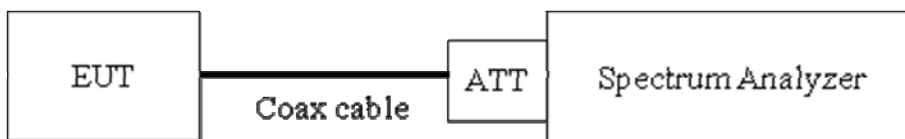


9.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS**Test Requirements and limit, §15.247(d)**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc**■ TEST CONFIGURATION****■ TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 01/07/2016)

RBW = 100 kHz

VBW $\geq 3 \times$ RBW

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points $\geq 2 \times \text{Span} / \text{RBW}$

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1(KDB558074 v03r05), so the peak output power measured in any 100 kHz bandwidth outside

of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

2. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.

3. Spectrum offset = Attenuator loss + Cable loss

4. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.7 dB is offset for 2.4 GHz Band.

5. In case of conducted spurious emissions test, please check factors blow table.

6. In order to simplify the report, attached plots were only the worst case channel and data rate.

■ FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	11.30
100	9.83
200	10.19
300	10.13
400	10.23
500	10.25
600	10.32
700	10.35
800	10.35
900	10.34
1000	10.39
2000	10.64
2400*	10.65
2500*	10.67
3000	10.68
4000	10.89
5000	11.07
6000	11.06
7000	11.35
8000	11.32
9000	11.48
10000	11.56
11000	11.56
12000	11.68

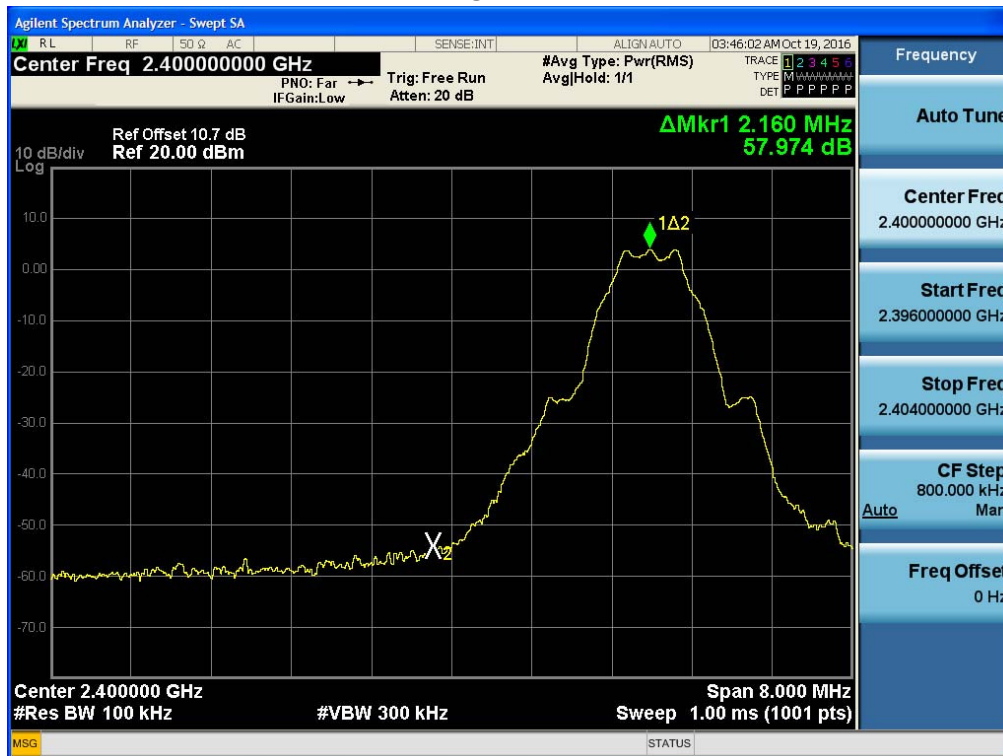
13000	11.83
14000	11.90
15000	11.98
16000	12.04
17000	12.02
18000	12.08
19000	12.07
20000	12.14
21000	12.17
22000	12.31
23000	12.60
24000	12.34
25000	12.53

Note : 1. '**' is fundamental frequency range.

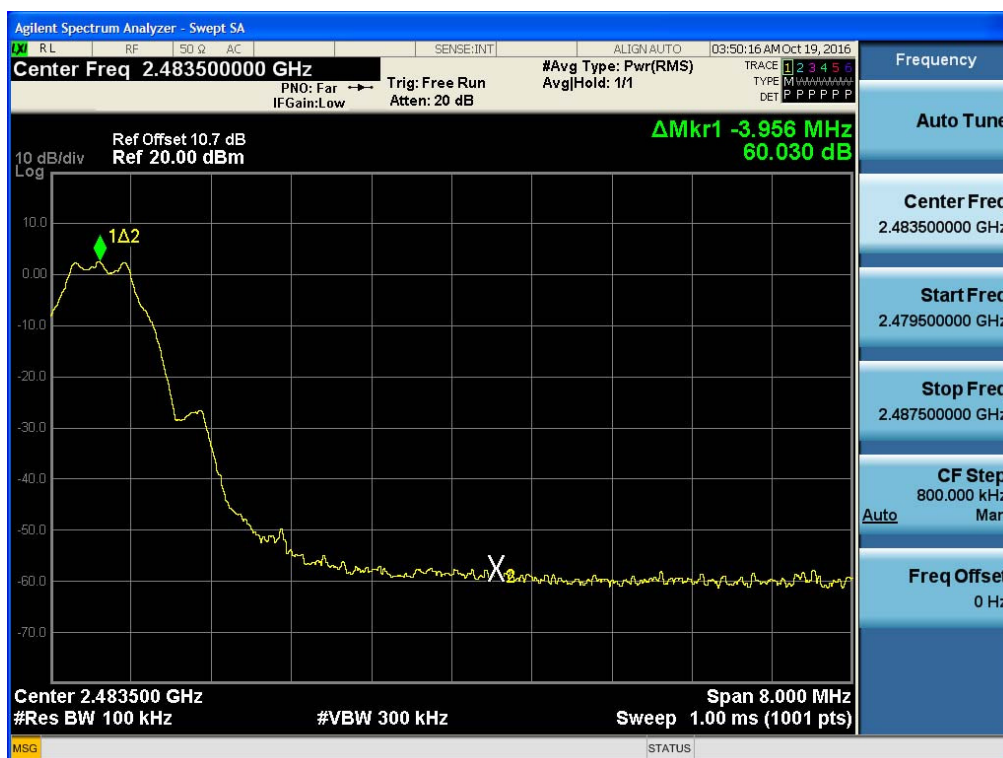
2. Factor = Cable loss + Attenuator loss

■ RESULT PLOTS_ Data packet length (Min)

BandEdge (Low-CH 0)

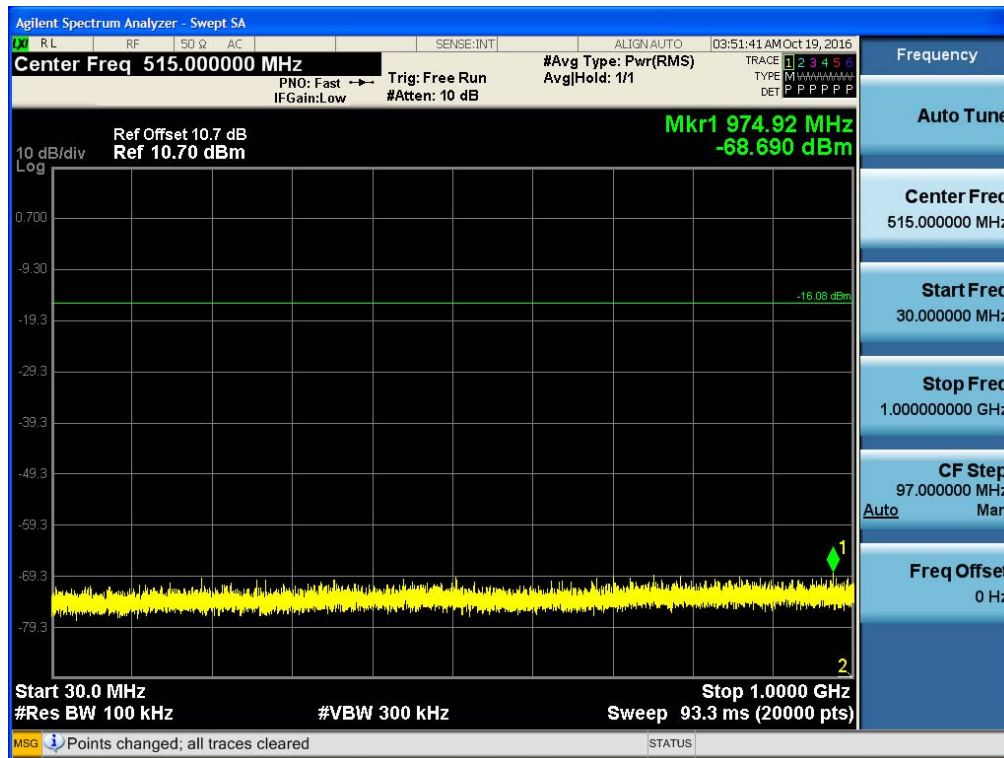


BandEdge (High-CH 39)



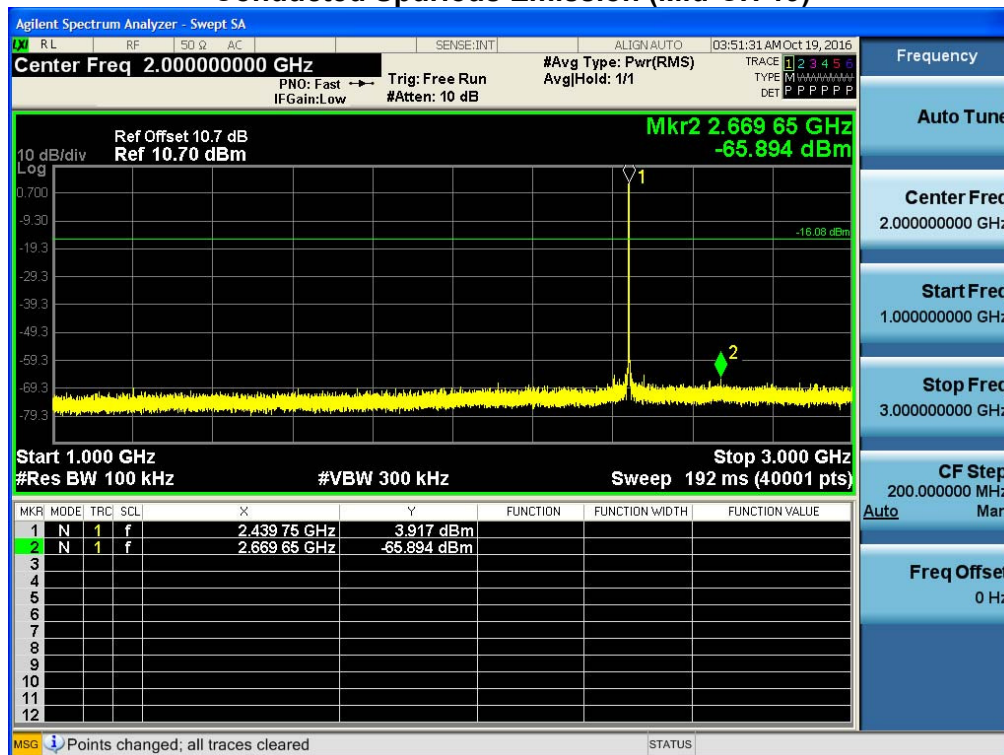
30 MHz ~ 1 GHz

Conducted Spurious Emission (Mid-CH 19)



