

Prüfbericht-Nr.: <i>Test report no.:</i>	CN24RTIB 002	Auftrags-Nr.: <i>Order no.:</i>	168502657	Seite 1 von 19 <i>Page 1 of 19</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2024-09-03	
Auftraggeber: <i>Client:</i>	Shenzhen RAKwireless Technology Co.,Ltd. Room 506, Building B, New Compark, Pingshan First Road, Taoyuan Street, Nanshan District, Shenzhen, Guangdong, China			
Prüfgegenstand: <i>Test item:</i>	WisDuo LPWAN+BLE Module			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	RAK11720 (Trademark: )			
Auftrags-Inhalt: <i>Order content:</i>	FCC CIIPC and IC C4PC			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 February 2021			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2024-10-17	Please refer to photo documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A003836239-005			
Prüfzeitraum: <i>Testing period:</i>	2024-10-17 – 2024-11-21			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	 Hardy Suo		genehmigt von: <i>authorized by:</i>	 Lin Lin
Datum: <i>Date:</i>	2025-02-13		Ausstellungsdatum: <i>Issue date:</i>	2025-02-13
Stellung / Position	Sachverständige(r)/Expert		Stellung / Position	Sachverständige(r)/Expert
Sonstiges / Other:	FCC ID: 2AF6B-RAK11720 IC: 25908-RAK11720, HVIN: RAK11720, FVIN: RUI_3.5.2+user_final.hex, HMN: RF-V1-900-2LATCH-BATT, RF-V1-900-2LATCH-SOLAR, RF-V1-900-4LATCH-BATT, RF-V1-900-4LATCH-SOLAR This report is for FCC CIIPC and ISSED C4PC as changed transmit antennas and will be installed into HOST LoRa control and monitoring node (M/N: RF-V1-900-2LATCH-BATT, RF-V1-900-2LATCH-SOLAR, RF-V1-900-4LATCH-BATT, RF-V1-900-4LATCH-SOLAR), radiated spurious emissions was re-performed.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) * Legend: P(ass) = passed a.m. test specification(s)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n) F(ail) = failed a.m. test specification(s)		N/A = nicht anwendbar N/A = not applicable N/T = nicht getestet N/T = not tested	
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Anmerkungen Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.</i> <i>Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

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Test Summary

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 RADIATED SPURIOUS EMISSION

RESULT: Pass

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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: Test Results.

Appendix B: Photographs of the Test Set-up.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

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. Date	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	2024-09-29	2025-09-28
Signal Analyzer	R&S	FSV 40	101439	2024-09-29	2025-09-28
System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
Filterbank	R&S	Wlan	100759	2024-09-29	2025-09-28
OSP	R&S	OSP 120	102040	N/A	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2024-09-29	2025-09-28
Amplifier	R&S	SCU-18F	180070	2024-09-29	2025-09-28
Amplifier	R&S	SCU40A	100475	2024-09-29	2025-09-28
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2024-09-28	2025-09-27
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2024-09-28	2025-09-27
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2024-09-28	2025-09-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2024-09-28	2025-09-27
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-09-14	2027-09-13

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 basis 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 (k=2)
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	± 4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

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 No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. 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 WisBlock LPWAN Module which supports Lora and Bluetooth Low Energy technologies.

Previous Antenna information:

For LoRa:

Antenna #	Model	Antenna Gain	Antenna Type	Connector Type
1#	RAKARJ14	2.3 dBi	Dipole Antenna	RP-SMA connector
2#	RAKARJ16	2.3 dBi	Dipole Antenna	RP-SMA connector

Note:

1. When connecting to the module, all antennas listed above need to transfer to an IPEX connector.
2. Antennas 1# and 2# have the same type and similar in-band and out-of-band characteristics and only the color of enclosure different, they are considered as equivalent antennas. Thus, the antenna 1# was selected to be tested.

For BLE:

Antenna #	Model	Antenna Gain	Antenna Type	Connector Type
1#	R S2B1BH2A1B01000	3.12 dBi	PCB Layout Antenna	IPEX connector

Current Antenna information:

For LoRa:

Antenna #	Model	Antenna Gain	Antenna Type	Connector Type
1#	RAKARJ18	1.2 dBi	Dipole Antenna	RP-SMA connector
2#	RAKARG12	3 dBi	Dipole Fiberglass Antenna	RP-SMA connector
3#	RAK0009	2.5 dBi	PCB Layout Antenna	IPEX connector

For BLE:

Antenna #	Model	Antenna Gain	Antenna Type	Connector Type
1#	RAK0008	2 dBi	PCB Layout Antenna	IPEX connector

This report is for FCC CIIPC and ISSED C4PC as changed transmit antennas and will be installed into HOST LoRa control and monitoring node (M/N: RF-V1-900-2LATCH-BATT, RF-V1-900-2LATCH-SOLAR, RF-V1-900-4LATCH-BATT, RF-V1-900-4LATCH-SOLAR), radiated spurious emissions for LoRa re-performed.

Configuration 1:

Data Rate	SF (Spreading factor)	Operating Frequency
0	LoRa Modulation: SF10 / Bandwidth 125 kHz	915.1 – 927.7 MHz
1	LoRa Modulation: SF9 / Bandwidth 125 kHz	
2	LoRa Modulation: SF8 / Bandwidth 125 kHz	
3	LoRa Modulation: SF7 / Bandwidth 125 kHz	
4	LoRa Modulation: SF8 / Bandwidth 500 kHz	915.8 – 927.0 MHz

Configuration 2:

Data Rate	SF (Spreading factor)	Operating Frequency
0	LoRa Modulation: SF12 / Bandwidth 500 kHz	902.5 – 927.1 MHz
1	LoRa Modulation: SF11 / Bandwidth 500 kHz	
2	LoRa Modulation: SF10 / Bandwidth 500 kHz	
3	LoRa Modulation: SF9 / Bandwidth 500 kHz	
4	LoRa Modulation: SF8 / Bandwidth 500 kHz	
6	LoRa Modulation: SF7 / Bandwidth 500 kHz	

HOST model list:

Model No.	Power Supply	Digital Inputs	Latching Outputs
RF-V1-900-2LATCH-BATT	31200mAh Battery	4 Digital Inputs: V1 IN V2 IN V3 IN V4 IN	2 Latching Outputs: V1 V2
RF-V1-900-2LATCH-SOLAR	13000mAh Battery and Solar Panel	4 Digital Inputs: V1 IN V2 IN V3 IN V4 IN	2 Latching Outputs: V1 V2
RF-V1-900-4LATCH-BATT	31200mAh Battery	4 Digital Inputs: V1 IN V2 IN V3 IN V4 IN	4 Latching Outputs: V1 V2 V3 V4
RF-V1-900-4LATCH-SOLAR	13000mAh Battery and Solar Panel	4 Digital Inputs: V1 IN V2 IN V3 IN V4 IN	4 Latching Outputs: V1 V2 V3 V4

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	WisDuo LPWAN+BLE Module
Type Designation	RAK11720
FCC ID	2AF6B-RAK11720
IC	25908-RAK11720
HVIN	RAK11720
FVIN	RUI_3.5.2+user_final.hex
HMN	RF-V1-900-2LATCH-BATT, RF-V1-900-2LATCH-SOLAR, RF-V1-900-4LATCH-BATT, RF-V1-900-4LATCH-SOLAR
Operating Voltage	DC 5V
Technical Specification of Lora DTS	
Operating Frequency	915.8 – 927.0 MHz 902.5 – 927.1 MHz
Type of Modulation	Lora
Data Rate	SF8 / DR4 for 903 – 914.2 MHz and 915.8 – 927.0 MHz SF7-SF12 / DR0 to DR5 for 902.5 – 927.1 MHz
Channel Number	8 channels for 915.8 – 927.0 MHz

	43 channels for 902.5 – 927.1 MHz
Channel Separation	1.6 MHz
Occupied Bandwidth	500 kHz
Antenna Number:	1
Antenna Gain and Type:	Refer to section 3.1
Technical Specification of Lora FHSS	
Frequency Range	915.1 – 927.7 MHz
Type of Modulation	Lora
Data Rate	SF7 to SF10 / DR0 to DR3
Channel Number	64 channels (Upstream)
Channel Separation	200 KHz
Occupied Bandwidth	125 KHz
Antenna Number:	1
Antenna Gain and Type:	Refer to section 3.1
Technical Specification of BLE	
Frequency Range	2402 - 2480 MHz
Type of Modulation	GFSK
Data Rate	1Mbps
Channel Number	40 channels
Channel Separation	2 MHz
Antenna Number:	1
Antenna Gain and Type:	Refer to section 3.1

Table 3: RF Channel and Frequency of Lora DTS (915.8 – 927.0 MHz)

RF Channel	Center Frequency (MHz)	Occupied Bandwidth (KHz)	Channel Separation(KHz)	Modulation
0	915.80	500(SF8)	1600	LoRa:CSS
1	917.40	500(SF8)	1600	LoRa:CSS
2	919.00	500(SF8)	1600	LoRa:CSS
3	920.60	500(SF8)	1600	LoRa:CSS
4	922.20	500(SF8)	1600	LoRa:CSS
5	923.80	500(SF8)	1600	LoRa:CSS
6	925.40	500(SF8)	1600	LoRa:CSS
7	927.00	500(SF8)	1600	LoRa:CSS

Table 4: RF Channel and Frequency of Lora DTS (902.5 – 927.1 MHz)

RF Channel	Center Frequency (MHz)	Occupied Bandwidth (KHz)	Channel Separation(KHz)	Modulation
0	902.50	500	600	LoRa:CSS
1	903.10	500	600	LoRa:CSS
2	903.70	500	600	LoRa:CSS
3	904.30	500	600	LoRa:CSS
4	904.90	500	600	LoRa:CSS
5	905.50	500	600	LoRa:CSS
6	906.10	500	600	LoRa:CSS
7	906.70	500	600	LoRa:CSS
8	907.30	500	600	LoRa:CSS
9	907.90	500	600	LoRa:CSS
10	908.50	500	600	LoRa:CSS

11	909.10	500	600	LoRa:CSS
12	909.70	500	600	LoRa:CSS
13	910.30	500	600	LoRa:CSS
14	910.90	500	600	LoRa:CSS
15	911.50	500	600	LoRa:CSS
16	912.10	500	600	LoRa:CSS
17	912.70	500	600	LoRa:CSS
18	913.30	500	600	LoRa:CSS
19	913.90	500	600	LoRa:CSS
20	914.50	500	600	LoRa:CSS
21	915.10	500	600	LoRa:CSS
22	915.70	500	600	LoRa:CSS
23	916.30	500	600	LoRa:CSS
24	916.90	500	600	LoRa:CSS
25	917.50	500	600	LoRa:CSS
26	918.10	500	600	LoRa:CSS
27	918.70	500	600	LoRa:CSS
28	919.30	500	600	LoRa:CSS
29	919.90	500	600	LoRa:CSS
30	920.50	500	600	LoRa:CSS
31	921.10	500	600	LoRa:CSS
32	921.70	500	600	LoRa:CSS
33	922.30	500	600	LoRa:CSS
34	922.90	500	600	LoRa:CSS
35	923.50	500	600	LoRa:CSS
36	924.10	500	600	LoRa:CSS
37	924.70	500	600	LoRa:CSS
38	925.30	500	600	LoRa:CSS
39	925.90	500	600	LoRa:CSS
40	926.50	500	600	LoRa:CSS
41	927.10	500	600	LoRa:CSS
42	927.70	500	600	LoRa:CSS

Table 5: RF Channel and Frequency of Lora FHSS

RF Channel	Center Frequency (MHz)	Occupied Bandwidth (KHz)	Channel Separation(KHz)	Modulation
0	915.10	125(SF7~SF10)	200	LoRa:CSS
1	915.30	125(SF7~SF10)	200	LoRa:CSS
2	915.50	125(SF7~SF10)	200	LoRa:CSS
3	915.70	125(SF7~SF10)	200	LoRa:CSS
4	915.90	125(SF7~SF10)	200	LoRa:CSS
5	916.10	125(SF7~SF10)	200	LoRa:CSS
6	916.30	125(SF7~SF10)	200	LoRa:CSS
7	916.50	125(SF7~SF10)	200	LoRa:CSS
8	916.70	125(SF7~SF10)	200	LoRa:CSS
9	916.90	125(SF7~SF10)	200	LoRa:CSS
10	917.10	125(SF7~SF10)	200	LoRa:CSS
11	917.30	125(SF7~SF10)	200	LoRa:CSS
12	917.50	125(SF7~SF10)	200	LoRa:CSS
13	917.70	125(SF7~SF10)	200	LoRa:CSS
14	917.90	125(SF7~SF10)	200	LoRa:CSS

15	918.10	125(SF7~SF10)	200	LoRa:CSS
16	918.30	125(SF7~SF10)	200	LoRa:CSS
17	918.50	125(SF7~SF10)	200	LoRa:CSS
18	918.70	125(SF7~SF10)	200	LoRa:CSS
19	918.90	125(SF7~SF10)	200	LoRa:CSS
20	919.10	125(SF7~SF10)	200	LoRa:CSS
21	919.30	125(SF7~SF10)	200	LoRa:CSS
22	919.50	125(SF7~SF10)	200	LoRa:CSS
23	919.70	125(SF7~SF10)	200	LoRa:CSS
24	919.90	125(SF7~SF10)	200	LoRa:CSS
25	920.10	125(SF7~SF10)	200	LoRa:CSS
26	920.30	125(SF7~SF10)	200	LoRa:CSS
27	920.50	125(SF7~SF10)	200	LoRa:CSS
28	920.70	125(SF7~SF10)	200	LoRa:CSS
29	920.90	125(SF7~SF10)	200	LoRa:CSS
30	921.10	125(SF7~SF10)	200	LoRa:CSS
31	921.30	125(SF7~SF10)	200	LoRa:CSS
32	921.50	125(SF7~SF10)	200	LoRa:CSS
33	921.70	125(SF7~SF10)	200	LoRa:CSS
34	921.90	125(SF7~SF10)	200	LoRa:CSS
35	922.10	125(SF7~SF10)	200	LoRa:CSS
36	922.30	125(SF7~SF10)	200	LoRa:CSS
37	922.50	125(SF7~SF10)	200	LoRa:CSS
38	922.70	125(SF7~SF10)	200	LoRa:CSS
39	922.90	125(SF7~SF10)	200	LoRa:CSS
40	923.10	125(SF7~SF10)	200	LoRa:CSS
41	923.30	125(SF7~SF10)	200	LoRa:CSS
42	923.50	125(SF7~SF10)	200	LoRa:CSS
43	923.70	125(SF7~SF10)	200	LoRa:CSS
44	923.90	125(SF7~SF10)	200	LoRa:CSS
45	924.10	125(SF7~SF10)	200	LoRa:CSS
46	924.30	125(SF7~SF10)	200	LoRa:CSS
47	924.50	125(SF7~SF10)	200	LoRa:CSS
48	924.70	125(SF7~SF10)	200	LoRa:CSS
49	924.90	125(SF7~SF10)	200	LoRa:CSS
50	925.10	125(SF7~SF10)	200	LoRa:CSS
51	925.30	125(SF7~SF10)	200	LoRa:CSS
52	925.50	125(SF7~SF10)	200	LoRa:CSS
53	925.70	125(SF7~SF10)	200	LoRa:CSS
54	925.90	125(SF7~SF10)	200	LoRa:CSS
55	926.10	125(SF7~SF10)	200	LoRa:CSS
56	926.30	125(SF7~SF10)	200	LoRa:CSS
57	926.50	125(SF7~SF10)	200	LoRa:CSS
58	926.70	125(SF7~SF10)	200	LoRa:CSS
59	926.90	125(SF7~SF10)	200	LoRa:CSS
60	927.10	125(SF7~SF10)	200	LoRa:CSS
61	927.30	125(SF7~SF10)	200	LoRa:CSS
62	927.50	125(SF7~SF10)	200	LoRa:CSS
63	927.70	125(SF7~SF10)	200	LoRa:CSS

Table 6: Operating Channel of Bluetooth LE

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	19	2440.00	29	2460.00	39	2480.00

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Lora transmitting mode (DTS) + BLE transmitting mode
- B. On, Lora transmitting mode (FHSS) + BLE transmitting mode

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- ID Label and Location Info
- User Manual

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 and ANSI C63.4: 2014.

