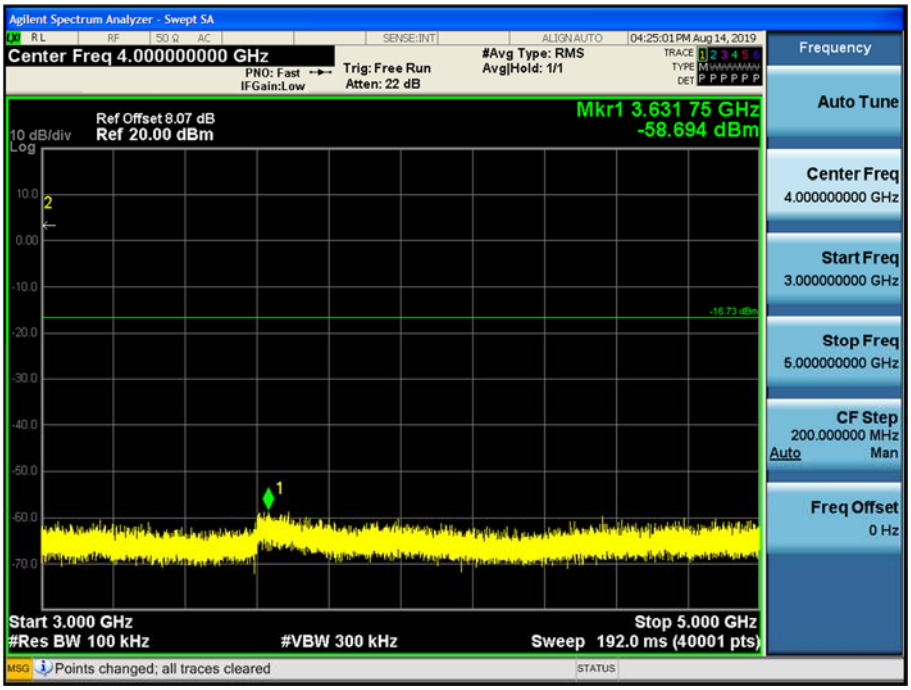
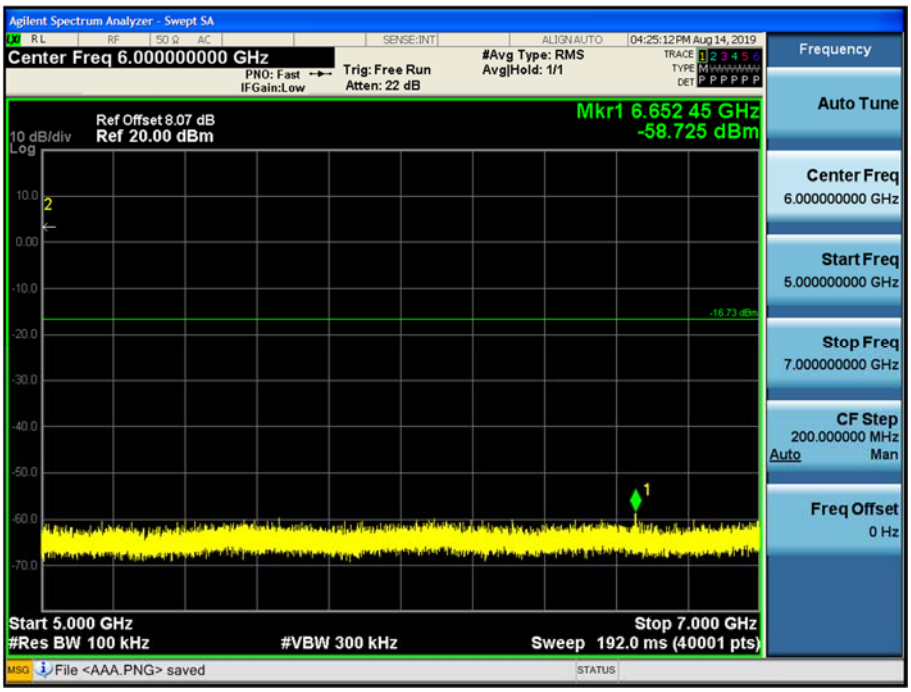
Test Plots(GFSK)- 3 GHz - 5 GHz

Spurious Emission (CH.39)



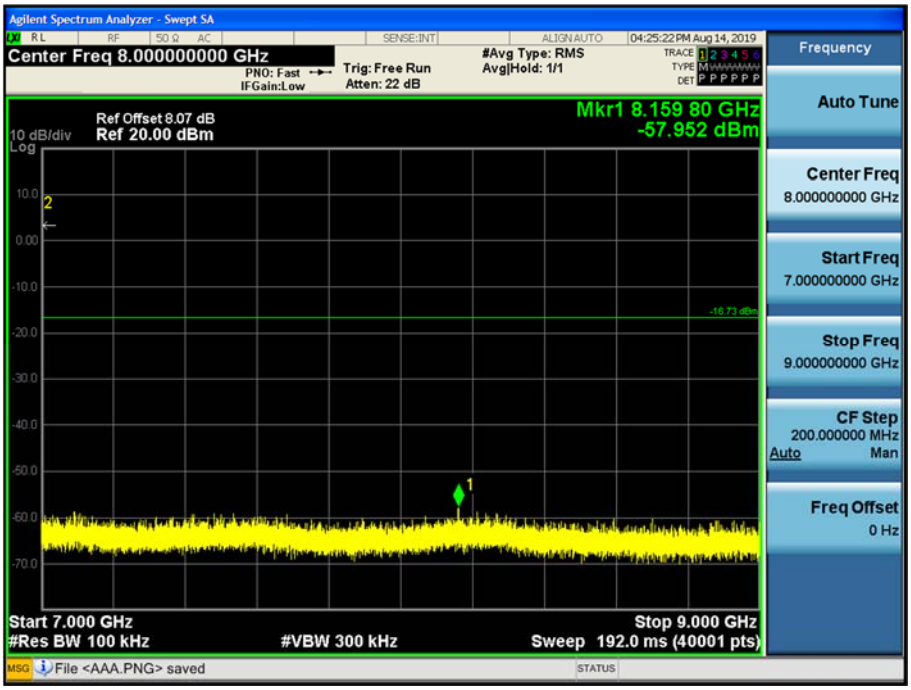
Test Plots (GFSK)- 5 GHz - 7 GHz

Spurious Emission (CH.39)



