

Prüfbericht-Nr.: Test report no.:	CN24ZFHO 002	Auftrags-Nr.: Order no.:	168492896	Seite 1 von 21 Page 1 of 21			
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2024-07-04				
Auftraggeber: Client:	Beijing Siemens Cerberus Electronics Ltd. No.1, Fengzhi East Road, Xibeiwang, Haidian District, 100094 BEIJING, China						
Prüfgegenstand: Test item:	Wireless room unit, with Thread communication						
Bezeichnung / Typ-Nr.: Identification / Type no.:	QMA230KT						
Auftrags-Inhalt: Order content:	Test Report						
Prüfgrundlage: Test specification:	CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 February 2021						
Wareneingangsdatum: Date of sample receipt:	2024-07-11	Please refer to Photo Document					
Prüfmuster-Nr.: Test sample no:	A003763162-001~007						
Prüfzeitraum: Testing period:	2024-07-12 - 2024-07-24						
Ort der Prüfung: Place of testing:	Refer to section 2.1						
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.						
Prüfergebnis*: Test result*:	Pass						
geprüft von: tested by:	☒ 		genehmigt von: authorized by:	☒ 			
Datum: Date:	2024-08-05	Signed by: Breeze Jiang		Ausstellungsdatum: Issue date:	2024-08-05	Signed by: Bell Hu	
Stellung / Position:	Sachverständige(r)/Expert		Stellung / Position:	Sachverständige(r)/Expert			
Sonstiges / Other:	FCC ID: 2AL8AQMA230KT IC: 22795-QMA230KT HVIN: QMA230KT PMN: QMA230KT						
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged						
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable 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. 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 MAXIMUM PEAK CONDUCTED OUTPUT POWER

RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY

RESULT: Pass

5.1.4 6dB BANDWIDTH

RESULT: Pass

5.1.5 99% BANDWIDTH

RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS

RESULT: N/A

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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 of Thread

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.

FCC Accreditation Designation No.: CN1260

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (TS8997)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
Signal Analyzer	R&S	FSV 40	101441	2023-07-26	2024-07-25
OSP	R&S	OSP 150	101017	2023-11-14	2024-11-13
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A	N/A
Test Software	R&S	WMS32 (V11.00.00)	N/A	N/A	N/A
Power Meter	R&S	NRP2	107105	2023-11-14	2024-11-13
Wideband Power Sensor	R&S	NRP-Z81	105677	2023-07-26	2024-07-25
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2021-06-22	2024-06-22
Unwanted Emission Testing (TS9975)					
Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until
EMI Test Receiver	R&S	ESR 7	102021	2023-07-26	2024-07-25
Signal Analyzer	R&S	FSV 40	101439	2023-07-26	2024-07-25
System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
Filterbank	R&S	Wlan	100759	2023-07-26	2024-07-25
OSP	R&S	OSP 120	102040	N/A	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2023-07-26	2024-07-25
Amplifier	R&S	SCU-18F	180070	2023-07-26	2024-07-25
Amplifier	R&S	SCU40A	100475	2023-07-26	2024-07-25
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2022-08-07	2024-08-06
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2022-08-07	2024-08-06
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2022-08-28	2024-08-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2022-08-07	2024-08-06
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	Albatross	SAC-3m	APC17151-	2021-06-22	2025-06-21

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Chamber			SAC		
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Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102680	2025-02-22
Artificial Mains Network	R&S	ENV216	101445	2025-02-22
Artificial Mains Network	R&S	ENV432	101546	2025-02-22
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

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.

Table 2: Measurement Uncertainty

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 product is a Wireless room unit which supports Thread communication wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	Wireless room unit, with Thread communication
Type Designation:	QMA230KT
FCC ID:	2AL8AQMA230KT
IC:	22795-QMA230KT
HVIN:	QMA230KT
PMN:	QMA230KT
Operating Voltage:	DC 3V (2 x 1.5 V AA batteries)
Testing Voltage:	DC 3V
Operating Temperature Range:	0 °C ~ +50 °C
Technical Specification	
Frequency Range:	2405 MHz to 2480 MHz
Type of Modulation:	DSSS(DBPSK/DQPSK/CCK)
Channel Number:	16 channels
Channel Separation:	5 MHz
Antenna Type:	Chip antenna
Antenna Gain:	3.59 dBi (Provided by the Client)

Table 4: RF Channel and Frequency of Thread

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
11	2405	15	2425	19	2445	23	2465
12	2410	16	2430	20	2450	24	2470
13	2415	17	2435	21	2455	25	2475
14	2420	18	2440	22	2460	26	2480

Test frequencies are lowest channel: 2405 MHz, middle channel: 2440 MHz and highest channel: 2480 MHz.

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, 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
- Operation Description
- PCB Layout
- User Manual
- Block Diagram
- FCC/IC Label and Location Info

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.

According to clause 3.1, all tests were performed on model QMA230KT in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8

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)

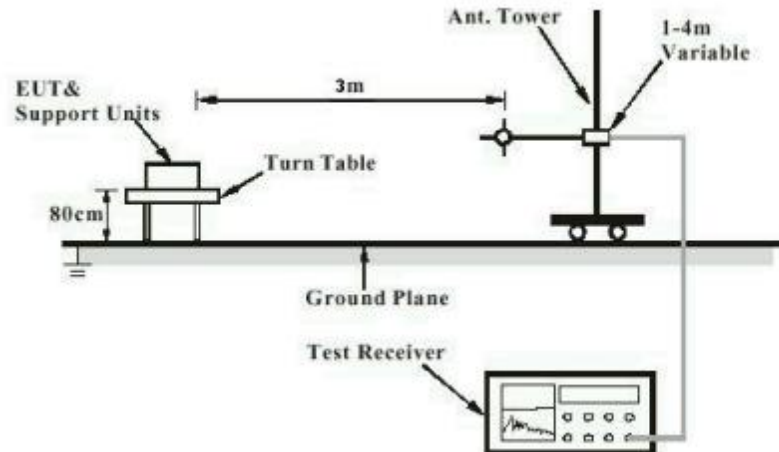


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

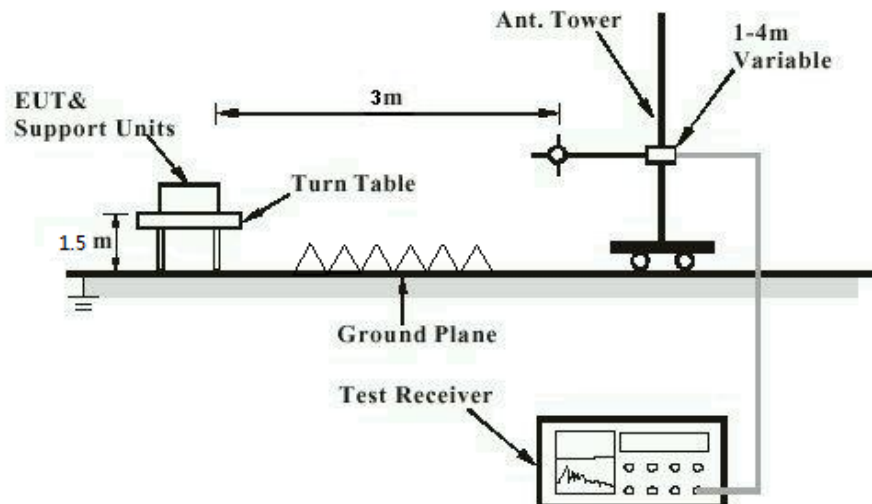


Diagram of Measurement Configuration for Mains Conduction Measurement

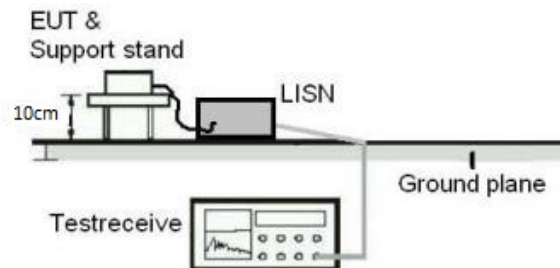
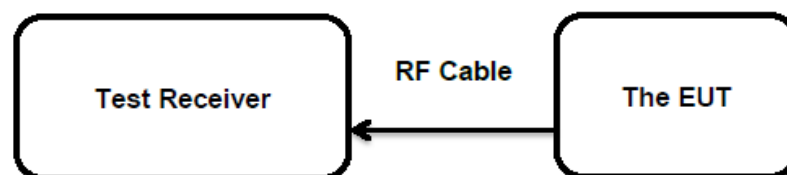


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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 integral antenna, the gain of antenna is 3.59 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 Maximum Peak Conducted Output Power

RESULT:
Pass
Test Specification

Test standard : FCC Part 15.247(b)(3)
RSS-247 Section 5.4(d)

Basic standard : ANSI C63.10: 2013

Limits : 1.0 Watts

Kind of test site : Shielded Room

Test Setup

Date of testing : 2024-07-20 to 2024-07-23

Input voltage : DC 3V

Operation mode : A

Test channel : Low / Middle / High

Ambient temperature : 23.5 °C

Relative humidity : 54 %

Atmospheric pressure : 101 kPa

Table 6: Test Result of Maximum Peak Conducted Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Measured Average Power (For reference)		Limit (W)
		(dBm)	(W)	(dBm)	(W)	
Thread	2405	3.41	0.0022	3.24	0.0021	< 1.0
	2440	3.67	0.0023	3.41	0.0022	
	2480	-8.78	0.0001	-8.97	0.0001	
Max. e.i.r.p.=3.67dBm+3.59dBi=7.26dBm, which is less than 36dBm=4W.						

