



FCC CO-LOCATION RADIO TEST REPORT

FCC ID : PY7-50241N
Equipment : GSM/WCDMA/LTE Phone with BT, DTS/UNII
a/b/g/n/ac/ax, GPS, and NFC
Brand Name : Sony
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 Part 15 Subpart E §15.407
FCC Part 15 Subpart C §15.247

The product was received on Jul. 28, 2020 and testing was started from Sep. 16, 2020 and completed on Sep. 18, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

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
FR042240-01	01	Initial issue of report	Sep. 22, 2020

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.407(b) 15.247(d)	Unwanted Emissions	Pass	Under limit 6.71 dB at 899.120 MHz
3.2	15.203 & 15.407 (a) 15.247(d)	Antenna Requirement	Pass	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Yimin Ho

1 General Description

1.1 Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, DTS/UNII a/b/g/n/ac/ax, NFC and GNSS.

Product Specification subjective to this standard	
Antenna Type / Gain	<Bluetooth> Loop Antenna with gain -1.8 dBi <2400-2483.5 MHz> <Ant. 0> : Loop Antenna with gain -1.80 dBi <Ant. 1> : Loop Antenna with gain -11.50 dBi <5150 MHz ~ 5250 MHz> <Ant. 0> : Loop Antenna with gain -2.90 dBi <Ant. 1> : Loop Antenna with gain -3.30 dBi

EUT Information List			
HW Version	SW Version	S/N	Performed Test Item
A	5.80	QV7100NA3Y	Radiated Spurious Emission

Accessory List	
AC Adapter	Model Name : UCH32
	S/N: 6218W30200215
Earphone	Model Name : MH750
	S/N : N/A
USB Cable	Model Name.: UCB24
	S/N : N/A

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 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
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.
	03CH15-HY

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

FCC designation No.: TW0007

1.4 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 §15.407
- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.

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: radiation 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 for GSM Link + 802.11b Tx CH01 and LTE Band 7 + 802.11b_Tx and Y Plane for GSM850 + Bluetooth_Tx + 802.11a_Tx and GSM850 + 802.11b_Tx + 802.11a_Tx) were recorded in this report.

2.1 Carrier Frequency and Channel

2400-2483.5 MHz Bluetooth		2400-2483.5 MHz 802.11b		5150-5250 MHz 802.11a	
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
39	2441	01	2412	36	5180

2.2 Test Mode

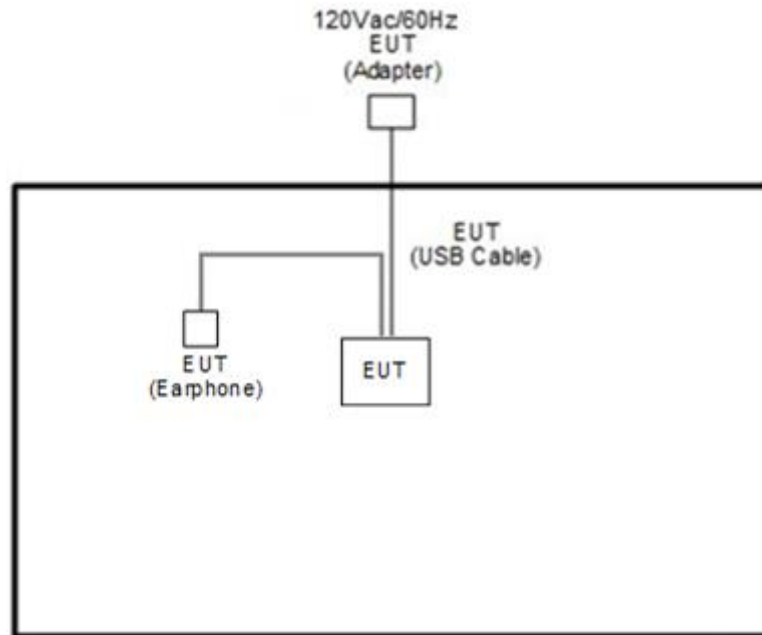
Final test modes are considering the modulation and worse data rates as below table.

<Co-Location>

Modulation	Data Rate
802.11b + GSM 850	1 Mbps + QPSK
802.11b + LTE Band 7	1 Mbps + QPSK
Bluetooth + 802.11a + GSM 850	1 Mbps + 6 Mbps + QPSK
802.11b + 802.11a + GSM 850	1 Mbps + 6 Mbps + QPSK

Remark: During the Radiated Spurious Emission test, the EUT turn on the WWAN functions simultaneously.

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, utility "FTMC_bridge V.0.39" was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.1.1 Limit of Unwanted Emissions

- (1) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits 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 (dBμV/m)
- 27	68.3

- (2) KDB789033 D02 v02r01 G)2)c)

- (i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.
- (ii) Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are based on the use of a peak detector.

3.1.2 Measuring Instruments

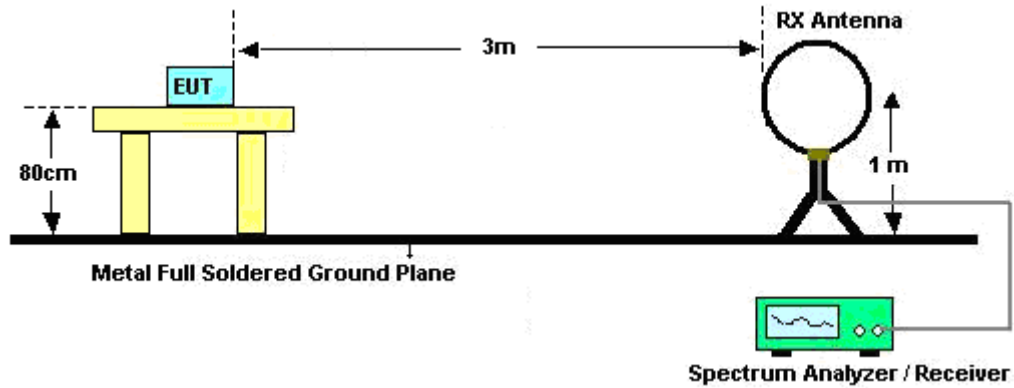
See list of measuring equipment of this test report.

3.1.3 Test Procedures

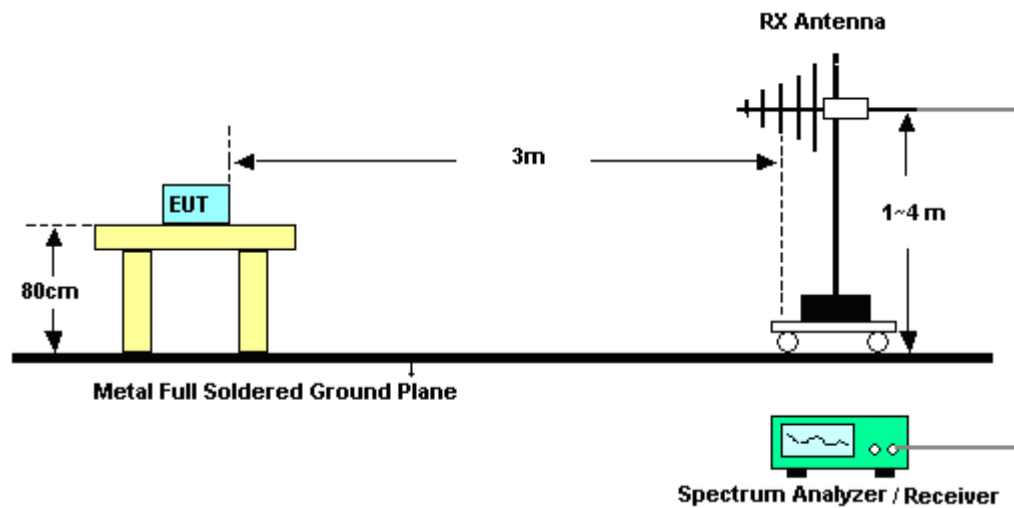
1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Section G) Unwanted emissions measurement.
(1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
(2) Procedure for Peak Unwanted 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.

