

Test Setup:

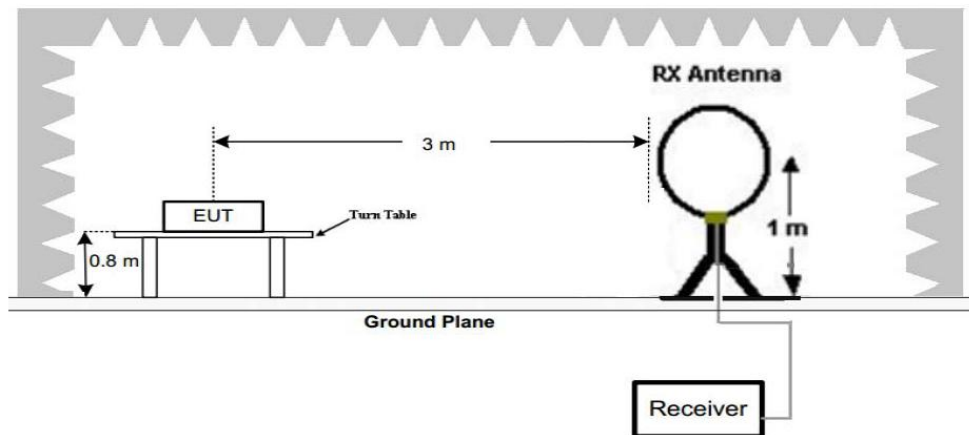


Figure 1. Below 30MHz

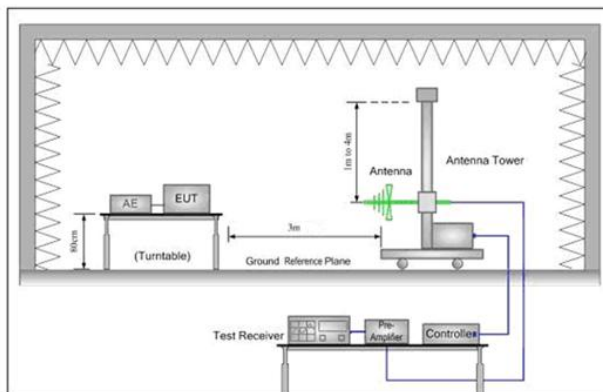


Figure 2. 30MHz to 1GHz

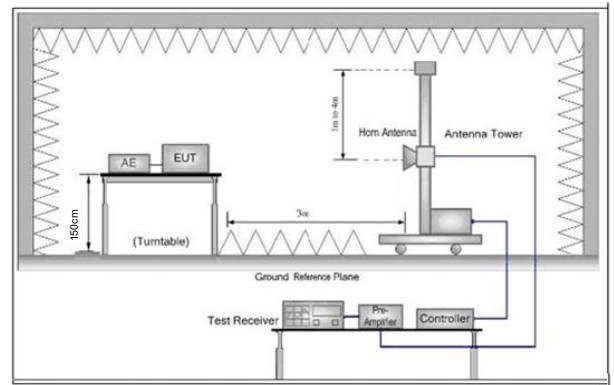


Figure 3. Above 1 GHz

Test Procedure:

