

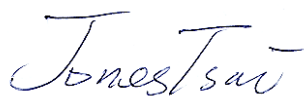
FCC EMI TEST REPORT

FCC ID : PY7-61352Q
Equipment : Observer
Brand Name : Sony Mobile
Applicant : Sony Mobile Communications Inc.
4-12-3 Higashi-shinagawa, Shinagawa-ku,
Tokyo, 140-0002, Japan
Manufacturer : Sony Mobile Communications Inc.
4-12-3 Higashi-shinagawa, Shinagawa-ku,
Tokyo, 140-0002, Japan
Standard : FCC 47 CFR FCC Part 15 Subpart B

The product was received on Jan. 08, 2018 and testing was started from Jan. 18, 2018 and completed on Jan. 19, 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
FC6D2013-01	01	Initial issue of report	Jun. 21, 2018
FC6D2013-01	02	1. Revising the connection diagram in 2.2 and 2.3. 2. Adding the measuring equipment in section 4.	Aug. 03, 2018



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 18.30 dB at 0.150 MHz
3.2	15.109	Radiated Emission	Pass	Under limit 14.04 dB at 958.700 MHz

Reviewed by: Louis Wu

Report Producer: Natasha Hsieh

1. General Description

1.1. Product Feature of Equipment Under Test

Bluetooth and DTS/UNII b/g/n

Product Specification subjective to this standard	
Antenna Type	WLAN: Chip Antenna Bluetooth: Chip Antenna

EUT Information List		
HW Version	SW Version	Performed Test Item
A	1.0	Conducted Emission Radiated Emission

Accessory List	
AC Adapter	Model No. : UH20
	S/N : 3515W34406073

Note:

1. Above EUT list used are electrically identical per declared by manufacturer.
2. Above the accessories list are used to exercise the EUT during test, and the serial number of each type of accessories is listed in each section of this report. .
3. For other wireless features of this EUT, test report will be issued separately.

1.2. Modification of EUT

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

1.3. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1093 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	03CH06-HY

1.4. 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:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. For FCC 15 Subpart B - Unintentional Radiators, receivers contained within a transceiver shall be authorized under the verification procedure per the Section 15.101 (b).
3. For other Unintentional Radiators features of this EUT, test reports are be issued separately.
Per the Note of the Section 15.101, when device supports features (USB, FM Radio, digital devices...etc) more than one category of authorization, type of authorization shall be appropriately chosen for FCC 15B compliance rule, and the Section 15.101 (b), only those receivers that operate (tune) within the frequency range of 30-960 MHz, CB receivers and radar detectors are subject to the authorizations shown in paragraph (a) of the Section 15.101. However, receivers indicated as being subject to Declaration of Conformity that are contained within a transceiver, the transmitter portion of which is subject to certification, shall be authorized under the verification procedure.
4. Receivers operating above 960 MHz or below 30 MHz, except for radar detectors and CB receivers, are exempt from complying with the technical provisions of this part but are subject to § 15.5.



