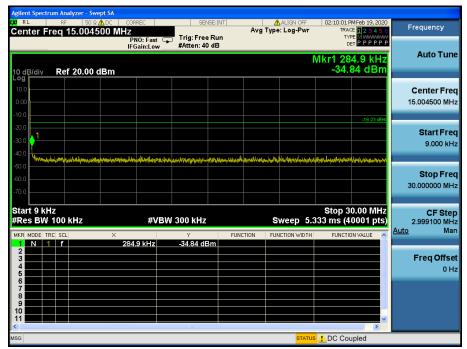
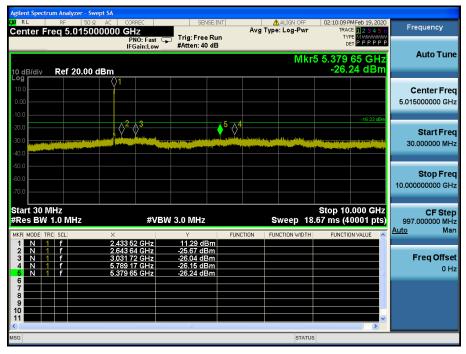
#### TM 2 & Middle

#### Reference







Agilent Spectrum Analyzer - Swept SA					
<b>LXI</b> RF 50 Ω AC	CORREC		ALIGN AUTO Avg Type: Log-Pwr	09:42:26 AM Feb 20, 2020 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.00 dBm		Free Run n: 30 dB	Mkr4 1	6.536 625 GHz -32.97 dBm	Auto Tune
10.0					Center Freq 17.50000000 GHz
-20.0 -30.0 -40.0				-16.23 dBm	<b>Start Freq</b> 10.000000000 GHz
-60.0					<b>Stop Freq</b> 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	#VBW 3.0 N	1Hz Functio		Stop 25.000 GHz .00 ms (40001 pts) FUNCTION VALUE	CF Step 1.50000000 GHz <u>Auto</u> Man
2 N 1 f 22.286 3 N 1 f 21.757 4 N 1 f 16.536 5 S	5 125 GHz -30.2 1 000 GHz -30.4	85 dBm 17 dBm 12 dBm 17 dBm			Freq Offset 0 Hz
6					
MSG	m		STATUS	>	

### TM 2 & Highest

#### Reference



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



Agilent Spectrum Analyzer - Swe			• · · · · · · · · · · · · · · ·		
w RL RF 50 Ω / Center Freq 15.0045	00 MHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr	02:30:30 PM Feb 19, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P P	Frequency
10 dB/div Ref 20.00 d	IFGain:Low	Atten: 30 dB		48.52 dBm	Auto Tune
10.0 0.00					Center Free 15.004500 MH
-20.0 -30.0 -40.0 × 1				-15.54 dBm	Start Free 9.000 kH:
-50.0	น่องสราชการโอยไรการไขยายใหญ่เป็นไปเรื่อมหัวยังเรื่องเหตุมี	nerickiewane folginaniewaliwał	da tis finin jan faitur interation for fold yan jaar it on filinge	eranhari qoʻlancha kanarhadi solor ashsan dan	<b>Stop Fre</b> 30.000000 MH
Start 9 kHz #Res BW 100 kHz	#VB	N 300 kHz	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	<b>CF Ste</b> j 2.999100 MH Auto Ma
1 N 1 F 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	282.7 kHz	-48.52 dBm		FUNCTION VALUE	<b>Freq Offse</b> 0 H
6					
11 <				×	

	50 Ω AC CORREC	SENSE:INT		ALIGN OFF	02:30:39 PM Feb 19, 2020	Frequency
Center Freq 5.015	50000000 GHz PNO: Fast ⊂ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg I	/pe:Log-Pwr	TRACE 123456 TYPE MWWWWW DET PPPPP	Troquency
10 dB/div Ref 20.0		Atten. oo db		Mkr	5 3.289 94 GHz -36.75 dBm	Auto Tune
Log 10.0 0.00 -10.0					-15.54 dBm	Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0			3		a a start a st	Start Freq 30.000000 MHz
-50.0					Millerberganz Leen, J. aus (Verlit) (Location Minister et al.	<b>Stop Freq</b> 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VBI	W 3.0 MHz		Sweep 18.	Stop 10.000 GHz 67 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	× 2.455 95 GHz	۲ 11.42 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 F 3 N 1 F 4 N 1 F 5 N 1 F	3.318 85 GHz 6.353 72 GHz 2.533 72 GHz 3.289 94 GHz	-36.64 dBm -36.68 dBm -36.72 dBm -36.75 dBm				<b>Freq Offset</b> 0 Hz
7 8 9 10						
<pre>11</pre>					>	
MSG				STATUS		

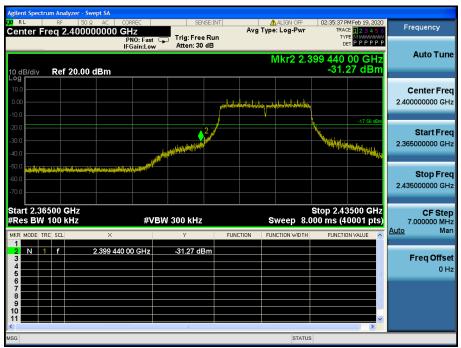
RL RE	yzer - Swept SA 50 Ω AC CORREC	SENSE: IN	П	ALIGN OFF	02:30:47 PM Feb 19, 20	120
enter Freq 17	7.500000000 GHz PNO: Fa IFGain:L	ast 🕞 Trig: Free Rur ow Atten: 30 dB		Type: Log-Pwr	TRACE 234 TYPE MWAMA DET PPPP	MAP -
0 dB/div <b>Ref</b> :	20.00 dBm			Mkr3 2	4.135 625 GH -29.10 dBi	
og 10.0 0.00					-15.54 d	Center Fre 17.500000000 G⊢
0.0			n tig an a statistic first tig a super-	La collega da collega d		Start Fre 10.000000000 GF
0.0						<b>Stop Fre</b> 25.00000000 GH
tart 10.000 G⊦ Res BW 1.0 M		≠VBW 3.0 MHz		Sweep 40.	Stop 25.000 GH 00 ms (40001 pt	(S) 1.50000000 GH
KR MODE TRC SCL	× 24.754 000 GH	y z -28.28 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 N 1 f	24.235 000 GH 24.135 625 GH	z -28.91 dBm				Freq Offso 0 ⊦
4						
4						
4 5 6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9					>	×