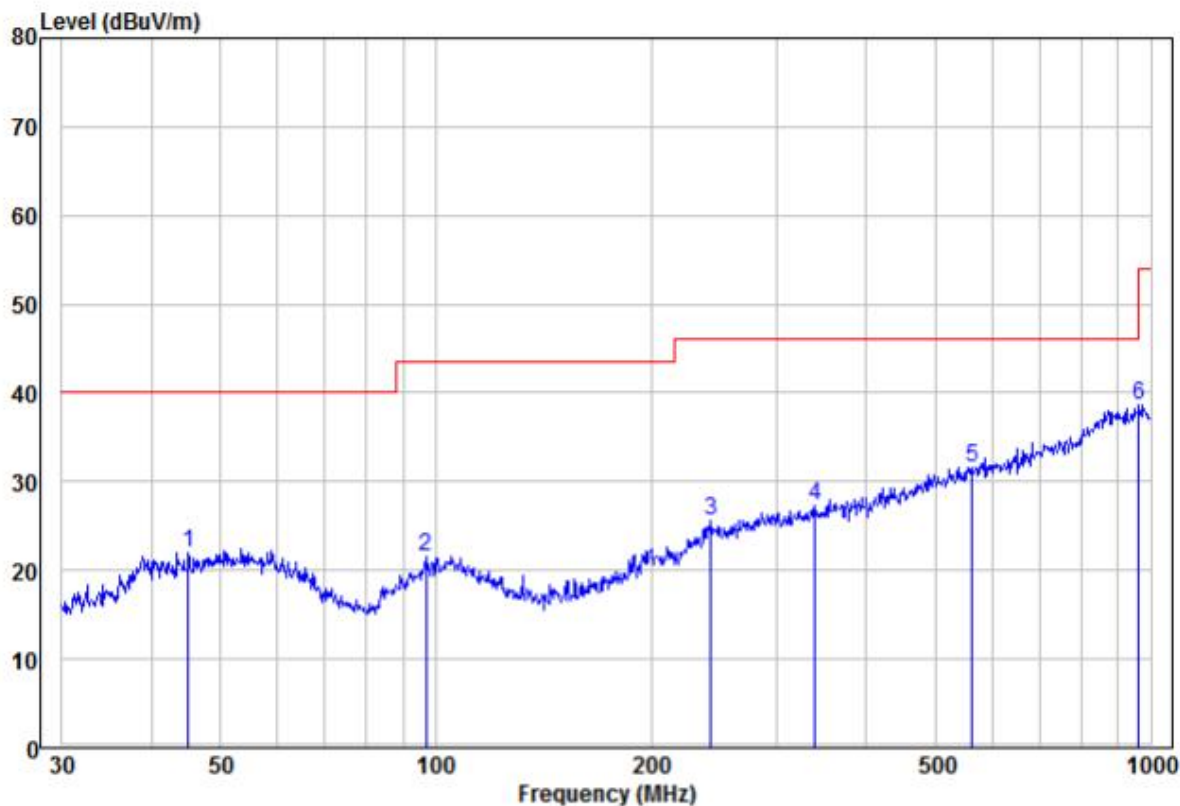
- a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
Note: For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

	d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel (2402MHz), the middle channel (2441MHz), the Highest channel (2480MHz) h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Transmitting mode
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. For below 1GHz part, through pre-scan, the worst case is the highest channel. Only the worst case is recorded in the report.
Test Results:	Pass

5.11.1 Radiated Emission below 1GHz

SHENZHEN SUNHE ENERGY CO., LTD

30MHz~1GHz		
Test mode:	Transmitting	Vertical



	Freq	Read		Limit	Over		
	MHz	Level	Factor	Line	Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1	45.06	9.90	12.07	21.97	40.00	-18.03 Peak	VERTICAL
2	96.77	10.17	11.34	21.51	43.50	-21.99 Peak	VERTICAL
3	242.53	10.13	15.42	25.55	46.00	-20.45 Peak	VERTICAL
4	339.59	9.35	17.87	27.22	46.00	-18.78 Peak	VERTICAL
5 pp	562.66	9.67	21.91	31.58	46.00	-14.42 Peak	VERTICAL
6	962.16	10.61	28.06	38.67	54.00	-15.33 Peak	VERTICAL

Remark:

