



FCC EMI TEST REPORT

Filing Type : Certification
FCC ID : 2APYSG019C
Equipment : Wireless Charger
Brand Name : G
Model Name : G019C
Applicant : Lanto Electronic Ltd
No.399 baisheng Road, jinxi Town, Kunshan City,
Jiangsu, 215324, China
Manufacturer : Lanto Electronic Ltd
No.399 baisheng Road, jinxi Town, Kunshan City,
Jiangsu, 215324, China
Standard : 47 CFR FCC Rules and Regulations Part 15
Subpart B, Class B Digital Device

The product was received on Jun. 11, 2018, and testing was started from Jun. 14, 2018 and completed on Jul. 27, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2014 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.


Approved by: William Li

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FC861107	01	Initial issue of report	Jul. 30, 2018



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
4	15.107	Conducted Emissions of Powerline	PASS	Under limit 9.23 dB at 2.798574 MHz
5.1	15.109	Radiated Emissions below 1GHz	PASS	Under limit 4.84 dB at 35.27 MHz
5.2	15.109	Radiated Emissions above 1GHz	Not Applicable	Note 1
Note 1: The highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement shall only be made up to 1GHz.				

Reviewed by: Teddy Chang

Report Producer: Kelly Yu

1. General Description of Equipment under Test

1.1. Basic Description of Equipment under Test

Equipment : Wireless Charger
Model No. : G019C
Power Supply Type : From Adapter(Switching)
AC Power Cord : Wall-Mount, 2 pin
DC Power Cable (Type-C USB) : AL-F-Shielded, 2.0 m, 6 pin
The maximum operating frequency : 148.5 kHz

1.2. Feature of Equipment under Test

Accessories

Item	Brand	Model	Spec. Description
Adapter	flextronics	G1000-US	Input: 100-240VAC, 50-60Hz, 0.5A Output: 5VDC, 3.0A / 9VDC, 2.0A
Type-C USB Cable	-	-	2.0 m
Type-C USB Cable	-	-	1.5 m

For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

1.3. Modification of EUT

No modifications to the EUT were made.

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. Both USB cable: 1.5m and 2.0m were pre-tested. The worst emission was found on USB cable: 2.0m.
- b. The equipment under test were performed the following test modes:

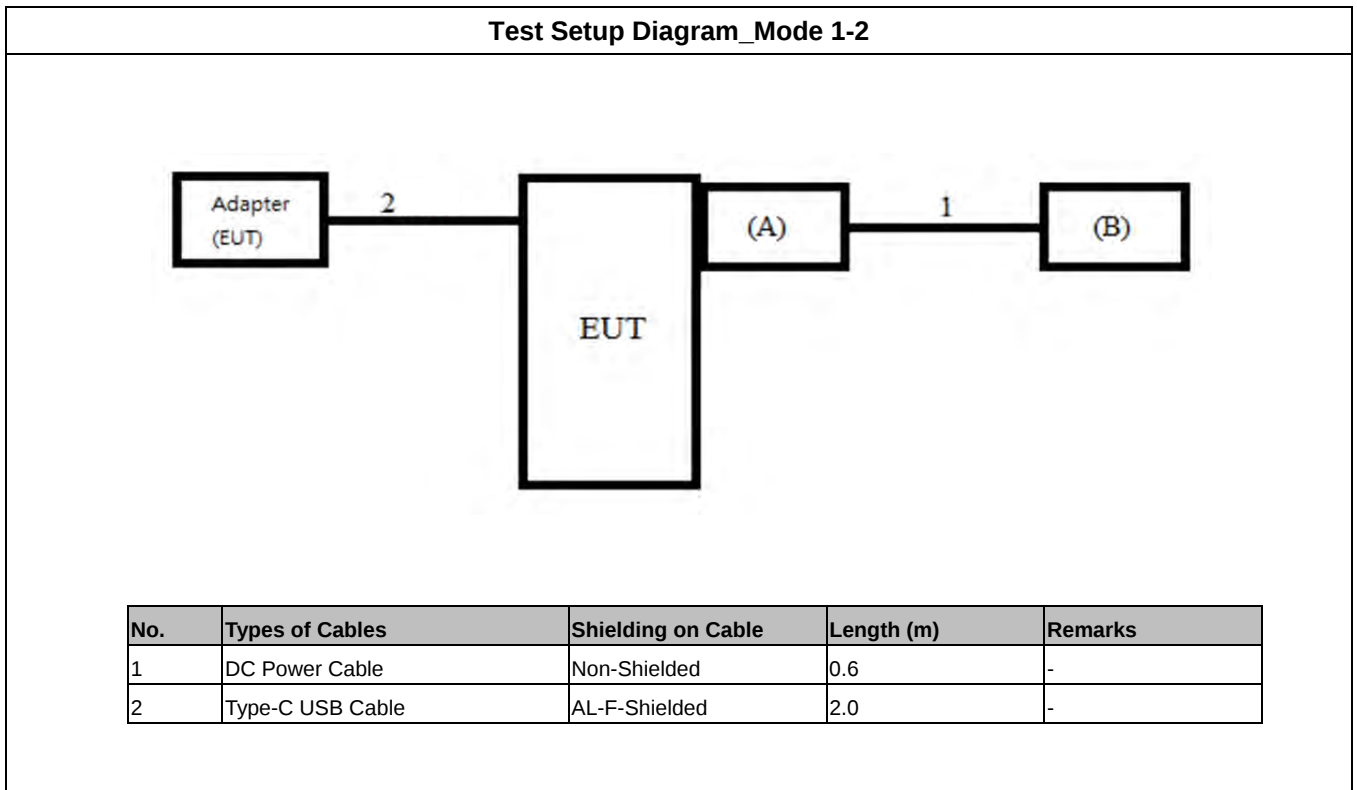
Test Items	Description of test modes
Conducted Emission	Mode 1. Adapter Charge+EUT (Z Axis, Horizontal)+RX Load(Y Axis) Mode 2. Adapter Charge+EUT (Z Axis, Horizontal)+RX Load(X Axis) Mode 3. Adapter Charge+EUT (Z Axis, Horizontal)+iPhone(Y Axis) Mode 4. Adapter Charge+EUT (Z Axis, Horizontal)+iPhone(X Axis)
Radiated Emissions <below 1GHz>	Mode 1. Adapter Charge+EUT (Z Axis, Horizontal)+RX Load(Y Axis) Mode 2. Adapter Charge+EUT (Z Axis, Horizontal)+RX Load(X Axis) Mode 3. Adapter Charge+EUT (Z Axis, Horizontal)+iPhone(Y Axis) Mode 4. Adapter Charge+EUT (Z Axis, Horizontal)+iPhone(X Axis)

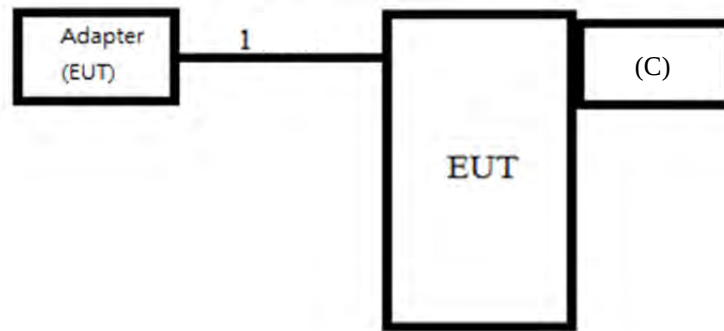
2.2. Description of Test System

Conducted emission and radiated emission below 1GHz

No.	Peripheral	Manufacturer	Model Number	FCC ID	Remarks
For Local					
A	Rx Load(client provided)	-	-	-	Mode 1-2
B	Load	SSR	400W	-	Mode 1-2
C	iPhone 8	Apple	MRRM2TA/A	-	Mode 3-4

2.3. Connection Diagram of Test System



Test Setup Diagram_Mode 3-4


No.	Types of Cables	Shielding on Cable	Length (m)	Remarks
1	Type-C USB Cable	AL-F-Shielded	2.0	-



2.4. Test Software

< Mode 1-2 >

During the test, the following program was executed:

- Turn on the power of all equipment.
- The Rx Load for charging by EUT via wireless, and then Rx Load keep output (9V/1.1A).

