# **TEST REPORT**

		DT&C Co.,	Ltd.
<b>Dt&amp;C</b>	42, Yurim-ro, 15	4Beon-gil, Cheoin-gu, Yongi Tel : 031-321-2664, Fax :	n-si, Gyeonggi-do, Korea, 17042 031-321-1664
1. Report No: DRTFCC2011-0350			
2. Customer			
• Name : BLUEBIRD INC.			
• Address : 3F, 115, Irwon-ro, Gangr	nam-gu, Seoul, Sc	outh Korea	
3. Use of Report : FCC Original Grant			
4. Product Name / Model Name : Hybr	id Full-Touch Har	ndheld Computer / HF5	50
FCC ID : SS4HF550			
5. FCC Regulation(s) : FCC Part 15.24	17		
Test Method Used : KDB558074 D0	1v05r02, ANSI C6	53.10-2013	
6. Date of Test : 2020.10.15 ~ 2020.11	.03		
7. Location of Test : 🛛 Permanent Te	sting Lab	On Site Testing	
8. Testing Environment : See appende	d test report.		
9. Test Result : Refer to the attached to	est result.		
The results shown in this test report refer of	only to the sample(s	) tested unless otherwise	stated.
Affirmation	Carth	Reviewed by	Atl-
Name : InHee Bae	(Signa re)	Name : JaeJin Lee	(Signature)
	0000	10	
	2020.11	. 19 .	

# DT&C Co., Ltd.

Unconnected with KS Q ISO / IEC 17025 and KOLAS accreditation

If this report is required to confirmation of authenticity, please contact to report@dtnc.net



# **Test Report Version**

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2011-0350	Nov. 19, 2020	Initial issue	InHee Bae	JaeJin Lee



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# **1. EUT DESCRIPTION**

FCC Equipment Class	Digital Transmission System(DTS)
Product Name	Hybrid Full-Touch Handheld Computer
Model Name	HF550
Add Model Name	NA
Hardware Version	Rev0.5
Software Version	R1.01
Test Device Serial Number	Conducted : HF550A4LAASTIBA009 Radiated: HF550A4LAASTIBA003
Power Supply	DC 3.85 V
Frequency Range	▪ 802.11b/g/n(20 MHz) : 2 412 MHz ~ 2 462 MHz
Max. RF Output Power	2.4GHz Band • 802.11b : 18.93 dBm • 802.11g : 21.78 dBm • 802.11n (HT20) : 20.32 dBm
Modulation Type	• 802.11b: CCK, DSSS • 802.11g/n: OFDM
Antenna Specification	Antenna type: PIFA Antenna Antenna gain: 0.674 dBi

# 2. INFORMATION ABOUT TESTING

# 2.1 Test mode

Test	Worst case data rate			z)
mode		Lowest	Middle	Highest
TM 1	802.11b 5.5 Mbps	2 412	2 437	2 462
TM 2	802.11g 54 Mbps	2 412	2 437	2 462
ТМ 3	802.11n(HT20) MCS 7	2 412	2 437	2 462

Note 1: The worst case data rate is determined as above test mode according to the power measurements. Note 2: The power measurement results for all modes and data rate were reported.

# 2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

# 2.3 Tested environment

Temperature	:	20 °C ~ 25 °C
Relative humidity content	:	35 % ~ 45 %
Details of power supply	:	DC 3.85 V

# 2.4 EMI suppression Device(s) / Modifications

EMI suppression device(s) added and/or modifications made during testing  $\rightarrow$  None

# 2.5 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014 and ANSI C 63.10-2013. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Test items	Measurement uncertainty
Antenna-port conducted emission	0.9 dB (The confidence level is about 95 %, k = 2)
AC power-line conducted emission	3.6 dB (The confidence level is about 95 %, k = 2)
Radiated emission (1 GHz Below)	4.9 dB (The confidence level is about 95 %, k = 2)
Radiated emission (1 GHz ~ 18 GHz)	5.1 dB (The confidence level is about 95 %, k = 2)
Radiated emission (18 GHz Above)	5.3 dB (The confidence level is about 95 %, k = 2)

# **3. SUMMARY OF TESTS**

FCC Part Section(s)	Parameter	Limit	Test Condition	Status Note 1
15.247(a)	6 dB Bandwidth	> 500 kHz		С
15.247(b)	Transmitter Output Power	< 1 Watt		С
15.247(d)	Out of Band Emissions / Band Edge	20 dBc in any 100 kHz BW	Conducted	с
15.247(e)	Transmitter Power Spectral Density	< 8 dBm/3 kHz	с	
15.247(d) 15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	FCC 15.209 limits (see section 8.5)	Radiated	C Note 3
15.207	AC Line Conducted Emissions	FCC 15.207 limits (see section 8.6)	AC Line Conducted	С
15.203	Antenna Requirements	FCC 15.203 (see section 7)	-	С

Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable

Note 2: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS. Note 3: This test item was measured in three orthogonal EUT positions and the worst case data was reported.



# FCC ID: **SS4HF550**

# 4. TEST METHODOLOGY

The measurement procedures described in the ANSI C63.10-2013 and the guidance provided in KDB558074 D01v05r02 were used in measurement of the EUT.

The EUT was tested per the guidance of KDB558074 D01v05r02. And ANSI C63.10-2013 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing.

# 4.1 EUT configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

# 4.2 EUT exercise

The EUT was operated in the test mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

# 4.3 General test procedures

# **Conducted Emissions**

The power-line conducted emission test procedure is not described on the KDB558074 D01v05r02.

So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10-2013.

The EUT is placed on the wooden table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector

# **Radiated Emissions**

Basically the radiated tests were performed with KDB558074 D01v05r02. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10 as stated on section 12.1 of the KDB558074 D01V05R02.

The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.



# 4.4 Description of test modes

The EUT has been tested with all modes of operating conditions to determine the worst case emission characteristics. A test program is used to control the EUT for staying in continuous transmitting mode.

# Operation test setup for EUT

- Test Software Version: QRCT / v 3.0-00277
- Power setting:

Test Mode	Frequency [MHz]	Power Setting
	2 412	9
TM 1	2 437	9
	2 462	9
	2 412	7
TM 2	2 437	9
	2 462	8
	2 412	5
TM 3	2 437	5
	2 462	5



# 5. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

# 6. FACILITIES AND ACCREDITATIONS

# 6.1 Facilities

### DT&C Co., Ltd.

The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The test site complies with the requirements of § 2.948 according to ANSI C63.4-2014.

### - FCC & ISED MRA Designation No. : KR0034

### - ISED#: 5740A

www.dtnc.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

# 6.2 Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, loop, horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

# 7. ANTENNA REQUIREMENTS

# 7.1 According to FCC 47 CFR §15.203

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

# The antenna is attached on the device by means of unique coupling method (Spring Tension). Therefore this EUT complies with the requirement of §15.203

# 8. TEST RESULT

# 8.1 6dB bandwidth

# Test Requirements and limit, §15.247(a)

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6 dB bandwidth is 500 kHz.

### **Test Configuration:**

Refer to the APPENDIX I.

### Test Procedure

- KDB558074 D01v05r02 - Section 8.2

### • ANSI C63.10-2013 – Section 11.8.2

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW)  $\ge$  3 x RBW.

### (RBW : 100 kHz / VBW : 300 kHz)

- 3. Detector = **Peak**.
- 4. Trace mode = **max hold**.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Option 1 - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2 - The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW  $\geq$  3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be  $\geq$  6 dB.

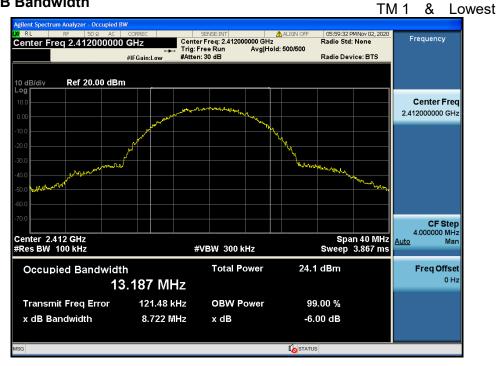
# Test Results: Comply

Test Mode	Frequency	Test Results[MHz]
	Lowest	8.72
TM 1	Middle	8.81
	Highest	8.16
	Lowest	16.53
TM 2	Middle	16.50
	Highest	16.49
	Lowest	17.71
ТМ 3	Middle	17.69
	Highest	17.60



# RESULT PLOTS

#### 6 dB Bandwidth



### 6 dB Bandwidth

TM 1 & Middle



#### FCC ID: SS4HF550

#### 6 dB Bandwidth

🛈 Dt&C

TM 1 & Highest

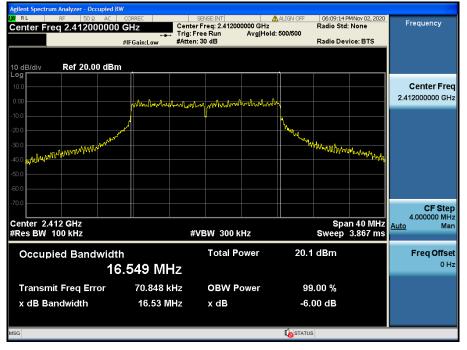


#### FCC ID: SS4HF550

#### 6 dB Bandwidth

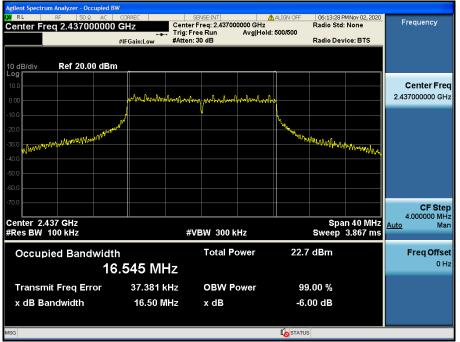
🛈 Dt&C

TM 2 & Lowest



#### 6 dB Bandwidth

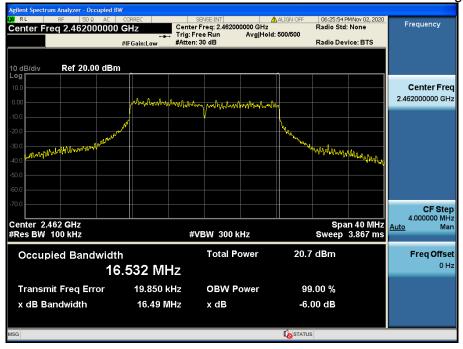
TM 2 & Middle



#### 6 dB Bandwidth

🛈 Dt&C

TM 2 & Highest



# TDt&C

### 6 dB Bandwidth

TM 3 & Lowest



#### 6 dB Bandwidth

TM 3 & Middle



# TDt&C

### 6 dB Bandwidth

TM 3 & Highest

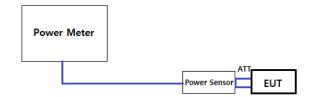


# 8.2 Maximum peak conducted output power

### Test Requirements and limit, §15.247(b)

The maximum permissible conducted output power is 1 Watt.

