

# FCC RF 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	:	PY7-75946T
STANDARD	:	FCC Part 15 Subpart C §15.225
CLASSIFICATION	:	(DXX) Low Power Communication Device Transmitter

This is a variant report which is only valid together with the original test report. The testing was completed on Jan. 18, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures 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.

Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager

### SPORTON INTERNATIONAL INC.

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#### APPENDIX C. ORIGINAL REPORT



# **REVISION HISTORY**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR6N2203-01D	Rev. 01	Initial issue of report	Feb. 21, 2017



# SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part FCC Rule Description of Test			Result	Under Limit
3.1	15.225(d) 15.209	Radiated Emissions	Complies	3.24 dB at 40.680 MHz for Quasi-Peak
3.2	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
Radiated Emissions (30MHz~1000MHz)	±5.70dB	Confidence levels of 95%



# **1. GENERAL INFORMATION**

### 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, GPS, and NFC

Standards-related Product Specification		
Antenna Type / Gain Loop Antenna		
<b>Bemark:</b> This is a variant report. All the test cases were performed on original report which can be		

**Remark:** This is a variant report. All the test cases were performed on original report which can be referred to Sporton Report Number FR6N2202-01D.

EUT Information List				
HW Version	SW Version	S/N	Performed Test Item	
A	0.79	RQ3003BJB0	Radiated Spurious Emission	
Accessory List				
AC Adapter 1 Model No. : UCH20 S/N : 1215W48600011				
Earphone 1	Model No. : N	Model No. : MH410C		
	S/N : 1632A8	S/N : 1632A86300007A6		
	Model No. : U	Model No. : UCB20		
USB Cable	S/N : 1625A9	S/N : 1625A912000332E		

#### 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 Product Specification of Equipment Under Test

Standards-related Product Specification		
Tx/Rx Frequency Range	13.553 ~ 13.567MHz	
Channel Number	1	
Type of Modulation	ASK	

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

### 1.5 Modification of EUT

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



### **1.6 Testing Location**

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,	
Test Site Location	Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.	
	TEL: +886-3-3273456 / FAX: +886-3-3284978	
Test Site No.	Sporton Site No.	
	03CH07-HY	
Test Engineer	Jess Wang	
Temperature	21~22°C	
Relative Humidity	49~50%	

Note: The test site complies with ANSI C63.4 2014 requirement.

Test Site	SPORTON INTERNATIONAL INC.	
	No. 30-2, Dingfu Tsuen, Linkou District,	
Test Site Location	New Taipei City, Taiwan 244, R.O.C.	
Test Sile Location	TEL: +886-2-2603-5367 / +886-2-2601-1640	
	FAX: +886-2-2601-1695	
Test Site No.	Sporton Site No.	
	OS03-LK	
Test Engineer	Eric Jeng	
Temperature	<b>24~25</b> ℃	
Relative Humidity	52~54%	

Note: The test site complies with ANSI C63.4 2014 requirement.

# 1.7 Applicable Standards

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

- FCC Part 15 Subpart C §15.225
- ANSI C63.10-2013



# 2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

### 2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations.

The following table is a list of the test modes shown in this test report.

Test Items		
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz	

The worst type (type F) declared by manufacturer was used and recorded in this report.

# 2.2 EUT Operation Test Setup

The EUT was programmed to be in continuously transmitting mode.

The ancillary equipment, NFC card, is used to make the EUT (NFC) continuously transmit at 13.56MHz and is placed around 2 cm gap to the EUT.



# **3. TEST RESULTS**

### 3.1 Radiated Emissions Measurement

#### 3.1.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies	Field Strength	Measurement Distance
(MHz)	(μV/m)	(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

#### 3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

#### 3.1.3 Measuring Instrument Setting

The following table is the setting of receiver.

Receiver Parameter	Setting
Attenuation	Auto
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

**Note:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.



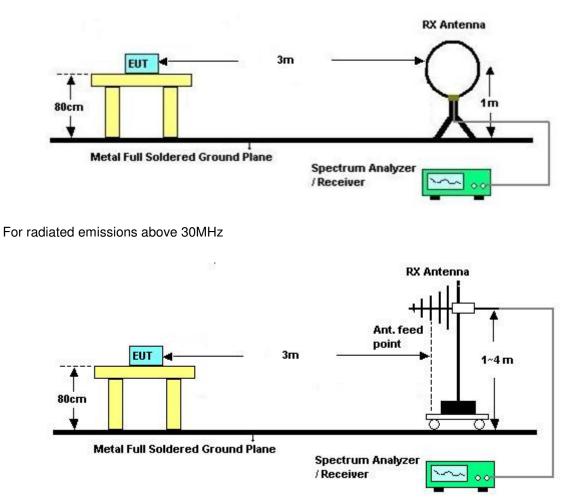
#### 3.1.4 Test Procedures

- Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
- 7. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. Antenna Requirements



