

9.6.2 RADIATED SPURIOUS EMISSIONS

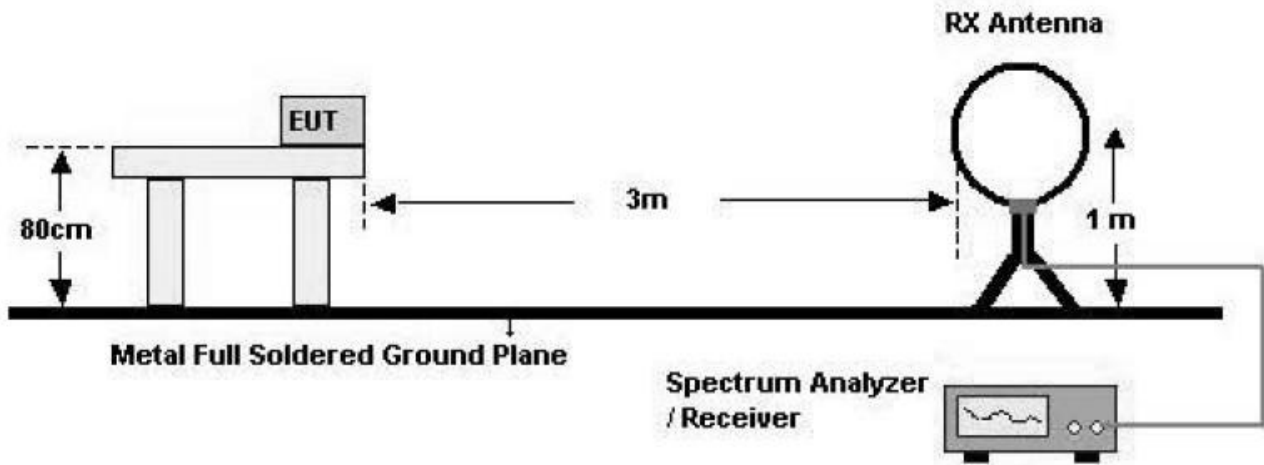
LIMIT : §15.247(d), §15.205, §15.209 / RSS-GEN(Issue 4) Section 8.9

1. 20dBc in any 100kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

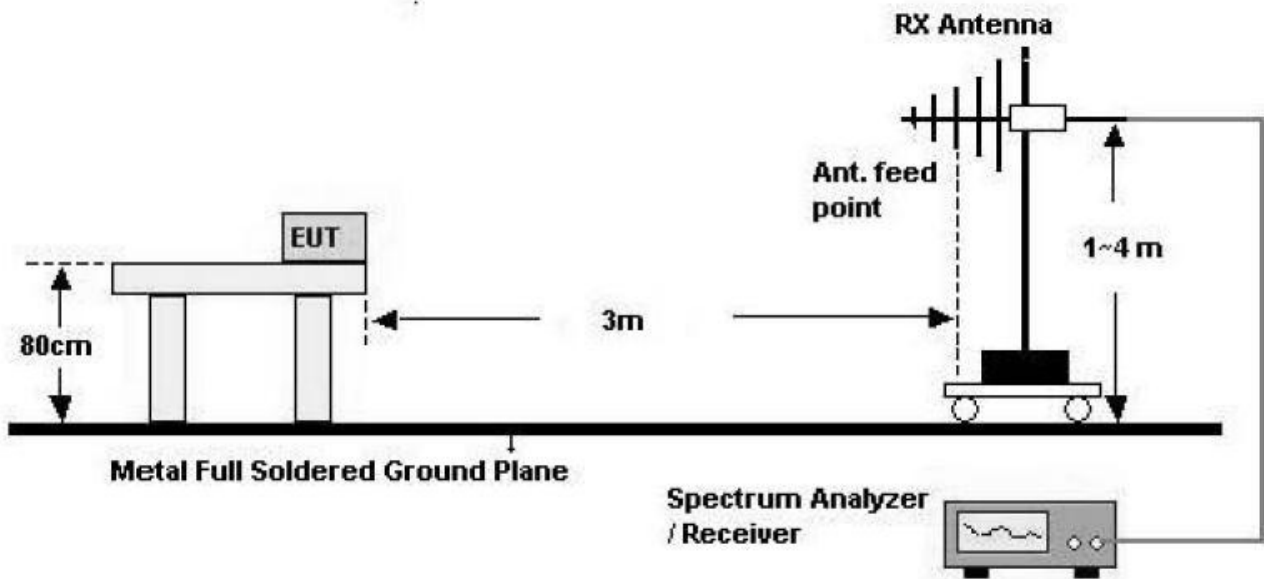
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

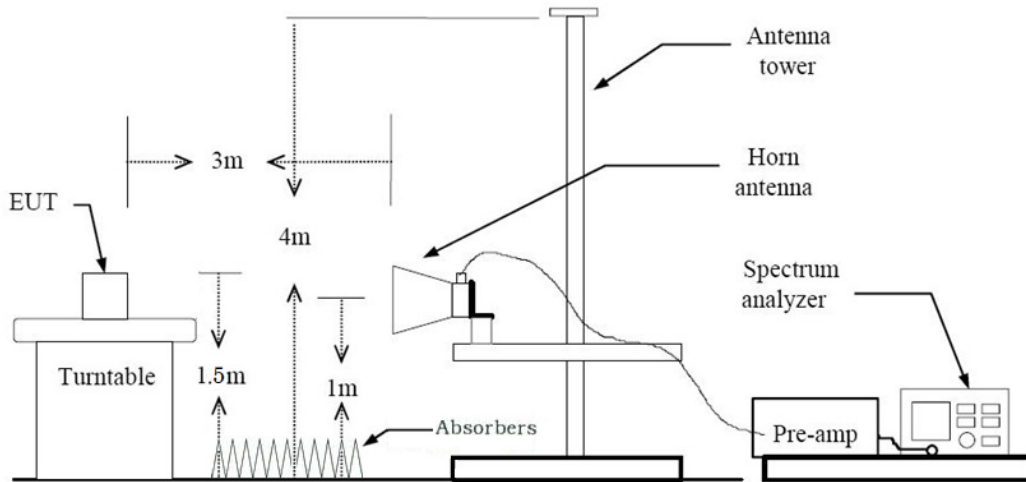
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. Spectrum Setting
 - a. Peak: 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 3 \times$ RBW
 - b. Average: 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.
2. The duty cycle factor for BT mode.

