NVLAP TESTING
NVLAP LAB CODE 600338-0

BACL Bay Area Compliance Labs Corp.

FCC PART 90

TEST REPORT

For

SingularXYZ Intelligent Technology Ltd.

Floor 2, Building A, No. 599 Gaojing Road, Shanghai, China

FCC ID: 2A4O3-X1

Report Type:	Product Name:
Original Report	GNSS Receiver

Report Number:	RKSA240425001-00D
Report Date:	2024-11-29
Reviewed By:	Bard Liu
Approved By:	Kyle Xu
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu Province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RKSA240425001-00D	R1V1	2024-11-29	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	SingularXYZ Intelligent Technology Ltd.
Product Name:	GNSS Receiver
Tested Model	X1
Series Model:	X1 Lite, X1 Pro, E1, E1 Plus, E1 Pro
Model Difference:	SIM card slot, top cover, model name, see the declaration letter for details
Power Supply:	DC 5~12V from type C port or DC 9V~28V from external power supply or DC 7.2V from battery
RF Function:	UHF
Operating Band/Frequency:	410-470 MHz
Modulation Type:	GMSK
Channel Separation:	25 kHz
Antenna Type:	External antenna
★Maximum Antenna Gain:	-3.33 dBi
Rated Power:	High power: 1W, Low power: 0.5W

Note: 1.The maximum antenna gain was declared by the manufacturer.
2. Pre-scan powered by type c port and RS232 port, only the worst case powered by type C port was record.

All measurement and test data in this report was gathered from production sample serial number: RKSA240425001-1（X1 for full test）, RKSA240425001-1 (X1 Lite for Spot check the output power and Radiated Emissions) (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-04-25.)

Objective

This test report is prepared for *SingularXYZ Intelligent Technology Ltd.* in accordance with Part 2, and Part 90 of the Federal Communication Commissions rules.

Test Methodology

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

Pat90-Private Land Mobile Radio Service

Applicable Standards: ANSI C63.26:2015.

Measurement Uncertainty

Item		Uncertainty
Unwanted Emissions, radiated	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6 GHz ~18 GHz	4.92dB
	18 GHz~40 GHz	5.21dB
Occupied Channel Bandwidth		±5%
RF output power, conducted		±0.61dB
Unwanted Emissions, conducted		±1.5dB
Temperature		±1℃
Humidity		±5%
DC and low frequency voltages		±0.4%
Duty Cycle		1%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

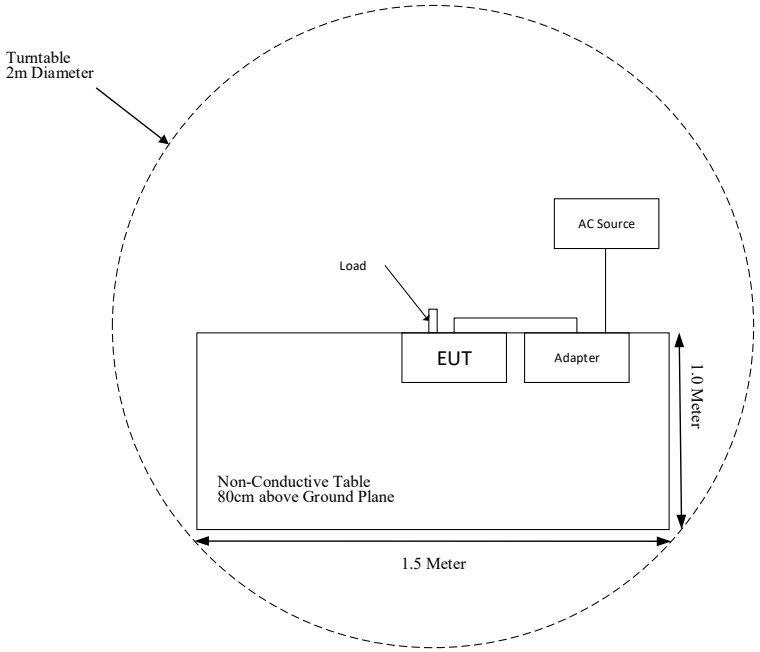
Manufacturer	Description	Model	Serial Number
Power on Tools Co.,Ltd.	Adapter	DA-00052000UL001	Unknown
Unknown	Load	Unknown	Unknown

External I/O Cable

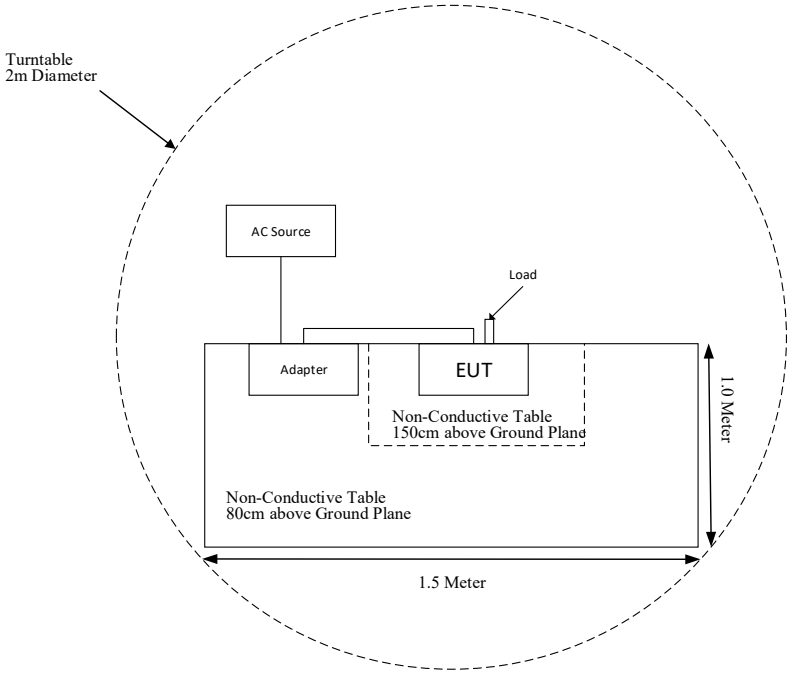
Cable Description	Length(m)	From Port	To
Power Cable 1	1.0	AC Source/LISN	Adapter
Power Cable 2	1.5	Adapter	EUT

Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz):



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1310, §2.1091	Maximum Permissible Exposure (MPE)	Compliant
§2.1046, §90.205	RF Output Power	Compliant
§2.1047	Modulation Characteristic	Not Applicable (See Note)
§2.1049; §90.209; §90.210	Occupied Bandwidth &Emission Mask	Compliant
§2.1051; §90.210	Spurious Emission at Antenna Terminal	Compliant
§2.1053; §90.210	Spurious Radiated Emissions	Compliant
§2.1055; §90.213	Frequency stability	Compliant
§90.214	Transient Frequency Behavior	Compliant

Note: The EUT is used in digital modulation.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber #1)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
Sunol Sciences	Hybrid Antenna	JB3	A090314-1	2023-11-11	2024-11-10
Sunol Sciences	Hybrid antenna	JB3	A060217	2023-12-14	2024-12-13
Narda	6dB Attenuator	773-6	10690812-2-1	2023-11-11	2024-11-10
Agilent	Analog Signal Generator	N5183A	MY51040755	2023-11-17	2024-11-16
Sonoma Instrument	Amplifier	310N	171205	2024-04-23	2025-04-22
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
Radiated Emission Test (Chamber #2)					
Agilent	Analog Signal Generator	N5183A	MY51040755	2023-11-17	2024-11-16
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2024-06-27	2025-06-26
ETS-LINDGREN	Horn Antenna	3115	6229	2024-01-06	2025-01-05
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-13	013	2024-04-25	2025-04-24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200103	2024-04-24	2025-04-23
Narda	Attenuator	30dB	N/A	2024-04-23	2025-04-22
Eastsheep	Attenuator	2W-N-JK-18G	20dB-01	2024-04-24	2025-04-23
BACL	Temperature & Humidity Chamber	BTH-150	30023	2024-04-25	2025-04-25
Rohde & Schwarz	Spectrum Analyzer	FSIQ26	100048	2024-04-24	2025-04-23
Agilent	Power meter	E4419B	MY41291878	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2024-04-23	2025-04-22

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements thattraceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time |E|, |H| or S (minutes)
0.3- 3.0	614	1.63	(100)*	6
3.0 - 30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	f/300	6
1500-100,000	/	/	5	6

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

General Population/Uncontrolled

Mode	Frequency Range (MHz)	Antenna Gain		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
Classic BT	2402-2480	0.1	1.02	-1.5	0.71	20	0.0001	1.0	0.0001
2.4G Wi-Fi	2412-2462	1.34	1.36	10.5	11.22	20	0.0030	1.0	0.0030
GSM 850	824-849	-6.24	0.24	25.81	381.07	20	0.0182	0.55	0.0331
PCS 900	1850-1910	-2.95	0.51	22.81	190.99	20	0.0194	1.0	0.0194
WCDMA band 2	1850-1910	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
WCDMA band 4	1710-1755	-5.48	0.28	25.00	316.23	20	0.0176	1.0	0.0176
WCDMA band 5	824-849	-6.24	0.24	25.00	316.23	20	0.0150	0.55	0.0273
LTE Band 2	1850-1910	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
LTE Band 4	1710-1755	-5.48	0.28	25.00	316.23	20	0.0176	1.0	0.0176
LTE Band 5	824-849	-6.24	0.24	25.00	316.23	20	0.0150	0.55	0.0273
LTE Band 7	2500-2570	-4.89	0.32	25.00	316.23	20	0.0201	1.0	0.0201
LTE Band 12	699-716	-15.37	0.03	25.00	316.23	20	0.0018	0.47	0.0038
LTE Band 13	777-787	-10.27	0.09	25.00	316.23	20	0.0059	0.52	0.0113
LTE Band 25	1850-1915	-2.95	0.51	25.00	316.23	20	0.0321	1.0	0.0321
LTE Band 26	814-849	-6.24	0.24	25.00	316.23	20	0.0150	0.54	0.028
LTE Band 38	2570-2620	-6.40	0.23	25.00	316.23	20	0.0145	1.0	0.0145
LTE Band 41	2496-2690	-2.62	0.55	25.00	316.23	20	0.0346	1.0	0.0346

Occupational/Controlled

Mode	Frequency Range (MHz)	Antenna Gain		★Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
UHF	410-470	-3.33	0.46	30.5	1122.02	20	0.1027	1.3667	0.0751

Note:
1. For the above tune up power were declared by the manufacturer.
2. The WWAN module FCC ID: XMR201903EG25G (Grant on: 03/29/2019).
3. 2.4G Wi-Fi/BT, WWAN and UHF can transmit simultaneously; the worst condition as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} =0.0030+0.0346+0.0751=0.1127< 1.0$$

Result: The device meet FCC MPE at 20 cm distance.

FCC §2.1046 & §90.205 RF OUTPUTPOWER

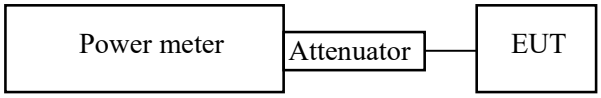
Applicable Standard

FCC §2.1046 & §90.205

Test Procedure

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the Power meter through sufficient attenuation.



