Prüfbericht-Nr.: *Test report no.:*	**60400561 001**	**Auftrags-Nr.:** *Order no.:*	168270705	Seite 1 von 16 *Page 1 of 16*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2020-06-24	
Auftraggeber: *Client:*	**Beijing Niu Technology Co., Ltd.** Block A, 11F, No.10 Wangjing street, Chaoyang, Beijing			
Prüfgegenstand: *Test item:*	Remote Controller			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	D23 (Trademark: NIU)			
Auftrags-Inhalt: *Order content:*	FCC and IC approval			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.231 CFR47 FCC Part 15: Subpart C Section 15.209 CFR47 FCC Part 2: Subpart J Section 2.1093			
Wareneingangsdatum: *Date of sample receipt:*	2020-06-29	Please refer to EUT Photos		
Prüfmuster-Nr.: *Test sample no.:*	A002855156-001~004			
Prüfzeitraum: *Testing period:*	2020-06-30 - 2020-08-07			
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:*	Bell Hu	**genehmigt von:** *authorized by:*	Winnie Hou
Datum: *Date:* 2020-09-01		**Ausstellungsdatum:** *Issue date:* 2020-09-01	
Stellung / Position	Bell Hu / Project Manager	**Stellung** / Position	Winnie Hou / Technical Certifier

Sonstiges / *Other:*

FCC ID: 2AQ95-NIUD23-433

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*

TUV Rheinland (Shenzhen) Co., Ltd. 1601 R&D Room, 1602-1604, 17-18F, Building 7 Site C, Vanke Cloud City Phase I, Xingke First Street, Xili Street, Xili Community, Nanshan District, Shenzhen 518052, P.R. China
Mail: service@de.tuv.com http://www.tuv.com

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 DEACTIVATION OF THE TRANSMISSION
RESULT: Pass

5.1.3 20DB 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.

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	19.08.2020
Signal Analyzer	R&S	FSV 40	101439	21.08.2020
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	21.08.2020
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	20.08.2020
Amplifier	R&S	SCU-18F	180070	20.08.2020
Amplifier	R&S	SCU40A	100475	20.09.2020
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	02.09.2020
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	02.09.2020
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	02.09.2020
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	01.09.2020
Wideband Ridged Horn Antenna (12-18 GHz)	Steatite	QMS-00208	18313	02.09.2021
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	06.07.2021

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.

Item		Extended Uncertainty
Radiated Emission (30-1000MHz)	Field strength (dBμV/m)	± 5.16 dB
Radiated Emission (above 1000MHz)	Field strength (dBμV/m)	± 2.22 dB
Radio Spectrum		± 4.51 dB

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. Test facility located at 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 a Remote Controller for vehicular use.

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

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	Remote Controller
Type Designation	D23
Trademark	NIU
FCC ID	2AQ95-NIUD23-433
Extreme Temperature Range	-40 - 85℃
Operating Voltage	2.4V-3.6V
Testing Voltage	Fully charged battery
Technical Specification of 2.4G	
Frequency Range	433.92 MHz
Type of Modulation	OOK
Channel Number	1 channel
Antenna Type	Integral Antenna
Antenna Gain	-1 dBi

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Transmitting mode

B. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- User Manual

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

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.
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.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5&6. All testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model D23 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 3: List of Accessories and Auxiliary Equipment

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

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)

