



FCC TEST REPORT

FCC ID: 2AXZU-GSDTPM7E31

On Behalf of

E.R.M ELECTRONIC SYSTEMS LTD

GPS 4G Tracker Self-Powered Shadow (CATM)

Model No.: GSDTPM7e31

Prepared for : E.R.M ELECTRONIC SYSTEMS LTD
Address : Ha'Sar Shapira 16, Rishon Le'Zion, Israel

Prepared By : Shenzhen PSI Testing Co., Ltd.
Address : 1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road,
Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Report Number : psi2506117-C01-R06
Date of Receipt : June 23, 2025
Date of Test : June 23, 2025-July 25, 2025
Date of Report : July 28, 2025
Version Number : V0

TABLE OF CONTENTS

	Description	Page
1	TEST SUMMARY	5
2	GENERAL INFORMATION	6
2.1	GENERAL DESCRIPTION OF EUT	6
2.2	RELATED SUBMITTAL(S) / GRANT (S)	7
2.3	TEST METHODOLOGY	7
2.4	TEST FACILITY	7
2.5	ACCESSORIES OF DEVICE (EUT)	7
2.6	TESTED SUPPORTING SYSTEM DETAILS	7
2.7	TEST CONDITIONS	7
2.8	MEASUREMENT UNCERTAINTY	8
3	TEST INSTRUMENTS LIST	9
4	SYSTEM TEST CONFIGURATION	10
4.1	TEST MODE	10
4.2	CONFIGURATION OF TESTED SYSTEM	10
4.3	TRANSMITTER RADIATED POWER (EIRP/ERP)	11
4.4	PEAK-TO-AVERAGE RATIO	16
4.5	OCCUPY BANDWIDTH	18
4.6	MODULATION CHARACTERISTIC	20
4.7	OUT OF BAND EMISSION AT ANTENNA TERMINALS	20
4.8	FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT	21
4.9	FREQUENCY STABILITY	29
5	PHOTOS OF TEST SETUP	36
6	PHOTOS OF EUT	36

TEST REPORT DECLARATION

Applicant : E.R.M ELECTRONIC SYSTEMS LTD
Address : Ha'Sar Shapira 16, Rishon Le'Zion, Israel
Manufacturer : E.R.M ELECTRONIC SYSTEMS LTD
Address : Ha'Sar Shapira 16, Rishon Le'Zion, Israel
EUT Description : GPS 4G Tracker Self-Powered Shadow (CATM)
(A) Model No. : GSDTPM7e31
(B) Trademark : N/A

Measurement Standard Used:

FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 24 Subpart E
FCC CFR Title 47 Part 27
ANSI C63.26:2015
Test Result: PASS

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....:

Felix Pang

Test Engineer


.....

Approved by (name + signature).....:

Simple Guan

Project Manager


.....

Date of issue.....:

July 28, 2025

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 28, 2025	Initial released Issue	Felix Pang



1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to RF Exposure)
Transmitter Radiated Power (EIRP/ERP)	Part 2.1046 Part 24.232 (c) Part 27.50 (d)(4) Part 27.50 (h)/(c)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 24.232 (d) Part 27.50(d) Part 27.50 (c)	Pass
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 24.238 Part 27.53(a)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Frequency stability	Part 2.1055(a)(1)(b) Part 2.1055(d)(1)(2) Part 27.54	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard.

2. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

3. N/A indicates not applicable.

2 General Information

2.1 General Description of EUT

Description of Device (EUT)

Description : GPS 4G Tracker Self-Powered Shadow (CATM)
Model Number : GSDTPM7e31
Diff : N/A
Test Voltage : DC 12V/24V from adapter, DC 3.0V from battery

Support Networks	: NB-IOT
Support Band	: FDD LTE B2/B4/B12
SCS	: 3.75KHz, 15KHz
Modulation Mode	: BPSK, QPSK
TX Frequency	LTE Band 2: 1850.1~1909.9MHz LTE Band 4: 1710.1~1754.9MHz LTE Band 12: 699.1~715.9MHz
Antenna type	: PCB Antenna
Antenna Type	: Maximum Gain is 0.85dBi for Band 2 Maximum Gain is 0.79dBi for Band 4 Maximum Gain is 0.24dBi for Band 12
Software version	: V1.0
Hardware version	: V1.0
Note	: Antenna information is provided by applicant. Testing lab is not responsible for the accuracy of the information.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 27 and Part 24 subpart E of the FCC CFR 47 Rules.

2.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

2.4 Test Facility

Shenzhen PSI Testing Co., Ltd.
1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 21, 2023 File on Federal Communication Commission
Registration Number: 916281

September 21, 2023 Certificated by IC
Registration Number: 31123
CAB identifier: CN0158

2.5 Accessories of Device (EUT)

Accessories : N/A
Manufacturer : N/A
Model : N/A
Ratings : N/A

2.6 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification
1.	N/A	N/A	N/A	N/A	N/A

2.7 Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	26℃
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	101kPa

2.8 Measurement Uncertainty

(95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.17dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	2.74dB(Polarize: V)
	2.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31dB(Polarize: V)
	4.30dB(Polarize: H)
Uncertainty for radio frequency	48.24KHz
Uncertainty for conducted RF Power	0.41dB
Uncertainty for Power Spectral Density	0.39 dB
Occupied-Bandwidth	968Hz
Conducted-Spurious Emission	1.26dB