#### TM 3 & Lowest

#### Reference



#### Low Band-edge



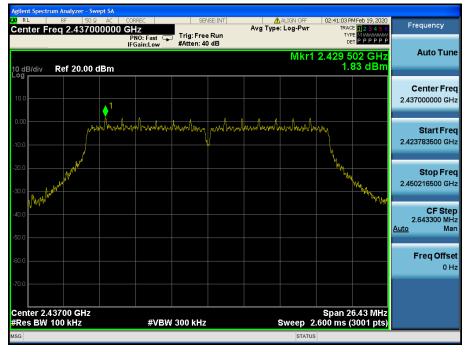
	pt SA					
RL RF 50 Ω2 Center Freq 15.0045		SENS	E:INT Ava	ALIGN OFF	02:35:44 PM Feb 19, 2020 TRACE 1 2 3 4 5 6	
Center Freq 15.0045	PNO: Fast IFGain:Low	, Trig: Free F Atten: 30 d	Run	iype. Log i m	TYPE MWWWWW DET P P P P P P	
10 dB/div Ref 20.00 d	IBm			ſ	Vkr1 281.9 kHz -48.47 dBm	
10.0 0.00 -10.0						Center Freq 15.004500 MHz
-20.0					-17.56 dBm	Start Freq
-30.0						9.000 kHz
-50.0	nini ell'ssipieritistanti america	aurphiations (Stationalistics)	Mahhhaloyatariatajahlayari	esst-opinional-loganci	ในปีว่าสาราชมาตรีสุขาวิวังระชุมีของประการใจ	Stop Freq
-70.0						30.000000 MHz
Start 9 kHz					04 00 00 MIL	
#Res BW 100 kHz	#V	BW 300 kHz		Sweep 5.3	Stop 30.00 MHz 33 ms (40001 pts)	2.999100 MHz
MKR MODE TRC SCL	#V × 281.9 kHz	BW 300 kHz -48.47 dBr	FUNCTION	Sweep 5.3 FUNCTION WIDTH		2.999100 MHz Auto Mar
1 N 1 F 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Х	Y			33 ms (40001 pts)	2.999100 MHz Auto Man Freq Offset
MKR MODE TRC SCL 1 N 1 f 2 3 4 4 5 6 7 7	Х	Y			33 ms (40001 pts)	2.999100 MHz Auto Man Freq Offset
MKR     MODE     TRC     SCL       1     N     1     F       2     -     -     -       3     -     -     -       4     -     -     -       5     -     -     -       6     -     -     -       7     -     -     -       9     -     -     -       10     -     -     -	Х	Y			33 mš (40001 pts)	2.999100 MHz Auto Man Freq Offset
MKR MODE TRC SCL 1 N 1 f 2 3 4 5 5 6 6 7 8 9	Х	Y			33 ms (40001 pts)	2.999100 MHz Auto Man

Agilent Spectrum Analyzer - Swept SA (X) RL RF 50 Ω AC CORI			02:35:53 PM Feb 19, 2020	Frequency
	0: Fast 😱 Trig: Free Run	Avg Type: Log-Pwr 1	TRACE 123456 TYPE MWWWWW DET P P P P P P	Trequency
IFG	ain:Low Atten: 30 dB	841		Auto Tune
10 dB/div Ref 20.00 dBm		IVIKI	5 3.142 88 GHz -36.63 dBm	
Log 10.0				Center Freq
0.00				5.015000000 GHz
-10.0			-17.56 dBm	
-20.0	25	۸4		Start Freq
-40.0			a series and the series of the	30.000000 MHz
-50.0	And the second se	A REAL PROPERTY AND A REAL		
-60.0				Stop Freq 10.000000000 GHz
-70.0				10.00000000 9112
Start 30 MHz #Res BW 1.0 MHz	#VBW 3.0 MHz	Sween 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz
MKRI MODEL TRCI SCL X	Y USER OLD WHITE	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2.415 82 2 N 1 f 2.389 40				
3 N 1 f 2.980 87 4 N 1 f 5.814 34	'GHz -36.41 dBm			Freq Offset
5 N 1 f 3.142 86	GHz -36.63 dBm		=	0 Hz
7				
9				
11			~	
MSG		STATUS		



#### TM 3 & Middle

#### Reference



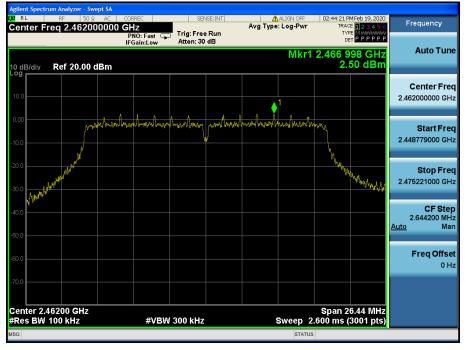
Agilent Spectrum Analyzer	r - Swept SA 50 Ω 🔥 DC CORREC	SENSE:IN	т	ALIGN OFF	02:41:10 PM Feb 19, 2020	
Center Freq 15.0		Trig: Free Run	Avg	Type: Log-Pwr	TRACE 12345 TYPE WWWWWW DET PPPPP	Frequency
10 dB/div Ref 20	.00 dBm	whiten: 40 dB		1	//kr1 305.9 kHz -38.23 dBm	Auto Tune
10.0						Center Freq 15.004500 MHz
-20.0 -30.0 - 1	an managari dan sa dijatan wita dan sa tikan		all to contra	antha a thing a star	-18.17 dBm	Start Freq 9.000 kHz
-50.0 -60.0 -70.0		stallanaugusperinteniingi perinteniingi perinteniingi perinteniingi perinteniingi perinteniingi perinteniingi p				Stop Freq 30.000000 MHz
Start 9 kHz #Res BW 100 kHz	: #V	BW 300 kHz	FUNCTION	Sweep 5.3	Stop 30.00 MHz 33 ms (40001 pts)	2.999100 MHz Auto Mar
1 N 1 f 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	305.9 kHz	-38.23 dBm				Freq Offset 0 Hz
6 7 8 9 10 11					~	
< MSG				STATUS	DC Coupled	



Agilent Spectrum Analyzer -						
XU RF 50	)Ω AC CORREC	SENSE:IN	Avg Typ	ALIGNAUTO e: Log-Pwr	09:45:22 AM Feb 20, 2020 TRACE 1 2 3 4 5	Frequency
	PNO: Fas IFGain:Lo		1	Mkr3.1	DET P N N N N	Auto Tupo
10 dB/div Ref 20.0	0 dBm			WIKIO I	-32.83 dBm	
10.0						Center Freq
-10.0						17.500000000 GHz
-20.0		3		^2	-18.17 dBr	Start Freq
-30.0						10.000000000 GHz
-50.0						Stop Freq
-60.0						25.000000000 GHz
Start 10.000 GHz					Stop 25.000 GHz	
#Res BW 1.0 MHz		/BW 3.0 MHz			00 ms (40001 pts	Auto Man
MKR MODE TRC SCL	× 24.705 625 GHz	۲ -27.40 dBm	FUNCTION FU	NCTION WIDTH	FUNCTION VALUE	
2 N 1 f 3 N 1 f 4	21.694 375 GHz 16.552 750 GHz	-30.65 dBm -32.83 dBm			_	Freq Offset 0 Hz
6 7 8						
9						
11		ш			<u>&gt;</u>	
<mark>nsg</mark>				STATUS		

