

FCC WPC REPORT

FCC Certification

Applicant Name:

CNA Co.,Ltd.

Date of Issue:

August 01, 2018

Address:

160, Hanggyo-ro, Paldal-gu, Suwon-si, Gyeonggi-do,
Republic of Korea.

Test Site/Location:

HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1807-FC027-R1

FCC ID: 2AQQTCNAXCAN01

APPLICANT: CNA Co.,Ltd.

Model:

XCAN

EUT Type:

Wireless Charger

Frequency of Operation:

110 kHz ~ 146 kHz

FCC Classification:

Part 15 Low Power Transmitter Below 1705 kHz (DCD)

FCC Rule Part(s):

FCC Part 15, Subpart C (15.209)

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Jeong Ho Kim

Engineer of Telecommunication testing center



Approved by : Jong Seok Lee

Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1807-FC027	July 27, 2018	- First Approval Report
HCT-RF-1807-FC027-R1	August 01, 2018	- Revised the Applicant Address

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1. GENERAL INFORMATION

Manufacturer: EMW
Address: 155 Namdongseo-ro, Namdong-gu, Incheon, Korea
FCC ID: 2AQQTCNAXCAN01
EUT Type: Wireless Charger
Model: XCAN
Date(s) of Tests: July 04, 2018 ~ July 23, 2018
Place of Tests: HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model:	XCAN
EUT Type	Wireless Charger
Frequency of Operation	110 kHz ~ 146 kHz
Power Supply	DC 4.1V
Max. Transmit Power	12.02 dBuV/m @300 m
Type of Antenna	N/A
Wireless charging distance	3mm
Power source	5 W

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207 and 15.209 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane.

The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.3 of ANSI C63.10. (Version: 2013).

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The 10 m semi anechoic chamber used to collect the Conducted and Radiated data is located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4 (Version: 2014). Detailed description of test facilities was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned loop, dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. TESR CONFIGURATIONS

In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table. Output power of the EUT are 5 W in WPC mode.

EUT Mode	Operation
5 W Charging Mode with Client device	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery

Note:

All modes of operation were investigated and the worst case configuration results are reported.
(Worstcase : Less than 1 % of Battery)

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70

8. TEST SUMMARY

Test Description	FCC Rule	Limit	Condition	Result
Radiated emission	§15.209	cf. Section 9	Radiated	Pass
AC Power Line Conducted Emission	§15.207	cf. Section 10		Pass
Occupied bandwidth.	§2.1049	See note1		Pass

Note:

1. For reporting purposes only.

9. RADIATED EMISSION MEASUREMENT

FCC Rule

: §15.209

Test Procedures used

: ANSI C63.10-2013

Test Settings

1. Analyzer frequency set to the frequency of the radiated spurious emissipn of interst
2. RBW :
9kHz – 150kHz : 300Hz
150kHz – 30MHz : 10kHz
30MHz – 1GHz : 100kHz
3. VBW : $\geq 3 \times$ RBW
4. Sweep time : Auto couple
5. Detector : Peak
6. Trace : Maxhold
7. Trace was allowed to stabilize

Limit

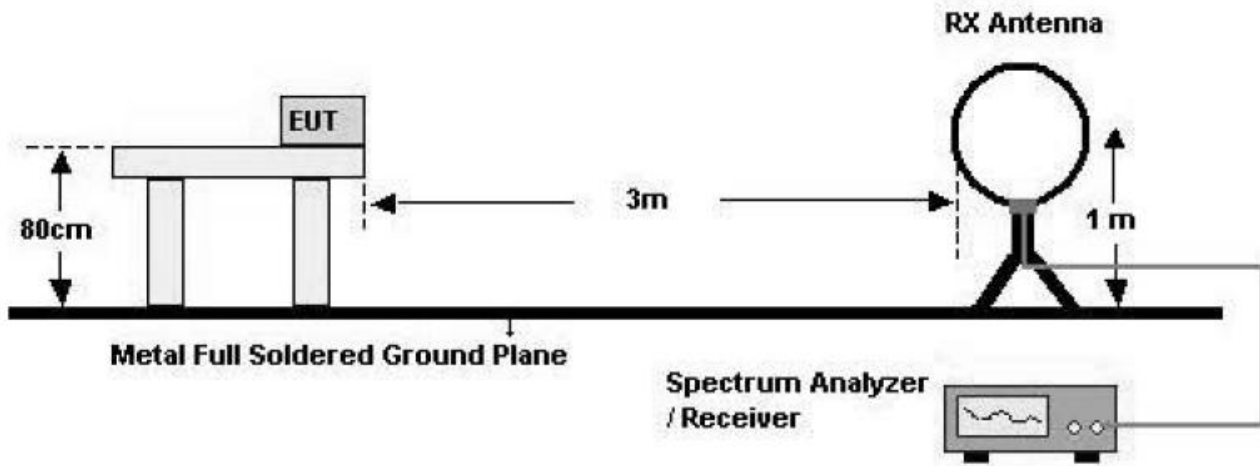
Except as provided elsewhere in this paragraph the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Rule Part	Frequency (MHz)	Limit
Part 15.209	0.009 ~ 0.490	2400/F(kHz) uV/m@300 m
	0.490 ~1.705	24000/F(kHz) uV/m@30 m
	1.705 ~ 30	30 uV/m@30 m
	30 ~ 88	100 ** uV/m@3 m
	88 ~ 216	150 ** uV/m@3 m
	216 ~ 960	200 ** uV/m@3 m
	Above 960	500 uV/m@3 m