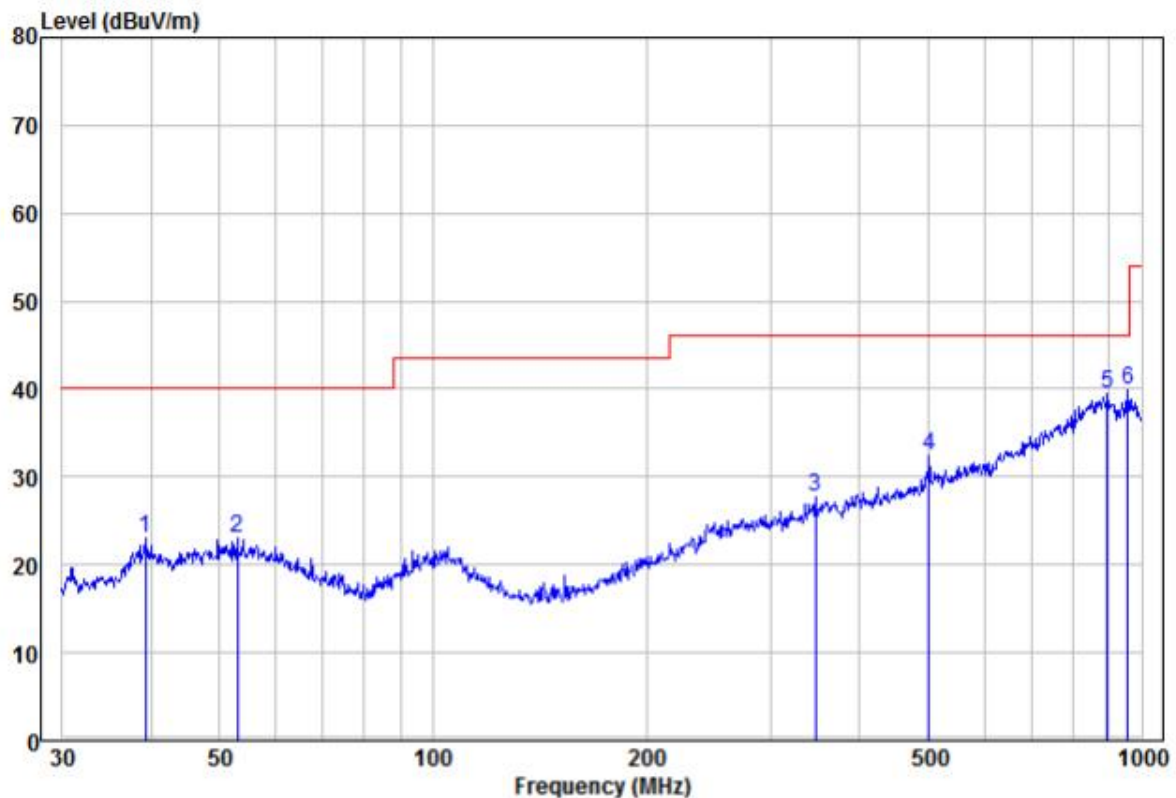
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Test mode:	Transmitting	Horizontal
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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	39.30	12.54	10.41	22.95	40.00	-17.05	Peak	HORIZONTAL
2	52.95	10.27	12.72	22.99	40.00	-17.01	Peak	HORIZONTAL
3	346.81	9.67	18.06	27.73	46.00	-18.27	Peak	HORIZONTAL
4	501.18	11.52	20.94	32.46	46.00	-13.54	Peak	HORIZONTAL
5	893.86	10.30	29.20	39.50	46.00	-6.50	Peak	HORIZONTAL
6 pp	955.44	11.90	28.02	39.92	46.00	-6.08	Peak	HORIZONTAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