### TM 3 & Highest

#### Reference



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



Agilent Spectrum Analyzer - Sv					
Center Freq 15.004	Ω≜DC CORREC	SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	02:44:55 PM Feb 19, 2020 TRACE 12 3 4 5 6	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB		DET PPPP	
				Mkr1 281.9 kHz	Auto Tune
10 dB/div Ref 20.00	dBm			-46.74 dBm	
10.0					Center Freq
0.00					15.004500 MHz
-10.0					
-20.0				-17.50 dBm	Otent From
-30.0					Start Freq 9.000 kHz
-40.0 1					9.000 KH2
-50.0					
-60.0	, between the the second of th	had and product the second states and the se	Unterteration of the second state of the	elendre la consumer en antital ancon	Stop Freq
-70.0					30.000000 MHz
Start 9 kHz #Res BW 100 kHz	#\/	3W 300 kHz	Sween 5	Stop 30.00 MHz 333 ms (40001 pts)	CF Step 2.999100 MHz
MKR MODE TRC SCL				FUNCTION VALUE	Auto Man
1 N 1 f	× 281.9 kHz	-46.74 dBm	INCTION FUNCTION WIDTH	FUNCTION VALUE	
2					Freq Offset
4					0 Hz
5					
7 8					
9					
10				~	
<		III		>	
MSG			STATUS	s 1. DC Coupled	

Agilent Spectrum Analyz						
Center Freq 5.0	50 Ω AC CORREC	SENSE:INT	ALIO	g-Pwr TRACE	123456	Frequency
	PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB		DET Mkr5 3.083 0		Auto Tune
10 dB/div Ref 2	0.00 dBm			-36.8	2 dBm	
10.0 0.00						Center Freq 5.015000000 GHz
-20.0					-17.50 dBm	
-30.0	2_5_		<b>∂</b> <sup>3</sup> <b>∂</b> 4			Start Freq 30.000000 MHz
-50.0 10.01000 pinting pinting the						Stop Freq
-60.0 -70.0						0.000000000 GHz
Start 30 MHz #Res BW 1.0 MH	lz #VB	W 3.0 MHz	Swee	Stop 10.0 ep 18.67 ms (40	001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	× 2.468 16 GHz	Y F 9.40 dBm	UNCTION FUNCTIO	N WIDTH FUNCTION	VALUE	<u>uto</u> Man
2 N 1 f 3 N 1 f	2.468 16 GHz 2.637 40 GHz 5.808 36 GHz 6.444 20 GHz	-36.56 dBm -36.69 dBm -36.77 dBm				Freq Offset
5 N 1 f	3.083 06 GHz	-36.82 dBm				0 Hz
8						
					~	
MSG				STATUS		

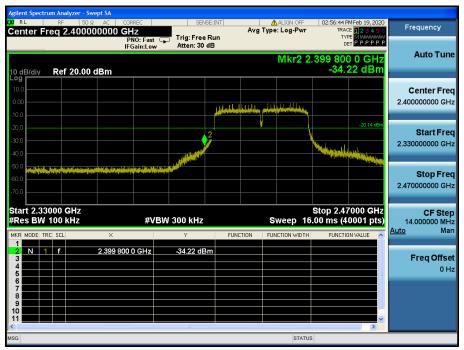
RL	RF 50	JΩ AC CORREC	SENS	E:INT	ALIGN OFF	02:45:12 PM Feb 19, 2	020
enter Fr	eq 17.50	0000000 GHz PNO: F	ast	Run	Type: Log-Pwr	TRACE 1234 TYPE MWAAA DET P P P P	www.
0 dB/div	Ref 20.0	IFGain: 0 dBm	Low Atten: 30 d	D	Mkr3 2	3.589 250 GI -30.55 dB	
<b>°g</b> 10.0							Center Fre 17.500000000 GH
20.0 30.0 40.0		المعاقد و بردین اظام از اس استان از اس استان از		Legennes (system of the sector of the		3	Start Fre 10.000000000 GH
io.o							
60.0 70.0							
10.0			#VBW 3.0 MHz		Sweep 40.	Stop 25.000 G 00 ms (40001 p	25.00000000 GH
tart 10.00 Res BW	1.0 MHz	X	Y	FUNCTION	Sweep 40.	Stop 25.000 G 00 ms (40001 p FUNCTION VALUE	Stop Fre       25.00000000 GH       1z       CF Ste       1.500000000 GH       Auto
tart 10.00 Res BW	1.0 MHz c scl f		+z -28.62 dBr +z -29.03 dBr	n n		.00 ms (40001 p	25.00000000 GH 15 1.50000000 GH Auto Ma
tart 10.00 Res BW KR MODE TR 1 N 1 2 N 1 3 N 1 4	1.0 MHz c scl f	× 24.119 125 GH 24.719 500 GH	+z -28.62 dBr +z -29.03 dBr	n n		.00 ms (40001 p	25.00000000 GH 12 CF Ste 1.50000000 GH <u>Auto</u> Ma Freq Offse
tart 10.00 Res BW KR MODE TR 1 N 1 2 N 1 3 N 1 4 5 5 6 7 7 8	1.0 MHz c scl f	× 24.119 125 GH 24.719 500 GH	+z -28.62 dBr +z -29.03 dBr	n n		.00 ms (40001 p	25.00000000 GH (S) CF Ste 1.50000000 GH <u>Auto</u> Ma Freq Offse

#### TM 4 & Lowest

#### Reference



#### Low Band-edge



Agilent Spectru										
Center Fre		500 MHz	NO:Fast		SE:INT		ALIGN OFF : Log-Pwr	TRAC	MFeb 19, 2020 E 1 2 3 4 5 6 PE M W 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	Frequency
			NO: Fast G Gain:Low	Atten: 30	dB					Auto Tune
10 dB/div	Ref 20.00	dBm						45.8 Vikr1	1.9 kHz 89 dBm	
Log 10.0										Center Freq
0.00										15.004500 MHz
-10.0									-20.14 dBm	
-20.0										Start Freq
-40.0										9.000 kHz
-50.0	ماليتور ومعالمة	t administration and a distant	مر بين مريد ال	land of the states of the	يري الاستقاد الم	I staturne mikitalia	a to be the state of a tag	aata Antoiside	the short-off former after short-of	04-m E
-60.0	and the second									Stop Freq 30.000000 MHz
-70.0										
Start 9 kHz #Res BW 1			#\/B\	N 300 kHz			weep 5.3		0.00 MHz	CF Step
MKR MODE TRO		X	#404	Y JOU KH2	FLIN		VCTION WIDTH			2.999100 MHz <u>Auto</u> Man
1 N 1 2			.9 kHz	-45.89 dE						
3										Freq Offset
4 5									=	0 Hz
6 7										
8 9										
10									~	
K MSG				Ш			CTATIO	DC Cou		
mag							STATUS		ipied	

