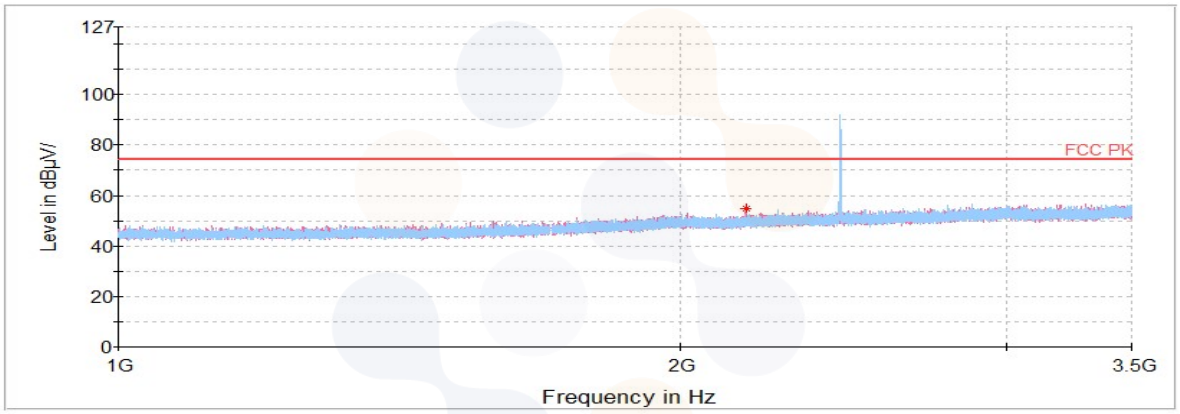
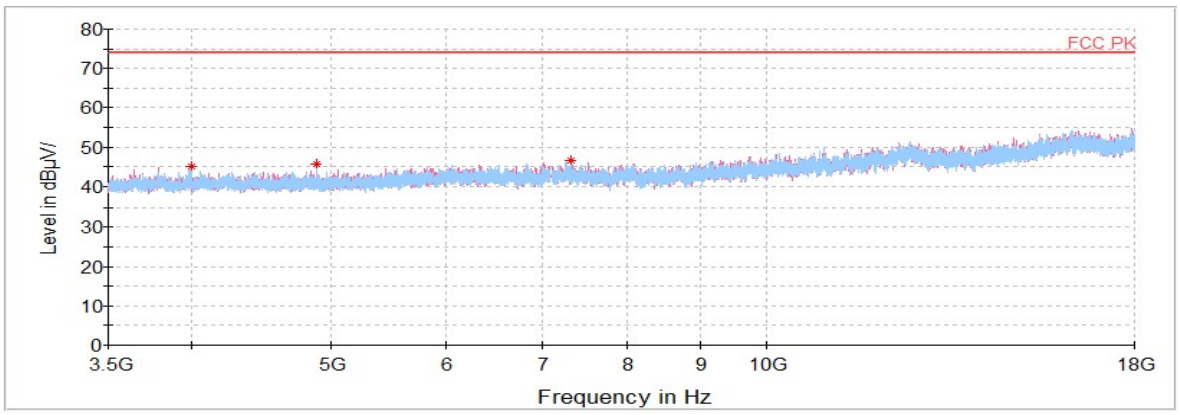
2 440 ㎒

Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
2 172.50	V	41.67	31.68	-18.50	-	54.85	74.00	19.15
3 995.72[1)]	H	67.74	33.59	-56.34	-	44.99	74.00	29.01
4 880.22[1)]	H	67.12	33.70	-55.09	-	45.73	74.00	28.27
7 319.39[1)]	H	63.11	35.16	-51.58	-	46.69	74.00	27.31
Average Data								
No spurious emissions were detected within 20 ㏈ of the limit.								

Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



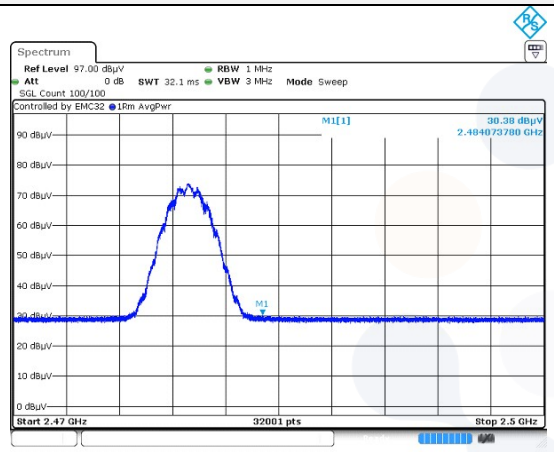
Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



2 480 ㎒

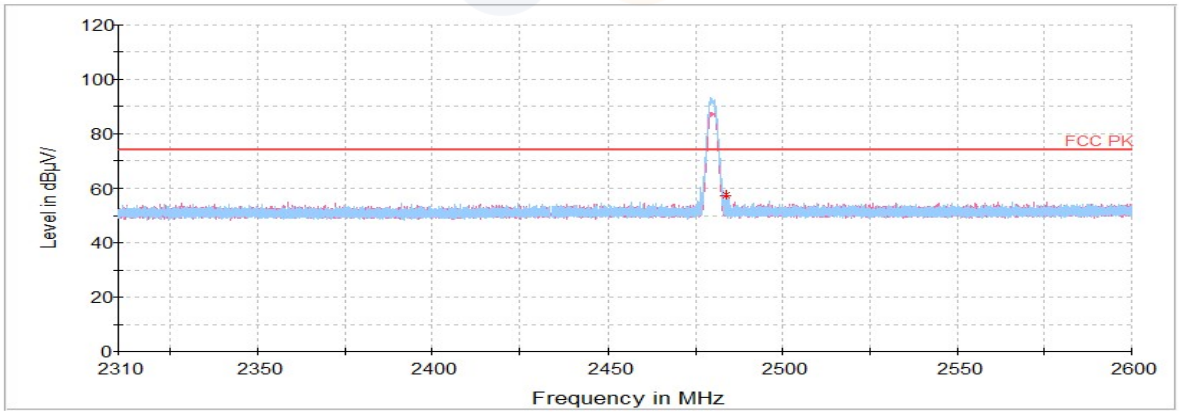
Frequency	Pol.	Reading	Antenna Factor	Amp. + Cable	DCF	Result	Limit	Margin
[㎒]	[V/H]	[dB(㎶)]	[dB]	[dB]	[dB]	[dB(㎶/m)]	[dB(㎶/m)]	[dB]
Peak data								
2 484.07[1)]	H	43.06	32.36	-17.88	-	57.54	74.00	16.46
3 985.30[1)]	V	67.88	33.58	-56.36	-	45.10	74.00	28.90
4 959.97[1)]	H	65.85	33.70	-54.98	-	44.57	74.00	29.43
7 438.56[1)]	H	63.43	35.19	-51.61	-	47.01	74.00	26.99
Average Data								
2 484.07[1)]	H	30.38	32.36	-17.88	4.84	49.70	54.00	4.30

