Radio Test Report

Report No.:STS2505157W02

Issued for

August International Ltd

Rawmec Business Park, Plumpton Road, Hoddesdon,
Hertfordshire, EN11 0EE, United Kingdom

Product Name:	Vital Sign Monitor Watch
Brand Name:	AUDAR
Model Name:	E2
Series Model:	N/A
FCC ID:	2A4RA-E2
Test Standard:	47 CFR Part 2, 24(E), 27

The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Shenzhen STS Test Services Co., Ltd.

TEST RESULT CERTIFICATION

Applicant's Name.....:	August International Ltd
Address.....:	Rawmec Business Park, Plumpton Road, Hoddesdon, Hertfordshire, EN11 0EE, United Kingdom
Manufacturer's Name.....:	August International Ltd
Address.....:	Rawmec Business Park, Plumpton Road, Hoddesdon, Hertfordshire, EN11 0EE, United Kingdom

Product description

Product Name .....:	Vital Sign Monitor Watch
Brand Name .....:	AUDAR
Model Name.....:	E2
Series Model .....:	N/A
Test Standards.....:	47 CFR Part 2, 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 .....:	22nd May 2025
Date (s) of performance of tests :	22nd May 2025~29th May 2025
Date of Issue .....:	29th May 2025
Test Result .....:	Pass

Testing Engineer : Lenon.Hou

(Lenon Hou)

Technical Manager : Skylar.Li

(Skylar Li)

Authorized Signatory : Bovey Yang

(Bovey Yang)

SHENZHEN STS TEST SERVICES CO., LTD. TESTING APPROVAL

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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	29th May 2025	STS2505157W02	ALL	Initial Issue

1.SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

The radiated emission testing was performed according to the procedures of KDB 971168 D01 v03r01 and ANSI C63.26(2015)

Test Description	FCC Rules	Band	Test Limit	Test Result
Conducted Output Power	2.1046	/	Reporting Only	PASS
	24.232(c)	B2	EIRP < 2Watt	
	27.50(b)	B13	ERP < 3 Watt	
	27.50(c)	B12	ERP < 3 Watt	
	27.50(d)	B4	EIRP < 1Watt	
	24.232(d)	B2		
	27.50	B4, B12		
Occupied Bandwidth	2.1049	/	Reporting Only	PASS
Frequency Stability	2.1055	/	< 2.5 ppm	PASS
	24.235	B2		
	27.54	B4, B12		
Spurious Emission at Antenna Terminals	2.1051	/	< 43+10log10(P[Watts])	PASS
	24.238(a)	B2		
	27.53(g)	B12		
	27.53(h)	B4		
Band Edge	2.1051	/	Please refer to standard	PASS
	24.238(a)	B2		
	27.53(g)	B12		
	27.53(h)	B4		
Field Strength of Spurious Radiation	2.1053	/	< 43+10log10(P[Watts])	PASS
	24.238(a)	B2		
	27.53(g)	B12		

1.1 INTRODUCTION

TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : 101, Building B, Zhuoke Science Park, No.190 Chongqing Road, ZhanChengShequ, Fuhai 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

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	±0.755dB
2	Unwanted Emissions, conducted	±2.874dB
3	All emissions, radiated 30-1GHz	±4.18dB
4	All emissions, radiated 1G-6GHz	±4.90dB
5	All emissions, radiated>6G	±5.24dB
6	Conducted Emission (9KHz-150KHz)	±2.19dB
7	Conducted Emission (150KHz-30MHz)	±2.53dB
8	Occupied Channel Bandwidth	±3.5%
9	Peak-to-Average Ratio	±0.845dB

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	Vital Sign Monitor Watch
Trade Name	AUDAR
Model Name	E2
Series Model	N/A
Model Difference	N/A
Frequency Bands	TX: NB-IoT Band 2:1850-1910MHz NB-IoT Band 4:1710-1755MHz NB-IoT Band 12:699-716MHz RX: NB-IoT Band 2:1930-1990MHz NB-IoT Band 4:2110-2155MHz NB-IoT Band 12:729-746MHz
SIM Card	Only support single SIM Card.
Antenna	PIFA
Antenna gain	NB-IoT Band2：-6.06 dBi NB-IoT Band4：-7.22 dBi NB-IoT Band12：-20.56 dBi
Rating	N/A
Battery	Model:ZWD352626V Brand:ZWD Rated Voltage:3.8V Charge Limit Voltage:4.35V Capacity:280mAh
Adapter	N/A
Extreme Vol. Limits	DC 3.42V ~ DC 4.35V (Normal: DC 3.8V)
Extreme Temp. Tolerance	-10℃~45℃
Hardware version number	E2-V3
Software version number	V3.4.5_250519EUF3.4.2

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sa-mple identified in the report.

2.1.2 RELATED SUBMITTAL(S) / GRANT (S)

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

2.1.3 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.

2.1.4 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.

2.1.5 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.

2.1.6 MEASUREMENT INSTRUMENTS

RF Radiation Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Wireless Communications Test Set	R&S	CMW 500	117239	2024.09.23	2025.09.22
Pre-Amplifier(0.1M-3GHz)	EM	EM330	060665	2025.02.22	2026.02.21
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2024.09.23	2025.09.22
Pre-Amplifier(18G-40GHz)	SKET	LNPA_1840-50	SK2018101801	2025.02.22	2026.02.21
Positioning Controller	MF	MF-7802	MF-780208587	N/A	N/A
Signal Analyzer	R&S	FSV 40-N	101823	2024.09.23	2025.09.22
Switch Control Box	N/A	N/A	N/A	N/A	N/A
Filter Box	BALUN Technology	SU319E	BL-SZ1530051	N/A	N/A
Video Controller	SKET	FCS C-3	N/A	N/A	N/A
Bilog Antenna	TESEQ	CBL6111D	34678	2024.09.30	2025.09.29
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2024.09.25	2025.09.24
Horn Antenna	A-INFOMW	LB-180400-KF	J211020657	2023.10.10	2025.10.09
Antenna Mast	MF	MFA-440H	N/A	N/A	N/A
Turn Table	MF	N/A	N/A	N/A	N/A
AC Power Source	APC	KDF-11010G	F214050035	N/A	N/A
DC Power Supply	Zhaoxin	RXN 605D	20R605D11010081	N/A	N/A
Test SW	EMC Test Software	15.2.0.339			
	EZ-EMC	Ver.STSLAB-03A1 RE			
RF Connected Test Equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Temperature & Humidity	SW-108	SuWei	N/A	2025.02.24	2026.02.23
Wireless Communications Test Set	R&S	CMW 500	131428	2025.02.22	2026.02.21
Signal Analyzer	Agilent	N9020A	MY52440124	2025.02.22	2026.02.21
RF Automatic Test System	Maiwei	MW200-SFCB	N/A	N/A	N/A
Temperature & Humidity Test Chamber	Safety test	AG80L	171200018	2025.02.22	2026.02.21
Programmable Power Supply	Agilent	E3642A	MY40002025	2024.09.23	2025.09.22
POWER DIVIDER	eastsheep	PD-0.5/0.6-2S	N/A	2025.02.25	2026.02.24
Test SW	MTS 8200	2.0.0.0			

