TEST REPORT

Applicant Name:	Tractive GmbH
Address:	Poststrasse 4, 4061 Pasching, Austria
Report Number:	SZ2240105-01314E-RF-00
FCC ID:	2AVE6TG5B

Test Standard (s)

FCC PART 27; FCC PART 22H; FCC PART 24E

Sample Description

Product Type:	Tractive CAT Mini
Model No.:	TG5
Multiple Model(s) No.:	N/A
Trade Mark:	N/A
Date Received:	2024/01/05
Issue Date:	2024/05/06

Test Result:	Pass▲

▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

April Zhang

April Zhang
RF Engineer

Approved By:

Jimmy Xiao

Jimmy Xiao
RF Supervisor

Note: The information marked # is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "▼".

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	SZ2240105-01314E-RF-00	Original Report	2024/05/06

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Tractive CAT Mini
Tested Model	TG5
Multiple Model(s)	N/A
Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) CAT-M1: LTE Band 2: 1850-1910MHz(TX); 1930-1990MHz(RX) LTE Band 4: 1710-1755MHz(TX); 2110-2155MHz(RX) LTE Band 5: 824-849MHz(TX); 869-894MHz(RX) LTE Band 12: 699-716MHz(TX); 729-746MHz(RX) LTE Band 13: 777-787MHz(TX); 746-756MHz(RX)
Modulation Technique	GSM: GMSK, 8PSK CAT-M1: QPSK, 16QAM
Antenna Specification#	GSM850/ LTE B5/LTE B12/LTE B13: -3.3dBi PCS1900/LTE B2/LTE B4: 0.9dBi (provided by the applicant)
Voltage Range	DC 3.8V from battery or DC 5V from USB port
Sample serial number	2G6B-6 for Radiated Emissions Test 2G6B-5 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Normal/Extreme Condition#	L.V.: Low Voltage 3.45V_{DC} N.V.: Normal Voltage 3.8V_{DC} H.V.: High Voltage 4.35V_{DC}
Adapter Information	N/A

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part24-Subpart E, and Subpart 27 of the Federal Communication Commission's rules.

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

Test Methodology

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

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 - Miscellaneous Wireless Communications Services

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
KDB 971168 D01: Power Meas License Digital Systems v03r01

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		0.72 dB(k=2, 95% level of confidence)
Unwanted Emission, conducted		1.75 dB(k=2, 95% level of confidence)
RF Frequency		213.55 Hz(k=2, 95% level of confidence)
Radiated Emissions	30MHz~200MHz (Horizontal)	4.48dB(k=2, 95% level of confidence)
	30MHz~200MHz (Vertical)	4.55dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Horizontal)	4.85dB(k=2, 95% level of confidence)
	200MHz~1000MHz (Vertical)	5.05dB(k=2, 95% level of confidence)
	1GHz - 6GHz	5.35dB(k=2, 95% level of confidence)
	6GHz - 18GHz	5.44dB(k=2, 95% level of confidence)
	18GHz - 40GHz	5.16dB(k=2, 95% level of confidence)
Temperature		±1℃
Humidity		±1%
Supply voltages		±0.4%

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

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Frequency Band	Bandwidth (MHz)	Test Frequency (MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.6	848.8
PCS1900	0.25	1850.2	1880	1909.8
LTE B2	1.4	1850.7	1880	1909.3
	3	1851.5	1880	1908.5
	5	1852.5	1880	1907.5
	10	1855	1880	1905
	15	1857.5	1880	1902.5
	20	1860	1880	1900
LTE B4	1.4	1710.7	1732.5	1754.3
	3	1711.5	1732.5	1753.5
	5	1712.5	1732.5	1752.5
	10	1715	1732.5	1750
	15	1717.5	1732.5	1747.5
	20	1720	1732.5	1745
LTE B5	1.4	824.7	836.5	848.3
	3	825.5	836.5	847.5
	5	826.5	836.5	846.5
	10	829	836.5	844
LTE B12	1.4	699.7	707.5	715.3
	3	700.5	707.5	714.5
	5	701.5	707.5	713.5
	10	704.0	707.5	711.0
LTE B13	5	779.5	782	784.5
	10	/	782	/

Equipment Modifications

No modification was made to the EUT.

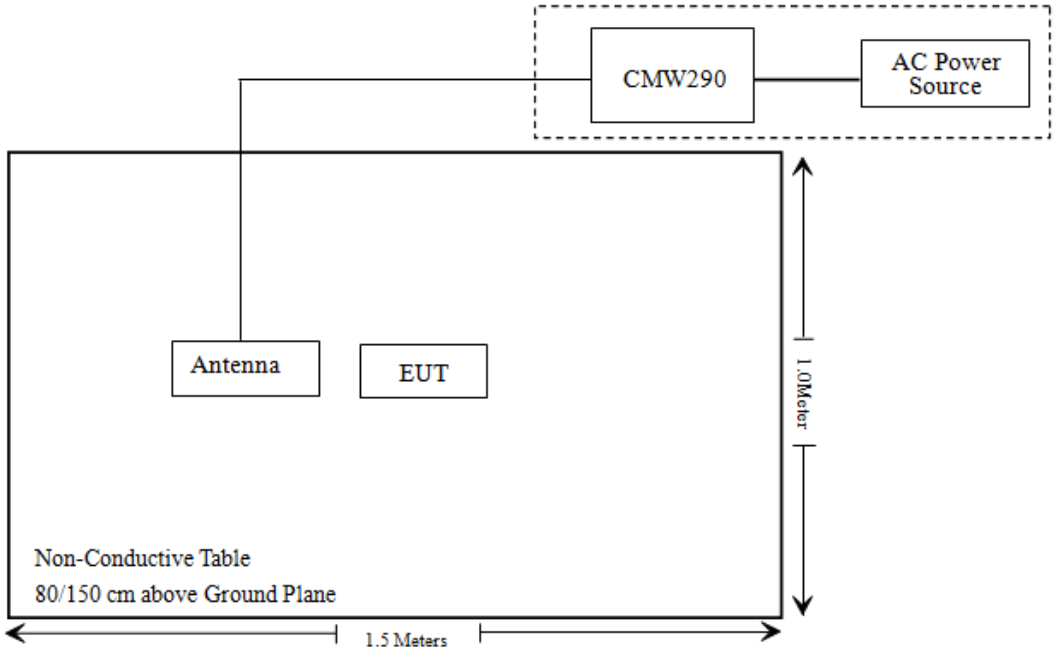
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Functional Radio Communication Tester	CMW290	154606

Support Cable Description

Cable Description	Length (m)	From / Port	To
Unshielded Detachable AC Cable	1.2	AC Power	CMW290

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 ,§2.1093	RF Exposure (SAR)	Compliant
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (b) (c) (d);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliant
§ 2.1051; §22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (c) (h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2024/01/16	2025/01/15
Sonoma instrument	Pre-amplifier	310 N	186238	2023/06/08	2024/06/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2024/07/19
Unknown	Cable	Chamber Cable 1	F-03-EM236	2023/08/03	2024/08/02
Unknown	Cable	Chamber Cable 4	EC-007	2023/08/03	2024/08/02
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2023/04/18	2024/04/17
COM-POWER	Pre-amplifier	PA-122	181919	2023/06/29	2024/06/28
Schwarzbeck	Horn Antenna	BBHA9120D(1201)	1143	2023/07/26	2024/07/25
A.H.System	Horn Antenna	SAS-200/571	135	2021/07/14	2024/07/13
Unknown	RF Cable	KMSE	0735	2023/10/08	2024/10/07
Unknown	RF Cable	UFA147	219661	2023/10/08	2024/10/07
Unknown	RF Cable	XH750A-N	J-10M	2023/10/08	2024/10/07
Agilent	Signal Generator	N5183A	MY50140588	2023/12/18	2024/12/17
Unknown	1.3G High Pass filter	1.3GHz	101120	2023/08/03	2024/08/02
MICRO-TRONICS	2.8G Passband filter	HPM50111	F-03-EM217	2023/08/03	2024/08/02
A.H.System	Pre-amplifier	PAM-1840VH	190	2023/08/03	2024/08/02
Electro-Mechanics Co	Horn Antenna	3116	9510-2270	2023/09/18	2026/09/17
Electro-Mechanics Co	Horn Antenna	3116	2026	2023/09/18	2026/09/17
UTIFLEX	RF Cable	NO. 13	232308-001	2023/08/03	2024/08/02

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
R&S	SPECTRUM ANALYZER	FSU26	200120	2024/01/08	2025/01/07
BACL	Temperature & Humidity Chamber	BTH-150-40	30145	2024/01/16	2025/01/15
R&S	Wideband Radio Communication Tester	CMW500	141718	2023/09/06	2024/09/05
Rohde & Schwarz	Functional Radio Communication Tester	CMW290	101742	2023/06/08	2024/06/07
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2023/06/08	2024/06/07
Unknown	3dB Attenuator	Unknown	F-03-EM121	2023/07/04	2024/07/03
WEINSCHEL	Power Splitter	1515	RH386	2023/07/04	2024/07/03
Micro-Tronics	RF Cable	8082135	W1113	2023/07/04	2024/07/03

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: SZ2240105-01314E-20A.

FCC§2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H,24E&27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c); §27.50 (b) (c) (d) - RF OUTPUT POWER

Applicable Standard

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

According to FCC §2.1046 and §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.

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

According to §27.50(b), Portable stations (hand-held devices) transmitting in the 746–757 MHz, 776–788 MHz, and 805–806 MHz bands are limited to 3 watts ERP.

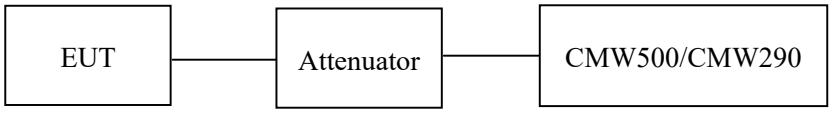
According to §27.50(c), Control and mobile stations in the 698-746 MHz band are limited to 30 watts ERP. And Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band and mobile and portable stations operating in the 1695–1710 MHz and 1755–1780 MHz bands are limited to 1 watt EIRP.

Test Procedure

Conducted method: ANSI C63.26-2015 Section 5.2

The RF output of the transmitter was connected to the CMW500/CMW290 through sufficient attenuation.



Test Data

Environmental Conditions

Temperature:	24.1~25.7 ℃
Relative Humidity:	37~45 %
ATM Pressure:	101.0 kPa

The testing was performed by Cheeb Huang from 2024-03-11 to 2024-03-15.

Test Result: Compliant

Cellular Band (Part 22H)

GSM 850

Test Mode	Conducted Average Output Power(dBm)			Maximum ERP (dBm)	ERP Limit (dBm)
	Lowest Channel	Middle Channel	Highest Channel		
GPRS 1 Slot	**30.36**	30.21	29.99	24.91	38.45
GPRS 2 Slots	28.12	27.96	27.68	22.67	38.45
GPRS 3 Slots	26.58	26.18	25.83	21.13	38.45
GPRS 4 Slots	25.71	25.57	25.4	20.26	38.45
EDGE 1 Slot	**25.08**	24.93	24.76	19.63	38.45
EDGE 2 Slots	24.69	24.56	24.49	19.24	38.45
EDGE 3 Slots	24.31	23.99	23.81	18.86	38.45
EDGE 4 Slots	23.46	23.33	23.22	18.01	38.45
Note: ERP= Conducted Power(dBm) + G_T(dBd) G_T(dBd)=G_T(dBi)-2.15					

PCS Band (Part 24E)

PCS 1900

Test Mode	Conducted Average Output Power(dBm)			Maximum EIRP (dBm)	EIRP Limit (dBm)
	Lowest Channel	Middle Channel	Highest Channel		
GPRS 1 Slot	25.9	25.92	**25.93**	26.83	33
GPRS 2 Slots	23.67	23.6	23.83	24.73	33
GPRS 3 Slots	21.69	21.52	21.75	22.65	33
GPRS 4 Slots	20.4	20.32	20.47	21.37	33
EDGE 1 Slot	**21.98**	21.87	21.78	22.88	33
EDGE 2 Slots	21.75	21.62	21.57	22.65	33
EDGE 3 Slots	21.42	21.06	21.19	22.32	33
EDGE 4 Slots	20.77	20.69	20.72	21.67	33
Note: EIRP=Conducted Power(dBm) + G_T(dBi)					

LTE Band 2

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	20.22	21.45	33
	0		RB6#0	18.31		
	0	Middle	RB1#0	20.55		
	0		RB6#0	18.64		
	0	Highest	RB1#5	20.3		
	0		RB6#0	18.55		
1.4MHz 16QAM	0	Lowest	RB1#0	19.64	20.54	33
	0		RB5#0	18.35		
	0	Middle	RB1#0	19.56		
	0		RB5#0	18.61		
	0	Highest	RB1#5	19.24		
	0		RB5#0	18.6		
3MHz QPSK	0	Lowest	RB1#0	20.6	21.5	33
	0		RB6#0	18.76		
	0	Middle	RB1#0	20.57		
	0		RB6#0	18.68		
	1	Highest	RB1#5	20.28		
	0		RB6#0	18.66		
3MHz 16QAM	0	Lowest	RB1#0	19.89	20.79	33
	0		RB5#0	18.64		
	0	Middle	RB1#0	19.75		
	0		RB5#0	18.49		
	1	Highest	RB1#5	19.09		
	0		RB5#0	18.69		
5MHz QPSK	3	Lowest	RB1#0	20.52	21.52	33
	0		RB6#0	19.7		
	0	Middle	RB1#0	20.62		
	0		RB6#0	19.57		
	0	Highest	RB1#5	20.52		
	0		RB6#0	19.65		
5MHz 16QAM	3	Lowest	RB1#0	20.71	21.61	33
	0		RB5#0	18.69		
	0	Middle	RB1#0	20.47		
	0		RB5#0	18.63		
	0	Highest	RB1#5	20.46		
	0		RB5#0	18.68		
10MHz QPSK	3	Lowest	RB1#0	20.6	21.6	33
	0		RB4#0	20.7		
	0	Middle	RB1#0	20.61		

