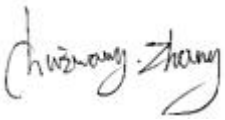
RF TEST REPORT

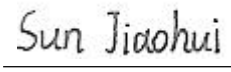
Report No.:	20240417G06070X-W6
Product Name:	AI Safety System
Model No.:	Mobile360 M500-T
FCC ID:	NCI-M360-M500-T
IC:	6673A-M500-T
Applicant:	VIA Technologies, Inc
Address:	8F., NO. 535, ZHONGZHENG RD., XINDIAN DIST., NEW TAIPEI CITY 23148, TAIWAN
Dates of Testing:	04/12/2024 - 06/04/2024
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. **Tel**：86 755 26627338 **E-Mail**：manager@ccic-set.com

Test Report

Product.....:	AI Safety System
Brand Name.....:	VIA
Trade Name .....:	VIA
Applicant.....:	VIA Technologies, Inc
Applicant Address.....:	8F., NO. 535, ZHONGZHENG RD., XINDIAN DIST., NEW TAIPEI CITY 23148, TAIWAN
Manufacturer.....:	VIA Technologies, Inc
Manufacturer Address.....:	8F., NO. 535, ZHONGZHENG RD., XINDIAN DIST., NEW TAIPEI CITY 23148, TAIWAN
Test Standards.....:	47 CFR Part 2/22/24/27 RSS-Gen, Issue 5: Feb 2021 RSS-132, Issue 4: Jan 2023 RSS-133, Issue 6: Jan 2018 RSS-139-Issue 4: Sep 2022
Test Result.....:	Pass

Tested by .....:  2024.06.04

Chuiwang Zhang, Test Engineer

Reviewed by.....:  2024.06.04

Sun Jiaohui, Senior Engineer

Approved by.....:  2024.06.04

Chris You, Manager

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Change History		
Issue	Date	Reason for change
1.0	2024.06.04	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	AI Safety System	
Model No.	Mobile360 M500-T	
Hardware Version	RA	
Software Version	v0.6.1	
EUT supports Radios application	WCDMA/HSPA	
Frequency Range	WCDMA 850:	Tx: 826.4 - 846.6MHz (at intervals of 200kHz); Rx: 871.4 - 891.6MHz (at intervals of 200kHz)
	WCDMA 1700:	Tx: 1712.4 - 1752.6MHz (at intervals of 200kHz); Rx: 2112.4 - 2152.6MHz (at intervals of 200kHz)
	WCDMA 1900:	Tx: 1852.4 - 1907.6MHz (at intervals of 200kHz); Rx: 1932.4 - 1987.6MHz (at intervals of 200kHz)
Maximum Output Power to Antenna	WCDMA 850: 24.53dBm WCDMA 1700: 24.153dBm WCDMA 1900: 24.52dBm	
Type of Modulation	WCDMA: QPSK(Uplink) HSDPA: QPSK(Uplink) HSUPA: QPSK(Uplink)	
Antenna Type	External Antenna	
Antenna gain	WCDMA 850: -1.22 dBi WCDMA 1700: 1.12 dB WCDMA 1900: 2.62 dBi	
Power supply	9~36V DC Power Supply	

Note 1: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

1.2. Maximum ERP/EIRP, Frequency Tolerance and Emission Designator

System	Type of Modulation	Emission Designator	Frequency Tolerance (ppm)	Maximum EIRP/ERP(W)
WCDMA 850	QPSK	4M15F9W	0.0108	0.131
WCDMA 1700	QPSK	4M14F9W	0.0104	0.337
WCDMA 1900	QPSK	4M14F9W	-0.0101	0.518

1.3. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC/IC certification standards:

No.	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22	Public Mobile Services
3	47 CFR Part 24	Personal Communications Services
4	47 CFR Part 27	Miscellaneous Wireless Communications Services
5	RSS-Gen-Issue 5: Feb 2021	General Requirements for Compliance of Radio Apparatus
6	RSS-132-Issue 4: Jan 2023	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
7	RSS-133-Issue 6: Jan 2018	2 GHz Personal Communications Services
8	RSS-139-Issue 4: Sep 2022	Advanced Wireless Services Equipment Operating in the Bands 1710-1780 MHz and 2110-2200 MHz
9	KDB 971168 D01 Power Meas License Digital Systems v03r01	Measurement Guidance For Certification of Licensed Digital Transmitters
12	KDB 412172 D01 Determining ERP and EIRP v01r01	Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) of an RF Transmitting Systems
13	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
14	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

