

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

**CERTIFICATION TEST REPORT** 

For

**HP Wireless Earbuds G2** 

MODEL NUMBER: HSA-G001CA HVIN: L Earbud FCC ID: 2AAP8-HSAG001CAL IC: 9043A-HSAG001CAL

**REPORT NUMBER: 4789469051-1** 

ISSUE DATE: August 05, 2020

Prepared for

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Prepared by

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## **Revision History**

Rev.	Issue Date	Revisions	Revised By
V0	08/05/2020	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	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass	
Note: 1 This test report is only published to and used by the applicant, and it is not for evidence				

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:	Guoguang Electric Company Ltd.
Address:	No. 8 Jinghu Rd, Xinya Street, Huadu Region, Guangzhou P. R.
	China 510800

#### Manufacturer Information

Company Name:	Guoguang Electric Company Ltd.
Address:	No. 8 Jinghu Rd, Xinya Street, Huadu Region, Guangzhou P. R.
	China 510800

### **EUT Information**

EUT Name:	HP Wireless Earbuds G2
Model:	HSA-G001CA
Brand:	HP
Sample Received Date:	July 15, 2020
Sample Status:	Normal
Sample ID:	3188340
Date of Tested:	July 16~24, 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		

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# 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.
	<b>FCC (FCC Designation No.: CN1187)</b> 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. has been registered and fully described in a report filed with ISED.
Certificate	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 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz 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	3.62dB		
Radiated Emission (Included Fundamental Emission) (9kHz ~ 30MHz)	2.2dB		
Radiated Emission (Included Fundamental Emission) (30MHz ~ 1GHz)	4.00dB		
Radiated Emission	5.78dB (1GHz ~ 18GHz)		
(Included Fundamental Emission) (1GHz to 26GHz)	5.23dB (18GHz ~ 26GHz)		
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	HP Wireless Earbuds G2		
Model	HSA-G001CA		
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	1Mbps	2Mbps	3Mbps
Power Supply	DC 3.7V		

# 5.2. MAXIMUM PEAK OUTPUT POWER

Bluetooth Mode	Frequency (MHz)	Channel Number	Maximum Peak Output Power (dBm)	Maximum EIRP (dBm)
GFSK	2402-2480	0-78[79]	3.38	3.38
8DPSK	2402-2480	0-78[79]	3.37	3.37

# 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)	2402MHz, 2441MHz, 2480MHz
8DPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402MHz, 2441MHz, 2480MHz
GFSK	Hopping	2402MHz ~ 2480MHz
8DPSK	Hopping	2402MHz ~ 2480MHz

# 5.6. WORST-CASE CONFIGURATIONS

Bluetooth 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.

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# 5.7. THE WORSE CASE POWER SETTING PARAMETER

The Wor	The Worse Case Power Setting Parameter under 2400 ~ 2483.5MHz Band						
Test Se	oftware	Non Signaling Test Tool					
Modulation Type	Transmit Antenna	Test Software Setting Value					
	Number	CH 00	CH 39	CH 78			
GFSK	1	1	1	1			
8DPSK	1	1 1 1					

# 5.8. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2402-2480	PCB Antenna	0

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: 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	Laptop	Lenovo	TP00094A	/
2	UART	/	/	/

### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	TYPE C	/	1.0	/

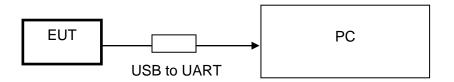
### ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	/	/	/	/

#### 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								
			Ins	strument					
Used	Equipment	Manufacturer	Мо	del No.	Serial No.		Last Cal.	Next Cal.	
$\checkmark$	EMI Test Receiver	R&S	Е	SR3	101	961	Dec.05,2019	Dec.05,2020	
V	Two-Line V- Network	R&S	EN	V216	101	983	Dec.05,2019	Dec.05,2020	
	Software								
Used	Desc	ription		Ма	nufactu	urer	Name	Version	
$\checkmark$	Test Software for Co	onducted distu	Irban	се	Farad		EZ-EMC	Ver. UL-3A1	
		Ra	diate	d Emiss	sions				
			Ins	strument					
Used	Equipment	Manufacturer	Mo	del No.	Seria	al No.	Last Cal.	Next Cal.	
$\checkmark$	MXE EMI Receiver	KESIGHT	NS	9038A	MY56	400036	Dec.06,2019	Dec.06,2020	
V	Hybrid Log Periodic Antenna	TDK	HLP	-3003C	130	960	Sep.17, 2018	Sep.17, 2021	
$\checkmark$	Preamplifier	HP	84	447D	2944	09099	Dec.05,2019	Dec.05,2020	
V	EMI Measurement Receiver	R&S	E	ESR26		377	Dec.05,2019	Dec.05,2020	
$\checkmark$	Horn Antenna	TDK	HRI	N-0118	130	939	Sep.17, 2018	Sep.17, 2021	
V	High Gain Horn Antenna	Schwarzbeck	BBH	IA-9170	691		Aug.11, 2018	Aug.11, 2021	
V	Preamplifier	TDK	PA-(	02-0118	00	-305- 066	Dec.05,2019	Dec.05,2020	
V	Preamplifier	TDK	PA	A-02-2		-307- 003	Dec.05,2019	Dec.05,2020	
$\checkmark$	Loop antenna	Schwarzbeck	1:	519B	00	800	Jan.07, 2019	Jan.07, 2022	
V	Preamplifier	TDK		02-001- 3000		-302- 050	Dec.5, 2019	Dec.5, 2020	
V	Band Reject Filter	Wainwright	WRCJV8- 2350-2400- 2483.5- 2533.5- 40SS			4	Dec.05,2019	Dec.05,2020	
V	High Pass Filter	Wi	WHKX10- 2700-3000- 18000-40SS		2	23	Dec.05,2019	Dec.05,2020	
			S	oftware					
Used				Manufa	cturer		Name	Version	
V	Test Software disturb			Fara	ad	E	Z-EMC	Ver. UL-3A1	

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	Other instruments								
Used	Equipment Manufacturer Model No. Serial No. Last Cal. Next C								
$\checkmark$	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			
$\checkmark$	Power Sensor	Keysight	U2021XA	MY5100022	Dec.06,2019	Dec.06,2020			



# 7. ANTENNA PORT TEST RESULTS

# 7.1. ON TIME AND DUTY CYCLE

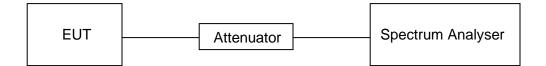
### <u>LIMITS</u>

None; for reporting purposes only.

### PROCEDURE

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

## TEST SETUP



### TEST ENVIRONMENT

Temperature	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

### **RESULTS**

Please refer to appendix A.



# 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

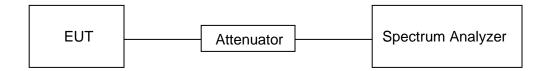
Refer to ANSI C63.10-2013 clause 6.9.2.

Center Frequency	The center frequency of the channel under test
Detector	Peak
IRBW	For 20dB Bandwidth: 1% to 5% of the 20dB bandwidth For 99% Occupied Bandwidth: 1% to 5% of the occupied bandwidth
	For 20dB 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 20dB Bandwidth.

#### TEST SETUP





### **TEST ENVIRONMENT**

Temperature	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

#### **RESULTS**

Please refer to appendix B and C.



# 7.3. CONDUCTED OUTPUT POWER

#### LIMITS

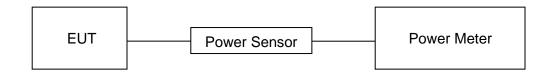
CFR 47 FCC Part15 (15.247), Subpart C ISED RSS-247 ISSUE 2			
Section	Frequency Range (MHz)		
CFR 47 FCC 15.247 (b) (1) ISED RSS-247 Clause 5.4 (b)	Peak Conducted Output Power	Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel: 1 watt or 30dBm; Hopping channel carrier frequencies that are separated by 25 kHz or two- thirds of the 20dB bandwidth of the hopping channel: 125 mW or 21dBm	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	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

#### **RESULTS**

Please refer to appendix D.



# 7.4. CARRIER FREQUENCY SEPARATION

#### <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 (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 20dB 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 20dB bandwidth of the hopping channel.	2400-2483.5

#### TEST PROCEDURE

Refer to ANSI C63.10-2013 clause 7.8.2.

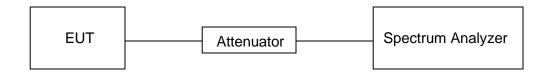
Connect the EUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Span	wide enough to capture the peaks of two adjacent channels
Detector	Peak
RBW	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	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

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

Please refer to Appendix E.



# 7.5. NUMBER OF HOPPING FREQUENCIES

#### 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)	Number of Hopping Frequency	at least 15 hopping channels	

#### TEST PROCEDURE

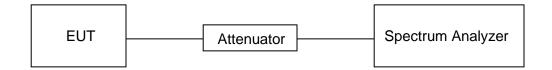
Refer to ANSI C63.10-2013 clause 7.8.3.

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 20dB bandwidth, whichever is smaller.
VBW	≥RBW
Span	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	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

#### <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 (Dwell Time) The average channel shall no within a period of the state of th		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):

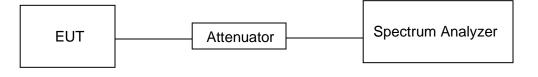
DH1 Dwell Time: Burst Width \* (1600/2) \* 31.6 / (channel number) DH3 Dwell Time: Burst Width \* (1600/4) \* 31.6 / (channel number) DH5 Dwell Time: Burst Width \* (1600/6) \* 31.6 / (channel number)

For AFHSS Mode (20 Channel):

DH1 Dwell Time: Burst Width \* (1600/2) \* 8 / (channel number) DH3 Dwell Time: Burst Width \* (1600/4) \* 8 / (channel number) DH5 Dwell Time: Burst Width \* (1600/6) \* 8 / (channel number)



## **TEST SETUP**



#### **TEST ENVIRONMENT**

Temperature	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

#### **RESULTS**

Please refer to appendix G.



# 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	100kHz
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:

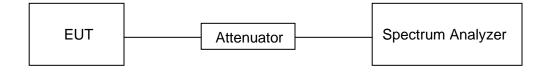
1.50/20	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100kHz
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

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	24.9°C	Relative Humidity	60.6%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V

#### **RESULTS**

Please refer to appendix H & I.



# 8. RADIATED TEST RESULTS

## <u>LIMITS</u>

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) (9kHz-1GHz)

Emissions radiated outside of the specified frequency bands above 30MHz				
Frequency Range	Field Strength Limit	Field Strength Limit		
(MHz)	(uV/m) at 3 m			
(11112)		Quasi-Peak		
30 - 88	100	40		
88 - 216	150	43.5		
216 - 960	200	46		
Above 960	500	54		
Above 1000	500	Peak	Average	
Above 1000	500	74	54	

FCC Emissions radiated outside of the specified frequency bands below 30MHz				
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 - 3.028	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	1645.5 - 1648.5	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	2855 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	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		

note in contain requertly barries is the initiative 7 and in barries above 35.0 GHz are designated to incence-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			

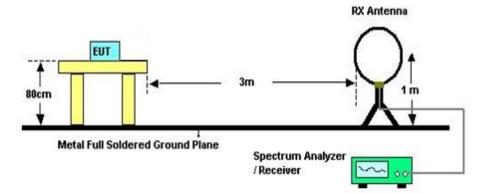
Note: <sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. <sup>2</sup>Above 38.6c

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## TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9kHz (From 0.15MHz to 30MHz)
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 80cm 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.

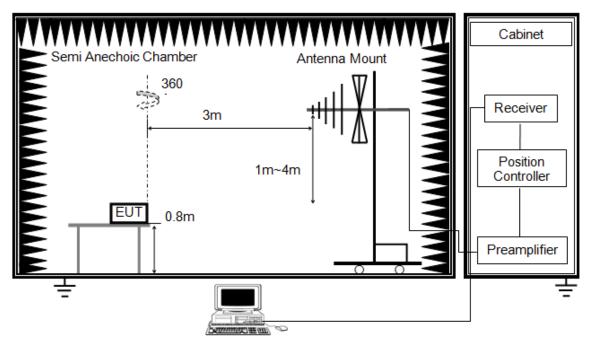
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1GHz, 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 1GHz and above 30MHz



The setting of the spectrum analyser

RBW	120kHz
VBW	300kHz
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.

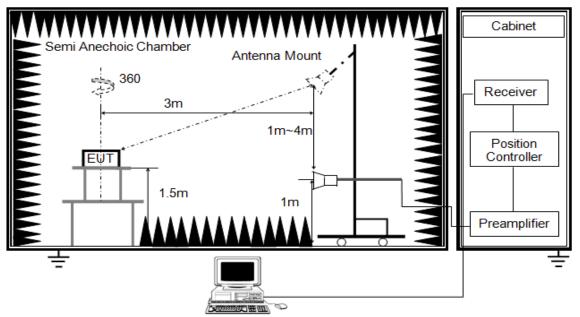
3. The EUT was placed on a turntable with 80cm above ground.

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 1GHz, 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 1GHz



The setting of the spectrum analyser

RBW	1MHz
IV BW	PEAK: 3MHz 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 1.5m above ground.

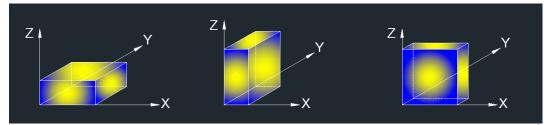
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, 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.



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: Simultaneous transmission had been evaluated with the 2.4GHz WiFi, 5GHz WiFi and BT transmitter and there were no any additional or worse emissions found. Only the worst data was recorded in the test report.

Note 3: 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.

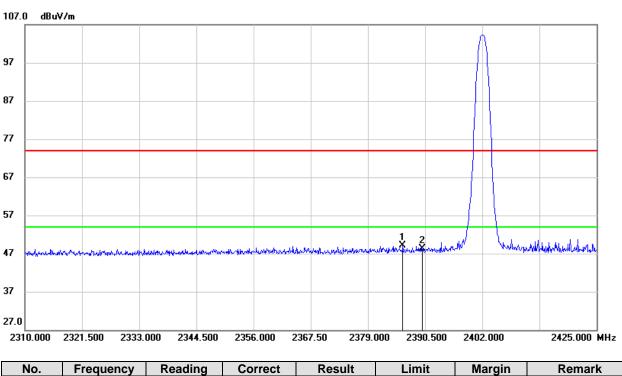
#### TEST ENVIRONMENT

Temperature	21.1°C	Relative Humidity	57%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.7V



# 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	2386.015	16.15	32.93	49.08	74.00	-24.92	peak
2	2390.000	15.35	32.94	48.29	74.00	-25.71	peak

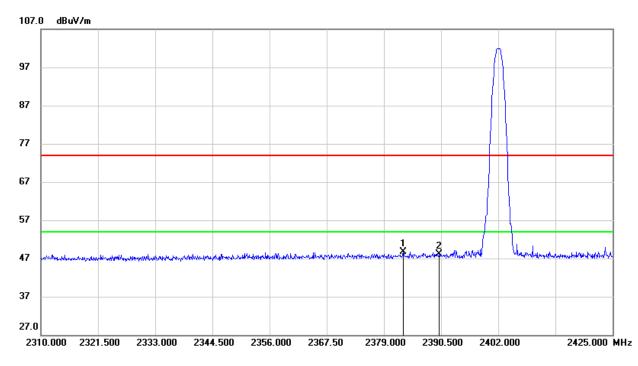
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.



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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2382.910	15.75	32.92	48.67	74.00	-25.33	peak
2	2390.000	15.25	32.94	48.19	74.00	-25.81	peak

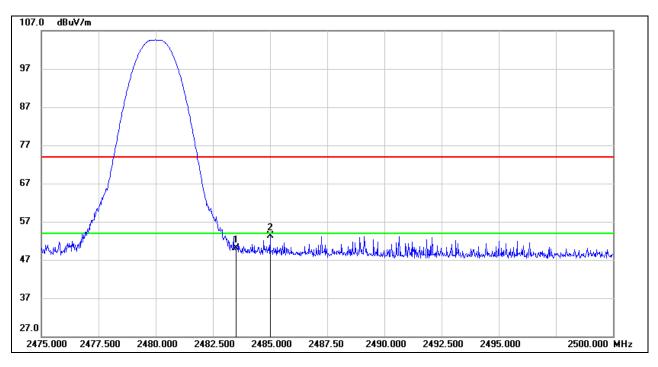
Note: 1. Measurement = Reading Level + Correct Factor.

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	2483.500	16.55	33.58	50.13	74.00	-23.87	peak
2	2485.000	19.65	33.59	53.24	74.00	-20.76	peak

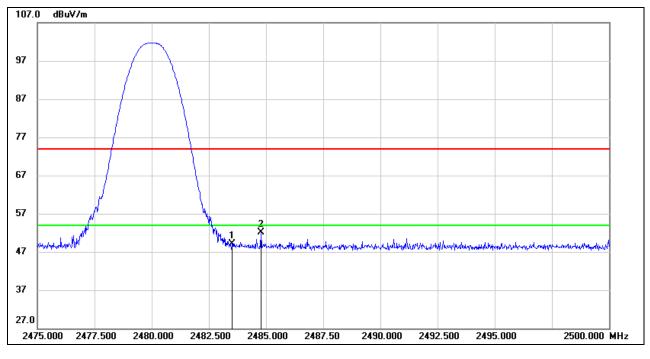
Note: 1. Measurement = Reading Level + Correct Factor.

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	2483.500	15.48	33.58	49.06	74.00	-24.94	peak
2	2484.775	18.45	33.59	52.04	74.00	-21.96	peak

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

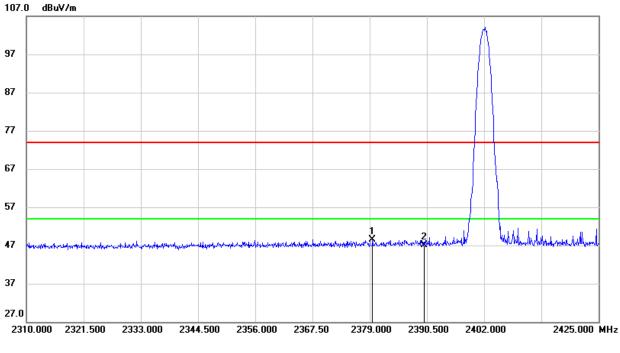
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



## 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	2379.575	15.52	32.91	48.43	74.00	-25.57	peak
2	2390.000	14.13	32.94	47.07	74.00	-26.93	peak

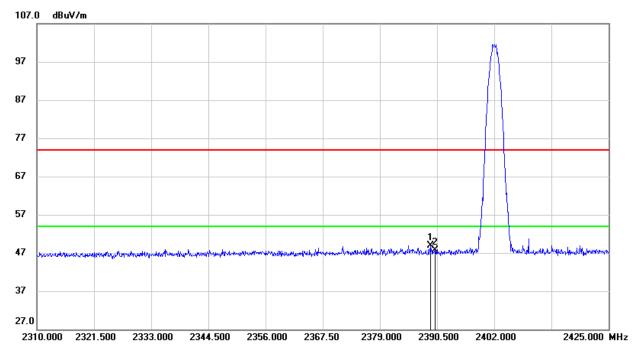
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.



