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

RF TEST REPORT

PRODUCT	Smart POS system
BRAND	SUNMI
MODEL	T6831
APPLICANT	Shanghai Sunmi Technology Co.,Ltd.
FCC ID	2AH25T6831
ISSUE DATE	June 6, 2024
STANDARD(S)	FCC Part 2, FCC Part 22H, FCC Part 24E,FCC Part 27

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1. Summary of Test Report

1.1 Test Standard (s)

No.	Test Standard	Title	Version
1	FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	--
2	FCC Part 22H	CELLULAR RADIOTELEPHONE SERVICE	--
3	FCC Part 24E	BROADBAND PCS	--
4	FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	--
Note: FCC Part 2 have not been accredited by A2LA.			

1.2 Reference Documents

No.	Test 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 Power Meas License Digital Systems	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01
4	KDB 484596 D01 Referencing Test Data	Test Reductions Via Data Referencing	v02r03
Note: KDB 971168 D01 Power Meas License Digital Systems and KDB 484596 D01 Referencing Test Data have not been accredited by A2LA.			

1.3 Sumsmary of Test Results

LTE Band 2

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/24.232(c)	Pass Note 2
2	Emission Limit	2.1053/24.238(a)	Pass
3	Frequency Stability	2.1055/24.235	Pass Note3
4	Occupied Bandwidth	2.1049	Pass Note3
5	Emission Bandwidth	2.1049	Pass Note3
6	Band Edge Compliance	2.1051/24.238(a)	Pass Note3
7	Conducted Spurious Emission	2.1051/24.238(a)	Pass Note3

8	Peak to Average Power Ratio	24.232 (d)	Pass[Note3]

LTE Band 4

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/27.50(d)(4)	Pass [Note 2]
2	Emission Limit	2.1053/27.53(h)	Pass
3	Frequency Stability	2.1055/27.54	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/27.53(h)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/27.53(h)	Pass[Note3]
8	Peak to Average Power Ratio	27.50(d)(5)	Pass[Note3]

LTE Band 5

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/22.913(a)	Pass [Note 2]
2	Emission Limit	2.1053/22.917(a)	Pass
3	Frequency Stability	2.1055/22.355	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/22.917(a)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/22.917(a)	Pass[Note3]
8	Peak to Average Power Ratio	N/A	Pass[Note3]

LTE Band 7

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/27.50(h)	Pass [Note 2]
2	Emission Limit	2.1053/27.53(m)	Pass
3	Frequency Stability	2.1055/27.54	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/27.53(m)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/27.53(m)	Pass[Note3]

LTE Band 26(Part 22) 824-849MHz

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power/ERP	2.1046/22.913(a)	Pass [Note 2]

2	Emission Limit	2.1053/22.917(a)	Pass
3	Frequency Stability	2.1055/22.355	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/22.917(a)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/22.917(a)	Pass[Note3]
8	Peak to Average Power Ratio	N/A	Pass[Note3]

LTE Band 38

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/27.50(h)	Pass [Note 2]
2	Emission Limit	2.1053/27.53(m)	Pass
3	Frequency Stability	2.1055/27.54	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/27.53(m)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/27.53(m)	Pass[Note3]
8	Peak to Average Power Ratio	N/A	Pass[Note3]

LTE Band 40 (2305-2315MHz and 2350-2360MHz)

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/27.50(a)	Pass [Note 2]
2	Emission Limit	2.1053/27.53(a)	Pass
3	Frequency Stability	2.1055/27.54	Pass[Note3]
4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/27.53(a)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/27.53(a)	Pass[Note3]
8	Peak to Average Power Ratio	27.50	Pass[Note3]
9	Duty Cycle	27.50(a)	Pass [Note 3]

LTE Band 41

Items	Test Name	Clause in FCC rules	Verdict
1	Output Power	2.1046/27.50(h)	Pass [Note 2]
2	Emission Limit	2.1053/27.53(m)	Pass
3	Frequency Stability	2.1055/27.54	Pass[Note3]

4	Occupied Bandwidth	2.1049	Pass[Note3]
5	Emission Bandwidth	2.1049	Pass[Note3]
6	Band Edge Compliance	2.1051/27.53(m)	Pass[Note3]
7	Conducted Spurious Emission	2.1051/27.53(m)	Pass[Note3]
8	Peak to Average Power Ratio	27.50	Pass[Note3]

Note1:

The T6831, manufactured by Shanghai Sunmi Technology Co.,Ltd. is a variant product for testing.

This project is a variant project based on the 23T04I30131-RF03-V02,original FCC ID 2AH25T6F10 with below changes:

SOFTWARE MODIFICATIONS:

Other changes detailed: Optimize functions, solve bugs, and iterate software versions. Iterative software upgrades do not affect RF performance.

HARDWARE MODIFICATIONS:

Components on PCB changes: Yes

Camera changes: Please refer to the following difference chart

LCD changes: Please refer to the following difference chart

Type of Service	Model Name	Scanner	Rear Camera	Flash Lamp	LCD (Just different manufacturers)
Original	T6F10	Yes	5M AF+flash	Yes	SHENZHEN DJN PHOTOELECTRIC TECHNOLOGY CO., LTD (9A-3R067-7026A)
Variant	T6831	NO	2M FF	NO	SHENZHEN DJN PHOTOELECTRIC TECHNOLOGY CO., LTD (98-31050-7084A) S06aa/S10aa/S23aa (Mainly Supply)
					SHENZHEN DJN PHOTOELECTRIC TECHNOLOGY CO., LTD (98-31050-7084A-H) S12aa (Secondary Supply)
					GUANGDONG SUPERVIEW OPTOELECTRONICS CO.,LTD. (G499BHA085A0) S16aa (Thirdly Supply)

Other changes： PCBA Change: The difference between the original and the variant of PCBA

MECHANICAL MODIFICATIONS:

Use new metal front/back cover or keypad: YES

Mechanical shell changes: YES

Other changes detailed:

1.No scanner.

2.The position of the front camera is different.

3.Add keyboard.

ACCESSORY MODIFICATIONS:

According to the Product Change Description, we tested all modes of radiated spurious emission and the worst mode of rest test cases in the original report, and the test data was recorded in this report.

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 5.3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 6 of this test report.

Note 2:

The test data refer to the original report, and the data in this report is spot check data.The verification data meets the KDB484596 requirements within 3dB.

Note 3:

The test data refer to the original report, and the data in this report is spot check data.

1.4 Data Provided by Applicant

No.	Item(s)	Data
1	LTE band 2	0.46
2	LTE band 4	-0.42
3	LTE band 5	-1.63
4	LTE band 7	0.39
5	LTE band 26	-1.63
6	LTE band 38	1.54
7	LTE band 40	1.01
8	LTE band 41	2.41
Note: The data of antenna gain is provided by Antenna specification may affect the validity of the test results in this report, and the impact and consequences of this shall be undertaken by the customer.		

