Prüfbericht-Nr.: *Test report no.*:	**CN24QSFA 001**	**Auftrags-Nr.:** *Order no.*:	**168492134**	Seite 1 von 16 *Page 1 of 16*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2024-07-02	
Auftraggeber: *Client*:	**IKEA of Sweden AB** Box 702, SE-343 81, Älmhult, Sweden			
Prüfgegenstand: *Test item*:	Remote control			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	E2552			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	CFR47 FCC Part 15.203 CFR47 FCC Part 15.231 RSS-210 Issue 11 RSS Gen Issue 5			

Wareneingangsdatum: *Date of sample receipt*:	2024-07-02	Please refer to Photo Document
Prüfmuster-Nr.: *Test sample no:*	A003759604-001 A003759604-002	
Prüfzeitraum: *Testing period*:	2024-07-02 - 2024-07-11	
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 Hardy Suo	**genehmigt von:** *authorized by*:	X Lin Lin
Datum: *Date:*	2024-07-16	**Ausstellungsdatum:** *Issue date:*	2024-07-16
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*: FCC ID: FHO-E2552
IC: 10912A-E2552, HVIN: E2552

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*

Prüfbericht-Nr.: CN24QSFA 001
Test report no.:

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. *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.*
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature *As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature*
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. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen 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 bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. *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.*

TEST SUMMARY

5.1.1 Antenna Requirement
RESULT: Pass
5.1.2 Deactivation of the Transmission
RESULT: Pass
5.1.3 Emission Bandwidth
RESULT: Pass
5.1.4 Field strength of fundamental and Unwanted Emissions in the Spurious Domain
RESULT: Pass

CONTENTS

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 radio spectrum

Appendix B: Photographs of the Test Set-Up

1.2 Test Standard(s)

Applied Rules:	CFR47 FCC Part 15.203 CFR47 FCC Part 15.231 RSS-210 Issue 11
Test Method:	ANSI C63.10:2013

2. Test Sites

2.1 Test Facilities

Test Facilities: TÜV Rheinland (Shenzhen) Co., Ltd.

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

2.2 Test Date

Date: 2024-07-02 - 2024-07-11

2.3 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing						
Equip. No.	**Description**	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Cal. until**
G1825795	Signal Analyzer	R&S	FSV 40	101441	26.07.2023	25.07.2024
G1826483	Humid & Temp Programmable Tester	BOST	NTH090-60	19040801	01.03.2024	28.02.2025
Unwanted Emission Testing						
Equip. No.	**Description**	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Cal. until**
G1826021	EMI Test Receiver	R&S	ESR 7	102021	26.07.2023	25.07.2024
G1826023	Signal Analyzer	R&S	FSV 40	101439	26.07.2023	25.07.2024
G1826024	System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
G1826025	Filterbank	R&S	Wlan	100759	26.07.2023	25.07.2024
G1826026	OSP	R&S	OSP 120	102040	N/A	N/A
G1826028	Pre-amplifier	R&S	SCU08F1	08320031	26.07.2023	25.07.2024
G1826029	Amplifier	R&S	SCU-18F	180070	26.07.2023	25.07.2024
G1826030	Amplifier	R&S	SCU40A	100475	26.07.2023	25.07.2024
G1826031	Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	07.08.2022	06.08.2024
G1826034	Active Loop Antenna	Schwarzbeck	FMZB 1513	302	07.08.2022	06.08.2024
G1826036	Test software	R&S	EMC32 (V10.60.10)	N/A	N/A	N/A
G1826037	Control PC	Dell	OptiPlex 7050	36NV9P2	N/A	N/A
G1826433	3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	21.06.2024	21.06.2027

2.4 TRACEABILITY

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.5 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.

2.6 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 (Shenzhen) file for certification follow-up purposes.

2.7 STATUS OF FACILITY USED FOR TESTING

The TÜV Rheinland (Shenzhen) Co., Ltd. facility located at No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, 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 Remote control with 433MHz.

