



FCC TEST REPORT

FCC ID: 2AXZU-GCAT2E3A

On Behalf of

E.R.M ELECTRONIC SYSTEMS LTD

GPS 4G Tracker StarLink (CATM)

Model No.: GCAT2e3A

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-R04
Date of Receipt : June 23, 2025
Date of Test : June 23, 2025-July 25, 2025
Date of Report : July 28, 2025
Version Number : V0

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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 StarLink (CATM)
(A) Model No. : GCAT2e3A
(B) Trademark : N/A

Measurement Standard Used:

FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 22 Subpart H
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 SAR Report)
Transmitter Radiated Power (EIRP/ERP)	Part 2.1046 part22.913(a) (5) Part 24.232 (c) Part 27.50 (d)(4) Part 27.50 (h)/(c)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 22.913(d) 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 22.917 Part 24.238 Part 27.53(a)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m)/(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) 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 StarLink (CATM)
Model Number : GCAT2e3A
Diff : N/A
Test Voltage : DC 12V/24V from DC power, DC 3.7V from battery

Support Networks	: NB-IOT
Support Band	: FDD LTE B2/B4/B5
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 5: 824.1~848.9MHz
Antenna type	: PCB Antenna
Antenna Type	: Maximum Gain is 0.69dBi for Band 2 Maximum Gain is 0.62dBi for Band 4 Maximum Gain is 0.58dBi for Band 5
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 22 subpart H, 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 5	■ QPSK link, BPSK link	■ QPSK link, BPSK link

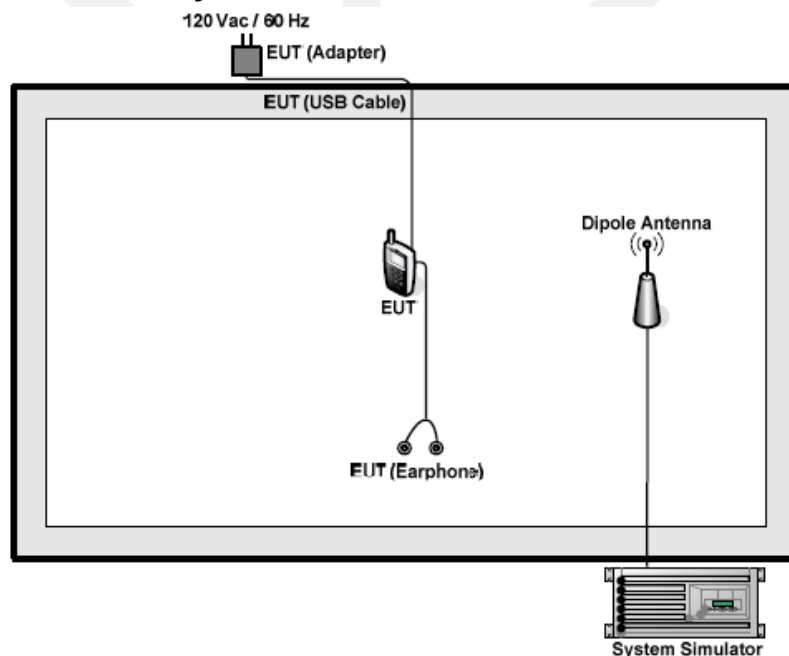
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

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

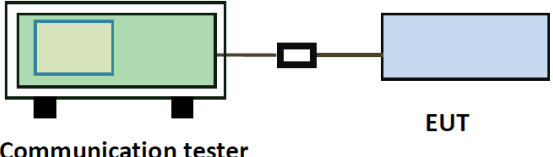
4.2 List of Frequencies under Test

Operation bands	Mode	Frequencies under Test					
		Uplink			Downlink		
		Range	EARFC N	Frequencies (MHz)	Range	EARFC N	Frequencies (MHz)
2	Standalone	Low	18601	1850.1000	Low	601	1930.1000
		Mid	18900	1880.0000	Mid	900	1960.0000
		High	19199	1909.9000	High	1199	1989.9000
4	Standalone	Low	19951	1710.1000	Low	1951	2110.1000
		Mid	20175	1732.5000	Mid	2175	2132.5000
		High	20399	1754.9000	High	2399	2154.9000
5	Standalone	Low	20401	824.1000	Low	2401	869.1000
		Mid	20525	836.5000	Mid	2525	881.5000
		High	20649	848.9000	High	2649	893.9000