	0		RB4#0	20.6		
	4	Highest	RB1#5	20.32		
	7		RB4#2	20.28		
10MHz 16QAM	3	Lowest	RB1#0	20.25	21.65	33
	0		RB4#0	19.76		
	0	Middle	RB1#0	20.75		
	0		RB4#0	19.63		
	4	Highest	RB1#5	20.19		
	7		RB4#2	19.21		
15MHz QPSK	3	Lowest	RB1#0	20.54	21.54	33
	0		RB6#0	20.54		
	0	Middle	RB1#0	20.64		
	0		RB6#0	20.5		
	8	Highest	RB1#5	20.35		
	11		RB6#0	20.32		
15MHz 16QAM	3	Lowest	RB1#0	20.77	21.67	33
	0		RB5#0	20.59		
	0	Middle	RB1#0	20.39		
	0		RB5#0	20.5		
	8	Highest	RB1#5	20.51		
	11		RB5#0	20.22		
20MHz QPSK	3	Lowest	RB1#0	20.57	21.47	33
	0		RB6#0	20.53		
	0	Middle	RB1#0	20.44		
	0		RB6#0	20.34		
	12	Highest	RB1#5	20.26		
	15		RB6#0	20.27		
20MHz 16QAM	3	Lowest	RB1#0	20.39	21.44	33
	0		RB5#0	20.54		
	0	Middle	RB1#0	20.51		
	0		RB5#0	20.35		
	12	Highest	RB1#5	20.19		
	15		RB5#0	20.16		
Note: EIRP=Conducted Power(dBm) + G_T(dBi)						

LTE Band 4

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum EIRP (dBm)	EIRP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	23.12	24.02	30
	0		RB6#0	21.04		
	0	Middle	RB1#0	22.41		
	0		RB6#0	20.29		
	0	Highest	RB1#5	22.14		
	0		RB6#0	20.33		
1.4MHz 16QAM	0	Lowest	RB1#0	22.31	23.21	30
	0		RB5#0	21.00		
	0	Middle	RB1#0	21.86		
	0		RB5#0	20.42		
	0	Highest	RB1#5	21.04		
	0		RB5#0	20.34		
3MHz QPSK	0	Lowest	RB1#0	23.09	23.99	30
	0		RB6#0	21.03		
	0	Middle	RB1#0	22.98		
	0		RB6#0	20.46		
	1	Highest	RB1#5	21.97		
	0		RB6#0	20.22		
3MHz 16QAM	0	Lowest	RB1#0	22.27	23.17	30
	0		RB5#0	20.87		
	0	Middle	RB1#0	21.62		
	0		RB5#0	20.58		
	1	Highest	RB1#5	21.01		
	0		RB5#0	20.34		
5MHz QPSK	3	Lowest	RB1#0	22.92	23.82	30
	0		RB6#0	21.95		
	0	Middle	RB1#0	22.69		
	0		RB6#0	21.68		
	0	Highest	RB1#5	22.13		
	0		RB6#0	21.37		
5MHz 16QAM	3	Lowest	RB1#0	22.88	23.78	30
	0		RB5#0	21.01		
	0	Middle	RB1#0	22.45		
	0		RB5#0	20.7		
	0	Highest	RB1#5	21.99		
	0		RB5#0	20.46		
10MHz QPSK	3	Lowest	RB1#0	22.86	23.84	30
	0		RB4#0	22.94		
	0	Middle	RB1#0	22.56		

	0		RB4#0	22.44		
	4	Highest	RB1#5	21.85		
	7		RB4#2	22.1		
10MHz 16QAM	3	Lowest	RB1#0	22.97	23.87	30
	0		RB4#0	21.95		
	0	Middle	RB1#0	22.37		
	0		RB4#0	21.38		
	4	Highest	RB1#5	21.69		
	7		RB4#2	21.2		
15MHz QPSK	3	Lowest	RB1#0	22.78	23.87	30
	0		RB6#0	22.97		
	0	Middle	RB1#0	22.71		
	0		RB6#0	22.65		
	8	Highest	RB1#5	22.02		
	11		RB6#0	22.06		
15MHz 16QAM	3	Lowest	RB1#0	23	23.9	30
	0		RB5#0	22.76		
	0	Middle	RB1#0	22.55		
	0		RB5#0	22.76		
	8	Highest	RB1#5	21.85		
	11		RB5#0	22.21		
20MHz QPSK	3	Lowest	RB1#0	22.76	23.85	30
	0		RB6#0	22.95		
	0	Middle	RB1#0	22.85		
	0		RB6#0	22.52		
	12	Highest	RB1#5	21.97		
	15		RB6#0	21.98		
20MHz 16QAM	3	Lowest	RB1#0	22.71	23.86	30
	0		RB5#0	22.96		
	0	Middle	RB1#0	22.71		
	0		RB5#0	22.59		
	12	Highest	RB1#5	21.78		
	15		RB5#0	21.98		
Note: EIRP=Conducted Power(dBm) + G_T(dBi)						

LTE Band 5

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum ERP (dBm)	ERP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	23.19	17.74	38.45
	0		RB6#0	20.99		
	0	Middle	RB1#0	23.00		
	0		RB6#0	20.86		
	0	Highest	RB1#5	22.68		
	0		RB6#0	20.71		
1.4MHz 16QAM	0	Lowest	RB1#0	22.05	16.63	38.45
	0		RB5#0	21.07		
	0	Middle	RB1#0	22.08		
	0		RB5#0	20.74		
	0	Highest	RB1#5	21.35		
	0		RB5#0	20.76		
3MHz QPSK	0	Lowest	RB1#0	23.13	17.68	38.45
	0		RB6#0	21.01		
	0	Middle	RB1#0	22.98		
	0		RB6#0	20.8		
	1	Highest	RB1#5	22.37		
	0		RB6#0	20.66		
3MHz 16QAM	0	Lowest	RB1#0	22.66	17.21	38.45
	0		RB5#0	20.85		
	0	Middle	RB1#0	21.69		
	0		RB5#0	20.83		
	1	Highest	RB1#5	21.43		
	0		RB5#0	20.84		
5MHz QPSK	3	Lowest	RB1#0	22.96	17.55	38.45
	0		RB6#0	21.96		
	0	Middle	RB1#0	23		
	0		RB6#0	21.75		
	0	Highest	RB1#5	22.57		
	0		RB6#0	21.73		
5MHz 16QAM	3	Lowest	RB1#0	22.8	17.42	38.45
	0		RB5#0	20.99		
	0	Middle	RB1#0	22.87		
	0		RB5#0	20.78		
	0	Highest	RB1#5	22.23		
	0		RB5#0	20.71		
10MHz QPSK	3	Lowest	RB1#0	22.95	17.59	38.45
	0		RB4#0	23.03		
	0	Middle	RB1#0	23.04		
	0		RB4#0	22.95		

	4	Highest	RB1#5	22.41		
	7		RB4#2	22.57		
10MHz 16QAM	3	Lowest	RB1#0	23.11	17.66	38.45
	0		RB4#0	22.08		
	0	Middle	RB1#0	22.87		
	0		RB4#0	21.91		
	4	Highest	RB1#5	22.57		
	7		RB4#2	21.5		
Note: ERP= Conducted Power(dBm) + G_T(dBd) G_T(dBd)=G_T(dBi)-2.15						

LTE Band 12

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum ERP (dBm)	ERP Limit (dBm)
1.4MHz QPSK	0	Lowest	RB1#0	22.61	17.73	34.77
	0		RB6#0	20.68		
	0	Middle	RB1#0	23.15		
	0		RB6#0	21.12		
	0	Highest	RB1#5	23.18		
	0		RB6#0	21.57		
1.4MHz 16QAM	0	Lowest	RB1#0	21.62	16.88	34.77
	0		RB5#0	20.69		
	0	Middle	RB1#0	22.33		
	0		RB5#0	21.2		
	0	Highest	RB1#5	22.26		
	0		RB5#0	21.28		
3MHz QPSK	0	Lowest	RB1#0	22.79	17.79	34.77
	0		RB6#0	20.85		
	0	Middle	RB1#0	23.14		
	0		RB6#0	21.22		
	1	Highest	RB1#5	23.24		
	0		RB6#0	21.56		
3MHz 16QAM	0	Lowest	RB1#0	22.07	16.9	34.77
	0		RB5#0	20.77		
	0	Middle	RB1#0	22.35		
	0		RB5#0	21.02		
	1	Highest	RB1#5	22.12		
	0		RB5#0	21.54		
5MHz QPSK	3	Lowest	RB1#0	22.99	17.89	34.77
	0		RB6#0	21.78		
	0	Middle	RB1#0	23.19		
	0		RB6#0	22.15		
	0	Highest	RB1#5	**23.34**		
	0		RB6#0	22.43		
5MHz 16QAM	3	Lowest	RB1#0	22.95	17.88	34.77
	0		RB5#0	20.91		
	0	Middle	RB1#0	23.13		
	0		RB5#0	21.23		
	0	Highest	RB1#5	23.33		
	0		RB5#0	21.45		
10MHz QPSK	3	Lowest	RB1#0	22.99	17.7	34.77
	0		RB4#0	22.84		
	0	Middle	RB1#0	22.82		
	0		RB4#0	22.82		

	4	Highest	RB1#5	23.06		
	7		RB4#2	23.15		
10MHz 16QAM	3	Lowest	RB1#0	22.85	17.85	34.77
	0		RB4#0	21.89		
	0	Middle	RB1#0	22.66		
	0		RB4#0	21.86		
	4	Highest	RB1#5	23.3		
	7		RB4#2	22.21		
Note: ERP= Conducted Power(dBm) + GT(dBd) GT(dBd)=GT(dBi)-2.15						

LTE Band 13

Test Bandwidth & Modulation	Index	Channel	Resource Block & RB offset	Conducted Average Output Power(dBm)	Maximum ERP (dBm)	ERP Limit (dBm)
5MHz QPSK	3	Lowest	RB1#0	24.28	18.97	34.77
	0		RB6#0	23.23		
	0	Middle	RB1#0	24.42		
	0		RB6#0	23.18		
	0	Highest	RB1#5	24.12		
	0		RB6#0	23.16		
5MHz 16QAM	3	Lowest	RB1#0	24.18	19.12	34.77
	0		RB5#0	22.26		
	0	Middle	RB1#0	24.57		
	0		RB5#0	22.16		
	0	Highest	RB1#5	24.06		
	0		RB5#0	22.28		
10MHz QPSK	0				18.97	34.77
	0					
	0	Middle	RB1#0	24.42		
	0		RB4#0	24.34		
	0					
	0					
10MHz 16QAM	0				19.16	34.77
	0					
	0	Middle	RB1#0	**24.61**		
	0		RB4#0	23.47		
	0					
	0					

Note:
ERP= Conducted Power(dBm) + GT(dBd)
GT(dBd)=GT(dBi)-2.15

Peak-to-average ratio (PAR)

Cellular Band

Test Bandwidth & Modulation	Channel	Peak-to-average Power Ratio(PAPR)			Limit (dB)
		Peak (dbm)	Avg (dbm)	PAPR (db)	
GPRS	824.4	30.96	20.76	10.1	13
	836.6	30.61	20.86	9.65	13
	848.8	30.4	19.96	10.29	13
EDGE	824.4	28.49	15.62	12.66	13
	836.6	28.07	15.12	12.69	13
	848.8	27.87	14.93	12.63	13

PCS Band

Test Bandwidth & Modulation	Channel	Peak-to-average Power Ratio(PAPR)			Limit (dB)
		Peak (dbm)	Avg (dbm)	PAPR (db)	
GPRS	1850.2	27.93	17.47	10.26	13
	1880	28.21	17.98	10.03	13
	1909.8	28.49	18.3	10.03	13
EDGE	1850.2	26.52	13.87	12.37	13
	1880	26.66	13.52	12.88	13
	1909.8	27.15	14.06	12.79	13

LTE Band 2

20MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	PAR (dB)	Limit (dB)
20MHz QPSK	Lowest	RB1#0	4.74	13
		RB6#0	5.29	13
20MHz 16QAM		RB1#0	5.44	13
		RB5#0	5.9	13
20MHz QPSK	Middle	RB1#0	4.53	13
		RB6#0	5.08	13
20MHz 16QAM		RB1#0	5.49	13
		RB5#0	5.65	13
20MHz QPSK	Highest	RB1#0	4.63	13
		RB6#0	5.23	13
20MHz 16QAM		RB1#0	5.39	13
		RB5#0	5.77	13

LTE Band 4

20MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	PAR (dB)	Limit (dB)
20MHz QPSK	Lowest	RB1#0	4.43	13
		RB6#0	4.60	13
20MHz 16QAM		RB1#0	5.05	13
		RB5#0	5.19	13
20MHz QPSK	Middle	RB1#0	4.40	13
		RB6#0	4.90	13
20MHz 16QAM		RB1#0	5.10	13
		RB5#0	5.42	13
20MHz QPSK	Highest	RB1#0	4.54	13
		RB6#0	4.96	13
20MHz 16QAM		RB1#0	5.19	13
		RB5#0	5.48	13

LTE Band 5

10MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	PAR (dB)	Limit (dB)
10MHz QPSK	Lowest	RB1#0	4.12	13
		RB6#0	4.78	13
10MHz 16QAM		RB1#0	4.81	13
		RB5#0	5.32	13
10MHz QPSK	Middle	RB1#0	4.14	13
		RB6#0	4.78	13
10MHz 16QAM		RB1#0	4.78	13
		RB5#0	5.57	13
10MHz QPSK	Highest	RB1#0	4.20	13
		RB6#0	4.78	13
10MHz 16QAM		RB1#0	5.03	13
		RB5#0	5.36	13

LTE Band 12

10MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	PAR (dB)	Limit (dB)
10MHz QPSK	Lowest	RB1#0	3.58	13
		RB6#0	4.24	13
10MHz 16QAM		RB1#0	4.20	13
		RB5#0	4.71	13
10MHz QPSK	Middle	RB1#0	3.61	13
		RB6#0	4.19	13
10MHz 16QAM		RB1#0	4.20	13
		RB5#0	4.98	13
10MHz QPSK	Highest	RB1#0	3.74	13
		RB6#0	4.11	13
10MHz 16QAM		RB1#0	4.69	13
		RB5#0	4.74	13

LTE Band 13

10MHz Bandwidth

Test Bandwidth & Modulation	Channel	Resource Block & RB offset	PAR (dB)	Limit (dB)
10MHz QPSK	Middle	RB1#0	3.99	13
		RB6#0	4.54	13
10MHz 16QAM		RB1#0	4.88	13
		RB5#0	5.32	13

FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH

Applicable Standard

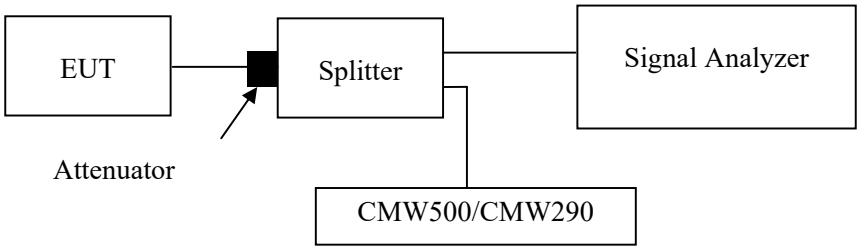
FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

ANSI C63.26-2015 Section 5.4.4

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

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	24.1~25.7 ℃
Relative Humidity:	37~45 %
ATM Pressure:	101.0 kPa

The testing was performed by Cheeb Huang from 2024-03-14 to 2024-03-16.