3.2 RATINGS AND SYSTEM DETAILS

Table 2: Technical Characteristics of EUT

General Information of EUT	Description
Kind of Equipment:	Remote control
Type Designation:	E2552
FCC ID:	FHO-E2552
IC:	10912A-E2552
HVIN:	E2552
Operating Voltage:	DC 3V (2xAAA Battery)
Type of Equipment:	Portable device
Operating Frequency Band:	433.05 – 434.79MHz
Operating Frequency:	433.92 MHz
Modulation Type:	FSK
Antenna Type:	Integral Antenna
Antenna Gain:	1 dBi (provided by client)
Operating Temperature Range:	0°C ~ +40°C

3.3 INDEPENDENT OPERATION MODES

The basic operation modes are:

A. Transmitting
    1. 433.92MHz
B. Idle

3.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS

Refer to the Circuit Diagram.

3.5 SUBMITTED DOCUMENTS

☒- Block Diagram
☐- PCB Layout
☒- Rating Label
☒- Photo Documentation
☒- Circuit Diagram
☐- Bill of Material
☒- Instruction 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.

Table 3: Test Environments

Environment Parameter	Selected Values During Tests		
	Temperature	Voltage (Battery)	Relative Humidity
Normal (NTNV)	22°C	3V	Ambient
LTLV	-	-	-
LTHV	-	-	-
HTLV	-	-	-
HTHV	-	-	-

4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT

The EUT was tested together with the following accessories:

