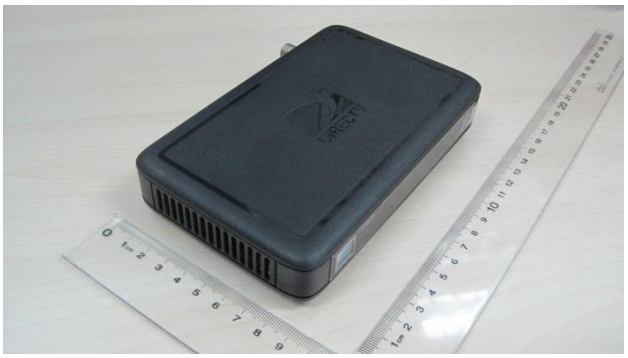
Prüfbericht-Nr.: *Test Report No.*:	**16803414 001**	**Auftrags-Nr.:** *Order No.*:	**1140013303**	Seite 1 von 77 *Page 1 of 77*
Kunden-Referenz-Nr.: *Client Reference No.*:	**451579**	**Auftragsdatum:** *Order date*:	**2014-05-16**	
Auftraggeber: *Client*:	**Technicolor USA, Inc.** *101 West 103rd Street, Indianapolis, IN 46290, United States*			
Prüfgegenstand: *Test item*:	**Set Top Box**			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	**C51**			
Auftrags-Inhalt: *Order content*:	**FCC certificate**			
Prüfgrundlage: *Test specification*:	**FCC Part 15 Subpart C Section 15.207** **FCC Part 15 Subpart C Section 15.209** **FCC Part 15 Subpart C Section 15.247**			
Wareneingangsdatum: *Date of receipt*:	**2014-05-16**			
Prüfmuster-Nr.: *Test sample No.*:	**Engineering sample**			
Prüfzeitraum: *Testing period*:	**2014-05-16**			
Ort der Prüfung: *Place of testing*:	**Refer to section 1.1**			
Prüflaboratorium: *Testing laboratory*:	**Refer to section 1.1**			
Prüfergebnis*: *Test result**:	Pass			



geprüft von / *tested by*:			**kontrolliert von /** *reviewed by*:		
2014-05-22	Yang, Kai/ PE	Yang Kai	2014-05-22	Sun, Lixun/Reviewer	Sun Lixun
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:

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 = mangelhaft
	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 specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST SUMMARY

4.1.1 ANTENNA REQUIREMENT
RESULT: Passed

4.1.2 PEAK OUTPUT POWER
RESULT: Passed

4.1.3 6DB BANDWIDTH AND 26DB BANDWIDTH
RESULT: Passed

4.1.4 CONDUCTED SPURIOUS EMISSIONS IN 100KHZ BANDWIDTH
RESULT: Passed

4.1.5 POWER SPECTRAL DENSITY
RESULT: Passed

4.1.6 RADIATED SPURIOUS EMISSION
RESULT: Passed

4.1.7 CONDUCTED EMISSIONS
RESULT: Passed

4.2.1 ELECTROMAGNETIC FIELDS
RESULT: Passed

Contents

1. Test Sites

1.1 Test Facilities

Laboratory 1: TA Beijing Limited (FCC Registration No.: 413514)
Address: Building B-4, No.1, JingHai 3rd Road, BDA East ParK,Beijing, 100176 China

The used test equipment is in accordance with CISPR 16-1 for measurement of radio interference.

1.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Lab 1: (Peak Output Power, 6dB and 26dB Bandwidth, Conducted Spurious Emissions in 100kHz Bandwidth, Power Spectral Density, Radiated Spruious Emission, Conduted Emission)

Kind of Equipment	Type	S/N	Manufacturer	Calibrated until
Bi-log Antenna	HL562	100488	Rohde & Schwarz	2015-02-15
Double Ridge Guide Horn Antenna	EMCO 3117	00056662	ETS-Lindgren	2015-02-15
EMI Test Receiver	ESIB26	100301	Rohde & Schwarz	2015-02-21
Signal Analyzer	FSQ26	100846	Rohde & Schwarz	2015-01-29
LISN	ENV216	101094	TFS	2015-05-24

1.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institude of Metrology P.R. China) or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

1.4 Calibration

Equipment requiring calibration is calibrated periodically by the lab or according to lab's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

1.5 Measurement Uncertainty

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

Table 2: Measurement Uncertainty

Items		Extended Uncertainty
RE (30-1000MHz)	Field strength (dBuV/m)	U=±4.94dB, k=2, σ=95%
RE (1-26GHz)	Field strength (dBuV/m)	U=±4.34dB, k=2, σ=95%

2. General Product Information

2.1 Product Function and Intended Use

The EUT (equipment under test) is Set Top Box which uses the RF4CE technology, For more information, please refer to the user manual.

2.2 Ratings and System Details

Table 3: Rating of EUT

Kind of Equipment:	Set Top Box	
Type Designation:	C51	
FCC ID	G95C51	
Rated Input Voltage	DC 12V	
Rated comsuption power	18W	
Adapter Information	Adapter 1	Adapter 2
Model	EPS10R1-15	EPS10R1-16
S/N	CL10F1406B5519	DD10B1244A6438
Input	AC 120V,60Hz,0.5A,	AC 120V,60Hz,0.5A,
Output	DC 12V,1.5A	DC 12V,1.5A
Manufactory	Chicony Power Technology	Delta Electronics, INC.

Note:Considering the affection by different adapters, the Radiated Spruious Emission and Conduted Emission were peformed on the both adapters, and other tests were performed on the adapter EPS10R1-15.

Table 4: Technical Specification

Item	**Description**
Operating Frequency band	2423.5-2476.5MHz
Channel Number	3
Channel Center Frequency	2425MHz, 2450MHz, 2475MHz.
Modulation	O-QPSK
Antenna	Integrated Antenna
Antenna Gain (dBi)	2

2.3 Independent Operation Modes

The basic operation modes are:

A. Transmitting via RF4CE;
B. Decoding;
C. Screen Saver;
D. Off

Note: The EUT is transmitting only on the operationg mode A, for operationg mode C, the EUT does not decoding and output video/audio but output a black background with a logo floating on it.

2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

2.5 Submitted Documents

- Bill of Material
- Circuit Diagram
- PCB Layout
- Instruction Manual
- Photo Document
- Rating Label

3. Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

3.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2009.

3.3 Special Accessories and Auxiliary Equipment

Kind of accessories	Model	Manufacture
Computer	OPTIPLEX745	Dell
Router	D-Link	DIR-110
DECA	Entropic	ECB3M-L3MRF

3.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

3.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

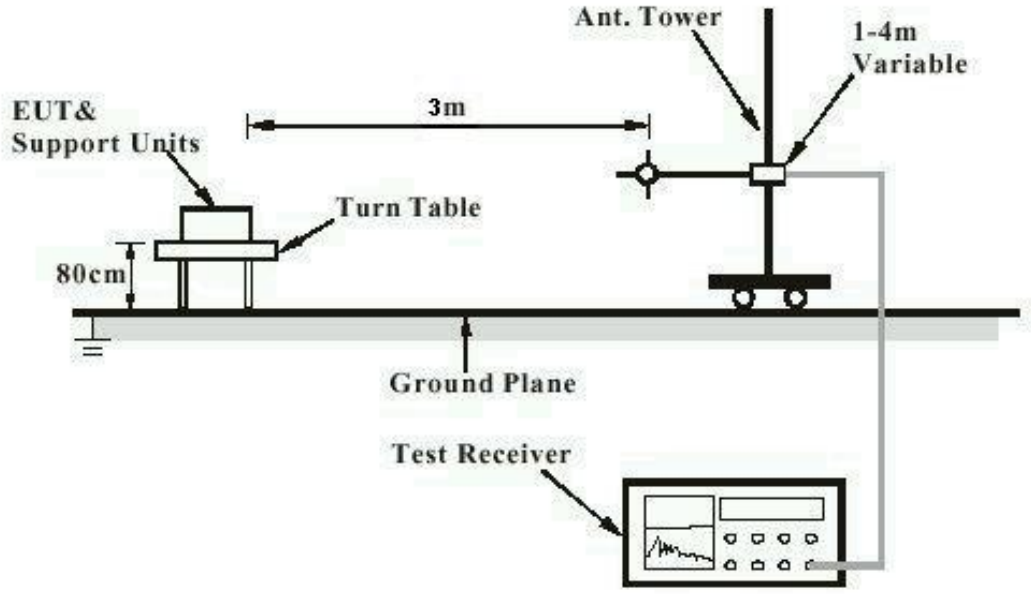


Diagram of Measurement Equipment Configuration for Conduction Measurement

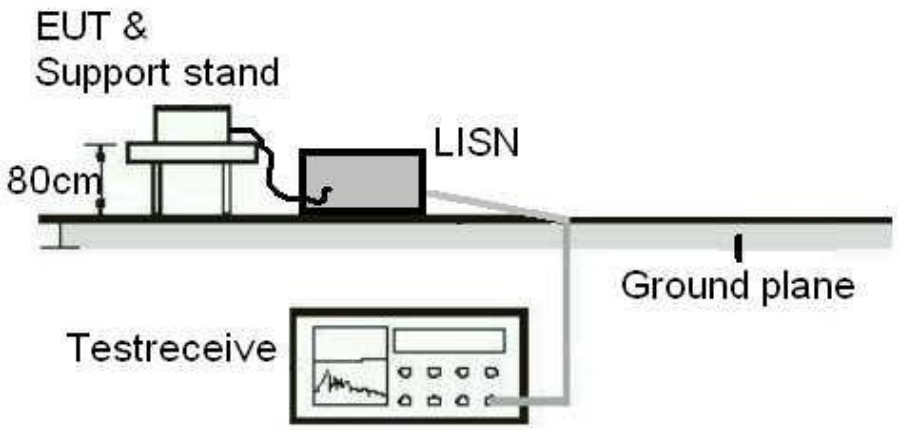
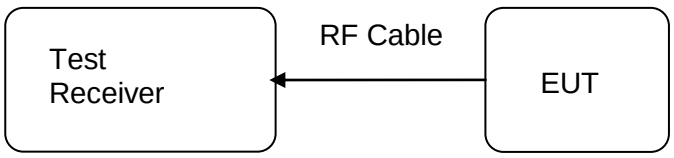


Diagram of Measurement Equipment Configuration for Transmitter Measurement



4. Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT: **Passed**

Test date	:	2014-05-16
Test standard	:	FCC Part 15.247(b)(4) and Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 2dBi, 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.

4.1.2 Peak Output Power

RESULT: **Passed**

Test date	:	2014-05-16
Test standard	:	FCC Part 15.247(b)(1)
Basic standard	:	ANSI C63.10: 2009
Limit	:	1 Watt
Kind of test site	:	Shielded room

Test setup

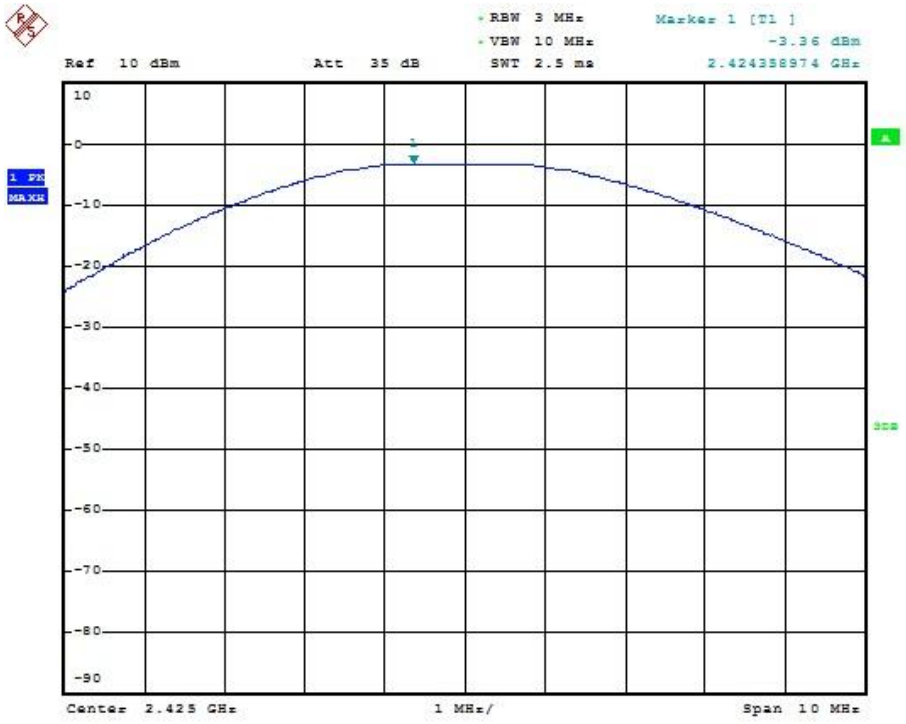
Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	101 kPa

Table 5: Test result of Peak Output Power

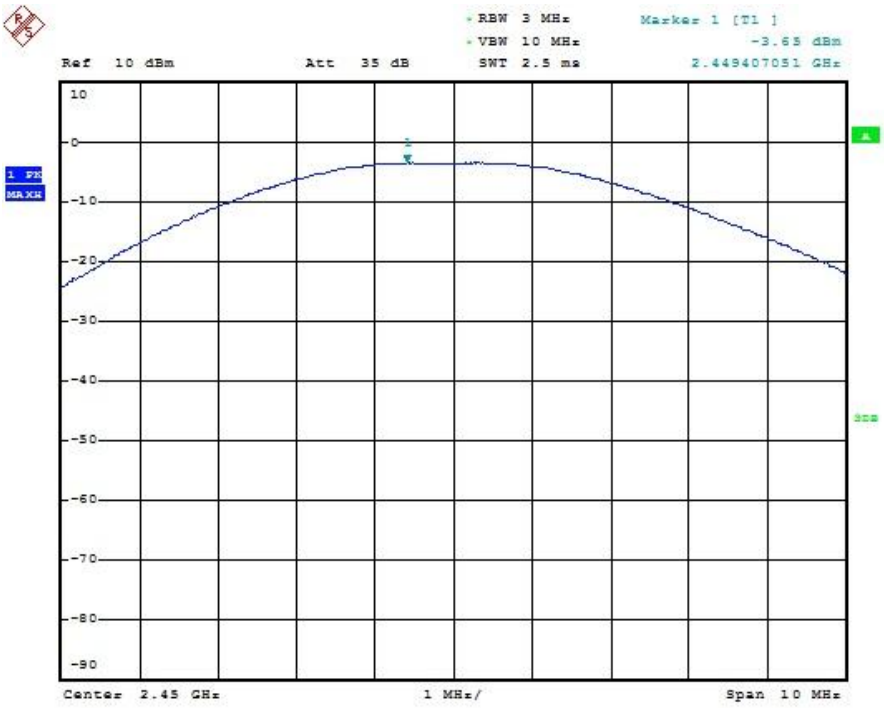
Channel Frequency (MHz)	Peak Output Power		Limit
	(dBm)	(mW)	(W)
2425	-3.36	0.46	1
2440	-3.65	0.43	1
2475	-3.80	0.42	1

Test Graph of Peak Output Power

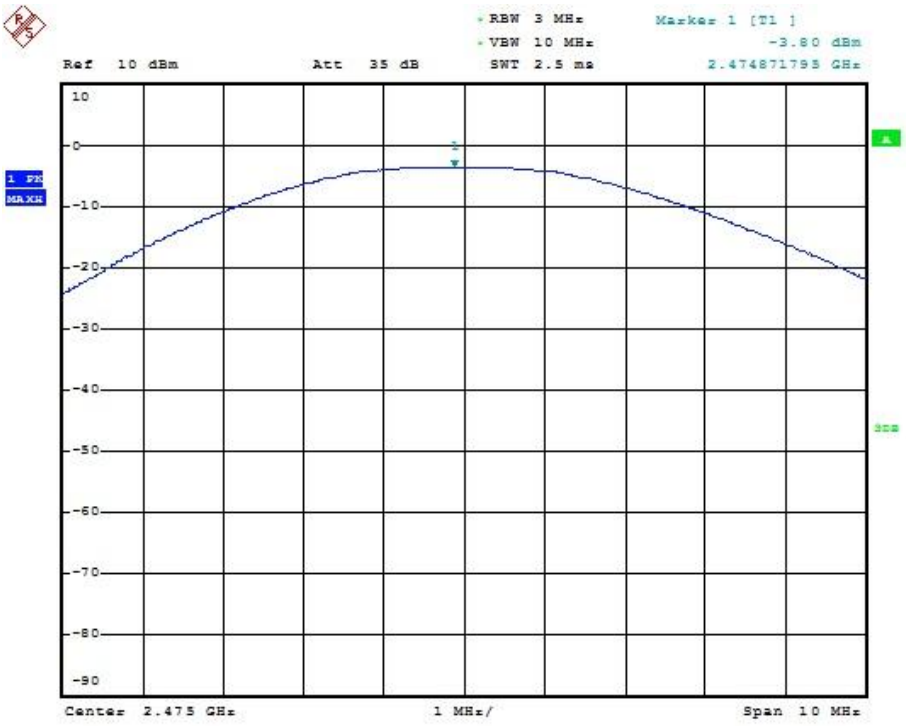
Low Channel



Middle Channel



High Channel



4.1.3 6dB Bandwidth and 26dB Bandwidth

RESULT: **Passed**

Date of testing	:	2014-05-16
Test standard	:	FCC Part 15.247(a)(2)
Basic standard	:	ANSI C63.10: 2009
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High
Operation Mode	:	A
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	101 kPa

Table 6: Test result of 6dB Bandwidth

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit(kHz)
Low Channel	2405	1602.564	>500
Mid Channel	2450	1602.564	>500
High Channel	2475	1602.564	>500

Table 7: Test result of 26dB Bandwidth

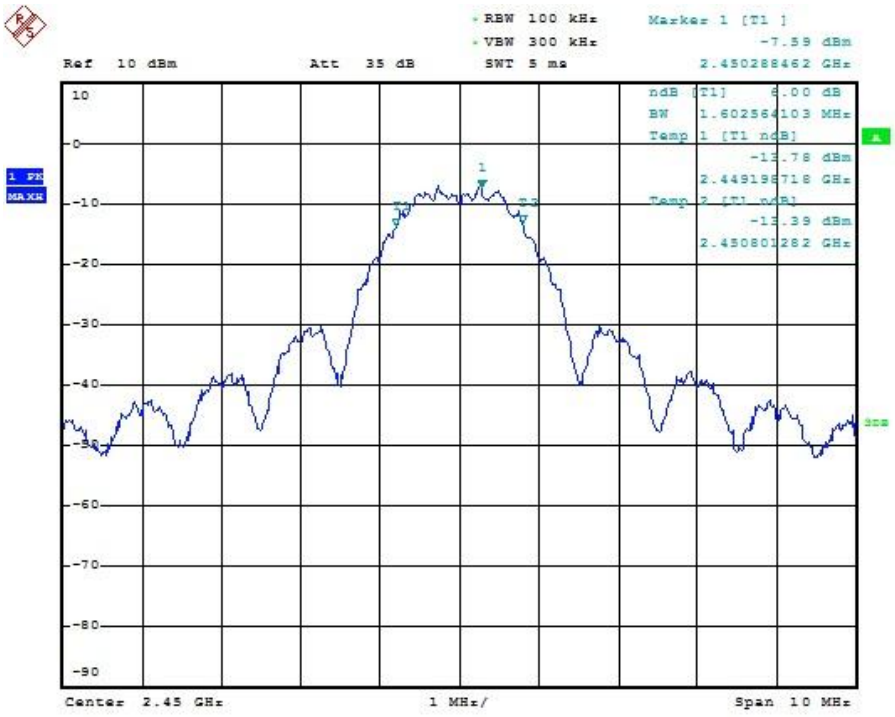
Channel	Channel Frequency (MHz)	26dB Bandwidth (kHz)
Low Channel	2405	4262.822
Mid Channel	2450	4150.641
High Channel	2475	4262.820

Notes: No specific 26dB bandwitdth requirement in part 15.247(a) (1).