3.1.4 Test Setup

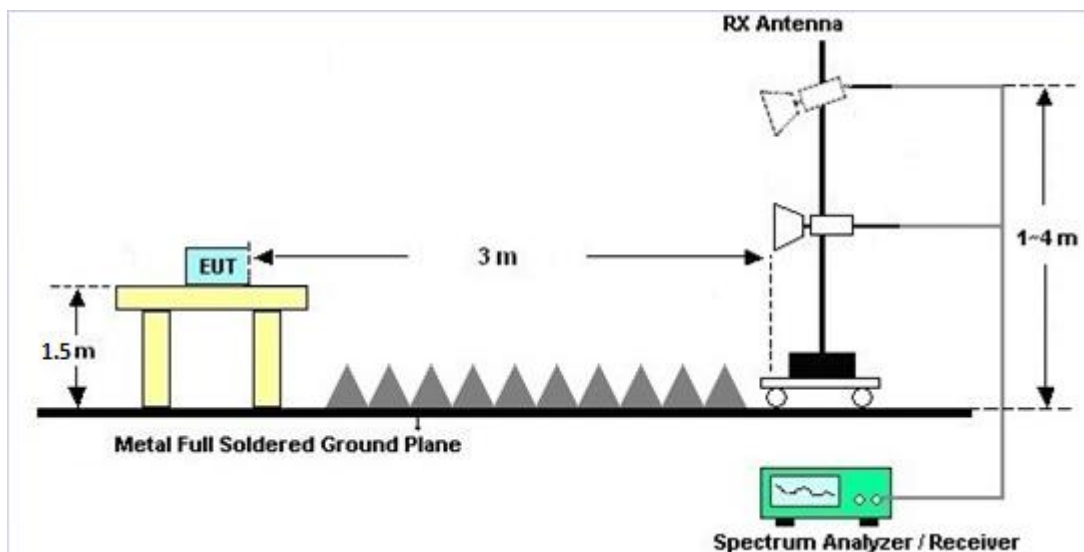
For radiated emissions below 30MHz



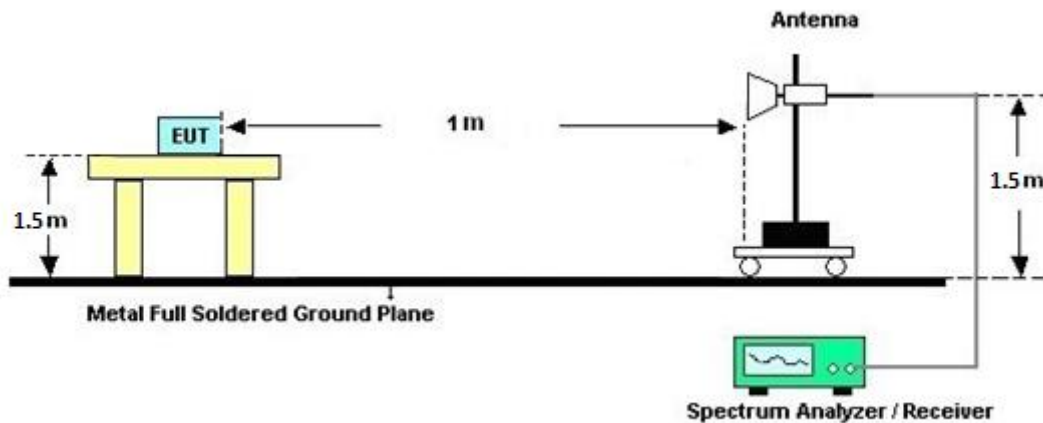
For radiated emissions from 30MHz to 1GHz



For radiated emissions from 1GHz to 18GHz



For radiated emissions above 18GHz



3.1.5 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 was not reported.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.1.6 Test Result of Radiated Band Edges

Please refer to Appendix A and B.

3.1.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.



3.2 Antenna Requirements

3.2.1 Standard Applicable

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.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 09, 2020	Sep. 16, 2020~ Sep.18, 2020	Jan. 08, 2021	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&0 0800N1D01N -06	41912&05	30MHz to 1GHz	Feb. 09, 2020	Sep. 16, 2020~ Sep.18, 2020	Feb. 08, 2021	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 27, 2019	Sep. 16, 2020~ Sep.18, 2020	Dec. 26, 2020	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1620	1-18GHz	Oct. 28, 2019	Sep. 16, 2020~ Sep.18, 2020	Oct. 27, 2020	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA91705 84	18GHz- 40GHz	Dec. 10, 2019	Sep. 16, 2020~ Sep.18, 2020	Dec. 09, 2020	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-3 03	1710001800 055006	1GHz~18GHz	May 07, 2020	Sep. 16, 2020~ Sep.18, 2020	May 06, 2021	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY5327019 5	1GHz~26.5GHz	Aug. 21, 2020	Sep. 16, 2020~ Sep.18, 2020	Aug. 20, 2021	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 13, 2019	Sep. 16, 2020~ Sep.18, 2020	Dec. 12, 2020	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY5413008 5	20MHz~8.4GHz	Nov. 01, 2019	Sep. 16, 2020~ Sep.18, 2020	Oct. 31, 2020	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY5018013 6	3Hz~44GHz	May 04, 2020	Sep. 16, 2020~ Sep.18, 2020	May 03, 2021	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Sep. 16, 2020~ Sep.18, 2020	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Sep. 16, 2020~ Sep.18, 2020	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24 (k5)	RK-000451	N/A	N/A	Sep. 16, 2020~ Sep.18, 2020	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 14, 2020	Sep. 16, 2020~ Sep.18, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4P E	30M-18G	Apr. 14, 2020	Sep. 16, 2020~ Sep.18, 2020	Apr. 13, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY37710/4	30M-18G	Apr. 17, 2020	Sep. 16, 2020~ Sep.18, 2020	Apr. 16, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30MHz-40GHz	Feb. 25, 2020	Sep. 16, 2020~ Sep.18, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30MHz-40GHz	Feb. 25, 2020	Sep. 16, 2020~ Sep.18, 2020	Feb. 24, 2021	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4P E	9kHz~30MHz	Mar. 12, 2020	Sep. 16, 2020~ Sep.18, 2020	Mar. 11, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000-1 530-8000-40 SS	SN4	1.53G Low Pass	Jul. 03, 2020	Sep. 16, 2020~ Sep.18, 2020	Jul. 02, 2021	Radiation (03CH15-HY)
Filter	Wainwright	WHKX8-5872 .5-6750-1800 0-40ST	SN6	6.75GHz High Pass Filter	Jul. 03, 2020	Sep. 16, 2020~ Sep.18, 2020	Jul. 02, 2021	Radiation (03CH15-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.06
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.63
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Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.16
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Appendix A. Radiated Spurious Emission

Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	22.1~23.1°C
		Relative Humidity :	55~60%

802 11b_Tx_Ch01 (Band Edge @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01		2352.63	56.11	-17.89	74	41.79	27.98	7.35	30.93	100	149	P	H
		2310.63	45.04	-8.96	54	30.72	28.08	7.27	30.95	100	149	A	H
	*	2412	105	-	-	90.84	27.68	7.47	30.91	100	149	P	H
	*	2412	101.93	-	-	87.77	27.68	7.47	30.91	100	149	A	H
													H
													H
		2349.69	56.54	-17.46	74	42.2	28	7.35	30.93	100	70	P	V
		2327.22	45.07	-8.93	54	30.74	28.05	7.3	30.94	100	70	A	V
	*	2412	96.58	-	-	82.42	27.68	7.47	30.91	100	70	P	V
	*	2412	93.44	-	-	79.28	27.68	7.47	30.91	100	70	A	V
													V
													V
Remark		1. No other spurious found. 2. All results are PASS against Peak and Average limit line.											

