



# CFR 47 FCC PART 15 SUBPART C ISED RSS-247 ISSUE 2

# **CERTIFICATION TEST REPORT**

For

## WiFi Module

### **MODEL NUMBER: SI06**

FCC ID: 2AFG6-SI06

## IC: 22166-SI06

## REPORT NUMBER: 4789609364.2-8

ISSUE DATE: November 17, 2020

Prepared for

Guangzhou Shirui Electronics Co Ltd 192 Kezhu Road, Scientech Park, guangzhou Economic Technology Development District Guangzhou China

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch

Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, 523808, People's Republic of China

> Tel: +86 769 22038881 Fax: +86 769 33244054 Website: www.ul.com

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## **Revision History**

Rev.	Issue Date	Revisions	Revised By
V0	11/17/2020	Initial Issue	



Summary of Test Results					
Clause	Test Items	FCC/ISED Rules	Test Results		
1	20dB Bandwidth and 99% Occupied Bandwidth	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a) RSS-Gen Clause 6.7	Pass		
2	Conducted Output Power	FCC 15.247 (b) (1) RSS-247 Clause 5.1 (b)	Pass		
3	Carrier Hopping Channel Separation	FCC 15.247 (a) (1) RSS-247 Clause 5.1 (b)	Pass		
4	Number of Hopping Frequency	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass		
5	Time of Occupancy (Dwell Time)	15.247 (a) (1) III RSS-247 Clause 5.1 (d)	Pass		
6	Conducted Bandedge	FCC 15.247 (d) RSS-247 Clause 5.5	Pass		
7	Radiated Bandedge and Spurious	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass		
8	Conducted Emission Test for AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Pass		
9	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass		
Note:					

Note:

1. This test report is only published to and used by the applicant, and it is not for evidence purpose in China.

2. The measurement result for the sample received is <Pass> according to < CFR 47 FCC PART 15 SUBPART C >< ISED RSS-247 > when <Accuracy Method> decision rule is applied.



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# **1. ATTESTATION OF TEST RESULTS**

#### Applicant Information

Company Name:	Guangzhou Shirui Electronics Co Ltd
Address:	192 Kezhu Road, Scientech Park, guangzhou Economic
	Technology Development District Guangzhou China

#### Manufacturer Information

Company Name:	Guangzhou Shirui Electronics Co Ltd
Address:	192 Kezhu Road, Scientech Park, guangzhou Economic
	Technology Development District Guangzhou China

### **EUT Information**

EUT Name:	WiFi Module
Model:	SI06
Sample Received Date:	August 27, 2020
Sample Status:	Normal
Sample ID:	3283003
Date of Tested:	August 27, 2020~ November 12, 2020

APPLICABLE STANDARDS					
STANDARD TEST RESULTS					
CFR 47 FCC PART 15 SUBPART C	PASS				
ISED RSS-247 Issue 2	PASS				
ISED RSS-GEN Issue 5	PASS				

Prepared By:

Mick Zhong

Mick Zhang Project Engineer

Approved By:

Aephenbuo

Stephen Guo Laboratory Manager Checked By:

Shenny les

Shawn Wen Laboratory Leader



# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

# 3. FACILITIES AND ACCREDITATION

	A2LA (Certificate No.: 4102.01) UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	has been assessed and proved to be in compliance with A2LA. FCC (FCC Designation No.: CN1187)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	Has been recognized to perform compliance testing on equipment subject
	to the Commission's Delcaration of Conformity (DoC) and Certification rules
	ISED (Company No.: 21320)
Accreditation	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Certificate	has been registered and fully described in a report filed with ISED.
	The Company Number is 21320.
	VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	has been assessed and proved to be in compliance with VCCI, the
	Membership No. is 3793.
	Facility Name:
	Chamber D, the VCCI registration No. is G-20019 and R-20004
	Shielding Room B, the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30 MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30 MHz had been correlated to measurements performed on an OFS.



# 4. CALIBRATION AND UNCERTAINTY

# 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

# 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty		
Conduction emission	3.62 dB		
Radiated Emission (Included Fundamental Emission) (9 kHz ~ 30 MHz)	2.2 dB		
Radiated Emission (Included Fundamental Emission) (30 MHz ~ 1 GHz)	4.00 dB		
Radiated Emission	5.78 dB (1 GHz ~ 18 GHz)		
(Included Fundamental Emission) (1 GHz to 26 GHz)	5.23 dB (18 GHz ~ 26 GHz)		
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.			

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

EUT Name	WiFi Module				
Model	SI06				
Technology	Bluetooth – BR	& EDR			
Transmit Frequency Range	2402 MHz ~ 2480 MHz				
Mode	Basic Rate		Enhanced Data Rate		
Modulation	GFSK		∏/4-DQPSK		8DPSK
Packet Type (Maximum Payload):	DH5		2DH5		3DH5
Data Rate	1 Mbps		2 N	1bps	3M bps
Power Supply	DC State Rate Inpu		out: DC 12 V		
Wireless Module	SKI.WB8821CU.1				

# 5.2. MAXIMUM PEAK OUTPUT POWER

Test Mode	Frequency (MHz)	Channel Number	Maximum Peak Output Power (dBm)	Maximum EIRP (dBm)
GFSK	2402 ~ 2480	0-78[79]	5.89	9.39
8DPSK	2402 ~ 2480	0-78[79]	6.34	9.84

# 5.3. PACKET TYPE CONFIGURATION

Test Mode	Packet Type	Setting (Packet Length)	
	DH1	27	
GFSK	DH3	183	
	DH5	339	
	2-DH1	54	
∏/4-DQPSK	2-DH3	367	
	2-DH5	679	
	3-DH1	83	
8DPSK	3-DH3	552	
	3-DH5	1021	



Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	/	/

# 5.4. CHANNEL LIST

# 5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
8DPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
GFSK	Нор	2402 MHz ~ 2480 MHz
8DPSK	Нор	2402 MHz ~ 2480 MHz

Note: The hop is hopping mode.

# 5.6. WORST-CASE CONFIGURATIONS

Test Mode	Modulation Technology	Modulation Type	Data Rate	Packet Type
BR	FHSS	GFSK	1Mbit/s	DH5
EDR	FHSS	8DPSK	3Mbit/s	3-DH5

Note: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates. Only GFSK and 8DPSK test data were report in this report.

Note: The EUT have two wireless modules, one is called module SKI.W7613E.1 and the other one called module SKI.WB8821CU.1.

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Simultaneously transmission condition.

Condition	Technology			Support (YES/NO)	
1 (Module SKI.W7613E.1)		WLAN(5G)			NO
2 (Module SKI.WB8821CU.1)	BT	BLE	WLAN(2.4G)	WLAN(5G)	NO

Co-Location condition.

Condition	Technology (Module SKI.W7613E.1)	Technology (Module SKI.WB8821CU.1)	Support (YES/NO)
1	WLAN (5G)	BT	YES
2	WLAN (5G)	BLE	YES
3	WLAN (5G)	WLAN (2.4G)	YES
4	WLAN (5G)	WLAN (5G)	YES

For the Co-Location test result please refer to test report 4789609364.2-16.

## 5.7. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5 MHz Band					
Test S	oftware	RTLBTAPP			
Test Mode	Transmit Antenna	Test Software Setting Value			
Test Mode	Number	CH 00	CH 39	CH 78	
GFSK	1	Default	Default	Default	
8DPSK	1	Default	Default	Default	

# 5.8. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	FPC antenna	3.50

Test Mode	Transmit and Receive Mode	Description	
GFSK	⊠1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.	
8DPSK	⊠1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.	

Note: 1. The value of the antenna gain was declared by customer.



# 5.9. DESCRIPTION OF TEST SETUP

#### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	PC	SEEWO	MT51A	MT51I14SI- 2SD191007519XAG0006

Note: The PC was provided by the customer.

#### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	Ribbon cable	/	/	1.0	/

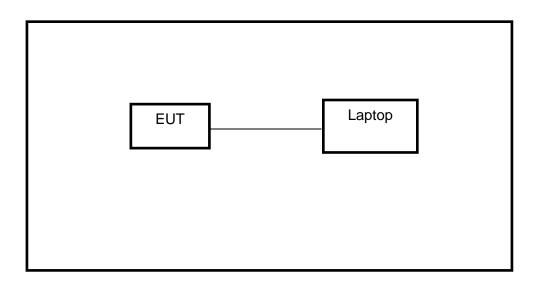
#### ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
/	/	/	/	/

#### TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

#### SETUP DIAGRAM FOR TESTS



# 6. MEASURING INSTRUMENT AND SOFTWARE USED

	Conducted Emissions							
	Instrument							
Used	Equipment	Manufacturer	urer Model No.		Serial No.		Last Cal.	Next Cal.
$\checkmark$	EMI Test Receiver	R&S	E	SR3	101961		Dec.05,2019	Dec.05,2020
V	Two-Line V- Network	R&S	EN	IV216	101983	3	Dec.05,2019	Dec.05,2020
			So	oftware				
Used	Desc	ription		Mai	nufacturer		Name	Version
$\checkmark$	Test Software for Co	onducted distu	Irbano	ce	Farad		EZ-EMC	Ver. UL-3A1
		Ra	diate	d Emiss	sions			
			Ins	trument				
Used	Equipment	Manufacturer	Мос	del No.	Serial N	0.	Last Cal.	Next Cal.
$\checkmark$	MXE EMI Receiver	KESIGHT	N9	038A	MY56400	036	Dec.06,2019	Dec.06,2020
V	Hybrid Log Periodic Antenna	TDK	HLP-3003C		130960	)	Sep.17, 2018	Sep.17, 2021
$\checkmark$	Preamplifier	HP	8447D		2944A090	)99	Dec.05,2019	Dec.05,2020
V	EMI Measurement Receiver	R&S	E	SR26	101377	7	Dec.05,2019	Dec.05,2020
$\checkmark$	Horn Antenna	TDK	HRN-0118		130939	)	Sep.17, 2018	Sep.17, 2021
V	High Gain Horn Antenna	Schwarzbeck	BBH	A-9170	691		Aug.11, 2018	Aug.11, 2021
V	Preamplifier	TDK	PA-0	02-0118	TRS-30 00066		Dec.05,2019	Dec.05,2020
V	Preamplifier	TDK	PA	-02-2	TRS-30 00003		Dec.05,2019	Dec.05,2020
$\checkmark$	Loop antenna	Schwarzbeck	15	519B	00008		Jan.07, 2019	Jan.07, 2022
V	Preamplifier	TDK	PA-02-001- 3000		TRS-302 00050		Dec.5, 2019	Dec.5, 2020
V	High Pass Filter	Wi	WHKX10- 2700-3000- 18000-40SS		23		Dec.05,2019	Dec.05,2020
	Software							
Used	Descri	Description Manuf		Manufa	cturer		Name	Version
$\checkmark$	Test Software disturb		Farad EZ-EM			Z-EMC	Ver. UL-3A1	

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	Other instruments							
Used	d Equipment Manufacturer Model No. Serial No. Last Cal. Next Cal.							
$\checkmark$	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.06,2019	Dec.06,2020		
$\checkmark$	Spectrum Analyzer	Keysight	N9020A	MY49100060	Dec.06,2019	Dec.06,2020		
$\checkmark$	Power Meter	Keysight	N1911A	MY55416024	Dec.06,2019	Dec.06,2020		
V	Power Sensor	Keysight	U2021XA	MY5100022	Dec.06,2019	Dec.06,2020		



# 7. ANTENNA PORT TEST RESULTS

# 7.1. ON TIME AND DUTY CYCLE

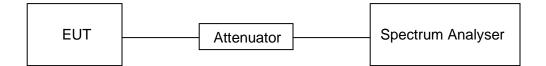
### LIMITS

None; for reporting purposes only.

### PROCEDURE

Refer to ANSI C63.10-2013 Zero – Span Spectrum Analyzer method.

### TEST SETUP



#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**

Please refer to appendix I.



# 7.2. 20 dB BANDWIDTH AND 99 % OCCUPIED BANDWIDTH

#### LIMITS

CFR 47FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2					
Section Test Item Limit Frequency Rang (MHz)					
CFR 47 FCC 15.247 (a) (1) RSS-247 Clause 5.1 (a)	20 dB Bandwidth	None; for reporting purposes only.	2400-2483.5		
ISED RSS-Gen Clause 6.7	99 % Occupied Bandwidth	None; for reporting purposes only.	2400-2483.5		

### TEST PROCEDURE

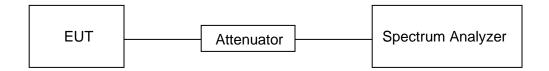
Refer to ANSI C63.10-2013 clause 6.9.2.

Center Frequency	The center frequency of the channel under test	
Detector	Peak	
IRRW	For 20 dB Bandwidth: 1 % to 5 % of the 20 dB bandwidth For 99 % Occupied Bandwidth: 1 % to 5 % of the occupied bandwidth	
	For 20 dB Bandwidth: approximately 3×RBW For 99 % Occupied Bandwidth: ≥ 3×RBW	
Span	Approximately 2 to 3 times the 20dB bandwidth	
Trace	Max hold	
Sweep	Auto couple	

Connect the EUT to the spectrum analyser and use the following settings:

a) Use the occupied bandwidth function of the instrument, allow the trace to stabilize and report the measured 99 % occupied bandwidth and 20 dB Bandwidth.

#### TEST SETUP





#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**

Please refer to appendix A and B.



# 7.3. CONDUCTED OUTPUT POWER

#### <u>LIMITS</u>

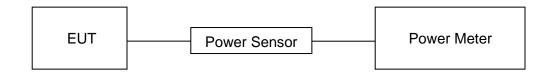
CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2					
Section	Test Item	Limit	Frequency Range (MHz)		
CFR 47 FCC 15.247 (b) (1) ISED RSS-247 Clause 5.4 (b)	Peak Conducted Output Power	Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel: 1 watt or 30 dBm; Hopping channel carrier frequencies that are separated by 25 kHz or two- thirds of the 20 dB bandwidth of the hopping channel: 125 mW or 21 dBm	2400-2483.5		

#### TEST PROCEDURE

Connect the EUT to a low loss RF cable from the antenna port to the power sensor (video bandwidth is greater than the occupied bandwidth).

Measure peak emission level, the indicated level is the peak output power, after any corrections for external attenuators and cables.

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**

Please refer to appendix C.



# 7.4. CARRIER FREQUENCY SEPARATION

#### LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2					
Section	Test Item	Limit	Frequency Range (MHz)		
CFR 47 FCC 15.247 (a) (1) ISED RSS-247 Clause 5.1 (b)	Carrier Frequency Separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel.	2400-2483.5		

#### TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.2.

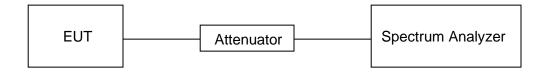
Connect the EUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
	Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
VBW	≥RBW
Trace	Max hold
Sweep time	Auto couple

Allow the trace to stabilize and use the marker-delta function to determine the separation between the peaks of the adjacent channels.

Compliance of an EUT with the appropriate regulatory limit shall be determined.

#### TEST SETUP





#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### <u>RESULTS</u>

Please refer to Appendix D.



# 7.5. NUMBER OF HOPPING FREQUENCIES

#### <u>LIMITS</u>

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2					
Section Test Item Limit					
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 5.1 (d)	Number of Hopping Frequency	at least 15 hopping channels			

### TEST PROCEDURE

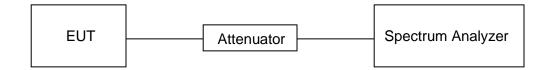
Refer to ANSI C63.10-2013 clause 7.8.3.

Connect the EUT to the spectrum Analyzer and use the following settings:

Detector	Peak
RBW	To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
VBW	≥RBW
	The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
Trace	Max hold
Sweep time	Auto couple

Set EUT to transmit maximum output power and switch on frequency hopping function. then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer, count the quantity of peaks to get the number of hopping channels.

