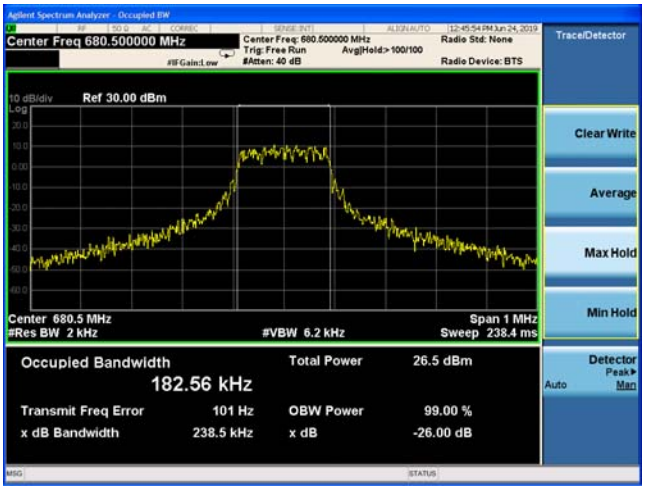
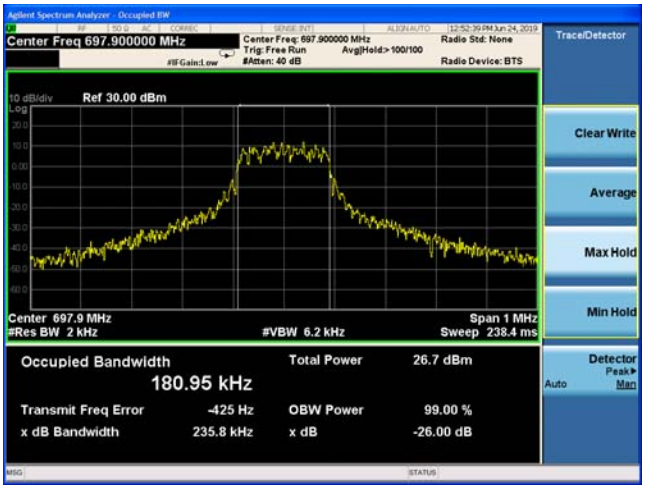
NB-IOT Band 71 QPSK 15KHz 12@0 CH-Low

NB-IOT Band 71 QPSK 15KHz 12@0 CH-Middle



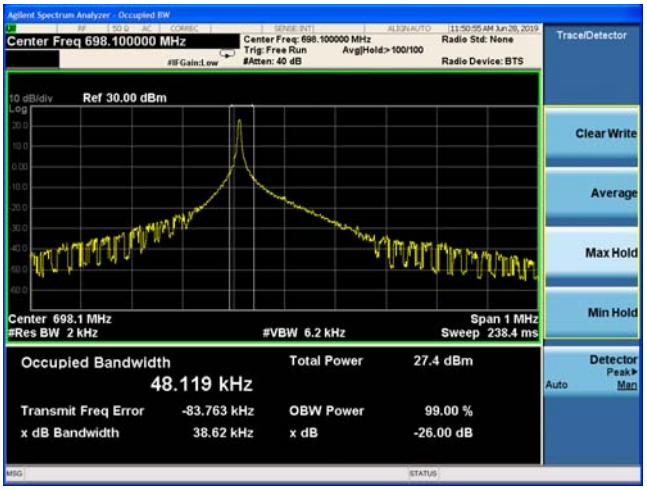

NB-IOT Band 71 QPSK 15KHz 12@0 CH-High





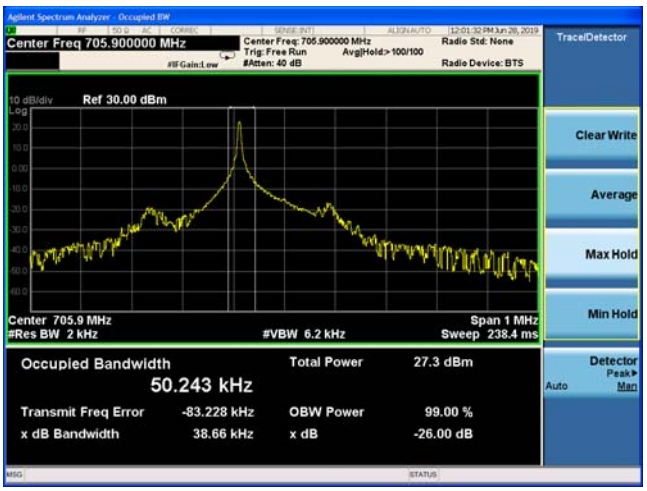
*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 85 BPSK 3.75KHz 1@0 CH-Low

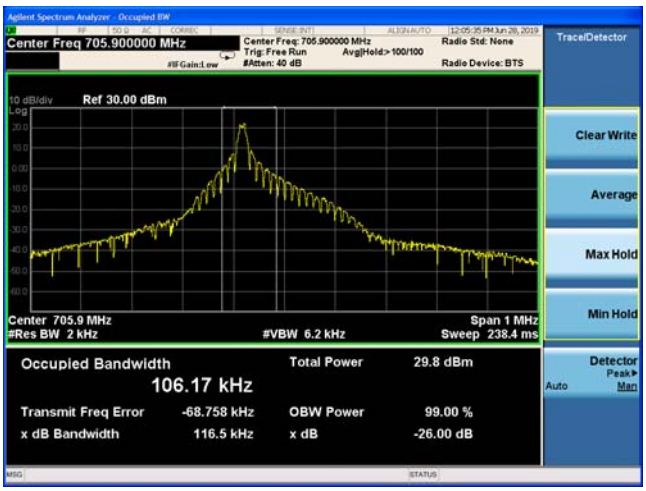



NB-IOT Band 85 BPSK 15KHz 1@0 CH-Low

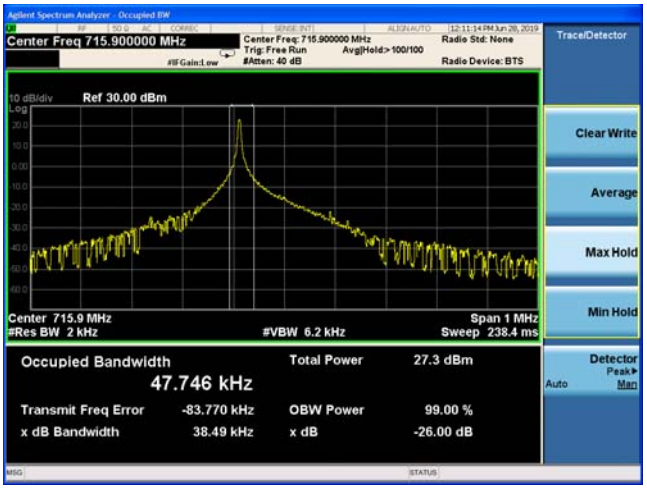
NB-IOT Band 85 BPSK 3.75KHz 1@0 CH-Middle




NB-IOT Band 85 BPSK 15KHz 1@0 CH-Middle



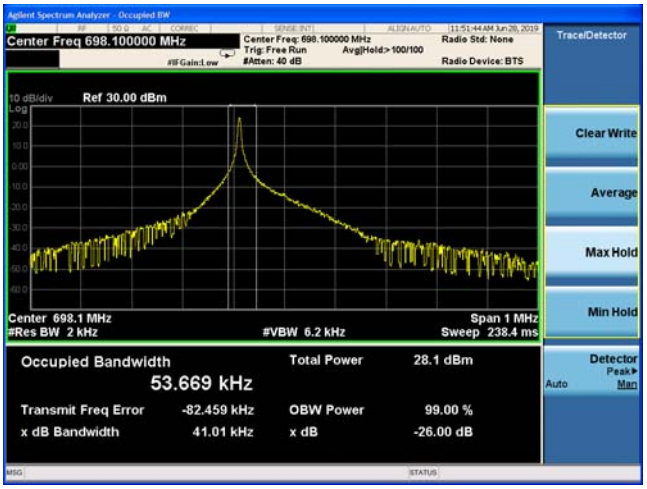

NB-IOT Band 85 BPSK 3.75KHz 1@0 CH-High




NB-IOT Band 85 BPSK 15KHz 1@0 CH-High

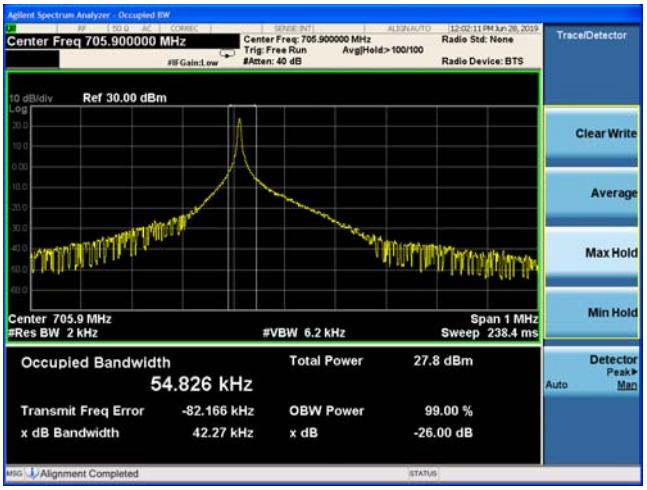
*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 85 QPSK 3.75KHz 1@0 CH-Low



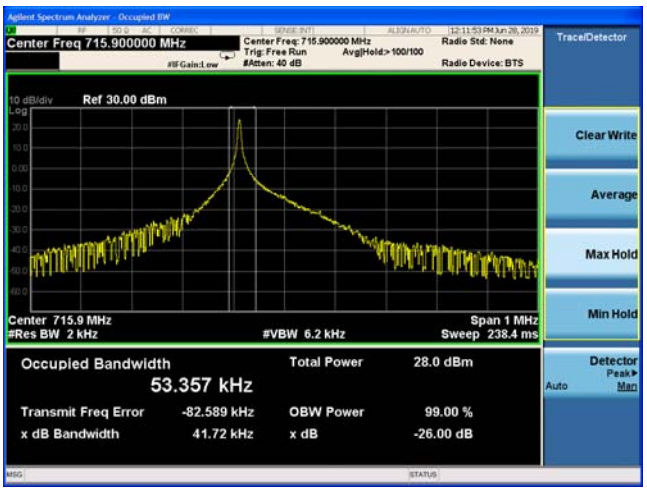

NB-IOT Band 85 QPSK 15KHz 1@0 CH-Low

NB-IOT Band 85 QPSK 3.75KHz 1@0 CH-Middle




NB-IOT Band 85 QPSK 15KHz 1@0 CH-Middle

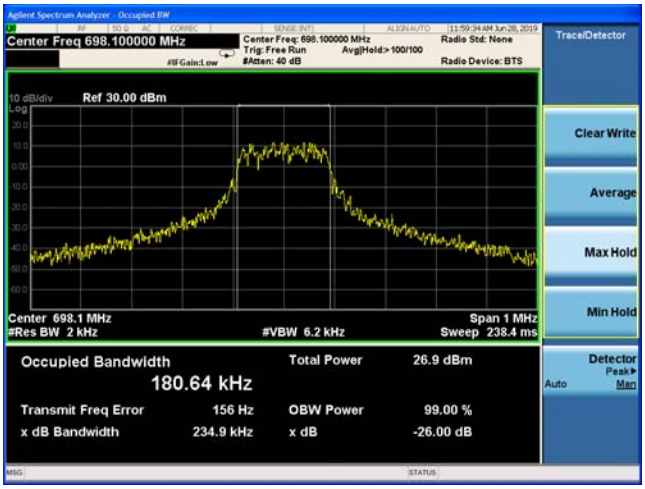
NB-IOT Band 85 QPSK 3.75KHz 1@0 CH-High



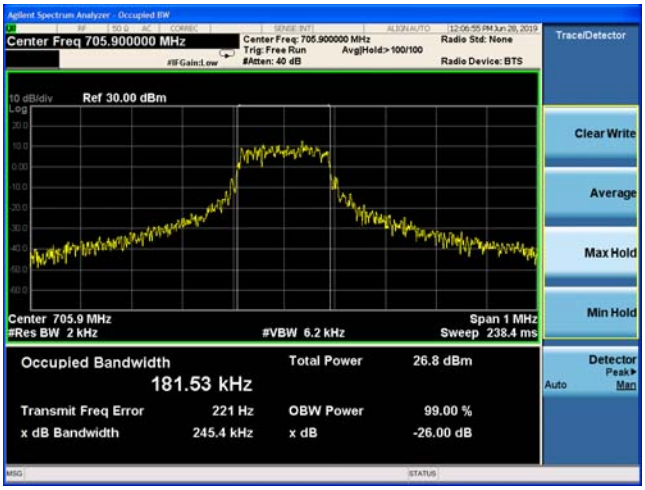

NB-IOT Band 85 QPSK 15KHz 1@0 CH-High

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

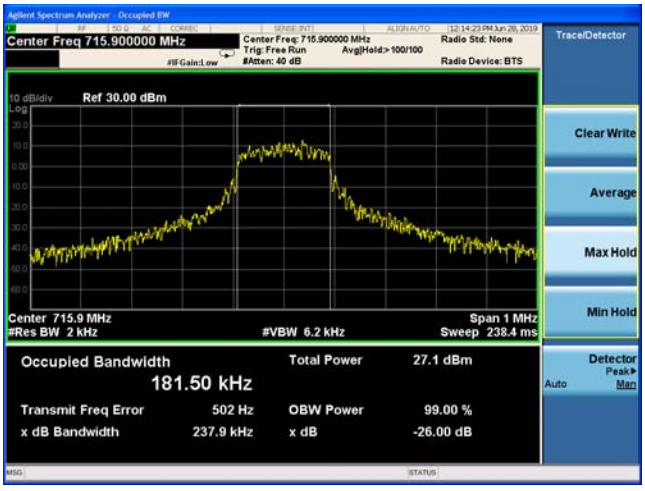
NB-IOT Band 85 QPSK 15KHz 12@0 CH-Low




NB-IOT Band 85 QPSK 15KHz 12@0 CH-Middle




NB-IOT Band 85 QPSK 15KHz 12@0 CH-High





*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## 5.4 Band Edge Compliance

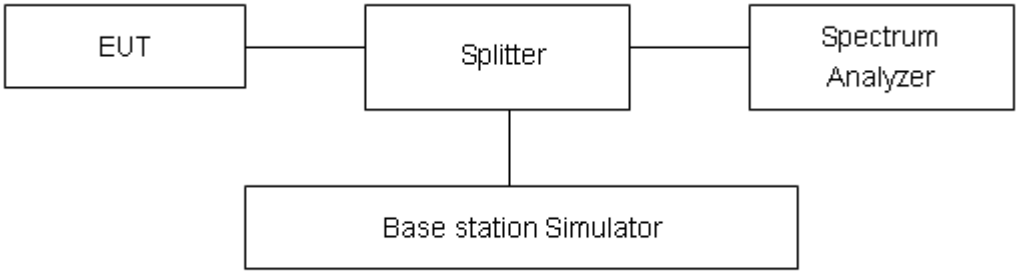
**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

**Method of Measurement**

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.
The testing follows KDB 971168 D01 v03r01 Section 6.0
The EUT was connected to spectrum analyzer and system simulator via a power divider.
The band edges of low and high channels for the highest RF powers were measured.
RBW is set to 51Hz, VBW is set to160Hz for 3.75KHz full carrier,
RBW is set to 200Hz, VBW is set to 620Hz for 15KHz full carrier,
Set spectrum analyzer with RMS detector.
The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Checked that all the results comply with the emission limit line.

**Test Setup**




**Limits**

Rule Part 27.53(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz.

Rule Part 27.53(h) specifies that " for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$ (P) dB"

Rule Part 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. 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.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Rule Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;
(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

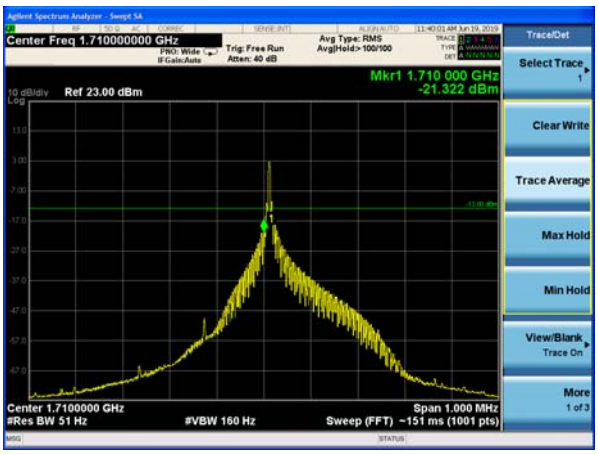
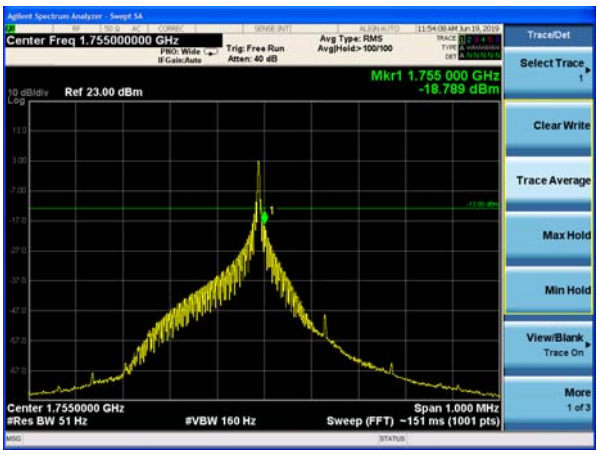
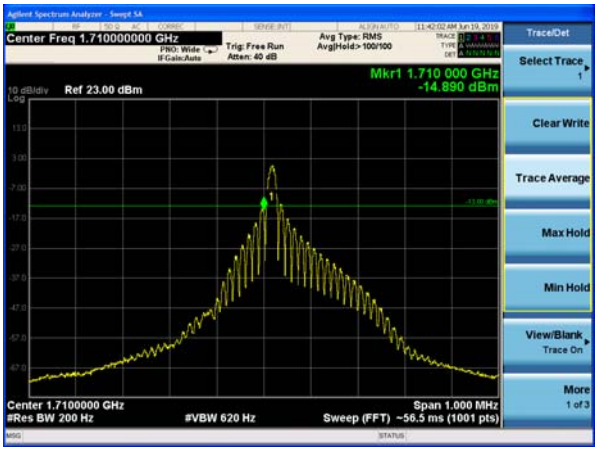
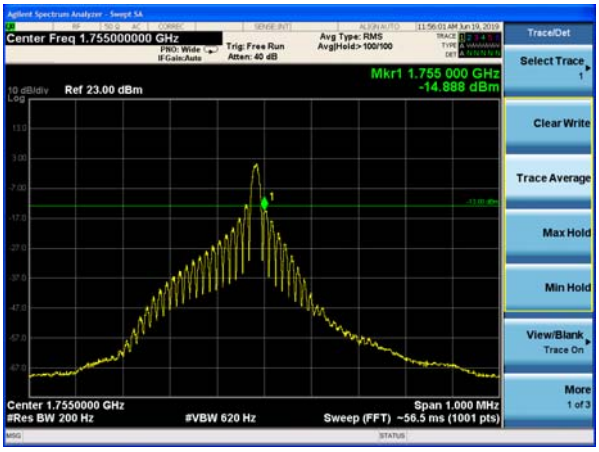
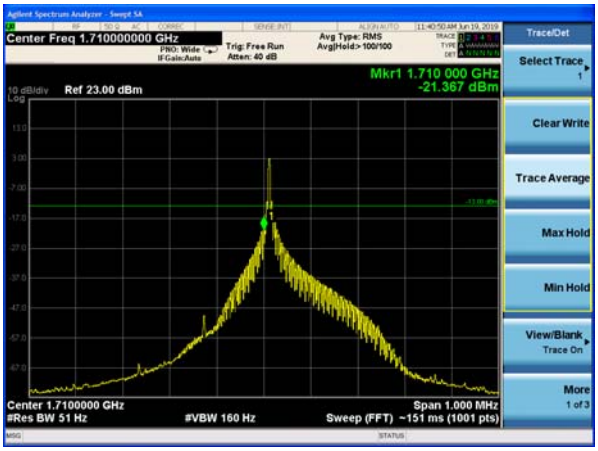
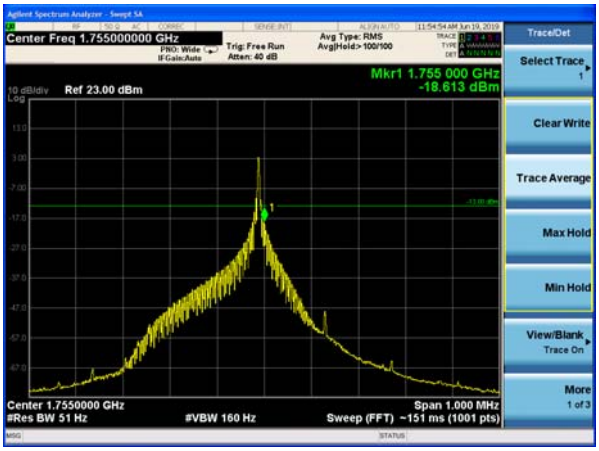
**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k$ = 1.96, $U$=0.684dB.


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

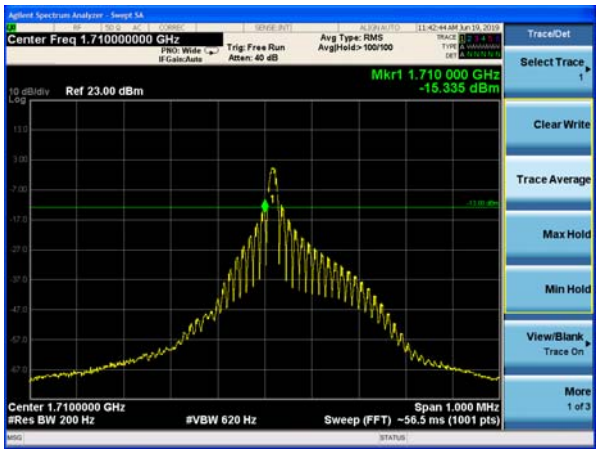
**Test Result**

All the test traces in the plots shows the test results clearly.