**802 11b_Tx_Ch01 (Harmonic @ 3m)**

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01		4824	39.95	-34.05	74	57.12	31.25	10.67	59.09	100	0	P	H
													H
													H
													H
													H
													H
													H
													H
		4824	39.78	-34.22	74	56.95	31.25	10.67	59.09	100	0	P	V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



802 11b_Tx_Ch01 (Band Edge @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01		2345.28	56.73	-17.27	74	42.39	28.01	17.26	30.93	100	202	P	H
		2310.63	45.01	-8.99	54	30.69	28.08	17.19	30.95	100	202	A	H
	*	2412	106.08	-	-	91.92	27.68	17.39	30.91	100	202	P	H
	*	2412	101.91	-	-	87.75	27.68	17.39	30.91	100	202	A	H
													H
													H
		2323.86	57.51	-16.49	74	43.18	28.05	17.22	30.94	100	49	P	V
		2329.74	45.02	-8.98	54	30.69	28.04	17.23	30.94	100	49	A	V
	*	2412	99.78	-	-	85.62	27.68	17.39	30.91	100	49	P	V
	*	2412	96.65	-	-	82.49	27.68	17.39	30.91	100	49	A	V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



802 11b_Tx_Ch01 (Harmonic @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01		4824	39.56	-34.44	74	56.73	31.25	10.67	59.09	100	0	P	H
													H
													H
													H
													H
													H
													H
													H
		4824	39.19	-34.81	74	56.36	31.25	10.67	59.09	100	0	P	V
													V
													V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



BT(1M)_Tx_CH39 + 802 11a_Tx_CH36 (Band Edge @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT_Tx_Ch39 + 11a_Tx_Ch36		2386.16	46.61	-27.39	74	42.33	27.78	7.42	30.92	132	205	P	H
		2386.16	21.82	-32.18	54	-	-	-	-	-	-	A	H
	*	2441	106.19	-	-	101.94	27.62	7.52	30.89	132	205	P	H
	*	2441	81.4	-	-	-	-	-	-	-	-	A	H
		2486.14	46.88	-27.12	74	42.63	27.53	7.6	30.88	132	205	P	H
		2486.14	22.09	-31.91	54	-	-	-	-	-	-	A	H
		2315.46	46.44	-27.56	74	42.04	28.07	7.28	30.95	400	275	P	V
		2315.46	21.65	-32.35	54	-	-	-	-	-	-	A	V
	*	2441	98.63	-	-	94.38	27.62	7.52	30.89	400	275	P	V
	*	2441	73.84	-	-	-	-	-	-	-	-	A	V
		2497.2	46.51	-27.49	74	42.25	27.51	7.62	30.87	400	275	P	V
		2497.2	21.72	-32.28	54	-	-	-	-	-	-	A	V
BT_Tx_Ch39 + 11a_Tx_Ch36		5087.36	52.99	-21.01	74	40.18	31.97	10.85	30.01	100	17	P	H
		5149.76	42.26	-11.74	54	29.17	32.1	11	30.01	100	17	A	H
	*	5180	104.71	-	-	91.72	31.92	11.08	30.01	100	17	P	H
	*	5180	97.22	-	-	84.23	31.92	11.08	30.01	100	17	A	H
													H
													H
		5072.8	52.45	-21.55	74	39.71	31.95	10.81	30.02	100	335	P	V
		5149.76	42.2	-11.8	54	29.11	32.1	11	30.01	100	335	A	V
	*	5180	99.34	-	-	86.35	31.92	11.08	30.01	100	335	P	V
	*	5180	91.16	-	-	78.17	31.92	11.08	30.01	100	335	A	V
													V
													V
Remark	1. No other spurious found.												
	2. All results are PASS against Peak and Average limit line.												



BT(1M)_Tx_CH39 + 802 11a_Tx_CH36 (Harmonic @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT_Tx_Ch39 + 11a_Tx_Ch36		4882	51.06	-22.94	74	37.84	31.24	10.61	30.05	350	151	P	H
		4882	26.27	-27.73	54	-	-	-	-	-	-	A	H
		7332	44.33	-29.67	74	53.39	36.56	12.92	58.54	100	0	P	H
		7332	19.54	-34.46	54	-	-	-	-	-	-	A	H
		10360	48.13	-20.07	68.2	54.72	39.9	14.41	60.9	100	0	P	H
		15540	47.82	-26.18	74	55.25	38	17.28	62.71	100	0	P	H
													H
													H
		4882	52.42	-21.58	74	39.2	31.24	10.61	30.05	153	242	P	V
		4882	27.63	-26.37	54	-	-	-	-	-	-	A	V
		7323	43.22	-30.78	74	52.3	36.55	12.92	58.55	100	0	P	V
		7323	18.43	-35.57	54	-	-	-	-	-	-	A	V
		10360	48.6	-19.6	68.2	55.19	39.9	14.41	60.9	100	0	P	V
		15540	47.96	-26.04	74	55.39	38	17.28	62.71	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



802 11b_Tx_CH01 + 802 11a_Tx_CH36 (Band Edge @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01 + 11a_Tx_Ch36		2317.35	55.97	-18.03	74	41.65	28.07	17.2	30.95	100	247	P	H
		2335.515	45.02	-8.98	54	30.69	28.03	17.24	30.94	100	247	A	H
	*	2412	100.53	-	-	86.37	27.68	17.39	30.91	100	247	P	H
	*	2412	97.41	-	-	83.25	27.68	17.39	30.91	100	247	A	H
												P	H
												A	H
		2318.925	56.6	-17.4	74	42.28	28.06	17.21	30.95	358	220	P	V
		2338.035	44.99	-9.01	54	30.67	28.02	17.24	30.94	358	220	A	V
	*	2412	98.56	-	-	84.4	27.68	17.39	30.91	358	220	P	V
	*	2412	95.53	-	-	81.37	27.68	17.39	30.91	358	220	A	V
												P	V
												A	V
11b_Tx_Ch01 + 11a_Tx_Ch36		5100.62	52.67	-21.33	74	39.8	32	10.88	30.01	100	51	P	H
		5149.76	42.27	-11.73	54	29.18	32.1	11	30.01	100	51	A	H
	*	5180	100.28	-	-	87.29	31.92	11.08	30.01	100	51	P	H
	*	5180	91.96	-	-	78.97	31.92	11.08	30.01	100	51	A	H
													H
													H
		5051.48	52.75	-21.25	74	40.11	31.9	10.76	30.02	100	348	P	V
		5149.76	42.34	-11.66	54	29.25	32.1	11	30.01	100	348	A	V
	*	5180	104.32	-	-	91.33	31.92	11.08	30.01	100	348	P	V
	*	5180	95.65	-	-	82.66	31.92	11.08	30.01	100	348	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**802 11b_Tx_CH01 + 802 11a_Tx_CH36 (Harmonic @ 3m)**

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01 + 11a_Tx_Ch36		4824	52.28	-21.72	74	39.07	31.25	12.03	30.07	312	242	P	H
		4824	44.45	-9.55	54	31.24	31.25	12.03	30.07	312	242	A	H
		10360	47.92	-20.28	68.2	54.51	39.9	14.41	60.9	100	0	P	H
		15540	46.8	-27.2	74	54.23	38	17.28	62.71	100	0	P	H
													H
													H
													H
													H
		4824	52.77	-21.23	74	39.56	31.25	12.03	30.07	211	329	P	V
		4824	46.03	-7.97	54	32.82	31.25	12.03	30.07	211	329	A	V
		10360	48.53	-19.67	68.2	55.12	39.9	14.41	60.9	100	0	P	V
		15540	47.73	-26.27	74	55.16	38	17.28	62.71	100	0	P	V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission above 18GHz

802 11b_Tx_Ch01 (SHF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
11b_Tx_Ch01		22389	40.72	-33.28	74	42.86	38.52	22.36	53.48	150	0	P	H
												P	H
												P	H
												P	H
												P	H
												P	H
		23502	42.11	-31.89	74	42.68	39.7	22.57	53.3	150	0	P	V
												P	V
												P	V
												P	V
												P	V
												P	V
Remark	1. No other spurious found.												
	2. All results are PASS against limit line.												



