

FCC PART 15B, CLASS B TEST REPORT

For

JLR Gear

2612 Barrington Court Hayward, California, United States

FCC ID: 2AMG5STG6432KB

Report Type: Original Report	Product Type: SPEAKER LANTERN
Report Number: RSZ180608008-00A	
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Xiangguang Kong <i>Xiangguang . Kong</i>	
Reviewed By: RF Engineer	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *JLR Gear*'s product, model number: *STG-6432-KB* (FCC ID: *2AMG5STG6432KB*) or the "EUT" in this report was a *SPEAKER LANTERN*, which was measured approximately: 95 cm (L) * 95 cm (W) * 194 cm (H), rated with input voltage: DC 3.7V from battery. The highest operating frequency is 2480MHz.

**All measurement and test data in this report was gathered from production sample serial number: 1800859 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-06-08.*

Objective

This test report is prepared on behalf of *JLR Gear* in accordance with Part 2-Subpart J, Part 15-Subparts A, B of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submission with FCC ID: 2AMG5STG6432KB

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 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

Parameter		Uncertainty
Conducted Emissions		±1.95dB
Emissions, radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB

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

Description of Test Configuration

The system was configured for testing in a manufacturer testing fashion.

EUT operation mode: Charging & Aux-in & Lighting

EUT Exercise Software

No exercise software was used.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

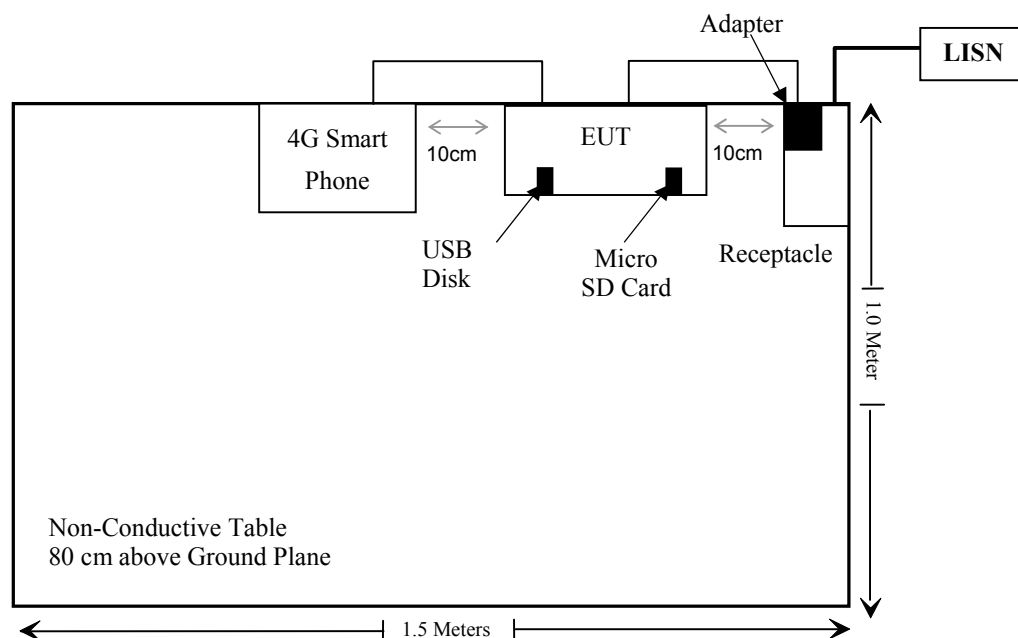
Manufacturer	Description	Model	Serial Number
SKY	Adapter	N/A	N/A
BULL	Socket	GN-415K	5503290068073
KINGSTON	USB Disk	N/A	N/A
Sandisk	Micro SD Card	N/A	3491
Comtrade Distribution	4G Smart Phone	Aeon6750-65-n	N/A

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable USB Cable	0.5	EUT	Adapter
Un-shielding Un-detachable AC Cable	1.0	LISN	Socket
Un-shielding Un-detachable Audio Cable	0.6	EUT	4G Smart Phone

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

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

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2017-08-04	2018-08-04
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-21	2018-12-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2018-05-21	2018-11-19
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
N/A	Conducted Emission Cable	N/A	UF A210B-1-0720-504504	2018-05-12	2018-11-12
Radiated Emission Test					
A.H.System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-04-24	2019-04-24
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-05-21	2019-05-21
HP	Amplifier	HP8447E	1937A01046	2018-05-21	2018-11-19
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-04-01	2018-10-01
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	1	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-05-22	2018-11-22
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR

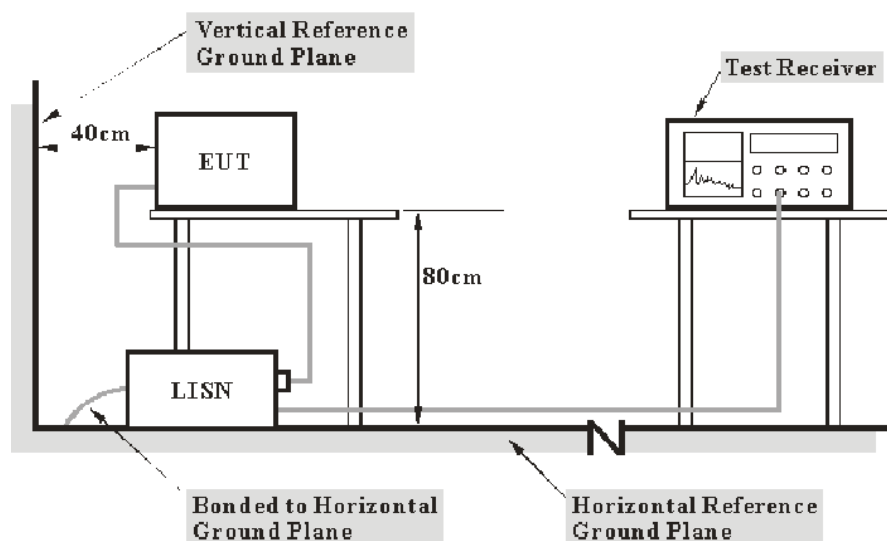
* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.107 – AC LINE CONDUCTED EMISSIONS

Applicable Standard

According to FCC §15.107

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 per ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 Class B.

The spacing between the peripherals was 10 cm.

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 host PC was connected to the first LISN and the other relevant equipments were connected to the second LISN.

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

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

Corrected Factor & Margin Calculation

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

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(L_m)} \leq L_{\text{lim}} + U_{\text{cisp}}r$$

In BACL., $U_{(L_m)}$ is less than $U_{\text{cisp}r}$, if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