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.	708870
FCC Designation No.	CN1364

2.2 Laboratory Environmental Requirements

Temperature	15℃~35℃
Relative Humidity	25%RH~75%RH
Atmospheric Pressure	86kPa~106kPa

2.3 Project Information

Project Manager	Gao Hongning
Test Date	April 20, 2024 to May 31, 2024

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	18826519551

3.2 Manufacturer

Company	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, No.388,Song Hu Road, Yang Pu District, Shanghai, China
Telephone	18826519551

4. General Information of The Product

4.1 Product Description for Equipment under Test (EUT)

Product	Smart POS system
Model	T6831
Date of Receipt	S10aa/ S12aa/S16aa/S04aa/S06aa: April 15, 2024 S23aa: April 29, 2024
EUT ID*	S04aa/S06aa/S10aa/S12aa/S16aa/S23aa
SN/IMEI	S04aa: 860104070000517'860104070005516 S06aa: 860104070000061'860104070005060 S10aa: 860104070000897'860104070005896 S12aa: 860104070001424'86010407006423 S16aa: 860104070002166'86010407007165 S23aa: 860104070000178'860104070005177
Supported Radio Technology and Bands	GSM850/GSM900/DCS1800/PCS1900 WCDMA Band I/II/IV/V/VI/VIII/XIX LTE Band 1/2/3/4/5/7/8/18/19/20/26/28/34/38/39/40/41 BT 5.0 BLE/BR/EDR WLAN 802.11b/g/n WLAN 802.11a/n/ac GPS/GLONASS/BDS/Galileo NFC
Hardware Version	V1.0
Software Version	V3.0.4
FCC ID	2AH25T6831
NOTE1: EUT ID is the internal identification code of the laboratory. NOTE2: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

4.2 Description for Auxiliary Equipment (AE)

AE ID*	Description	Model	SN/Remark
AE1	RF Cable	N/A	N/A
CA01	Adapter	TPA-141A050200UU01	N/A
CD01	Adapter	UC13US	N/A
UA02	AC Cable	N/A	N/A
BA10	Battery	HPPA	Guangdong Highpower NewEnergy Technology Co., Ltd.
NOTE1: AE ID is the internal identification code of the laboratory. NOTE2: By verifying that CA01+BA10 is the worst battery and adapter combination, this battery and adapter are used in all tests.			

4.3 Additional Information

Modulation:

Type of modulation	QPSK/16QAM

Band Frequency Range:

Band	Frequency Range
Band 2	1850 - 1910 MHz
Band 4	1710 - 1755 MHz
Band 5	824 - 849 MHz
Band 7	2500 - 2570 MHz
Band 26	824 - 849 MHz
Band 38	2570 - 2620 MHz
Band 40	2305 - 2315 MHz and 2350 - 2360 MHz
Band 41	2496-2690 MHz

Band List:

Band	BW (MHz)	Low Channel	Low Freq. (MHz)	Mid Channel	Mid Freq. (MHz)	High Channel	High Freq. (MHz)
Band 2	1.4	18607	1850.7	18900	1880	19193	1909.3
	3	18615	1851.5	18900	1880	19185	1908.5
	5	18625	1852.5	18900	1880	19175	1907.5
	10	18650	1855	18900	1880	19150	1905
	15	18675	1857.5	18900	1880	19125	1902.5
	20	18700	1860	18900	1880	19100	1900
Band 4	1.4	19957	1710.7	20175	1732.5	20393	1754.3
	3	19965	1711.5	20175	1732.5	20385	1753.5
	5	19975	1712.5	20175	1732.5	20375	1752.5
	10	20000	1715	20175	1732.5	20350	1750
	15	20025	1717.5	20175	1732.5	20325	1747.5
	20	20050	1720	20175	1732.5	20300	1745
Band 5	1.4	20407	824.7	20525	836.5	20643	848.3
	3	20415	825.5	20525	836.5	20635	847.5
	5	20425	826.5	20525	836.5	20625	846.5
	10	20450	829	20525	836.5	20600	844
Band 7	5	20775	2502.5	21100	2535	21425	2567.5
	10	20800	2505	21100	2535	21400	2565
	15	20825	2507.5	21100	2535	21375	2562.5
	20	20850	2510	21100	2535	21350	2560
Band 26 (824-849MHz)	1.4	26797	824.7	26915	836.5	27033	848.3
	3	26805	825.5	26915	836.5	27025	847.5
	5	26815	826.5	26915	836.5	27015	846.5
	10	26840	829	26915	836.5	26990	844
	15	26865	831.5	26915	836.5	26965	841.5
Band 38	5	37775	2572.5	38000	2595	38225	2617.5

Band	BW (MHz)	Low Channel	Low Freq. (MHz)	Mid Channel	Mid Freq. (MHz)	High Channel	High Freq. (MHz)
	10	37800	2575	38000	2595	38200	2615
	15	37825	2577.5	38000	2595	38175	2612.5
	20	37850	2580	38000	2595	38150	2610
Band 40A (2305–2315MHz)	5	38725	2307.5	38750	2310	38775	2312.5
	10	/	/	38750	2310	/	/
Band 40B (2350–2360MHz)	5	39175	2352.5	38750	2355	39225	2357.5
	10	/	/	38750	2355	/	/
Band 41	5	39675	2498.5	40620	2593	41565	2687.5
	10	39700	2501	40620	2593	41540	2685
	15	39725	2503.5	40620	2593	41515	2682.5
	20	39750	2506	40620	2593	41490	2680

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℃	-10℃	50℃
Working Voltage of EUT	Normal	Minimum	Maximum
	7.7V	6.0V	8.8 V

5.2 Test Equipments Utilized

Conduction test system

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Software	Eagle V3.3	N/A	V3.3	N/A	3IN	N/A	N/A
2	Frequency spectrum analyzer	FSQ	101091	V4.75	V11.00	R&S	2023-07-26	1 Year
3	Wideband Radio Communication Tester	CMW 500	148874	V3.5.136	N/A	R&S	2023-07-27	1 Year
4	Temperature Chamber	B-TF-107C	201804107	N/A	N/A	BoYi	2023-06-28	1 Year
5	Programmable power supply	Keithley 2303	4039070	N/A	N/A	Keithley	2023-06-23	1 Year
6	RF Test Automation Box	RF 2021B	2001	V3.3	N/A	RANATEC	N/A	N/A

Radiated emission test system

No.	Name	Model	S/N	SW Version	HW Version	Manufacturer	Cal. Date	Cal. Interval
1	Universal Radio Communication Tester	CMU200	123126	V5.2.1	B12	R&S	2023-10-16	1 Year
2	Universal Radio Communication Tester	CMW500	104178	V3.7.20	1206.0600.00	R&S	2023-10-16	1 Year

3	EMI Test Receiver	ESU40	100307	V5.1-24-3	01	R&S	2023-12-19	1 Year
4	TRILOG Broadband Antenna	VULB9163	01345	N/A	N/A	Schwarzbeck	2024 03-23	1 Year
5	Double- ridged Waveguide Antenna	ETS-3117	00135890	N/A	N/A	ETS	2023-07-28	2 Years
6	EMI Test Software	EMC32 V10.35.02	N/A	N/A	N/A	R&S	N/A	N/A
7	Preamplifier	SCU08F1	8320024	N/A	N/A	R&S	2023-10-16	1 year
8	Preamplifier	SCU18	10155	N/A	N/A	R&S	2023-10-16	1 year
9	Antenna	SWB-VUBA 9117	9117-266	N/A	N/A	Schwarzbeck	2023-9-8	1 year
10	Antenna	BBHA9120 D	02112	N/A	N/A	Schwarzbeck	2023-7-28	1 year
11	Signal Generator	SMF100A	102314	3.20.390.24	05.10	R&S	2023-10-16	1 year

Anechoic chamber

Fully anechoic chamber by ETS.

