	200	136	Horizontal	/
1	2479.8000	99.74	103.42	3.68	74.00	-29.42	200	109	Vertical	No limit
2	2483.5000	46.09	49.78	3.69	74.00	24.22	200	167	Vertical	/
3	2483.5450	50.86	54.55	3.69	74.00	19.45	200	120	Vertical	/
4	2500.0000	46.21	49.96	3.75	74.00	24.04	100	58	Vertical	/

Highest Channel

Frequency 2480MHz

Environment: 25°C/60%RH

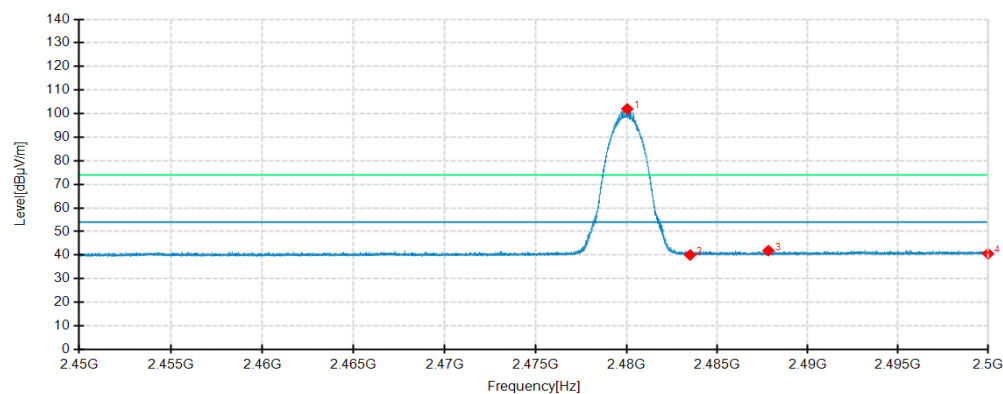
Tested By: Lu Qiang

Detector mode: Average

Voltage: DC 3.85V

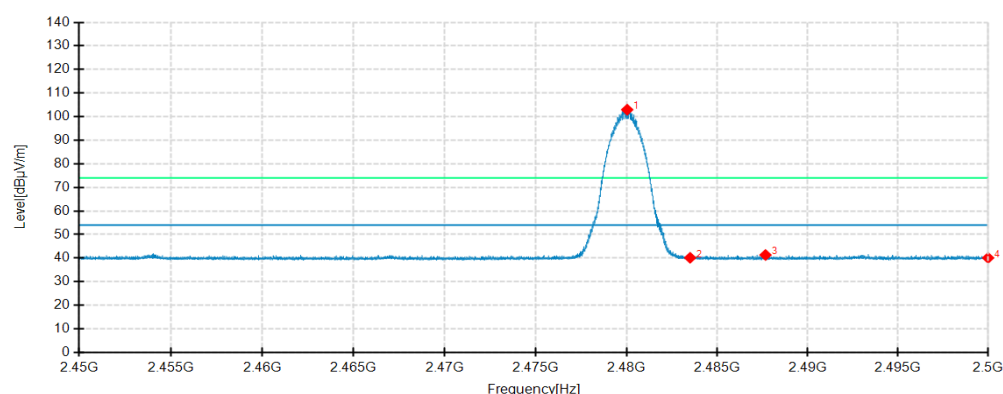
Date: 2022-03-21

Polarity: Horizontal



Detector mode: Average

Polarity: Vertical



No.	Frequency MHz	Reading dBμV/m	Level dBμV/m	Factor dB	Limit dBμV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2480.0350	97.72	101.98	4.26	54.00	-47.98	200	229	Horizontal	No limit
2	2483.5000	35.72	40.05	4.33	54.00	13.95	200	144	Horizontal	/
3	2487.8250	37.48	41.89	4.41	54.00	12.11	200	280	Horizontal	/
4	2500.0000	35.96	40.61	4.65	54.00	13.39	100	80	Horizontal	/
1	2480.0300	99.27	102.95	3.68	54.00	-48.95	200	111	Vertical	No limit
2	2483.5000	36.44	40.13	3.69	54.00	13.87	100	261	Vertical	/
3	2487.6650	37.61	41.32	3.71	54.00	12.68	200	310	Vertical	/
4	2500.0000	36.33	40.08	3.75	54.00	13.92	200	297	Vertical	/

Remark:

- 1) Max field strength in 3m distance. No any other emission which falls in restricted bands can be detected and be reported.

APPENDIX A. PHOTOGRAPH OF THE TEST CONNECTION DIAGRAM

Please refer to the attached document E202112291004-26-Test photo.

APPENDIX B. PHOTOGRAPH OF THE EUT

Please refer to the attached document E202112291004-27-EUT photo.

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