### Test Configuration



#### Test Procedure

#### 1. PKPM1 Peak power meter method of KDB558074 D01V05R02

The maximum conducted output powers were measured using a broadband peak RF power meter which has greater video bandwidth than DUT's DTS bandwidth and utilize a fast-responding diode detector.

#### 2. Method AVGPM-G (Measurement using a gated RF average power meter) of KDB558074 D01V05R02

The average conducted output powers were measured using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.



# Test Results: Comply

Frog		Maximum Peak Conducted Output Power (dBm) for 802.11b									
Freq. (MHz)	Det.	et. Data Rate [Mbps]									
		1	2	5.5	11	-	-	-	-		
2 412 -	PK	17.32	17.37	17.51	17.44	-	-	-	-		
	AV	15.10	15.11	15.30	15.27	-	-	-	-		
2 437	PK	18.74	18.76	18.93	18.85	-	-	-	-		
2 437	AV	16.29	16.31	16.51	16.50	-	-	-	-		
2 462	PK	17.30	17.27	17.44	17.40	-	-	-	-		
2 462	AV	15.02	15.05	15.21	15.20	-	-	-	-		

Freq.		Maximum Peak Conducted Output Power (dBm) for <u>802.11g</u>									
(MHz)	Det.	et. Data Rate [Mbps]									
		6	9	12	18	24	36	48	54		
0.440	PK	20.21	20.12	20.27	20.30	20.35	20.57	20.51	20.62		
2 412	AV	13.78	13.79	13.82	13.85	13.81	13.88	13.91	13.93		
2 437	PK	21.24	21.50	21.59	21.67	21.55	21.54	21.71	21.78		
2 437	AV	14.69	14.77	14.81	14.84	14.73	14.80	14.93	14.94		
2 462	PK	20.97	20.81	20.93	21.10	21.02	21.00	21.11	21.18		
2 462	AV	13.57	13.55	13.59	13.62	13.65	13.66	13.70	13.78		

<b>F</b> ree at	-	Maximum Peak Conducted Output Power (dBm) for 802.11n(HT20)									
Freq. (MHz)	Det.				Data Ra	te [MCS]					
		0	1	2	3	4	5	6	7		
0.440	PK	18.78	18.82	18.88	18.81	18.75	18.71	18.85	18.92		
2 412	AV	10.65	10.66	10.69	10.61	10.69	10.75	10.81	10.84		
2 437	PK	19.87	19.86	19.70	19.82	19.98	20.12	20.23	20.32		
2 437	AV	11.51	11.60	11.55	11.56	11.65	11.70	11.68	11.73		
2 462	PK	18.65	18.66	18.75	18.88	18.82	18.80	18.87	18.90		
2 462	AV	10.22	10.25	10.21	10.28	10.32	10.35	10.33	10.39		

# 8.3 Maximum power spectral density

#### Test requirements and limit, §15.247(e)

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### **Test Configuration:**

Refer to the APPENDIX I.

### Test Procedure

- KDB558074 D01v05r02 - Section 8.4

# - ANSI C63.10-2013 – Section 11.10.2

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to **1.5 times** the DTS bandwidth.
- 3. Set the RBW to : **3 kHz** ≤ RBW ≤ **100 kHz**
- 4. Set the VBW  $\geq$  3 x RBW
- 5. Detector = **Peak**
- 6. Sweep time = **Auto couple**
- 7. Trace mode = Max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the **peak marker function** to determine the maximum amplitude level within the RBW.

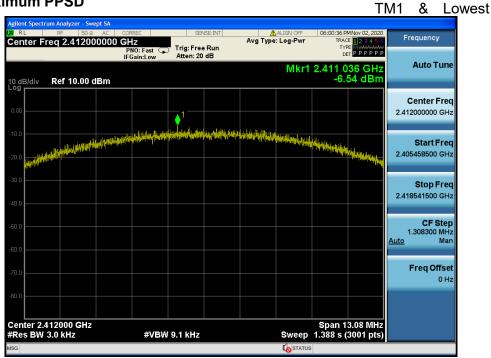
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### Test Results: Comply

Test Mode	Frequency	RBW	PKPSD [dBm]
	Lowest	3 kHz	-6.54
TM 1	Middle	3 kHz	-5.86
	Highest	3 kHz	-7.21
	Lowest	3 kHz	-12.74
TM 2	Middle	3 kHz	-10.94
	Highest	3 kHz	-12.02
	Lowest	3 kHz	-14.27
ТМ 3	Middle	3 kHz	-13.24
	Highest	3 kHz	-15.28

# RESULT PLOTS





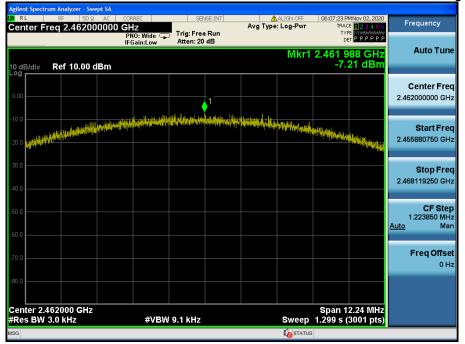
#### **Maximum PPSD**

TM 1 & Middle



# Maximum PPSD

TM 1 & Highest



# TDt&C

# Maximum PPSD

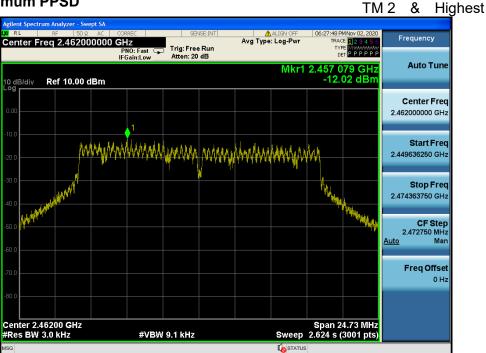


#### **Maximum PPSD**

TM 2 & Middle

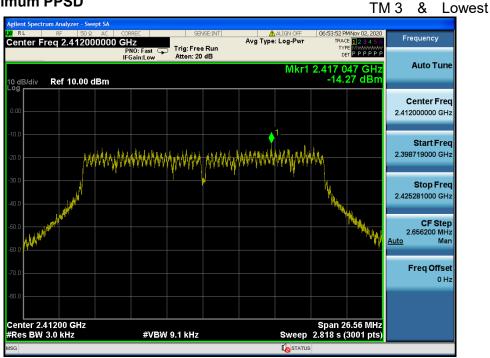


# Maximum PPSD



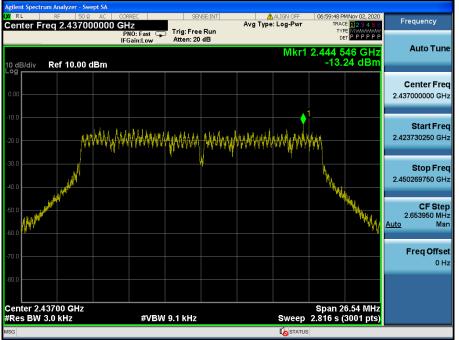
# **Dt&C**

# Maximum PPSD



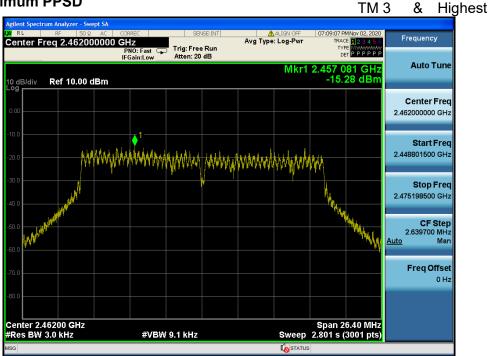
#### **Maximum PPSD**





# TDt&C

# Maximum PPSD





# 8.4 Out of band emissions at the band edge / conducted spurious emissions

### Test requirements and limit, §15.247(d)

**§15.247(d)** specifies that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to **15.247(b)(3)** requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in band average PSD level.

In either case, attenuation to levels below the general emission limits specified in §15.209(a) is not required.

#### **Test Configuration:**

Refer to the APPENDIX I.

