TEST REPORT

DT&C Co., Ltd.

42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042 Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC1902-00	port No	. R	I. Re	rt No :
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Dt&C

- 2. Customer
 - Name (FCC) : POINTMOBILE CO., LTD. / Name (IC) : POINTMOBILE CO., LTD
 - Address (FCC) : B-9F, Kabul Great Valley 32 Digital-ro 9-gil, Geumcheon-gu Seoul South Korea 153-709
 Address (IC) : B-9F Kabul Great Valley, 32, Digital-ro 9-gil, Geumcheon-gu Seoul Korea (Republic Of)

3. Use of Report : FCC & IC Original Grant

- 4. Product Name / Model Name : Mobile Computer / PM85G FCC ID : V2X-PM85G / IC : 10664A-PM85G
- 5. Test Method Used : KDB558074 D01v05, ANSI C63.10-2013 Test Specification : FCC Part 15.247

RSS-247 Issue 2, RSS-GEN Issue 5

- 6. Date of Test : 2018.11.28 ~ 2018.12.21
- 7. Testing Environment : See appended test report.
- 8. Test Result : Refer to the attached test result.

Affirmation	Tested by	,	Reviewed by	NAA
 St. State State State State State State 	Name : SunGeun Lee	(Sicharte)	Name : GeunKi Son	(Signature)

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

2019.02.26.

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



Test Report Version

Test Report No.	Date	Description
DRTFCC1902-0050	Feb. 26, 2019	Initial issue



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1. EUT DESCRIPTION

FCC Equipment Class	Digital Transmission System(DTS)	
Product	Mobile Computer	
Model Name(FCC, IC)	PM85G	
Add Model Name(FCC)	XT200WA	
Add Model Name(IC)	-	
Hardware Version	МР	
Software Version	85.M00	
Power Supply	DC 3.85 V	
Frequency Range	▪ 802.11b/g/n/ac(20 MHz) : 2412 MHz ~ 2462 MHz	
Max. RF Output Power	2.4GHz Band • 802.11b : 17.67 dBm • 802.11g : 22.12 dBm • 802.11n (HT20) : 21.92 dBm • 802.11ac (VHT20) : 22.32 dBm	
Modulation Type	• 802.11b: CCK, DSSS • 802.11g/n/ac: OFDM	
Antenna Specification	Antenna type: Internal Antenna Antenna gain: 2.22 dBi	

2. INFORMATION ABOUT TESTING

2.1 Test mode

Test	Worst case data rate	Tested Frequency(MHz)			
mode		Lowest	Middle	Highest	
TM 1	802.11b 11 Mbps	2412	2437	2462	
TM 2	802.11g 54 Mbps	2412	2437	2462	
ТМ 3	802.11n(HT20) MCS 7	2412	2437	2462	
TM 4	802.11ac(VHT20) MCS 8	2412	2437	2462	

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	:	18 ~ 22 °C
Relative humidity content	:	35 ~ 40 % R.H
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
Transmitter Output Power	0.9 dB (The confidence level is about 95 %, $k = 2$)
Conducted spurious emission	1.0 dB (The confidence level is about 95 %, $k = 2$)
AC conducted emission	2.4 dB (The confidence level is about 95 %, $k = 2$)
Radiated spurious emission (1 GHz Below)	5.1 dB (The confidence level is about 95 %, $k = 2$)
Radiated spurious emission (1 GHz ~ 18 GHz)	5.4 dB (The confidence level is about 95 %, $k = 2$)
Radiated spurious emission (18 GHz Above)	5.3 dB (The confidence level is about 95 %, k = 2)

3. SUMMARY OF TESTS

FCC Part	RSS Std.	Parameter	Limit	Test Condition	Status Note 1
15.247(a)	RSS-247 [5.2]	6 dB Bandwidth	> 500 kHz		С
15.247(b)	RSS-247 [5.4]	Transmitter Output Power	< 1 Watt		С
15.247(d)	RSS-247 [5.5]	Out of Band Emissions / Band Edge	20 dBc in any 100 kHz BW	Conducted	С
15.247(e)	RSS-247 [5.2]	Transmitter Power Spectral Density	< 8 dBm/3 kHz		С
-	RSS-Gen [6.7]	Occupied Bandwidth (99 %)	RSS-Gen(6.7)		С
15.247(d) 15.205 15.209	RSS-247 [5.5] RSS-GEN [8.9] RSS-GEN [8.10]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	FCC 15.209 limits	Radiated	C Note 3
15.207	RSS-Gen [8.8]	AC Line Conducted Emissions	FCC 15.207 limits	AC Line Conducted	С
15.203	RSS-Gen [8.3]	Antenna Requirements	FCC 15.203	-	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 performed in each axis and the worst case data was reported.



4. TEST METHODOLOGY

The measurement procedures described in the ANSI C63.10-2013 and the guidance provided in KDB558074 D01v05 were used in measurement of the EUT.

The EUT was tested per the guidance of KDB558074 D01v05. 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 D01v05.

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 D01v05. 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 C63.10-2013.

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. In order to find out the highest emission, the relative positions of the EUT were rotated through three orthogonal axes.

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.



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 MRA Accredited Test Firm No. : KR0034

- IC Test site No. : 5740A-4, 5740A-5

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 internal antenna is attached on the main PCB using the special spring tension. (Refer to Internal Photo file.) Therefore this E.U.T 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 D01v05 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. 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.

Test Results: Comply

Test Mode	Frequency	Test Results[MHz]
	Lowest	8.56
TM 1	Middle	8.53
	Highest	8.50
	Lowest	16.37
TM 2	Middle	16.44
	Highest	16.42
	Lowest	16.47
TM 4	Middle	16.88
	Highest	16.48