5.3 Measurement Uncertainty

Measurement Uncertainty of Radiation test

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 1GHz	±5.10
1GHz ≤ f ≤ 18GHz	±5.66
18GHz ≤ f ≤ 40GHz	±5.22

Measurement Uncertainty of Conduction test

No	Item	Extended uncertainty （k=2）	
1	Frequency Tolerance	23Hz	
2	RF Output Power	0.7dB	
3	conducted spurious	9kHz～3.6GHz	1.5dB
		3.6GHz～8.4GHz	2.8dB
		8.4GHz～12.75GHz	3.4dB
4	EVM	2.1%	
5	Occupied Bandwidth	Bandwidth 1.4MHz	0.03MHz
		Bandwidth 3MHz	0.03MHz
		Bandwidth 5MHz	0.03MHz
		Bandwidth 10MHz	0.05MHz
		Bandwidth 15MHz	0.06MHz
		Bandwidth 20MHz	0.08MHz

6	Emission intermodulation	Adjacent channel	1.4dB
		Alternate channel	1.4dB
7	Range of frequency	0.08MHz	

6. Test Results

6.1 Output Power

6.1.1 Measurement Limit

FCC §22.913(a) (5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.
FCC §24.232(c) Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.
FCC §27.50(a) For mobile and portable stations transmitting in the 2305–2315 MHz band or the 2350–2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. (EIRP≤24dBm/5MHz)
FCC §27.50(d) (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band is limited to 1 watt EIRP.
FCC §27.50(h):Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

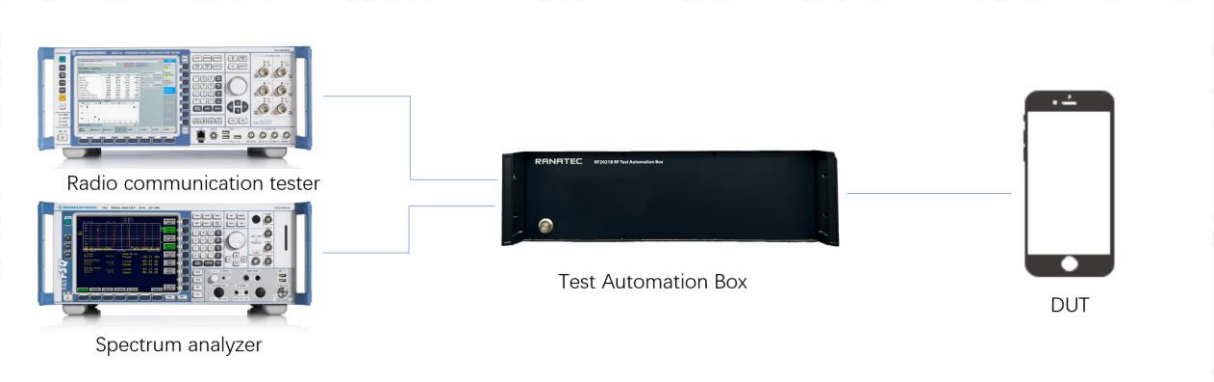
6.1.2 Method of Measurements

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 base station CMW500.
These measurements were done at 3 frequencies.(bottom, middle and top of operational frequency range).
1. The transmitter output port was connected to base station.
2. Set the EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record maximum average power for other modulation signal.
5. During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio.
6. Communication tester to ensure max power transmission and proper modulation.
7. This result contains output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.
EIRP= Conducted power+Gain, ERP = EIRP -2.15dBi.

6.1.3 Test procedures

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 base station reading.

6.1.4 Test Setup



6.1.5 Output Power Measurement result

BAND	Mode	Origina data(dBm)	Verified power(dBm)	d_{dB} Note3
Band2	QPSK	22.36	22.61	0.25
Band 4	QPSK	22.16	22.9	0.74
Band 5	QPSK	22.45	22.21	0.24
Band 7	QPSK	22.57	22.63	0.06
Band 26 (824-849)	QPSK	22.41	22.73	0.32
Band 38	QPSK	22.65	22.77	0.12
Band 40 (2305-2315)	QPSK	22.83	22.58	0.25
Band 40 (2350-2360)	QPSK	22.99	22.96	0.03
Band 41	QPSK	23.17	22.94	0.23

Note1: The power of the worst part is verified to meet the requirements.

Note2: The difference between Original and verified power is less than 3dB and meets the requirements of KDB484596 D01 data reference. The power listed in the original certificate still applies to this case.

Note3: $d_{dB}=|Verified_{dB}-original_{dB}|$

6.1.6 EIRP/ERP results

BAND	Mode	EIRP (dBm)	ERP (dBm)
Band2	QPSK	23.07	20.92
Band 4	QPSK	22.48	20.33
Band 5	QPSK	20.58	18.43

Band 7	QPSK	23.02	20.87
Band 26 (824-849)	QPSK	21.1	18.95
Band 38	QPSK	24.31	22.16
Band 40 (2305-2315)	QPSK	23.59	21.44
Band 40 (2350-2360)	QPSK	23.97	21.82
Band 41	QPSK	25.35	23.2

6.2 Emission Limt

6.1.1 Measurement Limit

According to KDB 971168, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

FCC §22.917(a) 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 §24.238(a) 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(a) For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

FCC §27.53(h) (1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, 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 §27.53(m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

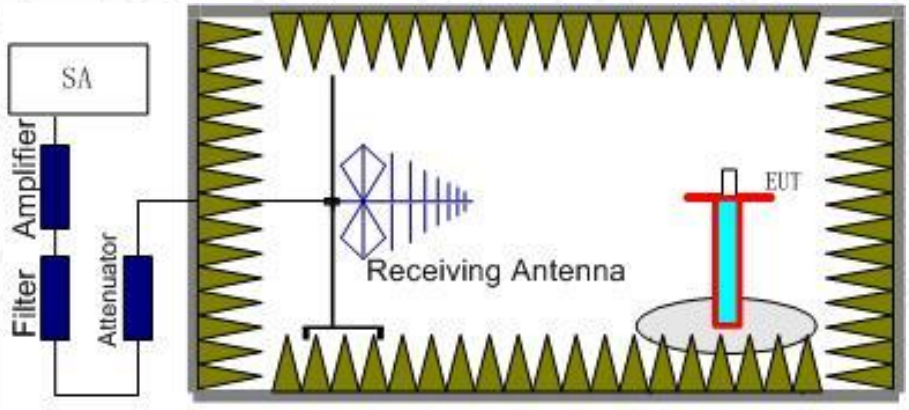
FCC §27.53(h):
AWS emission limits —
(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
(2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180–2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200–2290 MHz band.
(ii) For operations in the 2000–2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iii) For operations in the 1915–1920 MHz band, the power of any emission between 1930–1995 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iv) For operations in the 1995–2000 MHz band, the power of any emission between 2005–2020 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.

6.1.2 Method of Measurement

The measurements procedures in TIA-603E-2016 are used. This measurement is carried out in fully-anechoic chamber FAC-3.
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 22.917(a)/24.238(a)/27.53(g)/27.53(h)/27.53(m)(4). The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 2/4/5/7/38/41.

