TEST REPORT

CSA Group Korea Ltd. 155, Osan-Ro, Mohyeon-eup, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 Republic of Korea www.csagroup.org	Report No.: CSA-26-R-0054-R1 Page (1) of (44)	CSA GROUP™

1. **Report No.** : CSA-26-R-0054-R1
2. **Customer**
   - ◦ Name : Amorepacific Corporation
   - ◦ Address : 100, Hangang-daero, Yongsan-gu, Seoul, Republic of Korea
3. **Use of Report** : FCC Original Grant
4. **Product Name / Model Name** : LED Mask (Makeon OnFace) / MLEDFACE-02

   FCC ID : 2ACHV-MLEDFACE02

5. **FCC Regulation(s):** FCC Part 15 Subpart C 15.247

   Test Method used: KDB558074 D01v05r02, ANSI C63.10-2020
6. **Date of Test** : 2026-07-22 to 2026-07-30
7. **Location of Test** : ■ Permanent Testing Lab □ On Site Testing
   (Address: 155, Osan-Ro, Mohyeon-eup, Cheoin-Gu, Yongin-Si, Gyeonggi-Do 16885 Republic of Korea)
8. **Testing Environment** : See appended test report.
9. **Test Result** : Refer to the test result in the test report

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name : Sungjung Kim (Signature)	Technical Manager Name : Changwon Lee (Signature)

2026-09-10

CSA Group Korea Ltd.

REPORT REVISION HISTORY

Date	Revision	Page No
2026-08-28	Originally issued	-
2026-09-10	DCCF delete, Ant. Type modify	-

General remarks for test reports

Statement concerning the uncertainty of the measurement systems used for the tests
(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:
Calculations leading to the reported values are on file with the testing laboratory that conducted the testing.

☒ **Statement not required by the standard or client used for type testing**

Contents

1. General Information

1.1. Applicant information

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Contact name:	Sungmin Kim

1.2. Laboratory information

Address

CSA Group Korea Ltd. (Yongin Lab.)

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Telephone Number: +82-2-6371-6600

FCC&IC MRA Accredited Test Designation No. : KR0175

1.3 Description of EUT

Product	LED Mask (Makeon OnFace)
Model Name	MLEDFACE-02
Add Model Name	MLEDFACE-03
Serial Number	Identical prototype
Power Supply	DC 7.40 V
Frequency Range	2 402 MHz ~ 2 480 MHz(GFSK)
Number of Channels	40
Antenna Type	Chip antenna
Antenna Gain	3.3 dBi

1.4 Declaration by the manufacturer

- N/A

1.5 Test Equipment List

Type	Manufacturer	Model	S/N	Spec	Next.Cal.Date (yy/mm/dd)
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40	101404	10 Hz ~ 40GHz	2026-10-02
Signal Generator	ROHDE & SCHWARZ	SMB100B	105988	8 kHz ~ 40 GHz	2026-10-02
Temp & Humid Chamber	ESPEC	SH-241	92004648	-40 ℃ ~ 100 ℃	2026-10-01
DC Power Supply	ROHDE & SCHWARZ	NGL201	100791	0 V~ 20 V / 0 A ~ 6 A	2027-04-24
Digital Multimeter	HIOKI	3280-10F	2310B9354	-	2027-04-24
Digital thermometer	SATO	PC-5410TRH	545509	0.0 °C ~ 50.0 °C	2026-12-06
EMI TEST RECEIVER	ROHDE & SCHWARZ	ESW44	103091	1 Hz - 44 GHz	2027-04-22
Active Loop Antenna	ROHDE & SCHWARZ	HFH2-Z2E	101198	Frequency range : 8.3 kHz to 30 MHz, Nominal impedance : 50 Ω	2028-04-23
Signal Conditioning Unit	ROHDE & SCHWARZ	SCU 01	10029	9 kHz - 1 GHz, 40 dB	2027-04-22
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9168	01755	30 MHz - 1 GHz, 10 W	2026-12-05
DOUBLE RIDGED HORN ANTENNA	ROHDE & SCHWARZ	HF907	100197	1-18GHz	2027-04-23
Amplifier	TESTEK	TK-PA18H	240132-L	1 GHz - 18 GHz, 45 dB	2027-04-22
HORN ANTENNA	SCHWARZBECK	BBHA 9170	1392	14 GHz - 40 GHz, 10 W	2026-10-10
Amplifier	PASTERNACK	PE7390-6	240143-L	50 dB, 18 GHz-40 GHz	2026-10-13
Highpass Filter	Wainwright Instruments	WHKX10-2838-3300-18000-60SS	12	-	2026-10-13

1.6 Summary of Test Results

FCC Part Section(s)	Parameter	Limit (Using in 2400~ 2483.5MHz)	Test Condition	Status Note 1
15.247(a)	6 dB Bandwidth	> 500 kHz	Conducted	C
15.247(b)	Maximum Peak Output Power	< 1 Watt		C
15.247(d)	Unwanted Emissions(Conducted)	20 dBc in any 100 kHz BW		C
15.247(e)	Power Spectral Density	< 8 dBm / 3 kHz		C
15.247(d) 15.205 15.209	Unwanted Emissions(Radiated)	Part 15.209 limits (Refer to section 5.5)	Radiated	C
15.207	AC Power-Line Conducted Emissions	Part 15.207 limits (Refer to section 5.6)Part	AC Line Conducted	C
15.203	Antenna Requirement	15.203 (Refer to section 3)	-	C

Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable

1.7 Test Methodology

The measurement procedures described in the ANSI C63.10-2020 and the guidance provided in KDB558074 D01v05r02 were used in measurement of the EUT.

The EUT was tested per the guidance of KDB558074 D01v05r02. And ANSI C63.10-2020 was used to reference appropriate EUT setup and maximizing procedures of radiated spurious emission and AC line conducted emission testing.

1.7.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

1.7.2 EUT Exercise

The EUT was operated in the test mode to fix the TX frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

1.7.3 General Test Procedures

Conducted Emissions

The power-line conducted emission test procedure is not described on the KDB558074 D01v05r02.

So this test was fulfilled with the requirements in Section 6.2 of ANSI C63.10-2020.

The EUT is placed on the wooden table, which is 0.8 m above ground plane and the conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and Average detector.

Radiated Emissions

Basically the radiated tests were performed with KDB558074 D01v05r02. But some requirements and procedures like test site requirements, EUT setup and maximizing procedure were fulfilled with the requirements in Section 5 and 6 of the ANSI C63.10-2020 as stated on section 12.1 of the KDB558074 D01v05r02.

The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

1.7.4 Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

1.8 Conclusion of worst-case and operation mode

EUT has been tested with the operating condition for maximizing the emission characteristics. A test program is used to control the EUT for staying in continuous transmitting.

EUT Operation test setup

Test Software : STM32CubeMonitor-RF

Power setting : 24 (all Channels)

Test Mode

Test mode	Tested Frequency(MHz)		
	Lowest	Middle	Highest
TM 1	2 402	2 440	2 480

1.9 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C63.4-2014 and ANSI C63.10-2020. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Antenna-port conducted emission	1.04 dB (The confidence level is about 95 %, k = 2)
Output Power	1.04 dB (The confidence level is about 95 %, k = 2)
Bandwidth	1.4×10^4 Hz (The confidence level is about 95 %, k = 2)
Radiated emission (1 GHz Below)	5.82 dB (The confidence level is about 95 %, k = 2)
Radiated emission (1 GHz Above)	5.02 dB (The confidence level is about 95 %, k = 2)

2. Antenna Requirement

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section..

Conclusion: Comply

We use the Chip Ant. type on the PCB. (Please refer to the internal photo file.)

Therefore this E.U.T complies with the requirement of Part 15.203

3. Maximum Peak Conducted Ouput Power

3.1. Test Setup

3.2. Limit

FCC Requirements and limit, Part 15.247(b)

The maximum permissible conducted output power is 1 Watt.

3.3 Test Procedure :

1. The RF power output was measured with a Spectrum analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A spectrum analyzer was used to record the shape of the transmit signal.
2. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using ;
   RBW ≥ 20 dB BW
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

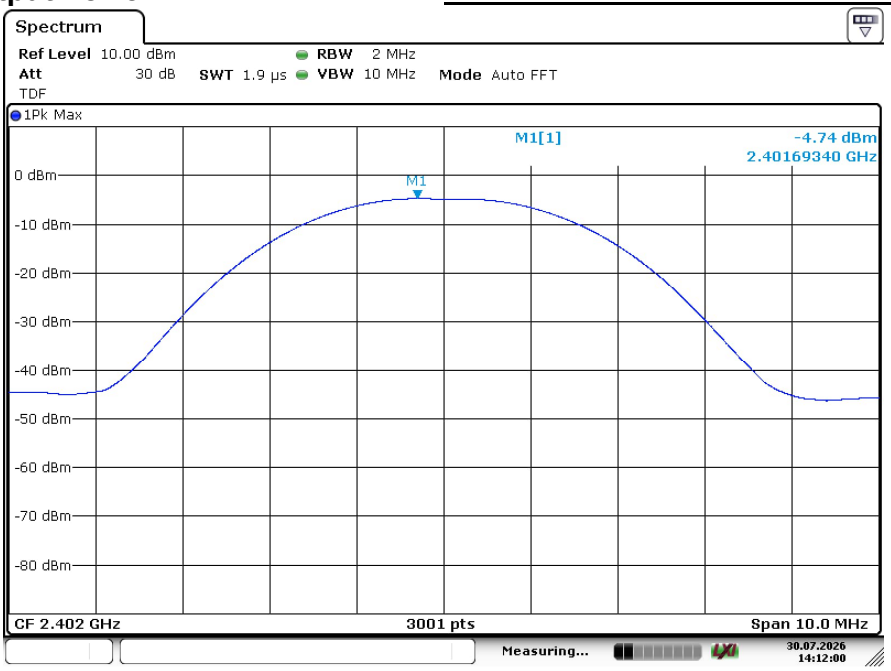
3.4 Test Results :

Tested Channel	Peak Output Power	
	dBm	mW
Lowest	**-4.74**	**0.34**
Middle	-5.10	0.31
Highest	-5.23	0.30

Note 1: See next pages for actual measured spectrum plots.