4.3 Configuration of Tested System



4.4 Transmitter Radiated Power (EIRP/ERP)

Test Requirement:	FCC part22.913(a) (5), 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 5: 7W(38.45dBm)
Test setup:	 Communication tester EUT
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	7.18	0.69	7.87	0.006	2	Pass
				1@47	6.30	0.69	6.99	0.005	2	Pass
			15	1@0	6.49	0.69	7.18	0.005	2	Pass
				1@11	6.29	0.69	6.98	0.005	2	Pass
Band 2	BPSK	18602	3.75	1@0	21.96	0.69	22.65	0.184	2	Pass
				1@47	21.05	0.69	21.74	0.149	2	Pass
			15	1@0	23.43	0.69	24.12	0.258	2	Pass
				1@11	23.06	0.69	23.75	0.237	2	Pass
Band 2	QPSK	18601	3.75	1@0	7.27	0.69	7.96	0.006	2	Pass
				1@47	6.44	0.69	7.13	0.005	2	Pass
			15	1@0	6.13	0.69	6.82	0.005	2	Pass
				1@11	6.46	0.69	7.15	0.005	2	Pass
				3@3	6.40	0.69	7.09	0.005	2	Pass
Band 2	QPSK	18602	3.75	1@0	21.36	0.69	22.05	0.160	2	Pass
				1@47	22.28	0.69	22.97	0.198	2	Pass
			15	1@0	23.07	0.69	23.76	0.238	2	Pass
				1@11	23.45	0.69	24.14	0.259	2	Pass
				3@3	21.17	0.69	21.86	0.153	2	Pass
Band 2	BPSK	18900	3.75	1@0	23.21	0.69	23.90	0.245	2	Pass
				1@47	22.28	0.69	22.97	0.198	2	Pass
			15	1@0	22.65	0.69	23.34	0.216	2	Pass
				1@11	23.37	0.69	24.06	0.255	2	Pass
Band 2	QPSK	18900	3.75	1@0	21.83	0.69	22.52	0.179	2	Pass
				1@47	21.77	0.69	22.46	0.176	2	Pass
			15	1@0	23.31	0.69	24.00	0.251	2	Pass
				1@11	23.22	0.69	23.91	0.246	2	Pass
				3@3	21.70	0.69	22.39	0.173	2	Pass
Band 2	BPSK	19198	3.75	1@0	22.79	0.69	23.48	0.223	2	Pass
				1@47	23.61	0.69	24.30	0.269	2	Pass
			15	1@0	23.22	0.69	23.91	0.246	2	Pass
				1@11	23.72	0.69	24.41	0.276	2	Pass
Band 2	BPSK	19199	3.75	1@0	7.16	0.69	7.85	0.006	2	Pass
				1@47	6.51	0.69	7.20	0.005	2	Pass
			15	1@0	6.56	0.69	7.25	0.005	2	Pass
				1@11	6.79	0.69	7.48	0.006	2	Pass
Band 2	QPSK	19198	3.75	1@0	23.81	0.69	24.50	0.282	2	Pass
				1@47	23.26	0.69	23.95	0.248	2	Pass
			15	1@0	22.41	0.69	23.10	0.204	2	Pass
				1@11	21.92	0.69	22.61	0.182	2	Pass
				3@3	23.88	0.69	24.57	0.286	2	Pass
Band 2	QPSK	19199	3.75	1@0	6.53	0.69	7.22	0.005	2	Pass
				1@47	6.76	0.69	7.45	0.006	2	Pass
			15	1@0	6.27	0.69	6.96	0.005	2	Pass
				1@11	7.12	0.69	7.81	0.006	2	Pass
				3@3	6.48	0.69	7.17	0.005	2	Pass

