

Report No.: SEWM2304000111RG02
 Rev.: 01
 Page: 1 of 68



TEST REPORT

Application No.: SEWM2304000111RG
Applicant: Shenzhen Tinno Mobile Technology Corp.
Address of Applicant: TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
Manufacturer: Shenzhen Tinno Mobile Technology Corp.
Address of Manufacturer: TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
EUT Description: Smart Phone
Model No.: U680AA, U680AC
FCC ID: XD6U680AA
Standards: FCC 47 CFR Part 2, Subpart J
 FCC 47 CFR Part 15, Subpart C
Date of Receipt: 2023/04/20
Date of Test: 2023/05/10 to 2023/06/06
Date of Issue: 2023/06/07

Test Result :	PASS *
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* 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		2023/06/07		Original

Prepared By		 <hr/> (Tizy Song) / Test Engineer
Checked By		 <hr/> (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 C63.10-2020 Section 6.2	Clause 4.3	PASS
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10-2020 Section 11.9.1.2	Clause 4.4	PASS
20dB Emission Bandwidth & 99% Occupied Bandwidth	15.247 (a)(1)	ANSI C63.10-2020 Section 6.9.2/6.9.3	Clause 4.5	For Report Purpose
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10-2020 Section 7.8.2	Clause 4.6	PASS
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10-2020 Section 7.8.3	Clause 4.7	PASS
Dwell Time	15.247 (a)(1)	ANSI C63.10-2020 Section 7.8.4	Clause 4.8	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10-2020 Section 7.8.7.2	Clause 4.9	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10-2020 Section 7.8.7.1	Clause 4.10	PASS
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10-2020 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 C63.10-2020 Section 6.10.5	Clause 4.12	PASS



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Contents

1	Version	2
2	Test Summary	3
3	General Information	5
3.1	Details of Client	5
3.2	Test Location	5
3.3	Test Facility	5
3.4	General Description of EUT	6
3.5	Test Environment	8
3.6	Description of Support Units	8
4	Test results and Measurement Data	9
4.1	Antenna Requirement	9
4.2	Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	10
4.2.1	Test Requirement:	10
4.2.2	Conclusion	10
4.3	AC Power Line Conducted Emissions	12
4.4	Conducted Output Power	16
4.5	20dB Emission Bandwidth & 99% Occupied Bandwidth	17
4.6	Carrier Frequencies Separation	18
4.7	Hopping Channel Number	19
4.8	Dwell Time	20
4.9	Band-edge for RF Conducted Emissions	21
4.10	Spurious RF Conducted Emissions	22
4.11	Radiated Spurious Emissions	23
4.12	Restricted bands around fundamental frequency	26
5	Measurement Uncertainty (95% confidence levels, k=2)	28
6	Equipment List	29
7	Photographs - Setup Photos	31



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3 General Information

3.1 Details of Client

Applicant:	Shenzhen Tinno Mobile Technology Corp.
Address of Applicant:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province
Manufacturer:	Shenzhen Tinno Mobile Technology Corp.
Address of Manufacturer:	TINNO HQ Building, Tongfa South Road Nanshan District Shenzhen, Guangdong Province

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, Tizzy Song

3.3 Test Facility

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

<ul style="list-style-type: none"> • 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:	Smart Phone	
Model No.:	U680AA, U680AC	
Hardware Version:	V1.0	
Software Version:	U680AAV01.02.10	
IMEI:	RF Conducted	861745060000385
	RSE & AC power line	8617450600008388
Operation Frequency:	2400MHz~2483.5MHz $f_c = 2402 \text{ MHz} + N * 1 \text{ MHz}$, where: - f_c = "Operating Frequency" in MHz, - N = "Channel Number" with the range from 0 to 78.	
Bluetooth version:	Bluetooth V5.0	
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)	
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK	
Number of Channel:	79	
Hopping Channel Type:	Adaptive Frequency Hopping systems	
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated	
Antenna Gain:	-0.6dBi(Ant2)	
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.	
RF Cable:	1.0dB	
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Operation Frequency of each channel							
Channel	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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3.5 Test Environment

Environment Parameter	101.0kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	3.70
Remark: NV: Normal Voltage NT: Normal Temperature		

3.6 Description of Support Units

The EUT has been tested as an independent unit.



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4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(b)
<p>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.</p> <p>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.</p>	
<p>The antenna is Integrated Antenna and no consideration of replacement. The best case gain of the antenna is -0.6dBi(Ant2).*</p> <p><i>*Note:</i> <i>The antenna gain are derived from the gain information report provided by the manufacturer.</i></p> <p><i>Remark:</i> <i>As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.</i></p>	



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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 Pseudo randomly 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 pseudo random 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.

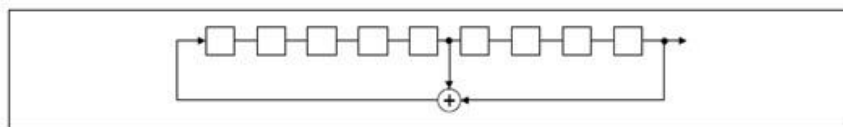
> Number of shift register stages: 9

> Length of pseudo-random sequence: $2^9 - 1 = 511$ bits

> Longest sequence of zeros: 8 (non-inverted signal)

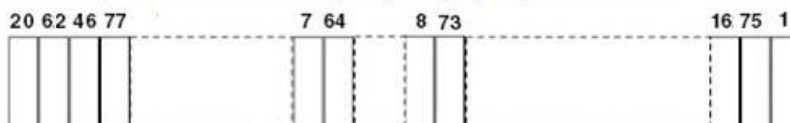
Linear Feedback Shift Register for Generation of the PRBS sequence

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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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 11 of 68

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):

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.

Compliance for section 15.247(h):

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 Section 15.207		
Test Method:	ANSI C63.10-2020 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		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 logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none"> 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10-2020 on conducted measurement. 		



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<p>Test Setup:</p>	
<p>Test Mode:</p>	<p>Non-hopping transmitting mode with all kind of modulation and all kind of data type at the lowest, middle, high channel. Charge + Transmitting mode.</p>
<p>Final Test Mode:</p>	<p>Through Pre-scan, find the DH5 of data type and GFSK modulation at the lowest channel is the worst case. Charge + Transmitting mode Only the worst case is recorded in the report.</p>
<p>Instruments Used:</p>	<p>Refer to section 6 for details.</p>
<p>Test Results:</p>	<p>Pass</p>



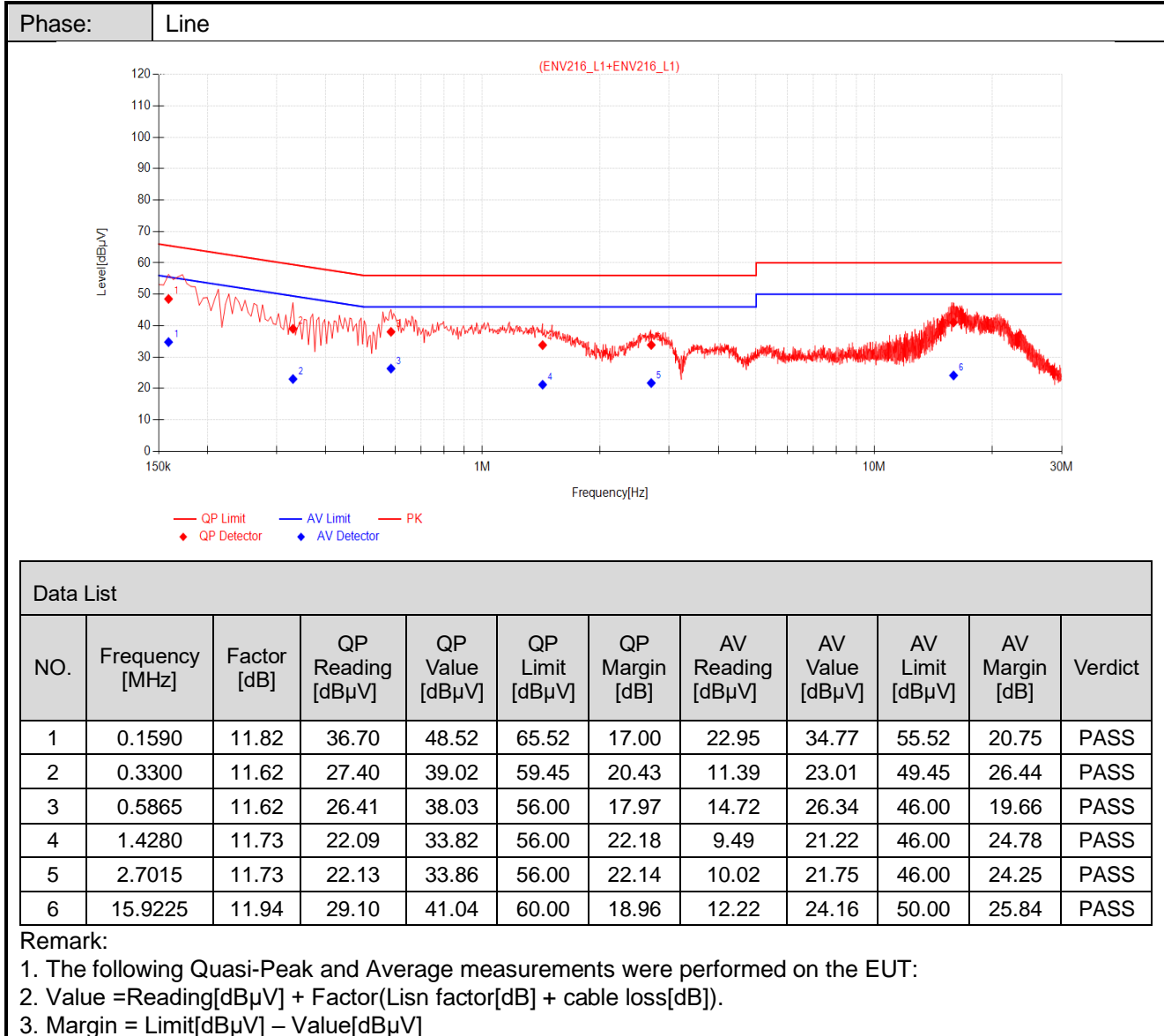
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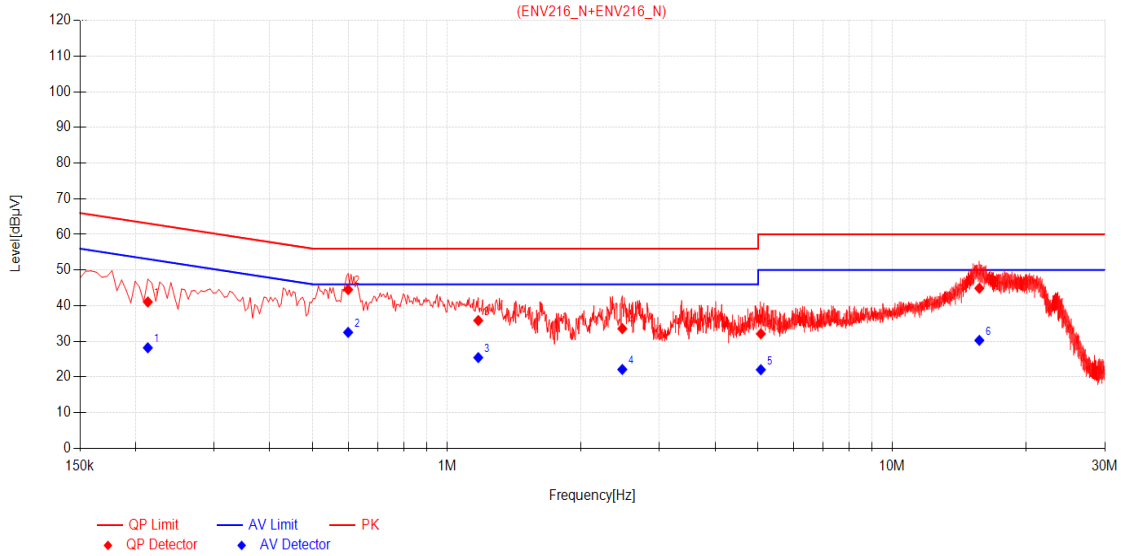
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Measurement Data

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.



Phase: Neutral



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	0.2130	11.65	29.39	41.04	63.09	22.05	16.54	28.19	53.09	24.90	PASS
2	0.6000	11.63	32.88	44.51	56.00	11.49	20.88	32.51	46.00	13.49	PASS
3	1.1760	11.73	24.12	35.85	56.00	20.15	13.72	25.45	46.00	20.55	PASS
4	2.4765	11.73	21.83	33.56	56.00	22.44	10.39	22.12	46.00	23.88	PASS
5	5.0685	11.80	20.32	32.12	60.00	27.88	10.25	22.05	50.00	27.95	PASS
6	15.6885	11.93	32.97	44.90	60.00	15.10	18.34	30.27	50.00	19.73	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[dBµV] – Value[dBµV]



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4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)&15.247 (b)(1)
Test Method:	ANSI C63.10-2020 Section 11.9.1.2
Test Setup:	<p>* Test with power meter (Detector function: Peak)</p>
Test Instruments:	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 $\pi/4$ DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	0.125 watts
Test Results:	Pass
The detailed test data see: Appendix	



4.5 20dB Emission Bandwidth & 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 Section 6.9.2 and 6.9.3
Test Setup:	
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 $\pi/4$ DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	NA
Test Results:	Pass
The detailed test data see: Appendix	



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4.6 Carrier Frequencies Separation

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 Section 7.8.2
Test Setup:	
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 $\pi/4$ DQPSK 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: Appendix	



4.7 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 Section 7.8.3
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Hopping transmitting with all kind of modulation
Limit:	At least 15 channels
Test Results:	Pass
The detailed test data see: Appendix	



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4.8 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10-2020 Section 7.8.4
Test Setup:	
Instruments Used:	Refer to section 6 for details
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass
The detailed test data see: Appendix	



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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 C63.10-2020 Section 7.8.7.2
Test Setup:	
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 $\pi/4$ DQPSK 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: Appendix	



4.10 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10-2020 Section 7.8.7.1
Test Setup:	
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 $\pi/4$ DQPSK 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: Appendix	



4.11 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10-2020 Section 6.4 / 6.5 / 6.6				
Test Site:	Measurement Distance: 3m (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)	-	-	30
	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 frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					

Test Setup:

