

TEST REPORT

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Report Number: RA221118-55124E-RF
FCC ID: 2ATUK-BN-401

Test Standard (s)

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

Sample Description

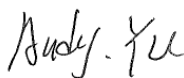
Product Type: GPS TRACKER
Model No.: 401, 401A, 401B, 401C, 401D, GPS-401, GPS-401A,
GPS-401B, GPS-401C, GPS-401D, BN-401, BN-401A,
BN-401B, BN-401C, BN-401D
Trade Mark: BAANOL, DI QIU TU XING

Date Received: 2022-11-18
Date of Test: 2022-12-14 to 2023-02-07
Report Date: 2023-03-28

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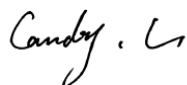
* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:



Audy.Yu
EMC Engineer

Approved By:



Candy Li
EMC Engineer

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

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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	3
GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	5
TEST METHODOLOGY	5
MEASUREMENT UNCERTAINTY	5
TEST FACILITY	6
SYSTEM TEST CONFIGURATION.....	7
DESCRIPTION OF TEST CONFIGURATION	7
EQUIPMENT MODIFICATIONS	8
SUPPORT EQUIPMENT LIST AND DETAILS	8
SUPPORT CABLE DESCRIPTION	8
BLOCK DIAGRAM OF TEST SETUP	8
SUMMARY OF TEST RESULTS.....	9
TEST EQUIPMENT LIST	10
FCC § 1.1307(B) – RF EXPOSURE.....	11
FCC§2.1047 - MODULATION CHARACTERISTIC	13
FCC § 2.1046,§ 22.913 (A)(D)&§ 24.232 (C)(D); §27.50(A)(D)(H)- RF OUTPUT POWER.....	14
APPLICABLE STANDARD	14
TEST PROCEDURE	14
TEST DATA	14
FCC §2.1049, §22.917, §22.905 & §24.238&§27.53 - OCCUPIED BANDWIDTH.....	36
APPLICABLE STANDARD	36
TEST PROCEDURE	36
TEST DATA	36
FCC §2.1051, §22.917(A) & §24.238(A)& §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS ...	41
APPLICABLE STANDARD	41
TEST PROCEDURE	41
TEST DATA	41
FCC § 2.1053; § 22.917 (A);§ 24.238 (A); §27.53 - SPURIOUS RADIATED EMISSIONS.....	42
APPLICABLE STANDARD	42
TEST PROCEDURE	42
TEST DATA	42
FCC§ 22.917 (A);§ 24.238 (A); §27.53(G) (H)(M) - BAND EDGES.....	47
APPLICABLE STANDARD	47
TEST PROCEDURE	47
TEST DATA	47
FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY	48
APPLICABLE STANDARD	48
TEST PROCEDURE	48
TEST DATA	49

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA221220-60242E-RF	Original Report	2023-02-07
1	RA221220-60242E-RF	Revised Test Date	2023-03-28

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	GPS TRACKER	
Tested Model	401	
Multiple Model	401A, 401B, 401C, 401D, GPS-401, GPS-401A, GPS-401B, GPS-401C, GPS-401D, BN-401, BN-401A, BN-401B, BN-401C, BN-401D	
Model difference	Please refer to DOS letter	
UE Category	Category 1	
Frequency Range	GSM 850: 824-849MHz(TX); 869-894MHz(RX) PCS 1900: 1850-1910MHz(TX); 1930-1990MHz(RX) 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 7: 2500-2570MHz(TX); 2620-2690MHz(RX) LTE Band 40: 2305-2315MHz(TX/RX); 2350-2360MHz(TX/RX)	
Maximum Average Conducted Output Power	GSM 850: 33.35dBm (GMSK); 31.47dBm(8PSK) PCS 1900: 30.79dBm(GMSK); 29.06dBm(8PSK) LTE Band 2: 24.82 dBm LTE Band 4: 24.53 dBm LTE Band 5: 22.58 dBm LTE Band 7: 24.77 dBm LTE Band 40(2305-2315MHz): 23.07 dBm LTE Band 40(2350-2360MHz): 23.25 dBm	
Modulation Technique	2G: GMSK, 8PSK 4G: QPSK, 16QAM	
Antenna Specification*	Internal Antenna (Antenna Gain provided by the applicant)	
	GSM850: -0.04dBi	LTE Band5: -0.04dBi
	PCS1900: 0.50dBi	LTE Band7: 0.60dBi
	LTE Band2: 0.50dBi	LTE Band40: 0.62dBi
	LTE Band4: -1.10dBi	
Voltage Range	DC 9~40V from Car Power or DC3.7V backup by battery	
Sample number	RA221118-55124E-RF-S1 (RF Radiated Test) RA221118-55124E-RF-S2 (RF Conducted Test) (Assigned by ATC, Shenzhen)	
Sample/EUT Status	Good condition	
Normal/Extreme Condition	L.V.: Low Voltage: 3.5V _{DC} N.V.: Normal Voltage: 3.7V _{DC} H.V.: High Voltage: 4.2V _{DC}	

Objective

This test report is in accordance with Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, and Part 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

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters. Each test item follows test standards and with no deviation.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		0.082×10^{-7}
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions		2.72dB
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
	18GHz -26.5GHz	5.06dB
	26.5GHz -40GHz	4.72dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

Test was performed as below table:

Frequency band	Bandwidth (MHz)	Test Frequency(MHz)		
		Low	Middle	High
GSM850	0.25	824.2	836.4	848.8
PCS1900	0.25	1850.2	1880.0	1909.8
LTE B2	1.4	1850.7	1880.0	1909.3
	3	1851.5	1880.0	1908.5
	5	1852.5	1880.0	1907.5
	10	1855	1880.0	1905.0
	15	1857.5	1880.0	1902.5
	20	1860.0	1880.0	1900.0
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	1715.0	1732.5	1750.0
	15	1717.5	1732.5	1747.5
	20	1720.0	1732.5	1745.0
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	829.0	836.5	844.0
LTE B7	5	2502.5	2535.0	2567.5
	10	2505.0	2535.0	2565.0
	15	2507.5	2535.0	2562.5
	20	2510.0	2535.0	2560.0
LTE B40 (2305MHz-2315MHz)	5	2307.5	2310	2312.5
	10	/	2310	/
LTE B40 (2350MHz-2360MHz)	5	2352.5	2355	2357.5
	10	/	2355.0	/

The EUT is UE Category 1 equipment, for 16QAM modulation, maximum support 27RB.

Equipment Modifications

No modification was made to the EUT.

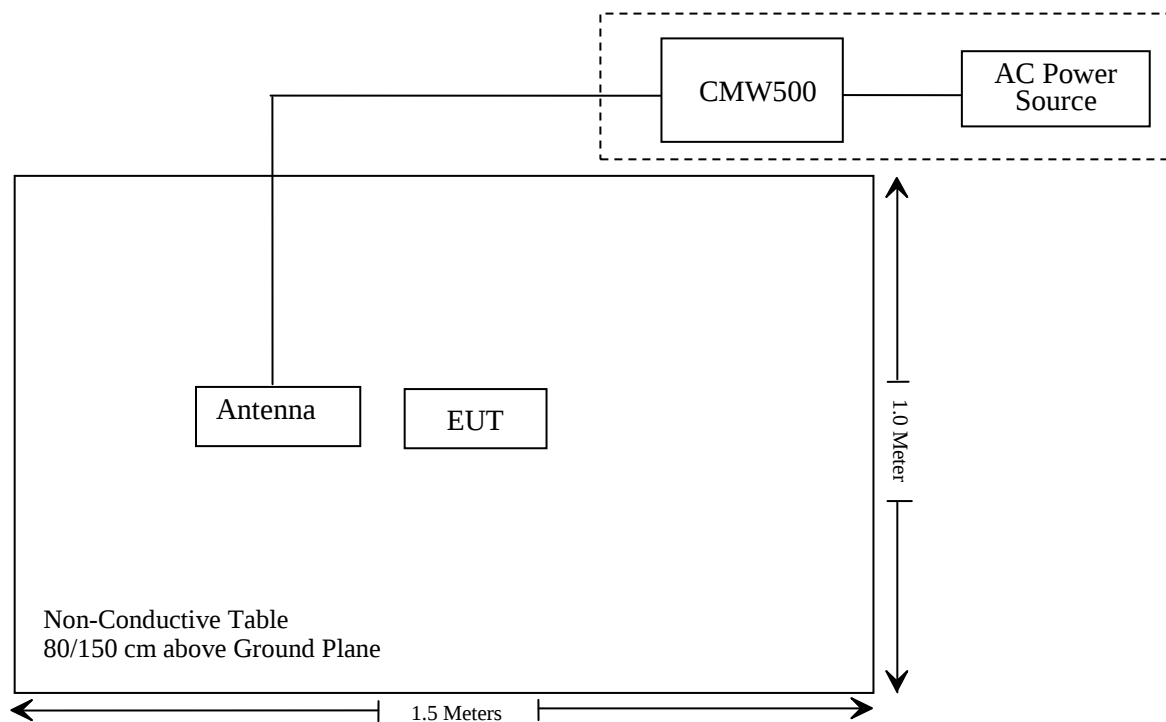
Support Equipment List and Details

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

Support Cable Description

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307(b)	RF Exposure	Compliant
§2.1046; § 22.913 (a)(d); § 24.232 (c)(d); §27.50 (a) (d) (h);	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 (g) (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					
Rohde & Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde & Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-1067	2020/01/05	2023/01/04
Schwarzbeck	Horn Antenna	BBHA9120D	9120D-655	2020/01/05	2023/01/04
Unknown	Band Reject Filter	MSF824-862MS-1147	ATCE-141	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF1850-1910MS-1148	ATCE-142	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF1710-1785MS-1150	ATCE-144	2022/11/25	2023/11/24
Unknown	Band Reject Filter	MSF2495-2570MS-1152	ATCE-146	2022/11/25	2023/11/24
PASTERNAK	Horn Antenna	PE9852/2F-20	1120(ATC-BA-024-1)	2020/01/05	2023/01/04
PASTERNAK	Horn Antenna	PE9852/2F-20	1120(ATC-BA-025-1)	2020/01/05	2023/01/04
Agilent	Signal Generator	N5183A	MY51040755	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RFCoaxialCable	No.16	N200	2022/11/25	2023/11/24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101948	2022/11/25	2023/11/24
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	154606	2022/11/25	2023/11/24
WEINSCHL	10dB Attenuator	5324	AU 3842	2022/11/25	2023/11/24
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2022/11/25	2023/11/24
REALE	Temp. & Humid. Chamber	RHP-800BT	R20170318310	2022/11/23	2023/11/22
Fluke	Desktop Multi Meter	45	7664009	2022/12/14	2023/12/13
UNI-T	DC Power Supply	UTP8305B	10584	NCR	NCR
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

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

FCC § 1.1307(b) – RF EXPOSURE

Applicable Standard

According to §1.1307(b), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance v01, clause 2.1.3.1-SAR-Based Exemption:

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.

Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold. This exemption threshold was derived based on general population 1-g SAR requirements and is detailed in Appendix C.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Result

For worst case:

Mode	Frequency	Maximum Time based Average Power	Antenna Gain		ERP	Distance	SAR-Based Exclusion Threshold		SAR-Based Exclusion
	(MHz)	(dBm)	(dBi)	(dBd)	(dBm)	(m)	(mW)	(dBm)	
GSM850	824-849	33.5	-0.04	-2.19	31.31	0.2	1680	32.25	Yes
PCS1900	1850-1910	31	0.50	-1.65	29.35	0.2	3060	34.85	Yes
LTE B2	1850-1910	25	0.50	-1.65	23.35	0.2	3060	34.85	Yes
LTE B4	1710-1755	25	-1.10	-3.25	21.75	0.2	3060	34.85	Yes
LTE B5	824-849	23	-0.04	-2.19	20.81	0.2	1680	32.25	Yes
LTE B7	2500-2570	25	0.60	-1.55	23.45	0.2	3060	34.85	Yes
LTE B40	2305-2315	23.3	0.62	-1.53	21.77	0.2	3060	34.85	Yes
	2350-2360	23.3	0.62	-1.53	21.77	0.2	3060	34.85	Yes

Note 1: 0dBd=2.15dBi.

Note 2: f = frequency in GHz.

Note 3: The tune-up power was declared by the applicant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

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)(d)&§ 24.232 (c)(d); §27.50(a)(d)(h)- 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)(d), 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(a), for mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

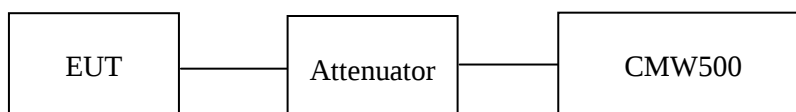
According to §27.50(d), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2496-2690MHz.

Test Procedure

Conducted method:

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



Note: the path loss (cable loss and attenuator) has including in result.

ANSI C63.26-2015 Section 5.5.

Test Data

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54-60 %
ATM Pressure:	101.0 kPa

The testing was performed by Jesse Chen from 2022-12-14 to 2023-01-15.

Conducted Power**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	ERP(dBm)	Limit (dBm)
GSM	128	824.2	33.18	30.99	38.45
	190	836.6	33.18	30.99	38.45
	251	848.8	33.34	31.15	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.19	33.00	32.00	30.64	31.00	30.81	29.81	28.45	38.45
	190	836.6	33.23	33.04	32.05	30.63	31.04	30.85	29.86	28.44	38.45
	251	848.8	33.35	33.14	32.16	30.81	31.16	30.95	29.97	28.62	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				ERP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	31.30	30.41	28.75	27.16	29.11	28.22	26.56	24.97	38.45
	190	836.6	31.41	30.58	28.90	27.37	29.22	28.39	26.71	25.18	38.45
	251	848.8	31.47	30.64	28.92	27.45	29.28	28.45	26.73	25.26	38.45

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd)
 For GSM850: Antenna Gain = -0.04dBi = -2.19dBd (0dBd=2.15dBi)
 Limit: ERP ≤ 38.45dBm

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	EIRP(dBm)	Limit (dBm)
GSM	512	1850.2	30.79	31.29	33
	661	1880.0	30.67	31.17	33
	810	1909.8	30.57	31.07	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	30.76	30.19	29.36	27.42	31.26	30.69	29.86	27.92	33
	661	1880.0	30.68	30.09	29.28	27.37	31.18	30.59	29.78	27.87	33
	810	1909.8	30.58	29.92	29.21	27.38	31.08	30.42	29.71	27.88	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				EIRP(dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	29.06	28.32	26.59	25.05	29.56	28.82	27.09	25.55	33
	661	1880.0	28.92	28.15	26.42	24.95	29.42	28.65	26.92	25.45	33
	810	1909.8	28.62	27.86	26.19	24.65	29.12	28.36	26.69	25.15	33

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)
 For PCS1900 : Antenna Gain = 0.50dBi
 Limit: EIRP ≤ 33dBm

LTE Band 2

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	23.06	23.19	23.47	23.56	23.69	23.97
		RB1#3	23.00	23.25	23.99	23.50	23.75	24.49
		RB1#5	22.95	23.33	24.24	23.45	23.83	24.74
		RB3#0	22.93	23.23	23.68	23.43	23.73	24.18
		RB3#3	22.92	23.37	24.14	23.42	23.87	24.64
		RB6#0	21.97	22.44	22.71	22.47	22.94	23.21
	16QAM	RB1#0	22.02	22.37	22.42	22.52	22.87	22.92
		RB1#3	22.02	22.47	22.91	22.52	22.97	23.41
		RB1#5	22.01	22.53	23.18	22.51	23.03	23.68
		RB3#0	22.80	23.34	23.76	23.30	23.84	24.26
		RB3#3	22.85	23.39	24.18	23.35	23.89	24.68
		RB6#0	20.83	21.63	21.55	21.33	22.13	22.05
3.0	QPSK	RB1#0	22.74	23.28	22.51	23.24	23.78	23.01
		RB1#8	22.68	23.51	23.65	23.18	24.01	24.15
		RB1#14	22.48	23.45	24.44	22.98	23.95	24.94
		RB6#0	21.78	22.25	21.85	22.28	22.75	22.35
		RB6#9	21.65	22.46	22.96	22.15	22.96	23.46
		RB15#0	21.73	22.41	22.38	22.23	22.91	22.88
	16QAM	RB1#0	21.92	22.21	22.13	22.42	22.71	22.63
		RB1#8	21.87	22.44	23.11	22.37	22.94	23.61
		RB1#14	21.78	22.46	23.72	22.28	22.96	24.22
		RB6#0	20.92	21.50	20.80	21.42	22.00	21.30
		RB6#9	20.87	21.65	21.79	21.37	22.15	22.29
		RB15#0	20.85	21.66	21.33	21.35	22.16	21.83

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	22.69	23.37	22.13	23.19	23.87	22.63
		RB1#13	22.54	23.67	23.32	23.04	24.17	23.82
		RB1#24	22.47	23.79	24.82	22.97	24.29	25.32
		RB15#0	21.62	22.34	21.28	22.12	22.84	21.78
		RB15#10	21.57	22.53	22.36	22.07	23.03	22.86
		RB25#0	21.59	22.52	21.85	22.09	23.02	22.35
	16QAM	RB1#0	22.04	22.27	21.15	22.54	22.77	21.65
		RB1#13	21.94	22.51	22.18	22.44	23.01	22.68
		RB1#24	21.90	22.64	23.58	22.40	23.14	24.08
		RB15#0	21.62	22.35	21.29	22.12	22.85	21.79
		RB15#10	21.54	22.52	22.41	22.04	23.02	22.91
		RB25#0	20.74	21.70	20.84	21.24	22.20	21.34
10.0	QPSK	RB1#0	22.49	22.95	21.46	22.99	23.45	21.96
		RB1#25	22.29	23.46	21.72	22.79	23.96	22.22
		RB1#49	22.13	23.88	24.58	22.63	24.38	25.08
		RB25#0	21.26	21.99	20.18	21.76	22.49	20.68
		RB25#25	21.12	22.41	21.55	21.62	22.91	22.05
		RB50#0	21.17	22.39	20.83	21.67	22.89	21.33
	16QAM	RB1#0	21.51	22.44	20.53	22.01	22.94	21.03
		RB1#14	21.43	23.00	20.81	21.93	23.50	21.31
		RB1#26	21.05	23.37	23.77	21.55	23.87	24.27
		RB15#0	21.25	21.75	20.06	21.75	22.25	20.56
		RB15#12	20.94	22.35	22.00	21.44	22.85	22.50
		RB27#0	21.27	22.00	20.19	21.77	22.50	20.69

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	22.40	22.90	21.88	22.90	23.40	22.38
		RB1#38	22.11	23.74	21.46	22.61	24.24	21.96
		RB1#74	22.08	23.80	24.58	22.58	24.30	25.08
		RB36#0	21.28	22.16	20.63	21.78	22.66	21.13
		RB36#39	20.99	22.77	21.39	21.49	23.27	21.89
		RB75#0	21.17	22.84	20.94	21.67	23.34	21.44
	16QAM	RB1#0	21.63	22.15	21.51	22.13	22.65	22.01
		RB1#14	21.38	23.16	20.89	21.88	23.66	21.39
		RB1#26	21.34	23.09	24.16	21.84	23.59	24.66
		RB15#0	21.61	22.16	21.47	22.11	22.66	21.97
		RB15#12	21.35	23.07	24.17	21.85	23.57	24.67
		RB27#0	21.32	21.96	20.60	21.82	22.46	21.10
20.0	QPSK	RB1#0	22.51	23.28	22.57	23.01	23.78	23.07
		RB1#50	22.06	24.11	21.44	22.56	24.61	21.94
		RB1#99	23.05	23.21	24.26	23.55	23.71	24.76
		RB50#0	21.12	22.08	20.75	21.62	22.58	21.25
		RB50#50	21.16	22.67	20.93	21.66	23.17	21.43
		RB100#0	21.05	22.87	21.08	21.55	23.37	21.58
	16QAM	RB1#0	21.69	21.91	22.04	22.19	22.41	22.54
		RB1#14	21.36	23.13	21.02	21.86	23.63	21.52
		RB1#26	21.85	22.36	24.24	22.35	22.86	24.74
		RB15#0	21.66	21.94	21.99	22.16	22.44	22.49
		RB15#12	21.86	22.36	24.27	22.36	22.86	24.77
		RB27#0	21.17	21.64	20.92	21.67	22.14	21.42

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band2: Antenna Gain = 0.50dBi

Limit: EIRP ≤ 33dBm

LTE Band 4

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	23.07	23.98	22.97	21.97	22.88	21.87
		RB1#3	23.05	23.98	22.85	21.95	22.88	21.75
		RB1#5	23.05	23.95	22.81	21.95	22.85	21.71
		RB3#0	22.99	23.94	22.87	21.89	22.84	21.77
		RB3#3	23.01	23.98	22.80	21.91	22.88	21.70
		RB6#0	22.84	22.87	22.28	21.74	21.77	21.18
	16QAM	RB1#0	22.98	22.97	22.36	21.88	21.87	21.26
		RB1#3	23.02	22.96	22.32	21.92	21.86	21.22
		RB1#5	22.99	22.95	22.31	21.89	21.85	21.21
		RB3#0	23.00	23.93	22.90	21.90	22.83	21.80
		RB3#3	23.03	23.99	22.81	21.93	22.89	21.71
		RB6#0	21.78	21.46	21.20	20.68	20.36	20.10
3.0	QPSK	RB1#0	23.35	23.96	23.21	22.25	22.86	22.11
		RB1#8	23.40	23.97	23.11	22.30	22.87	22.01
		RB1#14	23.34	23.83	22.88	22.24	22.73	21.78
		RB6#0	22.65	22.88	22.41	21.55	21.78	21.31
		RB6#9	22.74	22.82	22.31	21.64	21.72	21.21
		RB15#0	22.72	22.84	22.37	21.62	21.74	21.27
	16QAM	RB1#0	22.84	22.90	22.96	21.74	21.80	21.86
		RB1#8	22.92	22.93	22.95	21.82	21.83	21.85
		RB1#14	22.86	22.79	22.75	21.76	21.69	21.65
		RB6#0	21.55	21.47	21.29	20.45	20.37	20.19
		RB6#9	21.69	21.45	21.22	20.59	20.35	20.12
		RB15#0	21.60	21.54	21.30	20.50	20.44	20.20

