FCC PART 15B

MEASUREMENT AND TEST REPORT

For

Zhejiang Flashforge 3D Technology CO., Ltd.

No. 518, Xianyuan Road Jinhua, Zhejiang China

FCC ID: 2AKLL-GUIDERII

Report Type:	Product Type:
Original Report	3D printer

Test Engineer:	Phil Zhu
Report Number:	RKS170601002-00B
Report Date:	2017-06-30
Reviewed By:	Kamp Chen EMC Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan,Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Zhejiang Flashforge 3D Technology CO., Ltd.
Model	Guider Ⅱ
Product	3D printer
Rate Voltage	AC 100~240V
Highest Operating Frequency	2462MHz
Dimension	490 mm(L)×550 mm(W)×560 mm(H)

** All measurement and test data in this report was gathered from production sample serial number: 20170601001 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-06-01.*

Objective

This report is prepared on behalf of Zhejiang Flashforge 3D Technology CO., Ltd. in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15, Class B.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submission with FCC ID: 2AKLL-GUIDERII.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The test site A used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan,Jiangsu province, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test Mode: Continue working

EUT Exercise Software

Notebook executive “MyHWin”present “H” pattern on the monitor.
Notebook executive “winthrax.exe” for EUT’s Flash to Read/Write.
Notebook executive “winthrax.exe” through the Flash to Read/Write
EUT through Router to scan the web page.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

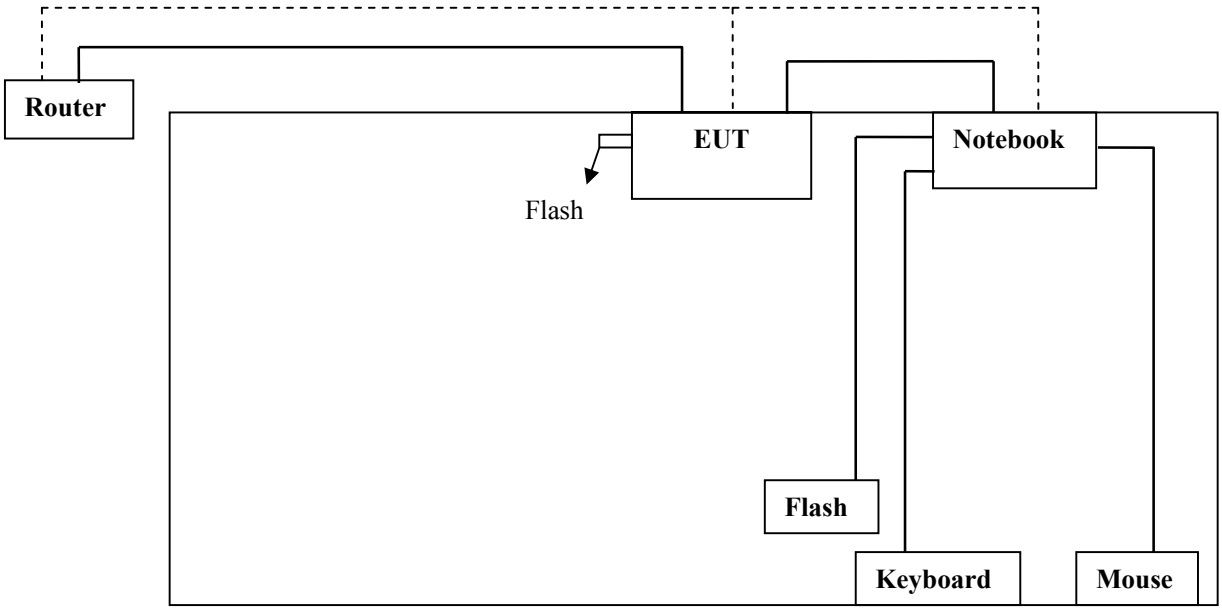
Manufacturer	Description	Model	Serial Number
DELL	Notebook	E6410	3094742521
Logitech	Keyboard	Y-U0009	1648MG010PW8
Logitech	Mouse	M-U0026	HS646HB
Lenovo	USB flash disk1	T180	0A1266865200521
Lenovo	USB flash disk2	T180	0A1233865200536

External I/O Cable

Cable Description	Length (m)	From/Port	To
USB Cable	0.8	Notebook	Mouse
USB Cable	0.8	Notebook	Keyboard
USB Cable	0.5	Notebook	USB flash disk
Type A to Type B	1.2	EUT	Notebook

Block Diagram of Radiated Test Setup

Test Mode: Continue working



Non-Conductive Table 80cm
Above Ground Plane

1.5m*1.0m*0.8m Table

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC §15.107 –CONDUCTED EMISSIONS