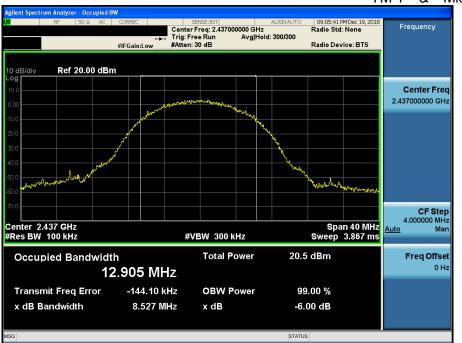
RESULT PLOTS

6 dB Bandwidth

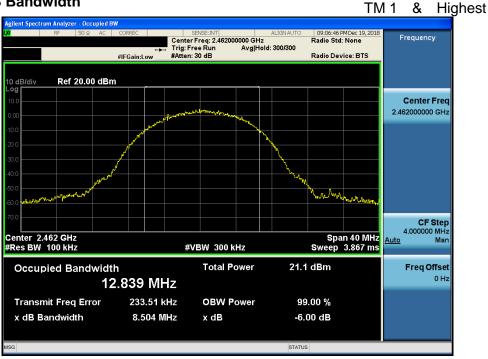


6 dB Bandwidth

TM 1 & Middle



🛈 Dt&C

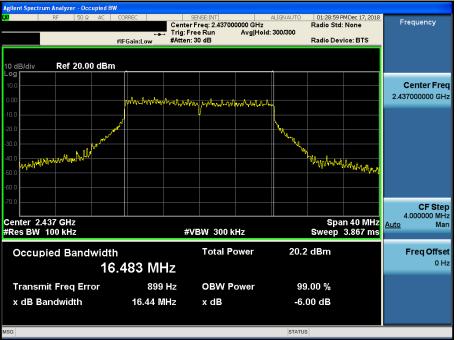


Dt&C

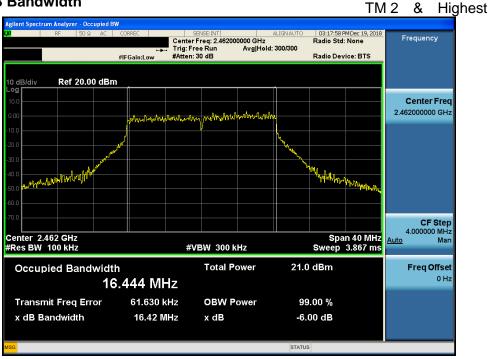


6 dB Bandwidth

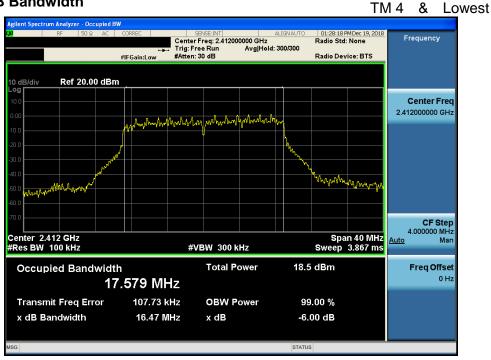




🛈 Dt&C

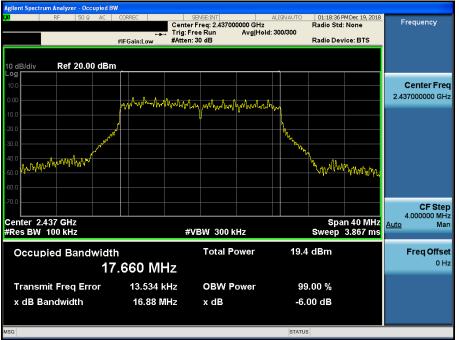


Dt&C

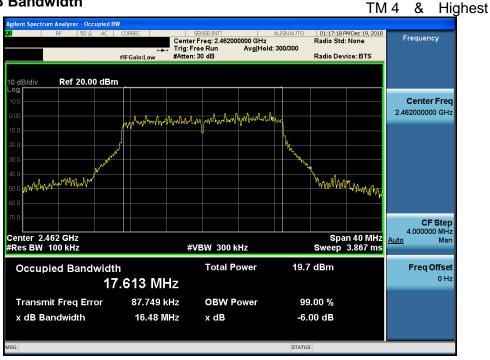


6 dB Bandwidth





🛈 Dt&C

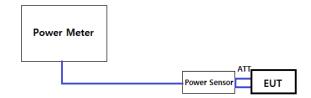


8.2 Maximum peak conducted output power

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 D01V05

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 D01V05

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

From	Maximum Peak Conducted Output Power (dBm) for 802.11b										
Freq. (MHz)	Det.	Data Rate [Mbps]									
		1	2	5.5	11	-	-	-	-		
2412	PK	16.51	16.58	16.62	16.73	-	-	-	-		
2412	AV	12.31	12.28	12.16	12.17	-	-	-	-		
2437	PK	17.19	17.26	17.44	17.67	-	-	-	-		
2437	AV	12.63	12.59	12.60	12.46	-	-	-	-		
2462	PK	17.09	17.15	17.24	17.31	-	-	-	-		
2402	AV	12.93	12.84	12.86	12.80	-	-	-	-		

From		Maximum Peak Conducted Output Power (dBm) for <u>802.11g</u>									
Freq. (MHz)	Det.	et. Data Rate [Mbps]									
		6	9	12	18	24	36	48	54		
2412	PK	21.63	21.49	21.86	21.99	22.02	22.07	22.06	22.12		
2412	AV	12.35	12.31	12.40	12.49	12.47	12.40	12.38	12.33		
2437	PK	21.70	21.85	21.87	21.69	21.63	21.59	21.78	22.07		
2437	AV	12.79	12.83	13.10	12.97	12.93	12.91	12.92	13.07		
2462	PK	21.85	21.93	21.91	22.02	22.05	22.08	22.06	22.12		
2402	AV	13.17	13.18	13.29	13.28	13.16	13.19	13.15	13.11		

From		Maximum Peak Conducted Output Power (dBm) for <u>802.11n(HT20)</u>									
Freq. (MHz)	Det.				te [MCS]						
		0	1	2	3	4	5	6	7		
2412	PK	21.02	21.05	20.86	20.99	21.00	21.04	21.07	21.12		
2412	AV	12.01	11.98	11.96	11.98	12.02	12.04	12.01	12.09		
2437	PK	21.07	21.06	21.13	21.19	21.15	21.21	21.19	21.22		
2437	AV	12.63	12.61	12.60	12.51	12.48	12.56	12.61	12.60		
2462	PK	21.55	21.57	21.54	21.58	21.50	21.52	21.62	21.92		
2402	AV	12.83	12.71	12.76	12.83	12.68	12.81	12.86	12.88		



F ree a			Maximu	m Peak Co	nducted Ou	Itput Powe	r (dBm) for	802.11ac	(VHT20)		
Freq. (MHz)	Det.	Data Rate [MCS]									
		0	1	2	3	4	5	6	7	8	
2412	PK	21.27	21.68	21.35	21.65	21.63	21.48	21.35	21.38	21.50	
	AV	12.28	12.20	12.29	12.33	12.40	12.23	12.20	12.19	12.22	
2437	PK	21.24	21.35	21.31	21.51	21.48	21.44	21.31	21.35	21.58	
2437	AV	13.18	13.02	13.11	13.15	13.25	13.18	13.15	13.14	13.17	
2462	PK	21.64	22.12	21.72	22.11	22.15	22.07	21.76	21.79	22.32	
2462	AV	13.16	13.15	13.14	13.28	13.13	13.19	13.13	13.13	13.14	

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 D01v05 Section 8.4
- ANSI C63.10-2013 Section 11.10.2

Method PKPSD (peak PSD)

- 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 : $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
- 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.

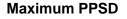
9. Use the **peak marker function** to determine the maximum amplitude level within the RBW.

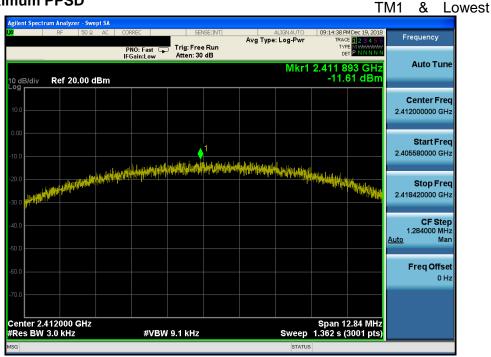
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Results: Comply

Test Mode	Frequency	RBW	PKPSD [dBm]
	Lowest	3 kHz	-11.61
TM 1	Middle	3 kHz	-10.93
	Highest	3 kHz	-9.78
	Lowest	3 kHz	-14.31
TM 2	Middle	3 kHz	-13.98
	Highest	3 kHz	-12.17
	Lowest	3 kHz	-17.14
TM 4	Middle	3 kHz	-15.98
	Highest	3 kHz	-16.02

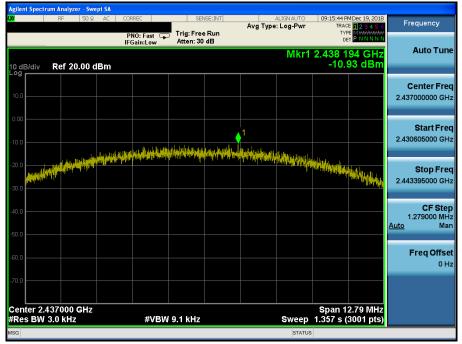
RESULT PLOTS

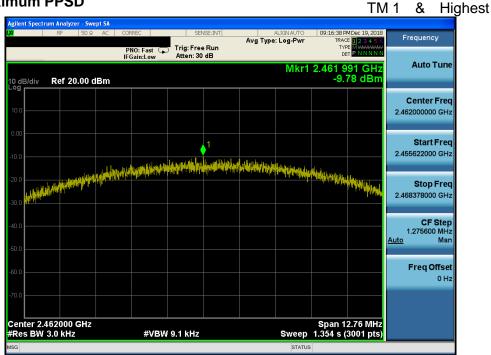


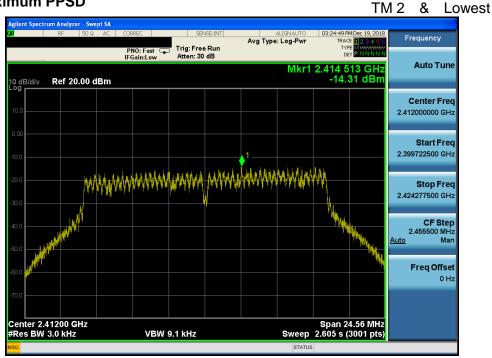


Maximum PPSD

TM 1 & Middle



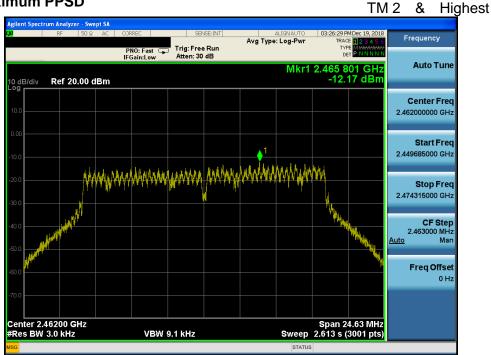


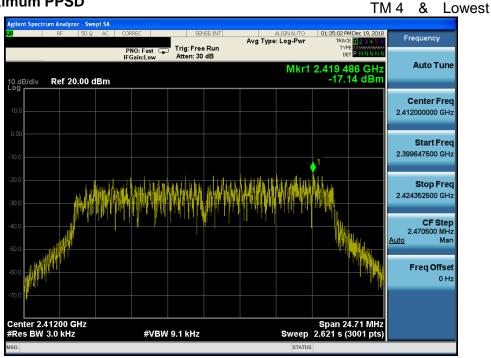


Maximum PPSD

TM2 & Middle

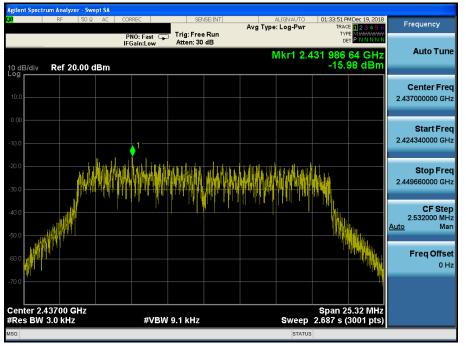


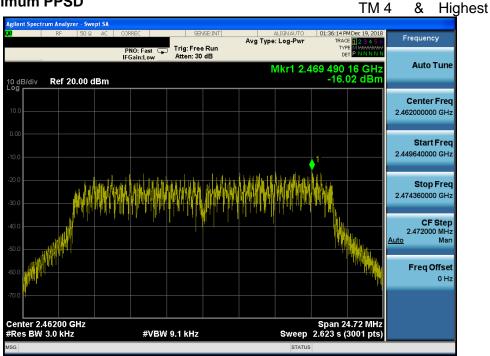




Maximum PPSD

TM 4 & Middle





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 D01v05 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 POINT : 40001

