

TEST REPORT

Applicant Name : Quanzhou Buxun Electronic Technology Co., Ltd.
Address : No. 28, Xiaguangwu, Xiamei Village, Xiamei Town, Quanzhou, China
Report Number : RXM210908050-00
FCC ID: 2AYFM-ZL10

Test Standard (s)

FCC PART 22H

Sample Description

Product Type: Public Network Walkie Talkie
Model No.: ZL10
Multiple Model(s) No.: KSW, ZL20, X-50TFSI, X-AL1, ZL30, ZL50, ZL60, X-TFSI, X-GZ10, X-GZ20, X-GZ
Trade Mark: KSUN
Date Received: 2021/08/05
Date of Test: 2021/10/10~2021/10/16
Report Date: 2021/11/17

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:



Ting Lv
EMC Engineer

Approved By:



Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "★". Customer model name, addresses, names, trademarks etc. are not considered data.

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Shenzhen Accurate Technology Co., Ltd.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	WCDMA Band 5: 824-849 MHz (TX), 869-894 MHz (RX)
Maximum Conducted Average Output Power	WCDMA Band 5: 23.71dBm
Modulation Technique	WCDMA Band 5: BPSK, QPSK, 16QAM
Antenna Specification*	WCDMA850: 3.0dBi (It is provided by the applicant)
Voltage Range	DC 3.7V from battery or DC 5V from adapter
Sample serial number	RF conducted: RXM210908050-S1 RE: RXM210908050-S6 (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: CA-12 Input: AC 100-240V ~ 50/60Hz, 0.15A Output: DC 5.0V, 1.0A

Objective

This test report is in accordance with Part 2, Part 22-Subpart H of the Federal Communication Commission's rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-Part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
RF Frequency		±0.082*10 ⁻⁷
Emissions, Radiated	30MHz - 1GHz	±4.28dB
	1GHz - 18GHz	±4.98dB
	18GHz - 26.5GHz	±5.06dB
Temperature		±1 °C
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

No modification was made to the EUT.

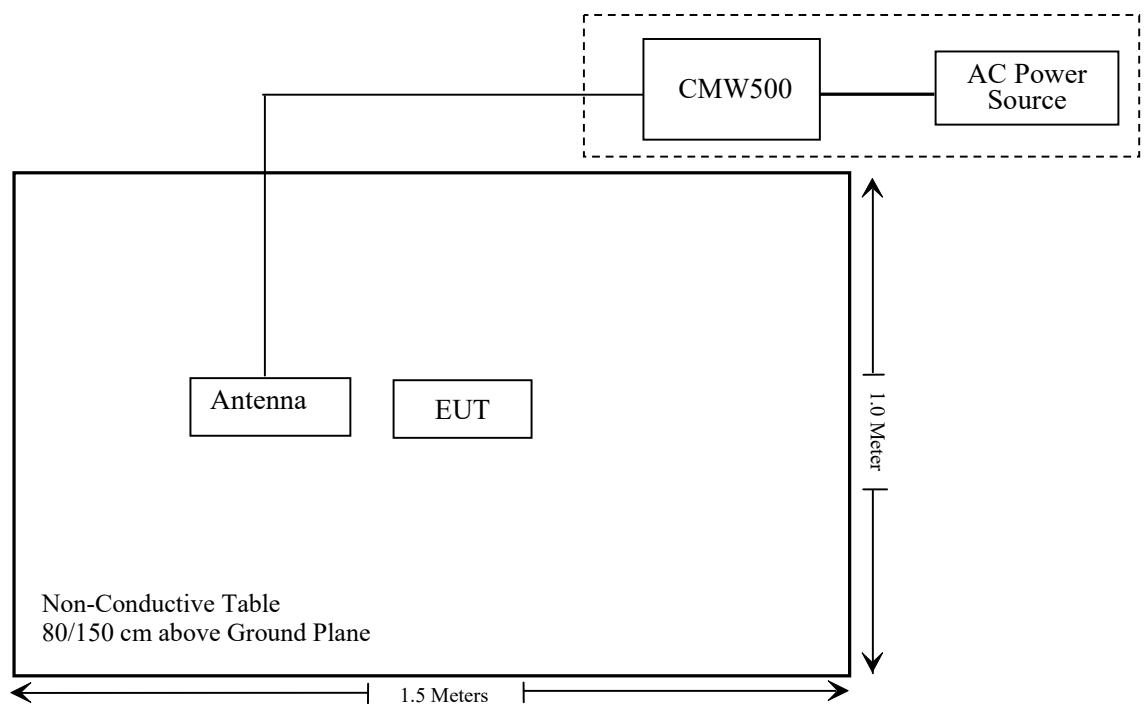
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606

Support Cable Description:

Cable Description	Length (m)	From / Port	To
Un-shielded Detachable AC cable	1.2	AC Power	CMW500

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	Compliant*
§2.1046; § 22.913 (a)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a)	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a)	Band Edge	Compliant
§ 2.1055; § 22.355	Frequency stability	Compliant

Compliant*: Please refer to SAR report released by Shenzhen Accurate Technology Co., Ltd., report number: CR21090133-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
Rohde&Schwarz	Spectrum Analyzer	FSV40	101495	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
A.H. Systems, inc.	Preamplifier	PAM-0118P	531	2021/07/08	2022/07/07
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-5m	No.4	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
Unknown	Band Reject Filter	MSF824-862MS-1147	201706003	2020/12/25	2021/12/24
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	N-1m	No.7	2020/12/25	2021/12/24
Anritsu	Signal Generator	68369B	004114	2021/7/31	2022/7/30
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101948	2020/12/24	2021/12/23
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2020/12/25	2021/12/24
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2020/12/25	2021/12/24
Gongwen	Temp. & Humid. Chamber	JB913R	GZ-WS004	2020/12/25	2021/12/24

* Statement of Traceability: Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: CR21090133-SA.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) - RF OUTPUT POWER

Applicable Standard

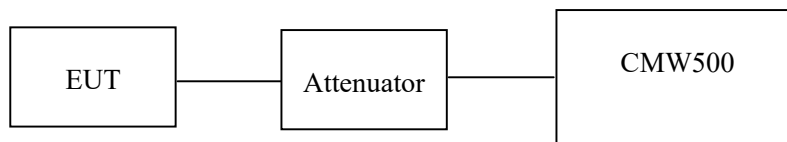
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



ANSI C63.26-2015 section 5.5.3.

Test Data

Environmental Conditions

Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-10-10.

