FCC CFR47 PART 22H, 24E, 27, 90S CERTIFICATION TEST REPORT

FCC ID: 2AE3Q-AUROTR

Product： AuroTrap

Trade Mark： AuroTrap

Model Number： NATURE

Family Model： COLLECT

Report No.： S24091004502003

Prepared for

JE electronic A/S

Maserativej 3, 7100 Vejle, Denmark

Prepared by

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Certificate #4298.01

TEST RESULT CERTIFICATION

Applicant's name ..... :	JE electronic A/S
Address..... :	Maserativej 3, 7100 Vejle, Denmark
Manufacturer's Name..... :	Aurocon A/S
Address..... :	Porsvej 2, Office B - 276, 9000 Aalborg, Denmark
Product name..... :	AuroTrap
Model and/or type reference .. :	NATURE
Family Model:	COLLECT
Standards..... :	FCC CFR 47 Part 22H, Part 24E, Part 27, 90S
Test procedure ..... :	ANSI C63.26:2015 ANSI/TIA-603-E-2016
Test Sample number ..... :	S240910045002

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test	
Date (s) of performance of tests.....	Sept. 10, 2024 ~ Nov, 06, 2024
Date of Issue.....	Nov, 06, 2024
Test Result.....	**Pass**

Prepared By :	Reviewed By :	Approved By :
Allen Liu	Aaron Cheng	Alex Li
(Project Engineer)	(Supervisor)	(Manager)

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1. GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Designation:	AuroTrap
Trade Mark	AuroTrap By AUROCON
Model Name	NATURE
Family Model	COLLECT
Model Difference	All models are the same circuit and RF module, except for the shell being different. (COLLECT has larger enclosure than Nature, but everything else is the same.)
FCC ID:	2AE3Q-AUROTR
Frequency Bands:	U.S. Bands: ☒ eMTC Band 2, 4, 5, 12,13, 25, 26a, 26b, 66 eMTC / NB IoT Band 2, 4, 5, 12,13, 25, 66, 71
Frequency Range:	eMTC / NB IoT Band 2 Uplink: 1850MHz-1910MHz, Downlink: 1930MHz-1990MHz; eMTC / NB IoT Band 4 Uplink: 1710MHz-1755MHz, Downlink: 2110MHz-2155MHz; eMTC / NB IoT Band 5 Uplink: 824MHz-849MHz, Downlink: 869MHz-894MHz; eMTC / NB IoT Band 12 Uplink: 699MHz-716MHz, Downlink: 729MHz-746MHz; eMTC / NB IoT Band 13 Uplink:777MHz-787MHz, Downlink: 746MHz-756MHz; eMTC / NB IoT Band 25 Uplink: 1850MHz-1915MHz, Downlink: 1930MHz-1995MHz; eMTC Band 26 Uplink: 814MHz-849MHz, Downlink: 859MHz-894MHz; eMTC / NB IoT Band 66 Uplink: 1710MHz-1780MHz, Downlink: 2110MHz-2200MHz; NB IoT Band 71 Uplink: 663MHz-698MHz, Downlink: 617MHz-652MHz;
Type of Modulation:	NB IoT Standalone: BPSK, QPSK; eMTC CAT M1: QPSK, 16QAM
Power Class	Class 3
Antenna:	FPC Antenna
Antenna gain:	Band2:3.6dBi;Band4:3.6dBi;Band5:1.9dBi;Band12:0.9dBi;Band13:0.9dBi; Band25:3.6dBi; Band26:1.9dBi; Band66:3.6dBi; Band71:0dBi;

Adapter	N/A
Battery	7.4V, 7500mAh, 55.5Wh
Power supply	DC 7.4V from battery
Extreme Vol. Limits:	DC 6.4V to DC 9.0V (Nominal DC 7.4V)（Note 1）
HW Version	JE973L
FW Version	66
SW Version	N/A
** Note1: The High Voltage 9.0V and Low Voltage 6.4V was declared by manufacturer, The EUT couldn’t be operate normally with higher or lower voltage.	

1.2 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2AE3Q-AUROTR** filing to comply with the FCC Part 22H&24E &27&90S.

1.3 TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-E-2016, FCC CFR 47 Part 2, Part 22, Part 24, Part 27, Part 90S, ANSI C63.26:2015.

1.4 TEST FACILITY

The test site used to collect the radiated data is located at:

ShenZhen NTEK Testing Technology Co., Ltd.

No. 24 Xinfa East Road, Xiangshan Community, Xinqiao Street, Baoan District, Shenzhen, Guangdong, People's Republic of China.

The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.26:2015& ANSI C63.4: 2014.

FCC Registration No.:463705

IC Registration No.:9270A-1,

CNAS Registration No.:L5516

MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.5dB
2	Conducted Emission Test	±1.38dB
3	RF power, conducted	±0.16dB
4	Spurious emissions, conducted	±0.21dB
5	All emissions, radiated(<1G)	±4.68dB
6	All emissions, radiated(>1G)	±4.89dB
7	Temperature	±0.5°C
8	Humidity	±2%
9	Frequency error, conducted	±0.19 ppm

1.5 SPECIAL ACCESSORIES

The battery and the charger, earphone supplied by the applicant were used as accessories and being tested with EUT intended for FCC grant together.

1.6 WORST-CASE CONFIGURATION AND MODE

The worst-case scenario for all measurements is based on the investigation results.

The device has eMTC / NB IoT Bands of: Band 2, Band 4, Band 5, Band 12, Band 13, Band 25, Band 26, Band 66, Band 71

The RB Size was selected to measure for peak or average ERP and EIRP, which was based on the conducted power verification baseline data.

For the fundamental investigation of radiated emissions, the EUT is investigated for vertical and horizontal antenna orientations and X Y and Z orientations of the EUT alone. After the investigations the worst case was determined to be at X orientation for all eMTC / NB IoT bands.

1.6 SUMMARY OF TEST RESULTS

FCC Part22, Subpart H/ FCC Part24, Subpart E, FCC Part27, Part 90S, Subpart L, KDB 971168 D01 Power Meas License Digital Systems v03			
FCC Rule	**Test Item**	**Verdict**	**Remark**
2.1046	Conducted Output Power	PASS	
22.913(d) 24.232(d) 27.50 KDB 971168 D01 Clause 5.7	Peak-to-Average Ratio	PASS	
2.1049 22.917(b) 24.238(b) KDB 971168 D01 Clause 4.2	Occupied Bandwidth	PASS	
2.1051 22.917(a) 24.238(a) 27.53 KDB 971168 D01 Clause 6	Band Edge	PASS	
22.913(a)(2) 27.50(c)(10) KDB 971168 D01 Clause 5.6	Effective Radiated Power	PASS	
24.232(c) 27.50 KDB 971168 D01 Clause 5.6	Equivalent Isotropic Radiated Power	PASS	

2.1053 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 7	Field Strength of Spurious Radiation	PASS	
2.1055 22.355 24.235 27.54 KDB 971168 D01 Clause 9	Frequency Stability for Temperature & Voltage	PASS	
2.1051 22.917(a) 24.238(a) 27.53(g)(h)(m) KDB 971168 D01 Clause 6	Conducted Emission	PASS	

1. Remark:
2. “N/A” denotes test is not applicable in this Test Report.
3. All test items were verified and recorded according to the standards and without any deviation during the test.
4. No modifications are made to the EUT during all test items.
5. For LTE CAT M1 (eMTC):Only support system bandwidth 1.4 MHz bandwidth modes for Bands 2, 4 and 25; 1.4 MHz bandwidth modes for Band 5 and 12; 5 MHz bandwidth modes for Band 13.

2. SYSTEM TEST CONFIGURATION

2.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT EXERCISE

The Transmitter was operated in the maximum output power mode through Communication Tester. The TX frequency was fixed which was for the purpose of the measurements.

2.3 CONFIGURATION OF EUT SYSTEM

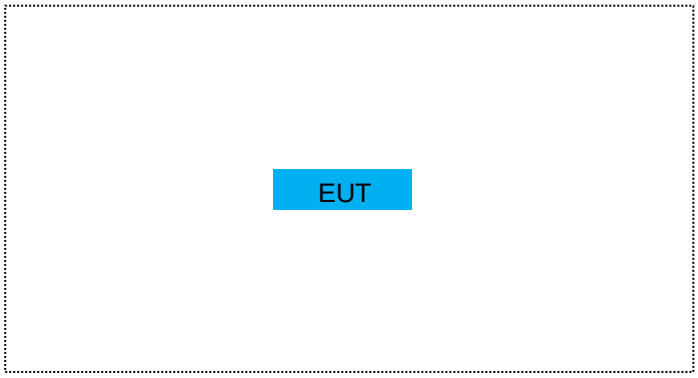
Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	ID or Specification	Note
1	AuroTrap	NATURE	FCC ID: 2AE3Q-AUROTR	EUT

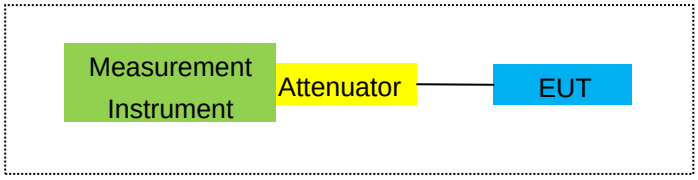
Note: All the accessories have been used during the test.
the following "EUT" in setup diagram means EUT system.

2.4 TEST SETUP

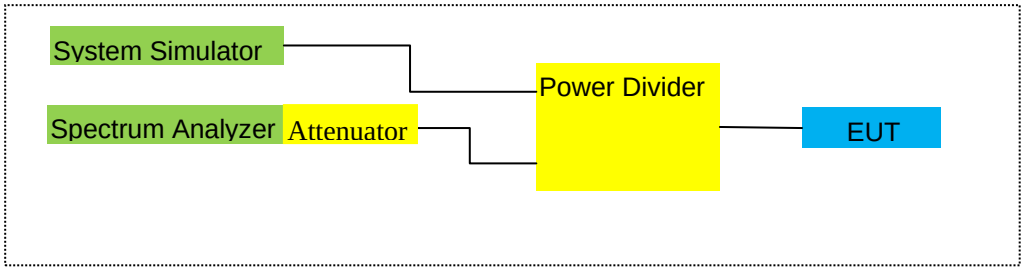
For Radiated Test Cases



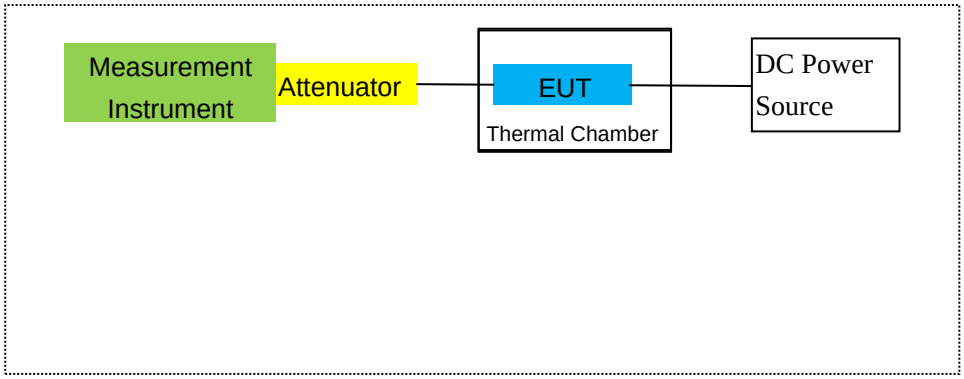
For Conducted Output Power



For Peak-to Average Ratio, Occupied Bandwidth, Conducted Band edge and Conducted Spurious Emission



For Frequency Stability



Note: EUT built-in battery-powered, the battery is fully-charged.