According to clause 3.1, all tests were performed on WisDuo LPWAN+BLE Module RAK11720 installed into HOST LoRa control and monitoring node (M/N: RF-V1-900-4LATCH-BATT in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 7: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N
PC	Lenovo	T14	/

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 30MHz)

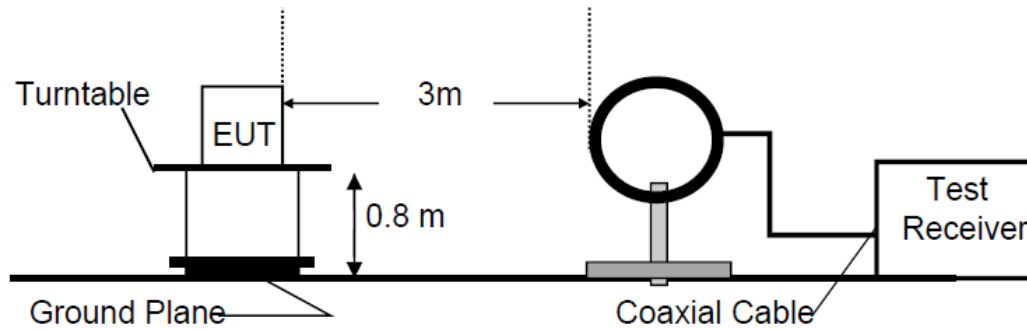


Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

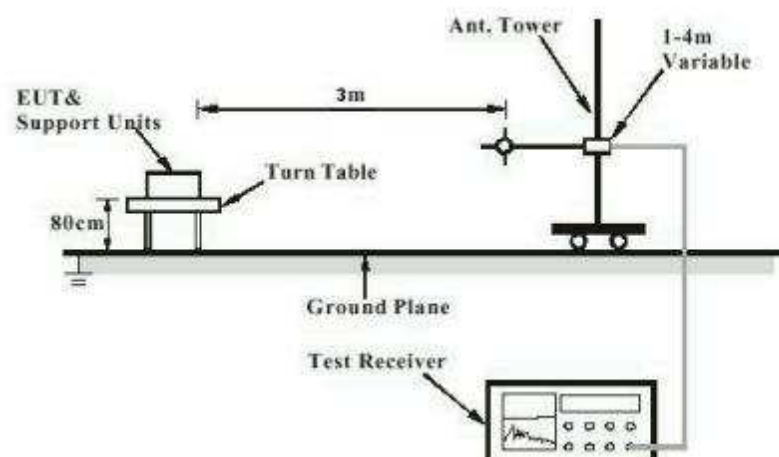


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

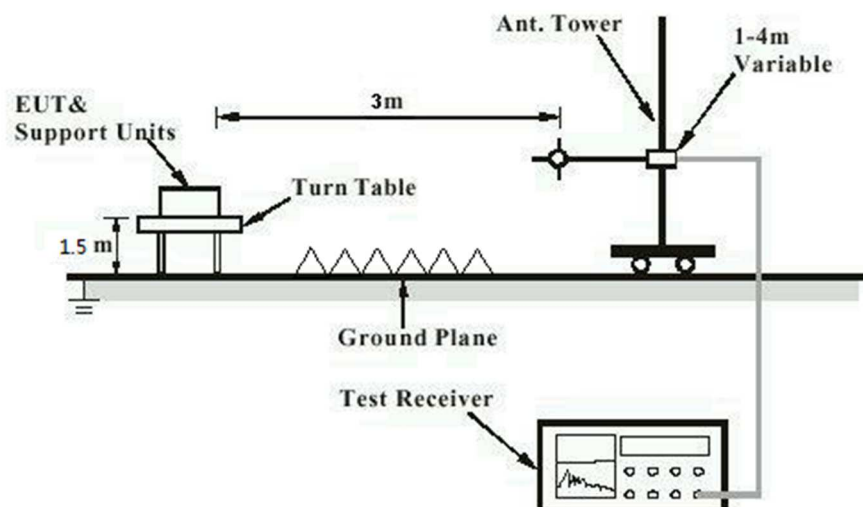
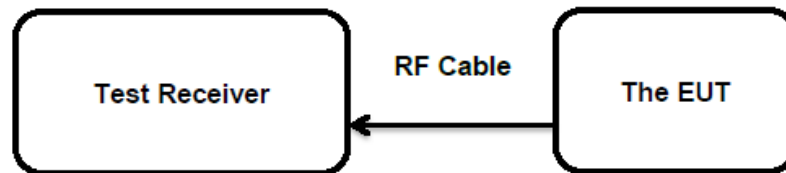


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has an external antenna, the maximum directional gain of antenna is 3dBi, and the antenna connector is designed with 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 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 2024-10-17 – 2024-11-21
Input voltage	: DC 5V
Operation mode	: A, B
Test channel	: Low / Mid / High
Ambient temperature	: Refer to test result
Relative humidity	: Refer to test result
Atmospheric pressure	: 101 kPa

Remark:

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 A.

6 Photographs of the Test Set-Up

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

7 List of Tables

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Appendix A: Test Results

APPENDIX A: TEST RESULTS	1
APPENDIX A.1: TEST RESULTS OF RADIATED SPURIOUS EMISSIONS	2

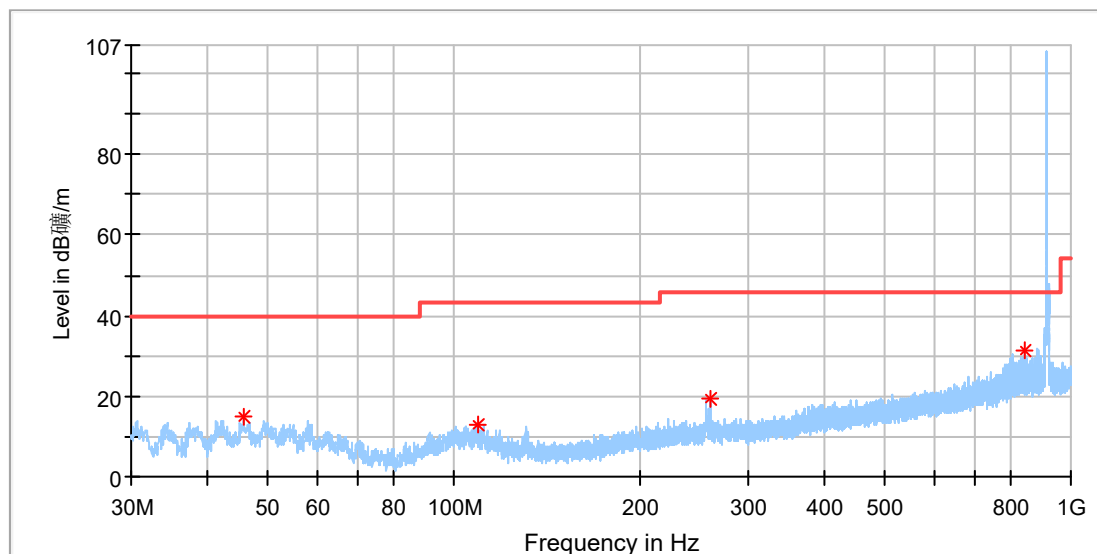
Note 1: Testing was carried out within frequency range 9 kHz to the tenth harmonics. The measurement results below 30MHz and above 18GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

Appendix A.1: Test Results of Radiated Spurious Emissions

Configuration with BLE + LoRa, integral PCB antenna for LoRa

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

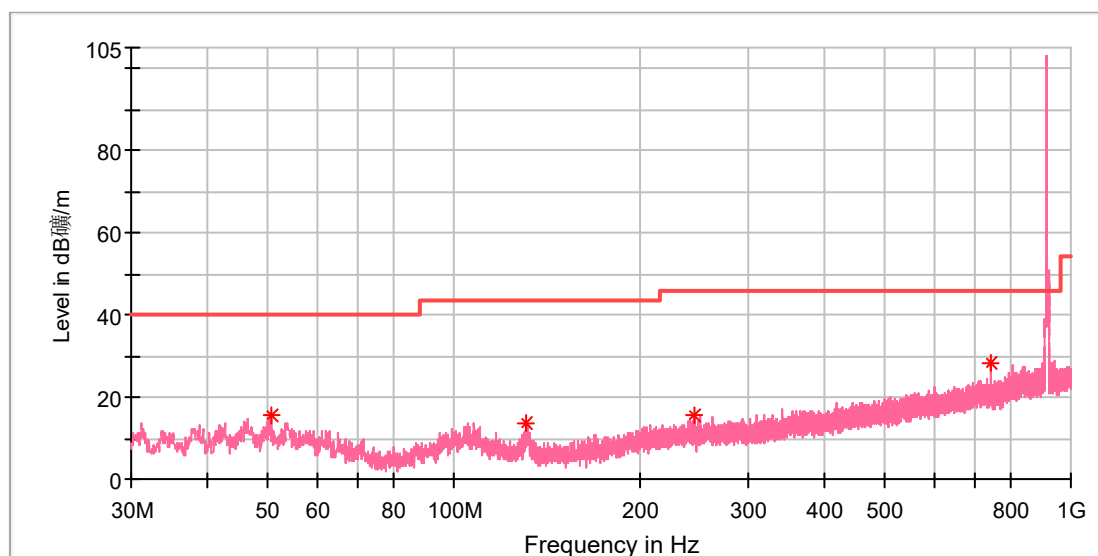
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.482692	14.74	40.00	25.26	100.0	H	343.0	-18.9
109.390769	12.95	43.50	30.55	100.0	H	343.0	-19.2
260.188462	19.35	46.00	26.65	100.0	H	0.0	-17.1
840.061923	31.51	46.00	14.49	100.0	H	324.0	-5.5

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical Freqs

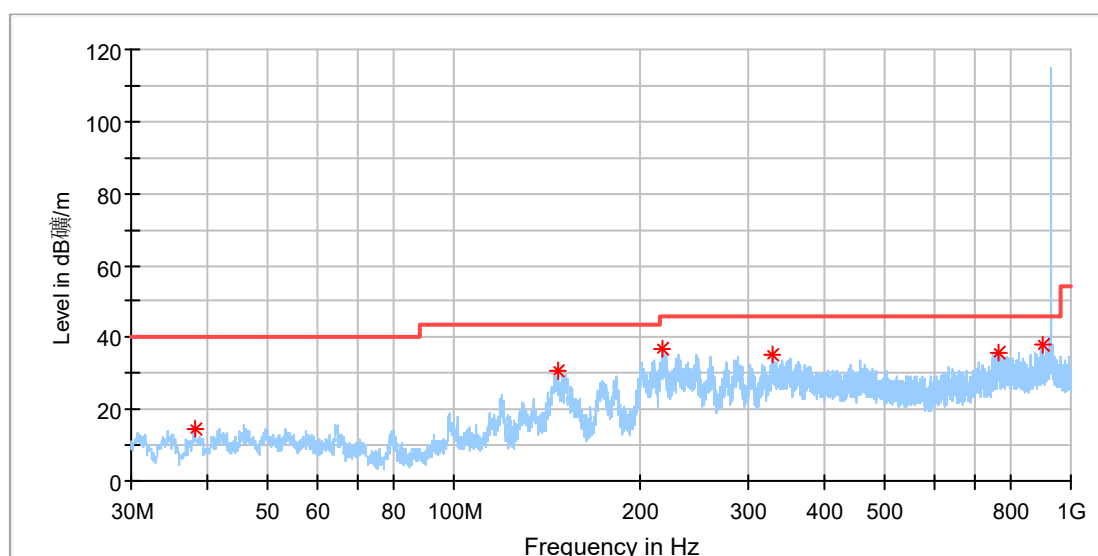
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
50.593846	15.68	40.00	24.32	100.0	V	28.0	-18.4
130.581539	13.64	43.50	29.86	100.0	V	99.0	-22.0
244.817692	15.84	46.00	30.16	100.0	V	180.0	-17.5
742.502308	28.14	46.00	17.86	100.0	V	275.0	-7.2