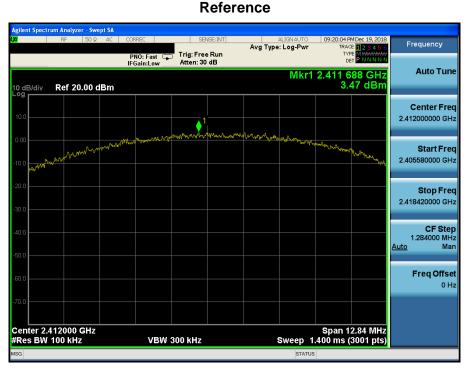
Frequency range: 30 MHz ~ 10 GHz, 10 GHz ~25 GHz RBW = 1 MHz, VBW = 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

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

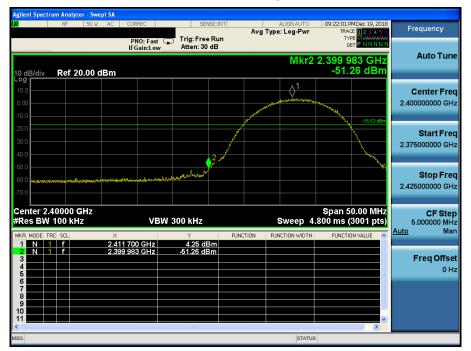
If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2001 to get accurate emission level within 100 kHz BW.

RESULT PLOTS

TM 1 & Lowest



Low Band-edge



Agilent Spectrum Analyzer - Sv						
LXI RF 50 \$	2 \Lambda DC 🔋 CORREC	SENSE:INT		ALIGNAUTO	09:22:46 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast	Trig: Free Run Atten: 30 dB	-		TYPE MWWWWWW DET P N.N.N.N.N	
	IFGain:Low	Atten: 30 dB				Auto Tune
10 dB/div Ref 20.00	dBm			n	/lkr1 281.9 kHz -55.30 dBm	
Log 10.0						O antes Error
0.00						Center Freq 15.004500 MHz
-10.0						15.004500 MHz
					-16.53 dBm	
-20.0						Start Freq
-30.0						9.000 kHz
-40.0						
-50.0						Stop Freq
	un in antipitan antipitan argintenda	And an and an and a state of the state of th	eliterstation and the	wywanitasi ingenetika panilika	والجزيرة والمعراسية المترومين والمتعار والمعا	30.000000 MHz
-70.0						
Start 9 kHz					Stop 30.00 MHz	CF Step
#Res BW 100 kHz	VB	W 300 kHz		Sweep 5.3	33 ms (40001 pts)	2.999100 MHz
MKR MODE TRC SCL	×	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f	281.9 kHz	-55.30 dBm				
3						Freq Offset
4						0 Hz
6						
7 8						
9						
11					×	
		.11		071710	> DO Courled	
ISG				STATUS	L DC Coupled	

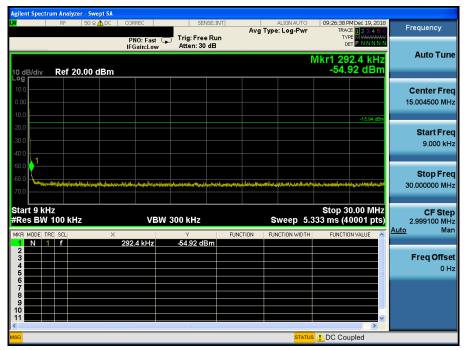
Agilent Spectrum Analyzer - Swe	ept SA				
LX/ RF 50Ω	AC CORREC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:23:42 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type. Log-rwr	TYPE MWWWWWW DET P NNNNN	
10 dB/div Ref 20.00 d	dBm		Mkr	4 2.801 41 GHz -45.66 dBm	Auto Tune
10.0 0.00 -10.0	<u> </u>			-16,53 dBm	Center Frec 5.015000000 GHz
-20.0	4,3		2 ↓	-10.53 UCHI	Start Free 30.000000 MH:
-50.0 -70.0					Stop Free 10.000000000 GH
Start 30 MHz #Res BW 1.0 MHz	VBW	3.0 MHz	Sweep 18	Stop 10.000 GHz 67 ms (40001 pts)	CF Stej 997.000000 MH
MKR MODE TRC SCL	× 2.413 58 GHz	Y FUR 10.07 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 f 3 N 1 f 4 N 1 f 5	2.413 30 GHz 6.245 30 GHz 3.066 86 GHz 2.801 41 GHz	-45.58 dBm -45.58 dBm -45.66 dBm			Freq Offse 0 Ha
6 7 8 9					
10 11 <		m		>	
<mark>//SG</mark>			STATUS		

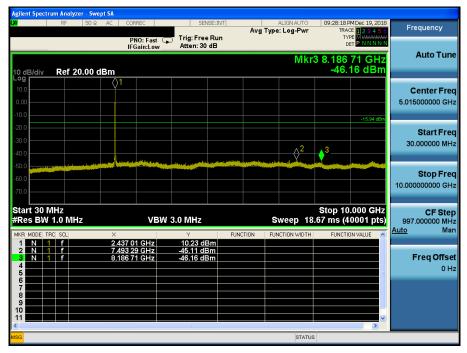


TM 1 & Middle

Reference







Agilent Spectrum Analyzer - Swept SA					
KF 50 Ω AC	CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	09:30:21 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
		Trig: Free Run Atten: 30 dB	Avg Type. Log-r wi	TYPE MWWWWW DET PNNNNN	
10 dB/div Ref 20.00 dBm			Mkr3 1	6.549 000 GHz -40.88 dBm	Auto Tune
10.0 0.00 -10.0				-15.94 dBm	Center Freq 17.50000000 GHz
-20.0 -30.0 -40.0					Start Freq 10.00000000 GHz
-50.0					Stop Freq 25.00000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	VBW 3.0	0 MHz	Sweep 40	Stop 25.000 GHz .00 ms (40001 pts)	CF Step 1.50000000 GHz Auto Man
		-36.48 dBm	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
	5 125 GHz 9 000 GHz	-36.87 dBm -40.88 dBm		3	Freq Offset 0 Hz
7 8 9 10					
11		m		×	
MSG			STATUS		

TM 1 & Highest

Reference



High Band-edge



Agilent Spectrum Analyzer - Swi					
L XI RF 50 Ω	ADC CORREC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	09:33:20 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE MWANNAW DET P N N N N N	
10 dB/div Ref 20.00				Vkr1 291.7 kHz -54.81 dBm	Auto Tune
10.0					Center Freq 15.004500 MHz
-10.0				-14.70 dBm	Start Freq
-30.0 -40.0					9.000 kHz
-50.0	and the second secon	ىرىلەر بەر يەر يەر يەر يەر يەر يەر يەر يەر يەر ي	ายวิสารรถเป็นเป็นเสร็ม เช่นกันสุราชาวารส	المعادين معادين والمعارفة والمعادية والمعارية والمعارية والمعارية والمعارية والمعارية والمعارية والمعارية والم	Stop Freq 30.000000 MHz
Start 9 kHz #Res BW 100 kHz	VBN	V 300 kHz	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	CF Step 2.999100 MHz Auto Man
MKR MODE TRC SCL	× 291.7 kHz	Y F⊍N -54.81 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	Auto Wan
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				=	Freq Offset 0 Hz
6 7 8 9					
10 11 <				>	
MSG			STATUS	DC Coupled	

Agilent Spectrum Analyzer - Sv	vept SA								
ιχι RF 50 Ω	Ω AC COI	RREC	SENSE	INT		ALIGNAUTO		4Dec 19, 2018	Frequency
	P	NO: Fast 😱 Gain:Low	Trig: Free R Atten: 30 dl		Avgiype	: Log-Pwr	TYP	123456 MWWWWW PNNNNN	
10 dB/div Ref 20.00	dBm					Mkr	2 6.308 -44.2	61 GHz 24 dBm	Auto Tune
10.0 0.00 -10.0								-14.70 dBm	Center Freq 5.015000000 GHz
-20.0					2				Start Freq 30.000000 MHz
-50.0 -60.0 -70.0					- 1 44 - 14				Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz		VBW 3	.0 MHz		s	weep 18.	Stop 10. 67 ms (40	000 GHz 0001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	×		Y	FUNCT	ION FUI	ICTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u> Man
1 N 1 F 2 N 1 F 3 4 5	2.463 4 6.308 6	1 GHz	11.15 dBn -44.24 dBm						Freq Offset 0 Hz
6									
10 11			Ш					×	
MSG						STATUS			