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
--	--	--	--

4.4 COUNTERMEASURES TO ACHIEVE ERM 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)

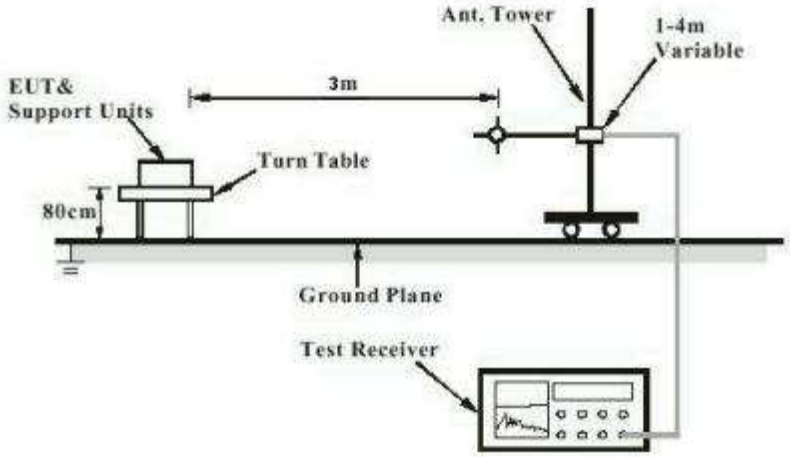


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

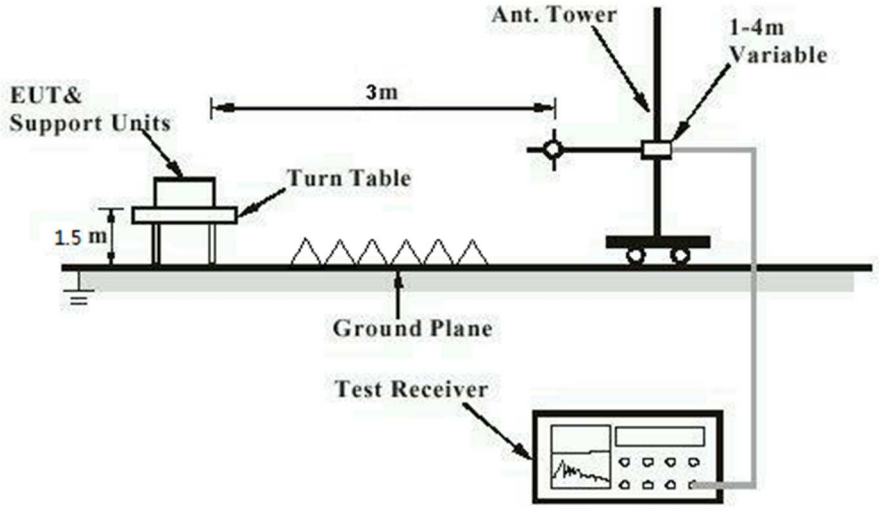
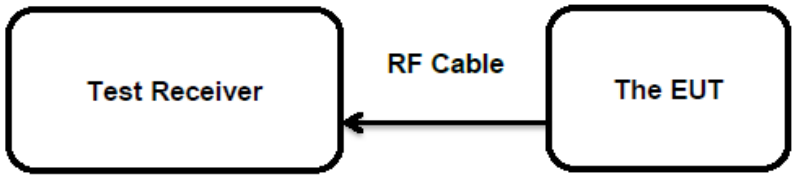


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5. TEST RESULTS

5.1 Essential Requirements of Standard

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 directional gain of antenna is 1.0 dBi, 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 Deactivation of the Transmission

RESULT: **Pass**

Test Specification

Test standard	:	CFR47 FCC Part 15.231 RSS-210 Issue 11 Annex A
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (a)(1) RSS-210 Issue 11 Annex A.1.1 (a)
Limit	:	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
Test suite	:	Shielding Room

Test Setup

Date of testing	:	2024-07-11
Test environment:	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	22°C
Relative humidity	:	53%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

5.1.3 Emission Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	CFR47 FCC Part 15.231 RSS-210 Issue 11 Annex A
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (c) RSS-210 Issue 11 Annex A.1.4
Limit	:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating
Test suite	:	3m Semi Anechoic Room

Test Setup

Date of testing	:	2024-07-11
Test environment:	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	22°C
Relative humidity	:	53%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

5.1.4 Field strength of fundamental and Unwanted Emissions in the Spurious Domain

RESULT: **Pass**

Test Specification

Test standard	:	CFR47 FCC Part 15.231 CFR47 FCC Part 15.205 CFR47 FCC Part 15.209 RSS-210 Issue 11 Annex A
Basic standard	:	ANSI C 63.10:2013
Test requirement	:	CFR47 FCC Part 15.231 (b)(1)(2)(3) RSS-210 Issue 11 Annex A.1.3
Limit	:	CFR47 FCC Part 15.231 (b) RSS-210 Issue 11 Annex A.1.3
Test suite	:	3m Semi Anechoic Room

Test Setup

Date of testing	:	2024-07-02 - 2024-07-11
Test environment:	:	Normal test conditions
Operation mode	:	A
Ambient temperature	:	22°C
Relative humidity	:	53%
Atmospheric pressure	:	101kPa

Conclusion:

Refer to attached Appendix A for details of test results.

6. System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Table 5: System Measurement Uncertainty

Items		Extended Uncertainty
RE	Radiated emission 9 kHz - 30 MHz	±3.97 dB
	Radiated emission 30 MHz - 1 GHz	±4.30 dB
Remark: 95% Confidence Levels, K=2.		