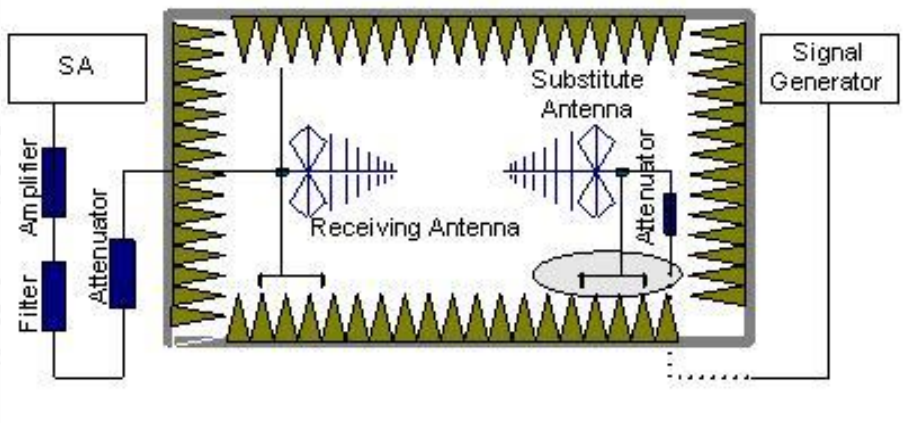
The procedure of radiated spurious emissions is as follows:

Below 1 GHz, EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. Above 1 GHz, EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna.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 10th harmonic 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. Adjust the level of the signal generator output until the value of the receiver reaches 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 (Pcl) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (Ga) should be recorded after test.

An amplifier should be connected in for the test.

The Path loss (Pcl) is the summation of the cable loss and the gain of the amplifier.

The measurement results are obtained as described below:

Power (EIRP) =Pmea- Pcl + Ga

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

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

6.1.3 Measurement Results

Radiated emissions measurements were made at the upper, middle, and lower carrier frequencies of the LTE Bands.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 LTE Bands. 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. The evaluated frequency range is from 30MHz to ten times the main frequency signal. The final data result takes the worst pattern data and places it in the report.

Test Frequency range：30M-26G

Only the worst mode data is provided

Mainly Supply

RSE-LTE2-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3701.2	-51.63	6.6	7.9	-50.33	-13	37.33	V
5552.4	-44.24	8.2	9.8	-42.64	-13	29.64	H
7402.0	-41.98	9.7	11.6	-40.08	-13	27.08	V
9253.2	-49.46	10.7	12.7	-47.46	-13	34.46	V
11105.0	-47.69	12.1	12.3	-47.49	-13	34.49	V
12953.0	-44.93	13.2	12.3	-45.83	-13	32.83	H

RSE-LTE2-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3760.0	-45.27	6.6	7.9	-43.97	-13	30.97	V
5640.0	-44.36	8.3	10.2	-42.46	-13	29.46	V
7520.0	-36.94	9.7	11.6	-35.04	-13	22.04	V
9400.0	-49.82	10.7	12.7	-47.82	-13	34.82	V
11280.0	-48.79	12.1	12.3	-48.59	-13	35.59	V
13161.6	-45.67	13.0	12.3	-46.37	-13	33.37	V
15039.0	-41.6	14.4	12.3	-43.7	-13	30.70	V

RSE-LTE2-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3818.4	-44.23	6.7	7.9	-43.03	-13	30.03	V
5727.6	-42.43	8.5	10.2	-40.73	-13	27.73	V
7637.2	-34.48	9.7	11.8	-32.38	-13	19.38	V
9546.4	-46.42	10.7	12.7	-44.42	-13	31.42	V
11456.4	-47.04	12.3	12.3	-47.04	-13	34.04	V
13364.6	-41.17	13.7	12.3	-42.57	-13	29.57	V

RSE-LTE4-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3421.2	-46.74	6.3	7.8	-45.24	-13	32.24	V
5132.8	-50.6	7.9	9.4	-49.1	-13	36.10	V
6842.8	-44.21	9.2	10.9	-42.51	-13	29.51	V
8554.0	-43.3	10.3	12.6	-41	-13	28.00	V
10264.4	-48.53	11.5	12.3	-47.73	-13	34.73	V
11974.4	-47.64	12.6	12.3	-47.94	-13	34.94	V

RSE-LTE4-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3464.4	-50.58	6.4	7.8	-49.18	-13	36.18	H
5197.6	-49.22	8.0	9.4	-47.82	-13	34.82	H
6930.4	-42.34	9.3	11.1	-40.54	-13	27.54	V
8662.4	-45.9	10.3	12.7	-43.5	-13	30.50	V
10395.2	-48.35	11.6	12.3	-47.65	-13	34.65	V
12128.4	-46.94	12.6	12.3	-47.24	-13	34.24	H

RSE-LTE4-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
3508.0	-49.53	6.4	7.8	-48.13	-13	35.13	V
5263.2	-49.24	8.0	9.4	-47.84	-13	34.84	H
7016.8	-45	9.3	11.1	-43.2	-13	30.20	H
8771.6	-44.6	10.4	12.7	-42.3	-13	29.30	V
10525.6	-47.58	11.6	12.3	-46.88	-13	33.88	V

RSE-LTE5-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization

1649.7	-49.33	4.2	4.7	-48.83	-13	35.83	V
2473.8	-39.74	5.4	5.6	-39.54	-13	26.54	V
3298.8	-54.03	6.2	6.9	-53.33	-13	40.33	V
4124.0	-54.25	7.0	8.6	-52.65	-13	39.65	V
4924.4	-53.63	7.7	9.6	-51.73	-13	38.73	H
5765.6	-54.1	8.5	10.2	-52.4	-13	39.40	V

RSE-LTE5-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
1672.9	-50.47	4.5	4.7	-50.27	-13	37.27	V
2508.5	-44.84	5.4	5.6	-44.64	-13	31.64	V
3345.2	-54.2	6.2	6.9	-53.5	-13	40.50	V
4182.8	-54.93	7.0	8.9	-53.03	-13	40.03	V
5019.2	-54.14	7.8	9.6	-52.34	-13	39.34	H
5856.0	-54.29	8.4	10.2	-52.49	-13	39.49	H

RSE-LTE5-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
1696.4	-49.87	4.5	4.7	-49.67	-13	36.67	V
2543.8	-39.64	5.4	5.6	-39.44	-13	26.44	V
3384.4	-55.04	6.3	7.8	-53.54	-13	40.54	H
4241.2	-50.34	7.1	8.9	-48.54	-13	35.54	V
5090.8	-52.06	7.9	9.6	-50.36	-13	37.36	V
5901.2	-52.72	8.5	10.2	-51.02	-13	38.02	H

RSE-LTE7-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5003.2	-47.37	7.8	9.6	-45.57	-25	20.57	V
7506.8	-31.21	9.7	11.6	-29.31	-25	4.31	V

10014.8	-46.28	11.2	12.5	-44.98	-25	19.98	V
12550.5	-41.52	12.8	12.3	-42.02	-25	17.02	H
15014.5	-35.84	14.4	12.3	-37.94	-25	12.94	V
17711.2	-30.85	15.8	12.3	-34.35	-25	9.35	V

RSE-LTE7-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5068.4	-46.25	7.8	9.6	-44.45	-25	19.45	V
7604.8	-31.99	9.7	11.6	-30.09	-25	5.09	V
10111.6	-45.58	11.3	12.5	-44.38	-25	19.38	V
12802.5	-40.45	12.5	12.3	-40.65	-25	15.65	H
15936.8	-32.2	15.0	12.3	-34.9	-25	9.90	H
17931.8	-29.98	16.2	12.3	-33.88	-25	8.88	V

RSE-LTE7-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5132.4	-46	7.9	9.4	-44.5	-25	19.50	H
7702.4	-28.32	9.8	11.8	-26.32	-25	1.32	H
10270.0	-44.94	11.5	12.3	-44.14	-25	19.14	V
12837.5	-40.84	12.5	12.3	-41.04	-25	16.04	V
15404.8	-29.31	14.4	12.3	-31.41	-25	6.42	H