TM 2 & Lowest

Reference



Low Band-edge



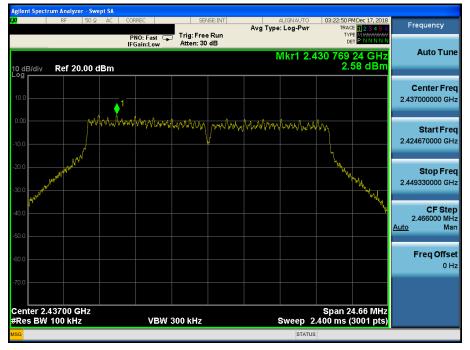
Agilent Spectrum Analyzer - Swept SA					
LXU RF 50 Ω 🛕 DC	CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	03:29:44 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
		rig: Free Run Atten: 30 dB		DET P N N N N	
	IFGain:Low A	tten: 30 dB			Auto Tune
			ľ	/lkr1 303.7 kHz -54.72 dBm	
10 dB/div Ref 20.00 dBm				-34.72 UBIII	
10.0					Center Freq
0.00					15.004500 MHz
-10.0					
-20.0				-17.83 dBm	
-30.0					Start Freq
-40.0					9.000 kHz
-50.0					Stop Freq
-60.0	والمتحد المتعالية المتعادم المتعادية		ميز ومراجع والمتحد ومناجع ومعادية	making and a second second	30.000000 MHz
-70.0					
Start 9 kHz				Stop 30.00 MHz	CF Step
#Res BW 100 kHz	VBW 300) kHz	Sweep 5.3	33 ms (40001 pts)	2.999100 MHz
MKR MODE TRC SCL X		Y FUNC	TION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
	303.7 kHz 🛛 🗧	54.72 dBm			
2					Freq Offset
4 5					0 Hz
6					
7 8					
9					
10				~	
<		110			
MSG			STATUS	1 DC Coupled	

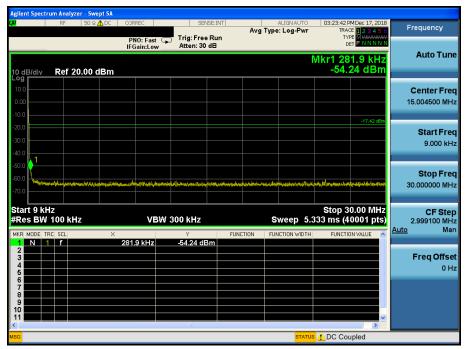
Agilent Spectrum Ana	alyzer - Swept SA							
L <mark>XI</mark> RF	50 Ω AC	CORREC	SENSE:IN		ALIGN AUTO	03:31:54 PM De		Frequency
		PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB		Type: Log-Pwr	TYPE N	23456 NNNNN	requency
10 dB/div Ref	20.00 dBm	I Gameow			Mkr	3 8.587 50 -46.88		Auto Tune
Log 10.0 0.00 -10.0								Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0						3	-17.83 dBm	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0								Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 M	ИНz	VBW 3	3.0 MHz		Sweep 18	Stop 10.00 67 ms (400	01 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL		19 56 GHz	ү 9.89 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION V	ALUE	<u>Auto</u> Man
2 N 1 f 3 N 1 f 4 5		98 19 GHz 37 50 GHz	-45.02 dBm -46.88 dBm				=	Freq Offset 0 Hz
6 7 8 9 10								
10			111				×	
MSG					STATUS			

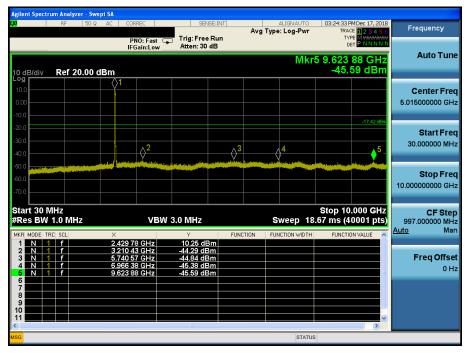


TM 2 & Middle

Reference







Agilent Spectrum Analyzer - S	wept SA					
LXI RF 50	Ω AC CORREC	SENSE: I		ALIGNAUTO Type: Log-Pwr	03:26:12 PM Dec 17, 20 TRACE 1 2 3 4	
	PNO: Fas IFGain:Los	Trig: Free Ru Atten: 30 dB		Type: Log-Pwr	TYPE MWWWW DET P NNNI	
10 dB/div Ref 20.00	dBm			Mkr3 1	6.427 125 GH -40.51 dBi	
10.0 0.00 -10.0						Center Freq 17.500000000 GHz
-20.0 -30.0 -40.0		3			-17.42 d	1 10.000000000 GHz
-50.0 -60.0 -70.0						Stop Freq 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz		3W 3.0 MHz			Stop 25.000 GH .00 ms (40001 pt	s) 1.500000000 GHz Auto Man
MKR MODE TRC SCL	× 24.560 500 GHz	-36.86 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	
2 N 1 f 3 N 1 f 4 5	22.205 125 GHz 16.427 125 GHz	-37.27 dBm -40.51 dBm				Freq Offset 0 Hz
6 7 8 9 10						
11						
K MSG		III		STATUS		
				STATUS		

TM 2 & Highest

trum Analyzei Swept S/ 03:34:06 PM Dec 19, 3 TRACE 1 2 3 4 Frequency Avg Type: Log-Pwr PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB RACE 2 3 4 5 TYPE MUMUMU DET PINNNN Auto Tune Mkr1 2.469 520 GHz 3.22 dBm Ref 20.00 dBm 0 dB/div Center Freq 2.462000000 GHz ma white mAnn matro mmmmmm Start Freq 2.449685000 GHz Stop Freq 2.474315000 GHz **CF Step** 2.463000 MHz Man <u>Auto</u> Freq Offset 0 Hz Center 2.46200 GHz #Res BW 100 kHz Span 24.63 MHz Sweep 2.400 ms (3001 pts) VBW 300 kHz

High Band-edge



Agilent Spectrum Analyzer - Swep					
LX4 RF 50 Ω 🥂	DC CORREC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	03:35:38 PMDec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE M WWWWWW DET P N N N N N	
10 dB/div Ref 20.00 dl	Bm			Mkr1 288.7 kHz -53.02 dBm	Auto Tune
Log 10.0					Center Freq 15.004500 MHz
-10.0				-16.78 dBm	15.004500 MHz
-20.0					Start Freq 9.000 kHz
-40.0					
-60.0	uggi utti kuun kirut taya yan kirut ya k		สารางการการการการการการการการการการการการการก	anstraalistiinistaasteitiintyksistittaa	Stop Freq 30.000000 MHz
Start 9 kHz #Res BW 100 kHz	VBW	300 kHz	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	CF Step 2.999100 MHz
MKR MODE TRC SCL	× 288.7 kHz	Y FI -53.02 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4					Freq Offset 0 Hz
6 7 8					
9 10 11					
K MSG		III	STATUS	DC Coupled	
			STATUS		

Agilent Spectrum Analyzer - Swept	SA				
LXU RF 50 Ω	AC CORREC	SENSE:INT	ALIGNAUTO	03:37:32 PMDec 19, 2018	Frequency
	PNO: Fast 🕞 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	TRACE 123456 TYPE MWWWW DET PNNNNN	
10 dB/div Ref 20.00 dE			Mkr	4 4.929 51 GHz -45.53 dBm	Auto Tune
Log 10.0 0.00 -10.0				-16.78 dBm	Center Freq 5.015000000 GHz
-20.0	3	¢⁴◊	2		Start Freq 30.000000 MHz
-50.0 -60.0 -70.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	VBW	3.0 MHz	Sweep 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	× 2.466 42 GHz	Y FUN 11.40 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 N 1 f 4 N 1 f 5	5.792 66 GHz 3.138 40 GHz 4.929 51 GHz	-45.02 dBm -45.15 dBm -45.53 dBm		=	Freq Offset 0 Hz
6 7 8 9 9					
10				×	
MSG			STATUS		

Agilent Spectri													
LXI	RF	50 Ω	AC	CORREC		SE	NSE:INT	Avg		LIGNAUTO	TR	i PM Dec 19, 2018 ACE 1 2 3 4 5 6	Frequency
				PNO: F	ast 🖵	Trig: Fre Atten: 30		_		-	r	YPE MUMANANA DET PNNNNN	
				IFGain:	LOW	Atten: or				Miles 4		250 GHz	Auto Tune
10 dB/div	Ref 20	n 00 d	Bm							WINIS		.17 dBm	
Log		0.00 u											
10.0													Center Freq
0.00													17.50000000 GHz
-10.0												-16.78 dBm	
-20.0											_		Start Freq
-30.0											0^2	4	10.00000000 GHz
-40.0					مالىمى لىبارى		a second site			and the second	in the second		
-50.0					التطليقية.								Stop Freq
-60.0													25.000000000 GHz
-70.0													
Start 10.0		,									Ston 2	5.000 GHz	CF Step
#Res BW					VBW 3	3.0 MHz			Sv	veep 40	.00 ms (40001 pts)	1.500000000 GHz
MKR MODE TR	C SCL		×			Y		FUNCTION	FUNG	TION WIDTH	FUNC	TION VALUE 🛛 🔼	<u>Auto</u> Man
1 N 1 2 N 1	f			7 625 GH 5 750 GH		-36.93 d -37.79 d							
3 N 1	f		21.366	5250 GH	Iz	-38.29 d	Bm						Freq Offset
4 N 1 5 N 1	f			2 625 GH 3 250 GH		<u>-38.36 d</u> -39.17 d						=	0 Hz
6													
8													
9													
11												~	
MSG		_							_	STATUS		2	
										STATUS			