BT Mode	T _{on} (ms)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
GFSK	2.895	345	1000
$\pi/4$ DQPSK	2.895	345	1000
8DPSK	2.890	346	1000

TEST RESULTS**9 kHz – 30MHz****Operation Mode:** Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 9 kHz to the 30MHz.
2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
3. Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB)
4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
5. This test is performed with hopping off.
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

TEST RESULTS**Below 1 GHz****Operation Mode:** Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Notes:

1. Measuring frequencies from 30 MHz to the 1 GHz.
2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
3. This test is performed with hopping off.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Mode: CH Low(GFSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	52.02	0.11	V	52.13	73.98	21.85	PK
4804	42.45	0.11	V	42.56	53.98	11.42	AV
7206	49.17	6.86	V	56.03	73.98	17.95	PK
7206	35.34	6.86	V	42.20	53.98	11.78	AV
4804	51.03	0.11	H	51.14	73.98	22.84	PK
4804	41.18	0.11	H	41.29	53.98	12.69	AV
7206	49.14	6.86	H	56.00	73.98	17.98	PK
7206	35.32	6.86	H	42.18	53.98	11.80	AV

Operation Mode: CH Low(8DPSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	50.73	0.11	V	50.84	73.98	23.14	PK
4804	38.06	0.11	V	38.17	53.98	15.81	AV
7206	49.25	6.86	V	56.11	73.98	17.87	PK
7206	35.33	6.86	V	42.19	53.98	11.79	AV
4804	50.41	0.11	H	50.52	73.98	23.46	PK
4804	37.84	0.11	H	37.95	53.98	16.03	AV
7206	49.16	6.86	H	56.02	73.98	17.96	PK
7206	35.24	6.86	H	42.10	53.98	11.88	AV

Operation Mode: CH Low($\pi/4$ DQPSK)

Frequency [MHz]	Reading DBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	50.65	0.11	V	50.76	73.98	23.22	PK
4804	38.17	0.11	V	38.28	53.98	15.70	AV
7206	49.20	6.86	V	56.06	73.98	17.92	PK
7206	35.35	6.86	V	42.21	53.98	11.77	AV
4804	50.34	0.11	H	50.45	73.98	23.53	PK
4804	37.88	0.11	H	37.99	53.98	15.99	AV
7206	49.12	6.86	H	55.98	73.98	18.00	PK
7206	35.30	6.86	H	42.16	53.98	11.82	AV

※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP GAIN: AMPLIFIER GAIN

Notes:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
- Spectrum setting:
 - Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - Duty Cycle Correction = $20 \log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -30.752 dB
- Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$

- c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20\log(\text{Worst Case Dwell Time}/ 100\text{ms})$ dB = -24.7314 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.
8. We have done Normal Mode and EDR Mode test.
9. This test is performed with hopping off.
10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH Mid(GFSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4882	50.58	0.23	V	50.81	73.98	23.17	PK
4882	40.68	0.23	V	40.91	53.98	13.07	AV
7323	48.92	7.06	V	55.98	73.98	18.00	PK
7323	34.90	7.06	V	41.96	53.98	12.02	AV
4882	49.84	0.23	H	50.07	73.98	23.91	PK
4882	39.55	0.23	H	39.78	53.98	14.20	AV
7323	48.88	7.06	H	55.94	73.98	18.04	PK
7323	34.87	7.06	H	41.93	53.98	12.05	AV

Operation Mode: CH Mid(8DPSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4882	49.68	0.23	V	49.91	73.98	24.07	PK
4882	36.32	0.23	V	36.55	53.98	17.43	AV
7323	48.91	7.06	V	55.97	73.98	18.01	PK
7323	34.95	7.06	V	42.01	53.98	11.97	AV
4882	49.38	0.23	H	49.61	73.98	24.37	PK
4882	36.02	0.23	H	36.25	53.98	17.73	AV
7323	48.81	7.06	H	55.87	73.98	18.11	PK
7323	34.84	7.06	H	41.90	53.98	12.08	AV

Operation Mode: CH Mid($\pi/4$ DQPSK)

Frequency [MHz]	Reading DBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4882	49.68	0.23	V	49.91	73.98	24.07	PK
4882	36.32	0.23	V	36.55	53.98	17.43	AV
7323	48.95	7.06	V	56.01	73.98	17.97	PK
7323	34.93	7.06	V	41.99	53.98	11.99	AV
4882	49.43	0.23	H	49.66	73.98	24.32	PK
4882	36.10	0.23	H	36.33	53.98	17.65	AV
7323	48.85	7.06	H	55.91	73.98	18.07	PK
7323	34.90	7.06	H	41.96	53.98	12.02	AV

※ A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP GAIN: AMPLIFIER GAIN

Notes:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
- Spectrum setting:
 - Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - Duty Cycle Correction = $20 \log (\text{Worst Case Dwell Time} / 100\text{ms}) \text{ dB} = -30.752 \text{ dB}$
- Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$

- c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20\log(\text{Worst Case Dwell Time}/ 100\text{ms})$ dB = -24.7314 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.
8. We have done Normal Mode and EDR Mode test.
9. This test is performed with hopping off.
10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH High(GFSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	50.34	0.98	V	51.32	73.98	22.66	PK
4960	38.42	0.98	V	39.40	53.98	14.58	AV
7440	48.72	7.69	V	56.41	73.98	17.57	PK
7440	35.38	7.69	V	43.07	53.98	10.91	AV
4960	49.77	0.98	H	50.75	73.98	23.23	PK
4960	37.39	0.98	H	38.37	53.98	15.61	AV
7440	48.65	7.69	H	56.34	73.98	17.64	PK
7440	35.33	7.69	H	43.02	53.98	10.96	AV

Operation Mode: CH High(8DPSK)

Frequency [MHz]	Reading DBuV	*A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	49.60	0.98	V	50.58	73.98	23.40	PK
4960	36.31	0.98	V	37.29	53.98	16.69	AV
7440	48.76	7.69	V	56.45	73.98	17.53	PK
7440	35.44	7.69	V	43.13	53.98	10.85	AV
4960	49.24	0.98	H	50.22	73.98	23.76	PK
4960	36.04	0.98	H	37.02	53.98	16.96	AV
7440	48.65	7.69	H	56.34	73.98	17.64	PK
7440	35.35	7.69	H	43.04	53.98	10.94	AV

Operation Mode: CH High ($\pi/4$ DQPSK)

Frequency [MHz]	Reading DBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	49.54	0.98	V	50.52	73.98	23.46	PK
4960	36.28	0.98	V	37.26	53.98	16.72	AV
7440	48.73	7.69	V	56.42	73.98	17.56	PK
7440	35.41	7.69	V	43.10	53.98	10.88	AV
4960	49.30	0.98	H	50.28	73.98	23.70	PK
4960	36.03	0.98	H	37.01	53.98	16.97	AV
7440	48.61	7.69	H	56.30	73.98	17.68	PK
7440	35.31	7.69	H	43.00	53.98	10.98	AV

