Prüfbericht-Nr.: *Test report no.:*	**CN21CYDH 001**	**Auftrags-Nr.:** *Order no.:*	168310213	Seite 1 von 20 *Page 1 of 20*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2021-03-10	
Auftraggeber: *Client:*	**Beijing Smartmi Electronic Technology Co., Ltd.** Room 201-203, Unit 6, Building A, No. 66, Zhufang Road, Qinghe, Haidian District, 100085 Beijing, China			
Prüfgegenstand: *Test item:*	Smartmi Air Circulator Fan			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	ZLBPKQXHS02ZM, ZLBPKQXHS02ZM/DG (Trade Mark: Smartmi)			
Auftrags-Inhalt: *Order content:*	FCC & IC approval			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.249 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 2: Section 2.1091 CFR47 FCC Part 15: Subpart B Section 15.107 CFR47 FCC Part 15: Subpart B Section 15.109 ICES-003 Issue 7 October 2020		RSS-210 Issue 10 December 2019 RSS-Gen Issue 5 March 2019 RSS-102 Issue 5 March 2015	
Wareneingangsdatum: *Date of sample receipt:*	2021-03-28	Please refer to photo documents		
Prüfmuster-Nr.: *Test sample no.:*	A003010337-001~004			
Prüfzeitraum: *Testing period:*	2021-03-15 – 2020-04-20			
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result*:*	Pass			
geprüft von: *tested by:*	X Bell Hu Signed by: Bell Hu	**genehmigt von:** *authorized by:*	X Winnie Hou Signed by: Winnie Hou	
Datum: *Date:* 2021-04-26		**Ausstellungsdatum:** *Issue date:* 2021-04-26		
Stellung / Position	Project Manager	**Stellung** / Position	Department Manager	

Sonstiges / *Other:*

FCC ID: 2AP98-XHS02ZM IC: 26864-XHS02ZM; HVIN: V2.0; PMN: Smartmi Air Circulator Fan.

Contians FCC ID: 2ANDL-TYWE3SE, IC: 23243-TYWE3SE.

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

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

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 FUNDAMENTAL & HARMONICS RADIATED EMISSION
RESULT: Pass

5.1.3 BANDWIDTH
RESULT: Pass

5.1.4 RADIATED SPURIOUS EMISSION & BAND EDGE
RESULT: Pass

5.1.5 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

5.1.6 RADIATED EMISSION
RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS
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

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Radio Spectrum Testing				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Wireless Connectivity Tester	Rohde & Schwarz	CMW270	101375	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101441	2021-08-30
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	Rohde & Schwarz	WMS32 (V10.40.10)	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	107105	2021-12-20
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	105350	2021-12-20
Unwanted Emission Testing				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
Signal Generator	Rohde & Schwarz	SMB100A	180840	2021-08-30
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	2021-08-30
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	CDMA	100751	2021-08-30
Filterbank	Rohde & Schwarz	GSM	100811	2021-08-30
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	N/A
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	2021-08-30
Amplifier	Rohde & Schwarz	SCU-18F	180079	2021-08-30
Amplifier	Rohde & Schwarz	SCU40A	100450	2021-09-03
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	192	2021-09-02
Double-Ridged Antenna (1 - 18 GHz)	ETS-LINDGREN	3117	00218719	2021-09-02
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18312	2021-09-02
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19066	2021-09-02
Biconical Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VUBA 9117	357	2021-09-02
Conducted Emission				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESR3	102428	2021-09-03
Artificial Mains Network	R&S	ENV216	102333	2021-08-19
Artificial Mains Network	R&S	ENV432	101411	2021-08-19
EMC32 test software	R&S	EMC32(Ver.10.50.01)	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 basics using in house standards or comparisons.

2.5 Measurement Uncertainty

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

Parameter	Uncertainty
Radio Frequency	±1 x 10^{-7}
RF Power (conducted)	±2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	±6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	±6 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.52 dB
Radiated Emission (3m SAC), above 1000MHz	± 4.37 dB
Temperature	±1 °C
Humidity	±5 %
Voltage (DC)	±1 %
Voltage (AC, <10kHz)	±2 %

2.6 Location of Original Data

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

2.7 Status of Facility Used for Testing

The **Error! Reference source not found.** Test facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is Smartmi Air Circulator Fan, which supports 2.4GHz band wireless technology.
It contains a single module (Contains FCC ID: 2ANDL-TYWE3SE, IC: 23243-TYWE3SE) for Wi-Fi function.
For details, refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Smartmi Air Circulator Fan
Type Designation	ZLBPKQXHS02ZM, ZLBPKQXHS02ZM/DG. The are identical except for appeance color.
Trademark	Smartmi
FCC ID	2AP98-XHS02ZM
IC	26864-XHS02ZM
HVIN	V2.0
Operating Voltage	Powered by adapter, DC15V
Adapter	Model name: BLJ36W150240P-UF
	Input: 100-240V,50/60Hz,1.0A
	Output:15Vdc 2.4A
Testing Voltage	Powered by adapter, DC15V
Technical Specification	
Operating Frequency band	2402 – 2480 MHz
Channel Number	40 channels
Channel separation	2MHz
Modulation	GFSK
Antenna Type	Internal Antenna
Antenna Gain	-6.73 dBi

3.3 Independent Operation Modes

The basic operation modes are:

A. On, General 2.4GHz Transmitting mode
   1. Low channel
   2. Middle channel
   3. High channel

B. On, Wireless functions connecting

C. On, normal working with fan running at the highest speed

D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Operation Description
- ID Label and Location Info
- Schematics
- Block Diagram
- 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.

4.3 Special Accessories and Auxiliary Equipment

Table 3: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Notebook	Lenovo	ThinkPad 260	PC0GP71G
Mobile Phone	HUAWEI	/	N/A

4.4 Countermeasures to Achieve EMC Compliance

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

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

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

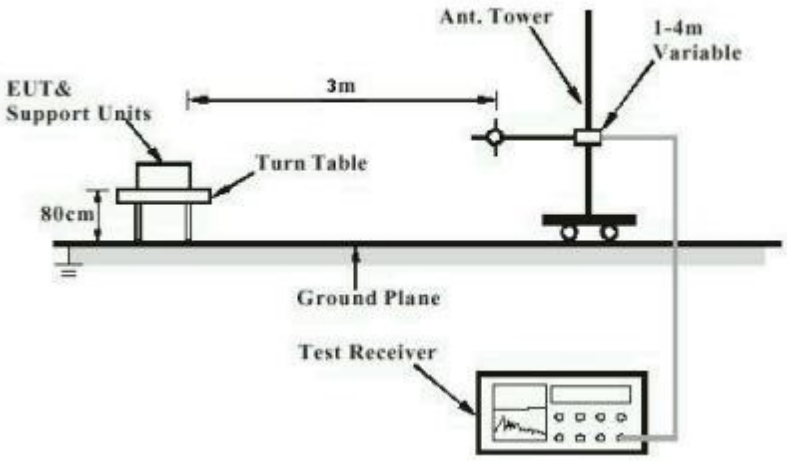


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

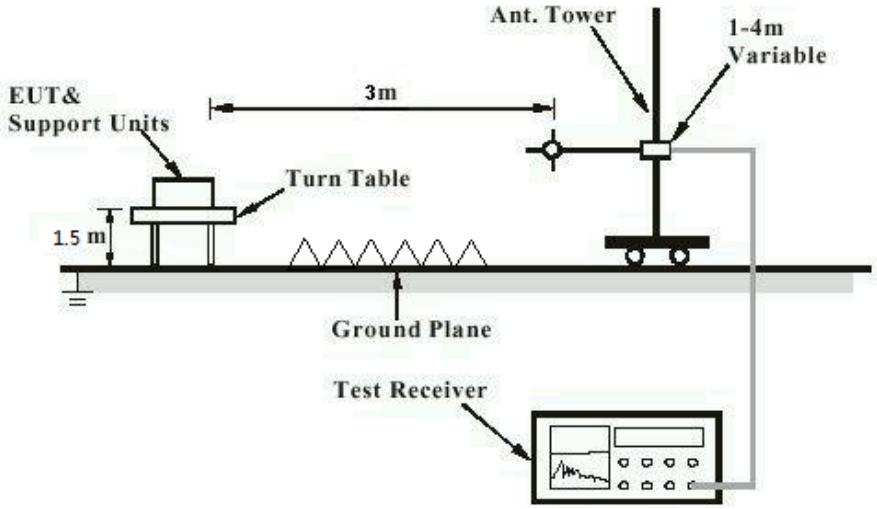


Diagram of Measurement Configuration for Mains Conduction Measurement

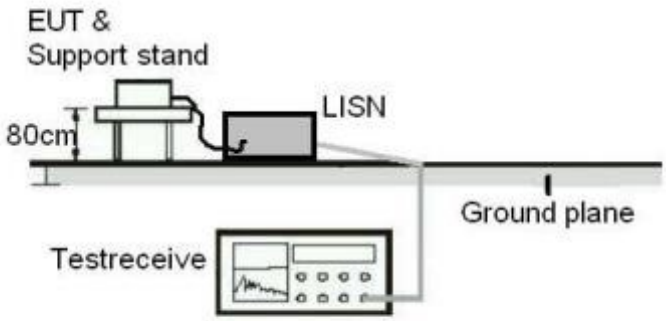
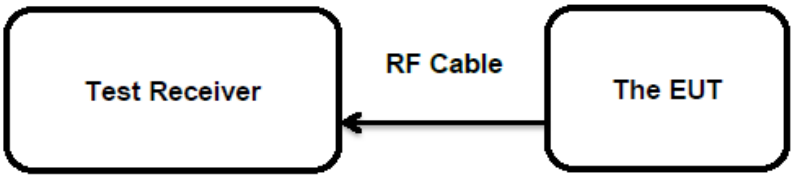


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.203 RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has an integral antenna, the directional gain of antenna is -6.73dBi, 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 Fundamental & Harmonics Radiated Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.249(a), RSS-210
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to FCC Part 15.209(a) RSS-210 Annex B.10(a)
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	30.03.2021
Input voltage	:	120V/60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	23 ℃
Relative humidity	:	42 %
Atmospheric pressure	:	100 kPa

For the measurement records, refer to the appendix A.

5.1.3 Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	RSS-Gen Section 6.7 &FCC Part 15.215
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	01.04.2021
Input voltage	:	120V/60Hz
Operation mode	:	A
Ambient temperature	:	23 ℃
Relative humidity	:	42 %
Atmospheric pressure	:	100 kPa

For the measurement records, refer to the appendix A.

5.1.4 Radiated Spurious Emission & Band Edge

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.249 (d) & FCC Part 15.205 RSS-210 Annex B.10(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.249(d) RSS-Gen Clause 8.9 & 8.10
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	11.04.2021
Input voltage	:	120V/60Hz
Operation mode	:	A
Ambient temperature	:	24 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	100 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.

5.1.5 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) &FCC Part 15.107(a) RSS-Gen Clause 8.8 & ICES-003
Basic standard	:	ANSI C63.10: 2013, ANSI C63.4: 2014
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) FCC Part 15.107(a) & ICES-003 Table 1 RSS-Gen Table 4
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	13.04.2021
Input voltage	:	AC 120V/60Hz
Operation mode	:	B, C
Earthing	:	Not connected
Ambient temperature	:	23 ℃
Relative humidity	:	42 %
Atmospheric pressure	:	100 kPa

For the measurement records, refer to the appendix A. The worst-case data listed.

