



FCC RADIO TEST REPORT

FCC ID : P4Q-N672B
Equipment : LTE Module
Brand Name : MITAC,MIO, Magellen,Teletrac Navman
Model Name : SC600T-NA
Applicant : Mitac Digital Technology Corp.
4F., NO. 1, R&D Road 2, Hsinchu Science
Park, 30076 Hsinchu,TAIWAN, R.O.C.
Manufacturer : Mitac Digital Technology Corp.
4F., NO. 1, R&D Road 2, Hsinchu Science
Park, 30076 Hsinchu,TAIWAN, R.O.C.
Standard : FCC 47 CFR Part 2, 22(H), 24(E), 27(L)

The product was received on May 30, 2022 and testing was performed from Jun. 23, 2022 to Jun. 30, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



Table of Contents

History of this test report..... 3

Summary of Test Result..... 4

1 General Description 5

 1.1 Product Feature of Equipment Under Test 5

 1.2 Modification of EUT 6

 1.3 Testing Location 7

 1.4 Applicable Standards 7

2 Test Configuration of Equipment Under Test 8

 2.1 Test Mode..... 8

 2.2 Connection Diagram of Test System 9

 2.3 Support Unit used in test configuration 9

 2.4 Frequency List of Low/Middle/High Channels 9

3 Conducted Test Result 10

 3.1 Measuring Instruments..... 10

 3.2 Conducted Output Power and ERP/EIRP 11

4 Radiated Test Items 12

 4.1 Measuring Instruments..... 12

 4.2 Test Setup 12

 4.3 Test Result of Radiated Test..... 13

 4.4 Field Strength of Spurious Radiation Measurement 14

5 List of Measuring Equipment..... 15

6 Uncertainty of Evaluation 16

Appendix A. Test Results of Conducted Test

Appendix B. Test Results of Radiated Test

Appendix C. Test Setup Photographs



History of this test report

Report No.	Version	Description	Issue Date
FG000714-06A	01	Initial issue of report	Jul. 21, 2022
FG000714-06A	02	Revise Summary of Test Result, Product Feature of Equipment Under Test and Test Mode	Jul. 27, 2022



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Pass	-
	§22.913 (a)(5)	Effective Radiated Power (WCDMA Band V)		
	§24.232 (c)	Equivalent Isotropic Radiated Power (WCDMA Band II)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (WCDMA Band IV)		
-	§24.232 (d)	Peak-to-Average Ratio	Not Required	-
-	§2.1049 §22.917 (b) §24.238 (b) §27.53 (g)	Occupied Bandwidth (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Not Required	-
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Band Edge Measurement (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Not Required	-
-	§2.1051 §22.917 (a) §24.238 (a) §27.53 (g)	Conducted Emission (WCDMA Band V) (WCDMA Band II) (WCDMA Band IV)	Not Required	-
-	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	Not Required	-
4.4	§2.1053 §27.53 (h)	Field Strength of Spurious Radiation (WCDMA Band IV)	Pass	31.71 dB under the limit at 3426.000 MHz

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by adding SKU. All the test cases were performed on original report which can be referred to Sporton Report Number FG0D1806A. Based on the original report, the test cases were verified.

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Yun Huang

Report Producer: Lucy Wu



1 General Description

1.1 Product Feature of Equipment Under Test

WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, and GNSS.

Product Feature	
Sample 1	EUT with Host 1
Sample 2	EUT with Host 2
Sample 3	EUT with Host 3
Sample 4	EUT with Host 4
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS / Glonass : Patch Antenna
Antenna Gain	Cellular Band: -4.7 dBi PCS Band: -4.1 dBi AWS Band: -3.3 dBi

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

The product was installed into Tablet (Brand Name: MITAC,MIO, Magellen,Teletrac Navman, Model Name: N672B) during test, and the host information was recorded in the following table.

Host Information	
Host 1	Host with SKU A
Host 2	Host with SKU B
Host 3	Host with SKU E
Host 4	Host with SKU F

Functions	SKU A	SKU B
Screen	5" 720x1280 (HD), IPS, 350nits (w/ touch)	5" 720x1280 (HD), IPS, 350nits (w/ touch)
CPU	SD625 octa core 2.0GHz	SD625 octa core 2.0GHz
Battery	4110mAh (hard pack)	4110mAh (hard pack)
RAM	3GB	3GB
Storage	32GB	32GB
External storage	Support	Support
WWAN + WLAN Module	Support (SC600T-NA)	Support (SC600T-NA)
NFC/RFID(HF)	Support	Support
GPS	Support	Support
Barcode	Support(N6603)	Support(N3601)