3.TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	MXA Signal Analyzer	Agilent	N9020A	MY49100060	2024.04.25	2025.04.24	1 year
2	Test Receiver	R&S	ESPI	101318	2024.04.26	2025.04.25	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2024.05.12	2025.05.11	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2024.04.26	2027.04.25	3 year
5	Horn Antenna	EM	EM-AH-10180	2011071402	2024.05.12	2027.05.11	3 year
6	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2024.05.12	2027.05.11	3 year
7	Amplifier	EM	EM-30180	060538	2024.04.26	2025.04.25	1 year
8	Loop Antenna	ARA	PLA-1030/B	1029	2024.03.12	2025.03.11	1 year
9	Power Meter	R&S	NRVS	100696	2024.04.26	2025.04.25	1 year
10	Power Sensor	R&S	URV5-Z4	0395.1619.05	2024.04.26	2025.04.25	1 year
11	Test Cable	N/A	R-01	N/A	2022.06.17	2025.06.16	3 year
12	Test Cable	N/A	R-02	N/A	2022.06.17	2025.06.16	3 year
13	Test Cable	N/A	R-03	N/A	2022.06.17	2025.06.16	3 year
14	Test Receiver	R&S	ESCI	101160	2024.04.26	2025.04.25	1 year
15	LISN	R&S	ENV216	101313	2024.04.25	2025.04.24	1 year
16	LISN	EMCO	3816/2	00042990	2024.04.25	2025.04.24	1 year
17	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2024.03.12	2025.03.11	1 year
18	Passive Voltage Probe	R&S	ESH2-Z3	100196	2024.03.12	2025.03.11	1 year
19	Test Cable	N/A	C01	N/A	2023.05.06	2026.05.05	3 year
20	Test Cable	N/A	C02	N/A	2023.05.06	2026.05.05	3 year
21	Test Cable	N/A	C03	N/A	2023.05.06	2026.05.05	3 year
22	Attenuator	MCE	24-10-34	BN9258	2024.03.12	2025.03.11	1 year
23	Spectrum Analyzer	agilent	e4440a	us44300399	2024.03.12	2025.03.11	1 year
24	test receiver	R&S	ESCI	a0304218	2024.03.12	2025.03.11	1 year
25	Communication Tester	R&S	CMU200	A0304247	2024.03.12	2025.03.11	1 year
26	Thermal Chamber	Ten Billion	TTC-B3C	TBN-960502	2024.03.12	2025.03.11	1 year

27	DC Power Source	N/A	PS-6005D	20170402923	2024.04.25	2027.04.24	3 year
28	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2024.05.30	2025.05.29	1 year
29	Communication Tester	R&S	CMW500	148500	2024.05.30	2025.05.29	1 year
30	PSG Analog Signal Generator	Agilent	E8257D	MY51110112	2024.05.30	2025.05.29	1 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& DC Power Source which is scheduled for calibration every 3 years.

Measurement Software

Item	Manufacturer	Software Name	Software Version	Description
1	MWRFtest	MTS 8200	2.0	RF Conducted Test
2	Farad	EZ-EMC_RE	AIT-03A	RadiatedTest
3	raditeq	RadiMation	2023.1.3	RadiatedTest
4	Farad	EZ-EMC_CE	AIT-03A	AC Conducted Test

4. OUTPUT POWER

4.1 OUTPUT POWER MEASUREMENT

Measurement Procedure:

All eMTC / NB IoT bands conducted power peak and average are obtained from the CMW500 telecommunication test set.

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.3

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23[1]	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
--					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Test data reference attachment.

5. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66
  NB IoT Band 2/4/5/12/13/25/66/71

RESULTS

PASS

Test data reference attachment.

6. BANDEDGE AND EMISSION MASK

RULE PART(S)

FCC: §2.1051,§22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

FCC: §2.1046, §22.913, §24.232

LIMITS

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

The minimum permissible attenuation level for Band 7 is as following.

Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.

For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.

Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

TEST PROCEDURE

The transmitter output was connected to a CMW500Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

For each band edge measurement:

Set the spectrum analyzer span to include the block edge frequency

Set a marker to point the corresponding band edge frequency in each test case.

Set display line

Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66
- NB IoT Band 2/4/5/12/13/25/66/71

RESULTS

Test data reference attachment.

7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051,§22.917(a), §24.238(a), §27.53(c)(g)(h)(m)

LIMITS

The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.
The minimum permissible attenuation level for Band 7 is as following.
Per 27.53(g) for operations in the 698-746 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
Per 27.53(c.5) for operations in the 776-788 MHz band, in the 100 kHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least 30 kHz may be employed to demonstrate compliance with the out-of-band emissions limit.
For all plots showing emissions in the 763 – 775MHz and 793 – 805MHz band, the FCC limit per 27.53(c.4) is 65 + 10log10(P) = -35dBm in a 6.25kHz bandwidth.
Per 27.53(m) for operations in the BRS/EBS bands, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.
For each out of band emissions measurement:

- Set display line
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66
  NB IoT Band 2/4/5/12/13/25/66/71

7.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

Test data reference attachment.

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported (eMTC / NB IoT Band 2/4/25: above 10GHz).

8. RADIATED MEASUREMENT

8.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913(a)(2), §24.232(c) and §27.50 (h)(2), (b)(10), (c)(10), (d)(4) and §90.635

LIMITS:

22.913(a) (2)- The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
24.232 (c) Mobile and portable stations are limited to 2 watts EIRP.
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.
27.50 (h)(2)Mobile and other user stations in the 2500–2570 MHz and 2620–2690 MHz bands. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.
90.635(b) The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

TEST PROCEDURE

ANSI/TIA-603-E Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66
  NB IoT Band 2/4/5/12/13/25/66/71

RESULTS

Pass

8.2 eMTC BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-8.90	3.76	28.24	19.61	91.41	Horizontal	Pass
		1880	-8.69	3.91	28.22	19.32	85.51	Horizontal	Pass
		1909.3	-8.63	3.93	28.20	19.31	85.31	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-8.81	3.76	28.24	19.45	88.10	Vertical	Pass
		1880	-8.72	3.91	28.22	19.31	85.31	Vertical	Pass
		1909.3	-8.65	3.93	28.20	19.13	81.85	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-9.69	3.76	28.24	19.28	84.72	Horizontal	Pass
		1880	-9.44	3.91	28.22	19.67	92.68	Horizontal	Pass
		1909.3	-9.51	3.93	28.20	18.94	78.34	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-9.72	3.76	28.24	19.81	95.72	Vertical	Pass
		1880	-9.41	3.91	28.22	19.16	82.41	Vertical	Pass
		1909.3	-9.45	3.93	28.20	19.08	80.91	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.3 eMTC BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	-9.80	3.12	27.58	19.66	92.47	Horizontal	Pass
		1732.5	-9.69	3.27	27.61	19.01	79.62	Horizontal	Pass
		1754.3	-9.57	3.29	27.63	19.23	83.75	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-9.68	3.12	27.58	19.01	79.62	Vertical	Pass
		1732.5	-9.68	3.27	27.61	19.17	82.60	Vertical	Pass
		1754.3	-9.59	3.29	27.63	19.78	95.06	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-10.59	3.12	27.58	19.79	95.28	Horizontal	Pass
		1732.5	-10.35	3.27	27.61	19.03	79.98	Horizontal	Pass
		1754.3	-10.44	3.29	27.63	19.32	85.51	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-10.54	3.12	27.58	19.39	86.90	Vertical	Pass
		1732.5	-10.36	3.27	27.61	19.51	89.33	Vertical	Pass
		1754.3	-10.42	3.29	27.63	19.64	92.04	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.4 eMTC BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	3/#Mid	824.7	-1.19	2.01	19.68	2.15	19.40	87.10	Horizontal	Pass
		836.5	-1.35	2.01	19.77	2.15	19.68	92.90	Horizontal	Pass
		848.3	-1.28	2.02	19.82	2.15	19.23	83.75	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	824.7	-1.13	2.01	19.68	2.15	19.09	81.10	Vertical	Pass
		836.5	-1.24	2.01	19.77	2.15	19.50	89.13	Vertical	Pass
		848.3	-1.29	2.02	19.82	2.15	19.40	87.10	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	3/#Mid	824.7	-1.93	2.01	19.68	2.15	19.30	85.11	Horizontal	Pass
		836.5	-1.97	2.01	19.77	2.15	19.72	93.76	Horizontal	Pass
		848.3	-2.00	2.02	19.82	2.15	20.07	101.62	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	824.7	-1.93	2.01	19.68	2.15	19.52	89.54	Vertical	Pass
		836.5	-2.06	2.01	19.77	2.15	19.35	86.10	Vertical	Pass
		848.3	-1.97	2.02	19.82	2.15	19.92	98.17	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.5 eMTC BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	699.7	0.53	1.91	19.21	2.15	19.68	92.90	Vertical	Pass
		707.5	0.44	1.91	19.26	2.15	19.17	82.60	Vertical	Pass
		715.3	0.30	1.93	19.34	2.15	19.95	98.86	Vertical	Pass
1.4MHz Band QPSK	1/#Mid	699.7	0.54	1.91	19.21	2.15	19.45	88.10	Horizontal	Pass
		707.5	0.44	1.91	19.26	2.15	19.85	96.61	Horizontal	Pass
		715.3	0.40	1.93	19.34	2.15	19.91	97.95	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	699.7	-0.78	1.91	19.21	2.15	19.24	83.95	Vertical	Pass
		707.5	-0.82	1.91	19.26	2.15	20.19	104.47	Vertical	Pass
		715.3	-0.91	1.93	19.34	2.15	19.92	98.17	Vertical	Pass
1.4MHz Band 16 QAM	1/#Mid	699.7	-0.70	1.91	19.21	2.15	19.25	84.14	Horizontal	Pass
		707.5	-0.76	1.91	19.26	2.15	20.08	101.86	Horizontal	Pass
		715.3	-0.83	1.93	19.34	2.15	19.29	84.92	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.6 eMTC BAND 13

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
5MHz Band QPSK	1/#Mid	779.5	0.49	1.95	19.23	2.15	19.39	86.90	Vertical	Pass
		782	0.42	1.95	19.26	2.15	19.76	94.62	Vertical	Pass
		784.5	0.40	1.96	19.33	2.15	19.32	85.51	Vertical	Pass
5MHz Band QPSK	1/#Mid	779.5	0.43	1.95	19.23	2.15	19.69	93.11	Horizontal	Pass
		782	0.48	1.95	19.26	2.15	19.27	84.53	Horizontal	Pass
		784.5	0.45	1.96	19.33	2.15	19.37	86.50	Horizontal	Pass

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
5MHz Band 16 QAM	1/#Mid	779.5	-0.63	1.95	19.23	2.15	19.97	99.31	Vertical	Pass
		782	-0.79	1.95	19.26	2.15	19.50	89.13	Vertical	Pass
		784.5	-0.83	1.96	19.33	2.15	19.56	90.36	Vertical	Pass
5MHz Band 16 QAM	1/#Mid	779.5	-0.41	1.95	19.23	2.15	20.02	100.46	Horizontal	Pass
		782	-0.41	1.95	19.26	2.15	19.87	97.05	Horizontal	Pass
		784.5	-0.50	1.96	19.33	2.15	19.29	84.92	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.7 eMTC BAND 25

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1850.7	-8.58	3.12	27.58	19.91	97.95	Horizontal	Pass
		1882.5	-8.45	3.27	27.61	19.27	84.53	Horizontal	Pass
		1914.3	-8.44	3.29	27.63	19.43	87.70	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1850.7	-8.49	3.12	27.58	19.44	87.90	Vertical	Pass
		1882.5	-8.47	3.27	27.61	19.78	95.06	Vertical	Pass
		1914.3	-8.39	3.29	27.63	19.51	89.33	Vertical	Pass

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1850.7	-9.68	3.12	27.58	19.55	90.16	Horizontal	Pass
		1882.5	-9.56	3.27	27.61	19.75	94.41	Horizontal	Pass
		1914.3	-9.62	3.29	27.63	19.16	82.41	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1850.7	-9.78	3.12	27.58	19.58	90.78	Vertical	Pass
		1882.5	-9.57	3.27	27.61	19.54	89.95	Vertical	Pass
		1914.3	-9.59	3.29	27.63	19.65	92.26	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.8 eMTC BAND 26a

