Prüfbericht - Produkte
Test Report - Products

TÜVRheinland®

Prüfbericht-Nr.: *Test report no.:*	**CN21LLE5 001**	**Auftrags-Nr.:** *Order no.:*	168312734	**Seite 1 von 16** *Page 1 of 16*
Kunden-Referenz-Nr.: *Client reference no.:*	**N/A**	**Auftragsdatum:** *Order date:*	2021-04-06	
Auftraggeber: *Client:*	Beijing Noitom Technology Ltd. 502, Tower A, 28 Xinjiekouwai Blvd, Beijing, China			
Prüfgegenstand: *Test item:*	Perception Neuron 3			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	NTM-MCP-05-BS-01, NTM-MCP-05-BS-02 (Trademark: Perception Neuron)			
Auftrags-Inhalt: *Order content:*	Test Report			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.249			

Wareneingangsdatum: *Date of sample receipt:*	2021-05-08
Prüfmuster-Nr.: *Test sample no:*	A003047443-001~004
Prüfzeitraum: *Testing period:*	2021-05-09 – 2021-06-18
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shenzhen) Co., Ltd.
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von: *tested by:*	Jonathan Li Jonathan Li	**genehmigt von:** *authorized by:*	Winnie Hou Winnie Hou
Datum: *Date:* 2021-07-09		**Ausstellungsdatum:** *Issue date:* 2021-07-09	
Stellung / *Position:*	Project Manager	**Stellung** / *Position:*	Technical Certifier

Sonstiges / *Other:* FCC ID: 2ABTR-NTM-MCP05BS01

Zustand des Prüfgegenstandes bei Anlieferung: **Prüfmuster vollständig und unbeschädigt**
Condition of the test item at delivery: ***Test item complete and undamaged***

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

V05

Table of Contents

TEST SUMMARY 2

1 GENERAL REMARKS 4
1.1 COMPLEMENTARY MATERIALS 4

2 TEST SITES 5
2.1 TEST FACILITIES 5
2.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS 5
2.3 TRACEABILITY 6
2.4 CALIBRATION 6
2.5 MEASUREMENT UNCERTAINTY 6
2.6 LOCATION OF ORIGINAL DATA 6
2.7 STATUS OF FACILITY USED FOR TESTING 6

3 GENERAL PRODUCT INFORMATION 7
3.1 PRODUCT FUNCTION AND INTENDED USE 7
3.2 RATINGS AND SYSTEM DETAILS 7
3.3 INDEPENDENT OPERATION MODES 8
3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS 8
3.5 SUBMITTED DOCUMENTS 8

4 TEST SET-UP AND OPERATION MODES 9
4.1 PRINCIPLE OF CONFIGURATION SELECTION 9
4.2 TEST OPERATION AND TEST SOFTWARE 9
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT 9
4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE 9
4.5 TEST SETUP DIAGRAM 10

5 TEST RESULTS 12
5.1 TRANSMITTER REQUIREMENT & TEST SUITES 12
5.1.1 Antenna Requirement 12
5.1.2 Field strength of fundamental and harmonics 13
5.1.3 20dB Bandwidth 14
5.1.4 Band Edge 15

6 PHOTOGRAPHS OF THE TEST SET-UP 16

7 LIST OF TABLES 16

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Accreditation Designation No.: 694916
ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	2021-08-11
Signal Analyzer	R&S	FSV 40	101439	2021-08-10
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	2021-08-10
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2021-08-10
Amplifier	R&S	SCU-18F	180070	2021-08-10
Amplifier	R&S	SCU40A	100475	2021-09-10
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2022-08-08
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2022-08-08
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2022-08-08
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2022-09-13
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	2021-09-02
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2021-07-06

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Parameter	Uncertainty
Radio Frequency	±1 x 10-7
RF Power (conducted)	±2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	±6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	±6 dB
Temperature	±1 °C
Humidity	±5 %
Voltage (DC)	±1 %
Voltage (AC, <10kHz)	±2 %

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Perception Neuron 3, which supports General 2.4GHz technology.
Both models are the same except for the model name and color.
For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	Perception Neuron 3
Type Designation:	NTM-MCP-05-BS-01, NTM-MCP-05-BS-02
Trademark:	Perception Neuron
FCC ID:	2ABTR-NTM-MCP05BS01
Testing Voltage:	Internal battery operated (3.7Vdc)
Antenna Type:	Chip Antenna
Antenna Gain:	1.5 dBi
Technical Specification of 2.4GHz	
Frequency Range:	2402 MHz to 2481 MHz
Type of Modulation:	GFSK
Channel Number:	80 channels
Channel Separation:	1 MHz

3.3 Independent Operation Modes

The basic operation modes are:

A. 2.4GHz transmitting mode
   1. Low channel
   2. Middle channel
   3. High channel

B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- User Manual
- FCC/IC Label and Location Info
- Schematics
- PCB Layout

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

Table 3: Test environments

Environment Parameter	Values During Tests		
	Temperature	Voltage (Battery operated)	Relative Humidity
NTNV	25°C±2°C	3.7Vdc	Ambient

Table 4: Test channel and frequency

Mode	Test Channels (MHz)	Remark
Transmitting	L/M/H: 2402MHz, 2449MHz, 2481MHz	--

4.3 Special Accessories and Auxiliary Equipment

N/A

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

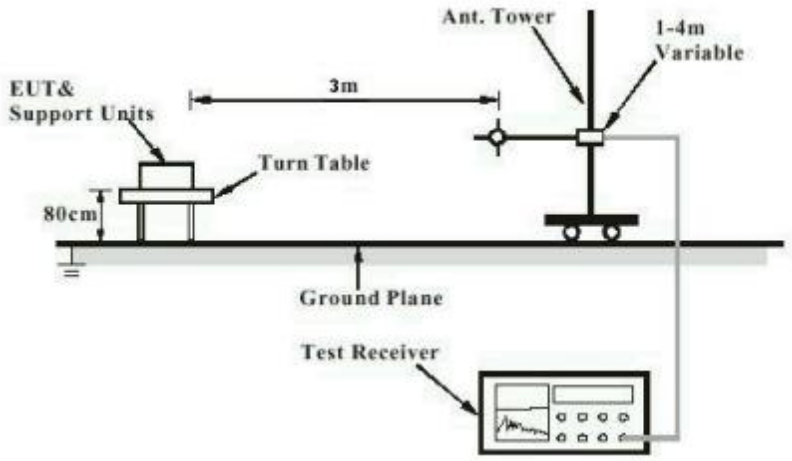


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

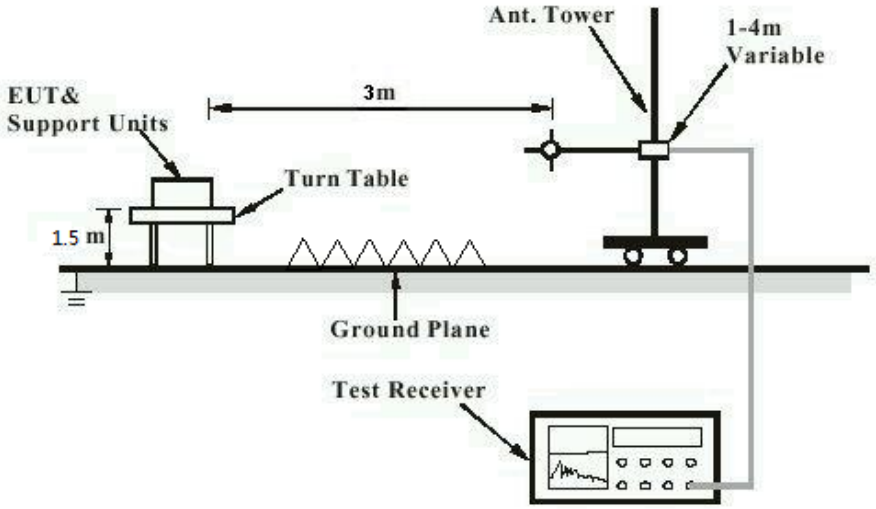
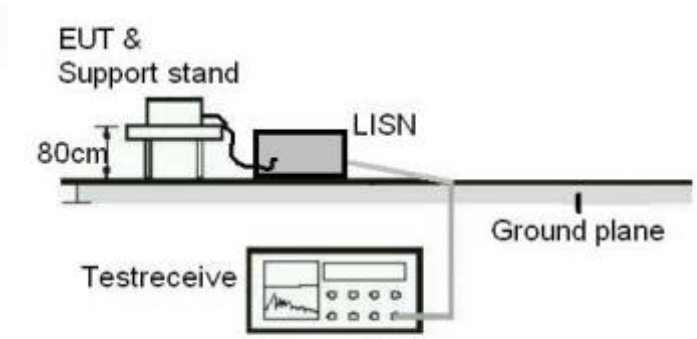


