

EMC TEST REPORT FCC CFR Title 47 / Chapter I / Subchapter A / Part 15 / Subpart B ISED ICES-003 Issue 7	
Report Reference No	G0M-2603-3598-EF0115B-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	  Deutsche Akkreditierungsstelle D-PL-12092-01-00 ISED testing laboratory: CN 3470A FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	TQ-Systems GmbH
Address	Gut Delling, Muehlstrasse 2 82229 Seefeld Germany
Test Specification Standard(s)	FCC CFR Title 47 / Chapter I / Subchapter A / Part 15 / Subpart B ISED ICES-Gen Issue 2 ISED ICES-003 Issue 7 ANSI C63.4:2014+A1:2017
Equipment under Test (EUT):	
Product Description	Wireless Remote
Model(s)	HPR-REM06
Brand Name(s)	TQ
Hardware Version(s)	378641.01xx
Software Version(s)	389610.0300
FCC ID	2ANFF-Q106
IC	23072-Q106
Test Result	PASSED

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
required by standard but not appl. to test object	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Date of receipt of test item	2026-08-13	
Report:		
Compiled by	Matthias Handrik	
Tested by (+ signature) (Responsible for Test)	Matthias Handrik	
Approved by (+ signature) (Head of Lab)	Stephan Liebich	
Date of Issue	2026-09-09	
Total number of pages	28	
General Remarks:		
<ol style="list-style-type: none"> The above equipment has been tested by Eurofins Product Service GmbH, and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. The test results are valid only for samples provided by customers and under the test conditions described in this report. This report shall not be reproduced except in full, without the written approval of Eurofins Product Service GmbH. The relevant information is provided by customer in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility. 		
Statement concerning the uncertainty of the measurement systems used for decisions on conformity (decision rule): The Decision Rule is applied on the basis of CISPR 16-4-2 and/or IEC 61000-4-x (TR 61000-1-6) and their national publications. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Compliance or non-compliance with a disturbance limit is determined in the following manner. <ul style="list-style-type: none"> If U_{lab} is less than or equal to U_{cisp}, then: compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit. If U_{lab} is greater than U_{cisp}, then: compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit; non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit. Where appropriate for the test, for example for EMC pulsed immunity tests, the laboratory has demonstrated, by calibrating its equipment and facilities, that it complies with the above requirements and therefore no allowance of uncertainties has been given to the tolerances.		
Additional Comments:		
None		

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
5G	5 th Generation
AE	Auxiliary equipment
AM	Amplitude modulation
AMN	Artificial Mains Network
CDN	Coupling/decoupling network
CR	Continuous phenomena applied to receiver
CT	Continuous phenomena applied to transmitter
EPS	External power supply
EUT	Equipment Under Test
E-UTRA	Evolved Universal Terrestrial Radio Access
FCC	Federal Communications Commission
GSM	Global System for Mobile communication
LTE	Long Term Evolution
NR	New Radio
RGP	Reference ground plane
IPT	Inductive power transfer
ISED	Innovation, Science and Economic Development Canada
NSA	Normalized site attenuation
RF	Radio frequency
SVSWR	Site voltage standing wave ratio
T _{NOM}	Nominal operating temperature
TR	Transient phenomena applied to receiver
TT	Transient phenomena applied to transmitter
UTRA	Universal Terrestrial Radio Access
UMTS	Universal Mobile Telecommunications System
V _{NOM}	Nominal supply voltage
WNP	Wired network port

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2026-09-09	Initial Release	-

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1 Equipment (Test Item) Under Test

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

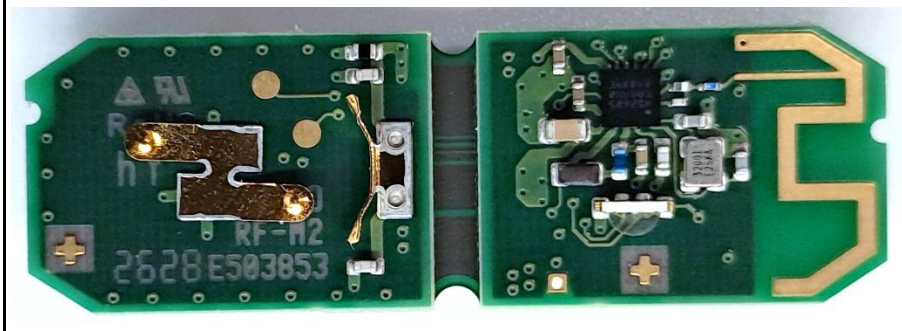
Description	Wireless Remote			
Intended Use	EUT is a shift lever on the handlebar used to control motor assistance (up- and downshifting) of e-bikes			
Model	HPR-REM06			
Brand Name(s)	TQ			
Hardware Version(s)	378641.01xx			
Software Version(s)	389610.0300			
Number of tested samples	1			
Sample Identification	EUT #	Sample-ID	Serial Number	Date of receipt
	EUT 1	54142	710006054	2026-08-13
EUT Dimensions [cm]	4.0 x 3.5 x 1.7			
FCC ID	2ANFF-Q106			
IC	23072-Q106			
Equipment Class	B			
Equipment Type	Table top			
Highest Operating Frequency [MHz]	2480 RF frequency			
Protective Earth	No			
Functional Earth	No			
EUT Power Rating	V _{NOM}	3 V DC via CR1220 Lithium manganese dioxide (Li-MnO ₂)		
Manufacturer	TQ-Systems GmbH Gut Delling, Muehlstrasse 2 82229 Seefeld Germany			
Dedicated Component(s)				
Radio Module / System on chip	Type	Bluetooth Low Energy (BLE)		
	Model	NRF52805-CAAA		
	Manufacturer	Nordi Semiconductors		
	FCC-ID	N/A		
	IC	N/A		

1.1 Equipment Ports

Name	Type	Attributes	Comment
N/A			
Description:			
AC	AC mains power input/output port		
DC	DC power input/output port		
BAT	DC power input port connected to external battery		
IO	Input/Output port		
TP	Telecommunication port		
ANT	Antenna/RF port		
NE	Non-electrical port		
GND	Ground		

