

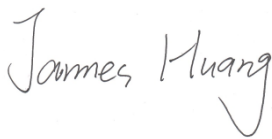
FCC RF Test Report

APPLICANT : Qualcomm Atheros, Inc.
EQUIPMENT : 802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
BRAND NAME : Qualcomm Atheros
MODEL NAME : QCNFA364A
FCC ID : PPD-QCNFA364AH
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DSS) Spread Spectrum Transmitter

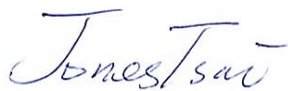
The product was installed into Notebook Computer (Brand Name: Lenovo, Model Name: Lenovo Legion Y920-17IKB Laptop, 80YW) during test.

The product was received on Feb. 18, 2017 and testing was completed on Mar. 30, 2017. We, Sporton International (KunShan) 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 (KunShan) INC., the test report shall not be reproduced except in full.



Prepared by: James Huang / Manager



Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR721810A	Rev. 01	Initial issue of report	Apr. 07, 2017



SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
-	15.247(a)(1)	Number of Channels	$\geq 15\text{Chs}$	Pass	1
-	15.247(a)(1)	Hopping Channel Separation	$\geq 2/3$ of 20dB BW	Pass	1
-	15.247(a)(1)	Dwell Time of Each Channel	$\leq 0.4\text{sec}$ in 31.6sec period	Pass	1
-	15.247(a)(1)	20dB Bandwidth	NA	Pass	1
-	-	99% Bandwidth	-	Pass	1
3.1	15.247(b)(1)	Peak and Average Output Power	$\leq 125\text{ mW}$	Pass	-
-	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	1
-	15.247(d)	Conducted Spurious Emission	$\leq 20\text{dBc}$	Pass	1
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 7.67 dB at 37.760 MHz
-	15.207	AC Conducted Emission	15.207(a)	Pass	1
3.3	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-
Remark 1: All conducted test items were leverage from module RF report which can refer to Report No. "RF150107E07B-2".					



1 General Description

1.1 Applicant

Qualcomm Atheros, Inc.

1700 Technology Drive, San Jose, CA 95110

1.2 Product Feature of Equipment Under Test

Product Feature	
Equipment	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand Name	Qualcomm Atheros
Model Name	QCNFA364A
FCC ID	PPD-QCNFA364AH
EUT supports Radios application	WLAN 2.4GHz 802.11b/g/n/ac HT20/HT40/VHT20/VHT40 WLAN 5GHz 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE
EUT Stage	Identical Prototype

Host Product Feature	
Equipment	Notebook Computer
Brand Name	Lenovo
Model Name	Lenovo Legion Y920-17IKB Laptop, 80YW
Applicant	Lenovo (Shanghai) Electronics Technology Co., Ltd. NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, Shanghai, 200131 China
Manufacturer	Lenovo PC HK Limited 23/F, Lincoln House, Taikoo Place, 979 King's Road, Quarry Bay Hong Kong

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

1.3 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	2402 MHz ~ 2480 MHz
Number of Channels	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78
Antenna Type / Gain	PIFA Antenna with gain -5.75 dBi
Type of Modulation	Bluetooth BR (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK

1.4 Modification of EUT

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

1.5 Testing Location

Test Site	Sporton International (KunShan) INC.	
Test Site Location	No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH03-KS	306251

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 C §15.247
- ♦ ANSI C63.10-2013

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

Preliminary tests were performed in different data rates and recorded the RF output power in the following table:

Channel	Frequency	Bluetooth RF Peak Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	5.68 dBm	7.29 dBm	7.58 dBm
Ch39	2441MHz	6.09 dBm	7.59 dBm	7.87 dBm
Ch78	2480MHz	6.46 dBm	7.95 dBm	8.17 dBm

Channel	Frequency	Bluetooth RF Average Output Power		
		Data Rate / Modulation		
		GFSK	$\pi/4$ -DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	5.39 dBm	5.27 dBm	5.36 dBm
Ch39	2441MHz	5.70 dBm	5.26 dBm	5.48 dBm
Ch78	2480MHz	5.83 dBm	5.54 dBm	5.58 dBm

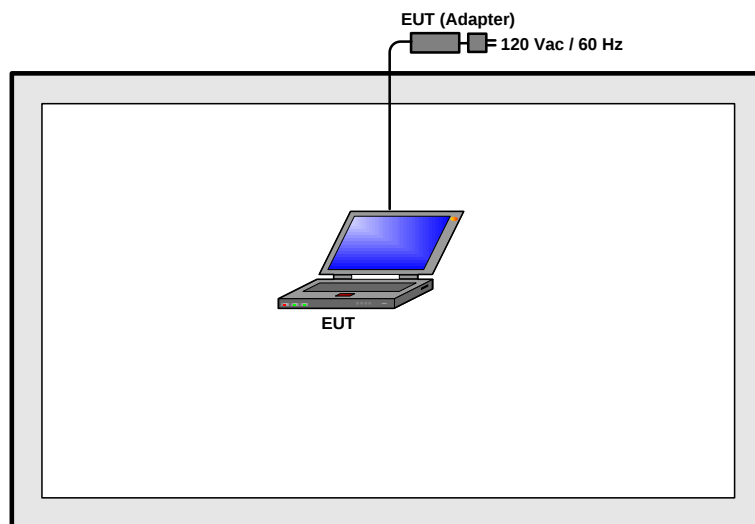
The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

Radiated Test Cases	Bluetooth
	Mode 1: CH00_2402 MHz
	Mode 2: CH39_2441 MHz
	Mode 3: CH78_2480 MHz

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

For Bluetooth function, an engineering test program was provided and enabled to make EUT transmitting and receiving signals.