Agilent Spectrum Analyzer - Swept SA					
RL RF 50 Ω AC CO Conter Freq 5.015000000 G	Hz	Avg Type	ALIGN OFF	02:57:00 PM Feb 19, 2020 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast Trig: Free FGain:Low Atten: 30				
10 dB/div Ref 20.00 dBm			Mkr5 (	6.279 20 GHz -36.07 dBm	Auto Tune
10.0					Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0		5		-20.14 dBm	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0					<b>Stop Freq</b> 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VBW 3.0 MHz	s	S weep 18.67	top 10.000 GHz ′ ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL X	Y 52 GHz 6.69 dE		NCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 2.394 3 N 1 f 2.767 4 N 1 f 3.138	63 GHz -25.00 dE 51 GHz -35.96 dE 40 GHz -36.00 dE 20 GHz -36.07 dE	m m		3	<b>Freq Offset</b> 0 Hz
7 8 9 10 11					
MSG			STATUS	>	



#### TM 4 & Middle

#### Reference



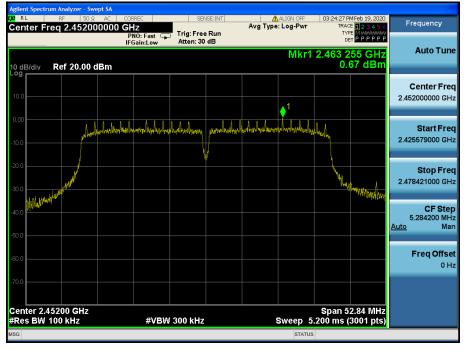
gilent Spectrum Analyzer						
RL RF Senter Freq 15.00	50 Ω ⚠ DC CORREC D4500 MHz PNO: Fast	SENSE: IN	Avg T	ALIGN OFF	03:18:40 PM Feb 19, 2020 TRACE 1 2 3 4 5 6 TVPE MWWWWW	Frequency
10 dB/div Ref 20.0	IFGain:Lov			ſ	<sup>рет</sup> РРРРР Mkr1 281.9 kHz -48.25 dBm	Auto Tuno
10.0						Center Fre 15.004500 M⊦
20.0 30.0 40.0 1					-20.68 dBm	<b>Start Fre</b> 9.000 k⊢
50.0	مەرىپىرىيە بەرمەرىيە بەرمەرىيە بەرمەرىيە بەرمەرىيە ئارىلىرىيە بەرمەرىيەر بەرمەرىيەر بەرمەرىيەر بەرمەرىيەر بەرمەر	มะการสรีสารางกระสำเสรีงกระการให้สามการ	den her andere den der	en la fraisceach d'h seann a	dfodarnadfogd fordiktarsarrats	Stop Fre 30.000000 MH
tart 9 kHz Res BW 100 kHz	#\ ×	′BW 300 kHz	FUNCTION	Sweep 5.3	Stop 30.00 MHz 333 ms (40001 pts)	CF Ste 2.999100 Mł <u>Auto</u> Mł
1 N 1 f 2 3 4 5	281.9 kHz	-48.25 dBm				Freq Offs 0 F
6 7 8 9 10						
					>	

Agilent Spectrum Analyzer - S		OFNOSUNIT	A 41 JON OFF		
Center Freg 5.015		SENSE:INT	ALIGN OFF	03:18:49 PM Feb 19, 2020 TRACE 1 2 3 4 5 6	Frequency
ochter rreg o.oro	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB	• •	TYPE MWWWWW DET PPPPP	
	IFGain:Low	Atten: 50 dB	Miles		Auto Tune
	• ·=		IVIKE	5 3.144 38 GHz -36.31 dBm	
10 dB/div Ref 20.00	0 dBm			-30.31 0.511	
10.0	()				Center Fre
0.00	ĭ				5.015000000 GH
10.0					0.01000000000
				-20.68 dBm	
20.0	2,3,54			-20.00 0.011	Start Fre
-30.0	───¥t�³   <b>♦</b> ѷ <sup>₄</sup> ──				30.000000 MH
-40.0	And search the fringed in the same	and the response of the logical estimation	And a second	and the second se	
50.0 manufacture and the mail and the		No. of Concession, and the second		Million interaction and the state of the state	
-60.0					Stop Fre
-70.0					10.00000000 GH
-70.0					
Start 30 MHz				Stop 10.000 GHz	CF Ste
≇Res BW 1.0 MHz	#VBI	N 3.0 MHz	Sweep 18	.67 ms (40001 pts)	997.000000 MH
MKR MODE TRC SCL	X	Y F	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
1 N 1 f	2.429 78 GHz	6.01 dBm			
2 N 1 f 3 N 1 f	2.397 13 GHz 2.657 34 GHz	-31.47 dBm -35.41 dBm			Freq Offse
4 N 1 f	3.314 12 GHz	-36.08 dBm			0 -
5 N 1 f	3.144 38 GHz	-36.31 dBm			
7					
8					
10					
				×	
SG			STATUS		
			STATUS		

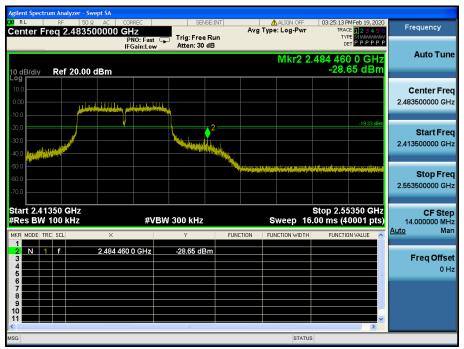
Agilent Spectrum Analyz					
Center Freq 17.	50 Ω AC CORREC .500000000 GHz PNO: Fast	SENSE:IN	Avg Type: Lo	g-Pwr TRACE	3456 Frequency
10 dB/div Ref 2	IFGain:Lov		Μ	er P P kr3 24.968 125 -29.38 c	GHz Auto Tune
Log 10.0 0.00 -10.0					<b>Center Freq</b> 17.500000000 GHz
-20.0 -30.0 -40.0		الدان أن يور و100 و11 ارتفاط المرافعة المرافعة المرافعة المرافعة المرافعة المرافعة المرافعة المرافعة المرافعة ا محروب ومرافع المرافعة		-21	<b>Start Freq</b> 10.000000000 GHz
-60.0					<b>Stop Freq</b> 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MH	IZ #V	BW 3.0 MHz		Stop 25.000 p 40.00 ms (4000	1 pts) 1.500000000 GHz
MKR MODE TRC SCL	× 24.977 500 GHz	ץ -28.59 dBm	FUNCTION FUNCTION	VIDTH FUNCTION VAL	
2 N 1 f 3 N 1 f 4 5	24.733 000 GHz 24.968 125 GHz	-29.22 dBm -29.38 dBm			Freq Offset 0 Hz
6 7 8 9 10 11					
<					<u>&gt;</u>
MSG				STATUS	

