RADIO TEST REPORT

Report No:STS1911255W03

Issued for

SIMCom Wireless Solutions Limited

No.633, Jinzhong Road, Shanghai, China

Product Name:	NB/GSM/GNSS MODULE
Brand Name:	SIMCom
Model Name:	SIM7070G
Series Model:	SIM7070G-PCIE
FCC ID:	2AJYU-8VC0001
Test Standard:	47 CFR Part 2, 22H, 24(E), 27

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TEST RESULT CERTIFICATION

Applicant's Name.....:	SIMCom Wireless Solutions Limited
Address.....:	No.633, Jinzhong Road, Shanghai, China
Manufacture's Name .....:	SIMCom Wireless Solutions Limited
Address.....:	No.633, Jinzhong Road, Shanghai, China

Product Description

Product Name .....:	NB/GSM/GNSS MODULE
Brand Name .....:	SIMCom
Model Name.....:	SIM7070G
Series Model .....:	SIM7070G-PCIE
Test Standards.....:	47 CFR Part 2, 22H, 24(E), 27
Test Procedure.....:	KDB 971168 D01 v03r01, ANSI C63.26 2015

This device described above has been tested by STS, 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 of receipt of test item.....:	20 Nov. 2019
Date (s) of performance of tests :	20 Nov. 2019 ~ 24 Dec. 2019
Date of Issue .....:	24 Dec. 2019
Test Result .....:	Pass

Testing Engineer : 

(Chris Chen)

Technical Manager : 

(Sunday Hu)

Authorized Signatory : 

(Vita Li)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	24 Dec. 2019	STS1911255W03	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

1.1 TEST RESULTS DESCRIPTION AND LABORATORY INFORMATION

FCC Rule	Description	Limit	Result
§2.1046	Conducted Output Power	Reporting Only	PASS
§24.232(d) §22.913(d) §27.50(a)(B)	Peak-to-Average Ratio	<13 dB	PASS
§2.1049 §22.917 §24.238(b) §27.53(h)(3) §27.53(m)(6)	Occupied Bandwidth	Reporting Only	PASS
§2.1051) §22.917 §24.238(a) §27.53(g) §27.53(h)	Conducted Band Edge Measurement	<43+10log10(P[Watts])	PASS
§27.53(m)(4)		<43+10log10(P[Watts])	PASS
§2.1051 §22.917 §24.238(a) §27.53(g) §27.53(h) §22.917	Conducted Spurious Emission	<43+10log10(P[Watts])	PASS
§27.53(m)(4)	Conducted Spurious Emission	< 55+10log10(P[Watts])	PASS
§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS
§27.50(c)(10)	Effective Radiated Power	ERP < 3 Watt	PASS
§24.232(c) §27.50(h)(2)	Equivalent Isotropic Radiated Power	EIRP < 2Watt	PASS
§27.50(d)(4)	Equivalent Isotropic Radiated Power	EIRP < 1Watt	PASS
§22.913	Effective Radiated Power	ERP < 7 Watt	PASS
§2.1053 §22.917 §24.238(a) §27.53(g) §27.53(h)	Radiated Spurious Emission	< 43+10log10(P[Watts])	PASS
§2.1053 §27.53(m)(4)	Radiated Spurious Emission	< 55+10log10(P[Watts])	PASS

1.1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± U, 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	RF output power, conducted	±0.68dB
2	Unwanted Emissions, conducted	±2.988dB
3	All emissions, radiated 30-1GHz	±6.7dB
4	All emissions, radiated 1G-6GHz	±5.5dB
5	All emissions, radiated>6G	±5.8dB
6	Conducted Emission (9KHz-150KHz)	±4.43dB
7	Conducted Emission (150KHz-30MHz)	±5dB

2. GENERAL INFORMATION

2.1 TECHNICAL SPECIFICATIONS AND REGULATIONS

2.1.1 PRODUCT DESCRIPTION

A major technical description of EUT is described as following:

Product Name:	NB/GSM/GNSS MODULE
Trade Name	SIMCom
Model Name	SIM7070G
Series Model	SIM7070G-PCIE
Model Difference	Only different in model name and appearance
Frequency Bands:	U.S. Bands: ☒NB-IOT FDD Band 2 ☒NB-IOT FDD Band 4 ☒NB-IOT FDD Band 5 ☒NB-IOT FDD Band 12 ☒NB-IOT FDD Band 13 ☒NB-IOT FDD Band 71
SIM CARD:	SIM 1 and SIM 2 is a chipset unit and tested as single chipset, SIM 1 is used to tested
Antenna:	External Antenna
Antenna gain:	B2/B4:3 dBi B5/B12/B13/B71:2dBi
Power Rating:	Input: DC 3.8V
Extreme Vol. Limits:	3.0V to 4.6V (Nominal 3.8V)
Extreme Temp. Tolerance:	-30℃ to +50℃
Hardware version number:	V1.03
Software version number:	R1951.01

2.1.2 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Product Specification Subjective To This Standard	
Tx Frequency	NB-IOT Band 2:1850~1910MHz NB-IOT Band 4:1710~1755MHz NB-IOT Band 5:824~849MHz NB-IOT Band 12:699~716MHz NB-IOT Band 13:777~787MHz NB-IOT Band 71:663~698MHz
Rx Frequency	NB-IOT Band 2:1930 ~1990MHz NB-IOT Band 4:2110~2155MHz NB-IOT Band 5:869~894MHz NB-IOT Band 12:729~746MHz NB-IOT Band 13:746~756MHz NB-IOT Band 71:617~652MHz
Deployment	Stand-alone
Ntones	Single, multi-tone
Sub-carrier spacing	3.75KHz, 15KHz
Maximum Output Power Limit	NB-IOT Band 2: 21.55 dBm NB-IOT Band 4: 21.61 dBm NB-IOT Band 5: 23.12 dBm NB-IOT Band 12: 22.75 dBm NB-IOT Band 13: 21.93 dBm NB-IOT Band 71: 23.05 dBm
Type of Modulation	BPSK /QPSK

2.1.3 TEST CONFIGURATION OF EQUIPMENT UNDER TEST

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 v03r01 and ANSI C63.26 2015 Power Meas. License Digital Systems with maximum output power. Radiated measurements are performed by rotating the EUT in three different orthogonal test planes tofind the maximum emission.

Remark:

1. The mark ‘v’means that this configuration is chosen for testing
2. The mark ‘-’means that this bandwidth is not supported.
3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated

ITEMS	Band	Subcarrier Spacing (KHz)		Modulation		Test Channel		
		3.75	15	BPSK	QPSK	L	M	H
Max. Output Power	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v
Peak&Avera Ratio	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v
26dB&99% Bandwidth	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v
Conducted Band Edge	2	v	v	v	v	v		v
	4	v	v	v	v	v		v
	5	v	v	v	v	v		v
	12	v	v	v	v	v		v
	13	v	v	v	v	v		v
	71	v	v	v	v	v		v
Conducted Spurious Emission	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v

Frequency Stability	2	v	v		v		v	
	4	v	v		v		v	
	5	v	v		v		v	
	12	v	v		v		v	
	13	v	v		v		v	
	71	v	v		v		v	
E.R.P.& E.I.R.P.	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v
Radiated Spurious Emission	2	v	v	v	v	v	v	v
	4	v	v	v	v	v	v	v
	5	v	v	v	v	v	v	v
	12	v	v	v	v	v	v	v
	13	v	v	v	v	v	v	v
	71	v	v	v	v	v	v	v

2.1.4 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for filing to comply with the 47 CFR Part 2, 22H, 24(E), 27

2.1.5 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.

2.1.6 EUT CONFIGURATION

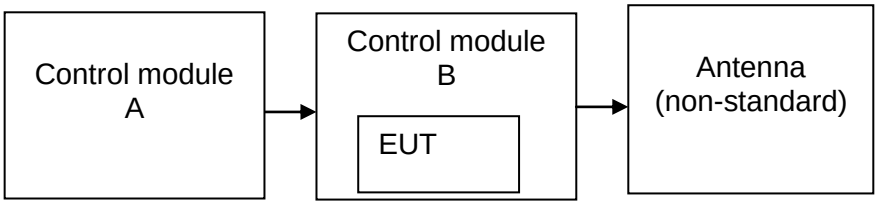
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission’s requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.1.7 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.

2.1.8 CONFIGURATION OF EUT SYSTEM

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.



As shown in figure

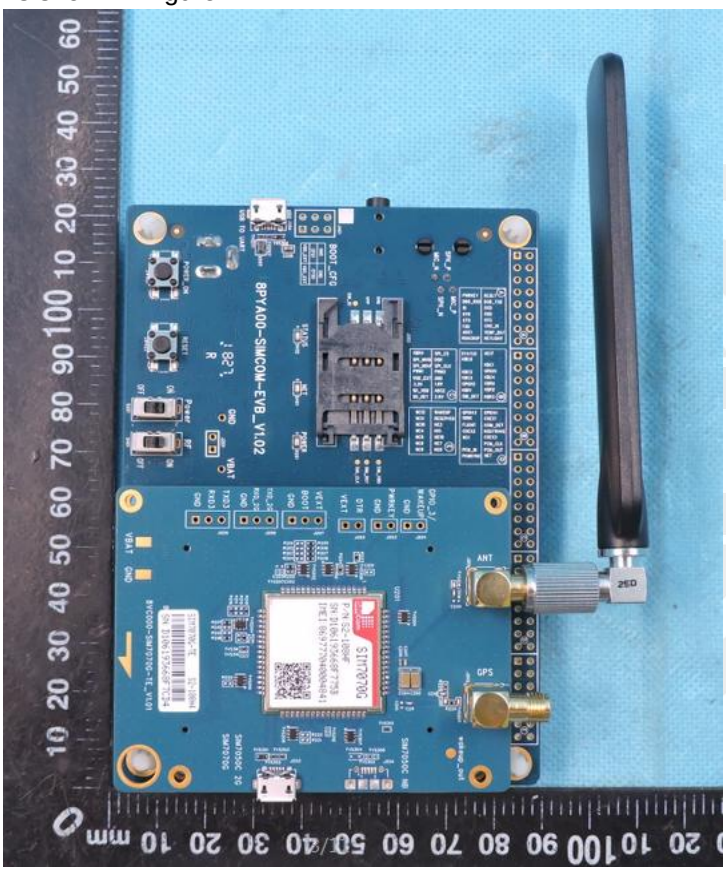


Table 2-1 Equipment Used in EUT System

Item	Equipment	Model No.	Serial No.	Note
1	Control module A	8PYA00-SIMCOM-EVB_V1.02	N/A	N/A
2	Control module B	8VC000-SIM7070G-TE_V1.01	N/A	N/A

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.1.9 MEASUREMENT INSTRUMENTS

The radiated emission testing was performed according to the procedures of ANSI C63.26 2015 and FCC CFR 47 rules of 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057.

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.7.29	2020.7.28
Signal Analyzer	Agilent	N9020A	MY51110105	2019.03.02	2020.03.01
Wireless Communications Test Set	R&S	CMW 500	133884	2019.03.02	2020.03.01
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier(0.1M-3GHz)	EM	EM330	060665	2019.10.9	2020.10.8
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2019.10.12	2020.10.11
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	BULUN	BL410-E/18.905			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Universal Radio communication tester	R&S	CMU200	11764	2019.10.11	2020.10.10
Wireless Communications Test Set	R&S	CMW 500	133884	2019.03.02	2020.03.01
Signal Analyzer	Agilent	N9020A	MY49100060	2019.10.9	2020.10.8
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	LZ-RF /LzRf-3A3			

2.1.10 MEASUREMENT RESULTS EXPLANATION EXAMPLE

For all conducted test items:
The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factorbetween EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.
The spectrum analyzer offset is derived from RF cable loss and attenuator factor.
Offset = RF Cable Loss + Attenuator Factor.