Peak Output Power

Lowest channel & Modulation : GFSK



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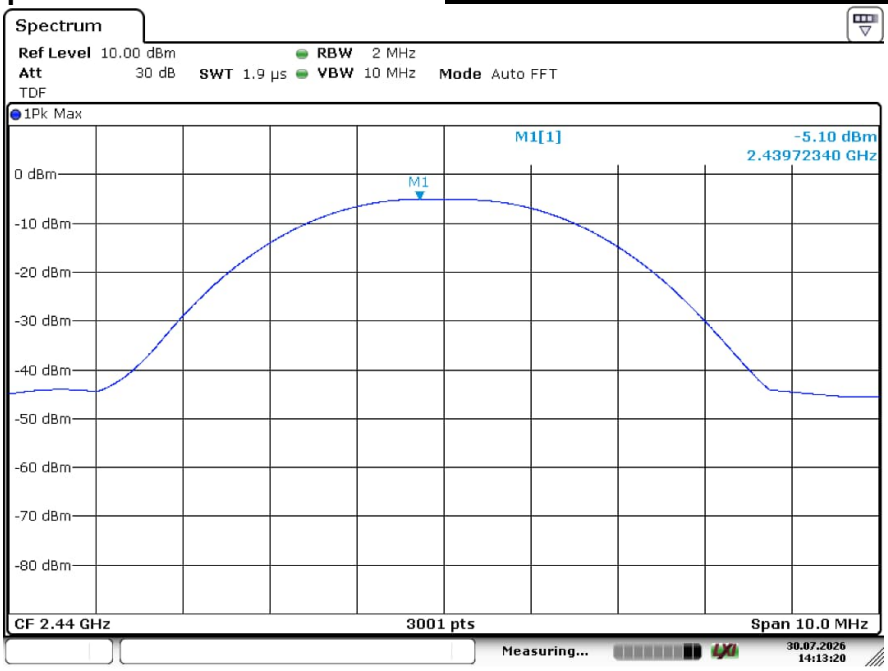
Peak Output Power

Middle channel & Modulation : GFSK



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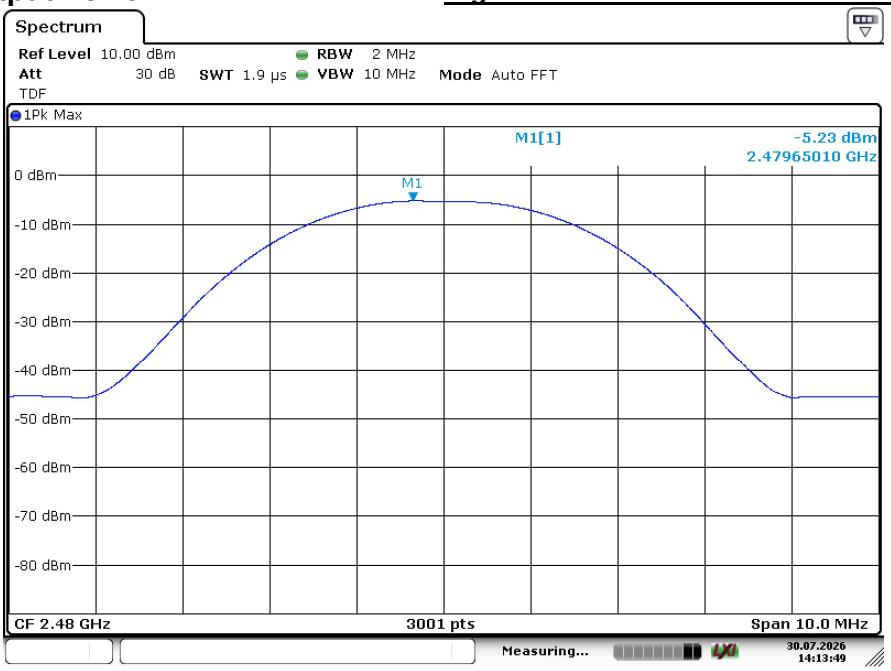
Peak Output Power

Highest channel & Modulation : GFSK



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4. 6 dB BW

4.1. Test Setup

4.2. Limit

The bandwidth at 6 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the EUT's antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6 dB bandwidth is 500 kHz.

4.3 Test Procedure :

- KDB558074 D01v05r02 - Section 8.2
- ANSI C63.10-2020 – Section 11.8.2

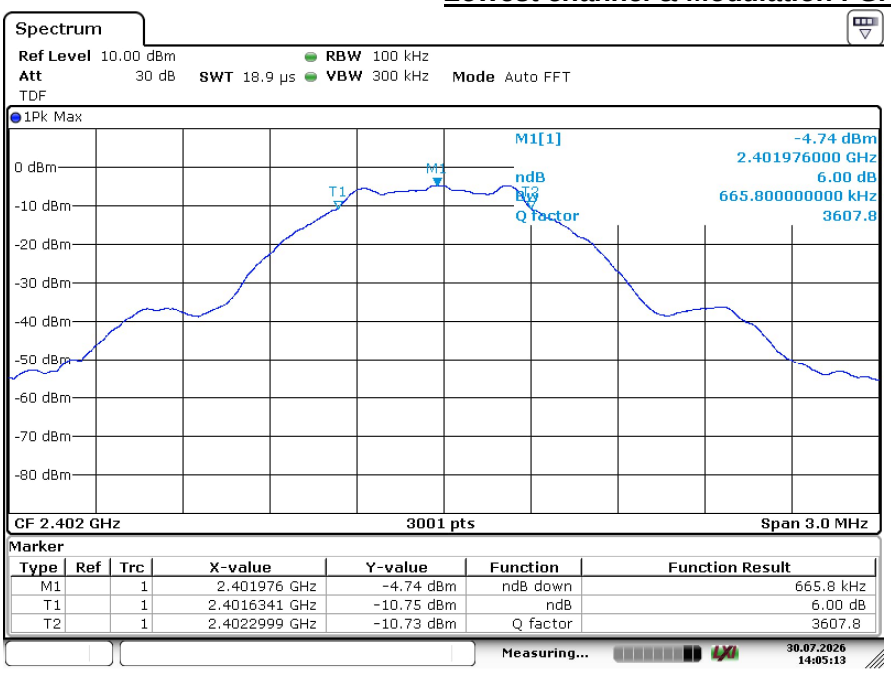
1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Option 1 - Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
8. Option 2 - The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ≥ 6 dB.

4.4 Test Results :

Test mode	Test Channel	Results (MHz)
TM 1	**Lowest**	0.666
	Middle	**0.667**
	Highest	0.664

6 dB BW

Lowest channel & Modulation : GFSK



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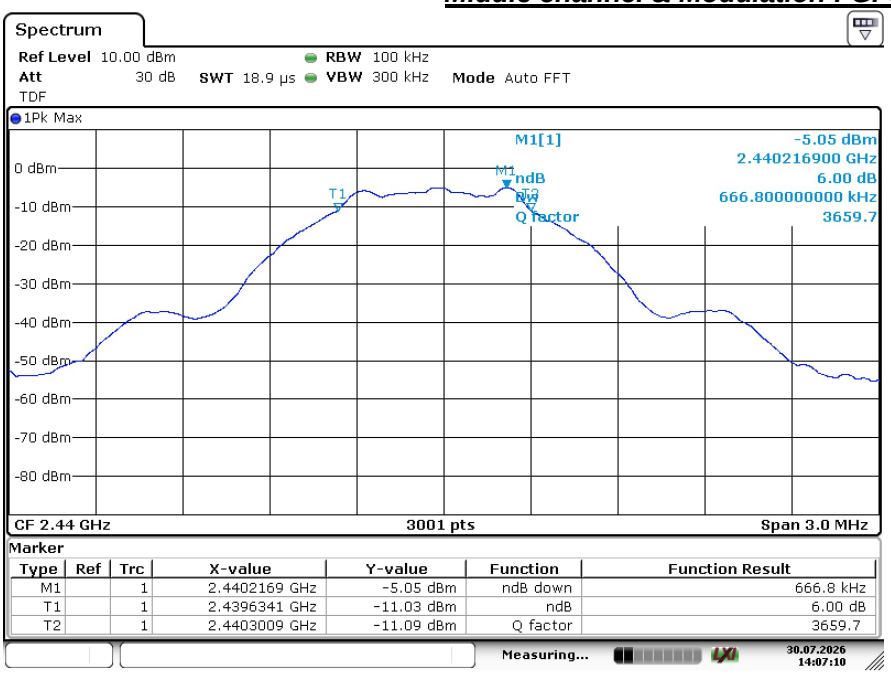
6 dB BW

Middle channel & Modulation : GFSK



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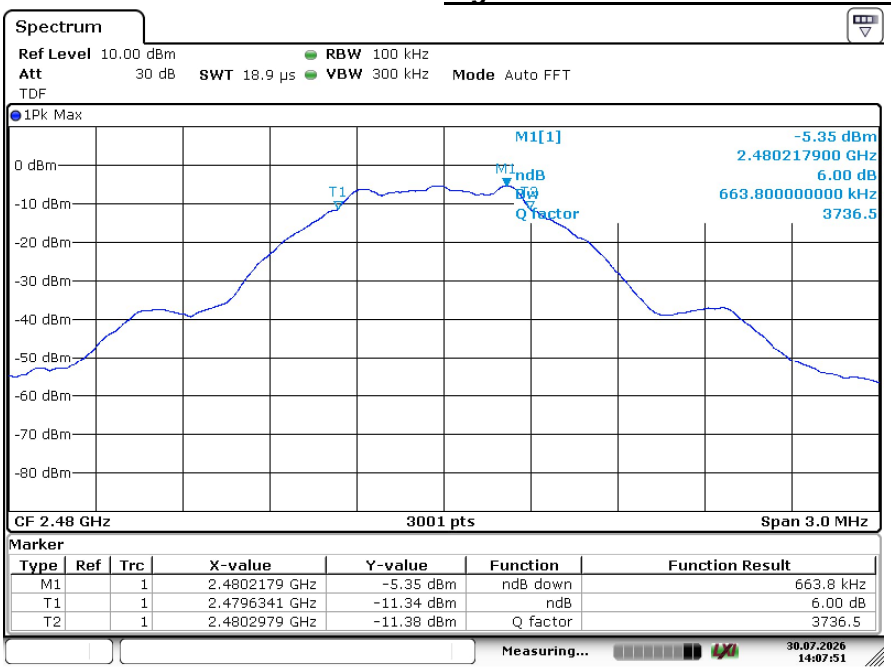
6 dB BW

