

4.6. CONDUCTED SUPRIOUS EMISSION AND BAND EDGE

4.6.1. Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.6.2. Conformance Limit

According to FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

4.6.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.6.4. Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DSS channel center frequency.

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel.

Set the RBW = 100 kHz. Set the VBW \ge 3 x RBW.

Set Detector = peak. Set Sweep time = auto couple.

Set Trace mode = max hold. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum Maximum conduceted level.

Note that the channel found to contain the maximum conduceted level can be used to establish the reference level.

Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation Set RBW $\ge 1\%$ of the span=100kHz Set VBW \ge RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

■ Conduceted Spurious RF Conducted Emission

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.(30MHz to 26.5GHz). Set RBW = 100 kHz Set VBW \ge RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.



Report No. LP24120045C05-01 page 31 of 59

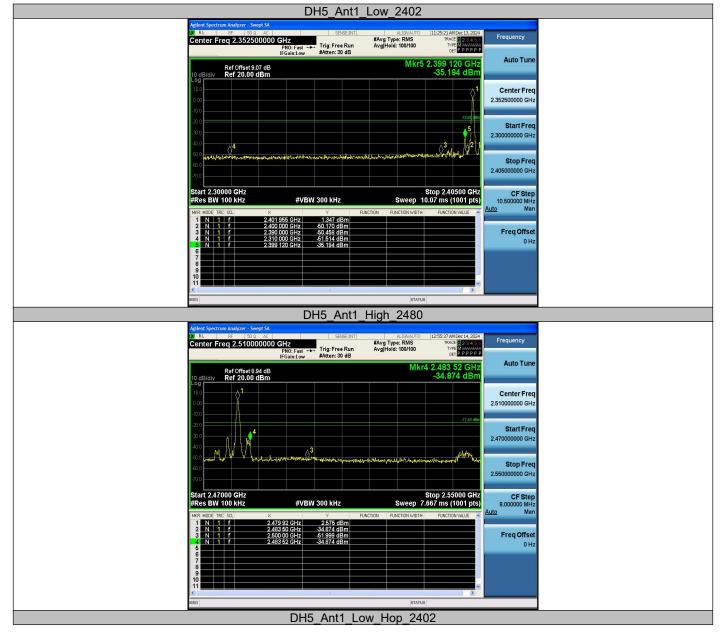
Test Results:

TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Low	2402	1.35	-35.19	≤-18.65	PASS
DH5	Ant1	High	2480	2.58	-34.87	≤-17.43	PASS
DHO	Anti	Low	Hop_2402	1.49	-35.43	≤-18.51	PASS
		High	Hop_2480	3.21	-37.88	≤-16.79	PASS
		Low	2402	1.13	-35.32	≤-18.87	PASS
2045	A n+1	High	2480	0.94	-39.66	≤-19.06	PASS
2DH5	Ant1	Low	Hop_2402	-0.70	-36.19	≤-20.7	PASS
		High	Hop_2480	3.24	-41.33	≤-16.76	PASS



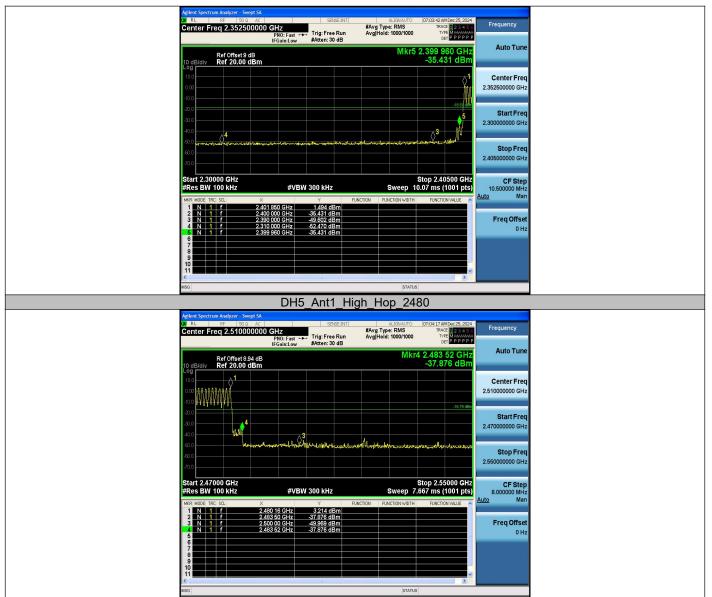
Report No. LP24120045C05-01 page 32 of 59

Test Graphs





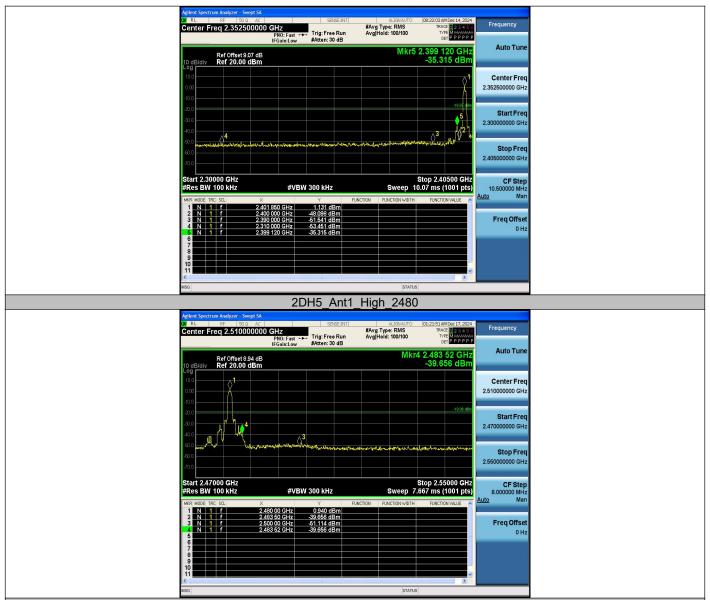
Report No. LP24120045C05-01 page 33 of 59