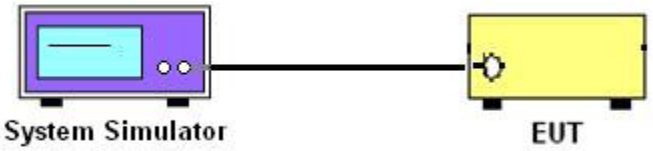
3. CONDUCTED OUTPUT POWER

3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

A system simulator was used to establish communication with the eut. Its parameters were set to force the eut transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.
Configuration follows KDB 971168 D01 v03r01.

3.1.2 TEST SETUP



3.1.3 TEST PROCEDURES

1. The transmitter output port was connected to system simulator.

2. Set EUT at maximum power through the system simulator.

3. Select lowest/middle/highest channels for each band and different modulation.

4. Measure and record the power level from the system simulator.

3.1.4 TEST RESULTS

NB-IoT Band 2 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 2 Standalone	BPSK	3.75	1@0	20.66	21.47	21.44
			1@47	20.54	21.46	21.43
		15	1@0	20.2	21.05	21.2
			1@11	20.22	21.33	21.21
	QPSK	3.75	1@0	20.66	21.55	21.54
			1@47	20.62	21.51	21.47
		15	1@0	20.44	21.18	21.4
			1@11	20.36	21.12	21.34
			12@0	20.01	20.06	20.2
NB-IoT Band 4 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 4 Standalone	BPSK	3.75	1@0	21.48	21.51	21.32
			1@47	21.37	21.49	21.26
		15	1@0	21.45	21.4	21.47
			1@11	21.4	21.34	21.39
	QPSK	3.75	1@0	21.53	21.58	21.47
			1@47	21.48	21.55	21.41
		15	1@0	21.59	21.58	21.61
			1@11	21.51	21.52	21.55
			12@0	20.94	20.9	20.97
NB-IoT Band 5 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 5 Standalone	BPSK	3.75	1@0	20.69	20.78	20.51
			1@47	20.67	20.7	20.45
		15	1@0	20.58	20.99	20.94
			1@11	20.5	20.95	20.86
	QPSK	3.75	1@0	20.84	20.85	20.65
			1@47	20.76	20.78	20.55
		15	1@0	20.69	21.31	21.02
			1@11	20.61	21.22	20.93
			12@0	23.12	23.08	22.95
NB-IoT Band 12 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 12 Standalone	BPSK	3.75	1@0	20.26	20.14	20.2
			1@47	20.24	20.08	20.11
		15	1@0	21.28	20.34	20.35
			1@11	21.27	20.32	20.33
	QPSK	3.75	1@0	20.34	20.24	20.26
			1@47	20.33	20.18	20.19
		15	1@0	21.42	20.46	20.48
			1@11	21.38	20.39	20.44
			12@0	22.55	22.53	22.75

NB-IoT Band 13 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 13 Standalone	BPSK	3.75	1@0	21.17	21.16	21.16
			1@47	21.15	21.06	21.15
		15	1@0	21.45	21.35	21.43
			1@11	21.42	21.33	21.36
	QPSK	3.75	1@0	21.31	21.22	21.35
			1@47	21.26	21.15	21.26
		15	1@0	21.57	21.51	21.55
			1@11	21.49	21.45	21.48
			12@0	21.64	21.59	21.93

NB-IoT Band 71 Maximum Average Power [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
Band 71 Standalone	BPSK	3.75	1@0	22.62	22.58	22.7
			1@47	22.36	22.29	22.46
		15	1@0	22.1	22.04	22.26
			1@11	21.89	21.74	21.99
	QPSK	3.75	1@0	21.65	21.46	21.77
			1@47	21.36	21.24	21.54
		15	1@0	21.11	20.96	21.33
			1@11	22.36	22.32	22.45
			12@0	22.93	22.97	23.05

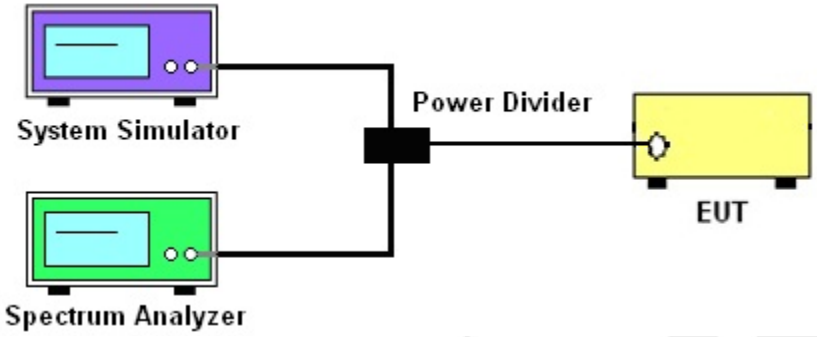
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:
PAPR (dB) = PPk (dBm) - PAvg (dBm).

4.1.2 TEST SETUP



4.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.2 and ANSI C63.26 2015 Section 5.2.3.4
2. The EUT was connected to spectrum and system simulator via a power divider
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Set the test probe and measure the peak and average power of the spectrum analyzer
5. Record the deviation as Peak to Average Ratio.

	LTE	
LTE BW	3.75K	15K
Span	1MHz	1MHz
RBW	30kHz	30kHz
VBW	100kHz	100kHz
Detector	PK/AVG	PK/AVG
Trace	Max	Max
Sweep Count	Auto	Auto

4.1.4 TEST RESULTS

NB-IoT Band 2 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 2 Standalone	BPSK	3.75	1@0	0.98	1.6	0.62
		15	1@0	3.46	3.65	3.49
	QPSK	3.75	1@0	1.13	1.48	1.71
		15	1@0	4.13	4.19	4.02
		15	12@0	4.68	5	5.01
Limit				≤13dB		

NB-IoT Band 4 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 4 Standalone	BPSK	3.75	1@0	0.93	1.73	0.9
		15	1@0	3.88	3.9	3.84
	QPSK	3.75	1@0	3	2.6	2.84
		15	1@0	4.2	4.26	4.17
		15	12@0	5.01	5.37	4.7
Limit				≤13dB		

NB-IoT Band 5 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 5 Standalone	BPSK	3.75	1@0	1.97	0.94	1.38
		15	1@0	3.64	0.89	3.93
	QPSK	3.75	1@0	1.41	1	2.58
		15	1@0	4.24	4.1	4.29
		15	12@0	5.69	5.66	5.89
Limit				≤13dB		

NB-IoT Band 12 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 12 Standalone	BPSK	3.75	1@0	0.82	0.64	0.76
		15	1@0	3.84	3.81	3.64
	QPSK	3.75	1@0	1.28	2.68	1.91
		15	1@0	2.96	4.17	4.12
		15	12@0	5.57	5.52	5.42
Limit				≤13dB		

NB-IoT Band 13 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 13 Standalone	BPSK	3.75	1@0	N/A	N/A	N/A
		15	1@0	N/A	N/A	N/A
	QPSK	3.75	1@0	N/A	N/A	N/A
		15	1@0	N/A	N/A	N/A
		15	12@0	N/A	N/A	N/A
Limit				≤13dB		

NB-IoT Band 71 PAR [dBm]						
Mode	Modulation	Subcarrier Space (KHz)	RB Configure	Lowest	Middle	Highest
				P-A	P-A	P-A
Band 71 Standalone	BPSK	3.75	1@0	1.53	0.85	0.86
		15	1@0	3.72	3.6	3.82
	QPSK	3.75	1@0	1.05	1.66	1.41
		15	1@0	4.25	3.75	3.72
		15	12@0	5.82	5.66	5.49
Limit				≤13dB		

Note: Test chart See Appendix D

5. RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

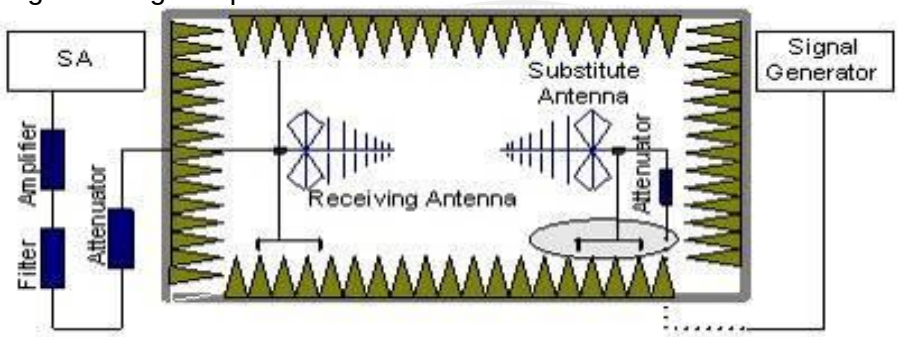
5.1 DESCRIPTION OF THE ERP/EIRP MEASUREMENT

5.1.1 MEASUREMENT METHOD

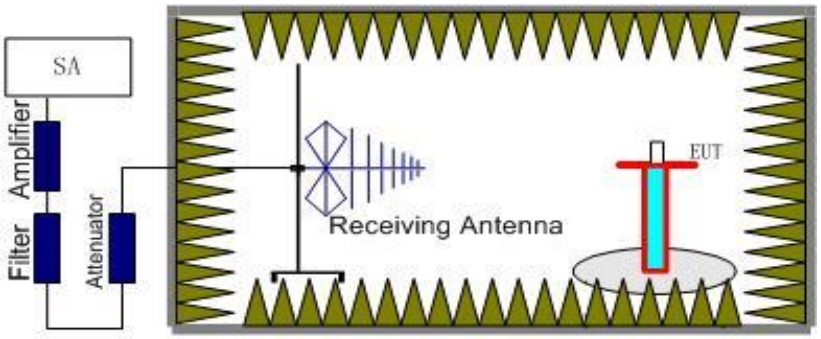
Effective radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas.
License Digital Systems. Mobile and portable (hand-held) stations operating are limited to average ERP, Equivalent isotropic radiated power output measurements by substitution method according to ANSI C63.26 2015, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas, Mobile and portable (hand-held) stations operating are limited to average EIRP.

5.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.



b) EUT was placed on a 1.5m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.
The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:
Power=PMea+ARpl

5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01v03r01 Section 5.6 and ANSI C63.26 2015 Section 5.2.

2. The EUT was placed on a non-conductive rotating platform 1.5 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with Peak detector.

3. During the measurement, the system simulator parameters were set to force the EUTtransmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 m in both horizontally and vertically polarized orientations.

4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26 2015. The EUT was replaced by dipole antenna (substitution antenna) at same location and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain -Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP/ERP= LVL +Correction factor

5. RB Set greater than bandwidth, VB Set spectrum analyzer Maximum support.

5.1.4 TEST RESULTS

Note: Test is divided into three directions, X/Y/Z. X pattern for the worst.