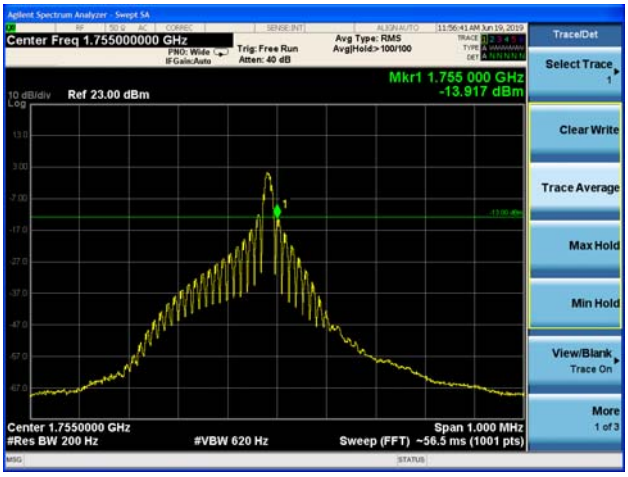
| | |
|---|---|
| NB-IOT Band 4 BPSK 3.75kHz 1@0 CH-Low | NB-IOT Band 4 BPSK 3.75kHz 1@47 CH-High |
|  |  |
| NB-IOT Band 4 BPSK 15kHz 1@0 CH-Low | NB-IOT Band 4 BPSK 15kHz 1@11 CH-High |
|  |  |
| NB-IOT Band 4 QPSK 3.75kHz 1@0 CH-Low | NB-IOT Band 4 QPSK 3.75kHz 1@47 CH-High |
|  |  |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

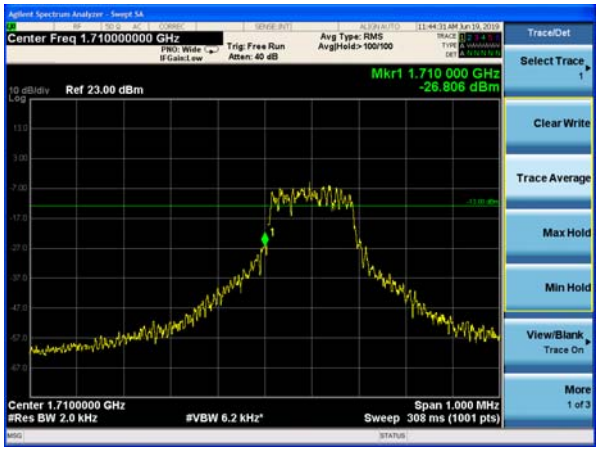
NB-IOT Band 4 QPSK 15kHz 1@0 CH-Low



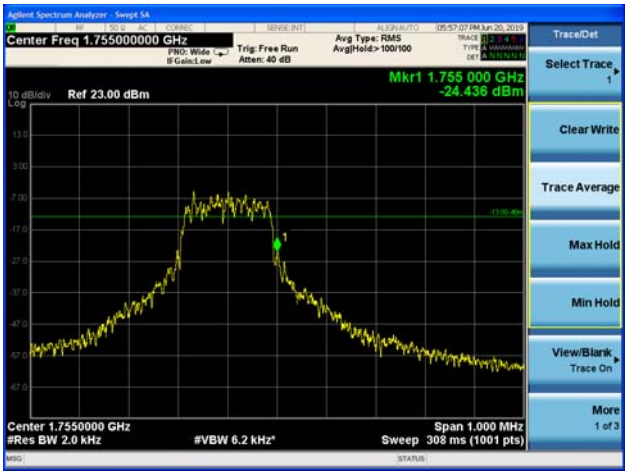

NB-IOT Band 4 QPSK 15kHz 1@11 CH-High




NB-IOT Band 4 QPSK 15kHz 12@0 CH-Low



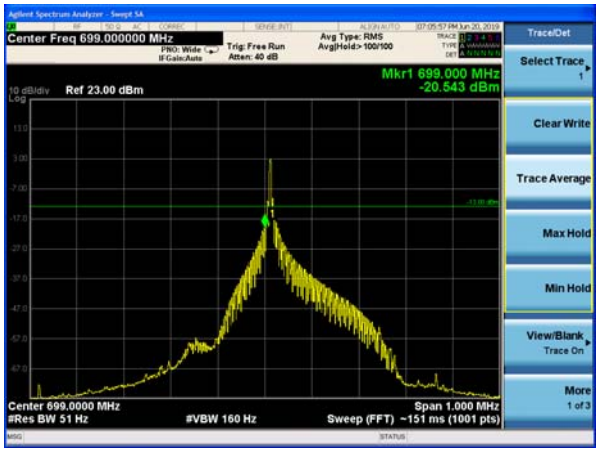

NB-IOT Band 4 QPSK 15kHz 12@0 CH-High



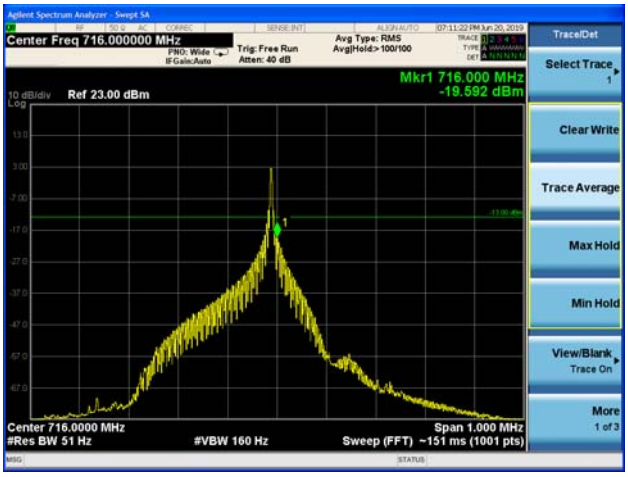


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

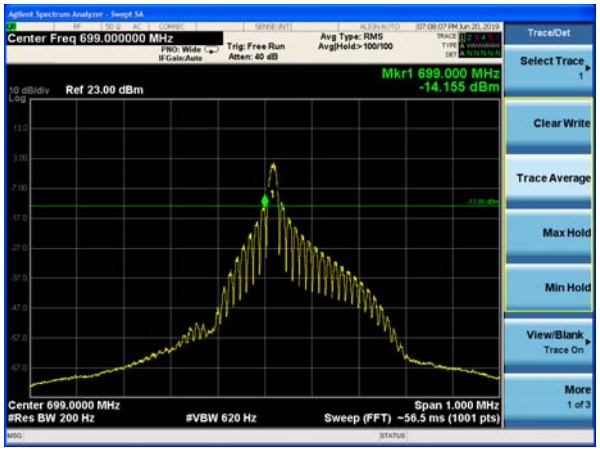
NB-IOT Band 12 BPSK 3.75kHz 1@0 CH-Low



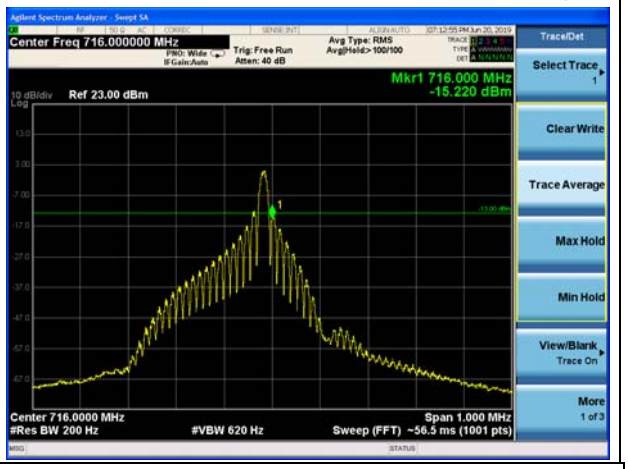

NB-IOT Band 12 BPSK 3.75kHz 1@47 CH-High



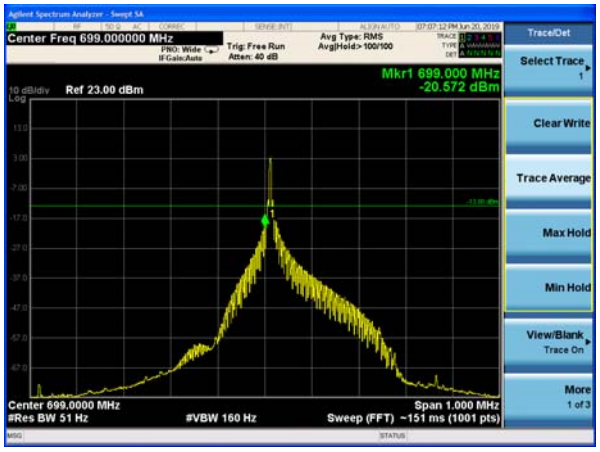

NB-IOT Band 12 BPSK 15kHz 1@0 CH-Low



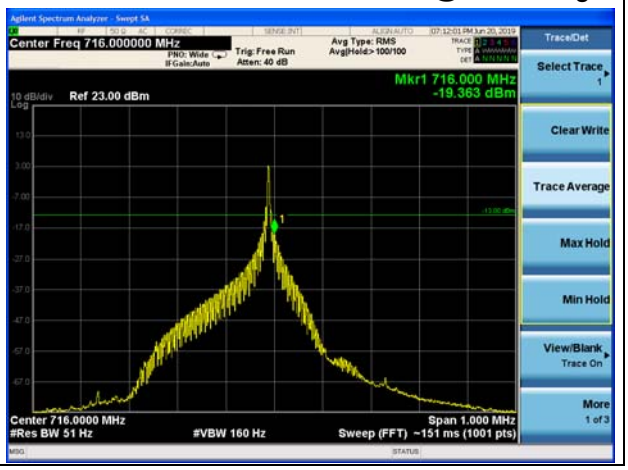

NB-IOT Band 12 BPSK 15kHz 1@11 CH-High




NB-IOT Band 12 QPSK 3.75kHz 1@0 CH-Low



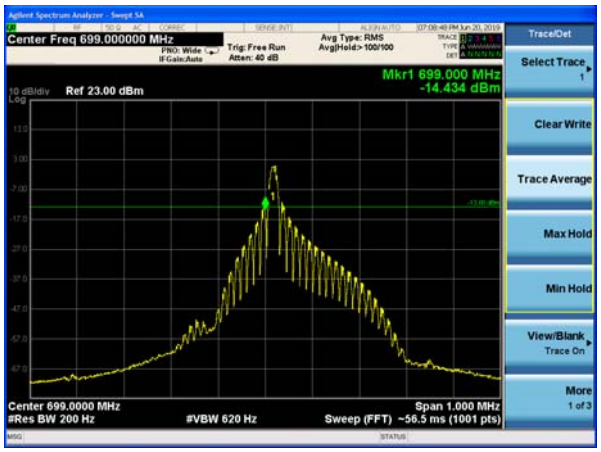

NB-IOT Band 12 QPSK 3.75kHz 1@47 CH-High



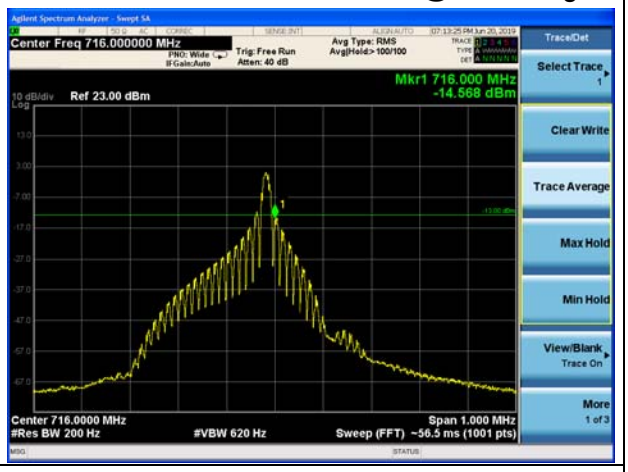


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

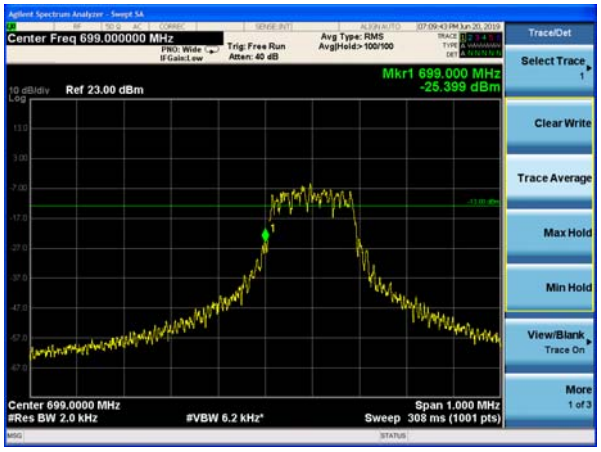
NB-IOT Band 12 QPSK 15kHz 1@0 CH-Low




NB-IOT Band 12 QPSK 15kHz 1@11 CH-High



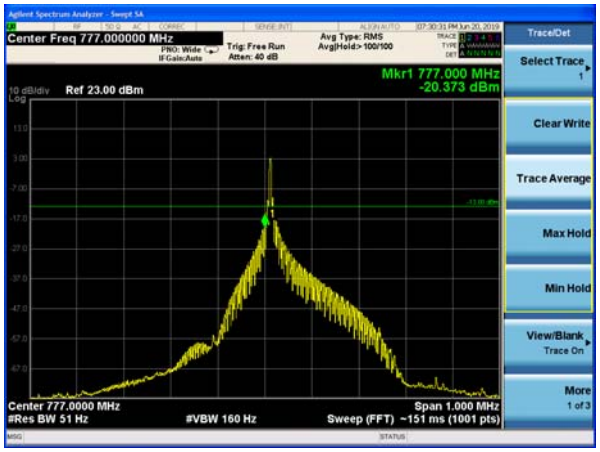

NB-IOT Band 12 QPSK 15kHz 12@0 CH-Low



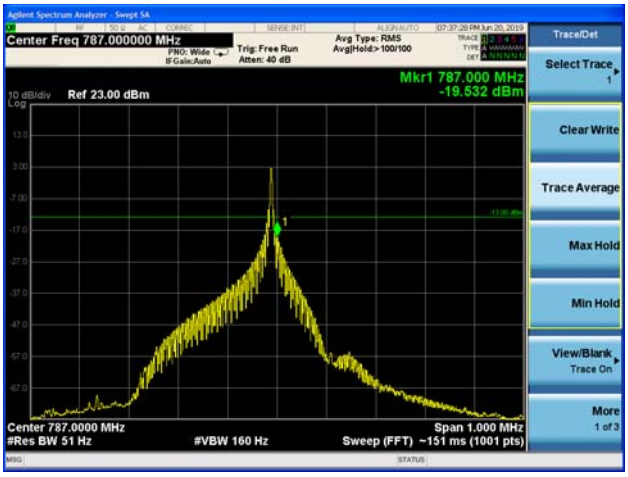

NB-IOT Band 12 QPSK 15kHz 12@0 CH-High

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

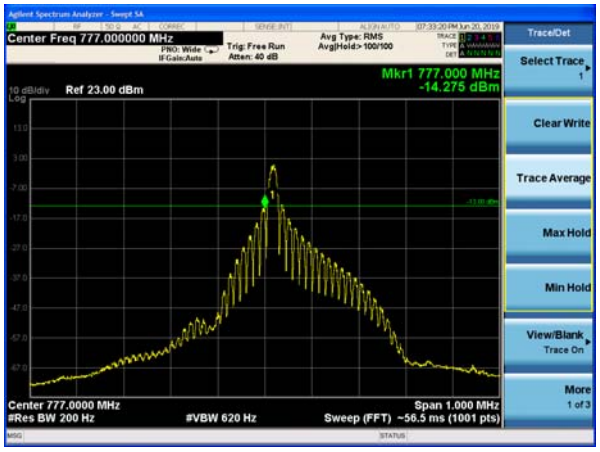
NB-IOT Band 13 BPSK 3.75kHz 1@0 CH-Low



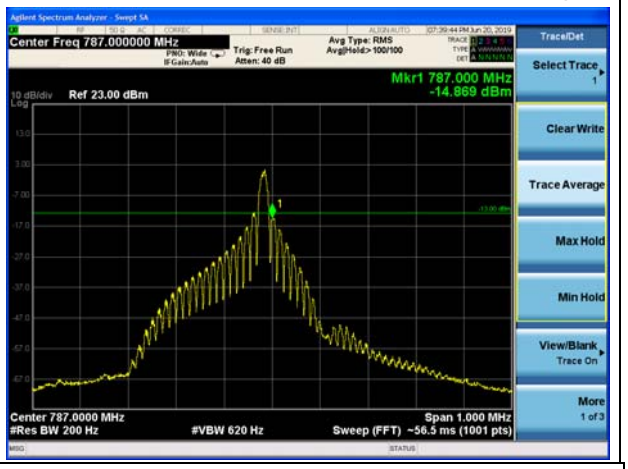

NB-IOT Band 13 BPSK 3.75kHz 1@47 CH-High



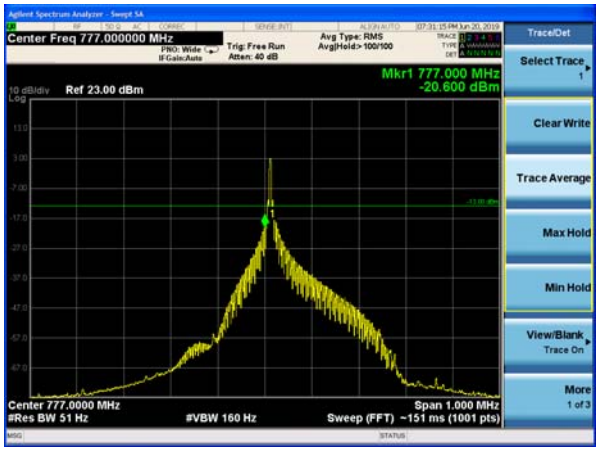

NB-IOT Band 13 BPSK 15kHz 1@0 CH-Low



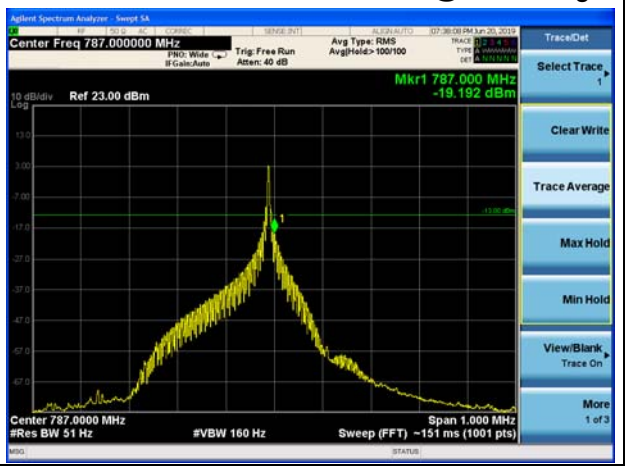

NB-IOT Band 13 BPSK 15kHz 1@11 CH-High




NB-IOT Band 13 QPSK 3.75kHz 1@0 CH-Low



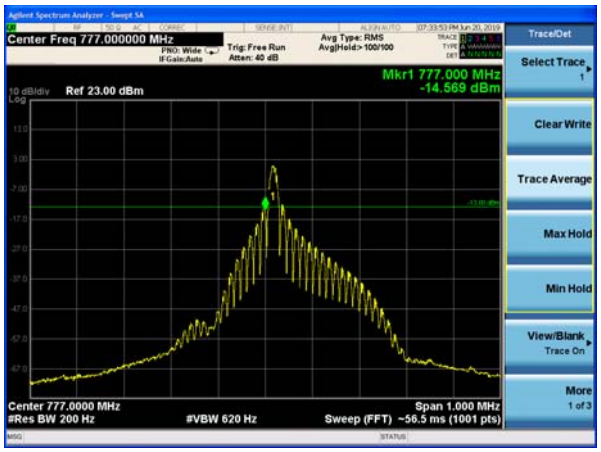

NB-IOT Band 13 QPSK 3.75kHz 1@47 CH-High





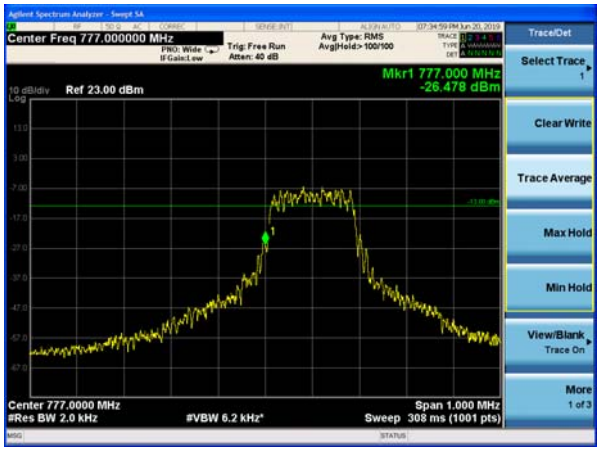
*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 13 QPSK 15kHz 1@0 CH-Low




NB-IOT Band 13 QPSK 15kHz 1@11 CH-High

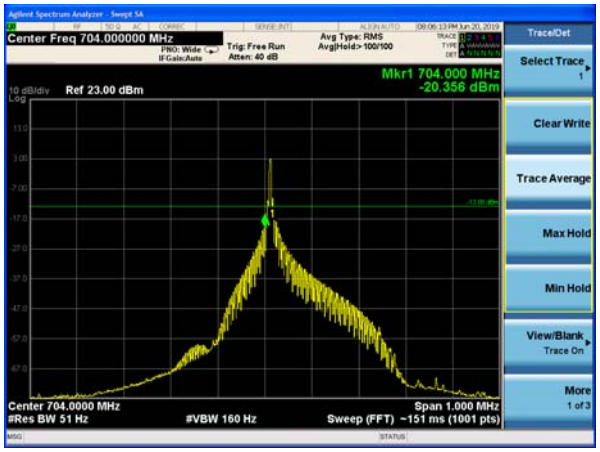
NB-IOT Band 13 QPSK 15kHz 12@0 CH-Low



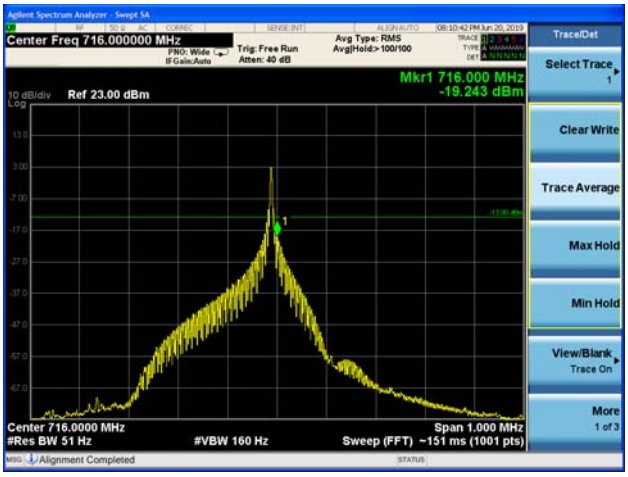

NB-IOT Band 13 QPSK 15kHz 12@0 CH-High

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

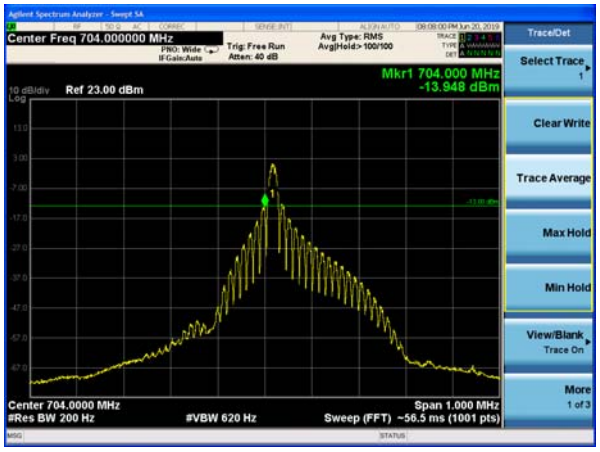
NB-IOT Band 17 BPSK 3.75kHz 1@0 CH-Low




NB-IOT Band 17 BPSK 3.75kHz 1@47 CH-High

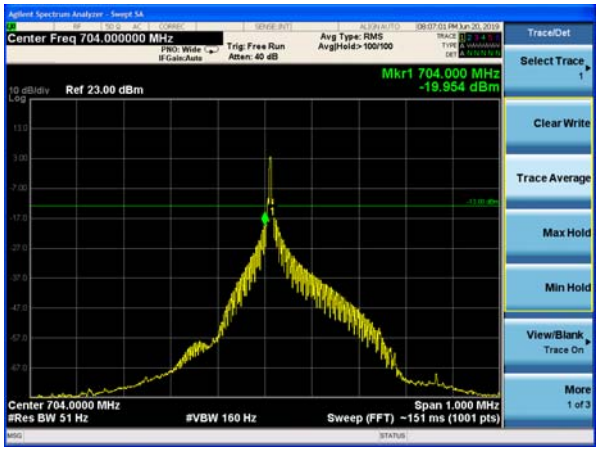



NB-IOT Band 17 BPSK 15kHz 1@0 CH-Low

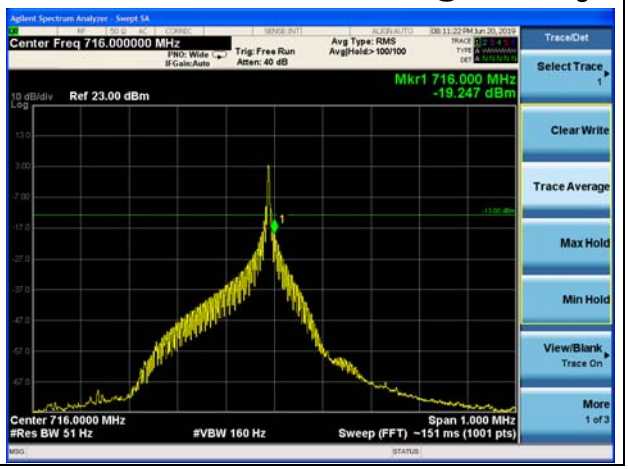



NB-IOT Band 17 BPSK 15kHz 1@11 CH-High

NB-IOT Band 17 QPSK 3.75kHz 1@0 CH-Low



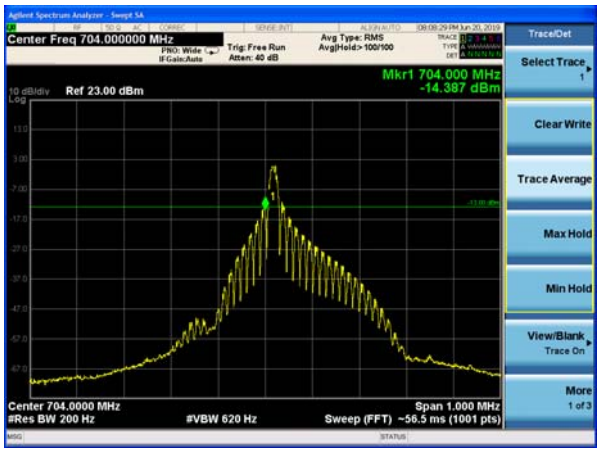

NB-IOT Band 17 QPSK 3.75kHz 1@47 CH-High





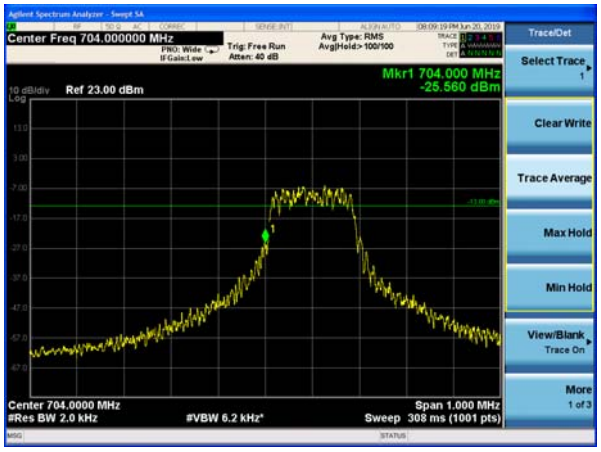
*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 17 QPSK 15kHz 1@0 CH-Low