2DH5_Ant1_Low_2402



Report No. LP24120045C05-01 page 34 of 59



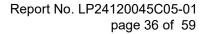
2DH5 Ant1 Low Hop 2402



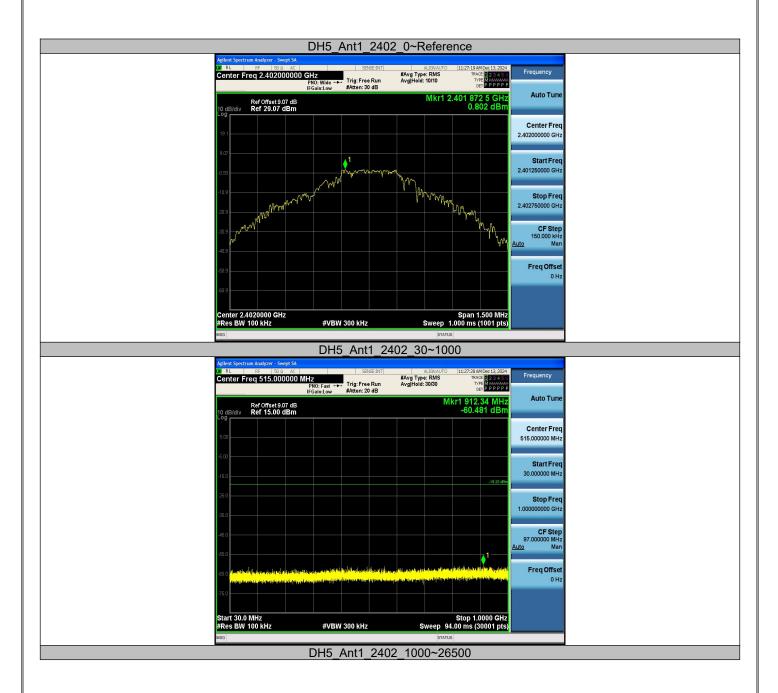
Report No. LP24120045C05-01 page 35 of 59

Agilent Spectrum Analyzer - Swep			
Aginer spectrum Analyzer swy ↓ R. R. F 50 2 Center Freq 2.352500	AC SENSE:INT	ALIGNAUTO 07:05:22 AM Dec 2 #Avg Type: RMS TRACE 2 Avg Hold: 1000/1000 TYPE MU DET P	5,2024 3 4 5 6 MMM P P P P
Ref Offset 9 di 10 dB/div Ref 20.00 di		Mkr5 2.399 960 -36.194 c	
			Center Freq 2.352500000 GHz
-20.0 -30.0 -40.0			52.300000000 GHz
40.0 60.0 -70.0	งามการแปละได้ที่ที่ที่ที่สุดของ หรือและสารสุดใหญ่ หรือเสียง เราะสารสารสารสาร	อาการขับอาการ	Stop Freq 2.405000000 GHz
Start 2.30000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.40500 Sweep 10.07 ms (1001	pts) 10.500000 MHz
MAR MODE TAC SL. 1 1 7 2 N 1 7 3 N 1 7 4 N 1 7 5 N 1 7 6 N 1 7	2 401 850 GHz 0.699 dBm 2 400 000 GHz 36 194 dBm 2 390 000 GHz 50.769 dBm 2 390 000 GHz 451 dBm 2 399 960 GHz 361 dBm	PUNCTION WIDTH PUNCTION VAL	Freq Offset
9 10 11			×
MSG	2DH5 Ant1 H	igh Hop 2480	
Aglent Spectrum Analyzer - Swej (1. R. 1. FP 150 2: Center Freq 2.510000	AC SENSE:INT	ALIGNAUTO 07:05:53 AM Dec 2 #Avg Type: RMS TRACE 12 Avg Hold: 1000/1000 TVPE Det 22	3456 Frequency
Ref Offset 8.94 10 dB/div Ref 20.00 d	4 dB	Mkr4 2.483 68 (-41.332 c	
			Center Freq 2.510000000 GHz
			Start Freq 2.470000000 GHz
400			2.55000000 GHz
Start 2.47000 GHz #Res BW 100 kHz IMSR MODEL TRC SOL	#VBW 300 kHz	Stop 2.55000 Sweep 7.667 ms (1001	pts) 8.000000 MHz
MRH MOLE THE SIL 1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 6 6 7	2,478 88 GHz 3,239 dBm 2,483 50 GHz 42,834 dBm 2,500 00 GHz 48,852 dBm 2,483 68 GHz 41,332 dBm	PUNCTION FUNCTION VAL	Freq Offset

