Certificate #6613.01

VARIANT FCC TEST REPORT

(PART 24)

Applicant:	NORDIC SEMICONDUCTOR ASA
Address:	Otto Nielsens Vei 12, 7052 Trondheim, Norway

Manufacturer or Supplier:	NORDIC SEMICONDUCTOR ASA
Address:	Otto Nielsens Vei 12, 7052 Trondheim, Norway
Product:	Cellular IoT module
Brand Name:	nRF91
Model Name:	nRF9151
FCC ID	2ANPO00NRF9151
Date of tests	Apr. 12, 2024 ~ Jun. 14, 2024

The tests have been carried out according to the requirements of the following standard:

☒ **FCC PART 24, Subpart E** ☒ **FCC PART 2**
☒ **ANSI/TIA/EIA-603-D** ☒ **ANSI/TIA/EIA-603-E** ☒ **ANSI C63.26-2015**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department
Date: Jun. 14, 2024	Date: Jun. 14, 2024

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
77535RRF.001	Original release	Mar. 21, 24
PSU-QSU2404090210RF02	Based on the original report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151). The firm wares are all the same, just different SW name and change Power class from PC3 to PC5. The new sample verify RSE worse case and conducted power. So this report only replaces the conducted power and RSE data. other test data refer to the original report.	Jun. 14, 2024

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 24 & Part 2			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**Test lab***
§2.1046	Coduncted Output Power	Compliance	A
§24.232(c)	Equivalent Isotropic Radiated Power	Compliance	A
§2.1055 §24.235	Frequency Stability	Compliance	See Note
§2.1049	Occupied Bandwidth	Compliance	See Note
§24.232(d)	Peak to average ratio*	Compliance	See Note
§24.238(a)(b)	Band Edge Measurements	Compliance	See Note
§2.1051 §24.238(a)(b)	Conducted Spurious Emissions	Compliance	See Note
§2.1053 §24.238(a)(b)	Radiated Spurious Emissions	Compliance	A

* Refer to KDB 971168 D01 Power Meas License Digital Systems v03r01.

Note: Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

***Test Lab Information Reference**

Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

Lab Address:

Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province

Accredited Test Lab Cert 6613.01

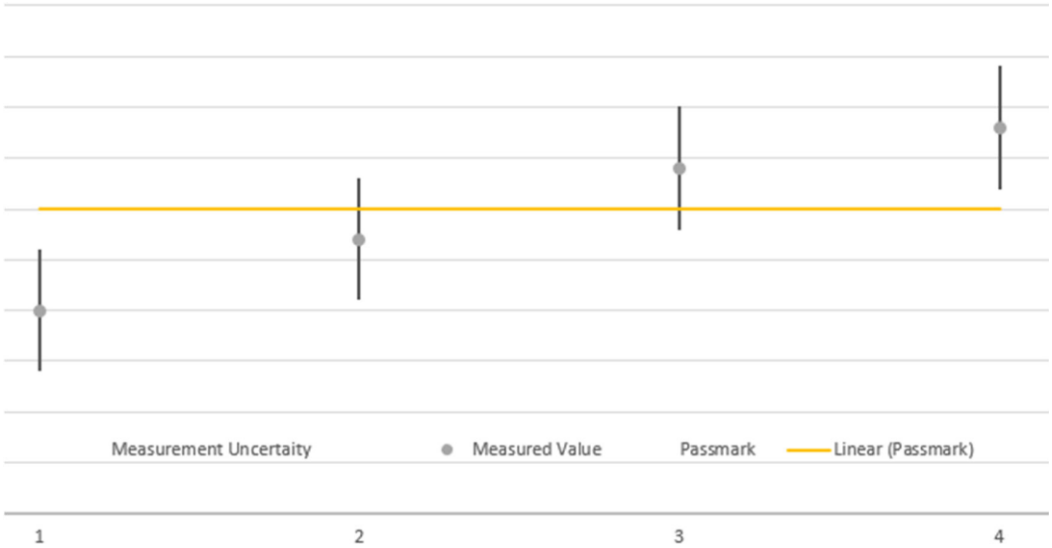
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
Frequency Stability	±76.97Hz
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions & Radiated Power (30MHz~1GHz)	±4.98dB
Radiated emissions & Radiated Power (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Band Edge Measurements	±4.70dB
Peak to average ratio	±0.76dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.

1.2 TEST SITE AND INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU08F1	101028	Sep.16,22	Sep.15,24
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A	182185	Mar.29,24	Mar.28,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESR26	101734	Mar.28,24	Mar.27,26
EMI TEST Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Bilog Antenna	SCHWARZBECK	VULB 9163	1264	Dec.26,23	Dec.25,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,22	Aug.21,24
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Feb.22,24	Feb.21,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,22	Aug.21,24
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.27,22	Jun.26,24
Test Software	EMC32	EMC32	N/A	N/A	N/A
6DB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	Oct.01,22	Sep.30,24
DC Source	HYELEC	HY3010B	551016	Aug.31,22	Aug.30,24
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,25
Temperature Chamber	votsch	VT4002	58566078100050	May.31,22	May.30,24
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26

NOTE: 1. The calibration interval of the above test instruments is 12/24/36 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Semi-anechoic Chamber and RF Oven Room.

3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 434559; The Designation No. is CN1325.

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT*	Cellular IoT module	
BRAND NAME*	nRF91	
MODEL NAME*	nRF9151	
NOMINAL VOLTAGE*	EUT 3.7Vdc	
MODULATION TYPE	**CAT-M1 / NB-IOT :LTE**	BPSK, QPSK, 16QAM
FREQUENCY RANGE CAT-M1	**LTE Band 2 Channel Bandwidth: 1.4MHz**	1850.7MHz ~ 1909.3MHz
	LTE Band 2 Channel Bandwidth: 3MHz	1851.5MHz ~ 1908.5MHz
	LTE Band 2 Channel Bandwidth: 5MHz	1852.5MHz ~ 1907.5MHz
	LTE Band 2 Channel Bandwidth: 10MHz	1855.0MHz ~ 1905.0MHz
	LTE Band 2 Channel Bandwidth: 15MHz	1857.5MHz ~ 1902.5MHz
	LTE Band 2 Channel Bandwidth: 20MHz	1860.0MHz ~ 1900.0MHz
	LTE Band 25 Channel Bandwidth: 1.4MHz	1850.7MHz ~ 1914.3MHz
	LTE Band 25 Channel Bandwidth: 3MHz	1851.5MHz ~ 1913.5MHz
	LTE Band 25 Channel Bandwidth: 5MHz	1852.5MHz ~ 1912.5MHz
	LTE Band 25 Channel Bandwidth: 10MHz	1855.0MHz ~ 1910.0MHz
	LTE Band 25 Channel Bandwidth: 15MHz	1857.5MHz ~ 1907.5MHz
	LTE Band 25 Channel Bandwidth: 20MHz	1860.0MHz ~ 1905.0MHz
FREQUENCY RANGE NB-IOT	**LTE Band 2 (Sub-carrier Spacing: 3.75/15KHz)**	1850.1MHz ~ 1909.9MHz
	LTE Band 25 (Sub-carrier Spacing: 3.75/15KHz)	1850.1MHz ~ 1914.9MHz
MAX. ERP POWER CAT-M1	**LTE Band 2 Channel Bandwidth: 1.4MHz**	181.97mW
	LTE Band 2 Channel Bandwidth: 3MHz	178.65mW

	LTE Band 2 Channel Bandwidth: 5MHz	177.83mW
	LTE Band 2 Channel Bandwidth: 10MHz	180.3mW
	LTE Band 2 Channel Bandwidth: 15MHz	179.89mW
	LTE Band 2 Channel Bandwidth: 20MHz	182.39mW
	LTE Band 25 Channel Bandwidth: 1.4MHz	179.06mW
	LTE Band 25 Channel Bandwidth: 3MHz	180.72mW
	LTE Band 25 Channel Bandwidth: 5MHz	177.42mW
	LTE Band 25 Channel Bandwidth: 10MHz	181.97mW
	LTE Band 25 Channel Bandwidth: 15MHz	180.3mW
	LTE Band 25 Channel Bandwidth: 20MHz	182.39mW
MAX. ERP POWER NB-IOT	**LTE Band 2 (Sub-carrier Spacing: 3.75KHz)**	184.5mW
	LTE Band 2 (Sub-carrier Spacing: 15KHz)	190.55mW
	LTE Band 25 (Sub-carrier Spacing: 3.75KHz)	186.21mW
	LTE Band 25 (Sub-carrier Spacing: 15KHz)	189.23mW
EMISSION DESIGNATORGOGN CAT-M1	**LTE Band 25 Channel Bandwidth: 1.4MHz**	QPSK: 1M11G7D
		16QAM: 965KD7D
EMISSION DESIGNATORGOGN NB-IOT	**LTE Band 25 (Sub-carrier Spacing: 15KHz)**	BPSK: 127KG7D
		QPSK: 188KG7D
ANTENNA TYPE*	RF4 Embedded LTE Antenna with 3.0dBi gain for LTE B2/ LTE B25	
HW VERSION*	nRF9151 LACA AA	
SW VERSION*	mfw_nRF91x1_2.0.1	
I/O PORTS*	Refer to user's manual	
CABLE SUPPLIED*	N/A	

EXTREME TEMPERATURE*	-40-85 ℃
EXTREME VOLTAGE*	3.0V - 5.5V

NOTE:

1. ***Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

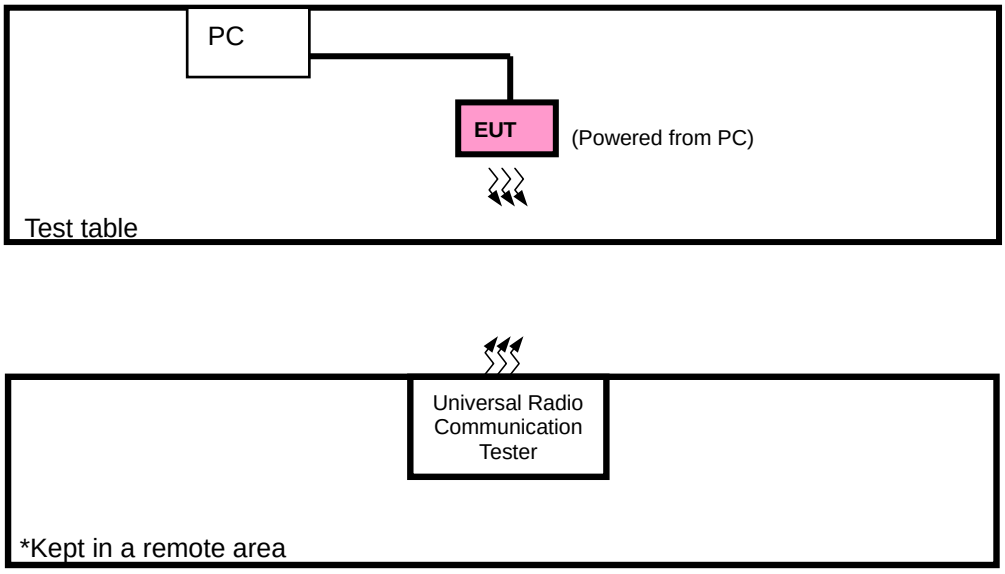
3. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
LTE	1TX/1RX

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

2.2 CONFIGURATION OF SYSTEM UNDER TEST

FOR RADIATION EMISSION TEST



2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	ThinkPad E14	HRSW00024	N/A
2	USB Cable	RF Murata cable for Cellular IoT	MXHS83QE3000	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

2.4 TEST ITEM AND TEST CONFIGURATION

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports The worst case in EIRP and radiated emission was found when positioned on X-plane for GSM/EDGE/ LTE. Following channel(s) was (were) selected for the final test as listed below:

EUT CONFIGURE MODE	DESCRIPTION
A	**EUT + USB Cable with LTE link**

LTE BAND 2 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
CAT-M1	EIRP	18607 to 19193	18607, 18900, 19193	1.4MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18615 to 19185	18615, 18900, 19185	3MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18625 to 19175	18625, 18900, 19175	5MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18650 to 19150	18650, 18900, 19150	10MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18675 to 19125	18675, 18900, 19125	15MHz	QPSK,16QAM	1 RB / 0 RB Offset
		18700 to 19100	18700, 18900, 19100	20MHz	QPSK,16QAM	1 RB / 0 RB Offset
NB-IOT	EIRP	18601 to 19199	18602, 18900, 19198	3.75KHz	BPSK,QPSK	1 RB / 0 RB Offset
		18601 to 19199	18602, 18900, 19198	15KHz	BPSK,QPSK	1 RB / 0 RB Offset

Note: 1.This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

2. LTE Band 2 are covered by LTE Band 25, Because it is a subset of LTE Band 25 with the same output power and supported bandwidths, So the conducted test data and RSE test data please refer to LTE Band 25

CAT-M1 LTE BAND 25 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	CHANNEL BANDWIDTH	MODULATION	MODE
A	EIRP	26047 to 26683	26047, 26365, 26683	1.4MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		26055 to 26675	26055, 26365, 26675	3MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		26065 to 26665	26065, 26365, 26665	5MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		26090 to 26640	26090, 26365 26640	10MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		26115 to 26615	26115, 26365, 26615	15MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
		26140 to 26590	26140, 26365, 26590	20MHz	QPSK,16QAM, 64QAM	1 RB / 0 RB Offset
A	RADIATED EMISSION	26047 to 26683	26365	1.4MHz	QPSK	1 RB / 0 RB Offset
		26055 to 26675	26365	3MHz	QPSK	1 RB / 0 RB Offset
		26065 to 26665	26365	5MHz	QPSK	1 RB / 0 RB Offset
		26090 to 26640	26090,26365,26640	10MHz	QPSK	1 RB / 0 RB Offset
		26115 to 26615	26365	15MHz	QPSK	1 RB / 0 RB Offset
		26140 to 26590	26365	20MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

NB-IOT LTE BAND 25 MODE

EUT CONFIGURE MODE	TEST ITEM	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	MODE
A	EIRP	26041 to 26689	26041,26365,26689	BPSK,QPSK	1 RB / 0 RB Offset
A	RADIATED EMISSION	26042 to 26688	26042,26365,26688	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

TEST CONDITION:

TEST ITEM	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
ERP	23deg. C, 70%RH	DC 3.7V By PC	Hanwen Xu
RADIATED EMISSION	23deg. C, 70%RH	DC 3.7V By PC	Hanwen Xu

2.5 EUT OPERATING CONDITIONS

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency.

2.6 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 24

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI/TIA/EIA-603-D

ANSI/TIA/EIA-603-E

ANSI C63.26-2015

NOTE: All test items have been performed and recorded as per the above standards.

3 TEST TYPES AND RESULTS

3.1 OUTPUT POWER MEASUREMENT

3.1.1 LIMITS OF OUTPUT POWER MEASUREMENT

Mobile and portable stations are limited to 2 watts EIRP.