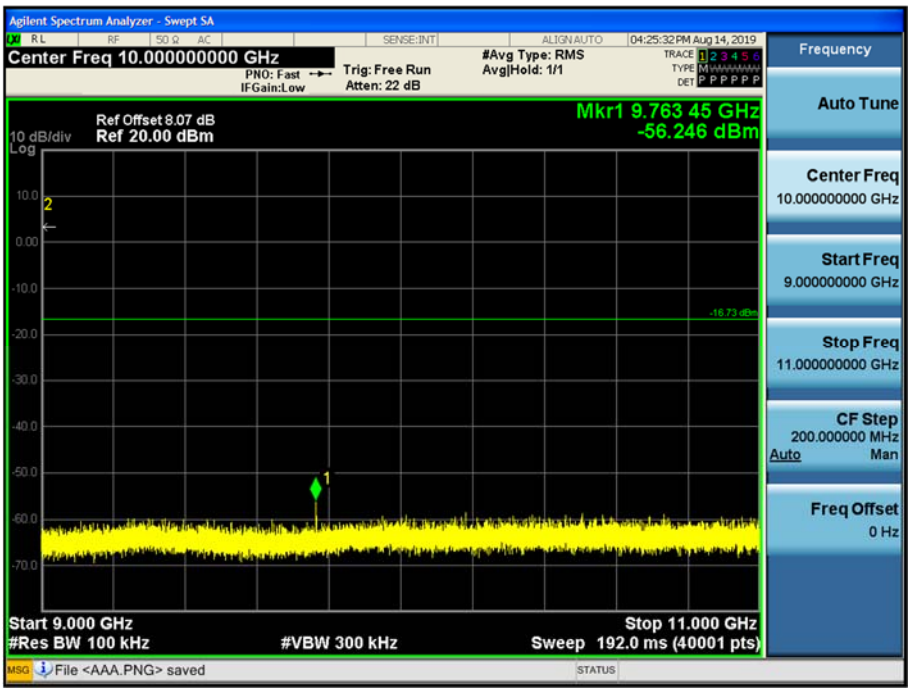
Test Plots(GFSK)- 7 GHz - 9 GHz

Spurious Emission (CH.39)



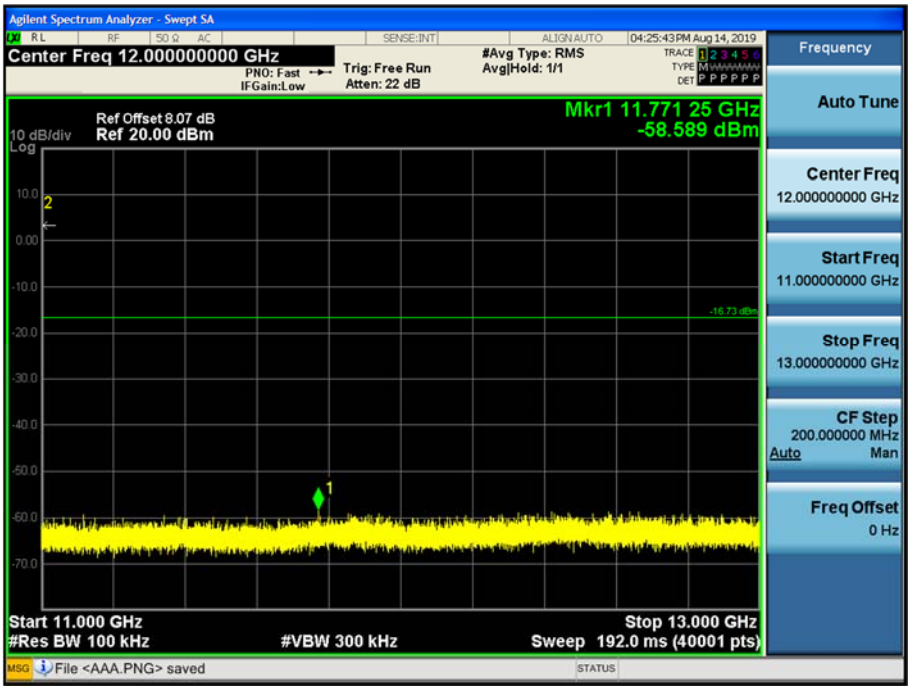
Test Plots(GFSK)- 9 GHz - 11 GHz

Spurious Emission (CH.39)



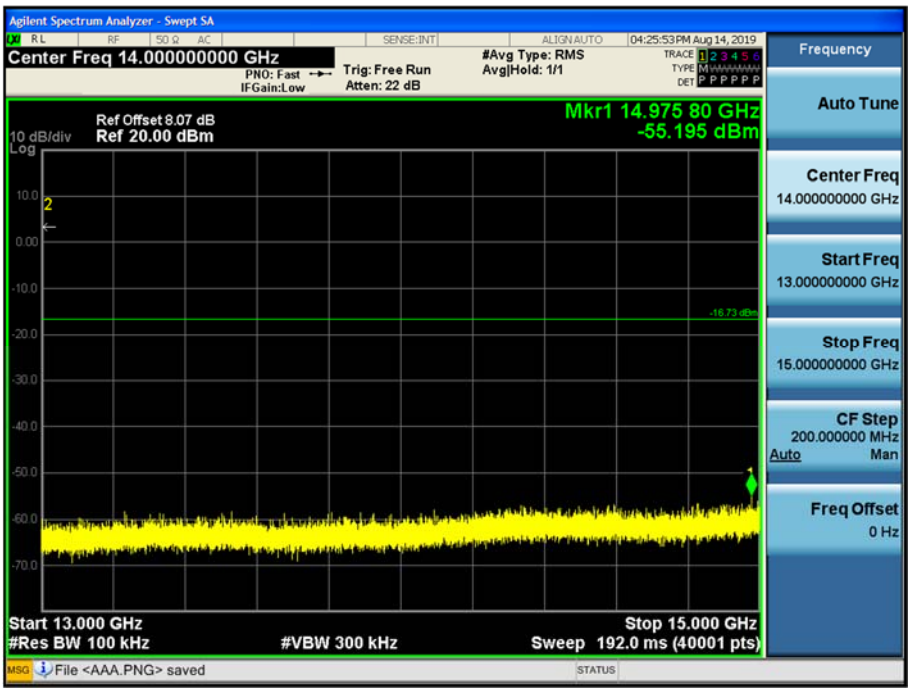
Test Plots(GFSK) 11 GHz - 13 GHz

Spurious Emission (CH.39)



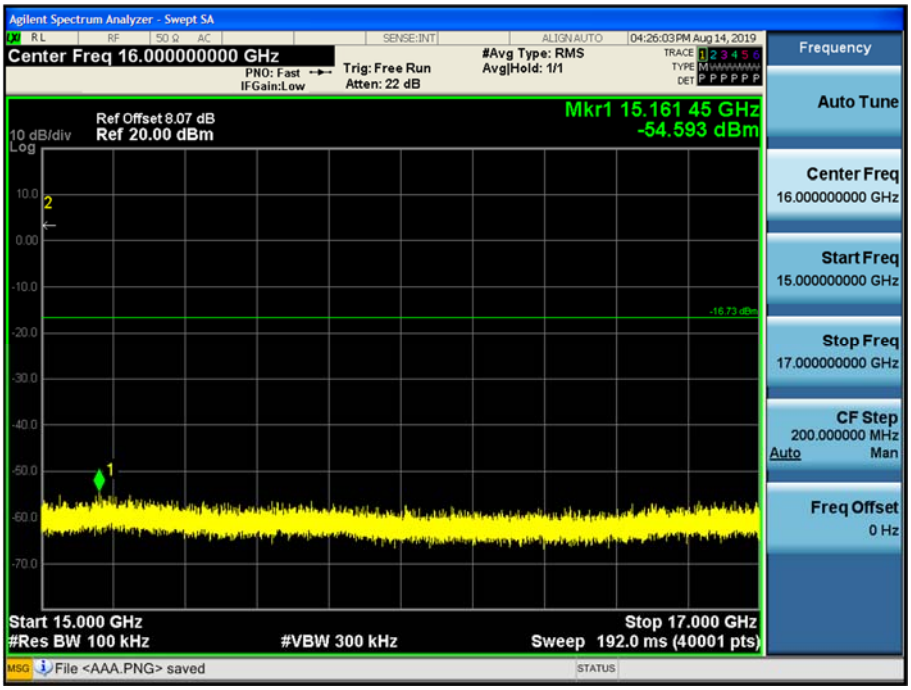
Test Plots (GFSK)- 13 GHz – 15 GHz

Spurious Emission (CH.39)