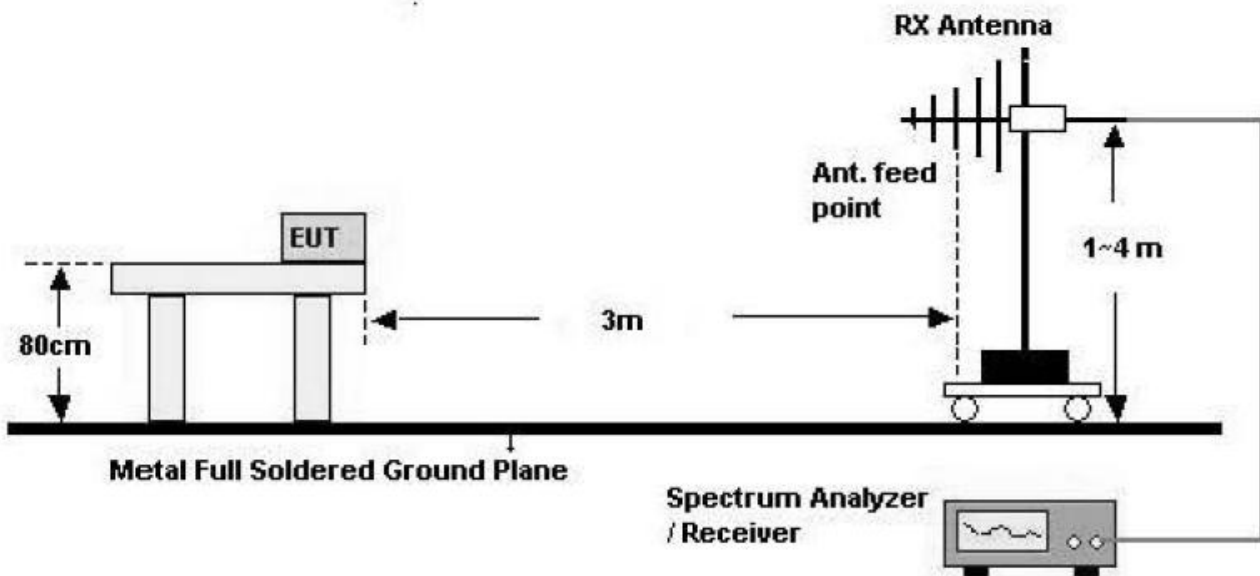
** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Test Set-up

Below 30 MHz



30 MHz - 1 GHz



Additional Information

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT.
3. Radiated emissions were measured with the loop antenna both parallel and perpendicular to the plane of the EUT loop antenna and with x, y, z planes in EUT.
4. The limit is converted from microvolts/meter to decibel microvolts/meter. Sample Calculation:
 - * Result level(dBμV/m@30m)
= Reading level(dBμV/m@3m) + Ant factor(dB/m) + Cable Loss(dB) – Distance Correction Factor.
5. Distance Correction
 - * 0.009 MHz – 0.490 MHz :
 $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
 - * 0.490 MHz – 30MHz :
 $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$
6. Worst case position : Z-H
7. The test results for below 30 MHz is correlated to an open site.
The result on OATS is about 2 dB higher than semi-anechoic chamber(10 m chamber)
8. Plots were taken without using any correction factors.
9. The worst case plots are reported.

Test Result (Below 30 MHz)

Frequency (kHz)	Reading Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
110.74	71.01	20.1	0.91	-80	12.02	26.72	14.70
24.834	36.89	20.1	0.91	-80	-22.10	39.70	61.80
112.5	31.08	20.1	0.91	-80	-27.91	26.58	54.49
332.4	45.03	19.6	0.91	-80	-14.46	17.17	31.63
3054	13.59	19.6	0.91	-40	-5.90	29.54	35.44

Note

1. Test Frequency : Low

Frequency (kHz)	Reading Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
128.08	59.22	20.1	0.91	-80	0.23	25.45	25.22
22.65	36.77	20.1	0.91	-80	-22.22	40.50	62.72
114.7	22.87	20.1	0.91	-80	-36.12	26.41	62.53
435	45.16	19.6	0.91	-80	-14.33	14.83	29.16
3810	13.79	19.6	0.91	-40	-5.70	29.54	35.24

Note

1. Test Frequency : Mid

Frequency (kHz)	Reading Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
145.16	50.87	20.1	0.91	-80	-8.12	24.37	32.49
35.208	36.09	20.1	0.91	-80	-22.90	36.67	59.57
115.2	24.31	20.1	0.91	-80	-34.68	26.38	61.06
150	51.75	20.1	0.91	-80	-7.24	24.08	31.32
3486	14.08	19.6	0.91	-40	-5.41	29.54	34.95

