FCC/ISED TEST REPORT

For

Chrion Pro

Trade Name: Mio, MiTAC, Magellan, Teletrac Navman

Model: N635

Issued to

FCC: Mitac Digital Technology Corporation
4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan

IC: MiTAC Digital Technology Corporation
4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan
Issued Date: January 17, 2024

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 4, 2024	Initial Issue	ALL	Allison Chen
01	January 17, 2024	See the following Note Rev.(01)	P.6	Allison Chen

Note:
Rev.(01)
1. Modify emission designator table in section 2.

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1. TEST RESULT CERTIFICATION

FCC Applicant:	Mitac Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
IC Applicant:	MiTAC Digital Technology Corporation 4F., No. 1, R&D Road 2, Hsinchu Science Park, Hsinchu 30076 Taiwan
Manufacturer:	MITAC COMPUTER (KUNSHAN) CO., LTD. No. 269, 2nd Avenue, District A, Comprehensive Free Trade Zone, Kunshan, Jiangsu, P.R. China
Equipment Under Test:	Chrion Pro
Trade Name:	Mio, MiTAC, Magellan, Teletrac Navman
Model Number:	N635
Date of Test:	October 17~24, 2023

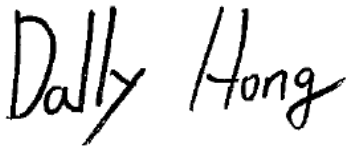
APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR PART 22 SUBPART H FCC 47 CFR PART 24 SUBPART E FCC 47 CFR PART 27 SUBPART L FCC CFR 47 Part 2 ISED RSS-132 Issue 4 Jan. 2023 ISED RSS-133 Issue 6, Amendment 1 Jan.18,2018 ISED RSS-139 Issue 4, September 29, 2022 ISED RSS-GEN Issue 5 April. 2018	Compliance
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA-603-C and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 22 Subpart H, PART 24 Subpart E, FCC PART 27 Subpart L and ISED RSS-132 Issue 4, RSS-133 Issue 6 and RSS-139 Issue 4.

The test results of this report relate only to the tested sample identified in this report.

Approved by:



Dally Hong
Sr. Engineer

2. EUT DESCRIPTION

Product	Chrion Pro	
Trade Name	Mio, MiTAC, Magellan, Teletrac Navman	
Model	N635	
Serial Number	N/A	
Model Discrepancy	Difference of the those trade names (list on this report) are just for marketing purpose only.	
Received Date	May 25, 2023	
Power Supply	1. Powered from AC Adapter. I/P: 100-240Vac, 50-60Hz, 0.3A; O/P: Vdc,5V 2.0A 2. Powered from car charge. I/P: 12-24Vdc; O/P: 5Vdc, 2A (Max) 3. Powered from Rechargeable Li-ion Polymer Battery. Rating: 3.7VDC, 4000mAh, 14.8Wh	
Antenna Specification	Antenna Type: PIFA Antenna Brand/Model: (1) Main: Auden / B31639-01 Brand/Model: (2) Aux: Auden / B31614-00 Band II: 2.92 dBi Band IV: 3.19 dBi Band V: 1.84 dBi	
Modulation Technique	WCDMA Band II	QPSK, 16QAM
	WCDMA Band IV	QPSK, 16QAM
	WCDMA Band V	QPSK, 16QAM
Frequency Range	WCDMA / HSDPA / HSUPA Band II: 1852.4MHz ~1907.6MHz	
	WCDMA / HSDPA / HSUPA Band IV: 1712.4MHz ~ 1752.6MHz	
	WCDMA / HSDPA / HSUPA Band V: 826.4 ~ 846.6MHz	

Remark:
1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
3. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.
4. For test mode WCDMA, HSUPA and HSDPA were pretest. The worst case was WCDMA

Emission Designator					
System	**Band**	**Frequency Range(MHz)**	**Emission Designator (99% OBW)**	**Maximum ERP (W)**	**Maximum EIRP (W)**
WCDMA 12.2K RMC	**II**	**1852.4MHz ~1907.6MHz**	**4M17F9W**	**N/A**	**0.1774**
	IV	**1712.4MHz ~1752.6MHz**	**4M14F9W**	**N/A**	**0.1722**
	V	**826.4MHz ~ 846.6MHz**	**4M15F9W**	**0.1746**	**N/A**

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to TIA -603-E, FCC CFR 47, Part 2 and Part 22 Subpart H & Part 24 Subpart E and ISED RSS-132, SPSR503, RSS-133, RSS-GEN SPSR510 and ANSI C63.26: 2015.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

According to the requirements in ANSI C63.26: 2015.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.26: 2015.

3.4 DESCRIPTION OF TEST MODES

Connect the EUT (model: N635) to the call box, set the EUT to the maximum output power through the call box, and set the call box to the lowest, middle, and highest channels of each frequency band and modulation.

WCDMA Band II: 1852.4MHz ~ 1907.6MHz

Channel Bandwidth	WCDMA Band II	
	Channel	Frequency (MHz)
Low channel (L)	9262	1852.4
Middle channel (M)	9400	1880
High channel (H)	9538	1907.6

WCDMA Band IV: 1712.4MHz ~ 1752.6MHz

Channel Bandwidth	WCDMA Band IV	
	Channel	Frequency (MHz)
Low channel (L)	1312	1712.4
Middle channel (M)	1412	1732.4
High channel (H)	1513	1752.6

WCDMA Band V: 826.4MHz ~ 846.6MHz

Channel Bandwidth	WCDMA Band V	
	Channel	Frequency (MHz)
Low channel (L)	4132	826.4
Middle channel (M)	4183	836.6
High channel (H)	4233	846.6

3.4.1 The worst mode of measurement

Radiated Emission Measurement Above 1G	
Test Condition	**Radiated Emission Above 1G**
Power supply Mode	**Mode 1: EUT power by Adapter without Cradle**
Worst Mode	**☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4**
Worst Position	**☐ Placed in fixed position.** **☒ Placed in fixed position at X-Plane (E2-Plane)** **☐ Placed in fixed position at Y-Plane (E1-Plane)** **☐ Placed in fixed position at Z-Plane (H-Plane)**

Radiated Emission Measurement Below 1G	
Test Condition	**Radiated Emission Below 1G**
Power supply Mode	**Mode 1: EUT power by Adapter without Cradle** **Mode 2: EUT power by N635_V+CarCharger** **Mode 3: EUT power by N564_TN+CarCharger** **Mode 4: EUT power by N635_V+Adapter** **Mode 5: EUT power by N564_TN+Adapter**
Worst Mode	**☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4**

Remark:
1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report

4. TEST SUMMARY

FCC Standard Sec.	IC Standard Sec.	Report Section	Test Item	Result
-	-	2	Antenna Requirement	Pass
§2.1046 22.913(a), 24.232(c) 27.50(d)	RSS-132, section 5.4 RSS-133, section 6.4 RSS-139, section 5.5	8.1	ERP and EIRP Measurement	Pass
§2.1055, 22.355, 24.235, 27.54	RSS-132 section 5.3 RSS-133 section 6.3 RSS-139, section 5.4	8.2	Frequency Stability v.s. temperature measurement	Pass
§2.1049	RSS-GEN 6.7	8.3	Occupied Bandwidth Measurement	Pass
§2.1046 22.913(d) 24.232(d) 27.50(d)	RSS-132 section 5.4 RSS-133 section 6.4 RSS-139, section 5.5	8.4	Peak to Average Ratio	Pass
§2.1051 22.917(a), 24.238(a) 27.53(h)	RSS-GEN 6.13 RSS-132 section 5.5 RSS-133 section 6.5 RSS-139 section 5.6	8.5	Out of Band Emission at Antenna Terminals	Pass
§2.1051 22.917(a), 24.238(a) 27.53(h)	RSS-GEN 6.13 RSS-132 section 5.5 RSS-133 section 6.5 RSS-139 section 5.6	8.6	Spurious Radiation Measurement	Pass