3 Test Result

3.1 Peak and Average Output Power Measurement

3.1.1 Limit of Peak and Average Output Power

Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts.

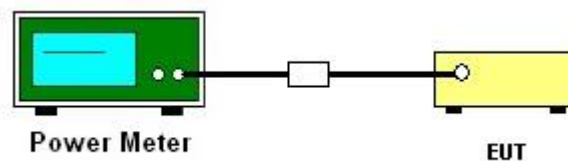
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows ANSI C63.10-2013 clause 7.8.5.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power with cable loss and record the results in the test report.
5. Measure and record the results in the test report.

3.1.4 Test Setup



3.1.5 Test Result of Peak Output Power

Test Mode :	1Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	5.68	20.97	Pass
39	2441	6.09	20.97	Pass
78	2480	6.46	20.97	Pass

Test Mode :	2Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	7.29	20.97	Pass
39	2441	7.59	20.97	Pass
78	2480	7.95	20.97	Pass

Test Mode :	3Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	7.58	20.97	Pass
39	2441	7.87	20.97	Pass
78	2480	8.17	20.97	Pass

3.1.6 Test Result of Average Output Power (Report Only)

Test Mode :	1Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	5.39	-	-
39	2441	5.70	-	-
78	2480	5.83	-	-

Test Mode :	2Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		$\pi/4$ -DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	5.27	-	-
39	2441	5.26	-	-
78	2480	5.54	-	-

Test Mode :	3Mbps	Temperature :	21~25°C
Test Engineer :	Silent Hai	Relative Humidity :	51~55%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	5.36	-	-
39	2441	5.48	-	-
78	2480	5.58	-	-

3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.2.2 Measuring Instruments

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

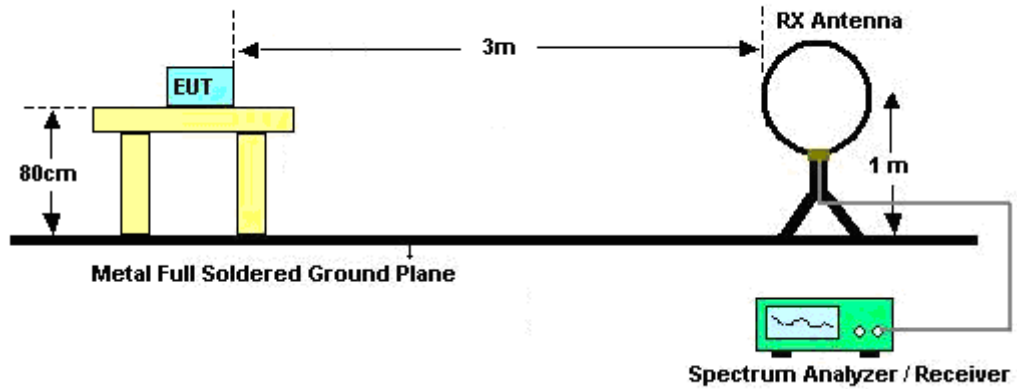
3.2.3 Test Procedures

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz, RBW=1MHz for $f > 1$ GHz ; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

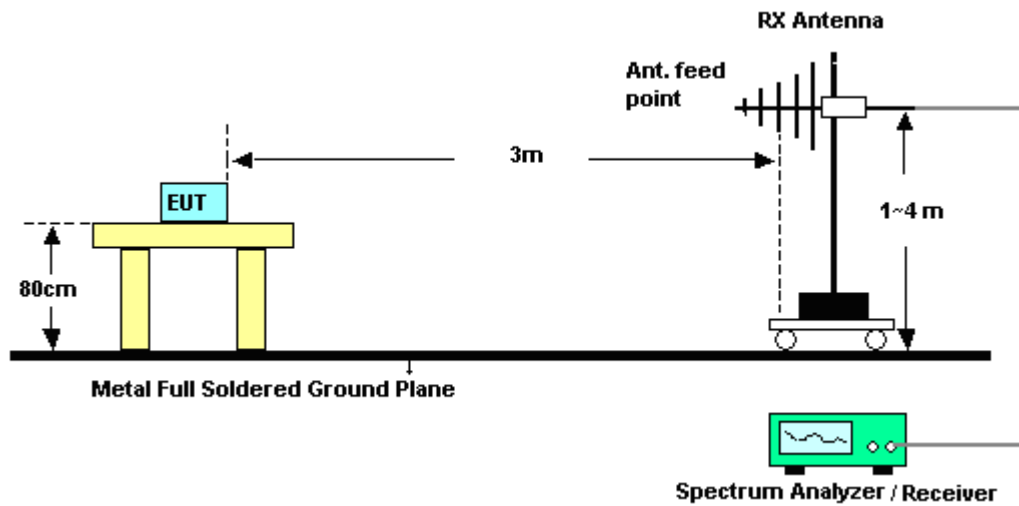
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.2.4 Test Setup