Functions	SKU C	SKU D
Screen	5" 720x1280 (HD), IPS, 350nits (w/ touch)	5" 720x1280 (HD), IPS, 350nits (w/ touch)
CPU	SD625 octa core 2.0GHz	SD625 octa core 2.0GHz
Battery	4110mAh (hard pack)	4110mAh (hard pack)
RAM	2GB	2GB
Storage	16GB	16GB
External storage	Support	Support
WWAN + WLAN Module	Support (SC600T-NA)	Support (SC600T-NA)
NFC/RFID(HF)	Support	Support
GPS	Support	Support
Barcode	Support(N6603)	Support(N3601)

Functions	SKU E	SKU F
Screen	5" 720x1280 (HD), IPS, 350nits (w/ touch)	5" 720x1280 (HD), IPS, 350nits (w/ touch)
CPU	SD625 octa core 2.0GHz	SD625 octa core 2.0GHz
Battery	4110mAh (hard pack)	4110mAh (hard pack)
RAM	3GB	3GB
Storage	32GB	32GB
External storage	Support	Support
WWAN + WLAN Module	Support (SC600T-NA)	Support (SC600T-NA)
NFC/RFID(HF)	Support	Not Support
GPS	Support	Support
Barcode	Not Support	Not Support

1.2 Modification of EUT

No modifications made to the EUT during the testing.



1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	TH03-HY	03CH07-HY
Test Engineer	Cotty Hsu	Stan Hsieh and Ken Wu
Temperature (°C)	23~24	24.3~29.5
Relative Humidity (%)	46~47	57.4~63.7

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190

1.4 Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ FCC 47 CFR Part 2, 22(H), 24(E), 27(L)
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.



2 Test Configuration of Equipment Under Test

2.1 Test Mode

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

For radiated measurement, the measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.26 exploratory test procedures and find Y plane as worst plane.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 18000 MHz for WCDMA Band IV

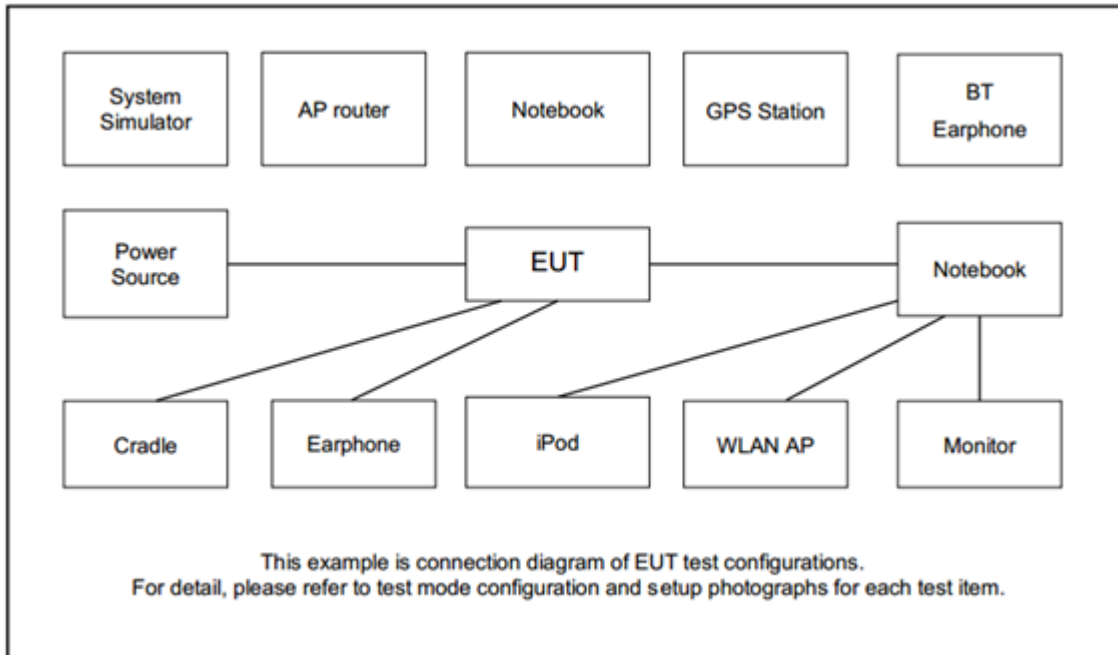
All modes, data rates and positions were investigated.

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

Test Modes	
Band	Radiated TCs
WCDMA Band IV	■ RMC 12.2Kbps Link

Remark: All the radiated test cases were performed with Sample 4.