2.1.7 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&RADIATED POWER AND EFFECTIVE ISOTROPIC RADIATED POWER

3.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

3.1.1 MEASUREMENT METHOD

CONDUCTED OUTPUT POWER:
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.
C63.26 2015 Section 5.2.5.5.
In many cases, RF output power limits are specified in terms of the ERP or the EIRP. Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are defined as the product of the power supplied to the antenna and its gain (relative to a dipole antenna in the case of ERP, and relative to an isotropic antenna in the case of EIRP); however, when working in decibels (i.e., logarithmic scale), the ERP and EIRP represent the sum of the transmit antenna gain (in dBd or dBi, respectively) and the conducted RF output power (expressed in dB relative to watts or milliwatts).
The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:
(1) ERP or EIRP = PMeas + GT
ERP= EIRP-2.15
where
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as PMeas, e.g., dBm or dBW)
PMeas measured transmitter output power or PSD, in dBm or dBW
GT gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)
For devices utilizing multiple antennas, see 6.4 for guidance with respect to determining the effective array transmit antenna gain term to be used in the above equation.
The following equations demonstrate the mathematical relationship between ERP and EIRP:
a) ERP = EIRP − 2.15, where ERP and EIRP are expressed in consistent units.
b) EIRP = ERP + 2.15, where ERP and EIRP are expressed in consistent units.

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	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	Conduction AVG Power(dBm)	Ant Gain(dBi)	EIRP (dBm)	EIRP Limit(W)	EIRP Limit(dBm)	Verdict
Band 2 Standalone	Lowest	BPSK	3.75	1#0	23.51	-6.06	17.45	2.00	33.01	PASS
				1#47	23.48	-6.06	17.42	2.00	33.01	PASS
			15	1#0	23.42	-6.06	17.36	2.00	33.01	PASS
				1#11	23.40	-6.06	17.34	2.00	33.01	PASS
		QPSK	3.75	1#0	23.52	-6.06	17.46	2.00	33.01	PASS
				1#47	23.47	-6.06	17.41	2.00	33.01	PASS
			15	1#0	23.39	-6.06	17.33	2.00	33.01	PASS
				1#11	23.41	-6.06	17.35	2.00	33.01	PASS
				12#0	21.50	-6.06	15.44	2.00	33.01	PASS
	Middle	BPSK	3.75	1#0	23.70	-6.06	17.64	2.00	33.01	PASS
				1#47	23.62	-6.06	17.56	2.00	33.01	PASS
			15	1#0	23.06	-6.06	17.00	2.00	33.01	PASS
				1#11	23.03	-6.06	16.97	2.00	33.01	PASS
		QPSK	3.75	1#0	23.69	-6.06	17.63	2.00	33.01	PASS
				1#47	23.64	-6.06	17.58	2.00	33.01	PASS
			15	1#0	23.06	-6.06	17.00	2.00	33.01	PASS
				1#11	23.50	-6.06	17.44	2.00	33.01	PASS
				12#0	21.53	-6.06	15.47	2.00	33.01	PASS
	Highest	BPSK	3.75	1#0	23.68	-6.06	17.62	2.00	33.01	PASS
				1#47	23.63	-6.06	17.57	2.00	33.01	PASS
			15	1#0	23.01	-6.06	16.95	2.00	33.01	PASS
				1#11	23.56	-6.06	17.50	2.00	33.01	PASS
		QPSK	3.75	1#0	23.68	-6.06	17.62	2.00	33.01	PASS
				1#47	23.62	-6.06	17.56	2.00	33.01	PASS
			15	1#0	23.51	-6.06	17.45	2.00	33.01	PASS
				1#11	23.52	-6.06	17.46	2.00	33.01	PASS
				12#0	21.58	-6.06	15.52	2.00	33.01	PASS