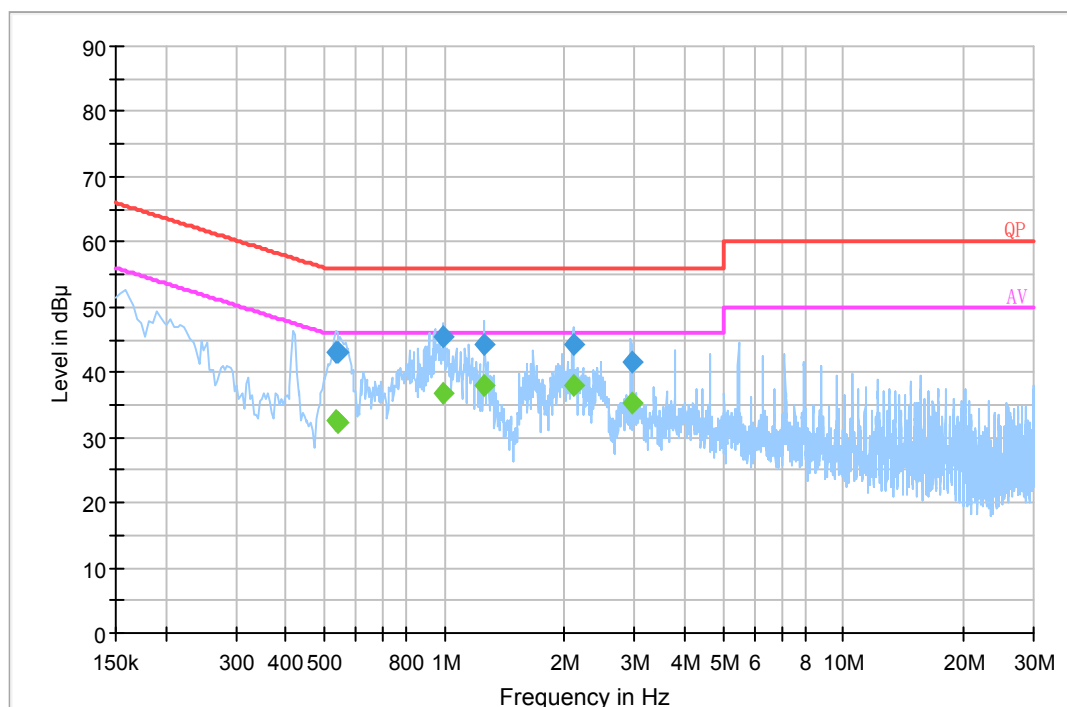
Test Data

Environmental Conditions

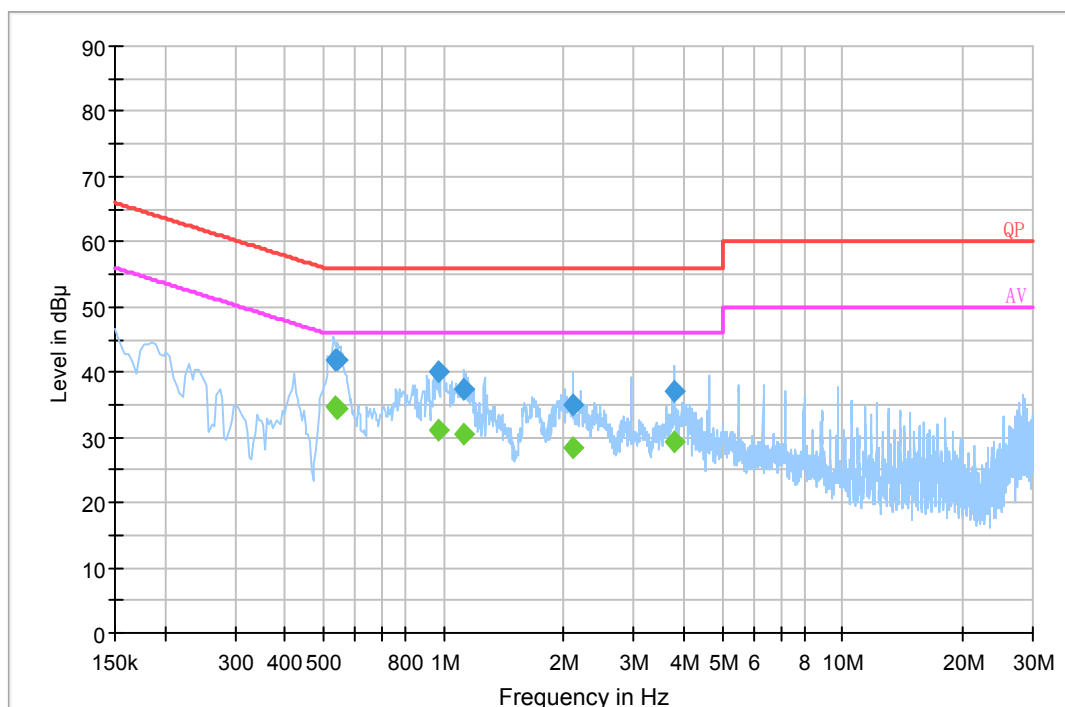
Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Bibo Zhang on 2018-06-27.

EUT Operation Mode: Charging & Aux-in & Lighting

AC 120V/60 Hz, Line

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.533930	43.0	20.1	56.0	13.0	QP
0.537990	43.1	20.1	56.0	12.9	QP
0.995030	45.4	20.0	56.0	10.6	QP
1.263130	44.2	20.0	56.0	11.8	QP
2.106530	44.1	20.0	56.0	11.9	QP
2.953930	41.7	20.0	56.0	14.3	QP
0.533930	32.6	20.1	46.0	13.4	Ave.
0.537990	32.4	20.1	46.0	13.6	Ave.
0.995030	36.8	20.0	46.0	9.2	Ave.
1.263130	37.9	20.0	46.0	8.1	Ave.
2.106530	37.9	20.0	46.0	8.1	Ave.
2.953930	35.3	20.0	46.0	10.7	Ave.

AC 120V/60 Hz, Neutral

Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.534050	41.9	20.1	56.0	14.1	QP
0.537870	41.8	20.1	56.0	14.2	QP
0.972370	40.2	20.0	56.0	15.8	QP
1.125110	37.4	20.0	56.0	18.6	QP
2.106350	35.0	20.0	56.0	21.0	QP
3.797090	37.2	20.0	56.0	18.8	QP
0.534050	34.7	20.1	46.0	11.3	Ave.
0.537870	34.5	20.1	46.0	11.5	Ave.
0.972370	31.1	20.0	46.0	14.9	Ave.
1.125110	30.4	20.0	46.0	15.6	Ave.
2.106350	28.3	20.0	46.0	17.7	Ave.
3.797090	29.2	20.0	46.0	16.8	Ave.

