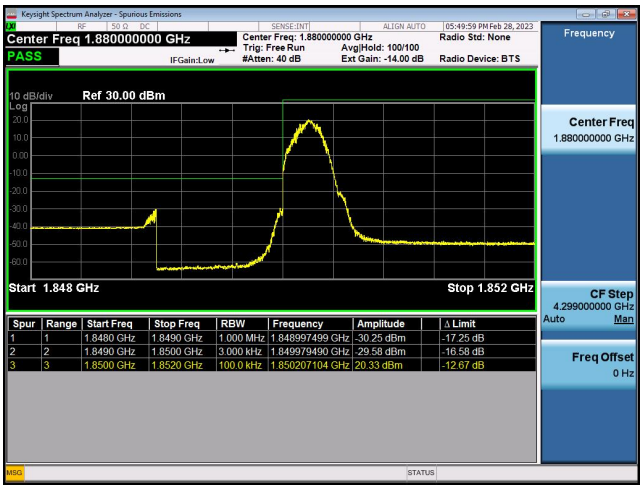
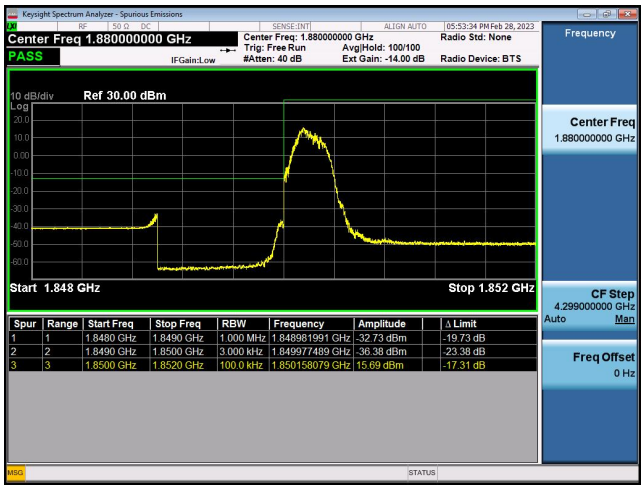
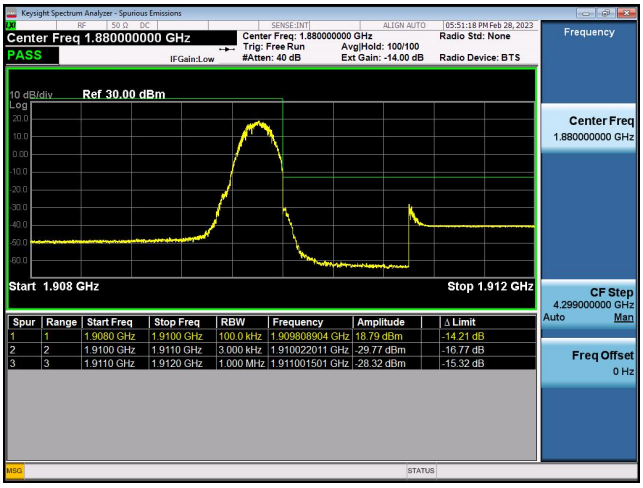
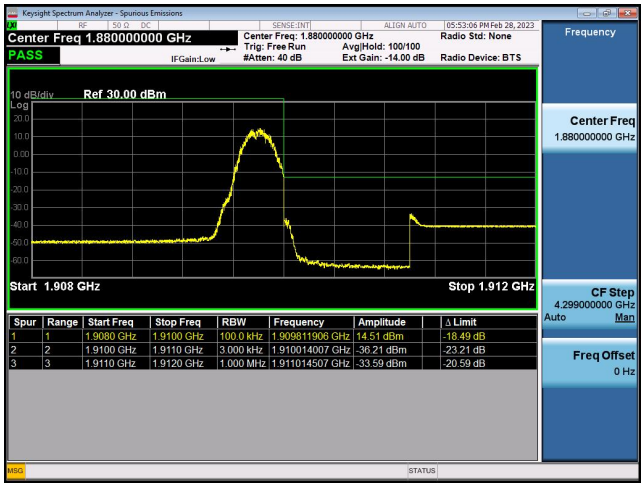
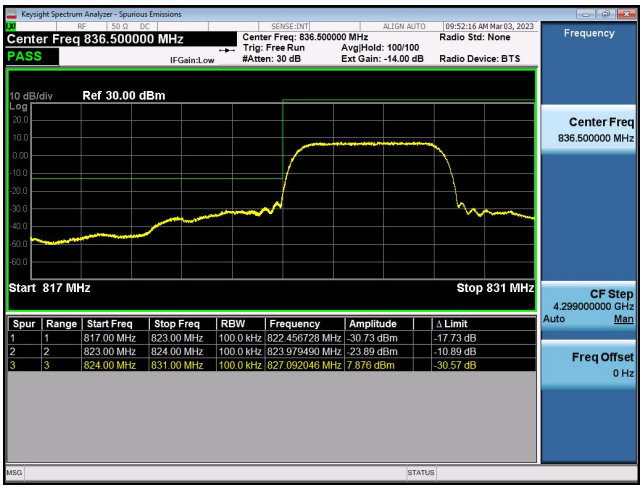