5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Conducted_FCC/IC/NCC (WWAN)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-02	2024-02-01
Radio Communication Analyzer	Rohde& Schwarz	CMW500	116875	2023-06-08	2024-06-07
Cable	Woken	SUMITOMO	1	2023-03-02	2024-03-01
Software	Radio Test Software Ver. 21				

966A_Radiated WWAN					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Loop Antenna	COM-POWER	AL-130	121051	2023-05-23	2024-05-22
Preamplifier	EMEC	EM330	060609	2023-02-22	2024-02-21
Thermo-Hygro Meter	WISEWIND	1206	D07	2022-12-19	2023-12-18
Signal Analyzer	KEYSIGHT	N9010A	MY54200716	2023-10-13	2024-10-12
Preamplifier	HP	8449B	3008A00965	2022-12-23	2023-12-22
Bi-Log Antenna	Sunol Sciences	JB1	A052609	2023-02-09	2024-02-08
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2023-08-08	2024-08-07
Cable	Huber+Suhner	104PEA	20995+21000+182330	2023-02-22	2024-02-21
Cable	EMCI	EMC101G	221213+221011+221012	2023-10-17	2024-10-16
Cable	EMCI	EMC104G	SN230204	2023-05-13	2024-05-12
Horn Antenna	ETS LINDGREN	3117	55165	2023-07-12	2024-07-11
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2023-01-12	2024-01-11
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2022-12-30	2023-12-29
Pre-Amplifier	EMCI	EMC184045SE	980860	2022-12-27	2023-12-26
Signal Generator	Agilent	E8257C	US42340383	2023-06-17	2024-06-16
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
RF Output Power	± 2.533 dB
Channel Bandwidth	± 2.532 MHz
Peak to average ratio	± 2.531 dB
Conducted Bandedge	± 2.532 dB
Conducted Unwanted Emissions	± 2.533 dB
Frequency Stability	± 2.579 Hz
Radiated Emission_9kHz-30MHz	± 3.778 dB
Radiated Emission_30MHz-200MHz	± 3.457 dB
Radiated Emission_200MHz-1GHz	± 3.962 dB
Radiated Emission_1GHz-6GHz	± 4.804 dB
Radiated Emission_6GHz-18GHz	± 4.781 dB
Radiated Emission_18GHz-26GHz	± 3.112 dB
Radiated Emission_26GHz-40GHz	± 3.314 dB

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.
Tel: 886-2-2299-9720 / Fax: 886-2-2299-9721

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

7.2 SUPPORT EQUIPMENT

Conducted_Sup_Units(WWAN)					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Cable	SP	Type C Cable	N/A	N/A	N/A

Support Unit List					
N0	Kind	Brand	Model	Core	Length
1	NB(D)	Lenovo	ThinkPad X260	N/A	N/A
A	Adapter	TPT	MSS050200BI	NA	NA
B	TypeA to TypeC	N/A	N/A	N/A	N/A

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer’s requirements and conditions for the intended use.

8. TEST PROCEDURE AND RESULT

8.1 ERP & EIRP MEASUREMENT

LIMIT

Band II & V

According to FCC 22.913(a):
The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.
FCC 24.232(b):
The equivalent Isotropic Radiated Power (EIRP) must not exceed 2 Watts.

RSS-132 § 5.4:

824-849 MHz and 869-894 MHz The transmitter output power shall be measured in terms of average power.The equivalent radiated power (e.r.p.) shall not exceed 7 watts for mobile equipment and 3 watts for portable equipment.

RSS-133 § 6.4:

Mobile stations and hand-held portables are limited to 2 watts maximum (EIRP).

Band IV

FCC Part 27.50(d)(4)
Fixed, mobile, and portable (handheld) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

RSS-139 section 5.5:
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt.

TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

TEST RESULTS

Compliance.

Temperature:	23.5℃	**Test date:**	October 17, 2023
Humidity:	51% RH	**Tested by:**	Allen Shen

WCDMA Band II:

Band		WCDMA II		
TX Channel		9262	9400	9538
Frequency (MHz)		1852.4	1880	1907.6
3GPP Rel 99	RMC 12.2Kbps	**22.49**	22.21	22.25
3GPP Rel 5	HSDPA Subtest-1	22.37	22.15	21.82
	HSDPA Subtest-2	22.33	21.97	21.63
	HSDPA Subtest-3	22.32	22.02	21.52
	HSDPA Subtest-4	22.30	22.09	21.76
3GPP Rel 6	HSUPA Subtest-1	21.90	21.84	22.22
	HSUPA Subtest-2	21.85	21.82	21.18
	HSUPA Subtest-3	21.87	21.81	21.16
	HSUPA Subtest-4	21.88	21.78	22.13
	HSUPA Subtest-5	21.82	21.82	21.14

WCDMA Band IV

Band		WCDMA IV		
TX Channel		1312	1412	1513
Frequency (MHz)		1712.4	1732.4	1752.6
3GPP Rel 99	RMC 12.2Kbps	22.16	22.30	**22.36**
3GPP Rel 5	HSDPA Subtest-1	21.18	21.24	21.43
	HSDPA Subtest-2	21.14	21.20	21.35
	HSDPA Subtest-3	21.08	21.15	21.37
	HSDPA Subtest-4	21.12	21.18	21.39
3GPP Rel 6	HSUPA Subtest-1	20.74	20.77	21.00
	HSUPA Subtest-2	20.68	20.66	20.78
	HSUPA Subtest-3	20.70	20.70	20.86
	HSUPA Subtest-4	20.65	20.62	20.83
	HSUPA Subtest-5	20.63	20.60	20.89

WCDMA Band V

Band		WCDMA V		
TX Channel		4132	4183	4233
Frequency (MHz)		826.4	836.6	846.6
3GPP Rel 99	RMC 12.2Kbps	22.13	22.26	**22.42**
3GPP Rel 5	HSDPA Subtest-1	21.18	21.30	21.36
	HSDPA Subtest-2	21.10	21.27	21.28
	HSDPA Subtest-3	21.06	21.20	21.25
	HSDPA Subtest-4	21.13	21.22	21.21
3GPP Rel 6	HSUPA Subtest-1	20.76	20.81	20.88
	HSUPA Subtest-2	20.66	20.76	20.82
	HSUPA Subtest-3	20.71	20.70	20.76
	HSUPA Subtest-4	20.68	20.72	20.85
	HSUPA Subtest-5	20.69	20.71	21.73

8.2 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355, FCC §24.235, FCC §27.54
Frequency Tolerance: +/- 2.5ppm

The rule is defined that" The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to RSS-132 section 5.3 & RSS-133 section 6.3 & RSS-139 section 5.4
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

TEST PROCEDURE

Use call box with frequency Error measurement capability.
Temp = -35℃ to +65℃
Voltage= 85% to 115% of the nominal value for AC/DC powered equipment.
NOTE: The frequency error was recorded frequency error from the communication simulator.

TEST RESULTS

Compliance.

Temperature:	23.5℃	**Test date:**	October 17, 2023
Humidity:	51% RH	**Tested by:**	Allen Shen

FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:

WCDMA Band II:

Reference Frequency: WCDMA Low Channel		1852.4		MHz
Limit: +/- 2.5 ppm =			4631	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	0.007381	0.0000	2.5
5	50	0.007383	0.0000	2.5
5	40	0.007384	0.0000	2.5
5	30	0.007376	0.0000	2.5
5	20	0.007374	0.0000	2.5
5	10	0.007367	0.0000	2.5
5	0	0.007365	0.0000	2.5
5	-10	0.007366	0.0000	2.5
5	-20	0.007365	0.0000	2.5
5	-35	0.007367	0.0000	2.5

Reference Frequency: WCDMA Low Channel		1852.4		MHz
Limit: +/- 2.5 ppm =			4631	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	0.007372	0.0000	2.5
5	20	0.007374	0.0000	2.5
5.75	20	0.007380	0.0000	2.5