Radiated Power (EIRP) for NB-IoT Band 2/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	10	2.37	10.40	18.03	Horizontal	Pass
			Middle	10.84	2.39	10.42	18.87	Horizontal	Pass
			Highest	10.7	2.40	10.44	18.74	Horizontal	Pass
		1@0	Lowest	11.36	2.37	10.40	19.39	Vertical	Pass
			Middle	12.2	2.39	10.42	20.23	Vertical	Pass
			Highest	12.18	2.40	10.44	20.22	Vertical	Pass
	15	1@0	Lowest	9.49	2.37	10.40	17.52	Horizontal	Pass
			Middle	10.48	2.39	10.42	18.51	Horizontal	Pass
			Highest	10.54	2.40	10.44	18.58	Horizontal	Pass
		1@0	Lowest	10.89	2.37	10.40	18.92	Vertical	Pass
			Middle	11.79	2.39	10.42	19.82	Vertical	Pass
			Highest	11.9	2.40	10.44	19.94	Vertical	Pass
QPSK	3.75	1@0	Lowest	9.79	2.37	10.40	17.82	Horizontal	Pass
			Middle	10.8	2.39	10.42	18.83	Horizontal	Pass
			Highest	10.8	2.40	10.44	18.84	Horizontal	Pass
		1@0	Lowest	11.29	2.37	10.40	19.32	Vertical	Pass
			Middle	12.29	2.39	10.42	20.32	Vertical	Pass
			Highest	12.11	2.40	10.44	20.15	Vertical	Pass
	15	1@0	Lowest	9.59	2.37	10.40	17.62	Horizontal	Pass
			Middle	10.49	2.39	10.42	18.52	Horizontal	Pass
			Highest	10.77	2.40	10.44	18.81	Horizontal	Pass
		1@0	Lowest	11.02	2.37	10.40	19.05	Vertical	Pass
			Middle	11.93	2.39	10.42	19.96	Vertical	Pass
			Highest	12.09	2.40	10.44	20.13	Vertical	Pass
Limit	EIRP<2W=33dBm								

Radiated Power (EIRP) for NB-IoT Band 4/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	11.06	2.35	10.13	18.84	Horizontal	Pass
			Middle	11.05	2.36	10.16	18.85	Horizontal	Pass
			Highest	10.85	2.37	10.22	18.70	Horizontal	Pass
		1@0	Lowest	12.38	2.35	10.13	20.16	Vertical	Pass
			Middle	12.43	2.36	10.16	20.23	Vertical	Pass
			Highest	12.16	2.37	10.22	20.01	Vertical	Pass
	15	1@0	Lowest	10.94	2.35	10.13	18.72	Horizontal	Pass
			Middle	10.76	2.36	10.16	18.56	Horizontal	Pass
			Highest	10.76	2.37	10.22	18.61	Horizontal	Pass
		1@0	Lowest	12.27	2.35	10.13	20.05	Vertical	Pass
			Middle	12.21	2.36	10.16	20.01	Vertical	Pass
			Highest	12.23	2.37	10.22	20.08	Vertical	Pass
QPSK	3.75	1@0	Lowest	11.05	2.35	10.13	18.83	Horizontal	Pass
			Middle	11.14	2.36	10.16	18.94	Horizontal	Pass
			Highest	10.97	2.37	10.22	18.82	Horizontal	Pass
		1@0	Lowest	12.47	2.35	10.13	20.25	Vertical	Pass
			Middle	12.48	2.36	10.16	20.28	Vertical	Pass
			Highest	12.35	2.37	10.22	20.20	Vertical	Pass
	15	1@0	Lowest	11.27	2.35	10.13	19.05	Horizontal	Pass
			Middle	11.12	2.36	10.16	18.92	Horizontal	Pass
			Highest	11.01	2.37	10.22	18.86	Horizontal	Pass
		1@0	Lowest	12.59	2.35	10.13	20.37	Vertical	Pass
			Middle	12.5	2.36	10.16	20.30	Vertical	Pass
			Highest	12.47	2.37	10.22	20.32	Vertical	Pass
Limit	EIRP<1W=30dBm								

Radiated Power (ERP) for NB-IoT Band 5/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	12.46	1.27	6.70	17.89	Horizontal	Pass
			Middle	12.57	1.28	6.70	17.99	Horizontal	Pass
			Highest	12.34	1.29	6.70	17.75	Horizontal	Pass
		1@0	Lowest	13.87	1.27	6.70	19.30	Vertical	Pass
			Middle	14.01	1.28	6.70	19.43	Vertical	Pass
			Highest	13.74	1.29	6.70	19.15	Vertical	Pass
	15	1@0	Lowest	12.55	1.27	6.70	17.98	Horizontal	Pass
			Middle	12.94	1.28	6.70	18.36	Horizontal	Pass
			Highest	12.82	1.29	6.70	18.23	Horizontal	Pass
		1@0	Lowest	13.92	1.27	6.70	19.35	Vertical	Pass
			Middle	14.32	1.28	6.70	19.74	Vertical	Pass
			Highest	14.24	1.29	6.70	19.65	Vertical	Pass
QPSK	3.75	1@0	Lowest	12.75	1.27	6.70	18.18	Horizontal	Pass
			Middle	12.75	1.28	6.70	18.17	Horizontal	Pass
			Highest	12.47	1.29	6.70	17.88	Horizontal	Pass
		1@0	Lowest	14.07	1.27	6.70	19.50	Vertical	Pass
			Middle	14.15	1.28	6.70	19.57	Vertical	Pass
			Highest	13.87	1.29	6.70	19.28	Vertical	Pass
	15	1@0	Lowest	12.49	1.27	6.70	17.92	Horizontal	Pass
			Middle	13.19	1.28	6.70	18.61	Horizontal	Pass
			Highest	13.04	1.29	6.70	18.45	Horizontal	Pass
		1@0	Lowest	13.88	1.27	6.70	19.31	Vertical	Pass
			Middle	14.64	1.28	6.70	20.06	Vertical	Pass
			Highest	14.35	1.29	6.70	19.76	Vertical	Pass
Limit	ERP<7W=38.45dBm								

Radiated Power (ERP) for NB-IoT Band 12/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	12.39	1.21	6.40	17.58	Horizontal	Pass
			Middle	12.25	1.22	6.40	17.43	Horizontal	Pass
			Highest	12.26	1.23	6.40	17.43	Horizontal	Pass
		1@0	Lowest	13.86	1.21	6.40	19.05	Vertical	Pass
			Middle	13.7	1.22	6.40	18.88	Vertical	Pass
			Highest	13.71	1.23	6.40	18.88	Vertical	Pass
	15	1@0	Lowest	13.46	1.21	6.40	18.65	Horizontal	Pass
			Middle	12.4	1.22	6.40	17.58	Horizontal	Pass
			Highest	12.5	1.23	6.40	17.67	Horizontal	Pass
		1@0	Lowest	14.86	1.21	6.40	20.05	Vertical	Pass
			Middle	13.77	1.22	6.40	18.95	Vertical	Pass
			Highest	13.95	1.23	6.40	19.12	Vertical	Pass
QPSK	3.75	1@0	Lowest	12.38	1.21	6.40	17.57	Horizontal	Pass
			Middle	12.31	1.22	6.40	17.49	Horizontal	Pass
			Highest	12.35	1.23	6.40	17.52	Horizontal	Pass
		1@0	Lowest	13.85	1.21	6.40	19.04	Vertical	Pass
			Middle	13.71	1.22	6.40	18.89	Vertical	Pass
			Highest	13.79	1.23	6.40	18.96	Vertical	Pass
	15	1@0	Lowest	13.5	1.21	6.40	18.69	Horizontal	Pass
			Middle	12.52	1.22	6.40	17.70	Horizontal	Pass
			Highest	12.58	1.23	6.40	17.75	Horizontal	Pass
		1@0	Lowest	14.91	1.21	6.40	20.10	Vertical	Pass
			Middle	13.9	1.22	6.40	19.08	Vertical	Pass
			Highest	13.98	1.23	6.40	19.15	Vertical	Pass
Limit	ERP<3W=34.77dBm								

Radiated Power (ERP) for NB-IoT Band 13/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	13.1	1.25	6.60	18.45	Horizontal	Pass
			Middle	13.17	1.25	6.60	18.52	Horizontal	Pass
			Highest	13.2	1.25	6.60	18.55	Horizontal	Pass
		1@0	Lowest	14.55	1.25	6.60	19.90	Vertical	Pass
			Middle	14.61	1.25	6.60	19.96	Vertical	Pass
			Highest	14.57	1.25	6.60	19.92	Vertical	Pass
	15	1@0	Lowest	13.52	1.25	6.60	18.87	Horizontal	Pass
			Middle	13.28	1.25	6.60	18.63	Horizontal	Pass
			Highest	13.34	1.25	6.60	18.69	Horizontal	Pass
		1@0	Lowest	14.86	1.25	6.60	20.21	Vertical	Pass
			Middle	14.69	1.25	6.60	20.04	Vertical	Pass
			Highest	14.78	1.25	6.60	20.13	Vertical	Pass
QPSK	3.75	1@0	Lowest	13.31	1.25	6.60	18.66	Horizontal	Pass
			Middle	13.17	1.25	6.60	18.52	Horizontal	Pass
			Highest	13.36	1.25	6.60	18.71	Horizontal	Pass
		1@0	Lowest	14.72	1.25	6.60	20.07	Vertical	Pass
			Middle	14.59	1.25	6.60	19.94	Vertical	Pass
			Highest	14.77	1.25	6.60	20.12	Vertical	Pass
	15	1@0	Lowest	13.49	1.25	6.60	18.84	Horizontal	Pass
			Middle	13.52	1.25	6.60	18.87	Horizontal	Pass
			Highest	13.56	1.25	6.60	18.91	Horizontal	Pass
		1@0	Lowest	14.88	1.25	6.60	20.23	Vertical	Pass
			Middle	14.92	1.25	6.60	20.27	Vertical	Pass
			Highest	14.87	1.25	6.60	20.22	Vertical	Pass
Limit	ERP<3W=34.77dBm								

Radiated Power (ERP) for NB-IoT Band 71/Standalone									
Modulation	Subcarrier Space (KHz)	RB Configure	Channel	Result					Conclusion
				SG.Level (dBm)	Cable loss	Gain (dBi)	PMeasE.R.P(dBm)	Polarization Of Max. ERP	
BPSK	3.75	1@0	Lowest	14.67	1.21	6.40	19.86	Horizontal	Pass
			Middle	14.61	1.22	6.40	19.79	Horizontal	Pass
			Highest	14.89	1.23	6.40	20.06	Horizontal	Pass
		1@0	Lowest	16.12	1.21	6.40	21.31	Vertical	Pass
			Middle	16.1	1.22	6.40	21.28	Vertical	Pass
			Highest	16.19	1.23	6.40	21.36	Vertical	Pass
	15	1@0	Lowest	14.2	1.21	6.40	19.39	Horizontal	Pass
			Middle	14.11	1.22	6.40	19.29	Horizontal	Pass
			Highest	14.43	1.23	6.40	19.60	Horizontal	Pass
		1@0	Lowest	15.66	1.21	6.40	20.85	Vertical	Pass
			Middle	15.58	1.22	6.40	20.76	Vertical	Pass
			Highest	15.73	1.23	6.40	20.90	Vertical	Pass
QPSK	3.75	1@0	Lowest	13.77	1.21	6.40	18.96	Horizontal	Pass
			Middle	13.66	1.22	6.40	18.84	Horizontal	Pass
			Highest	13.84	1.23	6.40	19.01	Horizontal	Pass
		1@0	Lowest	15.25	1.21	6.40	20.44	Vertical	Pass
			Middle	14.98	1.22	6.40	20.16	Vertical	Pass
			Highest	15.29	1.23	6.40	20.46	Vertical	Pass
	15	1@0	Lowest	13.24	1.21	6.40	18.43	Horizontal	Pass
			Middle	13.18	1.22	6.40	18.36	Horizontal	Pass
			Highest	13.37	1.23	6.40	18.54	Horizontal	Pass
		1@0	Lowest	14.6	1.21	6.40	19.79	Vertical	Pass
			Middle	14.51	1.22	6.40	19.69	Vertical	Pass
			Highest	14.8	1.23	6.40	19.97	Vertical	Pass
Limit	ERP<3W=34.77dBm								

6. OCCUPIED BANDWIDTH

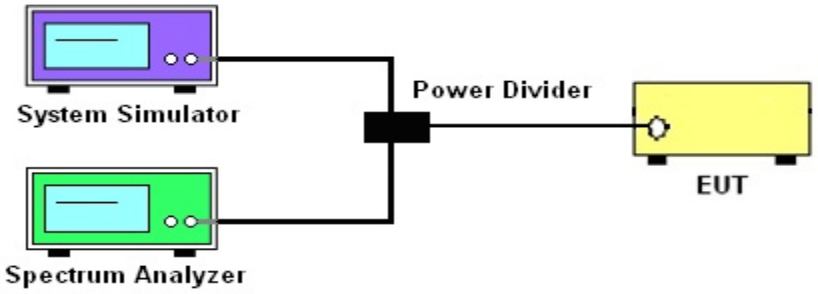
6.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