5.1.6 Radiated Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.109(a) & ICES-003
Basic standard	:	ANSI C63.4-2014
Frequency range	:	30 - 6000MHz
Classification	:	Class B
Limit		FCC Part 15.109(a)
		ICES-003 Table 2 & Table 4
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2021-04-13
Input voltage	:	AC 120V, 60Hz
Operation mode	:	B, C
Earthing	:	Not connected
Ambient temperature	:	26 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Remark: The limit of below radiated emission test data is from FCC part 15.109, it also meet the limit of ICES-003 issue 7. Only worst-case mode reported.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT: **Pass**

Test Specification

Test standard : CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06, section 7
RSS-102 Issue 5 March 2015, section 2.5.2

➢ **FCC requirements**

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to KDB 447498 v06

Power Density: $S_{(mW/cm^2)}= PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm^2)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain, the RF power density can be calculated as below:

$S_{(mW/cm^2)}= PG/4\pi R^2$

a) EUT RF Exposure Evaluation standalone operations

Test Mode	Measured Power		Antenna Gain (dBi)	Measured e.i.r.p		S(mW/cm2)= PG/4πR2	Limit (mW/cm^2)
	(dBm)	dBµV/m@3m		(dBm)	(mW)		
SRD*	/	92.77	-6.73	-2.45	0.57	0.0001	1.0
Wi-Fi**	19.66	/	2.5	21.16	130.62	0.026	

* The highest radiated power for SRD is 92.77dBµV/m@3m, after converted to EIRP, it equals to -2.45dBm (0.57mW).
**The Wi-Fi power cited from the module FCC ID: 2ANDL-TYWE3SE, IC: 23243-TYWE3SE.

b) EUT RF Exposure Evaluation simultaneous transmission operations

Simultaneous transmission mode	The sum of the ratios	Result
SRD+ Wi-Fi	0.0001/1 + 0.0246/1< 1	Pass

- **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1.31 x 10^{-2} $f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for SRD: 2.67 W
- RF exposure evaluation exempted power for 2.4GHz Wi-Fi: 2.68 W

a) EUT RF Exposure Evaluation standalone operations:

Test Mode	Measured Power		Antenna Gain (dBi)	Measured e.i.r.p	
	(dBm)	dBµV/m@3m		(dBm)	(mW)
SRD*	/	92.77	-6.73	-2.45	0.57
Wi-Fi**	19.66	/	2.5	21.16	130.62

* The highest radiated power for SRD is 92.77dBµV/m@3m, after converted to EIRP, it equals to -2.45dBm (0.57mW).
**The Wi-Fi power cited from the module FCC ID: 2ANDL-TYWE3SE, IC: 23243-TYWE3SE.

b) EUT RF Exposure Evaluation simultaneous transmission operations

Simultaneous transmission mode	The sum of the ratios	Result
SRD+ Wi-Fi	0.00057/2.67 + 0.13062/2.68< 1	Pass

The e.i.r.p. less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

"RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons."

7 List of Tables

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Appendix A: Test Results

APPENDIX A: TEST RESULTS **1**

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APPENDIX A.2: SPOT CHECKING EMISSIONS EMISSIONS, SIMULTANEOUS MODE FOR 2.4GHZ WI-FI AND SRD 16
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APPENDIX A.5: TEST RESULTS OF CONDUCTED EMISSION ON AC MAINS 26

Note: 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, therefore only the radiated spurious emissions from 30MHz to 18GHz were reported.

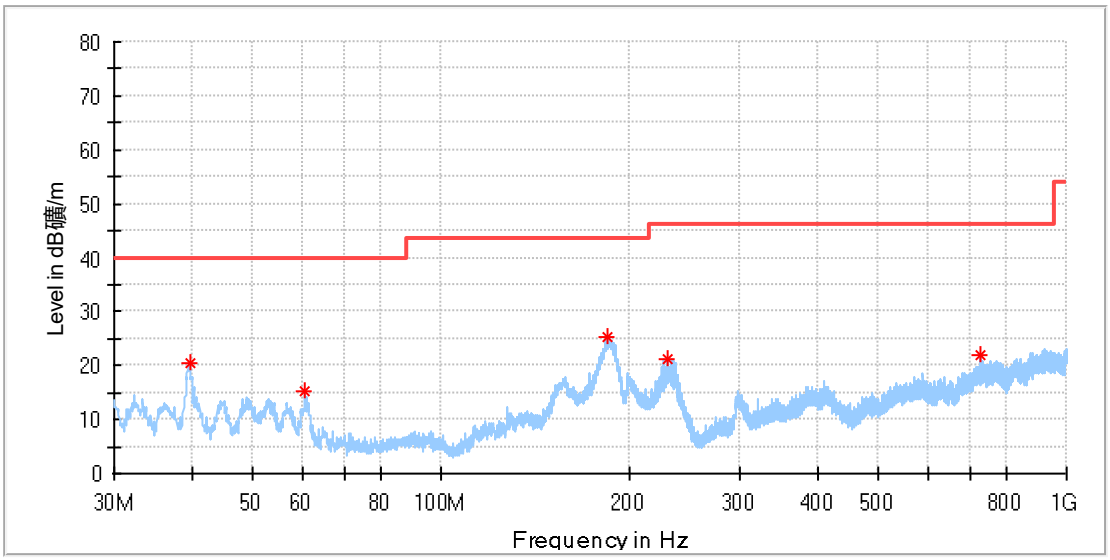
Appendix A.1: Fundamental & Harmonics Radiated Emission

Below 1GHz:

All channels tested, only worst-case reported.

EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	2.4GHz_Low channel
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

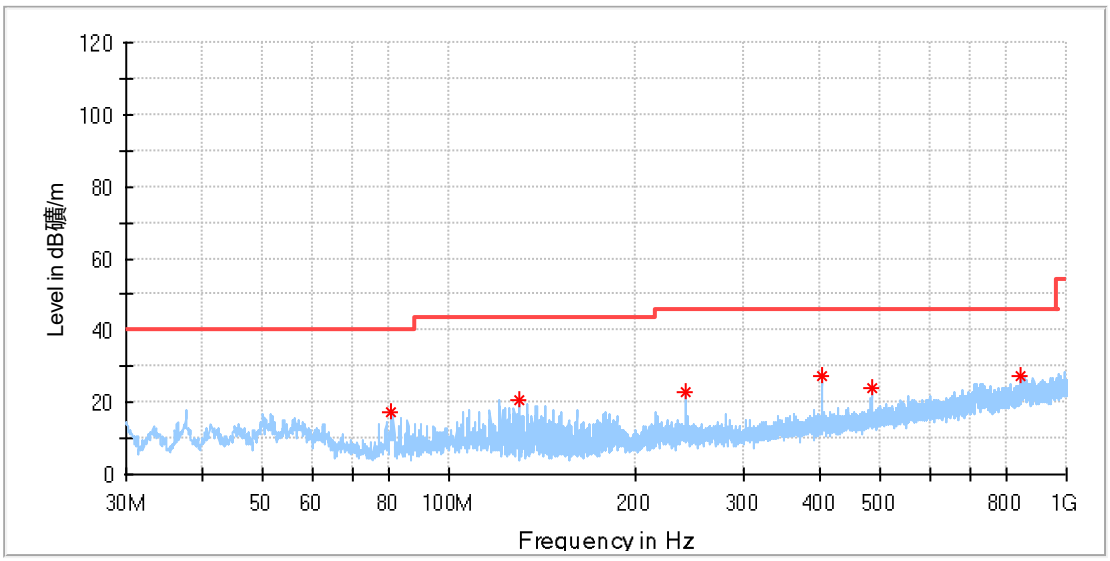


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.603000	20.31	40.00	19.69	100.0	H	268.0	-20.5
60.458000	15.40	40.00	24.60	100.0	H	236.0	-19.4
184.521000	25.46	43.50	18.04	100.0	H	297.0	-20.4
229.917000	21.18	46.00	24.82	100.0	H	184.0	-18.4
729.758000	22.09	46.00	23.91	100.0	H	247.0	-7.9

EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	2.4GHz_Low channel
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



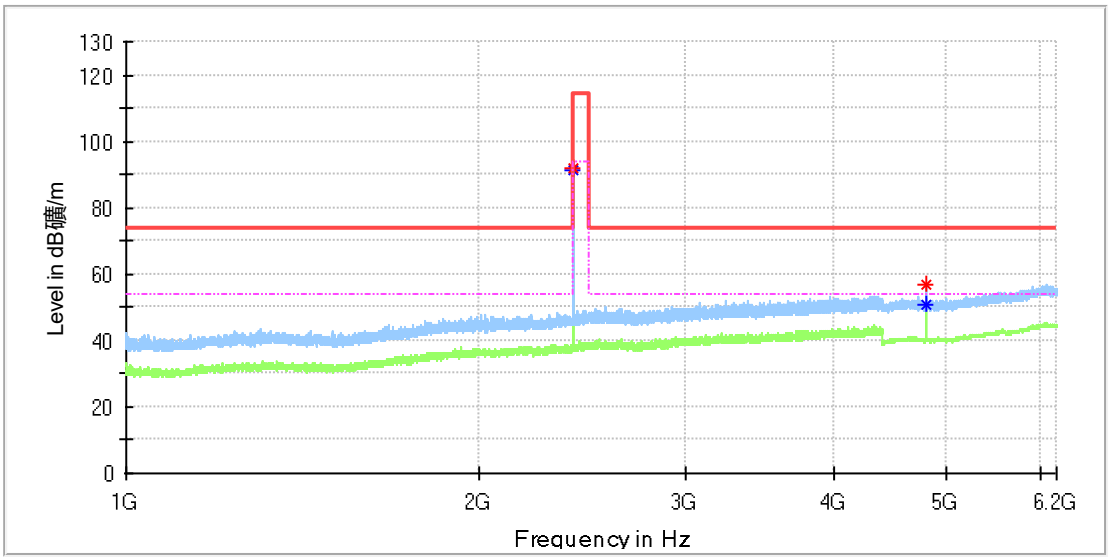
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.554500	25.60	40.00	14.40	100.0	V	74.0	-20.6
58.906000	21.38	40.00	18.62	100.0	V	85.0	-19.2
161.483500	26.73	43.50	16.77	100.0	V	319.0	-22.0
229.480500	24.87	46.00	21.13	100.0	V	36.0	-18.4
414.411000	17.88	46.00	28.12	100.0	V	140.0	-13.8
883.648500	23.05	46.00	22.95	100.0	V	309.0	-5.5

Above 1GHz:

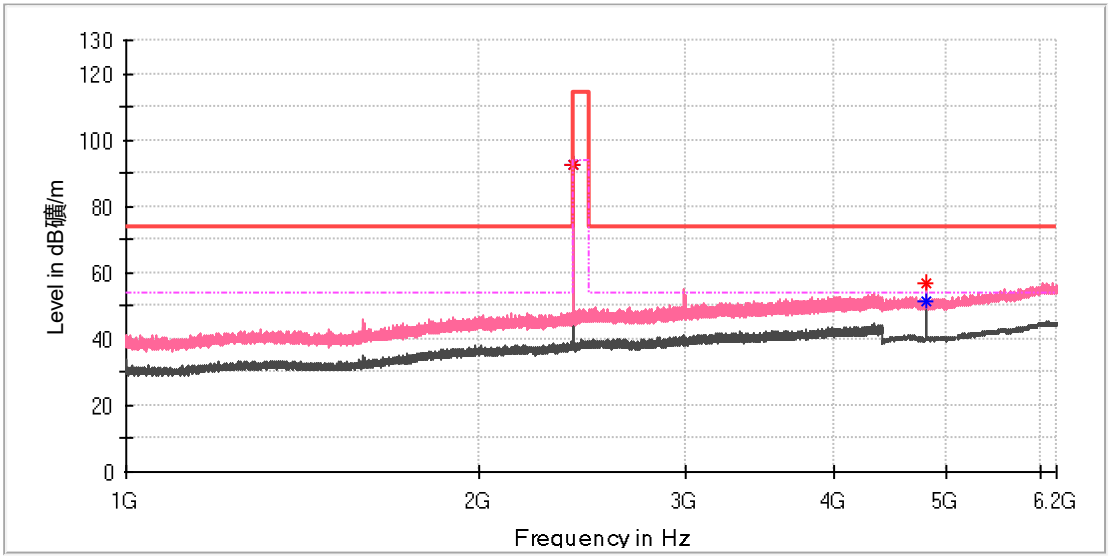
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	2.4GHz_Low channel
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



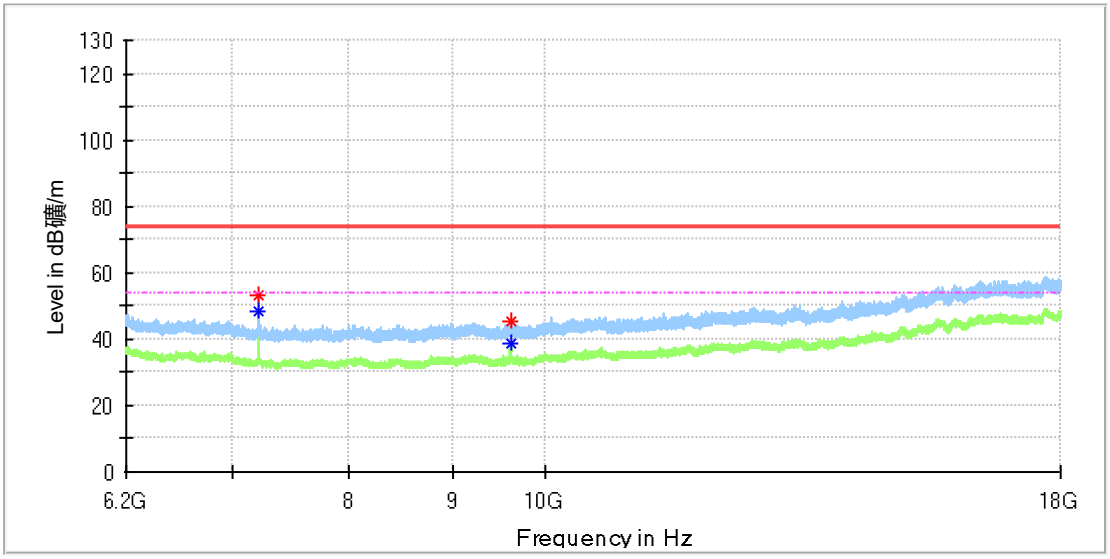
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.820000	91.73	---	114.00	22.27	100.0	H	154.0	7.0
2401.990000	---	91.09	94.00	2.91	100.0	H	154.0	7.0
4804.000000	---	50.85	54.00	3.15	100.0	H	224.0	11.8
4804.500000	56.73	---	74.00	17.27	100.0	H	224.0	11.8



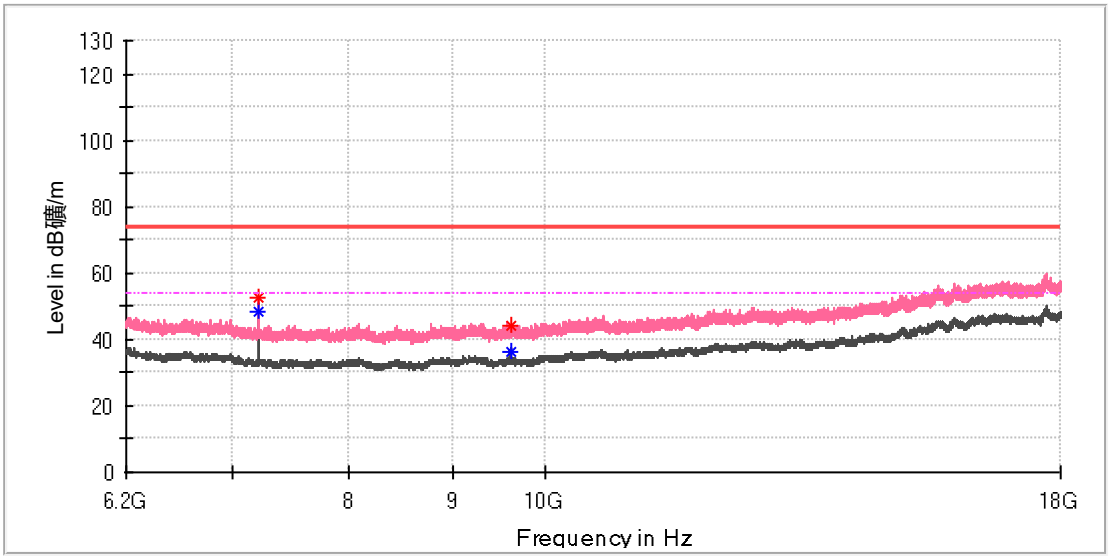
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2401.820000	92.77	---	114.00	21.23	100.0	V	48.0	7.0
2401.990000	---	92.21	94.00	1.79	100.0	V	48.0	7.0
4804.000000	---	50.97	54.00	3.03	100.0	V	159.0	11.8
4804.500000	56.90	---	74.00	17.10	100.0	V	159.0	11.8



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	53.35	---	74.00	20.65	100.0	H	4.0	8.8
7206.441667	---	48.64	54.00	5.36	100.0	H	103.0	8.8
9609.216667	45.26	---	74.00	28.74	100.0	H	273.0	10.4
9609.216667	---	38.41	54.00	15.59	100.0	H	273.0	10.4

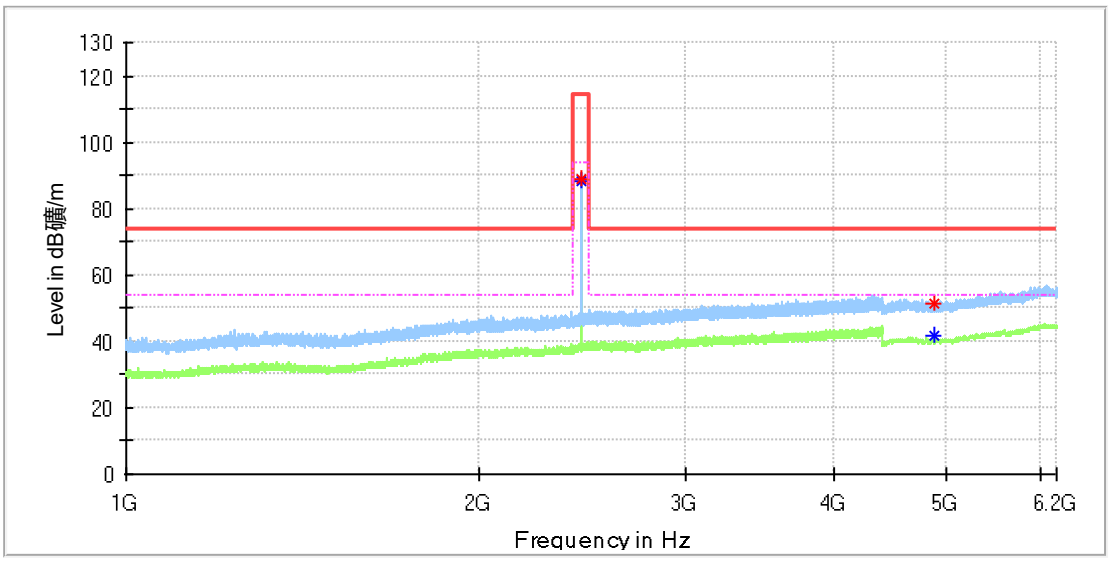


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7206.441667	52.78	---	74.00	21.22	100.0	V	108.0	8.8
7206.441667	---	48.54	54.00	5.46	100.0	V	108.0	8.8
9608.233333	44.15	---	74.00	29.85	100.0	V	150.0	10.4
9609.216667	---	36.21	54.00	17.79	100.0	V	298.0	10.4

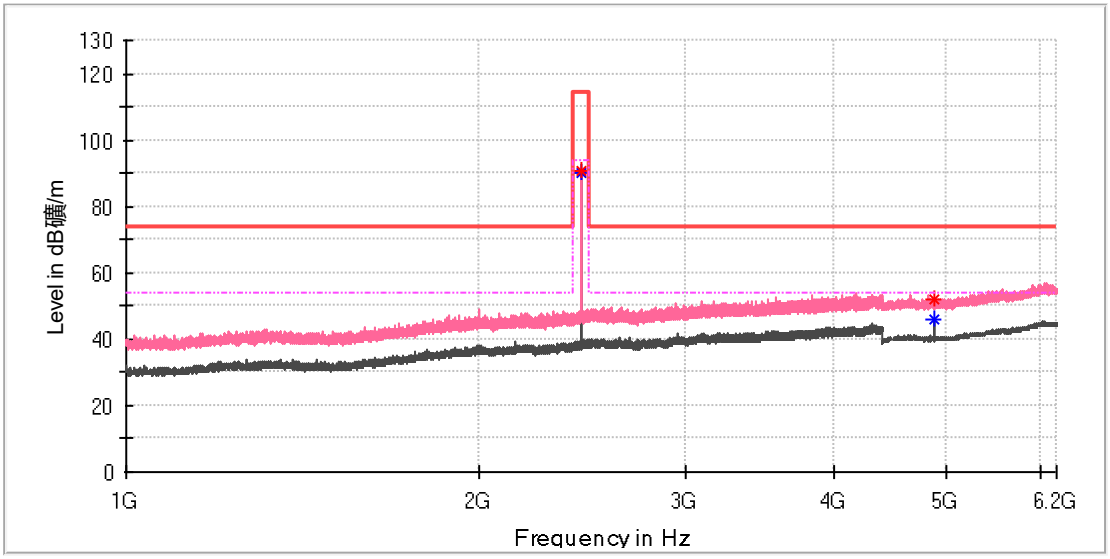
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	_Mid channel
Tested By:	Alano Qu
Reviewed By:	Terry Yin



