



FCC Test Report

APPLICANT : Sony Mobile Communications Inc.
EQUIPMENT : GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII
a/b/g/n and NFC
BRAND NAME : Sony
FCC ID : PY7-87507S
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : FCC Class B personal computers and peripherals

The product was received on Aug. 22, 2017 and testing was completed on Aug. 28, 2017. 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Louis Wu

Reviewed by: Louis Wu / Manager

Jones Tsai

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : PY7-87507S

Page Number : 1 of 22

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Report Version : Rev. 01

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC782203	Rev. 01	Initial issue of report	Oct. 30, 2017



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 12.90 dB at 0.198 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 8.77 dB at 952.400 MHz

1. General Description

1.1. Applicant

Sony Mobile Communications Inc.

4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan

1.2. Manufacturer

Sony Mobile Communications Inc.

4-12-3 Higashi-Shinagawa, Shinagawa-ku, Tokyo, 140-0002, Japan

1.3. Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII a/b/g/n, FM Receiver, NFC, and GPS.

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna GPS / Glonass: PIFA Antenna NFC: Loop Antenna

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
A	1.8	WUJ01Q23X8	Conducted Emission Radiation Emission

Accessory List	
Earphone	Model Name: MH410c
	S/N: N/A
USB Cable	Model Name: UCB20
	S/N: 1635A9190031260

Note:

1. Above EUT list and accessory list used are electrically identical per declared by manufacturer.
2. Above the accessories list are used to exercise the EUT during test.
3. For other wireless features of this EUT, test report will be issued separately.

1.4. Modification of EUT

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

1.5. 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, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan 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

1.6. 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, device supporting USB interface or similar peripherals (defined as the Section 15.3 (r) Peripheral device) acting as a peripheral for personal computers shall be authorized as "The Class B personal computers and peripherals" per the Section 15.101 (a) Equipment authorization of unintentional radiators.
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.