< Mode 3-4 >

During the test, the following programs under IOS 11.3.1(iPone 8) were executed:

- Turn on the power of all equipment.
- The iPhone for charging by EUT via wireless.
- The iPhone open "Note" to display continuously repeating "H" patterns



3. General Information of Test

3.1. Test Facilities

Test Site : SPORTON INTERNATIONAL INC.						
☒ HUA YA	ADD: No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: 886-3-327-3456 FAX: 886-3-318-0055 FCC Designation Number: TW1093					
☐ DONG HU	ADD: No. 3, Ln. 238, Kangle St., Neihsu Dist., Taipei City, Taiwan (R.O.C.) TEL: 886-2-2631-5551 FAX: 886-2-2631-9740 FCC Designation Number: TW1094					
☐ LIN KOU	ADD: No. 30-2, Dingfu Vil., Linkou Dist., New Taipei City, Taiwan (R.O.C.) TEL: 886-2-2601-1640 FAX: 886-2-2601-1695 FCC Designation Number: TW1095					

Test Items	Test Site No.	Test Engineer	Test Environment		Test Date	Remark
			temp °C	hum %		
Conducted Emissions of Powerline	CO01-HY	Bear	24	56	19/Jun/2018	Mode 1-3
		Bear	24	56	21/Jun/2018	Mode 4
Radiated Emissions below 1GHz	10CH02-HY	Nicky	25	64	14/Jun/2018	Mode 1-3
		Nicky	25	65	22/Jun/2018	Mode 4

3.2. Test Standards

Test items	Test Standards and Test Procedures
Radiated and Conducted Emissions	ANSI C63.4:2014 with FCC Method 47 CFR Part 15, Subpart B, Class B Digital Device, CISPR PUB. 22

3.3. Test Voltage/Frequencies

Power Supply Type	Voltage/Frequencies
AC Power Supply	120V / 60Hz

3.4. Test Distance and Frequency Range Investigated

Test Items	Frequency Range	Remark
Powerline Conducted Emissions	150 kHz to 30 MHz	-
Radiated Emissions (below 1GHz)	30 MHz to 1,000 MHz	Measurement distance is 10 m.

3.5. Operating Condition

- Full system.



3.6. Labelling requirements

The devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

3.7. User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

4. Conducted Emissions Measurement

Conducted Emissions were measured according to the methods defined in ANSI C63.4-2014 Section 7.
The EUT is which satisfies the Class B disturbance limits.

4.1. Limit

Limits for conducted disturbance at the mains ports of class B			
Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
0,15 – 0,5	AMN	Quasi-peak / 9 kHz	66 - 56
0,5 – 5			56
5 – 30			60
0,15 – 0,5	AMN	Average / 9 kHz	56 - 46
0,5 – 5			46
5 – 30			50

Note 1: The lower limit shall apply at the transition frequencies.
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

4.2. Test Procedures

- The EUT was warmed up for 15 minutes before testing started.
- The EUT was placed on a desk 0.8 meter height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meter from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connect to the other LISN.
- The LISN provides 50 ohm, coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- All emissions not reported here are more than 10 dB below the prescribed limit.

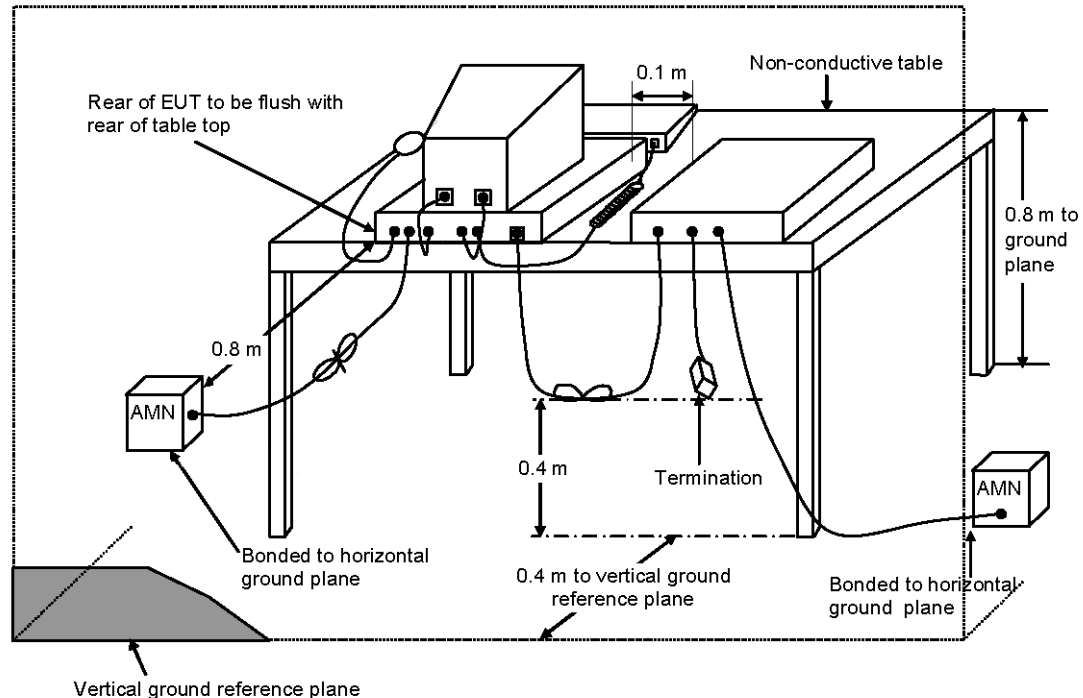
4.3. Measurement Results Calculation

The measurand Level is calculated using:

$$\text{Corrected Reading (dB}\mu\text{V)} = \text{Raw(Read Level)} + \text{AF(LISN Factor)} + \text{CL(Cable Loss)} + \text{AT(Attenuator)}$$
 For example at 0.3 MHz if the LISN Factor is 10.48 dB, the cable loss is 0.10 dB, the measured voltage is 36.39 dBμV, the signal strength would be calculated:

$$\text{Corrected Reading (dB}\mu\text{V)} = 36.39 \text{ dB}\mu\text{V} + 10.48 \text{ dB} + 0.10 \text{ dB} + 10 \text{ dB} = 56.97 \text{ dB}\mu\text{V}$$

4.4. Typical Test Setup Layout



- AMN is 80 cm from the EUT and at least 80 cm from other units and other metal planes.
- EUT is connected to one artificial mains network (AMN).
- All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
- Rear of EUT to be flushed with rear of table top.
- Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
- If cables, which hang closer than 40 cm to the horizontal metal ground plane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
- Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
- Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.

