



FCC EMI TEST REPORT

FCC ID : A4RG020D
Equipment : Smartphone
Model Name : G020D
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. 15 , 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
FC891147-01	01	Initial issue of report	Jan. 02, 2019
FC891147-01	02	Revising the frequency.	Jan. 16, 2019
FC891147-01	03	Add the test description.	Jan. 28, 2019
FC891147-01	04	Add the test remark description.	Jan. 30, 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 6.29 dB at 0.175 MHz
3.2	15.109	Radiated Emission	Pass	Under limit 4.24 dB at 479.900 MHz for Quasi-Peak

Reviewed by: Louis Wu

Report Producer: Natasha Hsieh



1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Model Name	G020D
Sample 1	The device with 1st battery
Sample 2	The device with 2nd battery
FCC ID	A4RG020D
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	
Tx Frequency	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
Rx Frequency	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	
Antenna Type	WWAN: 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
Antenna Type	WLAN: <2400 MHz ~ 2483.5 MHz> <Ant. 1> : PIFA Antenna type <Ant. 2> : PIFA Antenna type <5150 MHz ~ 5250 MHz> <Ant. 1> : PIFA Antenna type <Ant. 2> : PIFA Antenna type <5250 MHz ~ 5350 MHz> <Ant. 1> : PIFA Antenna type <Ant. 2> : PIFA Antenna type <5470 MHz ~ 5725 MHz> <Ant. 1> : PIFA Antenna type <Ant. 2> : PIFA Antenna type <5725 MHz ~ 5850 MHz> <Ant. 1> : PIFA Antenna type <Ant. 2> : PIFA Antenna type Bluetooth: PIFA Antenna GPS/Glonass/Galileo/BDS: PIFA Antenna NFC: Loop Antenna
Type of Modulation	GSM / GPRS: GMSK EGPRS : GMSK for MCS 0 ~ 4 & 8PSK for MCS5 ~9 WCDMA: QPSK (Uplink) HSDPA: QPSK (Downlink) HSUPA: QPSK (Uplink) LTE: QPSK / 16QAM Bluetooth: GFSK, $\pi/4$ -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

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.

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	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
Test Site No.	Sporton Site No. 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

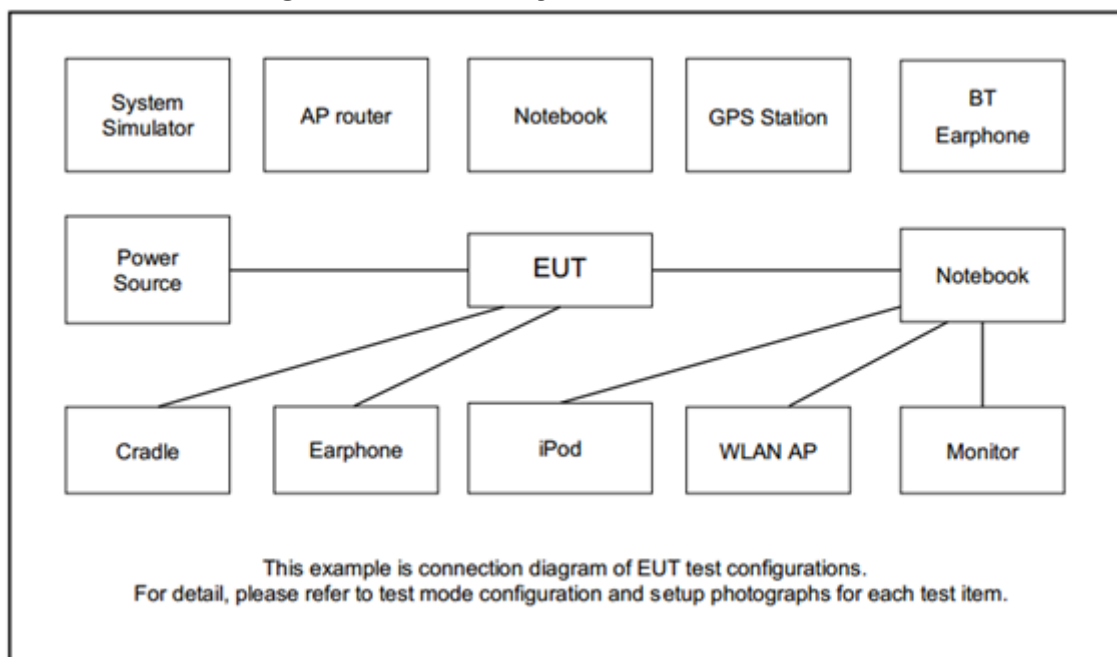
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

