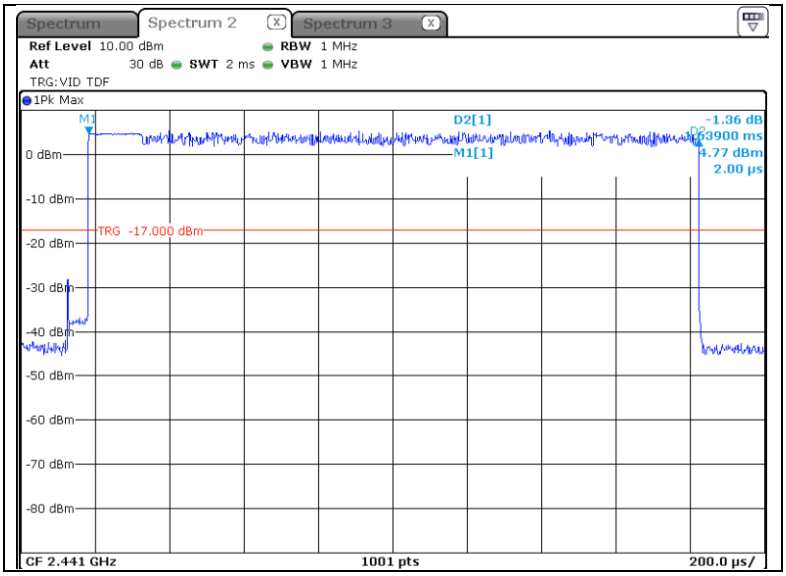
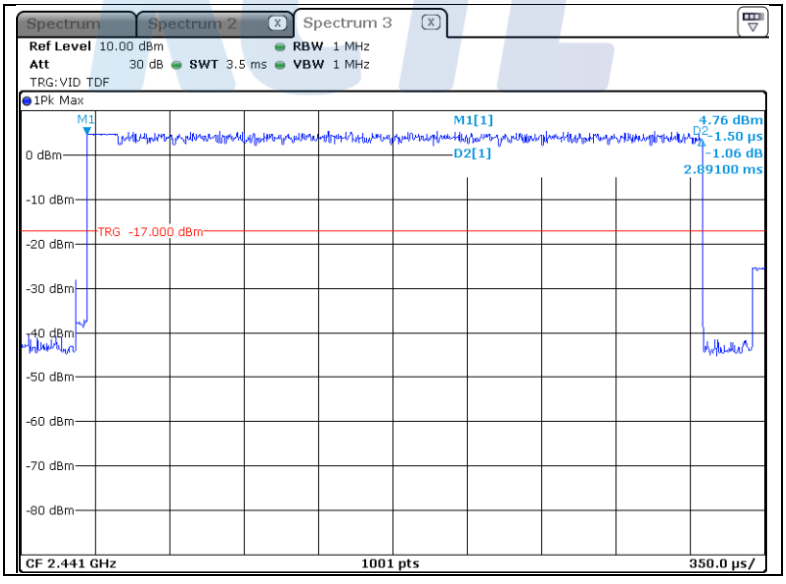
3-DH3 (2 441 ㎒)



3-DH5 (2 441 ㎒)



5.7 Spurious Emission, Band edge and Restricted bands

5.7.1 Regulation

According to §15.247(d), in any 100 ㎑ 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 ㏈ below that in the 100 ㎑ 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 this section, the attenuation required under this paragraph shall be 30 ㏈ instead of 20 ㏈. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall notexceed the field strength levels specified in the following table:

Frequency (㎒)	Field strength (㎶/m)	Measurement distance (m)
0.009 - 0.490	2 400/F(㎑)	300
0.490 -1.705	24 000/F(㎑)	30
1.705 – 30	30	30
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 ㎒, 76–88 ㎒, 174–216 ㎒ or 470–806 ㎒. However, operation within these frequency bands is permItted under other sections of this part, e.g., §§15.231 and 15.241.

According to § 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

㎒	㎒	㎒	㎓
0.009 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	Above 38.6
13.36 - 13.41	322 - 335.4		

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1 000 ㎒, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 ㎒, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

5.7.2 Measurement Procedure

The method of measurement used to test this FHSS device is ANSI C63.10-2013.

1) Band-edge Compliance of RF Conducted Emissions

These procedures are applicable for determining compliance at authorized-band band-edges where the requirements are expressed as a value relative to the in-band signal level. Procedures for determining compliance with field strength limits at or close to the band-edges are given in 6.10.6 (see also Table A.2).
Band-edge tests are typically performed as a conducted test but may be performed as Radiated measurements on a test site meeting the specifications in 5.2, at the measurement distances specified in 5.3. The instrumentation shall meet the requirements in 4.1.1 using the bandwidths and detectors Specified in 4.1.4.2.
When performing radiated measurements, the measurement antenna(s) shall meet the specifications in 4.3. The EUT shall be connected to an antenna and operated at the highest power settings following procedures in 6.3.

For other than frequency-hopping devices, this test sequence shall be performed once. For devices that support frequency hopping, this test sequence shall be performed twice: once with the hopping function turned OFF and then repeated with the hopping function turned ON. The purpose of the test with the hopping function turned on is to confirm that the RF power remains OFF while the device is changing frequencies, and that the oscillator stabilizes at the new frequency before RF power is turned back ON.Overshoot of any oscillator, including phase-lock-loop stabilized oscillators, can cause the device to be temporarily tuned to frequencies outside the authorized band, and it is important that no transmissions occur during such temporary periods. Particular attention to the hopping sequence requirements specified below is needed in the case of adaptive frequency-hopping devices:

a) Connect the EMI receiver or spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

b) Set the EUT to the lowest frequency channel (for the hopping on test, the hopping sequence shall include the lowest frequency channel).

c) Set the EUT to operate at maximum output power and 100 % duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.

d) If using the radiated method, then use the applicable procedure(s) of 6.4, 6.5, or 6.6, and orient the EUT and measurement antenna positions to produce the highest emission level.

e) Perform the test as follows:

1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.

2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

3) Attenuation: Auto (at least 10 dB preferred).

4) Sweep time: Coupled.

5) Resolution bandwidth: 100 ㎑.

6) Video bandwidth: 300 ㎑.

7) Detector: Peak.

8) Trace: Max hold.

f) Allow the trace to stabilize. For the test with the hopping function turned ON, this can take several minutes to achieve a reasonable probability of intercepting any emissions due to oscillator overshoot.

g) Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

h) Repeat step c) through step e) for every applicable modulation.

i) Set the EUT to the highest frequency channel (for the hopping on test, the hopping sequence shall include the highest frequency channel) and repeat step c) through step d).

j) The band-edge measurement shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

2) Spurious RF Conducted Emissions:

Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the Maximum transmit powers.
Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer.
The instrument shall span 30 ㎒ to 10 times the operating frequency in ㎓, with a resolution bandwidth of 100 ㎑, video bandwidth of 300 ㎑, and a coupled sweep time with a peak detector. The band 30 ㎒ to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.