EUT operation mode: Transmitting

Test Result: Compliant

Please refer to the following tables and plots.

Cellular Band (Part 22H)

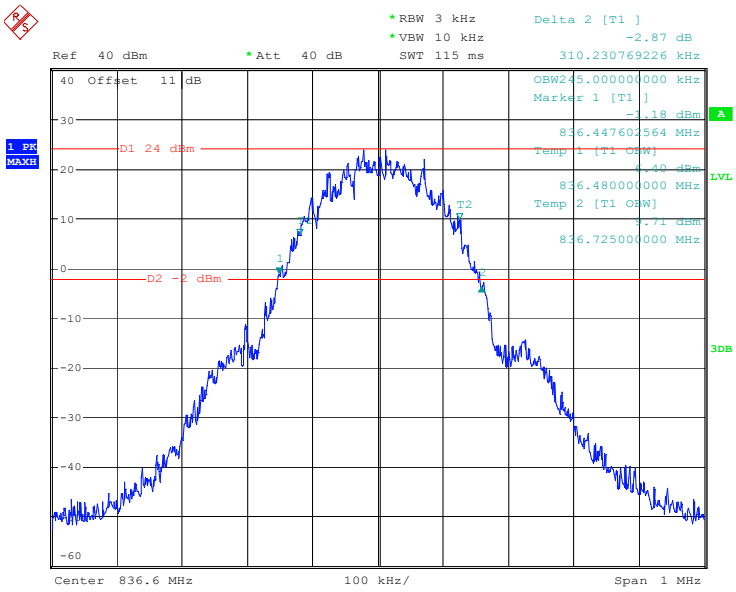
Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
GPRS	/	0.245	/	/	0.310	/
EDGE	/	0.244	/	/	0.308	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

PCS Band (Part 24E)

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
GPRS	/	0.246	/	/	0.312	/
EDGE	/	0.242	/	/	0.297	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

Cellular Band

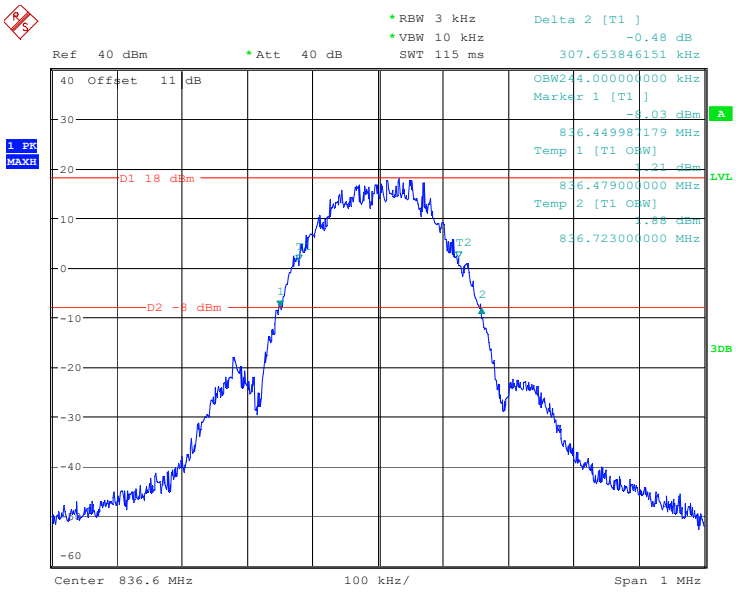
GSM(GMSK) Mode, Middle channel



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:14:21

GSM(EDGE) Mode, Middle channel

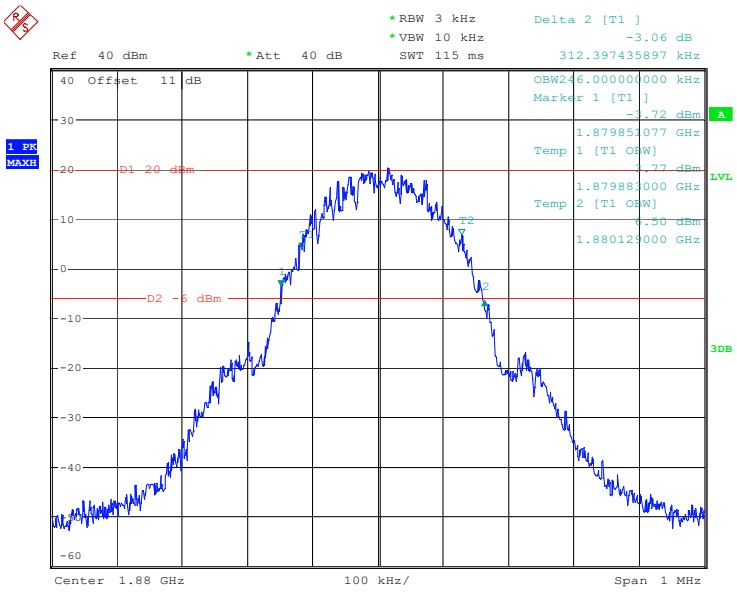


ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:28:45

PCS Band

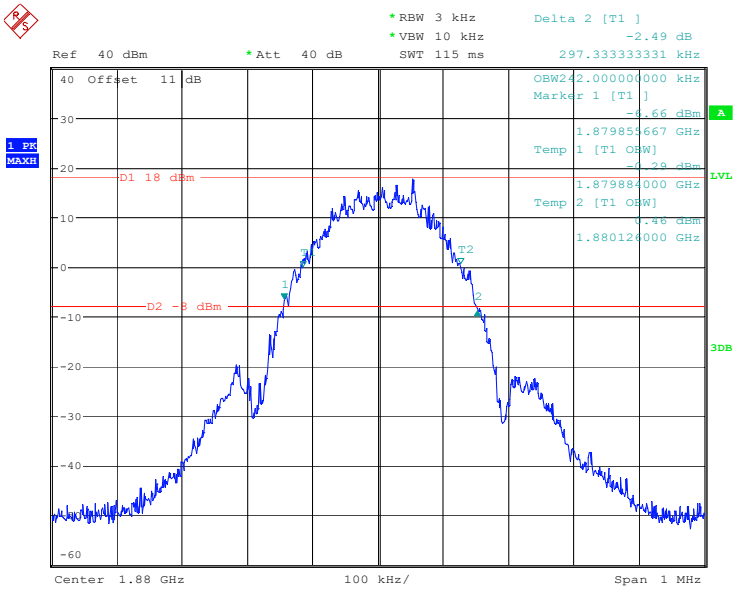
GSM(GMSK) Mode, Middle channel



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 16.MAR.2024 10:53:53

GSM(EDGE) Mode, Middle channel



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 16.MAR.2024 11:07:10

LTE Band 2

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	/	1.104	/	/	1.313	/
1.4MHz 16QAM	/	0.921	/	/	1.189	/
3MHz QPSK	/	1.107	/	/	1.313	/
3MHz 16QAM	/	0.933	/	/	1.214	/
5MHz QPSK	/	1.105	/	/	1.372	/
5MHz 16QAM	/	0.93	/	/	1.173	/
10MHz QPSK	/	1.11	/	/	1.325	/
10MHz 16QAM	/	0.94	/	/	1.16	/
15MHz QPSK	/	1.11	/	/	1.308	/
15MHz 16QAM	/	0.93	/	/	1.151	/
20MHz QPSK	/	1.1	/	/	1.345	/
20MHz 16QAM	/	0.92	/	/	1.091	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

LTE Band 4

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	/	1.098	/	/	1.331	/
1.4MHz 16QAM	/	0.939	/	/	1.208	/
3MHz QPSK	/	1.101	/	/	1.342	/
3MHz 16QAM	/	0.927	/	/	1.177	/
5MHz QPSK	/	1.090	/	/	1.331	/
5MHz 16QAM	/	0.930	/	/	1.166	/
10MHz QPSK	/	1.100	/	/	1.331	/
10MHz 16QAM	/	0.950	/	/	1.180	/
15MHz QPSK	/	1.095	/	/	1.366	/
15MHz 16QAM	/	0.930	/	/	1.153	/
20MHz QPSK	/	1.120	/	/	1.343	/
20MHz 16QAM	/	0.920	/	/	1.119	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

LTE Band 5

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	/	1.095	/	/	1.305	/
1.4MHz 16QAM	/	0.933	/	/	1.157	/
3MHz QPSK	/	1.098	/	/	1.296	/
3MHz 16QAM	/	0.921	/	/	1.169	/
5MHz QPSK	/	1.1	/	/	1.363	/
5MHz 16QAM	/	0.925	/	/	1.132	/
10MHz QPSK	/	1.09	/	/	1.295	/
10MHz 16QAM	/	0.93	/	/	1.173	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

LTE Band 12

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
1.4MHz QPSK	/	1.098	/	/	1.342	/
1.4MHz 16QAM	/	0.927	/	/	1.19	/
3MHz QPSK	/	1.104	/	/	1.354	/
3MHz 16QAM	/	0.933	/	/	1.196	/
5MHz QPSK	/	1.105	/	/	1.429	/
5MHz 16QAM	/	0.93	/	/	1.138	/
10MHz QPSK	/	1.11	/	/	1.344	/
10MHz 16QAM	/	0.92	/	/	1.234	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

LTE Band 13

Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
5MHz QPSK	/	1.105	/	/	1.306	/
5MHz 16QAM	/	0.93	/	/	1.11	/
10MHz QPSK	/	1.11	/	/	1.324	/
10MHz 16QAM	/	0.93	/	/	1.187	/
Note: The test plots please refer to the Plots of Occupied Bandwidth						

The test plots of LTE band please refer to the Appendix A.

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

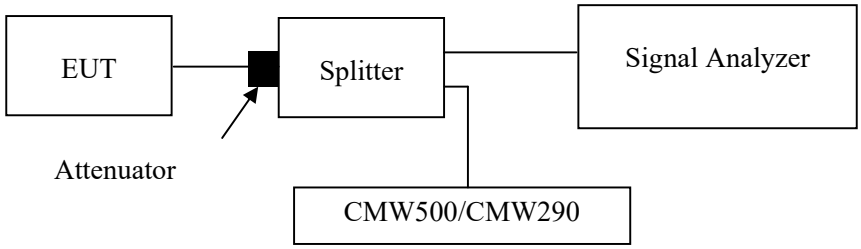
FCC §2.1051, §22.917(a) & §24.238(a) & §27.53.

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

Test Procedure

ANSI C63.26-2015 Section 5.7

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



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range was added into plots.

Test Data

Environmental Conditions

Temperature:	24.1~25.7 ℃
Relative Humidity:	37~45 %
ATM Pressure:	101.0 kPa

The testing was performed by Cheeb Huang from 2024-03-14 to 2024-03-28.

EUT operation mode: Transmitting

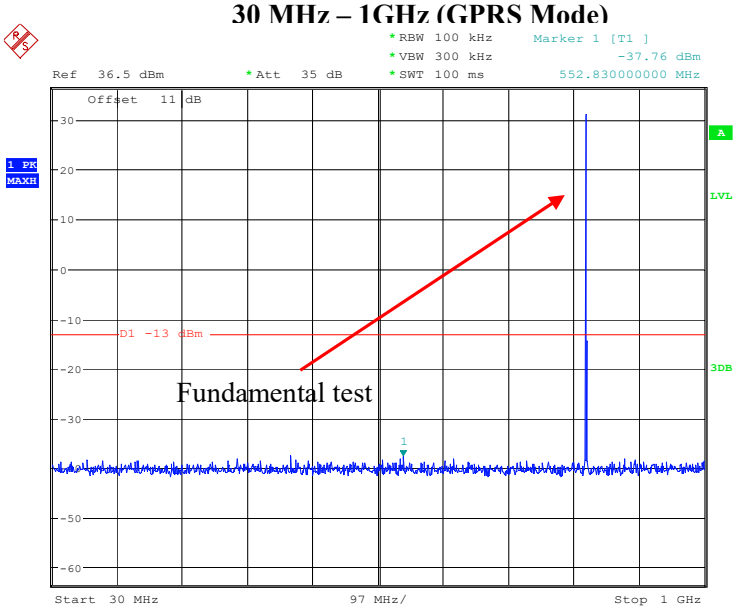
Test result: Compliant

Please refer to the following plots.