### TM 4 & Highest

#### Reference



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



Agilent Spectro	um Analyzer - Sv									
	RF 50 S eq 15.004	500 MHz	RREC		BE:INT		ALIGN OFF e: Log-Pwr	TRAC	MFeb 19, 2020	Frequency
		IF	NO: Fast G Gain:Low	Atten: 30				D		Auto Tune
10 dB/div	Ref 20.00	dBm					I		0.2 kHz 23 dBm	Auto Tune
Log 10.0										Center Freq
0.00										15.004500 MHz
-10.0									-19.33 dBm	
-20.0										Start Freq
-30.0										9.000 kHz
-50.0										
-60.0	hineral partentantintaled	hadro/fichiopent/exci	he is a subscript of the second s	marately states of the	nandari dari dari dari dari dari dari dari	elijistopenystitein	and work the parts	optantoristopstearty.	and the second	Stop Fred
-70.0										30.000000 MHz
Start 9 kH			49 (D)						0.00 MHz	CF Step
#Res BW		X	#VBI	N 300 kHz	<b>D</b> D I		weep 5.3	· ·		2.999100 MHz Auto Man
1 N 1			).2 kHz	-48.23 dB		LITON FO	NCTION WIDTH	FUNCTION	JN VALUE	
2 3										Freq Offset
4 5									а а	0 Hz
6 7										
8 9										
10									~	
<				Ш				• DO C		
ISG							STATUS	L DC Cou	ibied	

	um Analyzer - Swe						
Center Fr	RF 50 Ω reg 5.01500	AC CORREC	SENSE:IN	Avg 1	ALIGN OFF	03:25:29 PM Feb 19, 2020 TRACE 12 3 4 5 6	Frequency
10 dB/div	Ref 20.00 c	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB		Mkr	5 2.839 30 GHz -37.34 dBm	Auto Tune
10.0 0.00		1 					Center Freq 5.015000000 GHz
And a second	ار المربقة الم	<u>3</u> 52				-19.33 dBm	Start Freq 30.000000 MHz
-50.0							<b>Stop Freq</b> 10.000000000 GHz
Start 30 N #Res BW	1.0 MHz	#VBI	N 3.0 MHz		Sweep 18	Stop 10.000 GHz 67 ms (40001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TR 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6 7 7 8 9 9 10 11 4	f f f f	× 2.463 93 GHz 3.319 10 GHz 2.645 88 GHz 5.779 20 GHz 2.839 30 GHz	Y 7.49 dBm 36.58 dBm 36.75 dBm 37.24 dBm 37.34 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
MSG					STATUS		





#### 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 1 000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

#### Test Configuration

Refer to the APPENDIX I.

#### Test Procedure

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

#### - KDB558074 D01v05r02 - Section 8.6

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

#### **Peak Measurement**

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

Frequency	RBW
9-150 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/D), where D is the duty cycle.
- 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 <sub>on</sub> (ms)	T <sub>on+off</sub> (ms)	Duty Cycle (D)	Duty Cycle Correction Factor (dB)
TM 1	5.5 Mbps	1.652	1.850	0.893 0	0.49
TM 2	6 Mbps	1.364	1.562	0.873 2	0.59
TM 3	MCS 0	1.276	1.474	0.865 7	0.63
TM 4	MCS 0	0.636	0.836	0.761 2	1.19

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

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

#### Test Results: Comply

#### Test Notes.

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

Margin = Limit – Result / Result = Reading + T.F + DCCF + DCF / T.F = AF + CL – 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 3 m to 1 m. In this case, the distance factor(-9.54 dB) is applied to the result.

Calculation of distance factor = 20 log( applied distance / required distance ) = 20 log( 1 m / 3 m ) = -9.54 dB When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.67	Н	Х	PK	51.02	5.24	N/A	N/A	56.26	74.00	17.74
Lowoot	2 389.58	Н	Х	AV	41.03	5.24	0.49	N/A	46.76	54.00	7.24
Lowest	4 823.84	Н	Z	PK	50.40	1.58	N/A	N/A	51.98	74.00	22.02
	4 823.74	Н	Z	AV	39.06	1.58	0.49	N/A	41.13	54.00	12.87
Middle	4 873.73	Н	Z	PK	49.83	1.82	N/A	N/A	51.65	74.00	22.35
WILCOLE	4 873.99	Н	Z	AV	39.27	1.82	0.49	N/A	41.58	54.00	12.42
	2 483.92	Н	Х	PK	52.43	5.79	N/A	N/A	58.22	74.00	15.78
Highost	2 483.75	Н	Х	AV	41.95	5.79	0.49	N/A	48.23	54.00	5.77
Highest	4 924.40	Н	Z	PK	49.99	2.10	N/A	N/A	52.09	74.00	21.91
	4 924.29	Н	Z	AV	39.37	2.10	0.49	N/A	41.96	54.00	12.04

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



Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.91	н	Х	PK	53.61	5.24	N/A	N/A	58.85	74.00	15.15
Lowest	2 389.90	Н	Х	AV	41.62	5.24	0.59	N/A	47.45	54.00	6.55
Lowest	4 823.72	Н	Z	PK	50.01	1.58	N/A	N/A	51.59	74.00	22.41
	4 823.68	Н	Z	AV	38.81	1.58	0.59	N/A	40.98	54.00	13.02
Middle	4 874.23	Н	Z	PK	49.63	1.83	N/A	N/A	51.46	74.00	22.54
wildule	4 874.38	Н	Z	AV	39.08	1.83	0.59	N/A	41.50	54.00	12.50
	2 483.76	н	Х	PK	58.06	5.79	N/A	N/A	63.85	74.00	10.15
Highest	2 483.59	Н	Х	AV	45.40	5.79	0.59	N/A	51.78	54.00	2.22
	4 924.12	Н	Z	PK	49.70	2.10	N/A	N/A	51.80	74.00	22.20
	4 924.39	Н	Z	AV	39.22	2.10	0.59	N/A	41.91	54.00	12.09