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
AC Conducted Emission	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 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 1) + Battery <10% for Sample 2
	Mode 10 : 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 11 : 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

Test Items	Function Type
Radiated Emissions	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 : WCDMA Band II Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + USB Type C Cable 1 (Charging form Adapter 2) + Battery >90% for Sample 1
	Mode 9 : LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + Earphone + OTG Cable (Data Link with USB Flash Drive) + Battery >90% for Sample 2
	Mode 10 : 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 11 : 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
Remark: 1. The worst case of AC is mode 10; only the test data of this mode was reported. 2. The worst case of RE is mode 9; only the test data of this mode was reported. 3. Data Linking with Notebook/USB Flash Drive means data application transferred mode between EUT and Notebook/USB Flash Drive 4. After pre-scanned the all the cellular band between 30MHz ~ 960MHz (GSM850/WCDMA Band V/LTE Band 5/12/13/17/26), the worst case is GSM850; only the test data of this mode was reported	

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.

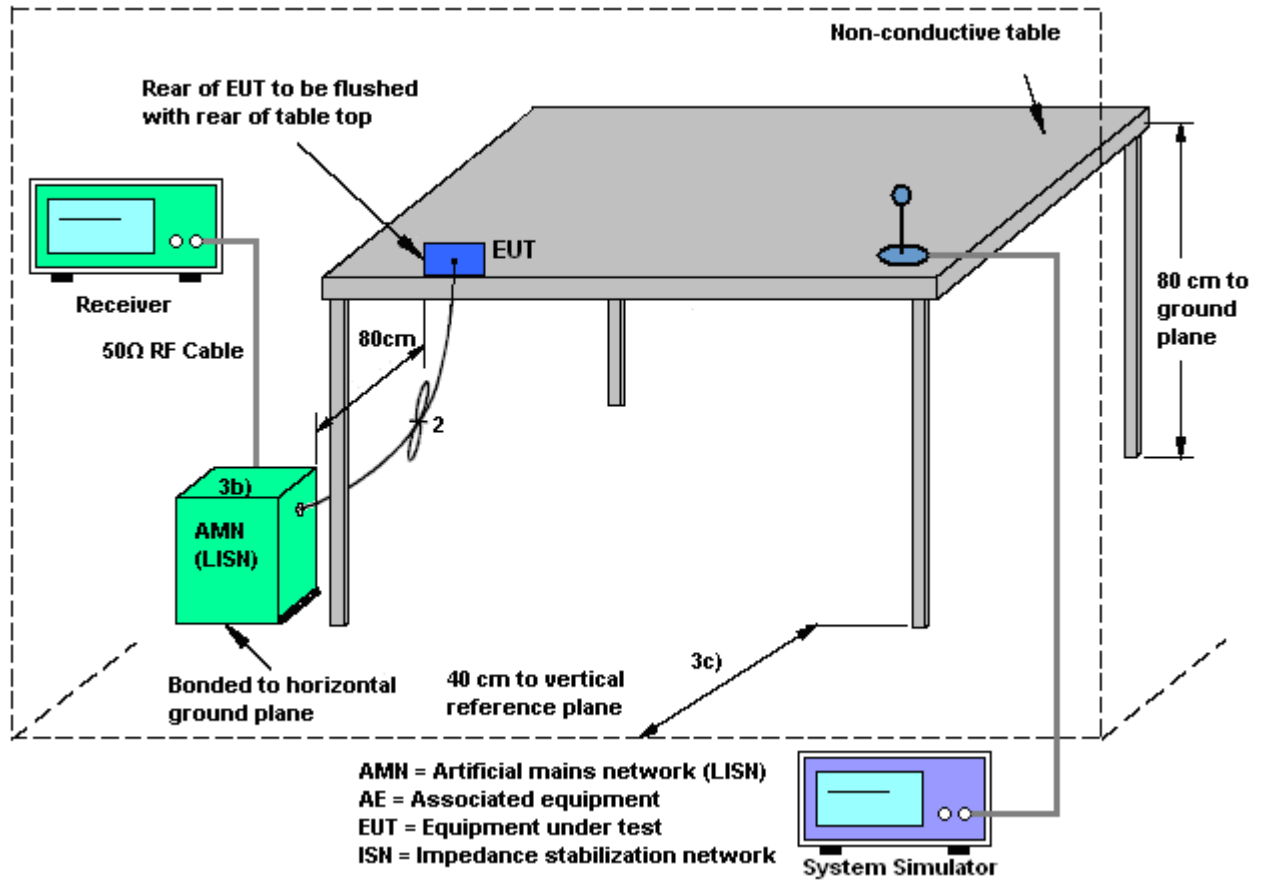
3.1.2 Measuring Instruments

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

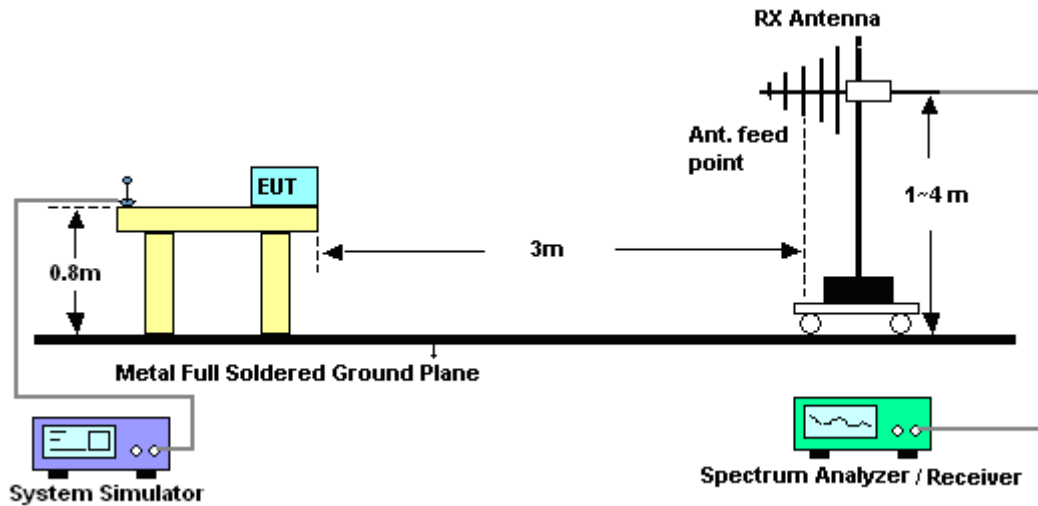
Refer a test equipment and calibration data table in this test report.