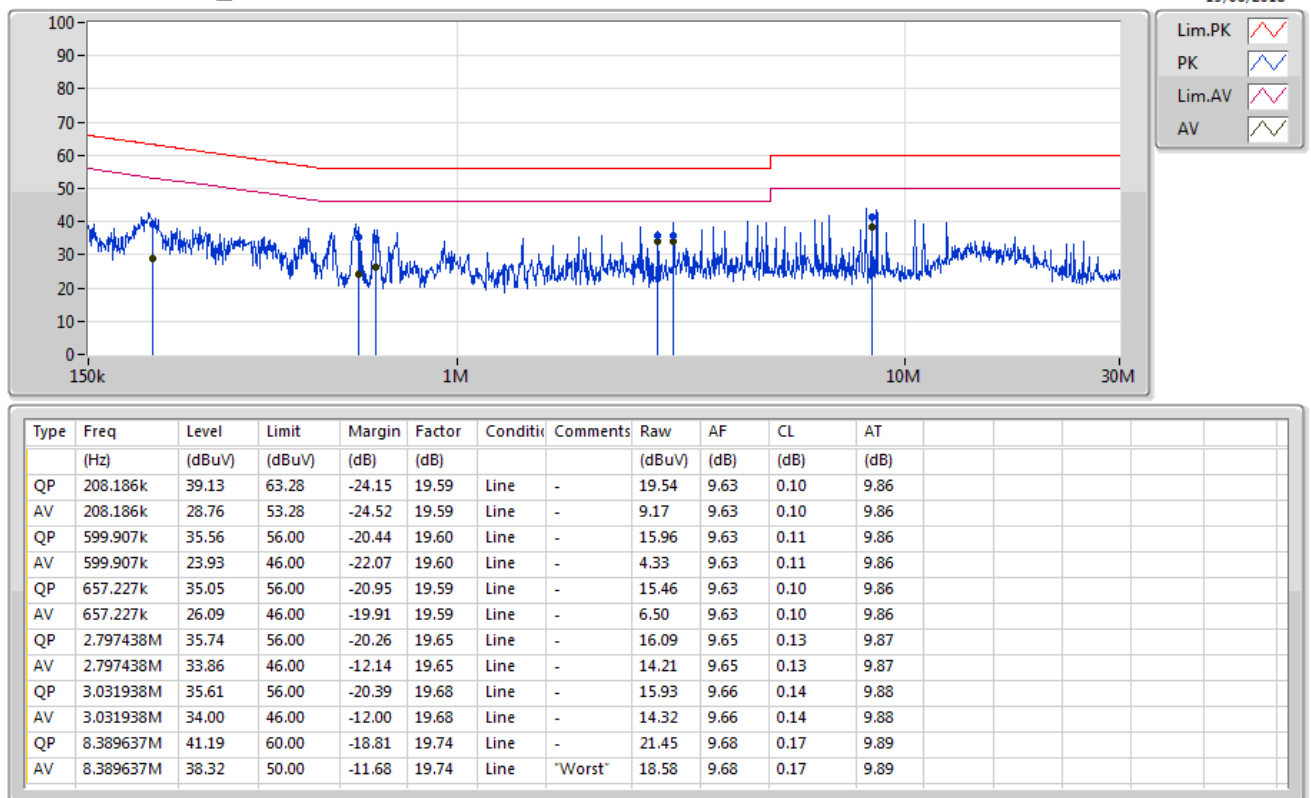


4.5. Test Result

Test Mode	Mode 1		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Line

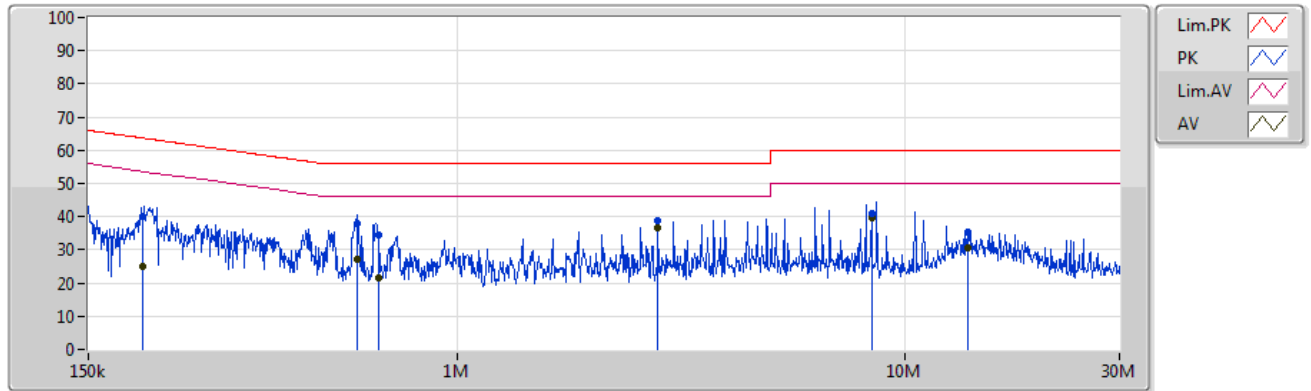
Conduction_FCC Mode 1



Neutral

Conduction_FCC Mode 1

19/06/2018

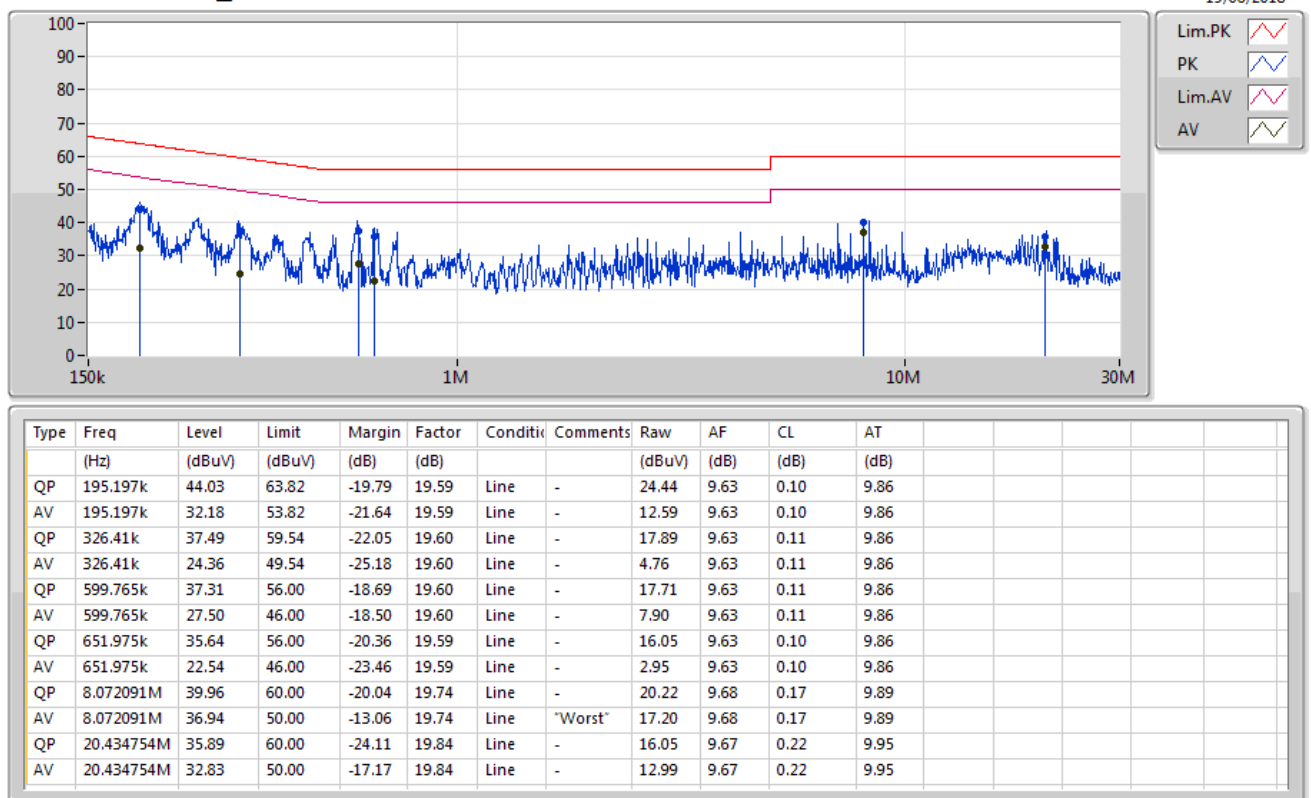


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Conditio	Comments	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)						
QP	198.352k	40.04	63.69	-23.65	19.64	Neutral	-	20.40	9.68	0.10	9.86						
AV	198.352k	25.20	53.69	-28.49	19.64	Neutral	-	5.56	9.68	0.10	9.86						
QP	596.575k	37.94	56.00	-18.06	19.61	Neutral	-	18.33	9.64	0.11	9.86						
AV	596.575k	27.37	46.00	-18.63	19.61	Neutral	-	7.76	9.64	0.11	9.86						
QP	666.779k	34.44	56.00	-21.56	19.60	Neutral	-	14.84	9.64	0.10	9.86						
AV	666.779k	21.39	46.00	-24.61	19.60	Neutral	-	1.79	9.64	0.10	9.86						
QP	2.798574M	38.88	56.00	-17.12	19.66	Neutral	-	19.22	9.66	0.13	9.87						
AV	2.798574M	36.77	46.00	-9.23	19.66	Neutral	"Worst"	17.11	9.66	0.13	9.87						
QP	8.394506M	41.15	60.00	-18.85	19.78	Neutral	-	21.37	9.72	0.17	9.89						
AV	8.394506M	39.72	50.00	-10.28	19.78	Neutral	-	19.94	9.72	0.17	9.89						
QP	13.752135M	35.26	60.00	-24.74	19.90	Neutral	-	15.36	9.77	0.20	9.93						
AV	13.752135M	30.72	50.00	-19.28	19.90	Neutral	-	10.82	9.77	0.20	9.93						