6.1.1 MEASUREMENT METHOD

1.The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

2.The 26 db emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 db below the maximum in-band spectral density of the modulated signal. spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

6.1.2 TEST SETUP



6.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.1.and 4.2

2. The EUT was connected to spectrum and system simulator via a power divider

3. Select lowest, middle, and highest channels for each band and different modulation.

4. Set the test probe and measure the Occupied Bandwidth of the spectrum analyzer

5. Measure and record the Occupied Bandwidth from the Spectrum Analyzer.

	LTE	
LTE BW	3.75K	15K
Span	1MHz	1MHz
RBW	2kHz	2kHz
VBW	6.2kHz	6.2kHz
Detector	PK	PK
Trace	Max	Max
Sweep Count	Auto	Auto

6.1.4 MEASUREMENT RESULT

NB-IoT Band 2	Bandwidth [kHz]/Standalone							
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	57.793	37.72	58.517	36.58	57.722	37.89
	15	1@0	124.77	129.2	118.22	98.4	128.82	117.8
QPSK	3.75	1@0	62.23	38.06	63.316	38.16	57.865	37.98
	15	1@0	116.19	129.5	118.5	116.5	121.27	116.2
	15	12@0	190.54	246.8	188.26	251.3	186.75	247.8
NB-IoT Band 4	Bandwidth [kHz]/Standalone							
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	57.866	33.55	56.356	32.71	56.716	38.02
	15	1@0	116.01	119.2	137.63	119.9	118.01	118.5
QPSK	3.75	1@0	56.959	38.2	59.529	38.11	64.624	38.44
	15	1@0	110.22	111.2	118.42	113.3	128.69	115.9
	15	12@0	185.78	251.5	186.43	257.3	186.62	249.2
NB-IoT Band 5	Bandwidth [kHz]/Standalone							
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	56.479	37.8	56.203	34.89	55.868	37.79
	15	1@0	127.86	128.5	127.39	127.7	131.01	117
QPSK	3.75	1@0	56.775	35.46	59.408	38.52	63.291	41.82
	15	1@0	131.21	130.1	116.52	115.4	128.02	102.2
	15	12@0	189.3	249.3	190.62	251.3	185.63	247.4
NB-IoT Band 12	Bandwidth [kHz]/Standalone							
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	55.687	37.65	57.512	34.14	55.461	35.57
	15	1@0	117.03	101.9	111.82	112.2	131.86	116
QPSK	3.75	1@0	62.411	38.73	64.629	38.33	65.377	38.45
	15	1@0	127.73	129.8	117.52	102.9	115.05	101
	15	12@0	191.1	245.4	191.02	250	188.07	248
NB-IoT Band 13	Bandwidth [kHz]/Standalone							
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	57.915	39.31	55.375	37.2	56.031	37.58
	15	1@0	124.6	129.6	123.81	116.1	119.23	116.2
QPSK	3.75	1@0	65.526	39.61	65.456	39.39	68.767	42.19
	15	1@0	116.6	113.7	118.14	102.5	121.08	115.5
	15	12@0	191.03	248.1	190.35	255.9	188.79	246

NB-IoT Band 71 Bandwidth [kHz]/Standalone								
Modulation	Subcarrier Space (KHz)	RB Configure	Lowest		Middle		Highest	
			99% BW	26dB BW	99% BW	26dB BW	99% BW	26dB BW
BPSK	3.75	1@0	56.804	36.79	53.817	32.32	55.249	37.53
	15	1@0	132.37	119.2	117.44	99.75	119.54	115.2
QPSK	3.75	1@0	59.977	37.73	62.482	38.23	63.425	41.88
	15	1@0	112.03	98.55	117.75	99.59	117.64	101
	15	12@0	189.86	257.3	186.92	256.2	189.62	246.5

Note: Test chart See Appendix A

7. CONDUCTED BAND EDGE

7.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

7.1.1 MEASUREMENT METHOD

1. §22.917(a)
For operations in the 824 – 849 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100kHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

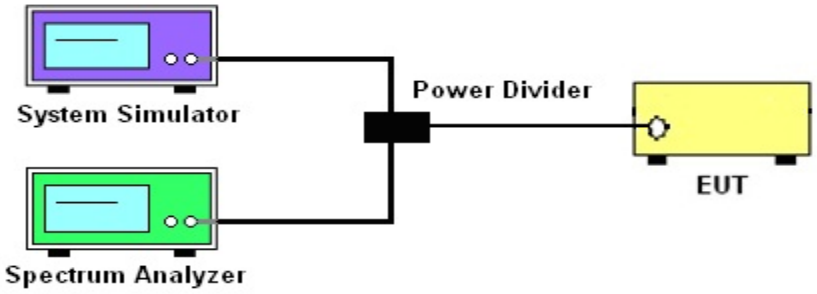
2. §24.238 (a)
For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed

3. §27.53 (h)
For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

4. §27.53(m)(4)
For operations in the 2500 MHz ~ 2570 MHz band this section, 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 as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHzand 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licenseesoperating on frequencies below 2495 MHz may also submit a documented interference complaintagainst BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5. §27.53 (g)
For operations in the 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

7.1.2 TEST SETUP



7.1.3 TEST PROCEDURES

1.The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26 2015 Section 5.7.

2. The EUT was connected to spectrum analyzer and system simulator via a power divider.

3. The band edges of low and high channels for the highest RF powers were measured. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

4. Set spectrum analyzer with RMS/AVG detector.

5. The RF fundamental frequency should be excluded against the limit line in the operating frquency band.

6.The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.

Band 7:
= P(W)- [55 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
= -25dBm.

	LTE	
LTE BW	3.75K	15K
Span	1MHz	1MHz
RBW	200Hz	200Hz
VBW	1kHz	1kHz
Detector	AVG	AVG
Trace	Max	Max
Sweep Count	Auto	Auto

7.1.4 MEASUREMENT RESULT

Note: Test chart See Appendix B

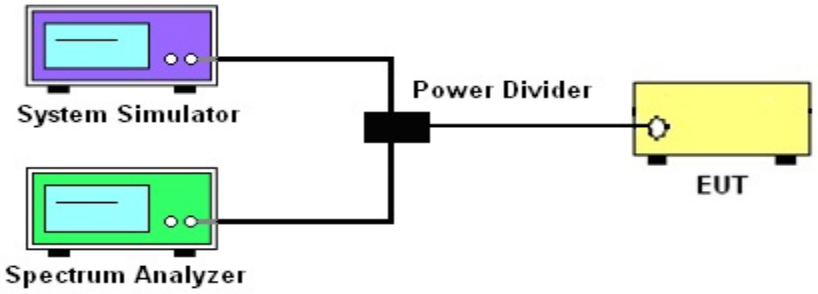
8. CONDUCTED SPURIOUS EMISSION

8.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

8.1.1 MEASUREMENT METHOD

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
For Band 7:
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.
It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

8.1.2 TEST SETUP



8.1.3 TEST PROCEDURES

1.The testing FCC KDB 971168 D01 v03r01 Section 6.0. and ANSI C63.26 2015 Section 5.7.

2. The EUT was connected to spectrum analyzer and system simulator via a power divider.

3. 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
4. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
5. The RF fundamental frequency should be excluded against the limit line in the operating frquency band.
6.The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB) = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm.
For Band 7: P(W)- [43 + 10log(P)] (dB) =-25dBm

	LTE	
LTE BW	3.75K	15K
Span	Auto	Auto
RBW	1000kHz	1000kHz
VBW	3000kHz	3000kHz
Detector	PK	PK
Trace	Max	Max

8.1.4 TEST RESULTS

Note: Test chart See Appendix C

9. RADIATED SPURIOUS EMISSION

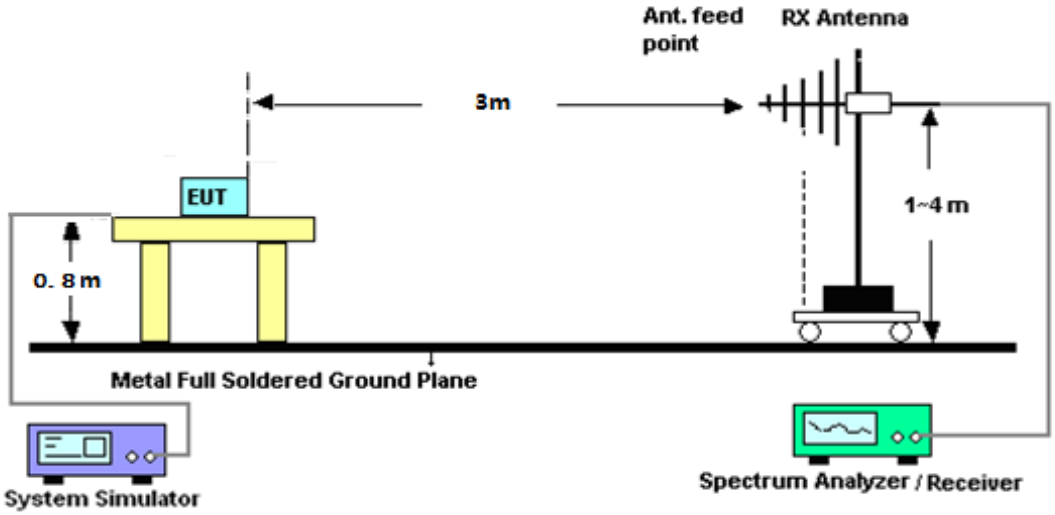
9.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

9.1.1 MEASUREMENT METHOD

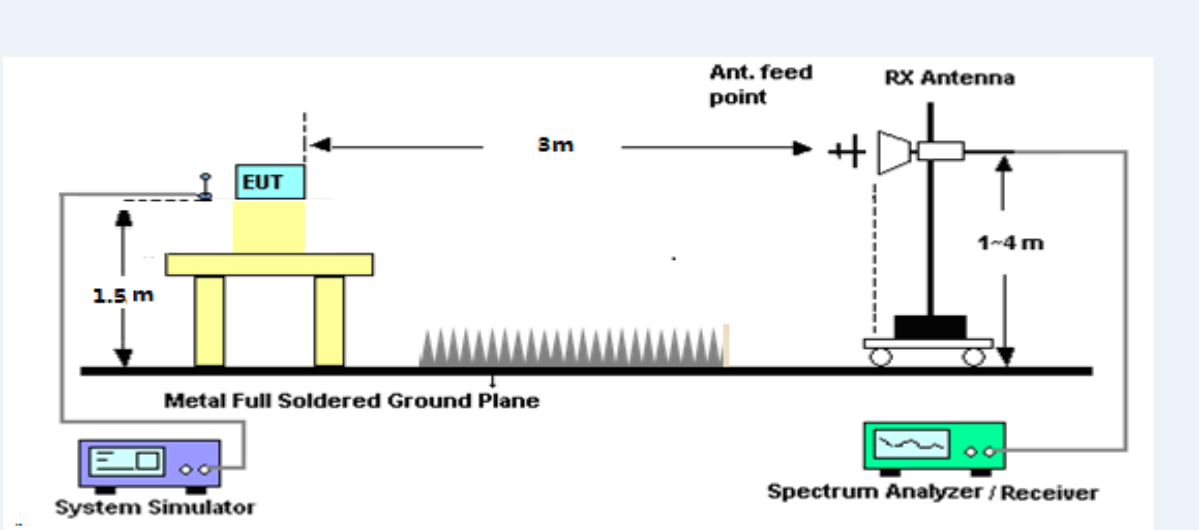
The radiated spurious emission was measured by substitution method according to ANSI C63.26 2015. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
For Band 7 The power of any emission outside of the authorized operating frequency ranges must attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

9.1.2 TEST SETUP

The procedure of radiated spurious emissions is as follows:
a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, RSE=Rx（dBuV）+CL（dB）+SA（dB）+Gain（dBi）-107（dBuV to dBm）The SA is calibrated using following setup.
b) EUT was placed on 1.5 m non-conductive stand at a 3 m test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 m from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic measured with peak detector and 1MHz bandwidth.
Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of any band into any of the other blocks.
The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below:
Power=PMea+ARpl
For radiated test from 30MHz to 1GHz



For radiated test from above 1GHz



9.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 Section 5.8 and ANSI C63.26 2015 Section 5.5.