Conducted Power**Cellular Band**

Mode	Test Mode	3GPP Sub Test	Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
WCDMA (Band 5)	RMC12.2k		23.71	23.69	23.57	24.56	24.54	24.42
	HSDPA	1	22.24	22.11	22.15	23.09	22.96	23.00
		2	22.14	22.21	22.16	22.99	23.06	23.01
		3	22.35	22.41	22.32	23.20	23.26	23.17
		4	22.37	22.53	22.44	23.22	23.38	23.29
	HSUPA	1	22.11	22.13	22.12	22.96	22.98	22.97
		2	22.01	22.03	22.05	22.86	22.88	22.90
		3	22.18	22.10	22.19	23.03	22.95	23.04
		4	22.19	22.31	22.53	23.04	23.16	23.38
		5	22.23	22.37	22.57	23.08	23.22	23.42
	HSPA+	1	22.49	22.24	22.38	23.34	23.09	23.23

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd)
 For WCDMA850: Antenna Gain = 3dBi = 0.85dBd (0dBd=2.15dBi)

Peak-to-average ratio (PAR)**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.56	13
	Middle	3.48	13
	High	3.49	13
HSDPA (16QAM)	Low	4.15	13
	Middle	3.87	13
	High	3.79	13
HSUPA (BPSK)	Low	3.57	13
	Middle	3.66	13
	High	3.64	13
HSPA+	Low	3.63	13
	Middle	3.59	13
	High	3.62	13

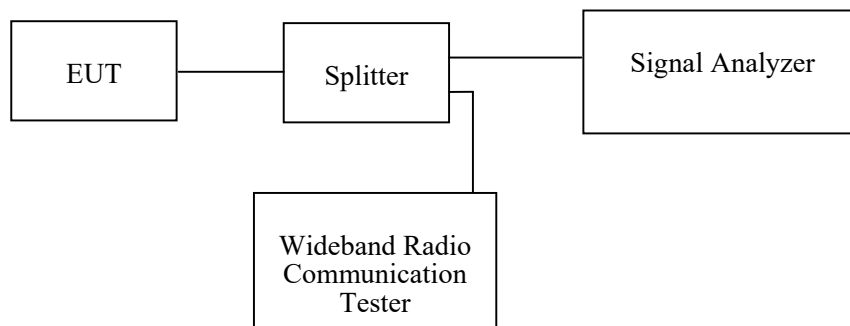
FCC §2.1049, §22.917, §22.905 - OCCUPIED BANDWIDTH**Applicable Standard**

FCC 47 §2.1049, §22.917, §22.905.

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 100kHz and the 26 dB & 99% bandwidth was recorded.

**Test Data****Environmental Conditions**

Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-10-10.

EUT operation mode: Transmitting

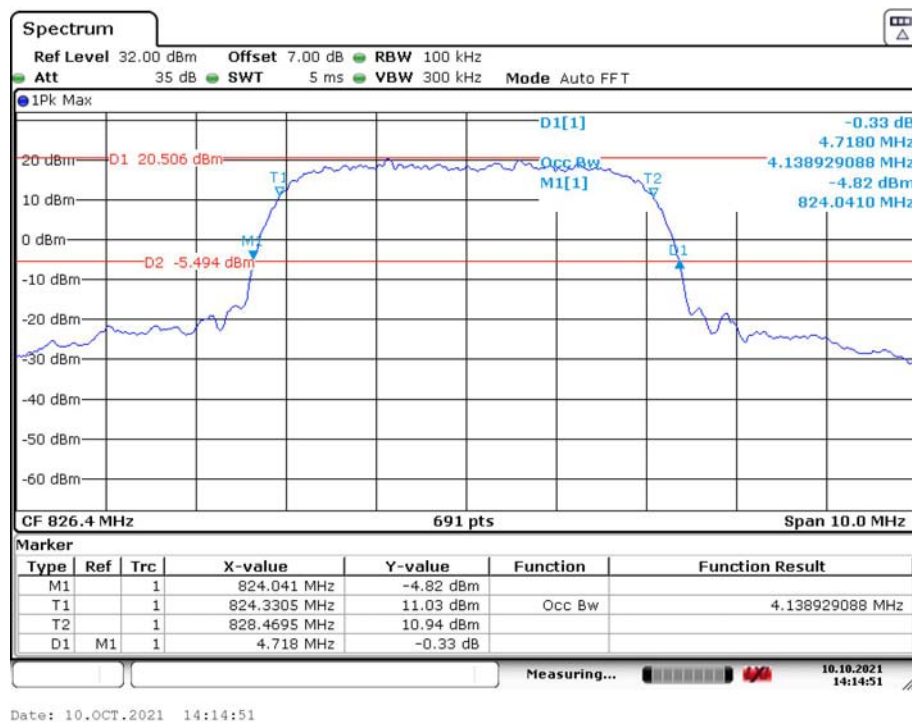
Test Result: Compliant. Please refer to the following tables and plots.

Cellular Band (Part 22H)

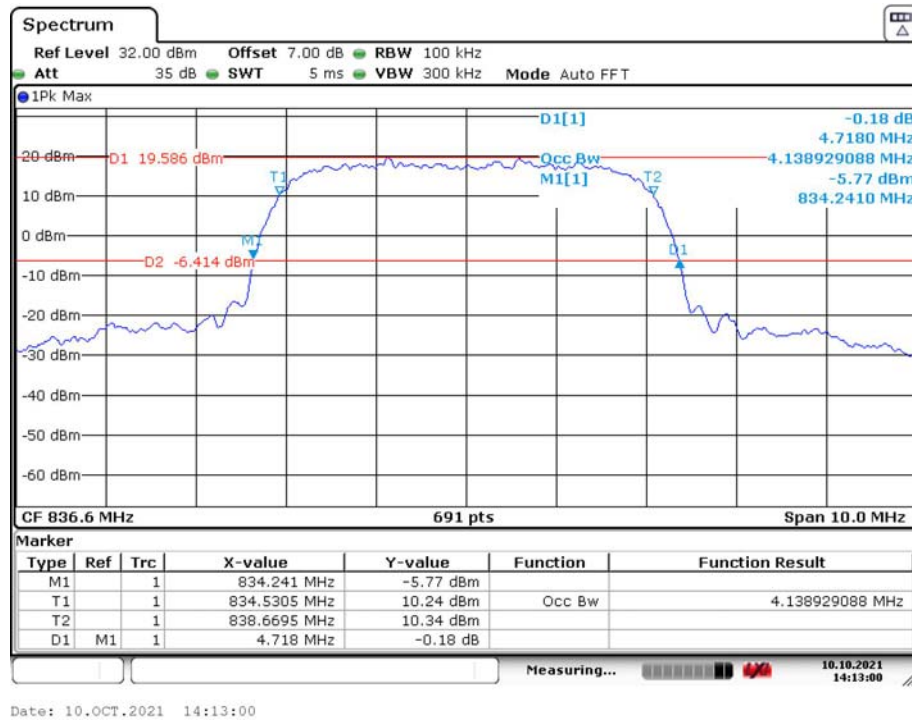
	Frequency (MHz)	Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)
RMC	826.4	4.14	4.72
	836.6	4.14	4.72
	846.6	4.12	4.72
HSDPA	826.4	4.14	4.70
	836.6	4.14	4.72
	846.6	4.12	4.72
HSUPA	826.4	4.14	4.70
	836.6	4.14	4.72
	846.6	4.14	4.70

Cellular Band (Part 22H)

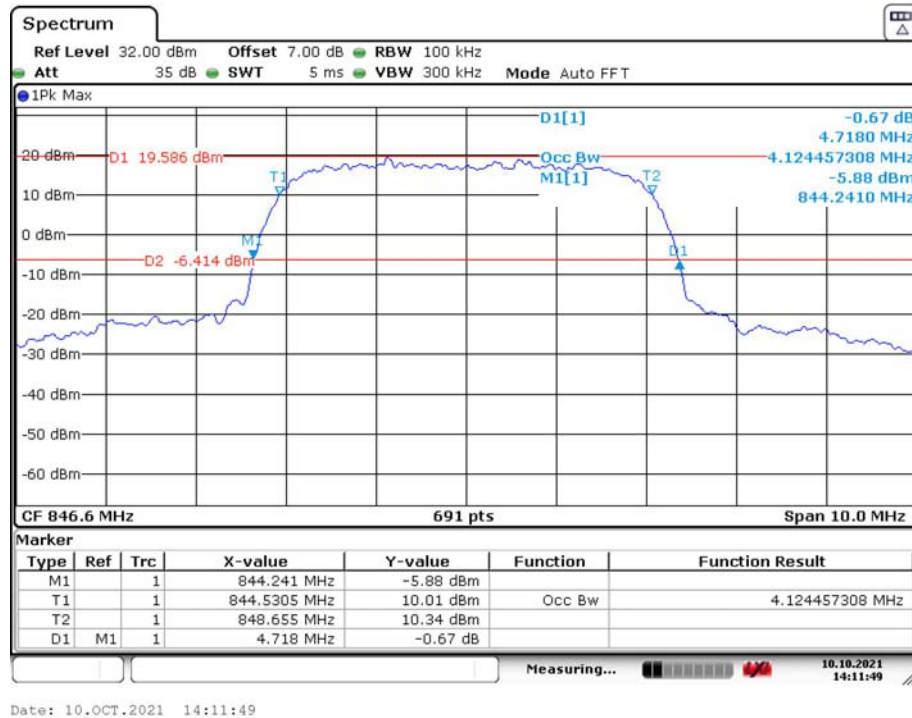
26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Low channel