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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2389.120	16.03	32.94	48.97	74.00	-25.03	peak
2	2390.000	14.86	32.94	47.80	74.00	-26.20	peak

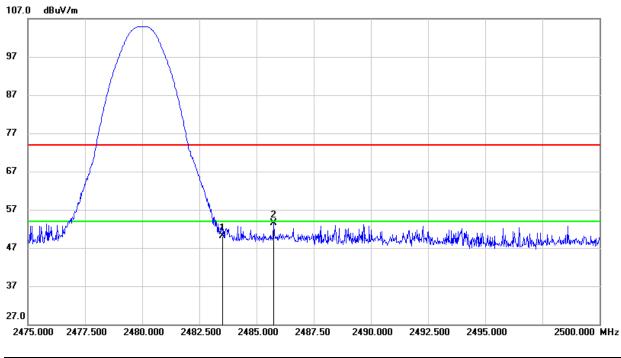
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.



### **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	16.51	33.58	50.09	74.00	-23.91	peak
2	2485.750	19.98	33.59	53.57	74.00	-20.43	peak

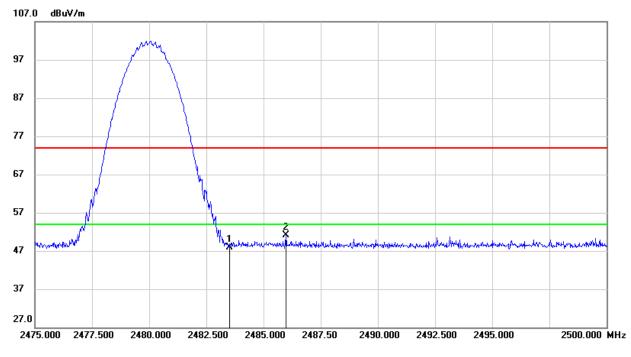
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.



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



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	14.32	33.58	47.90	74.00	-26.10	peak
2	2485.975	17.48	33.59	51.07	74.00	-22.93	peak

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

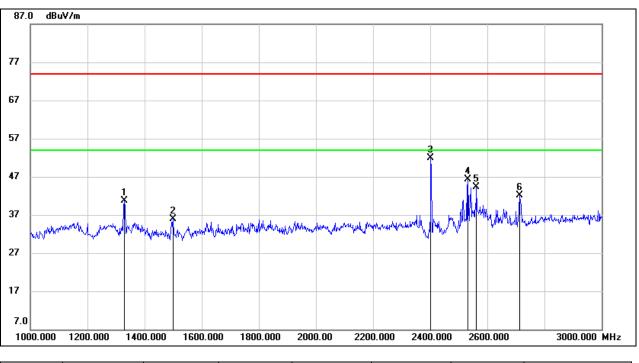
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.



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

## 8.2.1. 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	1328.000	53.07	-12.36	40.71	74.00	-33.29	peak
2	1500.000	48.05	-12.21	35.84	74.00	-38.16	peak
3	2402.000	59.69	-7.85	51.84	/	/	fundamental
4	2532.000	53.63	-7.33	46.30	74.00	-27.70	peak
5	2562.000	51.71	-7.50	44.21	74.00	-29.79	peak
6	2712.000	49.08	-7.00	42.08	74.00	-31.92	peak

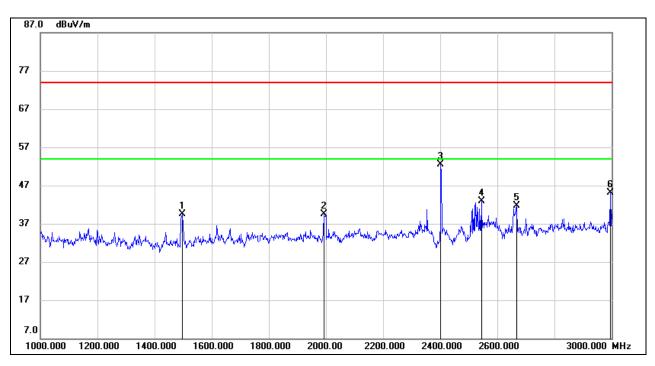
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

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





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1496.000	51.65	-12.22	39.43	74.00	-34.57	peak
2	1992.000	49.27	-9.83	39.44	74.00	-34.56	peak
3	2402.000	60.32	-7.85	52.47	/	/	fundamental
4	2544.000	50.37	-7.40	42.97	74.00	-31.03	peak
5	2668.000	49.08	-7.32	41.76	74.00	-32.24	peak
6	2996.000	50.43	-5.30	45.13	74.00	-28.87	peak

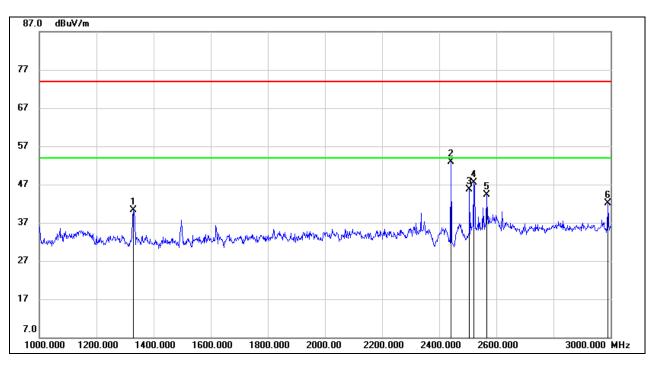
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject 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	1328.000	52.65	-12.36	40.29	74.00	-33.71	peak
2	2441.000	60.48	-7.58	52.90	/	/	fundamental
3	2506.000	52.99	-7.20	45.79	74.00	-28.21	peak
4	2520.000	54.72	-7.27	47.45	74.00	-26.55	peak
5	2566.000	51.89	-7.52	44.37	74.00	-29.63	peak
6	2990.000	47.36	-5.33	42.03	74.00	-31.97	peak

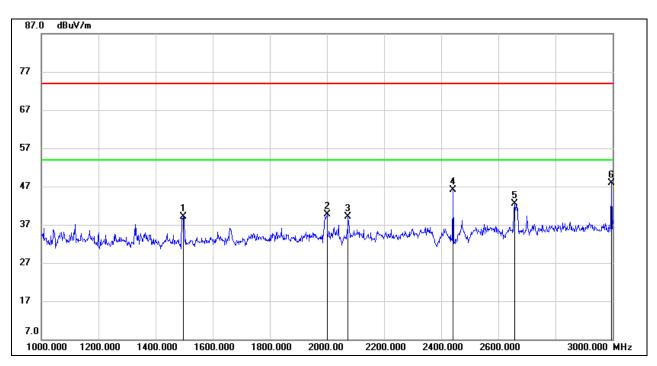
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

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





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

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1498.000	51.41	-12.21	39.20	74.00	-34.80	peak
2	2000.000	49.50	-9.82	39.68	74.00	-34.32	peak
3	2074.000	48.37	-9.33	39.04	74.00	-34.96	peak
4	2441.000	53.74	-7.58	46.16	/	/	fundamental
5	2656.000	49.82	-7.38	42.44	74.00	-31.56	peak
6	2996.000	53.27	-5.30	47.97	74.00	-26.03	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.

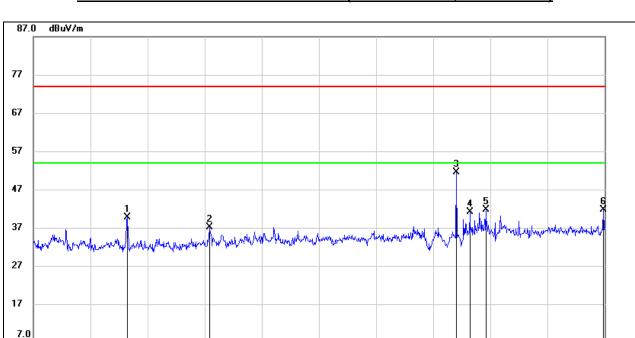
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.



1000.000

1200.000

1400.000



#### 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	1328.000	52.10	-12.36	39.74	74.00	-34.26	peak
2	1616.000	48.45	-11.32	37.13	74.00	-36.87	peak
3	2480.000	58.88	-7.31	51.57	/	/	fundamental
4	2528.000	48.45	-7.32	41.13	74.00	-32.87	peak
5	2584.000	49.23	-7.62	41.61	74.00	-32.39	peak
6	2996.000	46.97	-5.30	41.67	74.00	-32.33	peak

2000.00

2200.000

2400.000

2600.000

3000.000 MHz

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

1600.000

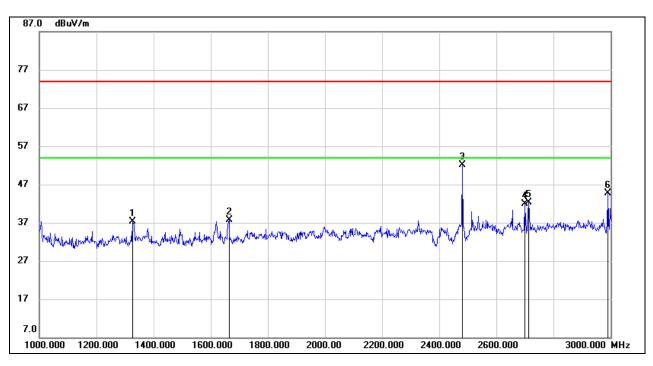
1800.000

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 Band Reject Filter losses.





|--|

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1326.000	49.69	-12.35	37.34	74.00	-36.66	peak
2	1664.000	48.75	-11.09	37.66	74.00	-36.34	peak
3	2480.000	59.48	-7.31	52.17	/	/	fundamental
4	2700.000	49.08	-7.13	41.95	74.00	-32.05	peak
5	2714.000	49.34	-6.98	42.36	74.00	-31.64	peak
6	2990.000	50.07	-5.33	44.74	74.00	-29.26	peak

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

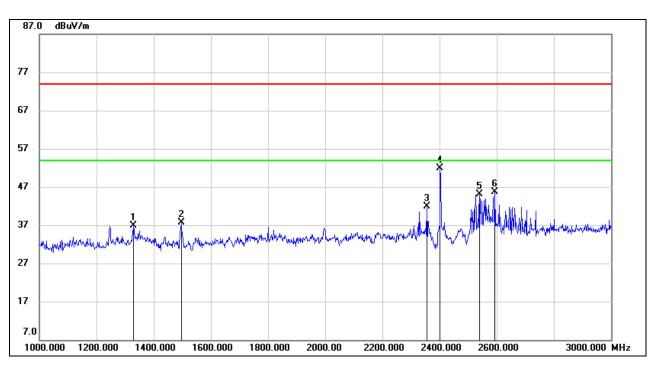
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Peak: Peak detector.

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



## 8.2.2. 8DPSK MODE



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1330.000	49.34	-12.36	36.98	74.00	-37.02	peak
2	1496.000	49.88	-12.22	37.66	74.00	-36.34	peak
3	2356.000	50.00	-8.00	42.00	74.00	-32.00	peak
4	2402.000	59.80	-7.85	51.95	/	/	fundamental
5	2540.000	52.39	-7.38	45.01	74.00	-28.99	peak
6	2594.000	53.35	-7.67	45.68	74.00	-28.32	peak

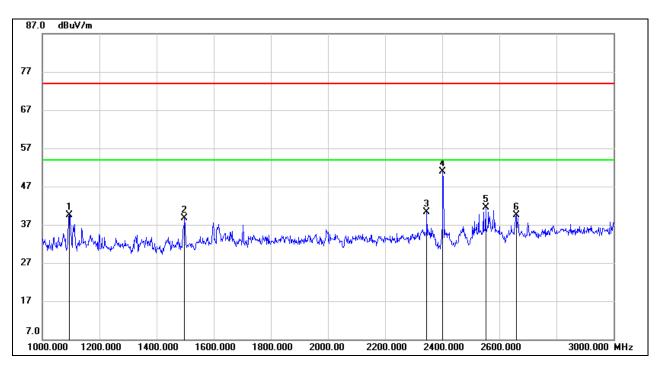
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject 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	1094.000	53.01	-13.52	39.49	74.00	-34.51	peak
2	1498.000	50.99	-12.21	38.78	74.00	-35.22	peak
3	2346.000	48.25	-8.04	40.21	74.00	-33.79	peak
4	2402.000	58.85	-7.85	51.00	/	/	fundamental
5	2552.000	48.99	-7.44	41.55	74.00	-32.45	peak
6	2660.000	46.87	-7.35	39.52	74.00	-34.48	peak

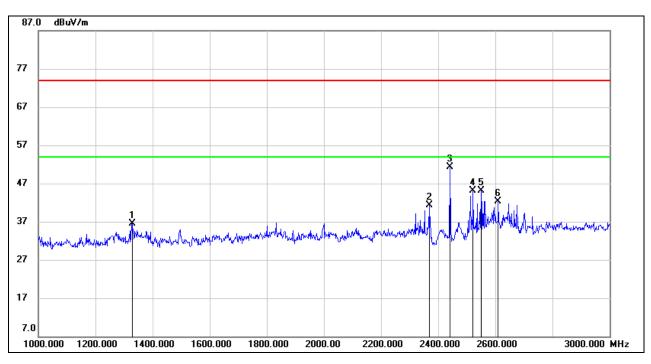
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject 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	1328.000	48.94	-12.36	36.58	74.00	-37.42	peak
2	2368.000	49.34	-7.96	41.38	74.00	-32.62	peak
3	2441.000	58.95	-7.58	51.37	/	/	fundamental
4	2522.000	52.41	-7.28	45.13	74.00	-28.87	peak
5	2550.000	52.62	-7.44	45.18	74.00	-28.82	peak
6	2610.000	49.88	-7.64	42.24	74.00	-31.76	peak

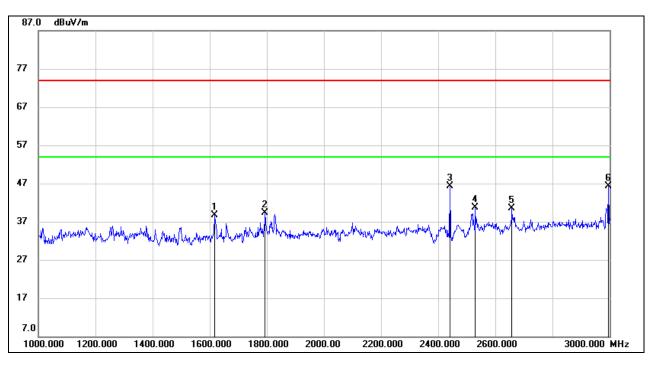
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

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





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	1618.000	50.00	-11.31	38.69	74.00	-35.31	peak
2	1794.000	49.22	-9.97	39.25	74.00	-34.75	peak
3	2441.000	53.94	-7.58	46.36	/	/	fundamental
4	2530.000	47.97	-7.32	40.65	74.00	-33.35	peak
5	2658.000	47.94	-7.37	40.57	74.00	-33.43	peak
6	2996.000	51.64	-5.30	46.34	74.00	-27.66	peak

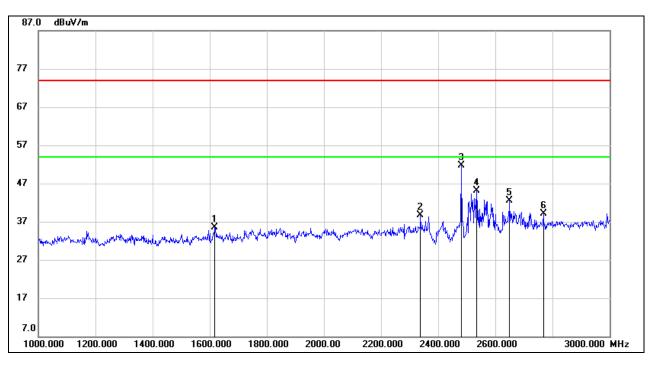
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject 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	1618.000	46.77	-11.31	35.46	74.00	-38.54	peak
2	2338.000	46.85	-8.06	38.79	74.00	-35.21	peak
3	2480.000	59.02	-7.31	51.71	/	/	fundamental
4	2534.000	52.55	-7.35	45.20	74.00	-28.80	peak
5	2650.000	49.83	-7.42	42.41	74.00	-31.59	peak
6	2768.000	45.42	-6.40	39.02	74.00	-34.98	peak

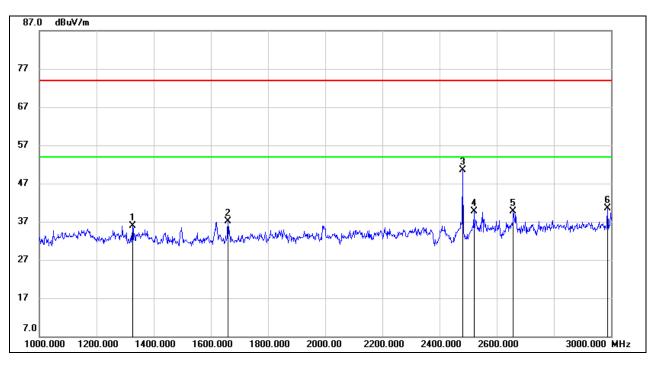
Note: 1. Measurement = Reading Level + Correct Factor.

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

3. Peak: Peak detector.

4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject 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	1326.000	48.34	-12.35	35.99	74.00	-38.01	peak
2	1660.000	48.26	-11.10	37.16	74.00	-36.84	peak
3	2480.000	57.77	-7.31	50.46	/	/	fundamental
4	2520.000	46.96	-7.27	39.69	74.00	-34.31	peak
5	2658.000	47.14	-7.37	39.77	74.00	-34.23	peak
6	2988.000	45.87	-5.33	40.54	74.00	-33.46	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.

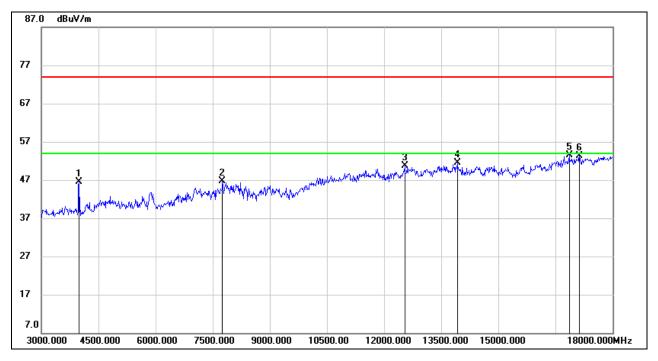
3. Peak: Peak detector.