3) Spurious Radiated Emissions:

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an semi-anechoic chamber at a distance of 3 meters.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 ㎑ to 30 ㎒ using the loop antenna, and from 30 to 1 000 ㎒ using the Bi-Log antenna, and from 1 000 ㎒ to 26 500 ㎒ using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter in an semi-anechoic chamber. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The 0.8m height is for below 1 G testing, and 1.5m is for above 1G testing.

- **Procedure for unwanted emissions measurements below 1 000 ㎒**

The procedure for unwanted emissions measurements below 1 000 ㎒ is as follows:

a) Follow the requirements in 12.7.4.

b) Compliance shall be determined using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.

- **Procedure for peak unwanted emissions measurements above 1 000 ㎒**

The procedure for peak unwanted emissions measurements above 1 000 ㎒ is as follows:

a) Follow the requirements in 12.7.4.

b) Peak emission levels are measured by setting the instrument as follows:

1) RBW = 1 ㎒.

2) VBW ≥ [3 ㎒ RBW].

3) Detector = peak.

4) Sweep time = auto.

5) Trace mode = max hold.

6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where *D* is the duty cycle. For example, at 50 ㆍ duty cycle, the measurement time will increase by a factor of two, relative to measurement time for continuous transmission.

- **Procedures for average unwanted emissions measurements above 1 000 ㎒**

Method VB-A is averaging using reduced video bandwidth. The procedure for this method is as follows:

a) RBW = 1 ㎒.

b) Video bandwidth:

1) If the EUT is configured to transmit with D ≥ 98 ㆍ, then set VBW ≤ RBW / 100 (i.e., 10 ㎑), but not less than 10 ㎐.

2) If the EUT D is < 98%, then set VBW ≥ 1 / T, where T is defined in item a1) of 12.2.

c) Video bandwidth mode or display mode:

1) The instrument shall be set with video filtering applied in the power domain. Typically, this requires setting the detector mode to RMS (power averaging) and setting the average-VBW type to power (rms).

2) As an alternative, the instrument may be set to linear detector mode. Video filtering shall be applied in linear voltage domain (rather than in a log or ㏈ domain). Some instruments require linear display mode to accomplish this. Others have a setting for average-VBW type, which can be set to “voltage” regardless of the display mode.

d) Detector = peak.

e) Sweep time = auto.

f) Trace mode = max hold.

g) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98% duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where D is the duty cycle. For example, use at least 200 traces if the duty cycle is 25%. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 50 traces should be averaged.)

5.7.3 Test Result

- Complied

1. Conducted Spurious Emissions was shown in figure 3.
   Note: We took the insertion loss of the cable into consideration within the measuring instrument.
2. Measured value of the Field strength of spurious Emissions (Radiated)
3. It tested x,y and z – 3 axis each, mentioned only worst case data at this report.

- Below 1 ㎓ data (Worst-case: 8DPSK)

Lowest Channel (2 402 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Quasi-Peak DATA. Emissions below 30 ㎒										
1.28	9	V	37.90	0.31	-32.72	19.61	-12.80	25.10	65.50	40.40
4.27	9	V	39.10	0.52	-32.70	19.68	-12.50	26.60	69.50	42.90
Quasi-Peak DATA. Emissions below 1 ㎓										
50.73	120	V	37.80	1.61	-32.51	14.30	-16.60	21.20	40.00	18.80
499.97	120	V	28.80	12.94	-32.74	17.20	-2.60	26.20	46.00	19.80
600.00	120	V	30.40	13.07	-32.87	19.30	-0.50	29.90	46.00	16.10
879.72	120	H	24.00	13.56	-32.18	21.92	3.30	27.30	46.00	18.70

NOTE 1. Factor = Cable loss + Amp gain + Antenna factor
NOTE 2. Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open field test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB414788.
NOTE 3. Duty Cycle Correction Factor Calculation
- Worst case : AFH mode
- Channel hop rate = 800 hops/second
- Hopping rate for DH5 mode = 133.33 hops/second
- Time per channel hop = 1 / 133.33 hops/second = 7.50 ms
- Time to cycle through all channels = 7.50 x 20 channels(AFH mode) = 150 ms
- Number of times transmitter hits on one channel = 100 ms /
  Time to cycle through all channels [ms] = 100 ms / 150 ms = 1 time
- Worst case Dwell time = 7.5 ms
- Duty Cycle Correction Factor = 20log10(7.5 ms/100 ms) = -22.5 dB
* FCC limits the correction factor to 20 dB, ∴ DCCF = -20 dB

- Above 1 ㎓ data

GFSK_Lowest channel (2 402 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 433.75	1 000	V	73.50	2.98	-65.31	29.53	-32.80	-	40.70	74.00	33.30
1 800.94	1 000	V	73.30	3.36	-64.05	30.79	-29.90	-	43.40	74.00	30.60
2 387.50[1)]	1 000	V	68.90	3.94	-63.17	31.93	-27.30	-	41.60	74.00	32.40
4 803.19	1 000	H	68.10	6.51	-62.74	34.13	-22.10	-	46.00	74.00	28.00
21 371.31	1 000	V	48.50	13.40	-54.50	46.00	4.90	-	53.40	74.00	20.60
24 926.44	1 000	V	46.50	15.00	-52.70	45.40	7.70	-	54.20	74.00	19.80
Average DATA. Emissions above 1 ㎓											
1 433.75	1 000	V	61.00	2.98	-65.31	29.53	-32.80	-	28.20	54.00	25.80
1 800.94	1 000	V	63.10	3.36	-64.05	30.79	-29.90	-	33.20	54.00	20.80
2 387.50[1)]	1 000	V	58.90	3.94	-63.17	31.93	-27.30	-20.00	9.10	54.00	44.90
4 803.19	1 000	H	65.30	6.51	-62.74	34.13	-22.10	-	43.20	54.00	10.80
21 371.31	1 000	V	34.20	13.40	-54.50	46.00	4.90	-	39.10	54.00	14.90
24 926.44	1 000	V	32.30	15.00	-52.70	45.40	7.70	-	40.00	54.00	14.00

[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

GFSK_Middle channel (2 441 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 086.88	1 000	H	78.90	2.62	-64.26	28.34	-33.30	-	45.60	74.00	28.40
1 199.06	1 000	V	69.30	2.74	-64.76	28.72	-33.30	-	36.00	74.00	38.00
1 800.63	1 000	V	71.90	3.36	-64.05	30.79	-29.90	-	42.00	74.00	32.00
4 881.13	1 000	H	67.60	6.52	-62.95	34.23	-22.20	-	45.40	74.00	28.60
21 862.19	1 000	V	47.80	13.70	-54.40	45.80	5.10	-	52.90	74.00	21.10
25 827.44	1 000	V	44.70	14.90	-51.90	46.20	9.20	-	53.90	74.00	20.10
Average DATA. Emissions above 1 ㎓											
1 086.88	1 000	H	64.10	2.62	-64.26	28.34	-33.30	-	30.80	54.00	23.20
1 199.06	1 000	V	61.60	2.74	-64.76	28.72	-33.30	-	28.30	54.00	25.70
1 800.63	1 000	V	62.00	3.36	-64.05	30.79	-29.90	-	32.10	54.00	21.90
4 881.13	1 000	H	63.60	6.52	-62.95	34.23	-22.20	-	41.40	54.00	12.60
21 862.19	1 000	V	34.50	13.70	-54.40	45.80	5.10	-	39.60	54.00	14.40
25 827.44	1 000	V	31.30	14.90	-51.90	46.20	9.20	-	40.50	54.00	13.50