STATUS

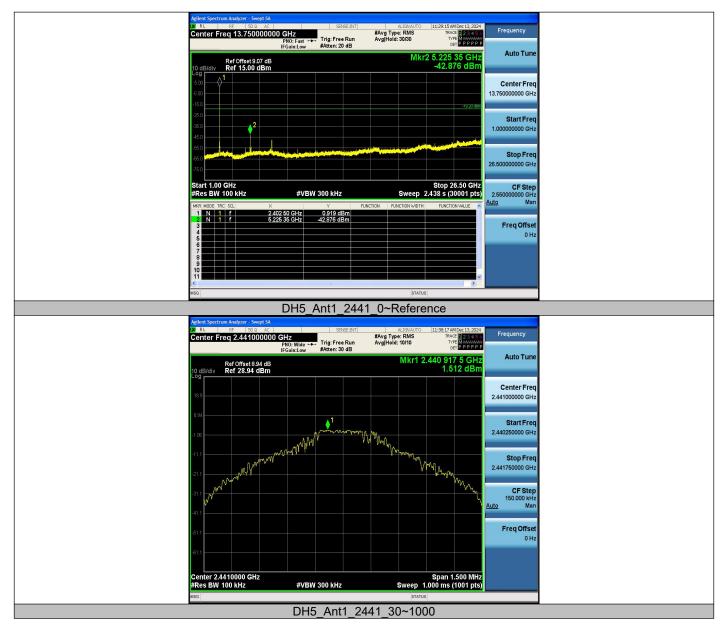






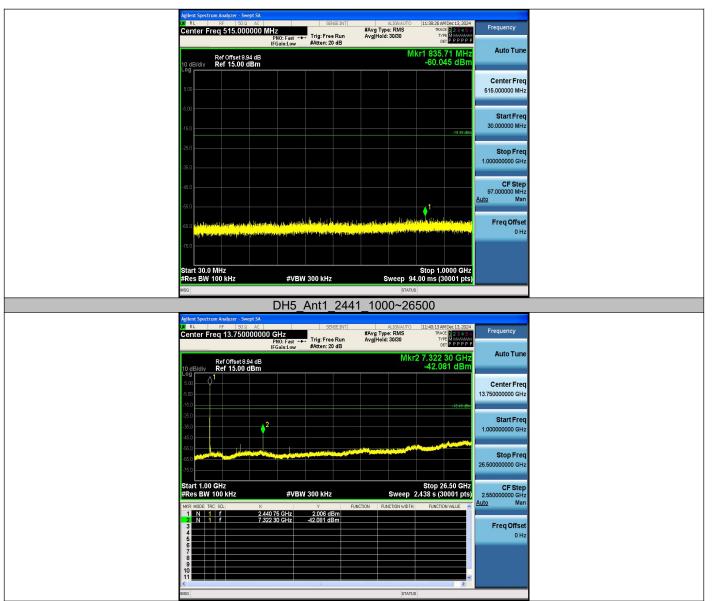


Report No. LP24120045C05-01 page 37 of 59





Report No. LP24120045C05-01 page 38 of 59



DH5_Ant1_2480_0~Reference



Report No. LP24120045C05-01 page 39 of 59





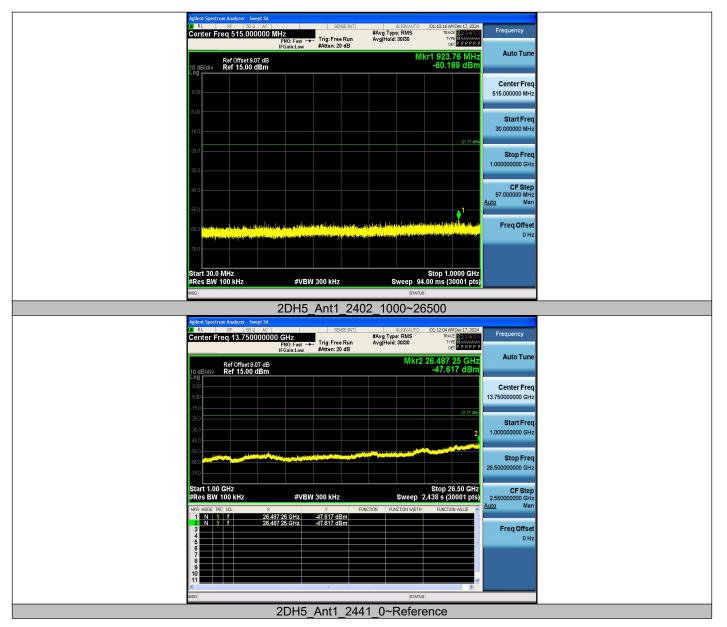
Report No. LP24120045C05-01 page 40 of 59



2DH5 Ant1 2402 30~1000



Report No. LP24120045C05-01 page 41 of 59



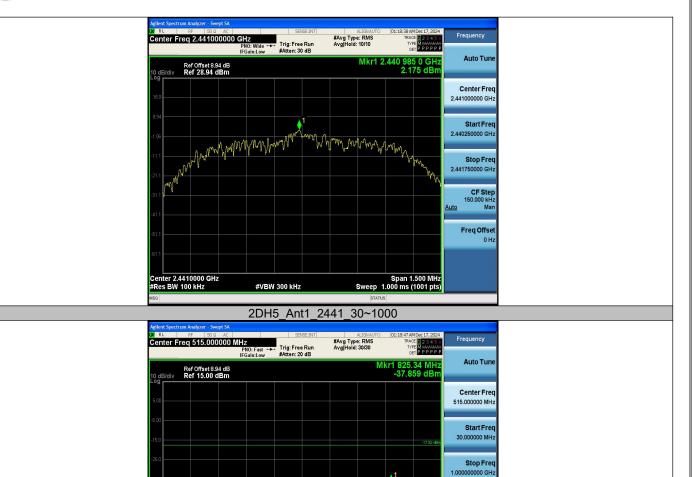


Start 30.0 MHz #Res BW 100 kHz

#VBW 300 kHz

2DH5 Ant1 2441 1000~26500

Report No. LP24120045C05-01 page 42 of 59



CF Step 97.000000 MH: Auto Mar

Freq Offset

Stop 1.0000 GHz Sweep 94.00 ms (30001 pts)



Report No. LP24120045C05-01 page 43 of 59





Report No. LP24120045C05-01 page 44 of 59

Agilent Spectrum Analyzer - Swept SA		orajor, avril	0.701.0170	01:22:04 AM Dec 17, 2024	
Center Freq 515.000000 MHz	A NO:East → Trig	sense:int g: Free Run ten: 20 dB	#Avg Type: RMS Avg Hold: 30/30	01:22:04 AM DEC 17, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWWWW DET P P P P P	Frequency
Ref Offset 8.94 dB	Junitow		М	kr1 899.99 MHz -60.404 dBm	Auto Tune
5.00					Center Freq 515.000000 MHz
-15.0				-18.88 dBm	Start Freq 30.000000 MHz
-25.0					Stop Freq 1.00000000 GHz
-45.0				A	CF Step 97.000000 MHz <u>Nuto</u> Man
-65.0 (deta-stational) of the telephone administrative of the state of	lari ye yelekaki dalari Yeriye ye yeriye kara yeri	da ada di galika ada di ada 	in particular biographic distance operation of suggraphic states p		Freq Offset 0 Hz
Start 30.0 MHz #Res BW 100 kHz	#VBW 300	I KH7	Sween 0/	Stop 1.0000 GHz I.00 ms (30001 pts)	
MSG			STATU	8	
Agilent Spectrum Analyzer - Swept SA	DH5_Ar		0_1000~20	Sec. 20	
Center Freq 13.750000000 G	NO East +++ I'll	g: Free Run ten: 20 dB	#Avg Type: RMS Avg Hold: 30/30	01:23:51 AM Dec 17, 2024 TRACE 2 3 4 5 6 TYPE MWWWWWW DET P P P P P P	Frequency
Ref Offset 8.94 dB			Mkr	2 2.399 95 GHz -45.186 dBm	Auto Tune
500 -500 -150				-10.09 dBm	Center Freq 13.750000000 GHz
-250 -360 -450					Start Freq 1.000000000 GHz
-55.0 -55.0 -75.0					Stop Freq 26.500000000 GHz
Start 1.00 GHz #Res BW 100 kHz MKR M00E TRC SCL X 1 1 f 2.401 6 2 N 1 f 2.399 9	#VBW 300	FUNC 7 FUNC 014 dBm 186 dBm		A	CF Step 2.550000000 GHz <u>Auto</u> Man
2 N 1 f 2.399 9 3 4 4 5 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	5 GHz -45.1	186 dBm			Freq Offset 0 Hz
8 9 10 11				×	
MSG			STATU	6	



