TEST REPORT

Dt&C

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 : DRTFCC1803-0049(1)

2. Customer

•	Name	:	LG	Electronics	MobileComm	USA,	Inc.
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• Address : 1000 Sylvan Ave., Englewood Cliffs, New Jersey, United States, 07632

- 3. Use of Report : FCC Original Grant
- 4. Product Name / Model Name : Mobile Phone / DS1803 FCC ID : ZNFDS1803
- 5. Test Method Used : KDB558074 D01v04

Test Specification : FCC Part 15.247

- 6. Date of Test : 2018.02.09 ~ 2018.03.09
- 7. Testing Environment : See appended test report.
- 8. Test Result : Refer to the attached test result.

Affirmation	Tested by	1	Reviewed by					
	Name : SunGeun Lee	(Si Doure)	Name : Geunki Son	(Signature)				
The tes	The test results presented in this test report are limited only to the sample supplied by applicant and							
the use of	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.							

2018.03.16.

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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
DRTFCC1803-0049	Mar. 12, 2018	Initial issue
DRTFCC1803-0049(1)	Mar. 16, 2018	Revised the section 6.1



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1. EUT DESCRIPTION

FCC Equipment Class	Digital Transmission System(DTS)
Product	Mobile Phone
Model Name	DS1803
Add Model Name	NA
Power Supply	DC 3.85 V
Frequency Range	• 802.11b/g/n(20 MHz) : 2412 MHz ~ 2462 MHz
Max. RF Output Power	2.4GHz Band • 802.11b : 20.12 dBm • 802.11g : 23.71 dBm • 802.11n (HT20) : 23.67 dBm
Modulation Type	• 802.11b: CCK, DSSS • 802.11g/n: OFDM
Antenna Specification	Antenna type: PIFA Antenna Antenna gain: -1.5 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 1 Mbps	2412	2437	2462	
TM 2	802.11g 6 Mbps	2412	2437	2462	
ТМ 3	802.11n(HT20) MCS 0	2412	2437	2462	

Note 1: The worst case data rate is determined as above test mode according to the power measurements.

Also radiated spurious emission was performed at lowest data rate.

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 ~ 25 °C
Relative humidity content	: 40 ~ 45 % 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	0.7 dB (The confidence level is about 95 %, $k = 2$)
Conducted spurious emission	1.1 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 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
-	RSS-Gen [6.6]	Occupied Bandwidth (99 %)		NA
15.247(d) 15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	FCC 15.209 limits	Radiated	C Note 2, 3
15.207	AC Line Conducted Emissions	FCC 15.207 limits	AC Line Conducted	С
15.203	Antenna Requirements	FCC 15.203	-	С

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

Note 2: This test item was performed in each axis and the worst case data was reported.

Note 3: For radiated emission tests below 30 MHz were performed on semi-anechoic chamber which is correlated with OATS.



4. TEST METHODOLOGY

Generally the tests were performed according to the KDB558074 D01v04. 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 D01v04.

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 D01v04. 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 D01V04.

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 comply with the requirements of § 2.948 according to ANSI 63.4-2014.

- FCC MRA Accredited Test Firm No. : KR0034

 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 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:

The transmitter output is connected to the Spectrum Analyzer and used following test procedure of KDB558074

D01V04

- 1. Set resolution bandwidth (RBW) = 100 kHz.
- Set the video bandwidth (VBW) ≥ 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	8.109
TM 1	Middle	8.111
	Highest	8.568
	Lowest	15.990
TM 2	Middle	16.330
	Highest	16.300
	Lowest	16.420
ТМ 3	Middle	17.000
	Highest	16.730



RESULT PLOTS

6 dB Bandwidth



6 dB Bandwidth

TM 1 & Middle



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6 dB Bandwidth





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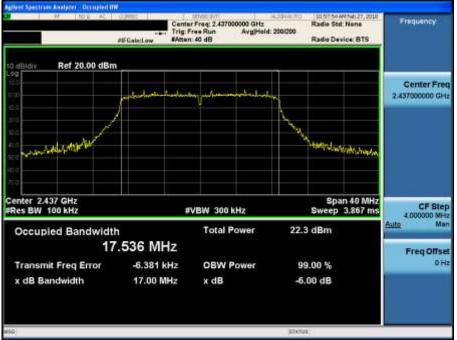
TM 2 & Highest Spectrum Analyzer Decupied HW Tadie Std: None Centre Free 2.462010000 GHz Trig: Free Run AvgiHold: 200/200 ##Gain:Low #Atten: 40 dB Frequency Radio Device: BTS Ref 20.00 dBm Center Freq 2.452000000 GHz MILLIAN Margan In marked w 14 Center 2.462 GHz #Res BW 100 kHz Span 40 MHz Sweep 3.867 ms CF Step 4.000000 MHz Man #VBW 300 kHz Auto Occupied Bandwidth Total Power 23.2 dBm 16.410 MHz Freq Offset Transmit Freq Error -31.921 kHz **OBW Power** 0 Hz 99.00 % x dB Bandwidth 16.30 MHz x dB -6.00 dB STATUS

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6 dB Bandwidth





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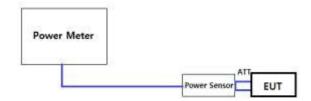
TM 3 & Highest Spectrum Analyzer Decupied HW Tadie Std: None Frequency Contract Freq: 2.462000000 GHz Trig: Freq: 2.462000000 GHz FF Gain:Low RAtten: 40 dB Radio Device: BTS Ref 20.00 dBm Center Freq 2.452000000 GHz In the state of th Kindy was a manager Center 2.462 GHz #Res BW 100 kHz Span 40 MHz Sweep 3.867 ms CF Step 4.000000 MHz Man #VBW 300 kHz Auto Occupied Bandwidth Total Power 22.0 dBm 17.559 MHz Freq Offset Transmit Freq Error 0 Hz -19,510 kHz **OBW Power** 99.00 % x dB Bandwidth 16.73 MHz x dB -6.00 dB STATUS

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 D01V04

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 D01V04

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.

Note: The measure-and-sum technique is used for test mode with multiple transmitting.