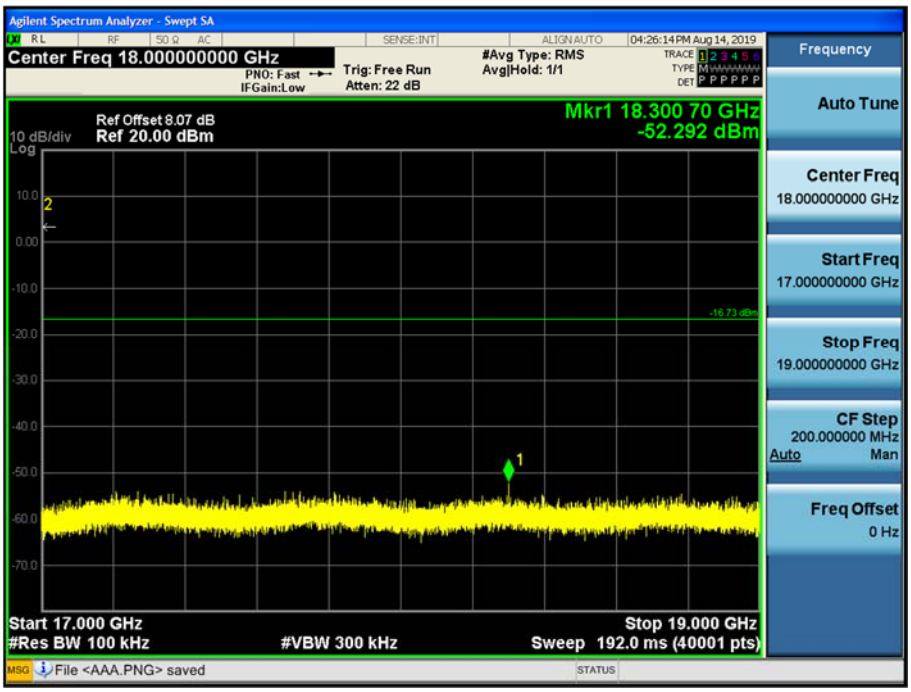
Test Plots(GFSK)– 15 GHz - 17 GHz

Spurious Emission (CH.39)



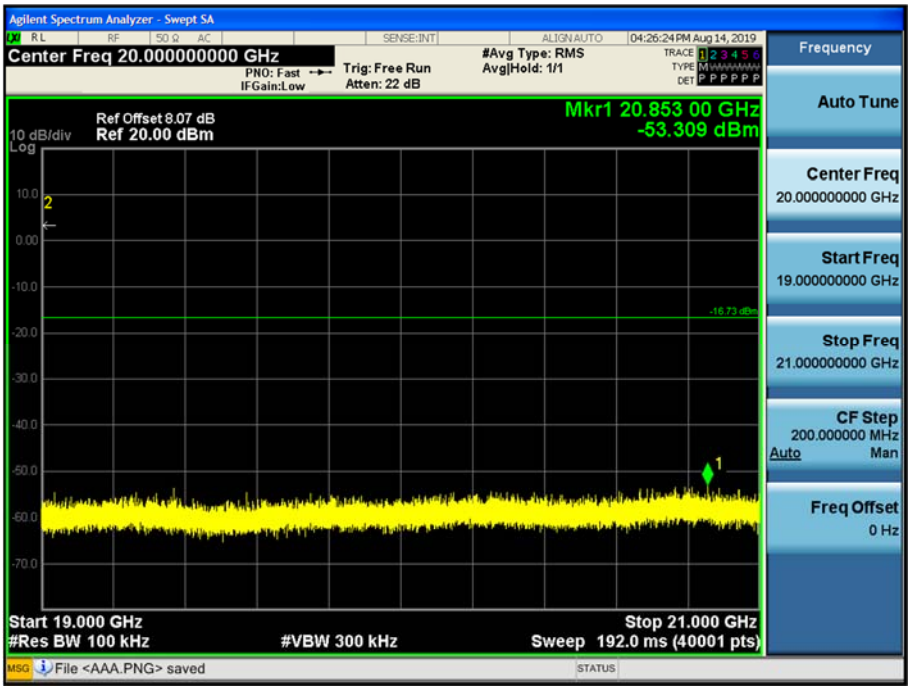
Test Plots(GFSK)- 17 GHz - 19 GHz

Spurious Emission (CH.39)



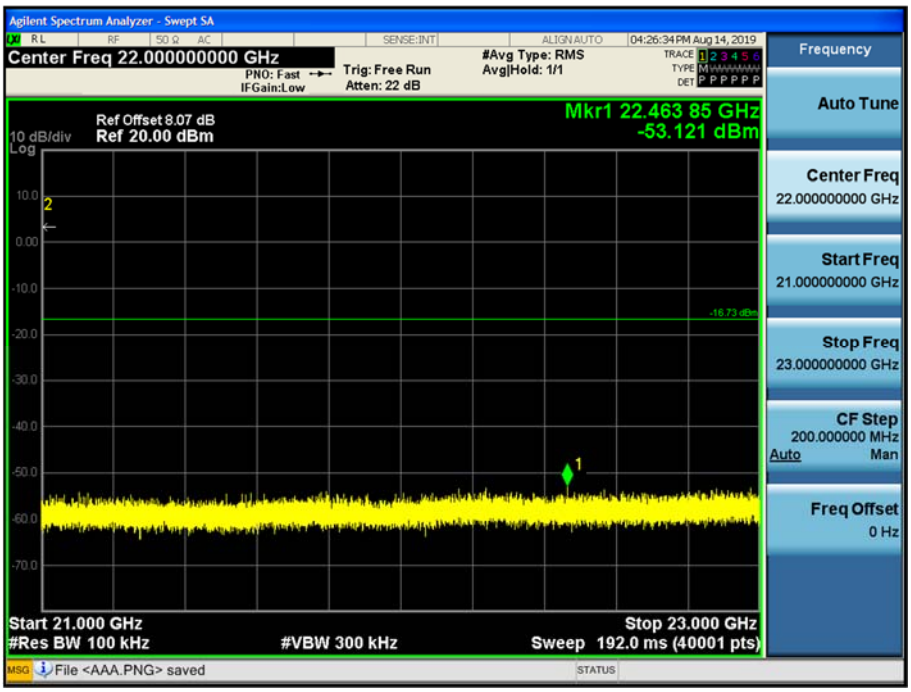
Test Plots (GFSK)- 19 GHz - 21 GHz

Spurious Emission (CH.39)