TM 4 & Lowest

Reference



Low Band-edge



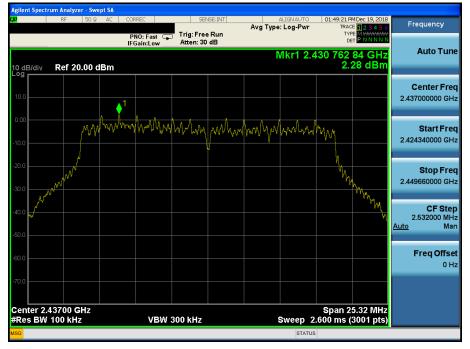
Agilent Spectrum Analyzer - Swept SA					
LXI RF 50 Ω 🚹 DC	CORREC SE	NSE:INT Ava T	ALIGNAUTO	04:12:47 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast Trig: Fre	e Run	,,	TYPE M WAARAAAAA DET P N N N N N	
	IFGain:Low Atten: 30	Jab			Auto Tune
10 dB/div Ref 20.00 dBm			N	/lkr1 281.9 kHz -56.02 dBm	
Log					
10.0					Center Freq
0.00					15.004500 MHz
-10.0					
-20.0				-18.71 dBm	Other Frank
-30.0					Start Freq
-40.0					9.000 kHz
-50.0					
-60.0					Stop Freq
When the state of	hall far her stand and the stand property and the	ورشيانا الماريح لاسميان ومرادا فافقاده	6/1/1pm/piper/1/1/1/1/1/1/1/1/1/1/1/1/1/	ununderstalleler einer die sterets	30.000000 MHz
-70.0					
Start 9 kHz				Stop 30.00 MHz	CF Step
#Res BW 100 kHz	VBW 300 kHz		Sweep 5.3	33 ms (40001 pts)	2.999100 MHz
MKR MODE TRC SCL X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f	281.9 kHz -56.02 d	Bm			
2					Freq Offset
4 5					0 Hz
6					
7 8					
9					
10				~	
<				>	
MSG			STATUS	1 DC Coupled	

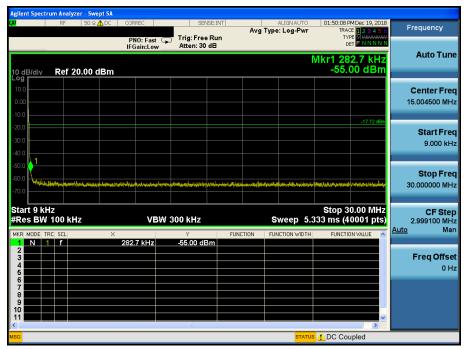
Agilent Spectrum Analyzer - Swept S	SA				
ιχι RF 50.Ω A	AC CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	01:47:23 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	TYPE MWWWWW DET PNNNNN	
10 dB/div Ref 20.00 dB	m		Mkr	5 6.976 60 GHz -45.75 dBm	Auto Tune
Log 10.0 0.00 -10.0	\$ ¹				Center Freq 5.015000000 GHz
-20.0	3		5	18.71 dBm	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	VBW 3	.0 MHz	Sweep 18.	Stop 10.000 GHz 67 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	x		CTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 F 2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F	2.418 81 GHz 5.802 88 GHz 3.299 16 GHz 9.639 09 GHz 6.976 60 GHz	9.22 dBm -45.32 dBm -45.71 dBm -45.72 dBm -45.75 dBm		a	Freq Offset 0 Hz
6 7 8 9 10					
<		111		>	
MSG			STATUS		

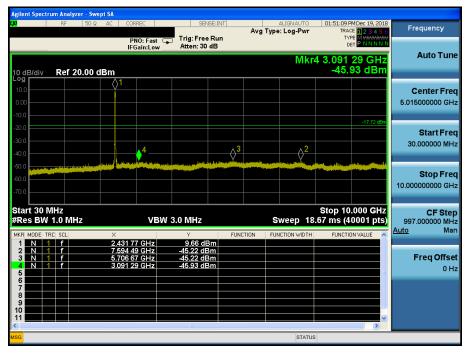


TM 4 & Middle

Reference







Agilent Spect		ılyzer - Sw	ept SA									
L <mark>XI</mark>	RF	50 Ω	AC	CORREC		SEN	ISE:INT	Ava	ALIGNAUT		21 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	
				PNO: I IFGain	Fast 🕞	Trig: Free Atten: 30		~~9	Type. Log-Fil	•	TYPE MUMANANA DET P N N N N	
10 dB/div	Ref	20.00	dBm	II Gain					Mkr4		2 500 GHz 9.89 dBm	Auto Tune
Log 10.0 0.00												Center Freq 17.500000000 GHz
-20.0 -30.0 -40.0					فخاده ذارو			4		2	-17.72 dBm	Start Freq 10.000000000 GHz
-50.0 -60.0 -70.0												Stop Freq 25.000000000 GHz
Start 10.0 #Res BW	1.0 N				VBW	3.0 MHz			· · ·	40.00 ms	25.000 GHz (40001 pts)	CF Step 1.50000000 GHz Auto Man
MKR MODE T	RC SCL		× 24 71	6 875 GI	-17	۲ -37.15 dl		UNCTION	FUNCTION WID	TH FUI	ICTION VALUE	<u>rate</u> man
2 N 3 N 4 N 5	f f f		22.18 21.29	6 750 GI 9 125 GI 2 500 GI	Hz Hz	-38.15 dE -38.51 dE -39.89 dE	3m 3m					Freq Offset 0 Hz
6 7 8 9												
11											~	
MSG	_		_		_	110	_		STA	TUS	>	
	_		_						017			

TM 4 & Highest

trum Ana Swept S/ 01:53:17 PMDec 19, TRACE 1 2 3 4 Frequency Avg Type: Log-Pwr RACE 2 3 4 5 TYPE MUMUMU DET PINNNN PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB Auto Tune Mkr1 2.467 018 16 GHz 2.32 dBm Ref 20.00 dBm 0 dB/div Center Freq 2.462000000 GHz monor and many many many many Mym Start Freq MΜ 2.449640000 GHz Stop Freq 2.474360000 GHz CF Step 2.472000 MHz Man <u>Auto</u> Freq Offset 0 Hz Center 2.46200 GHz #Res BW 100 kHz Span 24.72 MHz Sweep 2.400 ms (3001 pts) VBW 300 kHz

High Band-edge



Agilent Spectrum Analyzer - Swept					
🗶 RF 50 Ω 🧥 🛛	DC CORREC	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	01:54:58 PM Dec 19, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB		TYPE MWAWAWA	
	IFGain:Low	Atten: 30 dB			Auto Tune
10 dB/div Ref 20.00 dB	m			Mkr1 284.9 kHz -55.56 dBm	
Log 10.0					Center Freq
0.00					15.004500 MHz
-10.0					
-20.0				-17.68 dBm	
-30.0					Start Freq
-40.0					9.000 kHz
-50.0					
					Stop Freq
-50.0		ومفاجه بهديه المحاص مواللم والمساوية فألوه	and the second	unionistation designation of the second s	30.000000 MHz
-70.0					
Start 9 kHz				Stop 30.00 MHz	CF Step
#Res BW 100 kHz	VBW	300 kHz	Sweep 5.3	333 ms (40001 pts)	2.999100 MHz
MKR MODE TRC SCL	X		FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f	284.9 kHz	-55.56 dBm			
3					Freq Offset
5				=	0 Hz
6					
8					
9					
11				<u> </u>	
MSG		- 110	STATU	DC Coupled	

Agilent Spectrum A	nalyzer - Swept S	SA								
LXI R	F 50Ω A	AC CORRE	EC	SENS	EINT		ALIGN AUTO		MDec 19, 2018	Frequency
		PNC	:Fast 🖵	Trig: Free F		Avg Tyj	pe: Log-Pwr	TYP	E 1 2 3 4 5 6 E M WATATATA T P N N N N N	Frequency
		IFGa	in:Low	Atten: 30 d	В					Auto Tune
10 dB/div R	ef 20.00 dB	m					Mkr		13 GHz 19 dBm	Autorune
Log		<\>1								
10.0		Ť –								Center Freq
0.00										5.015000000 GHz
-10.0										
-20.0									-17.68 dBm	
										Start Freq
-30.0						2	. 2		. 4	30.000000 MHz
-40.0						<u> </u>			♦⁺ -	
-50.0		and antisiment			and a second					
-60.0										Stop Freq
-70.0										10.00000000 GHz
-70.0										
Start 30 MHz								Stop 10	.000 GHz	CF Step
#Res BW 1.0			VBW :	3.0 MHz			Sweep 18	.67 ms (4	0001 pts)	997.000000 MHz
MKR MODE TRC SO	1	X		Y	FUNC		UNCTION WIDTH		N VALUE	<u>Auto</u> Man
1 N 1 f		2.467 17	GHz	10.42 dBr		TION P	UNCTION WIDTH	FUNCTIO	N VALUE	
2 N 1 f		5.909 56		-45.24 dBn	n					Ener Offerst
3 N 1 f		9.624 13	GHZ GHZ	<u>-45.31 dBn</u> -45.49 dBn	n					Freq Offset
5		0.024 10		-40.45 ubn					Ξ	0 Hz
6										
8										
9										
10									~	
<									>	
MSG							STATUS			

Agilent Spectrum Analyzer - Swept SA					
RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO	01:57:07 PMDec 19, 20	
		ree Run : 30 dB	vg Type: Log-Pwr	TRACE 12345 TYPE MWWWW DET PNNNN	N
10 dB/div Ref 20.00 dBm			Mkr5 1	18.992 875 GH -40.13 dBn	
10.0 0.00 -10.0					Center Freq 17.500000000 GHz
-20.0		5-	4	-17.68 dB	Start Freq 10.000000000 GHz
-50.0					Stop Freq 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	VBW 3.0 MH	z	Sweep 40	Stop 25.000 GH .00 ms (40001 pts	1.50000000 GHz
			FUNCTION WIDTH	FUNCTION VALUE	Auto Mar
3 N 1 f 23.19 4 N 1 f 21.24	20 250 GHz 37.59 90 250 GHz 37.63 47 750 GHz 38.36 92 875 GHz 40.13	dBm			Freq Offset 0 Hz
7 8 9 10					
Alignment Completed			STATUS	3	



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	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

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 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	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	162.0125 ~ 167.17	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	167.72 ~ 173.2	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	240 ~ 285	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	608 ~ 614	3345.8 ~ 3358		
		960 ~ 1240	3600 ~ 4400		

• 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 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 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 D01v05 - 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
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
>1000 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/x), where x is the duty cycle.
- 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1/x), where x is the duty cycle.
- 3) 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.