Reference Frequency: WCDMA Mid Channel		1880		MHz
Limit: +/- 2.5 ppm =			4700	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	2.0000000	0.0011	2.5
5	50	1.0000000	0.0005	2.5
5	40	-1.0000000	-0.0005	2.5
5	30	-1.0000000	-0.0005	2.5
5	20	-0.0000695	0.0000	2.5
5	10	0.0000000	0.0000	2.5
5	0	1.0000000	0.0005	2.5
5	-10	1.0000000	0.0005	2.5
5	-20	-1.0000000	-0.0005	2.5
5	-35	1.0000000	0.0005	2.5

Reference Frequency: WCDMA Mid Channel		1880		MHz
Limit: +/- 2.5 ppm =			4700	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	0.0000000	0.0000	2.5
5	20	-0.0000695	0.0000	2.5
5.75	20	1.0000000	0.0005	2.5

Reference Frequency: WCDMA High Channel			1907.6	MHz
Limit: +/- 2.5 ppm =			4769	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	1.00	0.0005	2.5
5	50	0.00	0.0000	2.5
5	40	-1.00	-0.0005	2.5
5	30	0.00	0.0000	2.5
5	20	1.00	0.0005	2.5
5	10	-1.00	-0.0005	2.5
5	0	2.00	0.0010	2.5
5	-10	-1.00	-0.0005	2.5
5	-20	1.00	0.0005	2.5
5	-35	-1.00	-0.0005	2.5

Reference Frequency: WCDMA High Channel			1907.6	MHz
Limit: +/- 2.5 ppm =			4769	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	1.00	0.0005	2.5
5	20	1.00	0.0005	2.5
5.75	20	1.00	0.0005	2.5

WCDMA Band IV:

Reference Frequency: WCDMA Low Channel			1712.4	MHz
Limit: +/- 2.5 ppm =			4281	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	1.00	0.0006	2.5
5	50	-1.00	-0.0006	2.5
5	40	0.00	0.0000	2.5
5	30	-2.00	-0.0012	2.5
5	20	-1.00	-0.0006	2.5
5	10	0.00	0.0000	2.5
5	0	-1.00	-0.0006	2.5
5	-10	1.00	0.0006	2.5
5	-20	1.00	0.0006	2.5
5	-35	-1.00	-0.0006	2.5

Reference Frequency: WCDMA Low Channel			1712.4	MHz
Limit: +/- 2.5 ppm =			4281	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	-1.00	-0.0006	2.5
5	20	-1.00	-0.0006	2.5
5.75	20	-2.00	-0.0012	2.5

Reference Frequency: WCDMA Mid Channel			1732.6	MHz
Limit: +/- 2.5 ppm =			4331.5	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	0.00	0.0000	2.5
5	50	-1.00	-0.0006	2.5
5	40	0.00	0.0000	2.5
5	30	-1.00	-0.0006	2.5
5	20	1.00	0.0006	2.5
5	10	0.00	0.0000	2.5
5	0	1.00	0.0006	2.5
5	-10	1.00	0.0006	2.5
5	-20	1.00	0.0006	2.5
5	-35	0.00	0.0000	2.5

Reference Frequency: WCDMA Mid Channel			1732.6	MHz
Limit: +/- 2.5 ppm =			4331.5	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	-1.00	-0.0006	2.5
5	20	1.00	0.0006	2.5
5.75	20	0.00	0.0000	2.5

Reference Frequency: WCDMA High Channel			1752.6	MHz
Limit: +/- 2.5 ppm =			4381.5	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	-2.00	-0.0011	2.5
5	50	0.00	0.0000	2.5
5	40	2.00	0.0011	2.5
5	30	-1.00	-0.0006	2.5
5	20	2.00	0.0011	2.5
5	10	-2.00	-0.0011	2.5
5	0	1.00	0.0006	2.5
5	-10	0.00	0.0000	2.5
5	-20	-1.00	-0.0006	2.5
5	-35	-1.00	-0.0006	2.5

Reference Frequency: WCDMA High Channel			1752.6	MHz
Limit: +/- 2.5 ppm =			4381.5	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	0.00	0.0000	2.5
5	20	2.00	0.0011	2.5
5.75	20	-1.00	-0.0006	2.5

WCDMA Band V:

Reference Frequency: WCDMA Low Channel			826.4	MHz
Limit: +/- 2.5 ppm =			2066	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	-1.00	-0.0012	2.5
5	50	2.00	0.0024	2.5
5	40	2.00	0.0024	2.5
5	30	1.00	0.0012	2.5
5	20	0.00	0.0000	2.5
5	10	1.00	0.0012	2.5
5	0	-1.00	-0.0012	2.5
5	-10	-2.00	-0.0024	2.5
5	-20	1.00	0.0012	2.5
5	-35	1.00	0.0012	2.5

Reference Frequency: WCDMA Low Channel			826.4	MHz
Limit: +/- 2.5 ppm =			2066	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	1.00	0.0012	2.5
5	20	0.00	0.0000	2.5
5.75	20	-1.00	-0.0012	2.5

Reference Frequency: WCDMA Mid Channel			836.4	MHz
Limit: +/- 2.5 ppm =			2091	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	-2.00	-0.0024	2.5
5	50	1.00	0.0012	2.5
5	40	1.00	0.0012	3.5
5	30	0.00	0.0000	2.5
5	20	-1.00	-0.0012	2.5
5	10	-1.00	-0.0012	2.5
5	0	0.00	0.0000	2.5
5	-10	0.00	0.0000	2.5
5	-20	-2.00	-0.0024	2.5
5	-35	-2.00	-0.0024	2.5

Reference Frequency: WCDMA Mid Channel			836.6	MHz
Limit: +/- 2.5 ppm =			2091	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	0.00	0.0000	2.5
5	20	0.00	0.0000	2.5
5.75	20	-1.00	-0.0012	2.5

Reference Frequency: WCDMA High Channel			846.6	MHz
Limit: +/- 2.5 ppm =			2116.5	Hz
Power Supply	Environment	Frequency Error	Frequency Error	Limit
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
5	65	-2.00	-0.0024	2.5
5	50	1.00	0.0012	2.5
5	40	-1.00	-0.0012	3.5
5	30	0.00	0.0000	4.5
5	20	1.00	0.0012	5.5
5	10	-2.00	-0.0024	6.5
5	0	-2.00	-0.0024	7.5
5	-10	-1.00	-0.0012	8.5
5	-20	0.00	0.0000	9.5
5	-35	1.00	0.0012	10.5

Reference Frequency: WCDMA High Channel			846.6	MHz
Limit: +/- 2.5 ppm =			2116.5	Hz
Vdc	Temperature (℃)	(Hz)	(ppm)	(ppm)
4.25	20	1.00	0.0012	2.5
5	20	0.00	0.0000	2.5
5.75	20	-1.00	-0.0012	2.5

8.3 OCCUPIED BANDWIDTH MEASUREMENT

LIMIT

According to §FCC 2.1049 & RSS-GEN 6.7

TEST PROCEDURE

KDB 971168 D01

1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max. hold

TEST RESULTS

Compliance

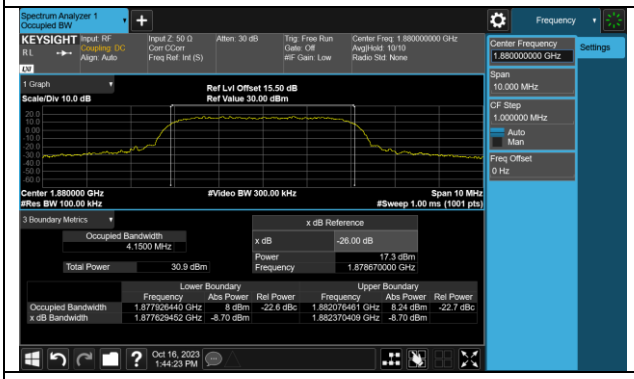
Test Data

Temperature: 23.5℃ **Test date:** October 17, 2023

Humidity: 51% RH **Tested by:** Allen Shen

Test Mode	CH	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
WCDMA 12.2k RMC (Band II)	Low_9262	1852.4	4.1598	4.7418
	Mid_9400	1880.0	4.1500	**4.9410**
	High_9538	1907.6	**4.1677**	4.7526
WCDMA 12.2k RMC (Band IV)	Low_1312	1712.4	4.1296	4.7185
	Mid_1412	1732.4	4.1281	**4.7401**
	High_1513	1752.6	**4.1440**	4.7172
WCDMA 12.2k RMC (Band V)	Low_4132	826.4	4.1321	4.7142
	Mid_4183	836.4	4.1390	4.7203
	High_4233	846.6	**4.147**	**4.7476**

Test Plot(s)

WCDMA Band II	WCDMA Band IV
Low CH_9262	Low CH_1312
	
Mid CH_9400	Mid CH_1412
	
High CH_9538	High CH_1513
	

WCDMA Band V
Low CH_4132

Mid CH_4183

High CH_4233


8.4 PEAK TO AVERAGE RATIO

LIMIT

In measuring transmissions in this band using an average power technique, peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.