※ A·F: ANTENNA FACTOR
 C·L: CABLE LOSS
 AMP GAIN: AMPLIFIER GAIN

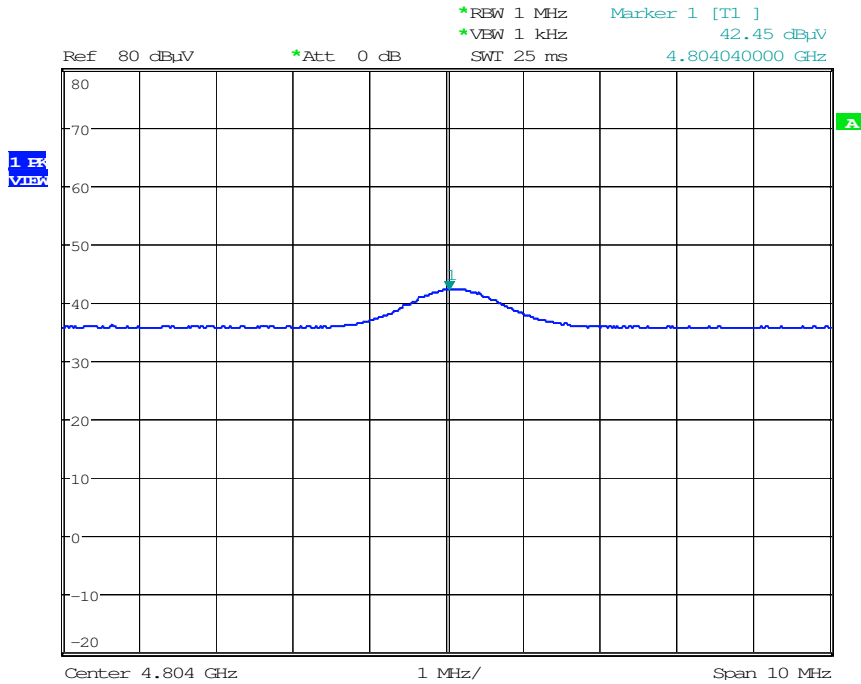
Notes:

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- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain
- Spectrum setting:
 - Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - Duty Cycle Correction = $20 \log (\text{Worst Case Dwell Time} / 100\text{ms}) \text{ dB} = -30.752 \text{ dB}$
- Duty Cycle Correction Factor (AFH mode – minimum channel number case - 20 channels)
 - Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$

- c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20\log(\text{Worst Case Dwell Time}/ 100\text{ms})$ dB = -24.7314 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.
8. We have done Normal Mode and EDR Mode test.
9. This test is performed with hopping off.
10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

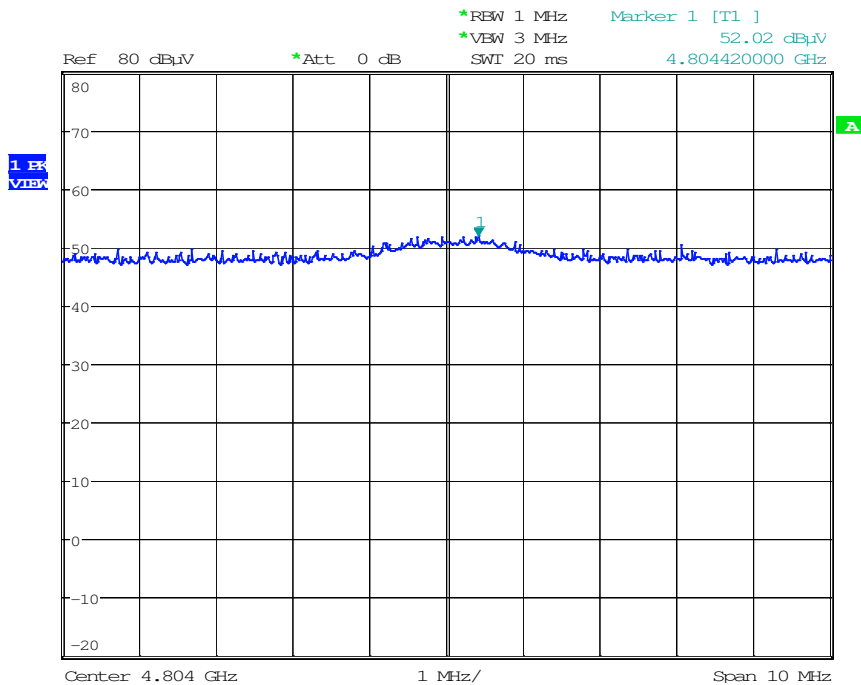
■ **RESULT PLOTS (Worst case : z-V)**

Radiated Spurious Emissions plot – Average Reading (GFSK, Ch.0 2nd Harmonic)



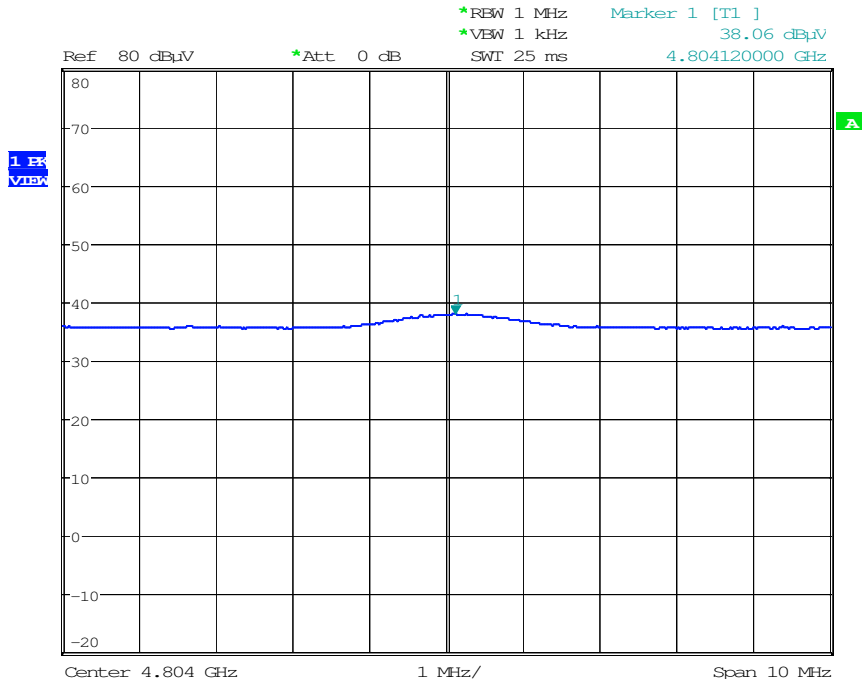
Date: 28.APR.2016 10:30:47

Radiated Spurious Emissions plot – Peak Reading (GFSK, Ch.0 2nd Harmonic)