Duty Cycle Correction factor

Test Mode	Date rate	Duty Cycle (%)	Duty Cycle Correction Factor (dB)		
TM 1	11Mbps	82.14	0.86		
TM 2	54Mbps	46.47	3.33		
TM 4	MCS8	37.65	4.25		

Note: Refer to the APPENDIX II for duty cycle plot.

Test Results: Comply

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)
	2386.99	Н	Z	PK	54.32	2.68	N/A	N/A	57.00	74.00	17.00
Louroot	2387.27	Н	Z	AV	42.66	2.69	0.86	N/A	46.21	54.00	7.79
Lowest	4823.71	Н	Z	PK	50.03	1.49	N/A	N/A	51.52	74.00	22.48
	4823.79	Н	Z	AV	39.57	1.49	0.86	N/A	41.92	54.00	12.08
Middle	4874.17	Н	Z	PK	50.10	1.62	N/A	N/A	51.72	74.00	22.28
wildule	4874.02	Н	Z	AV	39.60	1.62	0.86	N/A	42.08	54.00	11.92
	2483.94	Н	Z	PK	53.53	3.10	N/A	N/A	56.63	74.00	17.37
Lighoot	2484.71	Н	Z	AV	42.51	3.10	0.86	N/A	46.47	54.00	7.53
Highest	4923.73	Н	Z	PK	49.85	1.78	N/A	N/A	51.63	74.00	22.37
	4923.79	Н	Z	AV	38.92	1.78	0.86	N/A	41.56	54.00	12.44

Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : TM 1

Note.

- 1. The radiated emissions were investigated 9kHz to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.
- 2. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

3. Information of Distance Factor.

For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.

- Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB



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)
	2389.98	Н	Z	PK	54.19	2.70	N/A	N/A	56.89	74.00	17.11
Lowoot	2389.32	Н	Z	AV	42.76	2.70	3.33	N/A	48.79	54.00	5.21
Lowest	4823.82	Н	Z	PK	50.05	1.49	N/A	N/A	51.54	74.00	22.46
	4823.67	Н	Z	AV	39.40	1.49	3.33	N/A	44.22	54.00	9.78
Middle	4874.20	Н	Z	PK	50.34	1.62	N/A	N/A	51.96	74.00	22.04
widdie	4874.09	Н	Z	AV	39.49	1.62	3.33	N/A	44.44	54.00	9.56
	2485.20	Н	Z	PK	59.29	3.10	N/A	N/A	62.39	74.00	11.61
Highoot	2483.52	Н	Z	AV	44.52	3.10	3.33	N/A	50.95	54.00	3.05
Highest	4924.02	Н	Z	PK	50.43	1.78	N/A	N/A	52.21	74.00	21.79
	4923.71	Н	Z	AV	39.11	1.78	3.33	N/A	44.22	54.00	9.78

Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : <u>TM 2</u>

Note.

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

2. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F + DCCF + DCF / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

3. Information of Distance Factor.

For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.

- Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB



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)
	2388.88	н	Z	PK	55.13	2.69	N/A	N/A	57.82	74.00	16.18
Lowoot	2389.67	Н	Z	AV	42.71	2.70	4.25	N/A	49.66	54.00	4.34
Lowest	4823.89	н	Z	PK	50.63	1.49	N/A	N/A	52.12	74.00	21.88
	4823.95	н	Z	AV	39.49	1.49	4.25	N/A	45.23	54.00	8.77
Middle	4873.62	н	Z	PK	50.79	1.62	N/A	N/A	52.41	74.00	21.59
wilddie	4873.74	н	Z	AV	39.61	1.62	4.25	N/A	45.48	54.00	8.52
	2483.69	н	Z	PK	55.89	3.10	N/A	N/A	58.99	74.00	15.01
Lligheet	2483.94	н	Z	AV	43.35	3.10	4.25	N/A	50.70	54.00	3.30
Highest	4923.57	н	Z	PK	50.38	1.78	N/A	N/A	52.16	74.00	21.84
	4923.83	н	Z	AV	39.12	1.78	4.25	N/A	45.15	54.00	8.85

Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : <u>TM 4</u>

Note.

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

2. Sample Calculation.

Margin = Limit – Result / Result = Reading + T.F + DCCF + DCF / T.F = AF + CL – AG Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

3. Information of Distance Factor.

For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.

- Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB

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 Procedure

- 1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
- 2. The EUT is connected via LISN to the test power supply.
- 3. The measurement results are obtained as described below:
- 4. Detectors Quasi Peak and Average Detector.

Test Results: Comply(Refer to next page.)

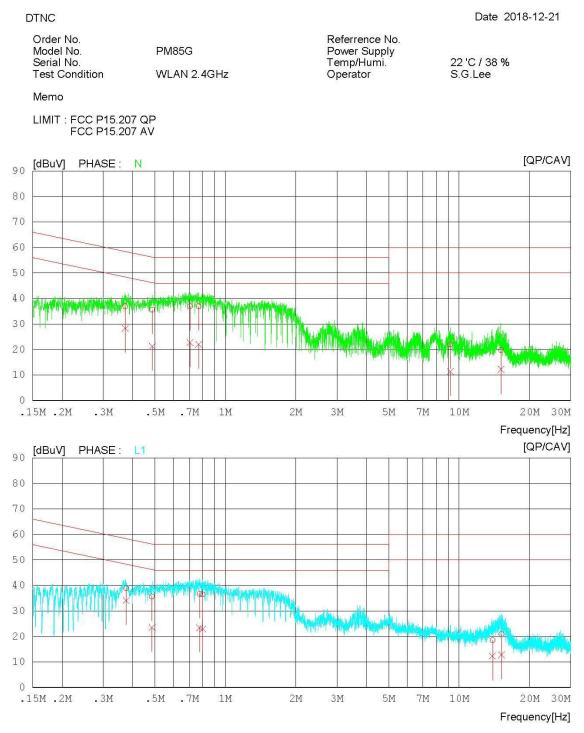
The worst data was reported.

RESULT PLOTS

AC Line Conducted Emissions (Graph)

Test Mode: TM 2 & 2462 MHz

Results of Conducted Emission



AC Line Conducted Emissions (List)

Test Mode: TM 2 & 2462 MHz

DTNC

Results of Conducted Emission

Date 2018-12-21

	Order No. Model No. Serial No. Test Condition		PM85G WLAN 2	.4GHz		Referrence No. Power Supply Temp/Humi. Operator	22 'C / 38 % S.G.Lee	6
	Memo							
	LIMIT	FCC P15 FCC P15	* 1888 (1889) - 1888 See					
	NO	FREQ	READING OP CAV	C.FACTOR	RESULT OP CAV	LIMIT OP CAV	MARGIN OP CAV	PHASE
		[MHz]	[dBuV] [dBuV]	[dB]	[dBuV][dBu'		~]
_	1	0.37327	26.93 18.27	10.03	36.9628.30	58.43 48.43	21.47 20.13	N
	2		25.5511.27	10.02	35.5721.29	56.22 46.22	20.6524.93	N

3	0.70649	26.92 12.69	10.05	36.9722.74	56.00	46.00	19.0323.26	Ν
4	0.76891	26.95 11.97	10.04	36.9922.01	56.00	46.00	19.0123.99	Ν
5	9.18040	11.58 1.03	10.35	21.93 11.38	60.00	50.00	38.0738.62	Ν
6	15.11900	9.31 1.67	10.52	19.8312.19	60.00	50.00	40.1737.81	Ν
7	0.37632	28.8824.06	9.99	38.8734.05	58.36	48.36	19.49 14.31	L1
8	0.48579	25.6513.47	10.00	35.65 23.47	56.24	46.24	20.59 22.77	L1
9	0.77710	26.7013.44	10.00	36.7023.44	56.00	46.00	19.30 22.56	L1
10	0.80017	26.40 12.98	10.00	36.4022.98	56.00	46.00	19.60 23.02	L1
11	13.89980	8.03 1.80	10.44	18.47 12.24	60.00	50.00	41.53 37.76	L1
12	15.19160	10.39 2.26	10.48	20.8712.74	60.00	50.00	39.13 37.26	L1

TRF-RF-236(04)171516

Test Requirements, RSS-Gen [6.7]

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99 % emission bandwidth, as calculated or measured.