7. LIST OF TABLES

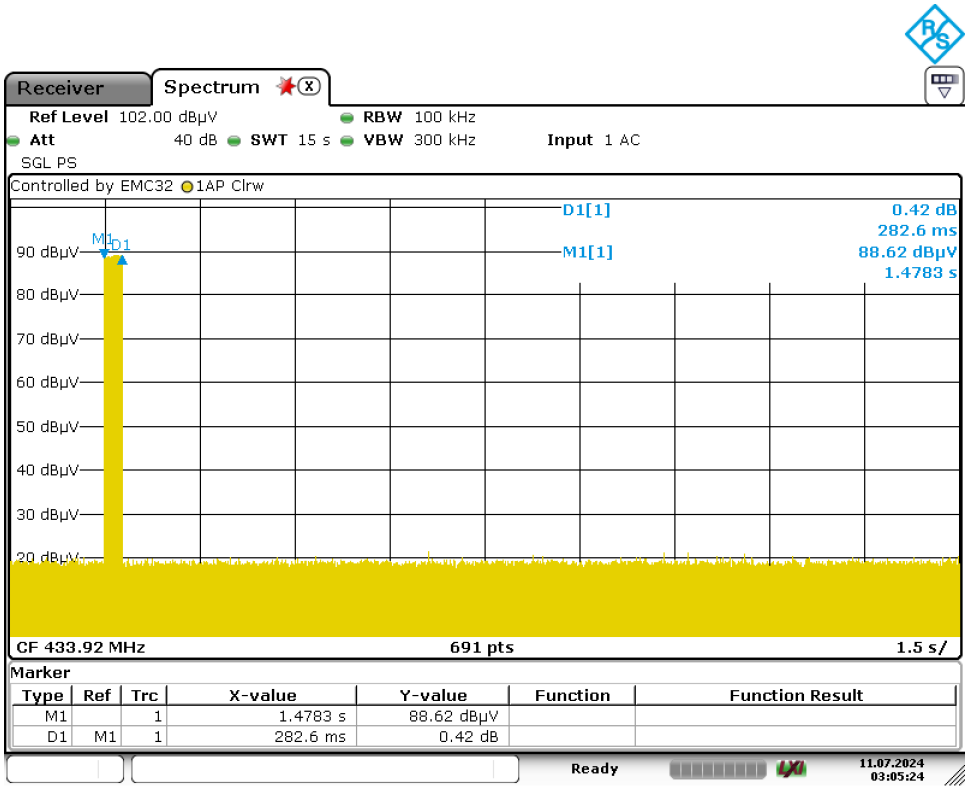
Appendix A

Test Results

APPENDIX A.1: TEST RESULTS OF DEACTIVATION OF THE TRANSMISSION

Test Results

Operation Mode	Duration Time (S)	Limit (S)	Result
A	0.283	5	Pass



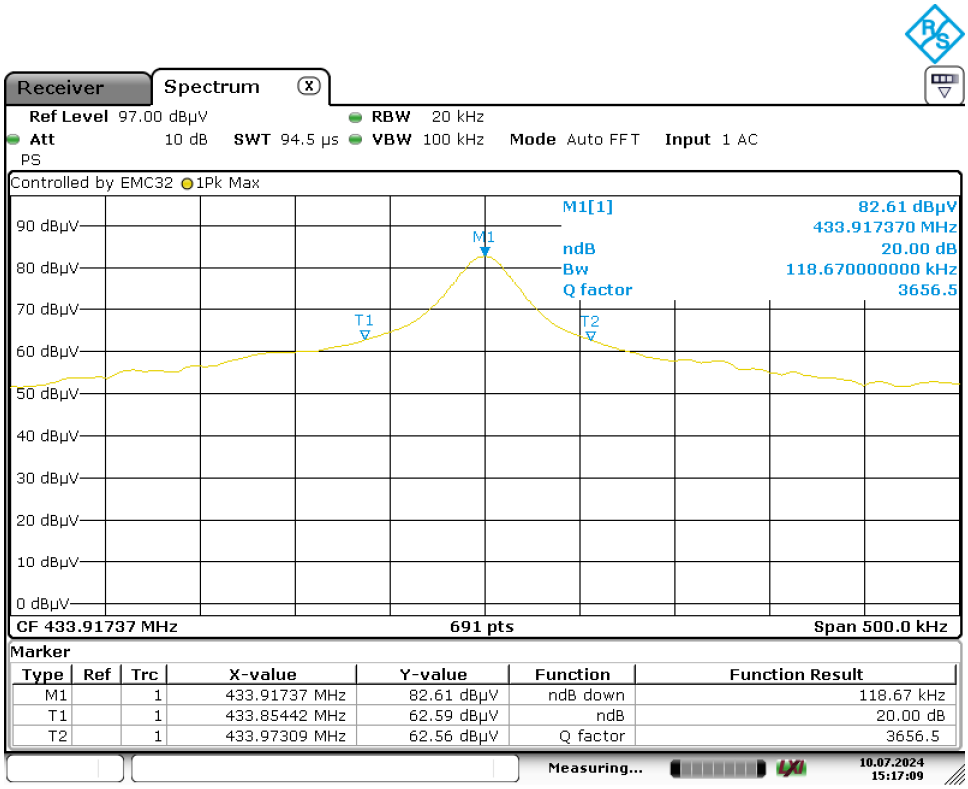
Date: 11.JUL.2024 03:05:21

APPENDIX A.2: TEST RESULTS OF EMISSION BANDWIDTH

Test Results