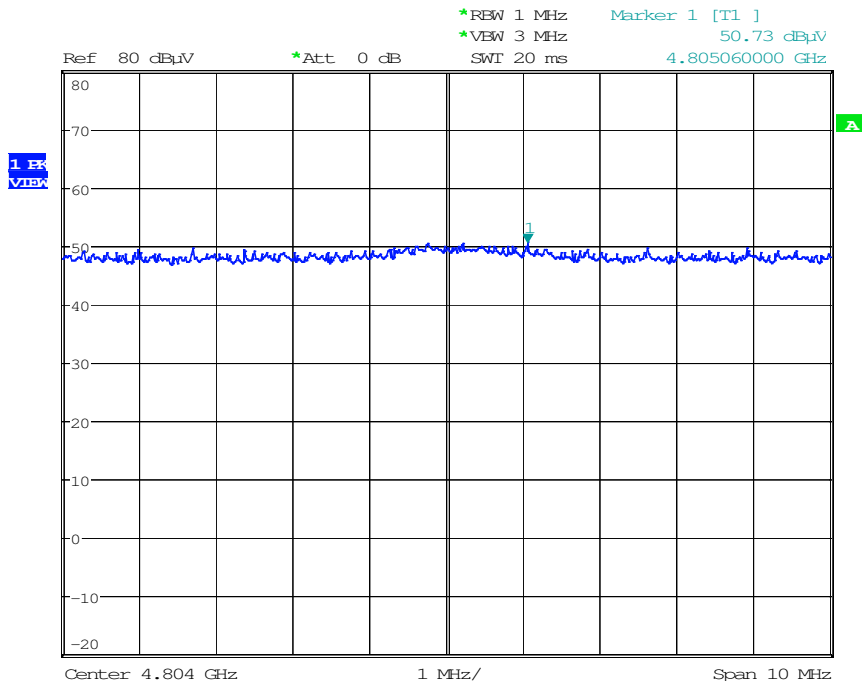
Date: 28.APR.2016 10:31:23

Radiated Spurious Emissions plot – Average Reading (8DPSK, Ch.0 2nd Harmonic)



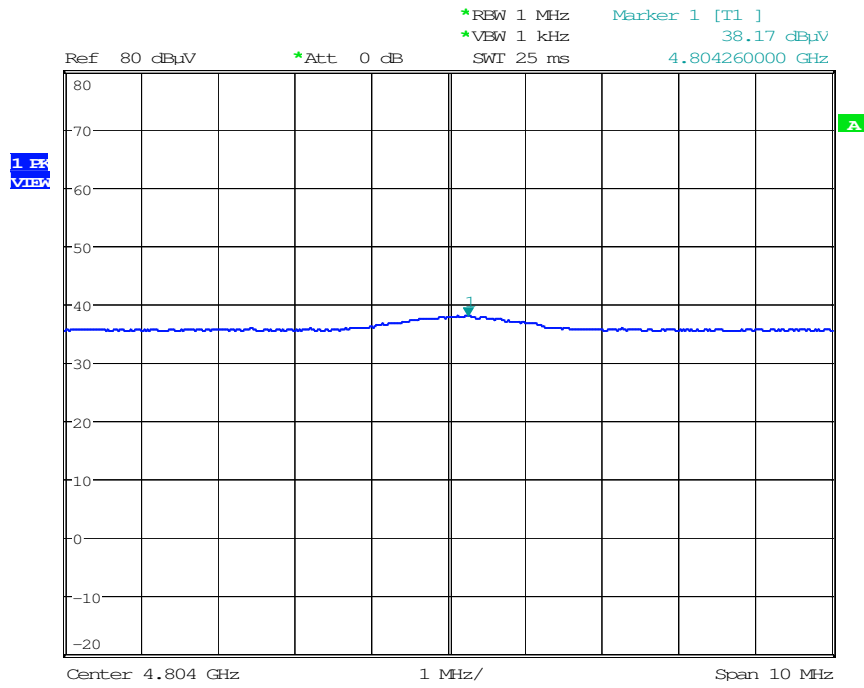
Date: 28.APR.2016 10:32:46

Radiated Spurious Emissions plot – Peak Reading (8DPSK, Ch.0 2nd Harmonic)



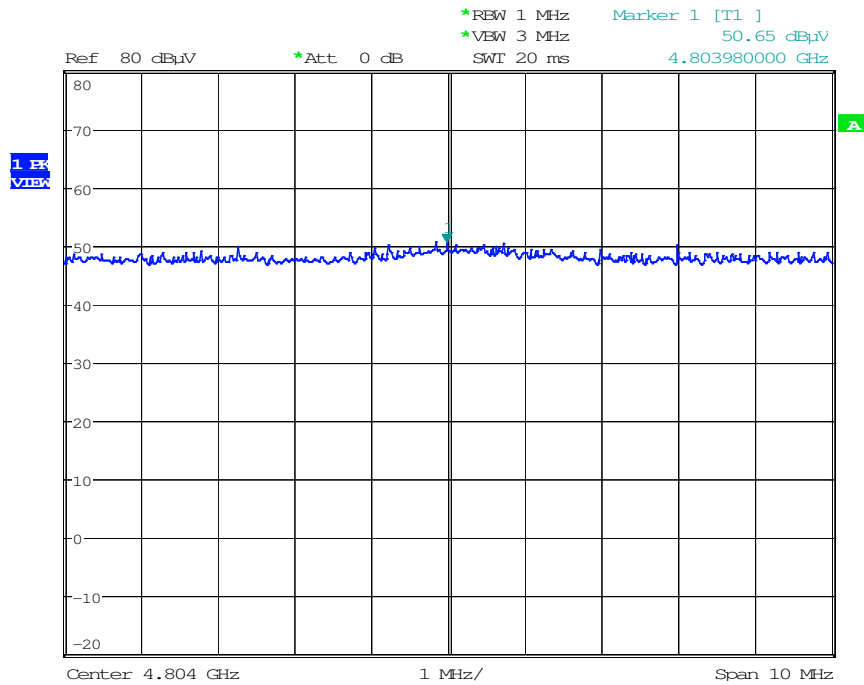
Date: 28.APR.2016 10:33:21

Radiated Spurious Emissions plot – Average Reading ($\pi/4$ DQPSK, Ch.0 2nd Harmonic)



Date: 28.APR.2016 10:32:23

Radiated Spurious Emissions plot – Peak Reading ($\pi/4$ DQPSK, Ch.0 2nd Harmonic)



Date: 28.APR.2016 10:32:05

9.6.3 RECEIVER SPURIOUS EMISSIONS

IC Rule(s) **RSS-GEN**
Test Requirements: **Blow the table**
Operating conditions: **Under normal test conditions**
Method of testing: **Radiated**

S/A. Settings: **F < 1 GHz: RBW: 120 kHz, VBW: 300 kHz (Quasi Peak)**
Mode of operation: **F > 1 GHz: RBW: 1 MHz, VBW: 1 MHz (Peak)**
Receive

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 - 216	150
216 – 960	200
Above 960	500

Operation Mode: Receive:

30 MHz ~ 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No critical peaks found							

Above 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
No critical peaks found							

9.6.4 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d), §15.205, §15.209 / RSS-GEN(Issue 4) Section 8.10

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. 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)).