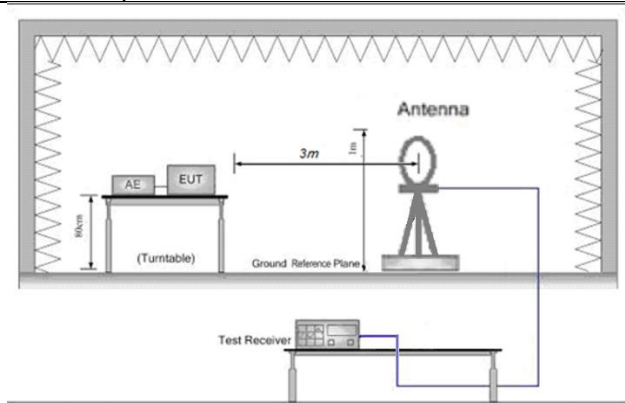


Figure 1. Below 30MHz

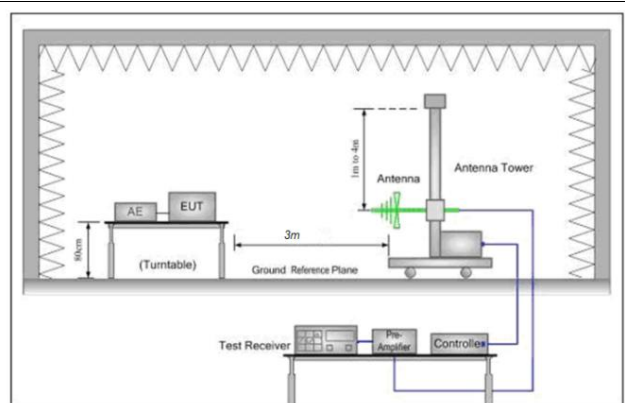


Figure 2. 30MHz to 1GHz



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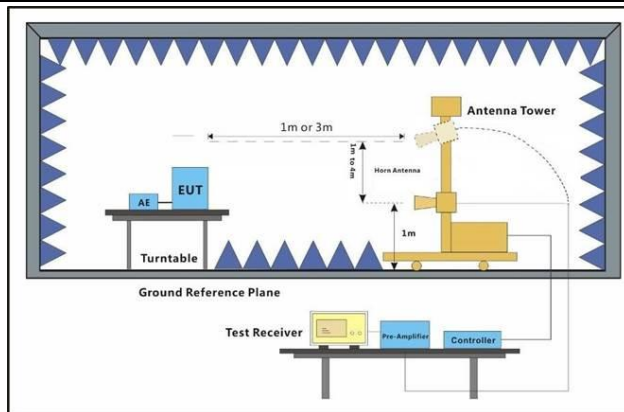


Figure 3. Above 1 GHz

<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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 (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. 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 $20 \cdot \text{LOG}(3/1) = 9.54 \text{ dB}$.
<p>Test Configuration:</p>	<p>Measurements below 30MHz</p> <ul style="list-style-type: none"> RBW = 10 kHz VBW = 30 kHz Detector = Peak & Average & Quasi-peak Trace mode = max hold <p>Measurements Below 1000MHz</p>



	<ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW ≥ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <p>Use duty cycle correction factor method per 15.35(c).</p> <p>Duty cycle = On time / 100 milliseconds</p> <p>On time = $N_1 * L_1 + N_2 * L_2 \dots + N_{N-1} * L_{N-1} + N_N * L_N$</p> <p>Where N_1 is number of type 1 pulse, L_1 is length of type 1 pulses, etc.</p> <p>Average Value = Peak Value + 20*log(Duty cycle).</p>
Exploratory Test Mode:	<p>Non-hopping transmitting mode with all kind of modulation and all kind of data type</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case.</p> <p>Pretest the EUT at Charge + Transmitting mode</p> <p>For below 1GHz part, through pre-scan, the worst case is the lowest channel.</p> <p>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: Appendix	



4.12 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10-2020 Section 6.10.5		
Test Site:	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
		74.0	Peak Value

Test Setup:

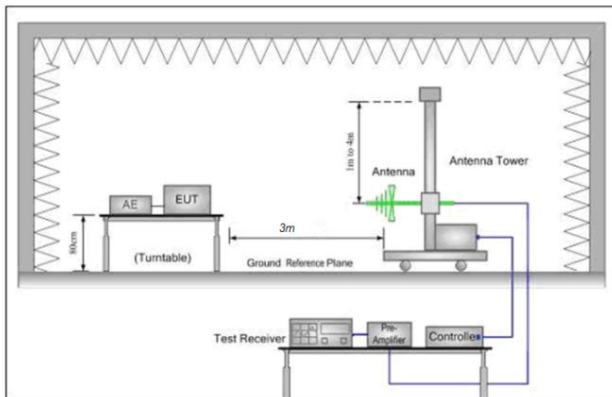


Figure 1. 30MHz to 1GHz

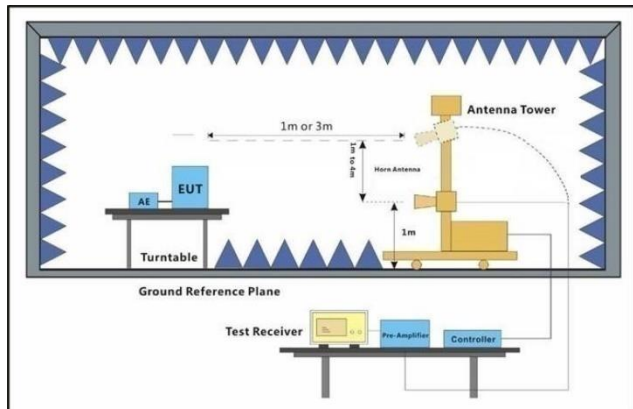


Figure 2. Above 1 GHz

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 chamber. 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 chamber. 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.
- 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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	<p>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</p> <p>h. Test the EUT in the lowest channel , the Highest channel</p> <p>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.</p> <p>j. Repeat above procedures until all frequencies measured was complete.</p>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak • Trace mode = max hold <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> • RBW = 1 MHz • VBW ≥ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold <p>Average Measurements Above 1000MHz</p> <p>Use duty cycle correction factor method per 15.35(c).</p> <p>Duty cycle = On time / 100 milliseconds</p> <p>On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{N-1} * L_{N-1} + N_N * L_N$</p> <p>Where N_1 is number of type 1 pulse, L_1 is length of type 1 pulses, etc.</p> <p>Average Value = Peak Value + 20 * log(Duty cycle).</p>
Exploratory Test Mode:	<p>Non-hopping transmitting mode with all kind of modulation and all kind of data type</p> <p>Charge + Transmitting mode.</p>
Final Test Mode:	<p>Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case.</p> <p>Pretest the EUT at Charge + Transmitting mode,</p> <p>Only the worst case is recorded in the report.</p>
Instruments Used:	Refer to section 6 for details
Test Results:	Pass
The detailed test data see: 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)
8	Radiated Emission	± 3.13dB (9k to 30MHz)
		± 4.88dB (30M to 1GHz)
		± 4.75dB (1GHz to 18GHz)
		± 4.77dB (Above 18GHz)

Remark:

The U_{lab} (lab Uncertainty) is less than $U_{CISPR/ETSI}$ (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

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
				2023/05/11	2024/05/10
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
				2023/05/11	2024/05/10
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
Signal Generator	ROHDE&SCHWARZ	SMM100A	SN:101716	2023/02/22	2024/02/21

Conduction 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-04-03-01	2021/05/08	2024/05/07
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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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-04-02-02	2021/11/25	2024/11/24
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-13	2023/02/07	2024/02/06
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27
				2023/05/11	2024/05/10
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-06	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 9168	SUWI-01-11-04	2021/12/05	2023/12/04
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-05	2021/12/05	2023/12/04
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13
				2023/05/12	2024/05/11
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09
Amplifier	Tonscend	TAP9K3G32	SUWI-01-14-06	2022/11/23	2023/11/22
Amplifier	Tonscend	TAP01018050	SUWI-01-14-04	2022/11/23	2023/11/22
Amplifier	Tonscend	TAP30M7G30	SUWI-01-14-05	2022/11/23	2023/11/22
Measurement Software	Tonscend	JS32-RE V4.0.0.0	SUWI-02-09-04	NCR	NCR



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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 31 of 68

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	0.86	2401.55	2402.41	For Report Purpose
DH5	Ant2	2441	0.86	2440.55	2441.41	
DH5	Ant2	2480	0.86	2479.55	2480.41	
2DH5	Ant2	2402	1.26	2401.37	2402.63	
2DH5	Ant2	2441	1.26	2440.37	2441.63	
2DH5	Ant2	2480	1.26	2479.37	2480.63	
3DH5	Ant2	2402	1.25	2401.36	2402.62	
3DH5	Ant2	2441	1.26	2440.36	2441.62	
3DH5	Ant2	2480	1.26	2479.36	2480.62	

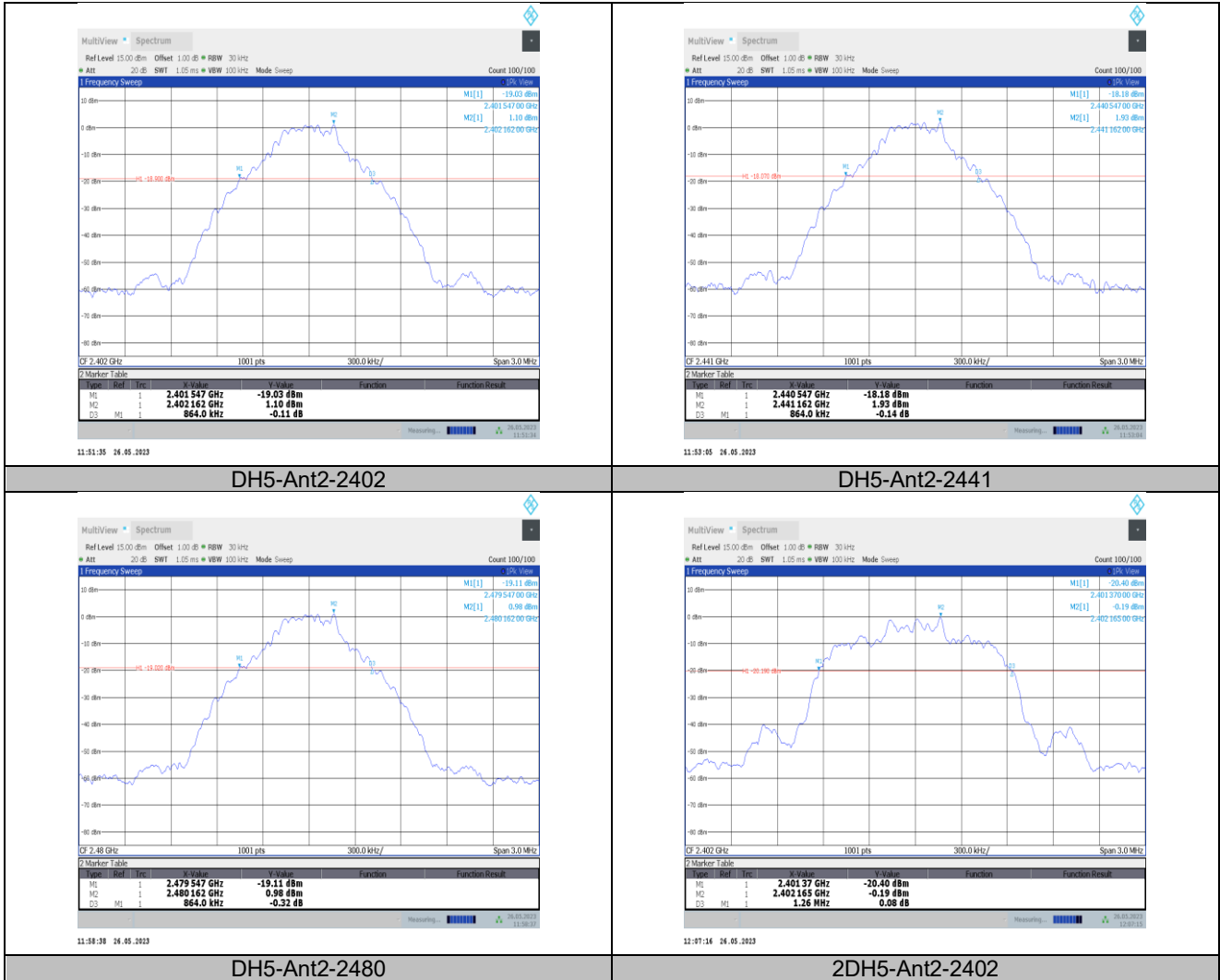


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Test Graphs





2DH5-Ant2-2441



2DH5-Ant2-2480



3DH5-Ant2-2402



3DH5-Ant2-2441



3DH5-Ant2-2480



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Occupied Channel Bandwidth

Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
DH5	Ant2	2402	0.754	2401.6253	2402.3789	For Report Purpose
DH5	Ant2	2441	0.754	2440.6239	2441.3778	
DH5	Ant2	2480	0.753	2479.6235	2480.3768	
2DH5	Ant2	2402	1.14	2401.4249	2402.5652	
2DH5	Ant2	2441	1.139	2440.4244	2441.5638	
2DH5	Ant2	2480	1.14	2479.4231	2480.5634	
3DH5	Ant2	2402	1.144	2401.4287	2402.5723	
3DH5	Ant2	2441	1.141	2440.4282	2441.5696	
3DH5	Ant2	2480	1.141	2479.4269	2480.5683	



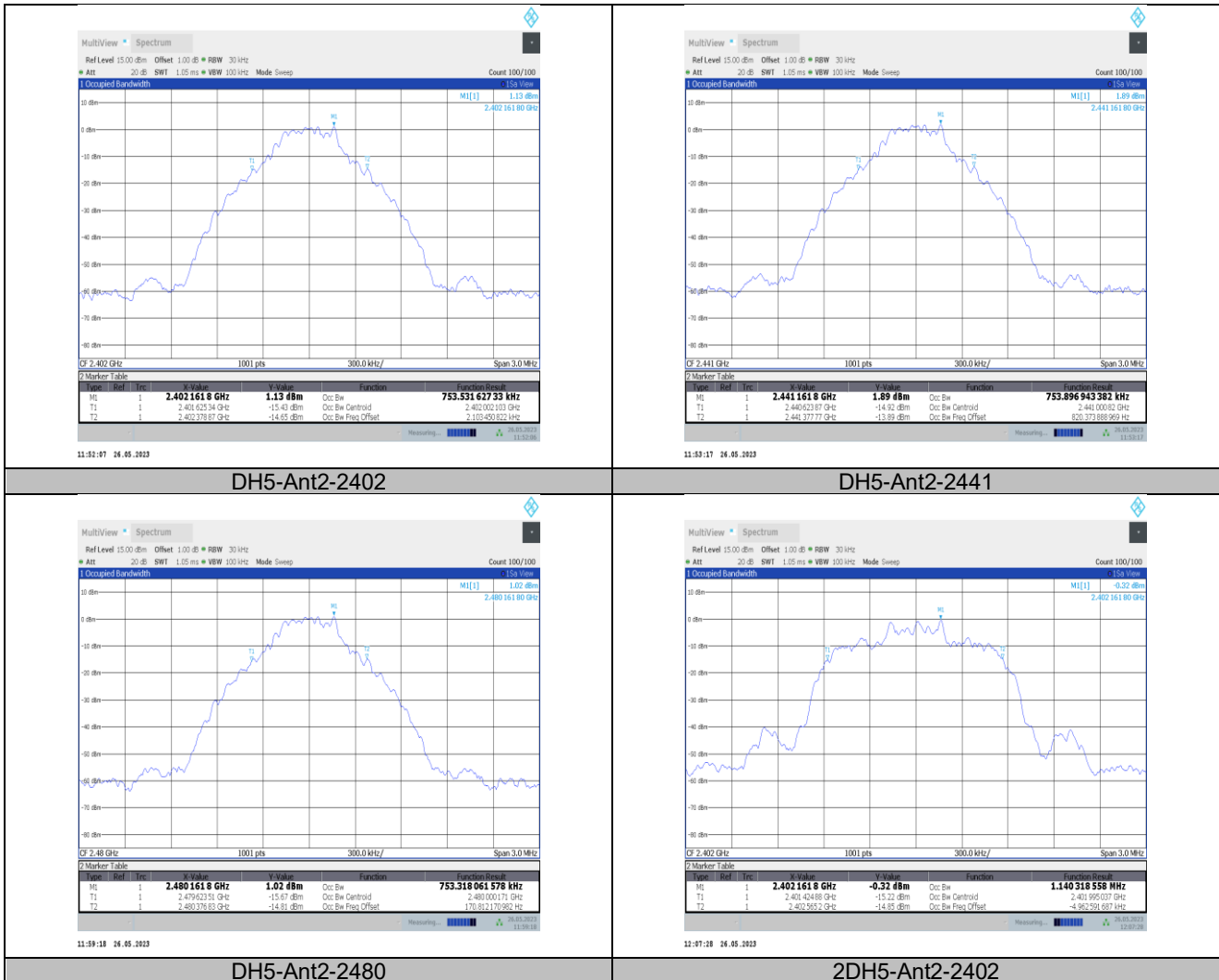
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Test Graphs