3 Test Instruments list

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2022.12.20	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2024.12.18	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV216	102282	/	2024.12.18	1 Year
4.	L.I.S.N.#2	RFT	NNB111	13835240	/	2024.12.18	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2025.01.02	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2025.01.02	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101648	3.70	2024.12.18	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2025.01.02	2 Year
9.	Amplifier	SKET	LAPA_01G1 8G-45dB	SK20220329 01	/	2024.12.18	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2024.12.31	2 Year
11.	Amplifier	SKET	LNPA_0118 G-45	SK20200108 01	/	2024.12.18	1 Year
12.	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.02 -1111533-Fz	/	2024.12.18	1 Year
13.	RF Sensor Unit	Tachoy	TR1029-2	20220428P0 08	/	2024.12.18	1 Year
14.	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2024.12.18	1 Year
15.	Temp. & Humid Chamber	Auchno	9606	/	/	2024.12.18	1 Year
16.	Regulated DC Power Supply	Xinouhua	ADC120V10 A	20221125163 8	/	2024.12.18	1 Year
For Test Software Information							
Item	Software Name	Manufacturer			Version		
RE	EZ EMC	Farad			PSI-3A1		
CE	EZ EMC	Farad			PSI-3A1		

4 System test configuration

4.1 Test mode

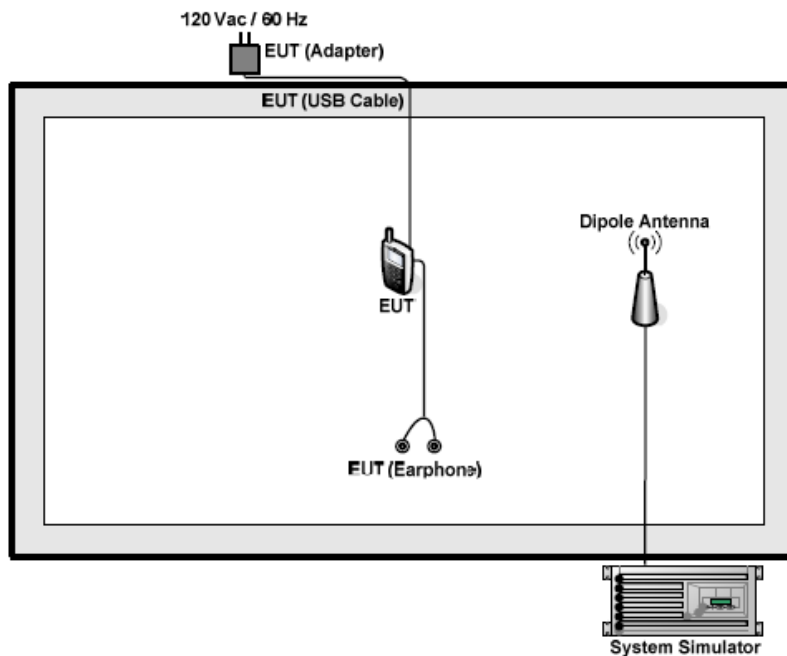
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK link, BPSK link	■ QPSK link, BPSK link
LTE Band 4	■ QPSK link, BPSK link	■ QPSK link, BPSK link
LTE Band 12	■ QPSK link, BPSK link	■ QPSK link, BPSK link

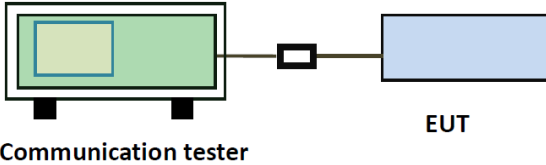
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

4.2 Configuration of Tested System



4.3 Transmitter Radiated Power (EIRP/ERP)

Test Requirement:	FCC part24.232(b) and FCC Part 27.50 (d)(4)/(h)/(c)
Test Method:	ANSI C63.26:2015
Limit:	LTE Band 2: 2W(33.01dBm) LTE Band 4: 1W(30.00dBm) LTE Band 12: 3W(34.77dBm)
Test setup:	 The diagram illustrates the test setup. On the left, a green box labeled 'Communication tester' is connected via a black line to a small black square representing a power splitter. This splitter is then connected to a blue box labeled 'EUT' (Equipment Under Test).
Test Procedure:	Description of the Conducted Output Power Measurement The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. A system simulator is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported. The relevant equation for determining the conducted measured value is: Conducted Output Power Value (dBm) = Measured Value (dBm) + Path Loss (dB) where: Conducted Output Power Value = final conducted measured value in the conducted power test, in dBm; Measured Value = measured conducted power received by spectrum analyzer or power meter, in dBm; Path Loss = signal attenuation in the connecting cable between the transmitter and spectrum analyzer or power meter, including external cable loss, in dB; During the test, the data of Path Loss (dB) is added in the spectrum analyzer or power meter, so Measured Value (dBm) is the final values which contains the data of Path Loss (dB). For example: In the conducted output power test, when measured value for GSM850 is 24.7 dBm, and path loss is 8.5 dB, then final conducted output power value is: Conducted Output Power Value (dBm) = 24.7 dBm + 8.5 dB = 33.2 dBm Description of the Transmitter Radiated Power Measurement In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is