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	23.35	24.19	23.28	22.25	23.09	22.18
		RB1#13	23.63	24.00	23.36	22.53	22.90	22.26
		RB1#24	23.51	23.91	22.89	22.41	22.81	21.79
		RB15#0	22.72	22.85	22.48	21.62	21.75	21.38
		RB15#10	22.76	22.76	22.40	21.66	21.66	21.30
		RB25#0	22.74	22.78	22.41	21.64	21.68	21.31
	16QAM	RB1#0	23.12	23.15	22.55	22.02	22.05	21.45
		RB1#13	23.17	22.96	22.45	22.07	21.86	21.35
		RB1#24	23.25	22.95	22.31	22.15	21.85	21.21
		RB15#0	22.72	22.86	22.49	21.62	21.76	21.39
		RB15#10	22.82	22.75	22.40	21.72	21.65	21.30
		RB25#0	21.57	21.51	21.24	20.47	20.41	20.14
10.0	QPSK	RB1#0	22.80	24.01	22.91	21.70	22.91	21.81
		RB1#25	23.65	23.87	23.33	22.55	22.77	22.23
		RB1#49	23.63	23.26	22.54	22.53	22.16	21.44
		RB25#0	22.46	22.60	22.25	21.36	21.50	21.15
		RB25#25	22.75	22.44	22.22	21.65	21.34	21.12
		RB50#0	22.63	22.56	22.26	21.53	21.46	21.16
	16QAM	RB1#0	22.79	23.24	23.12	21.69	22.14	22.02
		RB1#14	22.92	22.79	23.03	21.82	21.69	21.93
		RB1#26	23.28	22.72	22.93	22.18	21.62	21.83
		RB15#0	22.37	22.63	22.13	21.27	21.53	21.03
		RB15#12	22.72	22.32	22.09	21.62	21.22	20.99
		RB27#0	22.54	22.58	22.27	21.44	21.48	21.17

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.26	24.39	23.45	22.16	23.29	22.35
		RB1#38	24.12	24.01	23.49	23.02	22.91	22.39
		RB1#74	24.53	23.59	23.00	23.43	22.49	21.90
		RB36#0	22.75	22.91	22.50	21.65	21.81	21.40
		RB36#39	23.14	22.68	22.50	22.04	21.58	21.40
		RB75#0	23.00	22.76	22.50	21.90	21.66	21.40
	16QAM	RB1#0	22.93	23.71	23.10	21.83	22.61	22.00
		RB1#14	23.24	23.22	23.18	22.14	22.12	22.08
		RB1#26	23.57	23.13	23.04	22.47	22.03	21.94
		RB15#0	22.94	23.66	23.19	21.84	22.56	22.09
		RB15#12	23.57	23.12	23.05	22.47	22.02	21.95
		RB27#0	22.64	22.96	22.40	21.54	21.86	21.30
20.0	QPSK	RB1#0	23.09	24.12	23.59	21.99	23.02	22.49
		RB1#50	24.32	23.99	23.64	23.22	22.89	22.54
		RB1#99	24.39	23.27	22.86	23.29	22.17	21.76
		RB50#0	22.76	22.86	22.39	21.66	21.76	21.29
		RB50#50	23.11	22.57	22.44	22.01	21.47	21.34
		RB100#0	22.89	22.60	22.41	21.79	21.50	21.31
	16QAM	RB1#0	23.03	23.79	23.01	21.93	22.69	21.91
		RB1#14	23.40	23.43	22.89	22.30	22.33	21.79
		RB1#26	23.49	23.19	22.79	22.39	22.09	21.69
		RB15#0	23.04	23.79	23.00	21.94	22.69	21.90
		RB15#12	23.47	23.18	22.80	22.37	22.08	21.70
		RB27#0	22.54	22.91	22.24	21.44	21.81	21.14

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band4: Antenna Gain = -1.10dBi

Limit: EIRP ≤ 30dBm

LTE Band 5

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
1.4	QPSK	RB1#0	22.37	21.80	22.27	20.18	19.61	20.08
		RB1#3	22.44	21.80	22.22	20.25	19.61	20.03
		RB1#5	22.43	21.81	22.21	20.24	19.62	20.02
		RB3#0	22.41	21.77	22.23	20.22	19.58	20.04
		RB3#3	22.48	21.78	22.19	20.29	19.59	20.00
		RB6#0	21.49	20.93	21.22	19.30	18.74	19.03
	16QAM	RB1#0	21.49	20.86	21.39	19.30	18.67	19.20
		RB1#3	21.57	20.99	21.41	19.38	18.80	19.22
		RB1#5	21.58	21.03	21.36	19.39	18.84	19.17
		RB3#0	22.46	21.77	22.19	20.27	19.58	20.00
		RB3#3	22.44	21.80	22.22	20.25	19.61	20.03
		RB6#0	20.46	19.97	20.25	18.27	17.78	18.06
3	QPSK	RB1#0	22.45	21.71	22.27	20.26	19.52	20.08
		RB1#8	22.47	21.83	22.18	20.28	19.64	19.99
		RB1#14	22.43	21.70	22.06	20.24	19.51	19.87
		RB6#0	21.53	20.82	21.32	19.34	18.63	19.13
		RB6#9	21.51	20.91	21.30	19.32	18.72	19.11
		RB15#0	21.56	20.90	21.35	19.37	18.71	19.16
	16QAM	RB1#0	21.58	20.77	21.87	19.39	18.58	19.68
		RB1#8	21.68	20.97	21.92	19.49	18.78	19.73
		RB1#14	21.60	20.83	21.77	19.41	18.64	19.58
		RB6#0	20.50	19.84	20.35	18.31	17.65	18.16
		RB6#9	20.53	19.89	20.30	18.34	17.70	18.11
		RB15#0	20.46	19.99	20.32	18.27	17.80	18.13

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			ERP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QPSK	RB1#0	22.57	21.82	22.40	20.38	19.63	20.21
		RB1#13	22.58	21.90	22.38	20.39	19.71	20.19
		RB1#24	22.50	21.81	22.29	20.31	19.62	20.10
		RB15#0	21.50	20.87	21.36	19.31	18.68	19.17
		RB15#10	21.53	20.91	21.36	19.34	18.72	19.17
		RB25#0	21.48	20.89	21.32	19.29	18.70	19.13
	16QAM	RB1#0	21.84	21.01	21.38	19.65	18.82	19.19
		RB1#13	21.89	21.08	21.37	19.70	18.89	19.18
		RB1#24	21.82	21.05	21.31	19.63	18.86	19.12
		RB15#0	21.50	20.88	21.36	19.31	18.69	19.17
		RB15#10	21.52	20.91	21.30	19.33	18.72	19.11
		RB25#0	20.48	19.95	20.35	18.29	17.76	18.16
10	QPSK	RB1#0	22.50	22.07	21.90	20.31	19.88	19.71
		RB1#25	22.32	21.81	22.22	20.13	19.62	20.03
		RB1#49	21.89	22.01	22.23	19.70	19.82	20.04
		RB25#0	21.29	20.67	20.95	19.10	18.48	18.76
		RB25#25	21.05	20.81	21.17	18.86	18.62	18.98
		RB50#0	21.21	20.85	21.01	19.02	18.66	18.82
	16QAM	RB1#0	21.67	21.18	21.60	19.48	18.99	19.41
		RB1#14	21.57	20.95	21.89	19.38	18.76	19.70
		RB1#26	21.19	21.20	21.88	19.00	19.01	19.69
		RB15#0	21.25	20.69	20.82	19.06	18.50	18.63
		RB15#12	20.90	20.79	21.07	18.71	18.60	18.88
		RB27#0	21.31	20.67	20.98	19.12	18.48	18.79

Note: ERP(dBm) = Conducted Power(dBm) + Antenna Gain(dBd)
 For Band5: Antenna Gain = -0.04dBi = -2.19dBd (0dBd=2.15dBi)
 Limit: ERP≤38.45dBm

LTE Band 7

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	24.45	23.89	23.14	25.05	24.49	23.74
		RB1#13	24.74	24.10	23.01	25.34	24.70	23.61
		RB1#24	24.77	24.01	22.82	25.37	24.61	23.42
		RB15#0	23.32	22.57	21.59	23.92	23.17	22.19
		RB15#10	23.42	22.74	21.80	24.02	23.34	22.40
		RB25#0	23.51	22.73	21.72	24.11	23.33	22.32
	16QAM	RB1#0	24.02	22.82	21.74	24.62	23.42	22.34
		RB1#13	23.89	22.84	21.68	24.49	23.44	22.28
		RB1#24	24.16	23.18	22.26	24.76	23.78	22.86
		RB15#0	23.66	22.63	21.65	24.26	23.23	22.25
		RB15#10	23.69	22.78	21.87	24.29	23.38	22.47
		RB25#0	22.28	21.71	20.81	22.88	22.31	21.41
10.0	QPSK	RB1#0	23.42	23.35	23.51	24.02	23.95	24.11
		RB1#25	24.43	23.79	22.94	25.03	24.39	23.54
		RB1#49	24.61	23.86	22.39	25.21	24.46	22.99
		RB25#0	23.86	22.54	21.51	24.46	23.14	22.11
		RB25#25	24.05	22.95	21.56	24.65	23.55	22.16
		RB50#0	23.98	22.80	21.50	24.58	23.40	22.10
	16QAM	RB1#0	23.29	23.10	22.21	23.89	23.70	22.81
		RB1#14	24.20	22.89	21.65	24.80	23.49	22.25
		RB1#26	24.62	23.84	22.54	25.22	24.44	23.14
		RB15#0	23.56	22.40	21.47	24.16	23.00	22.07
		RB15#12	23.94	23.01	21.59	24.54	23.61	22.19
		RB27#0	23.76	22.52	21.49	24.36	23.12	22.09

