



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 : PY7-40069V
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

This is a variant report which is only valid together with the original test report. The product was received on Sep. 22, 2016 and testing was completed on Nov. 28, 2016. 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.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

SPORTON INTERNATIONAL INC.

TEL : 886-3-327-3456

FAX : 886-3-328-4978

FCC ID : PY7-40069V

Page Number : 1 of 21

Report Issued Date : Feb. 06, 2017

Report Version : Rev. 01

Report Template No.: BU5-FR15EWL Version 1.4



TABLE OF CONTENTS

SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Product Feature of Equipment Under Test	5
1.4 Modification of EUT	6
1.5 Testing Location	7
1.6 Applicable Standards	7
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	8
2.1 Carrier Frequency Channel	8
2.2 Test Mode	9
2.3 Connection Diagram of Test System	9
2.4 EUT Operation Test Setup	9
3 TEST RESULT	10
3.1 Maximum Conducted Output Power Measurement	10
3.2 Unwanted Radiated Emission Measurement	12
3.3 Automatically Discontinue Transmission	17
3.4 Antenna Requirements	18
4 LIST OF MEASURING EQUIPMENTS	19
5 UNCERTAINTY OF EVALUATION	21
APPENDIX A. CONDUCTED TEST RESULTS	
APPENDIX B. RADIATED SPURIOUS EMISSION	
APPENDIX C. RADIATED SPURIOUS EMISSION PLOTS	
APPENDIX D. DUTY CYCLE PLOTS	
APPENDIX E. ORIGINAL REPORT	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR692211-01E	Rev. 01	Initial issue of report	Feb. 06, 2017



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.407(a)	Maximum Conducted Output Power	FCC ≤ 24 dBm (depend on band)	Pass	-
3.2	15.407(b)	Unwanted Emissions	$\leq -17, -27$ dBm (depend on band)&15.209(a)	Pass	Under limit 3.04 dB at 5351.280 MHz
3.3	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.4	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-

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, GPS, and NFC

Standards-related Product Specification	
Antenna Type	PIFA Antenna
Antenna Gain	<5150 MHz ~ 5250 MHz> -3.40 dBi
	<5250 MHz ~ 5350 MHz> -2.70 dBi
	<5470 MHz ~ 5725 MHz> -1.50 dBi

Remark: This is a variant report. All the test cases were performed on original report which can be referred to Sporton Report Number FR692208-01E.

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
A	0.85	RQ3002JC97	RF conducted measurement
		RQ3002JB3E	Radiated Spurious Emission



Accessory List	
AC Adapter 1	Model No. : UCH20
	S/N : 1215W48600011
Earphone 1	Model No. : MH410c
	S/N : 1632A86300007A6
USB Cable	Model No. : UCB20
	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 Modification of EUT

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

1.5 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 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.
	TH05-HY

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

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.
	03CH12-HY

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

1.6 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03
- ♦ ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th 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 (X plane) were recorded in this report.

2.1 Carrier Frequency Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	-	-		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5250-5350 MHz Band 2 (U-NII-2A)	52	5260	60	5300
	54*	5270	62*	5310
	56	5280	64	5320
	-	-		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5470-5725 MHz Band 3 (U-NII-2C)	100	5500	112	5560
	102*	5510	116	5580
	104	5520	132	5660
	-	-	134*	5670
	108	5540	136	5680
	110*	5550	140	5700

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
Straddle Channel	-	-	144	5720
	142*	5710		

Note: The above Frequency and Channel in "*" were 802.11n HT40

2.2 Test Mode

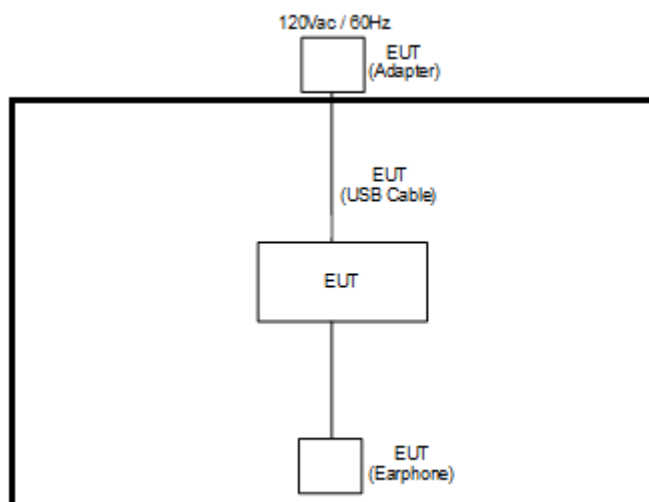
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11n HT20	MCS0
802.11n HT40	MCS0

Ch. #		Band I : 5150-5250 MHz	Band II : 5250-5350 MHz	Band III : 5470-5725MHz
		802.11n HT40	802.11n HT40	802.11n HT20
L	Low	38	-	-
M	Middle	-	-	-
H	High	-	62	140

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



2.4 EUT Operation Test Setup

For RF test items, an engineering test program was provided and enabled to make EUT transmitting signals.