GFSK_Highest channel (2 480 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 781.56	1 000	H	73.40	3.34	-64.16	30.72	-30.10	-	43.30	74.00	30.70
1 802.81	1 000	V	73.90	3.36	-64.05	30.79	-29.90	-	44.00	74.00	30.00
2 484.69[1)]	1 000	V	84.80	4.04	-62.88	32.04	-26.80	-	58.00	74.00	16.00
4 959.06	1 000	V	68.20	6.52	-63.24	34.32	-22.40	-	45.80	74.00	28.20
20 636.06	1 000	V	48.80	13.10	-54.30	45.80	4.60	-	53.40	74.00	20.60
26 031.44	1 000	V	44.10	14.90	-51.80	46.30	9.40	-	53.50	74.00	20.50
Average DATA. Emissions above 1 ㎓											
1 781.56	1 000	H	56.80	3.34	-64.16	30.72	-30.10	-	26.70	54.00	27.30
1 802.81	1 000	V	62.80	3.36	-64.05	30.79	-29.90	-	32.90	54.00	21.10
2 484.69[1)]	1 000	V	82.80	4.04	-62.88	32.04	-26.80	-20.00	33.50	54.00	20.50
4 959.06	1 000	V	62.90	6.52	-63.24	34.32	-22.40	-	40.50	54.00	13.50
20 636.06	1 000	V	34.70	13.10	-54.30	45.80	4.60	-	39.30	54.00	14.70
26 031.44	1 000	V	31.10	14.90	-51.80	46.30	9.40	-	40.50	54.00	13.50

[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

π/4DQPSK_Lowest channel (2 402 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 088.75	1 000	H	78.50	2.62	-64.26	28.34	-33.30	-	45.20	74.00	28.80
1 798.75	1 000	V	77.40	3.36	-64.04	30.78	-29.90	-	47.50	74.00	26.50
2 388.75[1)]	1 000	H	67.90	3.94	-63.17	31.93	-27.30	-	40.60	74.00	33.40
4 803.19	1 000	H	66.80	6.51	-62.74	34.13	-22.10	-	44.70	74.00	29.30
21 591.25	1 000	V	48.00	13.60	-54.50	45.90	5.00	-	53.00	74.00	21.00
25 380.12	1 000	V	44.40	15.00	-52.50	45.80	8.30	-	52.70	74.00	21.30
Average DATA. Emissions above 1 ㎓											
1 088.75	1 000	H	64.50	2.62	-64.26	28.34	-33.30	-	31.20	54.00	22.80
1 798.75	1 000	V	63.20	3.36	-64.04	30.78	-29.90	-	33.30	54.00	20.70
2 388.75[1)]	1 000	H	56.90	3.94	-63.17	31.93	-27.30	-20.00	7.10	54.00	46.90
4 803.19	1 000	H	61.60	6.51	-62.74	34.13	-22.10	-	39.50	54.00	14.50
21 591.25	1 000	V	34.00	13.60	-54.50	45.90	5.00	-	39.00	54.00	15.00
25 380.12	1 000	V	31.50	15.00	-52.50	45.80	8.30	-	39.80	54.00	14.20

[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

π/4DQPSK_Middle channel (2 441 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 049.69	1 000	H	75.00	2.58	-64.09	28.21	-33.30	-	41.70	74.00	32.30
1 415.94	1 000	V	72.80	2.96	-65.33	29.47	-32.90	-	39.90	74.00	34.10
1 801.25	1 000	V	75.10	3.36	-64.05	30.79	-29.90	-	45.20	74.00	28.80
4 881.13	1 000	H	66.60	6.52	-62.95	34.23	-22.20	-	44.40	74.00	29.60
20 543.62	1 000	H	48.60	13.10	-54.20	45.60	4.50	-	53.10	74.00	20.90
26 008.06	1 000	V	44.10	14.90	-51.90	46.40	9.40	-	53.50	74.00	20.50
Average DATA. Emissions above 1 ㎓											
1 049.69	1 000	H	62.00	2.58	-64.09	28.21	-33.30	-	28.70	54.00	25.30
1 415.94	1 000	V	60.10	2.96	-65.33	29.47	-32.90	-	27.20	54.00	26.80
1 801.25	1 000	V	60.80	3.36	-64.05	30.79	-29.90	-	30.90	54.00	23.10
4 881.13	1 000	H	60.40	6.52	-62.95	34.23	-22.20	-	38.20	54.00	15.80
20 543.62	1 000	H	34.70	13.10	-54.20	45.60	4.50	-	39.20	54.00	14.80
26 008.06	1 000	V	31.10	14.90	-51.90	46.40	9.40	-	40.50	54.00	13.50

π/4DQPSK_Highest channel (2 480 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 064.06	1 000	H	75.90	2.60	-64.16	28.26	-33.30	-	42.60	74.00	31.40
1 797.50	1 000	V	73.10	3.36	-64.04	30.78	-29.90	-	43.20	74.00	30.80
2 484.69[1)]	1 000	V	84.00	4.04	-62.88	32.04	-26.80	-	57.20	74.00	16.80
4 959.06	1 000	H	67.90	6.52	-63.24	34.32	-22.40	-	45.50	74.00	28.50
20 560.62	1 000	H	48.20	13.10	-54.30	45.70	4.50	-	52.70	74.00	21.30
24 250.69	1 000	H	46.60	14.50	-52.60	45.00	6.90	-	53.50	74.00	20.50
Average DATA. Emissions above 1 ㎓											
1 064.06	1 000	H	62.60	2.60	-64.16	28.26	-33.30	-	29.30	54.00	24.70
1 797.50	1 000	V	63.10	3.36	-64.04	30.78	-29.90	-	33.20	54.00	20.80
2 484.69[1)]	1 000	V	79.70	4.04	-62.88	32.04	-26.80	-20.00	30.40	54.00	23.60
4 959.06	1 000	H	60.80	6.52	-63.24	34.32	-22.40	-	38.40	54.00	15.60
20 560.62	1 000	H	34.70	13.10	-54.30	45.70	4.50	-	39.20	54.00	14.80
24 250.69	1 000	H	32.70	14.50	-52.60	45.00	6.90	-	39.60	54.00	14.40