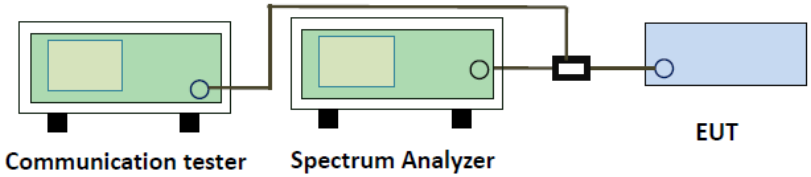
	referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi). Final measurement calculation as below: The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is: $\text{ERP/EIRP} = \text{PMeas} + \text{GT} - \text{LC}$ where: ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as PMeas, typically dBW or dBm); PMeas = measured transmitter output power or PSD, in dBm or dBW; GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP); dBd (ERP)=dBi (EIRP) -2.15 dB LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB. For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation. For example: In the EIRP test, when PMeas value for GSM1900 is 30.2 dBm, LC is 0.6 dB, and GT is -3.4 dB, then final EIRP value is: $\text{EIRP for GSM1900} = 30.2 \text{ dBm} - 3.4 \text{ dBi} - 0.6 \text{ dB} = 26.2 \text{ dBm}$ The relevant equation for determining the ERP/EIRP from the radiated RF output power is: $\text{ERP/EIRP (dBm)} = \text{SA Read Value (dBm)} + \text{Correction Factor (dB)}$ where: ERP/EIRP = effective or equivalent radiated power, in dBm; SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm; Correction Factor = total correction factor including cable loss, in dB; During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB). For example: In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is: $\text{ERP (dBm)} = 21\text{dBm} + 8\text{dB} = 29\text{dBm}$
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Band	Modulation	Channel	Subcarrier Space (KHz)	RB Configure	Result (dBm)	Gain (dBi)	EIRP (dBm) (watts)		Limit (watts)	Verdict
Band 2	BPSK	18601	3.75	1@0	7.34	0.85	6.38	0.004	2	Pass
				1@47	6.55	0.85	6.69	0.005	2	Pass
			15	1@0	6.35	0.85	6.16	0.004	2	Pass
				1@11	6.14	0.85	6.51	0.004	2	Pass
Band 2	BPSK	18602	3.75	1@0	22.10	0.85	21.27	0.134	2	Pass
				1@47	20.95	0.85	21.40	0.138	2	Pass
			15	1@0	23.42	0.85	23.86	0.243	2	Pass
				1@11	22.95	0.85	21.56	0.143	2	Pass
Band 2	QPSK	18601	3.75	1@0	7.25	0.85	6.96	0.005	2	Pass
				1@47	6.29	0.85	6.20	0.004	2	Pass
			15	1@0	6.03	0.85	6.45	0.004	2	Pass
				1@11	6.49	0.85	6.54	0.005	2	Pass
Band 2	QPSK	18602	3.75	3@3	6.52	0.85	6.61	0.005	2	Pass
				1@0	21.61	0.85	23.84	0.242	2	Pass
			15	1@47	22.29	0.85	21.56	0.143	2	Pass
				1@0	23.37	0.85	21.01	0.126	2	Pass
Band 2	QPSK	18602	3.75	3@3	21.16	0.85	23.93	0.247	2	Pass
				1@0	23.79	0.85	22.50	0.178	2	Pass
			15	1@11	23.37	0.85	21.01	0.126	2	Pass
				3@3	21.16	0.85	23.93	0.247	2	Pass
Band 2	BPSK	18900	3.75	1@0	23.23	0.85	23.27	0.213	2	Pass
				1@47	22.44	0.85	21.22	0.133	2	Pass
			15	1@0	22.54	0.85	21.25	0.133	2	Pass
				1@11	23.42	0.85	22.45	0.176	2	Pass
Band 2	QPSK	18900	3.75	1@0	22.03	0.85	24.00	0.251	2	Pass
				1@47	21.95	0.85	23.44	0.221	2	Pass
			15	1@0	23.46	0.85	21.49	0.141	2	Pass
				1@11	23.39	0.85	21.57	0.144	2	Pass
Band 2	QPSK	18900	3.75	3@3	21.74	0.85	21.56	0.143	2	Pass
				1@0	22.99	0.85	22.07	0.161	2	Pass
			15	1@47	23.56	0.85	21.22	0.132	2	Pass
				1@0	23.77	0.85	22.29	0.170	2	Pass
Band 2	BPSK	19198	3.75	1@11	23.50	0.85	23.59	0.228	2	Pass
				1@0	7.21	0.85	6.79	0.005	2	Pass
			15	1@47	6.67	0.85	6.90	0.005	2	Pass
				1@0	6.47	0.85	6.44	0.004	2	Pass
Band 2	BPSK	19199	3.75	1@11	6.83	0.85	6.46	0.004	2	Pass
				1@0	7.21	0.85	6.79	0.005	2	Pass
			15	1@47	6.67	0.85	6.90	0.005	2	Pass
				1@0	6.47	0.85	6.44	0.004	2	Pass
Band 2	BPSK	19199	3.75	1@0	7.21	0.85	6.79	0.005	2	Pass
				1@47	6.67	0.85	6.90	0.005	2	Pass
			15	1@0	6.47	0.85	6.44	0.004	2	Pass
				1@11	6.83	0.85	6.46	0.004	2	Pass
Band 2	QPSK	19198	3.75	1@0	23.67	0.85	21.32	0.135	2	Pass
				1@47	23.37	0.85	21.87	0.154	2	Pass
			15	1@0	22.33	0.85	22.70	0.186	2	Pass
				1@11	21.88	0.85	23.82	0.241	2	Pass
Band 2	QPSK	19198	3.75	3@3	22.49	0.85	21.06	0.128	2	Pass
				1@0	23.67	0.85	21.32	0.135	2	Pass
			15	1@47	23.37	0.85	21.87	0.154	2	Pass
				1@0	22.33	0.85	22.70	0.186	2	Pass
Band 2	QPSK	19199	3.75	1@11	21.88	0.85	23.82	0.241	2	Pass
				3@3	22.49	0.85	21.06	0.128	2	Pass
			15	1@0	6.49	0.85	6.50	0.004	2	Pass
				1@47	6.63	0.85	6.58	0.005	2	Pass
Band 2	QPSK	19199	3.75	1@0	6.46	0.85	6.56	0.005	2	Pass
				1@11	7.33	0.85	6.36	0.004	2	Pass
			15	3@3	6.52	0.85	6.27	0.004	2	Pass
				1@0	6.49	0.85	6.50	0.004	2	Pass