Final Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

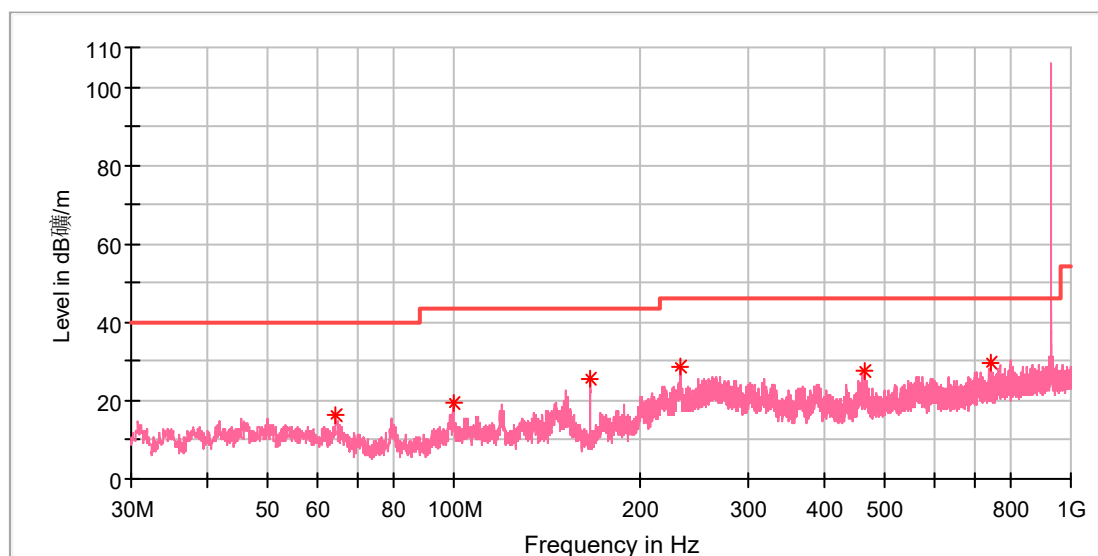
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
38.095769	14.48	40.00	25.52	100.0	H	49.0	-20.8
147.146154	30.51	43.50	12.99	100.0	H	235.0	-22.3
217.471154	36.57	46.00	9.43	100.0	H	166.0	-18.7
329.133077	35.14	46.00	10.86	100.0	H	42.0	-15.3
765.297308	35.66	46.00	10.34	100.0	H	181.0	-6.8
899.978077	37.80	46.00	8.20	100.0	H	196.0	-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: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

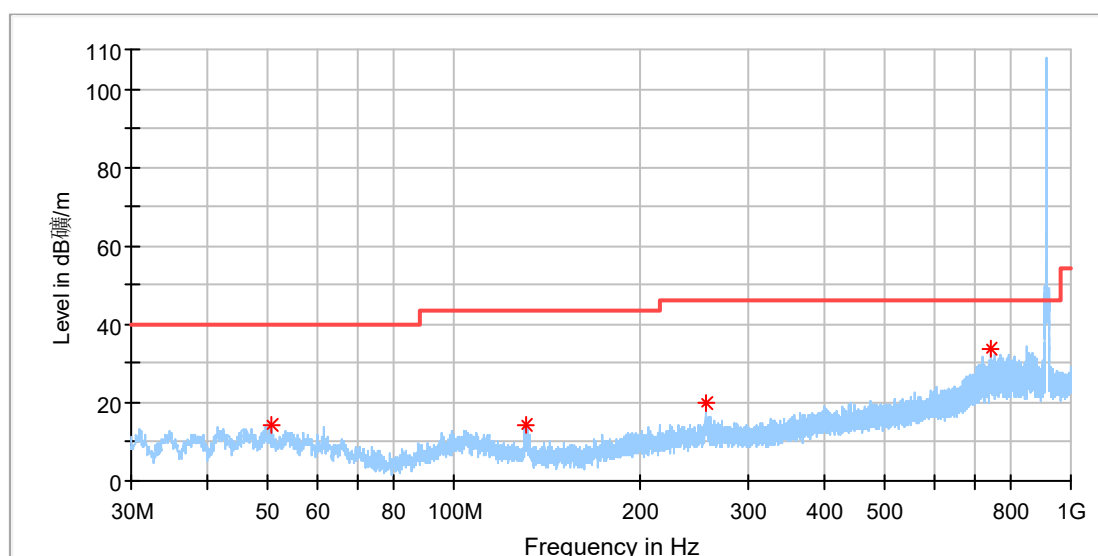
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
64.360385	16.32	40.00	23.68	100.0	V	286.0	-20.1
99.914615	19.41	43.50	24.09	100.0	V	333.0	-19.1
166.583462	25.46	43.50	18.04	100.0	V	161.0	-21.5
233.215000	28.77	46.00	17.23	100.0	V	192.0	-18.0
463.851154	27.60	46.00	18.40	100.0	V	4.0	-12.5
742.465000	29.87	46.00	16.13	100.0	V	250.0	-7.2

Final_Result

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

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

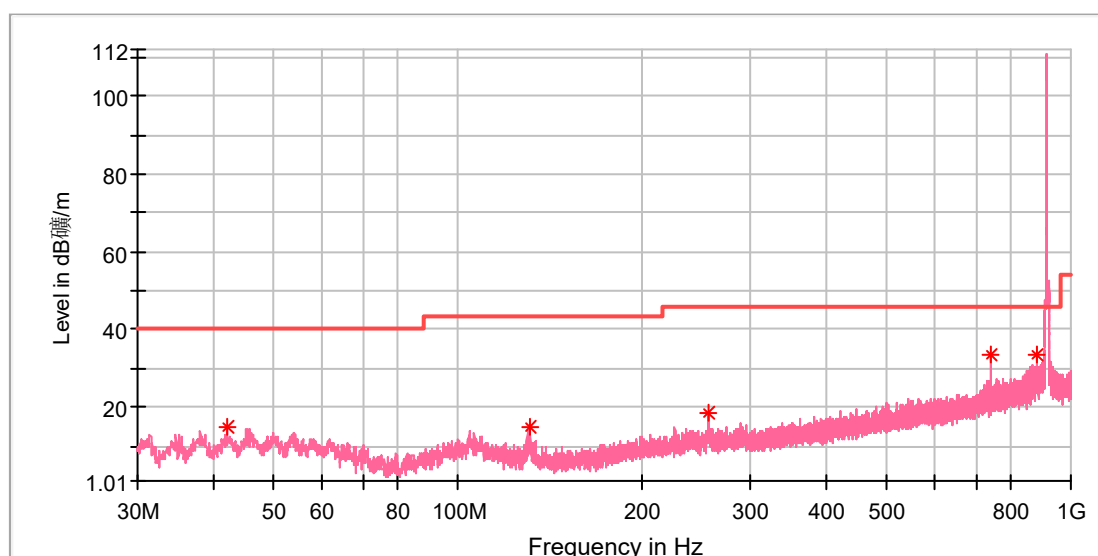
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
50.519231	14.35	40.00	25.65	100.0	H	138.0	-18.4
131.029231	14.22	43.50	29.28	100.0	H	204.0	-22.0
256.047308	19.89	46.00	26.11	100.0	H	285.0	-17.2
742.502308	33.69	46.00	12.31	100.0	H	76.0	-7.2

Final_Result

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

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

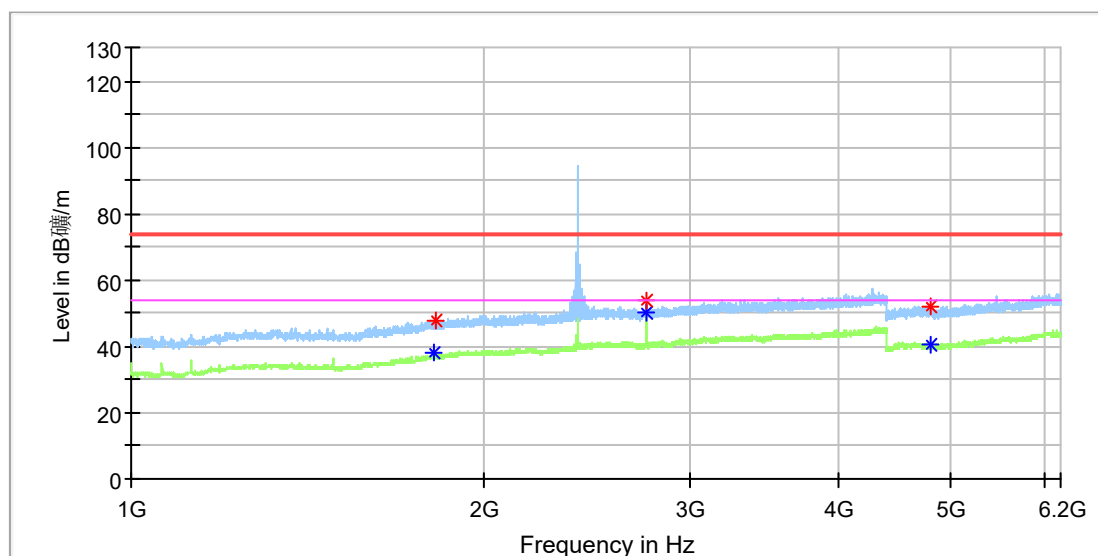
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.125000	14.99	40.00	25.01	100.0	V	259.0	-19.6
130.842692	15.03	43.50	28.47	100.0	V	4.0	-22.0
256.718846	18.32	46.00	27.68	100.0	V	306.0	-17.2
742.465000	33.54	46.00	12.46	100.0	V	11.0	-7.2
882.555385	33.29	46.00	12.71	100.0	V	218.0	-5.0

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

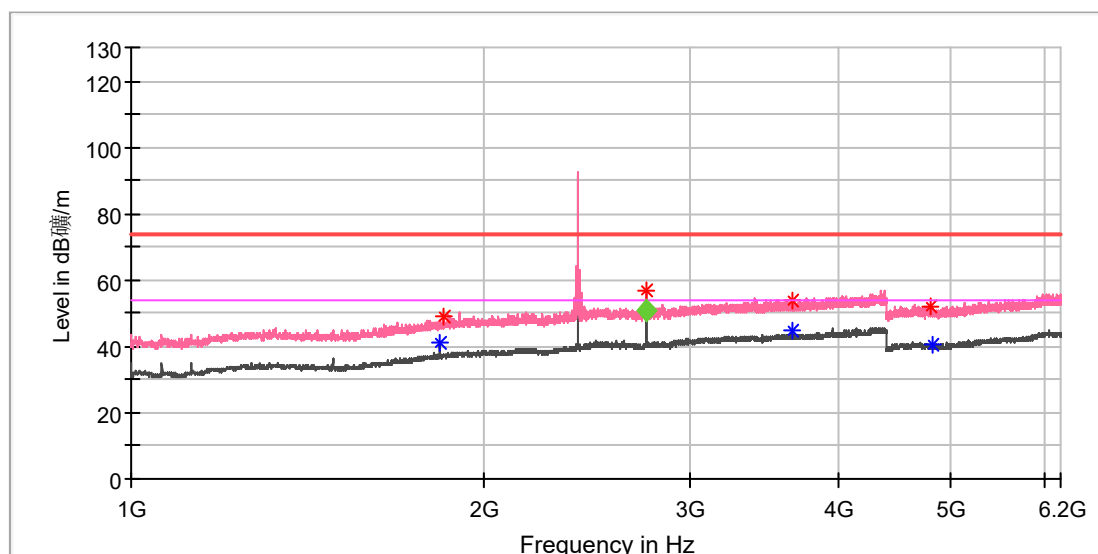
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1812.500000	---	38.26	54.00	15.74	150.0	H	14.0	6.3
1816.500000	48.00	---	74.00	26.00	150.0	H	61.0	6.3
2747.500000	54.10	---	74.00	19.90	150.0	H	91.0	9.3
2747.500000	---	50.41	54.00	3.59	150.0	H	91.0	9.3
4806.500000	51.73	---	74.00	22.27	150.0	H	46.0	13.3
4808.000000	---	40.75	54.00	13.25	150.0	H	238.0	13.3

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

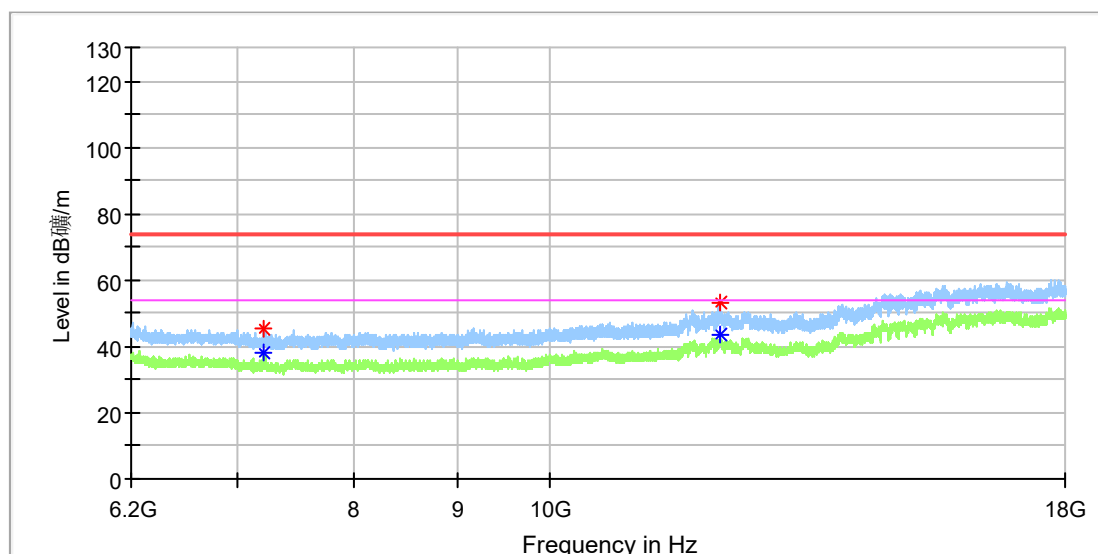
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1831.000000	---	41.14	54.00	12.86	150.0	V	327.0	6.4
1844.500000	48.95	---	74.00	25.05	150.0	V	327.0	6.4
2748.000000	56.55	---	74.00	17.45	150.0	V	0.0	9.3
3662.500000	---	45.03	54.00	8.97	150.0	V	321.0	11.0
3664.000000	53.59	---	74.00	20.41	150.0	V	327.0	11.0
4796.000000	51.85	---	74.00	22.15	150.0	V	314.0	13.3
4817.000000	---	40.73	54.00	13.27	150.0	V	12.0	13.3

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2747.336765	50.91	54.00	3.09	150.0	V	-5.0	9.3