Note: Maximum Gain is 0.69dBi for Band 2

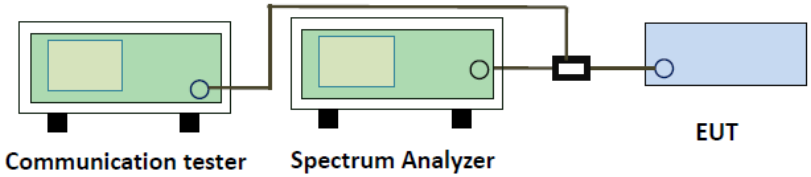
Band	Modulation	Channel	Subcarrier Space (KHz)	RB Configure	Result (dBm)	Gain (dBi)	EIRP (dBm) (watts)		Limit (watts)	Verdict
Band 4	BPSK	19951	3.75	1@0	6.52	0.62	7.14	0.005	1	Pass
				1@47	6.09	0.62	6.71	0.005	1	Pass
			15	1@0	6.31	0.62	6.93	0.005	1	Pass
				1@11	6.29	0.62	6.91	0.005	1	Pass
Band 4	BPSK	19952	3.75	1@0	23.52	0.62	24.14	0.259	1	Pass
				1@47	21.48	0.62	22.10	0.162	1	Pass
			15	1@0	22.99	0.62	23.61	0.230	1	Pass
				1@11	21.44	0.62	22.06	0.161	1	Pass
Band 4	QPSK	19951	3.75	1@0	7.21	0.62	7.83	0.006	1	Pass
				1@47	6.86	0.62	7.48	0.006	1	Pass
			15	1@0	6.73	0.62	7.35	0.005	1	Pass
				1@11	6.61	0.62	7.23	0.005	1	Pass
				3@3	7.22	0.62	7.84	0.006	1	Pass
Band 4	QPSK	19952	3.75	1@0	23.21	0.62	23.83	0.242	1	Pass
				1@47	23.17	0.62	23.79	0.239	1	Pass
			15	1@0	22.39	0.62	23.01	0.200	1	Pass
				1@11	21.24	0.62	21.86	0.153	1	Pass
				3@3	23.39	0.62	24.01	0.252	1	Pass
Band 4	BPSK	20175	3.75	1@0	23.26	0.62	23.88	0.244	1	Pass
				1@47	23.05	0.62	23.67	0.233	1	Pass
			15	1@0	22.40	0.62	23.02	0.200	1	Pass
				1@11	23.82	0.62	24.44	0.278	1	Pass
Band 4	QPSK	20175	3.75	1@0	23.83	0.62	24.45	0.279	1	Pass
				1@47	22.75	0.62	23.37	0.217	1	Pass
			15	1@0	23.47	0.62	24.09	0.256	1	Pass
				1@11	21.34	0.62	21.96	0.157	1	Pass
				3@3	23.90	0.62	24.52	0.283	1	Pass
Band 4	BPSK	20398	3.75	1@0	23.02	0.62	23.64	0.231	1	Pass
				1@47	22.73	0.62	23.35	0.216	1	Pass
			15	1@0	22.15	0.62	22.77	0.189	1	Pass
				1@11	23.75	0.62	24.37	0.274	1	Pass
Band 4	BPSK	20399	3.75	1@0	6.72	0.62	7.34	0.005	1	Pass
				1@47	6.10	0.62	6.72	0.005	1	Pass
			15	1@0	7.08	0.62	7.70	0.006	1	Pass
				1@11	6.79	0.62	7.41	0.006	1	Pass
Band 4	QPSK	20398	3.75	1@0	22.86	0.62	23.48	0.223	1	Pass
				1@47	21.72	0.62	22.34	0.171	1	Pass
			15	1@0	21.51	0.62	22.13	0.163	1	Pass
				1@11	21.40	0.62	22.02	0.159	1	Pass
				3@3	23.70	0.62	24.32	0.270	1	Pass
Band 4	QPSK	20399	3.75	1@0	6.90	0.62	7.52	0.006	1	Pass
				1@47	6.61	0.62	7.23	0.005	1	Pass
			15	1@0	7.02	0.62	7.64	0.006	1	Pass
				1@11	6.82	0.62	7.44	0.006	1	Pass
				3@3	6.37	0.62	6.99	0.005	1	Pass

Note: Maximum Gain is 0.62dBi for Band 4.