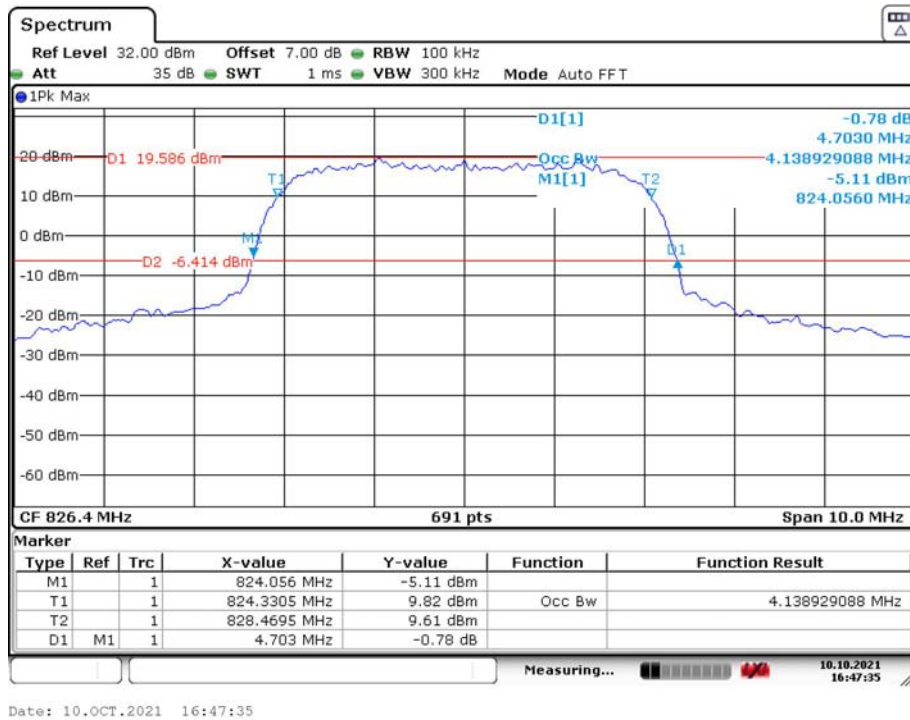
26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, Middle channel



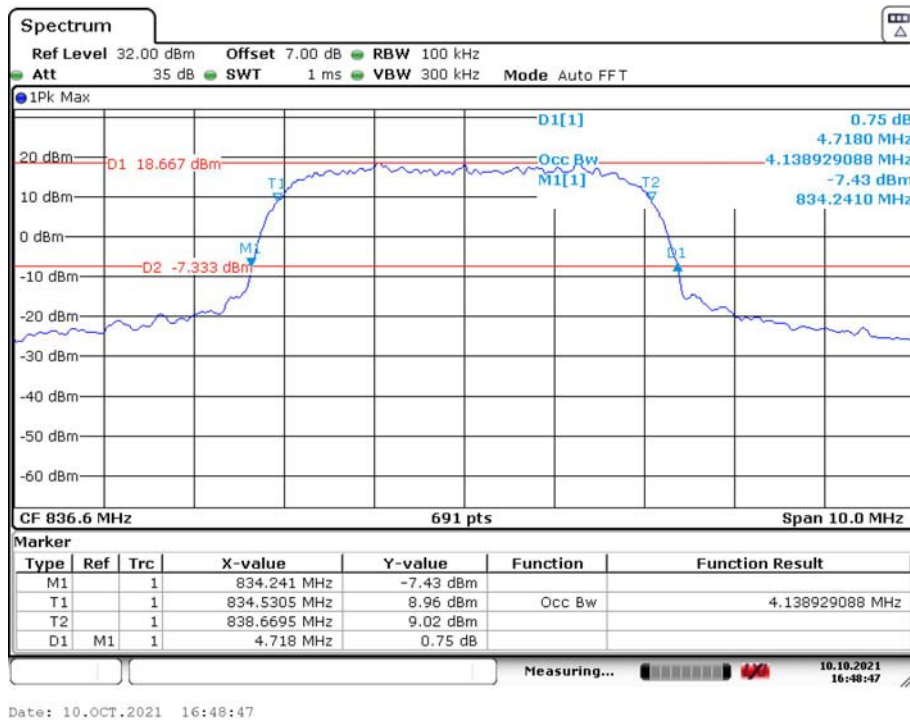
26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode, High channel



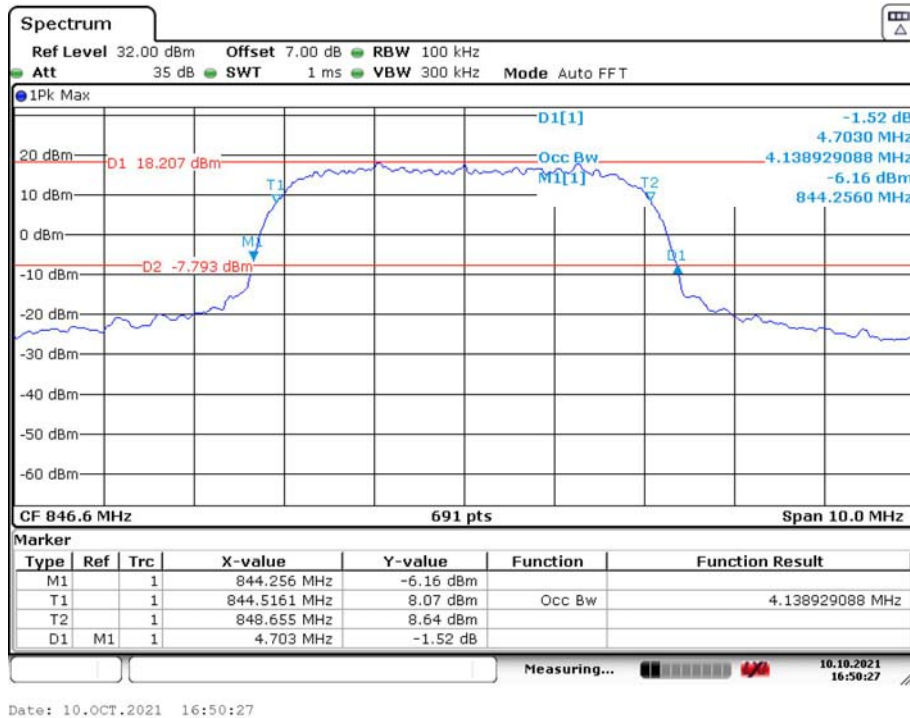
26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Low channel