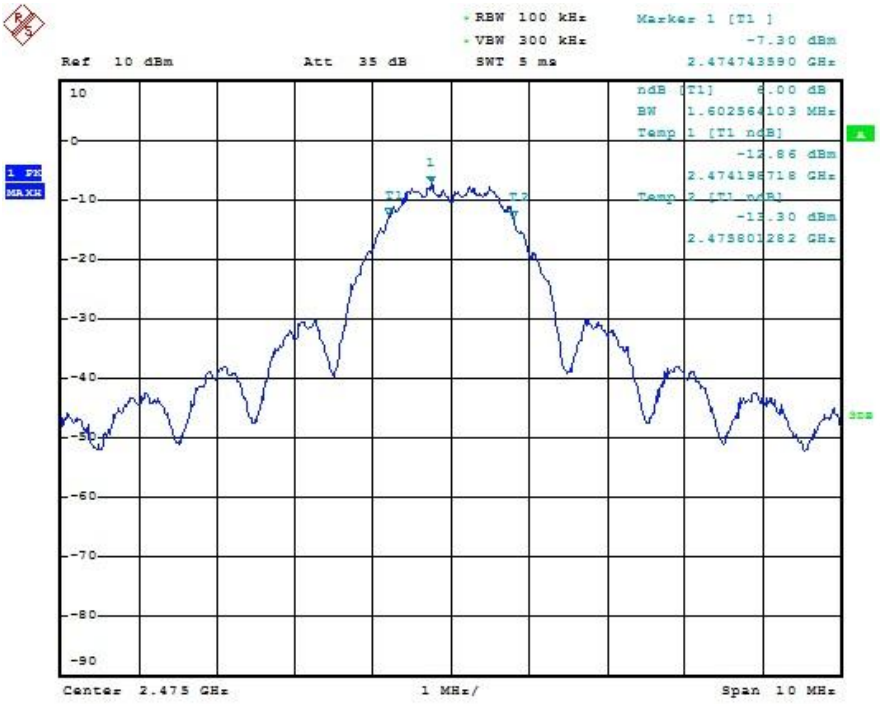
Test Graph of 6dB Bandwidth

Low Channel

Middle Channel

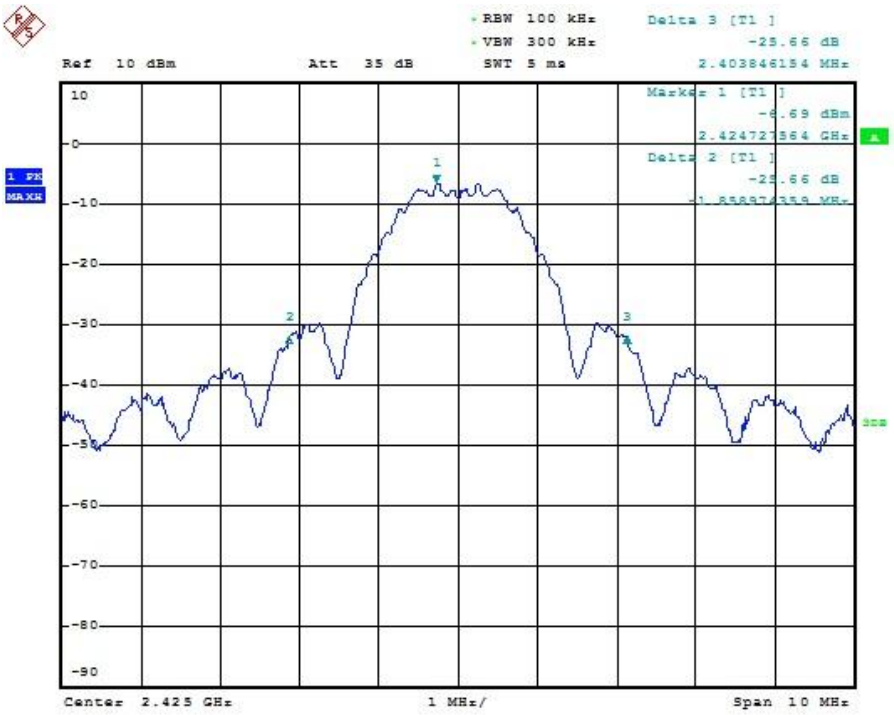


High Channel

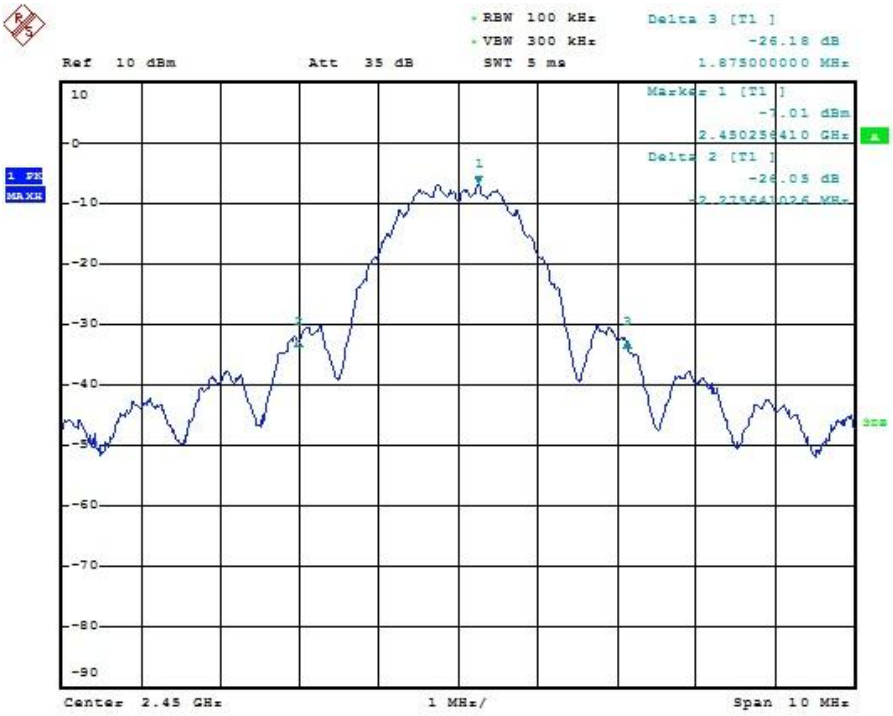


Test Graph of 26dB Bandwidth

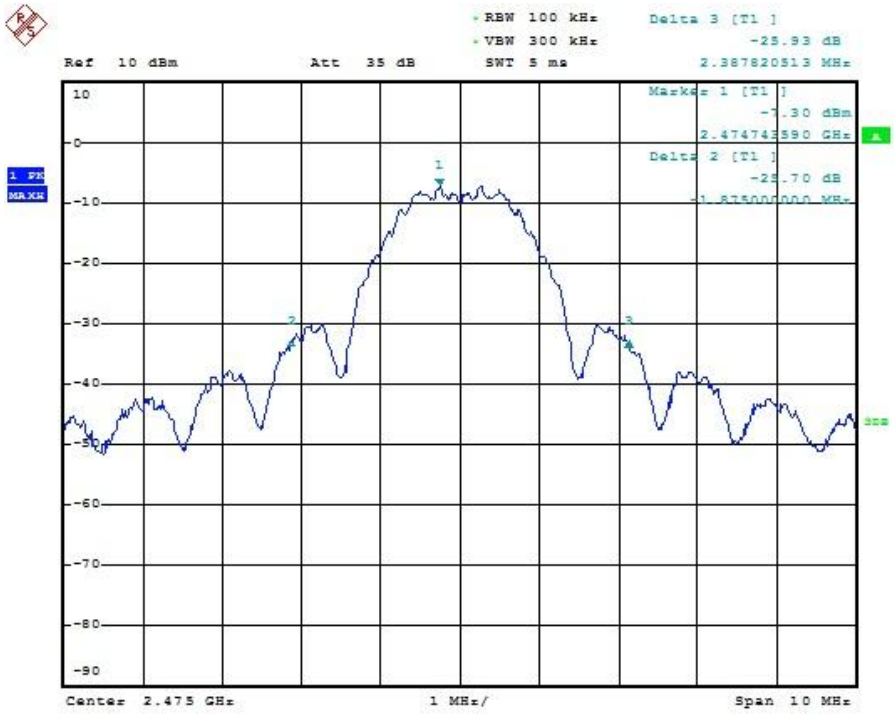
Low Channel



Middle Channel



High Channel



4.1.4 Conducted Spurious Emissions in 100kHz Bandwidth

RESULT: **Passed**

Date of testing	:	2014-05-16
Test standard	:	FCC part 15.247(d)
Basic standard	:	ANSI C63.10: 2009
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shield room

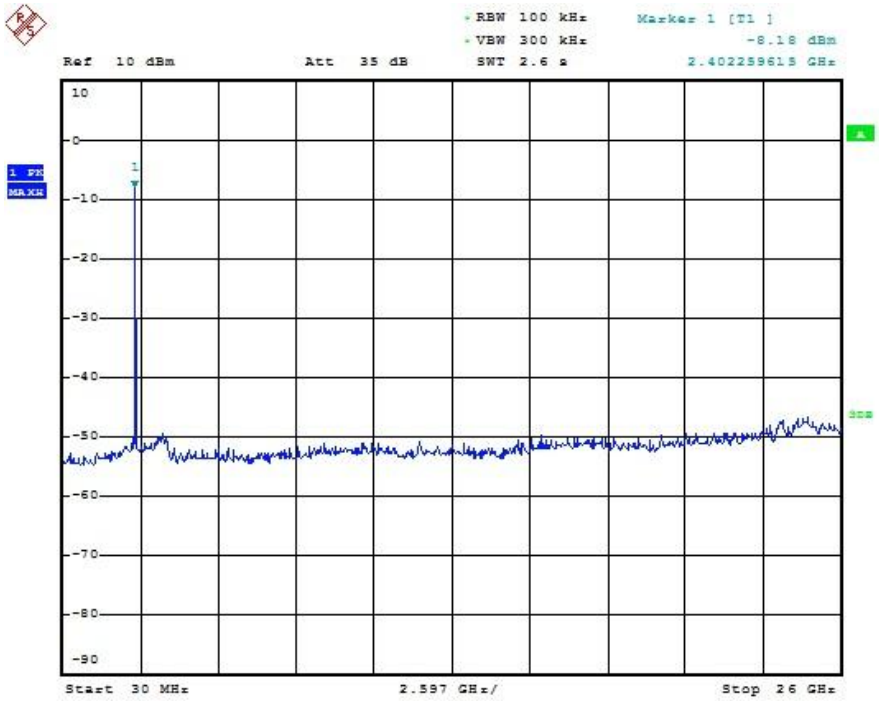
Test setup

Test Channel	:	Low/ Mid/High
Operation mode	:	A
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	101 kPa

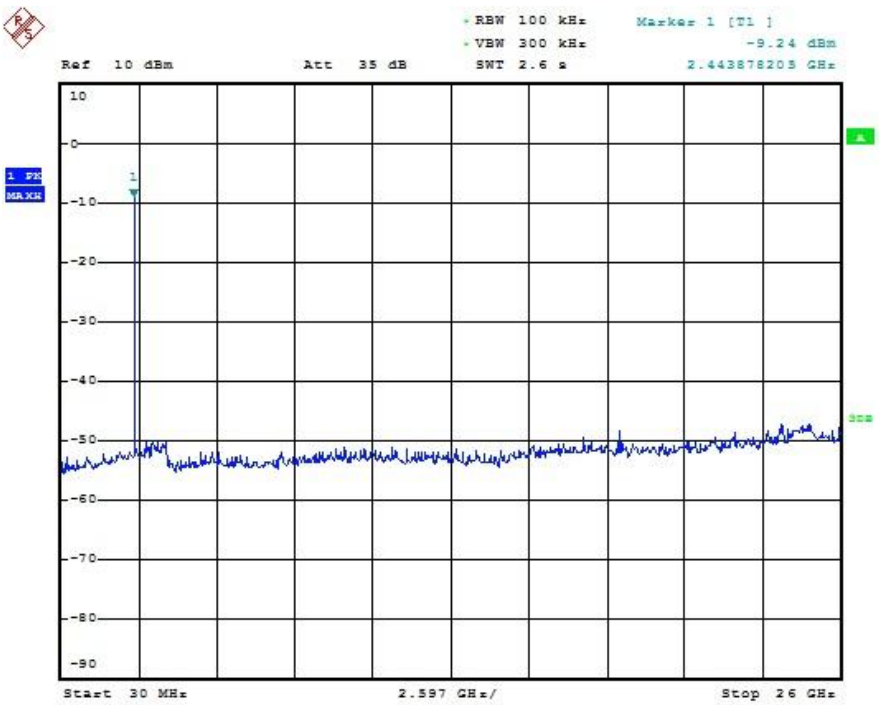
All emissions are more than 20dB below fundamental, details refer to following test Graph, and compliance is achived as well.

Test Graph of Conducted Spurious Emissions measured in 100kHz Bandwidth

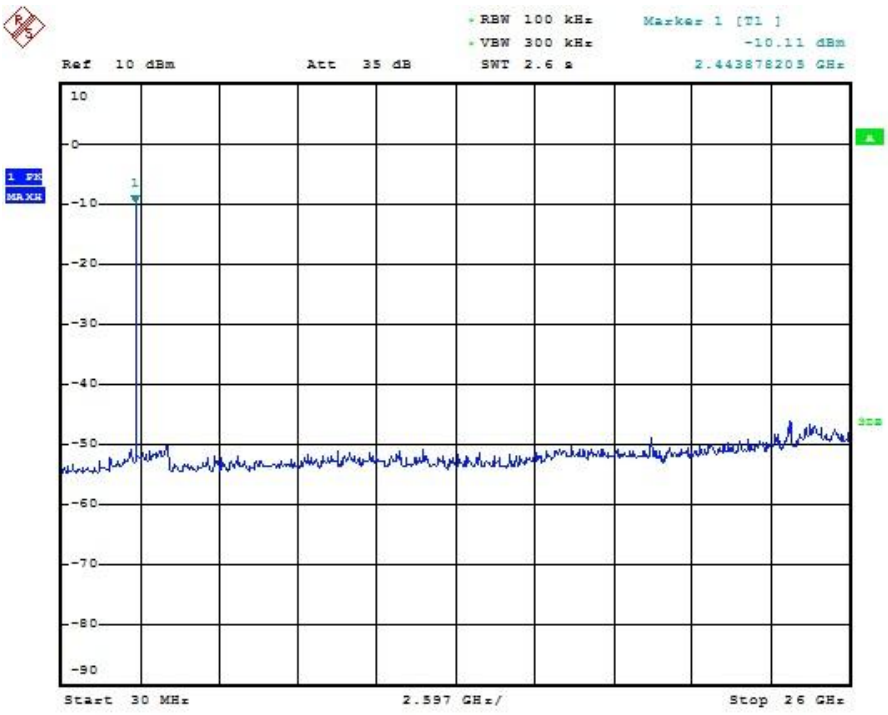
Low Channel



Middle Channel

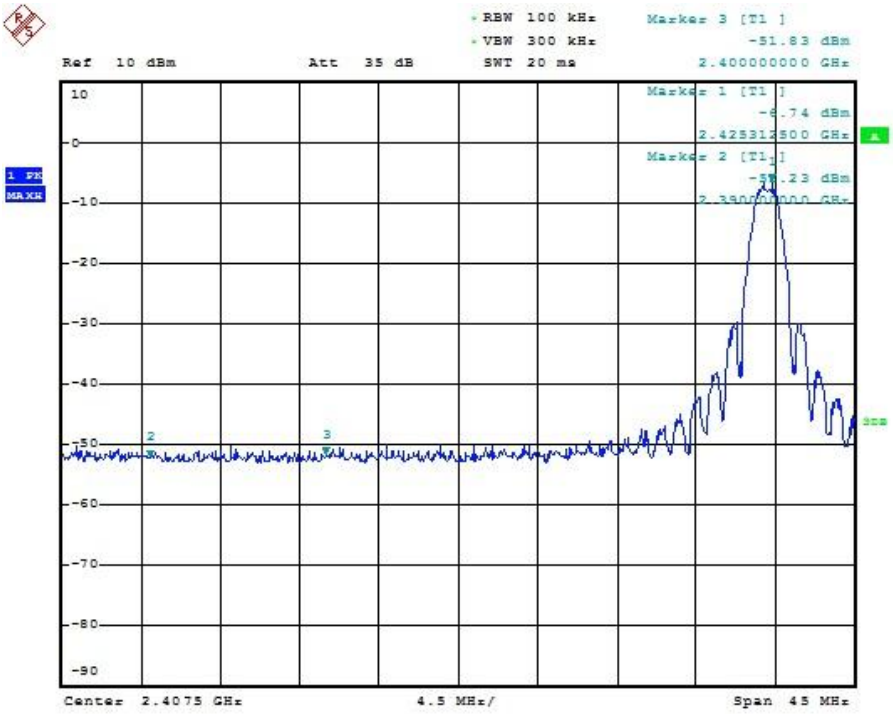


High Channel

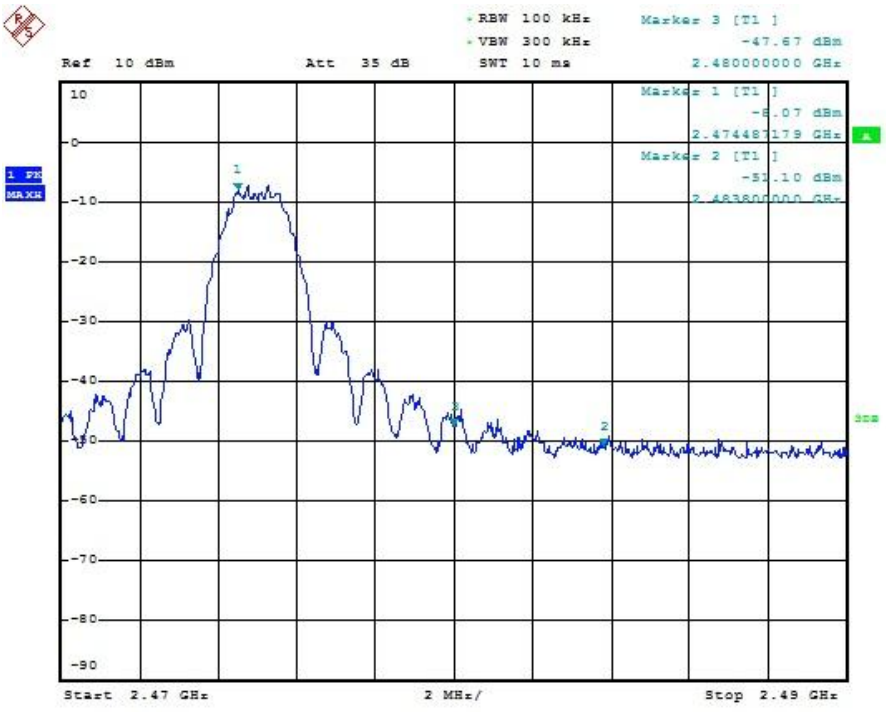


Test Graph of Band Edge measured in 100kHz Bandwidth

Low Channel



High Channel



4.1.5 Power Spectral Density

RESULT: **Passed**

Date of testing	:	2014-05-16
Test standard	:	FCC part 15.247(e)
Basic standard	:	ANSI C63.10: 2009
Limits	:	8.0 dBm (in any 3kHz band)
Kind of test site		Shield room

Test Setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	101 kPa

According to the peak output power's result, the type of AC power supply has the highest output power, therefore this test is only performed on the product with AC power suuply.

Table 8: Test result of power spectral density(PSD)

Channel	Maximum power spectral density (dBm/100kHz)	Maximum power spectral density (dBm/3kHz)	Limit (dBm/3kHz)
Low Channel	-6.73	-21.93	8
Mid Channel	-7.02	-22.22	8
High Channel	-7.41	-22.61	8

Note: According to the KDB558074, PSD_{3kHz}= PSD_{100kHz} ×10log(3kHz/100kHz)= PSD_{100kHz} -15.2dB

Test Graph of Power Spectral Density

Low Channel

Middle Channel

High Channel

4.1.6 Radiated Spurious Emission

RESULT: **Passed**

Date of testing	:	2014-05-16
Test standard	:	FCC part 15.247(d)
Basic standard	:	ANSI C63.10: 2009
Limits	:	Refer to 15.209(a)
Kind of test site	:	3m Semi-Anechoic Chamber

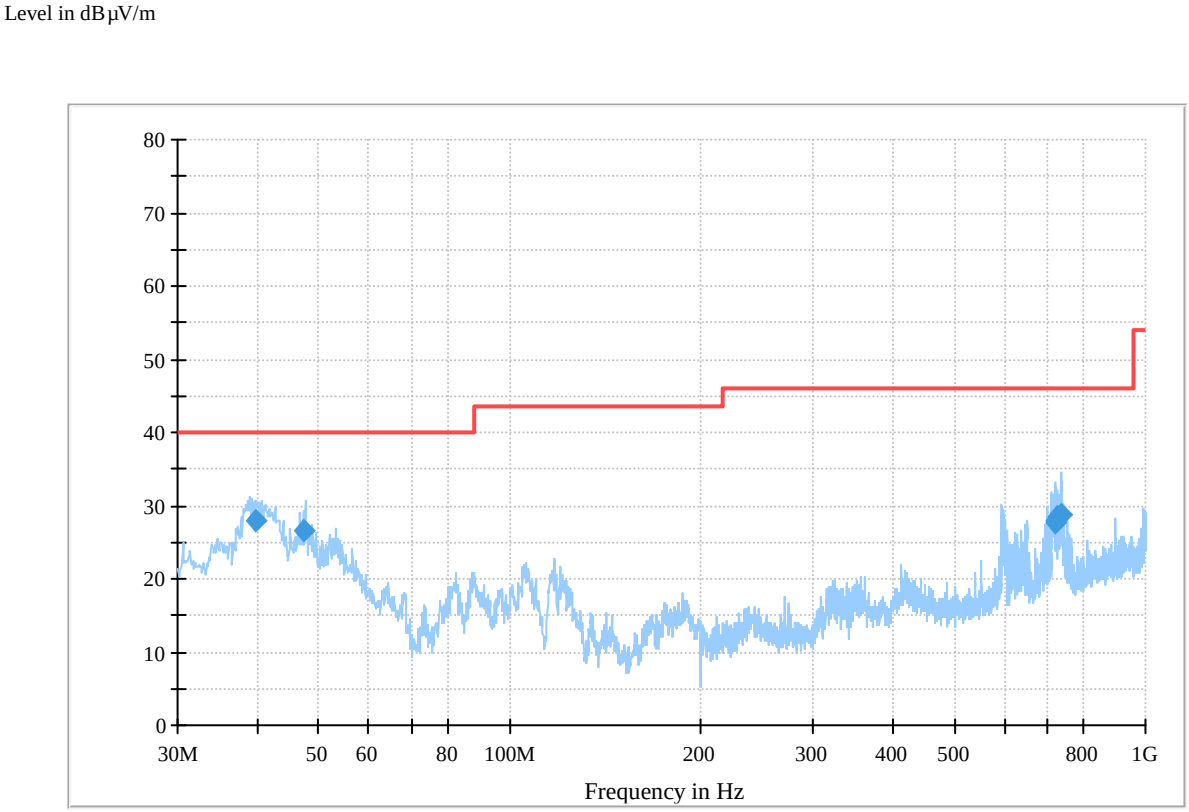
Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, B and C
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	100 kPa

During the test, the wooden table was rotated 360° around and the antenna was varied from 1m to 4m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.
As the different adapters cannot affect the test result of the bandedge, the bandedge test was only performed with the adapter EPS10R1-15.
The following figures and tables were those measured by an automatic measurement system. The vertical results are marked with red, and the horizontal ones are marked with blue.
Plots of the band edge are also shown.