Test Data: See Appendix

FCC §2.1049 & § 90.209 § 90.210 - OCCUPIED BANDWIDTH &EMISSION MASK

Applicable Standard

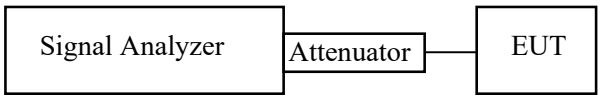
FCC §2.1049, §90.209 and §90.210

Emission Mask C. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:
(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz, but not more than 10 kHz: At least 83 log (fd/5) dB;
(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz, but not more than 250 percent of the authorized bandwidth:At least 29 log (f_d^2/11) dB or 50 dB, whichever is the lesser attenuation;
(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.
(4) In the 1427–1432 MHz band, licensees are encouraged to take all reasonable steps to ensure that unwanted emissions power does not exceed the following levels in the 1400–1427 MHz band:
(i) For stations of point-to-point systems in the fixed service: -45 dBW/27 MHz.
(ii) For stations in the mobile service: -60 dBW/27 MHz.

Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 100Hz and the spectrum was recorded in the frenquency band.



Test Data: See Appendix

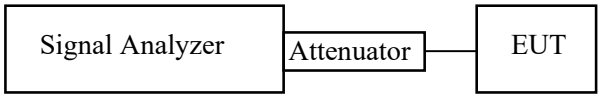
FCC § 2.1051&§90.210 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

FCC §2.1051,§90.210

Test Procedure

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



Test Data: See Appendix

FCC § 2.1053 & §90.210 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC §2.1053, §90.210

Test Procedure

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

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

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

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

Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level

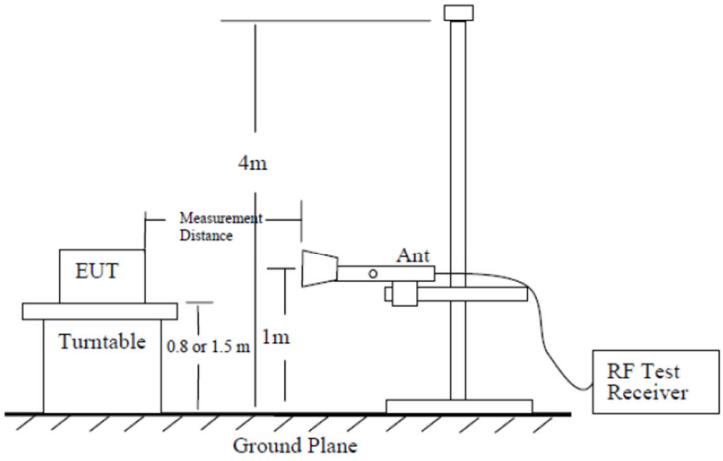


Figure 6—Test site-up for radiated ERP and/or EIRP measurements

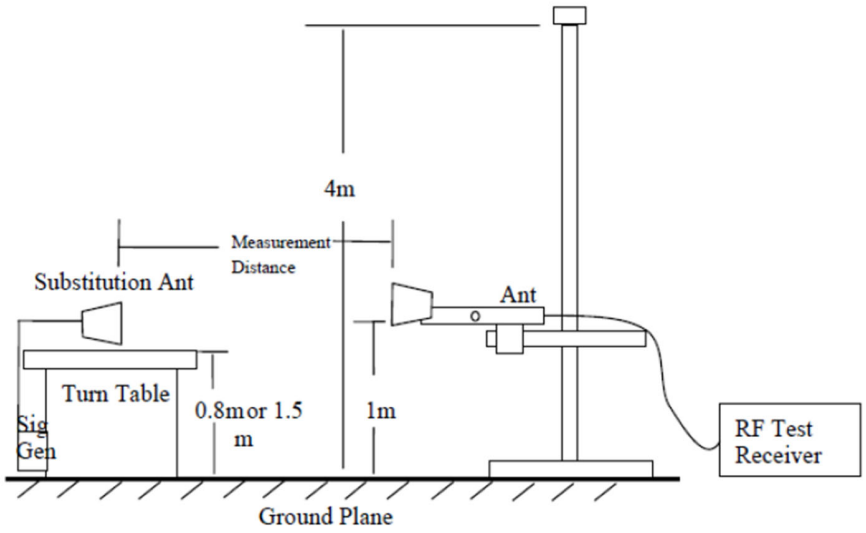


Figure 7 —Substitution method set-up for radiated emission

Test Data: See Appendix

FCC § 2.1055 & §90.213 - FREQUENCY STABILITY

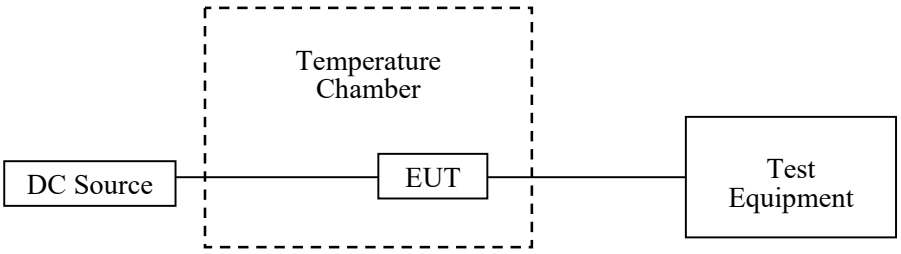
Applicable Standard

FCC §2.1055, §90.213

Test Procedure

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

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.



Test Data: See Appendix

FCC §90.214 - TRANSIENT FREQUENCY BEHAVIOR

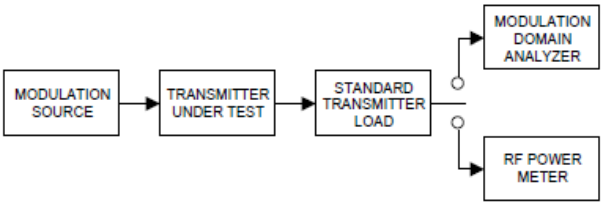
Applicable Standard

Regulations: FCC §90.214

Test method: ANSI C63.26.