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

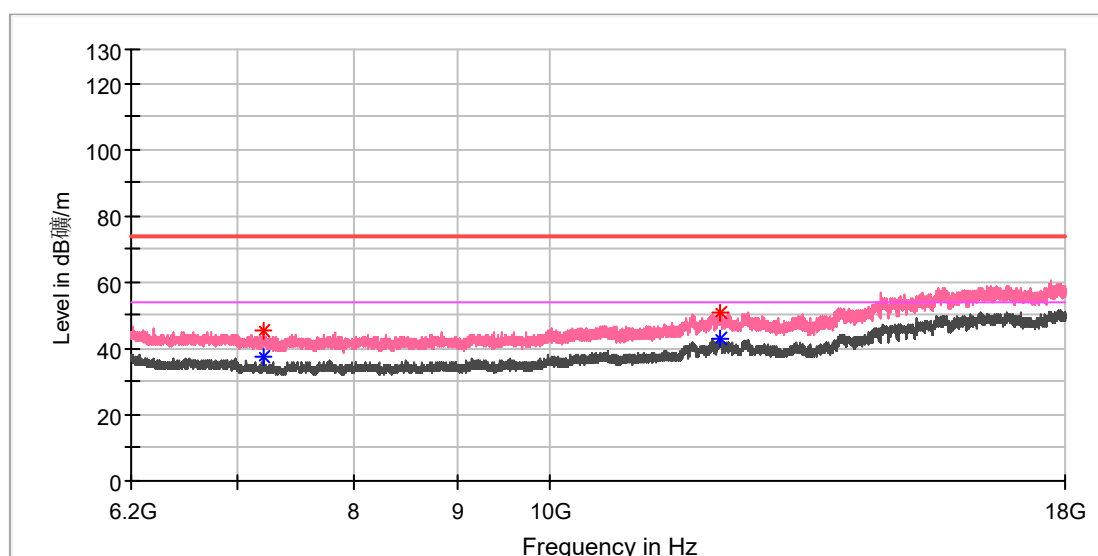
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.475000	---	38.01	54.00	15.99	150.0	H	256.0	8.8
7206.441667	45.20	---	74.00	28.80	150.0	H	118.0	8.8
12149.166667	52.94	---	74.00	21.06	150.0	H	234.0	16.7
12149.166667	---	43.26	54.00	10.74	150.0	H	234.0	16.7

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

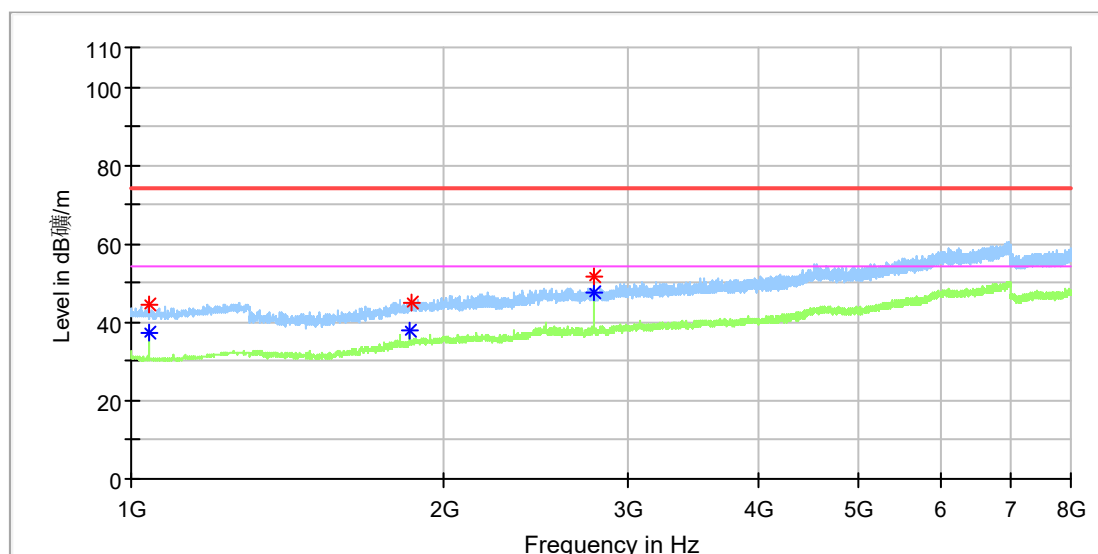
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.966667	45.30	---	74.00	28.70	150.0	V	200.0	8.8
7204.966667	---	37.47	54.00	16.53	150.0	V	200.0	8.8
12146.216667	50.57	---	74.00	23.43	150.0	V	74.0	16.6
12156.050000	---	42.95	54.00	11.05	150.0	V	134.0	16.4

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

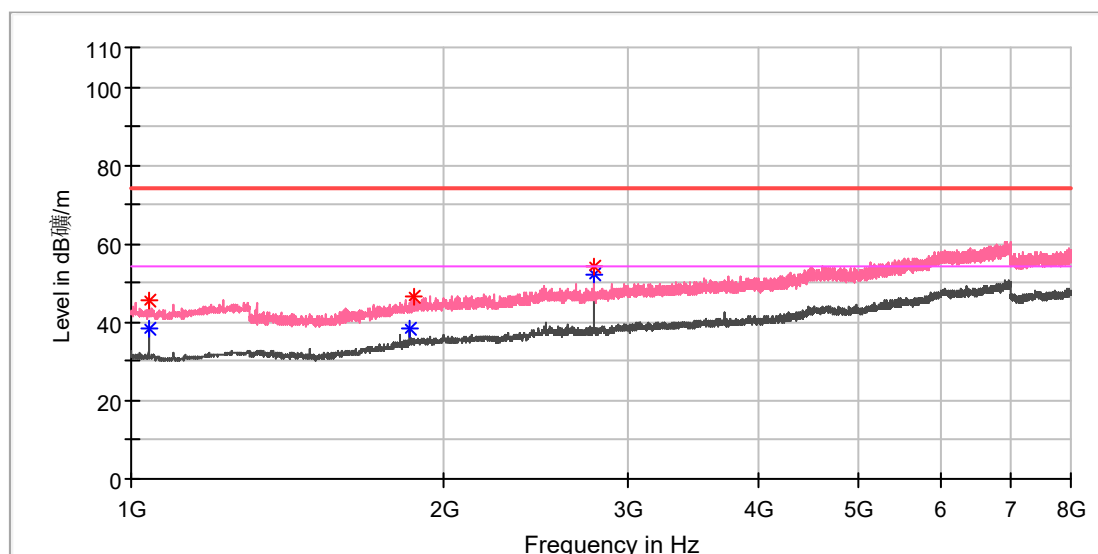
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1039.000000	44.53	---	74.00	29.47	150.0	H	174.0	0.5
1039.500000	---	37.29	54.00	16.71	150.0	H	0.0	0.5
1854.983333	---	37.92	54.00	16.08	150.0	H	89.0	6.5
1858.891667	45.21	---	74.00	28.79	150.0	H	233.0	6.6
2782.375000	51.63	---	74.00	22.37	150.0	H	0.0	9.4
2782.933333	---	47.43	54.00	6.57	150.0	H	12.0	9.4

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

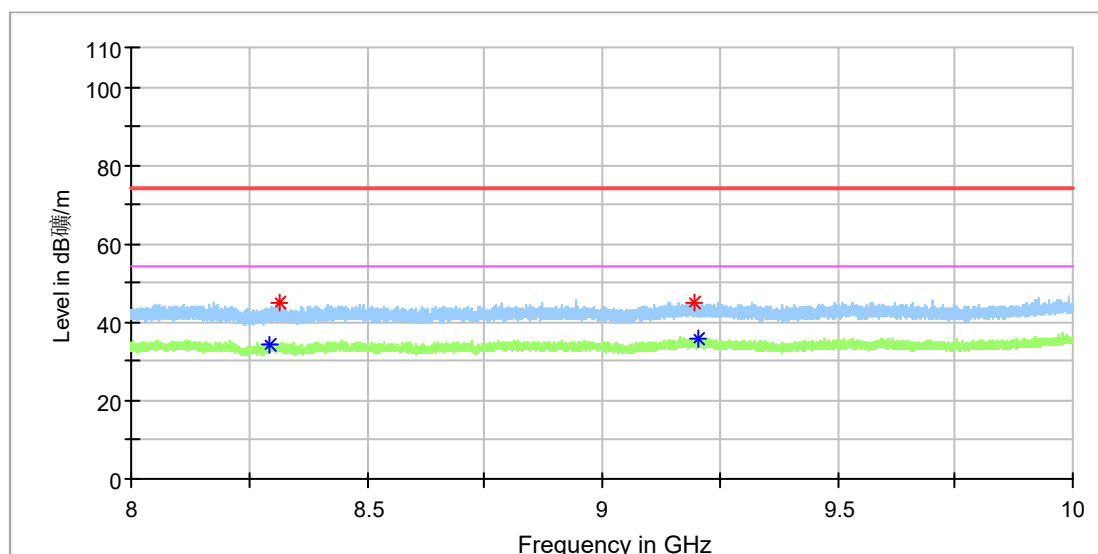
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1039.000000	---	38.34	54.00	15.66	150.0	V	84.0	0.5
1039.000000	45.42	---	74.00	28.58	150.0	V	84.0	0.5
1854.983333	---	38.31	54.00	15.69	150.0	V	306.0	6.5
1864.475000	46.31	---	74.00	27.69	150.0	V	137.0	6.7
2782.933333	54.40	---	74.00	19.60	150.0	V	0.0	9.4
2782.933333	---	51.94	54.00	2.06	150.0	V	0.0	9.4

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
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Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

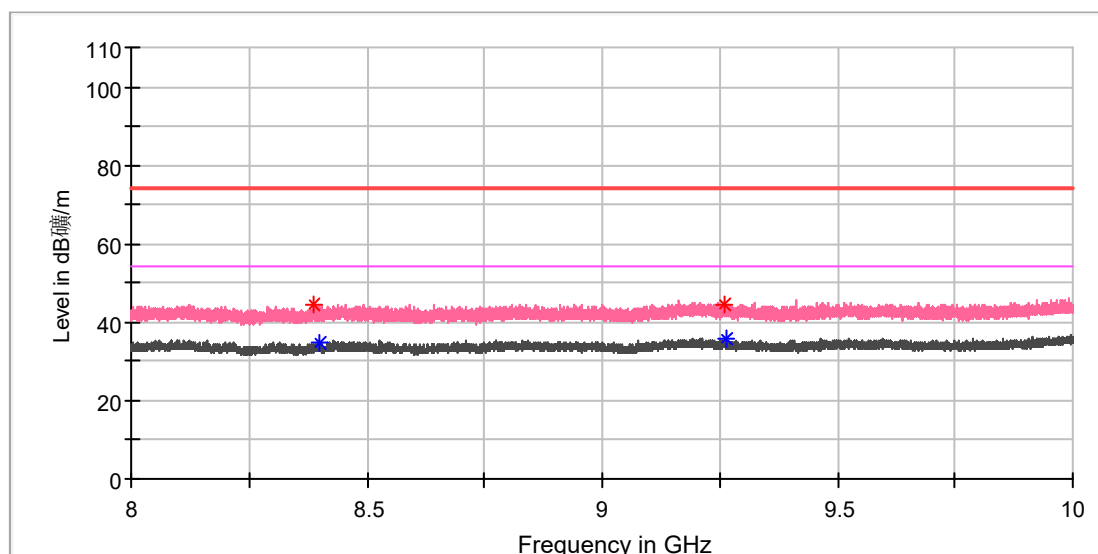
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8294.300000	---	34.48	54.00	19.52	150.0	H	176.0	8.7
8313.200000	45.21	---	74.00	28.79	150.0	H	63.0	8.8
9193.800000	45.24	---	74.00	28.76	150.0	H	54.0	10.6
9204.900000	---	35.71	54.00	18.29	150.0	H	0.0	10.6

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

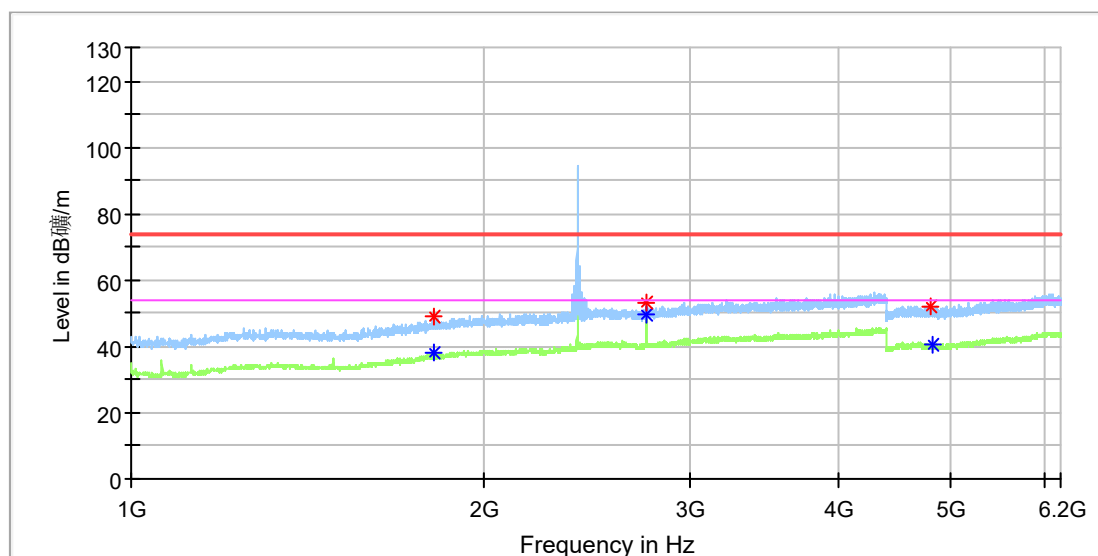
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8387.700000	44.69	---	74.00	29.31	150.0	V	359.0	9.0
8398.100000	---	34.75	54.00	19.25	150.0	V	290.0	9.1
9259.200000	44.30	---	74.00	29.70	150.0	V	0.0	10.5
9264.500000	---	35.66	54.00	18.34	150.0	V	152.0	10.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