Emission below 1GHz

802 11b_Tx_Ch01 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
Simultaneously		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
11b_Tx_Ch01		42.61	24.77	-15.23	40	37.95	18.2	0.95	32.33	-	-	P	H
		142.52	29.48	-14.02	43.5	42.51	17.58	1.9	32.51	-	-	P	H
		195.87	28.55	-14.95	43.5	43.55	15.07	2.31	32.38	-	-	P	H
		273.47	24.04	-21.96	46	35.21	18.6	2.69	32.46	-	-	P	H
		721.61	37.15	-8.85	46	38.25	26.95	4.37	32.42	-	-	P	H
		886.51	38.5	-7.5	46	36.91	28.54	4.96	31.91	100	0	P	H
													H
		42.61	31.74	-8.26	40	44.92	18.2	0.95	32.33	-	-	P	V
		71.71	29.52	-10.48	40	48.19	12.65	1.27	32.59	-	-	P	V
		176.47	26.76	-16.74	43.5	41.6	15.39	2.16	32.39	-	-	P	V
		500.45	27.71	-18.29	46	32.66	23.82	3.66	32.43	-	-	P	V
		721.61	38.46	-7.54	46	39.56	26.95	4.37	32.42	-	-	P	V
		893.3	38.47	-7.53	46	36.87	28.55	4.99	31.94	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



802 11b_Tx_Ch01 (LF @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01		41.64	24.12	-15.88	40	36.73	18.77	0.95	32.33	-	-	P	H
		143.49	29.16	-14.34	43.5	42.19	17.56	1.91	32.5	-	-	P	H
		270.56	24.62	-21.38	46	35.6	18.79	2.69	32.46	-	-	P	H
		398.6	23.12	-22.88	46	30.31	21.78	3.18	32.15	-	-	P	H
		720.64	30.47	-15.53	46	31.6	26.92	4.37	32.42	-	-	P	H
		899.12	39.29	-6.71	46	37.68	28.56	5.01	31.96	100	0	P	H
													H
		41.64	32.56	-7.44	40	45.17	18.77	0.95	32.33	100	0	P	V
		144.46	30.15	-13.35	43.5	43.26	17.48	1.91	32.5	-	-	P	V
		175.5	27.42	-16.08	43.5	42.23	15.43	2.15	32.39	-	-	P	V
		512.09	25.01	-20.99	46	29.9	23.82	3.69	32.4	-	-	P	V
		713.85	33.29	-12.71	46	34.79	26.57	4.34	32.41	-	-	P	V
		891.36	38	-8	46	36.44	28.51	4.98	31.93	-	-	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



BT_Tx_Ch39 + 802 11a_Tx_Ch36 (LF @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT_Tx_Ch39 + 11a_Tx_Ch36		135.73	28.94	-14.56	43.5	42.16	17.67	1.61	32.5	-	-	P	H
		196.84	27.03	-16.47	43.5	42.33	15.09	1.99	32.38	-	-	P	H
		265.71	23.5	-22.5	46	34.16	19.48	2.3	32.44	-	-	P	H
		599.39	26.81	-19.19	46	30.6	25.45	3.4	32.64	-	-	P	H
		757.5	30.13	-15.87	46	30.96	27.72	3.85	32.4	-	-	P	H
		890.39	37.19	-8.81	46	36.36	28.49	4.27	31.93	100	0	P	H
													H
		40.67	24.7	-15.3	40	37.11	19.11	0.82	32.34	-	-	P	V
		64.92	23.52	-16.48	40	42.04	12.24	1.05	31.81	-	-	P	V
		142.52	25.76	-17.74	43.5	39.04	17.58	1.65	32.51	-	-	P	V
		180.35	23.4	-20.1	43.5	38.68	15.2	1.9	32.38	-	-	P	V
		565.44	27.67	-18.33	46	30.87	25.91	3.29	32.4	-	-	P	V
		887.48	38.38	-7.62	46	37.52	28.52	4.26	31.92	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



802 11b_Tx_CH01 + 802 11a_Tx_CH36 (LF @ 3m)

WIFI Ant. Simultaneously	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
11b_Tx_Ch01 + 11a_Tx_Ch36		42.61	24.67	-15.33	40	37.85	18.2	0.95	32.33	-	-	P	H
		140.58	29.67	-13.83	43.5	42.81	17.49	1.89	32.52	-	-	P	H
		195.87	27.76	-15.74	43.5	42.76	15.07	2.31	32.38	-	-	P	H
		273.47	25.02	-20.98	46	36.19	18.6	2.69	32.46	-	-	P	H
		714.82	36.67	-9.33	46	38.12	26.62	4.34	32.41	100	0	P	H
		790.48	31.14	-14.86	46	30.89	27.7	4.62	32.07	-	-	P	H
													H
		41.64	32.56	-7.44	40	45.17	18.77	0.95	32.33	100	0	P	V
		65.89	24.22	-15.78	40	42.65	12.29	1.22	31.94	-	-	P	V
		96.93	24.17	-19.33	43.5	39.11	15.8	1.54	32.28	-	-	P	V
		179.38	27.98	-15.52	43.5	42.92	15.25	2.19	32.38	-	-	P	V
		567.38	28.25	-17.75	46	30.97	25.85	3.84	32.41	-	-	P	V
		713.85	37.13	-8.87	46	38.63	26.57	4.34	32.41	-	-	P	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	H orizontal or V ertical

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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)

2. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path 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) + Path 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)

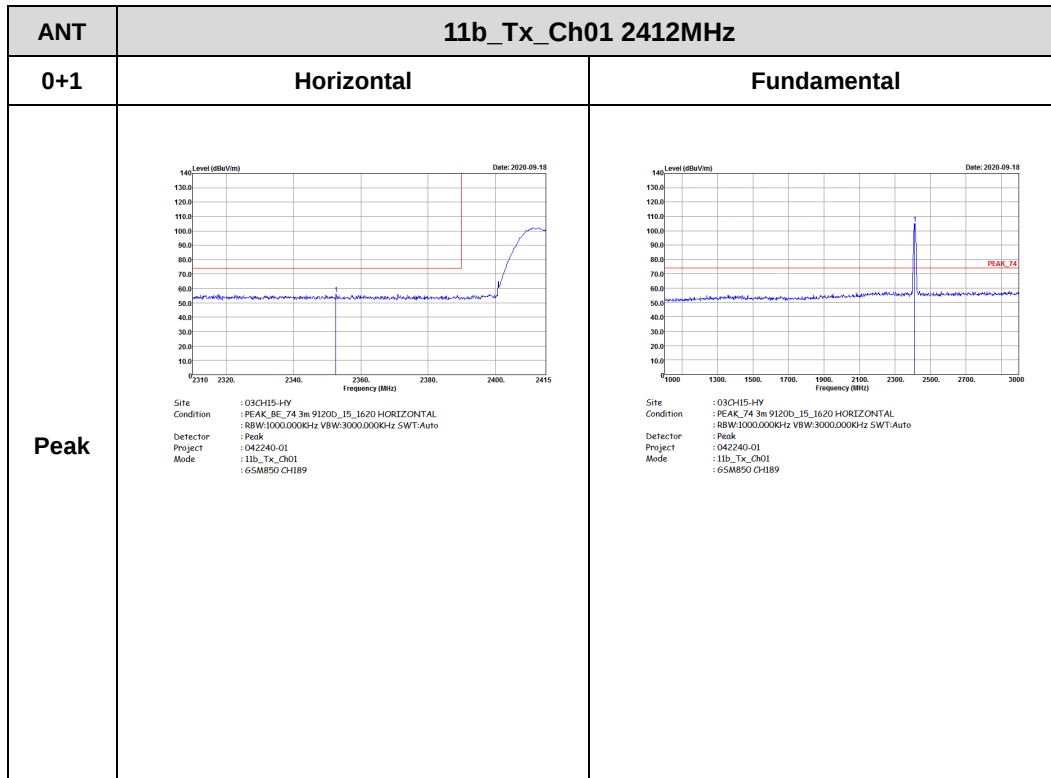
= -10.46(dB)

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

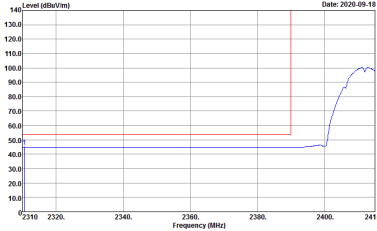
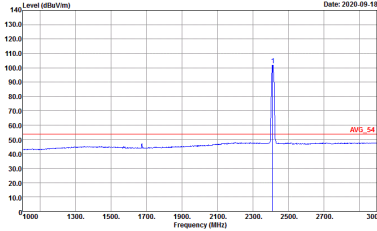