2. Test Configuration of Equipment Under Test

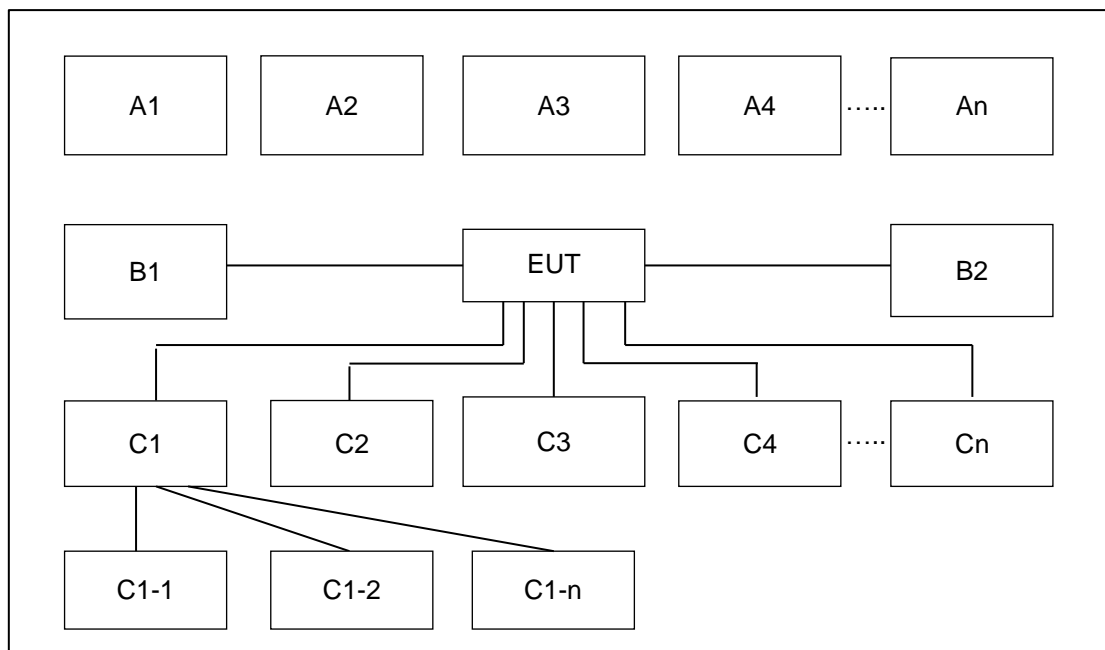
2.1. Test Mode

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).

Test Items	Function Type
AC Conducted Emission	Mode 1 : EUT Charging + WLAN Idle + Bluetooth On
Radiated Emissions	Mode 1 : EUT Charging + WLAN Idle + Bluetooth On

2.2. Connection Diagram of Test System



Test Setup									
No.	Wireless Station	Connection Type	Test Mode						
			1	-	-	-	-	-	-
A1	Tag	Bluetooth	X						
A2	AP router	WiFi	X						
A3	Notebook	WiFi	X						
No.	Power Source	Connection Type	1	-	-	-	-	-	-
B1	AC : 120V/60Hz	AC Power Cable	X						

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
2.	Bluetooth Tag	Sony	D52.1	PY7-32042C	N/A	N/A
3.	Notebook	Dell	Latitude E6320	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2.4. EUT Operation Test Setup

WLAN

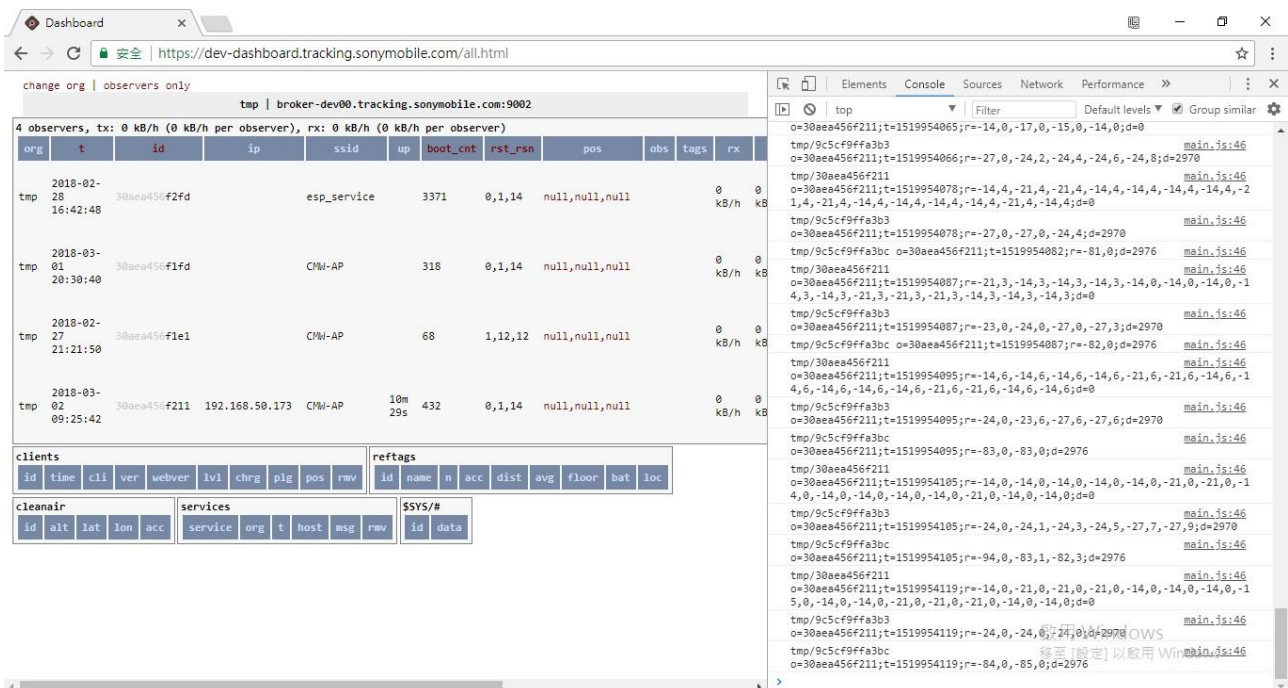
1. Enable WLAN function of the EUT.
2. The EUT links with supported units
3. Execute "PING IP" function under the "cmd" of Window system to transfer packet bi-directionally between the EUT and supported units.
4. Monitor the packet loss and WLAN radio performance.