Cellular Band

Low Channel:

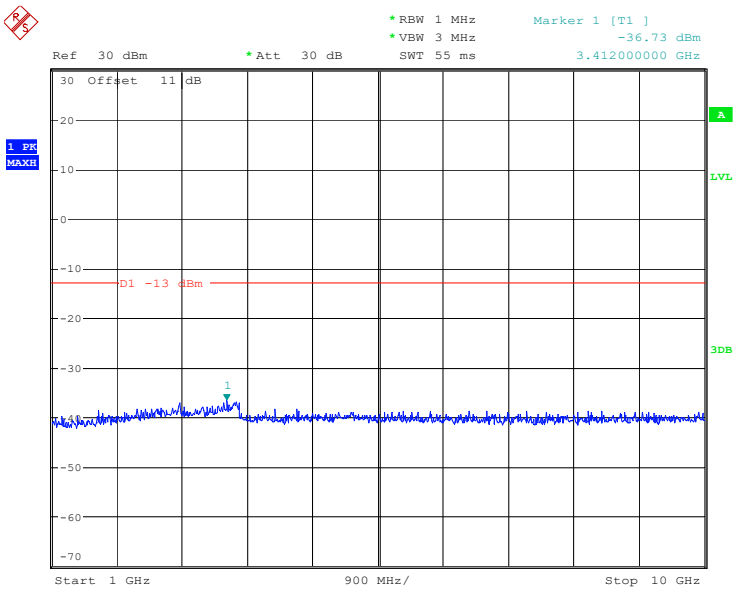
30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:11:43

1 – 10GHz (GPRS Mode)

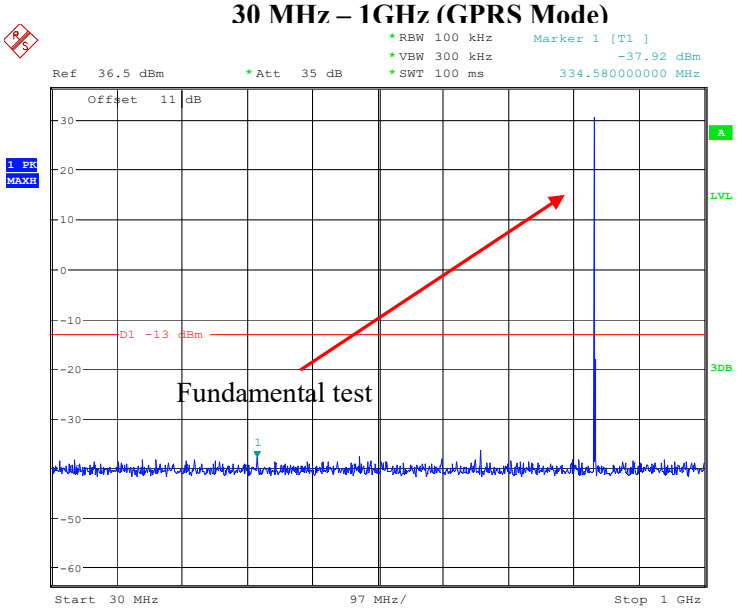


ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:12:05

Middle Channel:

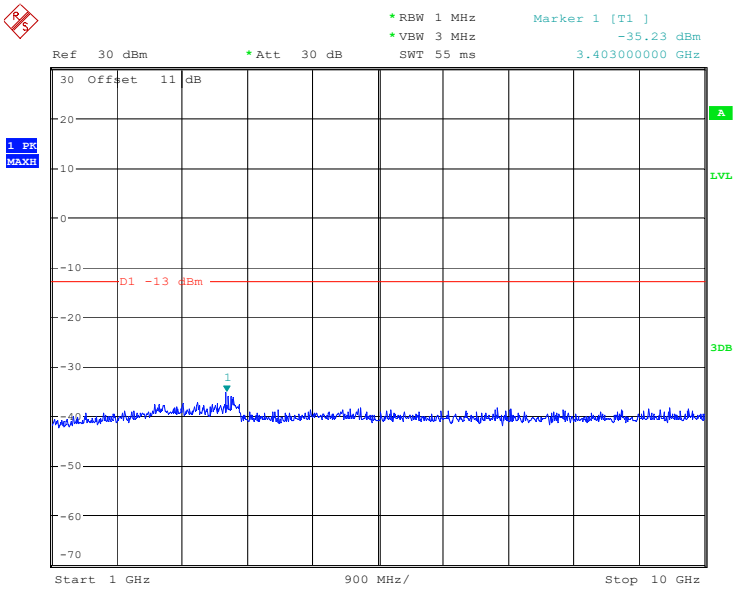
30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:14:48

1 – 10GHz (GPRS Mode)

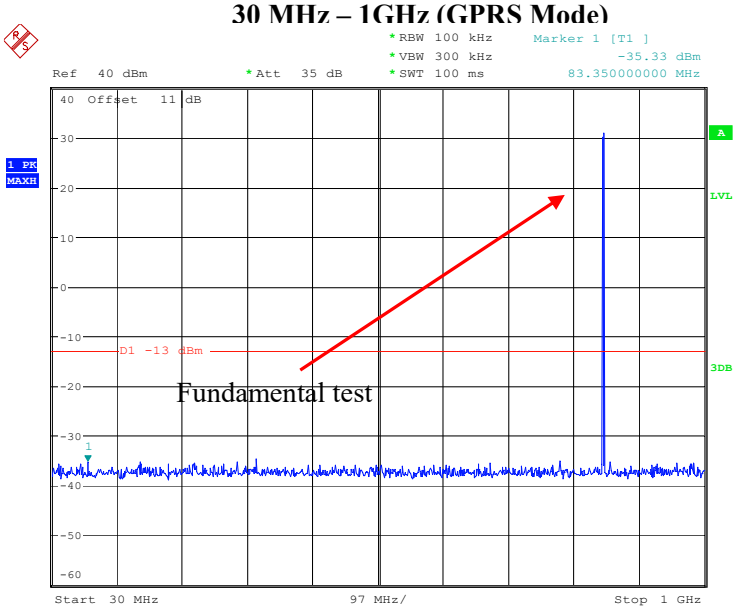


ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:15:09

High Channel:

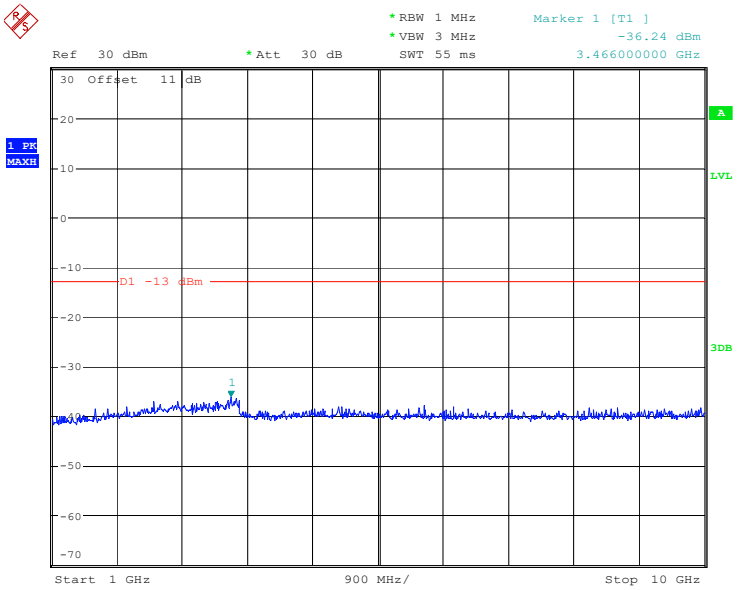
30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:17:51

1 – 10GHz (GPRS Mode)

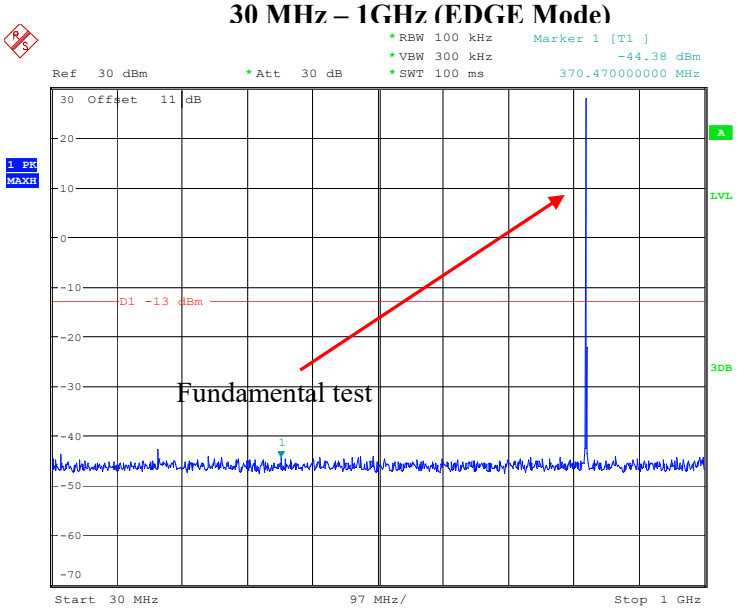


ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:18:32

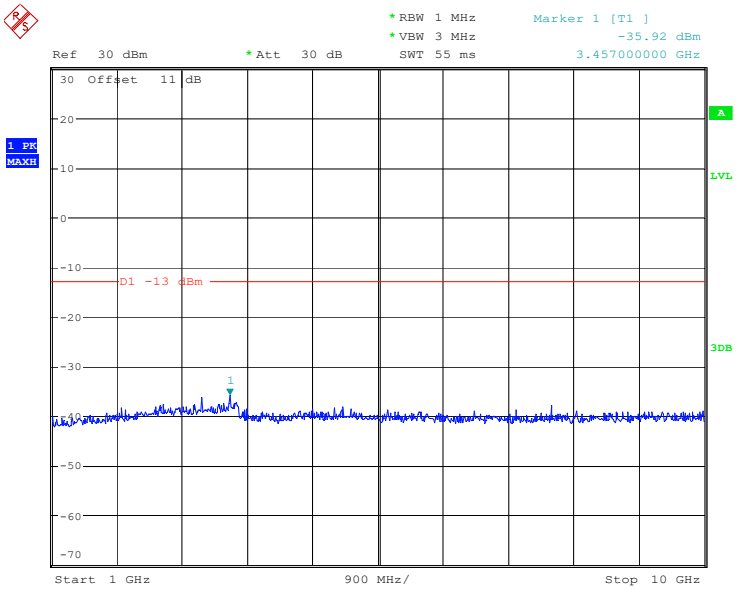
Low Channel:

30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:24:42

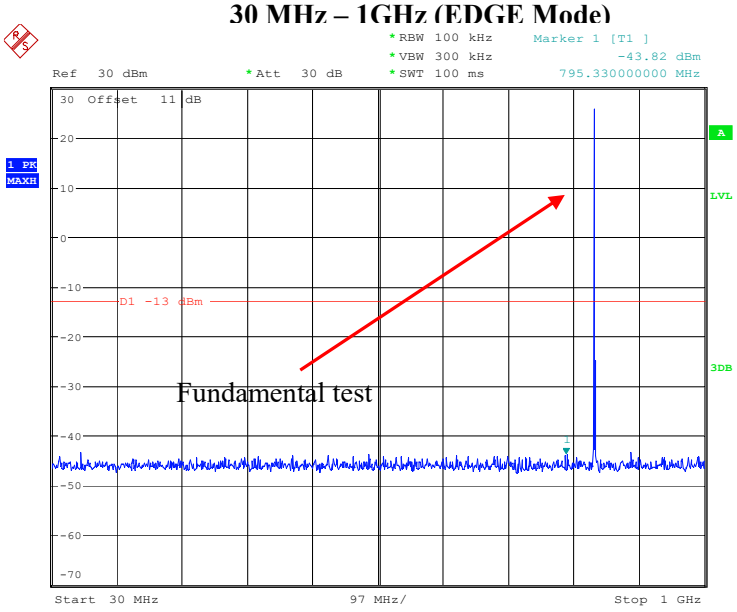
1 – 10GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:25:02

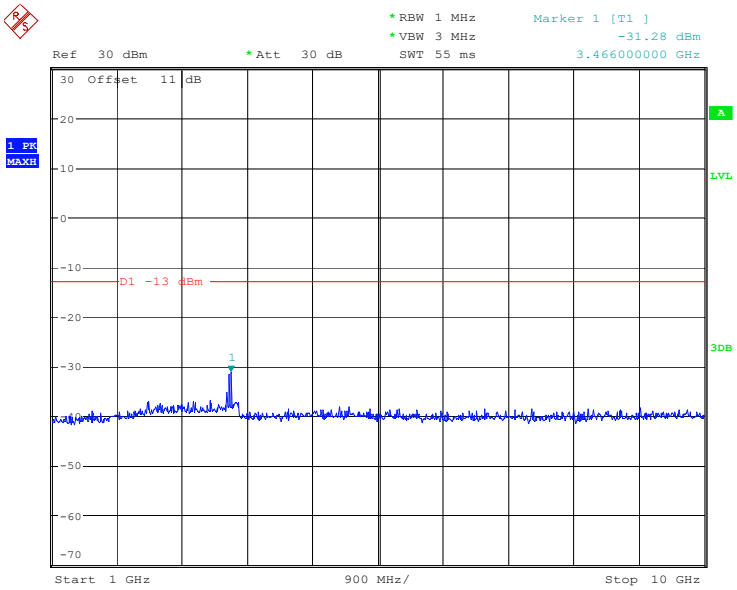
Middle Channel:

30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:29:11

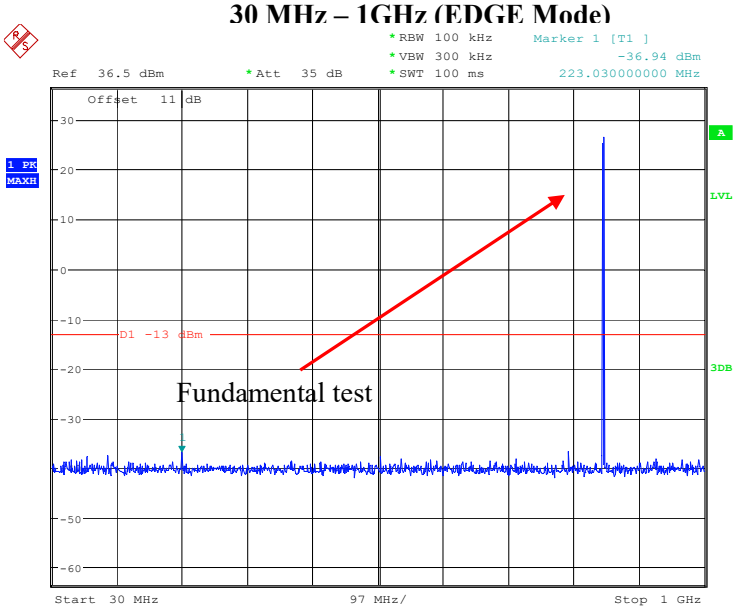
1 – 10GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:29:43

High Channel:

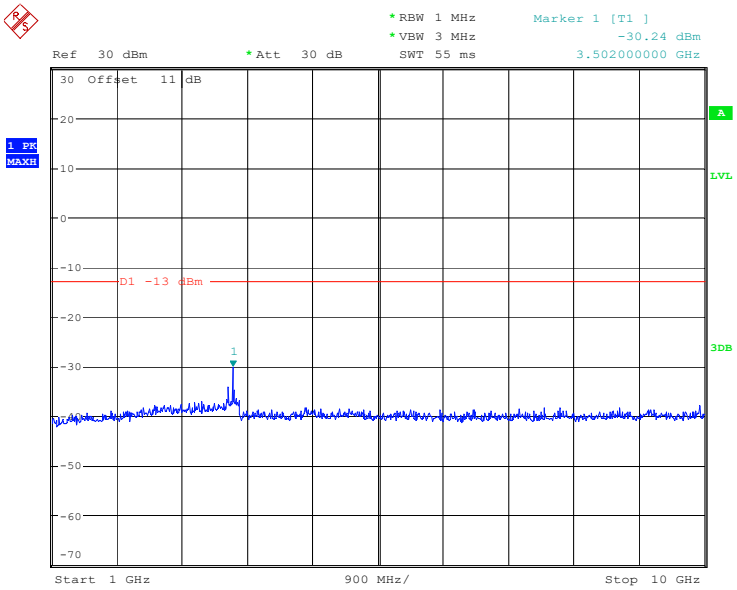
30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:33:34