2. Test Configuration of Equipment Under Test

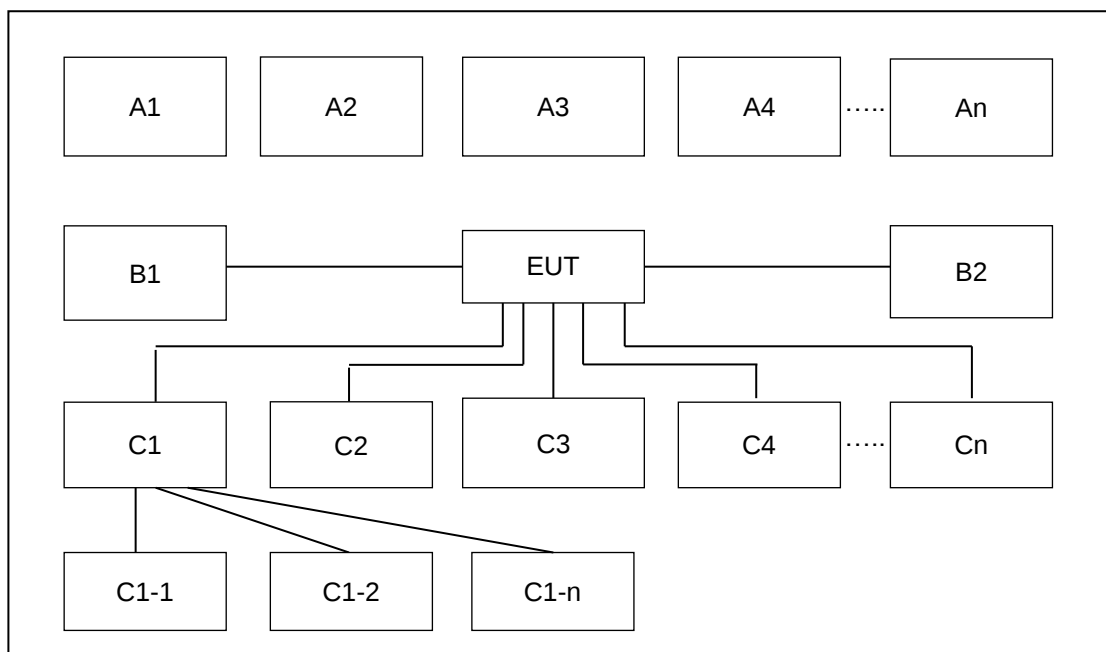
2.1. Test Mode

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 (150 kHz to 30 MHz), radiation (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: Flight Mode + USB Cable (Data Link with Notebook) + Battery + Earphone
Radiated Emissions	Mode 1: Flight Mode + USB Cable (Data Link with Notebook) + Battery + Earphone
Remark: Data Link with Notebook means data application transferred mode between EUT and Notebook.	

2.2. Connection Diagram of Test System



Test Setup									
No.	Setup Peripherals	Connection Type	Test Mode						
			1	2	3	4	5	6	7
C1	Notebook	USB Cable	X						
C1-1	Music Player	USB Cable to C1	X						
C1-2	AP router	RJ-45 Cable to C1	X						
C2	Earphone	Earphone jack	X						
C3	SD card	SD I/O interface without 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.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Music Player	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
6.	SD Card	SanDisk	microSD HC 16GB Class 10 UHS-I	FCC DoC	N/A	N/A

2.4. EUT Operation Test Setup

The data application (each file size is greater than 30Mbytes) is continuously transferred between the EUT and Notebook connected via USB cable, while Flight mode.

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.

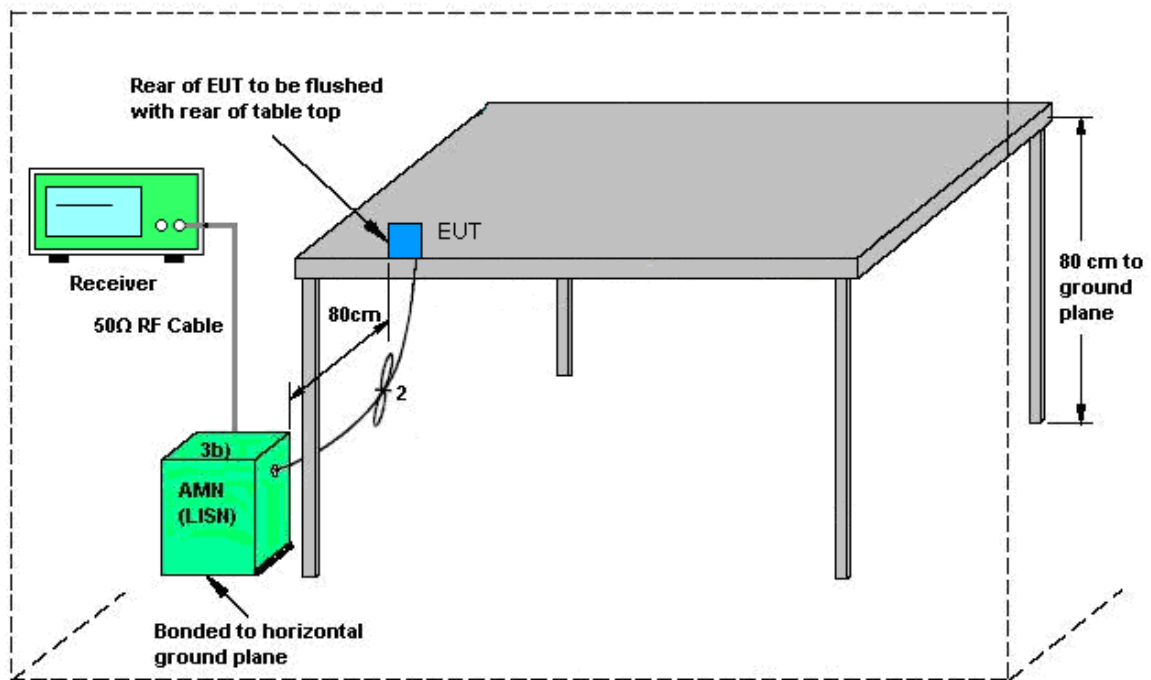
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of 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.

