Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

FCC/IC WCDMA TEST REPORT

PRODUCT	Wireless data POS System
BRAND	SUNMI
MODEL	T5820
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T5820C
IC	22621-T5820C
ISSUE DATE	January 31, 2023
STANDARD(S)	FCC Part 2, FCC Part 22, FCC Part 24 FCC Part27, RSS-Gen Issue 5, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3

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1. Summary of Test Report

1.1 Test Standard (s)

No.	Test Standard（Include the version of standard）	Title	Version
1	FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	2021-10-01
2	FCC Part 22	PUBLIC MOBILE SERVICES	2021-10-01
3	FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	2021-10-01
4	FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	2021-10-01
5	RSS-Gen Issue 5	RSS-Gen —General Requirements for Compliance of Radio Apparatus	2021-02
6	RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz	2013-01
7	RSS-133 Issue 6	2 GHz Personal Communications Services	2018-01
8	RSS-139 Issue 3	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz	2015-07

1.2 Reference Documents

No.	Test Standard（Include the version of standard）	Title	Version
1	ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
2	ANSI C63.26	American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio	2015
3	KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01

1.3 Summary of Test Results

Measurement Items	Sub-clause of FCC	Sub-clause of IC	Verdict
Output Power	2.1046/22.913(a)/24.232(c)	RSS-132 5.4 RSS-133 6.4 RSS-139 6.5	Pass

Peak-to-Average Ratio	24.232(d)	RSS-132 5.4 RSS-133 6.4 RSS-139 6.5	Pass
99%Occupied Bandwidth	2.1049(h)(i)/ 22.917(b)	RSS-Gen 6.7	Pass
-26dB Emission Bandwidth	22.917(b)/24.238(b)	RSS-Gen 6.7	Pass
Band Edge at antenna terminals	22.917(a)/24.238(a)	RSS-132 5.5 RSS-133 6.5 RSS-139 6.6	Pass
Frequency stability	2.1055/24.235	RSS-132 5.3 RSS-133 6.3 RSS-139 6.4	Pass
Conducted Spurious mission	2.1053/22.917(a)/24.238(a)	RSS-132 5.5 RSS-133 6.5 RSS-139 6.6	Pass
Emission Limit	2.1051/22.917/24.238/22.913/24.232	RSS-132 5.5 RSS-133 6.5 RSS-139 6.6	Pass

Note:

The T5820, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a new product for testing.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.

1.4 Data Provided by Applicant

No.	Item(s)	Data
1	WCDMA Band 2	1.77dBi
2	WCDMA Band 4	2.02dBi
3	WCDMA Band 5	0.15dBi

2. General Information of The Laboratory

2.1 Testing Laboratory

Lab Name	Industrial Internet Innovation Center (Shanghai) Co.,Ltd.
Address	Building 4，No. 766，Jingang Road，Pudong，Shanghai，China
Telephone	021-68866880
FCC Registration No.	958356
FCC Designation No.	CN1177
IC Designation No.	10766A
CAB identifier	CN0067

2.2 Laboratory Environmental Requirements

Temperature	15℃~35℃
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	101kPa

2.3 Project Information

Project Manager	Gao Hongning
Test Date	October 20, 2022 to January 10, 2023

3. General Information of The Customer

3.1 Applicant

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388,Song Hu Road, Yang Pu District, Shanghai, China
Telephone	13510126210

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388,Song Hu Road, Yang Pu District, Shanghai, China

4. General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product	Wireless data POS System
Model	T5820
Date of Receipt	S05aa/S06aa:October 20,2022
EUT ID*	S05aa/S06aa
SN/IMEI	S05aa: 860450060019169 860450060019177 S06aa: 860450060018740 860450060018757
Supported Radio Technology and Bands	GSM850/GSM900/DCS1800/PCS1900 WCDMA Band I/II/IV/V/VIII LTE Band 2/4/5/7/12/17/38/41 BT 5.1 BR/EDR ,BLE WLAN 802.11b/g/n WLAN 802.11a/n/ac GPS/Glonass/BDS/OTDOA NFC
HVIN	T5820C
Hardware Version	V01
Software Version	XQT530_V004_20220923
FCC ID	2AH25T5820C
IC	22621-T5820C
NOTE： EUT ID is the internal identification code of the laboratory.	

4.2 Description for Auxiliary Equipment (AE)

AE ID*	Description	Model	SN/Remark
AE1	RF Cable	N/A	N/A
NOTE： AE ID is the internal identification code of the laboratory.			

4.3 Additional Information

Type of modulation	QPSK/16QAM

5. Test Configuration Information

5.1 Laboratory Environmental Conditions

5.1.1 Permanent Facilities

Relative Humidity	Min. = 45%, Max. = 55 %		
Atmospheric Pressure	101kPa		
Temperature	Normal	Minimum	Maximum
	25℃	0℃	45℃
Working Voltage of EUT	Normal	Minimum	Maximum
	7.2V	6.8V	8.4V

5.2 Test Equipments Utilized

Radiated emission test system

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	October 17,2022	1Year
					March 10, 2021	1.5 Years
2	Universal Radio Communication Tester	CMW500	104178	R&S	October 17,2022	1Year
					March 10, 2021	1.5 Years
3	EMI Test Receiver	ESU40	100307	R&S	February 23, 2022	1 Year
4	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	March 11, 2022	1 Year
5	Double- ridged Waveguide Antenna	ETS-3117	00135890	ETS	March 9, 2022	2 Years
6	2-Line V-Network	ENV216	101380	R&S	February 21, 2022	1 Year
7	EMI Test Software	EMC32 V9.15.00	N/A	R&S	N/A	N/A

Anechoic chamber

Fully anechoic chamber by ETS.

Conducted Test System

No.	Name	Model	S/N	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication	CMW500	148874	R&S	August. 23,2022	1 Year

	Tester					
2	Vector Signal Analyzer	FSQ26	101091	R&S	August. 23,2022	1 Year
3	Programmable power supply	Keithley 2303	4039070	Keithley	July 12,2022	1 Year
4	Eagle Test Software	Eagle V3.3	N/A	ECIT	N/A	N/A
5	Temperature Chamber	B-TF-107C	BTF107C-201804107	BoYi	June 30,2022	1Year

5.3 Measurement Uncertainty

Measurement uncertainty for all the testing in this report are within the limit specified in 3IN documents.

The detailed measurement uncertainty is defined in 3IN documents.

Measurement Items	Range	Confidence Level	Calculated Uncertainty
Maximum Peak Output Power	30MHz-3600MHz	95%	±0.544dB
EBW and VBW	30MHz-3600MHz	95%	±62.04Hz
Transmitter Spurious Emission-Conducted	30MHz-2GHz	95%	±0.90dB
Transmitter Spurious Emission-Conducted	2GHz-3.6GHz	95%	±0.88dB
Transmitter Spurious Emission-Conducted	3.6GHz-8GHz	95%	±0.96dB
Transmitter Spurious Emission-Conducted	8GHz-20GHz	95%	±0.94dB
Transmitter Spurious Emission-Radiated	9KHz-30MHz	95%	±5.66dB
Transmitter Spurious Emission-Radiated	30MHz-1000MHz	95%	±4.98dB
Transmitter Spurious Emission-Radiated	1000MHz -18000MHz	95%	±5.06dB
Transmitter Spurious Emission-Radiated	18000MHz -40000MHz	95%	±5.20dB
Frequency stability	1MHz-16GHz	95%	±62.04Hz

6. Test Results

6.1 Output Power

6.1.1 Summary

During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio.
Communication tester to ensure max power transmission and proper modulation.
This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

6.1.2 Conducted

6.1.2.1Method of Measurements

Method of measurements please refer to KDB971168 D01 v03 clause 5.
The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSQ(peak).
These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II; 1732.6 MHz, 1712.4MHz and 1752.6MHz for WCDMA Band IV; 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

6.1.2.2 Test procedures

The transmitter output port was connected to base station.
Set the EUT at maximum power through base station.
Select lowest, middle, and highest channels for each band and different modulation.
Measure maximum average power for other modulation signal.

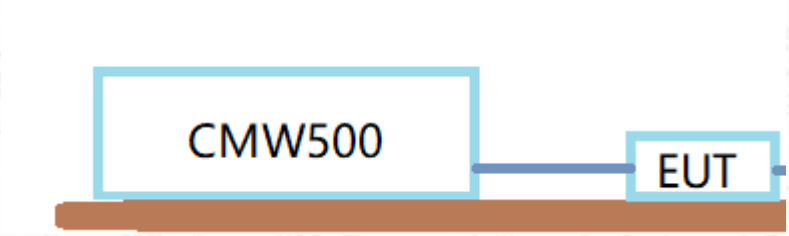
6.1.2.3 Limit

22.913(a) Mobile stations are limited to 7watts.
24.232(c) Mobile and portable stations are limited to 2 watts.
27.50d(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-
1780 MHz bands are limited to 1 watt EIRP.
Rule RSS-132 5.4 specifies that “The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.”Limit ≤ 11.5 W (40.6 dBm)
Rule RSS-133 6.4 specifies that " Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication”.Limit≤ 2 W (33 dBm)
Rule RSS-139 6.5 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 one watt. ≤ 1W (30 dBm)

6.1.2.4 Test Procedure

The transmitter output power was connected to calibrated attenuator, the other end of which was connected to signal analyzer. Transmitter output power was read off the power in dBm. The power outputs at the transmitter antenna port was determined by adding the value of attenuator to the signal analyzer reading.