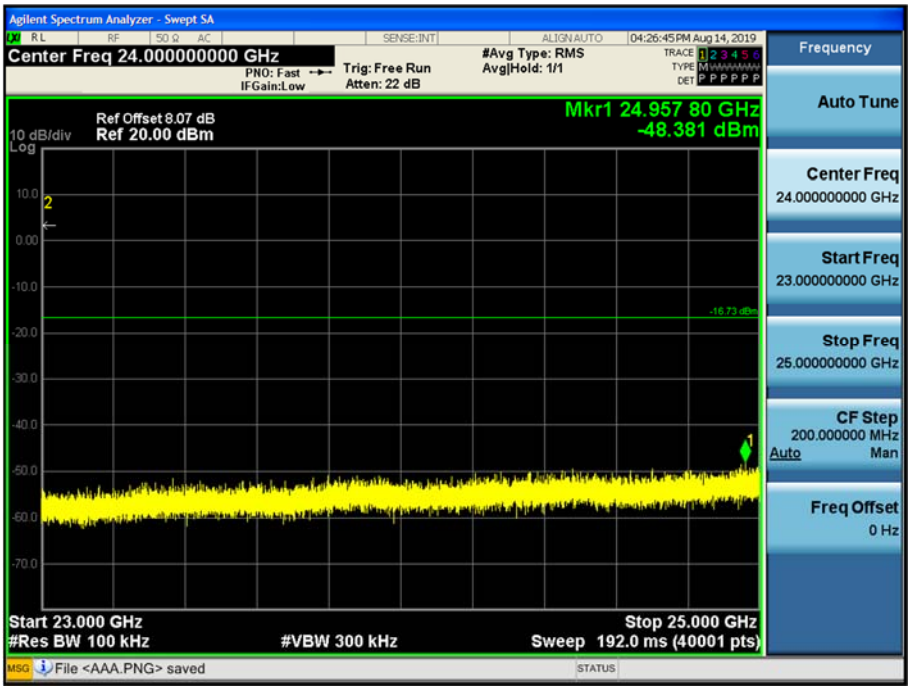
Test Plots (GFSK)- 21 GHz - 23 GHz

Spurious Emission (CH.39)



Test Plots (GFSK)- 23 GHz - 25 GHz

Spurious Emission (CH.39)



10.6.2 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

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							

Note:

1. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40*log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor
4. Radiated test is performed with hopping off.
5. The test results for below 30 MHz is correlated to an open site.
   The result on OFS is about 2 dB higher than semi-anechoic chamber(10 m chamber)

Frequency Range : Below 1 GHz

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							

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
2. Radiated test is performed with hopping off.

Frequency Range : Above 1 GHz

Operation Mode: CH Low(GFSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	35.55	2.17	V	37.72	73.98	36.26	PK
4804	34.26	2.17	V	36.43	53.98	17.55	AV
7206	42.00	8.97	V	50.97	73.98	23.01	PK
7206	28.45	8.97	V	37.42	53.98	16.56	AV
4804	35.63	2.17	H	37.8	73.98	36.18	PK
4804	34.55	2.17	H	36.72	53.98	17.26	AV
7206	42.07	8.97	H	51.04	73.98	22.94	PK
7206	28.55	8.97	H	37.52	53.98	16.46	AV

Operation Mode: CH Low(8DPSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	44.56	2.17	V	46.73	73.98	27.25	PK
4804	33.12	2.17	V	35.29	53.98	18.69	AV
7206	42.05	8.97	V	51.02	73.98	22.96	PK
7206	28.31	8.97	V	37.28	53.98	16.70	AV
4804	45.87	2.17	H	48.04	73.98	25.94	PK
4804	34.30	2.17	H	36.47	53.98	17.51	AV
7206	42.26	8.97	H	51.23	73.98	22.75	PK
7206	28.57	8.97	H	37.54	53.98	16.44	AV

Operation Mode: CH Low(π/4DQPSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	44.98	2.17	V	47.15	73.98	26.83	PK
4804	34.32	2.17	V	36.49	53.98	17.49	AV
7206	42.09	8.97	V	51.06	73.98	22.92	PK
7206	28.42	8.97	V	37.39	53.98	16.59	AV
4804	45.99	2.17	H	48.16	73.98	25.82	PK
4804	34.41	2.17	H	36.58	53.98	17.40	AV
7206	42.38	8.97	H	51.35	73.98	22.63	PK
7206	28.51	8.97	H	37.48	53.98	16.50	AV

Operation Mode: CH Mid(GFSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	43.26	2.68	V	45.94	73.98	28.04	PK
4882	29.47	2.68	V	32.15	53.98	21.83	AV
7323	43.11	9.03	V	52.14	73.98	21.84	PK
7323	28.49	9.03	V	37.52	53.98	16.46	AV
4882	43.53	2.68	H	46.21	73.98	27.77	PK
4882	31.29	2.68	H	33.97	53.98	20.01	AV
7323	43.15	9.03	H	52.18	73.98	21.80	PK
7323	28.50	9.03	H	37.53	53.98	16.45	AV

Operation Mode: CH Mid(8DPSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	43.66	2.68	V	46.34	73.98	27.64	PK
4882	30.42	2.68	V	33.1	53.98	20.88	AV
7323	40.99	9.03	V	50.02	73.98	23.96	PK
7323	28.14	9.03	V	37.17	53.98	16.81	AV
4882	44.12	2.68	H	46.8	73.98	27.18	PK
4882	31.41	2.68	H	34.09	53.98	19.89	AV
7323	41.97	9.03	H	51	73.98	22.98	PK
7323	28.42	9.03	H	37.45	53.98	16.53	AV

Operation Mode: CH Mid(π/4DQPSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	42.47	2.68	V	45.15	73.98	28.83	PK
4882	31.33	2.68	V	34.01	53.98	19.97	AV
7323	41.59	9.03	V	50.62	73.98	23.36	PK
7323	28.11	9.03	V	37.14	53.98	16.84	AV
4882	43.58	2.68	H	46.26	73.98	27.72	PK
4882	31.36	2.68	H	34.04	53.98	19.94	AV
7323	42.49	9.03	H	51.52	73.98	22.46	PK
7323	28.58	9.03	H	37.61	53.98	16.37	AV

Operation Mode: CH High(GFSK)

Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	30.00	1.54	V	31.54	53.98	22.44	AV
4960	43.74	1.54	H	45.28	73.98	28.70	PK
4960	30.63	1.54	H	32.17	53.98	21.81	AV
7440	41.21	9.82	H	51.03	73.98	22.95	PK
7440	27.70	9.82	H	37.52	53.98	16.46	AV

Operation Mode: CH High(8DPSK)