3.1.2 TEST PROCEDURES

EIRP MEASUREMENT:

Per KDB 971168 D01 Power Meas License Digital Systems v03r01 or subclause 5.2.5.5 of ANSI C63.26-2015, the relevant equation for determing the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP = $P_{Meas} + G_T – L_C$

Where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as P_{Meas}, typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

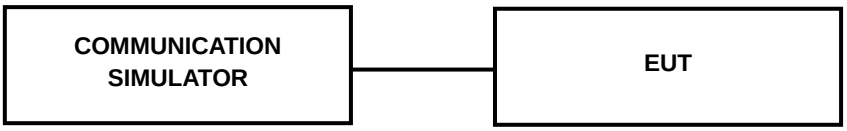
CONDUCTED POWER MEASUREMENT:

The EUT was set up for the maximum power with WCDMA link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

3.1.3 TEST SETUP

EIRP / ERP Measurement:

CONDUCTED POWER MEASUREMENT:



3.1.4 TEST RESULTS

CONDUCTED OUTPUT POWER (dBm) :

CAT-M1

LTE BAND 2

Band/BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz
2/ 1.4	QPSK	1	0	19.44	19.35	19.15
		1	5	19.25	19.24	19.17
		3	0	19.43	19.48	19.27
		3	3	19.32	19.22	19.22
		6	0	19.26	19.29	19.25
	16QAM	1	0	19.41	19.44	19.44
		1	5	19.60	19.47	19.42
		3	0	19.30	19.29	19.20
		3	3	19.32	19.27	19.32
		6	0	19.28	19.19	19.32

Band/BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz
2/ 3	QPSK	1	0	19.44	19.30	19.11
		1	5	19.25	19.30	19.21
		3	0	19.40	19.46	19.17
		3	3	19.36	19.27	19.20
		6	0	19.30	19.21	19.28
	16QAM	1	0	19.40	19.32	19.34
		1	5	19.52	19.37	19.33
		3	0	19.31	19.28	19.26
		3	3	19.25	19.26	19.32
		6	0	19.21	19.13	19.23

Band/BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz
2/ 5	QPSK	1	0	19.45	19.25	19.18
		1	5	19.34	19.29	19.26
		3	0	19.43	19.35	19.29
		3	3	19.35	19.29	19.28
		6	0	19.34	19.24	19.32
	16QAM	1	0	19.37	19.42	19.45
		1	5	19.50	19.40	19.45
		3	0	19.31	19.20	19.30
		3	3	19.25	19.26	19.24
		6	0	19.27	19.20	19.28

Band/BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz
2/ 10	QPSK	1	0	19.32	19.36	19.21
		1	5	19.29	19.21	19.22
		3	0	19.37	19.38	19.27
		3	3	19.38	19.27	19.22
		6	0	19.31	19.26	19.20
	16QAM	1	0	19.47	19.30	19.36
		1	5	19.56	19.42	19.42
		3	0	19.22	19.25	19.29
		3	3	19.22	19.25	19.26
		6	0	19.23	19.25	19.36

Band/BW	Modulation	RB Size	RB Offset	Low CH 18675	Mid CH 18900	High CH 19125
				Frequency 1857.5 MHz	Frequency 1880 MHz	Frequency 1902.5 MHz
2/ 15	QPSK	1	0	19.34	19.25	19.15
		1	5	19.32	19.27	19.15
		3	0	19.41	19.45	19.23
		3	3	19.35	19.16	19.17
		6	0	19.26	19.33	19.25
	16QAM	1	0	19.41	19.43	19.42
		1	5	19.55	19.46	19.44
		3	0	19.31	19.18	19.30
		3	3	19.32	19.28	19.23
		6	0	19.28	19.16	19.32

Band/BW	Modulation	RB Size	RB Offset	Low CH 18700	Mid CH 18900	High CH 19100
				Frequency 1860 MHz	Frequency 1880 MHz	Frequency 1900 MHz
2/ 20	QPSK	1	0	19.46	19.39	19.25
		1	5	19.39	19.31	19.28
		3	0	19.46	19.50	19.30
		3	3	19.42	19.30	19.32
		6	0	19.36	19.34	19.35
	16QAM	1	0	19.51	19.45	19.48
		1	5	19.61	19.52	19.46
		3	0	19.34	19.30	19.31
		3	3	19.34	19.33	19.37
		6	0	19.36	19.28	19.38

LTE BAND 25

Band/BW	Modulation	RB Size	RB Offset	Low CH 26047	Mid CH 26365	High CH 26683
				Frequency 1850.7 MHz	Frequency 1882.5 MHz	Frequency 1914.3 MHz
25/ 1.4	QPSK	1	0	19.27	19.31	19.23
		1	5	19.25	19.22	19.22
		3	0	19.38	19.41	19.28
		3	3	19.37	19.34	19.28
		6	0	19.41	19.34	19.25
	16QAM	1	0	19.37	19.36	19.28
		1	5	19.53	19.35	19.32
		3	0	19.29	19.26	19.22
		3	3	19.41	19.13	19.18
		6	0	19.33	19.24	19.33

Band/BW	Modulation	RB Size	RB Offset	Low CH 26055	Mid CH 26365	High CH 26675
				Frequency 1851.5 MHz	Frequency 1882.5 MHz	Frequency 1913.5 MHz
25/ 3	QPSK	1	0	19.28	19.33	19.35
		1	5	19.33	19.28	19.29
		3	0	19.33	19.43	19.36
		3	3	19.47	19.31	19.20
		6	0	19.33	19.26	19.36
	16QAM	1	0	19.41	19.45	19.30
		1	5	19.57	19.35	19.27
		3	0	19.36	19.25	19.17
		3	3	19.36	19.22	19.32
		6	0	19.35	19.25	19.35

Band/BW	Modulation	RB Size	RB Offset	Low CH 26065	Mid CH 26365	High CH 26665
				Frequency 1852.5 MHz	Frequency 1882.5 MHz	Frequency 1912.5 MHz
25/ 5	QPSK	1	0	19.29	19.26	19.37
		1	5	19.27	19.26	19.15
		3	0	19.33	19.42	19.40
		3	3	19.42	19.31	19.25
		6	0	19.29	19.25	19.31
	16QAM	1	0	19.44	19.47	19.30
		1	5	19.49	19.44	19.33
		3	0	19.33	19.18	19.17
		3	3	19.39	19.13	19.22
		6	0	19.26	19.21	19.28

Band/BW	Modulation	RB Size	RB Offset	Low CH 26090	Mid CH 26365	High CH 26640
				Frequency 1855 MHz	Frequency 1882.5 MHz	Frequency 1910 MHz
25/ 10	QPSK	1	0	19.25	19.28	19.28
		1	5	19.24	19.25	19.22
		3	0	19.32	19.46	19.35
		3	3	19.36	19.34	19.30
		6	0	19.32	19.30	19.27
	16QAM	1	0	19.50	19.42	19.35
		1	5	19.60	19.43	19.33
		3	0	19.26	19.22	19.11
		3	3	19.41	19.22	19.19
		6	0	19.31	19.27	19.25

Band/BW	Modulation	RB Size	RB Offset	Low CH 26115	Mid CH 26365	High CH 26615
				Frequency 1857.5 MHz	Frequency 1882.5 MHz	Frequency 1907.5 MHz
25/ 15	QPSK	1	0	19.31	19.34	19.29
		1	5	19.30	19.22	19.22
		3	0	19.37	19.37	19.28
		3	3	19.36	19.36	19.29
		6	0	19.40	19.26	19.31
	16QAM	1	0	19.46	19.33	19.31
		1	5	19.56	19.43	19.31
		3	0	19.25	19.12	19.12
		3	3	19.40	19.25	19.23
		6	0	19.29	19.29	19.35

Band/BW	Modulation	RB Size	RB Offset	Low CH 26140	Mid CH 26365	High CH 26590
				Frequency 1860 MHz	Frequency 1882.5 MHz	Frequency 1905 MHz
25/ 20	QPSK	1	0	19.38	19.35	19.38
		1	5	19.36	19.34	19.30
		3	0	19.42	19.49	19.41
		3	3	19.48	19.42	19.34
		6	0	19.42	19.37	19.37
	16QAM	1	0	19.51	19.48	19.37
		1	5	19.61	19.49	19.39
		3	0	19.40	19.27	19.26
		3	3	19.44	19.26	19.33
		6	0	19.37	19.30	19.38

NB-IOT

LTE Band 2						
Sub-carrier Spacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		18601	18900	19199
		Frequence (MHz)		1850.1	1880	1909.9
3.75	BPSK	1	0	19.63	19.54	19.43
		1	47	19.58	19.57	19.47
	QPSK	1	0	19.54	19.66	19.56
		1	47	19.59	19.60	19.49
15	BPSK	1	0	**19.80**	19.66	19.57
		1	11	19.79	19.64	19.60
	QPSK	1	0	19.58	19.70	19.64
		1	11	19.57	19.69	19.62
		12	0	17.59	17.50	17.40

LTE Band 25						
Sub-carrier Spacing (KHz)	Modulation	RB Size	RB Offset	Low	Mid	High
		Channel		26041	26365	26689
		Frequence (MHz)		1850.1	1882.5	1914.9
3.75	BPSK	1	0	19.57	19.58	19.51
		1	47	19.51	19.69	19.42
	QPSK	1	0	19.64	19.57	19.48
		1	47	19.60	19.70	19.42
12	BPSK	1	0	19.76	19.59	19.57
		1	11	19.75	19.56	19.55
	QPSK	1	0	19.74	19.54	19.55
		1	11	**19.77**	19.58	19.57
		12	0	17.50	17.39	17.26

EIRP POWER (dBm)

CAT-M1

LTE BAND 2

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	19.44	3	22.44	175.39	2
18900	1880	19.48	3	22.48	177.01	2
19193	1909.3	19.27	3	22.27	168.66	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18607	1850.7	19.6	3	22.6	181.97	2
18900	1880	19.47	3	22.47	176.6	2
19193	1909.3	19.44	3	22.44	175.39	2

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	19.44	3	22.44	175.39	2
18900	1880	19.46	3	22.46	176.2	2
19185	1908.5	19.28	3	22.28	169.04	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18615	1851.5	19.52	3	22.52	178.65	2
18900	1880	19.37	3	22.37	172.58	2
19185	1908.5	19.34	3	22.34	171.4	2

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	19.45	3	22.45	175.79	2
18900	1880	19.35	3	22.35	171.79	2
19175	1907.5	19.32	3	22.32	170.61	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18625	1852.5	19.5	3	22.5	177.83	2
18900	1880	19.42	3	22.42	174.58	2
19175	1907.5	19.45	3	22.45	175.79	2

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855	19.38	3	22.38	172.98	2
18900	1880	19.38	3	22.38	172.98	2
19150	1905	19.27	3	22.27	168.66	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18650	1855	19.56	3	22.56	180.3	2
18900	1880	19.42	3	22.42	174.58	2
19150	1905	19.42	3	22.42	174.58	2

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	19.41	3	22.41	174.18	2
18900	1880	19.45	3	22.45	175.79	2
19125	1902.5	19.25	3	22.25	167.88	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18675	1857.5	19.55	3	22.55	179.89	2
18900	1880	19.46	3	22.46	176.2	2
19125	1902.5	19.44	3	22.44	175.39	2

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	19.46	3	22.46	176.2	2
18900	1880	19.5	3	22.5	177.83	2
19100	1900	19.35	3	22.35	171.79	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
18700	1860	19.61	3	22.61	182.39	2
18900	1880	19.52	3	22.52	178.65	2
19100	1900	19.48	3	22.48	177.01	2

CAT-M1

LTE BAND 25

CHANNEL BANDWIDTH: 1.4MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26047	1850.7	19.41	3	22.41	174.18	2
26365	1882.5	19.41	3	22.41	174.18	2
26683	1914.3	19.28	3	22.28	169.04	2

CHANNEL BANDWIDTH: 1.4MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26047	1850.7	19.53	3	22.53	179.06	2
26365	1882.5	19.36	3	22.36	172.19	2
26683	1914.3	19.33	3	22.33	171	2

CHANNEL BANDWIDTH: 3MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26055	1851.5	19.47	3	22.47	176.6	2
26365	1882.5	19.43	3	22.43	174.98	2
26675	1913.5	19.36	3	22.36	172.19	2

CHANNEL BANDWIDTH: 3MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26055	1851.5	19.57	3	22.57	180.72	2
26365	1882.5	19.45	3	22.45	175.79	2
26675	1913.5	19.35	3	22.35	171.79	2

CHANNEL BANDWIDTH: 5MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26065	1852.5	19.42	3	22.42	174.58	2
26365	1882.5	19.42	3	22.42	174.58	2
26665	1912.5	19.4	3	22.4	173.78	2

CHANNEL BANDWIDTH: 5MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26065	1852.5	19.49	3	22.49	177.42	2
26365	1882.5	19.47	3	22.47	176.6	2
26665	1912.5	19.33	3	22.33	171	2

CHANNEL BANDWIDTH: 10MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26090	1855	19.36	3	22.36	172.19	2
26365	1882.5	19.46	3	22.46	176.2	2
26640	1910	19.35	3	22.35	171.79	2

CHANNEL BANDWIDTH: 10MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26090	1855	19.6	3	22.6	181.97	2
26365	1882.5	19.43	3	22.43	174.98	2
26640	1910	19.35	3	22.35	171.79	2

CHANNEL BANDWIDTH: 15MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26115	1857.5	19.4	3	22.4	173.78	2
26365	1882.5	19.37	3	22.37	172.58	2
26615	1907.5	19.31	3	22.31	170.22	2

CHANNEL BANDWIDTH: 15MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26115	1857.5	19.56	3	22.56	180.3	2
26365	1882.5	19.43	3	22.43	174.98	2
26615	1907.5	19.35	3	22.35	171.79	2

CHANNEL BANDWIDTH: 20MHz QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26140	1860	19.48	3	22.48	177.01	2
26365	1882.5	19.49	3	22.49	177.42	2
26590	1905	19.41	3	22.41	174.18	2

CHANNEL BANDWIDTH: 20MHz 16QAM

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	EIRP (dBm)	EIRP (mW)	Limit (W)
26140	1860	19.61	3	22.61	182.39	2
26365	1882.5	19.49	3	22.49	177.42	2
26590	1905	19.39	3	22.39	173.38	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

NB-IOT

LTE B2 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18601	1850.1	19.63	3	22.63	183.23	2
18900	1880	19.57	3	22.57	180.72	2
19199	1909.9	19.47	3	22.47	176.6	2

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18601	1850.1	19.59	3	22.59	181.55	2
18900	1880	19.66	3	22.66	184.5	2
19199	1909.9	19.56	3	22.56	180.3	2

LTE B2 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18601	1850.1	19.8	3	22.8	190.55	2
18900	1880	19.66	3	22.66	184.5	2
19199	1909.9	19.6	3	22.6	181.97	2

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
18601	1850.1	19.58	3	22.58	181.13	2
18900	1880	19.7	3	22.7	186.21	2
19199	1909.9	19.64	3	22.64	183.65	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

NB-IOT

LTE B25 3.75KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26041	1850.1	19.57	3	22.57	180.72	2
26365	1882.5	19.69	3	22.69	185.78	2
26689	1914.9	19.51	3	22.51	178.24	2

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26041	1850.1	19.64	3	22.64	183.65	2
26365	1882.5	19.7	3	22.7	186.21	2
26689	1914.9	19.48	3	22.48	177.01	2

LTE B25 15KHz

CHANNEL BANDWIDTH: BPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26041	1850.1	19.76	3	22.76	188.8	2
26365	1882.5	19.59	3	22.59	181.55	2
26689	1914.9	19.57	3	22.57	180.72	2

CHANNEL BANDWIDTH: QPSK

Channel	Frequency (MHz)	Conducted Power (dBm)	G_T-L_C (dB)	ERP (dBm)	ERP (mW)	Limit (W)
26041	1850.1	19.77	3	22.77	189.23	2
26365	1882.5	19.58	3	22.58	181.13	2
26689	1914.9	19.57	3	22.57	180.72	2

REMARKS: ERP Output Power (dBm) = EIRP (dBm) -2.15(dB).

