



# FCC EMI TEST REPORT

**FCC ID** : A4RG020H  
**Equipment** : Smartphone  
**Model Name** : G020H  
**Applicant** : Google LLC  
1600 Amphitheatre Parkway,  
Mountain View, CA 94043, USA  
**Standard** : FCC 47 CFR FCC Part 15 Subpart B

The product was received completed on Dec. 20 , 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in 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: Jones Tsai

**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
FC891148-01	01	Initial issue of report	Jan. 02, 2019
FC891148-01	02	Revising the frequency.	Jan. 16, 2019
FC891148-01	03	Add the test description.	Jan. 28, 2019



### Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	Under limit 8.32 dB at 0.170 MHz
3.2	15.109	Radiated Emission	Pass	Under limit 4.10 dB at 700.400 MHz for Quasi-Peak

**Reviewed by: Louis Wu**

**Report Producer: Wii Chang**



# 1. General Description

## 1.1. Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Model Name	G020H
Sample 1	The device with 1st battery
Sample 2	The device with 2nd battery
FCC ID	A4RG020H
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/NFC/GNSS WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

## 1.2. Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx Frequency</b>	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz LTE Band 26 : 814.7 MHz ~ 848.3 MHz LTE Band 38 : 2572.5 MHz ~ 2617.5 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
<b>Rx Frequency</b>	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz LTE Band 2: 1930.7 MHz ~ 1989.3 MHz LTE Band 4: 2110.7 MHz ~ 2154.3 MHz LTE Band 5: 869.7 MHz ~ 893.3 MHz LTE Band 12: 729.7 MHz ~ 745.3 MHz LTE Band 13: 748.5 MHz ~ 753.5 MHz LTE Band 17: 736.5 MHz ~ 743.5 MHz LTE Band 26: 859.7 MHz ~ 893.3 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz 802.11b/g/n: 2412 MHz ~ 2472 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5720 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz GNSS: 1559 MHz ~ 1610 MHz (GPS/GLONASS/Galileo/BDS) NFC: 13.56 MHz



Standards-related Product Specification	
<b>Antenna Type</b>	<p><b>WWAN:</b>            Cellular Band : PIFA Antenna type            PCS Band : PIFA Antenna type            AWS Band : PIFA Antenna type            LTE Band 2 : PIFA Antenna type            LTE Band 4 : PIFA Antenna type            LTE Band 5 : PIFA Antenna type            LTE Band 12 : PIFA Antenna type            LTE Band 13 : PIFA Antenna type            LTE Band 17 : PIFA Antenna type            LTE Band 26 : PIFA Antenna type            LTE Band 38 : PIFA Antenna type            LTE Band 41 : PIFA Antenna type</p>
<b>Antenna Type</b>	<p><b>WLAN:</b>  <b>&lt;2400 MHz ~ 2483.5 MHz&gt;</b>            &lt;Ant. 1&gt; : PIFA Antenna type            &lt;Ant. 2&gt; : PIFA Antenna type  <b>&lt;5150 MHz ~ 5250 MHz&gt;</b>            &lt;Ant. 1&gt; : PIFA Antenna type            &lt;Ant. 2&gt; : PIFA Antenna type  <b>&lt;5250 MHz ~ 5350 MHz&gt;</b>            &lt;Ant. 1&gt; : PIFA Antenna type            &lt;Ant. 2&gt; : PIFA Antenna type  <b>&lt;5470 MHz ~ 5725 MHz&gt;</b>            &lt;Ant. 1&gt; : PIFA Antenna type            &lt;Ant. 2&gt; : PIFA Antenna type  <b>&lt;5725 MHz ~ 5850 MHz&gt;</b>            &lt;Ant. 1&gt; : PIFA Antenna type            &lt;Ant. 2&gt; : PIFA Antenna type            Bluetooth: PIFA Antenna            GPS/Glonass/Galileo/BDS: PIFA Antenna            NFC: Loop Antenna</p>
<b>Type of Modulation</b>	<p>GSM / GPRS: GMSK            EGPRS : GMSK for MCS 0 ~ 4 &amp; 8PSK for MCS5 ~9            WCDMA: QPSK (Uplink)            HSDPA: QPSK (Downlink)            HSUPA: QPSK (Uplink)            LTE: QPSK / 16QAM            Bluetooth: GFSK, <math>\pi/4</math>-DQPSK, 8-DPSK            802.11b: DSSS (BPSK / QPSK / CCK)            802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)            802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)            GPS/Glonass/Galileo/BDS: BPSK            NFC: ASK</p>

### 1.3. Modification of EUT

No modifications are made to the EUT during all test items.