2. The EUT was placed on a rotatable wooden table with 1.5 meter above ground.

3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.

4. The table was rotated 360 degrees to determine the position of the highest spurious emission.

5. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations

6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.

7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.

8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

9. Taking the record of output power at antenna port.

10. Repeat step 7 to step 8 for another polarization.

11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
= P(W)- [43 + 10log(P)] (dB)
= [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
= -13dBm
.

For Band 7:
The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
= [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)
= -25dBm
EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
ERP (dBm) = EIRP - 2.15

9.1.4 TEST RESULTS

NB-IoT Band 2 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3701.80	-33.88	12.60	12.93	-34.21	-13.00	-21.21	H
5553.08	-34.69	13.10	17.11	-38.70	-13.00	-25.70	H
7404.11	-32.25	11.50	22.20	-42.95	-13.00	-29.95	H
3701.80	-35.52	12.60	12.93	-35.85	-13.00	-22.85	V
5553.08	-35.09	13.10	17.11	-39.10	-13.00	-26.10	V
7404.11	-32.65	11.50	22.20	-43.35	-13.00	-30.35	V
NB-IoT Band 2 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.80	-34.36	12.60	12.93	-34.69	-13.00	-21.69	H
5639.88	-35.34	13.10	17.11	-39.35	-13.00	-26.35	H
7520.27	-33.03	11.50	22.20	-43.73	-13.00	-30.73	H
3759.80	-34.92	12.60	12.93	-35.25	-13.00	-22.25	V
5639.88	-34.38	13.10	17.11	-38.39	-13.00	-25.39	V
7520.27	-32.32	11.50	22.20	-43.02	-13.00	-30.02	V
NB-IoT Band 2 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3818.07	-33.49	12.60	12.93	-33.82	-13.00	-20.82	H
5726.85	-34.13	13.10	17.11	-38.14	-13.00	-25.14	H
7635.79	-32.23	11.50	22.20	-42.93	-13.00	-29.93	H
3818.07	-34.84	12.60	12.93	-35.17	-13.00	-22.17	V
5726.85	-34.86	13.10	17.11	-38.87	-13.00	-25.87	V
7635.79	-32.41	11.50	22.20	-43.11	-13.00	-30.11	V

NB-IoT Band 2 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3701.83	-33.60	12.60	12.93	-33.93	-13.00	-20.93	H
5553.19	-35.21	13.10	17.11	-39.22	-13.00	-26.22	H
7404.12	-33.64	11.50	22.20	-44.34	-13.00	-31.34	H
3701.83	-34.64	12.60	12.93	-34.97	-13.00	-21.97	V
5553.19	-35.10	13.10	17.11	-39.11	-13.00	-26.11	V
7404.12	-32.83	11.50	22.20	-43.53	-13.00	-30.53	V
NB-IoT Band 2 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3760.10	-34.63	12.60	12.93	-34.96	-13.00	-21.96	H
5639.89	-35.02	13.10	17.11	-39.03	-13.00	-26.03	H
7520.09	-32.40	11.50	22.20	-43.10	-13.00	-30.10	H
3760.10	-35.09	12.60	12.93	-35.42	-13.00	-22.42	V
5639.89	-33.81	13.10	17.11	-37.82	-13.00	-24.82	V
7520.09	-32.42	11.50	22.20	-43.12	-13.00	-30.12	V
NB-IoT Band 2 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3817.64	-33.90	12.60	12.93	-34.23	-13.00	-21.23	H
5727.21	-34.45	13.10	17.11	-38.46	-13.00	-25.46	H
7636.12	-32.18	11.50	22.20	-42.88	-13.00	-29.88	H
3817.64	-34.82	12.60	12.93	-35.15	-13.00	-22.15	V
5727.21	-34.18	13.10	17.11	-38.19	-13.00	-25.19	V
7636.12	-32.91	11.50	22.20	-43.61	-13.00	-30.61	V

NB-IoT Band 2 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3701.95	-33.59	12.60	12.93	-33.92	-13.00	-20.92	H
5553.20	-34.37	13.10	17.11	-38.38	-13.00	-25.38	H
7404.27	-32.64	11.50	22.20	-43.34	-13.00	-30.34	H
3701.95	-35.75	12.60	12.93	-36.08	-13.00	-23.08	V
5553.20	-34.01	13.10	17.11	-38.02	-13.00	-25.02	V
7404.27	-32.10	11.50	22.20	-42.80	-13.00	-29.80	V
NB-IoT Band 2 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.82	-33.55	12.60	12.93	-33.88	-13.00	-20.88	H
5640.29	-34.27	13.10	17.11	-38.28	-13.00	-25.28	H
7519.96	-33.36	11.50	22.20	-44.06	-13.00	-31.06	H
3759.82	-34.63	12.60	12.93	-34.96	-13.00	-21.96	V
5640.29	-34.54	13.10	17.11	-38.55	-13.00	-25.55	V
7519.96	-32.10	11.50	22.20	-42.80	-13.00	-29.80	V
NB-IoT Band 2 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3817.69	-34.02	12.60	12.93	-34.35	-13.00	-21.35	H
5726.85	-34.32	13.10	17.11	-38.33	-13.00	-25.33	H
7635.96	-32.31	11.50	22.20	-43.01	-13.00	-30.01	H
3817.69	-35.28	12.60	12.93	-35.61	-13.00	-22.61	V
5726.85	-35.15	13.10	17.11	-39.16	-13.00	-26.16	V
7635.96	-32.98	11.50	22.20	-43.68	-13.00	-30.68	V

NB-IoT Band 2 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3702.05	-34.07	12.60	12.93	-34.40	-13.00	-21.40	H
5552.99	-34.57	13.10	17.11	-38.58	-13.00	-25.58	H
7404.03	-33.06	11.50	22.20	-43.76	-13.00	-30.76	H
3702.05	-34.72	12.60	12.93	-35.05	-13.00	-22.05	V
5552.99	-34.96	13.10	17.11	-38.97	-13.00	-25.97	V
7404.03	-32.93	11.50	22.20	-43.63	-13.00	-30.63	V
NB-IoT Band 2 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3759.97	-34.68	12.60	12.93	-35.01	-13.00	-22.01	H
5640.19	-34.37	13.10	17.11	-38.38	-13.00	-25.38	H
7520.09	-32.97	11.50	22.20	-43.67	-13.00	-30.67	H
3759.97	-35.66	12.60	12.93	-35.99	-13.00	-22.99	V
5640.19	-35.05	13.10	17.11	-39.06	-13.00	-26.06	V
7520.09	-31.86	11.50	22.20	-42.56	-13.00	-29.56	V
NB-IoT Band 2 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3817.91	-33.90	12.60	12.93	-34.23	-13.00	-21.23	H
5726.73	-34.95	13.10	17.11	-38.96	-13.00	-25.96	H
7635.78	-33.06	11.50	22.20	-43.76	-13.00	-30.76	H
3817.91	-34.62	12.60	12.93	-34.95	-13.00	-21.95	V
5726.73	-34.67	13.10	17.11	-38.68	-13.00	-25.68	V
7635.78	-32.93	11.50	22.20	-43.63	-13.00	-30.63	V

NB-IoT Band 4 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3420.04	-34.32	12.90	12.56	-33.98	-13.00	-20.98	H
5130.08	-34.87	13.10	16.32	-38.09	-13.00	-25.09	H
6840.29	-32.89	12.33	21.13	-41.69	-13.00	-28.69	H
3420.04	-35.02	12.90	12.56	-34.68	-13.00	-21.68	V
5130.08	-34.90	13.10	16.32	-38.12	-13.00	-25.12	V
6840.29	-32.34	12.33	21.13	-41.14	-13.00	-28.14	V
NB-IoT Band 2 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3465.16	-33.99	12.90	12.56	-33.65	-13.00	-20.65	H
5197.35	-34.24	13.10	16.32	-37.46	-13.00	-24.46	H
6930.16	-32.38	12.33	21.13	-41.18	-13.00	-28.18	H
3465.16	-35.17	12.90	12.56	-34.83	-13.00	-21.83	V
5197.35	-35.17	13.10	16.32	-38.39	-13.00	-25.39	V
6930.16	-31.97	12.33	21.13	-40.77	-13.00	-27.77	V
NB-IoT Band 4 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3510.19	-33.60	12.90	12.56	-33.26	-13.00	-20.26	H
5765.21	-34.36	13.10	16.32	-37.58	-13.00	-24.58	H
7019.84	-32.17	12.33	21.13	-40.97	-13.00	-27.97	H
3510.19	-34.98	12.90	12.56	-34.64	-13.00	-21.64	V
5765.21	-34.06	13.10	16.32	-37.28	-13.00	-24.28	V
7019.84	-32.12	12.33	21.13	-40.92	-13.00	-27.92	V

NB-IoT Band 4 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3419.99	-33.73	12.90	12.56	-33.39	-13.00	-20.39	H
5130.02	-34.67	13.10	16.32	-37.89	-13.00	-24.89	H
6840.31	-32.25	12.33	21.13	-41.05	-13.00	-28.05	H
3419.99	-35.26	12.90	12.56	-34.92	-13.00	-21.92	V
5130.02	-35.24	13.10	16.32	-38.46	-13.00	-25.46	V
6840.31	-31.92	12.33	21.13	-40.72	-13.00	-27.72	V
NB-IoT Band 4 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3464.82	-34.31	12.90	12.56	-33.97	-13.00	-20.97	H
5197.81	-34.06	13.10	16.32	-37.28	-13.00	-24.28	H
6930.17	-33.63	12.33	21.13	-42.43	-13.00	-29.43	H
3464.82	-35.76	12.90	12.56	-35.42	-13.00	-22.42	V
5197.81	-34.11	13.10	16.32	-37.33	-13.00	-24.33	V
6930.17	-32.17	12.33	21.13	-40.97	-13.00	-27.97	V
NB-IoT Band 4 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3509.77	-33.92	12.90	12.56	-33.58	-13.00	-20.58	H
5764.99	-34.01	13.10	16.32	-37.23	-13.00	-24.23	H
7019.77	-32.23	12.33	21.13	-41.03	-13.00	-28.03	H
3509.77	-35.61	12.90	12.56	-35.27	-13.00	-22.27	V
5764.99	-33.87	13.10	16.32	-37.09	-13.00	-24.09	V
7019.77	-32.42	12.33	21.13	-41.22	-13.00	-28.22	V

