

Report No.: SEWA2208000038RG02

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### **TEST REPORT**

Application No.:SEWA2208000038RGApplicant:SmartWitness USA, LLC

Address of Applicant: 1016 Lunt Avenue Schaumburg, IL 60193 United States

Manufacturer: SmartWitness USA, LLC

Address of Manufacturer: 1016 Lunt Avenue Schaumburg, IL 60193 United States

EUT Description: Dash Camera

Model No.: DC4026-NAD011

Trade Mark: Sensata

FCC ID: 2AQ2S-DC402X

Standards: FCC 47 CFR Part 2, Subpart J

FCC 47 CFR Part 15, Subpart C

**Date of Receipt:** 2023/02/10

**Date of Test:** 2023/02/21 to 2023/03/25

**Date of Issue:** 2023/03/27

Test Result : PASS \*

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Panta Sun Wireless Laboratory Manager



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### 1 Version

Revision Record						
Version Chapter Date Modifier Remark						
01		2023/03/27		Original		

Prepared By	(Ives Cheng) / Test Engineer
Checked By	(Well Wei) / Reviewer



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2 Test Summary

Test Item	FCC Rule No.	Test Method	Test Result	Result
Antenna Requirement	15.203/15.247(b)		Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 (2013) Section 6.2	Clause 4.3	PASS
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10 (2013) Section 11.9.1.3	Clause 4.4	PASS
20dB Emission Bandwidth & 99% Occupied Bandwidth	15.247 (a)(1)	ANSI C63.10 (2013) Section 6.9.2/6.9.3	Clause 4.5	Reporting only
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10 (2013) Section 7.8.2	Clause 4.6	PASS
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10 (2013) Section 7.8.3	Clause 4.7	PASS
Dwell Time	15.247 (a)(1)	ANSI C63.10 (2013) Section 7.8.4	Clause 4.8	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 (2013) Section 7.8.7.2	Clause 4.9	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 (2013) Section 7.8.7.1	Clause 4.10	PASS
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10 (2013) Section 6.4 / 6.5 / 6.6	Clause 4.11	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10 (2013) Section 6.10.5	Clause 4.12	PASS



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### 3 General Information

#### 3.1 Details of Client

Applicant:	SmartWitness USA, LLC
Address of Applicant:	1016 Lunt Avenue Schaumburg, IL 60193 United States
Manufacturer:	SmartWitness USA, LLC
Address of Manufacturer:	1016 Lunt Avenue Schaumburg, IL 60193 United States

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Ives Cheng, King-p Li

### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

#### • A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

#### • Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

#### • FCC -Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an

accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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### 3.4 General Description of EUT

EUT Description:	Dash Camera				
Model No.:	DC4026-NAD011				
Trade Mark:	Sensata				
Hardware Version:	V1.2				
Software Version:	SC600YNAPAR06A04_	BP03.006_QDM039			
IMEI:	RF Conducted	868899060125222			
IIVI⊏I.	RSE & AC power line	868899060124740			
Operation Frequency:	2400MHz~2483.5MHz  fc = 2402 MHz + N * 1 MHz, where: -fc = "Operating Frequency" in MHz, -N = "Channel Number" with the range from 0 to 78.				
Bluetooth version:	Bluetooth V4.2				
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)				
Modulation Type:	GFSK, π/4DQPSK, 8DPSK				
Number of Channel:	79				
Hopping Channel Type:	Adaptive Frequency Hop	pping systems			
Antenna Type:	Ceramic patch Antenna				
	2.65dBi (Ant2)				
Antenna Gain:	Note:  The antenna gain are derived from the gain information report provided by manufacturer.				
RF Cable:	0.5dB				
Remark:					



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	Operation Frequency of each channel							
Channel	nnel Frequency Channel		Frequency	Channel	Frequency	Channel	Frequency	
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz	
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz	
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz	
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz	
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz	
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz	
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz	
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz	
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz	
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz	
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz	
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz	
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz	
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz	
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz	
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz	
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz	
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz	
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz	
19	2421MHz	39	2441MHz	59	2461MHz			

#### Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH0)	2402MHz
The Middle channel(CH39)	2441MHz
The Highest channel(CH78)	2480MHz



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NT:

## SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

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#### 3.5 Test Environment

Normal Temperature

Environment Parameter	101.0 kPa Selected Values During Tests					
Relative Humidity	44-46 % RH Ambient					
Value	Temperature(°C) Voltage(V)					
NTNV	22~23	12				
Remark: NV: Normal Voltage						

### 3.6 Description of Support Units

The EUT has been tested as an independent unit.



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### **Test results and Measurement Data**

### 4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(b)

15.203 requirement: 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, 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.

15.247(b) (4) requirement: 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.

The antenna is Ceramic patch Antenna and no consideration of replacement.

The best case gain of the antenna is 2.65dBi (Ant2). \*

\*Note:

The antenna gain are derived from the gain information report provided by the manufacturer.

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## 4.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

#### 4.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

#### 4.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

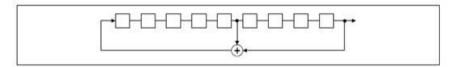
Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- > Number of shift register stages: 9
- > Length of pseudo-random sequence: 29 -1 = 511 bits
- > Longest sequence of zeros: 8 (non-inverted signal)

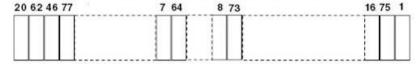
Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.



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According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

Compliance for section 15.247(h):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the RF system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels. The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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#### 4.3 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Sectio	n 15.207				
Test Method:	ANSI C63.10: 2013 Section 6.2					
Test Frequency Range:	150kHz to 30MHz					
Receiver Setup:	RBW = 9kHz, VBW = 30	kHz				
Limit:	Fraguenov rango (MUz)	Limit (d	BuV)			
	Frequency range (MHz)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the log	arithm of the frequency.				
Test Procedure:	1) The mains terminal of room.  2) The EUT was connected to a second plane in the same of multiple socket outlets single LISN provided.  3) The tabletop EUT was ground reference plane placed on the horizor.  4) The test was performed the EUT shall be 0. vertical ground reference plane. The unit under test and mounted on top of the the closest points of and associated equip.  5) In order to find the mand all of the interface.	listurbance voltage test was ected to AC power source to cion Network) which provides ower cables of all other und LISN 2, which was bonded way as the LISN 1 for the strip was used to connect method the rating of the LISN was not as placed upon a non-metall ne. And for floor-standing arrotal ground reference plane. The was placed upon a non-metall ne. And for floor-standing arrotal ground reference plane was bonded to a ground reference plane. The LISN 1 was placed 0.8 m from the LISN 1 and the EUT. All the LISN 1 and the EUT. A	through a LISN 1 (Line a 50Ω/50μH + 5Ω linear nits of the EUT were I to the ground reference unit being measured. A ultiple power cables to a ot exceeded. It is table 0.8m above the angement, the EUT was rence plane. The rear of a dreference plane. The to the horizontal ground rom the boundary of the rence plane for LISNs is distance was between II other units of the EUT in the LISN 2.			



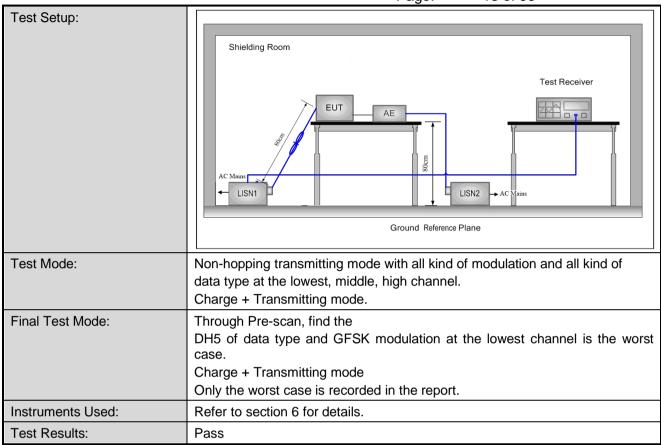
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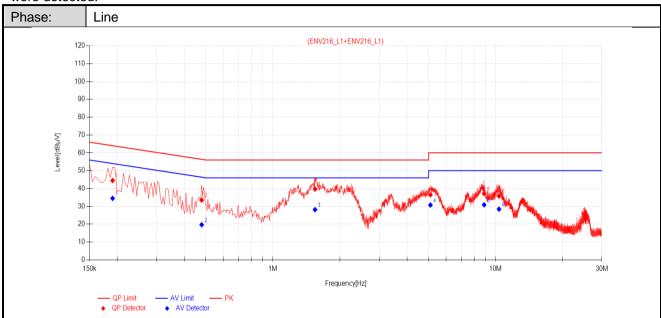
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#### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



Data	Data List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1905	10.78	33.71	44.49	64.01	19.52	23.72	34.50	54.01	19.51	PASS
2	0.4785	10.59	22.92	33.51	56.37	22.86	9.12	19.71	46.37	26.66	PASS
3	1.5450	10.77	28.93	39.70	56.00	16.30	17.40	28.17	46.00	17.83	PASS
4	5.0955	10.64	25.84	36.48	60.00	23.52	20.10	30.74	50.00	19.26	PASS
5	8.8800	10.66	26.50	37.16	60.00	22.84	20.21	30.87	50.00	19.13	PASS
6	10.3560	10.62	25.19	35.81	60.00	24.19	17.81	28.43	50.00	21.57	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value = Reading[dB $\mu$ V] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[dBµV] Value[dBµV]