Note:

- 1) Correction Factor = LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

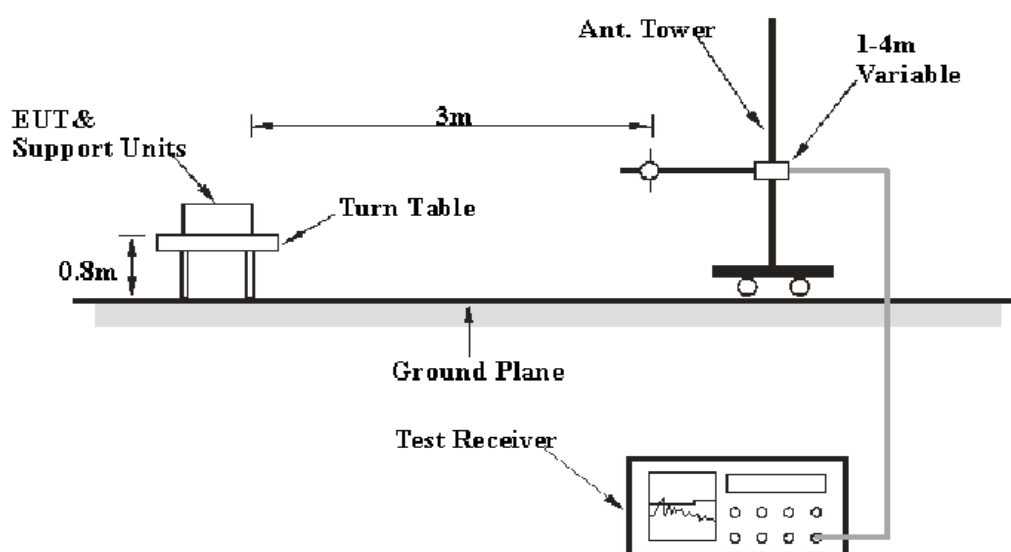
FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Applicable Standard

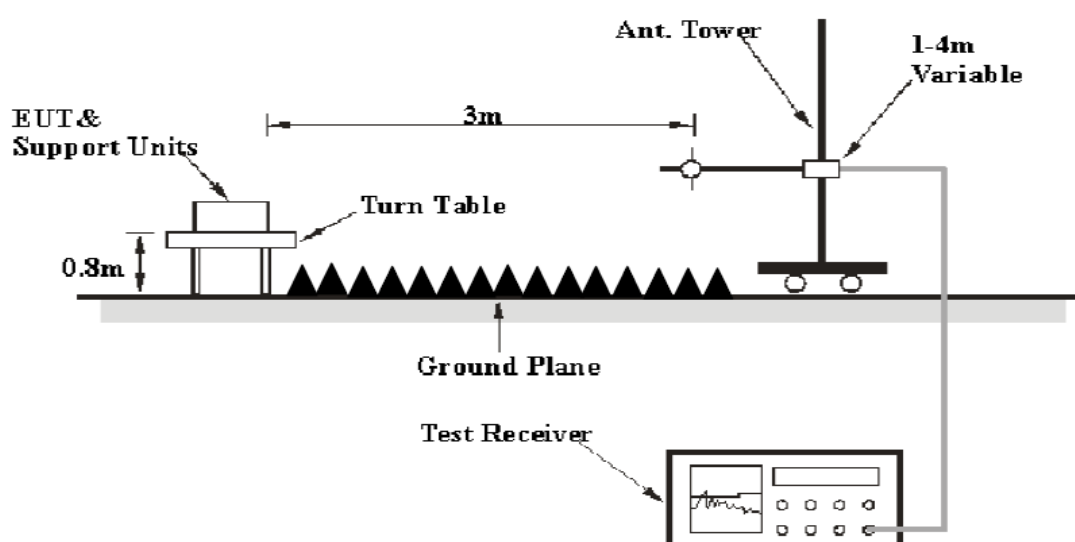
FCC §15.109

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.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 12.5 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	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

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 and PK and average detector modes for frequencies above 1 GHz.