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



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

## 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	3990.000	49.32	-2.89	46.43	74.00	-27.57	peak
2	7755.000	39.42	7.29	46.71	74.00	-27.29	peak
3	12540.000	36.30	14.33	50.63	74.00	-23.37	peak
4	13920.000	35.37	16.17	51.54	74.00	-22.46	peak
5	16860.000	33.50	19.95	53.45	74.00	-20.55	peak
6	17130.000	32.60	20.72	53.32	74.00	-20.68	peak

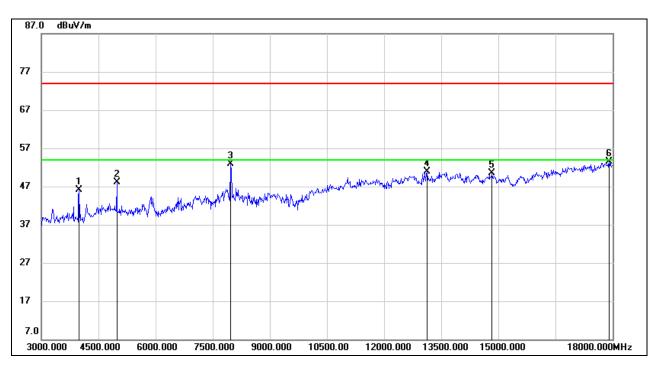
Note: 1. Peak Result = Reading Level + Correct Factor.

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	3990.000	49.03	-2.89	46.14	74.00	-27.86	peak
2	4980.000	46.86	1.29	48.15	74.00	-25.85	peak
3	7965.000	45.83	7.00	52.83	74.00	-21.17	peak
4	13125.000	35.70	15.17	50.87	74.00	-23.13	peak
5	14835.000	34.56	15.95	50.51	74.00	-23.49	peak
6	17910.000	30.08	23.35	53.43	74.00	-20.57	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.

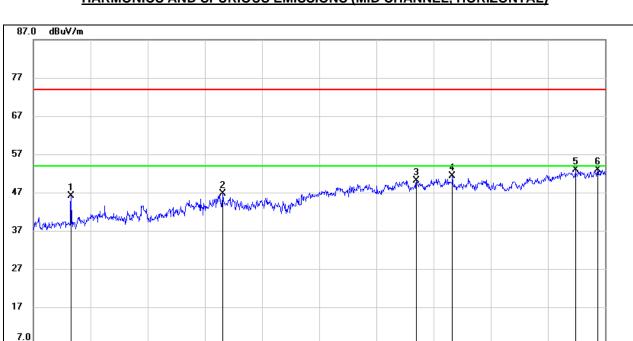
4. Filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for High Pass Filter losses.



3000.000

4500.000

6000.000



#### 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	3990.000	49.06	-2.89	46.17	74.00	-27.83	peak
2	7965.000	39.74	7.00	46.74	74.00	-27.26	peak
3	13050.000	34.96	15.07	50.03	74.00	-23.97	peak
4	13995.000	35.37	16.03	51.40	74.00	-22.60	peak
5	17220.000	31.89	21.08	52.97	74.00	-21.03	peak
6	17805.000	29.67	23.31	52.98	74.00	-21.02	peak

10500.00

12000.000

13500.000

15000.000

18000.000MHz

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

7500.000

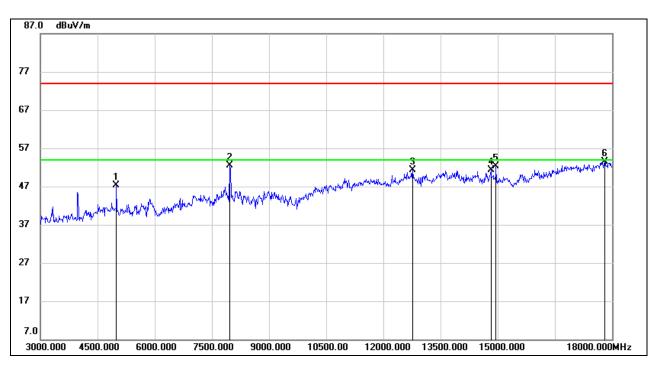
9000.000

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 (MID CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	4995.000	45.96	1.37	47.33	74.00	-26.67	peak
2	7965.000	45.59	7.00	52.59	74.00	-21.41	peak
3	12765.000	36.20	15.18	51.38	74.00	-22.62	peak
4	14820.000	35.37	15.94	51.31	74.00	-22.69	peak
5	14955.000	36.36	15.99	52.35	74.00	-21.65	peak
6	17805.000	30.26	23.31	53.57	74.00	-20.43	peak

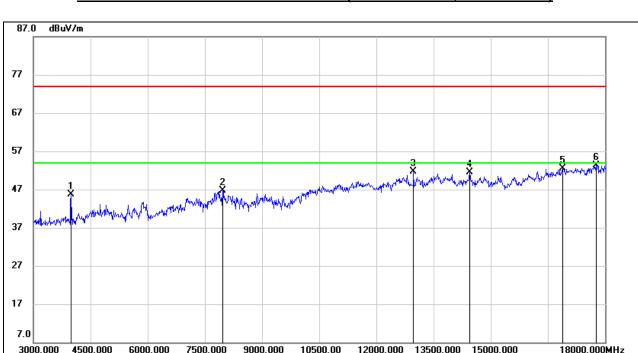
Note: 1. Peak Result = Reading Level + Correct Factor.

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 (HIGH CHANNEL, HORIZONTAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3990.000	48.69	-2.89	45.80	74.00	-28.20	peak
2	7965.000	39.74	7.00	46.74	74.00	-27.26	peak
3	12975.000	36.86	14.93	51.79	74.00	-22.21	peak
4	14445.000	35.23	16.36	51.59	74.00	-22.41	peak
5	16890.000	32.44	19.97	52.41	74.00	-21.59	peak
6	17760.000	30.37	22.95	53.32	74.00	-20.68	peak

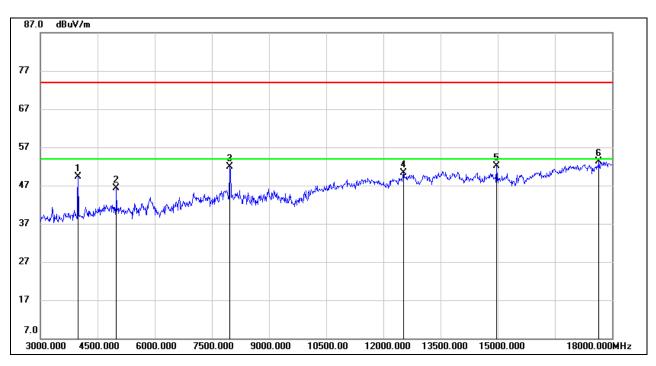
Note: 1. Peak Result = Reading Level + Correct Factor.

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 (HIGH CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3990.000	52.24	-2.89	49.35	74.00	-24.65	peak
2	4995.000	45.01	1.37	46.38	74.00	-27.62	peak
3	7965.000	44.98	7.00	51.98	74.00	-22.02	peak
4	12525.000	35.85	14.41	50.26	74.00	-23.74	peak
5	14970.000	36.09	15.98	52.07	74.00	-21.93	peak
6	17655.000	31.14	22.15	53.29	74.00	-20.71	peak

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

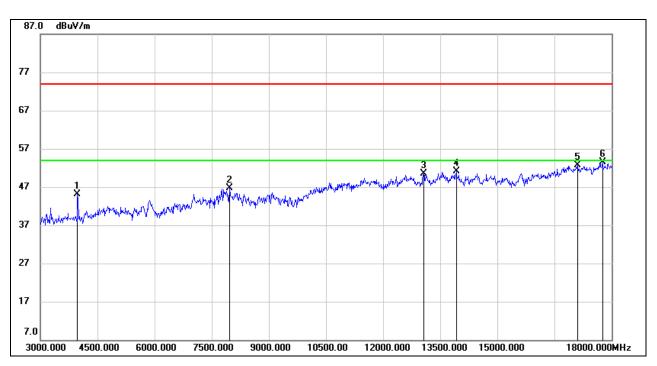
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

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.



## 8.3.2. 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	3975.000	47.93	-2.90	45.03	74.00	-28.97	peak
2	7965.000	39.74	7.00	46.74	74.00	-27.26	peak
3	13065.000	35.34	15.11	50.45	74.00	-23.55	peak
4	13920.000	34.95	16.17	51.12	74.00	-22.88	peak
5	17100.000	32.05	20.64	52.69	74.00	-21.31	peak
6	17760.000	30.62	22.95	53.57	74.00	-20.43	peak

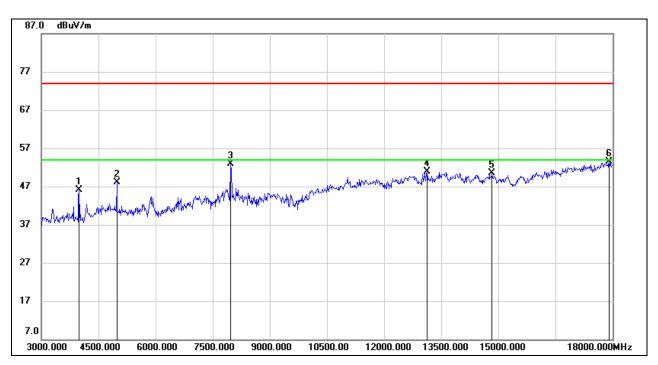
Note: 1. Peak Result = Reading Level + Correct Factor.

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	3990.000	49.03	-2.89	46.14	74.00	-27.86	peak
2	4980.000	46.86	1.29	48.15	74.00	-25.85	peak
3	7965.000	45.83	7.00	52.83	74.00	-21.17	peak
4	13125.000	35.70	15.17	50.87	74.00	-23.13	peak
5	14835.000	34.56	15.95	50.51	74.00	-23.49	peak
6	17910.000	30.08	23.35	53.43	74.00	-20.57	peak

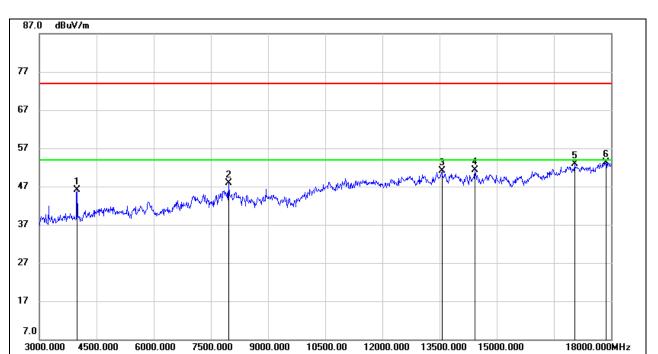
Note: 1. Peak Result = Reading Level + Correct Factor.

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.





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3990.000	48.99	-2.89	46.10	74.00	-27.90	peak
2	7965.000	40.93	7.00	47.93	74.00	-26.07	peak
3	13560.000	35.15	15.93	51.08	74.00	-22.92	peak
4	14430.000	34.98	16.35	51.33	74.00	-22.67	peak
5	17040.000	32.42	20.49	52.91	74.00	-21.09	peak
6	17865.000	29.98	23.33	53.31	74.00	-20.69	peak

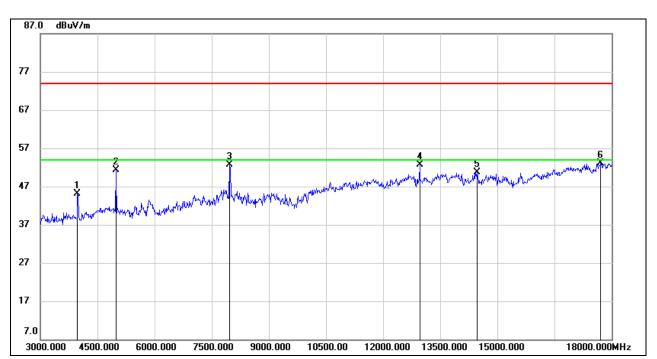
Note: 1. Peak Result = Reading Level + Correct Factor.

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 (MID CHANNEL, VERTICAL)

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3975.000	48.04	-2.90	45.14	74.00	-28.86	peak
2	4980.000	50.06	1.29	51.35	74.00	-22.65	peak
3	7965.000	45.78	7.00	52.78	74.00	-21.22	peak
4	12960.000	37.72	14.92	52.64	74.00	-21.36	peak
5	14460.000	34.34	16.36	50.70	74.00	-23.30	peak
6	17715.000	30.57	22.56	53.13	74.00	-20.87	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.



27

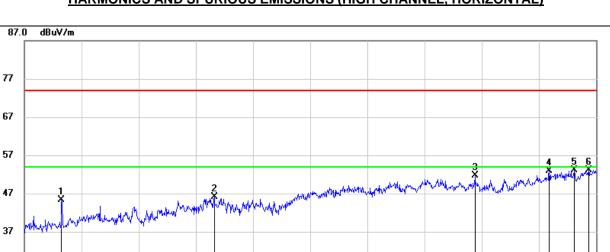
17

7.0

4500.000

6000.000

18000.000MHz



#### 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	3975.000	48.15	-2.90	45.25	74.00	-28.75	peak
2	7980.000	39.07	6.94	46.01	74.00	-27.99	peak
3	14820.000	35.79	15.94	51.73	74.00	-22.27	peak
4	16770.000	32.89	19.95	52.84	74.00	-21.16	peak
5	17430.000	31.64	21.38	53.02	74.00	-20.98	peak
6	17805.000	29.89	23.31	53.20	74.00	-20.80	peak

10500.00

12000.000 13500.000 15000.000

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

7500.000

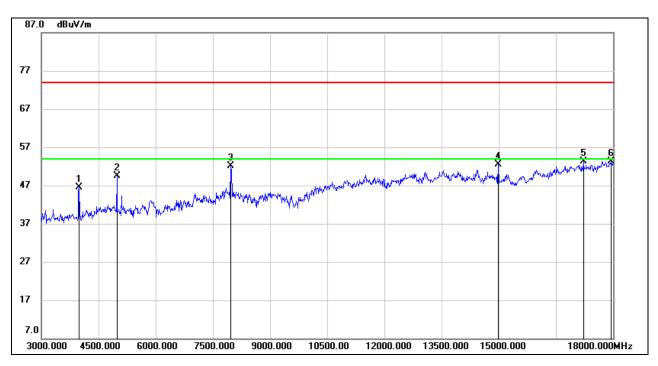
9000.000

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 (HIGH CHANNEL, VERTICAL)

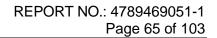
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	3990.000	49.49	-2.89	46.60	74.00	-27.40	peak
2	4980.000	48.14	1.29	49.43	74.00	-24.57	peak
3	7965.000	45.04	7.00	52.04	74.00	-21.96	peak
4	14985.000	36.59	15.97	52.56	74.00	-21.44	peak
5	17220.000	32.20	21.08	53.28	74.00	-20.72	peak
6	17940.000	29.92	23.39	53.31	74.00	-20.69	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.

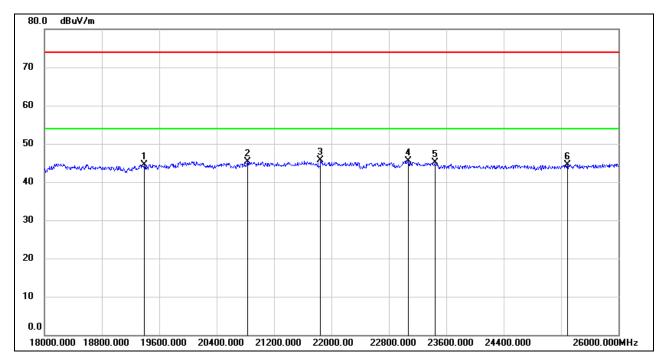




## 8.4. SPURIOUS EMISSIONS (18GHz ~ 26GHz)

## 8.4.1. GFSK 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	19392.000	50.12	-5.57	44.55	74.00	-29.45	peak
2	20832.000	50.35	-5.04	45.31	74.00	-28.69	peak
3	21848.000	50.01	-4.39	45.62	74.00	-28.38	peak
4	23072.000	49.02	-3.42	45.60	74.00	-28.40	peak
5	23440.000	48.28	-3.20	45.08	74.00	-28.92	peak
6	25288.000	46.17	-1.68	44.49	74.00	-29.51	peak

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

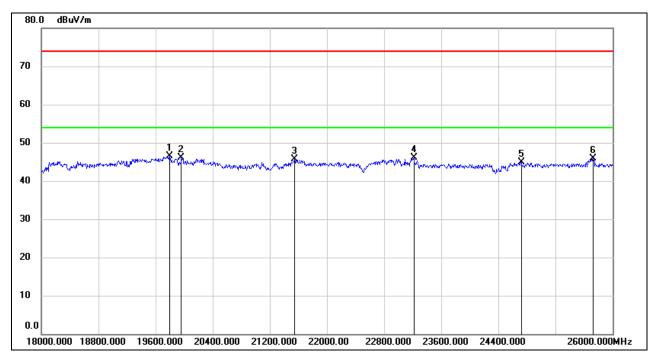
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.

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	19792.000	51.70	-5.29	46.41	74.00	-27.59	peak
2	19960.000	51.56	-5.42	46.14	74.00	-27.86	peak
3	21544.000	50.26	-4.63	45.63	74.00	-28.37	peak
4	23216.000	49.51	-3.38	46.13	74.00	-27.87	peak
5	24720.000	47.22	-2.33	44.89	74.00	-29.11	peak
6	25728.000	46.61	-0.72	45.89	74.00	-28.11	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.

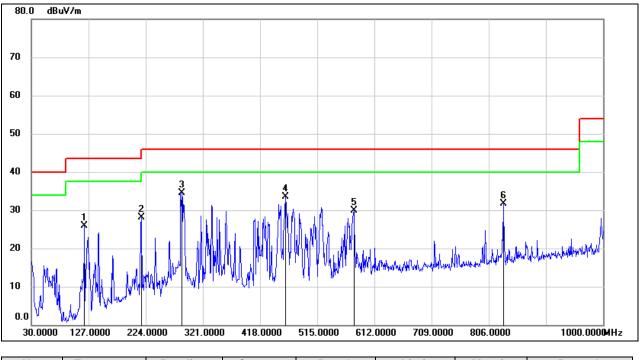
3. Peak: Peak detector.

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 (30MHz ~ 1 GHz)

## 8.5.1. GFSK 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	120.2100	45.90	-20.06	25.84	43.50	-17.66	QP
2	216.2400	46.24	-18.04	28.20	46.00	-17.80	QP
3	285.1099	51.29	-16.70	34.59	46.00	-11.41	QP
4	460.6800	45.84	-12.38	33.46	46.00	-12.54	QP
5	577.0800	40.09	-10.26	29.83	46.00	-16.17	QP
6	831.2199	38.88	-7.15	31.73	46.00	-14.27	QP

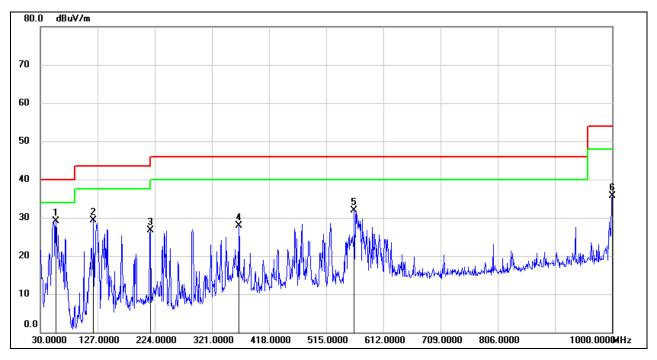
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

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.