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
15.0	QPSK	RB1#0	23.30	21.20	22.26	23.90	21.80	22.86
		RB1#38	24.30	21.41	20.18	24.90	22.01	20.78
		RB1#74	22.54	22.22	20.16	23.14	22.82	20.76
		RB36#0	21.71	20.18	19.33	22.31	20.78	19.93
		RB36#39	21.50	20.99	18.97	22.10	21.59	19.57
		RB75#0	21.54	20.65	19.11	22.14	21.25	19.71
	16QAM	RB1#0	21.39	20.67	20.38	21.99	21.27	20.98
		RB1#14	21.84	21.04	19.11	22.44	21.64	19.71
		RB1#26	22.39	22.08	19.90	22.99	22.68	20.50
		RB15#0	21.66	20.65	20.37	22.26	21.25	20.97
		RB15#12	21.78	22.08	19.90	22.38	22.68	20.50
		RB27#0	21.76	20.06	19.69	22.36	20.66	20.29
20.0	QPSK	RB1#0	21.19	20.93	22.71	21.79	21.53	23.31
		RB1#50	22.62	21.32	20.19	23.22	21.92	20.79
		RB1#99	21.73	22.31	19.92	22.33	22.91	20.52
		RB50#0	21.64	19.97	20.05	22.24	20.57	20.65
		RB50#50	20.83	21.00	18.82	21.43	21.60	19.42
		RB100#0	21.29	20.60	19.26	21.89	21.20	19.86
	16QAM	RB1#0	21.45	20.19	21.94	22.05	20.79	22.54
		RB1#14	22.13	20.67	19.68	22.73	21.27	20.28
		RB1#26	20.85	21.97	20.30	21.45	22.57	20.90
		RB15#0	21.46	20.20	21.92	22.06	20.80	22.52
		RB15#12	20.84	21.98	20.29	21.44	22.58	20.89
		RB27#0	21.51	19.65	20.49	22.11	20.25	21.09

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band 7: Antenna Gain = 0.60dBi

Limit: EIRP ≤ 33dBm

For 5MHz mode, the channel power is equal to the test result in dBm/5MHz.

For 10MHz mode, the channel power is sum of 10MHz bandwidth, the result is less than 24dBm, so in any 5MHz bandwidth, it will not exceed the limit.

LTE Band 40:

2305-2315MHz

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5.0	QPSK	RB1#0	21.99	21.59	22.52	22.61	22.21	23.14
		RB1#13	21.90	23.07	21.91	22.52	23.69	22.53
		RB1#24	21.52	21.42	21.68	22.14	22.04	22.30
		RB15#0	21.99	21.48	20.52	22.61	22.10	21.14
		RB15#10	21.81	21.41	20.34	22.43	22.03	20.96
		RB25#0	21.92	21.40	20.41	22.54	22.02	21.03
	16QAM	RB1#0	22.21	21.76	20.99	22.83	22.38	21.61
		RB1#13	22.15	21.45	20.46	22.77	22.07	21.08
		RB1#24	21.77	21.57	20.53	22.39	22.19	21.15
		RB15#0	22.08	21.43	20.70	22.70	22.05	21.32
		RB15#10	21.89	21.39	20.44	22.51	22.01	21.06
		RB25#0	20.77	20.23	19.69	21.39	20.85	20.31
10.0	QPSK	RB1#0	/	22.99	/	/	23.61	/
		RB1#25	/	22.46	/	/	23.08	/
		RB1#49	/	22.82	/	/	23.44	/
		RB25#0	/	21.32	/	/	21.94	/
		RB25#25	/	21.18	/	/	21.80	/
		RB50#0	/	21.12	/	/	21.74	/
	16QAM	RB1#0	/	21.74	/	/	22.36	/
		RB1#14	/	21.48	/	/	22.10	/
		RB1#26	/	21.46	/	/	22.08	/
		RB15#0	/	21.75	/	/	22.37	/
		RB15#12	/	21.47	/	/	22.09	/
		RB27#0	/	21.33	/	/	21.95	/

2350-2360MHz

Bandwidth (MHz)	Modulation	RB size/ RB Offset	Conducted Average Output Power (dBm)			EIRP(dBm)		
			Low	Mid	High	Low	Mid	High
5	QPSK	RB1#0	23.25	23.06	23.17	23.87	23.68	23.79
		RB1#13	23.01	22.55	22.67	23.63	23.17	23.29
		RB1#24	22.60	22.67	21.66	23.22	23.29	22.28
		RB15#0	21.75	21.57	21.59	22.37	22.19	22.21
		RB15#10	22.73	21.30	20.87	23.35	21.92	21.49
		RB25#0	22.59	21.28	21.17	23.21	21.90	21.79
	16QAM	RB1#0	21.50	22.02	21.77	22.12	22.64	22.39
		RB1#13	22.44	21.71	21.76	23.06	22.33	22.38
		RB1#24	22.46	21.55	20.67	23.08	22.17	21.29
		RB15#0	21.49	21.99	21.78	22.11	22.61	22.40
		RB15#10	22.47	21.55	20.67	23.09	22.17	21.29
		RB25#0	21.66	21.59	21.53	22.28	22.21	22.15
10	QPSK	RB1#0		22.99		/	23.61	/
		RB1#25		22.57		/	23.19	/
		RB1#49		22.83		/	23.45	/
		RB25#0		21.51		/	22.13	/
		RB25#25		21.28		/	21.90	/
		RB50#0		21.19		/	21.81	/
	16QAM	RB1#0		21.88		/	22.50	/
		RB1#14		21.77		/	22.39	/
		RB1#26		21.53		/	22.15	/
		RB15#0		21.58		/	22.20	/
		RB15#12		21.13		/	21.75	/
		RB27#0		21.51		/	22.13	/

Note: EIRP(dBm) = Conducted Power(dBm) + Antenna Gain(dBi)

For Band 40: Antenna Gain = 0.62dBi

Limit: EIRP ≤ 24dBm/5MHz

For 5MHz mode, the channel power is equal to the test result in dBm/5MHz.

For 10MHz mode, the channel power is sum of 10MHz bandwidth, the result is less than 24dBm, so in any 5MHz bandwidth, it will not exceed the limit.

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	8.46	13
	Middle	8.29	13
	High	8.43	13
GPRS	Low	8.58	13
	Middle	8.52	13
	High	8.43	13
EGPRS	Low	8.32	13
	Middle	8.41	13
	High	8.55	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	8.61	13
	Middle	7.22	13
	High	8.58	13
GPRS	Low	8.32	13
	Middle	8.38	13
	High	8.49	13
EGPRS	Low	8.38	13
	Middle	8.29	13
	High	8.55	13

LTE Band: (pre-scan all bandwidth, the worst case as below)

LTE Band 2 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.03	5.01	5.74	13	Pass
QPSK (100RB Size)	4.32	4.03	4.32	13	Pass
16QAM (1RB Size)	7.33	6.32	7.07	13	Pass
16QAM (27RB Size)	5.71	5.25	5.65	13	Pass

LTE Band 4 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.14	5.48	5.57	13	Pass
QPSK (100RB Size)	4.17	4.26	4.26	13	Pass
16QAM (1RB Size)	5.88	6.55	5.94	13	Pass
16QAM (27RB Size)	5.62	5.51	5.71	13	Pass

LTE Band 5 10MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.26	5.83	6.64	13	Pass
QPSK (50RB Size)	5.33	5.39	5.25	13	Pass
16QAM (1RB Size)	7.36	5.94	6.00	13	Pass
16QAM (27RB Size)	5.65	5.54	5.57	13	Pass

LTE Band 7 20MHz Bandwidth

Modulation	Low channel (dB)	Middle channel (dB)	High channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.61	5.28	3.68	13	Pass
QPSK (100RB Size)	3.80	3.88	3.94	13	Pass
16QAM (1RB Size)	5.39	8.43	4.61	13	Pass
16QAM (27RB Size)	4.70	5.13	4.99	13	Pass

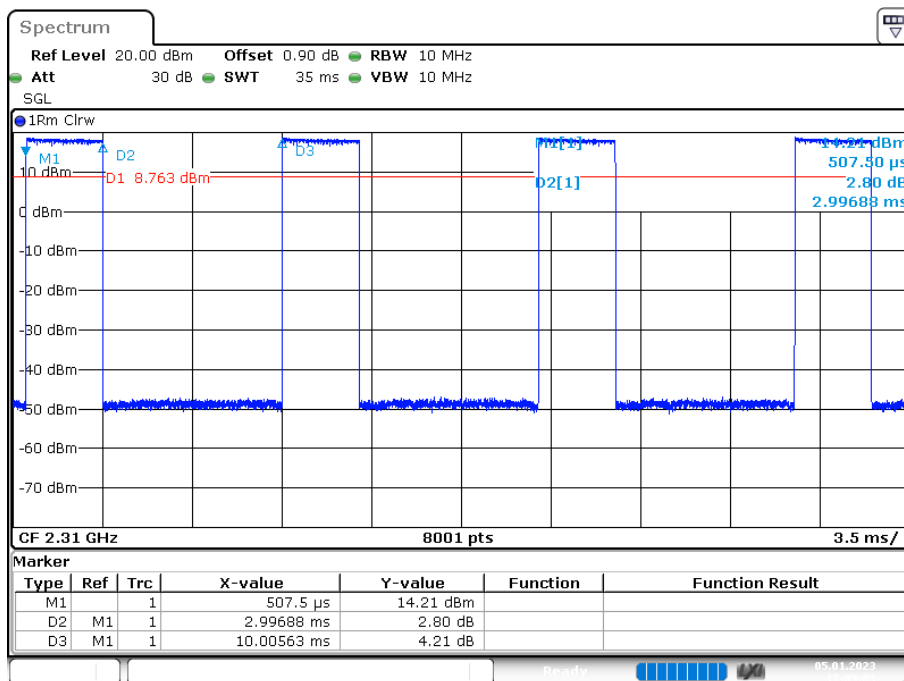
Duty Cycle:**LTE Band 40****2305-2315MHz**

Test Modulation	Test Bandwidth	Ton (ms)	Total (ms)	Duty Cycle (%)	Limit (%)
QPSK	5M	2.997	10.006	29.95	38
	10M	2.997	10.056	29.80	
16-QAM	5M	2.997	10.006	29.95	
	10M	2.997	10.006	29.95	