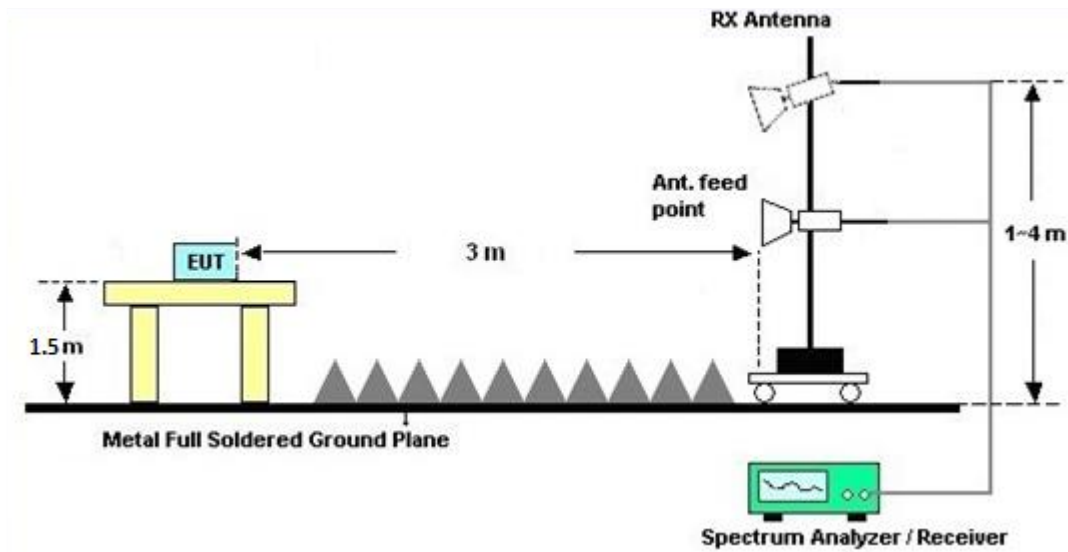
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz

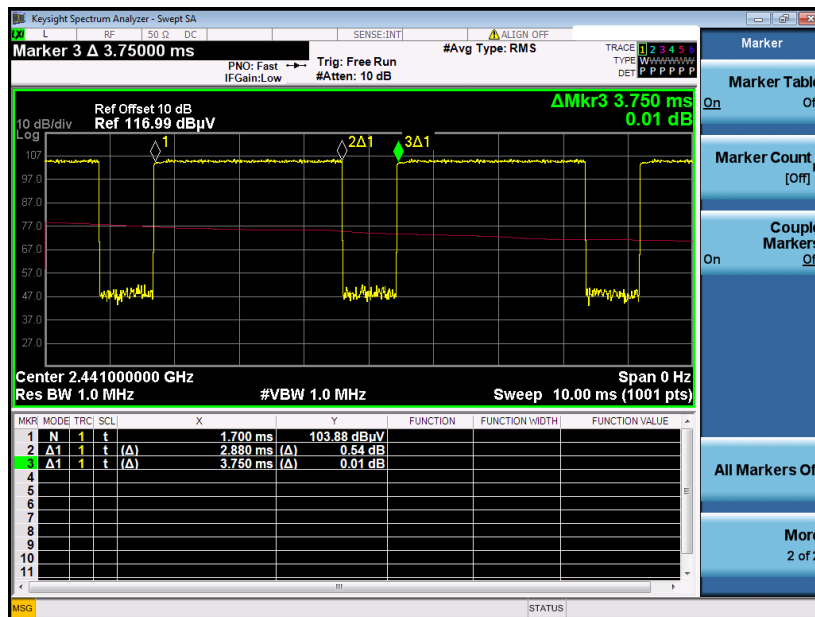


For radiated emissions above 1GHz

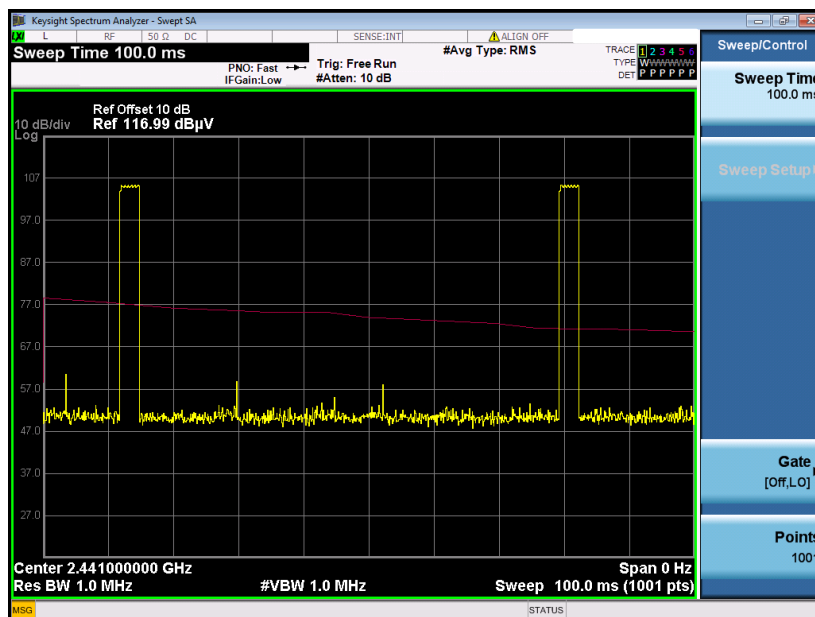


3.2.5 Duty cycle correction factor for average measurement

3DH5 on time (One Pulse) Plot on Channel 39



3DH5 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. 3DH5 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,

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

3.2.6 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.