6.1.2.5 Test Setup



6.1.2.6 WCDMA Test Condition

RBW	VBW	Sweep time	Span
10MHz	30MHz	Auto	50MHz

6.1.2.7 Measurement results

WCDMA BAND 2	
Channel	**Peak power (dBm)**
Low 9262/1852.6	24.15
Mid 9400 /1880	24.23
High 9538/1907.4	24.29

WCDMA BAND 4	
Channel	**Peak power (dBm)**
Mid 1413 /1732.6	24.26
Low 1312/1712.4	24.27
High 1513/1752.6	24.22

WCDMA BAND 5	
Channel	**Peak power (dBm)**
Low 4132/826.6	24.00
Mid 4183/835	24.02
High 4232/846.4	24.05

6.2 Peak-to-Average Power Ratio

Method of test measurements please refer to KDB971168 D01 v03 clause 5.7.

6.2.1 PAPR Limit

The peak-to-average power ratio (PAPR) of the transmission may not exceed 13dB

Rule RSS-132: 5.4: 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. Limit ≤ 13dB

Rule RSS-133 6.4 specifies that " the transmitter's peak-to-average power ratio (PAPR) 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." Limit ≤ 13dB

Rule RSS-139 6.5 specifies that "In addition, the peak to average power ratio (PAPR) of the equipment shall not exceed 13 dB for more than 0.1% of the time, using a signal that corresponds to the highest PAPR during periods of continuous transmission."

6.2.2 Test procedures

The EUT was connected to the spectrum analyzer and system simulator via a power divider.

Select the spectrum analyzer CCDF function.

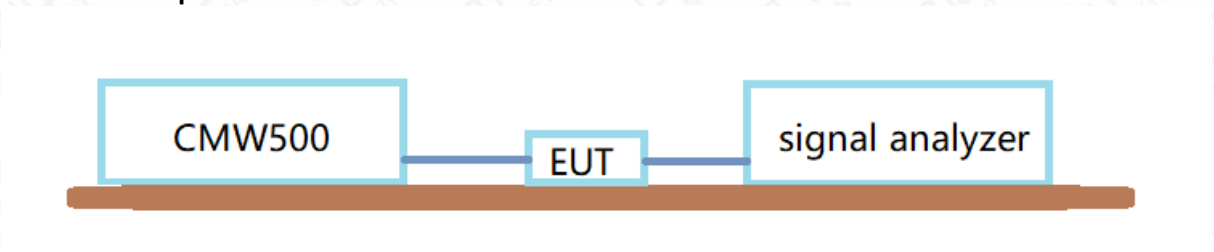
Set RBW ≥ signal's occupied bandwidth.

Set the number of counts to a value that stabilizes the measured CCDF cure;

Sweep time ≥ 1s.

Record the maximum PAPR level associated with a probability of 0.1%.

6.2.3 Test Setup



6.2.4 Test results:

WCDMA Band 2			
Channel	9263	9400	9537
Frequency (MHz)	1852.6	1880	1907.4
PAPR(dB)	2.72	2.76	2.85

WCDMA Band 4			
Channel	1313	1450	1512

Frequency (MHz)	1712.6	1740.4	1752.4
PAPR(dB)	2.85	2.76	2.66

WCDMA Band 5			
Channel	4133	4183	4232
Frequency (MHz)	826.4	836.6	846.6
PAPR(dB)	3.04	2.92	2.92

6.3 99% Occupied Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0.

No specific occupied bandwidth requirements in RSS-Gen: 6.6.

6.3.1. Occupied Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA BAND II , WCDMA BAND IV and WCDMA BAND V.

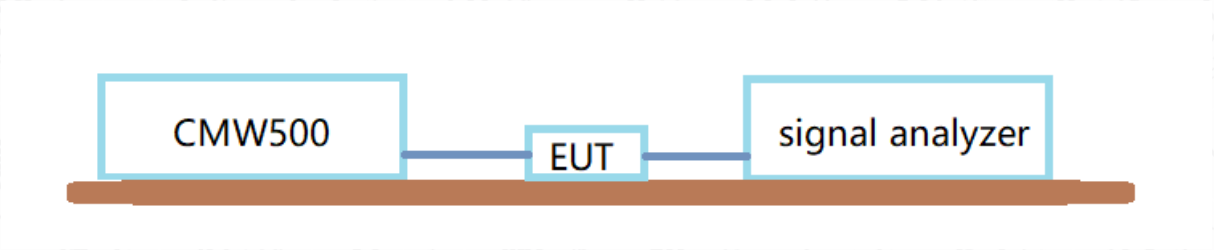
6.3.2 Test Procedure

The EUT output RF connector was connected with a short cable to the signal analyzer.

RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.

99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

6.3.3 Test Setup



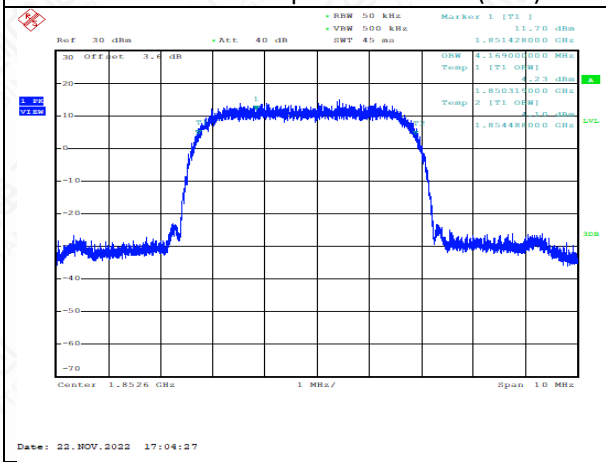
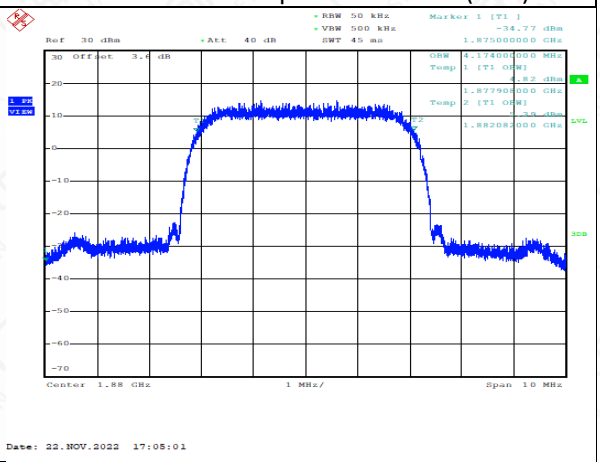
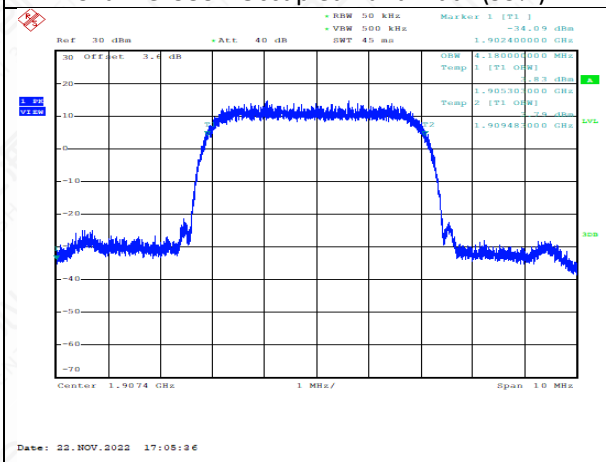
6.3.4 Test result

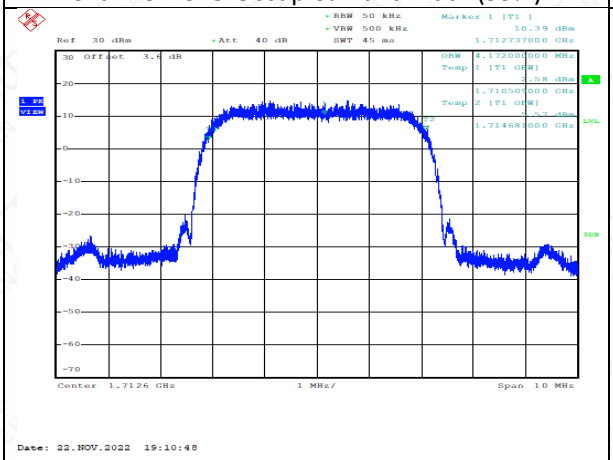
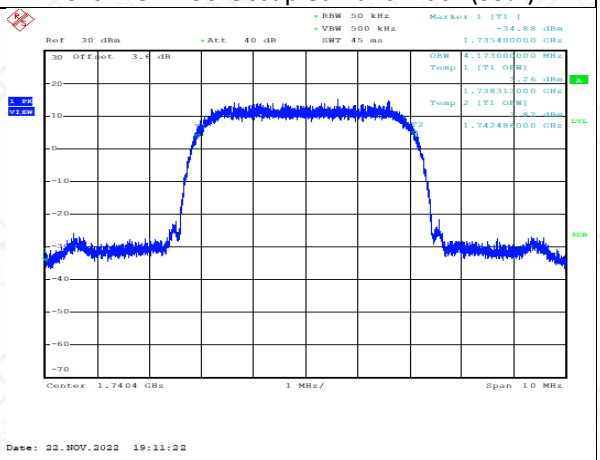
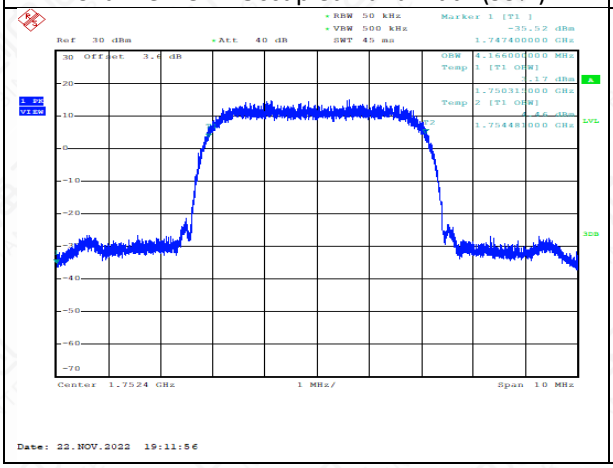
WCDMA BAND 2		
Test channel	**Frequency (MHz)**	**99% Occupied Bandwidth(MHz)**
Low 9263	1852.6	4.169
Mid 9400	1880	4.174
High 9537	1907.4	4.180