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2DH5-Ant2-2441



2DH5-Ant2-2480



3DH5-Ant2-2402



3DH5-Ant2-2441



3DH5-Ant2-2480



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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 39 of 68

Maximum conducted output power

Test Result Peak

Test Mode	Antenna	Frequency[MHz]	Conducted Peak Power[dBm]	Conducted Limit[dBm]	Verdict
DH5	Ant2	2402	3.39	≤20.97	PASS
DH5	Ant2	2441	4.09	≤20.97	PASS
DH5	Ant2	2480	3.29	≤20.97	PASS
2DH5	Ant2	2402	2.46	≤20.97	PASS
2DH5	Ant2	2441	3.26	≤20.97	PASS
2DH5	Ant2	2480	2.34	≤20.97	PASS
3DH5	Ant2	2402	2.59	≤20.97	PASS
3DH5	Ant2	2441	3.38	≤20.97	PASS
3DH5	Ant2	2480	2.41	≤20.97	PASS



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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 40 of 68

Carrier frequency separation

Test Result

TestMode	Antenna	Hop/No Hop	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant2	Hop	1.006	≥0.573	PASS
2DH5	Ant2	Hop	1.000	≥0.840	PASS
3DH5	Ant2	Hop	1.008	≥0.840	PASS

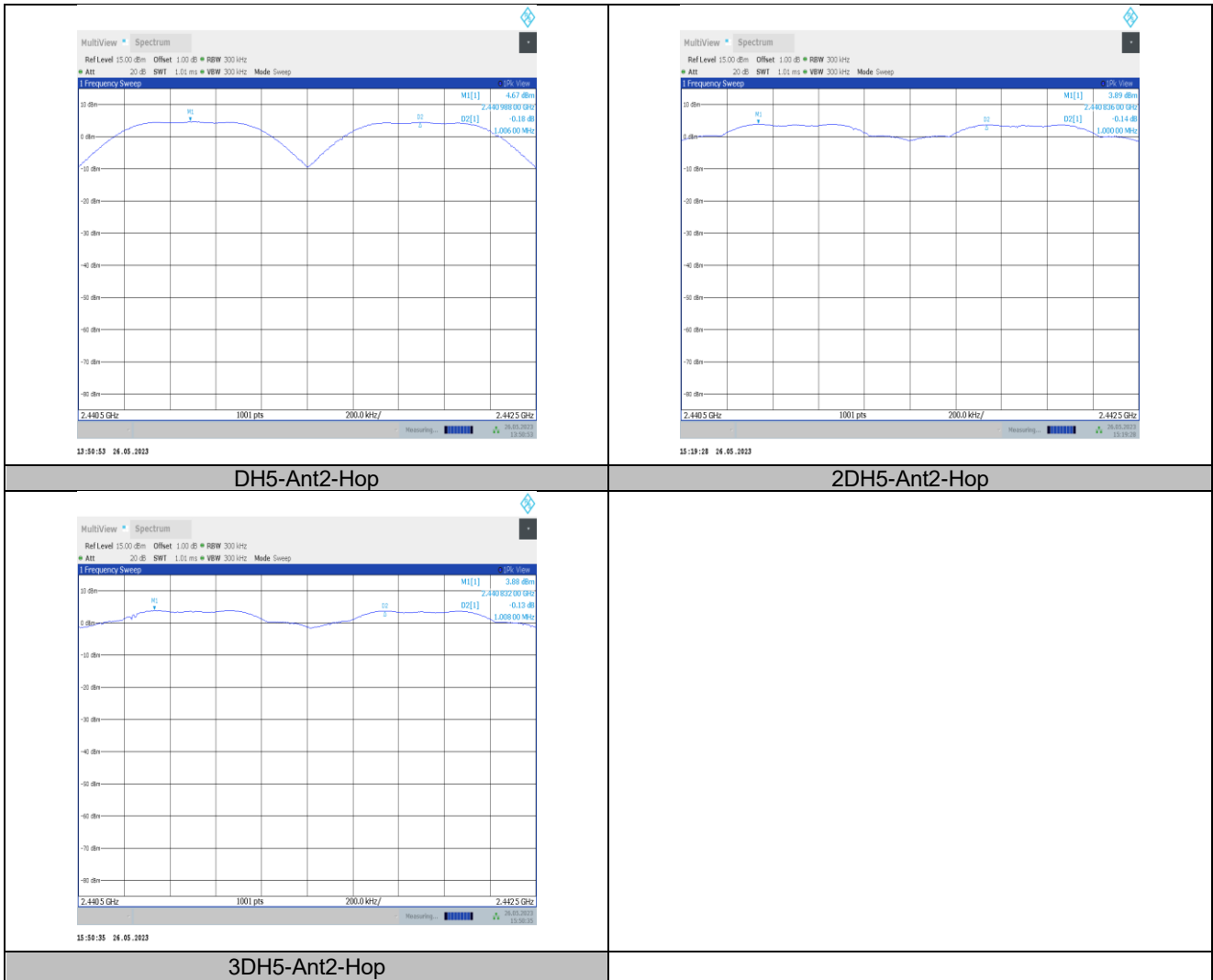


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Test Graphs



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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 42 of 68

Time of occupancy

Test Result

TestMode	Antenna	Hop/No Hop	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant2	Hop	2.870	106.67	0.306	≤0.4	PASS
DH1	Ant2	Hop	0.350	320	0.112	≤0.4	PASS
DH3	Ant2	Hop	1.610	160	0.258	≤0.4	PASS
2DH5	Ant2	Hop	2.870	106.67	0.306	≤0.4	PASS
2DH1	Ant2	Hop	0.360	320	0.115	≤0.4	PASS
2DH3	Ant2	Hop	1.620	160	0.259	≤0.4	PASS
3DH5	Ant2	Hop	2.870	106.67	0.306	≤0.4	PASS
3DH1	Ant2	Hop	0.370	320	0.118	≤0.4	PASS
3DH3	Ant2	Hop	1.620	160	0.259	≤0.4	PASS

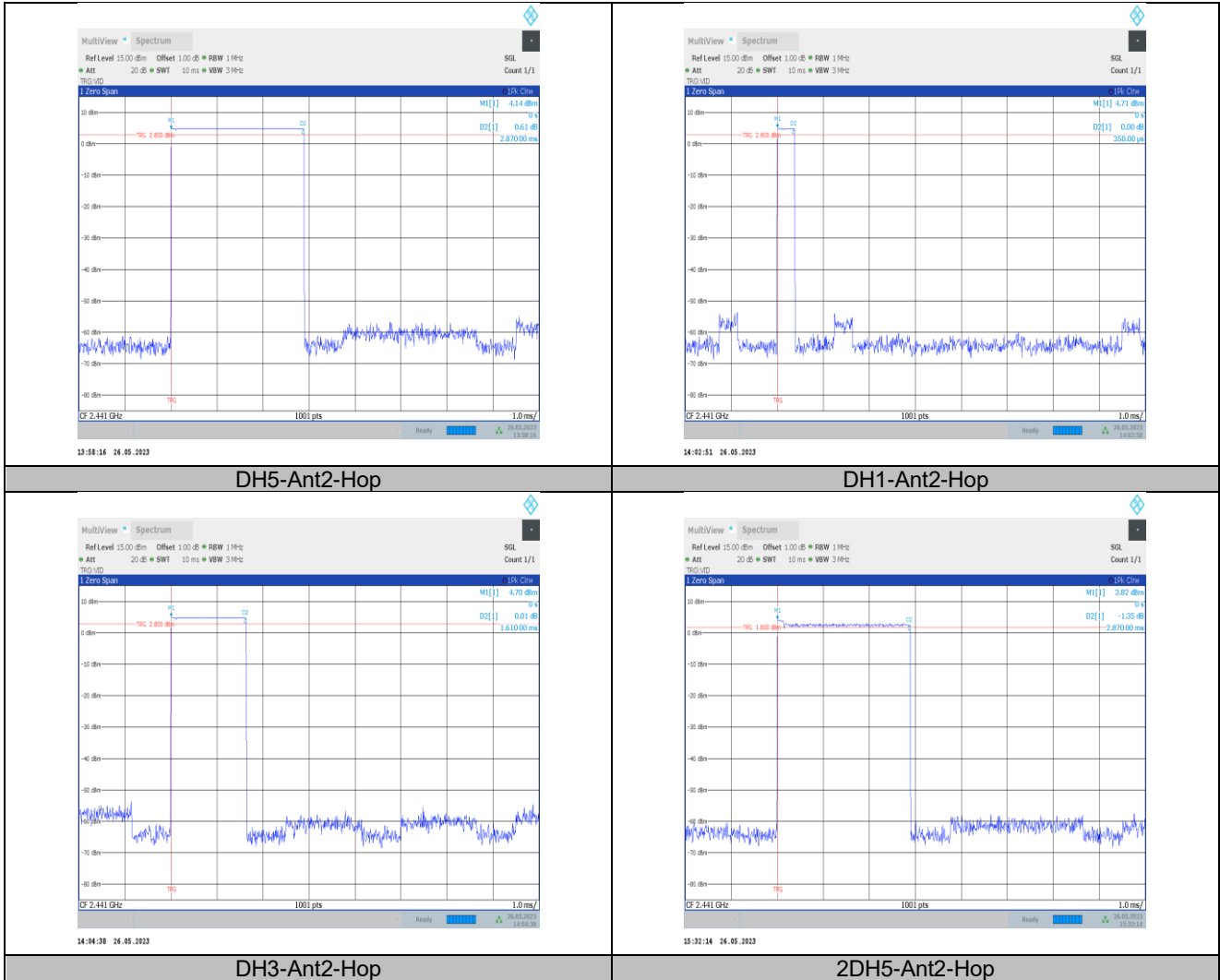


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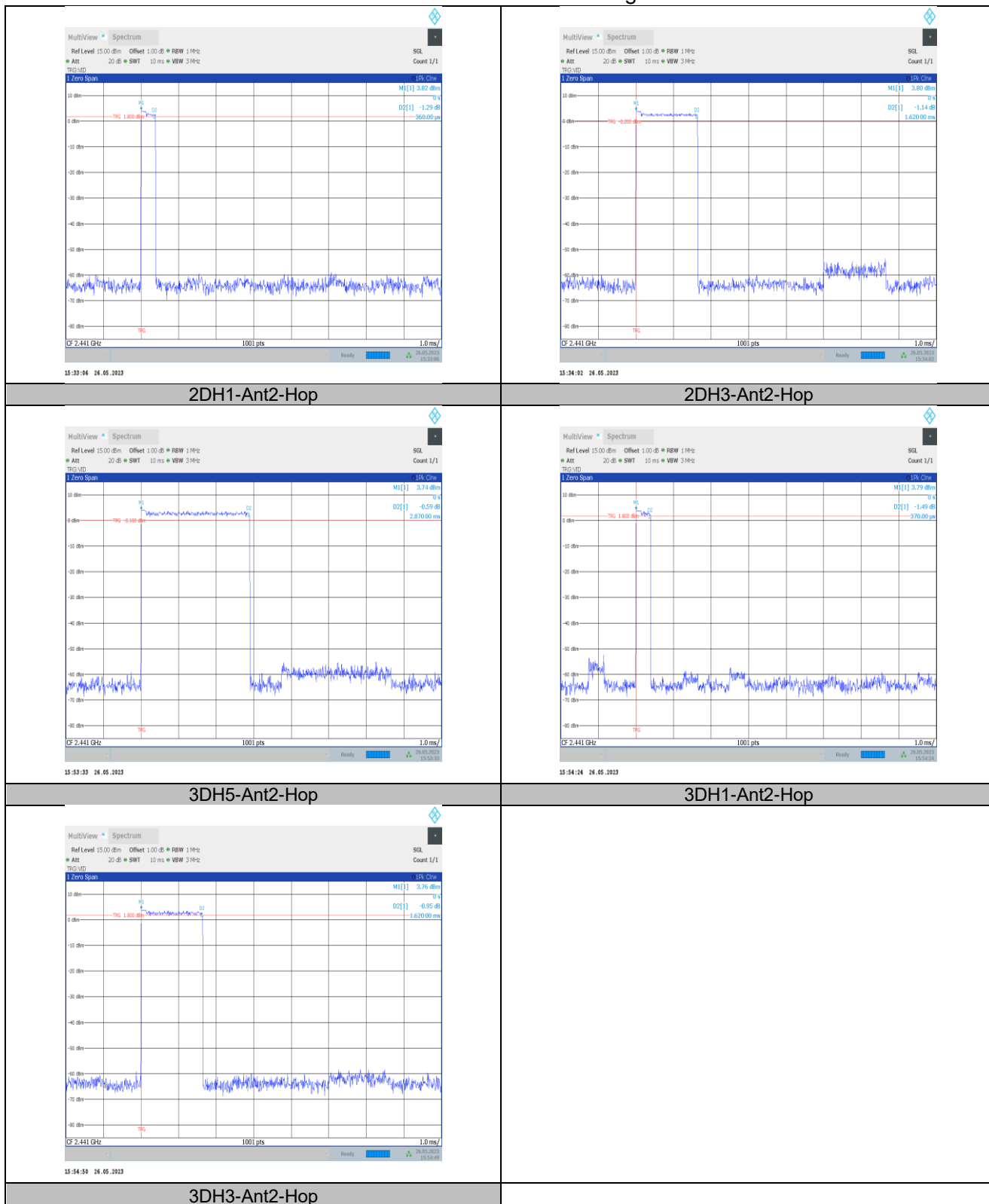
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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 45 of 68

Number of hopping channels

Test Result

TestMode	Antenna	Hop/No Hop	Result[Num]	Limit[Num]	Verdict
DH5	Ant2	Hop	79	≥15	PASS
2DH5	Ant2	Hop	79	≥15	PASS
3DH5	Ant2	Hop	79	≥15	PASS