1.2 Equipment Photos - Internal

INTERNAL EUT PICTURE #1



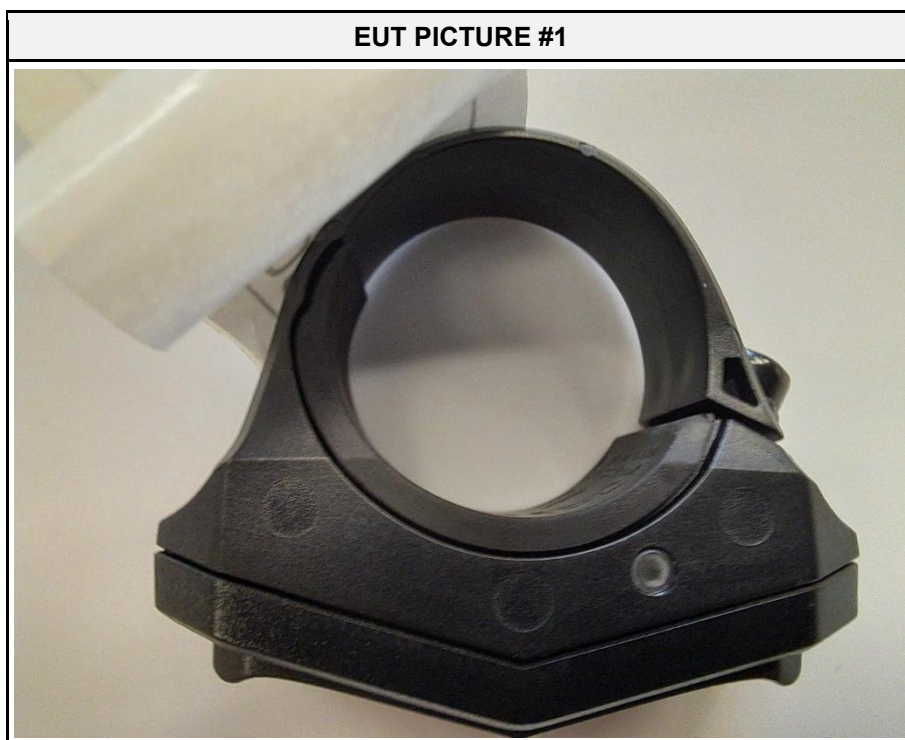
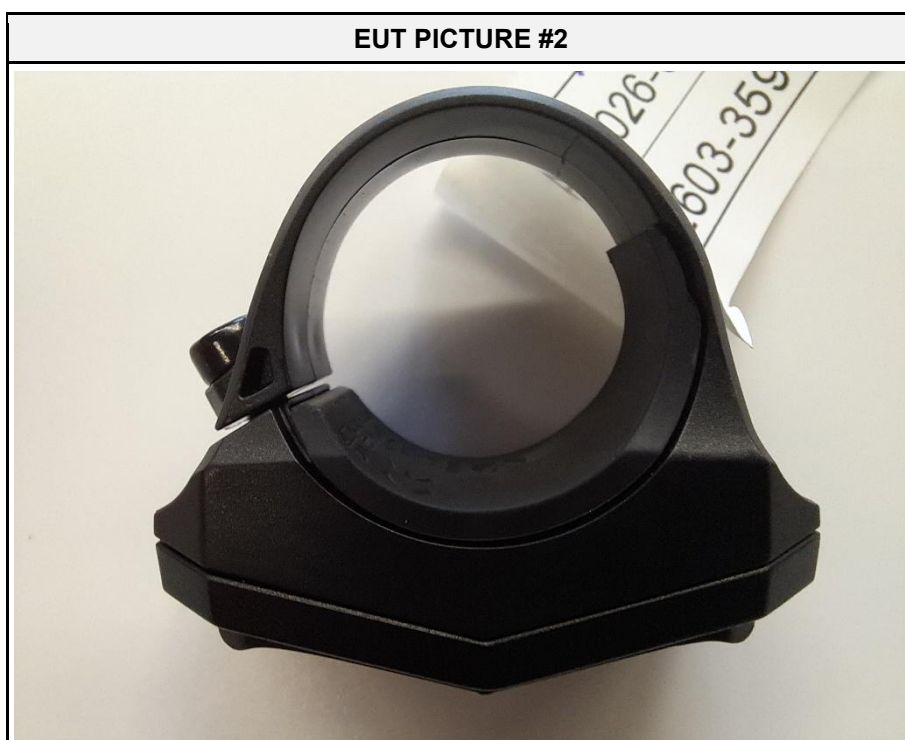
INTERNAL EUT PICTURE #2