Highest channel & Modulation : GFSK



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5. Power Spectral Density

5.1. Test Setup

5.2. Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.3 Test Procedure :

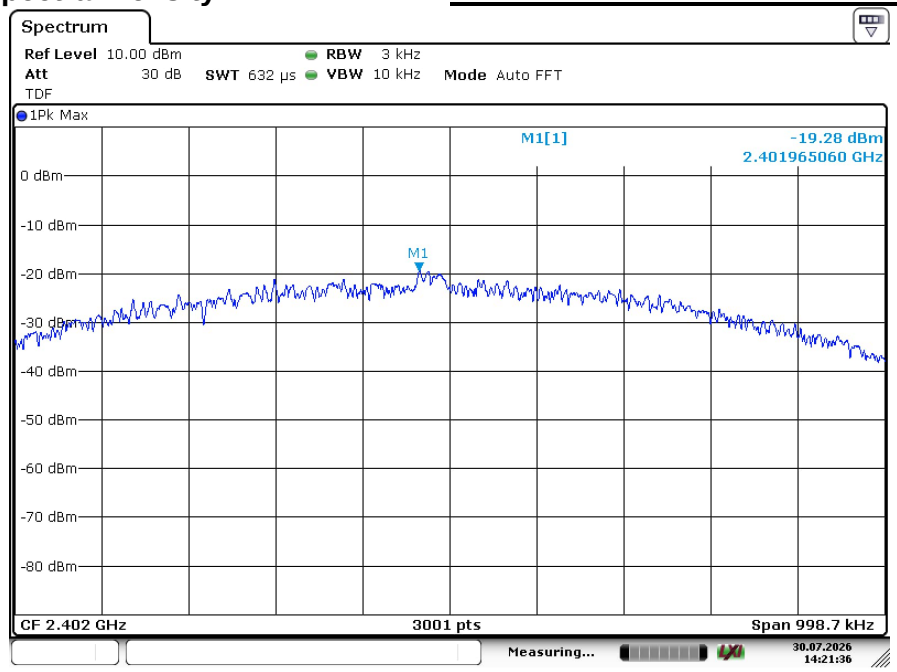
- KDB558074 D01v05r02 - Section 8.4
- ANSI C63.10-2020 – Section 11.10.2

1. Set analyzer center frequency to DTS channel center frequency
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW : 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Test results

Test Mode	Frequency (MHz)	RBW	PKPSD (dBm)	Limit (dBm / 3 kHz)
TM1	Lowest	3 kHz	-19.28	8.00
	Middle	3 kHz	-19.40	8.00
	Highest	3 kHz	-19.74	8.00

Power Spectral Density ***Lowest channel & Modulation : GFSK***



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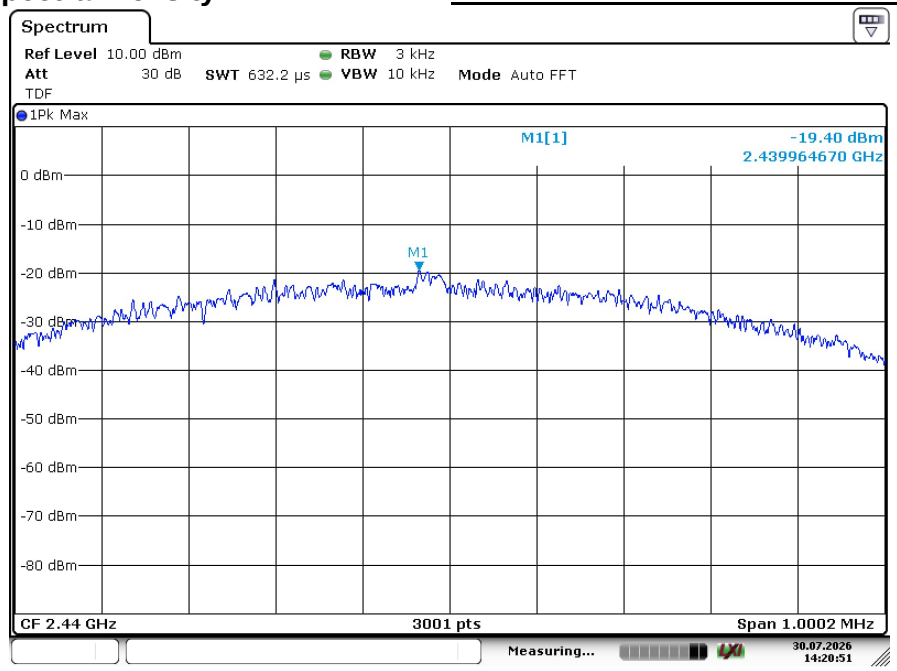
Power Spectral Density

Middle channel & Modulation : GFSK



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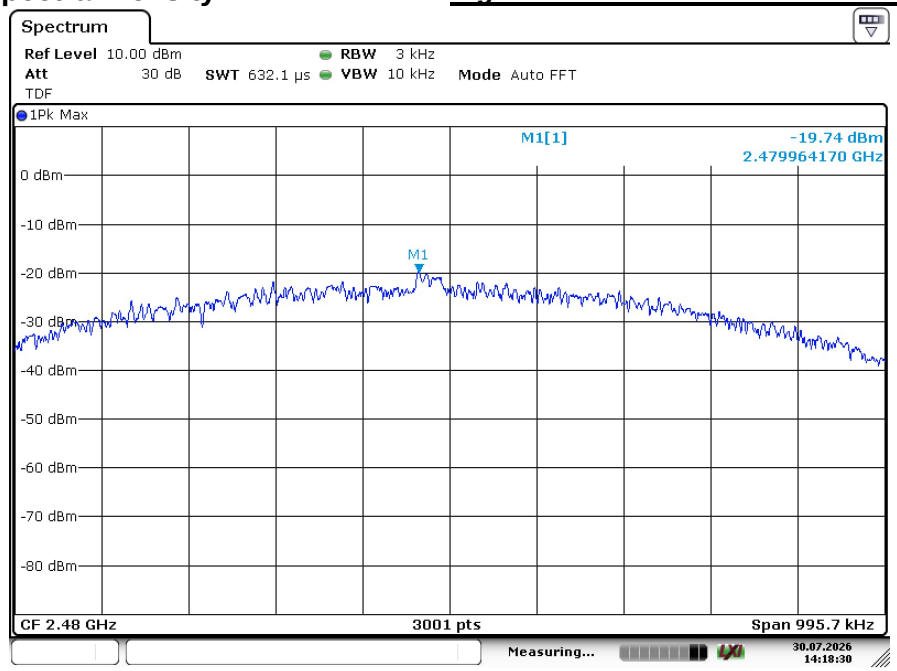
Power Spectral Density

Highest channel & Modulation : GFSK



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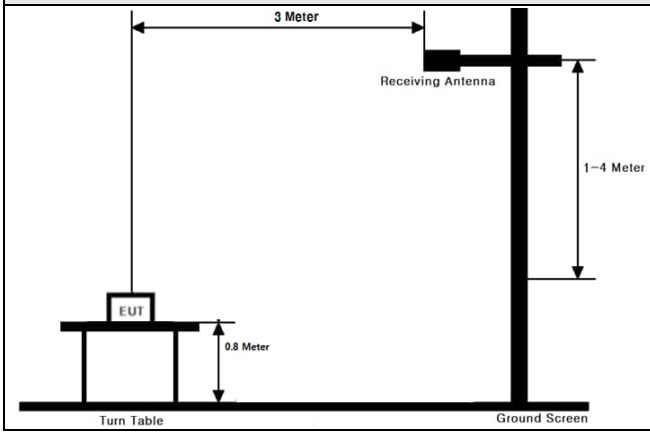
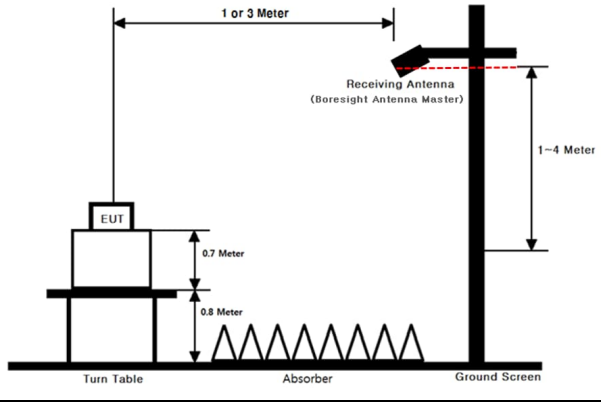
8. Unwanted Emission

8.1. Test Setup

Radiated Measurement

Below 1 GHz	Above 1 GHz
	

- **Conducted Measurement**

8.2. Limit

Radiated

Part 15.247(d), Part 15.205, Part 15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of Part 15.247 the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

- Part 15.209: General requirement

Frequency (MHz)	FCC Limit (uV/m)	Measurement Distance (m)
0.009 – 0.490	2 400 / F (kHz)	300
0.490 – 1.705	24 000 / F (kHz)	30
1.705 – 30.0	30	30

Frequency (MHz)	FCC Limit (uV/m)	Measurement Distance (m)
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §15.231 and 15.241.