#### Test Procedure

- KDB558074 D01v05r02 Section 8.5
- ANSI C63.10-2013 Section 11.11

#### **Reference level measurement**

- 1. Set instrument center frequency to DTS channel center frequency.
- 2. Set the span to  $\geq$  1.5 times the DTS bandwidth.
- 3. Set the RBW = 100 kHz.
- 4. Set the VBW  $\geq$  3 x RBW.
- 5. Detector = Peak.
- 6. Sweep time = **Auto couple.**
- 7. Trace mode = **Max hold.**
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum PSD level.

#### **Emission level measurement**

- 1. Set the center frequency and span to encompass frequency range to be measured.
- 2. Set the RBW = 100 kHz. (Actual 1 MHz , See below note)
- 3. Set the VBW ≥ 3 x RBW. (Actual 3 MHz, See below note)
- 4. Detector = **Peak**.
- 5. Ensure that the number of measurement points  $\geq$  Span / RBW.
- 6. Sweep time = **Auto couple.**
- 7. Trace mode = **Max hold.**
- 8. Allow the trace to stabilize. (this may take some time, depending on the extent of the span)
- 9. Use the peak marker function to determine the maximum amplitude level.

Note: The conducted spurious emission was tested with below settings.

Frequency range: 9 kHz ~ 30 MHz

RBW = 100 kHz, VBW = 300 kHz, Sweep time = Auto, Detector = Peak, Trace = Max hold, Sweep points: 40 001 Frequency range: 30 MHz ~ 10 GHz, 10 GHz ~ 25 GHz

RBW = 1 MHz, VBW = 3 MHz, Sweep time = Auto, Detector = Peak, Trace = Max hold, Sweep points: 40 001

#### LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)

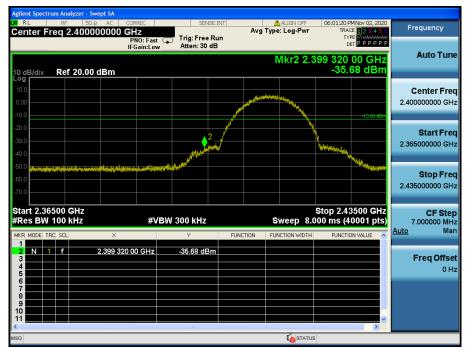
If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2 001 to get accurate emission level within 100 kHz BW.

# RESULT PLOTS

TM 1 & Lowest

Reference n Analyzer - Si ept S/ V RL RF 50 Q AC CURRE. Center Freq 2.412000000 GHz PN0: Fast C IFGain:Low Atten: 30 dB 06:00:50 PMNov 02, 2020 TRACE 1 2 3 4 5 6 TYPE MWWW DET P P P P P SENSE:INT Frequency ALIGN OFF Mkr1 2.412 545 GHz 6.97 dBm Auto Tune 10 dB/div Ref 20.00 dBm **Center Freq** 2.412000000 GHz AAAA warding mm Start Freq 2.405458500 GHz Stop Freq 2.418541500 GHz CF Step 1.308300 MHz <u>Auto</u> Man Freq Offset 0 Hz Center 2.412000 GHz #Res BW 100 kHz Span 13.08 MHz Sweep 1.400 ms (3001 pts) #VBW 300 kHz In ST.

Low Band-edge



Agilent Spectrum Analyzer - Swe					
Center Freg 15.0045		SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	06:01:28 PMNov 02, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast C IFGain:Low	Trig: Free Run Atten: 30 dB	· · · ·	DET PPPPP	
10 dB/div Ref 20.00 d	Bm			Vkr1 303.7 kHz -46.51 dBm	Auto Tune
					Center Freq 15.004500 MHz
-20.0					Start Freq 9.000 kHz
-50.0	neidler initielinen en	asrasshanstraturnetafsahtniran	lastendelingten series and an and a plate the series and	hanga tahta tahta ngang tahta kati si si badi	Stop Freq 30.000000 MHz
Start 9 kHz #Res BW 100 kHz	#VB	W 300 kHz	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	CF Step 2.999100 MHz Auto Man
MKR MODE TRC SCL	× 303.7 kHz	Y Fi -46.51 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 3 4 5					Freq Offset 0 Hz
6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7					
10 11 <				×	
MSG				DC Coupled	

Agilent Spectrum Analyzer -					
Center Freq 5.015		SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	06:01:35 PMNov 02, 2020 TRACE 123456	Frequency
	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE MWWWWWW DET P P P P P P	
			Mkr	5 3.293 43 GHz	Auto Tune
10 dB/div Ref 20.0				-35.69 dBm	
Log	Q1				Center Freq
0.00					5.015000000 GHz
-10.0				-13.03 dBm	
-20.0					ot at East
-30.0					Start Freq 30.000000 MHz
-40.0	And the statement of the	and a state of the second second	Service and the service of the servi	In the second	30.000000 WH2
-50.0				i di ante a secondo de la construir de la cons	
-60.0					Stop Freq
-70.0					10.00000000 GHz
Start 30 MHz				Stop 10.000 GHz	
#Res BW 1.0 MHz	#VB\	N 3.0 MHz	Sweep 18	.67 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	X	Y	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2 N 1 f	2.411 83 GHz 2.906 59 GHz	11.96 dBm -35.04 dBm			
3 N 1 f	7.099 98 GHz	-35.38 dBm			Freq Offset
4 N 1 f 5 N 1 f	3.110 98 GHz 3.293 43 GHz	-35.68 dBm -35.69 dBm			0 Hz
6					
8					
10					
11				×	
MSG				3	

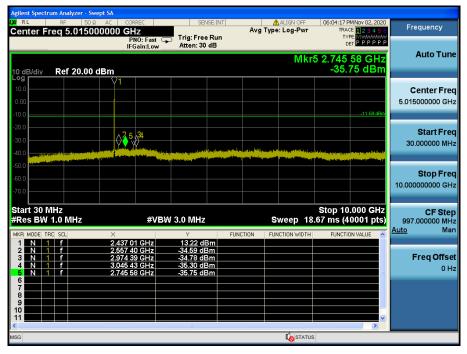


# TM 1 & Middle

### Reference



Agilent Spectrum Analyzer - Swept SA				
ໝ RL RF 50ΩA∆DC Center Freq 15.004500 MH	CORREC SENSE	Avg Type: Log-Pwr	06:04:09 PMNov 02, 2020 TRACE 2 3 4 5 6 TYPE MWWWWWW	Frequency
10 dB/div Ref 20.00 dBm	IFGain:Low Atten: 30 dE	3	Mkr1 317.2 kHz -47.64 dBm	Auto Tune
10.0 .000 -10.0				Center Freq 15.004500 MHz
-20.0				Start Freq 9.000 kHz
-60.0	รรณะ สาขารสาขาร เป็นไหญามีที่สามาร์ อากสารสาขางกับระเป	ntergenetatuarei seinetualettekeungerlenesterkeunge	estal klongharmarantika pilitarak sita makatabila	<b>Stop Freq</b> 30.000000 MHz
Start 9 KHz #Res BW 100 KHz MKR MODE TRC SCL ×	#VBW 300 kHz	FUNCTION FUNCTION WIDTH	Stop 30.00 MHz 333 ms (40001 pts) FUNCTION VALUE	<b>CF Step</b> 2.999100 MHz <u>Auto</u> Mar
1         N         1         F         ::           2         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -	317.2 kHz 47.64 dBm			Freq Offset 0 Hz
11		La STATU	DC Coupled	



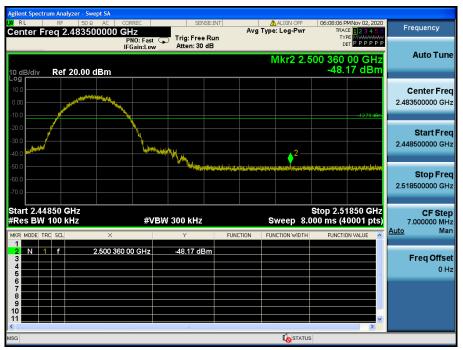
LXI RL	um Analyzer - Sw RF 50 ຜ req 17.500	AC CORRE 000000 GH PNC		SENS	Run	ALIGN OFF	TRAC	MNov 02, 2020 E 1 2 3 4 5 6 M M M M M M T P P P P P P	Frequency
10 dB/div	Ref 20.00					Mkr3 2	1.655 0 -28.	00 GHz 54 dBm	Auto Tune
10.0 0.00								-11.69.dBm	Center Freq 17.500000000 GHz
-20.0 -30.0 -40.0			ng lang ang san balan sa			3		∲ <sup>1</sup> ⁄2	<b>Start Freq</b> 10.000000000 GHz
-50.0 -60.0 -70.0									<b>Stop Freq</b> 25.00000000 GHz
Start 10.0 #Res BW	1.0 MHz	× 24.222 625		/ 3.0 MHz Y -25.54 dBr	FUNC	weep 40	.00 ms (4	.000 GHz 0001 pts) IN VALUE	<b>CF Step</b> 1.500000000 GHz <u>Auto</u> Man
2 N 1 3 N 1 4 5	f	24.668 500 21.655 000	GHz	-26.44 dBr -28.54 dBr	n				Freq Offset 0 Hz
7 8 9 10 11									
MSG						 STATUS			