Appendix B. Radiated Spurious Emission Plots

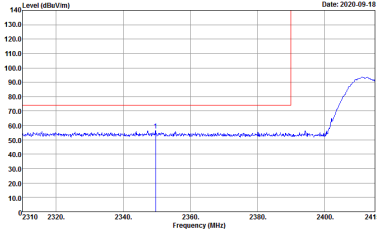
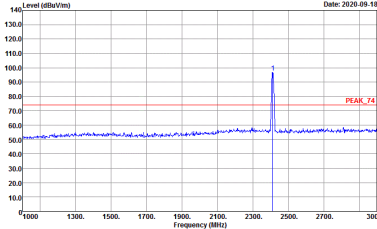
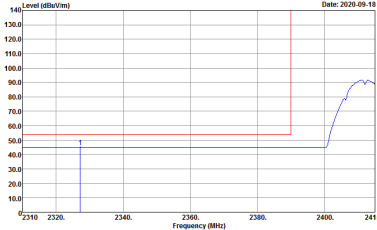
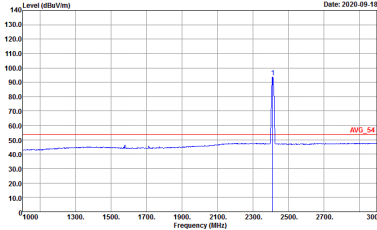
Test Engineer :	Leo Lee, Mancy Chou and Bigshow Wang	Temperature :	22.1~23.1°C
		Relative Humidity :	55~60%

11b_Tx_Ch01 Band Edge @ 3m)

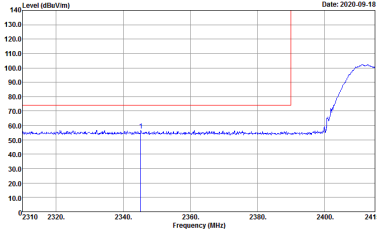
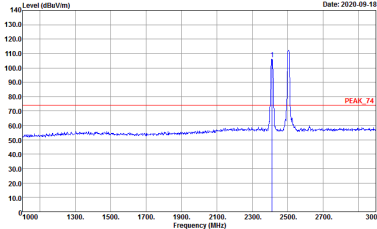
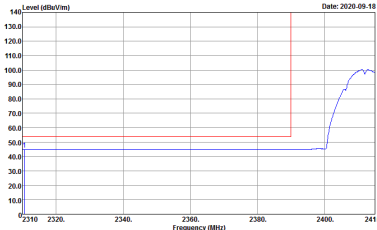
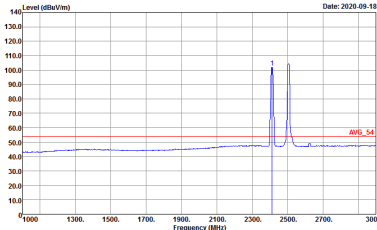


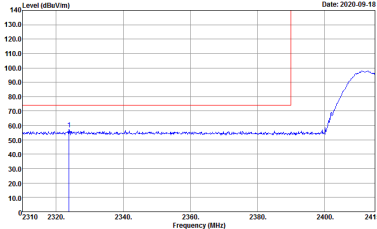
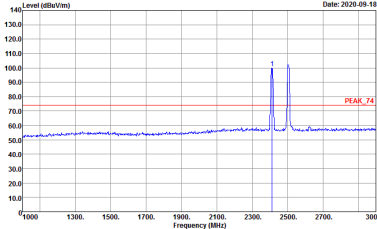
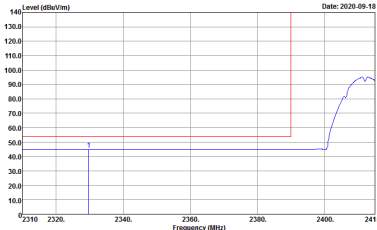
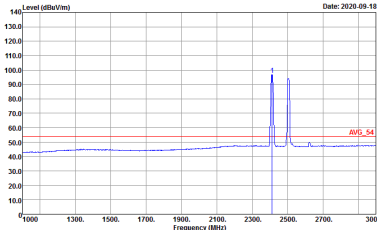
ANT	11b_Tx_Ch01 2412MHz	
0+1	Horizontal	Fundamental
Avg.	 Site : 03CH15-HY Condition : AV6_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189	 Site : 03CH15-HY Condition : AV6_54 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:0.010KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189



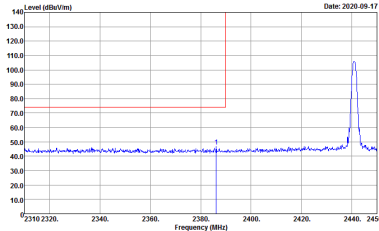
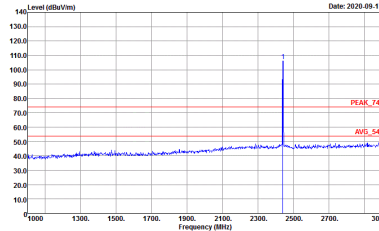
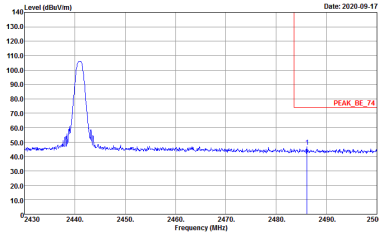
ANT	11b_Tx_Ch01 2412MHz	
0+1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 : 65M850 CH189

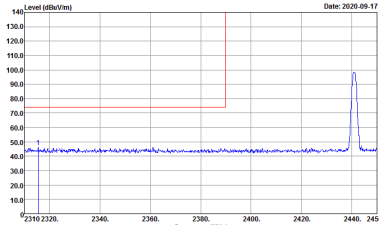
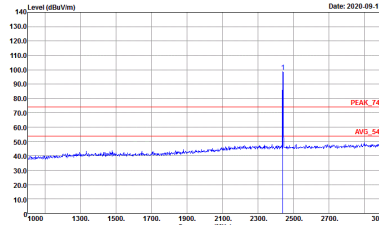
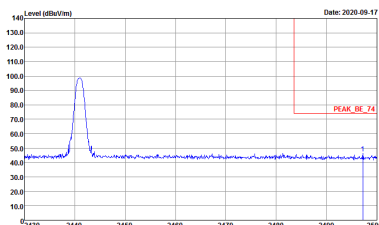
11b_Tx_Ch01 (Band Edge @ 3m)

ANT	11b_Tx_Ch01 2412MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 10M Ch20800 50R80 QPSK	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 10M Ch20800 50R80 QPSK
	 Site : 03CH15-HY Condition : AV6_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 10M Ch20800 50R80 QPSK	 Site : 03CH15-HY Condition : AV6_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 10M Ch20800 50R80 QPSK

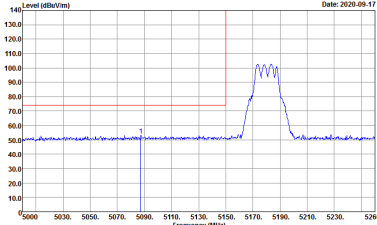
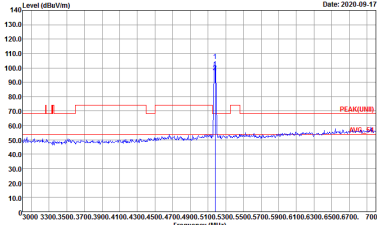
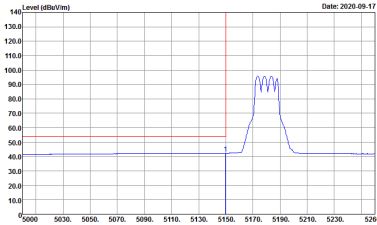
ANT	11b_Tx_Ch01 2412MHz	
0+1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 10M Ch20800 50R80 QPSK	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 10M Ch20800 50R80 QPSK
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 10M Ch20800 50R80 QPSK	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:0.000KHz SWT:Auto Project : 042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 10M Ch20800 50R80 QPSK

