EMC TEST REPORT

Applicant	Xiaomi Communications Co., Ltd.
FCC ID	2AFZZ-RMSDG1
Product	Mobile Phone
Brand	MI
Model	MDG1
Report No.	RXA1710-0339EMC02
Issue Date	November 20, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2017)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Wei Liu

Performed by: Wei Liu/ Manager

Guangchang Fan

Approved by: Guangchang Fan/ Director

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	PASS
Test Date: October 18, 2017 ~ October 25, 2017			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement any government agencies.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
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E-mail:	xukai@ta-shanghai.com

2 General Description of Equipment under Test

2.1 Client Information

Applicant	Xiaomi Communications Co., Ltd.
Applicant address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China
Manufacturer	Xiaomi Communications Co., Ltd.
Manufacturer address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

2.2 General information

EUT Description	
Device Type:	Portable Device
Product Name:	Mobile Phone
Model Number:	MDG1
IMEI:	SIM 1:865498030064281 SIM 2:865498030064828
HW Version:	P2
SW Version:	MIUI 9
Antenna Type:	Internal Antenna
Test Mode:	Transfer Data Mode
EUT Accessory	
Adapter-US	Manufacturer: Dongguan Aohai Power Technology Co., Ltd. Model: MDY-08-EZ
Battery	Manufacturer: SCUD (Fujian) Electronics Co., LTD Model: BN35
USB Cable 1	Manufacturer: KeLi Model: KLC-2639, 82cm
USB Cable 2	Manufacturer: BROAD Model: 0US231XI0015, 82cm
Auxiliary test equipment	
PC	PC Manufacturer: lenovo Model: Thinkpad T540p (SN : SL10E37685)
Remark: The information of the EUT is declared by the manufacturer.	

2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards
FCC Code CFR47 Part15B (2017)
ANSI C63.4 (2014)

2.4 Test Mode

Test Mode	
Mode 1:	Adapter + USB cable+ Camera On +GPS Rx + MP3 +Idle
Mode 2:	Adapter + USB cable+ MP3 +Idle
Mode 3:	Adapter + USB cable+Idle
Mode 4:	USB Copy(EUT with PC) + USB cable + Camera On + MP3+GPS Rx +Idle
Mode 5:	Camera On + GPS Rx +Idle
Mode 6:	MP3+Idle
Mode 7:	Traffic

During the test, the preliminary test was performed in all modes (Camera/MP3/GPS) with all frequency bands (GSM/ WCDMA/ LTE/ BT/ Wi-Fi), mode 4 (with Camera + MP3 + GPS Rx + GSM/ WCDMA/ LTE/ BT/ Wi-Fi idle) selected as the worst condition. The test data of the worst-case condition was recorded in this report.

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

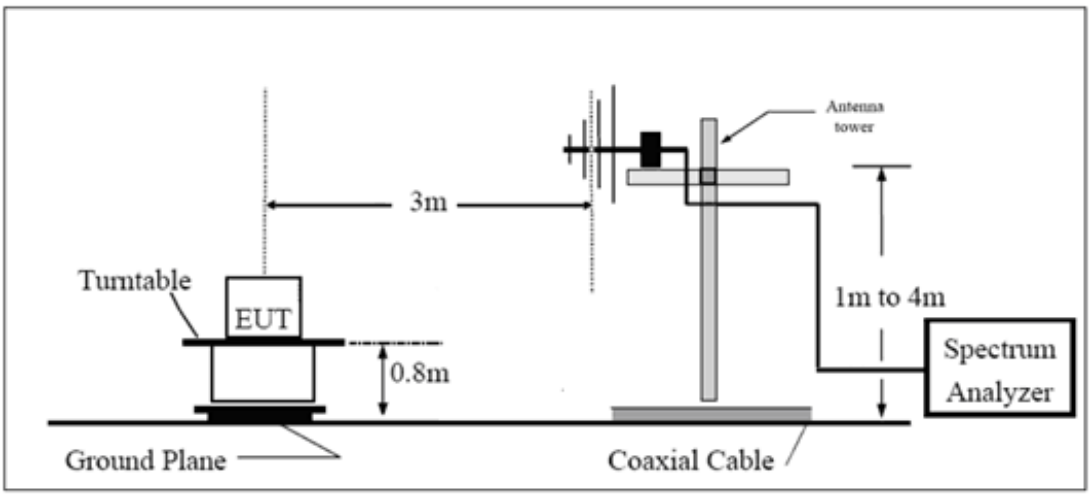
The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz) to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.
The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.
Set the spectrum analyzer in the following:
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (Xaxis) and the worst case was recorded.