#### 3.1.5 Test Setup

For radiated emissions below 30MHz



#### 3.1.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix A.



### 3.2 Antenna Requirements

#### 3.2.1 Standard Applicable

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

#### 3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.



# 4. LIST OF MEASURING EQUIPMENT

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	CBL 6111D&0080 0N1D01N-06	35419&03	30MHz to 1GHz	Jan. 13, 2016	Dec. 21, 2016	Jan. 12, 2017	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Dec. 21, 2016	Sep. 01, 2017	Radiation (03CH07-HY)
EMI Test Receiver	Keysight	N9038A(MX E)	MY5413008 5	20Hz ~ 8.4GHz	Oct. 26, 2016	Dec. 21, 2016	Oct. 25, 2017	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Dec. 21, 2016	Mar. 17, 2017	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY5347011 8	10Hz~44GHz	Feb. 27, 2016	Dec. 21, 2016	Feb. 26, 2017	Radiation (03CH07-HY)
Hygrometer	Testo	608-H1	34897197	N/A	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Filter	Wainwright	WHK20 /1000C7/40S S	SN1	20M High Pass	Sep. 26, 2016	Dec. 21, 2016	Sep. 25, 2017	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY8420952 1	30MHz~1GHz	Dec. 01, 2016	Dec. 21, 2016	Nov. 30, 2017	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY8420952 1	9KHz~30MHz	Dec. 01, 2016	Dec. 21, 2016	Nov. 30, 2017	Radiation (03CH07-HY)
Controller	ChainTek	Chaintek 3000	N/A	Control Turn table	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Controller	Max-Full	MF7802	MF7802083 68	Control Ant Mast	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Test Software	Audix	E3	6.2009-8-24 (sporton)	N/A	N/A	Dec. 21, 2016	N/A	Radiation (03CH07-HY)
Open Area Test Site	SPORTON	OATS-10	OS03-LK	30 MHz ~ 1 GHz 10m, 3m	May 21, 2016	Dec. 23, 2016	May 20, 2017	Radiation (OS03-LK)
Spectrum Analyzer	R&S	FSP 7	100641	9 kHz ~ 7 GHz	Jun. 23, 2016	Dec. 23, 2016	Jun. 22, 2017	Radiation (OS03-LK)
Test Receiver	R&S	ESCS 30	836858/024	9 kHz ~ 2.75 GHz	Jun. 24, 2016	Dec. 23, 2016	Jun. 23, 2017	Radiation (OS03-LK)
Turn Table	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Dec. 23, 2016	N/A	Radiation (OS03-LK)
Antenna Mast	EMCO	2075	9711-2115	1 m ~ 4 m	N/A	Dec. 23, 2016	N/A	Radiation (OS03-LK)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Dec. 23, 2016	Sep. 01, 2017	Radiation (OS03-LK)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	Mar. 18, 2016	Dec. 23, 2016	Mar. 17, 2017	Radiation (OS03-LK)
Test Software	Audix	E3	4	N/A	N/A	Dec. 23, 2016	N/A	Radiation (OS03-LK)



# Appendix A. Test Results of Radiated Test Items

Test Mode :	NFC	Tx		Polariz	ation :	Hor	izontal		
1	40 Level (dBuV/n	n)						Date: 2016	-12-21
128									
117	<b>7.1</b>								
105	5.7								
94									
82								15.209 LIMIT	
	0.0			8					
	<b>3.6</b>			7					10
37						9			10
25									
	.3								
	8.6								
	20	5. 7	. 9. 11.	13. 1	5. 17. 1	19. 21.	23. 2	r 07	
	200.009 3.	5. 7	. 9. 11.	Frequen	5. 17. cy (MHz)	19. 21.	23. 2	5. 27.	29. 30
Frequency	Level	Over	Limit	Read	Antenna	Cable	Ant	Table	Remark
(MHz)	(dBµV/m)	Limit (dB)	Line ( dBµV/m )	Level (dBµV)	Factor (dB)	Loss (dB)	Pos ( cm )	Pos ( deg )	
0.03782	53.35	-62.7	116.05	33.47	19.2	0.68			Average
0.07344	55.05	-55.24	110.29	35.37	19	0.68			Average
0.09358	44.1	-64.08	108.18	24.62	18.8	0.68			QP
0.11116	39.75	-66.94	106.69	20.27	18.8	0.68			Average
0.15408	49.1	-54.75	103.85	29.65	18.77	0.68			Average
0.49	40.03	-33.77	73.8	20.75	18.6	0.68			QP
13.456	42.17	-27.33	69.5	21	20.49	0.68	100	194	QP
13.56	60.63	-8.87	69.5	39.44	20.51	0.68			QP
20.329	38.44	-31.06	69.5	15.55	21.82	1.07			QP
29.23	39.95	-29.55	69.5	16.53	22.35	1.07			QP