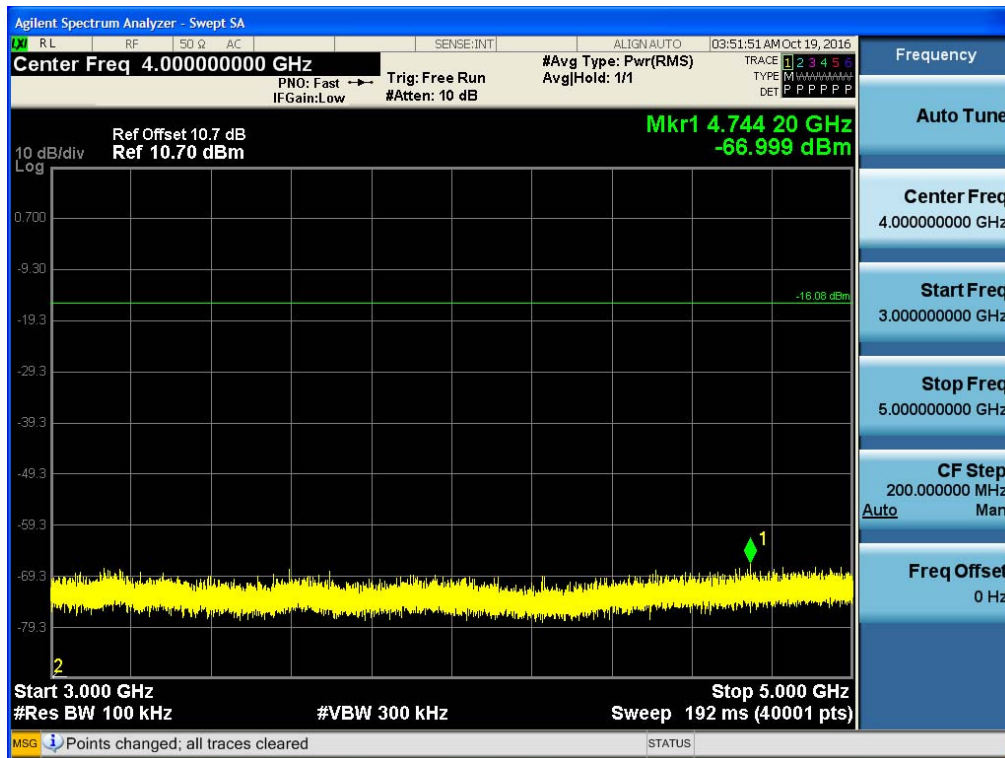
1 GHz ~ 3 GHz

Conducted Spurious Emission (Mid-CH 19)



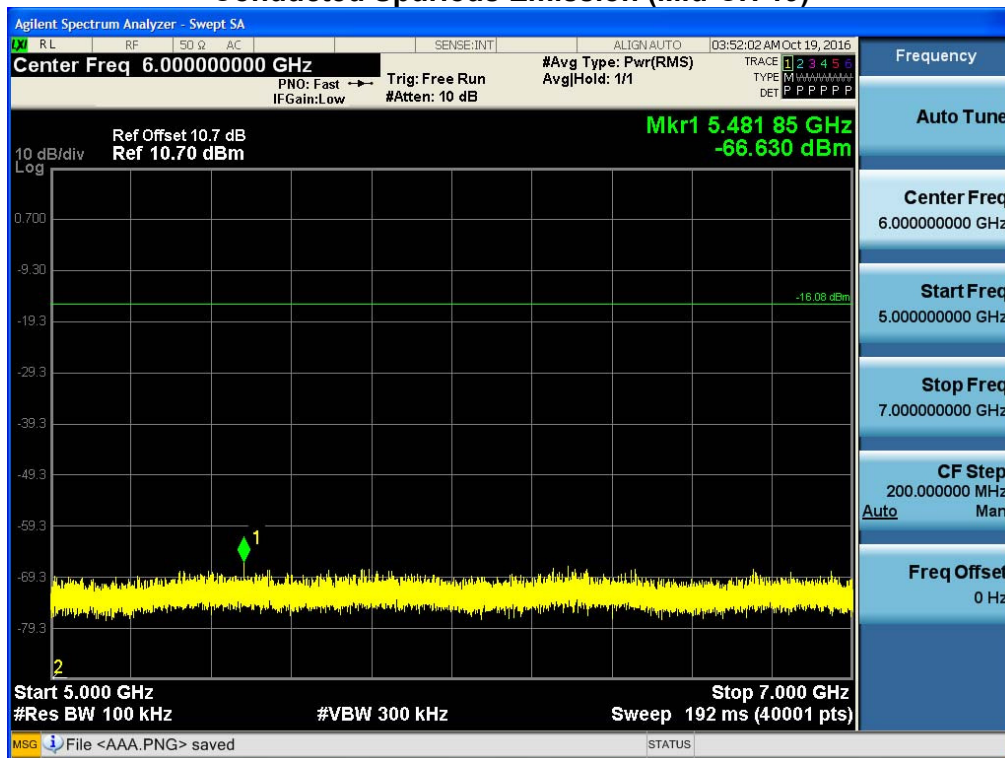
3 GHz ~ 5 GHz

Conducted Spurious Emission (Mid-CH 19)



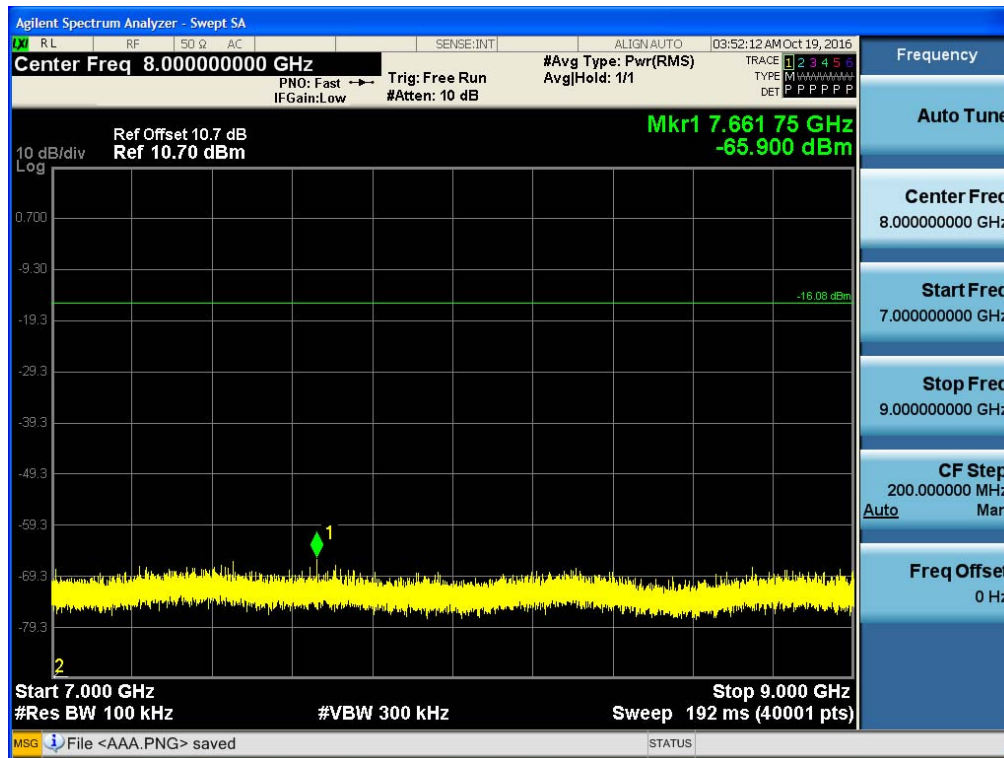
5 GHz ~ 7 GHz

Conducted Spurious Emission (Mid-CH 19)



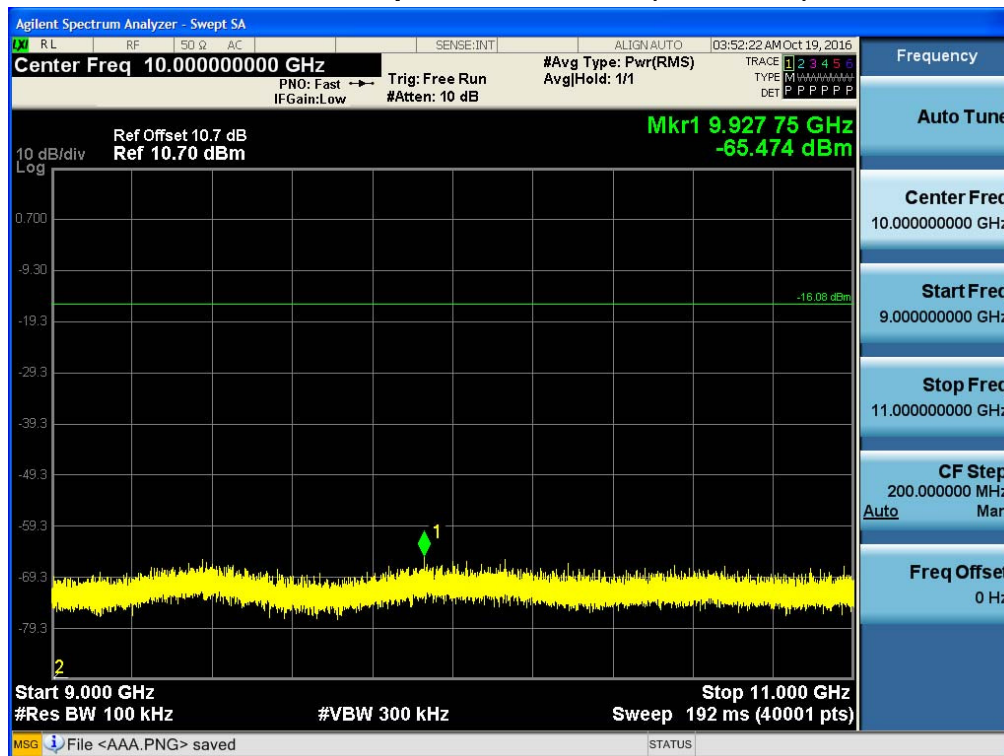
7 GHz ~ 9 GHz

Conducted Spurious Emission (Mid-CH 19)



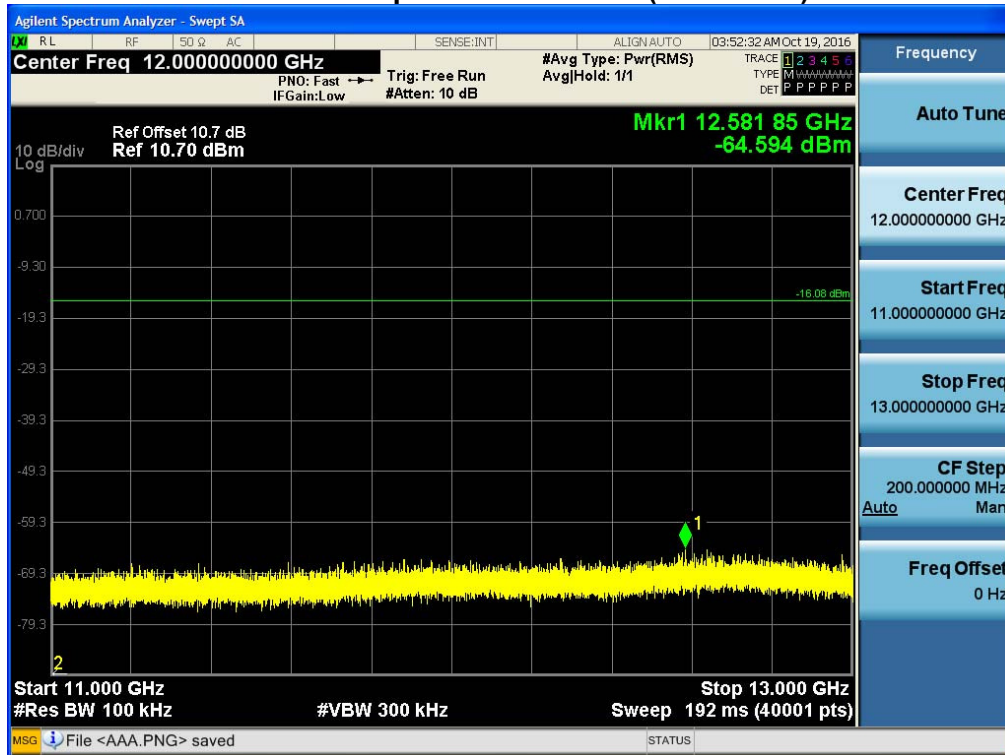
9 GHz ~ 11 GHz

Conducted Spurious Emission (Mid-CH 19)