Radiated Power (ERP) for Band 26(814-824)										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz BW QPSK	1/#Mid	814.7	-1.47	3.76	28.24	2.15	20.86	121.90	Horizontal	Pass
		819	-1.33	3.91	28.22	2.15	20.83	121.06	Horizontal	Pass
		823.3	-1.45	3.93	28.20	2.15	20.67	116.68	Horizontal	Pass
1.4MHz BW QPSK	1/#Mid	814.7	-1.43	3.79	28.34	2.15	20.97	125.03	Vertical	Pass
		819	-1.25	3.95	28.22	2.15	20.87	122.18	Vertical	Pass
		823.3	-2.00	3.97	28.18	2.15	20.06	101.39	Vertical	Pass

Radiated Power (ERP) for Band 26(814-824)										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz BW 16 QAM	1/#Mid	814.7	-1.50	3.76	28.24	2.15	20.83	121.06	Horizontal	Pass
		819	-1.36	3.91	28.22	2.15	20.80	120.23	Horizontal	Pass
		823.3	-1.48	3.93	28.20	2.15	20.64	115.88	Horizontal	Pass
1.4MHz BW 16 QAM	1/#Mid	814.7	-1.46	3.79	28.34	2.15	20.94	124.17	Vertical	Pass
		819	-1.28	3.95	28.22	2.15	20.84	121.34	Vertical	Pass
		823.3	-2.86	3.97	28.18	2.15	19.20	83.18	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.9 eMTC BAND 26b

Radiated Power (ERP) for Band 26(824-849)										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	824.7	4.13	2.01	19.68	2.15	19.65	92.26	Horizontal	Pass
		836.5	4.07	2.01	19.77	2.15	19.68	92.90	Horizontal	Pass
		848.3	4.01	2.02	19.82	2.15	19.66	92.47	Horizontal	Pass
1.4MHz Band QPSK	6/0	824.7	3.71	2.01	19.68	2.15	19.23	83.75	Vertical	Pass
		836.5	3.65	2.01	19.77	2.15	19.26	84.33	Vertical	Pass
		848.3	3.91	2.02	19.82	2.15	19.56	90.36	Vertical	Pass

Radiated Power (ERP) for Band 26(824-849)										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	6/0	824.7	4.46	2.01	19.68	2.15	19.98	99.54	Horizontal	Pass
		836.5	3.69	2.01	19.77	2.15	19.30	85.11	Horizontal	Pass
		848.3	3.63	2.02	19.82	2.15	19.28	84.72	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	824.7	3.97	2.01	19.68	2.15	19.49	88.92	Vertical	Pass
		836.5	4.36	2.01	19.77	2.15	19.97	99.31	Vertical	Pass
		848.3	4.11	2.02	19.82	2.15	19.76	94.62	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.10 eMTC BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	1/#Mid	1710.7	-4.07	3.76	28.24	20.41	109.901	Horizontal	Pass
		1745	-3.93	3.91	28.22	20.38	109.144	Horizontal	Pass
		1779.3	-3.80	3.93	28.2	20.47	111.429	Horizontal	Pass
1.4MHz Band QPSK	1/#Mid	1710.7	-5.31	3.76	28.24	19.17	82.604	Vertical	Pass
		1745	-4.43	3.91	28.22	19.88	97.275	Vertical	Pass
		1779.3	-4.59	3.93	28.2	19.68	92.897	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band 16 QAM	1/#Mid	1710.7	-5.07	3.76	28.24	19.41	87.297	Horizontal	Pass
		1745	-4.68	3.91	28.22	19.63	91.833	Horizontal	Pass
		1779.3	-4.86	3.93	28.2	19.41	87.297	Horizontal	Pass
1.4MHz Band 16 QAM	1/#Mid	1710.7	-6.29	3.76	28.24	18.19	65.917	Vertical	Pass
		1745	-5.38	3.91	28.22	18.93	78.163	Vertical	Pass
		1779.3	-5.72	3.93	28.2	18.55	71.614	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

8.11 NB-IoT BAND 2

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	1850.2	-10.53	3.76	28.24	19.03	79.98	Horizontal	Pass
		1880	-10.21	3.91	28.22	19.47	88.51	Horizontal	Pass
		1909.8	-10.32	3.93	28.20	19.38	86.70	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	1850.2	-10.44	3.76	28.24	19.55	90.16	Vertical	Pass
		1880	-10.27	3.91	28.22	19.77	94.84	Vertical	Pass
		1909.8	-10.31	3.93	28.20	19.05	80.35	Vertical	Pass

Radiated Power (EIRP) for Band 2									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	1850.2	-10.49	3.76	28.24	19.65	92.26	Horizontal	Pass
		1880	-10.24	3.91	28.22	19.75	94.41	Horizontal	Pass
		1909.8	-10.24	3.93	28.20	19.30	85.11	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	1850.2	-10.47	3.76	28.24	19.68	92.90	Vertical	Pass
		1880	-10.37	3.91	28.22	19.37	86.50	Vertical	Pass
		1909.8	-10.35	3.93	28.20	19.40	87.10	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.12 NB-IoT BAND 4

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	1710.2	-11.48	3.12	27.58	19.44	87.90	Horizontal	Pass
		1732.5	-11.39	3.27	27.61	19.83	96.16	Horizontal	Pass
		1754.8	-11.41	3.29	27.63	19.21	83.37	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	1710.2	-11.59	3.12	27.58	19.13	81.85	Vertical	Pass
		1732.5	-11.34	3.27	27.61	19.46	88.31	Vertical	Pass
		1754.8	-11.36	3.29	27.63	19.94	98.63	Vertical	Pass

Radiated Power (EIRP) for Band 4									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	1710.2	-11.60	3.12	27.58	19.66	92.47	Horizontal	Pass
		1732.5	-11.54	3.27	27.61	19.32	85.51	Horizontal	Pass
		1754.8	-11.53	3.29	27.63	19.17	82.60	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	1710.2	-11.60	3.12	27.58	19.12	81.66	Vertical	Pass
		1732.5	-11.50	3.27	27.61	19.24	83.95	Vertical	Pass
		1754.8	-11.49	3.29	27.63	19.27	84.53	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.13 NB-IoT BAND 5

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. ERP Average (dBm)	Max. ERP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	824.2	-0.19	2.01	19.68	2.15	18.89	77.45	Horizontal	Pass
		836.5	-0.27	2.01	19.77	2.15	19.27	84.53	Horizontal	Pass
		848.8	-0.25	2.02	19.82	2.15	19.05	80.35	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	824.2	-0.15	2.01	19.68	2.15	19.59	90.99	Vertical	Pass
		836.5	-0.34	2.01	19.77	2.15	19.64	92.04	Vertical	Pass
		848.8	-0.39	2.02	19.82	2.15	19.29	84.92	Vertical	Pass

Radiated Power (ERP) for Band 5										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	824.2	-0.27	2.01	19.68	2.15	18.96	78.70	Horizontal	Pass
		836.5	-0.39	2.01	19.77	2.15	19.16	82.41	Horizontal	Pass
		848.8	-0.36	2.02	19.82	2.15	19.15	82.22	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	824.2	-0.23	2.01	19.68	2.15	18.85	76.74	Vertical	Pass
		836.5	-0.30	2.01	19.77	2.15	18.90	77.62	Vertical	Pass
		848.8	-0.32	2.02	19.82	2.15	19.45	88.10	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.14 NB-IoT BAND 12

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	699.2	-0.15	1.91	19.21	2.15	19.23	83.75	Vertical	Pass
		707.5	-0.21	1.91	19.26	2.15	19.18	82.79	Vertical	Pass
		715.8	-0.24	1.93	19.34	2.15	19.53	89.74	Vertical	Pass
BPSK 3.75kHz	1/#Mid	699.2	-0.09	1.91	19.21	2.15	19.78	95.06	Horizontal	Pass
		707.5	-0.12	1.91	19.26	2.15	19.32	85.51	Horizontal	Pass
		715.8	-0.27	1.93	19.34	2.15	19.05	80.35	Horizontal	Pass

Radiated Power (ERP) for Band 12										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	699.2	-0.17	1.91	19.21	2.15	19.02	79.80	Vertical	Pass
		707.5	-0.35	1.91	19.26	2.15	19.68	92.90	Vertical	Pass
		715.8	-0.27	1.93	19.34	2.15	19.24	83.95	Vertical	Pass
QPSK 3.75kHz	1/#Mid	699.2	-0.25	1.91	19.21	2.15	19.65	92.26	Horizontal	Pass
		707.5	-0.24	1.91	19.26	2.15	19.76	94.62	Horizontal	Pass
		715.8	-0.26	1.93	19.34	2.15	19.38	86.70	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.15 NB-IoT BAND 13

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	777.2	-1.20	1.95	19.23	2.15	19.18	82.79	Vertical	Pass
		782	-1.22	1.95	19.26	2.15	19.38	86.70	Vertical	Pass
		786.8	-1.27	1.96	19.33	2.15	19.25	84.14	Vertical	Pass
BPSK 3.75kHz	1/#Mid	777.2	-1.14	1.95	19.23	2.15	18.85	76.74	Horizontal	Pass
		782	-1.26	1.95	19.26	2.15	19.77	94.84	Horizontal	Pass
		786.8	-1.25	1.96	19.33	2.15	19.14	82.04	Horizontal	Pass

Radiated Power (ERP) for Band 13										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Correction (dB)	Max. EPR Average (dBm)	Max. EPR Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	777.2	-1.08	1.95	19.23	2.15	18.88	77.27	Vertical	Pass
		782	-1.09	1.95	19.26	2.15	19.32	85.51	Vertical	Pass
		786.8	-1.27	1.96	19.33	2.15	19.36	86.30	Vertical	Pass
QPSK 3.75kHz	1/#Mid	777.2	-1.04	1.95	19.23	2.15	18.95	78.52	Horizontal	Pass
		782	-1.18	1.95	19.26	2.15	19.15	82.22	Horizontal	Pass
		786.8	-1.26	1.96	19.33	2.15	19.65	92.26	Horizontal	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.16 NB-IoT BAND 25

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	1850.2	-8.08	3.12	27.58	19.26	84.33	Horizontal	Pass
		1882.5	-7.86	3.27	27.61	19.91	97.95	Horizontal	Pass
		1914.8	-7.97	3.29	27.63	19.31	85.31	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	1850.2	-8.00	3.12	27.58	19.54	89.95	Vertical	Pass
		1882.5	-7.89	3.27	27.61	19.95	98.86	Vertical	Pass
		1914.8	-7.85	3.29	27.63	19.02	79.80	Vertical	Pass

Radiated Power (EIRP) for Band 25									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	1850.2	-7.75	3.12	27.58	19.63	91.83	Horizontal	Pass
		1882.5	-7.55	3.27	27.61	19.74	94.19	Horizontal	Pass
		1914.8	-7.57	3.29	27.63	19.05	80.35	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	1850.2	-7.80	3.12	27.58	19.69	93.11	Vertical	Pass
		1882.5	-7.58	3.27	27.61	19.73	93.97	Vertical	Pass
		1914.8	-7.59	3.29	27.63	19.24	83.95	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.17 NB-IoT BAND 66

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	1710.2	-3.99	3.76	28.24	20.49	111.944	Horizontal	Pass
		1745	-3.85	3.91	28.22	20.46	111.173	Horizontal	Pass
		1779.8	-3.72	3.93	28.2	20.55	113.501	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	1710.2	-5.00	3.76	28.24	19.48	88.716	Vertical	Pass
		1745	-4.51	3.91	28.22	19.80	95.499	Vertical	Pass
		1779.8	-4.57	3.93	28.2	19.70	93.325	Vertical	Pass