[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

8DPSK_Lowest channel (2 402 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 105.00	1 000	H	76.80	2.64	-64.34	28.40	-33.30	-	43.50	74.00	30.50
1 803.13	1 000	V	74.70	3.37	-64.06	30.79	-29.90	-	44.80	74.00	29.20
2 388.44[1)]	1 000	V	68.40	3.94	-63.17	31.93	-27.30	-	41.10	74.00	32.90
4 803.19	1 000	V	68.60	6.51	-62.74	34.13	-22.10	-	46.50	74.00	27.50
21 859.00	1 000	H	47.50	13.70	-54.40	45.80	5.10	-	52.60	74.00	21.40
25 833.81	1 000	V	44.20	14.90	-51.90	46.20	9.20	-	53.40	74.00	20.60
Average DATA. Emissions above 1 ㎓											
1 105.00	1 000	H	63.70	2.64	-64.34	28.40	-33.30	-	30.40	54.00	23.60
1 803.13	1 000	V	60.80	3.37	-64.06	30.79	-29.90	-	30.90	54.00	23.10
2 388.44[1)]	1 000	V	57.30	3.94	-63.17	31.93	-27.30	-20.00	7.50	54.00	46.50
4 803.19	1 000	V	60.40	6.51	-62.74	34.13	-22.10	-	38.30	54.00	15.70
21 859.00	1 000	H	34.10	13.70	-54.40	45.80	5.10	-	39.20	54.00	14.80
25 833.81	1 000	V	31.30	14.90	-51.90	46.20	9.20	-	40.50	54.00	13.50

[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

8DPSK_Middle channel (2 441 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(μV)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 086.56	1 000	H	75.60	2.62	-64.26	28.34	-33.30	-	42.30	74.00	31.70
1 506.88	1 000	V	73.20	3.06	-65.44	29.78	-32.60	-	40.60	74.00	33.40
1 799.38	1 000	V	75.10	3.36	-64.04	30.78	-29.90	-	45.20	74.00	28.80
4 881.13	1 000	H	66.80	6.52	-62.95	34.23	-22.20	-	44.60	74.00	29.40
21 176.87	1 000	H	48.40	13.30	-54.50	46.10	4.90	-	53.30	74.00	20.70
26 138.75	1 000	H	43.90	14.90	-51.50	46.20	9.60	-	53.50	74.00	20.50
Average DATA. Emissions above 1 ㎓											
1 086.56	1 000	H	66.00	2.62	-64.26	28.34	-33.30	-	32.70	54.00	21.30
1 506.88	1 000	V	60.40	3.06	-65.44	29.78	-32.60	-	27.80	54.00	26.20
1 799.38	1 000	V	61.40	3.36	-64.04	30.78	-29.90	-	31.50	54.00	22.50
4 881.13	1 000	H	60.40	6.52	-62.95	34.23	-22.20	-	38.20	54.00	15.80
21 176.87	1 000	H	34.40	13.30	-54.50	46.10	4.90	-	39.30	54.00	14.70
26 138.75	1 000	H	30.80	14.90	-51.50	46.20	9.60	-	40.40	54.00	13.60

8DPSK_Highest channel (2 480 ㎒)

Frequency [㎒]	Receiver Bandwidth [㎑]	Pol. [V/H]	Reading [dB(㎶)]	Cable Loss [dB]	Amp Gain [dB]	Antenna Factor [dB]	Factor [dB]	DCCF [dB]	Result [dB(㎶/m)]	Limit [dB(㎶/m)]	Margin [dB]
Peak DATA. Emissions above 1 ㎓											
1 076.88	1 000	H	76.40	2.61	-64.21	28.30	-33.30	-	43.10	74.00	30.90
1 800.00	1 000	V	75.60	3.36	-64.04	30.78	-29.90	-	45.70	74.00	28.30
2 484.69[1)]	1 000	V	84.90	4.04	-62.88	32.04	-26.80	-	58.10	74.00	15.90
4 959.06	1 000	H	67.90	6.52	-63.24	34.32	-22.40	-	45.50	74.00	28.50
20 109.06	1 000	V	48.30	13.00	-53.90	45.10	4.20	-	52.50	74.00	21.50
25 833.81	1 000	V	44.20	14.90	-51.90	46.20	9.20	-	53.40	74.00	20.60
Average DATA. Emissions above 1 ㎓											
1 076.88	1 000	H	64.20	2.61	-64.21	28.30	-33.30	-	30.90	54.00	23.10
1 800.00	1 000	V	61.20	3.36	-64.04	30.78	-29.90	-	31.30	54.00	22.70
2 484.69[1)]	1 000	V	78.70	4.04	-62.88	32.04	-26.80	-20.00	29.40	54.00	24.60
4 959.06	1 000	H	61.80	6.52	-63.24	34.32	-22.40	-	39.40	54.00	14.60
20 109.06	1 000	V	34.60	13.00	-53.90	45.10	4.20	-	38.80	54.00	15.20
25 833.81	1 000	V	31.20	14.90	-51.90	46.20	9.20	-	40.40	54.00	13.60

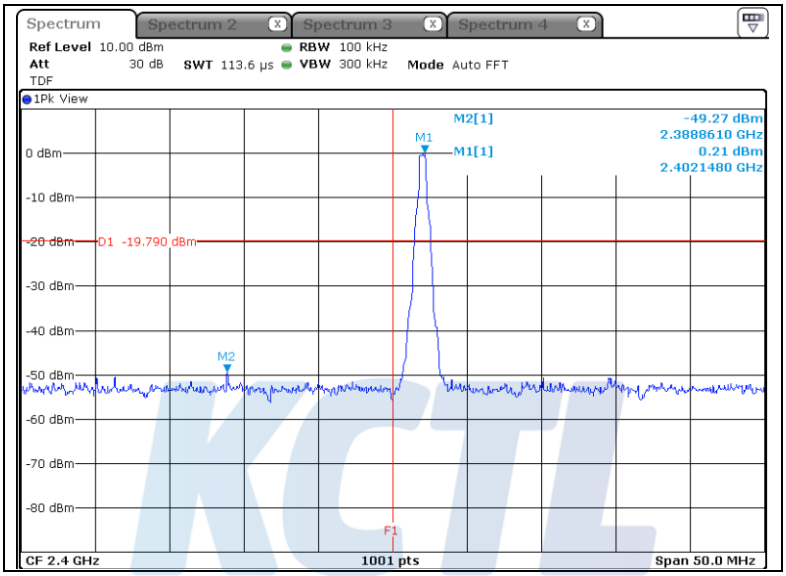
[1)] Restricted band. (Please refer to NOTE 3 for DCCF values)

5.7.4 Test Plot

Figure 5. Plot of the Band Edge (Conducted)

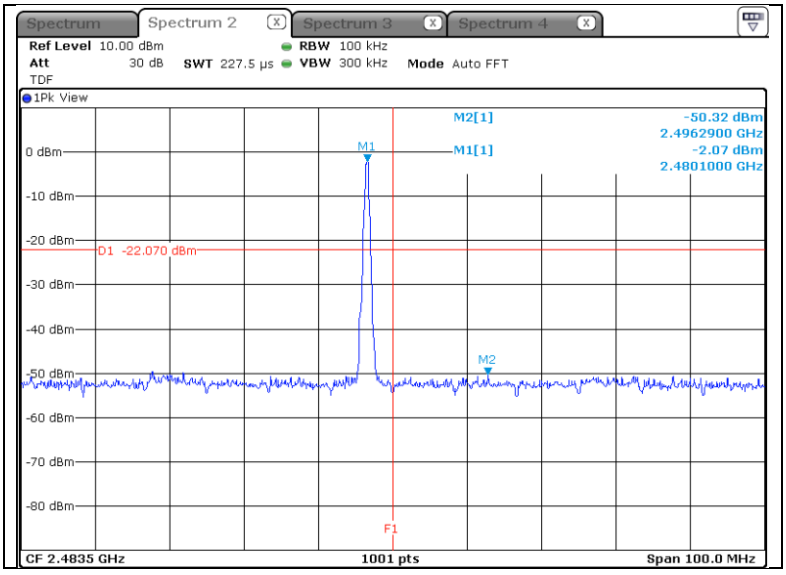
- GFSK (Without hopping)