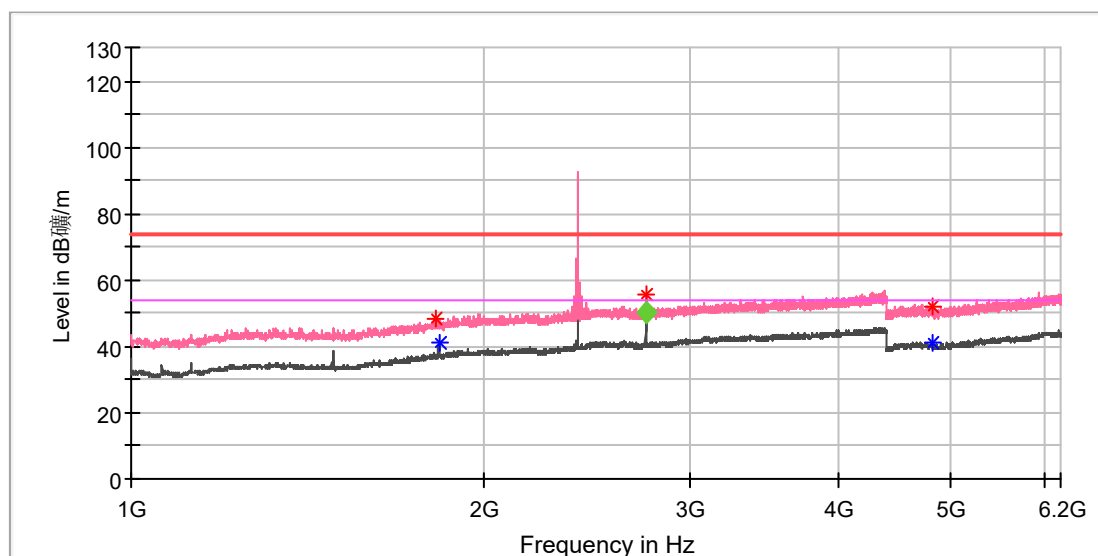
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1812.500000	---	38.34	54.00	15.66	150.0	H	338.0	6.3
1813.500000	48.80	---	74.00	25.20	150.0	H	201.0	6.3
2744.000000	53.06	---	74.00	20.94	150.0	H	85.0	9.3
2744.000000	---	49.32	54.00	4.68	150.0	H	85.0	9.3
4796.000000	51.80	---	74.00	22.20	150.0	H	86.0	13.3
4821.000000	---	40.61	54.00	13.39	150.0	H	59.0	13.3

Final_Result

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

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

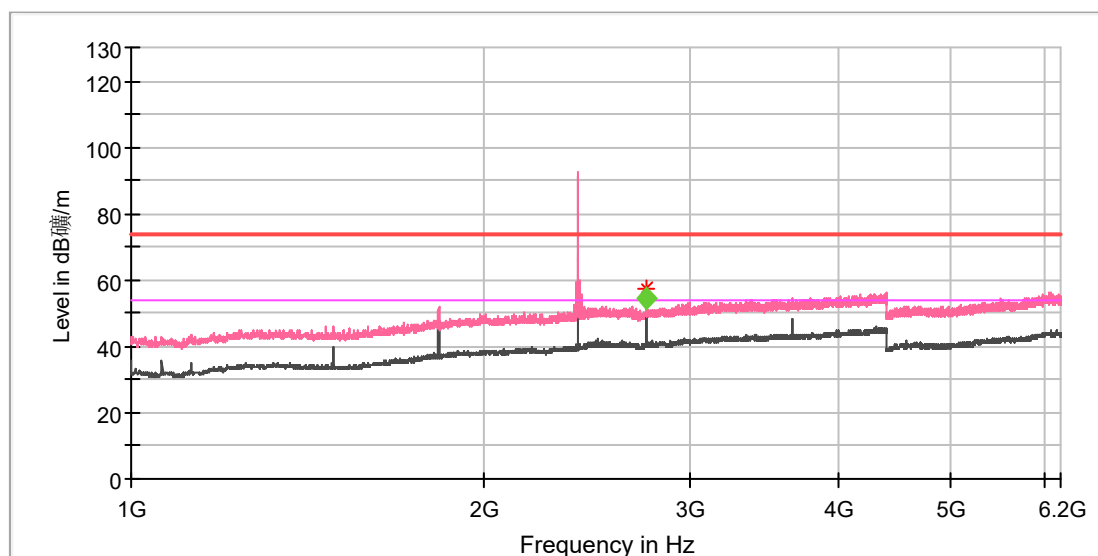
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1815.500000	48.49	---	74.00	25.51	150.0	V	87.0	6.3
1829.000000	---	40.93	54.00	13.07	150.0	V	357.0	6.4
2743.000000	55.86	---	74.00	18.14	150.0	V	10.0	9.3
4813.500000	52.17	---	74.00	21.83	150.0	V	150.0	13.3
4820.000000	---	40.87	54.00	13.13	150.0	V	11.0	13.3

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2742.883824	50.32	54.00	3.68	145.0	V	8.0	9.3

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

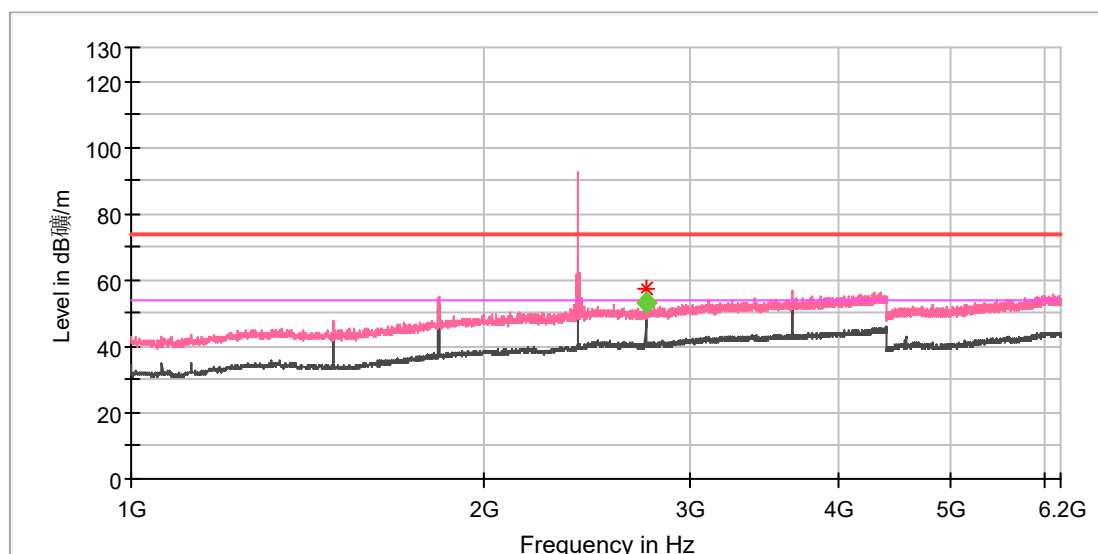
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2743.500000	57.23	---	74.00	16.77	150.0	V	15.0	9.3

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2743.722059	54.48	54.00	-0.48	145.0	V	14.0	9.3

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

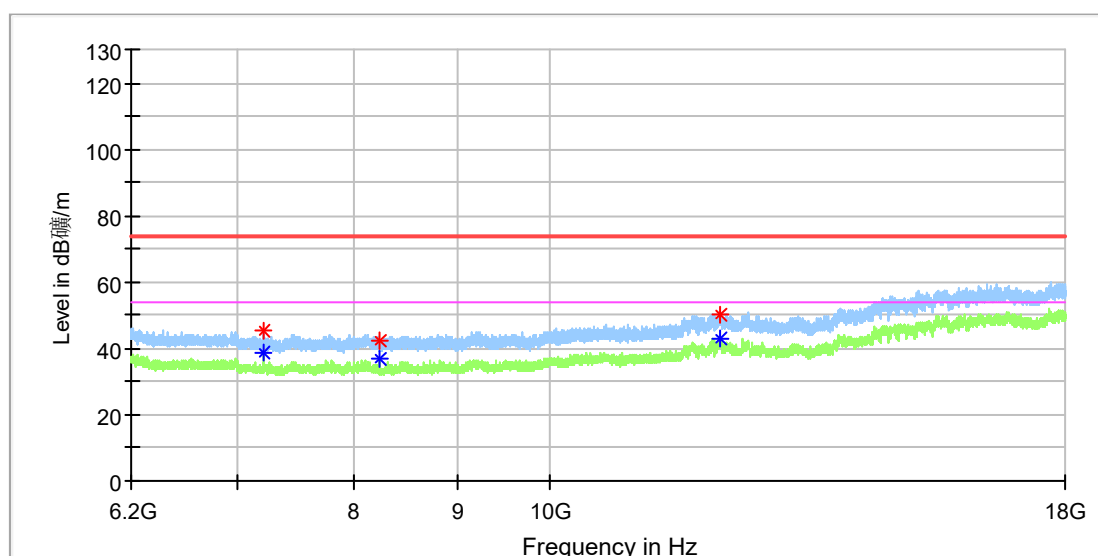
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2743.000000	57.22	---	74.00	16.78	150.0	V	305.0	9.3

Final_Result

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2743.775000	53.43	54.00	0.57	145.0	V	11.0	9.3

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

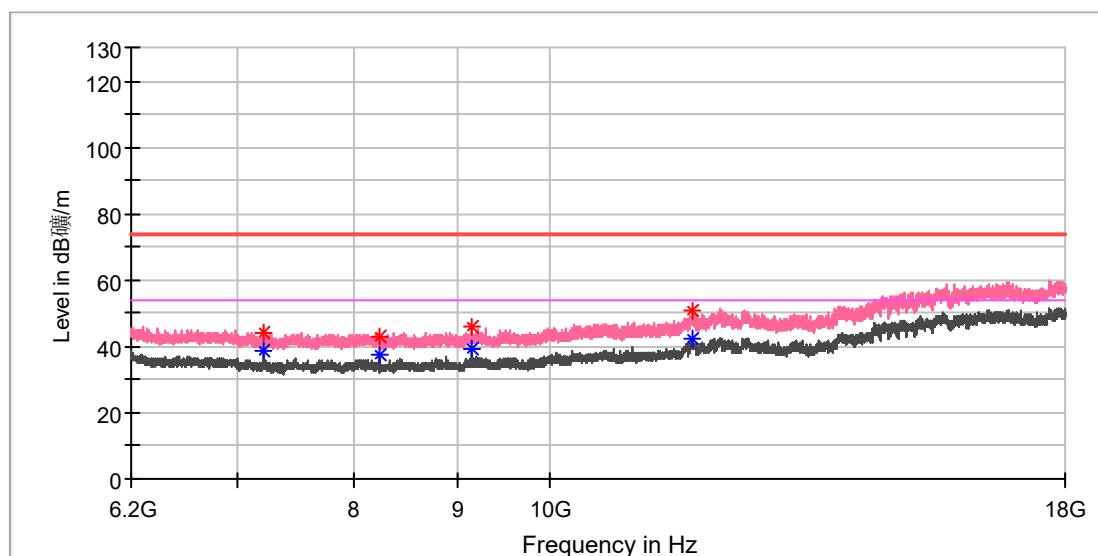
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7204.966667	45.41	---	74.00	28.59	150.0	H	173.0	8.8
7204.966667	---	38.44	54.00	15.56	150.0	H	173.0	8.8
8231.075000	---	36.69	54.00	17.31	150.0	H	264.0	8.8
8231.566667	42.24	---	74.00	31.76	150.0	H	35.0	8.8
12136.875000	---	43.22	54.00	10.78	150.0	H	24.0	16.4
12151.133333	50.48	---	74.00	23.52	150.0	H	80.0	16.7

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
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)
7205.950000	44.31	---	74.00	29.69	150.0	V	304.0	8.8
7205.950000	---	38.50	54.00	15.51	150.0	V	304.0	8.8
8230.583333	42.71	---	74.00	31.29	150.0	V	328.0	8.8
8230.583333	---	37.47	54.00	16.53	150.0	V	328.0	8.8
9144.591667	45.88	---	74.00	28.12	150.0	V	0.0	10.4
9144.591667	---	39.26	54.00	14.74	150.0	V	0.0	10.4
11751.408333	50.55	---	74.00	23.45	150.0	V	296.0	15.5
11751.408333	---	42.25	54.00	11.75	150.0	V	296.0	15.5

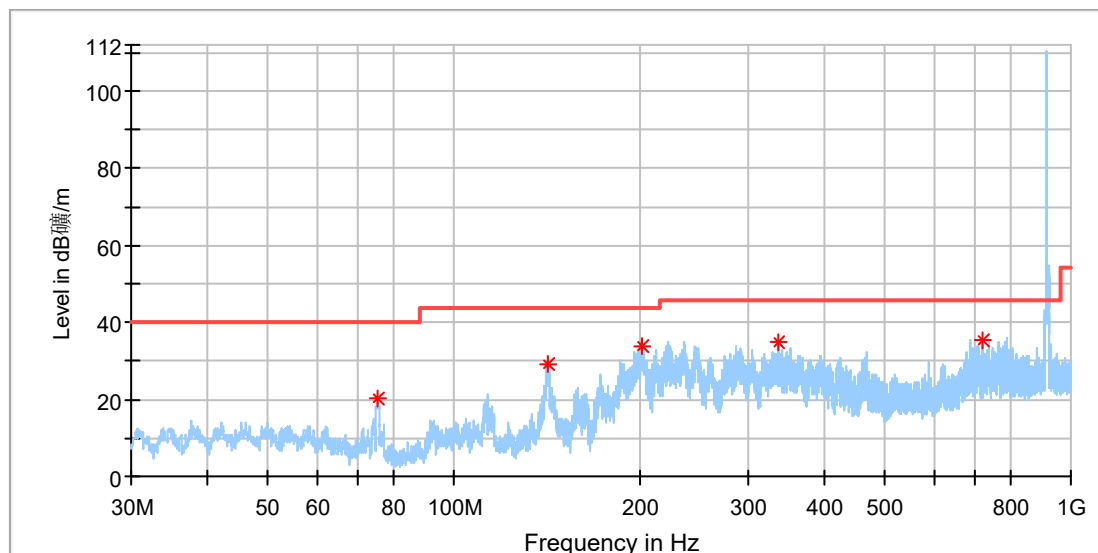
Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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Configuration with BLE + LoRa, external dipole fiberglass antenna for LoRa