Band	Modulation	Channel	Subcarrier Space (KHz)	RB Configure	Result (dBm)	Gain (dBi)	EIRP (dBm) (watts)		Limit (watts)	Verdict
Band 4	BPSK	19951	3.75	1@0	7.36	0.79	6.59	0.005	1	Pass
				1@47	6.43	0.79	6.37	0.004	1	Pass
			15	1@0	6.71	0.79	6.08	0.004	1	Pass
				1@11	6.17	0.79	6.49	0.004	1	Pass
Band 4	BPSK	19952	3.75	1@0	21.81	0.79	21.12	0.129	1	Pass
				1@47	21.20	0.79	21.07	0.128	1	Pass
			15	1@0	23.65	0.79	23.09	0.204	1	Pass
				1@11	22.94	0.79	23.06	0.202	1	Pass
Band 4	QPSK	19951	3.75	1@0	7.43	0.79	6.58	0.005	1	Pass
				1@47	6.70	0.79	6.31	0.004	1	Pass
			15	1@0	6.02	0.79	6.10	0.004	1	Pass
				1@11	6.42	0.79	6.11	0.004	1	Pass
Band 4	QPSK	19952	3.75	1@0	21.48	0.79	21.64	0.146	1	Pass
				1@47	22.20	0.79	23.24	0.211	1	Pass
			15	1@0	23.21	0.79	23.68	0.233	1	Pass
				1@11	23.42	0.79	22.53	0.179	1	Pass
Band 4	BPSK	20175	3.75	1@0	23.74	0.79	23.08	0.203	1	Pass
				1@47	22.53	0.79	22.95	0.197	1	Pass
			15	1@0	22.69	0.79	21.49	0.141	1	Pass
				1@11	23.40	0.79	21.65	0.146	1	Pass
Band 4	QPSK	20175	3.75	1@0	22.05	0.79	23.47	0.222	1	Pass
				1@47	21.92	0.79	21.45	0.140	1	Pass
			15	1@0	23.92	0.79	23.89	0.245	1	Pass
				1@11	23.27	0.79	21.74	0.149	1	Pass
Band 4	BPSK	20398	3.75	1@0	22.79	0.79	21.40	0.138	1	Pass
				1@47	23.56	0.79	23.76	0.238	1	Pass
			15	1@0	23.34	0.79	22.08	0.161	1	Pass
				1@11	23.62	0.79	23.94	0.248	1	Pass
Band 4	BPSK	20399	3.75	1@0	7.07	0.79	6.79	0.005	1	Pass
				1@47	6.51	0.79	6.60	0.005	1	Pass
			15	1@0	6.44	0.79	6.95	0.005	1	Pass
				1@11	6.82	0.79	6.14	0.004	1	Pass
Band 4	QPSK	20398	3.75	1@0	23.63	0.79	21.14	0.130	1	Pass
				1@47	23.24	0.79	23.67	0.233	1	Pass
			15	1@0	22.47	0.79	22.20	0.166	1	Pass
				1@11	22.00	0.79	23.43	0.220	1	Pass
Band 4	QPSK	20399	3.75	1@0	6.53	0.79	6.26	0.004	1	Pass
				1@47	6.70	0.79	6.16	0.004	1	Pass
			15	1@0	6.42	0.79	6.79	0.005	1	Pass
				1@11	7.26	0.79	6.86	0.005	1	Pass
Band 4	QPSK	20399	15	3@3	6.52	0.79	6.60	0.005	1	Pass

Band	Modulation	Channel	Subcarrier Space (KHz)	RB Configure	Result (dBm)	Gain (dBi)	ERP (dBm)	(watts)	Limit (watts)	Verdict
Band 12	BPSK	23011	3.75	1@0	7.31	0.24	6.17	0.004	3	Pass
				1@47	6.17	0.24	6.37	0.004	3	Pass
			15	1@0	6.38	0.24	6.23	0.004	3	Pass
				1@11	6.18	0.24	6.35	0.004	3	Pass
Band 12	BPSK	23012	3.75	1@0	22.07	0.24	22.86	0.193	3	Pass
				1@47	20.92	0.24	22.02	0.159	3	Pass
			15	1@0	23.94	0.24	21.64	0.146	3	Pass
				1@11	23.19	0.24	21.72	0.149	3	Pass
Band 12	QPSK	23011	3.75	1@0	7.17	0.24	6.88	0.005	3	Pass
				1@47	6.70	0.24	6.69	0.005	3	Pass
			15	1@0	6.39	0.24	6.10	0.004	3	Pass
				1@11	6.47	0.24	6.48	0.004	3	Pass
Band 12	QPSK	23012	3.75	3@3	6.59	0.24	7.05	0.005	3	Pass
				1@0	21.60	0.24	21.16	0.131	3	Pass
			15	1@47	22.47	0.24	21.16	0.131	3	Pass
				1@0	23.16	0.24	23.67	0.233	3	Pass
Band 12	QPSK	23012	3.75	1@11	23.48	0.24	21.28	0.134	3	Pass
				3@3	21.29	0.24	21.30	0.135	3	Pass
			15	1@0	23.36	0.24	21.67	0.147	3	Pass
				1@47	22.33	0.24	21.47	0.140	3	Pass
Band 12	BPSK	23095	3.75	1@0	23.70	0.24	22.74	0.188	3	Pass
				1@11	23.29	0.24	22.53	0.179	3	Pass
			15	1@0	21.69	0.24	23.39	0.218	3	Pass
				1@47	21.63	0.24	23.98	0.250	3	Pass
Band 12	QPSK	23095	3.75	1@0	23.29	0.24	22.25	0.168	3	Pass
				1@11	23.22	0.24	22.84	0.192	3	Pass
			15	3@3	21.68	0.24	21.36	0.137	3	Pass
				1@0	23.05	0.24	21.91	0.155	3	Pass
Band 12	BPSK	23178	3.75	1@47	23.67	0.24	21.38	0.137	3	Pass
				1@0	23.25	0.24	22.77	0.189	3	Pass
			15	1@11	23.57	0.24	21.92	0.155	3	Pass
				1@0	7.32	0.24	6.37	0.004	3	Pass
Band 12	BPSK	23178	3.75	1@47	6.68	0.24	6.46	0.004	3	Pass
				1@0	6.80	0.24	6.81	0.005	3	Pass
			15	1@11	6.68	0.24	6.99	0.005	3	Pass
				1@0	23.29	0.24	22.42	0.174	3	Pass
Band 12	QPSK	23178	3.75	1@47	23.39	0.24	21.09	0.128	3	Pass
				1@0	22.25	0.24	23.53	0.225	3	Pass
			15	1@11	22.09	0.24	23.51	0.224	3	Pass
				3@3	22.62	0.24	22.13	0.163	3	Pass
Band 12	QPSK	23179	3.75	1@0	6.76	0.24	6.88	0.005	3	Pass
				1@47	6.85	0.24	6.98	0.005	3	Pass
			15	1@0	6.51	0.24	6.79	0.005	3	Pass
				1@11	7.22	0.24	7.05	0.005	3	Pass
Band 12	QPSK	23179	3.75	3@3	6.66	0.24	6.26	0.004	3	Pass
				1@0	6.76	0.24	6.88	0.005	3	Pass