Radiated Power (EIRP) for Band 66									
Mode	RB/RB SIZE	Frequency	Result						Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	1710.2	-4.93	3.76	28.24	19.55	90.157	Horizontal	Pass
		1745	-4.54	3.91	28.22	19.77	94.842	Horizontal	Pass
		1779.8	-4.72	3.93	28.2	19.55	90.157	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	1710.2	-6.10	3.76	28.24	18.38	68.865	Vertical	Pass
		1745	-5.45	3.91	28.22	18.86	76.913	Vertical	Pass
		1779.8	-6.12	3.93	28.2	18.15	65.313	Vertical	Pass

Note:

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

8.18 NB-IoT BAND 71

Radiated Power (ERP) for Band 71										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
BPSK 3.75kHz	1/#Mid	663.2	4.97	2.01	19.68	2.15	20.52	112.72	Horizontal	Pass
		680.5	4.85	2.01	19.77	2.15	20.46	111.17	Horizontal	Pass
		697.8	4.65	2.02	19.82	2.15	20.30	107.15	Horizontal	Pass
BPSK 3.75kHz	1/#Mid	663.2	3.55	2.01	19.68	2.15	19.07	80.72	Vertical	Pass
		680.5	3.17	2.01	19.77	2.15	18.78	75.51	Vertical	Pass
		697.8	3.84	2.02	19.82	2.15	19.49	88.92	Vertical	Pass

Radiated Power (ERP) for Band 71										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			SG Level (dBm)	Cable Loss (dBm)	Antenna Factor (dB)	Correction (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
QPSK 3.75kHz	1/#Mid	663.2	5.00	2.01	19.68	2.15	20.49	111.94	Horizontal	Pass
		680.5	4.88	2.01	19.77	2.15	20.49	111.94	Horizontal	Pass
		697.8	4.68	2.02	19.82	2.15	20.33	107.89	Horizontal	Pass
QPSK 3.75kHz	1/#Mid	663.2	3.61	2.01	19.68	2.15	19.13	81.85	Vertical	Pass
		680.5	3.55	2.01	19.77	2.15	19.16	82.41	Vertical	Pass
		697.8	4.02	2.02	19.82	2.15	19.67	92.68	Vertical	Pass

Note:

ERP=EIRP-2.15

SG Level= Signal generator output

Max. EIRP Average (dBm)= Antenna Gain(dB)+ SG Level (dBm)- Cable Loss(dBm)

The worst mode is 3.75kHz and the report only shows the worst mode.

9. SPURIOUS RADIATION EMISSION

RULE PART(S)

FCC: §2.1051,§22.917(a), §24.238(a), §27.53(c)(g)(h)(m) and §90.691

LIMIT

For Band 7, the minimum permissible attenuation level of any spurious emission is 55 + log10 (P [Watts]).
The minimum permissible attenuation level of any spurious emission is 43 + log10 (P [Watts]), where P is the transmitter power in Watts.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:
a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66
  NB IoT Band 2/4/5/12/13/25/66/71

RESULTS

PASS

9.1 e MTC BAND 2

QPSK EIRP POWER FOR BAND 2 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-52.39	4.04	33.51	-22.92	-13	-9.92	Horizontal
3701.4	-51.03	4.04	33.51	-21.56	-13	-8.56	Vertical
5552.1	-53.03	5.24	35.84	-22.43	-13	-9.43	Vertical
5552.1	-51.86	5.24	35.84	-21.26	-13	-8.26	Horizontal
192.9	-42.92	1.43	16.02	-28.33	-13	-15.33	Vertical
342.4	-36.56	1.30	17.99	-19.87	-13	-6.87	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-47.57	4.04	33.56	-18.05	-13	-5.05	Horizontal
3760.0	-50.97	4.04	33.56	-21.45	-13	-8.45	Vertical
5640.0	-50.44	5.24	35.91	-19.77	-13	-6.77	Vertical
5640.0	-49.84	5.24	35.91	-19.17	-13	-6.17	Horizontal
206.0	-39.91	1.62	16.97	-24.56	-13	-11.56	Vertical
411.6	-42.79	1.74	15.98	-28.56	-13	-15.56	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-46.72	4.04	34.00	-16.76	-13	-3.76	Horizontal
3818.6	-46.62	4.04	34.00	-16.66	-13	-3.66	Vertical
5727.9	-48.62	5.24	36.04	-17.82	-13	-4.82	Vertical
5727.9	-53.34	5.24	36.04	-22.54	-13	-9.54	Horizontal
185.4	-41.19	1.42	17.29	-25.32	-13	-12.32	Vertical
374.6	-35.96	1.50	17.90	-19.55	-13	-6.55	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.2 e MTC BAND 4

QPSK EIRP POWER FOR BAND 4 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-50.08	4.02	29.80	-24.30	-13	-11.30	Horizontal
3421.4	-46.33	4.02	29.80	-20.55	-13	-7.55	Vertical
5132.1	-45.99	5.24	35.84	-15.39	-13	-2.39	Vertical
5132.1	-52.07	5.24	35.84	-21.47	-13	-8.47	Horizontal
203.6	-40.31	1.68	16.04	-25.95	-13	-12.95	Vertical
241.6	-40.48	1.78	17.74	-24.52	-13	-11.52	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-45.93	4.03	30.00	-19.96	-13	-6.96	Horizontal
3465.0	-51.70	4.03	30.00	-25.73	-13	-12.73	Vertical
5197.5	-46.66	5.25	35.86	-16.05	-13	-3.05	Vertical
5197.5	-49.32	5.25	35.86	-18.71	-13	-5.71	Horizontal
184.8	-34.75	1.72	17.69	-18.78	-13	-5.78	Vertical
253.6	-38.10	1.62	16.02	-23.69	-13	-10.69	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-48.69	4.05	30.01	-22.73	-13	-9.73	Horizontal
3508.6	-48.94	4.05	30.01	-22.98	-13	-9.98	Vertical
5262.9	-49.00	5.26	35.86	-18.40	-13	-5.40	Vertical
5262.9	-50.04	5.26	35.86	-19.44	-13	-6.44	Horizontal
183.4	-39.14	1.80	16.69	-24.25	-13	-11.25	Vertical
387.4	-35.65	1.75	16.66	-20.75	-13	-7.75	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.3 e MTC BAND 5

QPSK EIRP POWER FOR BAND 5 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-53.37	2.78	27.50	-28.65	-13	-15.65	Horizontal
1649.4	-48.62	2.78	27.50	-23.90	-13	-10.90	Vertical
2474.1	-50.80	2.90	27.80	-25.90	-13	-12.90	Vertical
2474.1	-49.81	2.90	27.80	-24.91	-13	-11.91	Horizontal
176.7	-43.87	1.76	17.59	-28.04	-13	-15.04	Vertical
270.3	-43.59	1.63	15.87	-29.35	-13	-16.35	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-53.02	2.80	27.48	-28.34	-13	-15.34	Horizontal
1673.0	-45.60	2.80	27.48	-20.92	-13	-7.92	Vertical
2509.5	-49.52	2.91	27.70	-24.73	-13	-11.73	Vertical
2509.5	-50.83	2.91	27.70	-26.04	-13	-13.04	Horizontal
175.9	-38.99	1.61	15.68	-24.92	-13	-11.92	Vertical
450.3	-43.14	1.59	17.52	-27.22	-13	-14.22	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-45.53	2.82	27.43	-20.92	-13	-7.92	Horizontal
1696.6	-51.59	2.82	27.43	-26.98	-13	-13.98	Vertical
2544.9	-50.35	2.92	27.74	-25.53	-13	-12.53	Vertical
2544.9	-49.38	2.92	27.74	-24.56	-13	-11.56	Horizontal
192.2	-35.88	1.69	16.67	-20.89	-13	-7.89	Vertical
406.1	-38.42	1.70	17.18	-22.94	-13	-9.94	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.4 e MTC BAND 12

QPSK EIRP POWER FOR BAND 12 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1399.4	-50.30	2.60	27.20	-25.70	-13	-12.70	Horizontal
1399.4	-49.82	2.60	27.20	-25.22	-13	-12.22	Vertical
2099.1	-46.50	2.85	27.54	-21.81	-13	-8.81	Vertical
2099.1	-50.15	2.85	27.54	-25.46	-13	-12.46	Horizontal
191.5	-39.28	1.49	17.78	-22.99	-13	-9.99	Vertical
451.2	-34.10	1.36	17.33	-18.13	-13	-5.13	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-51.51	2.61	27.28	-26.84	-13	-13.84	Horizontal
1415.0	-53.64	2.61	27.28	-28.97	-13	-15.97	Vertical
2122.5	-47.83	2.87	27.59	-23.11	-13	-10.11	Vertical
2122.5	-53.00	2.87	27.59	-28.28	-13	-15.28	Horizontal
212.6	-41.13	1.73	15.74	-27.12	-13	-14.12	Vertical
359.6	-34.92	1.62	15.79	-20.75	-13	-7.75	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-51.55	2.63	27.28	-26.90	-13	-13.90	Horizontal
1430.6	-48.12	2.63	27.28	-23.47	-13	-10.47	Vertical
2145.9	-50.85	2.88	27.60	-26.13	-13	-13.13	Vertical
2145.9	-50.75	2.88	27.60	-26.03	-13	-13.03	Horizontal
196.4	-34.03	1.61	18.00	-17.64	-13	-4.64	Vertical
257.3	-36.21	1.45	15.49	-22.18	-13	-9.18	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.5 e MTC BAND 13

QPSK EIRP POWER FOR BAND 13 (5MHZ BANDWIDTH)

Test Results for Low Channel 779.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
1559.0	-70.36	2.61	27.28	-45.69	-40	-5.69	Horizontal
1559.0	-73.00	2.61	27.28	-48.33	-40	-8.33	Vertical
2338.5	-42.90	2.87	27.59	-18.18	-13	-5.18	Vertical
2338.5	-42.46	2.87	27.59	-17.74	-13	-4.74	Horizontal
120.1	-39.01	1.54	15.61	-24.94	-13	-11.94	Vertical
197.8	-35.04	1.51	15.21	-21.34	-13	-8.34	Horizontal
Test Results For Mid Channel 782MHz							
1564.0	-69.05	2.62	27.30	-44.37	-40	-4.37	Horizontal
1564.0	-72.99	2.62	27.30	-48.31	-40	-8.31	Vertical
2346.0	-42.13	2.87	27.62	-17.38	-13	-4.38	Vertical
2346.0	-43.55	2.87	27.62	-18.80	-13	-5.80	Horizontal
131.2	-37.37	1.65	16.17	-22.85	-13	-9.85	Vertical
267.5	-38.62	1.48	16.88	-23.22	-13	-10.22	Horizontal
Test Results for High Channel 784.5MHz							
1569.0	-74.21	2.66	27.28	-49.59	-40	-9.59	Horizontal
1569.0	-74.41	2.66	27.28	-49.79	-40	-9.79	Vertical
2353.5	-43.16	2.88	27.60	-18.44	-13	-5.44	Vertical
2353.5	-39.79	2.88	27.60	-15.07	-13	-2.07	Horizontal
80.8	-38.30	1.54	16.40	-23.44	-13	-10.44	Vertical
155.6	-37.19	1.43	15.77	-22.85	-13	-9.85	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.6 e MTC BAND 25