- Part 15.205(a): Restricted band of operation

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.414 25 ~ 8.414 75	108 ~ 121.94	1 300 ~ 1 427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1 435 ~ 1 626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.173 5 ~ 2.190 5	12.519 75 ~ 12.520 25	149.9 ~ 150.05	1 645.5 ~ 1 646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.576 75 ~ 12.577 25	156.524 75 ~ 156.525 25	1 660 ~ 1 710	8.025 ~ 8.5	22.01 ~ 23.12
4.177 25 ~ 4.177 75	13.36 ~ 13.41	156.7 ~ 156.9	1 718.8 ~ 1 722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.207 25 ~ 4.207 75	16.42 ~ 16.423	162.012 5 ~ 167.17	2 200 ~ 2 300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.694 75 ~ 16.695 25	167.72 ~ 173.2	2 310 ~ 2 390	10.6 ~ 12.7	36.43 ~ 36.5
6.267 75 ~ 6.268 25	16.804 25 ~ 16.804 75	240 ~ 285	2 483.5 ~ 2 500	13.25 ~ 13.4	Above 38.6
6.311 75 ~ 6.312 25	25.5 ~ 25.67	322 ~ 335.4	2 655 ~ 2 900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3 260 ~ 3 267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3 332 ~ 3 339		
8.376 25 ~ 8.386 75	74.8 ~ 75.2	960 ~ 1 240	3 345.8 ~ 3 358		
			3 600 ~ 4 400		

Conducted

Part 15.247(d)

In any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions :

If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to 15.247(b)(3) requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

If the average output power procedure is used to measure the fundamental emission power to demonstrate

compliance to 15.247(b)(3) requirements, then the power in any 100 kHz outside of the authorized frequency band

shall be attenuated by at least 30 dB relative to the maximum measured inband average PSD level.

In either case, attenuation to levels below the general emission limits specified in §15.209(a) is not required.

8.3. Test Procedures

Radiated

1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm.
2. For emission measurements above 1 GHz, the table height is 1.5 m.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until the measurements for all frequencies are complete.

Measurement Instrument Setting

- **KDB558074 D01v05r02 - Section 8.6**
- **ANSI C63.10-2020 – Section 11.12**

1. Frequency Range Below 1 GHz
   RBW = 100 or 120 kHz, VBW = 3 x RBW, Detector = Peak or Quasi Peak
2. Frequency Range > 1 GHz
   Peak Measurement > 1 GHz
   RBW = 1 MHz, VBW = 3 MHz, Detector = Peak, Sweep time = Auto, Trace mode = Max Hold until the trace stabilizes
   Average Measurement > 1 GHz
   1. RBW = 1 MHz (unless otherwise specified).
   2. VBW ≥ 3 x RBW.
   3. Detector = RMS (Number of points ≥ 2 x Span / RBW)
   4. Averaging type = power (i.e., RMS).
   5. Sweep time = auto.
   6. Perform a trace average of at least 100 traces.
   7. A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had

the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step 4, then the applicable correction factor is 10 log(1 / D), where D is the duty cycle.

2) If linear voltage averaging mode was used in step 4, then the applicable correction factor is 20 log(1 / D), where D is the duty cycle.

3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

Conducted

- **KDB558074 D01v05r02 - Section 8.5**

- **ANSI C63.10-2020 – Section 11.11**

Reference level measurement

1. Set instrument center frequency to DTS channel center frequency.
2. Set the span to ≥ 1.5 times the DTS bandwidth.
3. Set the RBW = 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum PSD level

LIMIT LINE = 20 dB below of the reference level.

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured.
2. Set the RBW = 100 kHz.(Actual 1 MHz , See below note)
3. Set the VBW ≥ 3 x RBW.(Actual 3 MHz, See below note)
4. Detector = peak.
5. Ensure that the number of measurement points ≥ span / RBW
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use the peak marker function to determine the maximum amplitude level.

Note: The unwanted emission(conducted) was tested with below settings.

Frequency range	RBW	VBW	Detector	Trace	Sweep Point
9 kHz ~ 30 MHz	100 kHz	300 kHz	Peak	Max Hold	40 001
30 MHz ~ 10 GHz	1 MHz	3 MHz			
10 GHz ~ 25 GHz	1 MHz	3 MHz			

If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2 001 to get accurate emission level within 100 kHz BW.

8.4. Test Results

Unwanted emissions(Radiated)

1. The radiated emissions below 1 GHz were investigated 9 kHz to 1 GHz and the worst case data was reported.

2. Information of Distance Correction Factor

For finding emissions, measurements may be performed at a distance closer than that specified in the regulations. In this case, the distance factor is applied to the result.

- Calculation of distance correction factor

At frequencies below 30 MHz = 40 log(tested distance / specified distance)

At frequencies at or above 30 MHz = 20 log(tested distance / specified distance)

When distance factor is “N/A”, the measurements were performed at the specified distance and distance factor is not applied.

3. Sample Calculation.

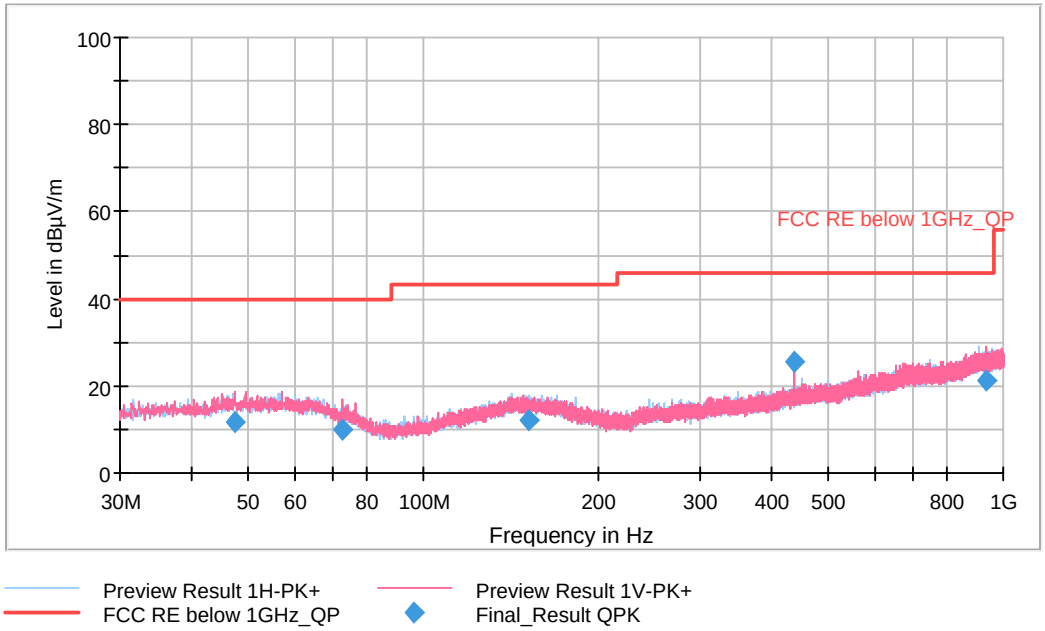
Margin = Limit – Result / Result = Reading + TF+ DCCF + DCF / TF = AF + CL + HL + AL – AG

Where, TF = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, HL = High pass filter Loss, AL = Attenuator Loss, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

9 kHz ~ 1 GHz Data (Modulation : *GFSK*)

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
437.51	H	Y	QP	43.49	-17.80	N/A	N/A	25.69	46.00	20.31
934.85	V	Y	QP	31.17	-9.90	N/A	N/A	21.27	46.00	24.73

Full Spectrum



▪ **Test Notes.**

1. The radiated emissions were investigated 1 GHz to 25 GHz. And no other spurious and harmonic emissions were found below listed frequencies.

2. Information of Distance Correction Factor

For finding emissions, measurements may be performed at a distance closer than that specified in the regulations. In this case, the distance correction factor is applied to the result.

- Calculation of distance factor

At frequencies below 30 MHz = 40 log(tested distance / specified distance)

At frequencies at or above 30 MHz = 20 log(tested distance / specified distance)

When distance factor is “N/A”, the measurements were performed at the specified distance and distance factor is not applied.

3. Sample Calculation.

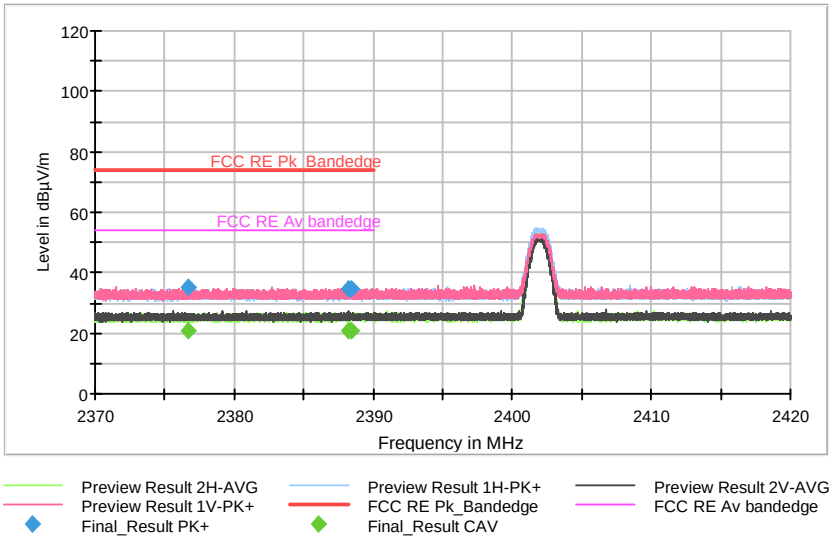
Margin = Limit – Result / Result = Reading + TF+ DCCF + DCF / TF = AF + CL + HL + AL – AG

