



FCC TEST REPORT

FCC ID: 2AXZU-GTPMBAT2E4

On Behalf of

E.R.M ELECTRONIC SYSTEMS LTD

GPS 4G Tracker Sleek (CATM)

Model No.: GTPMBAT2e4

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

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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 Sleek (CATM)
(A) Model No. : GTPMBAT2e4
(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 and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the above standards requirements.

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 25, 2025

Revision History

Revision	Issue Date	Revisions	Revised By
V0	July 25, 2025	Initial released Issue	Felix Pang



1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure	Part 1.1307 Part 2.1093	Pass* (Please refer to RF Exposure)
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 Sleek (CATM)
Model Number : GTPMBAT2e4
Diff : N/A
Test Voltage : DC 12V/24V from adapter, DC 3.7V from battery

Support Networks : LTE

Support Bands : CAT-M: Band 2/4/5/12/13

CAT-M Band 2: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz
CAT-M Band 4: 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz

Channel Bandwidth : CAT-M Band 5: 1.4MHz / 3MHz / 5MHz / 10MHz
CAT-M Band 12: 1.4MHz / 3MHz / 5MHz / 10MHz
CAT-M Band 13: 5MHz / 10MHz

TX Frequency : CAT-M Band 2: 1850.7~1909.3MHz
CAT-M Band 4: 1710.7~1754.3MHz
CAT-M Band 5: 824.7~848.3MHz
CAT-M Band 12: 699.7~715.3MHz
CAT-M Band 13: 779.5~784.5MHz

Modulation type : QPSK, 16QAM

Antenna type : PCB Antenna

Antenna Type : Maximum Gain is 0.3dBi for CAT-M Band 2
Maximum Gain is 0.5dBi for CAT-M Band 4
Maximum Gain is -0.4dBi for CAT-M Band 5
Maximum Gain is -0.6dBi for CAT-M Band 12
Maximum Gain is -0.6dBi for CAT-M Band 13

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.
The product has another product name: OnBatt 4G SF LTE (catM1)

Final test channel:

Operation bands	Channel Bandwidth (MHz)	Frequencies under Test					
		Channel Low	CH Fre (MHz)	Channel Mid	CH Fre (MHz)	Channel High	CH Fre (MHz)
Band 2	1.4	18607	1850.7	18900	1880	19193	1909.3
	3	18615	1851.5	18900	1880	19185	1908.5
	5	18625	1852.5	18900	1880	19175	1907.5
	10	18650	1855	18900	1880	19150	1905
	15	18675	1857.5	18900	1880	19125	1902.5
	20	18700	1860	18900	1880	19100	1900
Band 4	1.4	19957	1710.7	20175	1732.5	20393	1754.3
	3	19965	1711.5	20175	1732.5	20385	1753.5
	5	19975	1712.5	20175	1732.5	20375	1752.5
	10	20000	1715	20175	1732.5	20350	1750
	15	20025	1717.5	20175	1732.5	20325	1747.5
	20	20050	1720	20175	1732.5	20300	1745
Band 5	1.4	20407	824.7	20525	836.5	20643	848.3
	3	20415	825.5	20525	836.5	20635	847.5
	5	20425	826.5	20525	836.5	20625	846.5
	10	20450	829	20525	836.5	20600	844
Band 12	1.4	23017	699.7	23095	707.5	23173	715.3
	3	23025	700.5	23095	707.5	23165	714.5
	5	23035	701.5	23095	707.5	23155	713.5
	10	23060	704	23095	707.5	23130	711
Band 13	5	23205	779.5	23230	782	23255	784.5
	10	23230	782	23230	782	23230	782

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
Temperature range:	15-35℃
Humidity range:	25-75%
Pressure range:	86-106kPa

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		
RF	RTS	TACHOY			V1.0.0		

4 System test configuration

4.1 Test mode

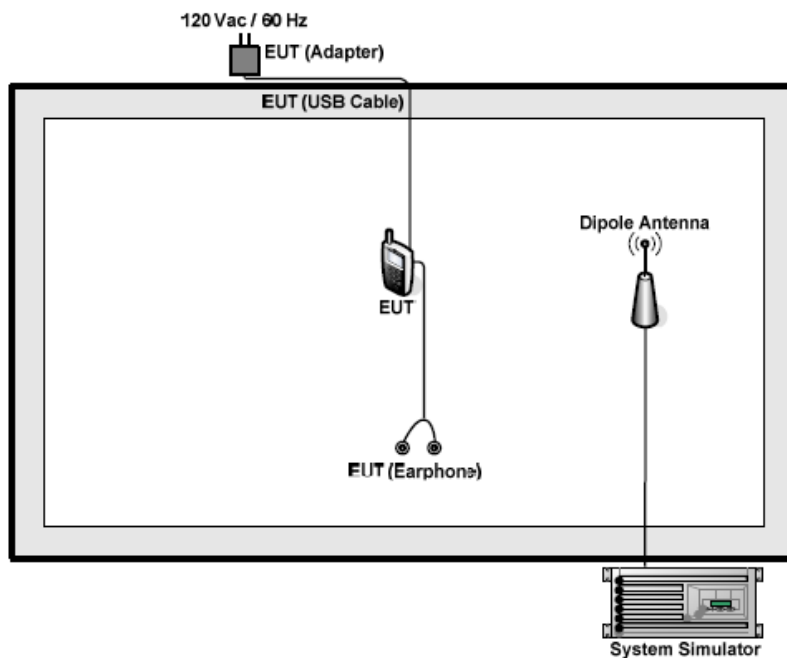
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
CAT-M Band 2	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
CAT-M Band 4	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
CAT-M Band 5	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
CAT-M Band 12	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
CAT-M Band 13	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

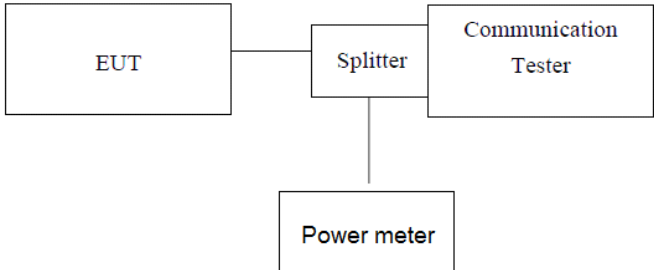
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

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 part22.913(a) (5), FCC part24.232(b) and FCC Part 27.50 (d)(4)/(h)/(c)
Test Method:	ANSI C63.26:2015
Limit:	CAT-M Band 2: 2W(33.01dBm) CAT-M Band 4: 1W(30.00dBm) CAT-M Band 5: 7W(38.45dBm) CAT-M Band 12: 3W(34.77dBm) CAT-M Band 13: 3W(34.77dBm)
Test setup:	 <i>Note: Measurement setup for testing on Antenna connector</i>
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 (Please refer to ANNEX for the test results)