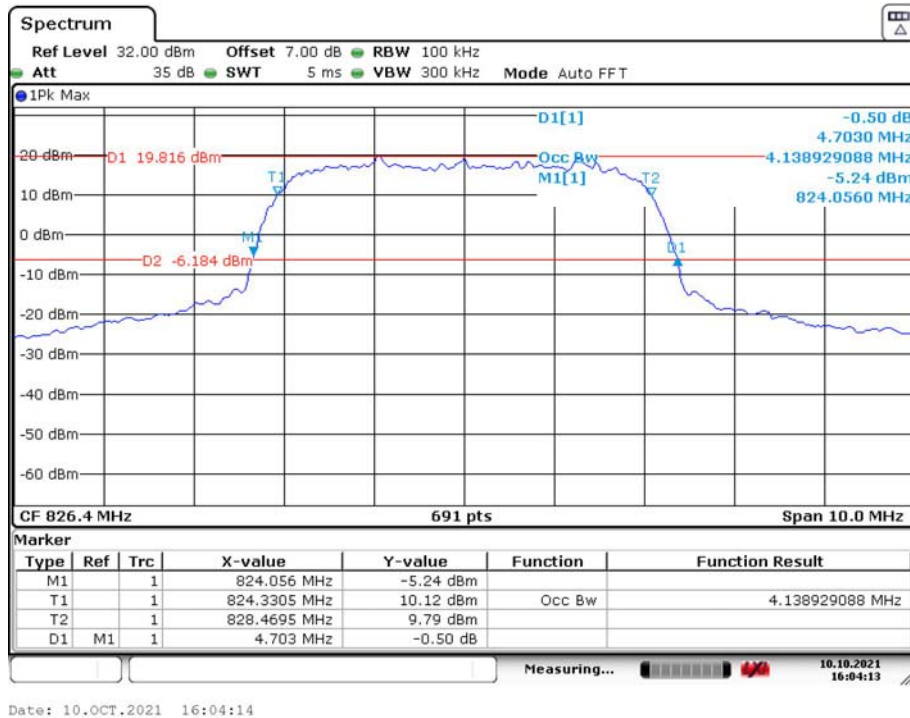
26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, Middle channel

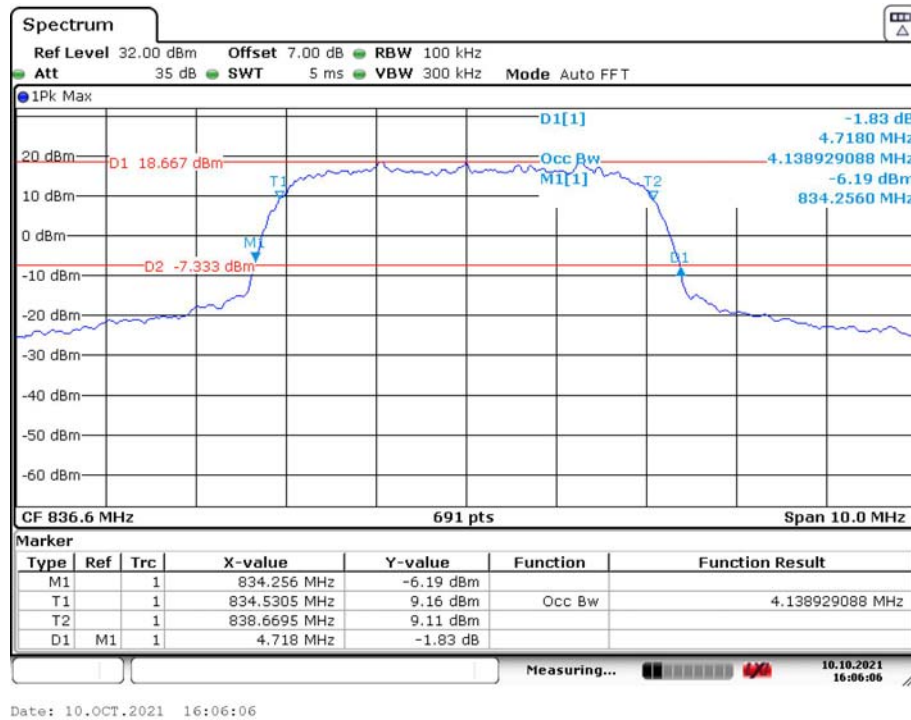
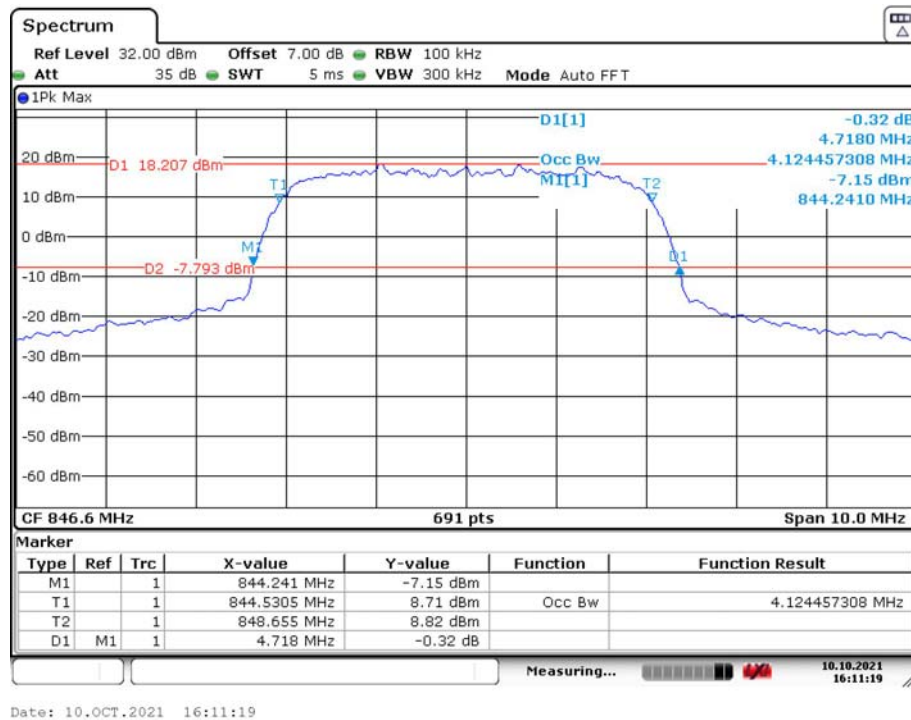


26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode, High channel



26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Low channel



26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, Middle channel**26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode, High channel**

FCC §2.1051, §22.917(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

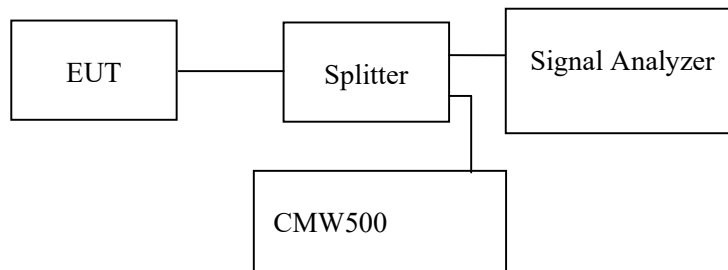
Applicable Standard

FCC §2.1051, §22.917(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100kHz for below 1GHz and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

