ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No.	**: OT-19N-RWD-042**
AGR No	**: A19OA-294**
Applicant	**: BROS&COMPANY INC.**
Address	**: A-402, InnoValley, 253, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea**
Manufacturer	**: Shenzhen Boli Technology Co.,Ltd**
Address	**: 301, No.5177, Yiyuan Rd, 74 Area, Buxin Community, Xin'an Street, Baoan District, Shenzhen**
Type of Equipment	**: HANDS3 SPLIT**
FCC ID.	**: 2AQIS-POUT-02201**
Model Name	**: POUT-02201**
Multiple Model Name	**: N/A**
Serial number	**: N/A**
Total page of Report	**: 50 pages (including this page)**
Date of Incoming	**: October 29, 2019**
Date of issue	**: November 22, 2019**

SUMMARY

The equipment complies with the regulation; **FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by: Ha-Ram Lee / Assistant Manager
ONETECH Corp.

Approved by: Jae-Ho Lee / Chief Engineer
ONETECH Corp.

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Revision History

Issue Report No.	Issued Date	Revisions	Effect Section
OT-19N-RWD-042	November 22, 2019	Initial Release	All

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: BROS&COMPANY INC.
ADDRESS	: A-402, InnoValley, 253, Pangyo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Korea
CONTACT PERSON	: PARK KIYEOL / CEO
TELEPHONE NO	: +82-31-286-8646
FCC ID	: 2AQIS-POUT-02201
MODEL NAME	: POUT-02201
BRAND NAME	: N/A
SERIAL NUMBER	: N/A
DATE	: November 22, 2019

EQUIPMENT CLASS	**DCD – Part 15 Low Power Transmitter Below 1 705 kHz**
KIND OF EQUIPMENT	HANDS3 SPLIT
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC&IC RULES PART(S)	FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. The equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.209, 15.209(a)	Radiated emission, Spurious Emission and Field Strength of Fundamental	Met the Limit / PASS
2.1049	20 dB Bandwidth	Met the Limit / PASS
15.207	Transmitter AC Power Line Conducted Emission	Met the Limit / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209, 2.1049.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.10: 2013 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The ONETECH Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862 Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The BROS&COMPANY INC., Model: POUT-02201 (referred to as the EUT in this report) is a HANDS3 SPLIT. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Wireless Charger
OPERATING FREQUENCY	111 kHz ~ 150 kHz
RATED RF OUTPUT POWER	81.20 dBμV/m
ANTENNA TYPE	Coil Antenna
MODULATION	ASK
RATED SUPPLY VOLTAGE	DC 5.0 V, DC 9.0 V, DC 12.0 V

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

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5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	N/A	N/A	N/A

5.2 Peripheral equipment

Model	Manufacturer	Description	Connected to
N/A	N/A	DUMMY load	N/A

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at the following condition.

- Max. load (112 kHz), Mid. load (124 kHz), and Min. load (145 kHz) for 5V
- Max. load (114 kHz), Mid. load (124 kHz), and Min. load (145 kHz) for 9V
- Max. load (114 kHz), Mid. load (120 kHz), and Min. load (140 kHz) for 12V.

To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

Mode	Charging current	Description
Charging Mode With load	1 000 mA	Using Max. load
	500 mA	Using Mid. load
	100 mA	Using Min. load

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5.4 Configuration of Test System

Line Conducted Test **:** The EUT was tested in a charging mode. The EUT was connected to Adapter. All supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2014 7.3.3 to determine the worse operating conditions.

Radiated Emission Test **:** Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

According to section 15.203, 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.

Antenna Construction:

The antenna of the EUT is a Coil Antenna on the main board in the EUT, so no consideration of replacement by the user.

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6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Charging & Transmitting mode	X

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Charging & Transmitting mode	X

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7. 20 dB BANDWIDTH

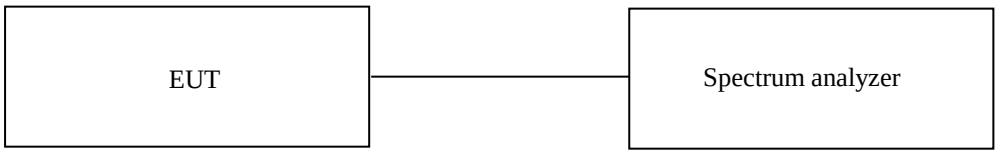
7.1 Operating environment

Temperature	:	24 ℃
Relative humidity	:	48 % R.H.

7.2 Test set-up

a. Span = approximately 2 to 3 times the 20 dB bandwidth, RBW = greater than 1 % of the 20 dB bandwidth, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.

b. The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.
The marker-delta reading at this point is 20 dB bandwidth of the emission.



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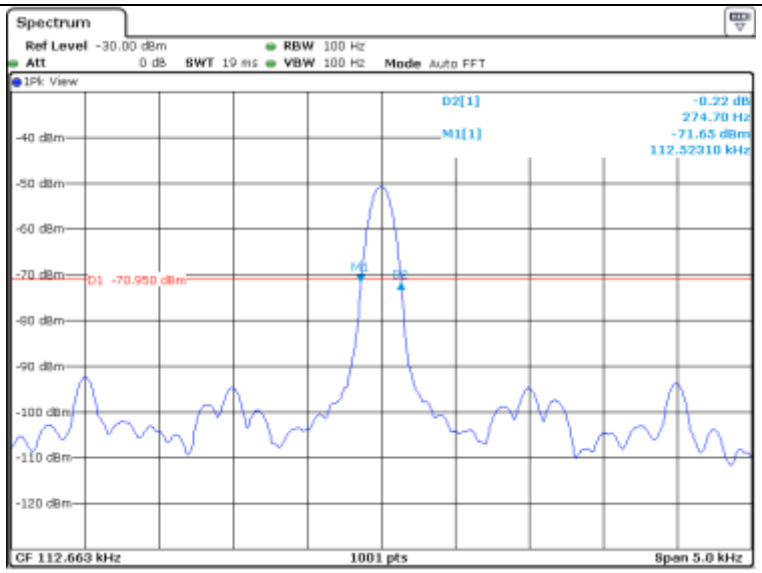
7.3 Test data

7.3.1 Test data for 5 V

Test Date : November 04, 2019

Frequency : 112.66 KHz

20 dB Bandwidth : 274.70 Hz



Tested by: Sieon Lee / Assistant Manager

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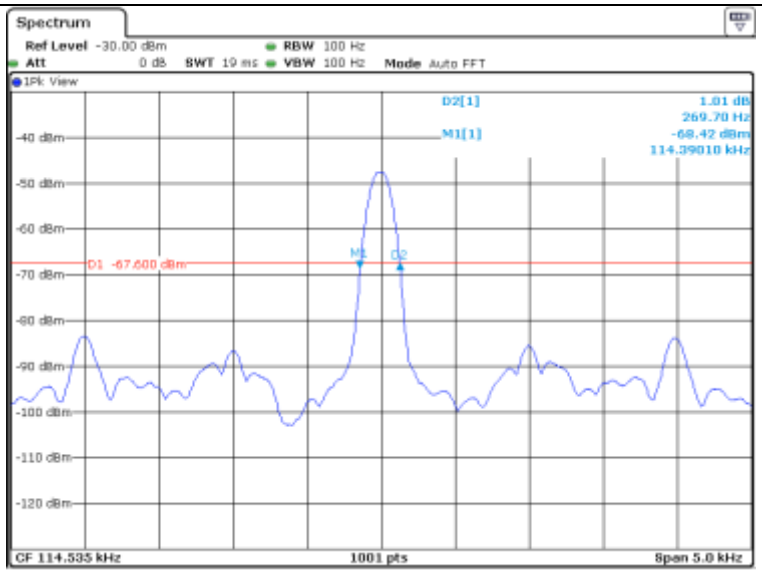
7.3.2 Test data for 9 V

Test Date : November 04, 2019

Frequency : 114.54 KHz

20 dB Bandwidth : 269.70 Hz



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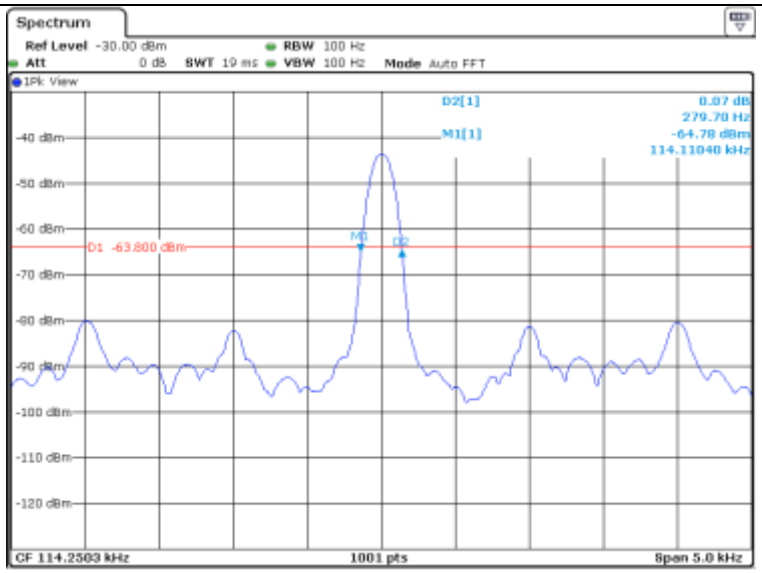
7.3.3 Test data for 12 V

Test Date : November 04, 2019

Frequency : 114.25 KHz

20 dB Bandwidth : 279.70 Hz



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8. Spurious Emission Test

8.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency [MHz]	Field strength [μ V/m]	Field strength [dBμ V/m]	Measurement distance [m]
0.009 ~ 0.490	2 400 / F (kHz)	48.52 ~ 13.80	300
0.490 ~ 1.705	24 000 / F (kHz)	33.8 ~ 22.97	30
1.705 ~ 30	30	29.50	30
30 ~ 88	*100	40.00	3
88 ~ 216	*150	43.52	3
216 ~ 960	*200	46.02	3
Above 960	500	53.98	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., Sections 15.231 and 15.241.

8.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 kHz to 1 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

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8.3 Test data for 5 V

8.3.1 Test data for Using Max load (1 000 mA)

8.3.1.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.047	32.7	H	19.40	0.0	52.10	114.20	62.10
*0.112	58.4	H	19.40	0.1	77.90	106.60	28.70
0.329	32.6	H	19.20	0.1	51.90	97.30	45.40
0.538	24.6	H	19.20	0.1	43.90	73.00	29.10
0.777	20.7	H	19.20	0.1	40.00	69.80	29.80
18.956	19.7	V	19.30	0.7	39.70	70.00	30.30

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.3.1.2 Test Plot

8.3.1.2.1 Spurious Radiated Emission Below 30 MHz (1000 mA)

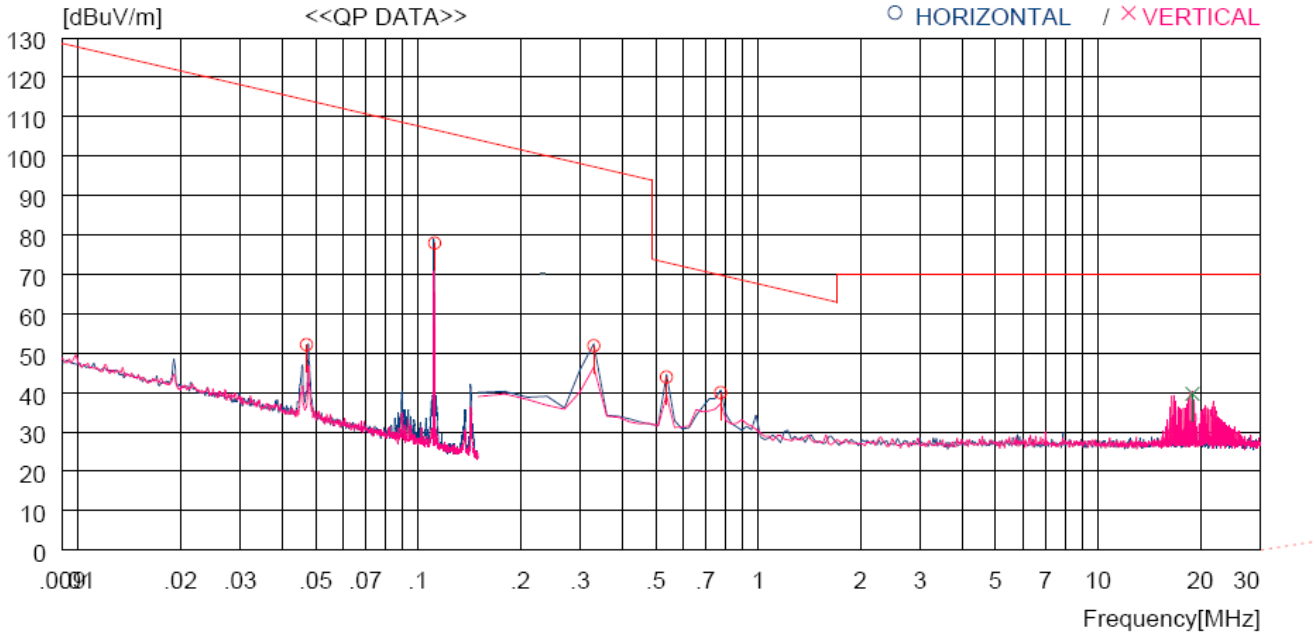
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.047	32.7	19.4	0.0	0.0	52.1	114.2	62.1	100	106
2	0.112	58.4	19.4	0.1	0.0	77.9	106.6	28.7	100	150
3	0.329	32.6	19.2	0.1	0.0	51.9	97.3	45.4	100	0
4	0.538	24.6	19.2	0.1	0.0	43.9	73.0	29.1	100	166
5	0.777	20.7	19.2	0.1	0.0	40.0	69.8	29.8	100	163
----- Vertical ------										
6	18.956	19.7	19.3	0.7	0.0	39.7	70.0	30.3	100	263