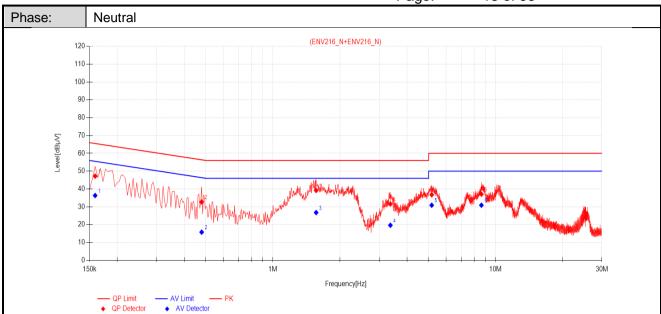
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Data	Data List										
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1590	10.72	36.50	47.22	65.52	18.30	25.62	36.34	55.52	19.18	PASS
2	0.4785	10.81	21.92	32.73	56.37	23.64	4.99	15.80	46.37	30.57	PASS
3	1.5630	10.77	28.42	39.19	56.00	16.81	16.01	26.78	46.00	19.22	PASS
4	3.3675	10.64	20.94	31.58	56.00	24.42	9.03	19.67	46.00	26.33	PASS
5	5.1630	10.63	26.14	36.77	60.00	23.23	20.27	30.90	50.00	19.10	PASS
6	8.6325	10.60	26.51	37.11	60.00	22.89	20.31	30.91	50.00	19.09	PASS

#### Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
- 3. Margin = Limit[ $dB\mu V$ ] Value[ $dB\mu V$ ]



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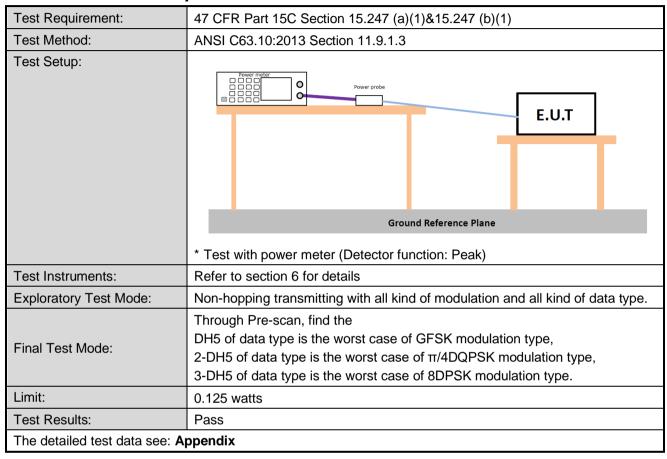
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### 4.4 Conducted Output Power





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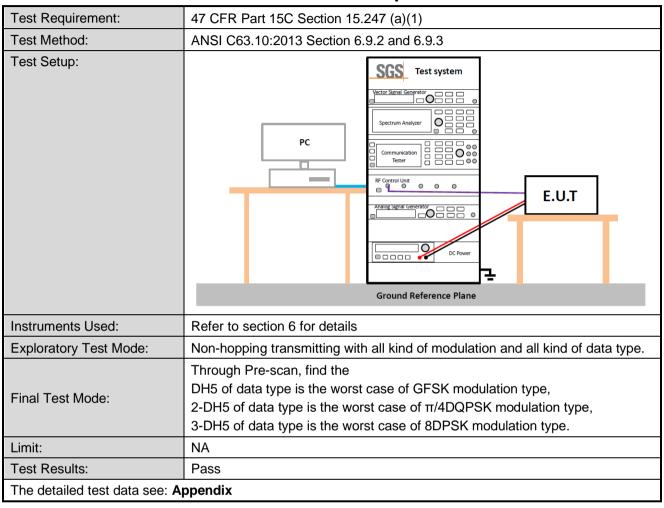
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### 4.5 20dB Emission Bandwidth & 99% Occupied Bandwidth





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### 4.6 Carrier Frequencies Separationy

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)				
Test Method:	ANSI C63.10:2013 Section 7.8.2				
Test Setup:	SGS Test system    Sector Signal Generator				
Test Instruments:	Refer to section 6 for details				
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.				
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.				
Limit:	2/3 of the 20dB bandwidth				
	Remark: the transmission power is less than 0.125W.				
Test Results:	Pass				
The detailed test data see: A	ppendix				



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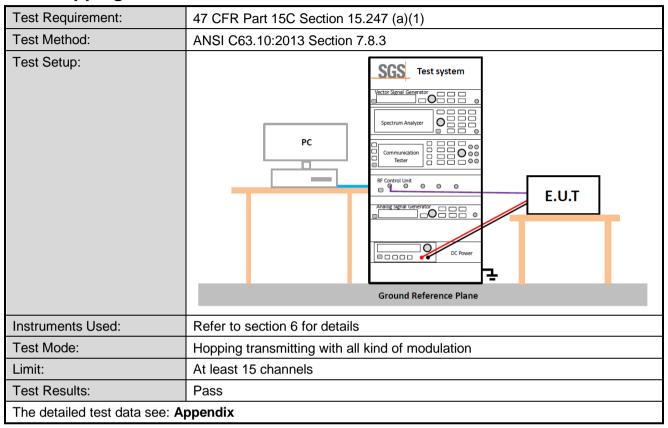
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### 4.7 Hopping Channel Number





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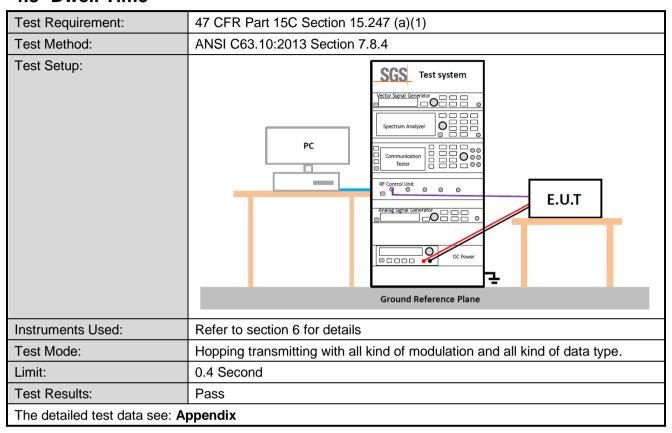
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#### 4.8 Dwell Time





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### 4.9 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)				
Test Method:	ANSI C63.10:2013 Section 7.8.7.2				
Test Setup:	PC    Sector Signal Generator   Spectrum Analyzer   Spectrum Analy				
Instruments Used:	Refer to section 6 for details				
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type.				
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.				
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.				
Test Results:	Pass				
The detailed test data see: A	ppendix				



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### 4.10 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)					
Test Method:	ANSI C63.10:2013 Section 7.8.7.1					
Test Setup:	PC    Spectrum Analyzer   O   O   O   O   O   O   O   O   O					
Instruments Used:	Refer to section 6 for details					
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.					
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.					
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.					
Test Results:	Pass					
The detailed test data see: A	The detailed test data see: Appendix					



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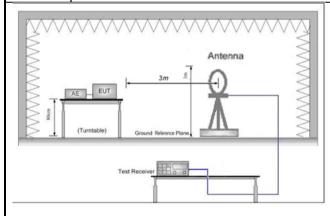
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### 4.11 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section	15.209 and 15.20	5					
Test Method:	ANSI C63.10 :2013 Section 6.4 / 6.5 / 6.6							
Test Site:	Measurement Distance: 3	m (Semi-Anechoic	Chamber)					
Test Frequency:	9kHz ~ 25GHz							
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)			
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300			
0.490MHz-1.705MHz 24000/F(kHz)								
	1.705MHz-30MHz	30	-	-	30			
	30MHz-88MHz	100	40.0	Quasi-peak	3			
	88MHz-216MHz	150	43.5	Quasi-peak	3			
	216MHz-960MHz	200	46.0	Quasi-peak	3			
	960MHz-1GHz	500	54.0	Quasi-peak	3			
	Above 1GHz 500 54.0 Average 3							
Remark: 15.35(b),Unless otherwise specified, the limit on peak radio freque emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total pelevel radiated by the device.								

#### Test Setup:



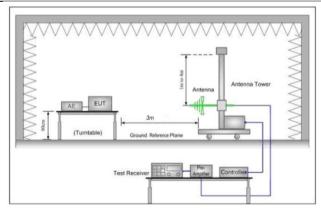


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz



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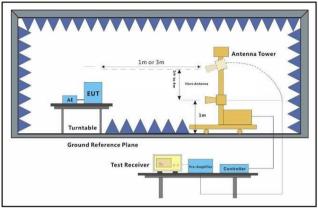


Figure 3. Above 1 GHz

#### Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation (Distance from antenna to EUT is 1m for measurements >18GHz).
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- Test the EUT in the lowest channel, the middle channel, the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.
- The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported
- The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.
- At a measurement distance of 1 meter the limit line was increased by 20\*LOG(3/1) = 9.54 dB.