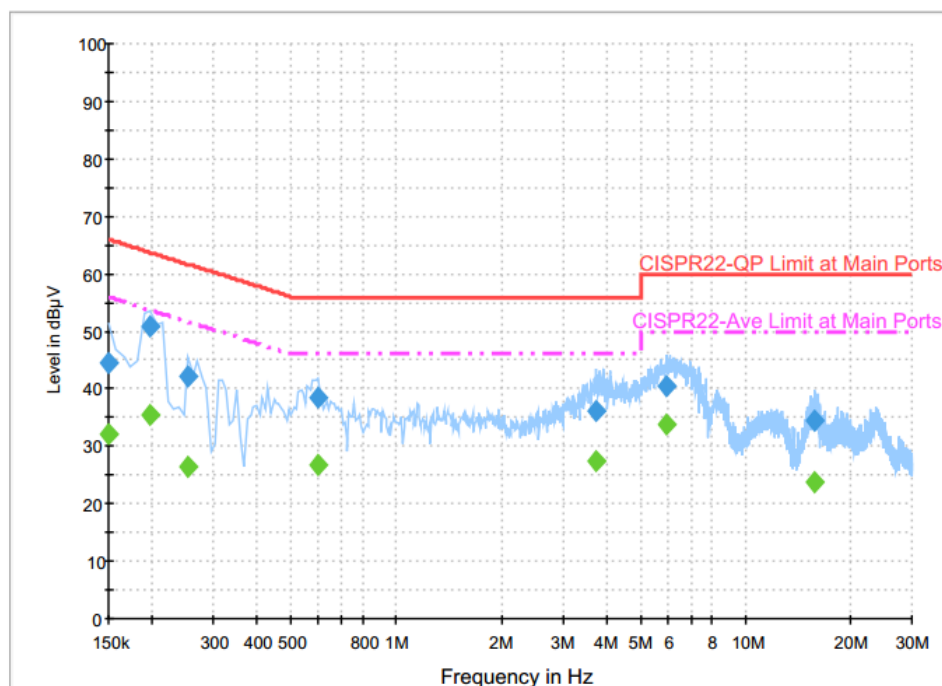
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	26~27°C
Test Engineer :	Eric Jeng	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	Flight Mode + USB Cable (Data Link with Notebook) + Battery + Earphone		