3.2.3. Test Procedures

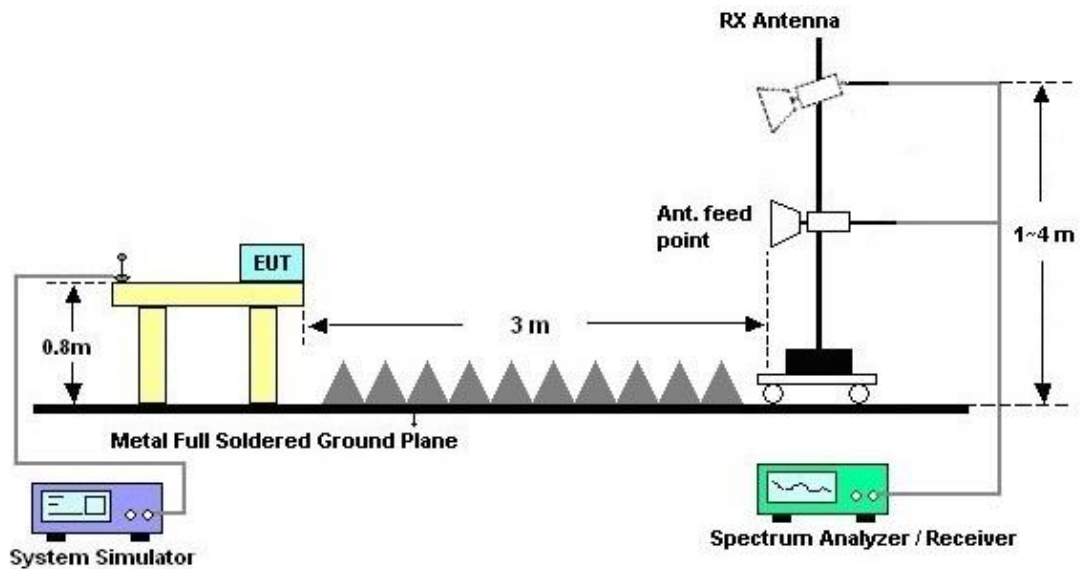
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBμV/m) = 20 log Emission level (μV/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. 18, 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. 18, 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. 18, 2018~ Dec. 15, 2018	Oct. 01, 2019	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800- 30-10P	160118550 004	1GHz~18GHz	Apr. 17, 2018	Nov. 18, 2018~ Dec. 15, 2018	Apr. 16, 2019	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY542004 85	10Hz ~ 44GHz	Nov. 02, 2018	Nov. 18, 2018~ Dec. 15, 2018	Nov. 01, 2019	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Nov. 18, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1~4m	N/A	Nov. 18, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Nov. 18, 2018~ Dec. 15, 2018	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-00104 2	N/A	N/A	Nov. 18, 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. 18, 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. 18, 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. 18, 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. 