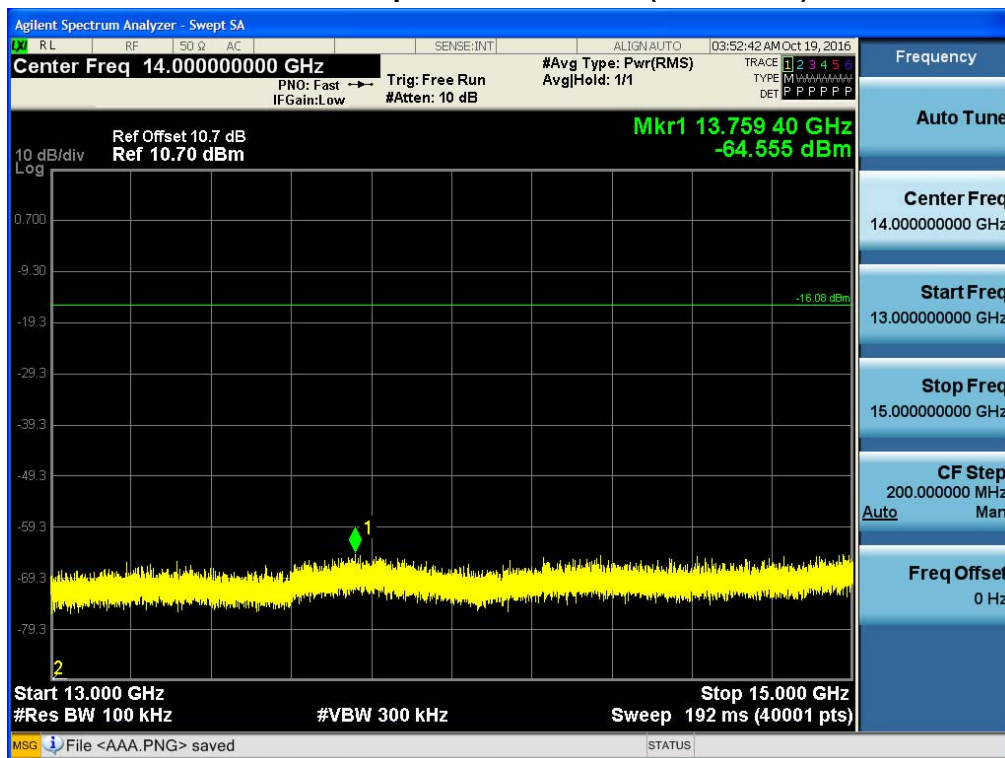
11 GHz ~ 13 GHz

Conducted Spurious Emission (Mid-CH 19)



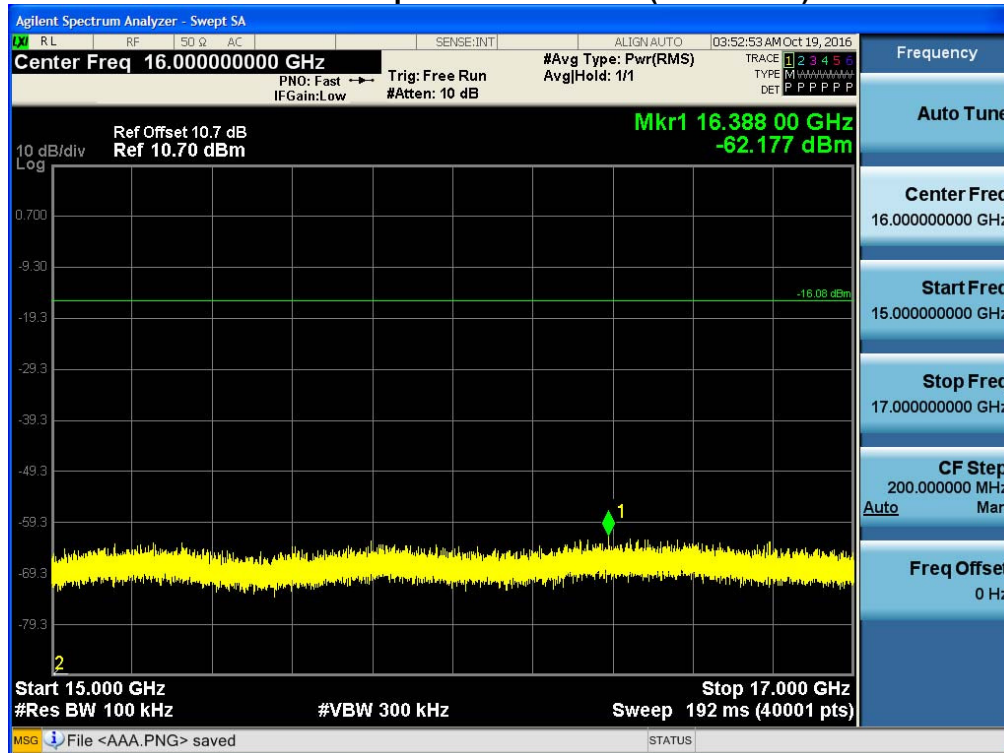
13 GHz ~ 15 GHz

Conducted Spurious Emission (Mid-CH 19)



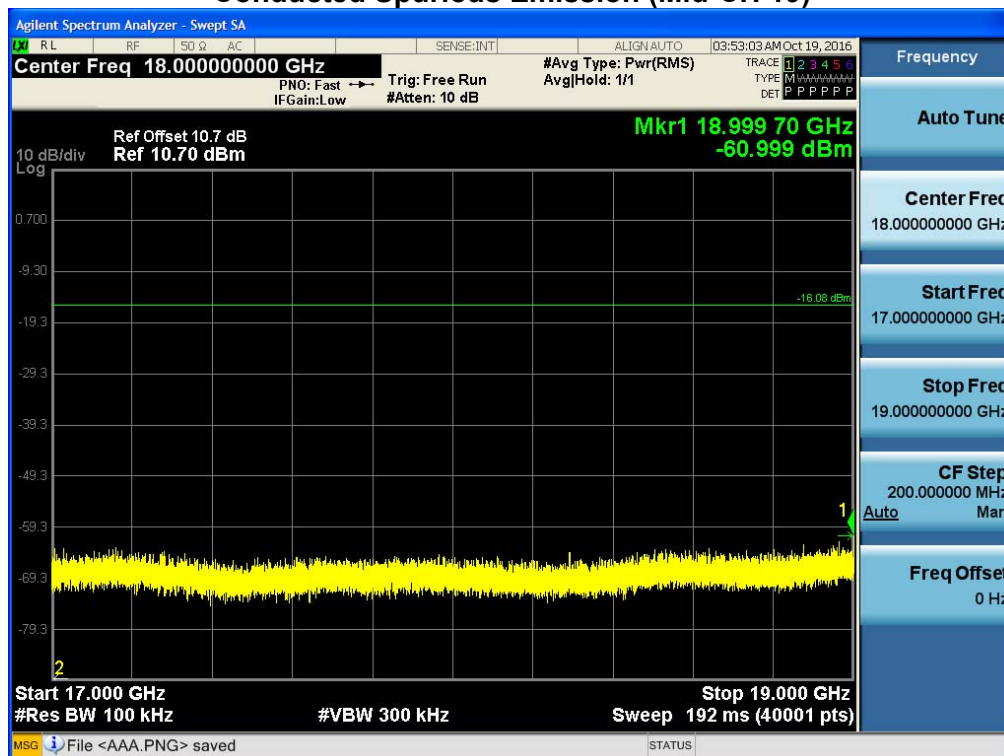
15 GHz ~ 17 GHz

Conducted Spurious Emission (Mid-CH 19)



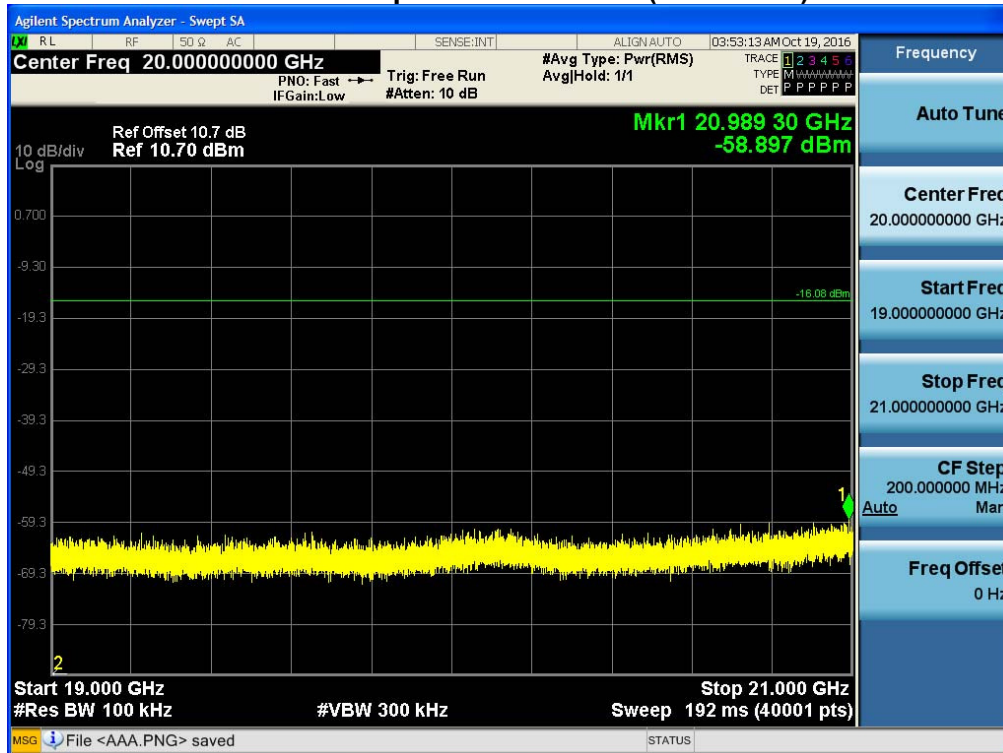
17 GHz ~ 19 GHz

Conducted Spurious Emission (Mid-CH 19)



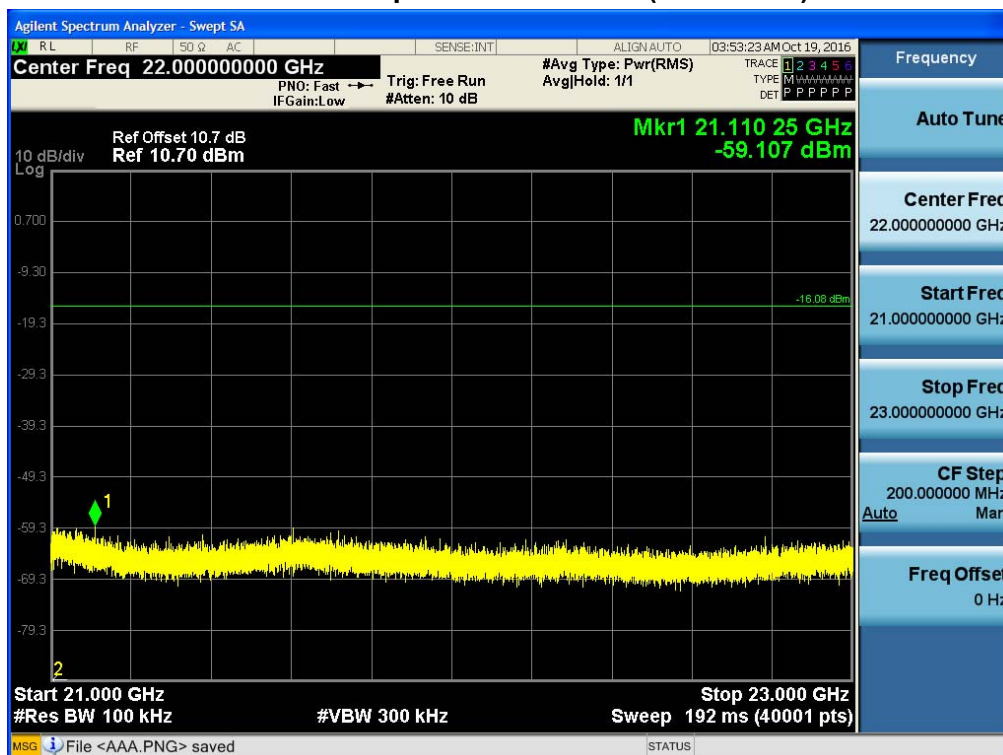
19 GHz ~ 21 GHz

Conducted Spurious Emission (Mid-CH 19)