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8.3.1.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

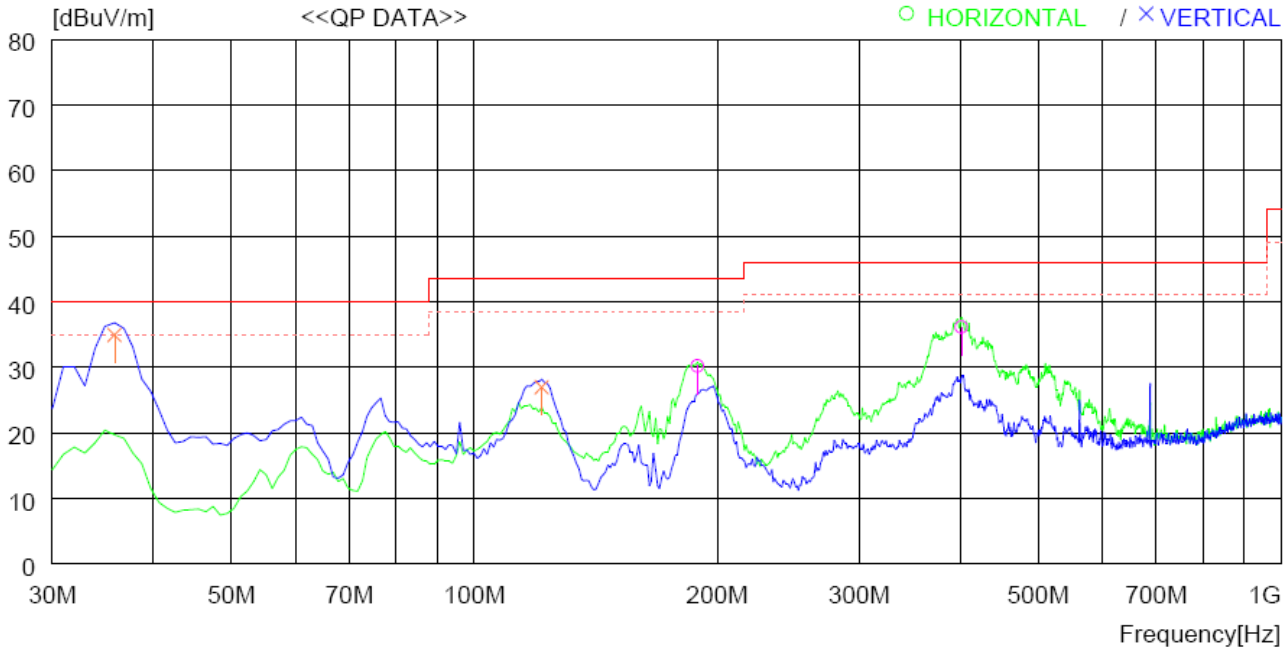
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	189.080	48.6	12.9	1.3	32.6	30.2	43.5	13.3	200	0
2	401.510	50.4	16.5	1.9	32.7	36.1	46.0	9.9	100	254
----- Vertical ------										
3	35.820	56.1	11.0	0.5	32.7	34.9	40.0	5.1	100	165
4	121.180	47.9	10.8	1.0	32.7	27.0	43.5	16.5	100	356

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8.3.2 Test data for Using Mid. load (500 mA)

8.3.2.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.048	32.0	H	19.40	0.0	51.40	114.00	62.60
*0.124	54.0	H	19.30	0.1	73.40	105.70	32.30
0.240	28.0	H	19.30	0.1	47.40	100.00	52.60
0.359	32.9	H	19.20	0.1	52.20	96.50	44.30
0.598	22.0	H	19.20	0.1	41.30	72.10	30.80
20.985	23.4	H	19.30	0.7	43.40	70.00	26.60

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.3.2.2 Test Plot

8.3.2.2.1 Spurious Radiated Emission Below 30 MHz (500 mA)

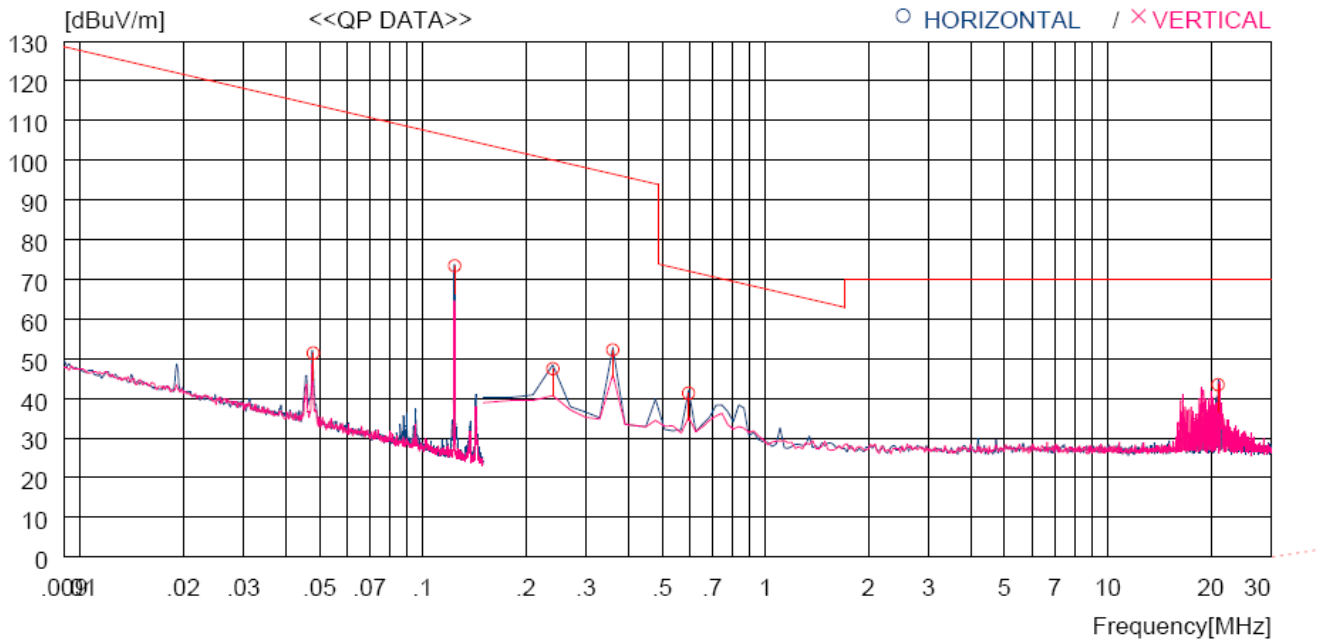
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.048	32.0	19.4	0.0	0.0	51.4	114.0	62.6	100	359
2	0.124	54.0	19.3	0.1	0.0	73.4	105.7	32.3	100	359
3	0.240	28.0	19.3	0.1	0.0	47.4	100.0	52.6	100	0
4	0.359	32.9	19.2	0.1	0.0	52.2	96.5	44.3	100	0
5	0.598	22.0	19.2	0.1	0.0	41.3	72.1	30.8	100	116
6	20.985	23.4	19.3	0.7	0.0	43.4	70.0	26.6	100	268

Tested by: Sieon Lee / Assistant Manager

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8.3.2.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

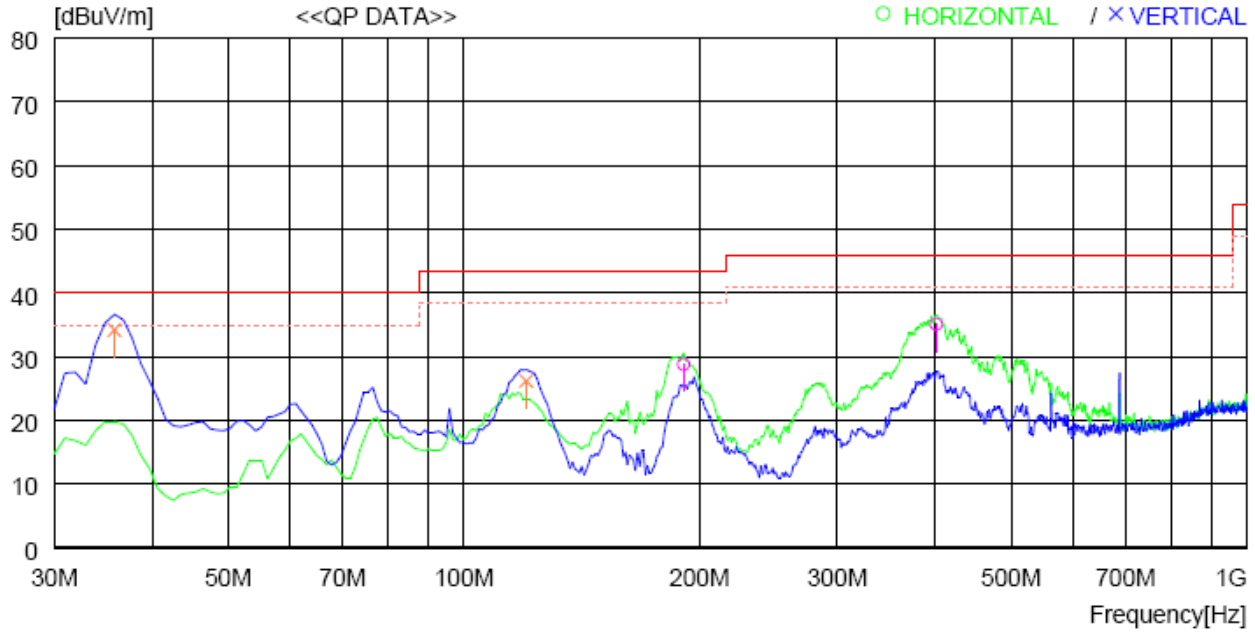
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	191.020	47.3	12.8	1.3	32.6	28.8	43.5	14.7	200	0
2	401.510	49.4	16.5	1.9	32.7	35.1	46.0	10.9	100	272
----- Vertical ------										
3	35.820	55.4	11.0	0.5	32.7	34.2	40.0	5.8	100	121
4	120.210	47.1	10.8	1.0	32.7	26.2	43.5	17.3	100	0

Tested by: Sieon Lee / Assistant Manager

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8.3.3 Test data for Using Min. load (100 mA)

8.3.3.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.048	32.0	H	19.40	0.0	51.40	114.00	62.60
*0.145	55.1	H	19.30	0.1	74.50	104.40	29.90
0.419	33.0	H	19.20	0.1	52.30	95.20	42.90
0.717	24.1	H	19.20	0.1	43.40	70.50	27.10
0.986	18.8	H	19.20	0.1	38.10	67.70	29.60
16.478	23.1	V	19.20	0.7	43.00	70.00	27.00