18, 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. 18, 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. 18, 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. 18, 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. 17, 2018~ Dec. 14, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Nov. 12, 2018	Nov. 17, 2018~ Dec. 14, 2018	Nov. 11, 2019	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Nov. 17, 2018~ Dec. 14, 2018	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	Nov. 17, 2018~ Dec. 14, 2018	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	Nov. 17, 2018~ Dec. 14, 2018	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Nov. 17, 2018~ Dec. 14, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Nov. 17, 2018~ Dec. 14, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Nov. 17, 2018~ Dec. 14, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Amplifier	SONOMA	310N	187231	9kHz~1GHz	Jan. 08, 2018	Nov. 18, 2018~ Dec. 15, 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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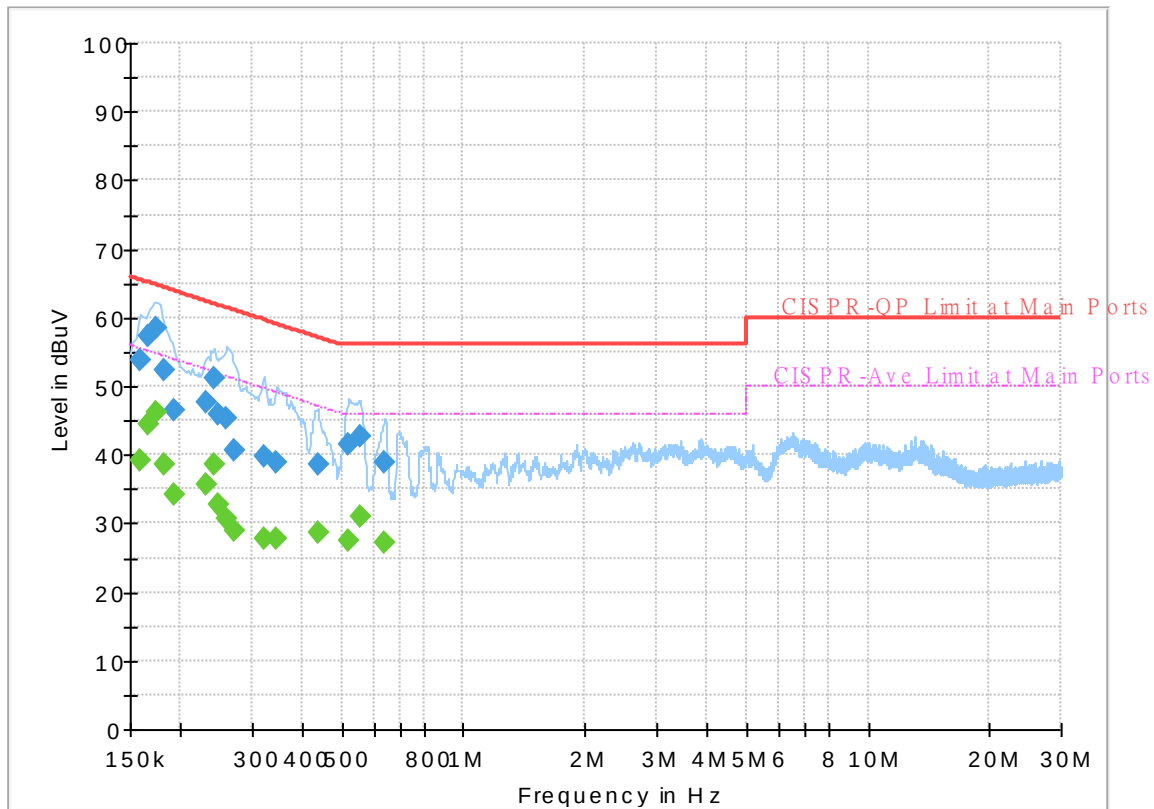
Appendix A. AC Conducted Emission Test Results