INTERNAL BATTERY



1.3 Equipment Photos - External



EUT PICTURE #3



EUT PICTURE #4



EUT PICTURE #5



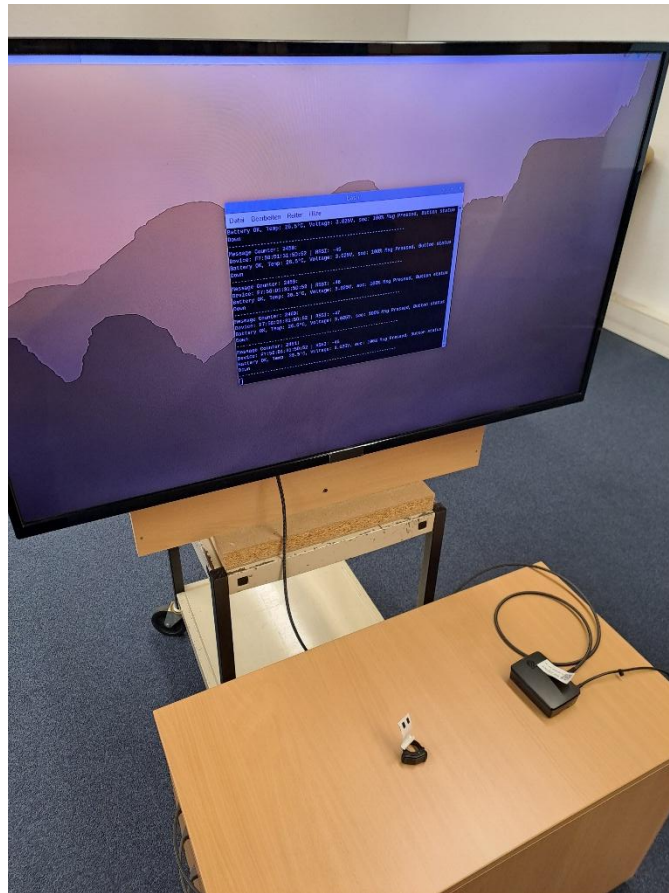
EUT PICTURE #6



EUT LABEL



EUT WITH SUPPORT EQUIPMENT

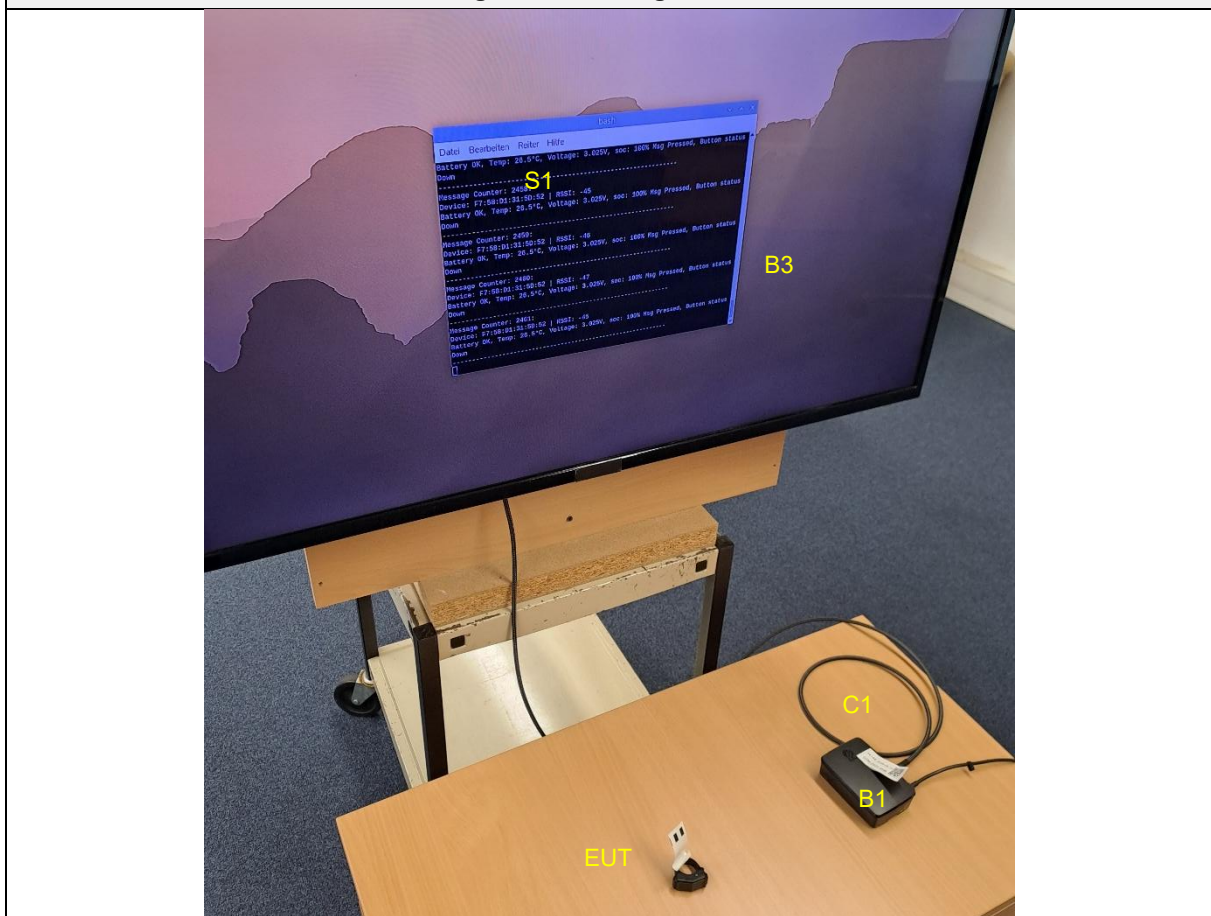


1.4 Operational Modes

Test Mode #	Description
1	Active BLE transmission mode. Every second the EUT transmits a BLE packet using dedicated test firmware.
Comment: -	

1.5 EUT Configuration and Support Equipment

EUT connection diagram for configuration 1 and Test Mode 1



Before the test

BLE packet transmission and reception the Raspberry Pi shall be positioned within 1 m of the EUT. It shall receive and display one valid BLE data packet per second.

Designator	Type	Device	Manufacturer	Model	Serial Number	Connection Type
B1	MON	Raspberry Pi	Raspberry Pi	Raspberry Pi 5	-	HDMI connection to Monitor
B2	AE	AC/DC adaptor	DELL	LA100PM20 20	-	Power supply for Raspberry
B3	MON	Monitor	DYON	-	-	HDMI connection to Raspberry Pi
C1	AE	HDMI cable	-	2 m	-	Connected Monitor with Raspberry Pi
S1	MON	Software	TQ-Systems GmbH	Python script	-	Shows the BLE message from EUT
Description:						
AE		Auxiliary Equipment				
SIM		Simulator				
MON		Monitoring Equipment				
Comment: -						

1.6 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyser in dBµV. Any external preamplifiers used are taken into account through internal analyser settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyser. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyser (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

$$\text{Limit (dB}\mu\text{V/m)} = 20 \cdot \log(\mu\text{V/m})$$

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading + AF	=	Net Reading	:	Net reading - FCC limit	=	Margin
+21.5 dBµV + 26 dB/m	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m	=	-9.5 dB

2 Result Summary

Title 47 CFR Part 15B, ISED ICES-003 Issue 7				
Reference	Requirement	Reference Method	Result	Remarks
Emission				
FCC 15.109 ICES-003, 3.2.2	Radiated emissions	ANSI C63.4:2014 +A1:2017	Verdict	-
FCC 15.107 ICES-003, 3.2.1	AC power line conducted emissions	ANSI C63.4:2014 +A1:2017	N/R	1
Comment: 1 EUT cannot be direct or indirectly connected to a public utility (AC) power line.				