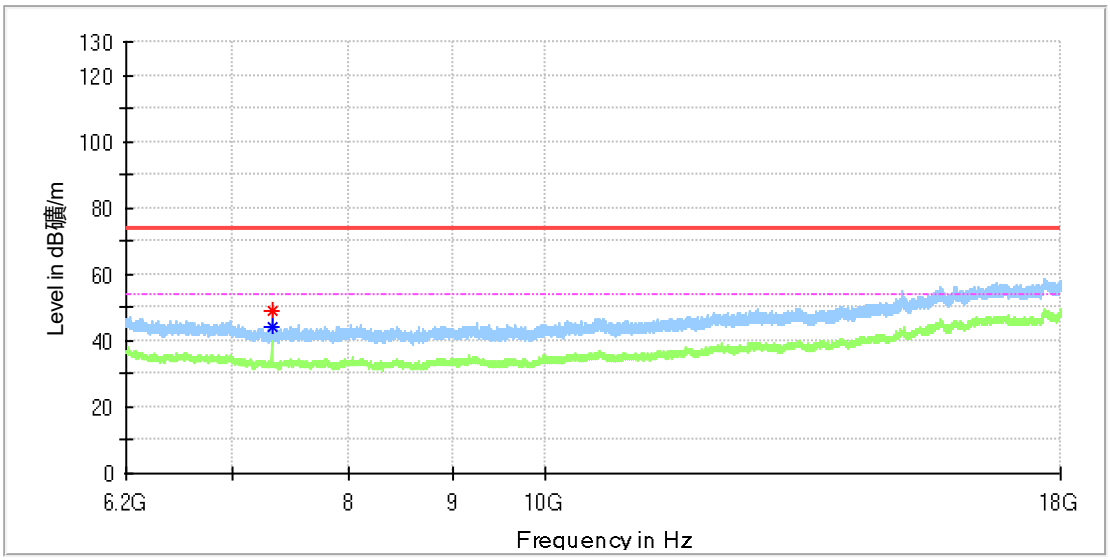
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2439.900000	---	88.49	94.00	5.51	100.0	H	256.0	7.4
2440.240000	89.09	---	114.00	24.91	100.0	H	256.0	7.4
4879.500000	---	41.91	54.00	12.09	100.0	H	251.0	11.8
4880.500000	51.69	---	74.00	22.31	100.0	H	359.0	11.8



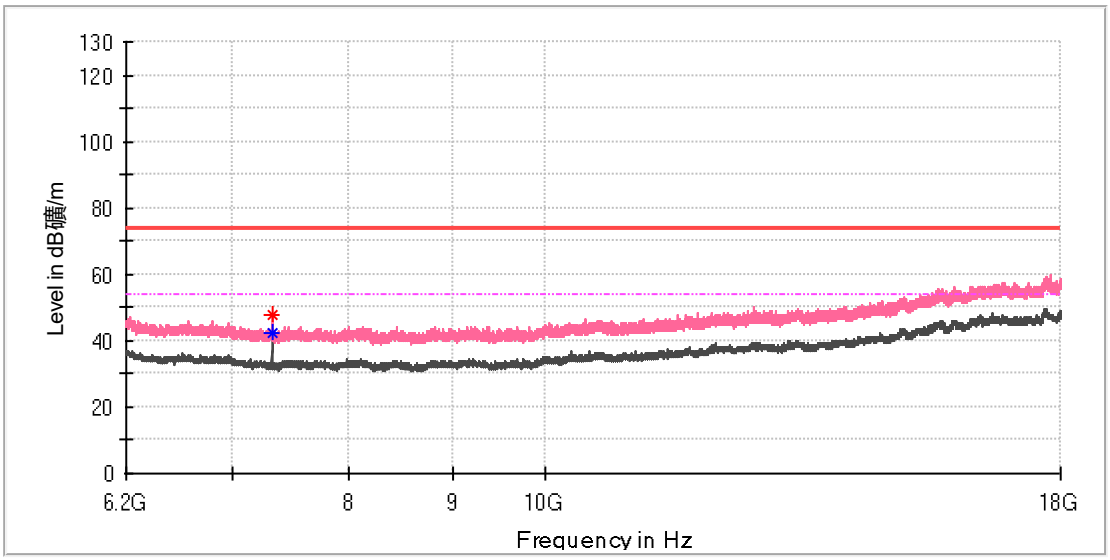
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2440.070000	---	90.13	94.00	3.87	100.0	V	204.0	7.4
2440.240000	90.66	---	114.00	23.34	100.0	V	187.0	7.4
4879.500000	52.19	---	74.00	21.81	100.0	V	177.0	11.8
4880.000000	---	45.93	54.00	8.07	100.0	V	177.0	11.8



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7320.508333	49.10	---	74.00	24.90	100.0	H	88.0	8.2
7320.508333	---	44.27	54.00	9.73	100.0	H	88.0	8.2

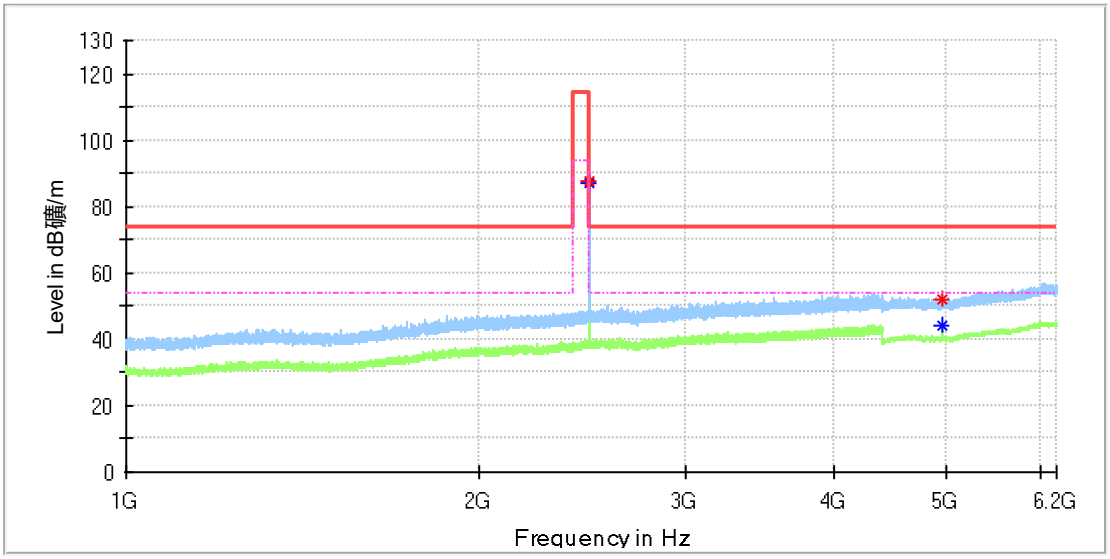


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7319.525000	47.52	---	74.00	26.48	100.0	V	122.0	8.2
7320.016667	---	42.05	54.00	11.95	100.0	V	122.0	8.2

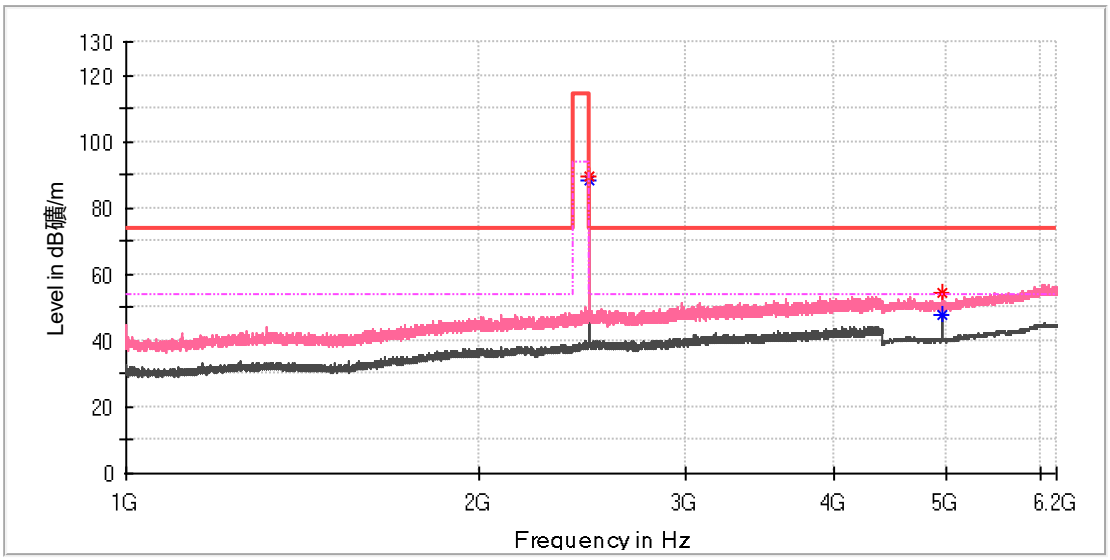
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	High channel
Tested By:	Alano Qu
Reviewed By:	Terry Yin



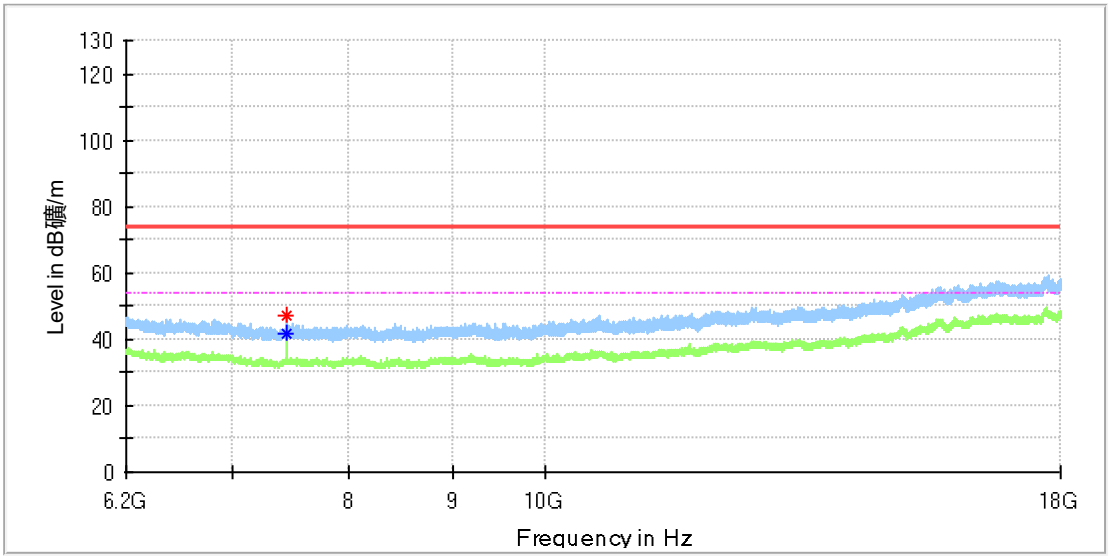
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.020000	---	86.81	94.00	7.19	100.0	H	342.0	7.4
2480.360000	87.46	---	114.00	26.54	100.0	H	189.0	7.4
4959.500000	52.07	---	74.00	21.93	100.0	H	158.0	11.8
4960.000000	---	44.43	54.00	9.57	100.0	H	158.0	11.8