Operation Freqnency (MHz)	20dB Emission Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.119	1.057	Pass

Operation Freqnency (MHz)	99% Emission Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.408	1.057	Pass



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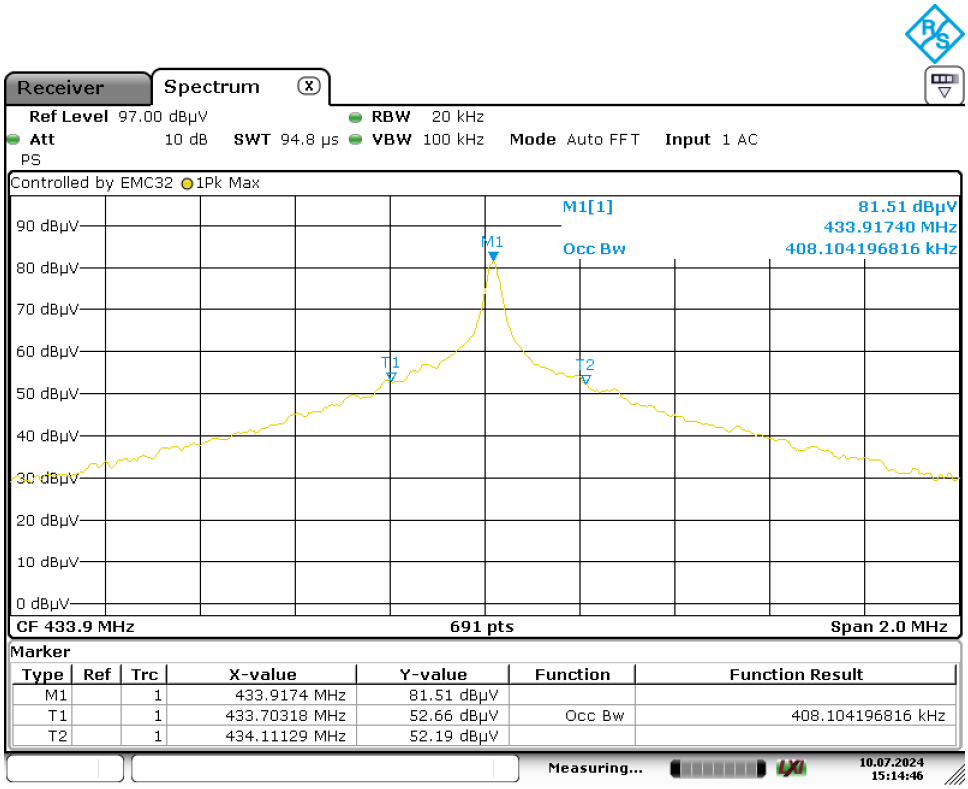
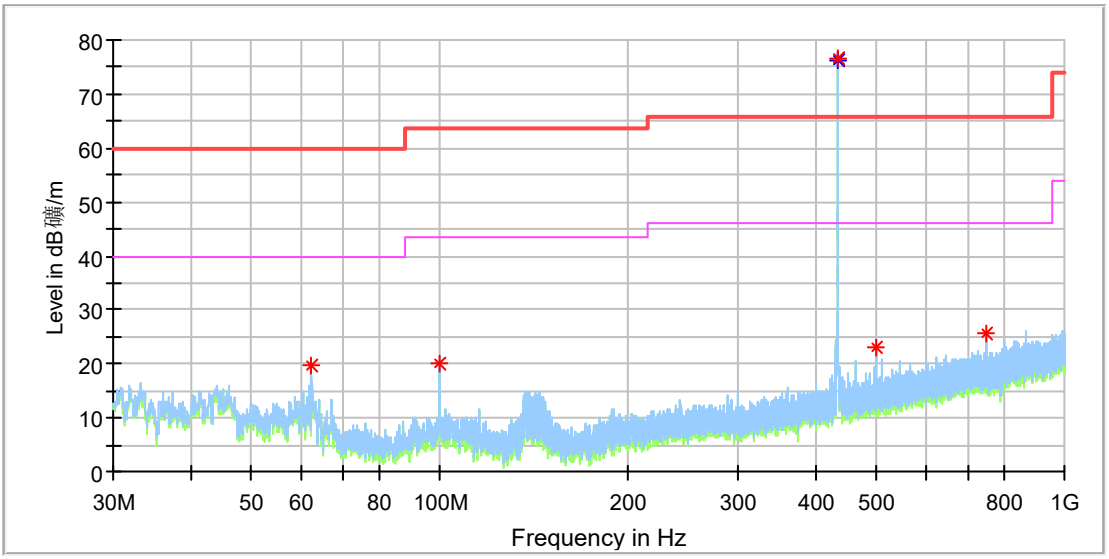