RSE-LTE26-L-830.3

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
1662.2	-52.22	4.5	4.7	-52.02	-13	39.02	H
2490.8	-45.5	5.4	5.6	-45.3	-13	32.30	V
3322.0	-55.1	6.2	6.9	-54.4	-13	41.40	H
4146.8	-56.36	7.0	8.9	-54.46	-13	41.46	V
4993.2	-54.36	7.8	9.6	-52.56	-13	39.56	V

5812.8	-55.45	8.4	10.2	-53.65	-13	40.65	H

RSE-LTE26-M-836.5

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
1676.3	-52.84	4.5	4.7	-52.64	-13	39.64	V
2505.0	-45.75	5.4	5.6	-45.55	-13	32.55	V
3348.0	-54.91	6.2	6.9	-54.21	-13	41.21	H
4186.4	-56.05	7.0	8.9	-54.15	-13	41.15	H
5023.6	-55.85	7.8	9.6	-54.05	-13	41.05	H
5854.8	-54.62	8.4	10.2	-52.82	-13	39.82	H

RSE-LTE26-H-842.8

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
1685.7	-53.53	4.5	4.7	-53.33	-13	40.33	H
2528.8	-44.89	5.4	5.6	-44.69	-13	31.69	V
3372.8	-55.02	6.2	6.9	-54.32	-13	41.32	H
4214.8	-55.85	7.0	8.9	-53.95	-13	40.95	H
5056.8	-54.5	7.8	9.6	-52.7	-13	39.70	V
5898.8	-54.31	8.5	10.2	-52.61	-13	39.61	H

RSE-LTE38-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5144.8	-43.85	7.9	9.4	-42.35	-25	17.35	V
7717.6	-28.85	9.8	11.8	-26.85	-25	1.85	V
10268.4	-45.31	11.5	12.3	-44.51	-25	19.51	H
12834.0	-40.72	12.5	12.3	-40.92	-25	15.92	H
15894.8	-31.2	15.0	12.3	-33.9	-25	8.90	H
17823.2	-30.51	16.0	12.3	-34.21	-25	9.21	V

RSE-LTE38-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5190.0	-44.16	8.0	9.4	-42.76	-25	17.76	V
6361.2	-49.58	8.8	10.3	-48.08	-25	23.08	H
7785.2	-29.95	9.9	11.8	-28.05	-25	3.05	V
10379.6	-41.67	11.6	12.3	-40.97	-25	15.97	H
13301.2	-38.63	13.6	12.3	-39.93	-25	14.93	V
15571.0	-26.63	14.6	12.3	-28.93	-25	3.93	V

RSE-LTE38-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5234.4	-45.49	8.0	9.4	-44.09	-25	18.10	H
6308.0	-49.39	8.8	10.3	-47.89	-25	22.89	V
7852.0	-28.18	9.9	11.8	-26.28	-25	1.28	H
10469.6	-41.89	11.6	12.3	-41.19	-25	16.19	V
13338.0	-38.44	13.6	12.3	-39.74	-25	14.74	H
15705.8	-27.52	14.5	12.3	-29.72	-25	4.72	V

RSE-LTE40-L-2307.5

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4612.4	-51.89	7.4	8.7	-50.59	-40	1000.000
6928.4	-49.32	9.3	11.1	-47.52	-40	1000.000
9222.8	-49.38	10.5	12.6	-47.28	-40	1000.000
11544.2	-44.06	12.3	12.3	-44.06	-40	1000.000
13835.0	-41.23	13.8	12.3	-42.73	-40	1000.000

RSE-LTE40-M-2310

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4625.2	-52.5	7.5	9.0	-51	-40	1000.000
6938.0	-52.29	9.3	11.1	-50.49	-40	1000.000

9237.2	-48.56	10.5	12.6	-46.46	-40	1000.000
11556.5	-44.27	12.2	12.3	-44.17	-40	1000.000
13875.2	-41.95	13.5	12.3	-43.15	-40	1000.000

RSE-LTE40-H-2312.5

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4624.4	-51.39	7.4	8.7	-50.09	-40	1000.000
6938.8	-47.07	9.3	11.1	-45.27	-40	1000.000
9250.8	-48.72	10.7	12.7	-46.72	-40	1000.000
11563.5	-43.82	12.2	12.3	-43.72	-40	1000.000
13875.2	-41.44	13.5	12.3	-42.64	-40	1000.000

RSE-LTE40-L-2352.5

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4704.8	-50.52	7.5	9.0	-49.02	-40	1000.000
7058.4	-51.76	9.4	11.1	-50.06	-40	1000.000
9414.8	-49.18	10.7	12.7	-47.18	-40	1000.000
11782.2	-44.72	12.5	12.3	-44.92	-40	1000.000
14108.0	-40.59	14.0	12.3	-42.29	-40	1000.000

RSE-LTE40-M-2355

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4714.4	-52.38	7.5	9.0	-50.88	-40	1000.000
7062.0	-51.18	9.4	11.1	-49.48	-40	1000.000
9429.2	-49.11	10.7	12.7	-47.11	-40	1000.000
11780.5	-44.08	12.5	12.3	-44.28	-40	1000.000
14127.2	-40.37	14.0	12.3	-42.07	-40	1000.000

RSE-LTE40-H-2357.5

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Peak ERP (dBm)	Limit(dBm)	Polarization
4719.2	-52.44	7.5	9.0	-50.94	-40	1000.000

7082.8	-51.94	9.4	11.1	-50.24	-40	1000.000
9428.4	-48.48	10.7	12.7	-46.48	-40	1000.000
11780.5	-43.57	12.5	12.3	-43.77	-40	1000.000
14146.5	-41.69	14.0	12.3	-43.39	-40	1000.000

RSE-LTE41-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
4994.0	-46.97	7.8	9.6	-45.17	-25	20.17	V
7496.0	-32.98	9.7	11.6	-31.08	-25	6.08	V
10000.4	-45.72	11.2	12.5	-44.42	-25	19.42	H
12498.0	-43.01	12.7	12.3	-43.41	-25	18.41	H
14993.5	-35.71	14.4	12.3	-37.81	-25	12.81	V
17769.0	-30.72	16.0	12.3	-34.42	-25	9.42	V

RSE-LTE41-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5185.2	-44.92	8.0	9.4	-43.52	-25	18.52	V
6334.8	-50.14	8.8	10.3	-48.64	-25	23.64	H
7779.2	-30.35	9.9	11.8	-28.45	-25	3.45	V
10371.6	-42.8	11.6	12.3	-42.1	-25	17.10	H
12895.2	-40.27	13.0	12.3	-40.97	-25	15.97	V
15557.0	-28.43	14.6	12.3	-30.73	-25	5.73	V

RSE-LTE41-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5304.4	-46.85	8.0	9.4	-45.45	-25	20.45	V
6550.8	-49.45	9.0	10.6	-47.85	-25	22.85	V
7957.6	-30.02	9.8	12.2	-27.62	-25	2.62	V
10610.0	-41.68	11.6	12.3	-40.98	-25	15.98	V

13353.8	-38.71	13.7	12.3	-40.11	-25	15.11	H
15915.8	-23.92	15.0	12.3	-26.62	-25	1.62	V

Secondary Supply

RSE-LTE41-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
4994.4	-47.03	7.8	9.6	-45.23	-25	20.23	V
7494.4	-42.63	9.7	11.6	-40.73	-25	15.73	V
9995.2	-44.8	11.2	12.5	-43.5	-25	18.50	H
12494.5	-42.41	12.7	12.3	-42.81	-25	17.81	V
14993.5	-32.41	14.4	12.3	-34.51	-25	9.51	V