NB-IoT Band 4 Maximum Average Power [dBm]										
Mode	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	Conduction AVG Power(dBm)	Ant Gain(dBi)	EIRP (dBm)	EIRP Limit(W)	EIRP Limit(dBm)	Verdict
Band 4 Standalone	Lowest	BPSK	3.75	1#0	23.23	-7.22	16.01	1.00	30.00	PASS
				1#47	23.18	-7.22	15.96	1.00	30.00	PASS
			15	1#0	23.31	-7.22	16.09	1.00	30.00	PASS
				1#11	23.33	-7.22	16.11	1.00	30.00	PASS
		QPSK	3.75	1#0	23.14	-7.22	15.92	1.00	30.00	PASS
				1#47	23.08	-7.22	15.86	1.00	30.00	PASS
			15	1#0	23.34	-7.22	16.12	1.00	30.00	PASS
				1#11	23.38	-7.22	16.16	1.00	30.00	PASS
				12#0	21.25	-7.22	14.03	1.00	30.00	PASS
	Middle	BPSK	3.75	1#0	23.33	-7.22	16.11	1.00	30.00	PASS
				1#47	23.30	-7.22	16.08	1.00	30.00	PASS
			15	1#0	23.26	-7.22	16.04	1.00	30.00	PASS
				1#11	23.31	-7.22	16.09	1.00	30.00	PASS
		QPSK	3.75	1#0	23.37	-7.22	16.15	1.00	30.00	PASS
				1#47	23.31	-7.22	16.09	1.00	30.00	PASS
			15	1#0	23.32	-7.22	16.10	1.00	30.00	PASS
				1#11	23.33	-7.22	16.11	1.00	30.00	PASS
				12#0	21.37	-7.22	14.15	1.00	30.00	PASS
	Highest	BPSK	3.75	1#0	23.37	-7.22	16.15	1.00	30.00	PASS
				1#47	23.30	-7.22	16.08	1.00	30.00	PASS
			15	1#0	23.54	-7.22	16.32	1.00	30.00	PASS
				1#11	23.47	-7.22	16.25	1.00	30.00	PASS
		QPSK	3.75	1#0	23.36	-7.22	16.14	1.00	30.00	PASS
				1#47	23.29	-7.22	16.07	1.00	30.00	PASS
			15	1#0	23.45	-7.22	16.23	1.00	30.00	PASS
				1#11	23.46	-7.22	16.24	1.00	30.00	PASS
				12#0	21.43	-7.22	14.21	1.00	30.00	PASS

NB-IoT Band 12 Maximum Average Power [dBm]										
Mode	UL Channel	Modulation	Subcarrier Space (KHz)	RB Configure	Conduction AVG Power(dBm)	Ant Gain(dBi)	ERP (dBm)	ERP Limit(W)	ERP Limit(dBm)	Verdict
Band 12 Standalone	Lowest	BPSK	3.75	1#0	23.51	-20.56	0.80	3.00	34.77	PASS
				1#47	23.48	-20.56	2.92	3.00	34.77	PASS
			15	1#0	22.58	-20.56	2.02	3.00	34.77	PASS
				1#11	23.59	-20.56	3.03	3.00	34.77	PASS
		QPSK	3.75	1#0	23.52	-20.56	2.96	3.00	34.77	PASS
				1#47	23.47	-20.56	2.91	3.00	34.77	PASS
			15	1#0	22.64	-20.56	2.08	3.00	34.77	PASS
				1#11	22.65	-20.56	2.09	3.00	34.77	PASS
				12#0	21.65	-20.56	1.09	3.00	34.77	PASS
	Middle	BPSK	3.75	1#0	23.70	-20.56	3.14	3.00	34.77	PASS
				1#47	23.62	-20.56	3.06	3.00	34.77	PASS
			15	1#0	23.85	-20.56	3.29	3.00	34.77	PASS
				1#11	23.77	-20.56	3.21	3.00	34.77	PASS
		QPSK	3.75	1#0	23.69	-20.56	3.13	3.00	34.77	PASS
				1#47	23.64	-20.56	3.08	3.00	34.77	PASS
			15	1#0	23.78	-20.56	3.22	3.00	34.77	PASS
				1#11	22.78	-20.56	2.22	3.00	34.77	PASS
				12#0	21.77	-20.56	1.21	3.00	34.77	PASS
	Highest	BPSK	3.75	1#0	23.68	-20.56	3.12	3.00	34.77	PASS
				1#47	23.63	-20.56	3.07	3.00	34.77	PASS
			15	1#0	22.63	-20.56	2.07	3.00	34.77	PASS
				1#11	22.64	-20.56	2.08	3.00	34.77	PASS
		QPSK	3.75	1#0	23.68	-20.56	3.12	3.00	34.77	PASS
				1#47	23.62	-20.56	3.06	3.00	34.77	PASS
			15	1#0	23.64	-20.56	3.08	3.00	34.77	PASS
				1#11	22.65	-20.56	2.09	3.00	34.77	PASS
				12#0	21.74	-20.56	1.18	3.00	34.77	PASS

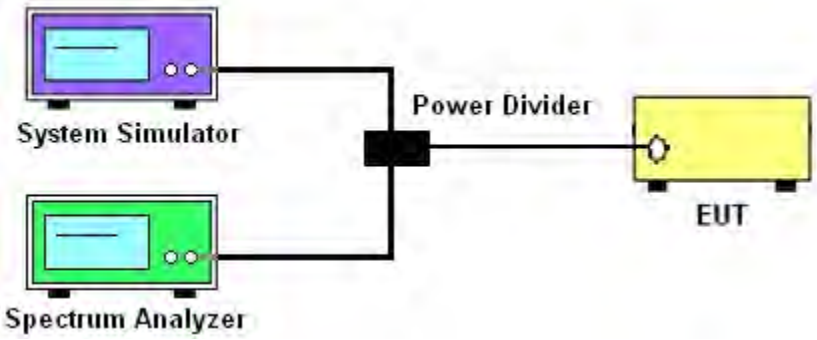
4. PEAK-TO-AVERAGE RATIO

4.1 DESCRIPTION OF THE CONDUCTED OUTPUT POWER MEASUREMENT

4.1.1 MEASUREMENT METHOD

Use one of the procedures presented in 4.1.3 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.1.3 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 and ANSI C63.26 2015 Section 5.2.6.

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.

4.1.4 TEST RESULTS

Note: The test data please reference to attachment “STS2505157W02_Appendix NB-IOT”.

5. OCCUPIED BANDWIDTH

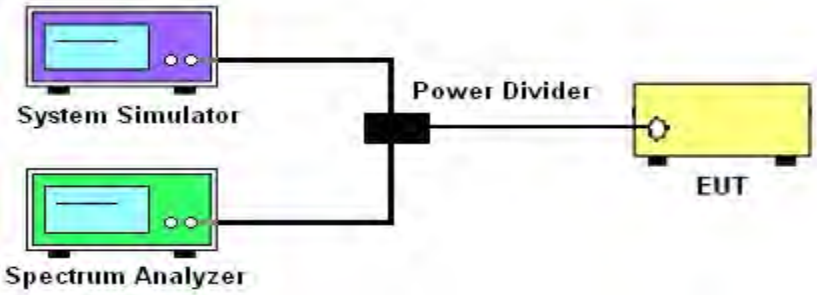
5.1 DESCRIPTION OF OCCUPIED BANDWIDTH MEASUREMENT

5.1.1 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.