Diagram of Measurement Configuration for Mains Conduction Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.203

According to the manufacturer declared, the EUT has a Chip antenna, the gain of antenna is 1.5 dBi, which that permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Field strength of fundamental and harmonics

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.249(a) (d) (e)
Basic standard	:	ANSI C63.10: 2013
Limits	:	FCC Part 15.249(a) (d) (e) & 15.209(a)
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2021-06-03 ~ 2021-06-09
Input voltage	:	Internal battery operated (3.7Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

Note: Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

5.1.3 20dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.215
Basic standard	:	ANSI C63.10: 2013
Limits	:	Within assigned band
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2021-06-15
Input voltage	:	Internal battery operated (3.7Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	22 ℃
Relative humidity	:	50 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.4 Band Edge

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.249(a) (d) (e) & 15.209 & 15.205
Basic standard	:	ANSI C63.10: 2013
Limits	:	FCC Part 15.249(a) (d) (e) & 15.209 & 15.205
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2021-06-03
Input voltage	:	Internal battery operated (3.7Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

7 List of Tables

Table 1: List of Test and Measurement Equipment 5
Table 2: Technical Specification of EUT 7
Table 3: Test environments 9
Table 4: Test channel and frequency 9

Appendix A: Photographs of the Test Set-Up

APPENDIX A: PHOTOGRAPHS OF THE TEST SET-UP 1

PHOTOGRAPH 1: SET-UP PHOTO FOR RADIATED SPURIOUS EMISSION, 30MHZ ~ 1GHZ 2
PHOTOGRAPH 2: SET-UP PHOTO FOR RADIATED SPURIOUS EMISSION, 1GHZ ~ 18GHZ 2

Photograph 1: Set-up photo for Radiated Spurious Emission, 30MHz ~ 1GHz

Photograph 2: Set-up photo for Radiated Spurious Emission, 1GHz ~ 18GHz

Appendix B: Test Results

APPENDIX B: TEST RESULTS **1**

APPENDIX B.1: TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL & HARMONICS 2

30MHz - 1GHz *2*

1GHz - 18GHz *6*

APPENDIX B.2: TEST RESULTS OF 20DB BANDWIDTH 18

APPENDIX B.3: TEST RESULTS OF BAND EDGE 20

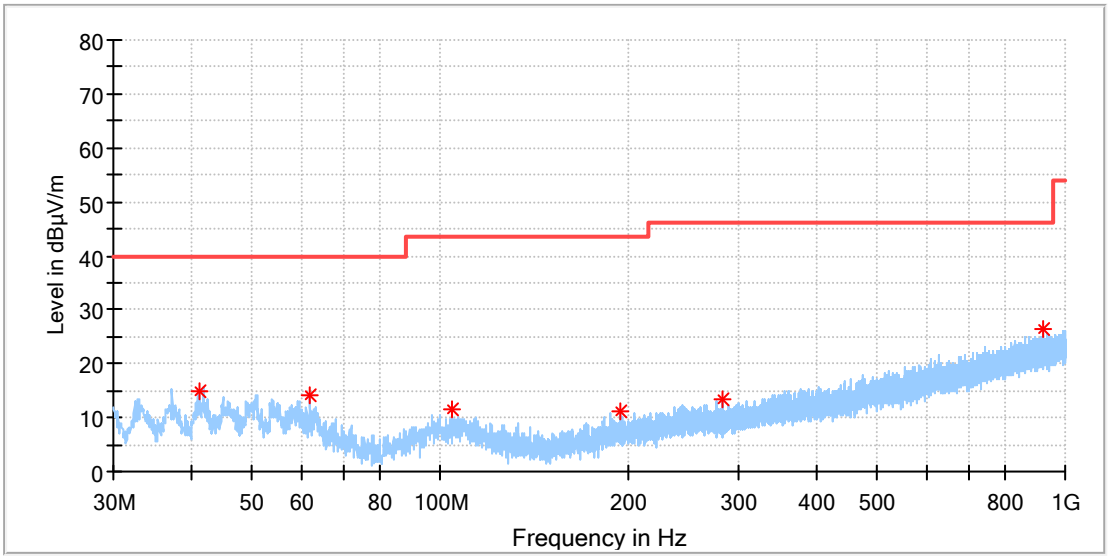
Note: The testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz to 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

Appendix B.1: Test Results of Field strength of fundamental & harmonics

30MHz - 1GHz

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

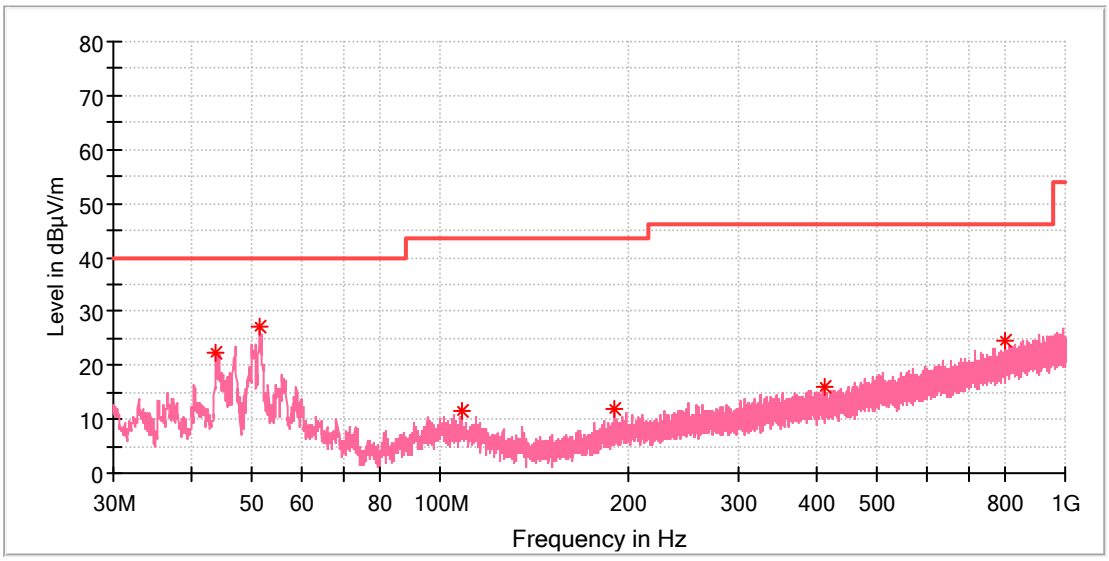
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
41.058000	15.04	40.00	24.96	100.0	H	320.0	-19.8
61.961500	14.13	40.00	25.87	100.0	H	240.0	-19.4
104.399000	11.63	43.50	31.87	100.0	H	187.0	-18.8
194.415000	11.26	43.50	32.24	100.0	H	0.0	-19.2
283.364000	13.52	46.00	32.48	100.0	H	0.0	-16.6
923.079000	26.52	46.00	19.48	100.0	H	164.0	-4.8