Date: 10.JUL.2024 15:14:45

APPENDIX A.3: TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL AND UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

EUT Information

EUT Name:	Remote control
Model:	E2552
Test Mode:	433.92MHz
Order No/Sample No:	168492134/A003759604-001
Test Voltage::	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC Part 15C
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

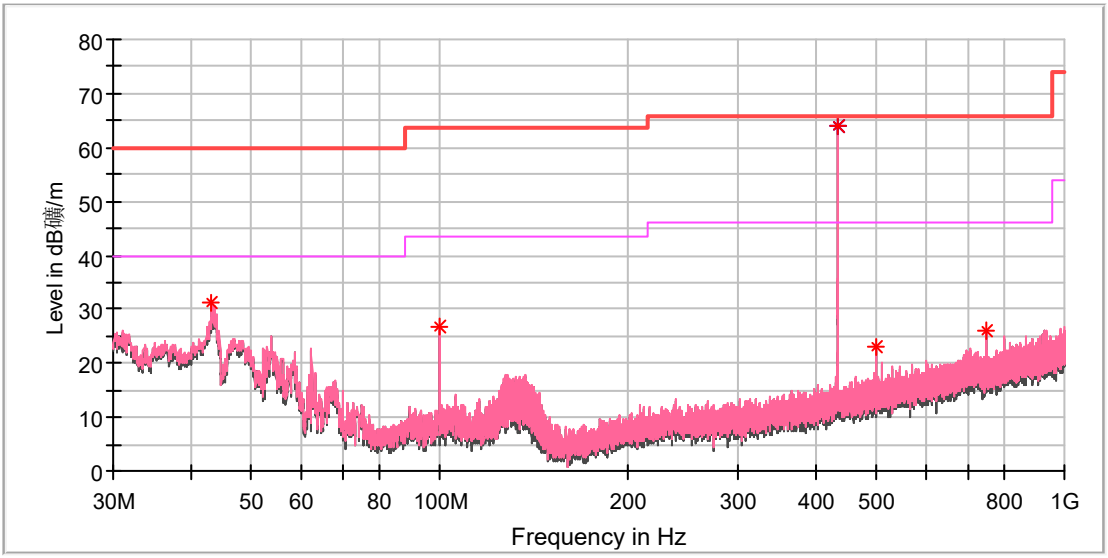
Frequency (MHz)	MaxPeak	Average (dBµV/m	Limit (dBµV/m	Margin	Height	Pol	Azimuth	Corr. (dB/
62.495000	19.63	---	40.00	20.37	100.0	H	209.0	-19.9
99.989231	20.03	---	43.50	23.47	100.0	H	161.0	-19.3
433.930385	---	76.30	80.82	4.52	100.0	H	69.0	-13.5
433.930385	76.57	---	100.82	24.25	100.0	H	69.0	-13.5
500.002308	22.97	---	46.00	23.03	100.0	H	102.0	-12.2
750.038462	25.83	---	46.00	20.17	100.0	H	124.0	-7.6