Note

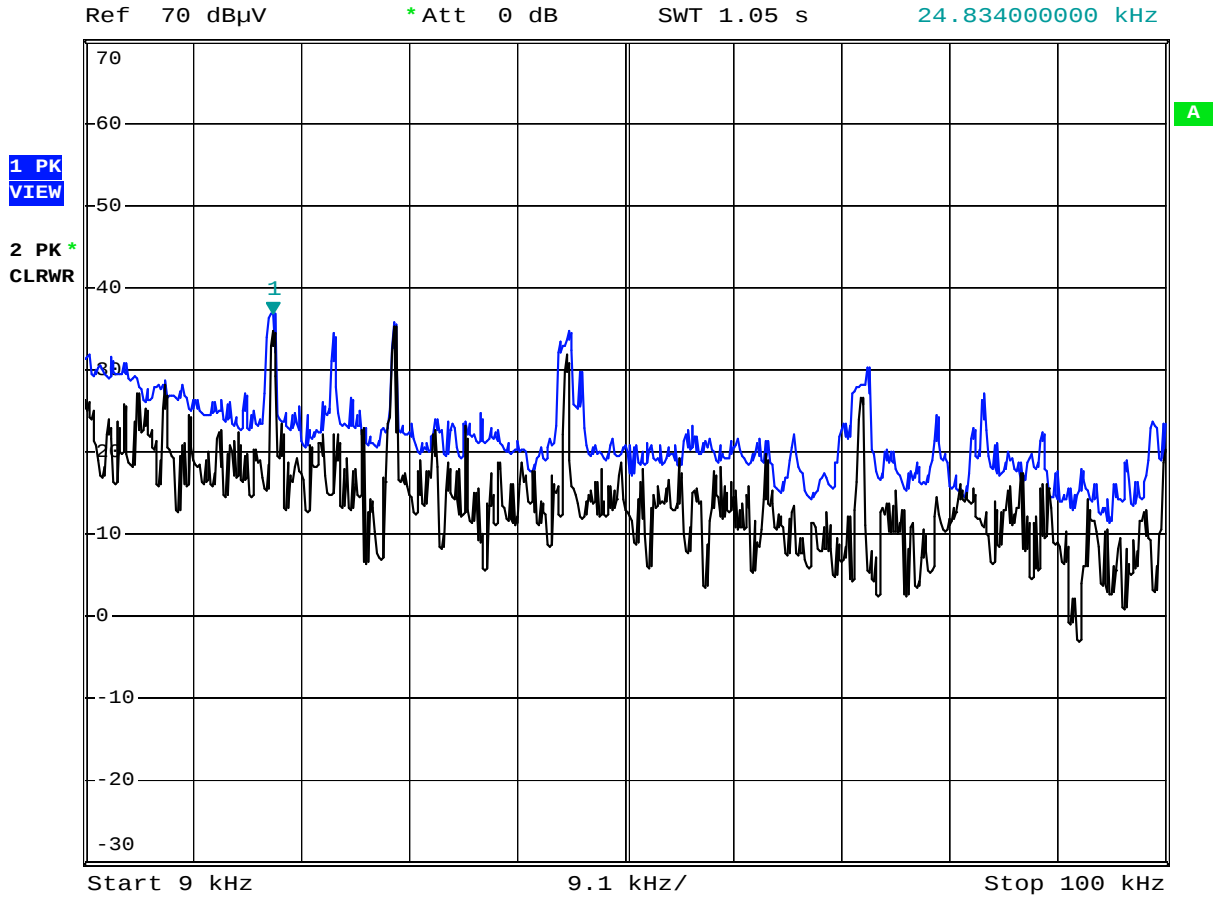
1. Test Frequency : High

Test Plot (Below 30 MHz)