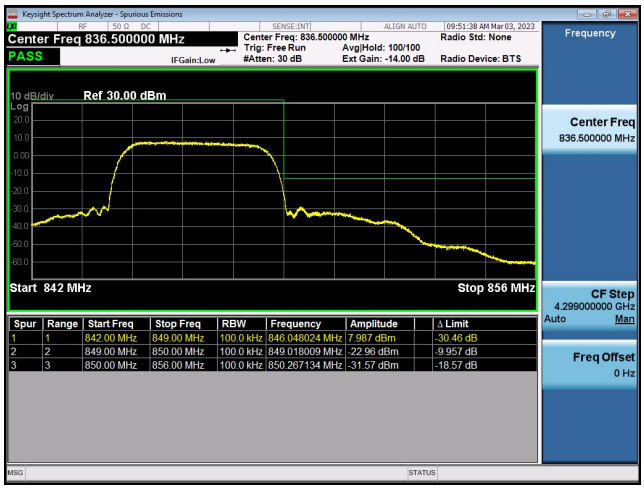
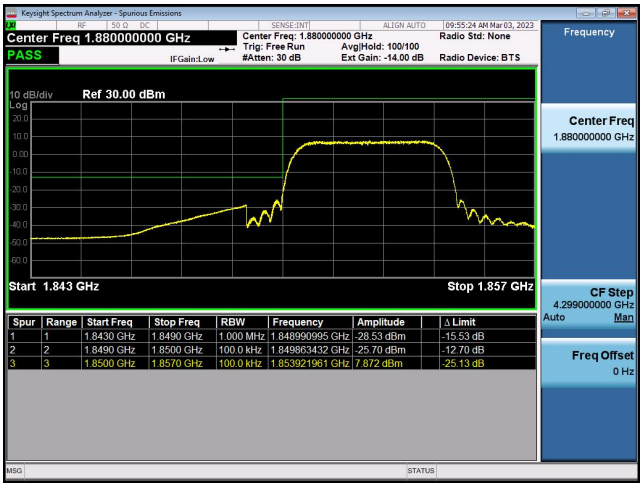
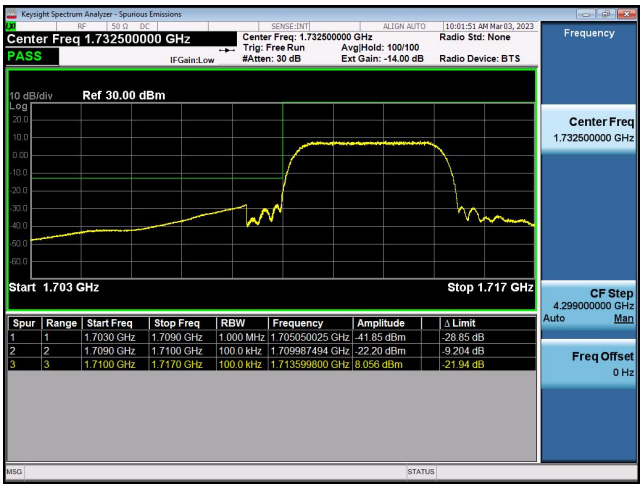
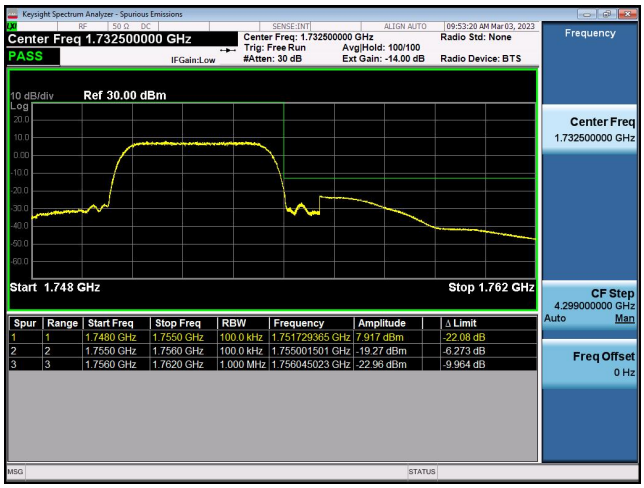
PCS 1900-512	EDGE 1900-512
	