2350-2360MHz

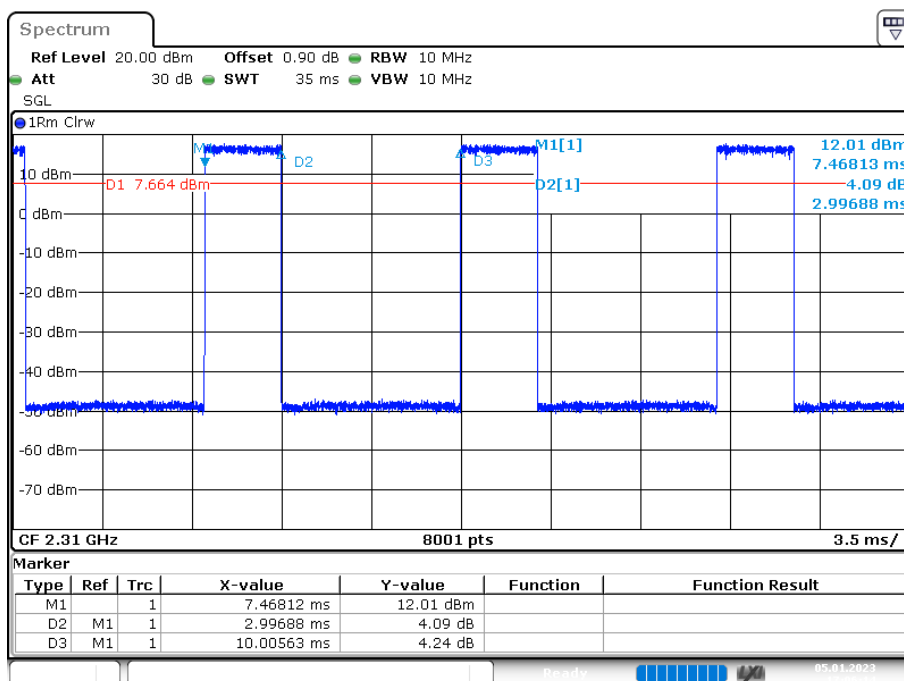
Test Modulation	Test Bandwidth	Ton (ms)	Total (ms)	Duty Cycle (%)	Limit (%)
QPSK	5M	2.997	10.006	29.95	38
	10M	2.997	10.006	29.95	
16-QAM	5M	2.997	10.006	29.95	
	10M	2.993	10.001	29.93	

LTE Band 40_5M_QPSK_(2305-2315)MHz



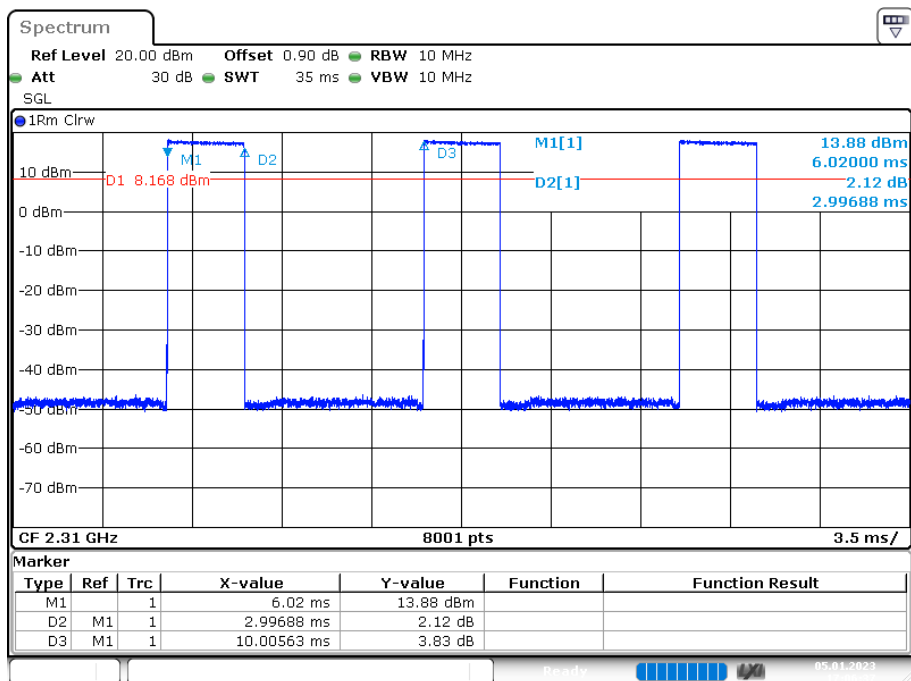
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LTE Band 40_5M_16QAM_(2305-2315)MHz



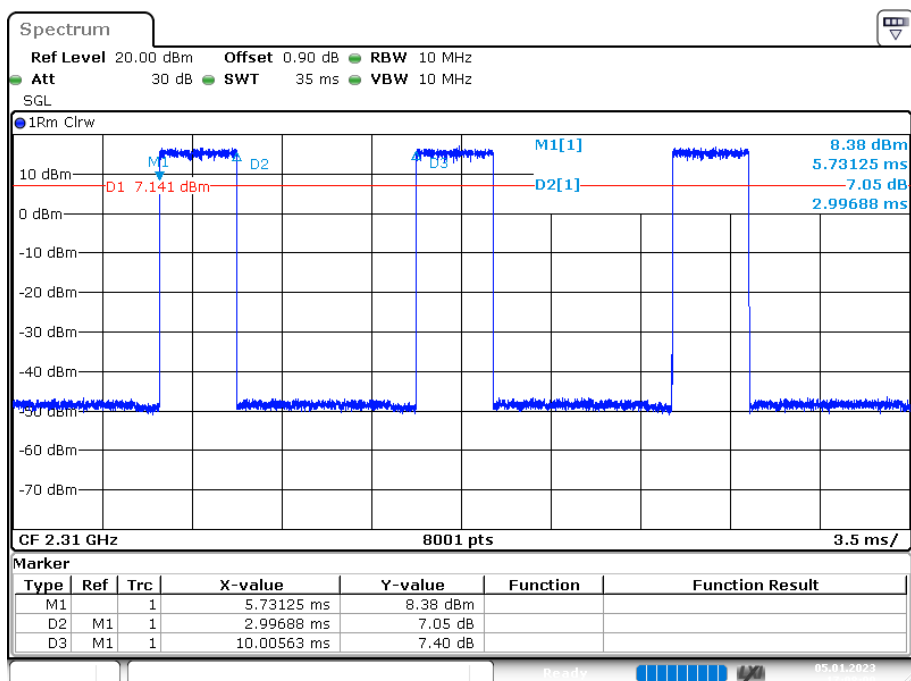
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LTE Band 40_10M_QPSK_(2305-2315)MHz



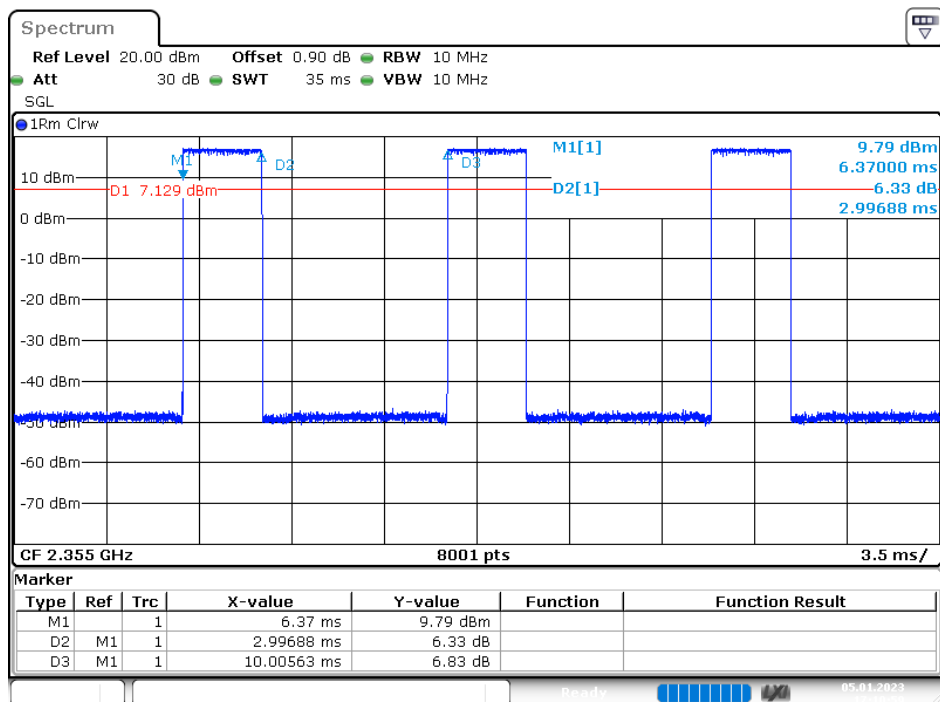
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LTE Band 40_10M_16QAM_(2305-2315)MHz



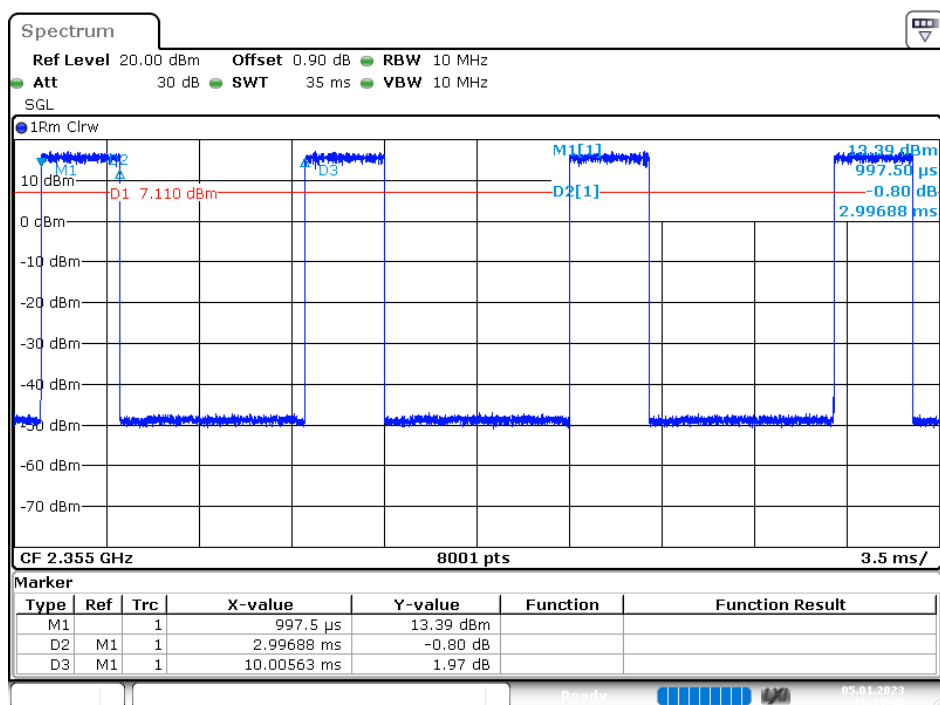
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LTE Band 40_5M_QPSK_(2350-2360)MHz