Average Data

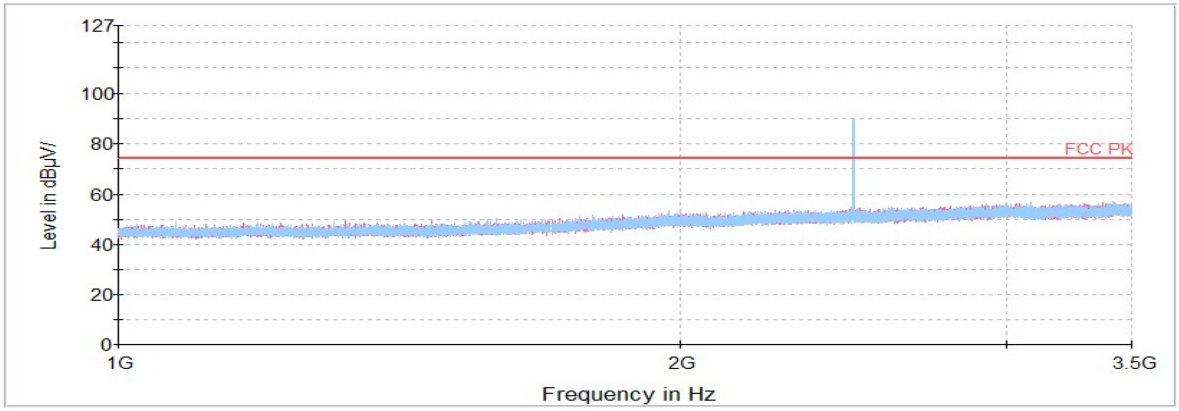


Blank

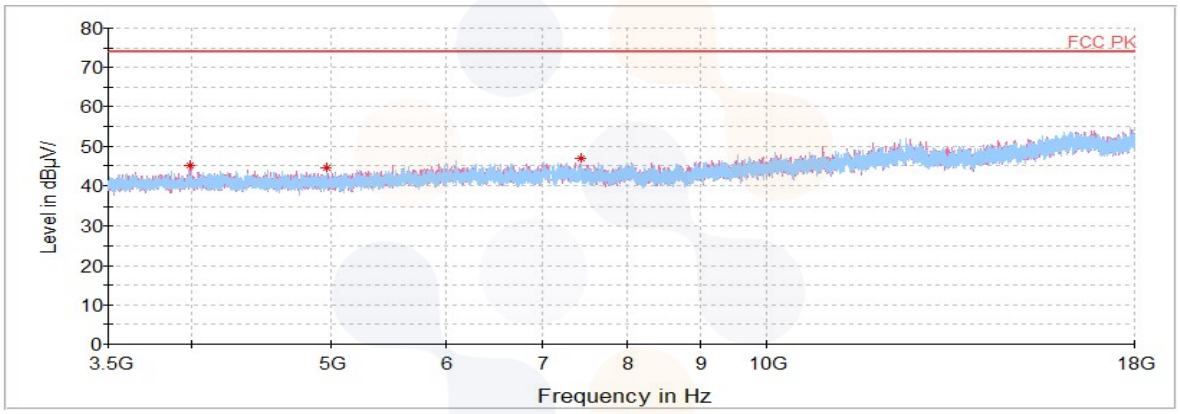
Horizontal/Vertical for Band-edge



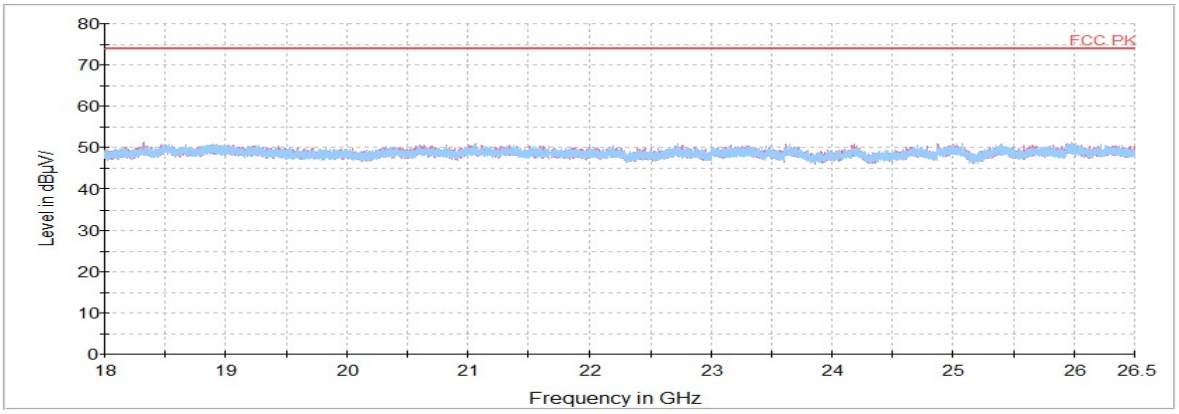
Horizontal/Vertical for 1 ㎓ ~ 3.5 ㎓



Horizontal/Vertical for 3.5 ㎓ ~ 18 ㎓



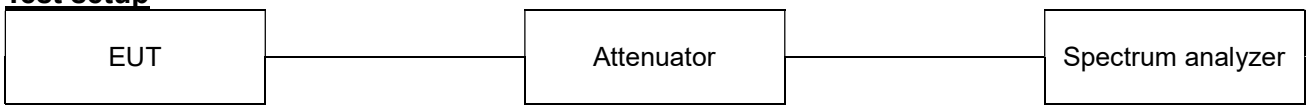
Test results (Above 18 ㎓) – Worst case: 2 MBits/s(37 Bytes) 2 440 ㎒

Horizontal/Vertical for 18 ㎓ ~ 26.5 ㎓


Note: The worst case was based on the lowest margin condition considering harmonic and spurious emission.

7.5. Conducted Spurious Emission

Test setup



Limit

According to §15.247(d) and RSS-247(5.5), In any 100 ㎑ bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operation, 