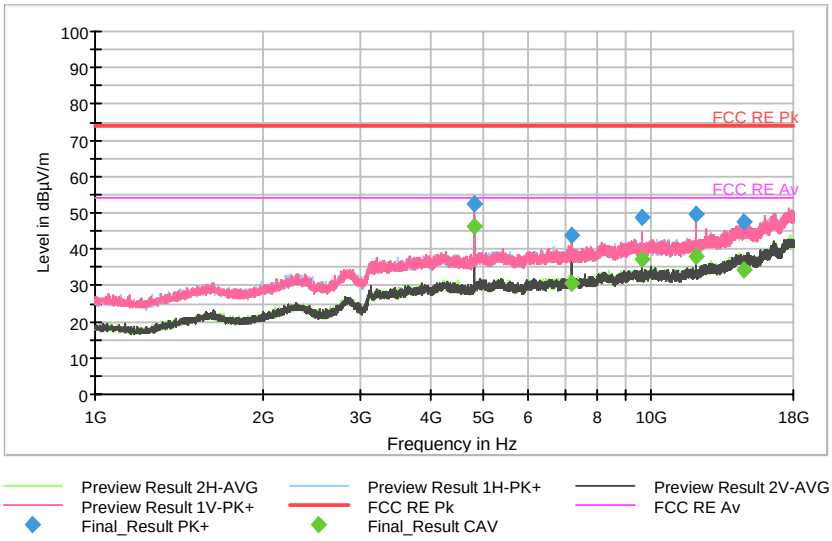
Where, TF = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain, HL = High pass filter Loss, AL = Attenuator Loss, DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor

1 GHz ~ 25 GHz Data (Modulation : *GFSK*)

▪ Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2 387.53	H	Y	PK	51.90	-16.10	N/A	N/A	35.80	74.00	38.20
2 387.53	H	Y	AV	37.25	-16.10	N/A	N/A	21.15	54.00	32.85
4 803.75	V	Y	PK	58.90	-6.50	N/A	N/A	52.40	74.00	21.60
4 803.75	V	Y	AV	52.89	-6.50	N/A	N/A	46.39	54.00	7.61
7 205.00	V	Y	PK	46.21	-2.40	N/A	N/A	43.81	74.00	30.19
7 205.00	V	Y	AV	32.83	-2.40	N/A	N/A	30.43	54.00	23.57
9 608.80	V	Y	PK	51.71	-3.00	N/A	N/A	48.71	74.00	25.29
9 608.80	V	Y	AV	40.30	-3.00	N/A	N/A	37.30	54.00	16.70

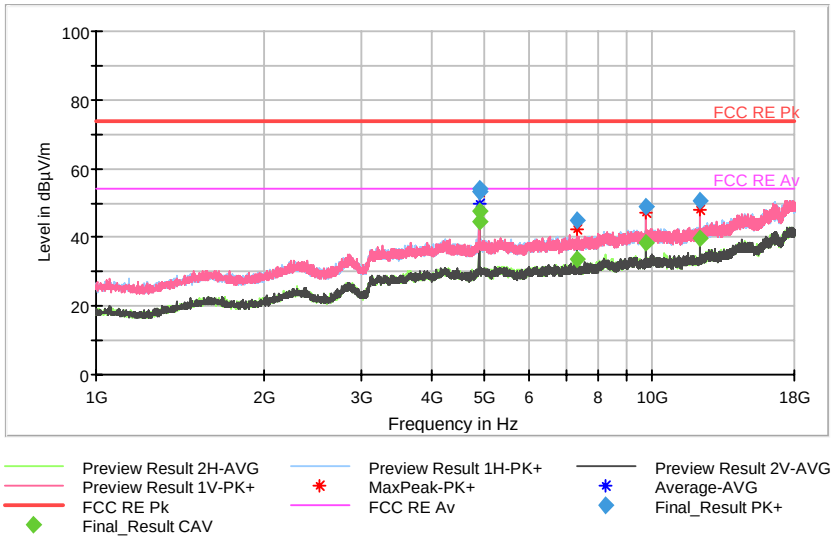




1 GHz ~ 25 GHz Data (Modulation : *GFSK*)

▪ Middle Channel

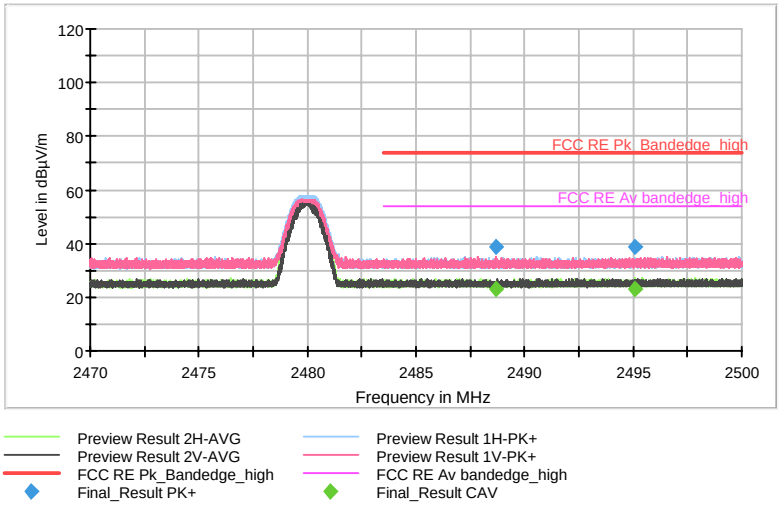
Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4 879.40	V	Y	PK	59.18	-6.10	N/A	N/A	53.08	74.00	20.92
4 879.40	V	Y	AV	50.54	-6.10	N/A	N/A	44.44	54.00	9.56
4 880.25	H	Y	PK	59.94	-6.00	N/A	N/A	53.94	74.00	20.06
4 880.25	H	Y	AV	53.47	-6.00	N/A	N/A	47.47	54.00	6.53
7 319.75	V	Y	AV	36.05	-2.50	N/A	N/A	33.55	54.00	20.45
7 319.75	V	Y	PK	47.54	-2.50	N/A	N/A	45.04	74.00	28.96
9 759.25	H	Y	PK	51.66	-2.80	N/A	N/A	48.86	74.00	25.14
9 759.25	H	Y	AV	41.20	-2.80	N/A	N/A	38.40	54.00	15.60
12 198.75	H	Y	PK	50.55	0.10	N/A	N/A	50.65	74.00	23.35
12 198.75	H	Y	AV	39.44	0.10	N/A	N/A	39.54	54.00	14.46

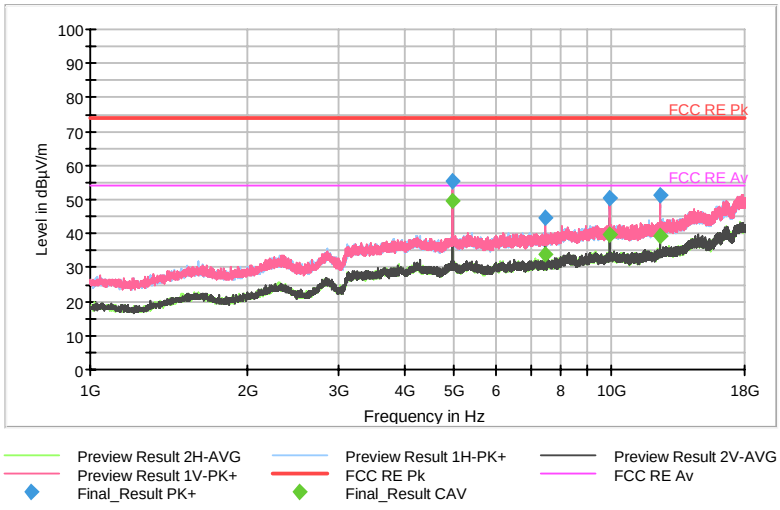


1 GHz ~ 25 GHz Data (Modulation : *GFSK*)

▪ Highest Channel

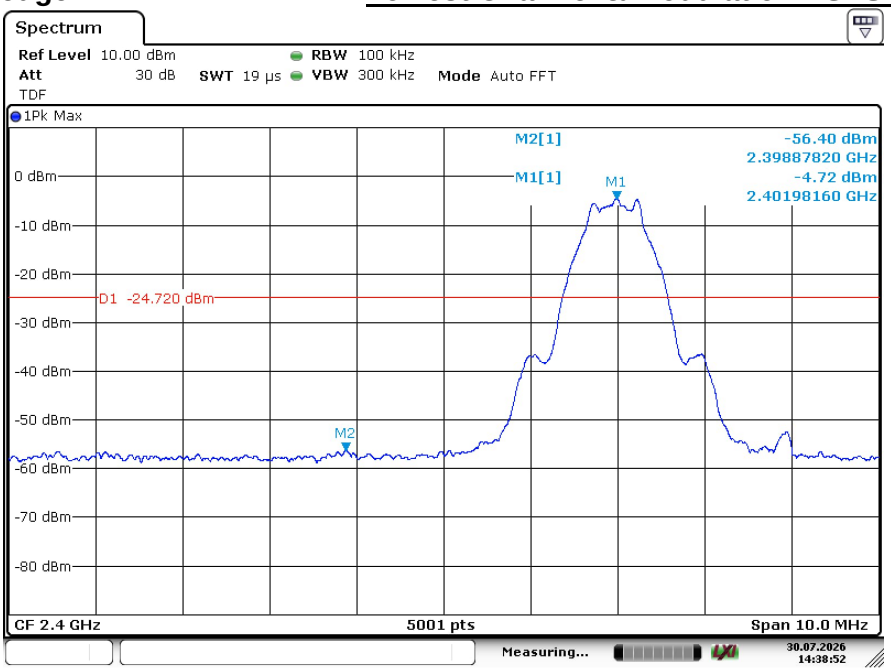
Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	TF (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2 488.67	V	Y	PK	54.66	-15.90	N/A	N/A	38.76	74.00	35.24
2 488.67	V	Y	AV	38.74	-15.90	N/A	N/A	22.84	54.00	31.16
2 495.06	H	Y	PK	54.41	-15.80	N/A	N/A	38.61	74.00	35.39
2 495.06	H	Y	AV	38.77	-15.80	N/A	N/A	22.97	54.00	31.03
4 960.15	H	Y	AV	55.18	-5.70	N/A	N/A	49.48	54.00	4.52
4 960.15	H	Y	PK	61.04	-5.70	N/A	N/A	55.34	74.00	18.66
7 440.45	V	Y	PK	47.17	-2.40	N/A	N/A	44.77	74.00	29.23
7 440.45	V	Y	AV	36.31	-2.40	N/A	N/A	33.91	54.00	20.09
9 920.75	V	Y	AV	41.91	-2.30	N/A	N/A	39.61	54.00	14.39
9 920.75	V	Y	PK	52.70	-2.30	N/A	N/A	50.40	74.00	23.60