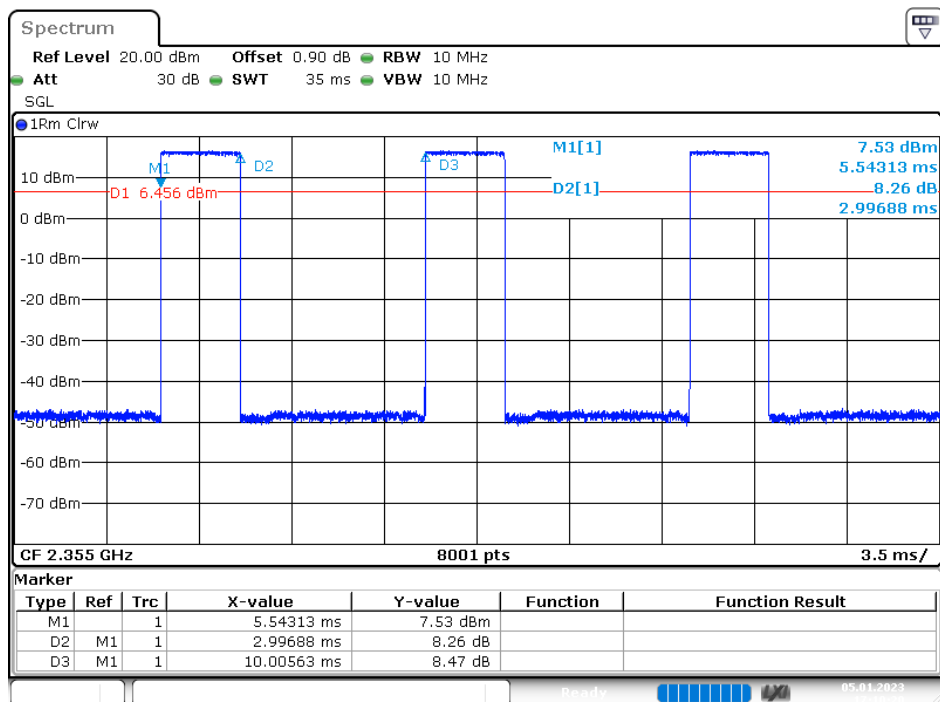
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LTE Band 40_5M_16QAM_(2350-2360)MHz



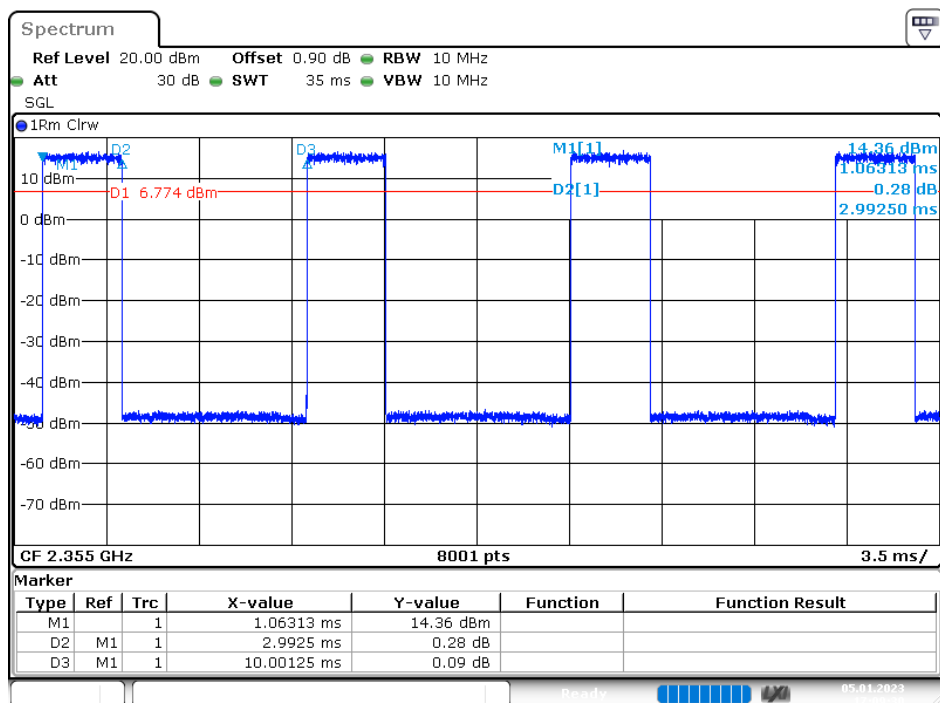
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LTE Band 40_10M_QPSK_(2350-2360)MHz



Date: 5.JAN.2023 17:10:20

LTE Band 40_10M_16QAM_(2350-2360)MHz



Date: 5.JAN.2023 17:09:30

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

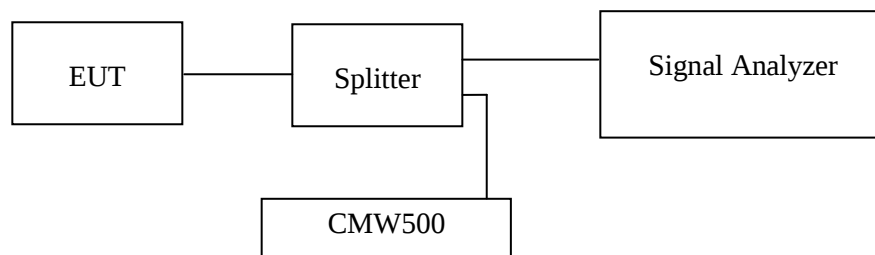
Applicable Standard

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

Test Procedure

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.



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range has including in test plot.

Test Data

Environmental Conditions

Temperature:	24°C
Relative Humidity:	56-60 %
ATM Pressure:	101.0 kPa

The testing was performed by Jesse Chen from 2022-12-16 to 2023-01-17.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	128	824.2	237.76	311.00
	190	836.6	238.76	311.00
	251	848.8	239.76	314.00
GPRS(GMSK)	128	824.2	238.76	318.00
	190	836.6	237.76	317.00
	251	848.8	237.76	318.00
EGPRS(8PSK)	128	824.2	231.77	312.00
	190	836.6	230.77	313.00
	251	848.8	230.77	312.00

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	512	1850.2	237.76	317.00
	661	1880.0	240.76	313.00
	810	1909.8	242.76	318.00
GPRS(GMSK)	512	1850.2	240.76	318.00
	661	1880.0	240.76	319.00
	810	1909.8	241.76	319.00
EGPRS(8PSK)	512	1850.2	238.76	316.00
	661	1880.0	237.76	316.00
	810	1909.8	241.76	315.00

LTE Band 2:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.108	1.278	1.096	1.314	1.108	1.332
	16QAM	1.102	1.308	1.102	1.326	1.096	1.338
3 MHz	QPSK	2.695	2.916	2.683	2.940	2.695	2.916
	16QAM	2.683	2.904	2.683	2.916	2.695	2.940
5 MHz	QPSK	4.511	4.980	4.491	4.940	4.531	4.980
	16QAM	4.511	4.960	4.511	5.020	4.491	4.960
10 MHz	QPSK	8.942	9.640	8.942	9.560	8.942	9.720
	16QAM	4.551	5.200	4.511	5.080	4.511	5.240
15 MHz	QPSK	13.473	14.580	13.413	14.520	13.533	14.640
	16QAM	4.611	5.280	4.551	5.340	4.551	5.280
20 MHz	QPSK	17.884	19.120	17.884	19.120	17.964	19.040
	16QAM	4.551	5.200	4.551	5.200	4.551	5.280

LTE Band 4:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.102	1.302	1.108	1.284	1.096	1.290
	16QAM	1.096	1.278	1.102	1.284	1.096	1.296
3 MHz	QPSK	2.695	2.916	2.683	2.904	2.695	2.904
	16QAM	2.683	2.904	2.683	2.904	2.683	2.916
5 MHz	QPSK	4.511	4.980	4.511	4.960	4.511	5.000
	16QAM	4.531	5.000	4.511	5.000	4.511	4.960
10 MHz	QPSK	8.942	9.600	8.942	9.600	8.942	9.720
	16QAM	4.551	5.160	4.511	5.120	4.551	5.200
15 MHz	QPSK	13.473	14.460	13.473	14.580	13.473	14.640
	16QAM	4.551	5.220	4.551	5.280	4.551	5.340
20 MHz	QPSK	17.964	19.120	17.884	19.200	17.884	19.040
	16QAM	4.551	5.200	4.551	5.200	4.551	5.280

LTE Band 5:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
1.4 MHz	QPSK	1.096	1.278	1.096	1.296	1.108	1.278
	16QAM	1.096	1.302	1.096	1.278	1.102	1.278
3 MHz	QPSK	2.695	2.904	2.683	2.916	2.683	2.904
	16QAM	2.683	2.892	2.683	2.904	2.683	2.916
5 MHz	QPSK	4.491	4.960	4.511	5.000	4.511	4.980
	16QAM	4.511	5.000	4.491	4.940	4.511	4.960
10 MHz	QPSK	8.942	9.640	8.942	9.640	8.942	9.720
	16QAM	4.551	5.200	4.511	5.120	4.551	5.200

LTE Band 7:

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.511	5.000	4.511	4.980	4.531	5.000
	16QAM	4.531	5.000	4.531	5.000	4.511	4.980
10 MHz	QPSK	8.942	9.680	8.942	9.760	8.982	9.600
	16QAM	4.551	5.240	4.551	5.320	4.551	5.200
15 MHz	QPSK	13.473	14.580	13.533	14.640	13.473	14.580
	16QAM	4.551	7.200	4.551	5.280	4.551	5.280
20 MHz	QPSK	17.884	19.040	17.964	19.120	17.884	19.120
	16QAM	4.551	5.200	4.551	5.280	4.551	5.280

LTE Band 40**2305-2315MHz**

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.511	4.900	4.511	4.980	4.511	4.940
	16QAM	4.491	4.920	4.511	4.980	4.511	5.080
10 MHz	QPSK	/	/	8.942	9.720	/	/
	16QAM	/	/	4.551	5.160	/	/

2350-2360MHz

Bandwidth	Modulation	Low channel		Middle channel		High channel	
		OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)	OBW (MHz)	26dB EBW (MHz)
5 MHz	QPSK	4.491	4.900	4.511	4.980	4.511	4.920
	16QAM	4.511	4.960	4.511	4.920	4.491	5.000
10 MHz	QPSK	/	/	8.942	9.640	/	/
	16QAM	/	/	4.591	5.200	/	/

The test plots please refer to the Appendix A.

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

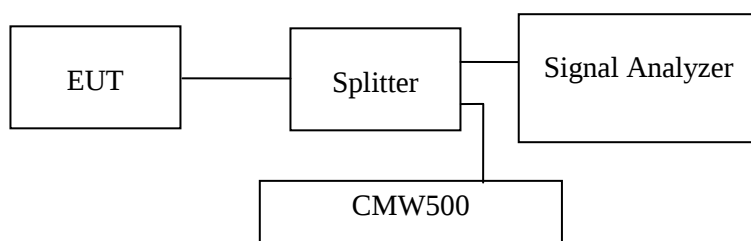
Applicable Standard

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

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 10th harmonic.



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range has including in test plot.

Test Data

Environmental Conditions

Temperature:	24°C
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Jesse Chen on 2023-02-07.

EUT operation mode: Transmitting

Test result: Pass.

The test plots 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

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:	21~24 °C
Relative Humidity:	49~55 %
ATM Pressure:	101.0 kPa

The testing was performed by Jimi Zheng from 2022-12-23 to 2022-12-26.