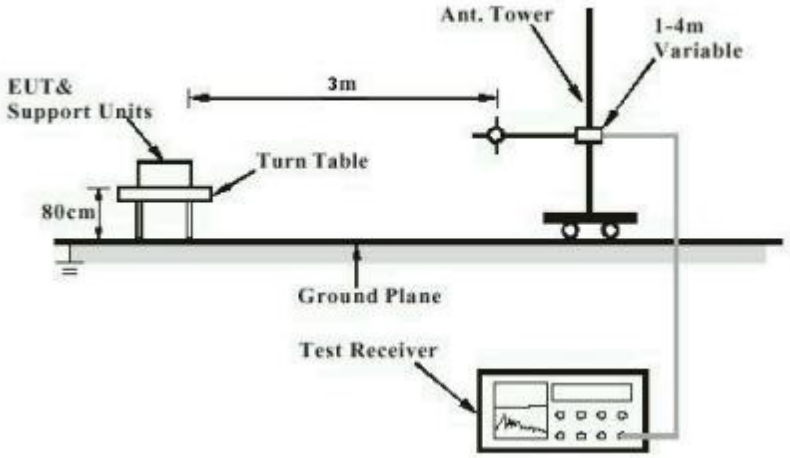


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

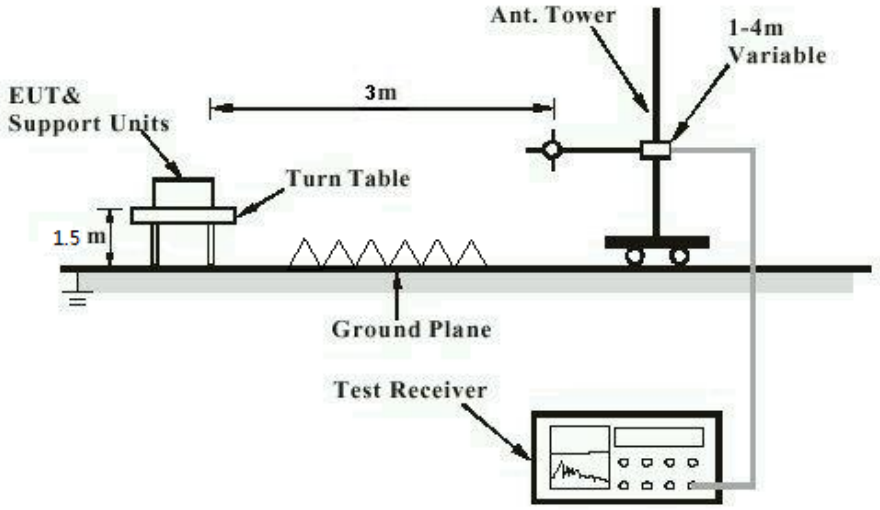
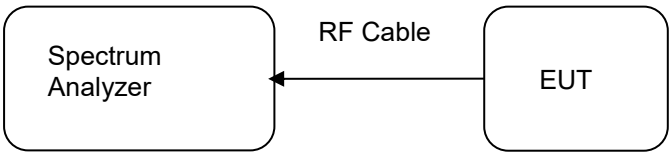


Diagram of Measurement Equipment Configuration for Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : Part 15.203

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is -1 dBi, permanent attachment and no consideration of replacement. Therefore, the EUT is considered sufficiently 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	:	FCC Part 15.31(a)(1) RSS-210 Issue 9 Table B
Basic standard	:	ANSI C63.10: 2013
Limit	:	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of after released.
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	18.07.2020
Input voltage	:	Fully charged battery
Operation mode	:	A
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.3 20dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.231(c)
		RSS-Gen Issue 5
Basic standard	:	ANSI C63.10: 2013
Limit	:	FCC Part 15.231(c)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	23.07.2020
Input voltage	:	Fully charged battery
Operation mode	:	A
Ambient temperature	:	25 ℃
Relative humidity	:	56 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

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

RESULT: **Pass**

Test Specification

Test standard	FCC Part 15.231(b) (1)(2)(3) FCC Part 15.205 FCC Part 15.209 RSS-Gen Issue 5 RSS-210 Issue 9
Basic standard	ANSI C63.10: 2013
Limits	FCC Part 15.231(b)
Kind of test site	3m Semi-anechoic Chamber

Test Setup

Date of testing	07.07.2020 – 22.07.2020
Input voltage	Fully charged battery
Operation mode	A
Ambient temperature	Refer to test result
Relative humidity	Refer to test result
Atmospheric pressure	101 kPa

For the measurement records, refer to the appendix A.