3.2 FREQUENCY STABILITY MEASUREMENT

3.2.1 LIMITS OF FREQUENCY STABILIITY MEASUREMENT

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

3.2.2 TEST PROCEDURE

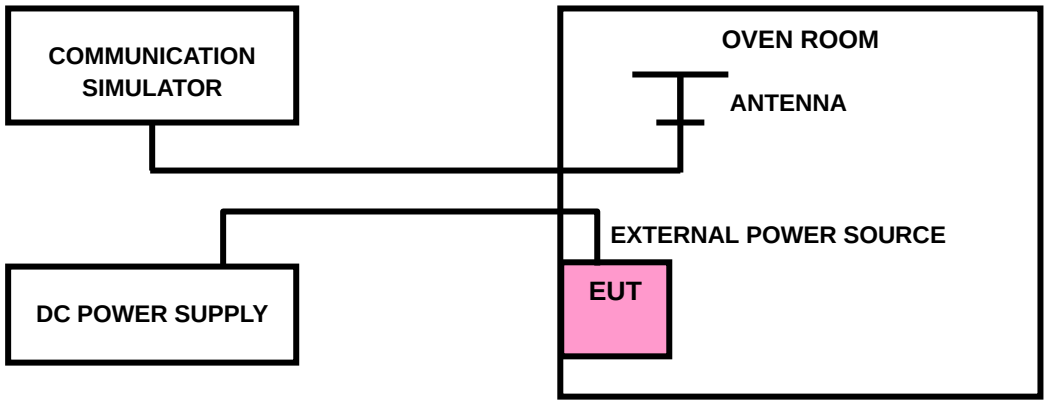
a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.

b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.

c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5℃ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

3.2.3 TEST SETUP



3.2.4 TEST RESULTS

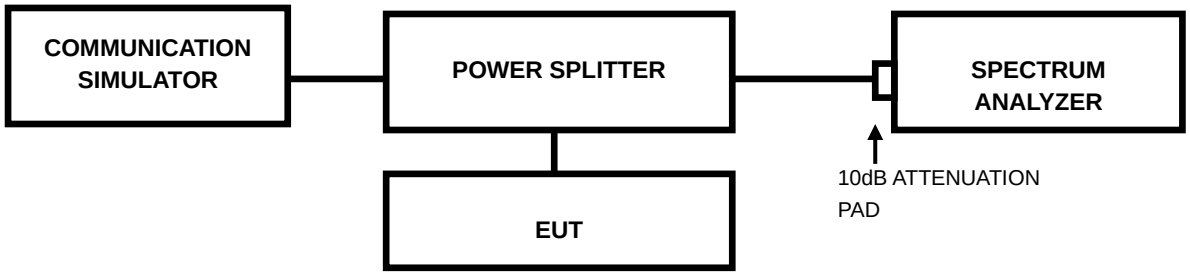
Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

3.3 OCCUPIED BANDWIDTH MEASUREMENT

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

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

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

3.3.4 TEST RESULTS

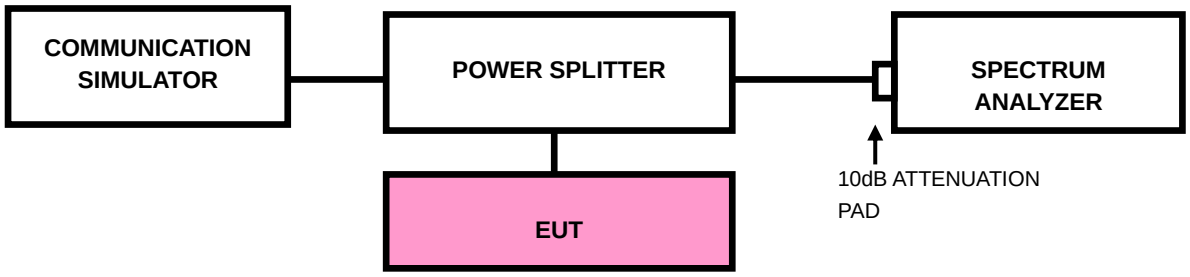
Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

3.4 BAND EDGE MEASUREMENTC

3.4.1 LIMITS OF BAND EDGE MEASUREMENT

Power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

a) All measurements were done at low and high operational frequency range

b) Connect the transmitter to the spectrum analyzer via coaxial cable while ensuring proper impedance matching.

c) Tune the analyzer to the nominal center frequency of the emission bandwidth (EBW)

d) .Set the resolution bandwidth (RBW) ≧ 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.

e) Beyond the 1MHz band from the band edge, RBW=1MHz was used.

f) Set the video bandwidth (VBW) to ≧3 x RBW.

g) Select the average power (RMS) display detector.

h) Set the number of measurement points to ≧ 1001.

i) Use auto-coupled sweep time.

j) Perform the measurement over an interval of time when the transmission is continuous and at its maximum power level.

k) The RF fundamental frequency should be excluded against the limit line in the operating frequency band and use RBW is 10KHz or 100KHz.

l) Record the max trace plot into the test report.

3.4.4. TEST RESULTS

Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

3.5 CONDUCTED SPURIOUS EMISSIONS

3.5.1 LIMITS OF CONDUCTED SPURIOUS EMISSIONS MEASUREMENT

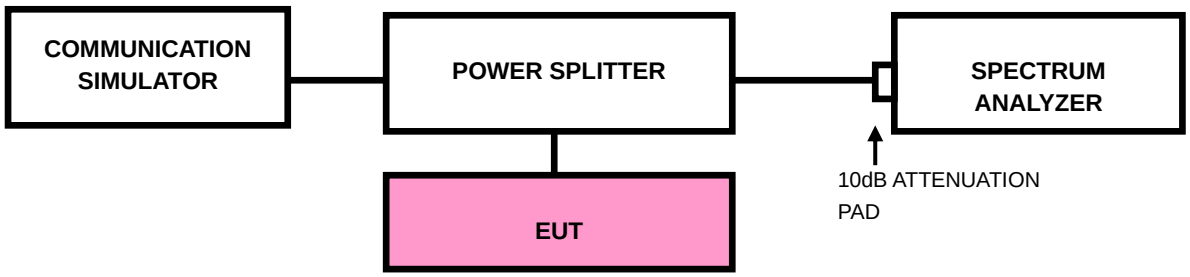
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.5.2 TEST PROCEDURE

a. The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.

b. Measuring frequency range is from 30MHz up to a frequency including its 10^{th} harmonic. 10dB attenuation pad is connected with spectrum. RBW=1MHz and VBW=3MHz is used for conducted emission measurement.

3.5.3 TEST SETUP



3.5.4 TEST RESULTS

NOTE ：The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

3.6 RADIATED EMISSION MEASUREMENT

3.6.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to –13dBm.

3.6.2 TEST PROCEDURES

a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.

b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value " of step a. Record the power level of S.G

c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

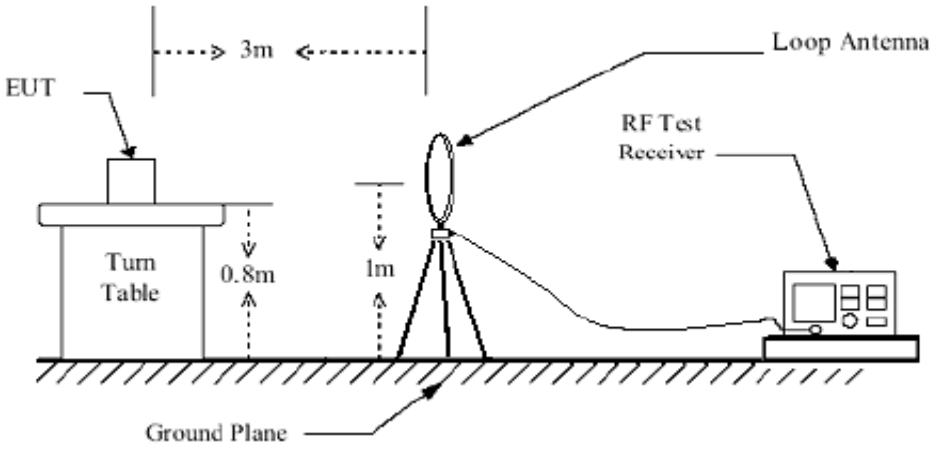
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

3.6.3 DEVIATION FROM TEST STANDARD

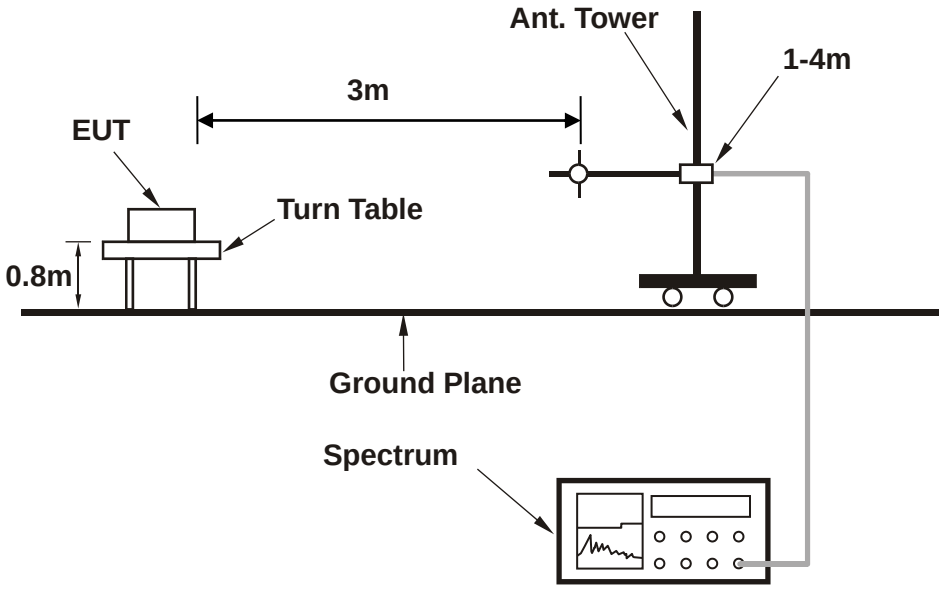
No deviation

3.6.4 TEST SETUP

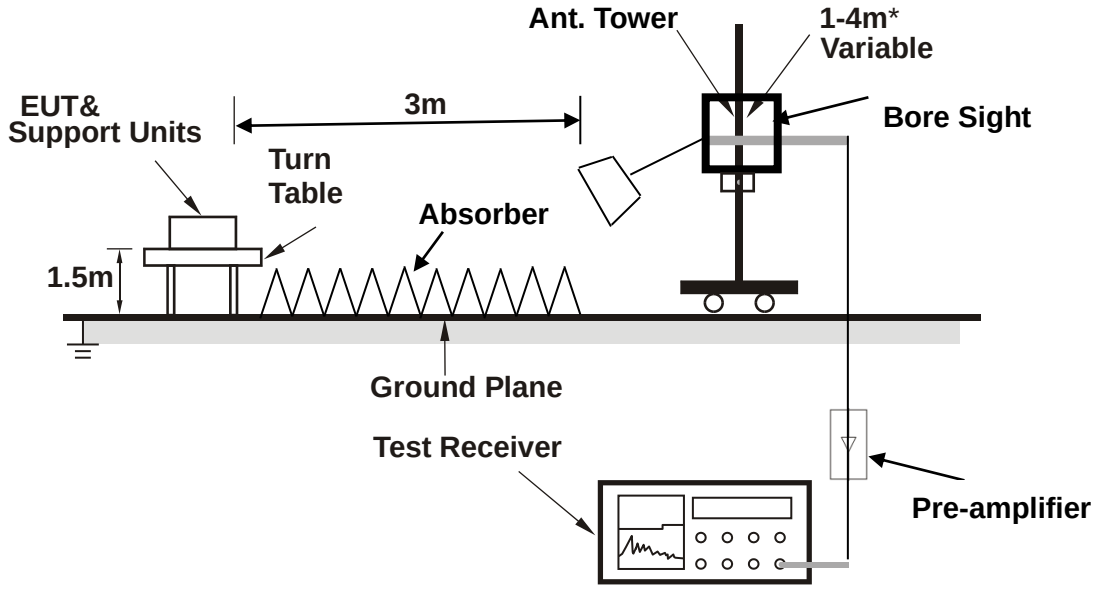
< Frequency Range below 30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.6.5 TEST RESULTS

NOTE ：The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA

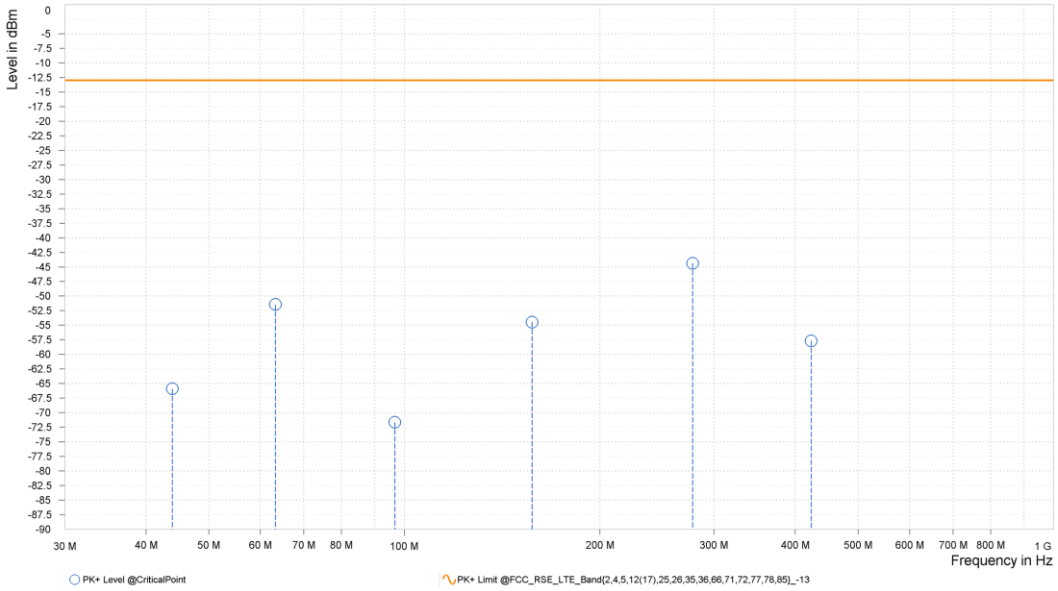
30 MHz – 1GHz data:

NB-IOT LTE Band25：

CHANNEL BANDWIDTH: QPSK

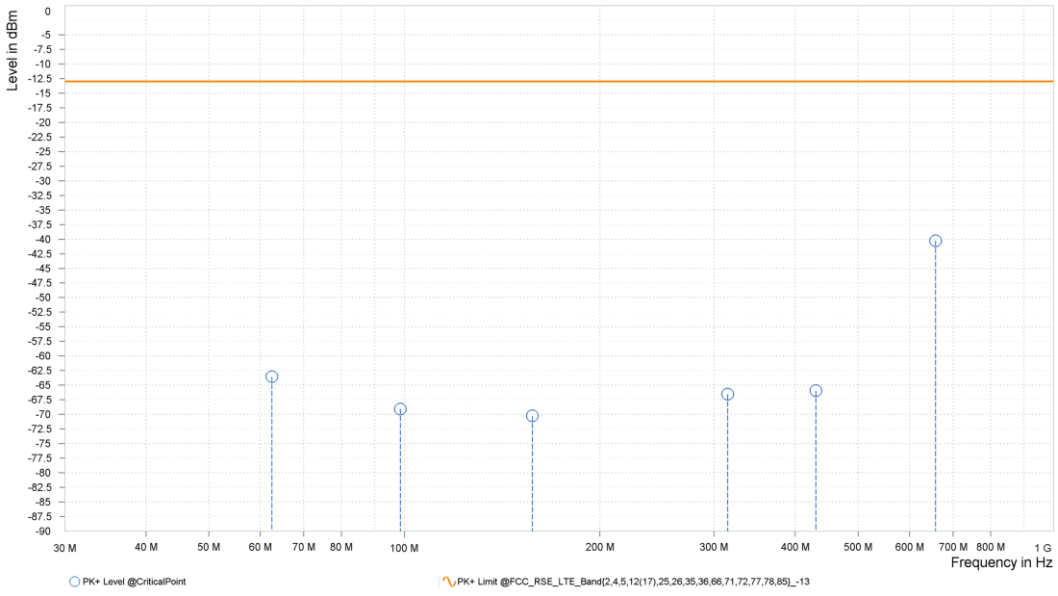
MODE	TX channel 26689	**FREQUENCY RANGE**	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	43.900	-65.90	-13.00	52.90	3.77	H	331.8	1.00
1	63.300	-51.43	-13.00	38.43	1.87	H	0.9	2.00
1	96.650	-71.64	-13.00	58.64	-2.26	H	226.6	2.00
1	157.300	-54.46	-13.00	41.46	-4.90	H	359	2.00
1	278.050	-44.36	-13.00	31.36	5.01	H	5.1	1.00
1	423.200	-57.67	-13.00	44.67	6.02	H	331.8	1.00



MODE	TX channel 26689	FREQUENCY RANGE	Below 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	62.500	-63.55	-13.00	50.55	0.57	V	5.1	1.00
1	98.600	-69.07	-13.00	56.07	5.05	V	331.8	1.00
1	157.500	-70.25	-13.00	57.25	-2.35	V	331.8	1.00
1	314.700	-66.56	-13.00	53.56	4.98	V	231.5	1.00
1	430.550	-65.95	-13.00	52.95	8.07	V	231.5	1.00
2	658.404	-40.27	-13.00	27.27	34.63	V	1	1.00



ABOVE 1GHz DATA

Note: For higher frequency, the emission is too low to be detected.

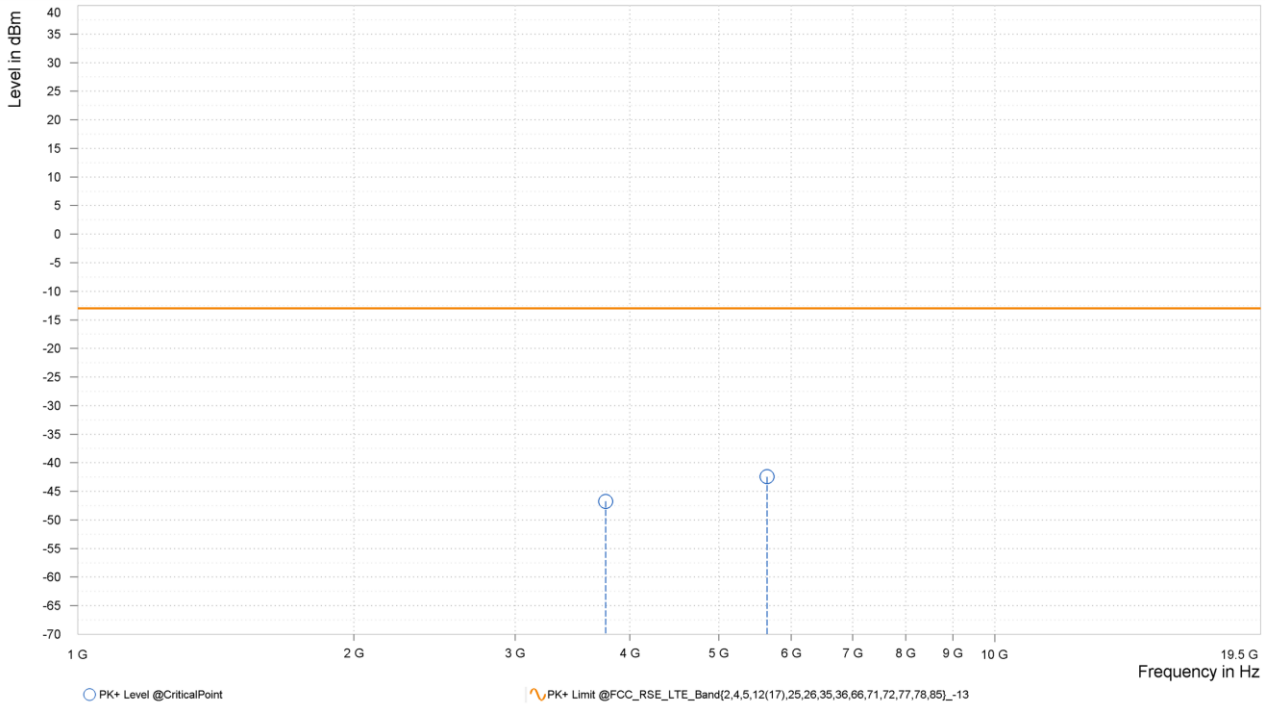
WORST-CASE DATA

CAT-M1 LTE Band 25

CHANNEL BANDWIDTH: 1.4MHz / QPSK

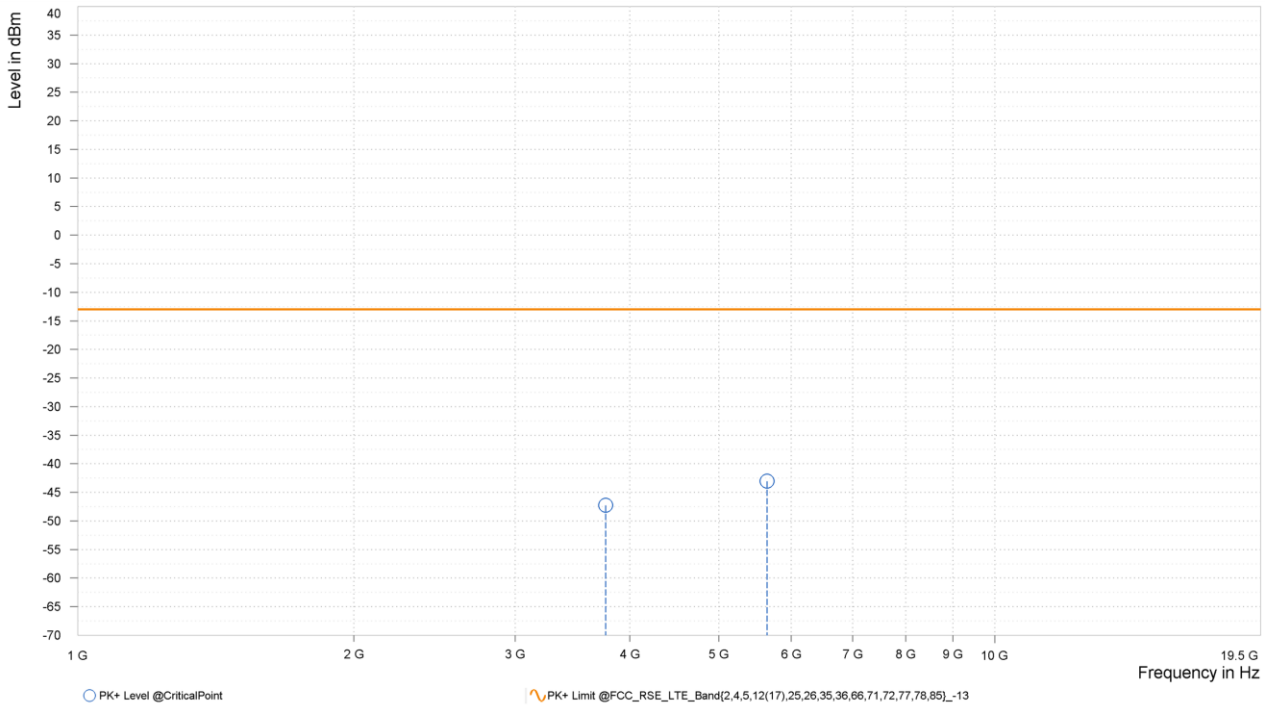
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,763.740	-46.76	-13.00	33.76	15.48	H	1	2.00
2	5,645.610	-42.42	-13.00	29.42	18.60	H	1	2.00



MODE	TX channel 26340	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

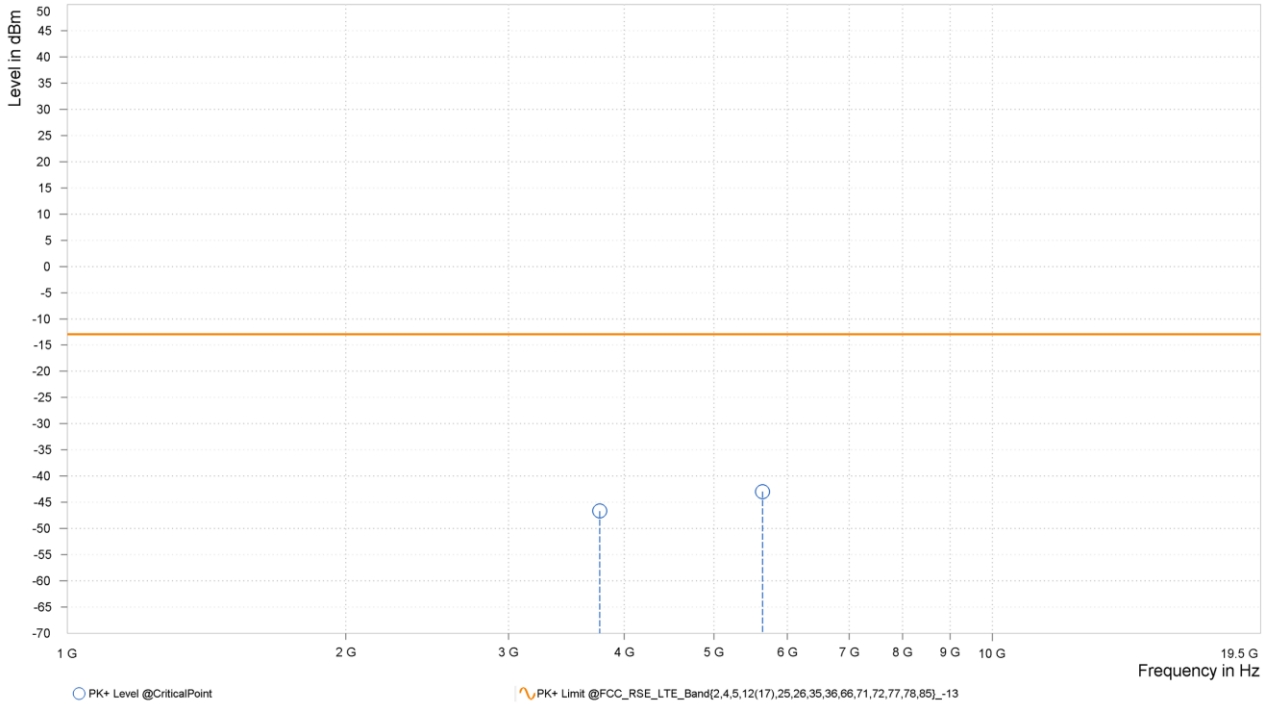
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,763.740	-47.28	-13.00	34.28	15.16	V	264.9	2.00
2	5,645.610	-43.07	-13.00	30.07	18.34	V	359	2.00



CHANNEL BANDWIDTH: 3MHz / QPSK

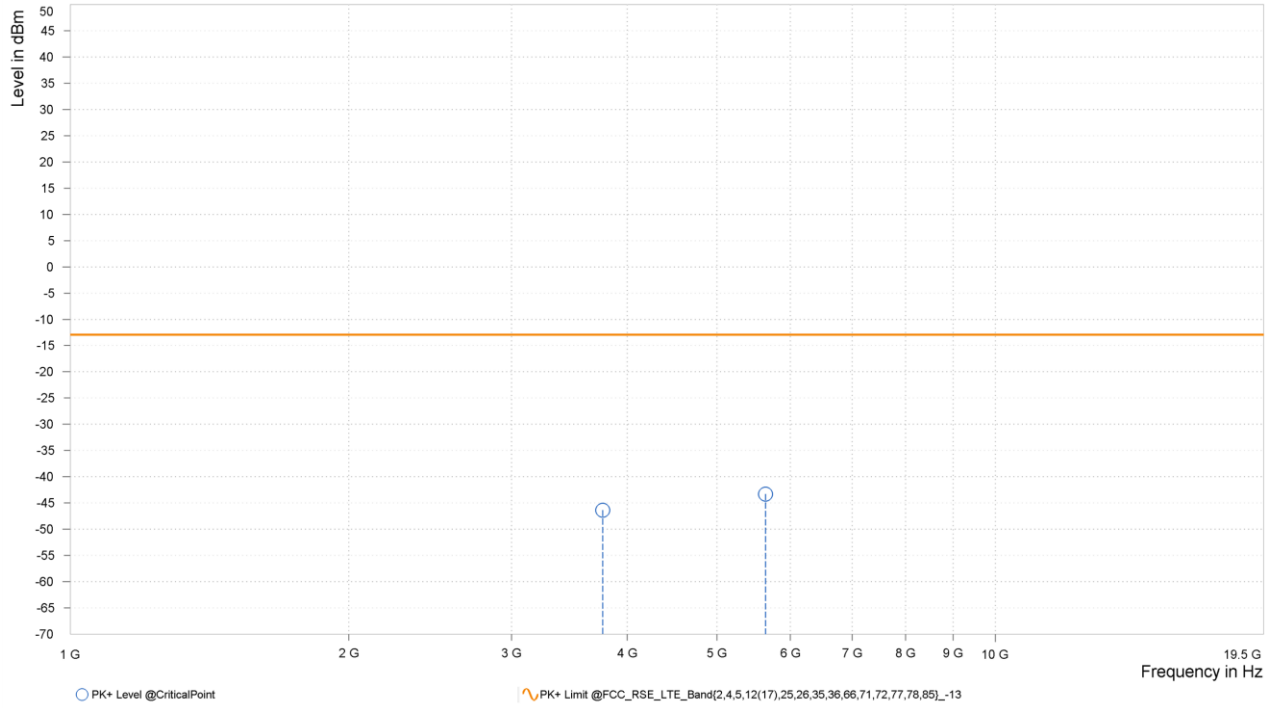
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,762.300	-46.68	-13.00	33.68	15.47	H	95.2	1.00
2	5,643.450	-42.96	-13.00	29.96	18.59	H	1	1.00