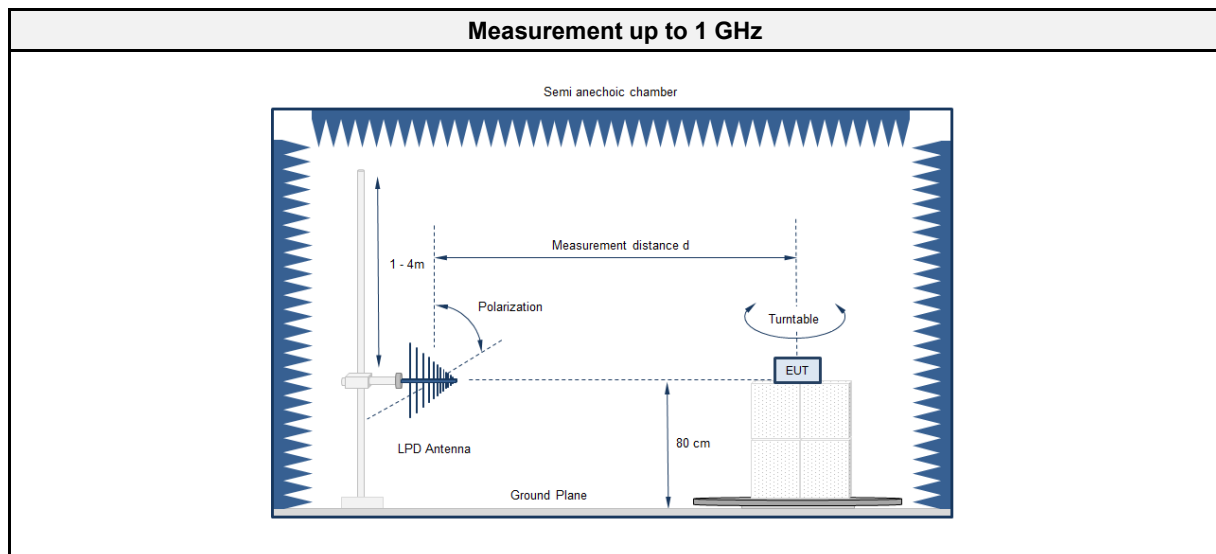
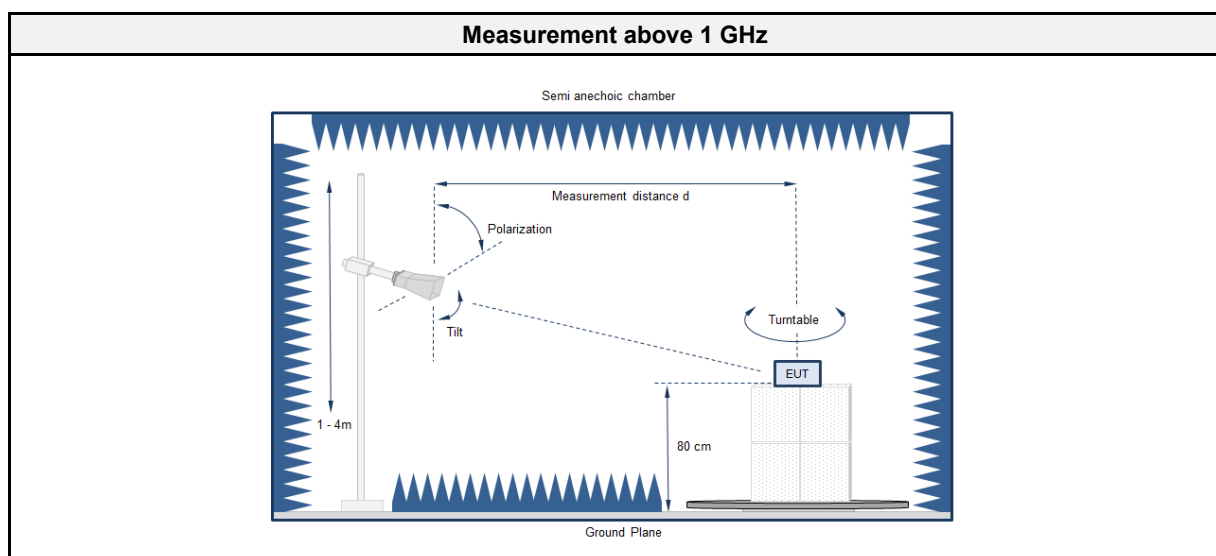
Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

2.1 Test Conditions and Results - Radiated emissions acc. to ANSI C63.4

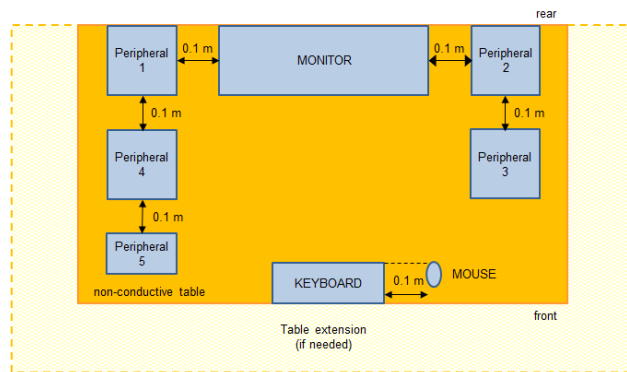
2.1.1 Information

Test Information	
Reference	FCC 15.109, ICES-003, 3.2.2
Reference method	ANSI C63.4:2014+A1:2017 Section 8
Equipment class	B
Equipment type	Table top
Highest Operating Frequency [MHz]	2470
Measurement range	30 MHz to 13000 MHz
Temperature [°C]	25 ±3
Humidity [%]	49 ±3
Operator	Matthias Handrik
Date	2026-08-17
EUT #	EUT 1