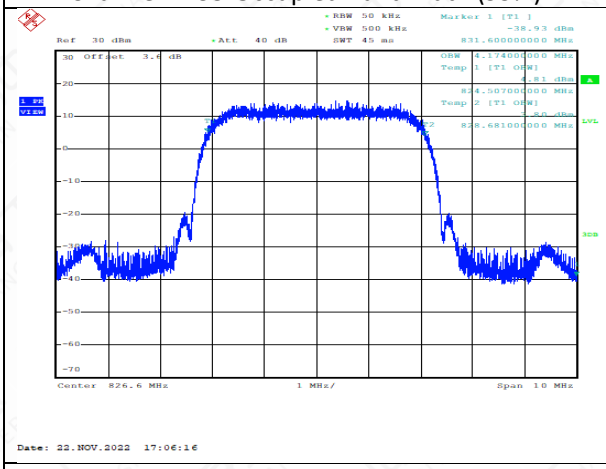
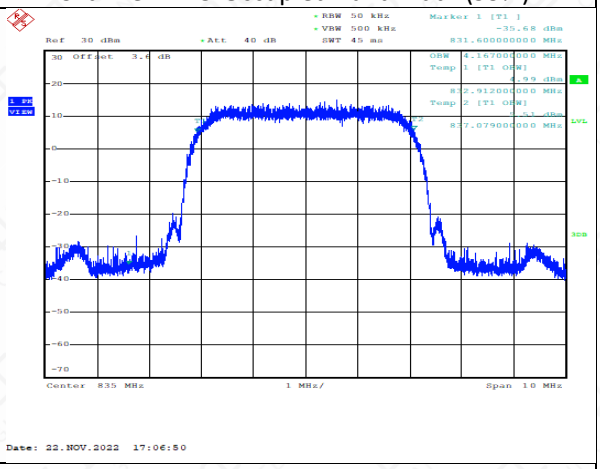
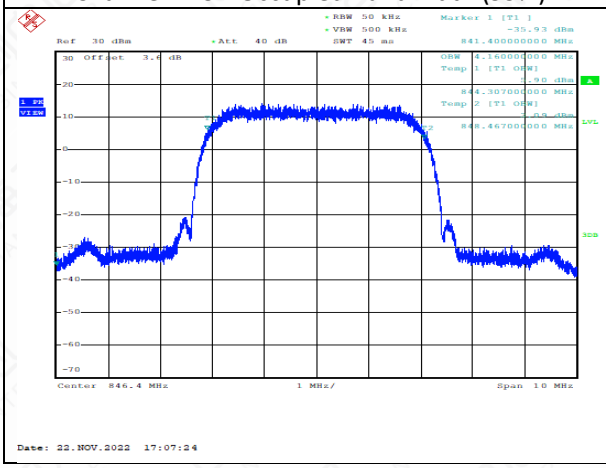
WCDMA BAND 4		
Test channel	**Frequency (MHz)**	**99% Occupied Bandwidth(MHz)**
Low 1313	1712.6	4.172
Mid 1450	1740.4	4.173
High 1512	1752.5	4.166

WCDMA BAND 5		
Test channel	**Frequency (MHz)**	**99% Occupied Bandwidth(MHz)**
Low 4133	826.4	4.174
Mid 4175	836.6	4.167
High 4232	846.6	4.160

Conclusion: PASS

WCDMA BAND 2	
Channel 9263-Occupied Bandwidth (99%)	Channel 9400-Occupied Bandwidth (99%)
	
Channel 9537-Occupied Bandwidth (99%)	/
	/

WCDMA BAND 4	
Channel 1313-Occupied Bandwidth (99%)	Channel 1450-Occupied Bandwidth (99%)
	
Channel 1512-Occupied Bandwidth (99%)	/
	/

WCDMA BAND 5	
Channel 4133-Occupied Bandwidth (99%)	Channel 4175-Occupied Bandwidth (99%)
	
Channel 4232-Occupied Bandwidth (99%)	/
	/

6.4 -26dB Emission Bandwidth

Method of test please refer to KDB971168 D01 v03 clause 4.0.

No specific occupied bandwidth requirements in RSS-Gen: 6.6.

6.4.1. -26dB Emission Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of WCDMA BANDII, WCDMA BANDIV, WCDMA BANDV.

6.4.2 Test Procedure:

The EUT output RF connector was connected with a short cable to the signal analyzer.

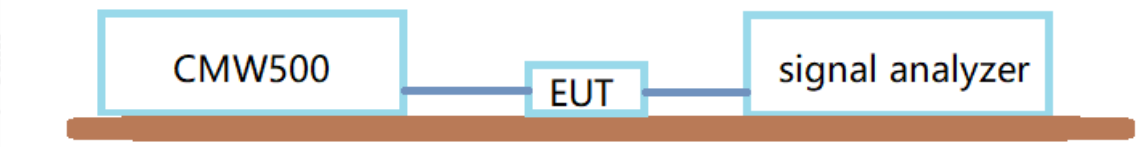
RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.

26dB bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

6.4.3 Measurement methods:

For WCDMA: signal analyzer setting as: RBW=50KHz; VBW=200KHz; Span=10MHz.

6.4.4 Test Setup



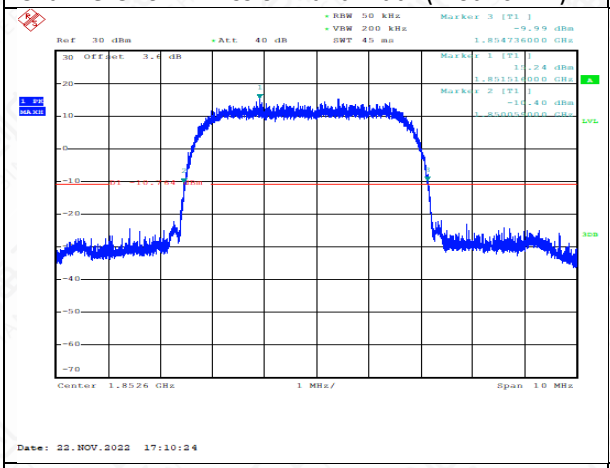
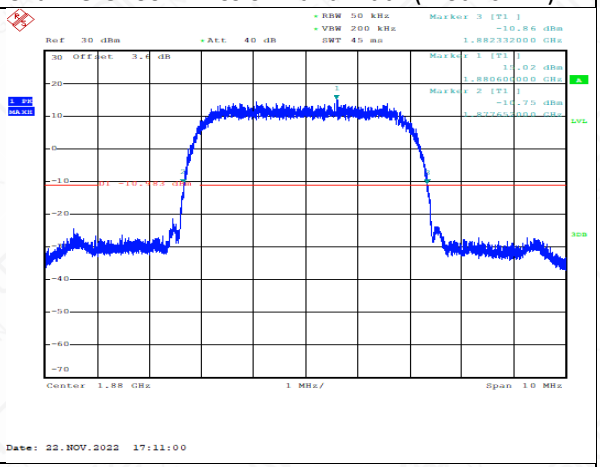
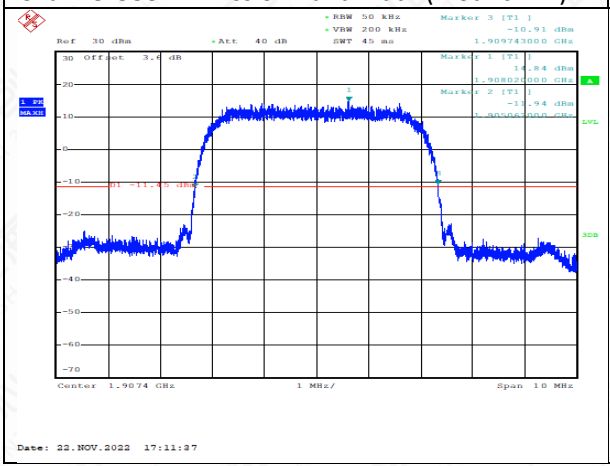
6.4.5 Test results:

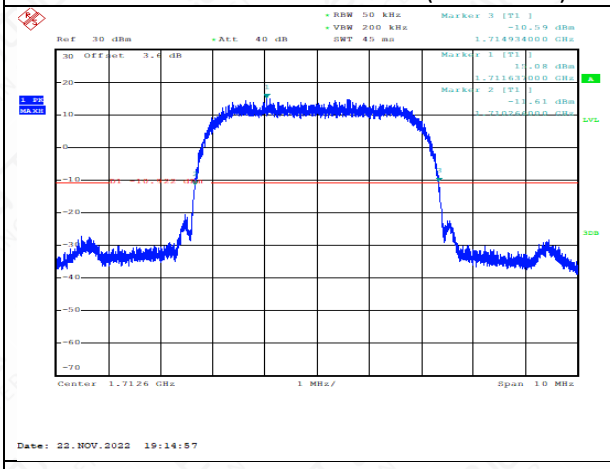
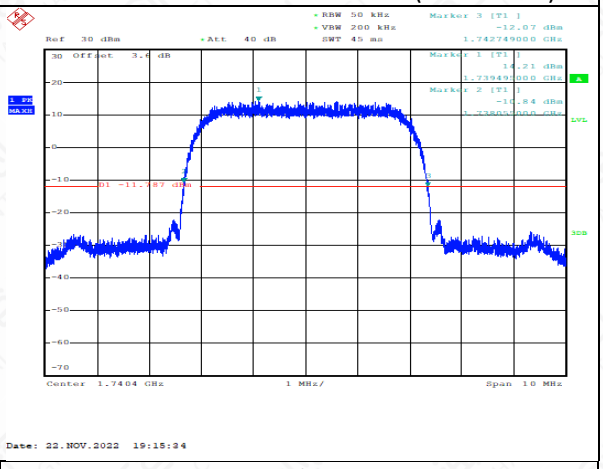
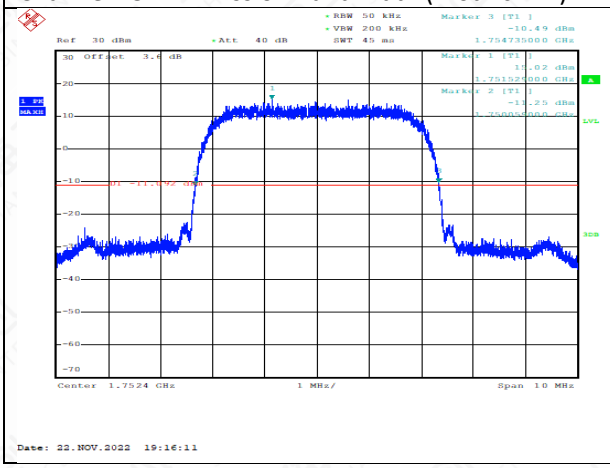
WCDMA BAND 2		
Test channel	**Frequency (MHz)**	**–26dBc Emission Bandwidth(MHz)**
Low 9263	1852.6	4.677
Mid 9400	1880	4.680
High 9537	1907.4	4.681

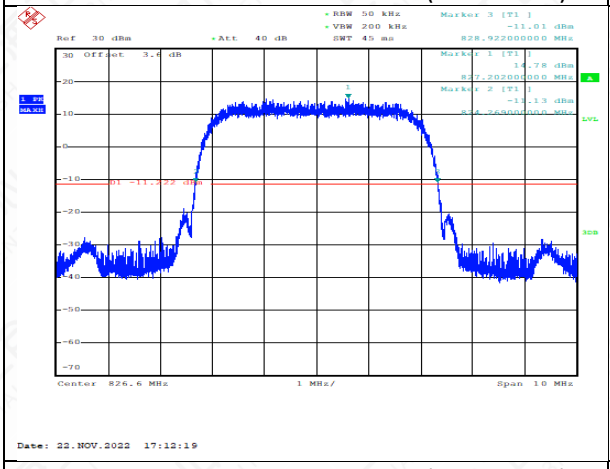
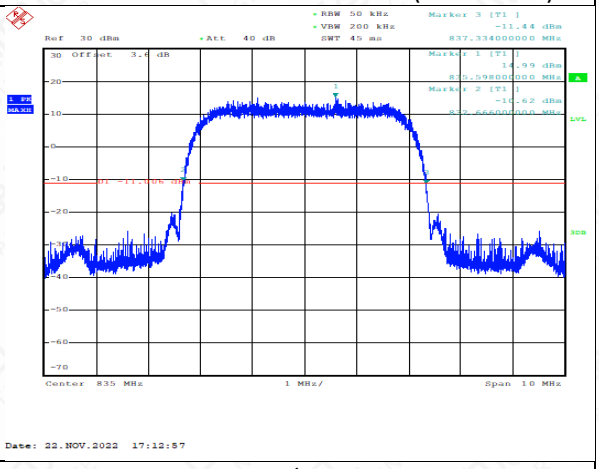
WCDMA BAND 4		
Test channel	**Frequency (MHz)**	**–26dBc Emission Bandwidth(MHz)**
Low 1313	1712.6	4.668
Mid 1450	1740.4	4.694
High 1512	1752.4	4.676

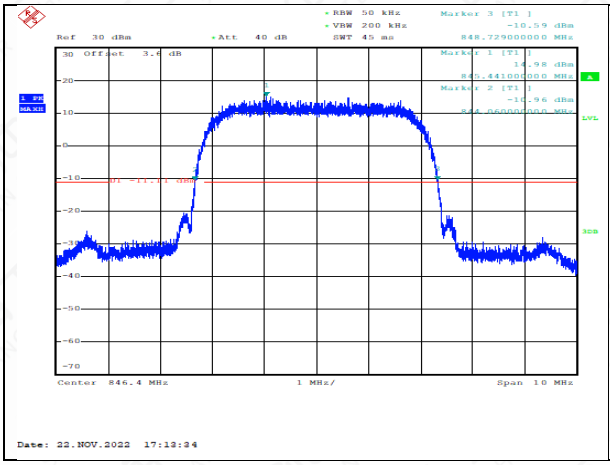
WCDMA BAND 5		
Test channel	**Frequency (MHz)**	**–26dBc Emission Bandwidth(MHz)**
Low 4132	826.4	4.653
Mid 4183	836.6	4.668
High 4233	846.6	4.669

Conclusion: PASS

WCDMA BAND 2	
Channel 9262- Emission Bandwidth (-26dBc BW)	Channel 9400- Emission Bandwidth (-26dBc BW)
	
Channel 9537- Emission Bandwidth (-26dBc BW)	/
	/

WCDMA BAND 4	
Channel 1313- Emission Bandwidth (-26dBc BW)	Channel 1450- Emission Bandwidth (-26dBc BW)
	
Channel 1512- Emission Bandwidth (-26dBc BW)	/
	/

WCDMA BAND 5	
Channel 4133- Emission Bandwidth (-26dBc BW)	Channel 4175- Emission Bandwidth (-26dBc BW)
	
Channel 4232- Emission Bandwidth (-26dBc BW)	/


RBW 50 kHz
VBW 200 kHz
SWT 45 ms
Marker 3 [T1]
-10.59 dBm
848.729000000 MHz
Ref 30 dBm
Att 40 dB
Offset 3.6 dB
Marker 1 [T1]
14.98 dBm
845.441000000 MHz
Marker 2 [T1]
-10.96 dBm
844.060000000 MHz
Center 846.4 MHz
1 MHz/
Span 10 MHz
Date: 22.NOV.2022 17:13:34

/

6.5 Band Edge at antenna terminals

Method of test measurements please refer to KDB971168 D01 v03 clause 6

6.5.1 Limit:

Part 22.917(a),24.238(a) state that 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.

Part 27.53(h) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Rule RSS-132: 5.5: (i) 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).

(ii)After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required. Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required."Limit -13 dBm

Rule RSS-139 6.6 specifies that " In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB."

6.5.2 Test procedure:

The RF output of the transceiver was connected to a signal analyzer through appropriate attenuation.

In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band

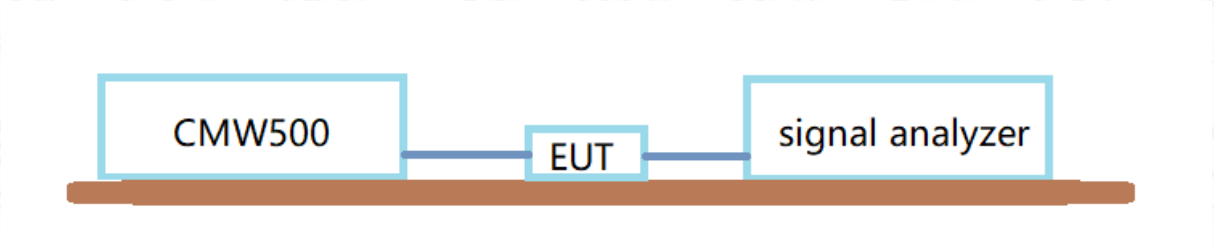
The limit line is derived from 43+10log(P) Db below the transmitter power P(Watts)

=P(W)-[43+10log(P)](Db)

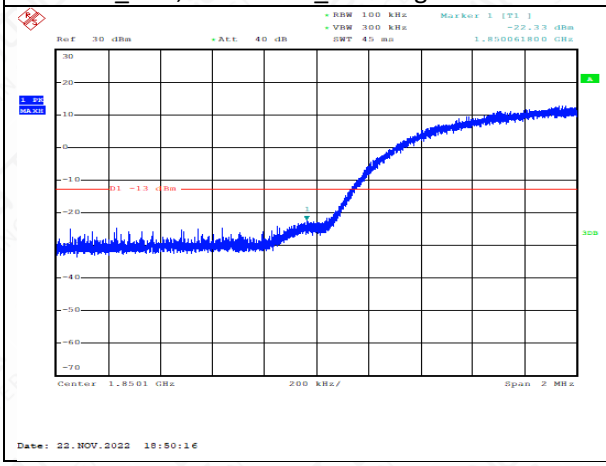
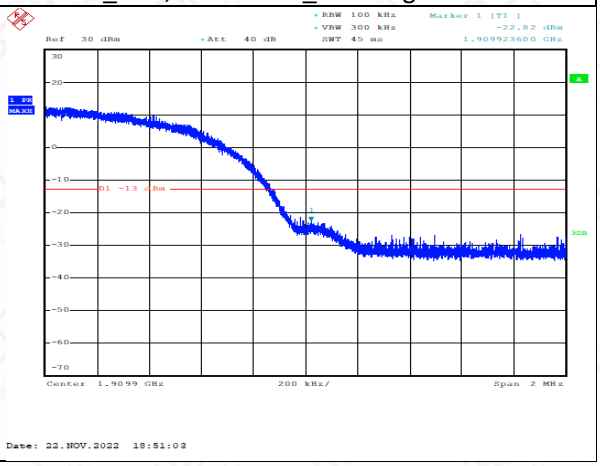
=[30+10log(P)](dBm)-[43+10log(P)](Db)