Figure 1: Spurious emission measurement results

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	1
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

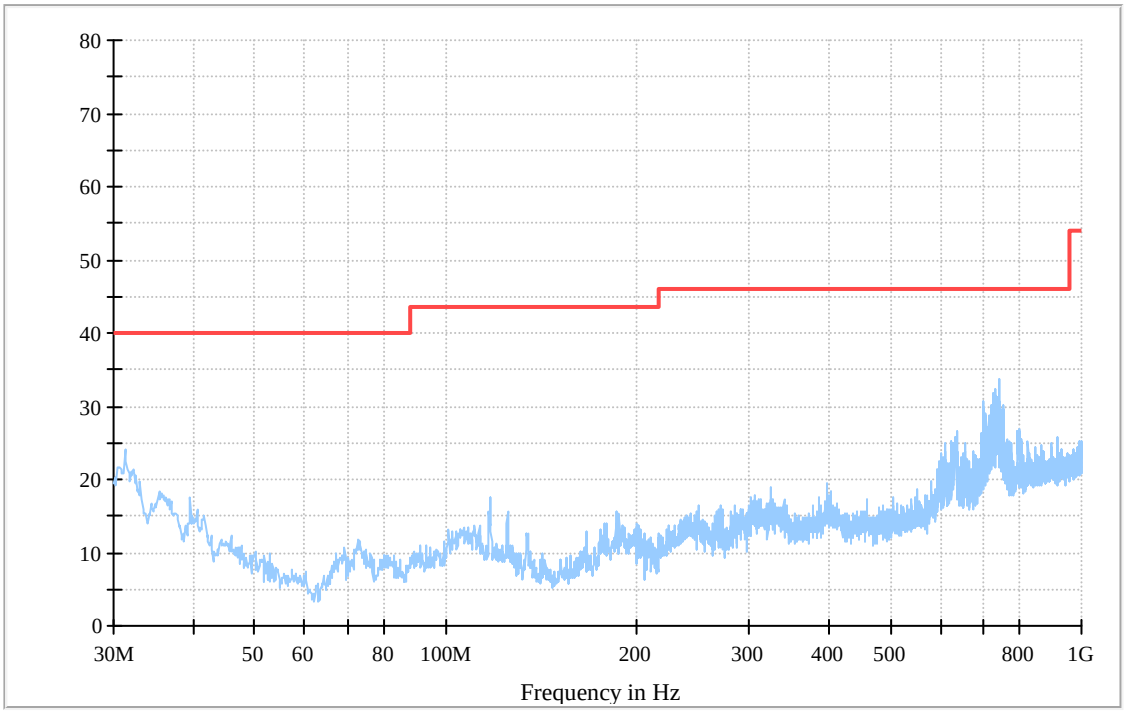


Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.767956	28.0	120.000	100.0	V	12.0	12.00	40.00
47.445351	26.5	120.000	100.0	V	18.0	13.50	40.00
722.236493	27.9	120.000	100.0	V	10.0	18.10	46.00
723.094489	27.6	120.000	100.0	V	5.0	18.40	46.00
724.833307	28.4	120.000	100.0	V	10.0	17.60	46.00
738.287756	28.8	120.000	100.0	V	16.0	17.20	46.00

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	2
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

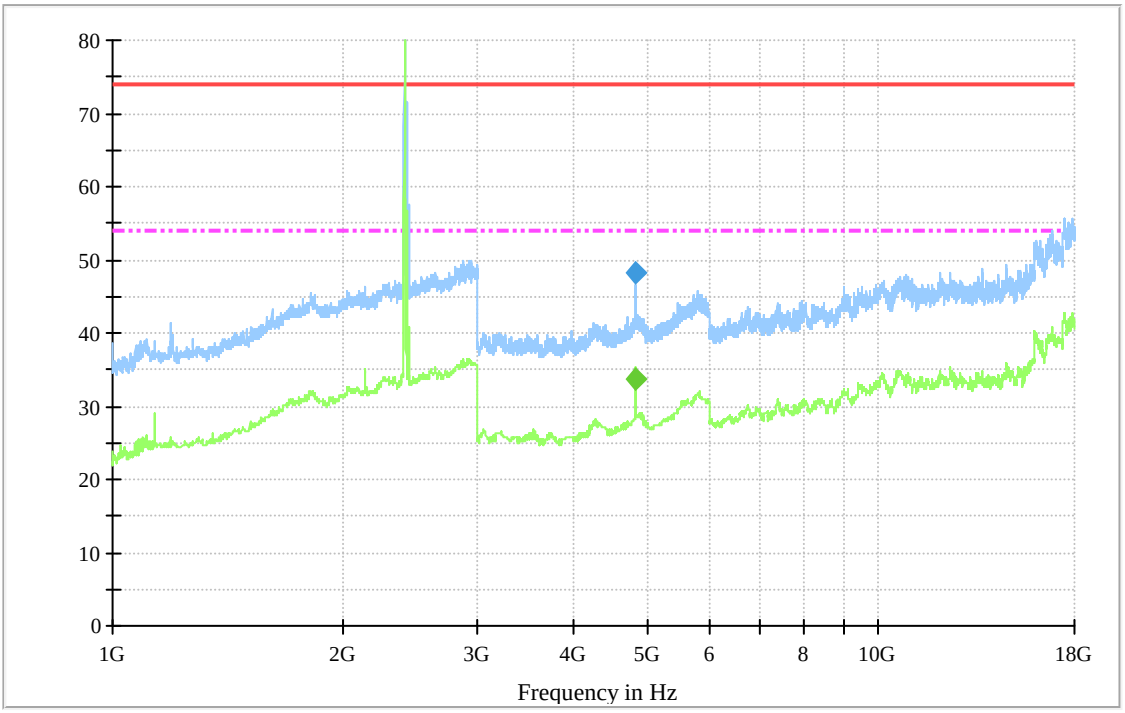
Level in dBµV/m



Final measurement result
The margin was more than 10dB.

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	3
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

Level in dBµV/m



Final measurement result:

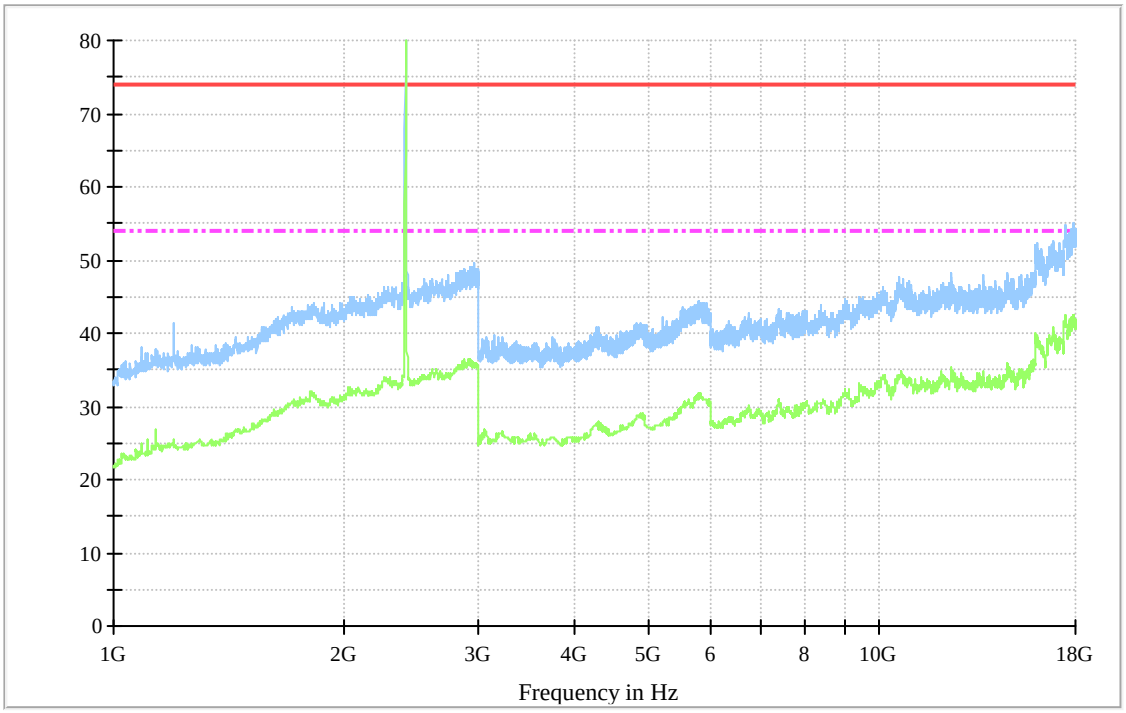
Frequency (MHz)	MaxPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4809.016233	48.2	1000.000	100.0	V	158.0	25.80	74.00

Frequency (MHz)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4809.919840	33.6	1000.000	100.0	V	180.0	20.40	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	4
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

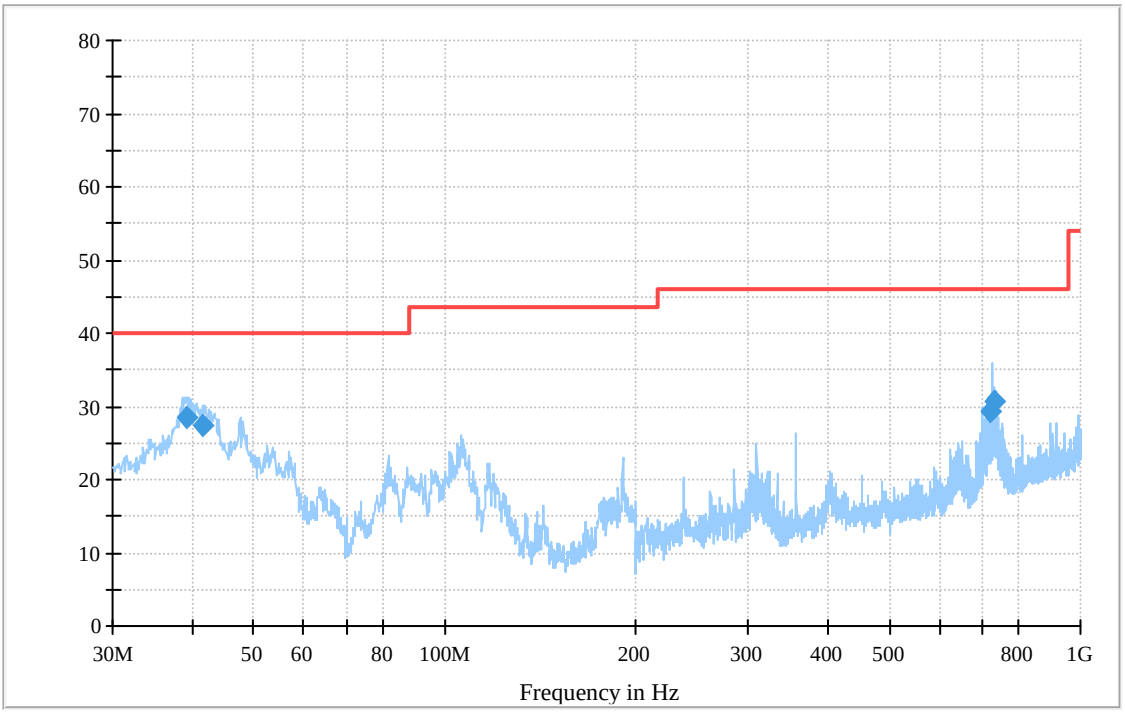
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	5
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

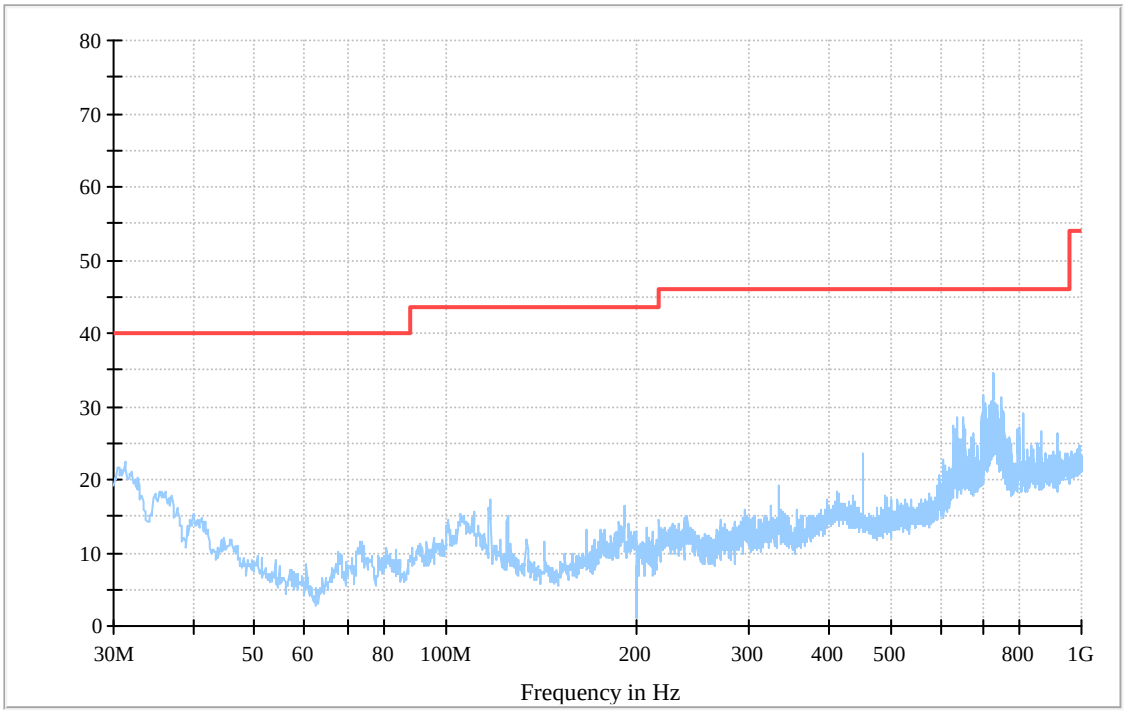
Level in dBµV/m



Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.219078	28.6	120.000	100.0	V	5.0	11.40	40.00
41.525251	27.3	120.000	100.0	V	7.0	12.70	40.00
723.435291	29.3	120.000	100.0	V	16.0	16.70	46.00
729.956112	30.6	120.000	100.0	V	16.0	15.40	46.00

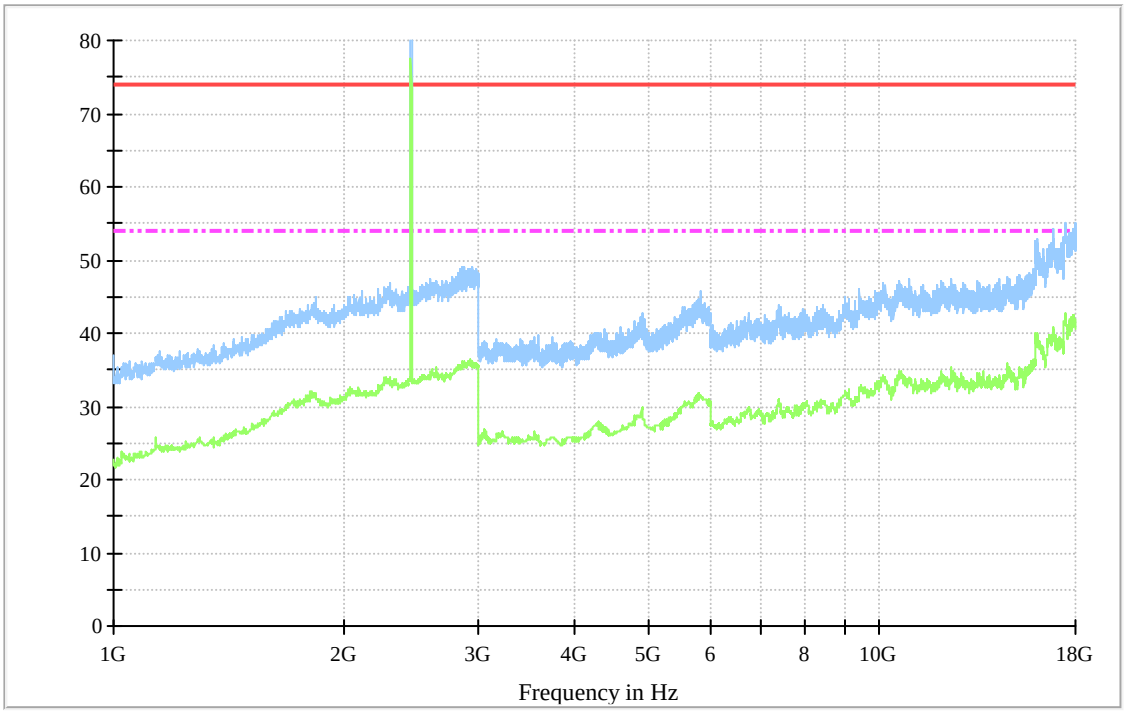
Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	6
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		



Final measurement result
The margin was more than 10dB.

Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	7
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

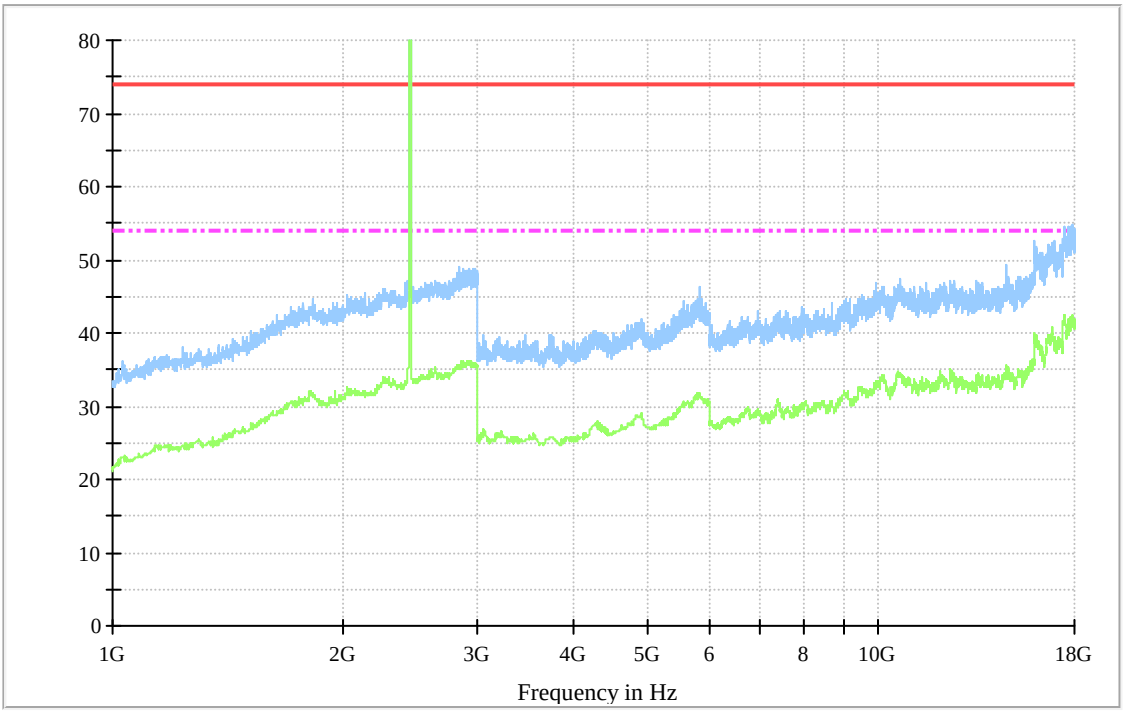
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	8
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

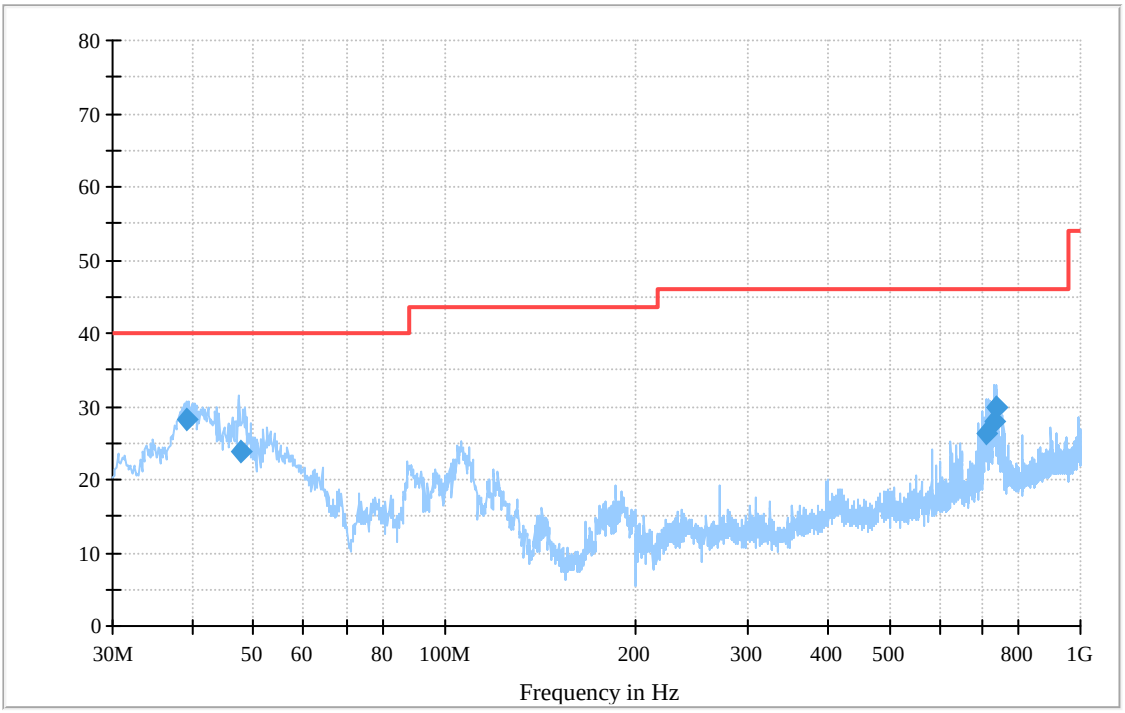
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	9
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

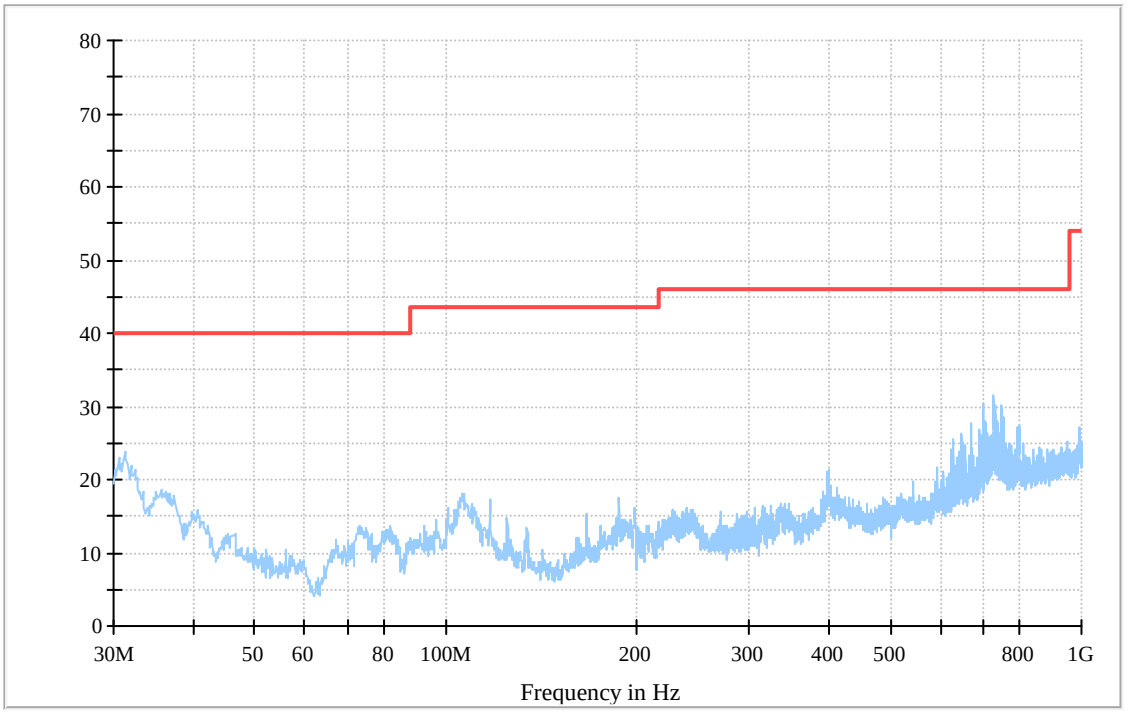


Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.248236	28.2	120.000	100.0	V	10.0	11.80	40.00
47.834509	23.8	120.000	100.0	V	21.0	16.20	40.00
710.831643	26.4	120.000	100.0	V	16.0	19.60	46.00
732.375331	27.9	120.000	100.0	V	18.0	18.10	46.00
736.871744	29.9	120.000	100.0	V	16.0	16.10	46.00
736.937756	29.8	120.000	100.0	V	16.0	16.20	46.00