RSE-LTE41-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5188.8	-45.37	8.0	9.4	-43.97	-25	18.97	V
7778.0	-42.02	9.9	11.8	-40.12	-25	15.12	V
10371.6	-39	11.6	12.3	-38.3	-25	13.30	V
12932.0	-40.41	13.0	12.3	-41.11	-25	16.11	H
15560.5	-32.67	14.6	12.3	-34.97	-25	9.97	V

RSE-LTE41-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5374.8	-43.52	8.1	9.4	-42.22	-25	17.22	H
6479.2	-48.72	9.0	10.6	-47.12	-25	22.12	H
8061.6	-39.91	9.9	12.2	-37.61	-25	12.61	V
10750.4	-33.54	11.7	12.3	-32.94	-25	7.94	H
13432.5	-39.57	13.7	12.3	-40.97	-25	15.97	H
16124.0	-26.95	15.0	12.3	-29.65	-25	4.65	H

Third Supply

RSE-LTE41-L

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
4994.0	-46.05	7.8	9.6	-44.25	-25	19.25	V
7494.0	-35.77	9.7	11.6	-33.87	-25	8.87	V
9992.4	-47.18	11.2	12.5	-45.88	-25	20.88	H
12492.8	-42.49	12.7	12.3	-42.89	-25	17.89	H
14993.5	-32.06	14.4	12.3	-34.16	-25	9.16	V
17517.0	-31.27	15.1	12.3	-34.07	-25	9.07	V

RSE-LTE41-M

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5188.8	-42.73	8.0	9.4	-41.33	-25	16.33	V
7778.4	-34.57	9.9	11.8	-32.67	-25	7.67	V
10376.0	-45.52	11.6	12.3	-44.82	-25	19.82	H
12960.0	-39.81	13.2	12.3	-40.71	-25	15.71	H
15571.0	-33.9	14.6	12.3	-36.2	-25	11.20	H

RSE-LTE41-H

Frequency (MHz)	PMea (dBm)	Pcl (dBm)	Ga (dBd)	Test Result (dBm)	Limit(dBm)	Margin(dBm)	Polarization
5372.8	-42.87	8.1	9.4	-41.57	-25	16.57	V
8062.4	-29.37	9.9	12.2	-27.07	-25	2.07	V
10750.4	-43.53	11.7	12.3	-42.93	-25	17.93	V
13460.5	-38.72	13.7	12.3	-40.12	-25	15.12	V
16124.0	-31.09	15.0	12.3	-33.79	-25	8.79	V

6.3 Frequency Stability

6.3.1 Measurement Limit

FCC §2.1055 The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.
FCC §24.235 Frequency stability.The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
FCC §22.355 Frequency tolerance.Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C–1 of this section.
FCC §27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

6.3.2 Method of Measurement

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 -30℃.
3.With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 7. 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 -30℃ to +50℃. Allow at least 1.5 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 1.5 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 CMW500 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 ℃ decrements from +50℃ to -30℃. 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.

6.3.3 Test Setup

6.3.4 Measurement results

Temperature	Voltage	Band	Band Width (MHz)	Channel	Rb Mode	QPSK (Hz)	Q16 (Hz)	QPSK (ppm)	Q16 (ppm)
Normal	Low	FDD02	5	fullRB	-17.166	12.002	0.009	0.006	Normal
Normal	Normal	FDD02	5	fullRB	-13.061	-21.944	0.007	0.012	Normal
Normal	High	FDD02	5	fullRB	-15.864	-16.837	0.008	0.009	Normal
50	Normal	FDD02	5	fullRB	-20.843	-17.409	0.011	0.009	50
40	Normal	FDD02	5	fullRB	-21.672	16.351	0.012	0.009	40
30	Normal	FDD02	5	fullRB	-15.206	-21.4	0.008	0.011	30
20	Normal	FDD02	5	fullRB	14.276	-18.754	0.008	0.01	20
10	Normal	FDD02	5	fullRB	-17.853	-15.035	0.009	0.008	10
0	Normal	FDD02	5	fullRB	8.597	-21.429	0.005	0.011	0
-10	Normal	FDD02	5	fullRB	-11.215	-19.727	0.006	0.01	-10
-20	Normal	FDD02	5	fullRB	-14.276	-17.638	0.008	0.009	-20
-30	Normal	FDD02	5	fullRB	-18.868	11.415	0.01	0.006	-30

6.4 Occupied Bandwidth

6.4.1 Summary

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated.

6.4.2 Method of Measurement

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 the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 9711684:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).

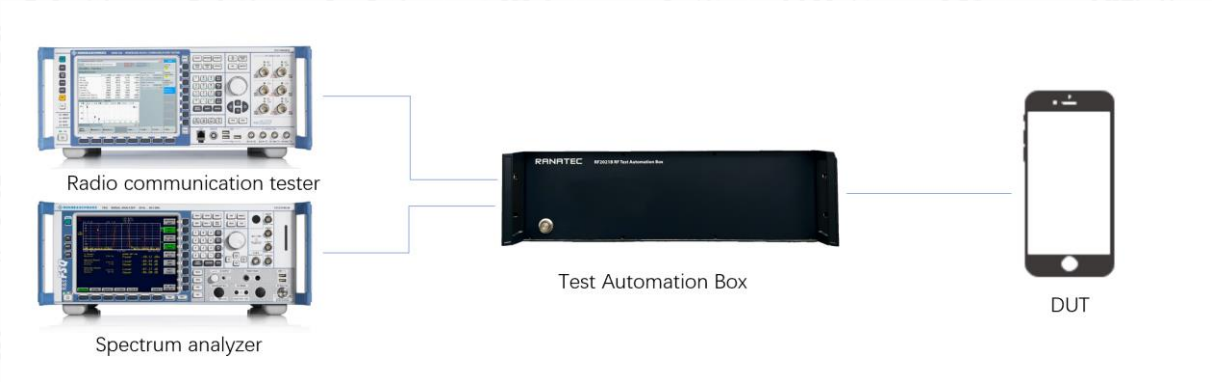
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

d) Set the detection mode to peak, and the trace mode to max hold.

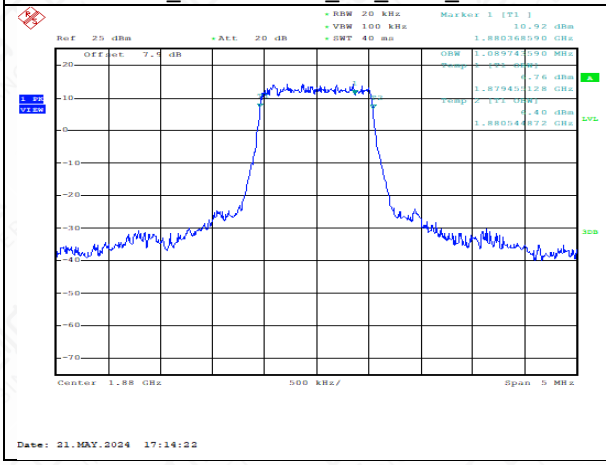
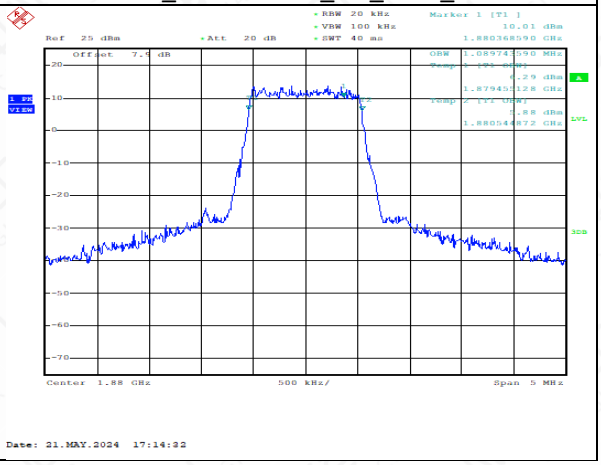
e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