### **Test Configuration:**

Measurements below 30MHz

- RBW = 10 kHz
- VBW = 30 kHz
- Detector = Peak & Average & Quasi-peak
- Trace mode = max hold

Measurements Below 1000MHz



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	Fage. 23 01 93					
	<ul><li>RBW = 120 kHz</li><li>VBW = 300 kHz</li></ul>					
	Detector = Quasi-peak					
	Trace mode = max hold					
	Peak Measurements Above 1000 MHz					
	• RBW = 1 MHz					
	<ul> <li>VBW ≥ 3 MHz</li> </ul>					
	Detector = Peak					
	Sweep time = auto					
	Trace mode = max hold					
	Average Measurements Above 1000MHz					
	Use duty cycle correction factor method per 15.35(c).					
	Duty cycle = On time / 100 milliseconds					
	On time = $N_1*L_1 + N_2*L_2+N_{N-1}*L_{N-1} + N_N*L_N$					
	Where $N_1$ is number of type 1 pulese, $L_1$ is length of type 1 pulses, etc.					
	Average Value = Peak Value +20*log(Duty cycle).					
Evoloratory Test	Non-hopping transmitting mode with all kind of modulation and all kind of					
•	data type					
mode.	Charge + Transmitting mode.					
	Through Pre-scan, find the					
	DH5 of data type and GFSK modulation is the worst case.					
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode					
	For below 1GHz part, through pre-scan, the worst case is the lowest channel.					
	Only the worst case is recorded in the report.					
Instruments Used:	Refer to section 6 for details					
Test Results:	Pass					
	a see: <b>Appendix</b>					
Instruments Used: Test Results:	Use duty cycle correction factor method per 15.35(c).  Duty cycle = On time / 100 milliseconds  On time = N <sub>1</sub> *L <sub>1</sub> + N <sub>2</sub> *L <sub>2</sub> +N <sub>N-1</sub> *L <sub>N-1</sub> + N <sub>N</sub> *L <sub>N</sub> Where N <sub>1</sub> is number of type 1 pulese, L <sub>1</sub> is length of type 1 pulses, etc.  Average Value = Peak Value +20*log(Duty cycle).  Non-hopping transmitting mode with all kind of modulation and all kind of data type  Charge + Transmitting mode.  Through Pre-scan, find the  DH5 of data type and GFSK modulation is the worst case.  Pretest the EUT at Charge + Transmitting mode  For below 1GHz part, through pre-scan, the worst case is the lowest channel.  Only the worst case is recorded in the report.  Refer to section 6 for details					



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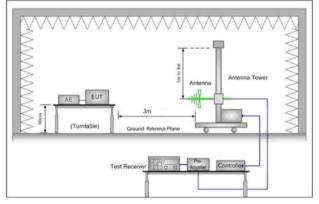
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### 4.12 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10: 2013 Section 6.10.5							
Test Site:	Measurement Distance: 3m	Measurement Distance: 3m (Semi-Anechoic Chamber)						
Limit:	Frequency	Limit (dBuV/m)	Remark					
	30MHz-88MHz	40.0	Quasi-peak					
	88MHz-216MHz	43.5	Quasi-peak					
	216MHz-960MHz	46.0	Quasi-peak					
	960MHz-1GHz	54.0	Quasi-peak					
	Above 1GHz	54.0	Average Value					
	Above IGHZ	74.0	Peak Value					

#### Test Setup:



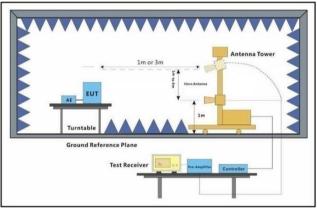


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

#### Test Procedure:

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- Place a marker at the end of the restricted band closest to the transmit



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	frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel					
	h. Test the EUT in the lowest channel , the Highest channel					
	i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.					
	j. Repeat above procedures until all frequencies measured was complete.					
Test Configuration:	Measurements Below 1000MHz					
	• RBW = 120 kHz					
	• VBW = 300 kHz					
	Detector = Quasi-peak					
	Trace mode = max hold					
	Peak Measurements Above 1000 MHz					
	• RBW = 1 MHz					
	• VBW ≥ 3 MHz					
	Detector = Peak					
	Sweep time = auto					
	Trace mode = max hold					
	Average Measurements Above 1000MHz					
	Use duty cycle correction factor method per 15.35(c).					
	Duty cycle = On time / 100 milliseconds					
	On time = $N_1*L_1 + N_2*L_2+N_{N-1}*L_{N-1} + N_N*L_N$					
	Where N <sub>1</sub> is number of type 1 pulese, L <sub>1</sub> is length of type 1 pulses, etc.					
	Average Value = Peak Value +20*log(Duty cycle).					
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type					
	Charge + Transmitting mode.					
E. TaskMada	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case.					
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode,					
	Only the worst case is recorded in the report.					
Instruments Used:	Refer to section 6 for details					
Test Results:	Pass					
The detailed test data see	e: Appendix					



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### 5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty		
1	Total RF power, conducted	±0.54dB		
2	RF power density, conducted ±1.03dB			
3	Spurious emissions, conducted	±0.54dB		
4	Radio Frequency	±1.0 %		
5	Duty Cycle	±0.37%		
6	Occupied Bandwidth	±1.0 %		
7	Conduction Emission ± 2.90dB (150kHz to 30MHz)			
		± 3.13dB (9k -30MHz)		
0	D # 4 15 1 1	± 4.8dB (30M -1GHz)		
8	Radiated Emission	± 4.8dB (1GHz to 18GHz)		
		± 4.80dB (Above 18GHz)		

#### Remark:

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cispt/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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6 Equipment List

C Equipment List								
RF Test Equipment								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2023/02/06	2024/02/05			
Signal Analyzer	ROHDE& SCHWARZ	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16			
Measurement Software	Tonscend	JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR			
Signal Analyzer	ROHDE& SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27			
Wideband Radio Communication Tester	ROHDE& SCHWARZ	CMW500	SUWI-01-16-05	2023/02/06	2024/02/05			
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05			
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2022/11/23	2023/11/22			
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2022/11/23	2023/11/22			
MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	2023/02/06	2024/02/05			
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05			

Conduction Test Equipment								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07			
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR			



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			raye.	30 01 93				
RSE Test System								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2023/02/07	2024/02/06			
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27			
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-05	2022/11/23	2023/11/22			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2021/05/16	2023/05/15			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2021/05/16	2023/05/15			
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13			
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2023/02/06	2024/02/05			
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2023/02/06	2024/02/05			
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2023/02/08	2024/02/07			
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09			
Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-04	NCR	NCR			



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### 7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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# **Appendix**



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## 20dB Emission Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Verdict
DH5	Ant2	2402	0.95	2401.51	2402.46	Reporting only
		2441	0.95	2440.51	2441.46	
		2480	0.95	2479.51	2480.46	
2DH5	Ant2	2402	1.29	2401.34	2402.63	
		2441	1.29	2440.34	2441.63	
		2480	1.29	2479.34	2480.63	
3DH5	Ant2	2402	1.29	2401.33	2402.62	
		2441	1.29	2440.33	2441.62	
		2480	1.29	2479.33	2480.62	



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#### **Test Graphs**





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# Occupied Channel Bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict	
DH5	Ant2	2402	0.900	2401.526	2402.426		
		2441	0.901	2440.524	2441.425		
		2480	0.902	2479.524	2480.425		
2DH5	Ant2	Ant2	2402	1.173	2401.385	2402.557	Poporting
			2441	1.174	2440.384	2441.557	Reporting only
		2480	1.172	2479.383	2480.556	Offig	
3DH5	Ant2		2402	1.174	2401.388	2402.562	
		2441	1.175	2440.387	2441.562		
		2480	1.175	2479.386	2480.561		



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### **Test Graphs**





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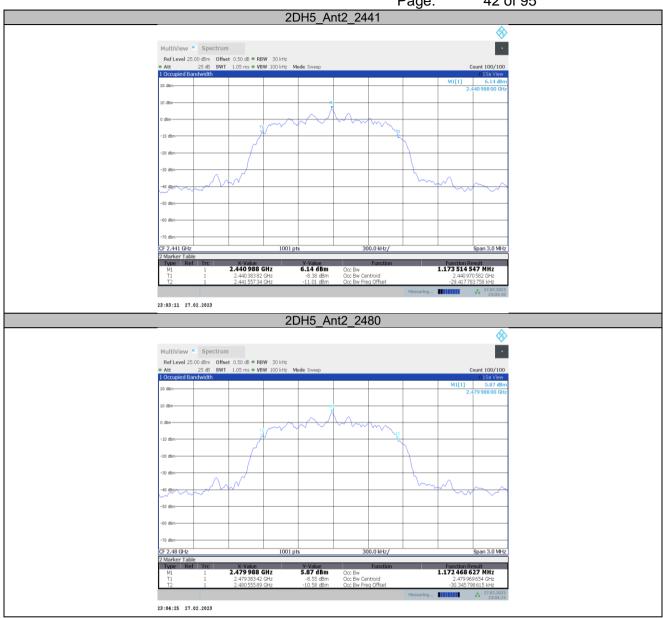
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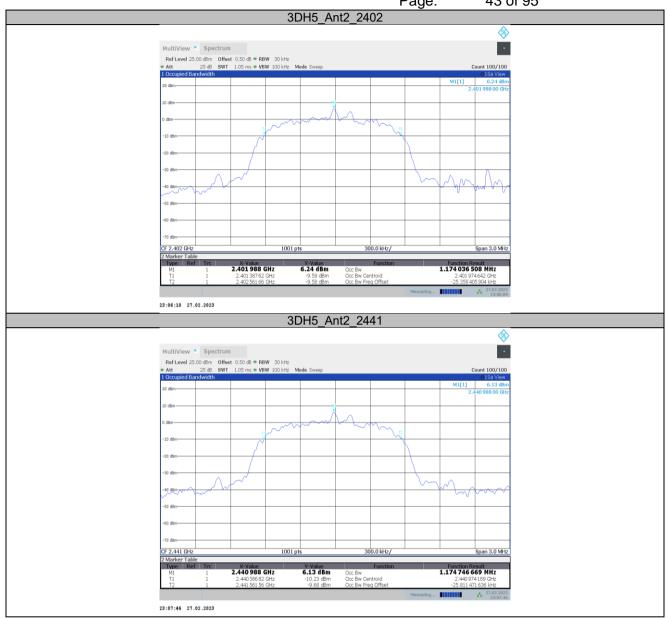
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### Maximum conducted output power **Test Result Peak**