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 averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation specified in §15.209(a) is not required. In addition, radiated emission limits specified in §15.209(a) (see §15.205(c)).
Limit : 20 ㏈c

Test procedure

ANSI C63.10-2013 - Section 11.11.3
KDB 558074 D01 v05 - Section 8.5
KDB 662911 D01 v02r01 – section (E)(3)(b)

Test settings

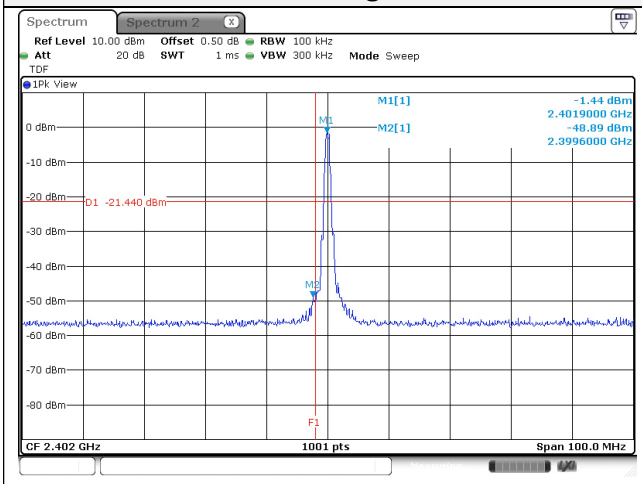
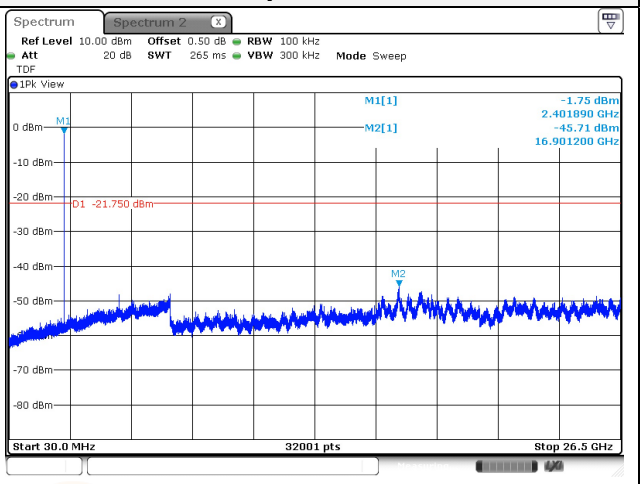
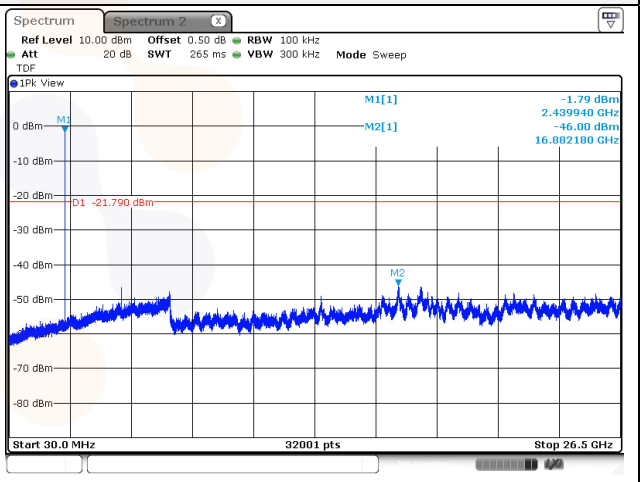
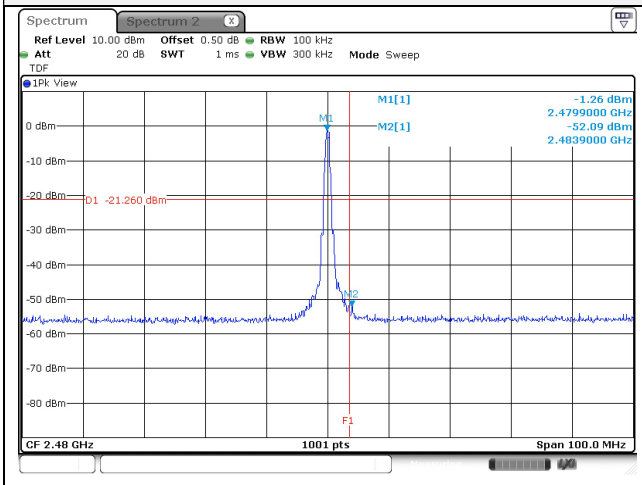
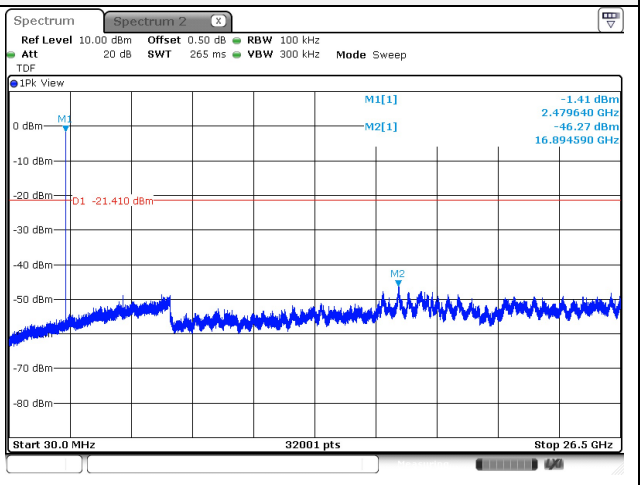
Establish an emission level by using the following procedure:

1) Set the center frequency and span to encompass frequency range to be measured.
2) Set the RBW = 100 ㎑
3) Set the VBW ≥ [3 x RBW]
4) Detector = peak
5) Sweep time = auto couple
6) Trace mode = max hold
7) Allow trace to fully stabilize.
8) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

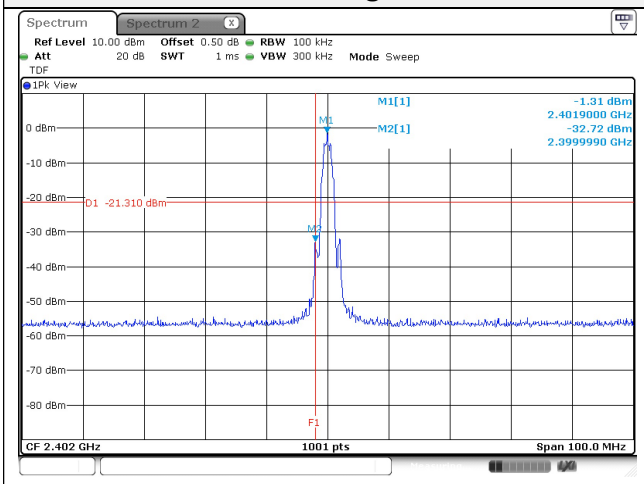
Test results

BLE_1 MBit/s(37 Bytes)