3 Test Result

3.1 Maximum Conducted Output Power Measurement

3.1.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, U-NII procedures and limits were applied for operations in the frequency band in accordance with FCC KDB 644545 D03.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

Method PM (Measurement using an RF average power meter):

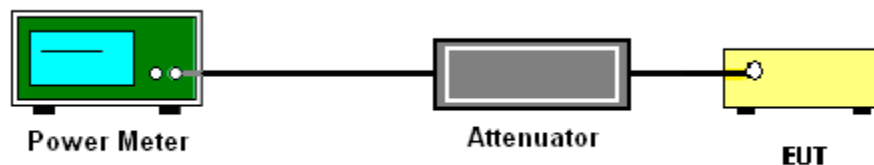
1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

For straddle channel, the testing follows Method SA-3 (RMS detection with max hold) of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

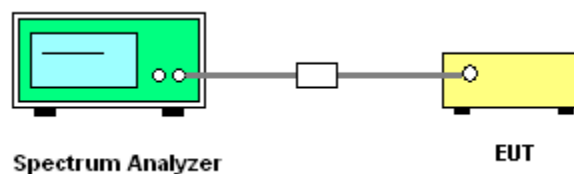
Compute power by integrating the spectrum across the 99% occupied bandwidth of the signal using the instrument's band power measurement function.

3.1.4 Test Setup

For normal channel:



For straddle channel:



3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.2 Unwanted Radiated Emission Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.2.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5725MHz band: all emissions outside of the 5470-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (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

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dB μ V/m)
-17	78.3
- 27	68.3

- (3) KDB789033 D01 v01r03 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.2.2 Measuring Instruments

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

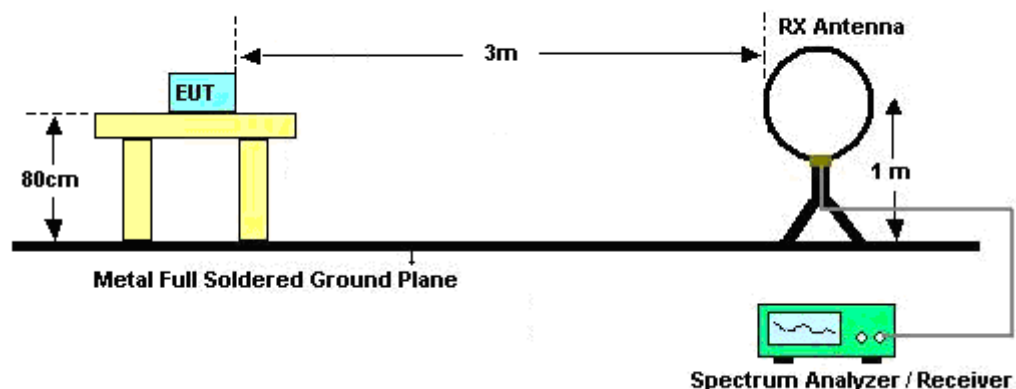
3.2.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW $\geq$ 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

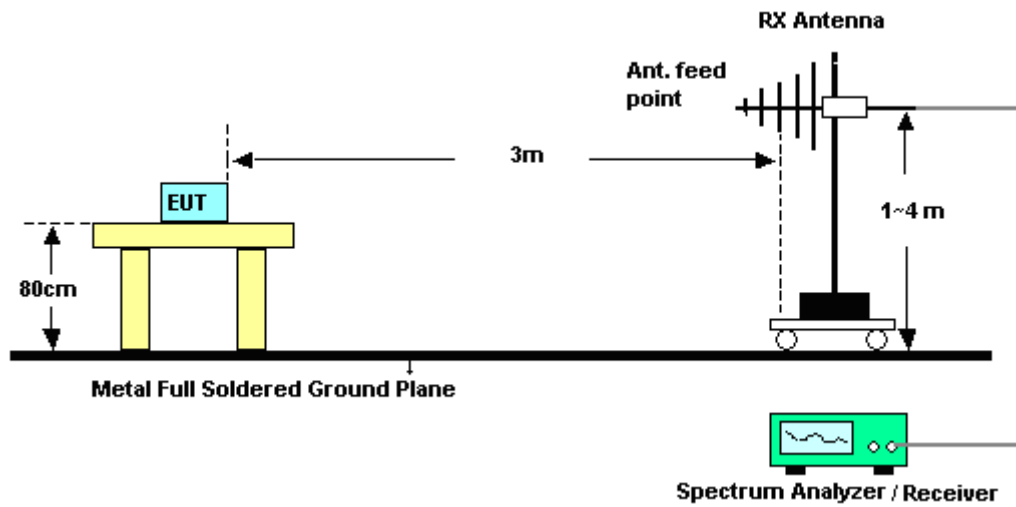
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and 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 adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.2.4 Test Setup