6 List of Tables

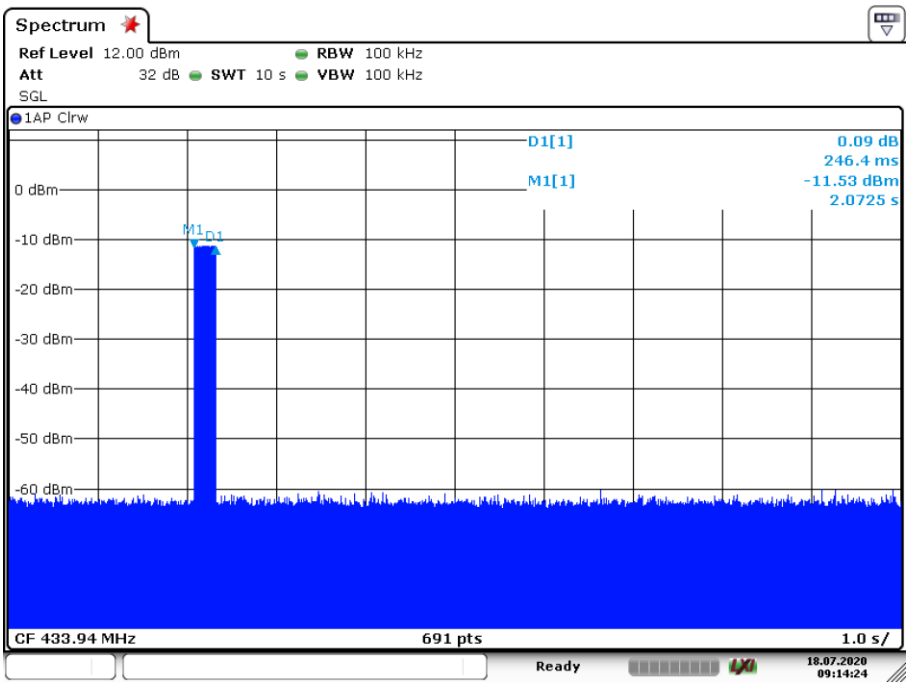
Appendix A

Test Results

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

Test Results

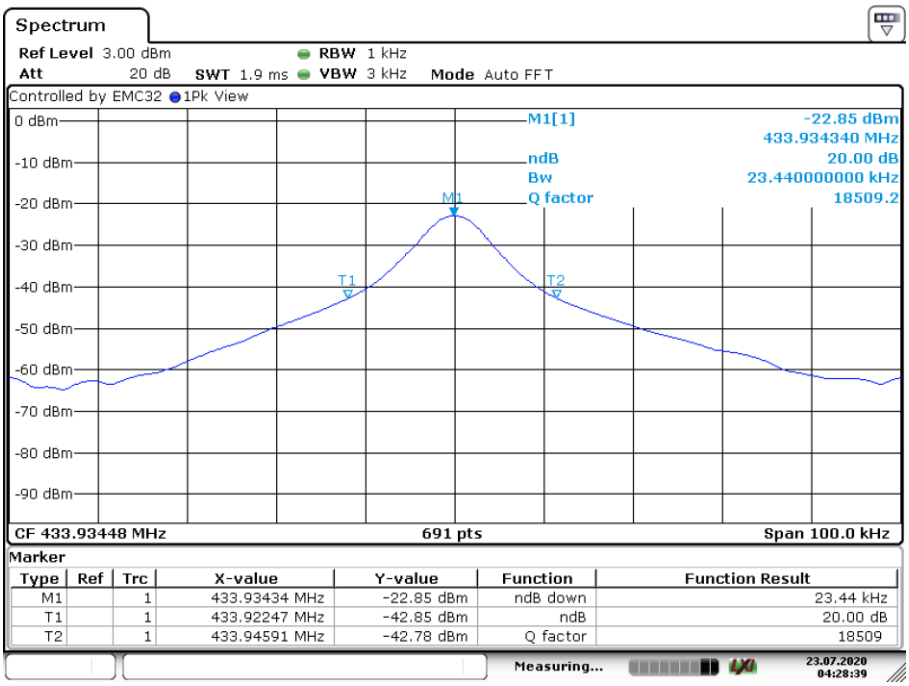
Operation Mode	Duration Time (S)	Limit (S)	Result
A	0.246	5	Pass



APPENDIX B.2: TEST RESULTS OF 20DB EMISSION BANDWIDTH

Test Results

Operation Freqnency (MHz)	20dB Emission Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.023	1.085	Pass