### TEST SETUP





#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### <u>RESULTS</u>

Please refer to appendix F.



## 7.6. TIME OF OCCUPANCY (DWELL TIME)

#### LIMITS

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	
CFR 47 15.247 (a) (1) III ISED RSS-247 Clause 5.1 (d)	Time of Occupancy (Dwell Time)	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed.	

#### TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.4.

Connect the EUT to the spectrum Analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	1 MHz
VBW	≥RBW
Span	Zero span, centered on a hopping channel
Trace	Max hold
Sweep time	As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel

Use the marker-delta function to determine the transmit time per hop (Burst Width). If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

For FHSS Mode (79 Channel):

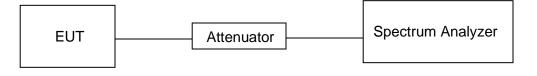
DH1/3DH1 Dwell Time: Burst Width \* (1600/2) \* 31.6 / (channel number) DH3/3DH3 Dwell Time: Burst Width \* (1600/4) \* 31.6 / (channel number) DH5/3DH5 Dwell Time: Burst Width \* (1600/6) \* 31.6 / (channel number)

For AFHSS Mode (20 Channel):

DH1/3DH1 Dwell Time: Burst Width \* (800/2) \* 8 / (channel number) DH3/3DH3 Dwell Time: Burst Width \* (800/4) \* 8 / (channel number) DH5/3DH5 Dwell Time: Burst Width \* (800/6) \* 8 / (channel number)



### **TEST SETUP**



#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**

Please refer to appendix E.



# 7.7. CONDUCTED BANDEDGE AND SPURIOUS EMISSION

#### <u>LIMITS</u>

CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Spurious Emission	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power	

#### TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.6 and 7.8.8.

Connect the EUT to the spectrum analyser and use the following settings for reference level measurement:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level.

Change the settings for emission level measurement:

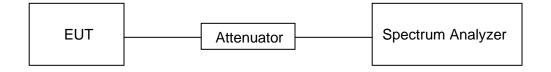
	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum PSD level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements.

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### **TEST SETUP**



#### **TEST ENVIRONMENT**

Temperature	22.8 °C	Relative Humidity	67.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**

Please refer to appendix G & H.



# 8. RADIATED TEST RESULTS

### LIMITS

Please refer to CFR 47 FCC §15.205 and §15.209.

Please refer to ISED RSS-GEN Clause 8.9 and Clause 8.10.

Radiation Disturbance Test Limit for FCC (Class B) (9 kHz-1 GHz)

Emissions radiated outside of the specified frequency bands above 30 MHz			
Frequency Range	Field Strength Limit	Field Strer	ngth Limit
(MHz)	(uV/m) at 3 m	(dBuV/m	) at 3 m
(11112)		Quasi-	Peak
30 - 88	100	4(	)
88 - 216	150	43	.5
216 - 960	200	46	6
Above 960	500	54	4
Above 1000	500	Peak	Average
Above 1000	500	74	54

FCC Emissions radiated outside of the specified frequency bands below 30 MHz			
Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	
0.009-0.490	2400/F(kHz)	300	
0.490-1.705	24000/F(kHz)	30	
1.705-30.0	30	30	

### ISED General field strength limits at frequencies below 30 MHz

Table 6 – General field strength limits at frequencies below 30 MHz		
Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement distance (m)
9 - 490 kHz <sup>Note 1</sup>	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

**Note 1:** The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.



### ISED Restricted bands please refer to ISED RSS-GEN Clause 8.10

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	158.52475 - 158.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1845.5 - 1848.5	Above 38.6
8.362 - 8.366	1880 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
18.69475 - 18.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138		

where it is certain requertly barries is teen in date 7 and in barries above 35.0 GHz are designated to incerce-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

### FCC Restricted bands of operation refer to FCC §15.205 (a):

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	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	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	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	( <sup>2</sup> )
13.36-13.41			

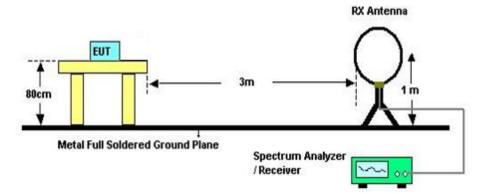
Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. <sup>2</sup>Above 38.6c

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### TEST SETUP AND PROCEDURE

Below 30 MHz



The setting of the spectrum analyser

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.4.

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1 m height antenna tower.

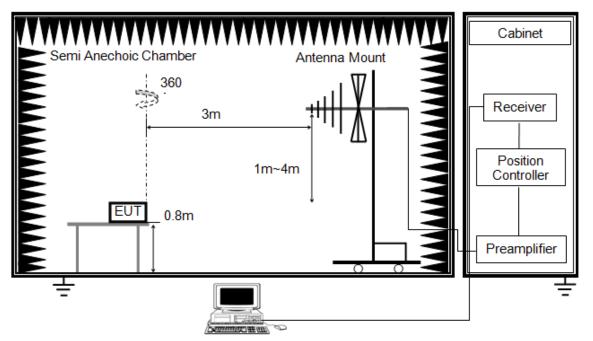
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak and average detector mode remeasured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak and average detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KDB 414788.



## Below 1 GHz and above 30 MHz



The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.5.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.



## Above 1 GHz Cabinet emi Anechoic Chamber Antenna Mount 360 Receiver 3m 1m~4m Position Controller EÜT 1.5m 1m Preamplifier 5

The setting of the spectrum analyser

RBW	1 MHz
IV BW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013 clause 6.6.

2. The EUT was arranged to its worst case and then tune the antenna tower (1.5 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5 m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

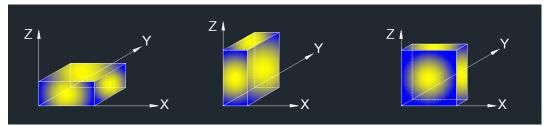
5. For measurement above 1 GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 7.1.ON TIME AND DUTY CYCLE.

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X axis, Y axis, Z axis positions:



Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

#### TEST ENVIRONMENT

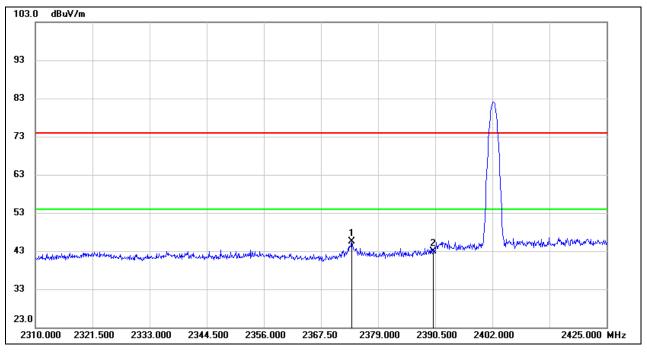
Temperature	23.5 °C	Relative Humidity	58 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

#### **RESULTS**



# 8.1. RESTRICTED BANDEDGE

## 8.1.1. GFSK MODE



#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2373.710	33.71	11.84	45.55	74.00	-28.45	peak
2	2390.000	30.90	11.96	42.86	74.00	-31.14	peak

Note: 1. Measurement = Reading Level + Correct Factor.

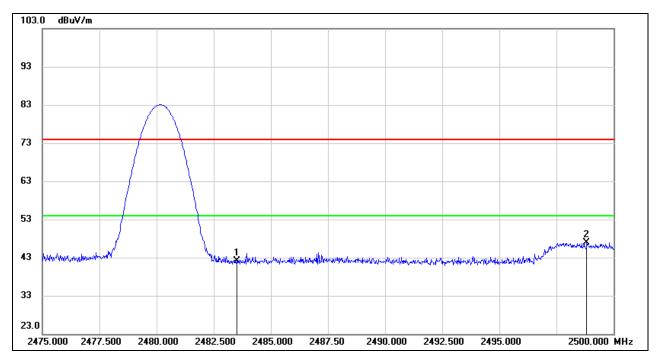
If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 Peak: Peak detector.

3. Peak: Peak detector.

4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



#### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	29.72	12.38	42.10	74.00	-31.90	peak
2	2498.825	34.48	12.44	46.92	74.00	-27.08	peak

Note: 1. Measurement = Reading Level + Correct Factor.

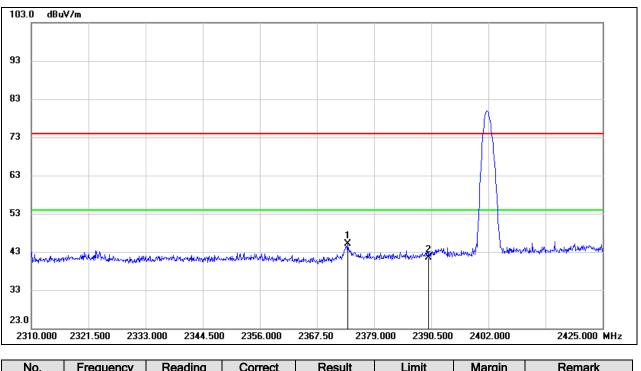
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.



## 8.1.2. 8DPSK MODE



### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2373.710	33.25	11.84	45.09	74.00	-28.91	peak
2	2390.000	29.49	11.96	41.45	74.00	-32.55	peak

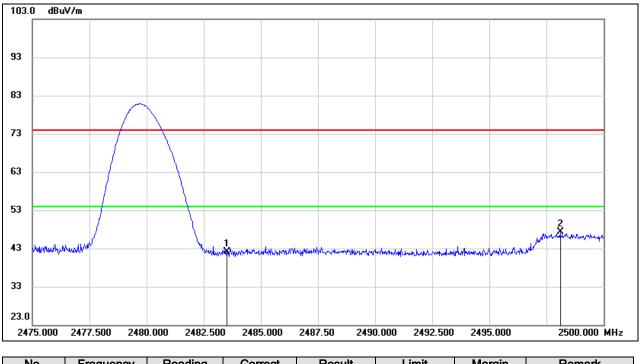
Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.





### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	29.63	12.38	42.01	74.00	-31.99	peak
2	2498.100	34.93	12.44	47.37	74.00	-26.63	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

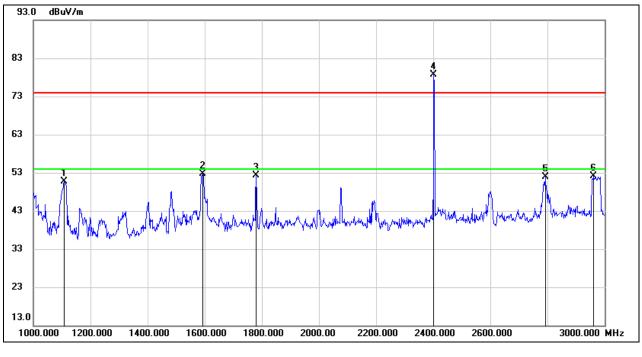
4. Only the worst data was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Note: All the polarities had been tested, only the worst data was recorded in the report.



# 8.2. SPURIOUS EMISSIONS (1 GHz ~ 3 GHz)

# 8.2.1. 8DPSK MODE



## HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

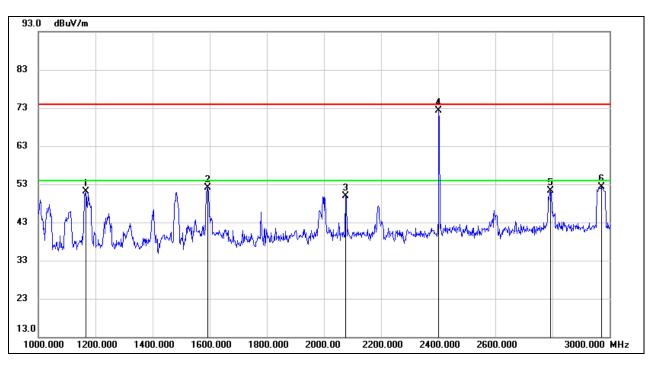
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1108.000	45.49	5.30	50.79	74.00	-23.21	peak
2	1592.000	44.90	7.90	52.80	74.00	-21.20	peak
3	1780.000	42.76	9.47	52.23	74.00	-21.77	peak
4	2402.000	66.58	12.03	78.61	/	/	fundamental
5	2792.000	38.27	13.70	51.97	74.00	-22.03	peak
6	2962.000	37.72	14.44	52.16	74.00	-21.84	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.





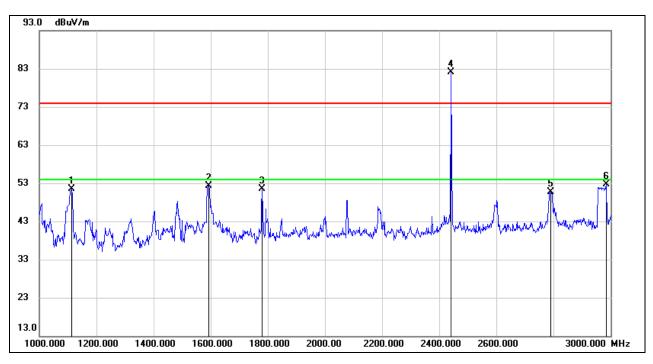
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1166.000	45.17	6.00	51.17	74.00	-22.83	peak
2	1592.000	44.12	7.90	52.02	74.00	-21.98	peak
3	2076.000	39.01	10.85	49.86	74.00	-24.14	peak
4	2402.000	60.21	12.03	72.24	/	/	fundamental
5	2794.000	37.62	13.71	51.33	74.00	-22.67	peak
6	2972.000	37.74	14.51	52.25	74.00	-21.75	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.





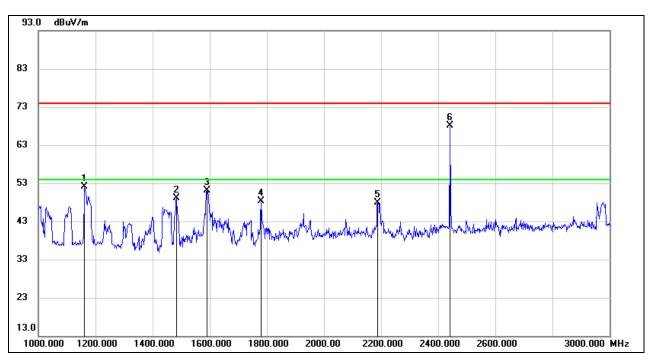
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1112.000	46.11	5.34	51.45	74.00	-22.55	peak
2	1594.000	44.38	7.92	52.30	74.00	-21.70	peak
3	1780.000	42.03	9.47	51.50	74.00	-22.50	peak
4	2441.000	69.96	12.19	82.15	/	/	fundamental
5	2790.000	37.07	13.68	50.75	74.00	-23.25	peak
6	2984.000	38.04	14.58	52.62	74.00	-21.38	peak

Note: 1. Measurement = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.





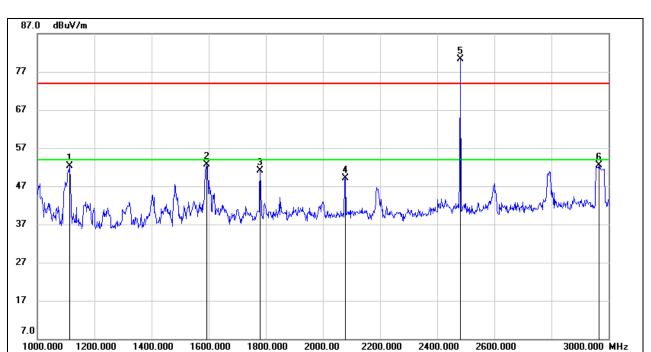
|--|

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1162.000	46.16	5.95	52.11	74.00	-21.89	peak
2	1484.000	42.10	6.92	49.02	74.00	-24.98	peak
3	1590.000	43.15	7.87	51.02	74.00	-22.98	peak
4	1780.000	38.88	9.47	48.35	74.00	-25.65	peak
5	2188.000	36.67	11.29	47.96	/	/	fundamental
6	2441.000	55.88	12.19	68.07	74.00	-5.93	peak

Note: 1. Measurement = Reading Level + Correct Factor.