## 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	56.1900	49.77	-20.73	29.04	40.00	-10.96	QP
2	120.2100	49.46	-20.06	29.40	43.50	-14.10	QP
3	216.2400	44.79	-18.04	26.75	46.00	-19.25	QP
4	366.5900	41.98	-14.14	27.84	46.00	-18.16	QP
5	562.5300	42.46	-10.58	31.88	46.00	-14.12	QP
6	1000.0000	40.39	-4.74	35.65	54.00	-18.35	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

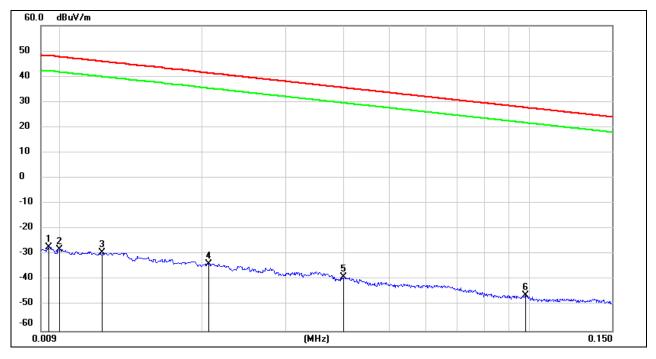
Note: All the modes have been tested, only the worst data was recorded in the report.



## 8.6. SPURIOUS EMISSIONS BELOW 30MHz

## 8.6.1. GFSK MODE

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



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

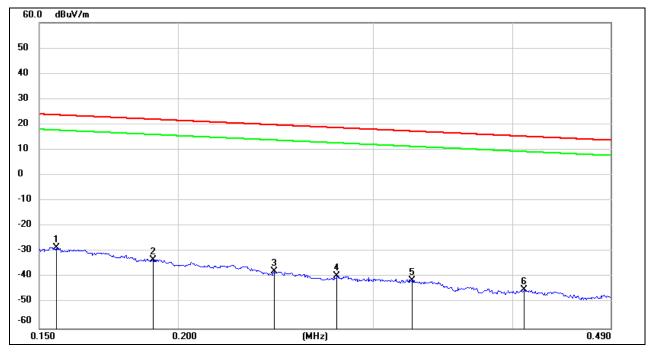
No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Result (dBuA/m)	Limit (dBuA/m)	(dB)	
	/		(ub/iii)			(ubuA/III)	(ubuA/III)	· · /	
1	0.0094	74.16	-	-27.19	48.05			-75.24	peak
			101.35			-78.69	-3.45		
2	0.0100	73.22	-	-28.18	47.60			-75.78	peak
			101.40			-79.68	-3.90		
3	0.0122	72.00	-	-29.39	45.87			-75.26	peak
			101.39			-80.89	-5.63		-
4	0.0206	67.71	-	-33.64	41.32			-74.96	peak
			101.35			-85.14	-10.18		-
5	0.0400	62.48	-	-38.95	35.56			-74.51	peak
			101.43			-90.45	-15.94		-
6	0.0981	55.77	-	-46.01	27.77			-73.78	peak
			101.78			-97.51	-23.73		

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>150kHz ~ 490kHz</u>



No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
				Result	Limit	Result	Limit		
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.1554	73.25	-	-28.40	23.77			-52.17	peak
			101.65			-79.90	-27.73		
2	0.1897	68.65	-	-33.05	22.04			-55.09	peak
			101.70			-84.55	-29.46		
3	0.2442	64.03	-	-37.76	19.85			-57.61	peak
			101.79			-89.26	-31.65		-
4	0.2782	62.29	-	-39.54	18.71			-58.25	peak
			101.83			-91.04	-32.79		
5	0.3251	60.71	-	-41.17	17.36			-58.53	peak
			101.88			-92.67	-34.14		-
6	0.4097	57.02	-	-44.95	15.35			-60.30	peak
			101.97			-96.45	-36.15		-

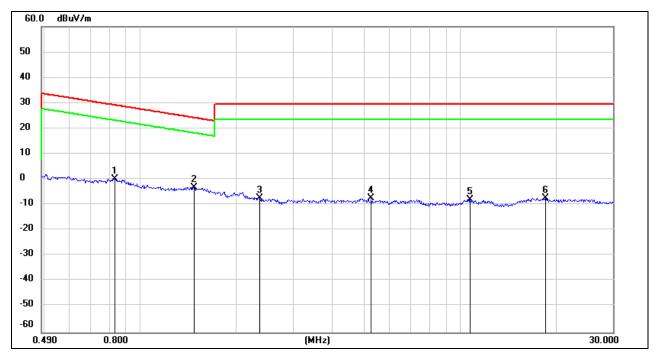
Note: 1. Measurement = Reading Level + Correct Factor ( $dBuA/m = dBuV/m - 20Log10[120\pi] = dBuV/m - 51.5$ ).

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>490kHz ~ 30MHz</u>



No.	Frequency	Reading	Correct	FCC	FCC	ISED	ISED	Margin	Remark
				Result	Limit	Result	Limit		
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuA/m)	(dBuA/m)	(dB)	
1	0.8296	62.44	-62.17	0.27	29.23	-51.23	-22.27	-28.96	peak
2	1.4700	58.89	-62.05	-3.16	24.26	-54.66	-27.24	-27.42	peak
3	2.3593	54.26	-61.73	-7.47	29.54	-58.97	-21.96	-37.01	peak
4	5.2705	54.04	-61.45	-7.41	29.54	-58.91	-21.96	-36.95	peak
5	10.7299	52.98	-60.83	-7.85	29.54	-59.35	-21.96	-37.39	peak
6	18.4908	53.55	-60.89	-7.34	29.54	-58.84	-21.96	-36.88	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. 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



## **APPENDIX A: DUTY CYCLE**

### **Test Result**

Mode	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)
GFSK	2.91	3.75	0.776	77.6%	1.10	0.34	0.5
8DPSK	2.91	3.75	0.776	77.6%	1.10	0.34	0.5

Note:

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

Where: x is Duty Cycle (Linear)

Where: T is On Time (transmit duration)

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



## **Test Graphs**

	DH5_Ant1_2	441	
Keysight Spectrum Analyzer - Swep	A SA		
021 RL RF 50 Ω Center Freq 2.402001	DOOD GHZ Avg	ALIGN AUTO 05:12:52 PM Jul 21, 2020 Type: Log-Pwr TRACE 1 2 3 4 5 6 TYPE WMM/WMW DET P P N N N N	Frequency
Ref Offset 1.5 10 dB/div Ref 21.50 d	IFGain:Low #Atten: 30 dB	ΔMkr3 3.750 ms 0.06 dB	Auto Tune
			Center Freq 2.402000000 GHz
-18.5 -28.5 -38.5 -38.5 -38.5 -38.5			Start Freq 2.402000000 GHz
48.5 <b>V P P P P P P P P P P</b>			<b>Stop Freq</b> 2.402000000 GHz
Center 2.40200000 G Res BW 8 MHz Δ. Δ. Δ	#VBW 50 MHz	Span 0 Hz Sweep 15.00 ms (1001 pts) FUNCTION WIDTH FUNCTION VALUE	CF Step 8.000000 MHz Auto Man
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.545 ms -1.14 dBm 3.750 ms (Δ) 0.06 dB 1.545 ms -1.14 dBm	E	Freq Offset 0 Hz
6 7 8 9 10 11		· L	Scale Type .og <u>Lin</u>
MSG	"	STATUS	
	3DH5_Ant1_2	2441	
Center Freq 2.40200	DC SENSE:INT DOOO GHZ Avg Avg Trig: Free Run	ALIGN AUTO 05:14:10 PM Jul 21, 2020 Type: Log-Pwr TRACE [] 2 3 4 5 6 Type WMMAWAWAW DET P N N N N	Frequency
Ref Offset 1.5 10 dB/div Ref 21.50 d	dB	 ΔMkr3 3.750 ms 0.09 dB	Auto Tune
11.5 1.50 -8.50	304		Center Freq 2.40200000 GHz
-18.5			Start Freq 2.40200000 GHz
-48.5 / 100		1441. Mila	Stop Freq 2.402000000 GHz
Center 2.402000000 G Res BW 8 MHz 1 Δ2 1 t (Δ)	#VBW 50 MHz	Span 0 Hz Sweep 15.00 ms (1001 pts) FUNCTION MIDTH	CF Step 8.000000 MHz Auto Man
2 F 1 t 3 Δ4 1 t (Δ) 4 F 1 t	870.0 μs 1.85 dBm 3.750 ms (Δ) 0.09 dB 870.0 μs 1.85 dBm	Ξ	Freq Offset 0 Hz
6			
5 6 7 8 9 10 11			Scale Type



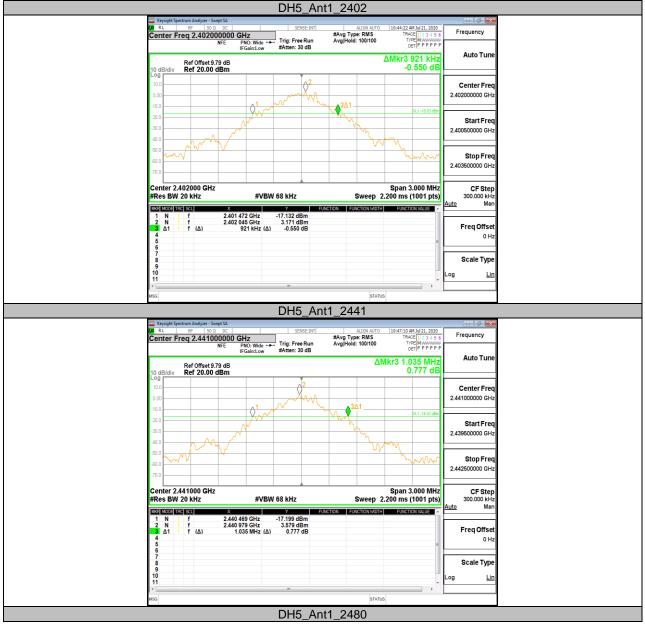
## **APPENDIX B: 20DB BANDWIDTH**

### **Test Result**

Test Mode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
		2402	0.921	2401.472	2402.393		PASS
DH5	Ant1	2441	1.035	2440.469	2441.504		PASS
		2480	1.035	2479.472	2480.507		PASS
		2402	1.263	2401.343	2402.606		PASS
3DH5	Ant1	2441	1.272	2440.343	2441.615		PASS
		2480	1.230	2479.364	2480.594		PASS



### **Test Graphs**



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## APPENDIX C: OCCUPIED CHANNEL BANDWIDTH

### **Test Result**

Test Mode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
		2402	0.88448	2401.551	2402.435		PASS
DH5	Ant1	2441	0.85770	2440.552	2441.410		PASS
		2480	0.89175	2479.548	2480.440		PASS
		2402	1.1542	2401.413	2402.567		PASS
3DH5	Ant1	2441	1.1388	2440.419	2441.558		PASS
		2480	1.1471	2479.414	2480.561		PASS

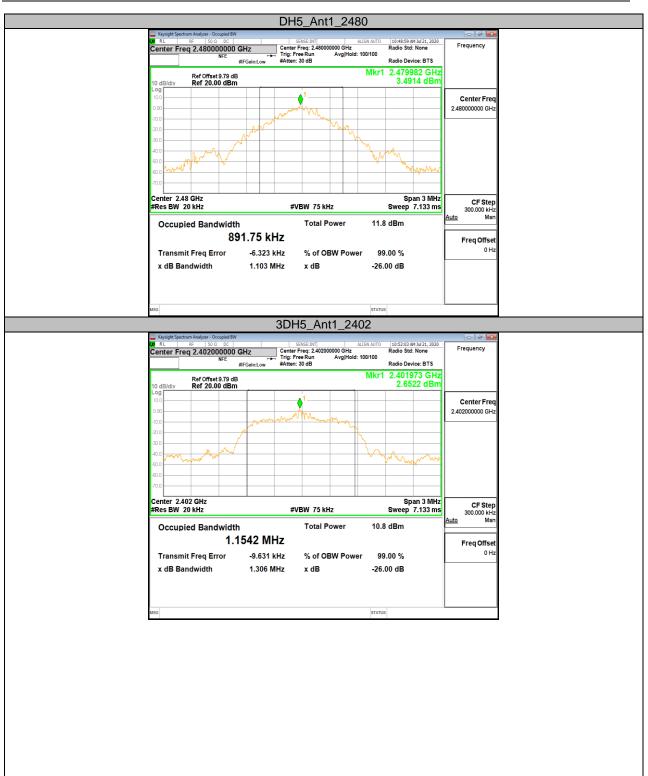


## **Test Graphs**



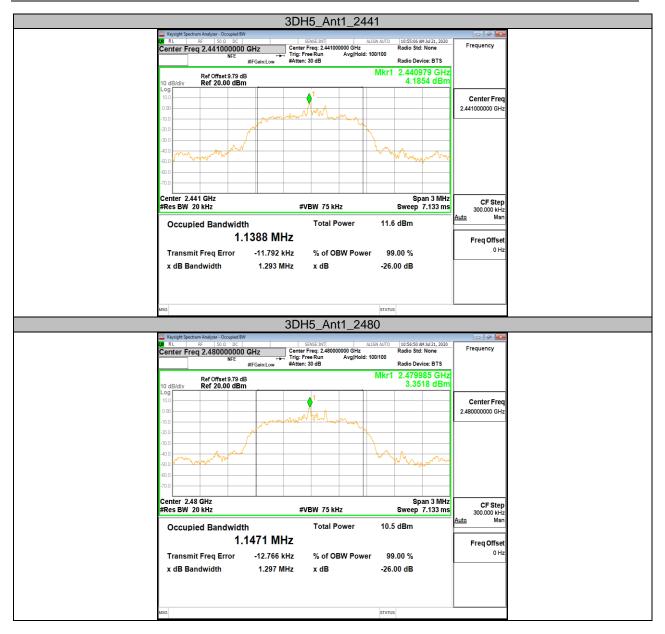


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## APPENDIX D: CONDUCTED OUTPUT POWER

### **Test Result**

Test Mode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
		2402	3.38	<=30	PASS
DH5	Ant1	2441	3.21	<=30	PASS
		2480	2.36	<=30	PASS
		2402	3.37	<=20.97	PASS
3DH5	Ant1	2441	3.22	<=20.97	PASS
		2480	2.38	<=20.97	PASS

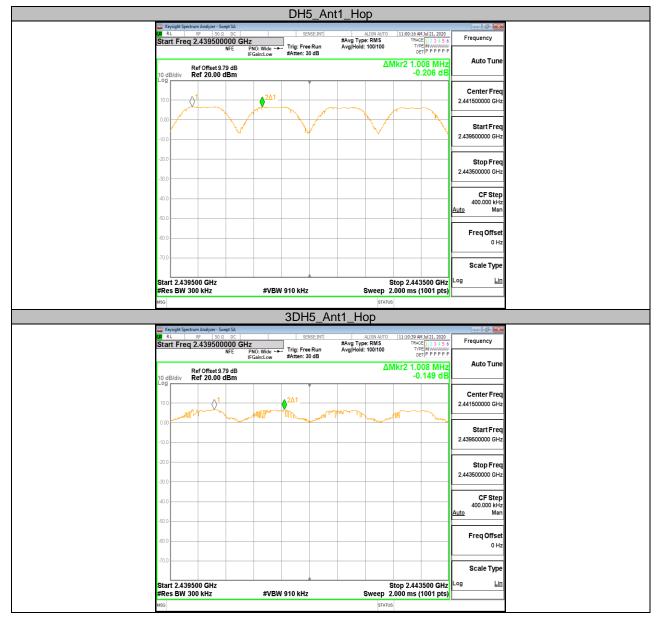


## **APPENDIX E: CARRIER FREQUENCY SEPARATION**

#### **Test Result**

Test Mode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Нор	1.008	>=1.035	PASS
3DH5	Ant1	Нор	1.008	>=0.848	PASS

### **Test Graphs**



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## **APPENDIX F: NUMBER OF HOPPING FREQUENCIES**