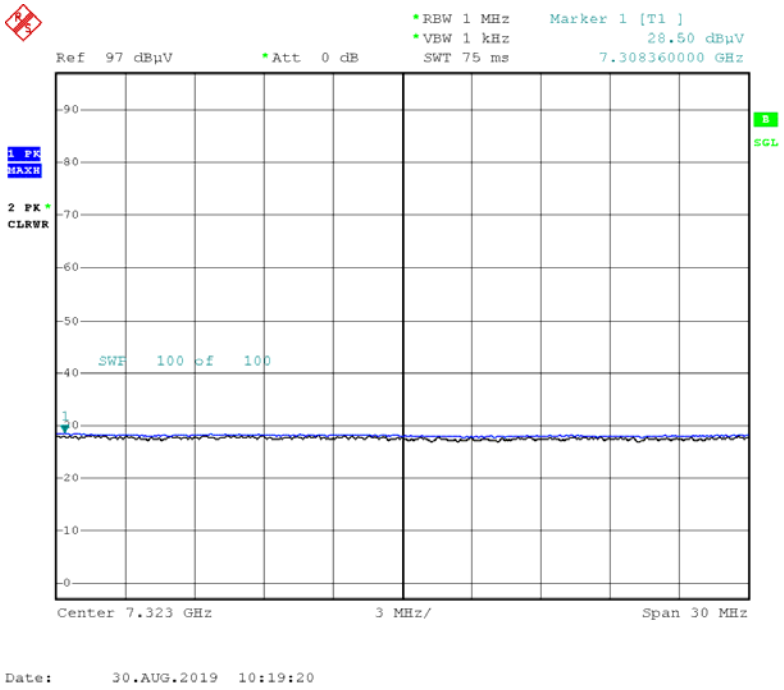
Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	43.95	1.54	V	45.49	73.98	28.49	PK
4960	30.58	1.54	V	32.12	53.98	21.86	AV
7440	40.78	9.82	V	50.6	73.98	23.38	PK
7440	27.65	9.82	V	37.47	53.98	16.51	AV
4960	44.53	1.54	H	46.07	73.98	27.91	PK
4960	30.61	1.54	H	32.15	53.98	21.83	AV
7440	40.81	9.82	H	50.63	73.98	23.35	PK
7440	27.71	9.82	H	37.53	53.98	16.45	AV

Operation Mode: CH High (π/4DQPSK)

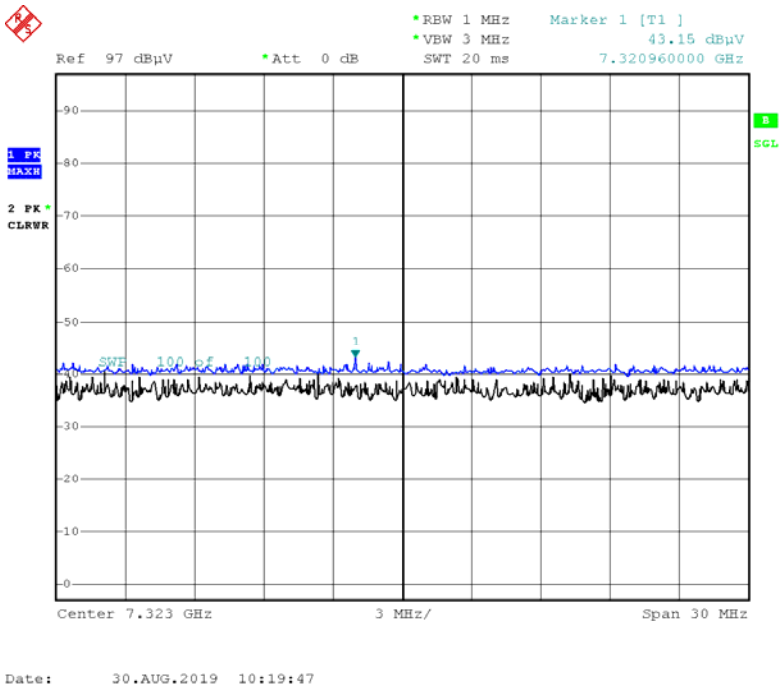
Frequency [MHz]	Reading dBuV	AN.+CL-AMP G [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4960	43.29	1.54	V	44.83	73.98	29.15	PK
4960	30.17	1.54	V	31.71	53.98	22.27	AV
7440	41.07	9.82	V	50.89	73.98	23.09	PK
7440	27.20	9.82	V	37.02	53.98	16.96	AV
4960	44.28	1.54	H	45.82	73.98	28.16	PK
4960	30.67	1.54	H	32.21	53.98	21.77	AV
7440	41.70	9.82	H	51.52	73.98	22.46	PK
7440	27.73	9.82	H	37.55	53.98	16.43	AV

RESULT PLOTS (Worst case : H)

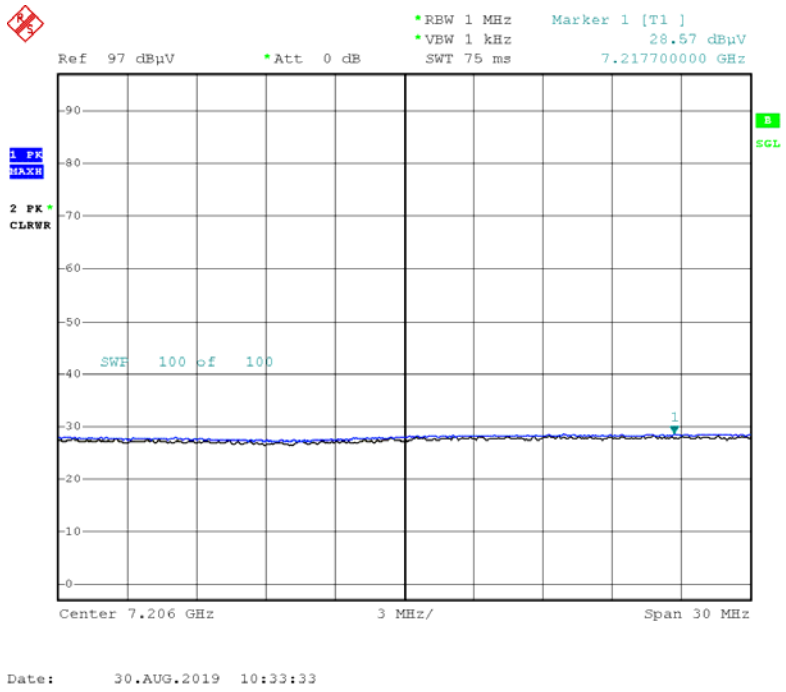
Radiated Spurious Emissions plot – Average Reading (GFSK, Ch.39 3rd Harmonic)