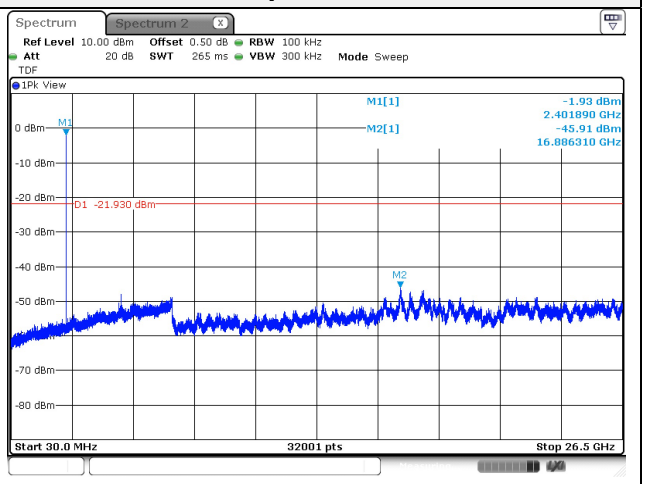
Conducted band-edge / 2 402 ㎒	Conducted spurious / 2 402 ㎒
	
Conducted band-edge / 2 440 ㎒	**Conducted spurious / 2 440 ㎒**
Blank	
Conducted band-edge / 2 480 ㎒	**Conducted spurious / 2 480 ㎒**
	

BLE_2 MBit/s(37 Bytes)

