

14 SPURIOUS RADIATED EMISSION TEST

Standard Applicable 14.1

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. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.

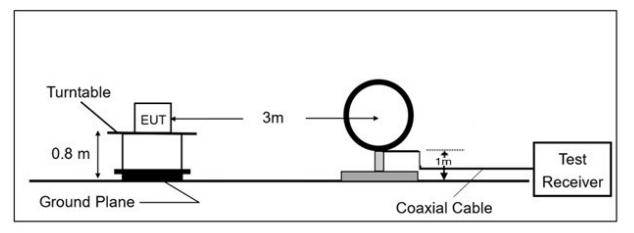
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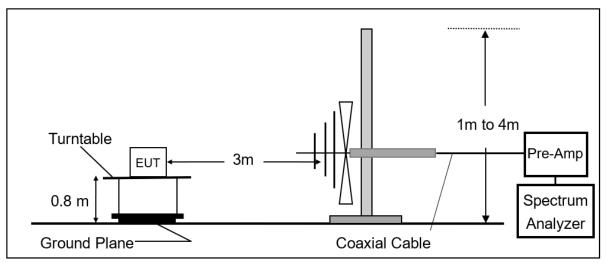


14.2 **Test Setup**

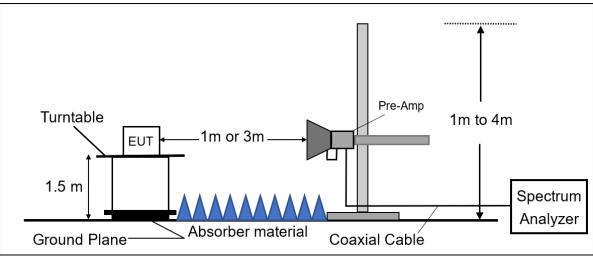
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



(C) Radiated Emission Test Set-Up, Frequency Above 1GHz.



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14.3 **Measurement Procedure**

- The testing follows the Measurement Procedure of ANSI C63.10:2013. 1.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- The turn table shall rotate 360 degrees to determine the position of maximum emission 3. level.
- 4 EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- Set the spectrum analyzer as RBW=100 kHz and VBW=300 kHz for Peak Detector 5. (PK) at frequency between 30MHz and 1 GHz.
- 6. Use receiver mode as RBW=120 kHz for Quasi-peak (QP) at frequency between 30MHz and 1 GHz.
- Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Maximum Emission 7. Measurements at frequency above 1 GHz.
- According to C63.10:2013 Section 7.5 Procedure for determining the average value of 8. pulsed emissions with duty cycle correction factor 20 log (Ton/100ms).
- When measurement procedures for electric field radiated emissions above 1 GHz the EUT 9. measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 12. Repeat above procedures until all default test channel measured were complete.

14.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitu	le AG = Amplifier Gain
AF = Antenna Factor	

The limit of the emission level is expressed in dBuV/m, which converts 20*log(uV/m)

Actual FS(dB μ V/m) = SPA. Reading level(dB μ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

14.5 Test Results of Radiated Spurious Emissions from 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) & RSS-GEN §6.13.2 was not reported.

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14.6 AVG Duty Cycle Factor calculation

Bluetooth 1M

Time ON of 100ms:	73.000	ms		
Duty Cycle=73ms / 10	00ms= 0.1	73		
Duty Cycle correction	n factor=2	0 LOG 0	.73 = -2.73	3 dB

Internal antenna

Keysight Spectrum Analyzer - Swept SA			- @ <u>*</u>
M RL RF 50 Ω DC Center Freq 915.000000 Λ	AHz	04:06:52 PM Jun 25, 2 Avg Type: Log-Pwr TRACE	5 Frequency
10 dB/div Ref 0.00 dBm	PNO: Fast Trig: Free Run IFGain:Low Atten: 10 dB	۲۳۳۳ ۵۳۳ ΔMkr1 73.00 r 28.91 d	Auto Tune
-10.0		, <u>μ</u> 1Δ2	Center Freq 915.000000 MHz
-40.0 X2 -50.0			Start Freq 915.000000 MHz
-70.0			Stop Freq 915.000000 MHz
Center 915.000000 MHz Res BW 1.0 MHz	#VBW 1.0 MHz	Span 0 Sweep 100.0 ms (1001 p	Hz CF Step 1.000000 MHz Auto Man
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	73.00 ms (Δ) 28.91 dB 10.30 ms -39.77 dBm		Freq Offset
7 8 9 10 11			Scale Type
MSG	m	STATUS	

External antenna

Keysight Spectrum Analyzer - Swept SA RL RF 50 Ω DC Center Freq 915.000000	MHz PNO: Fast +++ Trig: Free Run	Avg Type: Log-Pwr	04:06:52 PM Jun 25, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWWW	Frequency
10 dB/div Ref 0.00 dBm	IFGain:Low Atten: 10 dB	Δ	Mkr1 73.00 ms 28.91 dB	Auto Tune
-10.0		• • • • • • • • • • • • • • • • • • •		Center Fre 915.000000 MH
-30.0 -40.0 -50.0 -60.0				Start Fre 915.000000 M⊦
-70.0				Stop Fre 915.000000 MH
Center 915.000000 MHz Res BW 1.0 MHz	#VBW 1.0 MHz	Sweep 1	Span 0 Hz 00.0 ms (1001 pts)	CF Ste 1.000000 Mł <u>Auto</u> Mł
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	73.00 ms (Δ) 28.91 dB 10.30 ms -39.77 dBm		E	Freq Offs 0 F
6 7 8 9 10				Scale Typ
		STATUS	• • • •	