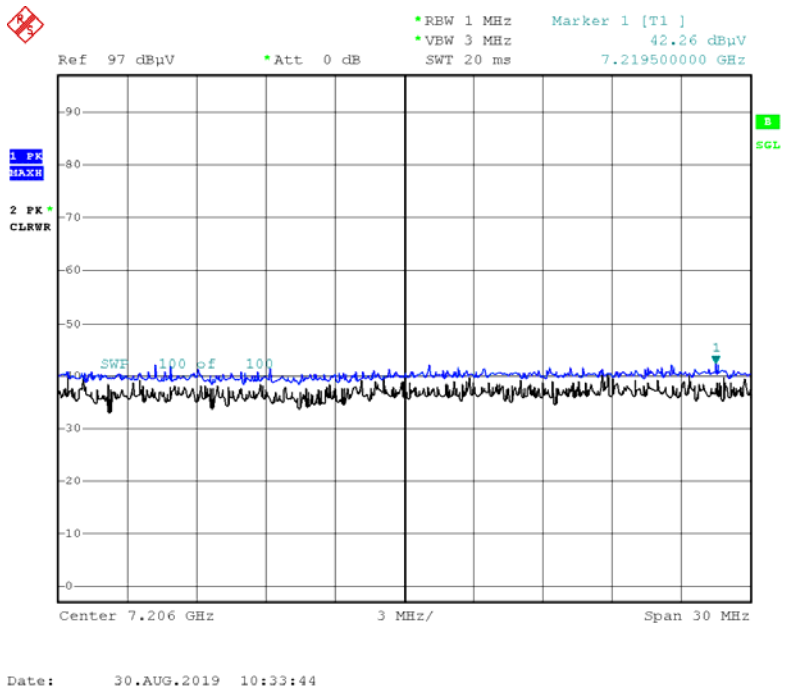
Radiated Spurious Emissions plot – Peak Reading (GFSK, Ch.39 3rd Harmonic)



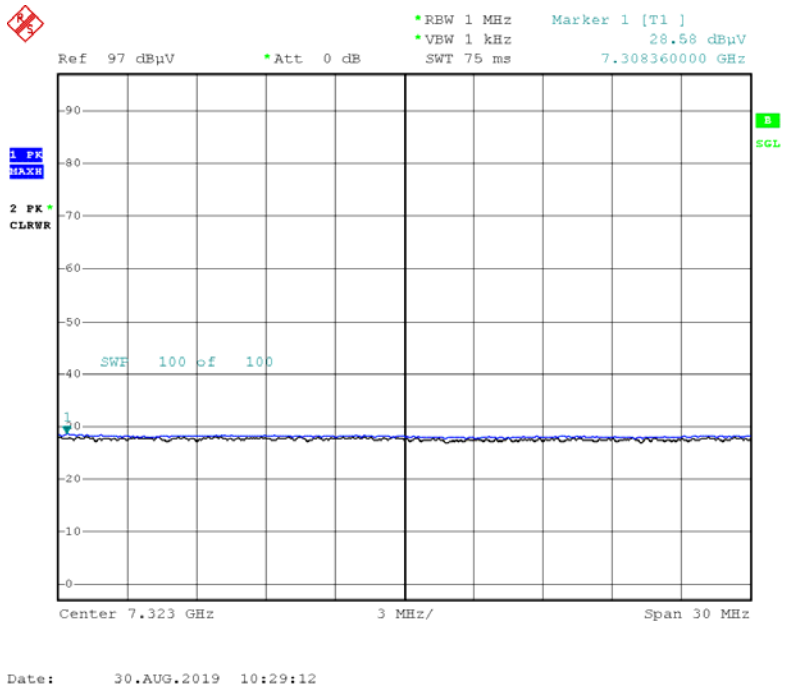
Radiated Spurious Emissions plot – Average Reading (8DPSK, Ch.0 3rd Harmonic)



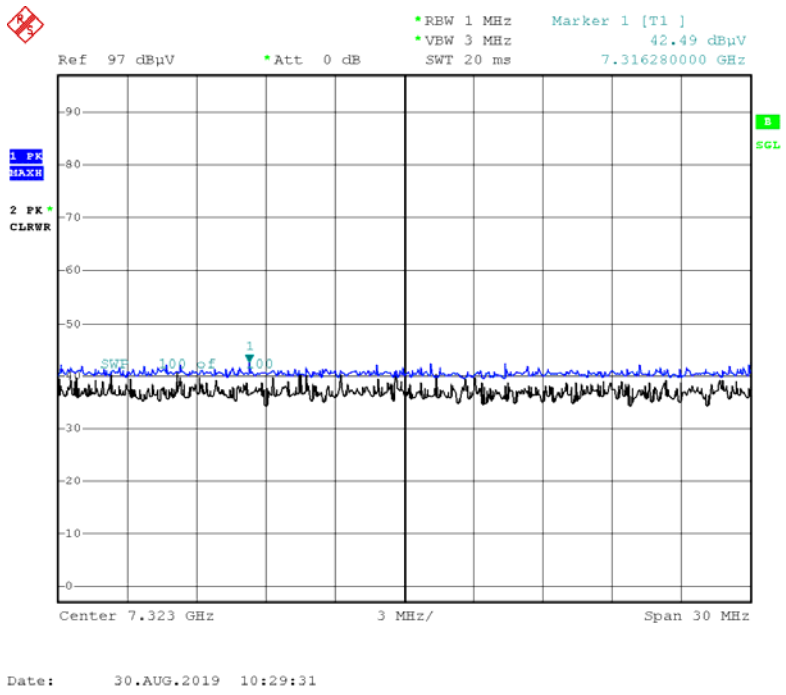
Radiated Spurious Emissions plot – Peak Reading (8DPSK, Ch.0 3rd Harmonic)



Radiated Spurious Emissions plot – Average Reading (π/4DQPSK, Ch.39 3rd Harmonic)



Radiated Spurious Emissions plot – Peak Reading (π/4DQPSK, Ch.39 3rd Harmonic)



Note:

Plot of worst case are only reported.

10.6.3 RADIATED RESTRICTED BAND EDGES

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]	Detect [dB]
2390.0	48.78	0.22	H	0	49.00	73.98	24.98	PK
2390.0	35.82	0.22	H	-24.73	11.31	53.98	42.67	AV
2390.0	50.08	0.22	V	0	50.30	73.98	23.68	PK
2390.0	35.81	0.22	V	-24.73	11.30	53.98	42.68	AV
2483.5	63.71	0.65	H	0	64.36	73.98	9.62	PK
2483.5	52.43	0.65	H	-24.73	28.35	53.98	25.63	AV
2483.5	56.49	0.65	V	0	57.14	73.98	16.84	PK
2483.5	52.88	0.65	V	-24.73	28.80	53.98	25.18	AV