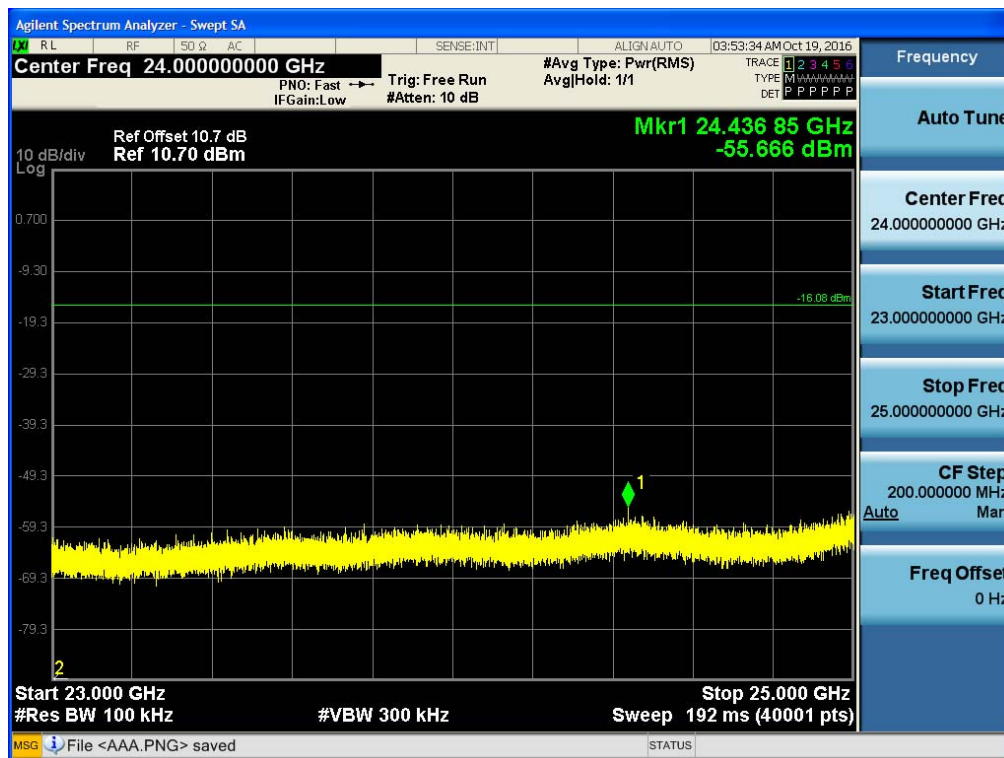
21 GHz ~ 23 GHz

Conducted Spurious Emission (Mid-CH 19)



23 GHz ~ 25 GHz

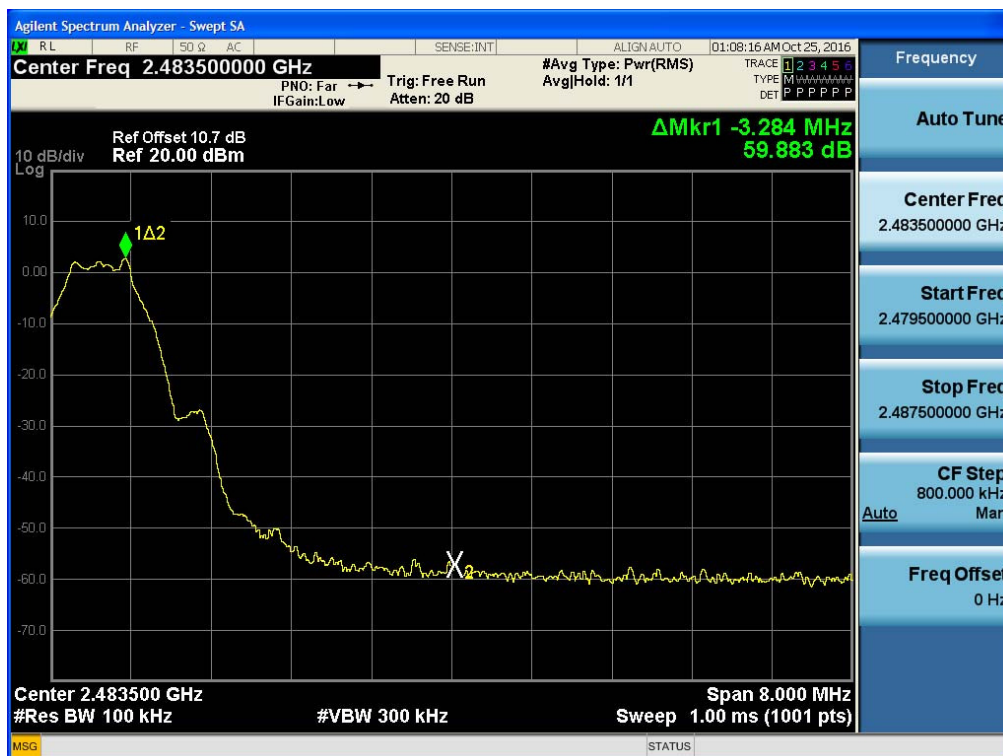
Conducted Spurious Emission (Mid-CH 19)



■ RESULT PLOTS_ Data packet length (Max)
BandEdge (Low-CH 0)

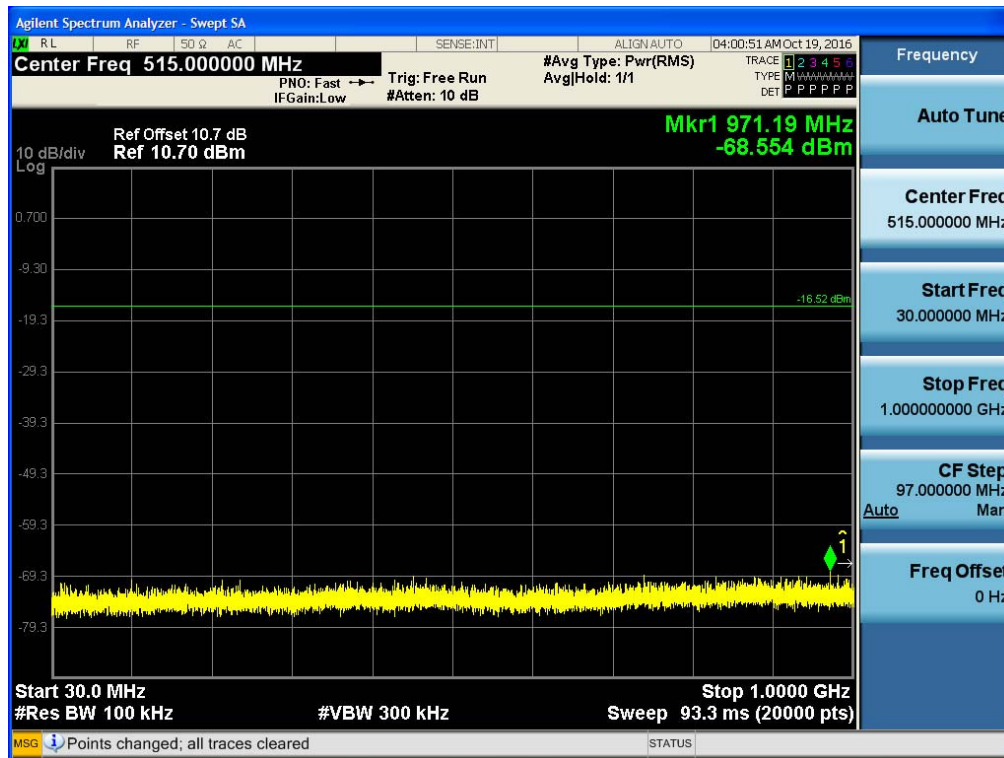


BandEdge (High-CH 39)



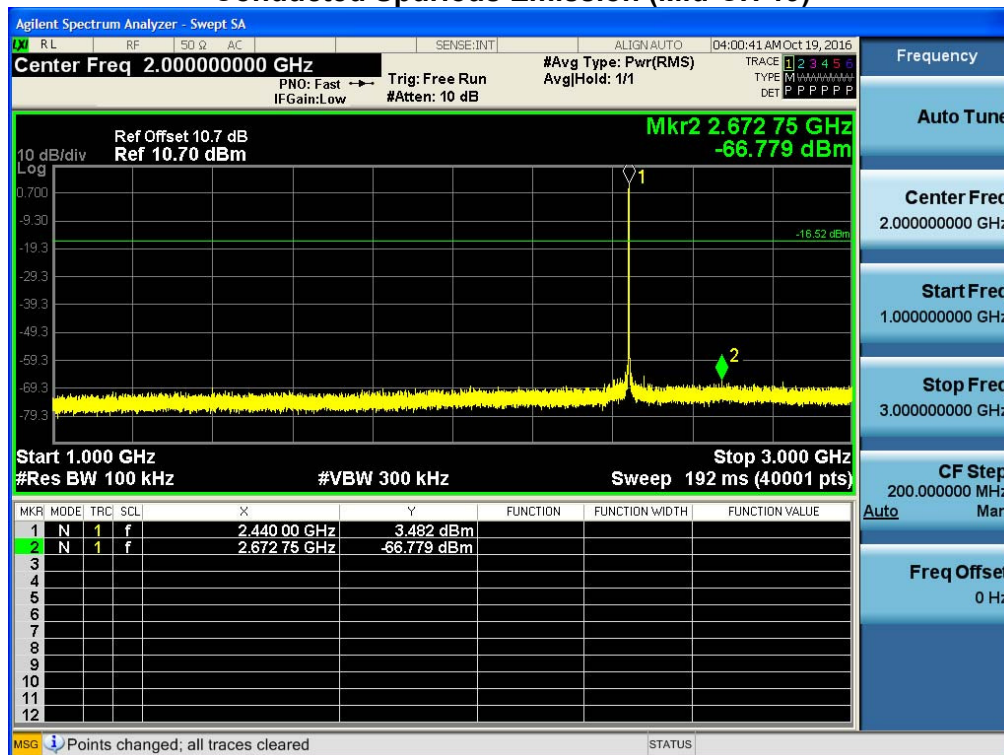
30 MHz ~ 1 GHz

Conducted Spurious Emission (Mid-CH 19)



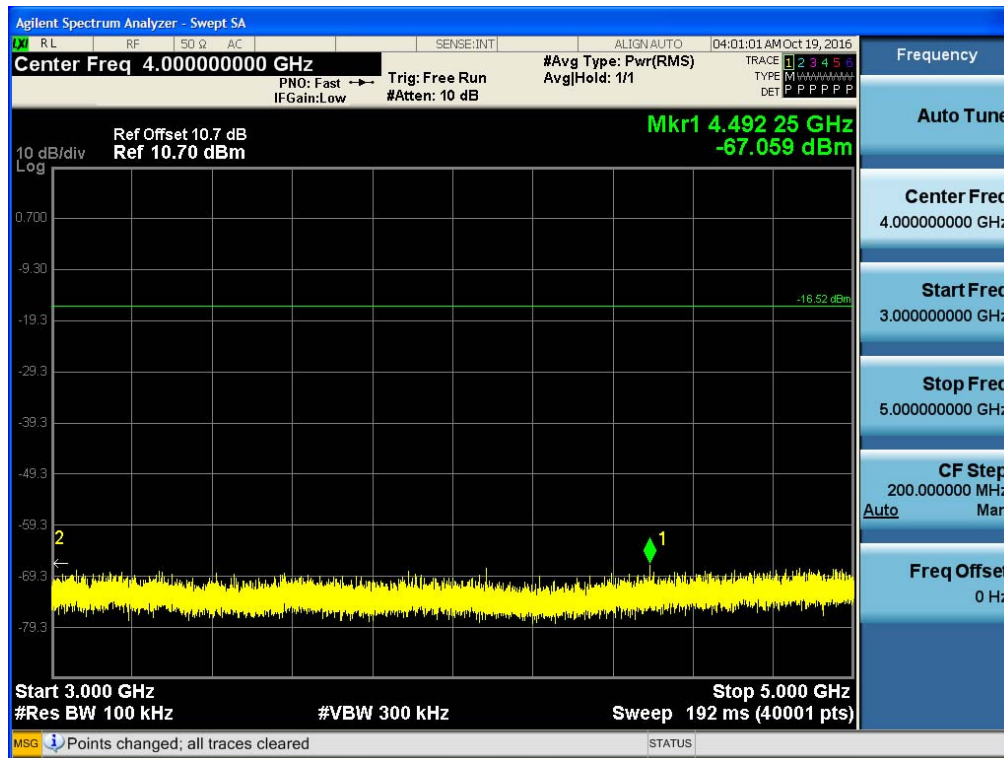
1 GHz ~ 3 GHz

Conducted Spurious Emission (Mid-CH 19)