3.2.7 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

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

Please refer to Appendix A and B.



3.3 Antenna Requirements

3.3.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Mar. 30, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Mar. 30, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Mar. 30, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Mar. 30, 2017	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 23, 2016	Mar. 30, 2017	Nov. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Mar. 30, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Mar. 30, 2017	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Mar. 30, 2017	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Mar. 30, 2017	Aug. 08, 2017	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-H G	1887435	18GHz~40GHz	Oct. 13, 2016	Mar. 30, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 13, 2016	Mar. 30, 2017	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Mar. 30, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Mar. 30, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Mar. 30, 2017	NCR	Radiation (03CH03-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5dB
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Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7dB
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Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	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)
BT CH00 2402MHz		2359.01	49.57	-24.43	74	54.25	26.91	5.43	37.02	161	239	P	H
		2359.01	24.78	-29.22	54	-	-	-	-	-	-	A	H
	*	2402	93.24	-	-	97.79	27	5.47	37.02	161	239	P	H
		2402	68.45	-	-	-	-	-	-	-	-	A	H
		2384.62	50.93	-23.07	74	55.55	26.95	5.45	37.02	394	223	P	V
		2384.62	26.14	-27.86	54	-	-	-	-	-	-	A	V
	*	2402	99.59	-	-	104.14	27	5.47	37.02	394	223	P	V
		2402	74.8	-	-	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		2351.34	49.49	-24.51	74	54.23	26.86	5.41	37.01	161	244	P	H
		2351.34	24.7	-29.3	54	-	-	-	-	-	-	A	H
	*	2442	94.02	-	-	98.11	27.39	5.49	36.97	161	244	P	H
		2442	69.23	-	-	-	-	-	-	-	-	A	H
		2492.44	50.06	-23.94	74	53.7	27.77	5.52	36.93	161	244	P	H
		2492.44	25.27	-28.73	54	-	-	-	-	-	-	A	H
		2383.06	51.95	-22.05	74	56.57	26.95	5.45	37.02	377	223	P	V
		2383.06	27.16	-26.84	54	-	-	-	-	-	-	A	V
	*	2442	101.2	-	-	105.29	27.39	5.49	36.97	377	223	P	V
		2442	76.41	-	-	-	-	-	-	-	-	A	V
		2492.44	51.03	-22.97	74	54.67	27.77	5.52	36.93	377	223	P	V
		2492.44	26.24	-27.76	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	95.18	-	-	98.97	27.64	5.51	36.94	158	244	P	H
		2480	70.39	-	-	-	-	-	-	-	-	A	H
		2483.55	51.77	-22.23	74	55.56	27.64	5.51	36.94	158	244	P	H
		2483.55	26.98	-27.02	54	-	-	-	-	-	-	A	H
	*	2480	101.7	-	-	105.49	27.64	5.51	36.94	364	224	P	V
		2480	76.91	-	-	-	-	-	-	-	-	A	V
		2483.51	53.51	-20.49	74	57.3	27.64	5.51	36.94	364	224	P	V
		2483.51	28.72	-25.28	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	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)
BT CH 00 2402MHz		4806	42.78	-31.22	74	40.28	31.48	7.71	36.69	100	360	P	H
		4806	43.02	-30.98	74	40.52	31.48	7.71	36.69	100	360	P	V
BT CH 39 2441MHz		4884	42.59	-31.41	74	39.9	31.59	7.76	36.66	100	360	P	H
		7320	45.82	-28.18	74	38.67	34.08	9.78	36.71	100	360	P	H
		4884	42.26	-31.74	74	39.57	31.59	7.76	36.66	100	360	P	V
		7320	46.19	-27.81	74	39.04	34.08	9.78	36.71	100	360	P	V
BT CH 78 2480MHz		4962	42.34	-31.66	74	39.43	31.72	7.82	36.63	100	360	P	H
		7440	45.05	-28.95	74	37.51	34.44	9.87	36.77	100	360	P	H
		4962	42.59	-31.41	74	39.68	31.72	7.82	36.63	100	360	P	V
		7440	45.51	-28.49	74	37.97	34.44	9.87	36.77	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz BT (LF)

BT	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)
2.4GHz BT LF		37.76	32.33	-7.67	40	39.43	23.52	0.74	31.36	100	91	P	H
		59.1	30.95	-9.05	40	48.08	13.38	0.91	31.42	-	-	P	H
		216.24	32.39	-13.61	46	45.91	16.23	1.73	31.48	-	-	P	H
		303.54	31.43	-14.57	46	41.45	19.18	2.15	31.35	-	-	P	H
		709	29.74	-16.26	46	30.7	26.73	3.37	31.06	-	-	P	H
		900.09	30.57	-15.43	46	29.06	28.52	3.85	30.86	-	-	P	H
		31.94	31.02	-8.98	40	35.12	26.52	0.68	31.3	-	-	P	V
		42.61	31.08	-8.92	40	41.13	20.55	0.8	31.4	100	360	P	V
		153.19	27.54	-15.96	43.5	39.81	17.78	1.5	31.55	-	-	P	V
		181.32	26.8	-16.7	43.5	40.09	16.58	1.64	31.51	-	-	P	V
		367.56	31.15	-14.85	46	38.06	21.96	2.36	31.23	-	-	P	V
		839.95	30.04	-15.96	46	28.49	28.78	3.69	30.92	-	-	P	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	P eak or A verage
H/V	H orizontal or V ertical



