



TM 1 & ANT 2 & 2412

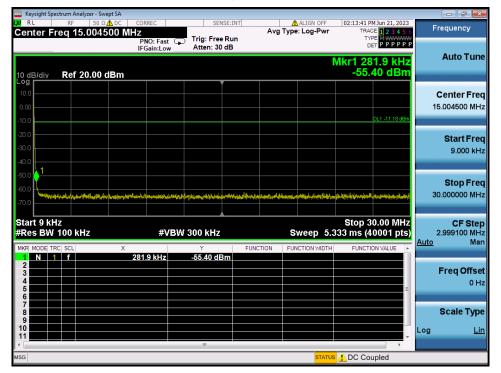
rum Analyzer - Swent Si ALIGN OFF 02:09:19 PM Jun 21, 2023 Frequency r Freq 2.412000000 GHz RACE 1 2 3 4 5 6 TYPE M</ Cent Trig: Free Run Atten: 30 dB PNO: Wide Composition IFGain:Low Auto Tune Mkr1 2.412 501 GHz 8.82 dBm Ref 20.00 dBm 10 dB/div **Center Freq** 2.412000000 GHz Start Freq 2.406352500 GHz Stop Freq 2.417647500 GHz CF Step 1.129500 MHz <u>Auto</u> Man Freq Offset 0 Hz Scale Type Center 2.412000 GHz #Res BW 100 kHz Span 11.30 MHz Sweep 1.200 ms (3001 pts) Lin Log #VBW 300 kHz STATUS

Reference

Low Band-edge







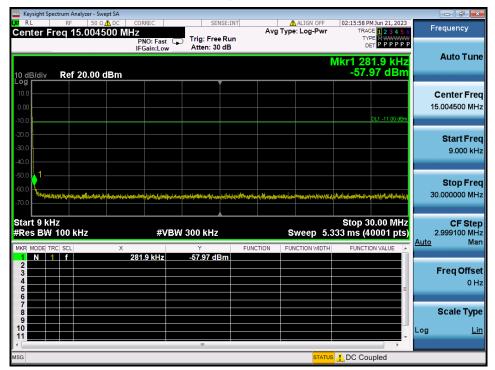
🔤 Keysight Spectrum Analyzer - Sw			
Center Freq 5.0150			55 PM Jun 21, 2023 TRACE 12 3 4 5 6 Frequency
10 dB/div Ref 20.00	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB		TYPE NUMBER DET P P P P P P 77 29 GHz 4.90 dBm
Log 10.0 0.00 -10.0			Center Freq 5.015000000 GHz
-20.0		$\diamond^3 \diamond^2 \diamond^{15}$	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 18.67 ms	Auto Mar
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6	X Y 2.411 58 GHz 12.35 dBm 6.455 17 GHz 44.44 dBm 5.745 05 GHz 44.70 dBm 6.934 97 GHz 44.84 dBm 7.077 29 GHz 44.90 dBm	FUNCTION FUNCTION WIDTH FUI	Freq Offset
7 8 9 10			Scale Type
11			
MSG		STATUS	



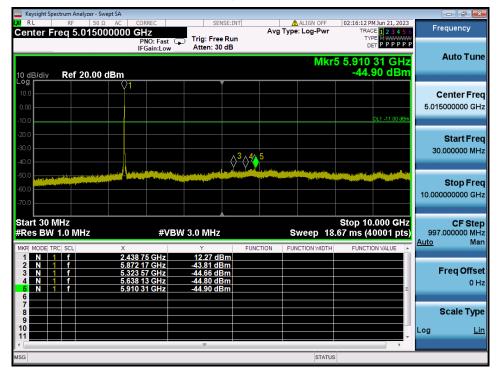
TM 1 & ANT 2 & 2437



Reference









TM 1 & ANT 2 & 2462

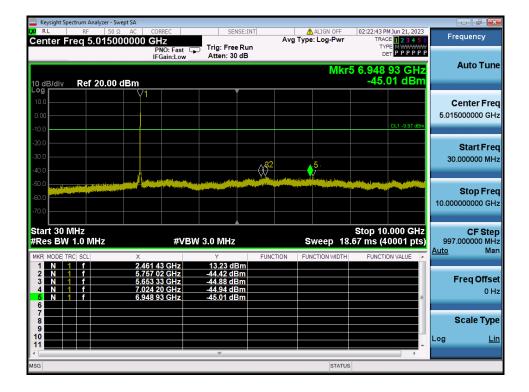


Reference

High Band-edge



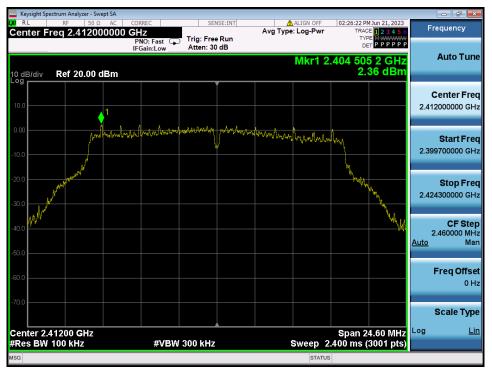
Keysight Spectrum Analyzer - S					
	Ω 🚹 DC CORREC	SENSE:INT	ALIGN OFF	02:22:30 PM Jun 21, 2023	Frequency
enter Freq 15.004	-500 MHZ PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P P	
0 dB/div Ref 20.00	dBm			Vkr1 293.2 kHz -57.55 dBm	Auto Tun
10.0					Center Fre
1.00 10.0				DL1 -9.97 dBm	15.004500 MH
0.0					Start Fre
40.0					9.000 kH
io.o <mark> 1</mark>					Stop Fre
50.0 50.0	ingitalinghalingutitiongaal.theimphile	nen personal instal provident	natura ang ang ang ang ang ang ang ang ang an	theologillitereture real marketilana	30.000000 MH
tart 9 kHz Res BW 100 kHz	#V	BW 300 kHz	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	CF Ste 2.999100 M
KR MODE TRC SCL	× 293.2 kHz	Y FU -57.55 dBm	JNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2					Freq Offs
5 6				E	0 H
8					Scale Typ
					Log L
0					
		m		DC Coupled	