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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.109 Class B,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

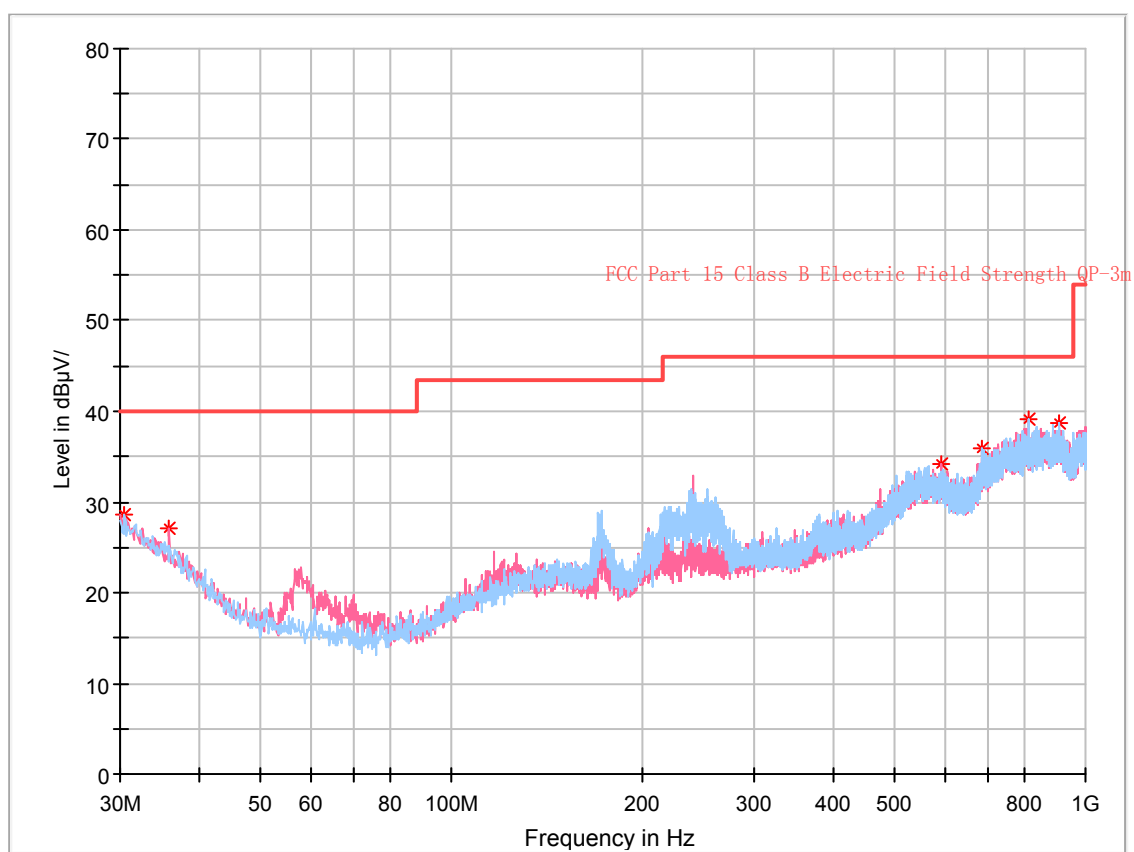
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Bibo Zhang on 2018-06-27.

EUT Operation Mode: Charging & Aux-in & Lighting

30 MHz~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)
30.485000	28.55	102	H	238	0.4	40.00	11.45
35.941250	27.01	102	V	53	-3.2	40.00	12.99
590.29625	34.11	102	V	282	4.8	46.00	11.89
686.69000	35.94	202	H	238	6.1	46.00	10.06
813.76000	39.09	202	H	4	9.2	46.00	6.91
905.54625	38.72	102	H	92	10	46.00	7.28

Note: The above table show the result test in peak detector, because the peak value is far below the limit for QP, so the QP value is not performed.