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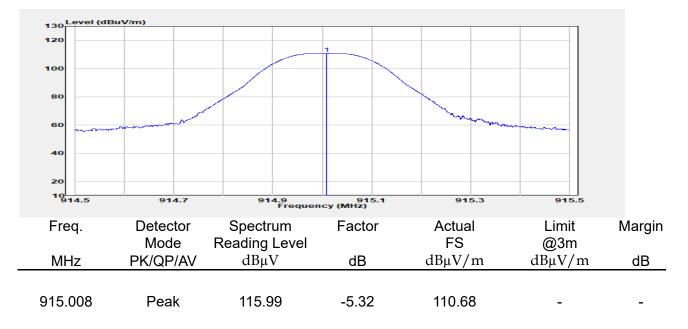


14.7 **Measurement Result:**

Main Result 14.7.1

Internal antenna

:TERF2406001611E2	Test Site	:SAC D
: FSK 50Kbps	Test Date	:2024-07-04
:915 MHz	Temp./Humi.	: 22 .4℃/54%
:Main	Antenna Pol.	:Vertical
:H Plane	Engineer	:Sam Huang
		: FSK 50Kbps Test Date :915 MHz Temp./Humi. :Main Antenna Pol.



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Report Numbe Operation Mod Test Frequenc Test Mode EUT Pol	de:FSK 50KI		Tes Ter Ant	st Date :20 np./Humi. :22 tenna Pol. :H		
130 Level (dBu	ıV/m)					
120						
100						
80				m l		
	a second and a second			mannen		
60	where the second s				Vinne	
40						
20						
10 914.5	914.7	914.9 Frequen	915.1 cy (MHz)	915.3	915.5	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
•	Mode F	Reading Level		FS	@3m	Ū
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
914.981	Peak	121.67	-5.32	116.35	-	-

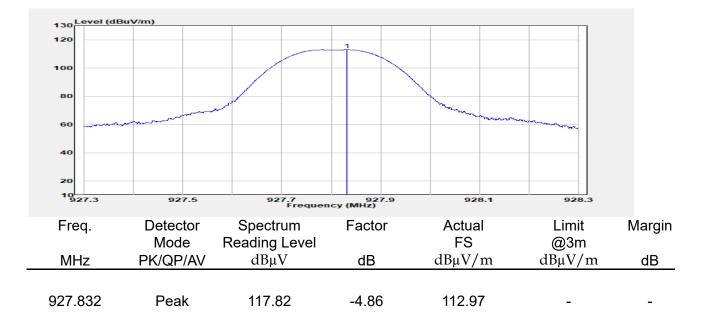
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External antenna

:TERF2406001611E2
: FSK 50Kbps
:927.8 MHz
:Main
:H Plane

Test Site	:SAC D
Test Date	:2024-07-04
Temp./Humi.	:22.4°C/54%
Antenna Pol.	:Vertical
Engineer	:Sam Huang



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Report Numb Operation Mo Test Frequend Test Mode EUT Pol	de FSK 50Kb	ops	Te Te Ar	est Date :2 emp./Humi. :2 ntenna Pol. :H		
130 Level (dB	uV/m)					
120			1			
100						
80						
	man			- marine		
60						
40						
40						
20						
10 927.3	927.5	927.7 Frequen	927.9 cy (MHz)	928.1	928.3	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
4.		Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
927.833	Peak	120.19	-4.86	115.33	-	-

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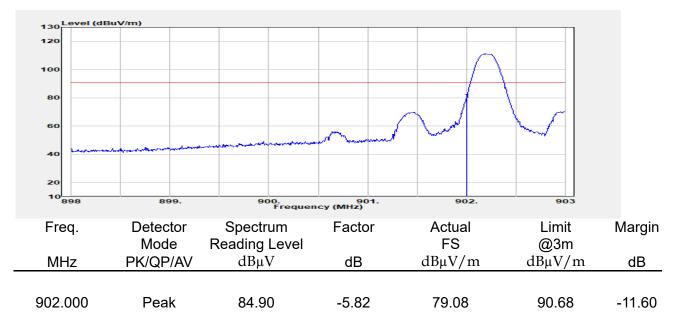
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14.7.2 **Bandedge Result**

Internal antenna

:TERF2406001611E2	Test Site	:SAC D
:FSK 50Kbps	Test Date	:2024-07-04
:902.2 MHz	Temp./Humi.	: 22.4℃/54%
:Bandedge	Antenna Pol.	:Vertical
:H Plane	Engineer	:Sam Huang
	0	:FSK 50KbpsTest Date:902.2 MHzTemp./Humi.:BandedgeAntenna Pol.