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

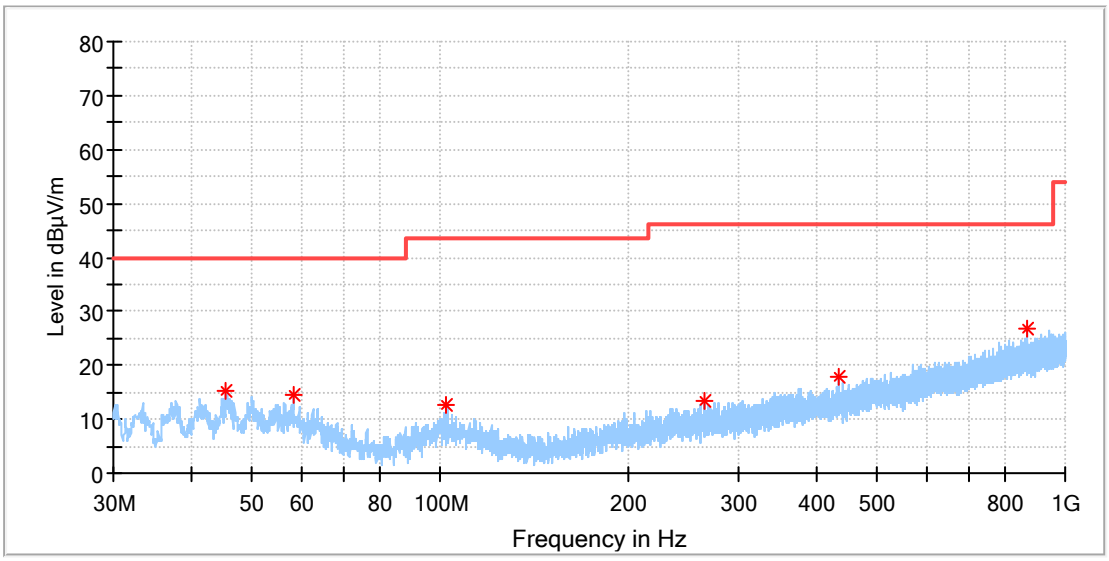
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.822500	22.36	40.00	17.64	100.0	V	130.0	-19.1
51.340000	27.00	40.00	13.00	100.0	V	190.0	-18.3
108.376000	11.41	43.50	32.09	100.0	V	205.0	-19.0
190.147000	11.99	43.50	31.51	100.0	V	348.0	-19.5
411.598000	15.89	46.00	30.11	100.0	V	39.0	-13.5
804.157000	24.65	46.00	21.35	100.0	V	258.0	-6.3

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

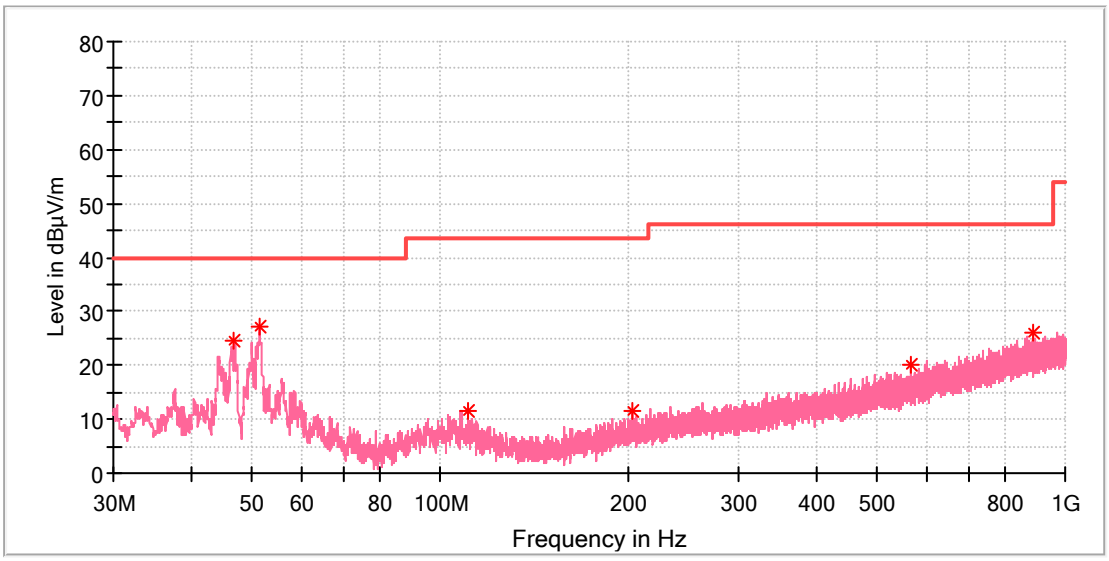
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.520000	15.36	40.00	24.64	100.0	H	261.0	-18.7
58.227000	14.57	40.00	25.43	100.0	H	73.0	-18.8
102.507500	12.50	43.50	31.00	100.0	H	82.0	-18.9
264.497500	13.49	46.00	32.51	100.0	H	131.0	-17.0
435.217500	17.81	46.00	28.19	100.0	H	48.0	-13.2
868.322500	26.66	46.00	19.34	100.0	H	6.0	-5.3

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
46.878000	24.63	40.00	15.37	100.0	V	345.0	-18.5
51.340000	27.05	40.00	12.95	100.0	V	298.0	-18.3
110.607000	11.49	43.50	32.01	100.0	V	189.0	-19.2
203.096500	11.39	43.50	32.11	100.0	V	49.0	-18.9
568.350000	20.12	46.00	25.88	100.0	V	272.0	-10.5
885.394500	26.18	46.00	19.82	100.0	V	345.0	-5.1

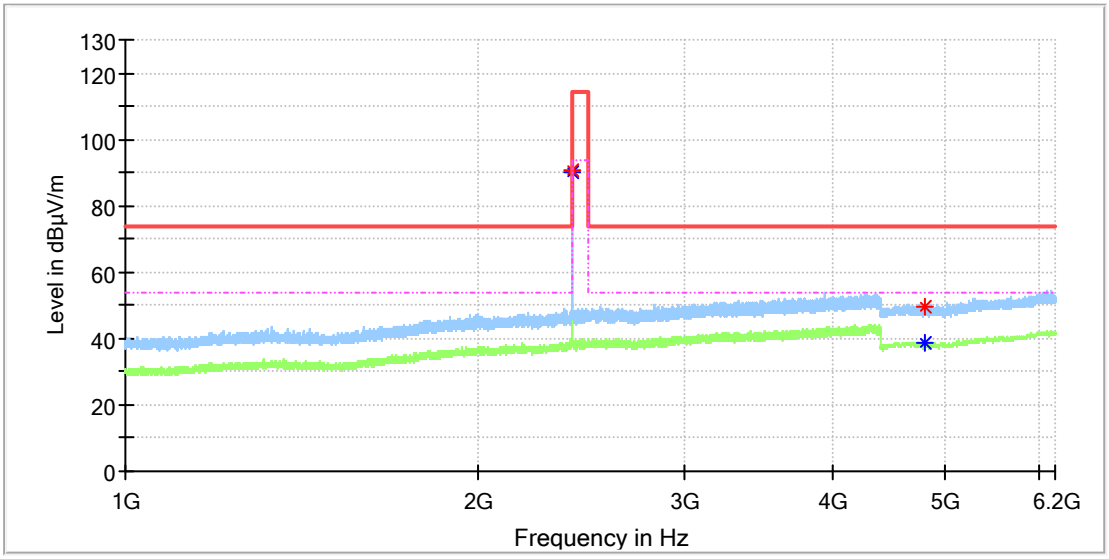
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz - 18GHz
Note: The highest waveform in the figure is 2.4GHz Fundamental.