Test Results: Comply

Erog		Maximum Peak Conducted Output Power (dBm) for <u>802.11b</u>								
Freq. (MHz)	Det.			Data Rate [Mbps]						
		1	2	5.5	11	-	-	-	-	
0410	PK	20.04	19.99	19.86	19.92	-	-	-	-	
2412	AV	17.14	17.13	17.04	17.03	-	-	-	-	
2437	PK	20.05	20.04	19.59	19.94	-	-	-	-	
2437	AV	17.20	17.16	16.84	16.91	-	-	-	-	
2462	PK	20.12	20.03	19.53	19.86	-	-	-	-	
2402	AV	17.25	17.20	16.79	16.86	-	-	-	-	

Erog		Maximum Peak Conducted Output Power (dBm) for <u>802.11g</u>								
Freq. (MHz)	Det.	Data Rate [Mbps]								
		6	9	12	18	24	36	48	54	
2412	PK	23.52	23.49	23.44	23.47	23.16	23.22	23.31	23.09	
2412	AV	15.62	15.61	15.06	15.05	14.84	14.77	15.12	15.09	
2437	PK	23.71	23.53	23.34	23.61	23.54	23.01	23.54	23.43	
2437	AV	15.84	15.55	15.44	15.01	14.99	14.96	14.84	14.85	
2462	PK	23.50	23.39	23.11	23.08	23.18	23.26	23.43	23.18	
2402	AV	15.54	15.38	14.88	14.87	14.90	14.86	14.95	14.90	

Erog		Maximum Peak Conducted Output Power (dBm) for 802.11n(HT20)								
Freq. (MHz)	Det.	Data Rate [MCS]								
		0	1	2	3	4	5	6	7	
2412	PK	23.41	23.26	22.81	22.76	22.63	22.36	22.27	22.61	
2412	AV	14.92	14.91	14.00	13.99	13.98	13.97	14.08	14.01	
2437	PK	23.67	23.42	22.70	22.62	22.65	23.13	22.67	23.10	
2437	AV	15.08	14.84	14.08	14.03	14.01	14.08	14.04	14.03	
2462	PK	23.47	23.22	22.72	22.44	22.55	22.43	22.91	22.60	
2402	AV	14.97	14.92	14.12	14.10	14.09	13.99	13.98	13.95	

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

Method PKPSD of KDB558074 D01V04 is used.

- 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 ≥ **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	-3.56
TM 1	Middle	3 kHz	-3.49
	Highest	3 kHz	-4.53
	Lowest	3 kHz	-7.36
TM 2	Middle	3 kHz	-8.14
	Highest	3 kHz	-8.24
	Lowest	3 kHz	-8.31
TM 3	Middle	3 kHz	-9.11
	Highest	3 kHz	-8.59

RESULT PLOTS





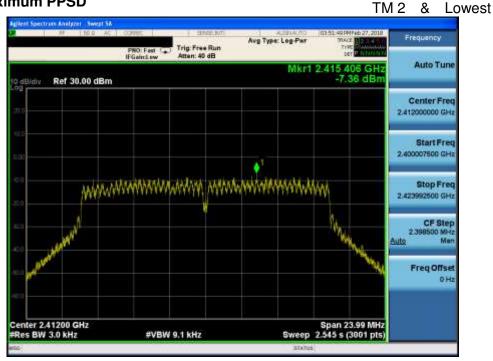
TM 1 & Middle



Maximum PPSD



Maximum PPSD



Maximum PPSD

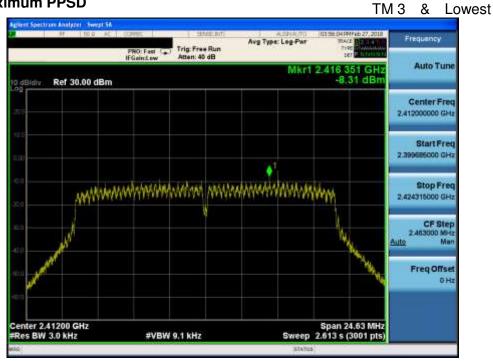
TM2 & Middle



Maximum PPSD



Maximum PPSD



Maximum PPSD

TM3 & Middle



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

The transmitter output is connected to a spectrum analyzer.

- Measurement Procedure 1 – Reference Level of KDB558074 D01v04

- 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.

- Measurement Procedure 2 - Unwanted Emissions of KDB558074 D01v04

- 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)

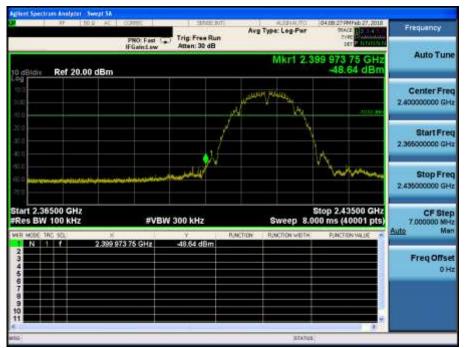
If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2001 to get accurate emission level within 100 kHz BW.

RESULT PLOTS

TM 1 & Lowest

Reference eb 27, 2018 Frequency 04:02 Avg Type: Log-Pwr PHO: Wide C Trig: Free Run Atten: 30 dB DET. Auto Tune Mkr1 2.412 482 GHz 9.98 dBm Ref 20.00 dBm Center Freq ŧ 2.412000000 GHz W. M. M. Start Freq 2.405918250 GHz Stop Freq 2.418081760 GHz CF Step 1.216350 MHz Man Auto Freq Offset OHz Center 2.412000 GHz #Res BW 100 kHz Span 12.16 MHz Sweep 1.200 ms (3001 pts) #VBW 300 kHz

Low Band-edge



	PNO: Fast C. IFGainLow	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	04:11:19 PMYeb 27, 2018 Tixe: 12 2 4 4 Type: 12 2 4 4 ter: 10 10 10 10	Frequency
dBidiv Ref 20.00 dBm			Mkr	-62.02 dBm	Auto Tune
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19 10 10					Start Free 9.000 kH
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art 9 kHz	#VBV	∉ 300 kHz	Sweep 5.3	Stop 30.00 MHz 33 ms (40001 pts)	CF Ste 2.999100 MH
Res BW 100 kHz					Auto Man
R MODE TRO SOL X	281.9 kHz	-55,42 dBm	UNCTION RUNCTION WOTH	PUNCTION WILLIE	Auto Mar
R MODE TRO SOL X			UNCTION RUNCTION WOTH	PUNCTION WILLIE +	Auto Mar Freq Offse 0 H
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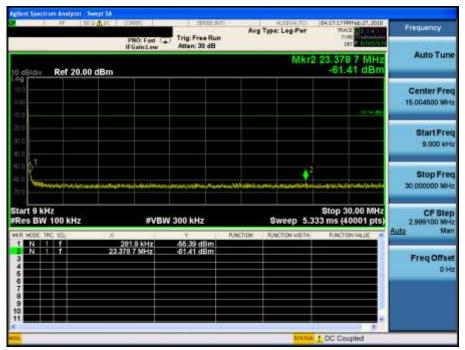
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Auto Tun	83 GHz 03 dBm		Mkr					dBm	Ref 20.00		Bidiv
Center Free 5.015000000 GH								V1			
Start Frei 30.000000 MH	6 5	04			¢²		¢ ³				
Stop Frei 10.00000000 GH							-			~	-
CF Step 997.000000 MH Auto Ma	0.000 GHz 10001 pts)	67 ms (4	weep 18		R.MC	3.0 MHz	#VBW		.0 MHz	N 1	t 30 s B)
Freq Offset 0 Hz		PONES				12.75 dBm 45.42 dBm 46.46 dBm 46.87 dBm 47.03 dBm	09 GHz 70 GHz 07 GHz 42 GHz 83 GHz	5.779 3.165 8.199			22222