Lowest Channel (2 402 ㎒)



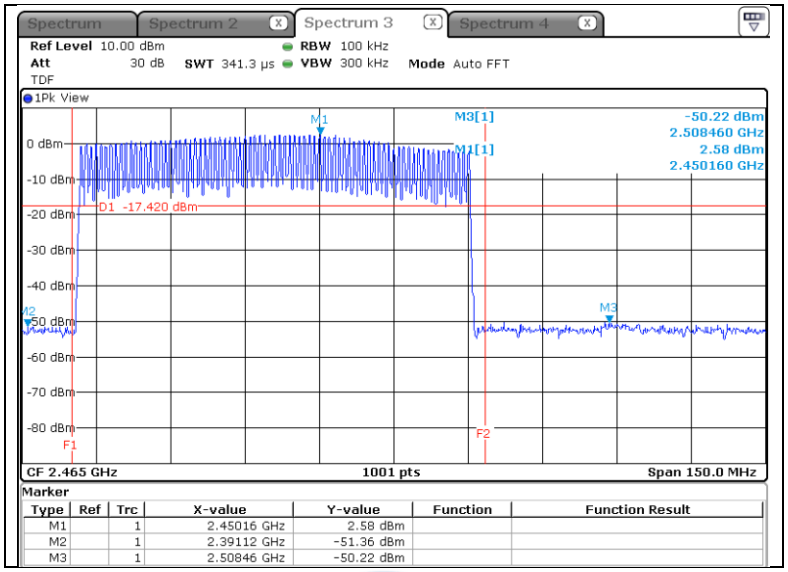
- Result of 2 400.0 ㎒

Highest Channel (2 480 ㎒)



- Result of 2 483.5 ㎒

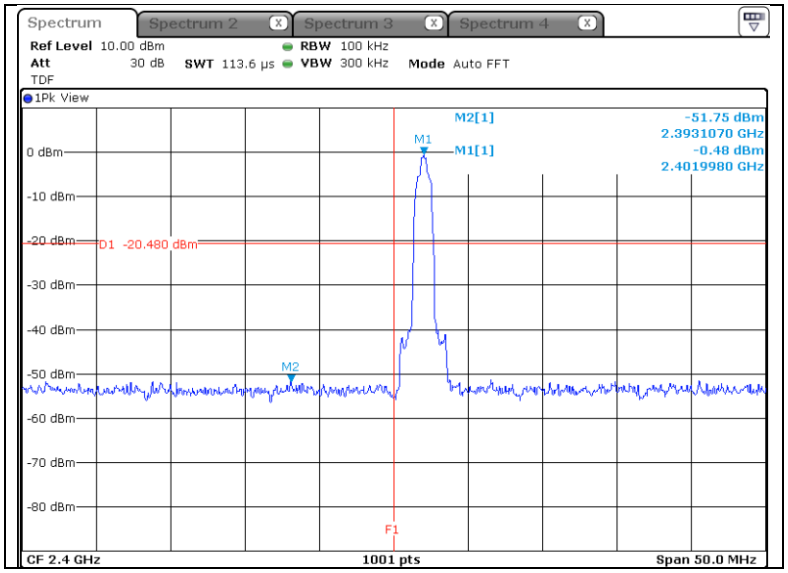
- GFSK (With hopping)



- Result of 2 400.0 ㎒ - 2 483.5 ㎒

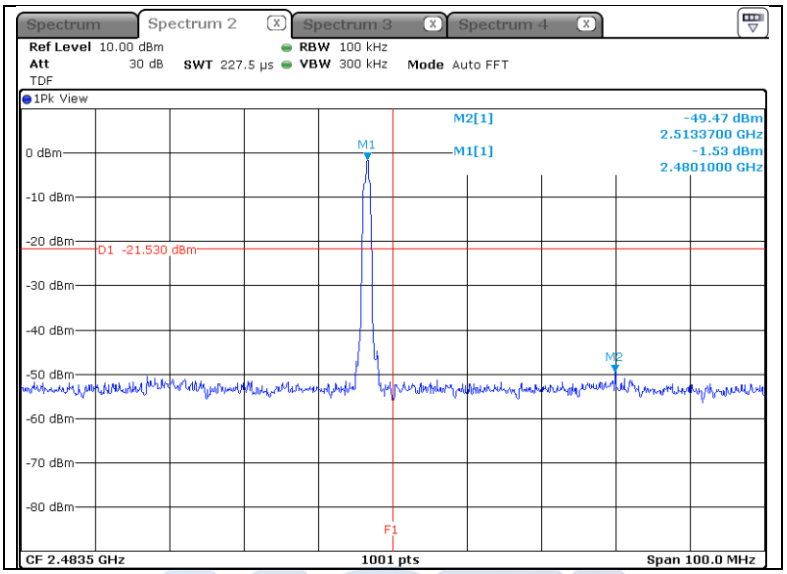
- π/4DQPSK (Without hopping)

Lowest Channel (2 402 ㎒)



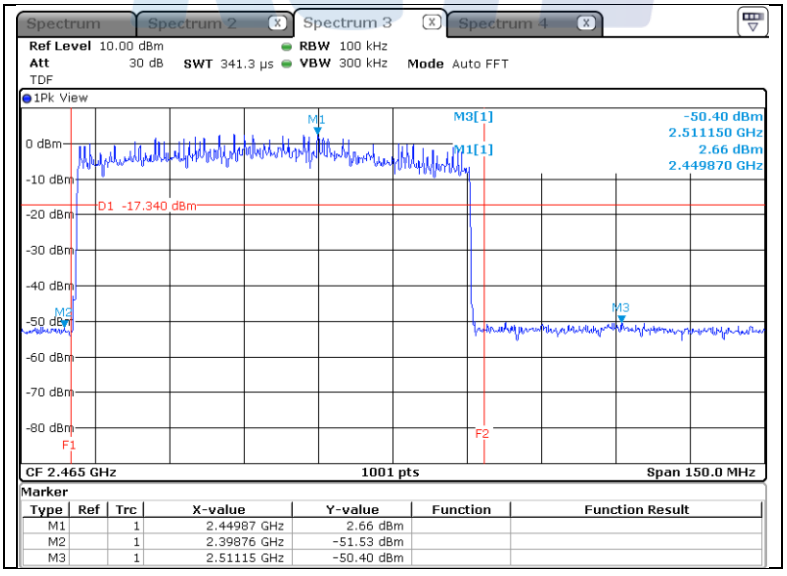
- Result of 2 400.0 ㎒

Highest Channel (2 480 ㎒)