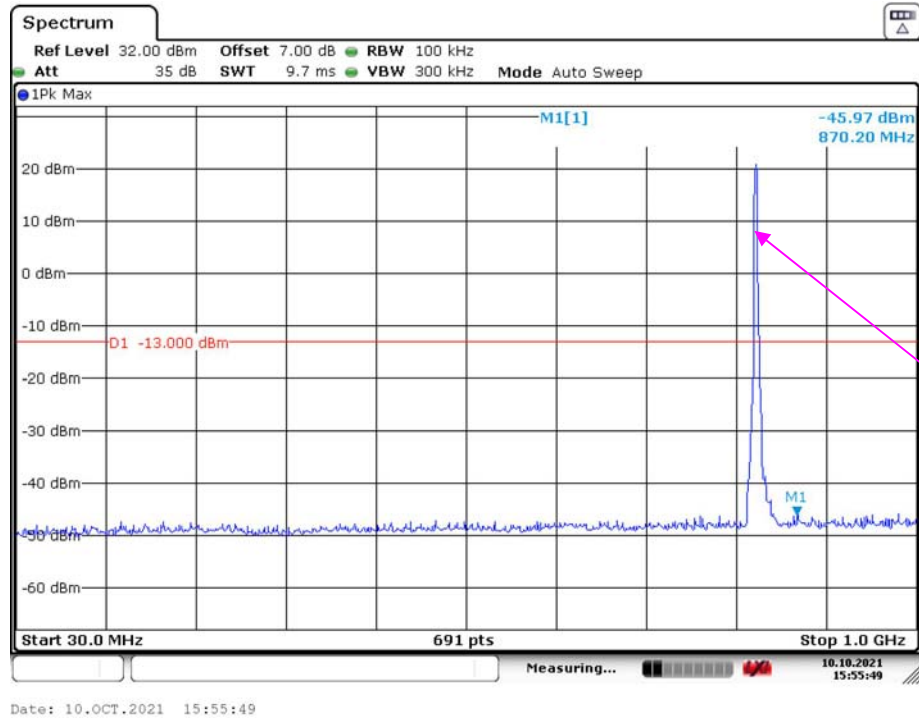
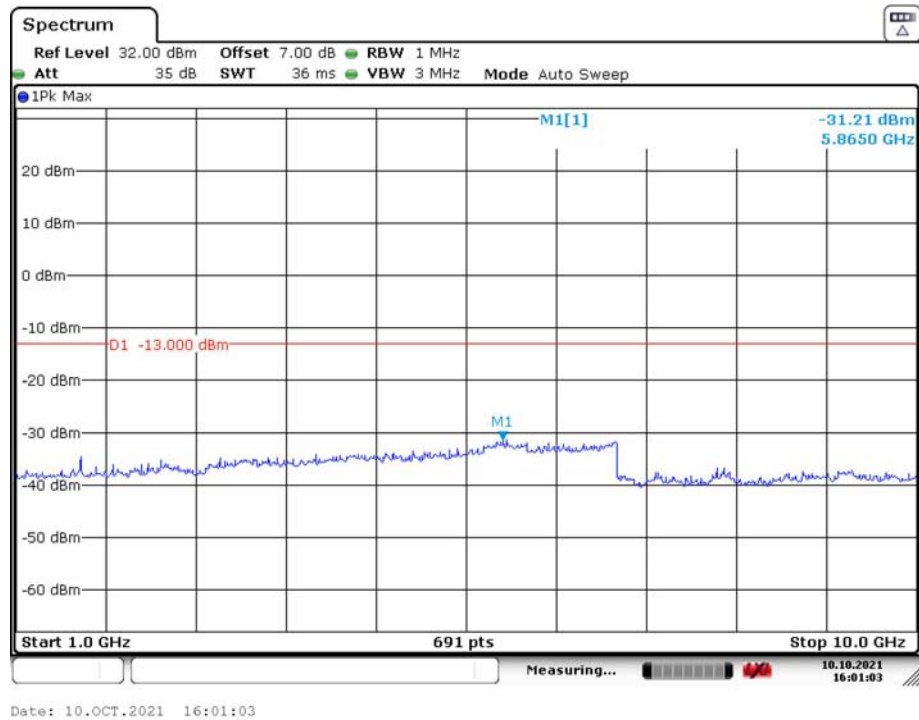
Environmental Conditions

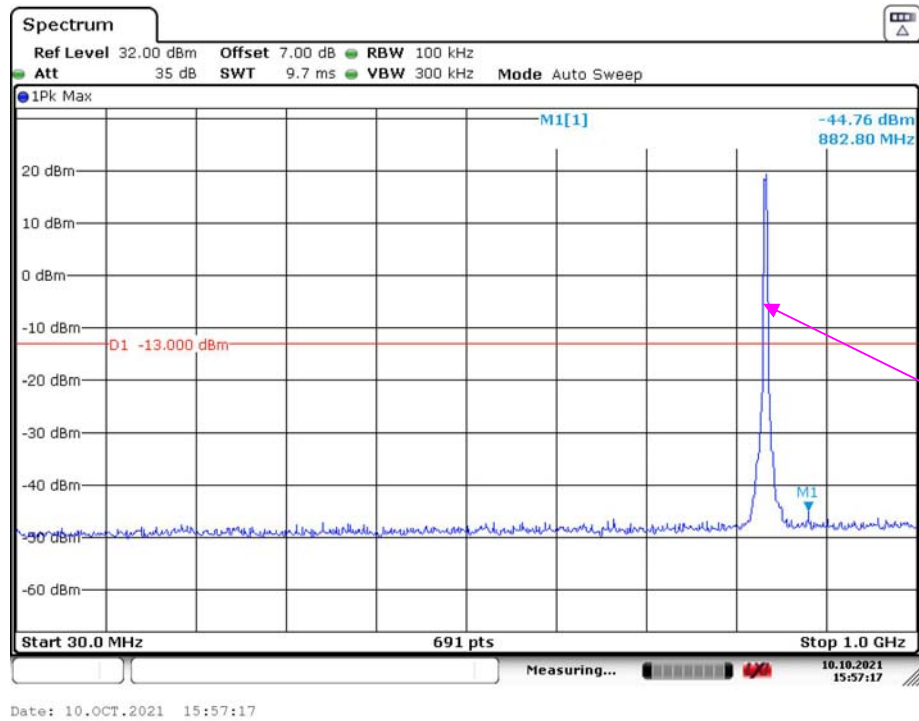
Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-10-10.