Bluetooth

1. The BLE function of this device is Rx only,
2. We connect to the cloud server and check the BLE function and performance
3. Before the EMC testing, the receiver packet error rate is 0%
4. After the EMC testing, the receiver packet error rate is also 0%

Monitoring screen as below:

1. The base station transmits 1500(Decimal) packets to the device.
2. Using the command to check the packets received by the device.
3. Reading the feedback information overturned.
4. 05DC (Hexadecimal) is equal to 1500(Decimal).
5. The packet error rate is 0%



The screenshot displays a web interface for monitoring a tracking device. The main table lists four observers with their respective IDs, IP addresses, SSIDs, and other parameters. Below the table, there are sections for 'clients', 'cleanair', 'services', and a 'console' log. The console log shows detailed network traffic, including packet counts, error rates, and timestamps.

org	t	id	ip	ssid	up	boot_cnt	rst_rsn	pos	obs	tags	rx
tmp	2018-02-28 16:42:48	30aea456f2fd		esp_service	3371	0,1,14	null,null,null		0	0	0
tmp	2018-03-01 20:30:40	30aea456f1fd		CPW-AP	318	0,1,14	null,null,null		0	0	0
tmp	2018-02-27 21:21:50	30aea456f1e1		CPW-AP	68	1,12,12	null,null,null		0	0	0
tmp	2018-03-02 09:25:42	30aea456f211	192.168.50.173	CPW-AP	10m 29s	432	0,1,14	null,null,null	0	0	0

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.