Band	BW [MHz]	Modulation	Channel	RB Size	RB Start	NBIndex	Result (dBm)	EIRP (dBm)(watts)	Limit (watts)	Verdict
B2	1.4	QPSK	Low	1	0	Low	23.48	23.78 0.239	2	Pass
B2	1.4		Low	6	0	Low	21.24	21.54 0.143	2	Pass
B2	3		Low	1	0	Low	23.48	23.78 0.239	2	Pass
B2	3		Low	6	0	Low	21.42	21.72 0.149	2	Pass
B2	5		Low	1	0	Low	23.04	23.34 0.216	2	Pass
B2	5		Low	6	0	Low	22.57	22.87 0.194	2	Pass
B2	10		Low	1	0	Low	22.87	23.17 0.207	2	Pass
B2	10		Low	6	0	Low	22.09	22.39 0.173	2	Pass
B2	15		Low	1	0	Low	23.06	23.36 0.217	2	Pass
B2	15		Low	6	0	Low	21.59	21.89 0.155	2	Pass
B2	20		Low	1	0	Low	22.02	22.32 0.171	2	Pass
B2	20		Low	6	0	Low	21.41	21.71 0.148	2	Pass
B2	1.4	16-QAM	Low	1	0	Low	23.33	23.63 0.231	2	Pass
B2	1.4		Low	5	0	Low	21.26	21.56 0.143	2	Pass
B2	3		Low	1	0	Low	23.39	23.69 0.234	2	Pass
B2	3		Low	5	0	Low	22.40	22.70 0.186	2	Pass
B2	5		Low	1	0	Low	23.51	23.81 0.240	2	Pass
B2	5		Low	5	0	Low	21.33	21.63 0.146	2	Pass
B2	10		Low	1	0	Low	23.38	23.68 0.233	2	Pass
B2	10		Low	5	0	Low	21.46	21.76 0.150	2	Pass
B2	15		Low	1	0	Low	23.15	23.45 0.221	2	Pass
B2	15		Low	5	0	Low	22.68	22.98 0.199	2	Pass
B2	20		Low	1	0	Low	23.06	23.36 0.217	2	Pass
B2	20		Low	5	0	Low	22.34	22.64 0.184	2	Pass
B2	1.4	QPSK	Middle	1	0	Low	22.87	23.17 0.207	2	Pass
B2	1.4		Middle	6	0	Low	21.14	21.44 0.139	2	Pass
B2	3		Middle	1	0	Low	22.04	22.34 0.171	2	Pass
B2	3		Middle	6	0	Low	21.77	22.07 0.161	2	Pass
B2	5		Middle	1	0	Low	23.69	23.99 0.251	2	Pass
B2	5		Middle	6	0	Low	21.58	21.88 0.154	2	Pass
B2	10		Middle	1	0	Low	23.67	23.97 0.249	2	Pass
B2	10		Middle	6	0	Low	22.38	22.68 0.185	2	Pass
B2	15		Middle	1	0	Low	23.48	23.78 0.239	2	Pass
B2	15		Middle	6	0	Low	21.11	21.41 0.138	2	Pass
B2	20		Middle	1	0	Low	23.88	24.18 0.262	2	Pass
B2	20		Middle	6	0	Low	21.55	21.85 0.153	2	Pass
B2	1.4	16-QAM	Middle	1	0	Low	22.89	23.19 0.208	2	Pass
B2	1.4		Middle	5	0	Low	22.80	23.10 0.204	2	Pass
B2	3		Middle	1	0	Low	23.15	23.45 0.221	2	Pass
B2	3		Middle	5	0	Low	22.14	22.44 0.175	2	Pass
B2	5		Middle	1	0	Low	22.75	23.05 0.202	2	Pass
B2	5		Middle	5	0	Low	21.36	21.66 0.147	2	Pass
B2	10		Middle	1	0	Low	21.67	21.97 0.157	2	Pass
B2	10		Middle	5	0	Low	22.08	22.38 0.173	2	Pass
B2	15		Middle	1	0	Low	23.26	23.56 0.227	2	Pass
B2	15		Middle	5	0	Low	21.72	22.02 0.159	2	Pass
B2	20		Middle	1	0	Low	23.74	24.04 0.254	2	Pass
B2	20		Middle	5	0	Low	22.24	22.54 0.179	2	Pass
B2	1.4	QPSK	High	1	5	High	23.05	23.35 0.216	2	Pass
B2	1.4		High	6	0	High	21.39	21.69 0.148	2	Pass
B2	3		High	1	5	High	23.42	23.72 0.236	2	Pass
B2	3		High	6	0	High	21.34	21.64 0.146	2	Pass
B2	5		High	1	5	High	23.31	23.61 0.230	2	Pass
B2	5		High	3	3	High	22.64	22.94 0.197	2	Pass
B2	10		High	1	5	High	23.02	23.32 0.215	2	Pass
B2	10		High	6	0	High	22.20	22.50 0.178	2	Pass
B2	15		High	1	5	High	22.81	23.11 0.205	2	Pass
B2	15		High	6	0	High	21.43	21.73 0.149	2	Pass
B2	20		High	1	5	High	23.62	23.92 0.247	2	Pass
B2	20		High	6	0	High	21.17	21.47 0.140	2	Pass
B2	1.4	16-QAM	High	1	5	High	23.57	23.87 0.244	2	Pass
B2	1.4		High	5	1	High	21.64	21.94 0.156	2	Pass
B2	3		High	1	5	High	23.12	23.42 0.220	2	Pass
B2	3		High	5	1	High	22.01	22.31 0.170	2	Pass
B2	5		High	1	5	High	23.66	23.96 0.249	2	Pass
B2	5		High	3	3	High	21.20	21.50 0.141	2	Pass

B2	10		High	1	5	High	23.35	23.65	0.232	2	Pass
B2	10		High	5	1	High	21.29	21.59	0.144	2	Pass
B2	15		High	1	5	High	22.98	23.28	0.213	2	Pass
B2	15		High	5	1	High	22.81	23.11	0.205	2	Pass
B2	20		High	1	5	High	23.47	23.77	0.238	2	Pass
B2	20		High	5	1	High	22.13	22.43	0.175	2	Pass