* Frequency Range : 9 kHz – 100kHz

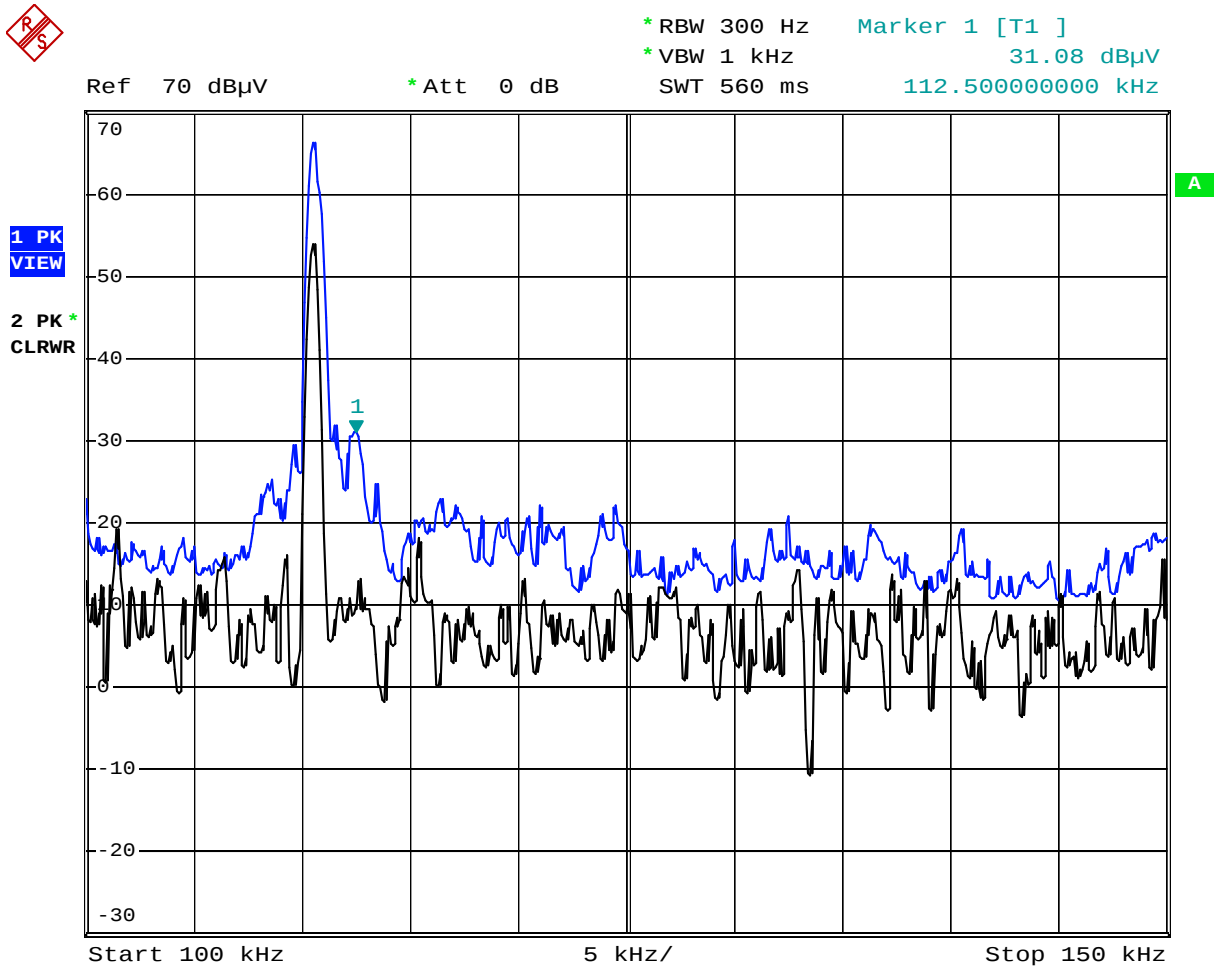


* RBW 300 Hz Marker 1 [T1]
* VBW 1 kHz 36.89 dBμV
SWT 1.05 s 24.834000000 kHz



Date: 10.JUL.2018 13:20:26

* Frequency Range : 100 kHz – 150kHz



Date: 10.JUL.2018 13:22:01



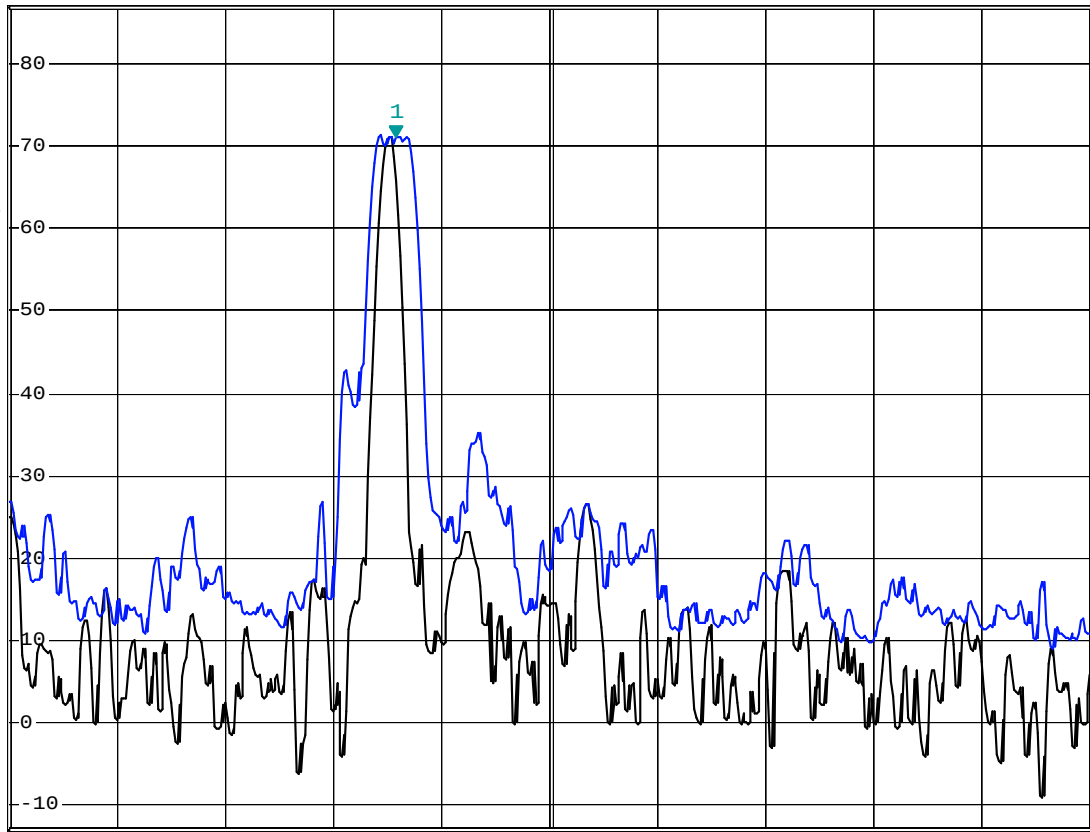
* RBW 300 Hz Marker 1 [T1]
* VBW 1 kHz 71.01 dBμV
SWT 340 ms 110.740000000 kHz