Test detailed items/section required by FCC/IC rules and results are as below:

No.	FCC Rule	IC Rule	Description	Limit	Result
1	2.1046	RSS-GEN, 6.12	Conducted Output Power	Reporting Only	PASS[Note3]
2	22.913(a)(5)	RSS-132,5.4	Effective Radiated Power (W850)	ERP < 7Watts	PASS
	24.232 (c)	RSS-133,6.4	Equivalent Isotropic Radiated Power	EIRP < 2Watts	PASS
	27.50(d)(4)	RSS-139,6.5	Equivalent Isotropic Radiated Power	EIRP < 1Watts	PASS
3	22.913(d) 24.232(d) 27.50(d)(5)	RSS-132,5.4 RSS-133,6.4 RSS-139,6.5	Peak to Average Radio	< 13dBm	PASS[Note3]
4	2.1049	RSS-GEN,6.7	Occupied Bandwidth	Reporting Only	PASS[Note3]
5	2.1055 22.355 24.235 27.54	RSS-GEN, 6.11 RSS-132, 5.3 RSS-133, 6.3 RSS-139, 6.4	Frequency Stability (FCC W850, IC W1900)	< ±2.5ppm	PASS[Note3]
			Frequency Stability (FCC W1900, IC W850, W1700)	Within the Authorized Band	PASS[Note3]
6	2.1051 22.917 24.238 27.53	RSS-GEN,6.13 RSS-132,5.5 RSS-133,6.5 RSS-139,6.6	Conducted Spurious Emission and Conducted Band Edge	< $43+10\log_{10}$ (P[Watts])	PASS[Note3]
7	2.1053 22.917 24.238 27.53	RSS-GEN,6.13 RSS-132,5.5 RSS-133,6.5 RSS-139,6.6	Radiated Spurious Emissions	< $43+10\log_{10}$ (P[Watts])	PASS

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B and ICES-003 Issue 7 October 2020, recorded in a separate test report.

3. Please refer to FCC ID: QIPPLS83-W, IC: 7830A-PLS83-W, Report number is 200722013RFM-1.

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1.4. Test Configuration of Equipment Under Test

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three(X: flat, Y: portrait, Z: landscape) different orthogonal test planes to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 9000 MHz for WCDMA Band V.
2. 30 MHz to 20000 MHz for WCDMA Band II.
3. 30 MHz to 18000 MHz for WCDMA Band IV.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
WCDMA Band V	RMC 12.2kbps Link	RMC 12.2kbps Link
WCDMA Band II	RMC 12.2kbps Link	RMC 12.2kbps Link
WCDMA Band IV	RMC 12.2kbps Link	RMC 12.2kbps Link

Note: The maximum power levels are chosen to test as the worst case configuration as follows:

RMC 12.2kbps mode for WCDMA band V,

RMC 12.2kbps mode for WCDMA band II,

RMC 12.2kbps mode for WCDMA band IV, only these modes were used for all tests.

1.5. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15℃- 35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86kPa-106kPa

1.6. Laboratory Facilities

FCC-Registration No.: 406086

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

ISED Registration: 11185A

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.

CAB number: CN0064

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

2. 47 CFR Part 2 and RSS-Gen Requirements

2.1. Conducted Output Power and ERP/EIRP

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

The EIRP of mobile transmitters must not exceed 2 Watts for W1900.

The EIRP of mobile transmitters must not exceed 1 Watts for W1700.

The ERP of mobile transmitters must not exceed 7 Watts for W850.

According to KDB 412172 D01 Determining ERP and EIRP v01r01.

$EIRP = P_T + {}_{GT} - L_C$, $ERP = EIRP - 2.15$, where

P_T = transmitter output power in dBm;

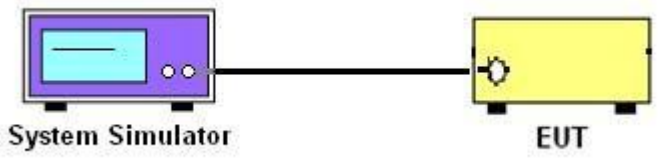
G_T = gain of the transmitting antenna in dBi;

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB.