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	10
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

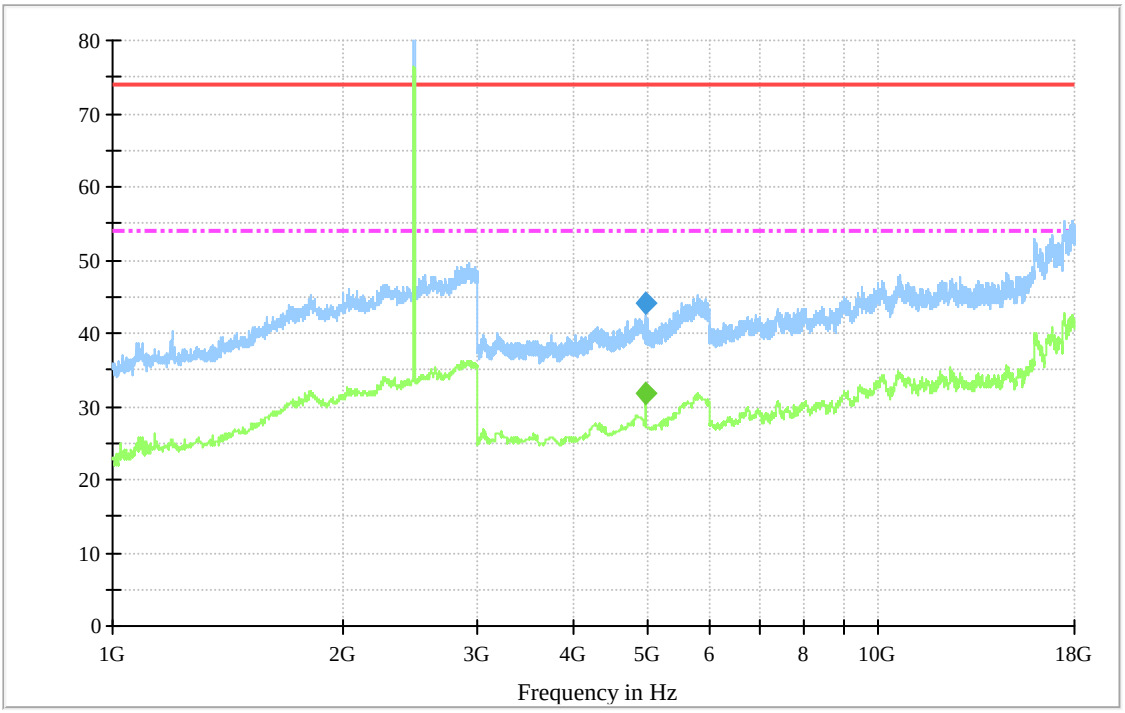
Level in dBµV/m



Final measurement result
The margin was more than 10dB.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	11
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

Level in dBµV/m



Final measurement result:

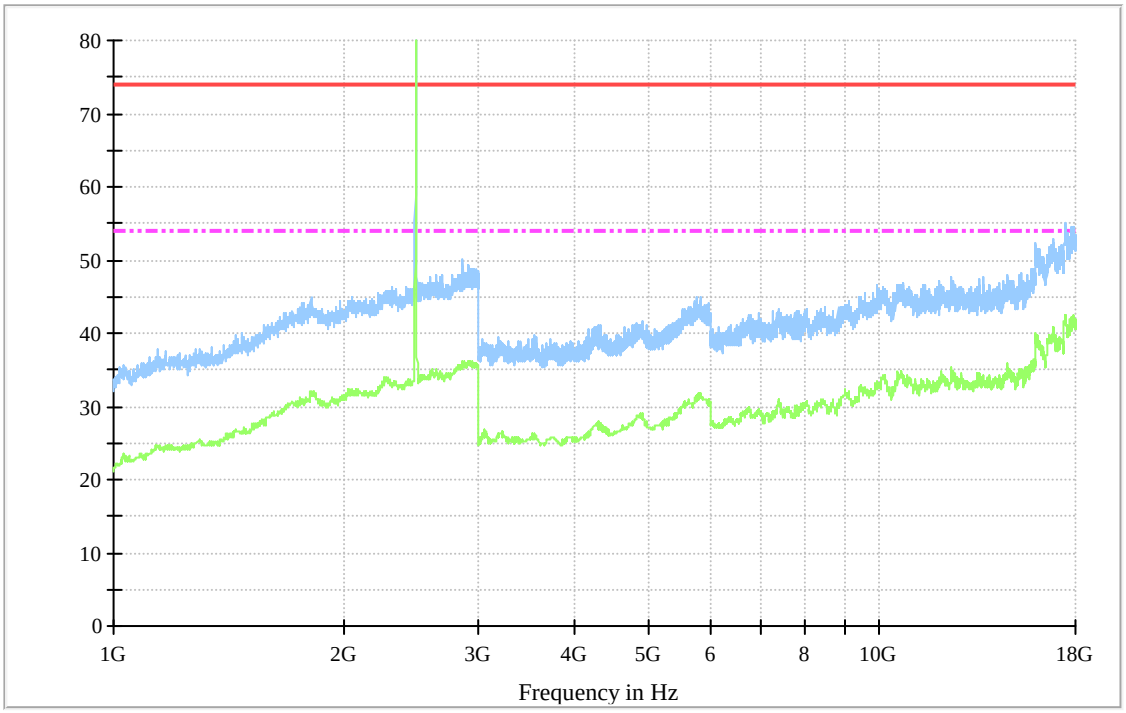
Frequency (MHz)	MaxPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4949.297595	44.0	1000.000	100.0	V	164.0	30.00	74.00

Frequency (MHz)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4948.797595	31.9	1000.000	100.0	V	180.0	22.10	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	12
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

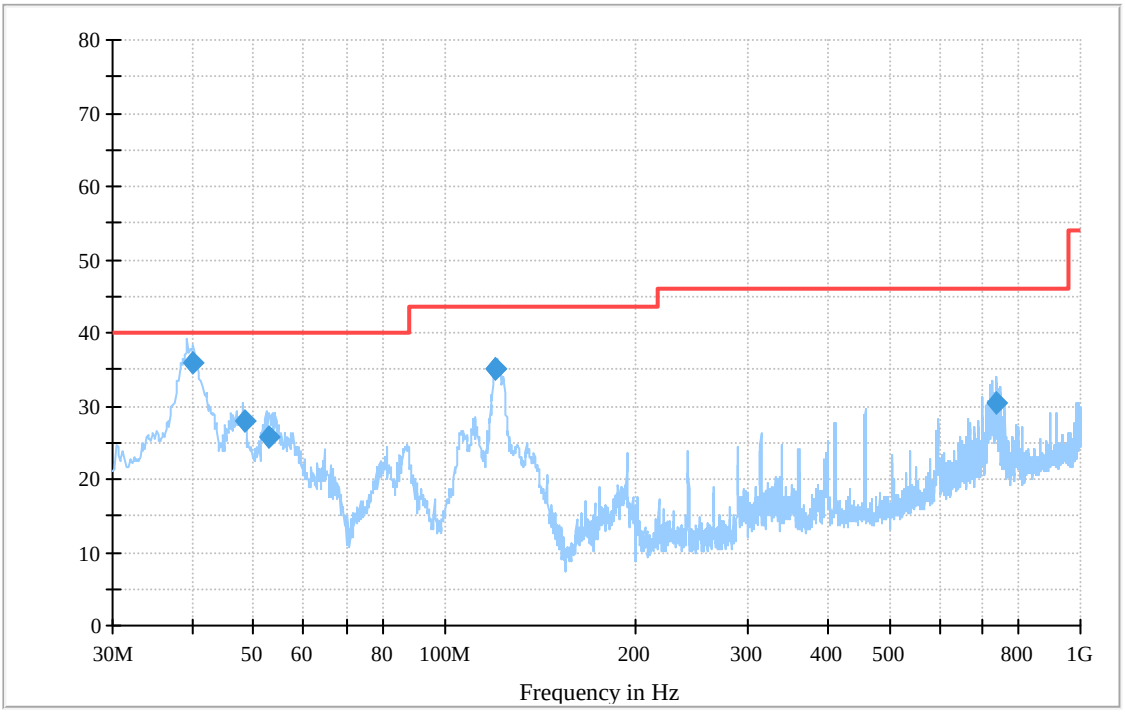
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	13
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

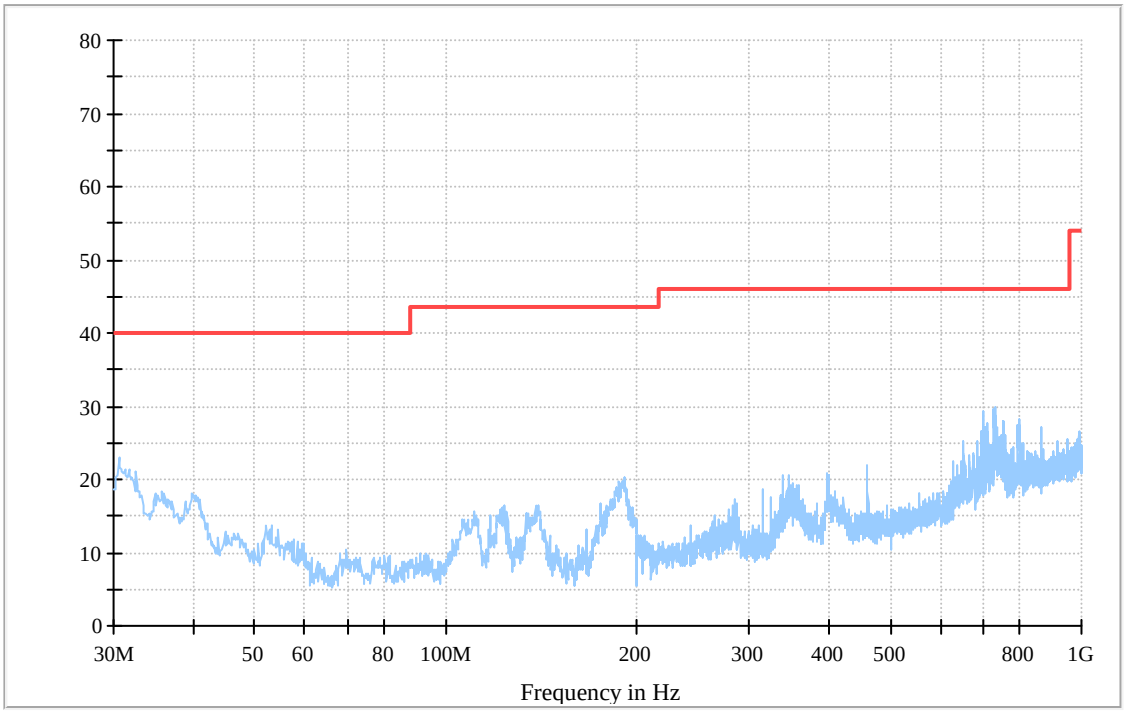


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
40.108517	35.8	120.000	100.0	V	202.0	4.20	40.00
48.466192	27.9	120.000	100.0	V	22.0	12.10	40.00
52.914609	25.7	120.000	100.0	V	187.0	14.30	40.00
120.362084	34.9	120.000	100.0	V	202.0	8.60	43.50
120.374088	34.9	120.000	100.0	V	202.0	8.60	43.50
737.396152	30.5	120.000	100.0	V	21.0	15.50	46.00

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	14
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

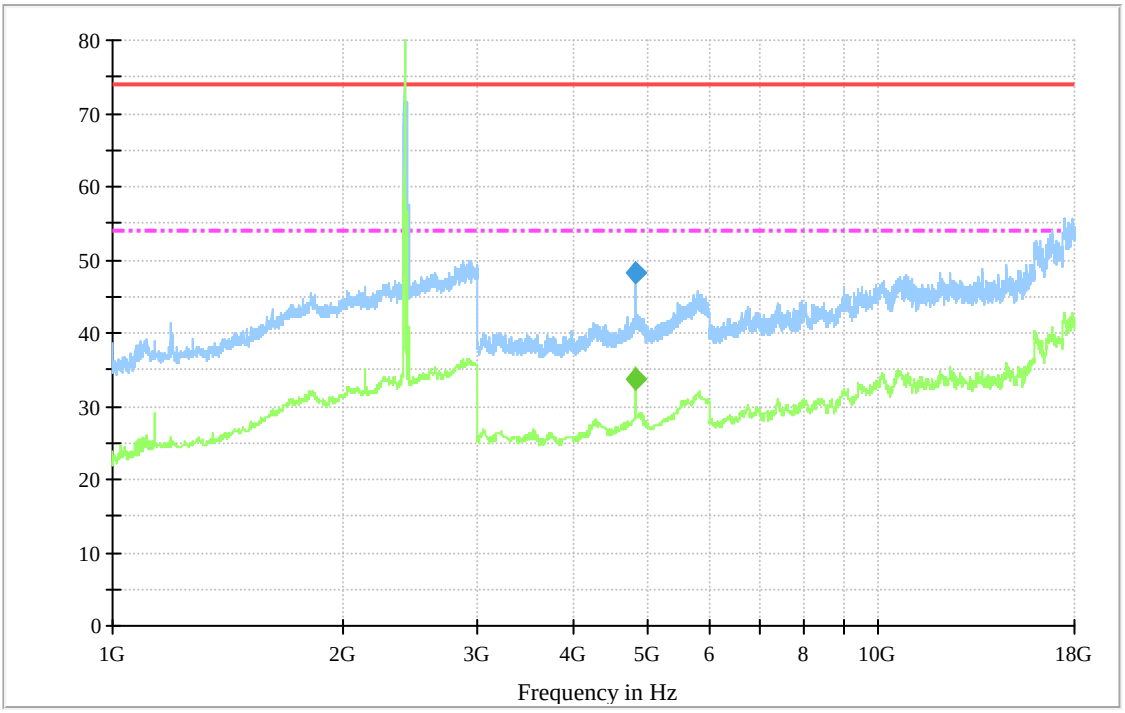
Level in dBµV/m



Final quasi-peak measurement result
The margin was more than 10dB.

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	15
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

Level in dBµV/m



Final measurement result:

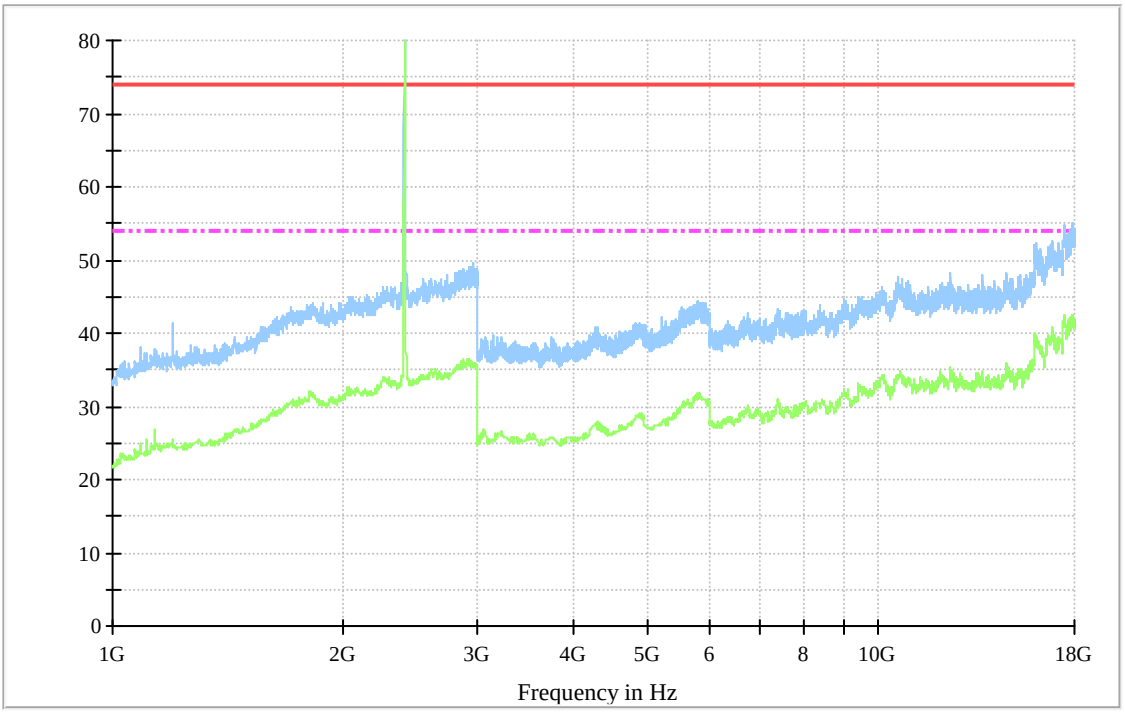
Frequency (MHz)	MaxPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4809.016233	48.2	1000.000	100.0	V	158.0	25.80	74.00

Frequency (MHz)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4809.919840	33.6	1000.000	100.0	V	180.0	20.40	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, low channel	**Data No.**	16
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

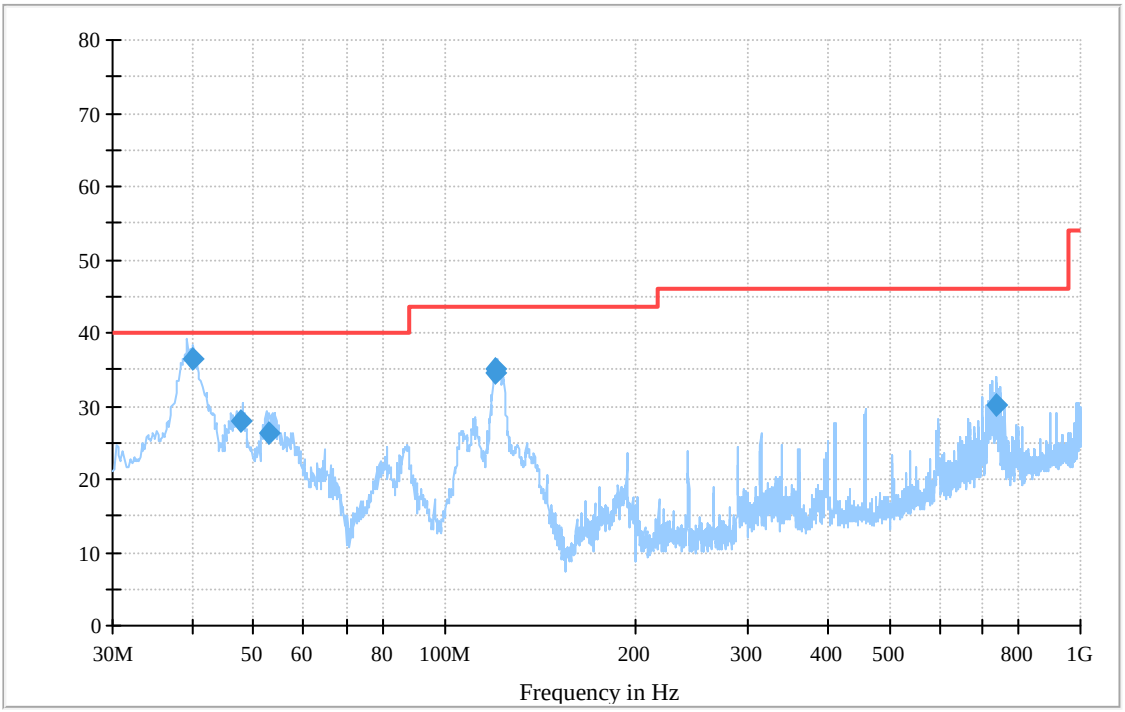
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	17
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

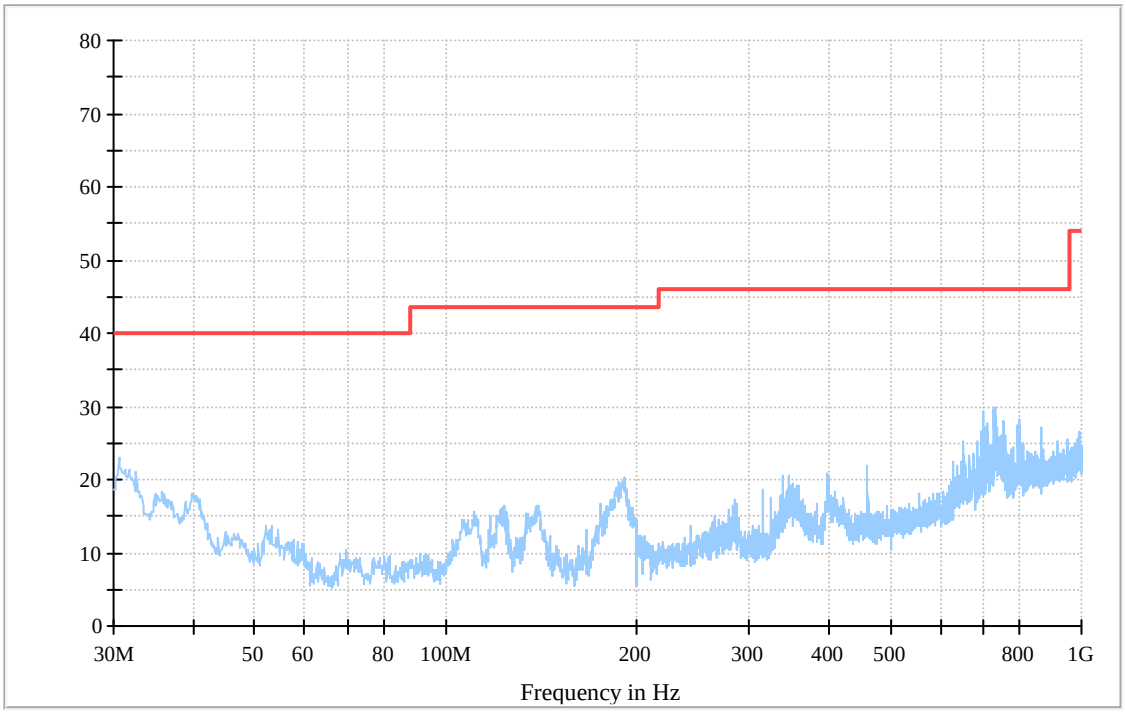


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
40.143517	35.6	120.000	100.0	V	202.0	4.40	40.00
47.432192	26.7	120.000	100.0	V	212.0	13.30	40.00
52.914609	25.7	120.000	100.0	V	157.0	14.30	40.00
119.432084	35.0	120.000	100.0	V	212.0	8.50	43.50
120.374088	34.9	120.000	100.0	V	131.0	8.60	43.50
739.396432	30.3	120.000	100.0	V	121.0	15.70	46.00

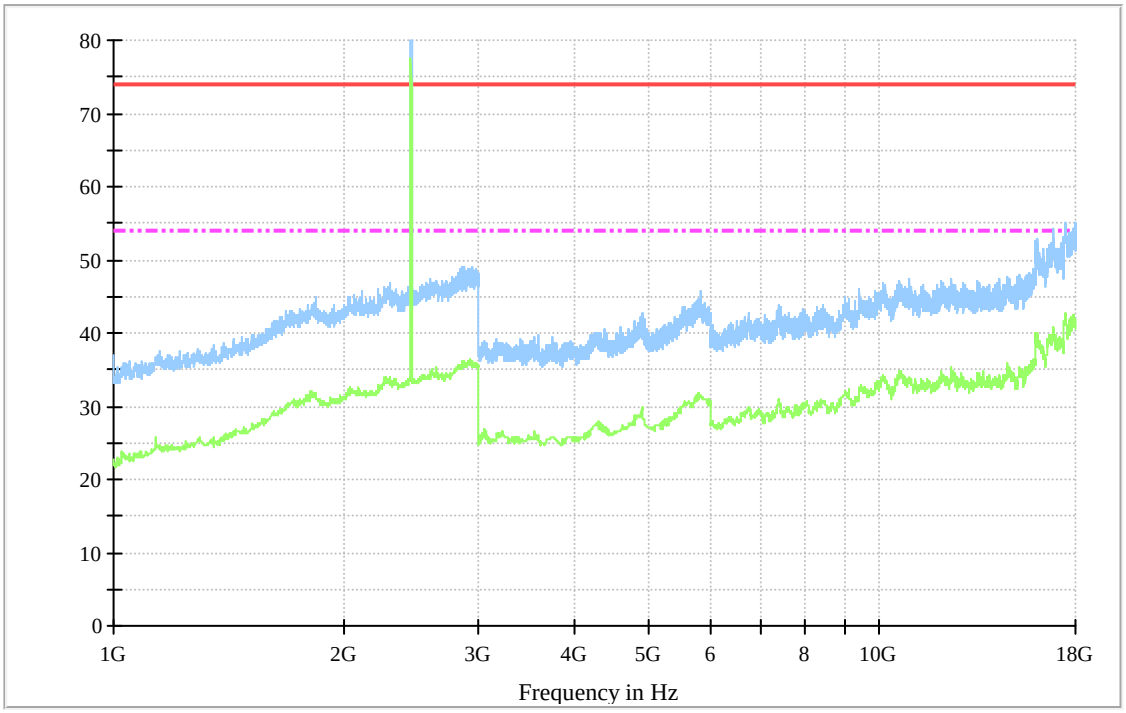
Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	18
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

Level in dBµV/m



Final quasi-peak measurement result
The margin was more than 10dB.