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.3.3.2 Test Plot

8.3.3.2.1 Spurious Radiated Emission Below 30 MHz (100 mA)

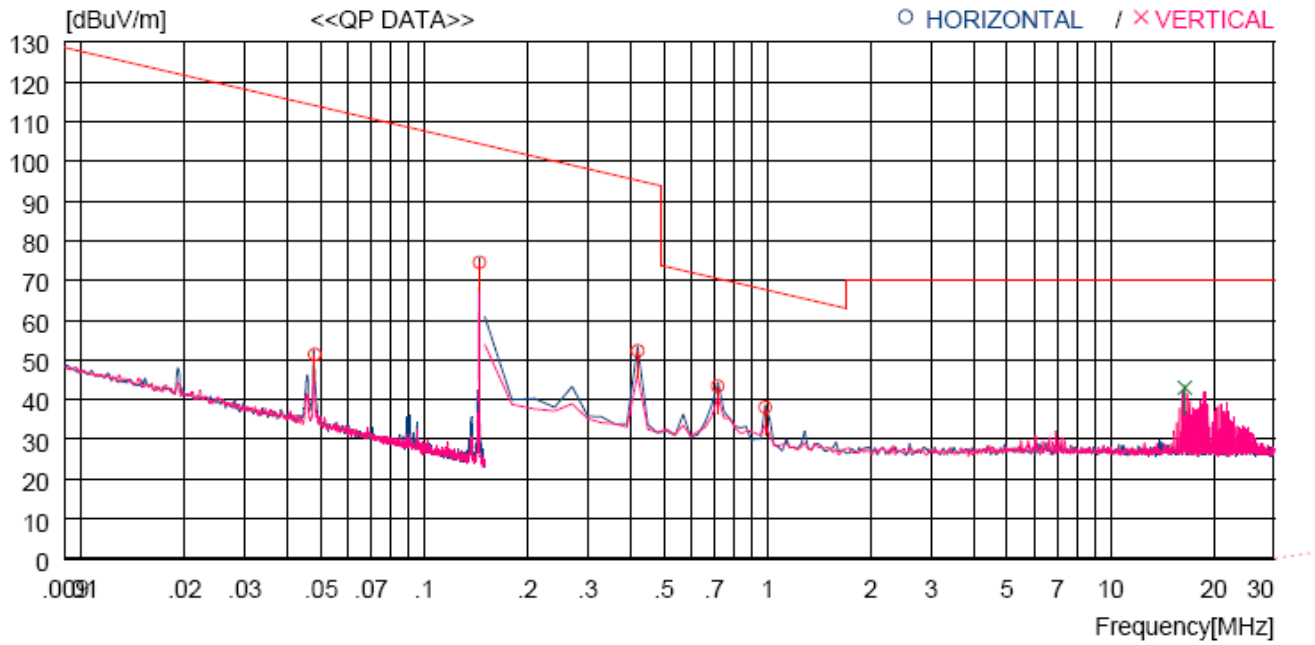
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.048	32.0	19.4	0.0	0.0	51.4	114.0	62.6	100	359
2	0.145	55.1	19.3	0.1	0.0	74.5	104.4	29.9	100	359
3	0.419	33.0	19.2	0.1	0.0	52.3	95.2	42.9	100	0
4	0.717	24.1	19.2	0.1	0.0	43.4	70.5	27.1	100	0
5	0.986	18.8	19.2	0.1	0.0	38.1	67.7	29.6	100	140
----- Vertical ------										
6	16.478	23.1	19.2	0.7	0.0	43.0	70.0	27.0	100	138

Tested by: Sieon Lee / Assistant Manager

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8.3.3.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

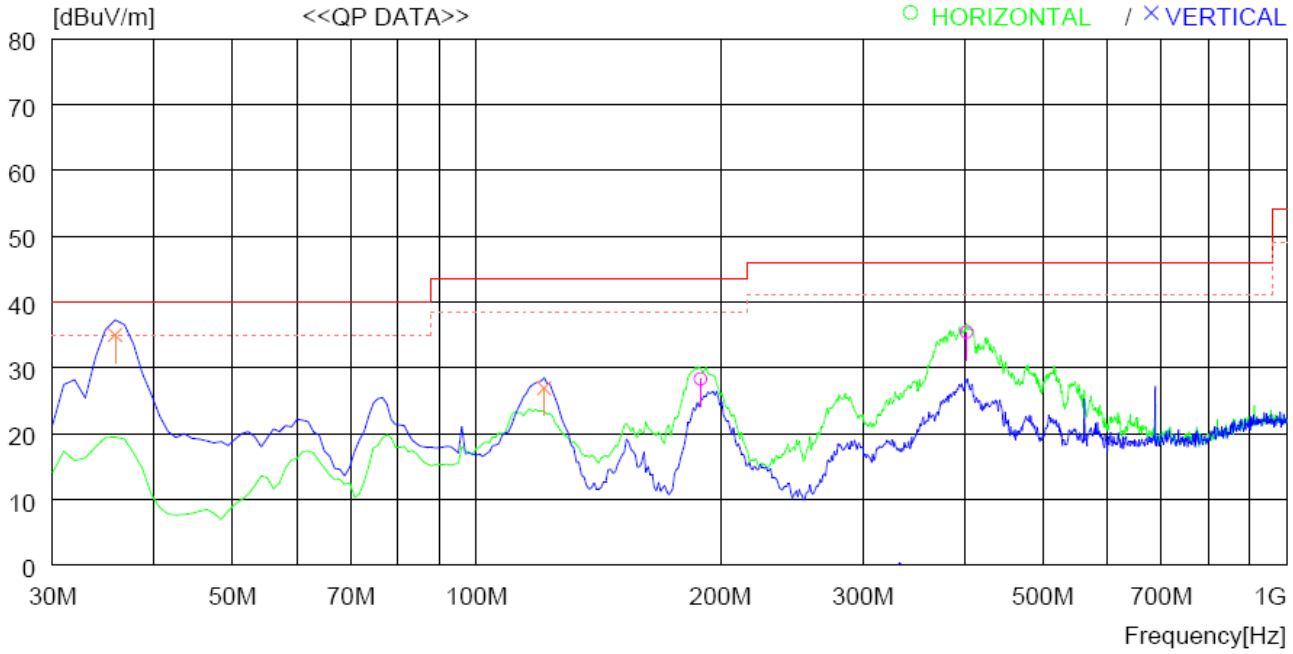
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	189.080	46.7	12.9	1.3	32.6	28.3	43.5	15.2	200	271
2	402.480	49.7	16.5	1.9	32.7	35.4	46.0	10.6	100	264
----- Vertical ------										
3	35.820	56.2	11.0	0.5	32.7	35.0	40.0	5.0	100	175
4	121.180	47.8	10.8	1.0	32.7	26.9	43.5	16.6	100	0

Tested by: Sieon Lee / Assistant Manager

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8.4 Test data for 9 V

8.4.1 Test data for Using Max load (1 000 mA)

8.4.1.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.047	34.1	H	19.40	0.0	53.50	114.20	60.70
*0.114	60.1	H	19.40	0.1	79.60	106.50	26.90
0.329	36.1	H	19.20	0.1	55.40	97.30	41.90
0.568	26.0	H	19.20	0.1	45.30	72.50	27.20
0.777	20.7	H	19.20	0.1	40.00	69.80	29.80
18.926	21.0	V	19.30	0.7	41.00	70.00	29.00

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.4.1.2 Test Plot

8.4.1.2.1 Spurious Radiated Emission Below 30 MHz (1000 mA)

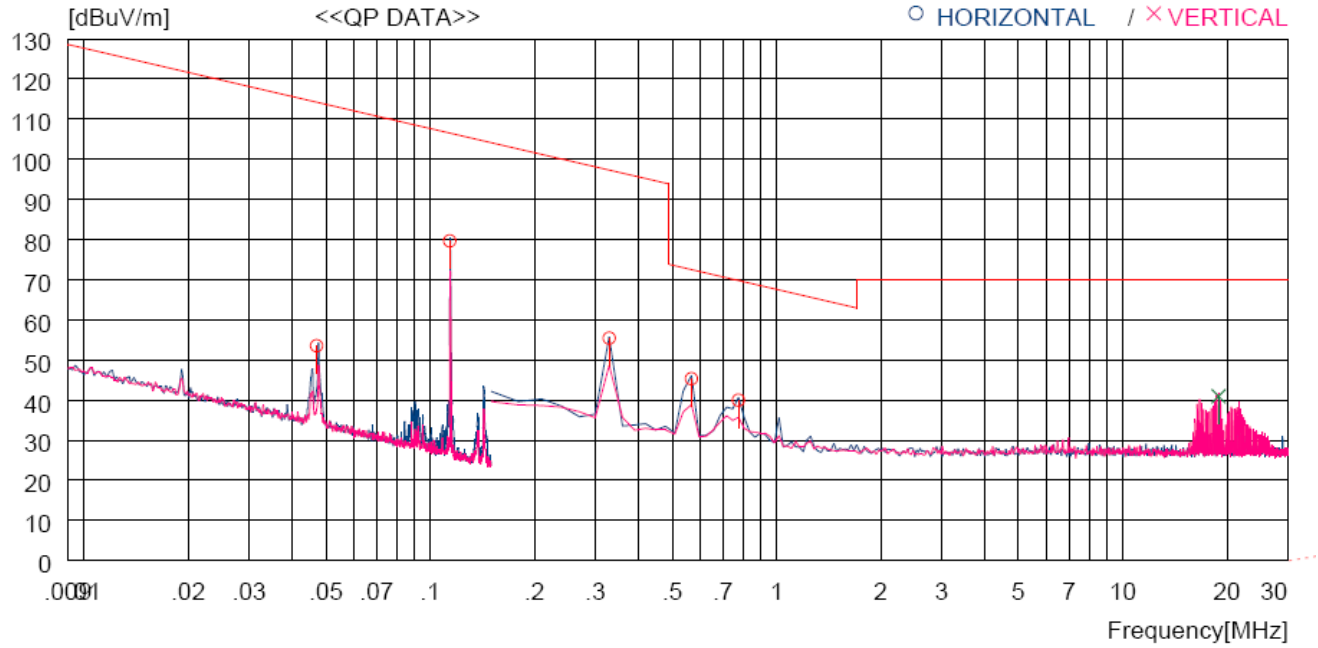
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.047	34.1	19.4	0.0	0.0	53.5	114.2	60.7	100	359
2	0.114	60.1	19.4	0.1	0.0	79.6	106.5	26.9	100	359
3	0.329	36.1	19.2	0.1	0.0	55.4	97.3	41.9	100	0
4	0.568	26.0	19.2	0.1	0.0	45.3	72.5	27.2	100	121
5	0.777	20.7	19.2	0.1	0.0	40.0	69.8	29.8	100	185
----- Vertical ------										
6	18.926	21.0	19.3	0.7	0.0	41.0	70.0	29.0	100	244

Tested by: Sieon Lee / Assistant Manager

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8.4.1.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

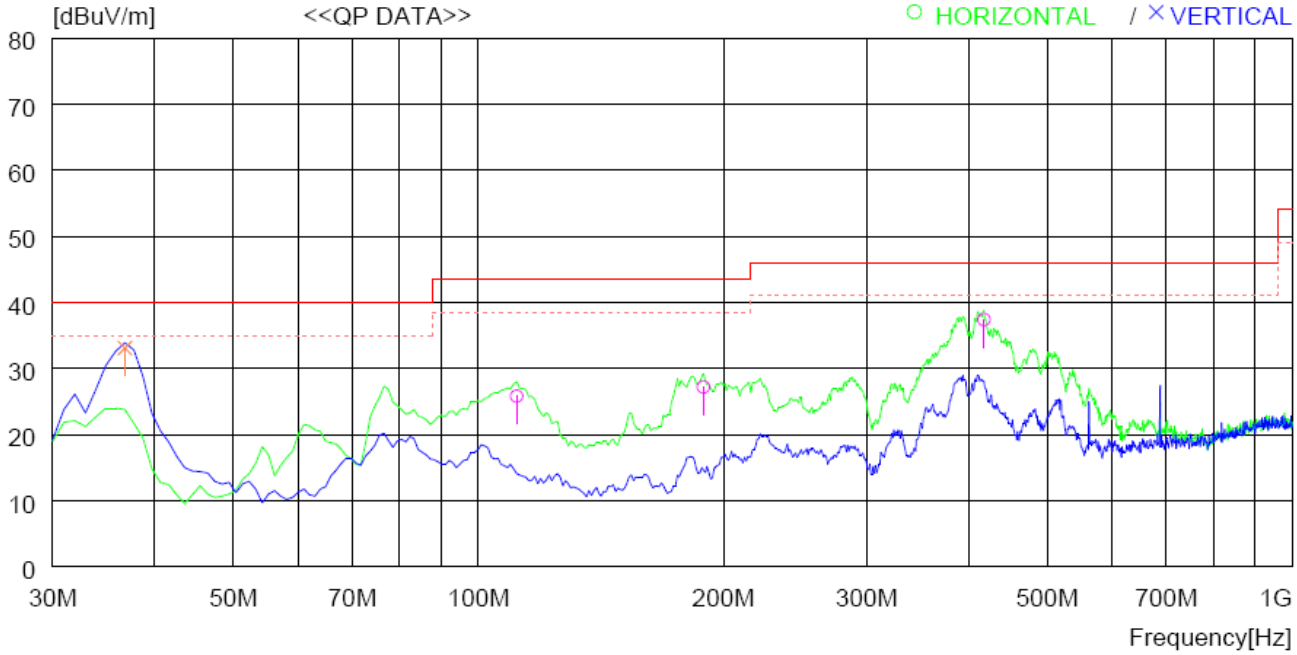
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	111.480	47.3	10.2	1.0	32.7	25.8	43.5	17.7	200	121
2	189.080	45.6	12.9	1.3	32.6	27.2	43.5	16.3	200	0
3	418.001	51.4	16.7	2.0	32.7	37.4	46.0	8.6	100	359
----- Vertical ------										
4	36.790	54.3	11.0	0.5	32.7	33.1	40.0	6.9	100	184