PCS 1900-810	**EDGE 1900-810**
	

WCDMA 850-4132	WCDMA 850-4233
	
WCDMA 1900-9262	WCDMA 1900-9538
	
WCDMA 1700-1312	WCDMA 1700-1513
	

2.5. Conducted Spurious Emission

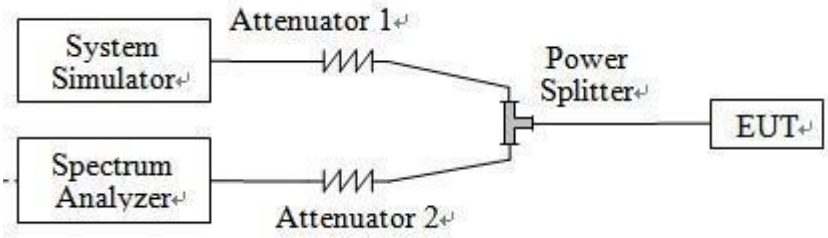
2.5.1. Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup

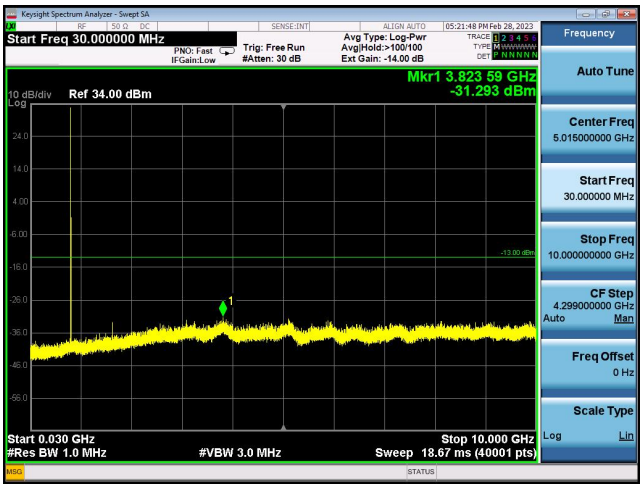
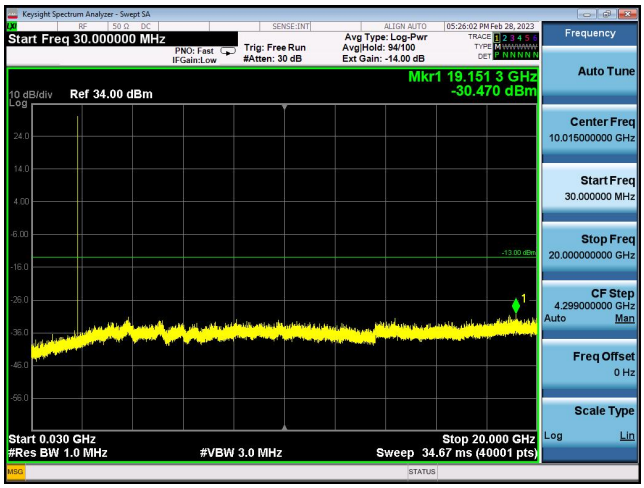
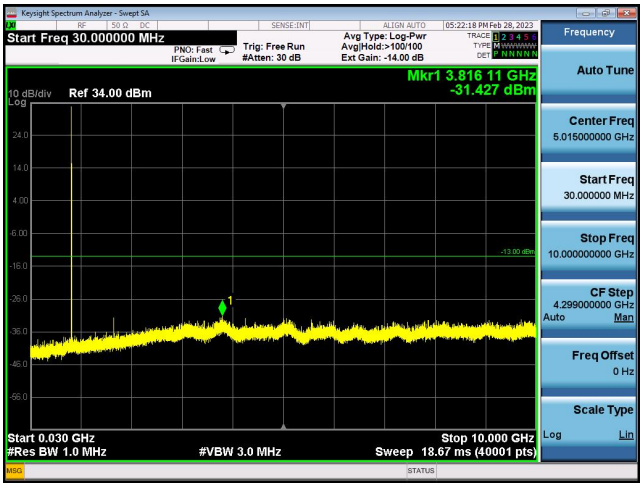
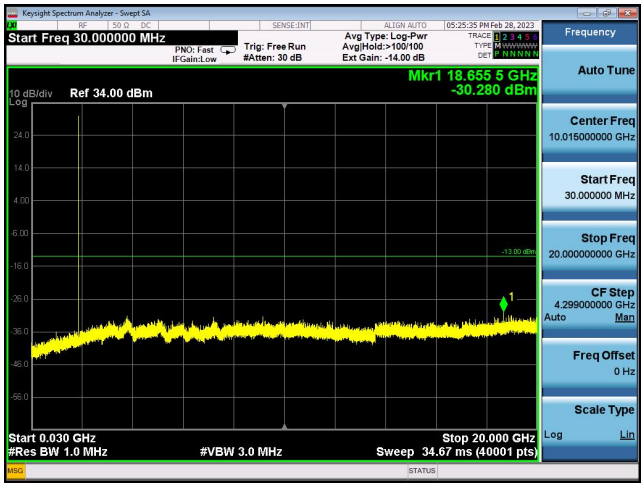
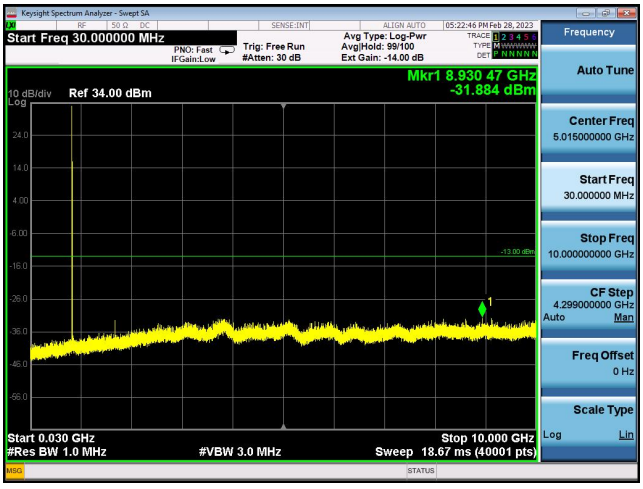
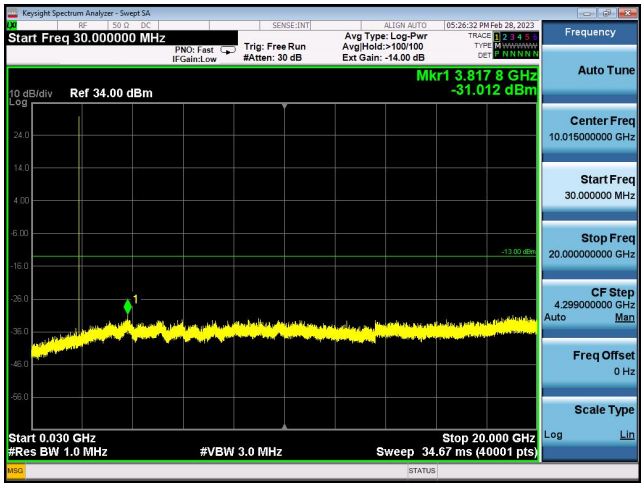