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

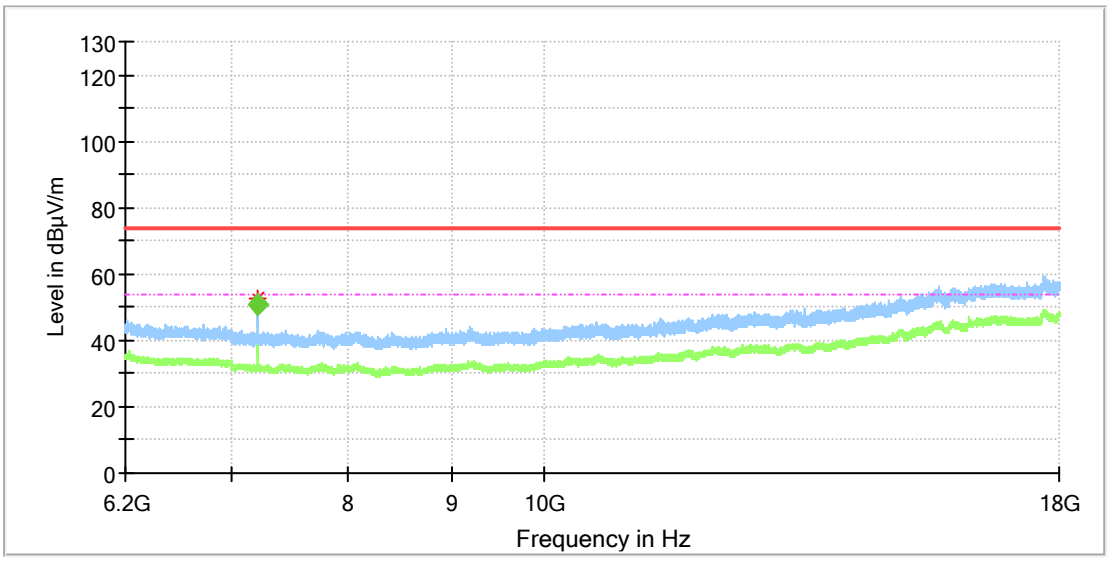
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.650000	90.80	---	114.00	23.20	100.0	H	305.0	7.0
2401.650000	---	90.19	94.00	3.81	100.0	H	305.0	7.0
4801.500000	49.70	---	74.00	24.30	100.0	H	162.0	11.8
4803.000000	---	38.75	54.00	15.25	100.0	H	7.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

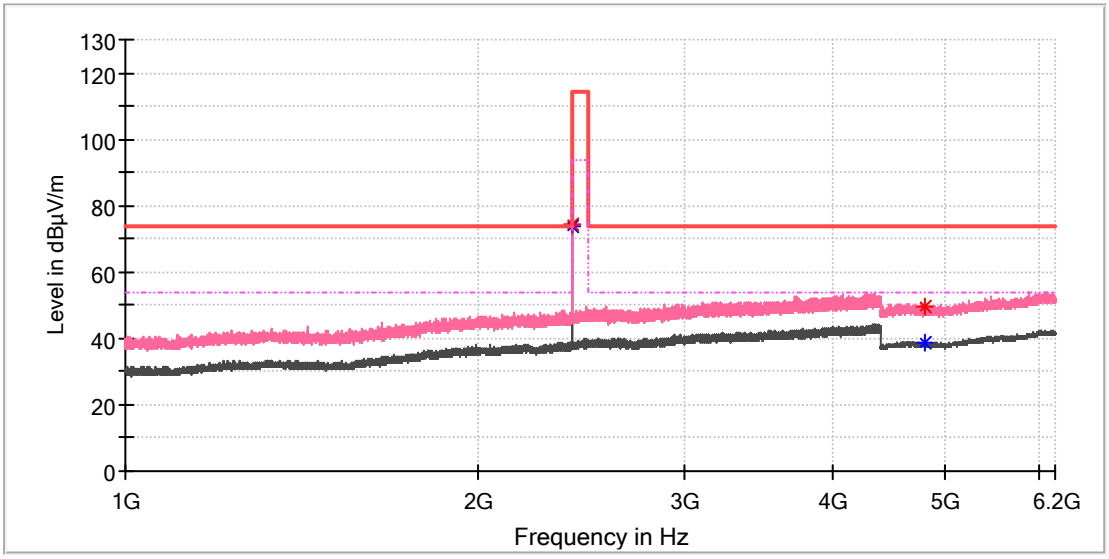
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.475000	52.65	---	74.00	21.35	100.0	H	218.0	8.8

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.742500	50.83	54.00	3.17	100.0	H	218.0	8.8

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

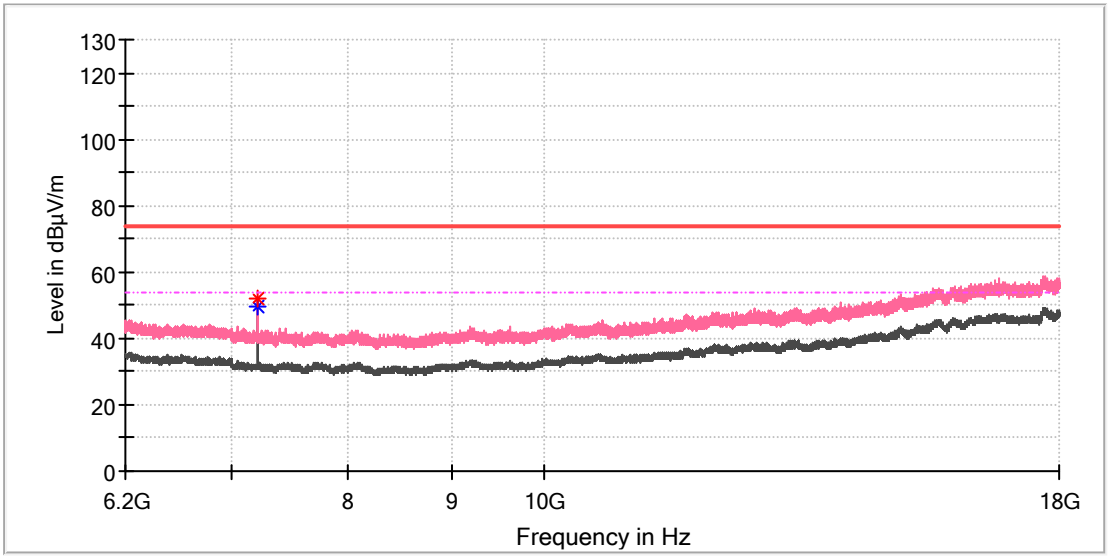
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.820000	---	73.73	94.00	20.27	100.0	V	353.0	7.0
2402.330000	74.37	---	114.00	39.63	100.0	V	322.0	7.0
4809.500000	49.68	---	74.00	24.32	100.0	V	76.0	11.8
4809.500000	---	38.57	54.00	15.43	100.0	V	76.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

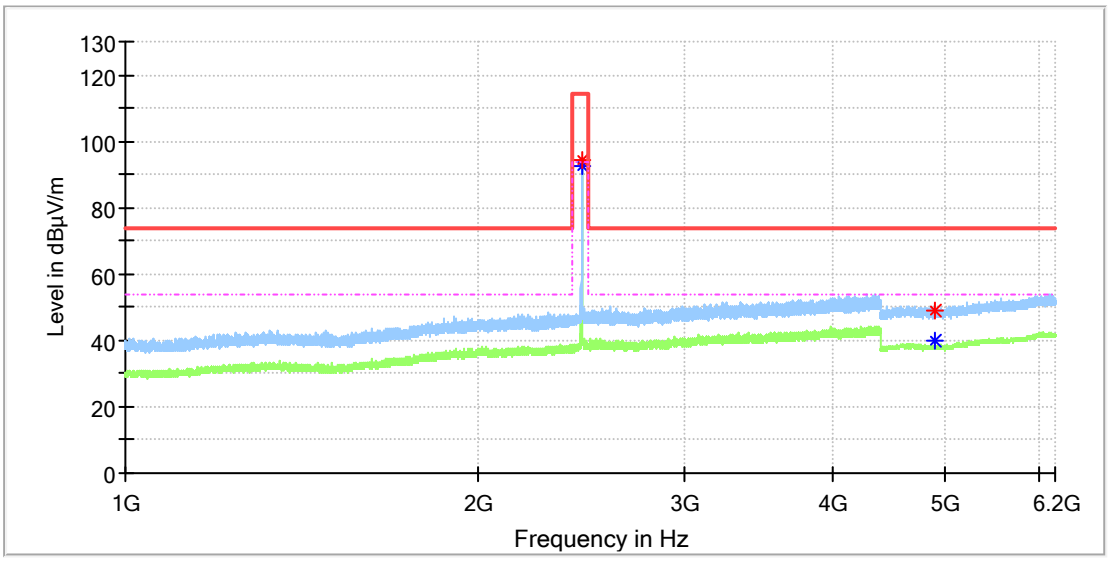
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.475000	51.91	---	74.00	22.09	100.0	V	180.0	8.8
7204.475000	---	49.72	54.00	4.28	100.0	V	180.0	8.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2449MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