Final_Result

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

EUT Information

EUT Name:	Remote control
Model:	E2552
Test Mode:	433.92MHz
Order No/Sample No:	168492134/A003759604-001
Test Voltage::	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC Part 15C
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

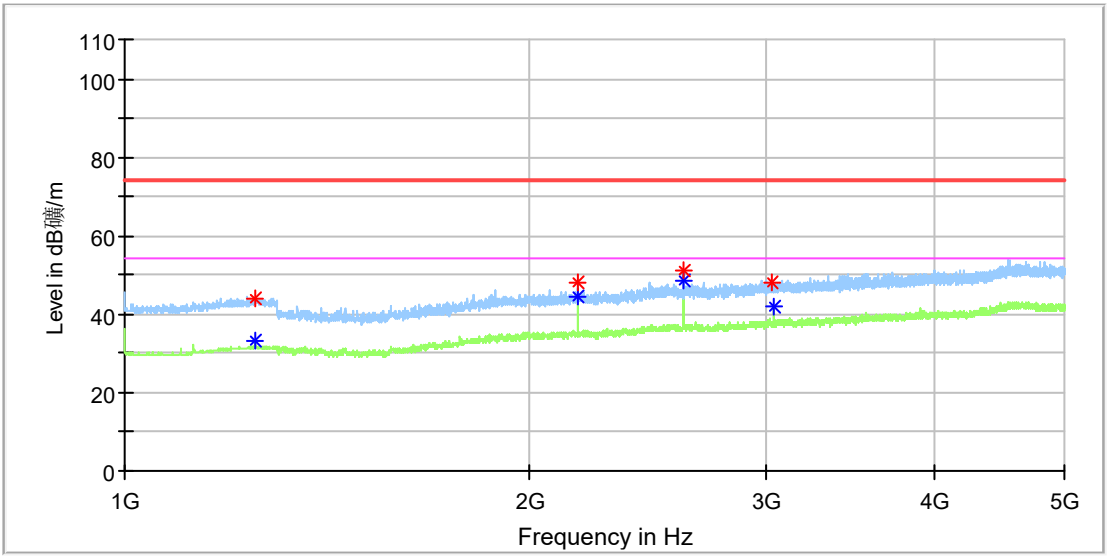
Frequency (MHz)	MaxPeak	Average (dBµV/m	Limit (dBµV/m	Margin	Height	Pol	Azimuth	Corr. (dB/
43.206923	31.19	---	40.00	8.81	100.0	V	23.0	-19.6
99.989231	26.88	---	43.50	16.62	100.0	V	318.0	-19.3
433.930385	---	63.93	80.82	16.89	100.0	V	113.0	-13.5
433.930385	64.17	---	100.82	36.65	100.0	V	113.0	-13.5
500.002308	23.00	---	46.00	23.00	100.0	V	238.0	-12.2
750.038462	26.02	---	46.00	19.98	100.0	V	0.0	-7.6