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
	Ant2	2402	9.23	≤20.97	PASS
DH5		2441	9.42	≤20.97	PASS
		2480	9.12	≤20.97	PASS
2DH5	Ant2	2402	9.21	≤20.97	PASS
		2441	9.17	≤20.97	PASS
		2480	9.16	≤20.97	PASS
3DH5	Ant2	2402	9.23	≤20.97	PASS
		2441	9.21	≤20.97	PASS
		2480	9.19	≤20.97	PASS



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### **Carrier frequency separation Test Result**

TestMode	Antenna	Frequency[MHz]	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant2	Нор	1.306	≥0.633	PASS
2DH5	Ant2	Нор	1.006	≥0.860	PASS
3DH5	Ant2	Нор	1.012	≥0.860	PASS



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### **Test Graphs**





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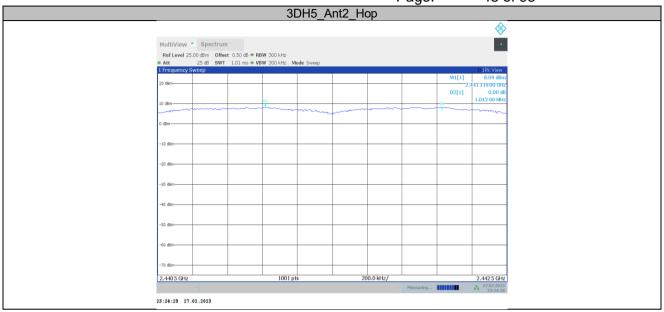
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### Time of occupancy Test Result

TestMode	Antenna	Frequency[MHz]	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant2	Нор	0.36	320	0.115	≤0.4	PASS
DH3	Ant2	Нор	1.62	160	0.259	≤0.4	PASS
DH5	Ant2	Нор	2.87	106.67	0.306	≤0.4	PASS
2DH1	Ant2	Нор	0.36	320	0.115	≤0.4	PASS
2DH3	Ant2	Нор	1.62	160	0.259	≤0.4	PASS
2DH5	Ant2	Нор	2.87	106.67	0.306	≤0.4	PASS
3DH1	Ant2	Нор	0.37	320	0.118	≤0.4	PASS
3DH3	Ant2	Нор	1.62	160	0.259	≤0.4	PASS
3DH5	Ant2	Нор	2.87	106.67	0.306	≤0.4	PASS



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### **Test Graphs**





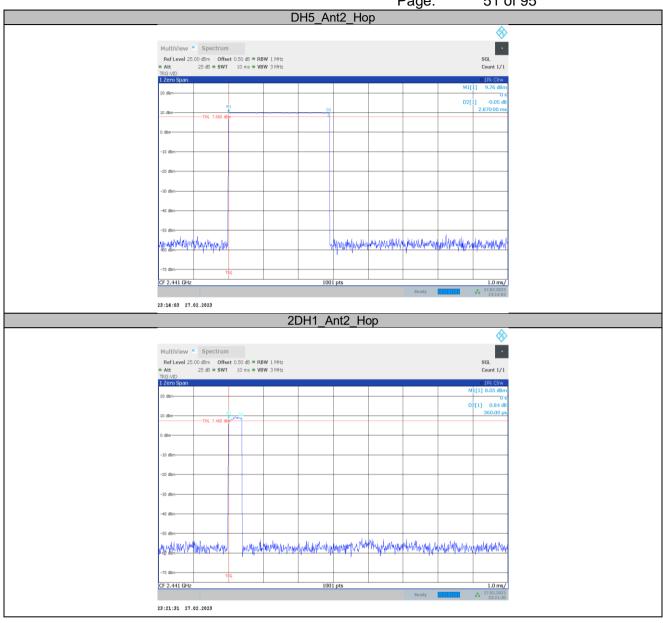
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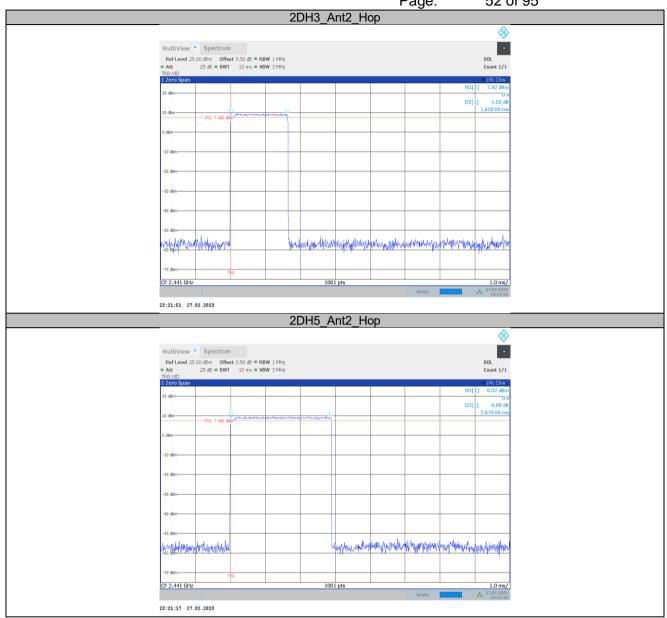
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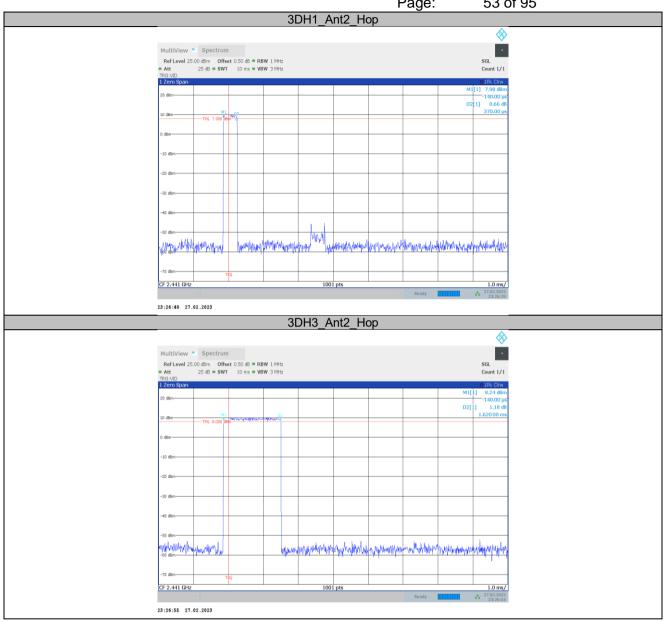
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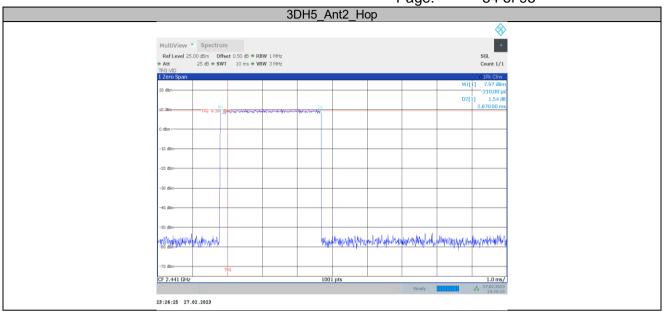
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### Number of hopping channels Test Result

TestMode	Antenna	Frequency[MHz]	Result[Num]	Limit[Num]	Verdict
DH5	Ant2	Нор	79	≥15	PASS
2DH5	Ant2	Нор	79	≥15	PASS
3DH5	Ant2	Нор	79	≥15	PASS