Operation Mode	Normal(GFSK)
Operating Frequency	2402 MHz, 2480 MHz
Channel No	CH 0, CH 78

Frequency [MHz]	Reading dBuV	* A.F.+CL [dB]	Ant. Pol. [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	24.99	32.32	H	0	57.31	73.98	16.67	PK
2390.0	12.16	32.32	H	-24.73	19.75	53.98	34.23	AV
2390.0	24.85	32.32	V	0	57.17	73.98	16.81	PK
2390.0	12.14	32.32	V	-24.73	19.73	53.98	34.25	AV
2483.5	35.94	32.68	H	0	68.62	73.98	5.36	PK
2483.5	33.13	32.68	H	-24.73	41.08	53.98	12.90	AV
2483.5	34.24	32.68	V	0	66.92	73.98	7.06	PK
2483.5	31.05	32.68	V	-24.73	39.00	53.98	14.98	AV

Operation Mode EDR(8DPSK)
 Operating Frequency 2402 MHz , 2480 MHz
 Channel No CH 0, CH 78

Frequency [MHz]	Reading dBuV	* A.F.+CL [dB]	Ant. Pol. [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	24.95	32.32	H	0	57.27	73.98	16.71	PK
2390.0	12.15	32.32	H	-24.73	19.74	53.98	34.24	AV
2390.0	24.84	32.32	V	0	57.16	73.98	16.82	PK
2390.0	12.13	32.32	V	-24.73	19.72	53.98	34.26	AV
2483.5	34.65	32.68	H	0	67.33	73.98	6.65	PK
2483.5	29.79	32.68	H	-24.73	37.74	53.98	16.24	AV
2483.5	33.14	32.68	V	0	65.82	73.98	8.16	PK
2483.5	27.84	32.68	V	-24.73	35.79	53.98	18.19	AV

Operation Mode EDR(π /4DQPSK)
 Operating Frequency 2402 MHz , 2480 MHz
 Channel No CH 0, CH 78

Frequency [MHz]	Reading dBuV	* A.F.+CL [dB]	Ant. Pol. [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	24.84	32.32	H	0	57.16	73.98	16.82	PK
2390.0	12.14	32.32	H	-24.73	19.73	53.98	34.25	AV
2390.0	24.85	32.32	V	0	57.17	73.98	16.81	PK
2390.0	12.13	32.32	V	-24.73	19.72	53.98	34.26	AV
2483.5	34.86	32.68	H	0	67.54	73.98	6.44	PK
2483.5	29.87	32.68	H	-24.73	37.82	53.98	16.16	AV
2483.5	33.22	32.68	V	0	65.90	73.98	8.08	PK
2483.5	27.96	32.68	V	-24.73	35.91	53.98	18.07	AV

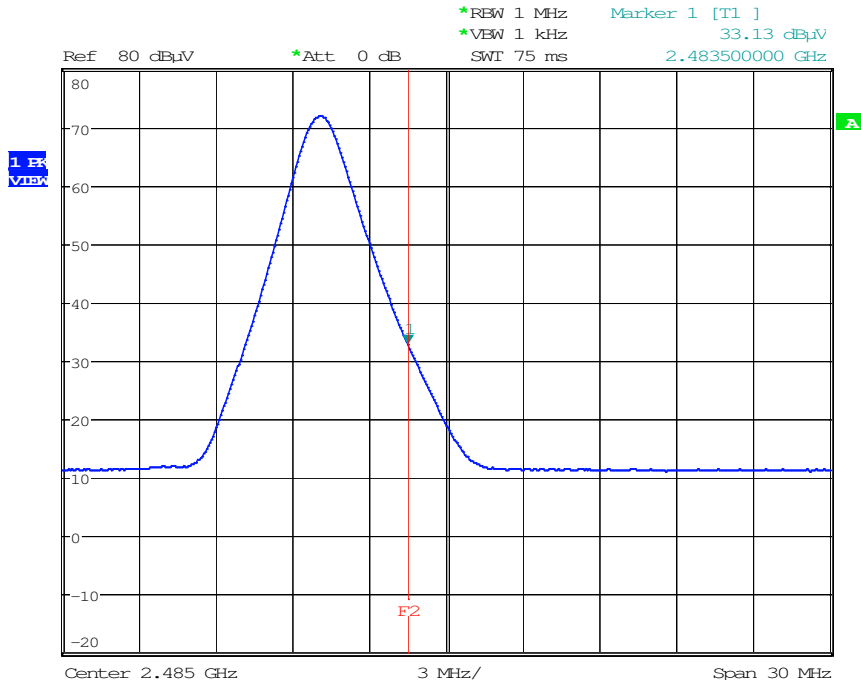
* A:F: ANTENNA FACTOR
 C:L: CABLE LOSS
 AMP GAIN: AMPLIFIER GAIN

Notes:

1. Frequency range of measurement = 2483.5 MHz ~ 2500 MHz
2. Total = Reading Value + Antenna Factor + Cable Loss + Duty Cycle Correction Factor
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW = 3 MHz.
 - b. Average Setting 1 GHz – 25 GHz, RBW = 1 MHz, VBW $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
4. FYI : Duty Cycle Correction Factor (79 channel hopping)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 79 channels = 229.100 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 1$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 2.900$ ms
 - d. Duty Cycle Correction = $20\log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -30.752 dB
5. Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
 - a. Time to cycle through all channels= $\Delta t = \tau$ [ms] x 20 channels = 58.00 ms, where τ = pulse width
 - b. $100 \text{ ms} / \Delta t$ [ms] = $H \rightarrow$ Round up to next highest integer, $H' = 2$
 - c. Worst Case Dwell Time = τ [ms] x $H' = 5.800$ ms
 - d. Duty Cycle Correction(AFH) = $20\log(\text{Worst Case Dwell Time} / 100\text{ms})$ dB = -24.7314 dB
 - e. We applied DCCF in the test result which hopping channel number is 20.
6. We have done Normal Mode, EDR Mode.
7. This test is performed with hopping off.
8. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

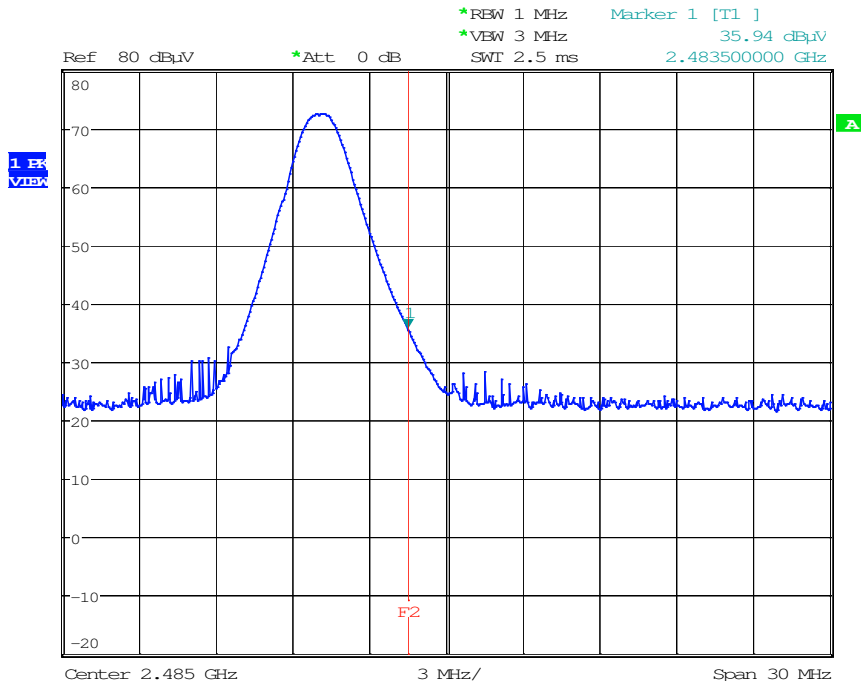
▣ **RESULT PLOTS (Worst case : y-H)**

Radiated Restricted Band Edges plot – Average Reading (GFSK, Ch.78)