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

Item	Equipment	Brand Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8821C	N/A	N/A	Unshielded, 1.8 m
2.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.4 Frequency List of Low/Middle/High Channels

Frequency List				
Band	Channel/Frequency(MHz)	Lowest	Middle	Highest
WCDMA Band V	Channel	4132	4182	4233
	Frequency	826.4	836.4	846.6
WCDMA Band II	Channel	9262	9400	9538
	Frequency	1852.4	1880.0	1907.6
WCDMA Band IV	Channel	1312	1413	1513
	Frequency	1712.4	1732.6	1752.6

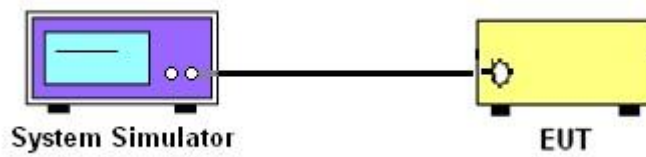
3 Conducted Test Result

3.1 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.1 Test Setup

3.1.2 Conducted Output Power



3.1.3 Test Result of Conducted Test

Please refer to Appendix A.



3.2 Conducted Output Power and ERP/EIRP

3.2.1 Description of the Conducted Output Power and ERP/EIRP

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 7 Watts for WCDMA Band V

The EIRP of mobile transmitters must not exceed 2 Watts for WCDMA Band II

The EIRP of mobile transmitters must not exceed 1 Watts for WCDMA Band IV

According to KDB 412172 D01 Power Approach,

$EIRP = P_T + G_T - L_C$, $ERP = EIRP - 2.15$, 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

3.2.2 Test Procedures

1. The transmitter output port is connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select the lowest, middle, and the highest channels for each band and different modulation.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

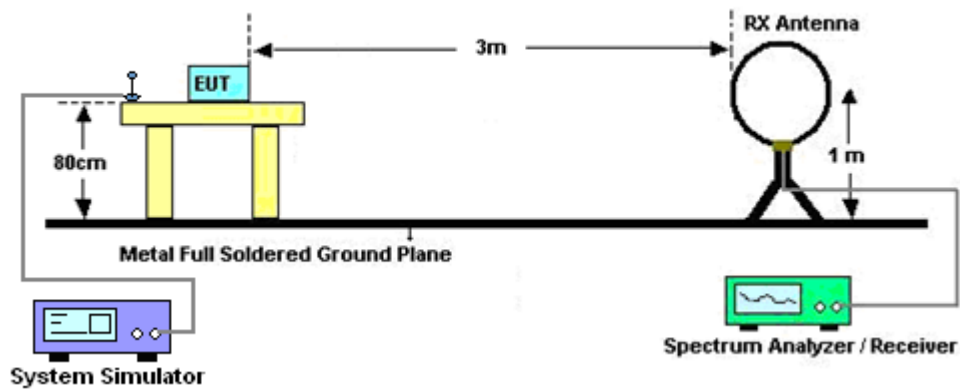
4 Radiated Test Items

4.1 Measuring Instruments

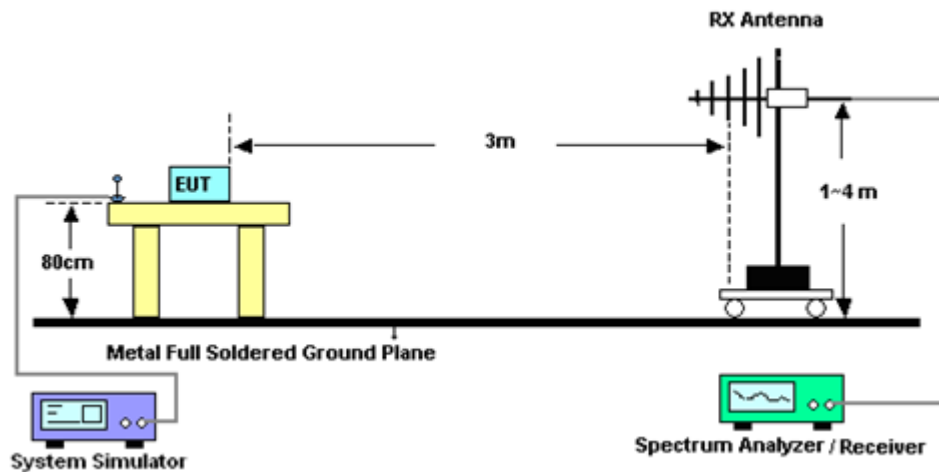
Please refer to the measuring equipment list in this test report.