# TM 1 & Highest

### Reference



# **High Band-edge**



Agilent Spectrum Analyzer - Swept ₩ RL RF 50 Q 🔥 [		SENSE:INT	ALIGN OFF	06:08:13 PM Nov 02, 2020	
Center Freq 15.00450			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	Frequency
10 dB/div Ref 20.00 dB		Atten: 30 dB		Mkr1 298.4 kHz -46.49 dBm	Auto Tune
Log 10.0 0.00					Center Freq 15.004500 MHz
-20.0 -30.0 -40.0					Start Fred 9.000 kHz
-50.0	theorytal project to an industry addression	49 <sup>4</sup> , 5449 <sup>4</sup> 949494444444444444444444444444444	ballinelnetteskerkerieterenntheandereth	ting tangan ang ata dari sa tang dara a	Stop Fred 30.000000 MH;
Start 9 kHz #Res BW 100 kHz	#VB	W 300 kHz		Stop 30.00 MHz 333 ms (40001 pts)	CF Step 2.999100 MH Auto Ma
MKR MODE TRC SCL 1 N 1 f 2 3 3 4 5 9 1 1 1 1 1 1 5 1 5 1 1 1 1 1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	× 298.4 kHz	-46.49 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offse
6 7 8 9 10 11					
<					

Agilent Spectro									
		000000 GI	RREC IZ NO: Fast 0	SENSE:	Avg	ALIGN OFF	TRACE	1Nov 02, 2020	Frequency
		IF	Gain:Low	Atten: 30 dB				М <del>илиили</del> ТРРРРРР	Auto Tune
10 dB/div	Ref 20.0					Mkr	5 6.990 ( -36.1	31 GHz 3 dBm	Auto Tune
Log 10.0 0.00 -10.0		↓ ↓						-12.70 dBm	Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0		2 <sup>2</sup>	Ø <sup>34</sup>		sense and the second			l togging and have all a	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0									<b>Stop Freq</b> 10.00000000 GHz
Start 30 N #Res BW			#VB	W 3.0 MHz		Sweep 18	Stop 10. 3.67 ms (40	000 GHz )001 pts)	CF Step 997.000000 MHz
MKR MODE TF	C SCL	× 2.461 4	I3 GHz	۲ 11.68 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	N VALUE	<u>Auto</u> Man
2 N 1 3 N 1 4 N 1 5 N 1 6	f f f f	2.660 ( 3.197 2 3.266 ( 6.990 3	9 GHz 2 GHz 1 GHz	-33.76 dBm -34.93 dBm -36.12 dBm -36.13 dBm					<b>Freq Offset</b> 0 Hz
7 8 9 10									
11 <u> </u>				10				>	
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#### TM 2 & Lowest

#### Reference

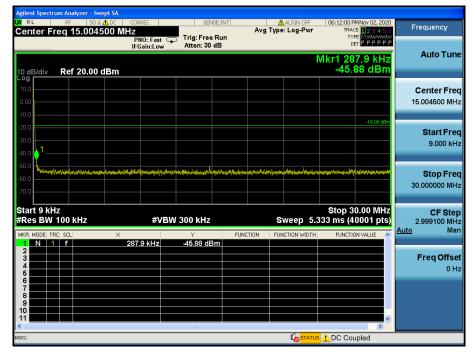


#### Low Band-edge









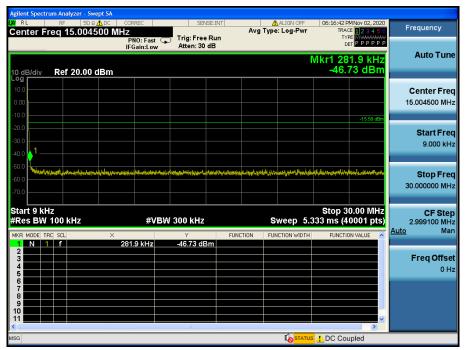
Agilent Spectrum Analyzer - Swe						
RL RF 50 Ω     Center Freq 5.01500		SENSE:INT	Avg Type:	ALIGN OFF	06:12:09 PMNov 02, 2020 TRACE 1 2 3 4 5 (	Frequency
	PNO: Fast G	Trig: Free Run Atten: 30 dB			DET P P P P P	
	in Guilleow _			Mkr	5 6.297 64 GHz	Auto Tune
10 dB/div Ref 20.00 d	Bm				-35.71 dBm	
Log 10.0	<b>⊘1</b>					Conton From
0.00						Center Freq 5.015000000 GHz
-10.0						3.013000000 GH2
-20.0	<sup>2</sup>				-18.06 dBm	
-30.0			5			Start Freq
-40.0	stantine and of section of the section	and the second state of th	attitu aantaidaa cati	State of the state	hat the state of t	30.000000 MHz
-50.0	A DESCRIPTION OF TAXABLE PARTY.			and and the second		
-60.0						Stop Freq
-70.0						10.00000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#\/B)	V 3.0 MHz	6	voon 19	Stop 10.000 GHz .67 ms (40001 pts)	
MKR MODE TRC SCL		Y 5.0 WILL2		CTION WIDTH	FUNCTION VALUE	Auto Man
1 N 1 f	2.417 57 GHz	9.98 dBm	FUNCTION	CHON WIDTH	FONCTION VALUE	
2 N 1 f 3 N 1 f	2.393 89 GHz 2.663 33 GHz	-23.12 dBm -34.34 dBm				Freq Offset
4 N 1 f 5 N 1 f	3.009 78 GHz 6.297 64 GHz	-35.39 dBm -35.71 dBm				0 Hz
6	0.237 04 0112					
7 8						
9						
11					~	
MSG				I STATUS		
				<u> </u>		



#### TM 2 & Middle

#### Reference



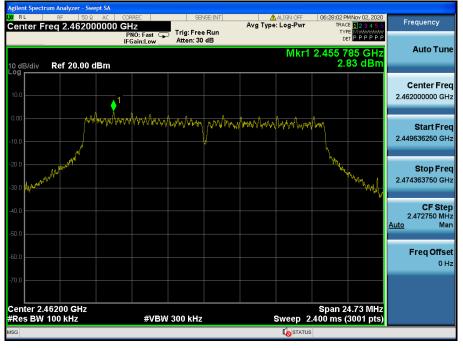


Agilent Spectrum Analyzer - S	Swept SA	SENSE:INT	ALIGN OFF	06:16:51 PMNov 02, 2020	
Center Freq 5.015			Avg Type: Log-Pwr	TRACE 123456	Frequency
	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE MWAWAAAA DET P P P P P	
	in outlineow		Mkr	5 3.038 70 GHz	Auto Tune
10 dB/div Ref 20.0	0 dBm		IVINI	-35.45 dBm	
Log	01				
10.0					Center Free
0.00					5.015000000 GH
-10.0				-15.58 dBm	
-20.0					Start Free
-30.0					30.000000 MH
-40.0	ALCO PROPERTY OF THE REAL PROP	and a standard and a	University of the second se		
-50.0					
-60.0					Stop Fre
-70.0					10.00000000 GH
10.0					
Start 30 MHz				Stop 10.000 GHz	CF Ster
#Res BW 1.0 MHz	#VB\	N 3.0 MHz	Sweep 18	.67 ms (40001 pts)	997.000000 MH
MKR MODE TRC SCL	×		UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
1 N 1 f	2.430 53 GHz 3.145 87 GHz	11.24 dBm -34.96 dBm			
3 N 1 f	3.296 67 GHz	-35.07 dBm			Freq Offse
4 N 1 F	3.132 17 GHz 3.038 70 GHz	-35.26 dBm -35.45 dBm		=	он
6					
8					
9					
11				<b>~</b>	
<		111	r1		
ISG					

Agilent Spectrum Analyzer - Swept SA				
M         RL         RF         50.Ω         AC         CORREC           Center Freq 17.500000000 GHz         PN0: Fa	SENSE:INT	ALIGN OFF	06:16:59 PMNov 02, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWWWW DET P P P P P P	Frequency
IFGain:Lo	Atten: 30 dB	Mkr3 2	1.823 375 GHz -27.76 dBm	Auto Tune
10 dB/div Ref 20.00 dBm			-21.10 dbm	Center Freq 17.50000000 GHz
			315.58 dBm	<b>Start Freq</b> 10.000000000 GHz
-50.0 -60.0 -70.0				<b>Stop Freq</b> 25.00000000 GHz
MKR MODE TRC SCL X		Sweep 40	Stop 25.000 GHz 00 ms (40001 pts) FUNCTION VALUE	<b>CF Step</b> 1.50000000 GHz <u>Auto</u> Man
1 N 1 f 24.795 250 GHz 2 N 1 f 24.195 625 GHz 3 N 1 f 24.195 625 GHz 4 5 5 5	-26.96 dBm			Freq Offset 0 Hz
0         7         7         8           9         10         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11         11				
MSG		<b>I</b> o STATUS		

# TM 2 & Highest

#### Reference



#### **High Band-edge**



LXI RL		DC CORRE	ic	SENS	E:INT		ALIGN OFF		MNov 02, 2020	Frequency
Center Fr	eq 15.004	PNO	:Fast 🖵 in:Low	Trig: Free Atten: 30 d		Avgiy	se. Log-Pwr	TYI	ETPPPPP	
10 dB/div	Ref 20.00	dBm						Mkr1 28 -48.0	1.9 kHz 00 dBm	Auto Tune
10.0										Center Freq 15.004500 MHz
-10.0									-17.17 dBm	Start Freq
-30.0										9.000 kHz
-50.0	Marchael foisfellers for these	~kidhetterusselaihiitiem	her and the second s	genterin and the second	antiki <del>kateka</del> dap	- Antonia Antonia Antonia	างไปเหมืองเหมืองเมือง	in start is the start of the	hanna tha that an	Stop Freq 30.000000 MHz
-70.0										30.00000 WHZ
Start 9 kH #Res BW			#VBW	/ 300 kHz			Sweep 5.3	Stop 3 333 ms (4	0.00 MHz 0001 pts)	CF Step 2.999100 MHz
MKR MODE TR		× 281.9	kHz	۲ -48.00 dBi		CTION F	UNCTION WIDTH	FUNCTIO	ON VALUE	<u>Auto</u> Man
2 3 4 5										Freq Offset 0 Hz
6 7 8 9										
10 11 <				m					~	
MSG								DC Cou	upled	