NB-IoT Band 4 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3420.11	-33.85	12.90	12.56	-33.51	-13.00	-20.51	H
5130.39	-34.99	13.10	16.32	-38.21	-13.00	-25.21	H
6840.27	-33.20	12.33	21.13	-42.00	-13.00	-29.00	H
3420.11	-35.47	12.90	12.56	-35.13	-13.00	-22.13	V
5130.39	-35.25	13.10	16.32	-38.47	-13.00	-25.47	V
6840.27	-32.22	12.33	21.13	-41.02	-13.00	-28.02	V
NB-IoT Band 4 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3464.85	-34.84	12.90	12.56	-34.50	-13.00	-21.50	H
5197.66	-34.24	13.10	16.32	-37.46	-13.00	-24.46	H
6930.06	-32.52	12.33	21.13	-41.32	-13.00	-28.32	H
3464.85	-34.81	12.90	12.56	-34.47	-13.00	-21.47	V
5197.66	-35.03	13.10	16.32	-38.25	-13.00	-25.25	V
6930.06	-32.98	12.33	21.13	-41.78	-13.00	-28.78	V
NB-IoT Band 4 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3510.26	-33.47	12.90	12.56	-33.13	-13.00	-20.13	H
5765.10	-34.82	13.10	16.32	-38.04	-13.00	-25.04	H
7019.90	-33.20	12.33	21.13	-42.00	-13.00	-29.00	H
3510.26	-35.73	12.90	12.56	-35.39	-13.00	-22.39	V
5765.10	-34.20	13.10	16.32	-37.42	-13.00	-24.42	V
7019.90	-33.20	12.33	21.13	-42.00	-13.00	-29.00	V

NB-IoT Band 4 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3420.08	-34.86	12.90	12.56	-34.52	-13.00	-21.52	H
5130.04	-34.72	13.10	16.32	-37.94	-13.00	-24.94	H
6840.51	-32.80	12.33	21.13	-41.60	-13.00	-28.60	H
3420.08	-34.58	12.90	12.56	-34.24	-13.00	-21.24	V
5130.04	-34.82	13.10	16.32	-38.04	-13.00	-25.04	V
6840.51	-32.69	12.33	21.13	-41.49	-13.00	-28.49	V
NB-IoT Band 4 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3465.17	-34.10	12.90	12.56	-33.76	-13.00	-20.76	H
5197.49	-34.63	13.10	16.32	-37.85	-13.00	-24.85	H
6929.96	-32.60	12.33	21.13	-41.40	-13.00	-28.40	H
3465.17	-35.25	12.90	12.56	-34.91	-13.00	-21.91	V
5197.49	-35.07	13.10	16.32	-38.29	-13.00	-25.29	V
6929.96	-32.08	12.33	21.13	-40.88	-13.00	-27.88	V
NB-IoT Band 4 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3510.14	-34.69	12.90	12.56	-34.35	-13.00	-21.35	H
5764.93	-35.08	13.10	16.32	-38.30	-13.00	-25.30	H
7020.20	-33.45	12.33	21.13	-42.25	-13.00	-29.25	H
3510.14	-35.61	12.90	12.56	-35.27	-13.00	-22.27	V
5764.93	-34.67	13.10	16.32	-37.89	-13.00	-24.89	V
7020.20	-32.92	12.33	21.13	-41.72	-13.00	-28.72	V

NB-IoT Band 5 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.25	-34.61	9.56	9.72	-34.77	-13.00	-21.77	H
2471.98	-34.70	10.50	10.86	-35.06	-13.00	-22.06	H
3296.58	-32.85	12.78	11.57	-31.64	-13.00	-18.64	H
1648.25	-35.08	9.56	9.72	-35.24	-13.00	-22.24	V
2471.98	-35.23	10.50	10.86	-35.59	-13.00	-22.59	V
3296.58	-32.66	12.78	11.57	-31.45	-13.00	-18.45	V
NB-IoT Band 5 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1672.95	-33.66	9.56	9.72	-33.82	-13.00	-20.82	H
2509.31	-35.12	10.50	10.86	-35.48	-13.00	-22.48	H
3346.13	-32.50	12.78	11.57	-31.29	-13.00	-18.29	H
1672.95	-35.28	9.56	9.72	-35.44	-13.00	-22.44	V
2509.31	-34.07	10.50	10.86	-34.43	-13.00	-21.43	V
3346.13	-32.57	12.78	11.57	-31.36	-13.00	-18.36	V
NB-IoT Band 5 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.82	-34.19	9.56	9.72	-34.35	-13.00	-21.35	H
2546.63	-35.42	10.50	10.86	-35.78	-13.00	-22.78	H
3395.55	-32.37	12.78	11.57	-31.16	-13.00	-18.16	H
1697.82	-35.82	9.56	9.72	-35.98	-13.00	-22.98	V
2546.63	-34.46	10.50	10.86	-34.82	-13.00	-21.82	V
3395.55	-32.40	12.78	11.57	-31.19	-13.00	-18.19	V

NB-IoT Band 5 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.22	-33.70	9.56	9.72	-33.86	-13.00	-20.86	H
2471.94	-34.79	10.50	10.86	-35.15	-13.00	-22.15	H
3296.41	-32.19	12.78	11.57	-30.98	-13.00	-17.98	H
1648.22	-35.32	9.56	9.72	-35.48	-13.00	-22.48	V
2471.94	-34.13	10.50	10.86	-34.49	-13.00	-21.49	V
3296.41	-32.97	12.78	11.57	-31.76	-13.00	-18.76	V
NB-IoT Band 5 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.03	-34.10	9.56	9.72	-34.26	-13.00	-21.26	H
2509.42	-34.48	10.50	10.86	-34.84	-13.00	-21.84	H
3345.91	-32.89	12.78	11.57	-31.68	-13.00	-18.68	H
1673.03	-34.88	9.56	9.72	-35.04	-13.00	-22.04	V
2509.42	-35.15	10.50	10.86	-35.51	-13.00	-22.51	V
3345.91	-31.92	12.78	11.57	-30.71	-13.00	-17.71	V
NB-IoT Band 5 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.86	-34.13	9.56	9.72	-34.29	-13.00	-21.29	H
2546.58	-35.30	10.50	10.86	-35.66	-13.00	-22.66	H
3395.35	-33.32	12.78	11.57	-32.11	-13.00	-19.11	H
1697.86	-35.81	9.56	9.72	-35.97	-13.00	-22.97	V
2546.58	-34.05	10.50	10.86	-34.41	-13.00	-21.41	V
3395.35	-32.75	12.78	11.57	-31.54	-13.00	-18.54	V

NB-IoT Band 5 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.37	-33.80	9.56	9.72	-33.96	-13.00	-20.96	H
2472.31	-34.93	10.50	10.86	-35.29	-13.00	-22.29	H
3296.33	-32.16	12.78	11.57	-30.95	-13.00	-17.95	H
1648.37	-35.60	9.56	9.72	-35.76	-13.00	-22.76	V
2472.31	-34.81	10.50	10.86	-35.17	-13.00	-22.17	V
3296.33	-32.98	12.78	11.57	-31.77	-13.00	-18.77	V
NB-IoT Band 5 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1673.01	-33.44	12.90	12.56	-33.10	-13.00	-20.10	H
2509.61	-34.63	13.10	16.32	-37.85	-13.00	-24.85	H
3346.18	-32.59	12.33	21.13	-41.39	-13.00	-28.39	H
1673.01	-35.16	12.90	12.56	-34.82	-13.00	-21.82	V
2509.61	-34.27	13.10	16.32	-37.49	-13.00	-24.49	V
3346.18	-32.72	12.33	21.13	-41.52	-13.00	-28.52	V
NB-IoT Band 5 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.60	-34.69	9.56	9.72	-34.85	-13.00	-21.85	H
2546.48	-34.62	10.50	10.86	-34.98	-13.00	-21.98	H
3395.82	-32.85	12.78	11.57	-31.64	-13.00	-18.64	H
1697.60	-35.07	9.56	9.72	-35.23	-13.00	-22.23	V
2546.48	-34.04	10.50	10.86	-34.40	-13.00	-21.40	V
3395.82	-33.15	12.78	11.57	-31.94	-13.00	-18.94	V

NB-IoT Band 5 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1648.04	-34.44	9.56	9.72	-34.60	-13.00	-21.60	H
2471.85	-34.39	10.50	10.86	-34.75	-13.00	-21.75	H
3296.50	-33.42	12.78	11.57	-32.21	-13.00	-19.21	H
1648.04	-35.71	9.56	9.72	-35.87	-13.00	-22.87	V
2471.85	-34.96	10.50	10.86	-35.32	-13.00	-22.32	V
3296.50	-31.97	12.78	11.57	-30.76	-13.00	-17.76	V
NB-IoT Band 5 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1672.74	-33.62	9.56	9.72	-33.78	-13.00	-20.78	H
2509.44	-35.15	10.50	10.86	-35.51	-13.00	-22.51	H
3346.04	-32.41	12.78	11.57	-31.20	-13.00	-18.20	H
1672.74	-35.45	9.56	9.72	-35.61	-13.00	-22.61	V
2509.44	-34.71	10.50	10.86	-35.07	-13.00	-22.07	V
3346.04	-33.18	12.78	11.57	-31.97	-13.00	-18.97	V
NB-IoT Band 5 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1697.92	-33.59	9.56	9.72	-33.75	-13.00	-20.75	H
2546.55	-34.62	10.50	10.86	-34.98	-13.00	-21.98	H
3395.37	-32.67	12.78	11.57	-31.46	-13.00	-18.46	H
1697.92	-34.58	9.56	9.72	-34.74	-13.00	-21.74	V
2546.55	-34.29	10.50	10.86	-34.65	-13.00	-21.65	V
3395.37	-32.78	12.78	11.57	-31.57	-13.00	-18.57	V

NB-IoT Band 12 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1398.38	-33.88	8.17	9.34	-35.05	-13.00	-22.05	H
2097.04	-34.20	9.53	10.42	-35.09	-13.00	-22.09	H
2796.38	-32.79	11.27	11.12	-32.64	-13.00	-19.64	H
1398.38	-35.43	8.17	9.34	-36.60	-13.00	-23.60	V
2097.04	-33.98	9.53	10.42	-34.87	-13.00	-21.87	V
2796.38	-32.36	11.27	11.12	-32.21	-13.00	-19.21	V
NB-IoT Band 12 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1414.90	-33.85	8.17	9.34	-35.02	-13.00	-22.02	H
2122.29	-34.57	9.53	10.42	-35.46	-13.00	-22.46	H
2829.72	-32.20	11.27	11.12	-32.05	-13.00	-19.05	H
1414.90	-34.96	8.17	9.34	-36.13	-13.00	-23.13	V
2122.29	-35.01	9.53	10.42	-35.90	-13.00	-22.90	V
2829.72	-31.77	11.27	11.12	-31.62	-13.00	-18.62	V
NB-IoT Band 12 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1431.61	-33.99	8.17	9.34	-35.16	-13.00	-22.16	H
2147.90	-34.37	9.53	10.42	-35.26	-13.00	-22.26	H
2863.76	-32.39	11.27	11.12	-32.24	-13.00	-19.24	H
1431.61	-35.86	8.17	9.34	-37.03	-13.00	-24.03	V
2147.90	-34.37	9.53	10.42	-35.26	-13.00	-22.26	V
2863.76	-33.17	11.27	11.12	-33.02	-13.00	-20.02	V

NB-IoT Band 12 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1398.37	-33.66	8.17	9.34	-34.83	-13.00	-21.83	H
2097.39	-34.60	9.53	10.42	-35.49	-13.00	-22.49	H
2796.30	-32.17	11.27	11.12	-32.02	-13.00	-19.02	H
1398.37	-34.78	8.17	9.34	-35.95	-13.00	-22.95	V
2097.39	-34.98	9.53	10.42	-35.87	-13.00	-22.87	V
2796.30	-32.59	11.27	11.12	-32.44	-13.00	-19.44	V
NB-IoT Band 12 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1415.15	-34.83	8.17	9.34	-36.00	-13.00	-23.00	H
2122.23	-34.20	9.53	10.42	-35.09	-13.00	-22.09	H
2829.88	-33.21	11.27	11.12	-33.06	-13.00	-20.06	H
1415.15	-35.12	8.17	9.34	-36.29	-13.00	-23.29	V
2122.23	-34.88	9.53	10.42	-35.77	-13.00	-22.77	V
2829.88	-33.15	11.27	11.12	-33.00	-13.00	-20.00	V
NB-IoT Band 12 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1431.63	-34.39	8.17	9.34	-35.56	-13.00	-22.56	H
2147.62	-35.01	9.53	10.42	-35.90	-13.00	-22.90	H
2863.78	-32.70	11.27	11.12	-32.55	-13.00	-19.55	H
1431.63	-35.68	8.17	9.34	-36.85	-13.00	-23.85	V
2147.62	-34.04	9.53	10.42	-34.93	-13.00	-21.93	V
2863.78	-31.72	11.27	11.12	-31.57	-13.00	-18.57	V