### 1.4. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1093 and TW1098 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
<b>Test Site Location</b>	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
<b>Test Site No.</b>	<b>Sporton Site No.</b>
	CO05-HY

<b>Test Site</b>	SPORTON INTERNATIONAL INC.
<b>Test Site Location</b>	No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
<b>Test Site No.</b>	<b>Sporton Site No.</b>
	03CH10-HY

### 1.5. Applicable Standards

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

- ♦ FCC 47 CFR FCC Part 15 Subpart B
- ♦ ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.



## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

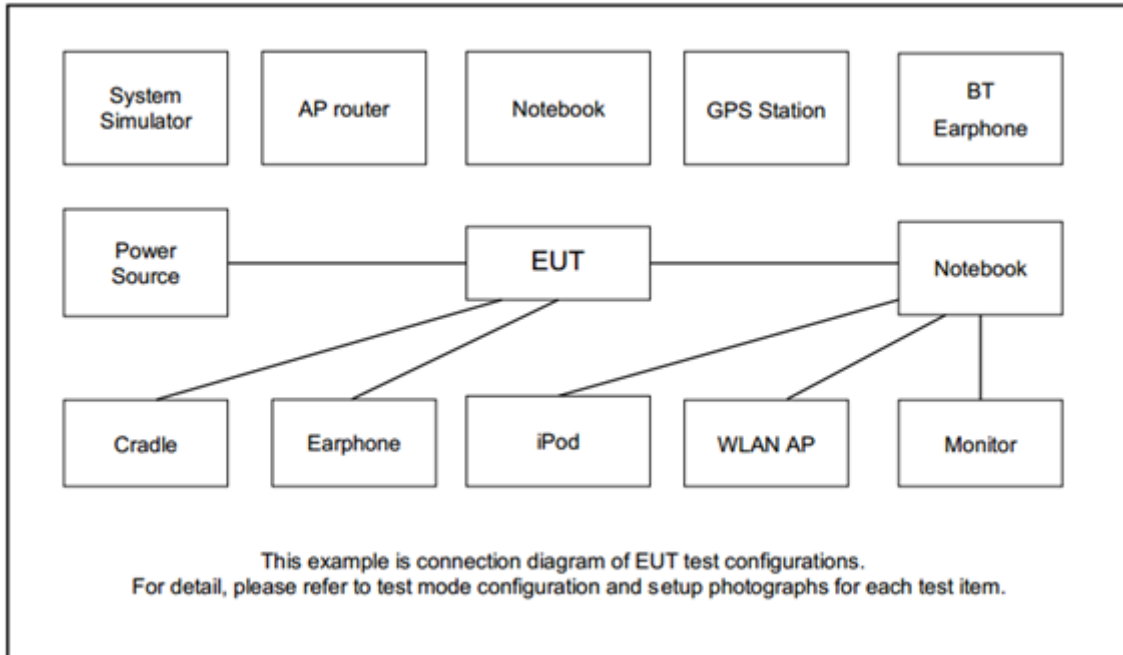
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

Test Items	Function Type
<b>AC Conducted Emission</b>	Mode 1: GSM850 (Middle Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Camera (Front) + Earphone + USB Type C Cable 2 (Charging form Adapter 1) + Battery at 50% for Sample 1
	Mode 3: WCDMA Band II Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + Camera (Rear) + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery >90% for Sample 1
	Mode 4: WCDMA Band V Idle + Bluetooth Idle + WLAN (5GHz) Idle + MPEG4 + Earphone + USB Type C Cable 2 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 5: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery at 50% for Sample 1
	Mode 6: LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Fingerprint + Earphone + USB Type C Cable 1 (Data Link with Notebook) + Battery >90% for Sample 1
	Mode 7: LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Fingerprint + Earphone + USB Type C Cable 2 (Data Link with Notebook) + Battery <10% for Sample 1
	Mode 8: GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz Idle) + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 2) + Battery<10% for Sample 1
	Mode 9: GSM850 (Low Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 10 : GSM850 (High Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 11 : GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 2