Conducted band-edge / 2 402 ㎒



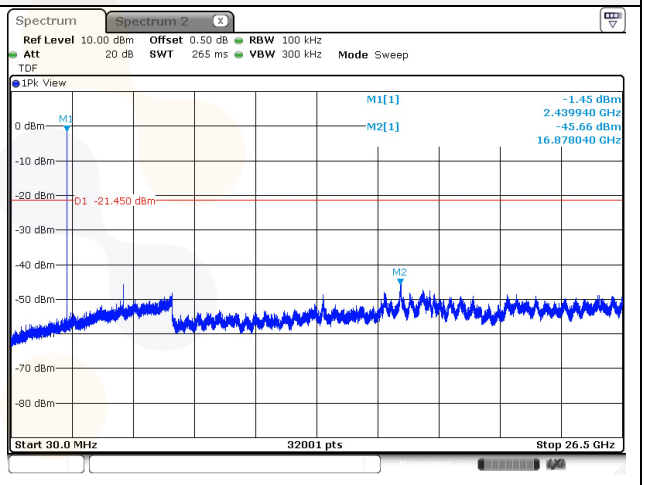
Conducted spurious / 2 402 ㎒



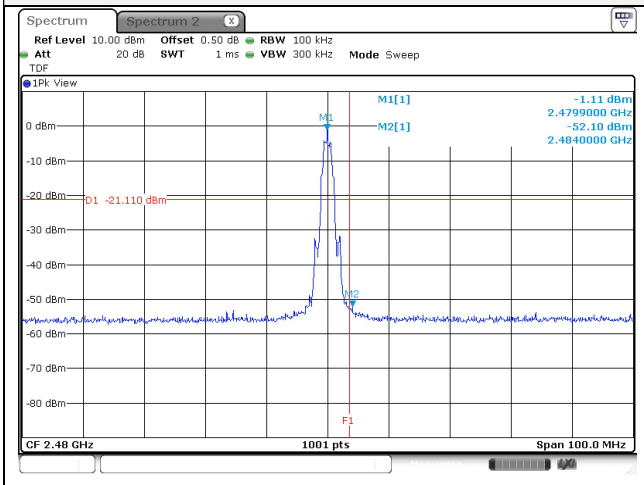
Conducted band-edge / 2 440 ㎒

Blank

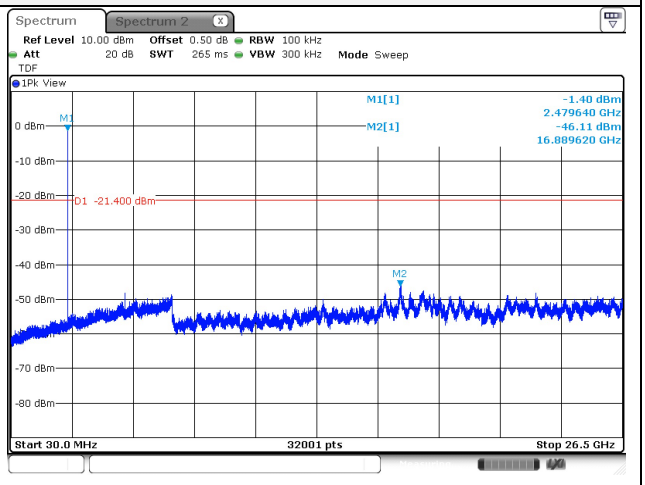
Conducted spurious / 2 440 ㎒



Conducted band-edge / 2 480 ㎒

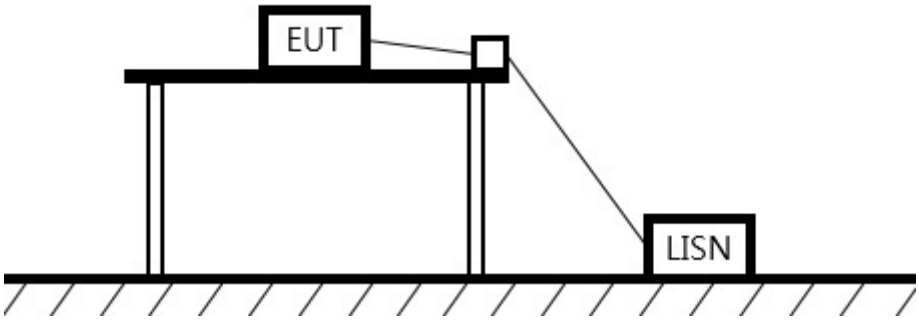


Conducted spurious / 2 480 ㎒



7.6. AC Conducted emission

Test setup



Limit

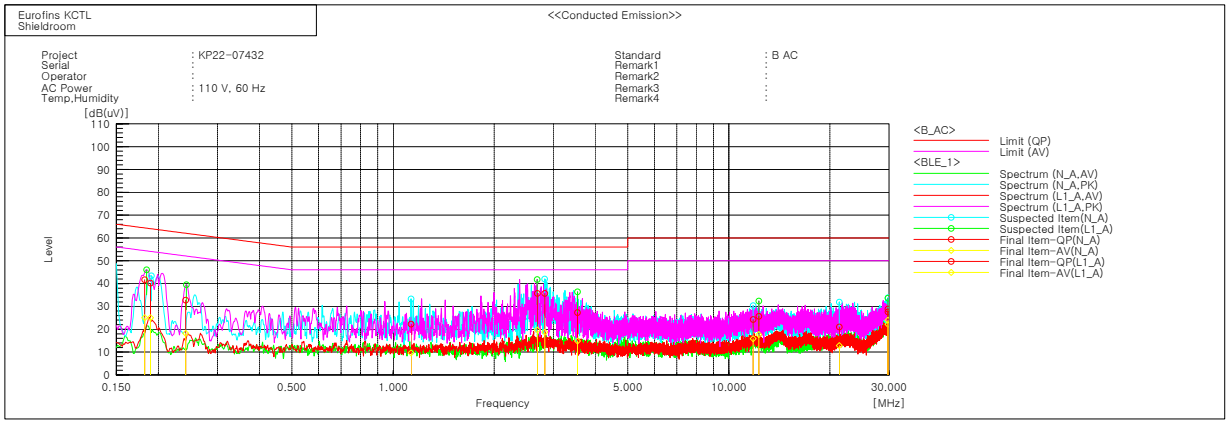
According to 15.207(a) and RSS-Gen(8.8), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 ㎑ to 30 ㎒, shall not exceed the limits in the following table, as measured using a 50uH/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 frequencies ranges.