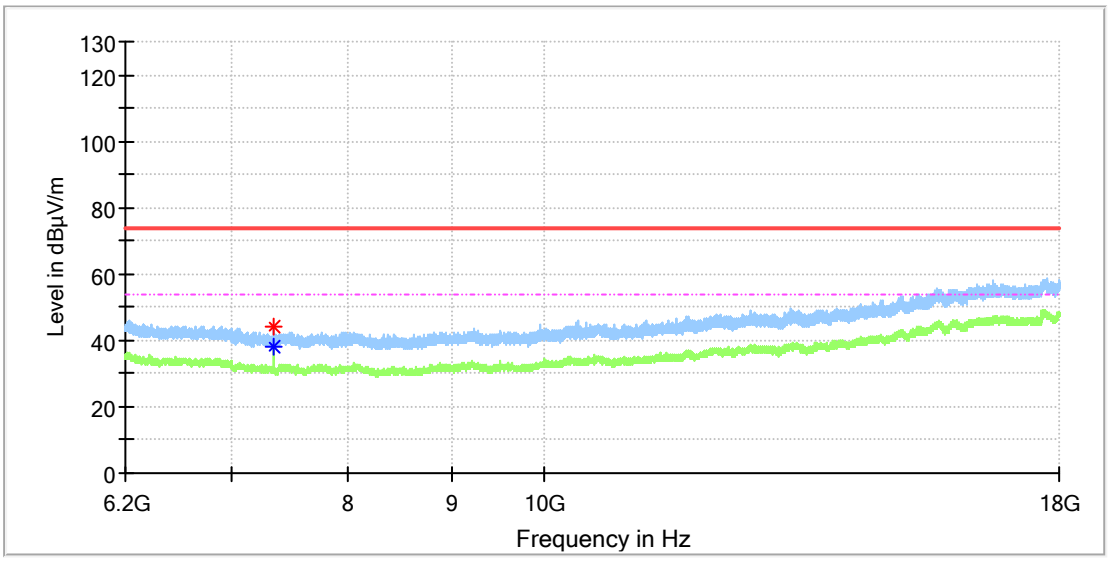
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2448.400000	94.38	---	114.00	19.62	100.0	H	139.0	7.5
2449.250000	---	92.66	94.00	1.34	100.0	H	139.0	7.5
4897.500000	---	39.66	54.00	14.34	100.0	H	230.0	11.8
4899.500000	48.85	---	74.00	25.15	100.0	H	37.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2449MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

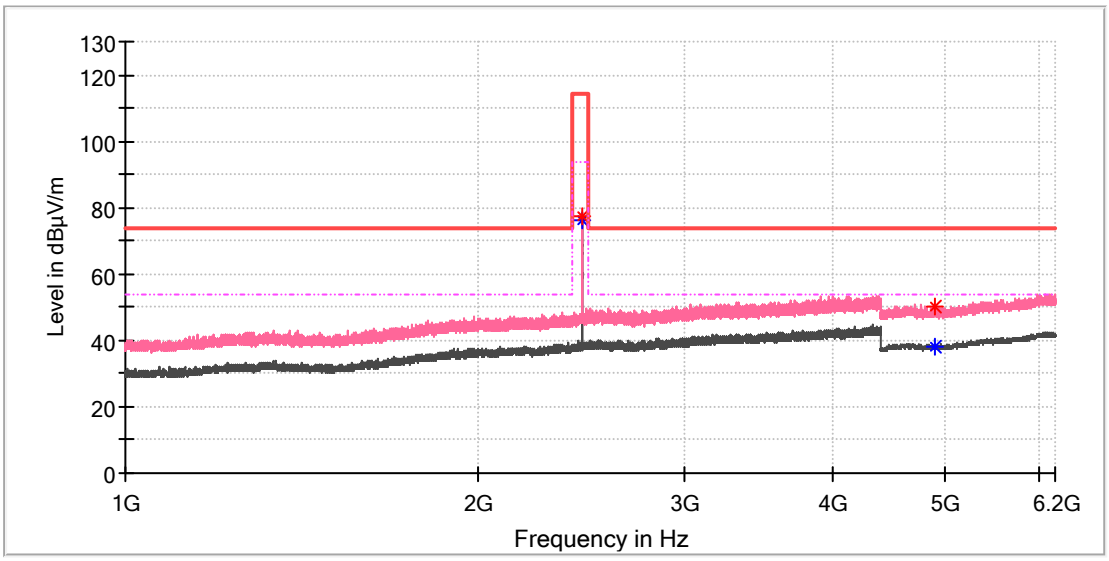
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7345.583333	---	38.37	54.00	15.63	100.0	H	313.0	8.1
7347.058333	44.36	---	74.00	29.64	100.0	H	313.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2449MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

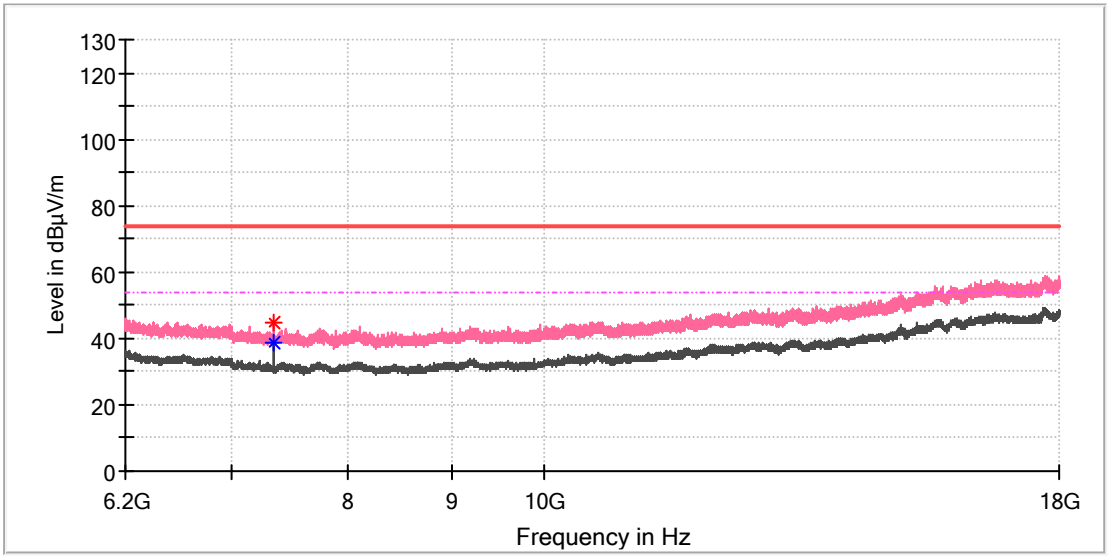
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2448.740000	---	76.23	94.00	17.77	100.0	V	300.0	7.5
2449.080000	77.22	---	114.00	36.78	100.0	V	300.0	7.5
4898.000000	---	38.39	54.00	15.61	100.0	V	0.0	11.8
4903.500000	49.97	---	74.00	24.03	100.0	V	60.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2449MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