4.2 Test Setup

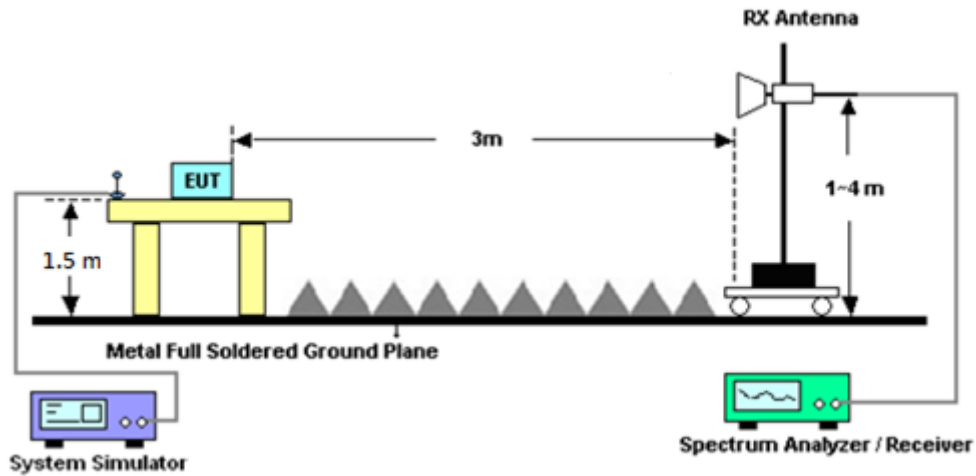
For radiated test below 30MHz



For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

Note:

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.



4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT is placed on a rotatable wooden table 0.8 meters for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz above the ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the antenna tower.
3. The table is 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 for the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1 MHz, VBW = 3 MHz, taking record of maximum spurious emission.
6. A horn antenna is substituted in place of the EUT and is driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Take the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. $EIRP (dBm) = S.G. Power - Tx Cable Loss + Tx Antenna Gain$
11. $ERP (dBm) = EIRP - 2.15$
12. The RF fundamental frequency shall be excluded against the limit line in the operating frequency band.
13. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)



5 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35419 & 03	30MHz~1GHz	Apr. 24, 2022	Jun. 23, 2022~Jun. 24, 2022	Apr. 23, 2023	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 07, 2022	Jun. 23, 2022~Jun. 24, 2022	Jan. 06, 2023	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 03, 2021	Jun. 23, 2022~Jun. 24, 2022	Dec. 02, 2022	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz~18GHz	Apr. 21, 2022	Jun. 23, 2022~Jun. 24, 2022	Apr. 20, 2023	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 04, 2021	Jun. 23, 2022~Jun. 24, 2022	Oct. 03, 2022	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Oct. 04, 2021	Jun. 23, 2022~Jun. 24, 2022	Oct. 03, 2022	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Jul. 22, 2021	Jun. 23, 2022~Jun. 24, 2022	Jul. 21, 2022	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15682/4	30MHz to 18GHz	Feb. 23, 2022	Jun. 23, 2022~Jun. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4	9kHz to 18GHz	Feb. 23, 2022	Jun. 23, 2022~Jun. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4	9kHz to 18GHz	Feb. 23, 2022	Jun. 23, 2022~Jun. 24, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126	532078/126E	30MHz~18GHz	Sep. 17, 2021	Jun. 23, 2022~Jun. 24, 2022	Sep. 16, 2022	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801606/2	9KHz ~ 40GHz	Apr. 14, 2022	Jun. 23, 2022~Jun. 24, 2022	Apr. 13, 2023	Radiation (03CH07-HY)
Controller	EMEC	EM1000	N/A	Control Ant Mast	N/A	Jun. 23, 2022~Jun. 24, 2022	N/A	Radiation (03CH07-HY)
Controller	MF	MF-7802	N/A	Control Turn table	N/A	Jun. 23, 2022~Jun. 24, 2022	N/A	Radiation (03CH07-HY)
Antenna Mast	EMEC	AM-BS-4500E	N/A	Boresight mast 1M~4M	N/A	Jun. 23, 2022~Jun. 24, 2022	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Jun. 23, 2022~Jun. 24, 2022	N/A	Radiation (03CH07-HY)
Software	Audix	E3	N/A	N/A	N/A	Jun. 23, 2022~Jun. 24, 2022	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	Mar. 07, 2022	Jun. 23, 2022~Jun. 24, 2022	Mar. 06, 2023	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	37059 & 01	30MHz~1GHz	Oct. 09, 2021	Jun. 23, 2022~Jun. 24, 2022	Oct. 08, 2022	Radiation (03CH07-HY)
Horn Antenna	EMCO	3117	00143261	1GHz~18GHz	Feb. 11, 2022	Jun. 23, 2022~Jun. 24, 2022	Feb. 10, 2023	Radiation (03CH07-HY)
Signal Generator	Rohde & Schwarz	SMF100A	101107	100kHz~40GHz	Dec. 08, 2021	Jun. 23, 2022~Jun. 24, 2022	Dec. 07, 2022	Radiation (03CH07-HY)
Base Station (Measure)	Rohde & Schwarz	CMU200	117995	GSM / GPRS / WCDMA / CDMA	Jul. 13, 2021	Jun. 30, 2021	Jul. 12, 2022	Conducted (TH03-HY)