87 10.0	PNO: Fast Ca IEGaint aw	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	04.12.32 PMPab 27, 2018 TRACE 12, 214 7196 2, 214 14 (14) 19 (14)	Frequency
o dBidiy Ref 20.00 d		Constantions	Mkr	5 22.427 0 GHz -38.89 dBm	Auto Tune
					Center Freq 18.25000000 GHz
na na ad			Q ⁴ 5	$\phi^{1}\phi^{3}\phi^{2}$	Start Freq 10.00000000 GHz
and the second se	Contraction of the second second	o to the second state of t			
					202012/07/2010
Start 10.000 GHz	#VBW	/ 3.0 MHz	Sweep 42	Stop 26.500 GHz 67 ms (40001 pts)	26.50000000 GH
Start 10.000 GHz Res BW 1.0 MHz WR HODE TRO SOL	×	Y F	Sweep 42		Stop Freq 26.50000000 GHz CF Step 1.65000000 GHz <u>Auto</u> Man
Start 10,000 GHz Res BW 1.0 MHz MR MORE TRC SD 1 N 1 7 2 N 1 7	× 24,8215 GHz 25,900 2 GHz	y P -33.35 dBm -35.10 dBm		.67 ms (40001 pts)	26.50000000 GH: CF Step 1.65000000 GH: <u>Auto</u> Mar
Start 10.000 GHz Res BW 1.0 MHz WER MODE TRO SOL 1 N 1 F 2 N 1 F 3 N 1 F 4 N 1 F 6 N 1 F	× 24.8215 GHz	y P 33,35 dBm		.67 ms (40001 pts)	26.50000000 GHz CF Step 1.65000000 GHz
Start 10,000 GHz #Res BW 1.0 MHz wrs wobe TRO SCI 1 N f 2 N f 3 N f 4 N f 5 N f 5 N f	24,821 5 GHz 25,900 2 GHz 25,348 3 GHz 21,446 1 GHz	Y F 33.35 dBm -35.10 dBm -36.39 dBm -36.93 dBm		.67 ms (40001 pts)	26.50000000 GH2 CF Step 1.85000000 GH2 <u>Auto</u> Men

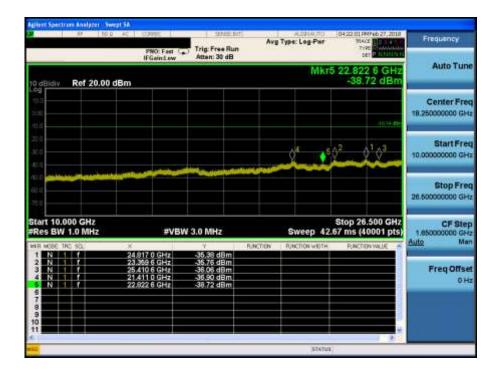
TM 1 & Middle

Reference









TM 1 & Highest

Reference



High Band-edge



Frequency	PMPab 27, 2018	Trix.	Type: Log-Pwr	٨	Trig: Free Run	-	PNO: Fa	1 to 0 to 0	
Auto Tur	1 8 MHz 88 dBm	25.60	Mkr		Atten: 30 dB	Lew	IFGaints	20.00 dBm	1Bidiy
Center Fre 15.004500 M	1042 nt he								
Start Fre 9.000 kF									
Stop Fre 30.000000 Mi	ang jing agai salar	inex line	AL-DANJART-W	Harleytin	ware and a second	ebin-bab	Norman	andar that the second second	1
CF Ste 2.999100 Mi Auto Mi	Contract of the local division of the local	33 ms (4	Sweep 5.3		300 kHz	#VBW :		Hz	rt 9 kHz es BW 1
Freq Offs	FION WILLIE *	PUNCTO	RUNCTION WOTH	RUNCTION	55.96 dBm -60.88 dBm		201.9 kH 5 601 9 MH	2	NGBE TRO
03									
	belouio	t DC Co	stano			-102			AL 46.00

11 100 AC	007155	SIME PUT	Avg Type: Log-Pwr	04:50-42 PMPeb 27, 2018 714/2 B 2 84 40	Frequency
	PNO: Fast	Trig: Free Run Atten: 30 dB		Der Third Street	1000-000 A
dBidiy Ref 20.00 dBm	1		Mkr	4 9.729 56 GHz -46.92 dBm	Auto Tune
10 10	Q1			10.42-494	Center Free 5.015000000 GH
10 10 10 10		6 ³ 0	2	4	Start Free 30.000000 MH
	/				Stop Frei 10.00000000 GH
art 30 MHz tes BW 1.0 MHz	#VBW	3.0 MHz	Sweep 18	Stop 10.000 GHz 67 ms (40001 pts)	CF Ste 997.000000 MH
R MODE THO SOL	2.461 18 GHz	Y 8,4 12,70 dBm	ECTION: RUNCTION WIDTH:	FUNCTION WILLIE	Auto Me
	5.772 97 GHz 4.833 80 GHz 9.729 66 GHz	44.46 dBm 45.00 dBm 46.92 dBm			Freq Offse 0H
				4	





TM 2 & Lowest

Reference



Low Band-edge



IF THERAD	PNO: Fast G	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	COLOR 19 PM Pub 27, 2018 TRACE BIS 204 TYPE Distribution Date Distribution	Frequency	
dBidiv Ref 20.00 dBr	m		Mk	r2 3.079 3 MHz -60.68 dBm	Auto Tune	
29 0.3					Center Free 15.004500 MH	
				11.0.002	Start Free 9,000 kH	
10 10 10 10	When states and the states of	nag signalana sala	k (_a . Zjenski Distanti pradska gover i kala	وبدوا موجد والمالية المراجع والمحمد وال	Stop Free 30.000000 MH	
art 9 kHz Res BW 100 kHz	#VBW	/ 300 kHz	Sweep 5.3	Stop 30.00 MHz 133 ms (40001 pts)	CF Step 2.999100 MH	
R WORE THE SOL	335.2 kHz 3.079 3 MHz	Y P. 455.45 dBm 460.68 dBm	NCTION FUNCTION WIDTH	PUNCTION WILLIE	Auto Mer	
3 N. 1 F. 44 55 66 77 88	30/93 MP2	-60,65 dB/m			Freq Offse OH	
2			statu	DC Coupled		