#### A1. Results of Radiated Spurious Emissions (9 kHz~30MHz)



Test Mode :	NFC T	x		Polariz	ation :	Ver	tical		
1	40 Level (dBuV/m	)						Date: 2016	-12-21
128									
117	.1								
105	5.7								
	1.3								
	2.9							15.209 LIMI	
71	.0			8					
	.6 <u>5</u>								
37	.1			1		9			10
	5.7								
	2.9								
	20 <mark>0.009 3.</mark>	5. 7.	9. 11.	13. 1	5. 17. 1	19. 21.	23. 2	5. 27.	29. 30
	0,000 01	0. 1.			cy (MHz)	211	201 21		201 00
Frequency	Level	Over	Limit	Read	Antenna	Cable	Ant	Table	Remark
(MHz)	(dBµV/m)	Limit (dB)	Line (dBµV/m)	Level (dBµV)	Factor (dB)	Loss (dB)	Pos (cm)	Pos ( deg )	
0.01318	53.57	-71.64	125.21	29.99	22.9	0.68	1		Average
0.0753	51.58	-58.49	110.07	31.9	19	0.68			Average
0.09066	38.19	-70.27	108.46	18.71	18.8	0.68			QP
0.11364	35.02	-71.47	106.49	15.54	18.8	0.68			Average
0.41724	46.94	-48.26	95.2	27.63	18.63	0.68			Average
0.49	37.3	-36.5	73.8	18.02	18.6	0.68			QP
13.464	40.68	-28.82	69.5	19.51	20.49	0.68	100	232	QP
13.56	59.02	-10.48	69.5	37.83	20.51	0.68			QP
21.742	38.49	-31.01	69.5	15.52	21.9	1.07			QP
29.575	39.24	-30.26	69.5	15.8	22.37	1.07			QP

#### Note:

1. 13.56 MHz is fundamental signal which can be ignored.

2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

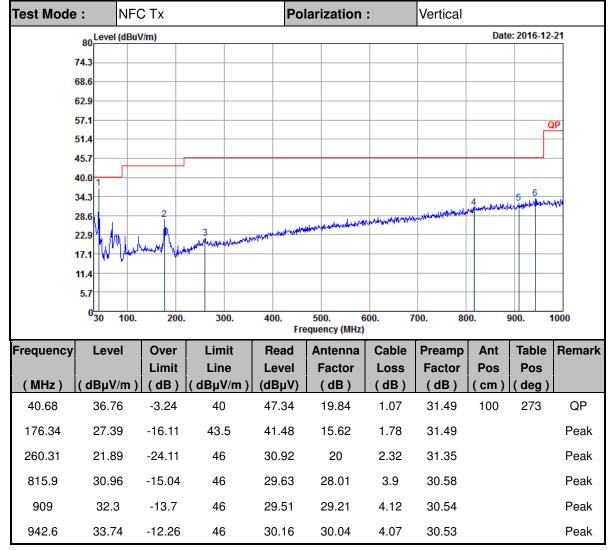
3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