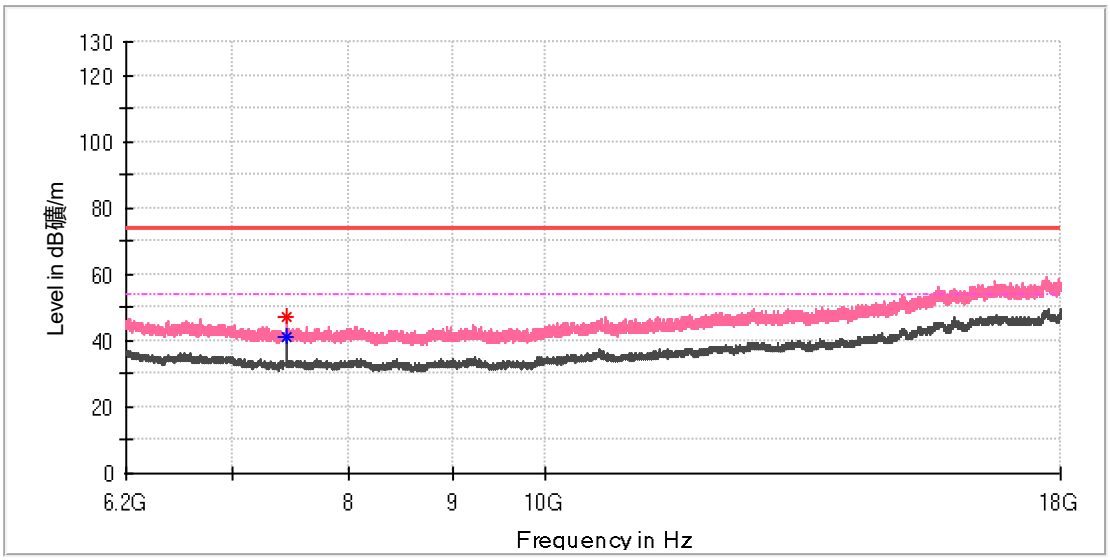
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2480.020000	---	88.51	94.00	5.49	100.0	V	106.0	7.4
2480.190000	89.19	---	114.00	24.81	100.0	V	106.0	7.4
4960.000000	54.25	---	74.00	19.75	100.0	V	189.0	11.8
4960.000000	---	47.51	54.00	6.49	100.0	V	189.0	11.8



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.983333	---	41.43	54.00	12.57	100.0	H	87.0	8.4
7440.475000	47.34	---	74.00	26.66	100.0	H	171.0	8.4



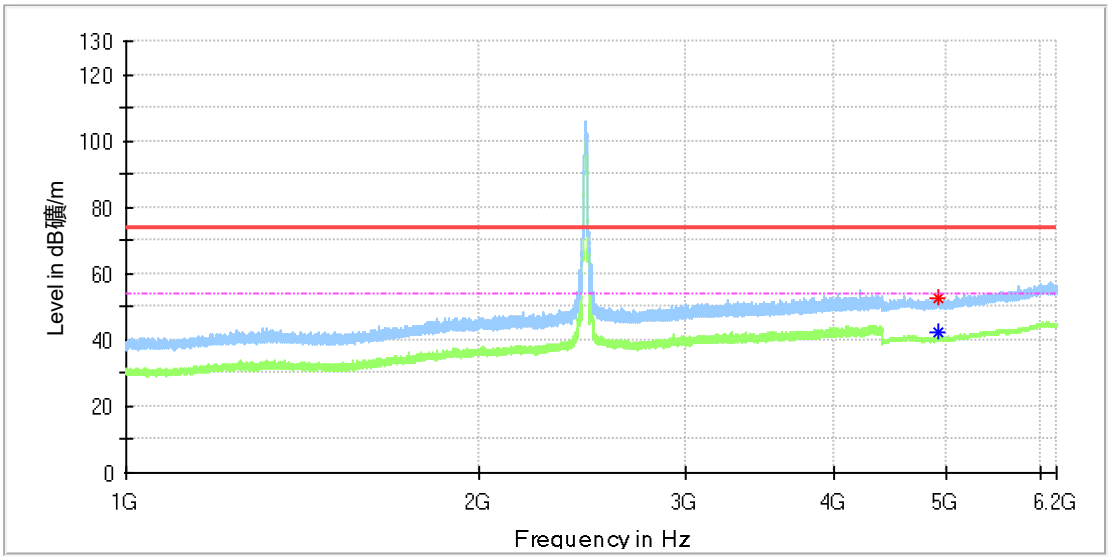
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.000000	---	40.88	54.00	13.12	100.0	V	160.0	8.4
7440.966667	46.95	---	74.00	27.05	100.0	V	200.0	8.4

Appendix A.2: Spot checking emissions emissions, Simultaneous mode for 2.4GHz WI-Fi and SRD

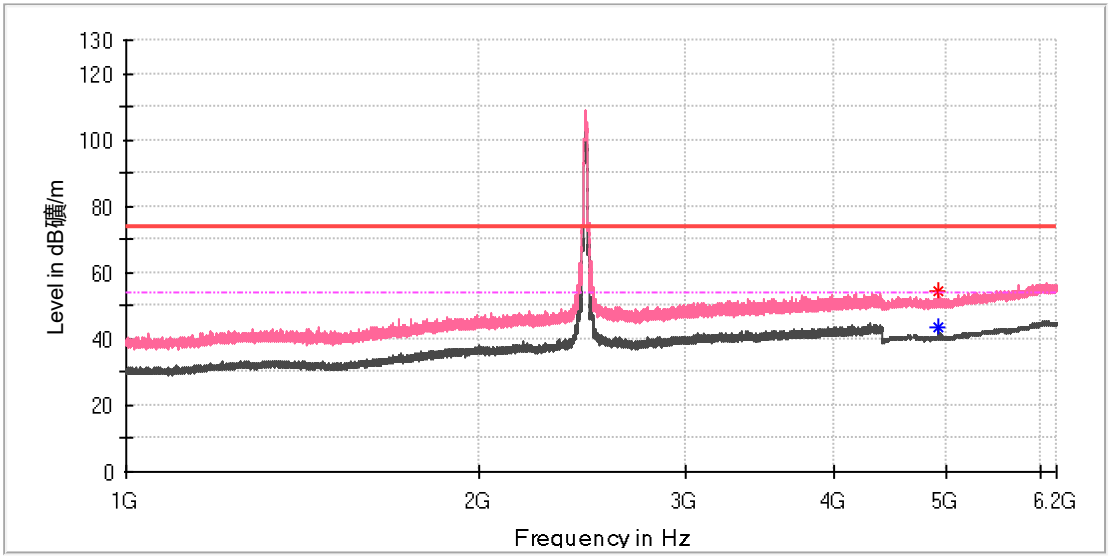
All modes tested, Only worst-case mode reported.

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	802.11b+SRD (worst-case)
Test Voltage::	Battery
Remark:	Temp 23 Humi:48%
Test Standard:	FCC 15.247& FCC 15.249
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4923.000000	52.86	---	74.00	21.14	100.0	H	170.0	11.8
4923.000000	---	42.58	54.00	11.42	100.0	H	170.0	11.8

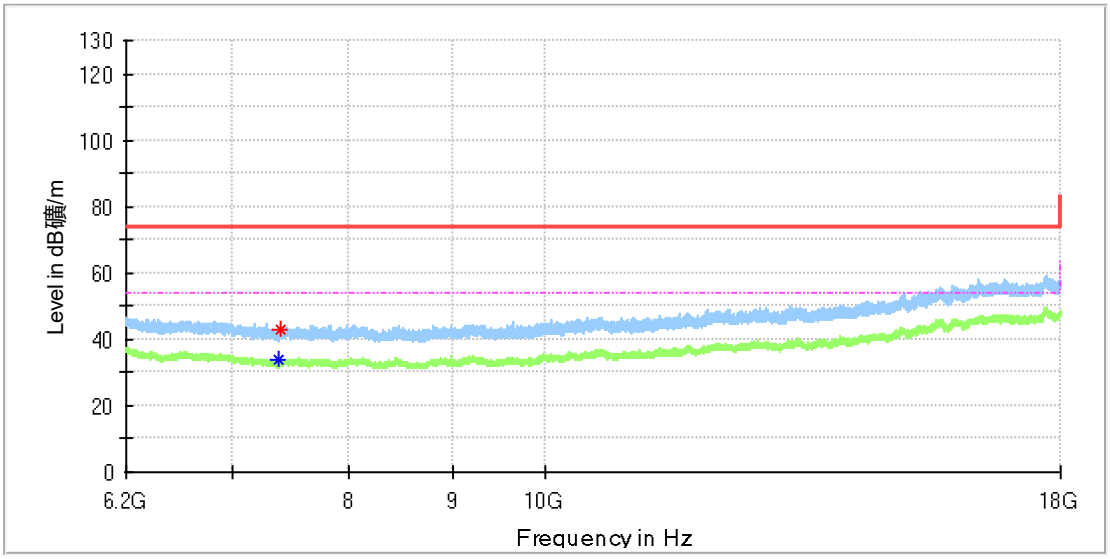


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4924.000000	54.42	---	74.00	19.58	100.0	V	115.0	11.8
4924.500000	---	43.79	54.00	10.21	100.0	V	15.0	11.8

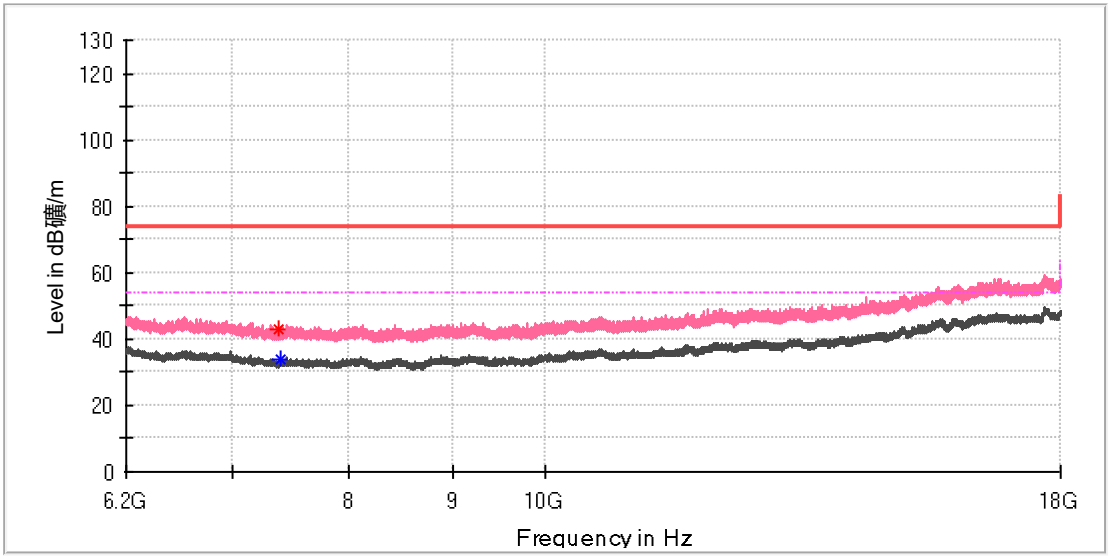
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	802.11b+SRD (Worst-case)
Test Voltage::	Battery
Remark:	Temp 22 Humi:52%
Test Standard:	FCC 15.247& FCC 15.249
Tested By:	Alano Qu
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)
7384.425000	---	34.08	54.00	19.92	100.0	H	26.0	8.2
7387.375000	42.67	---	74.00	31.33	100.0	H	41.0	8.2