Date: 28.APR.2016 09:30:46

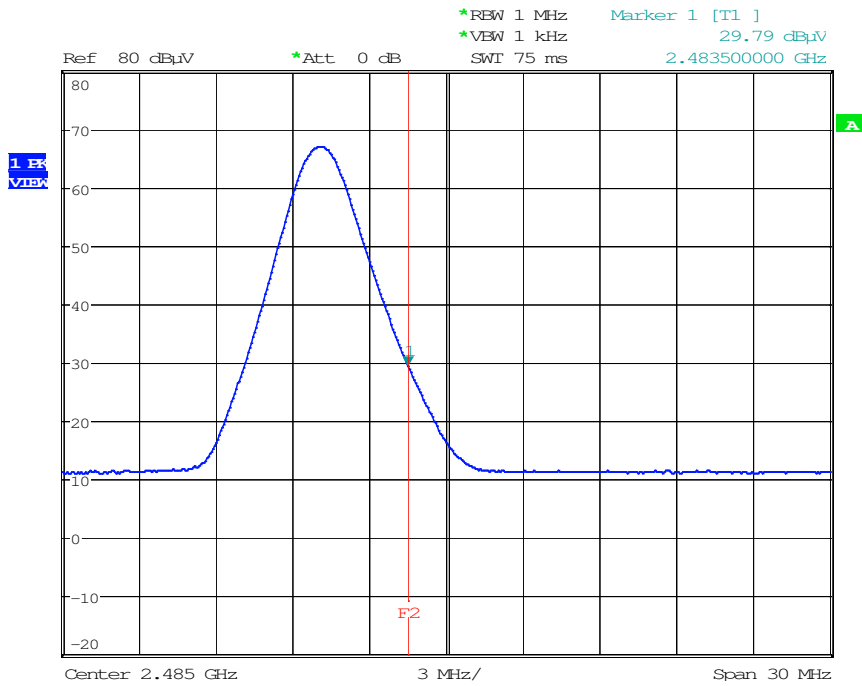
Radiated Restricted Band Edges plot – Peak Reading (GFSK, Ch.78)



Date: 28.APR.2016 09:31:35

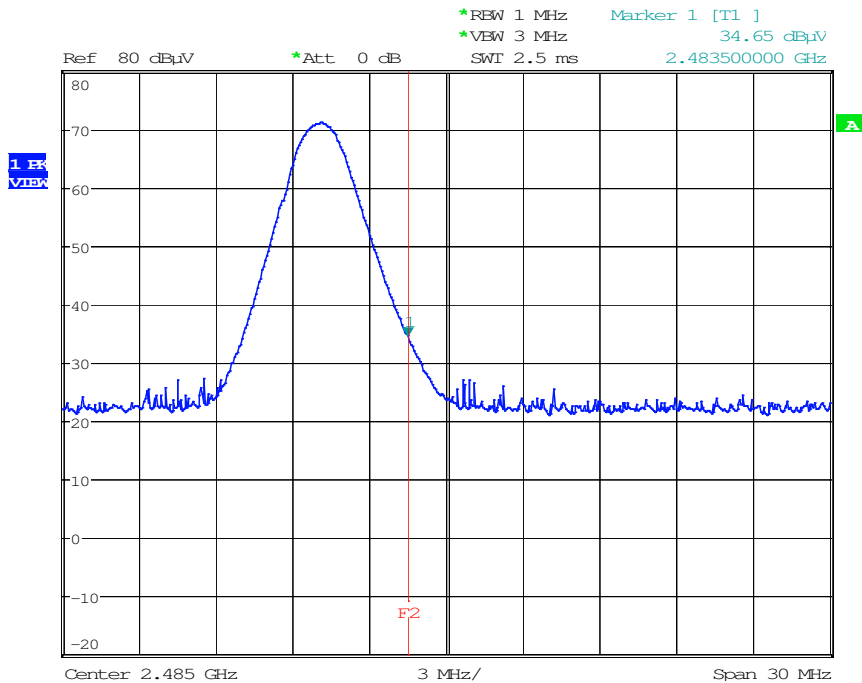
Note : Only the worst case plots for Radiated Restricted Band Edges.

Radiated Restricted Band Edges plot – Average Reading (8DPSK, Ch.78)



Date: 28.APR.2016 09:32:48

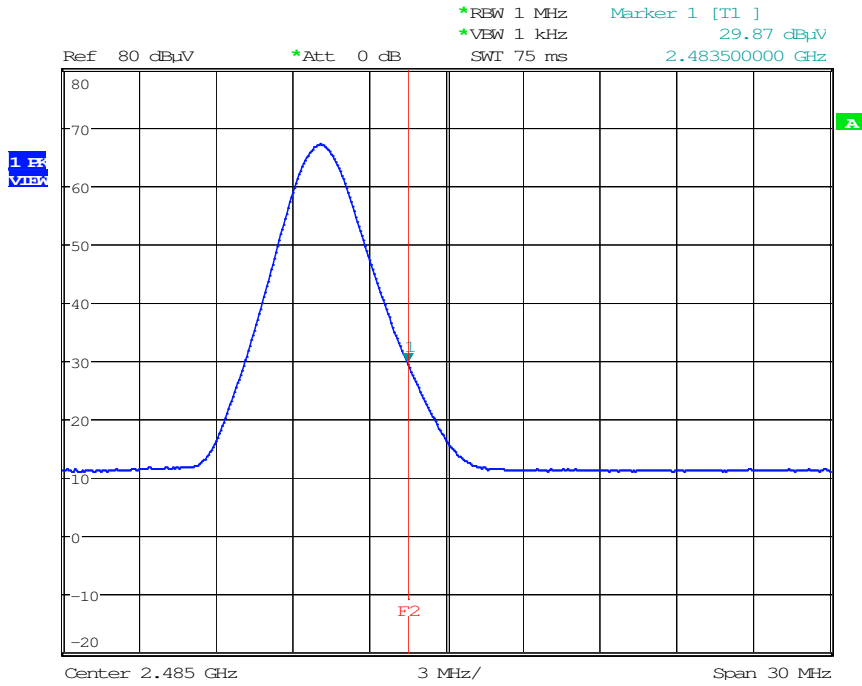
Radiated Restricted Band Edges plot – Peak Reading (8DPSK, Ch.78)