Unwanted emissions(Conducted)

Low Band-edge ***Lowest Channel & Modulation : GFSK***



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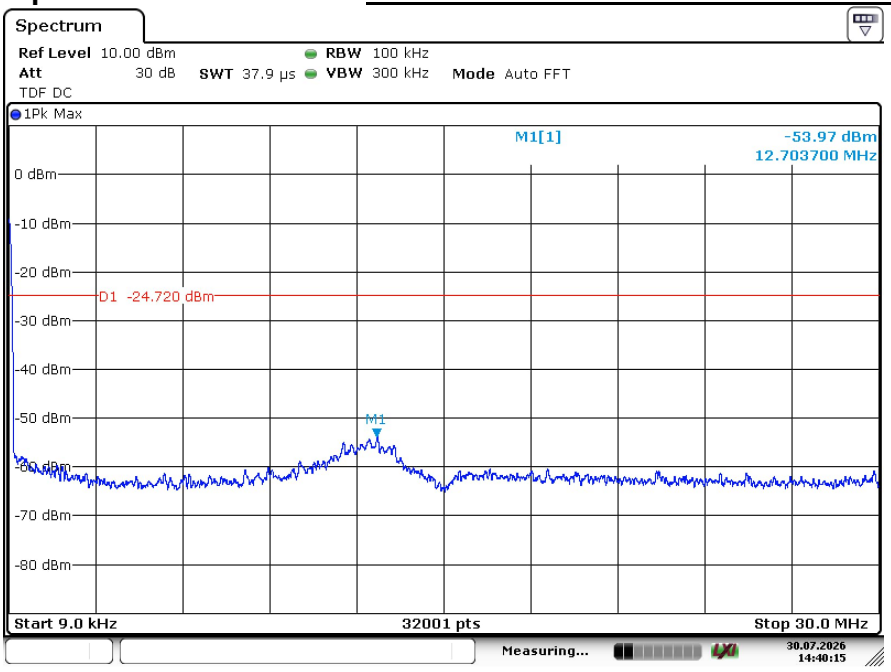
Conducted Spurious Emissions ***Lowest Channel & Modulation : GFSK***



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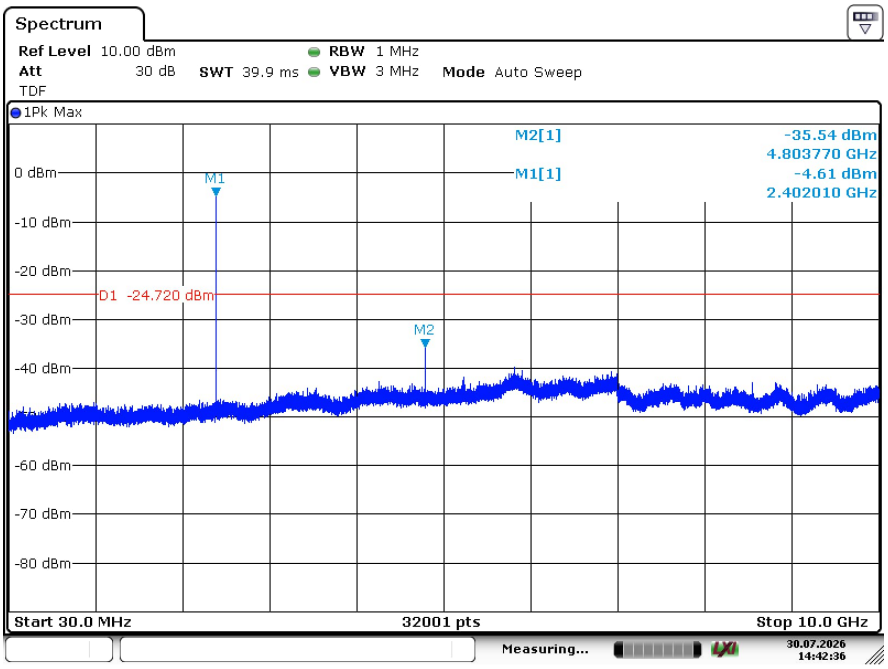

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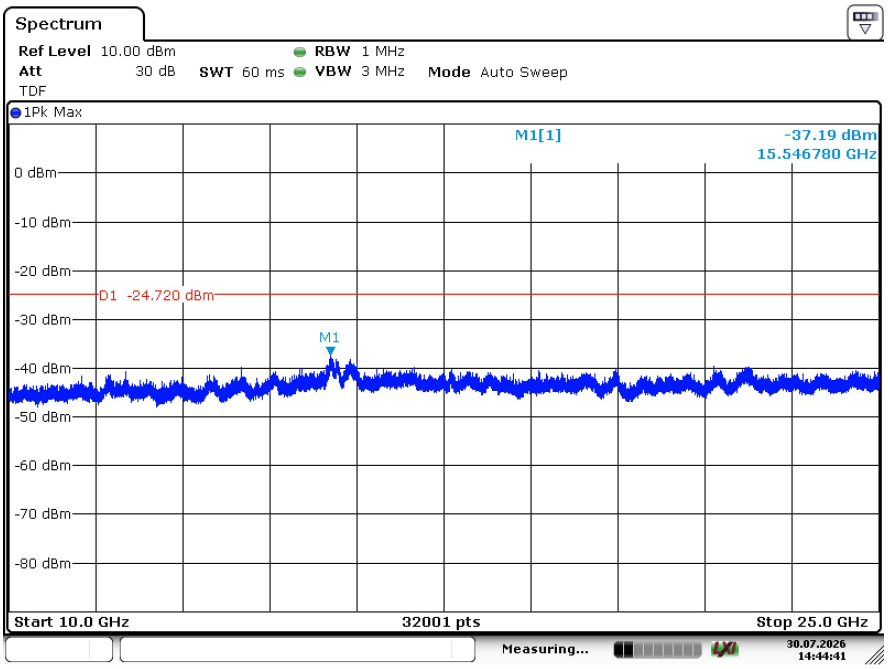

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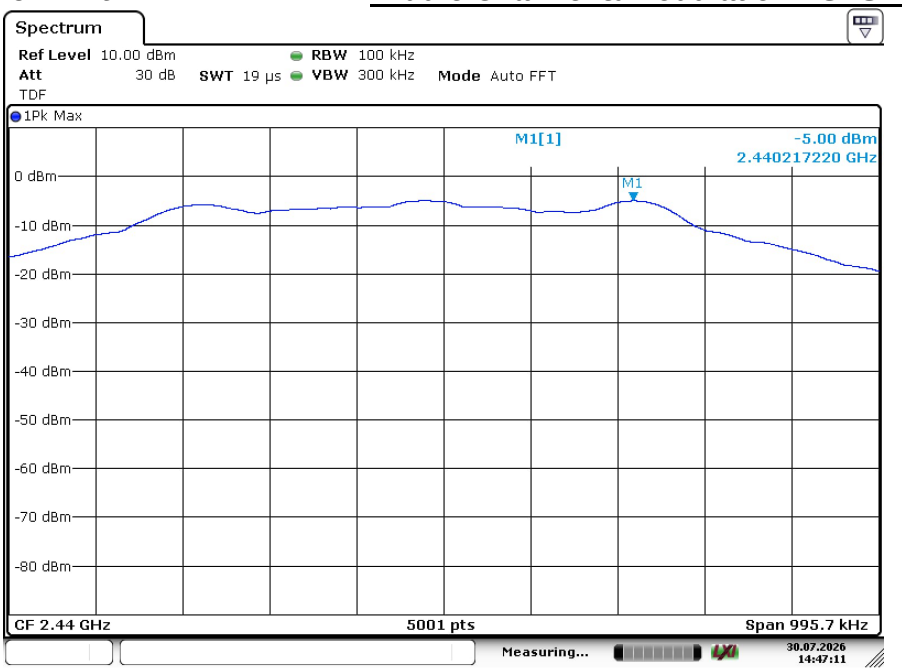
Reference for limit

Middle Channel & Modulation : GFSK



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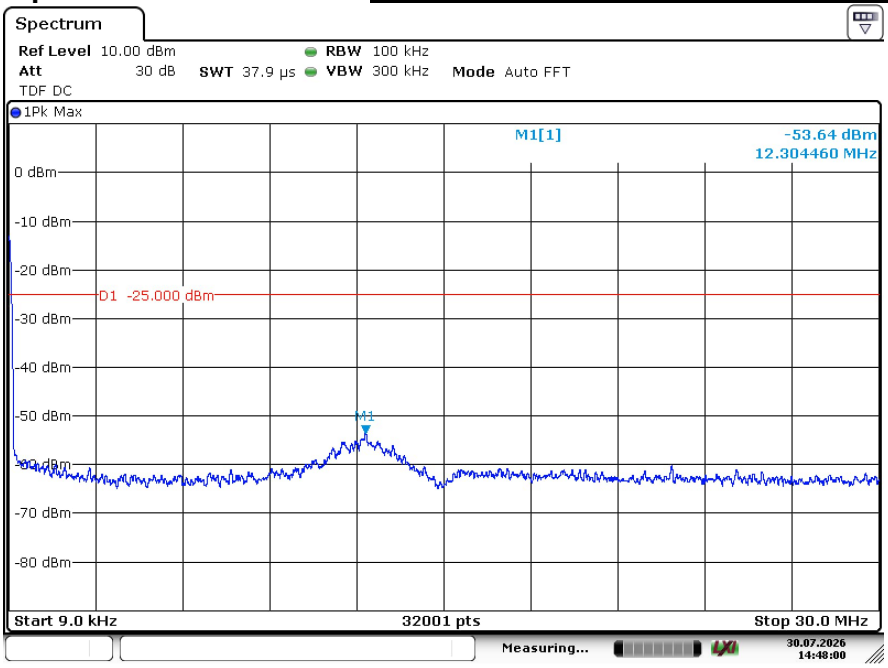
Conducted Spurious Emissions