Critical_Freqs

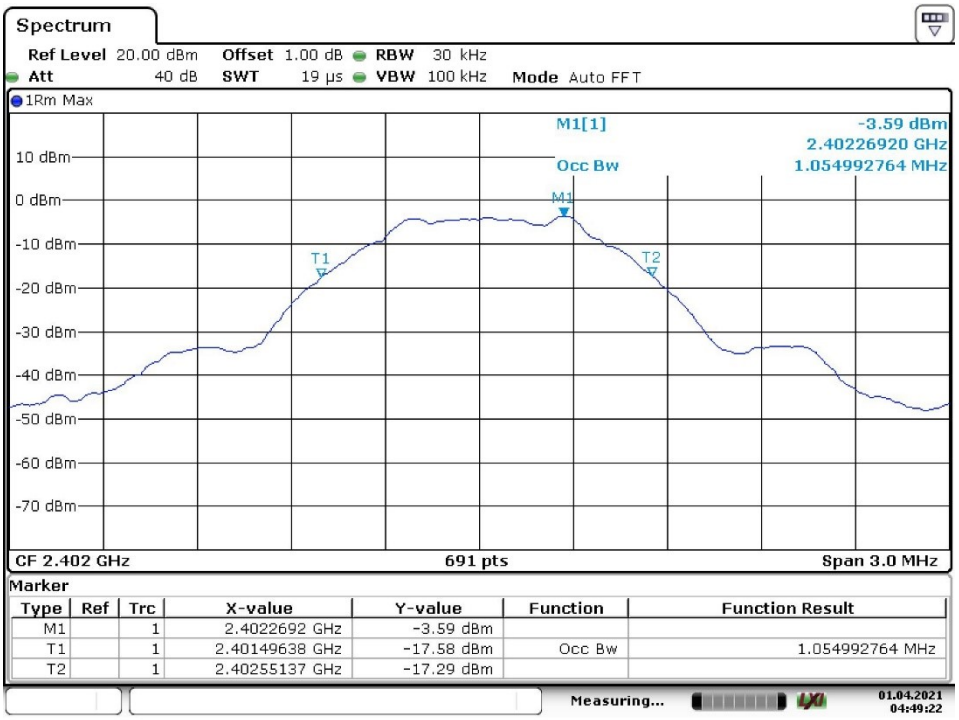
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7383.933333	42.71	---	74.00	31.29	100.0	V	0.0	8.2
7386.883333	---	33.62	54.00	20.38	100.0	V	126.0	8.2

Appendix A.3: Test Results Bandwidth

Test Result of 99% Bandwidth, General 2.4GHz

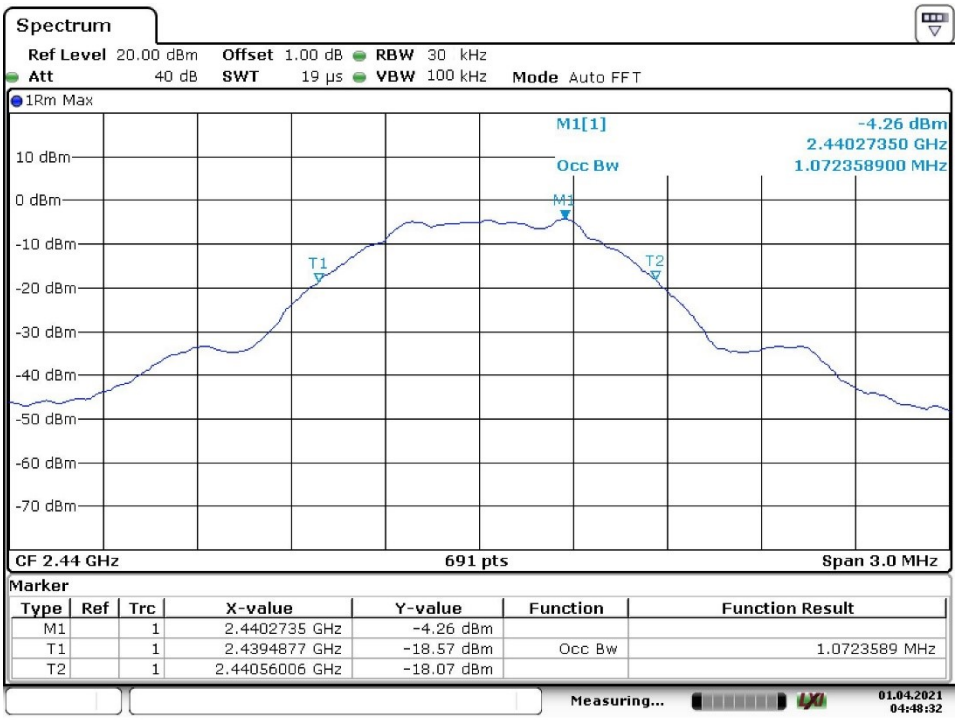
Test Mode Test Channel (MHz)	99% Bandwidth (kHz)
2402	1055
2440	1072
2480	1059

Low Channel



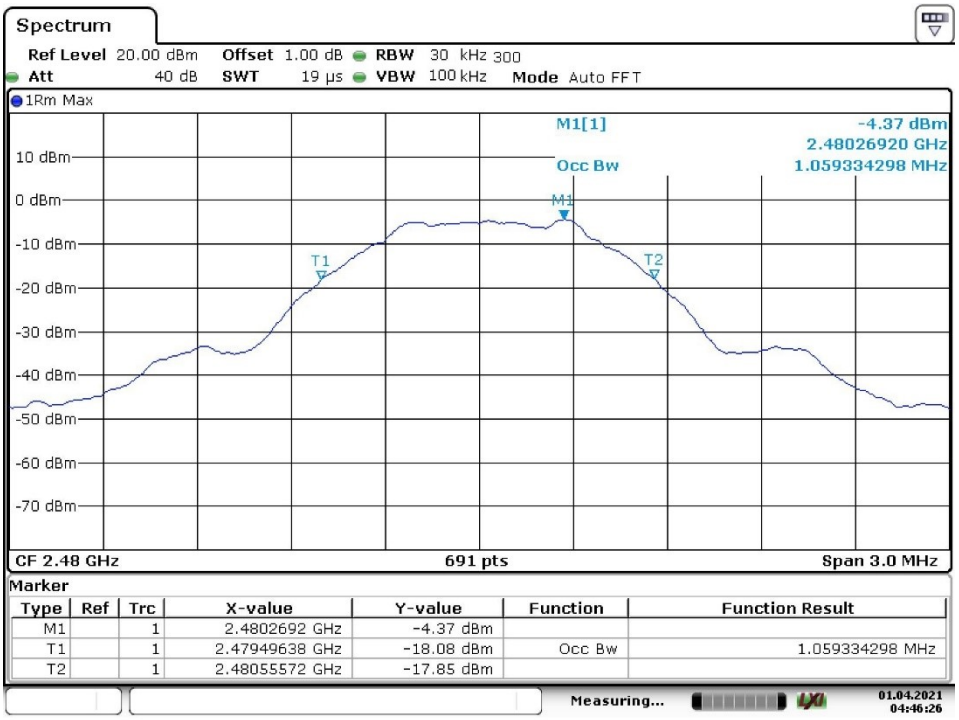
Date: 1.APR.2021 04:49:22

Middle Channel



Date: 1.APR.2021 04:48:32

High Channel

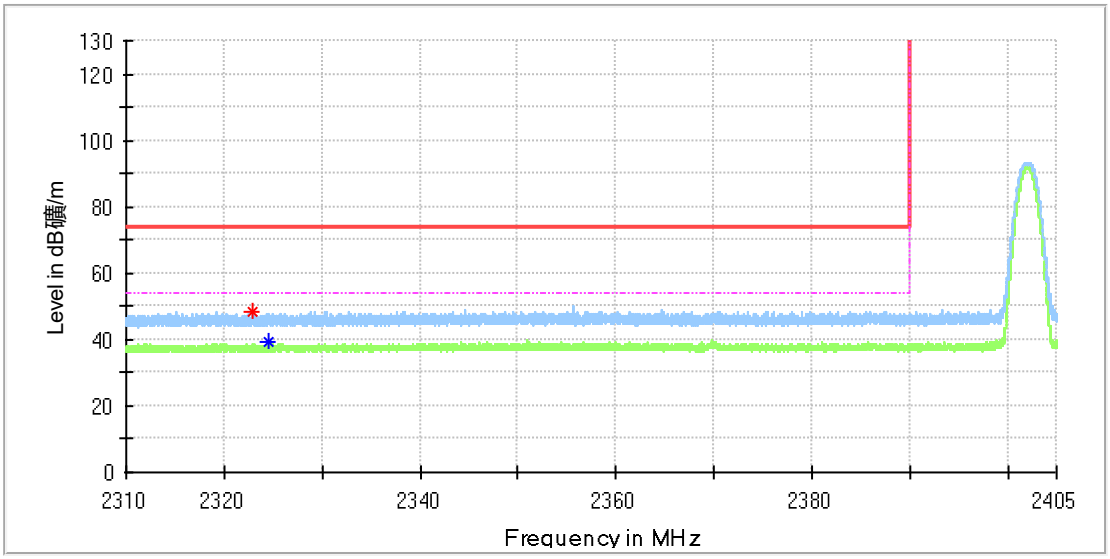


Date: 1.APR.2021 04:46:26

Appendix A.4: Test Results of Radiated Emissions in Restricted Bands

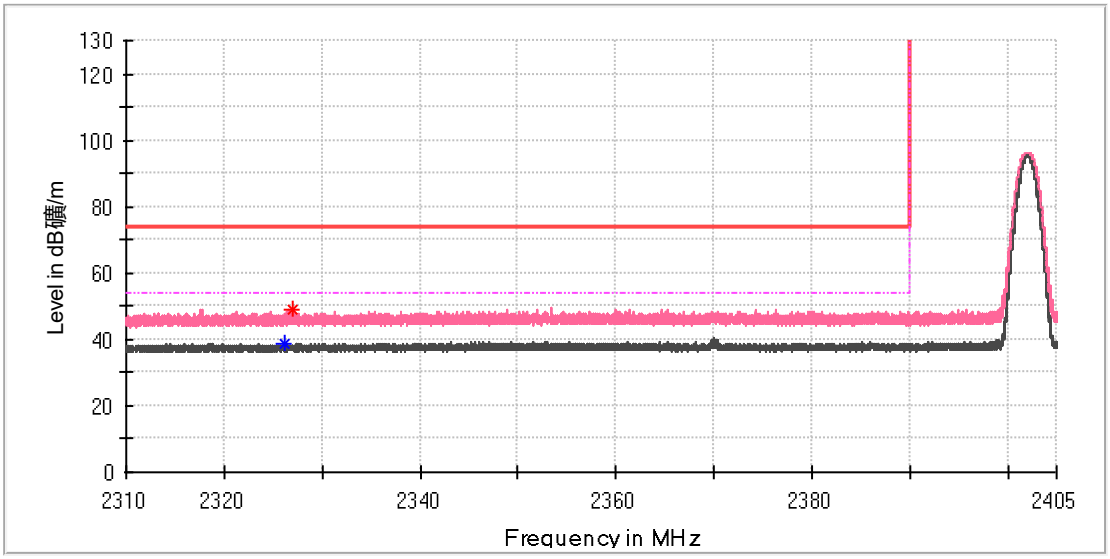
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	2.4GHz_Low channel
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)
2322.863000	48.23	---	74.00	25.77	100.0	H	256.0	6.6
2324.444750	---	39.42	54.00	14.58	100.0	H	190.0	6.6