Date: 28.APR.2016 09:34:01

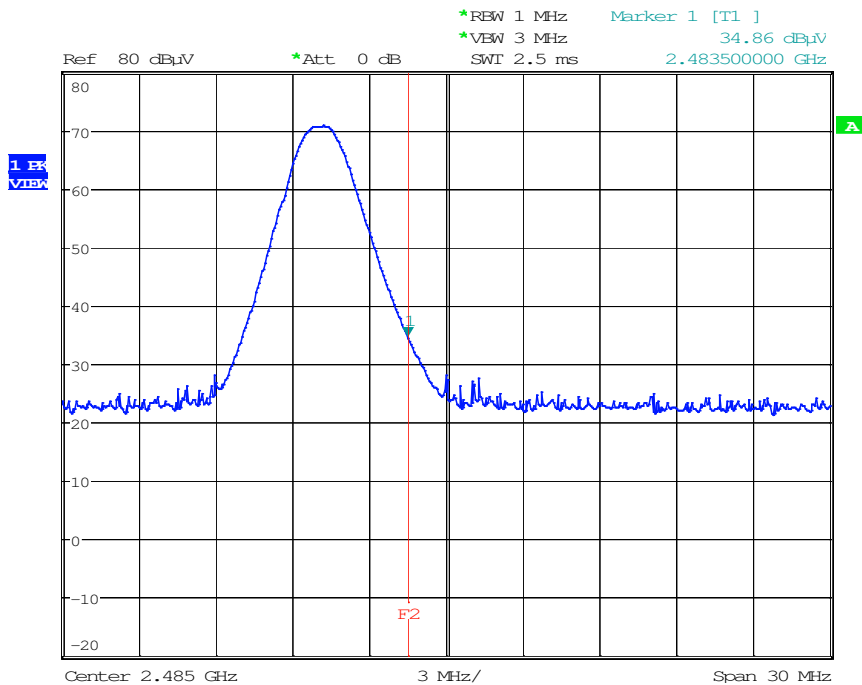
Note : Only the worst case plots for Radiated Restricted Band Edges.

Radiated Restricted Band Edges plot – Average Reading ($\pi/4$ DQPSK, Ch.78)



Date: 28.APR.2016 09:32:30

Radiated Restricted Band Edges plot – Peak Reading ($\pi/4$ DQPSK, Ch.78)



Date: 28.APR.2016 09:32:09

Note : Only the worst case plots for Radiated Restricted Band Edges.

9.7 POWERLINE CONDUCTED EMISSIONS

LIMIT

For an intentional radiator which 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 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors – Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

RESULT PLOTS

Conducted Emissions (Line 1)

Test

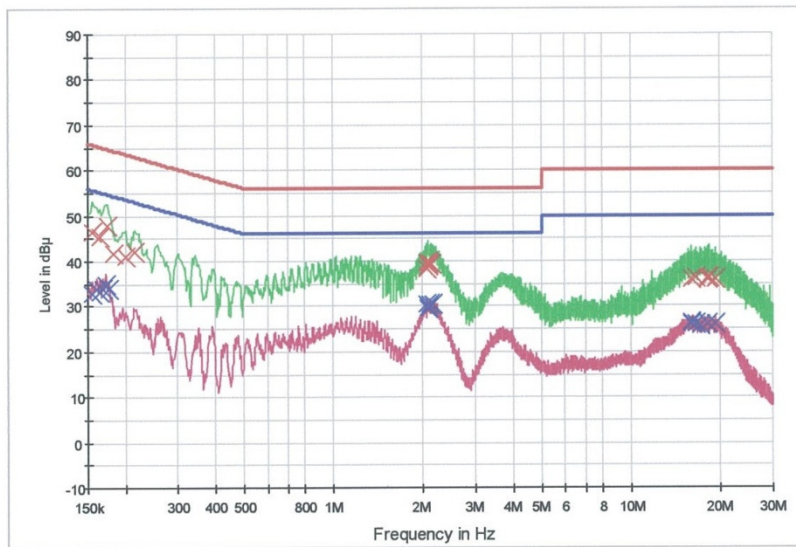
1 / 2

HCT TEST Report

Common Information

EUT: SM-T230NW
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE

FCC CLASS B



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.156000	46.4	9.000	Off	N	9.6	19.3	65.7
0.164000	45.6	9.000	Off	N	9.6	19.7	65.3
0.174000	47.8	9.000	Off	N	9.6	17.0	64.8
0.184000	41.6	9.000	Off	N	9.6	22.7	64.3
0.200000	41.1	9.000	Off	N	9.6	22.5	63.6
0.216000	42.2	9.000	Off	N	9.6	20.8	63.0
2.050000	38.2	9.000	Off	N	9.7	17.8	56.0
2.072000	39.6	9.000	Off	N	9.7	16.4	56.0
2.078000	39.7	9.000	Off	N	9.7	16.3	56.0
2.086000	39.3	9.000	Off	N	9.7	16.7	56.0
2.092000	38.8	9.000	Off	N	9.7	17.2	56.0
2.128000	39.4	9.000	Off	N	9.7	16.6	56.0
15.976000	36.1	9.000	Off	N	10.2	23.9	60.0
16.452000	36.2	9.000	Off	N	10.2	23.8	60.0
18.058000	36.2	9.000	Off	N	10.2	23.8	60.0
18.244000	36.0	9.000	Off	N	10.2	24.0	60.0
18.250000	36.2	9.000	Off	N	10.2	23.8	60.0
19.210000	35.8	9.000	Off	N	10.2	24.2	60.0

Final Result 2

2016-05-04

오전 9:14:02

Test

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Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.156000	32.9	9.000	Off	N	9.6	22.8	55.7
0.160000	33.9	9.000	Off	N	9.6	21.6	55.5
0.164000	33.1	9.000	Off	N	9.6	22.1	55.3
0.168000	33.9	9.000	Off	N	9.6	21.1	55.1
0.172000	35.0	9.000	Off	N	9.6	19.8	54.9
0.176000	33.9	9.000	Off	N	9.6	20.7	54.7
2.072000	30.6	9.000	Off	N	9.7	15.4	46.0
2.082000	29.8	9.000	Off	N	9.7	16.2	46.0
2.086000	29.6	9.000	Off	N	9.7	16.4	46.0
2.092000	29.5	9.000	Off	N	9.7	16.6	46.0
2.114000	30.6	9.000	Off	N	9.7	15.4	46.0
2.156000	30.4	9.000	Off	N	9.7	15.6	46.0
15.976000	26.2	9.000	Off	N	10.2	23.8	50.0
16.008000	26.4	9.000	Off	N	10.2	23.6	50.0
16.452000	26.2	9.000	Off	N	10.2	23.8	50.0
17.108000	25.8	9.000	Off	N	10.2	24.2	50.0
18.244000	26.2	9.000	Off	N	10.2	23.8	50.0
19.210000	25.9	9.000	Off	N	10.2	24.1	50.0