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G): 3.59 dBi
e.i.r.p.=P_(Peak power)+ G, which is far below the 4 W

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5.1.3 Conducted Power Spectral Density

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(e)
RSS-247 Section 5.2(b)
Basic standard : ANSI C63.10: 2013
Limits : < 8 dBm / 3kHz
Kind of test site : Shielded Room

Test Setup

Date of testing : 2024-07-20 to 2024-07-23
Input voltage : DC 3V
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 23.5 °C
Relative humidity : 54 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

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5.1.4 6dB Bandwidth

RESULT:

Pass

Test Specification

Test standard : FCC Part 15.247(a)(2)
RSS-247 Section 5.2(a)
Basic standard : ANSI C63.10: 2013
Limits : > 500 KHz
Kind of test site : Shielded Room

Test Setup

Date of testing : 2024-07-20 to 2024-07-23
Input voltage : DC 3V
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 23.5 °C
Relative humidity : 54 %
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

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5.1.5 99% Bandwidth

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

Test standard	: RSS-Gen Clause 6.7
Basic standard	: ANSI C63.10: 2013
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2024-07-20 to 2024-07-23
Input voltage	: DC 3V
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 23.5 °C
Relative humidity	: 54 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

Prüfbericht - Nr.: **CN24ZFHO 002**
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Page 18 of 21**5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth****RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.247(d) RSS-247 Section 5.5
Basic standard	: ANSI C63.10: 2013
Limits	: 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2024-07-20 to 2024-07-23
Input voltage	: DC 3V
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 23.5 °C
Relative humidity	: 54 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

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5.1.7 Radiated Spurious Emission

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

Test standard : FCC Part 15.247(d) & FCC Part 15.205
RSS-247 Section 3.3

Basic standard : ANSI C63.10: 2013

Limits : Refer to 15.209(a) of FCC part 15.247(d)
RSS-Gen Section 8.9 & 8.10

Kind of test site : 3m Semi-anechoic Chamber

Test Setup

Date of testing : 2024-07-20 to 2024-07-23

Input voltage : DC 3V

Operation mode : A

Test channel : Low / Middle / 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.

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5.1.8 Conducted Emission on AC Mains

RESULT:

N/A

Test Specification

Test standard	: FCC Part 15.207(a) RSS-Gen Section 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	: Shielded Room

This product is battery powered only.

6 Photographs of the Test Set-Up

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

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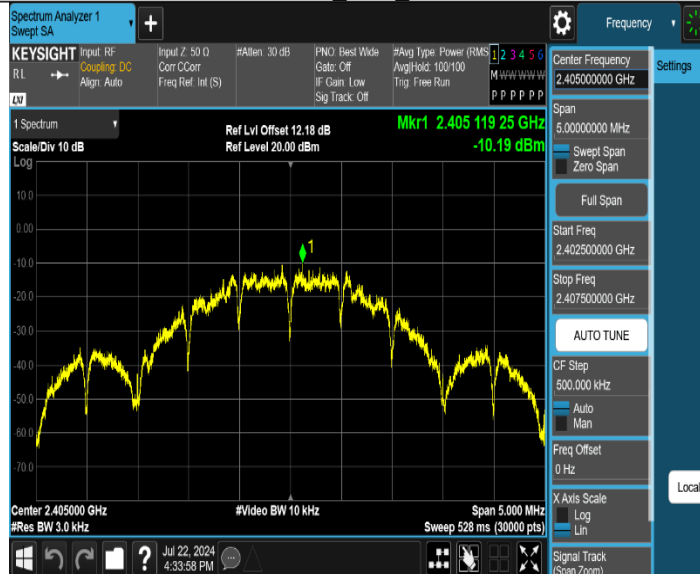
Appendix A: Test Results

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Appendix A.1: Test Results of Conducted Power Spectral Density

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
Thread	Ant1	2405	-10.19	≤8.00	PASS
		2440	-9.93	≤8.00	PASS
		2480	-22.58	≤8.00	PASS

Thread_Ant1_2405



Thread_Ant1_2440



Thread_Ant1_2480



Appendix A.2: Test Results of 6dB Bandwidth

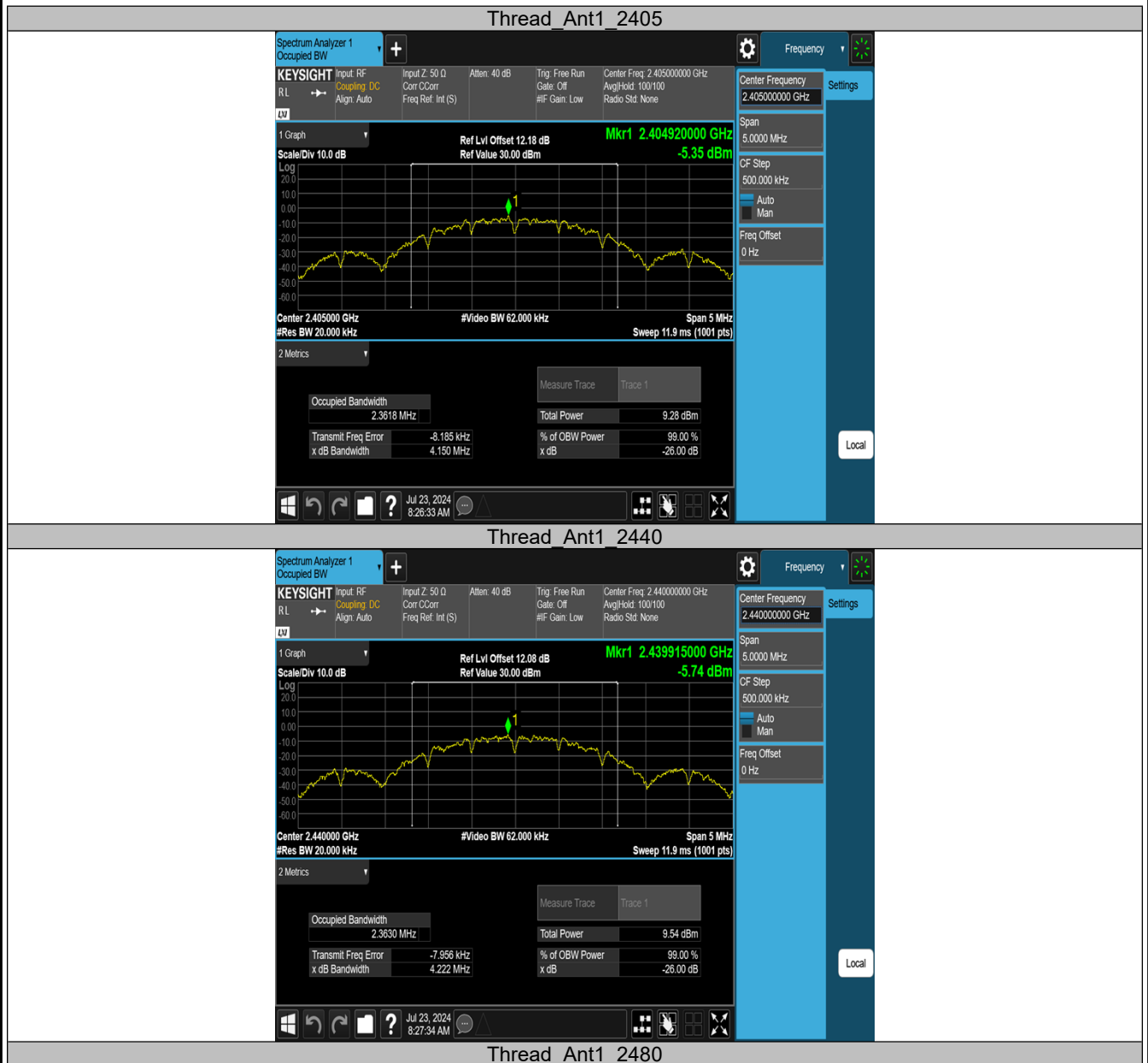
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
Thread	Ant1	2405	1.520	2404.225	2404.765	0.5	PASS
		2440	1.450	2439.300	2439.740	0.5	PASS
		2480	1.525	2479.225	2480.430	0.5	PASS