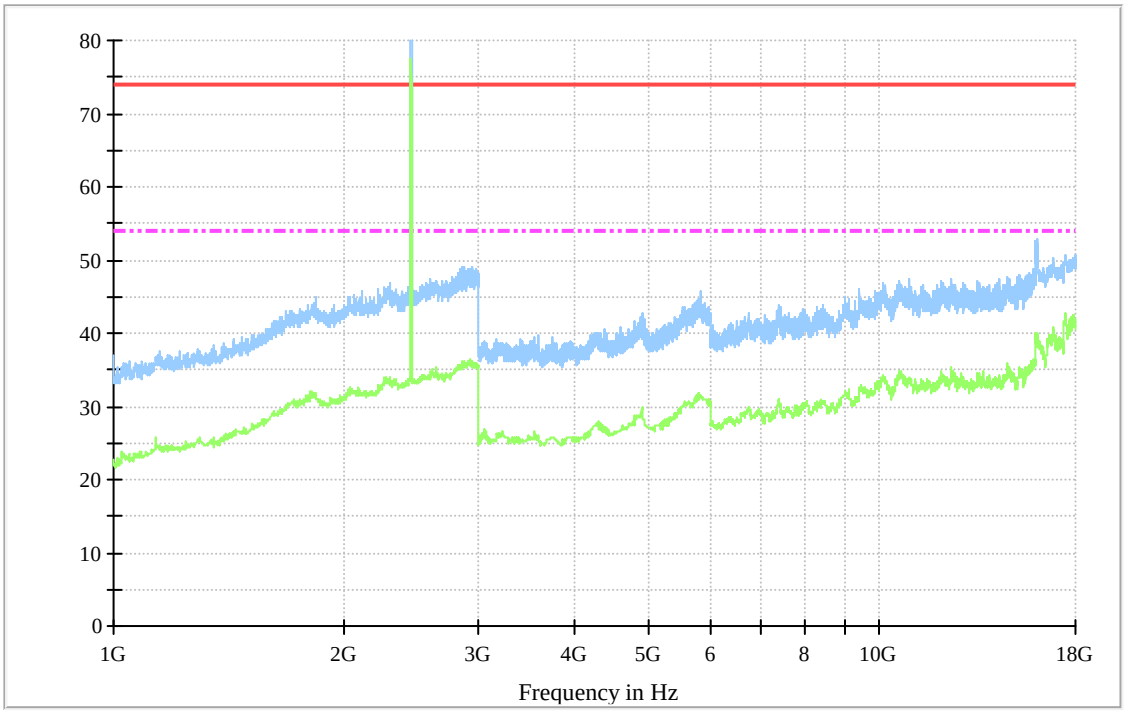
Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	19
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, mid channel	**Data No.**	20
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

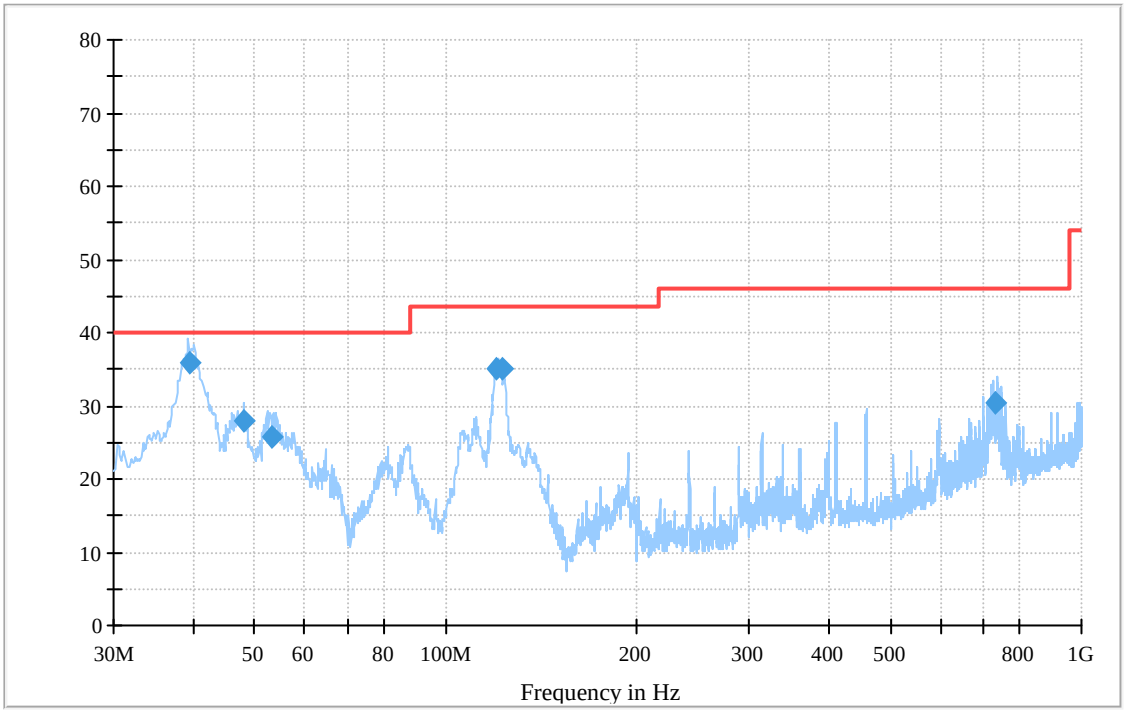
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	21
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

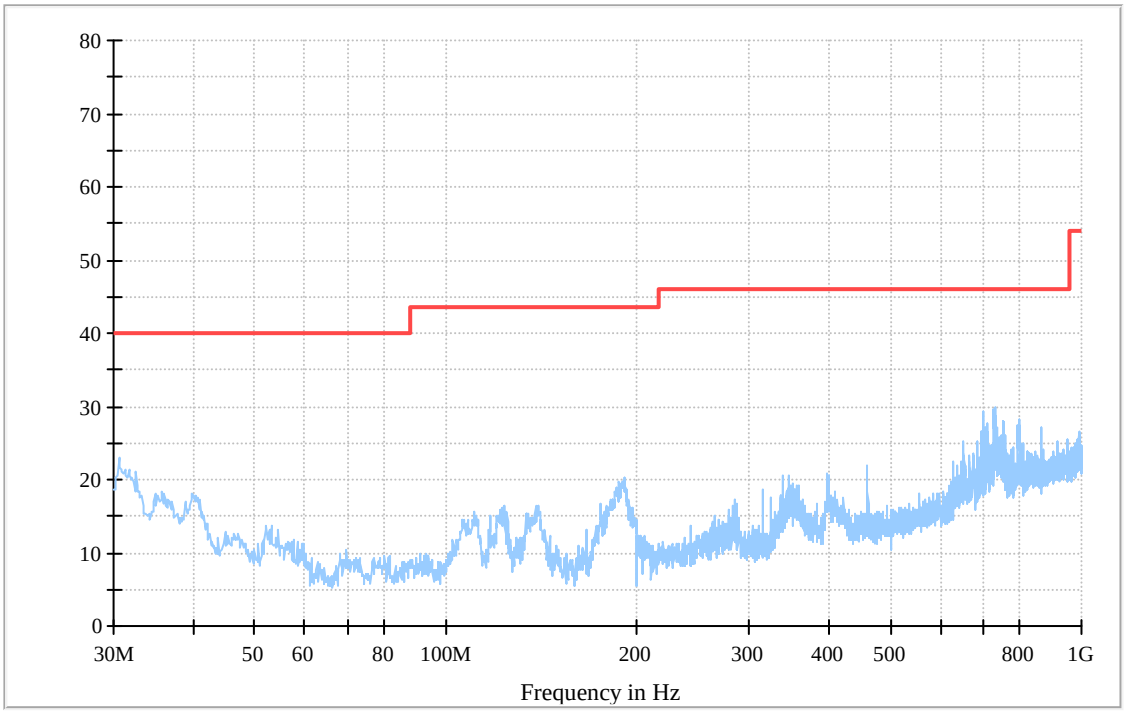


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
39.532642	35.7	120.000	100.0	V	342.0	4.30	40.00
48.876192	27.4	120.000	100.0	V	122.0	12.60	40.00
53.532609	25.7	120.000	100.0	V	137.0	14.30	40.00
123.362453	34.9	120.000	100.0	V	256.0	8.60	43.50
120.374088	34.9	120.000	100.0	V	132.0	8.60	43.50
737.396152	30.5	120.000	100.0	V	21.0	15.50	46.00

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	22
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

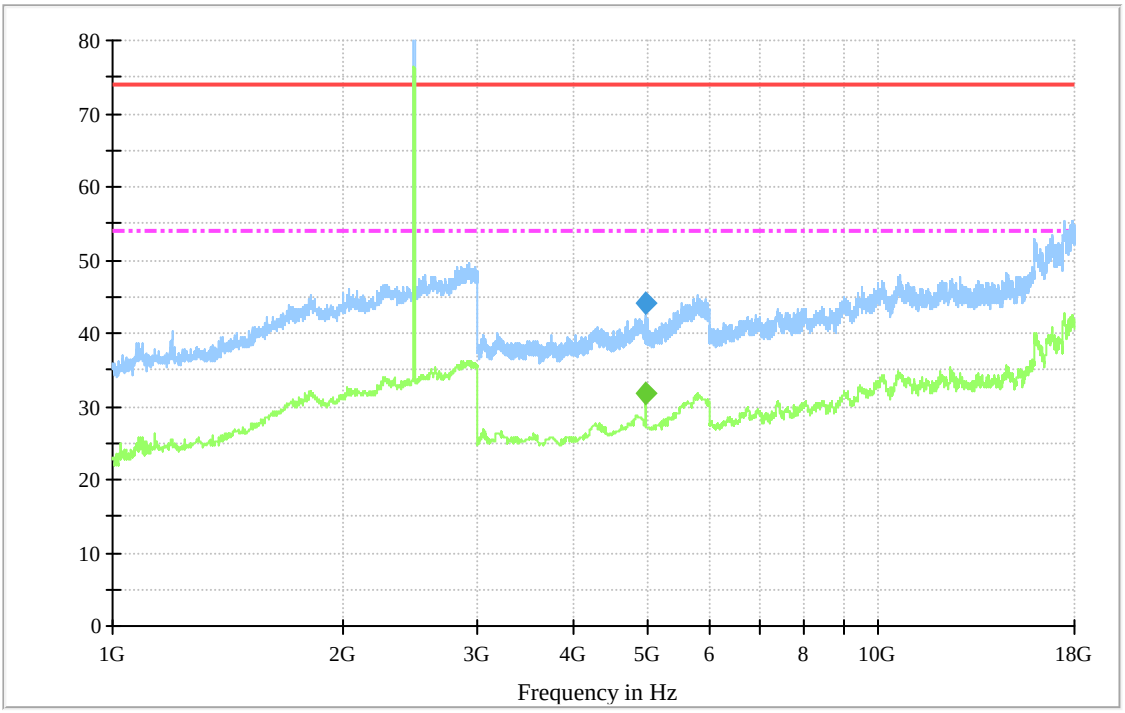
Level in dBµV/m



Final quasi-peak measurement result
The margin was more than 10dB.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	23
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

Level in dBµV/m



Final measurement result:

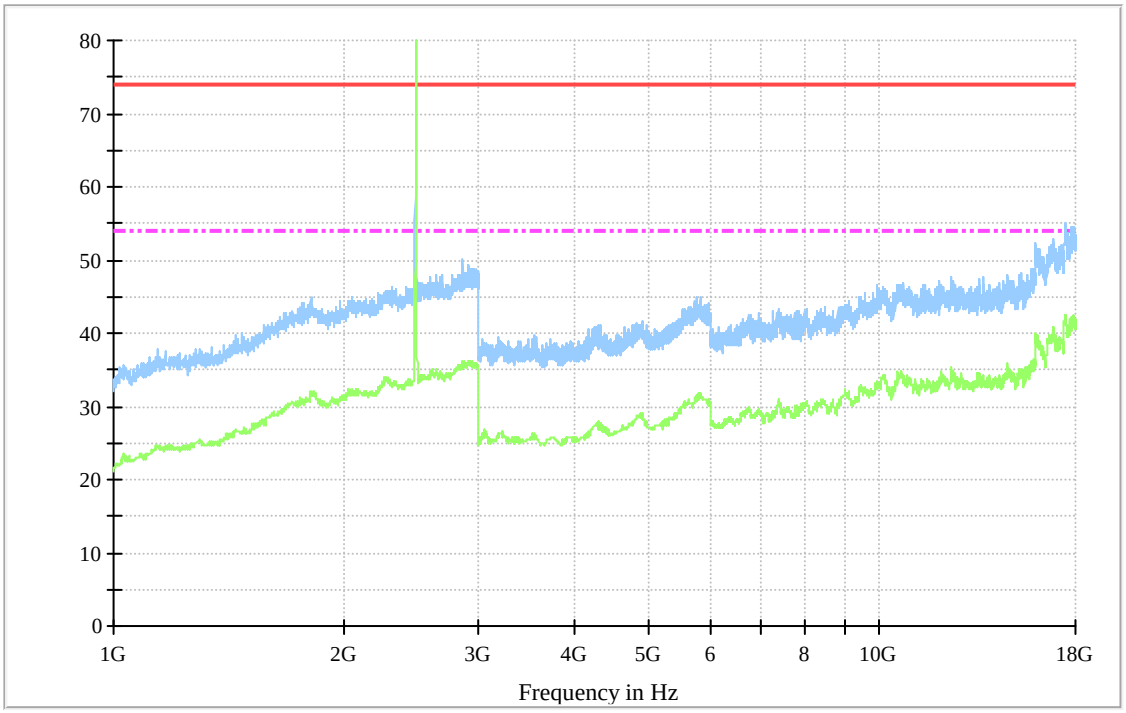
Frequency (MHz)	MaxPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4949.297595	44.0	1000.000	100.0	V	164.0	30.00	74.00

Frequency (MHz)	Average (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
4948.797595	31.9	1000.000	100.0	V	180.0	22.10	54.00

Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Transmiting on, high channel	**Data No.**	24
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

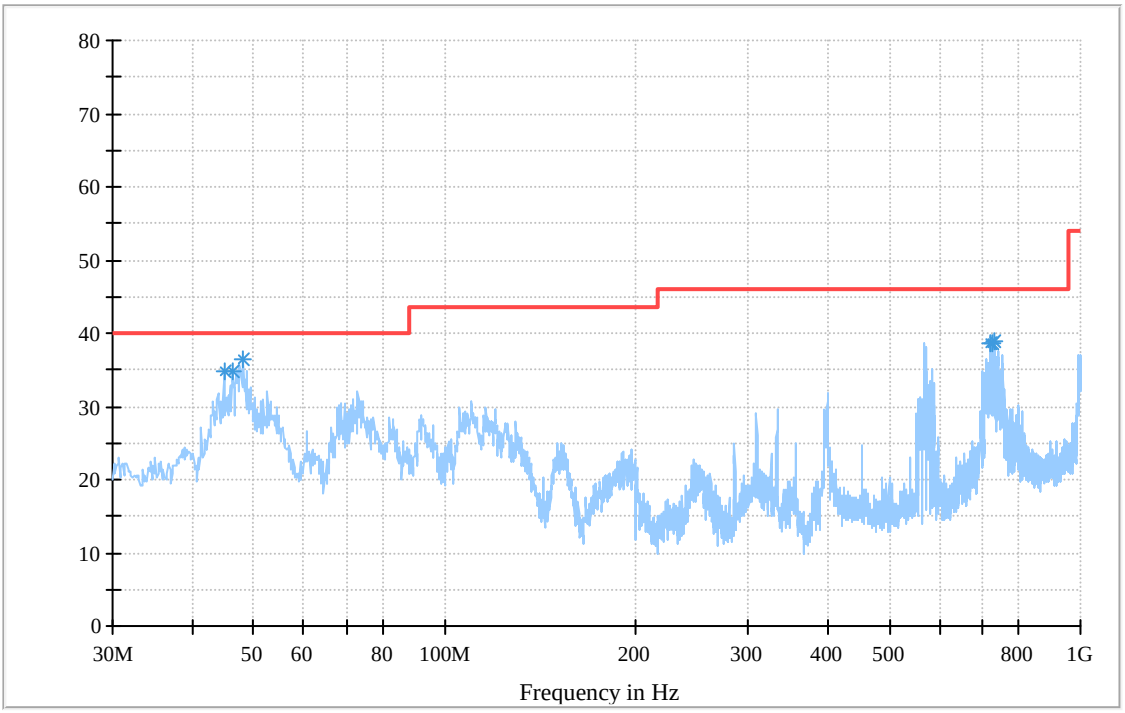
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Decoding	**Data No.**	25
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

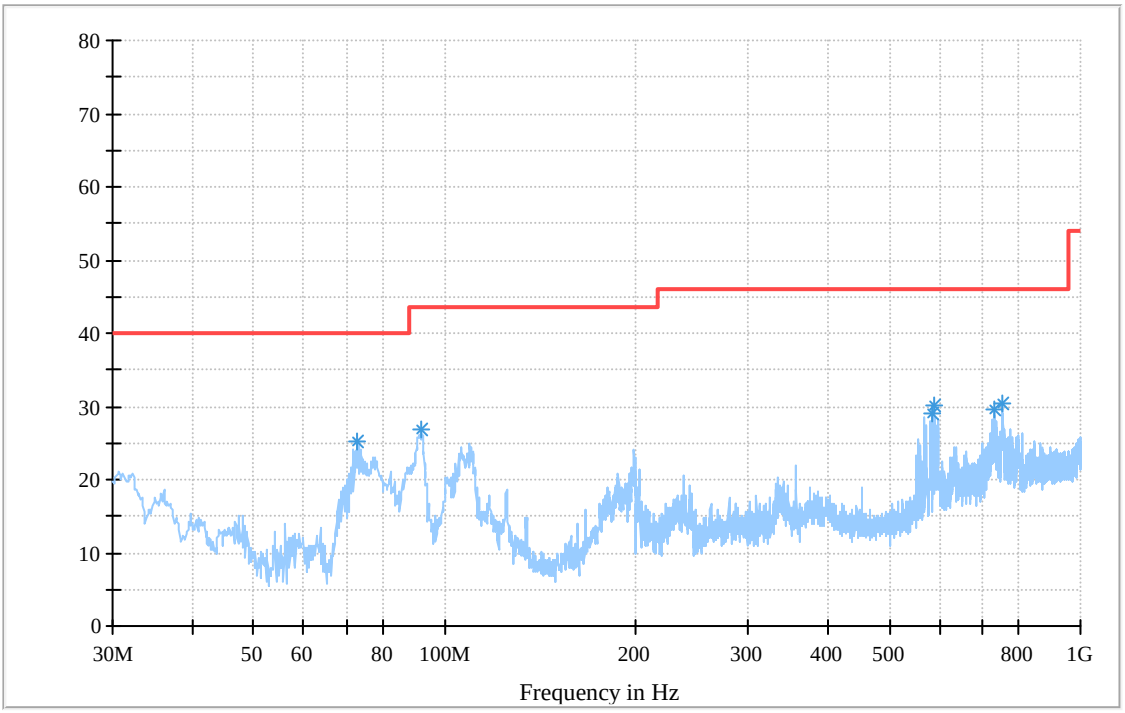


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
45.010020	34.8	120.000	100.0	V	112.0	5.2	40.00
46.272545	34.9	120.000	100.0	V	22.0	5.1	40.00
48.236473	36.5	120.000	100.0	V	42.0	3.5	40.00
719.839679	38.7	120.000	100.0	V	17.0	7.3	46.00
726.052104	38.7	120.000	100.0	V	132.0	7.3	46.00
729.258517	38.9	120.000	100.0	V	261.0	7.1	46.00

Result Information			
Testing mode	Decoding	**Data No.**	26
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