4.4 Peak-to-Average Ratio

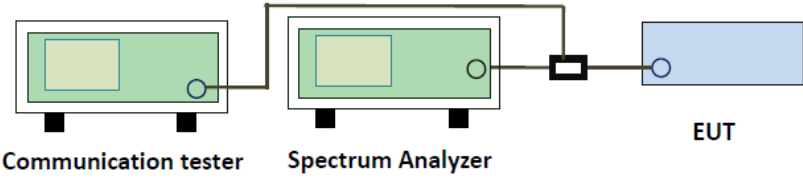
Test Requirement:	FCC part24.232(d) and FCC part27.50(d)(5)/(c)
Test Method:	ANSI C63.26:2015
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 The diagram illustrates the test setup. On the left is a 'Communication tester' (green box). A cable connects its output to the input of a 'Spectrum Analyzer' (green box). The Spectrum Analyzer's output is connected to a power divider (black box), which then splits the signal to the 'EUT' (Equipment Under Test, blue box).
Test Procedure:	1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7. 2. The EUT was connected to spectrum and system simulator via a power divider 3. Using the CCDF measurement of spectrum analyzer; 4. Set $RBW \geq OBW$ or specified reference bandwidth; 5. Set the number of counts to a value that stabilizes the measured CCDF curve; 6. Set the measurement interval as 1ms 7. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX B for the test results)

NB-IoT Band 2 PAR [dB]				
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Middle
				P-A
Band 2 Standalone	BPSK	3.75	1@0	0.49
			1@47	0.47
		15	1@0	1.31
			1@11	1.35
	QPSK	3.75	1@0	0.61
			1@47	0.59
		15	1@0	1.34
			1@11	1.35
			3@3	2.90
Limit				≤13dB

NB-IoT Band 4 PAR [dB]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Middle		
				P-A		
Band 4 Standalone	BPSK	3.75	1@0	0.62		
			1@47	0.57		
		15	1@0	1.41		
			1@11	1.45		
	QPSK	3.75	1@0	0.60		
			1@47	0.64		
		15	1@0	1.43		
			1@11	1.49		
			3@3			3.25
			Limit			

NB-IoT Band 12 PAR [dB]				
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Middle
				P-A
Band 5 Standalone	BPSK	3.75	1@0	0.64
			1@47	0.77
		15	1@0	1.43
			1@11	1.49
	QPSK	3.75	1@0	1.04
			1@47	0.91
		15	1@0	1.49
			1@11	1.53
			3@3	4.00
Limit				≤13dB

4.5 Occupy Bandwidth

Test Requirement:	FCC part24.232(b) and FCC part27.53(a)
Test Method:	ANSI C63.26:2015
Test setup:	 Communication tester Spectrum Analyzer EUT
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer, set center frequency to channel center frequency. 2. RBW was set to about 1%-5% of emission OBW, VBW$\geq$ 3 X RBW. 3. Set spectrum analyzer detection mode to peak, and the trace mode to max hold. 4. Use the 99% OBW function, The 99% power OBW can be found on the plot, determine the "-26dB amplitude" as equal to reference value -26dB.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

NB-IoT Band 2 Bandwidth [kHz]/Standalone								
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	66.747	38.19	57.934	38.09	57.734	37.93
	15	1@0	129.49	141.3	133.96	124.2	129.66	107.0
QPSK	3.75	1@0	57.852	37.41	59.015	34.92	55.113	37.45
	15	1@0	136.00	130.0	129.08	116.8	126.28	127.5
	15	12@0	186.87	300.1	187.46	303.6	188.71	312.0

NB-IoT Band 4 Bandwidth [kHz]/Standalone								
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	57.850	37.20	59.397	35.33	56.144	37.50
	15	1@0	130.77	127.0	129.35	116.5	130.94	125.3
QPSK	3.75	1@0	62.133	37.91	61.524	37.94	59.724	37.92
	15	1@0	133.69	126.9	130.00	122.9	130.64	126.7
	15	12@0	186.29	280.5	186.46	276.1	186.38	254.5

NB-IoT Band 12 Bandwidth [kHz]/Standalone								
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	58.385	39.22	54.028	37.33	54.608	36.56
	15	1@0	133.68	127.9	132.54	125.0	132.70	128.6
QPSK	3.75	1@0	58.569	39.00	64.193	41.40	65.429	42.41
	15	1@0	134.77	129.2	143.90	143.5	144.23	156.9
	15	12@0	186.68	275.4	186.48	274.3	186.55	287.1