- Result of 2 483.5 ㎒

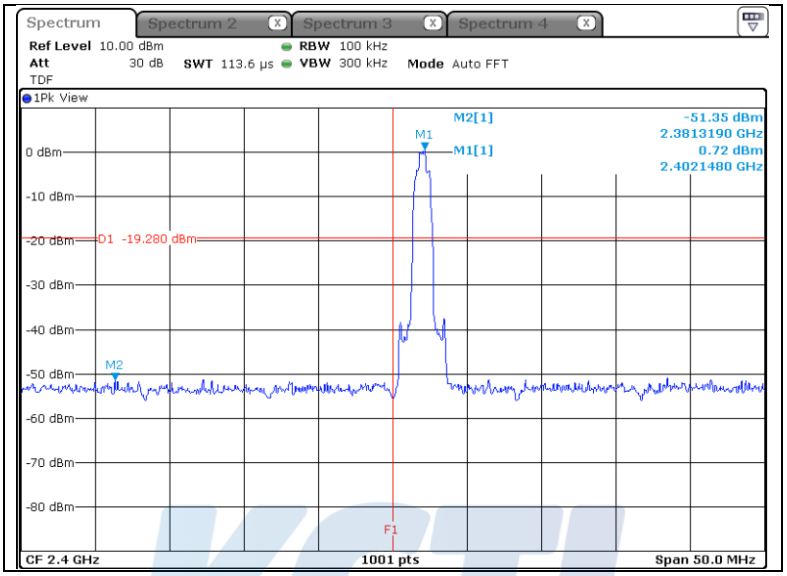
- π/4DQPSK (With hopping)



- Result of 2 400.0 ㎒ - 2 483.5 ㎒

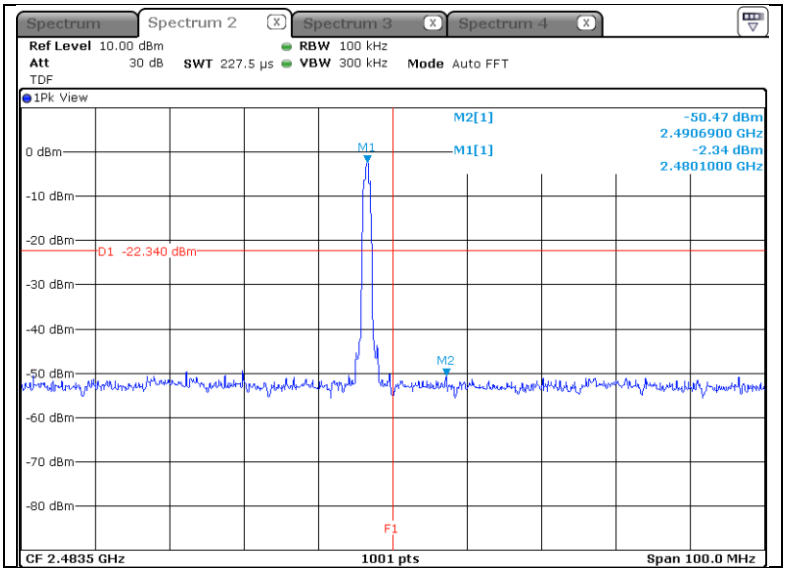
- 8DPSK (Without hopping)

Lowest Channel (2 402 ㎒)



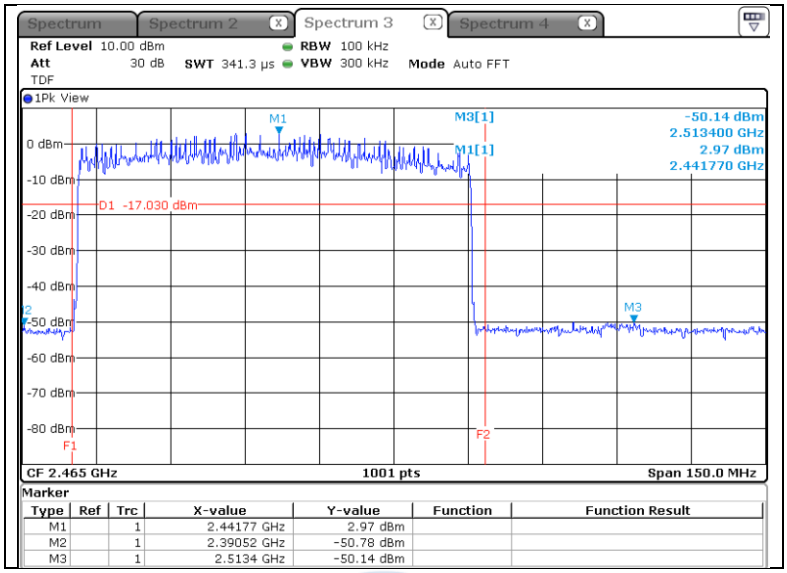
- Result of 2 400.0 ㎒

Highest Channel (2 480 ㎒)



- Result of 2 483.5 ㎒

- 8DPSK (With hopping)

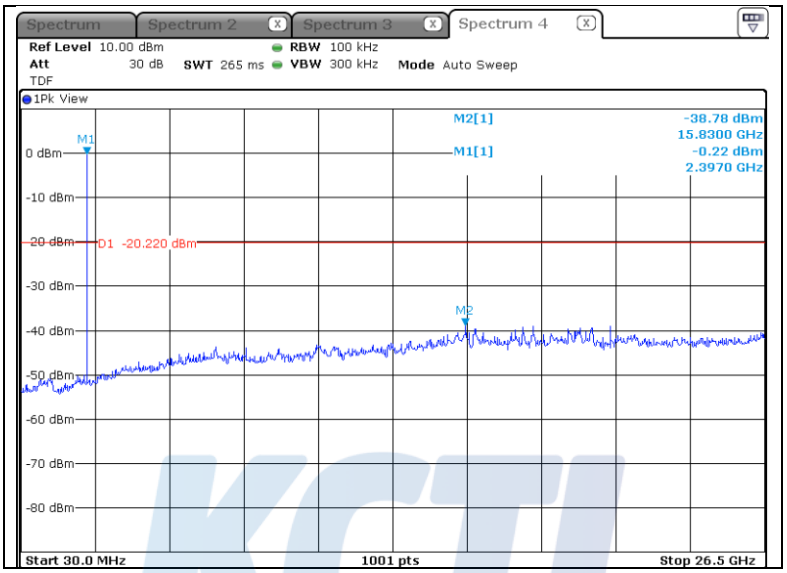


- Result of 2 400.0 ㎒ - 2 483.5 ㎒

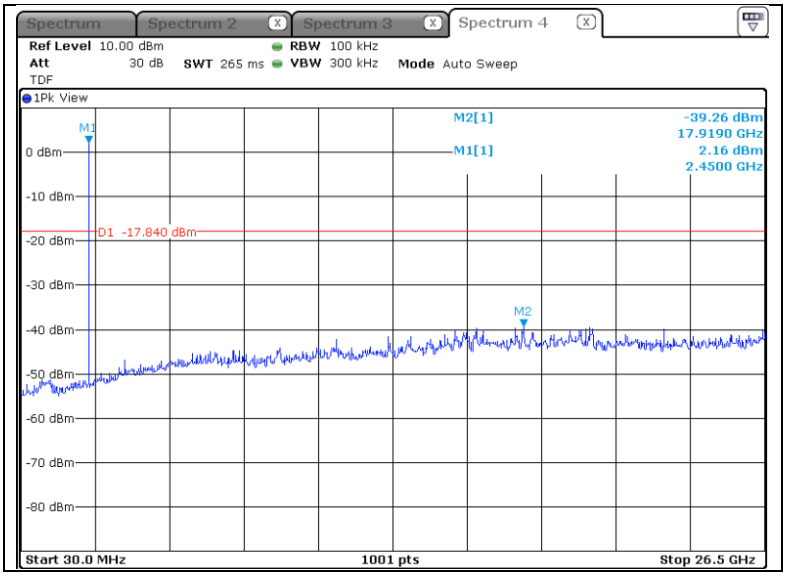
Figure 6. Plot of the Spurious RF conducted emissions