Test Items	Function Type
<b>Radiated Emissions</b>	Mode 1 : GSM850 (Middle Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 2 : GSM1900 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Camera (Front) + Earphone + USB Type C Cable 2 (Charging form Adapter 1) + Battery at 50% for Sample 1
	Mode 3 : WCDMA Band II Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + Camera (Rear) + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery >90% for Sample 1
	Mode 4 : WCDMA Band V Idle + Bluetooth Idle + WLAN (5GHz) Idle + MPEG4 + Earphone + USB Type C Cable 2 (Charging form Adapter 1) + Battery <10% for Sample 1
	Mode 5 : LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + Earphone + OTG Cable (Data Link with USB Flash Drive) + Battery at 50% for Sample 1
	Mode 6 : LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Fingerprint + Earphone + USB Type C Cable 1 (Data Link with Notebook) + Battery >90% for Sample 1
	Mode 7 : LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Fingerprint + Earphone + USB Type C Cable 2 (Data Link with Notebook) + Battery <10% for Sample 1
	Mode 8 : GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 2) + Battery <10% for Sample 1
	Mode 9 : GSM850 (Low Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + Earphone + OTG Cable (Data Link with USB Flash Drive) + Battery at 50% for Sample 1
	Mode 10 : GSM850 (High Channel) Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + Earphone + OTG Cable (Data Link with USB Flash Drive) + Battery at 50% for Sample 1
	Mode 11 : GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 2
<b>Remark:</b> <b>1.</b> The worst case of AC is mode 11; only the test data of this mode was reported. <b>2.</b> The worst case of RE is mode 5; only the test data of this mode was reported. <b>3.</b> Data Linking with Notebook/USB Flash Drive means data application transferred mode between EUT and Notebook/USB Flash Drive	

## 2.2. Connection Diagram of Test System



## 2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	Anritsu	8820C	N/A	N/A	Unshielded, 1.8 m
3.	Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
4.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
5.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
6.	Bluetooth Earphone	Sony Ericsson	SBH20	PY7-RD0010	N/A	N/A
7.	WLAN AP	ASUS	AC66U	NA	N/A	Unshielded, 1.8 m
8.	Notebook	DELL	Latitude E5480	FCC DoC	N/A	AC I/P : Unshielded, 1.2 m DC O/P : Shielded, 1.8 m
9.	iPod	Apple	A1199	FCC DoC	Shielded, 1.2 m	N/A
10.	USB Flash Drive	SanDisk	N/A	N/A	N/A	N/A



## **2.4. EUT Operation Test Setup**

The EUT was in GSM or WCDMA idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between Laptop/USB Flash Drive and EUT via OTG cable.
2. Execute "GPS Test" to make the EUT receive continuous signals from GPS station.
3. Execute "Video player" to play MPEG4 files.
4. Turn on camera to capture images.
5. Turn on the Fingerprint function.
6. Turn on the NFC function.

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1 Limits of AC Conducted Emission

For equipment 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.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

##### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.1.4 Test Setup



### 3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

### 3.2.2. Measuring Instruments

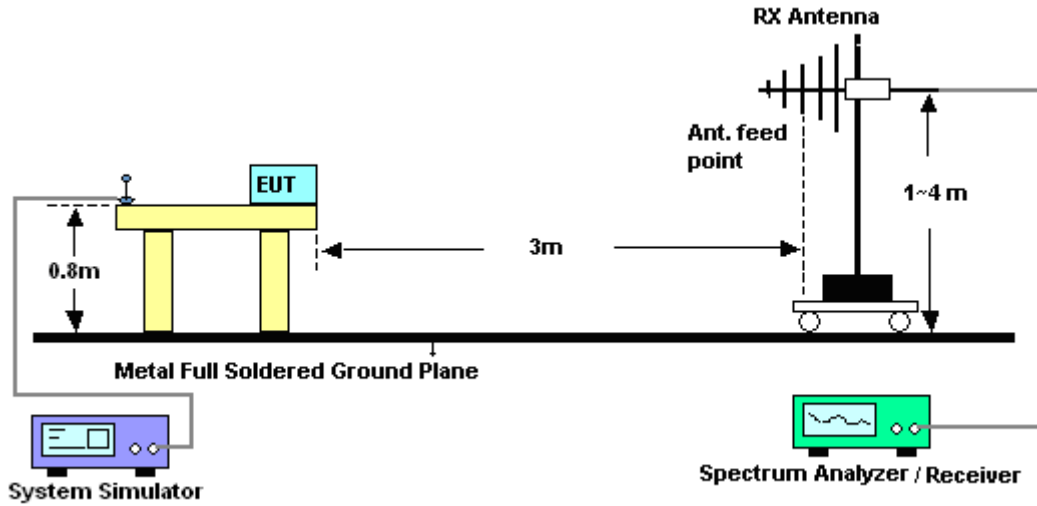
Refer a test equipment and calibration data table in this test report.