NB-IOT Band 17 QPSK 15kHz 1@11 CH-High

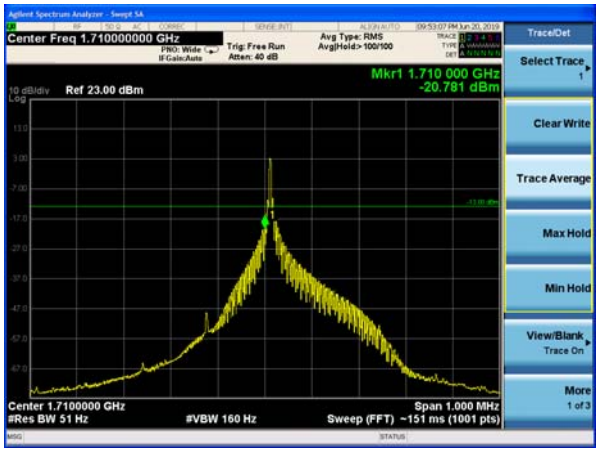
NB-IOT Band 17 QPSK 15kHz 12@0 CH-Low



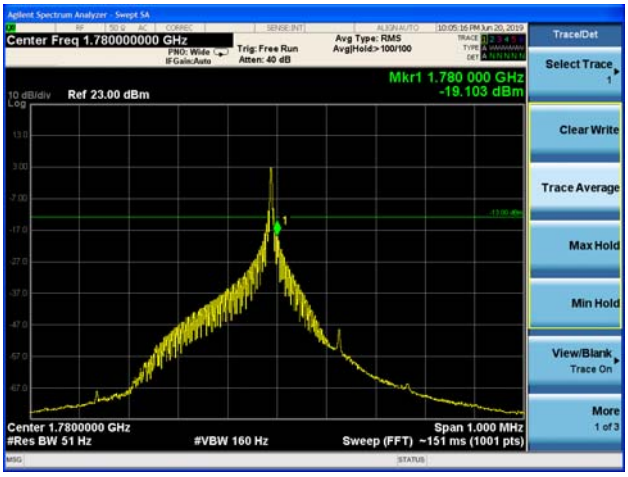

NB-IOT Band 17 QPSK 15kHz 12@0 CH-High

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

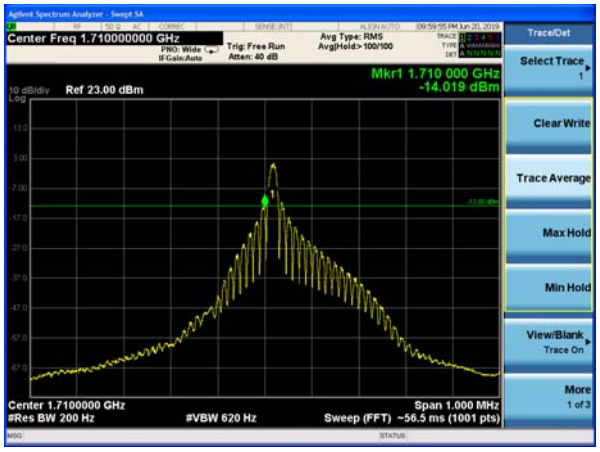
NB-IOT Band 66 BPSK 3.75kHz 1@0 CH-Low



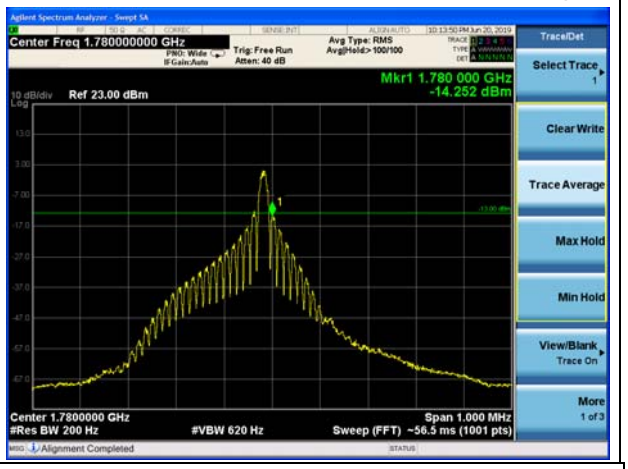

NB-IOT Band 66 BPSK 3.75kHz 1@47 CH-High



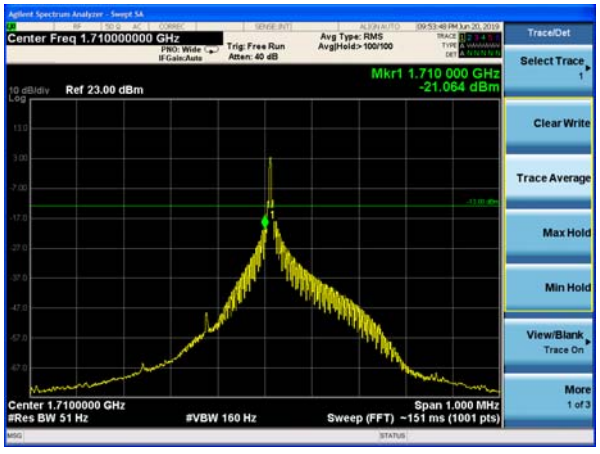

NB-IOT Band 66 BPSK 15kHz 1@0 CH-Low



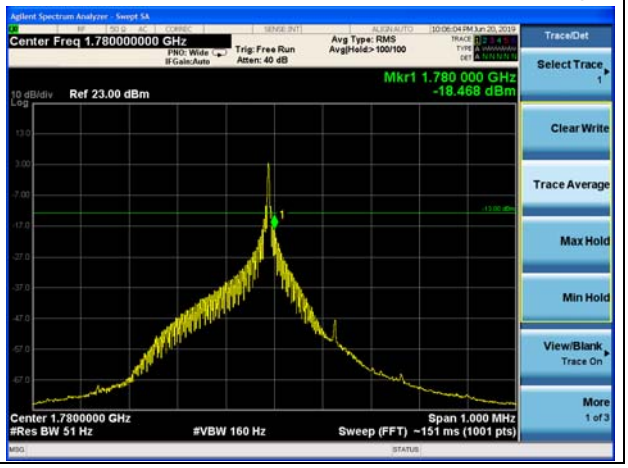

NB-IOT Band 66 BPSK 15kHz 1@11 CH-High




NB-IOT Band 66 QPSK 3.75kHz 1@0 CH-Low



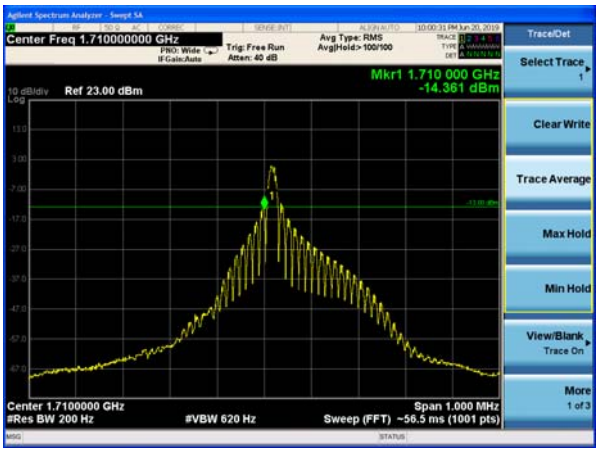

NB-IOT Band 66 QPSK 3.75kHz 1@47 CH-High



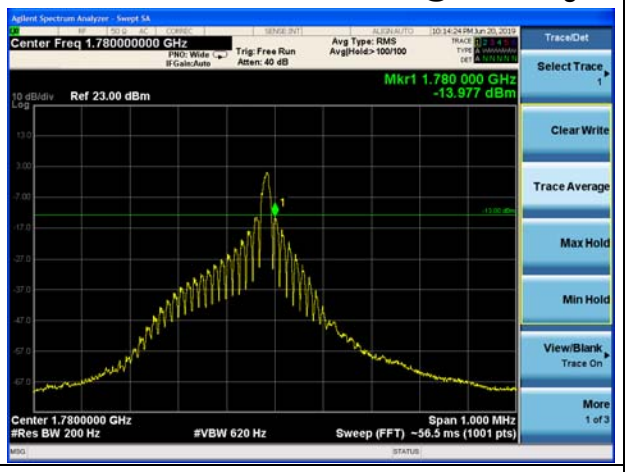


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

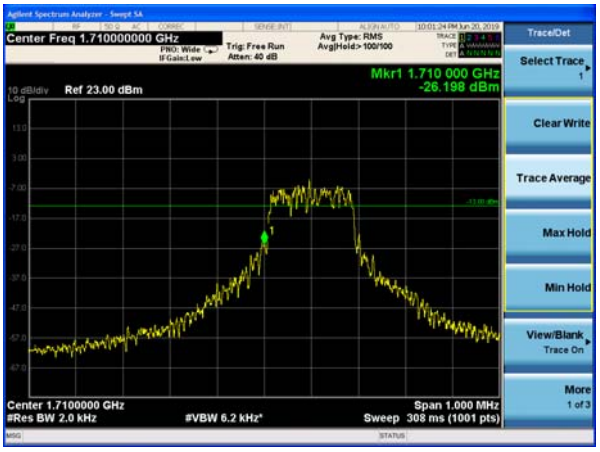
NB-IOT Band 66 QPSK 15kHz 1@0 CH-Low



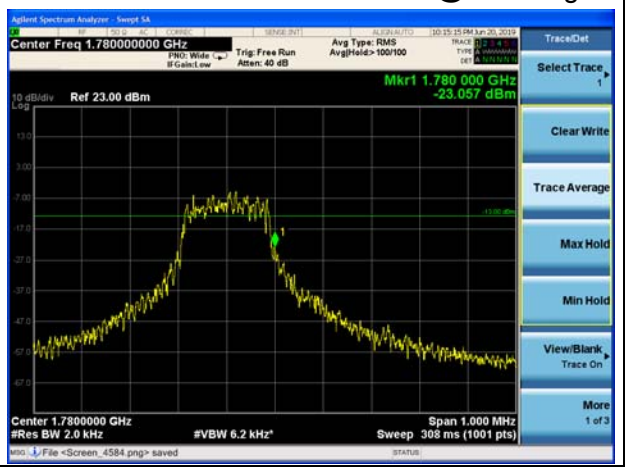

NB-IOT Band 66 QPSK 15kHz 1@11 CH-High




NB-IOT Band 66 QPSK 15kHz 12@0 CH-Low



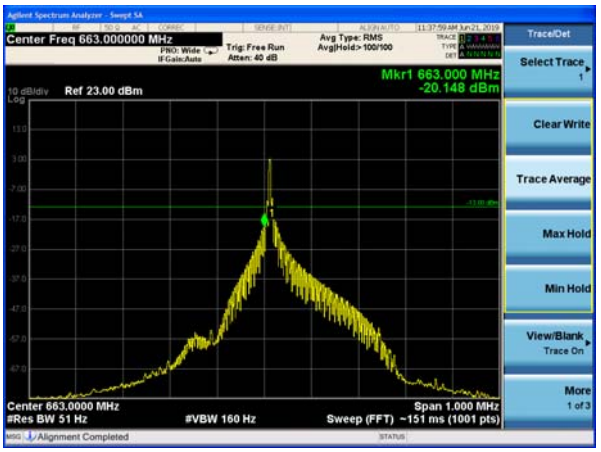

NB-IOT Band 66 QPSK 15kHz 12@0 CH-High



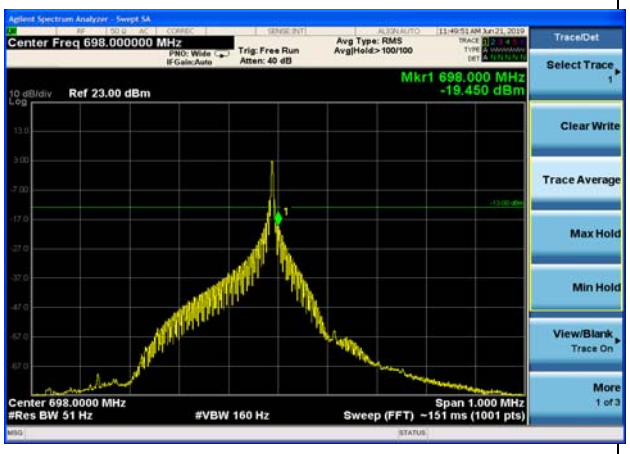


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

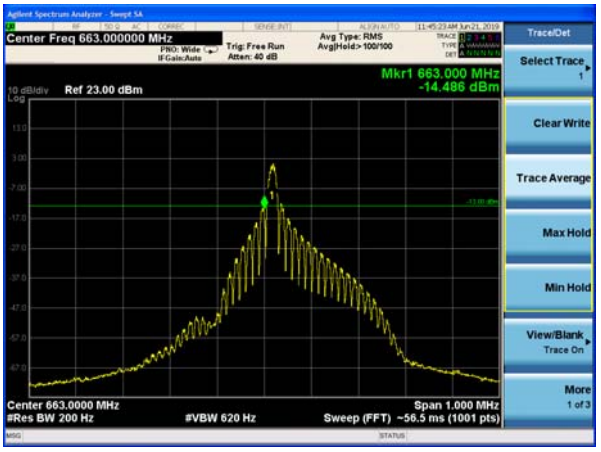
NB-IOT Band 71 BPSK 3.75kHz 1@0 CH-Low



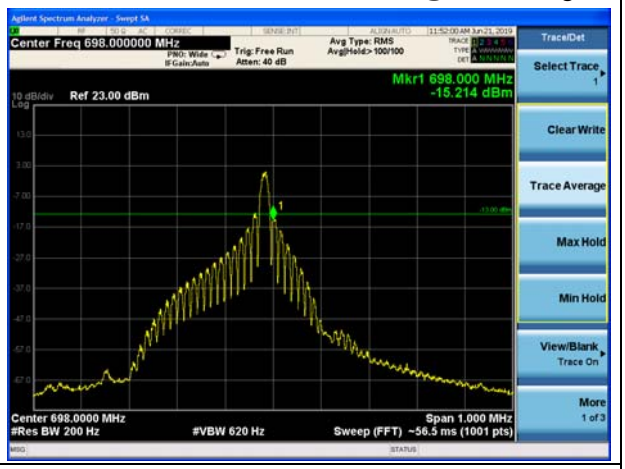

NB-IOT Band 71 BPSK 3.75kHz 1@47 CH-High



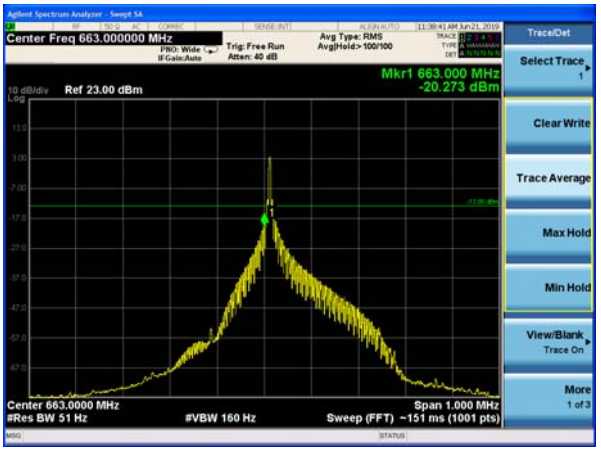

NB-IOT Band 71 BPSK 15kHz 1@0 CH-Low



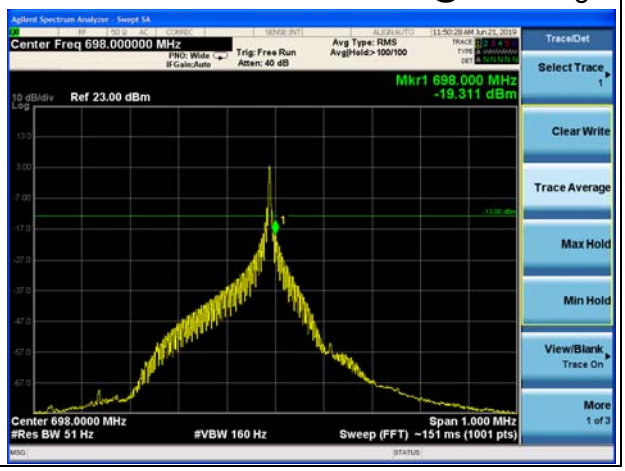

NB-IOT Band 71 BPSK 15kHz 1@11 CH-High




NB-IOT Band 71 QPSK 3.75kHz 1@0 CH-Low



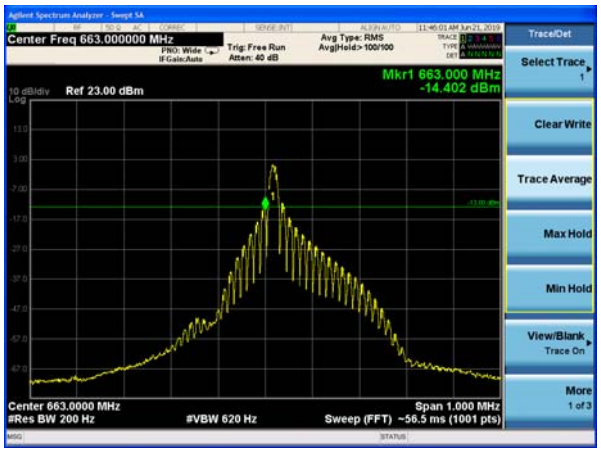

NB-IOT Band 71 QPSK 3.75kHz 1@47 CH-High



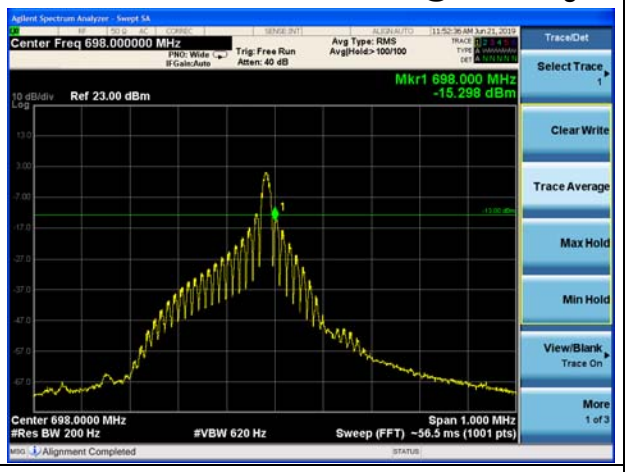


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

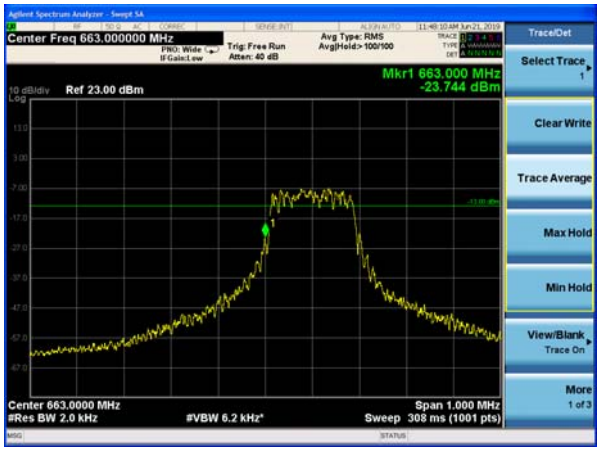
NB-IOT Band 71 QPSK 15kHz 1@0 CH-Low



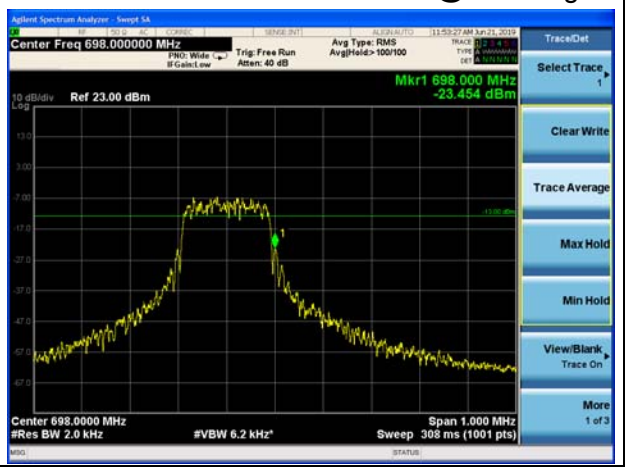

NB-IOT Band 71 QPSK 15kHz 1@11 CH-High




NB-IOT Band 71 QPSK 15kHz 12@0 CH-Low



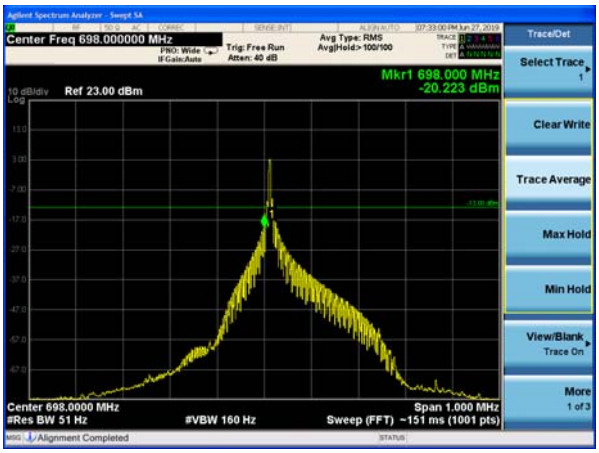

NB-IOT Band 71 QPSK 15kHz 12@0 CH-High



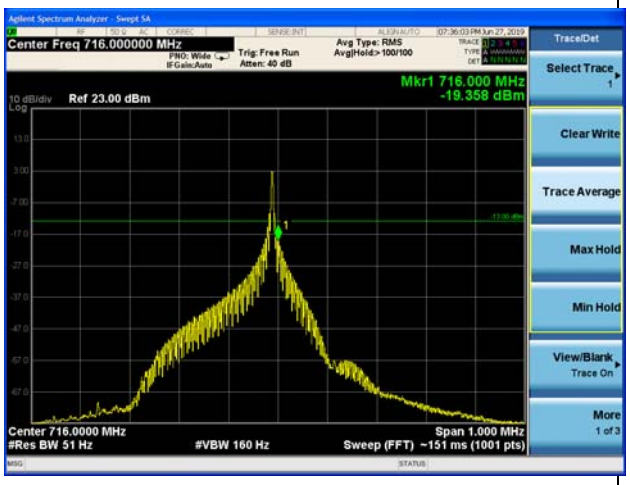


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

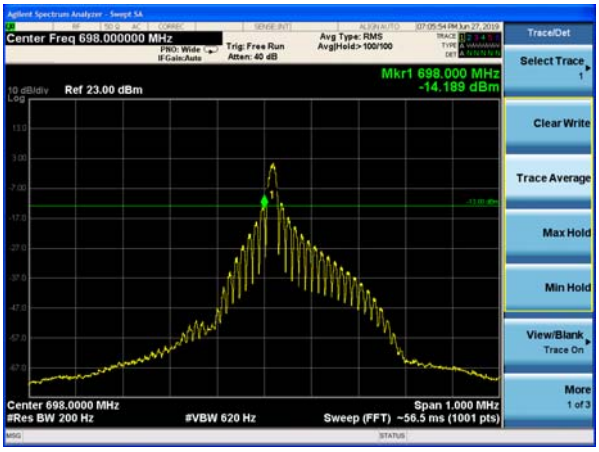
NB-IOT Band 85 BPSK 3.75kHz 1@0 CH-Low




NB-IOT Band 85 BPSK 3.75kHz 1@47 CH-High

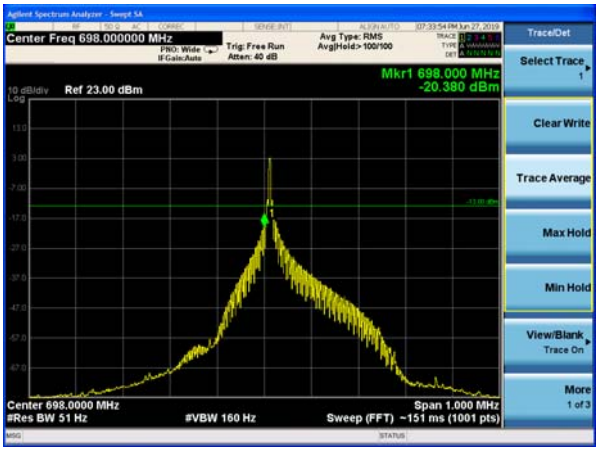



NB-IOT Band 85 BPSK 15kHz 1@0 CH-Low

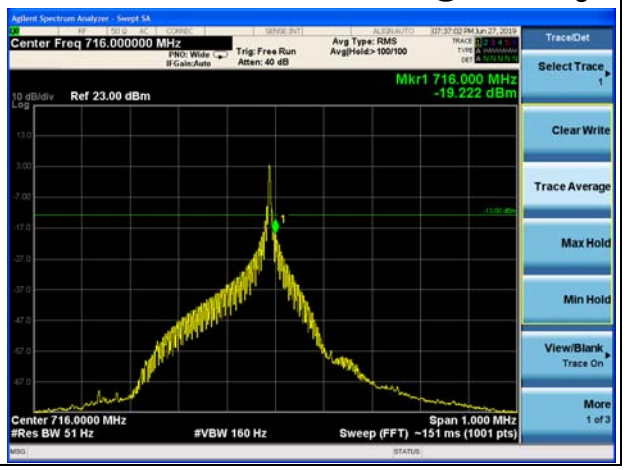



NB-IOT Band 85 BPSK 15kHz 1@11 CH-High

NB-IOT Band 85 QPSK 3.75kHz 1@0 CH-Low



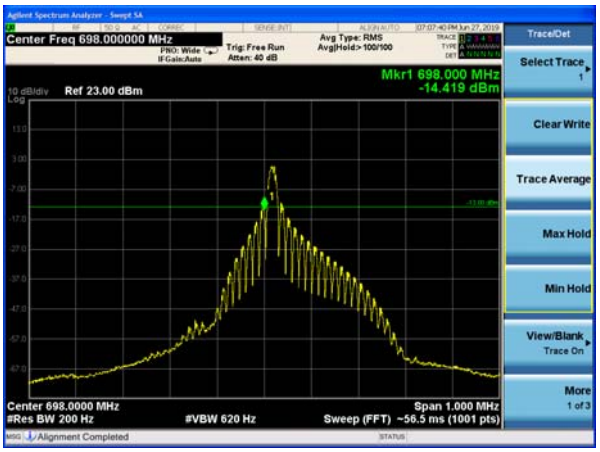

NB-IOT Band 85 QPSK 3.75kHz 1@47 CH-High



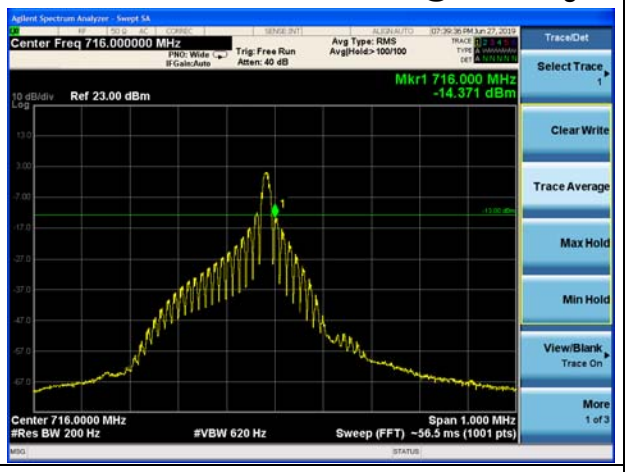


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

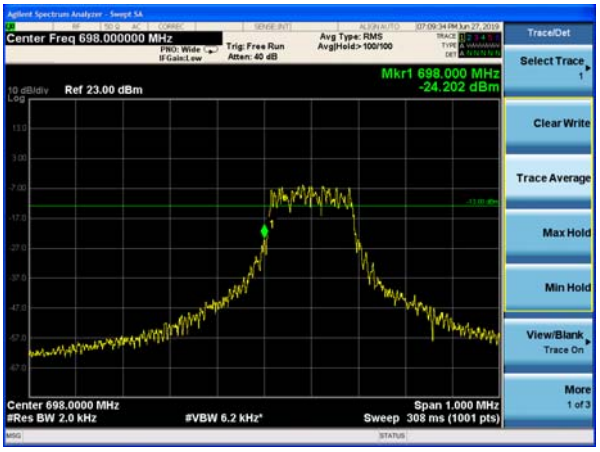
NB-IOT Band 85 QPSK 15kHz 1@0 CH-Low




NB-IOT Band 85 QPSK 15kHz 1@11 CH-High




NB-IOT Band 85 QPSK 15kHz 12@0 CH-Low




NB-IOT Band 85 QPSK 15kHz 12@0 CH-High

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## 5.5 Peak-to-Average Power Ratio (PAPR)

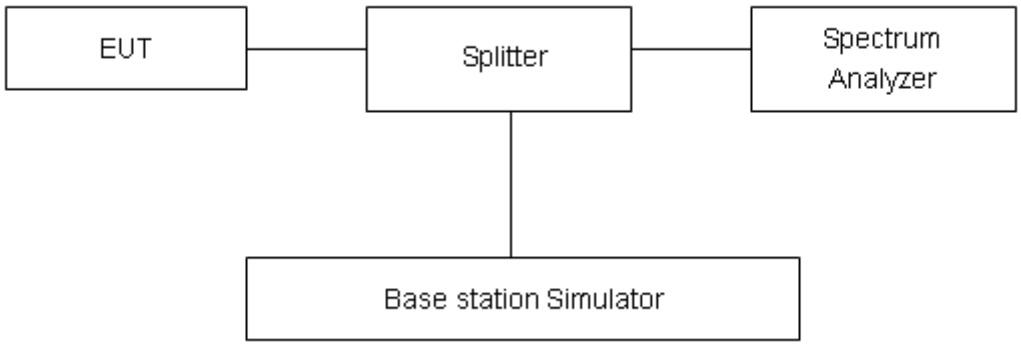
### Ambient condition

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

### Methods of Measurement

Measure the total peak power and record as PPk. And 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).

### Test Setup




### Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for thenormal distribution is with the coverage factor k = 2, U= 0.4 dB.


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

**Test Results**

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 4 Standalone | BPSK | 3.75 | 20175/1732.5 | 23.91 | 21.43 | 2.48 |
| | QPSK | 3.75 | 20175/1732.5 | 24.05 | 21.44 | 2.61 |
| | BPSK | 15 | 20175/1732.5 | 24.00 | 18.48 | 5.52 |
| | QPSK | 15 | 20175/1732.5 | 24.10 | 18.48 | 5.62 |

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 12 Standalone | BPSK | 3.75 | 23095/707.5 | 24.18 | 21.77 | 2.41 |
| | QPSK | 3.75 | 23095/707.5 | 24.33 | 21.67 | 2.66 |
| | BPSK | 15 | 23095/707.5 | 24.17 | 18.69 | 5.48 |
| | QPSK | 15 | 23095/707.5 | 24.37 | 18.72 | 5.65 |

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 13 Standalone | BPSK | 3.75 | 23230/782 | 24.02 | 21.57 | 2.45 |
| | QPSK | 3.75 | 23230/782 | 24.24 | 21.58 | 2.66 |
| | BPSK | 15 | 23230/782 | 24.12 | 18.68 | 5.44 |
| | QPSK | 15 | 23230/782 | 24.35 | 18.68 | 5.67 |

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 17 Standalone | BPSK | 3.75 | 23790/710 | 24.13 | 21.71 | 2.42 |
| | QPSK | 3.75 | 23790/710 | 24.35 | 21.72 | 2.63 |
| | BPSK | 15 | 23790/710 | 24.21 | 18.75 | 5.46 |
| | QPSK | 15 | 23790/710 | 24.43 | 18.77 | 5.66 |

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 66 Standalone | BPSK | 3.75 | 132322/1745 | 24.21 | 21.72 | 2.49 |
| | QPSK | 3.75 | 132322/1745 | 24.36 | 21.73 | 2.63 |
| | BPSK | 15 | 132322/1745 | 24.11 | 18.61 | 5.50 |
| | QPSK | 15 | 132322/1745 | 24.24 | 18.60 | 5.64 |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 71 Standalone | BPSK | 3.75 | 133297/680.5 | 24.07 | 21.68 | 2.39 |
| | QPSK | 3.75 | 133297/680.5 | 24.31 | 21.62 | 2.69 |
| | BPSK | 15 | 133297/680.5 | 24.12 | 18.67 | 5.45 |
| | QPSK | 15 | 133297/680.5 | 24.37 | 18.61 | 5.76 |

| Mode | Modulation | Sub-carrier spacing (KHz) | Channel/ Frequency(MHz) | Peak-to-Average Power Ratio (PAPR) | | |
|---|---|---|---|---|---|---|
| | | | | Peak(dBm) | Avg(dBm) | PAPR(dB) |
| Band 85 Standalone | BPSK | 3.75 | 134081/705.9 | 24.11 | 21.71 | 2.40 |
| | QPSK | 3.75 | 134081/705.9 | 24.34 | 21.69 | 2.65 |
| | BPSK | 15 | 134081/705.9 | 24.21 | 18.76 | 5.45 |
| | QPSK | 15 | 134081/705.9 | 24.45 | 18.75 | 5.70 |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## 5.6 Frequency Stability

**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

**Method of Measurement**

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +85°C in 10°C step size.

(1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.

(2)Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

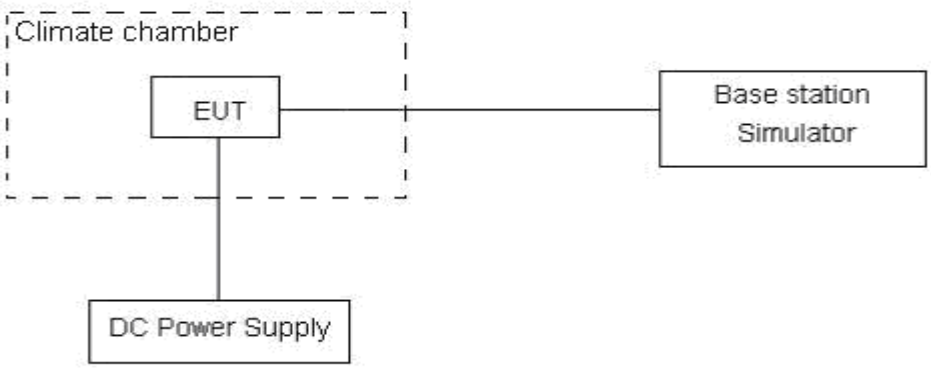
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 2.1 V and 3.6V, with a nominal voltage of 3.3V.

**Test setup**




**Limits**

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor $k$ = 3,$U$=0.01ppm.


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

**Test Result**

| NB-IOT Band 4 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 8.79 | 5.40 | 0.00467 | 0.00287 | PASS |
| Extreme（85℃） | | 12.90 | 7.88 | 0.00686 | 0.00419 | PASS |
| Extreme（80℃） | | 10.75 | 16.59 | 0.00572 | 0.00883 | PASS |
| Extreme（70℃） | | 17.07 | 7.14 | 0.00908 | 0.00380 | PASS |
| Extreme（60℃） | | 9.25 | 15.17 | 0.00492 | 0.00807 | PASS |
| Extreme（50℃） | | 12.26 | 11.28 | 0.00652 | 0.00600 | PASS |
| Extreme（40℃） | | 15.44 | 4.45 | 0.00821 | 0.00236 | PASS |
| Extreme（30℃） | | 13.06 | 8.24 | 0.00695 | 0.00438 | PASS |
| Extreme（20℃） | | 8.29 | 13.45 | 0.00441 | 0.00715 | PASS |
| Extreme（10℃） | | 11.30 | 4.79 | 0.00601 | 0.00255 | PASS |
| Extreme（0℃） | | 15.49 | 3.95 | 0.00824 | 0.00210 | PASS |
| Extreme（-10℃） | | 5.49 | 11.50 | 0.00292 | 0.00612 | PASS |
| Extreme（-20℃） | | 4.80 | 10.34 | 0.00255 | 0.00550 | PASS |
| Extreme（-30℃） | | 13.41 | 8.88 | 0.00713 | 0.00473 | PASS |
| Extreme（-40℃） | | 4.75 | 2.52 | 0.00253 | 0.00134 | PASS |
| 25℃ | LV | 4.34 | 16.58 | 0.00231 | 0.00882 | PASS |
| | HV | 14.33 | 4.93 | 0.00762 | 0.00262 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 5.47 | 9.54 | 0.00291 | 0.00508 | PASS |
| Extreme（85℃） | | 14.65 | 11.48 | 0.00779 | 0.00611 | PASS |