LXI RL		AC CORREC	SENSE:INT	ALIGN OFF	06:28:48 PMNov 02, 2020 TRACE 123456	Frequency
Center Fi	req 5.015000	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr		
10 dB/div	Ref 20.00 di			Mkr	5 3.339 04 GHz -35.45 dBm	Auto Tune
10.0 0.00 -10.0		<u></u>				Center Freq 5.015000000 GHz
The second se				end direct in the second s	-17.17.dBm	Start Freq 30.000000 MHz
-60.0						Stop Freq 10.00000000 GHz
Start 30 N #Res BW	1.0 MHz		N 3.0 MHz		Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TR 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6	SC SCL f f f f f f	× 2.456 95 GHz 2.686 01 GHz 2.787 45 GHz 3.151 86 GHz 3.339 04 GHz	9.82 dBm -35.04 dBm -35.20 dBm -35.40 dBm -35.45 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10 11					~	
MSG						





#### TM 3 & Lowest

#### Reference



#### Low Band-edge



LXI RL	um Analyzer - Sw RF 50 G	2 🛆 DC 🔋 CORREC 📗	SENSE		ALIGN OFF	06:54:43 PMNov 02, 2020 TRACE 1 2 3 4 5 6	Frequency
10 dB/div	Ref 10.00	PNO: Fast IFGain:Lov		un 3		түре Милини DET P P P P P P Mkr1 281.9 kHz -56.45 dBm	Auto Tune
Log 0.00 -10.0 -20.0						-19.84 dBm	Center Freq 15.004500 MHz
-30.0 -40.0 -50.0							<b>Start Freq</b> 9.000 kHz
-60.0 -70.0 -80.0	«elahtyataphaphaphataph	ส์ไละมีมีเห็นคุณๆให้สุภาพในสมารณ์กร	ahyandu ulatat haran dalama kana kana	<del>r de <sub>e</sub>nsensen Herren</del> side	net yn en gelen fylder yn en yn en gelen gelen yn en gelen gelen yn en gelen gelen yn en gelen gelen yn en gel	bendarideisendisen vonnetheilif faddunte	<b>Stop Freq</b> 30.000000 MHz
Start 9 kH #Res BW	100 kHz	X	<b>'BW 300 kHz</b> Y	FUNCTION	Sweep 5.	Stop 30.00 MHz 333 ms (40001 pts) FUNCTION VALUE	CF Step 2.999100 MHz <u>Auto</u> Man
1 N 1 2 3 4 5	f	281.9 kHz	-56.45 dBm				Freq Offset 0 Hz
6 7 8 9 10							
MSG						DC Coupled	

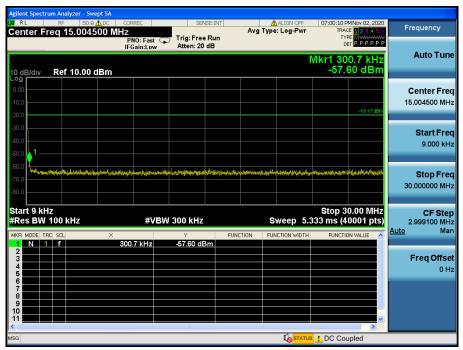
Agilent Spectro	u <mark>m Analyzer - Swep</mark> RF 50 Ω		RREC	SENSE	- TA IT		ALIGN OFF	06/54/52.0	MNoy 02, 2020	
	req 5.015000	000 GH					e: Log-Pwr	TRAC		Frequency
			Gain:Low	Atten: 20 d	B					Auto Tune
10 dB/div	Ref 10.00 di						Mkr		57 GHz 57 dBm	
0.00		¥1								Center Freq
-10.0		2							-19.84 dBm	5.015000000 GHz
-20.0		84								
-40.0			<b>↓</b> <sup>5</sup>							Start Freq 30.000000 MHz
-50.0					and an inclusion of the second se					
-60.0										Stop Freq
-80.0										10.00000000 GHz
Start 30 N	/Hz							Stop 10	.000 GHz	CF Step
#Res BW	1.0 MHz		#VB۱	N 3.0 MHz		S	weep 18			997.000000 MHz Auto Man
MKR MODE TF	C SCL	× 2.404 8	5 GHz	ץ 6.34 dBr	FUNC	TION FUI	NCTION WIDTH	FUNCTIO	IN VALUE	Auto Mari
2 N 1 3 N 1	f	2.397 1 2.391 6	3 GHz	-24.82 dBn -30.95 dBn	1					Freq Offset
4 N 1 5 N 1	f	2.389 9	0 GHz	-33.49 dBn -45.57 dBn	1					0 Hz
6		0.1000		40.01 0.01						
8										
10									~	
<				Ш						
MSG							<b>I</b> o status			

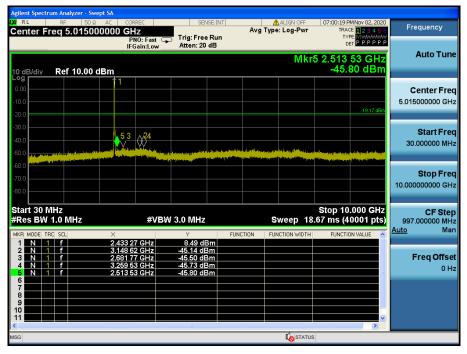


#### TM 3 & Middle

#### Reference







Agilent Spectrum Analyzer - Swept SA W RL RF 50 Ω AC CORF Center Freq 17.500000000 G PN IFG		ALIGN OFF Avg Type: Log-Pwr	07:00:27 PM Nov 02, 2020 TRACE 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	Frequency					
10 dB/div Ref 10.00 dBm	о dB/div Ref 10.00 dBm -38.05 dBm								
-10.0			-19.17 dBm	Center Freq 17.500000000 GHz					
-2000 -30.0 -40.0 -50.0			<sup>3</sup> <sup>1</sup> <sup>2</sup>	Start Freq 10.000000000 GHz					
-60.0 -70.0 -80.0				<b>Stop Freq</b> 25.00000000 GHz					
Start 10.000 GHz #Res BW 1.0 MHz MKR MODE TRC SCL X 1 N 1 f 24.202 750		Sweep 40 CTION FUNCTION WIDTH	Stop 25.000 GHz .00 ms (40001 pts) FUNCTION VALUE	CF Step 1.50000000 GHz <u>Auto</u> Man					
2 N 1 F 24.703 750 3 N 1 F 22.247 875 4 5 6 7	GHz -35.80 dBm			Freq Offset 0 Hz					
8 9 10 11 • •		I STATUS							

# TM 3 & Highest

#### Reference



#### **High Band-edge**



Agilent Spectrum Analyzer - Swept					
₩ RL RF 50 Ω ▲ Center Freq 15.00450	) MHz	SENSE:INT	Avg Type: Log-Pwr	07:09:58 PMNov 02, 2020 TRACE 2 3 4 5 6	Frequency
	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 20 dB		DET PPPPP	
10 dB/div Ref 10.00 dB	m			Vkr1 282.7 kHz -57.21 dBm	Auto Tune
0.00					Center Freq
-10.0				-19.81 dBm	15.004500 MHz
-20.0					
-40.0					Start Freq 9.000 kHz
-50.0 1					
-60.0 ในปฏิภูษิษาในสุราชสมบาทีเหลือเมา	antion and the states and the states of the	enter and the state of the second states of the second states of the second states of the second states of the	International States and the states of the s	errossendertelututeterrossertiteterros	Stop Fred
-80.0					30.000000 MHz
Start 9 kHz				Stop 30.00 MHz	05.04
#Res BW 100 kHz	#VBW	300 kHz	Sweep 5.3	333 ms (40001 pts)	CF Step 2.999100 MHz
MKR MODE TRC SCL	× 282.7 kHz	Y F -57.21 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
					Freq Offset
4 5 5				11	0 Hz
6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7					
8 9 10					
				~	
MSG				DC Coupled	

	AC CORREC	SENSE:INT	ALIGN OFF	07:10:07 PMNov 02, 2020	Frequency
Center Freq 5.0150	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 20 dB	Avg Type. Log-t wi		A. 4. 7
10 dB/div Ref 10.00	dBm		Mkr	5 3.139 64 GHz -45.83 dBm	Auto Tune
Log 0.00 -10.0 -20.0	×1			-19.81 dBm	Center Freq 5.015000000 GHz
-30.0 -40.0 -50.0	<u>34</u> 52		i den se di la segur per de la seconda d La seconda de la seconda de	n Performant and a start process for the Person of the Performance	Start Freq 30.000000 MHz
-80.0					<b>Stop Freq</b> 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VBV	V 3.0 MHz	Sweep 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz Auto Man
MKR         MODE         TRC         SCL           1         N         1         F           2         N         1         F           3         N         1         F           4         N         1         F           5         N         1         F	× 2.458 19 GHz 3.286 20 GHz 2.607 74 GHz 2.769 26 GHz 3.139 64 GHz	F 6.77 dBm -45.35 dBm -45.63 dBm -45.72 dBm -45.83 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
6 7 8 9 10 11				~	
MSG					







# 8.5 Radiated spurious emissions

#### Test Requirements and limit, §15.247(d), §15.205, §15.209

In any 100 kHz bandwidth outside the operating frequency band, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 KHz bandwidth within the band. In case the emission fall within the restricted band specified on 15.205(a) and (b), then the 15.209(a) limit in the table below has to be followed.

#### • FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)	
0.009 - 0.490	2 400 / F (kHz)	300	
0.490 – 1.705	24 000 / 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	

- \*\* Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 MHz - 72 MHz, 76 MHz - 88 MHz, 174 MHz - 216 MHz or 470 MHz -806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.
- FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.414 25 ~ 8.414 75	108 ~ 121.94	1 300 ~ 1 427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1 435 ~ 1 626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.173 5 ~ 2.190 5	12.519 75 ~ 12.520 25	149.9 ~ 150.05	1 645.5 ~ 1 646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.576 75 ~ 12.577 25	156.524 75 ~ 156.525 25	1 660 ~ 1 710	8.025 ~ 8.5	22.01 ~ 23.12
4.177 25 ~ 4.177 75	13.36 ~ 13.41	156.7 ~ 156.9	1 718.8 ~ 1 722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.207 25 ~ 4.207 75	16.42 ~ 16.423	162.0125 ~ 167.17	2 200 ~ 2 300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.694 75 ~ 16.695 25	167.72 ~ 173.2	2 310 ~ 2 390	10.6 ~ 12.7	36.43 ~ 36.5
6.267 75 ~ 6.268 25	16.804 25 ~ 16.804 75	240 ~ 285	2 483.5 ~ 2 500	13.25 ~ 13.4	Above 38.6
6.311 75 ~ 6.312 25	25.5 ~ 25.67	322 ~ 335.4	2 690 ~ 2 900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3 260 ~ 3 267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3 332 ~ 3 339		
8.376 25 ~ 8.386 75	74.8 ~ 75.2	960 ~ 1 240	3 345.8 ~ 3 358		
			3 600 ~ 4 400		

• FCC Part 15.205(b): The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

#### Test Configuration

Refer to the APPENDIX I.

#### Test Procedure

- 1. The EUT is placed on a non-conductive table, emission measurements at below 1 GHz, the table height is 80 cm and above 1 GHz, the table height is 1.5 m.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 1 or 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
- 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 6. Repeat above procedures until the measurements for all frequencies are complete.

#### - KDB558074 D01v05r02 - Section 8.6

#### - ANSI C63.10-2013 – Section 11.12

#### Peak Measurement

RBW = As specified in below table, VBW  $\ge$  3 x RBW, Sweep = Auto, Detector = Peak, Trace mode = Max Hold until the trace stabilizes.

Frequency	RBW
9 kHz – 150 kHz	200 Hz – 300 Hz
0.15 MHz – 30 MHz	9 kHz – 10 kHz
30 MHz – 1 000 MHz	100 kHz – 120 kHz
> 1 000 MHz	1 MHz

#### Average Measurement:

- 1. RBW = 1 MHz (unless otherwise specified).
- 2. VBW  $\geq$  3 x RBW.
- 3. Detector = RMS (Number of points ≥ 2 x Span / RBW)
- 4. Averaging type = power. (i.e., RMS)
- 5. Sweep time = auto.
- 6. Perform a trace average of at least 100 traces.
- 7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
- 1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is 10 log(1 / D), where D is the duty cycle.
- 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1 / D), where D is the duty cycle.
- If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Test Mode	Date rate	T <sub>on</sub> (ms)	T <sub>on+off</sub> (ms)	D = T <sub>on</sub> / (T <sub>on+off</sub> )	DCCF = 10 log(1 / D) (dB)
TM 1	5.5Mbps	1.652	1.850	0.8930	0.49
TM 2	54Mbps	0.172	0.370	0.4657	3.32
TM 3	MCS 7	0.160	0.358	0.4464	3.50

#### **Duty Cycle Correction factor**

Note1: Where, T= Transmission duration / D = Duty cycle Note2: Please refer to the appendix I for duty cycle plots.

#### Test Results: Comply

#### Test Notes.

1. The radiated emissions were investigated 9 kHz to 25 GHz. And no other spurious and harmonic emissions were found below listed frequencies.

2. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL + HL + AL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, HL = High pass filter Loss, AL = Attenuator Loss, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

3. Information of Distance Correction Factor

For finding emissions, measurements may be performed at a distance closer than that specified in the regulations.

In this case, the distance correction factor is applied to the result.

- Calculation of distance correction factor

At frequencies below 30 MHz = 40 log( tested distance / specified distance )

At frequencies at or above 30 MHz = 20 log( tested distance / specified distance )

When distance factor is "N/A", the measurements were performed at the specified distance and distance factor is not applied.

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 388.86	V	Z	PK	50.68	4.80	N/A	N/A	55.48	74.00	18.52
Lowoot	2 389.00	V	Z	AV	40.39	4.80	0.49	N/A	45.68	54.00	8.32
Lowest	4 824.21	V	Х	PK	50.94	0.93	N/A	N/A	51.87	74.00	22.13
	4 824.16	V	Х	AV	39.62	0.93	0.49	N/A	41.04	54.00	12.96
Middle	4 874.01	V	Х	PK	50.62	1.17	N/A	N/A	51.79	74.00	22.21
wilddie	4 873.93	V	Х	AV	40.15	1.17	0.49	N/A	41.81	54.00	12.19
	2 484.62	V	Z	PK	50.42	5.27	N/A	N/A	55.69	74.00	18.31
Highest	2 484.45	V	Z	AV	40.98	5.26	0.49	N/A	46.73	54.00	7.27
rignest	4 924.25	V	Х	PK	51.59	1.45	N/A	N/A	53.04	74.00	20.96
	4 923.58	V	Х	AV	40.23	1.44	0.49	N/A	42.16	54.00	11.84

# Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : <u>TM 1</u>



<b>Radiated Spurious</b>	Emissions	data(9 kHz ~	25 GHz) : <i>TM 2</i>
radiated oparious		aatalo	

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.74	V	Z	PK	57.80	4.80	N/A	N/A	62.60	74.00	11.40
Lowoot	2 389.82	V	Z	AV	42.46	4.80	3.32	N/A	50.58	54.00	3.42
Lowest	4 824.51	V	Х	PK	49.03	0.94	N/A	N/A	49.97	74.00	24.03
	4 824.26	V	Х	AV	38.60	0.93	3.32	N/A	42.85	54.00	11.15
Middle	4 874.49	V	Х	PK	49.56	1.19	N/A	N/A	50.75	74.00	23.25
wildule	4 874.55	V	Х	AV	38.86	1.19	3.32	N/A	43.37	54.00	10.63
	2 483.79	V	Z	PK	56.44	5.26	N/A	N/A	61.70	74.00	12.30
Highoot	2 483.69	V	Z	AV	42.08	5.25	3.32	N/A	50.65	54.00	3.35
Highest	4 924.15	V	Х	PK	49.28	1.45	N/A	N/A	50.73	74.00	23.27
	4 924.54	V	Х	AV	38.64	1.45	3.32	N/A	43.41	54.00	10.59

# Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : TM 3

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.69	V	Z	PK	54.55	4.80	N/A	N/A	59.35	74.00	14.65
Lowest	2 389.69	V	Z	AV	41.15	4.80	3.50	N/A	49.45	54.00	4.55
Lowest	4 823.85	V	Х	PK	49.14	0.93	N/A	N/A	50.07	74.00	23.93
	4 823.97	V	Х	AV	38.41	0.93	3.50	N/A	42.84	54.00	11.16
Middle	4 874.08	V	Х	PK	49.13	1.18	N/A	N/A	50.31	74.00	23.69
wildule	4 874.10	V	Х	AV	38.67	1.18	3.50	N/A	43.35	54.00	10.65
	2 483.82	V	Z	PK	51.67	5.26	N/A	N/A	56.93	74.00	17.07
Highest	2 483.73	V	Z	AV	41.46	5.25	3.50	N/A	50.21	54.00	3.79
nighest	4 923.96	V	Х	PK	49.40	1.45	N/A	N/A	50.85	74.00	23.15
	4 924.23	V	Х	AV	38.81	1.45	3.50	N/A	43.76	54.00	10.24

# 8.6 Power-line conducted emissions

#### Test Requirements and limit, §15.207

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency Range	Conducted Limit (dBuV)				
(MHz)	Quasi-Peak	Average			
0.15 ~ 0.5	66 to 56 *	56 to 46 *			
0.5 ~ 5	56	46			
5 ~ 30	60	50			

\* Decreases with the logarithm of the frequency

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

#### Test Configuration

See test photographs for the actual connections between EUT and support equipment.

#### Test Procedure

Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

- The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
- 2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
- 3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
- 4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

#### Test Results: Comply(Refer to next page.)

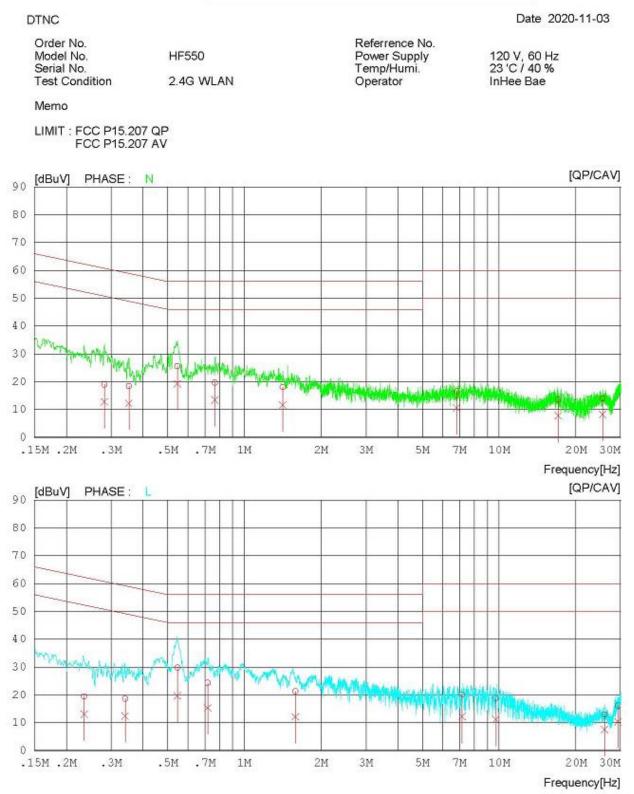
The worst data was reported.