Note: Maximum Gain is 0.3dBi for CAT-M Band 2



Band	BW [MHz]	Modulation	Channel	RB Size	RB Start	NBIndex	Result (dBm)	EIRP (dBm) (watts)	Limit (watts)	Verdict
B4	1.4	QPSK	Low	1	0	Low	23.60	24.10 0.257	1	Pass
B4	1.4		Low	6	0	Low	21.20	21.70 0.148	1	Pass
B4	3		Low	1	0	Low	23.47	23.97 0.249	1	Pass
B4	3		Low	6	0	Low	21.36	21.86 0.153	1	Pass
B4	5		Low	1	0	Low	22.96	23.46 0.222	1	Pass
B4	5		Low	6	0	Low	22.48	22.98 0.199	1	Pass
B4	10		Low	1	0	Low	23.14	23.64 0.231	1	Pass
B4	10		Low	6	0	Low	22.01	22.51 0.178	1	Pass
B4	15		Low	1	0	Low	22.79	23.29 0.213	1	Pass
B4	15		Low	6	0	Low	21.31	21.81 0.152	1	Pass
B4	20		Low	1	0	Low	21.81	22.31 0.170	1	Pass
B4	20		Low	6	0	Low	21.22	21.72 0.149	1	Pass
B4	1.4	16-QAM	Low	1	0	Low	23.52	24.02 0.252	1	Pass
B4	1.4		Low	5	0	Low	21.37	21.87 0.154	1	Pass
B4	3		Low	1	0	Low	23.07	23.57 0.228	1	Pass
B4	3		Low	5	0	Low	22.50	23.00 0.200	1	Pass
B4	5		Low	1	0	Low	23.48	23.98 0.250	1	Pass
B4	5		Low	5	0	Low	21.48	21.98 0.158	1	Pass
B4	10		Low	1	0	Low	23.60	24.10 0.257	1	Pass
B4	10		Low	5	0	Low	21.57	22.07 0.161	1	Pass
B4	15		Low	1	0	Low	23.16	23.66 0.232	1	Pass
B4	15		Low	5	0	Low	22.63	23.13 0.206	1	Pass
B4	20		Low	1	0	Low	23.07	23.57 0.228	1	Pass
B4	20		Low	5	0	Low	22.44	22.94 0.197	1	Pass
B4	1.4	QPSK	Middle	1	0	Low	22.82	23.32 0.215	1	Pass
B4	1.4		Middle	6	0	Low	21.14	21.64 0.146	1	Pass
B4	3		Middle	1	0	Low	22.03	22.53 0.179	1	Pass
B4	3		Middle	6	0	Low	22.01	22.51 0.178	1	Pass
B4	5		Middle	1	0	Low	23.78	24.28 0.268	1	Pass
B4	5		Middle	6	0	Low	21.59	22.09 0.162	1	Pass
B4	10		Middle	1	0	Low	23.57	24.07 0.255	1	Pass
B4	10		Middle	6	0	Low	22.57	23.07 0.203	1	Pass
B4	15		Middle	1	0	Low	23.43	23.93 0.247	1	Pass
B4	15		Middle	6	0	Low	21.11	21.61 0.145	1	Pass
B4	20		Middle	1	0	Low	23.59	24.09 0.256	1	Pass
B4	20		Middle	6	0	Low	21.58	22.08 0.161	1	Pass
B4	1.4	16-QAM	Middle	1	0	Low	22.89	23.39 0.218	1	Pass
B4	1.4		Middle	5	0	Low	22.42	22.92 0.196	1	Pass
B4	3		Middle	1	0	Low	22.93	23.43 0.220	1	Pass
B4	3		Middle	5	0	Low	22.25	22.75 0.188	1	Pass
B4	5		Middle	1	0	Low	22.76	23.26 0.212	1	Pass
B4	5		Middle	5	0	Low	21.59	22.09 0.162	1	Pass
B4	10		Middle	1	0	Low	21.71	22.21 0.166	1	Pass
B4	10		Middle	5	0	Low	21.93	22.43 0.175	1	Pass
B4	15		Middle	1	0	Low	23.25	23.75 0.237	1	Pass
B4	15		Middle	5	0	Low	21.73	22.23 0.167	1	Pass
B4	20		Middle	1	0	Low	23.09	23.59 0.229	1	Pass
B4	20		Middle	5	0	Low	22.49	22.99 0.199	1	Pass
B4	1.4	QPSK	High	1	5	High	23.20	23.70 0.234	1	Pass
B4	1.4		High	6	0	High	21.38	21.88 0.154	1	Pass
B4	3		High	1	5	High	23.49	23.99 0.251	1	Pass
B4	3		High	6	0	High	21.47	21.97 0.157	1	Pass
B4	5		High	1	5	High	23.31	23.81 0.240	1	Pass
B4	5		High	3	3	High	22.73	23.23 0.210	1	Pass
B4	10		High	1	5	High	22.84	23.34 0.216	1	Pass
B4	10		High	6	0	High	22.48	22.98 0.199	1	Pass
B4	15		High	1	5	High	22.70	23.20 0.209	1	Pass
B4	15		High	6	0	High	21.34	21.84 0.153	1	Pass
B4	20		High	1	5	High	23.82	24.32 0.270	1	Pass
B4	20		High	6	0	High	21.09	21.59 0.144	1	Pass
B4	1.4	16-QAM	High	1	5	High	23.53	24.03 0.253	1	Pass
B4	1.4		High	5	1	High	21.78	22.28 0.169	1	Pass
B4	3		High	1	5	High	23.33	23.83 0.242	1	Pass
B4	3		High	5	1	High	22.09	22.59 0.182	1	Pass
B4	5		High	1	5	High	23.56	24.06 0.255	1	Pass
B4	5		High	3	3	High	21.28	21.78 0.151	1	Pass
B4	10		High	1	5	High	23.57	24.07 0.255	1	Pass

B4	10		High	5	1	High	21.19	21.69	0.148	1	Pass
B4	15		High	1	5	High	23.01	23.51	0.224	1	Pass
B4	15		High	5	1	High	22.62	23.12	0.205	1	Pass
B4	20		High	1	5	High	23.78	24.28	0.268	1	Pass
B4	20		High	5	1	High	21.98	22.48	0.177	1	Pass

Note: Maximum Gain is 0.5dBi for CAT-M Band 4.