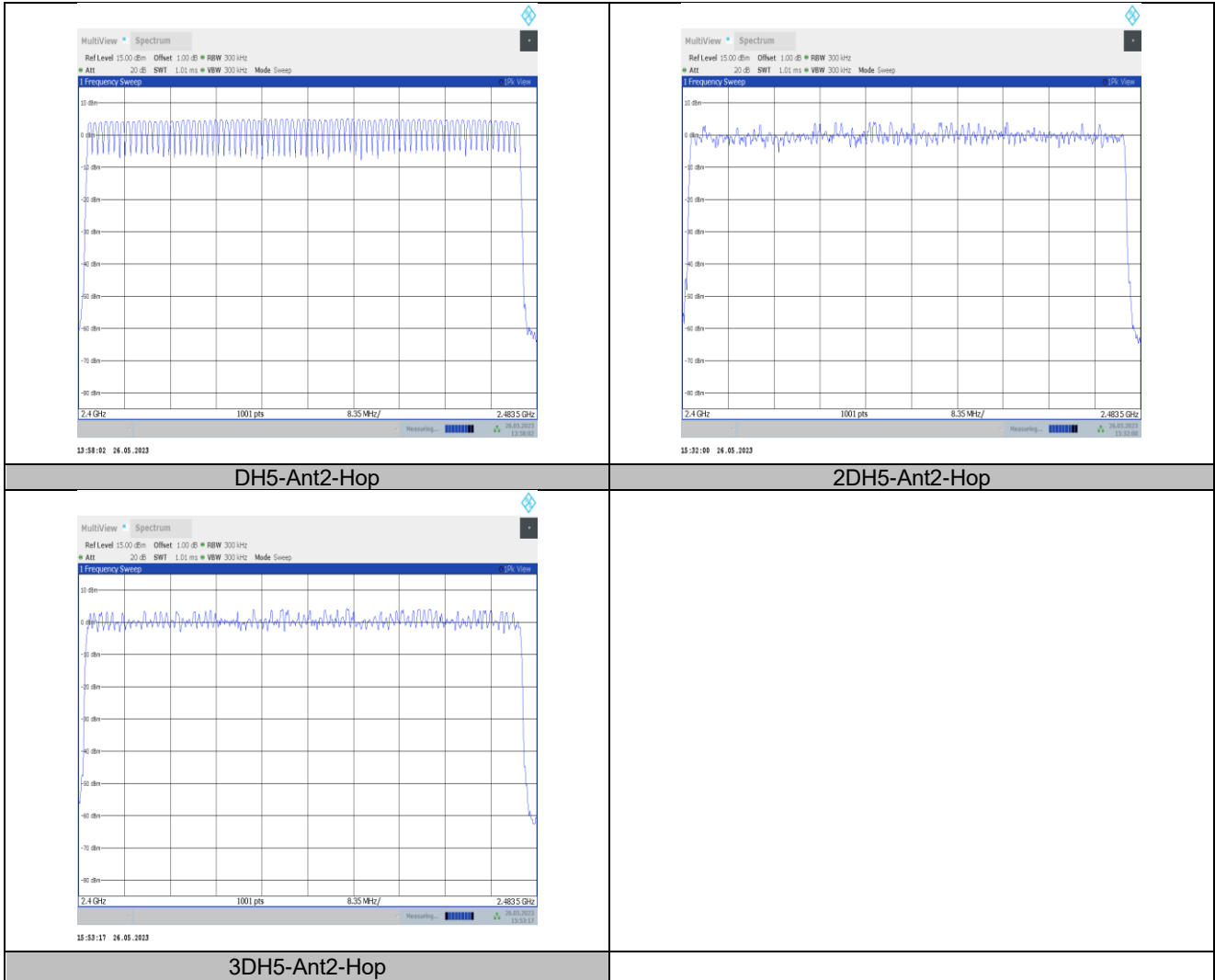


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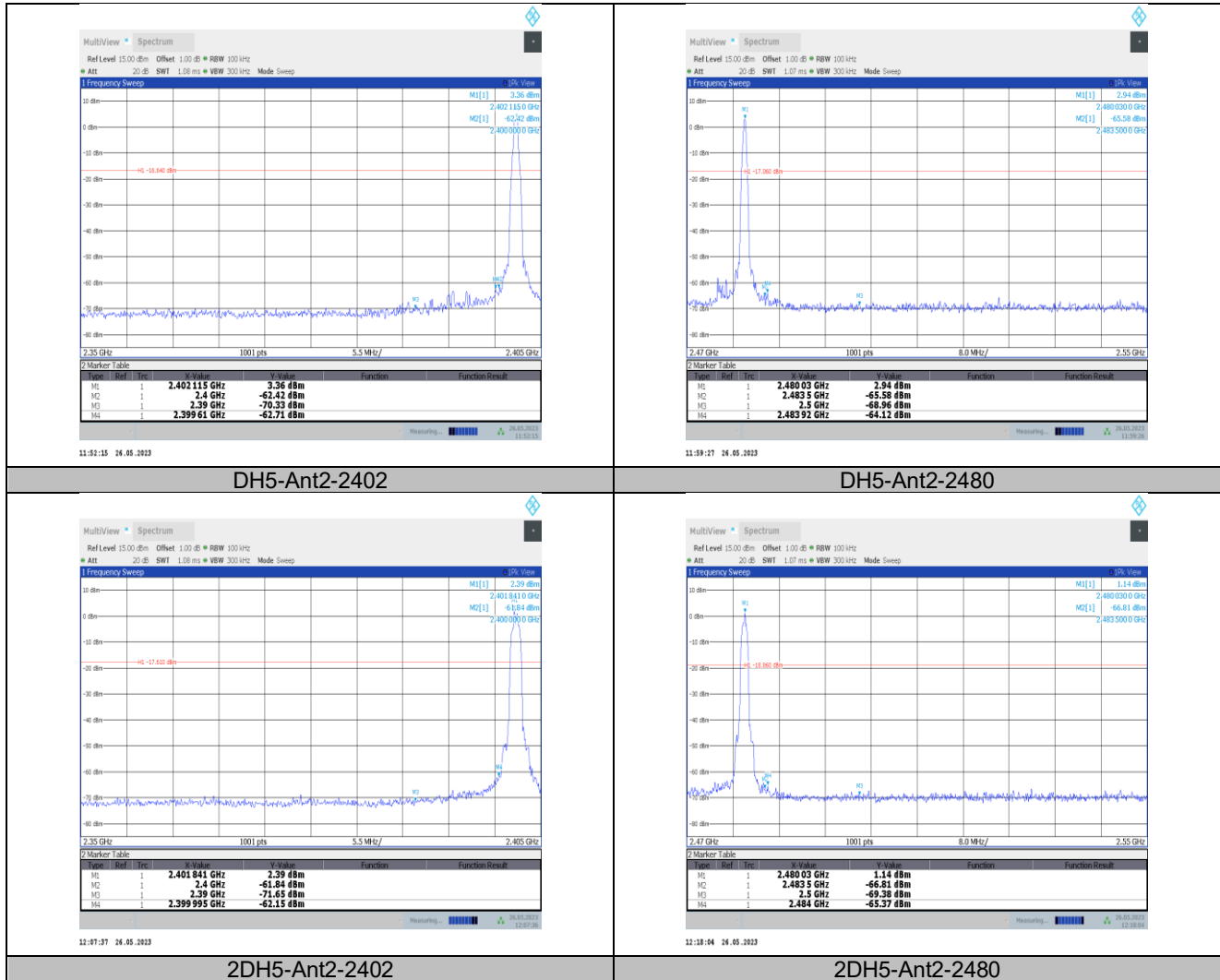
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Band edge measurements

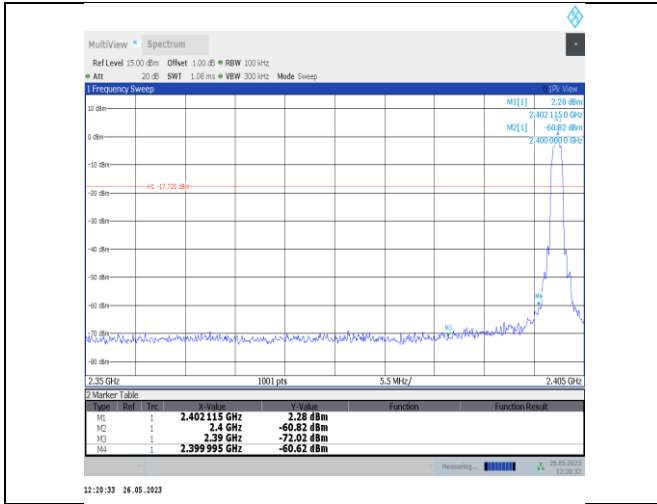
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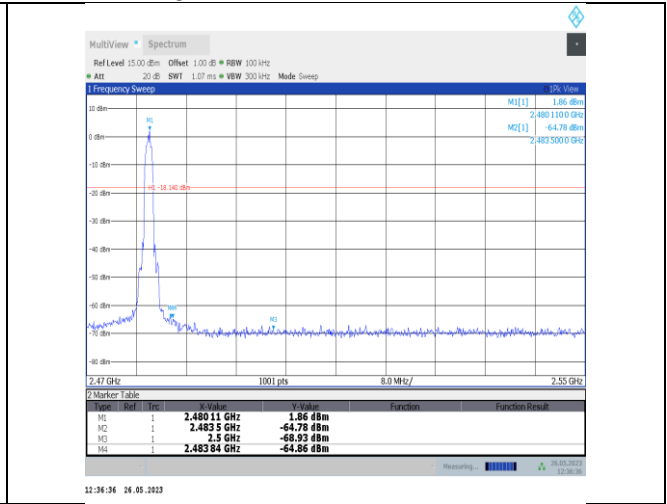
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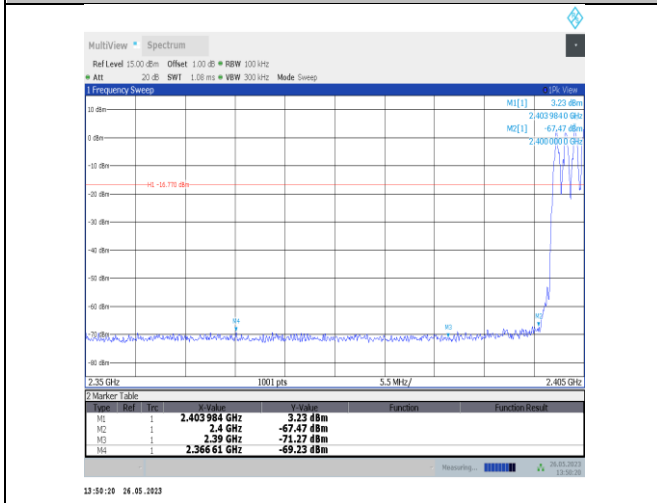
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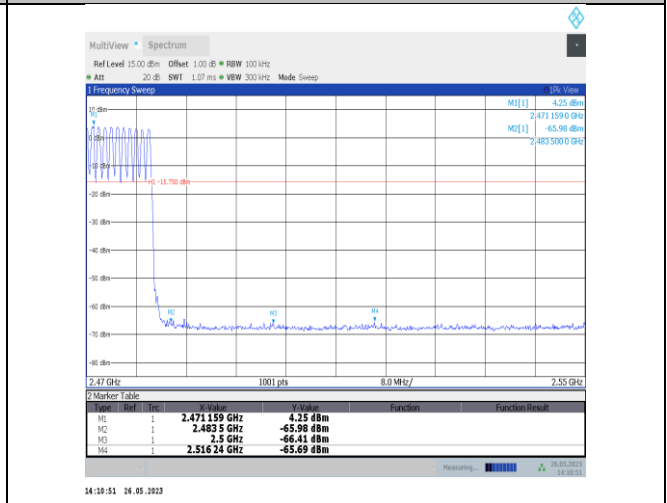
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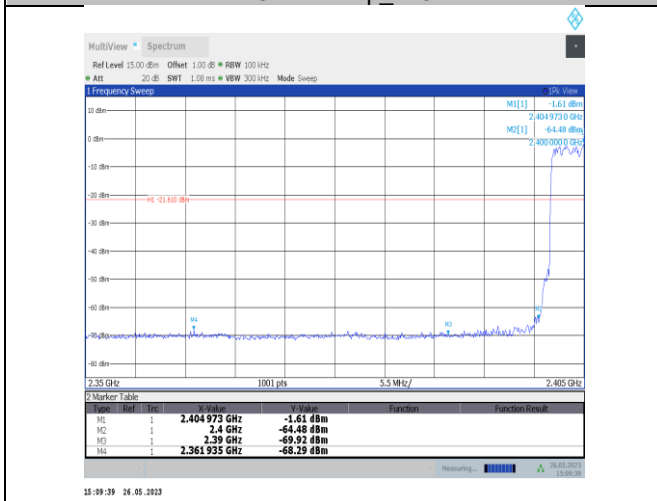
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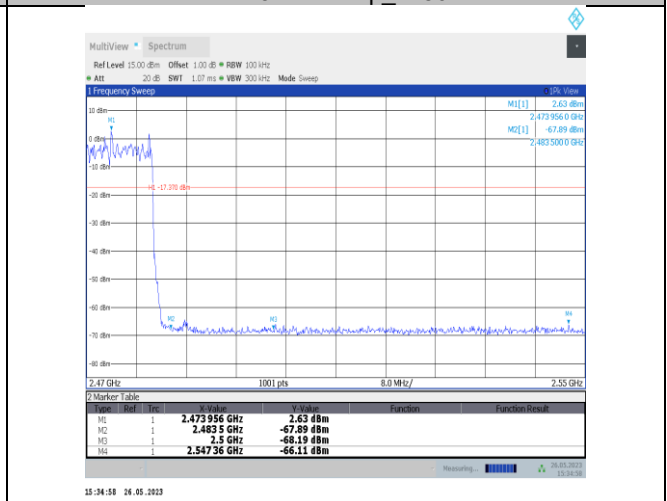
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DH5-Ant2-Hop_2480