QPSK EIRP POWER FOR BAND 25 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
3701.4	-48.86	4.02	29.80	-23.08	-13	-10.08	Horizontal
3701.4	-42.55	4.02	29.80	-16.77	-13	-3.77	Vertical
5552.1	-49.43	5.24	35.84	-18.83	-13	-5.83	Vertical
5552.1	-48.35	5.24	35.84	-17.75	-13	-4.75	Horizontal
93.9	-34.02	1.59	15.11	-20.50	-13	-7.50	Vertical
119.7	-33.68	1.80	15.61	-19.87	-13	-6.87	Horizontal
Test Results for Mid Channel 1732.5MHz							
3765.0	-48.48	4.03	30.00	-22.51	-13	-9.51	Horizontal
3765.0	-49.34	4.03	30.00	-23.37	-13	-10.37	Vertical
5647.5	-46.13	5.25	35.86	-15.52	-13	-2.52	Vertical
5647.5	-49.70	5.25	35.86	-19.09	-13	-6.09	Horizontal
166.1	-32.68	1.37	15.62	-18.43	-13	-5.43	Vertical
274.4	-34.47	1.55	17.51	-18.51	-13	-5.51	Horizontal
Test Results for High Channel 1754.3MHz							
3828.6	-49.53	4.05	30.01	-23.57	-13	-10.57	Horizontal
3828.6	-46.34	4.05	30.01	-20.38	-13	-7.38	Vertical
5742.9	-49.14	5.26	35.86	-18.54	-13	-5.54	Vertical
5742.9	-46.04	5.26	35.86	-15.44	-13	-2.44	Horizontal
108.6	-32.34	1.66	17.19	-16.81	-13	-3.81	Vertical
138.7	-33.31	1.35	17.94	-16.72	-13	-3.72	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.7 e MTC BAND 26a

BAND 26(814MHz~824MHz) (1.4MHZ BANDWIDTH)

Test Results for Low Channel 814.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
1629.4	-48.62	2.78	27.50	-23.90	-13	-10.90	Horizontal
1629.4	-46.42	2.78	27.50	-21.70	-13	-8.70	Vertical
2444.1	-46.79	2.90	27.80	-21.89	-13	-8.89	Vertical
2444.1	-49.88	2.90	27.80	-24.98	-13	-11.98	Horizontal
229.6	-32.35	1.54	16.98	-16.91	-13	-3.91	Vertical
83.3	-32.54	1.47	15.82	-18.19	-13	-5.19	Horizontal
Test Results For Mid Channel 819MHz							
1638.0	-47.50	2.80	27.48	-22.82	-13	-9.82	Horizontal
1638.0	-47.66	2.80	27.48	-22.98	-13	-9.98	Vertical
2457.0	-49.06	2.91	27.70	-24.27	-13	-11.27	Vertical
2457.0	-49.09	2.91	27.70	-24.30	-13	-11.30	Horizontal
168.2	-34.51	1.74	16.19	-20.06	-13	-7.06	Vertical
92.9	-34.04	1.46	15.43	-20.07	-13	-7.07	Horizontal
Test Results for High Channel 823.3MHz							
1646.6	-46.14	2.82	27.43	-21.53	-13	-8.53	Horizontal
1646.6	-49.41	2.82	27.43	-24.80	-13	-11.80	Vertical
2469.9	-49.03	2.92	27.74	-24.21	-13	-11.21	Vertical
2469.9	-49.33	2.92	27.74	-24.51	-13	-11.51	Horizontal
213.1	-32.29	1.67	17.05	-16.91	-13	-3.91	Vertical
121.7	-33.77	1.42	16.12	-19.07	-13	-6.07	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.8 e MTC BAND 26b

BAND 26(824MHz~849MHz) (1.4MHZ BANDWIDTH)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
1649.4	-49.93	2.78	27.50	-25.21	-13	-12.21	Horizontal
1649.4	-41.63	2.78	27.50	-16.91	-13	-3.91	Vertical
2474.1	-46.63	2.90	27.80	-21.73	-13	-8.73	Vertical
2474.1	-48.67	2.90	27.80	-23.77	-13	-10.77	Horizontal
237.0	-34.68	1.33	17.34	-18.67	-13	-5.67	Vertical
180.5	-32.02	1.47	16.80	-16.69	-13	-3.69	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-49.42	2.80	27.48	-24.74	-13	-11.74	Horizontal
1673.0	-49.94	2.80	27.48	-25.26	-13	-12.26	Vertical
2509.5	-46.19	2.91	27.70	-21.40	-13	-8.40	Vertical
2509.5	-48.76	2.91	27.70	-23.97	-13	-10.97	Horizontal
140.8	-32.00	1.75	15.46	-18.29	-13	-5.29	Vertical
90.6	-33.53	1.52	16.14	-18.91	-13	-5.91	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-47.88	2.82	27.43	-23.27	-13	-10.27	Horizontal
1696.6	-41.19	2.82	27.43	-16.58	-13	-3.58	Vertical
2544.9	-48.08	2.92	27.74	-23.26	-13	-10.26	Vertical
2544.9	-48.35	2.92	27.74	-23.53	-13	-10.53	Horizontal
171.4	-34.54	1.67	16.09	-20.12	-13	-7.12	Vertical
247.2	-34.12	1.80	17.55	-18.37	-13	-5.37	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.9 e MTC BAND 66

BAND 66 (1.4MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
3421.4	-44.43	4.02	29.80	-18.65	-13	-5.65	Horizontal
3421.4	-44.82	4.02	29.80	-19.04	-13	-6.04	Vertical
5132.1	-53.67	5.24	35.84	-23.07	-13	-10.07	Vertical
5132.1	-54.70	5.24	35.84	-24.10	-13	-11.10	Horizontal
112.6	-45.13	1.52	15.57	-31.08	-13	-18.08	Vertical
220.5	-51.27	1.33	17.14	-35.46	-13	-22.46	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-53.35	4.03	30.00	-27.38	-13	-14.38	Horizontal
3490.0	-44.06	4.03	30.00	-18.09	-13	-5.09	Vertical
5235.0	-54.78	5.25	35.86	-24.17	-13	-11.17	Vertical
5235.0	-54.85	5.25	35.86	-24.24	-13	-11.24	Horizontal
157.3	-49.46	1.53	17.13	-33.86	-13	-20.86	Vertical
213.1	-53.66	1.41	15.95	-39.12	-13	-26.12	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-44.67	4.05	30.01	-18.71	-13	-5.71	Horizontal
3558.6	-48.14	4.05	30.01	-22.18	-13	-9.18	Vertical
5337.9	-49.96	5.26	35.86	-19.36	-13	-6.36	Vertical
5337.9	-54.34	5.26	35.86	-23.74	-13	-10.74	Horizontal
170.6	-49.56	1.44	15.51	-35.49	-13	-22.49	Vertical
169.0	-52.59	1.78	15.76	-38.61	-13	-25.61	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. Both QPSK and 16QAM has been tested, the worst case is QPSK mode, the report just reported the worst case.

9.10 NB-IoT BAND 2

BPSK EIRP POWER FOR BAND 2 (3.75kHZ)

Test Results for Low Channel 1850.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-53.34	4.04	33.51	-23.87	-13	-10.87	Horizontal
3701.4	-45.64	4.04	33.51	-16.17	-13	-3.17	Vertical
5552.1	-45.99	5.24	35.84	-15.39	-13	-2.39	Vertical
5552.1	-53.27	5.24	35.84	-22.67	-13	-9.67	Horizontal
205.1	-39.02	1.43	16.02	-24.43	-13	-11.43	Vertical
249.7	-43.88	1.30	17.99	-27.19	-13	-14.19	Horizontal
Test Results for Mid Channel 1880MHz							
3760.0	-51.78	4.04	33.56	-22.26	-13	-9.26	Horizontal
3760.0	-45.09	4.04	33.56	-15.57	-13	-2.57	Vertical
5640.0	-51.75	5.24	35.91	-21.08	-13	-8.08	Vertical
5640.0	-51.44	5.24	35.91	-20.77	-13	-7.77	Horizontal
190.1	-44.87	1.62	16.97	-29.52	-13	-16.52	Vertical
434.5	-42.42	1.74	15.98	-28.19	-13	-15.19	Horizontal
Test Results for High Channel 1909.3MHz							
3818.6	-52.26	4.04	34.00	-22.30	-13	-9.30	Horizontal
3818.6	-51.90	4.04	34.00	-21.94	-13	-8.94	Vertical
5727.9	-46.74	5.24	36.04	-15.94	-13	-2.94	Vertical
5727.9	-53.10	5.24	36.04	-22.30	-13	-9.30	Horizontal
205.1	-37.68	1.42	17.29	-21.81	-13	-8.81	Vertical
281.0	-41.14	1.50	17.90	-24.73	-13	-11.73	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.11 NB-IoT BAND 4

BPSK EIRP POWER FOR BAND 4 (3.75kHZ)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-49.71	4.02	29.80	-23.93	-13	-10.93	Horizontal
3421.4	-50.69	4.02	29.80	-24.91	-13	-11.91	Vertical
5132.1	-48.35	5.24	35.84	-17.75	-13	-4.75	Vertical
5132.1	-49.95	5.24	35.84	-19.35	-13	-6.35	Horizontal
183.6	-34.65	1.68	16.04	-20.29	-13	-7.29	Vertical
461.4	-44.45	1.78	17.74	-28.49	-13	-15.49	Horizontal
Test Results for Mid Channel 1732.5MHz							
3465.0	-44.80	4.03	30.00	-18.83	-13	-5.83	Horizontal
3465.0	-53.17	4.03	30.00	-27.20	-13	-14.20	Vertical
5197.5	-48.88	5.25	35.86	-18.27	-13	-5.27	Vertical
5197.5	-51.04	5.25	35.86	-20.43	-13	-7.43	Horizontal
179.2	-40.63	1.72	17.69	-24.66	-13	-11.66	Vertical
261.9	-40.82	1.62	16.02	-26.41	-13	-13.41	Horizontal
Test Results for High Channel 1754.3MHz							
3508.6	-46.70	4.05	30.01	-20.74	-13	-7.74	Horizontal
3508.6	-47.94	4.05	30.01	-21.98	-13	-8.98	Vertical
5262.9	-47.96	5.26	35.86	-17.36	-13	-4.36	Vertical
5262.9	-49.54	5.26	35.86	-18.94	-13	-5.94	Horizontal
198.7	-34.41	1.80	16.69	-19.52	-13	-6.52	Vertical
447.4	-36.78	1.75	16.66	-21.88	-13	-8.88	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.12 NB-IoT BAND 5

BPSK EIRP POWER FOR BAND 5 (3.75kHZ)

Test Results for Low Channel 824.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1649.4	-51.33	2.78	27.50	-26.61	-13	-13.61	Horizontal
1649.4	-52.48	2.78	27.50	-27.76	-13	-14.76	Vertical
2474.1	-49.01	2.90	27.80	-24.11	-13	-11.11	Vertical
2474.1	-51.37	2.90	27.80	-26.47	-13	-13.47	Horizontal
191.4	-40.64	1.76	17.59	-24.81	-13	-11.81	Vertical
384.2	-42.31	1.63	15.87	-28.07	-13	-15.07	Horizontal
Test Results For Mid Channel 836.5MHz							
1673.0	-52.41	2.80	27.48	-27.73	-13	-14.73	Horizontal
1673.0	-46.48	2.80	27.48	-21.80	-13	-8.80	Vertical
2509.5	-49.50	2.91	27.70	-24.71	-13	-11.71	Vertical
2509.5	-49.90	2.91	27.70	-25.11	-13	-12.11	Horizontal
196.5	-42.79	1.61	15.68	-28.72	-13	-15.72	Vertical
440.6	-36.97	1.59	17.52	-21.05	-13	-8.05	Horizontal
Test Results for High Channel 848.3MHz							
1696.6	-48.49	2.82	27.43	-23.88	-13	-10.88	Horizontal
1696.6	-48.89	2.82	27.43	-24.28	-13	-11.28	Vertical
2544.9	-44.92	2.92	27.74	-20.10	-13	-7.10	Vertical
2544.9	-52.90	2.92	27.74	-28.08	-13	-15.08	Horizontal
209.8	-34.64	1.69	16.67	-19.65	-13	-6.65	Vertical
275.2	-43.09	1.70	17.18	-27.61	-13	-14.61	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.13 NB-IoT BAND 12

BPSK EIRP POWER FOR BAND 12 (3.75kHZ)