Tested by: Sieon Lee / Assistant Manager

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8.4.2 Test data for Using Mid. load (500 mA)

8.4.2.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.047	35.1	H	19.40	0.0	54.50	114.20	59.70
*0.124	56.0	H	19.30	0.1	75.40	105.70	30.30
0.240	29.6	H	19.30	0.1	49.00	100.00	51.00
0.359	34.8	H	19.20	0.1	54.10	96.50	42.40
0.598	24.7	H	19.20	0.1	44.00	72.10	28.10
21.224	21.0	V	19.30	0.7	41.00	70.00	29.00

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.4.2.2 Test Plot

8.4.2.2.1 Spurious Radiated Emission Below 30 MHz (500 mA)

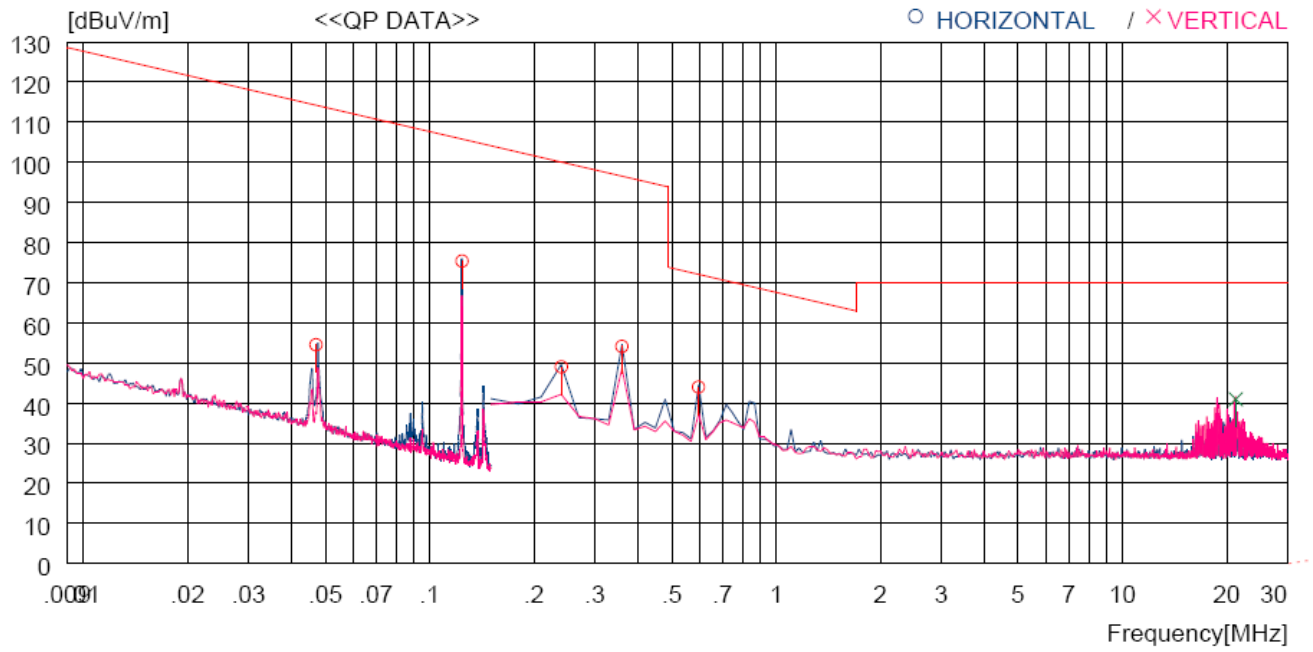
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.047	35.1	19.4	0.0	0.0	54.5	114.2	59.7	100	359
2	0.124	56.0	19.3	0.1	0.0	75.4	105.7	30.3	100	105
3	0.240	29.6	19.3	0.1	0.0	49.0	100.0	51.0	100	0
4	0.359	34.8	19.2	0.1	0.0	54.1	96.5	42.4	100	0
5	0.598	24.7	19.2	0.1	0.0	44.0	72.1	28.1	100	0
----- Vertical ------										
6	21.224	21.0	19.3	0.7	0.0	41.0	70.0	29.0	100	0

Tested by: Sieon Lee / Assistant Manager

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8.4.2.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

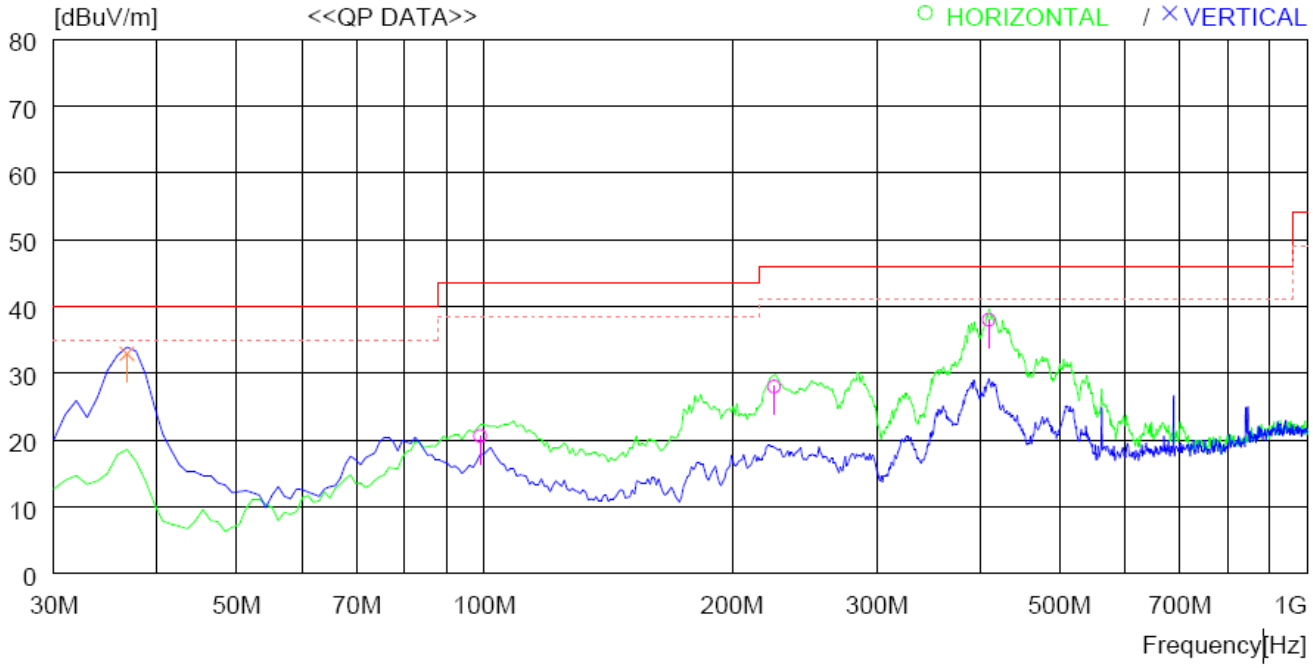
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	98.870	43.2	9.2	0.9	32.7	20.6	43.5	22.9	200	0
2	224.970	47.9	11.3	1.4	32.6	28.0	46.0	18.0	200	359
3	410.240	52.1	16.6	2.0	32.7	38.0	46.0	8.0	100	288
----- Vertical ------										
4	36.790	54.1	11.0	0.5	32.7	32.9	40.0	7.1	100	359

Tested by: Sieon Lee / Assistant Manager

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8.4.3 Test data for Using Min. load (100 mA)

8.4.3.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.048	34.8	H	19.40	0.0	54.20	114.00	59.80
*0.145	57.0	H	19.30	0.1	76.40	104.10	27.70
0.269	25.1	H	19.30	0.1	44.50	99.00	54.50
0.419	35.1	H	19.20	0.1	54.40	95.20	40.80
0.717	28.4	H	19.20	0.1	47.70	70.50	22.80
16.478	24.0	V	19.20	0.7	43.90	70.00	26.10

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.4.3.2 Test Plot

8.4.3.2.1 Spurious Radiated Emission Below 30 MHz (100 mA)

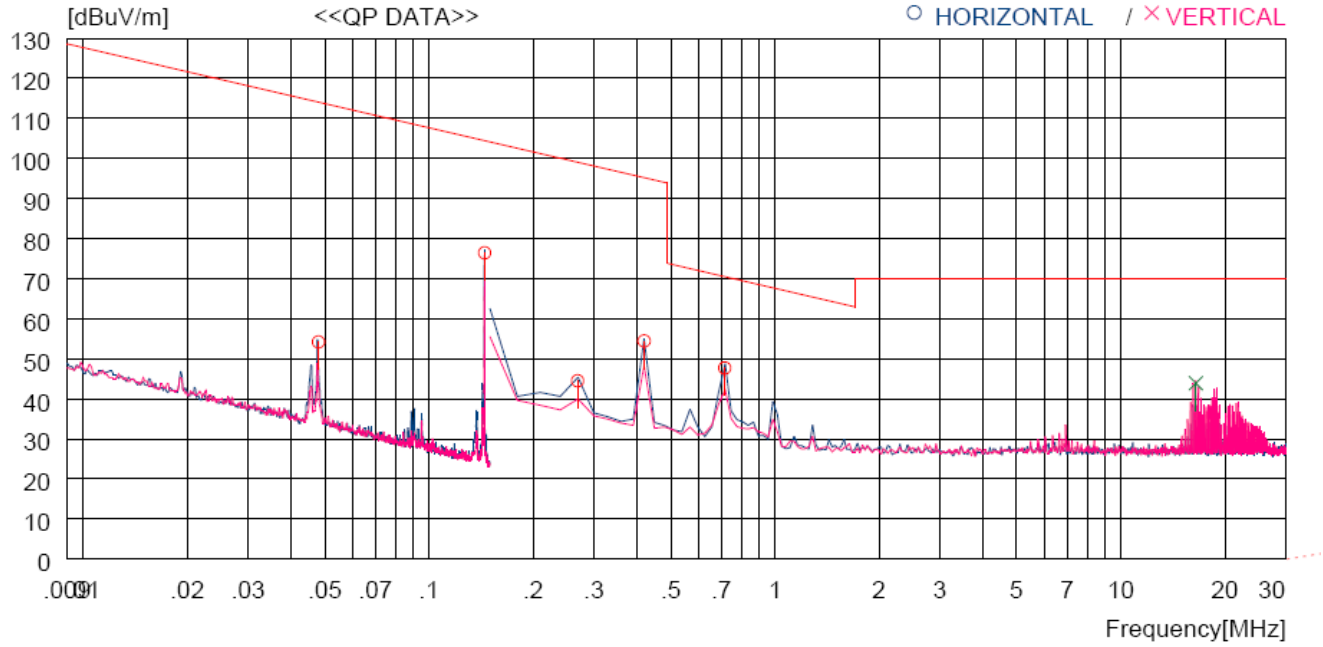
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.048	34.8	19.4	0.0	0.0	54.2	114.0	59.8	100	114
2	0.145	57.0	19.3	0.1	0.0	76.4	104.4	28.0	100	359
3	0.269	25.1	19.3	0.1	0.0	44.5	99.0	54.5	100	155
4	0.419	35.1	19.2	0.1	0.0	54.4	95.2	40.8	100	159
5	0.717	28.4	19.2	0.1	0.0	47.7	70.5	22.8	100	159
----- Vertical ------										
6	16.478	24.0	19.2	0.7	0.0	43.9	70.0	26.1	100	0