FCC §22.913(d), Band V
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

FCC §27.50(d), Band IV

In measuring transmissions in this band using an average power technique, peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.
FCC §24.232(d), Band II
In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB

RSS-132 section 5.4, RSS-133 section 6.4 and RSS-139 section 5.5
The peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

TEST PROCEDURES

1. According to KDB 971168 D01,
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.

TEST RESULTS

Compliance

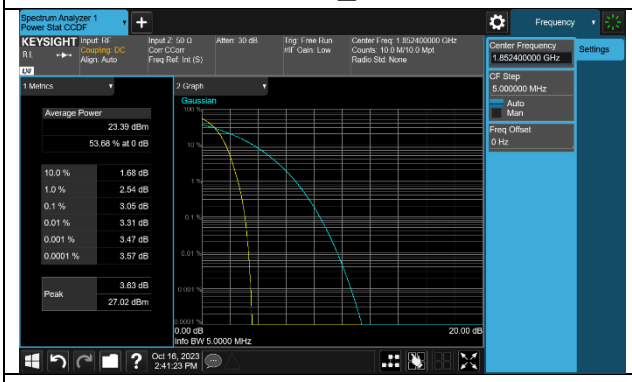
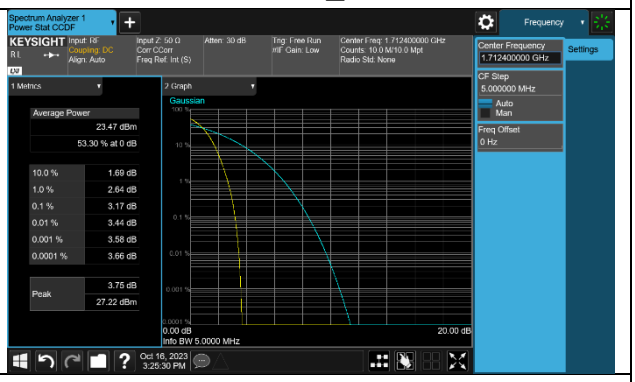
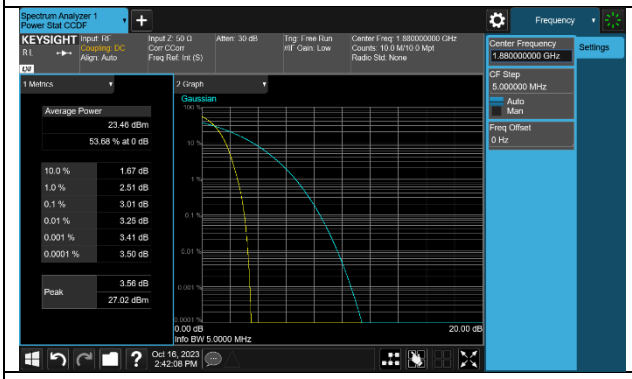
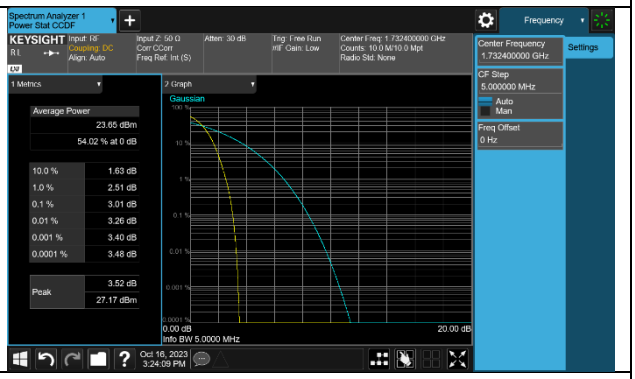
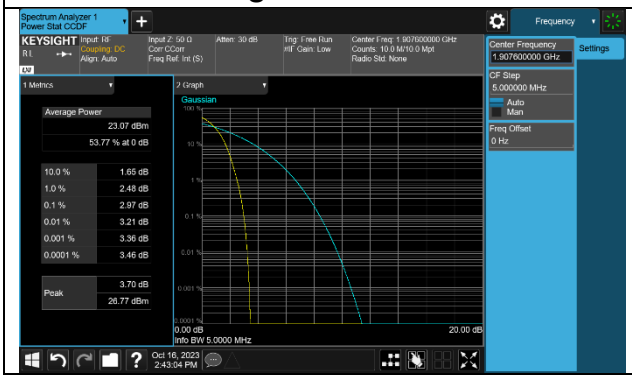
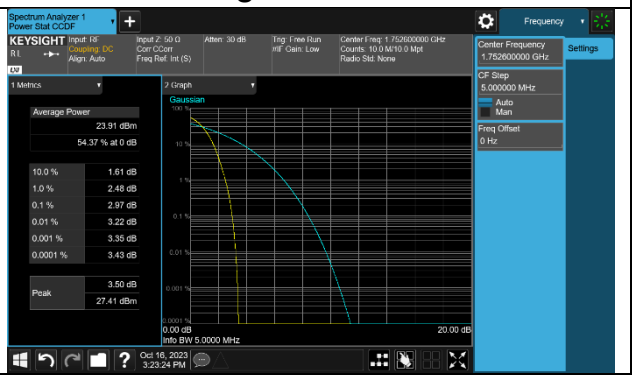
Test Data

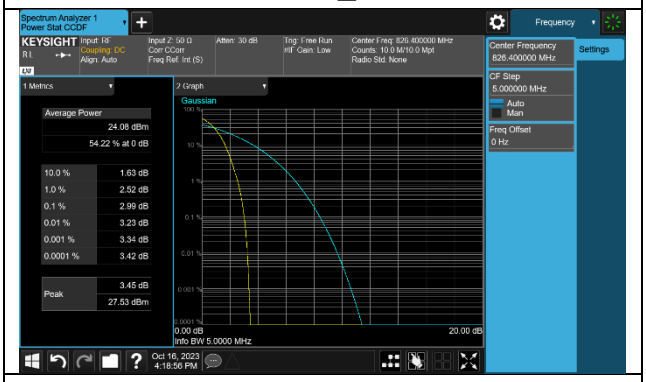
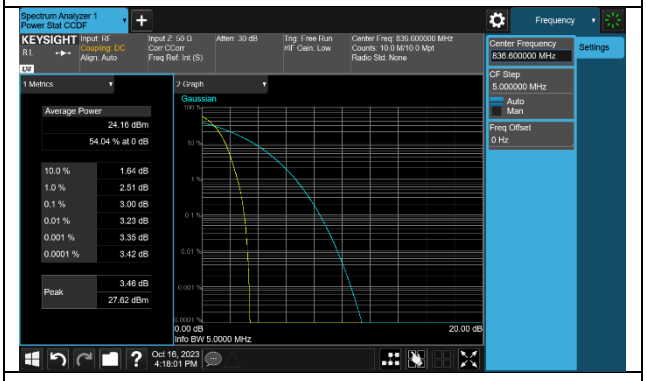
Temperature: 23.5℃ **Test date:** October 17, 2023

Humidity: 51% RH **Tested by:** Allen Shen

Test Mode	CH	Frequency (MHz)	PAPR (dB)	Limit
WCDMA 12.2k RMC (Band II)	Low_9262	1852.4	3.05	13
	Mid_9400	1880.0	3.01	13
	High_9538	1907.6	2.97	13
WCDMA 12.2k RMC (Band V)	Low_1312	826.4	3.17	13
	Mid_1412	836.4	3.01	13
	High_1513	846.6	2.97	13
WCDMA 12.2k RMC (Band IV)	Low_4132	1712.4	2.99	13
	Mid_4183	1732.4	3.00	13
	High_4233	1752.6	2.85	13

Test Plot(s)

WCDMA Band II	WCDMA Band IV
Low CH_9262	**Low CH_1312**
	
Mid CH_9400	**Mid CH_1412**
	
High CH_9538	**High CH_1513**
	

WCDMA Band V
Low CH_4132

Mid CH_4183

High CH_4233


8.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

FCC §24.238(a), Band II
For operations in the 1850-1910 and 1930-1950 MHz band , Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §22.917(a), Band V
For operations in the 824-849 MHz band ,Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §27.53 (h), Band IV
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

RSS-132 section 5.5 and RSS-133 section 6.5
In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

RSS-139 section 5.6
The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log P dB.