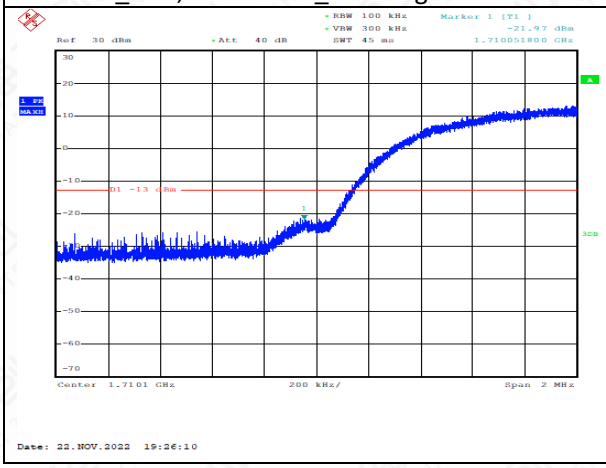
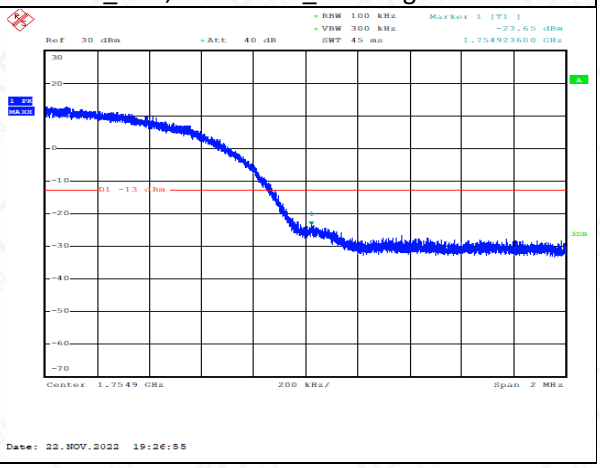
=-13dBm

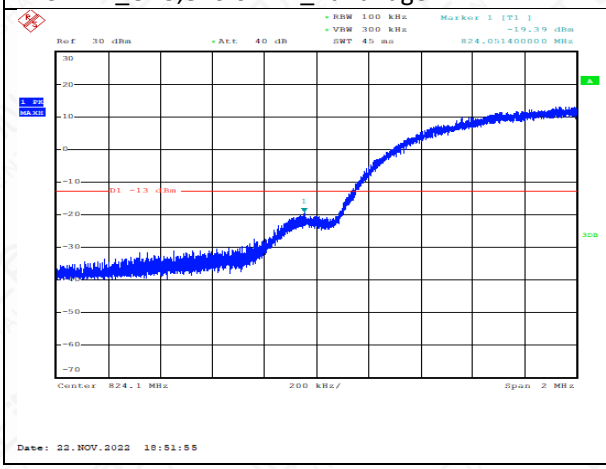
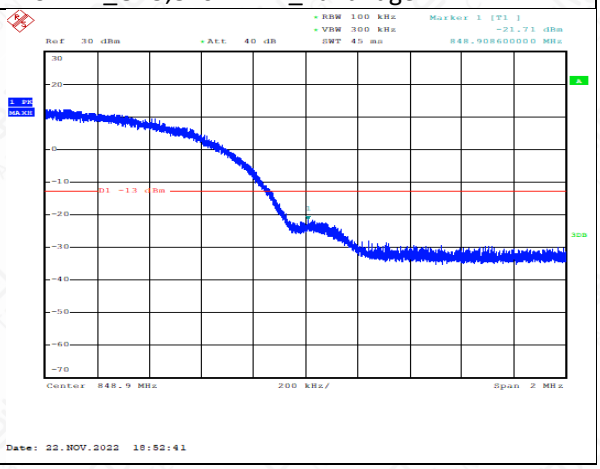
6.5.3 Test Setup



6.5.4 Test Result:

WCDMA BAND 2	
WCDMA_OB2,1852.6MHz_BandEdge	WCDMA_OB2,1907.4MHz_BandEdge
	

WCDMA BAND IV	
WCDMA_OB4,1712.6MHz_BandEdge	WCDMA_OB4,1752.4MHz_BandEdge
	

WCDMA BAND 5	
WCDMA_OB5,826.6MHz_BandEdge	WCDMA_OB5,846.4MHz_BandEdge
	

Conclusion: PASS

6.6 Frequency Stability

Method of test measurements please refer to KDB971168 D01 v03 clause 9

6.6.1 Method of Measurement and test procedures

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -10℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on mid channel of WCDMA BANDII, WCDMA BANDIV and WCDMA BANDV, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at -10℃ increments from -10℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50℃ to -10℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

6.6.2. Measurement Limit

6.6.2.1. For Hand carried battery powered equipment

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.6VDC and 4.35VDC, with a nominal voltage of 3.8VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages was varied from 85% to 115%.

6.6.2.2. For equipment powered by primary supply voltage

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. For this EUT section 2.1055(d)(1)

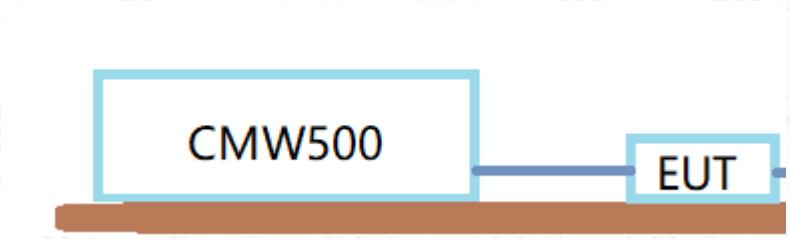
applies. This requires varying primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Rule RSS-132 5.3 specifies that "The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations." Limits ≤ ±2.5 ppm

Rule RSS-133 6.3 specifies that "The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations." Limit ≤ ±2.5 ppm

Rule RSS-139 6.4 specifies that "The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen."

6.6.3Test Setup



6.6.4 Test results

WCDMA BAND II Mid Channel/fc(MHz) 9400 /1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
7.2	-30	-14.884	4700
7.2	-20	-16.615	4700
7.2	-10	-11.744	4700
7.2	0	-9.899	4700
7.2	10	-10.371	4700
7.2	20	-12.524	4700
7.2	30	-11.294	4700
7.2	40	-13.454	4700
7.2	50	-16.522	4700

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
6.8	25	-13.611	4700

7.2	25	-9.205	4700
8.4	25	-18.661	4700

WCDMA BAND IV Mid Channel/fc(MHz) 1450/1740.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
7.2	-30	-7.539	4331.5
7.2	-20	-9.048	4331.5
7.2	-10	-15.45	4331.5
7.2	0	-14.613	4331.5
7.2	10	-13.411	4331.5
7.2	20	-13.196	4331.5
7.2	30	-10.958	4331.5
7.2	40	-8.912	4331.5
7.2	50	-10.836	4331.5

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
6.8	25	-7.718	4331.5
7.2	25	-12.395	4331.5
8.4	25	-12.875	4331.5

WCDMA BAND V Mid Channel/fc(MHz) 4175/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
7.2	-30	-9.477	2091.5
7.2	-20	-11.63	2091.5
7.2	-10	-9.234	2091.5
7.2	0	-12.574	2091.5

7.2	10	-5.178	2091.5
7.2	20	-10.114	2091.5
7.2	30	-4.342	2091.5
7.2	40	-9.341	2091.5
7.2	50	-12.238	2091.5

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
6.8	25	-9.248	2091.5
7.2	25	-11.423	2091.5
8.4	25	-11.902	2091.5

Conclusion: PASS

6.7 Conducted Spurious Emission

6.7.1 WCDMA Measurement Method and test procedures

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of WCDMA Band II and WCDMA BANDIV, these equate to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.

2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.

3. The procedure to get the conducted spurious emission is as follows:

The trace mode is set to MaxHold to get the highest signal at each frequency;

Wait 25 seconds;

Get the result.