Tested by: Sieon Lee / Assistant Manager

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8.4.3.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

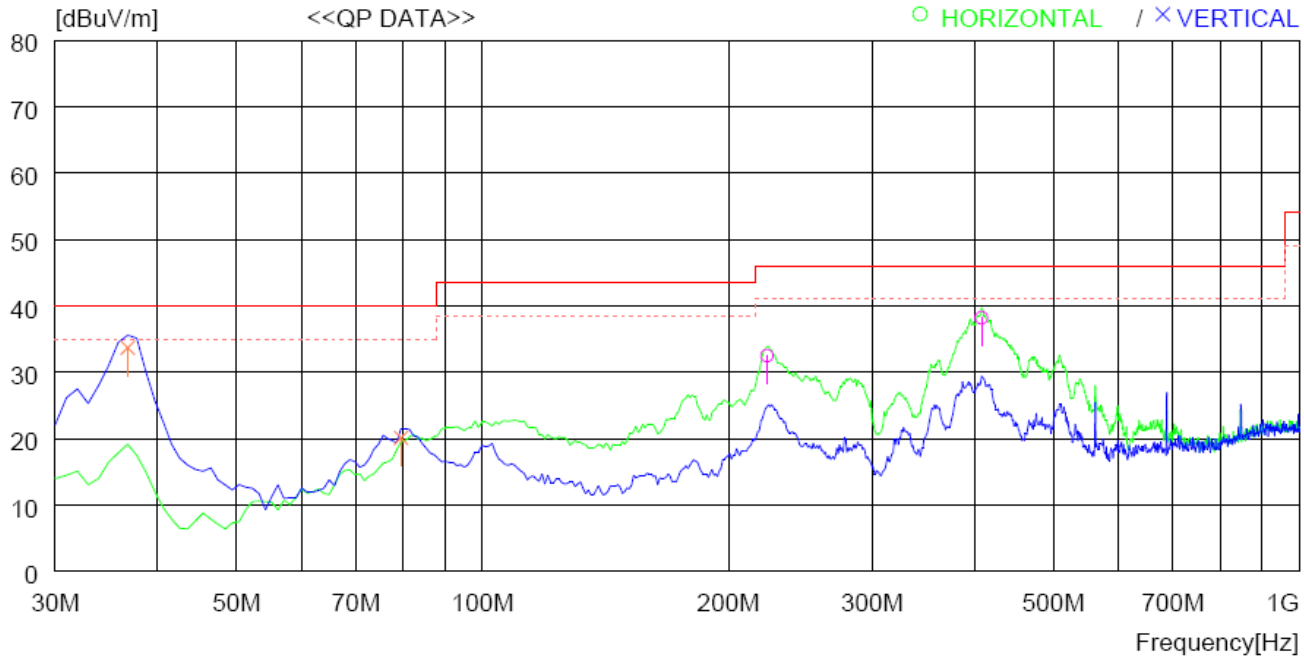
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	223.030	52.3	11.4	1.4	32.6	32.5	46.0	13.5	200	359
2	408.300	52.4	16.6	1.9	32.7	38.2	46.0	7.8	100	0
----- Vertical ------										
3	36.790	54.9	11.0	0.5	32.7	33.7	40.0	6.3	100	129
4	79.470	44.2	7.8	0.8	32.7	20.1	40.0	19.9	200	187

Tested by: Sieon Lee / Assistant Manager

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8.5 Test data for 12 V

8.5.1 Test data for Using Max load (1 000 mA)

8.5.1.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.047	36.0	H	19.40	0.0	55.40	114.20	58.80
*0.114	61.7	H	19.40	0.1	81.20	106.50	25.30
0.329	37.1	H	19.20	0.1	56.40	97.30	40.90
0.568	28.1	H	19.20	0.1	47.40	72.50	25.10
0.777	22.0	H	19.20	0.1	41.30	69.80	28.50
18.776	19.6	V	19.30	0.7	39.60	70.00	30.40

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.5.1.2 Test Plot

8.5.1.2.1 Spurious Radiated Emission Below 30 MHz (1000 mA)

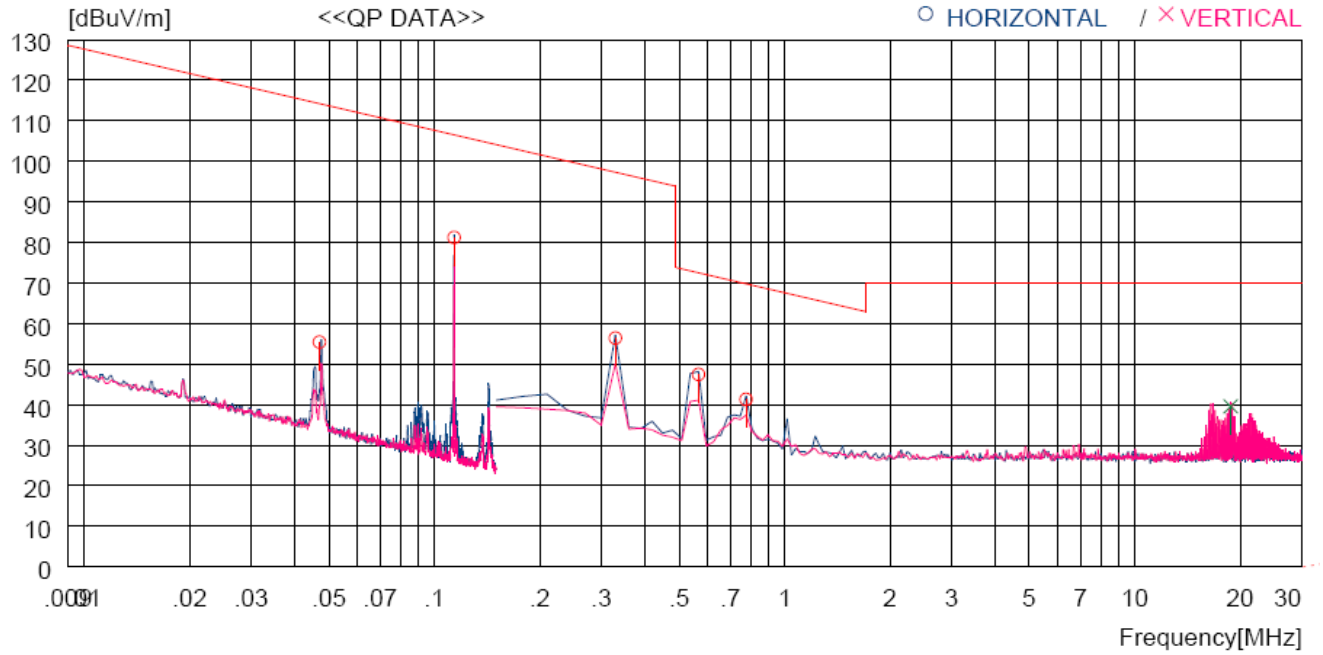
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.047	36.0	19.4	0.0	0.0	55.4	114.2	58.8	100	109
2	0.114	61.7	19.4	0.1	0.0	81.2	106.5	25.3	100	359
3	0.329	37.1	19.2	0.1	0.0	56.4	97.3	40.9	100	0
4	0.568	28.1	19.2	0.1	0.0	47.4	72.5	25.1	100	0
5	0.777	22.0	19.2	0.1	0.0	41.3	69.8	28.5	100	136
----- Vertical ------										
6	18.776	19.6	19.3	0.7	0.0	39.6	70.0	30.4	100	235

Tested by: Sieon Lee / Assistant Manager

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8.5.1.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

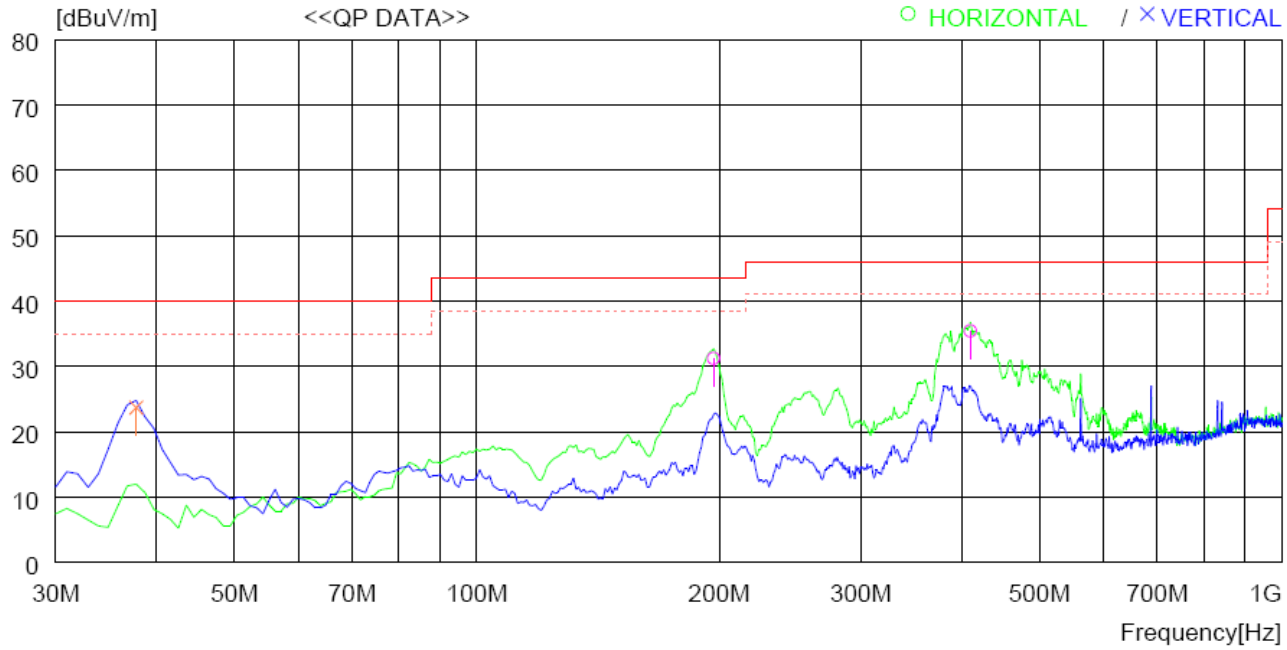
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	196.840	49.8	12.7	1.3	32.6	31.2	43.5	12.3	200	278
2	410.240	49.5	16.6	2.0	32.7	35.4	46.0	10.6	100	0
----- Vertical ------										
3	37.760	45.0	10.9	0.5	32.7	23.7	40.0	16.3	100	157

Tested by: Sieon Lee / Assistant Manager

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8.5.2 Test data for Using Mid. load (500 mA)

8.5.2.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.047	36.1	H	19.40	0.0	55.50	114.20	58.70
*0.120	57.7	H	19.30	0.1	77.10	106.00	28.90
0.210	28.8	H	19.30	0.1	48.20	101.20	53.00
0.359	34.0	H	19.20	0.1	53.30	96.50	43.20
0.598	24.1	H	19.20	0.1	43.40	72.10	28.70
21.314	21.2	V	19.30	0.7	41.20	70.00	28.80