4.7. RADIATED SPURIOUS EMISSION

4.7.1. Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.7.2. Conformance Limit

According to FCC Part 15.247(d): 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)).

According to FUU	Part 15.205, Restricted t	Danus	
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part15.205, Restricted bands

According to FCC Part15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted	Field Strength	Field Strength	Measurement
Frequency(MHz)	(µV/m)	(dBµV/m)	Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

4.7.3. Test Configuration

Test according to clause 3.2 radio frequency test setup 2



4.7.4. Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings: For Above 1GHz: The EUT was placed on a turn table which is 1.5m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Span = wide enough to fully capture the emission being measured RBW = 1 MHz $VBW \ge RBW$ Sweep = auto Detector function = peak Trace = max hold For Below 1GHz: The EUT was placed on a turn table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Span = wide enough to fully capture the emission being measured RBW = 100 kHz $VBW \ge RBW$ Sweep = auto Detector function = peak Trace = max hold For Below 30MHz: The EUT was placed on a turn table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Span = wide enough to fully capture the emission being measured RBW = 9kHz $VBW \ge RBW$ Sweep = auto Detector function = peak Trace = max hold For Below 150KHz: The EUT was placed on a turn table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Span = wide enough to fully capture the emission being measured RBW = 200Hz $VBW \ge RBW$ Sweep = auto Detector function = peak Trace = max hold Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data. Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data. Repeat above procedures until all frequency measured was complete.



■ Spurious Emission below 30MHz (9KHz to 30MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type	H/V

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =40log(Specific distance/ test distance)(dB); Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Spurious Emission Above 1GHz (1GHz to 25GHz)

Bluetooth (GFSK, π /4-DQPSK) mode have been tested, and the worst result(π /4-DQPSK) was report as below:

Test mo	de:	π/4-DQPS	к		Frequency:		С	hannel 0: 24	02MHz
Frequency	Meter Reading	Factor		ission evel Limits		Ma	rgin	Detector	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµ∖	//m)	(dBµV/m)	(d	B)	Туре	H/V
4804	54.72	0.98	55.	7	74	-18	8.3	peak	V
4804	40.93	0.98	41.9	91	54	-12	2.09	AVG	V
5216	45.39	1.82	47.2	21	74	-26	6.79	peak	V
5216	36.03	1.82	37.8	35	54	-16	6.15	AVG	V
7206	37.98	7.68	45.6	6	74	-28	8.34	peak	V
7206	29.65	7.68	37.3	33	54	-16	6.67	AVG	V
4804	50.71	0.98	51.6	69	74	-22	2.31	peak	Н
4825	38.16	0.98	39.1	4	54	-14	.86	AVG	Н
7206	40.09	7.68	47.7	7	74	-26	5.23	peak	Н
7222	31.91	7.67	39.5	58	54	-14	.42	AVG	Н
8514	42.18	8.25	50.4	13	74	-23	8.57	peak	Н
8531	30.28	8.27	38.5	55	54	-15	5.45	AVG	Н



Report No. LP24120045C05-01 page 48 of 59

Test mo	de:		π/4-DQPS	K	F	requency:		Channel 39		41MHz
Frequency	Mete Readi		Factor	Emiss Lev		Limits	M	argin Detector		Ant. Pol.
(MHz)	(dBµ\	√)	(dB)	(dBµ∖	//m)	(dBµV/m)	(dB)	Туре	H/V
3499	52.4	9	0.36	52.8	35	74	-2	1.15	peak	V
3516	36.3	6	0.4	36.7	' 6	54	-1	7.24	AVG	V
4876	51.1	8	0.99	52.1	7	74	-2	1.83	peak	V
4893	37.4	9	1	38.4	19	54	-1	5.51	AVG	V
7323	38.8	6	7.62	46.4	18	74	-2	7.52	peak	V
7341	28.6	6	7.62	36.2	22	54	-1	7.78	AVG	V
3448	63.1	7	0.28	63.4	15	74	-1	0.55	peak	Н
3465	49.0	6	0.3	49.3	36	54	-4	4.64	AVG	Н
4876	47.5	2	0.99	48.5	51	74	-2	5.49	peak	Н
4893	34.8	1	1	35.8	31	54	-1	8.19	AVG	Н
7323	38.4	3	7.62	46.0)5	74	-2	7.95	peak	Н
7341	28.4	6	7.62	36.0)8	54	-1	7.92	AVG	Н

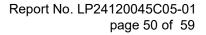


Test mo	de:	π/4-DQPS	к	F	requency:	Ch	annel 78: 24	80MHz
Frequency	Meter Reading	Factor	Emiss Lev		Limits	Margin	Datastar	Ant. Pol.
(MHz)	(dBµV)	(dB)	(dBµ∖	//m)	(dBµV/m)	(dB)	Detector Type	H/V
4960	45.05	1	46.0)5	74	-27.95	peak	V
4978	32.55	0.99	33.5	54	54	-20.46	AVG	V
7440	39.96	7.58	47.5	54	74	-26.46	peak	V
7460	29.18	7.56	36.7	' 4	54	-17.26	AVG	V
9840	42.01	9.71	51.7	'2	74	-22.28	peak	V
9857	30.3	9.73	40.0)3	54	-13.97	AVG	V
4960	44.34	1	45.3	34	74	-28.66	peak	Н
4978	32.13	0.99	33.1	2	54	-20.88	AVG	Н
7440	40.39	7.58	47.9	97	74	-26.03	peak	Н
7460	29.01	7.56	36.5	57	54	-17.43	AVG	Н
10214	41.44	10.19	51.6	63	74	-22.37	peak	Н
10231	30.09	10.22	40.3	31	54	-13.69	AVG	Н

Note: (1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).