#### **Test Result**

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

## **Test Graphs**

					DH5	5_Ant	1_Ho	р			
20	RL I	n Analyzer - Swept ∛F 50 Ω	DC		SEN	SE:INT		LIGN AUTO	11:00:34 A	VM Jul 21, 2020	Frequency
Ce	nter Freq	2.441750	DOOO GHz FF PNO:	East +	Trig: Free	Run	#Avg Type Avg Hold:	: RMS 1000/1000	TRAI TY	CE 1 2 3 4 5 6 PE M ET P P P P P P	Frequency
_	D	of Offset 9.79	IFGair	n:Low	#Atten: 30	dB			0	211-1-1-1	Auto Tun
10 c Log	IB/div Re	ef 20.00 dE	3m								
10.											Center Fre 2.441750000 GH
	<b>DABABAT</b>	AADDOODA	ANAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	INAMAN	UAAAAA	NAAAAAAA	ANAANA	TADAADAD	VANANAN	Afilhaa	2.441730000 8H
0.0		H AND	din h	,,,,,	1.44.111						Start Fre
-10.0		ine fri	diama.			11111		111111	l		2.400000000 GH
-20.0											Stop Fre
-30.0											2.483500000 GH
-40.0											CF Ste
	4										8.350000 MH <u>Auto</u> Ma
-60.0										N-h	Freq Offse
-60.0											0 H
-70.0											Scale Typ
Sta	rt 2.40000								Stop 3.4	8350 GHz	
	es BW 200			#VBW	200 kHz		\$	Sweep 1	.733 ms	(1001 pts)	
MSG	_	_	_	_				STATUS		_	
	evsight Spectrum	n Analyzer - Swept	r SA		3DH	5_An	t1_Ho	р			- 8 -
(X)	RL I	50 Ω 2.441750	DC		SEN	SE:INT		LIGN AUTO	11:11:43 A	M Jul 21, 2020	-
							#Avg Type	RMS	TRA	CE 1 2 3 4 5 6	Frequency
		N	FE PNO: IFGair	Fast ↔ n:Low	Trig: Free #Atten: 30	Run dB	#Avg Type Avg Hold:	:: RMS 1000/1000	TRA TY D	OE 1 2 3 4 5 6 PE M	
10 0	Bidiy R	offset 9.79	FE PNO: IFGair dB	:Fast ↔ n:Low	Trig: Free #Atten: 30	Run dB	#Avg Type Avg Hold:	RMS	TRAI TY D	CE 1 2 3 4 5 6	Frequency Auto Tun
10 c Log	Bidiy R		FE PNO: IFGair dB	Fast ↔→ n:Low	Trig: Free #Atten: 30	Run I dB	#Avg Typ Avg Hold:	RMS	TRAI TY D	CE 1 2 3 4 5 6	Auto Tun
10 d Log		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	
Log	B/div Re	offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	#Avg Typ Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun Center Fre 2.441750000 GH
10.1		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun Center Fre
10. -10.		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun Center Fre 2.441750000 GH Start Fre 2.40000000 GH
100 -100 -100 -200	IB/div R(	offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun Center Fre 2.441750000 GH Start Fre
-10. -10. -10.0 -30.0		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.483500000 GH
100 -100 -100 -200		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.48350000 GH           CF Ste           8.350000 HH
-10. -10. -10.0 -30.0		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.483500000 GH           CF Ste           8.350000 MH           Auto           Mato
100 000 -100 -200 -300 -400		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.483500000 GH           CF Ste           8.350000 MH <u>Auto</u> Ma           Freq Offse
-10. -10. -30.0 -40.0 -50.0		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	:: RMS 1000/1000	D	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.483500000 GH           CF Ste           8.350000 MH           Auto           Mato
100 100 -100 -200 -400 -400 -400 -400		offset 9.79	FE PNO: IFGair dB 3m	Fast ↔ n:Low	#Atten: 30	dB	Avg Hold:	: RMS 1000/1000			Ацto Tun Сепter Fre 2.441750000 GH Start Fre 2.400000000 GH Stop Fre 2.48350000 GH CF Ste 8.35000 MH Auto Ma Freq Offss 0 H Scale Typ
- Log 100 - 100 - 300 - 300 - 400 - 400 - 700 - <b>Sta</b>		of offset 9.79 ef 20.00 de 	FE PNO: IFGair dB 3m	Least → →	#Atten: 30	dB		: FMS 1000/1000	D 2 2 2 2 3 2 3 5 5 5 5 5 5 2 4	CE 1 2 3 4 5 6	Auto Tun           Center Fre           2.441750000 GH           Start Fre           2.400000000 GH           Stop Fre           2.483500000 GH           CF Ste           8.350000 MH           Auto           Main           Freq Offset           0 H           Scale Typ           Log

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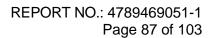


## APPENDIX G: TIME OF OCCUPANCY (DWELL TIME)

#### **Test Result**

			FHSS Mode			
Test Mode	Antenna	Channel	Burst Width [ms]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.40	0.068	<=0.4	PASS
DH3	Ant1	Нор	1.66	0.149	<=0.4	PASS
DH5	Ant1	Нор	2.90	0.203	<=0.4	PASS
3DH1	Ant1	Нор	0.41	0.078	<=0.4	PASS
3DH3	Ant1	Нор	1.66	0.133	<=0.4	PASS
3DH5	Ant1	Нор	2.91	0.204	<=0.4	PASS

			AFHSS Mode			
Test Mode	Antenna	Channel	Burst Width [ms]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Нор	0.40	0.0109	<=0.4	PASS
DH3	Ant1	Нор	1.66	0.0119	<=0.4	PASS
DH5	Ant1	Нор	2.90	0.0108	<=0.4	PASS
3DH1	Ant1	Нор	0.41	0.0125	<=0.4	PASS
3DH3	Ant1	Нор	1.66	0.0106	<=0.4	PASS
3DH5	Ant1	Нор	2.91	0.0109	<=0.4	PASS





## **Test Graphs**

BBM BM BM BM BM BM BM BM BM BM	ALIGNATO		Center Freq           2.441000000 GHz           Start Freq           2.441000000 GHz           Start Freq           2.441000000 GHz           Stop Freq           2.441000000 GHz           CF Step           1.000000 MHz           CF Step           1.000000 MHz
DC SINGENT SOUCH STATUS NFE PNO: Wide IFG States 200 us IFG states 200 us Trg: Video #Atten: 30 dB BM 		TROCK         13.4 5 6           TYPE         MKr2 400.3 µS           13.11 dB         13.11 dB	Frequency           Auto Tune           Center Freq           2.441000000 GHz           Start Freq           2.441000000 GHz           Stop Freq           2.441000000 GHz           CF Step           1.000000 MHz
0000 CH2 PROVINGE		TROCK         13.4 5 6           TYPE         MKr2 400.3 µS           13.11 dB         13.11 dB	Auto Tune           Center Freq           2.441000000 GHz           Start Freq           2.441000000 GHz           Stop Freq           2.441000000 GHz           CF Step           1.000000 MHz
IFGainci ow #Atten: 30 dB  Bm		Mkr2 400.3 µs 13.11 dB	Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz
n di tensi tensi sensi di tensi de la consensi di tensi tensi tensi de la consensi di tensi de la consensi de la co el consensi de la consens		13.11 dB	Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz
n di tensi tensi sensi di tensi de la consensi di tensi tensi tensi de la consensi di tensi de la consensi de la co el consensi de la consens		TROLVS	2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			2.441000000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			Start Freq           2.441000000 GHz           Stop Freq           2.441000000 GHz           CF Step           1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			2.44100000 GHz Stop Freq 2.44100000 GHz CF Step 1.00000 MHz
n finandalan Labortoo na milikilin ya Ama			2.44100000 GHz Stop Freq 2.44100000 GHz CF Step 1.00000 MHz
n finandalan Labortoo na milikilin ya Ama			Stop Freq 2.44100000 GHz CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			2.441000000 GHz CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			2.441000000 GHz CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			CF Step 1.000000 MHz
n finandalan Labortoo na milikilin ya Ama			1.000000 MHz
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and the second sec		and the second	0 Hz
	out the light	والكري يتركبه السريا فا	
			Scale Type
Hz	_	Span 0 Hz	Log <u>Lin</u>
#VBW 3.0 MHz		.13 ms (8000 pts)	
	STATUS		
	пп_нор		
pt SA DC SENSE:INT	ALIGN AUTO	11:02:33 AM Jul 21, 2020	Frequency
0000 GHz NFE PNO: Wide ↔ Trig: Video Trig: Video	#Avg Type: RMS	TYPE WWWWWW DET P P P P P P	
IFGain:Low #Atten: 30 dB	AL		Auto Tune
Bm		10.81 dB	
			Contra Franc
			Center Freq 2.441000000 GHz
		TRIG LVL	Start Freq
Δ1			2.441000000 GHz
			Stop Freq
			2.441000000 GHz
			CF Step 1.000000 MHz
			<u>Auto</u> Man
al de la contra la contra da contra la desente de la contra	hid, phenological and a state of the	A solution in the constant	Freq Offset
			0 Hz
a se de la constante de la const	A constant of the last of the second	vialeisolautu	
			Scale Type
Hz		Span 0 Hz	Log <u>Lin</u>
#VBW 3.0 MHz	· · ·	.13 ms (8000 pts)	
	STATUS		
	ext 53 BC SENCE INT NFE PNC: Wide →→ IFGaint.Cov 3Bm 221 3Bm 221 3Bm 3Bm 3Bm 3Bm 3Bm 3Bm 3Bm 3Bm	PHZ #VEW 3.0 MHz Sweep 10	DH3_Ant1_Hop           SPRCE:INT         ALIGN ANTO         1130233 AM M212, 2020           Trig: T



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DH5_Ant1_Hop NE 00 0C Allow A
English Superior         Superior         Superior         Superior         Superior         Superior         Frequency           Int         RF         FV0: Wide         Trig Data/2000 µs         #Awg Type: RMS         Trig-Clip 12 a 3 a register         Frequency           NFE         FV0: Wide         Trig Data/2000 µs         #Awg Type: RMS         Trig-Clip 12 a 3 a register         Frequency           NFE         FV0: Wide         Trig Data/2000 µs         #Awg Type: RMS         Trig-Clip 12 a 3 a register         Frequency           NFE         FV0: Wide         Trig Data/2000 µs         #Awg Type: RMS         Trig-Clip 12 a 3 a register         Frequency           10 dBidiv         Ref 20.00 dBm         Salar         Salar         Center Freq         2.441000000 GHz           10 d         20 d         20 d         Trig-Video         Trig-Video         Start Freq           30 d         20 d         20 d         20 d         Trig-Video         Trig-Video         Start Freq           30 d         20 d         20 d         20 d         Start Freq         2.441000000 GHz         Start Freq           30 d         20 d         1 do to
Bit No.       No. Trip Delay-2000       Auton Auton Trip Delay-2000       Frequency         MFE       PNO: Wide → IFGsinLow       Trip Delay-2000       #Avg Type: RMS       Track[1]: 3.3.5 to Trip Delay-2000       Frequency         MFE       PNO: Wide → IFGsinLow       Trip Delay-2000       #Avg Type: RMS       Track[1]: 3.3.5 to Trip: Uideo       Auto Tune         00 dBidiv       Ref 20.00 dBm       Auton       1100224 Auton       Auton       Auton         00 dBidiv       Ref 20.00 dBm       2.01       Auton       Trip Delay-2000       #Avg Type: RMS       Track[1]: 3.4.5 to Trip: Video       Center Freq         10 dBidiv       Ref 20.00 dBm       2.01       Auton       Trip Delay-2000       #Avg Type: RMS       Track[1]: 3.4.5 to Trip Delay-2000       #Auton         10 dBidiv       Ref 20.00 dBm       2.01       Auton       Trip Delay-2000       #Avg Type: RMS       Trip Delay-2000       #Auton       Auton         10 d       2.41100000 GHz       2.41100000 GHz       2.41100000 GHz       2.41100000 GHz       2.41100000 GHz       2.41100000 GHz         40 d       40
Center Freq 2.441000000 GHz         Ing. Uses (FG ainLow)
Auto Tune           OdB/div         Ref 20.00 dBm         Auto Tune           0.0         8.39 dB         2.44100000 GHz           0.0         201         100         100           0.00         201         100         100           0.00         201         100         100           0.00         201         100         100           0.00         201         100         100           0.00         100         201         100           0.00         100         100         100           0.00         100         100         100         100           0.00         100         100         100         100         100           0.00         100         100         100         100         100         100           0.00         100         100         100         100         100         100         100           0.00         100         100         100         100         100         100         100           0.00         100         100         100         100         100         100         100         100         100           0.00
Interference       Interference <th< td=""></th<>
Cog         Center Freq           100         201         100           100         201         100           100         201         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100           1000         100         100           100         100         100           100         100         100           100         100         100           100         100         100           100         100         100 <t< td=""></t<>
100       2.441000000 GHz         000       100         000       2Δ1         000       2Δ1         000       1         000
Start Freq           201         100           201         100           300         1           400         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1           500         1
30.0     30.0
30.0     30.0
30.0     1     Stop Freq       30.0     2.441000000 GHz       40.0     1       50.0     1       60.0     1       50.0     1       50.0     1
30.0     Stop Freq 2.44100000 GHz       40.0     CF Step 1.00000 MHz       50.0     Man       50.0     Freq Offset
30.0     Stop Freq 2.44100000 GHz       40.0     CF Step 1.00000 MHz       50.0     Man       50.0     Freq Offset
30.0
500     1.000000 MHz       500     Man
500     1.000000 MHz       500     Man
50.0 Freq Offset
500 Freq Offset
-60.0
-70.0 Scale Type
Center 2.441000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8000 pts)
NSG STATUS
3DH1_Ant1_Hop
🔤 Keysight Spectrum Analyzer - Swept SA
RL RF 50Ω DC SENSEINT ALTON MUTO 11:12:26 MM Jul 21, 2020     Center Freq 2.441000000 GHz     Trig Delay-20:00 μs #Avg Type: RMS TRACE[]: 3.4 5.6     Frequency     More DMC: MMA → Trig: Video
#Atten: 30 dB DET PPPPP
ΔMkr2 410.4 μs Auto Tune
10 dBldiv Ref 20.00 dBm 6.38 dB
Center Freq
10.0 2.441000000 GHz
The Start Freq
-100 2441000000 GHz
Stop Freq
-30.0 2.441000000 GHz
CF Step
40.0 1.00000 MHz
500 Auto Man
and the many helperiod in the mainteen and the real termination of the termination of ter
Scale Type
Center 2.441000000 GHz Span 0 Hz
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8000 pts)
MSG STATUS