Frequency	01.07.20 PM/xb 27,2018 Th4/2 Plants	VDe: Log-Pwr		Sthee N	COPYERS .	AS 1.3	## 110 B	
	DET TO DE	New Poll of		Trig: Free Run Atten: 30 dB	PNO: Fast	- 2		
Auto Tun	4.793 42 GHz -46.40 dBm	Mkr4				dBm	Ref 20.00 d	dBidiv
Center Fre 5,015000000 GH						V1		99 0.0
Start Fre 30.000000 MH	1120.000		<u>да (</u>	4				1.0 2.0 0.0
Stop Fre 10.00000000 GH	ودالتنبية ويتروينان							
CF Ste 997.000000 MH Auto Ma	Stop 10.000 GHz 67 ms (40001 pts)			3.0 MHz	#VBW :		MHz 1.0 MHz	tart 30 N Res BW
FreqOffse	PUNCTION WALLIE	RUNCTION WIDTH	RANCTION	Y 12.94 dBm 44.53 dBm 46.07 dBm 46.40 dBm	6 57 GHz 8 75 GHz 9 84 GHz 3 42 GHz	5.428 5.649		R MODE TR
OH				40.40 0.00	342 002	4,059		5 5 7 9 9 1
-		STATUS	_			_		

88 (10 (PNO: Fast G	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	THE DESCRIPTION	Frequency
dBidiv Ref 20.00	dBm		Mkr	5 21.434 1 GHz -37.39 dBm	Auto Tune
					Center Freq 18.250000000 GHz
			● ⁵ ♦ ⁴	a^3 $a^2 a^1$	Start Freq 10.00000000 GHz
110 					Stop Fred 26.50000000 GHz
	#VBV	V 3.0 MHz	Sweep 42	Stop 26.500 GHz 67 ms (40001 pts)	1.85000000 GHz
Res BW 1.0 MHz		V P	Sweep 42 Skction Wolth		CF Step 1.650000000 GHz Auto Men
Start 10,000 GHz Res BW 1.0 MHz M MOLE THC SD. 1 N 1 f 2 N 1 f 3 N 1 f	× 25.208 1 GHz 24.791 8 GHz 23.365 0 GHz	Y 8 -35.15 dBm -35.31 dBm -35.67 dBm		.67 ms (40001 pts)	1.65000000 GHz
Res BW 1.0 MHz #R MSEE TRO SD. 1 N 1 7 2 N 1 7 3 N 1 7 4 N 1 7 5 N 1 7 6 N 1 7	25,200 1 GHz 24,791 8 GHz	y P 35.15 dBm -35.31 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Men Freq Offset
Res BW 1.0 MHz RR MORE TRO SOL 1 N 7 2 N 7 3 N 7 4 N 7 5 N 7 6 N 7 6 7 8 9	25.200 1 GHz 24.791 8 GHz 23.365 0 GHz 21.970 8 GHz	Y F -35.15 dBm -35.31 dBm -35.67 dBm -37.33 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Man
Res BW 1.0 MHz	25.200 1 GHz 24.791 8 GHz 23.365 0 GHz 21.970 8 GHz	Y F -35.15 dBm -35.31 dBm -35.67 dBm -37.33 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Man Freq Offset

TM 2 & Middle

Reference



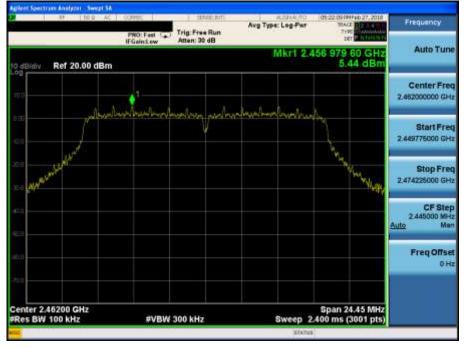




10 10 0	PNO: Fast Ca	Trig: Free Run	Avg	Type: Log-Pwr	In 20 24 PMP to 27, 2018 TISCE	Frequency
	IFGainLow	Atten: 30 dB		Mkr	5 21.459 7 GHz -37.53 dBm	Auto Tune
dBidiv. Ref. 20.00 d 9	5m					Center Free 18.25000000 GH
				5:	02 04 0103	Start Frei 10.00000000 GH
	All and a second second				العقد اعتلاد: الحك يست	Stop Fre 26.50000000 GH
art 10.000 GHz tes BW 1.0 MHz	#VBW	/ 3.0 MHz		Sweep 42	Stop 26.500 GHz 67 ms (40001 pts)	
R MODE TRO SOL	24.875.6 GHz	- -35.22 dBm	RINCTION	RUNCTION WIDTH:	FUNCTION WILLIE	Auto Me
	23.301 5 GHz 25.402 8 GHz 24.150 8 GHz 21.459 7 GHz	-36,06 dBm -36,20 dBm -36,61 dBm -37,53 dBm				Freq Offse 0H

TM 2 & Highest

Reference



High Band-edge



# 100 <u>0</u> 1	X OWER	State an	Avg Type: Log-Pwr	01:20:27 PMP46:27,2018 704/2 822000	Frequency
	PNO: Fast G	Trig: Free Run Atten: 30 dB		Der Die teil and	1. 1.1.1.1.1.1.1
dBidiv Ref 20.00 dB	m		Mk	2 5.084 2 MHz -62.02 dBm	Auto Tune
9					Center Fre
8				1115 200	
0					Start Free 9,000 kH
1 22	Antoinin a thomas to	nated taxalors at the Patrick on the International Patrick of the Internat	nia instalaan dasti matti mitta ja	nyym pradius gidy fi na rida y nyd	Stop Fre 30.000000 MH
art 9 kHz les BW 100 kHz	#VBV	¥ 300 kHz	Sweep 5.3	Stop 30.00 MHz 33 ms (40001 pts)	CF Ste 2.999100 MH
R WODE THE SOL	× 385.9 kHz	у В. -55.51 dBm	NCTION RUNCTION WIDTH	PUNCTION WILLIE	Auto Ma
Ň I I	6.084 2 MHz	-62.02 dBm			Freq Offse 0 H
				-	