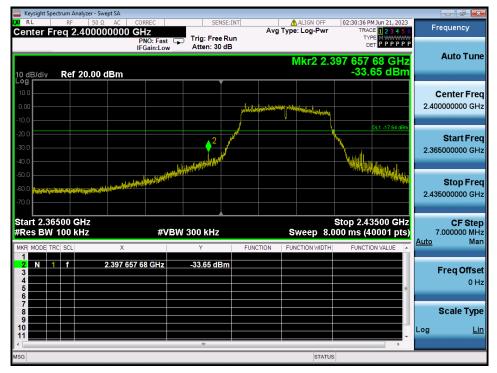
Dt&C

TM 2 & ANT 2 & 2412

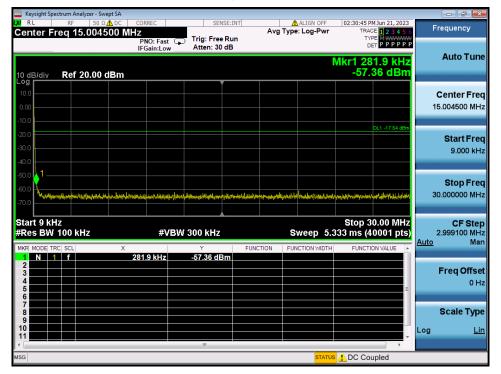


Reference

Low Band-edge







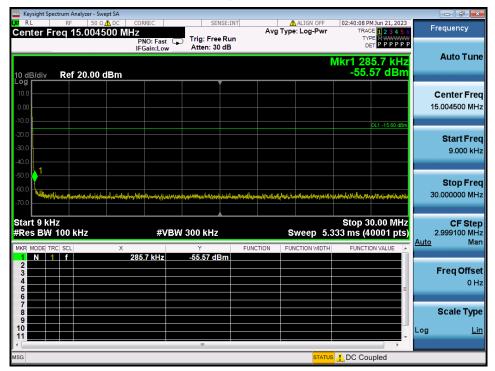
	um Analyzer - Swept SA						
Center Fre	RF 50 Ω AC	GHz	SENSE:IN	Avg Typ	ALIGN OFF	02:31:01 PM Jun 21, 2023 TRACE 1 2 3 4 5 (Frequency
10 dB/div	Ref 20.00 dBm	PNO: Fast IFGain:Low	Trig: Free Ru Atten: 30 dB	n	Mkr	5 7.058 60 GHz -45.64 dBm	Auto Tune
Log 10.0 0.00 -10.0							Center Fred 5.015000000 GHz
-20.0) ³	5	DL1 -17.84 dBm	Start Free 30.000000 MHz
-50.0 -60.0 -70.0							Stop Fred 10.000000000 GHz
Start 30 MH #Res BW 1.	0 MHz	#VBW	3.0 MHz		-	Stop 10.000 GHz .67 ms (40001 pts)	
MKR MODE TRC 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6	f 2.41 f 5.78 f 5.30 f 6.32	1 33 GHz 1 69 GHz 21 GHz 22 57 GHz 58 60 GHz	Y 13.08 dBm -44.29 dBm -44.80 dBm -45.19 dBm -45.64 dBm	FUNCTION FUI	NCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 10							Scale Type
11			ш				
MSG					STATUS	8	



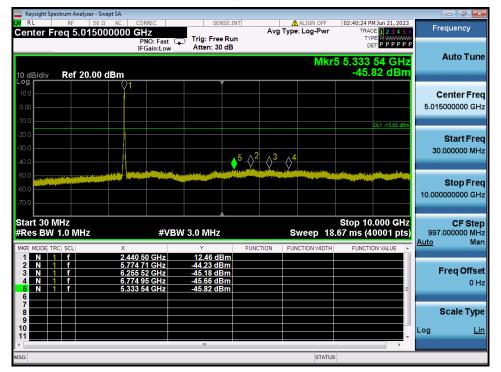
TM 2 & ANT 2 & 2437

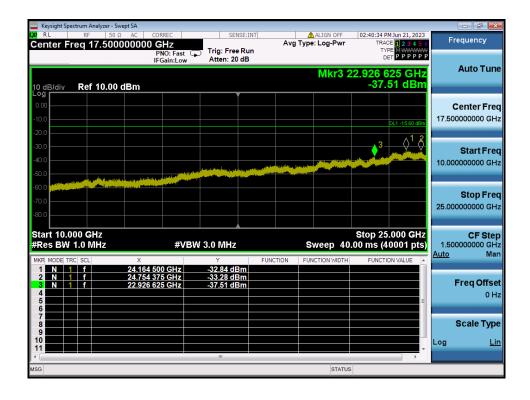


Reference









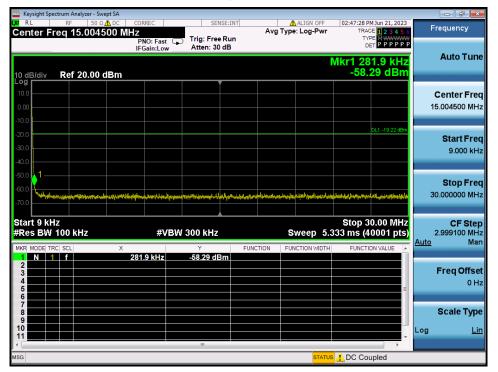
TM 2 & ANT 2 & 2462

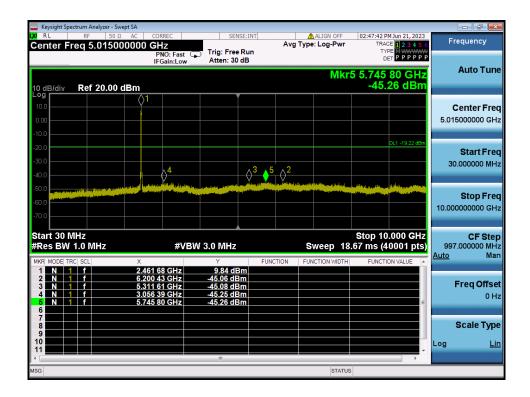


Reference

High Band-edge









TM 3 & ANT 2 & 2412

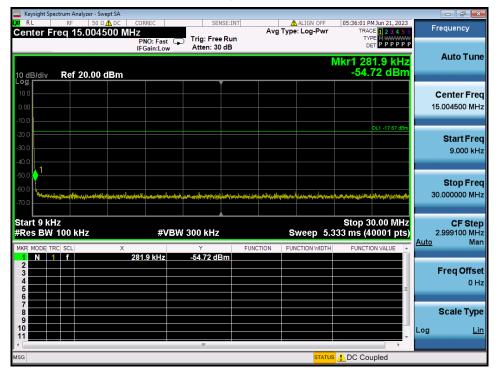


Reference

Low Band-edge







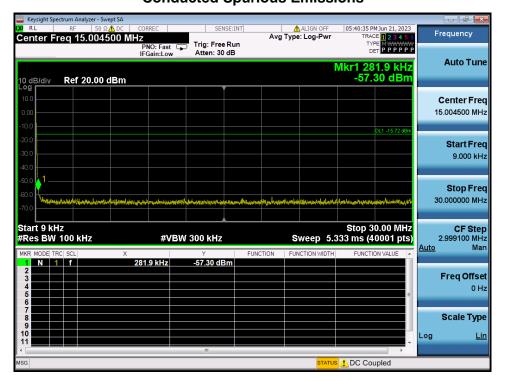
Keysight Spectrum Analyzer - Sw	· ·				
Center Freq 5.0150		SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	05:36:17 PM Jun 21, 2023 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB	Mkr	5 7.115 18 GHz -45.19 dBm	Auto Tune
Log 10.0 0.00 -10.0					Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0			3 <u>4</u> <u>5 </u> <u>2</u>	DL1 -17.67 dBm	Start Free 30.000000 MHz
-50.0 -60.0 -70.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz		3.0 MHz		Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz Auto Mar
MKR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6	X 2.411 58 GHz 7.588 01 GHz 5.832 04 GHz 6.351 23 GHz 7.115 18 GHz	Y FUI 11.77 dBm -44.84 dBm -44.94 dBm -45.11 dBm -45.19 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
7 8 9 9 10					Scale Type
					Log <u>Lin</u>
MSG			STATU	5	



TM 3 & ANT 2 & 2437

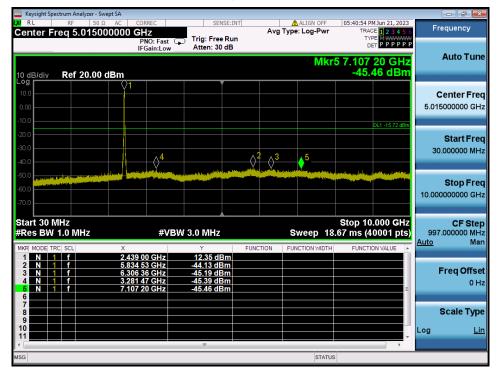
Keysight Spectrum Analyzer - Swept SA ALIGN OFF 05:40:27 PM Jun 21, 2023 Frequency Center Freq 2.437000000 GHz TRACE 1 2 3 4 5 PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB Mkr1 2.444 475 GHz 4.28 dBm Auto Tune 10 dB/div Ref 20.00 dBm **Center Freq** 2.437000000 GHz 1 manna manhand hanaha munturn Start Freq 2.423792500 GHz M WWW Stop Freq 2.450207500 GHz 1.1 CF Step 2.641500 MHz <u>Auto</u> Man Freq Offset 0 Hz Scale Type Center 2.43700 GHz #Res BW 100 kHz Span 26.42 MHz Sweep 2.600 ms (3001 pts) Lin Log #VBW 300 kHz