EUT operation mode: Transmitting

(Pre-scan in the X,Y and Z axes of orientation, the worst case Y-axes of orientation was recorded)

The worst case is as below:

Cellular Band (Part 22H)

30MHz-10GHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
GSM850, Low Channel									
56.35	-75.48	PK	138	1.7	H	4.6	-70.88	-13	-57.88
678.77	-81.36	PK	283	1.1	V	8.75	-72.61	-13	-59.61
1648.4	-53.03	PK	138	1.7	H	3.52	-49.51	-13	-36.51
1648.4	-55.57	PK	283	1.1	V	3.1	-52.47	-13	-39.47
GSM850, Middle Channel									
56.35	-73.78	PK	298	1.1	H	4.6	-69.18	-13	-56.18
678.77	-80.02	PK	65	2.0	V	8.75	-71.27	-13	-58.27
1673.2	-52.64	PK	225	1.5	H	3.78	-48.86	-13	-35.86
1673.2	-54.53	PK	176	1.7	V	3.1	-51.43	-13	-38.43
GSM850, High Channel									
56.35	-74.44	PK	248	1.1	H	4.6	-69.84	-13	-56.84
678.77	-78.81	PK	163	1.8	V	8.75	-70.06	-13	-57.06
1697.6	-52.11	PK	131	1.6	H	4.07	-48.04	-13	-35.04
1697.6	-53.26	PK	119	1.1	V	3.1	-50.16	-13	-37.16

PCS Band (Part 24E)

30MHz-20GHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
PCS1900, Low Channel									
56.35	-72.19	PK	157	1.6	H	4.6	-67.59	-13	-54.59
678.77	-78.78	PK	340	1.4	V	8.75	-70.03	-13	-57.03
3700.4	-58.59	PK	304	1.4	H	8.11	-50.48	-13	-37.48
3700.4	-60.01	PK	242	1.2	V	7.6	-52.41	-13	-39.41
PCS1900, Middle Channel									
56.35	-72.89	PK	217	1.9	H	4.6	-68.29	-13	-55.29
678.77	-78.91	PK	128	1.3	V	8.75	-70.16	-13	-57.16
3760	-58.62	PK	85	2.0	H	8.84	-49.78	-13	-36.78
3760	-59.32	PK	11	1.0	V	7.96	-51.36	-13	-38.36
PCS1900, High Channel									
56.35	-73.79	PK	183	1.7	H	4.6	-69.19	-13	-56.19
678.77	-79.79	PK	131	1.2	V	8.75	-71.04	-13	-58.04
3819.6	-57.82	PK	92	1.5	H	8.68	-49.14	-13	-36.14
3819.6	-58.30	PK	287	1.9	V	7.96	-50.34	-13	-37.34

LTE Bands: (pre-scan all bandwidth/modulation, the worst case as below)

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
LTE BAND2									
Test frequency range: 30MHz-20GHz									
1.4MHz bandwidth, QPSK, Low Channel									
56.35	-73.94	PK	331	1.8	H	4.6	-69.34	-13	-56.34
678.77	-79.89	PK	237	1.6	V	8.75	-71.14	-13	-58.14
3701.4	-52.74	PK	129	1.0	H	8.12	-44.62	-13	-31.62
3701.4	-63.75	PK	71	1.7	V	7.61	-56.14	-13	-43.14
1.4MHz bandwidth, QPSK, Middle Channel									
56.35	-74.64	PK	50	1.5	H	4.6	-70.04	-13	-57.04
678.77	-79.88	PK	157	1.9	V	8.75	-71.13	-13	-58.13
3760	-51.84	PK	81	2.0	H	8.84	-43.00	-13	-30.00
3760	-63.22	PK	170	2.2	V	7.96	-55.26	-13	-42.26
1.4MHz bandwidth, QPSK, High Channel									
56.35	-73.71	PK	290	1.3	H	4.6	-69.11	-13	-56.11
678.77	-79.24	PK	84	1.5	V	8.75	-70.49	-13	-57.49
3818.6	-51.15	PK	2	2.1	H	8.67	-42.48	-13	-29.48
3818.6	-61.10	PK	63	2.1	V	7.95	-53.15	-13	-40.15
LTE BAND4									
Test frequency range: 30MHz-20GHz									
1.4MHz bandwidth, QPSK,									
56.35	-72.67	PK	238	1.9	H	4.6	-68.07	-13	-55.07
678.77	-79.08	PK	254	1.0	V	8.75	-70.33	-13	-57.33
3421.4	-59.62	PK	86	1.9	H	6.37	-53.25	-13	-40.25
3421.4	-58.91	PK	296	1.4	V	5.7	-53.21	-13	-40.21
1.4MHz bandwidth, QPSK, Middle Channel									
56.35	-73.73	PK	107	1.9	H	4.6	-69.13	-13	-56.13
678.77	-80.69	PK	45	1.6	V	8.75	-71.94	-13	-58.94
3465	-59.07	PK	229	1.5	H	6.96	-52.11	-13	-39.11
3465	-58.22	PK	5	1.0	V	6.22	-52.00	-13	-39.00
1.4MHz bandwidth, QPSK, High Channel									
56.35	-71.88	PK	337	1.7	H	4.6	-67.28	-13	-54.28
678.77	-78.88	PK	259	2.1	V	8.75	-70.13	-13	-57.13
3508.6	-58.27	PK	40	1.8	H	7.78	-50.49	-13	-37.49
3508.6	-57.63	PK	237	1.9	V	6.57	-51.06	-13	-38.06

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
LTE BAND5									
Test frequency range: 30MHz-10GHz									
1.4MHz bandwidth, QPSK, Low Channel									
56.35	-72.88	PK	297	1.8	H	4.6	-68.28	-13	-55.28
678.77	-78.07	PK	237	1.5	V	8.75	-69.32	-13	-56.32
1649.4	-44.67	PK	357	1.1	H	3.51	-41.16	-13	-28.16
1649.4	-50.97	PK	316	1.6	V	3.1	-47.87	-13	-34.87
1.4MHz bandwidth, QPSK, Middle Channel									
56.35	-71.83	PK	131	1.9	H	4.6	-67.23	-13	-54.23
678.77	-78.13	PK	14	2.1	V	8.75	-69.38	-13	-56.38
1673	-43.76	PK	149	2.0	H	3.78	-39.98	-13	-26.98
1673	-50.29	PK	164	2.0	V	3.1	-47.19	-13	-34.19
1.4MHz bandwidth, QPSK, High Channel									
56.35	-72.72	PK	336	1.9	H	4.6	-68.12	-13	-55.12
678.77	-78.94	PK	167	1.8	V	8.75	-70.19	-13	-57.19
1696.6	-43.57	PK	252	2.0	H	4.06	-39.51	-13	-26.51
1696.6	-48.18	PK	167	1.8	V	3.1	-45.08	-13	-32.08
LTE BAND7									
Test frequency range: 30MHz-26.5GHz									
5MHz bandwidth, QPSK, Low Channel									
56.35	-70.96	PK	297	1.8	H	4.6	-66.36	-25	-41.36
678.77	-77.26	PK	237	1.5	V	8.75	-68.51	-25	-43.51
5005	-59.1	PK	357	1.1	H	10.83	-48.27	-25	-23.27
5005	-59.8	PK	316	1.6	V	10.16	-49.64	-25	-24.64
5MHz bandwidth, QPSK, Middle Channel									
56.35	-71.71	PK	131	1.9	H	4.6	-67.11	-25	-42.11
678.77	-77.4	PK	14	2.1	V	8.75	-68.65	-25	-43.65
5070	-59.61	PK	149	2	H	11.14	-48.47	-25	-23.47
5070	-60.1	PK	164	2	V	10.78	-49.32	-25	-24.32
5MHz bandwidth, QPSK, High Channel									
56.35	-71.28	PK	336	1.9	H	4.6	-66.68	-25	-41.68
678.77	-77.01	PK	167	1.8	V	8.75	-68.26	-25	-43.26
5135	-59.79	PK	252	2	H	11.34	-48.45	-25	-23.45
5135	-60.29	PK	167	1.8	V	10.76	-49.53	-25	-24.53

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Absolute Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	Reading (dBuV)	PK/Ave		Height (m)	Polar (H/V)				
LTE BAND 40 (2305-2315MHz)									
Test frequency range: 30MHz-24GHz									
5MHz bandwidth, QPSK, Low Channel									
56.35	-71.88	PK	237	1.9	H	4.6	-67.28	-40	-27.28
678.77	-78.91	PK	290	1.3	V	8.75	-70.16	-40	-30.16
4615	-58.03	PK	84	1.5	H	10.46	-47.57	-40	-7.57
4615	-58.43	PK	26	1.6	V	10.1	-48.33	-40	-8.33
5MHz bandwidth, QPSK, Middle Channel									
56.35	-72.63	PK	316	1.6	H	4.6	-68.03	-40	-28.03
678.77	-79.79	PK	238	1.9	V	8.75	-71.04	-40	-31.04
4620	-56.77	PK	254	1	H	10.48	-46.29	-40	-6.29
4620	-58.06	PK	285	1.2	V	10.1	-47.96	-40	-7.96
5MHz bandwidth, QPSK, High Channel									
56.35	-73.79	PK	164	2	H	4.6	-69.19	-40	-29.19
678.77	-79.09	PK	107	1.9	V	8.75	-70.34	-40	-30.34
4625	-56.04	PK	45	1.6	H	10.5	-45.54	-40	-5.54
4625	-56.71	PK	92	1.9	V	10.1	-46.61	-40	-6.61
LTE BAND 40 (2350-2360MHz)									
Test frequency range: 30MHz-24GHz									
5MHz bandwidth, QPSK, Low Channel									
56.35	-72.94	PK	167	1.8	H	4.6	-68.34	-40	-28.34
678.77	-78.94	PK	337	1.7	V	8.75	-70.19	-40	-30.19
4705	-60.02	PK	259	2.1	H	10.9	-49.12	-40	-9.12
4705	-57.29	PK	222	2.1	V	10.01	-47.28	-40	-7.28
5MHz bandwidth, QPSK, Middle Channel									
56.35	-73.67	PK	317	1.5	H	4.6	-69.07	-40	-29.07
678.77	-79.3	PK	297	1.8	V	8.75	-70.55	-40	-30.55
4710	-59.11	PK	237	1.5	H	10.9	-48.21	-40	-8.21
4710	-56.54	PK	51	1.5	V	10.02	-46.52	-40	-6.52
5MHz bandwidth, QPSK, High Channel									
56.35	-71.89	PK	340	1.7	H	4.6	-67.29	-40	-27.29
678.77	-78.13	PK	131	1.9	V	8.75	-69.38	-40	-29.38
4715	-57.52	PK	14	2.1	H	10.9	-46.62	-40	-6.62
4715	-54.62	PK	267	1.5	V	10.03	-44.59	-40	-4.59

Note:

Absolute Level = Reading Level + Substituted Factor

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

Margin = Absolute Level - Limit

FCC§ 22.917 (a);§ 24.238 (a); §27.53(g) (h)(m) - 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.