2.1.2. Measuring Instruments

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

2.1.3. Test Setup



2.1.4. Test Procedures

1. The transmitter output port was connected to the system simulator.

2. Set EUT at maximum power through system simulator.

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

2.1.5. Test Results of Conducted Output Power and ERP/EIRP

WCDMA 850							
EUT Mode		Average power (dBm)			Ant. Gain (dBi)	Max. ERP (dBm)	ERP Limit (dBm)
		4132	4183	4233			
		826.4MHz	836.6MHz	846.6MHz			
RMC	12.2 kbps	24.38	24.39	24.53	-1.22	21.16	38.45
HSDPA	Subtest 1	22.56	22.60	22.76			
	Subtest 2	22.07	22.11	22.01			
	Subtest 3	20.29	20.32	20.31			
	Subtest 4	20.13	20.25	20.33			
HSUPA	Subtest 1	22.70	22.93	22.94			
	Subtest 2	22.49	22.85	22.37			
	Subtest 3	22.09	22.14	22.47			
	Subtest 4	22.21	22.29	22.32			
	Subtest 5	23.15	23.16	23.35			

WCDMA 1700							
EUT Mode		Average power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
		1312	1413	1513			
		1712.4MHz	1732.6MHz	1752.6MHz			
RMC	12.2 kbps	24.06	24.15	23.94	1.12	25.27	30.00
HSDPA	Subtest 1	23.15	23.02	23.08			
	Subtest 2	21.25	21.23	21.17			
	Subtest 3	19.95	19.89	19.87			
	Subtest 4	19.89	19.93	19.83			
HSUPA	Subtest 1	22.96	22.93	22.88			
	Subtest 2	22.49	22.57	22.70			
	Subtest 3	22.82	22.64	22.29			
	Subtest 4	23.04	23.15	23.02			
	Subtest 5	23.24	23.40	23.32			

WCDMA 1900							
EUT Mode		Average power (dBm)			Ant. Gain (dBi)	Max. EIRP (dBm)	EIRP Limit (dBm)
		9262	9400	9538			
		1852.4MHz	1880.0MHz	1907.6MHz			
RMC	12.2 kbps	24.46	24.52	24.34	2.62	27.14	33
HSDPA	Subtest 1	23.27	23.14	22.96			
	Subtest 2	21.66	21.53	21.58			
	Subtest 3	20.71	20.65	20.40			
	Subtest 4	20.36	20.55	20.49			
HSUPA	Subtest 1	22.44	22.54	22.04			
	Subtest 2	22.28	22.12	22.43			
	Subtest 3	22.17	22.18	22.03			
	Subtest 4	22.15	22.14	22.15			
	Subtest 5	23.16	23.19	23.05			