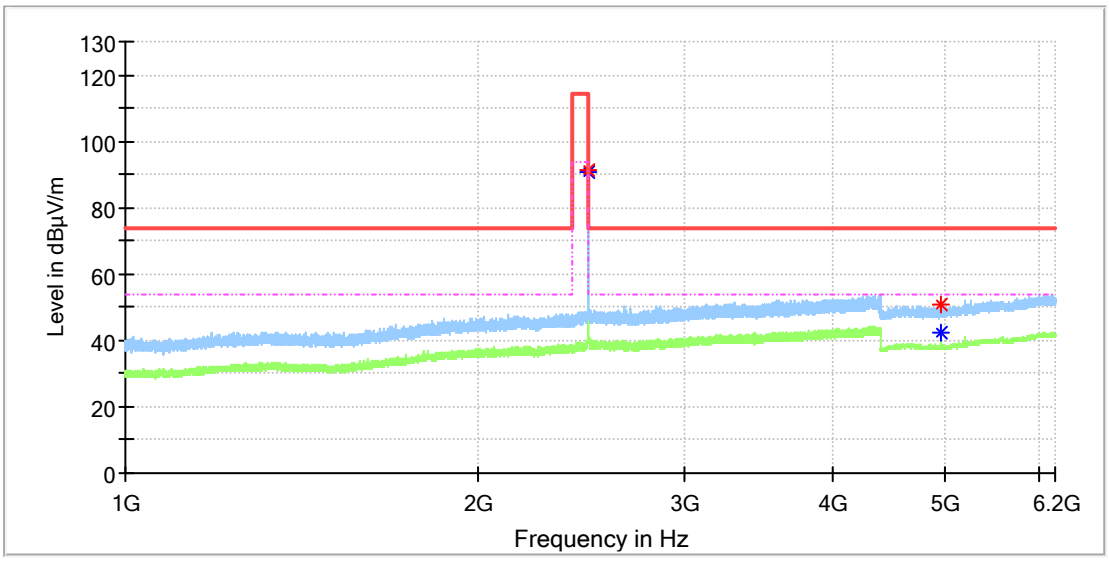
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7345.583333	44.86	---	74.00	29.14	100.0	V	337.0	8.1
7346.075000	---	38.46	54.00	15.54	100.0	V	0.0	8.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

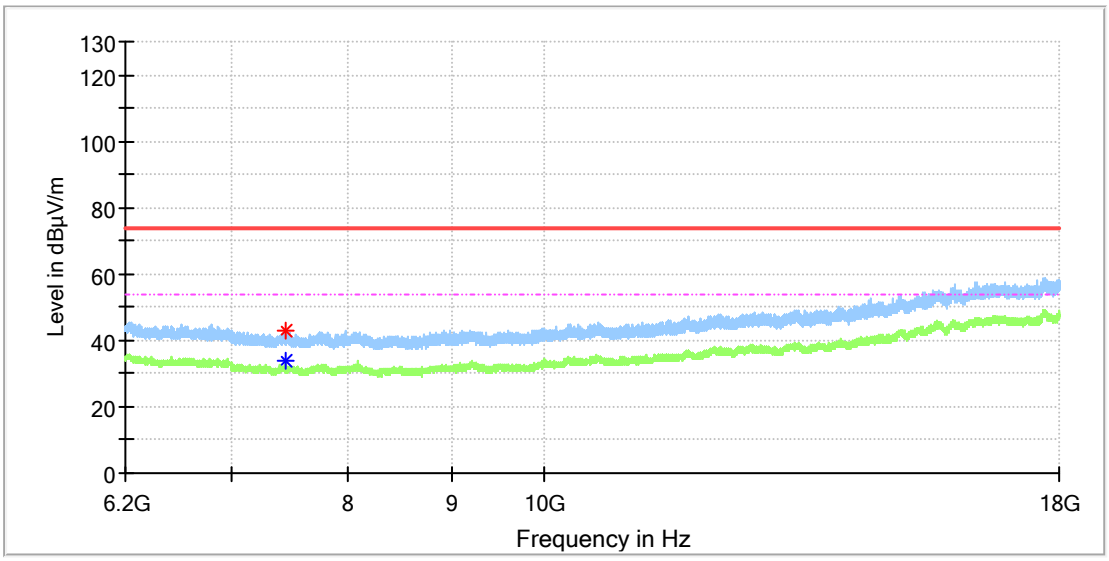
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.530000	91.44	---	114.00	22.56	100.0	H	137.0	7.4
2480.870000	---	90.95	94.00	3.05	100.0	H	153.0	7.4
4960.500000	50.63	---	74.00	23.37	100.0	H	288.0	11.8
4961.500000	---	42.20	54.00	11.80	100.0	H	112.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

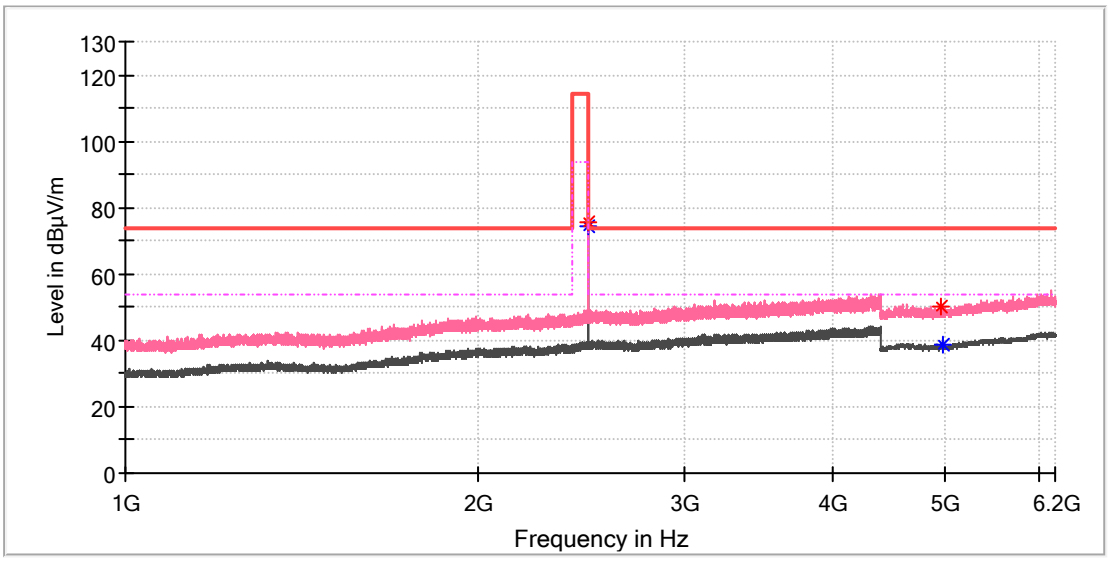
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7441.950000	42.71	---	74.00	31.29	100.0	H	7.0	8.4
7442.441667	---	34.03	54.00	19.97	100.0	H	133.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

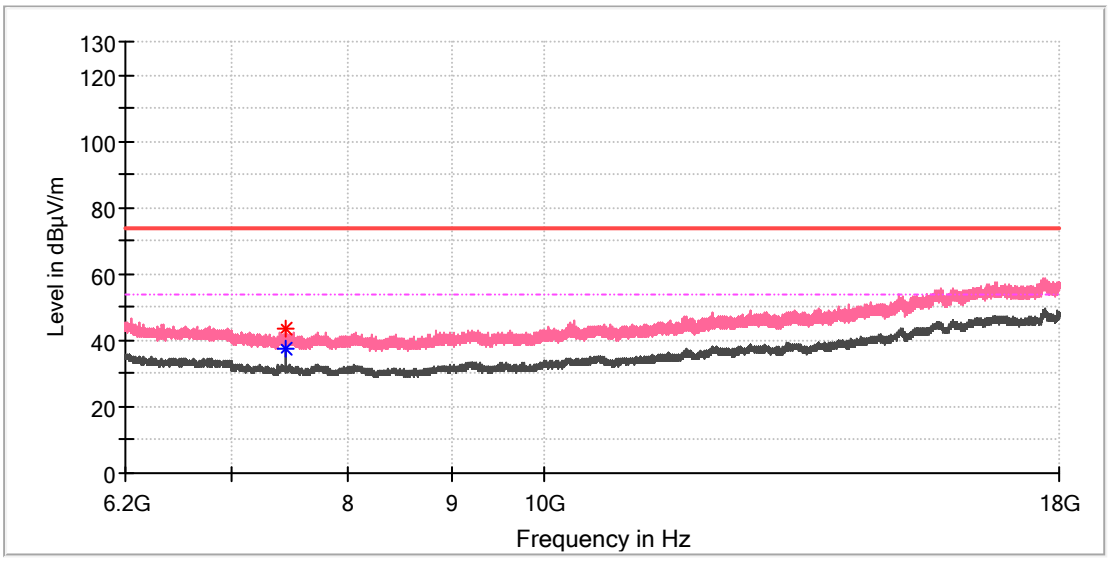
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.700000	75.31	---	114.00	38.69	100.0	V	205.0	7.4
2480.870000	---	74.59	94.00	19.41	100.0	V	205.0	7.4
4963.000000	49.94	---	74.00	24.06	100.0	V	225.0	11.8
4966.000000	---	38.60	54.00	15.40	100.0	V	162.0	11.8