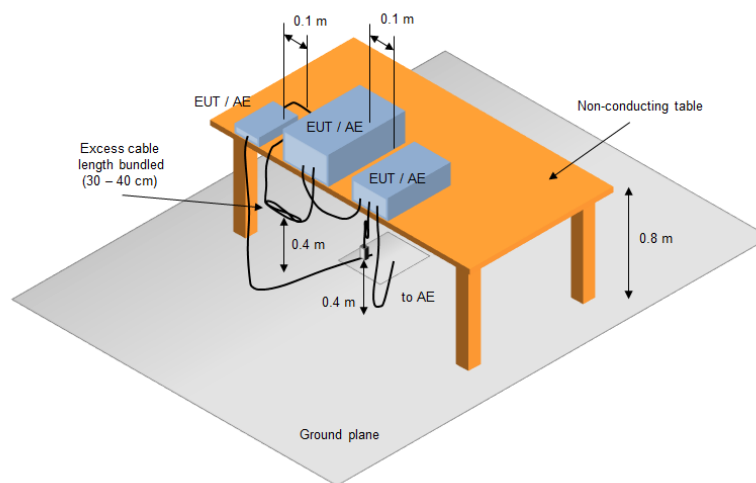
2.1.2 Setup Table top:



Equipment placement - Table top



Test Setup



2.1.3 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	Raditeq	RadiMation Pro	2024.2.5

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber (NSA)	Frankonia	AC1	EF00062	2026-06	2029-06
Anechoic chamber (SVSWR)	Frankonia	AC 1	EF01011	2024-07	2027-07
Programmable AC Source	Chroma ATE Inc.	61604	EF01068	2025-08	2027-08
Horn antenna	Schwarzbeck	BBHA 9120D	EF01561	2024-11	2027-11
Test Receiver	R&S	ESW44	EF01856	2025-10	2026-10
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	EF01824	2025-10	2028-10
Temperature/Humidity Sensor	V-IUS Solutions GmbH	NANO SPY TH	EF01911	2026-01	2027-01

2.1.4 Procedure

Exploratory measurement Table top
<ol style="list-style-type: none"> 1. The EUT was placed on a non-conductive table at a height of 0.8 m. 2. The EUT and support equipment, if needed, were set up to simulate typical usage. 3. Cables, of type and length specified by the manufacturer, were connected to at least one port of each type and were terminated by a device or simulating load of actual usage. 4. The antenna was placed at a distance of 3 or 10 m. 5. The received signal was monitored at the measurement receiver. 6. This procedure has to be performed in both antenna polarizations, horizontal and vertical. 7. The arrangement of the equipment with the maximum emission level is shown on the setup picture at item 2.1.2

Final measurement 3 m Table top
<ol style="list-style-type: none"> 1. The EUT was placed on a 0.8 m non-conductive table at a 3 or 10 m distance from the receive antenna. The antenna output was connected to the measurement receiver. 2. A broadband hybrid antenna was used for the frequency range 30 – 1000 MHz. Above one 1 GHz a Double Ridged Broadband Horn antenna was used. The antenna was placed on an adjustable height antenna mast. If required, in the range 1- 18 GHz a Double Ridged Broadband Horn antenna, in the range 18 – 40 GHz a High Gain / Standard Gain Horn was used. The antenna was placed on an adjustable height antenna mast. 3. The EUT and cable arrangement were based on the exploratory measurement results. 4. Emissions were maximized at each frequency by rotating the EUT and adjusting the receive antenna height and polarization. The maximum values were recorded. 5. The test data of the worst-case conditions were recorded and shown on the next pages.

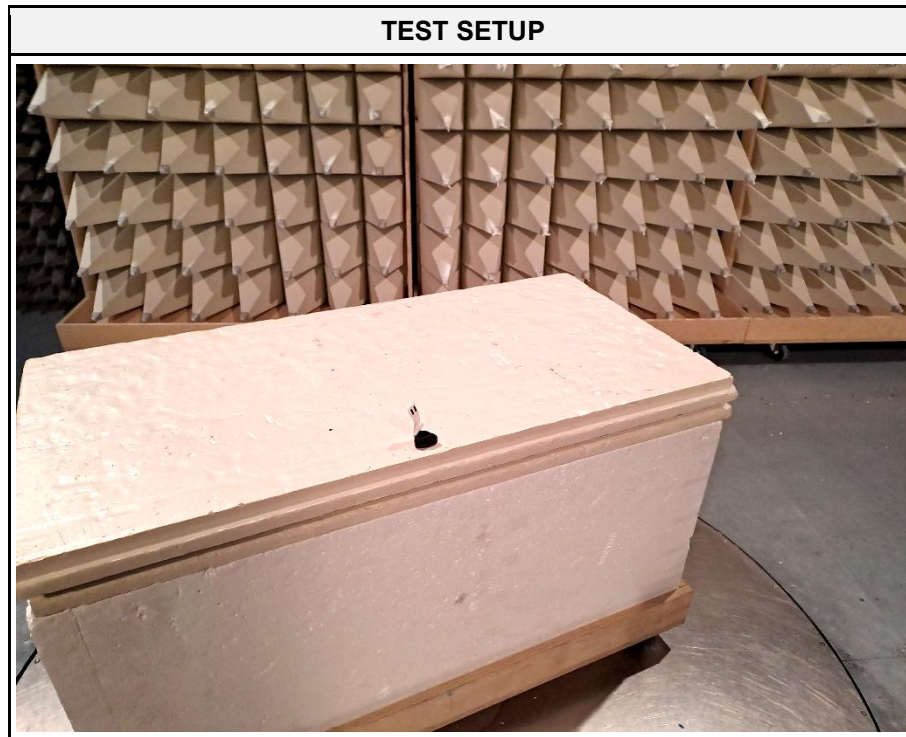
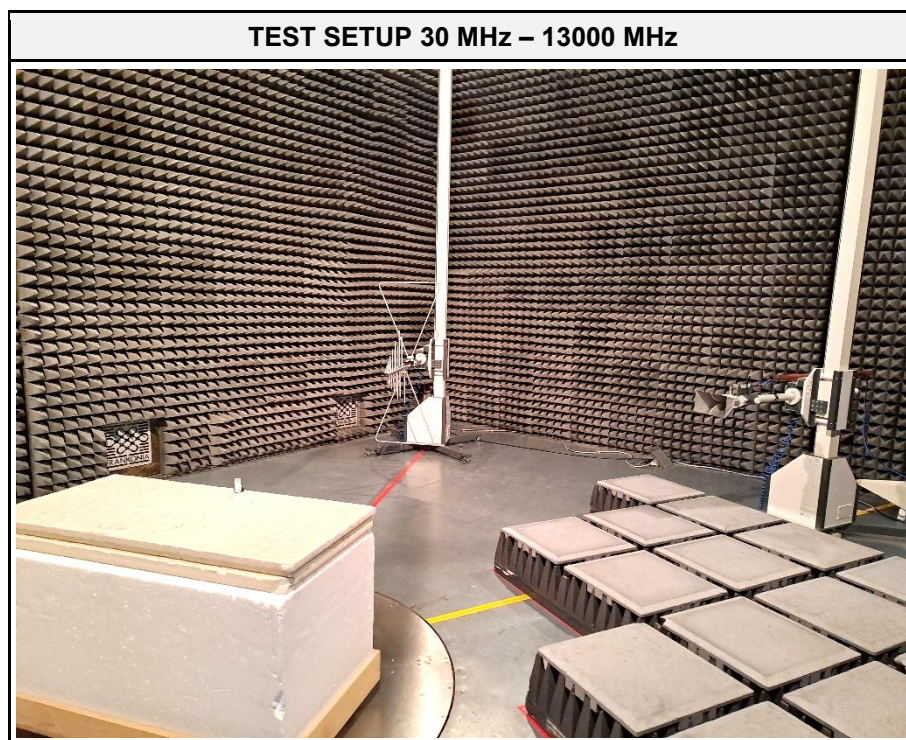
2.1.5 Limits