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### **Test Graphs**





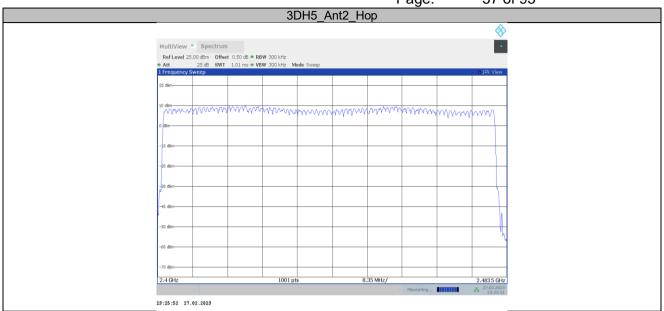
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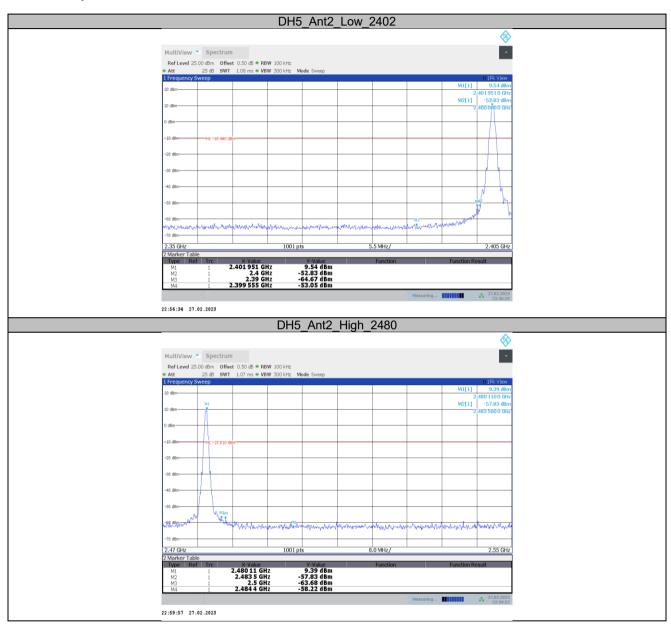


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### Band edge measurements Test Graphs





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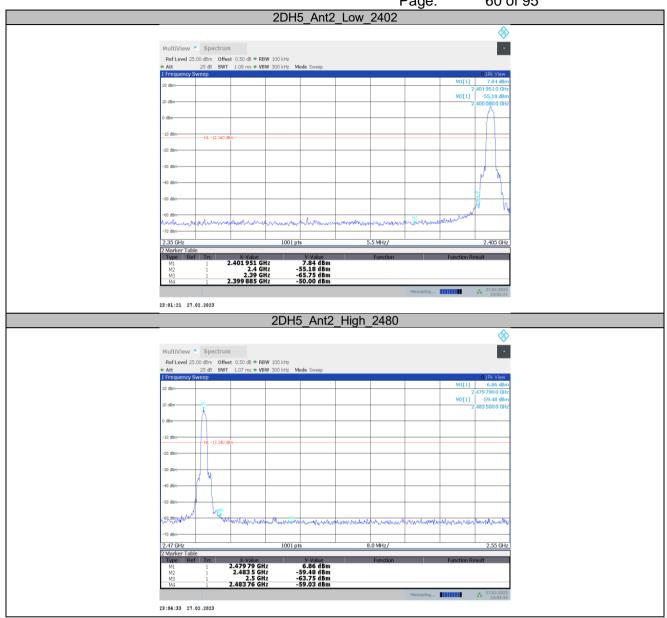
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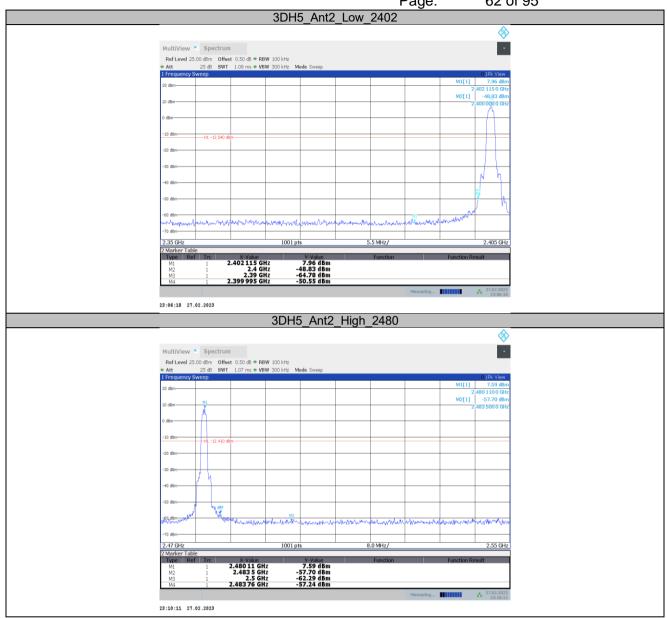
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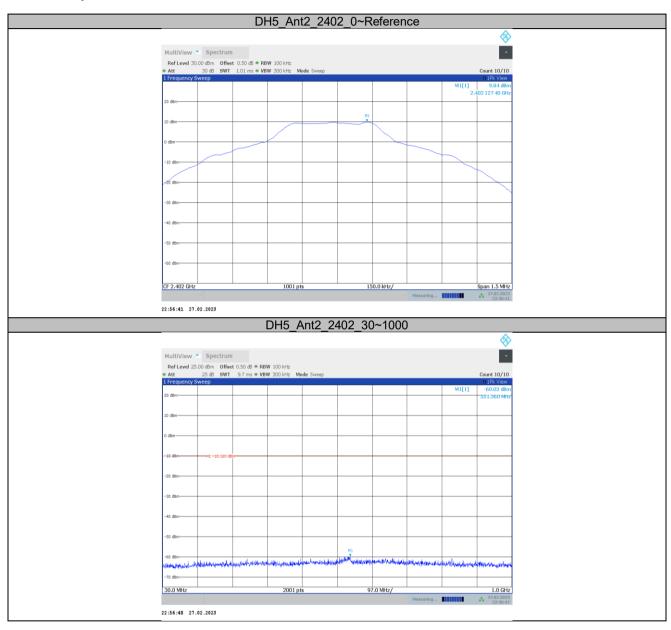


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# **Conducted Spurious Emission Test Graphs**