6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.16 dB
---	---------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.71 dB
---	---------



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power) & ERP / EIRP

WCDMA Band V Maximum Average Power [dBm] (GT - LC = -4.7 dB)					
Channel	4132	4182	4233	ERP (dBm)	ERP (W)
Frequency	826.4	836.4	846.6		
RMC 12.2K	22.08	22.17	22.23	15.38	0.0345
HSDPA Subtest-1	22.05	22.12	22.08		
HSDPA Subtest-2	22.11	22.15	22.08		
HSDPA Subtest-3	21.93	21.99	21.90		
HSDPA Subtest-4	21.94	21.99	21.94		
Limit	ERP < 7W			Result	Pass

WCDMA Band II Maximum Average Power [dBm] (GT - LC = -4.1 dB)					
Channel	9262	9400	9538	EIRP (dBm)	EIRP (W)
Frequency	1852.4	1880	1907.6		
RMC 12.2K	21.25	21.11	21.38	17.28	0.0535
HSDPA Subtest-1	21.04	21.08	20.99		
HSDPA Subtest-2	21.02	21.02	21.01		
HSDPA Subtest-3	20.91	21.00	20.91		
HSDPA Subtest-4	20.92	21.00	20.94		
Limit	EIRP < 2W			Result	Pass

WCDMA Band IV Maximum Average Power [dBm] (GT - LC = -3.3 dB)					
Channel	1312	1413	1513	EIRP (dBm)	EIRP (W)
Frequency	1712.4	1732.6	1752.6		
RMC 12.2K	21.51	21.38	21.77	18.47	0.0703
HSDPA Subtest-1	21.36	21.39	21.36		
HSDPA Subtest-2	21.27	21.37	21.27		
HSDPA Subtest-3	21.25	21.35	21.25		
HSDPA Subtest-4	21.32	21.36	21.32		
Limit	EIRP < 1W			Result	Pass



Appendix B. Test Results of Radiated Test

WCDMA 1700

WCDMA 1700									
Channel	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)
Lowest	3426	-44.71	-13	-31.71	-64.97	-50.8	1.58	7.67	H
	5136	-48.47	-13	-35.47	-72.15	-55.75	2.42	9.70	H
	6852	-52.92	-13	-39.92	-79.78	-60.9	2.64	10.62	H
									H
									H
									H
	3426	-47.51	-13	-34.51	-67.88	-53.6	1.58	7.67	V
	5136	-49.57	-13	-36.57	-72.98	-56.85	2.42	9.70	V
	6852	-52.73	-13	-39.73	-79.64	-60.71	2.64	10.62	V
									V
									V
									V
Middle	3462	-46.81	-13	-33.81	-67.12	-53.05	1.59	7.83	H
	5196	-45.55	-13	-32.55	-69.52	-52.8	2.45	9.70	H
	6930	-54.50	-13	-41.50	-81.11	-62.6	2.61	10.72	H
									H
									H
									H
	3462	-49.66	-13	-36.66	-70.17	-55.9	1.59	7.83	V
	5196	-49.63	-13	-36.63	-73.38	-56.88	2.45	9.70	V
	6930	-54.40	-13	-41.40	-81.05	-62.5	2.61	10.72	V
									V
									V
									V



Highest	3504	-44.80	-13	-31.80	-65.65	-51.2	1.61	8.00	H
	5256	-50.48	-13	-37.48	-74.43	-57.7	2.48	9.70	H
	7008	-53.17	-13	-40.17	-79.67	-61.4	2.59	10.82	H
									H
									H
									H
									H
	3504	-47.10	-13	-34.10	-67.73	-53.5	1.61	8.00	V
	5256	-53.28	-13	-40.28	-77.02	-60.5	2.48	9.70	V
	7008	-53.67	-13	-40.67	-80.27	-61.9	2.59	10.82	V
									V
									V
									V
									V

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.