Conducted Spurious Emissions



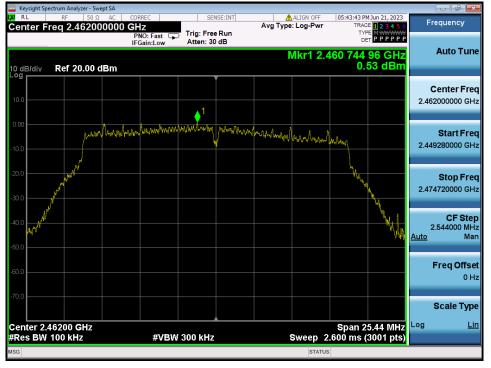
Reference





Keysight Spectrum Analyzer - Swep					
rt RF 50 Ω Center Freq 17.50000	AC CORREC 00000 GHz PNO: Fast	SENSE:INT	Avg Type: Log-Pwr	05:41:04 PM Jun 21, 2023 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P	Frequency
0 dB/div Ref 10.00 dB	IFGain:Low	Atten: 20 dB	Mkr3 2	23.749 750 GHz -33.36 dBm	Auto Tun
				DL1 -15.72 dBm	Center Fre 17.500000000 GH
40.0				4 ³ ∂ ¹ ∂	Start Fre 10.000000000 GF
50.0 70.0 30.0					Stop Fre 25.000000000 GF
itart 10.000 GHz Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 40	Stop 25.000 GHz .00 ms (40001 pts)	CF Ste 1.50000000 GI <u>Auto</u> Mi
1 N 1 f 2 N 1 f 3 N 1 f 4 - - - 5 - - -	24.264 250 GHz 24.767 500 GHz 23.749 750 GHz	-32.76 dBm -33.08 dBm -33.36 dBm	FORCHON WIDTH	FUNCTION VALUE	Freq Offs 0 F
6 7 8 9 9					Scale Typ
10 11					Log <u>L</u>
SG			STATUS	3	

TM 3 & ANT 2 & 2462



Reference

High Band-edge





Keysight Spectrum Analyzer - Swept SA					
ଅଜ୍ମା ଜୁନା ସହୁ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ ଅନ୍ୟ	Hz		ALIGN OFF	05:48:04 PM Jun 21, 2023 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Fre IFGain:Low Atten: 3		M	кr1 281.9 kHz -56.78 dBm	Auto Tune
10.0 0.00 -10.0					Center Freq 15.004500 MHz
-20.0				DL1 -19.47 dBm	Start Freq 9.000 kHz
-50.0	underhaltsprogram, styliefteringenations	An stilligten and a state of the state of the	adadd yddiaethaethaerhaethad	หม่หมะประเทศ (การณาสนุที่ไม่มี possibility	Stop Freq 30.000000 MHz
Start 9 kHz #Res BW 100 kHz MKR MODE TRC SCL X	#VBW 300 kHz	FUNCTION	Sweep 5.33	Stop 30.00 MHz 3 ms (40001 pts) FUNCTION VALUE	CF Step 2.999100 MHz <u>Auto</u> Man
	201.9 KH2 -30.7 6 U			E	Freq Offset 0 Hz
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					Scale Type Log <u>Lin</u>
MSG			STATUS	DC Coupled	

Keysight Spectrum Analyzer - Sw				
RL RF 50 Ω Center Freq 5.01500		ALIGN OFF	05:48:19 PM Jun 21, 2023 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00	PNO: Fast 🆵 Trig: Free Run IFGain:Low Atten: 30 dB	Mkr	5 5.271 98 GHz -45.54 dBm	Auto Tune
				Center Freq 5.015000000 GHz
-20.0			DL1 -19.47 dBm	Start Free 30.000000 MHz
-50.0 -60.0 -70.0				Stop Fred 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VBW 3.0 MHz	Sweep 18	Stop 10.000 GHz 3.67 ms (40001 pts)	CF Step 997.000000 MH: <u>Auto</u> Mar
1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f 6	2.461 43 GHz 9.72 dBm 5.832 04 GHz 45.08 dBm 3.136 15 GHz 45.27 dBm 6.282 19 GHz 45.27 dBm 5.271 98 GHz 45.54 dBm		E	Freq Offse 0 Hz
7 8 9 9 10				Scale Type
				Log <u>Lin</u>
MSG	m	STATU	s	





5.5. Unwanted Emissions (Radiated)

Test Requirements and limit,

Part 15.247(d), Part 15.205, Part 15.209 & RSS-247 [5.5], RSS-Gen [8.9], RSS-Gen [8.10]

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, 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 that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of Part 15.247 the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

- Part 15.209 & RSS-Gen[8.9]: General requirement

Frequency (MHz)	FCC Limit (uV/m)	IC Limit (µA/m)	Measurement Distance (m)					
0.009 - 0.490	2 400 / F (kHz)	6.37/F (F in kHz)	300					
0.490 - 1.705	24 000 / F (kHz)	63.7/F (F in kHz)	30					
1.705 – 30.0	30	0.08	30					

Frequency (MHz)	FCC Limit (uV/m)	IC Limit (uV/m)	Measurement Distance (m)
30 ~ 88	100 **	100	3
88 ~ 216	150 **	150	3
216 ~ 960	200 **	200	3
Above 960	500	500	3

**Except as provided in paragraph (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.



- Part 15.205(a): Restricted band of operation

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.414 25 ~ 8.414 75	108 ~ 121.94	1 300 ~ 1 427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1 435 ~ 1 626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.173 5 ~ 2.190 5	12.519 75 ~ 12.520 25	149.9 ~ 150.05	1 645.5 ~ 1 646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.576 75 ~ 12.577 25	156.524 75 ~ 156.525 25	1 660 ~ 1 710	8.025 ~ 8.5	22.01 ~ 23.12
4.177 25 ~ 4.177 75	13.36 ~ 13.41	156.7 ~ 156.9	1 718.8 ~ 1 722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.207 25 ~ 4.207 75	16.42 ~ 16.423	162.012 5 ~ 167.17	2 200 ~ 2 300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.694 75 ~ 16.695 25	167.72 ~ 173.2	2 310 ~ 2 390	10.6 ~ 12.7	36.43 ~ 36.5
6.267 75 ~ 6.268 25	16.804 25 ~ 16.804 75	240 ~ 285	2 483.5 ~ 2 500	13.25 ~ 13.4	Above 38.6
6.311 75 ~ 6.312 25	25.5 ~ 25.67	322 ~ 335.4	2 655 ~ 2 900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3 260 ~ 3 267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3 332 ~ 3 339		
8.376 25 ~ 8.386 75	74.8 ~ 75.2	960 ~ 1 240	3 345.8 ~ 3 358		
			3 600 ~ 4 400		