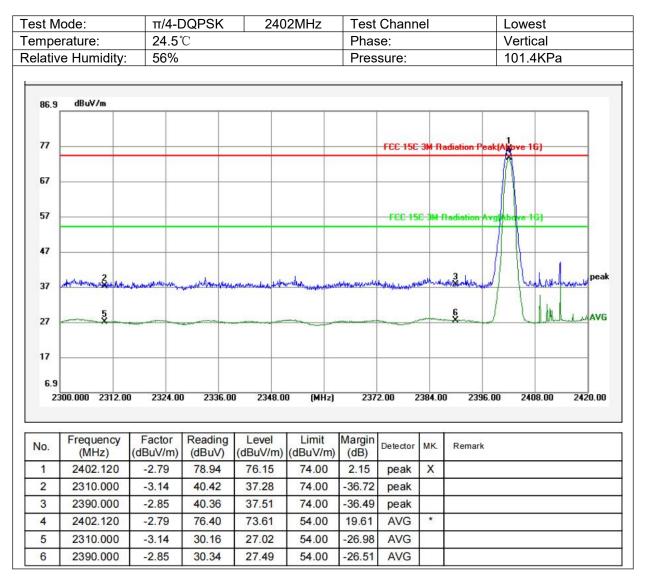
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

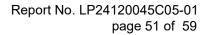
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.





Spurious Emission in Restricted Band 2300-2390MHz and 2483.5-2500MHz Bluetooth (GFSK, π /4-DQPSK, Hopping) mode have been tested, and the worst result(π /4-DQPSK) was report as below:





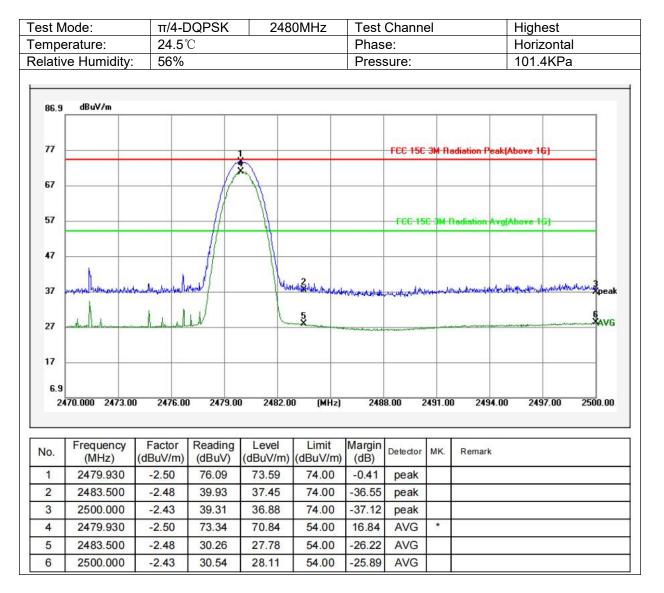


ode:	π/4-Ε	QPSK	240	2MHz	Test	Channe	əl		Lo	west			
erature:		С			Phas	Phase:			Horizontal 101.4KPa				
e Humidity:	56%		Pressure:					10	1.4KF	Pa			
dBuV/m							-					1	
						FCC 15C	ЭМ П	adiation Peak	(Abov	e 16)			
									ž				
							_		A	_			
									11				
						FCC 15	с эм г	Tadiation Avg	they w	e 16)			
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mothematica	-	and Martines	warter for strate a fer a fer	WARD BURN	المؤلفة المراجع والمحالية المراجع	Mary & a cloud for	winne	a Employed	14	haller	hearthan	peak	
	11.11.00 - C.11	and the second second	and the second second	C. C. Million Contraction	427.0*2 <i>0</i> 1.0	. a s stant.			1				
4		metron		And an and a second second				5			Anna yangan	AVG	
			and the second second second	- Martine									
00.000 2312.00	2324.00) 2336.00) 2348.0	0 (MHz)	237	2.00 2	384.0	0 2396.00	D	2408.00	24	20.00	
Frequency	Factor	Reading	Level	Limit	Margin			an a					
(MHz)	(dBuV/m)	(dBuV)				Detector	MK.	Remark					
2310.000	-3.14	39.34	36.20	74.00	-37.80	peak							
2390.000	-2.85	40.31	37.46	74.00	-36.54	peak							
2402.120	-2.79	74.95	72.16	74.00	-1.84	peak							
0040.000	-3.14	30.04	26.90	54.00	-27.10	AVG							
2310.000	-0.14												
2310.000	-2.85	30.15	27.30	54.00	-26.70	AVG							
	rature: e Humidity: dBuV/m dBuV/m dBuV/m dBuV/m 00.000 2312.00 Frequency (MHz) 2310.000 2390.000	rature: 24.5° e Humidity: 56%	rature: 24.5°C e Humidity: 56% dBuV/m dBuV/m 00.000 2312.00 2324.00 2336.00 Frequency Factor Reading (MHz) (dBuV/m) (dBuV) 2310.000 -3.14 39.34 2390.000 -2.85 40.31	rature: 24.5°C e Humidity: 56% dBuV/m	rature: 24.5°C e Humidity: 56% dBuV/m	rature: 24.5 °C Phas e Humidity: 56% Press dBuV/m	rature: 24.5 °C Phase: e Humidity: 56% Pressure: dBuV/m FEE 15E dBuV/m State dBuV/m State dBuV/m State dBuV/m FEE 15E dBuV/m State	rature: 24.5°C Phase: e Humidity: 56% Pressure: dBuV/m FEC 15C 3H fl dBuV/m <	rature: 24.5°C Phase: e Humidity: 56% Pressure: dBuV/m FEE 15E 34 Radiation Peak dBuV/m GBuV/m dBuV/m FEE 15E 34 Radiation Peak dBuV/m FEE 15E 34 Radiation Peak	rature: 24.5 °C Phase: Hc e Humidity: 56% Pressure: 10 dBuV/m FEE 15C 3M Radiation Peak(Abov dum fEE 15C 3M Radiation Peak(Abov dum get colspan="2">get colspan="2">get colspan="2">M Radiation Peak(Abov dum get colspan="2">get colspan="2">M Radiation Peak(Abov dum get colspan="2">get colspan="2" dum get colspan="2" dum get colspan="2" get colspan="2">get colspan="2" dum get colspan="2" get colspan="2">get colspan="2" get colspan="2">get colspan="2" get colspan="2" <td cols<="" td=""><td>rature: 24.5 °C Phase: Horizon e Humidity: 56% Pressure: 101.4KF dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Peak(Above 16) dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m<td>rature: 24.5°C Phase: Horizontal e Humidity: 56% Pressure: 101.4KPa d8uV/m FCE 15E 3H Rediation Peak(Above 16) FCE 15E 3H Rediation Peak(Above 16) 00.000 2312.00 2324.00 2336.00 2348.00 (MHz) 2372.00 2384.00 2396.00 2408.00 24 Frequency (MHz) Factor (BuV/m) (dBuV/m) (</td></td></td>	<td>rature: 24.5 °C Phase: Horizon e Humidity: 56% Pressure: 101.4KF dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Peak(Above 16) dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m<td>rature: 24.5°C Phase: Horizontal e Humidity: 56% Pressure: 101.4KPa d8uV/m FCE 15E 3H Rediation Peak(Above 16) FCE 15E 3H Rediation Peak(Above 16) 00.000 2312.00 2324.00 2336.00 2348.00 (MHz) 2372.00 2384.00 2396.00 2408.00 24 Frequency (MHz) Factor (BuV/m) (dBuV/m) (</td></td>	rature: 24.5 °C Phase: Horizon e Humidity: 56% Pressure: 101.4KF dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Peak(Above 16) dBuV/m FEE 15E 3H Rediation Peak(Above 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m FEE 15E 3H Rediation Avg b ve 16) FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m FEE 15E 3H Rediation Avg b ve 16) dBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m GBuV/m <td>rature: 24.5°C Phase: Horizontal e Humidity: 56% Pressure: 101.4KPa d8uV/m FCE 15E 3H Rediation Peak(Above 16) FCE 15E 3H Rediation Peak(Above 16) 00.000 2312.00 2324.00 2336.00 2348.00 (MHz) 2372.00 2384.00 2396.00 2408.00 24 Frequency (MHz) Factor (BuV/m) (dBuV/m) (</td>	rature: 24.5°C Phase: Horizontal e Humidity: 56% Pressure: 101.4KPa d8uV/m FCE 15E 3H Rediation Peak(Above 16) FCE 15E 3H Rediation Peak(Above 16) 00.000 2312.00 2324.00 2336.00 2348.00 (MHz) 2372.00 2384.00 2396.00 2408.00 24 Frequency (MHz) Factor (BuV/m) (dBuV/m) (



est M	lode:	π/4-Ε	DQPSK	2480	IMHZ	lest	Chann	el					Highest Vertical		
<u> </u>	erature:	24.5°	С			Phas	se:								
elativ	e Humidity:	56%				Pres	sure:			10	01.4	KPa	l		
86.9 77 67 57	dBuV/m			2			FCC 15C		idiation f						
47 37 27 17		geneeren de seekers		1	<u>zamur m</u>	-dansky vi-sky k				hidys, egyr dwy	h	ller-her	3 		
37 27 17 6.9		k			5	funtation and a second		at 1. At 1.			***				
37 27 17 6.9	sulips gan an a	k				248		491.00		14994.4994.4994	***	0 ₆₀	6		
37 27 17 6.9		k	2479.00 Reading		5 <u>×</u> (MHz) Limit	248	3.00 2	at 1. At 1.		34.00	***				
37 27 17 6.9 24	70.000 2473.00 Frequency) 2476.00 Factor	2479.00 Reading	2482.00	5 <u>×</u> (MHz) Limit	248i Margin	3.00 2	491.00) 245	34.00	***				
37 27 17 6.9 24 No.	70.000 2473.00 Frequency (MHz)) 2476.00 Factor (dBuV/m)	2479.00 Reading (dBuV) (2482.00 Level (dBuV/m) (((MHz) Limit dBuV/m)	248 Margin (dB)	3.00 2 Detector	491.00) 245	34.00	***				
37 27 17 6.9 24 No.	Frequency (MHz) 2479.930	Factor (dBuV/m) -2.50	2479.00 Reading (dBuV) 73.37	2482.00 Level (dBuV/m) (d 70.87	5 (MHz) Limit dBuV/m) 74.00	2488 Margin (dB) -3.13	3.00 2 Detector peak	491.00) 245	34.00	***				
37 27 17 6.9 24 No. 1 2	Frequency (MHz) 2479.930 2483.500	Factor (dBuV/m) -2.50 -2.48	2479.00 Reading (dBuV) (73.37 39.50	2482.00 Level (dBuV/m) (d 70.87 37.02	5 (MHz) Limit dBuV/m) 74.00 74.00	248 Margin (dB) -3.13 -36.98	3.00 2 Detector peak peak	491.00) 245	34.00	***				
37 27 17 6.9 24 No. 1 2 3	Frequency (MHz) 2479.930 2483.500 2500.000	Factor (dBuV/m) -2.50 -2.48 -2.43	Reading (dBuV) 73.37 39.50 40.56	2482.00 Level (dBuV/m) (d 70.87 37.02 38.13	5 (MHz) Limit dBuV/m) 74.00 74.00 74.00	248 Margin (dB) -3.13 -36.98 -35.87	3.00 2 Detector peak peak peak	491.00 MK.) 245	34.00	***				