### 3.2.3. Test Procedures

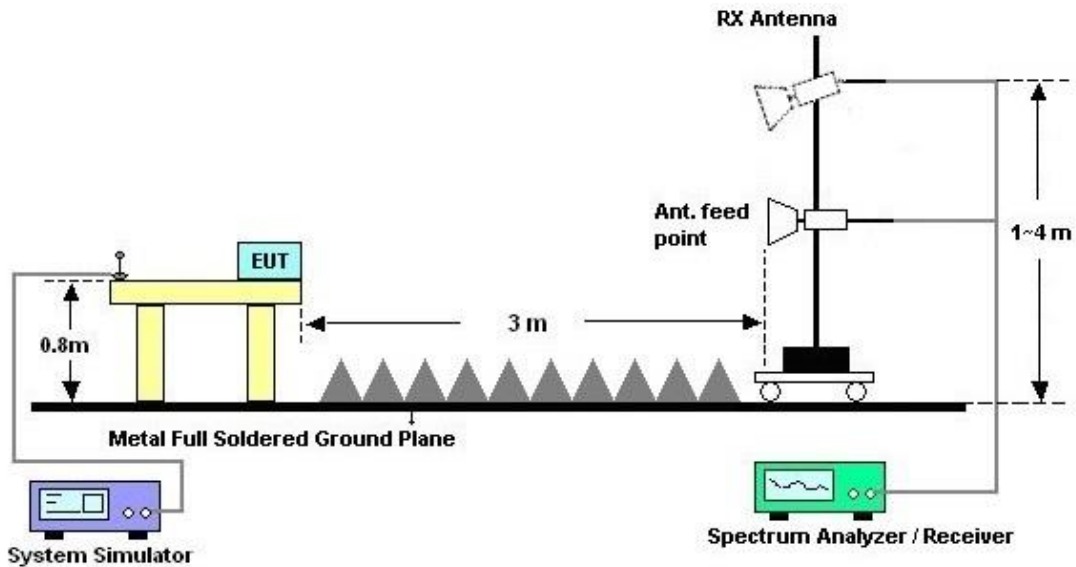
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. 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 turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

### 3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



## 4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	187231	9kHz~1GHz	Jan. 08, 2018	Nov. 21, 2018~ Dec. 15, 2018	Jan. 07, 2019	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Dec. 18, 2017	Nov. 21, 2018~ Dec. 15, 2018	Dec. 17, 2018	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-132 5	1GHz ~ 18GHz	Oct. 02, 2018	Nov. 21, 2018~ Dec. 15, 2018	Oct. 01, 2019	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800- 30-10P	160118550 004	1GHz~18GHz	Apr. 17, 2018	Nov. 21, 2018~ Dec. 15, 2018	Apr. 16, 2019	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 85	10Hz ~ 44GHz	Nov. 02, 2018	Nov. 21, 2018~ Dec. 15, 2018	Nov. 01, 2019	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Nov. 21, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	Nov. 21, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Nov. 21, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-00104 2	N/A	N/A	Nov. 21, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY532900 53	20Hz to 26.5GHz	Jan. 16, 2018	Nov. 21, 2018~ Dec. 15, 2018	Jan. 15, 2019	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/ 4PE, MY11693/ 4PE, MY2855/2	30M-1G	Nov. 08, 2018	Nov. 21, 2018~ Dec. 15, 2018	Nov. 07, 2019	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104 / 102	MY11692/ 4PE, MY11693/ 4PE, MY2855/2	1G-18G	Nov. 08, 2018	Nov. 21, 2018~ Dec. 15, 2018	Nov. 07, 2019	Radiation (03CH10-HY)
Notch Filter	Wainwright	WRCGV2400/ 2483-2390/24 93-35/10SS	SN4	2.4G	Nov. 02, 2018	Nov. 21, 2018~ Dec. 15, 2018	Nov. 01, 2019	Radiation (03CH10-HY)
Notch Filter	Wainwright	WRCT5-901.6 -902.3-902.5-9 03.2-30SS	SN1	N/A	May 22, 2018	Nov. 21, 2018~ Dec. 15, 2018	May 21, 2019	Radiation (03CH10-HY)
Notch Filter	Wainwright	WRCT10-1920 -1980-20-40-4 0SSK	SN1	1920-1980	May 22, 2018	Nov. 21, 2018~ Dec. 15, 2018	May 21, 2019	Radiation (03CH10-HY)
Notch Filter	Wainwright	WRCJV12-512 0-5150-5350-5 380-40SS	SN7	5G	Jul. 05, 2018	Nov. 21, 2018~ Dec. 15, 2018	Jul. 04, 2019	Radiation (03CH10-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 21, 2018~ Dec. 20, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Nov. 12, 2018	Nov. 21, 2018~ Dec. 20, 2018	Nov. 11, 2019	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Nov. 21, 2018~ Dec. 20, 2018	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	Nov. 21, 2018~ Dec. 20, 2018	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	Nov. 21, 2018~ Dec. 20, 2018	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Nov. 21, 2018~ Dec. 20, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Nov. 21, 2018~ Dec. 20, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Nov. 21, 2018~ Dec. 20, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Amplifier	SONOMA	310N	187231	9kHz~1GHz	Jan. 08, 2018	Nov. 21, 2018~ Dec. 20, 2018	Jan. 07, 2019	Radiation (03CH10-HY)