Band	Modulation	Channel	Subcarrier Space (KHz)	RB Configure	Result (dBm)	Gain (dBi)	ERP (dBm) (watts)		Limit (watts)	Verdict
Band 5	BPSK	20401	3.75	1@0	6.52	0.58	4.95	0.003	7	Pass
				1@47	6.09	0.58	4.52	0.003	7	Pass
			15	1@0	6.22	0.58	4.65	0.003	7	Pass
				1@11	6.18	0.58	4.61	0.003	7	Pass
Band 5	BPSK	20402	3.75	1@0	23.62	0.58	22.05	0.160	7	Pass
				1@47	21.41	0.58	19.84	0.096	7	Pass
			15	1@0	22.72	0.58	21.15	0.130	7	Pass
				1@11	21.35	0.58	19.78	0.095	7	Pass
Band 5	QPSK	20401	3.75	1@0	6.91	0.58	5.34	0.003	7	Pass
				1@47	6.89	0.58	5.32	0.003	7	Pass
			15	1@0	6.44	0.58	4.87	0.003	7	Pass
				1@11	6.70	0.58	5.13	0.003	7	Pass
3@3	6.94	0.58		5.37	0.003	7	Pass			
Band 5	QPSK	20402	3.75	1@0	23.31	0.58	21.74	0.149	7	Pass
				1@47	23.30	0.58	21.73	0.149	7	Pass
			15	1@0	22.54	0.58	20.97	0.125	7	Pass
				1@11	21.04	0.58	19.47	0.089	7	Pass
3@3	23.61	0.58		22.04	0.160	7	Pass			
Band 5	BPSK	20525	3.75	1@0	23.31	0.58	21.74	0.149	7	Pass
				1@47	23.56	0.58	21.99	0.158	7	Pass
			15	1@0	22.33	0.58	20.76	0.119	7	Pass
				1@11	23.63	0.58	22.06	0.161	7	Pass
Band 5	QPSK	20525	3.75	1@0	23.65	0.58	22.08	0.161	7	Pass
				1@47	22.74	0.58	21.17	0.131	7	Pass
			15	1@0	23.79	0.58	22.22	0.167	7	Pass
				1@11	21.15	0.58	19.58	0.091	7	Pass
3@3	22.06	0.58		20.49	0.112	7	Pass			
Band 5	BPSK	20648	3.75	1@0	23.02	0.58	21.45	0.140	7	Pass
				1@47	23.00	0.58	21.43	0.139	7	Pass
			15	1@0	22.13	0.58	20.56	0.114	7	Pass
				1@11	23.79	0.58	22.22	0.167	7	Pass
Band 5	BPSK	20649	3.75	1@0	6.49	0.58	4.92	0.003	7	Pass
				1@47	6.03	0.58	4.46	0.003	7	Pass
			15	1@0	7.11	0.58	5.54	0.004	7	Pass
				1@11	6.77	0.58	5.20	0.003	7	Pass
Band 5	QPSK	20648	3.75	1@0	23.03	0.58	21.46	0.140	7	Pass
				1@47	21.88	0.58	20.31	0.107	7	Pass
			15	1@0	21.66	0.58	20.09	0.102	7	Pass
				1@11	21.11	0.58	19.54	0.090	7	Pass
3@3	23.86	0.58		22.29	0.169	7	Pass			
Band 5	QPSK	20649	3.75	1@0	6.82	0.58	5.25	0.003	7	Pass
				1@47	6.57	0.58	5.00	0.003	7	Pass
			15	1@0	7.17	0.58	5.60	0.004	7	Pass
				1@11	6.78	0.58	5.21	0.003	7	Pass
				3@3	6.38	0.58	4.81	0.003	7	Pass

Note: Maximum Gain is 0.58dBi for Band 5.

4.5 Peak-to-Average Ratio

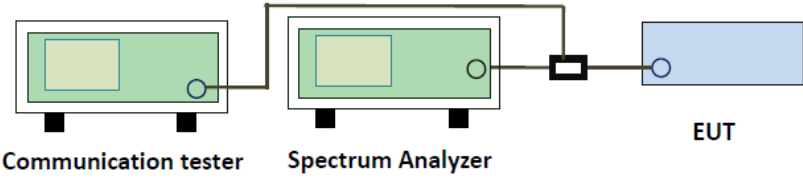
Test Requirement:	Part 22.913(d), FCC part24.232(d) and FCC part27.50(d)(5)/(c)
Test Method:	ANSI C63.26:2015
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 The diagram illustrates the test setup. A 'Communication tester' (green box) is connected to a 'Spectrum Analyzer' (green box) via a cable. The 'Spectrum Analyzer' is then connected to the 'EUT' (Equipment Under Test, blue box) through a power divider (black box). The labels 'Communication tester', 'Spectrum Analyzer', and 'EUT' are placed below their respective components.
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 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	0.47
			1@47	0.45
		15	1@0	1.33
			1@11	1.36
	QPSK	3.75	1@0	0.59
			1@47	0.58
		15	1@0	1.33
			1@11	1.36
			3@3	3.01
			Limit	

NB-IoT Band 4 PAR [dB]				
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Middle
				P-A
Band 4 Standalone	BPSK	3.75	1@0	0.58
			1@47	0.58
		15	1@0	1.37
			1@11	1.46
	QPSK	3.75	1@0	0.63
			1@47	0.58
		15	1@0	1.38
			1@11	1.45
			3@3	3.26
			Limit	

NB-IoT Band 5 PAR [dB]				
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Middle
				P-A
Band 5 Standalone	BPSK	3.75	1@0	0.42
			1@47	0.42
		15	1@0	1.08
			1@11	1.08
	QPSK	3.75	1@0	0.43
			1@47	0.42
		15	1@0	1.11
			1@11	1.13
			3@3	2.55
			Limit	