2.2. Radiated Spurious Emission

2.2.1. Requirement

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

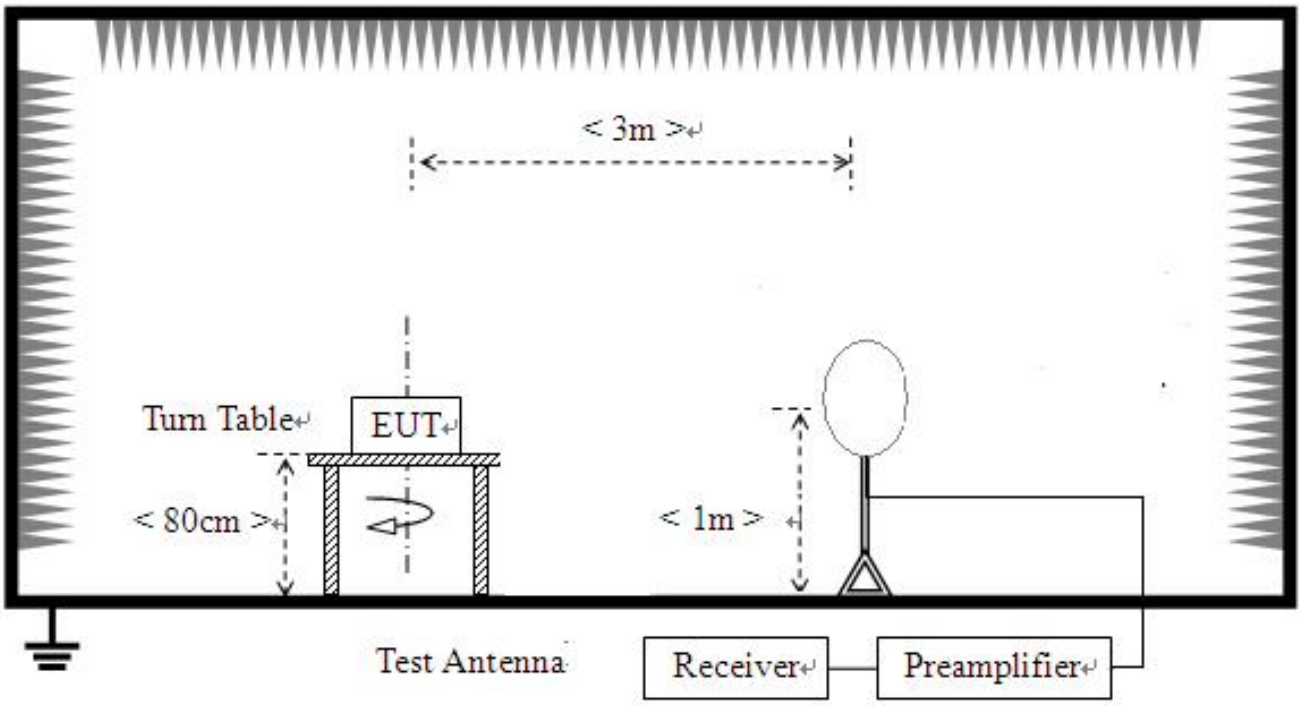
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

2.2.2. Measuring Instruments

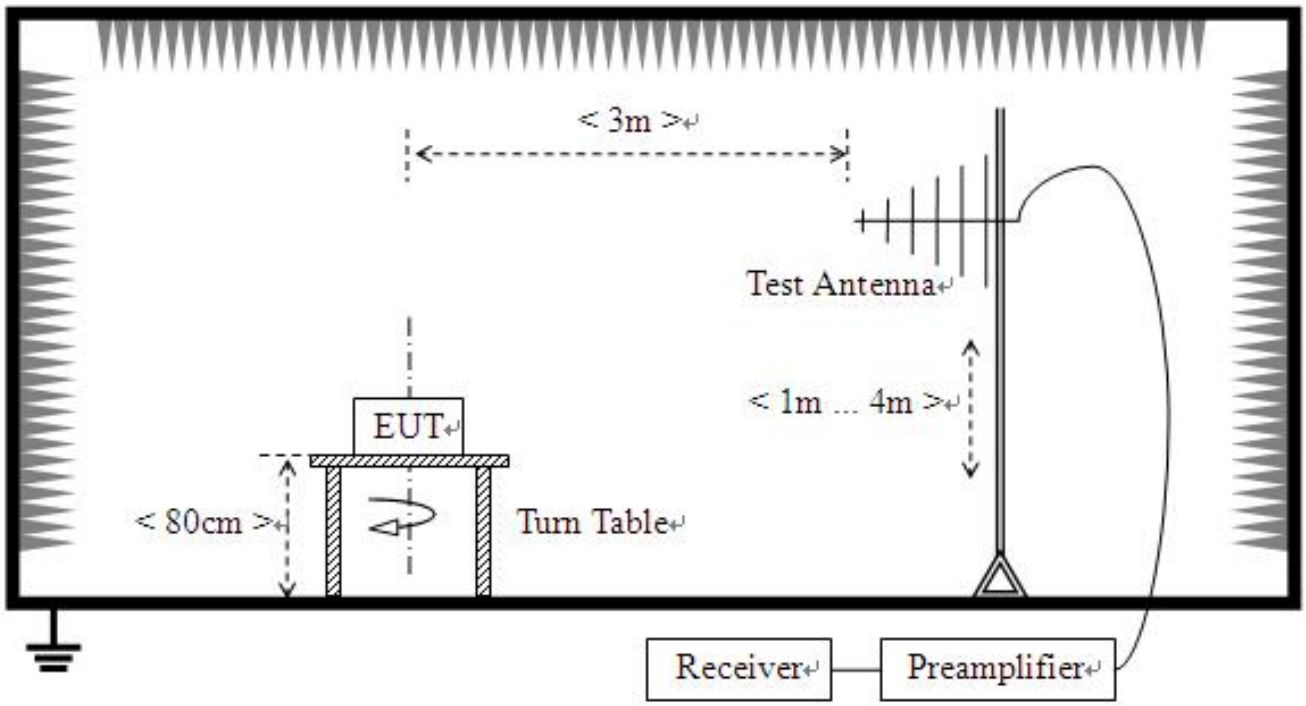
The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup

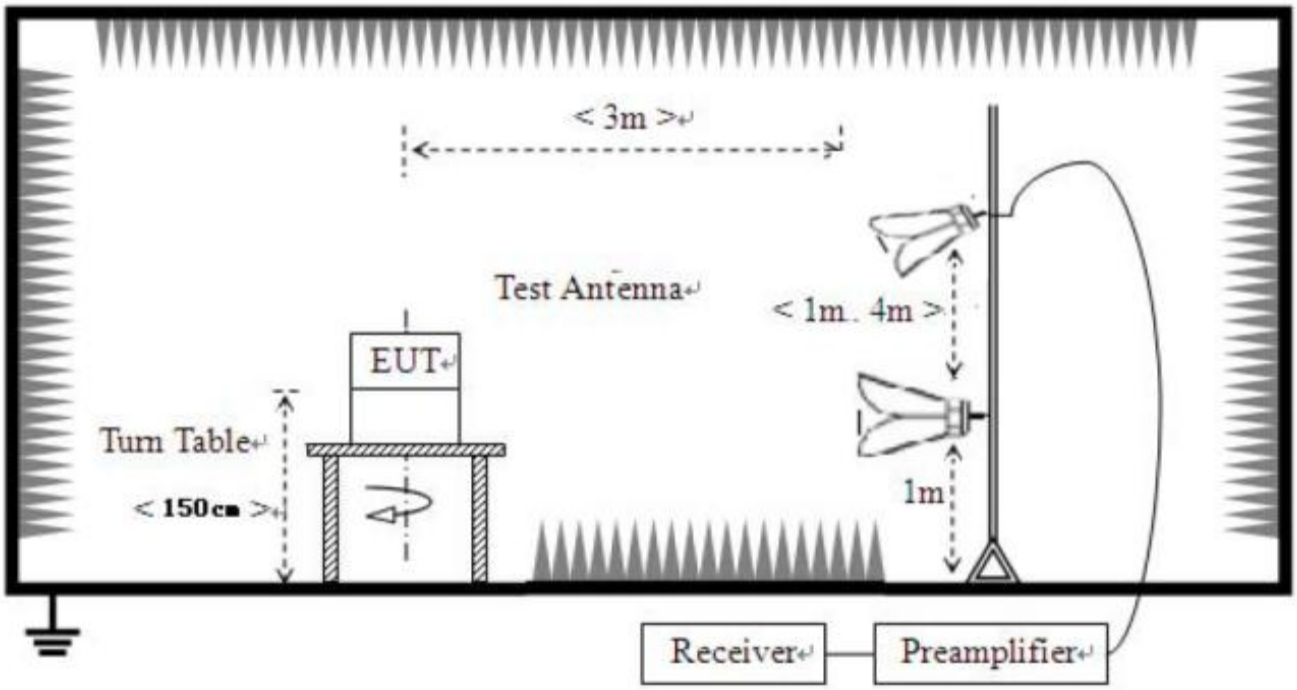
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



2.2.4. 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.