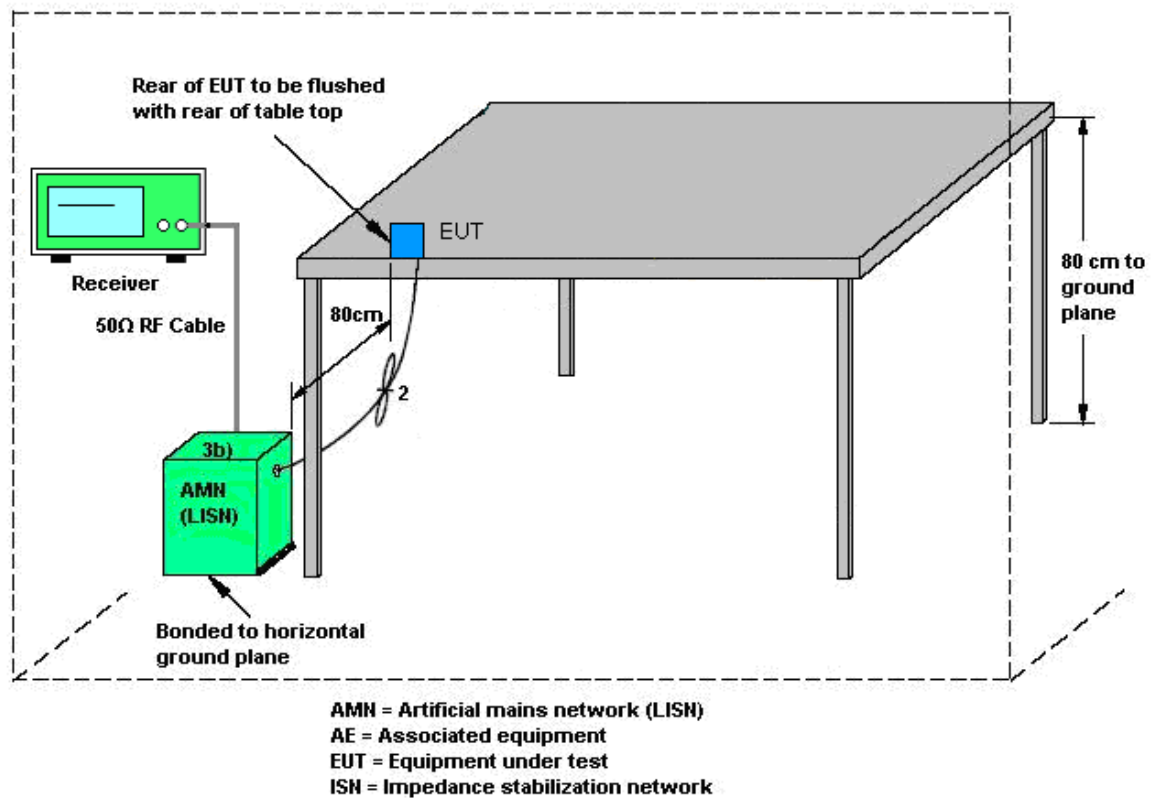
3.1.2 Measuring Instruments

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

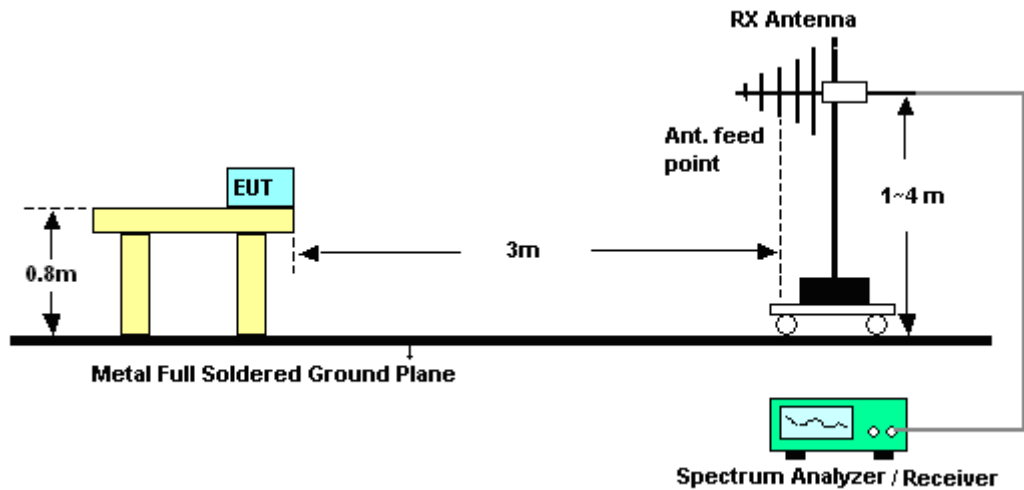
Refer a test equipment and calibration data table in this test report.

3.2.3. Test Procedures

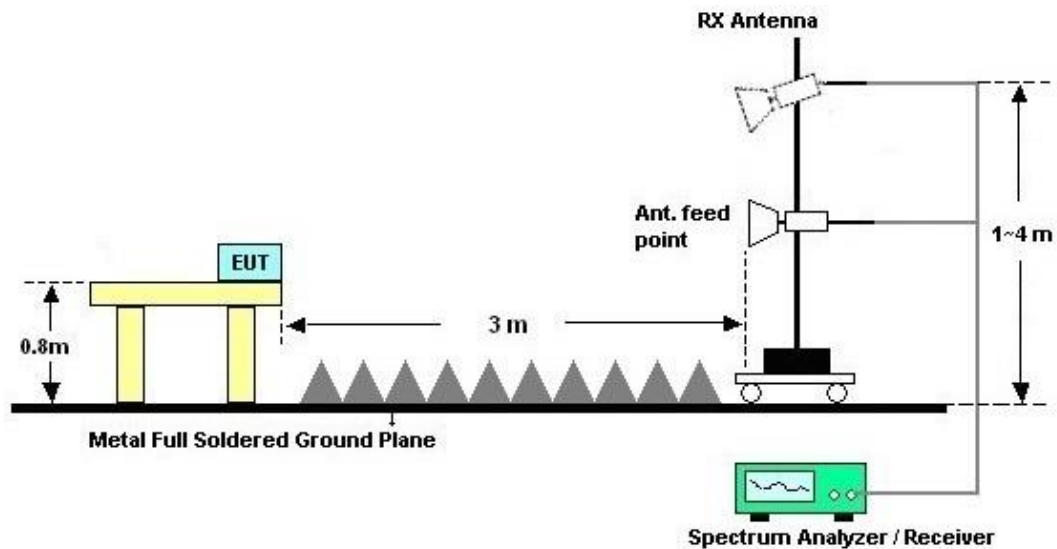
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its 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
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jan. 19, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 20, 2017	Jan. 19, 2018	Sep. 19, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jan. 19, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 05, 2018	Jan. 19, 2018	Jan. 04, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 05, 2018	Jan. 19, 2018	Jan. 04, 2019	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Oct. 14, 2017	Jan. 18, 2018	Oct. 13, 2018	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Jan. 04, 2018	Jan. 18, 2018	Jan. 03, 2019	Radiation (03CH06-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 15, 2017	Jan. 18, 2018	Mar. 14, 2018	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1156	1GHz~18GHz	Aug. 08, 2017	Jan. 18, 2018	Aug. 07, 2018	Radiation (03CH06-HY)
Preamplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 25, 2017	Jan. 18, 2018	Apr. 24, 2018	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A01917	1GHz~26.5GHz	Apr. 25, 2017	Jan. 18, 2018	Apr. 24, 2018	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 17, 2017	Jan. 18, 2018	Oct. 16, 2018	Radiation (03CH06-HY)
RF Cable	HUBER+SUHNER/UTIFLEX	SUCOFLEX 104 / UFA210A	MY24966/4 / LF-01	30MHz~1GHz	Nov. 24, 2017	Jan. 18, 2018	Nov. 23, 2018	Radiation (03CH06-HY)
RF Cable	Infinet/Sunhner	LL142/SF104	CA3601-3601-HLL	1GHz~26GHz	Nov. 24, 2017	Jan. 18, 2018	Nov. 23, 2018	Radiation (03CH06-HY)
Controller	INN-CO	EM1000	060782	Control Turn table & Ant Mast	N/A	Jan. 18, 2018	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Jan. 18, 2018	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Jan. 18, 2018	N/A	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~ 40GHz	Nov. 10, 2017	Jan. 18, 2018	Nov. 09, 2018	Radiation (03CH06-HY)
Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jan. 18, 2018	Jul. 17, 2018	Radiation (03CH06-HY)