If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 Peak: Peak detector.





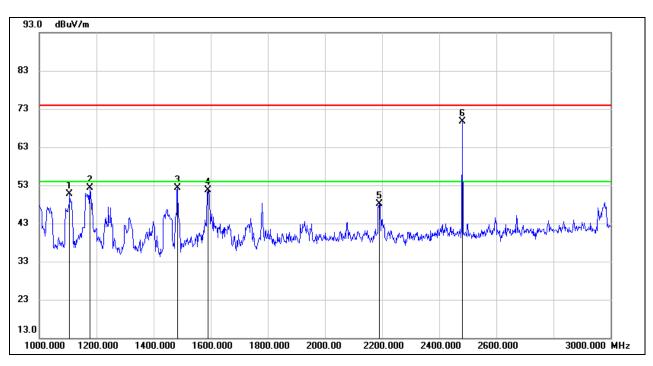
#### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1112.000	47.04	5.34	52.38	74.00	-21.62	peak
2	1594.000	44.71	7.92	52.63	74.00	-21.37	peak
3	1780.000	41.67	9.47	51.14	74.00	-22.86	peak
4	2078.000	38.17	10.86	49.03	74.00	-24.97	peak
5	2480.000	67.90	12.35	80.25	/	/	fundamental
6	2966.000	38.01	14.47	52.48	74.00	-21.52	peak

Note: 1. Measurement = Reading Level + Correct Factor.

If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 Peak: Peak detector.





#### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1106.000	45.47	5.28	50.75	74.00	-23.25	peak
2	1176.000	46.11	6.12	52.23	74.00	-21.77	peak
3	1484.000	45.31	6.92	52.23	74.00	-21.77	peak
4	1590.000	43.75	7.87	51.62	74.00	-22.38	peak
5	2190.000	36.81	11.29	48.10	/	/	fundamental
6	2480.000	57.42	12.35	69.77	74.00	-4.23	peak

Note: 1. Measurement = Reading Level + Correct Factor.

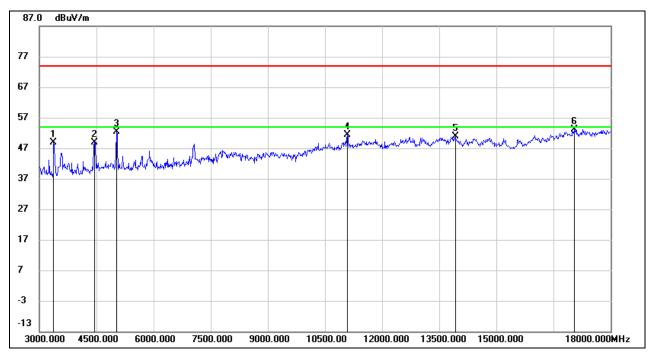
If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 Peak: Peak detector.

Note: All the modes and channels have been tested, only the worst data was recorded in the report.



# 8.3. SPURIOUS EMISSIONS (3 GHz ~ 18 GHz)

# 8.3.1. GFSK MODE



## HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3375.000	53.31	-4.35	48.96	74.00	-25.04	peak
2	4455.000	49.95	-1.13	48.82	74.00	-25.18	peak
3	5025.000	51.00	1.43	52.43	74.00	-21.57	peak
4	11085.000	38.86	12.57	51.43	74.00	-22.57	peak
5	13920.000	34.68	16.17	50.85	74.00	-23.15	peak
6	17040.000	32.76	20.49	53.25	74.00	-20.75	peak

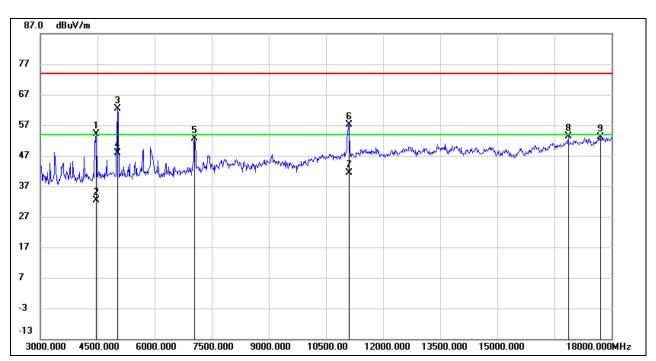
Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





HARMONICS AND SPURIOUS EMISSIONS (LOW CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	55.10	-0.98	54.12	74.00	-19.88	peak
2	4470.000	33.34	-0.98	32.36	54.00	-21.64	AVG
3	5025.000	60.84	1.43	62.27	74.00	-11.73	peak
4	5025.000	46.40	1.43	47.83	54.00	-6.17	AVG
5	7050.000	46.71	5.84	52.55	74.00	-21.45	peak
6	11100.000	44.65	12.56	57.21	74.00	-16.79	peak
7	11100.000	28.72	12.56	41.28	54.00	-12.72	AVG
8	16860.000	33.36	19.95	53.31	74.00	-20.69	peak
9	17700.000	30.59	22.43	53.02	74.00	-20.98	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

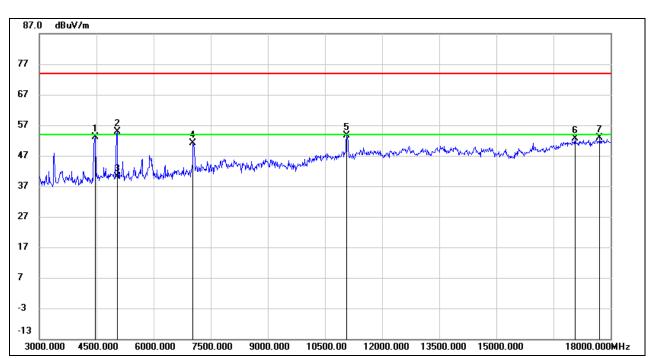
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

- 3. Peak: Peak detector.
- 4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





#### HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	54.11	-0.98	53.13	74.00	-20.87	peak
2	5040.000	53.41	1.46	54.87	74.00	-19.13	peak
3	5040.000	38.76	1.46	40.22	54.00	-13.78	AVG
4	7035.000	45.28	5.81	51.09	74.00	-22.91	peak
5	11070.000	40.98	12.58	53.56	74.00	-20.44	peak
6	17070.000	32.03	20.57	52.60	74.00	-21.40	peak
7	17715.000	30.32	22.56	52.88	74.00	-21.12	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

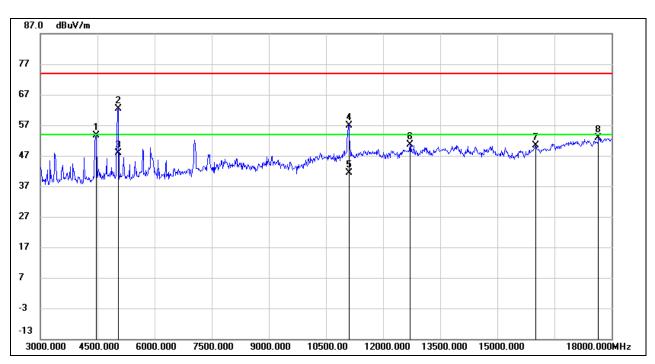
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	54.61	-0.98	53.63	74.00	-20.37	peak
2	5040.000	61.03	1.46	62.49	74.00	-11.51	peak
3	5040.000	46.39	1.46	47.85	54.00	-6.15	AVG
4	11100.000	44.44	12.56	57.00	74.00	-17.00	peak
5	11100.000	28.78	12.56	41.34	54.00	-12.66	AVG
6	12705.000	36.31	14.35	50.66	74.00	-23.34	peak
7	16005.000	32.67	17.71	50.38	74.00	-23.62	peak
8	17655.000	30.84	22.15	52.99	74.00	-21.01	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

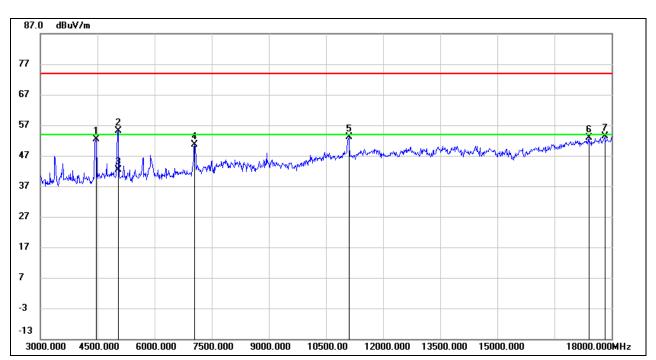
If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
 Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





#### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	53.33	-0.98	52.35	74.00	-21.65	peak
2	5040.000	53.74	1.46	55.20	74.00	-18.80	peak
3	5040.000	40.85	1.46	42.31	54.00	-11.69	AVG
4	7050.000	44.87	5.84	50.71	74.00	-23.29	peak
5	11100.000	40.62	12.56	53.18	74.00	-20.82	peak
6	17400.000	31.57	21.41	52.98	74.00	-21.02	peak
7	17820.000	30.08	23.30	53.38	74.00	-20.62	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

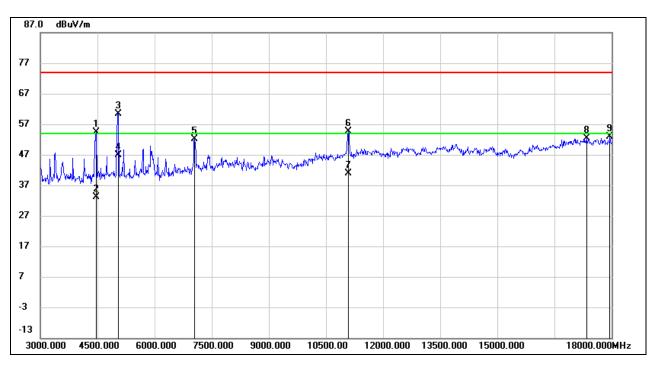
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





## HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	55.26	-0.98	54.28	74.00	-19.72	peak
2	4470.000	33.99	-0.98	33.01	54.00	-20.99	AVG
3	5040.000	58.93	1.46	60.39	74.00	-13.61	peak
4	5040.000	45.49	1.46	46.95	54.00	-7.05	AVG
5	7050.000	46.34	5.84	52.18	74.00	-21.82	peak
6	11085.000	42.00	12.57	54.57	74.00	-19.43	peak
7	11085.000	28.21	12.57	40.78	54.00	-13.22	AVG
8	17340.000	30.81	21.61	52.42	74.00	-21.58	peak
9	17955.000	29.50	23.41	52.91	74.00	-21.09	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

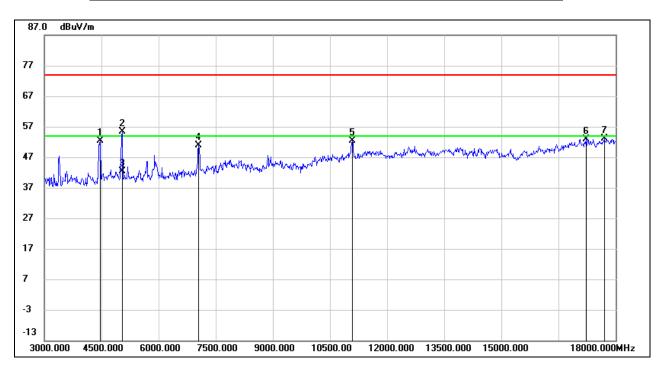
- 3. Peak: Peak detector.
- 4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.



# 8.3.2. 8DPSK MODE



HARMONICS AND SPURIOUS EMISSIONS	(LOW CHANNEL	HORIZONTAL)
TARMONICS AND SPORIOUS LIMISSIONS		, HONIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	53.40	-0.98	52.42	74.00	-21.58	peak
2	5040.000	53.92	1.46	55.38	74.00	-18.62	peak
3	5040.000	40.90	1.46	42.36	54.00	-11.64	AVG
4	7050.000	45.09	5.84	50.93	74.00	-23.07	peak
5	11085.000	39.69	12.57	52.26	74.00	-21.74	peak
6	17220.000	31.90	21.08	52.98	74.00	-21.02	peak
7	17700.000	30.71	22.43	53.14	74.00	-20.86	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

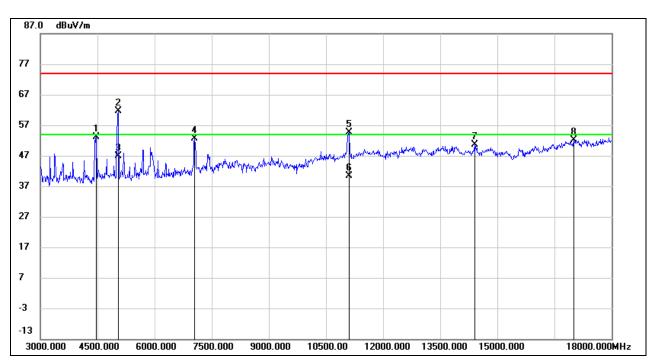
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	54.03	-0.98	53.05	74.00	-20.95	peak
2	5040.000	60.05	1.46	61.51	74.00	-12.49	peak
3	5040.000	45.36	1.46	46.82	54.00	-7.18	AVG
4	7050.000	46.74	5.84	52.58	74.00	-21.42	peak
5	11100.000	42.12	12.56	54.68	74.00	-19.32	peak
6	11100.000	27.77	12.56	40.33	54.00	-13.67	AVG
7	14400.000	34.21	16.35	50.56	74.00	-23.44	peak
8	17010.000	31.76	20.43	52.19	74.00	-21.81	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

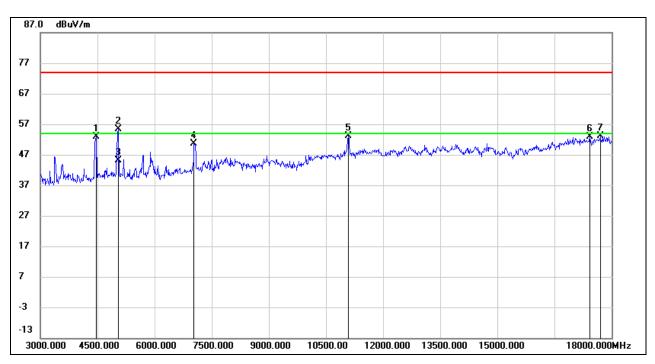
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





## HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	53.75	-0.98	52.77	74.00	-21.23	peak
2	5040.000	53.82	1.46	55.28	74.00	-18.72	peak
3	5040.000	43.55	1.46	45.01	54.00	-8.99	AVG
4	7035.000	44.84	5.81	50.65	74.00	-23.35	peak
5	11085.000	40.66	12.57	53.23	74.00	-20.77	peak
6	17430.000	31.42	21.38	52.80	74.00	-21.20	peak
7	17700.000	30.76	22.43	53.19	74.00	-20.81	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

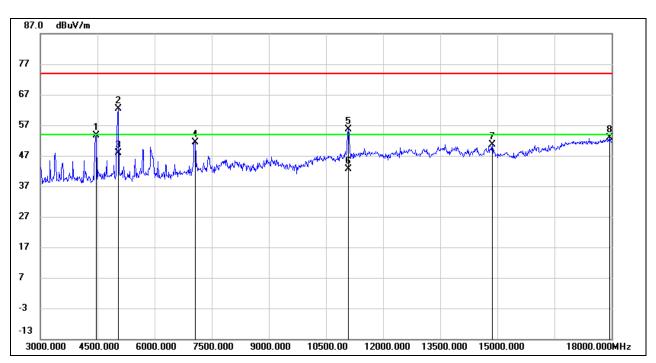
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





HARMONICS AND SPURIOUS EMISSIONS (MID CHANNEL, VERTICAL)
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No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	54.59	-0.98	53.61	74.00	-20.39	peak
2	5040.000	60.92	1.46	62.38	74.00	-11.62	peak
3	5040.000	46.43	1.46	47.89	54.00	-6.11	AVG
4	7065.000	45.60	5.86	51.46	74.00	-22.54	peak
5	11085.000	42.95	12.57	55.52	74.00	-18.48	peak
6	11085.000	29.97	12.57	42.54	54.00	-11.46	AVG
7	14865.000	34.77	15.98	50.75	74.00	-23.25	peak
8	17955.000	29.51	23.41	52.92	74.00	-21.08	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

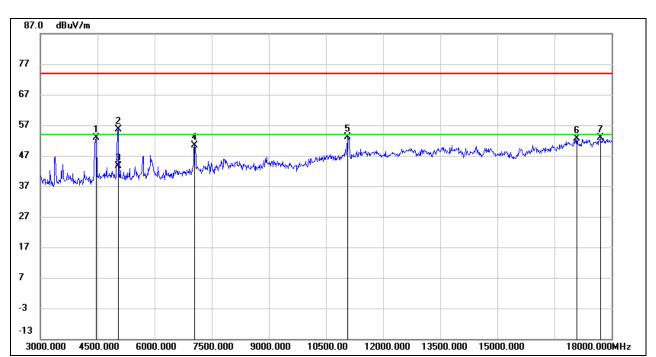
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





#### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	53.83	-0.98	52.85	74.00	-21.15	peak
2	5040.000	54.08	1.46	55.54	74.00	-18.46	peak
3	5040.000	42.16	1.46	43.62	54.00	-10.38	AVG
4	7050.000	44.47	5.84	50.31	74.00	-23.69	peak
5	11070.000	40.46	12.58	53.04	74.00	-20.96	peak
6	17085.000	31.99	20.60	52.59	74.00	-21.41	peak
7	17700.000	30.48	22.43	52.91	74.00	-21.09	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

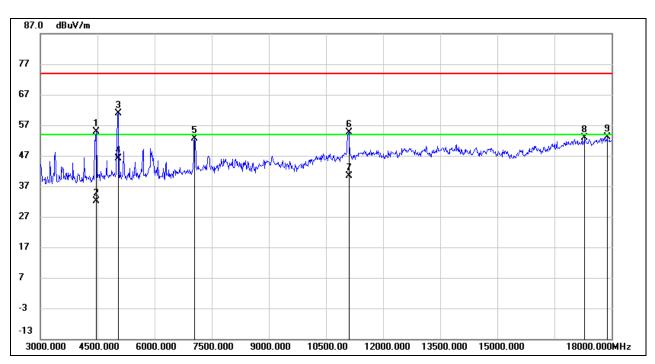
3. Peak: Peak detector.