Frequency of Emission (㎒)	Conducted limit (dB㎶/m)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

Measurement procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 ㎝ in which is located 40 ㎝ away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a spectrum analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 ㎒ to 30 ㎒.
5. The measurements were made with the detector set to peak amplitude within a bandwidth of 10 ㎑ or to quasi-peak and average within a bandwidth of 9 ㎑. The EUT was in transmitting mode during the measurements.

Test results-Worst case: 1 MBits/s(37 Bytes) 2 402 ㎒



Final Result

--- N_A Phase ---

No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.1895	30.1	14.9	10.1	40.2	25.0	64.1	54.1	23.9	29.1
2	1.13107	12.3	-0.2	9.9	22.2	9.7	56.0	46.0	33.8	36.3
3	2.8307	25.8	8.9	9.9	35.7	18.8	56.0	46.0	20.3	27.2
4	11.81996	13.9	5.6	10.3	24.2	15.9	60.0	50.0	35.8	34.1
5	21.33554	10.1	1.9	10.9	21.0	12.8	60.0	50.0	39.0	37.2
6	29.79672	16.6	11.2	11.0	27.6	22.2	60.0	50.0	32.4	27.8

--- L1_A Phase ---

No.	Frequency	Reading QP	Reading CAV	c.f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV
	[MHz]	[dB(uV)]	[dB(uV)]	[dB]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB(uV)]	[dB]	[dB]
1	0.18207	31.5	14.9	10.2	41.7	25.1	64.4	54.4	22.7	29.3
2	0.24131	22.9	8.4	9.8	32.7	18.2	62.1	52.1	29.4	33.9
3	2.6904	25.9	9.9	9.8	35.7	19.7	56.0	46.0	20.3	26.3
4	3.54391	17.4	5.0	9.9	27.3	14.9	56.0	46.0	28.7	31.1
5	12.2825	15.2	7.2	10.4	25.6	17.6	60.0	50.0	34.4	32.4
6	29.76611	17.7	12.9	11.1	28.8	24.0	60.0	50.0	31.2	26.0

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R&S	FSV30	100808	23.07.11
Power Sensor	R&S	NRP-Z81	1137.9009.02-106224-tg	23.06.23
Attenuator	HP	8491A	18591	24.01.19
Attenuator	API Inmet	40AH2W-10	15	23.05.03
Spectrum Analyzer	R&S	FSV40	100989	23.10.14
ATTENUATOR	KEYSIGHT	8491B-6dB	MY39271060	24.04.27
Horn antenna	ETS.lindgren	3117	155787	23.09.29
Horn antenna	ETS.lindgren	3116	86632	24.01.25
Attenuator	API Inmet	40AH2W-10	12	23.05.03
AMPLIFIER	B&Z Technologies	BZRT-00504000-481055-382525	26299-27735	23.09.19
AMPLIFIER	B&Z Technologies	BZR-0050400-551028-252525	27736	23.09.19
High pass Filter	WT	WT-A1698-HS	WT160411001	23.05.03
High pass Filter	Qotana	DBHF058004000A	20070100016	23.07.04
TWO-LINE V - NETWORK	R&S	ENV216	101358	23.09.29
EMI TEST RECEIVER	R&S	ESCI3	100001	23.08.18
Vector Signal Generator	R&S	SMBV100A	257566	23.07.04
Signal Generator	R&S	SMB100A	176206	24.01.19
Spectrum Analyzer	R&S	FSVA40	101575	23.07.22
PSA Spectrum Analyzer	Agilent	E4440A	MY46186407	23.07.11
Amplifier	SONOMA INSTRUMENT	310N	421821	23.12.14
Bilog Antenna	Teseq GmbH	CBL 6112D	63756	24.11.17
Loop Antenna	R&S	HFH2-Z2	100355	24.08.10
Antenna Mast	Innco Systems	MA4640-XP-ET	-	-
Turn Table	Innco Systems	CO3000	1175/45850319/P	-
Controller	INNCO SYSTEMS	CO3000	1441/54370322/P	-
Antenna Mast	INNCO SYSTEMS	MA4640-XP-ET	-	-
Turn Device	INNCO SYSTEMS	DS1200-S-1t	-	-

End of test report