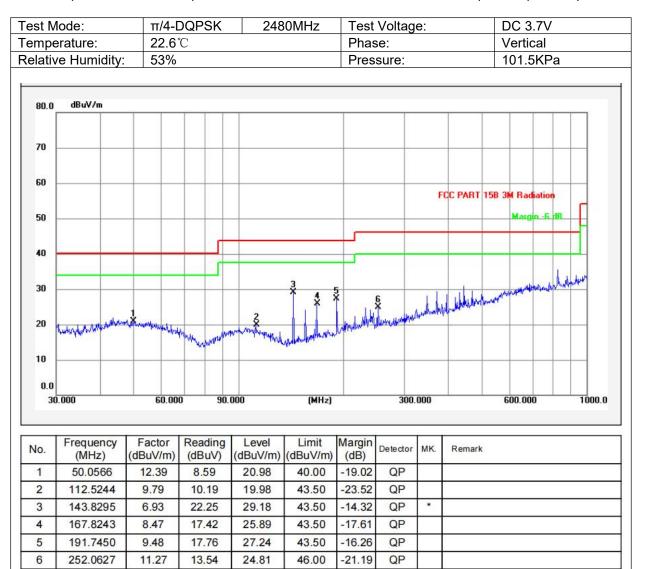
Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).

(2) Emission Level= Reading Level+Correct Factor.

- (3) Correct Factor= Ant_F + Cab_L Preamp
- (4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

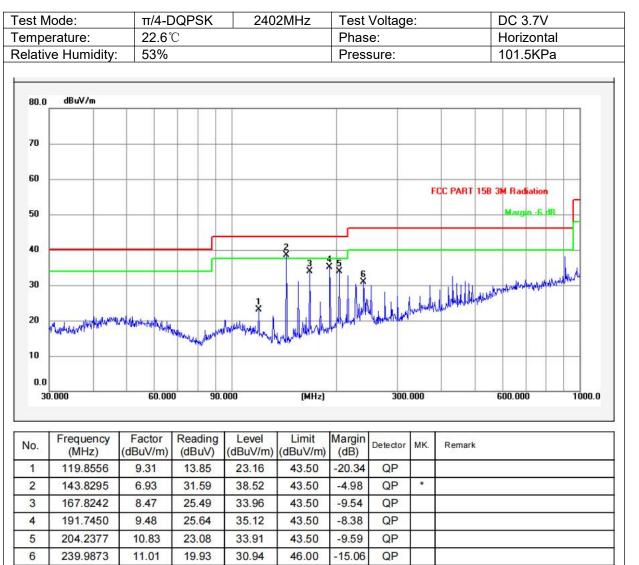


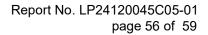
Spurious Emission below 1GHz (30MHz to 1GHz) Bluetooth (GFSK, π/4-DQPSK) mode have been tested, and the worst result(8DPSK) was report as below:





Report No. LP24120045C05-01 page 55 of 59







4.8. CONDUCTED EMISSION TEST

4.8.1. Applicable Standard

According to FCC Part 15.207(a)

4.8.2. Conformance Limit

Conducted Emission Limit									
Frequency(MHz)	Quasi-peak	Average							
0.15-0.5	66-56	56-46							
0.5-5.0	56	46							
5.0-30.0	60	50							
		•							

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

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Remark: Test results were obtained from the following equation:

Measurement (dB μ V) = LISN Factor (dB) + Cable Loss (dB) + Reading (dB μ V) Margin (dB) = Measurement (dB μ V) - Limit (dB μ V)

4.8.3. Test Configuration

Test according to clause 3.3 conducted emission test setup

4.8.4. Test Procedure

The EUT was placed on a table which is 0.8m above ground plane. Maximum procedure was performed on the highest emissions to ensure EUT compliance. Repeat above procedures until all frequency measured were complete.

Test Results : PASS

Bluetooth (GFSK, π /4-DQPSK,) mode have been tested, and the worst result(π /4-DQPSK) was report as below:



12

1.5737

10.58

13.21

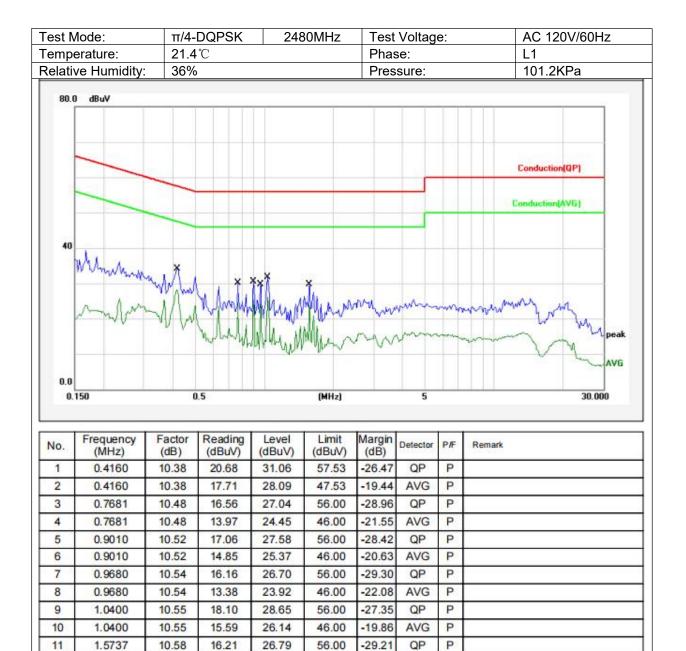
23.79

46.00

-22.21

Ρ

AVG







11

12

1.5737

1.5737

10.56

10.56

17.19

13.31

27.75

23.87

56.00

46.00

-28.25

-22.13 AVG

QP

Ρ

Ρ

	π/4-DQPS	SK 2480MF		Voltage:	AC 120V/60Hz
Femperature:	21.4 ℃		Phas		N
Relative Humidit	y: 36%		Press	sure:	101.2KPa
80.0 dBuV	mm	× * * * *	Ah .		Conduction(QP) Conduction(AVG)
Jun V	MMM	ah Mar Mar	Mar Mr	man and a second	when when the peak
0.0	0.5	(M	Hz)	5	30.000
0.150	Factor Read	ling Level Li	mit Margin	5 Detector P/F	30.000
0.150 No. Frequency (MHz)	Factor Read (dB) (dB)	ding Level Li IV) (dBuV) (dB	mit Margin 3uV) (dB)	Detector P/F	
0.150 No. Frequency (MHz) 1 0.2615	Factor Read (dB) (dB) 10.37 24.4	ting Level Li uV) (dBuV) (dB 48 34.85 61	mit Margin 3uV) (dB) 1.38 -26.53	Detector P/F QP P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615	Factor (dB) Read (dB) 10.37 24.4 10.37 16.3	ting Level Li UV) (dBuV) (dB 48 34.85 61 26 26.63 51	mit Margin 3uV) (dB) 1.38 -26.53 1.38 -24.75	Detector P/F QP P AVG P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344	Factor (dB) Read (dB) 10.37 24.4 10.37 16.1 10.46 19.0	ding Level Li IV) (dBuV) (dE 48 34.85 61 26 26.63 51 04 29.50 56	mit Margin (dB) .38 -26.53 .38 -24.75 5.00 -26.50	Detector P/F QP P AVG P QP P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344	Factor (dB) Read (dB) 10.37 24.4 10.37 16.1 10.46 19.1 10.46 15.1	ling JV) Level (dBuV) Li (dE 48 34.85 61 26 26.63 51 04 29.50 56 27 25.73 46	mit (dB) 1.38 -26.53 1.38 -24.75 5.00 -26.50 5.00 -20.27	Detector P/F QP P AVG P QP P AVG P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344 5 0.7681	Factor (dB) Read (dB) 10.37 24.4 10.37 16.4 10.46 19.4 10.46 15.4 10.48 19.4	ding UV) Level (dBuV) Li (dE 48 34.85 61 26 26.63 51 04 29.50 56 27 25.73 46 30 29.78 56	mit (dB) 30V) (dB) 38 -26.53 38 -24.75 3.00 -26.50 3.00 -20.27 3.00 -26.22	Detector P/F QP P AVG P QP P AVG P AVG P QP P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344 5 0.7681 6 0.7681	Factor (dB) Reac (dB) 10.37 24.4 10.37 16.1 10.46 19.1 10.46 19.1 10.48 19.3 10.48 19.4	ting Level Li (dBuV) (dE 48 34.85 61 26 26.63 51 04 29.50 56 27 25.73 46 30 29.78 56 43 26.91 46	mit (dB) 34V) (dB) 1.38 -26.53 1.38 -24.75 5.00 -26.50 5.00 -20.27 5.00 -26.22 5.00 -19.09	Detector P/F QP P AVG P QP P AVG P QP P AVG P AVG P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344 5 0.7681 6 0.7681 7 0.9010	Factor (dB) Read (dB) 10.37 24.4 10.37 16.1 10.46 19.1 10.46 19.1 10.48 19.1 10.48 19.1 10.48 19.1 10.48 19.1	ling IV) Level (dBuV) Li (dE (dE 26 26 26.63 51 04 29.50 56 27 25.73 46 30 29.78 56 43 26.91 46 42 29.94 56	mit (dB) 1.38 -26.53 1.38 -24.75 1.38 -24.75 1.30 -26.50 1.30 -26.22 1.30 -26.22 1.30 -19.09 1.30 -26.06	Detector P/F QP P AVG P QP P AVG P QP P AVG P AVG P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344 5 0.7681 6 0.7681 7 0.9010 8 0.9010	Factor (dB) Read (dB) 10.37 24.4 10.37 16.4 10.46 19.4 10.46 19.4 10.48 19.4 10.48 19.4 10.48 19.4 10.48 19.4 10.48 19.4 10.52 19.4	Jing (J) (M) Level (dBuV) Li (dE (dE (dE) (dE) (dE) (dE) (dE) (dE) (mit (dB) 30V) (dB) 38 -26.53 38 -24.75 3.00 -26.50 3.00 -20.27 3.00 -26.22 3.00 -19.09 3.00 -26.06 3.00 -18.68	Detector P/F QP P AVG P QP P AVG P QP P AVG P QP P AVG P AVG P	
0.150 No. Frequency (MHz) 1 0.2615 2 0.2615 3 0.6344 4 0.6344 5 0.7681 6 0.7681 7 0.9010	Factor (dB) Read (dB) 10.37 24.4 10.37 16.1 10.46 19.1 10.46 19.1 10.48 19.1 10.48 19.1 10.48 19.1 10.48 19.1	ling IV) Level (dBuV) Li (dE 48 34.85 61 26 26.63 51 04 29.50 56 27 25.73 46 30 29.78 56 43 26.91 46 42 29.94 56 80 27.32 46 19 31.73 56	mit (dB) 1.38 -26.53 1.38 -24.75 1.38 -24.75 1.30 -26.50 1.30 -26.22 1.30 -26.22 1.30 -19.09 1.30 -26.06	Detector P/F QP P AVG P QP P AVG P QP P AVG P AVG P	



4.9. ANTENNA APPLICATION

4.9.1. Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	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, or §15.221. 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.

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.9.2. Result

PASS.

The EUT has 1 antenna: Chip Antenna for BT with classic mode, the gain is 2.5dBi;

Antenna use a permanently attached antenna which is not replaceable.

Not using a standard antenna jack or electrical connector for antenna replacement

The antenna has to be professionally installed (please provide method of installation) Note: which in accordance to section 15.203, please refer to the internal photos.

----- END OF REPORT ------