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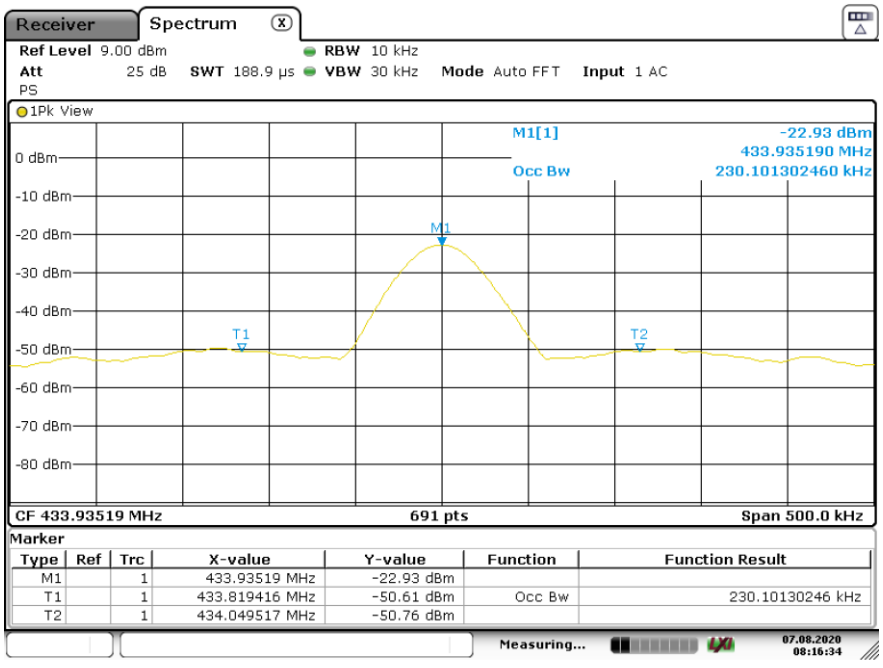


Date: 7.AUG.2020 08:16:35

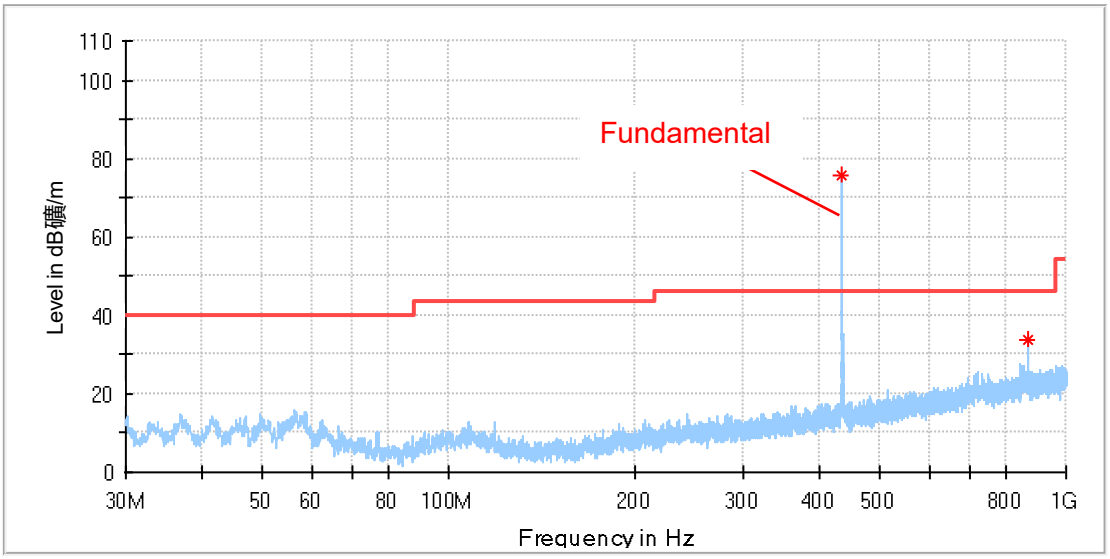
APPENDIX B.3: TEST RESULTS OF FIELD STRENGTH OF FUNDAMENTAL AND UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

B.3.1 Below 1GHz

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	D23
Test Mode:	TX_High
Test Voltage::	Full Battery
Remark:	Temp 23 Humi:42%
Test Standard:	FCC 15.231
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