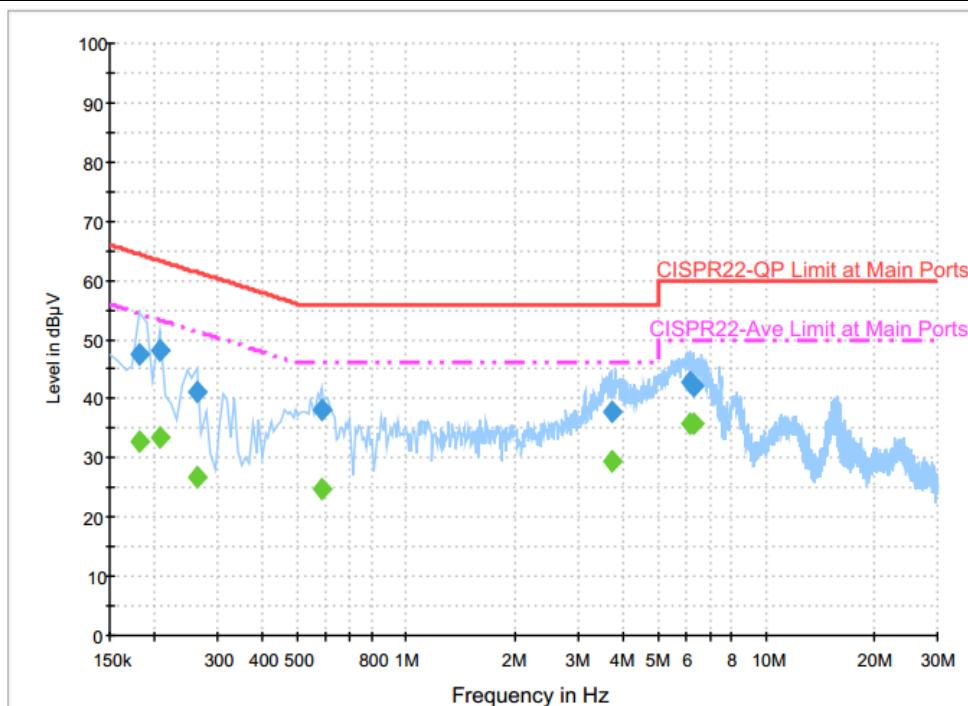
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	44.4	Off	L1	19.6	21.6	66.0
0.198000	50.8	Off	L1	19.5	12.9	63.7
0.254000	42.0	Off	L1	19.5	19.6	61.6
0.598000	38.5	Off	L1	19.5	17.5	56.0
3.734000	36.1	Off	L1	19.6	19.9	56.0
5.918000	40.4	Off	L1	19.6	19.6	60.0
15.750000	34.3	Off	L1	19.7	25.7	60.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	32.0	Off	L1	19.6	24.0	56.0
0.198000	35.6	Off	L1	19.5	18.1	53.7
0.254000	26.3	Off	L1	19.5	25.3	51.6
0.598000	26.8	Off	L1	19.5	19.2	46.0
3.734000	27.3	Off	L1	19.6	18.7	46.0
5.918000	33.9	Off	L1	19.6	16.1	50.0
15.750000	23.9	Off	L1	19.7	26.1	50.0

Test Mode :	Mode 1	Temperature :	26~27°C
Test Engineer :	Eric Jeng	Relative Humidity :	43~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	Flight Mode + USB Cable (Data Link with Notebook) + Battery + Earphone		


Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	47.4	Off	N	19.5	17.0	64.4
0.206000	48.2	Off	N	19.5	15.2	63.4
0.262000	41.1	Off	N	19.5	20.3	61.4
0.582000	38.2	Off	N	19.5	17.8	56.0
3.718000	37.7	Off	N	19.6	18.3	56.0
6.150000	42.8	Off	N	19.6	17.2	60.0
6.318000	42.2	Off	N	19.6	17.8	60.0

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	32.9	Off	N	19.5	21.5	54.4
0.206000	33.4	Off	N	19.5	20.0	53.4
0.262000	26.8	Off	N	19.5	24.6	51.4
0.582000	24.7	Off	N	19.5	21.3	46.0
3.718000	29.5	Off	N	19.6	16.5	46.0
6.150000	35.8	Off	N	19.6	14.2	50.0
6.318000	35.8	Off	N	19.6	14.2	50.0

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

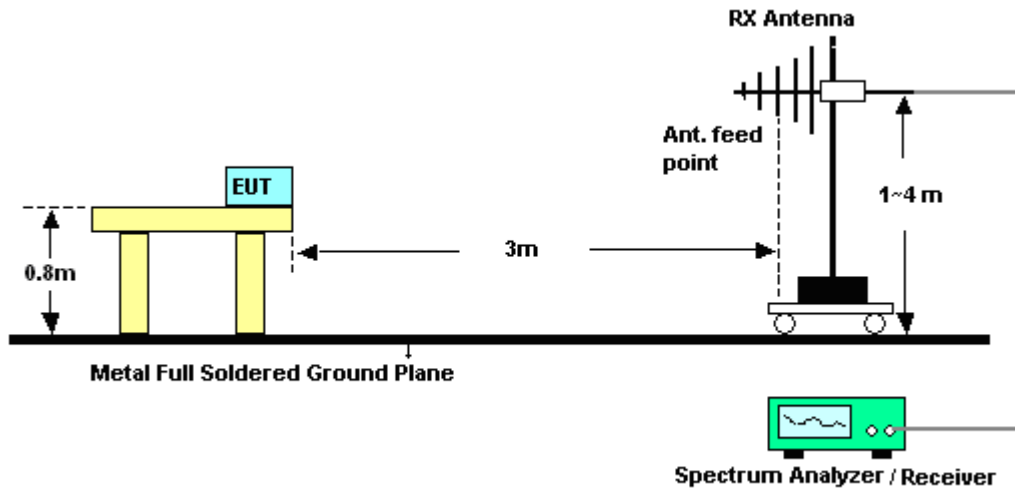
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