- RSS-Gen[8.10]: Restricted frequency bands

MHz	MHz	MHz	MHz	MHz	GHz
0.090 ~ 0.110	8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3 345.8 ~ 3 358	9.0 ~ 9.2
0.495 ~ 0.505	8.376 25 ~ 8.386 75	74.8 ~ 75.2	960 ~ 1 427	3 500 ~ 4 400	9.3 ~ 9.5
2.173 5 ~ 2.190 5	8.414 25 ~ 8.414 75	108 ~ 138	1 435 ~ 1 626.5	4 500 ~ 5 150	10.6 ~ 12.7
3.020 ~ 3.026	12.29 ~ 12.293	149.9 ~ 150.05	1 645.5 ~ 1 646.5	5 350 ~ 5 460	13.25 ~ 13.4
4.125 ~ 4.128	12.519 75 ~ 12.520 25	156.524 75 ~	1 660 ~ 1 710	7 250 ~ 7 750	14.47 ~ 14.5
4.177 25 ~ 4.177 75	12.576 75 ~ 12.577 25	156.525 25	1 718.8 ~ 1 722.2	8 025 ~ 8 500	15.35 ~ 16.2
4.207 25 ~ 4.207 75	13.36 ~ 13.41	156.7 ~ 156.9	2 200 ~ 2 300		17.7 ~ 21.4
5.677 ~ 5.683	16.42 ~ 16.423	162.01 25 ~ 167.17	2 310 ~ 2 390		22.01 ~ 23.12
6.215 ~ 6.218	16.694 75 ~ 16.695 25	167.72 ~ 173.2	2 483.5 ~ 2 500		23.6 ~ 24.0
6.267 75 ~ 6.268 25	16.804 25 ~ 16.804 75	240 ~ 285	2 655 ~ 2 900		31.2 ~ 31.8
6.311 75 ~ 6.312 25	25.5 ~ 25.67	322 ~ 335.4	3 260 ~ 3 267		36.43 ~ 36.5
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3 332 ~ 3 339		Above 38.6

5.5.1. Test Setup

Refer to the APPENDIX I.

5.5.2. Test Procedures

- 1. 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.
- 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 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.

Note: Measurement Instrument Setting for Radiated Emission Measurements.

- KDB558074 D01v05r02 Section 8.6
- ANSI C63.10-2013 Section 11.12

1. Frequency Range Below 1 GHz

RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak

2. Frequency Range > 1 GHz

Peak Measurement > 1 GHz

RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto, Trace mode = Max Hold until the trace stabilizes Average Measurement > 1 GHz

- 1. RBW = 1 MHz (unless otherwise specified).
- 2. VBW \geq 3 x RBW.
- 3. Detector = RMS (Number of points ≥ 2 x Span / RBW)
- 4. Averaging type = power (i.e., RMS).
- 5. Sweep time = auto.
- 6. Perform a trace average of at least 100 traces.
- 7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is $10 \log(1 / D)$, where D is the duty cycle.
 - 2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1 / D), where D is the duty cycle.
 - 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.

Test Mode	Date rate	T _{on} (ms)	T _{on+off} (ms)	$D = T_{on} / (T_{on+off})$	DCCF = 10 log(1/D) (dB)			
TM 1	1 Mbps	12.410	12.510	0.992 0	0.03			
TM 2	6 Mbps	2.064	2.163	0.954 2	0.20			
TM 3	MCS 0	1.920	2.020	0.950 5	0.22			

Duty Cycle Correction factor

Note1: Where, T= Transmission duration / D= Duty cycle

Note2: Please refer to the appendix II for duty cycle plots.



5.5.3. Test Results

Test Notes _

1. The radiated emissions were investigated 9 kHz to 25 GHz. And no other spurious and harmonic emissions were found below listed frequencies. 2. Information of Distance Correction Factor

For finding emissions, measurements may be performed at a distance closer than that specified in the regulations. In this case, the distance factor is applied to the result.

- Calculation of distance correction factor

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

At frequencies at or above 30 MHz = $20 \log(\text{tested distance / specified distance })$

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

3. Sample Calculation.

Margin = Limit – Result / Result = Reading + TF+ DCCF + DCF / TF = AF + CL + HL + AL – AG Where, TF = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, HL = High pass filter Loss, AL = Attenuator Loss, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

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

Tested Frequency (MHz)	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin(dB)
	2 386.36	V	Z	PK	54.86	4.61	N/A	N/A	59.47	74.00	14.53
	2 386.57	V	Z	AV	45.16	4.61	N/A	N/A	49.77	54.00	4.23
2 412	4 824.08	Н	Y	PK	51.27	2.34	N/A	N/A	53.61	74.00	20.39
2412	4 824.08	Н	Y	AV	42.22	2.34	N/A	N/A	44.56	54.00	9.44
	7 234.76	V	Х	PK	50.04	7.84	N/A	N/A	57.88	74.00	16.12
	7 234.76	V	Х	AV	42.08	7.84	N/A	N/A	49.92	54.00	4.08
	4 874.13	Н	Y	PK	51.83	2.18	N/A	N/A	54.01	74.00	19.99
0 407	4 874.07	Н	Y	AV	44.26	2.18	N/A	N/A	46.44	54.00	7.56
2 437	7 309.46	V	Х	PK	51.09	7.38	N/A	N/A	58.47	74.00	15.53
	7 309.73	V	Х	AV	43.82	7.37	N/A	N/A	51.19	54.00	2.81
	2 488.32	V	Z	PK	54.60	5.69	N/A	N/A	60.29	74.00	13.71
	2 487.73	V	Z	AV	44.83	5.68	N/A	N/A	50.51	54.00	3.49
2 462	4 923.82	Н	Y	PK	50.38	2.57	N/A	N/A	52.95	74.00	21.05
	4 923.94	Н	Y	AV	42.30	2.57	N/A	N/A	44.87	54.00	9.13
	7 384.65	V	Х	PK	50.39	7.65	N/A	N/A	58.04	74.00	15.96
	7 384.83	V	Х	AV	42.39	7.65	N/A	N/A	50.04	54.00	3.96

Radiated Emissions data(9 kHz ~ 25 GHz) : TM 1_ANT 2

Tested Frequency (MHz)	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin(dB)
	2 387.59	Н	Z	PK	51.86	4.61	N/A	N/A	56.47	74.00	17.53
	2 386.85	Н	Z	AV	42.31	4.61	N/A	N/A	46.92	54.00	7.08
2 412	4 823.83	V	Y	PK	51.03	2.35	N/A	N/A	53.38	74.00	20.62
2 412	4 823.93	V	Y	AV	41.74	2.34	N/A	N/A	44.08	54.00	9.92
	7 234.79	Н	Х	PK	46.71	7.84	N/A	N/A	54.55	74.00	19.45
	7 234.40	Н	Х	AV	36.52	7.83	N/A	N/A	44.35	54.00	9.65
	4 873.80	V	Y	PK	50.77	2.18	N/A	N/A	52.95	74.00	21.05
0.407	4 873.96	V	Y	AV	41.35	2.18	N/A	N/A	43.53	54.00	10.47
2 437	7 312.71	Н	Х	PK	47.81	7.33	N/A	N/A	55.14	74.00	18.86
	7 312.07	Н	Х	AV	37.03	7.34	N/A	N/A	44.37	54.00	9.63
	2 488.55	Н	Z	PK	53.05	5.69	N/A	N/A	58.74	74.00	15.26
	2 488.72	Н	Z	AV	43.07	5.69	N/A	N/A	48.76	54.00	5.24
2 462	4 924.37	V	Y	PK	50.10	2.57	N/A	N/A	52.67	74.00	21.33
	4 924.02	V	Y	AV	40.26	2.57	N/A	N/A	42.83	54.00	11.17
	7 386.34	Н	Х	PK	46.69	7.66	N/A	N/A	54.35	74.00	19.65
	7 386.18	Н	Х	AV	36.38	7.66	N/A	N/A	44.04	54.00	9.96