4.6 Occupy Bandwidth

Test Requirement:	FCC part22.913(a), 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, $VBW \geq 3 \times RBW$. 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	68.909	38.28	60.856	37.97	63.449	37.37
	15	1@0	119.19	38.39	127.88	116.4	131.41	114.4
QPSK	3.75	1@0	57.551	35.21	57.317	36.57	55.847	37.47
	15	1@0	131.61	128.1	132.94	128.5	134.84	116.4
	15	12@0	186.62	300.1	187.28	301.6	188.49	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	62.698	37.92	62.415	37.73	58.364	36.90
	15	1@0	129.71	105.2	129.89	126.7	131.08	128.3
QPSK	3.75	1@0	58.278	37.21	56.074	37.10	54.442	36.72
	15	1@0	131.68	126.8	131.85	127.4	126.31	124.7
	15	12@0	186.74	273.9	186.01	275.6	186.45	285.9

NB-IoT Band 5 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	62.504	37.87	60.767	38.08	62.644	38.10
	15	1@0	129.94	130.5	135.81	131.4	131.79	131.3
QPSK	3.75	1@0	60.496	37.99	54.364	37.74	55.052	37.32
	15	1@0	131.23	158.4	132.26	131.9	132.26	143.9
	15	12@0	191.04	334.4	188.77	302.7	187.25	315.6

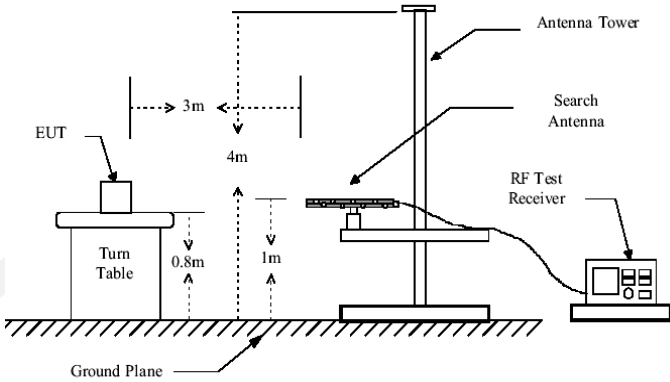
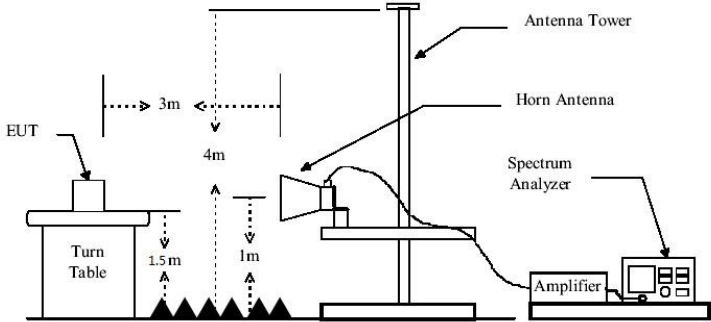
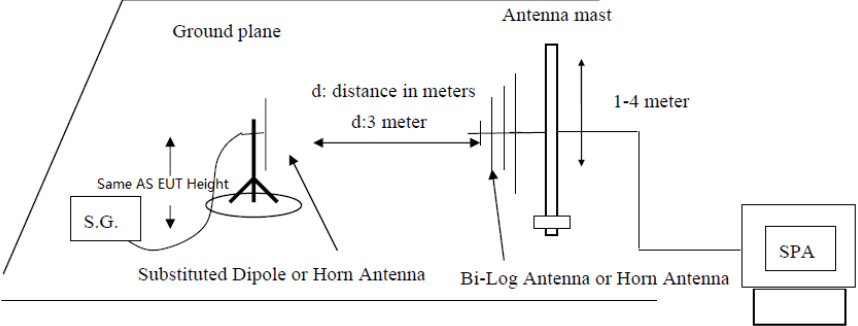
4.7 MODULATION CHARACTERISTIC

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

4.8 Out of band emission at antenna terminals

Test Requirement:	FCC part 22.913(a), 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)

4.9 Field strength of spurious radiation measurement

Test Requirement:	FCC part 22.913(a), FCC part 24.238(a), FCC part 27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	Band 2/4/5/12/13:-13dBm Band 13: -40dBm(1559-1610MHz) Band 7/38/41:-25dBm
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	-36.67	-13.00	Pass
5792.19	V	-37.40		
7722.30	V	-39.33		
9654.11	V	-43.17		
11584.23	V	-46.29		
3862.28	Horizontal	-37.11	-13.00	Pass
5791.16	H	-39.19		
7722.34	H	-39.84		
9652.04	H	-45.44		
11585.41	H	-42.72		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3920.32	Vertical	-37.54	-13.00	Pass
5880.28	V	-38.04		
7839.26	V	-37.39		
9799.61	V	-42.58		
11760.10	V	-45.23		
3919.68	Horizontal	-37.04	-13.00	Pass
5880.37	H	-39.61		
7839.83	H	-39.76		
9800.09	H	-46.42		
11759.75	H	-43.11		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3978.97	Vertical	-36.15	-13.00	Pass
5968.58	V	-37.09		
7956.52	V	-37.86		
9945.91	V	-46.88		
11935.92	V	-45.04		
3978.71	Horizontal	-35.41	-13.00	Pass
5967.54	H	-39.44		
7957.08	H	-37.94		
9947.24	H	-40.91		
11935.27	H	-45.19		

Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4220.98	Vertical	-37.50	-13.00	Pass
6332.66	V	-37.64		
8441.33	V	-38.14		
10553.88	V	-42.98		
12665.45	V	-46.33		
4220.92	Horizontal	-36.50	-13.00	Pass
6332.12	H	-38.75		
8442.60	H	-39.11		
10553.50	H	-45.40		
12663.24	H	-42.80		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4264.69	Vertical	-36.18	-13.00	Pass
6397.89	V	-38.09		
8529.59	V	-39.68		
10661.77	V	-43.66		
12794.35	V	-45.54		
4265.27	Horizontal	-35.37	-13.00	Pass
6397.77	H	-39.78		
8530.15	H	-37.67		
10662.99	H	-45.75		
12795.66	H	-42.82		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4307.91	Vertical	-37.64	-13.00	Pass
6462.86	V	-38.74		
8617.90	V	-38.13		
10771.15	V	-46.33		
12925.45	V	-46.86		
4309.14	Horizontal	-36.20	-13.00	Pass
6462.16	H	-39.04		
8617.21	H	-37.34		
10771.59	H	-44.48		
12925.16	H	-44.08		

Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1739.00	Vertical	-37.74	-13.00	Pass
2610.51	V	-38.39		
3479.78	V	-39.78		
4349.77	V	-42.92		
5218.38	V	-43.24		
1738.48	Horizontal	-37.49	-13.00	Pass
2610.23	H	-39.96		
3478.66	H	-37.94		
4347.36	H	-42.54		
5218.69	H	-42.63		
Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1763.59	Vertical	-36.11	-13.00	Pass
2644.12	V	-37.56		
3526.28	V	-37.90		
4407.07	V	-42.89		
5288.94	V	-44.33		
1762.26	Horizontal	-35.78	-13.00	Pass
2644.41	H	-37.88		
3526.24	H	-37.80		
4408.16	H	-46.60		
5289.43	H	-45.98		
Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1786.27	Vertical	-35.86	-13.00	Pass
2680.28	V	-38.89		
3572.68	V	-38.20		
4467.17	V	-45.72		
5359.69	V	-44.08		
1787.26	Horizontal	-36.92	-13.00	Pass
2680.09	H	-38.02		
3573.93	H	-38.52		
4466.98	H	-41.14		
5360.07	H	-46.15		

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	-36.07	-13.00	Pass
5790.91	V	-39.09		
7722.38	V	-38.79		
9654.87	V	-43.57		
11583.21	V	-45.36		
3860.57	Horizontal	-35.49	-13.00	Pass
5791.92	H	-38.68		
7722.40	H	-38.77		
9653.46	H	-45.39		
11583.49	H	-45.30		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3920.52	Vertical	-37.33	-13.00	Pass
5880.32	V	-39.82		
7840.72	V	-38.06		
9799.40	V	-46.47		
11760.49	V	-46.00		
3919.35	Horizontal	-37.20	-13.00	Pass
5880.05	H	-37.81		
7839.48	H	-37.32		
9800.34	H	-44.53		
11759.99	H	-43.96		
Test mode:	LTE Band 2(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3978.43	Vertical	-37.57	-13.00	Pass
5967.75	V	-37.68		
7956.70	V	-38.34		
9946.67	V	-42.29		
11936.31	V	-43.76		
3978.47	Horizontal	-35.97	-13.00	Pass
5967.87	H	-38.16		
7956.86	H	-38.12		
9946.74	H	-42.47		
11936.16	H	-46.55		