Test Results for Low Channel 699.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1399.4	-48.30	2.60	27.20	-23.70	-13	-10.70	Horizontal
1399.4	-44.86	2.60	27.20	-20.26	-13	-7.26	Vertical
2099.1	-45.91	2.85	27.54	-21.22	-13	-8.22	Vertical
2099.1	-51.59	2.85	27.54	-26.90	-13	-13.90	Horizontal
207.7	-44.83	1.49	17.78	-28.54	-13	-15.54	Vertical
316.1	-39.85	1.36	17.33	-23.88	-13	-10.88	Horizontal
Test Results For Mid Channel 707.5MHz							
1415.0	-44.90	2.61	27.28	-20.23	-13	-7.23	Horizontal
1415.0	-47.75	2.61	27.28	-23.08	-13	-10.08	Vertical
2122.5	-47.32	2.87	27.59	-22.60	-13	-9.60	Vertical
2122.5	-51.02	2.87	27.59	-26.30	-13	-13.30	Horizontal
191.1	-35.04	1.73	15.74	-21.03	-13	-8.03	Vertical
300.4	-40.15	1.62	15.79	-25.98	-13	-12.98	Horizontal
Test Results for High Channel 715.3MHz							
1430.6	-52.43	2.63	27.28	-27.78	-13	-14.78	Horizontal
1430.6	-44.24	2.63	27.28	-19.59	-13	-6.59	Vertical
2145.9	-45.82	2.88	27.60	-21.10	-13	-8.10	Vertical
2145.9	-50.42	2.88	27.60	-25.70	-13	-12.70	Horizontal
187.9	-39.82	1.61	18.00	-23.43	-13	-10.43	Vertical
237.7	-34.18	1.45	15.49	-20.15	-13	-7.15	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.14 NB-IoT BAND 13

BPSK EIRP POWER FOR BAND 13 (3.75kHZ)

Test Results for Low Channel 779.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
1559.0	-72.66	2.61	27.28	-47.99	-40	-7.99	Horizontal
1559.0	-72.47	2.61	27.28	-47.80	-40	-7.80	Vertical
2338.5	-43.46	2.87	27.59	-18.74	-13	-5.74	Vertical
2338.5	-44.67	2.87	27.59	-19.95	-13	-6.95	Horizontal
120.1	-36.61	1.54	15.61	-22.54	-13	-9.54	Vertical
197.8	-35.51	1.51	15.21	-21.81	-13	-8.81	Horizontal
Test Results For Mid Channel 782MHz							
1564.0	-70.75	2.62	27.30	-46.07	-40	-6.07	Horizontal
1564.0	-74.37	2.62	27.30	-49.69	-40	-9.69	Vertical
2346.0	-43.00	2.87	27.62	-18.25	-13	-5.25	Vertical
2346.0	-42.77	2.87	27.62	-18.02	-13	-5.02	Horizontal
131.2	-36.43	1.65	16.17	-21.91	-13	-8.91	Vertical
267.5	-38.24	1.48	16.88	-22.84	-13	-9.84	Horizontal
Test Results for High Channel 784.5MHz							
1569.0	-70.72	2.66	27.28	-46.10	-40	-6.10	Horizontal
1569.0	-73.18	2.66	27.28	-48.56	-40	-8.56	Vertical
2353.5	-40.38	2.88	27.60	-15.66	-13	-2.66	Vertical
2353.5	-41.14	2.88	27.60	-16.42	-13	-3.42	Horizontal
80.8	-37.78	1.54	16.40	-22.92	-13	-9.92	Vertical
155.6	-34.88	1.43	15.77	-20.54	-13	-7.54	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.15 NB-IoT BAND 25

BPSK EIRP POWER FOR BAND 25 (3.75kHZ)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
3701.4	-48.08	4.02	29.80	-22.30	-13	-9.30	Horizontal
3701.4	-46.70	4.02	29.80	-20.92	-13	-7.92	Vertical
5552.1	-46.25	5.24	35.84	-15.65	-13	-2.65	Vertical
5552.1	-49.06	5.24	35.84	-18.46	-13	-5.46	Horizontal
93.9	-32.97	1.59	15.11	-19.45	-13	-6.45	Vertical
119.7	-34.52	1.80	15.61	-20.71	-13	-7.71	Horizontal
Test Results for Mid Channel 1732.5MHz							
3765.0	-49.70	4.03	30.00	-23.73	-13	-10.73	Horizontal
3765.0	-43.97	4.03	30.00	-18.00	-13	-5.00	Vertical
5647.5	-49.01	5.25	35.86	-18.40	-13	-5.40	Vertical
5647.5	-48.10	5.25	35.86	-17.49	-13	-4.49	Horizontal
166.1	-32.09	1.37	15.62	-17.84	-13	-4.84	Vertical
274.4	-34.70	1.55	17.51	-18.74	-13	-5.74	Horizontal
Test Results for High Channel 1754.3MHz							
3828.6	-48.76	4.05	30.01	-22.80	-13	-9.80	Horizontal
3828.6	-47.28	4.05	30.01	-21.32	-13	-8.32	Vertical
5742.9	-48.11	5.26	35.86	-17.51	-13	-4.51	Vertical
5742.9	-47.95	5.26	35.86	-17.35	-13	-4.35	Horizontal
108.6	-32.42	1.66	17.19	-16.89	-13	-3.89	Vertical
138.7	-34.74	1.35	17.94	-18.15	-13	-5.15	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.16 NB-IoT BAND 66

BAND 66 (3.75KHz BPSK)

Test Results for Low Channel 1710.7MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit（dBm）	Margin(dBm)	Polarity
3421.4	-44.07	4.02	29.80	-18.29	-13	-5.29	Horizontal
3421.4	-54.62	4.02	29.80	-28.84	-13	-15.84	Vertical
5132.1	-54.55	5.24	35.84	-23.95	-13	-10.95	Vertical
5132.1	-47.74	5.24	35.84	-17.14	-13	-4.14	Horizontal
112.6	-44.71	1.52	15.57	-30.66	-13	-17.66	Vertical
220.5	-54.66	1.33	17.14	-38.85	-13	-25.85	Horizontal
Test Results for Mid Channel 1745MHz							
3490.0	-49.88	4.03	30.00	-23.91	-13	-10.91	Horizontal
3490.0	-48.93	4.03	30.00	-22.96	-13	-9.96	Vertical
5235.0	-52.40	5.25	35.86	-21.79	-13	-8.79	Vertical
5235.0	-48.84	5.25	35.86	-18.23	-13	-5.23	Horizontal
157.3	-44.08	1.53	17.13	-28.48	-13	-15.48	Vertical
213.1	-50.90	1.41	15.95	-36.36	-13	-23.36	Horizontal
Test Results for High Channel 1779.3MHz							
3558.6	-52.51	4.05	30.01	-26.55	-13	-13.55	Horizontal
3558.6	-47.95	4.05	30.01	-21.99	-13	-8.99	Vertical
5337.9	-51.43	5.26	35.86	-20.83	-13	-7.83	Vertical
5337.9	-54.77	5.26	35.86	-24.17	-13	-11.17	Horizontal
170.6	-44.65	1.44	15.51	-30.58	-13	-17.58	Vertical
169.0	-50.35	1.78	15.76	-36.37	-13	-23.37	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

9.17 NB-IoT BAND 71

BPSK EIRP POWER FOR BAND 71

Test Results for Low Channel 665.5.5MHz							
Frequency(MHz)	SG Level(dBm)	Cable Loss(dB)	Antenna Factor(dB)	Absolute Level(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1331	-53.31	2.61	27.28	-28.64	-13	-15.64	Horizontal
1331	-50.79	2.61	27.28	-26.12	-13	-13.12	Vertical
1996.5	-51.53	2.87	27.59	-26.81	-13	-13.81	Vertical
1996.5	-52.91	2.87	27.59	-28.19	-13	-15.19	Horizontal
Test Results For Mid Channel 680.5MHz							
1361	-52.25	2.62	27.30	-27.57	-13	-14.57	Horizontal
1361	-50.07	2.62	27.30	-25.39	-13	-12.39	Vertical
2041.5	-52.59	2.87	27.62	-27.84	-13	-14.84	Vertical
2041.5	-51.29	2.87	27.62	-26.54	-13	-13.54	Horizontal
Test Results for High Channel 695.5MHz							
1391	-49.12	2.66	27.28	-24.50	-13	-11.50	Horizontal
1391	-50.54	2.66	27.28	-25.92	-13	-12.92	Vertical
2086.5	-51.93	2.88	27.60	-27.21	-13	-14.21	Vertical
2086.5	-54.12	2.88	27.60	-29.40	-13	-16.40	Horizontal

Note: Spurious Emission Level = Spectrum Analyzer Read Value - Cable Loss+ Antenna Gain

. Margin = Spurious Emission Level - Limit

. The worst mode is BPSK(3.75kHz) and the report only shows the worst mode.

10. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54, §90.213

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

§24.235 - The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

- Temp. = −30° to +50°C
- Voltage =low voltage, DC6.4V, Normal, DC 7.4V and High voltage, DC 9.0V.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to -30ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

- eMTC Band 2/4/5/12/13/25/26/66

  NB IoT Band 2/4/5/12/13/25/66/71

RESULTS

See the following pages.

10.1 eMTC BAND 2

Band 2 QPSK, (1.4MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1880	12.8	0.006788	2.5
7.4	1880	13.7	0.007297	2.5
9.0	1880	12.9	0.006853	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.7	0.006772	2.5
Extreme (50C)	1880	11.2	0.005965	2.5
Extreme (40C)	1880	13.3	0.007087	2.5
Extreme (30C)	1880	13.7	0.007267	2.5
Extreme (10C)	1880	13.6	0.007241	2.5
Extreme (0C)	1880	12.2	0.006466	2.5
Extreme (-10C)	1880	13.5	0.007179	2.5
Extreme (-20C)	1880	13.9	0.007385	2.5
Extreme (-30C)	1880	14.7	0.007815	2.5

Band 2 16QAM, (1.4MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1880	9.8	0.005233	2.5
7.4	1880	8.9	0.004721	2.5
9.0	1880	8.1	0.004309	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.2	0.004884	2.5
Extreme (50C)	1880	8.7	0.004650	2.5
Extreme (40C)	1880	8.5	0.004503	2.5
Extreme (30C)	1880	8.7	0.004618	2.5
Extreme (10C)	1880	8.9	0.004716	2.5
Extreme (0C)	1880	7.6	0.004068	2.5
Extreme (-10C)	1880	8.6	0.004584	2.5
Extreme (-20C)	1880	8.9	0.004716	2.5
Extreme (-30C)	1880	8.4	0.004457	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.2 eMTC BAND 4

Band 4 QPSK, (1.4MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1732.5	8.4	0.004876	2.5
7.4	1732.5	8.4	0.004869	2.5
9.0	1732.5	8.1	0.004702	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.2	0.004755	2.5
Extreme (50C)	1732.5	9.4	0.005417	2.5
Extreme (40C)	1732.5	7.5	0.004346	2.5
Extreme (30C)	1732.5	6.1	0.003504	2.5
Extreme (10C)	1732.5	7.2	0.004172	2.5
Extreme (0C)	1732.5	9.0	0.005173	2.5
Extreme (-10C)	1732.5	8.5	0.004886	2.5
Extreme (-20C)	1732.5	6.6	0.003817	2.5
Extreme (-30C)	1732.5	8.9	0.005125	2.5

Band 4 16QAM, (1.4MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1732.5	9.4	0.005413	2.5
7.4	1732.5	9.1	0.005263	2.5
9.0	1732.5	8.0	0.004626	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.4	0.005433	2.5
Extreme (50C)	1732.5	8.7	0.005046	2.5
Extreme (40C)	1732.5	8.2	0.004726	2.5
Extreme (30C)	1732.5	9.3	0.005395	2.5
Extreme (10C)	1732.5	8.5	0.004890	2.5
Extreme (0C)	1732.5	8.4	0.004853	2.5
Extreme (-10C)	1732.5	8.7	0.005041	2.5
Extreme (-20C)	1732.5	9.1	0.005244	2.5
Extreme (-30C)	1732.5	8.4	0.004846	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.3 eMTC BAND 5