2DH5-Ant2-Hop_2402

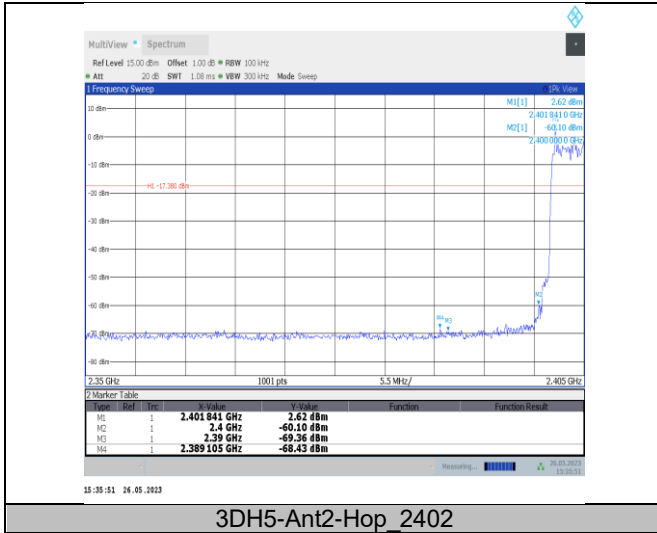


2DH5-Ant2-Hop_2480

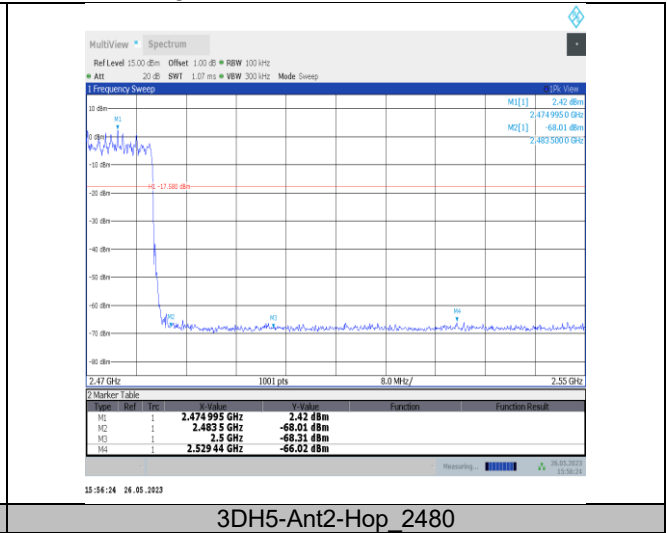


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3DH5-Ant2-Hop_2402



3DH5-Ant2-Hop_2480



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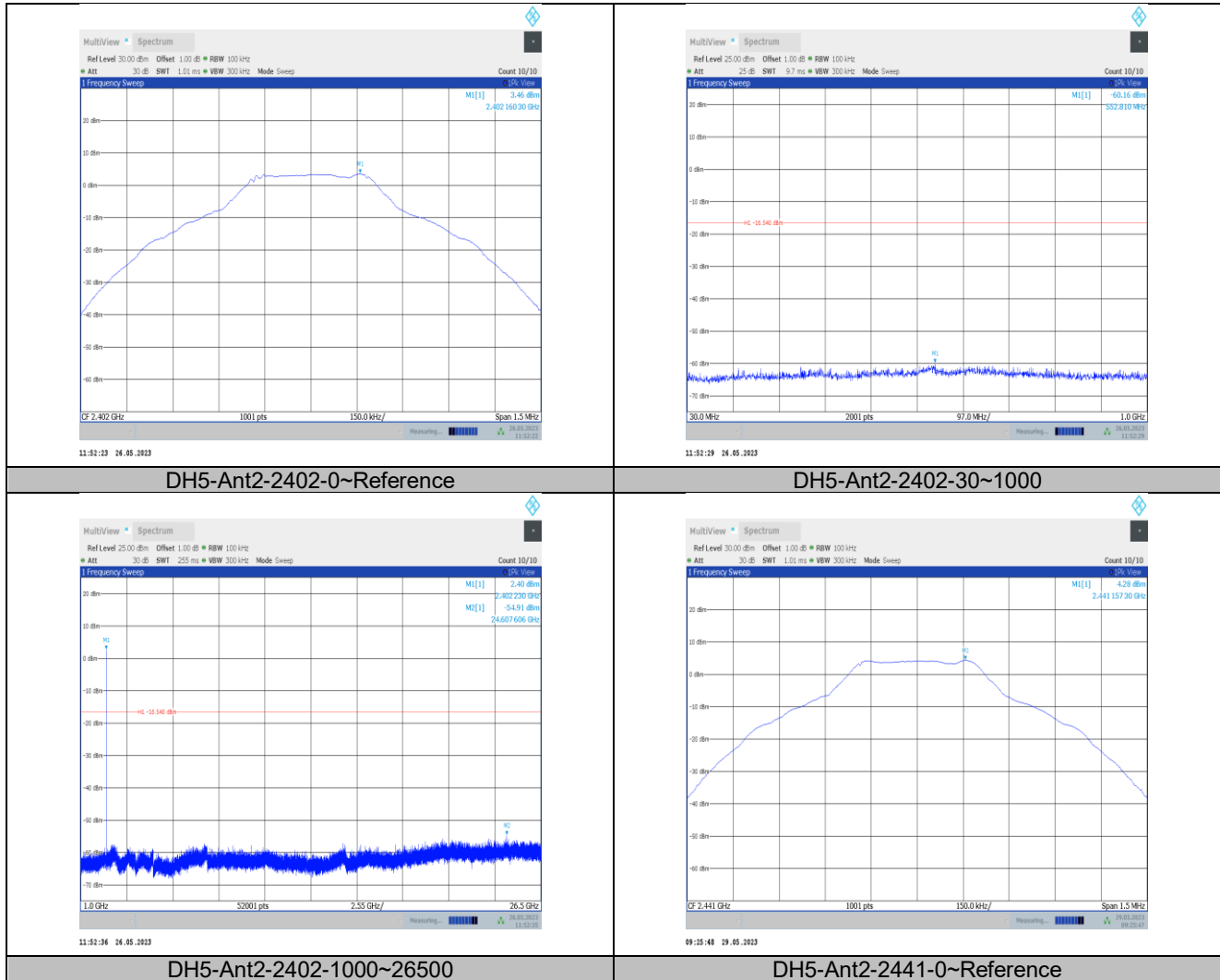
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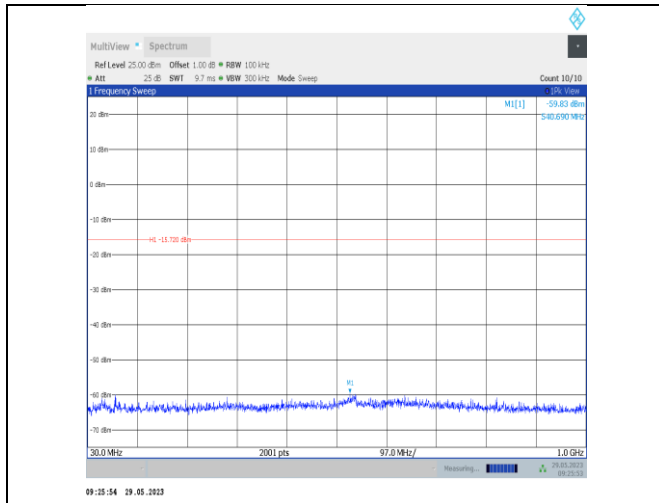
Conducted Spurious Emission

Test Graphs

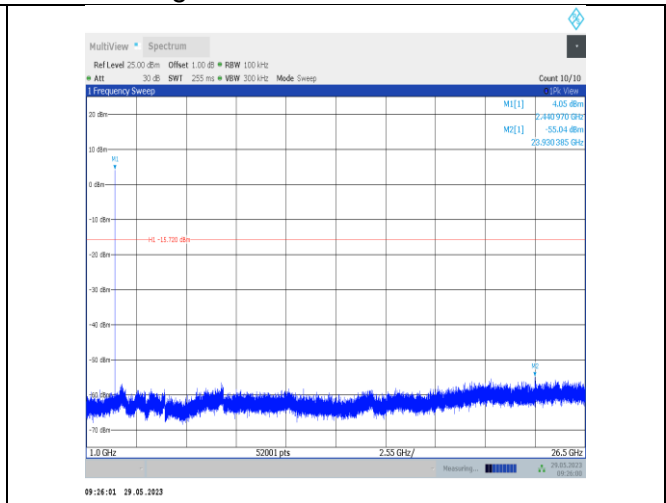


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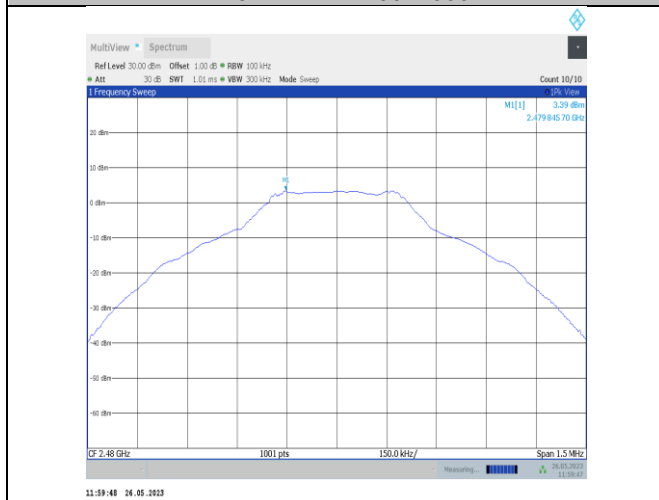
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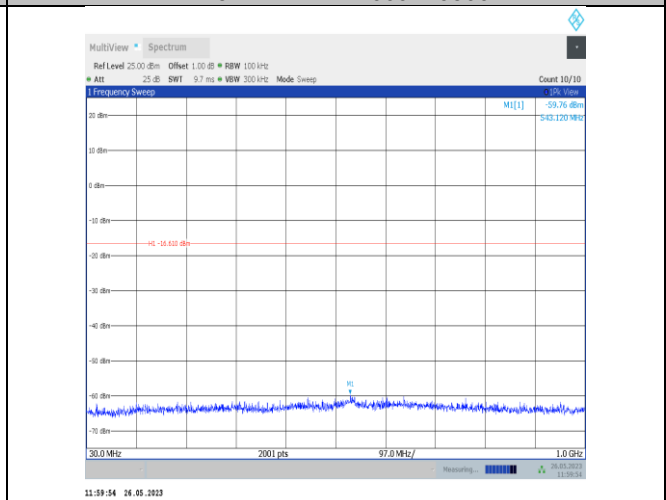
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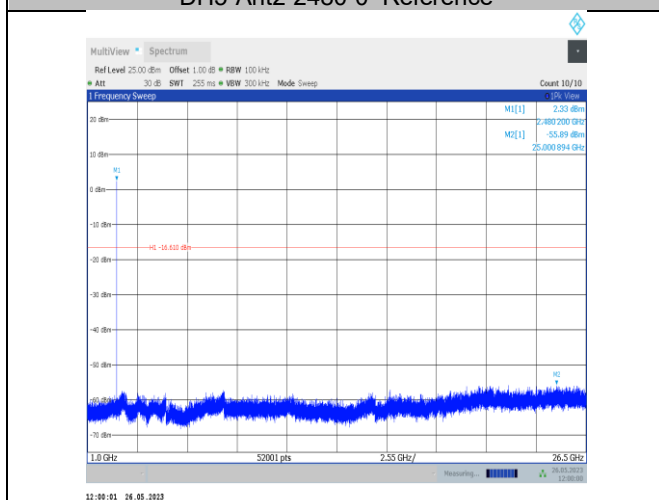
DH5-Ant2-2441-1000~26500



DH5-Ant2-2480-0~Reference



DH5-Ant2-2480-30~1000



DH5-Ant2-2480-1000~26500



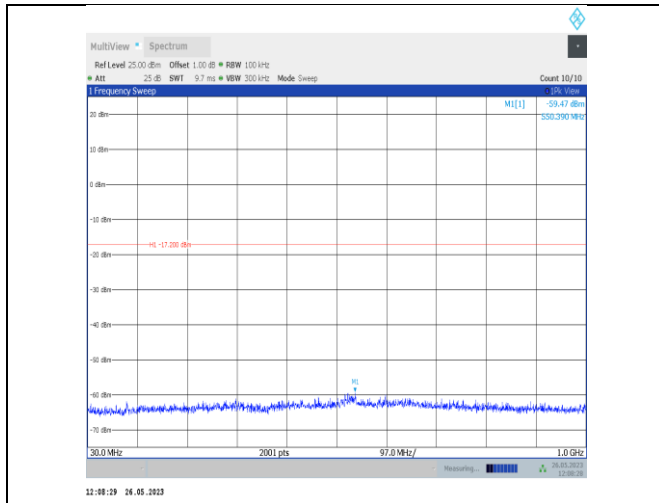
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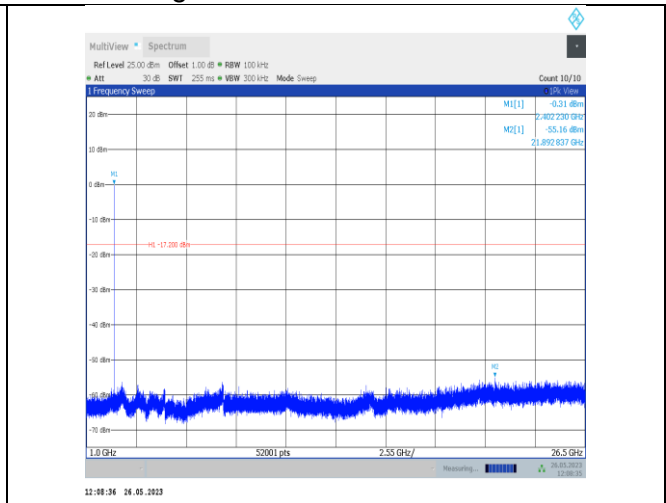
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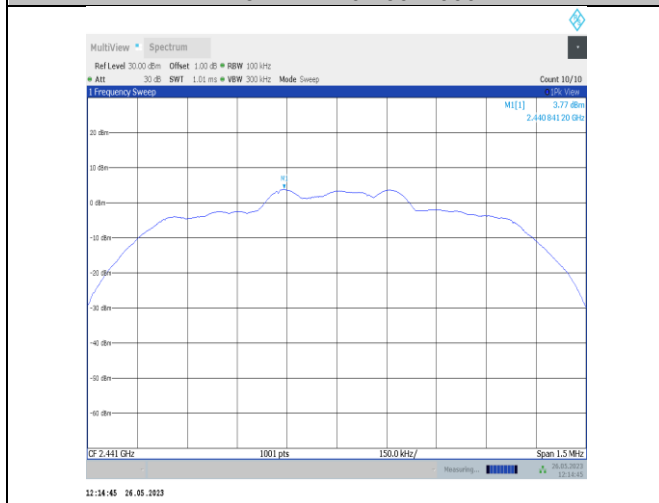
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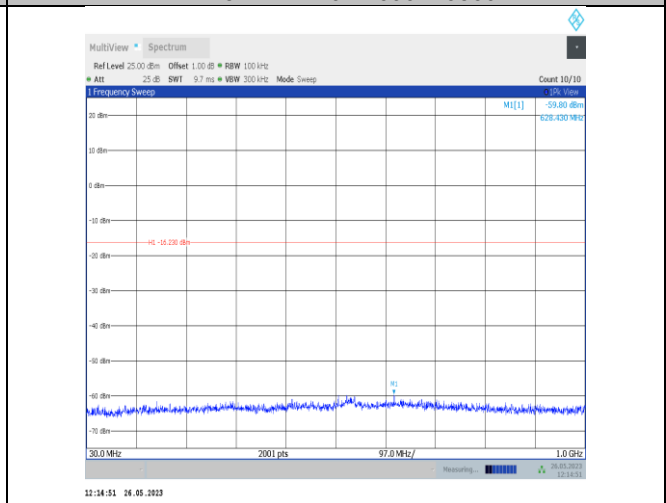
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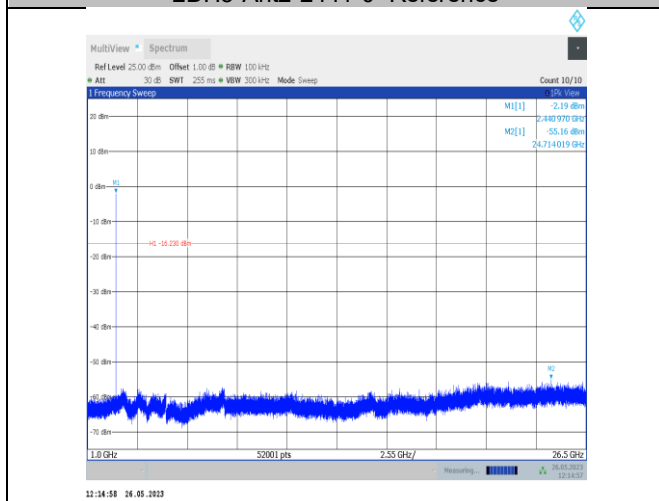
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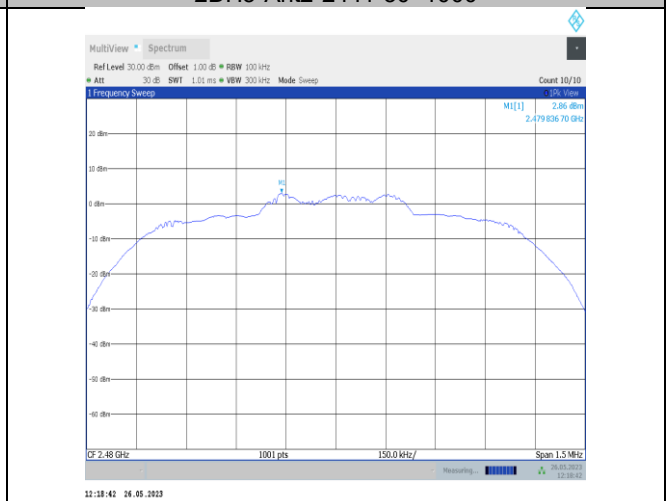
2DH5-Ant2-2441-0~Reference