Class B @ 3 m		
Frequency [MHz]	Detector	Limit [dB μ V/m]
30 - 88	Quasi-peak	40
88 - 216	Quasi-peak	43.5
216 - 960	Quasi-peak	46
960 - 1000	Quasi-peak	54
> 1000	Peak	74
	Average	54

2.1.6 Results

Test Results			
Operational mode	EUT Configuration	Verdict	Remark
1	1	PASS	-
Comments: -			

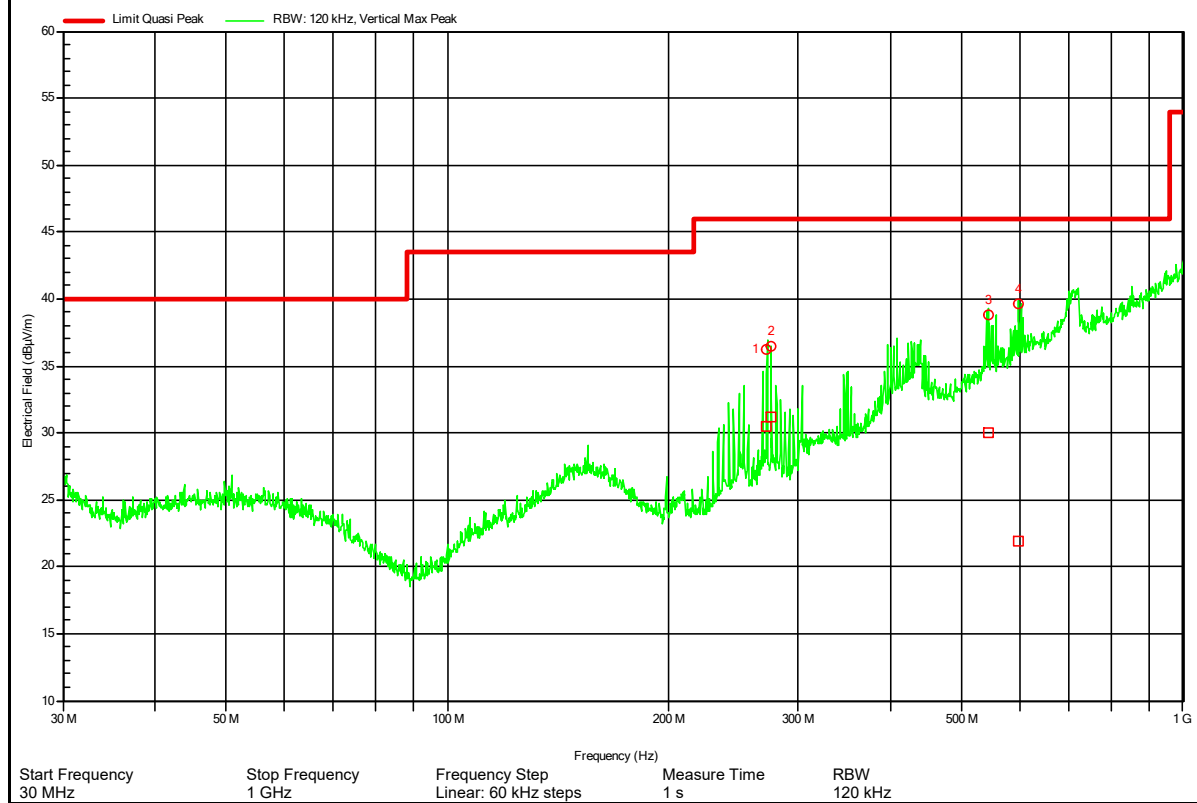
2.1.7 Setup Photos



2.1.8 Records

Radiated emissions according to FCC Part 15 Subpart B	
Project Number:	G0M-2603-3598
Applicant:	TQ-Systems GmbH
Model Description:	Wireless Remote
Model:	HPR-REM06
Test Sample ID:	54142
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Date & Time:	2026-08-17
Operating Conditions:	ambient temperature: 25 °Celsius power input: Battery
Antenna:	Schwarzbeck VULB 9168, Vertical
Measurement Distance:	3 m
Operational Mode:	1
DUT Configuration:	1
Note 1:	-