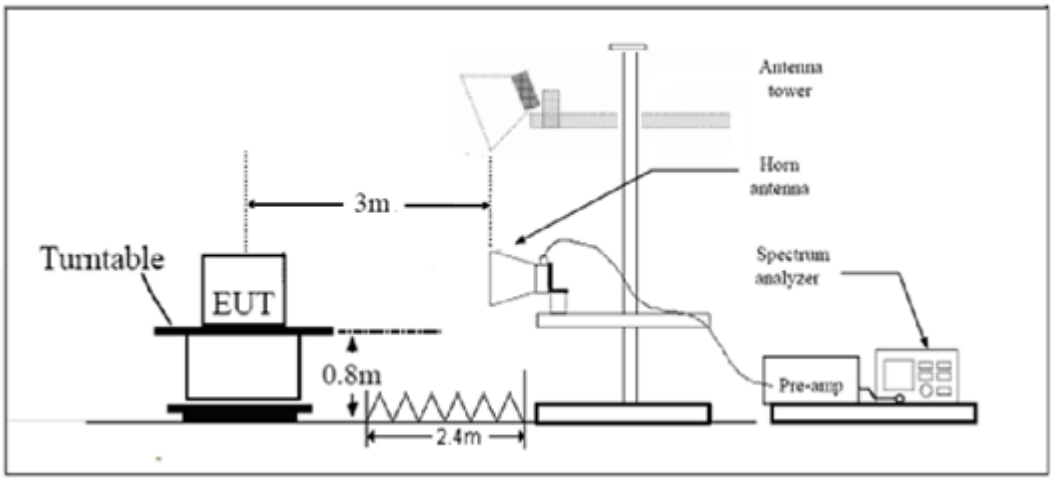
During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup

Below 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Frequency (MHz)	Field Strength (dBμV/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5th harmonic of the highest frequency or 40GHz,which is lower	54 74	Average Peak

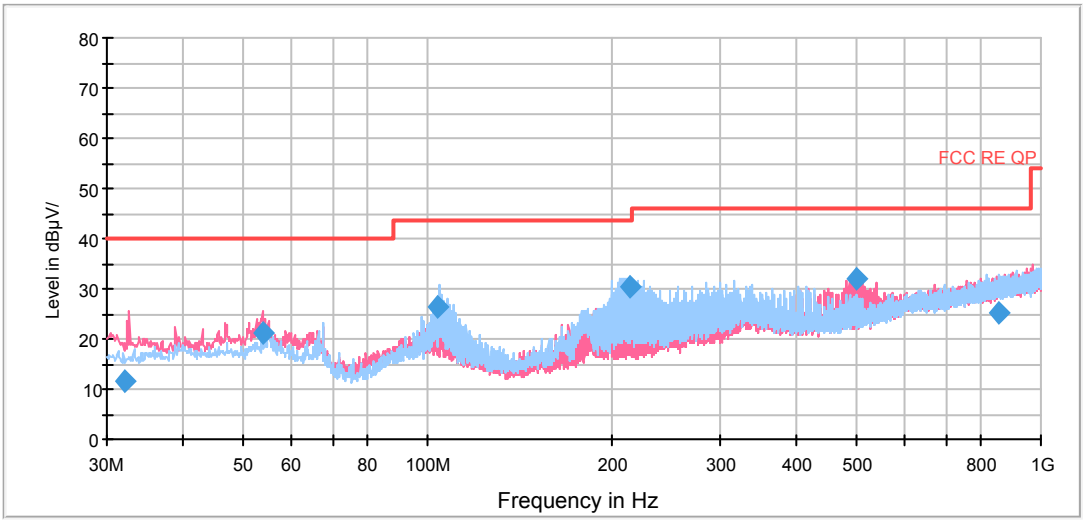
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 3.92 dB.