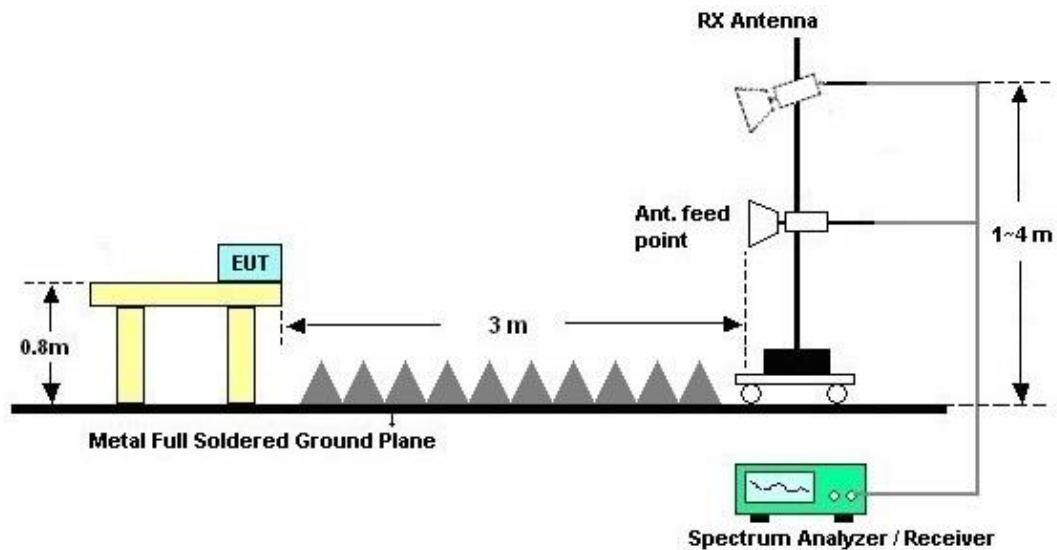
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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

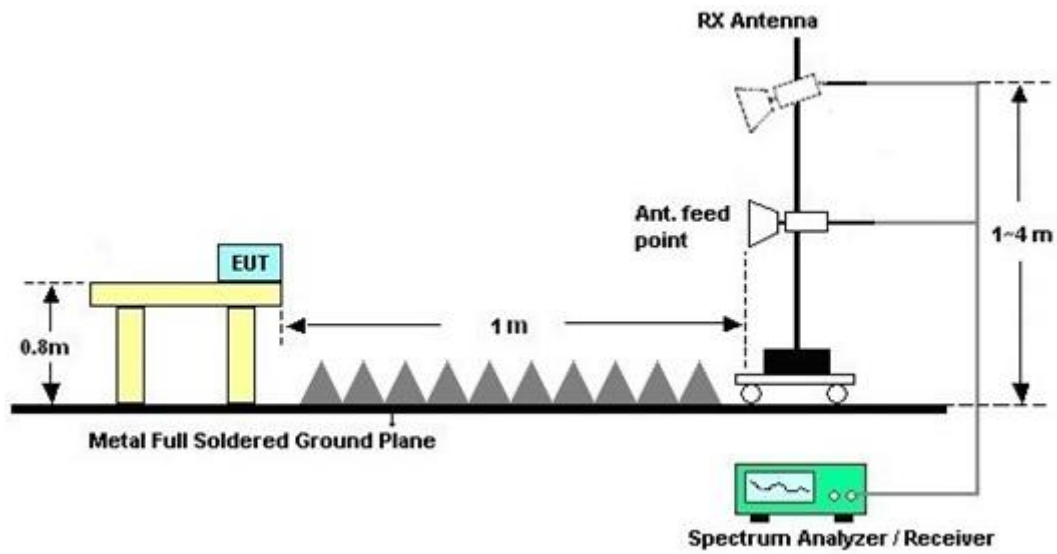
For radiated emissions from 30MHz to 1GHz