MODE	TX channel 26340	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

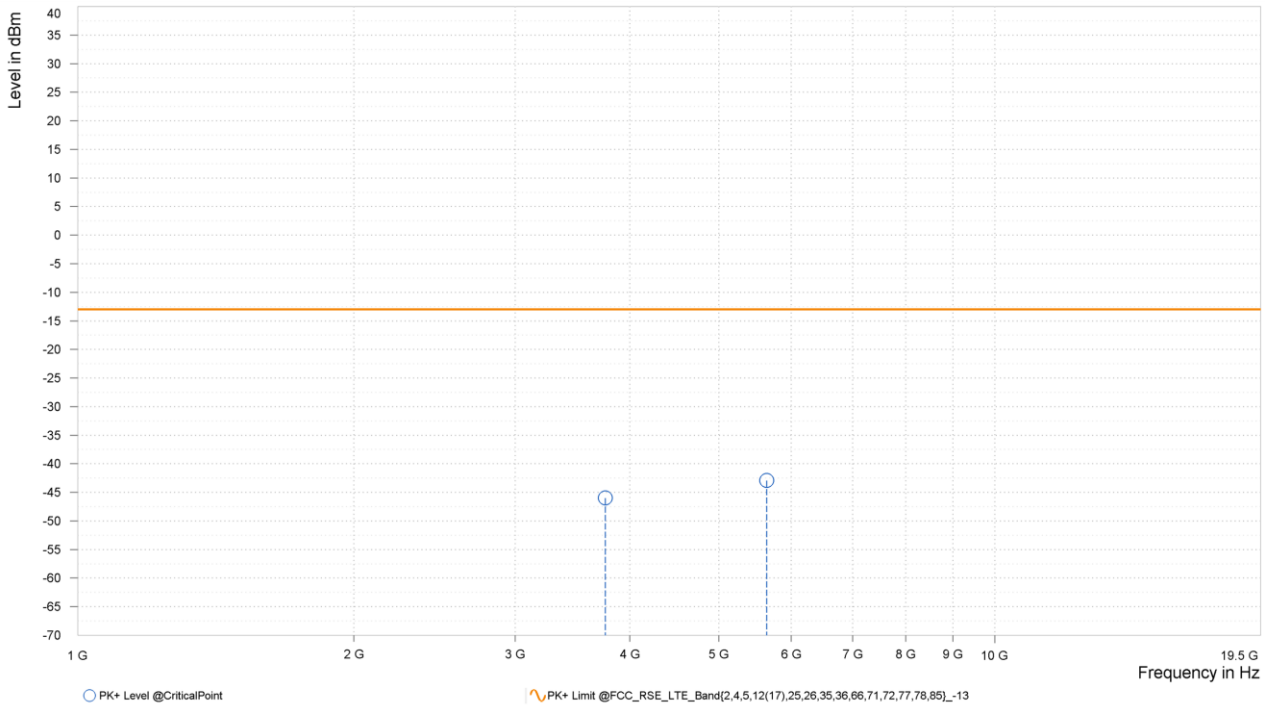
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,762.300	-46.38	-13.00	33.38	15.16	V	91.6	1.00
2	5,643.450	-43.29	-13.00	30.29	18.33	V	287.6	1.00



CHANNEL BANDWIDTH: 5MHz / QPSK

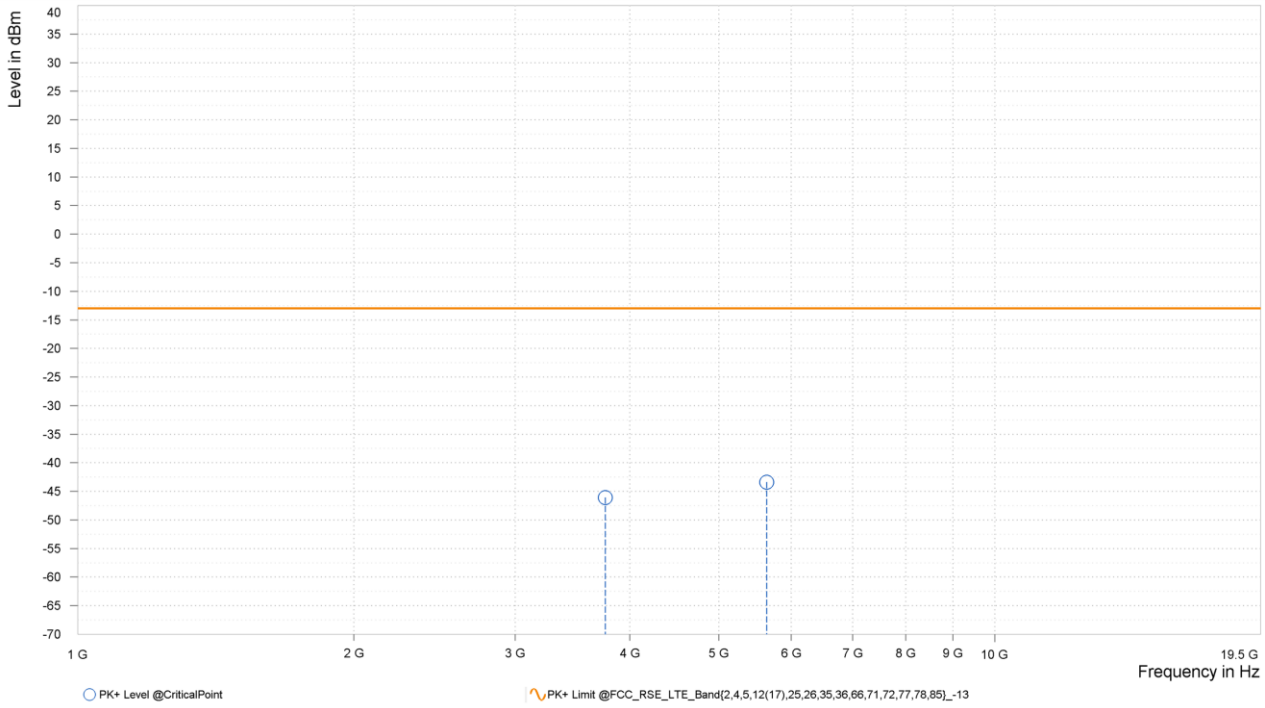
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,760.500	-45.98	-13.00	32.98	15.45	H	359	2.00
2	5,640.750	-42.92	-13.00	29.92	18.58	H	359.1	1.00



MODE	TX channel 26340	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,760.500	-46.06	-13.00	33.06	15.14	V	359	2.00
2	5,640.750	-43.37	-13.00	30.37	18.31	V	31.8	2.00

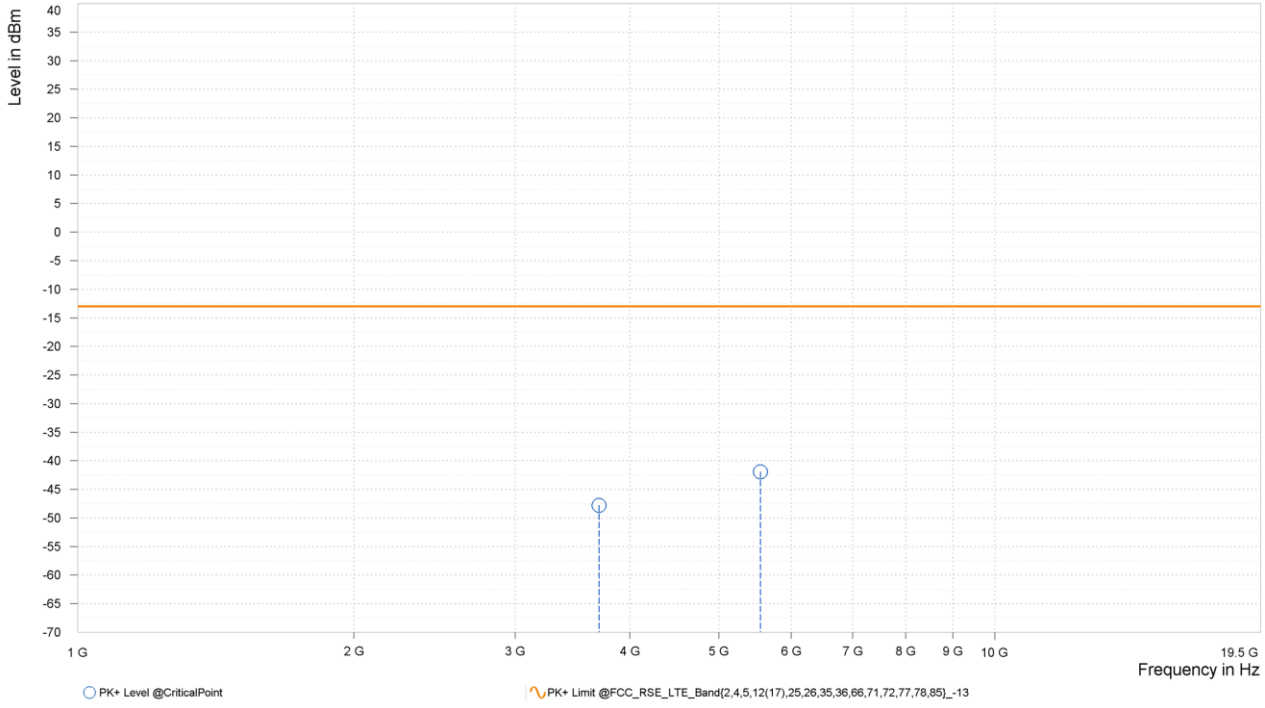


CHANNEL BANDWIDTH: 10MHz / QPSK

CH26090

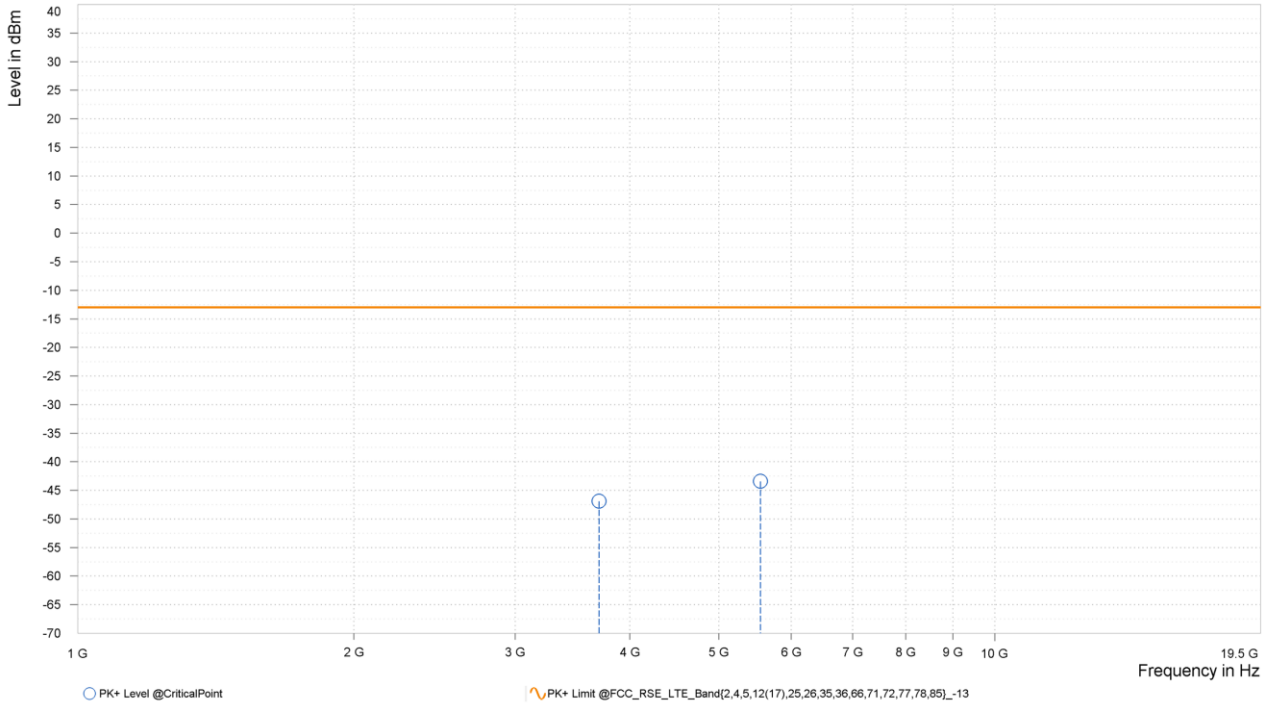
MODE	TX channel 26090	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,701.000	-47.78	-13.00	34.78	14.88	H	0.8	2.00
2	5,551.500	-41.93	-13.00	28.93	18.31	H	288.7	1.00



MODE	TX channel 26090	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	**Hanwen Xu**		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