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3DH3_Ant1_Hop	
- repagn spectrum muster such set	- 2 ×
RL RF 50 Ω DC SENSE:INT ALIGN AUTO 11:12:51 AM Jul 21, 2020	
Contor Frog 2 444000000 CHz Trig Delay-200 0 us #Avg Type RMS TRACE 1 2 3 4 5 6	Frequency
NFE PNO: Wide Irig: Video	
il duineon	
ΔMkr2 1.661 ms	Auto Tune
10 dB/div Ref 20.00 dBm 7.79 dB	
	Center Freq
10.0	2.441000000 GHz
	2.44100000000112
nm	
	Start Freq
	2.441000000 GHz
10.0 201 TRIGLVL	2.44 1000000 GHz
20.0 1	Stop Freq
	2.441000000 GHz
30.0	2.44100000 0H2
40.0	CF Step
	1.000000 MHz
	Auto Man
50.0	
a standard and the sector of the product of the state of the	Freq Offset
	0 Hz
	Scale Type
Center 2.441000000 GHz Span 0 Hz	.og <u>Lin</u>
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.13 ms (8000 pts)	
ISG	
3DH5_Ant1_Hop	
3DH5_Ant1_Hop	
Keysight Spectrum Analyzer - Swept SA     RL RF 500 DC SERVSE-INT ALTGN AUTO 111:11:58 AM hil 21.2020	- 3 <b>-</b>
Keysight Spectrum Analyzer - Swept SA     RL RF 500 DC SERVSE-INT ALTGN AUTO 111:11:58 AM hil 21.2020	Frequency
Keylight Spectrum Analyzer - Swept SA         SpinseE.IVIT         ALIGN AUTO         11:11:58 AM Jul 21, 2020           R.R.         RF         S0.0         DC         SPINSE.IVIT         ALIGN AUTO         11:11:58 AM Jul 21, 2020           Center Freq 2.441000000 GHz         Trig Delay-200.0 µs         #Avg Type: RMS         TRACE[1:2:3:4:5:6           NFE         PNO: Wide →         Trig: Video         Trig: Wideo	
Keyight Spectrum Analyzer - Sinegt SA         SENSE INT         ALLEN AUTO         1111158 AM Jul 21, 2020           R.t         RF         50.0         DC         Trig Delary-2000 µs         #Avg Type: RMS         Trig: Click           Center Freq 2.441000000 GHz         Trig: Under →	
Keyight Spectrum Analyzer - Swept SA         SElicE INT         ALLON AUTO         I111158 AM Jul 21, 2020           Rt         RF         50.0         DC         Trig Delay-2000 μs         #Avg Type: RMS         Trice [1]: 3.3.4.5.6           NFE         PR0: Wide         Trig: Video         Trig: Video         Trig: Video         Delay 2000 μs         #Avg Type: RMS         Trice [1]: 3.3.4.5.6           MFE         PR0: Wide         Trig: Video         Trig: Video         Delay 2000 μs         #Avg Type: RMS         Trice [1]: 3.3.4.5.6           MFE         PR0: Wide         Trig: Video         Delay 2000 μs         #Avg Type: RMS         Trice [1]: 3.3.4.5.6           MFE         PR0: Wide         Trig: Video         Trig: Video         Delay 2000 μs         Avg Type: RMS         Delay 2000 μs	Frequency
Keyight Spectrum Analyzer - Sinegt SA         SENSE INT         ALLEN AUTO         1111158 AM Jul 21, 2020           R.t         RF         50.0         DC         Trig Delary-2000 µs         #Avg Type: RMS         Trig: Click           Center Freq 2.441000000 GHz         Trig: Under →	Frequency
Logget Spectrum Languer: Sever 53.         Spectrum Languer: Sever 53.         Spectrum Languer: Sever 53.         ALSON AUTO 1111158 AM MU21, 3020           Center Freq 2.441000000 GHz NFE         Trip Delay-2000 µs FNO: Wide → IFG James ow Atten: 30 dB         Spectrum Languer: Spectrum Autor 111158 AM MU21, 3020         Trip Characteria Trip Characteria BAtten: 30 dB           10 dB/div         Ref 20.00 dBm         18.52 dBL         Spectrum Languer: Spectrum BAtten: 50 dB         ALSON AUTO 1111158 AM MU21, 3020	Frequency Auto Tune
Explight Spectrum Analyzer - Swept SA         SElicE INT         ALLEN AUTO         I111158 AM Jul 21, 2020           Center Freq 2.441000000 GHz         Trig Delay-2000 μs         #Avg Type: RMS         Trig: 3 a 5 s           NFE         PR0: Wide         Trig: Video         Trig: Video         Trig: Video           IFGainLow         #Atten: 30 dB         ΔMkr2 2.912 ms         Trig: State           0 dB/div         Ref 20.00 dBm         18.52 dB         209	Frequency Auto Tune Center Freq
Explight Spectrum Analyzer - Swept SA         SElicE INT         ALLEN AUTO         I111158 AM Jul 21, 2020           Center Freq 2.441000000 GHz         Trig Delay-2000 μs         #Avg Type: RMS         Trig: 3 a 5 s           NFE         PR0: Wide         Trig: Video         Trig: Video         Trig: Video           IFGainLow         #Atten: 30 dB         ΔMkr2 2.912 ms         Trig: State           0 dB/div         Ref 20.00 dBm         18.52 dB         209	Frequency Auto Tune
Exception Reduce: Reset SA         RL         File         S0.002.1NT         ALLOW AUTO         1111158AM1M121.3020           Center Freq 2.441000000 GHz, iFGalanLow         Frig. Delay-2000 μs         #Avg Type: RMS         Trace State so trace in Frig. Video #Atten: 30 dB         Trace State so trace in Frig. Video #Atten: 30 dB           0 dBiddly         Ref 20.00 dBm         18.52 dB         18.52 dB	Frequency Auto Tune Center Freq
Erystyld Spectrum Andyrer - Stept SA           R.L.         RF         S0.0         DC         SENSE INT         ALLEN AUTO         I111158 AM10/21, 2020           Center Freq 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trace[] II 24 3 5         Trace[] II 24 3 5           NFE         PN0: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trace[] II 24 3 5           OdB/div         Ref 20.00 dBm         PN0: Wide         Trig Delay-2000 µs         #Avg Type: RMS         DMKr2 2.912 ms           10         00         00         00         00         00         00         00	Frequency Auto Tune Center Freq 2.441000000 GHz
By open Spectrum Andyrer: Nexer SA         RL         SS 000 C I         SS000 C IIIII SPAN MU21, 3020           RL         SS         SS000 C IIIII SPAN MU21, 3020         Trice Delay-2020 0 µs         SAVing Type: RMS         Trace Of the start o	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq
Register Kandersen Ka	Frequency Auto Tune Center Freq 2.441000000 GHz
Explicit line         Ref         50.0         Conter         SElice INT         ALLEN AUTO         IIIII 58 AM JAI, 2020           Center Freg 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trice [] 3 a 5 5         Trice [] 3 a 5 5           NFE         PN0: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trice [] 3 a 5 5           0 Biology         ME         PN0: Wide         Trice [] 10 a 5 5         Trice [] 10 a 5 5           0 GB/div         Ref 20.00 dBm         ALLEN AUTO         IIIII 58 AM JAI, 2020           00	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq
Exception Reduces Adjust - Reger SA         Ref         SO 0 CC         SO 0 CC         SO 0 CC         Trig Delay-SOO0 μs         #Aug Type: RMS         #Aug Type: RMS         Trig Delay-SOO0 μs         #Aug Type: RMS	Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz
Excipate Spectrum Andyrer: Steps 5A         SSIGE:INT         ALLEW AUTO         [11:11:58 AM:M21: 2020]           R.L.         PFC         SG 0         C         SSIGE:INT         ALLEW AUTO         [11:11:58 AM:M21: 2020]           Center Freq 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         ME         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         ME         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trig Delay-2000 µs           000         ME         PRO: Wide         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs           000         ME         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs           000         ME         Trig Delay-2000 µs         Trig Dela	Frequency Auto Tune Center Freq 2.44100000 GHz 2.44100000 GHz Stop Freq
Explain Spectrum Analyzer - Singet SA         SElect INT         ALLEN AUTO         IIIII 58 AMI J01, 2020           Center Freg 2.441000000 GHz IFGainLow         Trig Delay-2000 μs         #Avg Type: RMS         Trice: [] 3 a 5 6 Trice: [] 4 a 5 6           NFE         PN0: Wide         Trice: [] 4 a 5 6         Trice: [] 3 a 5 6           IG Bidly         Ref 20.00 dBm         ALLEN AUTO         IIIII 58 AMI J21, 2020           00         ME         PN0: Wide         Trice: [] 4 a 5 6           00         ALLEN AUTO         IIIII 58 AMI J21, 2020         Trice: [] 3 a 5 6           00         ME         PN0: Wide         Trice: [] 4 a 5 6         Trice: [] 3 a 5 6           00         ALLEN AUTO         IIIIII 58 AMI J21, 2020         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6           00         ALLEN AUTO         BLEN AUTO         BLEN AUTO         Trice: [] 3 a 5 6           00         ALLEN AUTO         ALLEN AUTO         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6           00         ALLEN AUTO         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6           00         ALLEN AUTO         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6         Trice: [] 3 a 5 6           00         Trice: [] 7 p o p no         Trice: [] 7 p o p no         Trice: [] 7 p o p	Frequency Auto Tune Center Freq 2.441000000 GHz Start Freq 2.441000000 GHz
Excipate Spectrum Andyrer: Steps 5A         SSIGE:INT         ALLEW AUTO         [11:11:58 AM:M21: 2020]           R.L.         PFC         SG 0         C         SSIGE:INT         ALLEW AUTO         [11:11:58 AM:M21: 2020]           Center Freq 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         MFE         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         ME         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trackel [11:11:58 AM:M21: 2020]           000         ME         PRO: Wide         Trig Delay-2000 µs         #Avg Type: RMS         Trig Delay-2000 µs           000         ME         PRO: Wide         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs           000         ME         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs         Trig Delay-2000 µs           000         ME         Trig Delay-2000 µs         Trig Dela	Frequency Auto Tune Center Freq 2.44100000 GHz 2.44100000 GHz Stop Freq
Explain Spectrum Analyzer - Singet SA         SElect INT         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           Center Freg 2.441000000 GHz IFGainLow         Trig Delay-2000 μs         #Avg Type: RMS         Trice: [] 3 a 5 6 Trice: [] 4 a 5 6           NFE         PN0: Wide         Trice: [] 4 a 5 6         Trice: [] 3 a 5 6           IG Bidly         Ref 20.00 dBm         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ME         PN0: Wide         Trice: [] 3 a 5 6           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         IIIIII 58 AM Jul 21, 2020	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz
Explain Spectrum Analyzer - Singet SA         SElect INT         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           Center Freg 2.441000000 GHz IFGainLow         Trig Delay-2000 μs         #Avg Type: RMS         Trice: [] 3 a 5 6 Trice: [] 4 a 5 6           NFE         PN0: Wide         Trice: [] 4 a 5 6         Trice: [] 3 a 5 6           IG Bidly         Ref 20.00 dBm         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ME         PN0: Wide         Trice: [] 3 a 5 6           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         ALLEN AUTO         IIIII 58 AM Jul 21, 2020           00         IIIIII 58 AM Jul 21, 2020	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz
Explaid Spectrum Andyrer - Step 2 M ALLEW AUTO         IIIII 58 AM M/21, 2020           AL         RF         50.0 DC         SENSE INT         ALLEW AUTO         IIIII 58 AM M/21, 2020           Center Freq 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trig: Video         Trig: Video           MFE         PRO: Wide         Trig: Video         #Atten: 30 dB         ALLEW AUTO         IIIII 58 AM M/21, 2020           00 dB/div         Ref 20.00 dBm         ALLEW AUTO         IIIII 58 AM M/21, 2020         Trig: Video         Trig: Video           00 dB/div         Ref 20.00 dBm         ALMKr2 2.912 ms         Ref 20.00 dBm         18.52 dB         100 dB           00 dB/div         Ref 20.00 dBm         201         Trig: Uideo         100 dB	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz 2.44100000 GHz 2.45 CF Step 1.000000 MHz
Explaid Spectrum Andyrer - Step 2 M ALLEW AUTO         IIIII 58 AM M/21, 2020           AL         RF         50.0 DC         SENSE INT         ALLEW AUTO         IIIII 58 AM M/21, 2020           Center Freq 2.441000000 GHz         Trig Delay-2000 µs         #Avg Type: RMS         Trig: Video         Trig: Video           MFE         PRO: Wide         Trig: Video         #Atten: 30 dB         ALLEW AUTO         IIIII 58 AM M/21, 2020           00 dB/div         Ref 20.00 dBm         ALLEW AUTO         IIIII 58 AM M/21, 2020         Trig: Video         Trig: Video           00 dB/div         Ref 20.00 dBm         ALMKr2 2.912 ms         Ref 20.00 dBm         18.52 dB         100 dB           00 dB/div         Ref 20.00 dBm         201         Trig: Uideo         100 dB	Frequency Auto Tune Center Freq 2.44100000 GHz Start Freq 2.441000000 GHz Stop Freq 2.441000000 GHz
Exception Section         ALLOW AUTO         [11:11:58 AM1M21; 2020           RTig Delay-2000.0 µs         AAvg Type: RMS         Trig Delay-2000.0 µs           ALLOW AUTO         [11:11:58 AM1M21; 2020           Trig Delay-2000.0 µs         AAvg Type: RMS         Trig: Video           Trig Delay-2000.0 µs         AAvg Type: RMS         Trig: Video           PRO: Wide         Trig Delay-2000.0 µs         AAvg Type: RMS         Trig: Video           Trig: Video         AMKE 2.912 RMS           ID del Minte 2.2.912 RMS           10.0 dBldiv         Ref 20.00 dBm           00         Colspan="2">Trig: Video           0.0 dBldiv         Ref 20.00 dBm           0.0 dBldiv         Ref 20.00 dBm           0.0 dBldiv         Colspan="2">Colspan="2">Colspan="2"           0.0 dBldiv         Ref 20.00 dBm           0.0 dBldiv            0.0 dBldiv         Colspan="2"           0.0 dBldiv <th< td=""><td>Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz CF Step 1.000000 MHz Man</td></th<>	Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz CF Step 1.000000 MHz Man
Exception Section         ALLEW AUTO         [11:11:58 AM JM21: 2020           Refer Freq 2.441000000 GHz         Trig Delay-2000 µs         AAvg Type: RMS         Trig Delay-2020           Trig Delay-2000 µs         AAvg Type: RMS         Trig Delay-2000 µs         AAvg Type: RMS         Trig Delay-2020           Colspan="2">ALIEN AUTO 11:11:58 AM JM21: 2020           Trig Delay-2000 µs         AAvg Type: RMS         Trig Delay-2020           Colspan="2">AME         Colspan="2">AME         Colspan="2">Colspan="2">Trig Delay-2000 µs           Colspan="2">Colspan="2">Trig Delay-2000 µs         AME         Colspan="2">Colspan="2">Trig Delay-2000 µs           Colspan="2">Trig Delay-2000 µs         Trig Delay-200 µs         Trig Delay-200 µs	Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 1.000000 GHz 1.000000 MHz 1.000000 MHz Man Freq Offset
Exception Section         ALL (M + 100)         Section         Section         ALL (M + 100)         Section         ALL (M + 100)         Section         Section         ALL (M + 100)         Section	Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz CF Step 1.000000 MHz Man
Exception Reduce         Context Field         AL (M)         K         Field SA (M)         SA (M)         AL (M)         M (M)	Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 1.000000 GHz 1.000000 MHz 1.000000 MHz Man Freq Offset
Exception Section         ALL (M + 100)         Section         Section         ALL (M + 100)         Section         ALL (M + 100)         Section         Section         ALL (M + 100)         Section	Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz Stop Freq 2.44100000 GHz CF Step 1.00000 MHz CF Step 1.00000 MHz Freq Offset 0 Hz 0 Hz
Exception Reduce         Context Field         AL (M)         K         Field SA (M)         SA (M)         AL (M)         M (M)	Frequency Auto Tune Center Freq 2.441000000 GHz 2.441000000 GHz 2.441000000 GHz 1.000000 GHz 1.000000 MHz 1.000000 MHz Man Freq Offset
Exception         ALLION AUTOR         THE Delay-2000 Us         #ALON AUTO         #ALON AUTO         THE Delay-2000 US         #ALON AUTO <td>Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz CF Step 1.00000 MHz L00000 MHz Freq Offset 0 Hz Scale Type</td>	Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz CF Step 1.00000 MHz L00000 MHz Freq Offset 0 Hz Scale Type
Exception Reduction Reset SA         Store Circle         Store Circle         Store Circle         ALSON AUTO         1111158 AM M21, 300           Centrer Freq 2.441000000 GHz         NFE         FRO: Wide         Trig Flags         T	Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz Stop Freq 2.44100000 GHz CF Step 1.00000 MHz CF Step 1.00000 MHz Freq Offset 0 Hz 0 Hz
Exception         ALLION AUTOR         THE Delay-2000 Us         #ALON AUTO         THE DELAY         THE DELAY         #ALON AUTO         #ALON AUTO         #ALON AUTO         #A	Auto Tune Center Freq 2.44100000 GHz Start Freq 2.44100000 GHz CF Step 1.00000 MHz L00000 MHz Freq Offset 0 Hz Scale Type



## APPENDIX H: BAND EDGE MEASUREMENTS

## **Test Result**

Test Mode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Low	2402	6.21	-50.53	<=-13.79	PASS
DH5	Ant1	High	2480	5.51	-50.71	<=-14.5	PASS
DHD	Anti	Low	Hop_2402	6.27	-51.52	-13.73	PASS
		High	Hop_2480	5.97	-50.55	-14.03	PASS
		Low	2402	6.52	-49.65	<=-13.48	PASS
3DH5	A set 1	High	2480	4.75	-50.76	<=-15.25	PASS
3003	Ant1	Low	Hop_2402	6.33	-49.65	-13.67	PASS
		High	Hop_2480	5.99	-49.5	-14.01	PASS

## **Test Graphs**



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DH5_Ant1_Lc	w_Hop_2402		
Keysight Spectrum Analyzer - Swept SA           VI         RL         RF         S0 Ω         DC         SENSE:INT	ALIGN AUTO 10:58:37 AM Jul 21, 2020		
Center Freq 2.355000000 GHz NFE PNO: Fast ++ Trig: Free Run	#Avg Type: RMS Avg Hold: 500/500 DET P P P P P P	Frequency	
IFGain:Low #Atten: 30 dB Ref Offset 9.64 dB	Mkr5 2.319 36 GHz	Auto Tune	
10 dB/div Ref 20.00 dBm	-51.517 dBm		
10.0		Center Freq	
-10.0	DL(11975-00-	2.355000000 GHz	
-20.0		Start Freq	
-30.0		2.30000000 GHz	
-50.0 4 3	3 2	Stop Freq	
-60.0		2.410000000 GHz	
Start 2.30000 GHz	Stop 2.41000 GHz	CF Step	
#Res BW 100 kHz #VBW 300 kHz	Sweep 4.067 ms (1001 pts)	11.000000 MHz Auto Man	
1 N 1 f 240296 GHz 6274 dBm	NCTION FUNCTION WIDTH FUNCTION VALUE		
3 N 1 f 2.390 00 GHz -53.049 dBm		Freq Offset 0 Hz	
6	E		
7 8 9		Scale Type	
10	•	Log <u>Lin</u>	
e m	STATUS		
DH5_Ant1_Hi	gh_Hop_2480		
Keysight Spectrum Analyzer - Swept SA           μ         RL         RF         50 Ω         DC         SENSE:INT	ALIGN AUTO 11:03:13 AM Jul 21, 2020		
Center Freq 2.510000000 GHz NFE PN0: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	#Avg Type: RMS Avg Hold: 500/500 Det P P P P P	Frequency	
Ref Offset 9.79 dB	Mkr4 2.542 40 GHz	Auto Tune	
10 dB/div Ref 20.00 dBm	-50.549 dBm		
		Center Freq 2.51000000 GHz	
-10.0	DL1 -14.03 68%	2.5 1000000 012	
-20.0		Start Freq	
-30.0	4	2.470000000 GHz	
50.0 Contraction of the second	1	Stop Freq	
-60.0		2.550000000 GHz	
Start 2.47000 GHz	Stop 2.55000 GHz	CF Step	
#Res BW 100 kHz #VBW 300 kHz	Sweep 3.000 ms (1001 pts)	8.000000 MHz <u>Auto</u> Man	
1 N 1 f 2.476 00 GHz 5.974 dBm 2 N 1 f 2.483 50 GHz -53.234 dBm	NCTION FUNCTION WIDTH FUNCTION VALUE		
3 N 1 f 2.500 00 GHz -52.892 dBm 4 N 1 f 2.542 40 GHz -50.549 dBm		Freq Offset 0 Hz	
5 6 7			
8 9		Scale Type	
11			
MSG	STATUS		
8 9 10 11 *	STATUS ,	Scale Type	



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	3DH5 Ant	1_Low_2402		
-				
Keysight Spectrum Analyzer - Swep RL RF 50 Ω Center Freq 2.352500	DC SENSE:INT	ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	10:52:17 AM Jul 21, 2020 TRACE 1 2 3 4 5 6 TYPE M	Frequency
Ref Offset 9.75	IFGain:Low #Atten: 30 dB		.399 960 GHz -49.654 dBm	Auto Tune
10 dB/div Ref 20.00 d	BM		-40.004 UB	Center Freq
-10.0			DL1 -13.45 cBm	2.352500000 GHz
-20.0				Start Freq 2.30000000 GHz
-40.0 -50.0	particular and an and a second	malliperies markers and here to see	3 5 t	Stop Freq
-60.0				2.405000000 GHz
Start 2.30000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 3.86	top 2.40500 GHz 67 ms (1001 pts)	CF Step 10.500000 MHz <u>Auto</u> Man
MKR         MODE         TRC         SCL           1         N         1         f           2         N         1         f           3         N         1         f           4         N         1         f           5         N         1         f	X Y 2.401 955 GHz 6.518 dBm 2.400 000 GHz -49.654 dBm 2.300 000 GHz -54.264 dBm 2.310 000 GHz -52.891 dBm 2.399 960 GHz -49.654 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
6 7 8	2.000 000 0112 40.004 UDIII		5	Scale Type
9 10 11				Log <u>Lin</u>
 MSG		status 1_High_2480		
		1_11ig11_2400		- 2 🔀
Center Freq 2.51000	DC SENSE:INT	ALIGN AUTO #Avg Type: RMS Avg Hold: 300/300	10:57:04 AM Jul 21, 2020 TRACE 1 2 3 4 5 6 TYPE M	Frequency
Ref Offset 9.75 10 dB/div Ref 20.00 d	9 dB Bm	Mkr4	2.545 92 GHz -50.763 dBm	Auto Tune
10.0				Center Freq 2.510000000 GHz
-20.0			DL1 -15.25 dBm	Start Freq 2.470000000 GHz
-40.0 -50.0	and a second	un and an and an and a start a start a	atrestment where the second	Stop Freq
-60.0				2.550000000 GHz
	A			
Start 2.47000 GHz #Res BW 100 kHz			top 2.55000 GHz 00 ms (1001 pts) FUNCTION VALUE	CF Step 8.000000 MHz <u>Auto</u> Man
#Res         BW         100 kHz           1         N         1         f           2         N         1         f           3         N         1         f           4         N         1         f           5         -         -         -		Sweep 3.00	00 ms (1001 pts)	8.000000 MHz
#Res BW 100 kHz           1         N         1         f           2         N         1         f           3         N         1         f           6         7         6         7           7         8         9         10	X Y 2.480 00 GHz 4.754 dBm 2.483 50 GHz -51.593 dBm 2.500 00 GHz -54.087 dBm	Sweep 3.00	00 ms (1001 pts)	8.00000 MHz Auto Man Freq Offset 0 Hz Scale Type
#Res BW 100 kHz           1         N         1         f           2         N         1         f           3         N         1         f           5         6         7         7           8         9         9         9	X Y 2.480 00 GHz 4.754 dBm 2.483 50 GHz -51.593 dBm 2.500 00 GHz -54.087 dBm	Sweep 3.00	00 ms (1001 pts) FUNCTION VALUE	8.000000 MHz <u>Auto</u> Man Freq Offset 0 Hz