| Extreme（80℃） | | 15.98 | 2.04 | 0.00850 | 0.00109 | PASS |
| Extreme（70℃） | | 17.17 | 14.58 | 0.00914 | 0.00775 | PASS |
| Extreme（60℃） | | 5.87 | 10.25 | 0.00312 | 0.00545 | PASS |
| Extreme（50℃） | | 3.36 | 9.90 | 0.00179 | 0.00527 | PASS |
| Extreme（40℃） | | 11.77 | 3.55 | 0.00626 | 0.00189 | PASS |
| Extreme（30℃） | | 14.18 | 5.03 | 0.00754 | 0.00268 | PASS |
| Extreme（20℃） | | 2.43 | 4.43 | 0.00129 | 0.00235 | PASS |
| Extreme（10℃） | | 12.21 | 11.51 | 0.00649 | 0.00612 | PASS |
| Extreme（0℃） | | 5.23 | 1.08 | 0.00278 | 0.00058 | PASS |
| Extreme（-10℃） | | 17.60 | 13.23 | 0.00936 | 0.00704 | PASS |
| Extreme（-20℃） | | 1.53 | 5.71 | 0.00082 | 0.00304 | PASS |
| Extreme（-30℃） | | 10.46 | 9.09 | 0.00557 | 0.00484 | PASS |
| Extreme（-40℃） | | 13.90 | 11.09 | 0.00739 | 0.00590 | PASS |
| 25℃ | LV | 6.46 | 7.48 | 0.00343 | 0.00398 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| | HV | 11.45 | 2.03 | 0.00609 | 0.00108 | PASS |

| NB-IOT Band 12 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 5.66 | 5.39 | 0.00301 | 0.00287 | PASS |
| Extreme（85℃） | | 10.34 | 14.67 | 0.00550 | 0.00780 | PASS |
| Extreme（80℃） | | 6.15 | 6.18 | 0.00327 | 0.00329 | PASS |
| Extreme（70℃） | | 7.34 | 7.92 | 0.00391 | 0.00422 | PASS |
| Extreme（60℃） | | 15.66 | 2.11 | 0.00833 | 0.00112 | PASS |
| Extreme（50℃） | | 13.61 | 1.76 | 0.00724 | 0.00094 | PASS |
| Extreme（40℃） | | 1.17 | 17.65 | 0.00062 | 0.00939 | PASS |
| Extreme（30℃） | | 4.24 | 16.62 | 0.00225 | 0.00884 | PASS |
| Extreme（20℃） | | 4.32 | 14.18 | 0.00230 | 0.00754 | PASS |
| Extreme（10℃） | | 11.33 | 16.49 | 0.00602 | 0.00877 | PASS |
| Extreme（0℃） | | 9.60 | 3.44 | 0.00511 | 0.00183 | PASS |
| Extreme（-10℃） | | 2.31 | 14.72 | 0.00123 | 0.00783 | PASS |
| Extreme（-20℃） | | 5.62 | 16.60 | 0.00299 | 0.00883 | PASS |
| Extreme（-30℃） | | 7.65 | 16.87 | 0.00407 | 0.00897 | PASS |
| Extreme（-40℃） | | 14.75 | 15.43 | 0.00785 | 0.00821 | PASS |
| 25℃ | LV | 16.02 | 15.48 | 0.00852 | 0.00823 | PASS |
| | HV | 6.28 | 6.09 | 0.00334 | 0.00324 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 6.53 | 17.73 | 0.00347 | 0.00943 | PASS |
| Extreme（85℃） | | 4.79 | 10.90 | 0.00255 | 0.00580 | PASS |
| Extreme（80℃） | | 4.23 | 7.93 | 0.00225 | 0.00422 | PASS |
| Extreme（70℃） | | 15.87 | 4.02 | 0.00844 | 0.00214 | PASS |
| Extreme（60℃） | | 3.75 | 15.53 | 0.00199 | 0.00826 | PASS |
| Extreme（50℃） | | 10.63 | 16.79 | 0.00565 | 0.00893 | PASS |
| Extreme（40℃） | | 9.52 | 4.06 | 0.00506 | 0.00216 | PASS |
| Extreme（30℃） | | 7.65 | 13.15 | 0.00407 | 0.00700 | PASS |
| Extreme（20℃） | | 17.55 | 5.10 | 0.00934 | 0.00271 | PASS |
| Extreme（10℃） | | 6.90 | 7.69 | 0.00367 | 0.00409 | PASS |
| Extreme（0℃） | | 13.69 | 14.76 | 0.00728 | 0.00785 | PASS |
| Extreme（-10℃） | | 2.34 | 1.17 | 0.00124 | 0.00062 | PASS |
| Extreme（-20℃） | | 1.85 | 9.48 | 0.00099 | 0.00504 | PASS |
| Extreme（-30℃） | | 9.32 | 17.42 | 0.00496 | 0.00927 | PASS |
| Extreme（-40℃） | | 1.50 | 10.45 | 0.00080 | 0.00556 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| 25℃ | LV | 9.50 | 5.73 | 0.00505 | 0.00305 | PASS |
| | HV | 14.45 | 2.16 | 0.00768 | 0.00115 | PASS |

| NB-IOT Band 13 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 6.76 | 15.69 | 0.00360 | 0.00835 | PASS |
| Extreme（85℃） | | 17.62 | 16.35 | 0.00937 | 0.00870 | PASS |
| Extreme（80℃） | | 10.40 | 3.96 | 0.00553 | 0.00210 | PASS |
| Extreme（70℃） | | 8.73 | 8.22 | 0.00464 | 0.00437 | PASS |
| Extreme（60℃） | | 15.66 | 1.19 | 0.00833 | 0.00063 | PASS |
| Extreme（50℃） | | 10.75 | 8.40 | 0.00572 | 0.00447 | PASS |
| Extreme（40℃） | | 8.65 | 9.28 | 0.00460 | 0.00494 | PASS |
| Extreme（30℃） | | 2.06 | 7.15 | 0.00110 | 0.00381 | PASS |
| Extreme（20℃） | | 1.13 | 17.35 | 0.00060 | 0.00923 | PASS |
| Extreme（10℃） | | 14.07 | 10.69 | 0.00748 | 0.00569 | PASS |
| Extreme（0℃） | | 15.99 | 10.88 | 0.00850 | 0.00579 | PASS |
| Extreme（-10℃） | | 15.81 | 7.85 | 0.00841 | 0.00417 | PASS |
| Extreme（-20℃） | | 3.24 | 6.35 | 0.00172 | 0.00338 | PASS |
| Extreme（-30℃） | | 12.91 | 3.46 | 0.00687 | 0.00184 | PASS |
| Extreme（-40℃） | | 13.03 | 5.15 | 0.00693 | 0.00274 | PASS |
| 25℃ | LV | 4.24 | 10.76 | 0.00225 | 0.00572 | PASS |
| | HV | 7.06 | 12.35 | 0.00375 | 0.00657 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability （ppm） | Frequency Stability （ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 6.32 | 13.49 | 0.00336 | 0.00717 | PASS |
| Extreme（85℃） | | 3.08 | 13.90 | 0.00164 | 0.00739 | PASS |
| Extreme（80℃） | | 5.81 | 15.11 | 0.00309 | 0.00804 | PASS |
| Extreme（70℃） | | 15.43 | 5.24 | 0.00821 | 0.00279 | PASS |
| Extreme（60℃） | | 15.26 | 17.77 | 0.00812 | 0.00945 | PASS |
| Extreme（50℃） | | 1.85 | 9.77 | 0.00098 | 0.00520 | PASS |
| Extreme（40℃） | | 7.29 | 10.14 | 0.00388 | 0.00539 | PASS |
| Extreme（30℃） | | 5.86 | 13.74 | 0.00311 | 0.00731 | PASS |
| Extreme（20℃） | | 16.10 | 4.51 | 0.00857 | 0.00240 | PASS |
| Extreme（10℃） | | 4.62 | 11.85 | 0.00246 | 0.00630 | PASS |
| Extreme（0℃） | | 6.72 | 15.08 | 0.00357 | 0.00802 | PASS |
| Extreme（-10℃） | | 9.29 | 14.78 | 0.00494 | 0.00786 | PASS |
| Extreme（-20℃） | | 8.34 | 16.57 | 0.00444 | 0.00881 | PASS |
| Extreme（-30℃） | | 3.23 | 2.03 | 0.00172 | 0.00108 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Extreme（-40℃） | | 1.19 | 5.88 | 0.00063 | 0.00313 | PASS |
| 25℃ | LV | 3.01 | 10.39 | 0.00160 | 0.00553 | PASS |
| | HV | 17.94 | 14.90 | 0.00954 | 0.00792 | PASS |

| NB-IOT Band 17 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 8.61 | 3.84 | 0.00458 | 0.00204 | PASS |
| Extreme（85℃） | | 7.79 | 9.38 | 0.00414 | 0.00499 | PASS |
| Extreme（80℃） | | 10.52 | 10.66 | 0.00559 | 0.00567 | PASS |
| Extreme（70℃） | | 17.32 | 5.89 | 0.00921 | 0.00313 | PASS |
| Extreme（60℃） | | 11.47 | 8.40 | 0.00610 | 0.00447 | PASS |
| Extreme（50℃） | | 14.12 | 15.39 | 0.00751 | 0.00819 | PASS |
| Extreme（40℃） | | 5.92 | 2.56 | 0.00315 | 0.00136 | PASS |
| Extreme（30℃） | | 14.09 | 2.04 | 0.00750 | 0.00108 | PASS |
| Extreme（20℃） | | 3.52 | 8.72 | 0.00187 | 0.00464 | PASS |
| Extreme（10℃） | | 10.74 | 10.41 | 0.00571 | 0.00554 | PASS |
| Extreme（0℃） | | 2.33 | 17.10 | 0.00124 | 0.00909 | PASS |
| Extreme（-10℃） | | 5.37 | 3.76 | 0.00286 | 0.00200 | PASS |
| Extreme（-20℃） | | 3.04 | 7.79 | 0.00162 | 0.00414 | PASS |
| Extreme（-30℃） | | 12.26 | 1.76 | 0.00652 | 0.00094 | PASS |
| Extreme（-40℃） | | 10.30 | 5.92 | 0.00548 | 0.00315 | PASS |
| 25℃ | LV | 3.77 | 2.25 | 0.00201 | 0.00120 | PASS |
| | HV | 14.99 | 5.41 | 0.00797 | 0.00288 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 9.85 | 10.87 | 0.00524 | 0.00578 | PASS |
| Extreme（85℃） | | 16.49 | 8.30 | 0.00877 | 0.00442 | PASS |
| Extreme（80℃） | | 6.35 | 6.47 | 0.00338 | 0.00344 | PASS |
| Extreme（70℃） | | 2.17 | 1.44 | 0.00116 | 0.00076 | PASS |
| Extreme（60℃） | | 6.94 | 13.95 | 0.00369 | 0.00742 | PASS |
| Extreme（50℃） | | 13.66 | 7.35 | 0.00726 | 0.00391 | PASS |
| Extreme（40℃） | | 2.04 | 12.83 | 0.00109 | 0.00682 | PASS |
| Extreme（30℃） | | 14.95 | 4.18 | 0.00795 | 0.00222 | PASS |
| Extreme（20℃） | | 12.50 | 16.56 | 0.00665 | 0.00881 | PASS |
| Extreme（10℃） | | 3.67 | 7.50 | 0.00195 | 0.00399 | PASS |
| Extreme（0℃） | | 17.20 | 16.08 | 0.00915 | 0.00855 | PASS |
| Extreme（-10℃） | | 16.63 | 6.28 | 0.00885 | 0.00334 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Extreme（-20℃） | | 3.20 | 16.25 | 0.00170 | 0.00864 | PASS |
| Extreme（-30℃） | | 13.29 | 7.34 | 0.00707 | 0.00390 | PASS |
| Extreme（-40℃） | | 8.35 | 12.54 | 0.00444 | 0.00667 | PASS |
| 25℃ | LV | 11.73 | 9.27 | 0.00624 | 0.00493 | PASS |
| | HV | 11.52 | 4.24 | 0.00613 | 0.00226 | PASS |