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.70
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.90
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.70
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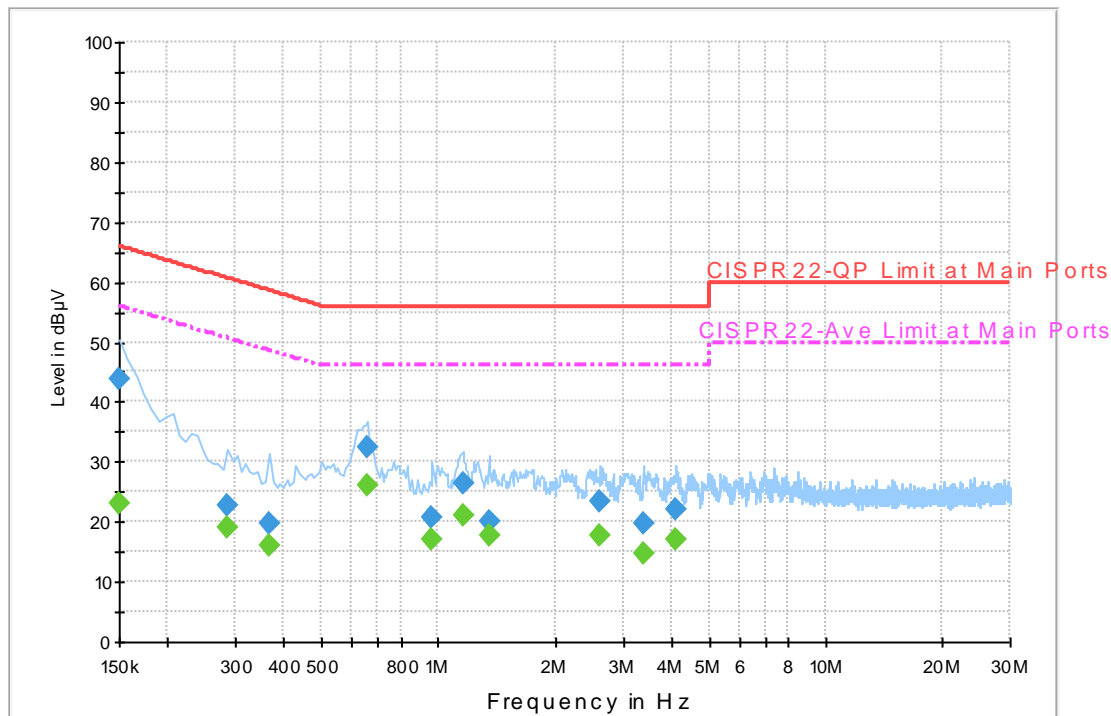
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Blue Lan	Temperature :	25~26°C
		Relative Humidity :	51~53%