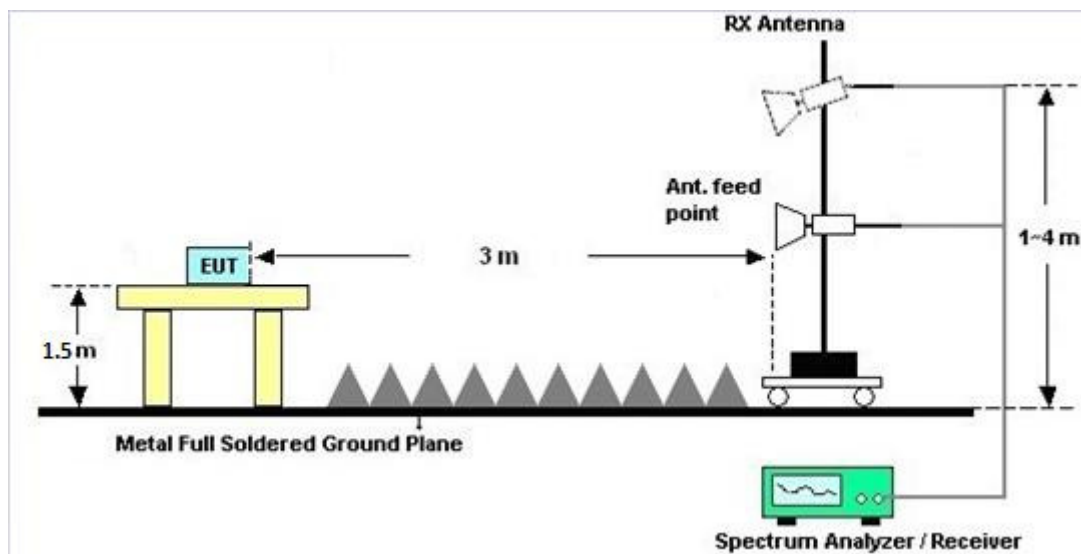
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





3.2.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.2.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and C.

3.2.7 Duty Cycle

Please refer to Appendix D.

3.2.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix B and C.



3.3 Automatically Discontinue Transmission

3.3.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.3.2 Measuring Instruments

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

3.3.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.4 Antenna Requirements

3.4.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2), if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.4.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1240001	300MHz~40GHz	Sep. 07, 2016	Oct. 04, 2016 ~ Oct. 17, 2016	Sep. 06, 2017	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz	Sep. 07, 2016	Oct. 04, 2016 ~ Oct. 17, 2016	Sep. 06, 2017	Conducted (TH05-HY)
Hygrometer	Testo	608-H2	41410069	N/A	Aug. 28, 2016	Oct. 04, 2016 ~ Oct. 17, 2016	Aug. 27, 2017	Conducted (TH05-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY84209521	1GHz~26GHz	Dec. 03, 2015	Oct. 04, 2016 ~ Oct. 17, 2016	Dec. 02, 2016	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Sep. 02, 2015	Oct. 15, 2016 ~ Nov. 28, 2016	Sep. 01, 2017	Radiation (03CH12-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 20, 2015	Oct. 15, 2016 ~ Nov. 08, 2016	Nov. 19, 2016	Radiation (03CH12-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Nov. 10, 2016	Nov. 22, 2016 ~ Nov. 28, 2016	Nov. 09, 2017	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&N-6-06	35414&AT-N 0602	30MHz~1GHz	Oct. 15, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Oct. 14, 2017	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1522	1G~18GHz	Mar. 31, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Mar. 30, 2017	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917057 6	18GHz ~ 40GHz	Apr. 15, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Apr. 14, 2017	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 21, 2015	Oct. 15, 2016 ~ Nov. 28, 2016	Dec. 20, 2016	Radiation (03CH12-HY)
Spectrum Analyzer	Agilent	N9030A	MY52350276	3Hz~44GHz	Mar. 21, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Mar. 20, 2017	Radiation (03CH12-HY)
Preamplifier	MITEQ	TTA0204	1872107	2GHz~40GHz	Feb. 15, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Feb. 14, 2017	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1815698	1GHz~18GHz	Dec. 14, 2015	Oct. 15, 2016 ~ Nov. 28, 2016	Dec. 13, 2016	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 30, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Jan. 29, 2017	Radiation (03CH12-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Nov. 17, 2015	Oct. 15, 2016 ~ Nov. 08, 2016	Nov. 16, 2016	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP140349	N/A	Nov. 14, 2016	Nov. 22, 2016 ~ Nov. 28, 2016	Nov. 13, 2017	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24958/4, MY28653/4, MY9839/4PE	26GHz~40GHz	Jan. 12, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Jan. 11, 2017	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24958/4, MY28653/4, MY9839/4PE	1GHz~26GHz	Jan. 12, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Jan. 11, 2017	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24958/4, MY28653/4, MY9839/4PE	30MHz~1GHz	Jan. 12, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Jan. 11, 2017	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24958/4, MY28653/4, MY9839/4PE	9K~30MHz	Jan. 12, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Jan. 11, 2017	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 15, 2016 ~ Nov. 28, 2016	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 15, 2016 ~ Nov. 28, 2016	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 15, 2016 ~ Nov. 28, 2016	N/A	Radiation (03CH12-HY)
Test Software	Audix	E3	6.2009-8-24	N/A	N/A	Oct. 15, 2016 ~ Nov. 28, 2016	N/A	Radiation (03CH12-HY)
Filter	Wainwright	WLKS4500-8S S	SN19	4.5G Low Pass	Sep. 19, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Sep. 18, 2017	Radiation (03CH12-HY)
Filter	Microwave Circuits	WHKX8-5872. 5-6750-18000-40ST	SN3	6.75 GHz Highpass	Sep. 19, 2016	Oct. 15, 2016 ~ Nov. 28, 2016	Sep. 18, 2017	Radiation (03CH12-HY)



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.10
--	------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20
--	------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.70
--	------



Appendix A. Conducted Test Results

Test Engineer:	Luffy Lin / Tommy Lee	Temperature:	21~25	°C
Test Date:	2016/10/06 ~ 2016/10/17	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Power Table