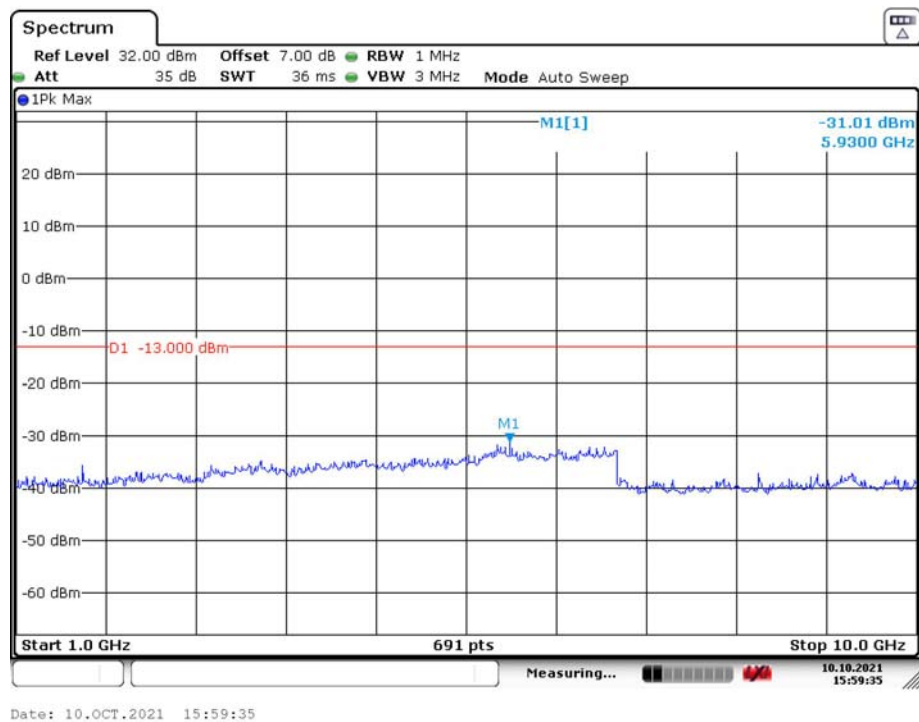
EUT operation mode: Transmitting

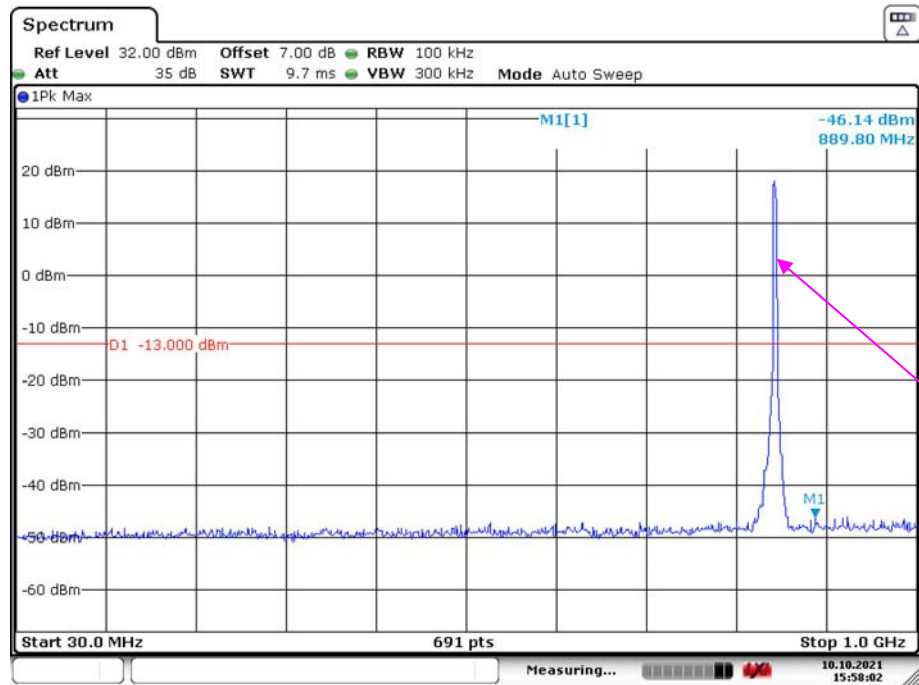
Test result: Compliant, please refer to the following plots.

**Cellular Band (Part 22H)
Low Channel****30 MHz – 1 GHz (WCDMA Mode)****1 GHz – 10 GHz (WCDMA Mode)**

Middle Channel**30 MHz – 1 GHz (WCDMA Mode)**

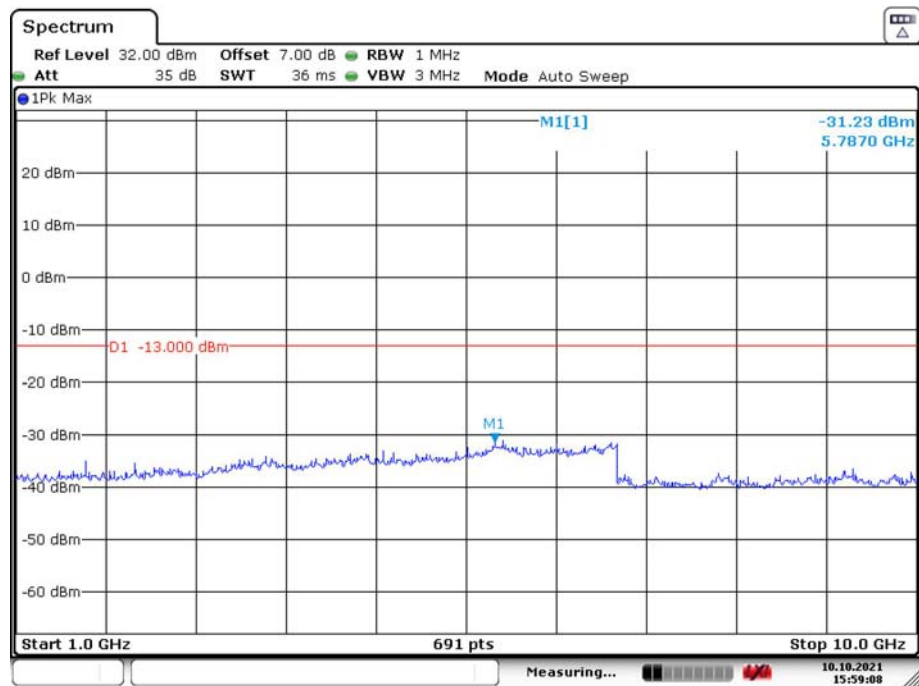
Fundamental test

1 GHz – 10 GHz (WCDMA Mode)

High Channel**30 MHz – 1 GHz (WCDMA Mode)**

Date: 10.OCT.2021 15:58:03

Fundamental test

1 GHz – 10 GHz (WCDMA Mode)

Date: 10.OCT.2021 15:59:08

FCC § 2.1053; § 22.917 (a) -SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a).

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TX pwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log₁₀ (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	103.0 kPa

The testing was performed by Chao Mo on 2021-10-16.

EUT operation mode: Transmitting

30 MHz ~ 10 GHz:**Cellular Band (Part 22H)**

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
	Reading (dBm)	PK/Ave		Height (m)	Polar (H/V)				
WCDMA BAND5,Low Channel									
46.17	-75.29	PK	220	1.4	H	3.12	-72.17	-13	59.17
46.5	-61.35	PK	42	1.5	V	-3.89	-65.24	-13	52.24
4132	-45.51	PK	277	1.0	H	7	-38.51	-13	25.51
4132	-45.35	PK	118	1.2	V	7.21	-38.14	-13	25.14
WCDMA BAND5,Middle Channel									
56.99	-64.35	PK	295	1.9	H	3.12	-61.23	-13	48.23
53.31	-62.97	PK	184	1.6	V	-3.89	-66.86	-13	53.86
4183	-49.42	PK	226	1.2	H	7.23	-42.19	-13	29.19
4183	-46.54	PK	154	1.8	V	7.38	-39.16	-13	26.16
WCDMA BAND5,High Channel									
57.03	-65.43	PK	285	2.0	H	3.12	-62.31	-13	49.31
52.14	-62.33	PK	359	1.6	V	-3.89	-66.22	-13	53.22
4233	-53.84	PK	139	1.7	H	7.46	-46.38	-13	33.38
4233	-53.73	PK	320	1.6	V	7.67	-46.06	-13	33.06