Applicable Standard

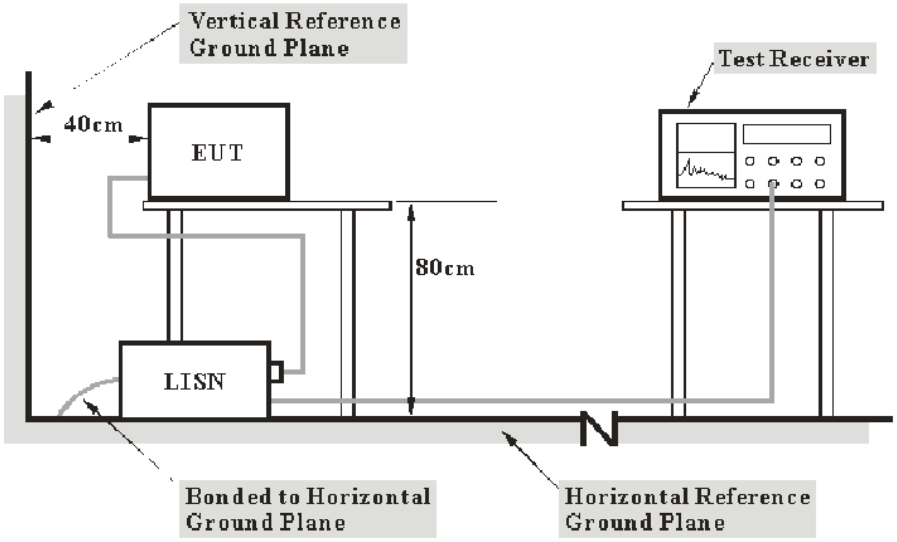
According to FCC§15.107

Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Item		Measurement Uncertainty	U_{cispr}
AMN	150kHz~30MHz	3.19 dB	3.4 dB

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-25
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2016-10-10	2017-10-09
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2016-11-25	2017-11-24
Rohde & Schwarz	CE Test software	EMC 32	100357	--	--
MICRO-COAX	Coaxial Cable	Cable-6	006	2016-09-08	2017-09-07

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

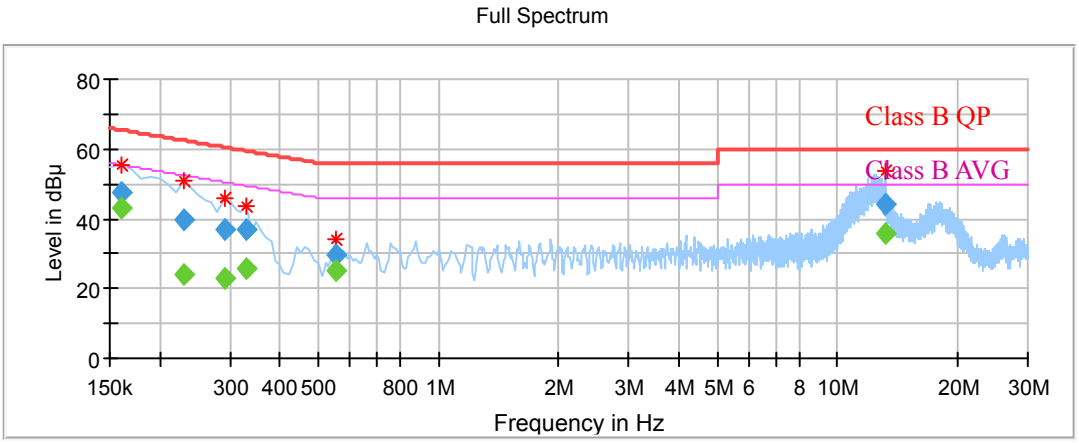
Environmental Conditions

Temperature:	22℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-06-10.