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

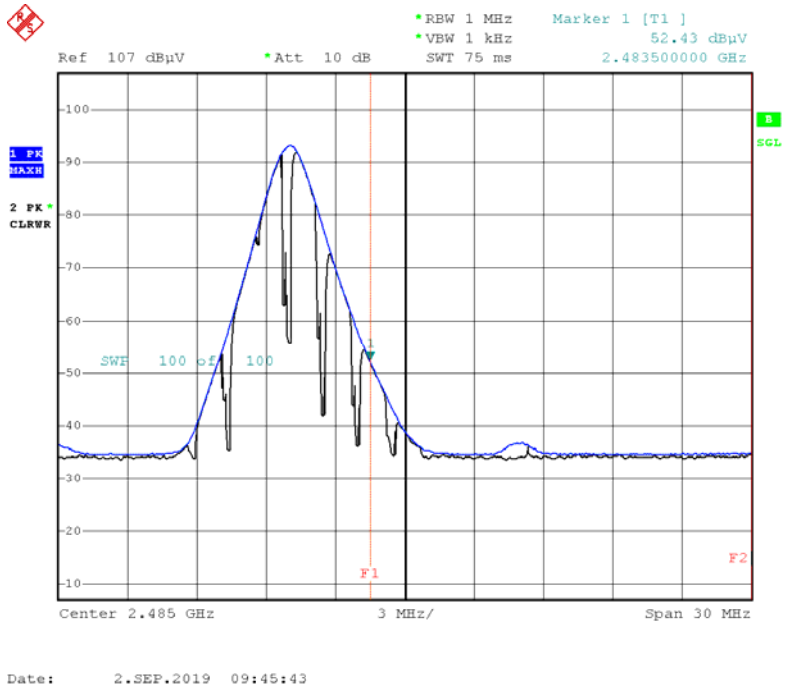
Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect [dB]
2390.0	48.99	0.22	H	0	49.21	73.98	24.77	PK
2390.0	35.77	0.22	H	-24.73	11.26	53.98	42.72	AV
2390.0	47.68	0.22	V	0	47.90	73.98	26.08	PK
2390.0	35.75	0.22	V	-24.73	11.24	53.98	42.74	AV
2483.5	54.95	0.65	H	0	55.60	73.98	18.38	PK
2483.5	49.75	0.65	H	-24.73	25.67	53.98	28.31	AV
2483.5	53.87	0.65	V	0	54.52	73.98	19.46	PK
2483.5	48.69	0.65	V	-24.73	24.61	53.98	29.37	AV

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

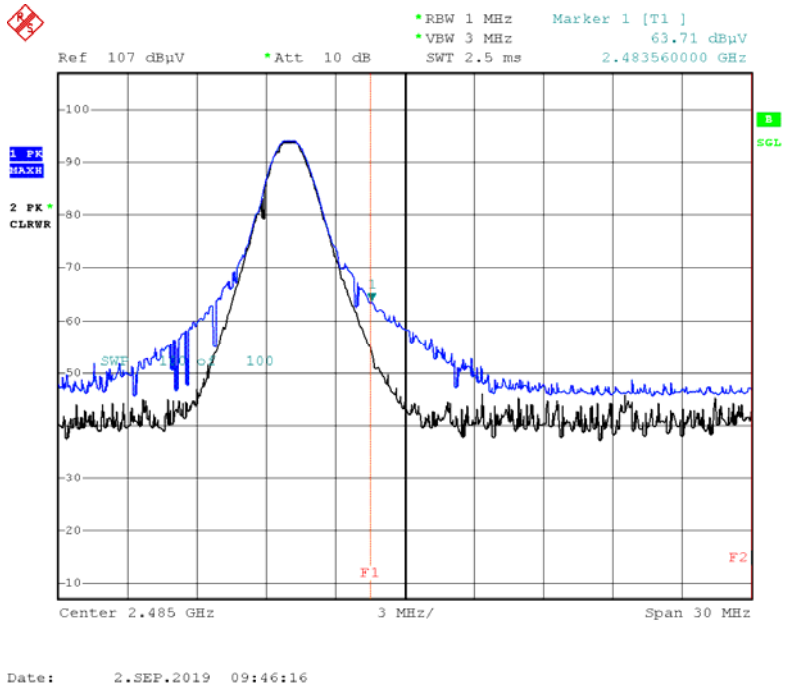
Frequency [MHz]	Reading dBuV	※ A.F.+CL [dB]	ANT. POL [H/V]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect [dB]
2390.0	48.76	0.22	H	0	48.98	73.98	25.00	PK
2390.0	35.97	0.22	H	-24.73	11.46	53.98	42.52	AV
2390.0	48.66	0.22	V	0	48.88	73.98	25.10	PK
2390.0	34.59	0.22	V	-24.73	10.08	53.98	43.90	AV
2483.5	54.79	0.65	H	0	55.44	73.98	18.54	PK
2483.5	49.28	0.65	H	-24.73	25.20	53.98	28.78	AV
2483.5	53.98	0.65	V	0	54.63	73.98	19.35	PK
2483.5	48.51	0.65	V	-24.73	24.43	53.98	29.55	AV

RESULT PLOTS

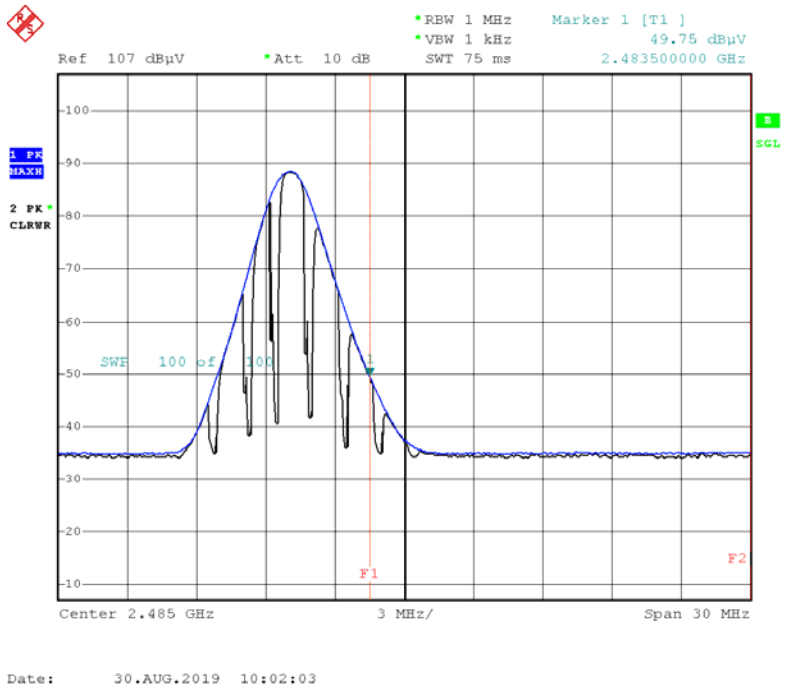
Radiated Restricted Band Edges plot – Average Reading (GFSK, Ch.78, X-H)