Frequency	DB 27.37 PM Feb 27, 2018 TRACE 1, 2, 3-4 T TYPE 1, 2014 DET 17 1, 10 T	E Log-Pwr	Avg	Run	Trig: Free I Atten: 30 d	WO: Fast ()	-	## 110.0	
Auto Tun	4.827 31 GHz -45.75 dBm	Mkr4					dBm	Ref 20.00	dBldiv
Center Fre 5,015000000 GH							V1		99 0.0 0.0
Start Fre 30.000000 MH	1172 07		0	03					16 29 20 10
Stop Fre 10.00000000 GH									
CF Step 997.000000 MH Auto Ma	Stop 10.000 GHz 67 ms (40001 pts)	weep 18.	TION	RJNC	3.0 MHz	#VBW 3		1.0 MHz	tart 30 M Res BW
FreqOffse 0H				71 71 71	13.03 dBr -44.27 dBr -45.62 dBr -45.75 dBr	20 GHz 78 GHz 37 GHz 31 GHz	6.501 5.739		
									7 8 9 0
	2	STATUS					_		

	PNO: Fast G	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	CRI 20: 21: PM Pab 27, 2018 TRACE 22: 24 TYPE DET CRIMINAL	Frequency
dBldiv Ref 20.00) dBm		Mkr	5 20.003 5 GHz -40.62 dBm	Auto Tune
					Center Freq 18.250000000 GHz
200 200 200			54	$\sqrt{2} \sqrt{2} \sqrt{3}$	Start Freq 10.00000000 GHz
110 					Stop Fred 26.500000000 GHz
	≠vBv	N 3.0 MHz	Sweep 42	Stop 26.500 GHz .67 ms (40001 pts)	1.85000000 GH
Res BW 1.0 MHz	×	Υ.	Sweep 42 RANCTION REACTION WOTH		CF Step 1.050000000 GHz Auto Men
Res BW 1.0 MHz	× 24,794 7 GHz 24,166 7 GHz	-35.31 dBm -35.87 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Man
Res BW 1.0 MHz	24,794 7 GHz 24,166 7 GHz 25,345 4 GHz	Y -35,31 dBm -35,87 dBm -36,06 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Mer Freq Offset
Res BW 1.0 MHz #R webt TRC SQL 1 N 1 7 2 N 1 7 3 N 1 7 4 N 1 7 5 N 1 7	× 24,794 7 GHz 24,166 7 GHz	-35.31 dBm -35.87 dBm		.67 ms (40001 pts)	1 85000000 GH <u>Auto</u> Mar Freq Offse
Res BW 1.0 MHz #R MSEE TAC SQL 1 N 2 N 3 N 4 N 5 N 6 N 7	24.794 7 GHz 24.165 7 GHz 25.345 4 GHz 21.479 5 GHz	Y -35,31 dBm -35,87 dBm -36,06 dBm -37,12 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Mer Freq Offset
2 N 1 T N 1 T S N 1 T	24.794 7 GHz 24.165 7 GHz 25.345 4 GHz 21.479 5 GHz	Y -35,31 dBm -35,87 dBm -36,06 dBm -37,12 dBm		.67 ms (40001 pts)	1.85000000 GH
Res BW 1.0 MHz 1 N 1 7 2 N 1 7 3 N 1 7 4 N 7 5 N 1 7 6 7 8	24.794 7 GHz 24.165 7 GHz 25.345 4 GHz 21.479 5 GHz	Y -35,31 dBm -35,87 dBm -36,06 dBm -37,12 dBm		.67 ms (40001 pts)	1.65000000 GHz <u>Auto</u> Mer Freq Offset

TM 3 & Lowest

Reference



Low Band-edge



ar iteo Ab	PNO: Fast G	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	TYPE DOWNLOW	Frequency
dBidiy Ref 20.00 dBi	m		Mkr	2 21.202 9 MHz -61.00 dBm	Auto Tune
99 9.0					Center Free 15.004500 MH
0.0				152.60	
9.9 10 10					Start Free 9.000 kHz
	4.164	gingenenie geschenten en	ang pinana ana kasimana su	nny tistiki kumanania	Stop Frei 30.000000 MH
tart 9 kHz Res BW 100 kHz	#VBW	300 kHz	Sweep 5.3	Stop 30.00 MHz 33 ms (40001 pts)	CF Ste 2,999100 MH
R WODE THE SOL	× 288.7 kHz	V R 54,64 dBm	NCTION RUNCTION WIDTH	PUNCTION WILLIE	Auto Mar
	200.7 MHz	-61.00 dBm			Freq Offse 0 H
Q.			status	DC Coupled	

24 0.01 18	.03995	Styles but	Ave Type: Log-Pwr	01:34.12PMFeb 27,2018 704/2 10 2010	Frequency
	PWO: Fast	Trig: Free Run Atten: 30 dB	and the real of	Der Derterer	
dBidiy Ref 20.00 dBm			Mkr	4.938 23 GHz -45.95 dBm	Auto Tune
94 00 00	1				Center Free 5,015000000 GH
ue 20				11.3.60	
		¢ ⁴ 0 ³	¢ ²		Start Free 30.000000 MH
					Stop Free 10.000000000 GH
tart 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 MH
RE MODE THO SOL X	417 57 GHz	Y RJ 12.23 dBm	NCTION RUNCTION WIDTH	PUNCTION WILLIE	Auto Mar
3 N 54	454 14 GHz 527 21 GHz 938 23 GHz	45.67 dBm 45.96 dBm 45.95 dBm			Freq Offset 0 Hz
7					
				1	



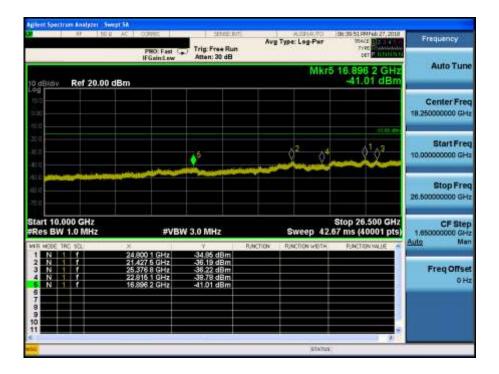
TM 3 & Middle

Reference









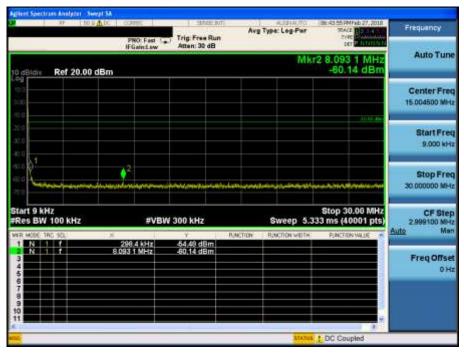
TM 3 & Highest

Reference



High Band-edge





	AC COPPEC	Trig: Free Run	Avg Type: Log-Pwr	00:95:31.949:6-27,2018 754:2 12:247.2018 7:96:2 12:247.2018	Frequency
	IFGainLow	Atten: 30 dB		cer a transfer	C10000000
dBidiv Ref 20.00 dl	Bm		Mkr	5 7.596 48 GHz -46.17 dBm	Auto Tun
	Q1				Center Fre 5,015000000 GH
1.e 2.g				1916 m	Start Fre
10 CIT		\Diamond^2	0 ³ 0 ⁴ ↓ ⁵		30.000000 MH
0					Stop Fre 10.00000000 GH
tart 30 MHz Res BW 1.0 MHz	#VBW	3.0 MHz		Stop 10.000 GHz 67 ms (40001 pts)	CF Ste 997.000000 Mi-
KR MODE TRO SOL	2,456 95 GHz	Y R.6	CTION RUNCTION WIDTH	FUNCTION WILLIE	Auto Ma
	5.503 48 GHz	-45.51 dBm			
3 N 1 f	6.343 25 GHz 7.053 34 GHz 7.596 48 GHz	-45,67 dBm -46,11 dBm -46,17 dBm			Freq Offse 0H
5 N 1 7					
5 N I F					