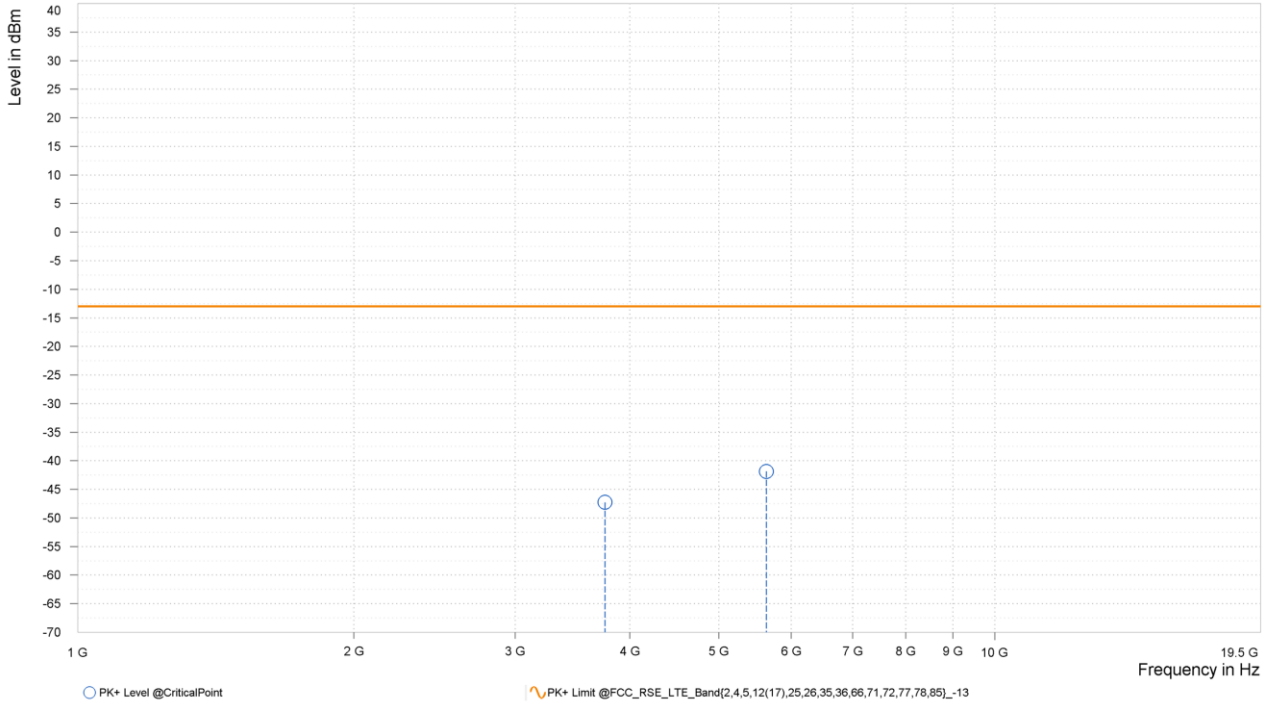
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,701.000	-46.90	-13.00	33.90	14.70	V	0.9	2.00
2	5,551.500	-43.42	-13.00	30.42	18.05	V	359	2.00



CH26340

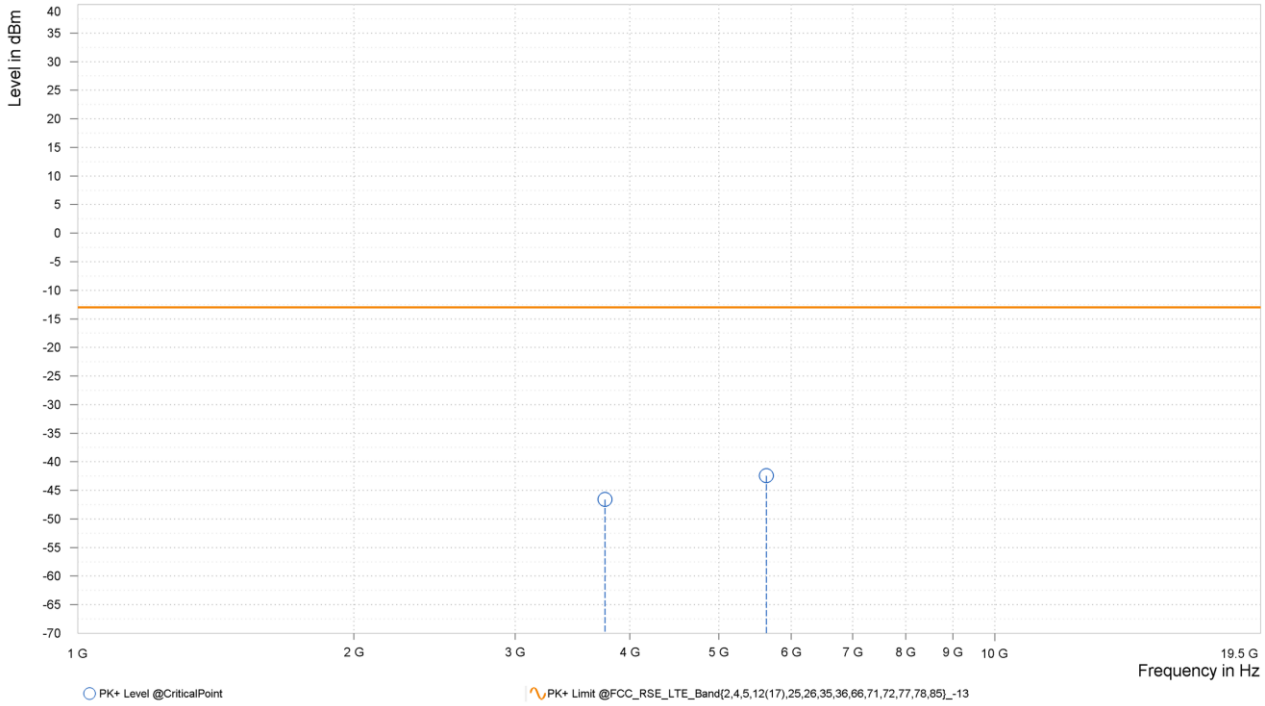
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,756.000	-47.26	-13.00	34.26	15.40	H	104.8	1.00
2	5,634.000	-41.86	-13.00	28.86	18.54	H	263.6	2.00



MODE	TX channel 26340	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

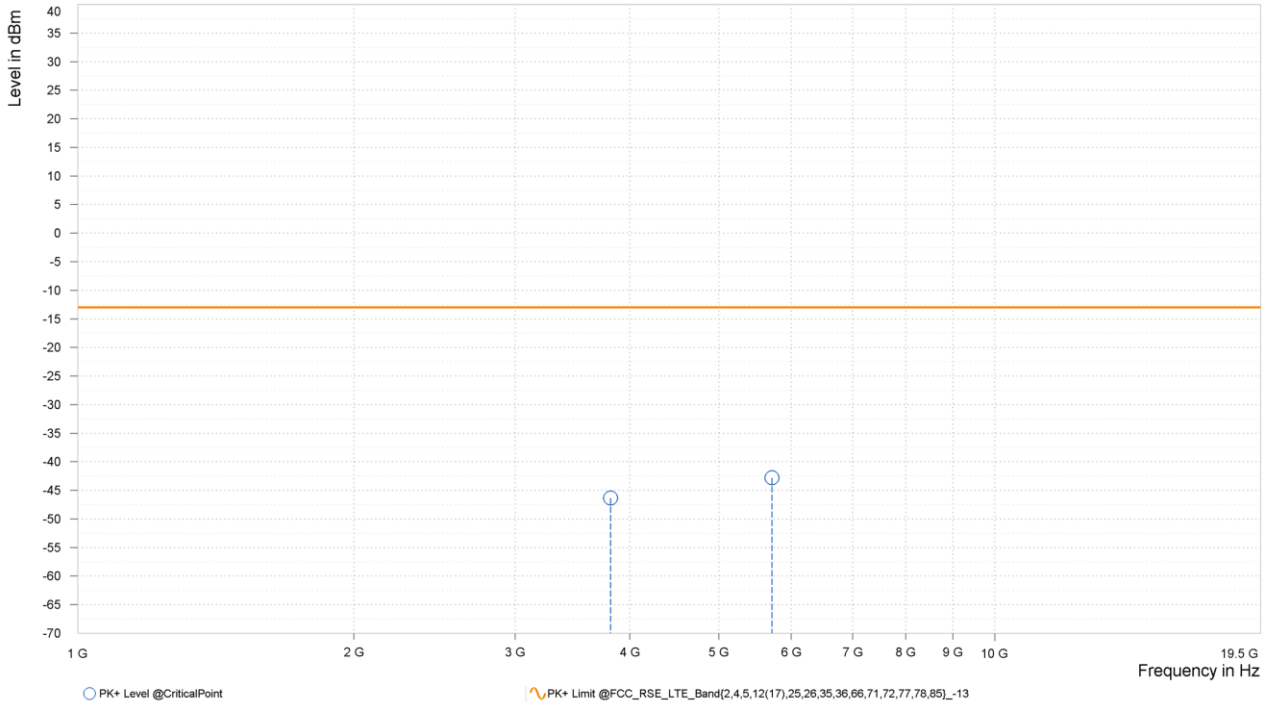
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,756.000	-46.59	-13.00	33.59	15.10	V	72.5	2.00
2	5,634.000	-42.44	-13.00	29.44	18.28	V	359	2.00



CH26640

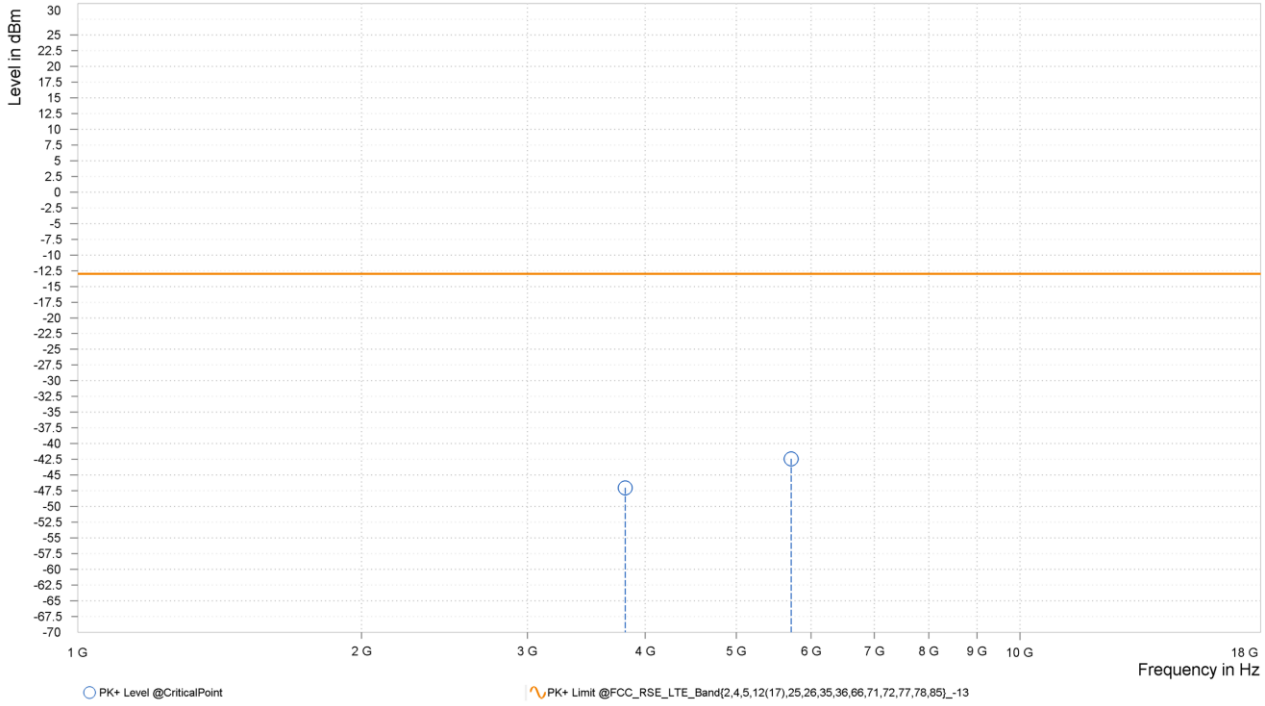
MODE	TX channel 26640	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,811.000	-46.34	-13.00	33.34	15.84	H	359	1.00
2	5,716.500	-42.81	-13.00	29.81	18.93	H	0.9	2.00



MODE	TX channel 26640	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

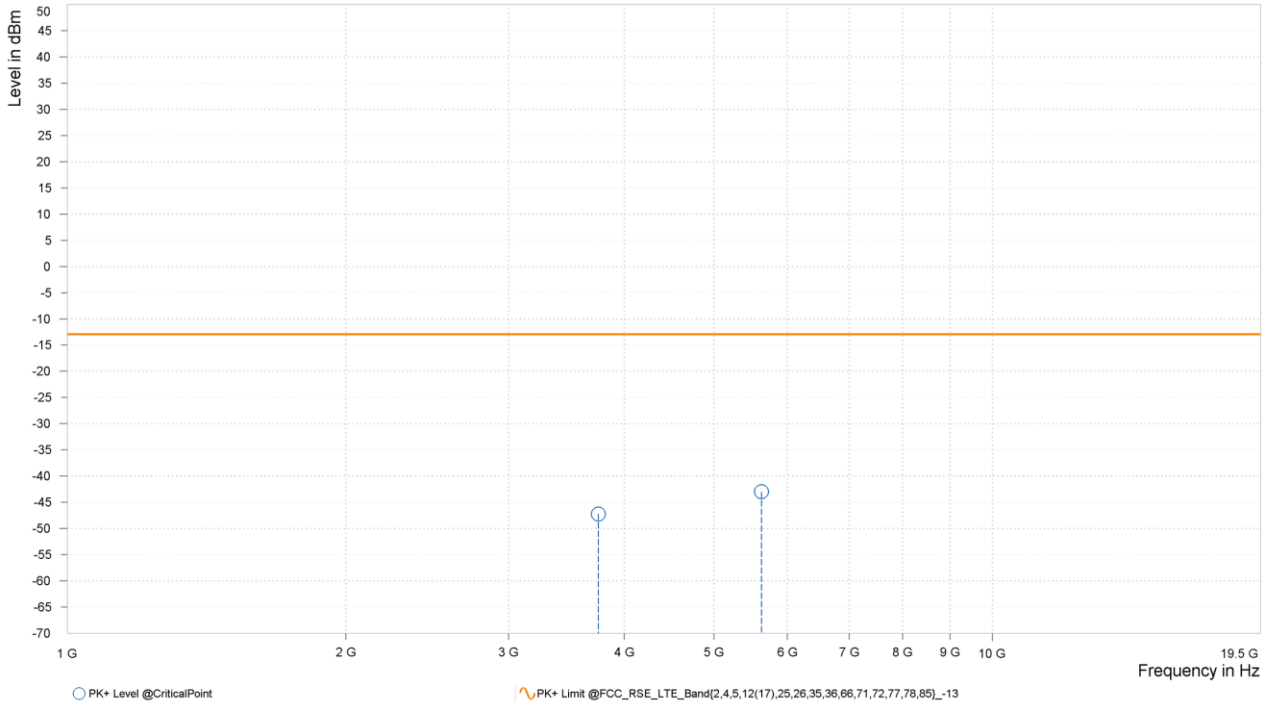
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,811.000	-47.04	-13.00	34.04	15.54	V	185.9	2.00
2	5,716.500	-42.41	-13.00	29.41	18.67	V	185.9	2.00