NB-IoT Band 12 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1398.06	-34.58	8.17	9.34	-35.75	-13.00	-22.75	H
2097.23	-34.32	9.53	10.42	-35.21	-13.00	-22.21	H
2796.21	-33.19	11.27	11.12	-33.04	-13.00	-20.04	H
1398.06	-35.61	8.17	9.34	-36.78	-13.00	-23.78	V
2097.23	-33.82	9.53	10.42	-34.71	-13.00	-21.71	V
2796.21	-32.76	11.27	11.12	-32.61	-13.00	-19.61	V
NB-IoT Band 12 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1415.21	-34.35	8.17	9.34	-35.52	-13.00	-22.52	H
2122.37	-34.46	9.53	10.42	-35.35	-13.00	-22.35	H
2830.14	-33.09	11.27	11.12	-32.94	-13.00	-19.94	H
1415.21	-35.72	8.17	9.34	-36.89	-13.00	-23.89	V
2122.37	-34.79	9.53	10.42	-35.68	-13.00	-22.68	V
2830.14	-32.32	11.27	11.12	-32.17	-13.00	-19.17	V
NB-IoT Band 12 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1431.80	-34.13	8.17	9.34	-35.30	-13.00	-22.30	H
2147.74	-35.15	9.53	10.42	-36.04	-13.00	-23.04	H
2863.51	-33.09	11.27	11.12	-32.94	-13.00	-19.94	H
1431.80	-35.00	8.17	9.34	-36.17	-13.00	-23.17	V
2147.74	-33.91	9.53	10.42	-34.80	-13.00	-21.80	V
2863.51	-32.39	11.27	11.12	-32.24	-13.00	-19.24	V

NB-IoT Band 12 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1398.12	-33.96	8.17	9.34	-35.13	-13.00	-22.13	H
2097.39	-35.17	9.53	10.42	-36.06	-13.00	-23.06	H
2796.25	-33.19	11.27	11.12	-33.04	-13.00	-20.04	H
1398.12	-35.70	8.17	9.34	-36.87	-13.00	-23.87	V
2097.39	-35.12	9.53	10.42	-36.01	-13.00	-23.01	V
2796.25	-32.25	11.27	11.12	-32.10	-13.00	-19.10	V
NB-IoT Band 12 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1415.08	-34.34	8.17	9.34	-35.51	-13.00	-22.51	H
2122.27	-33.99	9.53	10.42	-34.88	-13.00	-21.88	H
2829.70	-32.29	11.27	11.12	-32.14	-13.00	-19.14	H
1415.08	-35.01	8.17	9.34	-36.18	-13.00	-23.18	V
2122.27	-35.20	9.53	10.42	-36.09	-13.00	-23.09	V
2829.70	-32.50	11.27	11.12	-32.35	-13.00	-19.35	V
NB-IoT Band 12 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1431.63	-33.64	8.17	9.34	-34.81	-13.00	-21.81	H
2147.81	-35.05	9.53	10.42	-35.94	-13.00	-22.94	H
2863.64	-33.55	11.27	11.12	-33.40	-13.00	-20.40	H
1431.63	-34.90	8.17	9.34	-36.07	-13.00	-23.07	V
2147.81	-34.48	9.53	10.42	-35.37	-13.00	-22.37	V
2863.64	-32.95	11.27	11.12	-32.80	-13.00	-19.80	V

NB-IoT Band 13 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1554.30	-34.07	9.56	9.72	-34.23	-13.00	-21.23	H
2331.53	-34.61	10.50	10.86	-34.97	-13.00	-21.97	H
3018.53	-33.07	12.78	11.57	-31.86	-13.00	-18.86	H
1554.30	-34.61	9.56	9.72	-34.77	-13.00	-21.77	V
2331.53	-34.26	10.50	10.86	-34.62	-13.00	-21.62	V
3018.53	-32.84	12.78	11.57	-31.63	-13.00	-18.63	V
NB-IoT Band 13 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1564.04	-33.98	9.56	9.72	-34.14	-13.00	-21.14	H
2345.80	-34.06	10.50	10.86	-34.42	-13.00	-21.42	H
3128.04	-32.64	12.78	11.57	-31.43	-13.00	-18.43	H
1564.04	-35.76	9.56	9.72	-35.92	-13.00	-22.92	V
2345.80	-35.05	10.50	10.86	-35.41	-13.00	-22.41	V
3128.04	-32.73	12.78	11.57	-31.52	-13.00	-18.52	V
NB-IoT Band 13 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1573.93	-34.06	9.56	9.72	-34.22	-13.00	-21.22	H
2360.92	-35.24	10.50	10.86	-35.60	-13.00	-22.60	H
3147.49	-32.19	12.78	11.57	-30.98	-13.00	-17.98	H
1573.93	-35.88	9.56	9.72	-36.04	-13.00	-23.04	V
2360.92	-34.73	10.50	10.86	-35.09	-13.00	-22.09	V
3147.49	-32.28	12.78	11.57	-31.07	-13.00	-18.07	V

NB-IoT Band 13 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1554.46	-33.60	9.56	9.72	-33.76	-13.00	-20.76	H
2331.32	-34.93	10.50	10.86	-35.29	-13.00	-22.29	H
3018.32	-33.04	12.78	11.57	-31.83	-13.00	-18.83	H
1554.46	-34.96	9.56	9.72	-35.12	-13.00	-22.12	V
2331.32	-35.14	10.50	10.86	-35.50	-13.00	-22.50	V
3018.32	-33.09	12.78	11.57	-31.88	-13.00	-18.88	V
NB-IoT Band 13 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1564.08	-34.74	9.56	9.72	-34.90	-13.00	-21.90	H
2345.77	-34.94	10.50	10.86	-35.30	-13.00	-22.30	H
3128.18	-32.49	12.78	11.57	-31.28	-13.00	-18.28	H
1564.08	-35.31	9.56	9.72	-35.47	-13.00	-22.47	V
2345.77	-34.95	10.50	10.86	-35.31	-13.00	-22.31	V
3128.18	-32.16	12.78	11.57	-30.95	-13.00	-17.95	V
NB-IoT Band 13 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1573.66	-33.98	9.56	9.72	-34.14	-13.00	-21.14	H
2360.63	-34.63	10.50	10.86	-34.99	-13.00	-21.99	H
3147.68	-33.17	12.78	11.57	-31.96	-13.00	-18.96	H
1573.66	-35.56	9.56	9.72	-35.72	-13.00	-22.72	V
2360.63	-33.91	10.50	10.86	-34.27	-13.00	-21.27	V
3147.68	-32.71	12.78	11.57	-31.50	-13.00	-18.50	V

NB-IoT Band 13 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1554.31	-33.99	9.56	9.72	-34.15	-13.00	-21.15	H
2331.41	-34.55	10.50	10.86	-34.91	-13.00	-21.91	H
3018.31	-32.27	12.78	11.57	-31.06	-13.00	-18.06	H
1554.31	-35.59	9.56	9.72	-35.75	-13.00	-22.75	V
2331.41	-34.46	10.50	10.86	-34.82	-13.00	-21.82	V
3018.31	-33.06	12.78	11.57	-31.85	-13.00	-18.85	V
NB-IoT Band 13 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1564.23	-33.99	9.56	9.72	-34.15	-13.00	-21.15	H
2345.84	-34.14	10.50	10.86	-34.50	-13.00	-21.50	H
3128.03	-32.91	12.78	11.57	-31.70	-13.00	-18.70	H
1564.23	-36.01	9.56	9.72	-36.17	-13.00	-23.17	V
2345.84	-33.87	10.50	10.86	-34.23	-13.00	-21.23	V
3128.03	-32.84	12.78	11.57	-31.63	-13.00	-18.63	V
NB-IoT Band 13 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1573.88	-33.97	9.56	9.72	-34.13	-13.00	-21.13	H
2360.94	-34.14	10.50	10.86	-34.50	-13.00	-21.50	H
3147.51	-33.15	12.78	11.57	-31.94	-13.00	-18.94	H
1573.88	-35.88	9.56	9.72	-36.04	-13.00	-23.04	V
2360.94	-33.90	10.50	10.86	-34.26	-13.00	-21.26	V
3147.51	-32.63	12.78	11.57	-31.42	-13.00	-18.42	V

NB-IoT Band 13 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1554.26	-33.85	9.56	9.72	-34.01	-13.00	-21.01	H
2331.23	-34.65	10.50	10.86	-35.01	-13.00	-22.01	H
3018.18	-32.51	12.78	11.57	-31.30	-13.00	-18.30	H
1554.26	-35.14	9.56	9.72	-35.30	-13.00	-22.30	V
2331.23	-34.13	10.50	10.86	-34.49	-13.00	-21.49	V
3018.18	-32.87	12.78	11.57	-31.66	-13.00	-18.66	V
NB-IoT Band 13 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1564.05	-34.42	9.56	9.72	-34.58	-13.00	-21.58	H
2346.03	-34.74	10.50	10.86	-35.10	-13.00	-22.10	H
3128.16	-33.46	12.78	11.57	-32.25	-13.00	-19.25	H
1564.05	-35.23	9.56	9.72	-35.39	-13.00	-22.39	V
2346.03	-35.02	10.50	10.86	-35.38	-13.00	-22.38	V
3128.16	-31.73	12.78	11.57	-30.52	-13.00	-17.52	V
NB-IoT Band 13 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1573.68	-34.32	9.56	9.72	-34.48	-13.00	-21.48	H
2360.73	-34.80	10.50	10.86	-35.16	-13.00	-22.16	H
3147.69	-32.90	12.78	11.57	-31.69	-13.00	-18.69	H
1573.68	-35.41	9.56	9.72	-35.57	-13.00	-22.57	V
2360.73	-34.86	10.50	10.86	-35.22	-13.00	-22.22	V
3147.69	-31.89	12.78	11.57	-30.68	-13.00	-17.68	V

NB-IoT Band 71 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1326.37	-33.91	8.17	9.34	-35.08	-13.00	-22.08	H
1989.34	-35.12	9.53	10.42	-36.01	-13.00	-23.01	H
2652.39	-33.47	11.27	11.12	-33.32	-13.00	-20.32	H
1326.37	-35.46	8.17	9.34	-36.63	-13.00	-23.63	V
1989.34	-33.75	9.53	10.42	-34.64	-13.00	-21.64	V
2652.39	-32.28	11.27	11.12	-32.13	-13.00	-19.13	V
NB-IoT Band 71 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1360.91	-34.54	8.17	9.34	-35.71	-13.00	-22.71	H
2041.22	-34.45	9.53	10.42	-35.34	-13.00	-22.34	H
2721.82	-32.87	11.27	11.12	-32.72	-13.00	-19.72	H
1360.91	-34.62	8.17	9.34	-35.79	-13.00	-22.79	V
2041.22	-35.21	9.53	10.42	-36.10	-13.00	-23.10	V
2721.82	-32.48	11.27	11.12	-32.33	-13.00	-19.33	V
NB-IoT Band 71 / QPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1395.69	-34.78	8.17	9.34	-35.95	-13.00	-22.95	H
2093.69	-34.55	9.53	10.42	-35.44	-13.00	-22.44	H
2791.55	-32.43	11.27	11.12	-32.28	-13.00	-19.28	H
1395.69	-35.86	8.17	9.34	-37.03	-13.00	-24.03	V
2093.69	-34.38	9.53	10.42	-35.27	-13.00	-22.27	V
2791.55	-32.64	11.27	11.12	-32.49	-13.00	-19.49	V