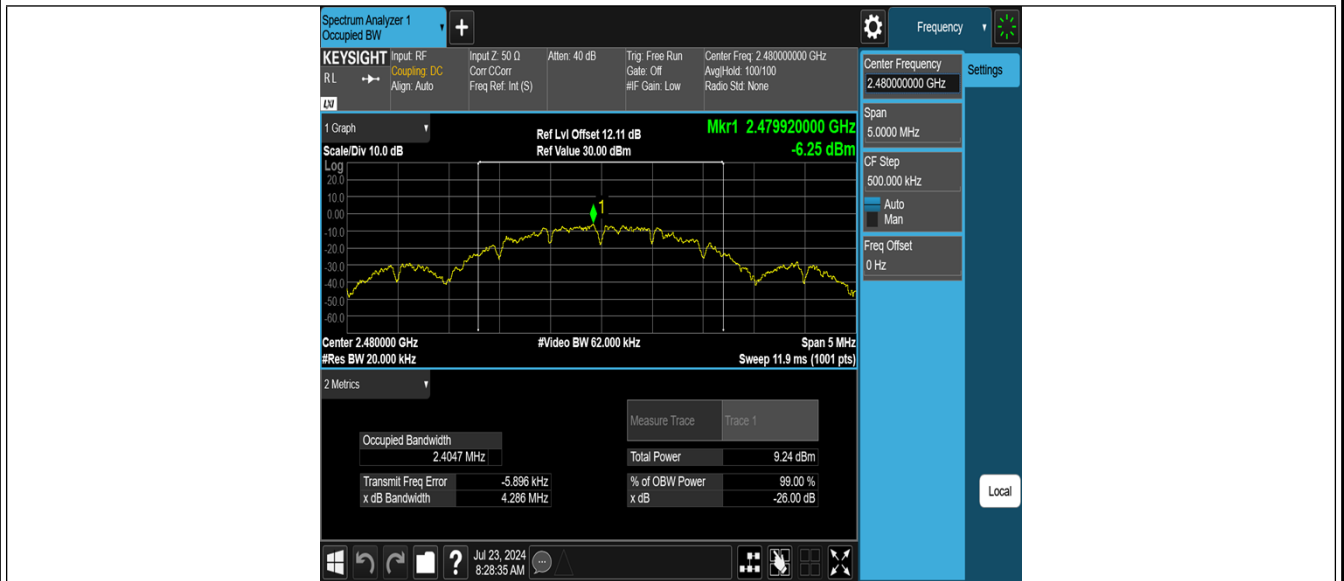




Appendix A.3: Test Results of 99% Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
Thread	Ant1	2405	2.36	2403.812	2406.175	---	---
		2440	2.36	2438.815	2441.175	---	---
		2480	2.40	2478.800	2481.195	---	---





Appendix A.4: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Band Edge

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
Thread	Ant1	Low	2405	-0.15	-44.55	≤-20.15	PASS
		High	2480	-12.36	-51.25	≤-32.36	PASS

Thread Ant1 Low 2405



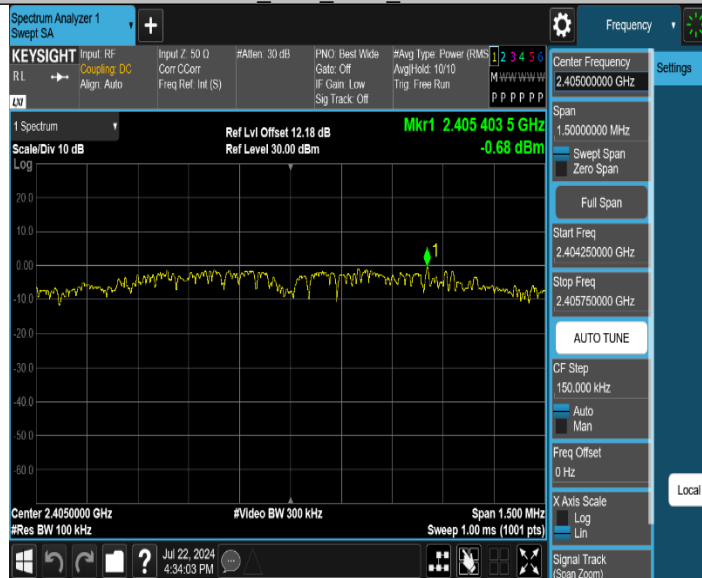
Thread Ant1 High 2480



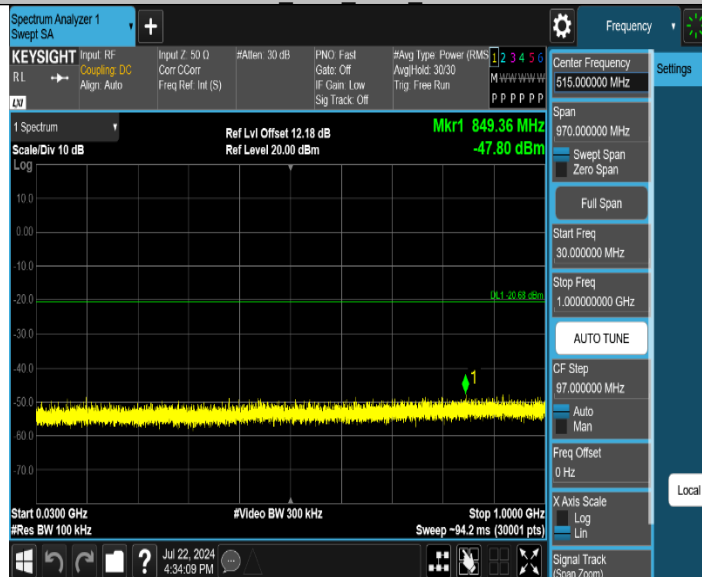
Conducted Spurious Emission

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
Thread	Ant1	2405	Reference	-0.68	-0.68	---	PASS
			30~1000	-0.68	-47.80	≤-20.68	PASS
			1000~26500	-0.68	-38.42	≤-20.68	PASS
		2440	Reference	-0.84	-0.84	---	PASS
			30~1000	-0.84	-48.12	≤-20.84	PASS
			1000~26500	-0.84	-38.52	≤-20.84	PASS
		2480	Reference	-12.82	-12.82	---	PASS
			30~1000	-12.82	-47.46	≤-32.82	PASS
			1000~26500	-12.82	-38.45	≤-32.82	PASS