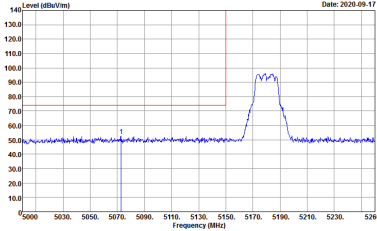
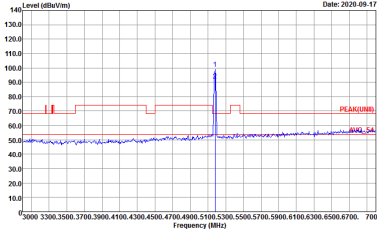
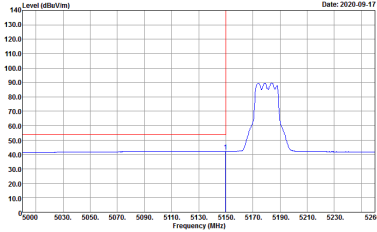
BT(1M)_Tx_CH39 + 802 11a_Tx_CH36 (Band Edge @ 3m)

ANT	BT_Tx_Ch39 2441MHz	
0	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 8T_Tx_Ch39 11a_Tx_Ch36 65M850 CH189	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 8T_Tx_Ch39 11a_Tx_Ch36 65M850 CH189
	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 8T_Tx_Ch39 11a_Tx_Ch36 65M850 CH189	Left blank

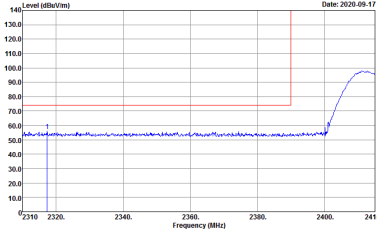
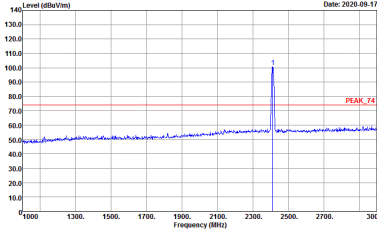
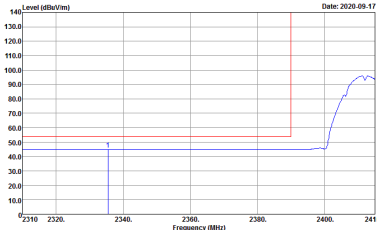
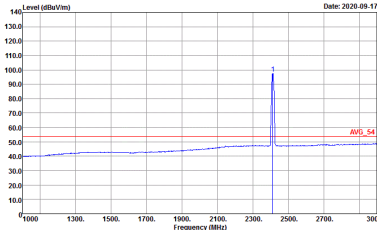
ANT	BT_Tx_Ch39 2441MHz	
0	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 : 11a_Tx_Ch36 : 65M850 CH189	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 : 11a_Tx_Ch36 : 65M850 CH189
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 : 11a_Tx_Ch36 : 65M850 CH189	Left blank

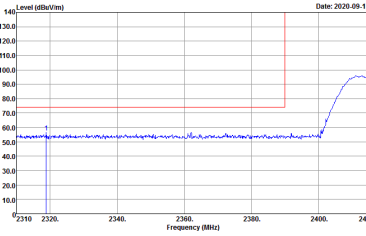
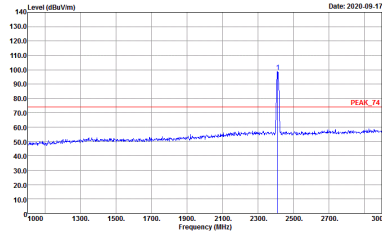
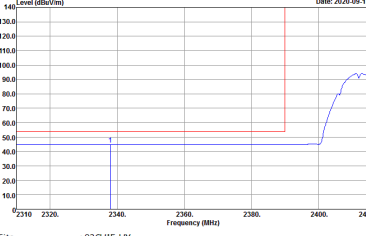
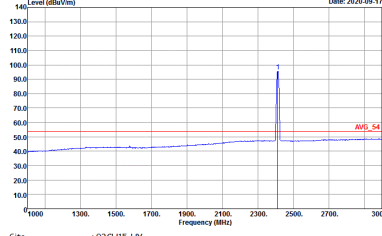
**BT(1M)_Tx_CH39 + 802 11a_Tx_CH36 (Band Edge @ 3m)**

ANT	11a_Tx_Ch36 5180MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	Left blank

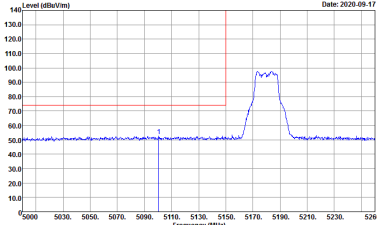
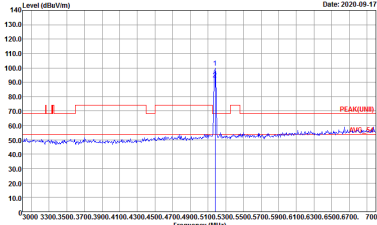
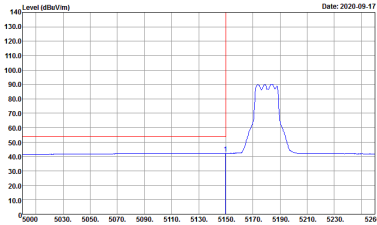
ANT	11a_Tx_Ch36 5180MHz	
0+1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK(LINII) 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:0.000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	Left blank

802 11b_Tx_CH01 + 802 11a_Tx_CH36 (Band Edge @ 3m)

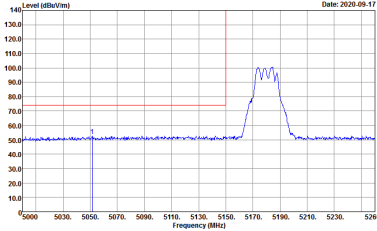
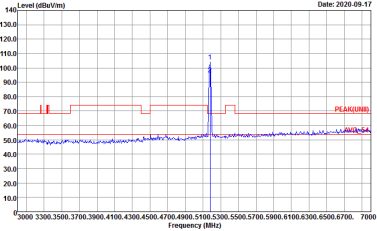
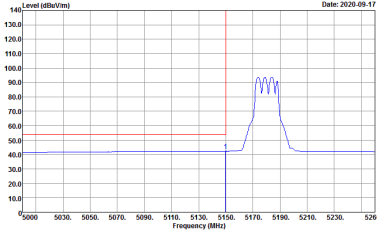
ANT	11b_Tx_Ch01 2412MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5
	 Site : 03CH15-HY Condition : AV6_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : AV6_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5

ANT	11b_Tx_Ch01 2412MHz	
0+1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : AVG_54 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5

**802 11b_Tx_CH01 + 802 11a_Tx_CH36 (Harmonic @ 3m)**

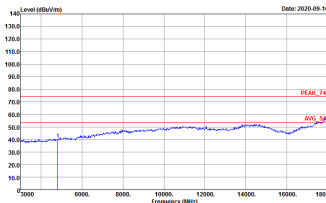
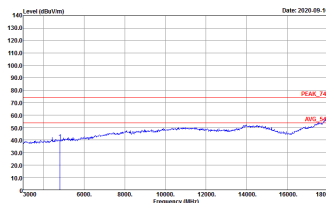
ANT	11a_Tx_Ch36 5180MHz	
0+1	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 : 11a_Tx_CH36 : 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK(UNIT) 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 : 11a_Tx_CH36 : 65M850 CH189 2.4G setting : 11 5G setting : 9.5
	 Site : 03CH15-HY Condition : AVG_BE_54 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 : 11a_Tx_CH36 : 65M850 CH189 2.4G setting : 11 5G setting : 9.5	Left blank



ANT	11a_Tx_Ch36 5180MHz	
0+1	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : 11a_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	 Site : 03CH15-HY Condition : PEAK(UNIT) 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : 11a_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5
Avg.	 Site : 03CH15-HY Condition : AVG_BE_54 3m 9120D_15_1620 VERTICAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 042240-01 Mode : 11a_Tx_Ch01 11a_Tx_Ch36 65M850 CH189 2.4G setting : 11 5G setting : 9.5	Left blank

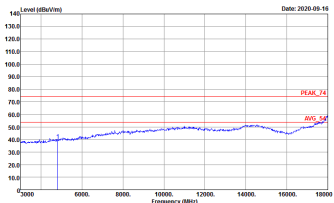
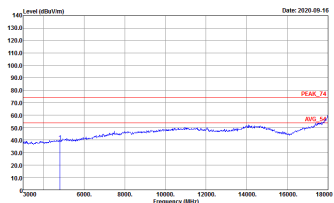