2016-05-04

오전 9:14:02

Conducted Emissions (Line 2)

Test

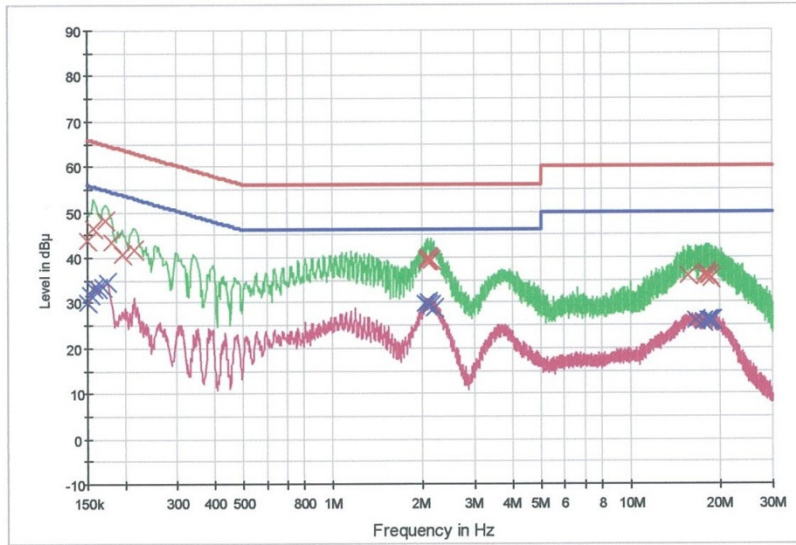
1 / 2

HCT TEST Report

Common Information

EUT: SM-T230NW
 Manufacturer: SAMSUNG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE

FCC CLASS B



— FCC CLASS B_QP — FCC CLASS B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG × Final Result 1-QPK × Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	43.8	9.000	Off	L1	9.7	22.2	66.0
0.158000	46.6	9.000	Off	L1	9.6	19.0	65.6
0.172000	48.3	9.000	Off	L1	9.6	16.6	64.9
0.180000	43.4	9.000	Off	L1	9.6	21.1	64.5
0.196000	40.8	9.000	Off	L1	9.6	23.0	63.8
0.216000	41.7	9.000	Off	L1	9.6	21.2	63.0
2.070000	39.2	9.000	Off	L1	9.8	16.8	56.0
2.076000	39.9	9.000	Off	L1	9.8	16.1	56.0
2.080000	39.6	9.000	Off	L1	9.8	16.4	56.0
2.090000	39.3	9.000	Off	L1	9.8	16.7	56.0
2.126000	39.3	9.000	Off	L1	9.8	16.7	56.0
2.130000	39.3	9.000	Off	L1	9.8	16.7	56.0
15.578000	36.0	9.000	Off	L1	10.2	24.0	60.0
17.622000	36.0	9.000	Off	L1	10.2	24.0	60.0
18.014000	36.5	9.000	Off	L1	10.2	23.5	60.0
18.100000	35.9	9.000	Off	L1	10.2	24.1	60.0
18.450000	35.8	9.000	Off	L1	10.2	24.2	60.0
18.520000	35.1	9.000	Off	L1	10.2	24.9	60.0

Final Result 2

2016-05-04

오전 9:23:28

Test

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Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	30.2	9.000	Off	L1	9.7	25.8	56.0
0.154000	31.9	9.000	Off	L1	9.6	23.9	55.8
0.158000	33.1	9.000	Off	L1	9.6	22.4	55.6
0.162000	33.3	9.000	Off	L1	9.6	22.1	55.4
0.168000	33.5	9.000	Off	L1	9.6	21.6	55.1
0.174000	34.6	9.000	Off	L1	9.6	20.1	54.8
2.034000	29.7	9.000	Off	L1	9.8	16.3	46.0
2.080000	30.0	9.000	Off	L1	9.8	16.0	46.0
2.092000	29.4	9.000	Off	L1	9.8	16.6	46.0
2.126000	29.4	9.000	Off	L1	9.8	16.6	46.0
2.130000	29.3	9.000	Off	L1	9.8	16.7	46.0
2.176000	28.8	9.000	Off	L1	9.8	17.2	46.0
16.458000	26.1	9.000	Off	L1	10.2	23.9	50.0
17.550000	25.7	9.000	Off	L1	10.2	24.3	50.0
18.100000	26.1	9.000	Off	L1	10.2	23.9	50.0
18.450000	26.1	9.000	Off	L1	10.2	23.9	50.0
18.538000	25.9	9.000	Off	L1	10.2	24.1	50.0
18.774000	26.0	9.000	Off	L1	10.2	24.0	50.0

2016-05-04

오전 9:23:28

Note : The Worst case of Conducted Emission is standalone mode.

10. LIST OF TEST EQUIPMENT

10.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216/ LISN	12/28/2015	Annual	100073
Rohde & Schwarz	ESCI / TEST RECEIVER	12/28/2015	Annual	100584
Agilent	N9020A / SIGNAL ANALYZER	06/30/2015	Annual	MY51110085
Agilent	N9030A / SIGNAL ANALYZER	11/24/2015	Annual	MY49431210
Agilent	N1911A / Power Meter	07/09/2015	Annual	MY45100523
Agilent	N1921A / Power Sensor	03/11/2016	Annual	MY52260025
Agilent	87300B/Directional Coupler	11/30/2015	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/15/2015	Annual	05001
Hewlett Packard	E3632A / DC POWER SUPPLY	03/09/2016	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/23/2015	Annual	07560
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/11/2015	Annual	100422

10.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Audix	ACT-A400 / Antenna Master	N/A	N/A	N/A
Audix	ACT-T150 / Turn Table	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	C060518
Rohde & Schwarz	Loop Antenna	02/23/2016	Biennial	1513-175
Schwarzbeck	VULB 9160 / Trilog Antenna	10/10/2014	Biennial	3368
Schwarzbeck	BBHA 9120D / Horn Antenna	07/31/2015	Biennial	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/03/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	01/15/2016	Annual	839117/011
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2015	Annual	101068-SZ
Wainwright Instruments	F6_HPF 3.0 / High Pass Filter	09/11/2015	Annual	F6
Wainwright Instruments	WHKX8-6090-7000-18000-40SS / High Pass Filter	09/11/2015	Annual	34
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	07/06/2015	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/26/2016	Annual	2
Weinshel	2-3 / Attenuator(3 dB)	10/26/2015	Annual	BR0617
CERNEX	CBLU1183540B-01 / Low Noise Amplifier	07/21/2015	Annual	25539
Rohde & Schwarz	SCU-18 / Signal Conditioning Unit	09/07/2015	Annual	10094
CERNEX	CBL18265035 / Power Amplifier	07/27/2015	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	07/09/2015	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	04/01/2016	Annual	3000C000276