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

WIFI Ant. 1+2	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)
802.11b CH 01		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
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 B. Radiated Spurious Emission Plots

2.4GHz 2400~2483.5MHz

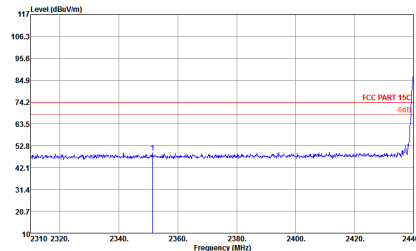
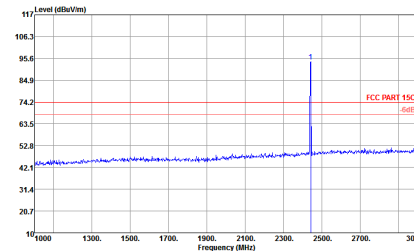
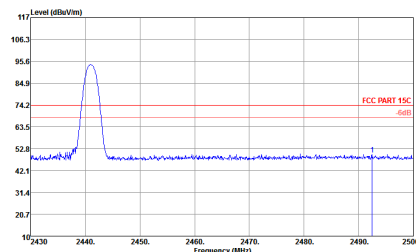
BT (Band Edge @ 3m)

BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m																																																																
		BT CH00 2402MHz																																																																
		Horizontal	Fundamental																																																															
Peak	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 HORIZONTAL : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2359.01</td><td>49.57</td><td>-24.43</td><td>74.00</td><td>54.25</td><td>26.91</td><td>5.43</td><td>37.02</td><td>161</td><td>239 Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		1	2359.01	49.57	-24.43	74.00	54.25	26.91	5.43	37.02	161	239 Peak	HORIZONTAL	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 HORIZONTAL : RBW:1000.000kHz VBW:1000.000kHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1 *</td><td>2402.00</td><td>93.24</td><td>19.24</td><td>74.00</td><td>97.79</td><td>27.00</td><td>5.47</td><td>37.02</td><td>161</td><td>239 Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg		1 *	2402.00	93.24	19.24	74.00	97.79	27.00	5.47	37.02	161	239 Peak	HORIZONTAL
	Freq	Level	Over	Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																								
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Peak		Site : 83CWB3-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 VERTICAL RSU:1000.000000Hz VSU:1000.000000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2384.62</td><td>58.93</td><td>-23.87</td><td>74.00</td><td>55.55</td><td>26.95</td><td>5.45</td><td>37.02</td><td>394</td><td>223</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg		1	2384.62	58.93	-23.87	74.00	55.55	26.95	5.45	37.02	394	223	Peak	VERTICAL	Site : 83CWB3-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 VERTICAL RSU:1000.000000Hz VSU:1000.000000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2402.00</td><td>99.59</td><td>25.59</td><td>74.00</td><td>104.14</td><td>27.00</td><td>5.47</td><td>37.02</td><td>394</td><td>223</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg		1	2402.00	99.59	25.59	74.00	104.14	27.00	5.47	37.02	394	223	Peak	VERTICAL
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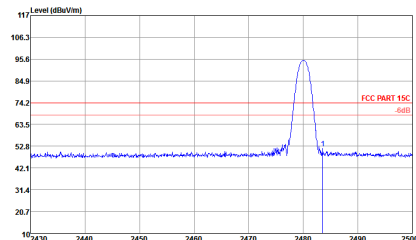
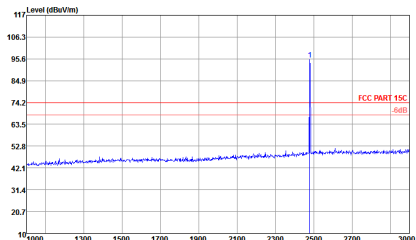


BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m																																																												
		BT CH39 2441MHz																																																												
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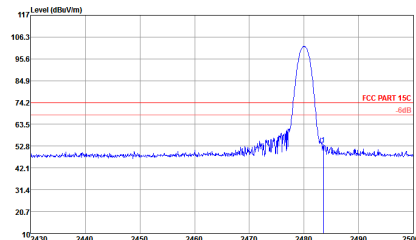
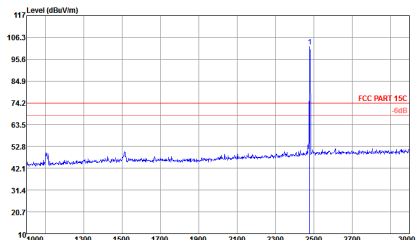


BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m																																																												
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Peak	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015013-91200 VERTICAL RBW:1000.000kHz VBW:1000.000kHz SMT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2383.06</td><td>51.95 -22.05</td><td>74.00</td><td>56.57</td><td>26.95</td><td>5.45</td><td>37.02</td><td>377</td><td>223 Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	cm	deg		1	2383.06	51.95 -22.05	74.00	56.57	26.95	5.45	37.02	377	223 Peak	VERTICAL	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015013-91200 VERTICAL RBW:1000.000kHz VBW:1000.000kHz SMT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2442.00</td><td>101.20</td><td>27.20</td><td>74.00</td><td>105.29</td><td>27.39</td><td>5.49</td><td>36.97</td><td>377</td><td>223 Peak</td><td>VERTICAL</td></tr></table>		Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	cm	deg		1	2442.00	101.20	27.20	74.00	105.29	27.39	5.49	36.97	377	223 Peak	VERTICAL
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Peak	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015013-91200 VERTICAL RBW:1000.000kHz VBW:1000.000kHz SMT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2492.44</td><td>51.03 -22.97</td><td>74.00</td><td>54.67</td><td>27.77</td><td>5.52</td><td>36.93</td><td>377</td><td>223 Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dB/m	dB	cm	deg		1	2492.44	51.03 -22.97	74.00	54.67	27.77	5.52	36.93	377	223 Peak	VERTICAL																																
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BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m																																																															
	BT CH78 2480MHz																																																															
	Horizontal	Fundamental																																																														
Peak	 Site : 83CHB3-K5 Condition : FCC PART 15C 3m HP ANT-2015813-91280 HORIZONTAL RNU:1000.000MHz VNU:1000.000MHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2483.55</td><td>51.77</td><td>-22.23</td><td>74.00</td><td>55.56</td><td>27.64</td><td>5.51</td><td>36.94</td><td>158</td><td>244</td><td>Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	cm	deg		1	2483.55	51.77	-22.23	74.00	55.56	27.64	5.51	36.94	158	244	Peak	HORIZONTAL	 Site : 83CHB3-K5 Condition : FCC PART 15C 3m HP ANT-2015813-91280 HORIZONTAL RNU:1000.000MHz VNU:1000.000MHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2480.00</td><td>95.18</td><td>21.18</td><td>74.00</td><td>98.97</td><td>27.64</td><td>5.51</td><td>36.94</td><td>158</td><td>244</td><td>Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB	cm	deg		1	2480.00	95.18	21.18	74.00	98.97	27.64	5.51	36.94	158	244	Peak	HORIZONTAL
	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																							
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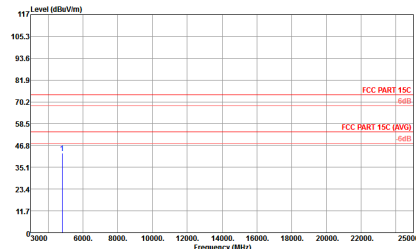
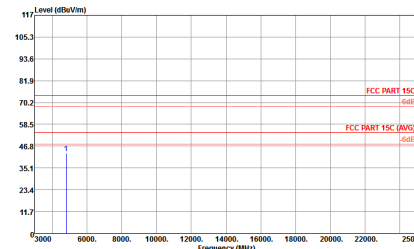


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m																																																															
	BT CH78 2480MHz																																																															
	Vertical	Fundamental																																																														
Peak	 Site : 03CHB3-KS Condition : FCC PART 15C 3m HF ANT-2015B13-91280 VERTICAL RSSI:1000.000MHz VSW:1.000.000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBm</th><th>dB</th><th>dBm</th><th>dBm</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2483.51</td><td>53.51</td><td>-20.49</td><td>74.00</td><td>57.30</td><td>27.64</td><td>5.51</td><td>36.94</td><td>304</td><td>224</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBm	dB	dBm	dBm	dB	cm	deg		1	2483.51	53.51	-20.49	74.00	57.30	27.64	5.51	36.94	304	224	Peak	VERTICAL	 Site : 03CHB3-KS Condition : FCC PART 15C 3m HF ANT-2015B13-91280 VERTICAL RSSI:1000.000MHz VSW:1.000.000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBm</th><th>dB</th><th>dBm</th><th>dBm</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>2480.00</td><td>101.70</td><td>27.70</td><td>74.00</td><td>105.49</td><td>27.64</td><td>5.51</td><td>36.94</td><td>304</td><td>224</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBm	dB	dBm	dBm	dB	cm	deg		1	2480.00	101.70	27.70	74.00	105.49	27.64	5.51	36.94	304	224	Peak	VERTICAL
	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																							
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2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m																																																																			
	BT CH00 2402MHz																																																																			
	Horizontal	Vertical																																																																		
Peak	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 HORIZONTAL RFU-1600-00000Hz VSW:3000-00000Hz SUT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th><th></th></tr><tr><td>1</td><td>4886.00</td><td>42.78</td><td>-31.22</td><td>74.00</td><td>49.28</td><td>31.48</td><td>7.71</td><td>36.69</td><td>100</td><td>368 Peak HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg			1	4886.00	42.78	-31.22	74.00	49.28	31.48	7.71	36.69	100	368 Peak HORIZONTAL	 Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 VERTICAL RFU-1600-00000Hz VSW:3000-00000Hz SUT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB/m</th><th>dB</th><th>cm</th><th>deg</th><th></th><th></th></tr><tr><td>1</td><td>4886.00</td><td>43.02</td><td>-38.98</td><td>74.00</td><td>49.52</td><td>31.48</td><td>7.71</td><td>36.69</td><td>100</td><td>368 Peak VERTICAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg			1	4886.00	43.02	-38.98	74.00	49.52	31.48	7.71	36.69	100	368 Peak VERTICAL
Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																										
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BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m																																																																																									
	BT CH39 2441MHz																																																																																									
	Horizontal	Vertical																																																																																								
Peak	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-20150813-91280 HORIZONTAL RISU:1000.000MHz VSW:3.000.000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>4884.00</td><td>42.59</td><td>-31.41</td><td>74.00</td><td>39.00</td><td>31.59</td><td>7.76</td><td>36.66</td><td>100</td><td>360</td><td>Peak</td><td>HORIZONTAL</td></tr><tr><td>2</td><td>7320.00</td><td>45.02</td><td>-28.18</td><td>74.00</td><td>38.67</td><td>34.00</td><td>9.78</td><td>36.71</td><td>100</td><td>360</td><td>Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	1	4884.00	42.59	-31.41	74.00	39.00	31.59	7.76	36.66	100	360	Peak	HORIZONTAL	2	7320.00	45.02	-28.18	74.00	38.67	34.00	9.78	36.71	100	360	Peak	HORIZONTAL	Site : 03CH03-KS Condition : FCC PART 15C 3m HF ANT-20150813-91280 VERTICAL RISU:1000.000MHz VSW:3.000.000Hz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>dB</th><th>dBuV/m</th><th>dBuV</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>4884.00</td><td>42.26</td><td>-31.74</td><td>74.00</td><td>39.57</td><td>31.59</td><td>7.76</td><td>36.66</td><td>100</td><td>360</td><td>Peak</td><td>VERTICAL</td></tr><tr><td>2</td><td>7320.00</td><td>46.19</td><td>-27.81</td><td>74.00</td><td>39.04</td><td>34.00</td><td>9.78</td><td>36.71</td><td>100</td><td>360</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg	1	4884.00	42.26	-31.74	74.00	39.57	31.59	7.76	36.66	100	360	Peak	VERTICAL	2	7320.00	46.19	-27.81	74.00	39.04	34.00	9.78	36.71	100	360	Peak	VERTICAL
Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas																																																																																		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg																																																																																		
1	4884.00	42.59	-31.41	74.00	39.00	31.59	7.76	36.66	100	360	Peak	HORIZONTAL																																																																														
2	7320.00	45.02	-28.18	74.00	38.67	34.00	9.78	36.71	100	360	Peak	HORIZONTAL																																																																														
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MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	cm	deg																																																																																		
1	4884.00	42.26	-31.74	74.00	39.57	31.59	7.76	36.66	100	360	Peak	VERTICAL																																																																														
2	7320.00	46.19	-27.81	74.00	39.04	34.00	9.78	36.71	100	360	Peak	VERTICAL																																																																														
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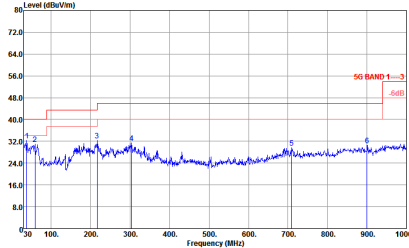
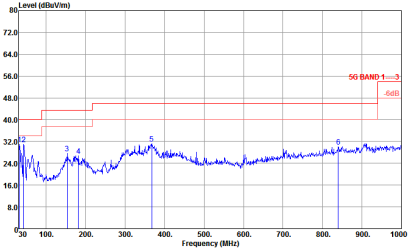