Final_Result

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

EUT Information

EUT Name:	Remote control
Model:	E2552
Test Mode:	433.92MHz
Order No/Sample No:	168492134/A003759604-001
Test Voltage::	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC Part 15C
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

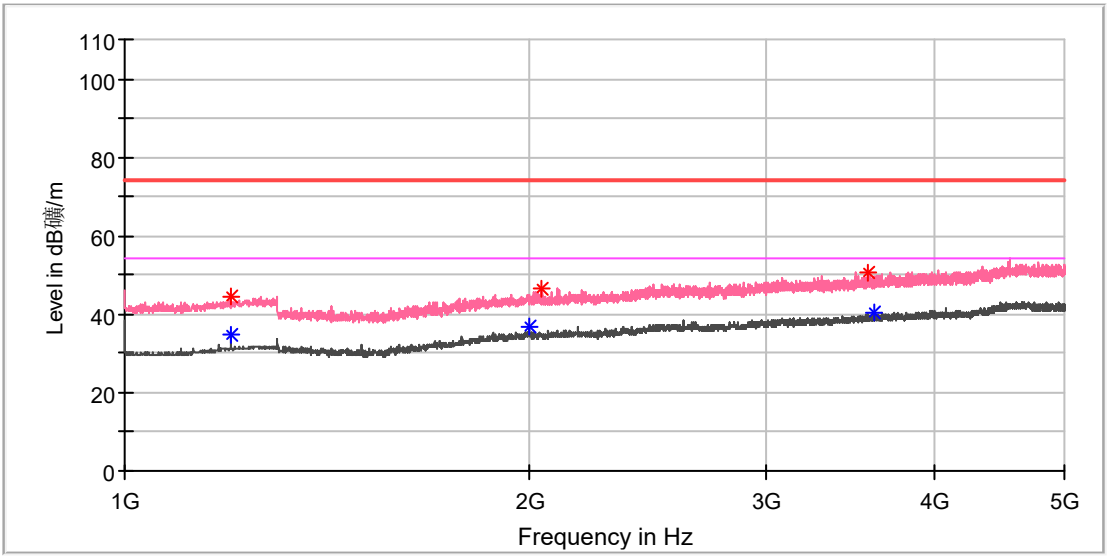
Frequency (MHz)	MaxPeak	Average (dBµV/m	Limit (dBµV/m	Margin	Height	Pol	Azimuth	Corr. (dB/m
1250.000000	---	33.07	54.00	20.93	150.0	H	340.0	1.9
1250.500000	44.20	---	74.00	29.80	150.0	H	27.0	1.9
2169.325000	---	44.56	54.00	9.44	150.0	H	358.0	6.2
2169.325000	48.27	---	74.00	25.73	150.0	H	358.0	6.2
2603.150000	51.18	---	74.00	22.82	150.0	H	358.0	7.4
2603.150000	---	48.40	54.00	5.60	150.0	H	358.0	7.4
3026.366667	47.93	---	74.00	26.07	150.0	H	311.0	8.5
3037.533333	---	41.95	54.00	12.05	150.0	H	120.0	8.6

Final_Result

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

EUT Information

EUT Name:	Remote control
Model:	E2552
Test Mode:	433.92MHz
Order No/Sample No:	168492134/A003759604-001
Test Voltage::	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC Part 15C
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak	Average (dBµV/m	Limit (dBµV/m	Margin	Height	Pol	Azimuth	Corr. (dB/m
1200.000000	44.67	---	74.00	29.33	150.0	V	149.0	1.1
1200.000000	---	34.67	54.00	19.33	150.0	V	149.0	1.1
1999.591667	---	36.71	54.00	17.29	150.0	V	350.0	6.0
2044.816667	46.43	---	74.00	27.57	150.0	V	321.0	5.9
3571.300000	50.84	---	74.00	23.16	150.0	V	220.0	9.2
3610.941667	---	40.32	54.00	13.68	150.0	V	193.0	9.4

Final_Result

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