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

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.84	н	Х	PK	56.78	5.24	N/A	N/A	62.02	74.00	11.98
Lowest	2 389.81	Н	Х	AV	42.44	5.24	0.63	N/A	48.31	54.00	5.69
Lowest	4 824.09	Н	Z	PK	49.63	1.58	N/A	N/A	51.21	74.00	22.79
	4 823.90	Н	Z	AV	38.92	1.58	0.63	N/A	41.13	54.00	12.87
Middle	4 874.34	Н	Z	PK	49.41	1.83	N/A	N/A	51.24	74.00	22.76
wildule	4 874.24	Н	Z	AV	39.16	1.83	0.63	N/A	41.62	54.00	12.38
	2 483.62	Н	Х	PK	58.41	5.79	N/A	N/A	64.20	74.00	9.80
Highest	2 483.82	Н	Х	AV	44.91	5.79	0.63	N/A	51.33	54.00	2.67
	4 923.65	Н	Z	PK	50.34	2.10	N/A	N/A	52.44	74.00	21.56
	4 923.59	Н	Z	AV	39.40	2.10	0.63	N/A	42.13	54.00	11.87



## Radiated Spurious Emissions data(9 kHz ~ 25 GHz) : TM 4

Tested Frequency	Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
	2 389.75	Н	Х	PK	52.40	5.24	N/A	N/A	57.64	74.00	16.36
Lowest	2 389.87	Н	Х	AV	41.36	5.24	1.19	N/A	47.79	54.00	6.21
Lowesi	4 844.12	Н	Z	PK	49.47	1.70	N/A	N/A	51.17	74.00	22.83
	4 844.39	Н	Z	AV	39.06	1.70	1.19	N/A	41.95	54.00	12.05
Middle	4 874.07	Н	Z	PK	49.76	1.82	N/A	N/A	51.58	74.00	22.42
wilddie	4 874.33	Н	Z	AV	38.99	1.83	1.19	N/A	42.01	54.00	11.99
	2 484.29	Н	Х	PK	55.67	5.79	N/A	N/A	61.46	74.00	12.54
	2 484.04	Н	Х	AV	43.67	5.79	1.19	N/A	50.65	54.00	3.35
Highest	4 904.02	Н	Z	PK	49.29	2.05	N/A	N/A	51.34	74.00	22.66
	4 904.14	Н	Z	AV	39.00	2.05	1.19	N/A	42.24	54.00	11.76

### 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.

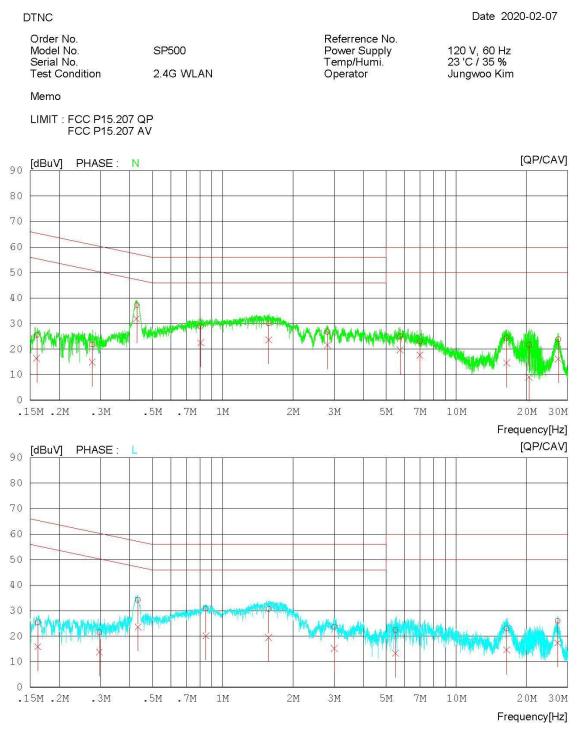


#### RESULT PLOTS

#### AC Line Conducted Emissions (Graph)

Test Mode: TM 2 & 2462 MHz

## **Results of Conducted Emission**



#### AC Line Conducted Emissions (List)

Test Mode: TM 2 & 2 462 MHz

DTNC

# **Results of Conducted Emission**

Date 2020-02-07

Order No. Model No. Serial No. Test Condition	SP500 2.4G WLAN	Referrence No. Power Supply Temp/Humi. Operator	120 V, 60 Hz 23 'C / 35 % Jungwoo Kim
Memo			

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

NC	FREQ [MHz]	READING QP CAV [dBuV] [dBuV	C.FACTOR ] [dB]	RESULT QP CAV [dBuV][dBuV	QP	IMIT CAV /] [dBuV	QP CAV	PHASE /]
1	0.16000	15.63 6.45	9.94	25.5716.39	65.46	55.46	39.8939.07	N
2	0.27634	11.84 5.00	9.94	21.7814.94	60.93	50.93	39.1535.99	Ν
3	0.42853	27.23 21.97	9.95	37.1831.92	57.28	47.28	20.1015.36	Ν
4	0.80472	18.85 12.52	9.97	28.8222.49	56.00	46.00	27.18 23.51	Ν
5	1.57576	20.10 13.68	10.01	30.1123.69	56.00	46.00	25.89 22.31	N
6	2.81300	16.77 11.61	10.07	26.84 21.68	56.00	46.00	29.1624.32	Ν
7	5.74926	14.93 9.53	10.18	25.11 19.71	60.00	50.00	34.8930.29	Ν
8	6.99122	12.81 7.47	10.22	23.0317.69	60.00	50.00	36.97 32.31	N
9	16.43038	13.77 4.13	10.51	24.2814.64	60.00	50.00	35.7235.36	Ν
10	20.49996	11.14 -1.53	10.56	21.70 9.03	60.00	50.00	38.3040.97	Ν
11	27.34187	13.18 5.43	10.70	23.8816.13	60.00	50.00	36.1233.87	Ν
12	0.16170	15.47 5.93	9.94	25.4115.87	65.38	55.38	39.9739.51	L
13	0.29677	11.61 3.82	9.94	21.5513.76	60.33	50.33	38.7836.57	L
14	0.43421	24.21 13.71	9.95	34.1623.66	57.17	47.17	23.01 23.51	L
15	0.84819	20.9510.17	9.96	30.9120.13	56.00	46.00	25.09 25.87	L
16	1.57277	20.64 9.47	10.01	30.6519.48	56.00	46.00	25.35 26.52	L
17	3.00755	13.69 5.18	10.06	23.7515.24	56.00	46.00	32.25 30.76	L
18	5.50267	12.19 3.07	10.18	22.37 13.25	60.00	50.00	37.6336.75	L
19	16.42981	12.55 4.12	10.48	23.0314.60	60.00	50.00	36.9735.40	L
20	27.16056	15.32 6.67	10.67	25.9917.34	60.00	50.00	34.01 32.66	L