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

Tested Frequency (MHz)	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin(dB)
	2 389.89	Н	Y	PK	59.54	4.60	N/A	N/A	64.14	74.00	9.86
	2 389.97	Н	Y	AV	44.68	4.60	0.20	N/A	49.48	54.00	4.52
2 412	4 824.25	Н	Х	PK	49.80	2.34	N/A	N/A	52.14	74.00	21.86
2 412	4 824.25	Н	Х	AV	39.69	2.34	0.20	N/A	42.23	54.00	11.77
	7 237.74	V	Y	PK	47.13	7.87	N/A	N/A	55.00	74.00	19.00
	7 237.60	V	Y	AV	36.79	7.86	0.20	N/A	44.85	54.00	9.15
	4 872.92	Н	Х	PK	50.11	2.18	N/A	N/A	52.29	74.00	21.71
0.407	4 872.33	Н	Х	AV	39.90	2.18	0.20	N/A	42.28	54.00	11.72
2 437	7 311.24	V	Y	PK	47.40	7.35	N/A	N/A	54.75	74.00	19.25
	7 311.83	V	Y	AV	37.21	7.34	0.20	N/A	44.75	54.00	9.25
	2 483.71	Н	Y	PK	58.61	5.62	N/A	N/A	64.23	74.00	9.77
	2 483.79	Н	Y	AV	43.65	5.62	0.20	N/A	49.47	54.00	4.53
2 462	4 922.73	Н	Х	PK	50.02	2.57	N/A	N/A	52.59	74.00	21.41
	4 922.22	Н	Х	AV	39.30	2.56	0.20	N/A	42.06	54.00	11.94
	7 385.69	V	Y	PK	46.72	7.66	N/A	N/A	54.38	74.00	19.62
	7 385.33	V	Y	AV	36.65	7.65	0.20	N/A	44.50	54.00	9.50

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

Tested Frequency (MHz)	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin(dB)
	2 389.24	Н	Y	PK	57.90	4.60	N/A	N/A	62.50	74.00	11.50
	2 389.29	Н	Y	AV	44.77	4.60	0.22	N/A	49.59	54.00	4.41
2 412	4 825.58	Н	Х	PK	50.12	2.34	N/A	N/A	52.46	74.00	21.54
2412	4 825.39	Н	Х	AV	39.90	2.34	0.22	N/A	42.46	54.00	11.54
	7 234.85	V	Y	PK	46.94	7.84	N/A	N/A	54.78	74.00	19.22
	7 234.81	V	Y	AV	36.56	7.84	0.22	N/A	44.62	54.00	9.38
	4 872.58	Н	Х	PK	50.63	2.18	N/A	N/A	52.81	74.00	21.19
2 437	4 873.17	Н	Х	AV	40.19	2.18	0.22	N/A	42.59	54.00	11.41
2 437	7 312.04	V	Y	PK	47.96	7.34	N/A	N/A	55.30	74.00	18.70
	7 312.52	V	Y	AV	37.47	7.33	0.22	N/A	45.02	54.00	8.98
	2 484.96	Н	Y	PK	60.49	5.64	N/A	N/A	66.13	74.00	7.87
	2 484.20	Н	Y	AV	44.93	5.63	0.22	N/A	50.78	54.00	3.22
2 462	4 924.32	Н	Х	PK	49.75	2.57	N/A	N/A	52.32	74.00	21.68
	4 924.56	Н	Х	AV	39.41	2.57	0.22	N/A	42.20	54.00	11.80
	7 384.26	V	Y	PK	47.23	7.65	N/A	N/A	54.88	74.00	19.12
	7 384.60	V	Y	AV	36.48	7.65	0.22	N/A	44.35	54.00	9.65



5.6. AC Power-Line Conducted Emissions

Test Requirements and limit, Part 15.207 & RSS-Gen [8.8]

An intentional radiator that 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.

	Conducted Limit (dBuV)				
Frequency Range (MHz)	Quasi-Peak	Average			
0.15 ~ 0.5	66 to 56 *	56 to 46 *			
0.5 ~ 5.0	56	46			
5 ~ 30	60	50			

* Decreases with the logarithm of the frequency

5.6.1. Test Setup

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

5.6.2. Test Procedures

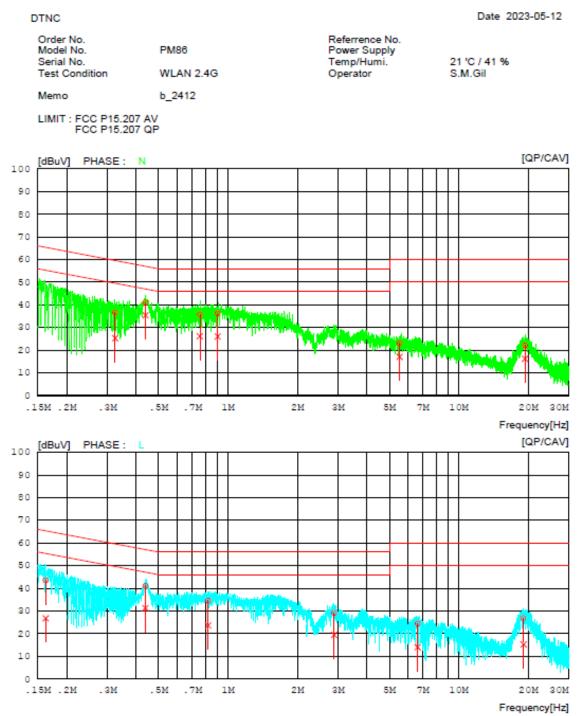
Conducted emissions from the EUT were measured according to the ANSI C63.10-2013.

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

5.6.3. Test Results

Refer to the next page. (The worst case data was reported. The worst data is TM 1 & Lowest)

AC Power-Line Conducted Emissions (Graph)



Results of Conducted Emission



DTNC

AC Power-Line Conducted Emissions (List)

Results of Conducted Emission

Date 2023-05-12

Order No. Model No. Serial No. Test Condition	PM86 WLAN 2.4G	Referrence No. Power Supply Temp/Humi. Operator	21 'C / 41 % S.M.Gil
Memo	b_2412		
LIMIT : FCC P15.207 A FCC P15.207 Q	-		
QP	CAV QP	CAV QP CAV [dBuV] [dBuV] [dBuV]	MARGIN PHASE QP CAV [dBuV][dBuV]
3 0.75455 25.76 4 0.90156 26.26 5 5.54220 12.95 6 19.37640 11.62 7 0.16212 33.63 8 0.43868 31.15	1 25.41 10.00 41.01 8 16.21 9.99 35.77 6 16.01 10.00 36.26 5 6.95 10.21 23.16 2 5.72 10.55 22.17 3 16.85 9.90 43.53 5 21.35 9.90 41.05 4 13.74 9.90 34.54 9 9.37 10.05 29.14 6 3.91 10.13 24.49	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	22.93 24.23 N 16.07 11.67 N 20.23 19.80 N 19.74 19.99 N 36.84 32.84 N 37.83 33.73 N 21.82 28.60 L 16.04 15.84 L 21.46 22.36 L 26.86 26.58 L 35.51 35.96 L 33.14 34.75 L



5.7. Occupied Bandwidth

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.

5.7.1. Test Setup

Refer to the APPENDIX I.

5.7.2. Test Procedures

The 99 % power bandwidth was measured with a calibrated spectrum analyzer.

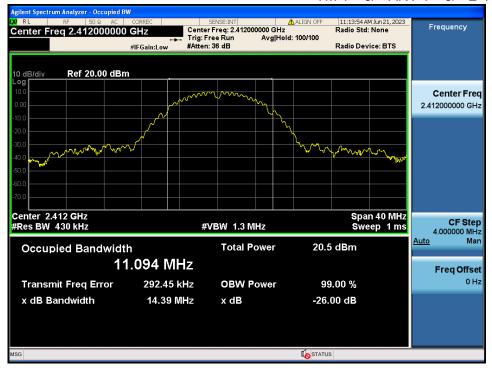
The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3 × RBW.