TEST PROCEDURES

a) Conducted Emission
The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.
1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

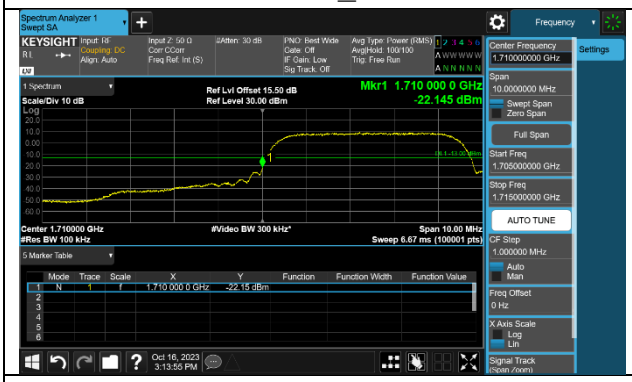
b) Band Edge
1. To connect Antenna Port of EUT to Spectrum.
2. The band edge of low and high channels for the highest RF powers was measured. Setting RBW ≥ 1% EBW.
3. Allow trace to fully stabilize
4. Repeat above procedures until all default test channel measured were complete.

TEST RESULTS

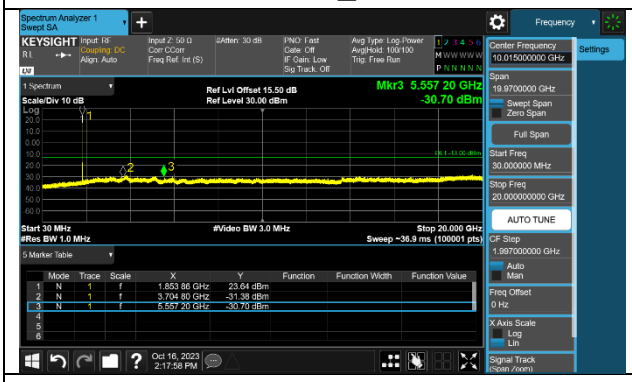
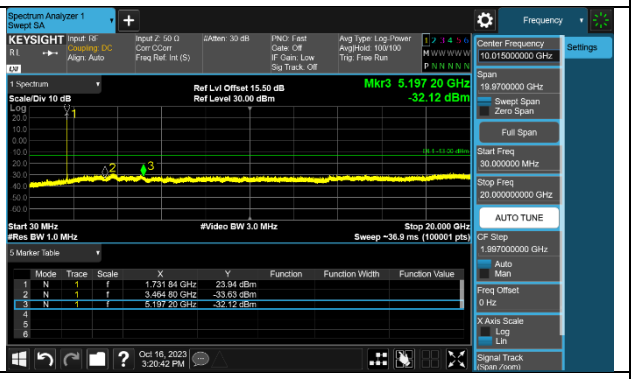
Compliance

Temperature:	23.5℃	**Test date:**	October 17, 2023
Humidity:	51% RH	**Tested by:**	Allen Shen

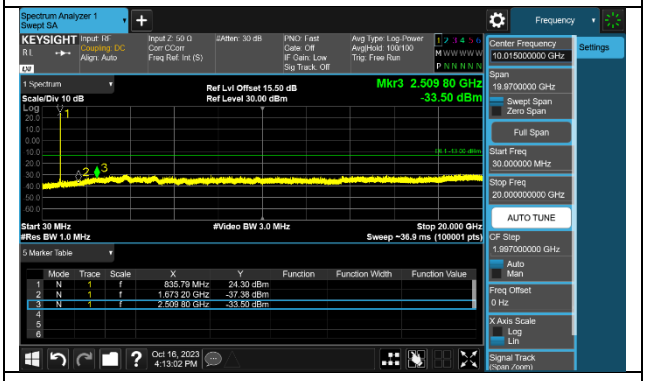
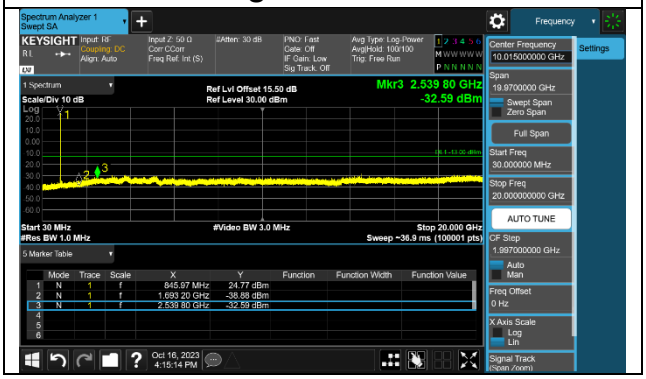
Test Data: Bandedge

WCDMA Band II	
Low CH_9262	High CH_9538
	
WCDMA Band IV	
Low CH_1312	High CH_1512
	
WCDMA Band V	
Low CH_4132	High CH_4233
	

Test Data: Spurious emission

WCDMA Band II	WCDMA Band IV
Low CH_9262	Low CH_1312
	
Mid CH_9400	Mid CH_1412
	
High CH_9538	High CH_1513
	

WCDMA Band V
Low CH_4132

Mid CH_4183

High CH_4233


8.6 SPURIOUS RADIATION MEASUREMENT

LIMIT

According to FCC §2.1053

FCC §24.238(a), Band II
For operations in the 1850-1910 and 1930-1950 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

FCC §27.53 (h), Band IV
The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

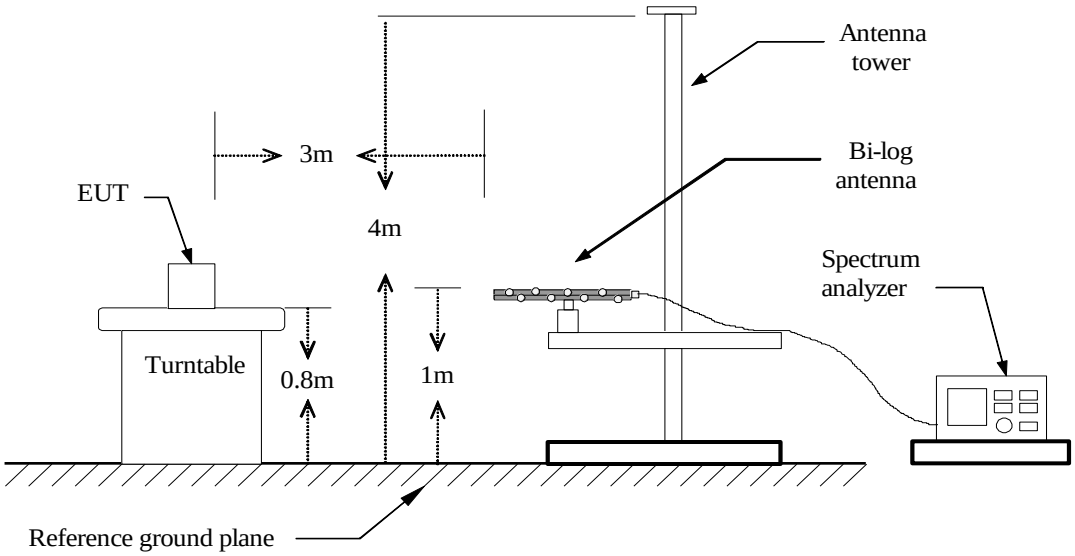
FCC §22.917(a), Band V
For operations in the 824-849 MHz band, out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

RSS-132 section 5.5 and RSS-133 section 6.5
In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts).