Thread_Ant1_2405_0~Reference



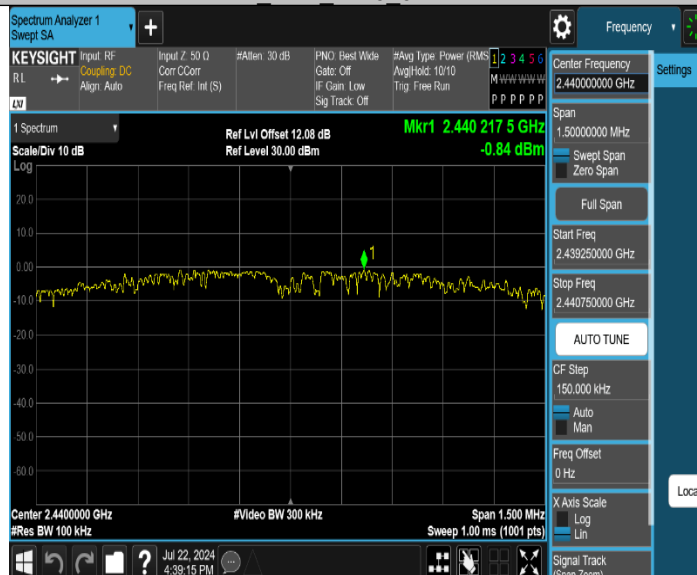
Thread_Ant1_2405_30~1000



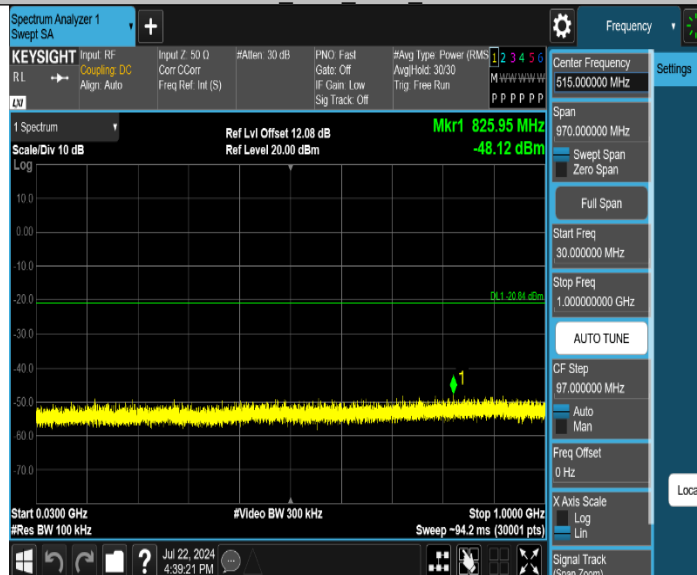
Thread_Ant1_2405_1000~26500



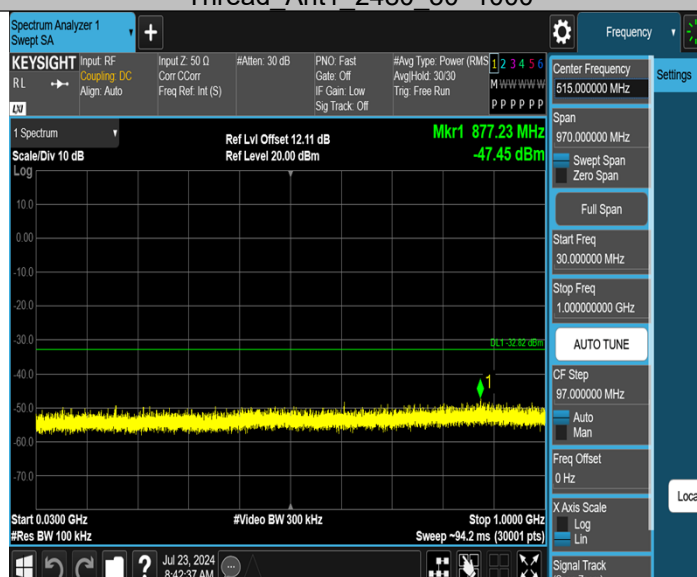
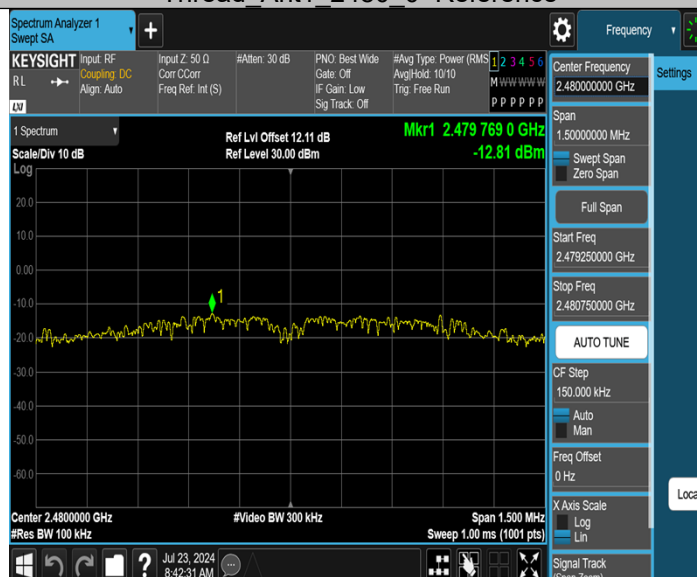
Thread Ant1 2440 0~Reference

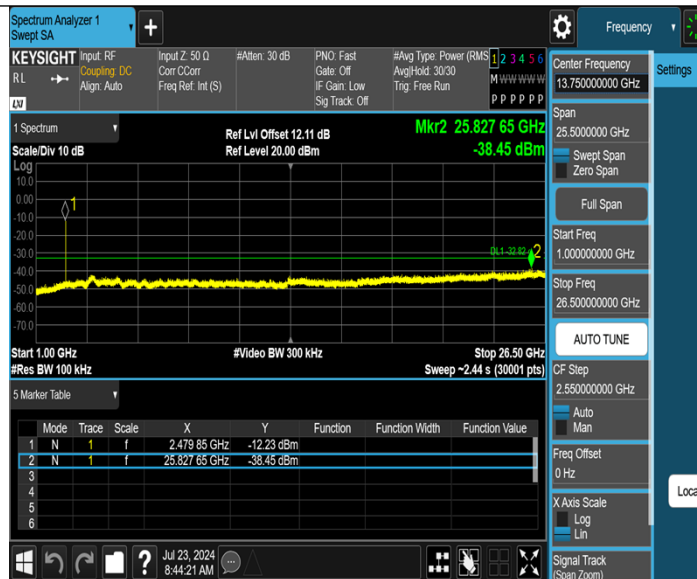


Thread Ant1 2440 30~1000



Thread Ant1 2440 1000~26500





Appendix A.5: Test Results of Radiated Spurious Emissions

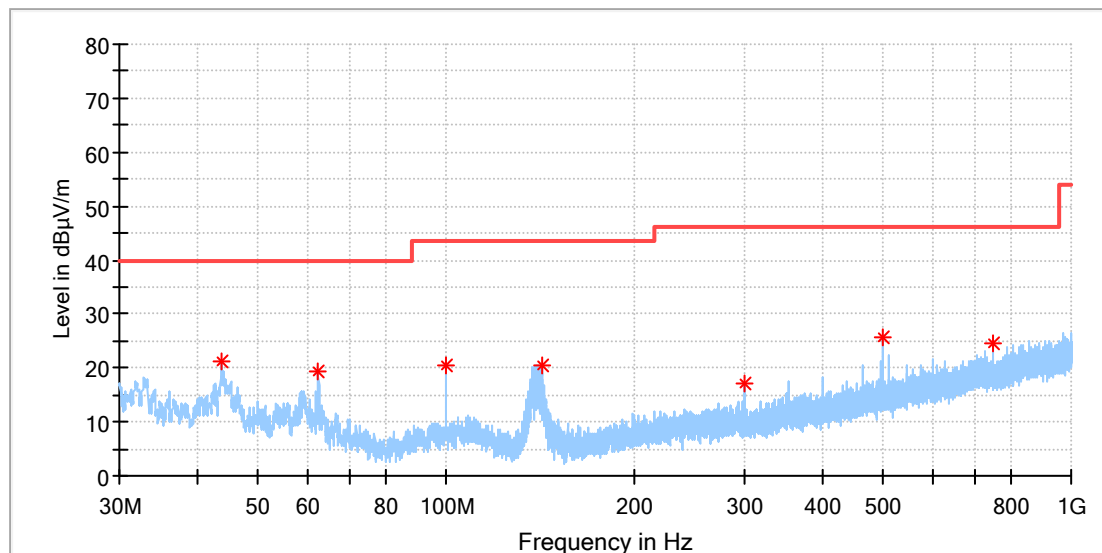
Note:

- 1) This testing was carried out on different modulations, but only the worst case was presented in this report.
- 2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30 MHz - 1GHz

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

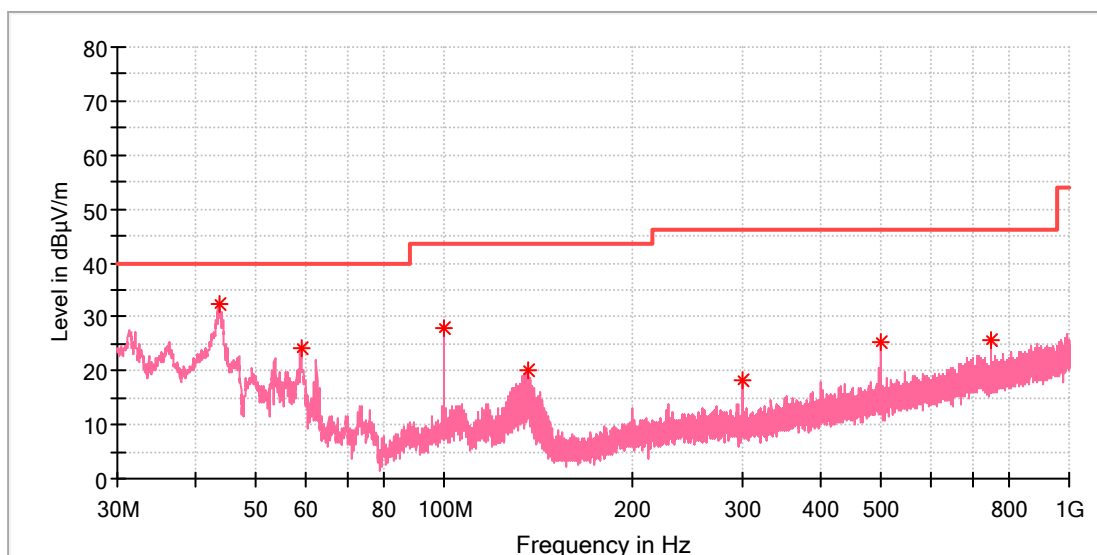
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
43.729231	21.08	40.00	18.92	100.0	H	265.0	-19.4
62.495000	19.37	40.00	20.63	100.0	H	185.0	-19.9
99.989231	20.44	43.50	23.06	100.0	H	234.0	-19.3
141.997692	20.50	43.50	23.00	100.0	H	225.0	-22.6
300.033077	17.16	46.00	28.84	100.0	H	0.0	-16.6
500.002308	25.75	46.00	20.25	100.0	H	218.0	-12.2
750.038462	24.72	46.00	21.28	100.0	H	341.0	-7.6

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
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)
43.580000	32.19	40.00	7.81	100.0	V	0.0	-19.5
59.100000	24.30	40.00	15.70	100.0	V	136.0	-19.2
99.989231	27.79	43.50	15.71	100.0	V	296.0	-19.3
136.326923	19.99	43.50	23.51	100.0	V	296.0	-22.4
299.995769	18.15	46.00	27.85	100.0	V	226.0	-16.6
500.002308	25.30	46.00	20.70	100.0	V	280.0	-12.2
750.038462	25.82	46.00	20.18	100.0	V	210.0	-7.6