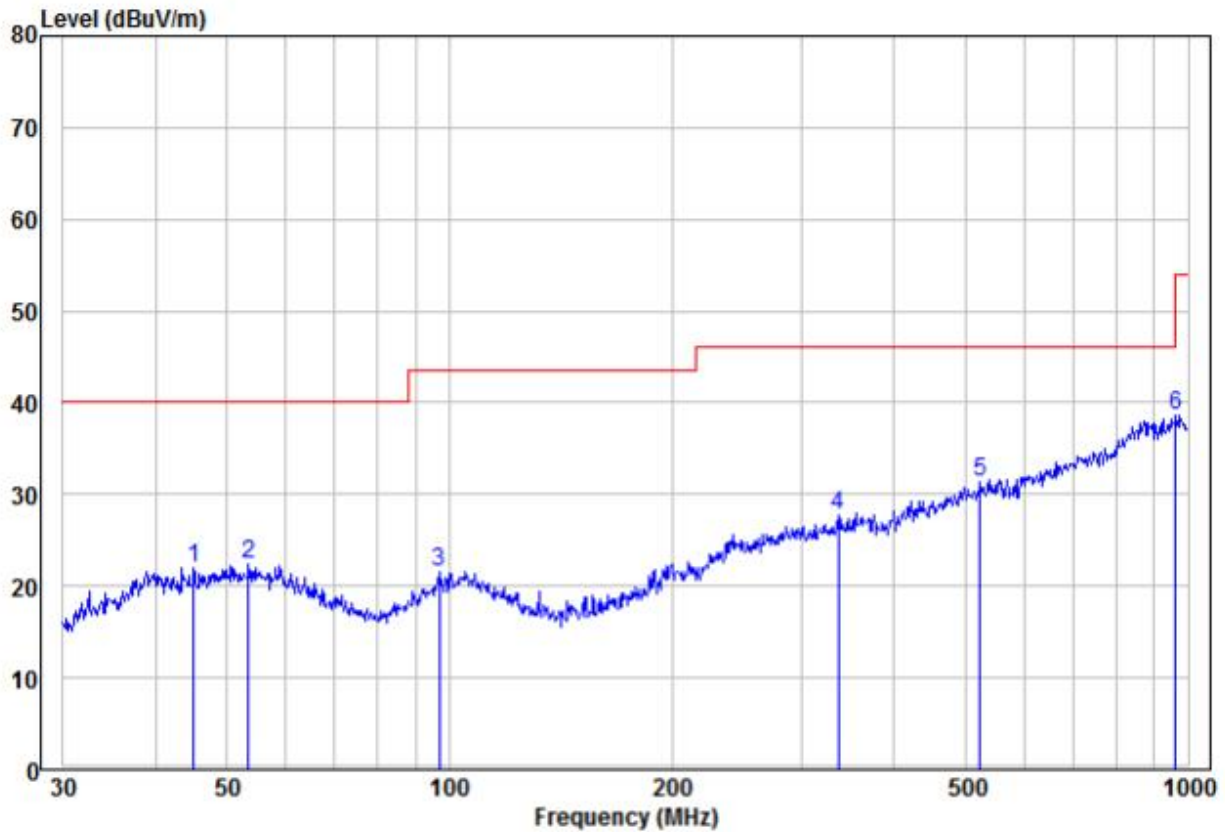
Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

ZHONGSHAN ZHONGWANGDE NEW ENERGY TECHNOLOGY CO.,LTD.

30MHz~1GHz		
Test mode:	Transmitting	Vertical



	Freq	Read	Factor	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	45.06	9.90	12.07	21.97	40.00	-18.03	Peak	VERTICAL
2	53.51	9.74	12.75	22.49	40.00	-17.51	Peak	VERTICAL
3	96.77	10.17	11.34	21.51	43.50	-21.99	Peak	VERTICAL
4	336.04	10.03	17.78	27.81	46.00	-18.19	Peak	VERTICAL
5 pp	522.72	10.12	21.23	31.35	46.00	-14.65	Peak	VERTICAL
6	962.16	10.61	28.06	38.67	54.00	-15.33	Peak	VERTICAL

Remark:

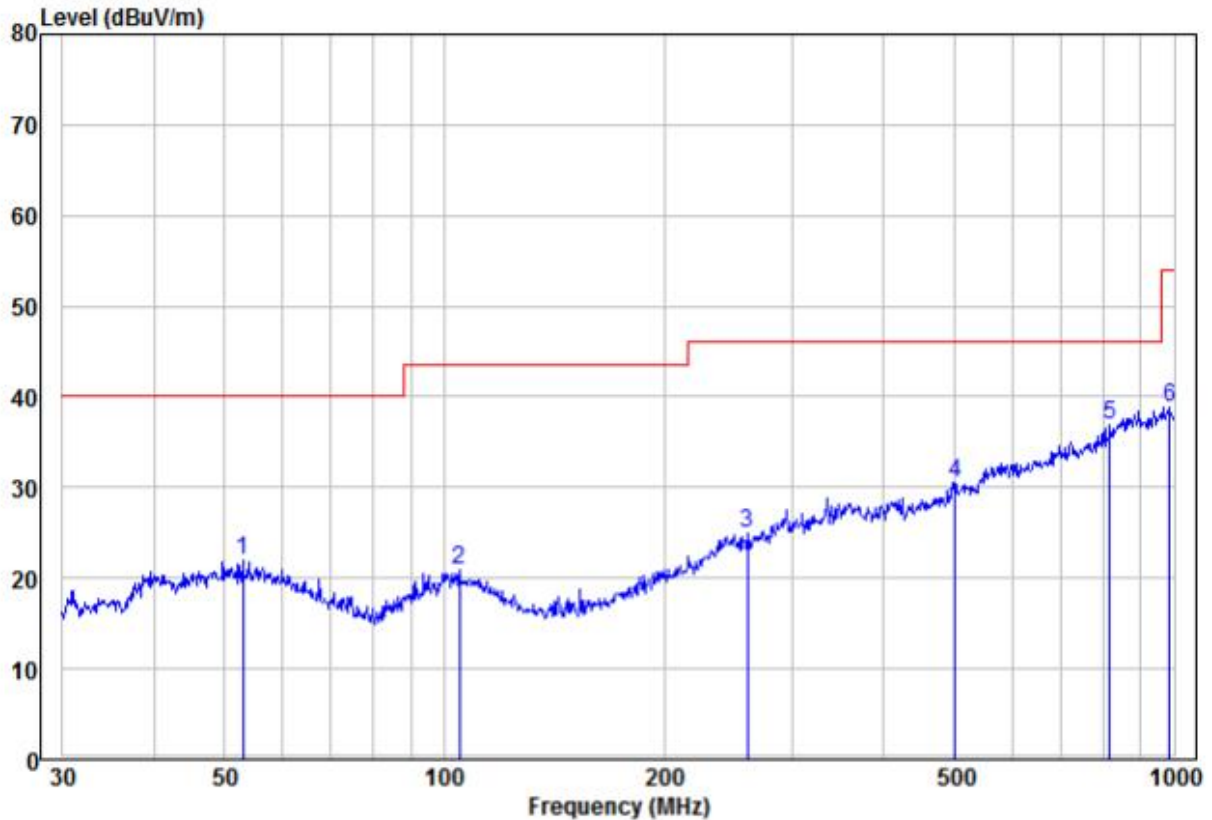
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

Test mode:	Transmitting	Horizontal
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	Freq	Read Level	Factor	Level	Limit	Over	Remark	Pol/Phase
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	52.95	9.27	12.72	21.99	40.00	-18.01	Peak	HORIZONTAL
2	104.90	9.09	11.86	20.95	43.50	-22.55	Peak	HORIZONTAL
3	260.14	8.98	15.95	24.93	46.00	-21.07	Peak	HORIZONTAL
4	501.18	9.52	20.94	30.46	46.00	-15.54	Peak	HORIZONTAL
5 pp	815.97	10.11	26.86	36.97	46.00	-9.03	Peak	HORIZONTAL
6	986.07	10.70	28.22	38.92	54.00	-15.08	Peak	HORIZONTAL

Remark:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Factor= Antenna Factor + Cable Factor – Preamplifier Factor,

Level = Read Level + Factor,

Over Limit=Level-Limit Line.