Test Mode	Mode 2		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

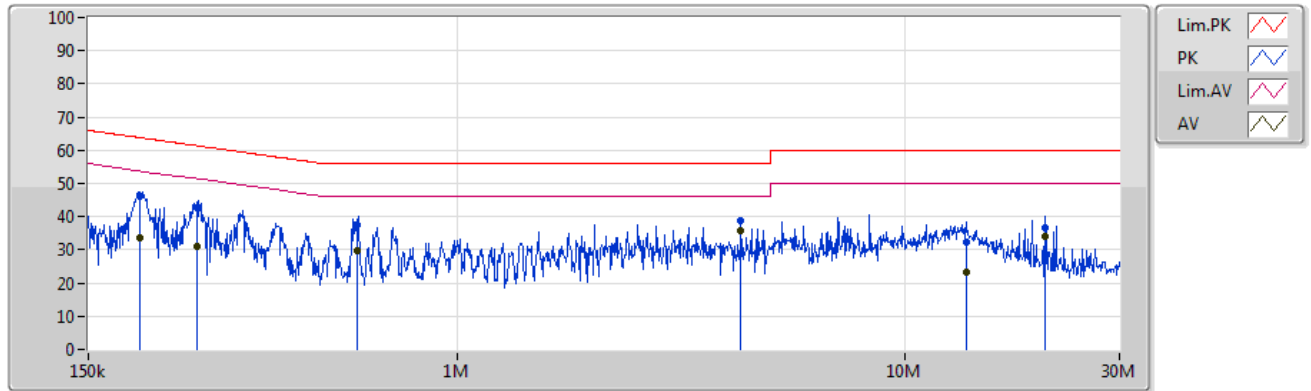
Line

Conduction_FCC Mode 2

Neutral

Conduction_FCC Mode 2

19/06/2018

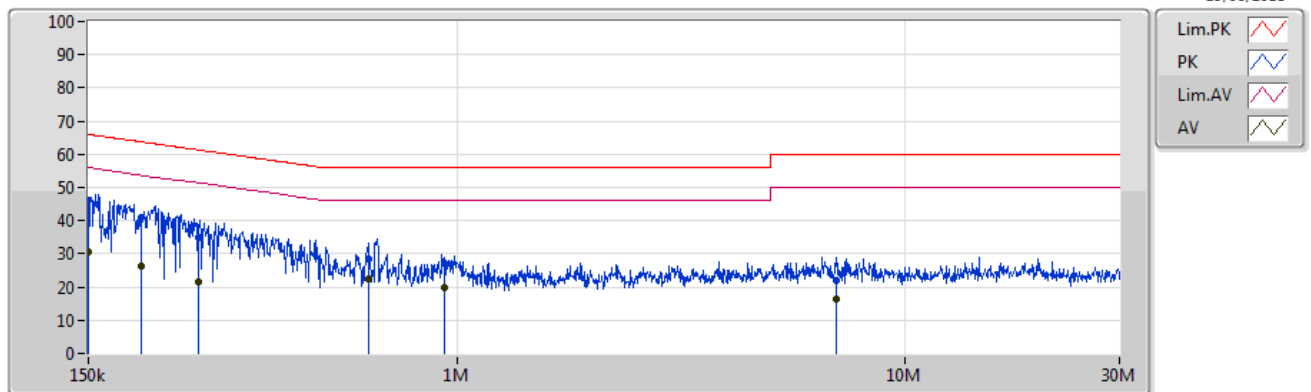


Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Conditio	Comments	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)						
QP	196.016k	46.17	63.78	-17.61	19.69	Neutral	-	26.48	9.73	0.10	9.86						
AV	196.016k	33.41	53.78	-20.37	19.69	Neutral	-	13.72	9.73	0.10	9.86						
QP	262.257k	42.70	61.35	-18.65	19.60	Neutral	-	23.10	9.64	0.10	9.86						
AV	262.257k	30.82	51.35	-20.53	19.60	Neutral	-	11.22	9.64	0.10	9.86						
QP	596.863k	37.55	56.00	-18.45	19.61	Neutral	-	17.94	9.64	0.11	9.86						
AV	596.863k	29.72	46.00	-16.28	19.61	Neutral	-	10.11	9.64	0.11	9.86						
QP	4.288533M	38.64	56.00	-17.36	19.70	Neutral	-	18.94	9.67	0.15	9.88						
AV	4.288533M	35.76	46.00	-10.24	19.70	Neutral	"Worst"	16.06	9.67	0.15	9.88						
QP	13.6427M	32.52	60.00	-27.48	19.90	Neutral	-	12.62	9.77	0.20	9.93						
AV	13.6427M	23.33	50.00	-26.67	19.90	Neutral	-	3.43	9.77	0.20	9.93						
QP	20.426099M	36.84	60.00	-23.16	19.99	Neutral	-	16.85	9.82	0.22	9.95						
AV	20.426099M	33.90	50.00	-16.10	19.99	Neutral	-	13.91	9.82	0.22	9.95						



Test Mode	Mode 3		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Line

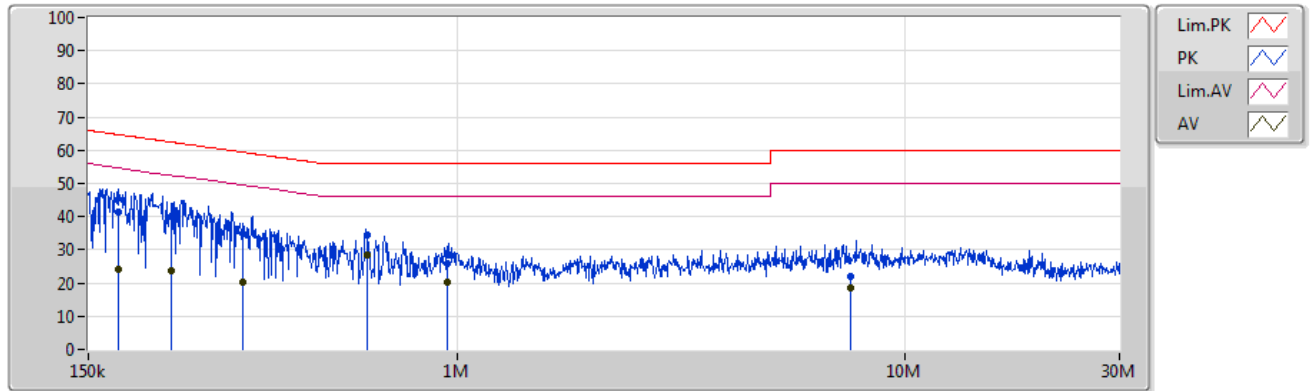
Conduction_FCC Mode 3

Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Conditio	Comments	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)						
QP	150.25k	46.08	65.98	-19.90	19.58	Line	"Worst"	26.50	9.63	0.09	9.86						
AV	150.25k	30.49	55.98	-25.49	19.58	Line	-	10.91	9.63	0.09	9.86						
QP	196.572k	41.13	63.74	-22.61	19.59	Line	-	21.54	9.63	0.10	9.86						
AV	196.572k	26.44	53.74	-27.30	19.59	Line	-	6.85	9.63	0.10	9.86						
QP	264.282k	35.12	61.30	-26.18	19.59	Line	-	15.53	9.63	0.10	9.86						
AV	264.282k	21.66	51.30	-29.64	19.59	Line	-	2.07	9.63	0.10	9.86						
QP	634.777k	28.46	56.00	-27.54	19.59	Line	-	8.87	9.63	0.10	9.86						
AV	634.777k	22.27	46.00	-23.73	19.59	Line	-	2.68	9.63	0.10	9.86						
QP	935.994k	27.02	56.00	-28.98	19.59	Line	-	7.43	9.63	0.10	9.86						
AV	935.994k	19.90	46.00	-26.10	19.59	Line	-	0.31	9.63	0.10	9.86						
QP	6.98701M	21.85	60.00	-38.15	19.74	Line	-	2.11	9.68	0.17	9.89						
AV	6.98701M	16.28	50.00	-33.72	19.74	Line	-	-3.46	9.68	0.17	9.89						

Neutral

Conduction_FCC Mode 3

19/06/2018



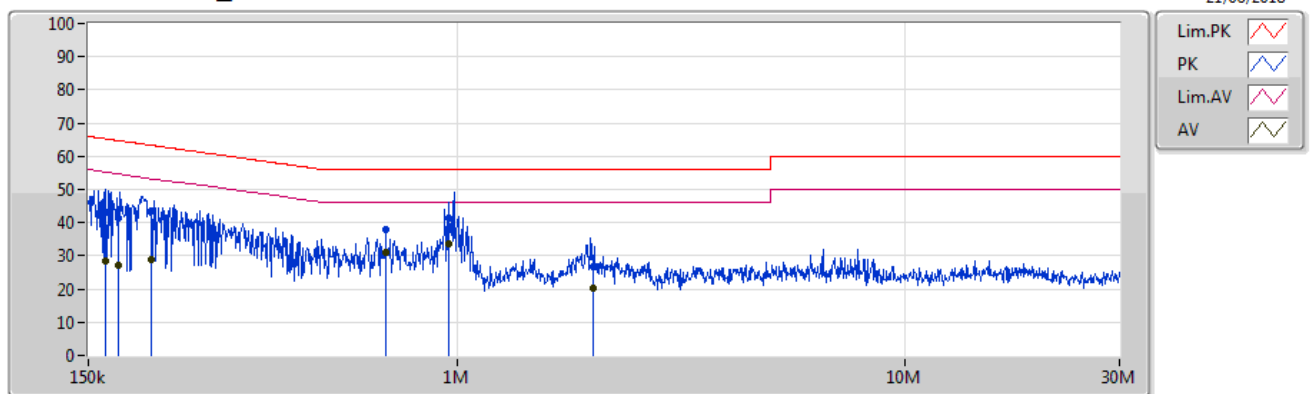
Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Conditio	Comments	Raw (dBuV)	AF (dB)	CL (dB)	AT (dB)						
QP	174.5k	41.58	64.74	-23.16	19.72	Neutral	-	21.86	9.77	0.09	9.86						
AV	174.5k	24.04	54.74	-30.70	19.72	Neutral	-	4.32	9.77	0.09	9.86						
QP	230.027k	40.23	62.44	-22.21	19.60	Neutral	-	20.63	9.64	0.10	9.86						
AV	230.027k	23.79	52.44	-28.65	19.60	Neutral	-	4.19	9.64	0.10	9.86						
QP	331.091k	34.77	59.42	-24.65	19.61	Neutral	-	15.16	9.64	0.11	9.86						
AV	331.091k	20.44	49.42	-28.98	19.61	Neutral	-	0.83	9.64	0.11	9.86						
QP	629.058k	34.55	56.00	-21.45	19.61	Neutral	-	14.94	9.64	0.11	9.86						
AV	629.058k	28.57	46.00	-17.43	19.61	Neutral	"Worst"	8.96	9.64	0.11	9.86						
QP	951.658k	25.93	56.00	-30.07	19.60	Neutral	-	6.33	9.64	0.10	9.86						
AV	951.658k	20.39	46.00	-25.61	19.60	Neutral	-	0.79	9.64	0.10	9.86						
QP	7.529009M	22.00	60.00	-38.00	19.77	Neutral	-	2.23	9.71	0.17	9.89						
AV	7.529009M	18.70	50.00	-31.30	19.77	Neutral	-	-1.07	9.71	0.17	9.89						