Test Procedure

a) Connect the equipment as illustrated.
b) Modulate the transmitter with the standard transmitter symbol rate pattern.
c) Connect the output of the standard transmitter load to the RF power meter.Supply sufficient attenuation via the RF attenuator to provide a level that is approximately 40 dB below the maximum allowable input to the modulation domain analyzer.
d) Turn the transmitter off.
e) Disconnect the RF power meter and connect the modulation domain analyzer in its place. Set the envelope trigger of the modulation domain analyzer to the minimum level that will trigger when the transmitter is keyed.
f) Reduce the attenuation of the RF attenuator so that the input to the to the modulation domain analyzer is increased by 30 dB when the transmitter is turned on.
g) Set the modulation domain analyzer to trigger on the rising edge of the waveform in order to capture a single-shot turn-on of the transmitter signal.
h) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the timebase reference to the left for observing the transmitter turn-on transient.
i) Turn the transmitter on.
j) Observe the stored display of the modulation domain analyzer. The average of the positive and negative peak of the signal trace shall be maintained within the allowable limits during the periods t_1 and t_2, and shall also remain within limits following t_2.
k) Adjust the modulation domain analyzer to trigger on the falling edge of the transmitter waveform in order to capture a single-shot turn-off transient of the transmitter signal.
l) Adjust the display of the modulation domain analyzer for proper viewing of the transmitter transient behavior. Set the timebase reference to the right for observing the transmitter turn-off transient.
m) Turn off the transmitter.
n) Observe the stored display of the modulation domain analyzer. The average of the positive and negative peak of the signal trace shall be maintained within the allowable limits during the period t_3.



Test Data: See Appendix

APPENDIX - TEST DATA

Environmental Conditions & Test Information

Test Item:	RF OUTPUT POWER	OCCUPIED BANDWIDTH &EMISSION MASK	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	SPURIOUS RADIATED EMISSIONS	FREQUENCY STABILITY	TRANSIENT FREQUENCY BEHAVIOR
Test Date:	2024-08-09	2024-11-18	2024-10-31	2024-08-09	2024-08-09	2024-11-28
Temperature:	25.5 ℃	21.5-23.1 ℃	20.5 ℃	25.5 ℃	25.5 ℃	22.5 ℃
Relative Humidity:	55 %	54-58 %	64 %	55 %	55 %	55 %
ATM Pressure:	100.6 kPa	101.6-101.8 kPa	102.0 kPa	100.6 kPa	100.6 kPa	102.0 kPa
Test Result:	Pass	Pass	Pass	Pass	Pass	Pass
Test Engineer:	Bard Liu	Neil Zhou	Neil Zhou	Bard Liu	Bard Liu	Bard Liu

RF OUTPUTPOWER

Test Result: Compliant.

Please refer to following table.

Modulation Mode	ChannelSpacing(kHz)	fc (MHz)	Conducted Output Power (W)	
			High power level	Low power level
GMSK	25 kHz	410.025	0.98	0.49
		440	0.99	0.50
		469.975	0.99	0.50

Spot check with Model: X1 Lite

Modulation Mode	ChannelSpacing(kHz)	fc (MHz)	Conducted Output Power (W)	
			High power level	Low power level
GMSK	25 kHz	410.025	0.99	0.49
		440	0.98	0.50
		469.975	0.99	0.50

Result：The test data results are close

Note: The output power shall not exceed by more than 20 percent of the rated power. The rated high power is 1W. the limit is 1.2W, and rated low power level 0.5W, the limit is 0.6W.

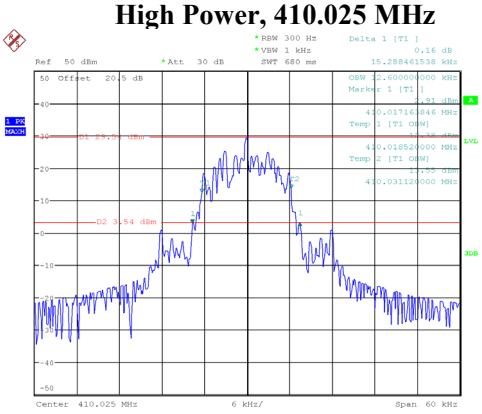
OCCUPIED BANDWIDTH &EMISSION MASK

TestMode: Transmitting

Test Result: Compliant.

Modulation Mode	ChannelSpacing(kHz)	fc (MHz)	Power level	99% Bandwidth (kHz)	26dB Bandwidth (kHz)
GMSK	25 kHz	410.025	High	12.600	15.288
			Low	12.600	14.423
		440	High	12.720	15.384
			Low	12.600	15.385
		469.975	High	12.600	14.519
			Low	12.720	15.385

High Power, 410.025 MHz



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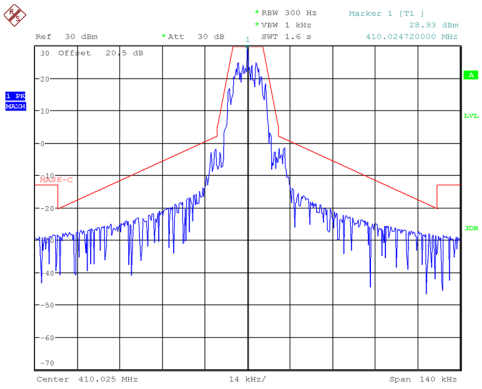
Date: 18.NOV.2024 14:22:55