802 11b_Tx_Ch01 (Harmonic @ 3m)

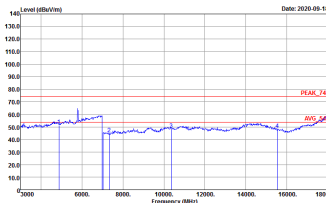
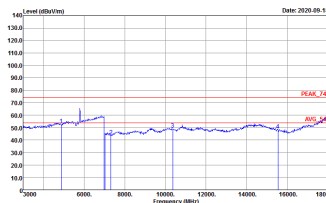
ANT	11b_Tx_Ch01	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 GSARMSD CH189	 Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 GSARMSD CH189



802 11b_Tx_Ch01 (Harmonic @ 3m)

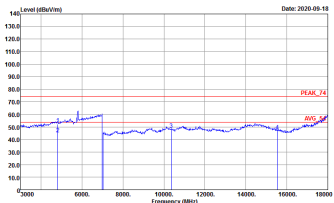
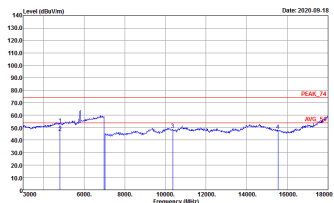
ANT	11b_Tx_Ch01	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 30M Ch20800 50RBQ QPSK	 Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 LTE Band 7 30M Ch20800 50RBQ QPSK

BT_Tx_Ch39 + 802 11a_Tx_Ch36 (Harmonic @ 3m)

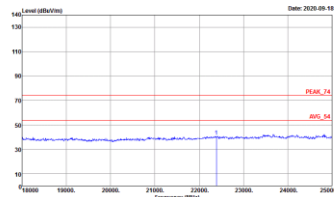
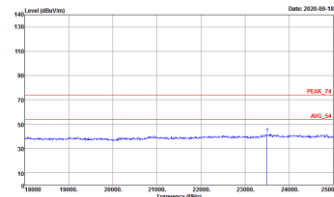
ANT	BT_Tx_Ch39+11a_Tx_Ch36	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_F4 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189	 Site : 03CH15-HY Condition : PEAK_F4 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : BT_Tx_Ch39 11a_Tx_Ch36 65M850 CH189



802 11b_Tx_CH01 + 802 11a_Tx_CH36 (Harmonic @ 3m)

ANT	11b_Tx_Ch01+11a_Tx_Ch36	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 11a_Tx_CH36 65SM850 CH189	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 11a_Tx_CH36 65SM850 CH189

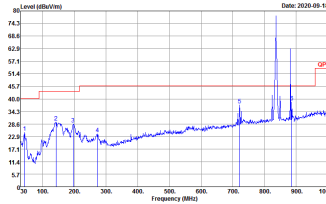
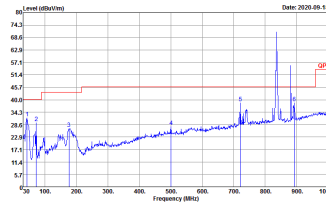
Emission above 18GHz
802 11b_Tx_Ch01 (Harmonic @ 3m)

ANT	11b_Tx_Ch01+11a_Tx_Ch36	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK 74 In SHF HORN BBH49170584 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01	 Site : 03CH15-HY Condition : PEAK 74 In SHF HORN BBH49170584 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01

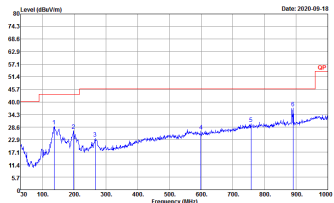
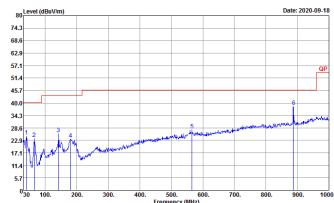


Emission below 1GHz

802 11b_Tx_Ch01 (LF @ 3m)

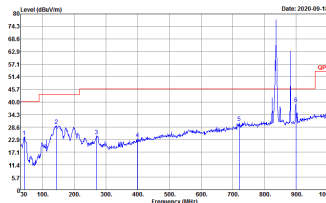
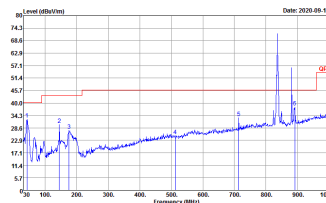
ANT	11b_Tx_Ch01	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CHIS-HY Condition : QP 5m BELOF_IS_41912 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 65M850 CH189	 Site : 03CHIS-HY Condition : QP 5m BELOF_IS_41912 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_Ch01 65M850 CH189

802 11b_Tx_Ch01 (LF @ 3m)

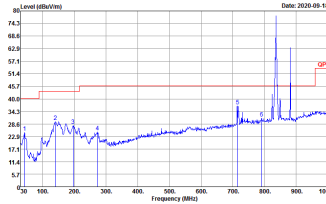
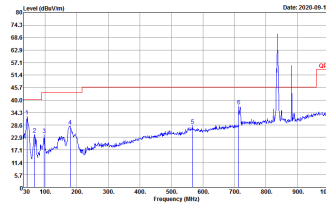
ANT	11b_Tx_Ch01	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 HORIZONTAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 30MHz 20800 50880 QPSK	 Site : 03CH15-HY Condition : QP 3m B1LOG_15_41912 VERTICAL Detector : Peak Project : FR042240-01 Mode : 11b_Tx_Ch01 : LTE Band 7 30MHz 20800 50880 QPSK



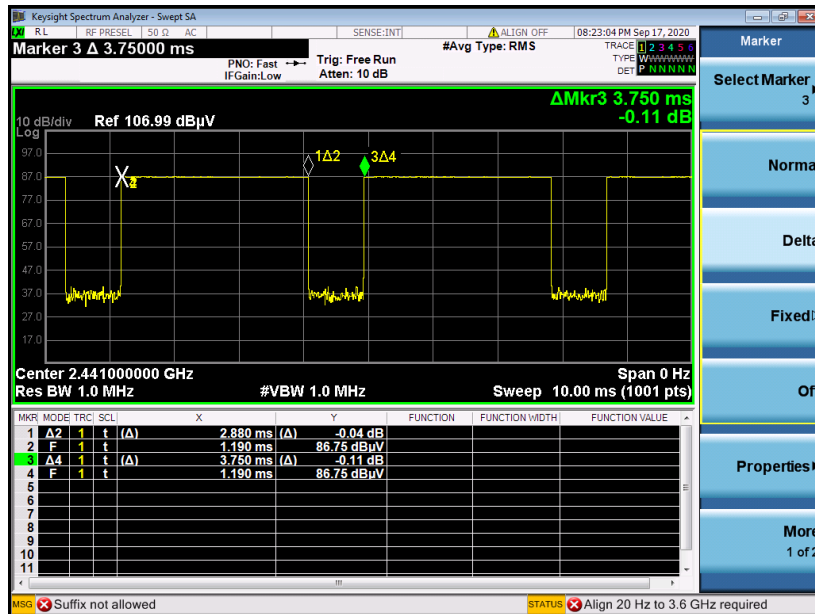
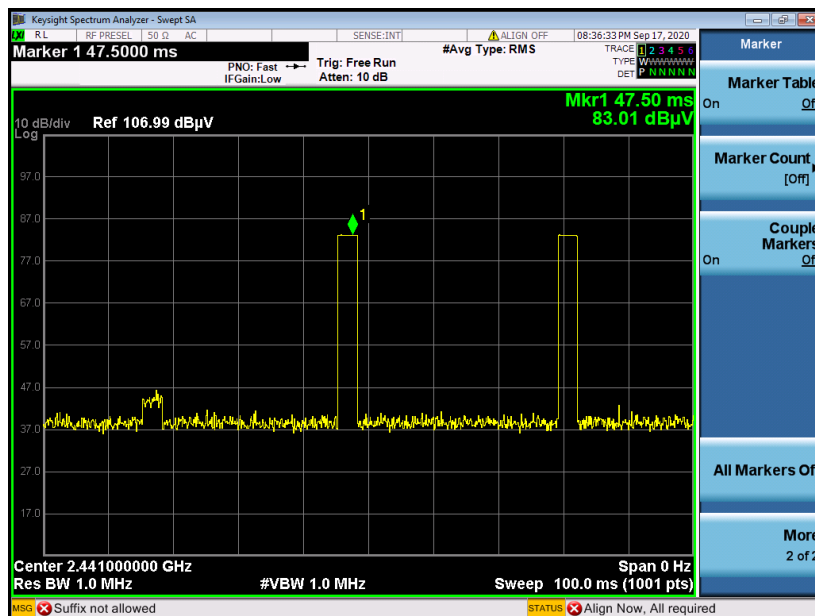
BT(1M)_Tx_CH39 + 802 11a_Tx_CH36 (LF @ 3m)