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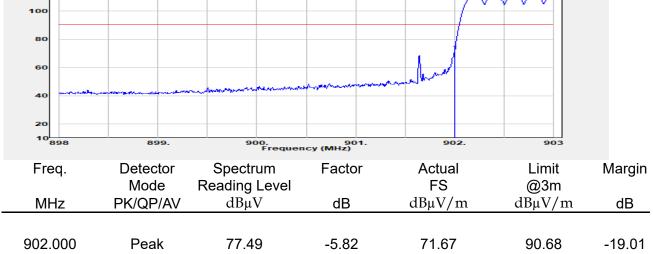
Report Numbe Operation Mod Test Frequency Test Mode EUT Pol	le :FSK 50k	Кbps Hz	ר ר <i>ו</i>	۲est Date :2 ۲emp./Humi. :2 Antenna Pol. :H		
Level (dBu)	V/m)					
130 Level (uBu)						
100				/		
80				1		
80						
60			10 A	/ June -	Ment	
mountain	mound	and a grand and the second second	w rendering			
40						
20						
10 898	899.	900.	901.	902.	903	
		900. Frequer	icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
902.000	Peak	91.14	-5.82	85.32	96.35	-11.03

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:TERF2406001611E2	Test Site	:SAC D
FSK 50Kbps	Test Date	:2024-07-04
:902.2 MHz	Temp./Humi.	:22.4°℃/54%
:Bandedge Hopping	Antenna Pol.	:Vertical
:H Plane	Engineer	:Sam Huang
m)		
	0 11 0	:FSK 50KbpsTest Date:902.2 MHzTemp./Humi.:Bandedge HoppingAntenna Pol.:H PlaneEngineer

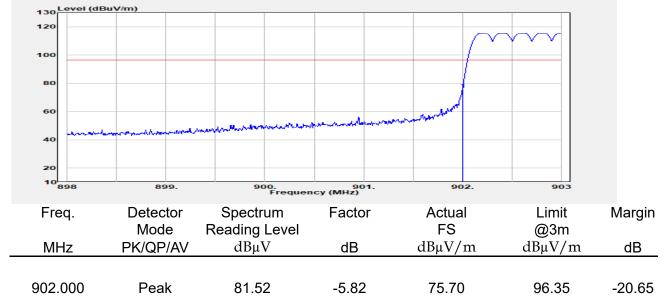


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Report Number	:TERF2406001611E2	Test Site	:SAC D
Operation Mode	:FSK 50Kbps	Test Date	:2024-07-04
Test Frequency	:902.2 MHz	Temp./Humi.	: 22.4℃/54%
Test Mode	:Bandedge Hopping	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Sam Huang



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Report Number Operation Mode Test Frequency Test Mode EUT Pol	•	Test Tem Ante	ip./Humi. :22.4 enna Pol. :Ver	4-07-04 4℃/54%	
130 Level (dBuV/n	m)				
120					
100					
80					
	/ N L L				
60		~			
40	the second se	und Whore man have been added			
40					
20					
10 927	928. 929	9. 930. Frequency (MHz)	931.	932	
Freq.	Detector Spectru		Actual	Limit	Margin
	Mode Reading L		FS	@3m	
MHz F	PK/QP/AV dBµV		dBµV/m	dBµV/m	dB
928.000	Peak 84.01	-4.86	79.15	90.68	-11.53

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Report Numbe Operation Mod Test Frequency Test Mode EUT Pol	le :FSK 50Kb	ops z	-	Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC D :2024-07-04 :22.4°C/54% :Horizontal :Sam Huang	
Level (dBu)	V/m)					
130						
	$ \cap $					
100	/ \					
80						
n n	$r \sim$	h				
60		manness in	mont			
40					montiment	
20						
10 927	928.	929. Frequen	930. cy (MHz)	931.	932	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
•	Mode	Reading Level		FS	@3m	Ū
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/n	n dB
928.000	Peak	90.05	-4.86	85.19	96.35	-11.16

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928.000

Peak

83.27

Report Numbe Operation Mod Test Frequency Test Mode EUT Pol	le :FSK 50k y :927.8 M	Kbps		Test Site Test Date Temp./Humi Antenna Po Engineer	:SAC D :2024-07-04 . :22.4℃/54% I. :Vertical :Sam Huang)
130 Level (dBu)	V/m)					
120						
	\sim					
100						
80						
60	time					
		and a manufacture and a second	moundar and			
40				and a second	ange ange de la galle de la	
20						
10927	928.	929.	930.	93	1. 93	2
_	D / /		cy (MHz)	A ()		
Freq.	Detector	Spectrum	Factor	Actual		
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/1	n dBµV/	m dB