Test Results

The following graphs display the maximum values of horizontal and vertical by software.
For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

FCC RE 0.03-1GHz QP Class B



Radiated Emission from 30MHz to 1GHz

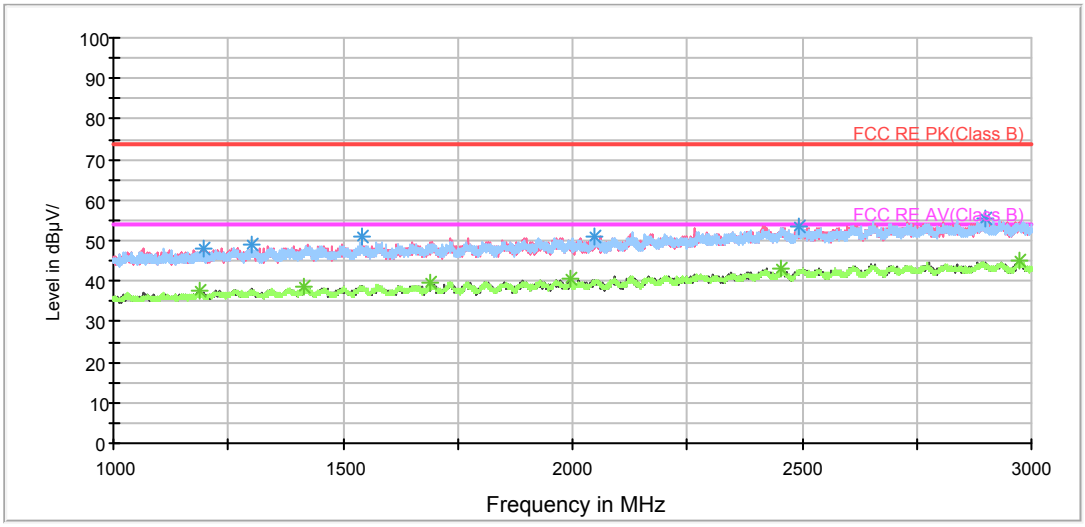
Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
32.107500	11.7	-0.3	200.0	V	138.0	12.0	28.3	40.0
53.806250	21.2	8.4	100.0	V	80.0	12.8	18.8	40.0
103.887500	26.5	13.6	175.0	H	135.0	12.9	17.0	43.5
214.016250	30.5	17.8	114.0	H	127.0	12.7	13.0	43.5
499.722500	31.8	11.3	100.0	V	0.0	20.5	14.2	46.0
853.686250	25.3	-0.8	175.0	H	171.0	26.1	20.7	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV

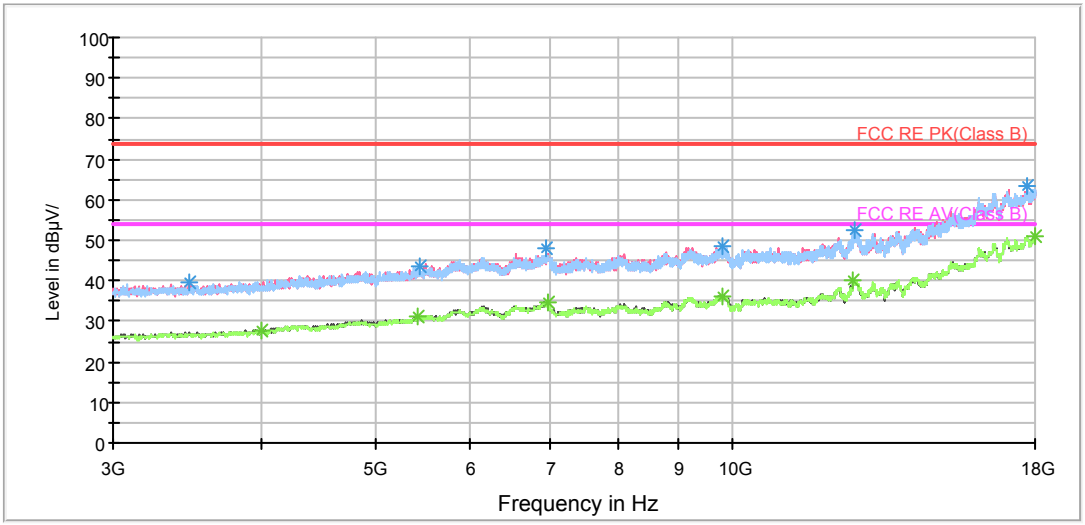


Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1197.250000	48.1	47.1	102.0	V	112.0	1.0	25.9	74
1302.250000	49.1	47.8	102.0	H	115.0	1.3	24.9	74
1542.500000	51.0	48.6	102.0	V	317.0	2.4	23.0	74
2047.250000	51.0	46.4	202.0	H	340.0	4.6	23.0	74
2495.000000	53.5	45.6	102.0	V	157.0	7.9	20.5	74
2897.500000	55.3	46.3	102.0	H	14.0	9.0	18.7	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1185.750000	37.4	36.2	202.0	H	296.0	1.2	16.6	54
1415.500000	38.4	36.5	202.0	V	272.0	1.9	15.6	54
1691.750000	39.5	36.1	102.0	V	224.0	3.4	14.5	54
1993.500000	40.7	36.1	202.0	V	0.0	4.6	13.3	54
2455.000000	43.1	35.9	202.0	V	214.0	7.2	10.9	54
2973.250000	45.0	36.0	202.0	V	100.0	9.0	9.0	54

RE 3-18GHz PK+AV



Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3472.500000	39.8	41.9	102.0	V	0.0	-2.1	34.2	74
5437.500000	43.5	40.6	202.0	H	276.0	2.9	30.5	74
6950.625000	47.8	41.6	202.0	H	90.0	6.2	26.2	74
9791.250000	48.5	38.6	202.0	H	343.0	9.9	25.5	74
12654.375000	52.4	38.4	202.0	H	253.0	14.0	21.6	74
17707.500000	63.3	38.6	202.0	H	320.0	24.7	10.7	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3995.625000	27.7	28.8	102.0	V	0.0	-1.1	26.3	54
5431.875000	31.4	28.6	102.0	V	319.0	2.8	22.6	54
6997.500000	34.7	28.2	202.0	V	0.0	6.5	19.3	54
9796.875000	36.3	26.3	202.0	V	0.0	10.0	17.7	54
12639.375000	40.1	25.6	102.0	V	0.0	14.5	13.9	54
18000.000000	51.0	25.5	102.0	V	274.0	25.5	3.0	54

3.2 Conducted Emission

Ambient condition

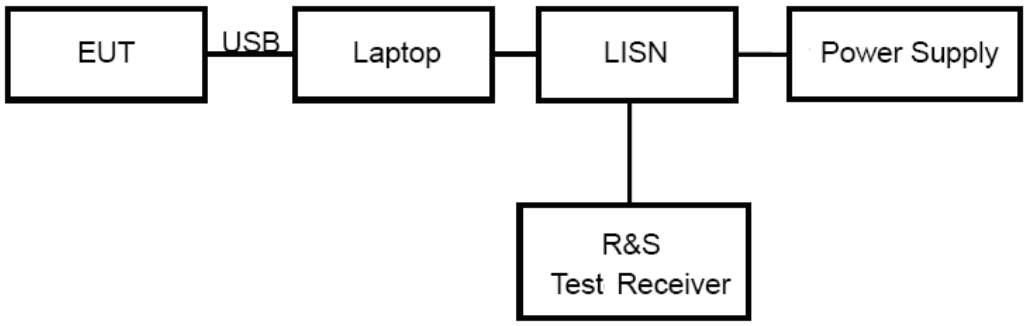
Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

Limits

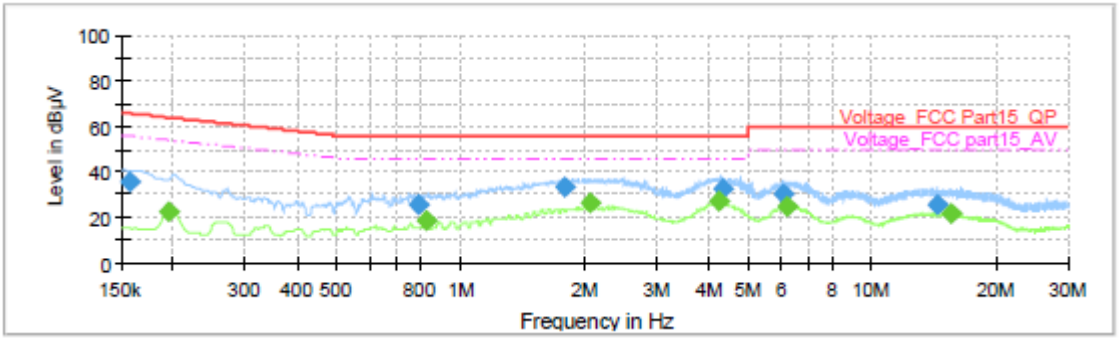
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 2.69 dB.