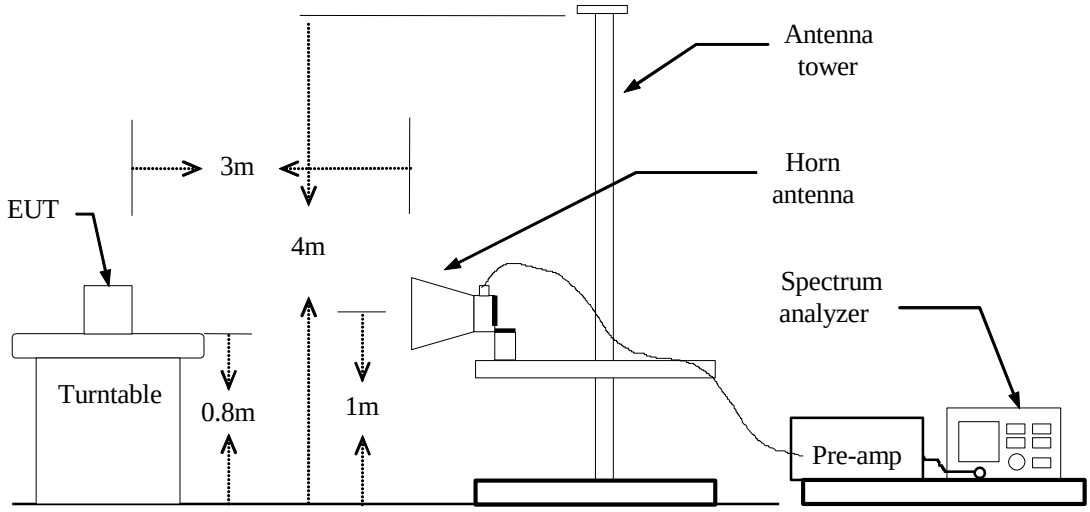
RSS-139 section 5.6
The mean power of emission must be attenuated below the mean power of the non-modulated carrier (P) on any frequency twice or more than twice the fundamental frequency by at least 43 + 10 log P dB.

Test Configuration

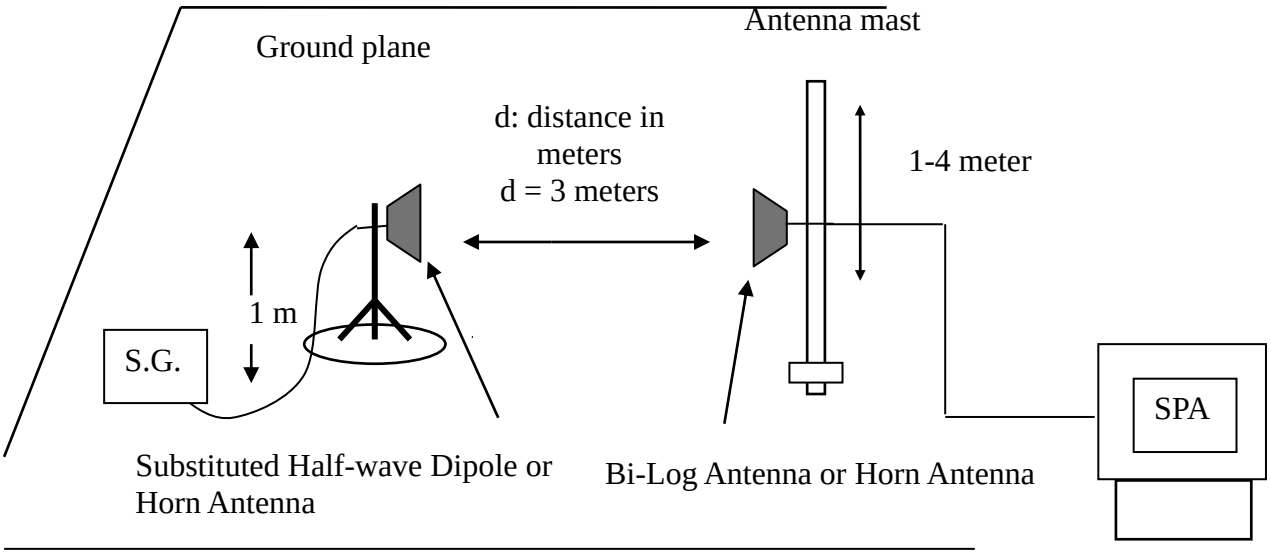
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURE

1. According to KDB 971168 D01.
2. The EUT was placed on a turntable
   (1) Below 1G : 0.8m
   (2) Above 1G : 1.5m
   (3) EUT set 3m from the receiving antenna
   (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission

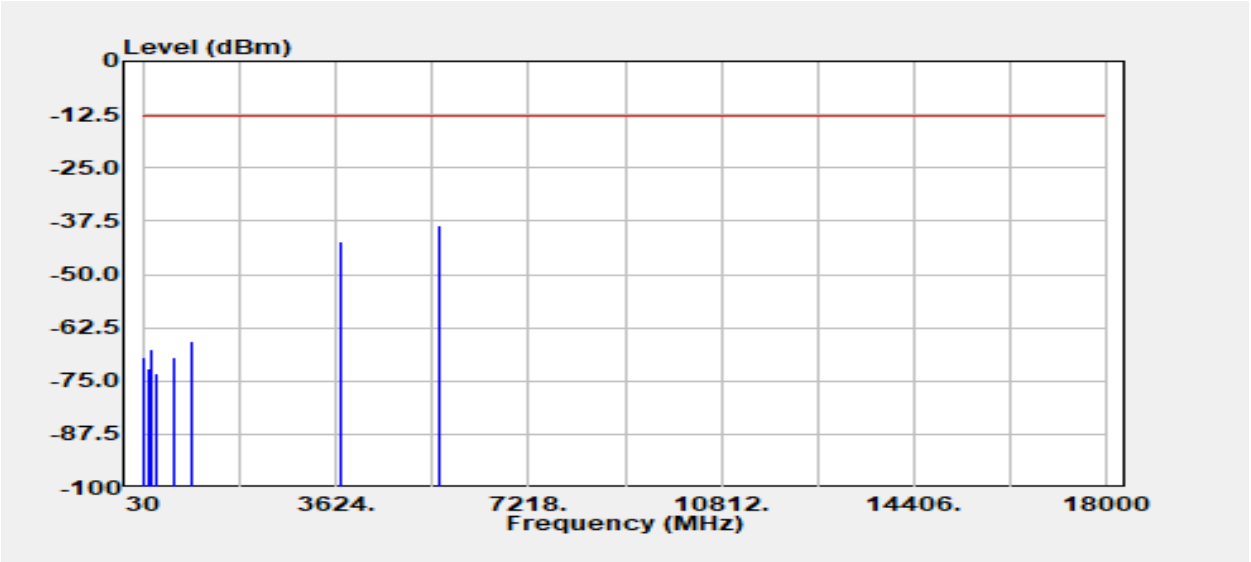
ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

TEST RESULTS

Refer to the attached tabular data sheets.