For radiated emissions from 1GHz to 18GHz

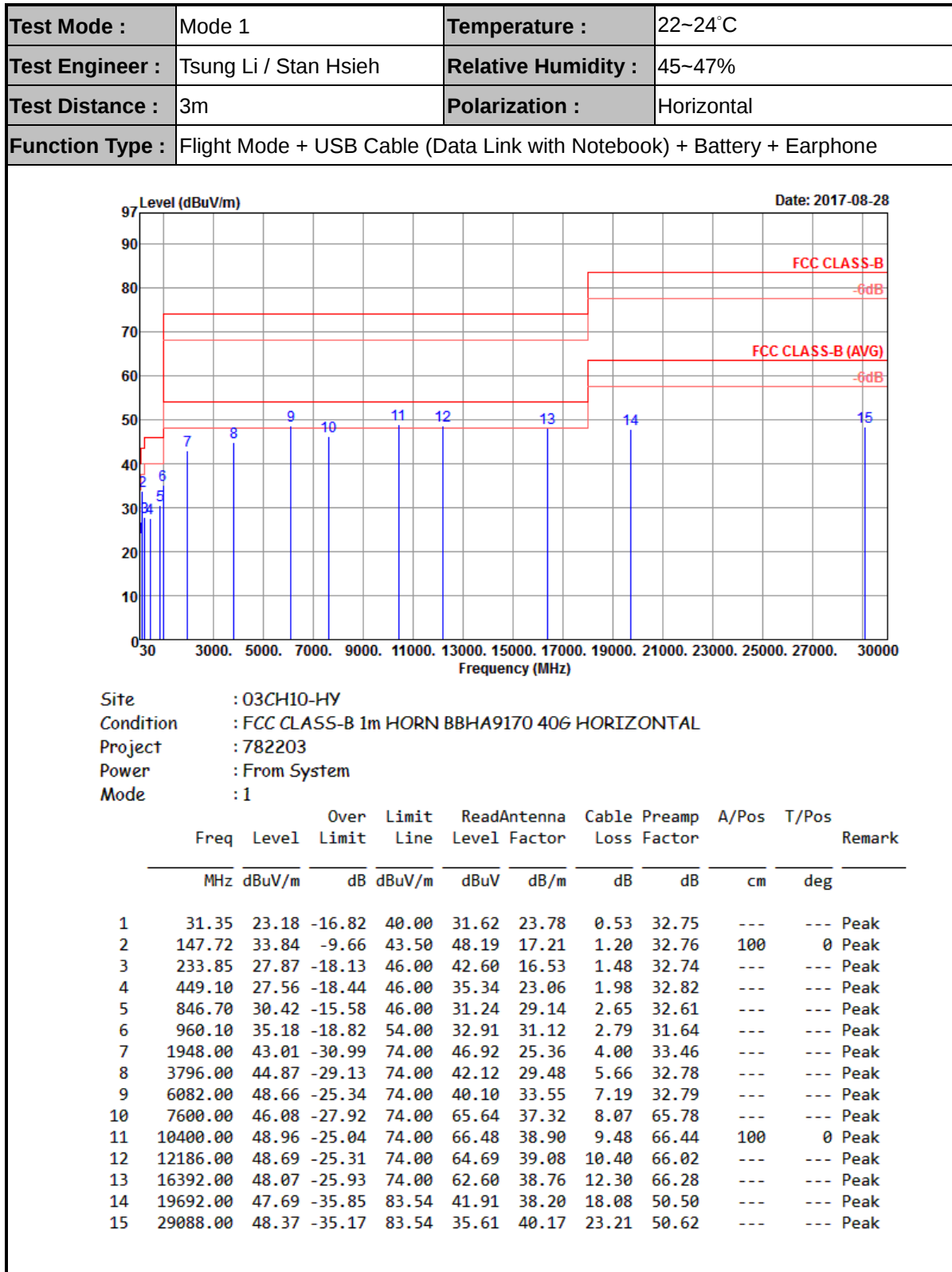


For radiated emissions above 18GHz



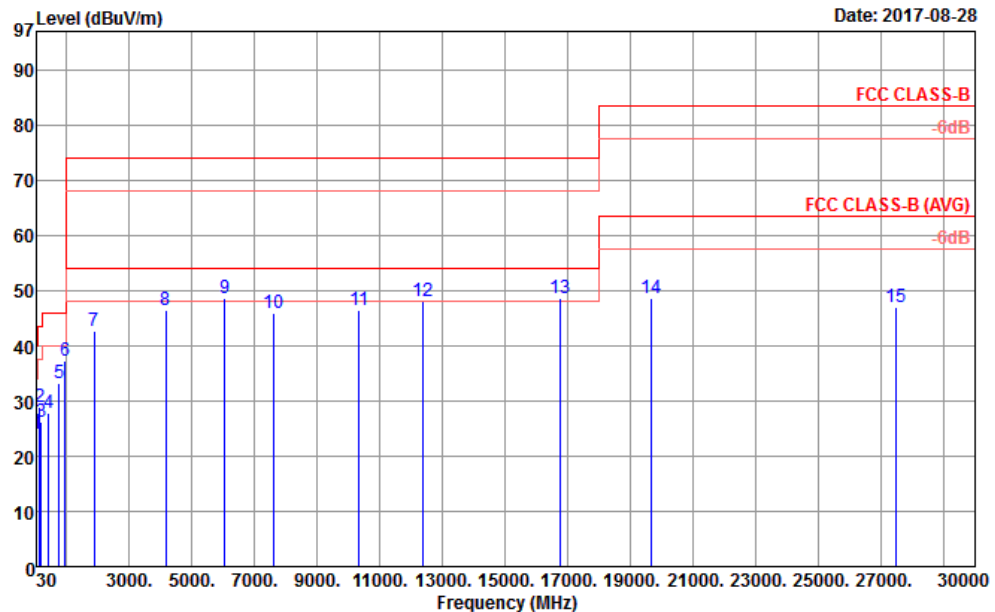


3.2.5. Test Result of Radiated Emission





Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Tsung Li / Stan Hsieh	Relative Humidity :	45~47%
Test Distance :	3m	Polarization :	Vertical
Function Type :	Flight Mode + USB Cable (Data Link with Notebook) + Battery + Earphone		



Site : 03CH10-HY
 Condition : FCC CLASS-B 1m HORN BBHA9170 40G VERTICAL
 Project : 782203
 Power : From System
 Mode : 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	31.35	23.94	-16.06	40.00	32.38	23.78	0.53	32.75	---	---	Peak
2	147.99	28.89	-14.61	43.50	43.26	17.19	1.20	32.76	---	---	Peak
3	182.01	26.24	-17.26	43.50	42.79	14.94	1.26	32.75	---	---	Peak