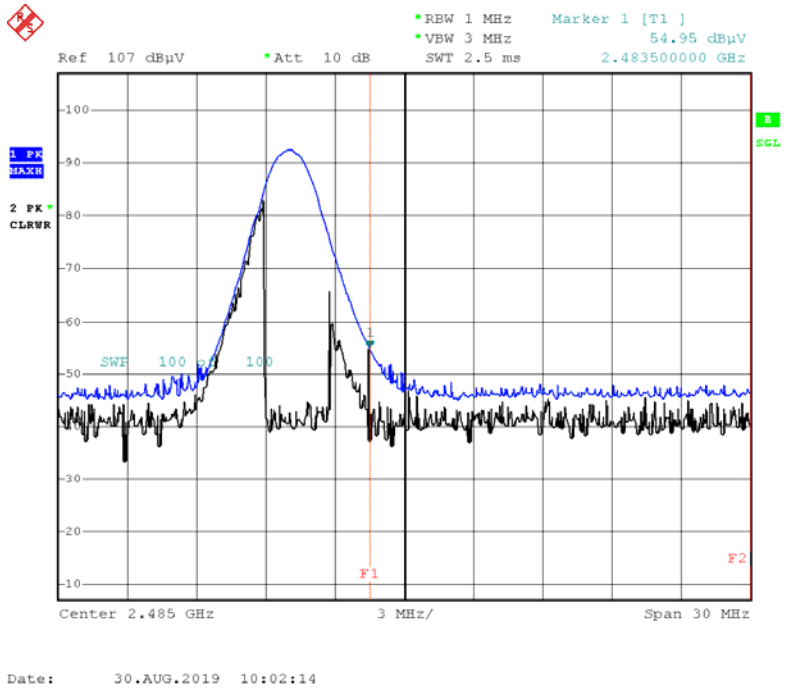
Radiated Restricted Band Edges plot – Peak Reading (GFSK, Ch.78, X-H)



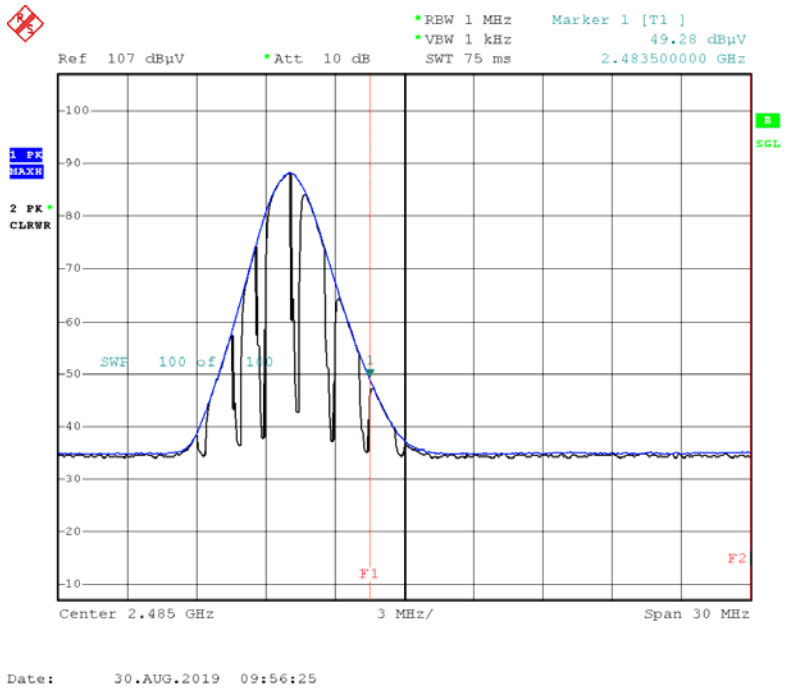
Radiated Restricted Band Edges plot – Average Reading (8DPSK, Ch.78, H)



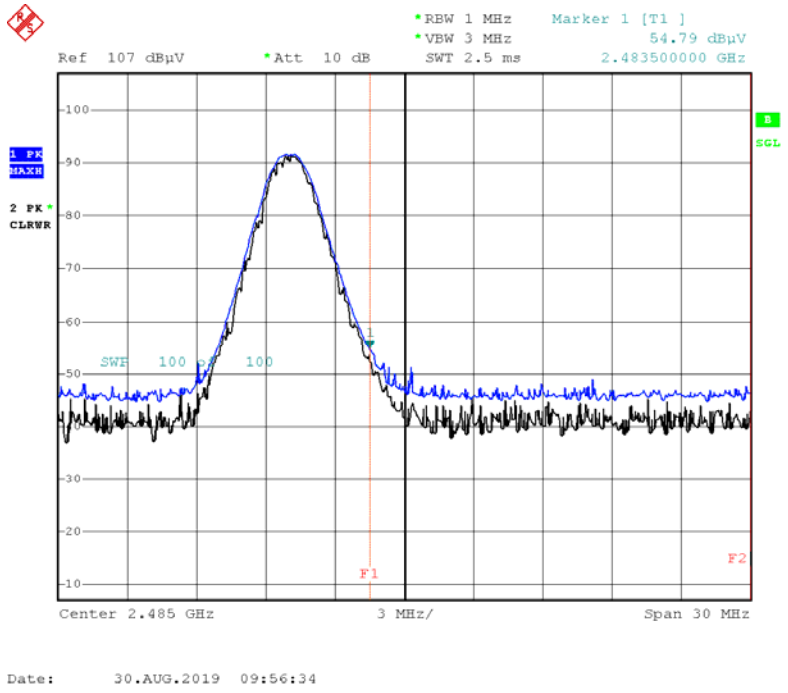
Radiated Restricted Band Edges plot – Peak Reading (8DPSK, Ch.78, H)



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



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



Note:

Plot of worst case are only reported.

10.7 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

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							

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

Frequency Range : Above 1 GHz

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							

11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	12/12/2018	Annual	102245
Rohde & Schwarz	ESCI / Test Receiver	06/18/2019	Annual	100033
ESPAC	SU-642 /Temperature Chamber	03/12/2019	Annual	0093008124
Agilent	N9020A / Signal Analyzer	05/23/2019	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/20/2018	Annual	MY49431210
Agilent	N1911A / Power Meter	04/10/2019	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/10/2019	Annual	MY52260025
Agilent	87300B / Directional Coupler	11/20/2018	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/24/2019	Annual	5001
Hewlett Packard	E3632A / DC Power Supply	06/18/2019	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	07/02/2019	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A
Rohde & Schwarz	CBT / Bluetooth Tester	05/16/2019	Annual	100422

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Emco	2090 / Controller	N/A	N/A	060520
Ets	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	01/18/2019	Biennial	1513-175
Schwarzbeck	VULB 9160 / Hybrid Antenna	08/09/2019	Biennial	3368
Schwarzbeck	BBHA 9120D / Horn Antenna	11/21/2017	Biennial	9120D-1191
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	12/04/2017	Biennial	BBHA9170541
Rohde & Schwarz	FSP(9 kHz ~ 30 GHz) / Spectrum Analyzer	09/19/2018	Annual	836650/016
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/19/2018	Annual	101068-SZ
Wainwright Instruments	WHKX10-2700-3000-18000-40SS / High Pass Filter	01/03/2019	Annual	4
Wainwright Instruments	WHKX8-6090-7000-18000-40SS / High Pass Filter	01/03/2019	Annual	5
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	06/19/2019	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/03/2019	Annual	2
Api tech.	18B-03 / Attenuator (3 dB)	06/04/2019	Annual	2
WEINSCHEL	56-10 / Attenuator(10 dB)	10/10/2018	Annual	72316
CERNEX	CBLU1183540B-01/Broadband Bench Top LNA	01/03/2019	Annual	28549
CERNEX	CBL06185030 / Broadband Low Noise Amplifier	01/03/2019	Annual	24615
CERNEX	CBL18265035 / Power Amplifier	01/03/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	03/26/2019	Annual	3000C000276

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.

2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

12. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-1909-FI007-P