5.7.3. Test Results

Test Mode	Frequency	Test Res	ults(MHz)
iest mode	(MHz)	ANT 1	ANT 2
	2 412	11.09	11.20
TM1	2 437	11.31	11.32
	2 462	11.33	11.09
	2 412	17.04	16.85
TM 2	2 437	17.32	17.24
	2 462	17.07	16.69
	2 412	18.10	17.97
ТМ 3	2 437	18.31	18.21
	2 462	18.07	17.80

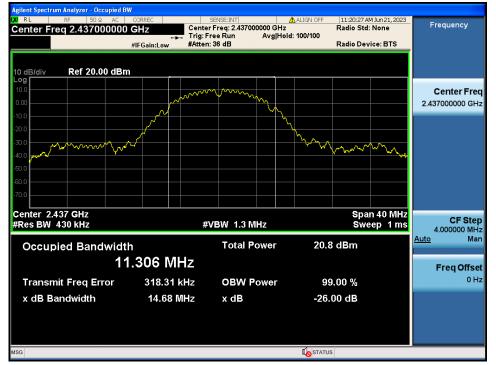
6 dB Bandwidth

TM 1 & ANT 1 & 2412

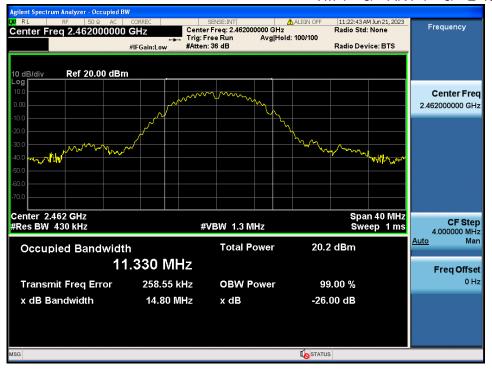


6 dB Bandwidth

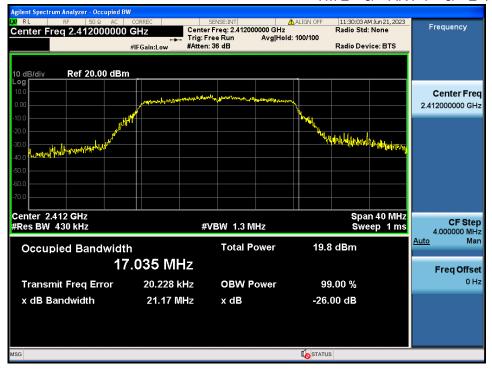
TM 1 & ANT 1 & 2437



TM 1 & ANT 1 & 2462



TM 2 & ANT 1 & 2412



6 dB Bandwidth

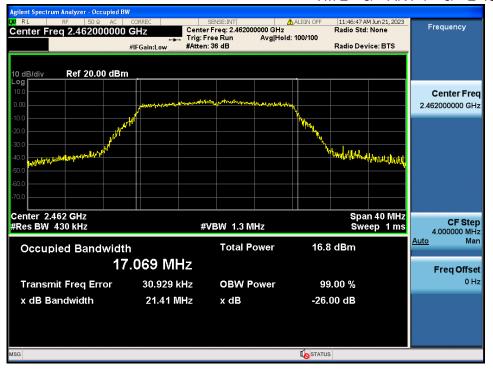
og

MSG

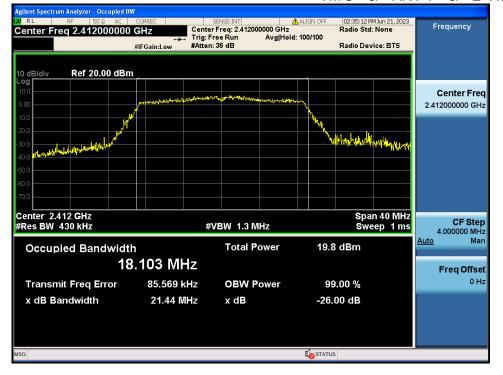
TM 2 & ANT 1 & 2437 SENSE:INT ALIGN OFF Center Freq: 2.43700000 GHz Trig: Free Run Avg|Hold: 100/100 #Atten: 36 dB 11:43:41 AM Jun 21, 2023 Radio Std: None Frequency Center Freg 2.437000000 GHz Radio Device: BTS #IFGain:Low Ref 20.00 dBm **Center Freq** 2.437000000 GHz AN AN AND المحط الماليسان المالية wheel . Center 2.437 GHz #Res BW 430 kHz Span 40 MHz Sweep 1 ms CF Step 4.000000 MHz Man #VBW 1.3 MHz Auto 21.4 dBm Occupied Bandwidth **Total Power** 17.320 MHz Freq Offset 0 Hz 120.26 kHz Transmit Freq Error **OBW Power** 99.00 % x dB Bandwidth 23.83 MHz x dB -26.00 dB