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Limit- Absolute Level

FCC § 22.917 (a) - BAND EDGES

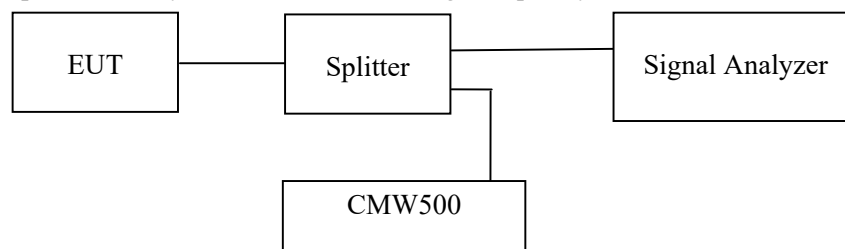
Applicable Standard

According to § 22.917(a), the power of any emissions 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.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

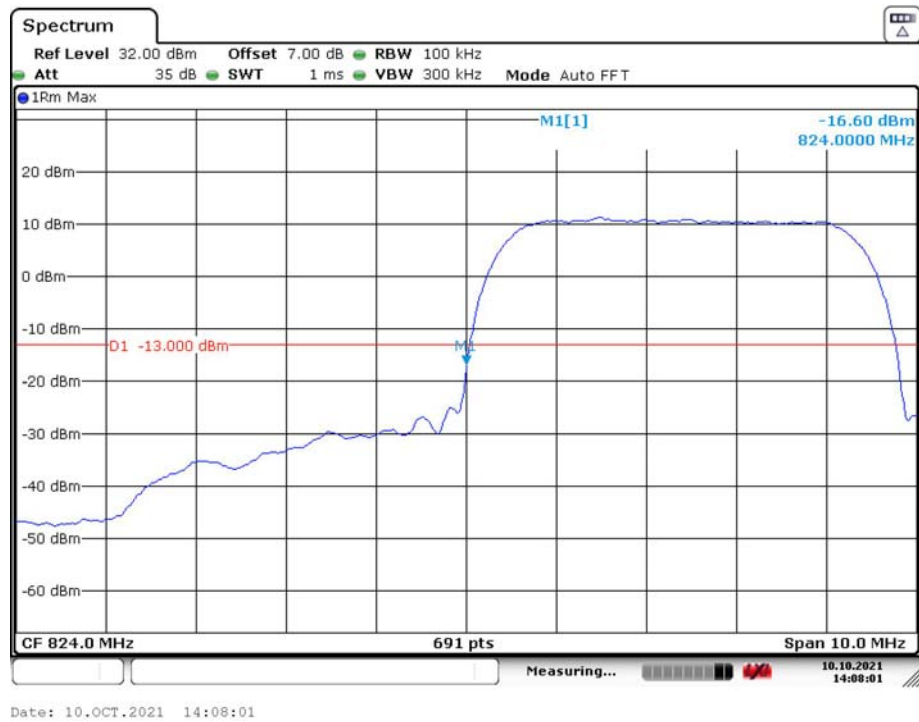
Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-10-10.

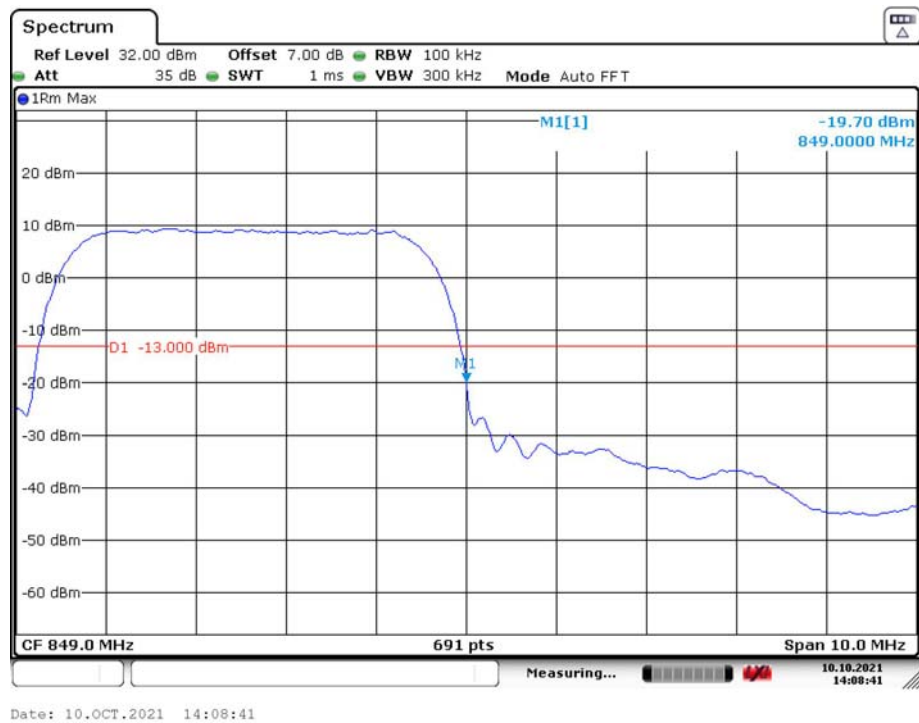
EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the following plots.

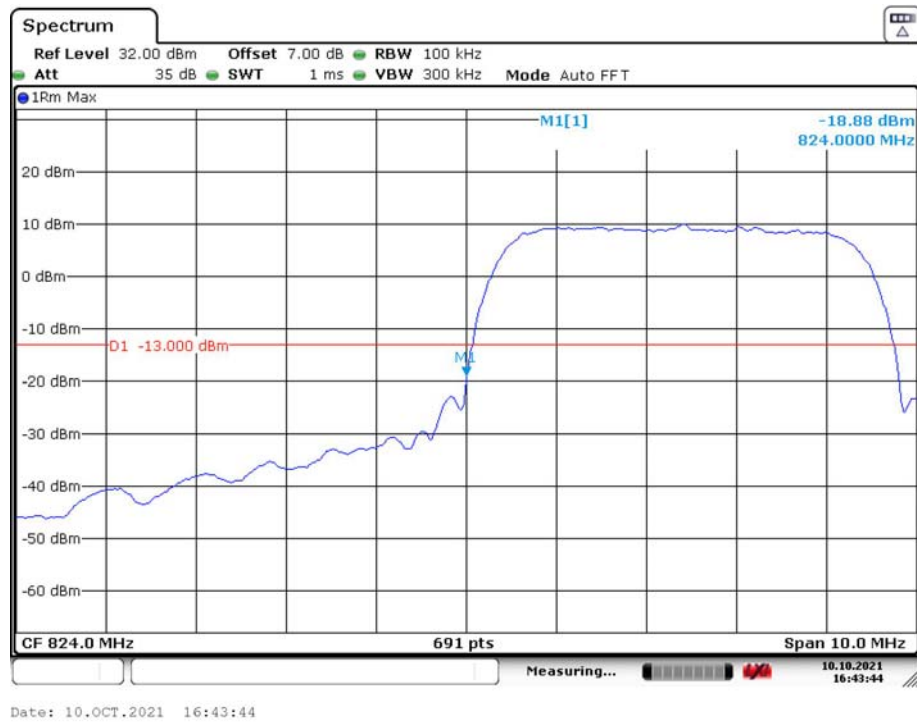
Cellular Band, Left Band Edge for RMC (BPSK) Mode