Test Mode	Mode 4		
Test Frequency	0.15 MHz ~ 30 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Line

Conduction_FCC Mode 4

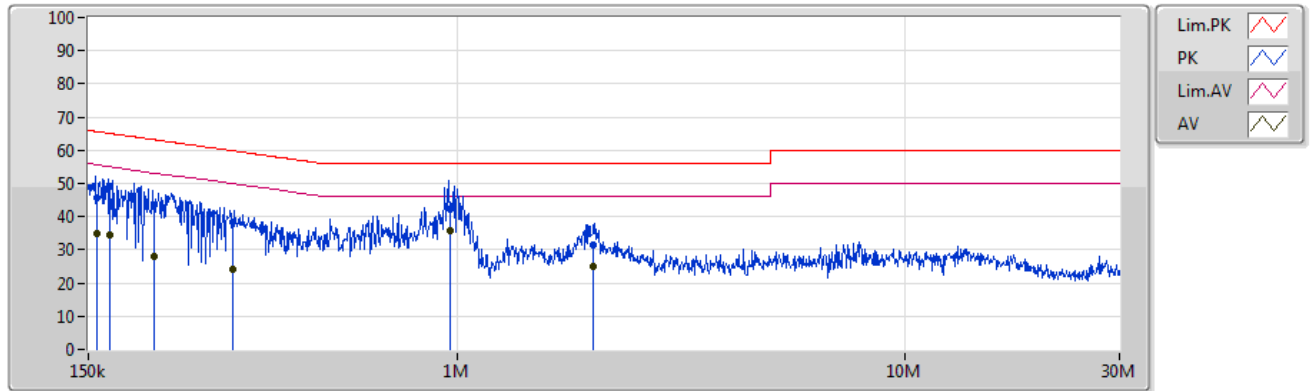


Type	Freq	Level	Limit	Margin	Factor	Conditio	Comments	Raw	LISN	CL	AT						
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)						
QP	163.92k	42.95	65.25	-22.30	19.58	Line	-	23.37	9.63	0.09	9.86						
AV	163.92k	28.37	55.25	-26.88	19.58	Line	-	8.79	9.63	0.09	9.86						
QP	175.018k	41.27	64.72	-23.45	19.59	Line	-	21.68	9.63	0.10	9.86						
AV	175.018k	27.12	54.72	-27.60	19.59	Line	-	7.53	9.63	0.10	9.86						
QP	207.301k	43.50	63.30	-19.80	19.59	Line	-	23.91	9.63	0.10	9.86						
AV	207.301k	29.09	53.30	-24.21	19.59	Line	-	9.50	9.63	0.10	9.86						
QP	689.51k	37.84	56.00	-18.16	19.59	Line	-	18.25	9.63	0.10	9.86						
AV	689.51k	31.10	46.00	-14.90	19.59	Line	-	11.51	9.63	0.10	9.86						
QP	956.908k	41.44	56.00	-14.56	19.59	Line	-	21.85	9.63	0.10	9.86						
AV	956.908k	33.63	46.00	-12.37	19.59	Line	"Worst"	14.04	9.63	0.10	9.86						
QP	2.00411M	26.62	56.00	-29.38	19.64	Line	-	6.98	9.65	0.12	9.87						
AV	2.00411M	20.10	46.00	-25.90	19.64	Line	-	0.46	9.65	0.12	9.87						

Neutral

Conduction_FCC Mode 4

21/06/2018



Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Conditio	Comments	Raw (dBuV)	LISN (dB)	CL (dB)	AT (dB)						
QP	156.24k	45.50	65.66	-20.16	19.60	Neutral	-	25.90	9.65	0.09	9.86						
AV	156.24k	34.90	55.66	-20.76	19.60	Neutral	-	15.30	9.65	0.09	9.86						
QP	167.32k	49.15	65.08	-15.93	19.60	Neutral	-	29.55	9.65	0.09	9.86						
AV	167.32k	34.37	55.08	-20.71	19.60	Neutral	-	14.77	9.65	0.09	9.86						
QP	209.772k	43.58	63.21	-19.63	19.60	Neutral	-	23.98	9.64	0.10	9.86						
AV	209.772k	27.92	53.21	-25.29	19.60	Neutral	-	8.32	9.64	0.10	9.86						
QP	314.42k	38.45	59.84	-21.39	19.61	Neutral	-	18.84	9.64	0.11	9.86						
AV	314.42k	24.24	49.84	-25.60	19.61	Neutral	-	4.63	9.64	0.11	9.86						
QP	965.928k	42.35	56.00	-13.65	19.60	Neutral	-	22.75	9.64	0.10	9.86						
AV	965.928k	35.61	46.00	-10.39	19.60	Neutral	"Worst"	16.01	9.64	0.10	9.86						
QP	2.011219M	31.67	56.00	-24.33	19.64	Neutral	-	12.03	9.65	0.12	9.87						
AV	2.011219M	24.79	46.00	-21.21	19.64	Neutral	-	5.15	9.65	0.12	9.87						



5. Radiated Emissions Measurement

Radiated Emissions were measured according to the methods defined in ANSI C63.4-2014 Section 8.
The EUT is which satisfies the Class B disturbance limits.

5.1. Radiated Emission below 1GHz

5.1.1.Limit

radiated emissions at frequencies up to 1 GHz for Class B equipment			
Frequency range MHz	Measurement		Class B limits
	Distance (m)	Detector type / bandwidth	dB(μV/m)
30 – 230	10	Quasi Peak / 120 kHz	30
230 – 1000			37

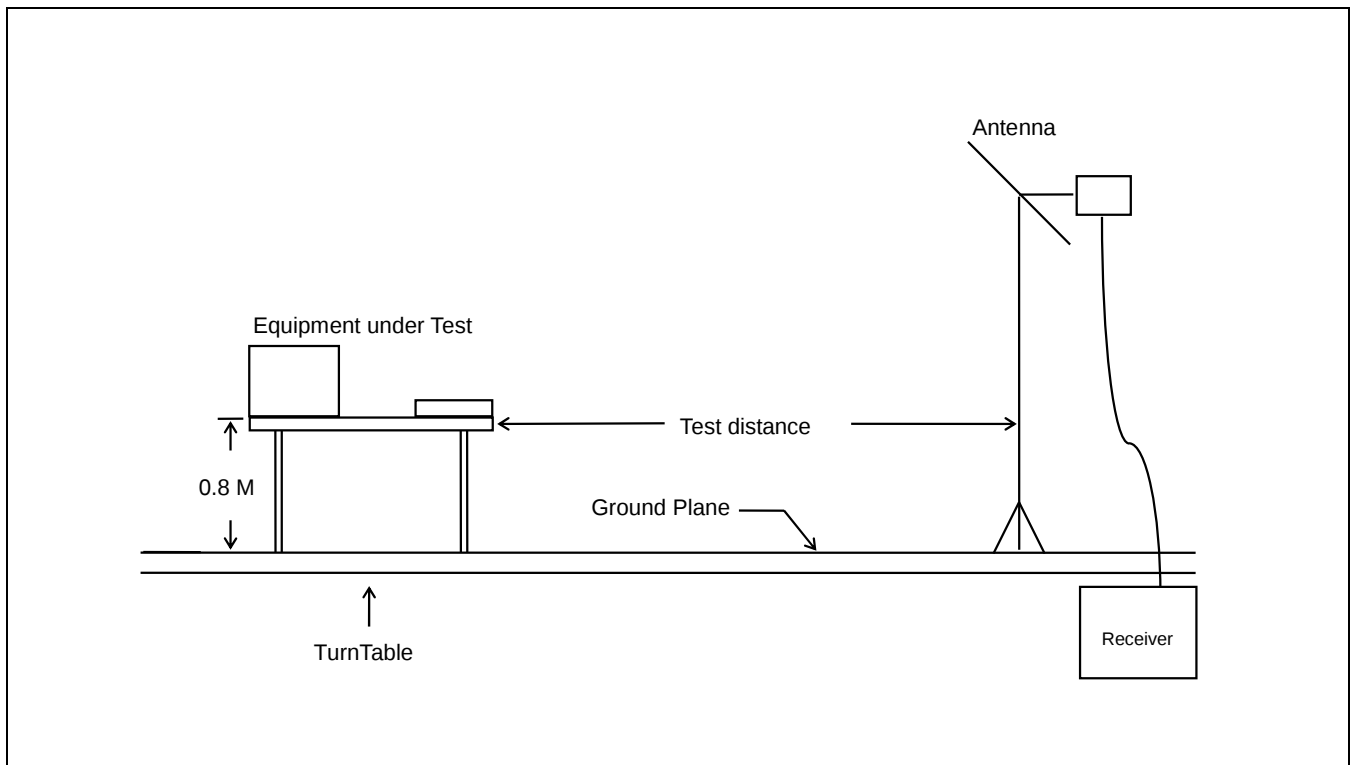
5.1.2.Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- The FCC Part 15.109(g) permit parties seeking to authorize a digital device to choose to demonstrate that the device complies with either the Part 15 standards or the international standards found in Publication 22 of the International Special Committee on Radio Interference (CISPR).