Level in dBµV/m

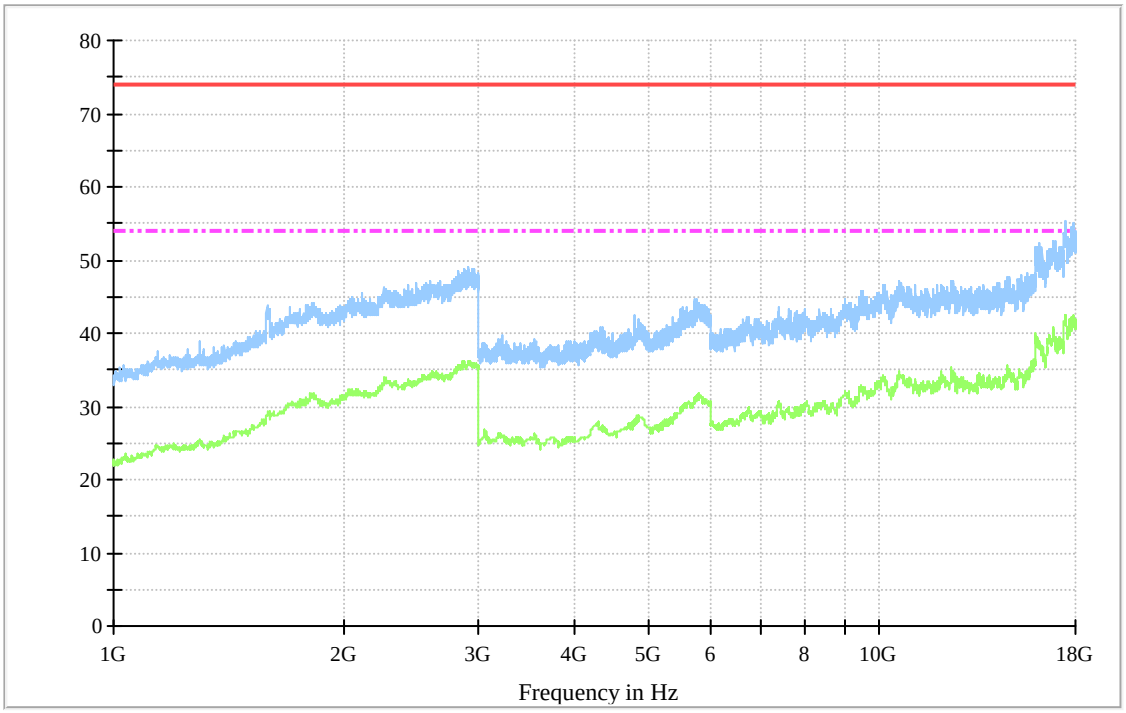


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
72.785571	25.3	120.000	100.0	H	74.7	14.7	40.00
91.723447	26.7	120.000	100.0	H	286.8	13.3	40.00
583.366733	29.1	120.000	100.0	H	296.4	16.9	46.00
588.376754	30.0	120.000	100.0	H	317.1	16	46.00
730.460922	29.6	120.000	100.0	H	61.8	16.4	46.00
755.911824	30.3	120.000	100.0	H	328.0	15.7	46.00

Result Information			
Testing mode	Decoding	**Data No.**	27
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

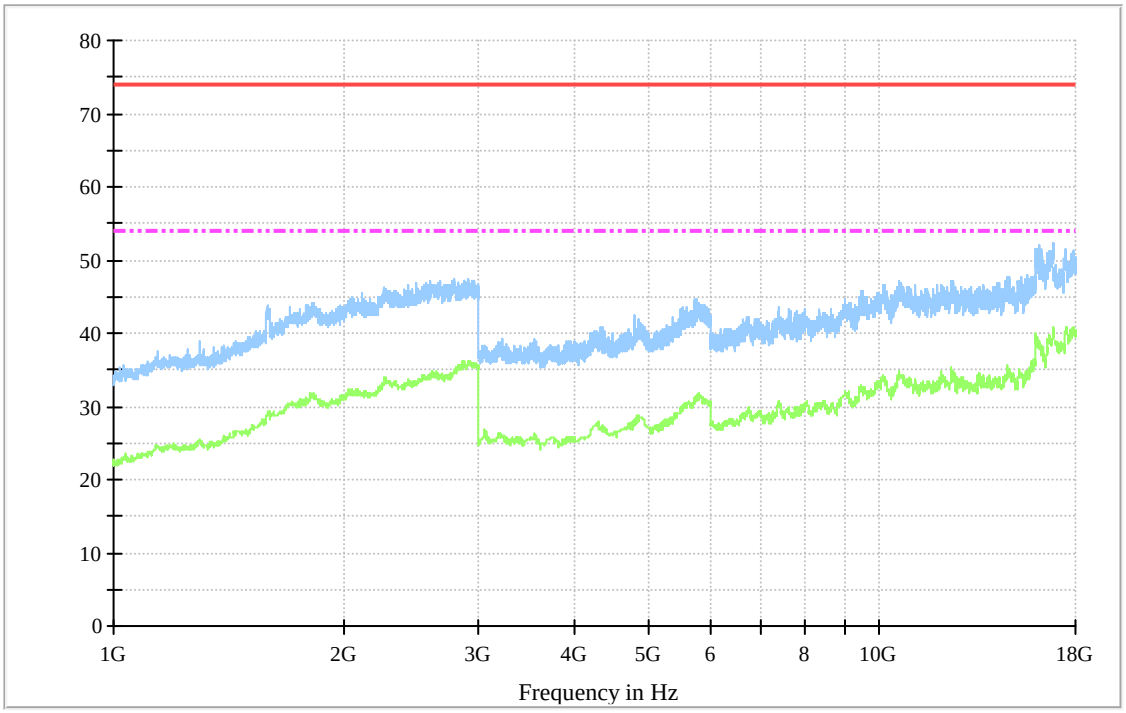
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Decoding	**Data No.**	28
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

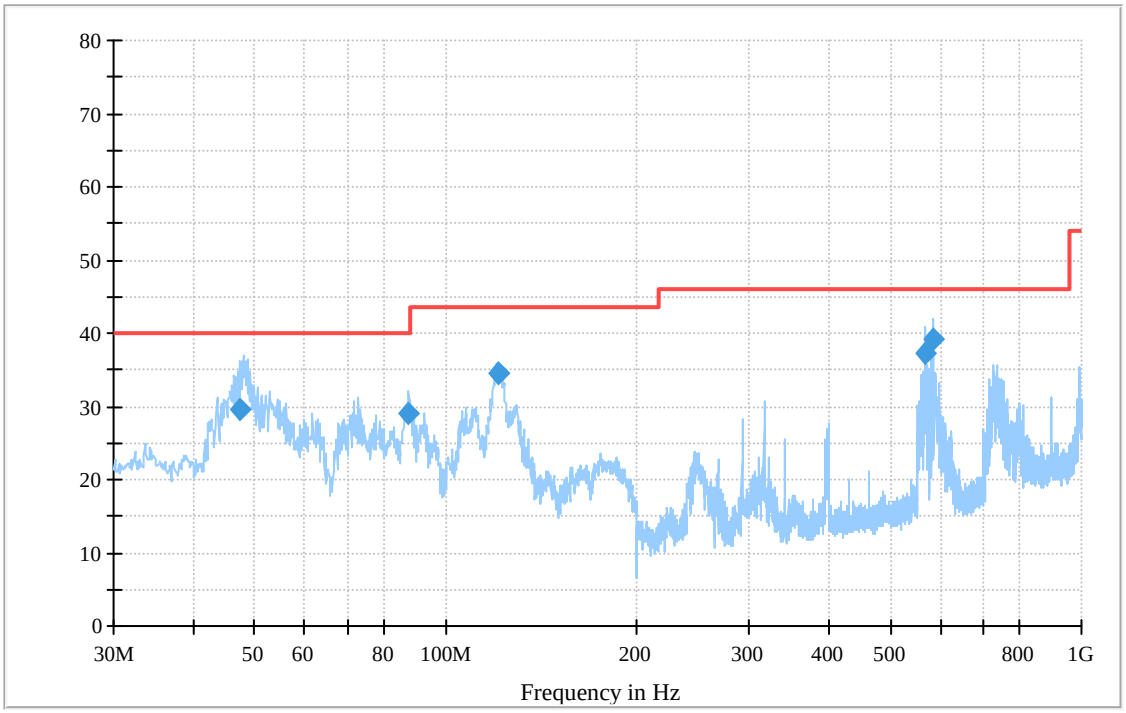
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Decoding	**Data No.**	29
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

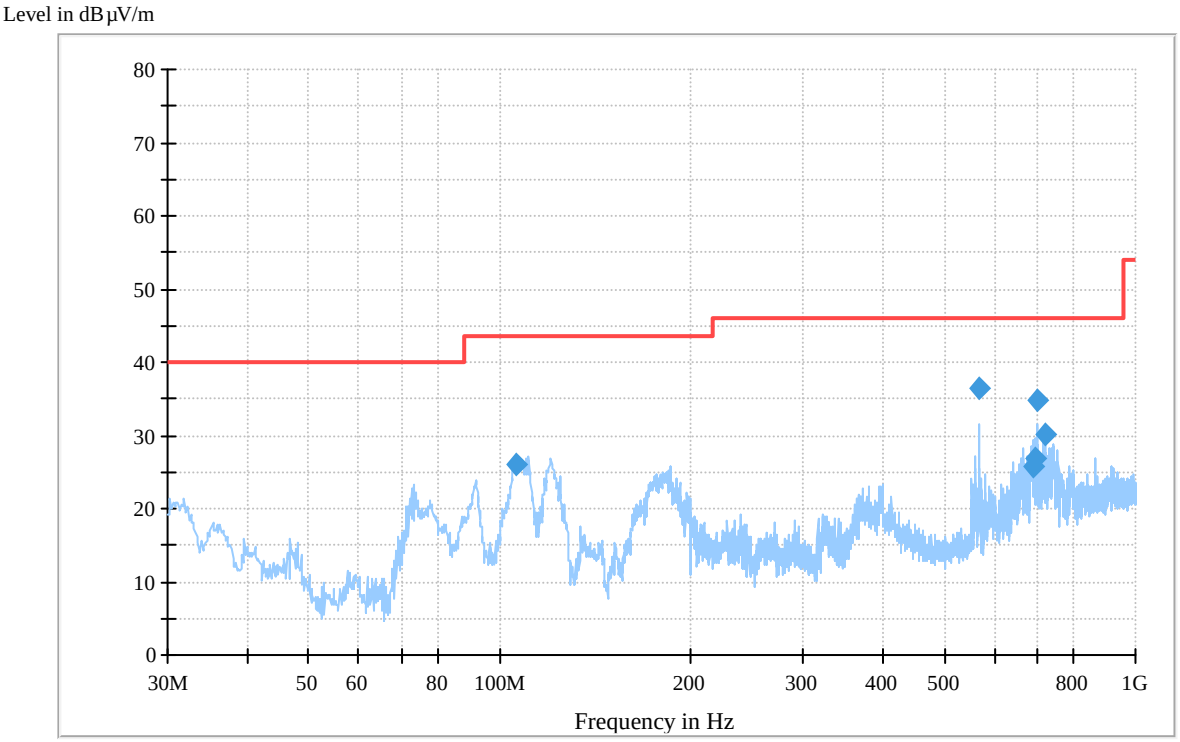
Level in dBµV/m



Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
47.545912	29.6	120.000	100.0	V	23.0	10.40	40.00
87.264749	29.0	120.000	100.0	V	23.0	11.00	40.00
120.750882	34.6	120.000	100.0	V	23.0	8.90	43.50
120.864890	34.5	120.000	100.0	V	17.0	9.00	43.50
566.653467	37.3	120.000	100.0	V	5.0	8.70	46.00
583.316733	39.3	120.000	100.0	V	21.0	6.70	46.00

Result Information			
Testing mode	Decoding	**Data No.**	30
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

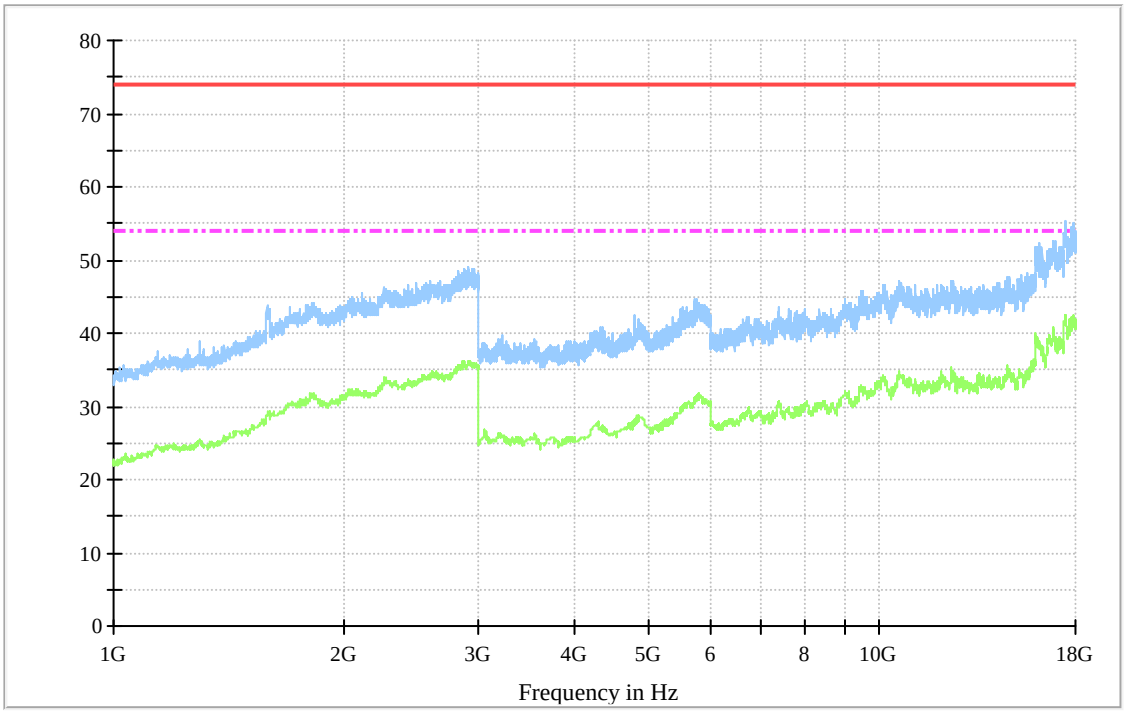


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
106.241623	25.9	120.000	100.0	H	159.9	17.60	43.50
566.653467	36.5	120.000	100.0	H	210.6	9.50	46.00
688.749158	25.9	120.000	100.0	H	186.0	20.10	46.00
695.992385	26.7	120.000	100.0	H	102.0	19.30	46.00
701.993607	34.8	120.000	100.0	H	322.1	11.20	46.00
719.936072	30.1	120.000	100.0	H	335.3	15.90	46.00

Result Information			
Testing mode	Decoding	**Data No.**	31
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

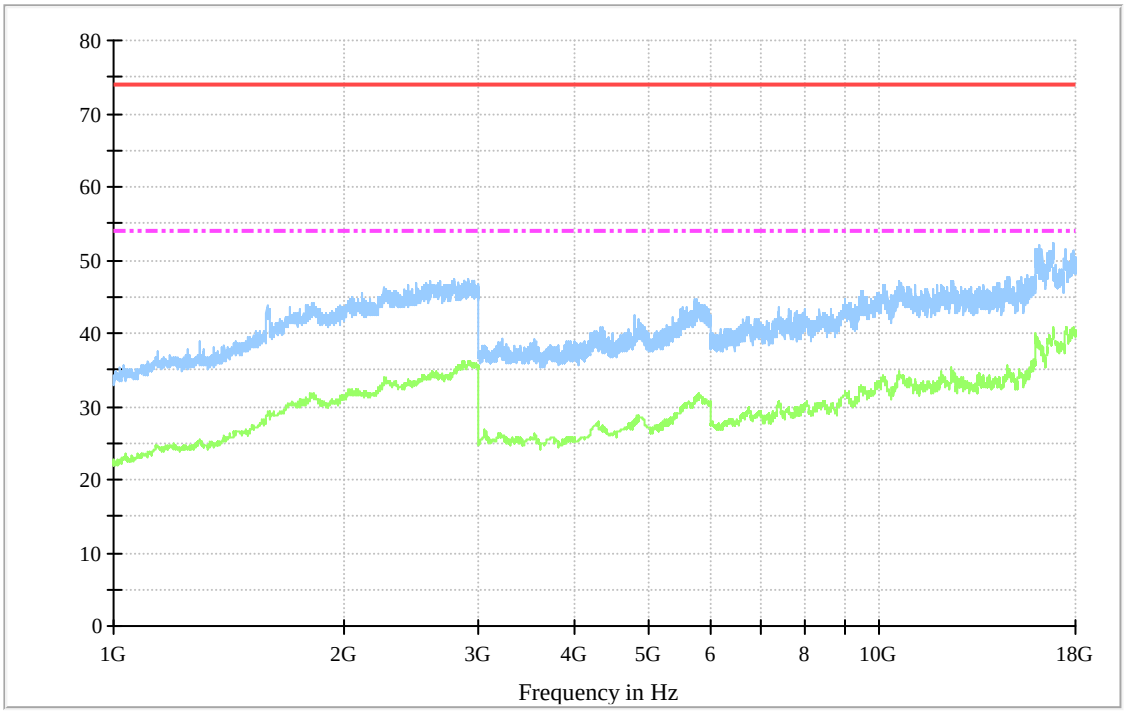
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Decoding	**Data No.**	32
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

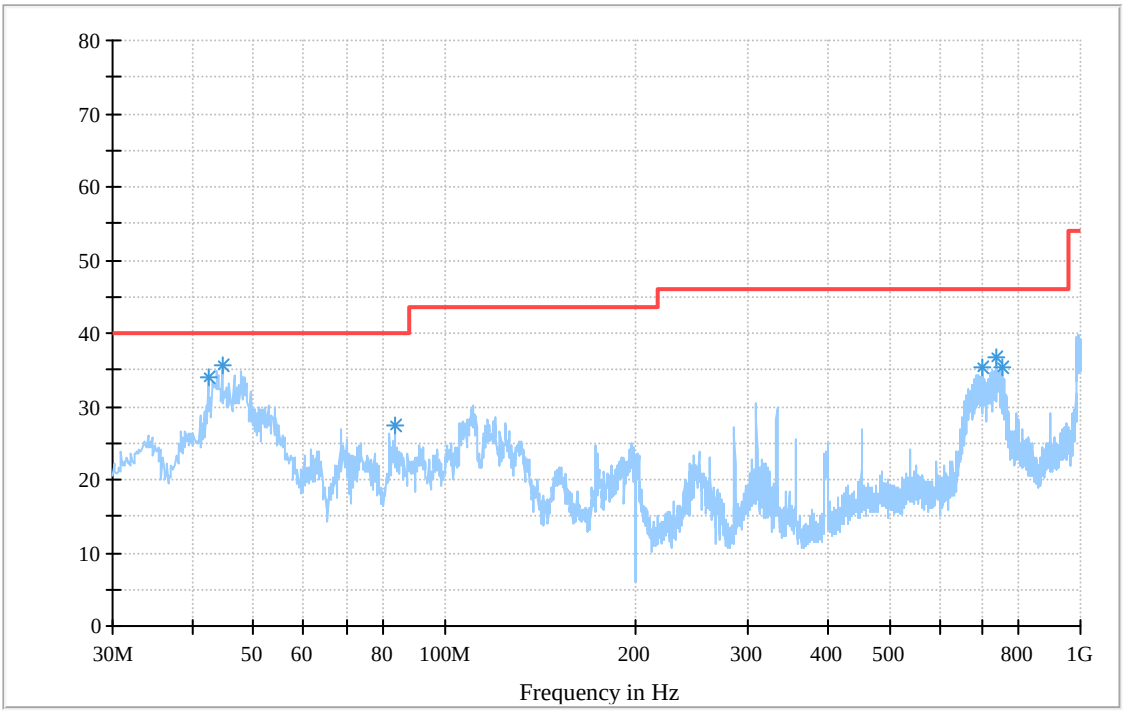
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Standby	**Data No.**	33
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

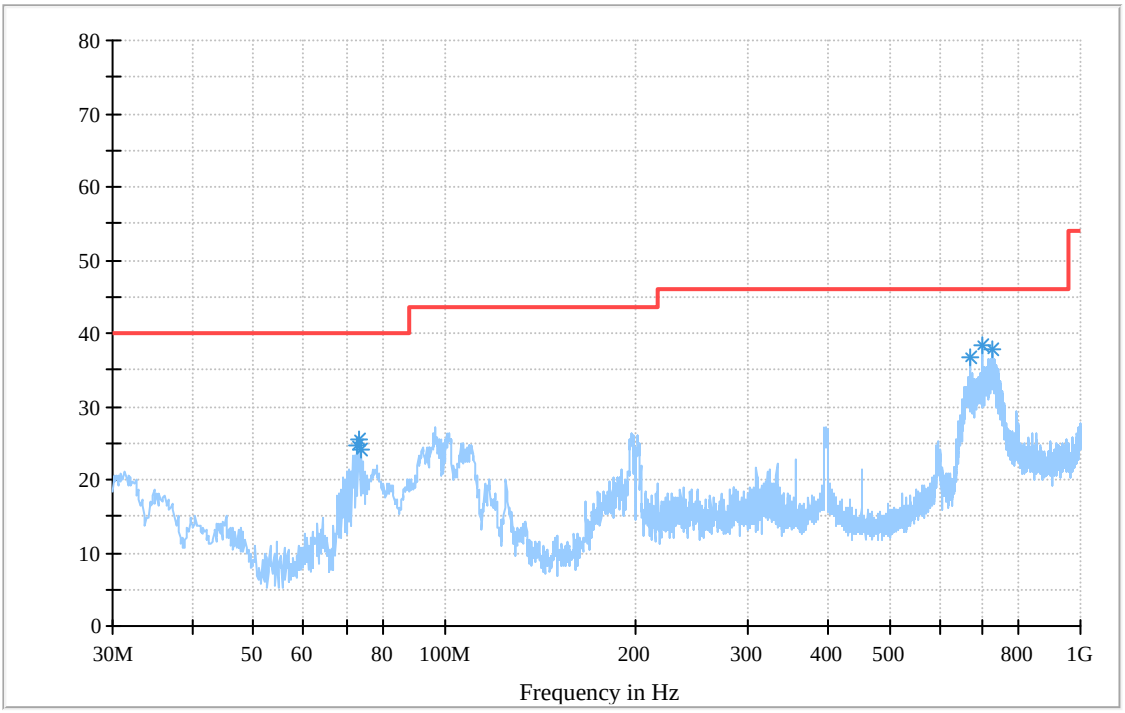


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
42.484970	33.9	120.000	100.0	V	343.6	6.1	40.00
44.589178	35.5	120.000	100.0	V	172.0	4.5	40.00
83.446894	27.4	120.000	100.0	V	319.4	12.6	40.00
701.803607	35.4	120.000	100.0	V	298.9	10.6	46.00
736.472946	36.7	120.000	100.0	V	314.1	9.3	46.00
755.911824	35.3	120.000	100.0	V	339.4	10.7	46.00