EUT Information

Report NO : 6d2013-01
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

ENV216 Auto Test FCC Power Bar - L



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	43.8	Off	L1	19.5	22.2	66.0
0.286000	22.7	Off	L1	19.5	37.9	60.6
0.366000	19.8	Off	L1	19.5	38.8	58.6
0.654000	32.4	Off	L1	19.5	23.6	56.0
0.966000	20.6	Off	L1	19.5	35.4	56.0
1.158000	26.4	Off	L1	19.6	29.6	56.0
1.350000	20.0	Off	L1	19.6	36.0	56.0
2.622000	23.5	Off	L1	19.5	32.5	56.0
3.382000	19.7	Off	L1	19.6	36.3	56.0
4.102000	22.1	Off	L1	19.6	33.9	56.0

Final Result 2

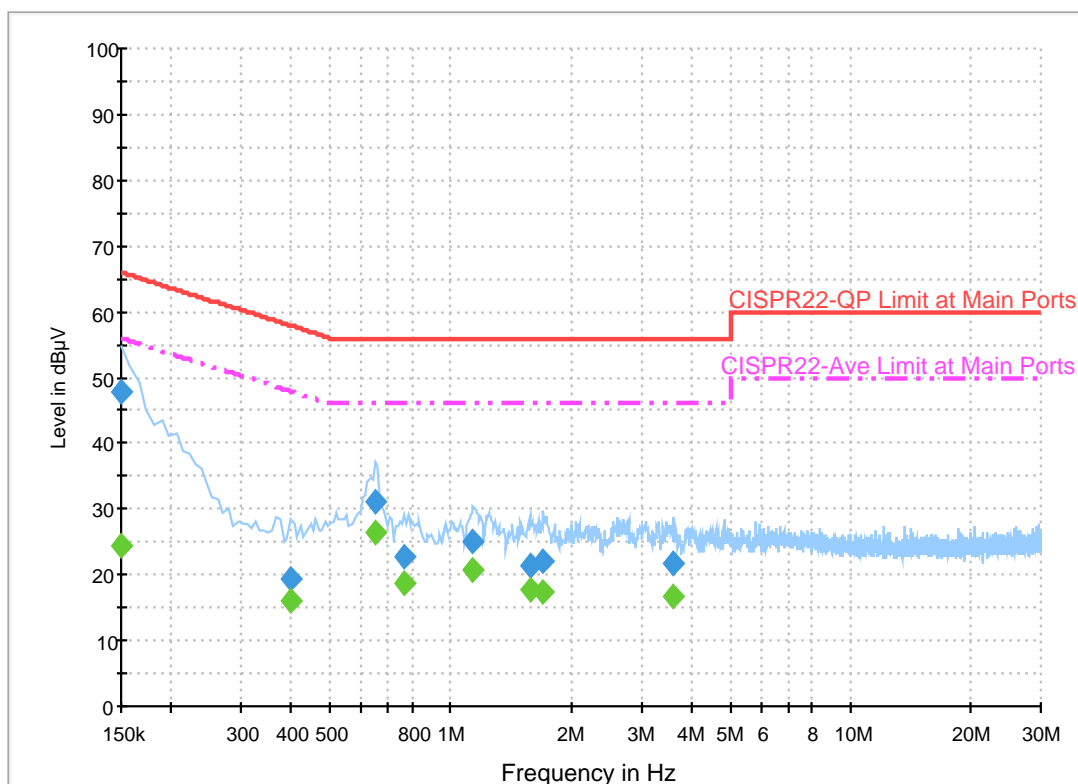
Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	23.1	Off	L1	19.5	32.9	56.0
0.286000	19.1	Off	L1	19.5	31.5	50.6
0.366000	16.1	Off	L1	19.5	32.5	48.6
0.654000	26.2	Off	L1	19.5	19.8	46.0
0.966000	17.0	Off	L1	19.5	29.0	46.0
1.158000	21.0	Off	L1	19.6	25.0	46.0
1.350000	17.7	Off	L1	19.6	28.3	46.0
2.622000	17.9	Off	L1	19.5	28.1	46.0
3.382000	14.7	Off	L1	19.6	31.3	46.0

4.102000	16.9	Off	L1	19.6	29.1	46.0
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EUT Information