5.11.2 Transmitter Emission above 1GHz

Worse case mode:		GFSK(DH5)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2390	55.73	-9.2	46.53	74	-27.47	Peak	H	1.5	314
2400	57.01	-9.39	47.62	74	-26.38	Peak	H	1.5	350
4804	53.65	-4.33	49.32	74	-24.68	Peak	H	1.5	357
7206	49.90	1.01	50.91	74	-23.09	Peak	H	1.5	326
2390	52.58	-9.2	43.38	74	-30.62	Peak	V	1.5	143
2400	52.29	-9.39	42.90	74	-31.10	Peak	V	1.5	330
4804	52.64	-4.33	48.31	74	-25.69	Peak	V	1.5	175
7206	48.69	1.01	49.70	74	-24.30	Peak	V	1.5	340

Worse case mode:		GFSK(DH5)		Test channel:		Middle			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4882	51.97	-4.11	47.86	74	-26.14	peak	H	1.5	178
7323	50.45	1.51	51.96	74	-22.04	peak	H	1.5	217
4882	54.13	-4.11	50.02	74	-23.98	peak	V	1.5	52
7323	48.64	1.51	50.15	74	-23.85	peak	V	1.5	245

Worse case mode:		GFSK(DH5)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2483.5	54.45	-9.2	45.25	74	-28.75	Peak	H	1.5	312
4960	56.03	-9.39	46.64	74	-27.36	Peak	H	1.5	14
7440	52.95	-4.33	48.62	74	-25.38	Peak	H	1.5	211
2483.5	50.75	1.01	51.76	74	-22.24	Peak	V	1.5	121
4960	54.14	-9.2	44.94	74	-29.06	Peak	V	1.5	2
7440	53.08	-9.39	43.69	74	-30.31	Peak	V	1.5	204

Worse case mode:		π /4DQPSK (2DH5)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)		H/V	(m)	(Degree)
2390	54.43	-9.2	45.23	74	-28.77	Peak	H	1.5	147
2400	57.08	-9.39	47.69	74	-26.31	Peak	H	1.5	33
4804	53.84	-4.33	49.51	74	-24.49	Peak	H	1.5	97
7206	50.54	1.01	51.55	74	-22.45	Peak	H	1.5	14
2390	53.91	-9.2	44.71	74	-29.29	Peak	V	1.5	135
2400	50.53	-9.39	41.14	74	-32.86	Peak	V	1.5	122
4804	52.43	-4.33	48.10	74	-25.90	Peak	V	1.5	343
7206	49.92	1.01	50.93	74	-23.07	Peak	V	1.5	160

Worse case mode:		π /4DQPSK (2DH5)		Test channel:		Middle			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)		H/V	(m)	(Degree)
4882	53.28	-9.2	44.08	74	-29.92	peak	H	1.5	305
7323	56.16	-9.39	46.77	74	-27.23	peak	H	1.5	327
4882	51.28	-4.33	46.95	74	-27.05	peak	V	1.5	76
7323	50.17	1.01	51.18	74	-22.82	peak	V	1.5	151

Worse case mode:		π /4DQPSK (2DH5)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dB μ V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)		H/V	(m)	(Degree)
2483.5	53.32	-9.2	44.12	74	-29.88	Peak	H	1.5	126
4960	56.56	-9.39	47.17	74	-26.83	Peak	H	1.5	305
7440	54.08	-4.33	49.75	74	-24.25	Peak	H	1.5	66
2483.5	48.69	1.01	49.70	74	-24.30	Peak	V	1.5	302
4960	53.99	-9.2	44.79	74	-29.21	Peak	V	1.5	223
7440	51.89	-9.39	42.50	74	-31.50	Peak	V	1.5	56