Band	BW [MHz]	Modulation	Channel	RB Size	RB Start	NBIndex	Result (dBm)	ERP (dBm) (watts)	Limit (watts)	Verdict
B5	1.4	QPSK	Low	1	0	Low	23.18	20.63 0.116	7	Pass
B5	1.4		Low	6	0	Low	21.39	18.84 0.077	7	Pass
B5	3		Low	1	0	Low	23.75	21.20 0.132	7	Pass
B5	3		Low	6	0	Low	21.54	18.99 0.079	7	Pass
B5	5		Low	1	0	Low	23.53	20.98 0.125	7	Pass
B5	5		Low	6	0	Low	22.25	19.70 0.093	7	Pass
B5	10		Low	1	0	Low	23.06	20.51 0.112	7	Pass
B5	10		Low	6	0	Low	22.14	19.59 0.091	7	Pass
B5	1.4	16-QAM	Low	1	0	Low	22.84	20.29 0.107	7	Pass
B5	1.4		Low	5	0	Low	21.41	18.86 0.077	7	Pass
B5	3		Low	1	0	Low	21.87	19.32 0.086	7	Pass
B5	3		Low	5	0	Low	21.88	19.33 0.086	7	Pass
B5	5		Low	1	0	Low	23.50	20.95 0.124	7	Pass
B5	5		Low	5	0	Low	21.35	18.80 0.076	7	Pass
B5	10		Low	1	0	Low	23.46	20.91 0.123	7	Pass
B5	10		Low	5	0	Low	22.64	20.09 0.102	7	Pass
B5	1.4	QPSK	Middle	1	0	Low	23.52	20.97 0.125	7	Pass
B5	1.4		Middle	6	0	Low	21.40	18.85 0.077	7	Pass
B5	3		Middle	1	0	Low	23.53	20.98 0.125	7	Pass
B5	3		Middle	6	0	Low	21.30	18.75 0.075	7	Pass
B5	5		Middle	1	0	Low	23.22	20.67 0.117	7	Pass
B5	5		Middle	6	0	Low	22.38	19.83 0.096	7	Pass
B5	10		Middle	1	0	Low	23.84	21.29 0.135	7	Pass
B5	10		Middle	6	0	Low	22.54	19.99 0.100	7	Pass
B5	1.4	16-QAM	Middle	1	0	Low	23.07	20.52 0.113	7	Pass
B5	1.4		Middle	5	0	Low	21.62	19.07 0.081	7	Pass
B5	3		Middle	1	0	Low	21.77	19.22 0.084	7	Pass
B5	3		Middle	5	0	Low	21.84	19.29 0.085	7	Pass
B5	5		Middle	1	0	Low	23.57	21.02 0.126	7	Pass
B5	5		Middle	5	0	Low	21.14	18.59 0.072	7	Pass
B5	10		Middle	1	0	Low	23.81	21.26 0.134	7	Pass
B5	10		Middle	5	0	Low	22.23	19.68 0.093	7	Pass
B5	1.4	QPSK	High	1	5	High	23.55	21.00 0.126	7	Pass
B5	1.4		High	6	0	High	21.12	18.57 0.072	7	Pass
B5	3		High	1	5	High	23.40	20.85 0.122	7	Pass
B5	3		High	6	0	High	21.53	18.98 0.079	7	Pass
B5	5		High	1	5	High	22.83	20.28 0.107	7	Pass
B5	5		High	3	3	High	22.52	19.97 0.099	7	Pass
B5	10		High	1	5	High	22.98	20.43 0.110	7	Pass
B5	10		High	6	0	High	22.37	19.82 0.096	7	Pass
B5	1.4	16-QAM	High	1	5	High	22.90	20.35 0.108	7	Pass
B5	1.4		High	5	1	High	21.24	18.69 0.074	7	Pass
B5	3		High	1	5	High	21.89	19.34 0.086	7	Pass
B5	3		High	5	1	High	21.95	19.40 0.087	7	Pass
B5	5		High	1	5	High	23.77	21.22 0.132	7	Pass
B5	5		High	3	3	High	21.67	19.12 0.082	7	Pass
B5	10		High	1	5	High	23.44	20.89 0.123	7	Pass
B5	10		High	5	1	High	22.35	19.80 0.095	7	Pass

Note: Maximum Gain is -0.4dBi for CAT-M Band 5.

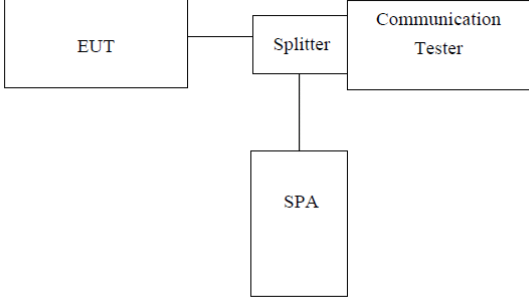
Band	BW [MHz]	Modulation	Channel	RB Size	RB Start	NBIndex	Result (dBm)	ERP (dBm) (watts)	Limit (watts)	Verdict
B12	1.4	QPSK	Low	1	0	Low	23.32	20.57 0.114	7	Pass
B12	1.4		Low	6	0	Low	21.44	18.69 0.074	7	Pass
B12	3		Low	1	0	Low	23.66	20.91 0.123	7	Pass
B12	3		Low	6	0	Low	21.43	18.68 0.074	7	Pass
B12	5		Low	1	0	Low	23.25	20.50 0.112	7	Pass
B12	5		Low	6	0	Low	22.27	19.52 0.090	7	Pass
B12	10		Low	1	0	Low	22.86	20.11 0.103	7	Pass
B12	10		Low	6	0	Low	21.78	19.03 0.080	7	Pass
B12	1.4	16-QAM	Low	1	0	Low	22.75	20.00 0.100	7	Pass
B12	1.4		Low	5	0	Low	21.67	18.92 0.078	7	Pass
B12	3		Low	1	0	Low	21.83	19.08 0.081	7	Pass
B12	3		Low	5	0	Low	21.92	19.17 0.083	7	Pass
B12	5		Low	1	0	Low	23.49	20.74 0.119	7	Pass
B12	5		Low	5	0	Low	21.25	18.50 0.071	7	Pass
B12	10		Low	1	0	Low	23.62	20.87 0.122	7	Pass
B12	10		Low	5	0	Low	22.50	19.75 0.094	7	Pass
B12	1.4	QPSK	Middle	1	0	Low	23.50	20.75 0.119	7	Pass
B12	1.4		Middle	6	0	Low	21.32	18.57 0.072	7	Pass
B12	3		Middle	1	0	Low	23.23	20.48 0.112	7	Pass
B12	3		Middle	6	0	Low	21.29	18.54 0.071	7	Pass
B12	5		Middle	1	0	Low	23.16	20.41 0.110	7	Pass
B12	5		Middle	6	0	Low	22.36	19.61 0.091	7	Pass
B12	10		Middle	1	0	Low	23.88	21.13 0.130	7	Pass
B12	10		Middle	6	0	Low	22.17	19.42 0.087	7	Pass
B12	1.4	16-QAM	Middle	1	0	Low	23.04	20.29 0.107	7	Pass
B12	1.4		Middle	5	0	Low	21.48	18.73 0.075	7	Pass
B12	3		Middle	1	0	Low	21.93	19.18 0.083	7	Pass
B12	3		Middle	5	0	Low	21.78	19.03 0.080	7	Pass
B12	5		Middle	1	0	Low	23.43	20.68 0.117	7	Pass
B12	5		Middle	5	0	Low	21.31	18.56 0.072	7	Pass
B12	10		Middle	1	0	Low	23.76	21.01 0.126	7	Pass
B12	10		Middle	5	0	Low	22.18	19.43 0.088	7	Pass
B12	1.4	QPSK	High	1	5	High	23.42	20.67 0.117	7	Pass
B12	1.4		High	6	0	High	21.30	18.55 0.072	7	Pass
B12	3		High	1	5	High	23.82	21.07 0.128	7	Pass
B12	3		High	6	0	High	21.41	18.66 0.073	7	Pass
B12	5		High	1	5	High	22.91	20.16 0.104	7	Pass
B12	5		High	3	3	High	22.54	19.79 0.095	7	Pass
B12	10		High	1	5	High	22.95	20.20 0.105	7	Pass
B12	10		High	6	0	High	22.04	19.29 0.085	7	Pass
B12	1.4	16-QAM	High	1	5	High	22.86	20.11 0.103	7	Pass
B12	1.4		High	5	1	High	21.39	18.64 0.073	7	Pass
B12	3		High	1	5	High	21.89	19.14 0.082	7	Pass
B12	3		High	5	1	High	21.90	19.15 0.082	7	Pass
B12	5		High	1	5	High	23.58	20.83 0.121	7	Pass
B12	5		High	3	3	High	21.57	18.82 0.076	7	Pass
B12	10		High	1	5	High	23.52	20.77 0.119	7	Pass
B12	10		High	5	1	High	22.59	19.84 0.096	7	Pass

Note: Maximum Gain is -0.6dBi for CAT-M Band 12.