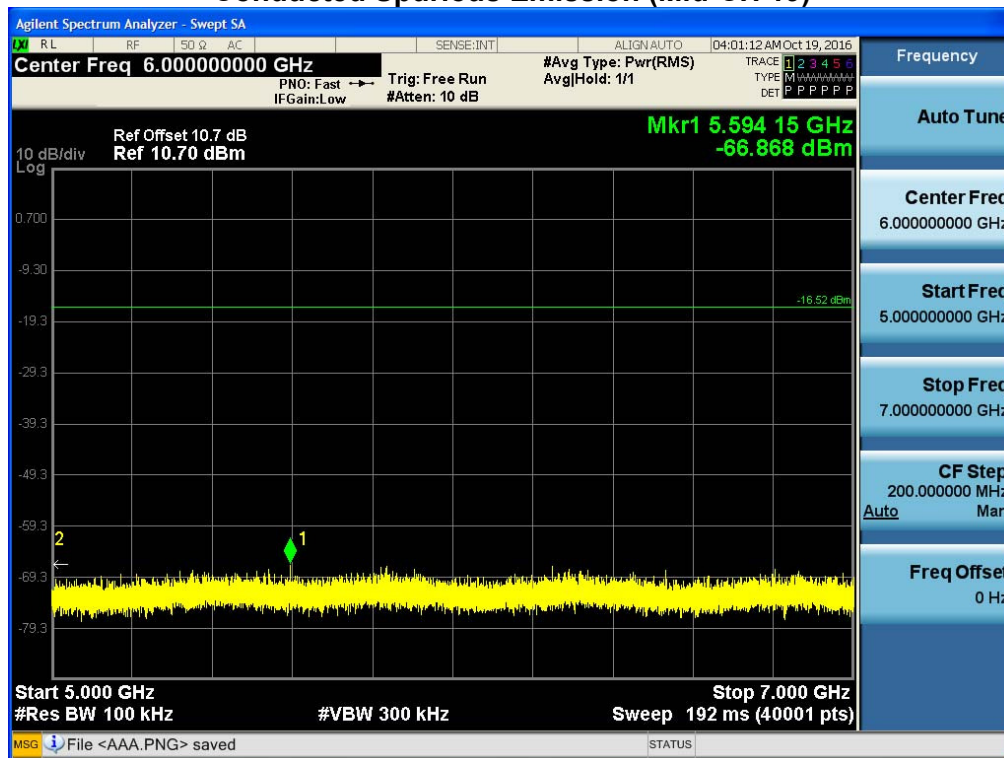
3 GHz ~ 5 GHz

Conducted Spurious Emission (Mid-CH 19)



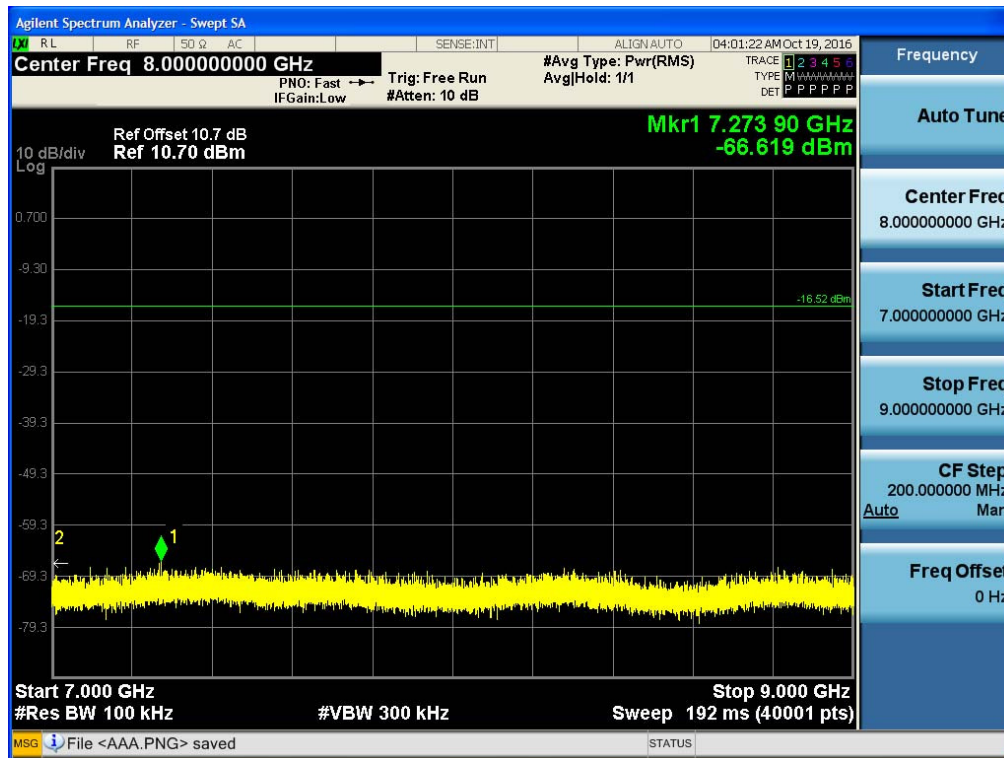
5 GHz ~ 7 GHz

Conducted Spurious Emission (Mid-CH 19)



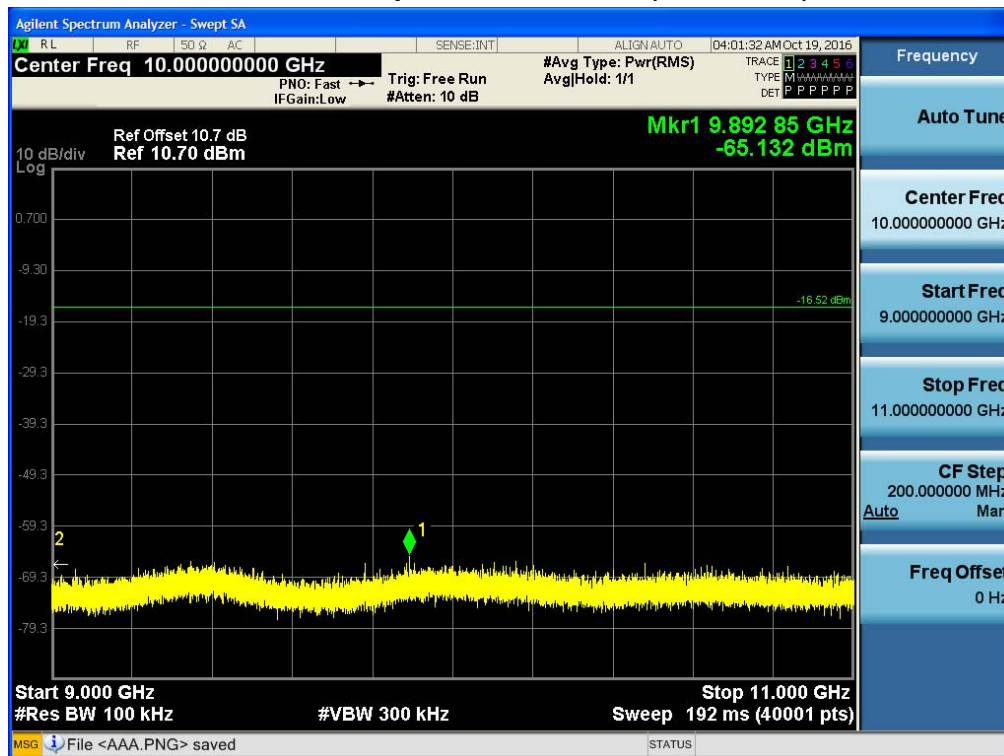
7 GHz ~ 9 GHz

Conducted Spurious Emission (Mid-CH 19)



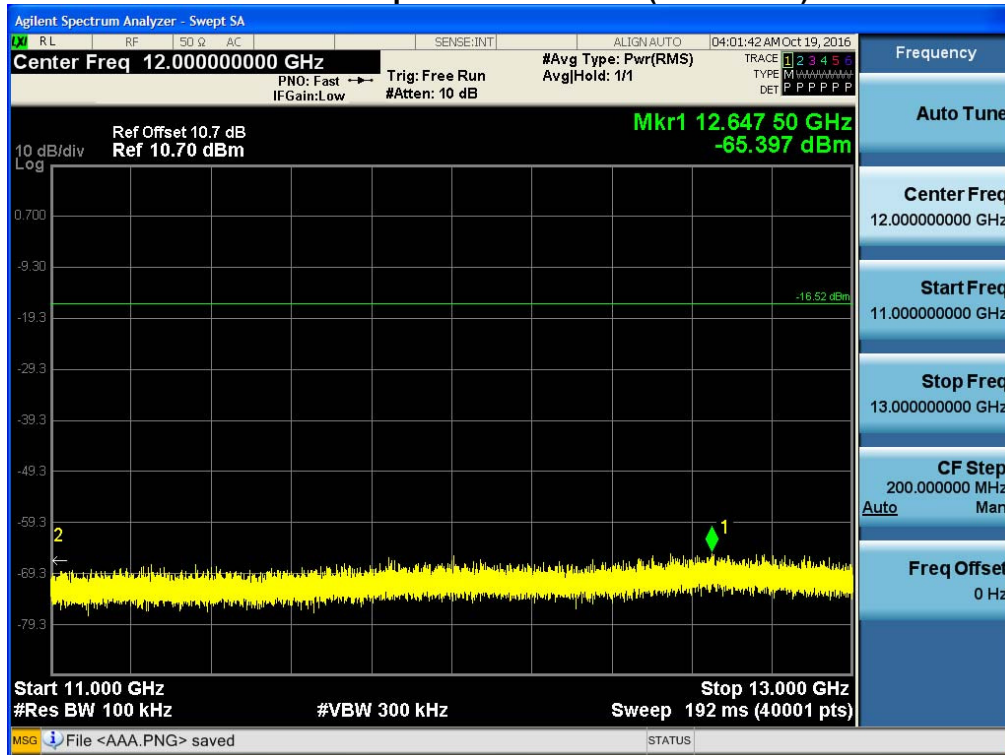
9 GHz ~ 11 GHz

Conducted Spurious Emission (Mid-CH 19)



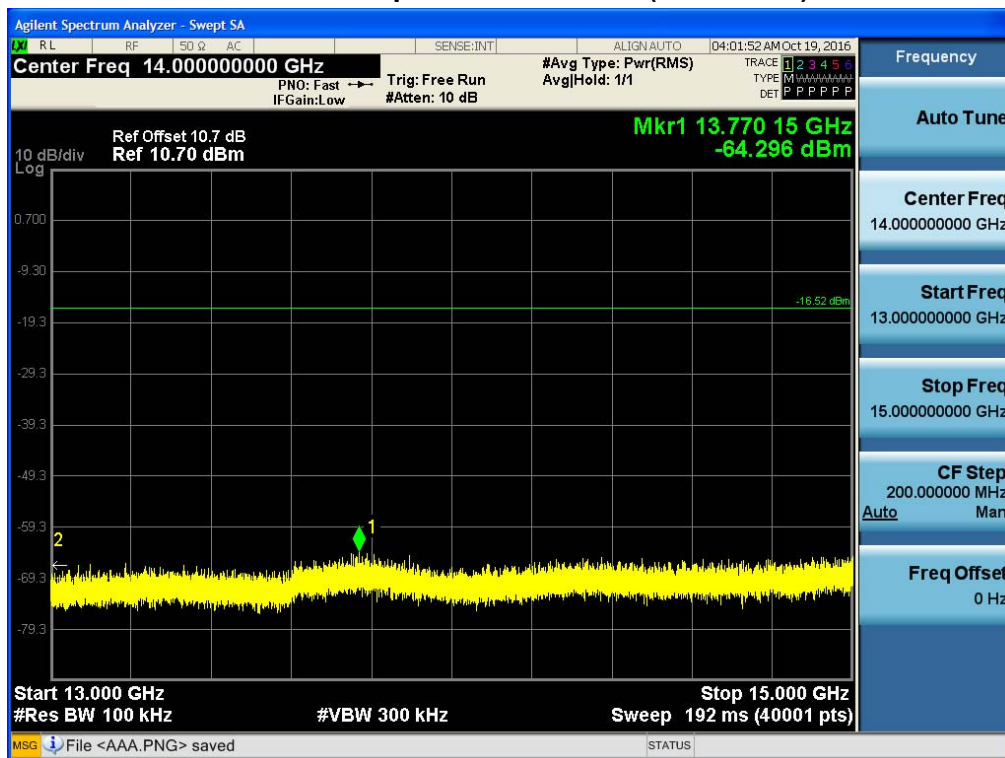
11 GHz ~ 13 GHz

Conducted Spurious Emission (Mid-CH 19)