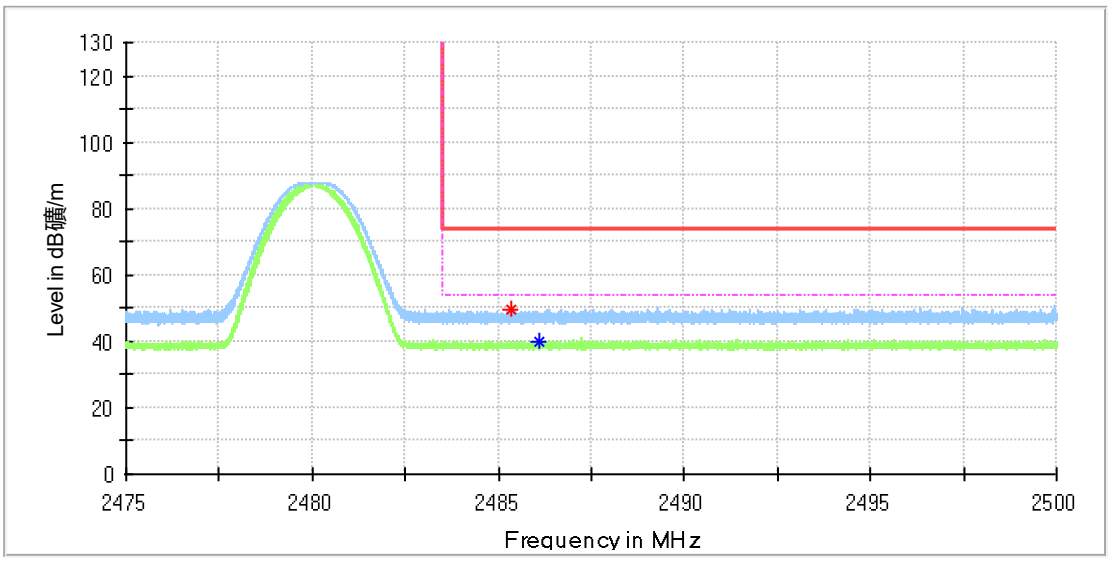


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2326.230750	---	38.69	54.00	15.31	100.0	V	295.0	6.7
2326.986000	49.01	---	74.00	24.99	100.0	V	178.0	6.7

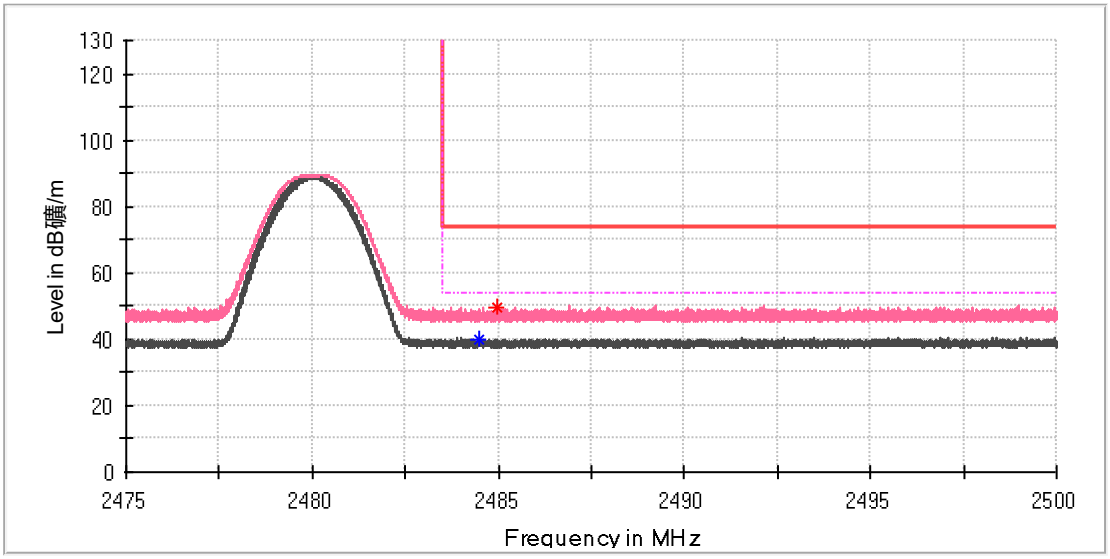
EUT Information

EUT Name:	Smartmi Air Circulator Fan
Model:	ZLBPKQXHS02ZM
Test Mode:	_High channel
Tested By:	Alano Qu
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)
2485.355000	49.78	---	74.00	24.22	100.0	H	271.0	7.4
2486.101250	---	40.18	54.00	13.82	100.0	H	188.0	7.4



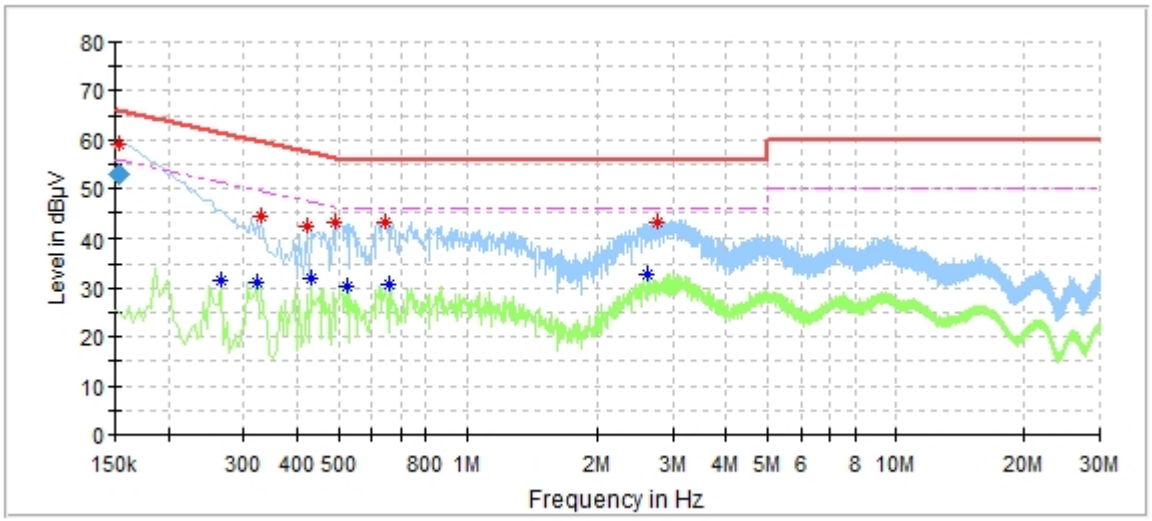
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.486250	---	40.17	54.00	13.83	100.0	V	169.0	7.4
2484.981250	49.72	---	74.00	24.28	100.0	V	113.0	7.4

Appendix A.5: Test Results of Conducted Emission on AC Mains

EUT Information

EUT Name:	Smartmi Air Circulator Fan
Order No.:	168310213 20
Model:	ZLBPKQXHS02ZM
Test Mode:	B,C
Test Voltage:	AC 120V/60Hz
Test By:	Mac Xie
Review By:	Gary Chen
Remark:	SR1



Critical_Freqs

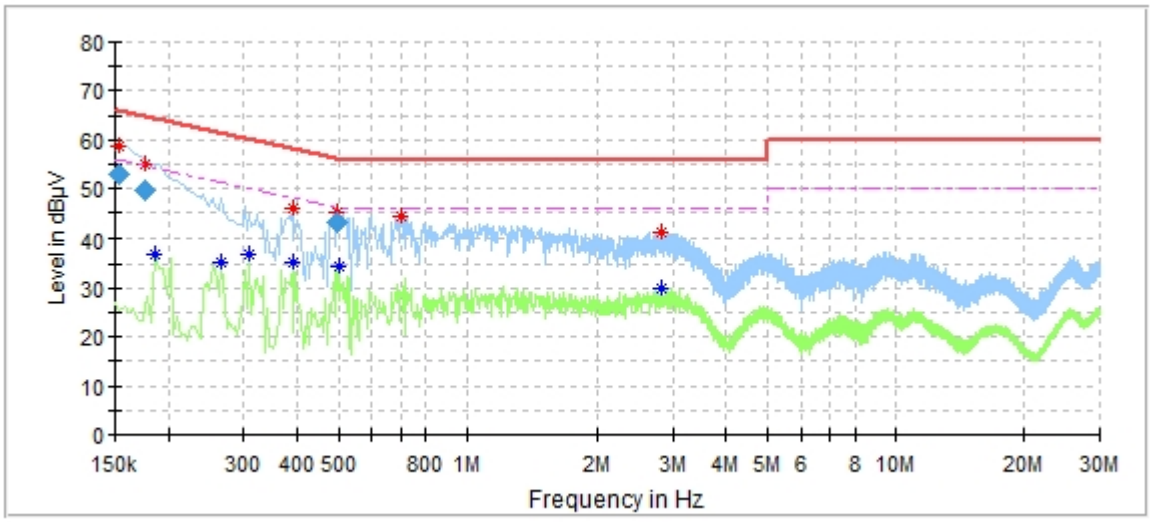
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	59.23	---	65.57	6.34	L1	9.6
0.266000	---	31.63	51.24	19.61	L1	9.6
0.322000	---	31.13	49.66	18.52	L1	9.7
0.330000	44.20	---	59.45	15.25	L1	9.7
0.422000	42.09	---	57.41	15.32	L1	9.7
0.430000	---	32.18	47.25	15.08	L1	9.7
0.494000	42.99	---	56.10	13.11	L1	9.7
0.524000	---	30.43	46.00	15.57	L1	9.7
0.644000	43.15	---	56.00	12.85	L1	9.7
0.656000	---	30.83	46.00	15.17	L1	9.7
2.632000	---	32.82	46.00	13.18	L1	9.8
2.756000	43.25	---	56.00	12.75	L1	9.8

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154000	53.08	---	65.78	12.71	200.0	9.000	L1	9.6

EUT Information

EUT Name:	Smartmi Air Circulator Fan
Order No.:	168310213 20
Model:	ZLBPKQXHS02ZM
Test Mode:	B,C
Test Voltage:	AC 120V/60Hz
Test By:	Mac Xie
Review By:	Gary Chen
Remark:	SR1



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	58.74	---	65.57	6.83	N	9.6
0.176500	54.97	---	64.04	9.07	N	9.6
0.186000	---	37.05	54.21	17.16	N	9.6
0.266000	---	35.48	51.24	15.76	N	9.6
0.310000	---	36.89	49.97	13.09	N	9.6
0.390000	---	35.29	48.06	12.77	N	9.7
0.390000	45.95	---	58.06	12.12	N	9.7
0.496500	45.08	---	56.03	10.95	N	9.7
0.500000	---	34.56	46.00	11.44	N	9.7
0.704000	44.18	---	56.00	11.82	N	9.7
2.820000	---	30.11	46.00	15.89	N	9.8
2.820000	41.23	---	56.00	14.77	N	9.8

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.154000	52.89	---	65.78	12.89	200.0	9.000	N	9.6
0.176500	49.49	---	64.65	15.16	200.0	9.000	N	9.6
0.496500	43.07	---	56.06	12.99	200.0	9.000	N	9.7

Appendix A.6: Test Results of Radiated Emissions

It verified that there is only noise-floor for above 6GHz, so only 30MHz-6GHz range reported.