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.12	14.78	24.00	-3.40		Pass
11a	6Mbps	1	44	5220	0.12	14.96	24.00	-3.40		Pass
11a	6Mbps	1	48	5240	0.12	14.91	24.00	-3.40		Pass
HT20	MCS0	1	36	5180	0.13	14.80	24.00	-3.40		Pass
HT20	MCS0	1	44	5220	0.13	14.94	24.00	-3.40		Pass
HT20	MCS0	1	48	5240	0.13	14.90	24.00	-3.40		Pass
HT40	MCS0	1	38	5190	0.26	12.40	24.00	-3.40		Pass
HT40	MCS0	1	46	5230	0.26	12.46	24.00	-3.40		Pass

TEST RESULTS DATA
Average Power Table

FCC Band II										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	52	5260	0.12	14.84	23.98	-2.70	26.99	Pass
11a	6M bps	1	60	5300	0.12	14.83	23.98	-2.70	26.99	Pass
11a	6M bps	1	64	5320	0.12	14.99	23.98	-2.70	26.99	Pass
HT20	MCS 0	1	52	5260	0.13	14.89	23.98	-2.70	26.99	Pass
HT20	MCS 0	1	60	5300	0.13	14.80	23.98	-2.70	26.99	Pass
HT20	MCS 0	1	64	5320	0.13	14.77	23.98	-2.70	26.99	Pass
HT40	MCS 0	1	54	5270	0.26	12.38	23.98	-2.70	26.99	Pass
HT40	MCS 0	1	62	5310	0.26	12.36	23.98	-2.70	26.99	Pass

TEST RESULTS DATA
Average Power Table

FCC Band III										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)	EIRP Power Limit (dBm)	Pass/Fail
11a	6M bps	1	100	5500	0.12	14.78	23.98	-1.50	26.99	Pass
11a	6M bps	1	116	5580	0.12	14.83	23.98	-1.50	26.99	Pass
11a	6M bps	1	140	5700	0.12	14.74	23.98	-1.50	26.99	Pass
HT20	MCS 0	1	100	5500	0.13	14.76	23.98	-1.50	26.99	Pass
HT20	MCS 0	1	116	5580	0.13	14.90	23.98	-1.50	26.99	Pass
HT20	MCS 0	1	140	5700	0.13	14.81	23.98	-1.50	26.99	Pass
HT40	MCS 0	1	102	5510	0.26	12.33	23.98	-1.50	26.99	Pass
HT40	MCS 0	1	110	5550	0.26	12.22	23.98	-1.50	26.99	Pass
HT40	MCS 0	1	134	5670	0.26	12.44	23.98	-1.50	26.99	Pass

TEST RESULTS DATA
Average Power Table

FCC Straddle Channel										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	144	5720	0.12	14.93	-	-1.50		Pass
HT20	MCS0	1	144	5720	0.13	14.82	-	-1.50		Pass
HT40	MCS0	1	142	5710	0.26	12.40	-	-1.50		Pass



Appendix B. Radiated Spurious Emission

Test Engineer :	Peter Chiu, Karl Hou, Nick Yu, and Citta Ke	Temperature :	21~23°C
		Relative Humidity :	54~58%

Band 1 5150~5250MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5148.46	62.06	-11.94	74	50.15	31.65	11.21	30.95	191	42	P	H
		5149.76	50.71	-3.29	54	38.8	31.65	11.21	30.95	191	42	A	H
	*	5190	101.03	-	-	89.12	31.68	11.18	30.95	191	42	P	H
	*	5190	91.29	-	-	79.38	31.68	11.18	30.95	191	42	A	H
		5418	60.06	-13.94	74	47.49	31.92	11.6	30.95	191	42	P	H
		5405.76	48.95	-5.05	54	36.4	31.9	11.6	30.95	191	42	A	H
		5149.24	60.81	-13.19	74	48.9	31.65	11.21	30.95	198	248	P	V
		5149.5	49.85	-4.15	54	37.94	31.65	11.21	30.95	198	248	A	V
	*	5190	97.55	-	-	85.64	31.68	11.18	30.95	198	248	P	V
	*	5190	88.01	-	-	76.1	31.68	11.18	30.95	198	248	A	V
		5406.72	59.91	-14.09	74	47.36	31.9	11.6	30.95	198	248	P	V
		5436.24	48.93	-5.07	54	36.31	31.93	11.64	30.95	198	248	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 1 5150~5250MHz****WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	46.18	-27.82	74	46.87	39.61	17.13	57.43	100	0	P	H
		15570	47.82	-26.18	74	46.42	38.22	21.64	58.46	100	0	P	H
													H
													H
		10380	46.31	-27.69	74	47	39.61	17.13	57.43	100	0	P	V
		15570	46.3	-27.7	74	44.9	38.22	21.64	58.46	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												