EUT Information

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

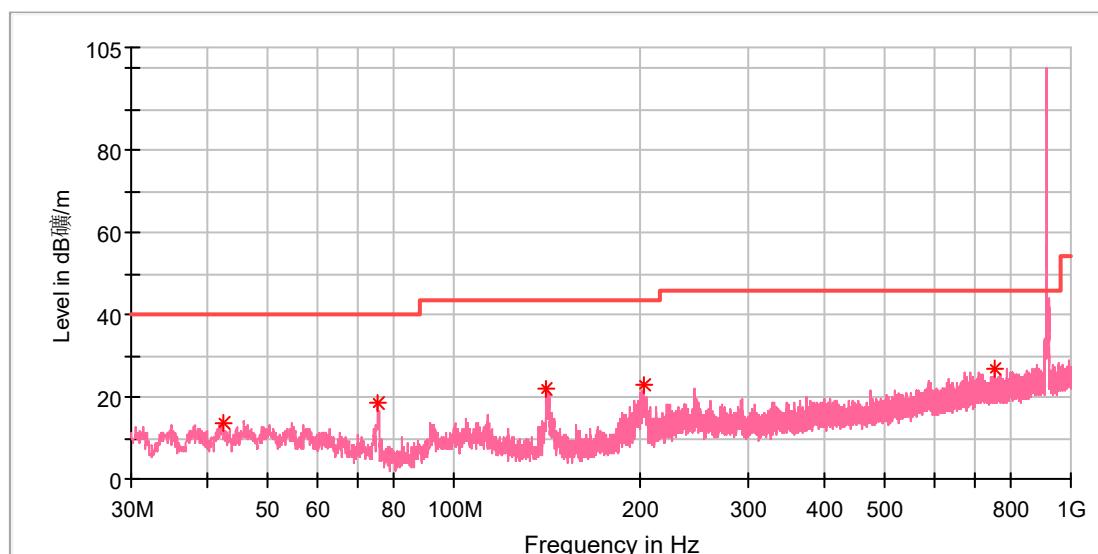
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
75.142308	20.24	40.00	19.76	100.0	H	347.0	-23.5
142.258846	29.24	43.50	14.26	100.0	H	340.0	-22.4
201.428846	34.05	43.50	9.45	100.0	H	359.0	-19.1
336.445385	34.96	46.00	11.04	100.0	H	228.0	-15.1
720.155000	35.38	46.00	10.62	100.0	H	228.0	-7.6

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

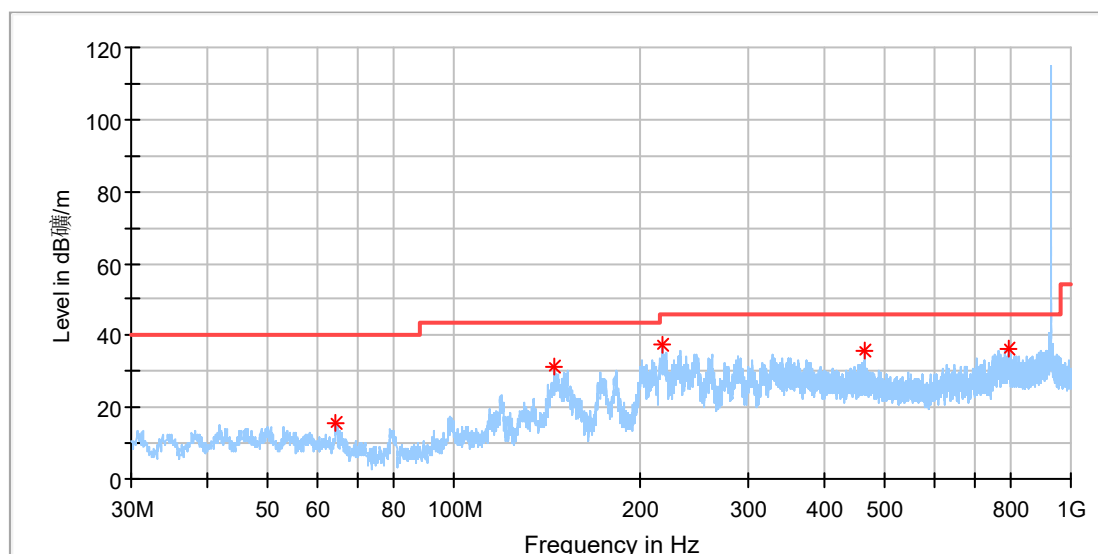
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.199615	13.86	40.00	26.14	100.0	V	356.0	-19.6
75.142308	18.41	40.00	21.59	100.0	V	231.0	-23.5
141.326154	22.08	43.50	21.42	100.0	V	231.0	-22.4
202.771923	23.10	43.50	20.40	100.0	V	49.0	-19.0
750.187692	27.00	46.00	19.00	100.0	V	286.0	-7.1

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

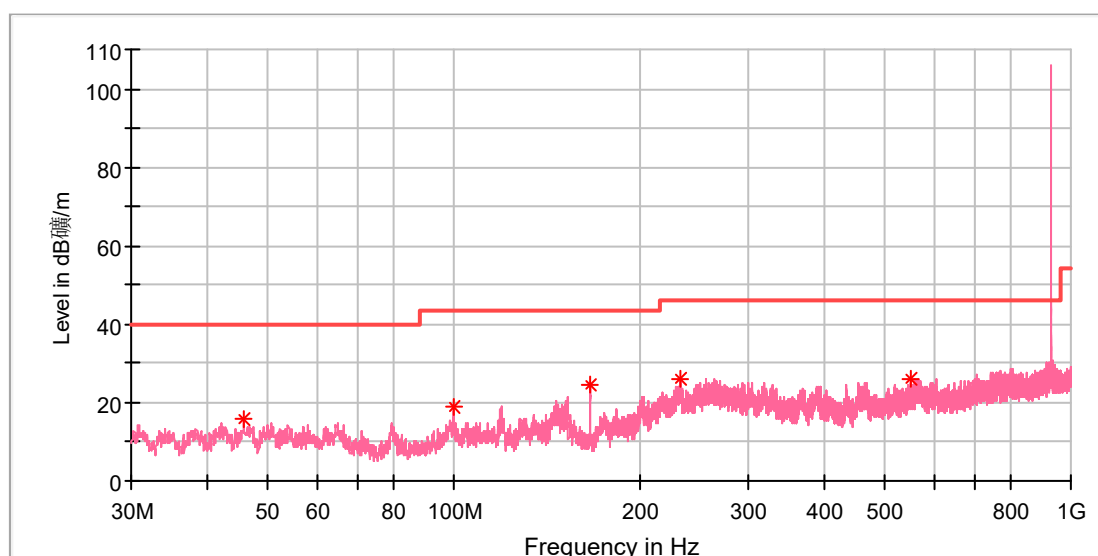
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
64.248462	15.47	40.00	24.53	100.0	H	193.0	-20.1
145.206154	31.48	43.50	12.02	100.0	H	227.0	-22.4
217.956154	37.16	46.00	8.84	100.0	H	165.0	-18.7
463.888462	35.89	46.00	10.11	100.0	H	34.0	-12.5
794.845000	36.08	46.00	9.92	100.0	H	193.0	-6.3

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

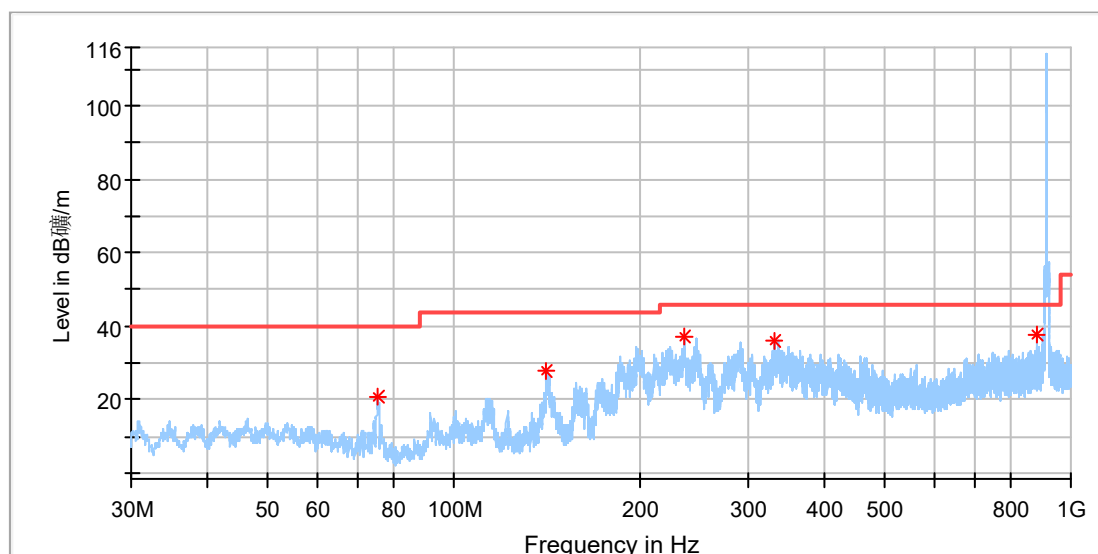
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.669231	15.76	40.00	24.24	100.0	V	159.0	-18.8
99.951923	18.76	43.50	24.74	100.0	V	340.0	-19.1
166.583462	24.69	43.50	18.81	100.0	V	204.0	-21.5
233.215000	25.89	46.00	20.11	100.0	V	0.0	-18.0
550.628846	26.26	46.00	19.74	100.0	V	140.0	-10.8

Final_Result

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

EUT Name:	WisDuo LPWAN+BLE Module
Model:	RAK11720
Test Mode:	Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No:	168502657/A003836239-005
Test Voltage::	DC 5V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

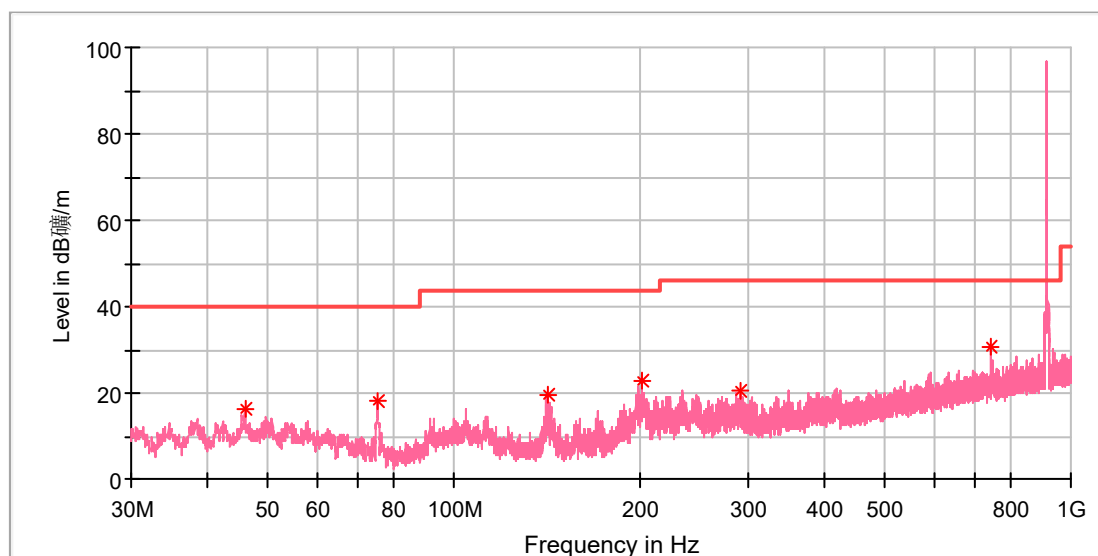
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
75.142308	20.51	40.00	19.49	100.0	H	352.0	-23.5
141.326154	27.94	43.50	15.56	100.0	H	109.0	-22.4
235.975769	36.94	46.00	9.06	100.0	H	40.0	-17.9
329.879231	36.20	46.00	9.80	100.0	H	58.0	-15.3
882.667308	37.61	46.00	8.39	100.0	H	40.0	-5.0

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

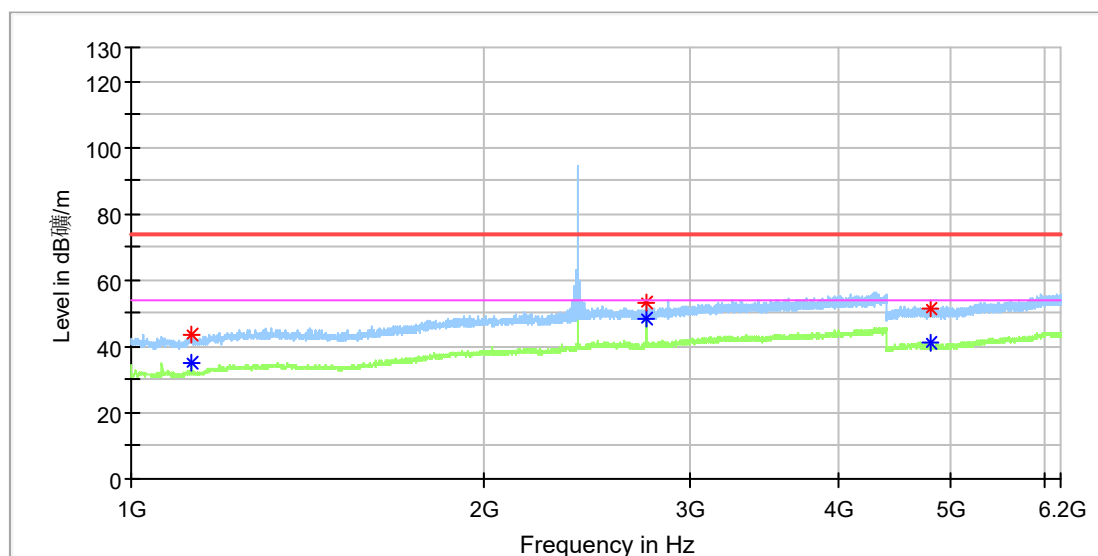
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
45.781154	16.22	40.00	23.78	100.0	V	43.0	-18.8
75.254231	18.05	40.00	21.95	100.0	V	85.0	-23.5
142.445385	19.68	43.50	23.82	100.0	V	265.0	-22.4
202.100385	22.92	43.50	20.58	100.0	V	75.0	-19.0
290.855385	20.52	46.00	25.48	100.0	V	85.0	-16.5
742.502308	30.48	46.00	15.52	100.0	V	191.0	-7.2