Band 5 QPSK, (1.4MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	5.8	0.006875	2.5
7.4	836.5	6.3	0.007582	2.5
9.0	836.5	4.5	0.005358	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.1	0.007269	2.5
Extreme (50C)	836.5	5.9	0.007025	2.5
Extreme (40C)	836.5	5.7	0.006819	2.5
Extreme (30C)	836.5	6.9	0.008244	2.5
Extreme (10C)	836.5	5.3	0.006373	2.5
Extreme (0C)	836.5	5.7	0.006868	2.5
Extreme (-10C)	836.5	5.2	0.006158	2.5
Extreme (-20C)	836.5	6.0	0.007172	2.5
Extreme (-30C)	836.5	6.3	0.007519	2.5

Band 5 16QAM, (1.4MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	5.9	0.007087	2.5
7.4	836.5	7.1	0.008474	2.5
9.0	836.5	5.0	0.005950	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006913	2.5
Extreme (50C)	836.5	5.7	0.006827	2.5
Extreme (40C)	836.5	6.6	0.007838	2.5
Extreme (30C)	836.5	6.0	0.007162	2.5
Extreme (10C)	836.5	5.8	0.006880	2.5
Extreme (0C)	836.5	4.9	0.005823	2.5
Extreme (-10C)	836.5	5.9	0.007019	2.5
Extreme (-20C)	836.5	6.6	0.007851	2.5
Extreme (-30C)	836.5	6.7	0.007958	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.4 eMTC BAND 12

Band 12 QPSK, (1.4MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	707.5	8.9	0.012634	2.5
7.4	707.5	9.9	0.013967	2.5
9.0	707.5	8.4	0.011926	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.6	0.012223	2.5
Extreme (50C)	707.5	7.8	0.011033	2.5
Extreme (40C)	707.5	7.8	0.011016	2.5
Extreme (30C)	707.5	8.5	0.012039	2.5
Extreme (10C)	707.5	7.3	0.010363	2.5
Extreme (0C)	707.5	9.1	0.012826	2.5
Extreme (-10C)	707.5	8.2	0.011555	2.5
Extreme (-20C)	707.5	9.1	0.012902	2.5
Extreme (-30C)	707.5	7.7	0.010933	2.5

Band 12 16QAM, (1.4MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	707.5	7.5	0.010579	2.5
7.4	707.5	7.9	0.011179	2.5
9.0	707.5	7.4	0.010436	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.3	0.013211	2.5
Extreme (50C)	707.5	8.6	0.012176	2.5
Extreme (40C)	707.5	9.1	0.012861	2.5
Extreme (30C)	707.5	7.9	0.011221	2.5
Extreme (10C)	707.5	8.5	0.012070	2.5
Extreme (0C)	707.5	7.9	0.011198	2.5
Extreme (-10C)	707.5	7.8	0.010963	2.5
Extreme (-20C)	707.5	8.6	0.012181	2.5
Extreme (-30C)	707.5	8.2	0.011601	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.5 eMTC BAND 13

Band 13 QPSK, (5MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	782.0	13.2	0.016866	2.5
7.4	782.0	13.5	0.017313	2.5
9.0	782.0	12.9	0.016522	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	14.2	0.018153	2.5
Extreme (50C)	782.0	13.3	0.017019	2.5
Extreme (40C)	782.0	14.9	0.019060	2.5
Extreme (30C)	782.0	14.0	0.017929	2.5
Extreme (10C)	782.0	14.3	0.018292	2.5
Extreme (0C)	782.0	14.5	0.018487	2.5
Extreme (-10C)	782.0	13.9	0.017782	2.5
Extreme (-20C)	782.0	14.2	0.018114	2.5
Extreme (-30C)	782.0	14.2	0.018105	2.5

Band 13 16QAM, (5MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	782.0	12.7	0.016191	2.5
7.4	782.0	13.4	0.017102	2.5
9.0	782.0	13.1	0.016768	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	12.6	0.016064	2.5
Extreme (50C)	782.0	11.6	0.014816	2.5
Extreme (40C)	782.0	13.3	0.016976	2.5
Extreme (30C)	782.0	13.8	0.017594	2.5
Extreme (10C)	782.0	14.4	0.018357	2.5
Extreme (0C)	782.0	11.6	0.014838	2.5
Extreme (-10C)	782.0	13.3	0.016972	2.5
Extreme (-20C)	782.0	13.9	0.017773	2.5
Extreme (-30C)	782.0	14.5	0.018481	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.6 eMTC BAND 25

Band 25 QPSK, (1.4MHz BANDWIDTH RB size 6 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1882.5	6.8	0.003592	2.5
7.4	1882.5	6.8	0.003620	2.5
9.0	1882.5	8.0	0.004240	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1882.5	5.8	0.003082	2.5
Extreme (50C)	1882.5	7.9	0.004211	2.5
Extreme (40C)	1882.5	6.3	0.003332	2.5
Extreme (30C)	1882.5	6.9	0.003642	2.5
Extreme (10C)	1882.5	7.3	0.003860	2.5
Extreme (0C)	1882.5	6.8	0.003619	2.5
Extreme (-10C)	1882.5	5.8	0.003065	2.5
Extreme (-20C)	1882.5	6.6	0.003480	2.5
Extreme (-30C)	1882.5	5.7	0.003003	2.5

Band 25 16QAM, (1.4MHz BANDWIDTH RB size 5 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1882.5	8.2	0.004382	2.5
7.4	1882.5	7.2	0.003835	2.5
9.0	1882.5	9.2	0.004890	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1882.5	9.1	0.004820	2.5
Extreme (50C)	1882.5	8.5	0.004495	2.5
Extreme (40C)	1882.5	8.9	0.004741	2.5
Extreme (30C)	1882.5	8.4	0.004473	2.5
Extreme (10C)	1882.5	8.7	0.004641	2.5
Extreme (0C)	1882.5	6.7	0.003571	2.5
Extreme (-10C)	1882.5	8.3	0.004397	2.5
Extreme (-20C)	1882.5	8.7	0.004646	2.5
Extreme (-30C)	1882.5	5.6	0.002995	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.7 eMTC BAND 26a

Band26a 814~824MHz QPSK, (1.4MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	819	9.0	0.010973	2.5
7.4	819	5.5	0.006685	2.5
9.0	819	6.4	0.007805	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	819	8.1	0.009949	2.5
Extreme (50C)	819	1.6	0.001951	2.5
Extreme (40C)	819	2.1	0.002624	2.5
Extreme (30C)	819	7.0	0.008495	2.5
Extreme (10C)	819	5.7	0.006949	2.5
Extreme (0C)	819	6.7	0.008133	2.5
Extreme (-10C)	819	8.5	0.010399	2.5
Extreme (-20C)	819	6.6	0.008096	2.5
Extreme (-30C)	819	4.3	0.005209	2.5

Band26a 814~824MHz 16QAM, (1.4MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	819	2.3	0.002867	2.5
7.4	819	6.4	0.007848	2.5
9.0	819	5.7	0.006962	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	819	6.8	0.008318	2.5
Extreme (50C)	819	8.2	0.009993	2.5
Extreme (40C)	819	6.8	0.008320	2.5
Extreme (30C)	819	4.5	0.005504	2.5
Extreme (10C)	819	6.3	0.007723	2.5
Extreme (0C)	819	5.2	0.006395	2.5
Extreme (-10C)	819	8.8	0.010695	2.5
Extreme (-20C)	819	6.6	0.008054	2.5
Extreme (-30C)	819	7.3	0.008859	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.8 eMTC BAND 26b

Band26b 824~849MHzQPSK, (1.4MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	8.1	0.009681	2.5
7.4	836.5	6.7	0.007958	2.5
9.0	836.5	8.8	0.010547	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	10.9	0.013042	2.5
Extreme (50C)	836.5	9.3	0.011142	2.5
Extreme (40C)	836.5	6.8	0.008182	2.5
Extreme (30C)	836.5	8.0	0.009617	2.5
Extreme (10C)	836.5	7.3	0.008755	2.5
Extreme (0C)	836.5	9.8	0.011741	2.5
Extreme (-10C)	836.5	2.0	0.002353	2.5
Extreme (-20C)	836.5	8.0	0.009571	2.5
Extreme (-30C)	836.5	7.7	0.009249	2.5

Band26b 824~849MHz 16QAM, (1.4MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	9.7	0.011607	2.5
7.4	836.5	11.9	0.014246	2.5
9.0	836.5	10.0	0.012011	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.3	0.007573	2.5
Extreme (50C)	836.5	9.0	0.010705	2.5
Extreme (40C)	836.5	7.2	0.008620	2.5
Extreme (30C)	836.5	7.6	0.009134	2.5
Extreme (10C)	836.5	6.5	0.007799	2.5
Extreme (0C)	836.5	5.5	0.006537	2.5
Extreme (-10C)	836.5	5.8	0.006894	2.5
Extreme (-20C)	836.5	3.5	0.011237	2.5
Extreme (-30C)	836.5	8.7	0.007292	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.9 eMTC BAND 66

Band 66 QPSK, (1.4MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1745	12.4	0.00710	2.5
7.4	1745	14.0	0.00800	2.5
9.0	1745	13.7	0.00785	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	7.2	0.004102	2.5
Extreme (50C)	1745	4.6	0.002645	2.5
Extreme (40C)	1745	5.0	0.002858	2.5
Extreme (30C)	1745	5.0	0.002877	2.5
Extreme (10C)	1745	6.9	0.003943	2.5
Extreme (0C)	1745	5.1	0.002933	2.5
Extreme (-10C)	1745	9.9	0.005677	2.5
Extreme (-20C)	1745	10.8	0.006183	2.5
Extreme (-30C)	1745	6.4	0.003658	2.5

Band 66 16QAM, (1.4MHz BANDWIDTH RB size 100 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1745	12.9	0.007381	2.5
7.4	1745	14.2	0.008146	2.5
9.0	1745	12.9	0.007376	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	7.5	0.004319	2.5
Extreme (50C)	1745	4.4	0.002526	2.5
Extreme (40C)	1745	5.6	0.003188	2.5
Extreme (30C)	1745	4.6	0.002627	2.5
Extreme (10C)	1745	6.3	0.003619	2.5
Extreme (0C)	1745	4.5	0.002585	2.5
Extreme (-10C)	1745	9.8	0.005588	2.5
Extreme (-20C)	1745	10.9	0.006260	2.5
Extreme (-30C)	1745	5.8	0.003325	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.10 NB-IoT BAND 2

Band 2 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1880	12.5	0.006658	2.5
7.4	1880	13.6	0.007241	2.5
9.0	1880	13.3	0.007061	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	12.2	0.006514	2.5
Extreme (50C)	1880	11.9	0.006347	2.5
Extreme (40C)	1880	13.7	0.007312	2.5
Extreme (30C)	1880	13.7	0.007272	2.5
Extreme (10C)	1880	14.1	0.007522	2.5
Extreme (0C)	1880	11.7	0.006215	2.5
Extreme (-10C)	1880	13.1	0.006950	2.5
Extreme (-20C)	1880	14.5	0.007699	2.5
Extreme (-30C)	1880	14.3	0.007619	2.5

Band 2 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1880	9.6	0.005099	2.5
7.4	1880	9.1	0.004849	2.5
9.0	1880	8.4	0.004470	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1880	9.5	0.005051	2.5
Extreme (50C)	1880	9.0	0.004796	2.5
Extreme (40C)	1880	8.5	0.004495	2.5
Extreme (30C)	1880	8.7	0.004617	2.5
Extreme (10C)	1880	9.3	0.004921	2.5
Extreme (0C)	1880	8.5	0.004530	2.5
Extreme (-10C)	1880	9.1	0.004826	2.5
Extreme (-20C)	1880	8.6	0.004599	2.5
Extreme (-30C)	1880	8.6	0.004570	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.11 NB-IoT BAND 4