-4.86

78.41

90.68

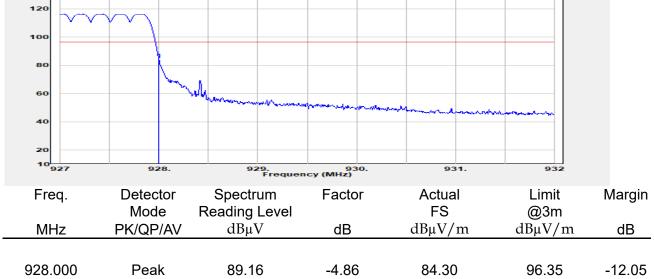
-12.27

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Report Number	:TERF240600161	1E2	Test	Site	:SAC	D
Operation Mode	:FSK 50Kbps		Test	Date	:2024	-07-04
Test Frequency	:927.8 MHz		Tem	p./Humi.	:22.4	°C /54%
Test Mode	:Bandedge Hoppi	ng	Ante	enna Pol.	:Horiz	zontal
EUT Pol	:H Plane		Engi	neer	:Sam	Huang
130 Level (dBuV/m	n)					

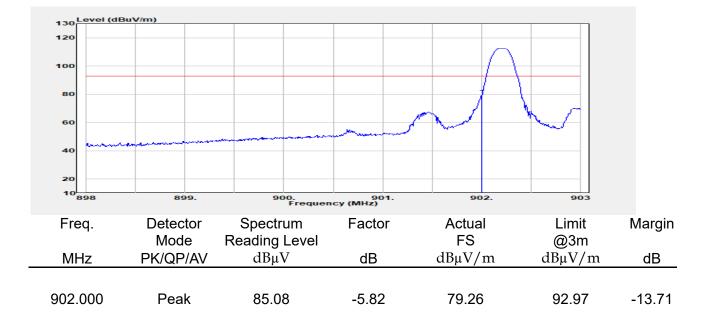




External antenna

Report Number	:TERF2406001611E2
Operation Mode	:FSK 50Kbps
Test Frequency	:902.2 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC D
Test Date	:2024-07-04
Temp./Humi.	:22.4°C/54%
Antenna Pol.	:Vertical
Engineer	:Sam Huang



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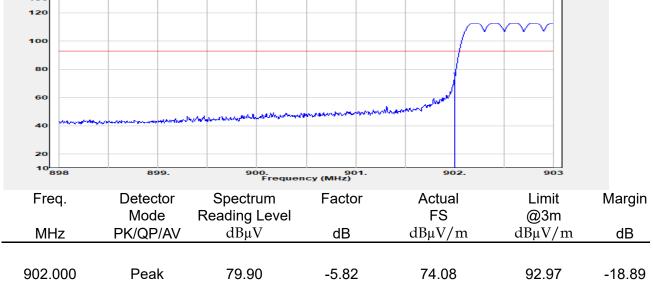


Report Numbe Operation Moo Test Frequenc Test Mode EUT Pol	de :FSK 50k	(bps Hz	Te Te Ar	st Date :20 mp./Humi. :22 itenna Pol. :Ho		
Level (dBu	V(m)					
130						
120						
100				/ \		
80				1		
60			m	- Comment		
mantak		- marrier and a marrier and	the molecular			
40						
20						
10 898	899.	900. Frequer	901. icy (MHz)	902.	903	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	margin
		•	dD		-	٩D
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
902.000	Peak	88.10	-5.82	82.28	95.33	-13.05

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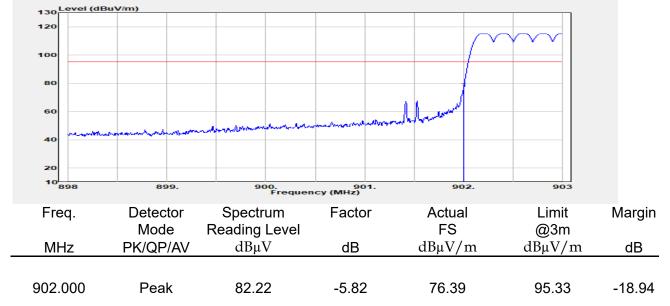
Report Number	:TERF240600161	1E2	Test	Site	:SAC D
Operation Mode	:FSK 50Kbps		Test	Date	:2024-07-04
Test Frequency	:902.2 MHz		Tem	p./Humi.	:22.4°C/54%
Test Mode	:Bandedge Hoppin	ıg	Ante	nna Pol.	:Vertical
EUT Pol	:H Plane		Engi	neer	:Sam Huang
130 Level (dBuV/n	n)				



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Report Number	:TERF2406001611E2	Test Site	:SAC D
Operation Mode	:FSK 50Kbps	Test Date	:2024-07-04
Test Frequency	:902.2 MHz	Temp./Humi.	:22.4°C/54%
Test Mode	:Bandedge Hopping	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:Sam Huang



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Report Numbe Operation Mod Test Frequenc Test Mode EUT Pol	le :FSK 50K	bps Iz	-	Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC D :2024-07-04 :22.4℃/54% :Vertical :Sam Huang	
130 Level (dBu	V/m)					
120						
100						
80	1					
60		m n				
40				man and a marken where	- martine	
40						
20						
10 927	928.	929. Frequen	930. cy (MHz)	931.	932	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
·	Mode	Reading Level		FS	@3m	Ū
MHz	PK/QP/AV	dBµV	dB	dBµV/m	n dBµV/n	n dB
928.000	Peak	86.08	-4.86	81.22	92.97	-11.75