Middle Channel & Modulation : GFSK



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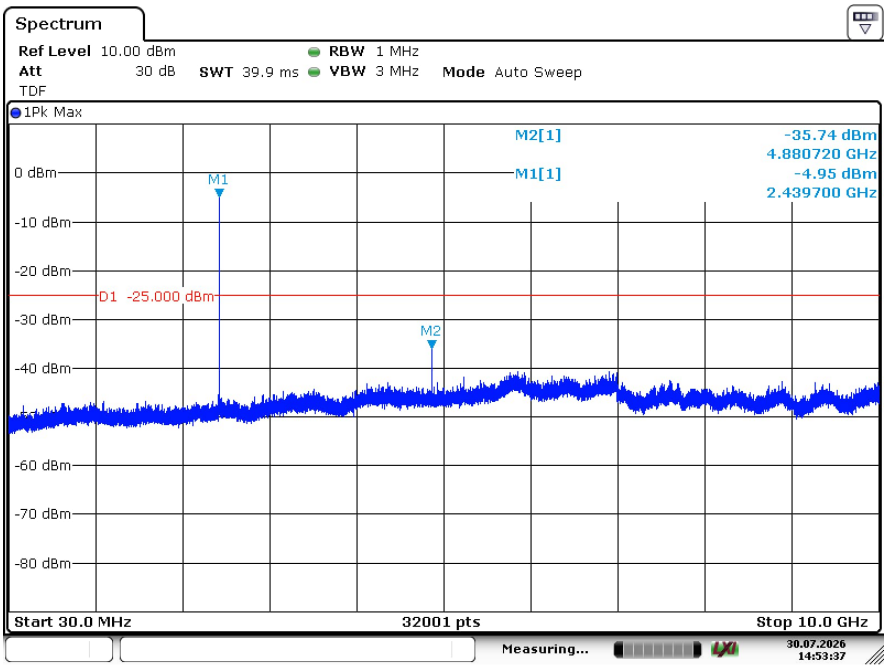

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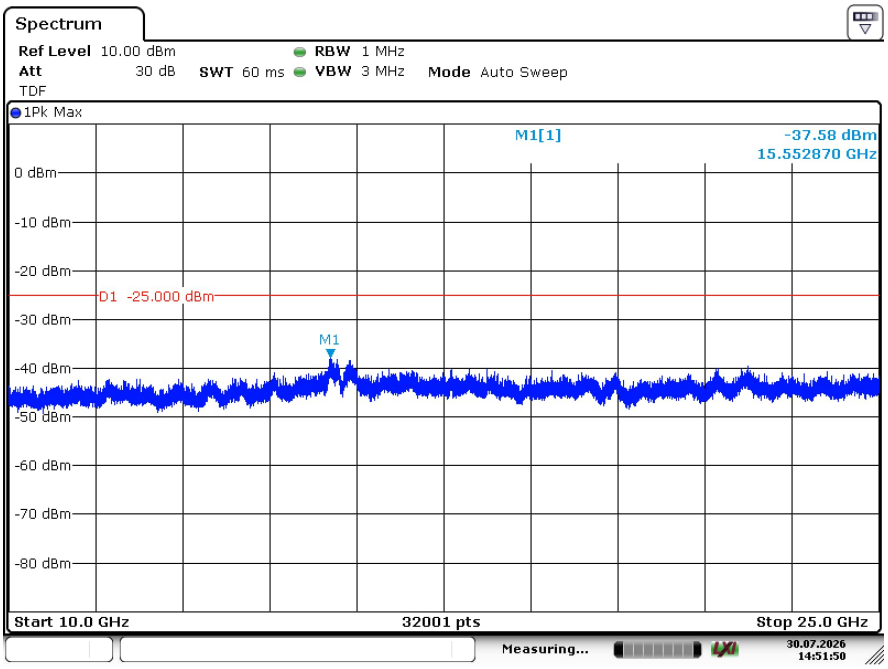

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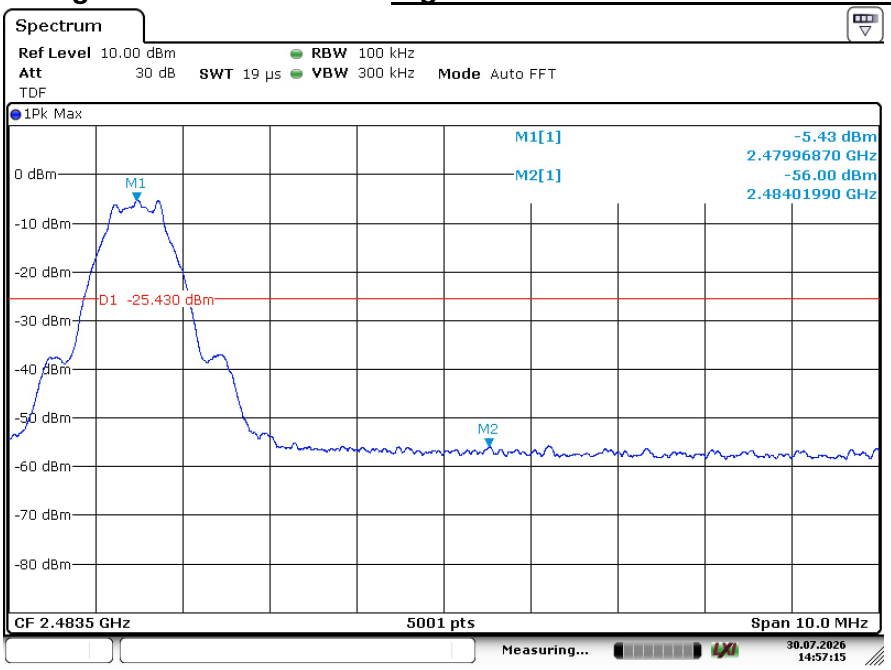
High Band-edge ***Highest Channel & Modulation : GFSK***



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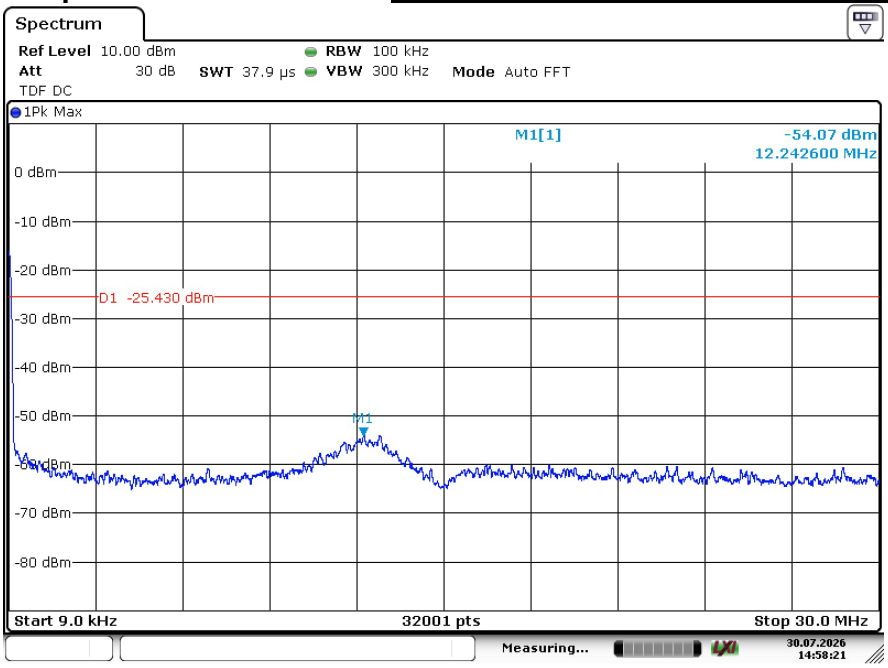
Conducted Spurious Emissions ***Highest Channel & Modulation : GFSK***



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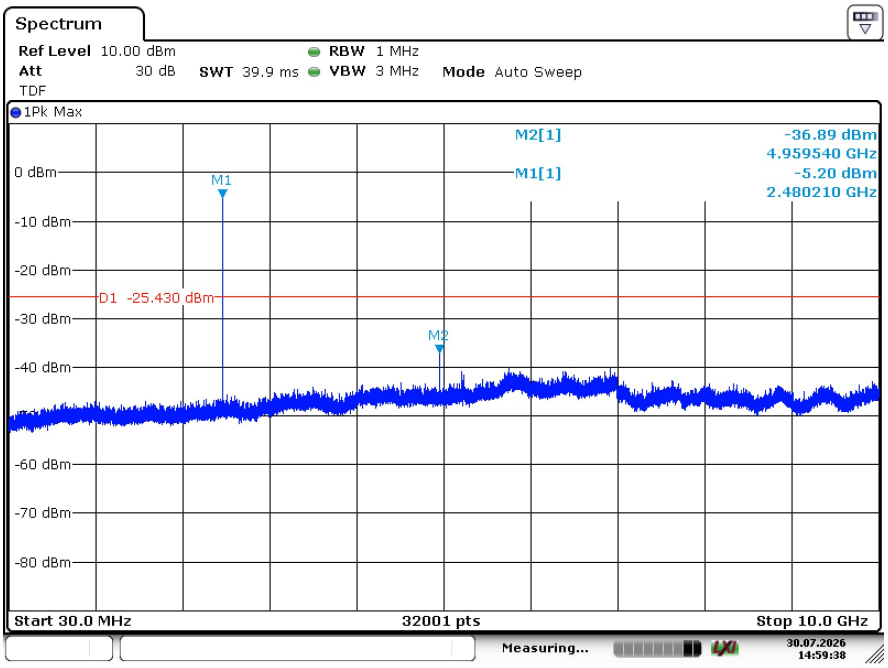