## 9. LIST OF TEST EQUIPMENT

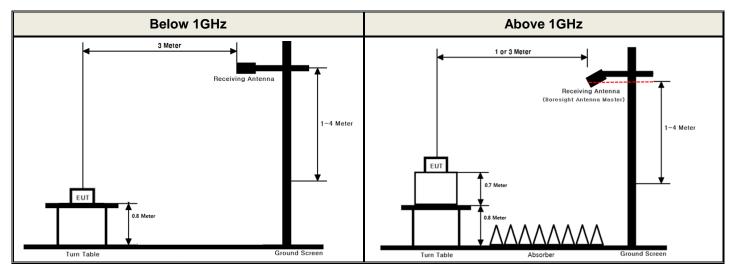
Туре	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY50410357
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48011700
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY46471251
Multimeter	FLUKE	17B	19/12/16	20/12/16	26030065WS
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/07/03	20/07/03	N/A
HYGROMETER	TESTO	608-H1	20/01/21	21/01/21	34862883
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
BILOG ANTENNA	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Horn Antenna	ETS-Lindgren	3115	19/01/11	21/01/11	9202-3820
Horn Antenna	A.H.Systems Inc.	SAS-574	19/07/03	21/07/03	155
PreAmplifier	tsj	MLA-0118-B01-40	19/12/16	20/12/16	1852267
PreAmplifier	tsj	MLA-1840-J02-45	19/06/27	20/06/27	16966-10728
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
Attenuator	Aeroflex/Weinschel	20515	19/06/27	20/06/27	Y2370
Attenuator	SMAJK	SMAJK-2-3	19/06/27	20/06/27	2
Attenuator	SRTechnology	F01-B0606-01	19/06/27	20/06/27	13092403
Attenuator	Hefei Shunze	SS5T2.92-10-40	19/06/27	20/06/27	16012202
Attenuator	SMAJK	SMAJK-50-10	19/08/07	20/08/07	15081901
High Pass Filter	Wainwright Instruments	WHNX8.0/26.5-6SS	19/06/27	20/06/27	3
High Pass Filter	Wainwright Instruments	WHKX12-935-1000- 15000-40SS	19/06/26	20/06/26	8
High Pass Filter	Wainwright Instruments	WHKX10-2838-3300- 18000-60SS	19/06/26	20/06/26	1
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2496A MA2411B	19/12/16	20/12/16	1338004 1306053
EMI Receiver	ROHDE&SCHWARZ	ESW44	19/07/30	20/07/30	101645
EMI Test Receiver	Rohde Schwarz	ESCI7	20/01/20	21/01/20	100910
PULSE LIMITER	Rohde Schwarz	ESH3-Z2	19/09/17	20/09/17	101333
LISN	SCHWARZBECK	NNLK 8121	19/03/19	20/03/19	06183
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-04
Cable	Junkosha	MWX241	20/01/13	21/01/13	G-07
Cable	DT&C	Cable	20/01/13	21/01/13	G-13
Cable	DT&C	Cable	20/01/13	21/01/13	G-14
Cable	HUBER+SUHNER	SUCOFLEX 104	20/01/13	21/01/13	G-15
Cable	Radiall	TESTPRO3	20/01/16	21/01/16	M-01
Cable	Junkosha	MWX315	20/01/16	21/01/16	M-05
Cable	Junkosha	MWX221	20/01/16	21/01/16	M-06
Cable	DT&C	Cable	20/01/16	21/01/16	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.

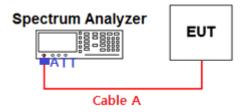
## **APPENDIX I**

#### Test set up diagrams

#### Radiated Measurement



#### Conducted Measurement



#### Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	9.25	15	12.39
1	9.43	20	13.73
2.412 & 2.437 & 2.462	9.73	25	15.20
5	10.30	-	-
10	11.12	-	-

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

## **APPENDIX II**

### Duty cycle plots

#### Test Procedure

**Duty Cycle** 

#### Duty Cycle was measured using section 6.0 b) of KDB558074 D01V05R02 :

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

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

#### TM 1 Frequency Avg Type: Log-Pwr Trig: Free Run Atten: 36 dB PNO: Fast IFGain:Low Auto Tune AMkr? Ref 25.00 dBm Center Freq 2.437000000 GH Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz Center 2.437000000 GHz Res BW 8 MHz CF Step Span 0 Hz Sweep 10.00 ms (10001 pts) #VBW 50 MHz 8.000000 Mar Auto 16.85 *(*Δ) Freq Offset $(\Delta)$ -0.22 dE 16.85 dBn 0 Hz