4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

WCDMA Band II Transmitter

Channel	Frequency (MHz)
9263	1852.60
9400	1880.00
9537	1907.40

WCDMA Band IV Transmitter

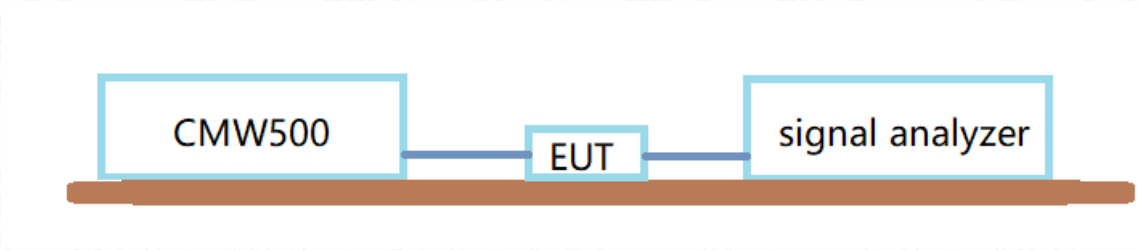
Channel	Frequency (MHz)
1312	1712.40
1413	1732.60
1513	1752.60

WCDMA Band V Transmitter

Channel	Frequency (MHz)
4133	826.60
4175	835.00

4232	846.40

6.7.1.1 Test Setup



6.7.1.2 Measurement Limit

Part 24.238 and Part 22.917 specify that 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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

27.53(h) specify that 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.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Rule RSS-132 5.5 specifies that " 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).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

Rule RSS-139 6.6 specifies that " In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. (ii) After the first 1.0 MHz

outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB

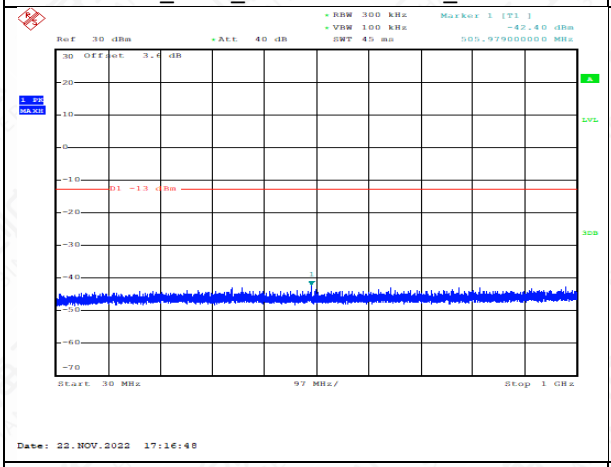
6.7.1.3Measurement result

Spurious emission limit -13dBm.

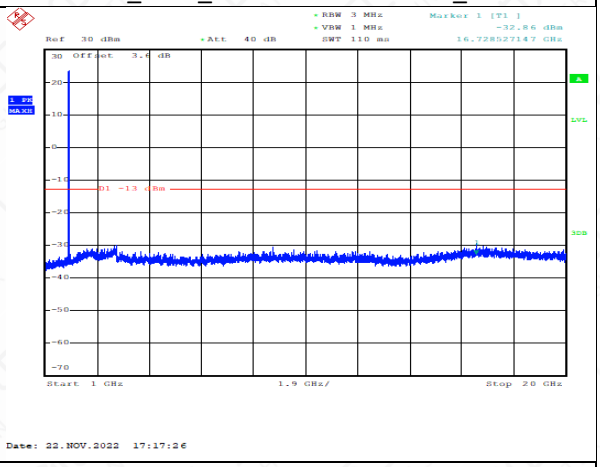
Note: peak above the limit line is the carrier frequency.

WCDMA Band II

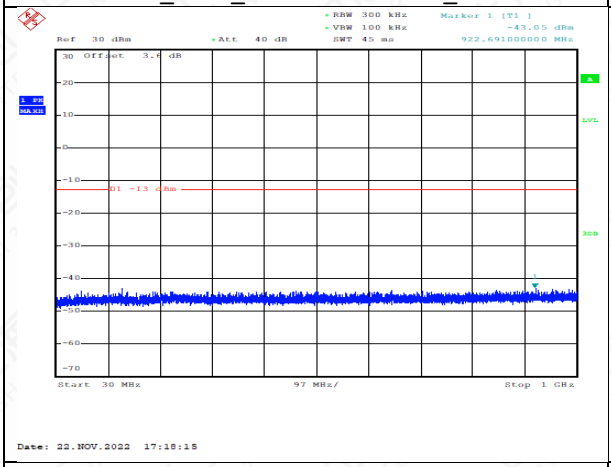
OB2_9263_30MHz-1000MHz_CSE



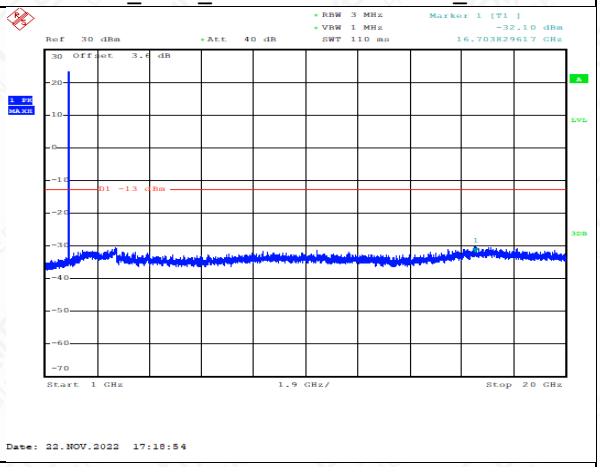
OB2_9263_1000MHz-20000MHz_CSE



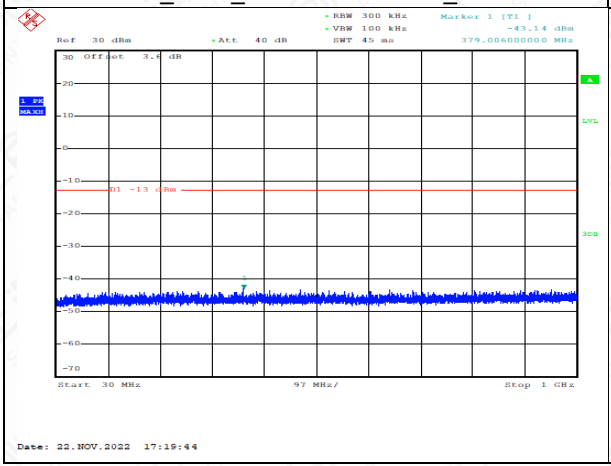
OB2_9400_30MHz-1000MHz_CSE



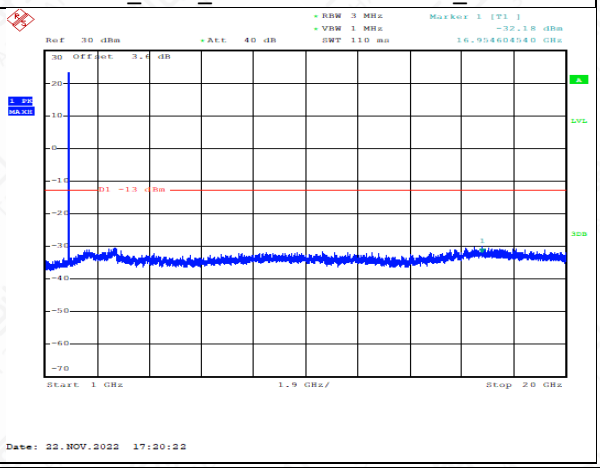
OB2_9400_1000MHz-20000MHz_CSE

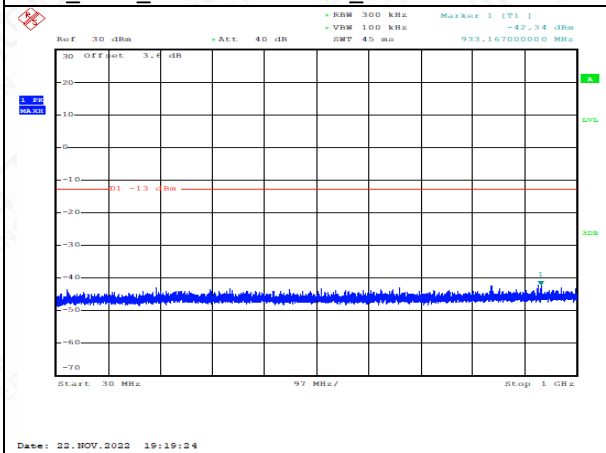
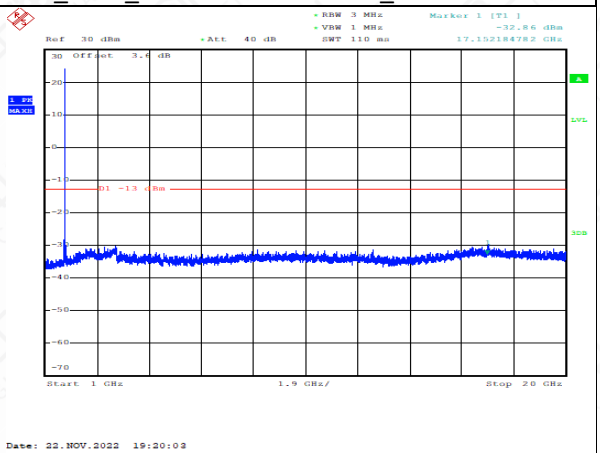
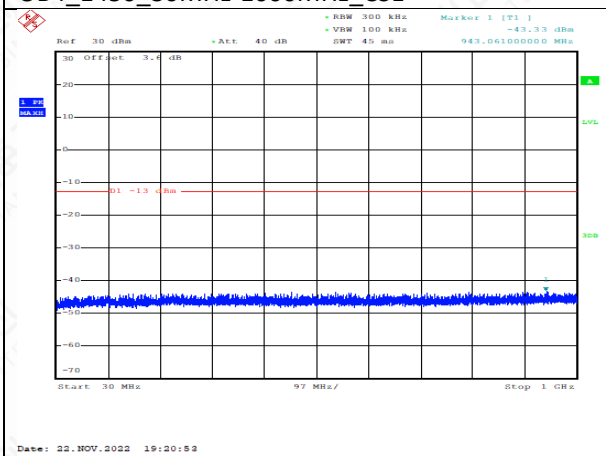
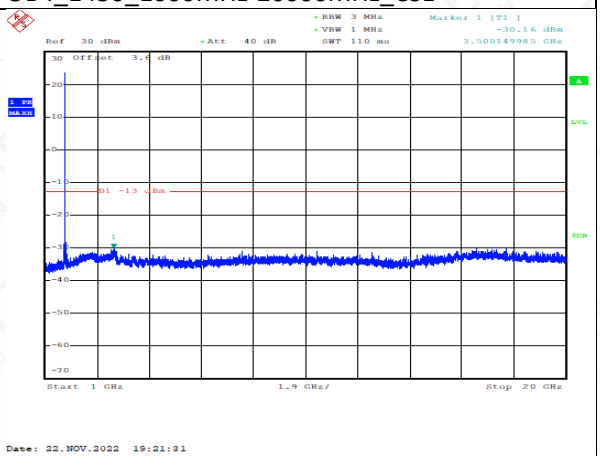
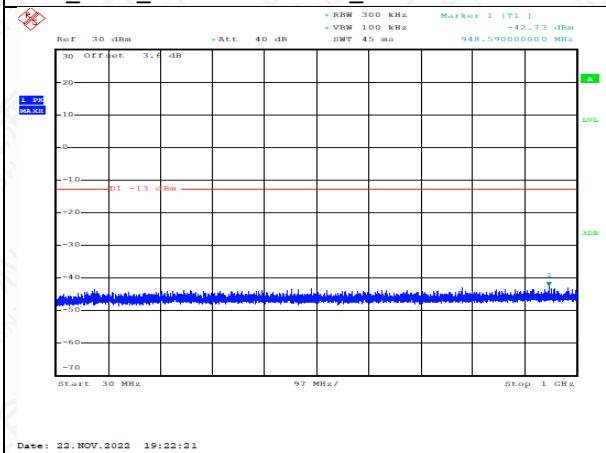
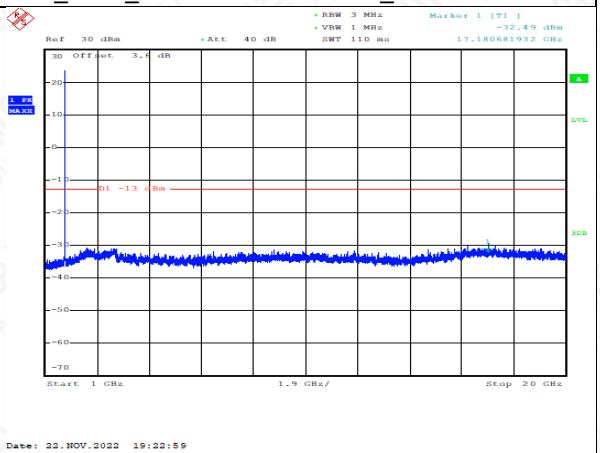