2DH5-Ant2-2441-30~1000



2DH5-Ant2-2441-1000~26500



2DH5-Ant2-2480-0~Reference

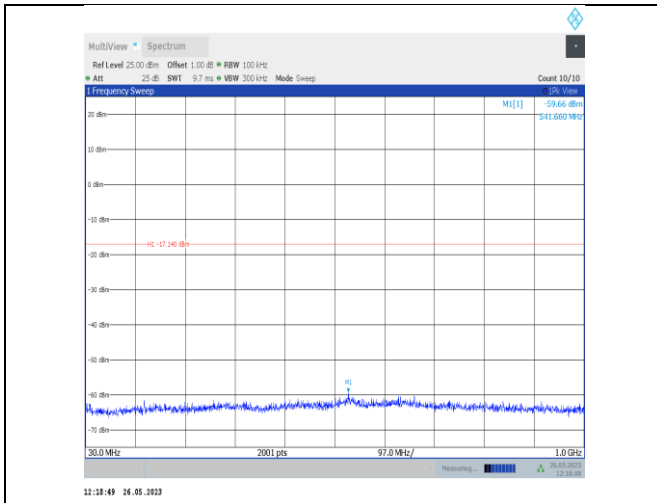


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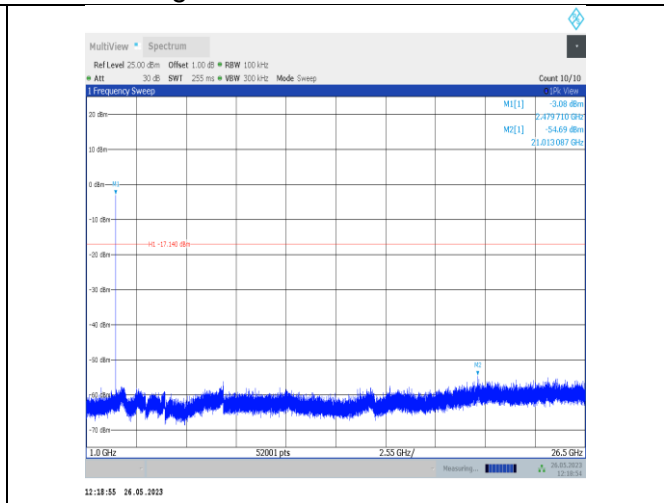
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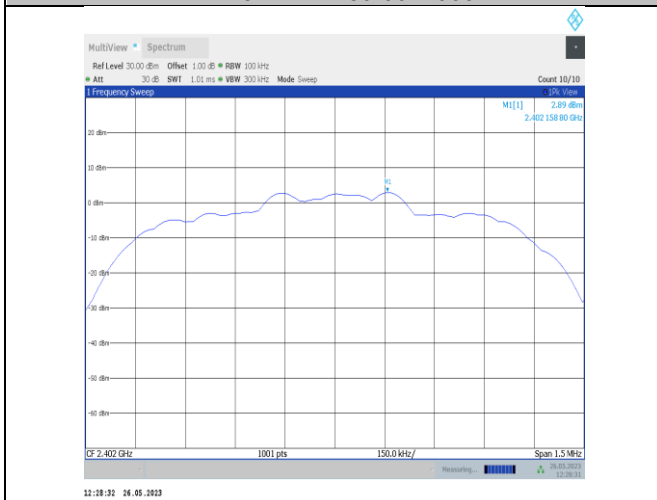
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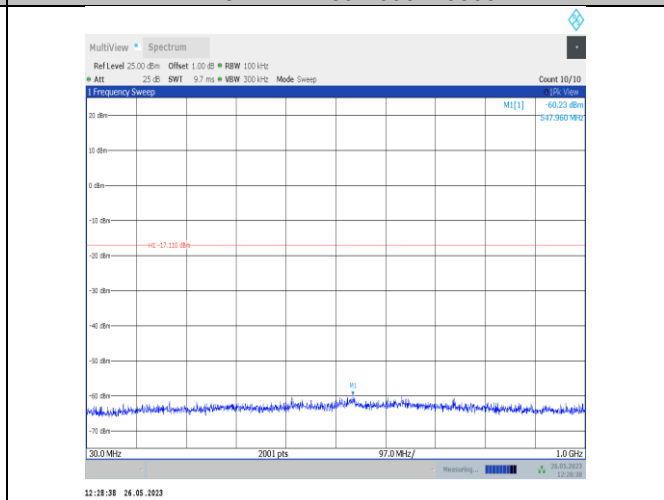
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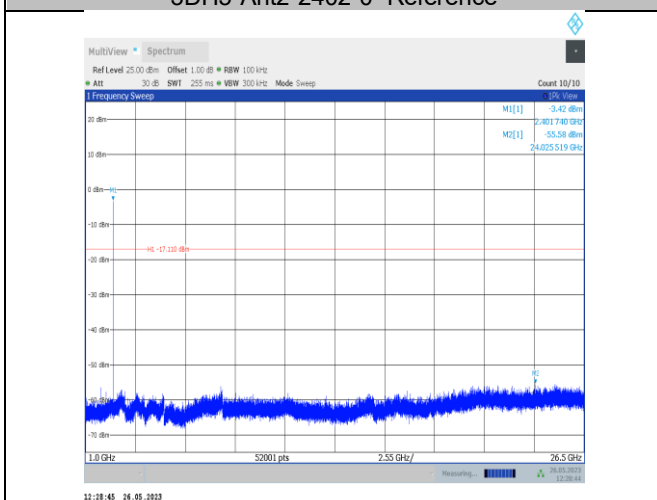
2DH5-Ant2-2480-1000~26500



3DH5-Ant2-2402-0~Reference



3DH5-Ant2-2402-30~1000



3DH5-Ant2-2402-1000~26500



3DH5-Ant2-2441-0~Reference

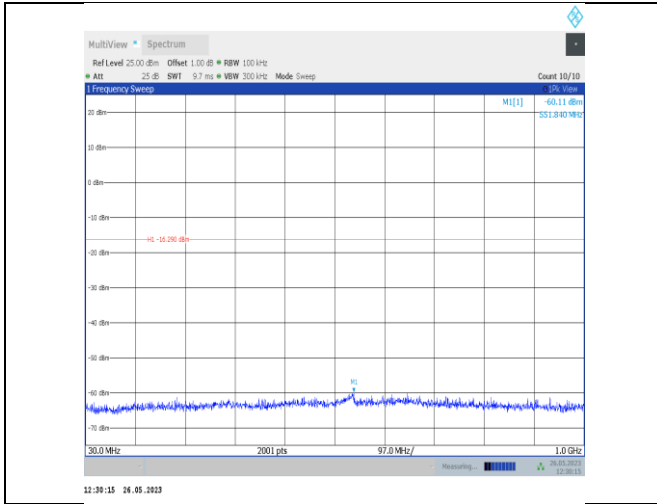


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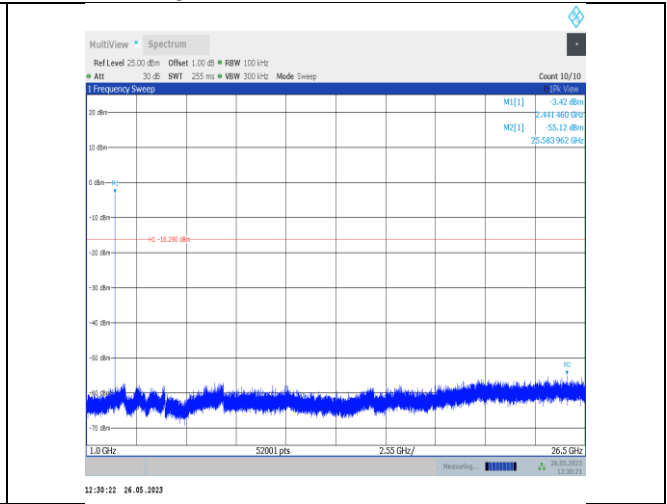
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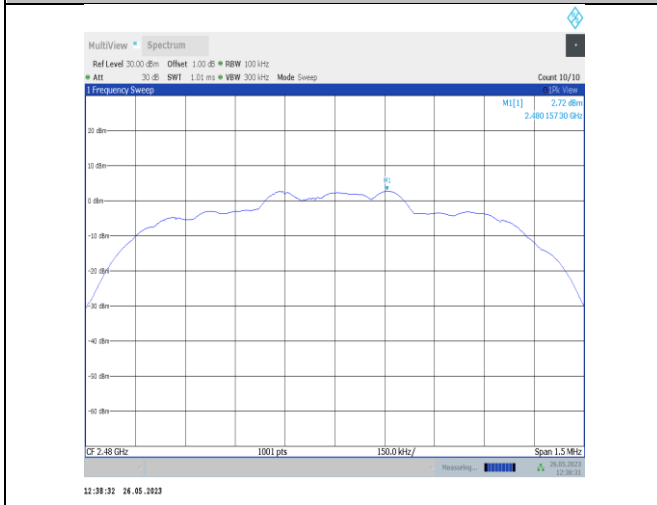
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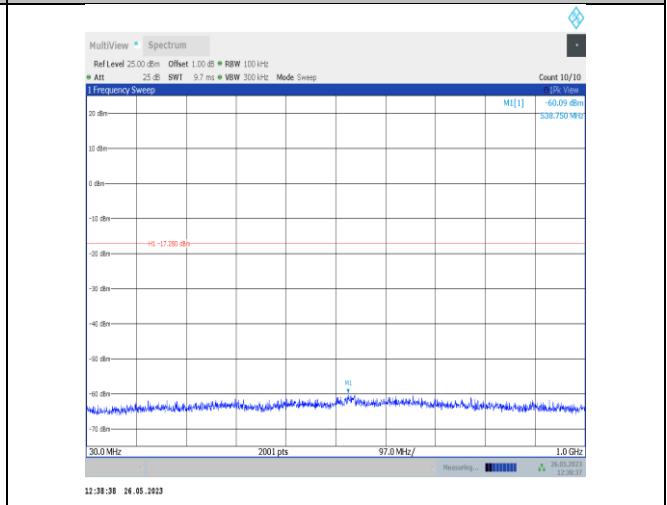
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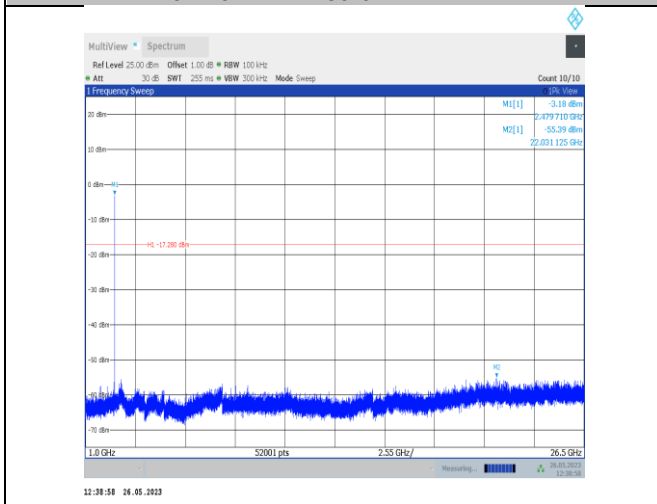
3DH5-Ant2-2441-1000~26500



3DH5-Ant2-2480-0~Reference



3DH5-Ant2-2480-30~1000



3DH5-Ant2-2480-1000~26500



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Report No.: SEWM2304000111RG02

Rev.: 01

Page: 55 of 68

Duty Cycle

Test Result

TestMode	Antenna	Frequency[MHz]	ON Time [ms]	Period [ms]	Duty Cycle [%]	Duty Cycle Factor[dB]
DH5	Ant2	2402	2.89	3.76	76.86	1.14
DH5	Ant2	2441	2.88	3.75	76.80	1.15
DH5	Ant2	2480	2.88	3.75	76.80	1.15

Note:

Duty cycle = on time / 100ms = 2 * 2.89 / 100 = 5.78%

Duty cycle Correction factor = 20*log(Duty cycle) = -24.76dB

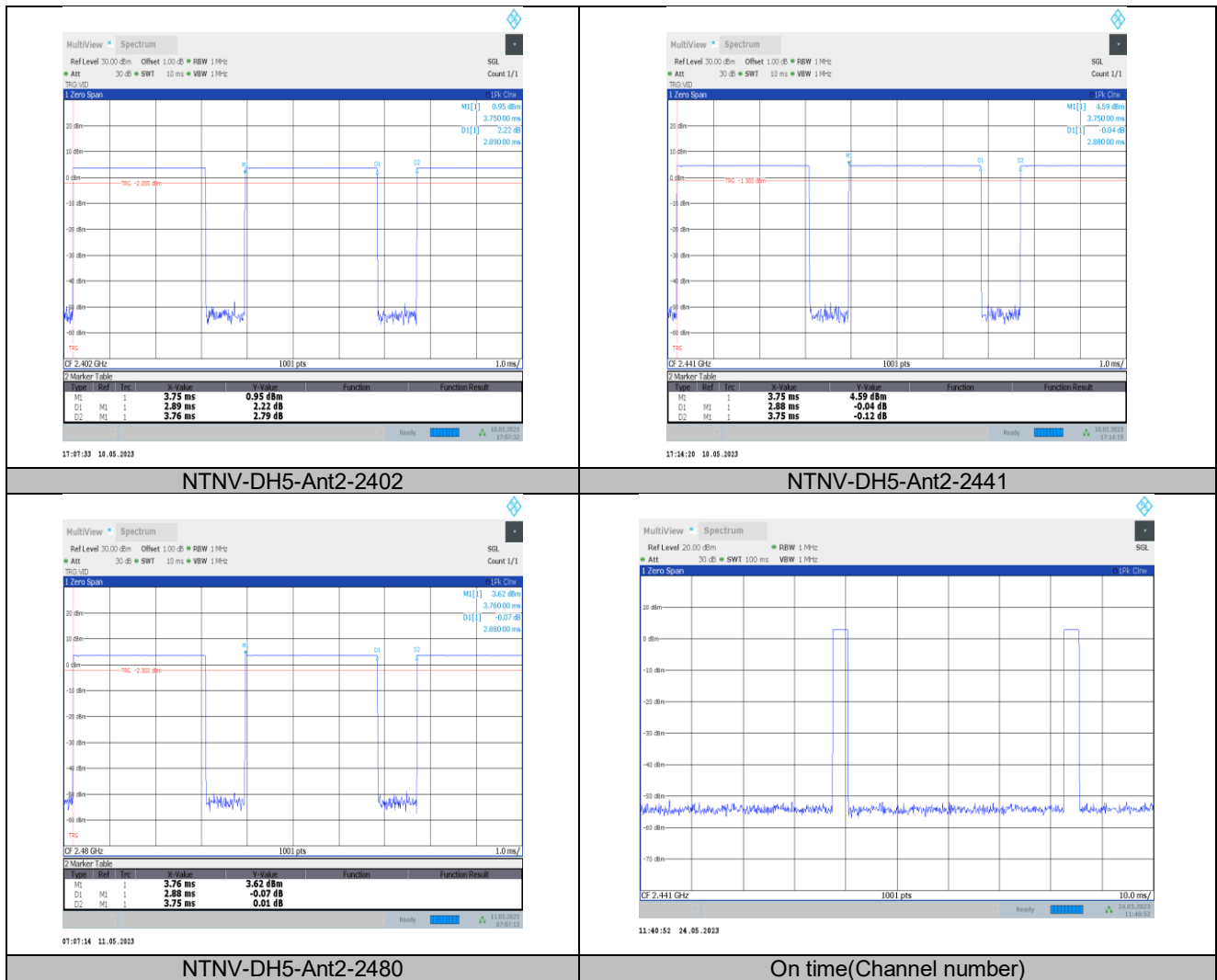


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Test Graphs



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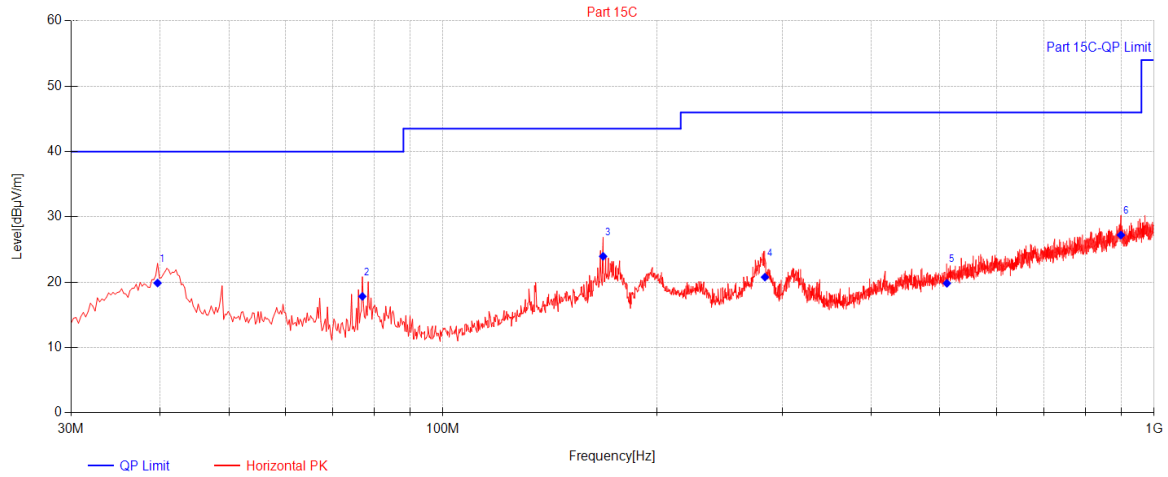
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Radiated Spurious Emissions

Radiated emission below 1GHz

Worst case Mode: GFSK_Channel 78



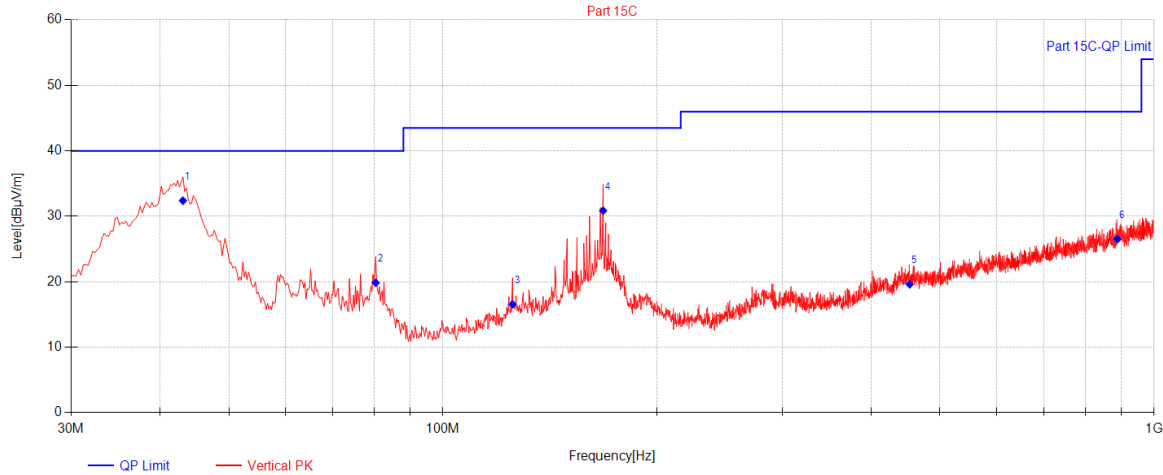
Data List										
NO.	Frequency [MHz]	Reading [dBμV]	Factor [dB]	AF [dB/m]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	39.7	42.13	-36.28	14.03	19.88	40.00	20.12	158	139	Horizontal
2	77.045	43.98	-35.89	9.74	17.83	40.00	22.17	147	310	Horizontal
3	167.9825	44.78	-35.18	14.36	23.96	43.50	19.54	223	9	Horizontal
4	283.655	42.74	-34.36	12.40	20.78	46.00	25.22	251	169	Horizontal
5	511.3625	36.12	-33.00	16.71	19.83	46.00	26.17	187	331	Horizontal
6	898.3925	35.96	-30.36	21.62	27.22	46.00	18.78	261	9	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	43.095	54.81	-36.23	13.81	32.39	40.00	7.61	152	199	Vertical
2	80.44	46.22	-35.67	9.30	19.85	40.00	20.15	187	168	Vertical
3	125.3025	39.92	-35.88	12.53	16.57	43.50	26.93	154	158	Vertical
4	167.9825	51.69	-35.18	14.36	30.87	43.50	12.63	282	199	Vertical
5	453.1625	36.69	-33.07	16.00	19.62	46.00	26.38	231	127	Vertical
6	888.2075	35.37	-30.33	21.50	26.53	46.00	19.47	147	168	Vertical

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier gain. The basic equation with a sample calculation is as follows:
 $Value = Reading(dB\mu V) + AF(dB/m) + Factor(dB)$
 $AF = Antenna\ Factor(dB/m)$
 $Factor = Cable\ Factor(dB) - Pre-amplifier\ gain(dB)$
 $Margin = Limit(dB\mu V/m) - Value(dB\mu V/m)$
- All channels have been tested, but only the worst case data displayed in this report.

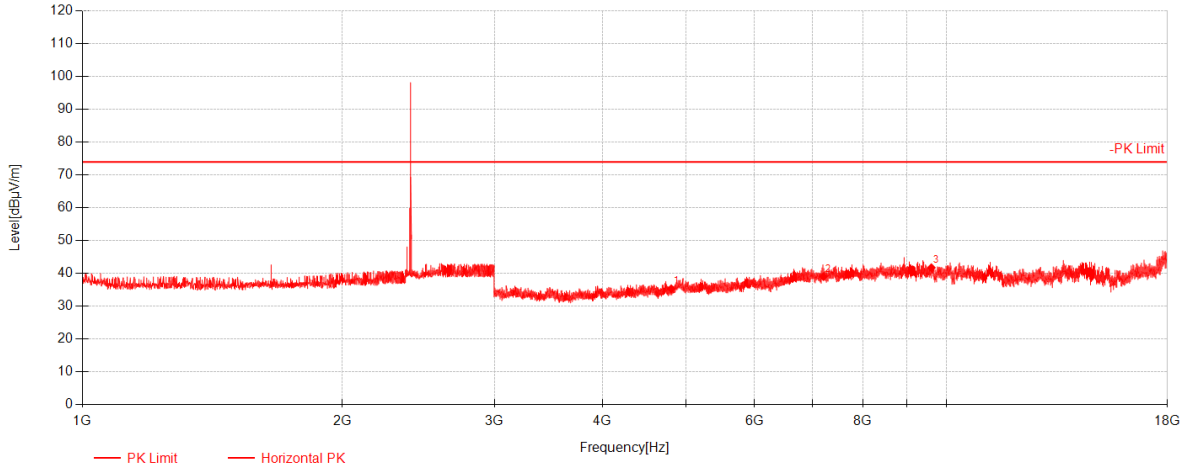


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Transmitter emission Above 1GHz

GFSK_Channel 00



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	4804.0000	48.51	32.33	-45.54	35.30	74.00	38.70	104	216	Horizontal
2	4804.0000	-	-	-	10.54	54.00	43.46	-	-	Horizontal
3	7206.0000	45.83	36.60	-43.44	38.99	74.00	35.01	217	126	Horizontal
4	7206.0000	-	-	-	14.23	54.00	39.77	-	-	Horizontal
5	9608.0000	42.94	38.43	-39.65	41.72	74.00	32.28	188	197	Horizontal
6	9608.0000	-	-	-	16.96	54.00	37.04	-	-	Horizontal



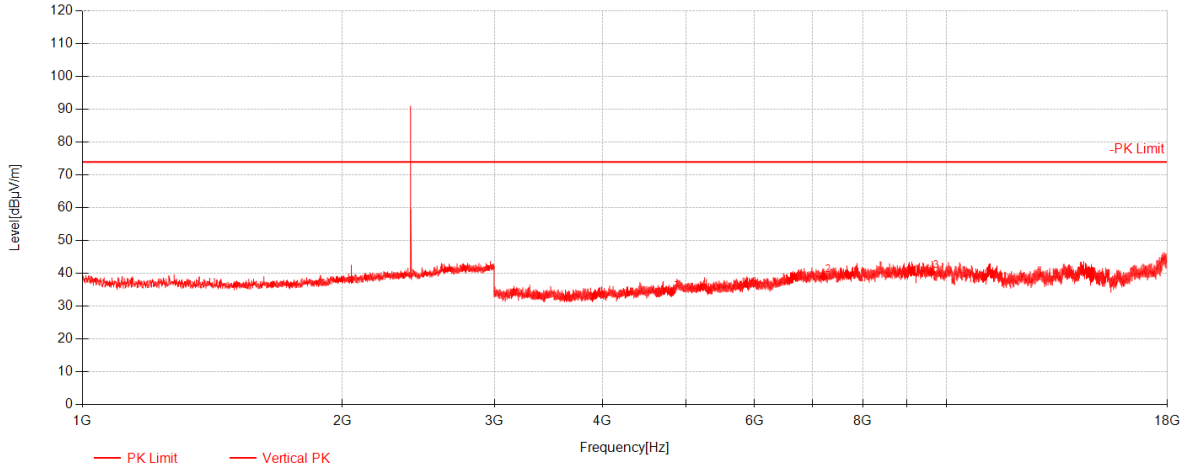
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GFSK_Channel 00



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	4804.0000	47.34	32.33	-45.54	34.13	74.00	39.87	103	360	Vertical
2	4804.0000	-	-	-	9.37	54.00	44.63	-	-	Vertical
3	7206.0000	45.76	36.60	-43.44	38.92	74.00	35.08	213	360	Vertical
4	7206.0000	-	-	-	14.16	54.00	39.84	-	-	Vertical
5	9608.0000	41.53	38.43	-39.65	40.31	74.00	33.69	147	269	Vertical
6	9608.0000	-	-	-	15.55	54.00	38.45	-	-	Vertical



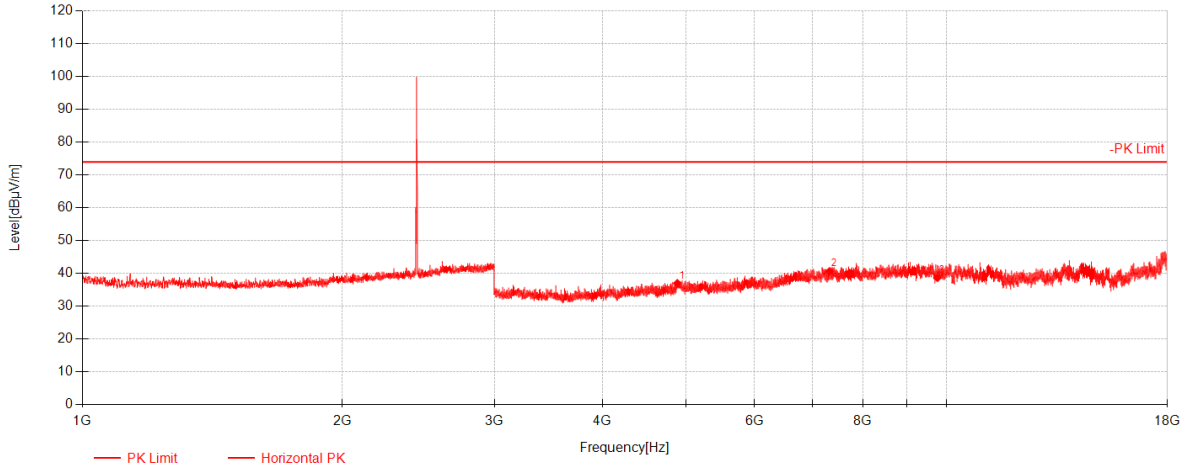
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GFSK_Channel 39



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	4882.0000	49.94	32.55	-45.53	36.96	74.00	37.04	125	106	Horizontal
2	4882.0000	-	-	-	12.20	54.00	41.80	-	-	Horizontal
3	7323.0000	47.73	36.53	-43.67	40.59	74.00	33.41	190	106	Horizontal
4	7323.0000	-	-	-	15.83	54.00	38.17	-	-	Horizontal
5	9764.0000	39.85	38.26	-39.47	38.64	74.00	35.36	172	106	Horizontal
6	9764.0000	-	-	-	13.88	54.00	40.12	-	-	Horizontal

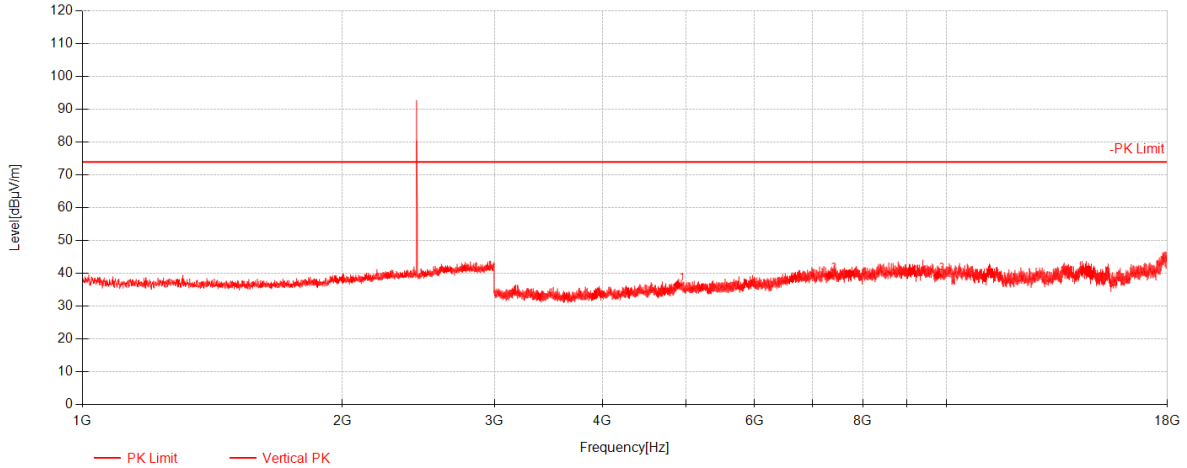


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GFSK_Channel 39



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	4882.0000	49.42	32.55	-45.53	36.44	74.00	37.56	106	179	Vertical
2	4882.0000	-	-	-	11.68	54.00	42.32	-	-	Vertical
3	7323.0000	46.54	36.53	-43.67	39.40	74.00	34.60	194	35	Vertical
4	7323.0000	-	-	-	14.64	54.00	39.36	-	-	Vertical
5	9764.0000	40.56	38.26	-39.47	39.35	74.00	34.65	239	341	Vertical
6	9764.0000	-	-	-	14.59	54.00	39.41	-	-	Vertical