Emission Mask C



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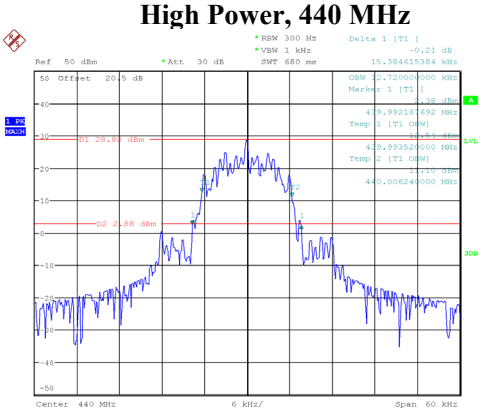
High Power, 440 MHz



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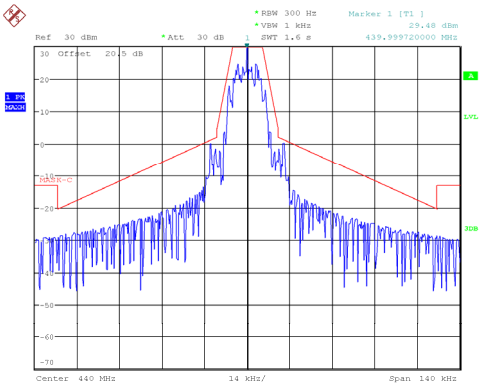
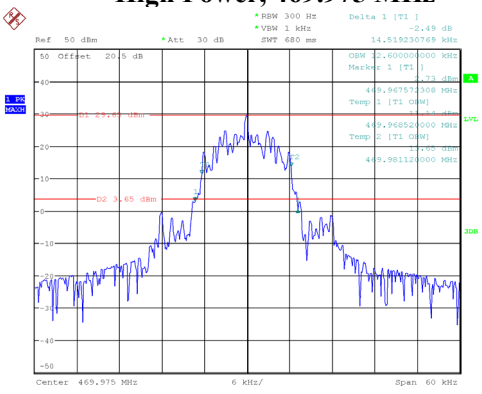
Date: 18.NOV.2024 16:17:13

Emission Mask C



ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 16:04:08

High Power, 469.975 MHz



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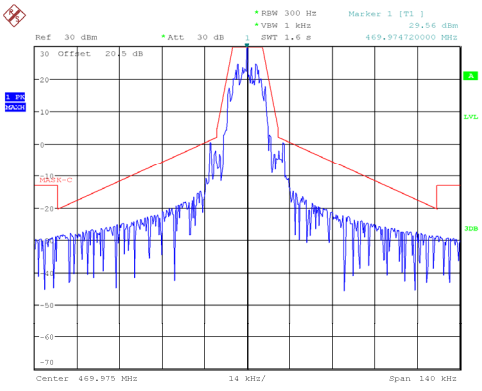
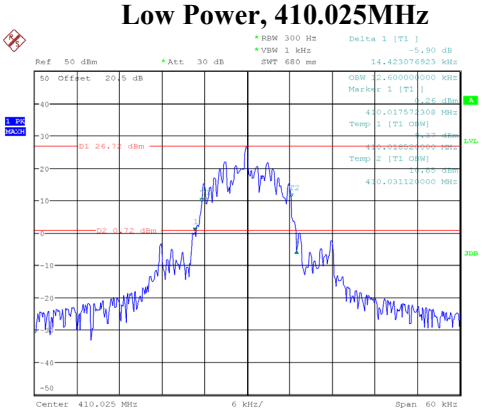
Date: 18.NOV.2024 17:40:33

Emission Mask C



ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 17:32:56

Low Power, 410.025MHz



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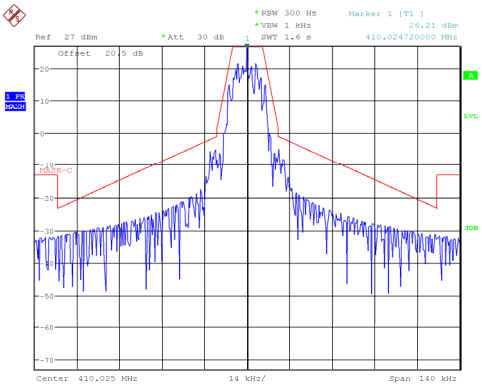
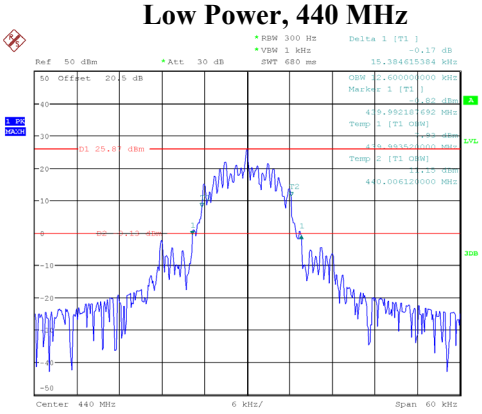
Date: 18.NOV.2024 14:53:25

Emission Mask C



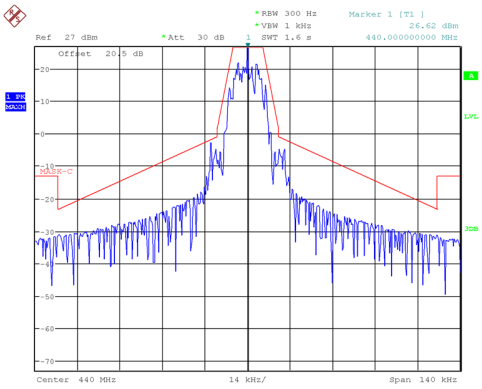
ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 15:09:49