Final_Result

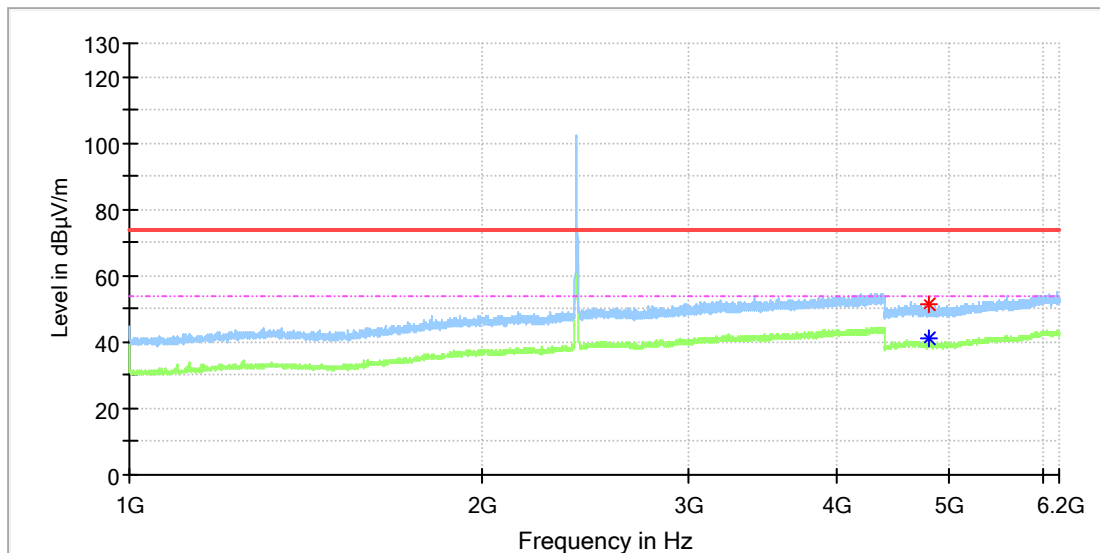
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz - 18GHz

Note: The highest waveform in the figure is Thread Fundamental.

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Low channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

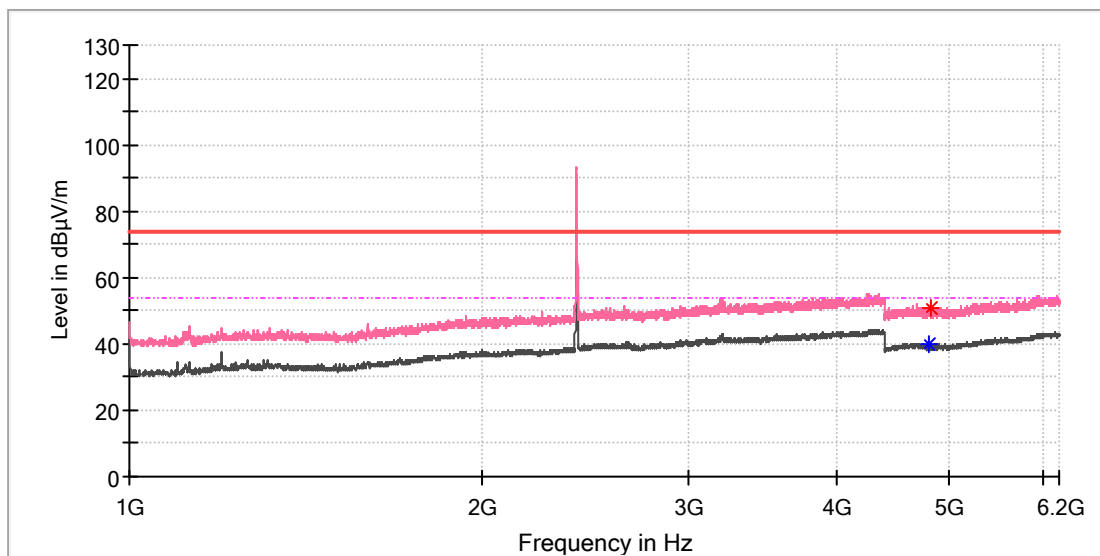
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4809.000000	51.13	---	74.00	22.87	150.0	H	227.0	11.8
4809.000000	---	41.03	54.00	12.97	150.0	H	227.0	11.8

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Low channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

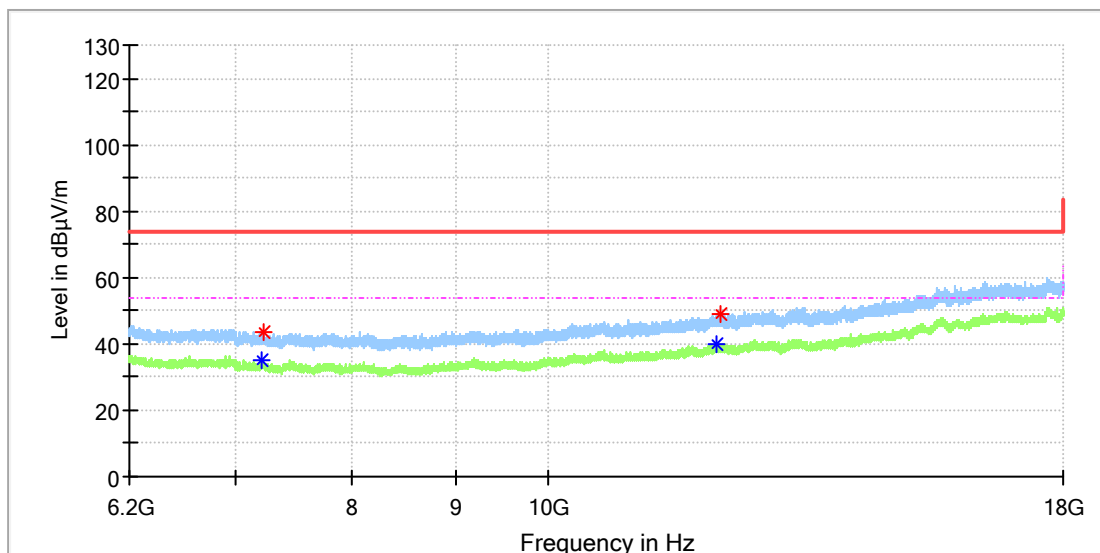
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4809.000000	---	39.88	54.00	14.12	150.0	V	284.0	11.8
4812.500000	51.00	---	74.00	23.00	150.0	V	323.0	11.8

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Low channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

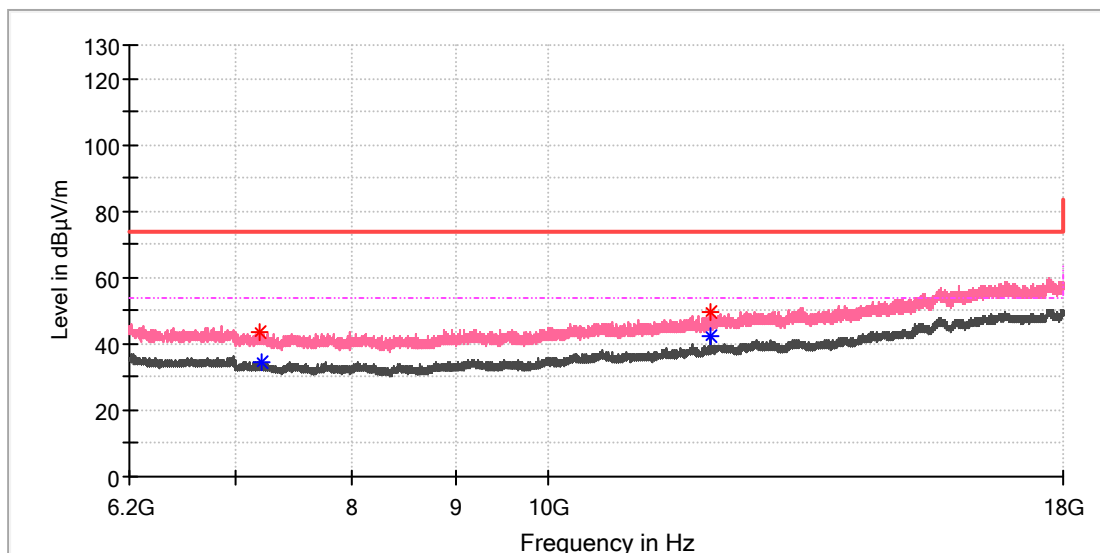
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7213.816667	---	34.95	54.00	19.05	150.0	H	302.0	8.7
7222.175000	43.56	---	74.00	30.44	150.0	H	267.0	8.7
12117.208333	---	39.93	54.00	14.07	150.0	H	359.0	14.2
12159.983333	48.85	---	74.00	25.15	150.0	H	206.0	14.5

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Low channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