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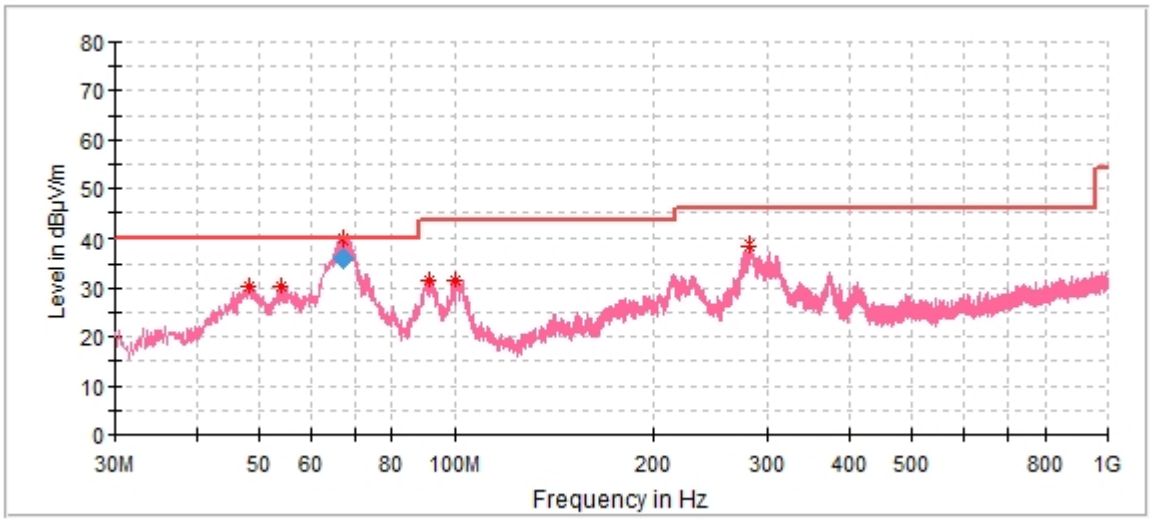
Review By:	Gary Chen
Adapter:	3m Chamber

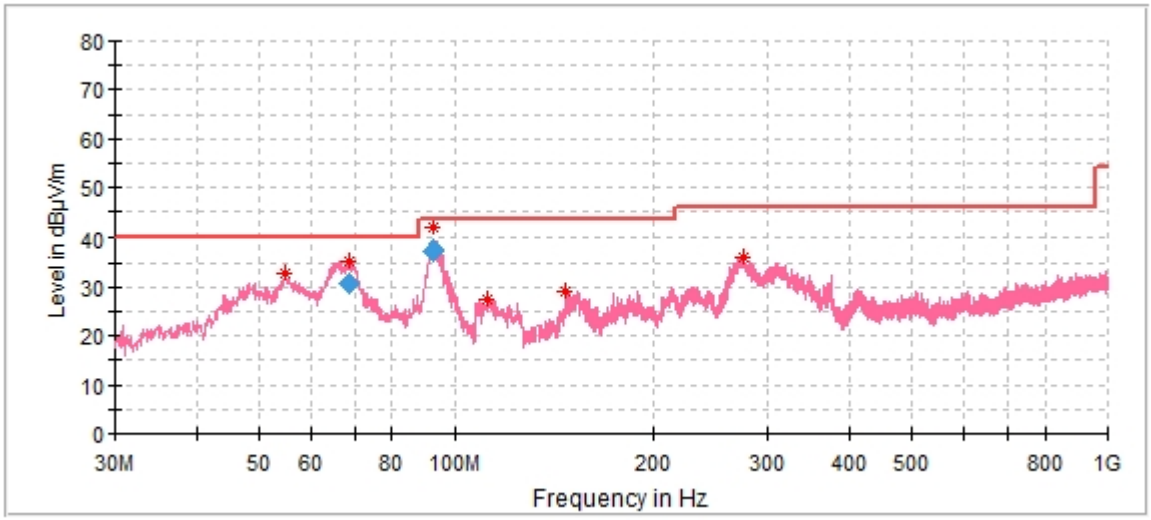


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.333000	30.46	40.00	9.54	100.0	V	171.0	21.3
54.153000	30.43	40.00	9.57	100.0	V	91.0	21.0
67.114000	39.89	40.00	0.11	100.0	V	165.0	19.4
91.110000	31.58	43.50	11.92	100.0	V	316.0	15.5
99.937000	31.62	43.50	11.88	100.0	V	99.0	17.2
282.200000	38.46	46.00	7.54	100.0	V	265.0	20.0

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
67.114000	36.07	40.00	3.93	1000.0	120.000	100.0	V	165.0	19.4



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
54.735000	32.63	40.00	7.37	100.0	V	207.0	21.0
68.569000	35.43	40.00	4.57	121.0	V	243.0	18.9
92.625000	41.97	43.50	1.53	106.0	V	0.0	15.9
112.353000	27.49	43.50	16.01	100.0	V	8.0	18.5
147.079000	29.10	43.50	14.40	100.0	V	229.0	20.3
274.634000	36.30	46.00	9.70	100.0	V	225.0	20.4

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
68.569000	30.95	40.00	9.05	1000.0	120.000	121.0	V	243.0	18.9
92.625000	37.41	43.50	6.09	1000.0	120.000	106.0	V	0.0	15.9

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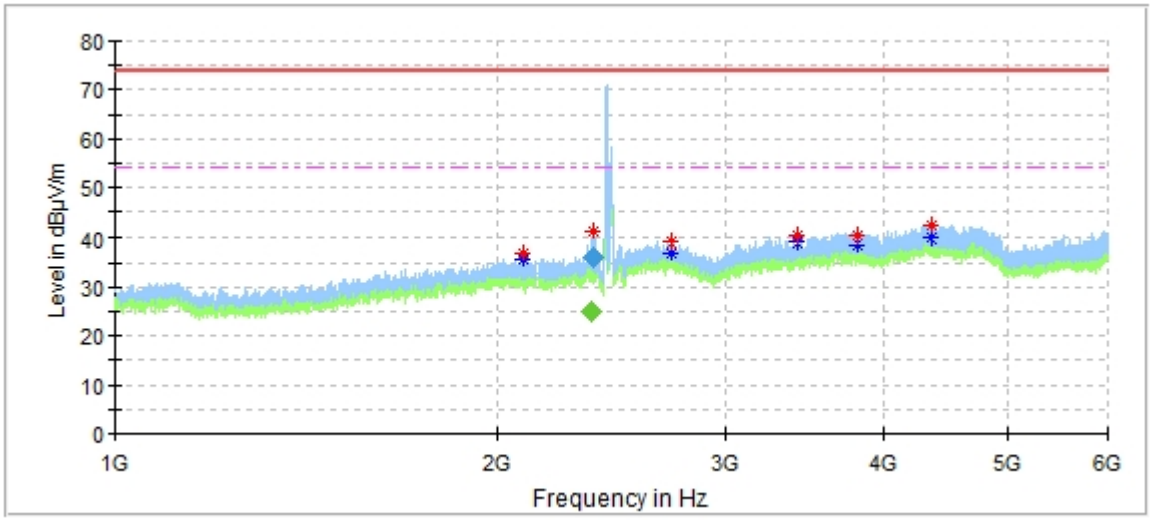
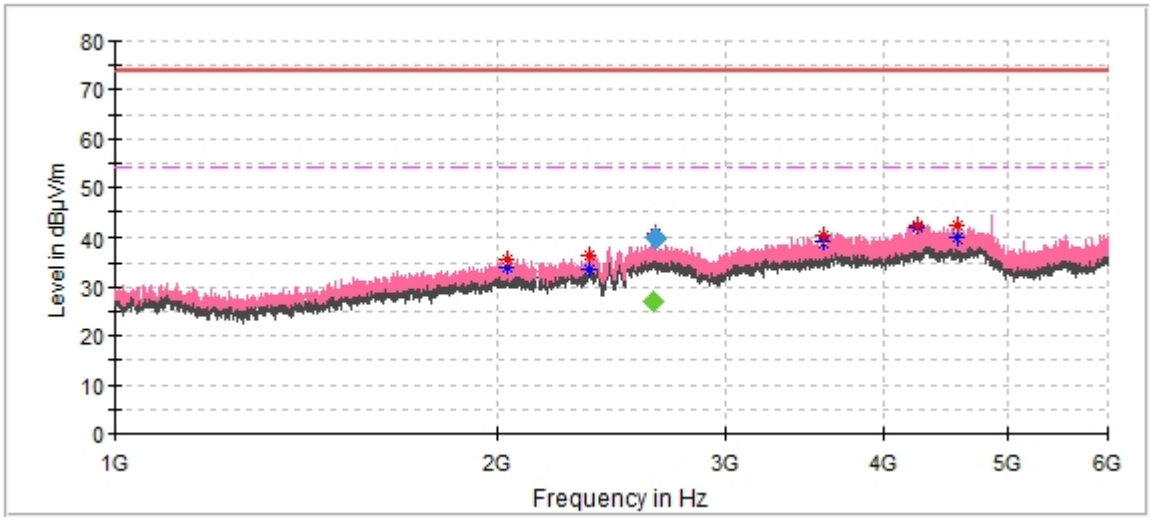


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2094.500000	36.88	---	74.00	37.12	100.0	H	167.0	-7.5
2094.500000	---	35.54	54.00	18.46	100.0	H	167.0	-7.5
2360.900000	---	25.25	54.00	28.75	100.0	H	84.0	-6.1
2368.100000	40.84	---	74.00	33.16	100.0	H	105.0	-6.0
2725.500000	38.95	---	74.00	35.05	100.0	H	312.0	-3.2
2725.500000	---	36.86	54.00	17.14	100.0	H	312.0	-3.2
3420.000000	40.27	---	74.00	33.73	200.0	H	104.0	-1.5
3420.000000	---	39.05	54.00	14.95	200.0	H	104.0	-1.5
3814.000000	40.09	---	74.00	33.91	100.0	H	189.0	0.0
3814.000000	---	38.46	54.00	15.54	100.0	H	189.0	0.0
4365.000000	42.45	---	74.00	31.55	100.0	H	167.0	2.1
4365.000000	---	39.87	54.00	14.13	100.0	H	167.0	2.1

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2360.900000	---	25.12	54.00	28.88	100.0	H	84.0	-6.1
2368.100000	36.18	---	74.00	37.82	100.0	H	105.0	-6.0



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2031.000000	35.77	---	74.00	38.23	200.0	V	183.0	-7.3
2031.000000	---	33.98	54.00	20.02	200.0	V	183.0	-7.3
2353.000000	36.59	---	74.00	37.41	100.0	V	261.0	-6.2
2353.000000	---	33.77	54.00	20.23	100.0	V	261.0	-6.2
2642.600000	---	27.26	54.00	26.74	100.0	V	143.0	-3.3
2643.800000	40.78	---	74.00	33.22	100.0	V	172.0	-3.3
3584.500000	40.21	---	74.00	33.79	100.0	V	61.0	-0.7
3584.500000	---	38.96	54.00	15.04	100.0	V	61.0	-0.7
4260.000000	42.26	---	74.00	31.74	200.0	V	346.0	1.9
4260.000000	---	41.78	54.00	12.22	200.0	V	346.0	1.9
4574.000000	42.09	---	74.00	31.91	100.0	V	324.0	1.9
4574.000000	---	39.74	54.00	14.26	100.0	V	324.0	1.9

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2642.600000	---	27.21	54.00	26.79	100.0	V	143.0	-3.3
2643.800000	39.86	---	74.00	34.14	100.0	V	172.0	-3.3