#### RESULT PLOTS

#### AC Line Conducted Emissions (Graph)

Test Mode: TM 2 & 2437 MHz

# **Results of Conducted Emission**



### AC Line Conducted Emissions (List)

Test Mode: TM 2 & 2 437 MHz

# Results of Conducted Emission

Date 2020-11-03

Test Condition 2.4G WLAN Operator InHee Bae	Serial No.	HF550 2.4G WLAN		120 V, 60 Hz 23 'C / 40 % InHee Bae
---------------------------------------------	------------	--------------------	--	-------------------------------------------

Memo

DTNC

LIMIT : FCC P15.207 QP FCC P15.207 AV

NC	FREQ	READING QP CAV	C.FACTOR	RESULT QP CAV	LIMIT QP CAV	MARGIN QP CAV	PHASE
	[MHz]	[dBuV] [dBuV	] [dB]	[dBuV] [dBuV	] [dBuV][dBuV	] [dBuV][dBuV	V]
1	0.28214	9.01 2.81	9.95	18.9612.76	60.75 50.75	41.7937.99	N
2	0.35236	8.41 2.32	9.96	18.3712.28	58.91 48.91	40.54 36.63	N
3	0.54586	15.57 9.25	9.98	25.5519.23	56.00 46.00	30.4526.77	N
4	0.76657	9.64 3.53	9.98	19.6213.51	56.00 46.00	36.3832.49	N
5	1.41514	8.10 1.64	9.99	18.0911.63	56.00 46.00	37.91 34.37	N
6	6.81494	6.28 0.41	10.21	16.4910.62	60.00 50.00	43.5139.38	N
7	17.04878	3.15 -2.71	10.50	13.65 7.79	60.00 50.00	46.35 42.21	N
8	25.50904	3.33-2.40	10.59	13.92 8.19	60.00 50.00	46.0841.81	N
9	0.23488	9.43 3.15	9.93	19.3613.08	62.28 52.28	42.9239.20	L
10	0.34037	8.64 2.42	9.96	18.60 12.38	59.19 49.19	40.5936.81	L
11	0.54639	19.71 9.73	9.98	29.6919.71	56.00 46.00	26.31 26.29	L
12	0.71789	14.26 5.33	9.96	24.2215.29	56.00 46.00	31.78 30.71	L
13	1.58551	11.23 2.10	10.01	21.24 12.11	56.00 46.00	34.7633.89	L
14	7.15947	9.87 1.96	10.20	20.0712.16	60.00 50.00	39.93 37.84	L
15	9.70688	8.50 0.85	10.31	18.8111.16	60.00 50.00	41.19 38.84	L
16	25.89545	2.41-3.05	10.56	12.97 7.51	60.00 50.00	47.0342.49	L
17	29.25076	5.52-0.21	10.58	16.1010.37	60.00 50.00	43.90 39.63	L

# 9. LIST OF TEST EQUIPMENT

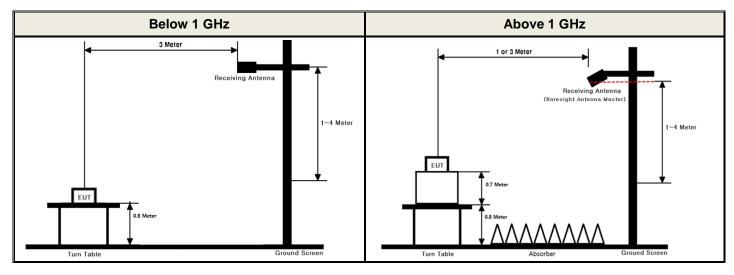
Туре	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY50410357
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48011700
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48010133
DC Power Supply	Agilent Technologies	66332A	20/06/24	21/06/24	MY43000211
Multimeter	FLUKE	17B	19/12/16	20/12/16	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	20/07/01	21/07/01	N/A
HYGROMETER	TESTO	608-H1	20/01/21	21/01/21	34862883
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
BILOG ANTENNA	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Horn Antenna	ETS-Lindgren	3115	20/01/30	21/01/30	6419
Horn Antenna	Schwarzbeck	BBHA 9120C	19/12/04	20/12/04	9120C-561
PreAmplifier	tsj	MLA-0118-B01-40	19/12/16	20/12/16	1852267
PreAmplifier	tsj	MLA-1840-J02-45	20/06/24	21/06/24	16966-10728
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
High Pass Filter	Wainwright Instruments	WHKX12-935-1000- 15000-40SS	20/06/24	21/06/24	8
High Pass Filter	Wainwright Instruments	WHKX10-2838- 3300-18000-60SS	20/06/24	21/06/24	1
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	20/06/24	21/06/24	3
Attenuator	Hefei Shunze	SS5T2.92-10-40	20/06/24	21/06/24	16012202
Attenuator	SRTechnology	F01-B0606-01	20/06/24	21/06/24	13092403
Attenuator	Aeroflex/Weinschel	56-3	20/06/24	21/06/24	Y2370
Attenuator	SMAJK	SMAJK-2-3	20/06/24	21/06/24	2
Attenuator	SMAJK	SMAJK-50-10	20/06/24	21/06/24	15081901
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2488B MA2491A	20/01/02	21/01/02	0910025 0845333
EMI Test Receiver	ROHDE&SCHWARZ	ESR	19/12/17	20/12/17	101767
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	20/08/25	21/08/25	101333
LISN	SCHWARZBECK	NSLK 8128 RC	19/11/04	20/11/04	8128 RC-387
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-04
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-07
Cable	DT&C	Cable	20/01/13	21/01/13	G-13
Cable	DT&C	Cable	20/01/13	21/01/13	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	20/01/13	21/01/13	G-15
Cable	Radiall	TESTPRO3	20/01/16	21/01/16	M-01
Cable	Junkosha	MWX315	20/01/16	21/01/16	M-05
Cable	Junkosha	MWX221	20/01/16	21/01/16	M-06
Cable	Radiall	TESTPRO3	20/01/16	21/01/16	RF-82
Test Software	tsj	Raidated Emission Measurement	NA	NA	Version 2.00.0177
Test Software	tsj	Noise Terminal Measurement	NA	NA	Version 2.00.0170

Note 1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017 Note 2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

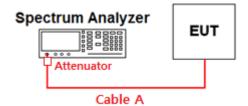
# **APPENDIX I**

# Test set up diagrams

#### Radiated Measurement



#### Conducted Measurement



#### Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	9.55	15	11.05
1	9.61	20	11.59
2.412 & 2.437 & 2.462	10.41	25	11.72
5	10.44	-	-
10	10.73	-	-

Note 1: The path loss from EUT to Spectrum analyzer was measured and used for test. Path loss (S/A's correction factor) = Cable A

Middle

# **APPENDIX II**

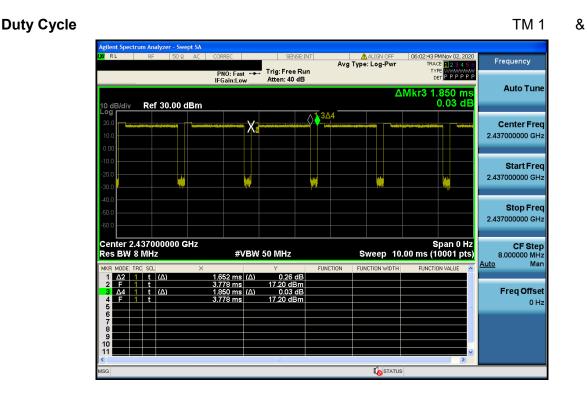
# **Duty cycle plots**

#### Test Procedure

#### Duty Cycle was measured using section 6.0 b) of KDB558074 D01v05r02 :

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW  $\geq$  OBW if possible; otherwise, set RBW to the largest available value. Set VBW  $\geq$  RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T  $\leq$  16.7 microseconds.)