ANT	BT(1M) CH39 Tx +802 11a_CH36 Tx	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HV Condition : QP 3m B1LOG_15_41912 HORIZONTAL Detector : Peak Project : 042240-01 Mode : BT_Tx_CH39 11a_Tx_CH36 65M850 CH189	 Site : 03CH15-HV Condition : QP 3m B1LOG_15_41912 VERTICAL Detector : Peak Project : 042240-01 Mode : BT_Tx_CH39 11a_Tx_CH36 65M850 CH189

802 11b_Tx_CH01 + 802 11a_Tx_CH36 (LF @ 3m)

ANT	802 11b_CH01 Tx+802 11a_CH36 Tx	
Simultaneously	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : QP 3m BIL06_15_41912 HORIZONTAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 : 11a_Tx_CH36 : 65M850 CH89	 Site : 03CH15-HY Condition : QP 3m BIL06_15_41912 VERTICAL Detector : Peak Project : 042240-01 Mode : 11b_Tx_CH01 : 11a_Tx_CH36 : 65M850 CH89

Appendix C. Duty Cycle Plots

DH5 on time (One Pulse) Plot on Channel 39

on time (Count Pulses) Plot on Channel 39

Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100 \text{ ms} / 57.6 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.76 \text{ ms}/100 \text{ ms}) = -24.79 \text{ dB}$$

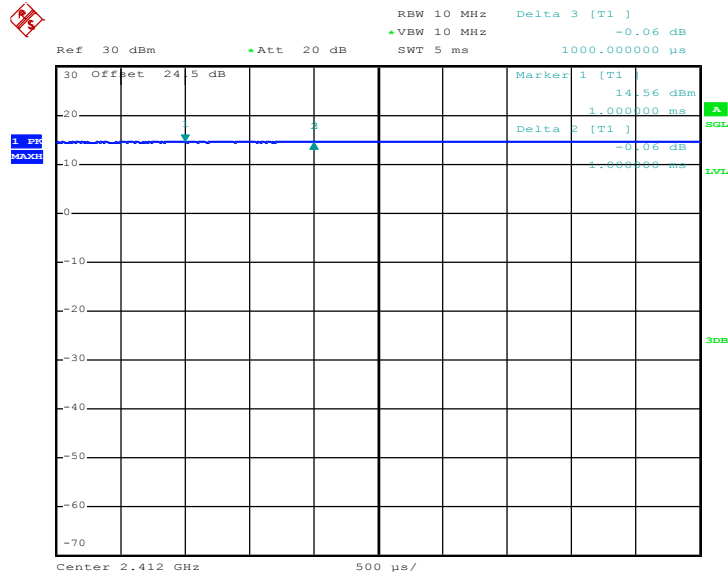


Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
0+1	2.4GHz 802.11b for Ant. 0	100.00	-	-	10Hz	0.00
0+1	2.4GHz 802.11b for Ant. 1	100.00	-	-	10Hz	0.00
0+1	5GHz 802.11a for Ant. 0	99.00	-	-	10Hz	0.04
0+1	5GHz 802.11a for Ant. 1	98.75	-	-	10Hz	0.05



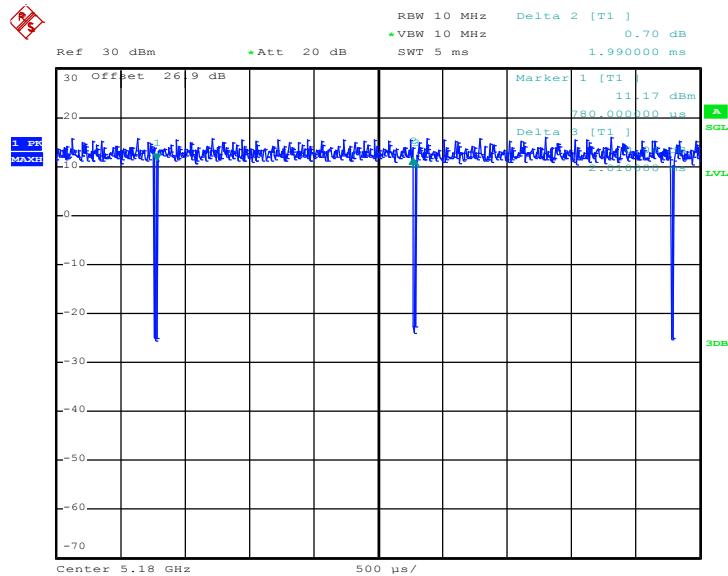
MIMO <Ant. 0>

2.4GHz 802.11b



Date: 16.SEP.2020 19:59:12

5GHz 802.11a

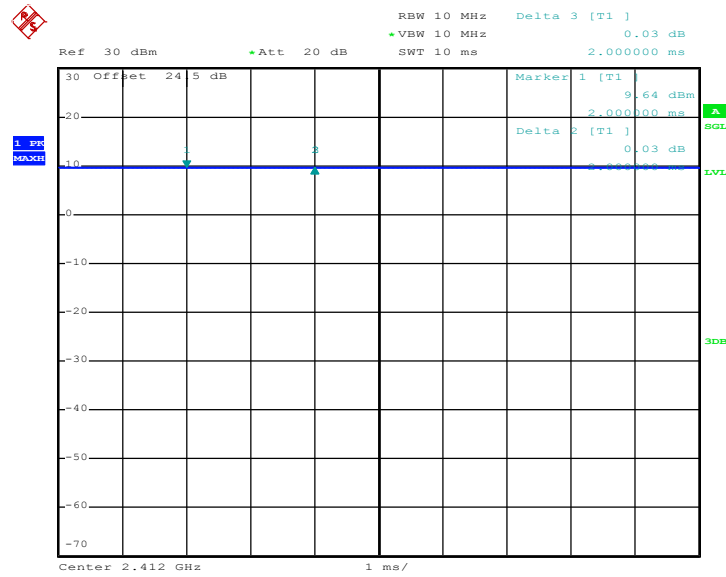


Date: 16.SEP.2020 20:13:57



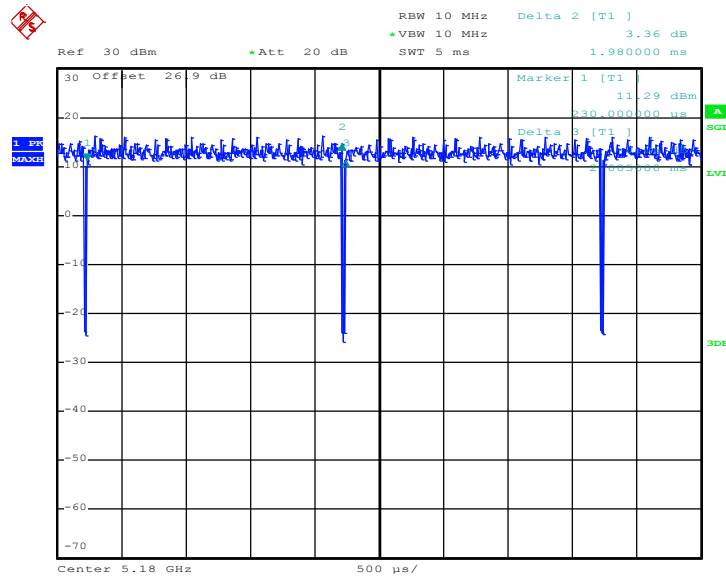
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2.4GHz 802.11b



Date: 16.SEP.2020 19:54:52

5GHz 802.11a



Date: 16.SEP.2020 20:15:43

—THE END—