5.1.2 TEST SETUP



5.1.3 TEST PROCEDURES

1. The testing follows FCC KDB 971168 D01 v03r01 Section 4.2 and 4.3.

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.

5.1.4 MEASUREMENT RESULT

Note: The test data please reference to attachment “STS2505157W02_Appendix NB-IOT”.

6. CONDUCTED BAND EDGE

6.1 DESCRIPTION OF CONDUCTED BAND EDGE MEASUREMENT

6.1.1 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.

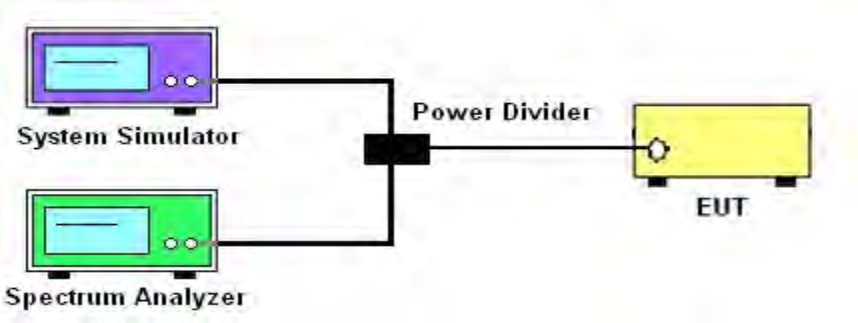
2. §24.238 (a)
For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent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

6.1.2 TEST SETUP



6.1.3 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.

6.1.4 MEASUREMENT RESULT

Note: The test data please reference to attachment “STS2505157W02_Appendix NB-IOT”.

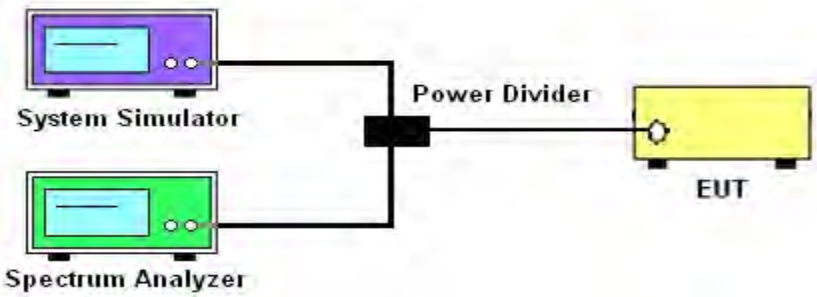
7. CONDUCTED SPURIOUS EMISSION

7.1 DESCRIPTION OF CONDUCTED SPURIOUS EMISSION MEASUREMENT

7.1.1 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.

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 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

7.1.4 TEST RESULTS

Note: The test data please reference to attachment “STS2505157W02_Appendix NB-IOT”.

8. RADIATED SPURIOUS EMISSION

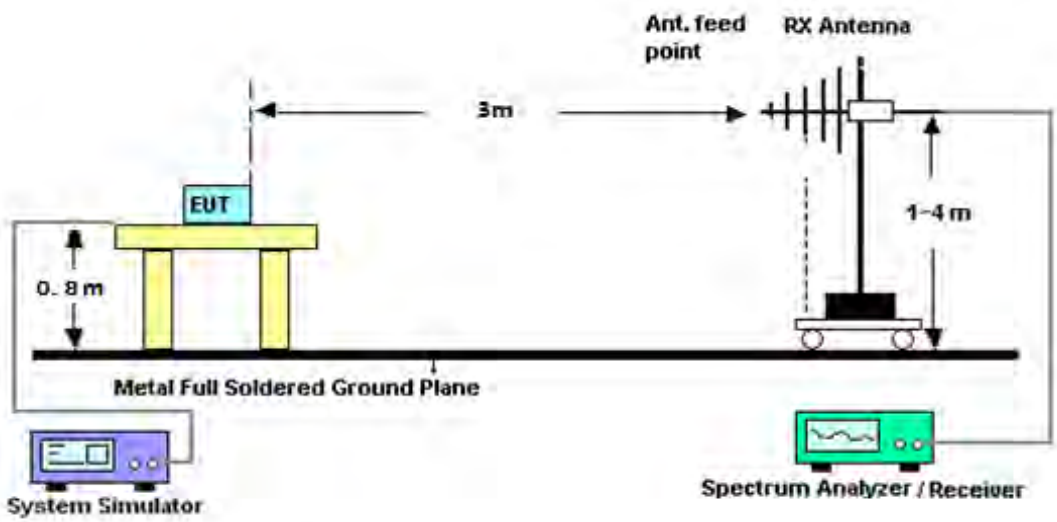
8.1 DESCRIPTION OF RADIATED SPURIOUS EMISSION