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)

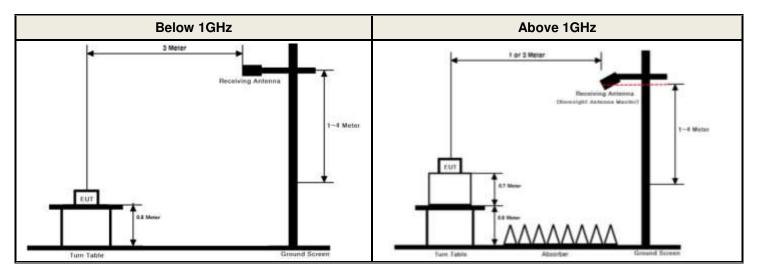
Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** 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.

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.

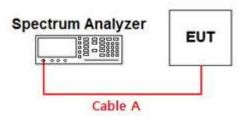
Test Configuration



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.

Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	0.14	15	0.93
1	0.32	20	1.38
2.402 & 2.440 & 2.480	0.42	25	1.52
5	0.58	-	-
10	0.70	-	-

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

(Attenuator, Applied only when it was used externally)



Measurement Instrument Setting for Radiated Emission Measurements.

The radiated emission was tested according to the section 6.3, 6.4, 6.5 and 6.6 of the ANSI C63.10-2013 with following settings.

Peak Measurement

RBW = As specified in below table, VBW \geq 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	1Mbps	99.75	0.01
TM 2	6Mbps	99.67	0.01
TM 3	MCS0	99.54	0.02

Note: Please refer to the test report of the granted module.

Test Results: Comply

Please refer to next page for data table and the appendix I for worst data plots.



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)
	2389.58	V	Z	PK	47.74	2.14	N/A	N/A	49.88	74.00	24.12
Louiset	2389.58	V	Z	AV	38.38	2.14	N/A	N/A	40.52	54.00	13.48
Lowest	4823.70	Н	Y	PK	45.19	6.10	N/A	N/A	51.29	74.00	22.71
	4824.03	Н	Y	AV	36.21	6.10	N/A	N/A	42.31	54.00	11.69
Middle	4873.85	Н	Y	PK	46.47	6.42	N/A	N/A	52.89	74.00	21.11
Middle	4873.88	Н	Y	AV	36.90	6.42	N/A	N/A	43.32	54.00	10.68
	2487.17	Н	Y	PK	49.01	2.37	N/A	N/A	51.38	74.00	22.62
Highest	2486.97	Н	Y	AV	39.47	2.37	N/A	N/A	41.84	54.00	12.16
	4923.74	Н	Y	PK	46.09	6.57	N/A	N/A	52.66	74.00	21.34
	4924.03	Н	Y	AV	38.10	6.57	N/A	N/A	44.67	54.00	9.33

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

Note.

1. The radiated emissions were investigated up 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. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)



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)
	2389.57	V	Z	PK	55.13	2.14	N/A	N/A	57.27	74.00	16.73
Lowest	2389.58	V	Z	AV	40.68	2.14	N/A	N/A	42.82	54.00	11.18
Lowest	4825.87	Н	Y	PK	44.84	6.10	N/A	N/A	50.94	74.00	23.06
	4825.57	Н	Y	AV	34.02	6.10	N/A	N/A	40.12	54.00	13.88
Middle	4875.16	Н	Y	PK	44.96	6.42	N/A	N/A	51.38	74.00	22.62
Middle	4875.06	Н	Y	AV	33.71	6.42	N/A	N/A	40.13	54.00	13.87
	2483.50	Н	Y	PK	56.97	2.37	N/A	N/A	59.34	74.00	14.66
Llighoot	2483.56	Н	Y	AV	42.89	2.37	N/A	N/A	45.26	54.00	8.74
Highest	4923.85	Н	Y	PK	44.41	6.57	N/A	N/A	50.98	74.00	23.02
	4923.86	Н	Y	AV	33.84	6.57	N/A	N/A	40.41	54.00	13.59

Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : Test Mode 2(TM 2)

Note.

1. The radiated emissions were investigated up 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. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)



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)
	2389.70	V	Z	PK	52.05	2.14	N/A	N/A	54.19	74.00	19.81
Lowest	2389.65	V	Z	AV	40.59	2.14	N/A	N/A	42.73	54.00	11.27
Lowest	4824.27	Н	Y	PK	46.36	6.10	N/A	N/A	52.46	74.00	21.54
	4824.92	Н	Y	AV	34.98	6.10	N/A	N/A	41.08	54.00	12.92
Middle	4873.17	Н	Y	PK	44.96	6.42	N/A	N/A	51.38	74.00	22.62
Middle	4873.21	Н	Y	AV	34.57	6.42	N/A	N/A	40.99	54.00	13.01
	2484.00	Н	Y	PK	55.51	2.37	N/A	N/A	57.88	74.00	16.12
Llighoot	2483.80	Н	Y	AV	41.95	2.37	N/A	N/A	44.32	54.00	9.68
Highest	4923.34	Н	Y	PK	44.79	6.57	N/A	N/A	51.36	74.00	22.64
	4924.83	Н	Y	AV	33.91	6.57	N/A	N/A	40.48	54.00	13.52

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

Note.

1. The radiated emissions were investigated up 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. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz. Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)



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.)