5.1.3.Measurement Results Calculation

The measurand Level is calculated using:
 $\text{Corrected Reading (dB}\mu\text{V/m)} = \text{Raw(Read Level)} + \text{AF(Antenna Factor)} + \text{CL(Cable Loss)} - \text{PA(Preamp Factor)}$
For example at 125 MHz if the Antenna Factor is 17.24 dB/m, the cable loss is 1.20 dB, the measured voltage is 35.80 dBμV and the Preamp Factor is 27.18 dB, the signal strength would be calculated:
 $\text{Corrected Reading (dB}\mu\text{V/m)} = 35.80 \text{ dB}\mu\text{V} + 17.24 \text{ dB/m} + 1.20 \text{ dB} - 27.18 \text{ dB} = 27.06 \text{ dB}\mu\text{V/m}$
Note: If a hybrid antenna is used, the antenna factor shall be the sum of the Antenna Factor + Attenuator Factor.

5.1.4. Typical Test Setup Layout

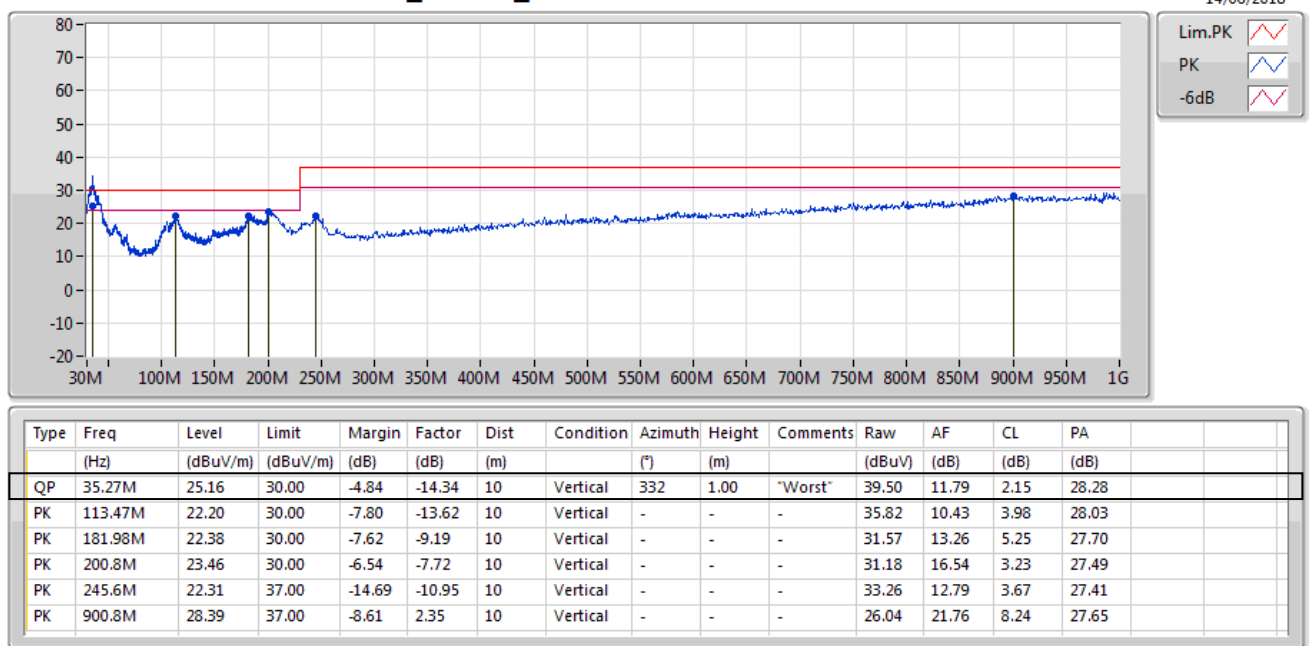


5.1.5. Test Result

Test mode	Mode 1		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Vertical

Radiation-below 1GHz_FD CI_Mode 1

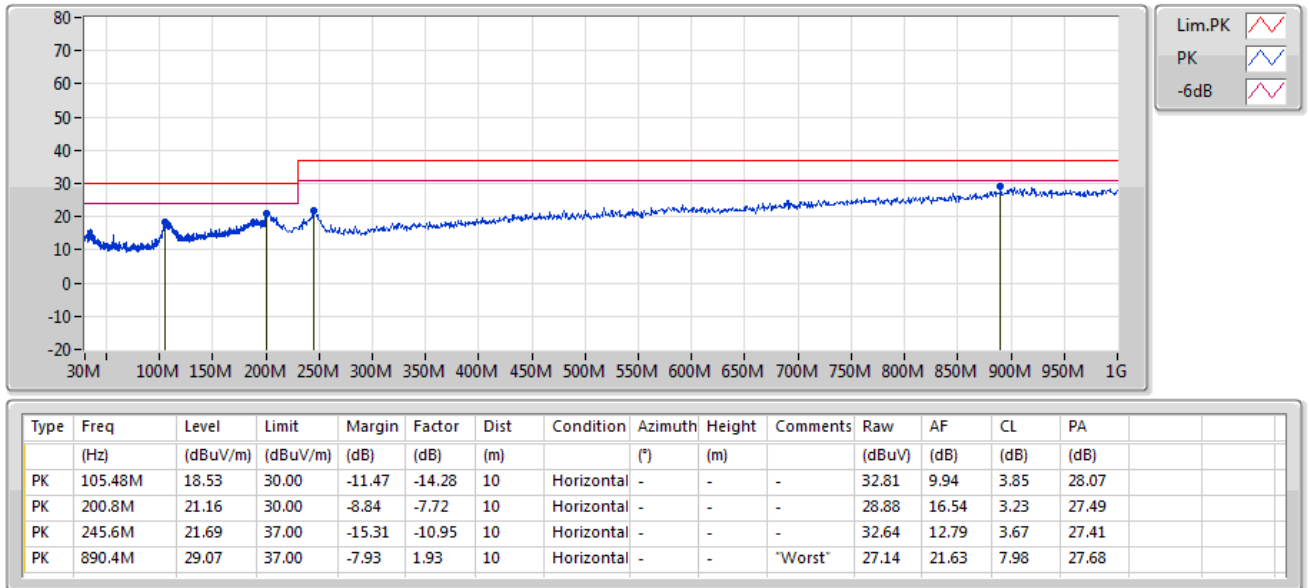




Horizontal

Radiation-below 1GHz_FD CI_Mode 1

14/06/2018

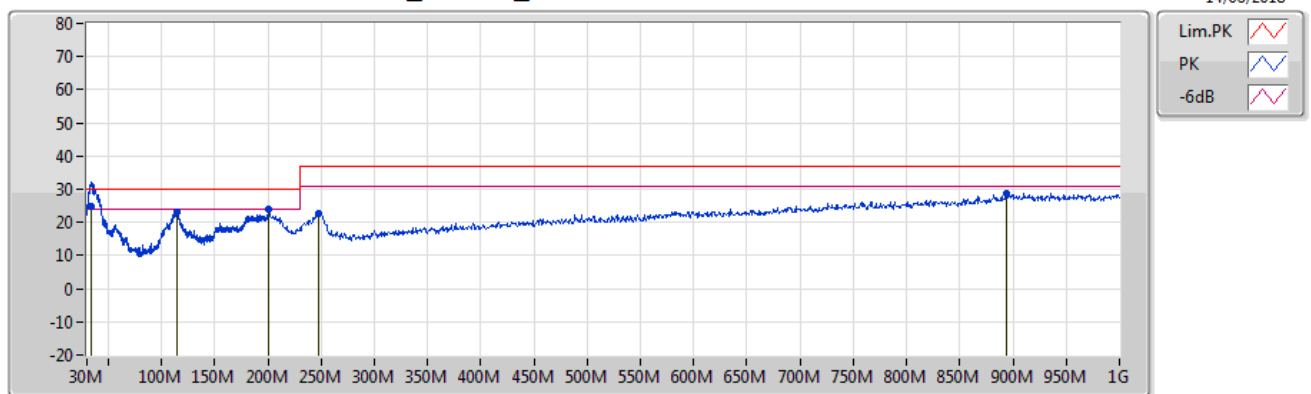




Test mode	Mode 2		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Vertical

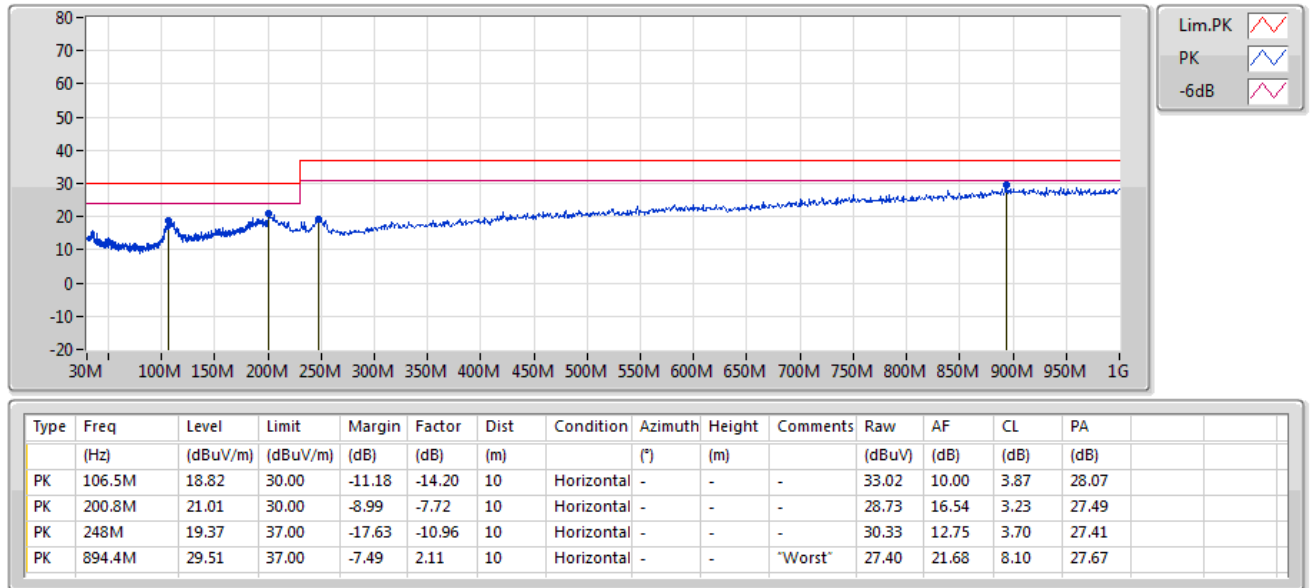
Radiation-below 1GHz_FD CI_Mode 2