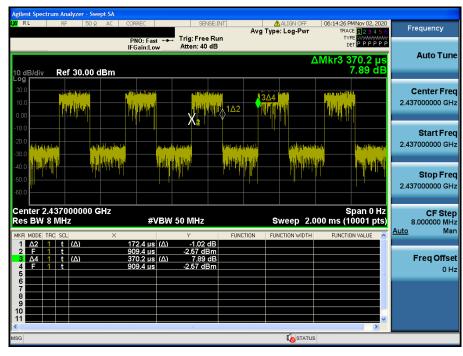
TRF-RF-236(04)171516

# **Dt&C**

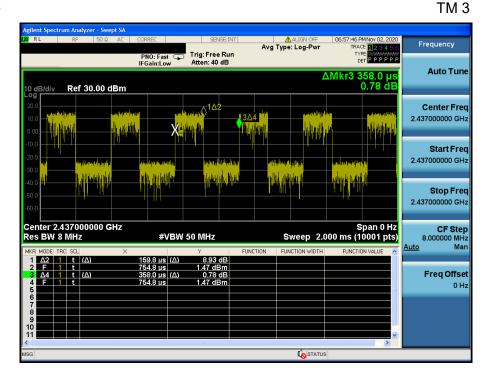
# TM 2 &

& Middle

#### **Duty Cycle**



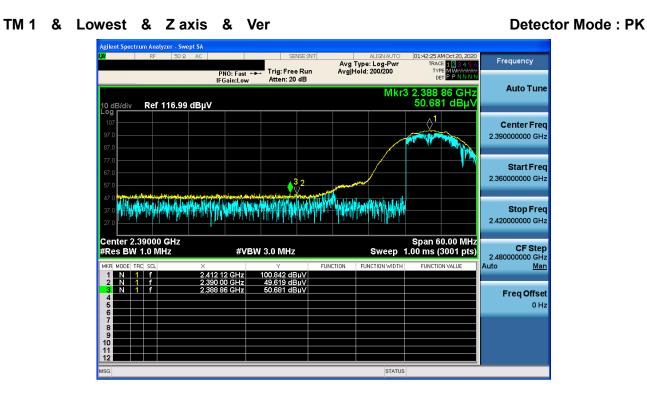
#### & Middle



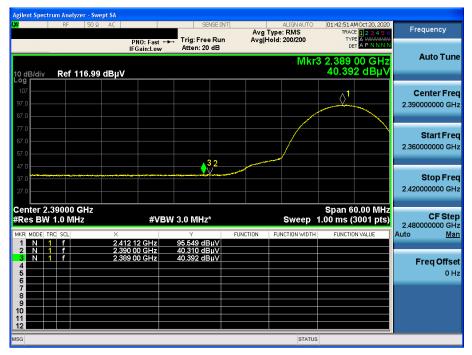
# **Duty Cycle**

# APPENDIX III

# **Unwanted Emissions (Radiated) Test Plot**



TM 1 & Lowest & Zaxis & Ver





#### TM 1 & Highest & Zaxis & Ver

#### **Detector Mode : PK**



#### TM 1 & Highest & Zaxis & Ver

#### Avg Type: RMS Avg|Hold: 200/200 Frequency Trig: Free Run Atten: 20 dB TYPE DET PNO: Fast IFGain:Low A P N Auto Tune Mkr3 2.484 448 GH 40.984 dBµ Ref 116.99 dBµV **Center Freq** $\Diamond^{1}$ 2.478500000 GHz Start Freq 2.457000000 GHz ⊖<mark>?)</mark>3 Stop Freq 2.500000000 GHz Stop 2.50000 GHz 1.00 ms (3001 pts) Start 2.45700 GHz #Res BW 1.0 MHz CF Step 2.48000000 GHz #VBW 3.0 MHz\* Sweep FUNCTION FUNCTION Auto Man 95.817 dBµ\ 40.035 dBµ\ 40.984 dBµ\ 2.482 002 GHz 2.483 500 GHz Freq Offset 0 Hz STATUS

# 🛈 Dt&C

### TM 2 & Lowest & Zaxis & Ver

0 dB/div

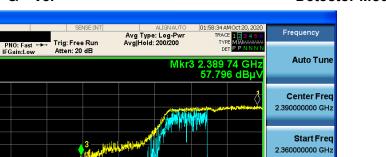
Swept SA

2.390 00 GHz 2.389 74 GHz

#VBW 3.0 MHz

52.753 dBµ\ 57.796 dBµ\

Ref 116.99 dBµV



**Verent Anter** Mar

ICTION:

Span 60.00 MHz Sweep 1.00 ms (3001 pts)

n i

#### **Detector Mode : PK**

Stop Freq

Man

2.420000000 GHz

CF Step 2.48000000 GHz

Freq Offset 0 Hz

\uto

# TM 2 & Lowest & Zaxis & Ver

Center 2.39000 GHz #Res BW 1.0 MHz

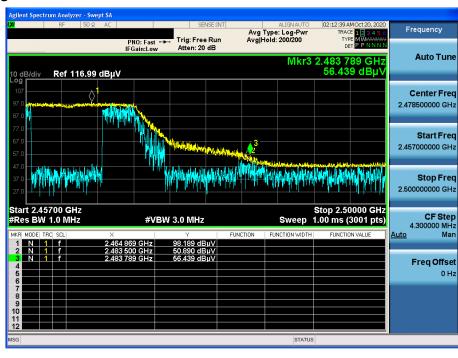
1 f NN

#### Frequency Avg Type: RMS Avg|Hold: 200/200 Trig: Free Run Atten: 20 dB TYPE DET PNO: Fast IFGain:Low A P N Auto Tune Mkr3 2.389 78 GH 42.455 dBµ' Ref 116.99 dBµV **Center Freq** 2.39000000 GHz $\Diamond$ Start Freq 2.36000000 GHz 3 Stop Freq 2.420000000 GHz Center 2.39000 GHz #Res BW 1.0 MHz Span 60.00 MHz 1.00 ms (3001 pts) CF Step 2.48000000 GHz #VBW 3.0 MHz\* Sweep FUNCTION FUNCTION WID Auto Man 85.713 dBµ\ 41.891 dBµ\ 42.455 dBµ\ Freq Offset 0 Hz STATUS

# **Dt&C**

# TM 2 & Highest & Zaxis & Ver





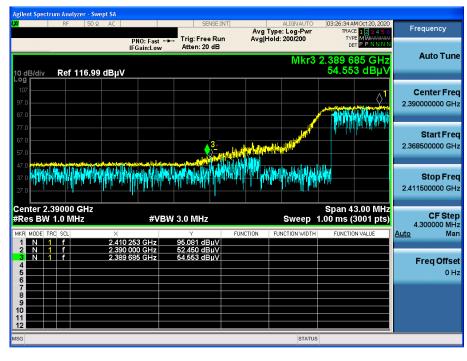
#### TM 2 & Highest & Zaxis & Ver

Avg Type: RMS Avg|Hold: 200/200 Frequency Trig: Free Run Atten: 20 dB TYPE DE1 PNO: Fast IFGain:Low A P N Auto Tune Mkr3 2.483 689 GH 42.084 dBµ Ref 116.99 dBµV **Center Freq** 2.478500000 GHz Start Freq 2.457000000 GHz <mark>~</mark>3 Stop Freq 2.500000000 GHz Stop 2.50000 GHz 1.00 ms (3001 pts) Start 2.45700 GHz #Res BW 1.0 MHz CF Step 4.300000 MHz Man #VBW 3.0 MHz\* Sweep FUNCTION FUNCTION Auto 87.643 dBµ∨ 41.759 dBµ∨ 42.084 dB 2.463 106 GHz 2.483 500 GHz Freq Offset 0 Hz STATUS



#### TM 3 & Lowest & Zaxis & Ver

#### **Detector Mode : PK**



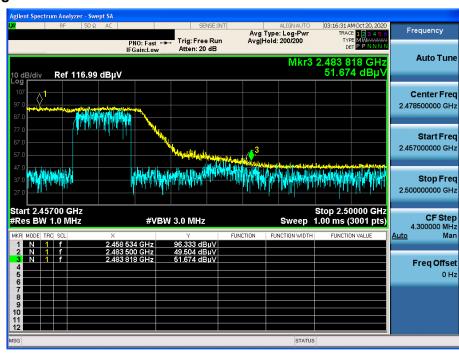
#### TM 3 & Lowest & Zaxis & Ver

#### Avg Type: RMS Avg|Hold: 200/200 Frequency Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low A P N Auto Tune Mkr3 2.389 685 GH 41.147 dBµ Ref 116.99 dBµV **Center Freq** 2.39000000 GHz Start Freq 2.368500000 GHz Stop Freq 2.411500000 GHz Center 2.39000 GHz #Res BW 1.0 MHz Span 43.00 MHz 1.00 ms (3001 pts) CF Step 4.300000 MHz Man #VBW 3.0 MHz\* Sweep FUNCTION FUNCTION WID Auto FUNCTION VALUE 82.154 dBµV 40.342 dBµV 41.147 dBµV .410 253 GHz .390 000 GHz Freq Offset 4 0 Hz STATUS

# **Dt&C**

# TM 3 & Highest & Zaxis & Ver





#### TM 3 & Highest & Zaxis & Ver

#### Avg Type: RMS Avg|Hold: 200/200 Frequency Trig: Free Run Atten: 20 dB TYPE DE1 PNO: Fast IFGain:Low A P N Auto Tune Mkr3 2.483 732 GH 41.464 dBµ Ref 116.99 dBµV **Center Freq** 2.478500000 GHz $\Diamond^1$ Start Freq 2.457000000 GHz <mark>⁄`3</mark> Stop Freq 2.500000000 GHz Stop 2.50000 GHz 1.00 ms (3001 pts) Start 2.45700 GHz #Res BW 1.0 MHz CF Step 4.300000 MHz Man #VBW 3.0 MHz\* Sweep FUNCTION FUNCTION Auto 2.458 534 5. 2.483 500 GHz 2.483 732 GHz 83.489 dBµV 41.309 dBµV 41.464 dBµV Freq Offset 4 0 Hz STATUS

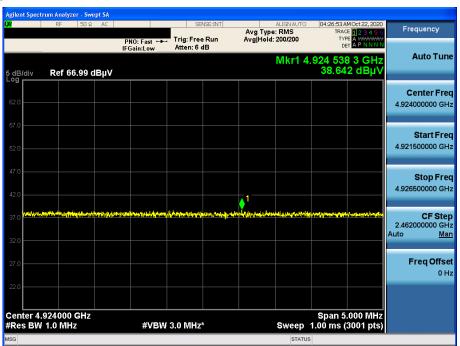
# **Dt&C**

# TM 1 & Lowest & X axis & Ver





#### TM 2 & Highest & X axis & Ver



#### TM 3 & Middle & X axis & Ver