Worse case mode:		8DPSK (3DH5)		Test channel:		Lowest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2390	54.10	-9.2	44.90	74	-29.10	Peak	H	1.5	185
2400	56.05	-9.39	46.66	74	-27.34	Peak	H	1.5	70
4804	52.07	-4.33	47.74	74	-26.26	Peak	H	1.5	179
7206	48.25	1.01	49.26	74	-24.74	Peak	H	1.5	290
2390	54.46	-9.2	45.26	74	-28.74	Peak	V	1.5	183
2400	50.51	-9.39	41.12	74	-32.88	Peak	V	1.5	261
4804	52.30	-4.33	47.97	74	-26.03	Peak	V	1.5	184
7206	48.28	1.01	49.29	74	-24.71	Peak	V	1.5	295

Worse case mode:		8DPSK (3DH5)		Test channel:		Middle			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
4882	51.86	-4.11	47.75	74	-26.25	peak	H	1.5	294
7323	49.67	1.51	51.18	74	-22.82	peak	H	1.5	14
4882	52.92	-4.11	48.81	74	-25.19	peak	V	1.5	337
7323	49.19	1.51	50.70	74	-23.30	peak	V	1.5	13

Worse case mode:		8DPSK (3DH5)		Test channel:		Highest			
Frequency	Meter Reading	Factor	Emission Level	Limits	Over	Detect or Type	Ant. Pol.	Antenna Height	Table Angle
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		H/V	(m)	(Degree)
2483.5	55.73	-9.2	46.53	74	-27.47	Peak	H	1.5	298
4960	55.24	-9.39	45.85	74	-28.15	Peak	H	1.5	219
7440	51.70	-4.33	47.37	74	-26.63	Peak	H	1.5	266
2483.5	50.57	1.01	51.58	74	-22.42	Peak	V	1.5	115
4960	52.79	-9.39	43.40	74	-30.60	Peak	V	1.5	258
7440	52.41	-4.33	48.08	74	-25.92	Peak	V	1.5	102

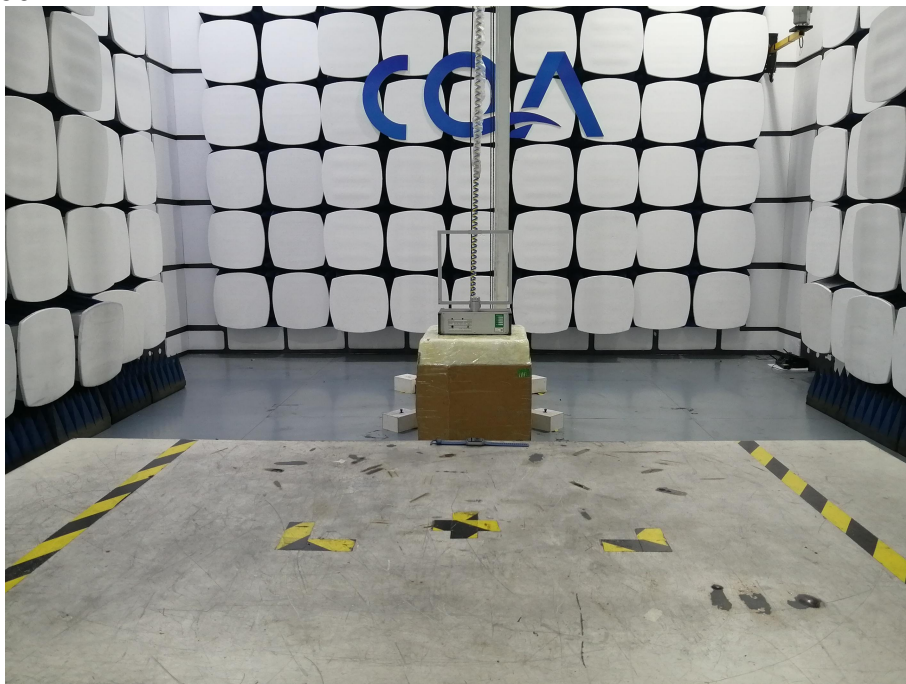
Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