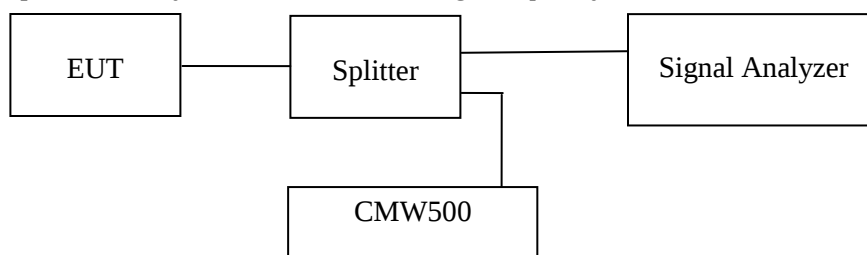
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to FCC §27.53(g) (h)(m), 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.

Test Procedure

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

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



Note: the worst path loss (cable loss and splitter inset loss) among the test frequency range has including in test plot.

Test Data**Environmental Conditions**

Temperature:	24 °C
Relative Humidity:	54-60 %
ATM Pressure:	101.0 kPa

The testing was performed by Jesse Chen from 2022-12-16 to 2023-01-17.

EUT operation mode: Transmitting (Worst case)

Test Result: Pass

Please refer to the following plots.

The test plots 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

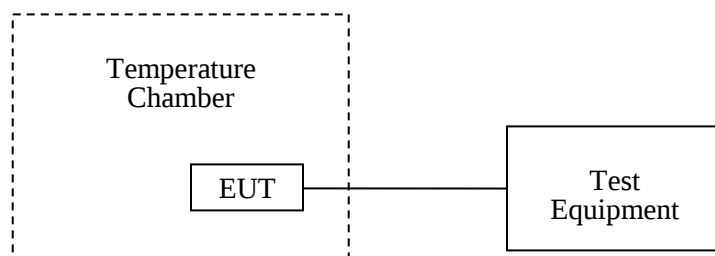
According to §24.235&§27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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°C
Relative Humidity:	56-60 %
ATM Pressure:	101.0 kPa

The testing was performed by Jesse Chen from 2022-12-14 to 2023-01-05.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

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

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	17.16	0.0205	2.5
-20		9.55	0.0114	2.5
-10		2.63	0.0031	2.5
0		1.48	0.0018	2.5
10		-2.69	-0.0032	2.5
20		-6.35	-0.0076	2.5
30		-2.44	-0.0029	2.5
40		-1.72	-0.0021	2.5
50		3.18	0.0038	2.5
20	L.V.	3.49	0.0042	2.5
	H.V.	4.06	0.0049	2.5

EDGE Mode

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	10.97	0.0131	2.5
-20		7.43	0.0089	2.5
-10		-1.14	-0.0014	2.5
0		-3.93	-0.0047	2.5
10		3.83	0.0046	2.5
20		-5.32	-0.0064	2.5
30		-4.34	-0.0052	2.5
40		-3.28	-0.0039	2.5
50		1.28	0.0015	2.5
20	L.V.	1.38	0.0016	2.5
	H.V.	1.76	0.0021	2.5

PCS Band (Part 24E)**GSM Mode**

Middle Channel, $f_0 = 1880.0\text{ MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	5.92	0.0032	pass
-20		0.70	0.0004	pass
-10		-8.20	-0.0044	pass
0		-9.69	-0.0052	pass
10		-8.83	-0.0047	pass
20		-15.64	-0.0083	pass
30		-8.04	-0.0043	pass
40		-11.84	-0.0063	pass
50		-14.49	-0.0077	pass
20	L.V.	-13.77	-0.0073	pass
	H.V.	-13.03	-0.0069	pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	-2.67	-0.0014	pass
-20		-3.66	-0.0019	pass
-10		-11.34	-0.0060	pass
0		-11.92	-0.0063	pass
10		-9.26	-0.0049	pass
20		-16.54	-0.0088	pass
30		-7.87	-0.0042	pass
40		-16.53	-0.0088	pass
50		-12.19	-0.0065	pass
20	L.V.	-12.09	-0.0064	pass
	H.V.	-11.45	-0.0061	pass

LTE:**QPSK:****Band 2:**

10MHz Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	-4.08	-0.0022	pass
-20		-5.14	-0.0027	pass
-10		-9.7	-0.0052	pass
0		-10.09	-0.0054	pass
10		-14.13	-0.0075	pass
20		-14.78	-0.0079	pass
30		-14.84	-0.0079	pass
40		-8.51	-0.0045	pass
50		-14.72	-0.0078	pass
20	L.V.	-14.56	-0.0077	pass
	H.V.	-13.93	-0.0074	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1710.1239	1754.8795	1710	1755
-20		1710.1233	1754.8802	1710	1755
-10		1710.1209	1754.8822	1710	1755
0		1710.1179	1754.8844	1710	1755
10		1710.1196	1754.8852	1710	1755
20		1710.1253	1754.8827	1710	1755
30		1710.1218	1754.8813	1710	1755
40		1710.1221	1754.8847	1710	1755
50		1710.1246	1754.8841	1710	1755
20	L.V.	1710.1194	1754.8878	1710	1755
	H.V.	1710.1154	1754.8816	1710	1755

Band 5:

10.0 MHz Middle Channel, f ₀ = 836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	5.43	0.0065	2.5
-20		2.61	0.0031	2.5
-10		-6.89	-0.0082	2.5
0		-6.97	-0.0083	2.5
10		-5.65	-0.0068	2.5
20		-6.85	-0.0082	2.5
30		-5.44	-0.0065	2.5
40		-0.33	-0.0004	2.5
50		-4.07	-0.0049	2.5
20	L.V.	-3.98	-0.0048	2.5
	H.V.	-3.55	-0.0042	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.0656	2569.9765	2500	2570
-20		2500.0656	2569.9681	2500	2570
-10		2500.0609	2569.9789	2500	2570
0		2500.0597	2569.9752	2500	2570
10		2500.0436	2569.9724	2500	2570
20		2500.0484	2569.9735	2500	2570
30		2500.0464	2569.9675	2500	2570
40		2500.0431	2569.9713	2500	2570
50		2500.0416	2569.9712	2500	2570
20	L.V.	2500.0476	2569.9734	2500	2570
	H.V.	2500.0527	2569.9761	2500	2570

Band 40 (2305-2315MHz):

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2305.1362	2314.9338	2305	2315
-20		2305.1371	2314.9324	2305	2315
-10		2305.1349	2314.9312	2305	2315
0		2305.1283	2314.9363	2305	2315
10		2305.1387	2314.9311	2305	2315
20		2305.1288	2314.9357	2305	2315
30		2305.1214	2314.9412	2305	2315
40		2305.1266	2314.9364	2305	2315
50		2305.1282	2314.9376	2305	2315
20	L.V.	2305.1332	2314.9343	2305	2315
	H.V.	2305.1215	2314.9331	2305	2315

Band 40 (2350-2360MHz):

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2350.1791	2359.9335	2350	2360
-20		2350.1691	2359.9324	2350	2360
-10		2350.1616	2359.9273	2350	2360
0		2350.1494	2359.9322	2350	2360
10		2350.1373	2359.9316	2350	2360
20		2350.1296	2359.9315	2350	2360
30		2350.1184	2359.9327	2350	2360
40		2350.1212	2359.9333	2350	2360
50		2350.2016	2359.9365	2350	2360
20	L.V.	2350.1675	2359.9322	2350	2360
	H.V.	2350.1592	2359.9274	2350	2360

16QAM:**Band 2:**

10MHz Middle Channel, f ₀ =1880.0 MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	N.V.	12.84	0.0068	pass
-20		6.77	0.0036	pass
-10		-0.66	-0.0004	pass
0		2.02	0.0011	pass
10		-3.58	-0.0019	pass
20		-6.7	-0.0036	pass
30		-2.42	-0.0013	pass
40		-1.78	-0.0009	pass
50		2.2	0.0012	pass
20	L.V.	2.29	0.0012	pass
	H.V.	2.75	0.0015	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	1710.2804	1754.7617	1710	1755
-20		1710.2763	1754.7712	1710	1755
-10		1710.2749	1754.7668	1710	1755
0		1710.2763	1754.7669	1710	1755
10		1710.2757	1754.7684	1710	1755
20		1710.2738	1754.7739	1710	1755
30		1710.274	1754.7676	1710	1755
40		1710.277	1754.7707	1710	1755
50		1710.2738	1754.7713	1710	1755
20	L.V.	1710.2747	1754.7673	1710	1755
	H.V.	1710.2792	1754.7639	1710	1755

Band 5:

10.0 MHz Middle Channel, f ₀ = 836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	N.V.	29.47	0.0352	2.5
-20		20.09	0.0240	2.5
-10		12.23	0.0146	2.5
0		9.45	0.0113	2.5
10		11.18	0.0134	2.5
20		6.11	0.0073	2.5
30		9.32	0.0111	2.5
40		12.37	0.0148	2.5
50		9.43	0.0113	2.5
20	L.V.	10.21	0.0122	2.5
	H.V.	10.51	0.0126	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2500.0576	2569.8691	2500	2570
-20		2500.0546	2569.8606	2500	2570
-10		2500.0599	2569.8675	2500	2570
0		2500.0607	2569.8622	2500	2570
10		2500.0526	2569.8694	2500	2570
20		2500.0564	2569.8665	2500	2570
30		2500.0504	2569.8635	2500	2570
40		2500.0412	2569.8623	2500	2570
50		2500.0446	2569.8702	2500	2570
20	L.V.	2500.0496	2569.8674	2500	2570
	H.V.	2500.0597	2569.8681	2500	2570

Band 40 (2305-2315MHz):

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2305.1533	2314.9331	2305	2315
-20		2305.1545	2314.9395	2305	2315
-10		2305.1425	2314.9354	2305	2315
0		2305.1324	2314.9332	2305	2315
10		2305.1196	2314.9359	2305	2315
20		2305.1262	2314.9361	2305	2315
30		2305.2061	2314.9235	2305	2315
40		2305.1959	2314.9235	2305	2315
50		2305.1904	2314.9294	2305	2315
20	L.V.	2305.1692	2314.9373	2305	2315
	H.V.	2305.1625	2314.9342	2305	2315

Band 40 (2350-2360MHz):

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	N.V.	2350.1513	2359.9341	2350	2360
-20		2350.1523	2359.9263	2350	2360
-10		2350.1404	2359.9264	2350	2360
0		2350.1348	2359.9296	2350	2360
10		2350.1223	2359.9333	2350	2360
20		2350.1231	2359.9292	2350	2360
30		2350.1986	2359.9286	2350	2360
40		2350.1603	2359.9296	2350	2360
50		2350.1875	2359.9265	2350	2360
20	L.V.	2350.1696	2359.9334	2350	2360
	H.V.	2350.1588	2359.9283	2350	2360

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