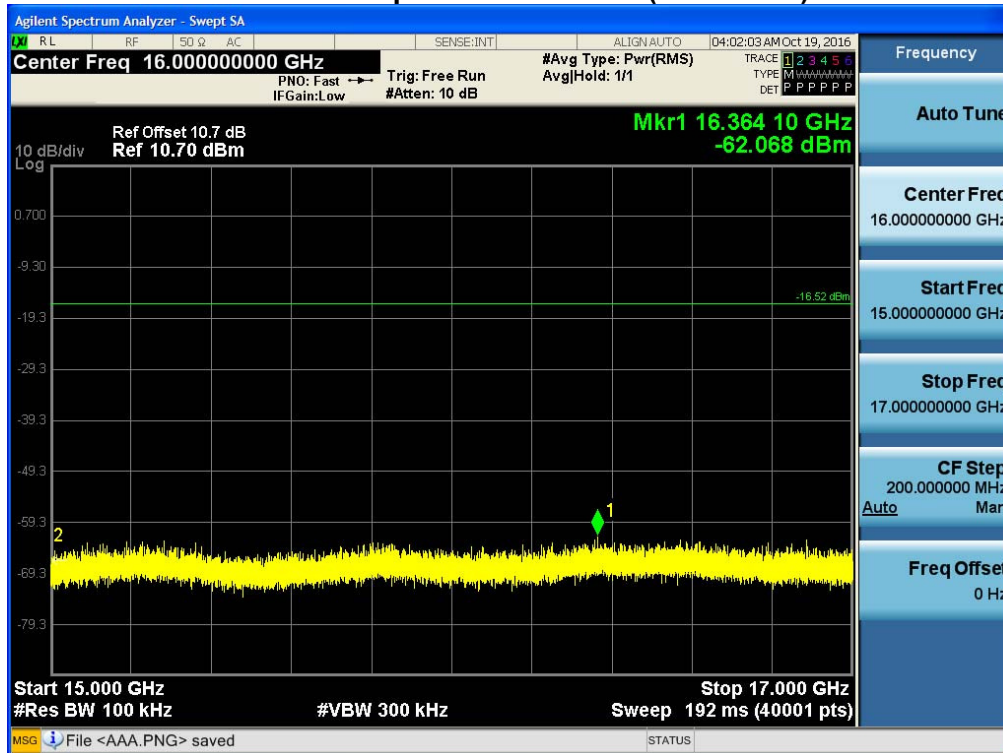
13 GHz ~ 15 GHz

Conducted Spurious Emission (Mid-CH 19)



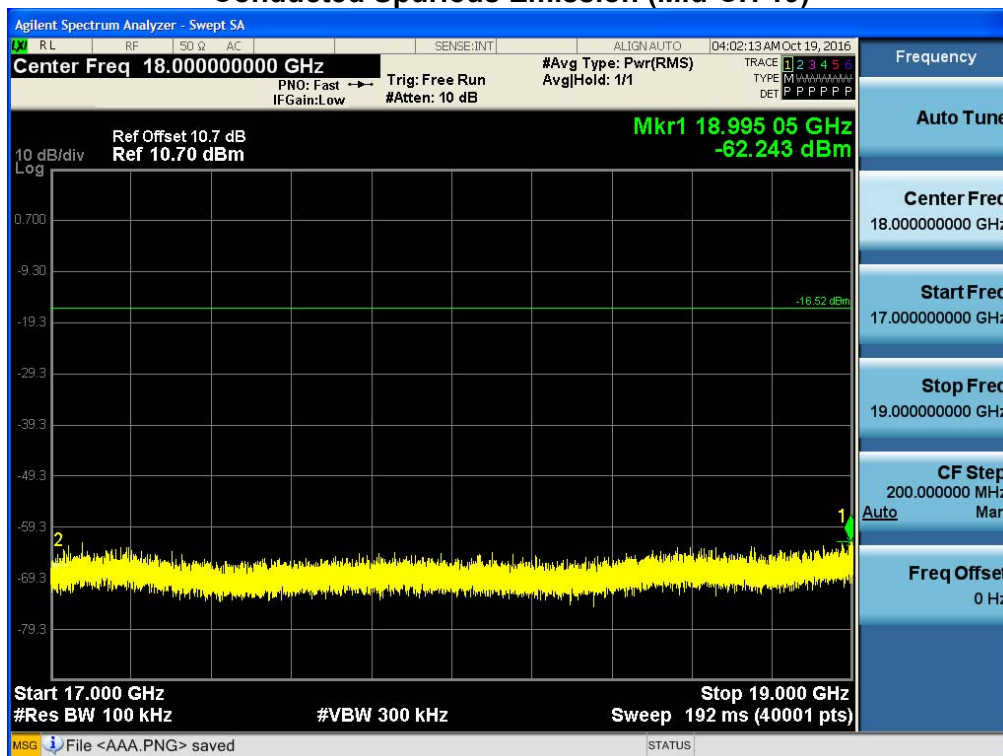
15 GHz ~ 17 GHz

Conducted Spurious Emission (Mid-CH 19)



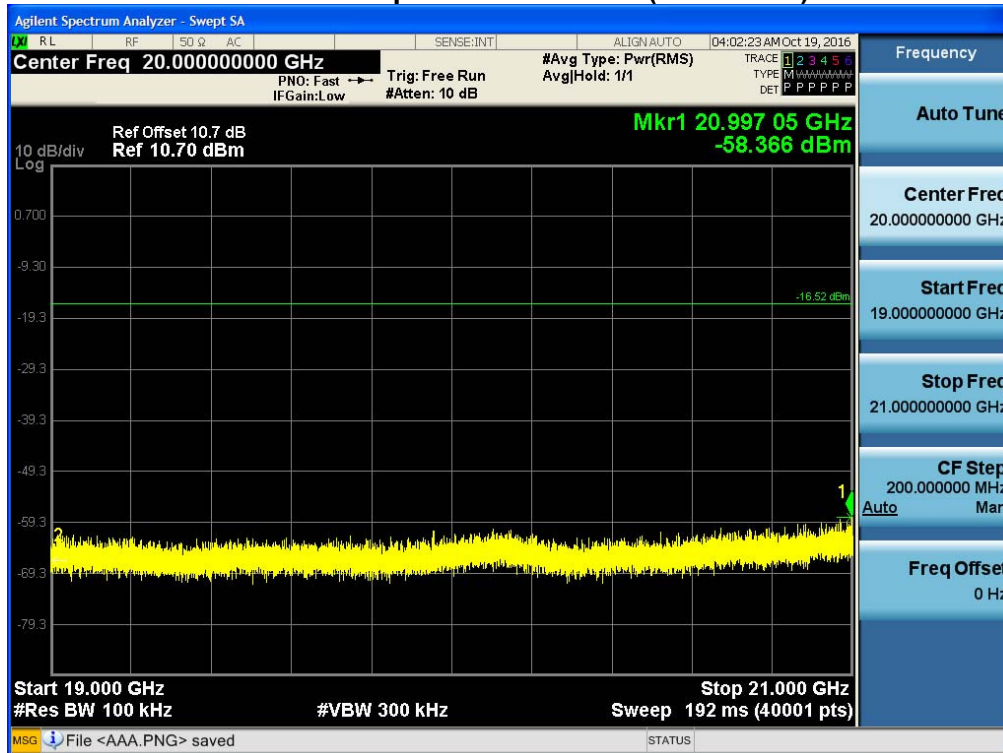
17 GHz ~ 19 GHz

Conducted Spurious Emission (Mid-CH 19)



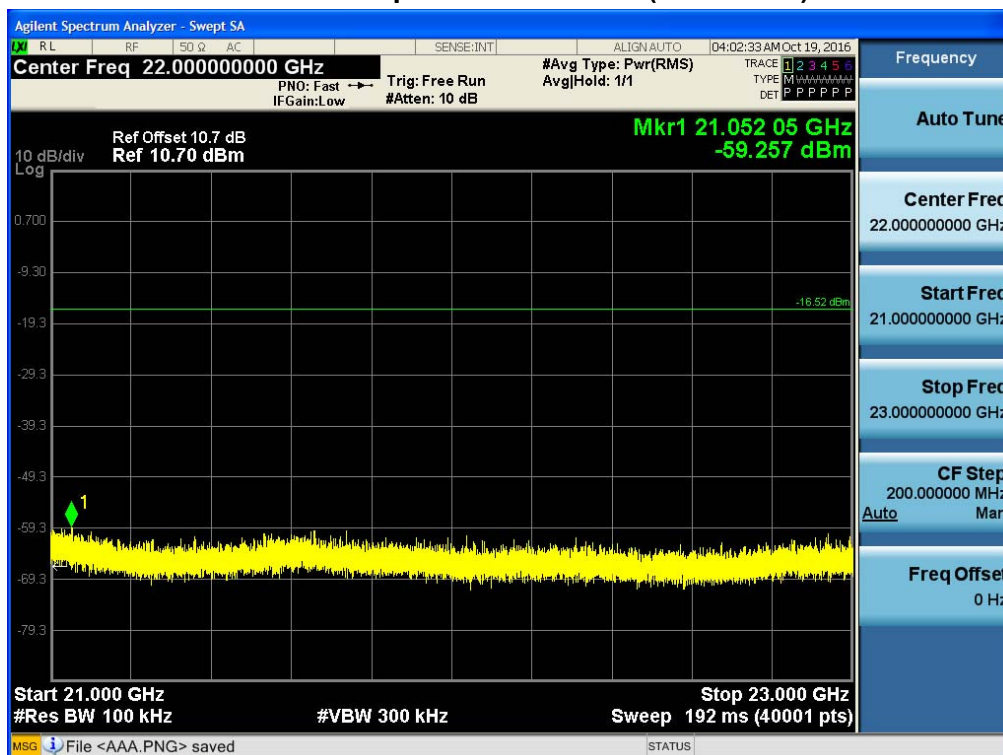
19 GHz ~ 21 GHz

Conducted Spurious Emission (Mid-CH 19)



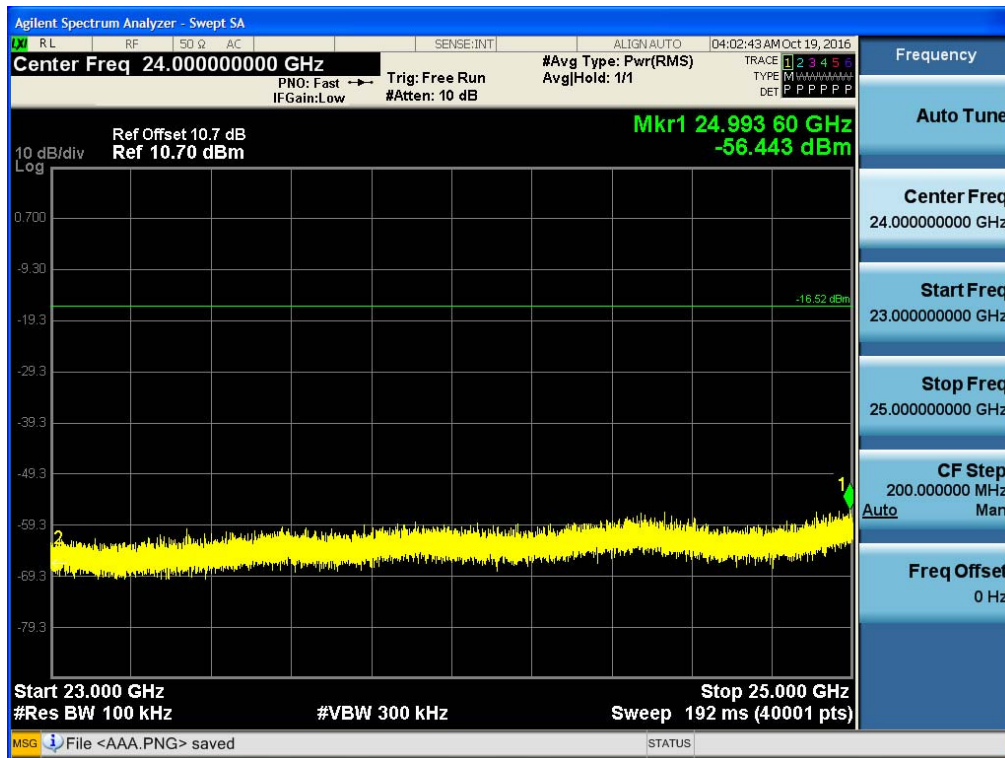
21 GHz ~ 23 GHz

Conducted Spurious Emission (Mid-CH 19)