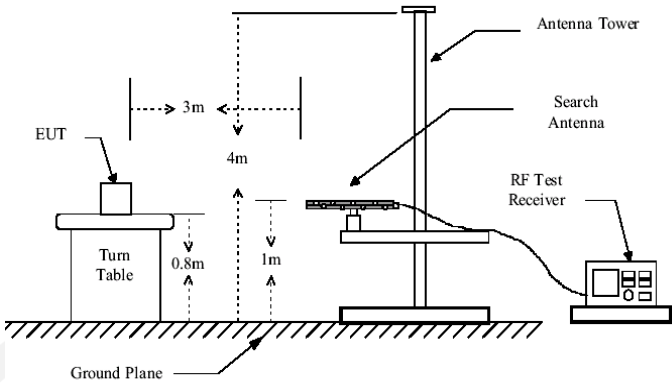
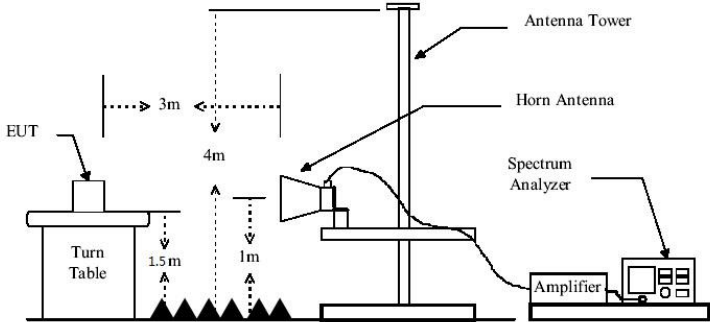
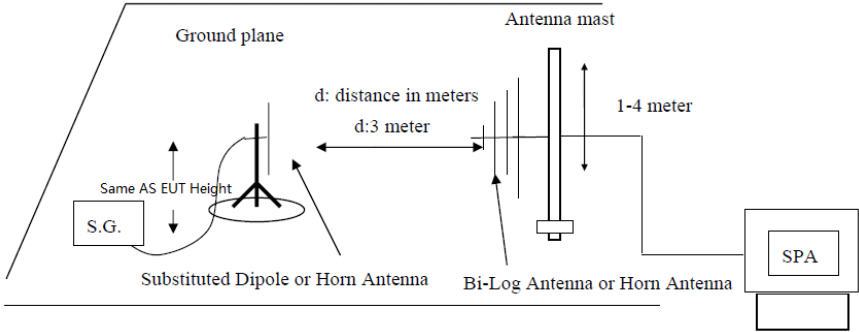
4.6 MODULATION CHARACTERISTIC

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

4.7 Out of band emission at antenna terminals

Test Requirement:	FCC part 24.238(a), FCC part 27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm Band 7/38/41: -25dBm
Test setup:	Communication tester Spectrum Analyzer EUT
Test Procedure:	1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2. The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3. For the out of band: Set the RBW=1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic. 4. Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass (Please refer to ANNEX for the test results)

4.8 Field strength of spurious radiation measurement

Test Requirement:	FCC part 24.238(a), FCC part 27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	Band 2/4/12:-13dBm
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data(Worst case):

SCC 15KHz and SCS 3.75KHz have both been tested, and the report reflects the data of the worst mode.

QPSK Mode:

Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3862.73	Vertical	-35.01	-13.00	Pass
5792.19	V	-39.21		
7722.30	V	-37.37		
9654.11	V	-42.60		
11584.23	V	-42.79		
3862.28	Horizontal	-35.71	-13.00	Pass
5791.16	H	-39.91		
7722.34	H	-38.07		
9652.04	H	-42.16		
11585.41	H	-42.28		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3920.32	Vertical	-37.89	-13.00	Pass
5880.28	V	-37.54		
7839.26	V	-38.74		
9799.61	V	-45.12		
11760.10	V	-44.60		
3919.68	Horizontal	-37.05	-13.00	Pass
5880.37	H	-37.78		
7839.83	H	-39.41		
9800.09	H	-44.32		
11759.75	H	-42.64		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3978.97	Vertical	-36.29	-13.00	Pass
5968.58	V	-39.62		
7956.52	V	-38.91		
9945.91	V	-46.41		
11935.92	V	-43.50		
3978.71	Horizontal	-37.39	-13.00	Pass
5967.54	H	-37.78		
7957.08	H	-38.42		
9947.24	H	-44.91		
11935.27	H	-43.99		

Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4220.98	Vertical	-36.97	-13.00	Pass
6332.66	V	-38.77		
8441.33	V	-38.88		
10553.88	V	-43.12		
12665.45	V	-42.76		
4220.92	Horizontal	-36.80	-13.00	Pass
6332.12	H	-37.08		
8442.60	H	-38.32		
10553.50	H	-41.22		
12663.24	H	-43.12		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4264.69	Vertical	-35.88	-13.00	Pass
6397.89	V	-39.37		
8529.59	V	-39.15		
10661.77	V	-45.85		
12794.35	V	-45.55		
4265.27	Horizontal	-36.97	-13.00	Pass
6397.77	H	-38.94		
8530.15	H	-38.27		
10662.99	H	-45.81		
12795.66	H	-45.98		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4307.91	Vertical	-37.22	-13.00	Pass
6462.86	V	-37.67		
8617.90	V	-37.78		
10771.15	V	-42.75		
12925.45	V	-42.76		
4309.14	Horizontal	-36.47	-13.00	Pass
6462.16	H	-39.33		
8617.21	H	-38.85		
10771.59	H	-42.93		
12925.16	H	-43.57		

Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1460.00	Vertical	-36.00	-13.00	Pass
2188.76	V	-38.70		
2919.58	V	-38.15		
3647.65	V	-42.97		
4377.52	V	-45.95		
1459.78	Horizontal	-35.58	-13.00	Pass
2190.35	H	-39.79		
2917.80	H	-38.31		
3649.74	H	-42.70		
4378.53	H	-46.67		
Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1474.29	Vertical	-37.30	-13.00	Pass
2211.91	V	-39.59		
2949.97	V	-38.26		
3687.59	V	-46.67		
4424.49	V	-43.92		
1474.44	Horizontal	-35.53	-13.00	Pass
2212.03	H	-37.71		
2950.34	H	-37.58		
3687.94	H	-46.67		
4424.36	H	-45.98		
Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1490.71	Vertical	-36.85	-13.00	Pass
2235.23	V	-39.24		
2981.78	V	-38.99		
3727.07	V	-45.36		
4471.14	V	-46.43		
1491.14	Horizontal	-36.58	-13.00	Pass
2236.09	H	-37.12		
2981.68	H	-38.21		
3726.84	H	-42.03		
4471.88	H	-46.36		

Remark :