Band 2 5250~5350MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 62 5310MHz		5129.22	59.73	-14.27	74	46.97	32.47	11.24	30.95	396	330	P	H
		5114.14	49.11	-4.89	54	36.34	32.48	11.24	30.95	396	330	A	H
	*	5310	98.54	-	-	85.62	32.44	11.43	30.95	396	330	P	H
	*	5310	88.63	-	-	75.71	32.44	11.43	30.95	396	330	A	H
		5350.8	62.69	-11.31	74	49.69	32.43	11.52	30.95	396	330	P	H
		5351.28	50.96	-3.04	54	37.96	32.43	11.52	30.95	396	330	A	H
		5003.9	59.74	-14.26	74	46.85	32.5	11.34	30.95	100	351	P	V
		5037.44	49.02	-4.98	54	36.17	32.49	11.31	30.95	100	351	A	V
	*	5310	94.91	-	-	81.99	32.44	11.43	30.95	100	351	P	V
	*	5310	84.22	-	-	71.3	32.44	11.43	30.95	100	351	A	V
		5354.4	60.29	-13.71	74	47.29	32.43	11.52	30.95	100	351	P	V
		5355.12	49.52	-4.48	54	36.52	32.43	11.52	30.95	100	351	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 2 5250~5350MHz****WIFI 802.11n HT40 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 62 5310MHz		10620	46.82	-27.18	74	46.55	40.05	17.4	57.18	100	0	P	H
		15930	47.48	-26.52	74	45.1	38.21	21.91	57.74	100	0	P	H
													H
													H
		10620	47.13	-26.87	74	46.86	40.05	17.4	57.18	100	0	P	V
		15930	47.26	-26.74	74	44.88	38.21	21.91	57.74	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 3 - 5470~5725MHz****WIFI 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 140 5700MHz	*	5700	107.55	-	-	93.78	32.96	11.82	31.01	249	329	P	H
	*	5700	96.95	-	-	83.18	32.96	11.82	31.01	249	329	A	H
		5725	64.87	-9.13	74	51.02	33.03	11.84	31.02	249	329	P	H
		5725.08	50.89	-3.11	54	37.04	33.03	11.84	31.02	249	329	A	H
													H
													H
	*	5700	104.89	-	-	91.12	32.96	11.82	31.01	238	147	P	V
	*	5700	95.49	-	-	81.72	32.96	11.82	31.01	238	147	A	V
		5726.28	63.22	-10.78	74	49.37	33.03	11.84	31.02	238	147	P	V
		5725.08	50.94	-3.06	54	37.09	33.03	11.84	31.02	238	147	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 3 - 5470~5725MHz****WIFI 802.11n HT20 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 140 5700MHz		11400	47.15	-26.85	74	46.3	40.2	18.31	57.66	100	0	P	H
		17100	54.44	-19.56	74	46.49	41.62	22.99	56.66	301	64	P	H
		17100	40.36	-13.64	54	32.41	41.62	22.99	56.66	301	64	A	H
													H
		11400	46.75	-27.25	74	45.9	40.2	18.31	57.66	100	0	P	V
		17100	50.47	-23.53	74	42.52	41.62	22.99	56.66	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 LF		66.72	25.83	-14.17	40	44.8	12.42	1.06	32.45			P	H
		96.96	26.55	-16.95	43.5	41.91	16.01	1.06	32.43			P	H
		143.4	30.61	-12.89	43.5	43.39	17.89	1.75	32.42	100	0	P	H
		418.3	24.31	-21.69	46	31.32	22.69	2.68	32.38			P	H
		656.3	27.65	-18.35	46	30.41	26.04	3.61	32.41			P	H
		794.2	30.16	-15.84	46	30.38	27.85	4.14	32.21			P	H
													H
													H
													H
													H
													H
													H
		31.89	31.72	-8.28	40	38.42	24.98	0.78	32.46	100	0	P	V
		160.14	27.65	-15.85	43.5	41.32	17	1.75	32.42			P	V
		257.07	21.5	-24.5	46	32.48	19.5	1.83	32.31			P	V
		530.3	25.6	-20.4	46	30.43	24.38	3.19	32.4			P	V
		686.4	28.43	-17.57	46	30.8	26.22	3.82	32.41			P	V
		833.4	31.69	-14.31	46	30.97	28.43	4.28	31.99			P	V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Radiated Spurious Emission

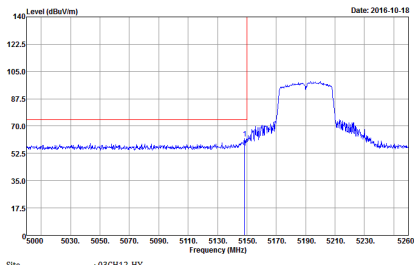
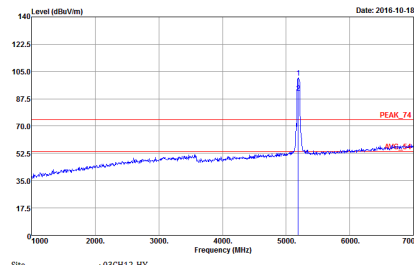
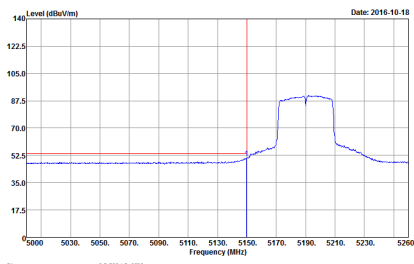
Test Engineer :	Peter Chiu, Karl Hou, Nick Yu, and Citta Ke	Temperature :	21~25°C
		Relative Humidity :	53~58%