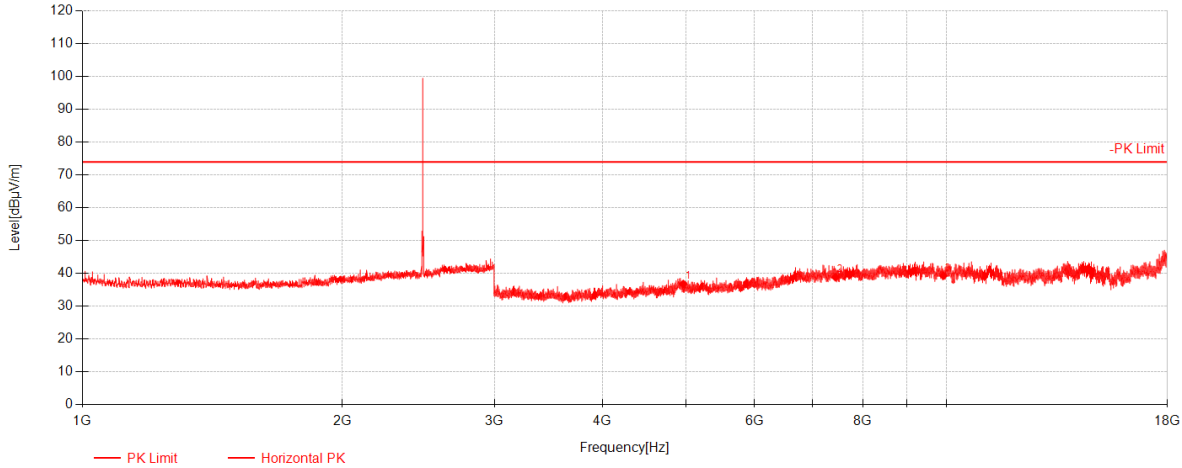
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GFSK_Channel 78



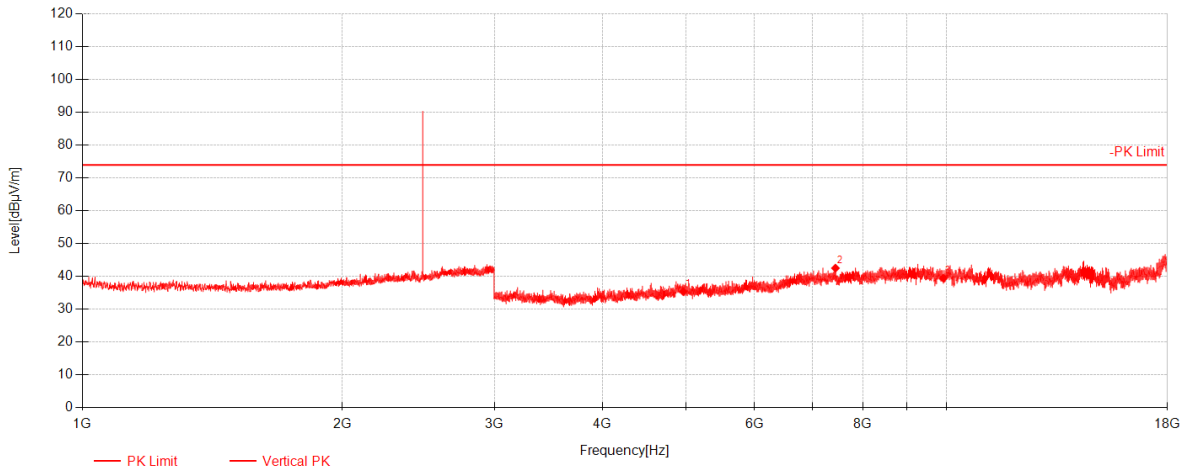
Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4960.0000	49.58	32.77	-45.60	36.75	74.00	37.25	184	88	Horizontal
2	4960.0000	-	-	-	11.99	54.00	42.01	-	-	Horizontal
3	7440.0000	45.65	36.47	-43.30	38.82	74.00	35.18	187	251	Horizontal
4	7440.0000	-	-	-	14.06	54.00	39.94	-	-	Horizontal
5	9920.0000	40.21	38.38	-39.31	39.28	74.00	34.72	221	234	Horizontal
6	9920.0000	-	-	-	14.52	54.00	39.48	-	-	Horizontal



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GFSK_Channel 78



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	4960.0000	48.14	32.77	-45.60	35.31	74.00	38.69	213	90	Vertical
2	4960.0000	-	-	-	10.55	54.00	43.45	-	-	Vertical
3	7440.0000	49.33	36.47	-43.30	42.50	74.00	31.50	199	17	Vertical
4	7440.0000	-	-	-	17.74	54.00	36.26	-	-	Vertical
5	9920.0000	40.36	38.38	-39.31	39.43	74.00	34.57	221	35	Vertical
6	9920.0000	-	-	-	14.67	54.00	39.33	-	-	Vertical

Remark:

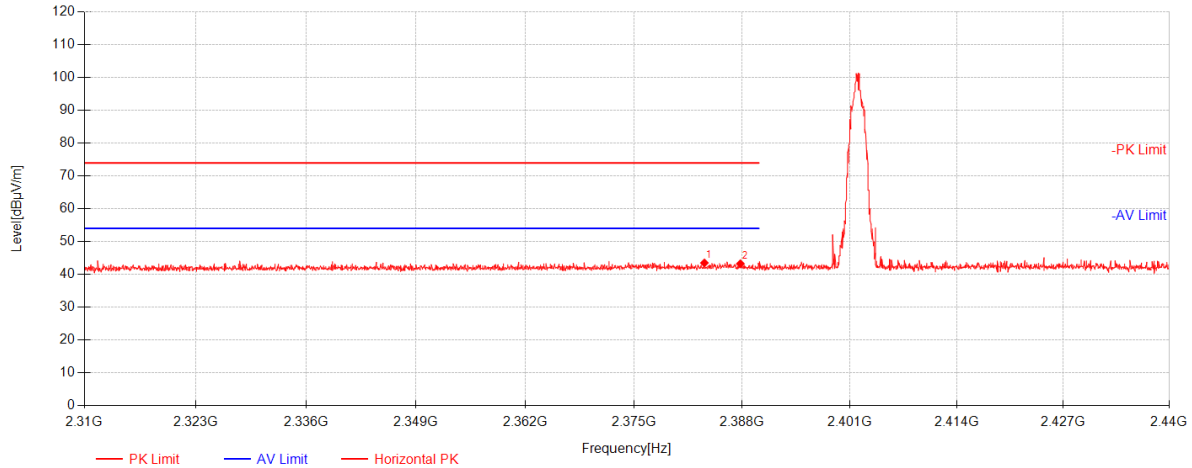
- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:
 $Level = Reading(dB\mu V) + AF(dB/m) + Factor(dB)$
 $AF = Antenna\ Factor(dB/m)$
 $Factor = Cable\ Factor(dB) - Preamplifier\ gain(dB)$
 $Margin = Limit(dB\mu V/m) - Level(dB\mu V/m)$
- All channels have been tested, but only the worst case data displayed in this report.



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Restricted bands around fundamental frequency

GFSK_Channel 00



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	2383.45	39.63	27.43	-23.57	43.49	74.00	30.51	265	138	Horizontal
2	2383.45	-	-	-	18.73	54.00	35.27	-	-	Horizontal
3	2387.7833	39.38	27.43	-23.57	43.24	74.00	30.76	265	138	Horizontal
4	2387.7833	-	-	-	18.48	54.00	35.52	-	-	Horizontal

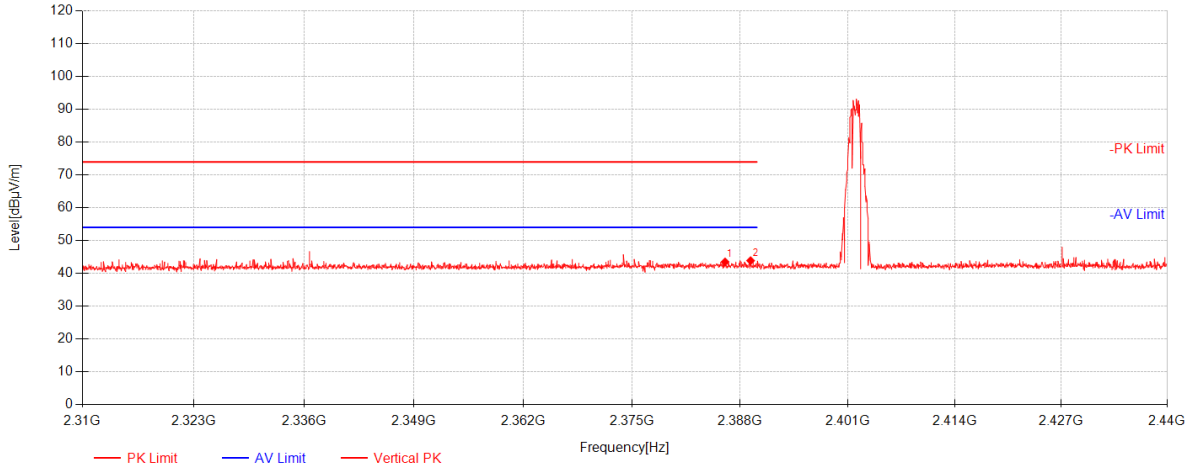


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GFSK_Channel 00



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	2386.18	39.64	27.43	-23.57	43.50	74.00	30.50	251	147	Vertical
2	2386.18	-	-	-	18.74	54.00	35.26	-	-	Vertical
3	2389.2567	40.01	27.43	-23.57	43.87	74.00	30.13	251	147	Vertical
4	2389.2567	-	-	-	19.11	54.00	34.89	-	-	Vertical

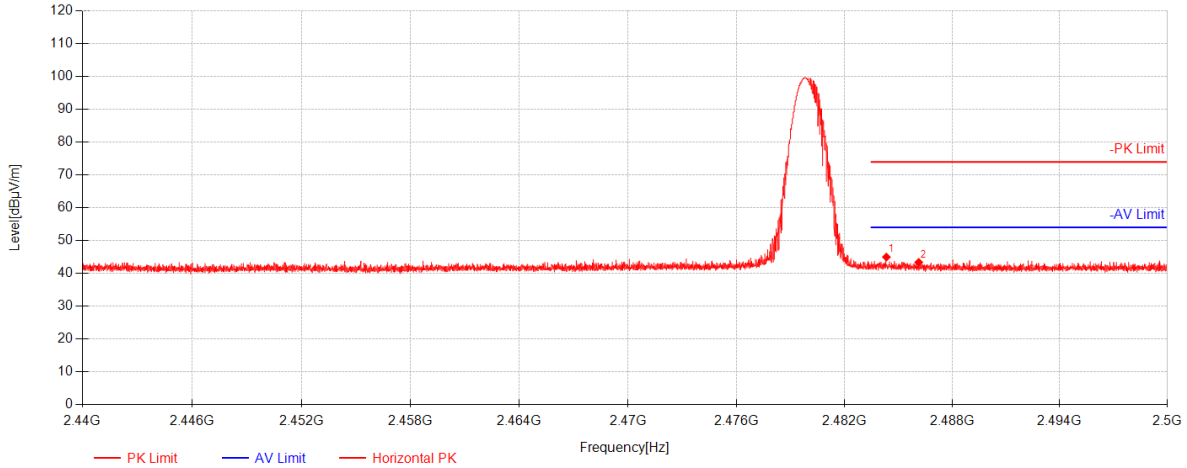


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GFSK_Channel 78



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	2484.34	40.79	27.72	-23.54	44.96	74.00	29.04	174	280	Horizontal
2	2484.34	40.79	27.72	-23.54	44.96	74.00	29.04	174	280	Horizontal
3	2486.14	39.17	27.72	-23.54	43.35	74.00	30.65	174	280	Horizontal
4	2486.14	-	-	-	18.59	54.00	35.41	-	-	Horizontal



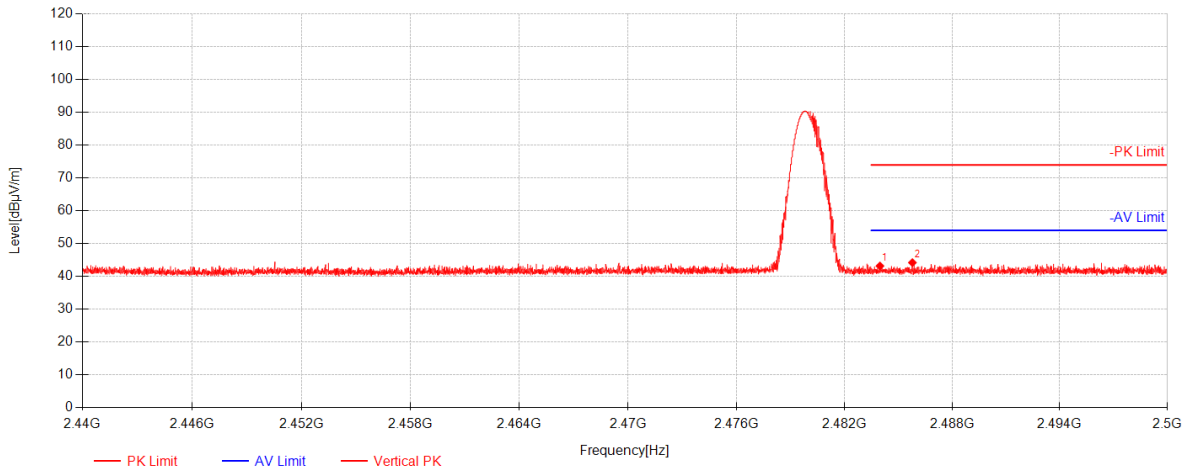
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GFSK_Channel 78



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	2483.98	38.99	27.72	-23.54	43.16	74.00	30.84	138	295	Vertical
2	2483.98	-	-	-	18.40	54.00	35.60	-	-	Vertical
3	2485.7875	40.00	27.72	-23.54	44.18	74.00	29.82	138	295	Vertical
4	2485.7875	-	-	-	19.42	54.00	34.58	-	-	Vertical

Remark:

- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

$$\text{Level} = \text{Reading}(\text{dB}\mu\text{V}) + \text{AF}(\text{dB}/\text{m}) + \text{Factor}(\text{dB});$$

$$\text{AF} = \text{Antenna Factor}(\text{dB}/\text{m})$$

$$\text{Factor} = \text{Cable Factor}(\text{dB}) - \text{Preamplifier gain}(\text{dB})$$

$$\text{Margin} = \text{Limit}(\text{dB}\mu\text{V}/\text{m}) - \text{Level}(\text{dB}\mu\text{V}/\text{m})$$

---End of Report---



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Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

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