- GFSK

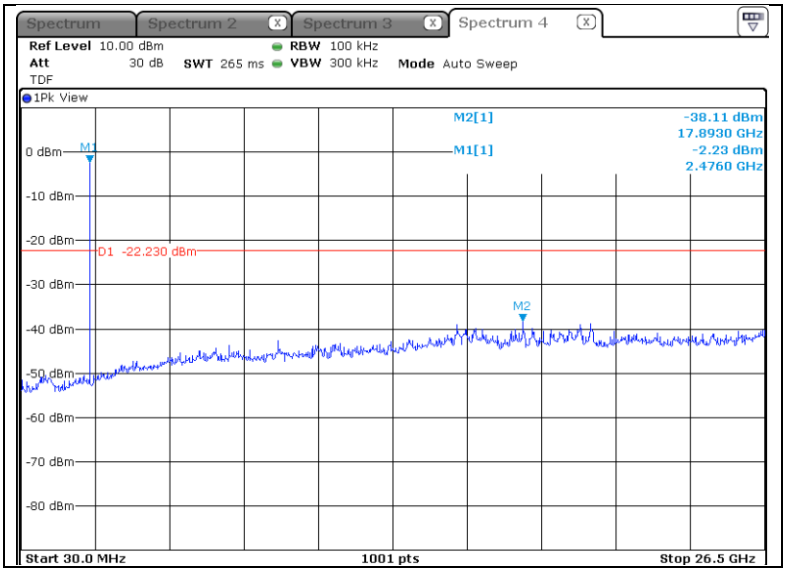
Lowest Channel (2 402 ㎒)



Middle Channel (2 441 ㎒)

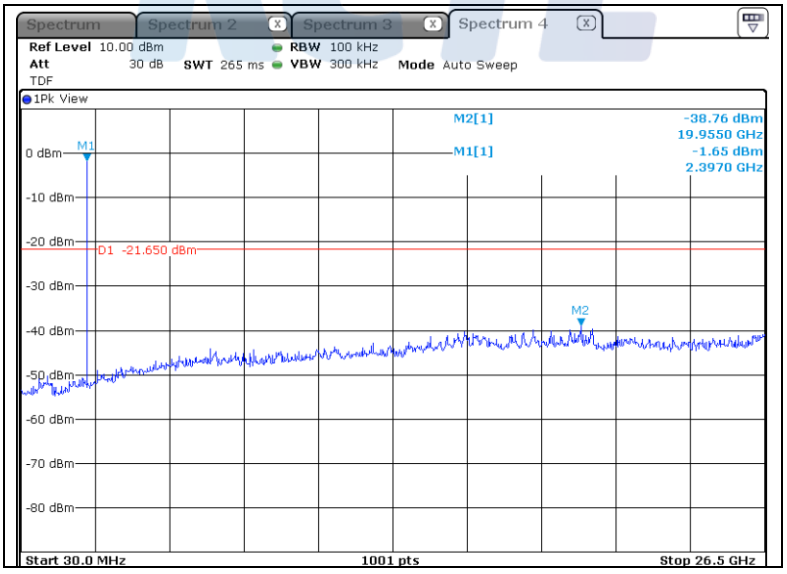


Highest Channel (2 480 ㎒)

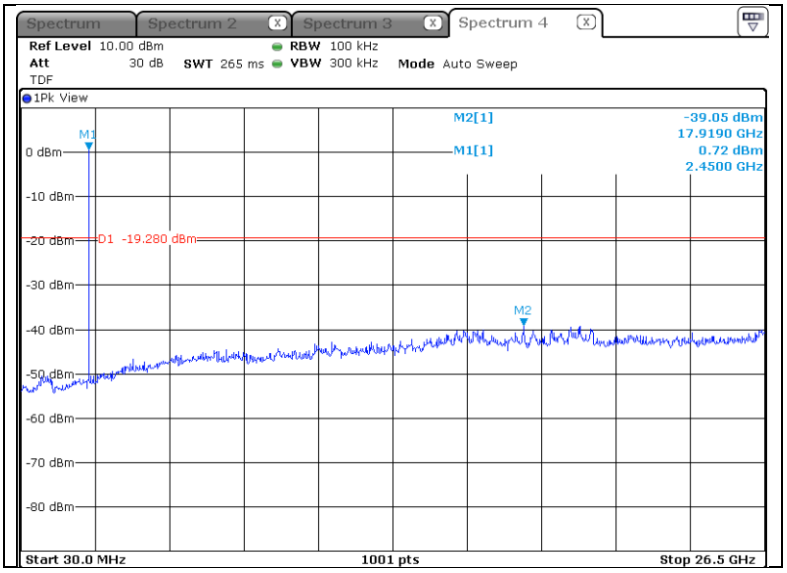


- π/4DQPSK

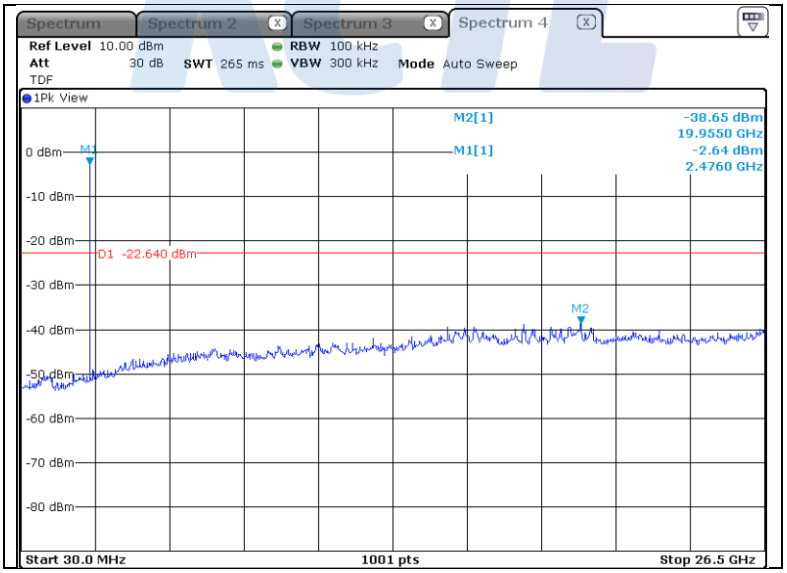
Lowest Channel (2 402 ㎒)