TEST CONFIGURATION

Refer to the APPENDIX I.

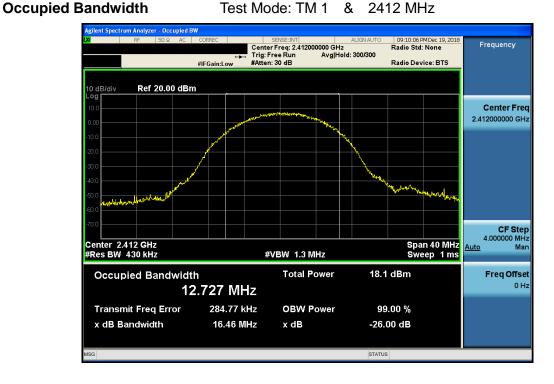
TEST PROCEDURE

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

TEST RESULTS: Comply

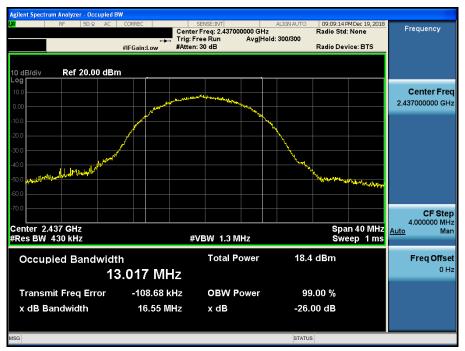
Test Mode	Frequency	Test Results[MHz]		
	Lowest	12.73		
TM 1	Middle	13.62		
	Highest	12.95		
	Lowest	16.86		
TM 2	Middle	17.06		
	Highest	16.96		
	Lowest	17.81		
TM 4	Middle	17.98		
	Highest	17.91		

RESULT PLOTS



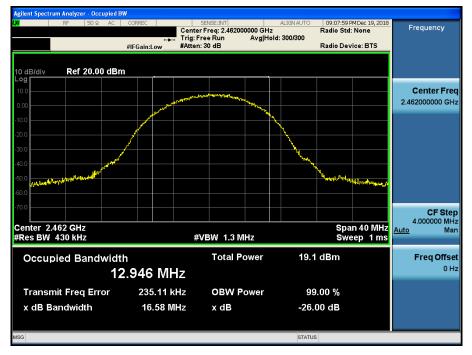
Occupied Bandwidth

Test Mode: TM 1 & 2437 MHz



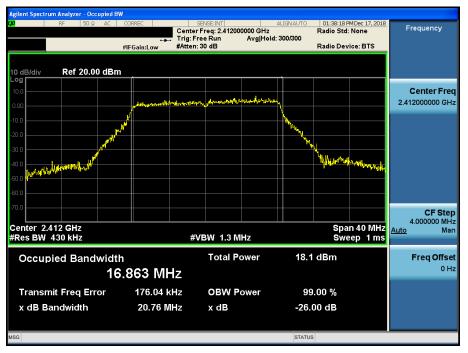


Test Mode: TM 1 & 2462 MHz





Test Mode: TM 2 & 2412 MHz

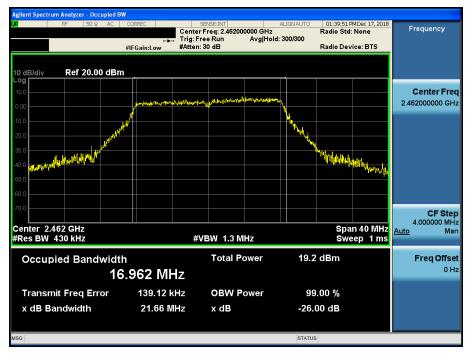


Occupied Bandwidth

Test Mode: TM 2 & 2437 MHz

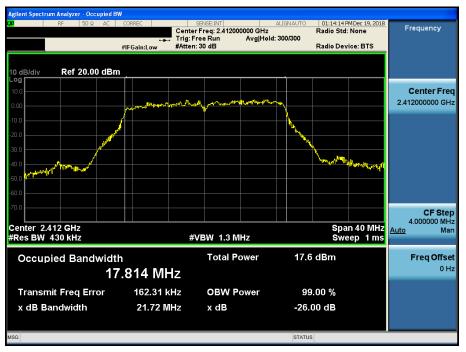


Test Mode: TM 2 & & 2462 MHz





Test Mode: TM 4 & 2412 MHz

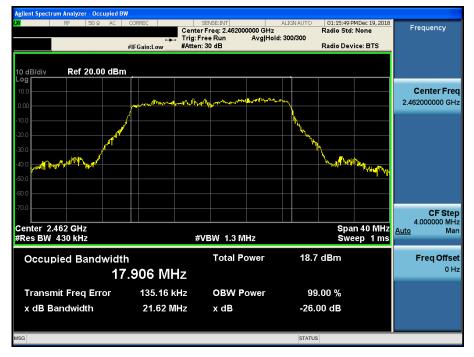


Occupied Bandwidth

Test Mode: TM 4 & 2437 MHz



Test Mode: TM 4 & 2462 MHz



9. LIST OF TEST EQUIPMENT

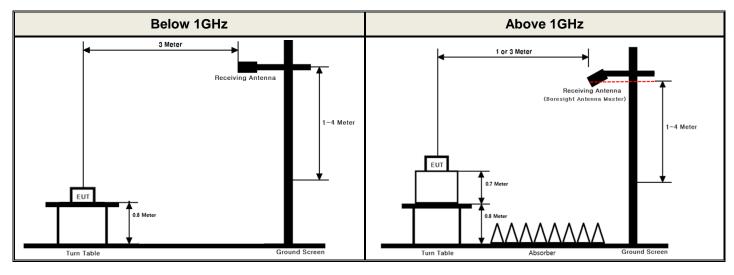
Туре	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	18/07/09	19/07/09	MY50200834
Spectrum Analyzer	Agilent Technologies	N9020A	18/01/03	19/01/03	MY48011700
DC Power Supply	Agilent Technologies	66332A	18/07/02	19/07/02	US37473422
Multimeter	FLUKE	17B	17/12/26	18/12/26	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	17/12/27	18/12/27	255571
Signal Generator	ANRITSU	MG3695C	18/02/12	19/02/12	173501
Thermohygrometer	BODYCOM	BJ5478	18/01/03	19/01/03	120612-1
Thermohygrometer	BODYCOM	BJ5478	18/01/03	19/01/03	120612-2
Thermohygrometer	BODYCOM	BJ5478	18/07/09	19/07/09	N/A
HYGROMETER	TESTO	608-H1	18/02/10	19/02/10	34862883
Loop Antenna	Schwarzbeck	FMZB1513	18/01/30	20/01/30	1513-128
BILOG ANTENNA	Schwarzbeck	VULB 9160	18/07/13	20/07/13	3359
Horn Antenna	ETS-Lindgren	3115	17/01/13	19/01/13	9202-3820
Horn Antenna	Schwarzbeck	BBHA 9120C	17/12/04	19/12/04	9120C-561
Horn Antenna	A.H.Systems Inc.	SAS-574	17/07/31	19/07/31	155
PreAmplifier	tsj	MLA-0118-J01-45	18/02/08	19/02/08	17138
PreAmplifier	tsj	MLA-1840-J02-45	18/07/06	19/07/06	16966-10728
PreAmplifier	H.P	8447D	17/12/26	18/12/26	2944A07774
Attenuator	SMAJK	SMAJK-2-3	18/07/02	19/07/02	3
Attenuator	Aeroflex/Weinschel	56-3	18/07/02	19/07/02	Y2370
Attenuator	SRTechnology	F01-B0606-01	18/07/02	19/07/02	13092403
Attenuator	Hefei Shunze	SS5T2.92-10-40	18/07/03	19/07/03	16012202
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	18/07/03	19/07/03	3
High Pass Filter	Wainwright Instruments	WHKX12-935-1000- 15000-40SS	18/07/02	19/07/02	8
High Pass Filter	Wainwright Instruments	WHKX10-2838- 3300-18000-60SS	18/07/02	19/07/02	1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A MA2490A	18/04/17	19/04/17	1306007 1249001
EMI Test Receiver	Rohde Schwarz	ESR7	18/02/13	19/02/13	101061
EMI Test Receiver	Rohde Schwarz	ESCI7	18/02/12	19/02/12	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	18/09/27	19/09/27	101333
LISN	SCHWARZBECK	NNLK 8121	18/03/20	19/03/20	06183
Cable	Radiall	TESTPRO3	18/07/06	19/07/06	M-01
Cable	Junkosha	MWX315	18/11/19	19/11/19	M-05
Cable	Junkosha	MWX221	18/11/19	19/11/19	M-06
Cable	Junkosha	MWX241	18/06/25	19/06/25	G-04
Cable	Junkosha	MWX241	18/06/25	19/06/25	G-07
Cable	DT&C	Cable	18/07/06	19/07/06	G-13
Cable	DT&C	Cable	18/07/06	19/07/06	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	18/07/06	19/07/06	G-15
Cable	DT&C	CABLE	18/07/05	19/07/05	RF-82

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.