| NB-IOT Band 66 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 16.62 | 14.58 | 0.00884 | 0.00775 | PASS |
| Extreme（85℃） | | 4.31 | 8.13 | 0.00229 | 0.00432 | PASS |
| Extreme（80℃） | | 1.60 | 16.57 | 0.00085 | 0.00882 | PASS |
| Extreme（70℃） | | 4.30 | 13.84 | 0.00229 | 0.00736 | PASS |
| Extreme（60℃） | | 5.59 | 12.67 | 0.00297 | 0.00674 | PASS |
| Extreme（50℃） | | 6.66 | 1.71 | 0.00354 | 0.00091 | PASS |
| Extreme（40℃） | | 10.89 | 17.95 | 0.00579 | 0.00955 | PASS |
| Extreme（30℃） | | 7.42 | 11.34 | 0.00395 | 0.00603 | PASS |
| Extreme（20℃） | | 5.95 | 11.19 | 0.00317 | 0.00595 | PASS |
| Extreme（10℃） | | 9.11 | 7.50 | 0.00485 | 0.00399 | PASS |
| Extreme（0℃） | | 9.08 | 7.20 | 0.00483 | 0.00383 | PASS |
| Extreme（-10℃） | | 16.55 | 9.60 | 0.00880 | 0.00511 | PASS |
| Extreme（-20℃） | | 9.39 | 2.03 | 0.00499 | 0.00108 | PASS |
| Extreme（-30℃） | | 8.30 | 9.86 | 0.00442 | 0.00525 | PASS |
| Extreme（-40℃） | | 6.73 | 8.72 | 0.00358 | 0.00464 | PASS |
| 25℃ | LV | 1.10 | 6.97 | 0.00058 | 0.00371 | PASS |
| | HV | 16.63 | 11.86 | 0.00885 | 0.00631 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 10.15 | 6.09 | 0.00540 | 0.00324 | PASS |
| Extreme（85℃） | | 7.18 | 9.34 | 0.00382 | 0.00497 | PASS |
| Extreme（80℃） | | 16.49 | 7.90 | 0.00877 | 0.00420 | PASS |
| Extreme（70℃） | | 6.16 | 8.38 | 0.00328 | 0.00446 | PASS |
| Extreme（60℃） | | 6.55 | 12.84 | 0.00348 | 0.00683 | PASS |
| Extreme（50℃） | | 3.92 | 1.38 | 0.00208 | 0.00073 | PASS |
| Extreme（40℃） | | 9.20 | 2.11 | 0.00489 | 0.00112 | PASS |
| Extreme（30℃） | | 11.21 | 14.43 | 0.00596 | 0.00767 | PASS |
| Extreme（20℃） | | 14.60 | 4.20 | 0.00777 | 0.00223 | PASS |
| Extreme（10℃） | | 4.26 | 4.04 | 0.00226 | 0.00215 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Extreme（0℃） | | 9.33 | 3.66 | 0.00496 | 0.00195 | PASS |
| Extreme（-10℃） | | 9.64 | 12.67 | 0.00513 | 0.00674 | PASS |
| Extreme（-20℃） | | 7.41 | 10.75 | 0.00394 | 0.00572 | PASS |
| Extreme（-30℃） | | 13.53 | 10.16 | 0.00720 | 0.00540 | PASS |
| Extreme（-40℃） | | 11.49 | 17.89 | 0.00611 | 0.00952 | PASS |
| 25℃ | LV | 13.32 | 15.74 | 0.00708 | 0.00837 | PASS |
| | HV | 11.52 | 4.81 | 0.00613 | 0.00256 | PASS |

| NB-IOT Band 71 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 3.62 | 2.59 | 0.00192 | 0.00138 | PASS |
| Extreme（85℃） | | 8.58 | 2.64 | 0.00456 | 0.00140 | PASS |
| Extreme（80℃） | | 13.78 | 8.22 | 0.00733 | 0.00437 | PASS |
| Extreme（70℃） | | 11.58 | 10.89 | 0.00616 | 0.00579 | PASS |
| Extreme（60℃） | | 12.71 | 12.53 | 0.00676 | 0.00666 | PASS |
| Extreme（50℃） | | 10.95 | 7.01 | 0.00582 | 0.00373 | PASS |
| Extreme（40℃） | | 3.04 | 11.58 | 0.00162 | 0.00616 | PASS |
| Extreme（30℃） | | 14.57 | 3.62 | 0.00775 | 0.00192 | PASS |
| Extreme（20℃） | | 9.30 | 13.81 | 0.00495 | 0.00735 | PASS |
| Extreme（10℃） | | 1.72 | 17.63 | 0.00092 | 0.00938 | PASS |
| Extreme（0℃） | | 9.74 | 11.76 | 0.00518 | 0.00626 | PASS |
| Extreme（-10℃） | | 9.43 | 15.93 | 0.00502 | 0.00847 | PASS |
| Extreme（-20℃） | | 11.71 | 5.56 | 0.00623 | 0.00296 | PASS |
| Extreme（-30℃） | | 2.13 | 15.41 | 0.00113 | 0.00820 | PASS |
| Extreme（-40℃） | | 11.50 | 6.24 | 0.00612 | 0.00332 | PASS |
| 25℃ | LV | 5.66 | 1.89 | 0.00301 | 0.00101 | PASS |
| | HV | 11.89 | 16.86 | 0.00633 | 0.00897 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | Normal | 4.08 | 7.43 | 0.00217 | 0.00395 | PASS |
| Extreme（85℃） | | 10.41 | 15.57 | 0.00554 | 0.00828 | PASS |
| Extreme（80℃） | | 15.27 | 5.95 | 0.00812 | 0.00316 | PASS |
| Extreme（70℃） | | 6.95 | 7.43 | 0.00370 | 0.00395 | PASS |
| Extreme（60℃） | | 14.14 | 5.79 | 0.00752 | 0.00308 | PASS |
| Extreme（50℃） | | 1.35 | 2.07 | 0.00072 | 0.00110 | PASS |
| Extreme（40℃） | | 13.72 | 17.71 | 0.00730 | 0.00942 | PASS |
| Extreme（30℃） | | 6.34 | 7.85 | 0.00337 | 0.00417 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Extreme（20℃） | | 6.67 | 13.04 | 0.00355 | 0.00693 | PASS |
| Extreme（10℃） | | 13.72 | 17.50 | 0.00730 | 0.00931 | PASS |
| Extreme（0℃） | | 8.42 | 7.26 | 0.00448 | 0.00386 | PASS |
| Extreme（-10℃） | | 10.84 | 10.71 | 0.00577 | 0.00570 | PASS |
| Extreme（-20℃） | | 4.12 | 12.15 | 0.00219 | 0.00646 | PASS |
| Extreme（-30℃） | | 4.32 | 6.28 | 0.00230 | 0.00334 | PASS |
| Extreme（-40℃） | | 11.62 | 2.50 | 0.00618 | 0.00133 | PASS |
| 25℃ | LV | 11.88 | 4.64 | 0.00632 | 0.00247 | PASS |
| | HV | 5.74 | 9.09 | 0.00305 | 0.00483 | PASS |

| NB-IOT Band 85 | | | | | | |
|---|---|---|---|---|---|---|
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 3.75 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | | 17.26 | 4.37 | 0.00918 | 0.00233 | PASS |
| Extreme（85℃） | | 17.60 | 16.38 | 0.00936 | 0.00871 | PASS |
| Extreme（80℃） | | 7.20 | 12.93 | 0.00383 | 0.00688 | PASS |
| Extreme（70℃） | | 5.59 | 2.51 | 0.00297 | 0.00133 | PASS |
| Extreme（60℃） | | 13.93 | 16.28 | 0.00741 | 0.00866 | PASS |
| Extreme（50℃） | | 4.28 | 11.21 | 0.00228 | 0.00596 | PASS |
| Extreme（40℃） | | 4.63 | 11.08 | 0.00246 | 0.00590 | PASS |
| Extreme（30℃） | Normal | 12.95 | 3.02 | 0.00689 | 0.00160 | PASS |
| Extreme（20℃） | | 14.77 | 6.79 | 0.00786 | 0.00361 | PASS |
| Extreme（10℃） | | 4.48 | 15.27 | 0.00238 | 0.00812 | PASS |
| Extreme（0℃） | | 1.41 | 8.81 | 0.00075 | 0.00469 | PASS |
| Extreme（-10℃） | | 13.77 | 5.66 | 0.00732 | 0.00301 | PASS |
| Extreme（-20℃） | | 6.12 | 15.23 | 0.00326 | 0.00810 | PASS |
| Extreme（-30℃） | | 9.78 | 8.50 | 0.00520 | 0.00452 | PASS |
| Extreme（-40℃） | | 8.73 | 14.14 | 0.00464 | 0.00752 | PASS |
| 25℃ | LV | 17.79 | 17.19 | 0.00946 | 0.00914 | PASS |
| | HV | 10.49 | 13.31 | 0.00558 | 0.00708 | PASS |
| Condition | | Freq.Error (Hz) | Freq.Error (Hz) | Frequency Stability（ppm） | Frequency Stability（ppm） | Verdict |
| BANDWIDTH | 15 | | | | | |
| Temperature | Voltage | BPSK | QPSK | BPSK | QPSK | |
| Normal（25℃） | | 17.72 | 6.39 | 0.00942 | 0.00340 | PASS |
| Extreme（85℃） | | 3.01 | 17.50 | 0.00160 | 0.00931 | PASS |
| Extreme（80℃） | | 5.54 | 12.59 | 0.00294 | 0.00670 | PASS |
| Extreme（70℃） | Normal | 9.92 | 2.48 | 0.00527 | 0.00132 | PASS |
| Extreme（60℃） | | 1.64 | 3.28 | 0.00087 | 0.00174 | PASS |
| Extreme（50℃） | | 15.00 | 12.30 | 0.00798 | 0.00654 | PASS |
| Extreme（40℃） | | 4.42 | 2.79 | 0.00235 | 0.00148 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

| | | | | | | |
|---|---|---|---|---|---|---|
| Extreme（30℃） | | 12.68 | 13.80 | 0.00674 | 0.00734 | PASS |
| Extreme（20℃） | | 15.57 | 17.68 | 0.00828 | 0.00941 | PASS |
| Extreme（10℃） | | 10.98 | 2.39 | 0.00584 | 0.00127 | PASS |
| Extreme（0℃） | | 5.66 | 6.34 | 0.00301 | 0.00337 | PASS |
| Extreme（-10℃） | | 15.45 | 7.84 | 0.00822 | 0.00417 | PASS |
| Extreme（-20℃） | | 16.80 | 17.22 | 0.00894 | 0.00916 | PASS |
| Extreme（-30℃） | | 10.30 | 3.51 | 0.00548 | 0.00187 | PASS |
| Extreme（-40℃） | | 13.42 | 9.31 | 0.00714 | 0.00495 | PASS |
| 25℃ | LV | 16.32 | 10.26 | 0.00868 | 0.00546 | PASS |
| | HV | 9.82 | 6.04 | 0.00522 | 0.00321 | PASS |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## 5.7 Spurious Emissions at Antenna Terminals

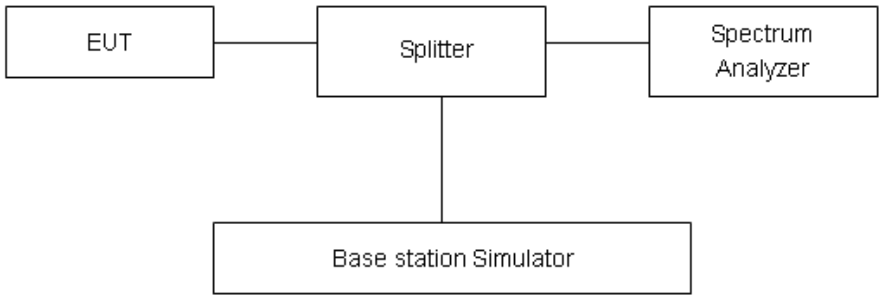
**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

**Method of Measurement**

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.
RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz
RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.
Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

**Test setup**




**Limits**

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB..”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. 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.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;
(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

| | | |
|---|---|---|
| Part 27.53 (h)/(g) Limit | | -13 dBm |
| Part 27.53(f)/(c) Limit | Limit out of the band 1559-1610 MHz | -13 dBm |
| | Limit in the band 1559-1610 MHz | -40 dBm |

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 99.75％ confidence level for the normal distribution is with the coverage factor *k* = 1.96.

| Frequency | Uncertainty |
|---|---|
| 9kHz-1GHz | 0.684 dB |
| 1GHz-27GHz | 1.407 dB |

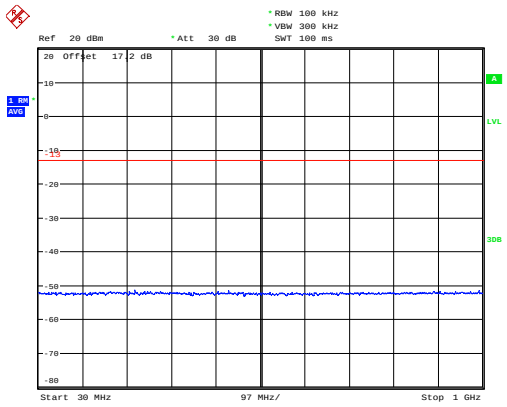

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## Test Result

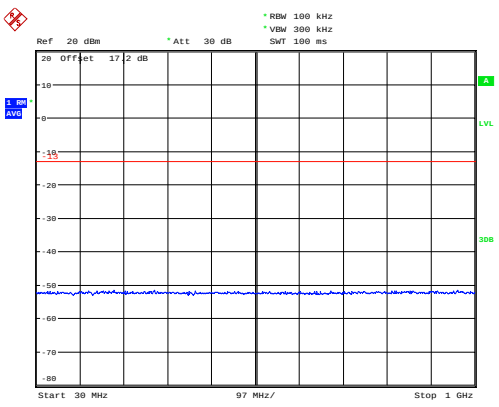
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

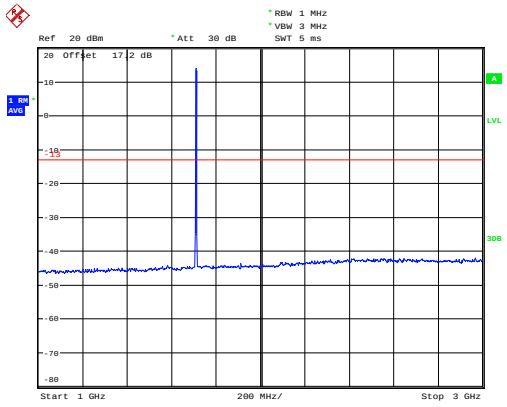
NB-IOT Band 4 CH-Low 30MHz~1GHz



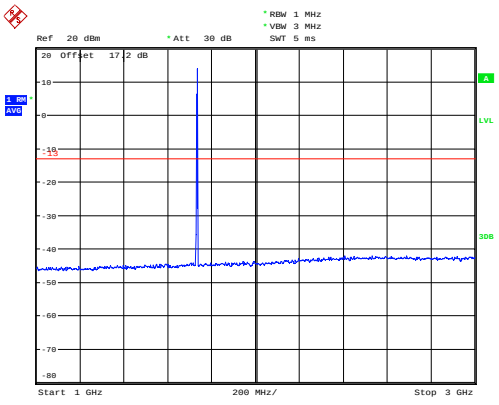

NB-IOT Band 4 CH-Middle 30MHz~1GHz



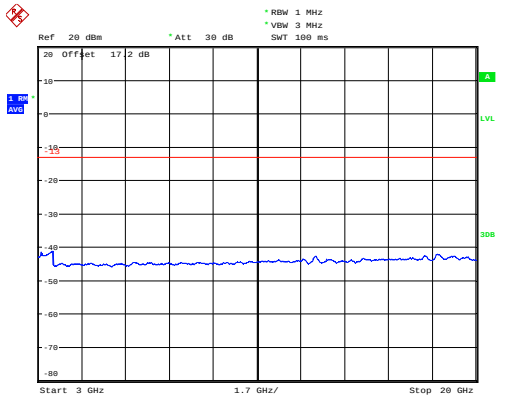

NB-IOT Band 4 CH-Low 1GHz~3GHz



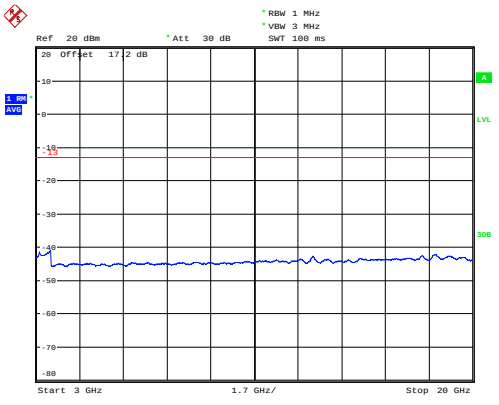

NB-IOT Band 4 CH-Middle 1GHz~3GHz




NB-IOT Band 4 CH-Low 3GHz~20GHz



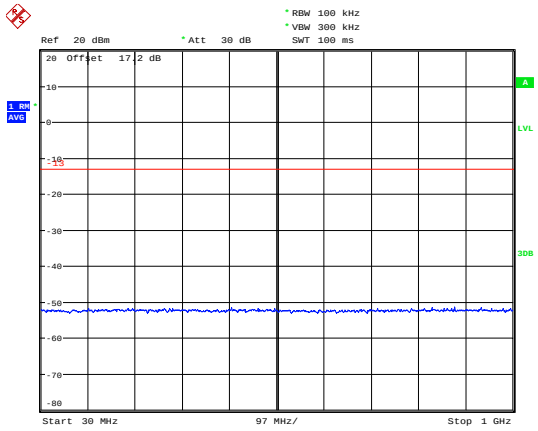

NB-IOT Band 4 CH-Middle 3GHz~20GHz





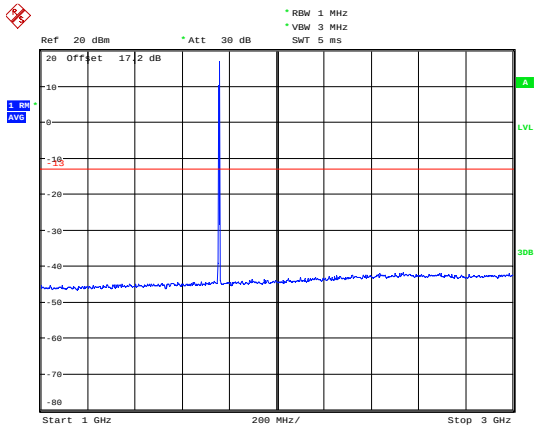
*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 4 CH-High 30MHz~1GHz