## 5. Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.20
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.60
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.90
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## Appendix A. AC Conducted Emission Test Results

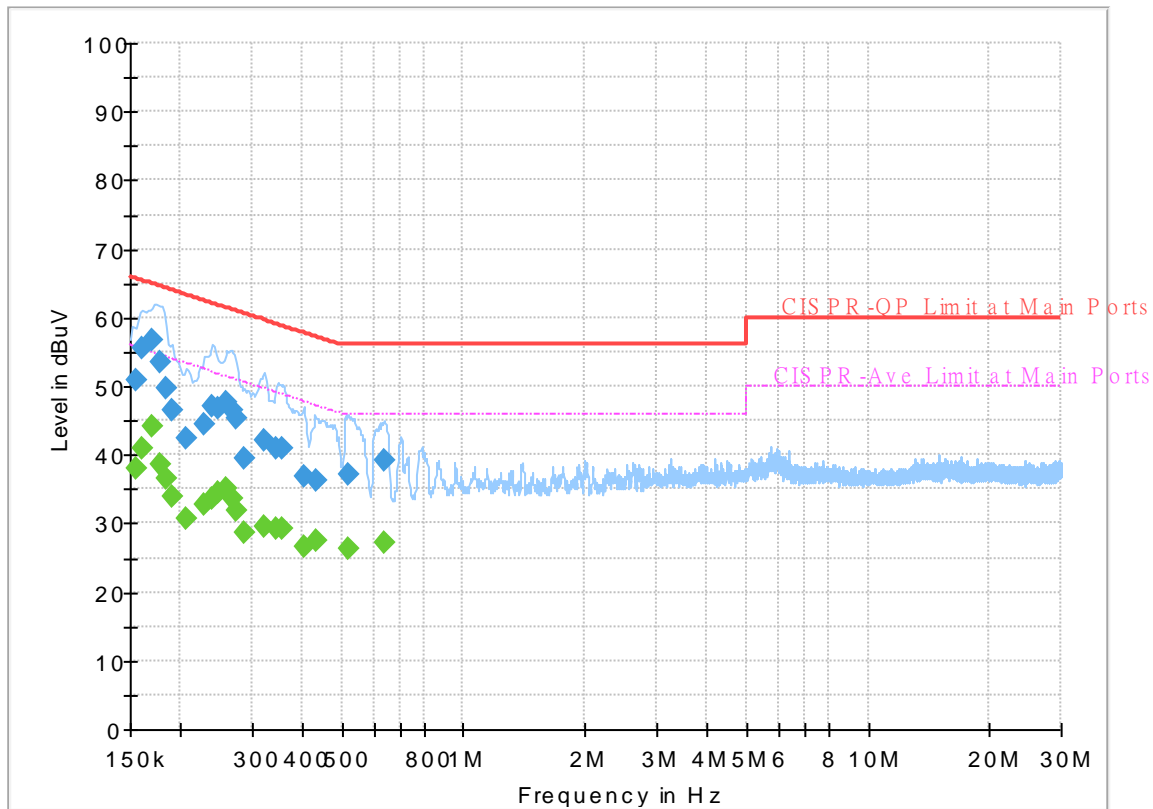
Test Engineer :	Rick Lin	Temperature :	23~25°C
		Relative Humidity :	55~58%

# EUT Information

Report NO : 891148-01

Test Voltage : 120Vac/60Hz  
Phase : Line

## Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	37.90	55.75	17.85	L1	OFF	19.5
0.154500	50.95	---	65.75	14.80	L1	OFF	19.5
0.161250	---	40.94	55.40	14.46	L1	OFF	19.5
0.161250	55.67	---	65.40	9.73	L1	OFF	19.5
0.170250	---	44.03	54.95	10.92	L1	OFF	19.5
0.170250	56.63	---	64.95	8.32	L1	OFF	19.5
0.177000	---	38.55	54.63	16.08	L1	OFF	19.5
0.177000	53.54	---	64.63	11.09	L1	OFF	19.5
0.183750	---	36.47	54.31	17.84	L1	OFF	19.5
0.183750	49.78	---	64.31	14.53	L1	OFF	19.5
0.190500	---	34.06	54.02	19.96	L1	OFF	19.5
0.190500	46.60	---	64.02	17.42	L1	OFF	19.5
0.206250	---	30.71	53.36	22.65	L1	OFF	19.5
0.206250	42.52	---	63.36	20.84	L1	OFF	19.5
0.228750	---	32.61	52.50	19.89	L1	OFF	19.5
0.228750	44.54	---	62.50	17.96	L1	OFF	19.5
0.240000	---	33.68	52.10	18.42	L1	OFF	19.5
0.240000	47.07	---	62.10	15.03	L1	OFF	19.5
0.249000	---	34.60	51.79	17.19	L1	OFF	19.5
0.249000	46.91	---	61.79	14.88	L1	OFF	19.5
0.258000	---	35.14	51.50	16.36	L1	OFF	19.5