4. Limit line = specific limits  $(dB\mu V)$  + distance extrapolation factor.

est Mode	e: Ni	FC Tx		Pol	arization	:	Horizont	al		
	80 Level (dB	uV/m)				1		Date	e: 2016-12	-21
	74.3									
	68.6									
	62.9									
	57.1								6	9
1	51.4									_
	45.7	ſ								
	40.0									_
	34.3							4	5 6	MT-
	28.6	2	3	11.1.1.0/	under and war and a second balance	Underson of productions	NUR AND	WWW IN 1		_
	22.9	establishing Wart	the mandar and and	prosed to the second second						
	VWP									
	11.4 5.7									
	0 <mark>00000000</mark>	). 200.	300.	400. Fre	500. 6 quency (MHz)	00. 7	700. 80	0. 9	900. 1	1000
requency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remar
		Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
(MHz)	( dBµV/m	) (dB)	$( dB\mu V/m )$	(dBµV)	( dB )	( dB )	(dB)	( cm )	(deg)	
30	27.52	-12.48	40	31.8	26	1.07	31.35	100	74	Peak
	24.21	-19.29	43.5	38.3	15.62	1.78	31.49			Peak
176.34	67.61									Deels
176.34 231.96	24.12	-21.88	46	36.1	17.36	2.07	31.41			Peak
		-21.88 -14.23	46 46	36.1 29.58	17.36 28.66	2.07 4.1	31.41 30.57			
231.96	24.12									Peak Peak Peak

#### A2. Results of Radiated Spurious Emissions (30MHz~1GHz)





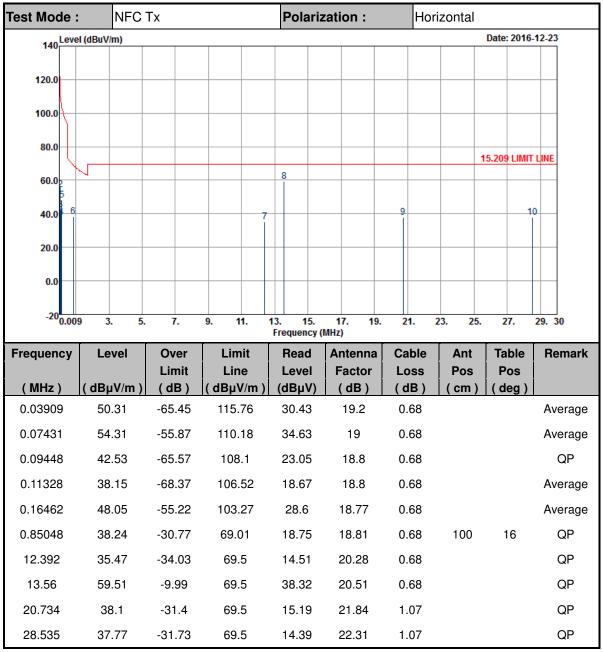
#### Note:

- 1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 2. Emission level (dB $\mu$ V/m) = 20 log Emission level ( $\mu$ V/m).
- 3. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor= Level.



# Appendix B. Verification of Radiated Spurious Emissions at

# open-area test site



#### B.1 Results of Radiated Emissions (9 kHz~30MHz)



Test Mode :	NFC	NFC Tx			ation :	Ver	Vertical			
140	l (dBuV/m)		1					Date: 2016	-12-23	
120.0										
100.0										
80.0							1	15.209 LIMIT	LINE	
<b>60.0</b>				7						
<b>40.0</b> ] 6				8		9			10	
20.0 0.0										
-2000.000	9 3. 5.	7.	9. 11.	13. 15. Frequency (	17. 19. MHz)	21.	23. 25.	27.	29. 30	
Frequency	Level	Over	Limit	Read	Antenna	Cable	Ant	Table	Remark	
		Limit	Line	Level	Factor	Loss	Pos	Pos		
( MHz )	( dBµV/m )	(dB)	( dBµV/m )		(dB)	(dB)	( cm )	(deg)	•	
0.01538	50.3	-73.57	123.87	26.72	22.9	0.68			Average	
0.06828	47.69	-63.23	110.92	28.01	19	0.68			Average	
0.0914	37.15	-71.24	108.39	17.67	18.8	0.68			QP	
0.1158	34.16	-72.17	106.33	14.69	18.79	0.68			Average	
0.4373	44.79	-50	94.79	25.48	18.63	0.68			Average	
0.75285	35.98	-34.09	70.07	16.54	18.76	0.68			QP	
13.56	58.29	-11.21	69.5	37.1	20.51	0.68			QP	
14.472	37.23	-32.27	69.5	15.86	20.69	0.68			QP	
19.87	36.42	-33.08	69.5	13.97	21.77	0.68			QP	
28.875	37.46	-32.04	69.5	14.06	22.33	1.07	100	248	QP	

#### Note:

- 1. 13.56 MHz are fundamental signal which can be ignored.
- 2. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
- 4. Limit line = specific limits (dBµV) + distance extrapolation factor.
- 5. The test distance between the receiving antenna and the EUT is 3meter



# **Appendix C. Original Report**

Please refer to Sporton report number FR6N2202-01D