4	415.50	27.94	-18.06	46.00	36.43	22.41	1.88	32.78	---	---	Peak
5	746.60	33.23	-12.77	46.00	35.45	28.22	2.51	32.95	---	---	Peak
6	952.40	37.23	-8.77	46.00	35.35	30.83	2.78	31.73	100	0	Peak
7	1882.00	42.63	-31.37	74.00	46.87	25.17	3.92	33.53	---	---	Peak
8	4168.00	46.58	-27.42	74.00	42.46	30.50	5.92	32.67	---	---	Peak
9	6052.00	48.58	-25.42	74.00	40.12	33.45	7.18	32.78	100	0	Peak
10	7590.00	45.97	-28.03	74.00	65.53	37.32	8.07	65.78	---	---	Peak
11	10335.00	46.48	-27.52	74.00	64.19	38.83	9.45	66.53	---	---	Peak
12	12384.00	48.09	-25.91	74.00	64.66	38.29	10.51	65.94	---	---	Peak
13	16764.00	48.56	-25.44	74.00	62.28	39.68	12.28	66.35	---	---	Peak
14	19656.00	48.63	-34.91	83.54	42.80	38.20	18.13	50.50	---	---	Peak
15	27456.00	46.98	-36.56	83.54	35.65	39.41	22.14	50.22	---	---	Peak