4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.





#### HARMONICS AND SPURIOUS EMISSIONS (HIGH CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4470.000	55.77	-0.98	54.79	74.00	-19.21	peak
2	4470.000	33.09	-0.98	32.11	54.00	-21.89	AVG
3	5040.000	59.39	1.46	60.85	74.00	-13.15	peak
4	5040.000	44.79	1.46	46.25	54.00	-7.75	AVG
5	7050.000	46.91	5.84	52.75	74.00	-21.25	peak
6	11100.000	42.08	12.56	54.64	74.00	-19.36	peak
7	11100.000	27.71	12.56	40.27	54.00	-13.73	AVG
8	17295.000	31.27	21.71	52.98	74.00	-21.02	peak
9	17880.000	29.89	23.34	53.23	74.00	-20.77	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

- 3. Peak: Peak detector.
- 4. AVG: VBW=1/Ton, where: Ton is the transmitting duration.

5. For the transmitting duration, please refer to clause 7.1.

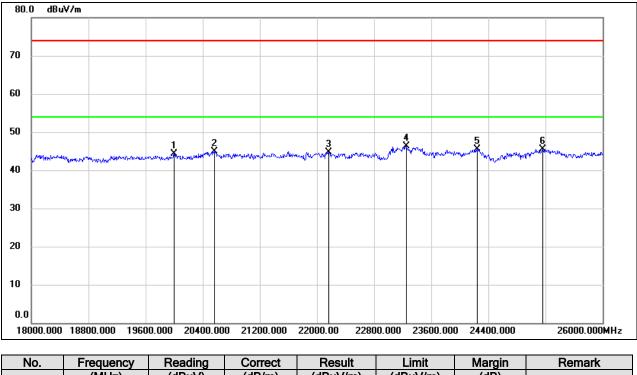
6. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.



# 8.4. SPURIOUS EMISSIONS (18 GHz ~ 26 GHz)

# 8.4.1.8DPSK MODE

SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	20000.000	49.81	-5.45	44.36	74.00	-29.64	peak
2	20560.000	50.23	-5.30	44.93	74.00	-29.07	peak
3	22160.000	49.08	-4.31	44.77	74.00	-29.23	peak
4	23256.000	49.72	-3.35	46.37	74.00	-27.63	peak
5	24248.000	48.32	-2.83	45.49	74.00	-28.51	peak
6	25160.000	47.42	-1.83	45.59	74.00	-28.41	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

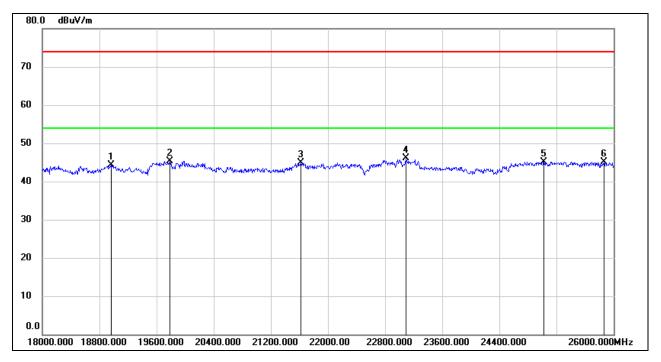
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. The preamplifier only effect to the above 18GHz signal and no filter added to the measurement chain.



## SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	18960.000	49.51	-5.25	44.26	74.00	-29.74	peak
2	19784.000	50.57	-5.28	45.29	74.00	-28.71	peak
3	21624.000	49.51	-4.51	45.00	74.00	-29.00	peak
4	23088.000	49.52	-3.41	46.11	74.00	-27.89	peak
5	25024.000	47.12	-2.05	45.07	74.00	-28.93	peak
6	25864.000	45.90	-0.81	45.09	74.00	-28.91	peak

Note: 1. Peak Result = Reading Level + Correct Factor.

2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

4. The preamplifier only effect to the above 18GHz signal and no filter added to the measurement chain.

Note: All the modes have been tested, only the worst data was recorded in the report.

# 8.5. SPURIOUS EMISSIONS (30 MHz ~ 1 GHz)

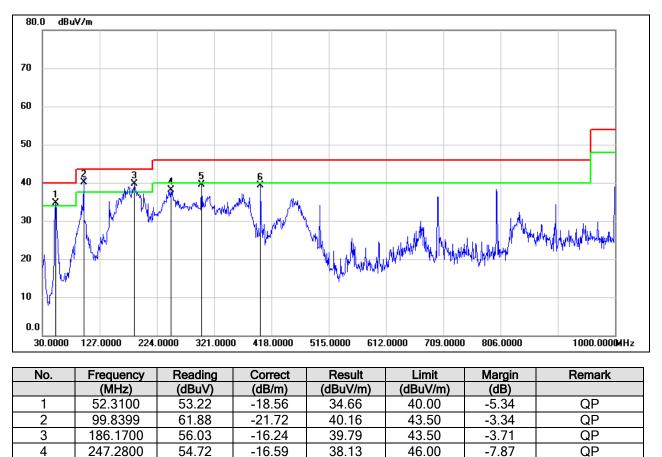
# 8.5.1.8DPSK MODE

5

6

299.6600

399.5700



SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, HORIZONTAL)

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

53.85

52.21

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

39.46

39.40

46.00

46.00

-6.54

-6.60

QP

QP

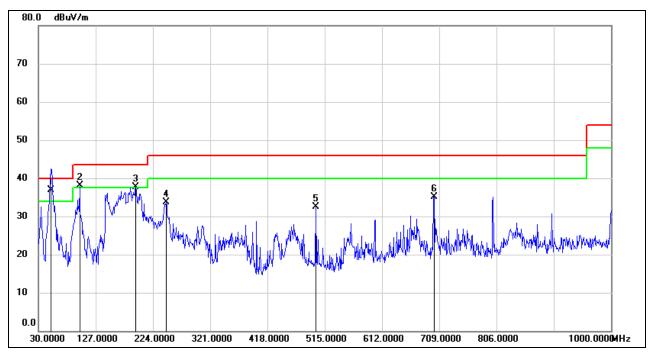
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

-14.39

-12.81



## SPURIOUS EMISSIONS (LOW CHANNEL, WORST-CASE CONFIGURATION, VERTICAL)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	51.3400	55.34	-18.46	36.88	40.00	-3.12	QP
2	99.8399	59.83	-21.72	38.11	43.50	-5.39	QP
3	194.9000	53.61	-15.99	37.62	43.50	-5.88	QP
4	246.3100	50.39	-16.69	33.70	46.00	-12.30	QP
5	499.4800	43.44	-10.93	32.51	46.00	-13.49	QP
6	700.2700	41.99	-6.90	35.09	46.00	-10.91	QP

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto

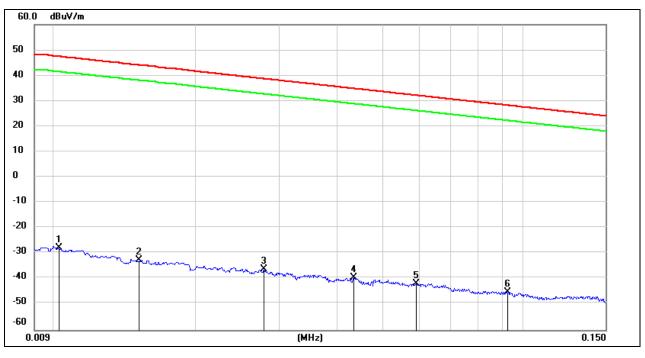
Note: All the modes have been tested, only the worst data was recorded in the report.



# 8.6. SPURIOUS EMISSIONS BELOW 30 MHz

# 8.6.1.8DPSK MODE

## (LOW CHANNEL, LOOP ANTENNA FACE ON TO THE EUT, WORST-CASE CONFIGURATION)



## <u>9 kHz~ 150 kHz</u>

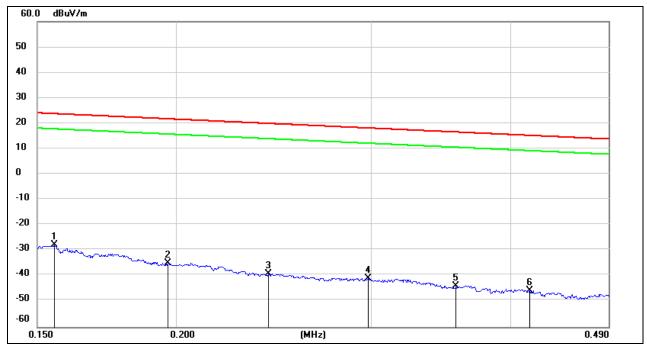
No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.0102	73.55	-101.40	-27.85	47.43	-79.35	-4.07	-75.28	peak
2	0.0151	68.71	-101.37	-32.66	44.02	-84.16	-7.48	-76.68	peak
3	0.0279	65.17	-101.38	-36.21	38.69	-87.71	-12.81	-74.90	peak
4	0.0434	62.04	-101.45	-39.41	34.85	-90.91	-16.65	-74.26	peak
5	0.0589	59.81	-101.52	-41.71	32.2	-93.21	-19.30	-73.91	peak
6	0.0926	56.48	-101.74	-45.26	28.27	-96.76	-23.23	-73.53	peak

Note: 1. Measurement = Reading Level + Correct Factor (dBuA/m= dBuV/m- 20Log10[120 $\pi$ ] = dBuV/m- 51.5).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

## <u>150 kHz ~ 490 kHz</u>



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1554	73.77	-101.65	-27.88	23.77	-79.38	-27.73	-51.65	peak
2	0.1965	66.69	-101.71	-35.02	21.73	-86.52	-29.77	-56.75	peak
3	0.2421	62.54	-101.78	-39.24	19.92	-90.74	-31.58	-59.16	peak
4	0.2977	60.91	-101.85	-40.94	18.13	-92.44	-33.37	-59.07	peak
5	0.3573	58.08	-101.91	-43.83	16.54	-95.33	-34.96	-60.37	peak
6	0.4162	56.18	-101.98	-45.8	15.22	-97.30	-36.28	-61.02	peak

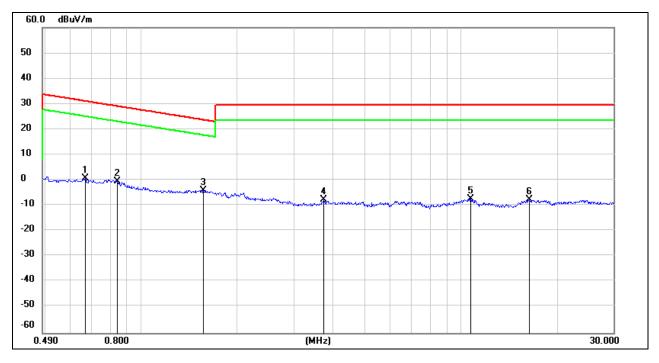
Note: 1. Measurement = Reading Level + Correct Factor ( $dBuA/m = dBuV/m - 20Log10[120\pi] = dBuV/m - 51.5$ ).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.



#### <u>490 kHz ~ 30 MHz</u>



No.	Frequency	Reading	Correct	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.6671	62.75	-62.10	0.65	31.12	-50.85	-20.38	-30.47	peak
2	0.8400	61.71	-62.17	-0.46	29.12	-51.96	-22.38	-29.58	peak
3	1.5625	57.96	-62.02	-4.06	23.73	-55.56	-27.77	-27.79	peak
4	3.7100	53.70	-61.41	-7.71	29.54	-59.21	-21.96	-37.25	peak
5	10.7299	53.48	-60.83	-7.35	29.54	-58.85	-21.96	-36.89	peak
6	16.3959	53.17	-60.96	-7.79	29.54	-59.29	-21.96	-37.33	peak

Note: 1. Measurement = Reading Level + Correct Factor ( $dBuA/m = dBuV/m - 20Log10[120\pi] = dBuV/m - 51.5$ ).

2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.

3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Note: All the modes have been tested, only the worst data was recorded in the report.



# 9. AC POWER LINE CONDUCTED EMISSIONS

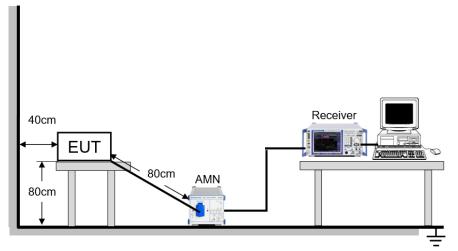
## LIMITS

Please refer to CFR 47 FCC §15.207 (a) and ISED RSS-Gen Clause 8.8

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

## TEST SETUP AND PROCEDURE

Refer to ANSI C63.10-2013 clause 6.2.



The EUT is put on a table of non-conducting material that is 80 cm high. The vertical conducting wall of shielding is located 40 cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9 kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

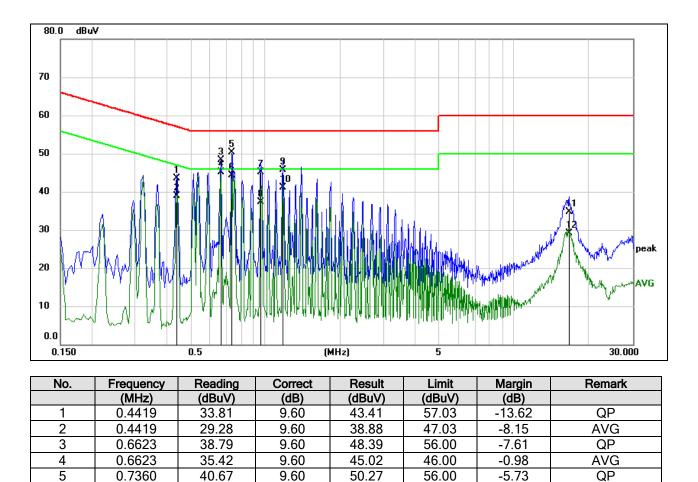
#### TEST ENVIRONMENT

Temperature	22.9 °C	Relative Humidity	68.3 %
Atmosphere Pressure	101 kPa	Test Voltage	DC 12 V

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# 9.1.1.8DPSK MODE



## LINE L RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)

Note: 1. Result = Reading + Correct Factor.