1 – 10GHz (EDGE Mode)



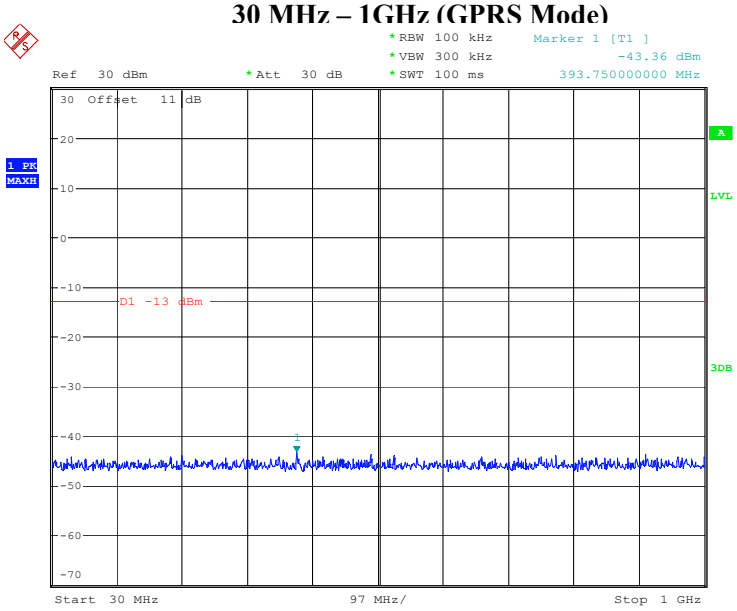
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 15.MAR.2024 16:34:07

PCS Band

Low Channel:

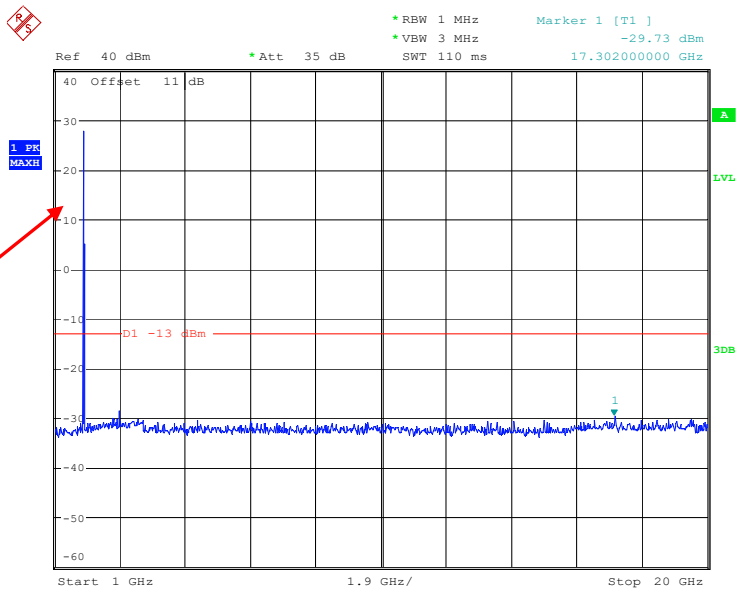
30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 16.MAR.2024 10:51:12

1 – 20GHz (GPRS Mode)



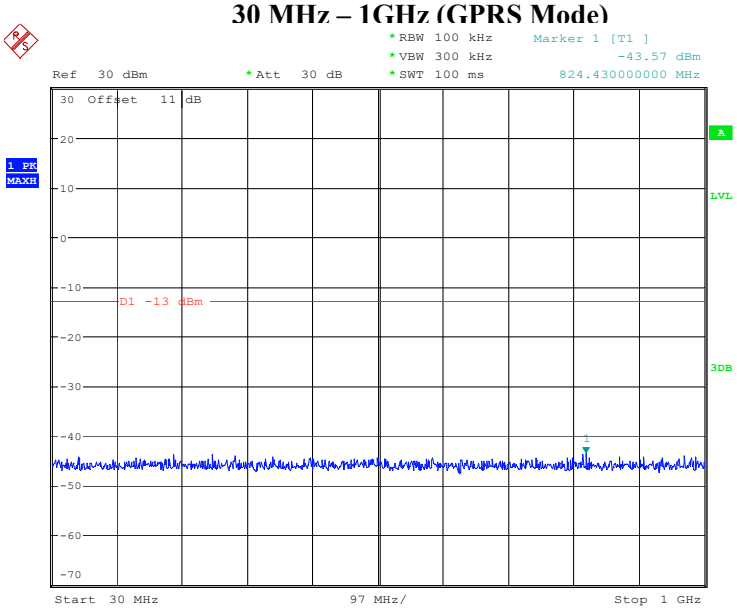
Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang

Date: 16.MAR.2024 10:51:53

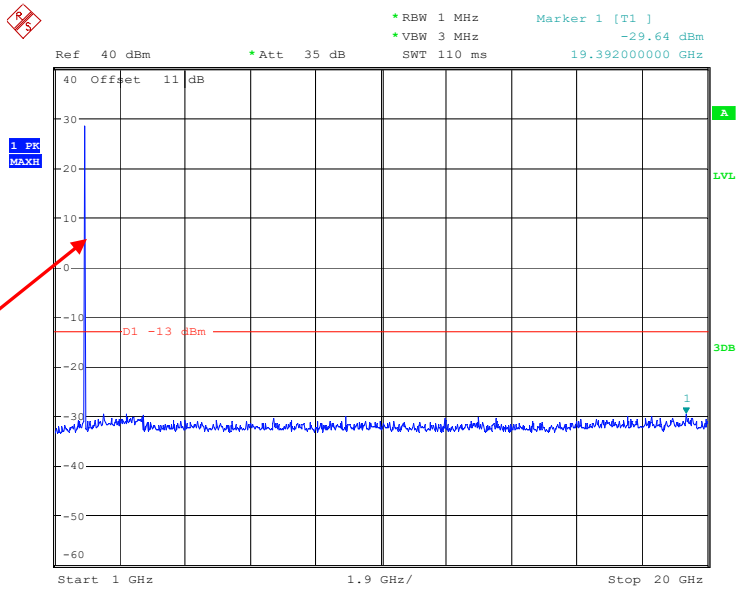
Middle Channel:

30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:54:15

1 – 20GHz (GPRS Mode)

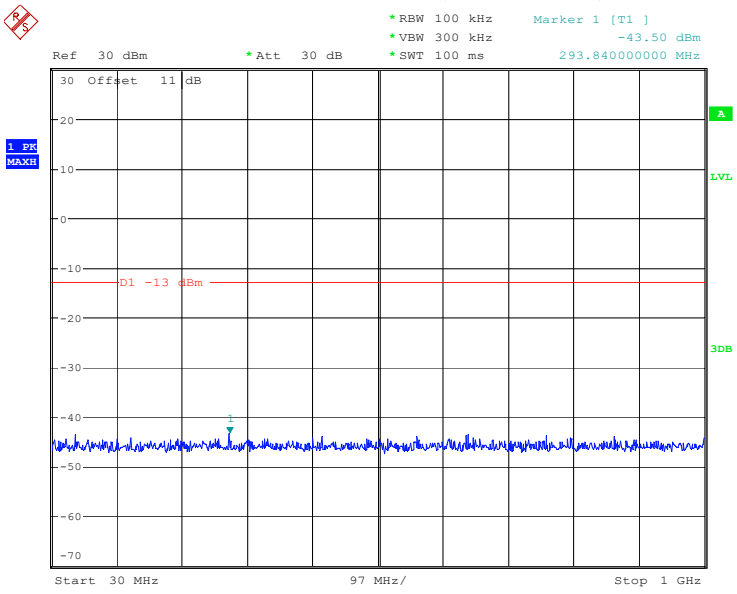


Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:55:22

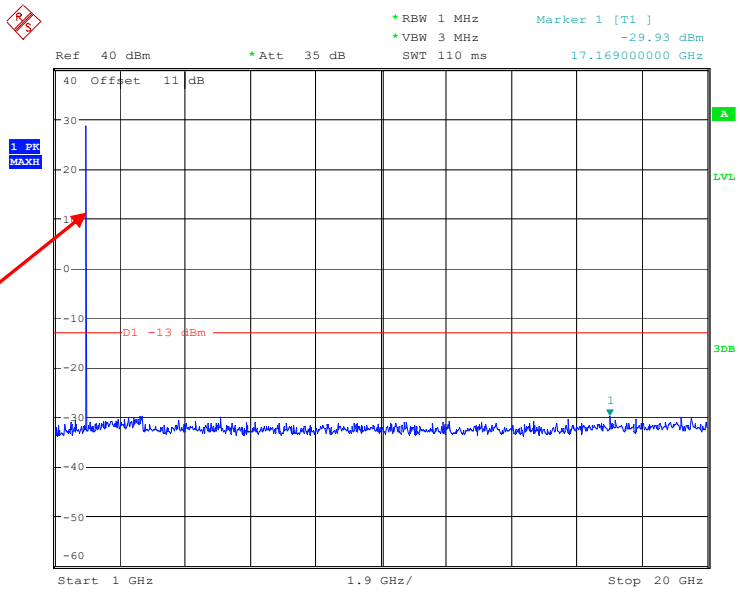
High Channel:

30 MHz – 1GHz (GPRS Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:58:35

1 – 20GHz (GPRS Mode)

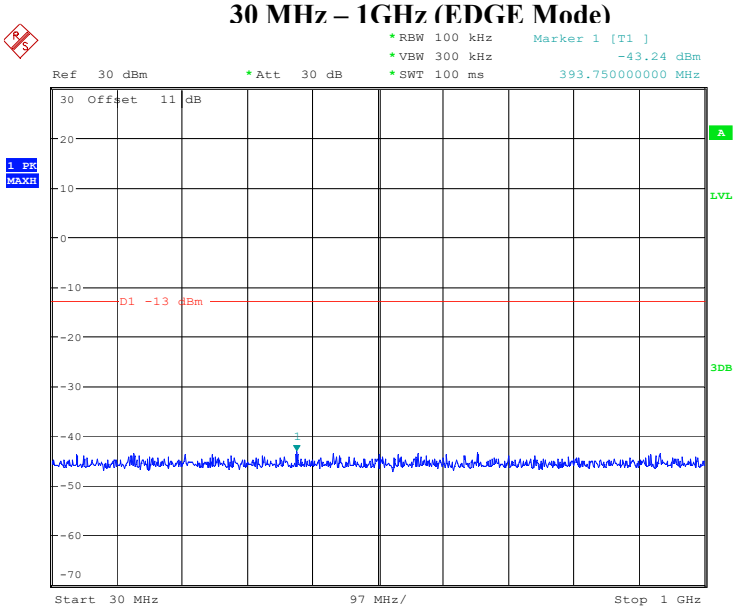


Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:58:59

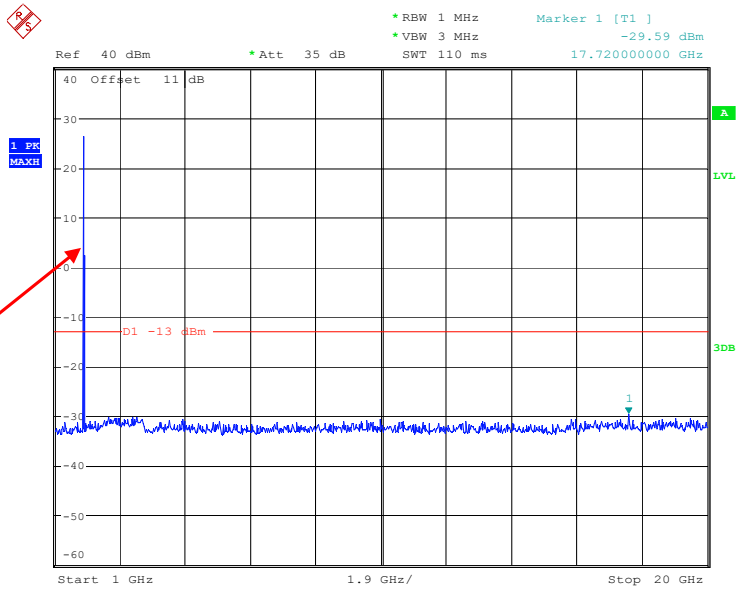
Low Channel:

30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:10:45

1 – 20GHz (EDGE Mode)

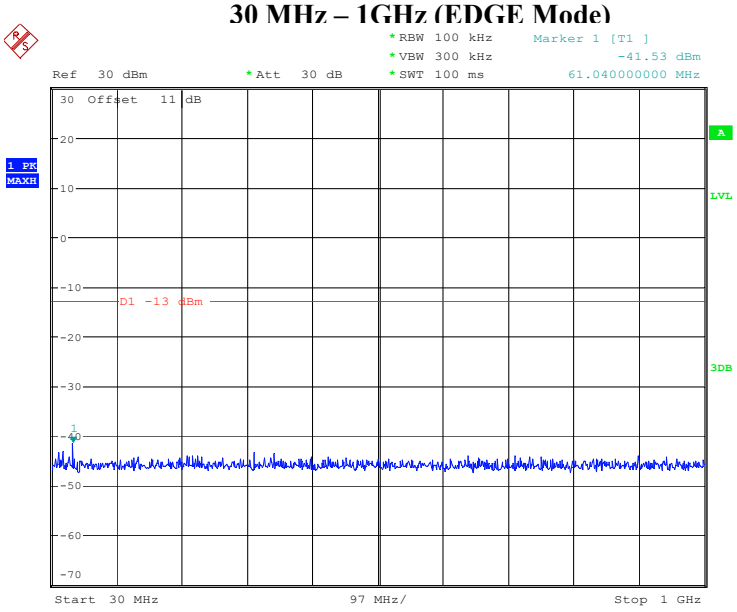


Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:11:12

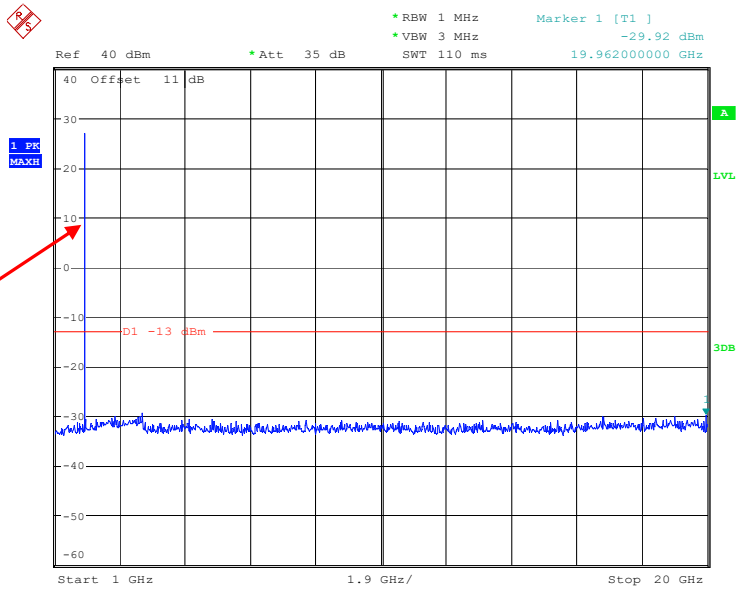
Middle Channel:

30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:07:32

1 – 20GHz (EDGE Mode)

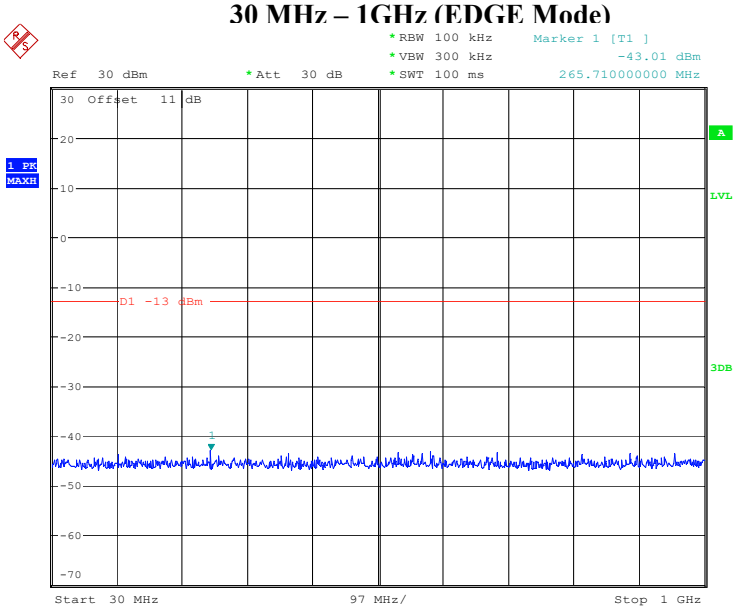


Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:07:56

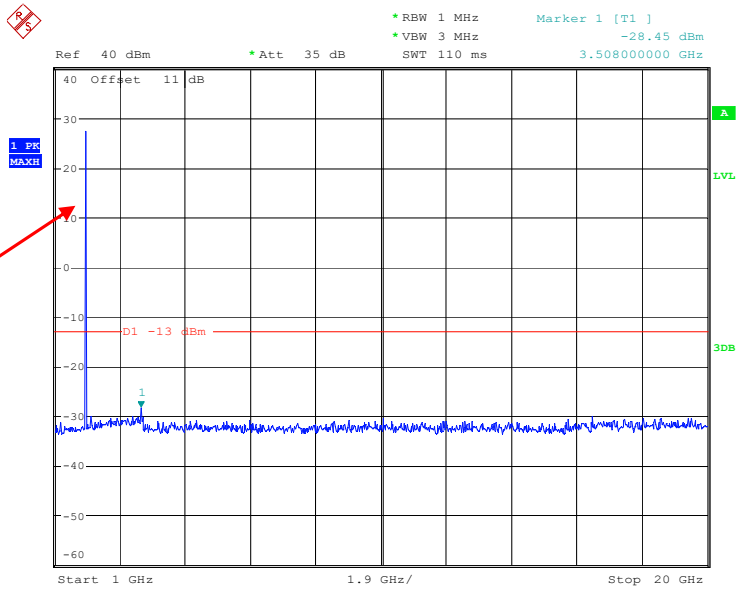
High Channel:

30 MHz – 1GHz (EDGE Mode)



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:02:42

1 – 20GHz (EDGE Mode)



Fundamental test

ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:03:20

The test plots of LTE band please refer to the Appendix B.

FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917(a)& § 24.238(a) &§ 27.53.

Test Procedure

ANSI/TIA-603-E-2016 Section 2.2.12
KDB 671168 D01 v03r01 Section 6.2

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

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

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

Test Data

Environmental Conditions

Temperature:	25~25.6 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Anson Su on 2024-03-06 for below 1GHz and Dylan Yang on 2024-03-26 for above 1GHz.

EUT operation mode: Transmitting (Pre-scan in the X, Y and Z axes of orientation, the worst case Y-axis of orientation was recorded)

Frequency (MHz)	Receiver Reading (dBµV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
GSM850								
Test frequency range: 30MHz-10GHz								
Low channel								
950.3	32.43	H	-64.1	1.36	0.0	-65.46	-13	52.46
950.3	32.58	V	-61.5	1.36	0.0	-62.86	-13	49.86
1648.40	50.59	H	-57.1	0.90	8.60	-49.40	-13	36.40
1648.40	55.22	V	-53.0	0.90	8.60	-45.30	-13	32.30
2472.60	56.07	H	-51.3	1.10	8.80	-43.60	-13	30.60
2472.60	47.08	V	-60.0	1.10	8.80	-52.30	-13	39.30
Middle Channel								
953.6	33.24	H	-63.3	1.36	0.0	-64.66	-13	51.66
953.6	33.39	V	-60.7	1.36	0.0	-62.06	-13	49.06
1673.20	50.99	H	-56.6	0.90	8.60	-48.90	-13	35.90
1673.20	55.57	V	-52.6	0.90	8.60	-44.90	-13	31.90
2509.80	56.09	H	-51.3	1.10	8.80	-43.60	-13	30.60
2509.80	47.98	V	-59.1	1.10	8.80	-51.40	-13	38.40
High Channel								
957.7	33.62	H	-62.9	1.36	0.0	-64.26	-13	51.26
957.7	33.78	V	-60.3	1.36	0.0	-61.66	-13	48.66
1697.60	51.17	H	-56.4	0.90	8.60	-48.70	-13	35.70
1697.60	55.50	V	-52.6	0.90	8.60	-44.90	-13	31.90
2546.40	56.54	H	-50.8	1.10	8.80	-43.10	-13	30.10
2546.40	48.17	V	-58.9	1.10	8.80	-51.20	-13	38.20

Frequency (MHz)	Receiver Reading (dBµV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
GSM1900								
Test frequency range: 30MHz-20GHz								
Low channel								
959.8	32.78	H	-63.7	1.36	0.0	-65.06	-13	52.06
959.8	32.86	V	-61.2	1.36	0.0	-62.56	-13	49.56
3700.40	44.74	H	-60.7	1.30	11.00	-51.00	-13	38.00
3700.40	46.84	V	-58.4	1.30	11.00	-48.70	-13	35.70
Middle Channel								
951.6	32.99	H	-63.5	1.36	0.0	-64.86	-13	51.86
951.6	33.02	V	-61.0	1.36	0.0	-62.36	-13	49.36
3760.00	45.51	H	-59.6	1.30	10.70	-50.20	-13	37.20
3760.00	46.89	V	-58.2	1.30	10.70	-48.80	-13	35.80
High Channel								
952.8	33.47	H	-63.0	1.36	0.0	-64.36	-13	51.36
952.8	33.51	V	-60.5	1.36	0.0	-61.86	-13	48.86
3819.60	45.97	H	-59.2	1.30	10.70	-49.80	-13	36.80
3819.60	47.04	V	-58.0	1.30	10.70	-48.60	-13	35.60

LTE Bands: (pre-scan QPSK & 16QAM with all bandwidths, the worst case as below)

Frequency (MHz)	Receiver Reading (dBμV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
LTE Band 2								
Test frequency range: 30MHz-20GHz								
QPSK 1.4MHz Bandwidth, Low channel								
952.1	31.61	H	-64.9	1.36	0.0	-66.26	-13	53.26
952.1	31.73	V	-62.3	1.36	0.0	-63.66	-13	50.66
3701.40	47.17	H	-58.2	1.30	11.00	-48.50	-13	35.50
3701.40	49.38	V	-55.9	1.30	11.00	-46.20	-13	33.20
5552.10	45.77	H	-56.6	1.70	10.90	-47.40	-13	34.40
5552.10	45.60	V	-56.9	1.70	10.90	-47.70	-13	34.70
QPSK 1.4MHz Bandwidth, Middle channel								
953.6	34.02	H	-62.5	1.36	0.0	-63.86	-13	50.86
953.6	34.13	V	-59.9	1.36	0.0	-61.26	-13	48.26
3760.00	46.62	H	-58.5	1.30	10.70	-49.10	-13	36.10
3760.00	48.81	V	-56.3	1.30	10.70	-46.90	-13	33.90
5640.00	45.27	H	-57.1	1.70	10.90	-47.90	-13	34.90
5640.00	45.58	V	-57.0	1.70	10.90	-47.80	-13	34.80
QPSK 1.4MHz Bandwidth, High channel								
950.5	34.39	H	-62.1	1.36	0.0	-63.46	-13	50.46
950.5	34.48	V	-59.6	1.36	0.0	-60.96	-13	47.96
3818.60	47.36	H	-57.8	1.30	10.70	-48.40	-13	35.40
3818.60	49.82	V	-55.2	1.30	10.70	-45.80	-13	32.80
5727.90	46.46	H	-55.7	1.70	11.10	-46.30	-13	33.30
5727.90	47.20	V	-55.1	1.70	11.10	-45.70	-13	32.70

Frequency (MHz)	Receiver Reading (dBµV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
LTE Band 4								
Test frequency range: 30MHz-20GHz								
QPSK 1.4MHz Bandwidth, Low channel								
951.4	31.53	H	-65.0	1.36	0.0	-66.36	-13	53.36
951.4	31.64	V	-62.4	1.36	0.0	-63.76	-13	50.76
3421.40	47.78	H	-58.2	1.30	9.90	-49.60	-13	36.60
3421.40	47.30	V	-58.4	1.30	9.90	-49.80	-13	36.80
5132.10	45.04	H	-58.1	1.50	9.60	-50.00	-13	37.00
5132.10	45.34	V	-57.3	1.50	9.60	-49.20	-13	36.20
QPSK 1.4MHz Bandwidth, Middle channel								
954.2	33.93	H	-62.6	1.36	0.0	-63.96	-13	50.96
954.2	34.04	V	-60.0	1.36	0.0	-61.36	-13	48.36
3465.00	47.82	H	-58.1	1.30	10.50	-48.90	-13	35.90
3465.00	47.44	V	-58.2	1.30	10.50	-49.00	-13	36.00
5197.50	45.36	H	-57.7	1.60	9.70	-49.60	-13	36.60
5197.50	45.51	V	-57.1	1.60	9.70	-49.00	-13	36.00
QPSK 1.4MHz Bandwidth, High channel								
953.5	34.51	H	-62.0	1.36	0.0	-63.36	-13	50.36
953.5	34.69	V	-59.4	1.36	0.0	-60.76	-13	47.76
3508.60	47.92	H	-58.0	1.30	10.50	-48.80	-13	35.80
3508.60	47.53	V	-58.1	1.30	10.50	-48.90	-13	35.90
5262.90	45.45	H	-57.5	1.60	10.00	-49.10	-13	36.10
5262.90	45.93	V	-56.8	1.60	10.00	-48.40	-13	35.40

Frequency (MHz)	Receiver Reading (dBµV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
LTE Band 5								
Test frequency range: 30MHz-10GHz								
QPSK 5MHz Bandwidth, Low channel								
955.1	31.44	H	-65.1	1.36	0.0	-66.46	-13	53.46
955.1	31.52	V	-62.5	1.36	0.0	-63.86	-13	50.86
1649.40	46.93	H	-60.7	0.90	8.60	-53.00	-13	40.00
1649.40	50.85	V	-57.3	0.90	8.60	-49.60	-13	36.60
2474.10	47.52	H	-59.8	1.10	8.80	-52.10	-13	39.10
2474.10	49.26	V	-57.9	1.10	8.80	-50.20	-13	37.20
3298.80	45.36	H	-60.6	1.30	8.80	-53.10	-13	40.10
3298.80	44.41	V	-61.3	1.30	8.80	-53.80	-13	40.80
QPSK 5MHz Bandwidth, Middle channel								
950.6	33.83	H	-62.7	1.36	0.0	-64.06	-13	51.06
950.6	33.95	V	-60.1	1.36	0.0	-61.46	-13	48.46
1673.00	46.73	H	-60.8	0.90	8.60	-53.10	-13	40.10
1673.00	50.31	V	-57.8	0.90	8.60	-50.10	-13	37.10
2509.50	47.13	H	-60.2	1.10	8.80	-52.50	-13	39.50
2509.50	48.54	V	-58.6	1.10	8.80	-50.90	-13	37.90
3346.00	44.43	H	-61.6	1.30	8.80	-54.10	-13	41.10
3346.00	44.32	V	-61.4	1.30	8.80	-53.90	-13	40.90
QPSK 5MHz Bandwidth, High channel								
952.2	34.63	H	-61.9	1.36	0.0	-63.26	-13	50.26
952.2	34.87	V	-59.2	1.36	0.0	-60.56	-13	47.56
1696.60	47.19	H	-60.4	0.90	8.60	-52.70	-13	39.70
1696.60	50.51	V	-57.6	0.90	8.60	-49.90	-13	36.90
2544.90	48.09	H	-59.3	1.10	8.80	-51.60	-13	38.60
2544.90	48.83	V	-58.3	1.10	8.80	-50.60	-13	37.60
3393.20	44.95	H	-61.0	1.30	9.90	-52.40	-13	39.40
3393.20	45.23	V	-60.4	1.30	9.90	-51.80	-13	38.80