ISTATUS

TM 2 & ANT 1 & 2462



TM 3 & ANT 1 & 2412

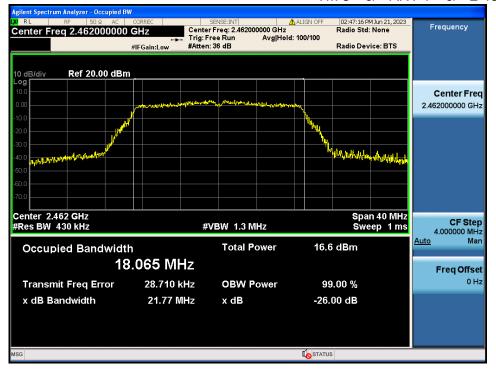


6 dB Bandwidth

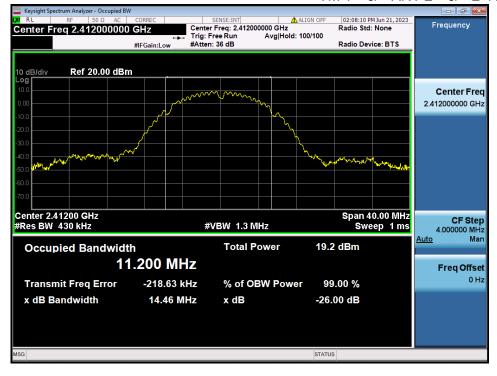
TM 3 & ANT 1 & 2437



TM 3 & ANT 1 & 2462

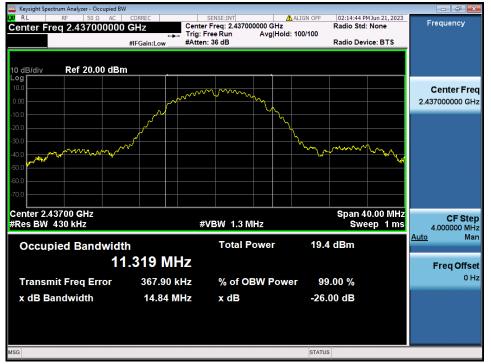


TM 1 & ANT 2 & 2412

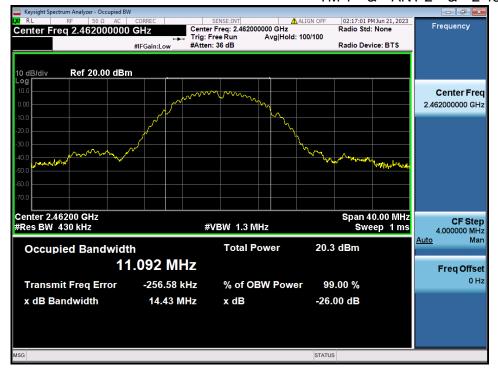


6 dB Bandwidth

TM 1 & ANT 2 & 2437



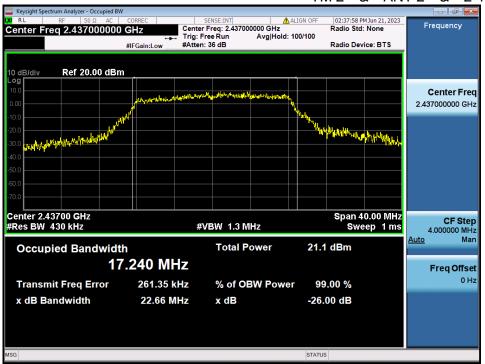
TM 1 & ANT 2 & 2462





6 dB Bandwidth

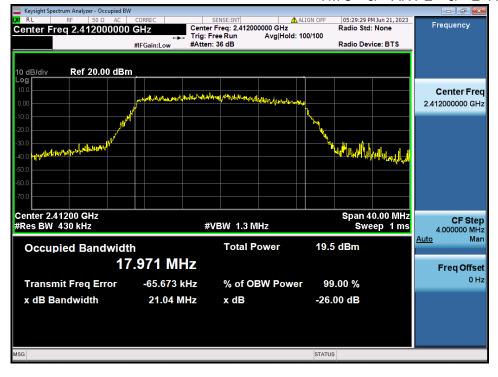
TM 2 & ANT 2 & 2437



TM 2 & ANT 2 & 2462

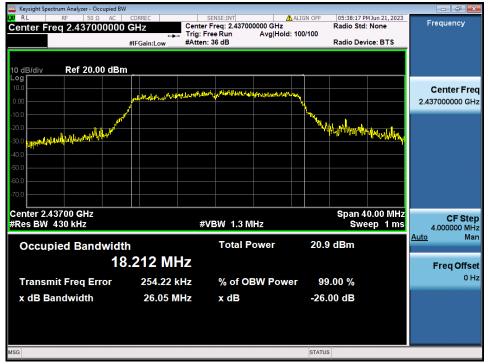


TM 3 & ANT 2 & 2412

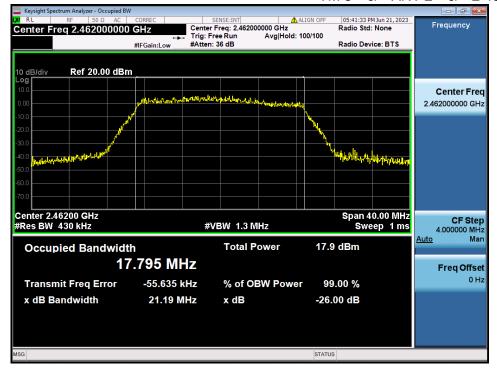


6 dB Bandwidth

TM 3 & ANT 2 & 2437



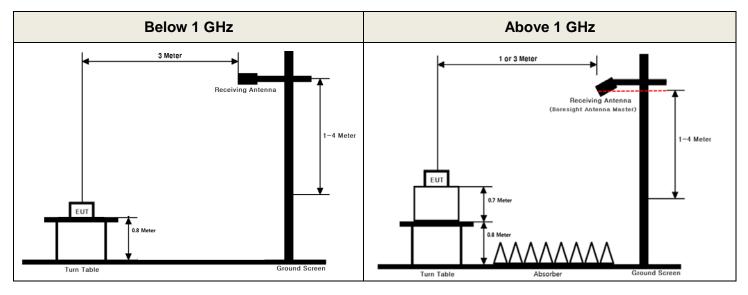
TM 3 & ANT 2 & 2462



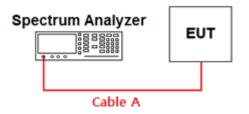
APPENDIX I

Test set up diagrams

Radiated Measurement



Conducted Measurement





APPENDIX II

Duty cycle plots

Test Procedures

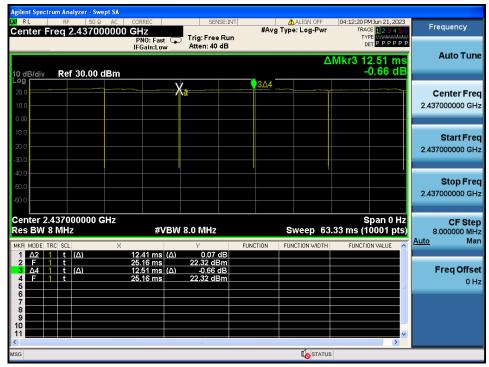
- KDB558074 D01v05r02 - Section 6

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

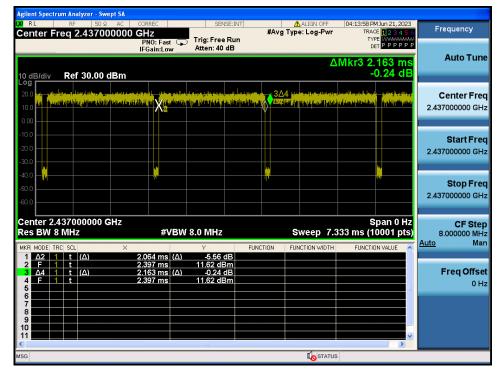
TM 1 & 2 437 MHz



Dt&C

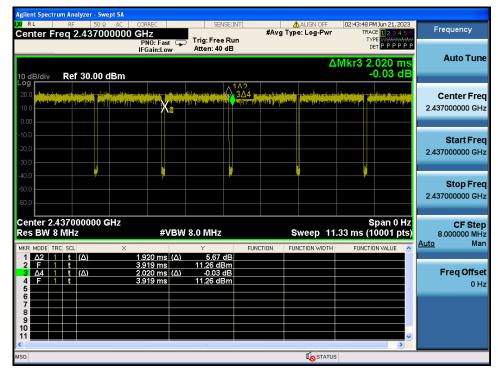
TM 2 & 2 437 MHz

Duty Cycle



TM 3 & 2 437 MHz

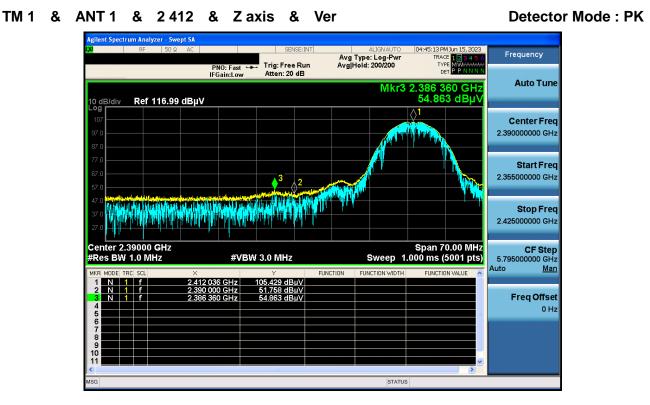
Duty Cycle



APPENDIX III

Unwanted Emissions (Radiated) Test Plot

Single antenna data

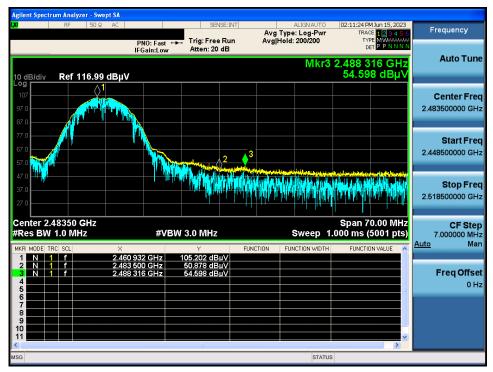


TM 1 & ANT 1 & 2412 & Zaxis & Ver

Detector Mode : AV



TM 1 & ANT 1 & 2462 & Zaxis & Ver



TM 1 & ANT 1 & 2462 & Zaxis & Ver



Detector Mode : PK

Detector Mode : AV

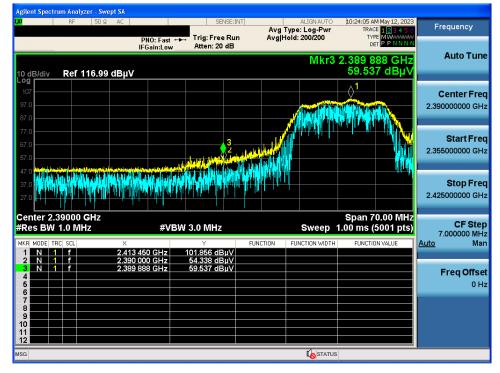
Detector Mode : AV

TM 1 & ANT 1 & 2437 & Xaxis & Ver



Detector Mode : PK

TM 2 & 2412 & Yaxis & Hor



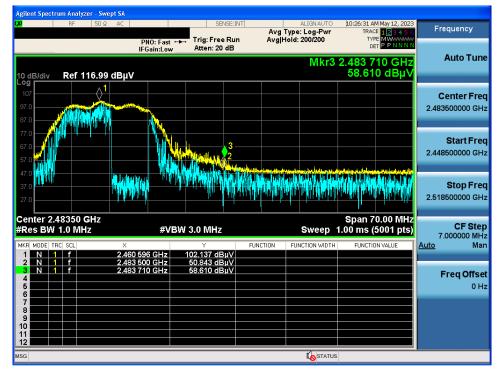
TM 2 & 2412 & Yaxis & Hor

Detector Mode : AV

Agilent Spectrum Analyzer - Swep		SENSE:INT	ALIGNAUTO	10.07.70 MM. 40.0000	
M R⊢ 50 Ω			Avg Type: RMS Avg Hold: 200/200	10:07:52 AM May 12, 2023 TRACE 1 2 3 4 5 6 TYPE A WAWAAA	Frequency
10 dB/div Ref 116.99	PNO: Fast ← IFGain:Low dBµV	Atten: 20 dB		ет АРИИИИ 2.389 972 GHz 44.675 dBµV	Auto Tune
97.0 87.0				¢1	Center Fred 2.390000000 GHz
77.0 67.0 57.0		3		\	Start Free 2.355000000 GHz
47.0 37.0 27.0					Stop Fred 2.425000000 GHz
Center 2.39000 GHz #Res BW 1.0 MHz	×		Sweep	Span 70.00 MHz 1.00 ms (5001 pts) FUNCTION VALUE	CF Step 7.000000 MHz <u>Auto</u> Mar
1 N 1 f 2 N 1 f 3 N 1 f 4 5 5 6	2.413 366 GHz 2.390 000 GHz 2.389 972 GHz	94.126 dBµV 44.420 dBµV 44.675 dBµV			Freq Offset 0 Hz
7 8 9 10 11 12					
ISG			STATUS		

Detector Mode : PK

TM 2 & 2462 & Yaxis & Hor



TM 2 & 2462 & Yaxis & Hor