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

BPSK Mode:

Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3861.34	Vertical	-36.39	-13.00	Pass
5790.91	V	-39.66		
7722.38	V	-38.84		
9654.87	V	-43.49		
11583.21	V	-43.08		
3860.57	Horizontal	-37.53	-13.00	Pass
5791.92	H	-37.50		
7722.40	H	-39.21		
9653.46	H	-41.29		
11583.49	H	-45.44		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3920.52	Vertical	-37.15	-13.00	Pass
5880.32	V	-38.67		
7840.72	V	-38.30		
9799.40	V	-46.65		
11760.49	V	-45.45		
3919.35	Horizontal	-37.81	-13.00	Pass
5880.05	H	-38.73		
7839.48	H	-39.59		
9800.34	H	-47.04		
11759.99	H	-42.17		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3978.43	Vertical	-35.85	-13.00	Pass
5967.75	V	-37.53		
7956.70	V	-38.26		
9946.67	V	-43.22		
11936.31	V	-43.21		
3978.47	Horizontal	-37.51	-13.00	Pass
5967.87	H	-37.24		
7956.86	H	-39.91		
9946.74	H	-45.29		
11936.16	H	-43.11		

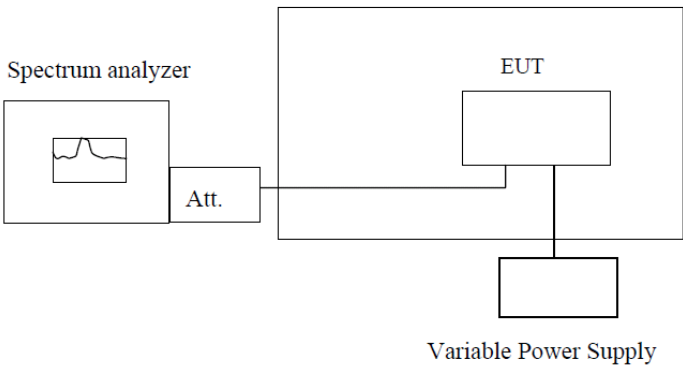
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4220.36	Vertical	-37.98	-13.00	Pass
6332.77	V	-39.98		
8443.96	V	-39.90		
10553.02	V	-45.58		
12665.48	V	-44.72		
4221.40	Horizontal	-36.59	-13.00	Pass
6331.53	H	-37.79		
8442.95	H	-39.05		
10552.41	H	-42.20		
12665.15	H	-45.22		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4264.66	Vertical	-37.50	-13.00	Pass
6397.09	V	-38.83		
8530.55	V	-38.68		
10662.91	V	-42.14		
12794.67	V	-44.45		
4264.73	Horizontal	-36.72	-13.00	Pass
6397.06	H	-38.70		
8529.33	H	-39.63		
10662.97	H	-45.77		
12795.43	H	-46.54		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4309.16	Vertical	-37.55	-13.00	Pass
6463.22	V	-37.18		
8617.84	V	-39.07		
10771.98	V	-44.44		
12925.87	V	-46.24		
4307.95	Horizontal	-36.47	-13.00	Pass
6462.24	H	-39.45		
8617.45	H	-39.80		
10771.98	H	-44.61		
12925.42	H	-42.16		

Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1460.64	Vertical	-37.68	-13.00	Pass
2188.44	V	-38.38		
2918.76	V	-39.94		
3649.61	V	-42.50		
4376.91	V	-44.63		
1458.44	Horizontal	-36.98	-13.00	Pass
2188.36	H	-38.84		
2918.88	H	-37.95		
3647.19	H	-42.34		
4377.97	H	-42.25		
Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1475.12	Vertical	-35.15	-13.00	Pass
2212.78	V	-38.15		
2950.72	V	-38.34		
3688.21	V	-46.89		
4424.51	V	-46.47		
1474.88	Horizontal	-36.12	-13.00	Pass
2212.61	H	-38.11		
2950.49	H	-37.28		
3688.07	H	-44.80		
4425.47	H	-46.97		
Test mode:	LTE Band 12(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1490.16	Vertical	-37.73	-13.00	Pass
2236.56	V	-37.21		
2981.00	V	-39.66		
3725.90	V	-46.99		
4472.38	V	-46.50		
1490.16	Horizontal	-37.53	-13.00	Pass
2235.27	H	-37.77		
2981.31	H	-39.03		
3726.96	H	-46.63		
4472.21	H	-42.86		

Remark:

- 1 The emission behaviour belongs to narrowband spurious emission, all modes investigated and only worst case is reported.
- 2 Remark"---" means that the emission level is too low (20dB lower than the limit) to be measured
- 3 The emission levels of below 1 GHz are very lower (20dB lower than the limit) than the limit and not show in test report.

4.9 Frequency stability

Test Requirement:	FCC Part 2.1055(a)(1)(b), FCC Part 2.1055(d)(1)(2), FCC Part 27.54
Test Method:	ANSI C63.26:2015
Limit:	2.5ppm(Part 22) Within the authorized bands of operation(Part 24, Part 27)
Test setup:	Temperature Chamber  Variable Power Supply Note : Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

NB-IoT Band 2 (QPSK) / 1880MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	36.41	0.019	2.5ppm	PASS
80		73.55	0.039		
70		71.47	0.038		
60		62.47	0.033		
50		39.44	0.021		
40		29.71	0.016		
30		42.93	0.023		
20		37.24	0.020		
10		41.18	0.022		
0		32.64	0.017		
-10		64.83	0.034		
-20		74.95	0.040		
-30		53.42	0.028		
-40		82.33	0.044		
25	Maximum Voltage	59.07	0.031	2.5ppm	PASS
25	BEP	50.65	0.027		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	66.63	0.035	2.5ppm	PASS
80		31.66	0.017		
70		59.68	0.032		
60		53.35	0.028		
50		33.66	0.018		
40		71.89	0.038		
30		29.00	0.015		
20		28.34	0.015		
10		83.45	0.044		
0		25.69	0.014		
-10		65.72	0.035		
-20		51.69	0.027		
-30		35.18	0.019		
-40		32.99	0.018		
25	Maximum Voltage	59.84	0.032	2.5ppm	PASS
25	BEP	41.70	0.022		