Band	BW [MHz]	Modulation	Channel	RB Size	RB Start	NBIndex	Result (dBm)	ERP (dBm)(watts)	Limit (watts)	Verdict	
B13	5	QPSK	Low	1	0	Low	23.40	21.72	0.149	7	Pass
B13	5		Low	6	0	Low	22.13	20.68	0.117	7	Pass
B13	10		Low	1	0	Low	22.91	21.29	0.135	7	Pass
B13	10		Low	6	0	Low	22.13	20.36	0.109	7	Pass
B13	5	16-QAM	Low	1	0	Low	23.45	21.95	0.157	7	Pass
B13	5		Low	5	0	Low	21.54	19.82	0.096	7	Pass
B13	10		Low	1	0	Low	23.50	21.83	0.152	7	Pass
B13	10		Low	5	0	Low	22.43	20.96	0.125	7	Pass
B13	5	QPSK	Middle	1	0	Low	23.06	21.60	0.145	7	Pass
B13	5		Middle	6	0	Low	22.39	20.75	0.119	7	Pass
B13	10		Middle	1	0	Low	23.87	22.06	0.161	7	Pass
B13	10		Middle	6	0	Low	22.22	20.74	0.119	7	Pass
B13	5	16-QAM	Middle	1	0	Low	23.39	21.93	0.156	7	Pass
B13	5		Middle	5	0	Low	21.37	19.61	0.091	7	Pass
B13	10		Middle	1	0	Low	23.49	22.01	0.159	7	Pass
B13	10		Middle	5	0	Low	22.12	20.65	0.116	7	Pass
B13	5	QPSK	High	1	5	High	23.03	21.41	0.138	7	Pass
B13	5		High	3	3	High	22.54	21.04	0.127	7	Pass
B13	10		High	1	5	High	23.13	21.31	0.135	7	Pass
B13	10		High	6	0	High	22.18	20.60	0.115	7	Pass
B13	5	16-QAM	High	1	5	High	23.14	22.02	0.159	7	Pass
B13	5		High	3	3	High	21.47	19.89	0.097	7	Pass
B13	10		High	1	5	High	23.78	21.86	0.153	7	Pass
B13	10		High	5	1	High	22.41	20.89	0.123	7	Pass

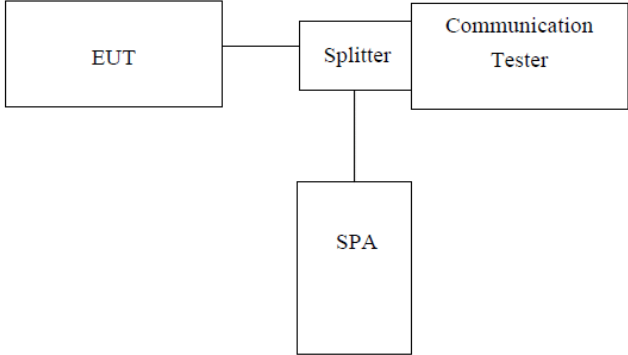
Note: Maximum Gain is -0.6Bi for CAT-M Band 13.

4.4 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:	 <i>Note: Measurement setup for testing on Antenna connector</i>
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)

Band	Mode	Channel	BW [MHz]	RB Size	RB Start	Result(dB)	Limit(dB)
BAND 2	QPSK	CH Mid	1.4	6	0	5.70	≤13
		CH Mid	3	6	0	5.80	≤13
		CH Mid	5	6	0	5.65	≤13
		CH Mid	10	6	0	5.64	≤13
		CH Mid	15	6	0	5.84	≤13
		CH Mid	20	6	0	5.69	≤13
	16-QAM	CH Mid	1.4	5	0	5.62	≤13
		CH Mid	3	5	0	5.72	≤13
		CH Mid	5	5	0	5.77	≤13
		CH Mid	10	5	0	5.82	≤13
		CH Mid	15	5	0	5.68	≤13
		CH Mid	20	5	0	5.67	≤13
BAND 4	QPSK	CH Mid	1.4	6	0	5.67	≤13
		CH Mid	3	6	0	5.68	≤13
		CH Mid	5	6	0	5.94	≤13
		CH Mid	10	6	0	5.98	≤13
		CH Mid	15	6	0	6.05	≤13
		CH Mid	20	6	0	5.68	≤13
	16-QAM	CH Mid	1.4	5	0	6.13	≤13
		CH Mid	3	5	0	5.84	≤13
		CH Mid	5	5	0	6.15	≤13
		CH Mid	10	5	0	5.64	≤13
		CH Mid	15	5	0	5.58	≤13
		CH Mid	20	5	0	5.83	≤13
BAND 5	QPSK	CH Mid	1.4	6	0	5.78	≤13
		CH Mid	3	6	0	5.79	≤13
		CH Mid	5	6	0	5.66	≤13
		CH Mid	10	6	0	6.08	≤13
	16-QAM	CH Mid	1.4	5	0	5.83	≤13
		CH Mid	3	5	0	6.20	≤13
		CH Mid	5	5	0	5.83	≤13
		CH Mid	10	5	0	5.76	≤13
BAND 12	QPSK	CH Mid	1.4	6	0	5.78	≤13
		CH Mid	3	6	0	5.70	≤13
		CH Mid	5	6	0	5.40	≤13
		CH Mid	10	6	0	5.73	≤13
	16-QAM	CH Mid	1.4	5	0	5.56	≤13
		CH Mid	3	5	0	5.60	≤13
		CH Mid	5	5	0	5.75	≤13
		CH Mid	10	5	0	5.85	≤13
BAND 13	QPSK	CH Mid	5	6	0	4.74	≤13
		CH Mid	10	6	0	4.74	≤13
	16-QAM	CH Mid	5	5	0	4.74	≤13
		CH Mid	10	5	0	4.72	≤13

4.5 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:	 <i>Note: Measurement setup for testing on Antenna connector</i>
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)

