



FCC PART 15C

TEST REPORT

For

Huangshan Goldenland Electronics Inc.

North Industrial Park, HuiZhou District, Huangshan, Anhui Province P.R. China

FCC ID: 2AI3UTECHO3

Report Type: Original Report	Product Type: Transmitter
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Product	Transmitter
Tested Model	Echo-70
Multiple Model [#]	Echo-90, Echo-110
Frequency Range	19 -31 kHz
Modulation Technique	PM
Antenna Specification	Internal Antenna
Voltage Range	DC 11.1V battery
Date of Test	2019-05-27~ 2019-05-30
Sample serial number	190402812
Received date	2019-04-02
Sample/EUT Status	Good condition

Note: For the product, series model Echo-90, Echo-110 and Echo-70 have the same or similar appearance, structure, PCB, material and function to the testing products, the differences between them are the model number. Echo-70 was selected for fully testing, which was explained in the attached product similarity declaration letter.

Objective

This report is prepared on behalf of *Huangshan Goldenland Electronics Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules.

The objective is to determine the compliance of EUT with FCC rules, section 15.203, 15.205 and 15.209.

Related Submittal(s)/Grant(s)

Submission with the receiver unit of a system with FCC ID: 2AI3URMAG7.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Line Conducted Emissions		±1.95 dB
Radiated emission	9 kHz~30MHz	±4.52 dB
	30MHz~1 GHz	±5.81 dB
Occupied Bandwidth		±0.5 kHz
Temperature		±3.0 °C
Humidity		±6 %

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a test mode

The device is a transmitter operation on frequency 19 kHz - 31 kHz.

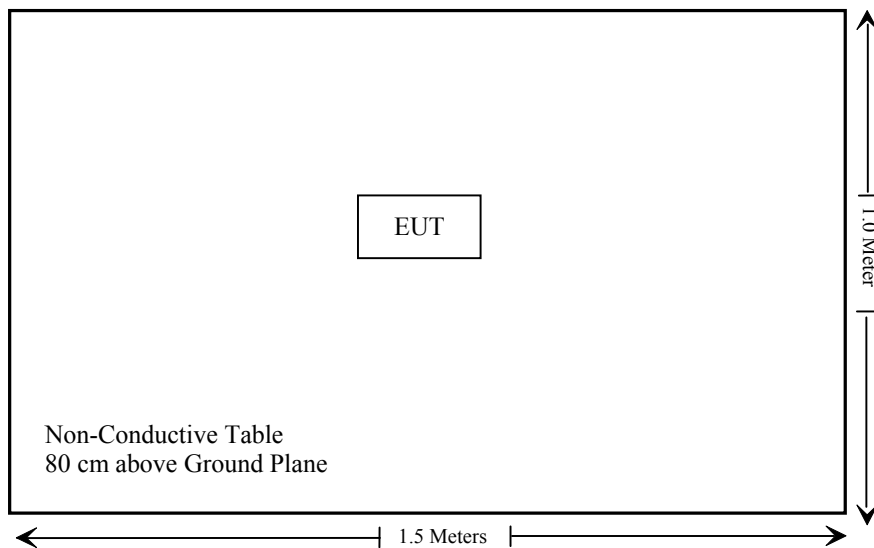
EUT Exercise Software

No software used in test.

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§15.203	Antenna Requirement	Compliance
FCC§15.207	AC Line Conducted Emission	Not Applicable
§15.209 §15.205	Radiated Emission Test	Compliance

Not Applicable: The EUT was powered by battery only.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sonoma instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
ETS	Passive Loop Antenna	6512	29604	2018-07-14	2021-07-13
UTiFLEX MICRO-COAX	RF Cable	UFA147A- 2362-100100	MFR64639 231029-003	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Fluke	Digital Multimeter	287	19000011	2019-04-12	2020-04-12
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019-01-05	2020-01-05
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
Unknown	Cable 2	RF Cable 2	Unknown	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR

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

FCC§15.203 – ANTENNA REQUIREMENT

Applicable Standard

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connected Construction

The EUT has an internal antenna; fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliance.