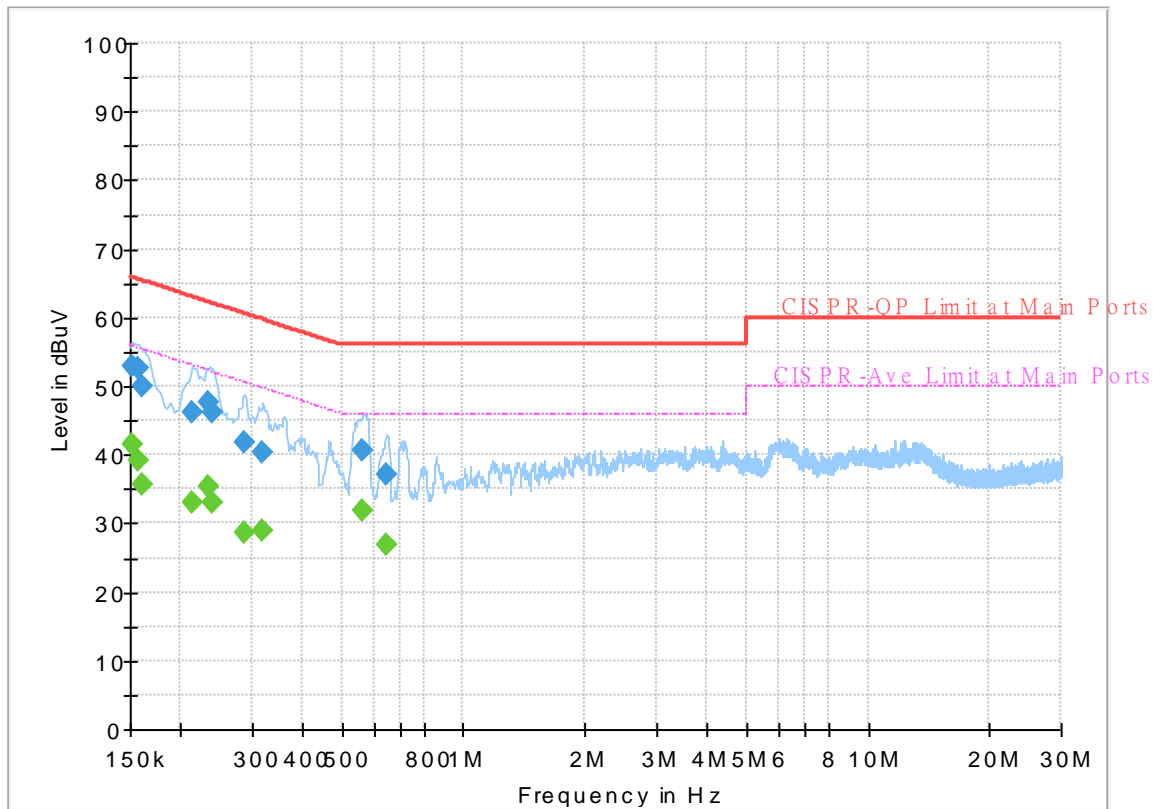
0.258000	47.59	---	61.50	13.91	L1	OFF	19.5
0.267000	---	33.66	51.21	17.55	L1	OFF	19.5
0.267000	46.61	---	61.21	14.60	L1	OFF	19.5
0.273750	---	32.01	51.00	18.99	L1	OFF	19.5
0.273750	45.40	---	61.00	15.60	L1	OFF	19.5
0.287250	---	28.63	50.60	21.97	L1	OFF	19.5
0.287250	39.54	---	60.60	21.06	L1	OFF	19.5
0.323250	---	29.45	49.62	20.17	L1	OFF	19.5
0.323250	42.03	---	59.62	17.59	L1	OFF	19.5
0.345750	---	29.16	49.06	19.90	L1	OFF	19.5
0.345750	40.79	---	59.06	18.27	L1	OFF	19.5
0.357000	---	29.18	48.80	19.62	L1	OFF	19.5
0.357000	40.97	---	58.80	17.83	L1	OFF	19.5
0.402000	---	26.64	47.81	21.17	L1	OFF	19.5
0.402000	36.88	---	57.81	20.93	L1	OFF	19.5
0.431250	---	27.43	47.23	19.80	L1	OFF	19.5
0.431250	36.19	---	57.23	21.04	L1	OFF	19.5
0.521250	---	26.18	46.00	19.82	L1	OFF	19.5
0.521250	37.21	---	56.00	18.79	L1	OFF	19.5
0.640500	---	27.15	46.00	18.85	L1	OFF	19.6
0.640500	39.04	---	56.00	16.96	L1	OFF	19.6