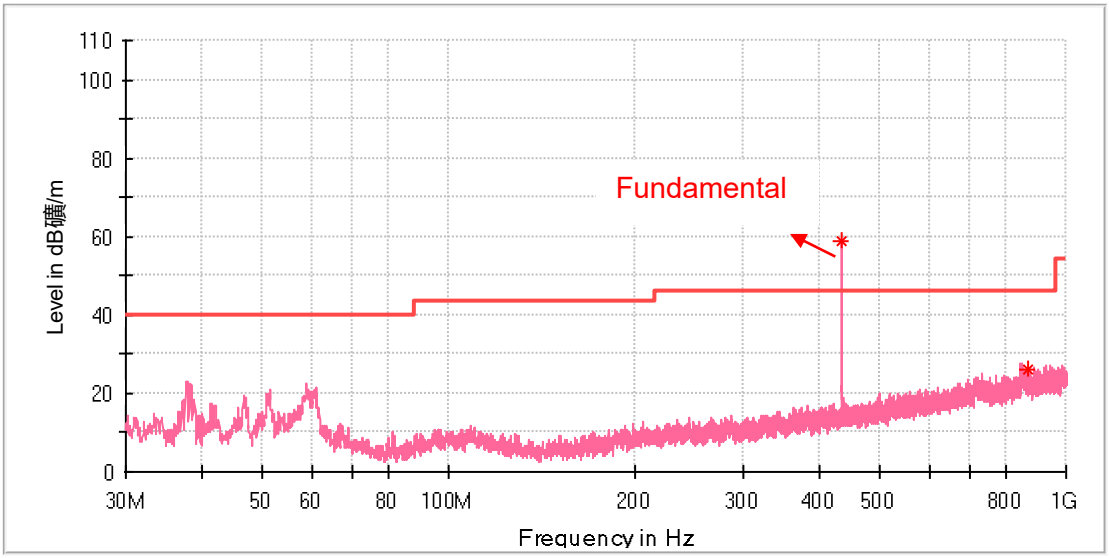
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m	Limit (dBµV/m	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
*433.908000	75.86	---	80.8	4.94	100.0	H	124.0	-13.5
867.886000	33.56	---	46.00	12.44	100.0	H	271.0	-5.7

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	D23
Test Mode:	TX_High
Test Voltage::	Full Battery
Remark:	Temp 23 Humi:42%
Test Standard:	FCC 15.231
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

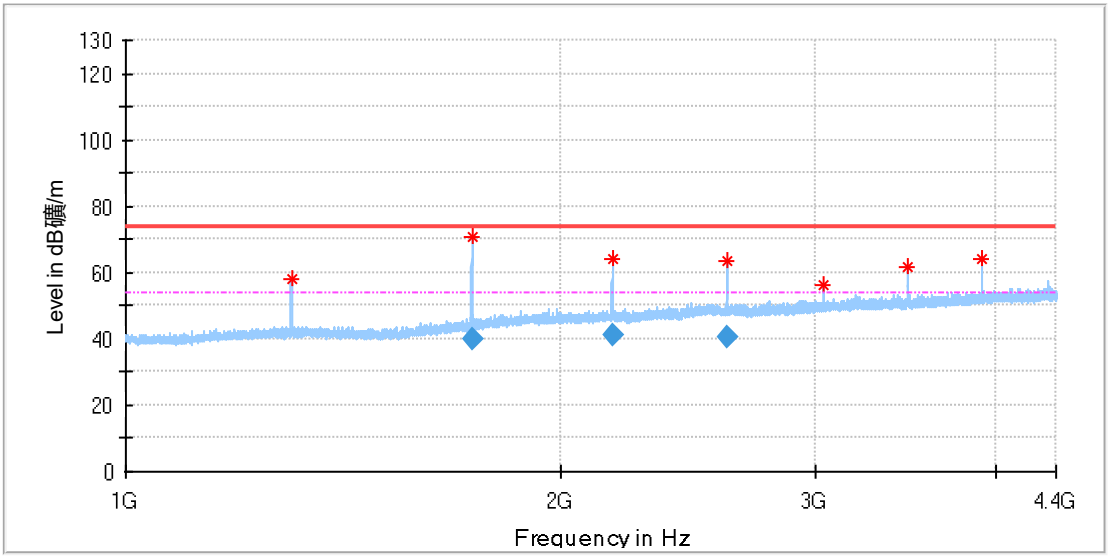
Frequency (MHz)	MaxPeak (dBµV/m	Average (dBµV/m)	Limit (dBµV/m	Margin (dB)	Heig ht	Pol	Azimuth (deg)	Corr. (dB/m)
*433.908000	58.60	---	80.8	22.12	100.0	V	34.0	-13.5
867.837500	26.14	---	46.00	19.86	100.0	V	63.0	-5.7

B.3.2 Above 1GHz

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	D23
Test Mode:	TX_High
Test Voltage::	Full Battery
Remark:	Temp 24 Humi:45%
Test Standard:	FCC 15.231
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Peak_Result