FCC §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

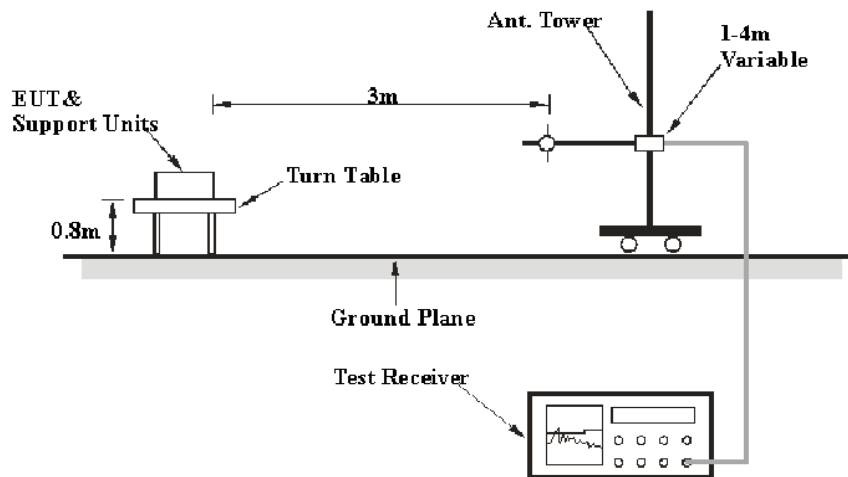
As per FCC Part 15.209

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

EUT Setup



The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 30 MHz.

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

Frequency Range	RBW	Video B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	QP/Average

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP/Average measurement

Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209&15.205.

Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	54~56 %
ATM Pressure:	101.0 kPa

The testing was performed by Andy Yu on 2019-05-30.

Test mode: Transmitting (Scan with X-AXIS, Y-AXIS, Z-AXIS, the worst case was recorded)

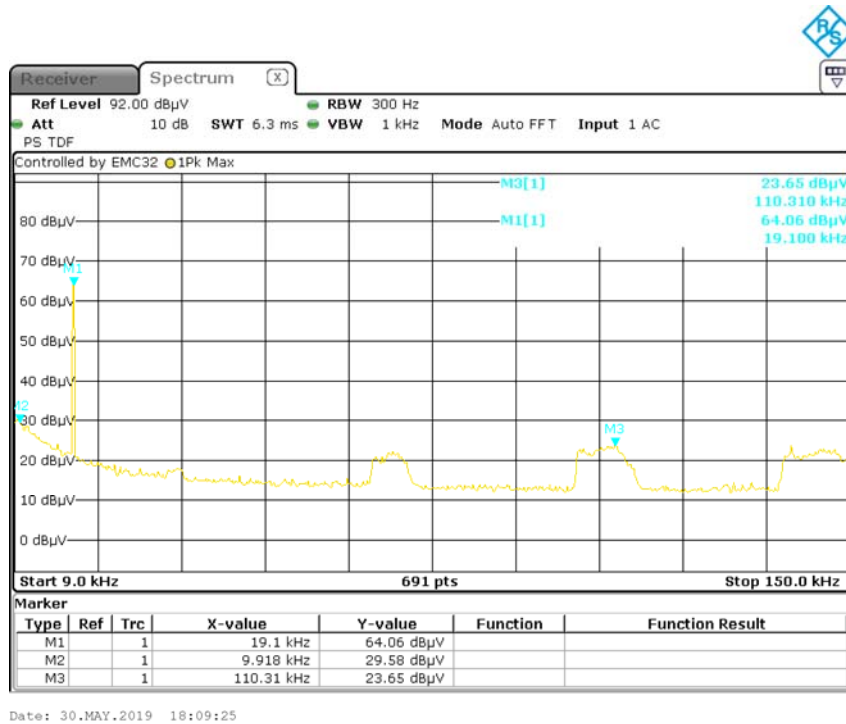
For Low Channel

1) 9 kHz~30MHz:

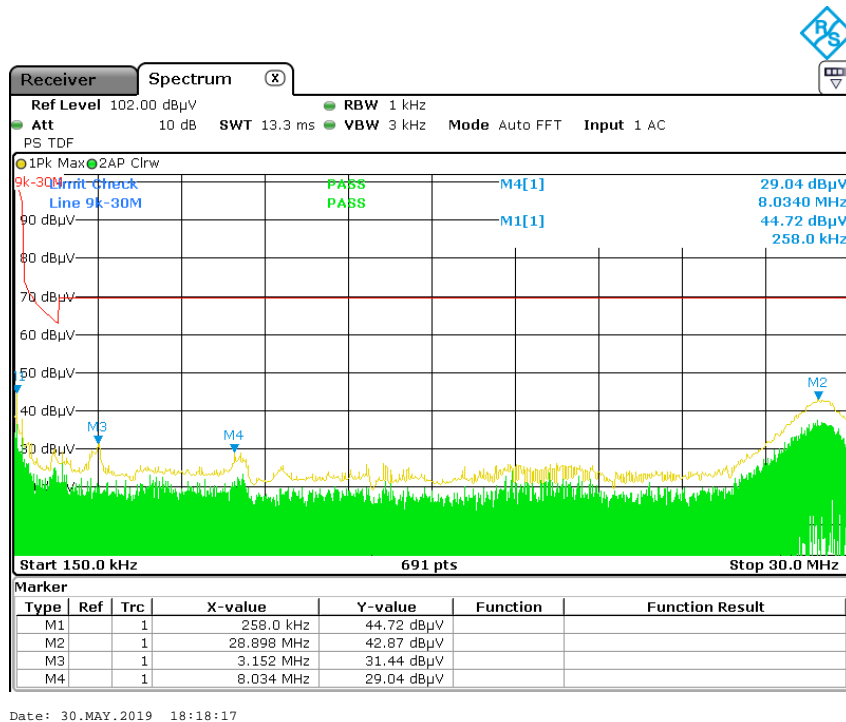
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Detector (PK/QP/AV)	Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	FCC Part 15.205&15.209		Remark
				Height (m)	Polar		Limit (dBμV/m)	Margin (dB)	
0.0099	29.58	PK	24	1	N/A	87.1	127.69	98.11	Spurious emission
0.110	23.65	PK	69	1	N/A	58.4	106.78	83.13	
0.258	44.72	PK	91	1	N/A	57.9	99.37	54.65	
0.019	64.06	PK	125	1	N/A	80.6	122.03	57.97	Fundamental

Note: PK detector data compliance with average detector limit.

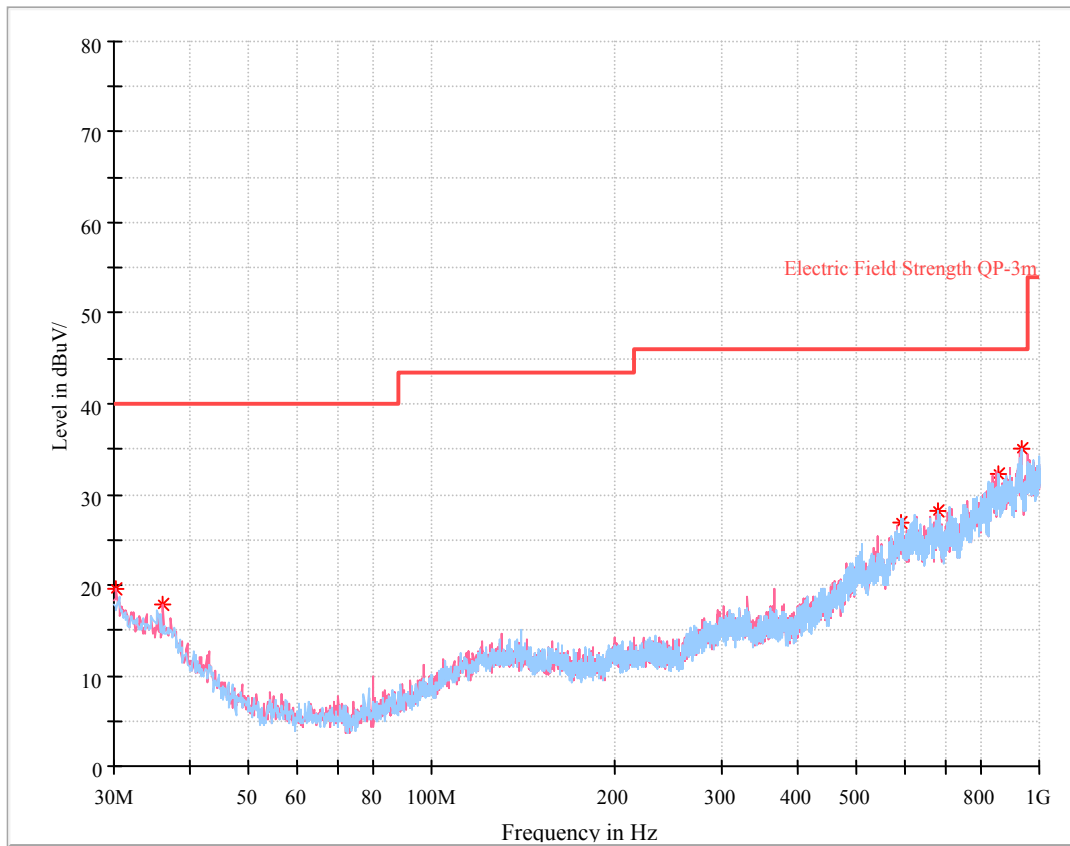
9 kHz~150 kHz



150 kHz~30 MHz



30MHz – 1 GHz:



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
30.242500	19.65	305.0	V	271.0	-7.8	40.00	20.35
36.183750	17.85	390.0	V	194.0	-11.3	40.00	22.15
590.660000	26.79	105.0	V	123.0	-2.0	46.00	19.21
680.142500	28.19	205.0	H	185.0	-1.4	46.00	17.81
856.925000	32.17	105.0	V	208.0	3.2	46.00	13.83
932.342500	35.12	105.0	H	144.0	4.8	46.00	10.88

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor

Margin = Limit- Corr. Amplitude

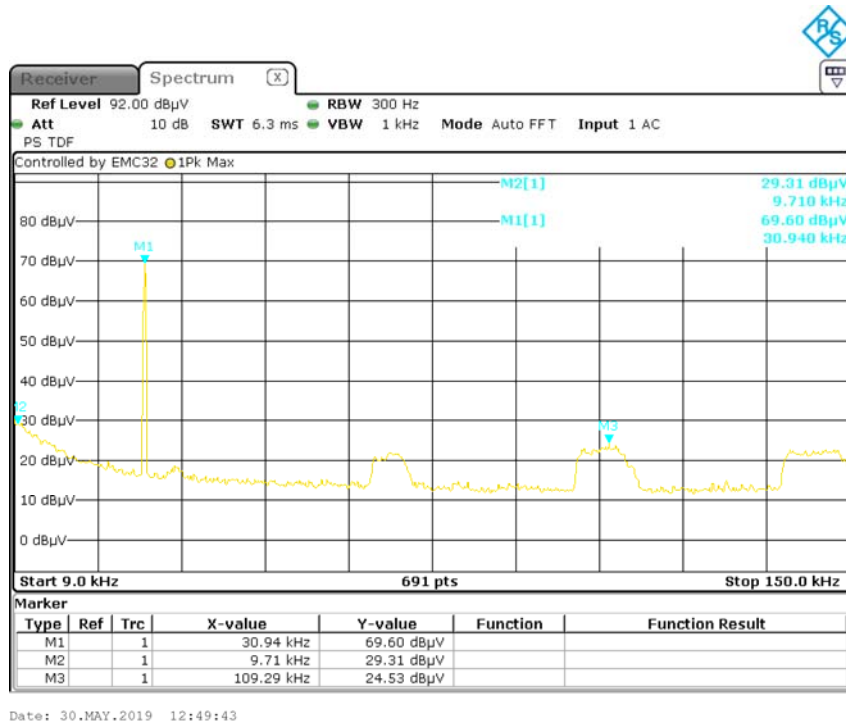
For High Channel

1) 9 kHz~30MHz:

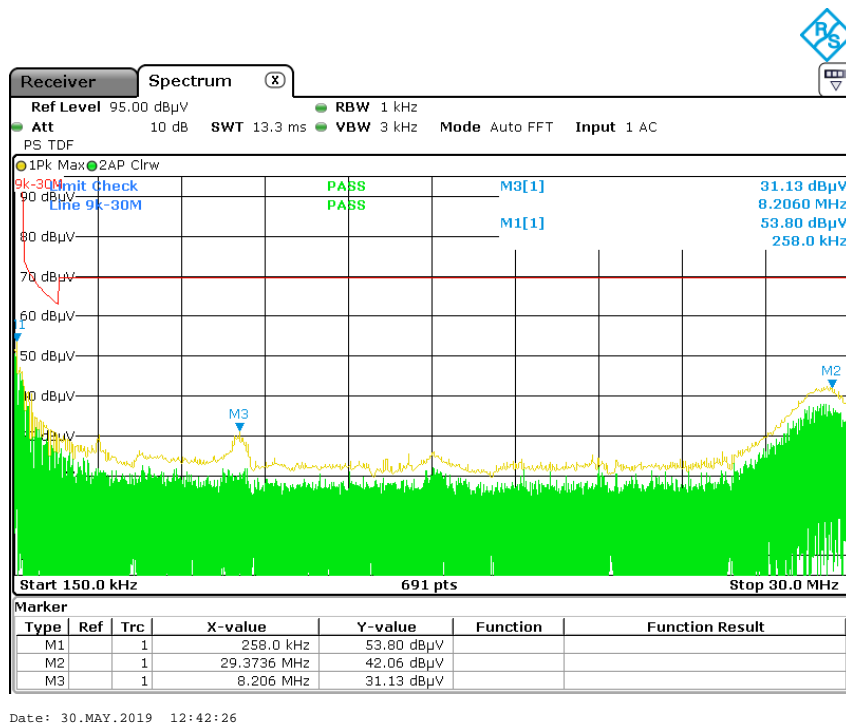
Frequency (MHz)	Corrected Amplitude (dBμV/m)	Detector (PK/QP/AV)	Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	FCC Part 15.205&15.209		Remark
				Height (m)	Polar		Limit (dBμV/m)	Margin (dB)	
0.0097	29.31	PK	75	1	N/A	87.1	127.87	98.56	Spurious emission
0.109	24.53	PK	268	1	N/A	66.1	106.86	82.33	
0.258	53.80	PK	24	1	N/A	57.9	89.37	35.57	
0.031	69.60	PK	107	1	N/A	77.6	117.78	48.18	Fundamental