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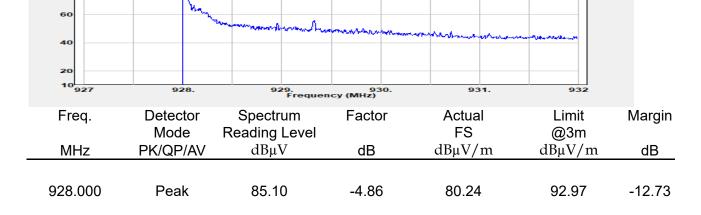
Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :FSK 50Kb	ops z	ד ד <i>ב</i>	Fest Site Fest Date Femp./Humi. Antenna Pol. Engineer	:SAC D :2024-07-04 :22.4°C/54% :Horizontal :Sam Huang	
130 Level (dBuV	/m)					
120						
	\cap					
100	+					
80	\mathcal{F}					
60	- Vara	Δ				
40			server warden we	March Harrow march		
40						
20						
10 927	928.	929. Frequen	930. cy (MHz)	931.	932	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Reading Level		FS	@3m	_
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	u dB
928.000	Peak	88.40	-4.86	83.54	95.33	-11.79

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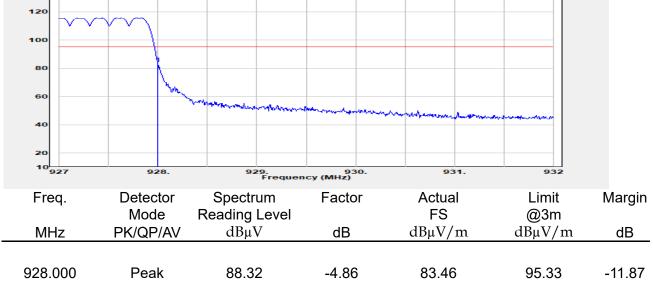
Report Number	:TERF2406001611E2	Test Site	:SAC D	
Operation Mode	e :FSK 50Kbps	Test Date :2024-07-0		
Test Frequency	:927.8 MHz	Temp./Humi. ∶22.4℃/54%		
Test Mode	:Bandedge Hopping	Antenna Pol. :Vertical		
EUT Pol	:H Plane	Engineer	:Sam Huang	
130 Level (dBuV/	m)			
120	\sim			
100				
80				



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Report Number	:TERF2406001611	E2	Test Site	:SAC D
Operation Mode	:FSK 50Kbps		Test Date	:2024-07-04
Test Frequency	:927.8 MHz		Temp./Humi.	:22.4°C/54%
Test Mode	:Bandedge Hopping	g	Antenna Pol.	:Horizontal
EUT Pol	:H Plane		Engineer	:Sam Huang
130 Level (dBuV/r	n)			



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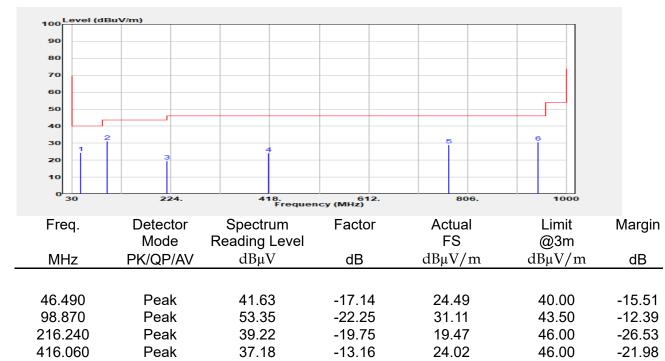
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14.7.3 Radiated Spurious Emission

Internal antenna

Report Number	:TERF2406001611E2	Test Site	:SAC D
Operation Mode	:FSK 50Kbps	Test Date	:2024-07-04
Test Frequency	:915 MHz	Temp./Humi.	:22.4°C/54%
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:Sam Huang



-6.80

-4.59

29.12

30.51

46.00

46.00

-16.88

-15.49

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35.92

35.10

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769.140

944.710

Peak

Peak



Report Numbe Operation Moe Test Frequenc Test Mode EUT Pol	de :FSK 50k	Kbps		Test Date Temp./Humi. Antenna Pol.		
100 Level (dBa 90 80 70 60 50 40 30 20 10 0 30	1V/m)	4 4 4 4 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	612. ccy (MHz)	806.		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
50.370 98.870 140.580 389.870 951.500 961.200	Peak Peak Peak Peak Peak Peak	34.63 41.90 32.91 41.21 34.38 34.62	-16.96 -22.25 -17.25 -13.76 -4.59 -4.29	17.67 19.66 15.66 27.45 29.79 30.33	40.00 43.50 43.50 46.00 46.00 54.00	-22.33 -23.84 -27.84 -18.55 -16.21 -23.67