Ref 87 dBμV

Att 10 dB

1 PK
MAXH

2 PK *
CLRWR



Date: 10.JUL.2018 08:42:58

* Frequency Range : 150 kHz – 3 MHz



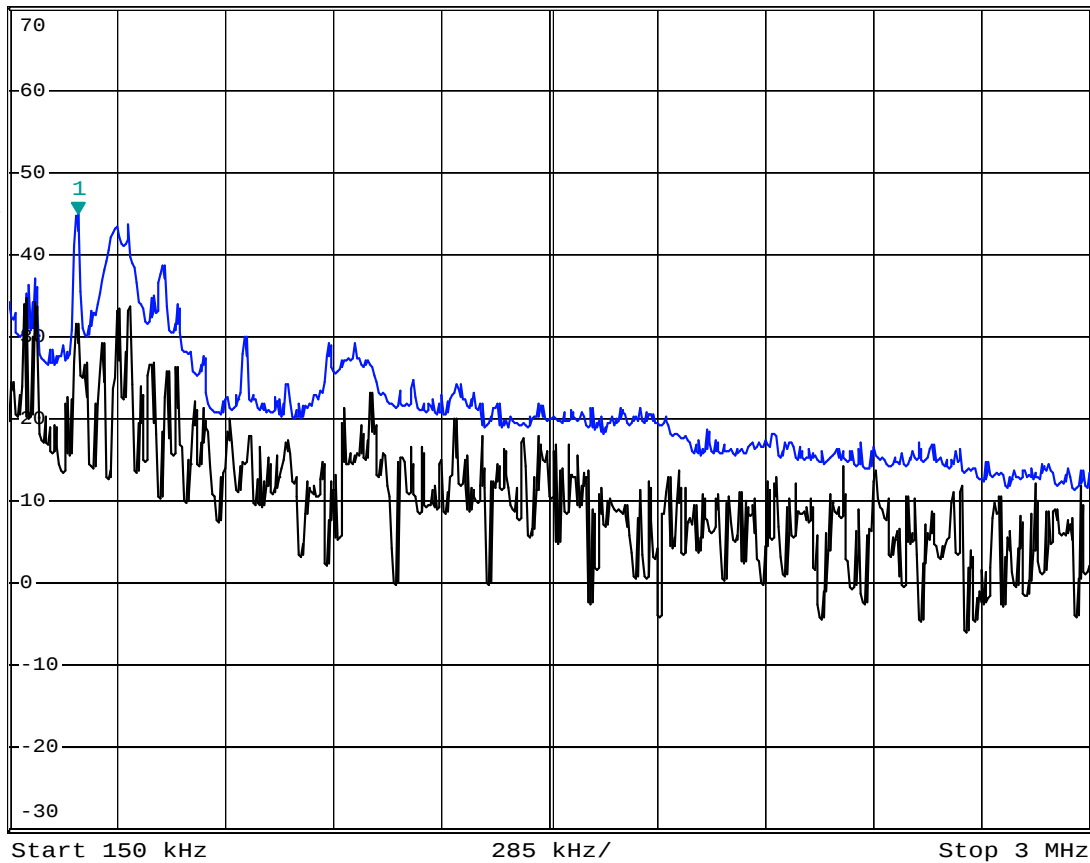
* RBW 10 kHz Marker 1 [T1]
* VBW 30 kHz 45.03 dBμV
SWT 30 ms 332.400000000 kHz