Index 1

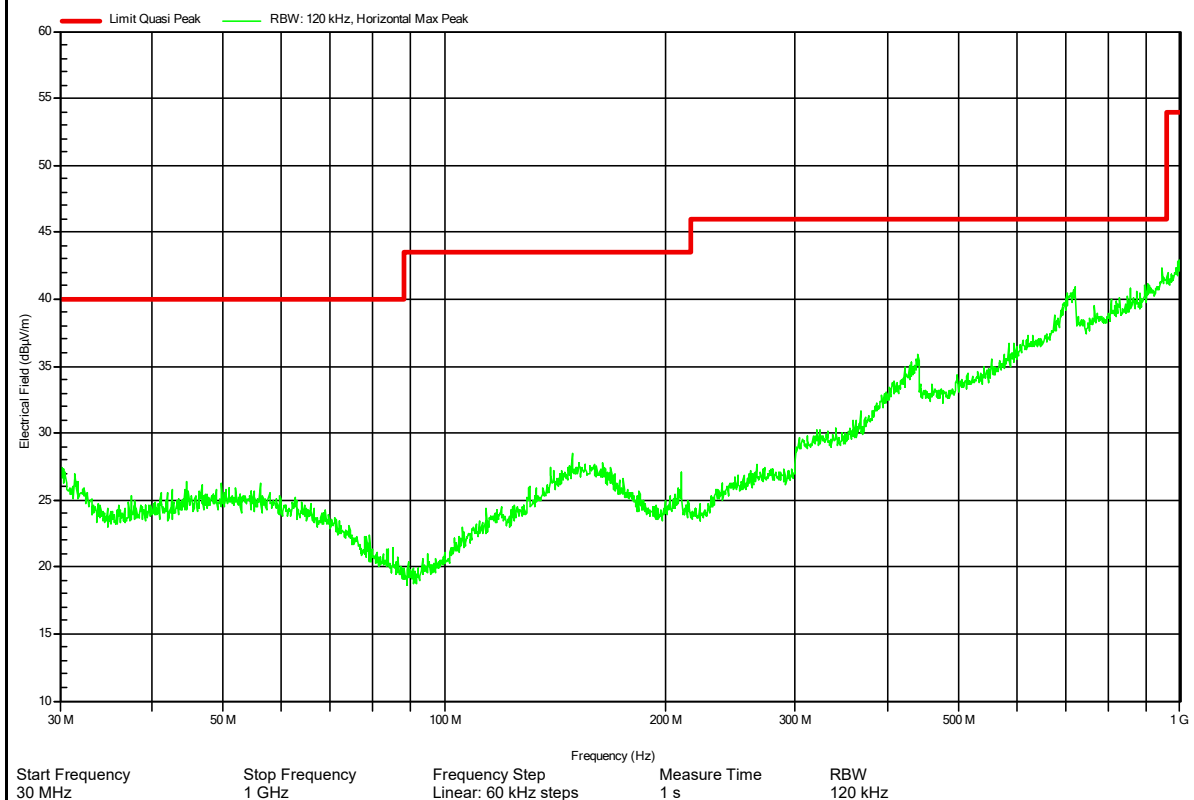


Peak Number	Frequency (MHz)	Quasi-Peak (dBV/m)	Quasi-Peak Limit (dBV/m)	Quasi-Peak Difference (dB)	Quasi-Peak Status	Angle (degrees)	Height (m)
1	271.98	30.43	46.02	-15.59	Pass	0	1
2	275.94	31.16	46.02	-14.86	Pass	0	1
3	543.9	30.01	46.02	-16.01	Pass	0	1
4	598.26	21.92	46.02	-24.1	Pass	0	1

Radiated emissions according to FCC Part 15 Subpart B

Project Number:	G0M-2603-3598
Applicant:	TQ-Systems GmbH
Model Description:	Wireless Remote
Model:	HPR-REM06
Test Sample ID:	54142
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Date & Time:	2026-08-17
Operating Conditions:	ambient temperature: 25 °Celsius power input: Battery
Antenna:	Schwarzbeck VULB 9168, Horizontal
Measurement Distance:	3 m
Operational Mode:	1
DUT Configuration:	1
Note 1:	-