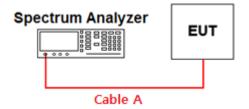
APPENDIX I

Test set up diagrams

Radiated Measurement



Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	0.04	15	2.13
1	0.35	20	2.47
2.412 & 2.437 & 2.462	0.80	25	2.80
5	1.50	-	-
10	1.87	-	-

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

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APPENDIX II

Duty cycle plots

Test Procedure

Duty Cycle was measured using section 6.0 b) of KDB558074 D01V05 :

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.)

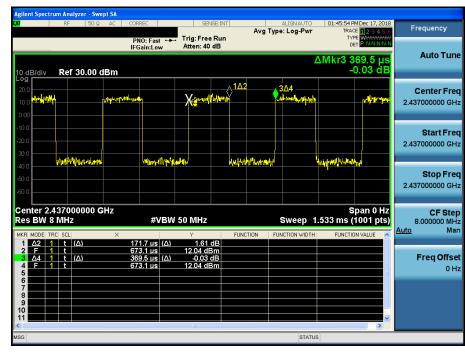
Duty Cycle TM 1 Frequency Avg Type: Log-Pwr Trig: Free Run Atten: 40 dB PNO: Fast IFGain:Low Auto Tune ΔM 0.25 d Ref 30.00 dBm **Center Freq** X 2.437000000 GHz Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Man Center 2.437000000 GHz Res BW 8 MHz Span 0 Hz Sweep 5.000 ms (1001 pts) #VBW 50 MHz Auto (Δ) -5.2 16.51 Freq Offset (Δ) s (Δ) dE 0.25 16.51 dE 0 Hz STATUS

Dt&C

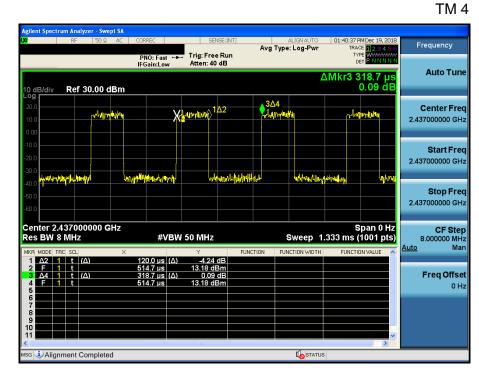
TM 2 & M

Middle

Duty Cycle



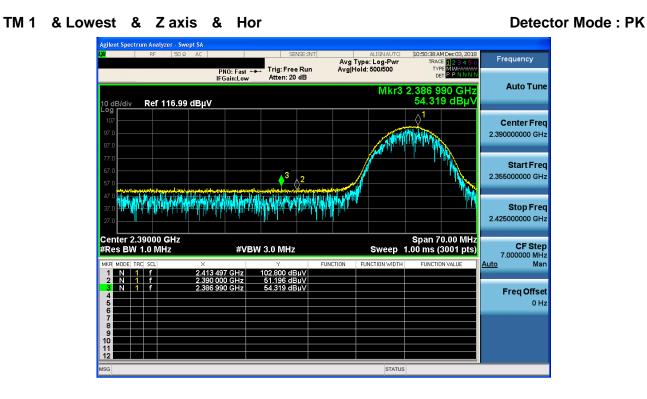
& Middle



Duty Cycle

APPENDIX III

Unwanted Emissions (Radiated) Test Plot

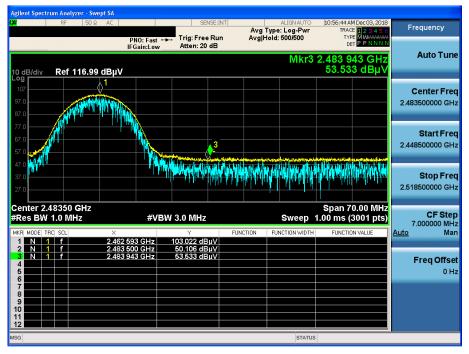


TM 1 & Lowest & Zaxis & Hor

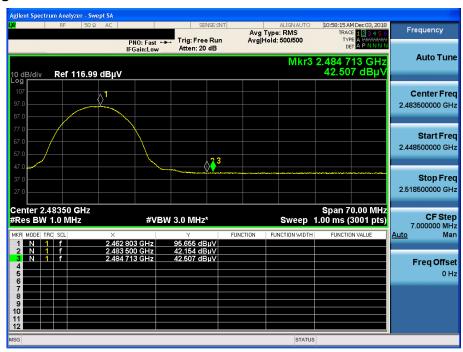


Detector Mode : AV

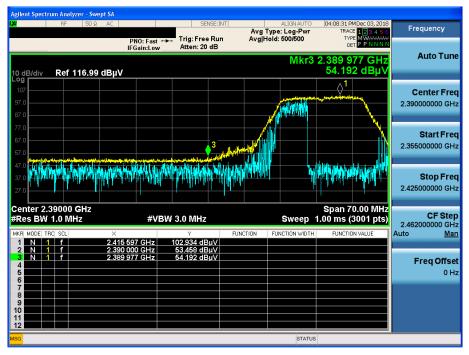
TM 1 & Highest & Zaxis & Hor



TM 1 & Highest & Zaxis & Hor



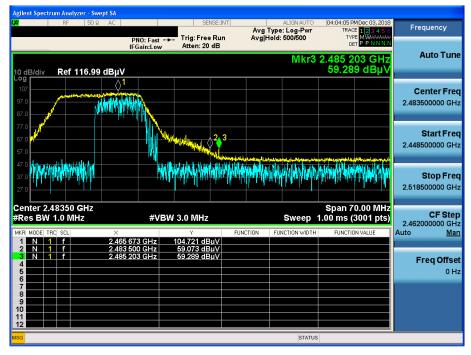
TM 2 & Lowest & Zaxis & Hor



TM 2 & Lowest & Zaxis & Hor

Frequency Avg Type: RMS Avg|Hold: 500/500 Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low AP Auto Tune Mkr3 2.389 323 GH 42.761 dBµ Ref 116.99 dBµV **Center Freq** 2.39000000 GHz Start Freq 2.355000000 GHz 3 Stop Freq 2.425000000 GHz Center 2.39000 GHz #Res BW 1.0 MHz Span 70.00 MHz 1.00 ms (3001 pts) CF Step 2.46200000 GHz #VBW 3.0 MHz* Sweep FUNCTION FUNCT Auto Man 90.842 dBµV 42.277 dBµV 42.761 dBµV Freq Offset 0 Hz STATUS

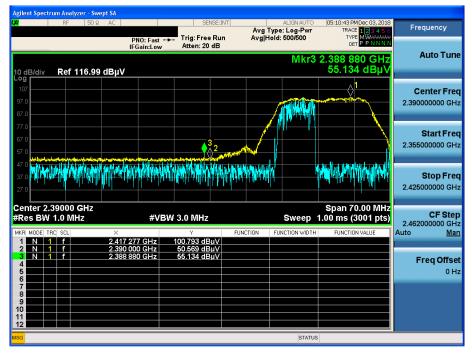
TM 2 & Highest & Zaxis & Hor



TM 2 & Highest & Zaxis & Hor



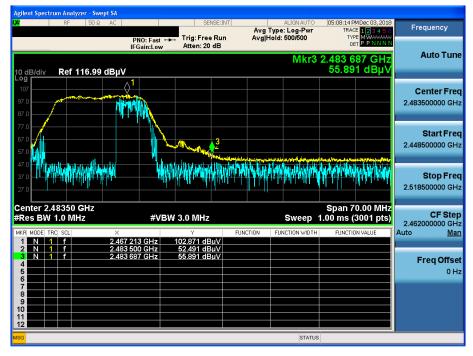
TM 4 & Lowest & Zaxis & Hor



TM 4 & Lowest & Zaxis & Hor



TM 4 & Highest & Zaxis & Hor

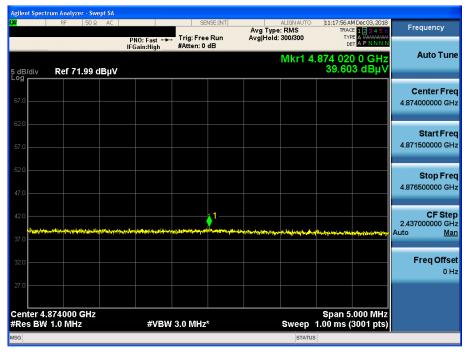


TM 4 & Highest & Zaxis & Hor

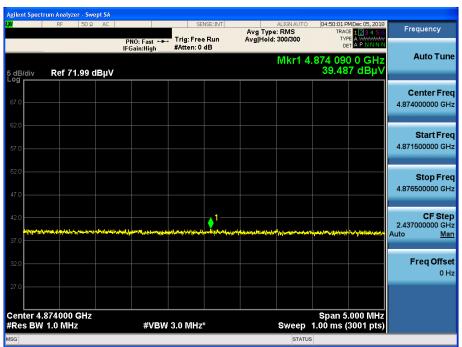


Detector Mode : AV

TM 1 & Middle & Zaxis & Hor



TM 2 & Middle & Zaxis & Hor



TM 4 & Middle & Z axis & Hor