23 GHz ~ 25 GHz

Conducted Spurious Emission (Mid-CH 19)

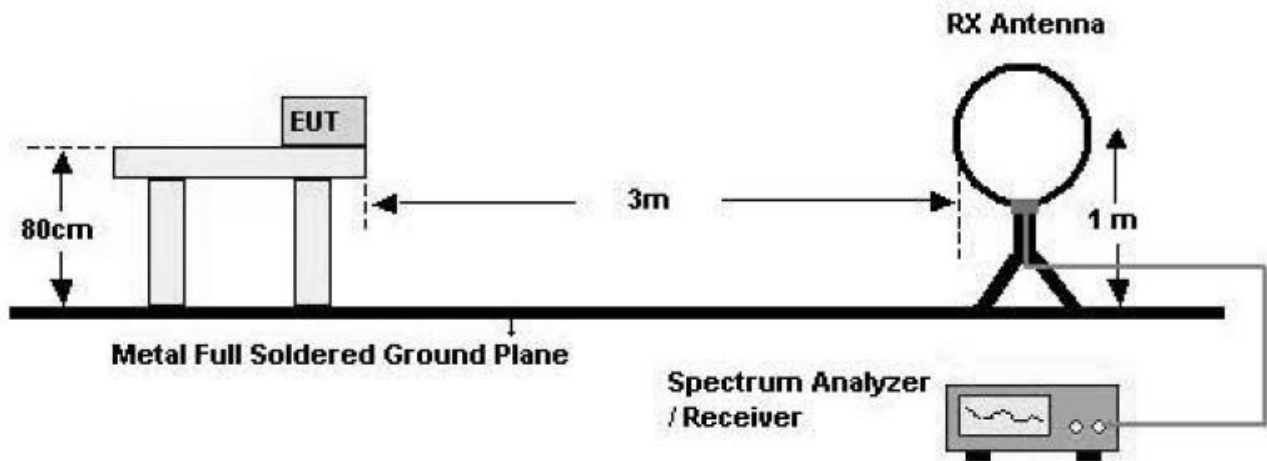


9.6 RADIATED MEASUREMENT.**9.6.1 RADIATED SPURIOUS EMISSIONS.****Test Requirements and limit, §15.205, §15.209**

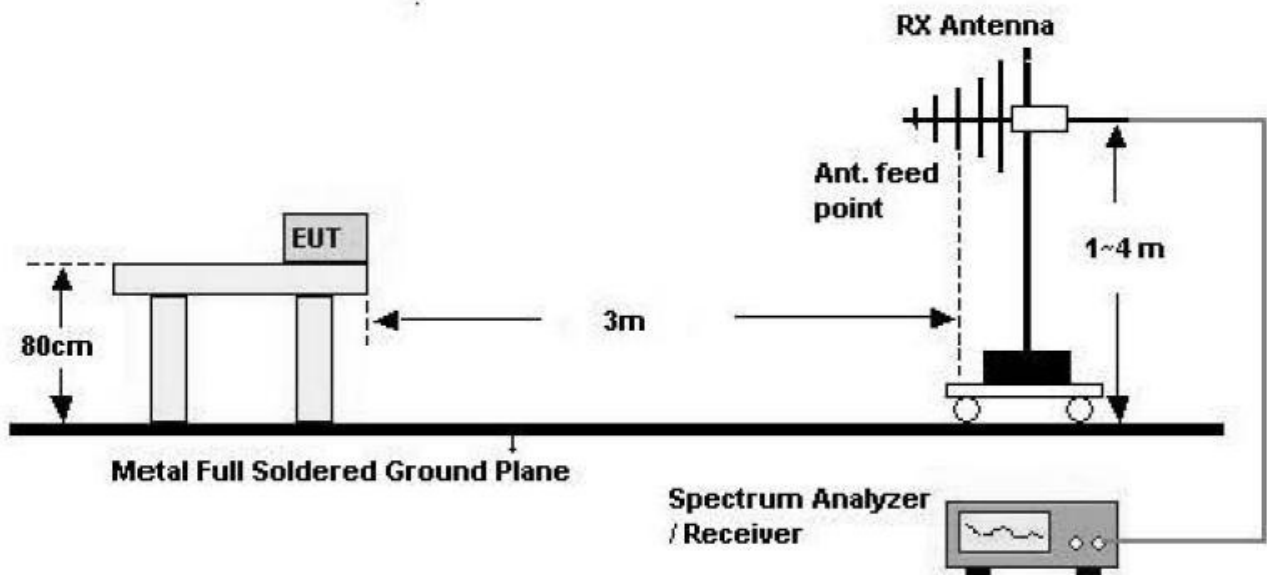
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

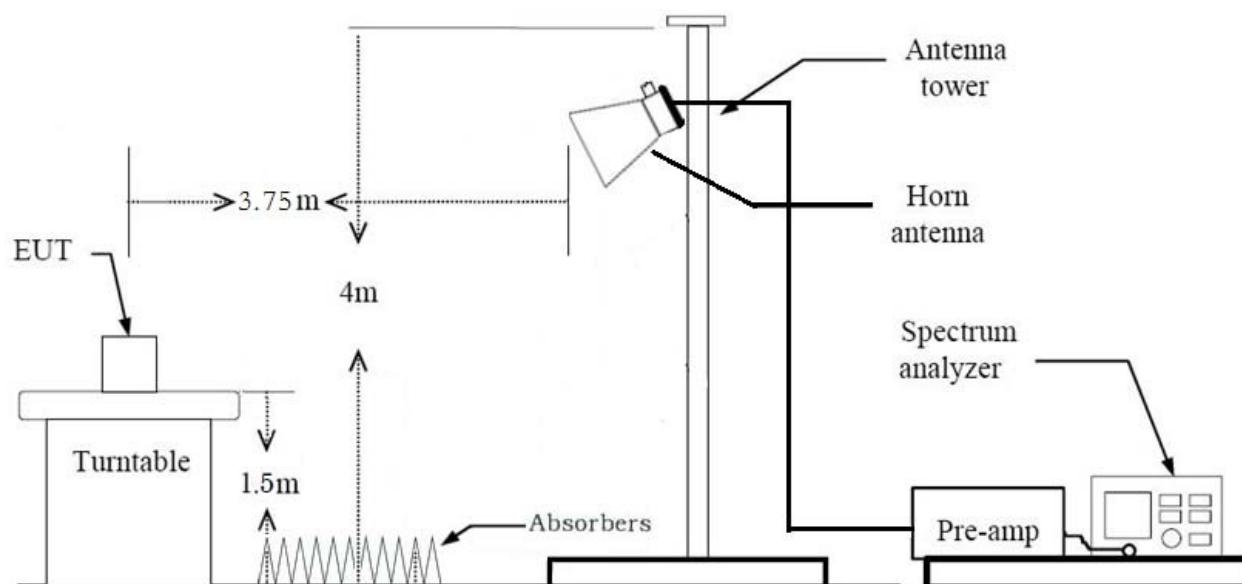
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074 v03r05

Spectrum Setting

- Peak

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

RBW = cf. Table 1.

VBW $\geq 3 \times$ RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

- Average (duty cycle < 98%, duty cycle variations are less than $\pm 2\%$)

Set RBW = 1 MHz

Set VBW $\geq 3 \times$ RBW

Detector = RMS.

Averaging type = power (*i.e.*, RMS).

Sweep time = auto.

Trace mode = average (at least 100 traces).

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method(RMS).
2. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
3. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)

Data packet length (Min)

LE Mode	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
	0.3901	0.6245	0.6247	2.04

Data packet length (Max)

LE Mode	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor (dB)
	2.1350	2.5000	0.8540	0.69

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. 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. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Above 1 GHz

Operation Mode: CH.0_ Data packet length (Min)

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	48.71	0.00	-0.61	V	48.10	73.98	25.88	PK
4804	37.16	2.04	-0.61	V	38.59	53.98	15.39	AV
7206	45.80	0.00	8.78	V	54.58	73.98	19.40	PK
7206	34.23	2.04	8.78	V	45.05	53.98	8.93	AV
4804	49.13	0.00	-0.61	H	48.52	73.98	25.46	PK
4804	37.18	2.04	-0.61	H	38.61	53.98	15.37	AV
7206	46.21	0.00	8.78	H	54.99	73.98	18.99	PK
7206	34.26	2.04	8.78	H	45.08	53.98	8.90	AV

*A.F. : Antenna Factor / C.L. : Cable Loss / A.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. 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.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = 20 log (test distance / specific distance) (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH.19_ Data packet length (Min)

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4880	49.62	0.00	0.19	V	49.81	73.98	24.17	PK
4880	37.69	2.04	0.19	V	39.92	53.98	14.06	AV
7320	46.31	0.00	8.85	V	55.16	73.98	18.82	PK
7320	34.35	2.04	8.85	V	45.24	53.98	8.74	AV
4880	50.01	0.00	0.19	H	50.2	73.98	23.78	PK
4880	37.72	2.04	0.19	H	39.95	53.98	14.03	AV
7320	46.88	0.00	8.85	H	55.73	73.98	18.25	PK
7320	34.43	2.04	8.85	H	45.32	53.98	8.66	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH.39_ Data packet length (Min)

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	49.71	0.00	0.92	V	50.63	73.98	23.35	PK
4960	37.63	2.04	0.92	V	40.59	53.98	13.39	AV
7440	46.54	0.00	9.03	V	55.57	73.98	18.41	PK
7440	34.11	2.04	9.03	V	45.18	53.98	8.80	AV
4960	49.90	0.00	0.92	H	50.82	73.98	23.16	PK
4960	37.69	2.04	0.92	H	40.65	53.98	13.33	AV
7440	46.68	0.00	9.03	H	55.71	73.98	18.27	PK
7440	34.14	2.04	9.03	H	45.21	53.98	8.77	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH.0_ Data packet length (Max)

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4804	48.95	0.00	-0.61	V	48.34	73.98	25.64	PK
4804	37.22	0.69	-0.61	V	37.3	53.98	16.68	AV
7206	45.78	0.00	8.78	V	54.56	73.98	19.42	PK
7206	34.27	0.69	8.78	V	43.74	53.98	10.24	AV
4804	49.29	0.00	-0.61	H	48.68	73.98	25.30	PK
4804	37.19	0.69	-0.61	H	37.27	53.98	16.71	AV
7206	45.86	0.00	8.78	H	54.64	73.98	19.34	PK
7206	34.31	0.69	8.78	H	43.78	53.98	10.20	AV

*A.F. : Antenna Factor / C.L. : Cable Loss / A.G. : Amplifier Gain / D.F. : Distance Factor

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. 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.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH.19_ Data packet length (Max)

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4880	49.55	0.00	0.19	V	49.74	73.98	24.24	PK
4880	37.71	0.69	0.19	V	38.59	53.98	15.39	AV
7320	46.24	0.00	8.85	V	55.09	73.98	18.89	PK
7320	34.49	0.69	8.85	V	44.03	53.98	9.95	AV
4880	49.86	0.00	0.19	H	50.05	73.98	23.93	PK
4880	37.75	0.69	0.19	H	38.63	53.98	15.35	AV
7320	46.57	0.00	8.85	H	55.42	73.98	18.56	PK
7320	34.59	0.69	8.85	H	44.13	53.98	9.85	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode: CH.39_ Data packet length (Max)