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

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8.5.2.2 Test Plot

8.5.2.2.1 Spurious Radiated Emission Below 30 MHz (500 mA)

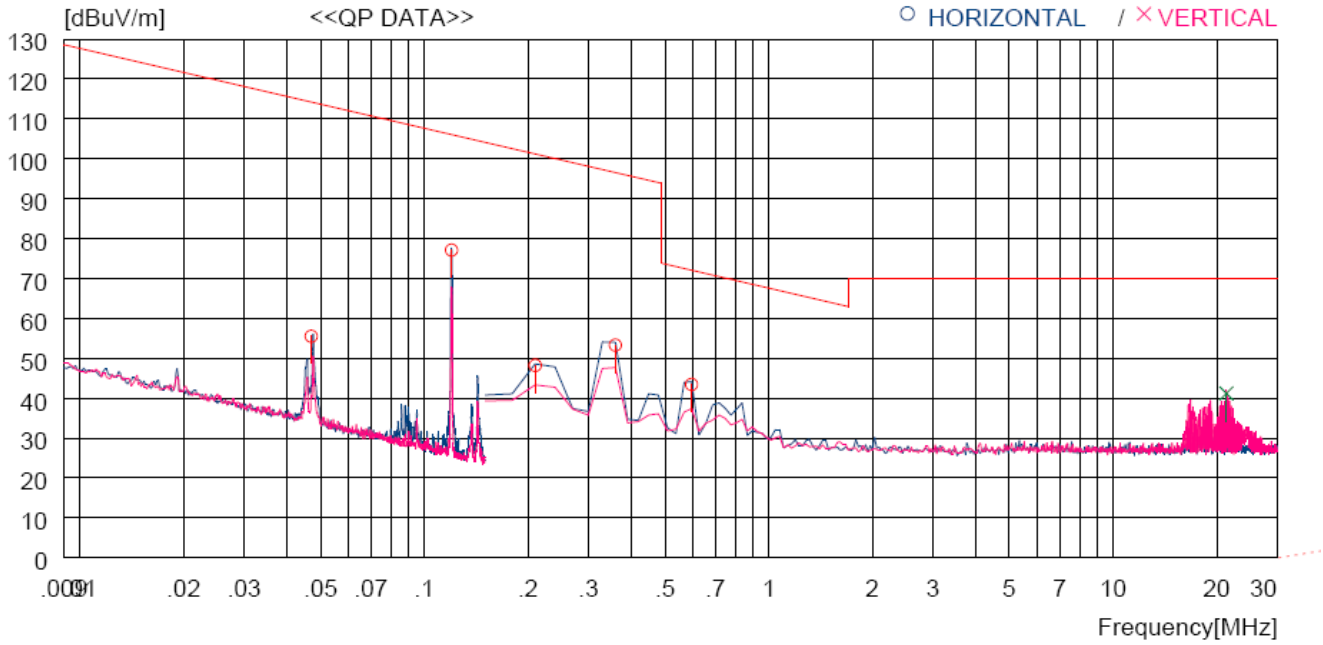
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.047	36.1	19.4	0.0	0.0	55.5	114.2	58.7	100	359
2	0.120	57.7	19.3	0.1	0.0	77.1	106.0	28.9	100	359
3	0.210	28.8	19.3	0.1	0.0	48.2	101.2	53.0	100	0
4	0.359	34.0	19.2	0.1	0.0	53.3	96.5	43.2	100	0
5	0.598	24.1	19.2	0.1	0.0	43.4	72.1	28.7	100	111
----- Vertical ------										
6	21.314	21.2	19.3	0.7	0.0	41.2	70.0	28.8	100	356

Tested by: Sieon Lee / Assistant Manager

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8.5.2.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

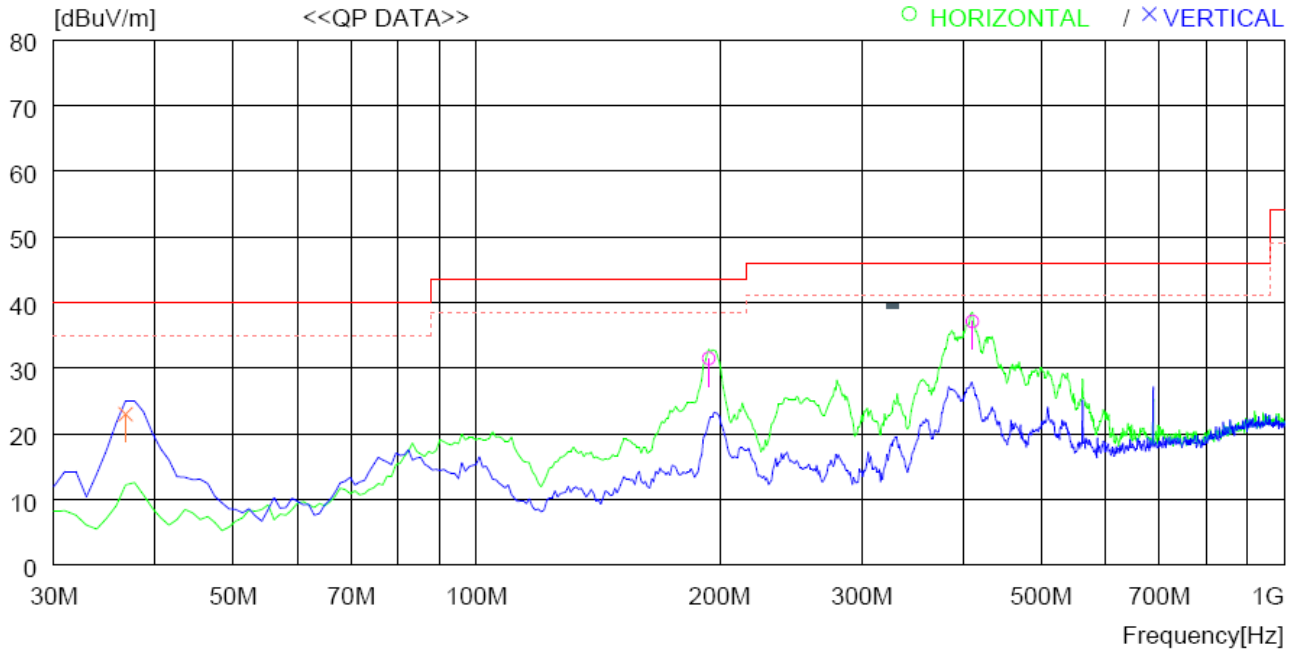
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	193.930	50.1	12.7	1.3	32.6	31.5	43.5	12.0	200	359
2	411.210	51.2	16.6	2.0	32.7	37.1	46.0	8.9	100	290
----- Vertical ------										
3	36.790	44.2	11.0	0.5	32.7	23.0	40.0	17.0	100	173

Tested by: Sieon Lee / Assistant Manager

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8.5.3 Test data for Using Min. load (100 mA)

8.5.3.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBµV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBµV/m)	Limits (dBµV/m)	Margin (dB)
0.048	35.4	H	19.40	0.0	54.80	114.00	59.20
*0.140	58.7	H	19.30	0.1	78.10	104.70	26.60
0.389	36.3	H	19.20	0.1	55.60	95.80	40.20
0.687	29.4	H	19.20	0.1	48.70	70.90	22.20
0.956	21.1	H	19.20	0.1	40.40	68.00	27.60
16.597	24.2	V	19.20	0.7	44.10	70.00	25.90

-. Remark: “H” Horizontal, “V” Vertical

-. “*” Means Fundamental frequency

-. Emission Level [dB µ V/m] = Reading [dBµV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBµV/m] – Limit [dBµV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz

Tested by: Sieon Lee / Assistant Manager

8.5.3.2 Test Plot

8.5.3.2.1 Spurious Radiated Emission Below 30 MHz (100 mA)

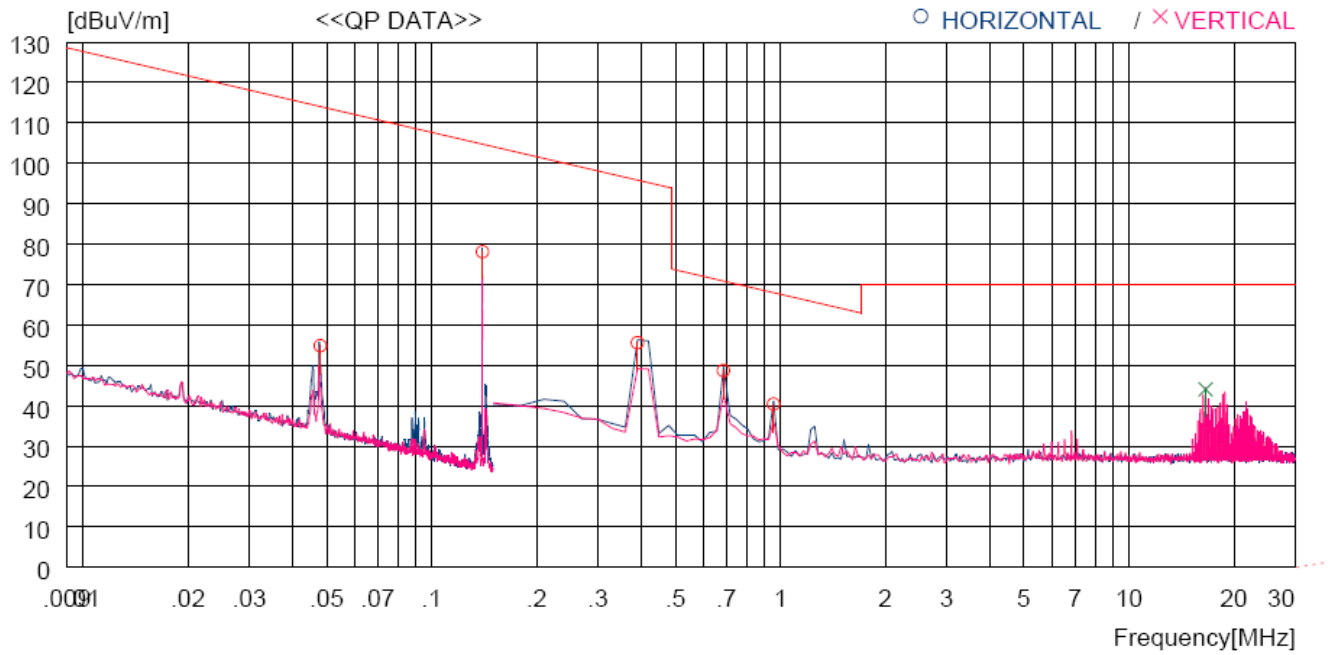
Humidity Level : 48 % R.H. Temperature: 24 ℃

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	0.048	35.4	19.4	0.0	0.0	54.8	114.0	59.2	100	359
2	0.140	58.7	19.3	0.1	0.0	78.1	104.7	26.6	100	359
3	0.389	36.3	19.2	0.1	0.0	55.6	95.8	40.2	100	149
4	0.687	29.4	19.2	0.1	0.0	48.7	70.9	22.2	100	0
5	0.956	21.1	19.2	0.1	0.0	40.4	68.0	27.6	100	126
----- Vertical ------										
6	16.597	24.2	19.2	0.7	0.0	44.1	70.0	25.9	100	0

Tested by: Sieon Lee / Assistant Manager

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8.5.3.2.2 Spurious Radiated Emission below 1 GHz

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48 % R.H. Temperature: 24 ℃

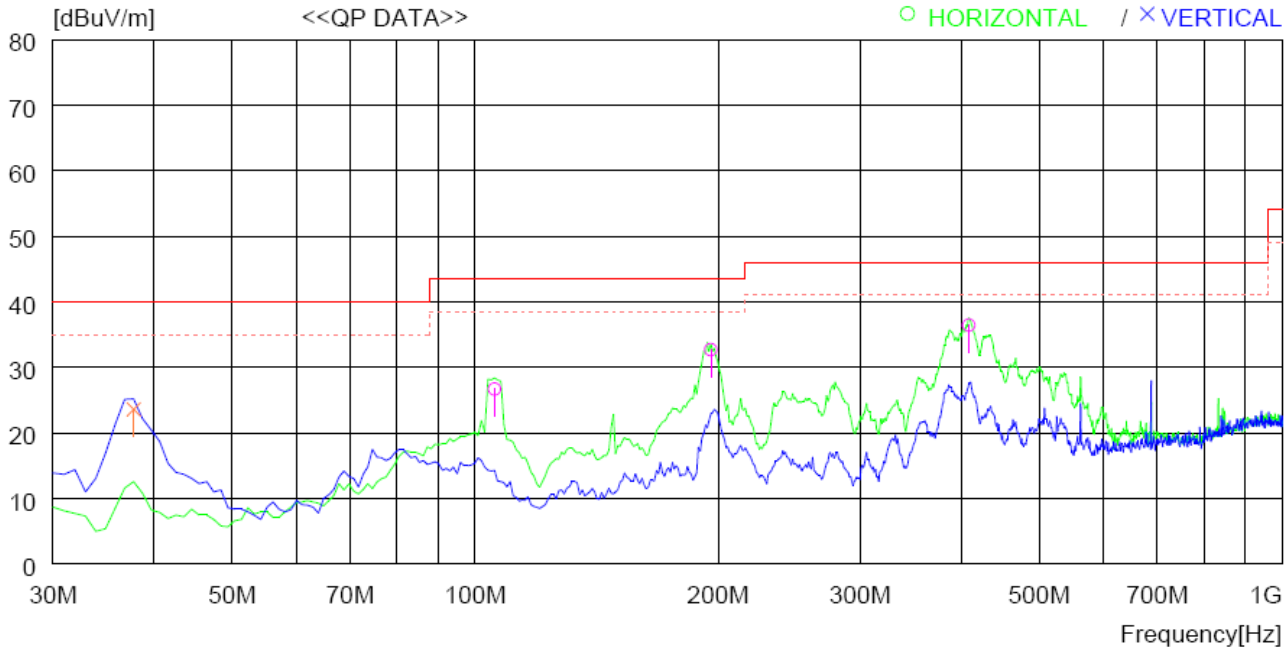
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency range : 30 MHz ~ 1 000 MHz

Result : PASSED

EUT : HANDS3 SPLIT Date: November 04, 2019

Operating Condition : Transmitting Mode



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	105.660	48.6	9.8	1.0	32.7	26.7	43.5	16.8	100	327
2	195.870	51.3	12.7	1.3	32.6	32.7	43.5	10.8	200	359
3	409.270	50.6	16.6	1.9	32.7	36.4	46.0	9.6	100	0
----- Vertical ------										
4	37.760	44.9	10.9	0.5	32.7	23.6	40.0	16.4	100	359

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9. CONDUCTED EMISSION TEST

9.1 Operating environment

Temperature	:	24 ℃
Relative humidity	:	48 % R.H

9.2 Test set-up

The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μH + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

9.3 Test equipment used

All test equipment used is calibrated on a regular basis.