Note symbol

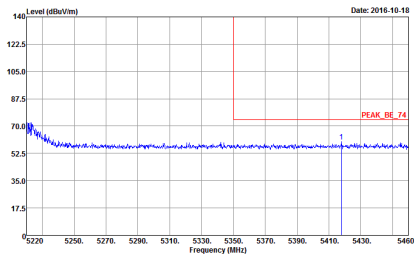
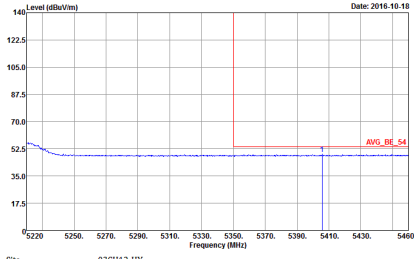
-L	Low channel location
-R	High channel location



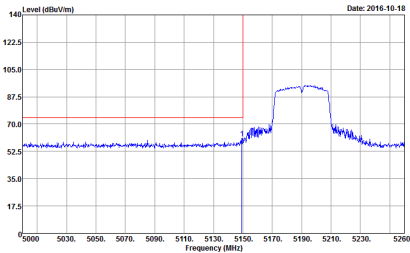
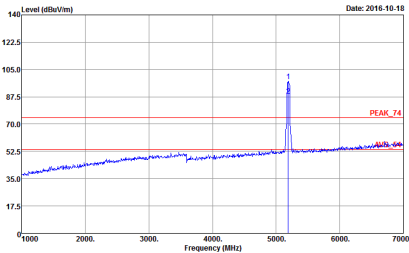
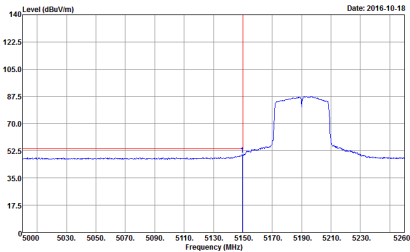
Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1	Horizontal	Fundamental
Peak	 Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL	 Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL
Avg.	 Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL	Left blank

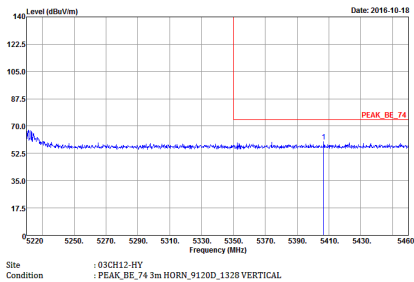
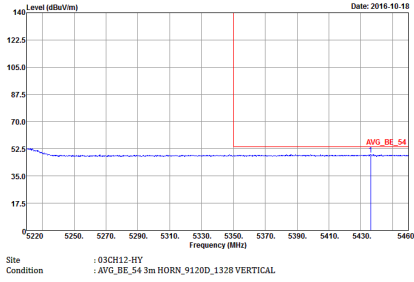


WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL	Left blank



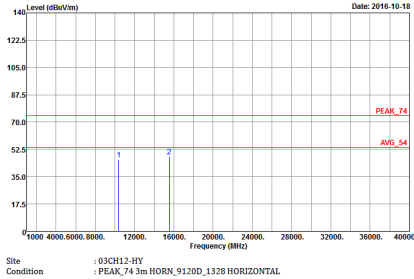
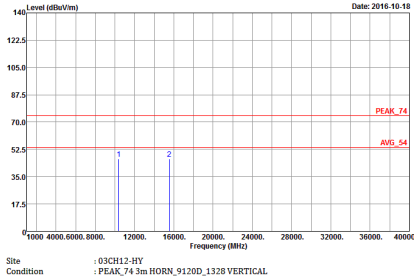
WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 VERTICAL	Left blank



WIFI	Band 1 5150~5250MHz Band Edge @ 3m	
ANT	802.11n HT40 CH38 5190MHz - R	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL	Left blank
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 VERTICAL	Left blank

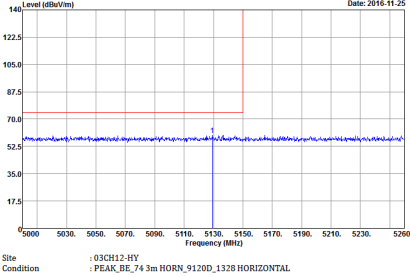
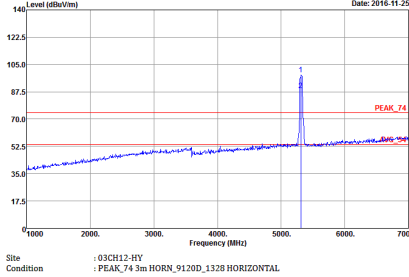
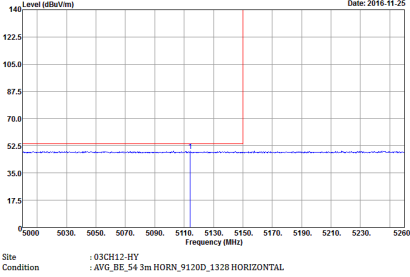


Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

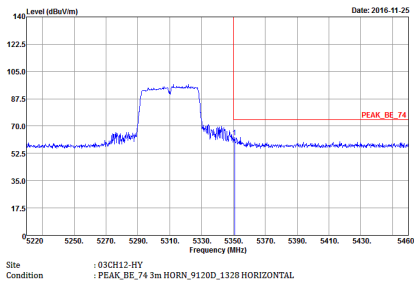
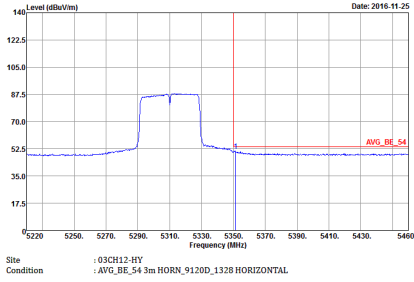
WIFI	Band 1 5150~5250MHz Harmonic @ 3m	
ANT	802.11n HT40 CH38 5190MHz	
1	Horizontal	Vertical
Peak Avg.		