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

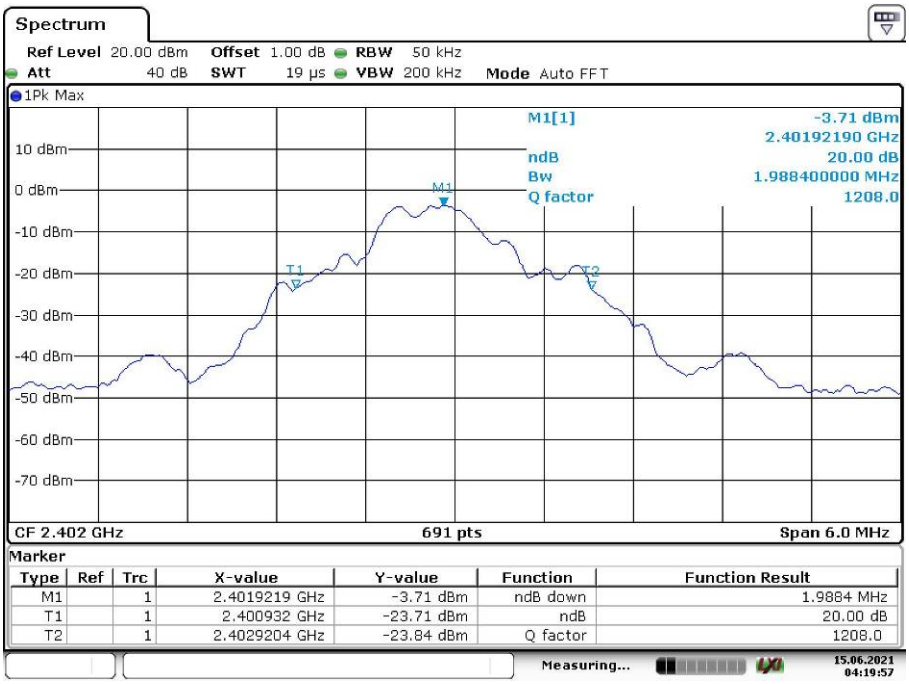
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7441.950000	---	37.24	54.00	16.76	100.0	V	183.0	8.4
7441.950000	43.31	---	74.00	30.69	100.0	V	183.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Appendix B.2: Test Results of 20dB Bandwidth

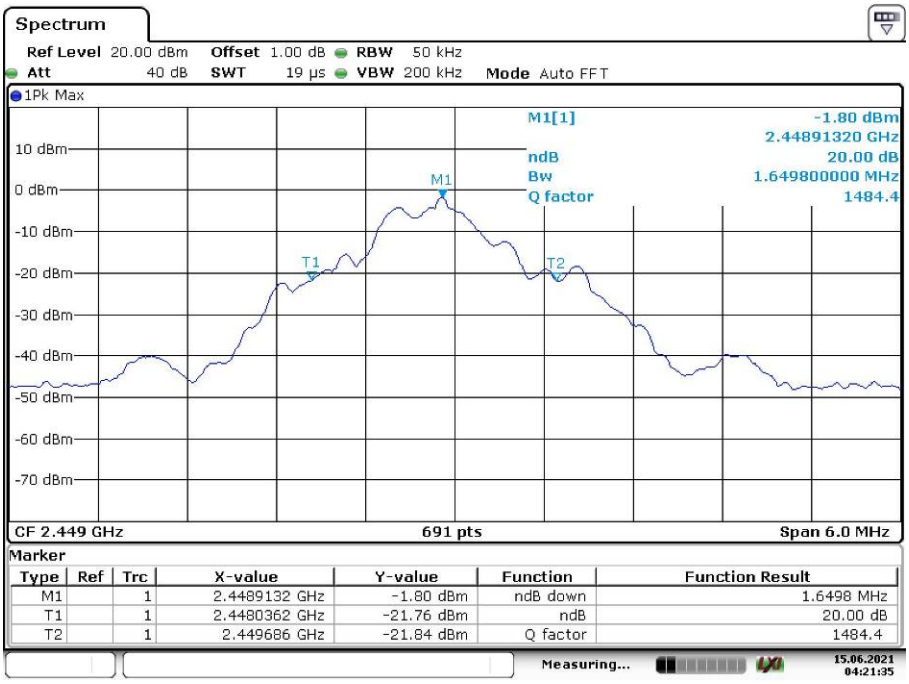
2402MHz



Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4019219 GHz	-3.71 dBm	ndB down	1.9884 MHz
T1		1	2.400932 GHz	-23.71 dBm	ndB	20.00 dB
T2		1	2.4029204 GHz	-23.84 dBm	Q factor	1208.0

Date: 15.JUN.2021 04:19:57

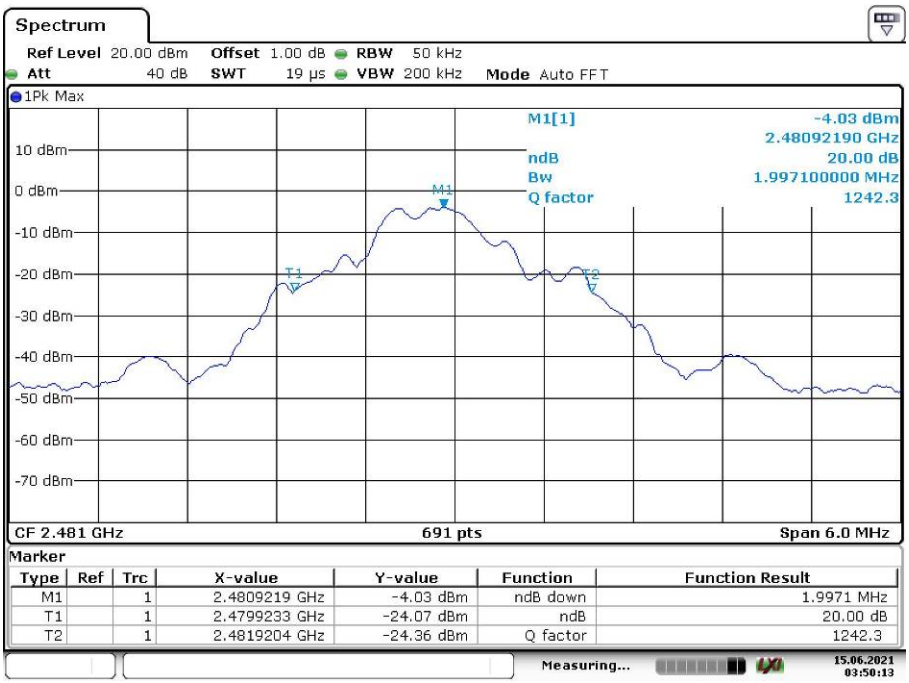
2449MHz



Marker						
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4489132 GHz	-1.80 dBm	ndB down	1.6498 MHz
T1		1	2.4480362 GHz	-21.76 dBm	ndB	20.00 dB
T2		1	2.449686 GHz	-21.84 dBm	Q factor	1484.4