Report NO : 6d2013-01
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

ENV216 Auto Test FCC Power Bar - N



Final Result 1

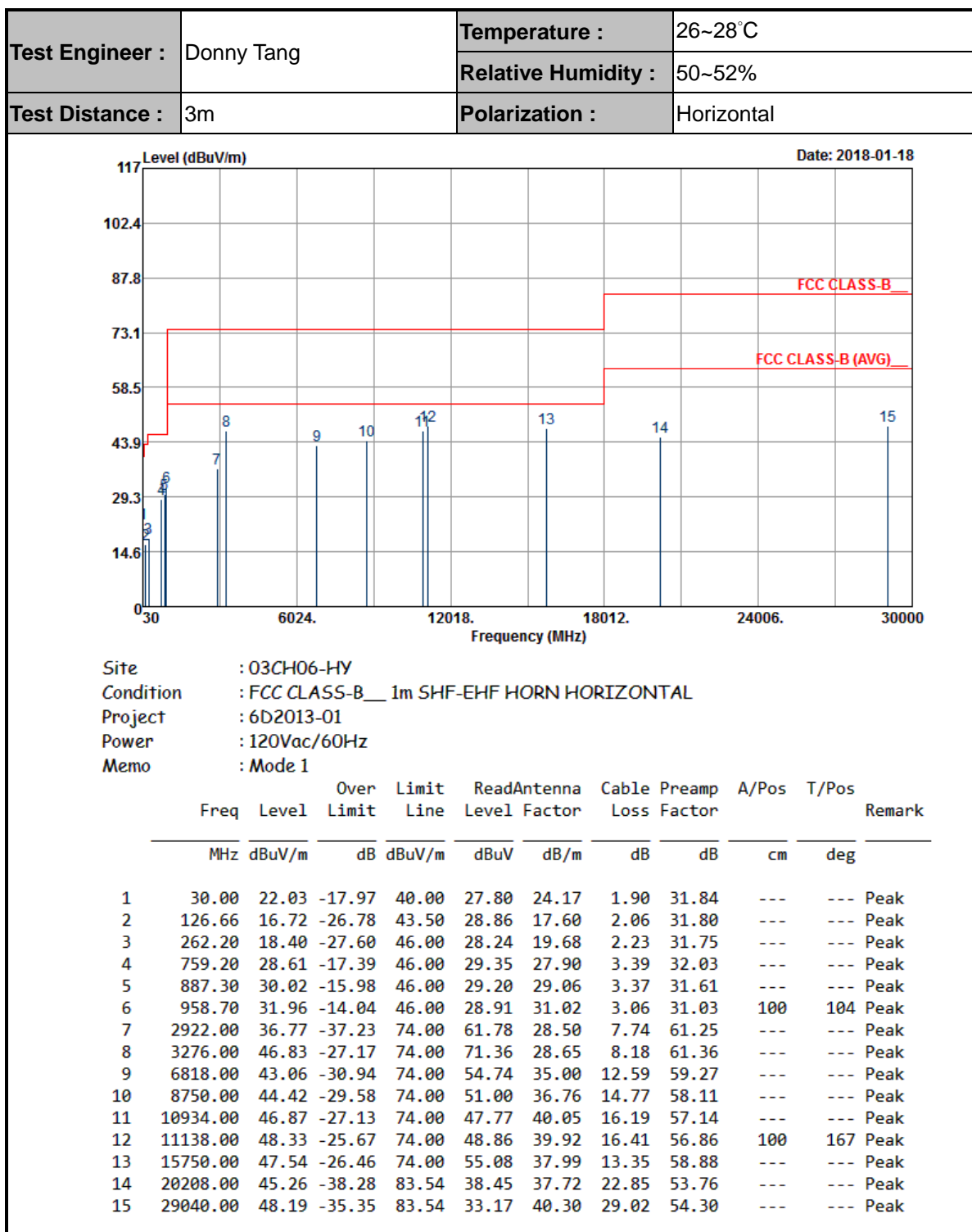
Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.7	Off	N	19.5	18.3	66.0
0.398000	19.4	Off	N	19.5	38.5	57.9
0.646000	31.2	Off	N	19.5	24.8	56.0
0.766000	22.7	Off	N	19.5	33.3	56.0
1.142000	25.2	Off	N	19.5	30.8	56.0
1.582000	21.6	Off	N	19.6	34.4	56.0
1.710000	22.0	Off	N	19.6	34.0	56.0
3.622000	21.8	Off	N	19.6	34.2	56.0