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

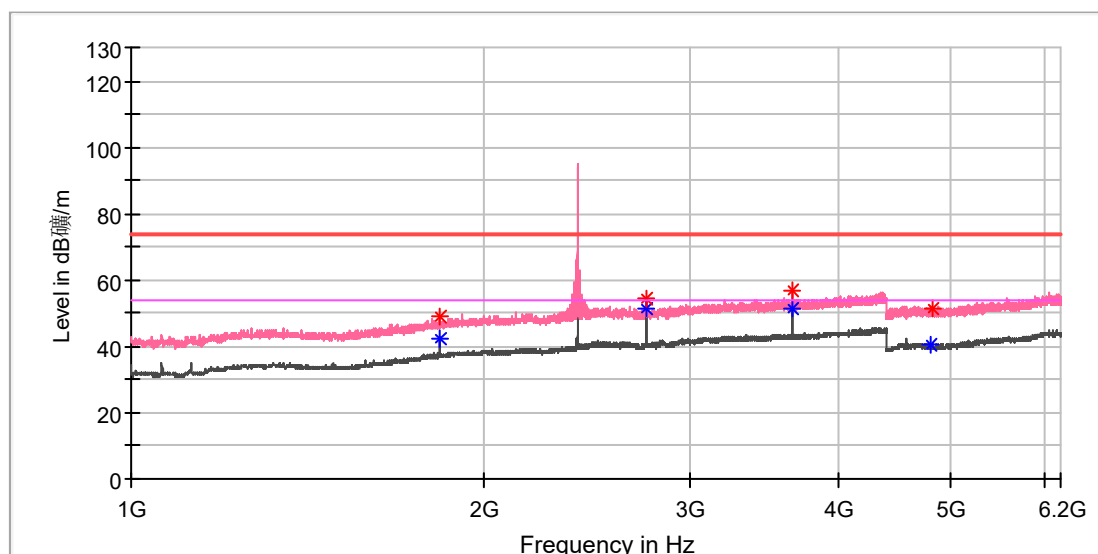
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1125.000000	43.47	---	74.00	30.53	150.0	H	3.0	1.8
1125.000000	---	35.05	54.00	18.95	150.0	H	3.0	1.8
2747.000000	53.33	---	74.00	20.67	150.0	H	271.0	9.3
2747.000000	---	48.50	54.00	5.50	150.0	H	271.0	9.3
4804.000000	---	41.24	54.00	12.76	150.0	H	287.0	13.3
4804.500000	51.43	---	74.00	22.57	150.0	H	299.0	13.3

Final_Result

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

EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

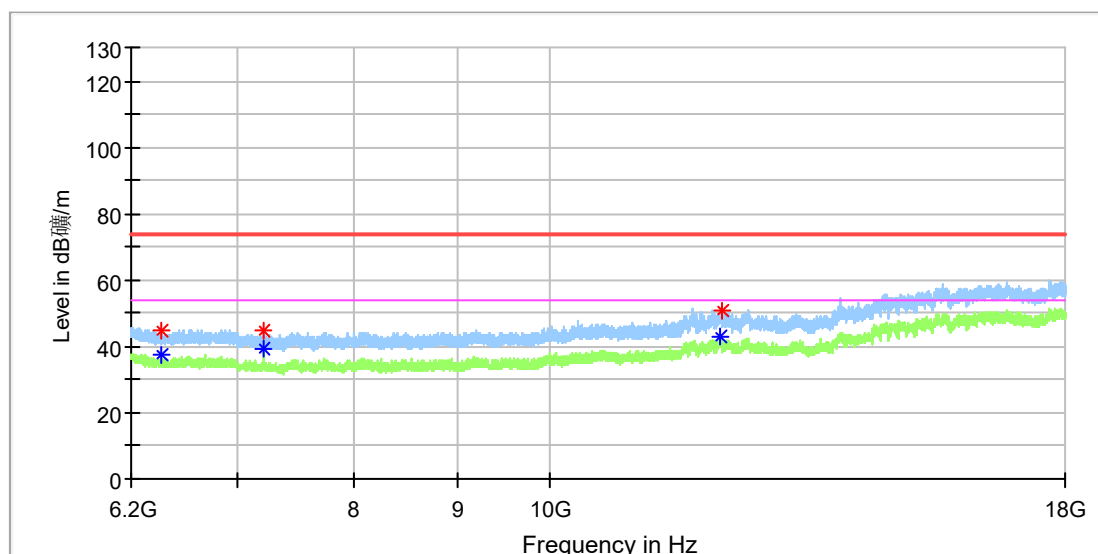
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1831.500000	---	42.36	54.00	11.64	150.0	V	51.0	6.4
1832.000000	48.85	---	74.00	25.15	150.0	V	51.0	6.4
2747.500000	54.26	---	74.00	19.74	150.0	V	183.0	9.3
2747.500000	---	51.47	54.00	2.53	150.0	V	183.0	9.3
3662.500000	---	51.47	54.00	2.53	150.0	V	117.0	11.0
3664.000000	57.08	---	74.00	16.92	150.0	V	113.0	11.0
4809.500000	---	40.69	54.00	13.31	150.0	V	349.0	13.3
4815.500000	51.52	---	74.00	22.48	150.0	V	33.0	13.3

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

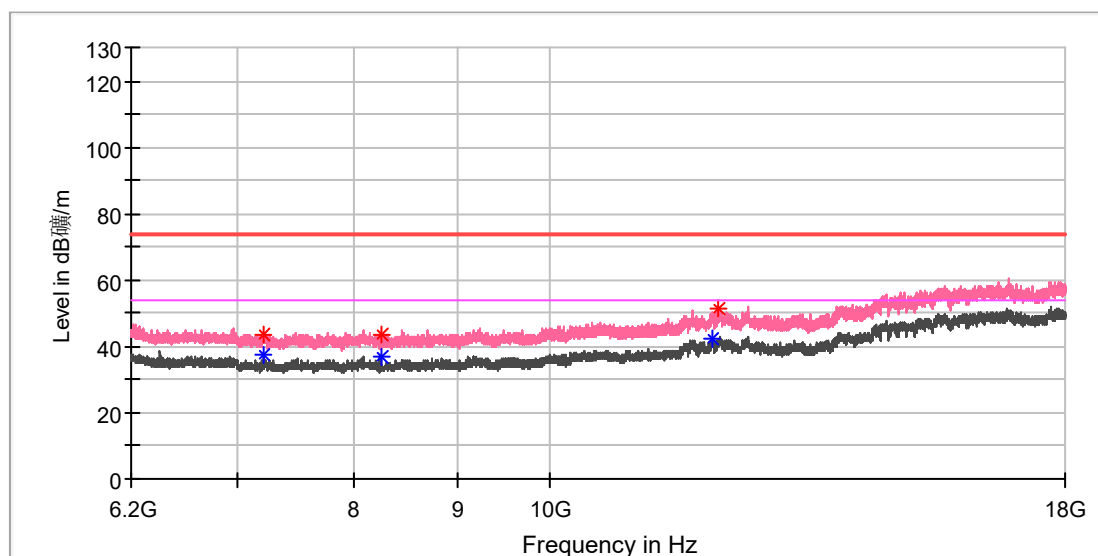
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6411.416667	---	37.78	54.00	16.22	150.0	H	92.0	8.8
6418.300000	44.60	---	74.00	29.40	150.0	H	318.0	8.8
7205.950000	44.89	---	74.00	29.11	150.0	H	102.0	8.8
7205.950000	---	39.49	54.00	14.51	150.0	H	102.0	8.8
12137.366667	---	42.83	54.00	11.17	150.0	H	285.0	16.4
12163.425000	50.62	---	74.00	23.38	150.0	H	228.0	16.0

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_915.8MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

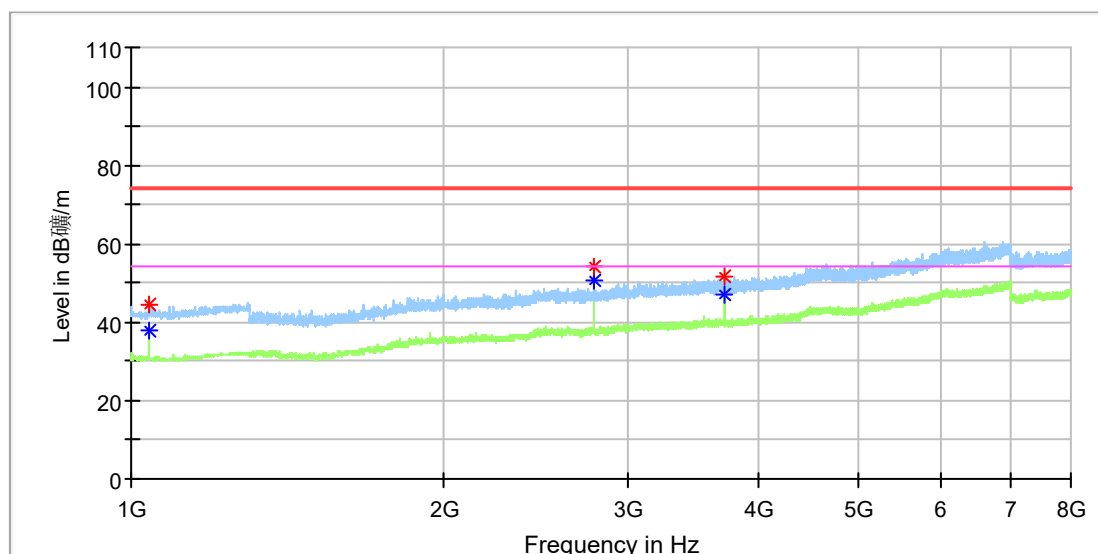
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7204.475000	---	37.32	54.00	16.68	150.0	V	101.0	8.8
7204.966667	43.58	---	74.00	30.42	150.0	V	167.0	8.8
8243.366667	43.61	---	74.00	30.39	150.0	V	50.0	8.8
8243.366667	---	37.17	54.00	16.83	150.0	V	50.0	8.8
12047.883333	---	42.61	54.00	11.39	150.0	V	216.0	16.4
12127.533333	51.52	---	74.00	22.49	150.0	V	208.0	16.1

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

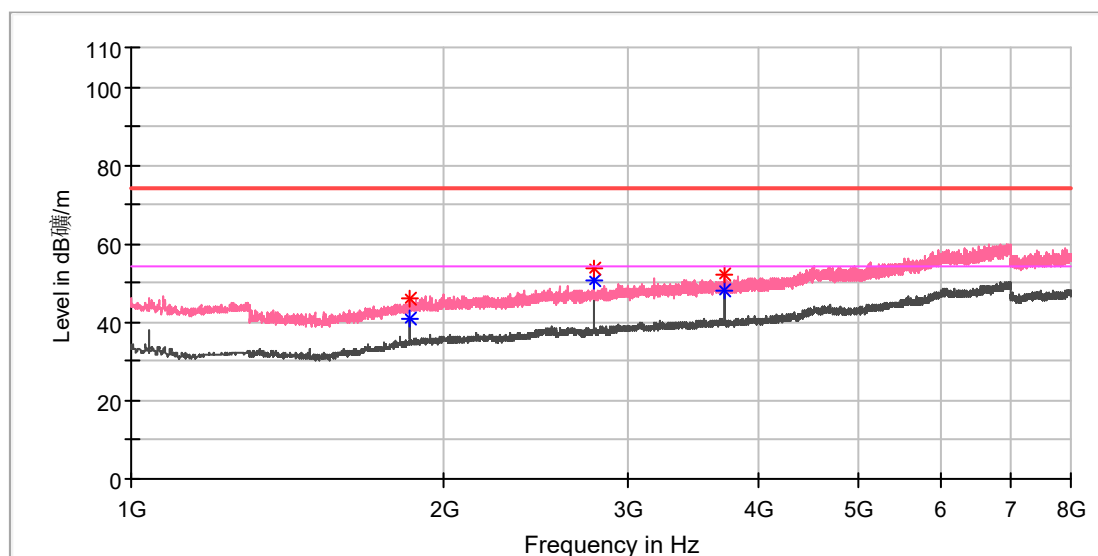
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1039.000000	44.43	---	74.00	29.57	150.0	H	46.0	0.5
1039.500000	---	37.72	54.00	16.28	150.0	H	46.0	0.5
2782.933333	---	50.68	54.00	3.32	150.0	H	43.0	9.4
2782.933333	54.42	---	74.00	19.58	150.0	H	43.0	9.4
3710.325000	---	46.90	54.00	7.10	150.0	H	138.0	11.1
3710.325000	51.84	---	74.00	22.16	150.0	H	138.0	11.1

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

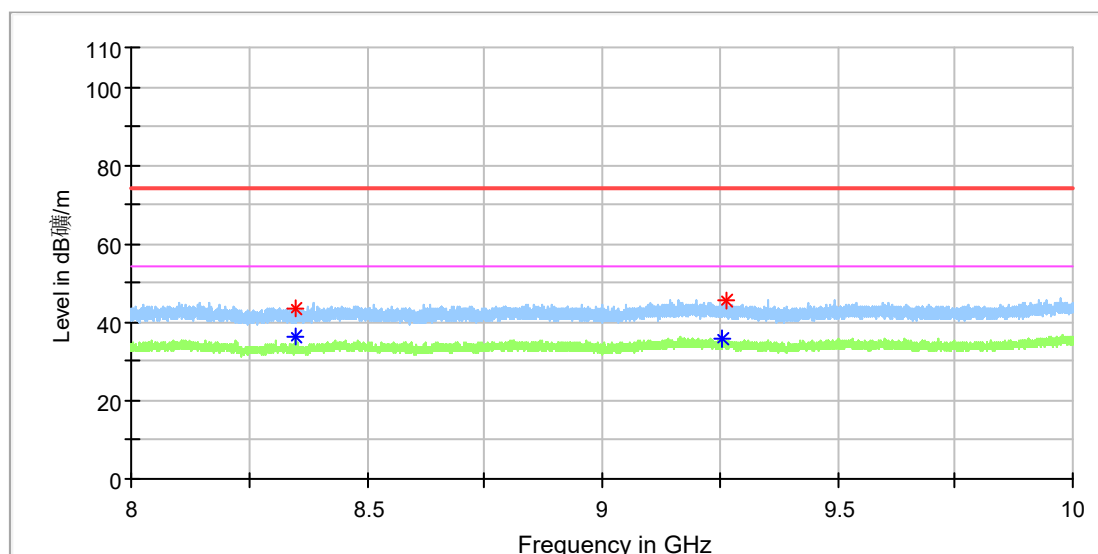
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1854.983333	---	40.79	54.00	13.21	150.0	V	138.0	6.5
1855.541667	46.27	---	74.00	27.73	150.0	V	158.0	6.5
2782.933333	53.64	---	74.00	20.36	150.0	V	168.0	9.4
2782.933333	---	50.47	54.00	3.53	150.0	V	168.0	9.4
3710.883333	52.38	---	74.00	21.62	150.0	V	118.0	11.1
3710.883333	---	48.29	54.00	5.71	150.0	V	118.0	11.1