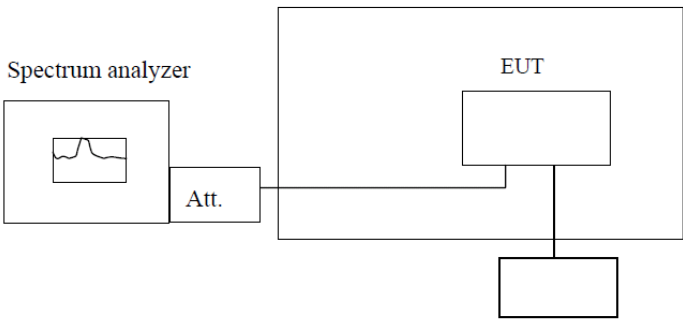
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4220.36	Vertical	-37.19	-13.00	Pass
6332.77	V	-37.85		
8443.96	V	-38.43		
10553.02	V	-45.24		
12665.48	V	-46.85		
4221.40	Horizontal	-35.34	-13.00	Pass
6331.53	H	-39.14		
8442.95	H	-37.97		
10552.41	H	-42.87		
12665.15	H	-44.39		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4264.66	Vertical	-35.79	-13.00	Pass
6397.09	V	-37.19		
8530.55	V	-38.47		
10662.91	V	-45.90		
12794.67	V	-43.89		
4264.73	Horizontal	-37.58	-13.00	Pass
6397.06	H	-37.07		
8529.33	H	-37.31		
10662.97	H	-44.42		
12795.43	H	-46.37		
Test mode:	LTE Band 4(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
4309.16	Vertical	-37.74	-13.00	Pass
6463.22	V	-39.38		
8617.84	V	-39.55		
10771.98	V	-42.54		
12925.87	V	-46.09		
4307.95	Horizontal	-37.75	-13.00	Pass
6462.24	H	-37.17		
8617.45	H	-37.32		
10771.98	H	-41.37		
12925.42	H	-43.40		

Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1739.98	Vertical	-36.66	-13.00	Pass
2607.93	V	-38.55		
3477.57	V	-37.95		
4347.60	V	-45.81		
5217.92	V	-45.93		
1738.37	Horizontal	-35.59	-13.00	Pass
2609.16	H	-38.44		
3478.78	H	-37.40		
4349.63	H	-44.72		
5217.85	H	-44.98		
Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1763.67	Vertical	-36.11	-13.00	Pass
2644.22	V	-39.73		
3526.51	V	-38.74		
4408.03	V	-46.10		
5289.53	V	-46.67		
1762.33	Horizontal	-36.37	-13.00	Pass
2644.51	H	-38.37		
3526.18	H	-38.76		
4406.83	H	-44.27		
5289.55	H	-44.07		
Test mode:	LTE Band 5(SCS: 15KHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1786.04	Vertical	-35.15	-13.00	Pass
2679.48	V	-39.20		
3573.45	V	-39.87		
4467.24	V	-42.68		
5360.06	V	-45.13		
1786.40	Horizontal	-35.56	-13.00	Pass
2680.50	H	-37.45		
3573.38	H	-39.86		
4466.69	H	-41.22		
5359.61	H	-44.42		

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.

4.10 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	68.86	0.037	2.5ppm	PASS
80		84.14	0.045		
70		62.80	0.033		
60		29.51	0.016		
50		41.58	0.022		
40		32.66	0.017		
30		75.09	0.040		
20		84.01	0.045		
10		84.02	0.045		
0		34.99	0.019		
-10		50.87	0.027		
-20		79.68	0.042		
-30		75.53	0.040		
-40		44.90	0.024		
25	Maximum Voltage	40.24	0.021		
25	BEP	76.82	0.041		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	25.15	0.013	2.5ppm	PASS
80		73.67	0.039		
70		82.17	0.044		
60		30.28	0.016		
50		43.03	0.023		
40		75.33	0.040		
30		60.36	0.032		
20		77.29	0.041		
10		40.44	0.022		
0		73.49	0.039		
-10		78.03	0.042		
-20		55.79	0.030		
-30		32.94	0.018		
-40		83.77	0.045		
25	Maximum Voltage	32.06	0.017		
25	BEP	72.68	0.039		

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	69.43	0.037	2.5ppm	PASS
80		53.89	0.029		
70		36.10	0.019		
60		66.82	0.036		
50		38.90	0.021		
40		54.40	0.029		
30		47.48	0.025		
20		77.67	0.041		
10		53.49	0.028		
0		31.99	0.017		
-10		68.34	0.036		
-20		73.31	0.039		
-30		79.31	0.042		
-40		79.82	0.042		
25	Maximum Voltage	60.93	0.032	2.5ppm	PASS
25	BEP	27.41	0.015		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@11					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	41.71	0.022	2.5ppm	PASS
80		54.94	0.029		
70		67.18	0.036		
60		40.00	0.021		
50		56.71	0.030		
40		62.43	0.033		
30		77.74	0.041		
20		41.91	0.022		
10		80.49	0.043		
0		73.76	0.039		
-10		48.63	0.026		
-20		73.14	0.039		
-30		49.69	0.026		
-40		37.94	0.020		
25	Maximum Voltage	26.62	0.014	2.5ppm	PASS
25	BEP	58.24	0.031		