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m																																																																																									
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Peak	Site : 03CH83-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 HORIZONTAL RNU:1000.000MHz VNU:3000.000MHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>RNU</th><th>dBm/100</th><th>dB</th><th>dBm/100</th><th>dBm/100</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>4962.00</td><td>42.34</td><td>31.66</td><td>74.00</td><td>39.43</td><td>31.72</td><td>7.82</td><td>36.63</td><td>100</td><td>360</td><td>Peak</td><td>HORIZONTAL</td></tr><tr><td>2</td><td>7440.00</td><td>45.05</td><td>-28.95</td><td>74.00</td><td>37.51</td><td>34.44</td><td>9.87</td><td>36.77</td><td>100</td><td>360</td><td>Peak</td><td>HORIZONTAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	RNU	dBm/100	dB	dBm/100	dBm/100	dB	dB	cm	deg	1	4962.00	42.34	31.66	74.00	39.43	31.72	7.82	36.63	100	360	Peak	HORIZONTAL	2	7440.00	45.05	-28.95	74.00	37.51	34.44	9.87	36.77	100	360	Peak	HORIZONTAL	Site : 03CH83-KS Condition : FCC PART 15C 3m HF ANT-2015813-91280 VERTICAL RNU:1000.000MHz VNU:3000.000MHz SWT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over Limit</th><th>ReadAntenna</th><th>Cable Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>RNU</th><th>dBm/100</th><th>dB</th><th>dBm/100</th><th>dBm/100</th><th>dB</th><th>dB</th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>4962.00</td><td>42.59</td><td>-31.41</td><td>74.00</td><td>39.68</td><td>31.72</td><td>7.82</td><td>36.63</td><td>100</td><td>360</td><td>Peak</td><td>VERTICAL</td></tr><tr><td>2</td><td>7440.00</td><td>45.51</td><td>-28.49</td><td>74.00</td><td>37.97</td><td>34.44</td><td>9.87</td><td>36.77</td><td>100</td><td>360</td><td>Peak</td><td>VERTICAL</td></tr></table>	Freq	Level	Over Limit	ReadAntenna	Cable Preamp	A/Pos	T/Pos	Remark	Pol/Phas	RNU	dBm/100	dB	dBm/100	dBm/100	dB	dB	cm	deg	1	4962.00	42.59	-31.41	74.00	39.68	31.72	7.82	36.63	100	360	Peak	VERTICAL	2	7440.00	45.51	-28.49	74.00	37.97	34.44	9.87	36.77	100	360	Peak	VERTICAL
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Avg.																																																																																										