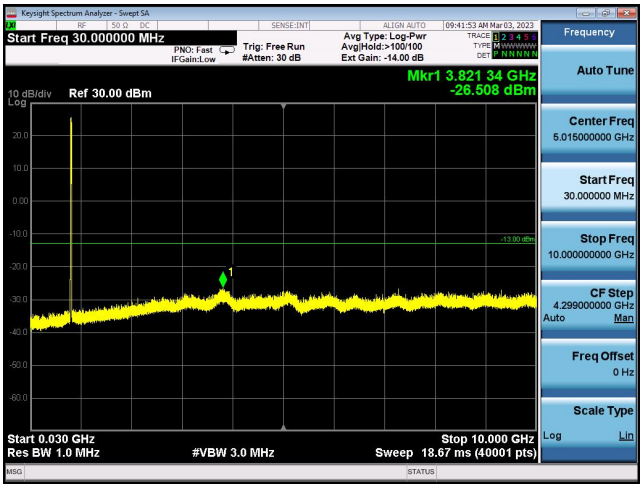
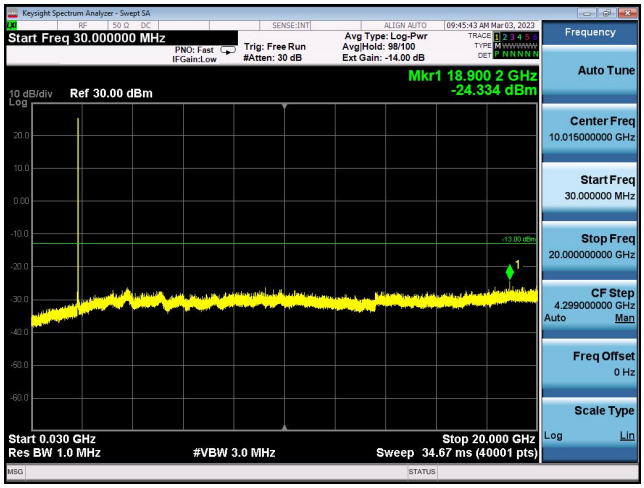
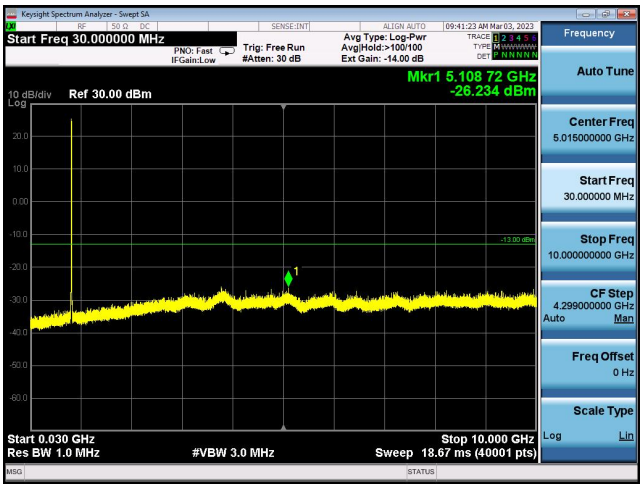
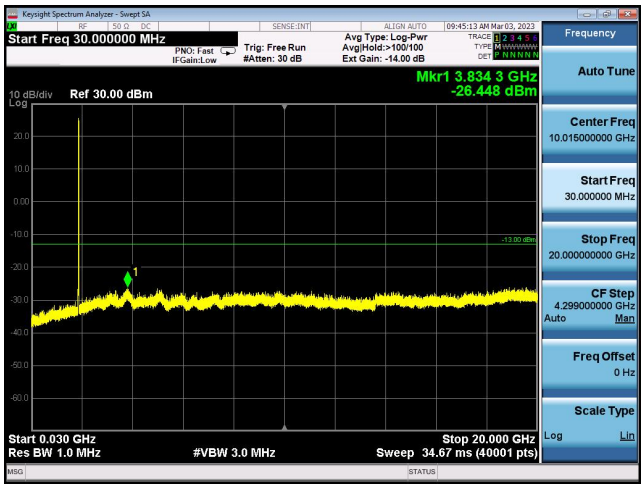
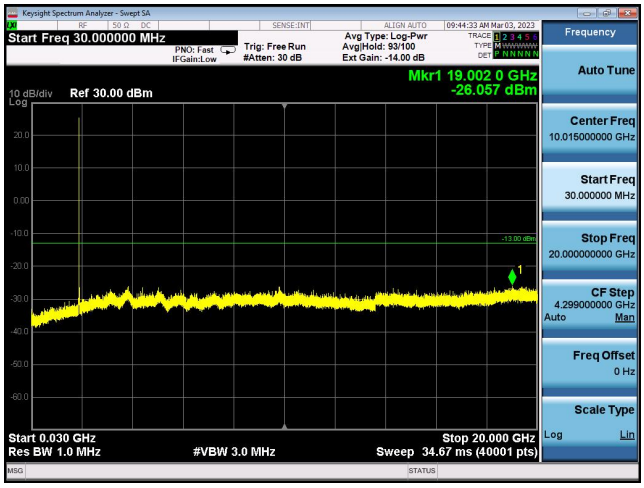
2.5.4. Test Procedures

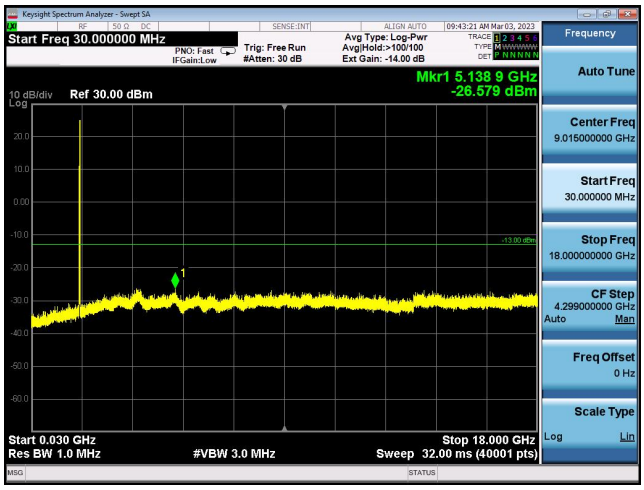
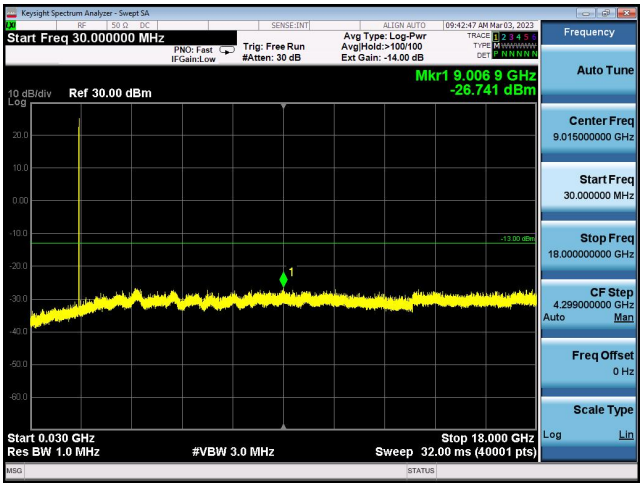
1. The testing follows the of KDB 971168 D01 v03r01 Section 6 and ANSI C63.26-2015 Section 5.7.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider, Path loss compensation is then performed on the spectrum analyzer and the system simulator respectively.
3. Set the spectrum analyzer start frequency to 9kHz and stop frequency to the tenth harmonic of the highest fundamental frequency.
4. Set RBW = 1MHz, VBW ≥ 3 × RBW
5. Set Detector = peak.
6. Set Trace mode = max hold.
7. Set Sweep time = auto-couple.
8. Identify and measure the highest spurious emission levels in each frequency range.
9. Compare the results with the corresponding limit in the applicable regulation.
10. Repeat step 3~9 at other frequency and modulations.