CHANNEL BANDWIDTH: 15MHz / QPSK

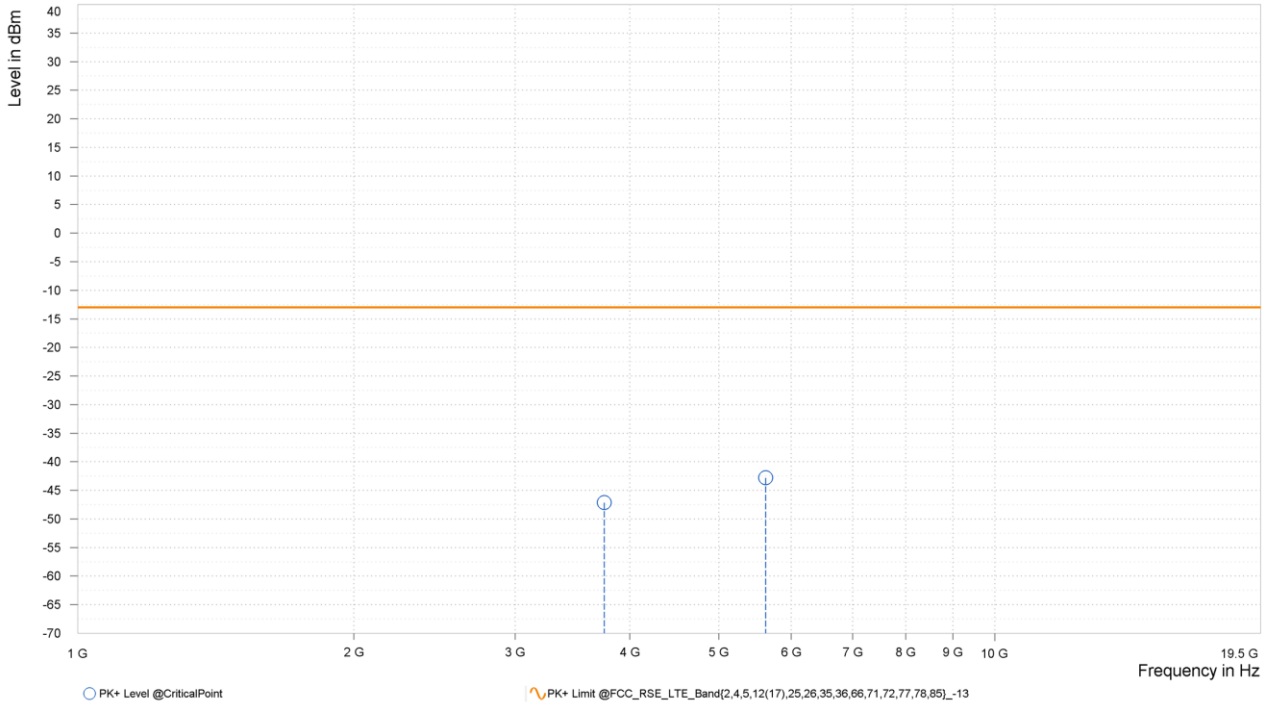
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,751.500	-47.25	-13.00	34.25	15.35	H	1	2.00
2	5,627.250	-43.00	-13.00	30.00	18.50	H	1	1.00



MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

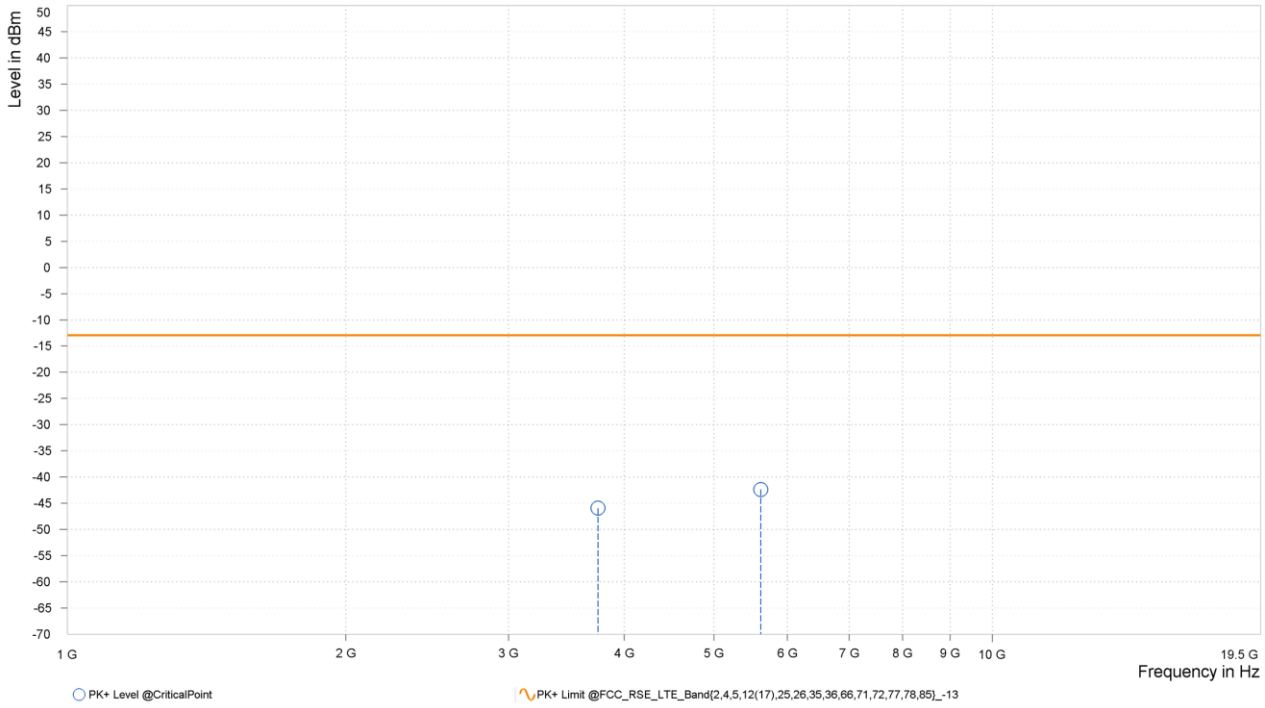
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,751.500	-47.14	-13.00	34.14	15.05	V	334.2	1.00
2	5,627.250	-42.82	-13.00	29.82	18.24	V	359	2.00



CHANNEL BANDWIDTH: 20MHz / QPSK

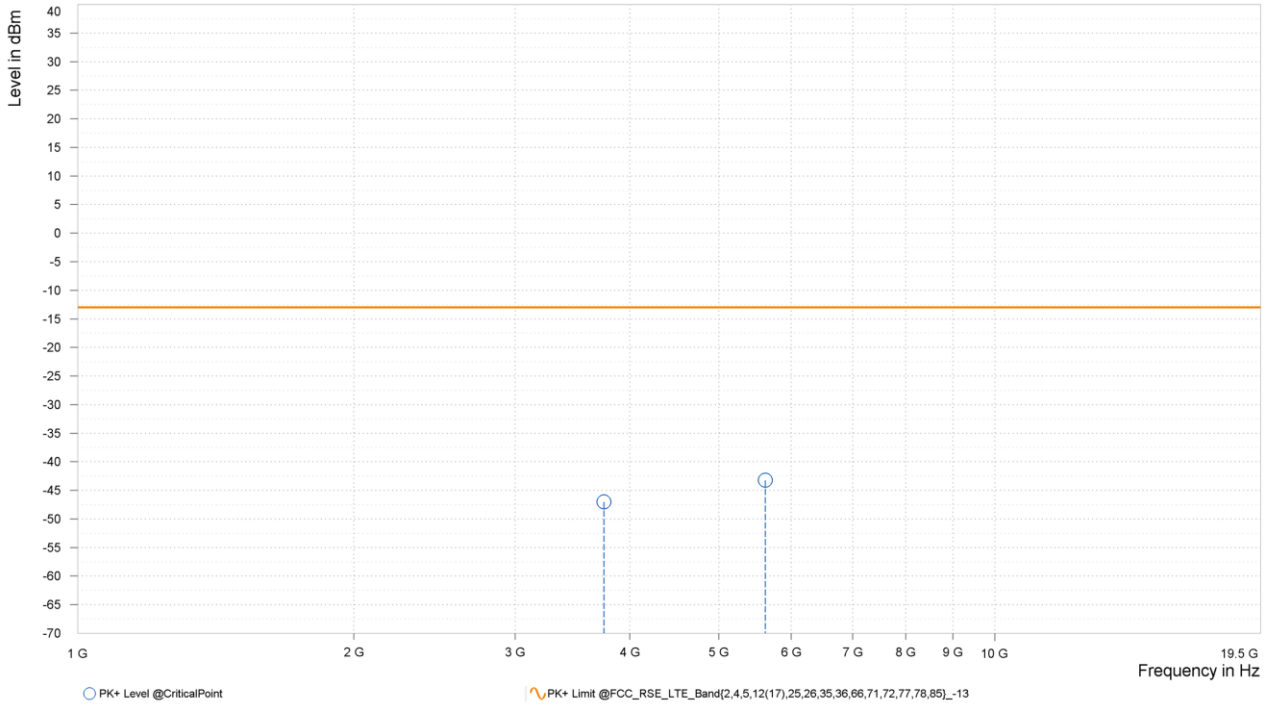
MODE	TX channel 26340	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,747.000	-45.95	-13.00	32.95	15.29	H	92.8	1.00
2	5,620.500	-42.35	-13.00	29.35	18.47	H	286.4	1.00



MODE	TX channel 26340	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,747.000	-47.04	-13.00	34.04	15.01	V	1	1.00
2	5,620.500	-43.24	-13.00	30.24	18.21	V	359	1.00

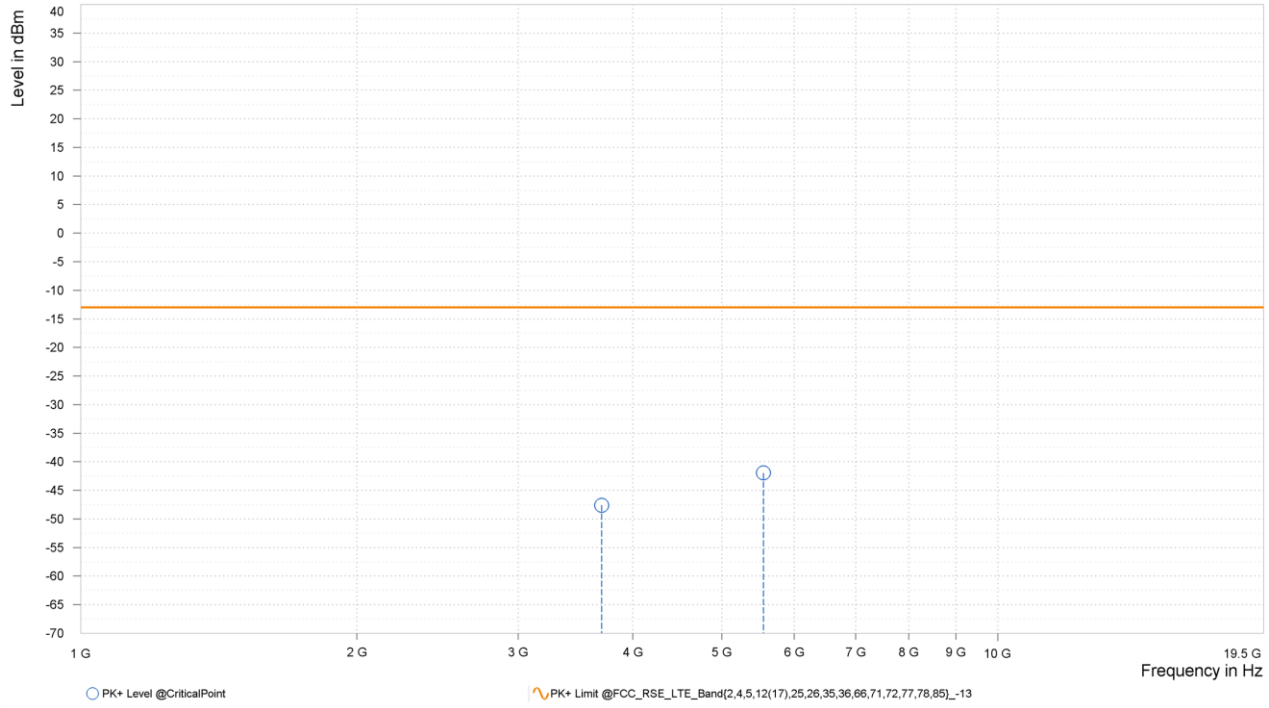


NB-IOT LTE Band 25

CH 26041

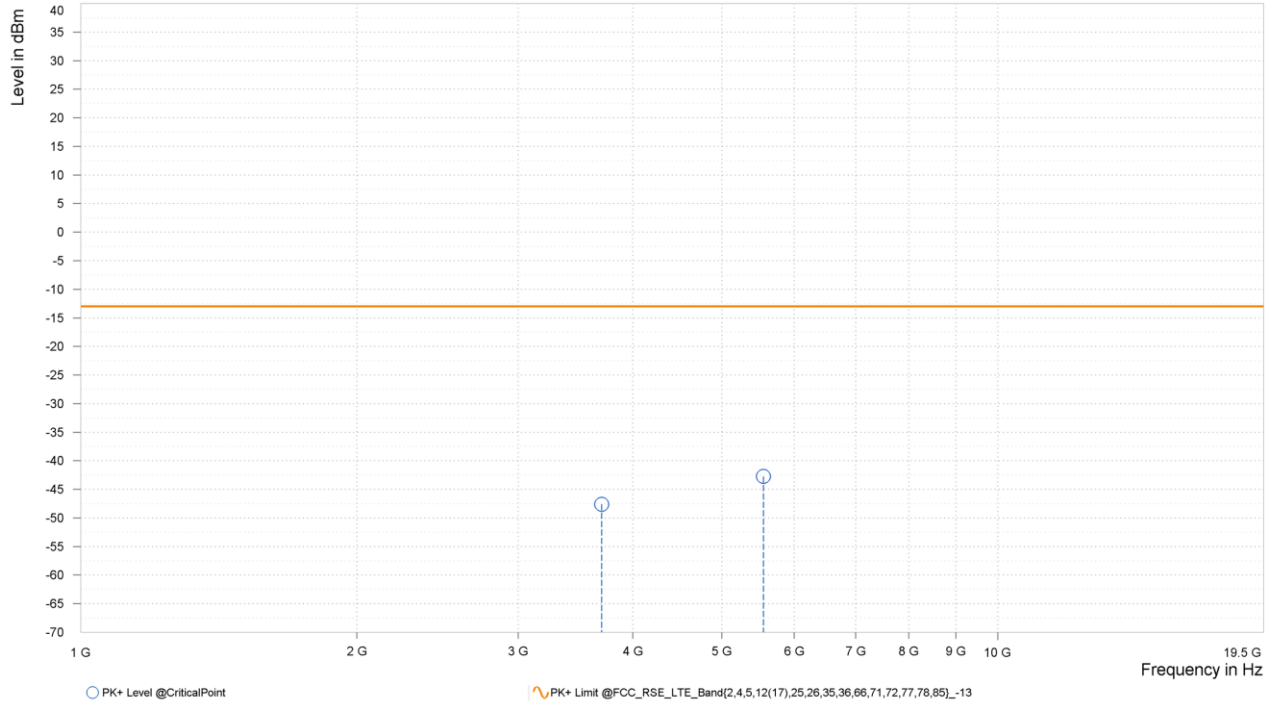
MODE	TX channel 26041	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,700.200	-47.62	-13.00	34.62	14.87	H	17.8	2.00
2	5,550.300	-41.94	-13.00	28.94	18.30	H	102.4	1.00