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	3DH5_Ant1_Lo	w Hop 2402	2	
Keysight Spectrum Analyzer - Swept SA		•		- 2 💌
Center Freq 2.3550000 NFE	OO GHZ PNO: Fast ↔ Trig: Free Run IFGain:Low #Atten: 30 dB	ALIGN AUTO 11 #Avg Type: RMS Avg Hold: 500/500	CO3:48 AM Jul 21, 2020 TRACE 1 2 3 4 5 6 TYPE M DET P P P P P P	Frequency
Ref Offset 9.64 dl 10 dB/div Ref 20.00 dBn	3		.349 94 GHz 49.652 dBm	Auto Tune
Log 10.0				Center Freq 2.355000000 GHz
-10.0			DL1 -13:67 dBm	
-30.0	*5			Start Freq 2.300000000 GHz
-50.0	en un manager of the land	and the second	minne <sup>2</sup>	Stop Freq 2.41000000 GHz
-70.0 Start 2.30000 GHz		Sto	p 2.41000 GHz	CF Step
#Res BW 100 kHz	#VBW 300 kHz		'ms (1001 pts)	11.000000 MHz <u>Auto</u> Man
4 N 1 f 5 N 1 f	2.402 96 GHz 6.327 dBm 2.400 00 GHz -52.387 dBm 2.390 00 GHz -53.187 dBm 2.310 00 GHz -52.679 dBm 2.349 94 GHz -49.652 dBm		E	Freq Offset 0 Hz
6 7 8 9				Scale Type
10 11 <	Π		•	Log <u>Lin</u>
MSG		STATUS		
	3DH5_Ant1_Hi	gh_Hop_2480	)	- Y - Y
🚾 Keysight Spectrum Analyzer - Swept SA 🗶 RL   RF   50 Ω DC	SENSE:INT	ALIGN AUTO 11	:13:19 AM Jul 21, 2020	Frequency
Center Freq 2.5100000 NFE	OO GHZ PNO: Fast ↔→ IFGain:Low #Atten: 30 dB	#Avg Type: RMS Avg Hold: 500/500	TRACE 1 2 3 4 5 6 TYPE M	Auto Tune
Ref Offset 9.79 dl 10 dB/div Ref 20.00 dBn	3		.505 04 GHz 49.504 dBm	
			DCT -14.01 OBM	Center Freq 2.510000000 GHz
-20.0				Start Freq 2.47000000 GHz
-40.0 -50.0 -60.0	martin latter by martine to the second	and and a second and a second and a second of the second o	~sil~winterturing	Stop Freq 2.55000000 GHz
50.0 50.0 -70.0 Start 2.47000 GHz			p 2.55000 GHz	2.55000000 GHz
-50.0	2.474 96 GHz 5.988 dBm		ms (1001 pts)	2.55000000 GHz
40.0 40.0 50.0	X Y FUI	Sweep 3.000	ms (1001 pts)	2.55000000 GHz CF Step 8.000000 MHz
60.0         0         0         0           80.0	X Y FU 2.474 96 GHz 5.988 dBm 2.483 50 GHz -53.009 dBm 2.500 00 GHz -53.086 dBm	Sweep 3.000	ms (1001 pts)	2.55000000 GHz CF Step 8.000000 MHz <u>Auto</u> Man Freq Offset
600         0         0         0           700         700         700         0           Start 2.47000 GHz         #Res BW 100 KHz         1         1           1         N         1         1         3         N         1           2         N         1         1         3         N         1         1           3         N         1         1         5         6         7         6         7         8         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9         9         1	X Y FU 2.474 96 GHz 5.988 dBm 2.483 50 GHz -53.009 dBm 2.500 00 GHz -53.086 dBm	Sweep 3.000	ms (1001 pts)	2.55000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz Scale Type



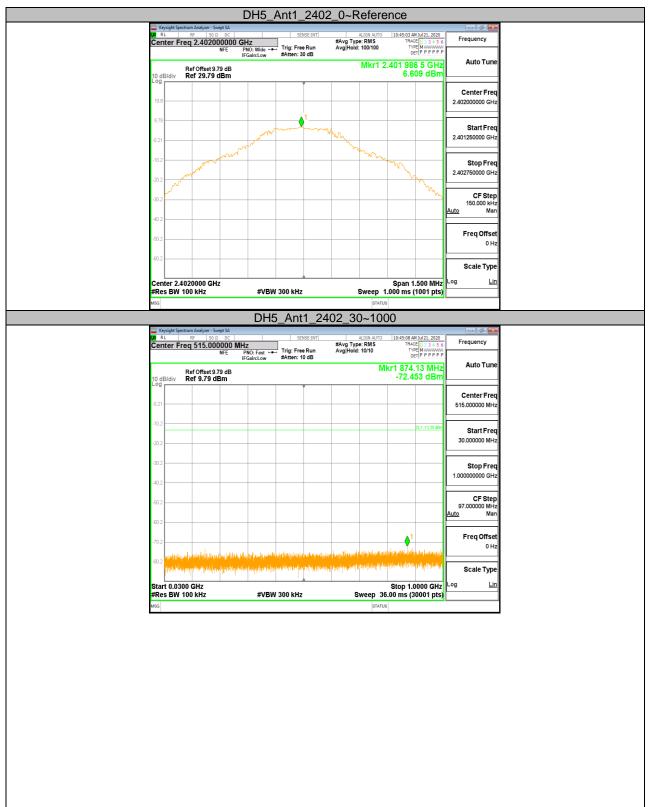
## APPENDIX I: CONDUCTED SPURIOUS EMISSION

### **Test Result**

Test Mode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
			Reference	6.61	6.61		PASS
		2402	30~1000	30~1000	-72.453	<=-13.391	PASS
			1000~26500	1000~26500	-39.46	<=-13.391	PASS
			Reference	5.97	5.97		PASS
DH5	Ant1	2441	30~1000	30~1000	-72.128	<=-14.033	PASS
			1000~26500	1000~26500	-41.736	<=-14.033	PASS
			Reference	5.50	5.50		PASS
		2480	30~1000	30~1000	-71.965	<=-14.505	PASS
			1000~26500	1000~26500	-47.919	<=-14.505	PASS
			Reference	6.66	6.66		PASS
		2402	30~1000	30~1000	-73.046	<=-13.339	PASS
			1000~26500	1000~26500	-45.905	<=-13.339	PASS
			Reference	6.08	6.08		PASS
3DH5	Ant1	2441	30~1000	30~1000	-72.777	<=-13.918	PASS
			1000~26500	1000~26500	-48.404	<=-13.918	PASS
			Reference	5.61	5.61		PASS
		2480	30~1000	30~1000	-72.536	<=-14.395	PASS
			1000~26500	1000~26500	-50.149	<=-14.395	PASS

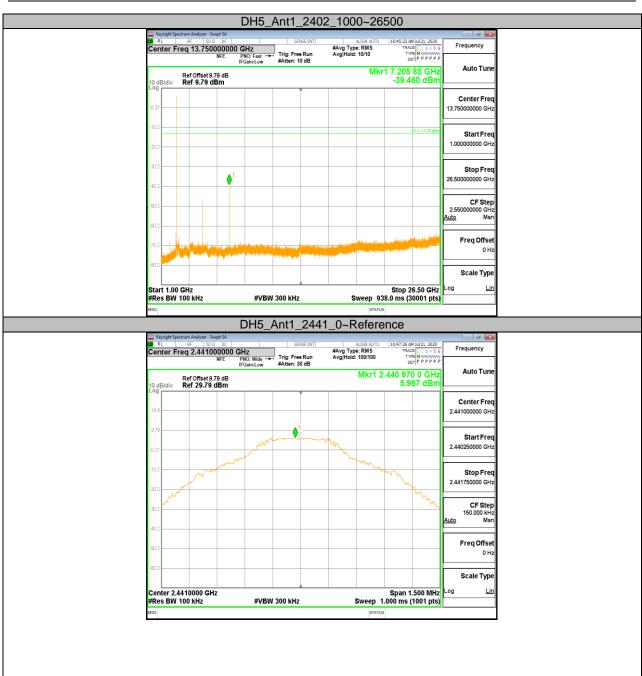


## **Test Graphs**





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	vsight Sne	ectrum Anal	vzer - Swent S	SA	DH	5_Ant	1_24	41_30	~100	00		- 3 🔀
Cen	ter Fi	<sub>R</sub> ⊧ req 51	yzer - Swept S 50 Ω [ 5.00000		2	SE	NSE:INT	#Avg Type Avg Hold:	LIGN AUTO	10:47:41 TR	AM Jul 21, 2020 RACE 1 2 3 4 5 6	Frequency
			NFI	e pi IFi	NO: Fast ↔ Gain:Low	Trig: Fre #Atten: 1	e Run 10 dB	Avg Hold:			DETPPPPP	Auto Tune
10 di Log	B/div	Ref Of Ref 9	fset 9.79 d .79 dBm	iB N					M	kr1 /4: -72.	3.53 MHz 128 dBm	
							Ĭ					Center Freq
-0.21												515.000000 MHz
-10.2											0L1 -14.03 dBm	Start Freq
-20.2	-											30.000000 MHz
-30.2	<u> </u>											Stop Freq
-40.2												1.000000000 GHz
-50.2												CF Step
-60.2												97.000000 MHz <u>Auto</u> Man
									<b>≜</b> <sup>1</sup>			Freq Offset
-70.2	L	las desiras d	ا ساسا	contrations	andra	مالالبامر فر	ور بالمعالية والعام	and a color	•	فالملغم	ատնեւներ	0 Hz
-80.2			No.		atore ( ) shad you	a de la calencia de l		inter de la company				Scale Type
Star	1 0.03	00 GHz	2				<u> </u>				.0000 GHz	Log <u>Lin</u>
#Re: MSG	s BW	100 kH	z		#VBV	/ 300 kHz	!	S	status		(30001 pts)	
				]	DH5	Ant1	244	1_100	0~26	500		
CXI R	L	RE	yzer - Swept S 50 Ω [	SA DC			NSE:INT		LIGN AUTO	10:48:04	AM Jul 21, 2020	
Cen	nter Fi	req 13	.750000 NF	D000 G	iHz NO:Fast ↔	Trig: Fre #Atten: 1	e Run	#Avg Type Avg Hold:	:RMS 10/10	TR T	AGE 1 2 3 4 5 6 TYPE M WWWW DET P P P P P P	Frequency
		Ref Of	fset 9.79 d	зв	Sam.cow				Mkr	1 7.32	3 15 GHz	Auto Tune
10 di Log	B/div	Ref 9	.79 dBm	1						-41.	736 dBm	
-0.21												Center Freq 13.75000000 GHz
-10.2											DL1 -14.03 dBm	
-20.2											Del VIVIS (DI	Start Freq 1.000000000 GHz
-30.2												
				<b>A</b> 1								Stop Freq 26.50000000 GHz
-40.2				Y								CE Stor
				+								CF Step 2.55000000 GHz <u>Auto</u> Man
-50.2				_							ي م ال	
-50.2										L. maile	and a straight of the	Freq Offset
					u baabba	inde datas	all an an an		الوالغيميومين مقاويت شيريانه	Providence of	Second Second	0 Hz
-60.2					alaada) daalah		allan san an		in report light welcom any fire			
-60.2 -70.2 -80.2					an han an hair Chan sharing a	laaday da sayaa Tabaada ahaa			i Maryang Upt	04-5	26.50.01/	Scale Type
-60.2 -70.2 -80.2 Star #Re:	t 1.00 s BW	GHz 100 kH	z		#VBV	/ 300 kHz		Si		8.0 ms	26.50 GHz (30001 pts)	Scale Type
-60.2 -70.2 -80.2 Star			z		#VBV			Si	veep 93	8.0 ms	26.50 GHz (30001 pts)	Scale Type
-60.2 -70.2 -80.2 Star #Re:			z		#VBV			St		8.0 ms	26.50 GHz (30001 pts)	Scale Type

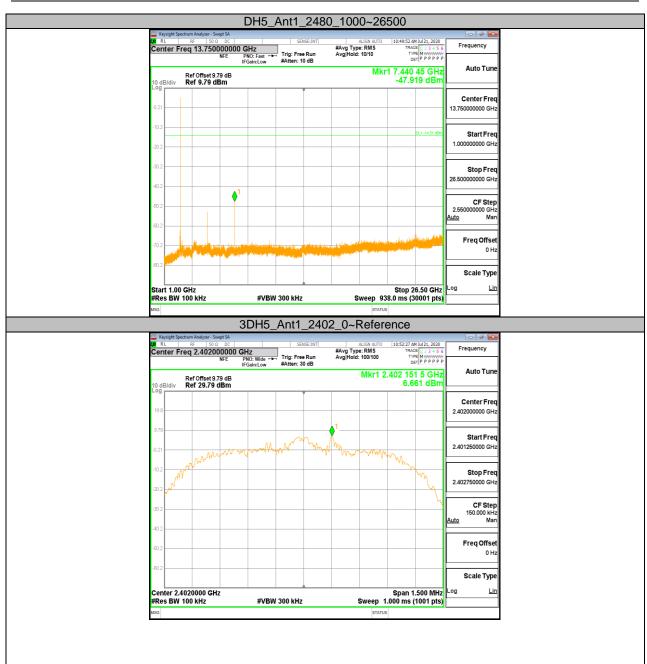


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Ref Offset 372 dB         Imm 1 2.493 dBm           10 dBd/k         Ref 29.79 dBm         5.495 dBm           10 dB         1         1         Center Freq           10 dB         1         1         1         Freq           10 dB         1         1         1         Freq           10 dB         1         1         1         1         Freq           10 dB         1         1         1         1         Frequency	10 dB Log 19.8 -	er Fre	q 2.480	000000	GHz	5	ENDELINI	A	LION AUTO	10:49:24 A	n Jul 21, 2020	
Ref 01:8:37 edb     Ref 29.79 dbm     5.495 dBm       10:8     Ref 29.79 dbm     Center Free 2.48000000 GH       9:3     Image: State of the state	19.8 -			NFE	PNO: Wide *	Trig: Fr #Atten:	ee Run 30 dB	#Avg Type Avg Hold:	: RMS 100/100	TRAC TYP DE	E 1 2 3 4 5 6 E M W P P P P P	Frequency
118       Image: Conter Free Subsection State Stat	19.8 -	(div	Ref Offset Ref 29.7	9.79 dB 9 dBm					Mkr1 2			Auto Tune
879         Image: Constraint of the second of the sec												Center Freq
Start Free 247250000 GH 247250000 GH 247250000 GH 247250000 GH 247250000 GH 247250000 GH 24725000 GH 2	9.79			_	_							2.480000000 GHz
0.31       0.472950000 GHz         0.32       0.479250000 GHz         0.32       0.47925000 GHz         0.32       0.4102 GHz         0.32       0.4102 GHz         0.32       0.4102 GHz         0.32       0.4102 GHz         0.32					_		<u>1</u>					Ctort Exag
32         32         32         33<	-0.21				- AM	v		m				2.479250000 GHz
32         32         32         33<				mark	-			- h	m-			
322         323         323 <td>-10.2 -</td> <td></td> <td>and the</td> <td>and the second s</td> <td></td> <td></td> <td></td> <td></td> <td>ي مو</td> <td>m.</td> <td></td> <td>Stop Freq 2 480750000 GHz</td>	-10.2 -		and the	and the second s					ي مو	m.		Stop Freq 2 480750000 GHz
10.2       150.000 kH         40.2       150.0000 kH         40.2       150.00000 kH         40.2       150.00000 kH         50.00000 kH       10.450.00000 kH         50.00000 kH       10.450.00000 kH         60.00000 kH       10.450.00000 kH         60.00000 kH       10.450.00000 kH         60.00000 kH       10.450.00000 kH         10.450.00000 kH       10.450.000000 kH         1	-20.2	west	× .	_		_				- m	www.	2.400700000 0112
40.2       Auto       Mat         40.2       Auto       Mat         40.2       Span 1.500 MHz       Freq Offset 0.100 ms (100 1 pts)         40.2       Span 1.500 MHz       Span 1.500 MHz         #Res BW 100 KHz       #VBW 300 KHz       Sweep 1.000 ms (100 1 pts)         40.0       Mat       Freq Units         40.0	-30.2	لهم		_								CF Step 150.000 kHz
40.2       Freq Offset 0H         40.2       Span 1.500 MHz         #Res BW 100 KHz       #VBW 300 KHz       Sweep 1.000 ms (1001 pts)         Integration       Integration       Integration         Miss       Integration       Integration       Integration         DH5_Ant1_2480_30       Integration       Integration       Integration         Miss       Integration       Integration       Integration       Integration         Miss       Integration       Integration       Integration       Integration       Integration         Miss       Integration       Integration       Integration       Integration       Integration       Integration       Integration         Offset 9.79 dB       Miss       -71.965 dBm       -71.965 dBm       Integration       <	-40.2											
012     0H       022     0H       023     0H       024     0H       025     Span 1.500 MHz       #Res BW 100 KHz     #VBW 300 KHz       Sweep 1.000 ms (1001 pts)       Miss     jsrutis       DH5_Ant1_2480_30~1000       Center 2.4800000 MHz       Auto muto       DH5_Ant1_2480_30~1000       Center Freq 51.000 ms (1001 pts)       Miss       DH5_Ant1_2480_30~1000       Center Freq 51.00000 MHz       Auto Tune       Auto Tune       Ref Offset 3.79 dB       Mirr 7.965 dBm       Offset 3.79 dB       Mirr 7.965 dBm       Center Freq 51.00000 MHz       Start 7.66.29 MHz       Auto Tune       Auto Tune       Center Freq 51.00000 MHz       Start 6.29 MHz       Offset 3.79 dB       Offset 3.79 dB       Center Freq 51.00000 MHz       Center Freq 51.00000 MHz       Start 6.29 MHz       Start 6.20 MHz       Start 6.20 MHz       Start 6.0300 GHz <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Freq Offset</td></t<>												Freq Offset
Center 2.4800000 GHz       #VBW 300 KHz       Sweep 1.000 ms (1001 pts)         #Res BW 100 KHz       #VBW 300 KHz       Sweep 1.000 ms (1001 pts)         msc       sname         DH5_Ant1_2480_30~1000         Center 5.000000 MHz         Ref Offset 3.79 dB       SNEE PNC 101 33.55 G         Ref Offset 3.79 dB       Mkr1 766.29 MHz         Center Freq 515.000000 MHz         Ref Offset 3.79 dB         Mkr 1 766.29 MHz         Center Freq 515.000000 MHz         Center Freq 515.000000 MHz         SNEE PNC ENT         Auto Tune         Ref Offset 3.79 dB         Mkr 1 766.29 MHz         Center Freq 515.000000 MHz         Center Freq 515.000000 MHz         Start 6.00000 MHz         Center Freq 515.000000 MHz         Center Freq 615.000000 MH         Start 6.000 ms (1001 block bl	-50.2 -											0 Hz
Center 2.4800000 GHz #Res BW 100 KHz #VBW 300 KHz Sweep 1.000 ms (1001 pts) Usg DH5_Ant1_2480_30~1000  Tegether Freq 515.000000 MHz NEE Frequency Auto Turn Ref Offset 5.79 dB Center Freq 515.000000 MHz Start 10 dB Center Freq 515.000000 MHz Center Freq 515.000000 MHz Center Freq 515.00000 MHz Start 10 dB Center Freq 515.00000 MHz Center Freq 515.0000 MHz Cente	-60.2				_							Scale Type
#Res BW 100 kHz         #VBW 300 kHz         Sweep 1.000 ms (1001 pts)           trac         partue           DH5_Ant1_2480_30~1000           Image: the section Analyzer - Sweet SA         colspan="2">Colspan="2"          Colspan="2"          Colspan="	Cent	or 2 49	00000 C	U-7						Snan 1	500 MH2	
DH5_Ant1_2480_30~1000           End Spectrum Analyzer - Singt SA Explore Not Regular Spectrum Analyzer - Singt SA Regular Spectrum Ana	#Res	BW 1	00 kHz	ΠZ	#VB	W 300 kH	z	s		.000 ms (	1001 pts)	
Register Spectrum Adulgare - Sneet SA         Section         ALLON AUTO         [10:49:29:48:4012], 2020           Center Freq 515.000000 MHz         Trig: Free Run Protified         #Arg Type: RNS Avgiptiold: 1010         Trid: Free Cun Protified         #Arg Type: RNS Avgiptiold: 1010         Trid: Free States         Frequency           0.4B/dbl         Ref Offset 9.79 dBn         -71.965 dBn         -71.965 dBn         Center Free S15.000000 MH           0.2	MSG						4 04					
Mit         Is         Source         Source         Source         Frequency           Center Freq 515.00000 MHz         Trig: Free Run Proc.Fist 3-5 (Frequency         Avg/Heid: 10/10         Trig: Free Run Avg/Heid: 10/10         Tri	Keys	sight Spects	um Analyzer -	Swept SA	DH	15_AN	t1_24	80_30	~100	0		×
Ref Offset 9.79 dB         Mkr1 766.29 MHz         Auto Tune           10 dB/div Ref 9.79 dBm         -71.965 dBm         -71.965 dBm           22         -71.965 dBm         -71.965 dBm           302         -71.965 dBm         Start Free           302         -71.965 dBm         -71.965 dBm           303         -71.965 dBm         -71.965 dBm           303         -71.965 dBm         -71.965 dBm           303         -71.965 dBm         -71.965 dBm           304         -71.965					Hz	S	ENSE:INT	#Avg Type	RMS	10:49:29 Al TRAC	1 Jul 21, 2020 E <mark>1 2 3 4 5 6</mark>	
Ref 07set 9.79 dB         -71.965 dBm           10 dB/div         Ref 9.79 dBm         Start Free           30 2         Start 1.451 dB         Start 1.451 dB           30 2         1         -71.965 dBm           3				NFE	PNO: Fast • IFGain:Low	#Atten:	ee Run 10 dB	Avg Hold:		DE	T P P P P P P	Auto Tupe
0.21         Center Free 515.00000 MH           102         0.1.1451 de 10.2           10300 GHz         #VBW 3000 kHz           10300 GHz         1.2           10300 GHz         1.2           10300 GHz	10 dB	/div	Ref Offset Ref 9.79	9.79 dB dBm					M	kr1 766. -71.9	29 MHz 65 dBm	
0.21         515.00000 MH           10.2         0.1.0153 de           30.2         0.1.0153 de												Center Frea
Diamond         Diamond         Diamond         Start Free	-0.21											515.000000 MHz
2022     30.00000 MH       302     30.00000 MH       302     Stop Free       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       402     1       403     1       404     1       405     1       406     1       407     1       408     1       409     1       401     1       402     1       403     1       404     1       405     1       406     1       407     1       408     1       408     1       409     1       401     1       402     1       403     1       404     1	-10.2				_							
302     Stop Free       402     Stop Free       402     CF Step       402     Stop Free       403     Stop Stop Stop Stop Stop Stop Stop Stop	-20.2										UC1 -14.51 08m	Start Freq 30.000000 MHz
40.2     1.00000000 GH       40.2     1.000000000 GH       50.000 GHZ     1.00000 GHZ       40.2     Storp 1.0000 GHZ												
40.2 40.2	-30.2 -					_						Stop Freq
002     97,000000 MH       002     1       002     1       002     1       002     1       002     1       002     1       002     1       002     1       003     1       003     1       004     1       005     1       005     1       007     1       008     1       009     1       000     1       001     1       002     1       003     1       004     1       005     1       006     1       007     1       008     1       009     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1       1     1	-40.2											1.00000000 GH2
40.2     Auto     Main       70.2     1     Freq Offse       40.2     1     Freq Offse       40.2     1     Freq Offse       40.2     1     Freq Offse       40.2     1     1	-50.2 -											CF Step
30.2     1     Freq Offset       30.2     1     1       30.	61.2											
012         0 H           02         Сорударство различи и просторани с простора и про									<b>A</b> 1			Freg Offset
50.2         Interpretent of the second state of the s	-70.2 -						I de la cale	a an analo		المتعملين	و بالله الله	0 Hz
Start 0.0300 GHz         Stop 1.0000 GHz           #Res BW 100 kHz         #VBW 300 kHz         Sweep 36.00 ms (30001 pts)	-80.2			n an an tao tao tao tao	n rann an gur an an Daoirt a' Mhaille (an					n dah dan	tablates salate	Scale Tyrne
#Res BW 100 kHz #VBW 300 kHz Sweep 36.00 ms (30001 pts)				. بالملية ب	L. U. W.	1.1.1.1.1		di ne cae i	1	01		
MSG STATUS	#Res	BW 1	0 GHZ 00 kHz		#VB	W 300 kH	z	Sv		.00 ms (3	0000 GHZ 0001 pts)	
	MSG								STATUS			