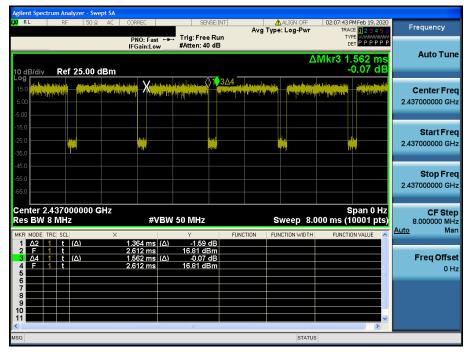
1 & Middle

# **Dt&C**

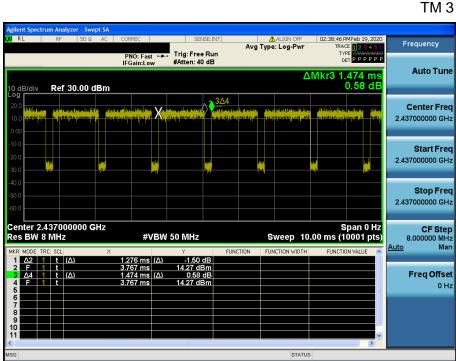
## TM 2 &

& Middle

#### **Duty Cycle**



#### & Middle



#### Agilen (X) R

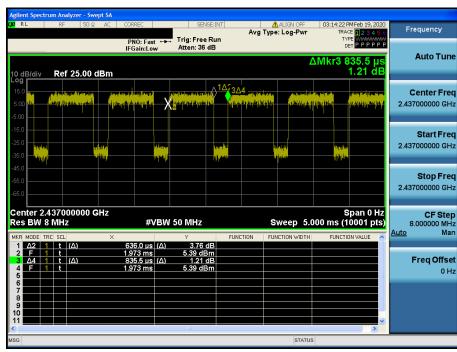
**Duty Cycle** 



**Duty Cycle** 

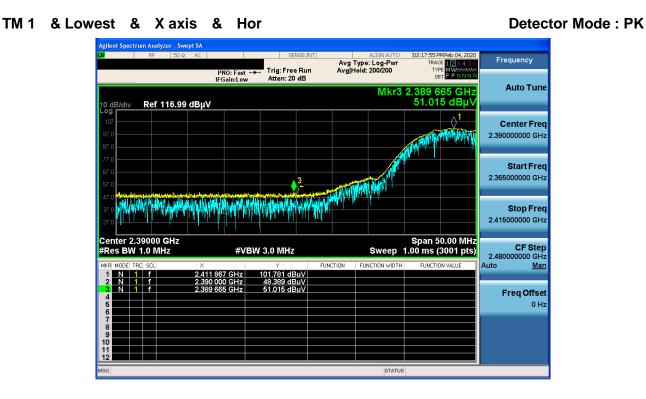
#### TM 4

& Middle



## APPENDIX III

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



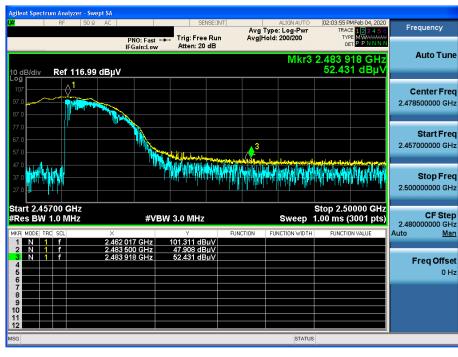
TM 1 & Lowest & X axis & Hor





#### TM 1 & Highest & X axis & Hor





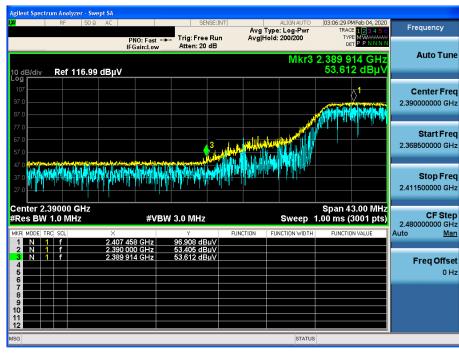
#### TM 1 & Highest & X axis & Hor





#### TM 2 & Lowest & X axis & Hor





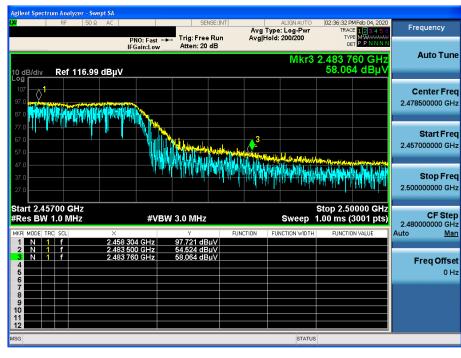
#### TM 2 & Lowest & X axis & Hor





#### TM 2 & Highest & X axis & Hor

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



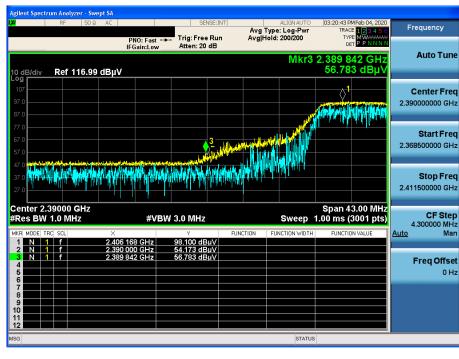
#### TM 2 & Highest & X axis & Hor





#### TM 3 & Lowest & X axis & Hor





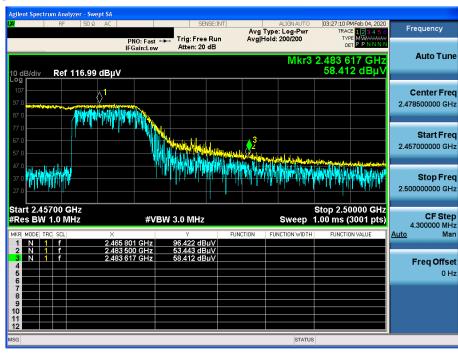
#### TM 3 & Lowest & Xaxis & Hor

#### gilent Spectrum Analyzer - Swept SA Frequency Avg Type: RMS Avg|Hold: 200/200 Trig: Free Run Atten: 20 dB DET PNO: Fast • IFGain:Low Auto Tune Mkr3 2.389 814 GH: 42.435 dBµ\ Ref 116.99 dBµV 10 dB/div ٥ç **Center Freq** 2.390000000 GHz $\Diamond^{1}$ Start Freq 2.368500000 GHz 3 Stop Freq 2.411500000 GHz Center 2.39000 GHz #Res BW 1.0 MHz Span 43.00 MHz 1.00 ms (3001 pts) CF Step 4.300000 MHz #VBW 3.0 MHz\* Sweep Man <u>Auto</u> 42.048 dBµ∖ 42.435 dBµ∖ 2.389 814 GHz Ñ Freq Offset 0 Hz STATUS

# **Dt&C**

#### TM 3 & Highest & X axis & Hor





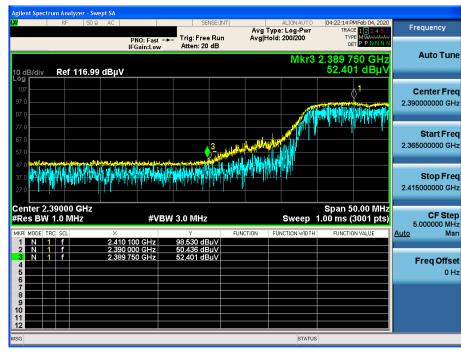
#### TM 3 & Highest & X axis & Hor





#### TM 4 & Lowest & X axis & Hor





#### TM 4 & Lowest & X axis & Hor

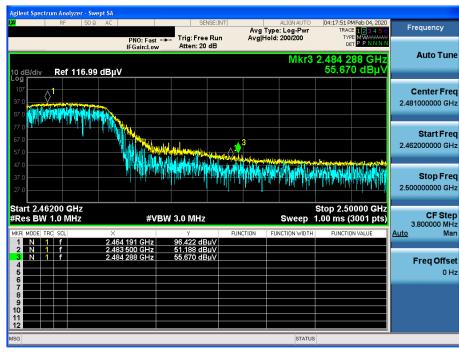




# **Dt&C**

#### TM 4 & Highest & X axis & Hor





#### TM 4 & Highest & X axis & Hor

#### ilent Spectrum Analyzer - Swept SA Frequency Avg Type: RMS Avg|Hold: 200/200 Trig: Free Run Atten: 20 dB DET PNO: Fast + IFGain:Low Auto Tune Mkr3 2.484 035 GH2 43.674 dBµ\ Ref 116.99 dBµV 0 dB/div **Center Freq** 01 2.481000000 GHz Start Freq 2.462000000 GHz **⊘∂**3 Stop Freq 2.500000000 GHz Start 2.46200 GHz #Res BW 1.0 MHz Stop 2.50000 GHz 1.00 ms (3001 pts) CF Step 3.800000 MHz #VBW 3.0 MHz\* Sweep Man <u>Auto</u> 43.074 dBµ∖ 43.674 dBµ∖ 2.484 035 GHz N Freq Offset 0 Hz STATUS

#### TM 1 & Highest & Zaxis & Hor





TM 2 & Highest & Zaxis & Hor





#### TM 3 & Highest & Zaxis & Hor





TM 4 & Highest & Zaxis & Hor