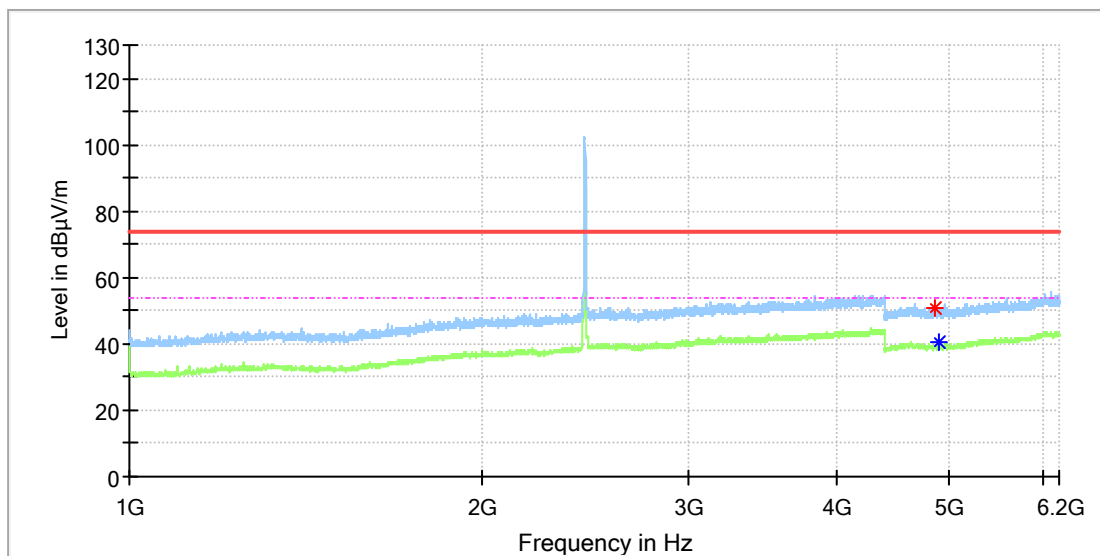
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7195.625000	43.83	---	74.00	30.17	150.0	V	142.0	8.8
7215.783333	---	34.60	54.00	19.40	150.0	V	274.0	8.7
12021.825000	49.42	---	74.00	24.58	150.0	V	328.0	14.0
12022.808333	---	42.46	54.00	11.54	150.0	V	341.0	14.0

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Middle channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

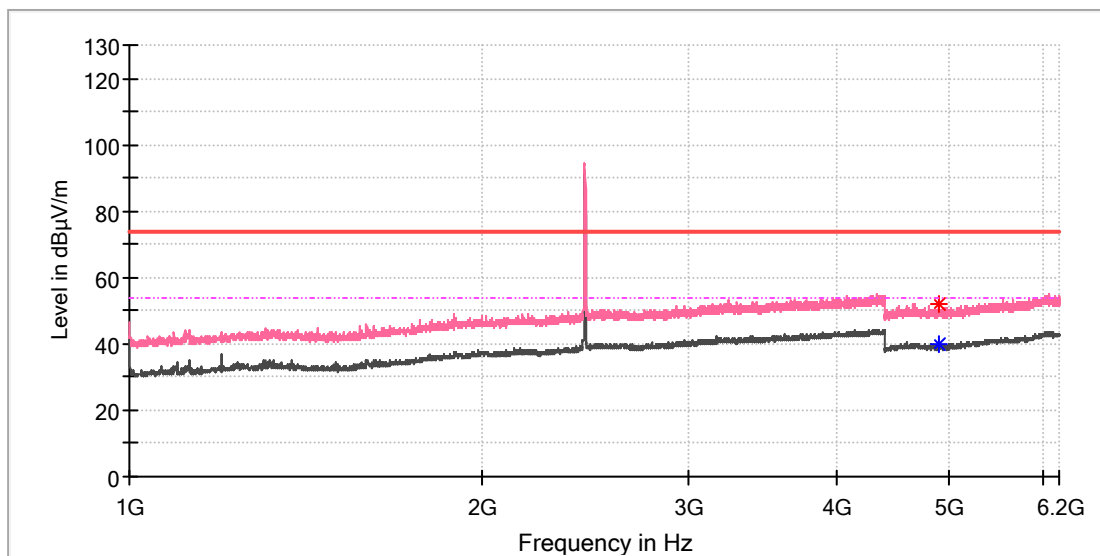
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4850.500000	50.79	---	74.00	23.21	150.0	H	240.0	11.8
4889.000000	---	40.30	54.00	13.70	150.0	H	278.0	11.8

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Middle channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

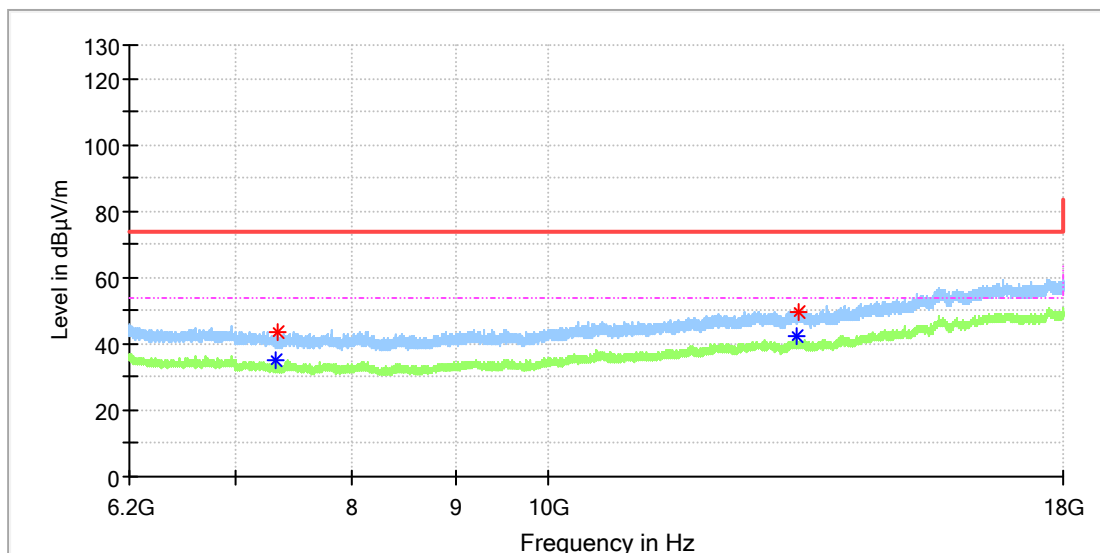
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4890.500000	---	39.84	54.00	14.16	150.0	V	178.0	11.8
4897.500000	51.85	---	74.00	22.15	150.0	V	259.0	11.8

Final_Result

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

EUT Information

EUT Name: Wireless room unit
Model: QMA230KT
Test Mode: Thread Middle channel
Order No/Sample No: 168492896/A003763162-005
Test Voltage:: DC 3V
Remark: Temp 23 Humi:53%
Test Standard: FCC 15.247
Tested By: Kei Zhang
Reviewed By: Terry Yin



Critical_Freqs

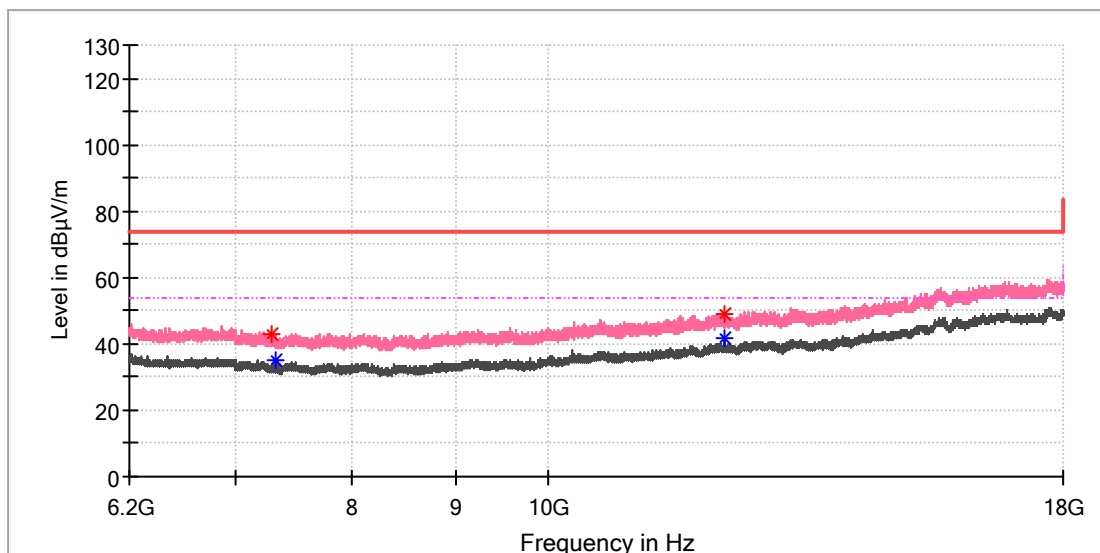
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7333.291667	---	34.84	54.00	19.16	150.0	H	210.0	8.1
7336.241667	43.42	---	74.00	30.58	150.0	H	317.0	8.1
13273.116667	---	42.05	54.00	11.95	150.0	H	197.0	15.5
13319.825000	49.81	---	74.00	24.19	150.0	H	329.0	15.5

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread Middle channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