0.7360

0.9613

0.9613

1.1798

1.1798

16.6322

16.6322

34.61

35.41

27.66

36.13

31.42

24.72

19.09

6

7

8

9

10

11

12

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

44.21

45.02

37.27

45.74

41.03

34.65

29.02

46.00

56.00

46.00

56.00

46.00

60.00

50.00

-1.79

-10.98

-8.73

-10.26

-4.97

-25.35

-20.98

AVG

QP

AVG

QP

AVG

QP

AVG

3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).

9.60

9.61

9.61

9.61

9.61

9.93

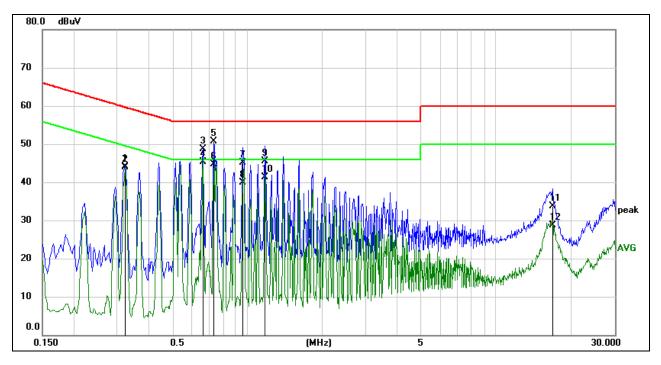
9.93

4. Step size: 80 Hz (0.009 MHz ~ 0.15 MHz), 4 kHz (0.15 MHz ~ 30 MHz), Scan time: auto.

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## LINE N RESULTS (LOW CHANNEL, WORST-CASE CONFIGURATION)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.3232	34.46	9.60	44.06	59.62	-15.56	QP
2	0.3232	34.21	9.60	43.81	49.62	-5.81	AVG
3	0.6622	39.14	9.60	48.74	56.00	-7.26	QP
4	0.6622	35.80	9.60	45.40	46.00	-0.60	AVG
5	0.7361	41.08	9.60	50.68	56.00	-5.32	QP
6	0.7361	35.03	9.60	44.63	46.00	-1.37	AVG
7	0.9633	35.44	9.61	45.05	56.00	-10.95	QP
8	0.9633	30.22	9.61	39.83	46.00	-6.17	AVG
9	1.1807	35.90	9.61	45.51	56.00	-10.49	QP
10	1.1807	31.61	9.61	41.22	46.00	-4.78	AVG
11	16.8503	23.76	10.02	33.78	60.00	-26.22	QP
12	16.8503	18.68	10.02	28.70	50.00	-21.30	AVG

Note: 1. Result = Reading + Correct Factor.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz ~ 150 kHz), 9 kHz (150 kHz ~ 30 MHz).

4. Step size: 80 Hz (0.009 MHz  $\sim$  0.15 MHz), 4 kHz (0.15 MHz  $\sim$  30 MHz), Scan time: auto.

Note: All the modes have been tested, only the worst data was recorded in the report.

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# **10. ANTENNA REQUIREMENTS**

## **APPLICABLE REQUIREMENTS**

## Please refer to FCC §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.

## Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## **RESULTS**

Complies



# 11. Appendix

# 11.1. Appendix A: 20dB Emission Bandwidth 11.1.1. Test Result

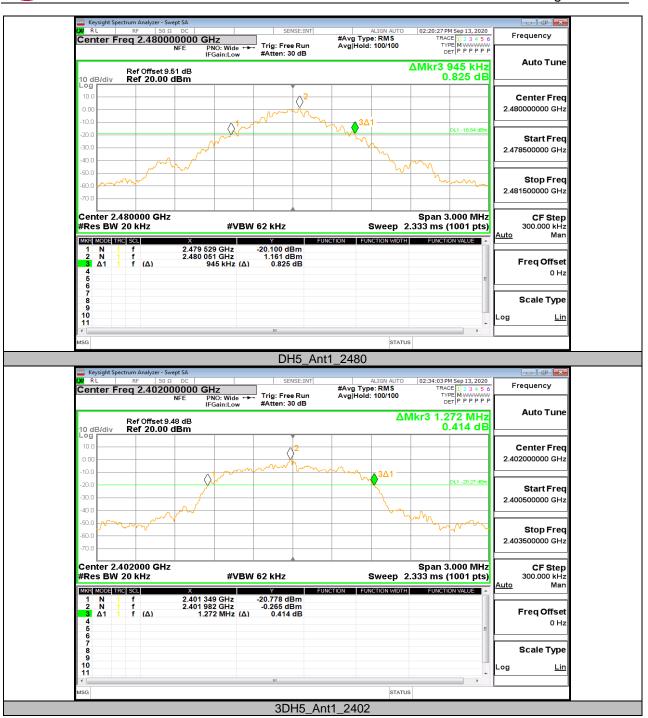
Test Packet Type	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Verdict
		2402	0.942	2401.532	2402.474	PASS
DH5	Ant1	2441	0.942	2440.532	2441.474	PASS
		2480	0.945	2479.529	2480.474	PASS
		2402	1.272	2401.349	2402.621	PASS
3DH5	Ant1	2441	1.248	2440.361	2441.609	PASS
		2480	1.242	2479.364	2480.606	PASS



# 11.1.2. Test Graphs



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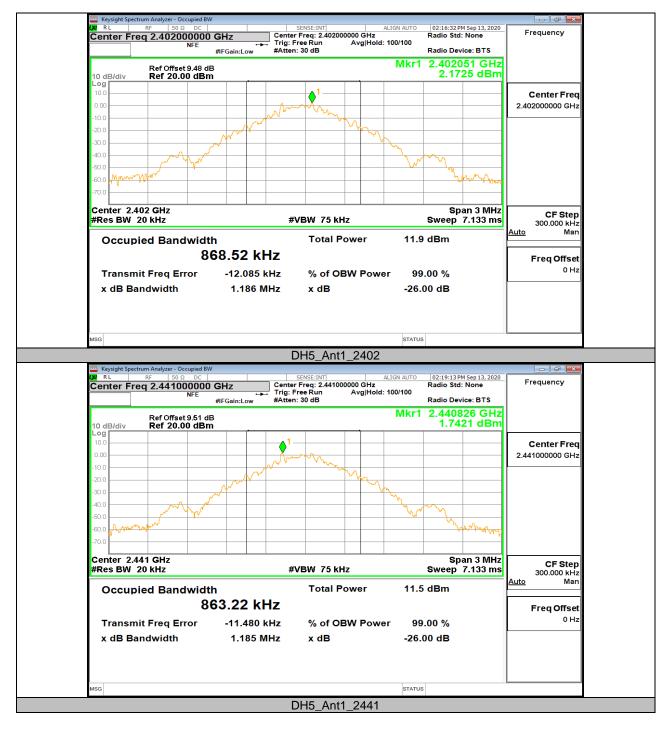


# 11.2. Appendix B: Occupied Channel Bandwidth 11.2.1. Test Result

Test Packet Type	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
	DH5 Ant1	2402	0.86852	2401.554	2402.422	PASS
DH5		2441	0.86322	2440.557	2441.420	PASS
		2480	0.86509	2479.555	2480.420	PASS
		2402	1.1573	2401.414	2402.571	PASS
3DH5	Ant1	2441	1.1688	2440.407	2441.576	PASS
		2480	1.1624	2479.411	2480.573	PASS

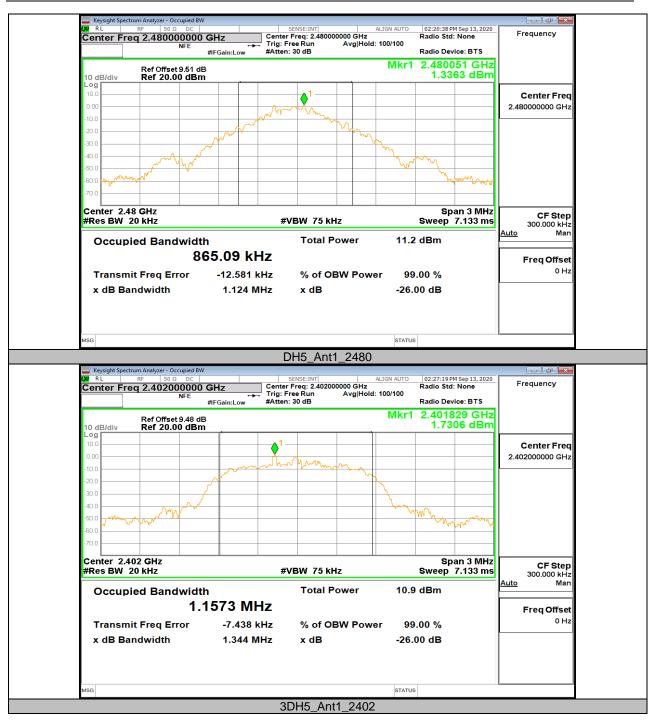


# 11.2.2. Test Graphs



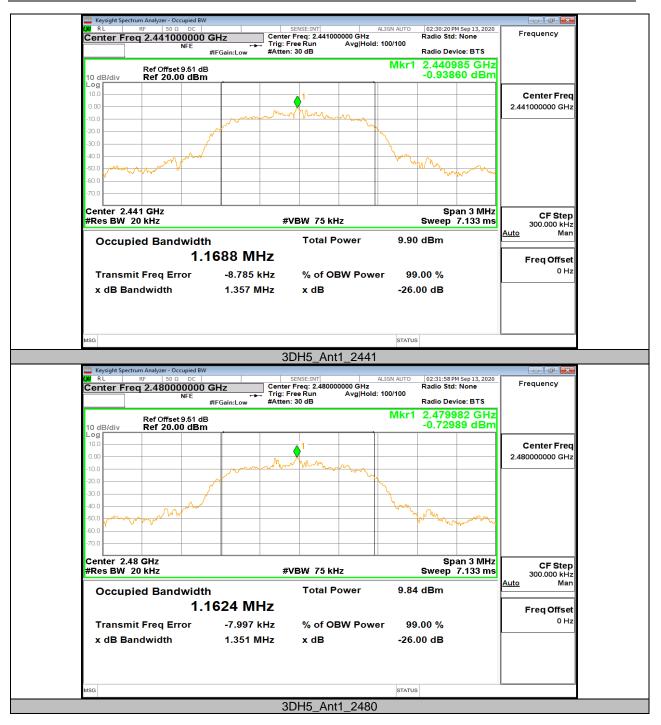


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## 11.3. Appendix C: Maximum peak conducted output power 11.3.1. Test Result

Test Packet Type	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
		2402	5.81	30	PASS
DH5	Ant1	2441	5.30	30	PASS
		2480	4.91	30	PASS
		2402	6.34	30	PASS
3DH5	Ant1	2441	5.83	30	PASS
		2480	5.46	30	PASS



# 11.4. Appendix D: Carrier frequency separation 11.4.1. Test Result

Test Packet Type	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Нор	1.008	>=0.945	PASS
3DH5	Ant1	Нор	1.008	>=1.272	PASS



## 11.4.2. Test Graphs





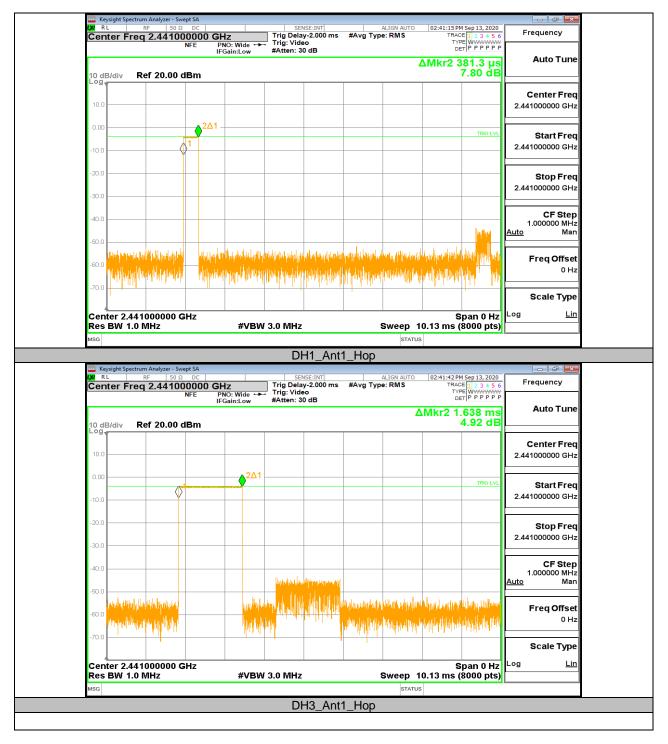
## 11.5. Appendix E: Time of occupancy 11.5.1. Test Result

			FHSS Mode			
Test Packet Type	Antenna	Channel	BurstWidth [ms]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.38	0.122	<=0.4	PASS
DH3	Ant1	Нор	1.64	0.262	<=0.4	PASS
DH5	Ant1	Нор	2.89	0.308	<=0.4	PASS
3DH1	Ant1	Нор	0.39	0.125	<=0.4	PASS
3DH3	Ant1	Нор	1.64	0.262	<=0.4	PASS
3DH5	Ant1	Нор	2.89	0.308	<=0.4	PASS

			AFHSS Mode			
Test Packet Type	Antenna	Channel	BurstWidth [ms]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.38	0.061	<=0.4	PASS
DH3	Ant1	Нор	1.64	0.131	<=0.4	PASS
DH5	Ant1	Нор	2.89	0.154	<=0.4	PASS
3DH1	Ant1	Нор	0.39	0.062	<=0.4	PASS
3DH3	Ant1	Нор	1.64	0.131	<=0.4	PASS
3DH5	Ant1	Нор	2.89	0.154	<=0.4	PASS

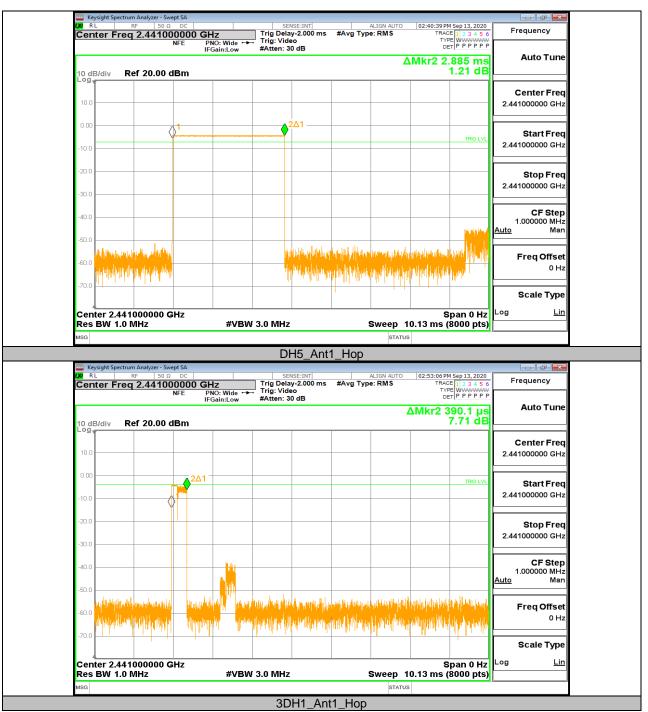


## 11.5.2. Test Graphs



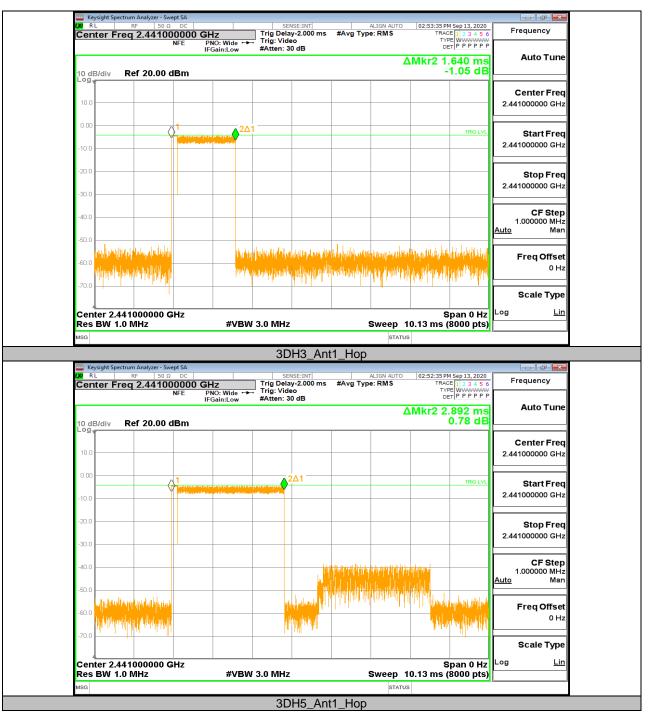
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## 11.6. Appendix F: Number of hopping channels 11.6.1. Test Result