Date: 15.JUN.2021 04:21:36

2481MHz

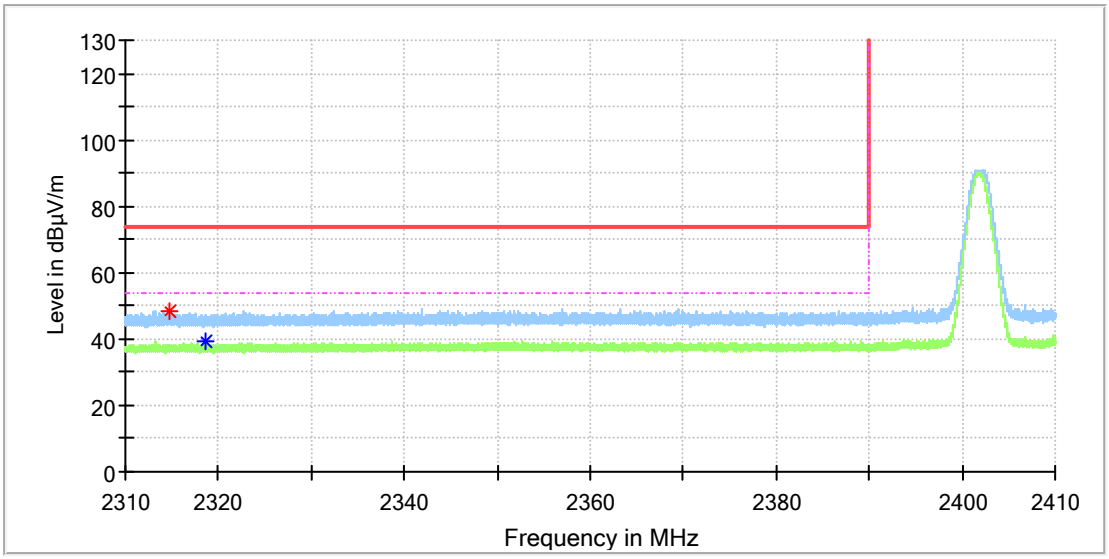


Date: 15.JUN.2021 03:50:13

Appendix B.3: Test Results of Band Edge

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

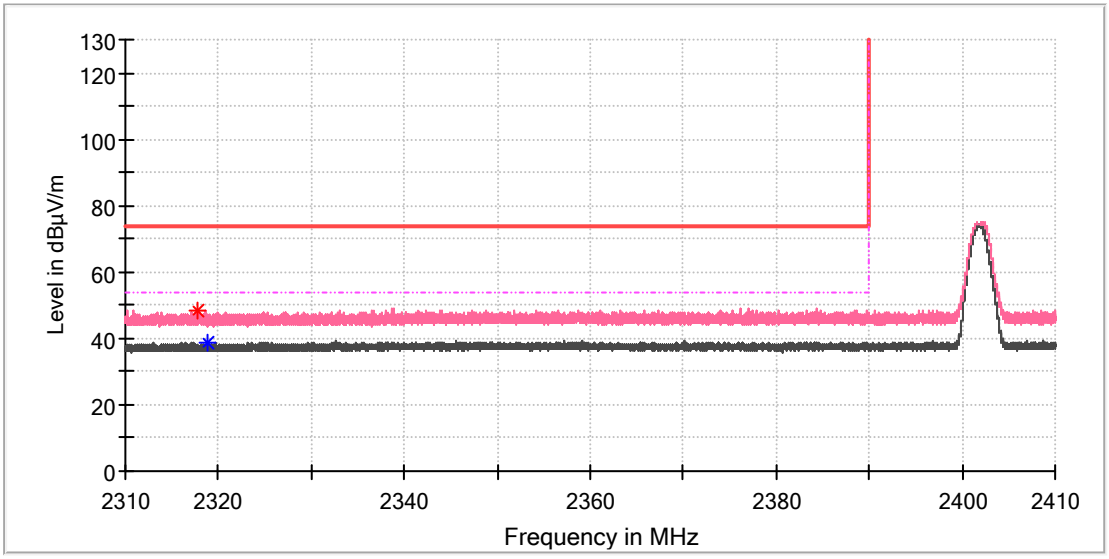
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2314.810000	48.44	---	74.00	25.56	100.0	H	31.0	6.5
2318.720000	---	39.55	54.00	14.45	100.0	H	192.0	6.6

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2402MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

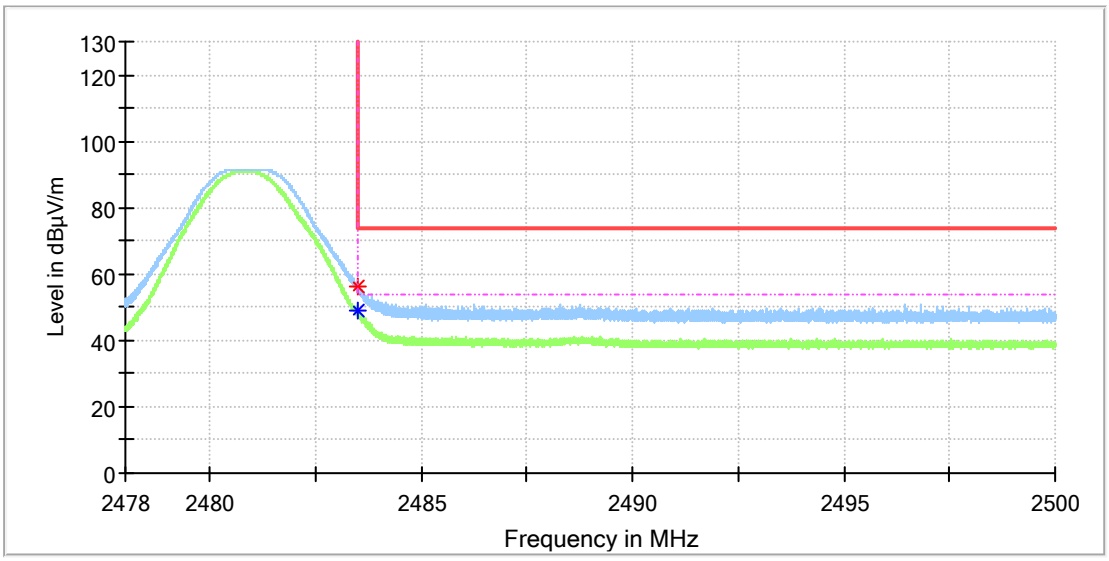
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2317.855000	48.17	---	74.00	25.83	100.0	V	0.0	6.6
2318.830000	---	38.57	54.00	15.43	100.0	V	275.0	6.6

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

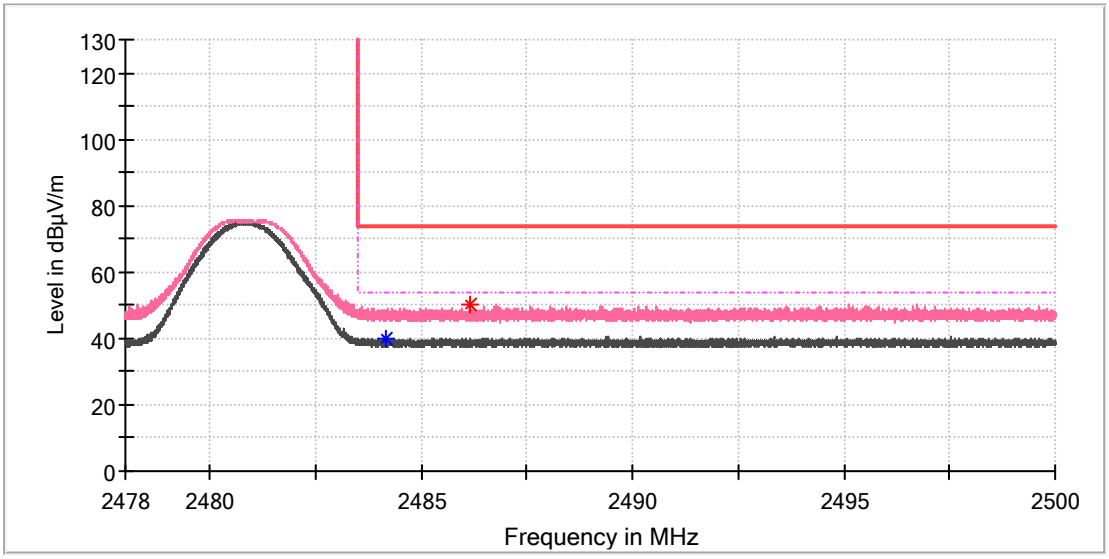
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.505000	---	48.77	54.00	5.23	100.0	H	145.0	7.4
2483.508750	56.16	---	74.00	17.84	100.0	H	156.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Perception Neuron 3
Model:	NTM-MCP-05-BS-01
Test Mode:	2481MHz
Test Voltage::	Battery
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.166250	---	40.11	54.00	13.89	100.0	V	264.0	7.4
2486.132500	49.95	---	74.00	24.05	100.0	V	79.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---