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
QP	33.74M	24.76	30.00	-5.24	-14.00	10	Vertical	300	1.00	"Worst"	38.76	12.22	2.06	28.28
PK	114.83M	22.95	30.00	-7.05	-13.52	10	Vertical	-	-	-	36.47	10.51	4.00	28.03
PK	200M	23.76	30.00	-6.24	-7.63	10	Vertical	-	-	-	31.39	16.64	3.22	27.49
PK	247.2M	22.86	37.00	-14.14	-10.96	10	Vertical	-	-	-	33.82	12.76	3.69	27.41
PK	893.6M	28.85	37.00	-8.15	2.07	10	Vertical	-	-	-	26.78	21.67	8.07	27.67

Horizontal
Radiation-below 1GHz_FD CI_Mode 2

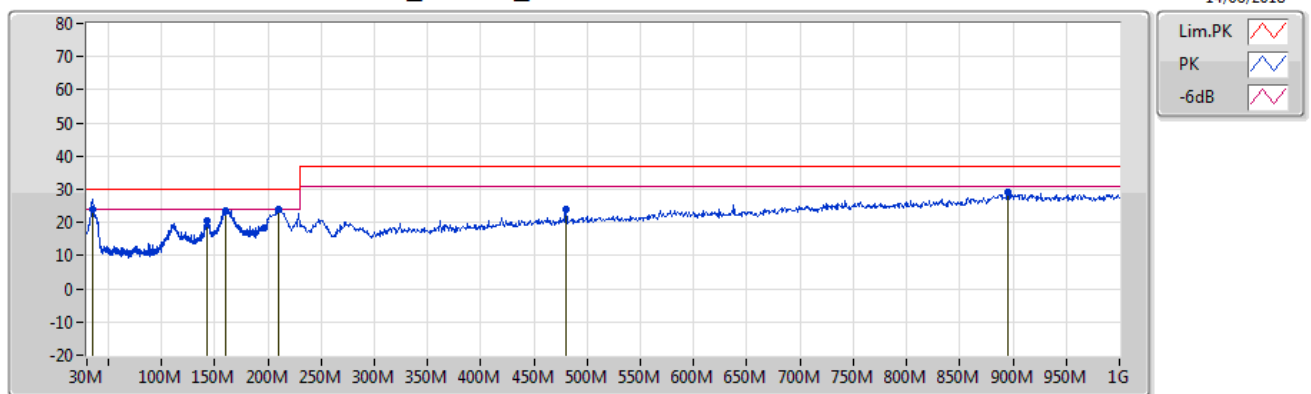
14/06/2018





Test mode	Mode 3		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

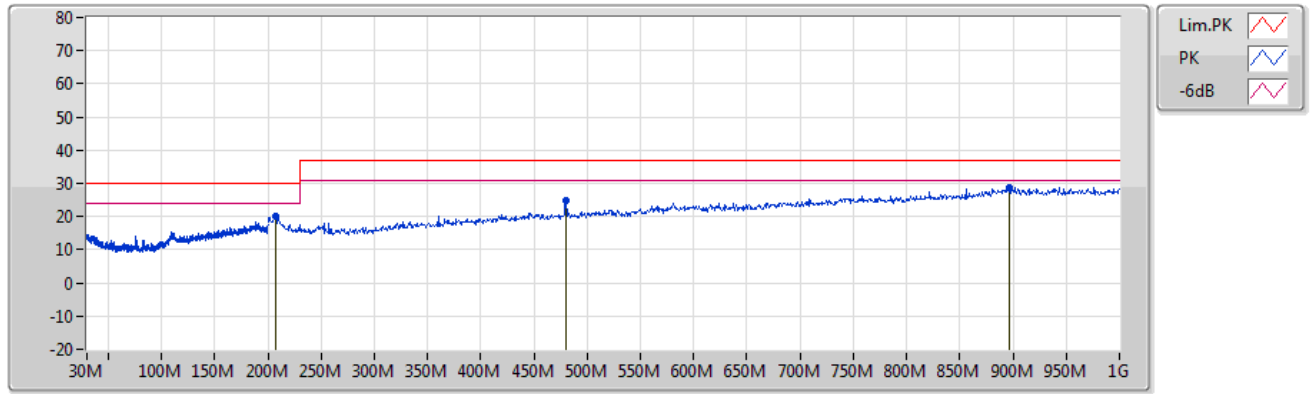
Vertical

Radiation-below 1GHz_FD CI_Mode 3

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)		
QP	35.22M	24.00	30.00	-6.00	-14.34	10	Vertical	80	1.00	"Worst"	38.34	11.79	2.15	28.28		
PK	143.39M	20.71	30.00	-9.29	-11.66	10	Vertical	-	-	-	32.37	11.75	4.48	27.89		
PK	160.73M	23.73	30.00	-6.27	-10.66	10	Vertical	-	-	-	34.39	12.38	4.77	27.81		
PK	209.6M	23.93	30.00	-6.07	-8.75	10	Vertical	-	-	-	32.68	15.39	3.33	27.47		
PK	480M	24.09	37.00	-12.91	-6.38	10	Vertical	-	-	-	30.47	17.31	4.74	28.43		
PK	895.2M	28.98	37.00	-8.02	2.14	10	Vertical	-	-	-	26.84	21.69	8.12	27.67		