Frequency (MHz)	MaxPeak (dBµV/m	Limit (dBµV/	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1301.537500	57.85	74.00	16.15	100.0	H	109.0	2.6
1735.462500	70.60	74.00	3.40	100.0	H	290.0	4.6
2170.237500	64.01	74.00	9.99	100.0	H	126.0	7.0
2603.525000	63.72	74.00	10.29	100.0	H	241.0	8.4
3037.875000	56.44	74.00	17.56	100.0	H	61.0	9.5
3471.587500	61.70	74.00	12.30	100.0	H	84.0	10.0
3905.725000	63.89	74.00	10.11	100.0	H	228.0	11.6

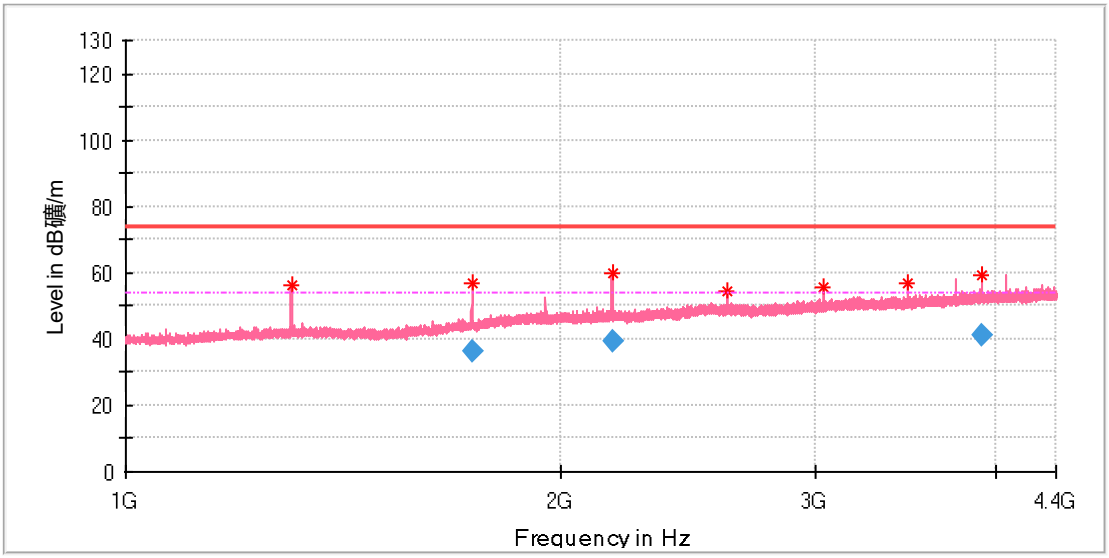
Average_Result

Frequency (MHz)	Average (dBµV/m	Limit (dBµV/m	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1736.040625	39.86	54.00	14.14	100.0	H	282.0	4.6
2169.803750	41.00	54.00	13.00	100.0	H	133.0	7.0
2603.766875	40.79	54.00	13.21	100.0	H	232.0	8.4

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	D23
Test Mode:	TX_High
Test Voltage::	Full Battery
Remark:	Temp 24 Humi:45%
Test Standard:	FCC 15.231
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Peak_Result

Frequency (MHz)	MaxPeak (dBµV/m	Limit (dBµV/	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1301.750000	56.06	74.00	17.94	100.0	V	217.0	2.6
1735.675000	57.07	74.00	16.93	100.0	V	186.0	4.6
2169.600000	60.00	74.00	14.00	100.0	V	308.0	7.0
2603.525000	54.39	74.00	19.61	100.0	V	206.0	8.4
3037.662500	55.40	74.00	18.60	100.0	V	119.0	9.5
3471.375000	57.07	74.00	16.93	100.0	V	158.0	10.0
3905.087500	59.55	74.00	14.45	100.0	V	247.0	11.6

Average_Result

Frequency (MHz)	Average (dBµV/m	Limit (dBµV/m	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1735.839375	36.52	54.00	17.48	134.0	V	180.0	4.6
2169.780625	39.16	54.00	14.84	100.0	V	330.0	7.0
3905.528750	41.34	54.00	12.66	100.0	V	205.0	11.6

Remark: the limit for field strength of fundamental is 100.8dBuV/m (PK), 80.8dBuV/m (AV).