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

EUT Information

Report NO : 891147-01
Test Mode : Mode 10
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



Final Result

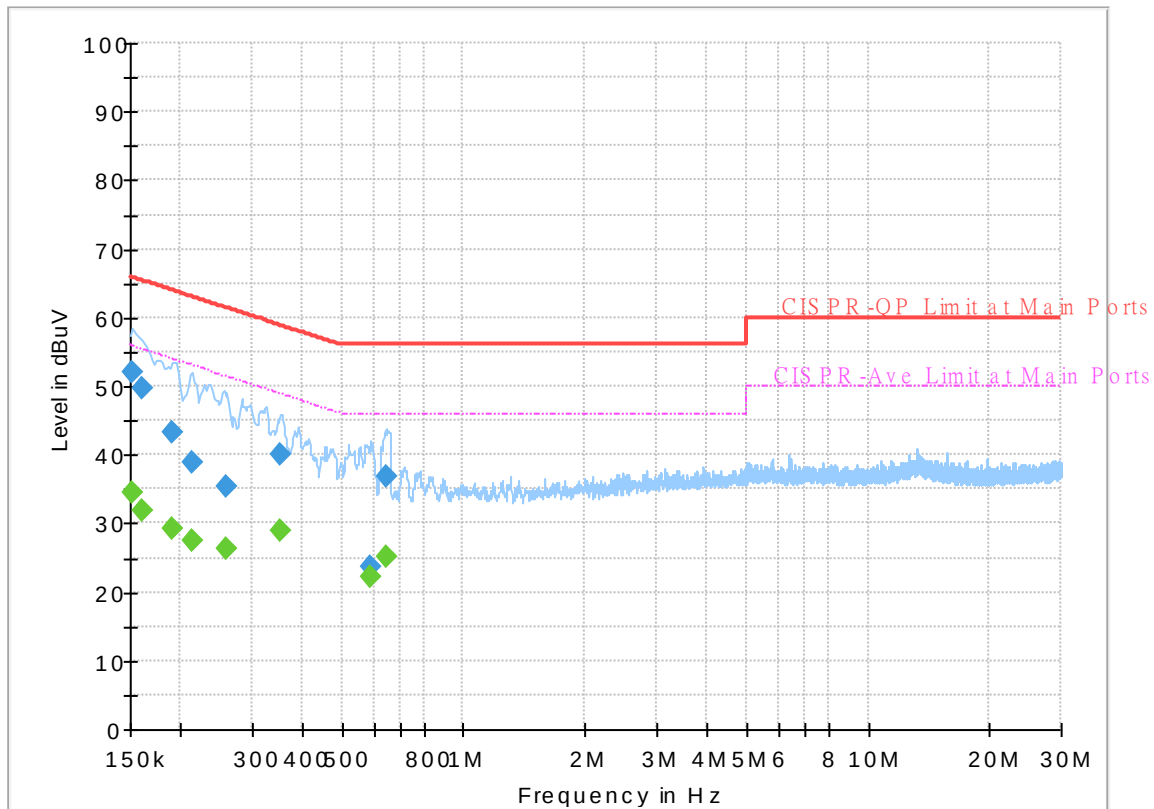
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	39.32	55.52	16.20	L1	OFF	19.5
0.159000	53.83	---	65.52	11.69	L1	OFF	19.5
0.165750	---	44.56	55.17	10.61	L1	OFF	19.5
0.165750	57.41	---	65.17	7.76	L1	OFF	19.5
0.174750	---	46.25	54.73	8.48	L1	OFF	19.5
0.174750	58.44	---	64.73	6.29	L1	OFF	19.5
0.181500	---	38.63	54.42	15.79	L1	OFF	19.5
0.181500	52.37	---	64.42	12.05	L1	OFF	19.5
0.192750	---	34.08	53.92	19.84	L1	OFF	19.5
0.192750	46.42	---	63.92	17.50	L1	OFF	19.5
0.231000	---	35.70	52.41	16.71	L1	OFF	19.5
0.231000	47.68	---	62.41	14.73	L1	OFF	19.5
0.242250	---	38.62	52.02	13.40	L1	OFF	19.5
0.242250	51.07	---	62.02	10.95	L1	OFF	19.5
0.249000	---	32.71	51.79	19.08	L1	OFF	19.5
0.249000	45.95	---	61.79	15.84	L1	OFF	19.5
0.260250	---	30.83	51.42	20.59	L1	OFF	19.5
0.260250	45.32	---	61.42	16.10	L1	OFF	19.5
0.271500	---	28.91	51.07	22.16	L1	OFF	19.5
0.271500	40.51	---	61.07	20.56	L1	OFF	19.5
0.321000	---	27.69	49.68	21.99	L1	OFF	19.5

0.321000	39.78	---	59.68	19.90	L1	OFF	19.5
0.345750	---	27.90	49.06	21.16	L1	OFF	19.5
0.345750	38.92	---	59.06	20.14	L1	OFF	19.5
0.435750	---	28.64	47.14	18.50	L1	OFF	19.5
0.435750	38.51	---	57.14	18.63	L1	OFF	19.5
0.521250	---	27.58	46.00	18.42	L1	OFF	19.5
0.521250	41.39	---	56.00	14.61	L1	OFF	19.5
0.555000	---	30.87	46.00	15.13	L1	OFF	19.5
0.555000	42.61	---	56.00	13.39	L1	OFF	19.5
0.638250	---	27.26	46.00	18.74	L1	OFF	19.6
0.638250	38.88	---	56.00	17.12	L1	OFF	19.6

EUT Information

Report NO : 891147-01
Test Mode : Mode 10
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