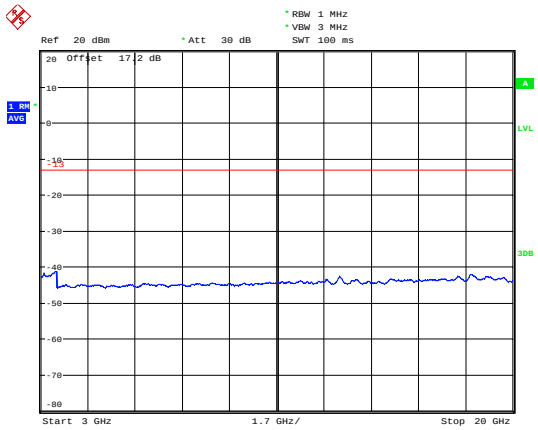

Date: 26.JUN.2019 12:35:59

NB-IOT Band 4 CH-High 1GHz~3GHz




Date: 26.JUN.2019 12:35:33

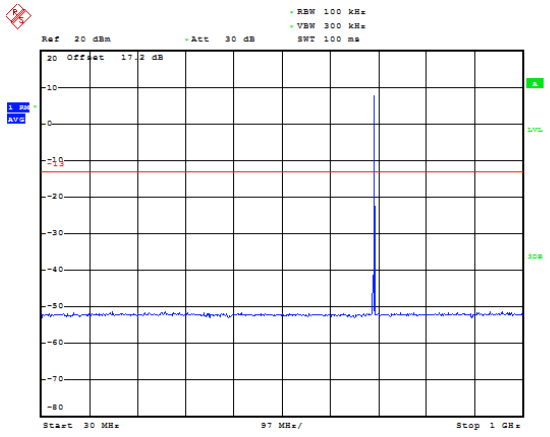
NB-IOT Band 4 CH-High 3GHz~20GHz




Date: 26.JUN.2019 12:35:16

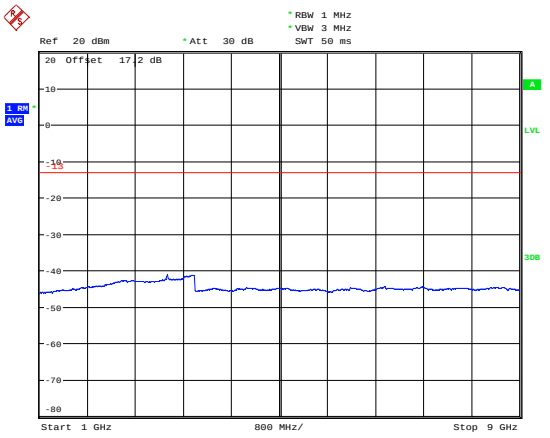

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 12 CH-Low 30MHz-1GHz



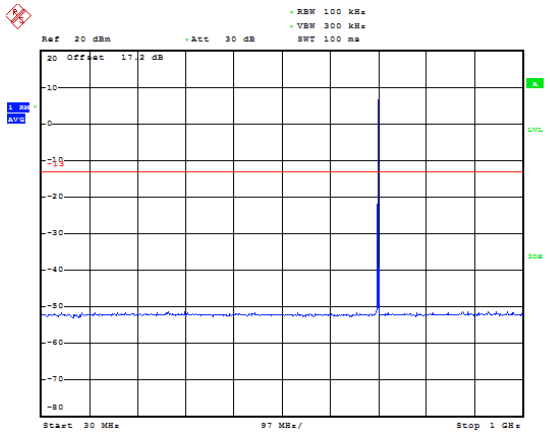

Date: 26.JUN.2019 16:11:28

NB-IOT Band 12 CH-Low 1GHz-9GHz



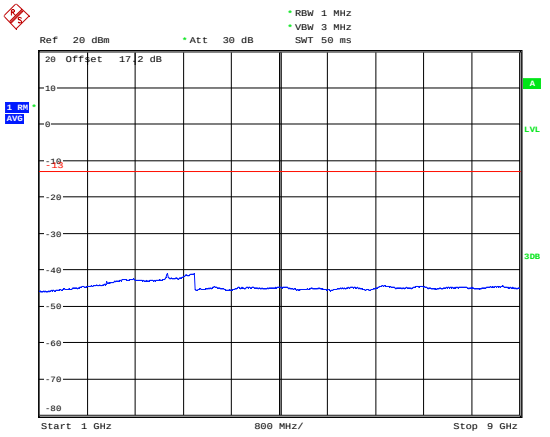

Date: 26.JUN.2019 16:11:51

NB-IOT Band 12 CH-Middle 30MHz-1GHz



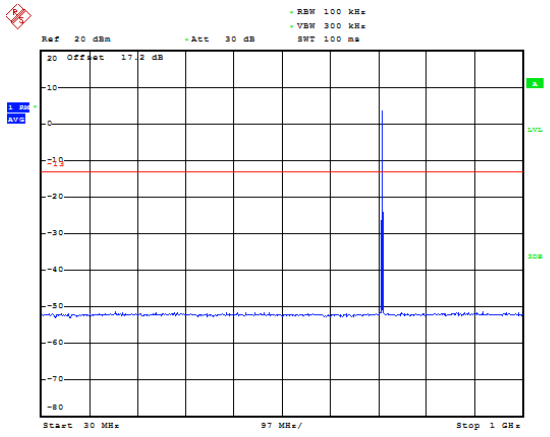

Date: 26.JUN.2019 16:15:55

NB-IOT Band 12 CH-Middle 1GHz-9GHz



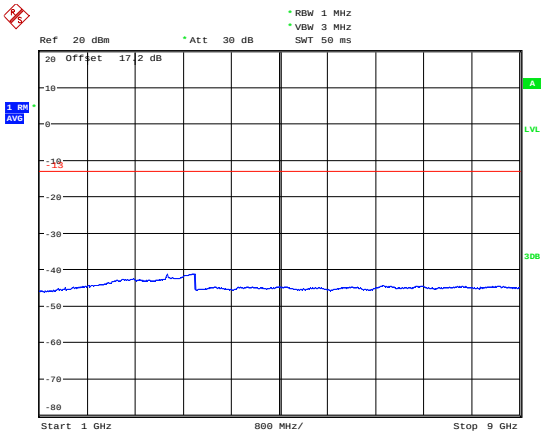

Date: 26.JUN.2019 16:15:18

NB-IOT Band 12 CH-High 30MHz-1GHz




Date: 26.JUN.2019 16:30:23

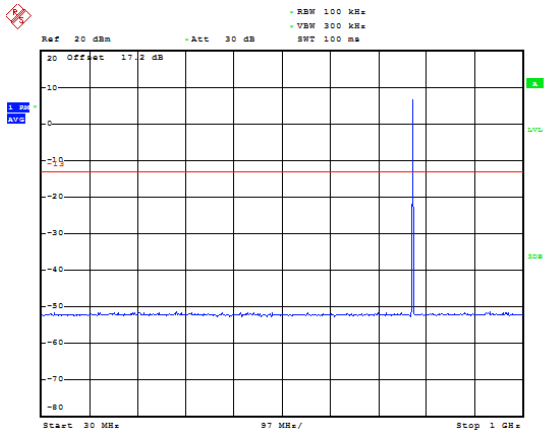
NB-IOT Band 12 CH-High 1GHz-9GHz




Date: 26.JUN.2019 16:30:40

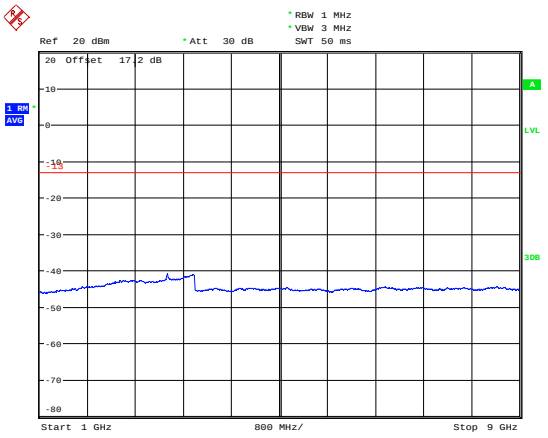

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 13 CH-Low 30MHz-1GHz



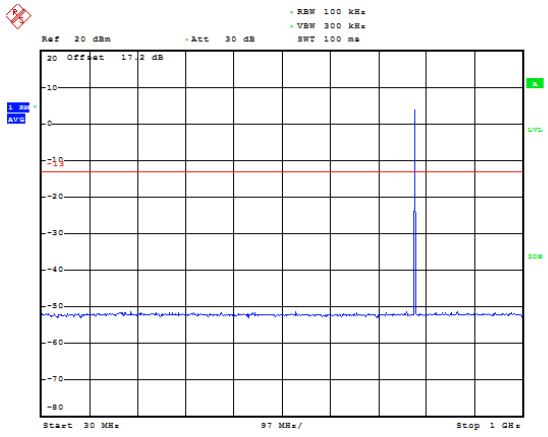

Date: 26.JUN.2019 16:51:06

NB-IOT Band 13 CH-Low 1GHz-9GHz



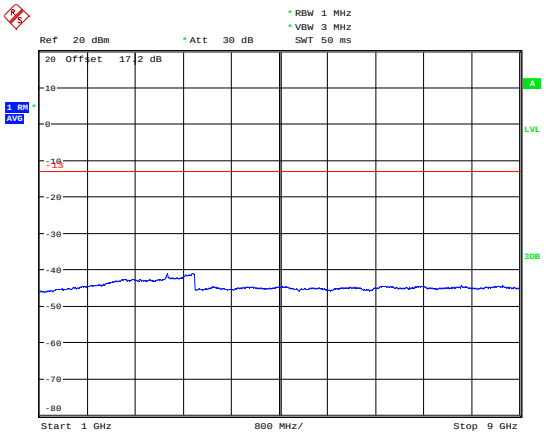

Date: 26.JUN.2019 16:50:38

NB-IOT Band 13 CH-Middle 30MHz-1GHz



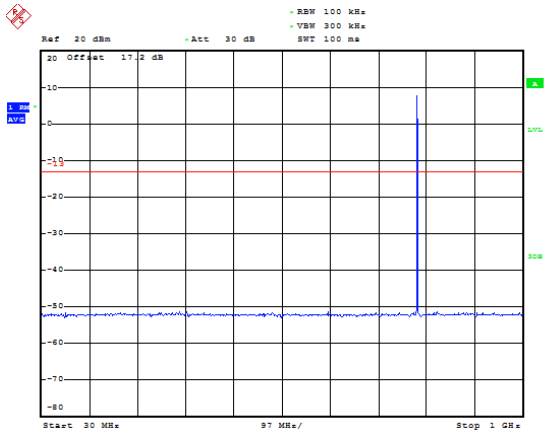

Date: 26.JUN.2019 17:40:57

NB-IOT Band 13 CH-Middle 1GHz-9GHz



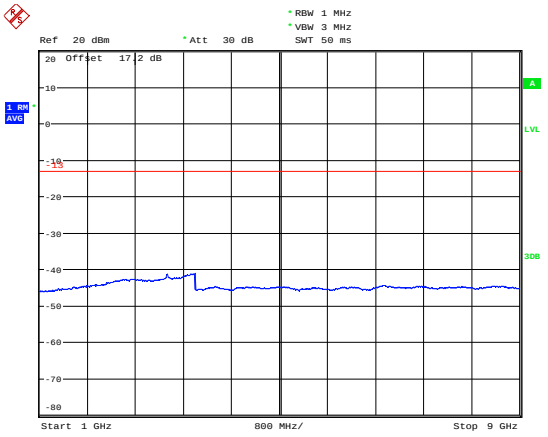

Date: 26.JUN.2019 17:41:15

NB-IOT Band 13 CH-High 30MHz-1GHz




Date: 26.JUN.2019 17:58:32

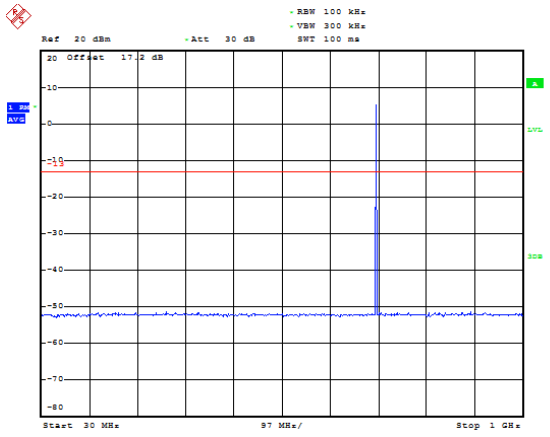
NB-IOT Band 13 CH-High 1GHz-9GHz




Date: 26.JUN.2019 17:58:09

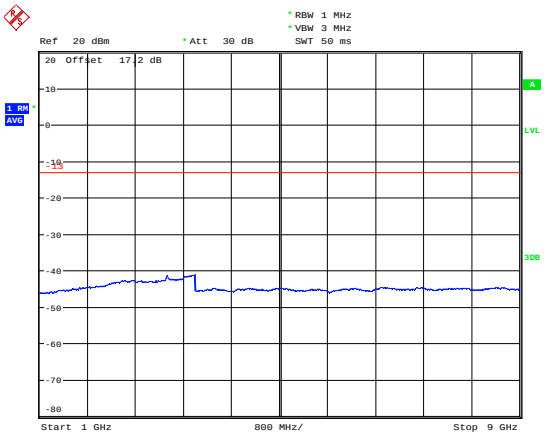

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 17 CH-Low 30MHz-1GHz



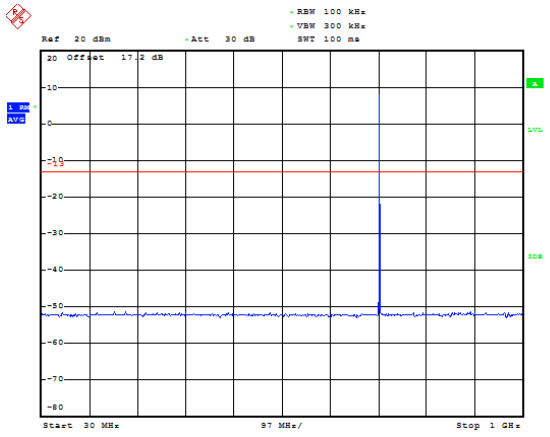

Date: 27.JUN.2019 10:51:31

NB-IOT Band 17 CH-Low 1GHz-9GHz



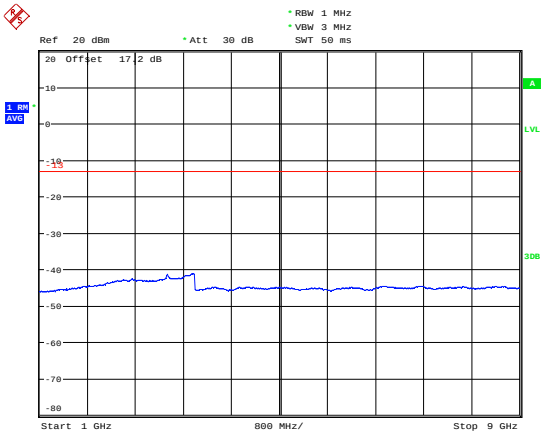

Date: 27.JUN.2019 10:51:50

NB-IOT Band 17 CH-Middle 30MHz-1GHz



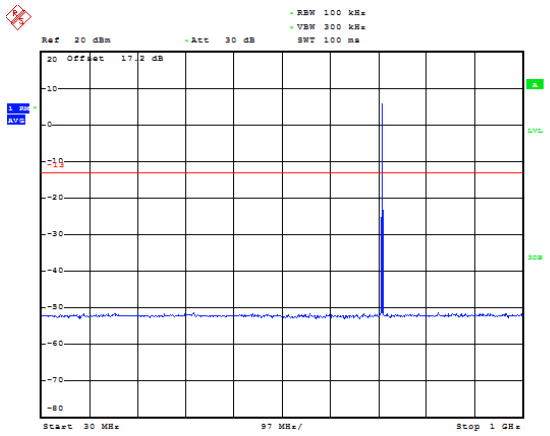

Date: 27.JUN.2019 10:52:44

NB-IOT Band 17 CH-Middle 1GHz-9GHz



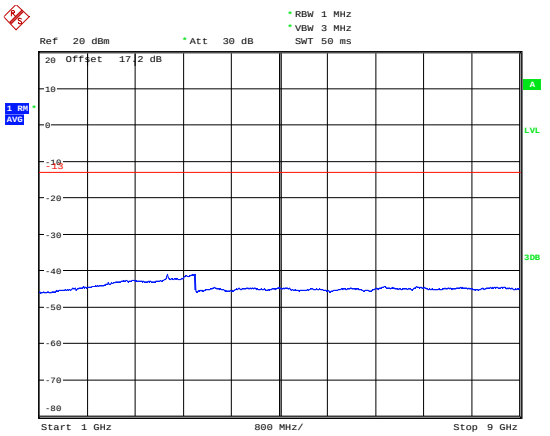

Date: 27.JUN.2019 10:52:16

NB-IOT Band 17 CH-High 30MHz-1GHz




Date: 27.JUN.2019 11:01:19

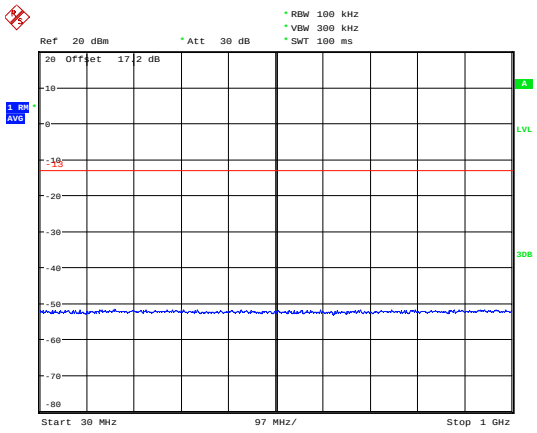
NB-IOT Band 17 CH-High 1GHz-9GHz




Date: 27.JUN.2019 11:01:41

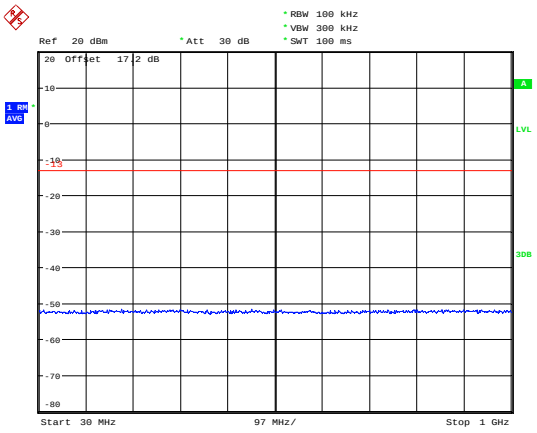

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## NB-IOT Band 66 CH-Low 30MHz~1GHz