Test Results

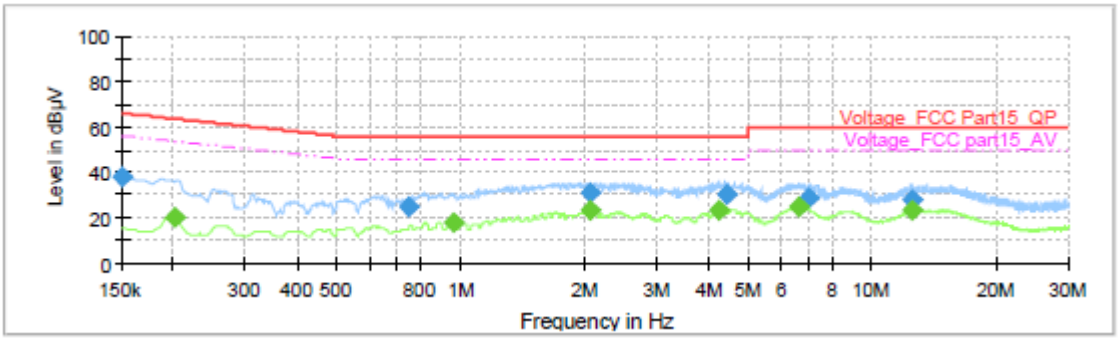
Following plots, Blue trace uses the peak detection; Green trace uses the average detection.



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.156750	35.99	---	65.63	29.65	1000.0	9.000	L1	ON	19.1
0.195000	---	22.49	53.82	31.33	1000.0	9.000	L1	ON	19.2
0.789000	25.37	---	56.00	30.63	1000.0	9.000	L1	ON	19.2
0.820500	---	18.66	46.00	27.34	1000.0	9.000	L1	ON	19.2
1.797000	33.51	---	56.00	22.49	1000.0	9.000	L1	ON	19.2
2.062500	---	26.19	46.00	19.81	1000.0	9.000	L1	ON	19.1
4.247250	---	27.50	46.00	18.50	1000.0	9.000	L1	ON	19.1
4.323750	32.69	---	56.00	23.31	1000.0	9.000	L1	ON	19.1
6.119250	30.18	---	60.00	29.82	1000.0	9.000	L1	ON	19.1
6.191250	---	25.05	50.00	24.95	1000.0	9.000	L1	ON	19.1
14.390250	25.91	---	60.00	34.09	1000.0	9.000	L1	ON	19.5
15.504000	---	21.85	50.00	28.15	1000.0	9.000	L1	ON	19.4

L line

Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	37.75	---	66.00	28.25	1000.0	9.000	N	ON	19.1
0.201750	---	19.82	53.54	33.72	1000.0	9.000	N	ON	19.2
0.750750	24.63	---	56.00	31.37	1000.0	9.000	N	ON	19.2
0.962250	---	17.85	46.00	28.15	1000.0	9.000	N	ON	19.2
2.062500	---	23.14	46.00	22.86	1000.0	9.000	N	ON	19.1
2.071500	31.20	---	56.00	24.80	1000.0	9.000	N	ON	19.1
4.247250	---	23.49	46.00	22.51	1000.0	9.000	N	ON	19.1
4.418250	29.94	---	56.00	26.06	1000.0	9.000	N	ON	19.1
6.625500	---	24.51	50.00	25.49	1000.0	9.000	N	ON	19.1
7.053000	28.38	---	60.00	31.62	1000.0	9.000	N	ON	19.2
12.468750	27.89	---	60.00	32.11	1000.0	9.000	N	ON	19.4
12.500250	---	23.56	50.00	26.44	1000.0	9.000	N	ON	19.4

N line

Conducted Emission from 150 KHz to 30 MHz

4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Signal Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2019-02-17
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2014-12-06	2017-12-05
Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2018-01-29
EMI Test Receiver	R&S	ESCS30	100138	2016-12-16	2017-12-15
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	NA	NA
Software	R&S	EMC32	V8.52.0	NA	NA