8.1.1 MEASUREMENT METHOD

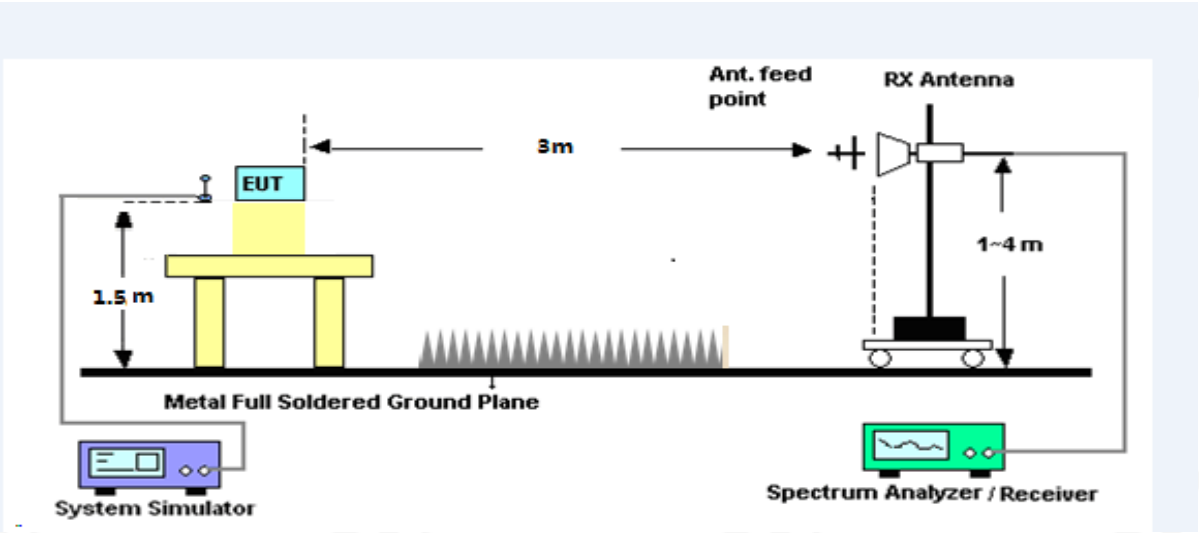
The radiated spurious emission was measured by substitution method according to ANSI C63.26 2015. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.
For Band 7 The power of any emission 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.