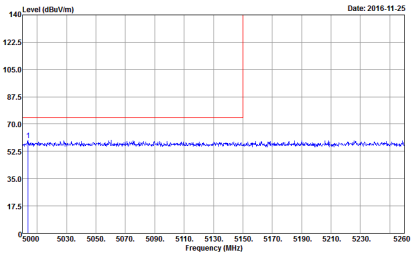
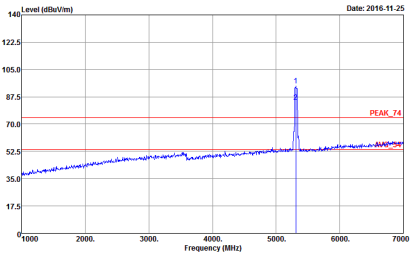
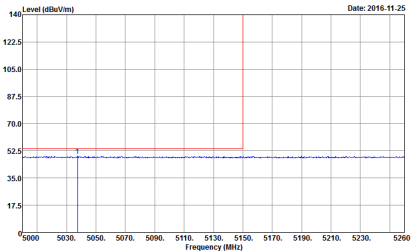
Band 2 5250~5350MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - L	
1	Horizontal	Fundamental
Peak	 Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL	 Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL
Avg.	 Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL	Left blank

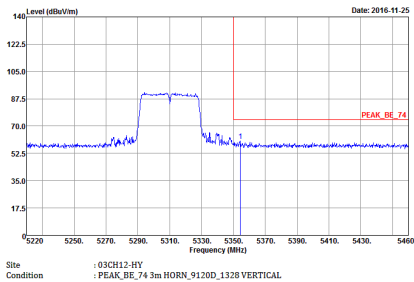
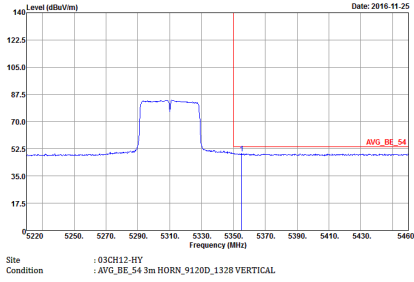


WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - R	
1	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank



WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - L	
1	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 VERTICAL	Left blank



WIFI	Band 2 5250~5350MHz Band Edge @ 3m	
ANT	802.11n HT40 CH62 5310 - R	
1	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank



Band 2 5250~5350MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

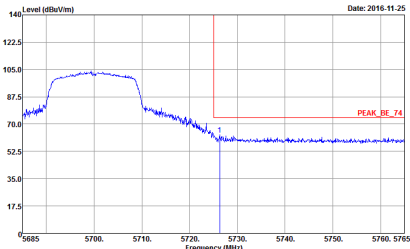
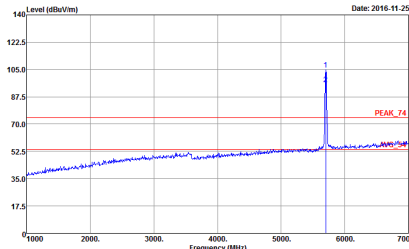
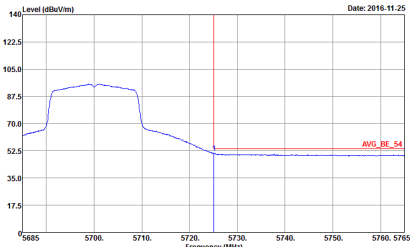
WIFI	Band 2 5250~5350MHz Harmonic @ 3m	
ANT	802.11n HT40 CH62 5310	
1	Horizontal	Vertical
Peak Avg.	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 VERTICAL



Band 3 5470~5725MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

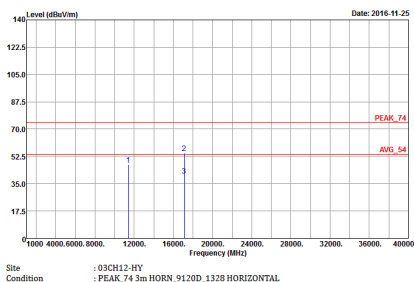
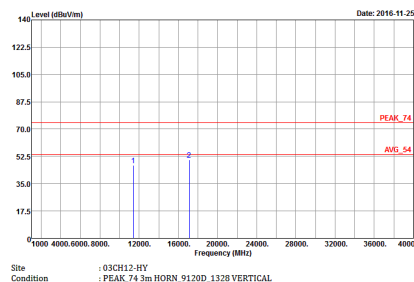
WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT20 CH140 5700MHz	
1	Horizontal	Fundamental
Peak	Site Condition : 03CH12-HY : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL	Site Condition : 03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL
Avg.	Site Condition : 03CH12-HY : AVG_BE_54 3m HORN_9120D_1328 HORIZONTAL	Left blank