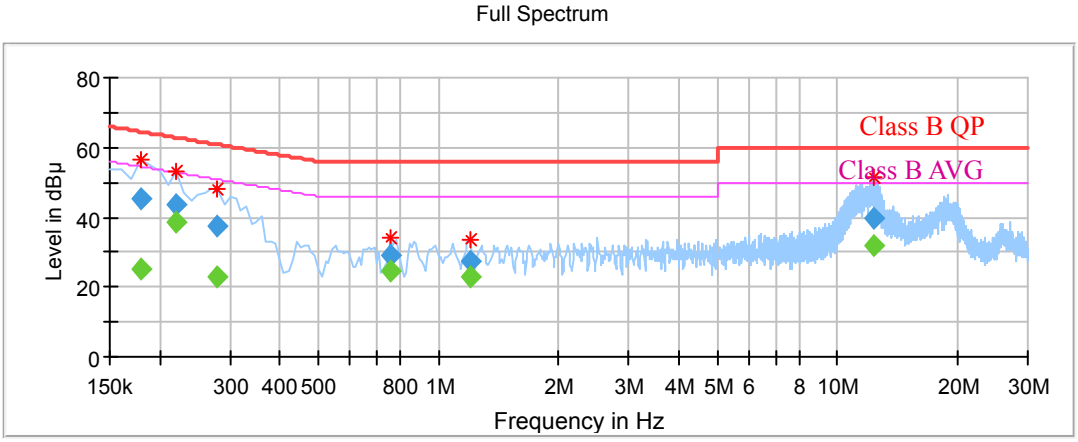
Test Mode: Continue working

Line



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.160000	---	43.10	55.46	12.36	L1	10.0
0.160000	47.65	---	65.46	17.81	L1	10.0
0.230000	---	23.97	52.45	28.48	L1	10.0
0.230000	39.74	---	62.45	22.71	L1	10.0
0.290000	---	23.00	50.52	27.52	L1	10.0
0.290000	37.20	---	60.52	23.32	L1	10.0
0.330000	---	25.77	49.45	23.68	L1	10.0
0.330000	36.96	---	59.45	22.49	L1	10.0
0.550000	---	25.11	46.00	20.89	L1	10.0
0.550000	29.88	---	56.00	26.12	L1	10.0
13.140000	---	35.80	50.00	14.20	L1	10.2
13.140000	44.25	---	60.00	15.75	L1	10.2

Neutral



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Line	Corr. (dB)
0.180000	---	25.04	54.49	29.45	N	10.1
0.180000	45.27	---	64.49	19.22	N	10.1
0.220000	---	38.39	52.82	14.43	N	10.1
0.220000	43.39	---	62.82	19.43	N	10.1
0.280000	---	22.92	50.82	27.90	N	10.1
0.280000	37.57	---	60.82	23.25	N	10.1
0.760000	---	24.42	46.00	21.58	N	10.0
0.760000	29.08	---	56.00	26.92	N	10.0
1.200000	---	22.84	46.00	23.16	N	9.9
1.200000	27.27	---	56.00	28.73	N	9.9
12.290000	---	32.01	50.00	17.99	N	10.0
12.290000	39.55	---	60.00	20.45	N	10.0

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

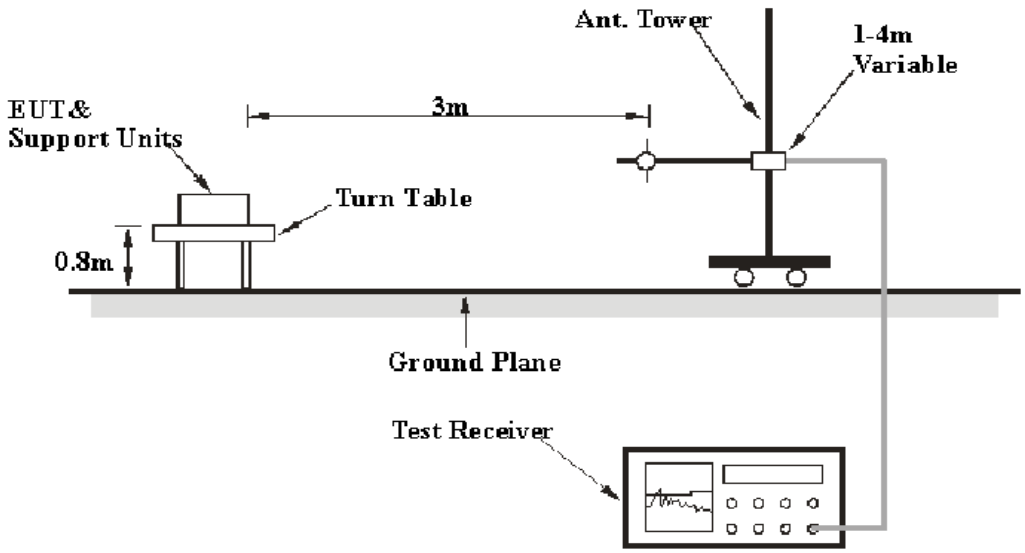
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

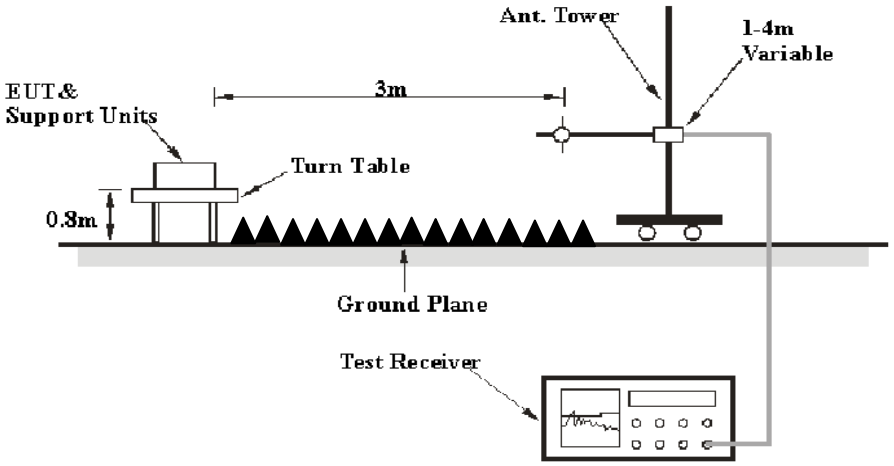
Item		Measurement Uncertainty	U_{cispr}
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB
	1GHz~6GHz	4.45dB	5.2 dB
	6 GHz ~18 GHz	5.23dB	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 13 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	1 Hz	/	Av