Test Packet Type	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Нор	79	>=15	PASS
3DH5	Ant1	Нор	79	>=15	PASS



### 11.6.2. Test Graphs



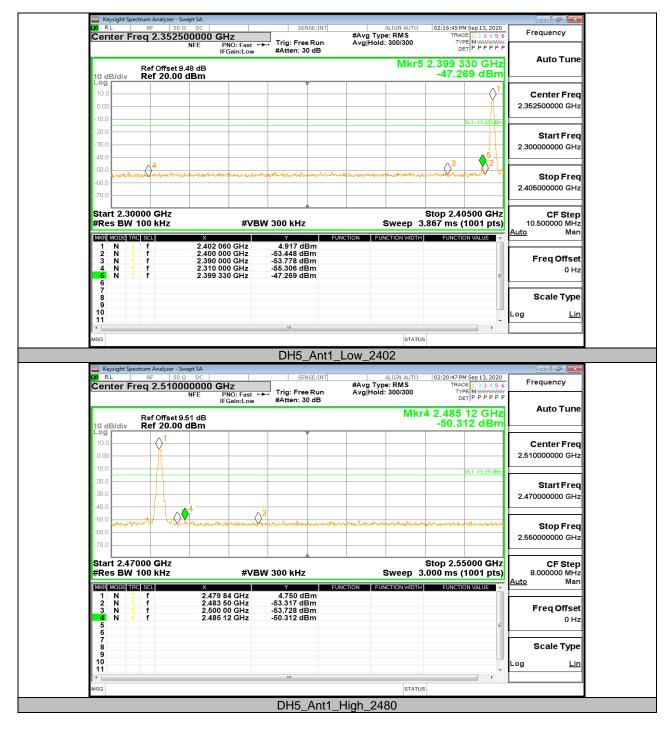


## 11.7. Appendix G: Band edge measurements 11.7.1. Test Result

Test Packet Type	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Low	2402	4.92	-47.27	<=-15.08	PASS
DH5	A pt1	High	2480	4.75	-50.31	<=-15.25	PASS
DHD	Ant1	Low	Hop_2402	4.79	-50.86	-15.21	PASS
		High	Hop_2480	4.21	-50.54	-15.79	PASS
		Low	2402	4.78	-48.4	<=-15.22	PASS
3DH5	Ant1	High	2480	4.62	-51.21	<=-15.38	PASS
3005	Anti	Low	Hop_2402	5.35	-50.38	-14.65	PASS
		High	Hop_2480	3.48	-50.55	-16.52	PASS



## 11.7.2. Test Graphs



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(X/ RL RF 50	Swept SA Ω DC	SENSE:INT	ALIGN AUTO	02:35:39 PM Sep 13, 2020	
Center Freq 2.3550		Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE M DET P P P P P	Frequency
Ref Offset 1 10 dB/div Ref 20.00	9.37 dB		Mkı	<sup>-5</sup> 2.399 33 GHz -50.861 dBm	Auto Tune
10.0 0.00 -10.0				DL(-15.2) dBrf	Center Freq 2.355000000 GHz
-20.0					<b>Start Freq</b> 2.300000000 GHz
-50.0 -70.0	กระระคาโหมหารหางราช 	drameral a host adready was	maandur ditman un totanud	3 	<b>Stop Freq</b> 2.410000000 GHz
Start 2.30000 GHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 4	Stop 2.41000 GHz 1.067 ms (1001 pts)	<b>CF Step</b> 11.000000 MHz <u>Auto</u> Man
1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	2.408 13 GHz 2.400 00 GHz 2.390 00 GHz 2.310 00 GHz 2.399 33 GHz	4.786 dBm -54.049 dBm -53.619 dBm -54.885 dBm -50.861 dBm		E	Freq Offset 0 Hz
6 7 8 9 10					Scale Type
11				-	Log <u>Lin</u>
MSG			STATU	e	
				3	
		DH5_Ant1_Lc	w_Hop_2402	3	
Keysight Spectrum Analyzer - 1			w_Hop_2402	02:42:13 PM Sep 13, 2020	
	Swept SA D Ω DC	DH5_Ant1_LC			Frequency
122 RL RF 50 Center Freq 2.5100 Ref Offset 1 10 dB/div Ref 20.00	Swept SA	SENSE:INT	W_Hop_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:42:13 PM Sep 13, 2020	
Center Freq 2.5100	Swept SA	SENSE:INT	W_Hop_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:42:13 PM Sep 13, 2020 TRACE [1 2:3 4 5 6 TYPE M 2:3 4 5 6 TYPE M 2:3 45 6 TYPE M 2:3 5 TYPE M 2:3	Frequency
00         RL         RF         50           Center Freq 2.5100         Ref Offset 1         10           10         dB/div         Ref 20.00           10.0         10.0         10.0	Swept SA DR DC	SENSE:INT	W_Hop_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:42:13PM Sep 13, 2020 TRACE [1 2 3 4 5 6 TYPE M WWWW DET   P P P P P P 4 2,505 76 GHz	Frequency Auto Tune Center Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 1         S0           10 dB/div         Ref 20.00         10.0         10.0           10.0         10.0         10.0         10.0         10.0           -10.0         10.0         10.0         10.0         10.0         10.0           -10.0         10.0	Swept SA	SENSE:INT	W_Hop_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:42:13 PM Sep 13, 2020 TRACE [1 2:3 4 5 6 TYPE M 2:3 4 5 6 TYPE M 2:3 45 6 TYPE M 2:3 5 TYPE M 2:3	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq
RL         RF         50           Center Freq 2.5100         Ref Offset         Start           10 dB/div         Ref 20.00         Ref 20.00           -20 0	Swept SA 19 DC NFE PNO: Fast IFGain:Low 9.51 dB 0 dBm 2 2 2 3 2 3 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4	sense:int Trig: Free Run #Atten: 30 dB	w_Hop_2402	02:42:13 PM Sep 13, 2020 TRACE [] 2 3 4 5 6 TYPE [] 4 2: 4 5 6 TYPE M WWWW DET  P P P P P 4 2.505 76 GHz -50.535 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz Stop Freq 2.550000000 GHz CF Step 8.000000 MHz
RL         RF         50           Center Freq 2.5100         Ref Offset:         S0           10 dE/div         Ref 20.00         Ref 20.00           10.0              -10.0               -20.0                -30.0                 -30.0                  -30.0	Swept SA 19 DC NFE PNO: Fast IFGain:Low 9.51 dB 0 dBm 2 2 2 3 2 3 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4	sense:int Trig: Free Run #Atten: 30 dB	W_Hop_2402	02:42:13 PM Sep 13, 2020 TRACE [] 2 3 4 5 6 TYPE [] 4 2: 4 5 6 TYPE M WWWW DET  P P P P P 4 2.505 76 GHz -50.535 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz Stop Freq 2.550000000 GHz CF Step 8.000000 MHz
RL         RF         50           Center Freq 2.5100         Ref Offset:         50           Log         Ref 20.00         Ref 20.00           10 dB/div         Ref 20.00         Ref 20.00           10 dB/div         Ref 20.00         Ref 20.00           -10.0         -10.0         -10.0         -10.0           -20.0         -30.0	Swept SA 3 Ω DC NFE PNO: Fast ↔ IFGain:Low 9.51 dB 0 dBm 2 2 4 2 4 8 8 4 8 8 4 8 8 4 8 8 4 8 8 4 8 8 8 4 8 8 8 4 8 8 8 4 8 8 8 8 8 8 8 8 8 8 8 8 8	SENSE:INT Trig: Free Run #Atten: 30 dB 4 4 300 kHz 4.214 dBm -54.265 dBm -52.102 dBm	w_Hop_2402	02:42:13 PM Sep 13, 2020 TRACE [] 2 3 4 5 6 TYPE [] 4 2: 4 5 6 TYPE M WWWW DET  P P P P P 4 2.505 76 GHz -50.535 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset
RL         RF         50           Center Freq 2.5100         Ref Offset:         S0           10 dE/div         Ref 20.00         Ref 20.00           10.0              -10.0               -20.0                -30.0                 -30.0                  -30.0	Swept SA 3 Ω DC NFE PNO: Fast ↔ IFGain:Low 9.51 dB 0 dBm 2 2 4 2 4 8 8 4 8 8 4 8 8 4 8 8 4 8 8 4 8 8 8 4 8 8 8 4 8 8 8 4 8 8 8 8 8 8 8 8 8 8 8 8 8	SENSE:INT Trig: Free Run #Atten: 30 dB 4 4 300 kHz 4.214 dBm -54.265 dBm -52.102 dBm	w_Hop_2402	02:42:13 PM Sep 13, 2020 TRACE [] 2 3 4 5 6 TYPE [] 4 2: 4 5 6 TYPE M WWWW DET  P P P P P 4 2.505 76 GHz -50.535 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 0L1 -15.79 dBm 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset 0 Hz

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	50 Ω DC	SENSE:INT	ALIGN AUTO	02:27:32 PM Sep 13, 2020	Frequency
Center Freq 2.35	NFE PNO: Fast • IFGain:Low	➡ Trig: Free Run #Atten: 30 dB	Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P	
	et 9.48 dB		Mkr5 2	2.399 645 GHz -48.401 dBm	Auto Tune
Log	00 dBm	Ť			
10.0					Center Freq 2.352500000 GHz
-10.0				DL1 -15.22 dBm	2.352500000 GH2
-20.0				DE1-15.22 05m	Start Freq
-30.0					2.300000000 GHz
-40.0					
-60.0	all All and all group of a second of a	managentistication	- manute - Martin Martin Regard Samphone	munited and the	Stop Freq 2.40500000 GHz
-70.0					2.403000000 GH2
Start 2.30000 GHz				top 2.40500 GHz	CF Step
#Res BW 100 kHz	#VB	SW 300 kHz	Sweep 3.8	67 ms (1001 pts)	10.500000 MHz <u>Auto</u> Man
	2.401 955 GHz 2.400 000 GHz	4.784 dBm -51.080 dBm	FORCHON WIDTH		
1 N 1 f 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	2.390 000 GHz 2.310 000 GHz	-54.522 dBm -55.019 dBm			Freq Offset 0 Hz
6	2.399 645 GHz	-48.401 dBm		E	
7 8 9					Scale Type
10 11					Log <u>Lin</u>
•		m	i i	•	
			OTATIO		
MSG		3DH5 Apt1	status		
		3DH5_Ant1	_Low_2402		
	50 Ω DC 0000000 GHz	SENSE:INT	_Low_2402 ALIGN AUTO #Avg Type: RMS	02:32:12 PM Sep 13, 2020 TRACE 1 2 3 4 5 6 TRACE 1 2 3 4 5 6	Frequency
Keysight Spectrum Analyze	50 Ω DC	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P	Frequency
Keysight Spectrum Analyze RL RF Center Freq 2.51 Ref Offse	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low et 9.51 dB	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P 2.484 80 GHz	
Keysight Spectrum Analyze R R RF Center Freq 2.51 10 dB/div Ref Offso 0 dB/div Ref 20.	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P	Frequency Auto Tune
Keysight Spectrum Analyze R RL RF Center Freq 2.51 Center Freq 2.51 Ref Offse 10 dB/div Ref 20. 10.0	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low et 9.51 dB	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P 2.484 80 GHz	Frequency Auto Tune Center Freq
Keysight Spectrum Analyze R R RF Center Freq 2.51 10 dB/div Ref Offso 0 dB/div Ref 20.	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low et 9.51 dB	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	123456 TYPE WWWWW DET PPPPP 2.484 80 GHz -51.208 dBm	Frequency Auto Tune
Keysight Spectrum Analyze	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low et 9.51 dB	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P P 2.484 80 GHz	Frequency Auto Tune Center Freq
Keysight Spectrum Analyze           RL         RF           Center Freq 2.51           Ref Offse           O dB/div         Ref 20.           10.0         1           20.0         1           20.0         1           30.0         1	50 Ω DC 0000000 GHz NFE PNO: Fast • IFGain:Low et 9.51 dB	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	123456 TYPE WWWWW DET PPPPP 2.484 80 GHz -51.208 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz
Keysight Spectrum Analyze     RL RF Center Freq 2.51	50 Q DC   0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWWDET P P P P P P P 2.484 80 GHz -51.208 dBm DL1 -1538 dBm	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz
Keysight Spectrum Analyze           R         RF           Center Freq 2.51           O dB/div         Ref Offs           0.0         0.0           10.0         0.0           -10.0         0.0           -30.0         -40.0	50 Q DC   0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm	SENSE:INT	Low_2402	123456 TYPE WWWWW DET PPPPP 2.484 80 GHz -51.208 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq
Keysight Spectrum Analyze     Ref Offset     Center Freq 2.51     Ref Offset     OdB/div Ref 20.     10.0     .00	50 Q DC   0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm	SENSE:INT	Low_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300 Mkr4	TRACE 1 2 3 4 5 6 TYPE MWWWWDET P P P P P P P 2.484 80 GHz -51.208 dBm DL1 -1538 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq
Keysight Spectrum Analyze           R         RF           Center Freq 2.51           O dB/div         Ref Offse           10 dB/div         Ref 20.           10 0         1           -10 0         1           -20 0         -1           -30 0         -40 0           -60 0         -70 0           Start 2.47000 GHz	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm	SENSE:INT	Low_2402	2.484 80 GHz -51.208 dBm DL1-1538 dBm	Frequency Auto Tune Center Freq 2.510000000 GHz 2.470000000 GHz 2.550000000 GHz CF Step
Keysight Spectrum Analyze     Ref Offse     Center Freq 2.51     Ref Offse     Cog     10.0     0.00     0	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6           TYPE MWWWWE           DET P P P P P           2.484 80 GHz           -51.208 dBm           DL1 -15.38 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz
Keysight Spectrum Analyze     Ref Offset     Center Freq 2.51     Ref Offset     R	50 Q DC   0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm #VB #VB 2.479 84 GHz 2.479 84 GHz	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man
Keysight Spectrum Analyze           R.L         RF           Center Freq 2.51           Ref Offset           Log         Ref Offset           10         Image: Center Freq 2.51           Ref Offset         Ref Offset           Log         Image: Center Freq 2.51           Image: Center Freq 2.51         Ref Offset           Image: Center Freq 2.51         Ref Offset           Image: Center Freq 2.51         Image: Center Freq 2.51           Image: Center Freq 2.51         Image: Center Freq 5.51           Image: C	50 Q DC 000000 GHz 0000000 GHz NFE PN0: Fast - IFGain:Low et 9.51 dB 00 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz Stop Freq 2.550000000 GHz CF Step 8.000000 MHz
Keysight Spectrum Analyze           Ref Offse           Center Freq 2.51           Center Freq 2.51           Ref Offse           O dB/div         Ref 20.           Start 2.47000         GHz           Start 2.47000         GHz           MXE MODE TRG SCL         SCL           I         I         I           I         I         I           Start Note TRG SCL         I         I           N         I         I           N         I         I	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset
Keysight Spectrum Analyze           Ref         Ref           Center Freq 2.51           Center Freq 2.51           Ref Offse           O dB/div         Ref 20.           10.0         1           10.0         1           10.0         1           10.0         1           10.0         1           20.0         1           30.0         1           40.0         1           50.0         1           50.0         1           50.0         1           50.0         1           6         6           7.0         1         1	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset
Keysight Spectrum Analyze           Ref Offse           Center Freq 2.51           Center Freq 2.51           Ref Offse           O dB/div         Ref 20.           Start 2.47000         GHz           Start 2.47000         GHz           MXE MODE TRG SCL         SCL           I         I         I           I         I         I           Start Note TRG SCL         I         I           N         I         I           N         I         I	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz CF Step 8.00000 GHz Auto Man Freq Offset 0 Hz
Ref Offs: Ref 2.51	50 Q DC 0000000 GHz NFE PNO: Fast - IFGain:Low et 9.51 dB 00 dBm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	Low_2402	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P 2.484 80 GHz -51.208 dBm DL1 -15.30 dBm DL1 -15.30 dBm top 2.55000 GHz 00 ms (1001 pts)	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz Stop Freq 2.550000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz Scale Type