8.1.2 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



8.1.3 TEST PROCEDURES

1. The testing FCC KDB 971168 D01 Section 7 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

8.1.4 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
3700.48	-33.87	12.60	12.93	-34.20	-13.00	-21.20	H
5550.62	-34.93	13.10	17.11	-38.94	-13.00	-25.94	H
7400.66	-32.67	11.50	22.20	-43.37	-13.00	-30.37	H
3700.48	-35.94	12.60	12.93	-36.27	-13.00	-23.27	V
5550.62	-35.16	13.10	17.11	-39.17	-13.00	-26.17	V
7400.66	-32.19	11.50	22.20	-42.89	-13.00	-29.89	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
3759.85	-34.58	12.60	12.93	-34.91	-13.00	-21.91	H
5639.83	-35.38	13.10	17.11	-39.39	-13.00	-26.39	H
7520.03	-33.62	11.50	22.20	-44.32	-13.00	-31.32	H
3759.85	-35.62	12.60	12.93	-35.95	-13.00	-22.95	V
5639.83	-33.89	13.10	17.11	-37.90	-13.00	-24.90	V
7520.03	-32.45	11.50	22.20	-43.15	-13.00	-30.15	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
3819.65	-34.31	12.60	12.93	-34.64	-13.00	-21.64	H
5729.78	-34.13	13.10	17.11	-38.14	-13.00	-25.14	H
7639.38	-32.63	11.50	22.20	-43.33	-13.00	-30.33	H
3819.65	-35.51	12.60	12.93	-35.84	-13.00	-22.84	V
5729.78	-34.60	13.10	17.11	-38.61	-13.00	-25.61	V
7639.38	-33.07	11.50	22.20	-43.77	-13.00	-30.77	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
3700.47	-34.50	12.60	12.93	-34.83	-13.00	-21.83	H
5550.60	-35.05	13.10	17.11	-39.06	-13.00	-26.06	H
7400.80	-33.11	11.50	22.20	-43.81	-13.00	-30.81	H
3700.47	-34.88	12.60	12.93	-35.21	-13.00	-22.21	V
5550.60	-34.08	13.10	17.11	-38.09	-13.00	-25.09	V
7400.80	-32.65	11.50	22.20	-43.35	-13.00	-30.35	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
3759.75	-34.10	12.60	12.93	-34.43	-13.00	-21.43	H
5640.09	-34.40	13.10	17.11	-38.41	-13.00	-25.41	H
7520.26	-32.41	11.50	22.20	-43.11	-13.00	-30.11	H
3759.75	-35.09	12.60	12.93	-35.42	-13.00	-22.42	V
5640.09	-35.23	13.10	17.11	-39.24	-13.00	-26.24	V
7520.26	-32.78	11.50	22.20	-43.48	-13.00	-30.48	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
3819.35	-34.00	12.60	12.93	-34.33	-13.00	-21.33	H
5729.75	-35.21	13.10	17.11	-39.22	-13.00	-26.22	H
7639.48	-33.17	11.50	22.20	-43.87	-13.00	-30.87	H
3819.35	-34.57	12.60	12.93	-34.90	-13.00	-21.90	V
5729.75	-34.35	13.10	17.11	-38.36	-13.00	-25.36	V
7639.48	-32.17	11.50	22.20	-42.87	-13.00	-29.87	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
3700.32	-34.36	12.60	12.93	-34.69	-13.00	-21.69	H
5550.53	-35.42	13.10	17.11	-39.43	-13.00	-26.43	H
7400.33	-32.34	11.50	22.20	-43.04	-13.00	-30.04	H
3700.32	-35.77	12.60	12.93	-36.10	-13.00	-23.10	V
5550.53	-34.19	13.10	17.11	-38.20	-13.00	-25.20	V
7400.33	-31.79	11.50	22.20	-42.49	-13.00	-29.49	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
3760.16	-33.51	12.60	12.93	-33.84	-13.00	-20.84	H
5640.27	-34.74	13.10	17.11	-38.75	-13.00	-25.75	H
7520.23	-33.05	11.50	22.20	-43.75	-13.00	-30.75	H
3760.16	-35.76	12.60	12.93	-36.09	-13.00	-23.09	V
5640.27	-35.05	13.10	17.11	-39.06	-13.00	-26.06	V
7520.23	-32.60	11.50	22.20	-43.30	-13.00	-30.30	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
3819.81	-34.11	12.60	12.93	-34.44	-13.00	-21.44	H
5729.77	-34.05	13.10	17.11	-38.06	-13.00	-25.06	H
7639.57	-32.55	11.50	22.20	-43.25	-13.00	-30.25	H
3819.81	-35.04	12.60	12.93	-35.37	-13.00	-22.37	V
5729.77	-34.58	13.10	17.11	-38.59	-13.00	-25.59	V
7639.57	-33.04	11.50	22.20	-43.74	-13.00	-30.74	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
3700.40	-33.78	12.60	12.93	-34.11	-13.00	-21.11	H
5550.49	-34.11	13.10	17.11	-38.12	-13.00	-25.12	H
7400.41	-33.28	11.50	22.20	-43.98	-13.00	-30.98	H
3700.40	-35.61	12.60	12.93	-35.94	-13.00	-22.94	V
5550.49	-34.07	13.10	17.11	-38.08	-13.00	-25.08	V
7400.41	-32.81	11.50	22.20	-43.51	-13.00	-30.51	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
3760.04	-34.34	12.60	12.93	-34.67	-13.00	-21.67	H
5640.18	-34.87	13.10	17.11	-38.88	-13.00	-25.88	H
7520.39	-33.45	11.50	22.20	-44.15	-13.00	-31.15	H
3760.04	-35.30	12.60	12.93	-35.63	-13.00	-22.63	V
5640.18	-33.80	13.10	17.11	-37.81	-13.00	-24.81	V
7520.39	-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 Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3819.70	-34.66	12.60	12.93	-34.99	-13.00	-21.99	H
5729.69	-34.18	13.10	17.11	-38.19	-13.00	-25.19	H
7639.64	-33.18	11.50	22.20	-43.88	-13.00	-30.88	H
3819.70	-35.03	12.60	12.93	-35.36	-13.00	-22.36	V
5729.69	-34.55	13.10	17.11	-38.56	-13.00	-25.56	V
7639.64	-32.97	11.50	22.20	-43.67	-13.00	-30.67	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
3420.30	-34.15	12.90	12.56	-33.81	-13.00	-20.81	H
5130.32	-34.94	13.10	16.32	-38.16	-13.00	-25.16	H
6840.58	-32.93	12.33	21.13	-41.73	-13.00	-28.73	H
3420.30	-35.59	12.90	12.56	-35.25	-13.00	-22.25	V
5130.32	-35.03	13.10	16.32	-38.25	-13.00	-25.25	V
6840.58	-32.21	12.33	21.13	-41.01	-13.00	-28.01	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
3494.98	-34.69	12.90	12.56	-34.35	-13.00	-21.35	H
5242.57	-34.42	13.10	16.32	-37.64	-13.00	-24.64	H
6990.09	-33.53	12.33	21.13	-42.33	-13.00	-29.33	H
3494.98	-34.66	12.90	12.56	-34.32	-13.00	-21.32	V
5242.57	-34.28	13.10	16.32	-37.50	-13.00	-24.50	V
6990.09	-32.33	12.33	21.13	-41.13	-13.00	-28.13	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
3510.04	-34.56	12.90	12.56	-34.22	-13.00	-21.22	H
5764.90	-35.16	13.10	16.32	-38.38	-13.00	-25.38	H
7019.85	-33.19	12.33	21.13	-41.99	-13.00	-28.99	H
3510.04	-35.43	12.90	12.56	-35.09	-13.00	-22.09	V
5764.90	-34.94	13.10	16.32	-38.16	-13.00	-25.16	V
7019.85	-32.01	12.33	21.13	-40.81	-13.00	-27.81	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
3419.93	-34.01	12.90	12.56	-33.67	-13.00	-20.67	H
5130.05	-34.65	13.10	16.32	-37.87	-13.00	-24.87	H
6840.59	-32.65	12.33	21.13	-41.45	-13.00	-28.45	H
3419.93	-34.83	12.90	12.56	-34.49	-13.00	-21.49	V
5130.05	-34.43	13.10	16.32	-37.65	-13.00	-24.65	V
6840.59	-31.76	12.33	21.13	-40.56	-13.00	-27.56	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
3494.82	-34.49	12.90	12.56	-34.15	-13.00	-21.15	H
5242.66	-35.20	13.10	16.32	-38.42	-13.00	-25.42	H
6990.03	-33.58	12.33	21.13	-42.38	-13.00	-29.38	H
3494.82	-35.37	12.90	12.56	-35.03	-13.00	-22.03	V
5242.66	-33.78	13.10	16.32	-37.00	-13.00	-24.00	V
6990.03	-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 Highest							
Frequency(MHz)	S G.Lev (dBm)	Ant(dBi)	Loss	PMea (dBm)	Limit （dBm）	Margin (dBm)	Polarity
3510.12	-33.99	12.90	12.56	-33.65	-13.00	-20.65	H
5765.13	-34.32	13.10	16.32	-37.54	-13.00	-24.54	H