NB-IoT Band 71 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1326.46	-34.49	8.17	9.34	-35.66	-13.00	-22.66	H
1989.50	-35.05	9.53	10.42	-35.94	-13.00	-22.94	H
2652.44	-32.32	11.27	11.12	-32.17	-13.00	-19.17	H
1326.46	-34.81	8.17	9.34	-35.98	-13.00	-22.98	V
1989.50	-34.06	9.53	10.42	-34.95	-13.00	-21.95	V
2652.44	-31.89	11.27	11.12	-31.74	-13.00	-18.74	V
NB-IoT Band 71 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1360.95	-34.40	8.17	9.34	-35.57	-13.00	-22.57	H
2041.66	-34.50	9.53	10.42	-35.39	-13.00	-22.39	H
2721.96	-32.93	11.27	11.12	-32.78	-13.00	-19.78	H
1360.95	-34.82	8.17	9.34	-35.99	-13.00	-22.99	V
2041.66	-34.67	9.53	10.42	-35.56	-13.00	-22.56	V
2721.96	-32.27	11.27	11.12	-32.12	-13.00	-19.12	V
NB-IoT Band 71 / BPSK / 3.75KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1395.92	-34.61	8.17	9.34	-35.78	-13.00	-22.78	H
2093.56	-35.12	9.53	10.42	-36.01	-13.00	-23.01	H
2791.67	-32.88	11.27	11.12	-32.73	-13.00	-19.73	H
1395.92	-35.79	8.17	9.34	-36.96	-13.00	-23.96	V
2093.56	-34.04	9.53	10.42	-34.93	-13.00	-21.93	V
2791.67	-32.09	11.27	11.12	-31.94	-13.00	-18.94	V

NB-IoT Band 71 / QPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1326.45	-34.12	8.17	9.34	-35.29	-13.00	-22.29	H
1989.34	-35.28	9.53	10.42	-36.17	-13.00	-23.17	H
2652.37	-33.01	11.27	11.12	-32.86	-13.00	-19.86	H
1326.45	-34.85	8.17	9.34	-36.02	-13.00	-23.02	V
1989.34	-34.96	9.53	10.42	-35.85	-13.00	-22.85	V
2652.37	-32.36	11.27	11.12	-32.21	-13.00	-19.21	V
NB-IoT Band 71 / QPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1360.87	-34.93	8.17	9.34	-36.10	-13.00	-23.10	H
2041.52	-35.25	9.53	10.42	-36.14	-13.00	-23.14	H
2722.06	-33.09	11.27	11.12	-32.94	-13.00	-19.94	H
1360.87	-35.21	8.17	9.34	-36.38	-13.00	-23.38	V
2041.52	-35.01	9.53	10.42	-35.90	-13.00	-22.90	V
2722.06	-31.74	11.27	11.12	-31.59	-13.00	-18.59	V
NB-IoT Band 71 / QPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1395.77	-34.34	8.17	9.34	-35.51	-13.00	-22.51	H
2093.63	-34.47	9.53	10.42	-35.36	-13.00	-22.36	H
2791.42	-33.23	11.27	11.12	-33.08	-13.00	-20.08	H
1395.77	-35.95	8.17	9.34	-37.12	-13.00	-24.12	V
2093.63	-34.55	9.53	10.42	-35.44	-13.00	-22.44	V
2791.42	-33.11	11.27	11.12	-32.96	-13.00	-19.96	V

NB-IoT Band 71 / BPSK / 15KHz /1@0/ The Worst Test Results for Lowest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1326.43	-34.21	8.17	9.34	-35.38	-13.00	-22.38	H
1989.14	-35.33	9.53	10.42	-36.22	-13.00	-23.22	H
2652.20	-33.18	11.27	11.12	-33.03	-13.00	-20.03	H
1326.43	-35.54	8.17	9.34	-36.71	-13.00	-23.71	V
1989.14	-35.06	9.53	10.42	-35.95	-13.00	-22.95	V
2652.20	-32.47	11.27	11.12	-32.32	-13.00	-19.32	V
NB-IoT Band 71 / BPSK / 15KHz /1@0/ The Worst Test Results for Middle							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1361.15	-34.68	8.17	9.34	-35.85	-13.00	-22.85	H
2041.25	-34.65	9.53	10.42	-35.54	-13.00	-22.54	H
2722.10	-32.51	11.27	11.12	-32.36	-13.00	-19.36	H
1361.15	-35.58	8.17	9.34	-36.75	-13.00	-23.75	V
2041.25	-34.77	9.53	10.42	-35.66	-13.00	-22.66	V
2722.10	-32.17	11.27	11.12	-32.02	-13.00	-19.02	V
NB-IoT Band 71 / BPSK / 15KHz /1@0/ The Worst Test Results for Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
1395.93	-33.51	8.17	9.34	-34.68	-13.00	-21.68	H
2093.87	-35.35	9.53	10.42	-36.24	-13.00	-23.24	H
2791.64	-32.45	11.27	11.12	-32.30	-13.00	-19.30	H
1395.93	-35.11	8.17	9.34	-36.28	-13.00	-23.28	V
2093.87	-34.33	9.53	10.42	-35.22	-13.00	-22.22	V
2791.64	-33.13	11.27	11.12	-32.98	-13.00	-19.98	V

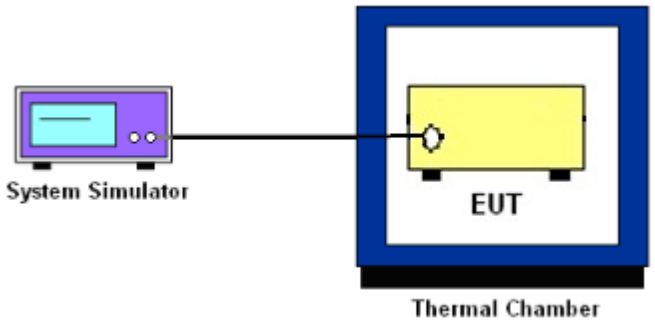
10. FREQUENCY STABILITY

10.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

10.1.1 MEASUREMENT METHOD

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

10.1.2 TEST SETUP



10.1.3 TEST PROCEDURES FOR TEMPERATURE VARIATION

1. The EUT was set up in the thermal chamber and connected with the system simulator.

2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

10.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.0.

2. The EUT was placed in a temperature chamber at 25±5° C and connected with the system simlator.

3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

4. The variation in frequency was measured for the worst case.

10.1.5 TEST RESULTS

NB-IoT Band 2 (QPSK) / 1880MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	25.87	0.014	2.5ppm	PASS
40		14.40	0.008		
30		25.40	0.014		
20		25.71	0.014		
10		11.75	0.006		
0		20.01	0.011		
-10		20.62	0.011		
-20		12.89	0.007		
-30		14.74	0.008		
25	Maximum Voltage	20.87	0.011		
25	BEP	27.08	0.014		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	22.78	0.012	2.5ppm	PASS
40		13.17	0.007		
30		11.87	0.006		
20		20.09	0.011		
10		24.36	0.013		
0		33.57	0.018		
-10		17.02	0.009		
-20		25.79	0.014		
-30		17.68	0.009		
25	Maximum Voltage	15.10	0.008		
25	BEP	19.52	0.010		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	12.32	0.007	2.5ppm	PASS
40		33.84	0.018		
30		18.75	0.010		
20		12.50	0.007		
10		34.63	0.018		
0		14.82	0.008		
-10		35.42	0.019		
-20		26.83	0.014		
-30		23.11	0.012		
25	Maximum Voltage	36.07	0.019		
25	BEP	36.34	0.019		

NB-IoT Band 4 (QPSK) / 1732.5MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	26.65	0.014	2.5ppm	PASS
40		12.64	0.007		
30		32.08	0.017		
20		23.87	0.013		
10		12.36	0.007		
0		21.50	0.011		
-10		14.81	0.008		
-20		23.77	0.013		
-30		13.82	0.007		
25	Maximum Voltage	28.83	0.015		
25	BEP	24.03	0.013		

NB-IoT Band 5 (QPSK) / 836.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	19.56	0.010	2.5ppm	PASS
40		22.46	0.012		
30		23.46	0.012		
20		33.23	0.018		
10		33.93	0.018		
0		16.77	0.009		
-10		25.78	0.014		
-20		26.55	0.014		
-30		32.09	0.017		
25	Maximum Voltage	31.17	0.017		
25	BEP	17.94	0.010		

NB-IoT Band 5 (QPSK) / 836.5MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	29.11	0.015	2.5ppm	PASS
40		14.45	0.008		
30		27.30	0.015		
20		27.09	0.014		
10		28.16	0.015		
0		13.07	0.007		
-10		14.99	0.008		
-20		30.99	0.016		
-30		29.28	0.016		
25	Maximum Voltage	18.67	0.010		
25	BEP	34.61	0.018		

NB-IoT Band 12 (QPSK) / 707.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	11.89	0.006	2.5ppm	PASS
40		12.11	0.006		
30		32.36	0.017		
20		14.91	0.008		
10		20.06	0.011		
0		32.85	0.017		
-10		27.00	0.014		
-20		19.64	0.010		
-30		25.61	0.014		
25	Maximum Voltage	27.47	0.015		
25	BEP	32.88	0.017		

NB-IoT Band 12 (QPSK) / 707.5MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	24.01	0.013	2.5ppm	PASS
40		34.64	0.018		
30		34.72	0.018		
20		33.07	0.018		
10		15.31	0.008		
0		27.81	0.015		
-10		30.91	0.016		
-20		23.59	0.013		
-30		23.12	0.012		
25	Maximum Voltage	30.41	0.016		
25	BEP	16.71	0.009		

NB-IoT Band 13 (QPSK) / 782MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	11.81	0.006	2.5ppm	PASS
40		17.30	0.009		
30		22.15	0.012		
20		32.66	0.017		
10		22.60	0.012		
0		34.94	0.019		
-10		27.48	0.015		
-20		32.20	0.017		
-30		17.32	0.009		
25	Maximum Voltage	11.97	0.006		
25	BEP	22.39	0.012		

NB-IoT Band 13 (QPSK) / 782MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	34.77	0.018	2.5ppm	PASS
40		33.77	0.018		
30		31.89	0.017		
20		18.14	0.010		
10		26.35	0.014		
0		25.55	0.014		
-10		25.52	0.014		
-20		30.38	0.016		
-30		26.77	0.014		
25	Maximum Voltage	29.90	0.016		
25	BEP	25.34	0.013		

NB-IoT Band 71 (QPSK) / 680.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	18.32	0.010	2.5ppm	PASS
40		20.83	0.011		
30		26.20	0.014		
20		17.51	0.009		
10		35.96	0.019		
0		35.77	0.019		
-10		35.88	0.019		
-20		21.88	0.012		
-30		12.02	0.006		
25	Maximum Voltage	34.29	0.018		
25	BEP	27.07	0.014		

NB-IoT Band 71 (QPSK) / 680.5MHz /15KHz/1@0					
Temperature (°C)	Voltage	Freq. Dev.	Freq. Dev.	Limit	Result
	(Volt)	(Hz)	(ppm)		
50	Normal Voltage	24.73	0.013	2.5ppm	PASS
40		28.64	0.015		
30		36.09	0.019		
20		15.98	0.009		
10		33.52	0.018		
0		14.96	0.008		
-10		25.31	0.013		
-20		18.48	0.010		
-30		17.17	0.009		
25	Maximum Voltage	23.27	0.012		
25	BEP	24.74	0.013		

APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

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