Middle Channel (2 441 ㎒)

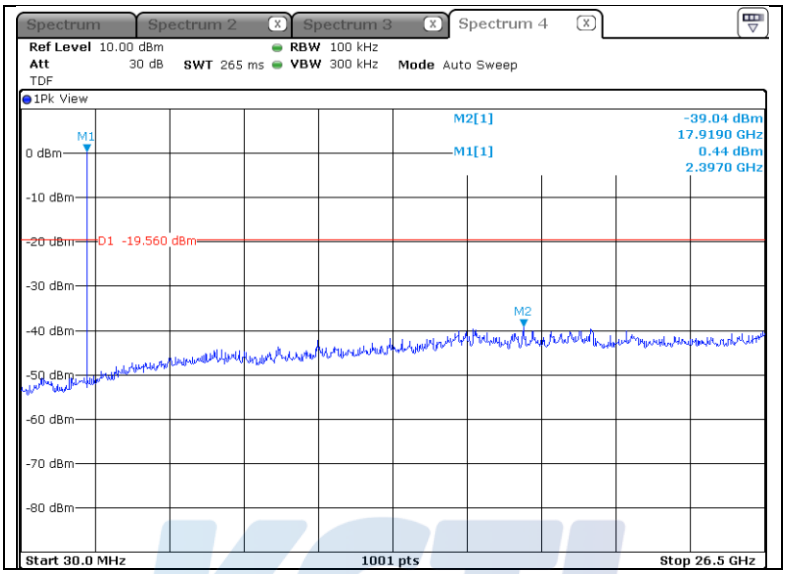


Highest Channel (2 480 ㎒)

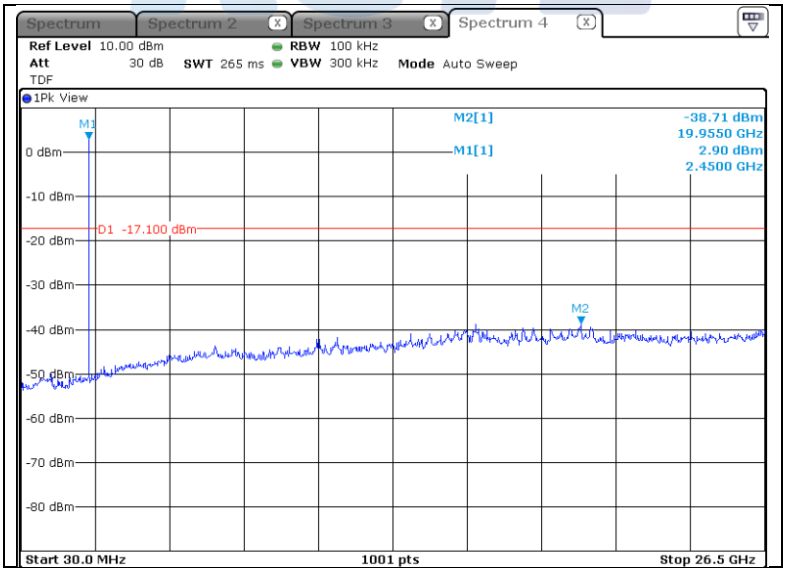


- 8DPSK

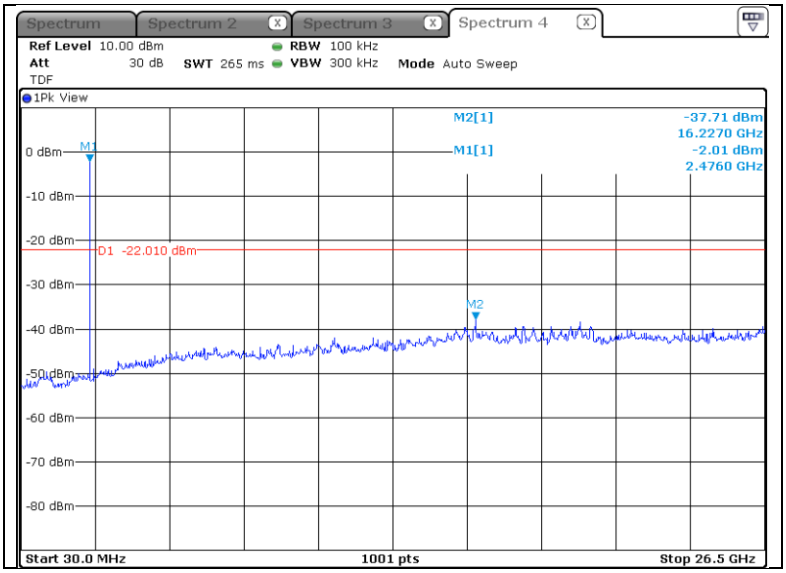
Lowest Channel (2 402 ㎒)



Middle Channel (2 441 ㎒)



Highest Channel (2 480 ㎒)



6. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	EMI TEST RECEIVER	R & S	ESCI	100732	17.08.25
■	Bi-Log Antenna	TESEQ	CBL 6112D	37876	18.08.05
■	Amplifier	SONOMA INSTRUMENT	310N	344922	17.08.26
■	Attenuator	AGILENT	8491B	MY39270292	-
■	Turn Table	Innco Systems	DT2000	79	-
■	Antenna Mast	Innco Systems	MA4000-EP	303	-
■	Spectrum Analyzer	R & S	FSV40	100989	18.01.06
■	DC POWER SUPPLY	Agilent	E3632A	MY40000265	18.05.15
■	Bluetooth Tester	TESCOM	TC-3000C	3000C000270	17.08.01
■	Wideband Power Sensor	R & S	NRP-Z81	102398	18.01.31
■	Power Divider	Aeroflex /Weinschel, Inc.	1580-1	SC571	17.08.31
■	Attenuator	R & S	DNF Dämpfungsglied 10 dB inN-50 Ohm	31209	18.05.15
■	Horn antenna	ETS.lindgren	3116	00086632	18.02.10
■	Horn antenna	ETS.lindgren	3117	00155787	17.11.25
■	AMPLIFIER	L-3 Narda-MITEQ	JS44-18004000 -33-8P	2000997	17.08.23
■	AMPLIFIER	L-3 Narda-MITEQ	AMF-7D-0100 1800-22-10P	2003683	18.06.12
■	LOOP Antenna	R & S	HFH2-Z2	100355	18.03.03
■	Antenna Mast	MATURO	AM4.0	079/3440509	-
■	Turn Table	MATURO	CO2000-SOFT	-	-
■	Highpass Filter	WT	WT-A1698-HS	WT160411001	18.05.15
■	Vector Signal Generator	R & S	SMBV100A	257566	18.01.06
■	SIGNAL GENERATOR	R & S	SMB100A	176206	18.01.31
■	Cable Assembly	JUNFLON	MWX221-DMSDMS	J1012214	-
■	Turn Table	Innco Systems	DT2000S-1t	79	-