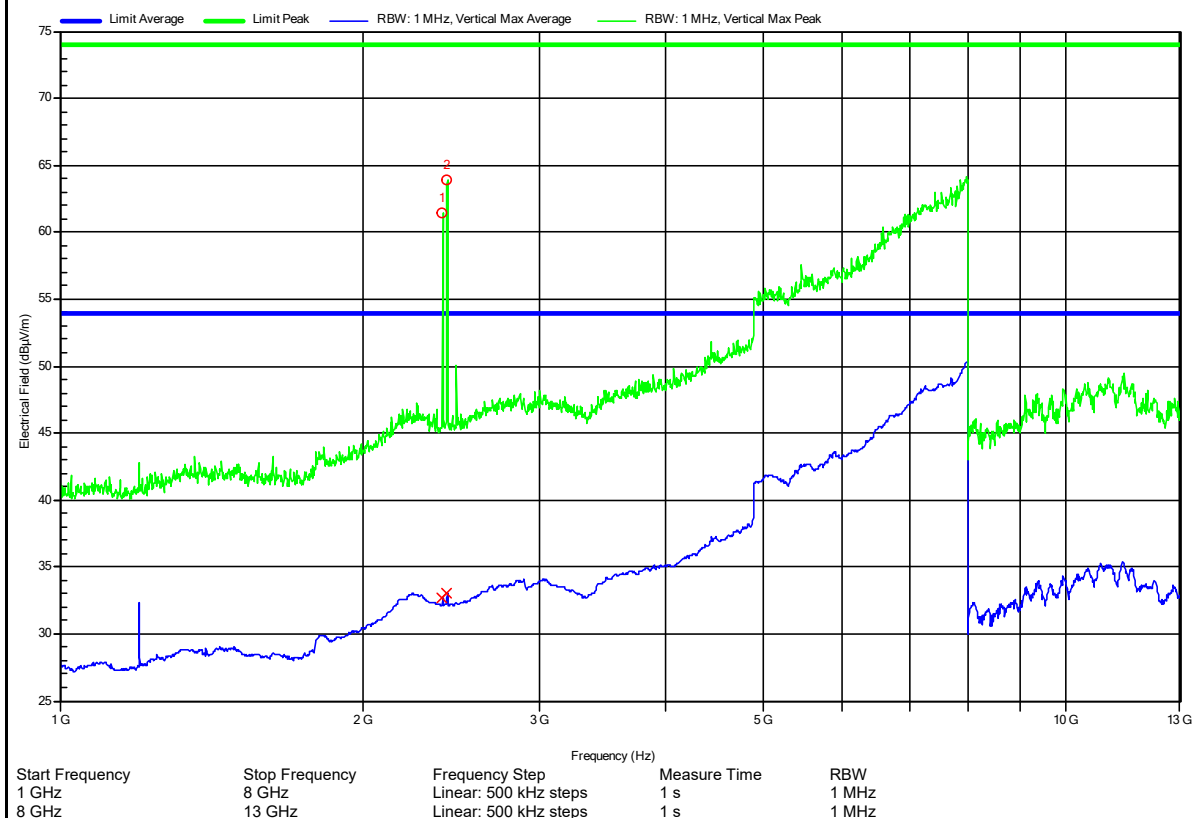
Index 2



Radiated emissions according to FCC Part 15 Subpart B

Project Number:	G0M-2603-3598
Applicant:	TQ-Systems GmbH
Model Description:	Wireless Remote
Model:	HPR-REM06
Test Sample ID:	54142
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Date & Time:	2026-08-17
Operating Conditions:	ambient temperature: 25 °Celsius power input: Battery
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement Distance:	3 m
Operational Mode:	1
DUT Configuration:	1
Note 1:	-

Index 3



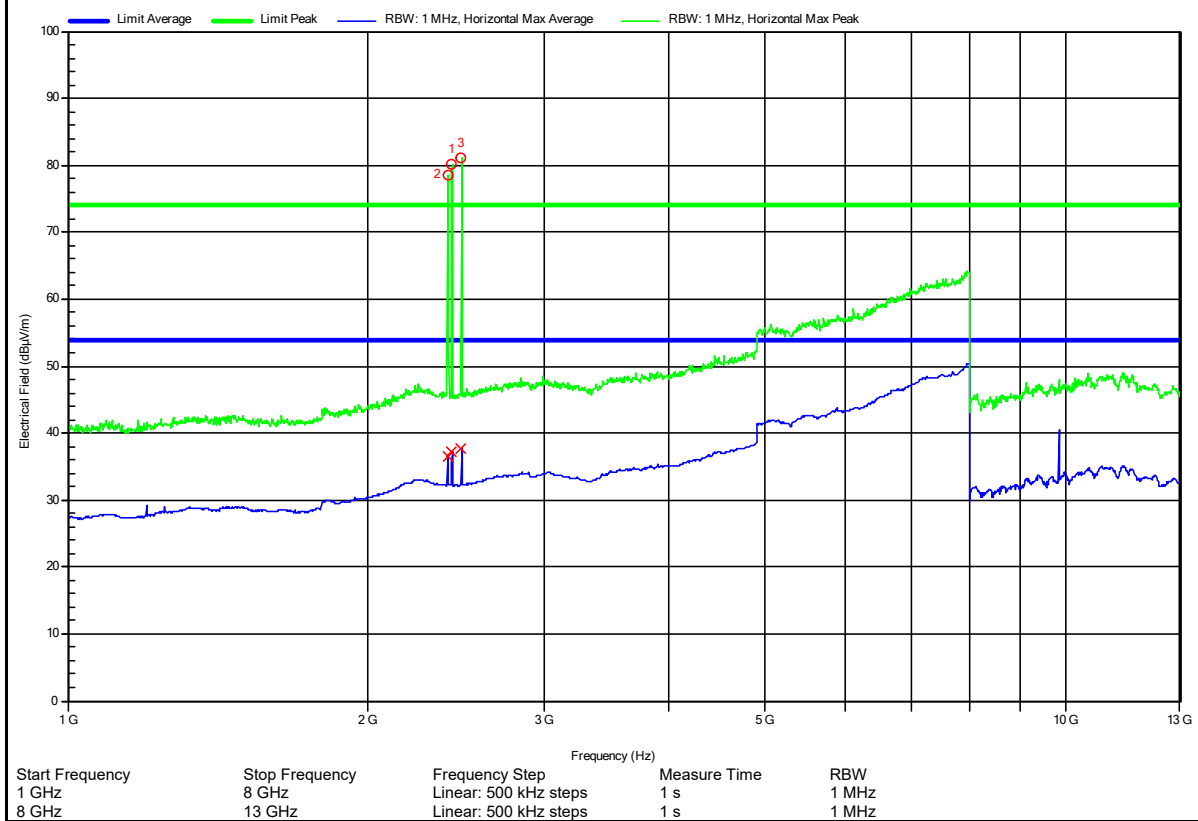
Peak Number	Frequency (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Peak Difference (dB)	Peak Status	Angle (degrees)	Height (m)
1	2402	61.49					
2	2426	63.93					

Bluetooth Low Energy carrier

Radiated emissions according to FCC Part 15 Subpart B

Project Number:	G0M-2603-3598
Applicant:	TQ-Systems GmbH
Model Description:	Wireless Remote
Model:	HPR-REM06
Test Sample ID:	54141
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Date & Time:	2026-08-17
Operating Conditions:	ambient temperature: 25 °Celsius power input: Battery
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement Distance:	3 m
Operational Mode:	1
DUT Configuration:	1
Note 1:	-

Index 4



Peak Number	Frequency (MHz)	Peak (dBµV/m)	Peak Limit (dBµV/m)	Peak Difference (dB)	Peak Status	Angle (degrees)	Height (m)
1	2426	80.06	Bluetooth Low Energy carrier				
2	2402	78.63					
3	2480	81.05					

3 Measurement Uncertainty

All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95%, with a coverage factor of 2.

Test Name	Measurement Uncertainty U_{LAB}	U_{CISPR}
Radiated Emission	30 MHz to 1000 MHz @ 3 m, 6.29 dB	6.30 dB
	1 GHz to 6 GHz @3 m, 5.17 dB	5.20 dB
	6 GHz to 13 GHz @3 m, 5.49 dB	5.50 dB