6.4.3 Test Setup



6.4.4 Measurement Results

Band	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
FDD02	Mid	1.4	1880	1.09	1.09

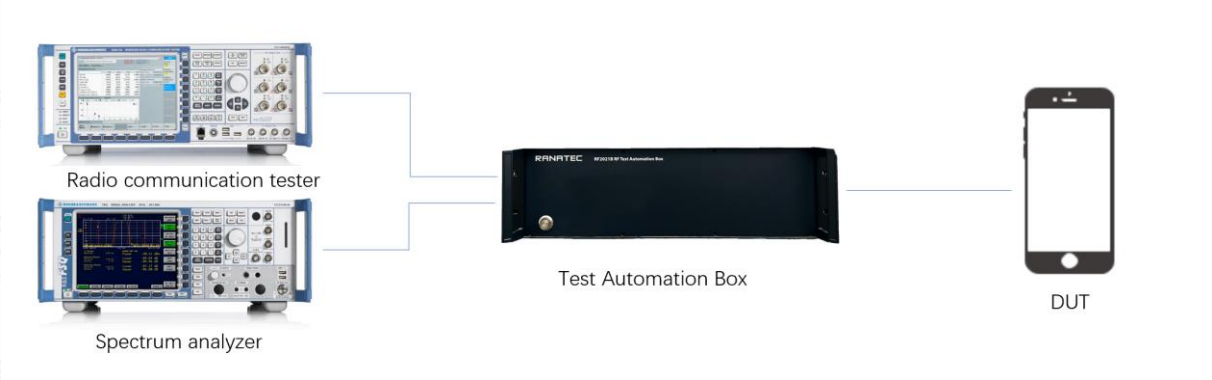
FDD02_Channel Mid_1.4_1880_QPSK	FDD02_Channel Mid_1.4_1880_Q16
	

6.5 Emission Bandwidth

6.5.1 Method of Measurement

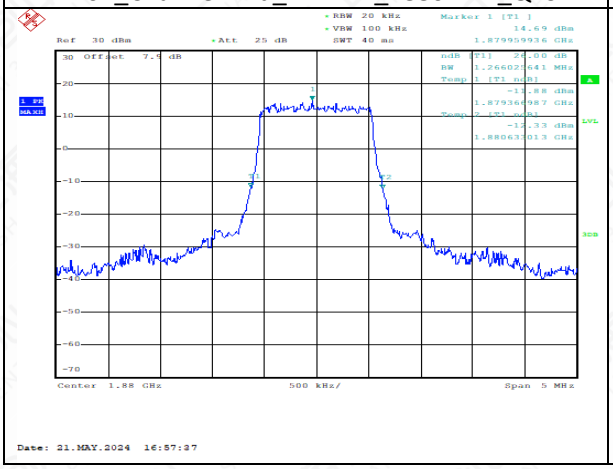
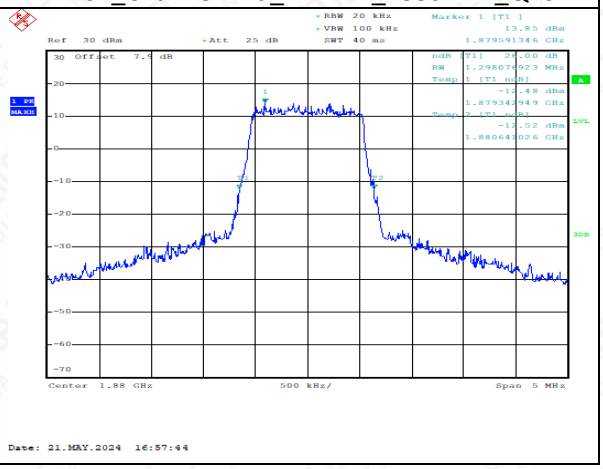
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the followinag pages.

6.5.2 Test Setup



6.5.3 Measurement results

Band	Channel	BandWidth	Frequency(MHz)	QPSK(MHz)	Q16(MHz)
FDD02	Mid	1.4	1880	1.27	1.30

FDD02_Channel Mid_1.4MHz_1880MHz_QPSK	FDD02_Channel Mid_1.4MHz_1880MHz_Q16
	

6.6 Band Edge Compliance

6.6.1 Measurement Limit

FCC §22.917(a) 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 §24.238(a) 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(a) For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

FCC §27.53(h) (1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, 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 §27.53(m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

FCC §27.53(h):

AWS emission limits —

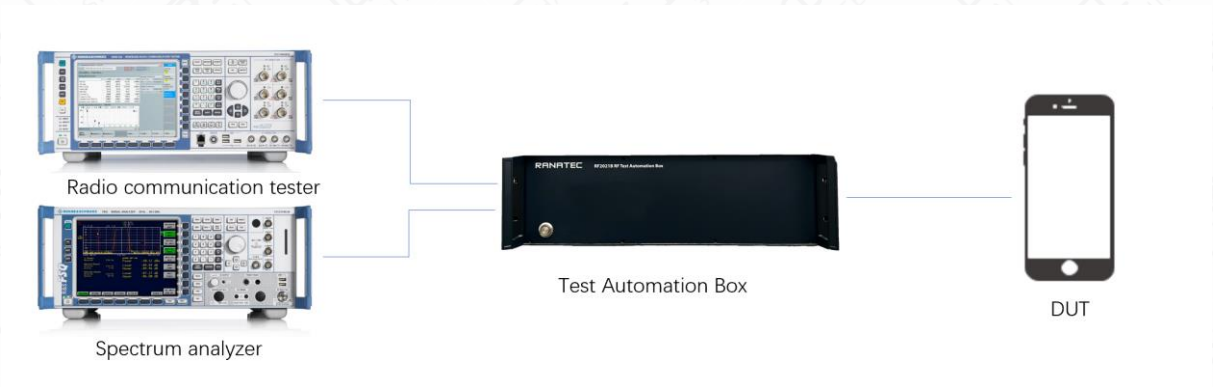
(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block

shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
(2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180–2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200–2290 MHz band.
(ii) For operations in the 2000–2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iii) For operations in the 1915–1920 MHz band, the power of any emission between 1930–1995 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iv) For operations in the 1995–2000 MHz band, the power of any emission between 2005–2020 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.

6.6.2 Method of Measurement

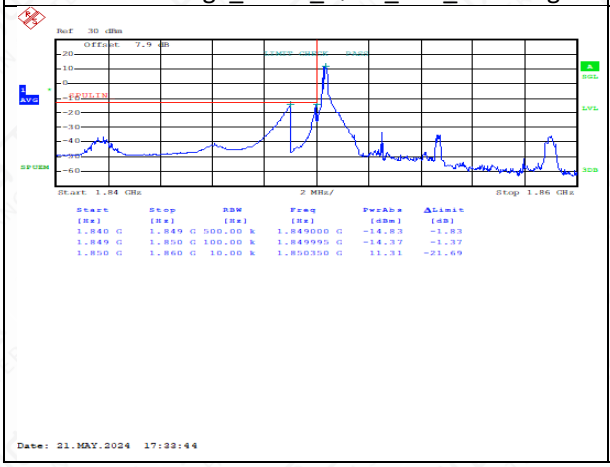
Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0
The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer. the other end of which was connected to a Base Station Simulator, The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points. Outside of which all emission are attenuated at east 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to RMS.