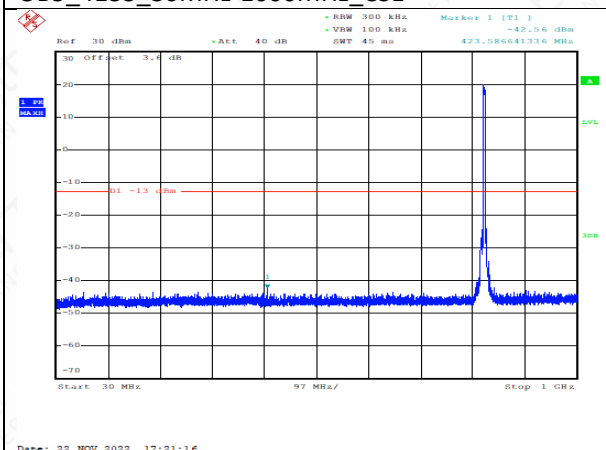
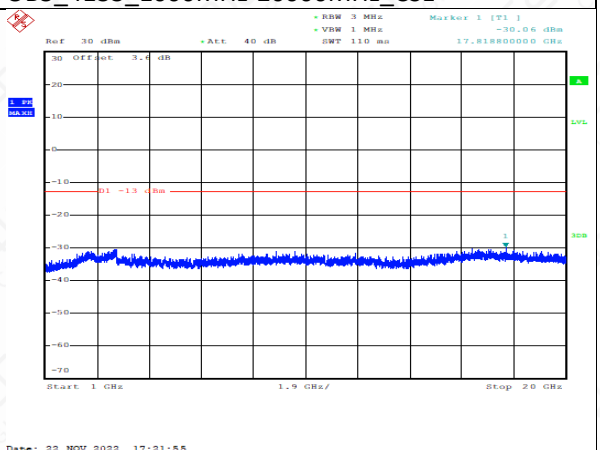
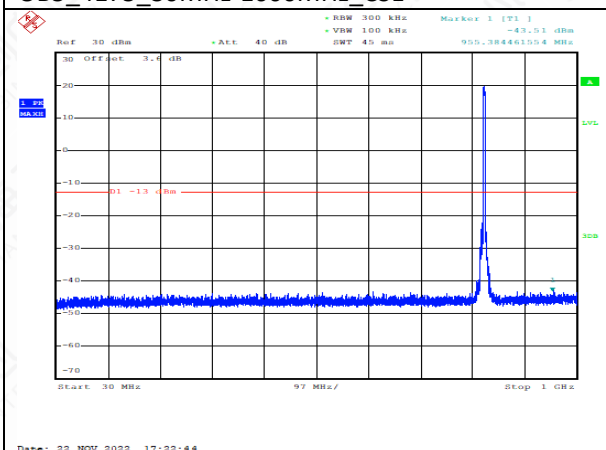
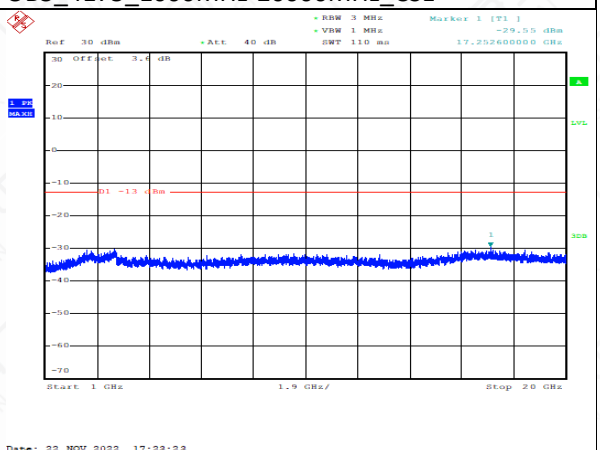
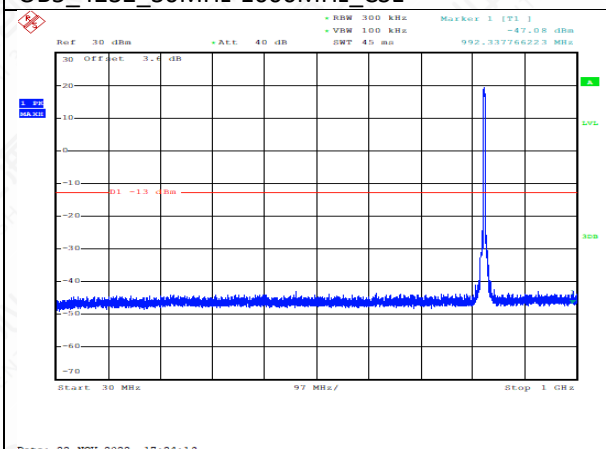
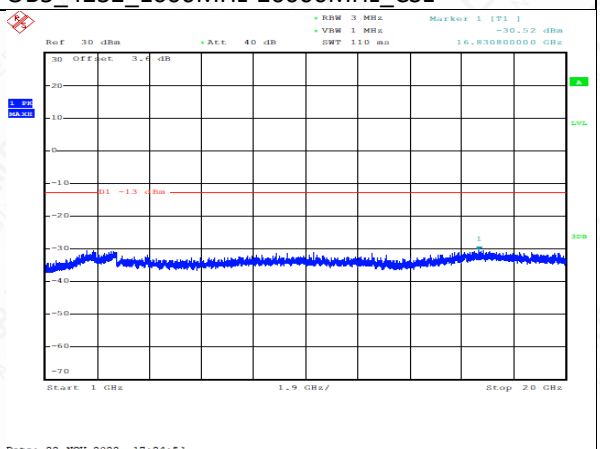
OB2_9537_30MHz-1000MHz_CSE



OB2_9537_1000MHz-20000MHz_CSE



WCDMA Band IV	
OB4_1313_30MHz-1000MHz_CSE	OB4_1313_1000MHz-20000MHz_CSE
	
OB4_1450_30MHz-1000MHz_CSE	OB4_1450_1000MHz-20000MHz_CSE
	
OB4_1512_30MHz-1000MHz_CSE	OB4_1512_1000MHz-20000MHz_CSE
	

WCDMA Band V	
OB5_4133_30MHz-1000MHz_CSE	OB5_4133_1000MHz-20000MHz_CSE
	
OB5_4175_30MHz-1000MHz_CSE	OB5_4175_1000MHz-20000MHz_CSE
	
OB5_4232_30MHz-1000MHz_CSE	OB5_4232_1000MHz-20000MHz_CSE
	

6.8 Radiated

6.8.1 EIRP

6.8.1.1 WCDMA EIRP

6.8.1.1.1. Description

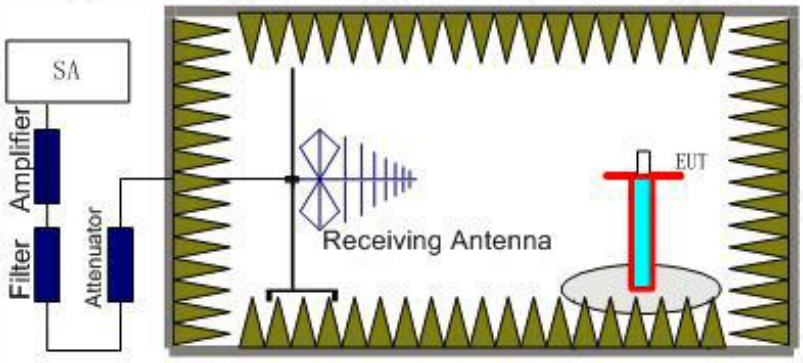
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 24.232(c) specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. "Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.”