Frequency (MHz)	Receiver Reading (dBμV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
LTE Band 12								
Test frequency range: 30MHz-10GHz								
QPSK 1.4MHz Bandwidth, Low channel								
953.1	31.35	H	-65.2	1.36	0.0	-66.56	-13	53.56
953.1	31.43	V	-62.6	1.36	0.0	-63.96	-13	50.96
1399.40	65.73	H	-42.0	0.80	7.90	-34.90	-13	21.90
1399.40	60.26	V	-48.1	0.80	7.90	-41.00	-13	28.00
2099.10	45.25	H	-62.1	1.00	8.30	-54.80	-13	41.80
2099.10	46.44	V	-61.4	1.00	8.30	-54.10	-13	41.10
2798.80	44.46	H	-62.1	1.20	9.20	-54.10	-13	41.10
2798.80	44.68	V	-61.6	1.20	9.20	-53.60	-13	40.60
QPSK 1.4MHz Bandwidth, Middle channel								
951.3	31.89	H	-64.6	1.36	0.0	-65.96	-13	52.96
951.3	31.98	V	-62.1	1.36	0.0	-63.46	-13	50.46
1415.00	65.92	H	-41.8	0.80	7.90	-34.70	-13	21.70
1415.00	60.61	V	-47.8	0.80	7.90	-40.70	-13	27.70
2122.50	45.79	H	-61.5	1.00	8.30	-54.20	-13	41.20
2122.50	46.53	V	-61.3	1.00	8.30	-54.00	-13	41.00
2830.00	44.79	H	-61.8	1.20	9.20	-53.80	-13	40.80
2830.00	44.86	V	-61.5	1.20	9.20	-53.50	-13	40.50
QPSK 1.4MHz Bandwidth, High channel								
952.0	34.13	H	-62.4	1.36	0.0	-63.76	-13	50.76
952.0	34.25	V	-59.8	1.36	0.0	-61.16	-13	48.16
1430.60	66.44	H	-41.3	0.80	7.90	-34.20	-13	21.20
1430.60	59.83	V	-48.6	0.80	7.90	-41.50	-13	28.50
2145.90	45.18	H	-62.1	1.00	8.30	-54.80	-13	41.80
2145.90	46.54	V	-61.3	1.00	8.30	-54.00	-13	41.00
2861.20	44.69	H	-61.6	1.20	9.00	-53.80	-13	40.80
2861.20	44.82	V	-61.2	1.20	9.00	-53.40	-13	40.40

Frequency (MHz)	Receiver Reading (dBµV)	Polar (H / V)	Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
LTE Band 13								
Test frequency range: 30MHz-10GHz								
QPSK 5MHz Bandwidth, Low channel								
954.4	31.26	H	-65.2	1.36	0.0	-66.56	-13	53.56
954.4	31.32	V	-62.7	1.36	0.0	-64.06	-13	51.06
1559.00	54.15	H	-53.5	0.90	8.60	-45.80	-40	5.80
1559.00	52.94	V	-55.2	0.90	8.60	-47.50	-40	7.50
2338.50	42.83	H	-64.5	1.10	9.40	-56.20	-13	43.20
2338.50	42.53	V	-64.9	1.10	9.40	-56.60	-13	43.60
3118.00	44.88	H	-61.1	1.20	7.20	-55.10	-13	42.10
3118.00	44.12	V	-61.6	1.20	7.20	-55.60	-13	42.60
QPSK 5MHz Bandwidth, Middle channel								
954.8	31.74	H	-64.8	1.36	0.0	-66.16	-13	53.16
954.8	31.86	V	-62.2	1.36	0.0	-63.56	-13	50.56
1564.00	54.27	H	-53.4	0.90	8.60	-45.70	-40	5.70
1564.00	53.52	V	-54.7	0.90	8.60	-47.00	-40	7.00
2346.00	43.27	H	-64.1	1.10	9.40	-55.80	-13	42.80
2346.00	43.01	V	-64.5	1.10	9.40	-56.20	-13	43.20
3128.00	44.92	H	-61.1	1.20	7.20	-55.10	-13	42.10
3128.00	44.95	V	-60.8	1.20	7.20	-54.80	-13	41.80
QPSK 5MHz Bandwidth, High channel								
950.0	34.22	H	-62.3	1.36	0.0	-63.66	-13	50.66
950.0	34.34	V	-59.7	1.36	0.0	-61.06	-13	48.06
1569.00	54.99	H	-52.7	0.90	8.60	-45.00	-40	5.00
1569.00	53.62	V	-54.6	0.90	8.60	-46.90	-40	6.90
2353.50	43.16	H	-64.2	1.10	9.10	-56.20	-13	43.20
2353.50	43.03	V	-64.3	1.10	9.10	-56.30	-13	43.30
3138.00	45.32	H	-60.7	1.20	7.20	-54.70	-13	41.70
3138.00	44.75	V	-61.0	1.20	7.20	-55.00	-13	42.00

Note:
Absolute Level = Substituted Level + Antenna Gain – Cable Loss
Margin =Limit – Absolute Level

FCC§ 22.917 (a); § 24.238 (a); §27.53 (c)(g)(h) - BAND EDGES

Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC §27.53 (h), 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.

According to FCC §27.53 (c), For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

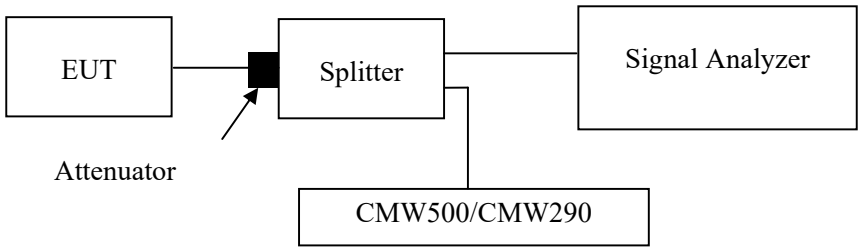
According to FCC §27.53 (g) , For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Test Procedure

ANSI C63.26-2015 Section 5.7

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

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



Test Data

Environmental Conditions

Temperature:	24.1~25.7 ℃
Relative Humidity:	37~45 %
ATM Pressure:	101.0 kPa

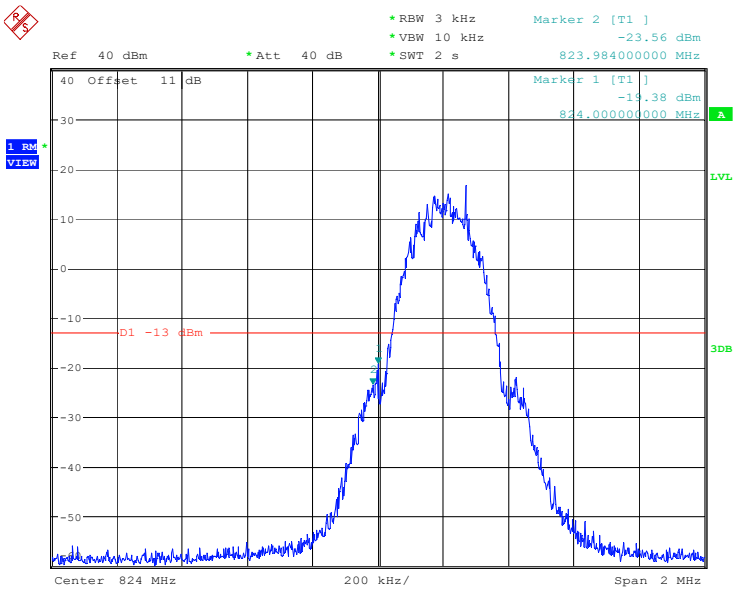
The testing was performed by Cheeb Huang from 2024-03-14 to 2024-03-16.

EUT operation mode: Transmitting (Worst case)

Test Result: Compliant

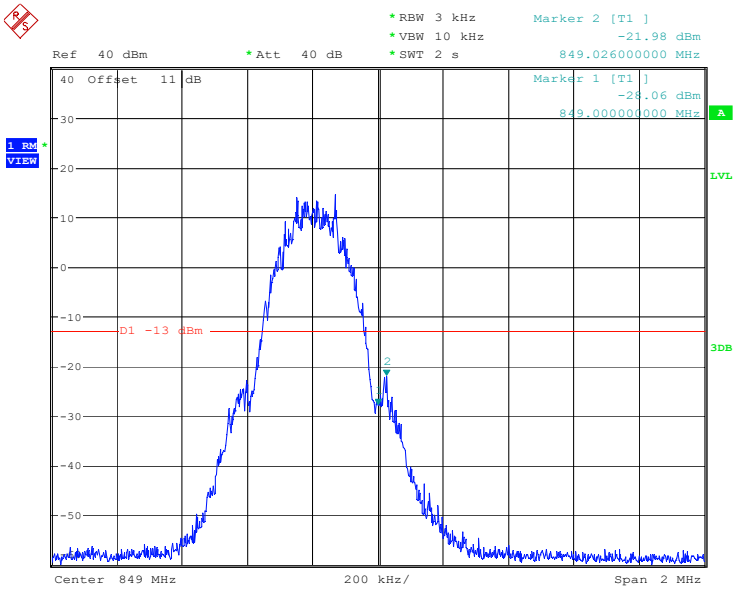
Please refer to the following plots.

Cellular Band, Left Band Edge for GPRS (GMSK) Mode



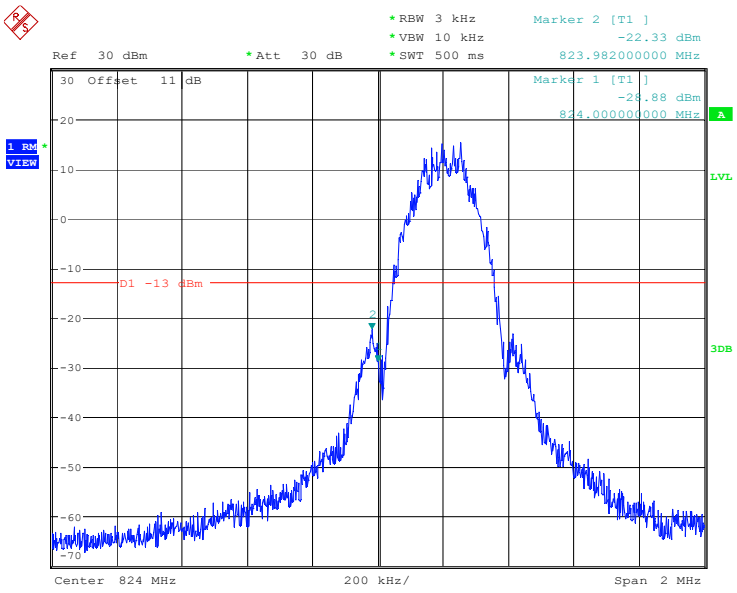
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:11:16

Cellular Band, Right Band Edge for GPRS (GMSK) Mode



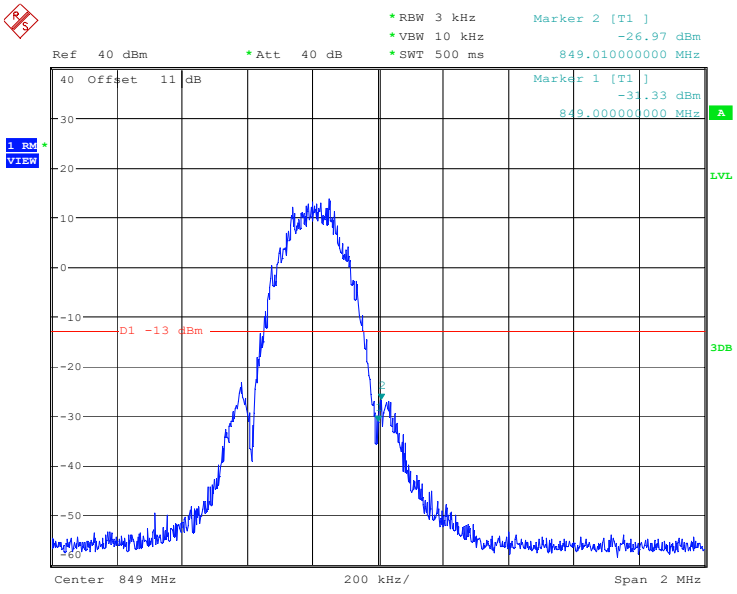
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:17:17

Cellular Band, Left Band Edge for GSM (EDGE) Mode



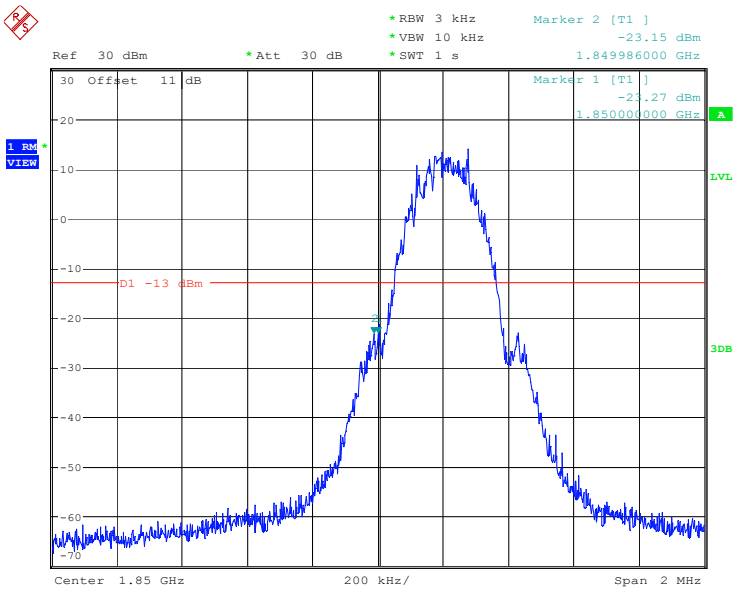
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:24:18

Cellular Band, Right Band Edge for GSM (EDGE) Mode



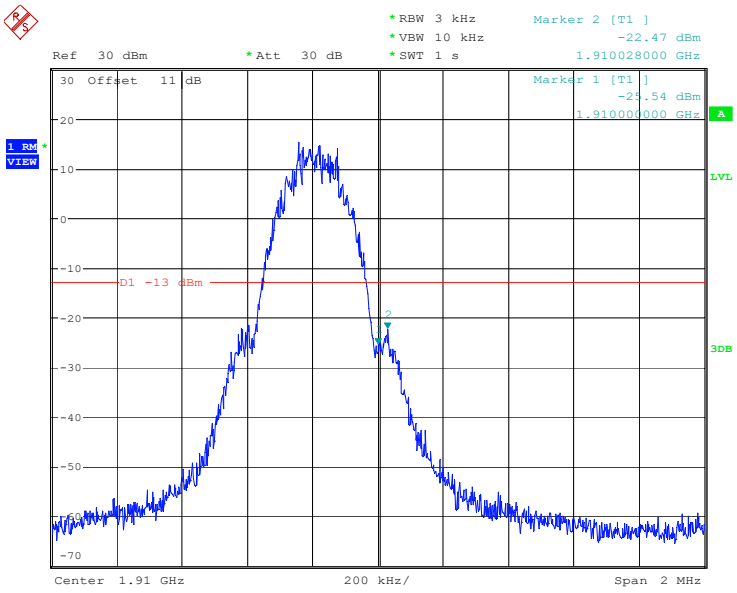
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 15.MAR.2024 16:33:05