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	Aug. 23, 2017	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Aug. 30, 2016	Aug. 23, 2017	Aug. 29, 2017	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	May 02, 2017	Aug. 23, 2017	May 01, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Aug. 23, 2017	Nov. 28, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 06, 2016	Aug. 23, 2017	Dec. 05, 2017	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 05, 2017	Aug. 23, 2017	Jan. 04, 2018	Conduction (CO05-HY)
Test Software	N/A	EMC32	8.40.0	N/A	N/A	Aug. 23, 2017	N/A	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35413&02	30MHz~1GHz	Jan. 07, 2017	Aug. 24, 2017~ Aug. 28, 2017	Jan. 06, 2018	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz to 26.5GHz	Jan. 12, 2017	Aug. 24, 2017~ Aug. 28, 2017	Jan. 11, 2018	Radiation (03CH10-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz ~ 44GHz	Oct. 17, 2016	Aug. 24, 2017~ Aug. 28, 2017	Oct. 16, 2017	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz ~ 18GHz	Sep. 30, 2016	Aug. 24, 2017~ Aug. 28, 2017	Sep. 29, 2017	Radiation (03CH10-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917057 6	18GHz ~ 40GHz	Apr. 27, 2017	Aug. 24, 2017~ Aug. 28, 2017	Apr. 26, 2018	Radiation (03CH10-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 26, 2016	Aug. 24, 2017~ Aug. 28, 2017	Oct. 25, 2017	Radiation (03CH10-HY)
Amplifier	MITEQ	TTA1840-35-H G	1871923	18GHz~40GHz	Jul. 18, 2017	Aug. 24, 2017~ Aug. 28, 2017	Jul. 17, 2018	Radiation (03CH10-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800	2025787	1GHZ~18GHZ	Feb. 13, 2017	Aug. 24, 2017~ Aug. 28, 2017	Feb. 12, 2018	Radiation (03CH10-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY249564 MY249524 MY283184	30MHz~1GHz	Sep. 30, 2016	Aug. 24, 2017~ Aug. 28, 2017	Sep. 29, 2017	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY249564 MY249524 MY283184	1GHz~25GHz	Sep. 30, 2016	Aug. 24, 2017~ Aug. 28, 2017	Sep. 29, 2017	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY249564 MY249524 MY283184	25GHz~40GHz	Sep. 30, 2016	Aug. 24, 2017~ Aug. 28, 2017	Sep. 29, 2017	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Aug. 24, 2017~ Aug. 28, 2017	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Aug. 24, 2017~ Aug. 28, 2017	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Aug. 24, 2017~ Aug. 28, 2017	N/A	Radiation (03CH10-HY)
Hygrometer	TECPEL	DTM-303B	TP140320	N/A	Nov. 14, 2016	Aug. 24, 2017~ Aug. 28, 2017	Nov. 13, 2017	Radiation (03CH10-HY)
Test Software	Audix	E3	6.2009-8-24	N/A	N/A	Aug. 24, 2017~ Aug. 28, 2017	N/A	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% ($U = 2Uc(y)$)	2.70
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.60
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 30000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.90
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