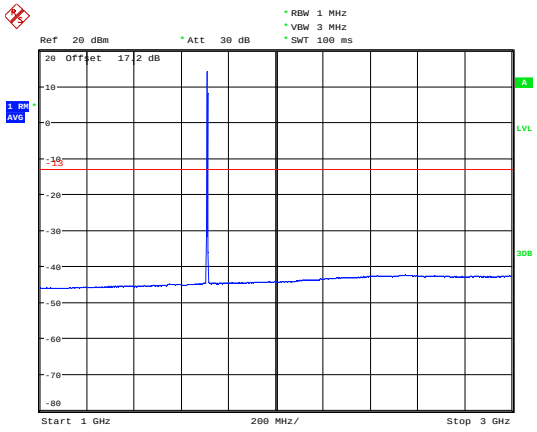

Date: 27.JUN.2019 13:14:14

## NB-IOT Band 66 CH-Middle 30MHz~1GHz



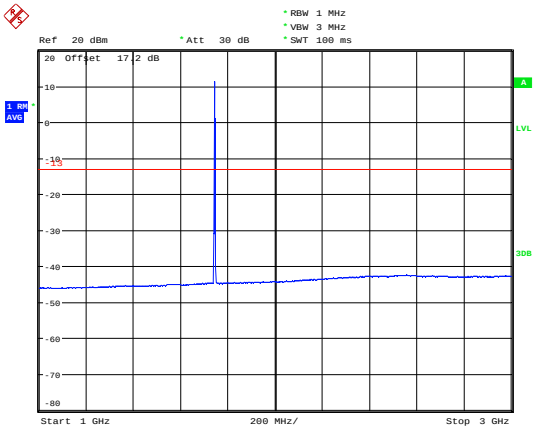

Date: 27.JUN.2019 13:14:27

## NB-IOT Band 66 CH-Low 1GHz~3GHz



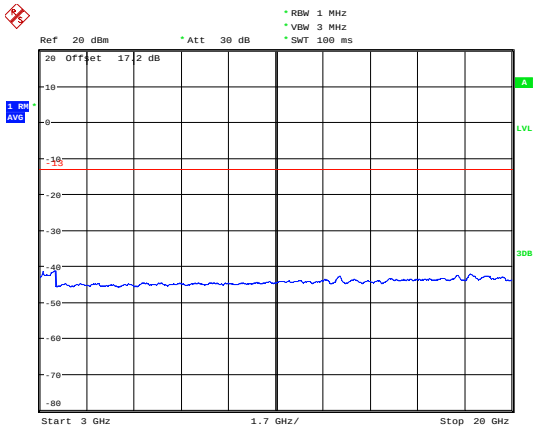

Date: 27.JUN.2019 14:59:28

## NB-IOT Band 66 CH-Middle 1GHz~3GHz



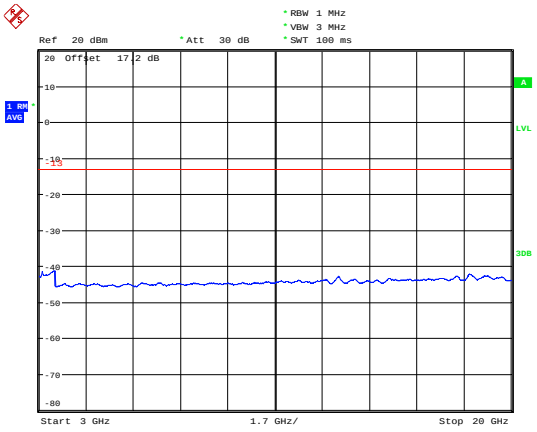

Date: 27.JUN.2019 15:04:53

## NB-IOT Band 66 CH-Low 3GHz~20GHz




Date: 27.JUN.2019 15:00:39

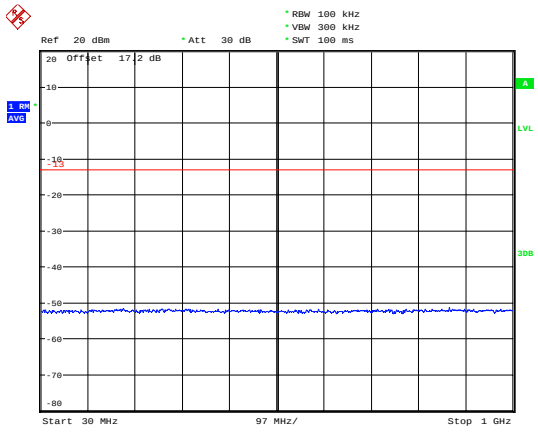
## NB-IOT Band 66 CH-Middle 3GHz~20GHz




Date: 27.JUN.2019 15:04:37

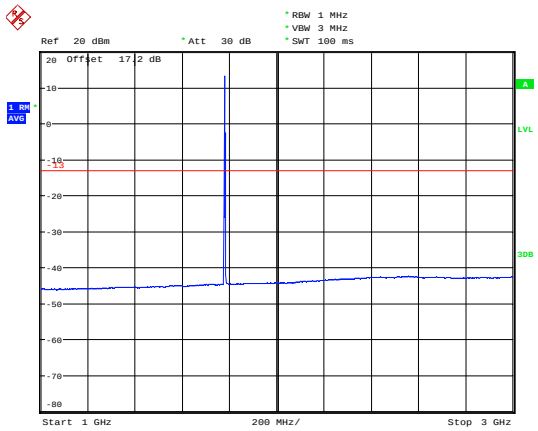

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 66 CH-High 30MHz~1GHz



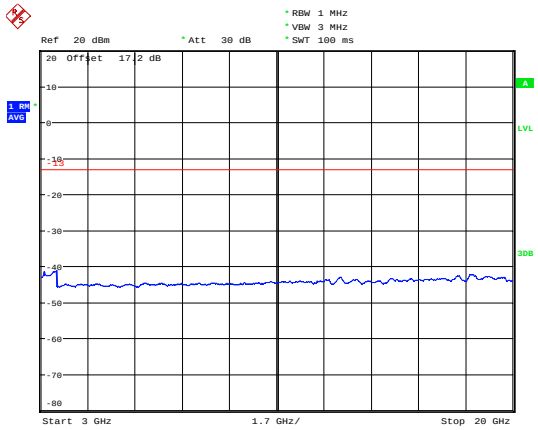

Date: 27.JUN.2019 13:14:44

NB-IOT Band 66 CH-High 1GHz~3GHz




Date: 27.JUN.2019 15:07:36

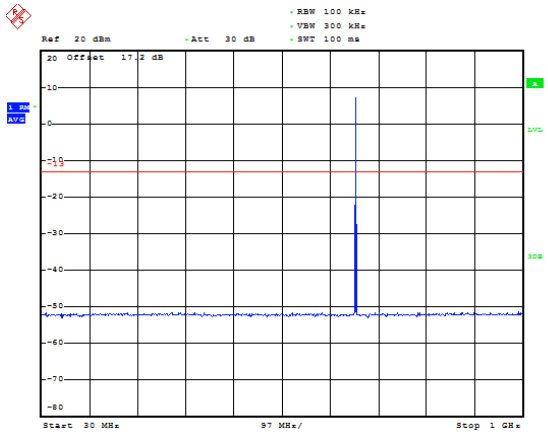
NB-IOT Band 66 CH-High 3GHz~20GHz




Date: 27.JUN.2019 15:07:59

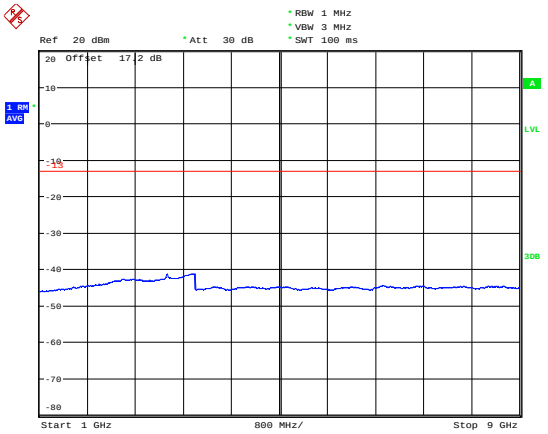

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 71 CH-Low 30MHz-1GHz



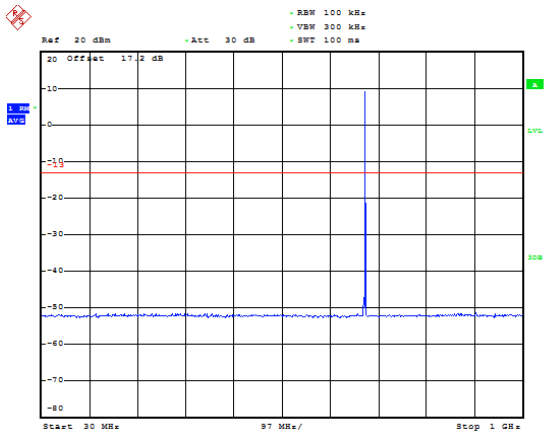

Date: 27.JUN.2019 15:11:09

NB-IOT Band 71 CH-Low 1GHz-9GHz



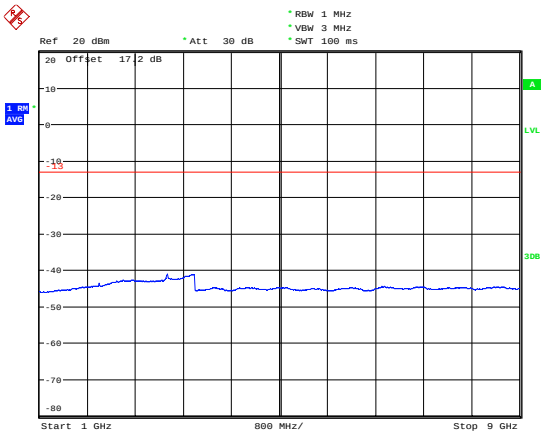

Date: 27.JUN.2019 15:09:21

NB-IOT Band 71 CH-Middle 30MHz-1GHz



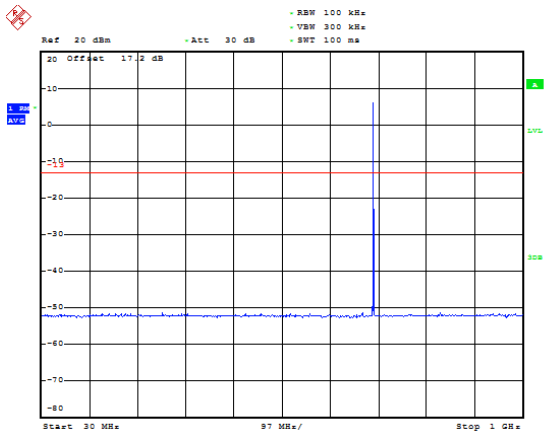

Date: 27.JUN.2019 15:11:39

NB-IOT Band 71 CH-Middle 1GHz-9GHz



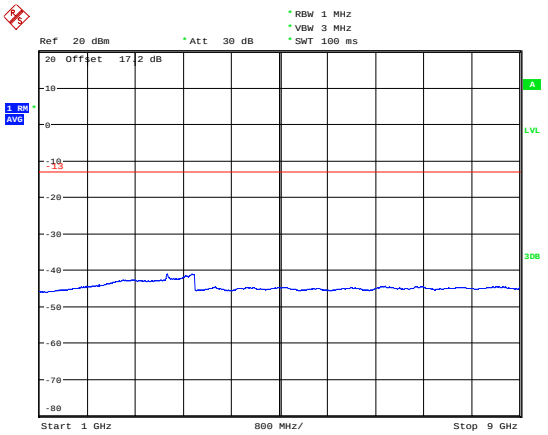

Date: 27.JUN.2019 15:10:05

NB-IOT Band 71 CH-High 30MHz-1GHz




Date: 27.JUN.2019 15:12:12

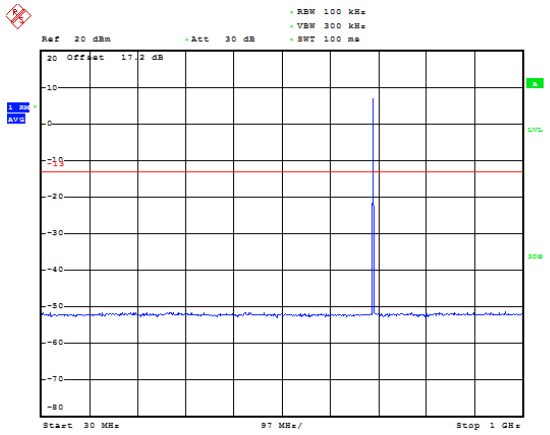
NB-IOT Band 71 CH-High 1GHz-9GHz




Date: 27.JUN.2019 15:10:39

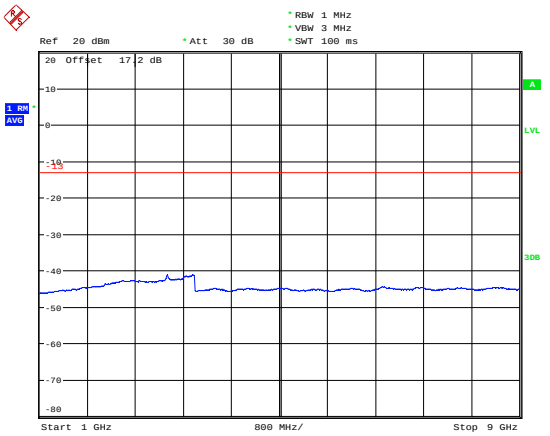

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 85 CH-Low 30MHz-1GHz



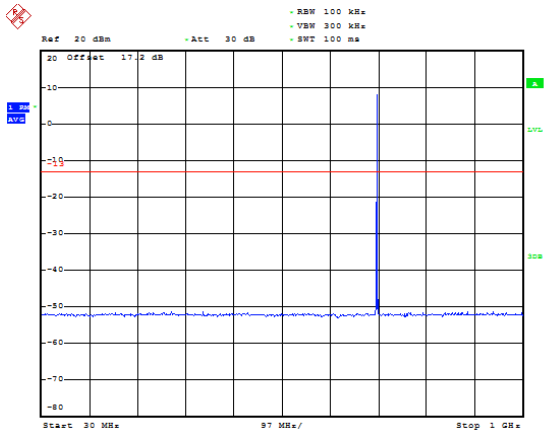

Date: 27.JUN.2019 17:15:17

NB-IOT Band 85 CH-Low 1GHz-9GHz



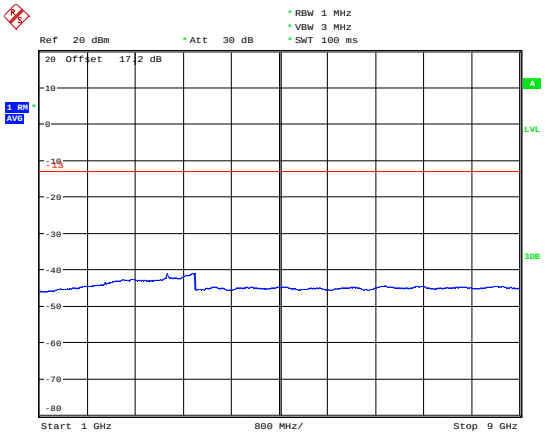

Date: 27.JUN.2019 17:15:43

NB-IOT Band 85 CH-Middle 30MHz-1GHz



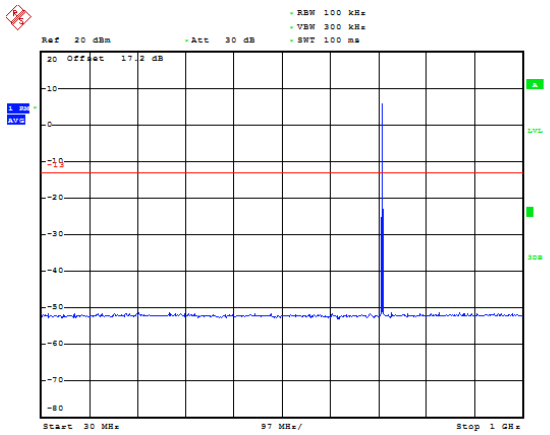

Date: 27.JUN.2019 17:03:10

NB-IOT Band 85 CH-Middle 1GHz-9GHz



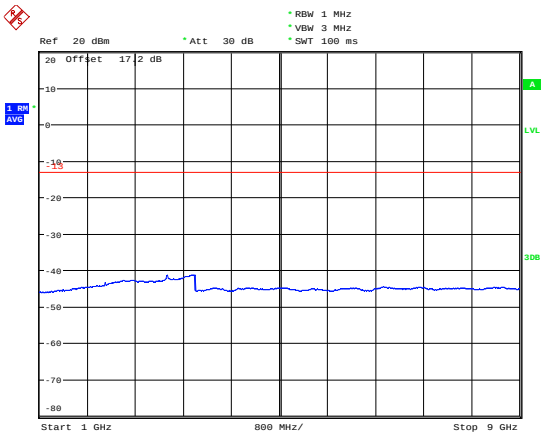

Date: 27.JUN.2019 17:16:02

NB-IOT Band 85 CH-High 30MHz-1GHz




Date: 27.JUN.2019 17:04:43

NB-IOT Band 85 CH-High 1GHz-9GHz




Date: 27.JUN.2019 17:20:59


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## 5.8 Radiates Spurious Emission

**Ambient condition**

| Temperature | Relative humidity | Pressure |
|---|---|---|
| 23°C ~25°C | 45%~50% | 101.5kPa |

**Method of Measurement**

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz ,RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

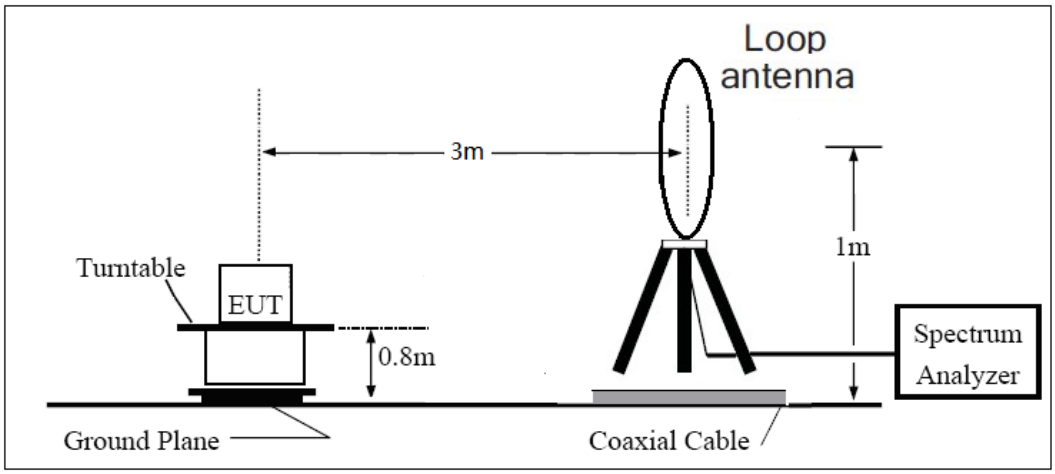

*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

= EIRP-2.15dBi.

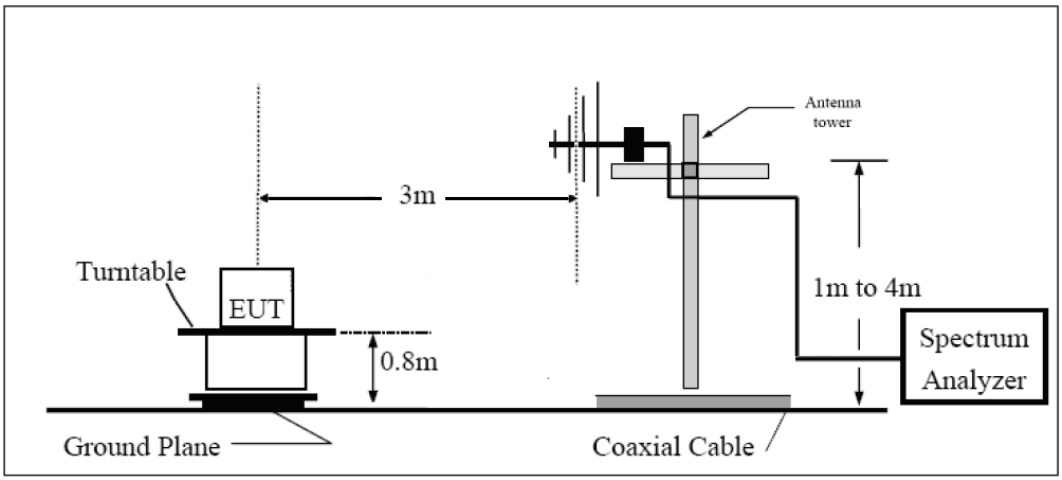
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

**Test setup**

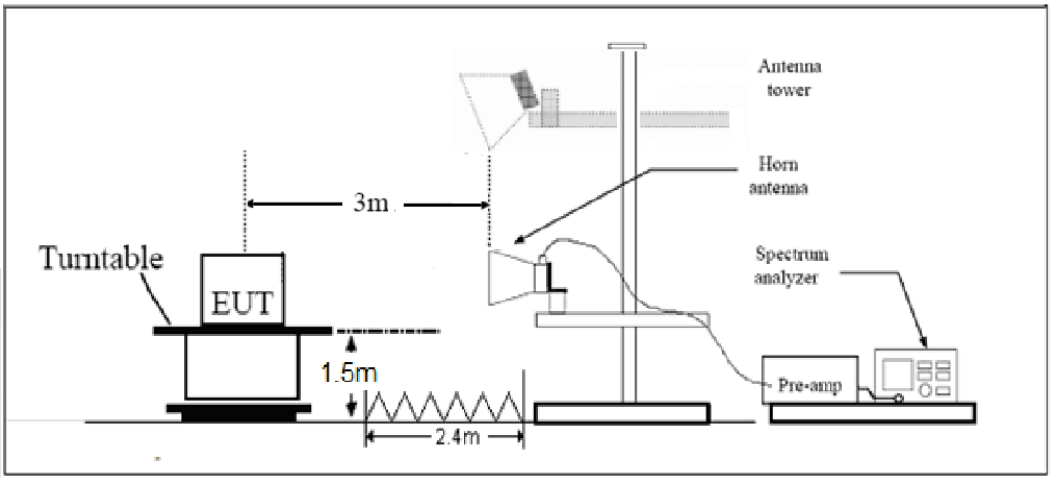
**9KHz ~ 30MHz**




**30MHz ~ 1GHz**




**Above 1GHz**




Note: Area side:2.4mX3.6m


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

**Limits**

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. 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.

Rule Part 27.53(f)For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:
(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;
(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

| | | |
|---|---|---|
| Part 27.53(a)/(h)/(g) Limit | | -13 dBm |
| Part 27.53(f)/(c) Limit | Limit out of the band 1559-1610 MHz | -13 dBm |
| | Limit in the band 1559-1610 MHz | -40 dBm |

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95％ confidence level for the normal distribution is with the coverage factor $k$ = ±1.96, $U$= ±3.55 dB.


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

**Test Result**

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

NB-IOT Band 4 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3419.6 | -53.13 | 2.6 | 10.15 | Horizontal | -45.58 | -13.00 | 32.58 | 135 |
| 3 | 5131.1 | -62.23 | 2.4 | 11.35 | Horizontal | -53.28 | -13.00 | 40.28 | 225 |
| 4 | 6842.8 | -56.46 | 4.5 | 10.85 | Horizontal | -50.11 | -13.00 | 37.11 | 45 |
| 5 | 8553.5 | -55.00 | 5.1 | 11.35 | Horizontal | -48.75 | -13.00 | 35.75 | 135 |
| 6 | 10264.2 | -52.34 | 5.3 | 11.95 | Horizontal | -45.69 | -13.00 | 32.69 | 225 |
| 7 | 11974.9 | -52.79 | 5.5 | 13.55 | Horizontal | -44.74 | -13.00 | 31.74 | 45 |
| 8 | 13685.6 | -50.85 | 6.3 | 13.75 | Horizontal | -43.40 | -13.00 | 30.40 | 135 |
| 9 | 15396.3 | -52.30 | 6.7 | 13.85 | Horizontal | -45.15 | -13.00 | 32.15 | 225 |
| 10 | 17107.0 | -49.72 | 6.8 | 14.25 | Horizontal | -42.27 | -13.00 | 29.27 | 45 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 4 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3464.3 | -53.95 | 2.6 | 10.75 | Horizontal | -45.80 | -13.00 | 32.80 | 135 |
| 3 | 5197.5 | -62.33 | 2.4 | 11.05 | Horizontal | -53.68 | -13.00 | 40.68 | 45 |
| 4 | 6930.0 | -58.50 | 4.5 | 11.15 | Horizontal | -51.85 | -13.00 | 38.85 | 45 |
| 5 | 8662.5 | -55.28 | 5.1 | 11.35 | Horizontal | -49.03 | -13.00 | 36.03 | 135 |
| 6 | 10395.0 | -51.30 | 5.3 | 11.95 | Horizontal | -44.65 | -13.00 | 31.65 | 45 |
| 7 | 12127.5 | -50.97 | 5.5 | 13.55 | Horizontal | -42.92 | -13.00 | 29.92 | 135 |
| 8 | 13860.0 | -51.57 | 6.3 | 13.75 | Horizontal | -44.12 | -13.00 | 31.12 | 225 |
| 9 | 15592.5 | -48.71 | 6.7 | 13.85 | Horizontal | -41.56 | -13.00 | 28.56 | 45 |
| 10 | 17325.0 | -49.02 | 6.8 | 14.25 | Horizontal | -41.57 | -13.00 | 28.57 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 4 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3507.8 | -54.22 | 2.6 | 10.15 | Horizontal | -46.67 | -13.00 | 33.67 | 225 |
| 3 | 5261.6 | -62.69 | 2.4 | 11.05 | Horizontal | -54.04 | -13.00 | 41.04 | 45 |
| 4 | 7017.2 | -55.07 | 4.5 | 11.15 | Horizontal | -48.42 | -13.00 | 35.42 | 135 |
| 5 | 8771.5 | -54.98 | 5.1 | 11.35 | Horizontal | -48.73 | -13.00 | 35.73 | 225 |
| 6 | 10525.8 | -53.11 | 5.3 | 11.95 | Horizontal | -46.46 | -13.00 | 33.46 | 45 |
| 7 | 12280.1 | -52.28 | 5.5 | 13.55 | Horizontal | -44.23 | -13.00 | 31.23 | 135 |
| 8 | 14034.4 | -49.11 | 6.3 | 13.75 | Horizontal | -41.66 | -13.00 | 28.66 | 225 |
| 9 | 15788.7 | -52.62 | 6.7 | 13.85 | Horizontal | -45.47 | -13.00 | 32.47 | 45 |
| 10 | 17543.0 | -49.10 | 6.8 | 14.25 | Horizontal | -41.65 | -13.00 | 28.65 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 12 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1399.4 | -49.53 | 2.00 | 10.15 | Horizontal | -43.53 | -13.00 | 30.53 | 135 |
| 3 | 2099.1 | -49.81 | 2.50 | 11.35 | Horizontal | -43.11 | -13.00 | 30.11 | 90 |
| 4 | 2798.8 | -62.76 | 4.20 | 10.85 | Horizontal | -58.26 | -13.00 | 45.26 | 180 |
| 5 | 3498.5 | -63.21 | 5.20 | 11.35 | Horizontal | -59.21 | -13.00 | 46.21 | 135 |
| 6 | 4198.2 | -61.38 | 5.50 | 11.95 | Horizontal | -57.08 | -13.00 | 44.08 | 225 |
| 7 | 4897.9 | -56.22 | 5.70 | 13.55 | Horizontal | -50.52 | -13.00 | 37.52 | 45 |
| 8 | 5597.6 | -60.76 | 6.30 | 13.75 | Horizontal | -55.46 | -13.00 | 42.46 | 135 |
| 9 | 6297.3 | -58.59 | 6.80 | 13.85 | Horizontal | -53.69 | -13.00 | 40.69 | 225 |
| 10 | 6997.0 | -57.02 | 6.90 | 14.25 | Horizontal | -51.82 | -13.00 | 38.82 | 45 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 12 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1415.0 | -45.88 | 2.00 | 10.75 | Horizontal | -39.28 | -13.00 | 26.28 | 135 |
| 3 | 2122.5 | -47.78 | 2.51 | 11.05 | Horizontal | -41.39 | -13.00 | 28.39 | 225 |
| 4 | 2830.0 | -62.92 | 4.20 | 11.15 | Horizontal | -58.12 | -13.00 | 45.12 | 45 |
| 5 | 3537.5 | -61.55 | 5.20 | 11.15 | Horizontal | -57.75 | -13.00 | 44.75 | 135 |
| 6 | 4245.0 | -61.80 | 5.50 | 11.95 | Horizontal | -57.50 | -13.00 | 44.50 | 0 |
| 7 | 4952.5 | -53.39 | 5.70 | 13.55 | Horizontal | -47.69 | -13.00 | 34.69 | 90 |
| 8 | 5660.0 | -59.95 | 6.30 | 13.75 | Horizontal | -54.65 | -13.00 | 41.65 | 135 |
| 9 | 6367.5 | -57.51 | 6.80 | 13.85 | Horizontal | -52.61 | -13.00 | 39.61 | 90 |
| 10 | 7075.0 | -55.16 | 6.90 | 14.25 | Horizontal | -49.96 | -13.00 | 36.96 | 180 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 12 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1430.6 | -48.19 | 2.00 | 10.15 | Horizontal | -42.19 | -13.00 | 29.19 | 135 |
| 3 | 2145.9 | -47.51 | 2.51 | 11.05 | Horizontal | -41.12 | -13.00 | 28.12 | 0 |
| 4 | 2861.2 | -63.98 | 4.20 | 11.15 | Horizontal | -59.18 | -13.00 | 46.18 | 90 |
| 5 | 3576.5 | -62.45 | 5.20 | 11.15 | Horizontal | -58.65 | -13.00 | 45.65 | 135 |
| 6 | 4291.8 | -59.84 | 5.50 | 11.95 | Horizontal | -55.54 | -13.00 | 42.54 | 225 |
| 7 | 5007.1 | -56.60 | 5.70 | 13.55 | Horizontal | -50.90 | -13.00 | 37.90 | 45 |
| 8 | 5722.4 | -60.67 | 6.30 | 13.75 | Horizontal | -55.37 | -13.00 | 42.37 | 270 |
| 9 | 6437.7 | -56.44 | 6.80 | 13.85 | Horizontal | -51.54 | -13.00 | 38.54 | 315 |
| 10 | 7153.0 | -54.32 | 6.90 | 14.25 | Horizontal | -49.12 | -13.00 | 36.12 | 225 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 13 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1555.8 | -49.16 | 2.00 | 10.15 | Horizontal | -43.16 | -13.00 | 30.16 | 0 |
| 3 | 2338.5 | -49.34 | 2.50 | 11.35 | Horizontal | -42.64 | -13.00 | 29.64 | 90 |
| 4 | 3118.0 | -61.73 | 4.20 | 10.85 | Horizontal | -57.23 | -13.00 | 44.23 | 270 |
| 5 | 3897.5 | -58.35 | 5.20 | 11.35 | Horizontal | -54.35 | -13.00 | 41.35 | 315 |
| 6 | 4677.0 | -52.52 | 5.50 | 11.95 | Horizontal | -48.22 | -13.00 | 35.22 | 225 |
| 7 | 5456.5 | -59.42 | 5.70 | 13.55 | Horizontal | -53.72 | -13.00 | 40.72 | 225 |
| 8 | 6236.0 | -58.93 | 6.30 | 13.75 | Horizontal | -53.63 | -13.00 | 40.63 | 45 |
| 9 | 7015.5 | -55.51 | 6.80 | 13.85 | Horizontal | -50.61 | -13.00 | 37.61 | 135 |
| 10 | 7795.0 | -54.34 | 6.90 | 14.25 | Horizontal | -49.14 | -13.00 | 36.14 | 0 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 13 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1564.0 | -55.86 | 2.00 | 10.75 | Horizontal | -49.26 | -40.00 | 9.26 | 135 |
| **Harmonic** | **Frequency (MHz)** | **SG (dBm)** | **Cable Loss (dB)** | **Gain (dBi)** | **Antenna Polarization** | **ERP Level (dBm)** | **Limit (dBm)** | **Margin (dB)** | **Azimuth (deg)** |
| 3 | 2346.0 | -54.30 | 2.51 | 11.05 | Horizontal | -47.91 | -13.00 | 34.91 | 90 |
| 4 | 3128.0 | -60.26 | 4.20 | 11.15 | Horizontal | -55.46 | -13.00 | 42.46 | 135 |
| 5 | 3910.0 | -56.15 | 5.20 | 11.15 | Horizontal | -52.35 | -13.00 | 39.35 | 225 |
| 6 | 4692.0 | -54.25 | 5.50 | 11.95 | Horizontal | -49.95 | -13.00 | 36.95 | 45 |
| 7 | 5474.0 | -60.90 | 5.70 | 13.55 | Horizontal | -55.20 | -13.00 | 42.20 | 135 |
| 8 | 6256.0 | -56.67 | 6.30 | 13.75 | Horizontal | -51.37 | -13.00 | 38.37 | 135 |
| 9 | 7038.0 | -55.51 | 6.80 | 13.85 | Horizontal | -50.61 | -13.00 | 37.61 | 225 |
| 10 | 7820.0 | -54.74 | 6.90 | 14.25 | Horizontal | -49.54 | -13.00 | 36.54 | 180 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 13 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1569.0 | -50.97 | 2.00 | 10.15 | Horizontal | -44.97 | -13.00 | 31.97 | 180 |
| 3 | 2353.5 | -53.90 | 2.51 | 11.05 | Horizontal | -47.51 | -13.00 | 34.51 | 135 |
| 4 | 3138.0 | -64.18 | 4.20 | 11.15 | Horizontal | -59.38 | -13.00 | 46.38 | 135 |
| 5 | 3922.5 | -61.07 | 5.20 | 11.15 | Horizontal | -57.27 | -13.00 | 44.27 | 225 |
| 6 | 4707.0 | -52.33 | 5.50 | 11.95 | Horizontal | -48.03 | -13.00 | 35.03 | 45 |
| 7 | 5491.5 | -60.58 | 5.70 | 13.55 | Horizontal | -54.88 | -13.00 | 41.88 | 135 |
| 8 | 6276.0 | -58.89 | 6.30 | 13.75 | Horizontal | -53.59 | -13.00 | 40.59 | 0 |
| 9 | 7060.5 | -55.03 | 6.80 | 13.85 | Horizontal | -50.13 | -13.00 | 37.13 | 225 |
| 10 | 7845.0 | -53.59 | 6.90 | 14.25 | Horizontal | -48.39 | -13.00 | 35.39 | 45 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 17 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1413.0 | -45.42 | 2.00 | 10.15 | Horizontal | -39.42 | -13.00 | 26.42 | 225 |
| 3 | 2119.5 | -46.60 | 2.50 | 11.35 | Horizontal | -39.90 | -13.00 | 26.90 | 45 |
| 4 | 2826.0 | -60.83 | 4.20 | 10.85 | Horizontal | -56.33 | -13.00 | 43.33 | 135 |
| 5 | 3532.5 | -61.80 | 5.20 | 11.35 | Horizontal | -57.80 | -13.00 | 44.80 | 90 |
| 6 | 4239.0 | -60.07 | 5.50 | 11.95 | Horizontal | -55.77 | -13.00 | 42.77 | 135 |
| 7 | 4945.5 | -61.25 | 5.70 | 13.55 | Horizontal | -55.55 | -13.00 | 42.55 | 225 |
| 8 | 5652.0 | -61.42 | 6.30 | 13.75 | Horizontal | -56.12 | -13.00 | 43.12 | 45 |
| 9 | 6358.5 | -57.40 | 6.80 | 13.85 | Horizontal | -52.50 | -13.00 | 39.50 | 135 |
| 10 | 7065.0 | -55.97 | 6.90 | 14.25 | Horizontal | -50.77 | -13.00 | 37.77 | 225 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 17 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1420.0 | -45.54 | 2.00 | 10.75 | Horizontal | -38.94 | -13.00 | 25.94 | 0 |
| 3 | 2130.0 | -47.90 | 2.51 | 11.05 | Horizontal | -41.51 | -13.00 | 28.51 | 135 |
| 4 | 2840.0 | -63.89 | 4.20 | 11.15 | Horizontal | -59.09 | -13.00 | 46.09 | 225 |
| 5 | 3550.0 | -62.90 | 5.20 | 11.15 | Horizontal | -59.10 | -13.00 | 46.10 | 45 |
| 6 | 4260.0 | -60.17 | 5.50 | 11.95 | Horizontal | -55.87 | -13.00 | 42.87 | 135 |
| 7 | 4970.0 | -57.63 | 5.70 | 13.55 | Horizontal | -51.93 | -13.00 | 38.93 | 45 |
| 8 | 5680.0 | -60.05 | 6.30 | 13.75 | Horizontal | -54.75 | -13.00 | 41.75 | 135 |
| 9 | 6390.0 | -58.57 | 6.80 | 13.85 | Horizontal | -53.67 | -13.00 | 40.67 | 0 |
| 10 | 7100.0 | -54.53 | 6.90 | 14.25 | Horizontal | -49.33 | -13.00 | 36.33 | 90 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 17 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1427.0 | -48.11 | 2.00 | 10.15 | Horizontal | -42.11 | -13.00 | 29.11 | 45 |
| 3 | 2140.5 | -48.70 | 2.51 | 11.05 | Horizontal | -42.31 | -13.00 | 29.31 | 135 |
| 4 | 2854.0 | -63.16 | 4.20 | 11.15 | Horizontal | -58.36 | -13.00 | 45.36 | 0 |
| 5 | 3567.5 | -61.48 | 5.20 | 11.15 | Horizontal | -57.68 | -13.00 | 44.68 | 135 |
| 6 | 4281.0 | -61.41 | 5.50 | 11.95 | Horizontal | -57.11 | -13.00 | 44.11 | 225 |
| 7 | 4994.5 | -54.70 | 5.70 | 13.55 | Horizontal | -49.00 | -13.00 | 36.00 | 45 |
| 8 | 5708.0 | -59.75 | 6.30 | 13.75 | Horizontal | -54.45 | -13.00 | 41.45 | 270 |
| 9 | 6421.5 | -58.50 | 6.80 | 13.85 | Horizontal | -53.60 | -13.00 | 40.60 | 315 |
| 10 | 7135.0 | -54.28 | 6.90 | 14.25 | Horizontal | -49.08 | -13.00 | 36.08 | 0 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 66 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3426.0 | -54.21 | 2.6 | 10.15 | Horizontal | -46.66 | -13.00 | 33.66 | 135 |
| 3 | 5131.1 | -61.03 | 2.4 | 11.35 | Horizontal | -52.08 | -13.00 | 39.08 | 225 |
| 4 | 6842.8 | -57.47 | 4.5 | 10.85 | Horizontal | -51.12 | -13.00 | 38.12 | 45 |
| 5 | 8553.5 | -54.06 | 5.1 | 11.35 | Horizontal | -47.81 | -13.00 | 34.81 | 135 |
| 6 | 10264.2 | -53.11 | 5.3 | 11.95 | Horizontal | -46.46 | -13.00 | 33.46 | 225 |
| 7 | 11974.9 | -51.52 | 5.5 | 13.55 | Horizontal | -43.47 | -13.00 | 30.47 | 45 |
| 8 | 13685.6 | -51.21 | 6.3 | 13.75 | Horizontal | -43.76 | -13.00 | 30.76 | 135 |
| 9 | 15396.3 | -49.44 | 6.7 | 13.85 | Horizontal | -42.29 | -13.00 | 29.29 | 45 |
| 10 | 17107.0 | -48.71 | 6.8 | 14.25 | Horizontal | -41.26 | -13.00 | 28.26 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 66 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3490.0 | -56.07 | 2.6 | 10.75 | Horizontal | -47.92 | -13.00 | 34.92 | 135 |
| 3 | 5235.0 | -62.44 | 2.4 | 11.05 | Horizontal | -53.79 | -13.00 | 40.79 | 45 |
| 4 | 6980.0 | -57.24 | 4.5 | 11.15 | Horizontal | -50.59 | -13.00 | 37.59 | 135 |
| 5 | 8725.0 | -55.15 | 5.1 | 11.35 | Horizontal | -48.90 | -13.00 | 35.90 | 0 |
| 6 | 10470.0 | -52.60 | 5.3 | 11.95 | Horizontal | -45.95 | -13.00 | 32.95 | 90 |
| 7 | 12215.0 | -53.12 | 5.5 | 13.55 | Horizontal | -45.07 | -13.00 | 32.07 | 135 |
| 8 | 13960.0 | -50.77 | 6.3 | 13.75 | Horizontal | -43.32 | -13.00 | 30.32 | 225 |
| 9 | 15705.0 | -51.63 | 6.7 | 13.85 | Horizontal | -44.48 | -13.00 | 31.48 | 45 |
| 10 | 17450.0 | -48.52 | 6.8 | 14.25 | Horizontal | -41.07 | -13.00 | 28.07 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 66 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | EIRP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 3559.5 | -54.69 | 2.6 | 10.15 | Horizontal | -47.14 | -13.00 | 34.14 | 225 |
| 3 | 5261.6 | -63.60 | 2.4 | 11.05 | Horizontal | -54.95 | -13.00 | 41.95 | 45 |
| 4 | 7017.2 | -59.24 | 4.5 | 11.15 | Horizontal | -52.59 | -13.00 | 39.59 | 135 |
| 5 | 8771.5 | -54.59 | 5.1 | 11.35 | Horizontal | -48.34 | -13.00 | 35.34 | 225 |
| 6 | 10525.8 | -53.46 | 5.3 | 11.95 | Horizontal | -46.81 | -13.00 | 33.81 | 45 |
| 7 | 12280.1 | -52.84 | 5.5 | 13.55 | Horizontal | -44.79 | -13.00 | 31.79 | 135 |
| 8 | 14034.4 | -52.77 | 6.3 | 13.75 | Horizontal | -45.32 | -13.00 | 32.32 | 45 |
| 9 | 15788.7 | -48.88 | 6.7 | 13.85 | Horizontal | -41.73 | -13.00 | 28.73 | 135 |
| 10 | 17543.0 | -49.53 | 6.8 | 14.25 | Horizontal | -42.08 | -13.00 | 29.08 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 71 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1326.0 | -45.61 | 2.00 | 10.15 | Horizontal | -39.61 | -13.00 | 26.61 | 135 |
| 3 | 1989.0 | -44.95 | 2.50 | 11.35 | Horizontal | -38.25 | -13.00 | 25.25 | 0 |
| 4 | 2662.0 | -60.09 | 4.20 | 10.85 | Horizontal | -55.59 | -13.00 | 42.59 | 90 |
| 5 | 3327.5 | -64.22 | 5.20 | 11.35 | Horizontal | -60.22 | -13.00 | 47.22 | 135 |
| 6 | 3993.0 | -62.16 | 5.50 | 11.95 | Horizontal | -57.86 | -13.00 | 44.86 | 225 |
| 7 | 4658.5 | -60.82 | 5.70 | 13.55 | Horizontal | -55.12 | -13.00 | 42.12 | 45 |
| 8 | 5324.0 | -58.10 | 6.30 | 13.75 | Horizontal | -52.80 | -13.00 | 39.80 | 135 |
| 9 | 5989.5 | -58.12 | 6.80 | 13.85 | Horizontal | -53.22 | -13.00 | 40.22 | 225 |
| 10 | 6655.0 | -56.62 | 6.90 | 14.25 | Horizontal | -51.42 | -13.00 | 38.42 | 135 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 71 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1361.0 | -48.58 | 2.00 | 10.75 | Horizontal | -41.98 | -13.00 | 28.98 | 135 |
| 3 | 2041.5 | -50.73 | 2.51 | 11.05 | Horizontal | -44.34 | -13.00 | 31.34 | 135 |
| 4 | 2722.0 | -62.55 | 4.20 | 11.15 | Horizontal | -57.75 | -13.00 | 44.75 | 225 |
| 5 | 3402.5 | -62.51 | 5.20 | 11.15 | Horizontal | -58.71 | -13.00 | 45.71 | 225 |
| 6 | 4083.0 | -61.01 | 5.50 | 11.95 | Horizontal | -56.71 | -13.00 | 43.71 | 135 |
| 7 | 4763.5 | -62.02 | 5.70 | 13.55 | Horizontal | -56.32 | -13.00 | 43.32 | 225 |
| 8 | 5444.0 | -58.57 | 6.30 | 13.75 | Horizontal | -53.27 | -13.00 | 40.27 | 45 |
| 9 | 6124.5 | -58.86 | 6.80 | 13.85 | Horizontal | -53.96 | -13.00 | 40.96 | 135 |
| 10 | 6805.0 | -57.45 | 6.90 | 14.25 | Horizontal | -52.25 | -13.00 | 39.25 | 225 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 71 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1395.3 | -47.68 | 2.00 | 10.15 | Horizontal | -41.68 | -13.00 | 28.68 | 45 |
| 3 | 2093.5 | -51.40 | 2.51 | 11.05 | Horizontal | -45.01 | -13.00 | 32.01 | 135 |
| 4 | 2790.0 | -61.15 | 4.20 | 11.15 | Horizontal | -56.35 | -13.00 | 43.35 | 225 |
| 5 | 3477.5 | -60.90 | 5.20 | 11.15 | Horizontal | -57.10 | -13.00 | 44.10 | 45 |
| 6 | 4173.0 | -60.69 | 5.50 | 11.95 | Horizontal | -56.39 | -13.00 | 43.39 | 135 |
| 7 | 4868.5 | -61.05 | 5.70 | 13.55 | Horizontal | -55.35 | -13.00 | 42.35 | 225 |
| 8 | 5564.0 | -59.90 | 6.30 | 13.75 | Horizontal | -54.60 | -13.00 | 41.60 | 45 |
| 9 | 6259.5 | -57.16 | 6.80 | 13.85 | Horizontal | -52.26 | -13.00 | 39.26 | 135 |
| 10 | 6955.0 | -54.08 | 6.90 | 14.25 | Horizontal | -48.88 | -13.00 | 35.88 | 45 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 85 CH-Low, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1396.2 | -48.62 | 2.00 | 10.15 | Horizontal | -42.62 | -13.00 | 29.62 | 135 |
| 3 | 2094.3 | -50.06 | 2.50 | 11.35 | Horizontal | -43.36 | -13.00 | 30.36 | 0 |
| 4 | 2792.4 | -62.33 | 4.20 | 10.85 | Horizontal | -57.83 | -13.00 | 44.83 | 45 |
| 5 | 3490.5 | -58.38 | 5.20 | 11.35 | Horizontal | -54.38 | -13.00 | 41.38 | 135 |
| 6 | 4188.6 | -54.03 | 5.50 | 11.95 | Horizontal | -49.73 | -13.00 | 36.73 | 225 |
| 7 | 4886.7 | -56.10 | 5.70 | 13.55 | Horizontal | -50.40 | -13.00 | 37.40 | 135 |
| 8 | 5584.8 | -55.98 | 6.30 | 13.75 | Horizontal | -50.68 | -13.00 | 37.68 | 225 |
| 9 | 6282.9 | -55.75 | 6.80 | 13.85 | Horizontal | -50.85 | -13.00 | 37.85 | 45 |
| 10 | 6981.0 | -55.74 | 6.90 | 14.25 | Horizontal | -50.54 | -13.00 | 37.54 | 225 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |

NB-IOT Band 85 CH-Middle, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1411.8 | -47.40 | 2.00 | 10.75 | Horizontal | -40.80 | -13.00 | 27.80 | 270 |
| 3 | 2117.7 | -50.69 | 2.51 | 11.05 | Horizontal | -44.30 | -13.00 | 31.30 | 0 |
| 4 | 2823.6 | -63.50 | 4.20 | 11.15 | Horizontal | -58.70 | -13.00 | 45.70 | 270 |
| 5 | 3529.5 | -57.88 | 5.20 | 11.15 | Horizontal | -54.08 | -13.00 | 41.08 | 45 |
| 6 | 4235.4 | -54.47 | 5.50 | 11.95 | Horizontal | -50.17 | -13.00 | 37.17 | 135 |
| 7 | 4941.3 | -54.97 | 5.70 | 13.55 | Horizontal | -49.27 | -13.00 | 37.86 | 135 |
| 8 | 5647.2 | -56.16 | 6.30 | 13.75 | Horizontal | -50.86 | -13.00 | 38.07 | 45 |
| 9 | 6353.1 | -55.97 | 6.80 | 13.85 | Horizontal | -51.07 | -13.00 | 38.34 | 135 |
| 10 | 7059.0 | -56.54 | 6.90 | 14.25 | Horizontal | -51.34 | -13.00 | 38.34 | 0 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

NB-IOT Band 85 CH-High, RB 1

| Harmonic | Frequency (MHz) | SG (dBm) | Cable Loss (dB) | Gain (dBi) | Antenna Polarization | ERP Level (dBm) | Limit (dBm) | Margin (dB) | Azimuth (deg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 1431.8 | -48.25 | 2.00 | 10.15 | Horizontal | -42.25 | -13.00 | 29.25 | 45 |
| 3 | 2147.7 | -51.62 | 2.51 | 11.05 | Horizontal | -45.23 | -13.00 | 32.23 | 135 |
| 4 | 2863.6 | -62.34 | 4.20 | 11.15 | Horizontal | -57.54 | -13.00 | 44.54 | 0 |
| 5 | 3579.5 | -57.24 | 5.20 | 11.15 | Horizontal | -53.44 | -13.00 | 40.44 | 90 |
| 6 | 4295.4 | -55.47 | 5.50 | 11.95 | Horizontal | -51.17 | -13.00 | 38.17 | 135 |
| 7 | 5011.3 | -56.05 | 5.70 | 13.55 | Horizontal | -50.35 | -13.00 | 37.35 | 45 |
| 8 | 5727.2 | -55.84 | 6.30 | 13.75 | Horizontal | -50.54 | -13.00 | 37.54 | 270 |
| 9 | 6443.1 | -56.30 | 6.80 | 13.85 | Horizontal | -51.40 | -13.00 | 38.40 | 315 |
| 10 | 7159.0 | -55.90 | 6.90 | 14.25 | Horizontal | -50.70 | -13.00 | 37.70 | 0 |
| Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.<br>2. The worst emission was found in the antenna is Horizontal position. | | | | | | | | | |


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

# 6 Main Test Instruments

| Name | Manufacturer | Type | Serial Number | Calibration Date | Expiration Date |
|---|---|---|---|---|---|
| Base Station Simulator | R&S | CMW500 | 113824 | 2019-05-19 | 2020-05-18 |
| Power Splitter | Hua Xiang | SHX-GF2-2-13 | 10120101 | / | / |
| Spectrum Analyzer | Key sight | N9010A | MY50210259 | 2019-05-19 | 2020-05-18 |
| Signal Analyzer | R&S | FSV30 | 100815 | 2018-12-16 | 2019-12-15 |
| Loop Antenna | SCHWARZBECK | FMZB1519 | 1519-047 | 2017-09-26 | 2019-09-25 |
| Trilog Antenna | SCHWARZBECK | VUBL 9163 | 9163-201 | 2017-11-18 | 2019-11-17 |
| Horn Antenna | R&S | HF907 | 100126 | 2018-07-07 | 2020-07-06 |
| Horn Antenna | ETS-Lindgren | 3160-09 | 00102643 | 2018-06-20 | 2020-06-19 |
| Signal generator | R&S | SMB 100A | 102594 | 2019-05-19 | 2020-05-18 |
| Climatic Chamber | ESPEC | SU-242 | 93000506 | 2017-12-17 | 2020-12-16 |
| Preampflier | R&S | SCU18 | 102327 | 2019-05-19 | 2020-05-18 |
| MOB COMMS DC SUPPLY | Keysight | 66319D | MY43004105 | 2019-05-19 | 2020-05-18 |
| RF Cable | Agilent | SMA 15cm | 0001 | 2019-06-14 | 2019-09-13 |
| Software | R&S | EMC32 | 9.26.0 | / | / |

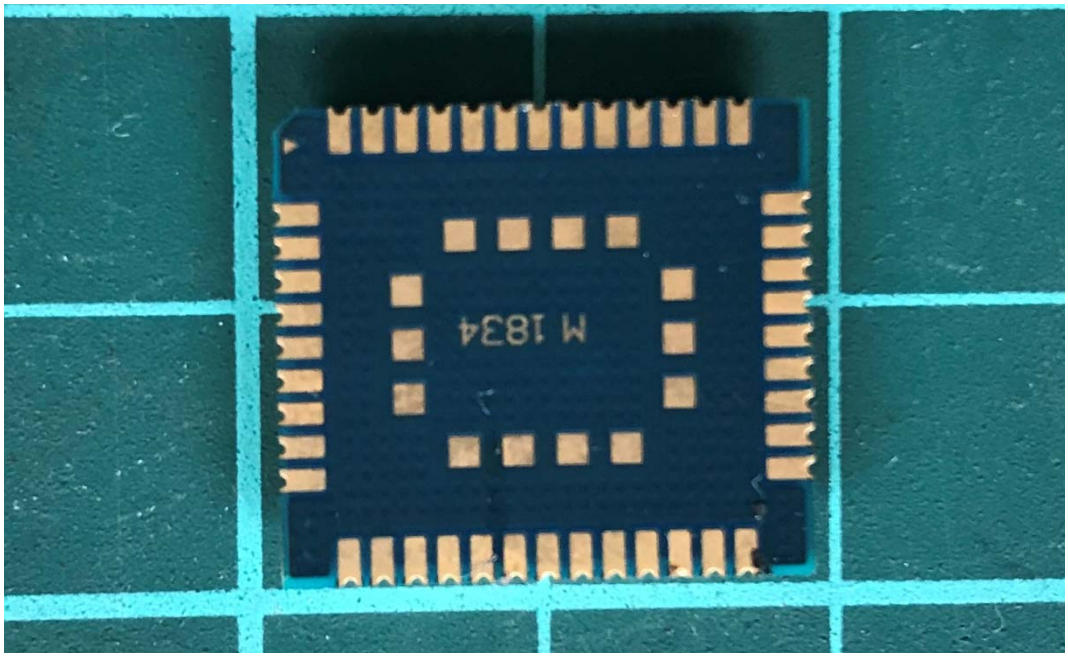
*******END OF REPORT *******


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

# ANNEX A: EUT Appearance and Test Setup

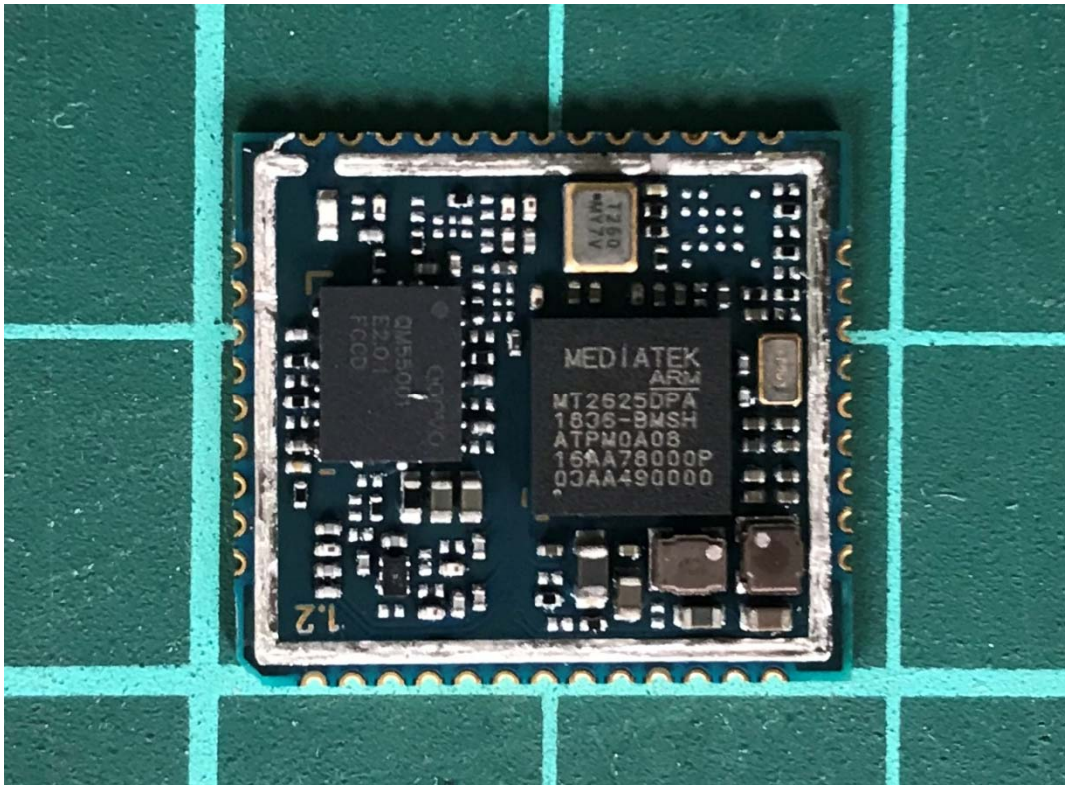
## A.1 EUT Appearance

Front Side



Back Side


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*



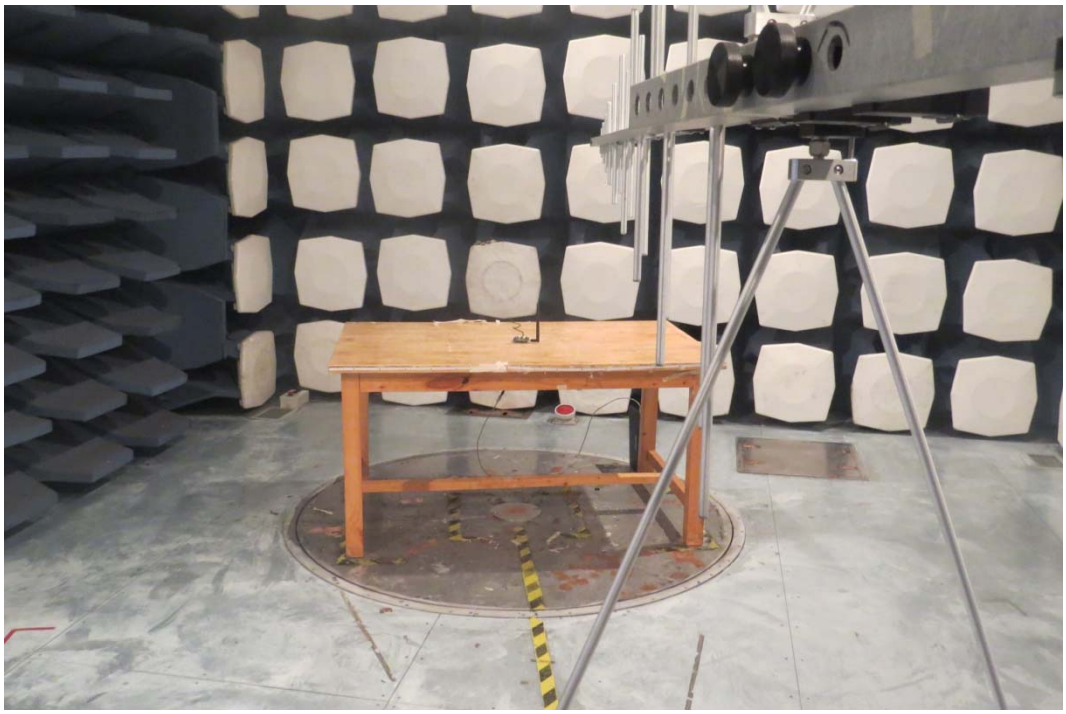

Unshielded

a: EUT

**Picture 1 EUT and Accessory**


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*

## A.2 Test Setup



**30MHz ~ 1GHz**

**Above 1GHz**

**Picture 2 Radiated Spurious Emissions Test setup**


*This report shall not be reproduced except in full, without the written approval of TA Technology (Shanghai) Co., Ltd.*