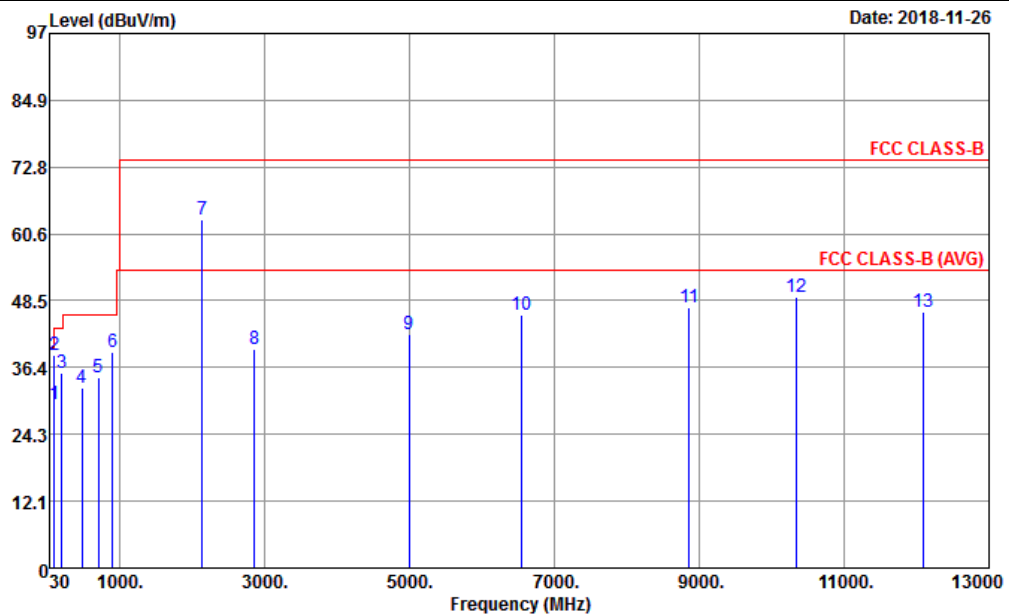
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	34.40	55.88	21.48	N	OFF	19.5
0.152250	51.95	---	65.88	13.93	N	OFF	19.5
0.161250	---	31.73	55.40	23.67	N	OFF	19.5
0.161250	49.58	---	65.40	15.82	N	OFF	19.5
0.190500	---	29.32	54.02	24.70	N	OFF	19.5
0.190500	43.39	---	64.02	20.63	N	OFF	19.5
0.213000	---	27.54	53.09	25.55	N	OFF	19.5
0.213000	38.75	---	63.09	24.34	N	OFF	19.5
0.260250	---	26.30	51.42	25.12	N	OFF	19.5
0.260250	35.50	---	61.42	25.92	N	OFF	19.5
0.352500	---	28.87	48.90	20.03	N	OFF	19.5
0.352500	39.96	---	58.90	18.94	N	OFF	19.5
0.591000	---	22.36	46.00	23.64	N	OFF	19.5
0.591000	23.72	---	56.00	32.28	N	OFF	19.5
0.642750	---	25.08	46.00	20.92	N	OFF	19.6
0.642750	36.91	---	56.00	19.09	N	OFF	19.6



Appendix B. Radiated Emission Test Result

Test Mode	Mode 9	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.		