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Report Numbe Operation Moo Test Frequenc Test Mode EUT Pol	de :FSK 50k	Kbps	-	Test Date : Temp./Humi. : Antenna Pol. :		
	2800.		3 4 3 4 6400. ency (MHz)	8200.		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1804.400 2706.600 5413.200 6315.400	Peak Peak Peak Peak	48.79 51.85 47.23 46.31	-7.91 -3.60 2.81 5.05	40.88 48.24 50.04 51.36	90.68 74.00 74.00 90.68	-49.80 -25.76 -23.96 -39.32
Freq. MHz	Detector Mode AV	Peak Actual FS (dBµV/m)	Duty Cycle Factor (dB)	Average Value (dBuV/m)	Average Limit@3m (dBuV/m)	Margin (dB)
2706.600 5413.200	Average Average	48.24 50.04	-2.73 -2.73	45.51 47.31	54.00 54.00	-8.49 -6.69

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Report Numbe	r :TERF24	06001611E2		Test Site	:SAC D	
Operation Mod	de :FSK 50k	Kbps		Test Date	:2024-07-01	
Test Frequenc	y :902.2 M	Hz		Temp./Humi.	:21.7℃/52%	
Test Mode	:Tx			Antenna Pol.		
EUT Pol	:H Plane			Engineer	:Sam Huang	
EUTFO				Engineer	.Sam nuany	
100 Level (dBu	V/m)					
90						
80						
70						
60			4			
50 40	2		3			
30						
20						
10						
0 1000	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
1001 100	D 1	40.77	7.04	44.00	00.05	54.40
1804.400 2706.600	Peak Peak	49.77 51.16	-7.91 -3.60	41.86 47.56	96.35 74.00	-54.49 -26.44
5413.200	Peak	40.88	-3.00	43.69	74.00	-20.44
6315.400	Peak	46.64	5.05	51.70	96.35	-44.65
Freq.	Detector	Peak Actual	Duty Cycle	•	Average	Margin
	Mode	FS	Factor		Limit@3m	
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2706.600	Average	47.56	-2.73	44.83	54.00	-9.17
2706.600 5413.200	Average Average	47.56 43.69	-2.73 -2.73	44.83 40.96	54.00 54.00	-9.17 -13.04
J T 13.200	Average	40.00	-2.13	40.30	54.00	-13.04

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Report Numbe Operation Mod					SAC D 2024-07-03	
Test Frequence	y :915 MHz	2	Ţ	ſemp./Humi. ::	22.1℃/53%	
Test Mode	:Tx		ŀ	Antenna Pol. :'	Vertical	
EUT Pol	:H Plane		E	Engineer :	Sam Huang	
100 Level (dBu	iV/m)	1 1	1 1			
90 80 70 60 50						
40	1 2		4			
20						
10						
1000	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1830.000	Peak	49.68	-7.87	41.80	90.68	-48.88
2745.000	Peak	46.60	-3.97	42.64	74.00	-31.36
5490.000	Peak	48.80	2.08	50.88	90.68	-39.80
6405.000	Peak	39.77	6.00	45.78	90.68	-44.90
Freq.	Detector Mode	Peak Actual FS	Duty Cycle Factor	Average Value	Average Limit@3m	Margin
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2745.000	Average	42.64	-2.73	39.91	54.00	-14.09

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Report Numbe	r :TERF24	06001611E2		Test Site	:SAC D	
Operation Mod	le :FSK 50K	lbps		Test Date	:2024-07-03	
Test Frequency	y :915 MHz	· ·		Temp./Humi.	:22.1℃/53%	
Test Mode	, Tx:			Antenna Pol.		
EUT Pol	:H Plane				:Sam Huang	
LOTIO				Lighteer	.oann ndang	
100 Level (dBu)	V/m)					
90 80 70 60						
50 40 30	2					
20						
0	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level	i dotoi	FS	@3m	margin
MHz	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
1830.000	Peak	49.56	-7.87	41.69	96.35	-54.66
2745.000 5490.000	Peak Peak	47.29 46.56	-3.97 2.08	43.32 48.64	74.00 96.35	-30.68 -47.71
6405.000	Peak	39.96	6.00	45.97	96.35	-47.71
0403.000	Fean	39.90	0.00	45.97	90.55	-30.30
Freq.	Detector	Peak Actual	Duty Cycle	e Average	Average	Margin
	Mode	FS	Factor	Value	Limit@3m	
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2745.000	Average	43.32	-2.73	40.59	54.00	-13.41

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Report Number Operation Moo Test Frequence Test Mode EUT Pol	de :FSK 50k	lbps	ד ד ק	Antenna Pol.	:SAC D :2024-07-03 :22.1℃/53% :Vertical :Sam Huang	
	2800.	4600. Freque	3 3 4 4 6400. ency (MH2)	8200.		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1855.600 2783.400 5566.800 6494.600	Peak Peak Peak Peak	49.57 44.71 53.42 37.86	-7.84 -4.09 2.04 5.24	41.74 40.61 55.46 43.10	90.68 74.00 90.68 90.68	-48.94 -33.39 -35.22 -47.58
Freq. MHz	Detector Mode AV	Peak Actual FS (dBµV/m)	Duty Cycle Factor (dB)	Average Value (dBuV/m)	Average Limit@3m (dBuV/m)	Margin (dB)
2783.400	Average	40.61	-2.73	37.88	54.00	-16.12