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

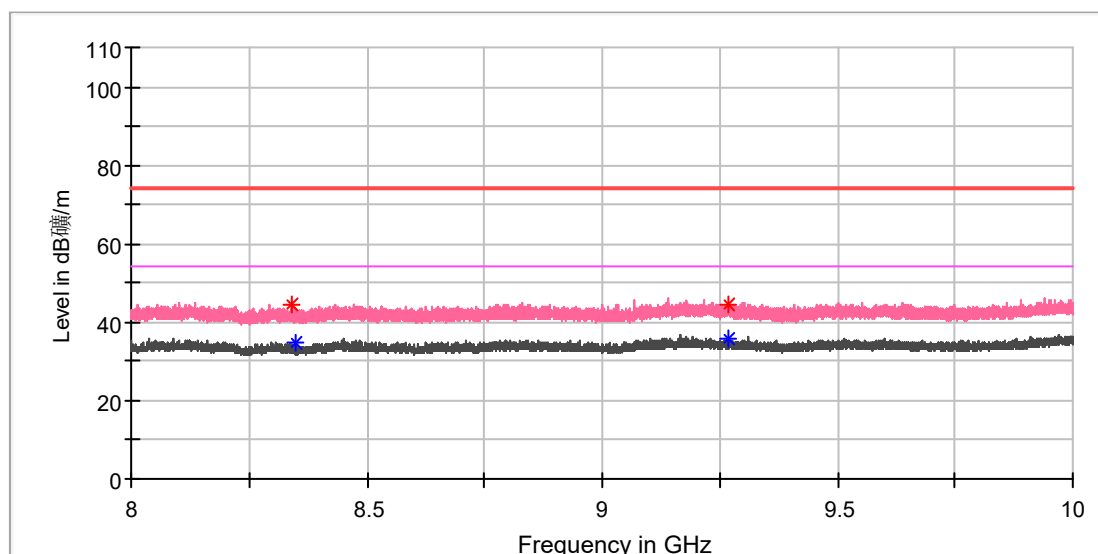
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8349.300000	---	36.45	54.00	17.55	150.0	H	51.0	8.9
8349.700000	43.60	---	74.00	30.40	150.0	H	0.0	8.9
9254.400000	---	35.92	54.00	18.08	150.0	H	31.0	10.5
9261.900000	45.70	---	74.00	28.30	150.0	H	120.0	10.5

Final_Result

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_927.7MHz
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

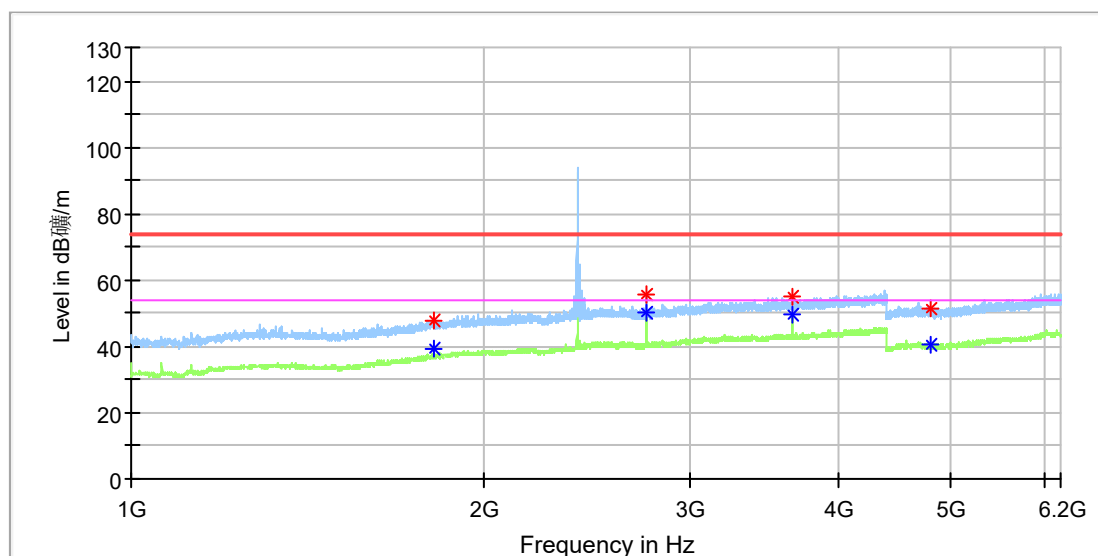
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
8340.100000	44.69	---	74.00	29.31	150.0	V	102.0	8.8
8349.800000	---	34.96	54.00	19.04	150.0	V	240.0	8.9
9267.900000	---	35.84	54.00	18.16	150.0	V	265.0	10.4
9268.500000	44.56	---	74.00	29.44	150.0	V	174.0	10.4

Final_Result

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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EUT Information

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

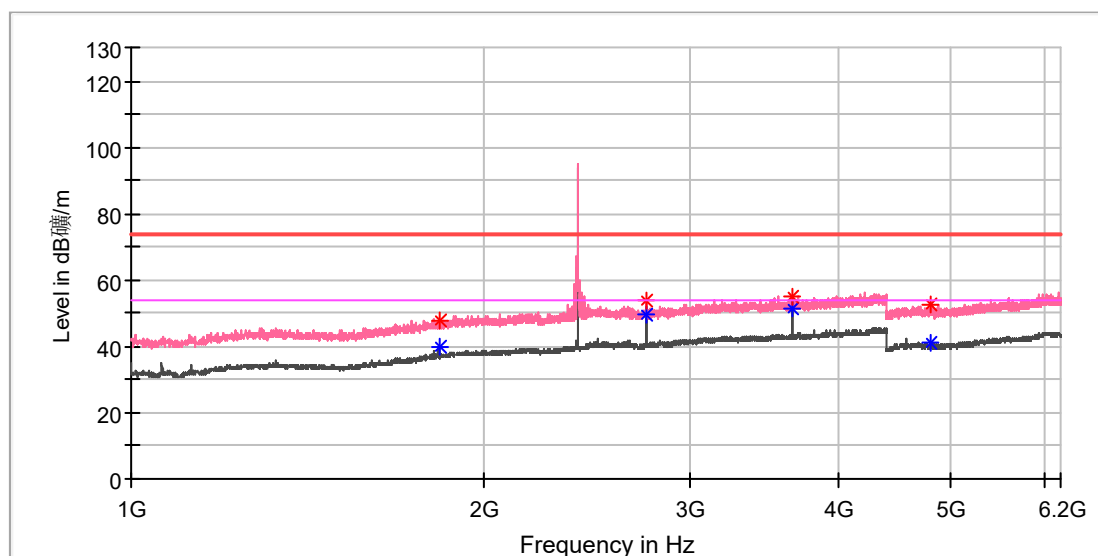
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1812.500000	47.59	---	74.00	26.41	150.0	H	0.0	6.3
1812.500000	---	39.54	54.00	14.46	150.0	H	0.0	6.3
2743.500000	55.46	---	74.00	18.55	150.0	H	136.0	9.3
2743.500000	---	50.30	54.00	3.70	150.0	H	136.0	9.3
3658.000000	---	49.56	54.00	4.44	150.0	H	132.0	10.9
3658.500000	55.04	---	74.00	18.96	150.0	H	145.0	10.9
4803.500000	51.45	---	74.00	22.55	150.0	H	337.0	13.3
4810.500000	---	40.68	54.00	13.32	150.0	H	358.0	13.3

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

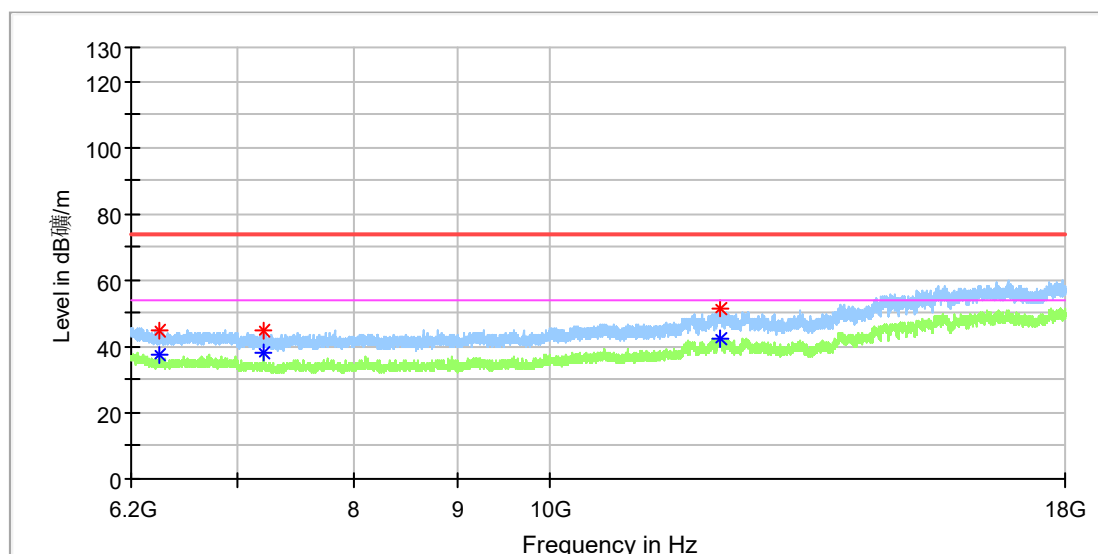
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1829.000000	48.06	---	74.00	25.94	150.0	V	17.0	6.4
1829.000000	---	39.84	54.00	14.16	150.0	V	17.0	6.4
2743.500000	53.84	---	74.00	20.16	150.0	V	203.0	9.3
2743.500000	---	49.54	54.00	4.46	150.0	V	203.0	9.3
3658.000000	55.25	---	74.00	18.75	150.0	V	113.0	10.9
3658.000000	---	51.31	54.00	2.69	150.0	V	113.0	10.9
4803.000000	52.50	---	74.00	21.50	150.0	V	95.0	13.3
4803.000000	---	40.82	54.00	13.18	150.0	V	95.0	13.3

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

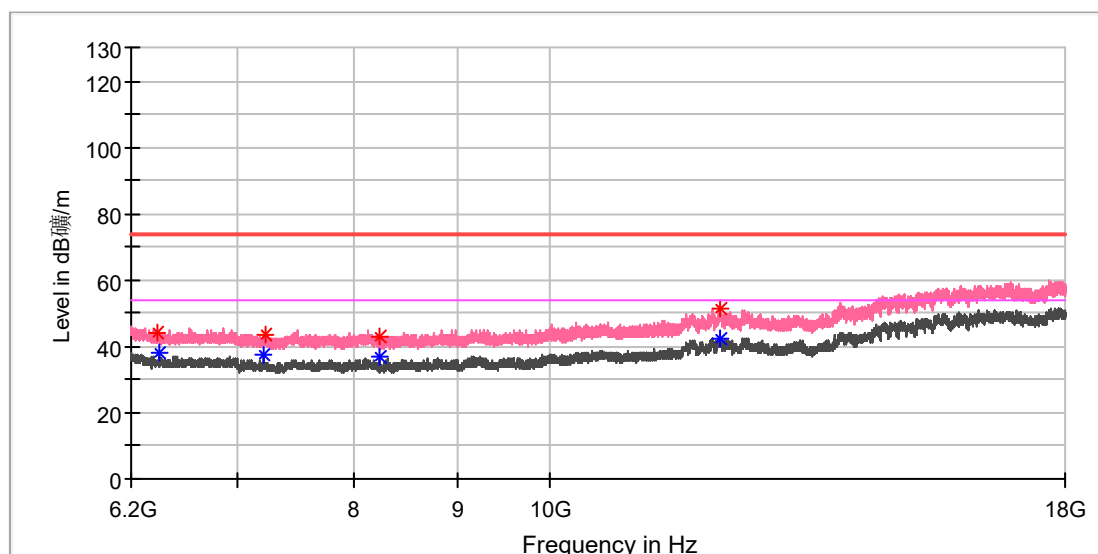
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6401.583333	---	37.73	54.00	16.27	150.0	H	147.0	8.9
6404.533333	44.54	---	74.00	29.46	150.0	H	48.0	8.9
7204.475000	44.45	---	74.00	29.55	150.0	H	136.0	8.8
7204.966667	---	37.83	54.00	16.17	150.0	H	136.0	8.8
12143.758333	51.11	---	74.00	22.89	150.0	H	329.0	16.6
12144.741667	---	42.56	54.00	11.44	150.0	H	59.0	16.6

Final_Result

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

EUT Name: WisDuo LPWAN+BLE Module
Model: RAK11720
Test Mode: Lora DTS_SF7_914.5MHz+BLE 1M_Low channel
Order No/Sample No: 168502657/A003836239-005
Test Voltage:: DC 5V
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Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
6388.800000	44.18	---	74.00	29.82	150.0	V	278.0	8.9
6401.091667	---	37.85	54.00	16.15	150.0	V	102.0	8.9
7205.950000	---	37.30	54.00	16.70	150.0	V	144.0	8.8
7232.500000	43.63	---	74.00	30.37	150.0	V	346.0	8.6
8230.091667	42.73	---	74.00	31.27	150.0	V	17.0	8.8
8231.075000	---	37.01	54.00	16.99	150.0	V	201.0	8.8
12136.383333	51.11	---	74.00	22.89	150.0	V	242.0	16.4
12149.658333	---	42.32	54.00	11.68	150.0	V	119.0	16.7

Final_Result

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