Low Power, 440 MHz



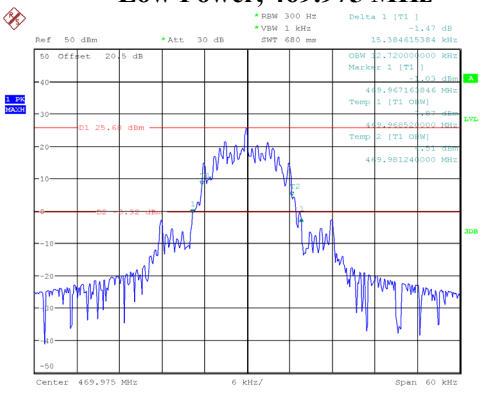
ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 16:24:52

Emission Mask C



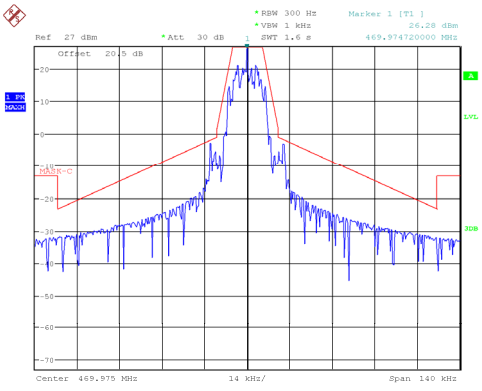
ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 16:35:46

Low Power, 469.975 MHz



ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 17:49:14

Emission Mask C



ProjectNo.:RKSA240425001 Tester:Neil Zhou
Date: 18.NOV.2024 17:22:19

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

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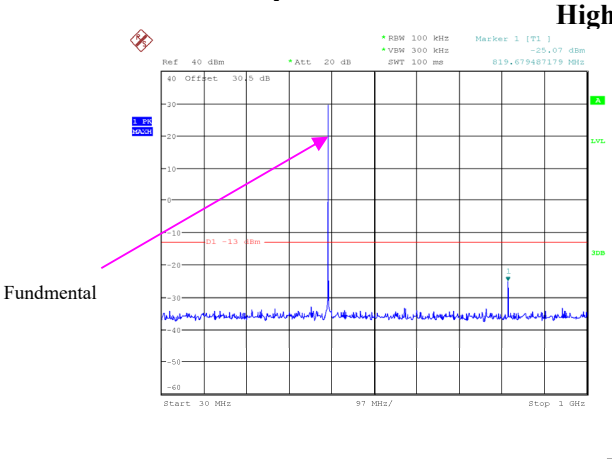
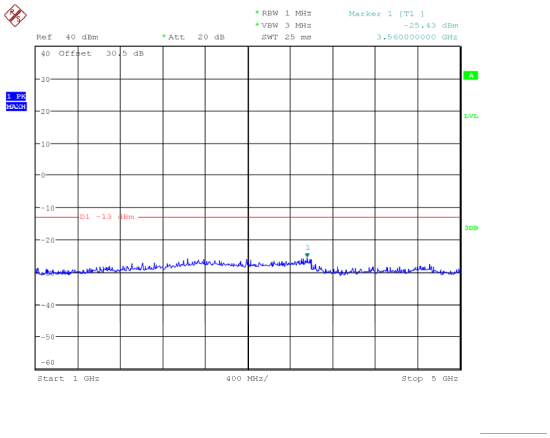
EUT Operation Mode: Transmitting

Test Result: Compliant.

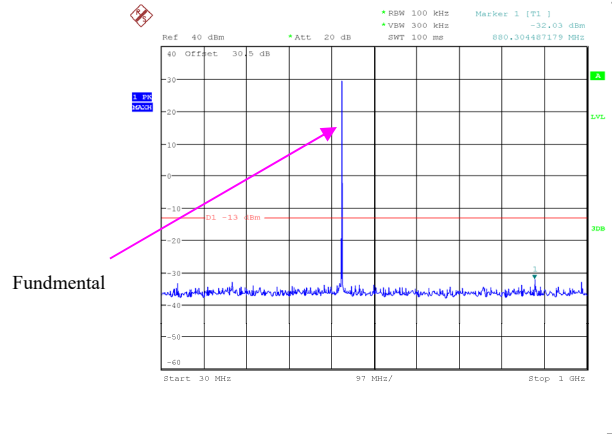
Conducted Spurious Emissions at Antenna Port (High power level (worst case))