Note: PK detector data compliance with average detector limit.

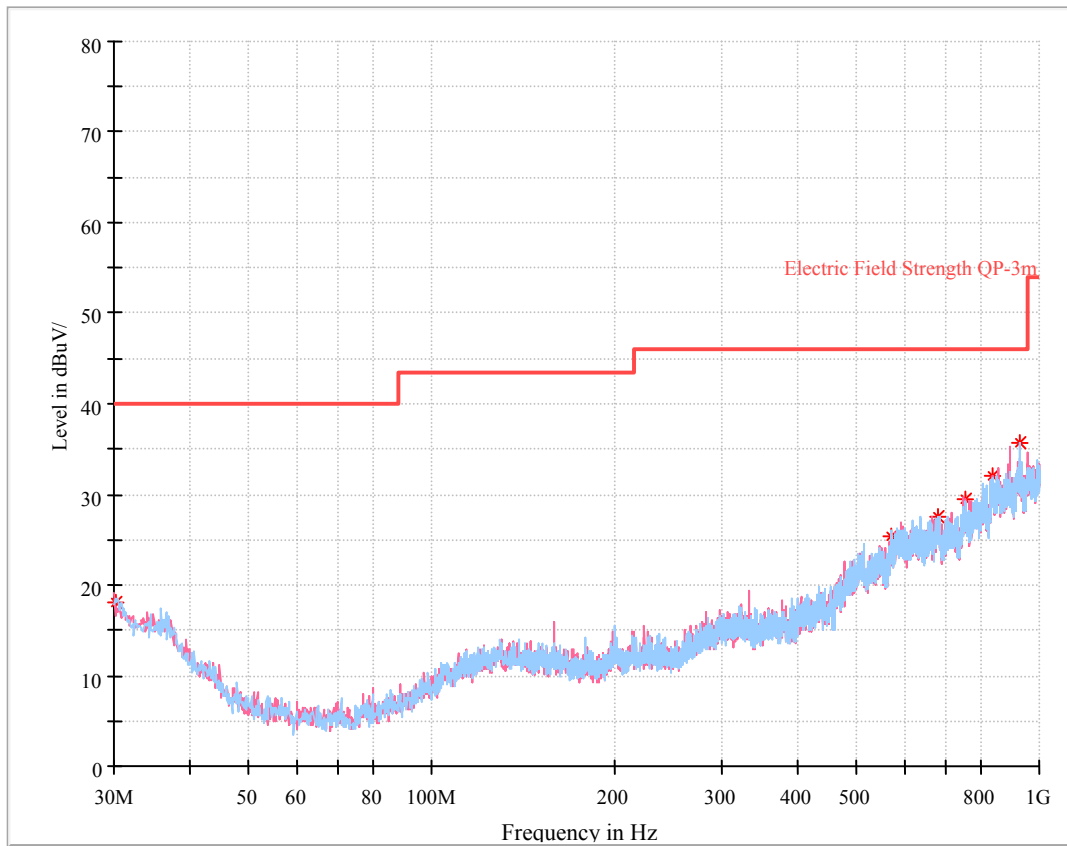
9 kHz~150 kHz



150 kHz~30 MHz



30MHz – 1 GHz:



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
30.242500	18.06	400.0	H	149.0	-7.8	40.00	21.94
570.775000	25.39	400.0	V	345.0	-3.1	46.00	20.61
681.233750	27.58	200.0	H	0.0	-1.4	46.00	18.42
754.711250	29.51	100.0	V	245.0	-0.2	46.00	16.49
836.555000	31.94	200.0	V	236.0	2.7	46.00	14.06
931.493750	35.68	300.0	H	332.0	4.8	46.00	10.32

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor=Antenna factor (RX) +cable loss – amplifier factor

Margin = Limit- Corr. Amplitude

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