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Kej	ysight Spe	trum Analyzer - RF 5	Swept SA		SEN	ISE-INT	402_30		10-52-32/	M Jul 21, 2020	- 2 🗷
Cen	iter Fr	eq 515.0	00000 N	IHz PNO: Fast ↔ IFGain:Low	Trig: Free	Run	#Avg Type: Avg Hold: 1	RMS	TRA	2E 1 2 3 4 5 6 PE M WWWW ET P P P P P P	Frequency
		Ref Offset	9 79 dB	IFGain:Low	#Atten: 10	) dB		М	kr1 939	.57 MHz	Auto Tune
10 de Log	B/div	Ref 9.79	dBm						-73.0	46 dBm	
-0.21											Center Free 515.000000 MHz
-10.2											
										DL1 -13.34 dBn	Start Free 30.000000 MHz
-20.2											
-30.2											Stop Fred 1.000000000 GHz
-40.2		_		_							1.00000000 0112
-50.2	<u> </u>										CF Step 97.000000 MHz
-60.2											<u>Auto</u> Mar
-70.2										1	Freq Offse
-80.2	days	home	Na indukan	and participation of	waayaa dhaa	hteral def	No panda h			hological	0 Hz
-00.2	<b>h</b> ere ha	per de la competencia	hall spender	ut jeren i	e de la construction de la construcción de la construcción de la construcción de la construcción de la construc	aleptotestale	le Mail Airis a's	anta tajinj	- alterna	MpManDalata	Scale Type
Star #Re	t 0.03 s BW	0 GHz 100 kHz		#VBV	V 300 kHz		Sw	/eep 36	Stop 1.	0000 GHz 0001 pts)	Log <u>Lir</u>
MSG								STATUS		. ,	<u></u>
								314103			
				3DH5_	_Ant1	_240	)2_100				
	ysight Spe	trum Analyzer - RF 5	- Swept SA 0 Ω DC		SEN	ISE:INT	A	0~26	6500	M Jul 21, 2020	Frequency
Cen	ysight Spe L Iter Fr	trum Analyzer RF 5 eq 13.75	- Swept SA 0 Ω DC 00000000 NFE		SEN	ISE:INT		0~26	6500	M Jul 21, 2020 E 1 2 3 4 5 6 M W W W W W T P P P P P P	Frequency
Cen	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TN L 1 4.803	<sup>№</sup> 1 2 3 4 5 6 Ретререре 75 GHz	[
Cen	ysight Spe L ter Fr	eq 13.75	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TN L 1 4.803	2E 1 2 3 4 5 6 PE M WWWWW ET P P P P P P	Frequency Auto Tune
<b>Cen</b>	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	<sup>№</sup> 1 2 3 4 5 6 Ретререре 75 GHz	Frequency
Cen 10 dE Log	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	<sup>№</sup> 1 2 3 4 5 6 Ретререре 75 GHz	Frequency Auto Tune Center Frec 13.75000000 GHz
<b>Cen</b> 10 dE Log -0.21	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency Auto Tune Center Freq
<b>Cen</b> 10 dE -0.21 -10.2 -20.2	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency Auto Tune Center Frec 13.75000000 GHz Start Frec 1.00000000 GHz
Cen 10 dE -0.21 -10.2 -20.2 -30.2	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq
<b>Cen</b> 10.dt -0.21 -10.2 -20.2 -30.2 -40.2	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency Auto Tune Center Free 13.75000000 GHz Start Free 1.00000000 GHz 26.50000000 GHz
Cen 10 dE -0.21 -10.2 -20.2 -30.2	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency Auto Tune Center Free 13.76000000 GHz Start Free 1.00000000 GHz Stop Free
<b>Cen</b> 10.dt -0.21 -10.2 -20.2 -30.2 -40.2	iter Fr	eq 13.75 Ref Offset	0000000		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency           Auto Tune           Center Freq           13.75000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           26.50000000 GHz           2.55000000 GHz           Auto           Mar
Cen 10 dE -0.21 -10.2 -20.2 -30.2 -40.2 -50.2	iter Fr	eq 13.75 Ref Offset	9.79 dB dBm		SEN Trig: Free #Atten: 10	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency           Auto Tune           Center Freq           13.76000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           26.50000000 GHz           2.550000000 GHz
Cen 10 de Log -0.21 -10.2 -30.2 -30.2 -40.2 -60.2	iter Fr	Ref Offset Ref 9.79	9.79 dB dBm		SEN	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 10:52:56 J TRA TRA TRA TRA TRA TRA TRA TRA TRA TRA	75 GHz 05 dBm	Frequency           Auto Tune           Center Frec           13.76000000 GHz           Start Frec           1.00000000 GHz           Stop Frec           25.50000000 GHz           2.550000000 GHz           Auto Mar           Freq Offset           0 Hz
Cen 10.0 df -0.21 -10.2 -30.2 -30.2 -40.2 -50.2 -50.2 -50.2 -50.2 -50.2 -50.2 -50.2		Ref Offset Ref 9.79	9.79 dB dBm		SEN Trig: Free #Atten: 10	ISE:INT	AL #Avg Type:	0~26 Ign auto RMS 10/10	5500 105256 TRA TRA TRA TRA TRA TRA TRA TRA	21 2 2 4 5 6 0 TTP PPPPP 75 GHz 05 dBm 21 -1334 den	Frequency           Auto Tune           Center Freq           13.76000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           255000000 GHz           Auto           Mar           Freq Offset           0 Hz           Scale Type
Cen 10 df -10 2 -02 -02 -02 -02 -02 -02 -02 -0	B/div	Ref Offset Ref 9.79	9.79 dB dBm	CH2 PN0:Fast → IFGainLow	SEN Trig: Free #Atten: 10	ISE:INT	Avg Type AvgHold 1	Mkr Mkr	5500 1052565 1754 184803 -45.5 -45.5 	21 22 4 5 6 0 TTP P P P P P 75 GHz 05 dBm	Frequency           Auto Tune           Center Freq           13.76000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           255000000 GHz           Auto           Mar           Freq Offset           0 Hz           Scale Type

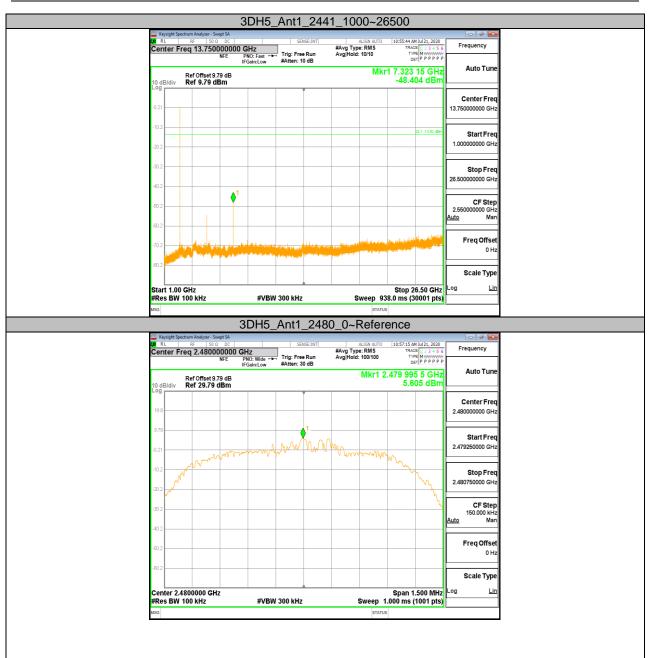


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					3DH	l5_Ant	1_24	480_3	)~10	00		
 	Keysig R L	ght Spectrum	n Analyzer - Sv F 50 Ω	wept SA			SE:INT	A	IGN AUTO	10-57-20 4	M Jul 21, 2020	_ 2 <b>X</b>
Ce	ente	er Freq	515.00	0000 MI	PNO: Fast ↔	Trig: Free	Run	#Avg Type Avg Hold:	RMS	TRAI TV	CE 1 2 3 4 5 6 PE M ET P P P P P P	Frequency
_					IFGain:Low	#Atten: 10	dB		M		.19 MHz	Auto Tune
10 Lo	dB/d	div Re	f Offset 9. ef 9.79 d	79 dB IBM							36 dBm	
												Center Freq
-0.1	21											515.000000 MHz
-10	1.2				_						DL1 -14.40 dBm	Start Freq
-20	1.2											30.000000 MHz
-30	1.2											Stop Freq 1.00000000 GHz
-40	1.2											1.00000000 0112
-50	1.2				_							CF Step 97.000000 MHz
-80												<u>Auto</u> Man
-0.											.1	Freq Offset
-70	1.2									u		0 Hz
-80	1.2	Repterblan						n unite portion			i den har senera den senera de senera de El como de senera de s	
	<u> </u>			astu tat	il initian in	Las and	t have de	pia, and diversity	ardea :			Scale Type
		0.0300 ( BW 100			#VB\	V 300 kHz		Sv	eep 36	Stop 1. .00 ms (3	0000 GHz 30001 pts)	Log <u>Lin</u>
MSC	3								STATUS			
					3DH5	_Ant1_	_248	0_100	0~26	6500		
()()	RL	pht Spectrum R	n Analyzer - Sv	wept SA								
Ce			F 50 S	2 DC		SEN	SE:INT	A	IGN AUTO	10:57:43 A	M Jul 21, 2020	Erequency
	ente	er Freq	13.750	000000 NEF	PNO: Fast +	Trig: Free	Run	#Avg Type Avg Hold:	RMS	TRAI	CE 1 2 3 4 5 6	Frequency
	ente	er Freq	13.750	000000 NFE	GHz PNO: Fast ↔ IFGain:Low		Run	#Avg Type	RMS 10/10	тка ту р 1 7.440	CE 1 2 3 4 5 6 PE M PE P P P P P P P P P P P P P 45 GHz	
	dB/d	er Freq Re	f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р 1 7.440	CE 1 2 3 4 5 6 PE M ET P P P P P P	Frequency
10 Lo	dB/d	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	CE 1 2 3 4 5 6 PE M PE P P P P P P P P P P P P P 45 GHz	Frequency Auto Tune Center Freq
<b>10</b> -0.		er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	CE 1 2 3 4 5 6 PE M PE P P P P P P P P P P P P P 45 GHz	Frequency Auto Tune
10 Lo		er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	CE 1 2 3 4 5 6 PE M PE P P P P P P P P P P P P P 45 GHz	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq
10 -0:	dB/d	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz
10 10 -10	dB/d	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz
10 -0. -10 -30	dB/d g 1.2 1.2	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq
10 -0. -10 -20	dB/d g 1.2 1.2	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency           Auto Tune           Center Freq           13.75000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           26.50000000 GHz
10 -0. -10 -20 -30	dB/d 21	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency           Auto Tune           Center Freq           13.75000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           26.50000000 GHz           2.55000000 GHz
10 -0. -10 -22 -32 -40	dB/d 21	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 26.50000000 GHz CF Step
10 -0. -32 -32 -42 -42	1 dB/d 19 12 1.2 1.2 1.2 1.2 1.2 1.2 1.2	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS 10/10	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz 25.50000000 GHz 25.50000000 GHz 2.55000000 GHz Auto Man Freq Offset
10 0. .10 .20 .20 .20 .20 .20 .20 .20 .20 .20 .2	dB/d       g       1.2       1.2       1.2       1.2       1.2       1.2       1.2       1.2	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS IO/10 Mkr	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Start Frequency           Auto Tune           Center Freq           13.75000000 GHz           Start Freq           1.00000000 GHz           Stop Freq           25.50000000 GHz           2.55000000 GHz           2.55000000 GHz
10 -0. -10 -20 -20 -20 -40 -40 -40 -40 -40 -40 -40 -40 -40 -4	dB/d       g       1.2       1.2       1.2       1.2       1.2       1.2       1.2       1.2	er Freq Re	13.750 f Offset 9.	000000 NFE 79 dB	PNO: Fast +	Trig: Free	Run	#Avg Type	RMS IO/10 Mkr	тка ту р <b>1 7.440</b>	45 GHz 49 dBm	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 1.00000000 GHz 25.50000000 GHz 25.50000000 GHz 2.55000000 GHz Auto Man Freq Offset
10 -0: -10 -20 -30 -40 -40 -40 -40 -40 -40 -40 -40 -40 -4	dB/d       21       12       12       12       12       12       12       12       12       12       12       12       12       12       12       12       12	er Freq Re	13.750 roffset9. rf 9.79 d	000000 NFE 79 dB	PNO: Fast → IFGain:Low	Trig: Free #Atten: 10	Run	#Avg Type	RMS IO/10 Mkr	TRAI TY 9 1 7.440 -50.1	20,1-14 40 dbs	Frequency Auto Tune Center Freq 13.76000000 GHz Start Freq 26.50000000 GHz 25.50000000 GHz 25.5000000 GHz 25.5000000 GHz 25.5000000 GHz 25.5000000 GHz 25.50000000 GHz 25.500000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.500000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.50000000 GHz 25.5000000 GHz 25.50000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.500000000 GHz 25.5000000000 GHz 25.500000000 GHZ 25.5000000000 GHZ 25.500000000000 GHZ 25.500000000000000000000000000000000000
10 -0. -10 -22 -33 -40 -40 -40 -40 -40 -40 -40 -40 -40 -40	dB/d       9       12	er Freq Re Re	13.750 f offset9. if 9.79 d	000000 NFE 79 dB	PNO: Fast → IFGain:Low	Trig: Free	Run	#Avg Type Avg Hold:	RMS DMO	таки ту -50.1 -50.1 	2x1-1440 dbs	Frequency Auto Tune Center Freq 13.75000000 GHz Start Freq 26.50000000 GHz 25.50000000 GHz 25.50000000 GHz 2.550000000 GHz 2.55000000 GHz 2.550000000 GHz 2.5500000000 GHZ 2.55000000000000 GHZ 2.5500000000 GHZ 2.5500000000 GHZ 2.5500000000 GHZ 2.550000000000000 GHZ 2.55000000000000 GHZ 2.5500000000000000000000000000000000000

# **END OF REPORT**