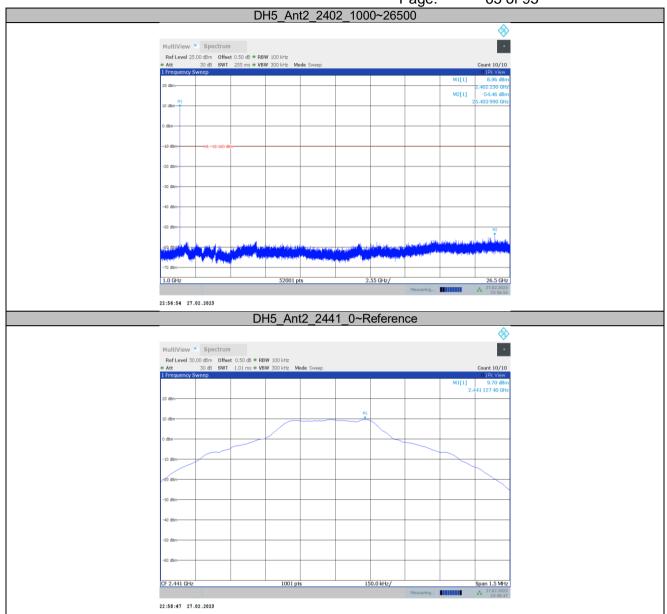
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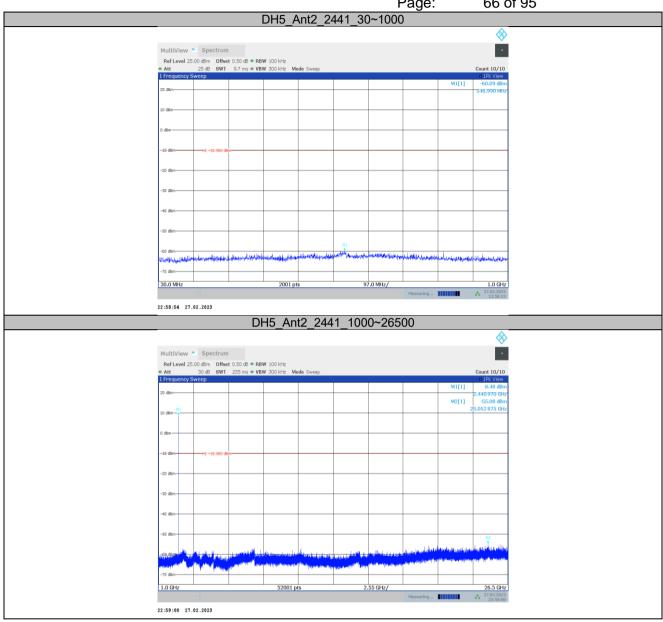
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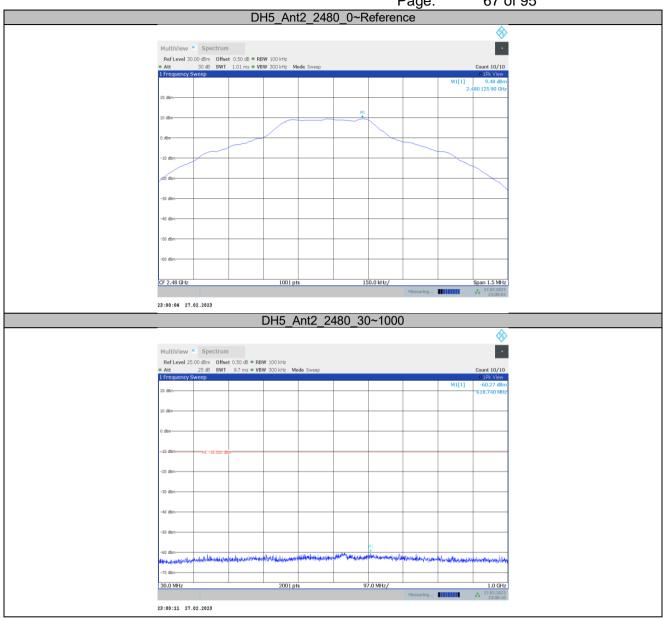
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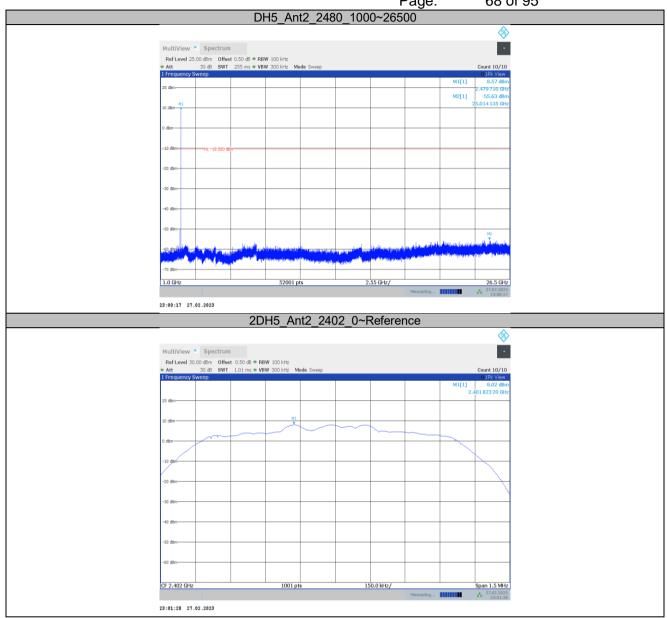
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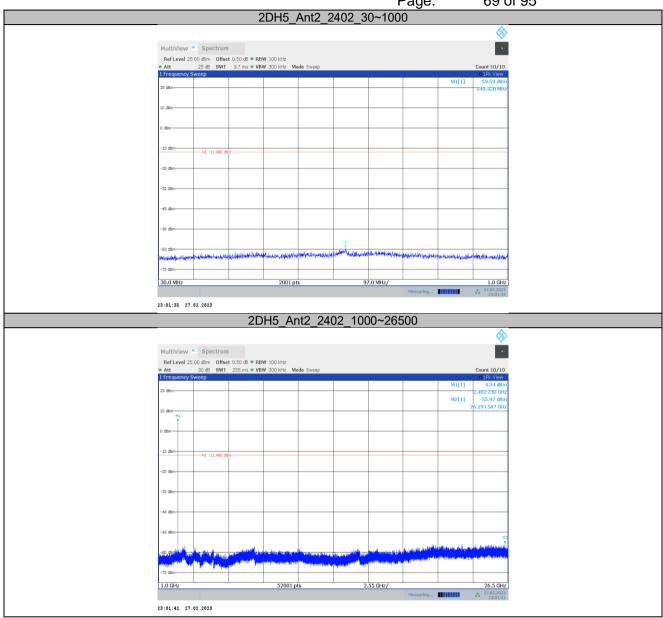
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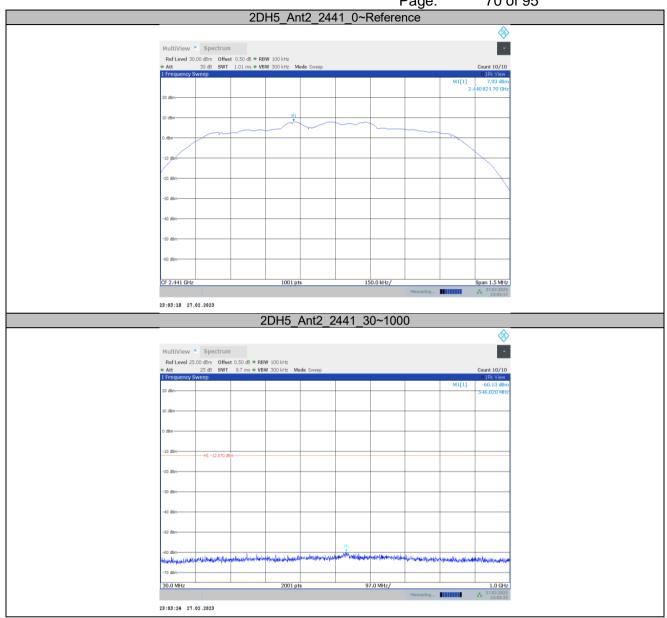
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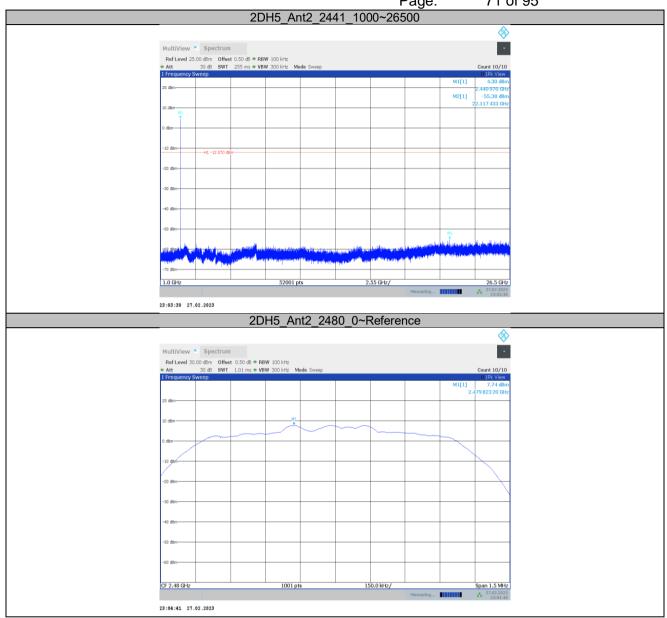
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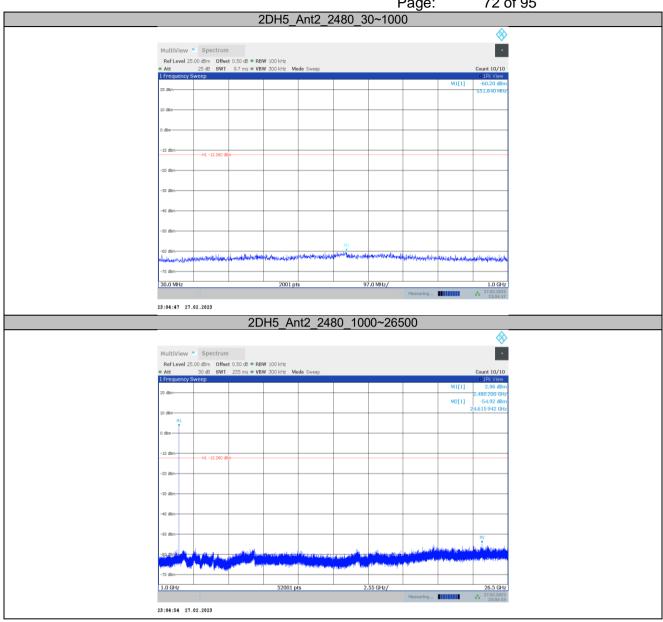
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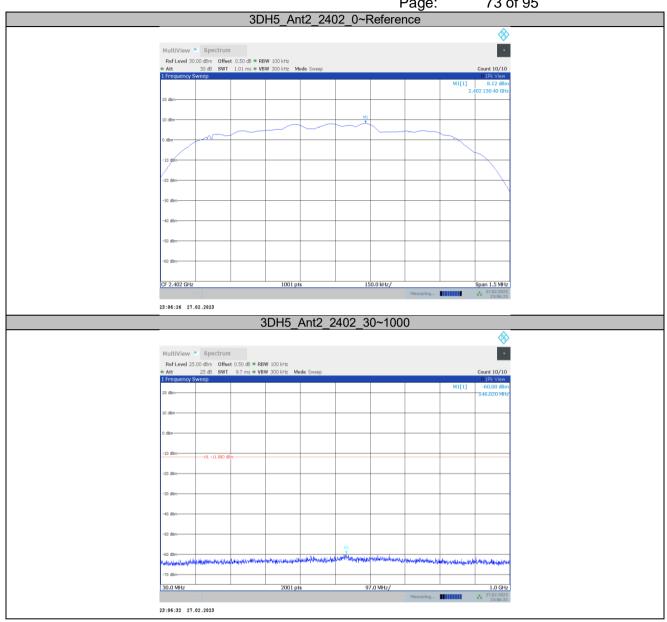
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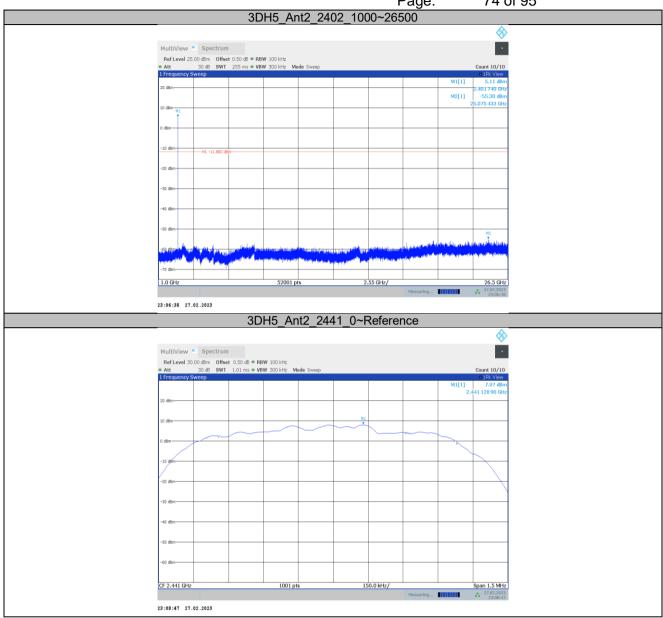
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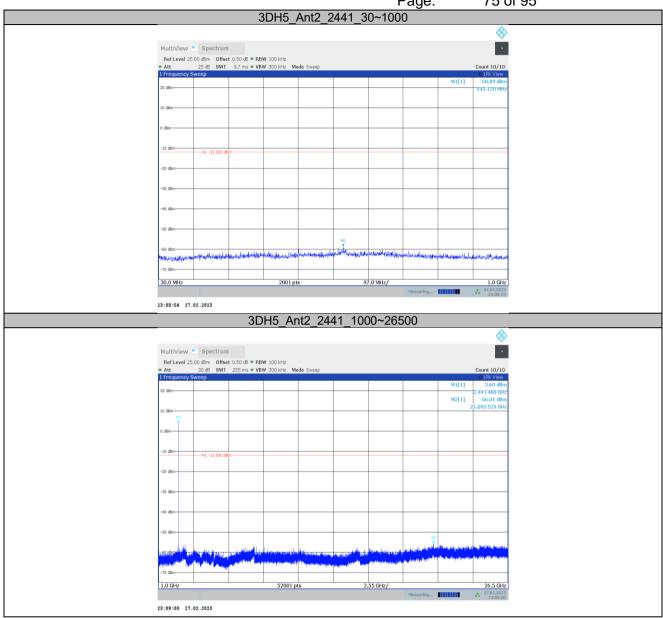
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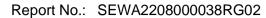