SENSE:INT Frequency Avg Type: RMS Avg|Hold: 200/200 RACE TYPE DET PNO: Fast +++ IFGain:Low Atten: 20 dB Auto Tune Mkr3 2.483 794 GHz 43.647 dBµ\ Ref 116.99 dBµV **Center Freq** $^{\wedge}$ 2.483500000 GHz Start Freq 2.448500000 GHz Stop Freq 2.518500000 GHz Center 2.48350 GHz #Res BW 1.0 MHz Span 70.00 MHz 1.00 ms (5001 pts) CF Step 7.000000 MHz Man #VBW 3.0 MHz* Sweep FUNCTION Auto 43.232 dBµ 4<u>3.647 d</u>Bµ\ Freq Offset 0 Hz **I**STATUS

Detector Mode : AV



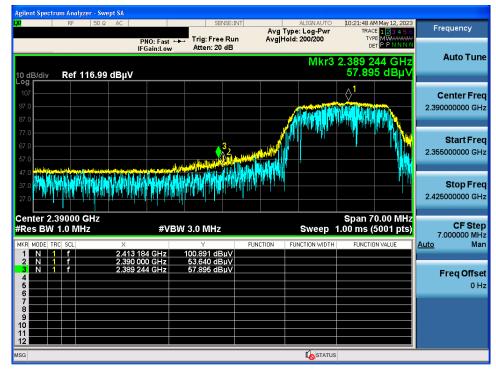
Detector Mode : PK

TM 2 & 2412 & Yaxis & Ver

Agilent Spect	r <mark>um Analyzer - Swe</mark> RF 50 Ω			SEN	SE:INT		ALIGNAUTO	10:36:57 P	4 Jun 15, 2023	
	10 00 2	110	PNO: Fast 🔸			Avg Type Avg Hold:	RMS	TRAC		Frequency
5 dB/div Log	Ref 66.99 d		IFGain:Low	Atten: 6 d	В		Mkr1	7.237 5	apnnnn 99 GHz 4 dBµV	Auto Tune
62.0										Center Fred 7.236000000 GH;
57.0										Start Fred 7.233500000 GH:
47.0										Stop Free 7.238500000 GH:
37.0 4444	ing form for the set of based	1999-1189-1199 	hen en in her in her In her in her	hjelogatel filmestered	talanaka aja 140	athapeysique and a glack	sterrer foglærer	<mark>∲</mark> 1 Mithanani	nadratelightensighte	CF Step 2.41200000 GH: Auto <u>Mar</u>
27.0										Freq Offse 0 H:
Center 7. #Res BW	236000 GHz 1.0 MHz		#VBW	3.0 MHz*			Sweep_1	Span 5 .000 m <u>s (</u>	.000 MHz 5001 pts)	
ISG							STATUS			



TM 3 & 2412 & Yaxis & Hor



TM 3 & 2412 & Yaxis & Hor

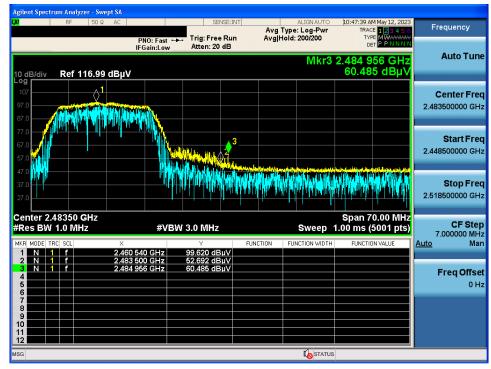


Detector Mode : AV

Detector Mode : PK



TM 3 & 2462 & Yaxis & Hor



TM 3 & 2462 & Yaxis & Hor



Detector Mode : AV

Detector Mode : PK



Detector Mode : AV

TM 3 & 2 437 & Y axis & Ver

Agilent Spect	r <mark>um Analyzer - S</mark> RF 50	wept SA Ω AC		SEI	VSE:INT		ALIGNAUTO	10:29:34 P	4 Jun 15, 2023		
	10		PNO: Fast 🔸			Avg Type: RMS Avg Hold: 200/200		TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A P N N N N		Frequency	
			IFGain:Low	Atten: 6						Auto Tune	
5 dB/div Log	<mark>Mkr1 7.312 515 GHz ما¢/div Ref 66.99 dBµV 37.472 dBµV</mark>									Auto Tun	
										Center Fred	
62.0										7.311000000 GH	
57.0											
										Start Fred 7.308500000 GHz	
52.0										7.506500000 GHz	
47.0										Stop Fred	
42.0										7.313500000 GH	
42.0								<mark>_</mark> 1			
37.0 414 - 1 4	ekurral they deday i	y-ly-traingety-set	and the second secon	nestal film	antification (Station);	alter alter alter alter alter	aningen fannsk fan	and when a	endinen med offen	CF Step 2.437000000 GH:	
32.0										Auto <u>Mar</u>	
										Freq Offse	
27.0										0 Hz	
22.0											
	enter 7.311000 GHz Span 5.000 MHz Res BW 1.0 MHz #VBW 3.0 MHz* Sweep 1.000 ms (5001 pts)										
FRES DV	1.0 10112		#4044	3.0 WIHZ			Sweep	1	Joor hts)		