Result Information			
Testing mode	Standby	**Data No.**	34
Power supply	Adapter 1	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

Level in dBµV/m

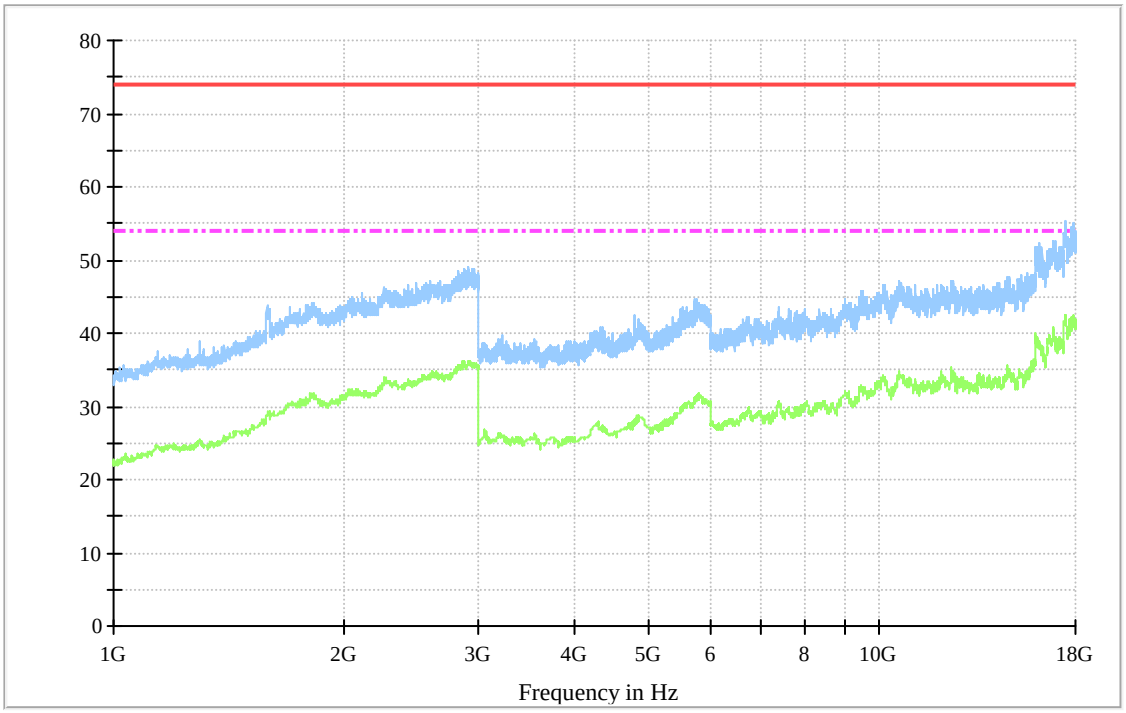


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
72.505010	24.5	120.000	100.0	H	331.2	19	43.50
73.206413	25.6	120.000	100.0	H	190.6	17.9	43.50
73.767535	24.1	120.000	100.0	H	25.6	19.4	43.50
670.541082	36.6	120.000	100.0	H	125.8	9.4	46.00
701.803607	38.3	120.000	100.0	H	77.7	7.7	46.00
728.857716	37.7	120.000	100.0	H	269.8	8.3	46.00

Result Information			
Testing mode	Standby	**Data No.**	35
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

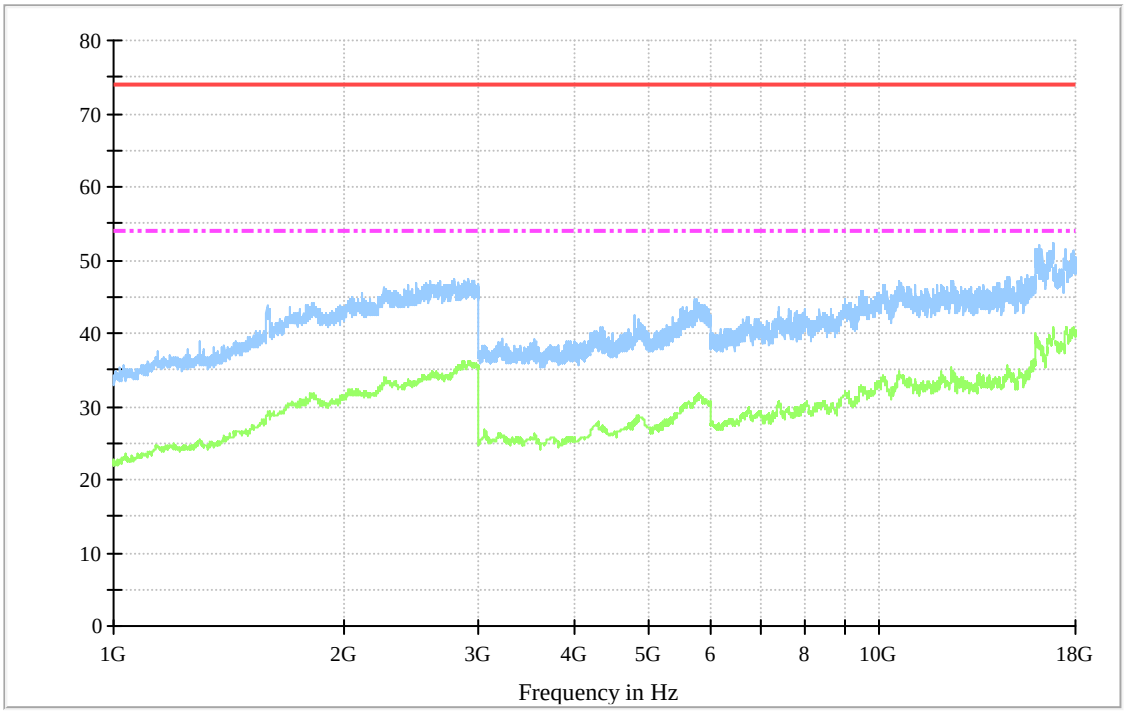
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Standby	**Data No.**	36
Power supply	Adapter 1	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

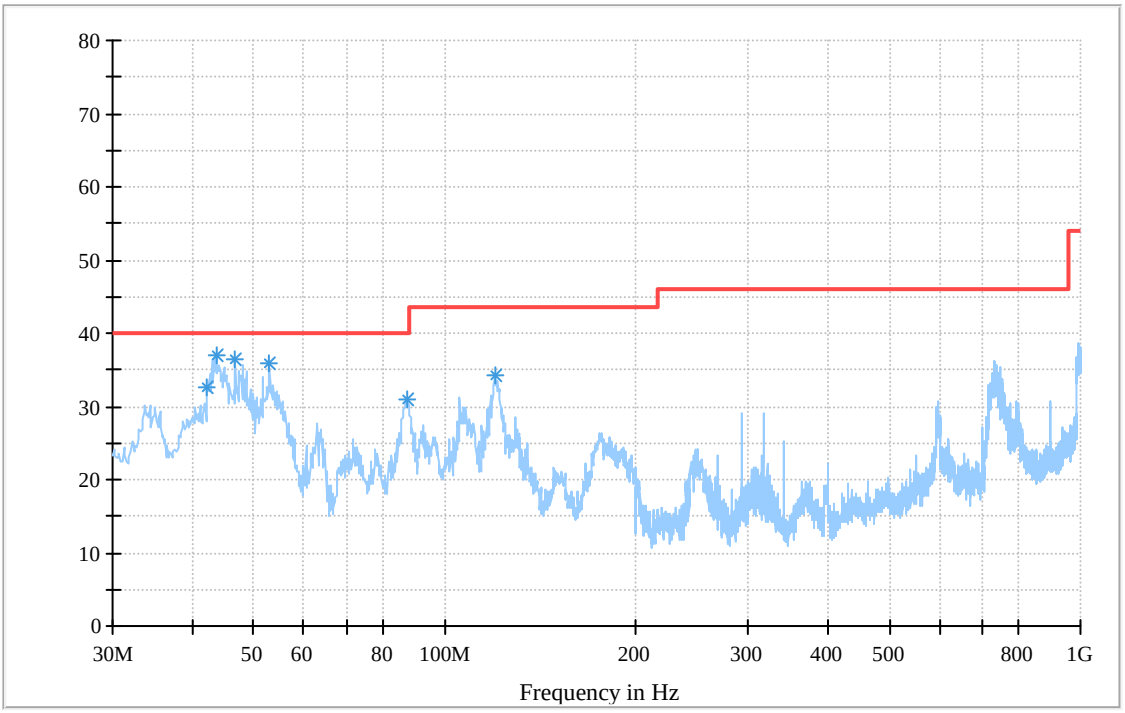
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Standby	**Data No.**	37
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Vertical		

Level in dBµV/m

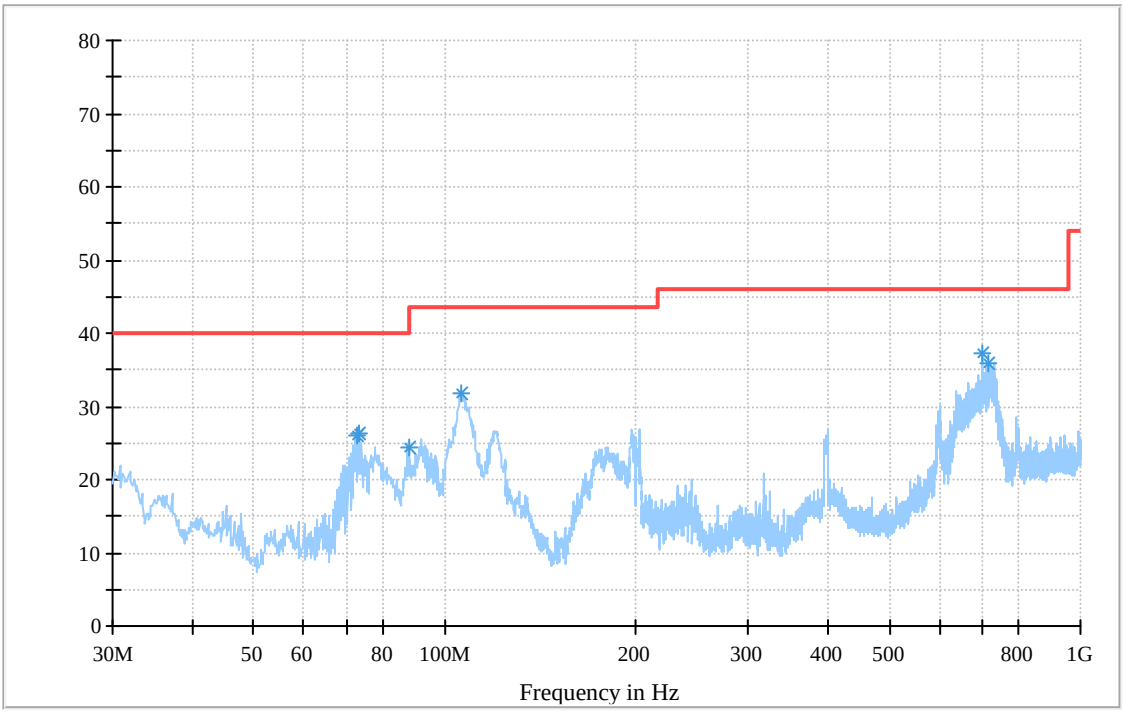


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
42.344689	32.7	120.000	100.0	V	221.1	7.3	40.00
43.607214	37.1	120.000	100.0	V	174.8	2.9	40.00
46.833667	36.3	120.000	100.0	V	143.5	3.7	40.00
53.006012	35.8	120.000	100.0	V	198.2	4.2	40.00
87.234469	30.9	120.000	100.0	V	342.9	9.1	40.00
119.639279	34.2	120.000	100.0	V	26.2	9.3	43.50

Result Information			
Testing mode	Standby	**Data No.**	38
Power supply	Adapter 2	**Test frequency**	Below 1GHz
Antenna polarization	Horizontal		

Level in dBµV/m

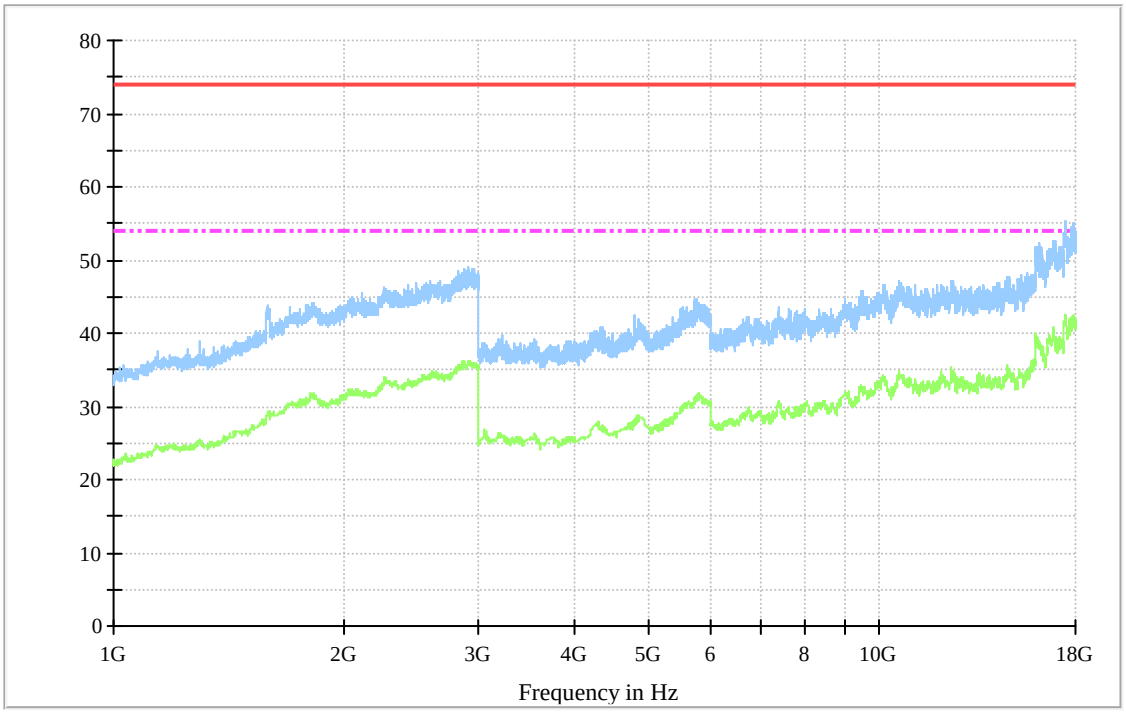


Final quasi-peak measurement result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
72.505010	26.2	120.000	100.0	H	206.2	13.8	40.00
73.066132	26.2	120.000	100.0	H	37.2	13.8	40.00
87.655311	24.5	120.000	100.0	H	164.8	15.5	40.00
106.012024	31.8	120.000	100.0	H	33.8	11.7	43.50
701.803607	37.3	120.000	100.0	H	33.7	8.7	46.00
716.032064	36.0	120.000	100.0	H	119.8	10.0	46.00

Result Information			
Testing mode	Standby	**Data No.**	39
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Vertical		

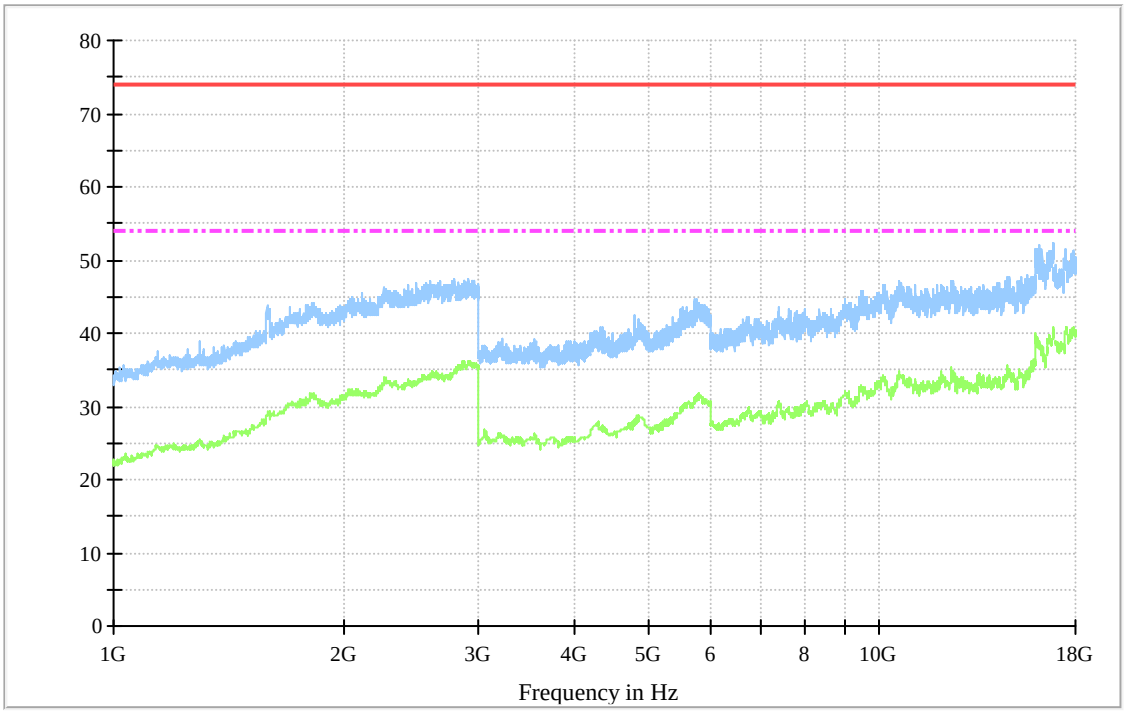
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Result Information			
Testing mode	Standby	**Data No.**	40
Power supply	Adapter 2	**Test frequency**	Above 1GHz
Antenna polarization	Horizontal		

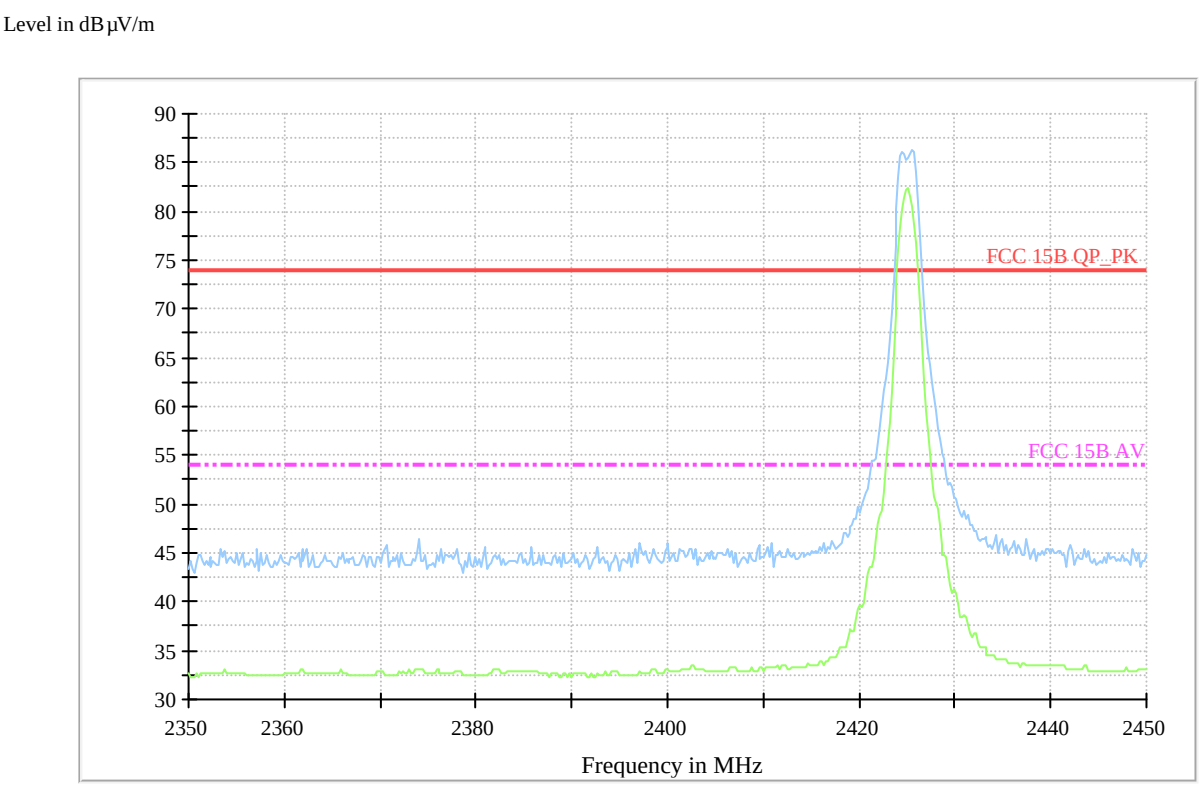
Level in dBµV/m



Final measurement result:
No emission was found above the background noise.
Note: At the frequency from 18GHz-26GHz, no emission was found above the background noise.