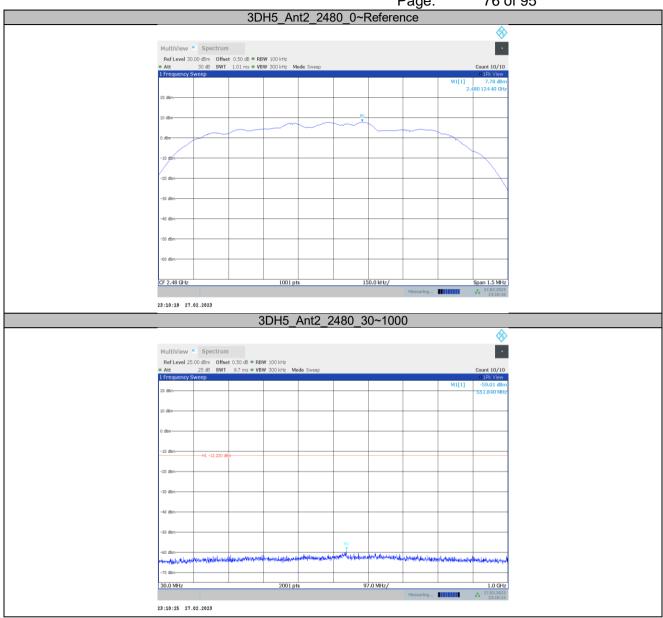
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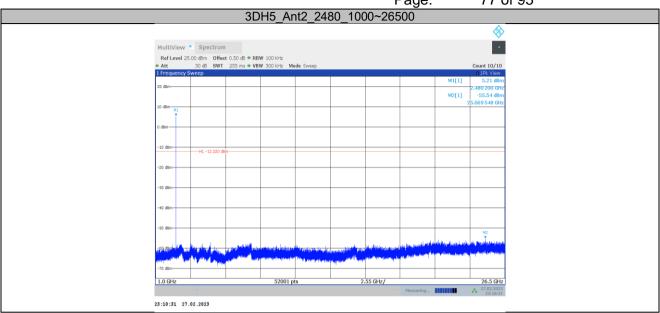
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#### **Duty Cycle** Test Result

TestMode	Antenna	Frequency[MHz]	ON Time	Period	Duty Cycle	Duty Cycle
restivioue	Antenna	i requericy[ivii iz]	[ms]	[ms]	[%]	Factor[dB]
		2402	2.89	3.75	77.07	1.13
DH5	Ant2	2441	2.88	3.75	76.80	1.15
		2480	2.89	3.76	76.86	1.14
		2402	2.89	3.75	77.07	1.13
2DH5	Ant2	2441	2.89	3.75	77.07	1.13
		2480	2.89	3.75	77.07	1.13
		2402	2.89	3.75	77.07	1.13
3DH5	Ant2	2441	2.90	3.76	77.13	1.13
		2480	2.89	3.75	77.07	1.13

Note:

Duty cycle = on time / 100ms = 2 \* 2.89 / 100 = 5.78% Duty cycle Correction factor = 20\*log(Duty cycle) = -24.76dB



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#### **Test Graphs**





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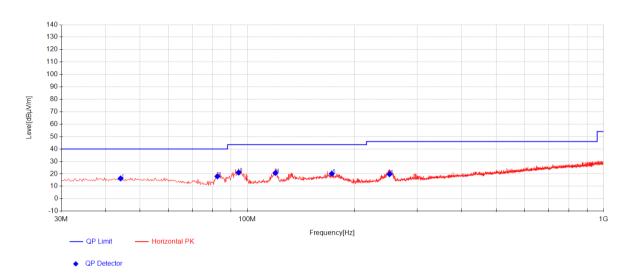


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# Radiated Spurious Emissions Radiated emission below 1GHz

Worst case Mode: GFSK\_Channel 78



Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.065	30.65	-28.05	13.73	16.33	40.00	23.67	165	22	Horizontal
2	82.38	36.52	-27.88	9.33	17.97	40.00	22.03	153	1	Horizontal
3	94.505	38.87	-27.53	9.76	21.10	43.50	22.40	142	63	Horizontal
4	119.9675	36.25	-27.71	12.24	20.78	43.50	22.72	186	15	Horizontal
5	172.59	32.24	-26.57	14.48	20.15	43.50	23.35	201	0	Horizontal
6	250.675	34.16	-26.03	11.59	19.72	46.00	26.28	241	358	Horizontal



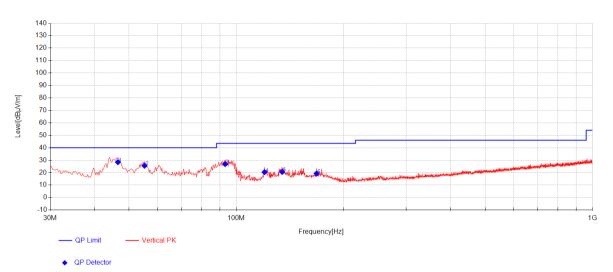
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Data	List									
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	46.49	42.81	-28.03	13.62	28.39	40.00	11.61	163	360	Vertical
2	55.22	40.19	-27.81	13.13	25.51	40.00	14.49	174	22	Vertical
3	93.05	44.77	-27.58	9.66	26.85	43.50	16.65	192	360	Vertical
4	119.9675	35.84	-27.71	12.24	20.37	43.50	23.13	206	255	Vertical
5	134.5175	34.56	-27.15	13.12	20.53	43.50	22.97	224	360	Vertical
6	167.9825	31.44	-26.52	14.36	19.27	43.50	24.23	148	315	Vertical

#### Remark

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain.

The basic equation with a sample calculation is as follows:

Value = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Value( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



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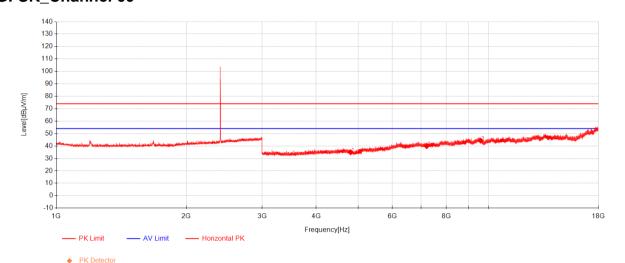
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# Transmitter emission Above 1GHz GFSK Channel 00



**Data List** Frequency Reading Factor Level Limit Margin Height Angle NO. Polarity [MHz] [dBµV] [dB/m] [dB] [dBµV/m]  $[dB\mu V/m]$ [dB] [cm] [°] 4804 47.28 32.13 -44.46 34.95 74.00 39.05 241 155 Horizontal 2 4804 10.19 54.00 43.81 3 7206 45.78 36.32 -42.23 39.87 74.00 34.13 185 75 Horizontal 4 7206 15.11 54.00 38.89 5 9608 43.80 38.54 -38.05 44.29 74.00 29.71 236 298 Horizontal 6 9608 19.53 54.00 34.47