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	Ω DC	SENSE:INT	ALIGN AUTO	02:42:40 PM Sep 13, 2020	Frequency
Center Freq 2.3550	NFE PNO: Fast ← IFGain:Low	► Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold: 300/300	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P P	. requercy
Ref Offset 9	9.37 dB		Mkr	r5 2.388 88 GHz	Auto Tune
10 dB/div Ref 20.00				-50.377 dBm	
10.0				1	Center Freq
0.00				- Willing Way	2.355000000 GHz
-10.0				DL1 -14.65 dBm	
-20.0					Start Freq
-30.0					2.300000000 GHz
-40.0				5 <sub>3</sub> 2	
-50.0	๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛	water and the second of the	พลงสาวารุโลริกสาราสาราสาราสาราสาร	- Moran Maria	Stop Freq
-60.0					2.410000000 GHz
Start 2.30000 GHz #Res BW 100 kHz	#VB	W 300 kHz	Sween 4	Stop 2.41000 GHz I.067 ms (1001 pts)	CF Step 11.000000 MHz
MKR MODE TRC SCL	× 13		UNCTION EUNCTION WIDTH		Auto Man
1 N 1 f	2.409 78 GHz 2.400 00 GHz	5.350 dBm -52.081 dBm			
2 N 1 f 3 N 1 f 4 N 1 f	2.390 00 GHz	-53.604 dBm			Freq Offset
4 N 1 f 5 N 1 f 6	2.310 00 GHz 2.388 88 GHz	-53.758 dBm -50.377 dBm		Е	0 Hz
0 7 8					Scale Type
9 10					
10				-	Log <u>Lin</u>
MSG		m	STATU	-	
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		3DH5 Ant1 L		S	
Keysight Spectrum Analyzer - S		3DH5_Ant1_L	ow_Hop_2402	S	
<b>IXI</b> RL RF 50	Swept SA Ω DC	3DH5_Ant1_L	OW_HOP_2402	02:54:02 PM Sep 13, 2020	Frequency
<b>IX RL RF 50</b>	Swept SA Ω DC     000000 GHz NFE PNO: Fast ←	SENSE:INT	ow_Hop_2402		
Denter Freq 2.5100	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWWW	
RE RF 30 Center Freq 2.5100 Ref Offset 3 10 dB/div Ref 20.00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P	Frequency
Center Freq 2.5100	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 11 23 4 5 6 TYPE MWWWW DET P P P P P P 4 2.485 84 GHz	Frequency Auto Tune
RL RF 50 Center Freq 2.510(     Ref Offset 5     Ref 20.00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 11 23 4 5 6 TYPE MWWWW DET P P P P P P 4 2.485 84 GHz	Frequency
RL         RF         50           Center Freq 2.510(         Ref Offset 1           10 dB/div         Ref Offset 20.000           10 dB/div         Ref 20.000	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M WWWW DET P P P P P P 74 2.485 84 GHz -50.550 dBm	Frequency Auto Tune Center Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 5           10 dB/div         Ref 20.00           10.0         1           .00         1           .00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 11 23 4 5 6 TYPE MWWWW DET P P P P P P 4 2.485 84 GHz	Frequency Auto Tune Center Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 5           10 dB/div         Ref 20.00           10.0         1           .00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M WWWW DET P P P P P P 74 2.485 84 GHz -50.550 dBm	Frequency Auto Tune Center Freq 2.510000000 GHz
RL         RF         50           Center Freq 2.5100         Ref Offset 2           10 dB/div         Ref 20.00           10.0         1           .00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M WWWW DET P P P P P P 74 2.485 84 GHz -50.550 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 2           10 dB/div         Ref 20.00           10.0         1           -10.0         -1           -10.0         -1           -20.0         -30.0           -40.0         -50.0	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M WWWW DET P P P P P P 74 2.485 84 GHz -50.550 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 2           10 dB/div         Ref 20.00           10 dB/div         Ref 20.00           -0.00	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M 23 4 5 6 TYPE M 24 5 84 GHz -50.550 dBm 0.1 -16.52 dBm	Frequency Auto Tune Center Freq 2.510000000 GHz Start Freq 2.470000000 GHz
RL         RF         50           Center Freq 2.5100         Ref Offset (Control of the control of the contro	Swept SA Ω DC D000000 GHz NFE PNO: Fast ← IFGain:Low 9.51 dB	SENSE:INT	OW_HOP_2402 ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	02:54:02 PM Sep 13, 2020 TRACE 1 23 4 5 6 TYPE M WWWW DET P P P P P 74 2.485 84 GHz -50.550 dBm DL1 -16.52 dBm DL1 -16.52 dBm DL1 -16.52 dBm	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz
RL         RF         50           Center Freq 2.5100         Ref Offset 3           10 dB/div         Ref 20.00           10 dB/div         Ref 20.00           10.0         1           10.0         1           10.0         1           20.0         1           30.0         1           -40.0         -           -50.0         -           -70.0         -           Start 2.47000 GHz	Swept SA Q DC   NFE PNO: Fast - IFGain:Low   9.51 dB   dBm   2.4	SENSE:INT	ow_Hop_2402  ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300  Mkr	102:54:02 PM Sep 13, 2020     TRACE 1 23 4 5 6     TYPE M ***********************************	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq
RL         RF         50           Center Freq 2.5100         Ref Offset 9           10 dB/dlv         Ref 20.00           10.0         1           .000	Swept SA Q DC   NFE PNO: Fast - IFGain:Low   9.51 dB   dBm   2.4	SENSE:INT Trig: Free Run #Atten: 30 dB	ow_Hop_2402  ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300  Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz 2.47000000 GHz 2.55000000 GHz 2.5500000 GHz CF Step
Ric         RF         50           Center Freq 2.510(         Ref Offset 5           0 dB/div         Ref 20.000           10.0         1           0.00         1 <t< td=""><td>Swept SA © DC                                    </td><td>SENSE:INT Trig: Free Run #Atten: 30 dB</td><td>ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr</td><td>02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)</td><td>Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man</td></t<>	Swept SA © DC	SENSE:INT Trig: Free Run #Atten: 30 dB	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man
Ric         RF         50           Center Freq 2.510(         Ref Offset 5           0 dB/div         Ref 20.000           10.0         1           0.00         1 <t< td=""><td>Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz</td><td>SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm</td><td>ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr</td><td>02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)</td><td>Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset</td></t<>	Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz	SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset
Ric         RF         50           Center Freq 2.510(         Ref Offset 5           0 dB/div         Ref 20.000           10.0         1           0.00         1 <t< td=""><td>Swept SA Q DC   NFE PNO: Fast - IFGain:Low   9.51 dB   0 dBm   2.44 4 </td><td>SENSE:INT</td><td>ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr</td><td>02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)</td><td>Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man</td></t<>	Swept SA Q DC   NFE PNO: Fast - IFGain:Low   9.51 dB   0 dBm   2.44 4 	SENSE:INT	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man
Ric         RF         50           Center Freq 2.510(         Ref Offset 5           0 dB/div         Ref 20.000           10.0         1           0.00         1 <t< td=""><td>Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz</td><td>SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm</td><td>ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr</td><td>02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)</td><td>Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset 0 Hz</td></t<>	Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz	SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset 0 Hz
M         RF         50           Center Freq 2.5100         Ref Offset 5           O         B/dlv         Ref 20.00           10         1         Ref 20.00           10.0         1         1           -0.0         1         1           -0.0         -0.0         -0.0         -0.0           -0.0         -0.0         -0.0         -0.0         -0.0           -0.0	Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz	SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency         Auto Tune         Center Freq         2.510000000 GHz         Start Freq         2.470000000 GHz         Stop Freq         2.550000000 GHz         B.000000 GHz         CF Step         8.000000 MHz         Auto         Man         Freq Offset         0 Hz         Scale Type
M         RL         RF         50           Center Freq 2.5100         Ref Offset 5         S0           100         1         Ref 2.5000         Ref 20.000           100         1         1         Ref 20.000           100         1         1         1           100         1         1         1           100         1         1         1           100         1         1         1           -20.0         -40.0         -40.0         -40.0           -60.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0           -70.0         -50.0         -50.0         -50.0	Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz	SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020           TRACE 11 23 45 6           TYPE M           DET P P P P P           4 2.485 84 GHz           -50.550 dBm           0L1 -16.52 dBm           0L1 -16.52 dBm           Stop 2.55000 GHz           3.000 ms (1001 pts)	Frequency Auto Tune Center Freq 2.51000000 GHz Start Freq 2.47000000 GHz Stop Freq 2.55000000 GHz CF Step 8.00000 MHz Auto Man Freq Offset 0 Hz
XX         RF         50           Center Freq 2.5100         Ref Offset 5         S0           10.0         B/div         Ref 20.00           10.0         Image: Arrow of the set of the s	Swept SA © DC   NFE PNO: Fast - IFGain:Low 9.51 dB 0 dBm #VB  #VB  * 2.472 96 GHz 2.483 50 GHz 2.483 50 GHz	SENSE:INT → Trig: Free Run #Atten: 30 dB 3 3 W 300 kHz Y F 3.483 dBm -53.480 dBm -53.460 dBm	ow_Hop_2402 ALIGN AUTO #Avg Type: RMS AvgHold: 300/300 Mkr	02:54:02 PM Sep 13, 2020         TRACE [] 23 45 6         TYPE M         DET P P P P P         4 2.485 84 GHz         -50.550 dBm         DL1 -16.52 dBm         DL1 -16.52 dBm         Stop 2.55000 GHz         3.000 ms (1001 pts)         FUNCTION VALUE         FUNCTION VALUE         , -	Frequency         Auto Tune         Center Freq         2.510000000 GHz         Start Freq         2.470000000 GHz         Stop Freq         2.550000000 GHz         B.000000 GHz         CF Step         8.000000 MHz         Auto         Man         Freq Offset         0 Hz         Scale Type



## 11.8. Appendix H: Conducted Spurious Emission 11.8.1. Test Result

Test Packet Type	Antenna	Channel	FreqRange [MHz]	Result [dBm]	Limit [dBm]	Verdict
			Reference	5.56		PASS
		2402	30~1000	-63.519	<=-14.444	PASS
			1000~26500	-55.042	<=-14.444	PASS
			Reference	4.64		PASS
DH5	Ant1	2441	30~1000	-63.684	<=-15.357	PASS
		2441	1000~26500	-54.437	<=-15.357	PASS
			Reference	4.74		PASS
		2480	30~1000	-62.312	<=-15.264	PASS
			1000~26500	-54.342	<=-15.264	PASS
			Reference	5.45		PASS
		2402	30~1000	-62.114	<=-14.549	PASS
			1000~26500	-53.134	<=-14.549	PASS
			Reference	4.78		PASS
3DH5	Ant1	2441	30~1000	-63.978	<=-15.216	PASS
			1000~26500	-54.439	<=-15.216	PASS
			Reference	3.66		PASS
		2480	30~1000	-63.403	<=-16.342	PASS
			1000~26500	-53.806	<=-16.342	PASS

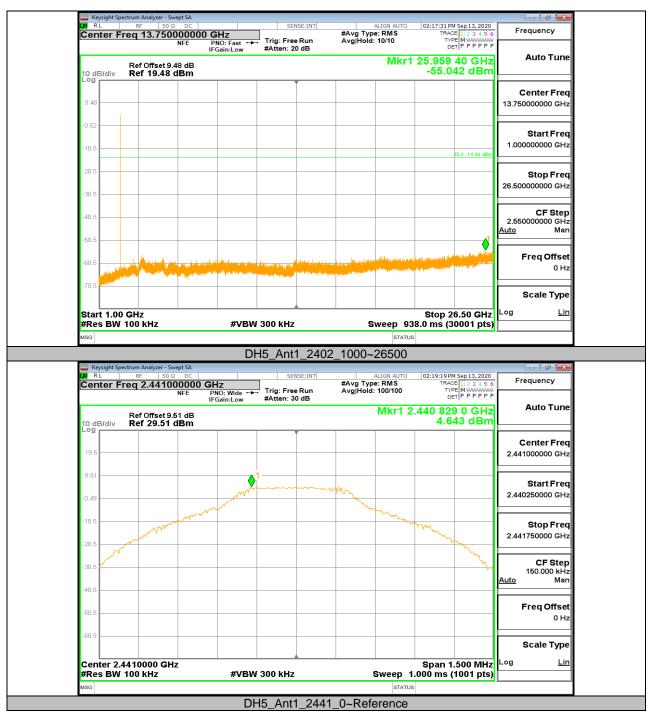


## 11.8.2. Test Graphs



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LXI RL	trum Analyzer - Swe RF 50 Ω ອ <b>q 515.000</b>	DC 1000 MHz	NO: Fast ↔		e Run	#Avg Typ Avg Hold		TRAC	M Sep 13, 2020 CE 1 2 3 4 5 6 PE M WWWWW	Frequency
	Ref Offset 9.5 Ref 19.51 c	IFG 1 dB	Gain:Low	#Atten: 2				kr1 920	.10 MHz 84 dBm	Auto Tune
9.51										Center Fred 515.000000 MH;
-0.49									DL1 -15.36 dBm	Start Free 30.000000 MH;
-20.5										Stop Fred 1.000000000 GHz
-40.5										CF Step 97.000000 MH <u>Auto</u> Mar
-60.5		1			olas	a arte ne e	ol Mader outcos	مار الماليدية المالي	11	Freq Offse 0 H;
-70.5	de de la compañía de la compañía 0 GHz	in an an the second states of	n hi Hermani Larri ly na Manani Allyki Hao	n politik de set de la des An de la de set de la deservation de la An de la deservation d	plandar an Manalar an	in e spinistenski In e spinistenski		n folgen er geberen. Men	D000 GHz	Scale Type
			#VPM	/ 300 kHz		s	weep 36		0001 pts)	
#Res BW 1			#1011		-		-		• •	
#Res BW 1	UU KHZ						STATUS	3	. /	
MSG		net SA				41_30~1	STATUS	2	• •	
MSG Keysight Spect	trum Analyzer - Swe RF 50 Ω ⊋ <b>q 13.7500</b>	DC 100000 G NFE PN	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1	STATUS	02:19:54 PI TRAC	M Sep 13, 2020 DE 12 3 4 5 6 PE M WWWWW T P P P P P P	Frequency
MSG Keysight Spect 20 RL Center Fre	trum Analyzer - Swe RF 50 Ω ⊋ <b>q 13.7500</b>	DC 000000 G NFE PN IFG 1 dB	Hz	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 E 1 2 3 4 5 6	Frequency
MSG Keysight Spect WRL Center Fre	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 E 1 2 3 4 5 6 M W W W W ET P P P P P P 50 GHz	Frequency
MSG Keysight Spect (M) RL Center Fre 10 dB/div Log	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 E 1 2 3 4 5 6 M W W W W ET P P P P P P 50 GHz	Frequency Auto Tune Center Freq
MSG Keysight Spect M RL Center Fre 10 dB/div 9.51 -0.49	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 EI 1 2 3 4 5 6 M У ФУТ EI P P P P P P 50 GHz 37 dBm	Frequency Auto Tune Center Free 13.75000000 GH: Start Free
Keysight Spect           Øf         RL           Center Fre           10 dB/div           20 dB/div           -0.49           -10.5           -20.5           -30.5           -40.5	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 EI 1 2 3 4 5 6 M У ФУТ EI P P P P P P 50 GHz 37 dBm	Frequency Auto Tune Center Frec 13.750000000 GH: Start Frec 1.00000000 GH:
MSG Keysight Spect M RL Center Fre Conter Fre 9.51 -0.49 -10.5 -20.5	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 EI 1 2 3 4 5 6 M У ФУТ EI P P P P P P 50 GHz 37 dBm	Frequency           Auto Tune           Center Free           13.75000000 GH;           Start Free           1.00000000 GH;           Stop Free           26.50000000 GH;           2.55000000 GH;
Keysight Spect           Center Fre           10 dB/div           9.51           -0.49           -10.5           -30.5           -40.5           -50.5	rrum Analyzer - Swe RF   50 Ω 2q 13.7500 Ref Offset 9.5	DC 000000 G NFE PN IFG 1 dB	Hz NO: Fast ↔	DH5_A	nt1_24 NSE:INT Run	41_30~1 #Avg Typ	STATUS OOO ALIGN AUTO e: RMS 10/10	02:19:54 P TRAC TYI D <b>26.066</b>	M Sep 13, 2020 EI 1 2 3 4 5 6 M У ФУТ EI P P P P P P 50 GHz 37 dBm	Frequency Auto Tune Center Free 13.75000000 GH: Start Free 1.00000000 GH: CF Step 2.55000000 GH: Auto Mar Freq Offset