2.2.5. 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~18GHz: WCDMA 850 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	51.99	-98.64	-79.14	-13.00	66.14	19.50	Horizontal
2	84.66	-99.67	-80.25	-13.00	67.25	19.42	Horizontal
3	199.48	-105.52	-81.65	-13.00	68.65	23.87	Horizontal
4	509.66	-103.89	-70.83	-13.00	57.83	33.06	Horizontal
5	1672.34	-47.47	-48.27	-13.00	35.27	-0.80	Horizontal
6	4821.91	-58.55	-44.21	-13.00	31.21	14.34	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	63.31	-99.19	-78.56	-13.00	65.56	20.63	Vertical
2	140.29	-105.13	-84.12	-13.00	71.12	21.01	Vertical
3	529.39	-105.08	-73.39	-13.00	60.39	31.69	Vertical
4	1672.34	-49.51	-50.31	-13.00	37.31	-0.80	Vertical
5	3849.42	-59.64	-51.27	-13.00	38.27	8.37	Vertical
6	7235.12	-60.63	-41.70	-13.00	28.70	18.93	Vertical

30MHz~18GHz: WCDMA 1900 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	52.81	-94.28	-75.02	-13.00	62.02	19.26	Horizontal
2	202.75	-106.37	-83.01	-13.00	70.01	23.36	Horizontal
3	651.60	-104.39	-69.56	-13.00	56.56	34.83	Horizontal
4	1556.19	-58.09	-56.98	-13.00	43.98	1.11	Horizontal
5	3765.38	-48.92	-40.99	-13.00	27.99	7.93	Horizontal
6	14173.0	-64.40	-33.91	-13.00	20.91	30.49	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	40.19	-100.80	-80.68	-13.00	67.68	20.12	Vertical
2	110.07	-100.97	-77.47	-13.00	64.47	23.50	Vertical
3	707.88	-105.05	-70.92	-13.00	57.92	34.13	Vertical
4	1266.76	-56.81	-57.29	-13.00	44.29	-0.48	Vertical
5	3765.38	-48.89	-40.96	-13.00	27.96	7.93	Vertical
6	12214.6	-61.43	-36.05	-13.00	23.05	25.38	Vertical

30MHz~20GHz: WCDMA 1700 Middle Channel							
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	78.25	-88.63	-69.37	-13.00	-56.37	19.26	Horizontal
2	110.37	-88.55	-69.13	-13.00	-56.13	19.42	Horizontal
3	240.52	-95.14	-73.24	-13.00	-60.24	21.90	Horizontal
4	4895.66	-52.41	-37.67	-13.00	-24.67	14.74	Horizontal
5	7844.23	-61.33	-41.97	-13.00	-28.97	19.36	Horizontal
6	14288.6	-67.21	-42.50	-13.00	-29.50	24.71	Horizontal
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	41.42	-91.22	-71.29	-13.00	-58.29	19.93	Vertical
2	110.24	-87.21	-63.35	-13.00	-50.35	23.86	Vertical
3	255.58	-98.31	-73.87	-13.00	-60.87	24.44	Vertical
4	2440.33	-52.54	-49.14	-13.00	-36.14	3.40	Vertical
5	7848.61	-60.33	-40.95	-13.00	-27.95	19.38	Vertical
6	13610.2	-62.14	-37.90	-13.00	-24.90	24.24	Vertical

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	2023.06.08	2024.06.07
2	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.06.09	2026.06.08
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2023.06.08	2024.06.07
5	EMI Horn Ant. (1-18G)	ETC	MCTD-1209	A150402241	2023.05.16	2026.05.15
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2024.03.31	2027.03.30
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-1000	A140101634	2023.10.20	2024.10.19
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2023.10.20	2024.10.19
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2024.01.18	2025.01.17
10	Test Receiver	R&S	ESIB7	A0501375	2024.02.28	2025.02.27
11	Broadband Ant.	ETC	MCTD 2786	A150402240	2023.05.22	2026.05.21
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.26
13	Constant Temperature Humidity Chamber	ESPEC	SU-642	A150802409	2024.02.22	2025.02.21
14	Wideband Radio Communication tester	R&S	CMW500	A130101034	2023.07.13	2024.07.12
15	Wideband Radio Communication tester	R&S	CMW500	A150802214	2023.06.01	2024.05.31
16	Test Receiver	KEYSIGHT	N9038A	A141202036	2023.06.12	2024.06.11
17	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2023.06.08	2024.06.07
18	Power Supply	R&S	WYJ-60100	A141102031	2023.07.12	2026.07.11

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 **