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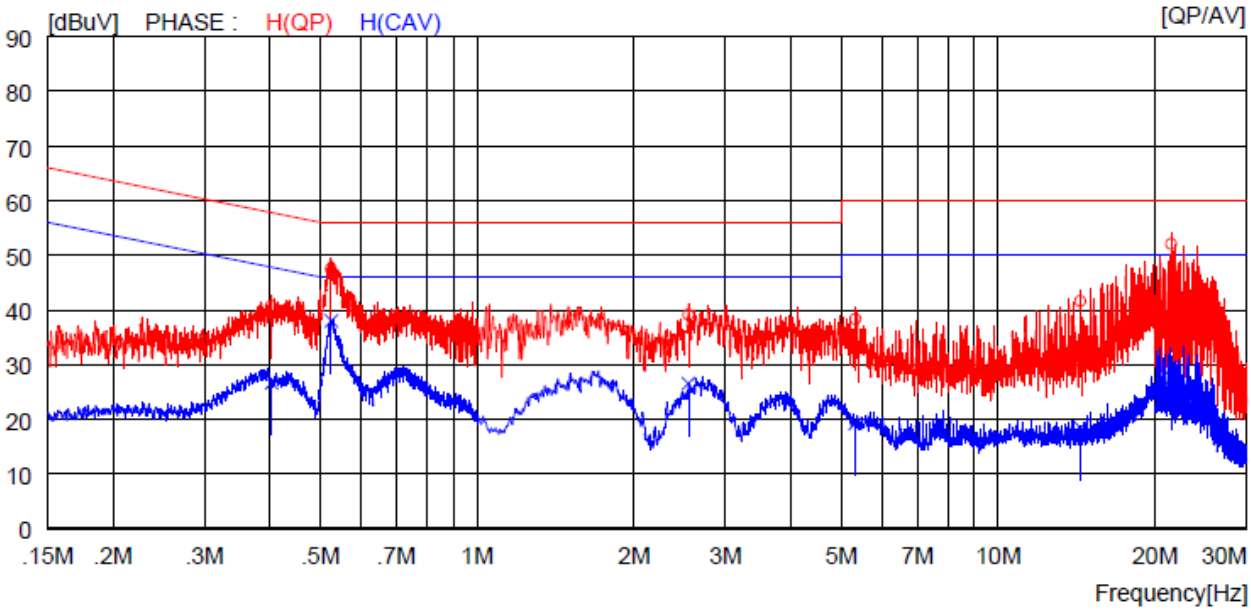
9.4 Test data for 5V

-. Test Date : November 06, 2019

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.40300	30.7	----	10.0	40.7	----	57.8	----	17.1	----	H(QP)
2	0.52500	37.5	----	10.0	47.5	----	56.0	----	8.5	----	H(QP)
3	2.54400	29.0	----	10.1	39.1	----	56.0	----	16.9	----	H(QP)
4	5.32500	28.1	----	10.2	38.3	----	60.0	----	21.7	----	H(QP)
5	14.38000	31.1	----	10.5	41.6	----	60.0	----	18.4	----	H(QP)
6	21.52000	41.3	----	10.7	52.0	----	60.0	----	8.0	----	H(QP)
7	0.40300	----	16.6	10.0	----	26.6	----	47.8	----	21.2	H(CAV)
8	0.52500	----	28.0	10.0	----	38.0	----	46.0	----	8.0	H(CAV)
9	2.54400	----	16.4	10.1	----	26.5	----	46.0	----	19.5	H(CAV)
10	5.32500	----	9.0	10.2	----	19.2	----	50.0	----	30.8	H(CAV)
11	14.38000	----	7.9	10.5	----	18.4	----	50.0	----	31.6	H(CAV)
12	21.52000	----	16.9	10.7	----	27.6	----	50.0	----	22.4	H(CAV)

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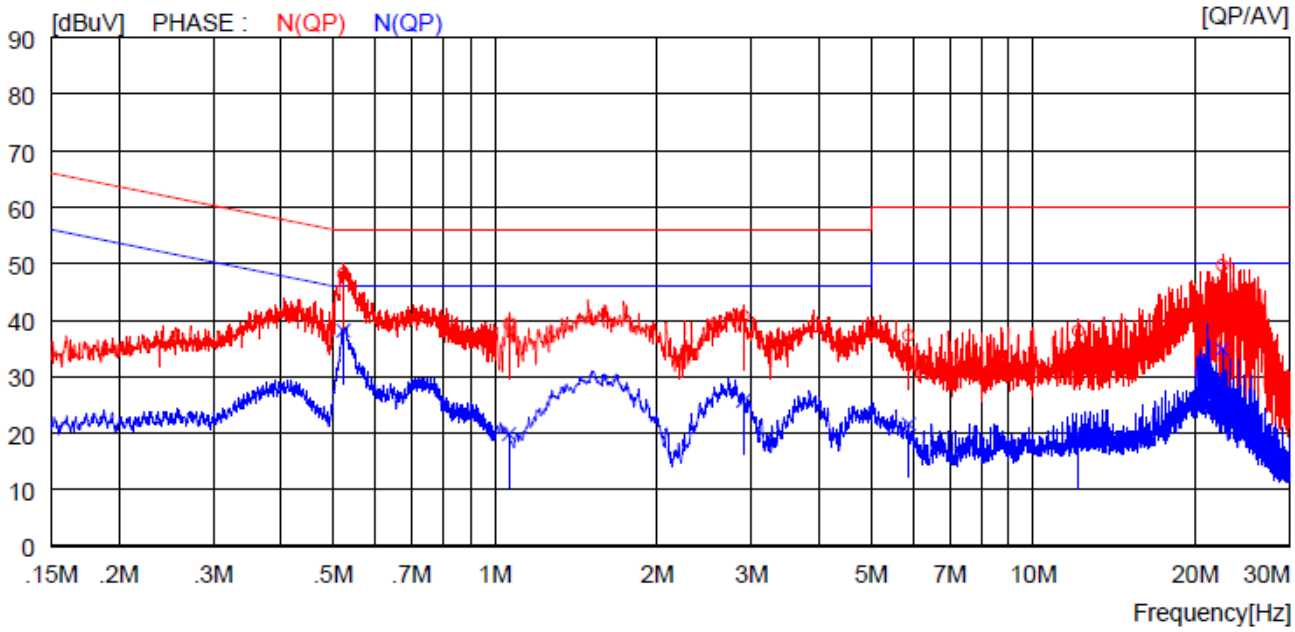
-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.52300	38.2	----	10.0	48.2	----	56.0	----	7.8	----	N(QP)
2	1.06400	29.2	----	10.1	39.3	----	56.0	----	16.7	----	N(QP)
3	2.89600	30.6	----	10.1	40.7	----	56.0	----	15.3	----	N(QP)
4	5.87000	27.1	----	10.2	37.3	----	60.0	----	22.7	----	N(QP)
5	12.14000	27.6	----	10.5	38.1	----	60.0	----	21.9	----	N(QP)
6	22.45000	39.0	----	10.7	49.7	----	60.0	----	10.3	----	N(QP)
7	0.52300	----	28.1	10.0	----	38.1	----	46.0	----	7.9	N(CAV)
8	1.06400	----	9.7	10.1	----	19.8	----	46.0	----	26.2	N(CAV)
9	2.89600	----	15.6	10.1	----	25.7	----	46.0	----	20.3	N(CAV)
10	5.87000	----	11.4	10.2	----	21.6	----	50.0	----	28.4	N(CAV)
11	12.14000	----	9.0	10.5	----	19.5	----	50.0	----	30.5	N(CAV)
12	22.45000	----	24.1	10.7	----	34.8	----	50.0	----	15.2	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Sieon Lee / Assistant Manager

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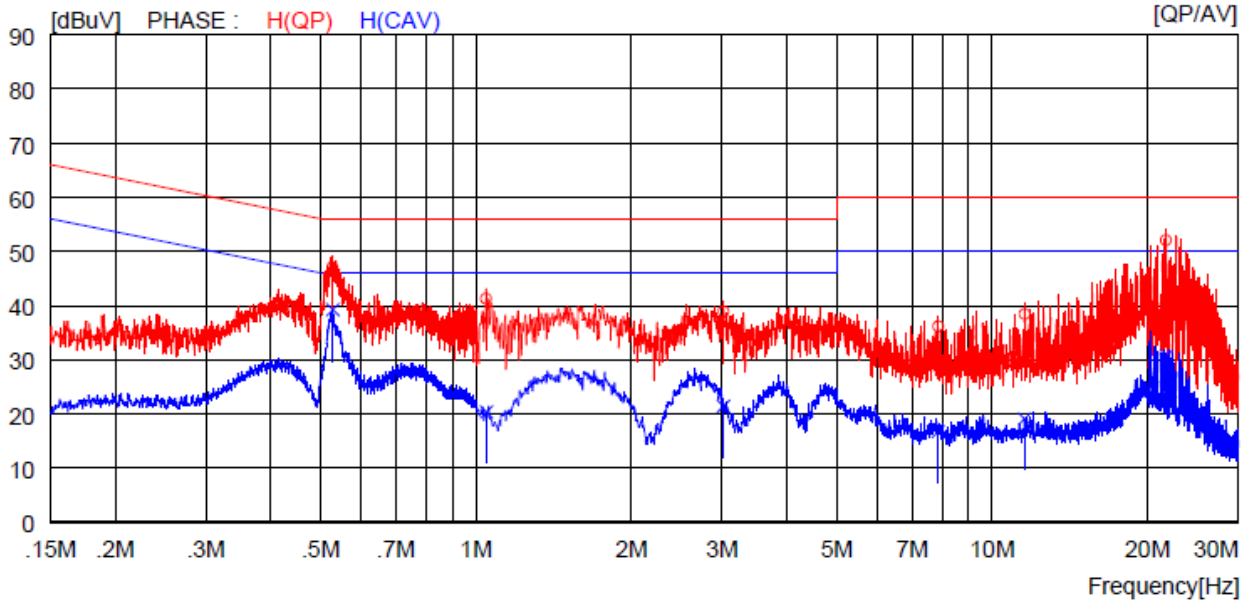
9.5 Test data for 9V

-. Test Date : November 06, 2019

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.52800	37.1	----	10.0	47.1	----	56.0	----	8.9	----	H(QP)
2	1.04800	31.1	----	10.1	41.2	----	56.0	----	14.8	----	H(QP)
3	3.02000	28.8	----	10.1	38.9	----	56.0	----	17.1	----	H(QP)
4	7.87000	25.9	----	10.2	36.1	----	60.0	----	23.9	----	H(QP)
5	11.56000	27.9	----	10.5	38.4	----	60.0	----	21.6	----	H(QP)
6	21.75000	41.4	----	10.7	52.1	----	60.0	----	7.9	----	H(QP)
7	0.52800	----	29.3	10.0	----	39.3	----	46.0	----	6.7	H(CAV)
8	1.04800	----	10.3	10.1	----	20.4	----	46.0	----	25.6	H(CAV)
9	3.02000	----	11.3	10.1	----	21.4	----	46.0	----	24.6	H(CAV)
10	7.87000	----	6.5	10.2	----	16.7	----	50.0	----	33.3	H(CAV)
11	11.56000	----	8.6	10.5	----	19.1	----	50.0	----	30.9	H(CAV)
12	21.75000	----	20.0	10.7	----	30.7	----	50.0	----	19.3	H(CAV)