# EUT Information

Report NO : 891148-01

Test Voltage : 120Vac/60Hz  
Phase : Neutral

## Full Spectrum



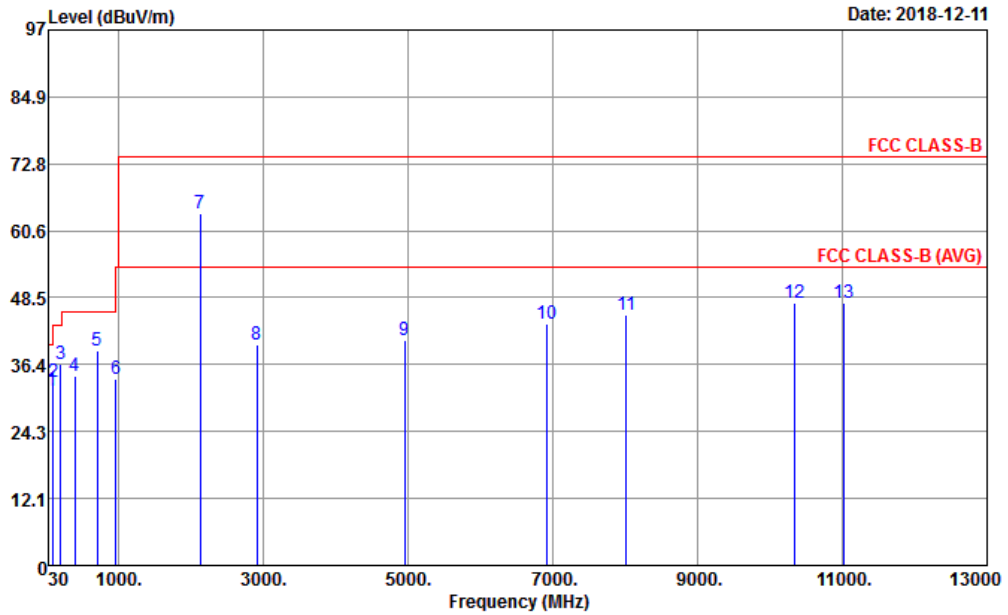
## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	41.46	55.88	14.42	N	OFF	19.5
0.152250	53.04	---	65.88	12.84	N	OFF	19.5
0.156750	---	39.15	55.63	16.48	N	OFF	19.5
0.156750	52.71	---	65.63	12.92	N	OFF	19.5
0.161250	---	35.64	55.40	19.76	N	OFF	19.5
0.161250	50.12	---	65.40	15.28	N	OFF	19.5
0.213000	---	32.96	53.09	20.13	N	OFF	19.5
0.213000	46.08	---	63.09	17.01	N	OFF	19.5
0.233250	---	35.31	52.33	17.02	N	OFF	19.5
0.233250	47.52	---	62.33	14.81	N	OFF	19.5
0.240000	---	33.14	52.10	18.96	N	OFF	19.5
0.240000	46.21	---	62.10	15.89	N	OFF	19.5
0.287250	---	28.70	50.60	21.90	N	OFF	19.5
0.287250	41.89	---	60.60	18.71	N	OFF	19.5
0.318750	---	28.86	49.74	20.88	N	OFF	19.5
0.318750	40.41	---	59.74	19.33	N	OFF	19.5
0.561750	---	31.85	46.00	14.15	N	OFF	19.5
0.561750	40.60	---	56.00	15.40	N	OFF	19.5
0.645000	---	27.02	46.00	18.98	N	OFF	19.6
0.645000	37.03	---	56.00	18.97	N	OFF	19.6



## Appendix B. Radiated Emission Test Result

Test Mode	Mode 5	Temperature :	22~24°C
Test Engineer :	Yu Wang and Lewis He	Relative Humidity :	50~53%
Test Distance :	3m	Polarization :	Horizontal
Remark :	#7 is system simulator signal which can be ignored.		