6.8.1.1.2. Method of Measurement

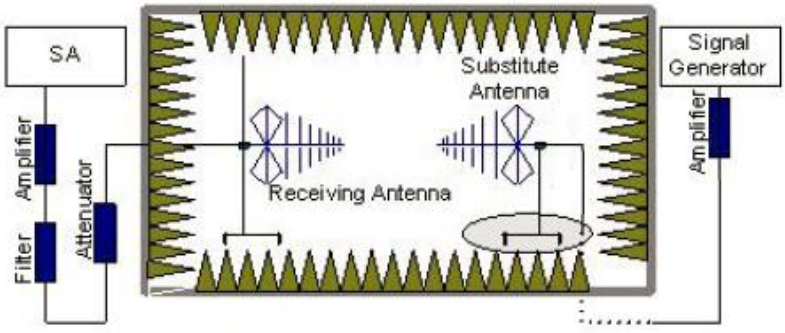
The measurements procedures in TIA-603E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the

substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.

The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.

The measurement results are obtained as described below:

Power (EIRP)=PMea+ PAg -Pcl+ Ga

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

6.8.1.1.3. Method of Measurement

27.53(h)state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

Rule RSS-132 5.5 specifies that " 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).

(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required."

Limit -13 dBm

Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).

After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

Rule RSS-139 6.6 specifies that "In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB. Limit -13 dBm

6.8.1.1.4.Measurement result

WCDMA Band 2

Frequency (MHz)	Peak EIRP (dBm)	Polarization

1852.6	25.92	V
1880.0	26.00	H
1907.4	26.06	V

WCDMA Band 4

Frequency(MHz)	Peak EIRP(dBm)	Polarization
1712.4	26.29	H
1732.6	26.28	H
1752.6	26.24	H

WCDMA Band 5

Frequency(MHz)	Peak EIRP (dBm)	Peak ERP (dBm)	Polarization
826.4	24.15	22.00	H
836.6	24.17	22.02	H
846.6	24.20	22.05	H

Note: the EUT was displayed in several different direction, the worst cases were shown.

6.8.2 EMISSION LIMIT

6.8.2.1 WCDMA Measurement Method

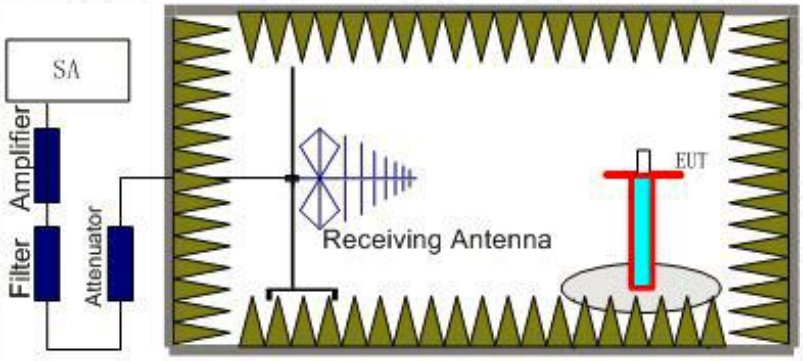
The measurements procedures in TIA-603E-2016 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917.

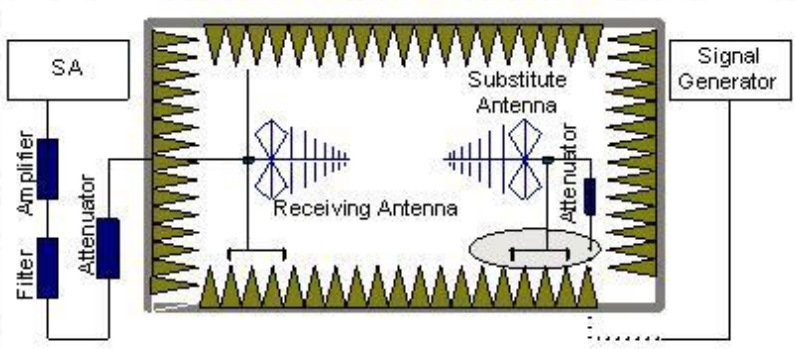
The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band V.

6.8.2.2 The procedure of radiated spurious emissions is as follows

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10thharmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4. The Path loss (Ppl) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (Ga) should be recorded after test.
A amplifier should be connected in for the test.
The Path loss (Ppl) is the summation of the cable loss .
The measurement results are obtained as described below:
Power(EIRP)=PMea- Ppl+ Ga
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

6.8.2.3 Measurement Limit

Part 24.238 and Part 22.917 specify that 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.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.
Rule RSS-132 5.5 specifies that " 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).
(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required." Limit -13 dBm
Rule RSS-133 6.5 specifies that " In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts).
After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required." Limit -13 dBm

Rule RSS-139 6.6 specifies that "In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,Footnote2 which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
Limit -13 dBm

6.8.2.4 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the WCDMA Band V (826.4MHz, 836.6MHz and 846.6MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band V into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

6.8.2.5 Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band II	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
WCDMA Band IV	Low	30MHz~20GHz	Pass

	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass
WCDMA Band V	Low	30MHz~20GHz	Pass
	Middle	30MHz~20GHz	Pass
	High	30MHz~20GHz	Pass

RSE-W2-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3813.2	-52.08	6.7	7.9	-50.88	-13	H
4529.6	-60.48	7.4	8.7	-59.18	-13	H
5726.8	-59.43	8.5	10.2	-57.73	-13	H
7092.4	-60.13	9.4	11.1	-58.43	-13	H
9376.0	-59.72	10.7	12.7	-57.72	-13	V
12072.4	-55.51	12.6	12.3	-55.81	-13	H

RSE-W2-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3703.6	-57.55	6.6	7.9	-56.25	-13	H
5555.6	-58.51	8.2	9.8	-56.91	-13	H
7431.6	-59.55	9.7	11.6	-57.65	-13	V
9233.2	-59.81	10.5	12.6	-57.71	-13	V
11268.8	-56.93	12.1	12.3	-56.73	-13	V
13677.2	-54.64	13.9	12.3	-56.24	-13	H

RSE-W2-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3758.4	-56.76	6.6	7.9	-55.46	-13	H
5643.6	-60.45	8.3	10.2	-58.55	-13	H
7513.2	-59.49	9.7	11.6	-57.59	-13	V
9307.2	-59.52	10.7	12.7	-57.52	-13	V
11935.9	-54.81	12.5	12.3	-55.01	-13	H

14485.6	-55.64	14.2	12.3	-57.54	-13	H

RSE-W4-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3503.6	-49.06	6.4	7.8	-47.66	-13	H
5254.0	-58.97	8.0	9.4	-57.57	-13	H
7009.2	-60.15	9.3	11.1	-58.35	-13	V
8804.8	-60.55	10.4	12.7	-58.25	-13	V
10434.8	-58.17	11.6	12.3	-57.47	-13	V
12060.8	-56.13	12.6	12.3	-56.43	-13	V

RSE-W4-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3423.2	-53.44	6.3	7.8	-51.94	-13	H
5139.2	-59.62	7.9	9.4	-58.12	-13	V
6850.0	-61.49	9.2	10.9	-59.79	-13	V
8566.8	-63.04	10.3	12.6	-60.74	-13	H
10198.0	-60.28	11.3	12.5	-59.08	-13	V
11954.1	-56.8	12.6	12.3	-57.1	-13	H

RSE-W4-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
3463.2	-47.53	6.4	7.8	-46.13	-13	H
5201.2	-56.05	8.0	9.4	-54.65	-13	H
7092.4	-59.28	9.4	11.1	-57.58	-13	V
8819.2	-60.65	10.4	12.7	-58.35	-13	V
10445.2	-58.55	11.6	12.3	-57.85	-13	V
12053.8	-55.48	12.6	12.3	-55.78	-13	H

RSE-W5-S06aa-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization

1742.9	-62.54	4.5	4.7	-62.34	-13	V
2439.2	-55.54	5.3	5.6	-55.24	-13	H
3609.2	-62.04	6.5	7.8	-60.74	-13	V
4540.8	-61.23	7.4	8.7	-59.93	-13	H
5962.8	-60.9	8.5	10.2	-59.2	-13	H
7384.6	-60.67	9.7	11.6	-58.77	-13	H

RSE-W5-S06aa-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1529.3	-63.73	4.2	5.3	-62.63	-13	H
2402.3	-54.64	5.3	5.6	-54.34	-13	H
3634.4	-61.67	6.6	7.9	-60.37	-13	H
4773.6	-60.38	7.5	9.0	-58.88	-13	H
6113.2	-60.17	8.7	10.2	-58.67	-13	V
7968.4	-60.9	9.8	12.2	-58.5	-13	H

RSE-W5-S06aa-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit （dBm）	Polarization
1672.9	-62.62	4.5	4.7	-62.42	-13	H
2503.8	-56.23	5.4	5.6	-56.03	-13	H
3353.6	-64.45	6.2	6.9	-63.75	-13	H
4128.8	-61.77	7.0	8.9	-59.87	-13	V
5008.8	-62.57	7.8	9.6	-60.77	-13	H
5863.2	-60.98	8.4	10.2	-59.18	-13	H

Annex A: Revised History

Version	Revised Content
V00	Initial
V01	HVIN is added in Section 4.1

Annex B: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

INDUSTRIAL INTERNET INNOVATION CENTER (SHANGHAI) CO., LTD.

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.