Emission below 1GHz

2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz																																																																																																																																																																																	
	BT LF																																																																																																																																																																																	
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QP / Peak	 Site : 03CH03-KS Condition : 5G BAND 1-3 3m LF ANT 600 HORIZONTAL : R80-100-000000 VSWR:100-000000 SUT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>Limit</th><th>Line</th><th>Level</th><th>Factor</th><th>Loss</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>37.76</td><td>32.33</td><td>-2.67</td><td>46.00</td><td>19.43</td><td>25.52</td><td>0.74</td><td>31.36</td><td>100</td><td>91 Peak HORIZONTAL</td></tr><tr><td>2</td><td>59.18</td><td>30.95</td><td>-9.05</td><td>46.00</td><td>13.30</td><td>0.91</td><td>31.42</td><td>---</td><td>---</td><td>Peak HORIZONTAL</td></tr><tr><td>3</td><td>216.24</td><td>32.39</td><td>-13.61</td><td>46.00</td><td>45.93</td><td>16.23</td><td>1.75</td><td>31.48</td><td>---</td><td>Peak HORIZONTAL</td></tr><tr><td>4</td><td>383.54</td><td>31.43</td><td>-14.57</td><td>46.00</td><td>41.45</td><td>15.10</td><td>2.15</td><td>31.35</td><td>---</td><td>Peak HORIZONTAL</td></tr><tr><td>5</td><td>789.00</td><td>29.74</td><td>-16.26</td><td>46.00</td><td>38.70</td><td>26.73</td><td>3.37</td><td>31.06</td><td>---</td><td>Peak HORIZONTAL</td></tr><tr><td>6</td><td>880.00</td><td>30.57</td><td>-15.43</td><td>46.00</td><td>29.06</td><td>26.52</td><td>3.85</td><td>30.46</td><td>---</td><td>Peak HORIZONTAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	dB	cm	deg		1	37.76	32.33	-2.67	46.00	19.43	25.52	0.74	31.36	100	91 Peak HORIZONTAL	2	59.18	30.95	-9.05	46.00	13.30	0.91	31.42	---	---	Peak HORIZONTAL	3	216.24	32.39	-13.61	46.00	45.93	16.23	1.75	31.48	---	Peak HORIZONTAL	4	383.54	31.43	-14.57	46.00	41.45	15.10	2.15	31.35	---	Peak HORIZONTAL	5	789.00	29.74	-16.26	46.00	38.70	26.73	3.37	31.06	---	Peak HORIZONTAL	6	880.00	30.57	-15.43	46.00	29.06	26.52	3.85	30.46	---	Peak HORIZONTAL	 Site : 03CH03-KS Condition : 5G BAND 1-3 3m LF ANT 600 VERTICAL : R80-100-000000 VSWR:100-000000 SUT:Auto <table><tr><th>Freq</th><th>Level</th><th>Over</th><th>Limit</th><th>ReadAntenna</th><th>Cable</th><th>Preamp</th><th>A/Pos</th><th>T/Pos</th><th>Remark</th><th>Pol/Phas</th></tr><tr><th>MHz</th><th>dBuV/m</th><th>Limit</th><th>Line</th><th>Level</th><th>Factor</th><th>Loss</th><th>dB</th><th>cm</th><th>deg</th><th></th></tr><tr><td>1</td><td>31.94</td><td>31.02</td><td>-0.90</td><td>46.00</td><td>25.12</td><td>20.52</td><td>0.60</td><td>31.38</td><td>---</td><td>Peak VERTICAL</td></tr><tr><td>2</td><td>42.61</td><td>31.00</td><td>-0.52</td><td>46.00</td><td>41.13</td><td>20.55</td><td>0.80</td><td>31.40</td><td>100</td><td>360 Peak VERTICAL</td></tr><tr><td>3</td><td>153.19</td><td>27.54</td><td>-15.96</td><td>43.50</td><td>39.83</td><td>17.78</td><td>1.50</td><td>31.55</td><td>---</td><td>Peak VERTICAL</td></tr><tr><td>4</td><td>181.32</td><td>26.00</td><td>-16.70</td><td>43.50</td><td>40.09</td><td>16.58</td><td>1.64</td><td>31.51</td><td>---</td><td>Peak VERTICAL</td></tr><tr><td>5</td><td>367.50</td><td>31.15</td><td>-14.85</td><td>46.00</td><td>38.06</td><td>21.96</td><td>2.36</td><td>31.23</td><td>---</td><td>Peak VERTICAL</td></tr><tr><td>6</td><td>830.95</td><td>30.04</td><td>-15.96</td><td>46.00</td><td>28.49</td><td>28.78</td><td>3.60</td><td>30.92</td><td>---</td><td>Peak VERTICAL</td></tr></table>	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	Pol/Phas	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	dB	cm	deg		1	31.94	31.02	-0.90	46.00	25.12	20.52	0.60	31.38	---	Peak VERTICAL	2	42.61	31.00	-0.52	46.00	41.13	20.55	0.80	31.40	100	360 Peak VERTICAL	3	153.19	27.54	-15.96	43.50	39.83	17.78	1.50	31.55	---	Peak VERTICAL	4	181.32	26.00	-16.70	43.50	40.09	16.58	1.64	31.51	---	Peak VERTICAL	5	367.50	31.15	-14.85	46.00	38.06	21.96	2.36	31.23	---	Peak VERTICAL	6	830.95	30.04	-15.96	46.00	28.49	28.78	3.60	30.92	---	Peak VERTICAL
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