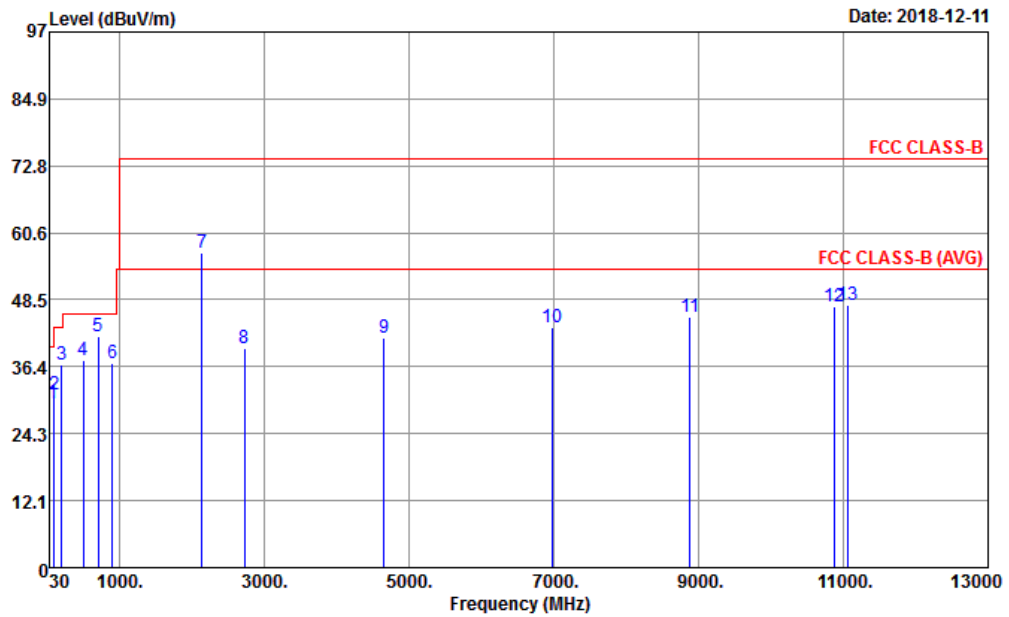
Site : 03CH10-HY  
 Condition : FCC CLASS-B 3m HORN 9120D-HF HORIZONTAL  
 Project : 891148-01

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	89.67	31.55	-11.95	43.50	48.46	14.76	1.02	32.69	---	Peak
2	100.20	33.26	-10.24	43.50	48.72	16.08	1.13	32.67	---	Peak
3	200.64	36.35	-7.15	43.50	52.44	15.02	1.48	32.59	---	Peak
4	400.80	34.30	-11.70	46.00	42.75	21.90	2.27	32.62	---	Peak
5	701.10	38.90	-7.10	46.00	41.85	26.59	3.03	32.57	100	0 Peak
6	959.40	33.75	-12.25	46.00	30.33	31.13	3.53	31.24	---	Peak
7	2124.00	63.78			92.10	27.09	6.31	61.72	---	Peak
8	2908.00	39.86	-34.14	74.00	65.96	28.22	7.56	61.88	---	Peak
9	4958.00	40.87	-33.13	74.00	63.10	31.13	8.94	62.30	---	Peak
10	6912.00	43.90	-30.10	74.00	61.91	35.05	10.43	63.49	---	Peak
11	8020.00	45.32	-28.68	74.00	60.70	37.00	11.24	63.62	---	Peak
12	10336.00	47.57	-26.43	74.00	60.04	39.34	12.72	64.53	100	0 Peak
13	11016.00	47.44	-26.56	74.00	57.99	40.02	13.23	63.80	---	Peak





Test Mode	Mode 5	Temperature :	22~24°C
Test Engineer :	Yu Wang and Lewis He	Relative Humidity :	50~53%
Test Distance :	3m	Polarization :	Vertical
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH10-HY  
 Condition : FCC CLASS-B 3m HORN 9120D-HF VERTICAL  
 Project : 891148-01

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	89.67	29.65	-13.85	43.50	46.56	14.76	1.02	32.69	---	---	Peak
2	100.20	31.41	-12.09	43.50	46.87	16.08	1.13	32.67	---	---	Peak
3	200.37	36.67	-6.83	43.50	52.76	15.02	1.48	32.59	---	---	Peak
4	500.20	37.50	-8.50	46.00	43.70	23.92	2.52	32.64	---	---	Peak
5	700.40	41.90	-4.10	46.00	44.86	26.58	3.03	32.57	100	189	QP
6	900.60	37.14	-8.86	46.00	36.48	29.04	3.43	31.81	---	---	Peak
7	2134.00	57.03	-----	-----	85.22	27.21	6.33	61.73	---	---	Peak
8	2722.00	39.73	-34.27	74.00	66.61	27.69	7.27	61.84	---	---	Peak
9	4650.00	41.48	-32.52	74.00	64.05	31.10	8.63	62.30	---	---	Peak
10	6978.00	43.43	-30.57	74.00	61.30	35.31	10.39	63.57	---	---	Peak
11	8884.00	45.26	-28.74	74.00	60.44	37.56	11.82	64.56	---	---	Peak
12	10874.00	47.42	-26.58	74.00	58.28	39.97	13.12	63.95	---	---	Peak
13	11066.00	47.68	-26.32	74.00	58.45	39.77	13.27	63.81	100	0	Peak