WIFI	Band 3 5470~5725MHz Band Edge @ 3m	
ANT	802.11n HT20 CH140 5700MHz	
1	Vertical	Fundamental
Peak.	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL
Avg.	 Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 VERTICAL	Left blank



Band 3 5470~5725MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

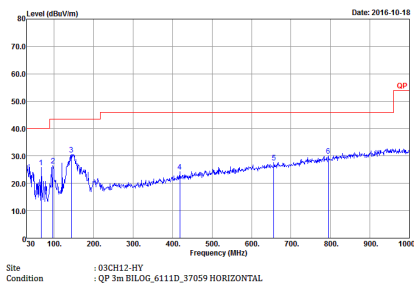
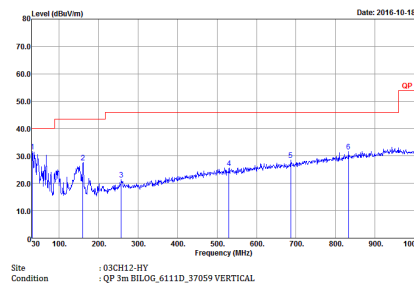
WIFI	Band 3 5470~5725MHz Harmonic @ 3m	
ANT	802.11n HT20 CH140 5700MHz	
1	Horizontal	Vertical
Peak Avg.	 Horizontal spectrum plot showing Level (dBuV/m) vs Frequency (MHz). Peaks are labeled 1, 2, and 3. A red line indicates PEAK_74 and a blue line indicates AVG_54. Site Condition: :03CH12-HY : PEAK_74 3m HORN_9120D_1328 HORIZONTAL.	 Vertical spectrum plot showing Level (dBuV/m) vs Frequency (MHz). Peaks are labeled 1 and 2. A red line indicates PEAK_74 and a blue line indicates AVG_54. Site Condition: :03CH12-HY : PEAK_74 3m HORN_9120D_1328 VERTICAL.



Band 3 5470~5725MHz

Emission below 1GHz

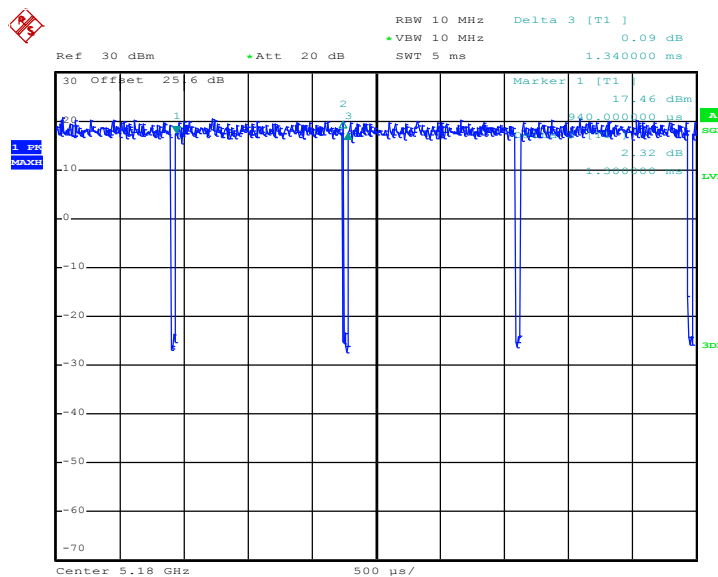
5GHz WIFI 802.11n HT40 (LF)

WIFI	5GHz WIFI	
ANT	802.11n HT40 LF	
1	Horizontal	Vertical
QP / Peak		

Appendix D Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
5GHz 802.11n HT20	97.02	1300	0.77	1kHz
5GHz 802.11n HT40	94.15	644	1.55	3kHz

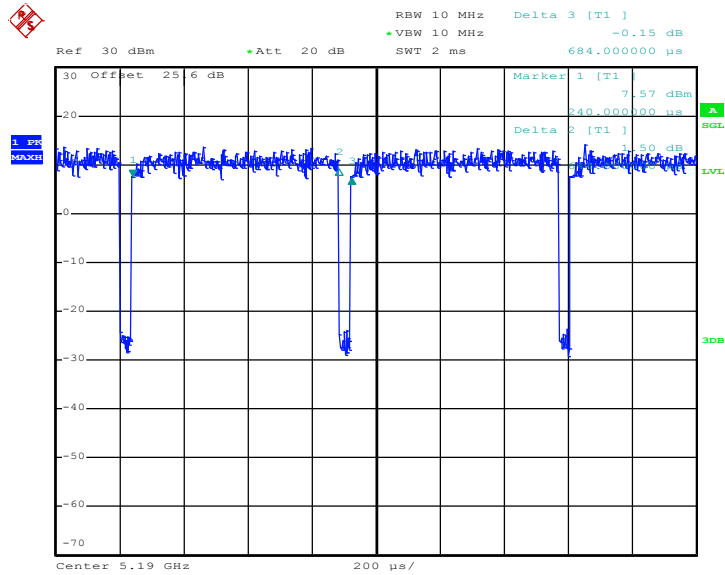
5GHz 802.11n HT20



Date: 4.OCT.2016 16:28:51



5GHz 802.11n HT40



Date: 4.OCT.2016 16:29:38



Appendix E. Original Report

Please refer to Sporton report number FR692208-01E