Note: For 9 kHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here.

2.5.5. Test Result of Conducted Spurious Emission

GSM 850-128, 30MHz ~9GHz	PCS 1900-512, 30MHz ~20GHz
	
GSM 850-190, 30MHz ~9GHz	PCS 1900-661, 30MHz ~20GHz
	
GSM 850-251, 30MHz ~9GHz	PCS 1900-810, 30MHz ~20GHz
	

WCDMA 850-4132, 30MHz ~9GHz	WCDMA 1900-9262, 30MHz ~20GHz
	
WCDMA 850-4183, 30MHz ~9GHz	WCDMA 1900-9400, 30MHz ~20GHz
	
WCDMA 850-4233, 30MHz ~9GHz	WCDMA 1900-9538, 30MHz ~20GHz
	

WCDMA 1700-1312, 30MHz ~18GHz	WCDMA 1700-1413, 30MHz ~18GHz
	
WCDMA 1700-1513, 30MHz ~18GHz	
	

2.6. Radiated Spurious Emission

2.6.1. Requirement

The radiated spurious emission was measured by substitution method according to ANSI/TIA-603-E-2016.

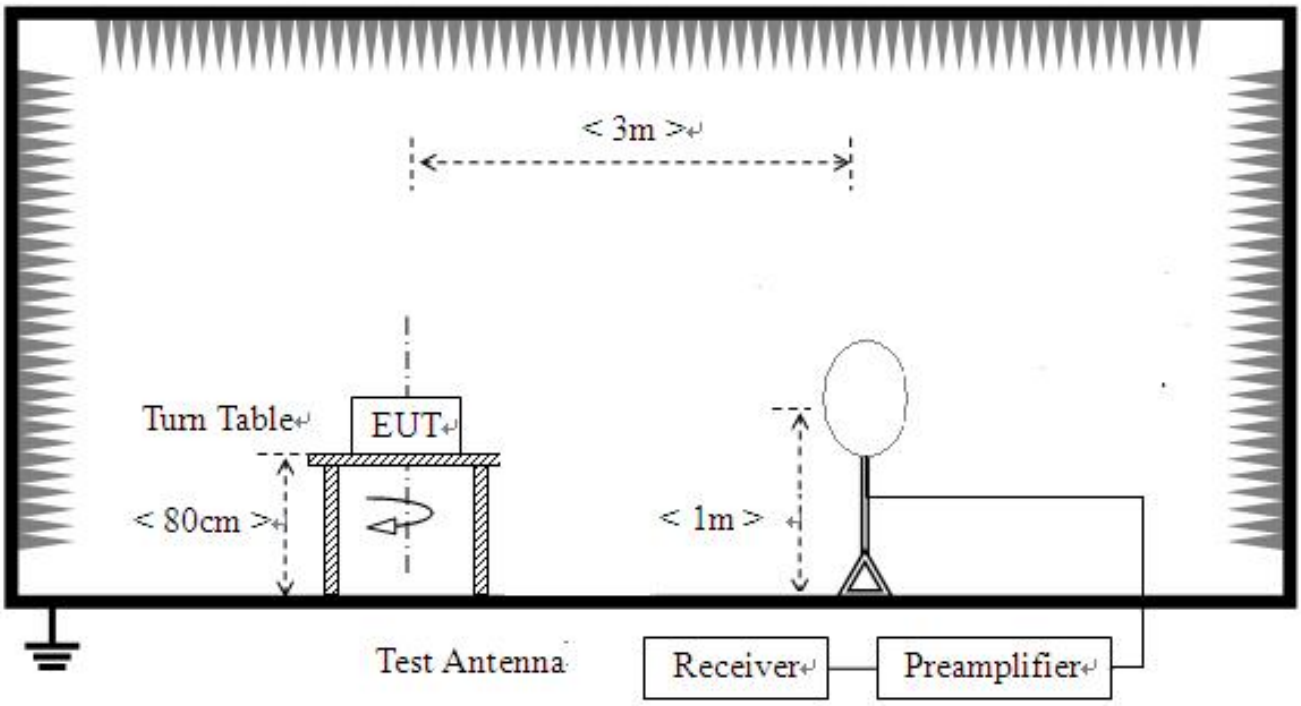
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