Ref 70 dBμV

* Att 0 dB

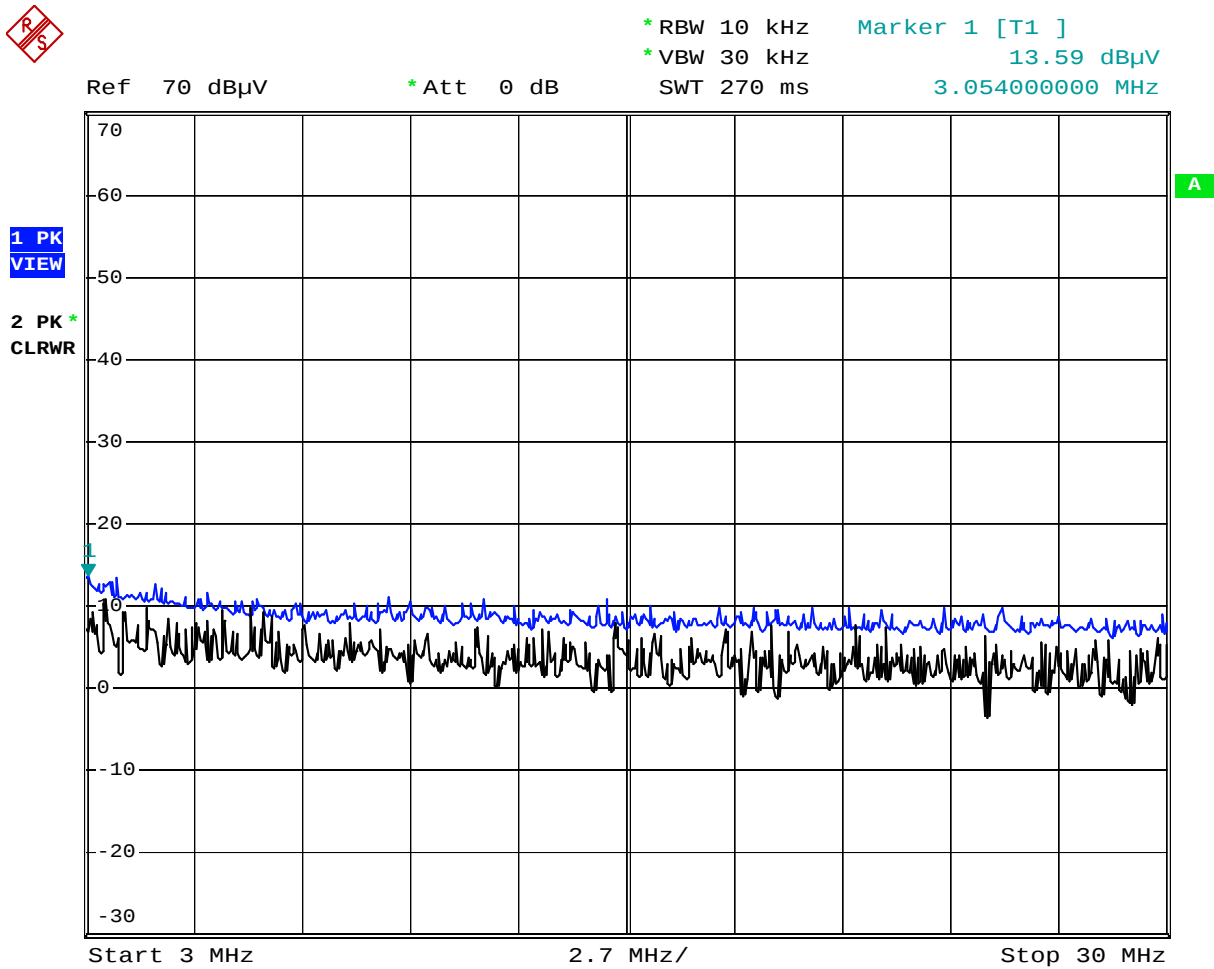
1 PK
VIEW

2 PK *
CLRWR



Date: 10.JUL.2018 13:23:32

* Frequency Range : 3 MHz – 30 MHz

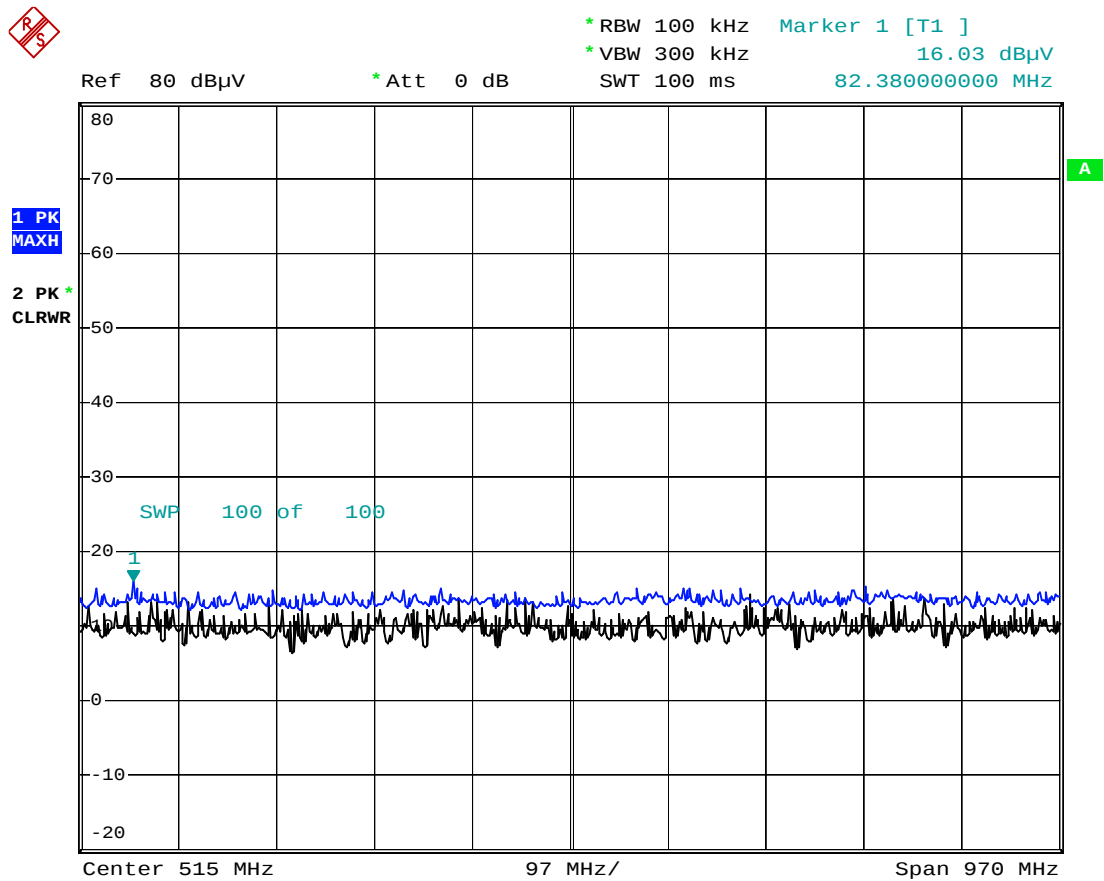


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Test Result (30 MHz – 1GHz)

Frequency (MHz)	Reading Level (dBuV/m) @3m	Ant.Factor (dB/m)	Cable Loss (dB)	Distance Correction (dB)	Result Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
No Critical peaks found							

Test Plot (30 MHz – 1GHz)



Date: 25.JUL.2018 10:51:03

10. POWERLINE CONDUCTE EMISSIONS

FCC Rule

: §15.207

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.
5. The EUT is the device operating below 30 MHz.
 - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
 - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Set-up

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

Test Result & Plot

Conducted Emissions (Line 1)