7019.74	-33.21	12.33	21.13	-42.01	-13.00	-29.01	H
3510.12	-34.83	12.90	12.56	-34.49	-13.00	-21.49	V
5765.13	-35.14	13.10	16.32	-38.36	-13.00	-25.36	V
7019.74	-31.83	12.33	21.13	-40.63	-13.00	-27.63	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
3420.26	-34.83	12.90	12.56	-34.49	-13.00	-21.49	H
5130.24	-34.58	13.10	16.32	-37.80	-13.00	-24.80	H
6840.47	-33.20	12.33	21.13	-42.00	-13.00	-29.00	H
3420.26	-35.45	12.90	12.56	-35.11	-13.00	-22.11	V
5130.24	-34.43	13.10	16.32	-37.65	-13.00	-24.65	V
6840.47	-31.92	12.33	21.13	-40.72	-13.00	-27.72	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
3494.91	-34.40	12.90	12.56	-34.06	-13.00	-21.06	H
5242.57	-34.96	13.10	16.32	-38.18	-13.00	-25.18	H
6990.22	-33.54	12.33	21.13	-42.34	-13.00	-29.34	H
3494.91	-35.45	12.90	12.56	-35.11	-13.00	-22.11	V
5242.57	-35.03	13.10	16.32	-38.25	-13.00	-25.25	V
6990.22	-32.12	12.33	21.13	-40.92	-13.00	-27.92	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
3510.17	-34.45	12.90	12.56	-34.11	-13.00	-21.11	H
5765.11	-35.44	13.10	16.32	-38.66	-13.00	-25.66	H
7019.94	-33.34	12.33	21.13	-42.14	-13.00	-29.14	H
3510.17	-35.76	12.90	12.56	-35.42	-13.00	-22.42	V
5765.11	-34.71	13.10	16.32	-37.93	-13.00	-24.93	V
7019.94	-32.97	12.33	21.13	-41.77	-13.00	-28.77	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
3419.93	-34.22	12.90	12.56	-33.88	-13.00	-20.88	H
5130.16	-35.23	13.10	16.32	-38.45	-13.00	-25.45	H
6840.22	-33.63	12.33	21.13	-42.43	-13.00	-29.43	H
3419.93	-35.16	12.90	12.56	-34.82	-13.00	-21.82	V
5130.16	-34.26	13.10	16.32	-37.48	-13.00	-24.48	V
6840.22	-32.16	12.33	21.13	-40.96	-13.00	-27.96	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
3495.20	-34.30	12.90	12.56	-33.96	-13.00	-20.96	H
5242.58	-34.30	13.10	16.32	-37.52	-13.00	-24.52	H
6990.21	-33.31	12.33	21.13	-42.11	-13.00	-29.11	H
3495.20	-35.09	12.90	12.56	-34.75	-13.00	-21.75	V
5242.58	-34.16	13.10	16.32	-37.38	-13.00	-24.38	V
6990.21	-32.18	12.33	21.13	-40.98	-13.00	-27.98	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
3509.87	-33.49	12.90	12.56	-33.15	-13.00	-20.15	H
5764.95	-34.33	13.10	16.32	-37.55	-13.00	-24.55	H
7019.99	-32.77	12.33	21.13	-41.57	-13.00	-28.57	H
3509.87	-35.71	12.90	12.56	-35.37	-13.00	-22.37	V
5764.95	-34.60	13.10	16.32	-37.82	-13.00	-24.82	V
7019.99	-32.33	12.33	21.13	-41.13	-13.00	-28.13	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
1398.22	-34.62	8.17	9.34	-35.79	-13.00	-22.79	H
2097.09	-34.36	9.53	10.42	-35.25	-13.00	-22.25	H
2796.14	-32.55	11.27	11.12	-32.40	-13.00	-19.40	H
1398.22	-34.68	8.17	9.34	-35.85	-13.00	-22.85	V
2097.09	-33.85	9.53	10.42	-34.74	-13.00	-21.74	V
2796.14	-32.34	11.27	11.12	-32.19	-13.00	-19.19	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
1414.87	-34.69	8.17	9.34	-35.86	-13.00	-22.86	H
2122.57	-34.90	9.53	10.42	-35.79	-13.00	-22.79	H
2830.07	-33.61	11.27	11.12	-33.46	-13.00	-20.46	H
1414.87	-35.36	8.17	9.34	-36.53	-13.00	-23.53	V
2122.57	-34.92	9.53	10.42	-35.81	-13.00	-22.81	V
2830.07	-33.16	11.27	11.12	-33.01	-13.00	-20.01	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
1431.80	-34.37	8.17	9.34	-35.54	-13.00	-22.54	H
2147.57	-35.23	9.53	10.42	-36.12	-13.00	-23.12	H
2863.42	-33.64	11.27	11.12	-33.49	-13.00	-20.49	H
1431.80	-35.19	8.17	9.34	-36.36	-13.00	-23.36	V
2147.57	-34.74	9.53	10.42	-35.63	-13.00	-22.63	V
2863.42	-31.94	11.27	11.12	-31.79	-13.00	-18.79	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
1398.12	-34.45	8.17	9.34	-35.62	-13.00	-22.62	H
2097.30	-35.18	9.53	10.42	-36.07	-13.00	-23.07	H
2796.39	-32.81	11.27	11.12	-32.66	-13.00	-19.66	H
1398.12	-35.62	8.17	9.34	-36.79	-13.00	-23.79	V
2097.30	-35.16	9.53	10.42	-36.05	-13.00	-23.05	V
2796.39	-32.76	11.27	11.12	-32.61	-13.00	-19.61	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
1414.75	-34.70	8.17	9.34	-35.87	-13.00	-22.87	H
2122.48	-34.90	9.53	10.42	-35.79	-13.00	-22.79	H
2830.07	-32.44	11.27	11.12	-32.29	-13.00	-19.29	H
1414.75	-34.61	8.17	9.34	-35.78	-13.00	-22.78	V
2122.48	-34.95	9.53	10.42	-35.84	-13.00	-22.84	V
2830.07	-32.10	11.27	11.12	-31.95	-13.00	-18.95	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
1431.94	-33.51	8.17	9.34	-34.68	-13.00	-21.68	H
2147.67	-34.49	9.53	10.42	-35.38	-13.00	-22.38	H
2863.53	-33.00	11.27	11.12	-32.85	-13.00	-19.85	H
1431.94	-35.26	8.17	9.34	-36.43	-13.00	-23.43	V
2147.67	-34.16	9.53	10.42	-35.05	-13.00	-22.05	V
2863.53	-32.93	11.27	11.12	-32.78	-13.00	-19.78	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
1398.37	-34.46	8.17	9.34	-35.63	-13.00	-22.63	H
2097.24	-35.36	9.53	10.42	-36.25	-13.00	-23.25	H
2796.44	-32.57	11.27	11.12	-32.42	-13.00	-19.42	H
1398.37	-35.25	8.17	9.34	-36.42	-13.00	-23.42	V
2097.24	-34.89	9.53	10.42	-35.78	-13.00	-22.78	V
2796.44	-33.19	11.27	11.12	-33.04	-13.00	-20.04	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
1415.05	-34.08	8.17	9.34	-35.25	-13.00	-22.25	H
2122.61	-34.60	9.53	10.42	-35.49	-13.00	-22.49	H
2829.89	-32.92	11.27	11.12	-32.77	-13.00	-19.77	H
1415.05	-35.86	8.17	9.34	-37.03	-13.00	-24.03	V
2122.61	-34.36	9.53	10.42	-35.25	-13.00	-22.25	V
2829.89	-33.06	11.27	11.12	-32.91	-13.00	-19.91	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
1431.69	-33.98	8.17	9.34	-35.15	-13.00	-22.15	H
2147.81	-34.68	9.53	10.42	-35.57	-13.00	-22.57	H
2863.40	-32.98	11.27	11.12	-32.83	-13.00	-19.83	H
1431.69	-35.66	8.17	9.34	-36.83	-13.00	-23.83	V
2147.81	-33.79	9.53	10.42	-34.68	-13.00	-21.68	V
2863.40	-31.77	11.27	11.12	-31.62	-13.00	-18.62	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	-34.93	8.17	9.34	-36.10	-13.00	-23.10	H
2097.26	-34.83	9.53	10.42	-35.72	-13.00	-22.72	H
2796.35	-32.58	11.27	11.12	-32.43	-13.00	-19.43	H
1398.12	-34.78	8.17	9.34	-35.95	-13.00	-22.95	V
2097.26	-34.28	9.53	10.42	-35.17	-13.00	-22.17	V
2796.35	-31.75	11.27	11.12	-31.60	-13.00	-18.60	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
1415.11	-34.71	8.17	9.34	-35.88	-13.00	-22.88	H
2122.45	-35.42	9.53	10.42	-36.31	-13.00	-23.31	H
2829.70	-33.26	11.27	11.12	-33.11	-13.00	-20.11	H
1415.11	-34.58	8.17	9.34	-35.75	-13.00	-22.75	V
2122.45	-34.67	9.53	10.42	-35.56	-13.00	-22.56	V
2829.70	-32.47	11.27	11.12	-32.32	-13.00	-19.32	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
1431.66	-34.14	8.17	9.34	-35.31	-13.00	-22.31	H
2147.78	-34.80	9.53	10.42	-35.69	-13.00	-22.69	H
2863.56	-32.80	11.27	11.12	-32.65	-13.00	-19.65	H
1431.66	-35.71	8.17	9.34	-36.88	-13.00	-23.88	V
2147.78	-33.78	9.53	10.42	-34.67	-13.00	-21.67	V
2863.56	-31.84	11.27	11.12	-31.69	-13.00	-18.69	V