2.6.2. Measuring Instruments

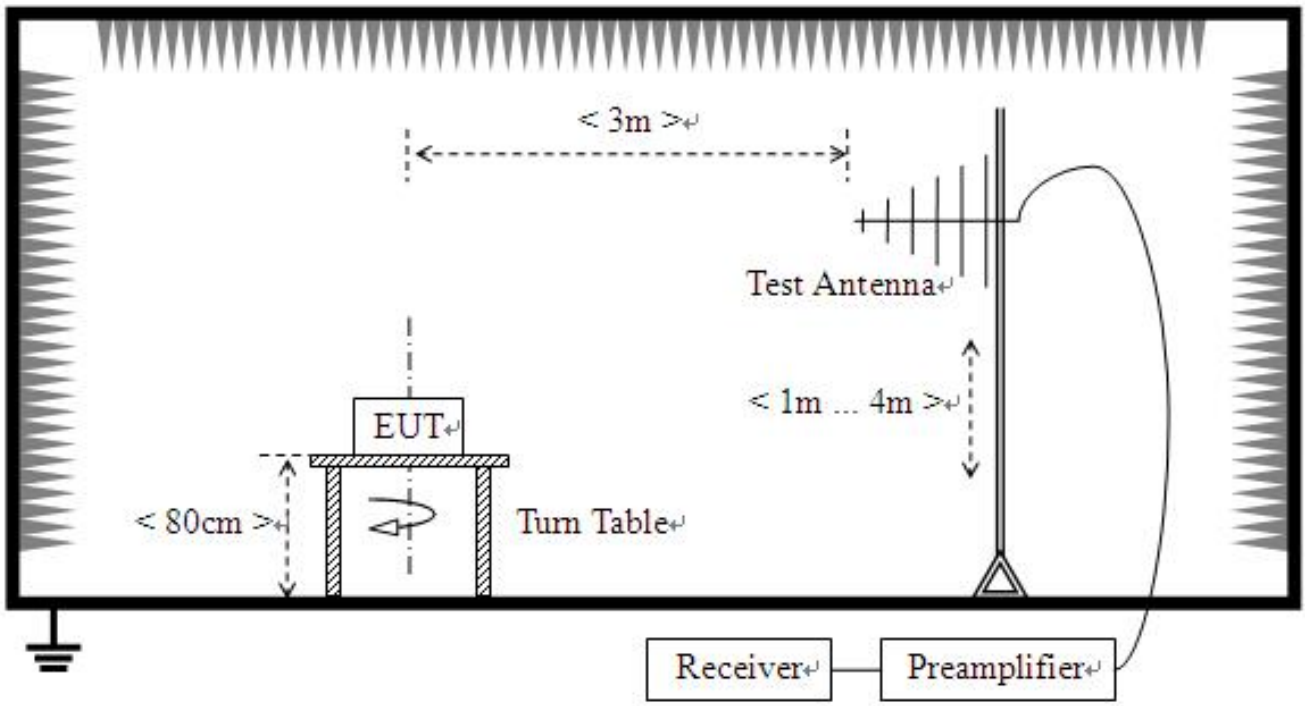
The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup

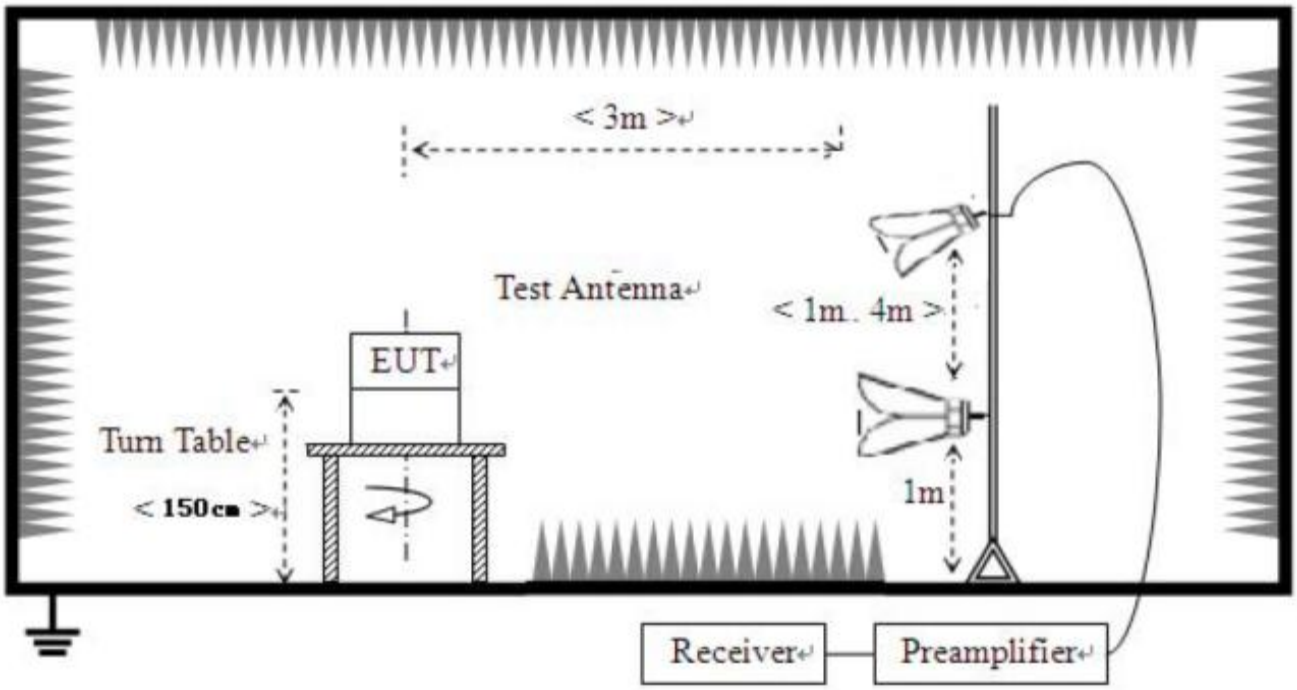
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.6.4. Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter (for below 1GHz) / 1.5 meters (for above 1GHz) above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. This device employs GMSK and 8PSK technology with GSM, GPRS and EGPRS capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.
12. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.
13. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.
13. The spectrum is measured from 9 kHz to the 10^{th} harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.