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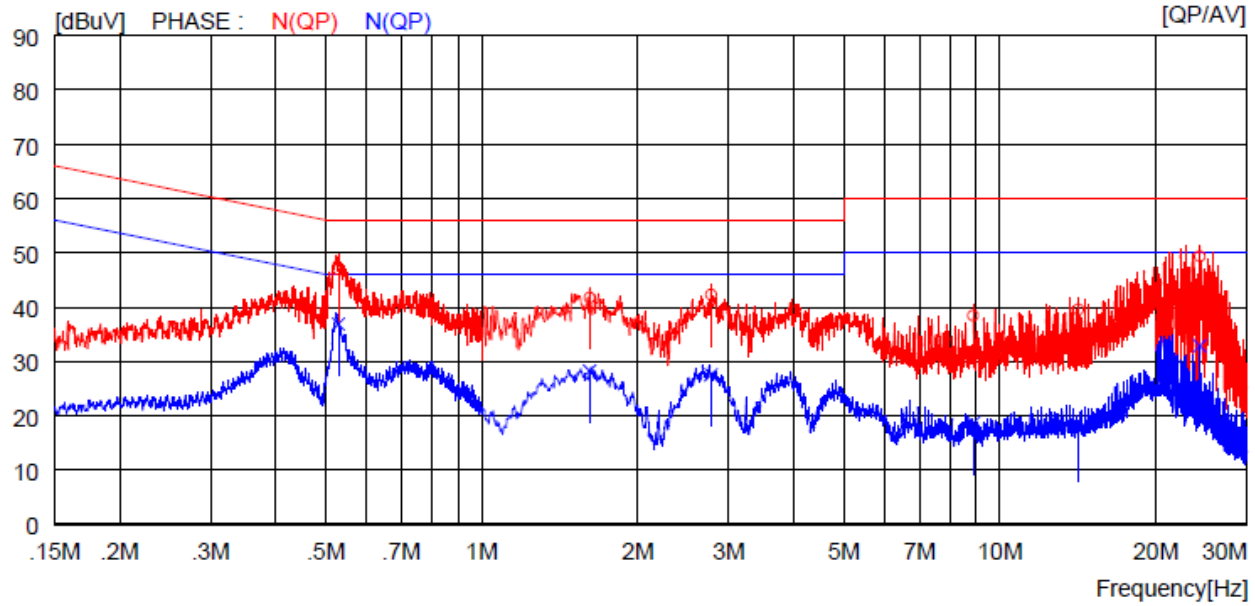
-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.52900	37.0	----	10.0	47.0	----	56.0	----	9.0	----	N(QP)
2	1.61600	31.6	----	10.1	41.7	----	56.0	----	14.3	----	N(QP)
3	2.77200	32.2	----	10.1	42.3	----	56.0	----	13.7	----	N(QP)
4	8.89000	28.1	----	10.3	38.4	----	60.0	----	21.6	----	N(QP)
5	14.19000	29.1	----	10.5	39.6	----	60.0	----	20.4	----	N(QP)
6	24.30000	38.6	----	10.7	49.3	----	60.0	----	10.7	----	N(QP)
7	0.52900	----	26.9	10.0	----	36.9	----	46.0	----	9.1	N(CAV)
8	1.61600	----	18.1	10.1	----	28.2	----	46.0	----	17.8	N(CAV)
9	2.77200	----	17.5	10.1	----	27.6	----	46.0	----	18.4	N(CAV)
10	8.89000	----	8.4	10.3	----	18.7	----	50.0	----	31.3	N(CAV)
11	14.19000	----	6.9	10.5	----	17.4	----	50.0	----	32.6	N(CAV)
12	24.30000	----	22.2	10.7	----	32.9	----	50.0	----	17.1	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Sieon Lee / Assistant Manager

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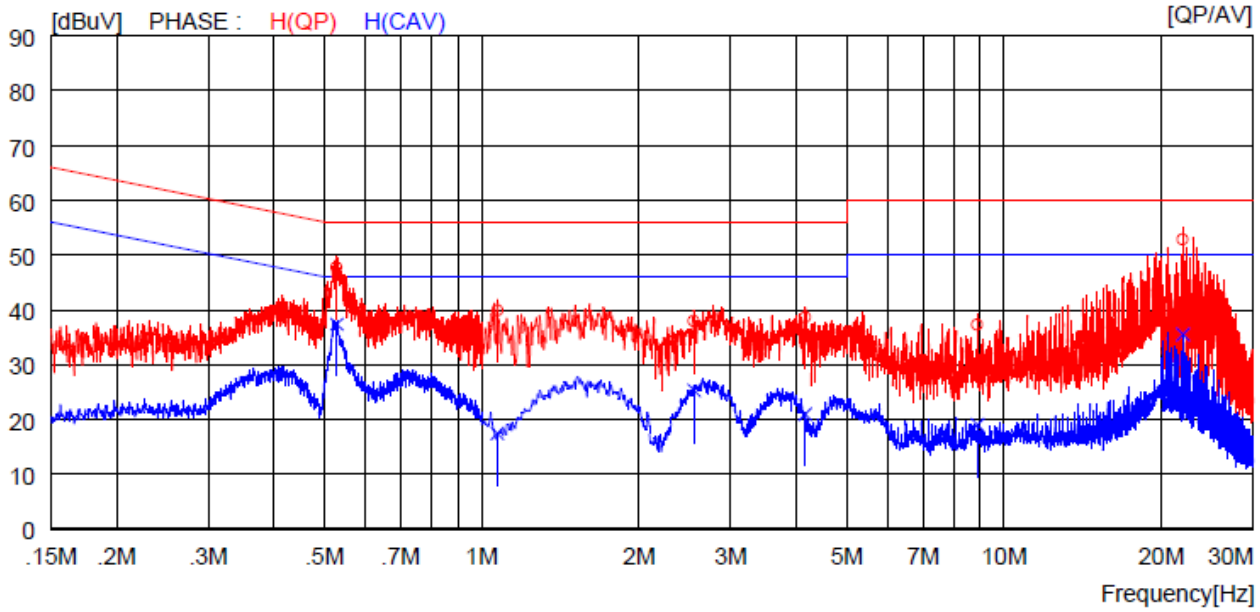
9.6 Test data for 12V

-. Test Date : November 06, 2019

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.52800	37.7	----	10.0	47.7	----	56.0	----	8.3	----	H(QP)
2	1.07200	29.8	----	10.1	39.9	----	56.0	----	16.1	----	H(QP)
3	2.54800	27.9	----	10.1	38.0	----	56.0	----	18.0	----	H(QP)
4	4.16400	28.6	----	10.1	38.7	----	56.0	----	17.3	----	H(QP)
5	8.89000	27.0	----	10.3	37.3	----	60.0	----	22.7	----	H(QP)
6	21.99000	42.2	----	10.7	52.9	----	60.0	----	7.1	----	H(QP)
7	0.52800	----	27.4	10.0	----	37.4	----	46.0	----	8.6	H(CAV)
8	1.07200	----	7.3	10.1	----	17.4	----	46.0	----	28.6	H(CAV)
9	2.54800	----	15.2	10.1	----	25.3	----	46.0	----	20.7	H(CAV)
10	4.16400	----	10.9	10.1	----	21.0	----	46.0	----	25.0	H(CAV)
11	8.89000	----	8.7	10.3	----	19.0	----	50.0	----	31.0	H(CAV)
12	21.99000	----	24.8	10.7	----	35.5	----	50.0	----	14.5	H(CAV)

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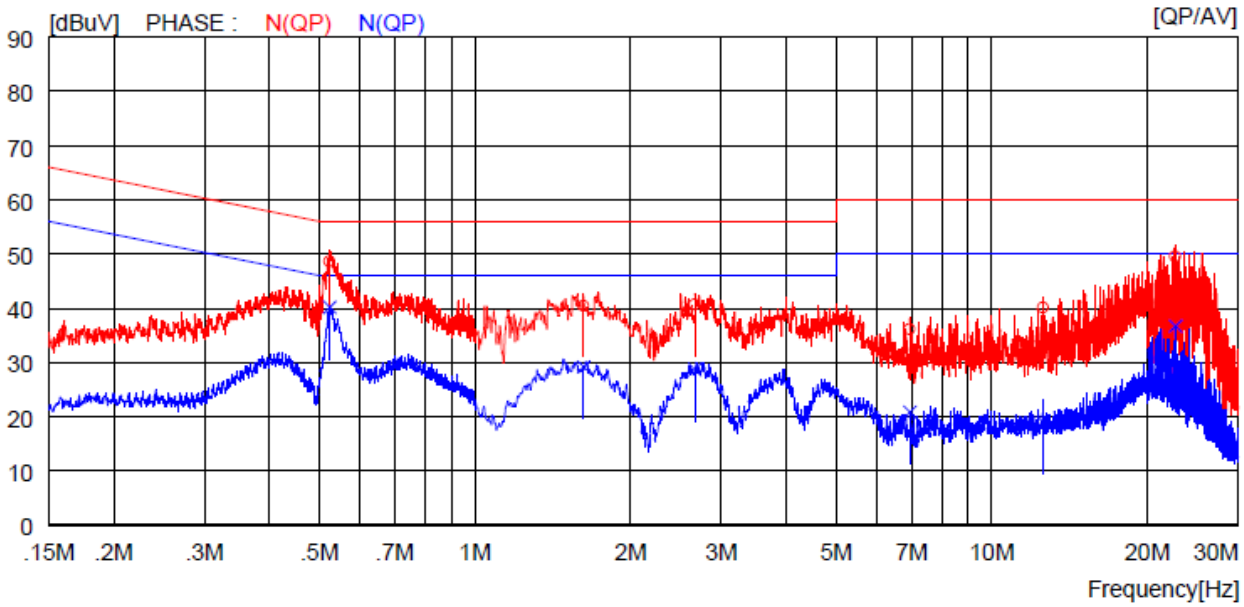
-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.52400	38.6	----	10.0	48.6	----	56.0	----	7.4	----	N(QP)
2	1.62400	30.4	----	10.1	40.5	----	56.0	----	15.5	----	N(QP)
3	2.66400	30.6	----	10.1	40.7	----	56.0	----	15.3	----	N(QP)
4	6.94500	26.0	----	10.2	36.2	----	60.0	----	23.8	----	N(QP)
5	12.57000	29.6	----	10.5	40.1	----	60.0	----	19.9	----	N(QP)
6	22.68000	38.9	----	10.7	49.6	----	60.0	----	10.4	----	N(QP)
7	0.52400	----	30.2	10.0	----	40.2	----	46.0	----	5.8	N(CAV)
8	1.62400	----	19.1	10.1	----	29.2	----	46.0	----	16.8	N(CAV)
9	2.66400	----	18.6	10.1	----	28.7	----	46.0	----	17.3	N(CAV)
10	6.94500	----	10.7	10.2	----	20.9	----	50.0	----	29.1	N(CAV)
11	12.57000	----	8.4	10.5	----	18.9	----	50.0	----	31.1	N(CAV)
12	22.68000	----	26.0	10.7	----	36.7	----	50.0	----	13.3	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Sieon Lee / Assistant Manager

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10. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1	Spectrum analyzer	R/S	FSV30	101199	Mar. 11, 2019	One Year	■
2	Test receiver	R/S	ESCI	101420	Mar. 28, 2019	One Year	■
3	Amplifier	Sonoma Instrument	310N	392756	Oct. 16, 2019	One Year	■
4	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-225	Sep. 17, 2018	Two Year	■
5	Controller	Innco Systems GmbH	CO3000	1026/40960617/P	N/A	N/A	■
6	Turn Table	Innco Systems GmbH	DT2000-2t	930611	N/A	N/A	■
7	LISN	Schwarzbeck	NSLK8126	8126-404	Mar. 19, 2019	One Year	■
		Schwarzbeck	NSLK8128	8128-216	Mar. 20, 2019	One Year	■
8	AMN	EMCO	3825/2	9109-1867	Mar. 27, 2019	One Year	■
9	Antenna Master	Innco Systems GmbH	MA-4640-XPET	MA4640/652/43100318/P	N/A	N/A	■
10	Loop Antenna	Schwarzbeck	FMZB 1513	1513-235	May. 13, 2018	Two Years	■
11	Environmental Test Chamber	ESPEC	PSL-2KP	14009407	Feb. 22, 2019	One Year	■
12	DC Power Supply	LG Precision Co.,Ltd	GP-4303D	5071069	Jan. 10, 2019	One Year	■

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