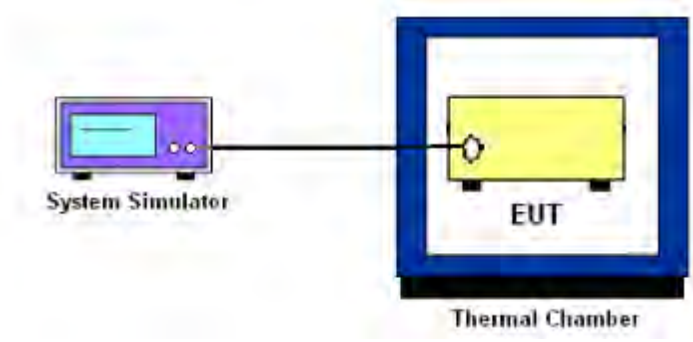
9. FREQUENCY STABILITY

9.1 DESCRIPTION OF FREQUENCY STABILITY MEASUREMENT

9.1.1 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.

9.1.2 TEST SETUP



9.1.3 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.

9.1.4 TEST PROCEDURES FOR VOLTAGE VARIATION

1. The testing follows FCC KDB 971168 D01v01r03 Section 9.

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.

9.1.5 TEST RESULTS

NB-IoT Band 2 (QPSK) / 1880MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	20.16	0.011	2.5ppm	PASS
40		24.92	0.013		
30		19.22	0.010		
20		24.57	0.013		
10		31.18	0.017		
0		36.44	0.019		
-10		21.54	0.011		
-20		12.06	0.006		
-30		35.71	0.019		
20	Maximum Voltage	29.63	0.016		
20	BEP	16.80	0.009		

NB-IoT Band 2 (QPSK) / 1880MHz /15KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	21.53	0.011	2.5ppm	PASS
40		33.82	0.018		
30		24.60	0.013		
20		27.49	0.015		
10		24.80	0.013		
0		29.16	0.016		
-10		35.68	0.019		
-20		19.63	0.010		
-30		14.26	0.008		
20	Maximum Voltage	19.12	0.010		
20	BEP	28.95	0.015		

NB-IoT Band 4 (QPSK) / 1732.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	26.67	0.014	2.5ppm	PASS
40		33.87	0.018		
30		19.00	0.010		
20		32.91	0.018		
10		29.91	0.016		
0		13.70	0.007		
-10		25.05	0.013		
-20		31.30	0.017		
-30		36.48	0.019		
20	Maximum Voltage	29.17	0.016		
20	BEP	29.07	0.015		

NB-IoT Band 4 (QPSK) / 1732.5MHz /15KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	34.85	0.019	2.5ppm	PASS
40		36.17	0.019		
30		31.72	0.017		
20		31.51	0.017		
10		25.20	0.013		
0		18.78	0.010		
-10		11.63	0.006		
-20		28.99	0.015		
-30		25.38	0.014		
20	Maximum Voltage	22.85	0.012		
20	BEP	15.30	0.008		

NB-IoT Band 12 (QPSK) / 707.5MHz / 3.75KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	32.18	0.017	2.5ppm	PASS
40		12.25	0.007		
30		15.37	0.008		
20		17.13	0.009		
10		17.79	0.009		
0		32.82	0.017		
-10		20.60	0.011		
-20		29.41	0.016		
-30		16.60	0.009		
20	Maximum Voltage	25.09	0.013		
20	BEP	30.38	0.016		

NB-IoT Band 12 (QPSK) / 707.5MHz /15KHz/1@0					
Temperature (°C)	Voltage (Volt)	Freq. Dev. (Hz)	Freq. Dev. (ppm)	Limit	Result
50	Normal Voltage	21.54	0.011	2.5ppm	PASS
40		16.37	0.009		
30		26.44	0.014		
20		22.49	0.012		
10		26.87	0.014		
0		25.12	0.013		
-10		31.72	0.017		
-20		32.10	0.017		
-30		17.60	0.009		
20	Maximum Voltage	35.83	0.019		
20	BEP	17.18	0.009		

APPENDIX-PHOTOS OF TEST SETUP

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

※※※※※END OF THE REPORT※※※※※