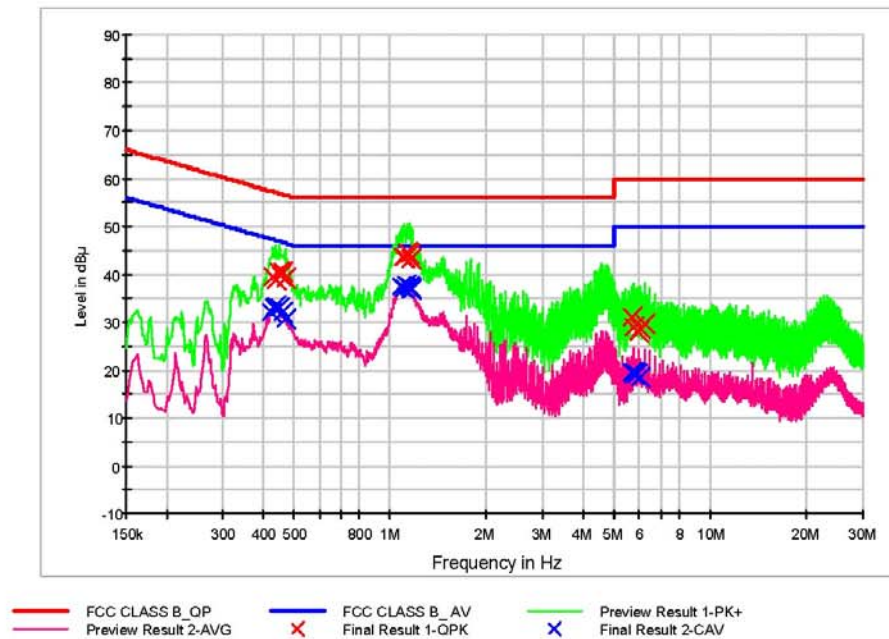
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HCT TEST Report

Common Information

EUT: XCAN
Test Site: SHIELD ROOM
Operating Conditions: Wireless Charging Mode

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.432000	39.4	9.000	Off	N	9.7	17.8	57.2
0.440000	38.8	9.000	Off	N	9.7	18.3	57.1
0.452000	40.6	9.000	Off	N	9.7	16.3	56.8
0.458000	39.9	9.000	Off	N	9.7	16.8	56.7
0.462000	40.4	9.000	Off	N	9.7	16.2	56.7
0.470000	39.3	9.000	Off	N	9.7	17.2	56.5
1.090000	43.6	9.000	Off	N	9.8	12.4	56.0
1.106000	43.4	9.000	Off	N	9.8	12.6	56.0
1.132000	44.7	9.000	Off	N	9.8	11.3	56.0
1.136000	44.5	9.000	Off	N	9.8	11.5	56.0
1.154000	44.3	9.000	Off	N	9.8	11.7	56.0
1.168000	43.4	9.000	Off	N	9.8	12.6	56.0
5.670000	30.9	9.000	Off	N	10.0	29.1	60.0
5.780000	28.9	9.000	Off	N	10.0	31.1	60.0
5.788000	29.0	9.000	Off	N	10.0	31.0	60.0
6.002000	27.9	9.000	Off	N	10.1	32.1	60.0
6.008000	28.8	9.000	Off	N	10.1	31.2	60.0
6.228000	29.7	9.000	Off	N	10.1	30.3	60.0

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.426000	32.1	9.000	Off	N	9.7	15.2	47.3
0.434000	32.9	9.000	Off	N	9.7	14.2	47.2
0.442000	33.3	9.000	Off	N	9.7	13.7	47.0
0.452000	33.0	9.000	Off	N	9.7	13.9	46.8
0.460000	31.9	9.000	Off	N	9.7	14.8	46.7
0.472000	30.7	9.000	Off	N	9.7	15.8	46.5
1.084000	37.3	9.000	Off	N	9.8	8.7	46.0
1.106000	37.0	9.000	Off	N	9.8	9.0	46.0
1.124000	37.7	9.000	Off	N	9.8	8.3	46.0
1.152000	37.5	9.000	Off	N	9.8	8.5	46.0
1.164000	37.2	9.000	Off	N	9.8	8.8	46.0
1.168000	36.9	9.000	Off	N	9.8	9.1	46.0
5.670000	19.4	9.000	Off	N	10.0	30.6	50.0
5.780000	19.5	9.000	Off	N	10.0	30.5	50.0
5.784000	19.3	9.000	Off	N	10.0	30.7	50.0
5.788000	19.2	9.000	Off	N	10.0	30.8	50.0
5.900000	19.0	9.000	Off	N	10.0	31.0	50.0
6.068000	18.5	9.000	Off	N	10.1	31.5	50.0

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Conducted Emissions (Line 2)