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrunent	Amplifier	330	171377	2016-12-12	2017-12-11
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-24
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
R&S	Auto test Software	EMC32	100361	-	-
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-25
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-1	001	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-2	002	2016-12-12	2017-12-11
haojintech	Coaxial Cable	Cable-3	003	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-12-12	2017-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-12-12	2017-12-11

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Data

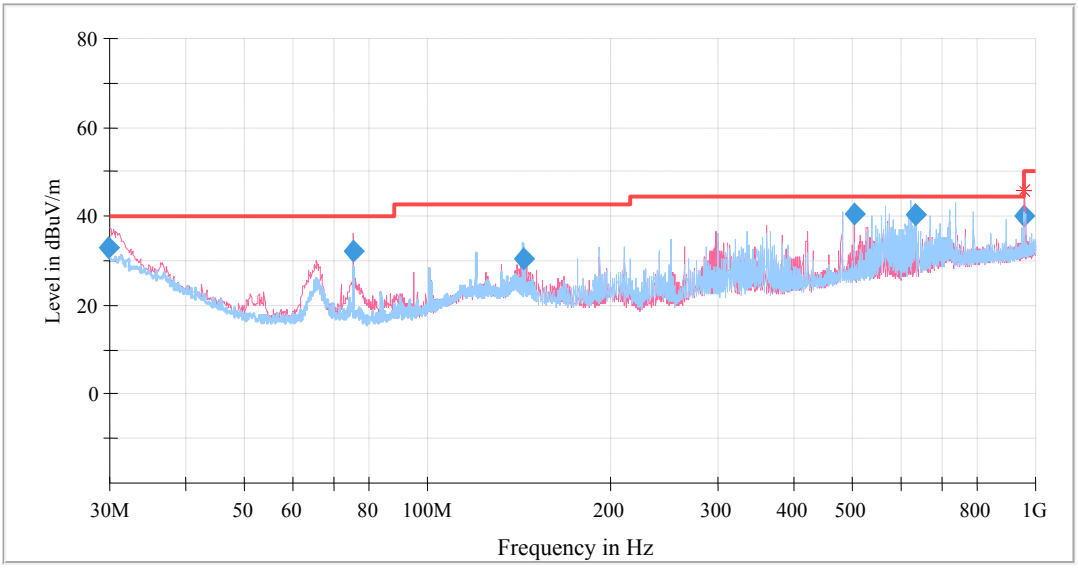
Environmental Conditions

Temperature:	27 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Phil Zhu on 2017-06-21.

Test Mode: Continue working

30MHz ~ 1GHz:



Frequency (MHz)	QuasiPeak (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.2257890	34.26	40.00	5.74	100.0	V	332.0	7.5
38.5521490	34.19	40.00	5.81	100.0	V	25.0	2.4
57.0254880	22.64	40.00	17.36	100.0	V	159.0	0.6
150.332560	32.38	43.50	11.12	100.0	H	228.0	-0.3
211.215700	37.49	43.50	6.01	100.0	H	297.0	-1.6
958.331569	31.20	46.0	14.8	100.0	V	15.0	11.3

Above 1 GHz:

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1037.044088	41.07	---	74.00	32.93	100.0	V	32.0	-11.8
1037.044088	---	25.40	54.00	28.60	100.0	V	32.0	-11.8
1410.230461	---	27.20	54.00	26.80	100.0	V	340.0	-9.7
1410.230461	46.34	---	74.00	27.66	100.0	V	340.0	-9.7
1919.769539	56.53	---	74.00	17.47	100.0	H	225.0	-7.1
1919.769539	---	46.75	54.00	7.25	100.0	H	225.0	-7.1
4922.274549	---	32.03	54.00	21.97	100.0	V	141.0	2.5
4922.274549	46.54	---	74.00	27.46	100.0	V	141.0	2.5
10470.050100	---	39.23	54.00	14.77	100.0	V	190.0	16.2
10470.050100	53.11	---	74.00	20.89	100.0	V	190.0	16.2
17457.965932	---	43.20	54.00	10.80	100.0	H	165.0	21.5
17457.965932	57.40	---	74.00	16.60	100.0	H	165.0	21.5

******* END OF REPORT *******