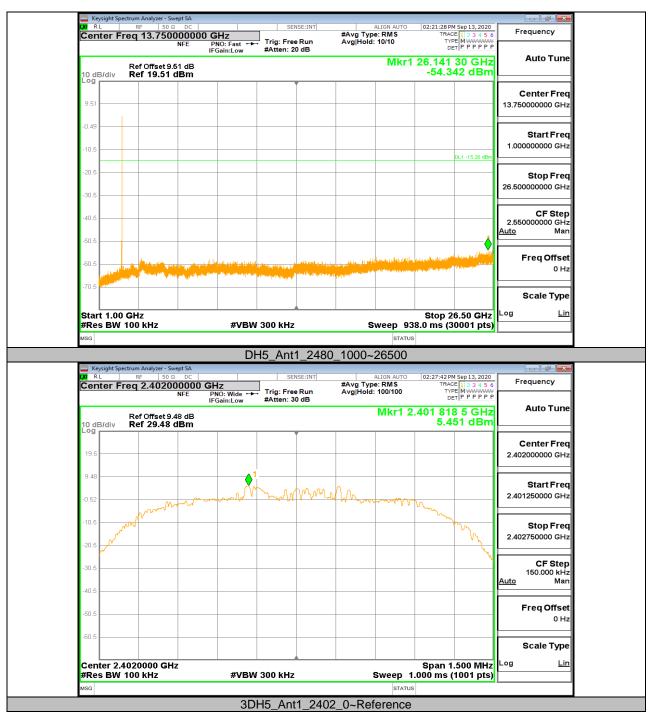


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Center Free	RF 50 Ω DC <b>2.48000000</b> NFE	PNO: Wide 🔸	Trig: Free Run #Atten: 30 dB	#Avg Type: F Avg Hold: 10	00/100	TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P	Frequency
10 dB/div	ef Offset 9.51 dB ef 29.51 dBm	IFGain:Low	#Atten: 30 dB	N	lkr1 2.479	827 5 GHz 4.736 dBm	Auto Tune
19.5							Center Freq 2.480000000 GHz
9.51		- I - I - I - I - I - I - I - I - I - I		mm			Start Freq 2.479250000 GHz
-10.5	Manufarm	North Contraction		*******	mm		Stop Freq
-20.5						- Marine Contraction	2.480750000 GHz
-40.5							150.000 kHz <u>Auto</u> Man
-50.5							Freq Offset 0 Hz
-60.5							Scale Type
Center 2.48				_	sp	an 1.500 MHz	
Center 2.480 #Res BW 10			300 кнz 15_Ant1_248		veep 1.000	an 1.500 MHz ms (1001 pts)	
#Res BW 10	0 kHz m Analyzer - Swept SA		15_Ant1_248	0_0~Refere	Veep 1.000 STATUS ENCE	ms (1001 pts)	
#Res BW 10	0 kHz	DH	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         gn auto         02:           gn auto         02:         gn s	21:01 PM Sep 13, 2020 TRACE 12 2 3 4 5 6 TYPE M DET P P P P F	Frequency
#Res BW 10 MSG Keysight Spectru W RL Center Free T0 dB/div	0 kHz m Analyzer - Swept SA RF 50 Ω DC 1 515.0000000	DH MHz PNO: Fast	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune
#Res BW 10 MSG Keysight Spectru RL Center Free	0 kHz m Analyzer - Swept SA RF 50 Ω CC 515.000000 NFE ef Offset 9.51 dB	DH MHz PNO: Fast	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune
#Res BW 10 MSG Keysight Spectru W RL Center Free 10 dB/div R Log	0 kHz m Analyzer - Swept SA RF 50 Ω CC 515.000000 NFE ef Offset 9.51 dB	DH MHz PNO: Fast	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune Center Freq
#Res BW 10 MISG Keysight Spectru W RL Center Free Center Free 9.51 -0.49	0 kHz m Analyzer - Swept SA RF 50 Ω CC 515.000000 NFE ef Offset 9.51 dB	DH MHz PNO: Fast	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune 515.00000 MHz Start Freq 30.00000 MHz Stop Freq
#Res BW 10           MISG           Keysight Spectru           UN RL           Center Free           10 dB/div           9.51           -0.49           -10.5           -20.5           -30.5	0 kHz m Analyzer - Swept SA RF 50 Ω CC 515.000000 NFE ef Offset 9.51 dB	DH MHz PNO: Fast	15_Ant1_248	0_0~Refere	veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune 515.00000 MHz 30.00000 MHz 30.00000 GHz 1.00000000 GHz CF Step
#Res BW 10           MISG           Image: Control of the sector of	0 kHz m Analyzer - Swept SA RF 50 Ω CC 515.000000 NFE ef Offset 9.51 dB	DH MHz PNO: Fast	15_Ant1_248		veep         1.000           status         status           ence         status           SN AUTO         02:           RMS         v10           Mkr1	ms (1001 pts)	Frequency Auto Tune Center Freq 515.00000 MHz Start Freq 30.000000 MHz Stop Freq 1.00000000 GHz CF Step 97.00000 MHz Auto Man
Res BW 10           Mss            Keysight Spectru            UR            Center Free            9.51            -0.49            -10.5            -20.5            -30.5            -40.5            -50.5	0 KHZ	DH MHz PNO: Fast ++- IFGain:Low	IS_Ant1_248 SENSE.INT Trig: Free Run #Atten: 20 dB	0_0~Refere	Veep 1.000 STATUS ENCE SN AUTO 02: SN AUTO	ms (1001 pts)	Frequency Auto Tune Center Freq 515.00000 MHz Start Freq 30.000000 MHz L00000000 GHz CF Step 97.000000 MHz
#Res BW 10           MISG           Center Free           10 dB/div           9.51           -0.49           -10.5           -20.5           -30.5           -30.5           -50.5           -50.5	0 KHZ	DH MHz PNO: Fast ++- IFGain:Low	15_Ant1_248		veep         1.000           status            ence            sn auto          02:           sms            mkr1         -(           -(	ms (1001 pts)	Frequency Auto Tune Center Freq 515.00000 MHz Start Freq 30.000000 MHz Stop Freq 1.00000000 GHz CF Step 97.00000 MHz Auto Man

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Keysight Spectr								
Center Fre	RF 50 Ω 50 Ω 50 Ω 50 Ω NF	00 MHz	Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	02:27:50 PM Sep 13, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P P	Frequency		
10 dB/div	Auto Tune							
9.48						Center Freq 515.000000 MHz		
-0.52						Start Freq 30.000000 MHz		
-20.5					DL1 -14.55 dBm	<b>Stop Freq</b> 1.00000000 GHz		
-30.5						<b>CF Step</b> 97.000000 MHz		
-50.5					1	Auto Man Freq Offset		
	nyanalahikayangnyahindi walahinda atangga dagal	nandalaanaa waadalaanaa haboontayoot loodalaa dahad	enne protoliky et anti-patron. Joshi Mahan ing salan si Man	ana bulaan dhaalay ada yarda yarda dhaarii dhaarii dhaarii dhaarii dhaarii dhaarii dhaarii dhaarii dhaarii dhaa May saarii ahaan dhaarii dhaala dhaarii	g ten genetike dia anta dia manja dia anita Manakan dia malampika na dia kana dia kana ma	0 Hz Scale Type		
Start 0.0300 #Res BW 10	0 GHz		/ 300 kHz		Stop 1.0000 GHz 6.00 ms (30001 pts)			
MSG				STATU	IS			
Keysight Spectr	rum Analyzer - Swept		3DH5_Ant1	_2402_30~1000				
LX/RL		DC 0000 GHz E PNO: Fast ↔	SENSE:IN Trig: Free Run #Atten: 20 dB	#Avg Type: RMS	02:28:17 PM Sep 13, 2020 TRACE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P P	Frequency		
10 dB/div	Ref Offset 9.48 Ref 19.48 dB		#Atten: 20 dB	Mkr	1 26.328 30 GHz -53.134 dBm			
9.48						Center Freq 13.750000000 GHz		
-0.52					DL1 -14.55 dBm	<b>Start Freq</b> 1.000000000 GHz		
-20.5						<b>Stop Freq</b> 26.50000000 GHz		
-40.5						<b>CF Step</b> 2.550000000 GHz <u>Auto</u> Man		
-50.5		and the second	In the second			Freq Offset		
-70.5		and the second subscription of a subscripting subscription of a subscription of a su	fredhardsandigenadari			Scale Type		
		1	1		Stop 26.50 GHz Sweep 938.0 ms (30001 pts)			

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Conton From	um Analyzer - Swe RF 50 Ω	DC		SE	NSE:INT		ALIGN AUTO	02:32:30 P	M Sep 13, 2020	Frequency
Center Free	•	NFE P	Z PNO: Fast ↔ Gain:Low	Trig: Fre #Atten: 2	e Run 20 dB	#Avg Typ Avg Hold	: 10/10	⊳ kr1 987	94 MHz	Auto Tune
Ref 0ffset9.51 dB -63.403 dBm -63.403 dBm										
9.51										Center Freq 515.000000 MHz
-0.49										Start Freq 30.000000 MHz
-20.5									DL1 -16.34 dBm	Stop Freq 1.000000000 GHz
-30.5										CF Step 97.000000 MHz
-50.5									<b>`</b>	Auto Man Freq Offset
	ra lapteto marando Almanemando podo	anda kanggi (1994) Nanggi (1994)	dak yantupaté Jakala puté	nan senjih sene Denta den di seksio	Aller and the state of the st	and the second states	angeodelaidh sua Gnachlachgadach	e posta de la seconda da s	Haan Mapazaha Majih persebuta	0 Hz Scale Type
Start 0.0300 #Res BW 10	GHz	'		/ 300 kHz	<u> </u>			Stop 1.0	0000 GHz 0001 pts)	Log <u>Lin</u>
MSG							STATUS	5		
3DH5_Ant1_2480_30~1000										
			3							- # <b>-</b>
Keysight Spectru Ki RL Center Free	RF 50 Ω q 13.7500	DC 1000000 G NFE P	GHz NO: Fast ↔	SE	NSE:INT		ALIGN AUTO e: RMS	TRAC	M Sep 13, 2020 2E 1 2 3 4 5 6 PE M WWWWW ET P P P P P P	Frequency
Conter Free 10 dB/div	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	SHz	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426		[
Center Free	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz	Frequency
Center Free	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz 06 dBm	Frequency Auto Tune Center Freq
20 RL Center Free 10 dB/div F 10 dB/div F -0.49 -10.5 -20.5	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq
0 RL Center Free 10 dB/div F 0 dB/div F 0 d9 -0.49 -10.5	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz 06 dBm	Frequency           Auto Tune           Center Freq           13.75000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           26.50000000 GHz           CF Step           2.550000000 GHz
0 RL Center Free 10 dB/div F 20.5 -0.49 -10.5 -20.5 -30.5	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz 06 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz CF Step 2.55000000 GHz Auto Man Freq Offset
Odd RL         Free           Center Free         10 dB/div         F           10 dB/div         F         10 dB/div         F           9.51         -0.49         -0.49         -0.49         -0.49         -0.49         -0.49         -0.49         -0.40<	RF 50 Ω q 13.7500	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ	ALIGN AUTO e: RMS : 10/10	TRAC TYI 26.426	90 GHz 06 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz CF Step 2.55000000 GHz Auto Man Freq Offset 0 Hz
But RL         F           Center Free         10           0         dB/div           9         51           -0.49         -           -10.5         -           -30.5         -           -40.5         -           -60.5         -	RF         50 Ω           q         13.7500           Ref Offset 9.5         Set 19.51 d	DC DOOOOO C NFE P IF	GHz NO: Fast ↔	SE	NSE:INT	#Avg Typ Avg Hold	ALIGN AUTO	5top 2	90 GHz 06 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz 26.50000000 GHz 2.550000000 GHz Auto Man Freq Offset 0 Hz Scale Type



## 11.9. Appendix I: Duty Cycle 11.9.1. Test Result

Test Packet Type	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
DH5	2.882	3.786	0.7612	76.12	1.19	0.35	0.5
3DH5	2.888	3.792	0.7616	76.16	1.18	0.35	0.5

Note:

Duty Cycle Correction Factor=10log (1/x).

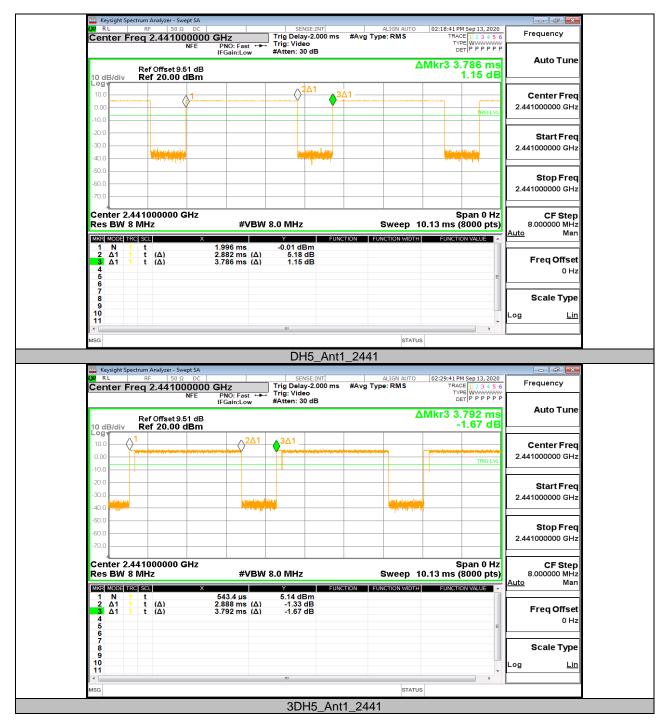
Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.



## 11.9.2. Test Graphs



# **END OF REPORT**