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	76.44	0.044	2.5ppm	PASS
80		49.45	0.029		
70		58.02	0.033		
60		83.65	0.048		
50		48.56	0.028		
40		74.35	0.043		
30		26.73	0.015		
20		60.14	0.035		
10		37.51	0.022		
0		25.09	0.014		
-10		34.42	0.020		
-20		26.55	0.015		
-30		75.18	0.043		
-40		61.39	0.035		
25	Maximum Voltage	35.33	0.020		
25	BEP	62.26	0.036		

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	73.15	0.042	2.5ppm	PASS
80		52.96	0.031		
70		47.17	0.027		
60		66.81	0.039		
50		58.79	0.034		
40		42.73	0.025		
30		29.12	0.017		
20		38.80	0.022		
10		41.19	0.024		
0		35.32	0.020		
-10		36.50	0.021		
-20		61.01	0.035		
-30		26.12	0.015		
-40		63.41	0.037		
25	Maximum Voltage	42.07	0.024		
25	BEP	54.74	0.032		

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	66.51	0.038	2.5ppm	PASS
80		62.62	0.036		
70		49.14	0.028		
60		55.85	0.032		
50		65.78	0.038		
40		77.44	0.045		
30		55.83	0.032		
20		81.58	0.047		
10		84.97	0.049		
0		85.91	0.050		
-10		46.38	0.027		
-20		70.83	0.041		
-30		46.71	0.027		
-40		28.18	0.016		
25	Maximum Voltage	35.98	0.021		
25	BEP	65.46	0.038		

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	66.41	0.038	2.5ppm	PASS
80		38.78	0.022		
70		79.08	0.046		
60		44.65	0.026		
50		28.74	0.017		
40		72.11	0.042		
30		72.33	0.042		
20		42.81	0.025		
10		53.24	0.031		
0		74.78	0.043		
-10		44.90	0.026		
-20		44.64	0.026		
-30		44.34	0.026		
-40		40.84	0.024		
25	Maximum Voltage	81.05	0.047		
25	BEP	31.66	0.018		

NB-IoT Band 5 (QPSK) / 836.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	40.71	0.049	2.5ppm	PASS
80		73.21	0.088		
70		54.15	0.065		
60		48.78	0.058		
50		73.77	0.088		
40		54.48	0.065		
30		59.00	0.071		
20		51.61	0.062		
10		71.14	0.085		
0		48.49	0.058		
-10		65.38	0.078		
-20		58.76	0.070		
-30		80.00	0.096		
-40		48.49	0.058		
25	Maximum Voltage	28.37	0.034		
25	BEP	45.26	0.054		

NB-IoT Band 5 (QPSK) / 836.5MHz / 15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	68.34	0.082	2.5ppm	PASS
80		71.47	0.085		
70		39.60	0.047		
60		76.47	0.091		
50		64.69	0.077		
40		27.52	0.033		
30		60.93	0.073		
20		76.02	0.091		
10		57.69	0.069		
0		51.79	0.062		
-10		47.35	0.057		
-20		52.92	0.063		
-30		33.88	0.041		
-40		78.50	0.094		
25	Maximum Voltage	79.80	0.095		
25	BEP	52.19	0.062		

NB-IoT Band 5 (QPSK) / 836.5MHz / 3.75KHz/1@47					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	45.14	0.054	2.5ppm	PASS
80		25.28	0.030		
70		31.31	0.037		
60		38.69	0.046		
50		81.04	0.097		
40		53.01	0.063		
30		40.73	0.049		
20		84.06	0.100		
10		68.34	0.082		
0		74.78	0.089		
-10		68.74	0.082		
-20		35.76	0.043		
-30		37.64	0.045		
-40		53.41	0.064		
25	Maximum Voltage	58.02	0.069		
25	BEP	45.04	0.054		

NB-IoT Band 5 (QPSK) / 836.5MHz / 15KHz/1@11					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
85	Normal Voltage	78.11	0.093	2.5ppm	PASS
80		84.16	0.101		
70		48.92	0.058		
60		35.96	0.043		
50		69.64	0.083		
40		50.89	0.061		
30		30.31	0.036		
20		77.97	0.093		
10		80.52	0.096		
0		56.33	0.067		
-10		32.18	0.038		
-20		66.35	0.079		
-30		27.25	0.033		
-40		48.79	0.058		
25	Maximum Voltage	25.35	0.030		
25	BEP	45.52	0.054		

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-----