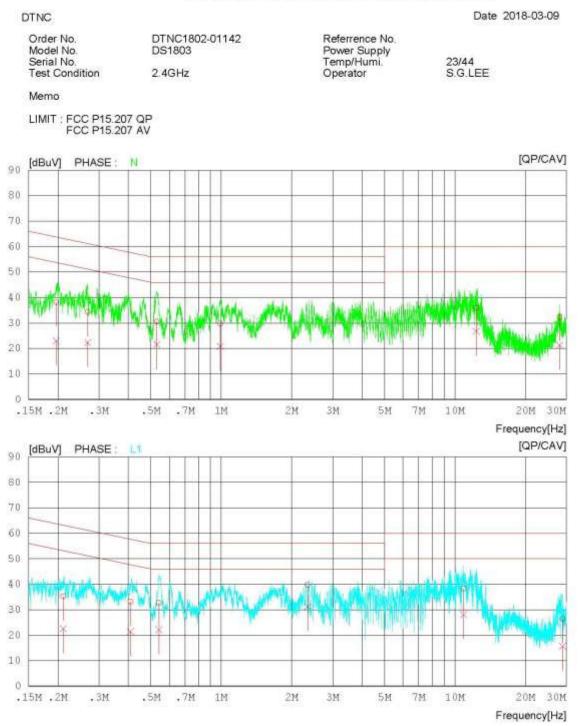
The worst data was reported.



RESULT PLOTS

AC Line Conducted Emissions (Graph)

Results of Conducted Emission



AC Line Conducted Emissions (List)

Results of Conducted Emission

Date 2018-03-09

DTNC				2018-0
Order No. Model No.	DTNC1802-01142 DS1803	Referrence No. Power Supply		
Serial No.		Temp/Humi,	23/44	
Test Condition	2.4GHz	Operator	S.G.LEE	

Memo

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

NO	FREQ [MHz]	READING QP CAV [dBuV][dBuV]	C.FACTOR [dB]	RESULT QP CAV [dBuV] [dBuV]	QP	CAV CAV [dBuV]	MARGIN QP CAV [dBuV][dBuV]	PHASE
1	0.19672	28.2813.04	9.94	38.22 22.98	63.75	53.75	25.53 30.77	N
2	0.26864	24.37 12.37	9.95	34.32 22.32	61.16	51.16	26.84 28.84	N
3	0.53048	20.53 11.51	9.99	30.52.21.50	56.00	46.00	25.4824.50	N
4	0.99232	19.73 10.70	9.99	29.72 20.69	56.00	46.00	26.28 25.31	N
5	12.34660	25.69 16.50	10.24	35.93 26.74	60.00	50.00	24.0723.26	N
6	28.07840	21.95 10.85	10.49	32.44 21.34	60.00	50.00	27.5628.66	N
7	0.21124	25.24 12.58	9.94	35.18 22.52	63.16	53.16	27.98 30.64	L1
8	0.40967	23.2111.36	9.97	33.18 21.33	57.65	47.65	24.4726.32	L1
9	0.54122	22.68 12.22	9.98	32.66 22.20	56.00	46.00	23.34 23.80	L1
10	2.34120	29.55 21.07	10.04	39.59 31.11	56.00	46.00	16.4114.89	L1
11	10.90060	28.0617.86	10.22	38.28 28.08	60.00	50.00	21.72 21.92	L1
12	28.93700	15.85 5.24	10.48	26.33 15.72	60.00	50.00	33.6734.28	Ll

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	17/07/12	18/07/12	MY46471601
Spectrum Analyzer	Agilent Technologies	N9020A	17/09/05	18/09/05	MY46471251
Multimeter	FLUKE	17B	17/12/26	18/12/26	26030065WS
DC Power Supply	Agilent	66332A	17/09/05	18/09/05	MY43000719
DC Power Supply	Agilent	66332A	17/12/27	18/12/27	US37473833
Signal Generator	Rohde Schwarz	SMBV100A	17/12/27	18/12/27	255571
Signal Generator	Rohde Schwarz	SMF100A	17/12/27	18/12/27	102341
Thermohygrometer	BODYCOM	BJ5478	18/01/03	19/01/03	120612-2
50W 10dB ATT	SMAJK	SMAJK-50-10	17/09/06	18/09/06	2-50-10
Loop Antenna	ETS	6502	17/03/24	19/03/24	3471
BILOG ANTENNA	Schwarzbeck	VULB 9160	16/08/05	18/08/05	9160-3362
Horn Antenna	ETS-LINDGREN	3117	16/05/03	18/05/03	00140394
Horn Antenna	A.H.Systems Inc.	SAS-574	17/07/31	19/07/31	155
PreAmplifier	Agilent	8449B	17/09/05	18/09/05	3008A02108
PreAmplifier	H.P	8447D	17/12/26	18/12/26	2944A07774
EMI Test Receiver	Rohde Schwarz	ESR7	17/02/16 18/02/13	18/02/16 19/02/13	101061
High-pass filter	Wainwright	WHKX12-2580- 3000-18000- 80SS	17/09/05	18/09/05	3
High-pass filter	Wainwright	WHNX6-6320- 8000-26500- 40CC	17/09/05	18/09/05	1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2496A MA2411B	17/12/27	18/12/27	1338004 1306053
EMI TEST RECEIVER	Rohde Schwarz	ESCI7	17/02/16 18/02/12	18/02/16 19/02/12	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	17/09/29	18/09/29	101333
LISN	SCHWARZBECK	NNLK 8121	17/04/03	18/04/03	06183

Note: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.

APPENDIX I

Duty cycle plots

Test Procedure

Duty Cycle was measured using section 6.0 b) of KDB558074 D01V04 :

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 & Middle

	PRO: Fast +++ Trig: Free Ru IFGainLow Atten: 40 dB	Avg Type: Log-Pwr	THE DEPARTMENT OF THE OWNER OF THE OWNER OF THE OWNER OF THE OWNER OWNE OWNER OWNE	Frequency
10 dB/div Ref 30.00 dBm		- 1	∆Mkr3 12.24 ms 0.85 dB	Auto Tune
	Xa	344		Center Free 2.437000000 GH
10.0 20.0 25.1				Start Free 2.437000000 GH
410 e).d e).d				Stop Frei 2.437000000 GH
Center 2.437000000 GHz Res BW 8 MHz	#VBW 50 MHz	Sweep 4	Span 0 Hz 10.00 ms (3001 pts)	CF Step 8.000000 MH
NER MODE THE SEL	γ 12.21 ms (Δ) 0.10 dB	RUNCTION: RUNCTION WIDTH	FUNCTION WILLIE	Auto Mar
2 F 1 t 3 Δ4 1 t (Δ) 4 F 1 t	14.07 ms 21.58 dBm 12.24 ms (Δ) 0.05 dB 14.07 ms 21.58 dBm			Freq Offse 0 H
6 7 8 9				