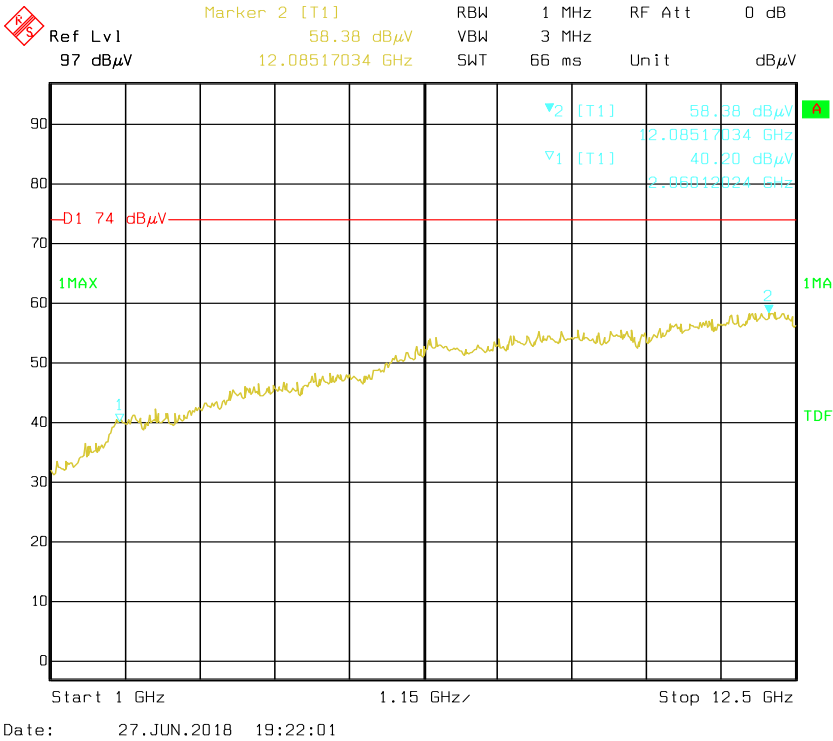
1 GHz – 12.5 GHz:

Frequency (MHz)	Receiver		Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	Corrected Amplitude (dBuV/m)	FCC Part 15B	
	Reading (dBμV)	PK/QP/Ave.		Height (m)	Polar (H / V)			Limit (dBuV/m)	Margin (dB)
1105.60	43.25	PK	143	1.1	H	-8.61	34.64	74	39.36
1105.60	28.74	Ave.	143	1.1	H	-8.61	20.13	54	33.87
1742.10	42.69	PK	103	2.1	V	-5.23	37.46	74	36.54
1742.10	28.92	Ave.	103	2.1	V	-5.23	23.69	54	30.31
2060.10	42.57	PK	45	2.4	H	-0.82	41.75	74	32.25
2060.10	28.55	Ave.	45	2.4	H	-0.82	27.73	54	26.27

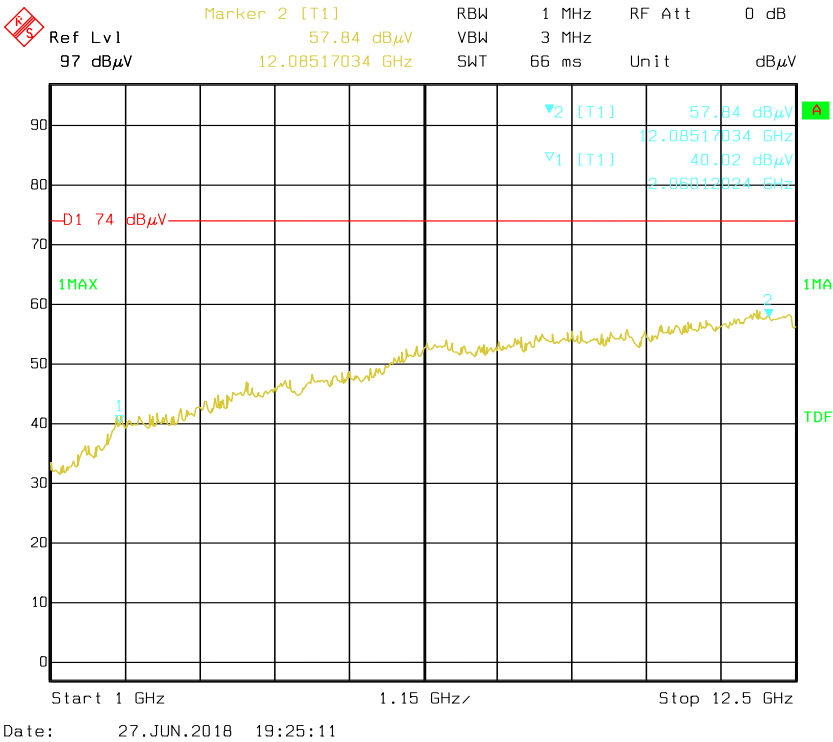
Note:

- 1) Correction Factor=Antenna factor (RX) + cable loss – amplifier factor
- 2) Corrected Amplitude = Correction Factor + Reading
- 3) Margin = Limit - Corrected Amplitude

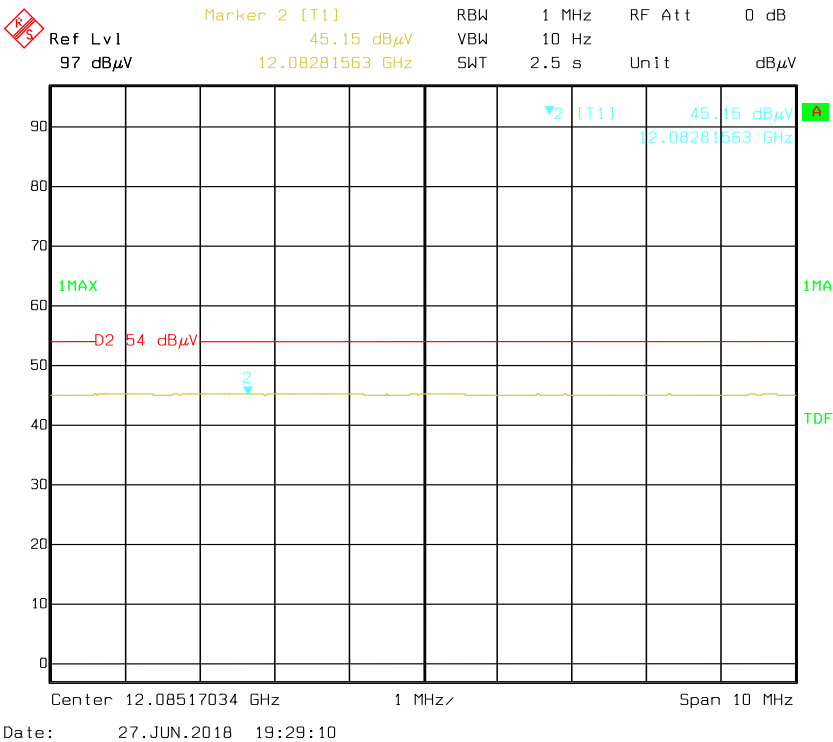
Pre-scan
Horizontal – Peak



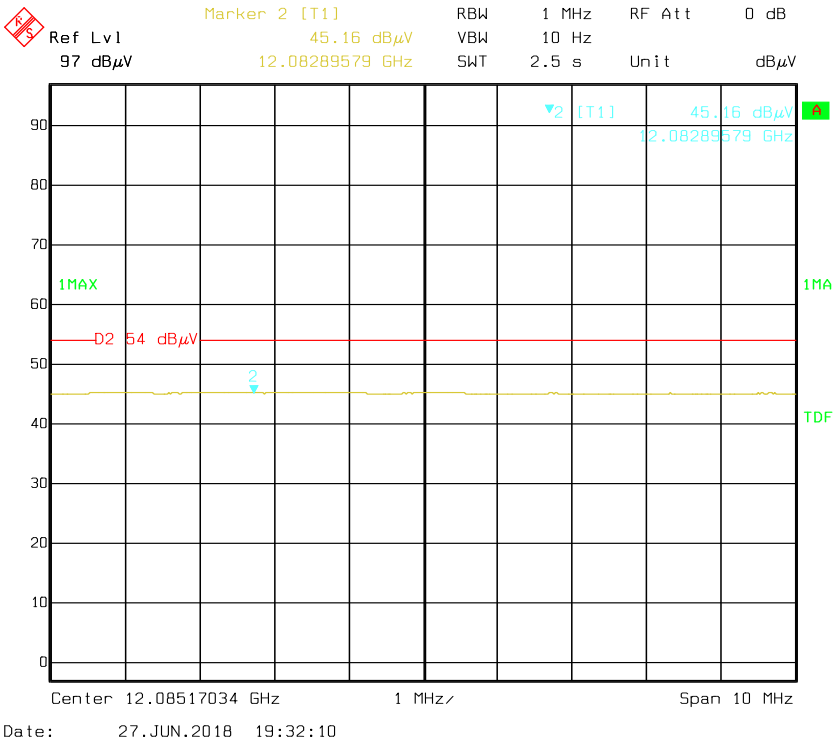
Vertical - Peak



Horizontal - Average



Vertical - Average



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