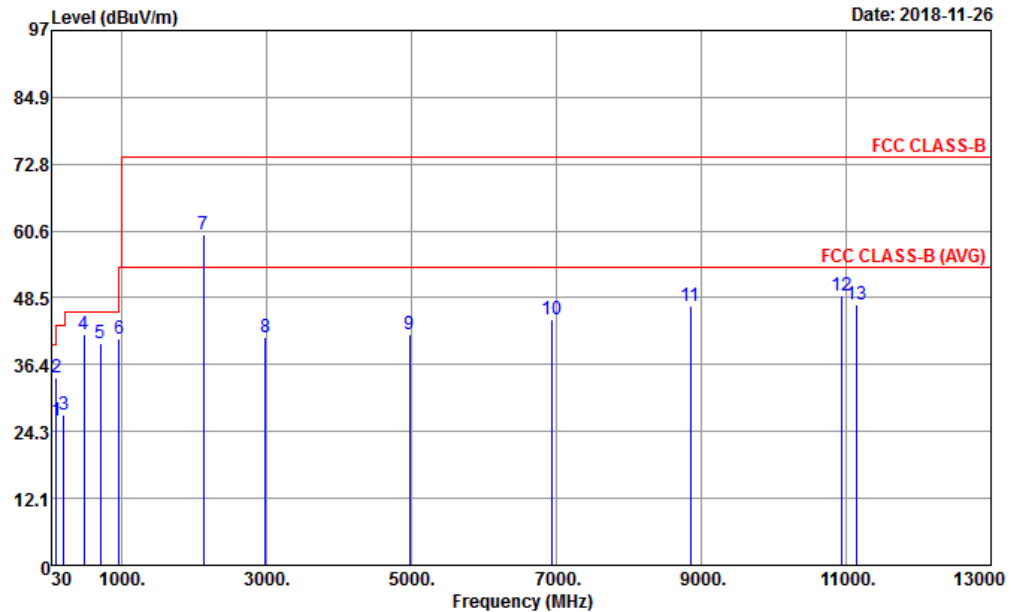


Site : 03CH10-HY
 Condition : FCC CLASS-B 3m HORN 9120D-HF HORIZONTAL
 Project : 891147-01
 Power : Real Battery
 Mode : 9
 : USB Dongle to EMMC

	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	92.64	29.79	-13.71	43.50	46.23	15.18	1.06	32.68	---	--- Peak
2	100.20	38.73	-4.77	43.50	54.19	16.08	1.13	32.67	100	0 Peak
3	200.37	35.53	-7.97	43.50	51.62	15.02	1.48	32.59	---	--- Peak
4	479.90	32.64	-13.36	46.00	39.17	23.63	2.48	32.64	---	--- Peak
5	701.80	34.67	-11.33	46.00	37.59	26.61	3.04	32.57	---	--- Peak
6	901.30	39.09	-6.91	46.00	38.42	29.05	3.43	31.81	---	--- Peak
7	2134.00	63.27			91.46	27.21	6.33	61.73	---	--- Peak
8	2864.00	39.80	-34.20	74.00	66.07	28.13	7.47	61.87	---	--- Peak
9	4994.00	42.32	-31.68	74.00	64.30	31.28	9.04	62.30	---	--- Peak
10	6556.00	45.84	-28.16	74.00	64.41	34.31	10.19	63.07	---	--- Peak
11	8864.00	47.33	-26.67	74.00	62.42	37.64	11.81	64.54	---	--- Peak
12	10332.00	49.11	-24.89	74.00	61.60	39.33	12.71	64.53	100	0 Peak
13	12088.00	46.43	-27.57	74.00	57.79	38.88	14.01	64.25	---	--- Peak



Test Mode	Mode 9	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 : 891147-01
 Power : Real Battery
 Mode : 9
 : USB Dongle to EMMC

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	93.45	26.29	-17.21	43.50	42.61	15.29	1.07	32.68	---	---	Peak
2	100.20	34.04	-9.46	43.50	49.50	16.08	1.13	32.67	---	---	Peak
3	200.10	27.35	-16.15	43.50	43.44	15.02	1.48	32.59	---	---	Peak
4	479.90	41.76	-4.24	46.00	48.29	23.63	2.48	32.64	116	63	QP
5	700.40	40.27	-5.73	46.00	43.23	26.58	3.03	32.57	105	46	QP
6	960.10	41.01	-12.99	54.00	37.56	31.15	3.53	31.23	---	---	Peak
7	2132.00	59.92			88.15	27.18	6.32	61.73	---	---	Peak
8	2984.00	41.41	-32.59	74.00	67.21	28.37	7.73	61.90	---	---	Peak
9	4974.00	41.85	-32.15	74.00	63.96	31.20	8.99	62.30	---	---	Peak
10	6942.00	44.48	-29.52	74.00	62.43	35.17	10.41	63.53	---	---	Peak
11	8848.00	47.01	-26.99	74.00	62.03	37.70	11.80	64.52	---	---	Peak
12	10930.00	48.98	-25.02	74.00	59.66	40.03	13.17	63.88	100	0	Peak
13	11146.00	47.35	-26.65	74.00	58.34	39.51	13.33	63.83	---	---	Peak