2.6.5. Test Result of Radiated Spurious Emission

Note: 1. The emission levels of above 18GHz are lower than the limit 20dB and not show in test report.

Note: 2. Absolute Level = Reading Level + Factor.

Note: 3. Worst-Case test data provide as below.

30MHz~10GHz: GSM 850 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	31.9406	-97.77	-74.15	-13.00	61.15	23.62	Horizontal
2	69.7833	-96.95	-77.44	-13.00	64.44	19.51	Horizontal
3	84.985	-100.60	-81.18	-13.00	68.18	19.42	Horizontal
4	2972.98	-57.73	-51.42	-13.00	38.42	6.31	Horizontal
5	4833.91	-59.63	-45.29	-13.00	32.29	14.34	Horizontal
6	7151.07	-59.27	-40.63	-13.00	27.63	18.64	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.9346	-95.36	-75.80	-13.00	62.80	19.56	Vertical
2	70.1067	-97.81	-76.44	-13.00	63.44	21.37	Vertical
3	85.9553	-97.69	-74.61	-13.00	61.61	23.08	Vertical
4	1868.43	-54.27	-53.75	-13.00	40.75	0.52	Vertical
5	2408.70	-54.75	-51.50	-13.00	38.50	3.25	Vertical
6	7619.30	-60.13	-39.75	-13.00	26.75	20.38	Vertical

30MHz~20GHz: PCS 1900 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.7769	-96.83	-77.56	-13.00	64.56	19.27	Horizontal
2	515.242	-103.54	-71.12	-13.00	58.12	32.42	Horizontal
3	671.005	-103.43	-68.74	-13.00	55.74	34.69	Horizontal
4	4905.95	-59.49	-44.77	-13.00	31.77	14.72	Horizontal
5	7509.75	-60.18	-40.09	-13.00	27.09	20.09	Horizontal
6	12342.1	-60.23	-34.99	-13.00	21.99	25.24	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	53.7769	-93.68	-74.38	-13.00	61.38	19.30	Vertical
2	67.3637	-96.74	-75.83	-13.00	62.83	20.91	Vertical
3	85.3177	-97.26	-74.53	-13.00	61.53	22.73	Vertical
4	5093.54	-58.44	-43.86	-13.00	30.86	14.58	Vertical
5	7674.83	-59.74	-40.23	-13.00	27.23	19.51	Vertical
6	12492.2	-61.24	-34.77	-13.00	21.77	26.47	Vertical

30MHz~18GHz: WCDMA 850 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30.0	-98.40	-74.33	-13.00	61.33	24.07	Horizontal
2	53.3033	-97.46	-77.95	-13.00	64.95	19.51	Horizontal
3	69.8098	-98.63	-79.12	-13.00	66.12	19.51	Horizontal
4	7704.35	-59.27	-39.97	-13.00	26.97	19.30	Horizontal
5	11044.5	-60.96	-38.18	-13.00	25.18	22.78	Horizontal
6	17191.0	-64.40	-36.18	-13.00	23.18	28.22	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	31.9419	-99.48	-78.12	-13.00	65.12	21.36	Vertical
2	69.8098	-99.10	-77.76	-13.00	64.76	21.34	Vertical
3	90.2002	-101.35	-77.76	-13.00	64.76	23.59	Vertical
4	7434.71	-60.25	-40.56	-13.00	27.56	19.69	Vertical
5	10329.1	-60.86	-39.09	-13.00	26.09	21.77	Vertical
6	17306.6	-64.91	-36.08	-13.00	23.08	28.83	Vertical

30MHz~18GHz: WCDMA 1900 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30.0	-99.32	-75.32	-13.00	62.32	24.00	Horizontal
2	53.3033	-97.74	-78.48	-13.00	65.48	19.26	Horizontal
3	71.7518	-98.96	-79.64	-13.00	66.64	19.32	Horizontal
4	5086.08	-58.87	-44.32	-13.00	31.32	14.55	Horizontal
5	7132.13	-59.01	-40.61	-13.00	27.61	18.40	Horizontal
6	11668.6	-61.10	-37.74	-13.00	24.74	23.36	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30	-98.23	-76.69	-13.00	63.69	21.54	Vertical
2	53.3033	-96.91	-77.67	-13.00	64.67	19.24	Vertical
3	68.8388	-96.94	-75.86	-13.00	62.86	21.08	Vertical
4	5090.09	-58.13	-43.56	-13.00	30.56	14.57	Vertical
5	7858.85	-60.04	-40.61	-13.00	27.61	19.43	Vertical
6	10886.8	-61.30	-38.26	-13.00	25.26	23.04	Vertical

30MHz~20GHz: WCDMA 1700 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30.3234	-98.88	-74.96	-36.00	38.96	23.92	Horizontal
2	53.9346	-96.88	-77.61	-36.00	41.61	19.27	Horizontal
3	69.7833	-97.17	-77.81	-36.00	41.81	19.36	Horizontal
4	5094.71	-58.71	-44.12	-30.00	14.12	14.59	Horizontal
5	7505.40	-60.81	-40.69	-30.00	10.69	20.12	Horizontal
6	10196.9	-60.79	-38.04	-30.00	8.04	22.75	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30.3234	-97.72	-76.23	-36.00	40.23	21.49	Vertical
2	56.1987	-97.97	-78.38	-36.00	42.38	19.59	Vertical
3	85.9553	-99.10	-76.29	-36.00	40.29	22.81	Vertical
4	4995.24	-58.64	-44.44	-30.00	14.44	14.20	Vertical
5	7585.36	-59.69	-39.95	-30.00	9.95	19.74	Vertical
6	10132.5	-61.12	-38.47	-30.00	8.47	22.65	Vertical