Band 4 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1732.5	8.5	0.004889	2.5
7.4	1732.5	9.3	0.005339	2.5
9.0	1732.5	8.6	0.004948	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	8.2	0.004758	2.5
Extreme (50C)	1732.5	9.3	0.005387	2.5
Extreme (40C)	1732.5	7.5	0.004329	2.5
Extreme (30C)	1732.5	6.1	0.003521	2.5
Extreme (10C)	1732.5	7.4	0.004264	2.5
Extreme (0C)	1732.5	9.6	0.005570	2.5
Extreme (-10C)	1732.5	8.1	0.004672	2.5
Extreme (-20C)	1732.5	6.7	0.003861	2.5
Extreme (-30C)	1732.5	8.1	0.004659	2.5

Band 4 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1732.5	9.8	0.005680	2.5
7.4	1732.5	9.1	0.005261	2.5
9.0	1732.5	8.1	0.004652	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1732.5	9.6	0.005550	2.5
Extreme (50C)	1732.5	9.2	0.005302	2.5
Extreme (40C)	1732.5	8.5	0.004889	2.5
Extreme (30C)	1732.5	8.5	0.004922	2.5
Extreme (10C)	1732.5	9.3	0.005363	2.5
Extreme (0C)	1732.5	8.0	0.004616	2.5
Extreme (-10C)	1732.5	9.4	0.005447	2.5
Extreme (-20C)	1732.5	9.1	0.005271	2.5
Extreme (-30C)	1732.5	7.8	0.004480	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.12 NB-IoT BAND 5

Band 5 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	6.2	0.007390	2.5
7.4	836.5	6.2	0.007446	2.5
9.0	836.5	5.1	0.006061	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	5.8	0.006962	2.5
Extreme (50C)	836.5	5.6	0.006741	2.5
Extreme (40C)	836.5	6.4	0.007666	2.5
Extreme (30C)	836.5	5.9	0.007090	2.5
Extreme (10C)	836.5	5.5	0.006590	2.5
Extreme (0C)	836.5	5.5	0.006537	2.5
Extreme (-10C)	836.5	5.2	0.006190	2.5
Extreme (-20C)	836.5	6.6	0.007870	2.5
Extreme (-30C)	836.5	6.0	0.007186	2.5

Band 5 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	836.5	5.8	0.006962	2.5
7.4	836.5	7.1	0.008454	2.5
9.0	836.5	5.1	0.006046	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	836.5	6.3	0.007510	2.5
Extreme (50C)	836.5	6.2	0.007425	2.5
Extreme (40C)	836.5	6.6	0.007833	2.5
Extreme (30C)	836.5	6.3	0.007563	2.5
Extreme (10C)	836.5	5.7	0.006805	2.5
Extreme (0C)	836.5	5.7	0.006814	2.5
Extreme (-10C)	836.5	5.2	0.006191	2.5
Extreme (-20C)	836.5	6.2	0.007360	2.5
Extreme (-30C)	836.5	6.3	0.007473	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.13 NB-IoT BAND 12

Band 12 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	707.5	8.3	0.011788	2.5
7.4	707.5	10.0	0.014199	2.5
9.0	707.5	8.4	0.011848	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	9.2	0.013024	2.5
Extreme (50C)	707.5	7.9	0.011130	2.5
Extreme (40C)	707.5	7.8	0.011061	2.5
Extreme (30C)	707.5	8.4	0.011924	2.5
Extreme (10C)	707.5	7.3	0.010383	2.5
Extreme (0C)	707.5	9.2	0.012980	2.5
Extreme (-10C)	707.5	8.1	0.011396	2.5
Extreme (-20C)	707.5	9.0	0.012696	2.5
Extreme (-30C)	707.5	8.2	0.011572	2.5

Band 12 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	707.5	7.8	0.010966	2.5
7.4	707.5	8.0	0.011312	2.5
9.0	707.5	7.5	0.010664	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	707.5	8.8	0.012368	2.5
Extreme (50C)	707.5	8.9	0.012530	2.5
Extreme (40C)	707.5	8.5	0.011993	2.5
Extreme (30C)	707.5	7.5	0.010659	2.5
Extreme (10C)	707.5	8.7	0.012304	2.5
Extreme (0C)	707.5	7.4	0.010461	2.5
Extreme (-10C)	707.5	7.7	0.010890	2.5
Extreme (-20C)	707.5	8.8	0.012495	2.5
Extreme (-30C)	707.5	8.6	0.012182	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.14 NB-IoT BAND 13

Band 13 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	782.0	12.2	0.015660	2.5
7.4	782.0	14.1	0.018092	2.5
9.0	782.0	13.2	0.016865	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	13.8	0.017705	2.5
Extreme (50C)	782.0	13.4	0.017196	2.5
Extreme (40C)	782.0	15.0	0.019209	2.5
Extreme (30C)	782.0	14.5	0.018487	2.5
Extreme (10C)	782.0	13.8	0.017634	2.5
Extreme (0C)	782.0	13.8	0.017682	2.5
Extreme (-10C)	782.0	14.1	0.018020	2.5
Extreme (-20C)	782.0	13.7	0.017529	2.5
Extreme (-30C)	782.0	14.0	0.017940	2.5

Band 13 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	782.0	12.5	0.015944	2.5
7.4	782.0	13.7	0.017516	2.5
9.0	782.0	13.8	0.017628	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	782.0	13.1	0.016782	2.5
Extreme (50C)	782.0	11.4	0.014623	2.5
Extreme (40C)	782.0	14.0	0.017939	2.5
Extreme (30C)	782.0	13.3	0.017011	2.5
Extreme (10C)	782.0	14.0	0.017923	2.5
Extreme (0C)	782.0	12.3	0.015793	2.5
Extreme (-10C)	782.0	12.5	0.016009	2.5
Extreme (-20C)	782.0	14.6	0.018607	2.5
Extreme (-30C)	782.0	15.0	0.019232	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.15 NB-IoT BAND 25

Band 25 BPSK, (15kHz RB size 1 RB Offset 11)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1882.5	6.1	0.003221	2.5
7.4	1882.5	6.7	0.003550	2.5
9.0	1882.5	8.0	0.004235	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1882.5	5.8	0.003082	2.5
Extreme (50C)	1882.5	7.9	0.004172	2.5
Extreme (40C)	1882.5	6.5	0.003439	2.5
Extreme (30C)	1882.5	7.4	0.003957	2.5
Extreme (10C)	1882.5	7.1	0.003790	2.5
Extreme (0C)	1882.5	6.8	0.003620	2.5
Extreme (-10C)	1882.5	5.8	0.003082	2.5
Extreme (-20C)	1882.5	6.6	0.003506	2.5
Extreme (-30C)	1882.5	5.0	0.002675	2.5

Band 25 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1882.5	8.3	0.004419	2.5
7.4	1882.5	7.7	0.004099	2.5
9.0	1882.5	9.3	0.004965	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1882.5	8.7	0.004641	2.5
Extreme (50C)	1882.5	8.5	0.004518	2.5
Extreme (40C)	1882.5	8.5	0.004536	2.5
Extreme (30C)	1882.5	8.2	0.004355	2.5
Extreme (10C)	1882.5	8.4	0.004467	2.5
Extreme (0C)	1882.5	6.3	0.003321	2.5
Extreme (-10C)	1882.5	8.2	0.004354	2.5
Extreme (-20C)	1882.5	8.2	0.004357	2.5
Extreme (-30C)	1882.5	5.8	0.003102	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.16 NB-IoT BAND 66

Band 66 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1745	12.9	0.00738	2.5
7.4	1745	13.5	0.00776	2.5
9.0	1745	13.6	0.00779	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	7.5	0.004314	2.5
Extreme (50C)	1745	5.3	0.003012	2.5
Extreme (40C)	1745	5.0	0.002838	2.5
Extreme (30C)	1745	4.5	0.002553	2.5
Extreme (10C)	1745	6.0	0.003442	2.5
Extreme (0C)	1745	4.6	0.002608	2.5
Extreme (-10C)	1745	9.8	0.005639	2.5
Extreme (-20C)	1745	10.4	0.005978	2.5
Extreme (-30C)	1745	5.9	0.003366	2.5

Band 66 16QAM, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	1745	13.0	0.007434	2.5
7.4	1745	13.3	0.007634	2.5
9.0	1745	13.6	0.007770	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	1745	7.3	0.004170	2.5
Extreme (50C)	1745	4.8	0.002732	2.5
Extreme (40C)	1745	5.8	0.003305	2.5
Extreme (30C)	1745	4.5	0.002567	2.5
Extreme (10C)	1745	6.2	0.003547	2.5
Extreme (0C)	1745	4.5	0.002595	2.5
Extreme (-10C)	1745	9.3	0.005328	2.5
Extreme (-20C)	1745	10.6	0.006073	2.5
Extreme (-30C)	1745	6.2	0.003525	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

10.17 NB-IoT BAND 71

Band 71 QPSK, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	683	8.6	0.01259	2.5
7.4	683	13.4	0.01962	2.5
9.0	683	13	0.01903	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	683	7.7	0.011274	2.5
Extreme (50C)	683	5.2	0.007613	2.5
Extreme (40C)	683	5.1	0.007467	2.5
Extreme (30C)	683	5	0.007321	2.5
Extreme (10C)	683	6.6	0.009663	2.5
Extreme (0C)	683	4.8	0.007028	2.5
Extreme (-10C)	683	9.8	0.014348	2.5
Extreme (-20C)	683	7.2	0.010542	2.5
Extreme (-30C)	683	7.3	0.010688	2.5

Band 71 16QAM, (15kHz RB size 12 RB Offset 0)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
6.4	683	12.3	0.018009	2.5
7.4	683	14.2	0.020791	2.5
9.0	683	11.2	0.016398	2.5

Frequency error vs. Temperature

Temperature [°C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
Normal (25C)	683	7.7	0.011274	2.5
Extreme (50C)	683	4.7	0.006881	2.5
Extreme (40C)	683	5.9	0.008638	2.5
Extreme (30C)	683	5.2	0.007613	2.5
Extreme (10C)	683	5.2	0.007613	2.5
Extreme (0C)	683	6.3	0.009224	2.5
Extreme (-10C)	683	9.4	0.013763	2.5
Extreme (-20C)	683	8.2	0.012006	2.5
Extreme (-30C)	683	8.4	0.012299	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11. Peak-to-Average Ratio

11.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

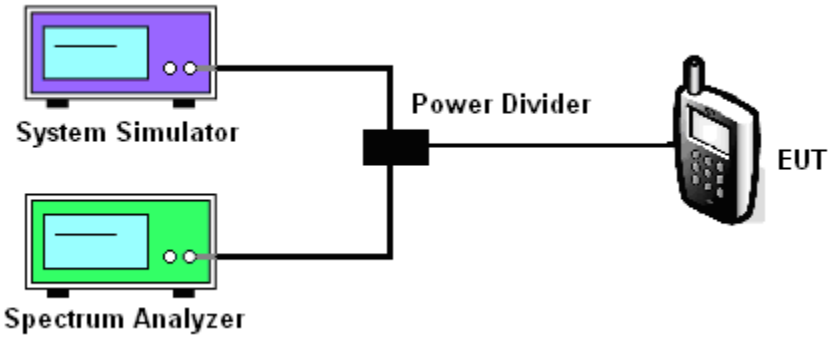
11.2 Measuring Instruments

See list of measuring instruments of this test report.

11.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For eMTC / NB IoT operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

11.4 Test Setup



MODES TESTED

- □ eMTC Band 2/4/5/12/13/25/26/66
  NB IoT Band 2/4/5/12/13/25/66/71
- □

Test data reference attachment.

----END OF REPORT----