NB-IoT Band 2 (QPSK) / 1880MHz / 3.75KHz/1@47					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	53.42	0.028	2.5ppm	PASS
80		54.93	0.029		
70		43.82	0.023		
60		54.10	0.029		
50		72.03	0.038		
40		72.89	0.039		
30		58.35	0.031		
20		71.73	0.038		
10		54.94	0.029		
0		84.10	0.045		
-10		53.58	0.028		
-20		28.72	0.015		
-30		77.03	0.041		
-40		85.01	0.045		
25	Maximum Voltage	68.66	0.037		
25	BEP	41.90	0.022		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@11					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	81.30	0.043	2.5ppm	PASS
80		69.70	0.037		
70		38.49	0.020		
60		44.06	0.023		
50		42.22	0.022		
40		60.25	0.032		
30		68.58	0.036		
20		32.28	0.017		
10		67.59	0.036		
0		79.52	0.042		
-10		73.51	0.039		
-20		61.73	0.033		
-30		52.15	0.028		
-40		27.97	0.015		
25	Maximum Voltage	68.35	0.036		
25	BEP	30.49	0.016		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	31.43	0.018	2.5ppm	PASS
80		54.81	0.032		
70		66.35	0.038		
60		29.76	0.017		
50		47.77	0.028		
40		79.60	0.046		
30		85.42	0.049		
20		39.46	0.023		
10		50.19	0.029		
0		45.90	0.026		
-10		47.33	0.027		
-20		26.24	0.015		
-30		55.61	0.032		
-40		76.01	0.044		
25	Maximum Voltage	48.37	0.028		
25	BEP	41.41	0.024		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	79.44	0.046	2.5ppm	PASS
80		44.48	0.026		
70		48.80	0.028		
60		45.84	0.026		
50		74.48	0.043		
40		73.71	0.043		
30		76.34	0.044		
20		62.78	0.036		
10		61.10	0.035		
0		60.39	0.035		
-10		61.34	0.035		
-20		46.60	0.027		
-30		81.40	0.047		
-40		34.59	0.020		
25	Maximum Voltage	66.07	0.038		
25	BEP	32.81	0.019		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 3.75KHz/1@47					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	31.97	0.018	2.5ppm	PASS
80		79.99	0.046		
70		85.75	0.049		
60		55.28	0.032		
50		64.01	0.037		
40		83.15	0.048		
30		35.04	0.020		
20		65.61	0.038		
10		31.50	0.018		
0		55.19	0.032		
-10		42.40	0.024		
-20		62.34	0.036		
-30		59.14	0.034		
-40		84.01	0.048		
25	Maximum Voltage	36.24	0.021		
25	BEP	39.15	0.023		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 15KHz/1@11					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	49.13	0.028	2.5ppm	PASS
80		36.52	0.021		
70		60.59	0.035		
60		50.01	0.029		
50		69.91	0.040		
40		80.13	0.046		
30		70.43	0.041		
20		28.67	0.017		
10		52.87	0.031		
0		79.84	0.046		
-10		85.16	0.049		
-20		49.69	0.029		
-30		48.46	0.028		
-40		64.47	0.037		
25	Maximum Voltage	46.35	0.027		
25	BEP	38.91	0.022		

NB-IoT Band 12 (QPSK) / 707.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	28.55	0.040	2.5ppm	PASS
80		39.43	0.056		
70		39.48	0.056		
60		23.10	0.033		
50		29.48	0.042		
40		16.78	0.024		
30		15.14	0.021		
20		41.95	0.059		
10		32.07	0.045		
0		34.13	0.048		
-10		35.29	0.050		
-20		18.34	0.026		
-30		33.79	0.048		
-40		36.92	0.052		
25	Maximum Voltage	25.95	0.037		
25	BEP	29.64	0.042		

NB-IoT Band 12 (QPSK) / 707.5MHz / 15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	33.66	0.048	2.5ppm	PASS
80		43.50	0.061		
70		16.33	0.023		
60		16.99	0.024		
50		32.08	0.045		
40		37.79	0.053		
30		29.19	0.041		
20		19.92	0.028		
10		21.50	0.030		
0		25.89	0.037		
-10		20.90	0.030		
-20		31.88	0.045		
-30		30.18	0.043		
-40		35.46	0.050		
25	Maximum Voltage	25.18	0.036		
25	BEP	22.33	0.032		

NB-IoT Band 12 (QPSK) / 707.5MHz / 3.75KHz/1@47					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	45.06	0.064	2.5ppm	PASS
80		35.67	0.050		
70		17.98	0.025		
60		40.92	0.058		
50		18.75	0.026		
40		31.47	0.044		
30		19.34	0.027		
20		33.39	0.047		
10		41.76	0.059		
0		37.22	0.053		
-10		34.13	0.048		
-20		45.77	0.065		
-30		32.57	0.046		
-40		20.38	0.029		
25	Maximum Voltage	34.88	0.049		
25	BEP	30.74	0.043		

NB-IoT Band 12 (QPSK) / 707.5MHz / 15KHz/1@11					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	17.90	0.025	2.5ppm	PASS
80		17.00	0.024		
70		23.00	0.033		
60		45.20	0.064		
50		20.34	0.029		
40		25.50	0.036		
30		42.39	0.060		
20		35.02	0.050		
10		17.51	0.025		
0		40.14	0.057		
-10		29.63	0.042		
-20		37.21	0.053		
-30		31.61	0.045		
-40		25.05	0.035		
25	Maximum Voltage	35.54	0.050		
25	BEP	30.75	0.043		

5 Photos of test setup

Reference to the **appendix I Test Setup photos** for details.

6 Photos of EUT

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

----- END OF REPORT-----