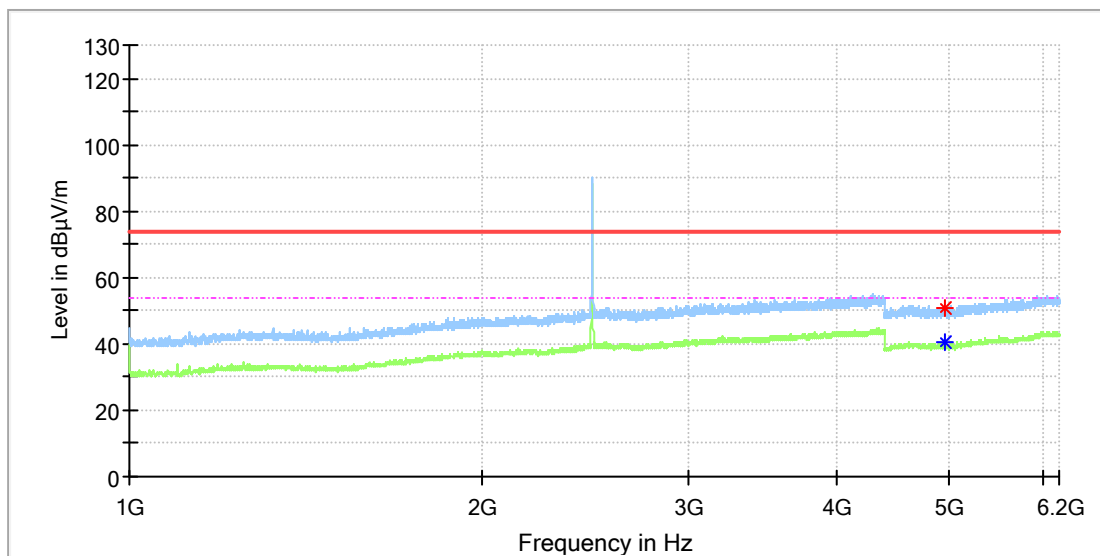
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7299.858333	43.20	---	74.00	30.80	150.0	V	2.0	8.3
7333.291667	---	34.85	54.00	19.15	150.0	V	82.0	8.1
12222.425000	48.72	---	74.00	25.28	150.0	V	242.0	14.7
12227.341667	---	41.64	54.00	12.36	150.0	V	254.0	14.7

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread High channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

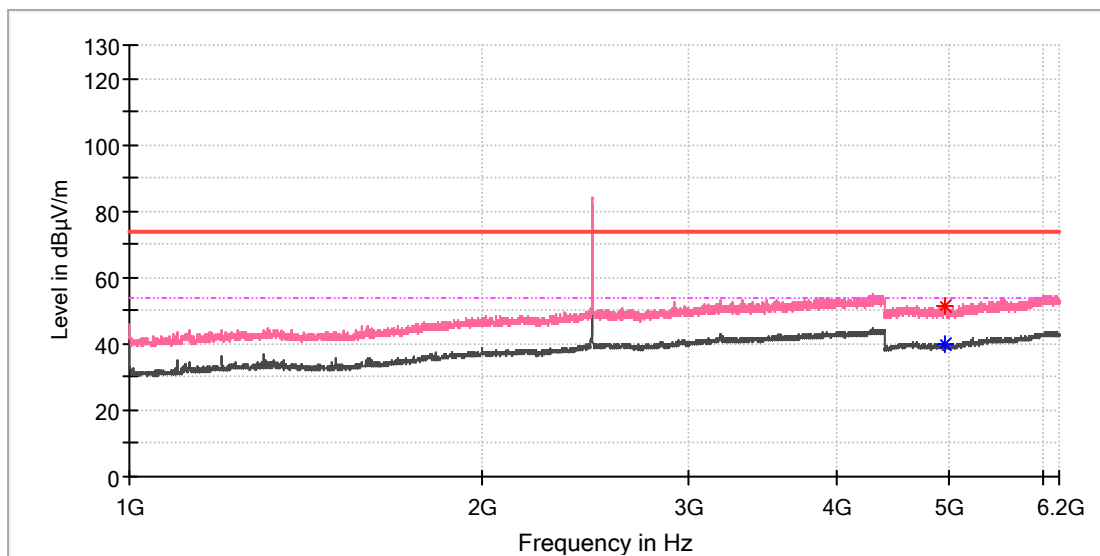
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4950.500000	---	40.26	54.00	13.74	150.0	H	349.0	11.8
4954.000000	50.57	---	74.00	23.43	150.0	H	358.0	11.8

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread High channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

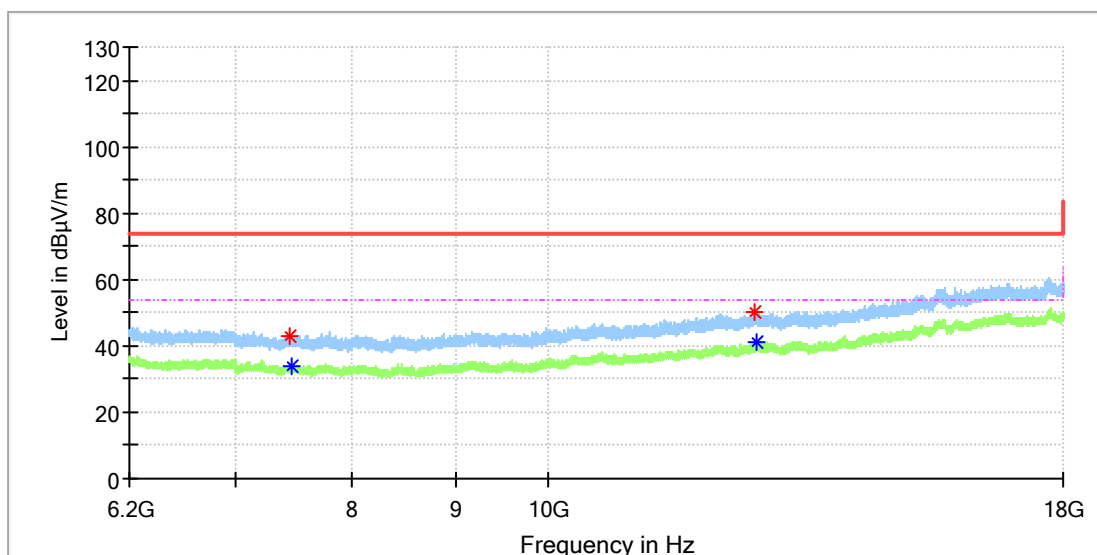
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.000000	---	39.73	54.00	14.27	150.0	V	59.0	11.8
4964.000000	51.09	---	74.00	22.91	150.0	V	251.0	11.8

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread High channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

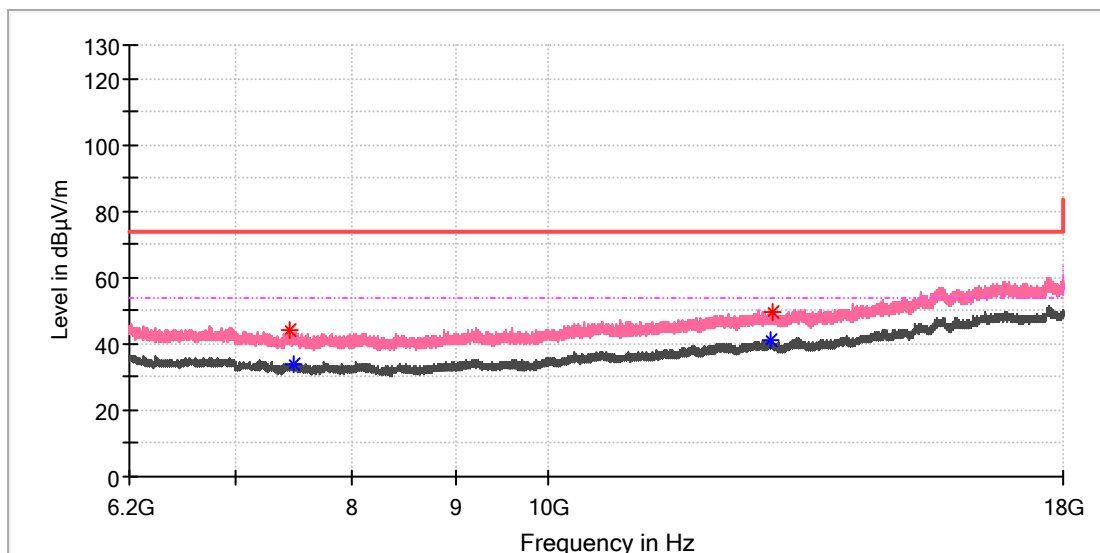
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7446.866667	43.16	---	74.00	30.84	150.0	H	176.0	8.5
7465.550000	---	34.11	54.00	19.89	150.0	H	213.0	8.6
12646.241667	50.13	---	74.00	23.87	150.0	H	176.0	15.0
12684.100000	---	40.84	54.00	13.16	150.0	H	0.0	15.1