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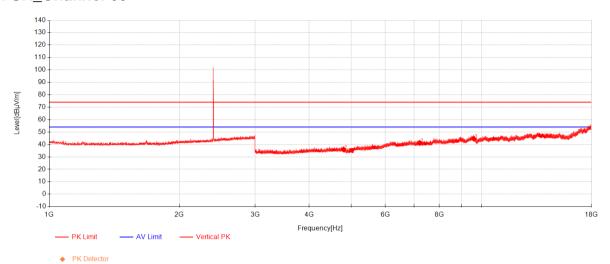
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#### **GFSK\_Channel 00**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4804	48.36	32.13	-44.46	36.03	74.00	37.97	362	55	Vertical			
2	4804	-	-	-	11.27	54.00	42.73	-	-	-			
3	7206	47.16	36.32	-42.23	41.25	74.00	32.75	296	0	Vertical			
4	7206	-	-	-	16.49	54.00	37.51	-	-	-			
5	9608	44.23	38.54	-38.05	44.72	74.00	29.28	204	255	Vertical			
6	9608	-	-	-	19.96	54.00	34.04	-	-	-			

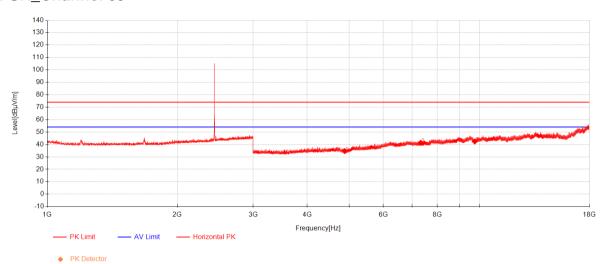




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#### **GFSK\_Channel 39**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4882	47.16	32.32	-44.80	34.68	74.00	39.32	241	89	Horizontal			
2	4882	-	-	-	9.89	54.00	44.11	-	-	-			
3	7323	46.76	36.39	-41.81	41.34	74.00	32.66	265	1	Horizontal			
4	7323	-	-	-	16.55	54.00	37.45	-	-	-			
5	9764	41.41	38.52	-37.51	42.43	74.00	31.57	263	0	Horizontal			
6	9764	-	-	1	17.64	54.00	36.36	•	-	-			

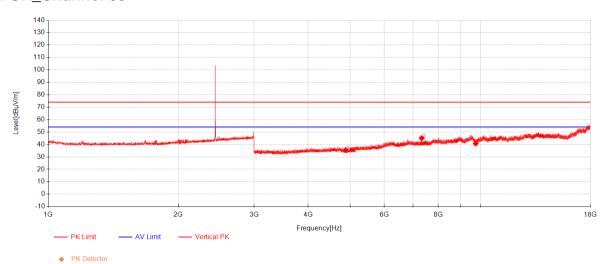




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#### **GFSK\_Channel 39**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4882	48.01	32.32	-44.80	35.53	74.00	38.47	211	357	Vertical			
2	4882	-	-	-	10.74	54.00	43.26	-	-	-			
3	7323	50.53	36.39	-41.81	45.11	74.00	28.89	174	88	Vertical			
4	7323	-	-	-	20.32	54.00	33.68	-	-	-			
5	9764	39.72	38.52	-37.51	40.74	74.00	33.26	146	10	Vertical			
6	9764	-	-	-	15.95	54.00	38.05	-	-	-			

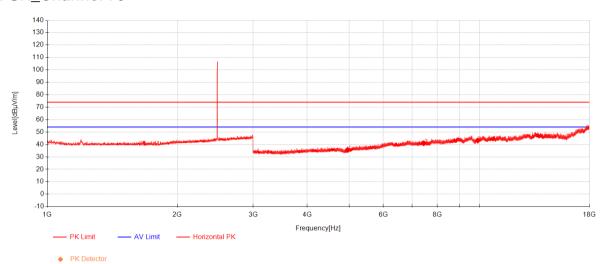




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#### **GFSK\_Channel 78**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4960	48.17	32.50	-44.92	35.76	74.00	38.24	293	5	Horizontal			
2	4960	-	-	-	11.00	54.00	43.00	-	-	-			
3	7440	46.34	36.46	-41.83	40.98	74.00	33.02	248	52	Horizontal			
4	7440	-	-	-	16.22	54.00	37.78	-	-	-			
5	9920	41.84	38.51	-37.22	43.13	74.00	30.87	186	217	Horizontal			
6	9920	-	1	-	18.37	54.00	35.63	•	-				

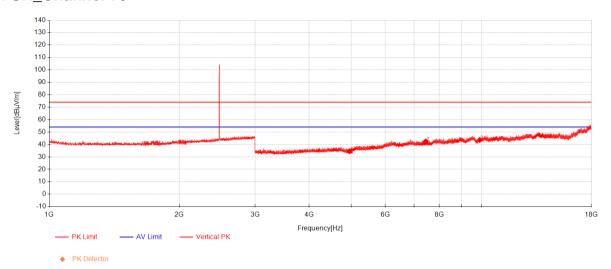




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#### **GFSK\_Channel 78**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4960	46.96	32.50	-44.92	34.55	74.00	39.45	296	1	Vertical			
2	4960	-	-	-	9.79	54.00	44.21	-	-	-			
3	7440	47.84	36.46	-41.83	42.48	74.00	31.52	174	94	Vertical			
4	7440	-	-	-	17.72	54.00	36.28	-	-	-			
5	9920	42.28	38.51	-37.22	43.57	74.00	30.43	286	113	Vertical			
6	9920	-	-	-	18.81	54.00	35.19	-	-	-			

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain.

The basic equation with a sample calculation is as follows:

Level = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Level( $dB\mu V/m$ )

2) All channels have been tested, but only the worst case data displayed in this report.



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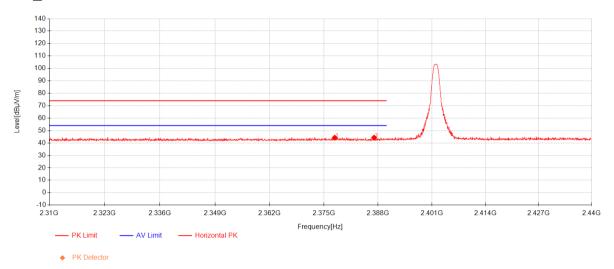


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#### Restricted bands around fundamental frequency

#### **GFSK\_Channel 00**



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2377.5792	41.04	27.66	-24.45	44.25	74.00	29.75	301	64	Horizontal		
2	2377.5792	-	-	-	19.49	54.00	34.51	-	-	-		
3	2387.029	41.04	27.67	-24.43	44.29	74.00	29.71	301	64	Horizontal		
4	2387.029	1	-	1	19.53	54.00	34.47	-	1	-		



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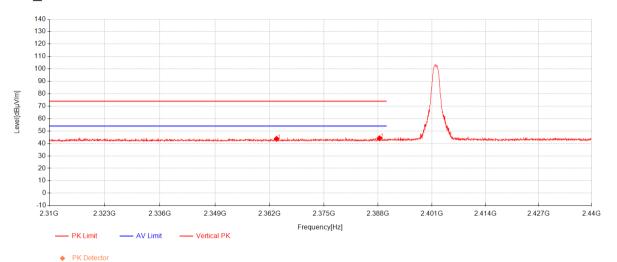
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#### **GFSK\_Channel 00**



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2363.6646	40.57	27.63	-24.48	43.72	74.00	30.28	324	106	Vertical		
2	2363.6646	-	-	-	18.96	54.00	35.04	-	-	-		
3	2388.3294	40.92	27.68	-24.43	44.17	74.00	29.83	324	106	Vertical		
4	2388.3294	1	-	-	19.41	54.00	34.59	•	1	-		

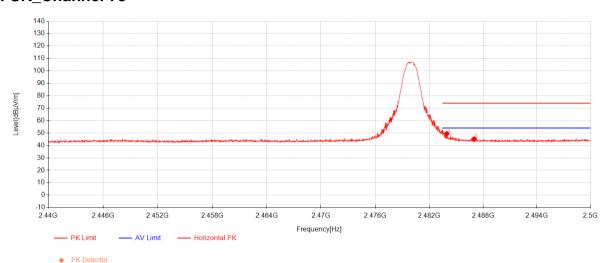




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#### **GFSK\_Channel 78**



Data	Data List											
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity		
1	2483.9547	45.56	27.87	-23.96	49.47	74.00	24.53	147	99	Horizontal		
2	2483.9547	-	-	-	24.71	54.00	29.29	-	-	-		
3	2486.9957	41.23	27.87	-23.94	45.17	74.00	28.83	147	99	Horizontal		
4	2486.9957	-	-	-	20.41	54.00	33.59	-	-	-		

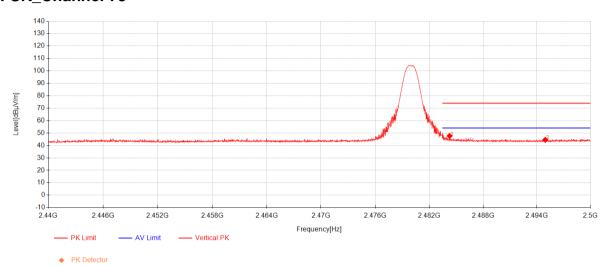




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#### **GFSK\_Channel 78**



Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2484.2748	43.78	27.87	-23.95	47.70	74.00	26.30	193	101	Vertical			
2	2484.2748	-	-	-	22.94	54.00	31.06	-	-	-			
3	2494.9383	40.54	27.89	-23.90	44.53	74.00	29.47	193	101	Vertical			
4	2494.9383	-	-	-	19.77	54.00	34.23	-	-	-			

#### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain.

The basic equation with a sample calculation is as follows:

Level = Reading( $dB\mu V$ ) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit( $dB\mu V/m$ ) – Level( $dB\mu V/m$ )

---End of Report---



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