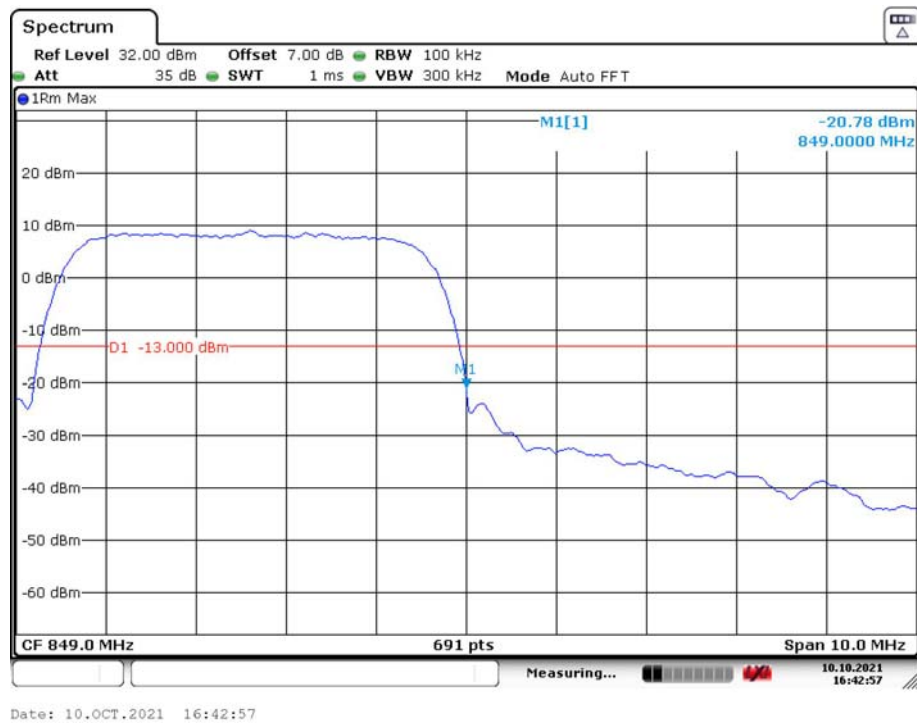
Cellular Band, Right Band Edge for RMC (BPSK) Mode



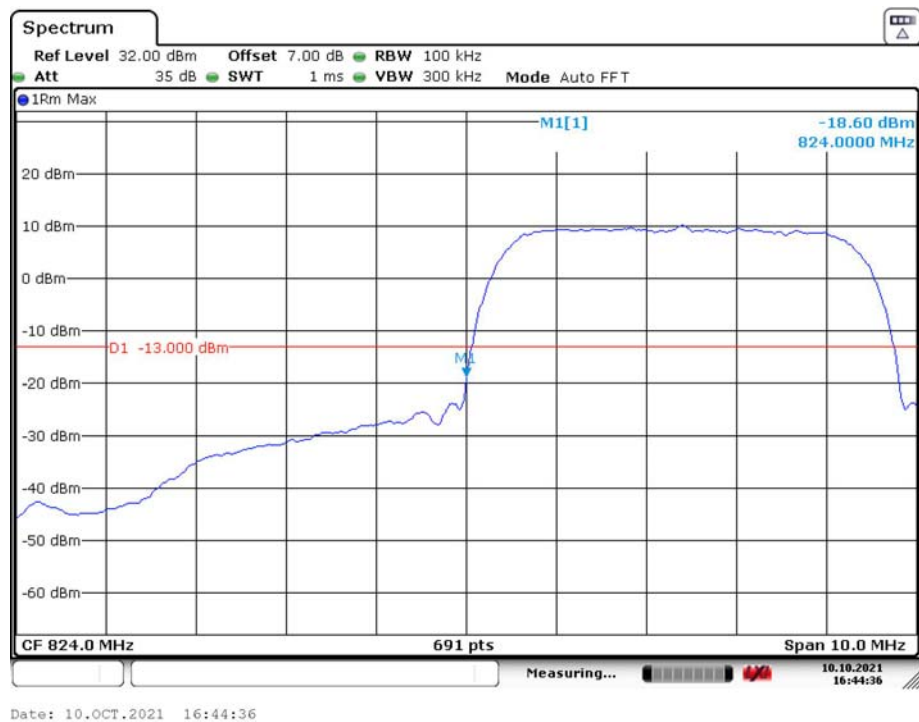
Cellular Band, Left Band Edge for HSDPA(16QAM) Mode



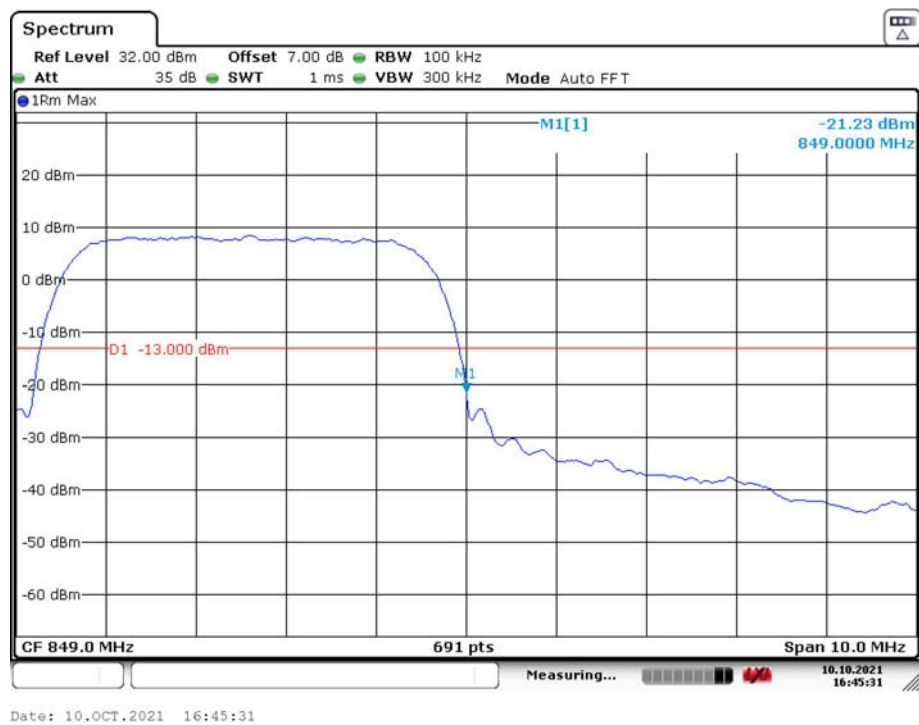
Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



FCC § 2.1055; § 22.355 - FREQUENCY STABILITY**Applicable Standard**

FCC § 2.1055, §22.355.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

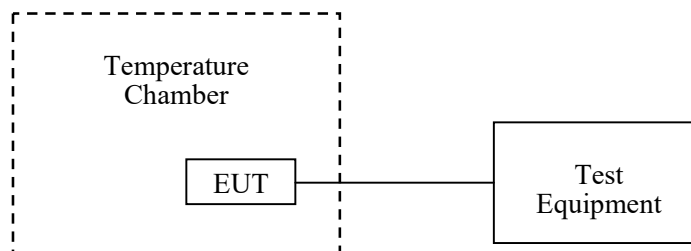
Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile > 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data**Environmental Conditions**

Temperature:	25.7 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

The testing was performed by Fan Yang on 2021-10-10.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the following tables.

Cellular Band (Part 22H)**WCDMA Mode**

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7	-11	-0.0131	2.5
-20		8	0.0096	2.5
-10		9	0.0108	2.5
0		-6	-0.0072	2.5
10		-5	-0.0060	2.5
20		-6	-0.0072	2.5
30		5	0.0060	2.5
40		-7	-0.0084	2.5
50		-9	-0.0108	2.5
20	3.2	6	0.0072	2.5
	4.2	-8	-0.0096	2.5

******* END OF REPORT *******