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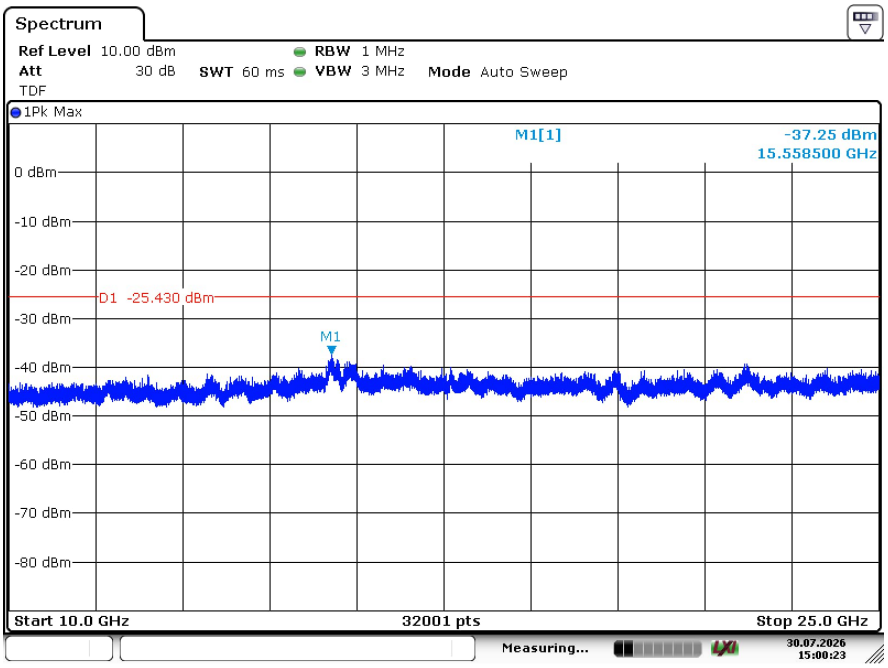


Date: 30.JUL.2026 15:00:23

9. Transmitter AC Power Line Conducted Emission

9.1. Test Setup

See test photo graphs for the actual connections between EUT and support equipment.

9.2. Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Conducted 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

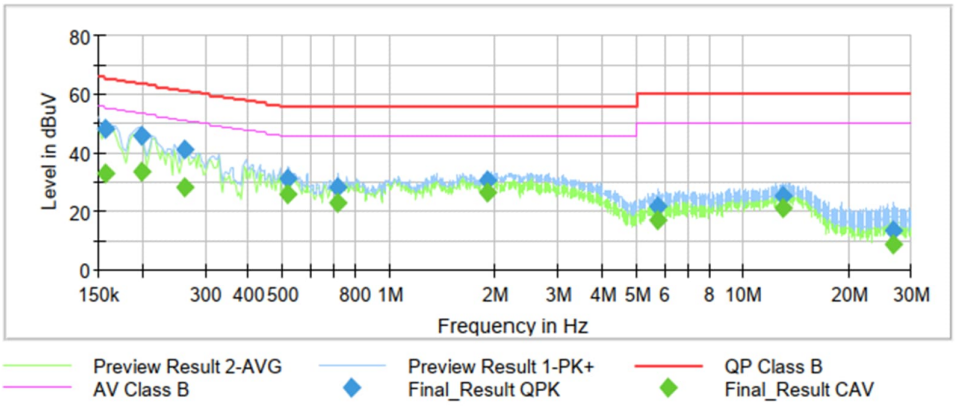
9.3. Test Procedures

Conducted emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

9.4. Test Results

AC Line Conducted Emission (Graph) = Lowest Channel_N



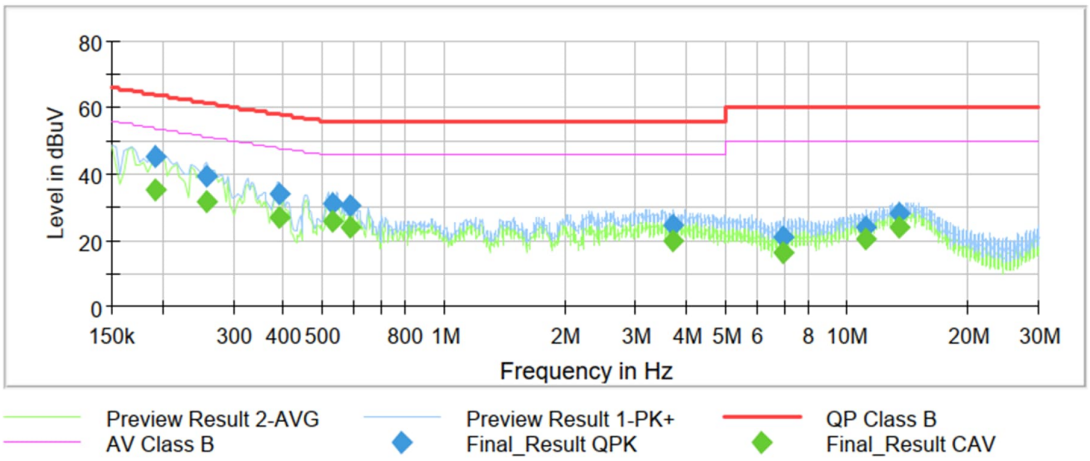
Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.157463	48.31	65.56	17.26	15000.0	9.000	N	ON	9.9
0.198506	45.99	63.52	17.54	15000.0	9.000	N	ON	10.0
0.261938	41.04	61.17	20.12	15000.0	9.000	N	ON	9.7
0.519394	31.47	56.00	24.53	15000.0	9.000	N	ON	9.9
0.717150	28.01	56.00	27.99	15000.0	9.000	N	ON	9.9
1.914881	30.42	56.00	25.58	15000.0	9.000	N	ON	9.7
5.765531	21.99	60.00	38.01	15000.0	9.000	N	ON	9.8
13.015350	25.38	60.00	34.62	15000.0	9.000	N	ON	9.9
26.832169	13.50	60.00	46.50	15000.0	9.000	N	ON	10.0

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.157463	32.71	55.56	22.85	15000.0	9.000	N	ON	9.9
0.198506	33.30	53.49	20.20	15000.0	9.000	N	ON	10.0
0.261938	28.45	51.13	22.68	15000.0	9.000	N	ON	9.7
0.519394	25.79	46.00	20.21	15000.0	9.000	N	ON	9.9
0.717150	23.07	46.00	22.93	15000.0	9.000	N	ON	9.9
1.914881	26.36	46.00	19.64	15000.0	9.000	N	ON	9.7
5.765531	17.14	50.00	32.86	15000.0	9.000	N	ON	9.8
13.015350	21.24	50.00	28.76	15000.0	9.000	N	ON	9.9
26.832169	9.00	50.00	41.00	15000.0	9.000	N	ON	10.0

AC Line Conducted Emission (Graph) = Lowest Channel_L1



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.191044	45.21	63.86	18.65	15000.0	9.000	L1	ON	10.0
0.258206	39.56	61.29	21.73	15000.0	9.000	L1	ON	9.7
0.388800	34.21	57.96	23.74	15000.0	9.000	L1	ON	9.9
0.530588	31.09	56.00	24.91	15000.0	9.000	L1	ON	9.9
0.586556	30.39	56.00	25.61	15000.0	9.000	L1	ON	9.9
3.720806	24.57	56.00	31.43	15000.0	9.000	L1	ON	9.8
6.985650	21.16	60.00	38.84	15000.0	9.000	L1	ON	9.8
11.145994	24.25	60.00	35.75	15000.0	9.000	L1	ON	9.9
13.448175	28.00	60.00	32.00	15000.0	9.000	L1	ON	9.9

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.191044	35.28	53.83	18.55	15000.0	9.000	L1	ON	10.0
0.258206	31.96	51.25	19.28	15000.0	9.000	L1	ON	9.7
0.388800	27.33	47.93	20.60	15000.0	9.000	L1	ON	9.9
0.530588	25.62	46.00	20.38	15000.0	9.000	L1	ON	9.9
0.586556	24.05	46.00	21.95	15000.0	9.000	L1	ON	9.9
3.720806	19.77	46.00	26.23	15000.0	9.000	L1	ON	9.8
6.985650	16.30	50.00	33.70	15000.0	9.000	L1	ON	9.8
11.145994	20.30	50.00	29.70	15000.0	9.000	L1	ON	9.9
13.448175	23.96	50.00	26.04	15000.0	9.000	L1	ON	9.9

APPENDIX I

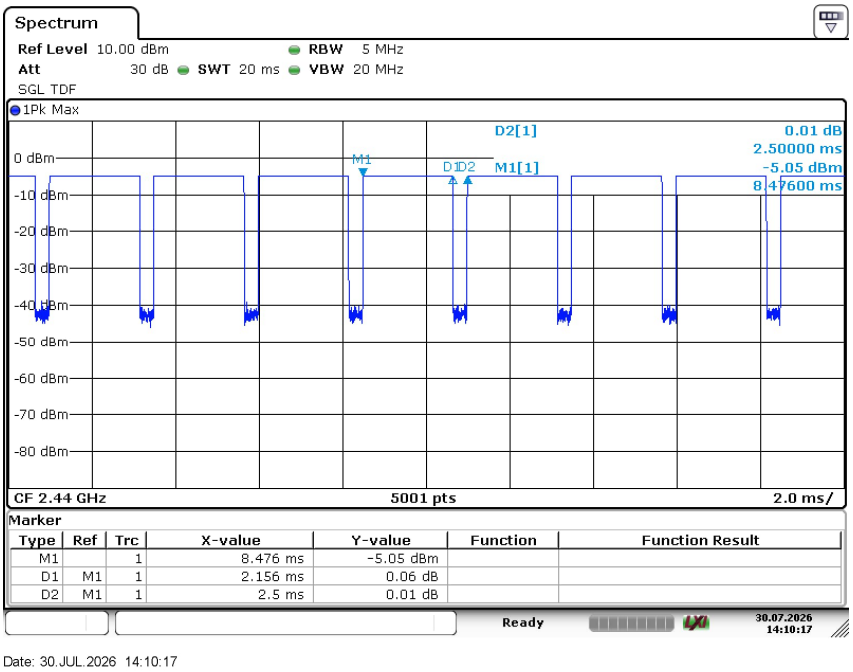
Duty cycle plots

- **Test Procedures**

- KDB558074 D01v05r02 – Section 6

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50 /T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

Duty Cycle TM 1



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