PCS Band, Left Band Edge for GPRS (GMSK) Mode



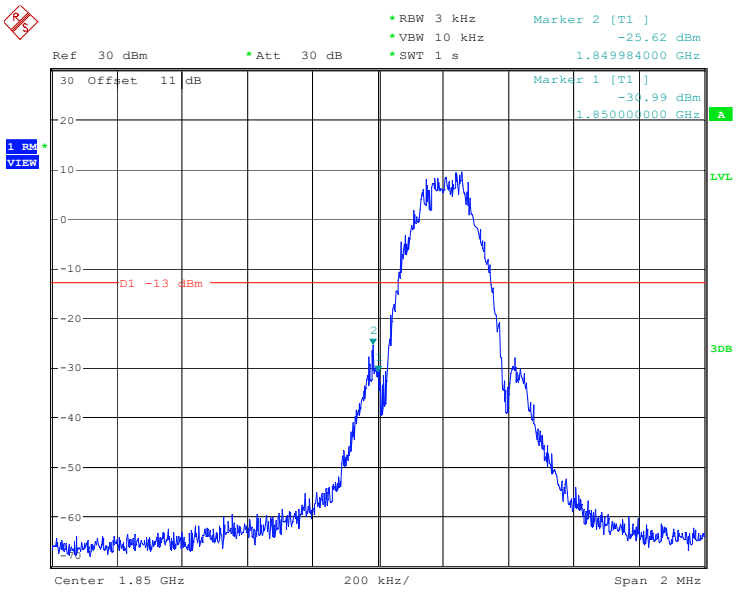
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:50:51

PCS Band, Right Band Edge for GPRS (GMSK) Mode



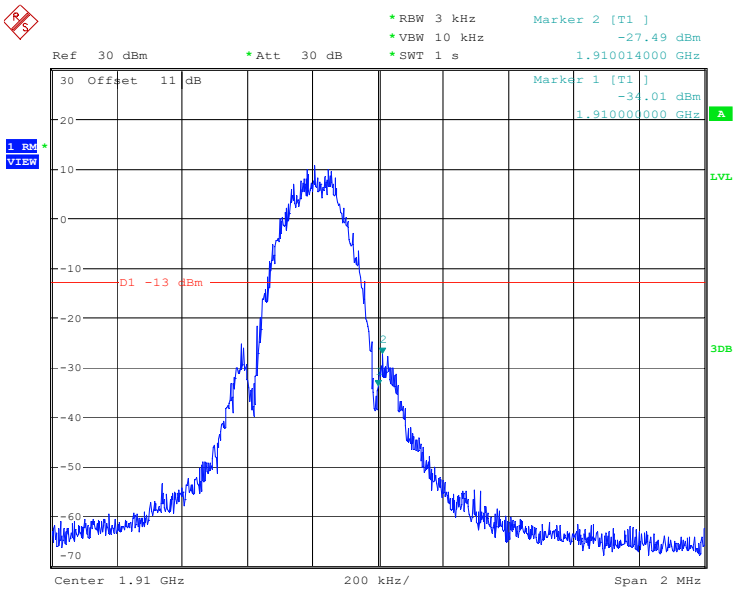
ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 10:58:14

PCS Band, Left Band Edge for GSM (EDGE) Mode



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:10:14

PCS Band, Right Band Edge for GSM (EDGE) Mode



ProjectNo.:SZ2240105-01314E-RF Tester:Cheeb Huang
Date: 16.MAR.2024 11:02:11

The test plots of LTE bands please refer to the Appendix C.

FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY

Applicable Standard

FCC § 2.1055, §22.355, §24.235&§27.54.

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

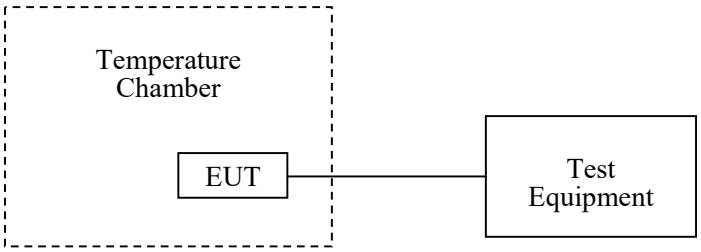
Test Procedure

ANSI C63.26-2015 Section 5.6

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

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

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



Test Data

Environmental Conditions

Temperature:	24.1~25.7 ℃
Relative Humidity:	37~45 %
ATM Pressure:	101.0 kPa

The testing was performed by Cheeb Huang from 2024-03-11 to 2024-03-15.

EUT operation mode: Transmitting

Test Result: Compliant

Please refer to the following tables.

Cellular Band (Part 22H)

GPRS Mode

Test Modulation:	GMSK		Test Channel:	(ppm)	MHz
Test Item	Temperature (°C)	Voltage (V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	23.90	0.029	2.5
	-20	3.8	20.87	0.025	2.5
	-10	3.8	18.00	0.022	2.5
	0	3.8	13.04	0.016	2.5
	10	3.8	20.55	0.025	2.5
	20	3.8	10.98	0.013	2.5
	30	3.8	12.33	0.015	2.5
	40	3.8	17.10	0.020	2.5
	50	3.8	11.32	0.014	2.5
Frequency Stability vs. Voltage	20	3.45	14.46	0.017	2.5
	20	4.35	16.80	0.020	2.5

EGPRS Mode

Test Modulation:	8PSK	Voltage	Test Channel:	836.6	MHz
Test Item	Temperature (°C)	(V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	15.80	0.019	2.5
	-20	3.8	16.77	0.020	2.5
	-10	3.8	17.66	0.021	2.5
	0	3.8	15.78	0.019	2.5
	10	3.8	20.00	0.024	2.5
	20	3.8	16.40	0.020	2.5
	30	3.8	16.13	0.019	2.5
	40	3.8	17.32	0.021	2.5
	50	3.8	18.22	0.022	2.5
Frequency Stability vs. Voltage	20	3.45	19.32	0.023	2.5
	20	4.35	19.38	0.023	2.5

PCS Band (Part 24E)

GPRS Mode

Test Mode:	GMSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1850.084	1850	1909.915	1910
	-20	3.8	1850.085	1850	1909.92	1910
	-10	3.8	1850.07	1850	1909.937	1910
	0	3.8	1850.066	1850	1909.919	1910
	10	3.8	1850.085	1850	1909.936	1910
	20	3.8	1850.087	1850	1909.938	1910
	30	3.8	1850.071	1850	1909.915	1910
	40	3.8	1850.081	1850	1909.916	1910
	50	3.8	1850.08	1850	1909.939	1910
Frequency Stability vs. Voltage	20	3.45	1850.073	1850	1909.928	1910
	20	4.35	1850.075	1850	1909.933	1910

EGPRS Mode

Test Mode:	8PSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (℃)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1850.078	1850	1909.917	1910
	-20	3.8	1850.078	1850	1909.932	1910
	-10	3.8	1850.079	1850	1909.923	1910
	0	3.8	1850.089	1850	1909.932	1910
	10	3.8	1850.071	1850	1909.923	1910
	20	3.8	1850.066	1850	1909.939	1910
	30	3.8	1850.077	1850	1909.929	1910
	40	3.8	1850.066	1850	1909.937	1910
	50	3.8	1850.087	1850	1909.929	1910
Frequency Stability vs. Voltage	20	3.45	1850.077	1850	1909.916	1910
	20	4.35	1850.065	1850	1909.934	1910

LTE
Band 2
QPSK:

Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1851.390	1850.000	1908.656	1910.000
	-20	3.8	1851.311	1850.000	1908.643	1910.000
	-10	3.8	1851.384	1850.000	1908.715	1910.000
	0	3.8	1851.393	1850.000	1908.701	1910.000
	10	3.8	1851.363	1850.000	1908.666	1910.000
	20	3.8	1851.352	1850.000	1908.656	1910.000
	30	3.8	1851.334	1850.000	1908.673	1910.000
	40	3.8	1851.375	1850.000	1908.665	1910.000
	50	3.8	1851.303	1850.000	1908.734	1910.000
Frequency Stability vs. Voltage	20	3.45	1851.341	1850.000	1908.681	1910.000
	20	4.35	1851.373	1850.000	1908.701	1910.000

16QAM:

Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1851.313	1850.000	1908.724	1910.000
	-20	3.8	1851.376	1850.000	1908.648	1910.000
	-10	3.8	1851.341	1850.000	1908.648	1910.000
	0	3.8	1851.328	1850.000	1908.637	1910.000
	10	3.8	1851.326	1850.000	1908.719	1910.000
	20	3.8	1851.299	1850.000	1908.666	1910.000
	30	3.8	1851.359	1850.000	1908.655	1910.000
	40	3.8	1851.369	1850.000	1908.716	1910.000
	50	3.8	1851.329	1850.000	1908.732	1910.000
Frequency Stability vs. Voltage	20	3.45	1851.326	1850.000	1908.716	1910.000
	20	4.35	1851.383	1850.000	1908.669	1910.000

Band 4
QPSK:

Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1711.378	1710.00	1753.690	1755
	-20	3.8	1711.371	1710.00	1753.662	1755
	-10	3.8	1711.324	1710.00	1753.679	1755
	0	3.8	1711.362	1710.00	1753.650	1755
	10	3.8	1711.391	1710.00	1753.694	1755
	20	3.8	1711.394	1710.00	1753.716	1755
	30	3.8	1711.374	1710.00	1753.718	1755
	40	3.8	1711.299	1710.00	1753.685	1755
	50	3.8	1711.360	1710.00	1753.675	1755
Frequency Stability vs. Voltage	20	3.45	1711.335	1710.00	1753.722	1755
	20	4.35	1711.367	1710.00	1753.664	1755

16QAM:

Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	1711.299	1710.00	1753.676	1755
	-20	3.8	1711.395	1710.00	1753.658	1755
	-10	3.8	1711.324	1710.00	1753.653	1755
	0	3.8	1711.371	1710.00	1753.665	1755
	10	3.8	1711.297	1710.00	1753.645	1755
	20	3.8	1711.338	1710.00	1753.678	1755
	30	3.8	1711.327	1710.00	1753.656	1755
	40	3.8	1711.384	1710.00	1753.663	1755
	50	3.8	1711.347	1710.00	1753.694	1755
Frequency Stability vs. Voltage	20	3.45	1711.390	1710.00	1753.655	1755
	20	4.35	1711.306	1710.00	1753.712	1755

Band 5
QPSK:

Test Modulation:	10 MHz QPSK		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	12.570	0.015	2.5
	-20	3.8	29.990	0.036	2.5
	-10	3.8	13.240	0.016	2.5
	0	3.8	10.720	0.013	2.5
	10	3.8	17.450	0.021	2.5
	20	3.8	28.690	0.034	2.5
	30	3.8	21.200	0.025	2.5
	40	3.8	22.170	0.027	2.5
	50	3.8	12.350	0.015	2.5
Frequency Stability vs. Voltage	20	3.45	19.220	0.023	2.5
	20	4.35	21.730	0.026	2.5

16QAM:

Test Modulation:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature (°C)	Voltage (V_{DC})	Frequency Error		Limit
			(Hz)	(ppm)	(ppm)
Frequency Stability vs. Temperature	-30	3.8	22.110	0.026	2.5
	-20	3.8	25.330	0.030	2.5
	-10	3.8	28.410	0.034	2.5
	0	3.8	14.340	0.017	2.5
	10	3.8	18.960	0.023	2.5
	20	3.8	18.850	0.023	2.5
	30	3.8	26.510	0.032	2.5
	40	3.8	15.500	0.019	2.5
	50	3.8	20.790	0.025	2.5
Frequency Stability vs. Voltage	20	3.45	12.990	0.016	2.5
	20	4.35	26.180	0.031	2.5

Band 12
QPSK:

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.687	699.00	715.305	716.00
	-20	3.8	699.687	699.00	715.349	716.00
	-10	3.8	699.671	699.00	715.316	716.00
	0	3.8	699.706	699.00	715.299	716.00
	10	3.8	699.653	699.00	715.376	716.00
	20	3.8	699.709	699.00	715.316	716.00
	30	3.8	699.632	699.00	715.304	716.00
	40	3.8	699.718	699.00	715.386	716.00
	50	3.8	699.662	699.00	715.305	716.00
Frequency Stability vs. Voltage	20	3.45	699.624	699.00	715.313	716.00
	20	4.35	699.651	699.00	715.319	716.00

16QAM:

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	699.721	699.00	715.347	716.00
	-20	3.8	699.681	699.00	715.295	716.00
	-10	3.8	699.688	699.00	715.389	716.00
	0	3.8	699.629	699.00	715.390	716.00
	10	3.8	699.698	699.00	715.310	716.00
	20	3.8	699.700	699.00	715.336	716.00
	30	3.8	699.670	699.00	715.325	716.00
	40	3.8	699.712	699.00	715.372	716.00
	50	3.8	699.660	699.00	715.316	716.00
Frequency Stability vs. Voltage	20	3.45	699.712	699.00	715.302	716.00
	20	4.35	699.693	699.00	715.360	716.00

Band 13
QPSK:

Test Mode:	10M QPSK	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	777.646	777.00	786.353	787.00
	-20	3.8	777.646	777.00	786.340	787.00
	-10	3.8	777.690	777.00	786.336	787.00
	0	3.8	777.691	777.00	786.298	787.00
	10	3.8	777.675	777.00	786.361	787.00
	20	3.8	777.632	777.00	786.372	787.00
	30	3.8	777.643	777.00	786.293	787.00
	40	3.8	777.695	777.00	786.297	787.00
	50	3.8	777.668	777.00	786.298	787.00
Frequency Stability vs. Voltage	20	3.45	777.627	777.00	786.339	787.00
	20	4.35	777.689	777.00	786.352	787.00

16QAM:

Test Mode:	10M 16QAM	Test Channel: Lowest for Lower Edge,Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V_{DC})	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	3.8	777.696	777.00	786.358	787.00
	-20	3.8	777.633	777.00	786.320	787.00
	-10	3.8	777.633	777.00	786.333	787.00
	0	3.8	777.608	777.00	786.362	787.00
	10	3.8	777.702	777.00	786.384	787.00
	20	3.8	777.679	777.00	786.391	787.00
	30	3.8	777.658	777.00	786.315	787.00
	40	3.8	777.672	777.00	786.319	787.00
	50	3.8	777.634	777.00	786.294	787.00
Frequency Stability vs. Voltage	20	3.45	777.651	777.00	786.296	787.00
	20	4.35	777.630	777.00	786.355	787.00

EUT PHOTOGRAPHS

Please refer to the attachment SZ2240105-01314E-RF External photo and SZ2240105-01314E-RF Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment SZ2240105-01314E-RF-00 Test Setup photo.

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