Dt&C

TM 2 & I

& Middle

Duty Cycle

Duty Cycle

0	110.0 45	PNO: Fast	Trig: Free		Avg	Type: Log-Pv				Frequency	
dBldiv Ref	ΔMkr3 8,200 ms									Auto Tune	
9 10 <mark>Anibha † An 12 00</mark>	and the second second		والمعارضة والمراجعة والمراجعة	Xa	******	harden a	Al and	u ipto prijeka	in to state	Center Free 2.437000000 GH	
										Start Free 2.437000000 GH	
										Stop Free 2.437000000 GH	
enter 2.43700 s BW 8 MHz		#V	BW 50 MHz			Sweep	40.0	Spa 0 ms (300	n 0 Hz)1 pts)	CF Step 8.000000 MH	
R MODE THO SOL	(A)	8.173 ms		dB	CTION:	RUNCTION WID)TH:	FUNCTION W	LUE A	<u>Auto</u> Mar	
	(Δ)	21.72 ms 8.200 ms 21.72 ms	18.78 dE (Δ) 0.02 18.78 dE	dB						FreqOffse 0H	
Ę				_	-	30	ATUS				

& Middle

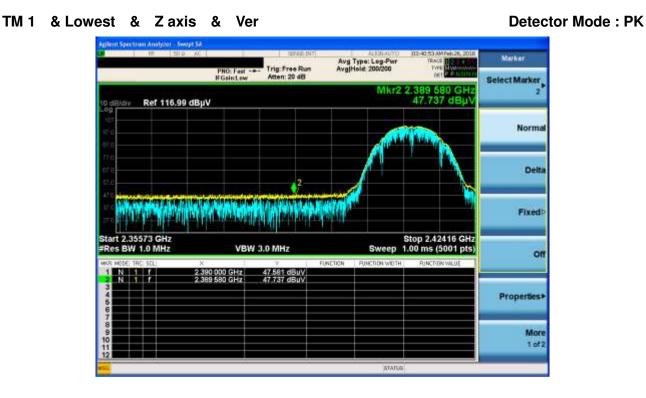
TM 3

Frequency Avg Type: Log-Pwr Trig: Free Run Atten: 40 dB PNO: Fast IFGain:Low Auto Tune ∆Mkr3 5.693 mt -0.48 dB Ref 30.00 dBm 364 Center Freq 2.437000000 GHz X Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz Center 2.437000000 GHz Res BW 8 MHz Span 0 Hz Sweep 40.00 ms (3001 pts) CF Step 8.000000 MHz Man #VBW 50 MHz 2.33 dE 17.75 dBn Freq Offset (Δ) 8 1(Δ) 0.48 dB 0 Hz STATUS



APPENDIX I

Unwanted Emissions (Radiated) Test Plot



TM 1 & Lowest & Z axis & Ver

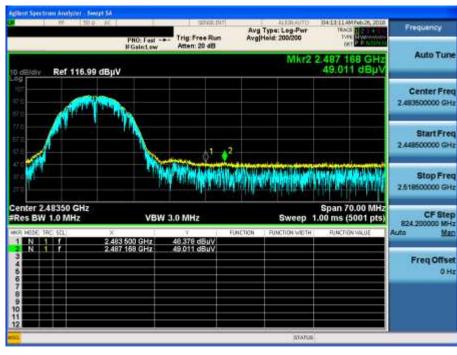


Detector Mode : AV



TM 1 & Highest & Yaxis & Hor





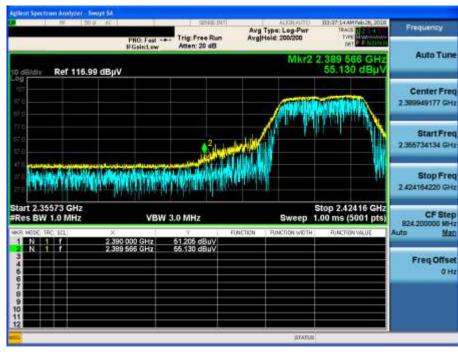
TM 1 & Highest & Yaxis & Hor



🛈 Dt&C

TM 2 & Lowest & Zaxis & Ver





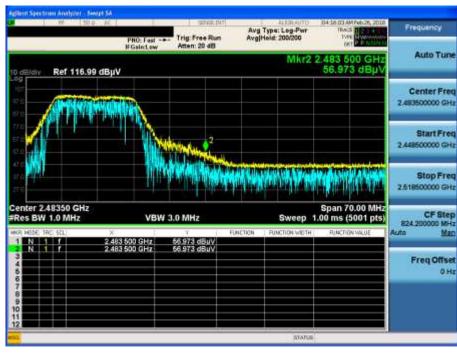
TM 2 & Lowest & Zaxis & Ver

Frequency Avg Type: Per(RMS) Avg[Hold: 200/200 Atten: 20 dB PRO: Fast ~ IFGain:Low Auto Tune Mkr2 2.389 580 GHz 40.677 dBpV Ref 116.99 dBµV Center Freq 2.389949177 GH Start Freq 2.355734134 GHz Stop Freq 2.424164220 GHz Start 2.35573 GHz #Res BW 1.0 MHz Stop 2.42416 GHz 1.00 ms (5001 pts) CF Step VBW 3.0 MHz* Sweep 824.200000 M Mar 2 390 000 GHz 2 389 580 GHz 39.785 dBuV 40.677 dBuV 1 1 Freq Offse OH REAL



TM 2 & Highest & Yaxis & Hor





TM 2 & Highest & Yaxis & Hor



🛈 Dt&C

TM 3 & Lowest & Zaxis & Ver



Start Freq

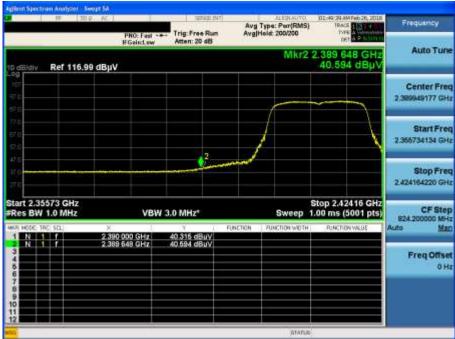
Freq Offset OH

Ref 116.99 dBµV

PNO: Fest



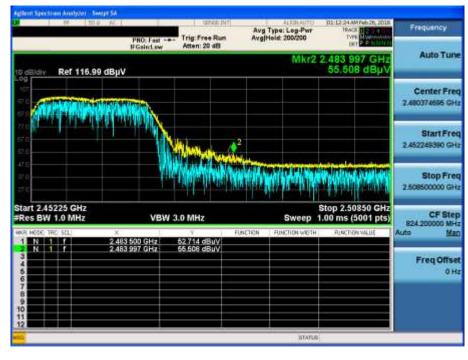
TM 3 & Lowest & Zaxis & Ver





TM 3 & Highest & Yaxis & Hor

Detector Mode : PK



TM 3 & Highest & Yaxis & Hor



TM 1 & Highest & Yaxis & Hor





TM 2 & Highest & Yaxis & Hor



TM 3 & Lowest & Yaxis & Hor