6.6.3 Test Setup



6.6.4 Measurement result

Band 2

FDD02LowRange_5MHz_QPSK_1RB_LowRange	/
	/

6.7 Conducted Spurious Emission

6.7.1 Measurement Limit

FCC §22.917(a) 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 §24.238(a) 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(a) For mobile and portable stations operating in the 2305–2315 MHz and 2350–2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

FCC §27.53(h) (1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, 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 §27.53(m)(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

FCC §27.53(h):

AWS emission limits —

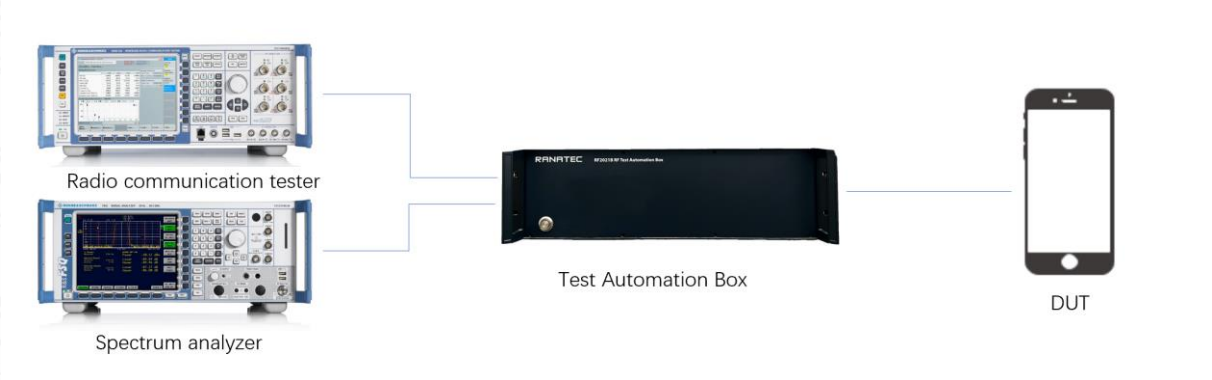
(1) General protection levels. Except as otherwise specified below, for operations in the 1695–1710 MHz, 1710–1755 MHz, 1755–1780 MHz, 1915–1920 MHz, 1995–2000 MHz, 2000–2020 MHz, 2110–2155 MHz, 2155–2180 MHz, and 2180–2200 bands, the power of any emission outside a licensee's frequency block

shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.
(2) Additional protection levels. Notwithstanding the foregoing paragraph (h)(1) of this section:
(i) Operations in the 2180–2200 MHz band are subject to the out-of-band emission requirements set forth in § 27.1134 for the protection of federal government operations operating in the 2200–2290 MHz band.
(ii) For operations in the 2000–2020 MHz band, the power of any emissions below 2000 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iii) For operations in the 1915–1920 MHz band, the power of any emission between 1930–1995 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.
(iv) For operations in the 1995–2000 MHz band, the power of any emission between 2005–2020 MHz shall be attenuated below the transmitter power (P) in watts by at least 70 + 10 log10(P) dB.

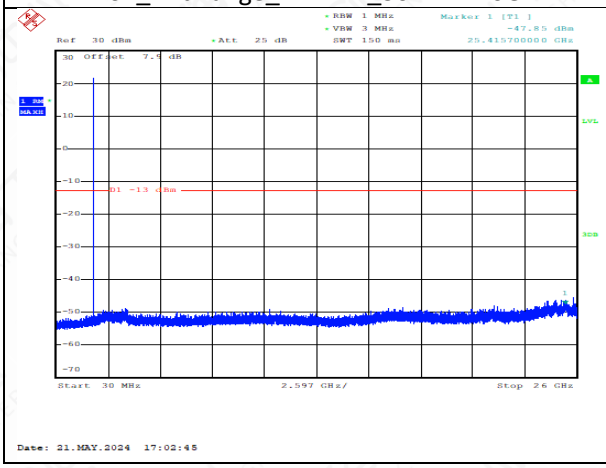
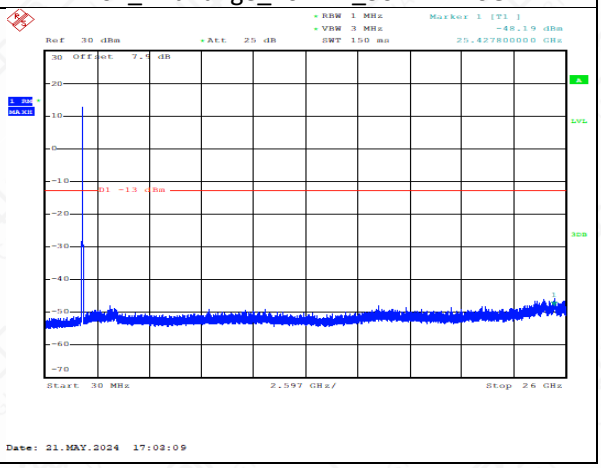
6.7.2 Method of Measurement

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 mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2.Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3.The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

6.7.3 Test Setup



6.7.4 Measurement result

FDD02_MidRange_1.4MHz_30MHz~26GHz	FDD02_MidRange_20MHz_30MHz~26GHz
	

6.8 Peak-To-Average Power Ratio

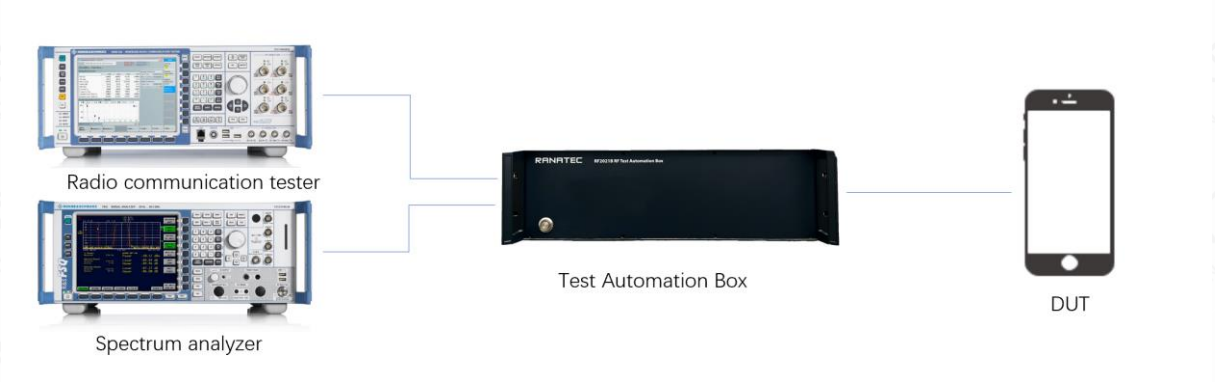
6.8.1 Measurement Limit

CFR Part 22.913(d)/24.232(d)/27.50 :The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

6.8.2 Method of Measurement

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.
According to KDB 971168 5.7:
a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
c) Set the number of counts to a value that stabilizes the measured CCDF curve;
d) Set the measurement interval to 1 ms
e) Record the maximum PAPR level associated with a probability of 0.1%

6.8.3 Test Setup



6.8.4 Measurement results

Band	Channel	BandWidth	RbMode	QPSK(dBm)	Q16(dBm)
FDD02	Low	20	fullRB	4.97	6.28

Annex A: Revised History

Version	Revised Content
V0	Initial

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 20th day of September 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2025

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

END OF REPORT