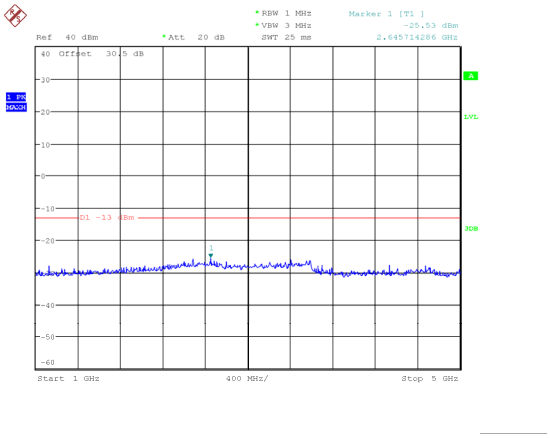
High Power, 410.025 MHz



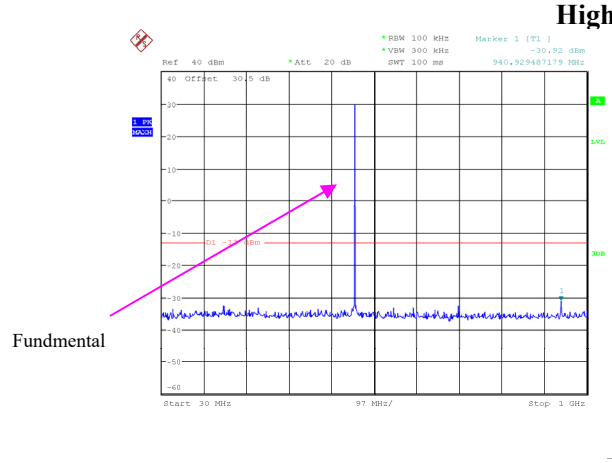


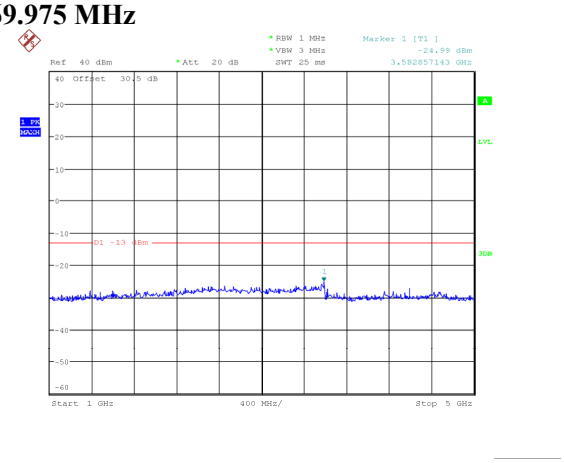
High Power, 440 MHz





High Power, 469.975 MHz





SPURIOUS RADIATED EMISSIONS

EUT Operation Mode: Transmitting in high power level (worst case)

30MHz - 5GHz:

Model: X1

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	SGLevel (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Frequency: 410.025 MHz										
820.05	59.95	4	150	H	-36.43	0.62	-1.19	-38.24	-13	25.24
820.05	60.7	179	150	V	-37.67	0.62	-1.19	-39.48	-13	26.48
1325.6	72.26	296	150	H	-42.11	0.81	7.71	-35.21	-13	22.21
1325.6	70.93	21	150	V	-43.44	0.81	7.71	-36.54	-13	23.54
Frequency: 440 MHz										
880	60.17	9	150	H	-35.72	0.63	-1.01	-37.36	-13	24.36
880	59.52	273	150	V	-37.1	0.63	-1.01	-38.74	-13	25.74
1324	72.86	187	150	H	-41.16	0.81	7.71	-34.26	-13	21.26
1324	71.37	150	150	V	-42.65	0.81	7.71	-35.75	-13	22.75
Frequency: 469.975 MHz										
939.95	61.09	119	150	H	-36.72	0.64	-1.11	-38.47	-13	25.47
939.95	56.44	26	150	V	-37.79	0.64	-1.11	-39.54	-13	26.54
1324.5	72.65	24	150	H	-41.37	0.81	7.71	-34.47	-13	21.47
1324.5	71.74	351	150	V	-42.28	0.81	7.71	-35.38	-13	22.38

Note:
1) Antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
2) Absolute Level = SG Level - Cable loss + Antenna Gain
3) Margin = Limit- Absolute Level

Model: X1 Lite

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	SGLevel (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Frequency: 410.025 MHz										
820.05	57.94	97	150	H	-38.44	0.62	-1.19	-40.25	-13	27.25
820.05	58.77	52	150	V	-39.6	0.62	-1.19	-41.41	-13	28.41
1295.3	69.67	151	150	H	-44.29	0.81	7.63	-37.47	-13	24.47
1295.3	68.52	197	150	V	-45.44	0.81	7.63	-38.62	-13	25.62
Frequency: 440 MHz										
880	58.5	92	150	H	-37.39	0.63	-1.01	-39.03	-13	26.03
880	58.02	108	150	V	-38.6	0.63	-1.01	-40.24	-13	27.24
1292.1	69.8	124	150	H	-44.15	0.81	7.62	-37.34	-13	24.34
1292.1	68.28	222	150	V	-45.67	0.81	7.62	-38.86	-13	25.86
Frequency: 469.975 MHz										
939.95	59.3	5	150	H	-38.51	0.64	-1.11	-40.26	-13	27.26
939.95	54.66	175	150	V	-39.57	0.64	-1.11	-41.32	-13	28.32
1297.3	70.81	169	150	H	-43.15	0.81	7.63	-36.33	-13	23.33
1297.3	69.89	157	150	V	-44.07	0.81	7.63	-37.25	-13	24.25

Note:
1) Antenna gain is dBd for frequency below 1GHz and is dBi for frequency above 1GHz.
2) Absolute Level = SG Level - Cable loss + Antenna Gain
3) Margin = Limit- Absolute Level

FREQUENCY STABILITY

EUT Operation Mode: Transmitting

Test Result: Compliant.

Powerd by battey:

Modulation	**Channel Spacing(kHz)**	**Reference: 410.025 MHz, High power**				
		Temperature (℃)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.7.2	410.02537	0.907	±5
		-20		410.02536	0.883	±5
		-10		410.02536	0.885	±5
		0		410.02528	0.678	±5
		10		410.02527	0.654	±5
		20		410.02528	0.673	±5
		30		410.02530	0.724	±5
		40		410.02530	0.719	±5
		50		410.02528	0.680	±5
		20	L.V.6.48	410.02527	0.654	±5
			H.V.7.92	410.02528	0.693	±5

Modulation	Channel Spacing(kHz)	Reference: 440 MHz, High power				
		Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.7.2	440.00048	1.091	±5
		-20		440.00052	1.182	±5
		-10		440.00061	1.386	±5
		0		440.00056	1.273	±5
		10		440.00049	1.114	±5
		20		440.00041	0.932	±5
		30		440.00038	0.864	±5
		40		440.00045	1.023	±5
		50		440.00039	0.886	±5
		20	L.V.6.48	440.00060	1.364	±5
			H.V.7.92	440.00042	0.955	±5