**Horizontal****Radiation-below 1GHz_FD CI_Mode 3**

14/06/2018



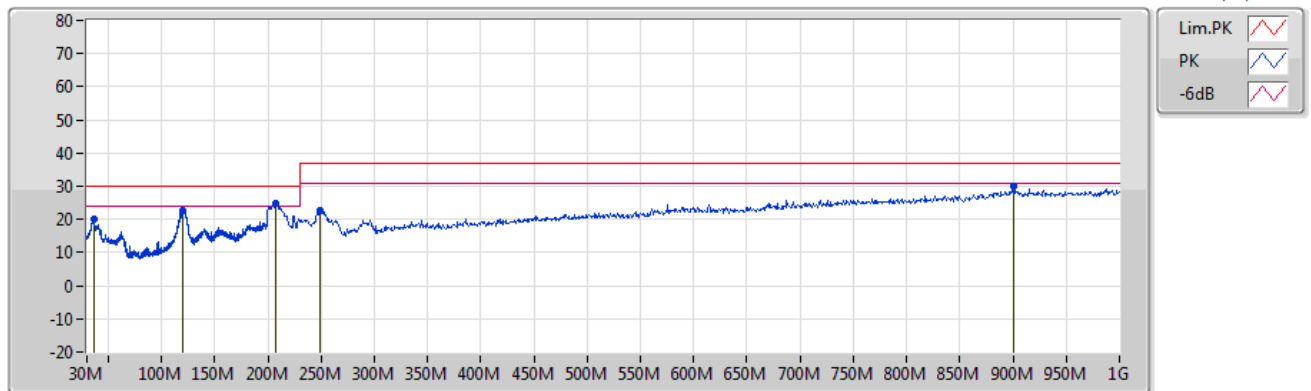
Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)		
PK	208M	20.05	30.00	-9.95	-8.57	10	Horizontal	-	-	-	28.62	15.60	3.31	27.48		
PK	480M	24.85	37.00	-12.15	-6.38	10	Horizontal	-	-	-	31.23	17.31	4.74	28.43		
PK	896M	28.65	37.00	-8.35	2.18	10	Horizontal	-	-	"Worst"	26.47	21.70	8.14	27.66		



Test mode	Mode 4		
Test frequency	30 MHz ~ 1000 MHz	Test Voltage	AC 120V / 60Hz
■ The test was passed at the minimum margin that marked by the frame in the following data			

Vertical

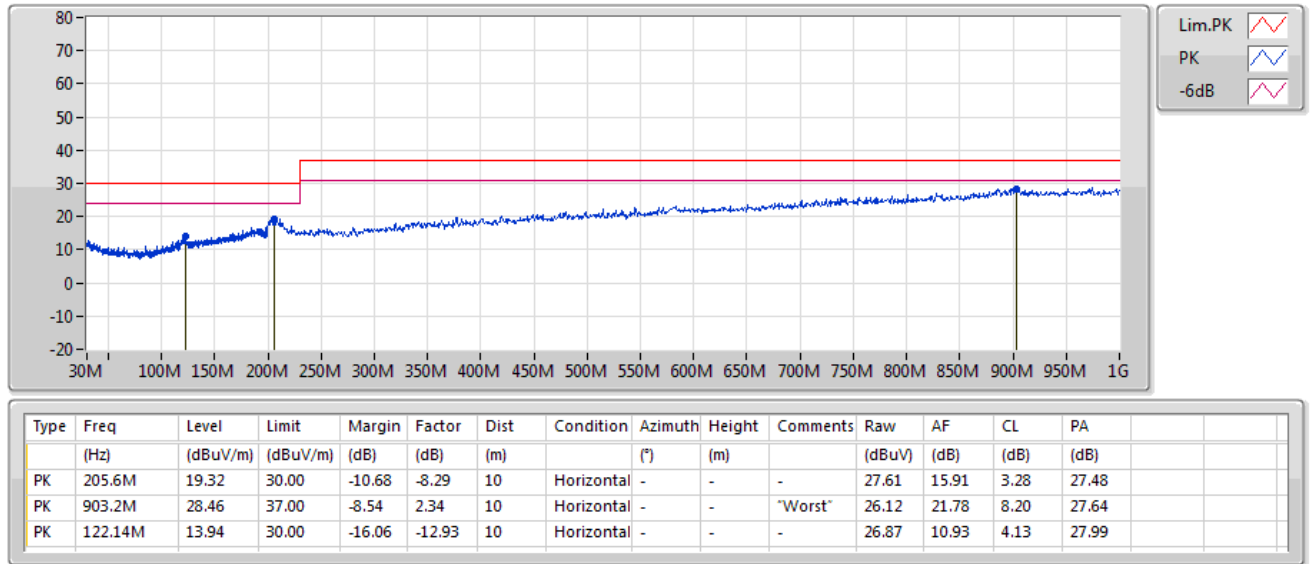
Radiation-below 1GHz_FD CI_Mode 4



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
PK	36.12M	20.01	30.00	-9.99	-14.31	10	Vertical	-	-	-	34.32	11.78	2.18	28.27
PK	120.27M	22.76	30.00	-7.24	-13.06	10	Vertical	-	-	-	35.82	10.85	4.09	28.00
PK	207.2M	24.90	30.00	-5.10	-8.48	10	Vertical	120	1.00	"Worst"	33.38	15.70	3.30	27.48
PK	249.6M	22.85	37.00	-14.15	-10.96	10	Vertical	-	-	-	33.81	12.73	3.72	27.41
PK	900.8M	29.99	37.00	-7.01	2.35	10	Vertical	-	-	-	27.64	21.76	8.24	27.65

Horizontal
Radiation-below 1GHz_FD CI_Mode 4

22/06/2018





5.2. Radiated Emission above 1GHz

The highest frequency of the internal sources of the EUT is less than 108MHz, so the measurement shall only be made up to 1GHz.

6. Uncertainty of Test Site

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

6.1. Emission Test Measurement Uncertainty

Test Items	Test Site No.	U_{LAB}
Conducted Emissions	CO01-HY	3.4 dB
Radiated Emissions below 1GHz	10CH02-HY	5.4 dB



7. List of Measuring Equipment Used

Conducted Emission - Test Date: 19/Jun/2018 ~ 21/Jun/2018

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	10/Apr/2018	Conduction (CO01-HY)
Two-Line V Network(LISN)	R&S	ENV 216	101274	9kHz ~ 30MHz	24/Apr/2018	Conduction (CO01-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	7611832010001	9kHz ~ 30MHz	02/Mar/2018	Conduction (CO01-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561F	9495	9kHz ~ 30MHz	12/Oct/2017	Conduction (CO01-HY)
Software	Sporton	SENSE-EMI	V5.9	-	NCR	Radiation (CO01-HY)

Note: Calibration Interval of instruments listed above is one year. NCR: No Calibration Request.

Radiated Emission below 1GHz - Test Date: 14/Jun/2018 ~ 22/Jun/2018

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
10m Semi Anechoic Chamber	TDK	SAC-10M	10CH02-HY	30MHz ~ 1GHz 10m,3m	23/Sep/2017	Radiation (10CH02-HY)
Amplifier	AGILENT	8447D	2944A10827	100kHz ~ 1.3GHz	29/Jan/2018	Radiation (10CH02-HY)
Amplifier	AGILENT	8447D	2944A10828	100kHz ~ 1.3GHz	06/Feb/2018	Radiation (10CH02-HY)
Receiver	R&S	ESU	100422	20Hz ~ 26.5GHz	31/Oct/2017	Radiation (10CH02-HY)
Spectrum Analyzer	KEYSIGHT	N9010A	MY54200401	10Hz ~ 44GHz	22/Dec/2017	Radiation (10CH02-HY)
Biconical Antenna	Schwarzbeck	VHBB 9124	287	30MHz ~ 200MHz	08/Jul/2017	Radiation (10CH02-HY)
Log Antenna	Schwarzbeck	VUSLP 9111	207	200MHz ~ 1GHz	08/Jul/2017	Radiation (10CH02-HY)
Turn Table	EM Electronics	EM 1000	060546	0 ~ 360 degree	NCR	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/664	1m ~ 4m	NCR	Radiation (10CH02-HY)
Antenna Mast	HD	MA240	240/667	1m ~ 4m	NCR	Radiation (10CH02-HY)
RF Cable-R10m	Jye Bao	RG142	CB027-INSIDE	30MHz ~ 1GHz	21/Sep/2017	Radiation (10CH02-HY)
RF Cable-R10m	MTJ	RG223/U + RG8/U	CB026-DOOR	30MHz ~ 1GHz	21/Sep/2017	Radiation (10CH02-HY)
Software	Sporton	SENSE-EMI	V5.9	-	NCR	Radiation (10CH02-HY)

Note: Calibration Interval of instruments listed above is one year. NCR: No Calibration Request.