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Report Numbe	r :TERF24	06001611E2	-	Test Site	:SAC D	
Operation Mod	le :FSK 50K	lbps	-	Test Date	:2024-07-03	
Test Frequency	y :927.8 Mł	Hz	-	Temp./Humi.	:22.1℃/53%	
Test Mode	; :Tx			Antenna Pol.		
EUT Pol	:H Plane				:Sam Huang	
			•	Linginoer	Carrindang	
100 Level (dBu)	V/m)					
90 80 70 60 50			3			
40 30 20	2		4			
10						
1000	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		dDµ V	dD			
1855.600	Peak	50.37	-7.84	42.54	96.35	-53.81
2783.400	Peak	47.61	-4.09	43.52	74.00	-30.48
5566.800	Peak	47.40	2.04	49.44	96.35	-46.91
6494.600	Peak	38.36	5.24	43.60	96.35	-52.75
Freq.	Detector Mode	Peak Actual FS	Duty Cycle Factor	Average Value	Average Limit@3m	Margin
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2783.400	Average	43.52	-2.73	40.79	54.00	-13.21

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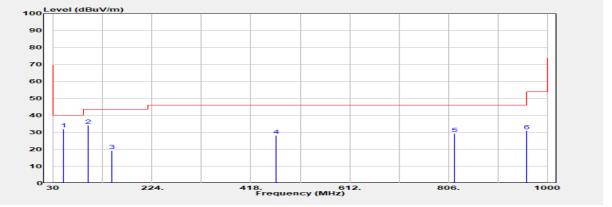
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External antenna

:TERF2406001611E2
:FSK 50Kbps
:915 MHz
:Tx
:H Plane

Test Site	:SAC D
Test Date	:2024-07-03
Temp./Humi.	:21.7°C/52%
Antenna Pol.	:Vertical
Engineer	:Sam Huang



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
 MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
50.370	Peak	48.83	-16.96	31.87	40.00	-8.13
98.870	Peak	56.33	-22.25	34.09	43.50	-9.41
144.460	Peak	35.93	-16.67	19.26	43.50	-24.24
467.470	Peak	40.14	-12.02	28.12	46.00	-17.88
817.640	Peak	35.74	-6.40	29.35	46.00	-16.65
959.260	Peak	35.15	-4.27	30.88	46.00	-15.12

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Report Number	:TERF24	06001611E2		Test Site	:SAC D	
Operation Mode	:FSK 50K	lbps		Test Date	:2024-07-03	
Test Frequency	:915 MHz	2		Temp./Humi.	: 21.7° C/ 52%	
Test Mode	:Tx			Antenna Pol.	:Horizontal	
EUT Pol	:H Plane			Engineer	:Sam Huang	
100 Level (dBuV/ 90	'm)					
80						
70						
60						
40						
30		4		5	6	
20 2	3					
10						
30	224.	418. Frequen		806.	1000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	ı dB
		ασμν	чD	ασμνγιι	αυμν/Π	
50.370	Peak	39.78	-16.96	22.82	40.00	-17.18
97.900	Peak	41.98	-22.37	19.62	43.50	-23.88
191.990	Peak	39.50	-19.37	20.13	43.50	-23.37
394.720	Peak	41.95	-13.61	28.34	46.00	-17.66
815.700 988.360	Peak Peak	35.59 35.25	-6.45 -4.83	29.14 30.42	46.00 54.00	-16.86 -23.58
200.000		00.20		00.12	000	20.00

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Report Numbe Operation Moo Test Frequenc	de :FSK 50k	Kbps	Т		:SAC D :2024-07-01 :21.7℃/52%	
Test Mode	:Tx		A	Antenna Pol.	:Vertical	
EUT Pol	:H Plane		E	Engineer	:Sam Huang	
100 Level (dBu 90 80 70 60 50 40 30 20 10 0 1000	V/m)	4600. Freque	3 4 3 4 6400.	8200.		
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
				. ,	. ,	
1804.400	Peak	57.32	-7.91	49.41	92.97	-43.56
2706.600	Peak	47.12	-3.60	43.51	74.00	-30.49
5413.200	Peak	44.01	2.81	46.82	74.00	-27.18
6315.400	Peak	41.37	5.05	46.43	92.97	-46.54
Freq.	Detector Mode	Peak Actual FS	Duty Cycle Factor	Average Value	Average Limit@3m	Margin
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2706.600 5413.200	Average Average	43.51 46.82	-2.73 -2.73	40.78 44.09	54.00 54.00	-13.22 -9.91