Final_Result

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

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread High channel
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
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)
7440.966667	44.35	---	74.00	29.65	150.0	V	200.0	8.4
7470.958333	---	34.10	54.00	19.90	150.0	V	6.0	8.6
12893.058333	---	41.03	54.00	12.97	150.0	V	248.0	15.5
12920.100000	49.32	---	74.00	24.68	150.0	V	355.0	15.5

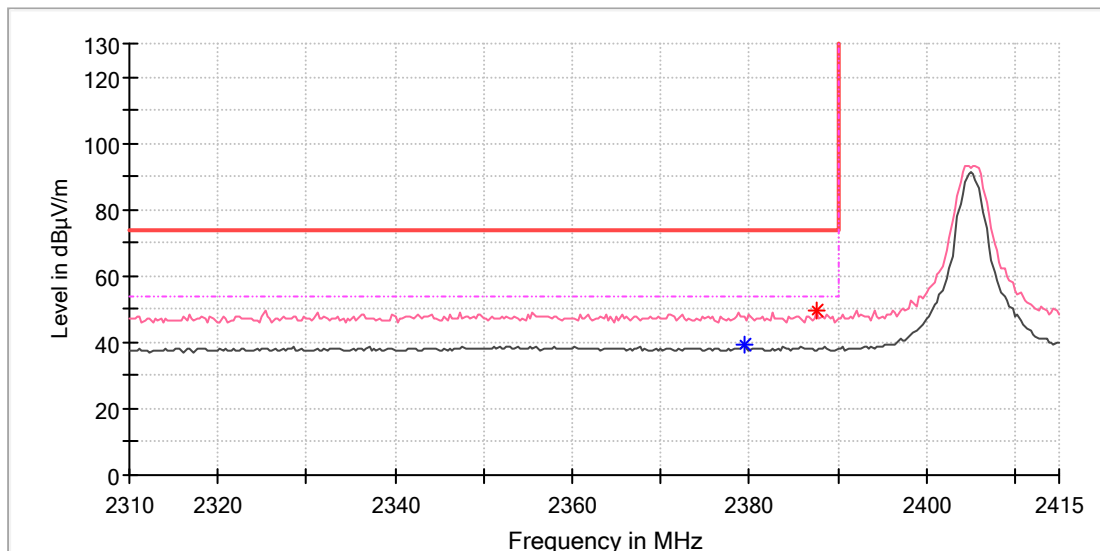
Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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Appendix A.6: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

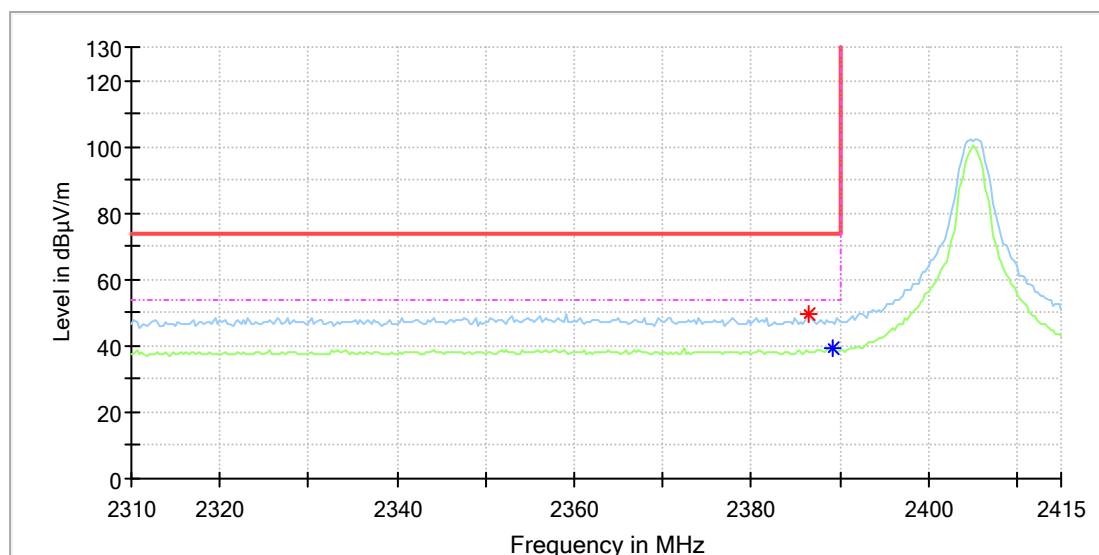
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2379.411765	---	39.03	54.00	14.97	150.0	V	124.0	7.0
2387.647059	49.62	---	74.00	24.38	150.0	V	124.0	7.0

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:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

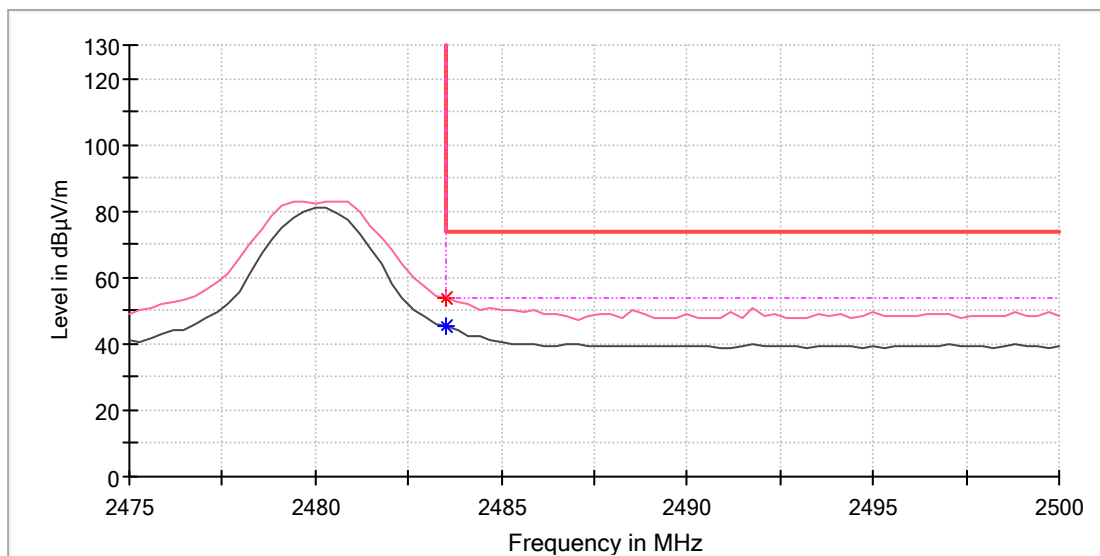
Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2386.470588	49.62	---	74.00	24.38	150.0	H	185.0	7.0
2389.117647	---	39.23	54.00	14.77	150.0	H	219.0	7.0

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:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

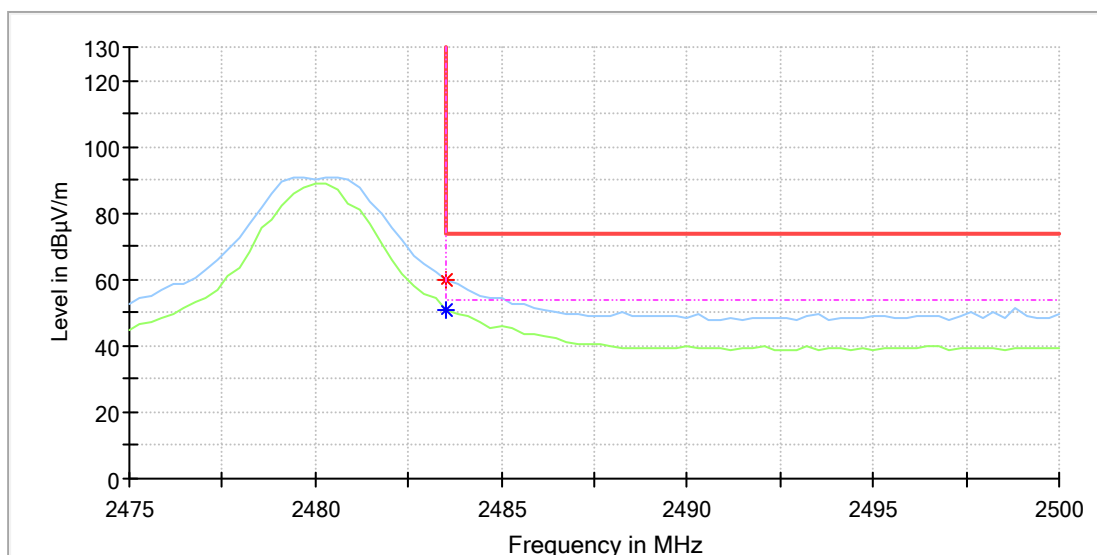
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.529412	53.75	---	74.00	20.25	150.0	V	158.0	7.4
2483.529412	---	45.20	54.00	8.80	150.0	V	158.0	7.4

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:	Wireless room unit
Model:	QMA230KT
Test Mode:	Thread
Order No/Sample No:	168492896/A003763162-005
Test Voltage::	DC 3V
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)
2483.529412	---	50.97	54.00	3.03	150.0	H	236.0	7.4
2483.529412	59.70	---	74.00	14.30	150.0	H	236.0	7.4

Final_Result

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