TEST RESULTS

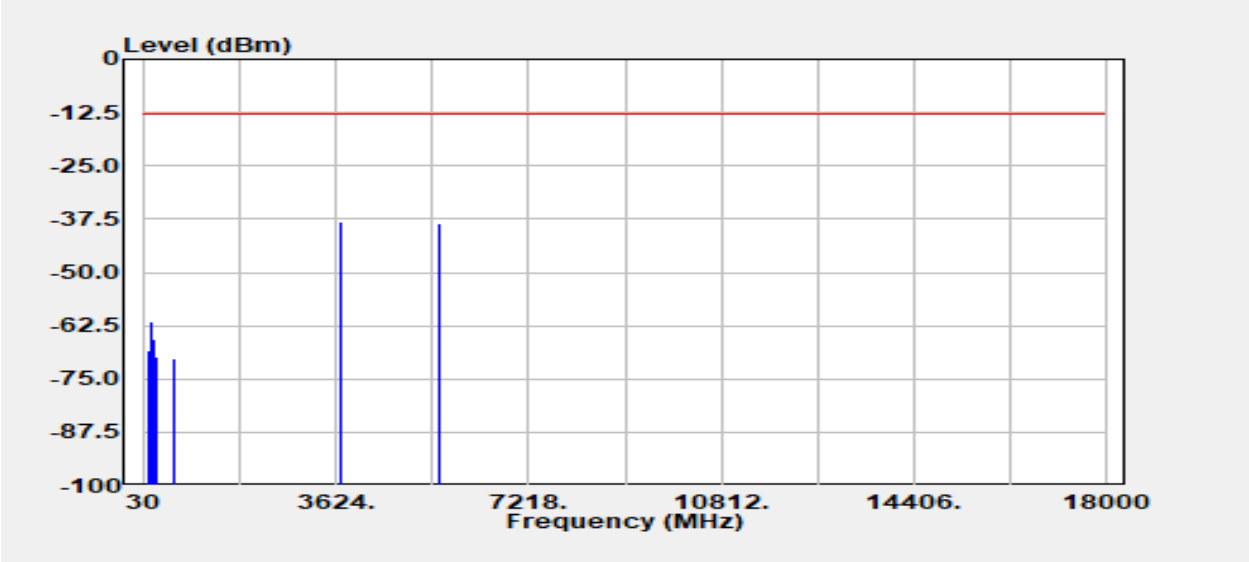
Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band2_CH9262	Temp./Humi.	:24.6/57
Frequency	:1852.4 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
43.68	-69.60	-55.68	-13.82	0.10	-13.00	-56.60
157.94	-72.25	-68.07	-3.97	0.22	-13.00	-59.25
202.18	-67.61	-65.91	-1.45	0.25	-13.00	-54.61
293.45	-73.34	-73.30	0.28	0.32	-13.00	-60.34
622.57	-69.42	-69.81	0.89	0.51	-13.00	-56.42
932.49	-65.84	-66.35	1.15	0.64	-13.00	-52.84
3704.80	-42.08	-48.65	7.80	1.23	-13.00	-29.08
5557.20	-38.51	-47.25	10.21	1.48	-13.00	-25.51

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.

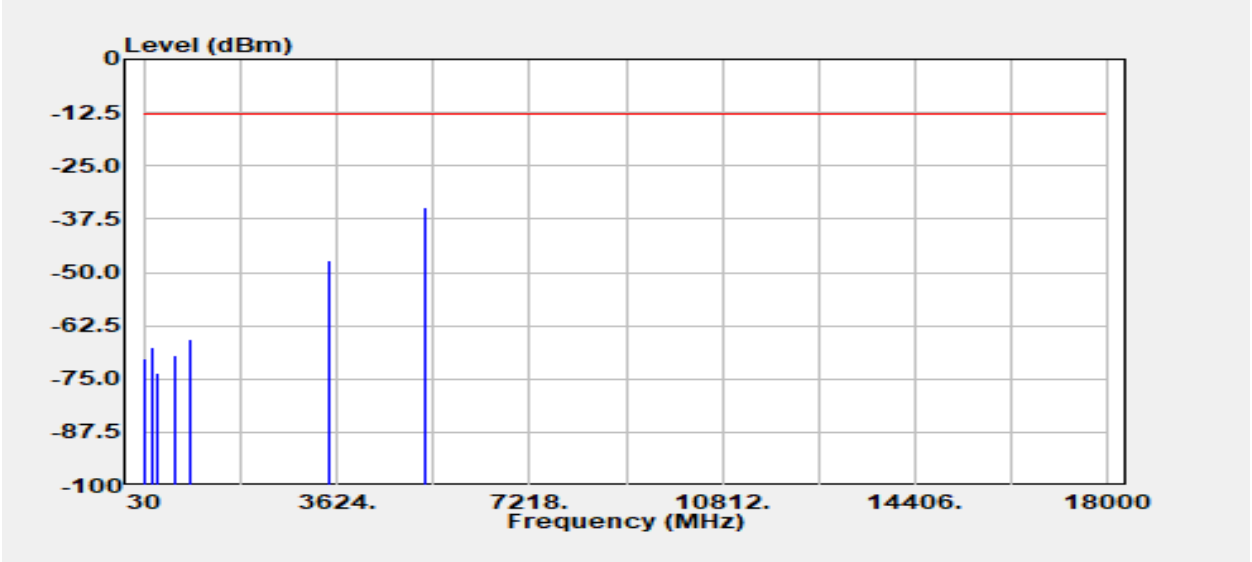
Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band2_CH9262	Temp./Humi.	:24.6/57
Frequency	:1852.4 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
139.42	-68.23	-62.06	-5.97	0.20	-13.00	-55.23
189.86	-64.53	-62.73	-1.56	0.24	-13.00	-51.53
202.27	-61.46	-59.81	-1.41	0.25	-13.00	-48.46
216.73	-65.77	-65.86	0.34	0.26	-13.00	-52.77
264.74	-69.95	-69.60	-0.05	0.30	-13.00	-56.95
600.55	-70.15	-71.26	1.61	0.50	-13.00	-57.15
3704.80	-38.24	-44.81	7.80	1.23	-13.00	-25.24
5557.20	-38.65	-47.39	10.21	1.48	-13.00	-25.65

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.

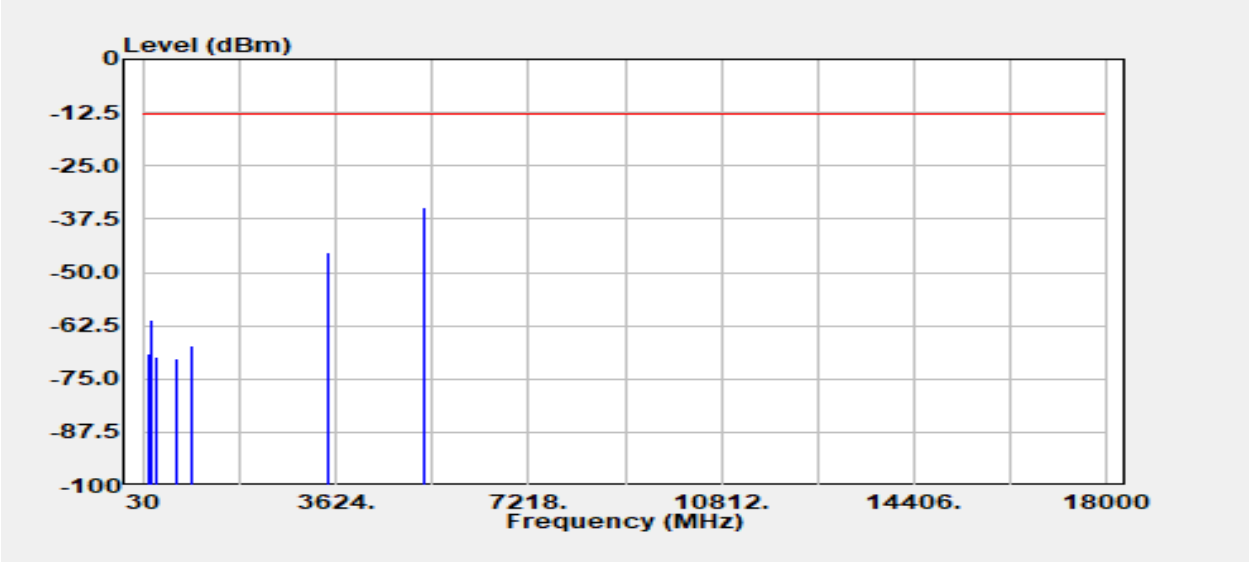
Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band4_CH1513	Temp./Humi.	:24.6/57
Frequency	:1752.6 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
43.68	-70.33	-56.40	-13.82	0.10	-13.00	-57.33
191.02	-67.59	-65.83	-1.52	0.24	-13.00	-54.59
204.02	-67.63	-66.68	-0.70	0.25	-13.00	-54.63
296.46	-73.70	-73.78	0.39	0.32	-13.00	-60.70
614.81	-69.39	-69.74	0.85	0.51	-13.00	-56.39
911.25	-65.73	-66.45	1.35	0.63	-13.00	-52.73
3505.20	-47.06	-53.65	7.79	1.20	-13.00	-34.06
5257.80	-34.90	-43.45	10.00	1.44	-13.00	-21.90

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.