MODE	TX channel 26041	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

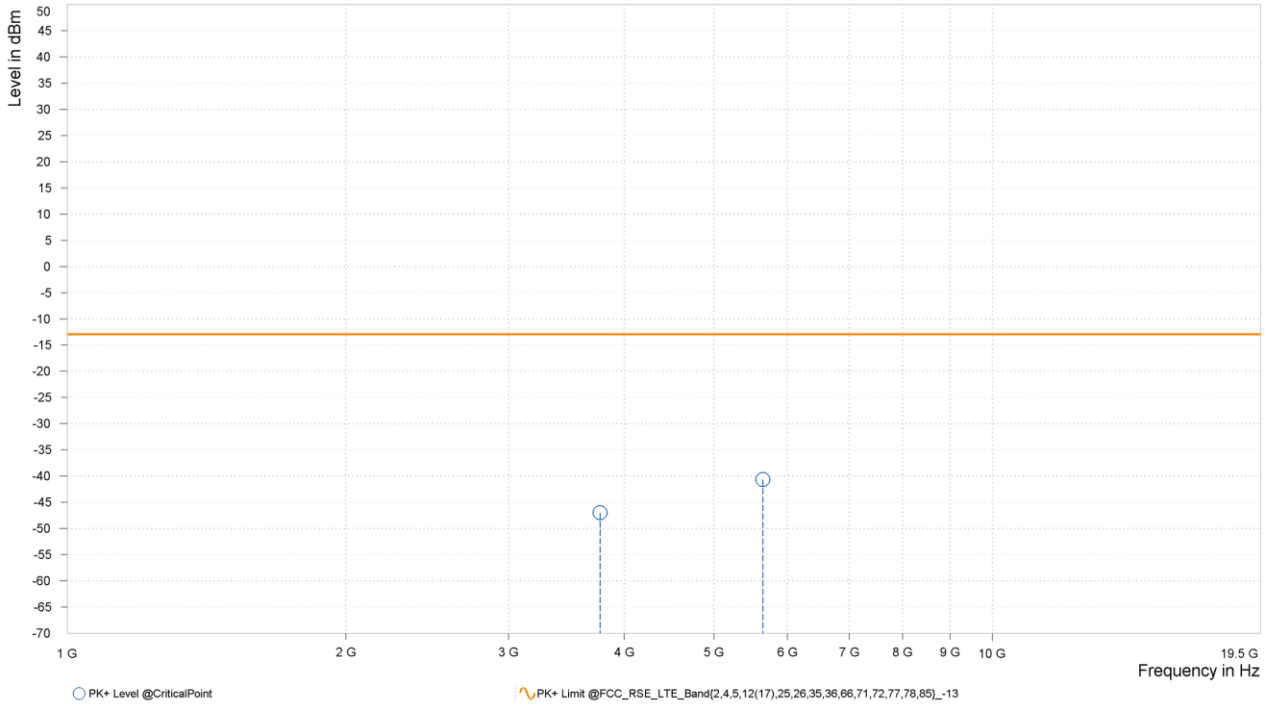
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,700.200	-47.60	-13.00	34.60	14.69	V	1	1.00
2	5,550.300	-42.74	-13.00	29.74	18.05	V	359	1.00



CHANNEL BANDWIDTH: QPSK

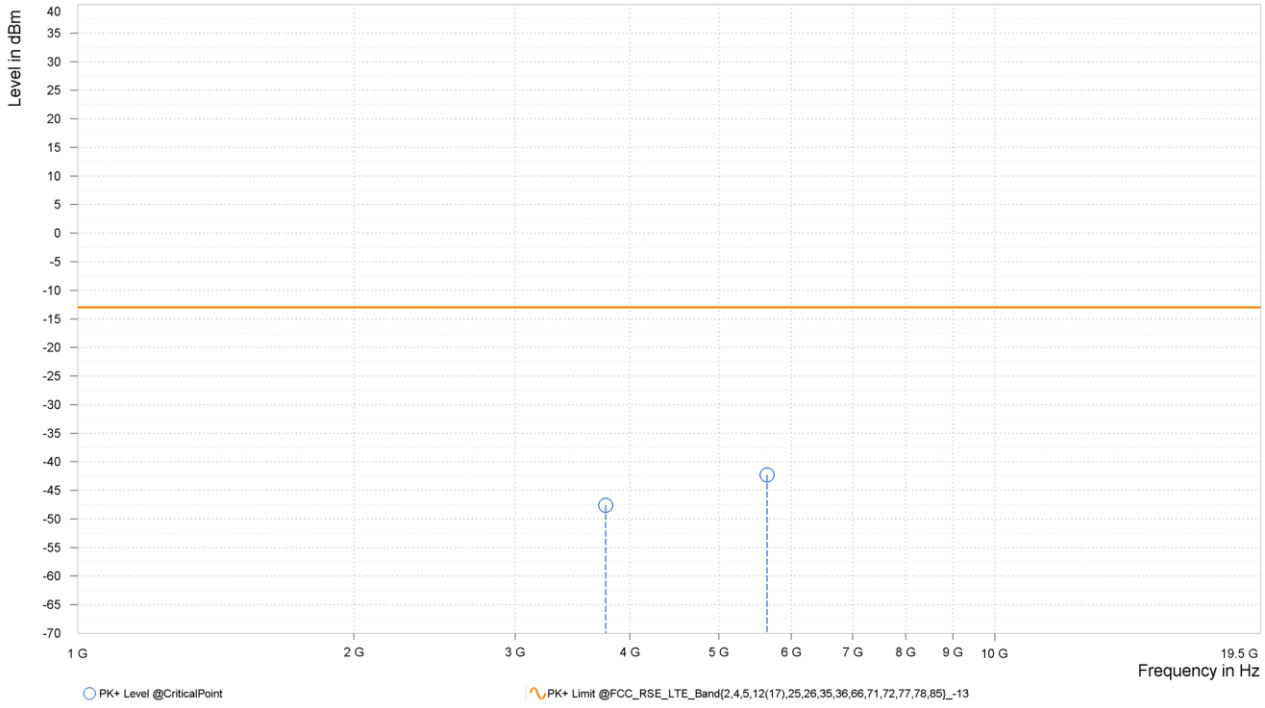
MODE	TX channel 26365	**FREQUENCY RANGE**	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	**INPUT POWER**	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,765.000	-46.99	-13.00	33.99	15.50	H	275.6	1.00
2	5,647.500	-40.66	-13.00	27.66	18.61	H	86.9	2.00



MODE	TX channel 26365	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

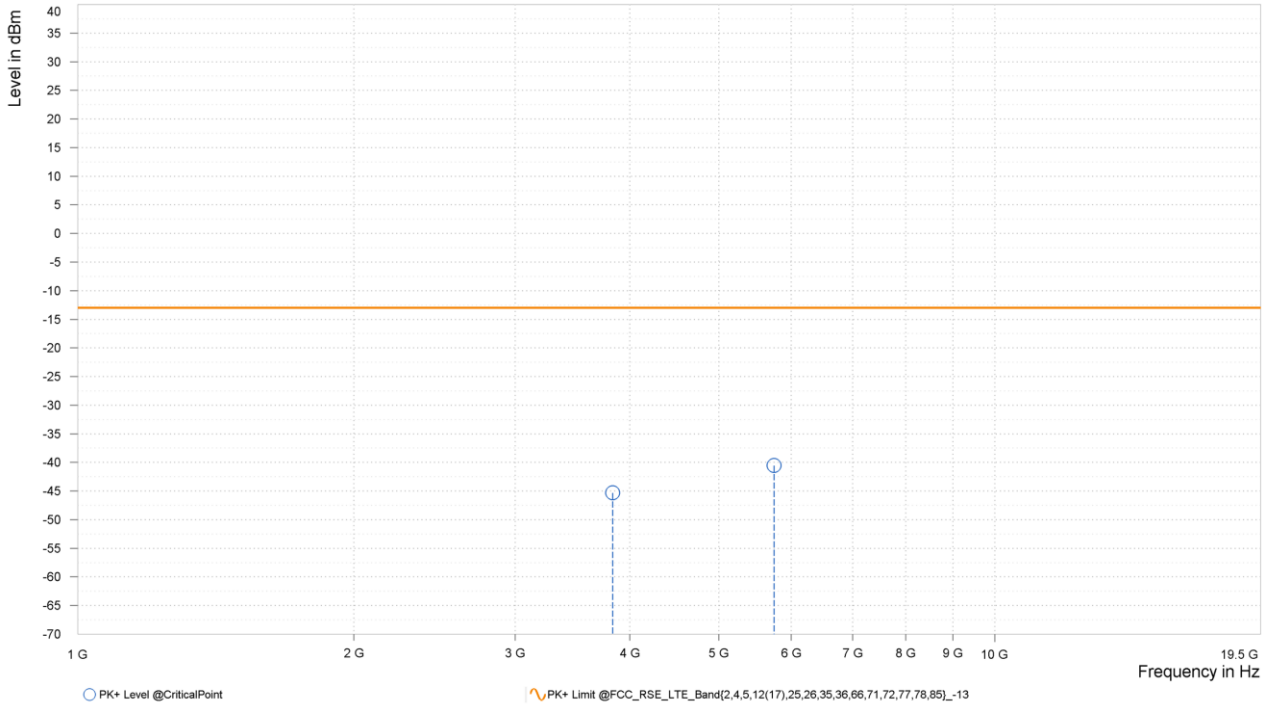
Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,765.000	-47.60	-13.00	34.60	15.18	V	1	1.00
2	5,647.500	-42.29	-13.00	29.29	18.35	V	85.7	2.00



CH 26689

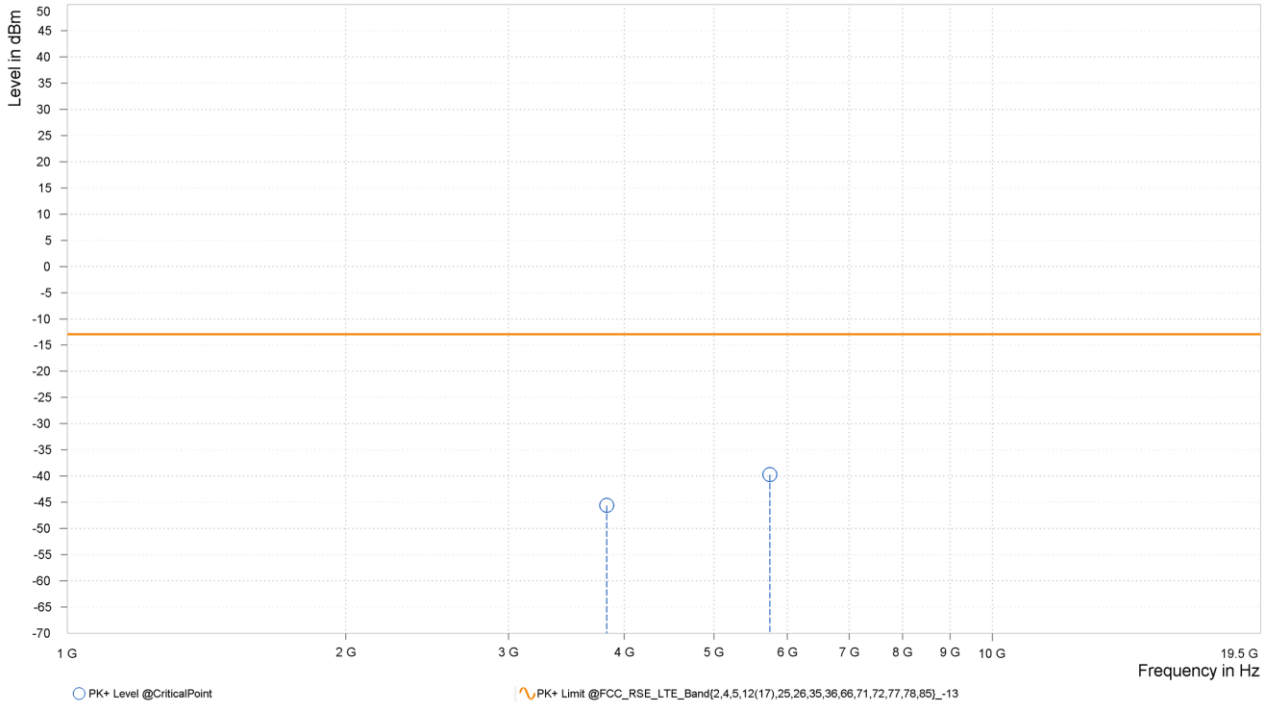
MODE	TX channel 26689	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,829.800	-45.31	-13.00	32.31	15.90	H	359	1.00
2	5,744.700	-40.53	-13.00	27.53	19.04	H	0.9	2.00



MODE	TX channel 26689	FREQUENCY RANGE	Above 1000MHz
ENVIRONMENTAL CONDITIONS	23deg. C, 70%RH	INPUT POWER	120Vac 60HZ
TESTED BY	Hanwen Xu		
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M			

Rg	Frequency [MHz]	PK+ Level [dBm]	PK+ Limit [dBm]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	3,829.800	-45.60	-13.00	32.60	15.63	V	56.8	2.00
2	5,744.700	-39.73	-13.00	26.73	18.79	V	56.8	2.00

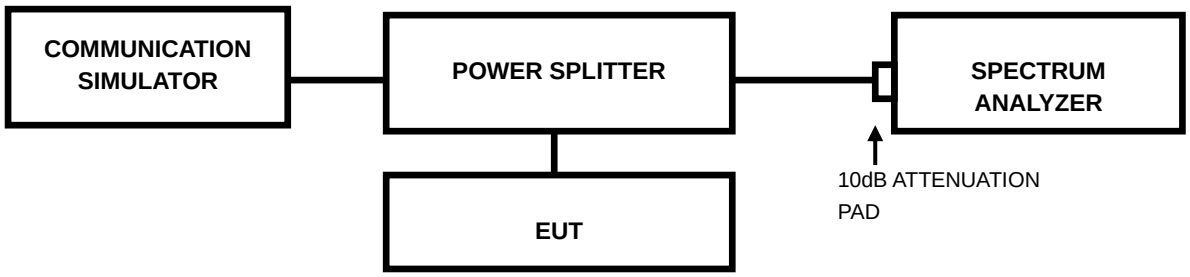


3.7 PEAK TO AVERAGE RATIO

3.7.1 LIMITS OF PEAK TO AVERAGE RATIO MEASUREMENT

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

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1%.

3.7.4 TEST RESULTS

Refer to the original source report (Report No.: 77535RRF.002, Model Name: nRF9151, FCC ID: 2ANPO00nRF9151).

4 INFORMATION ON THE TESTING LABORATORIES

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Huarui 7Layers High Technology (Suzhou) Co., Ltd.
Lab Address:
Tower N, Innovation Center, 88 Zhuyi Road, High-tech District, Suzhou City, Anhui Province
Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

If you have any comments, please feel free to contact us at the following:

Suzhou EMC/RF Lab:
Tel: +86 (0557) 368 1008

5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

--END--