Band	Mode	Channel	BW [MHz]	RB Size	RB Start	26dBc Result (MHz)	99% Result (MHz)
BAND 2	QPSK	CH Mid	1.4	6	0	1.302	1.1179
		CH Mid	3	6	0	1.301	1.1082
		CH Mid	5	6	0	1.297	1.1087
		CH Mid	10	6	0	1.300	1.1076
		CH Mid	15	6	0	1.280	1.0914
		CH Mid	20	6	0	1.297	1.1037
	16-QAM	CH Mid	1.4	5	0	1.361	1.1199
		CH Mid	3	5	0	1.293	1.1081
		CH Mid	5	5	0	1.278	1.1090
		CH Mid	10	5	0	1.294	1.1064
		CH Mid	15	5	0	1.276	1.0915
BAND 4	QPSK	CH Mid	1.4	6	0	1.311	1.1201
		CH Mid	3	6	0	1.283	1.0893
		CH Mid	5	6	0	1.300	1.1078
		CH Mid	10	6	0	1.281	1.0905
		CH Mid	15	6	0	1.273	1.1107
		CH Mid	20	6	0	1.270	1.1019
	16-QAM	CH Mid	1.4	5	0	1.329	1.1182
		CH Mid	3	5	0	1.279	1.0891
		CH Mid	5	5	0	1.286	1.1002
		CH Mid	10	5	0	1.271	1.0935
		CH Mid	15	5	0	1.285	1.0980
BAND 5	QPSK	CH Mid	1.4	6	0	1.319	1.1265
		CH Mid	3	6	0	1.289	1.1077
		CH Mid	5	6	0	1.285	1.1001
		CH Mid	10	6	0	1.280	1.0896
	16-QAM	CH Mid	1.4	5	0	1.269	1.1055
		CH Mid	3	5	0	1.295	1.1046
		CH Mid	5	5	0	1.286	1.0097
		CH Mid	10	5	0	1.278	1.0900

Band	Mode	Channel	BW [MHz]	RB Size	RB Start	26dBc Result (MHz)	99% Result (MHz)
BAND 12	QPSK	CH Mid	1.4	6	0	1.312	1.1163
		CH Mid	3	6	0	1.290	1.1004
		CH Mid	5	6	0	1.279	1.0892
		CH Mid	10	6	0	1.266	1.1007
	16-QAM	CH Mid	1.4	5	0	1.295	1.1135
		CH Mid	3	5	0	1.287	1.0999
		CH Mid	5	5	0	1.263	1.0883
		CH Mid	10	5	0	1.285	1.0992
BAND 13	QPSK	CH Mid	5	6	0	1.439	1.1089
		CH Mid	10	6	0	1.431	1.1098
	16-QAM	CH Mid	5	5	0	1.214	0.9263
		CH Mid	10	5	0	1.236	0.9301



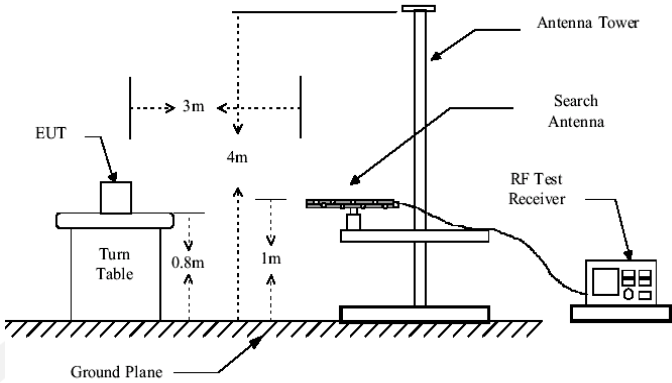
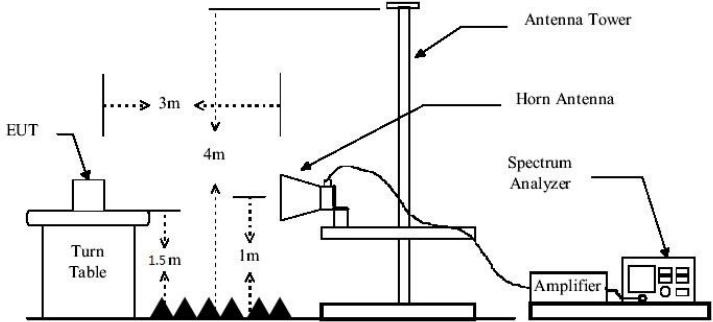
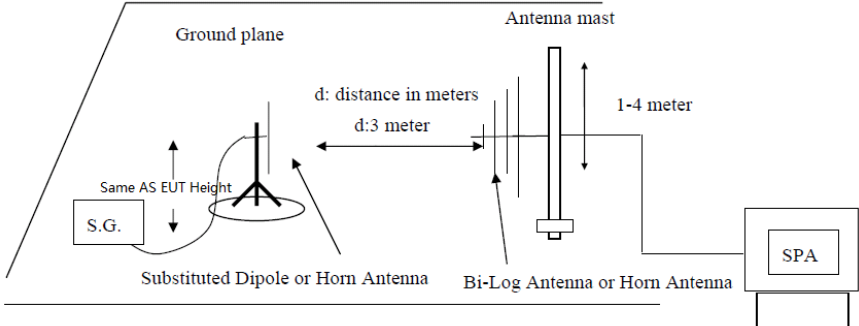
4.6 MODULATION CHARACTERISTIC

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 part22.913(a), FCC part24.238(a), FCC part27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm Band 7/41: -25dBm
Test setup:	<i>Note: Measurement setup for testing on Antenna connector</i>
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 part22.913(a), FCC part24.238(a), FCC part27.53(h)/(m)/(g)
Test Method:	ANSI C63.26:2015
Limit:	Band 2/4/5/12/13: -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):

QPSK Mode:

Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.4	V	-35.84	-13.00	Pass
5552.1	V	-37.90		
7402.8	V	-38.47		
9253.5	V	-44.31		
11104.2	V	---		
3701.4	H	-37.74	-13.00	Pass
5552.1	H	-39.33		
7402.8	H	-37.52		
9253.5	H	-40.72		
11104.2	H	---		
Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760	V	-35.19	-13.00	Pass
5640	V	-39.66		
7520	V	-39.47		
9400	V	-41.36		
11280	V	---		
3760	H	-38.02	-13.00	Pass
5640	H	-39.62		
7520	H	-38.57		
9400	H	-44.68		
11280	H	---		
Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.6	V	-37.74	-13.00	Pass
5727.9	V	-37.57		
7637.2	V	-39.96		
9546.5	V	-41.36		
11455.8	V	---		
3818.6	H	-35.51	-13.00	Pass
5727.9	H	-39.37		
7637.2	H	-39.72		
9546.5	H	-43.77		
11455.8	H	---		

Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.4	V	-36.47	-13.00	Pass
5132.1	V	-39.03		
6842.8	V	-39.47		
8553.5	V	-42.26		
10264.2	V	---		
3421.4	H	-36.43	-13.00	Pass
5132.1	H	-37.21		
6842.8	H	-39.72		
8553.5	H	-42.04		
10264.2	H	---		
Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465	V	-36.28	-13.00	Pass
5197.5	V	-37.37		
6930	V	-38.76		
8662.5	V	-41.68		
10395	V	---		
3465	H	-35.24	-13.00	Pass
5197.5	H	-39.30		
6930	H	-37.74		
8662.5	H	-44.95		
10395	H	---		
Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.6	V	-35.75	-13.00	Pass
5262.9	V	-38.03		
7017.2	V	-37.94		
8771.5	V	-45.18		
10525.8	V	---		
3508.6	H	-36.23	-13.00	Pass
5262.9	H	-38.87		
7017.2	H	-38.98		
8771.5	H	-46.69		
10525.8	H	---		

Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.4	V	-36.14	-13.00	Pass
2474.1	V	-37.61		
3298.8	V	-39.02		
4123.5	V	-45.92		
4948.2	V	---		
1649.4	H	-35.12	-13.00	Pass
2474.1	H	-37.67		
3298.8	H	-38.36		
4123.5	H	-46.18		
4948.2	H	---		
Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673	V	-35.55	-13.00	Pass
2509.5	V	-37.80		
3346	V	-38.59		
4182.5	V	-44.02		
5019	V	---		
1673	H	-37.66	-13.00	Pass
2509.5	H	-37.45		
3346	H	-37.50		
4182.5	H	-43.46		
5019	H	---		
Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.6	V	-37.88	-13.00	Pass
2544.9	V	-38.10		
3393.2	V	-38.96		
4241.5	V	-44.89		
5089.8	V	---		
1696.6	H	-37.39	-13.00	Pass
2544.9	H	-39.25		
3393.2	H	-39.26		
4241.5	H	-45.22		
5089.8	H	---		

Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1399.4	V	-35.79	-13.00	Pass
2099.1	V	-37.83		
2798.8	V	-37.89		
3498.5	V	-42.49		
4198.2	V	-44.71		
1399.4	H	-37.98	-13.00	Pass
2099.1	H	-37.40		
2798.8	H	-39.26		
3498.5	H	-45.11		
4198.2	H	-42.35		
Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1415	V	-37.02	-13.00	Pass
2122.5	V	-38.75		
2830	V	-39.93		
3537.5	V	-44.98		
4245	V	-47.02		
1415	H	-36.67	-13.00	Pass
2122.5	H	-39.75		
2830	H	-39.82		
3537.5	H	-45.68		
4245	H	-46.58		
Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1430.6	V	-36.64	-13.00	Pass
2145.9	V	-38.44		
2861.2	V	-37.34		
3576.5	V	-42.42		
4291.8	V	-42.34		
1430.6	H	-37.45	-13.00	Pass
2145.9	H	-39.90		
2861.2	H	-37.19		
3576.5	H	-40.75		
4291.8	H	-45.19		

Test mode:	CAT-M Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1559	V	-37.51	-13.00	Pass
2338.5	V	-38.63		
3118	V	-37.86		
3897.5	V	-46.36		
4677	V	-42.53		
5456.5	V	-35.47		
1559	H	-37.45	-13.00	Pass
2338.5	H	-39.35		
3118	H	-44.89		
3897.5	H	-44.44		
4677	H	-44.23		
5456.5	H	-43.29		
Test mode:	CAT-M Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1564	V	-36.56	-13.00	Pass
2346	V	-38.09		
3128	V	-37.33		
3910	V	-42.48		
4692	V	-42.33		
5474	V	-35.32		
1564	H	-39.94	-13.00	Pass
2346	H	-38.74		
3128	H	-42.79		
3910	H	-46.03		
4692	H	-42.19		
5474	H	-42.57		
Test mode:	CAT-M Band 13(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1569	V	-37.04	-13.00	Pass
2353.5	V	-39.47		
3138	V	-37.74		
3922.5	V	-46.46		
4707	V	-44.19		
5491.5	V	-37.26		
1569	H	-38.69	-13.00	Pass
2353.5	H	-38.39		
3138	H	-41.30		
3922.5	H	-46.10		
4707	H	-43.47		
5491.5	H	-46.28		

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.

Measurement Data(Worst case):

16 QAM Mode:

Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3701.4	V	-35.11	-13.00	Pass
5552.1	V	-37.51		
7402.8	V	-38.07		
9253.5	V	-42.66		
11104.2	V	-46.98		
3701.4	H	-37.35	-13.00	Pass
5552.1	H	-37.72		
7402.8	H	-38.96		
9253.5	H	-46.61		
11104.2	H	-46.60		
Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760	V	-37.87	-13.00	Pass
5640	V	-37.92		
7520	V	-39.27		
9400	V	-44.75		
11280	V	-46.14		
3760	H	-36.58	-13.00	Pass
5640	H	-37.19		
7520	H	-39.06		
9400	H	-43.07		
11280	H	-46.63		
Test mode:	CAT-M Band 2(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3818.6	V	-36.80	-13.00	Pass
5727.9	V	-38.15		
7637.2	V	-39.71		
9546.5	V	-44.06		
11455.8	V	-45.33		
3818.6	H	-35.51	-13.00	Pass
5727.9	H	-37.16		
7637.2	H	-37.94		
9546.5	H	-44.60		
11455.8	H	-43.44		

Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3421.4	V	-35.30	-13.00	Pass
5132.1	V	-37.22		
6842.8	V	-39.76		
8553.5	V	-43.56		
10264.2	V	-44.22		
3421.4	H	-35.80	-13.00	Pass
5132.1	H	-38.58		
6842.8	H	-38.30		
8553.5	H	-44.98		
10264.2	H	-43.76		
Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465	V	-36.07	-13.00	Pass
5197.5	V	-37.83		
6930	V	-39.55		
8662.5	V	-44.79		
10395	V	-42.22		
3465	H	-37.38	-13.00	Pass
5197.5	H	-37.60		
6930	H	-38.37		
8662.5	H	-47.01		
10395	H	-44.65		
Test mode:	CAT-M Band 4(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3508.6	V	-36.22	-13.00	Pass
5262.9	V	-37.15		
7017.2	V	-39.50		
8771.5	V	-44.63		
10525.8	V	-42.77		
3508.6	H	-36.02	-13.00	Pass
5262.9	H	-39.48		
7017.2	H	-38.87		
8771.5	H	-43.66		
10525.8	H	-42.63		

Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1649.4	V	-35.54	-13.00	Pass
2474.1	V	-37.83		
3298.8	V	-39.33		
4123.5	V	-46.60		
4948.2	V	-45.83		
1649.4	H	-36.03	-13.00	Pass
2474.1	H	-38.00		
3298.8	H	-37.64		
4123.5	H	-41.40		
4948.2	H	-42.85		
Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673	V	-35.66	-13.00	Pass
2509.5	V	-39.62		
3346	V	-39.96		
4182.5	V	-42.58		
5019	V	-42.62		
1673	H	-36.57	-13.00	Pass
2509.5	H	-37.08		
3346	H	-38.87		
4182.5	H	-45.48		
5019	H	-46.70		
Test mode:	CAT-M Band 5(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1696.6	V	-36.99	-13.00	Pass
2544.9	V	-37.86		
3393.2	V	-37.31		
4241.5	V	-42.31		
5089.8	V	-45.79		
1696.6	H	-35.41	-13.00	Pass
2544.9	H	-38.49		
3393.2	H	-39.25		
4241.5	H	-42.70		
5089.8	H	-46.48		

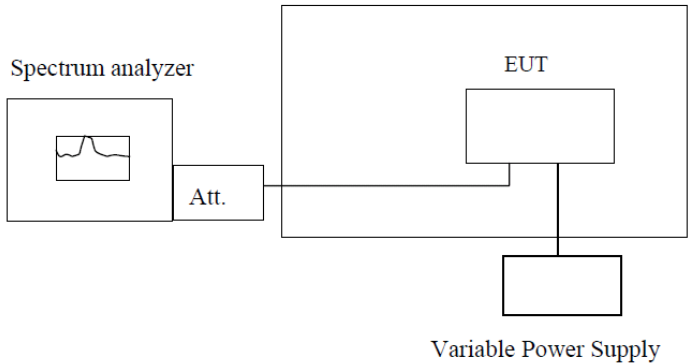
Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1399.4	V	-36.98	-13.00	Pass
2099.1	V	-39.60		
2798.8	V	-39.76		
3498.5	V	-44.95		
4198.2	V	-45.01		
1399.4	H	-37.25	-13.00	Pass
2099.1	H	-38.59		
2798.8	H	-37.59		
3498.5	H	-42.42		
4198.2	H	-46.86		
Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1415	V	-36.30	-13.00	Pass
2122.5	V	-38.07		
2830	V	-38.21		
3537.5	V	-46.94		
4245	V	-46.72		
1415	H	-35.60	-13.00	Pass
2122.5	H	-40.04		
2830	H	-39.40		
3537.5	H	-43.99		
4245	H	-46.71		
Test mode:	CAT-M Band 12(1.4MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1430.6	V	-35.76	-13.00	Pass
2145.9	V	-37.43		
2861.2	V	-39.39		
3576.5	V	-44.64		
4291.8	V	-42.84		
1430.6	H	-35.69	-13.00	Pass
2145.9	H	-39.97		
2861.2	H	-37.25		
3576.5	H	-44.45		
4291.8	H	-43.73		

Test mode:	CAT-M Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1559	V	-36.88	-13.00	Pass
2338.5	V	-37.10		
3118	V	-38.90		
3897.5	V	-42.67		
4677	V	-42.73		
5456.5	V	-37.49		
1559	H	-38.76	-13.00	Pass
2338.5	H	-37.25		
3118	H	-44.27		
3897.5	H	-46.87		
4677	H	-44.01		
5456.5	H	-43.94		
Test mode:	CAT-M Band 13(5MHz)		Test channel:	Middle
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1564	V	-37.21	-13.00	Pass
2346	V	-38.62		
3128	V	-37.36		
3910	V	-46.34		
4692	V	-45.39		
5474	V	-37.87		
1564	H	-39.15	-13.00	Pass
2346	H	-38.94		
3128	H	-45.07		
3910	H	-45.05		
4692	H	-44.85		
5474	H	-44.49		
Test mode:	CAT-M Band 13(5MHz)		Test channel:	Highest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1569	V	-37.97	-13.00	Pass
2353.5	V	-38.66		
3138	V	-39.78		
3922.5	V	-46.29		
4707	V	-43.97		
5491.5	V	-35.03		
1569	H	-37.99	-13.00	Pass
2353.5	H	-39.70		
3138	H	-42.26		
3922.5	H	-45.49		
4707	H	-43.27		
5491.5	H	-44.54		

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 (Please refer to ANNEX for the test results)

Mode	Voltage (V)	Frequency error (Hz)	frequency error (ppm)
CAT-M Bnad 2 CH 18900 Fre:1880MHz	10.2V	44.67	0.024
	11.2V	53.68	0.029
	12 V	58.79	0.031
	12.8V	60.22	0.032
	13.8V	40.36	0.021
CAT-M Bnad 4 CH 20175 Fre:1732.5MHz	10.2V	47.32	0.027
	11.2V	34.20	0.020
	12 V	79.63	0.046
	12.8V	42.31	0.024
	13.8V	53.80	0.031
CAT-M Bnad 5 CH 20525 Fre: 836.5MHz	10.2V	66.10	0.079
	11.2V	58.37	0.070
	12 V	57.65	0.069
	12.8V	56.68	0.068
	13.8V	85.35	0.102
CAT-M Bnad 12 CH 23095 Fre:707.5MHz	10.2V	28.25	0.040
	11.2V	39.83	0.056
	12 V	74.77	0.106
	12.8V	44.08	0.062
	13.8V	68.26	0.096
CAT-M Bnad 13 CH 23230 Fre:782MHz	10.2V	57.20	0.073
	11.2V	51.36	0.066
	12 V	61.08	0.078
	12.8V	43.30	0.055
	13.8V	36.62	0.047

Mode	Temperature (°C)	Frequency error (Hz)	frequency error (ppm)
CAT-M Bnad 2 CH 18900 Fre:1880MHz	-20	26.53	0.014
	-10	55.83	0.030
	0	55.29	0.029
	10	59.80	0.032
	20	60.05	0.032
	30	34.38	0.018
	40	51.15	0.027
	50	47.18	0.025
CAT-M Bnad 4 CH 20175 Fre:1732.5MHz	-20	66.12	0.038
	-10	37.50	0.022
	0	62.34	0.036
	10	66.21	0.038
	20	67.50	0.039
	30	65.95	0.038
	40	73.03	0.042
	50	59.00	0.034
CAT-M Bnad 5 CH 20525 Fre: 836.5MHz	-20	32.44	0.039
	-10	69.17	0.083
	0	31.69	0.038
	10	45.74	0.055
	20	27.48	0.033
	30	67.93	0.081
	40	63.75	0.076
	50	56.09	0.067
CAT-M Bnad 12 CH 23095 Fre:707.5MHz	-20	75.00	0.106
	-10	66.49	0.094
	0	31.31	0.044
	10	35.85	0.051
	20	30.85	0.044
	30	66.84	0.094
	40	65.25	0.092
	50	58.53	0.083
CAT-M Bnad 13 CH 23230 Fre:782MHz	-20	72.99	0.093
	-10	29.98	0.038
	0	68.63	0.088
	10	47.32	0.060
	20	35.69	0.046
	30	29.04	0.037
	40	58.89	0.075
	50	28.55	0.036

5 Photos of test setup

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

6 Photos of EUT

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

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