Band Edge measurement results

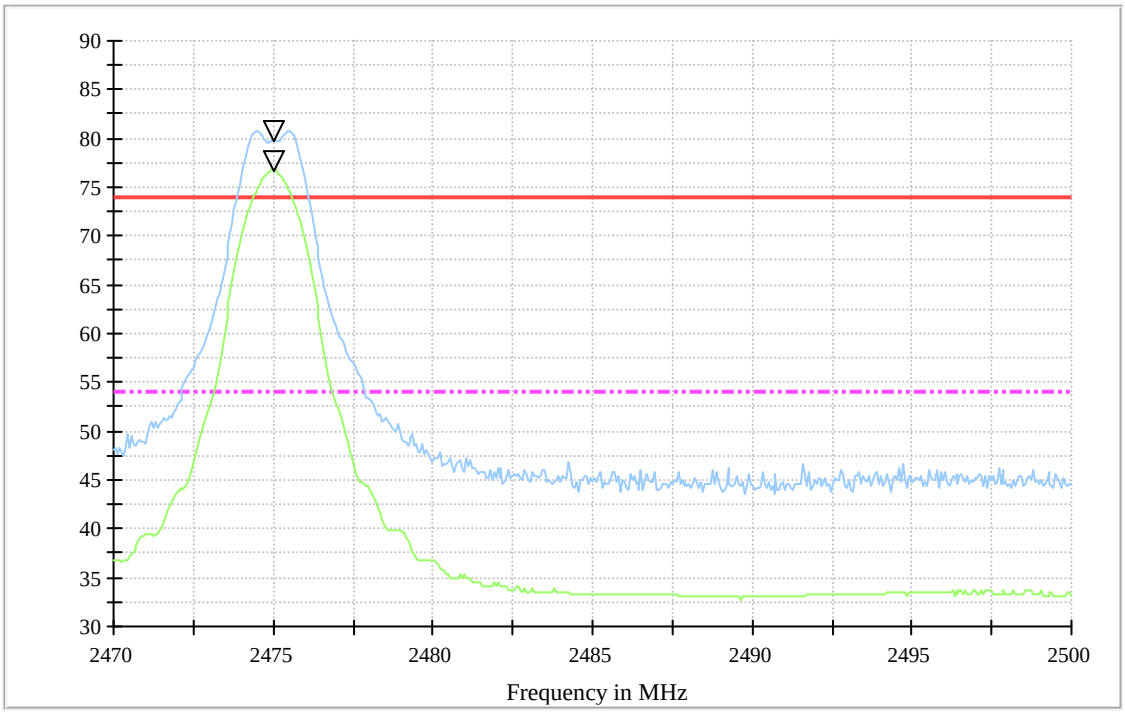
Low Channel, vertical and horizontal polarization:



Final measurement result:

Frequency(MHz)	polarization (horizontal H/ vertical V)	Detector	Level (dBuV/m)	Result
2424.949900	V	Peak	85.316	--
2424.949900	V	AV	82.247	--
2389.879760	V	Peak	44.413	Passed
2389.879760	V	AV	32.573	Passed
2400.701403	V	Peak	44.902	Passed
2400.701403	V	AV	32.831	Passed

High Channel, vertical and horizontal polarization:



Final measurement result:

Frequency(MHz)	polarization (horizontal H/ vertical V)	Detector	Level (dBuV/m)	Result
2474.989980	V	Peak	79.873	--
2474.989980	V	AV	76.873	--
2483.527054	V	Peak	45.110	Passed
2483.527054	V	AV	33.493	Passed

4.1.7 Conducted emissions

RESULT: **Passed**

Date of testing	:	2014-05-16
Test standard	:	FCC Part 15.207(a)
Basic standard	:	ANSI C63.10: 2009
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a)
Kind of test site	:	Shield room

Test setup

Input Voltage	:	AC 120V,60Hz
Operation Mode	:	A, B and C
Earthing	:	Not Connected
Ambient temperature	:	23℃
Relative humidity	:	49%
Atmospheric pressure	:	100 kPa

The measurement setup was made in a shielded room.

The measurement equipment like test receivers, quasi-peak detector, average detector and LISN are in compliance with CISPR 16-1 series standards and ANSI C63.10-2009. The tested object was operated under its rated voltage and its rated frequency. Prior to the measurements the test object operated about 5 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

Furthermore an internal calibration with the test receiver was conducted prior to each measurement.

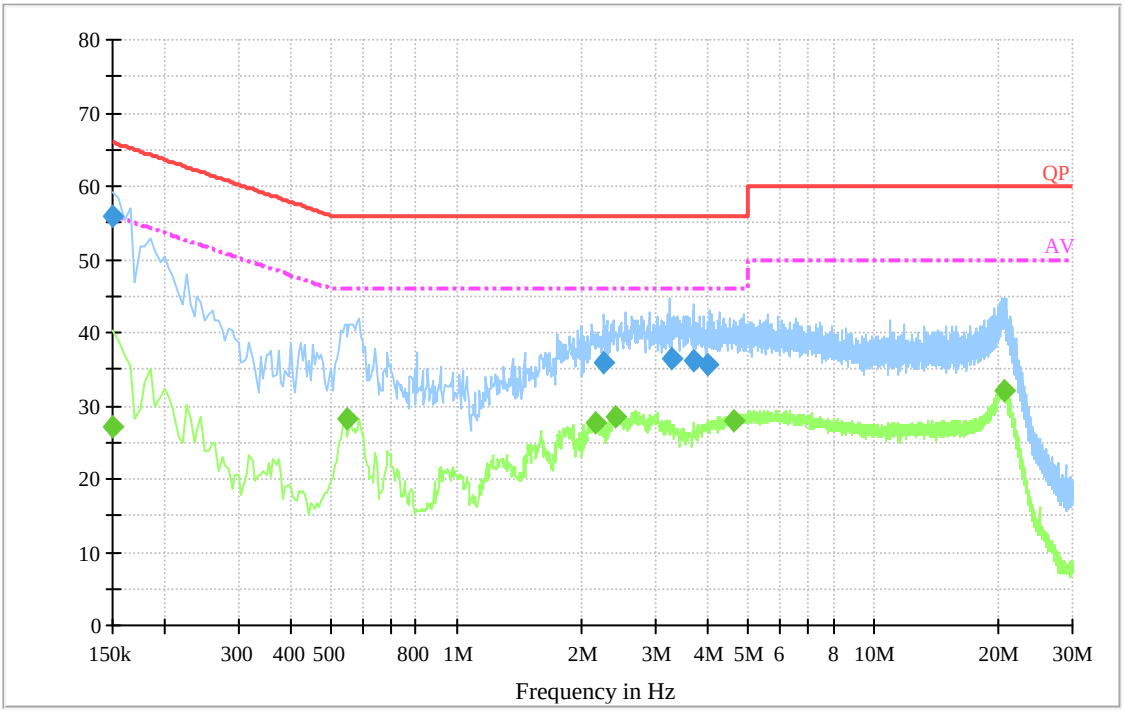
The EUT was set 0.8m away from the LISN. The cord longer than necessary to be connected to the LISN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

The pre-tests were performed on the operationg mode A,B and C, only the worst result was showed in this report.
The interference voltage was determined while measuring the line conductor by turns.

The following figures and tables were those measured by an automatic measuring system. A preview test was first made with peak detector. Final test with quasi-peak detector and average detector was only performed at these critical frequencies found via preview test.

Figure 2: Conducted emission measurement results, adapter 1, Line L

Level in dBµV

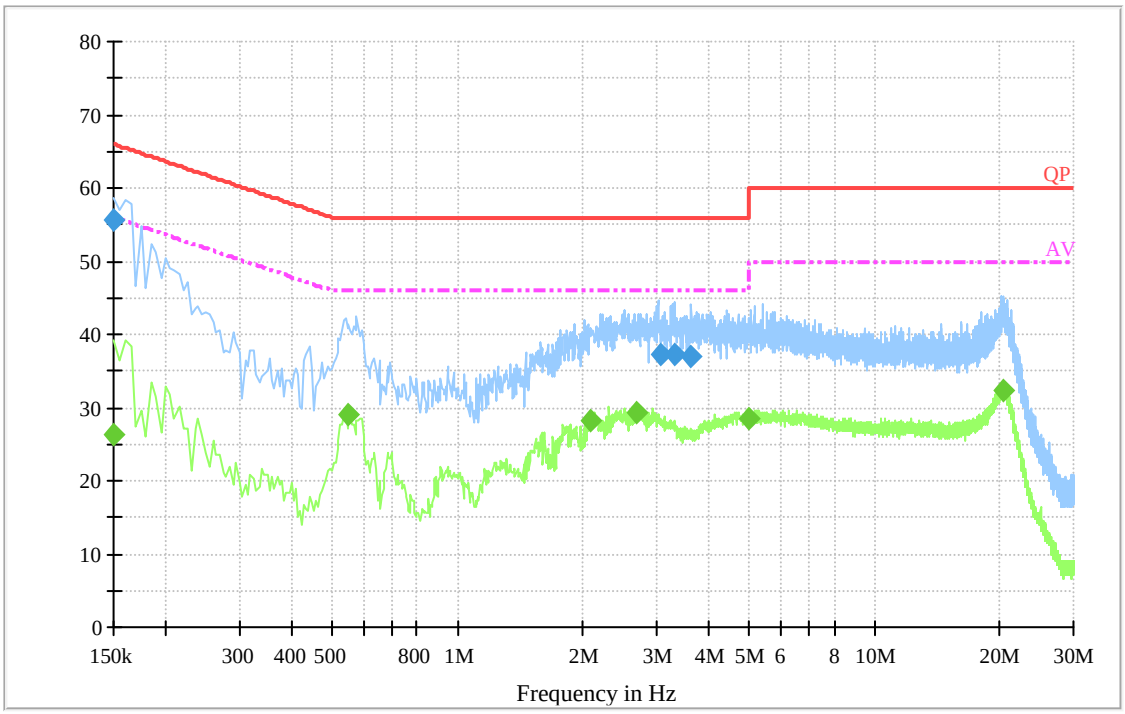


Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	56.0	9.000	On	L1	10.0	10.0	66.0
2.250000	35.8	9.000	On	L1	9.8	20.2	56.0
3.295000	36.5	9.000	On	L1	9.8	19.5	56.0
3.690000	36.2	9.000	On	L1	9.7	19.8	56.0
4.000000	35.7	9.000	On	L1	9.7	20.3	56.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	27.1	9.000	On	L1	10.0	28.9	56.0
0.545000	28.3	9.000	On	L1	10.1	17.7	46.0
2.145000	27.7	9.000	On	L1	9.8	18.3	46.0
2.400000	28.4	9.000	On	L1	9.8	17.6	46.0
4.605000	28.0	9.000	On	L1	9.7	18.0	46.0
20.505000	32.2	9.000	On	L1	9.8	17.8	50.0

Figure 3: Conducted emission measurement results, adapter 1, Line N



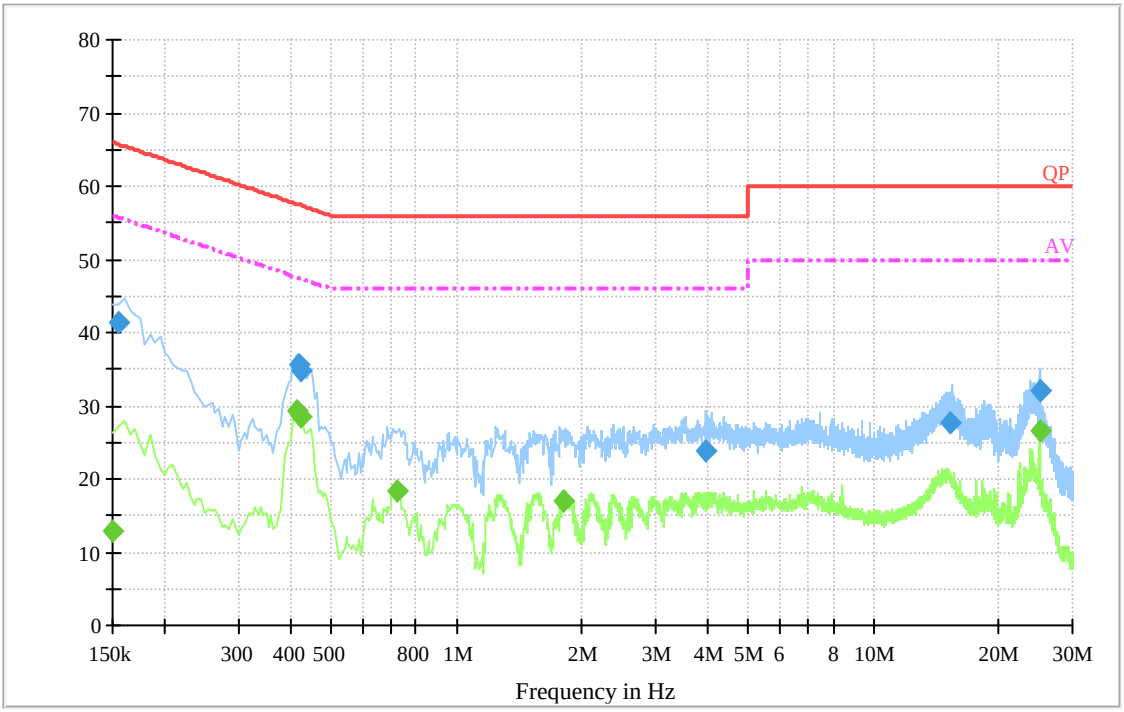
Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	55.6	9.000	On	N	10.2	10.4	66.0
3.065000	37.2	9.000	On	N	9.8	18.8	56.0
3.330000	37.1	9.000	On	N	9.8	18.9	56.0
3.630000	37.0	9.000	On	N	9.8	19.0	56.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	26.4	9.000	On	N	10.2	29.6	56.0
0.545000	28.9	9.000	On	N	10.1	17.1	46.0
2.080000	28.2	9.000	On	N	9.8	17.8	46.0
2.685000	29.2	9.000	On	N	9.8	16.8	46.0
4.975000	28.5	9.000	On	N	9.7	17.5	46.0
20.285000	32.4	9.000	On	N	9.8	17.6	50.0

Figure 4: Conducted emission measurement results, adapter 2, Line L

Level in dBµV

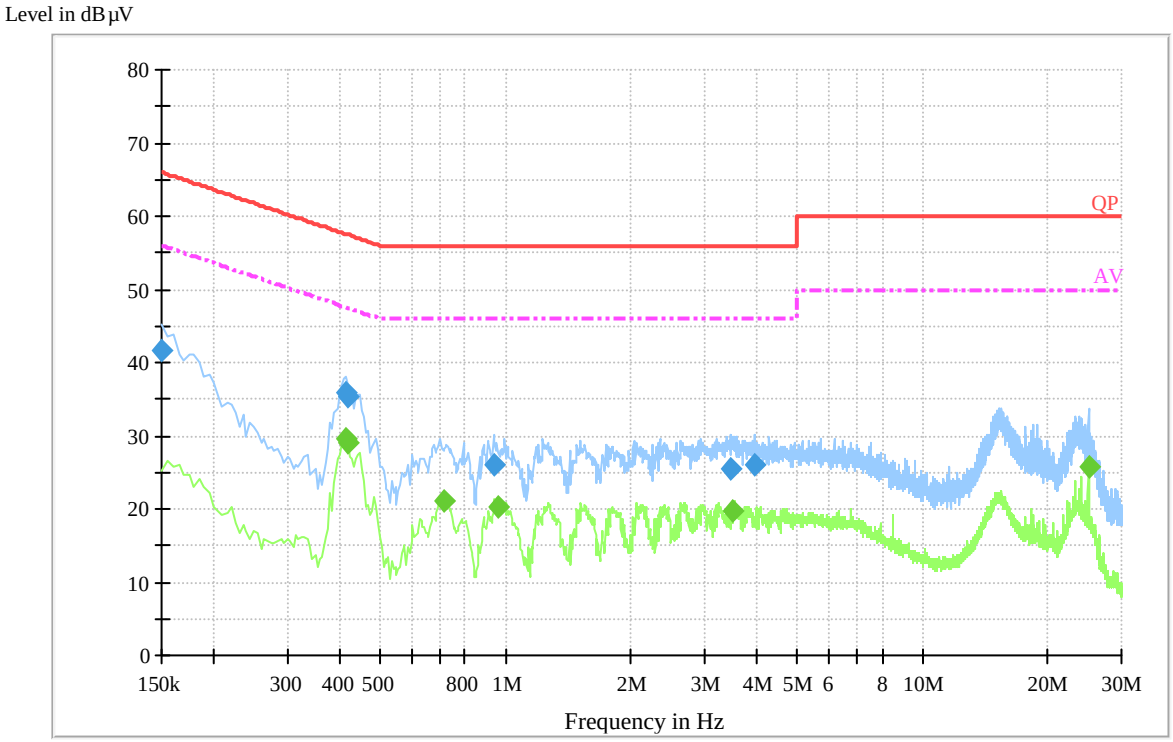


Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.155000	41.5	9.000	On	L1	10.0	24.2	65.7
0.420000	35.7	9.000	On	L1	9.8	21.8	57.4
0.425000	34.7	9.000	On	L1	9.8	22.6	57.3
3.960000	23.8	9.000	On	L1	9.7	32.2	56.0
15.345000	27.6	9.000	On	L1	9.7	32.4	60.0
25.000000	32.2	9.000	On	L1	9.7	27.8	60.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	13.0	9.000	On	L1	10.0	43.0	56.0
0.415000	29.4	9.000	On	L1	10.1	18.2	47.5
0.425000	28.6	9.000	On	L1	9.8	18.8	47.3
0.720000	18.5	9.000	On	L1	9.8	27.5	46.0
1.800000	17.0	9.000	On	L1	9.7	29.0	46.0
25.000000	26.7	9.000	On	L1	9.8	23.3	50.0

Figure 5: Conducted emission measurement results, adapter 2, Line N



Final measurement result:

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	41.6	9.000	On	N	10.2	24.4	66.0
0.415000	35.9	9.000	On	N	9.8	21.7	57.5
0.420000	35.4	9.000	On	N	9.8	22.0	57.4
0.945000	26.1	9.000	On	N	9.8	29.9	56.0
3.480000	25.5	9.000	On	N	9.8	30.5	56.0
3.955000	25.9	9.000	On	N	9.8	30.1	56.0

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.415000	29.5	9.000	On	N	10.2	18.1	47.5
0.420000	28.9	9.000	On	N	10.1	18.5	47.4
0.715000	21.2	9.000	On	N	9.8	24.8	46.0
0.960000	20.3	9.000	On	N	9.8	25.7	46.0
3.525000	19.7	9.000	On	N	9.7	26.3	46.0
25.000000	25.8	9.000	On	N	9.8	24.2	50.0

4.2 Radio Frequency Exprosure Compliance

4.2.1 Electromagnetic Fields

RESULT: **Passed**

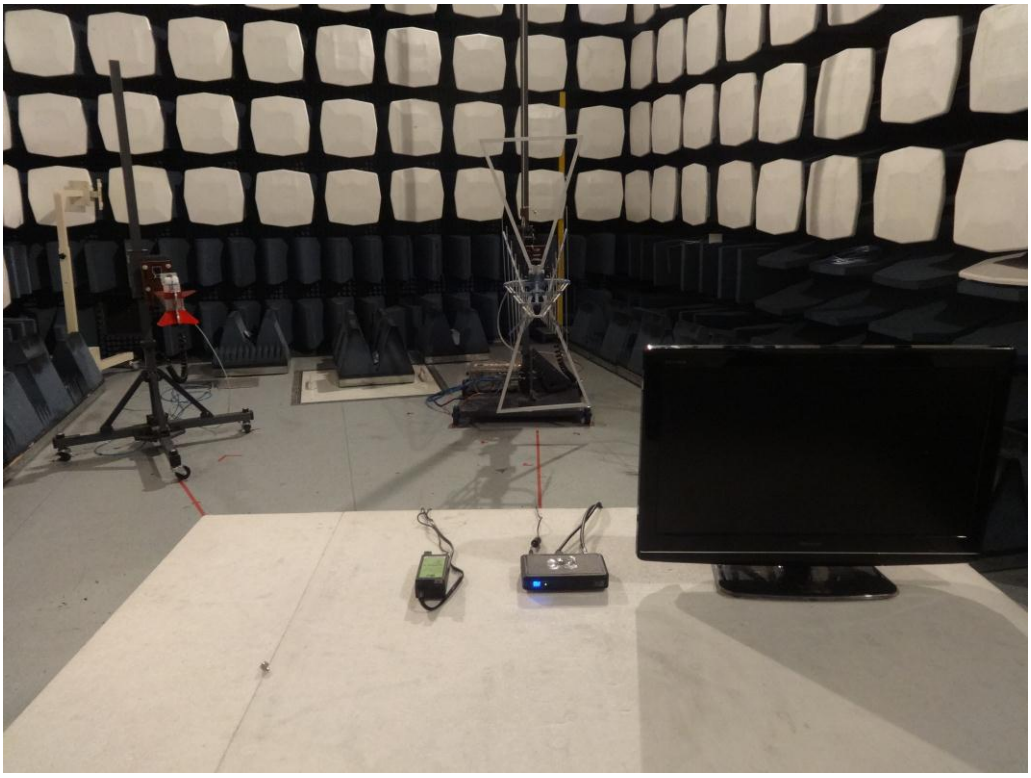
Date of testing	:	2014-05-16
Test standard	:	FCC KDB publication 447498

Test setup

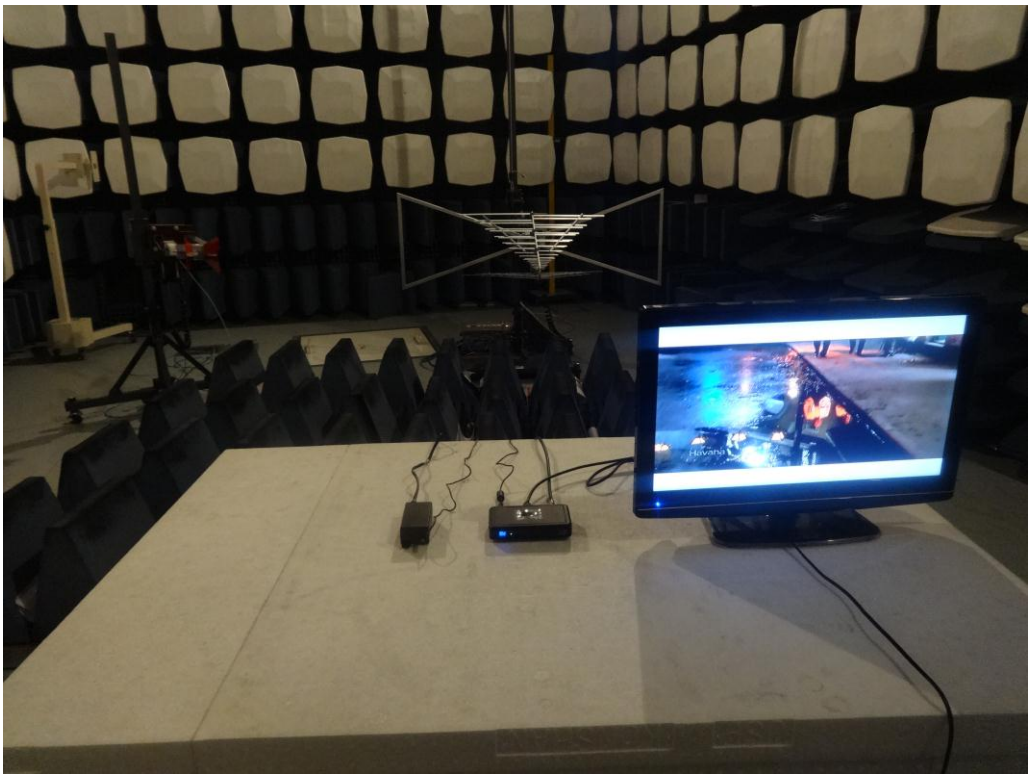
As for normally used, the attenna of the product is at least 5mm away from the body of user, according to the test result of clause 4.1.2 of this report (the max. output power is 0.46 mW, which the SAR Test Exclusion Threshold for device operating at frequency 2450MHz is 10mW), and the FCC KDB publication 447498 D01 General RF Exposure Guidance v05r02, the EUT is exempted from routine SAR evaluation.

5. Photographs of the Test Set-Up

Photograph 1: Set-up for Radiated Spurious Emissions, below 1GHz



Photograph 2: Set-up for Radiated Spurious Emissions, above 1GHz



Photograph 3: Set-up for RF test

Photograph 4: Set-up for Condutied emission

6. List of Tables

7. List of Figures

8. List of Photographs