Modulation	Channel Spacing(kHz)	Reference: 469.975 MHz, High power				
		Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.7.2	469.97545	0.957	±5
		-20		469.97548	1.021	±5
		-10		469.97563	1.340	±5
		0		469.97552	1.106	±5
		10		469.97570	1.489	±5
		20		469.97565	1.383	±5
		30		469.97541	0.872	±5
		40		469.97564	1.362	±5
		50		469.97558	1.234	±5
		20	L.V.6.48	469.97536	0.766	±5
			H.V.7.92	469.97537	0.787	±5

Powerd by type C port:

Modulation	Channel Spacing(kHz)	Reference: 410.025 MHz, High power				
		Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.9	410.02525	0.619	±5
		-20		410.02532	0.780	±5
		-10		410.02533	0.805	±5
		0		410.02526	0.641	±5
		10		410.02527	0.656	±5
		20		410.02524	0.585	±5
		30		410.02530	0.732	±5
		40		410.02534	0.829	±5
		50		410.02526	0.634	±5
		20	L.V.5	410.02524	0.585	±5
			H.V.12	410.02526	0.634	±5

Modulation	Channel Spacing(kHz)	Reference: 440 MHz, High power				
		Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.9	440.00029	0.659	±5
		-20		440.00032	0.727	±5
		-10		440.00035	0.795	±5
		0		440.00043	0.977	±5
		10		440.00023	0.523	±5
		20		440.00027	0.614	±5
		30		440.00031	0.705	±5
		40		440.00036	0.818	±5
		50		440.00033	0.750	±5
		20	L.V.5	440.00054	1.227	±5
			H.V.12	440.00038	0.864	±5

Modulation	Channel Spacing(kHz)	Reference: 469.975 MHz, High power				
		Temperature (℃)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.9	469.97534	0.723	±5
		-20		469.97542	0.894	±5
		-10		469.97556	1.192	±5
		0		469.97543	0.915	±5
		10		469.97564	1.362	±5
		20		469.97557	1.213	±5
		30		469.97547	0.989	±5
		40		469.97564	1.362	±5
		50		469.97561	1.298	±5
		20	L.V.5	469.97545	0.957	±5
			H.V.12	469.97548	1.021	±5

Powerd by external power supply:

Modulation	Channel Spacing(kHz)	Reference: 410.025 MHz, High power				
		Temperature (°C)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.12	410.02528	0.683	±5
		-20		410.02535	0.854	±5
		-10		410.02534	0.829	±5
		0		410.02522	0.537	±5
		10		410.02519	0.463	±5
		20		410.02531	0.756	±5
		30		410.02532	0.780	±5
		40		410.02534	0.829	±5
		50		410.02532	0.780	±5
		20	L.V.9	410.02529	0.707	±5
			H.V.28	410.02532	0.780	±5

Modulation	ChannelSpacing(kHz)	Reference: 440 MHz, High power				
		Temperature (℃)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.12	440.00041	0.932	±5
		-20		440.00038	0.864	±5
		-10		440.00054	1.227	±5
		0		440.00042	0.955	±5
		10		440.00041	0.932	±5
		20		440.00035	0.795	±5
		30		440.00037	0.841	±5
		40		440.00043	0.977	±5
		50		440.00034	0.773	±5
		20	L.V.9	440.00051	1.159	±5
			H.V.28	440.00038	0.864	±5

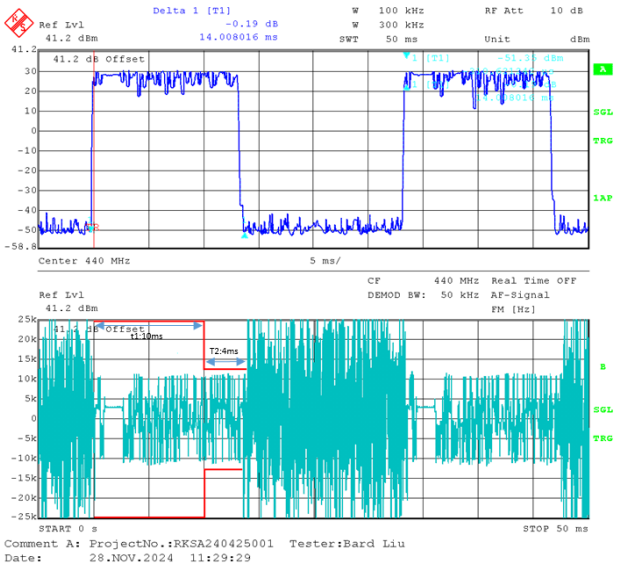
Modulation	ChannelSpacing(kHz)	Reference: 469.975 MHz, High power				
		Temperature (℃)	Voltage Supplied (V_{DC})	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
GMSK	25	-30	N.V.12	469.97542	0.894	±5
		-20		469.97553	1.128	±5
		-10		469.97557	1.213	±5
		0		469.97563	1.340	±5
		10		469.97557	1.213	±5
		20		469.97562	1.319	±5
		30		469.97546	0.979	±5
		40		469.97553	1.128	±5
		50		469.97554	1.149	±5
		20	L.V.9	469.97548	1.021	±5
			H.V.28	469.97543	0.915	±5

TRANSIENT FREQUENCY BEHAVIOR

Channel Spacing (kHz)	Transient Period (ms)	Transient Frequency(kHz)	Result
25	10(t_1)	±25.0	Compliant
	25(t_2)	±12.5	Compliant
	10(t_3)	±25.0	Not Applicable

Note:
Not Applicable: t3 is not applicable for the t2 less than 25ms

Frequency: 440 MHz



EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT D - TEST SETUP PHOTOGRAPHS.

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with "★".

2. The test data was only valid for the test sample(s).

3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

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