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Report Numbe Operation Moe Test Frequenc Test Mode EUT Pol	de :FSK 50K	lbps	- - /	Test Date : Temp./Humi. : Antenna Pol. :		
	2800.	4600. Freque	3 4 3 4 6400. ency (MHz)	8200.		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
1804.400 2706.600 5413.200 6315.400	Peak Peak Peak Peak	55.40 52.28 44.19 42.43	-7.91 -3.60 2.81 5.05	47.49 48.68 47.00 47.48	95.33 74.00 74.00 95.33	-47.84 -25.32 -27.00 -47.85
Freq. MHz	Detector Mode AV	Peak Actual FS (dBµV/m)	Duty Cycle Factor (dB)	Average Value (dBuV/m)	Average Limit@3m (dBuV/m)	Margin (dB)
2706.600 5413.200	Average Average	48.68 47.00	-2.73 -2.73	45.95 44.27	54.00 54.00	-8.05 -9.73

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Report Numbe Operation Mod					SAC D 2024-07-03	
Test Frequenc		•	Т	[emp./Humi. :	22.1℃/53%	
Test Mode	; Tx			, Antenna Pol. :		
EUT Pol	:H Plane		E	Engineer :	Sam Huang	
100 Level (dBu	V/m)					
80 70 60						
50 1 40	2		3			
30						
10						
1000	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1830.000	Peak	52.22	-7.87	44.35	92.97	-48.62
2745.000 5490.000	Peak Peak	47.43 40.79	-3.97 2.08	43.47 42.87	74.00 92.97	-30.53 -50.10
6405.000	Peak	43.90	6.00	49.91	92.97	-43.06
0100.000	1 Out	10.00	0.00	10.01	02.07	10.00
Freq.	Detector	Peak Actual	Duty Cycle	Average	Average	Margin
	Mode	FS	Factor	Value	Limit@3m	
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2745.000	Average	43.47	-2.73	40.74	54.00	-13.26

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Report Number :TERF240	6001611E2	Т	est Site :	SAC D	
Operation Mode :FSK 50K	bps	Т	est Date :2	2024-07-03	
Test Frequency :915 MHz		Т	emp./Humi. :2	22.1℃/53%	
Test Mode :Tx		Α	ntenna Pol. :I	Horizontal	
EUT Pol :H Plane		F	Engineer :	Sam Huang	
		-		Bain naung	
100 Level (dBuV/m)					
90 80 70 60					
40 1 2		3			
30					
20					
10 0 1000 2800.	4600	6400	8200.	10000	
		6400. ency (MHz)			
Freq. Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	•			· · ·	
1830.000 Peak	54.20	-7.87	46.33	95.33	-49.00
2745.000 Peak	47.21	-3.97	43.24	74.00	-30.76
5490.000 Peak	42.83	2.08	44.91	95.33	-50.42
6405.000 Peak	43.28	6.00	49.28	95.33	-46.05
Freq. Detector Mode	Peak Actual FS	Duty Cycle Factor	Average Value	Average Limit@3m	Margin
MHz AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)

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Report Numbe Operation Moo Test Frequenc Test Mode	le :FSK 50k	(bps	T T			
EUT Pol	:H Plane				:Sam Huang	
100 Level (dBu 90 80 70 60 50 40 30 20 10 0 1000	V/m)	4600, Freque	3 3 4 4 6400. ency (MHZ)	8200.		
Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
1855.600 2783.400 5566.800 6494.600	Peak Peak Peak Peak	48.43 42.78 46.39 39.15	-7.84 -4.09 2.04 5.24	40.59 38.69 48.43 44.39	92.97 74.00 92.97 92.97	-52.38 -35.31 -44.54 -48.58
Freq. MHz	Detector Mode AV	Peak Actual FS (dBµV/m)	Duty Cycle Factor (dB)	Average Value (dBuV/m)	Average Limit@3m (dBuV/m)	Margin (dB)
2783.400	Average	38.69	-2.73	35.96	54.00	-18.04

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Report Numbe	r :TERF24	06001611E2		Test Site	:SAC D	
Operation Mod	le :FSK 50k	Kbps		Test Date	:2024-07-03	
Test Frequency	y :927.8 M	Hz		Temp./Humi.	:22.1℃/53%	
Test Mode	:Tx			Antenna Pol.	:Horizontal	
EUT Pol	:H Plane				:Sam Huang	
			I	Engineer	.oum muang	
100 Level (dBu	V/m)					
90 80 70 60 50			- - 3			
40 30 20	2		4			
10						
0	2800.	4600. Freque	6400. ency (MHz)	8200.	10000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	· ·
MHz	PK/QP/AV	dBμV	dB	dBµV/m	dBµV/m	dB
	Deels	FA 7 A	7.04	42.00	05.00	F4 40
1855.600 2783.400	Peak Peak	51.74 42.38	-7.84 -4.09	43.90 38.29	95.33 74.00	-51.43 -35.71
5566.800	Peak	49.93	2.04	51.97	95.33	-43.36
6494.600	Peak	38.54	5.24	43.78	95.33	-51.55
Freq.	Detector Mode	Peak Actual FS	Duty Cycle Factor	Average Value	Average Limit@3m	Margin
MHz	AV	(dBµV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
2783.400	Average	38.29	-2.73	35.56	54.00	-18.44

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15 ANTENNA REQUIREMENT

15.1 Standard Applicable

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

15.2 Antenna Connected Construction:

The antenna complies with this requirement and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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