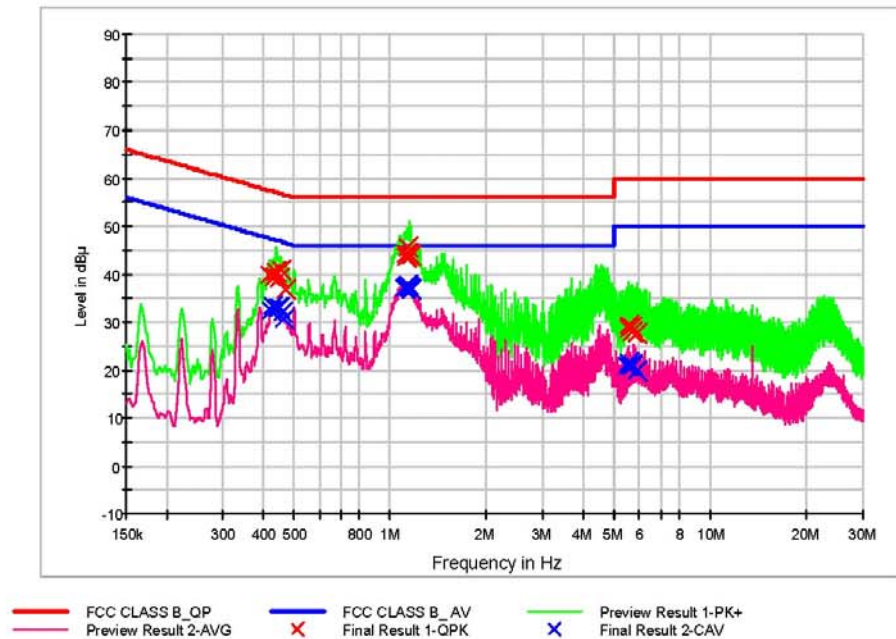
1 / 2

HCT TEST Report

Common Information

EUT: XCAN
Test Site: SHIELD ROOM
Operating Conditions: Wireless Charging Mode

FCC CLASS B_Exten Cable



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.422000	39.9	9.000	Off	L1	9.7	17.5	57.4
0.434000	39.4	9.000	Off	L1	9.7	17.8	57.2
0.442000	40.4	9.000	Off	L1	9.7	16.6	57.0
0.450000	39.2	9.000	Off	L1	9.7	17.7	56.9
0.454000	41.0	9.000	Off	L1	9.7	15.8	56.8
0.472000	36.9	9.000	Off	L1	9.7	19.6	56.5
1.124000	44.1	9.000	Off	L1	9.8	11.9	56.0
1.128000	43.7	9.000	Off	L1	9.8	12.3	56.0
1.134000	44.2	9.000	Off	L1	9.8	11.8	56.0
1.140000	45.4	9.000	Off	L1	9.8	10.6	56.0
1.150000	44.0	9.000	Off	L1	9.8	12.0	56.0
1.160000	44.0	9.000	Off	L1	9.8	12.0	56.0
5.536000	29.2	9.000	Off	L1	10.0	30.8	60.0
5.594000	28.7	9.000	Off	L1	10.0	31.3	60.0
5.708000	29.0	9.000	Off	L1	10.0	31.0	60.0
5.730000	28.1	9.000	Off	L1	10.0	31.9	60.0
5.896000	27.7	9.000	Off	L1	10.0	32.3	60.0
5.936000	27.7	9.000	Off	L1	10.0	32.3	60.0

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Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.424000	32.4	9.000	Off	L1	9.7	15.0	47.4
0.432000	33.3	9.000	Off	L1	9.7	13.9	47.2
0.444000	32.9	9.000	Off	L1	9.7	14.1	47.0
0.448000	33.0	9.000	Off	L1	9.7	14.0	46.9
0.460000	32.0	9.000	Off	L1	9.7	14.7	46.7
0.464000	30.8	9.000	Off	L1	9.7	15.8	46.6
1.108000	37.0	9.000	Off	L1	9.8	9.0	46.0
1.124000	37.4	9.000	Off	L1	9.8	8.6	46.0
1.134000	37.5	9.000	Off	L1	9.8	8.5	46.0
1.140000	37.6	9.000	Off	L1	9.8	8.4	46.0
1.152000	37.3	9.000	Off	L1	9.8	8.7	46.0
1.162000	36.8	9.000	Off	L1	9.8	9.2	46.0
5.484000	20.9	9.000	Off	L1	10.0	29.1	50.0
5.536000	21.6	9.000	Off	L1	10.0	28.4	50.0
5.636000	20.8	9.000	Off	L1	10.0	29.2	50.0
5.674000	21.3	9.000	Off	L1	10.0	28.7	50.0
5.730000	20.7	9.000	Off	L1	10.0	29.3	50.0
5.896000	19.7	9.000	Off	L1	10.0	30.3	50.0

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11. EMISSION BANDWIDTH PLOT

FCC Rule

: §2.1049

Test Settings

1. Analyzer frequency set to the frequency of the radiated spurious emissipn of interst
2. RBW : 300 Hz
(Becasuse the measured signal is CW/CW-like,adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.)
3. VBW : $\geq 3 \times \text{RBW}$
4. Sweep time : Auto couple
5. Detector : Peak
6. Trace : Maxhold
7. Trace was allowed to stabilize

Limit

None

(for reporting purposes only.)

Test Plot



Note

1. Test Frequency : Low



Note

1. Test Frequency : Mid



Note

1. Test Frequency : High

12. LIST OF TEST EQUIPMENT

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/20/2017	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/25/2018	Annual	100584
Agilent	N9020A / Signal Analyzer	06/08/2018	Annual	MY51110085
Hewlett Packard	E3632A / DC Power Supply	06/26/2018	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/10/2018	Annual	07560
Agilent	8493C / Attenuator(20 dB)	06/21/2018	Annual	17280
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Emco	2090 / Controller	N/A	N/A	060520
Ets	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	04/19/2017	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/06/2017	Biennial	760
Schwarzbeck	VULB 9168 / Hybrid Antenna	10/14/2016	Biennial	9160-3368
Rohde & Schwarz	ESU / Test Receiver	05/24/2018	Annual	100346
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/21/2017	Annual	836650/016

13. Annex A_TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1807-FC027-P