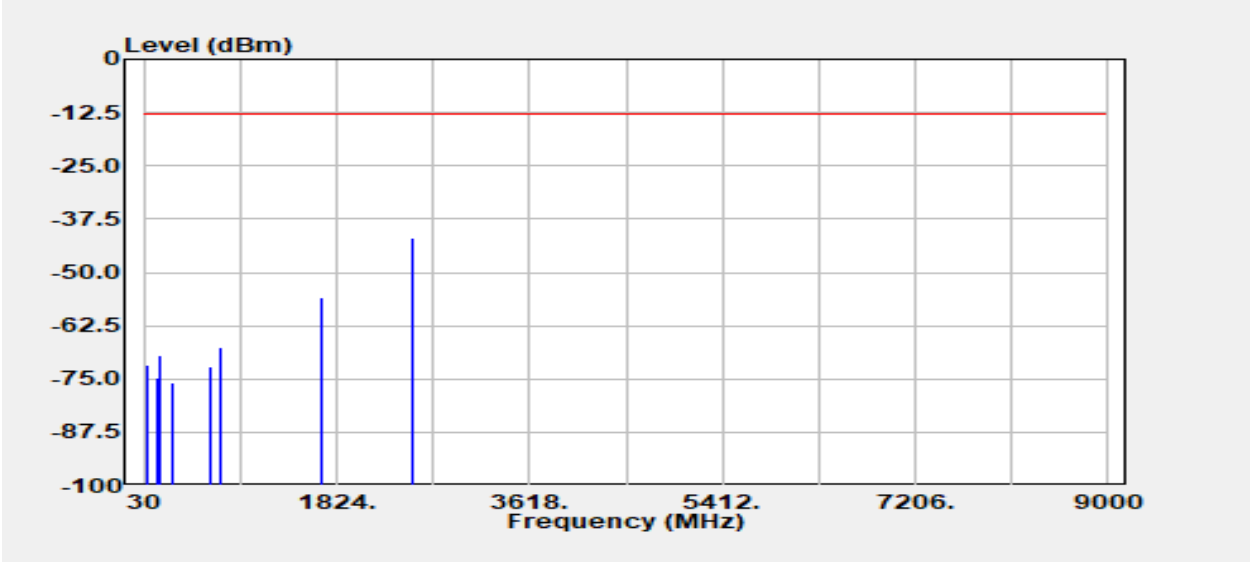
Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band4_CH1513	Temp./Humi.	:24.6/57
Frequency	:1752.6 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
140.19	-68.93	-62.90	-5.83	0.20	-13.00	-55.93
188.79	-63.23	-61.49	-1.50	0.24	-13.00	-50.23
203.82	-61.24	-60.20	-0.78	0.25	-13.00	-48.24
264.45	-69.73	-69.42	-0.02	0.30	-13.00	-56.73
681.74	-70.00	-70.57	1.10	0.53	-13.00	-57.00
929.87	-67.24	-67.83	1.23	0.64	-13.00	-54.24
3505.20	-45.26	-51.85	7.79	1.20	-13.00	-32.26
5257.80	-34.84	-43.40	10.00	1.44	-13.00	-21.84

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.

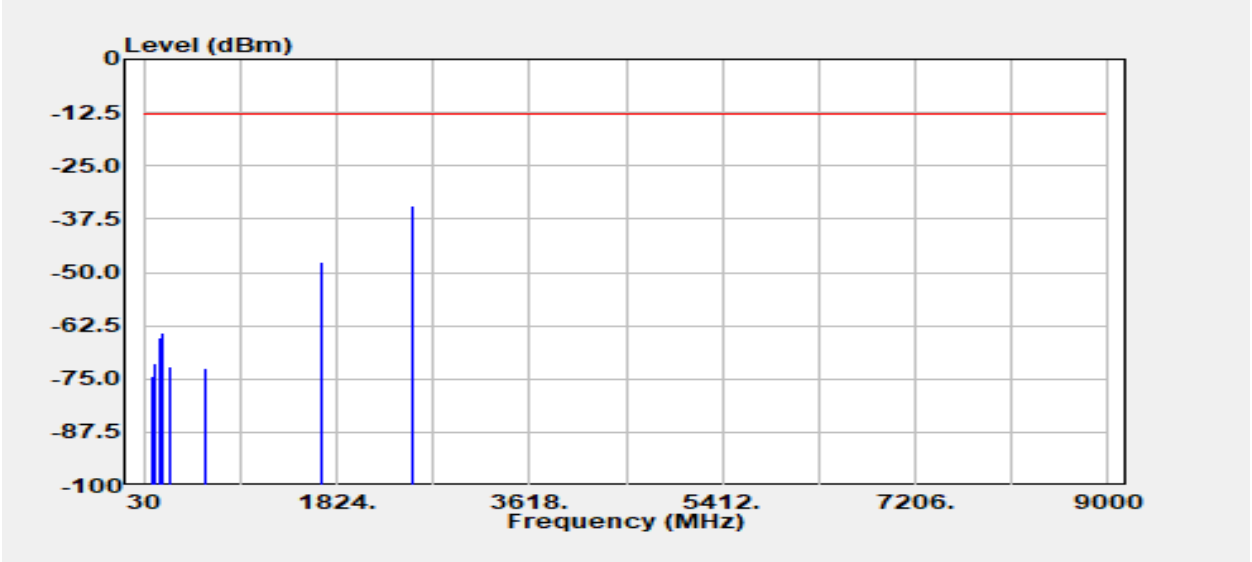
Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band5_CH4233	Temp./Humi.	:24.6/57
Frequency	:846.6 MHz	Antenna Pol.	:Vertical
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
63.76	-71.62	-64.03	-7.45	0.13	-13.00	-58.62
147.76	-74.80	-69.66	-4.93	0.21	-13.00	-61.80
188.89	-69.28	-67.54	-1.50	0.24	-13.00	-56.28
299.47	-75.92	-76.09	0.48	0.32	-13.00	-62.92
640.91	-71.99	-72.26	0.79	0.52	-13.00	-58.99
745.47	-67.51	-67.96	1.01	0.56	-13.00	-54.51
1693.20	-56.00	-60.69	5.54	0.85	-13.00	-43.00
2539.80	-41.82	-46.63	5.84	1.03	-13.00	-28.82

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.

Project No	:TM-2305000074P	Test Date	:2023-10-24
Operation Band	:WCDMA_Band5_CH4233	Temp./Humi.	:24.6/57
Frequency	:846.6 MHz	Antenna Pol.	:Horizontal
Operation Mode	:TX	Engineer	:Ray.Li
EUT Pol	:E2	Test Chamber	: 966A
Setting	:		



Freq. MHz	EIRP/ERP dBm	SG Output Level dBm	Antenna Gain dBi/dBd	Cable Loss dB	Limit dBm	Margin dB
109.06	-74.24	-66.55	-7.51	0.18	-13.00	-61.24
141.84	-71.35	-65.43	-5.73	0.20	-13.00	-58.35
191.02	-65.28	-63.51	-1.52	0.24	-13.00	-52.28
205.38	-64.08	-63.56	-0.26	0.25	-13.00	-51.08
264.84	-72.25	-71.89	-0.06	0.30	-13.00	-59.25
604.73	-72.41	-73.41	1.50	0.50	-13.00	-59.41
1693.20	-47.64	-52.33	5.54	0.85	-13.00	-34.64
2539.80	-34.45	-39.26	5.84	1.03	-13.00	-21.45

Remark:
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, 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.