2.7. Frequency Stability

2.7.1. Requirement

According to FCC requirement, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency. According to FCC section 2.1055, the test conditions are:

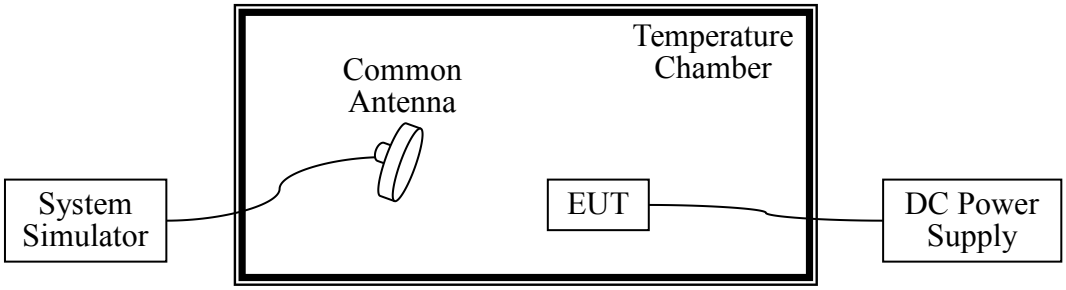
(1) The temperature is varied from -30° C to +50°C at intervals of not more than 10°C.

(2) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup



2.7.4. Test Procedures

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. The nominal, highest and lowest extreme voltages were tested, which are specified by the applicant; the normal temperature here used is 25°C.
5. The variation in frequency was measured for the worst case.

2.7.5. Test Result of Frequency Stability

GSM 850 Channel=190, Frequency=836.6 MHz					
Power (V_{DC})	Temperature (℃)	GSM Deviation (ppm)	EDGE Deviation (ppm)	Limit(ppm)	Result
3.80	-30	0.0045	0.0041	±2.5	PASS
	-20	0.0041	0.0038		
	-10	0.0035	0.0036		
	0	0.0039	0.0032		
	+10	0.0028	0.0024		
	+20	0.0031	0.0036		
	+30	0.0054	0.0058		
	+40	0.0036	**0.0069**		
	+50	**0.0071**	0.0047		
3.60	+25	0.0049	0.0051		
4.35	+25	0.0035	0.0044		

PCS 1900 Channel=661, Frequency=1880.0 MHz					
Power (V_{DC})	Temperature (℃)	GSM Deviation (ppm)	EDGE Deviation (ppm)	Limit(ppm)	Result
3.80	-30	0.0045	0.0041	Within authorized band for PCS 1900	PASS
	-20	0.0059	0.0045		
	-10	0.0042	0.0032		
	0	0.0038	0.0044		
	+10	0.0052	0.0041		
	+20	0.0044	**0.0066**		
	+30	0.0035	0.0051		
	+40	0.0045	0.0049		
	+50	**0.0068**	0.0035		
3.60	+25	0.0047	0.0039		
4.35	+25	0.0032	0.0059		

WCDMA Band V, RMC 12.2Kbps, Channel=4183, Frequency=836.6 MHz				
Power (V_{DC})	Temperature (℃)	Deviation (ppm)	Limit(ppm)	Result
3.80	-30	0.0058	±2.5	PASS
	-20	0.0051		
	-10	0.0042		
	0	0.0043		
	+10	0.0036		
	+20	0.0032		
	+30	0.0048		
	+40	**0.0067**		
	+50	0.0041		
3.60	+25	0.0054		
4.35	+25	0.0049		

WCDMA Band II, RMC 12.2Kbps, Channel=9400, Frequency=1880.0 MHz				
Power (V_{DC})	Temperature (℃)	Deviation (ppm)	Limit(ppm)	Result
3.80	-30	0.0055	Within authorized band for WCDMA II	PASS
	-20	0.0048		
	-10	0.0056		
	0	0.0049		
	+10	0.0035		
	+20	0.0048		
	+30	0.0047		
	+40	0.0052		
	+50	0.0061		
3.60	+20	0.0043		
4.35	+20	**0.0068**		

WCDMA Band IV, RMC 12.2Kbps, Channel=1413, Frequency=1732.6 MHz				
Power (V_{DC})	Temperature (℃)	Deviation (ppm)	Limit(ppm)	Result
12.0	-30	0.0061	Within authorized band for WCDMA IV	PASS
	-20	**0.0072**		
	-10	0.0058		
	0	0.0052		
	+10	0.0044		
	+20	0.0051		
	+30	0.0045		
	+40	0.0047		
	+50	0.0069		
10.2	+20	0.0043		
13.8	+20	0.0053		

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2022.07.21	2023.07.20
2	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2019.03.25	2023.03.24
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2020.06.19	2023.06.18
5	EMI Horn Ant. (1-18G)	ETC	1209	A150402241	2021.01.02	2024.01.01
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2020.06.19	2023.06.18
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2022.12.13	2023.12.12
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2022.12.13	2023.12.12
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2022.03.25	2023.03.24
10	Test Receiver	R&S	ESIB7	A0501375	2022.04.18	2023.04.17
11	Broadband Ant.	2786	ETC	A150402240	2021.09.16	2024.03.03
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2019.03.26	2023.03.25
13	Temperature chamber	TABAI	PS-232	A8708054	2022.08.18	2023.08.17
14	Wideband Radio Communication tester	R&S	CMW500	A130101034	2022.06.23	2023.06.22
15	Wideband Radio Communication tester	R&S	CMW500	A150802214	2022.06.17	2023.06.16
16	Test Receiver	KEYSIGHT	N9038A	A141202036	2022.07.21	2023.07.20
17	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2022.07.21	2023.07.20
18	Cable	MATCHING PAD	W7	/	2022.07.21	2023.07.20

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (9kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.5dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.91dB

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.9dB

Uncertainty of RF Conducted Measurement (9kHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	1.2dB

** END OF REPORT **