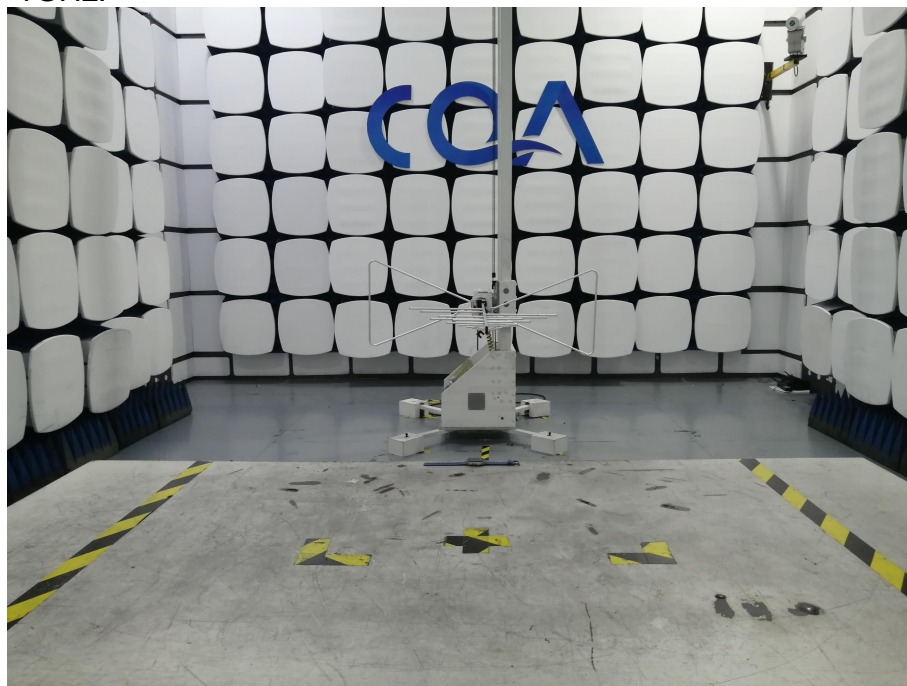
6 Photographs - EUT Test Setup

6.1 Radiated Emission

9KHz~30MHz:



30MHz~1GHz:



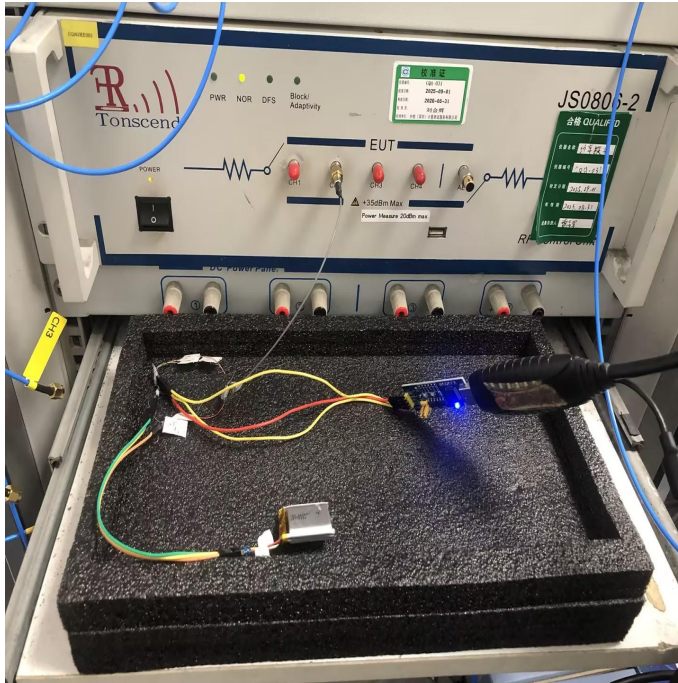
Above 1GHz:



6.2 Conducted Emission



6.3 RF Conducted measurement



7 Photographs - EUT Constructional Details

Refer to Photographs - EUT Constructional Details OF EUT for CQASZ20260500939E -01.

*** END OF REPORT ***