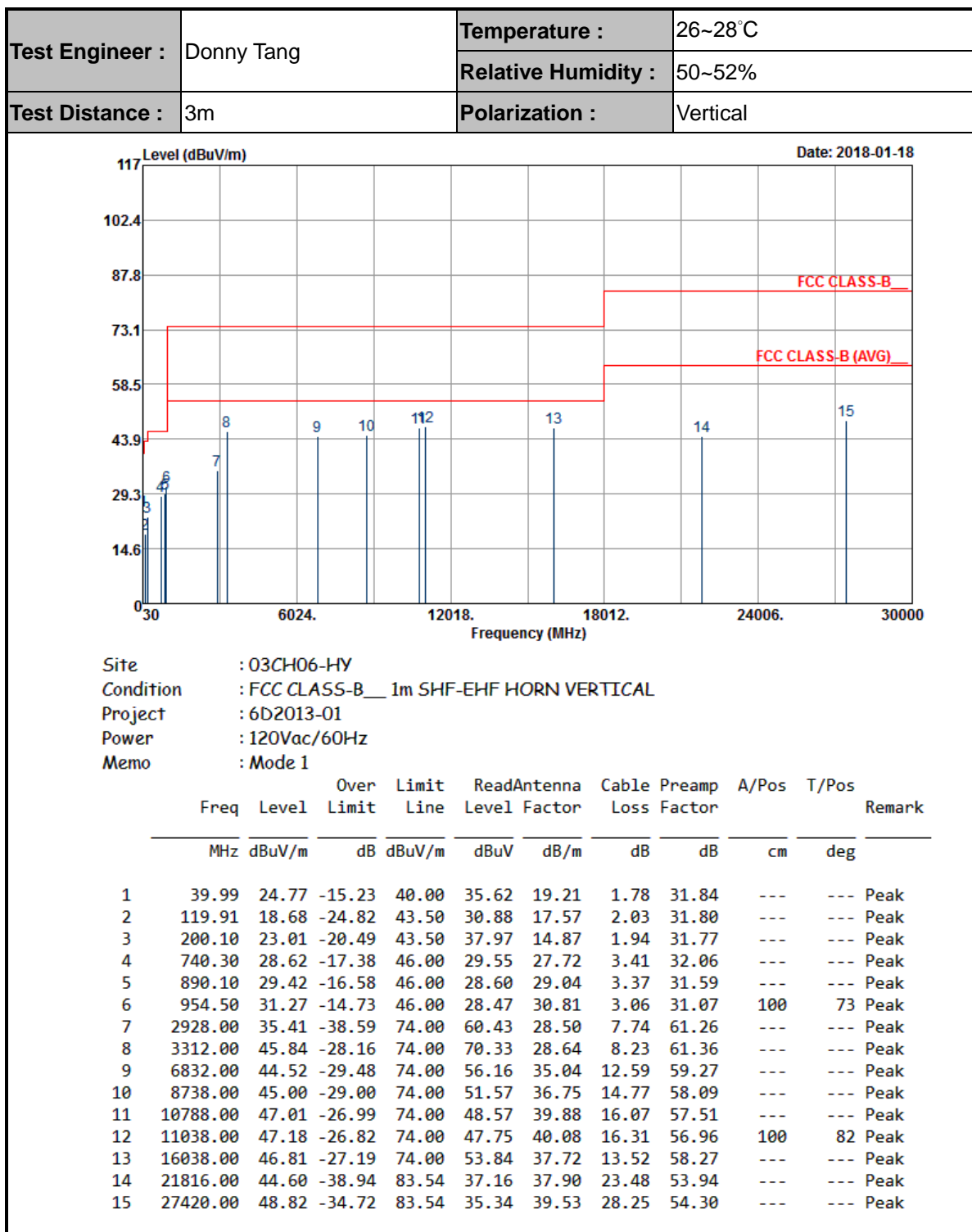
Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	24.4	Off	N	19.5	31.6	56.0
0.398000	16.0	Off	N	19.5	31.9	47.9
0.646000	26.4	Off	N	19.5	19.6	46.0
0.766000	18.9	Off	N	19.5	27.1	46.0
1.142000	20.9	Off	N	19.5	25.1	46.0
1.582000	17.9	Off	N	19.6	28.1	46.0
1.710000	17.6	Off	N	19.6	28.4	46.0
3.622000	16.9	Off	N	19.6	29.1	46.0



Appendix B. Radiated Emission Test Result





—————THE END—————