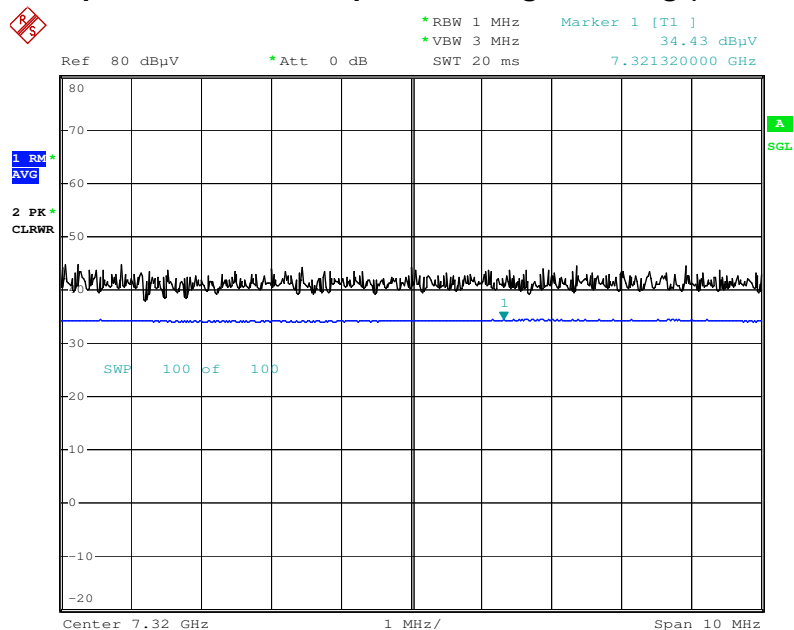
Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.-A.G.+D.F. [dBm]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
4960	49.58	0.00	0.92	V	50.50	73.98	23.48	PK
4960	37.76	0.69	0.92	V	39.37	53.98	14.61	AV
7440	46.16	0.00	9.03	V	55.19	73.98	18.79	PK
7440	34.16	0.69	9.03	V	43.88	53.98	10.10	AV
4960	49.72	0.00	0.92	H	50.64	73.98	23.34	PK
4960	37.82	0.69	0.92	H	39.43	53.98	14.55	AV
7440	46.82	0.00	9.03	H	55.85	73.98	18.13	PK
7440	34.22	0.69	9.03	H	43.94	53.98	10.04	AV

Notes:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. 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.
3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
4. Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Distance Factor
+ Duty Cycle Factor
5. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

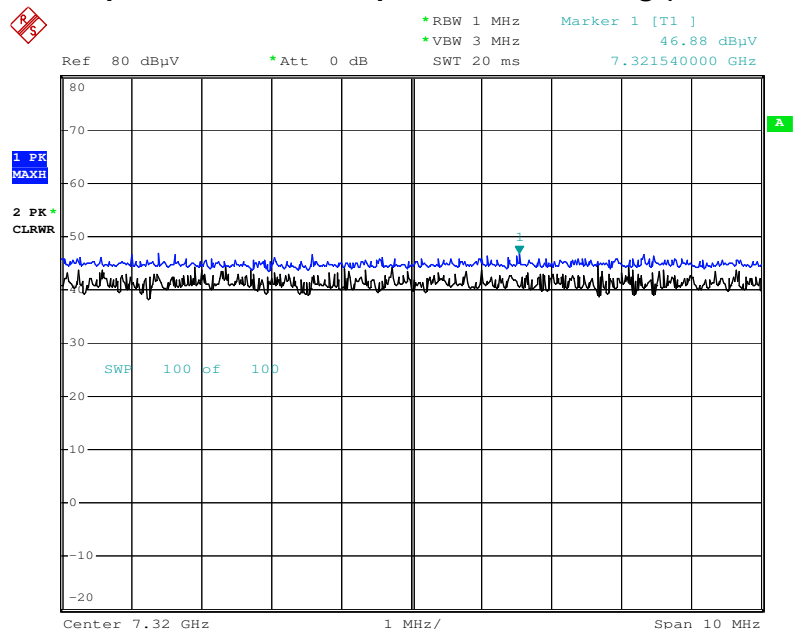
■ **RESULT PLOTS_Data packet length (Min) (Worst case : X-H)**

Radiated Spurious Emissions plot – Average Reading (Ch.19 3rd Harmonic)



Date: 9.NOV.2016 15:15:03

Radiated Spurious Emissions plot – Peak Reading (Ch.19 3rd Harmonic)

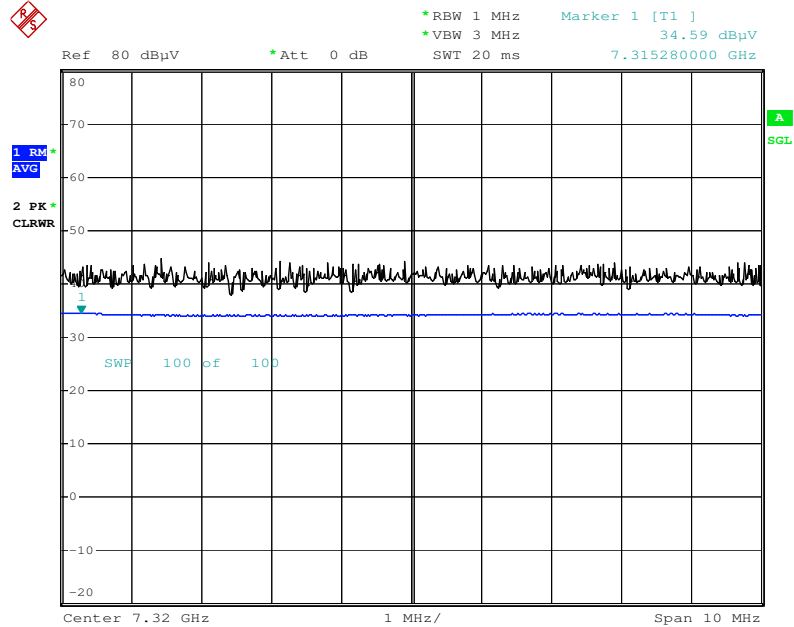


Date: 9.NOV.2016 15:16:36

Note : Only the worst case plots for Radiated Spurious Emissions.

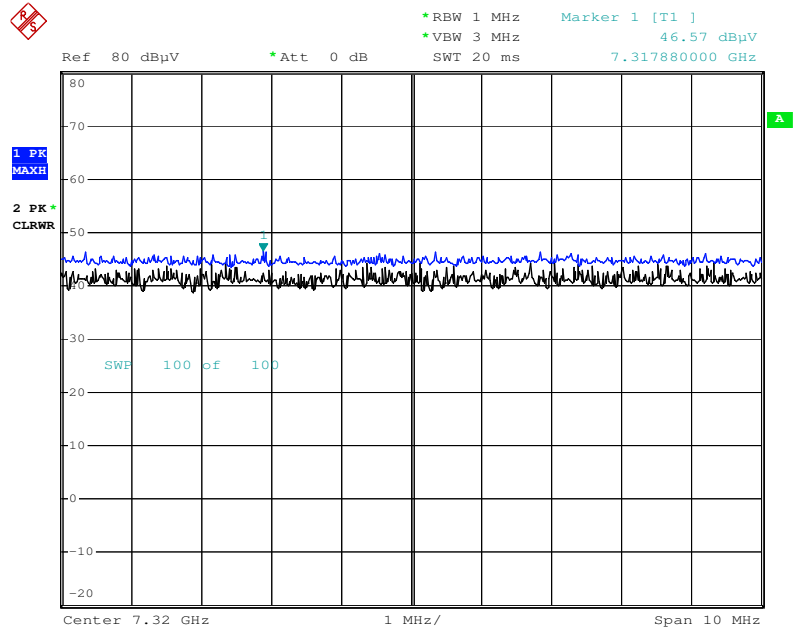
■ **RESULT PLOTS_Data packet length (Max) (Worst case : X-H)**

Radiated Spurious Emissions plot – Average Reading (Ch.19 3rd Harmonic)



Date: 9.NOV.2016 15:15:43

Radiated Spurious Emissions plot – Peak Reading (Ch.19 3rd Harmonic)



Date: 9.NOV.2016 15:16:10

Note : Only the worst case plots for Radiated Spurious Emissions.

9.6.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

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	BT_LE Data packet length (Min)
Operating Frequency	2402 MHz
Channel No.	0

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F. [dB]	Ant. Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	20.24	0.00	32.68	H	52.92	73.98	21.06	PK
2390.0	8.51	2.04	32.68	H	43.23	53.98	10.75	AV
2390.0	19.86	0.00	32.68	V	52.54	73.98	21.44	PK
2390.0	8.46	2.04	32.68	V	43.18	53.98	10.80	AV

Operation Mode	BT_LE Data packet length (Max)
Operating Frequency	2402 MHz
Channel No.	0

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F. [dB]	Ant. Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2390.0	19.43	0.00	32.68	H	52.11	73.98	21.87	PK
2390.0	8.58	0.69	32.68	H	41.95	53.98	12.03	AV
2390.0	19.20	0.00	32.68	V	51.88	73.98	22.10	PK
2390.0	8.35	0.69	32.68	V	41.72	53.98	12.27	AV

Notes:

1. Frequency range of measurement = 2310 MHz ~ 2390 MHz
2. Total = Reading Value + Antenna Factor + Cable Loss + Duty Cycle Factor + Distance Factor
3. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

Operation Mode	BT_LE Data packet length (Min)
Operating Frequency	2480 MHz
Channel No.	39

Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F. [dB]	Ant. Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	19.08	0.00	33.05	H	52.13	73.98	21.86	PK
2483.5	8.79	2.04	33.05	H	43.88	53.98	10.10	AV
2483.5	18.69	0.00	33.05	V	51.74	73.98	22.24	PK
2483.5	8.63	2.04	33.05	V	43.72	53.98	10.26	AV

Operation Mode	BT_LE Data packet length (Max)
Operating Frequency	2480 MHz
Channel No.	39

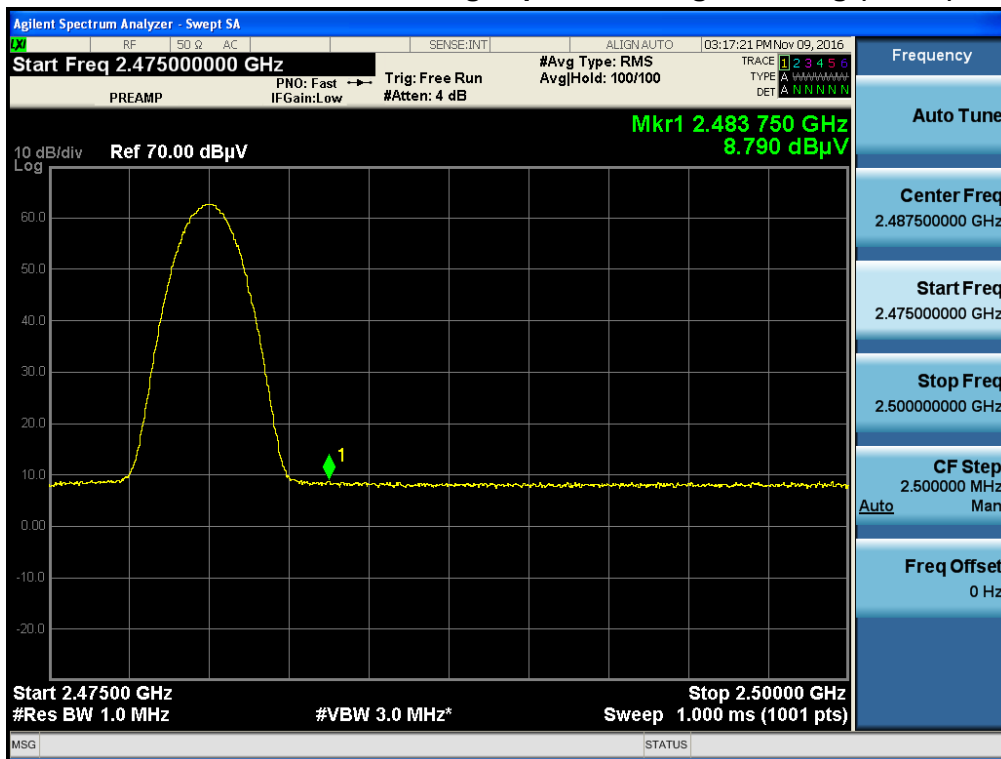
Frequency [MHz]	Reading [dBuV/m]	Duty Cycle Factor [dB]	A.F.+C.L.+D.F. [dB]	Ant. Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	20.50	0.00	33.05	H	53.55	73.98	20.43	PK
2483.5	8.89	0.69	33.05	H	42.63	53.98	11.35	AV
2483.5	19.44	0.00	33.05	V	52.49	73.98	21.49	PK
2483.5	8.68	0.69	33.05	V	42.42	53.98	11.57	AV

Notes:

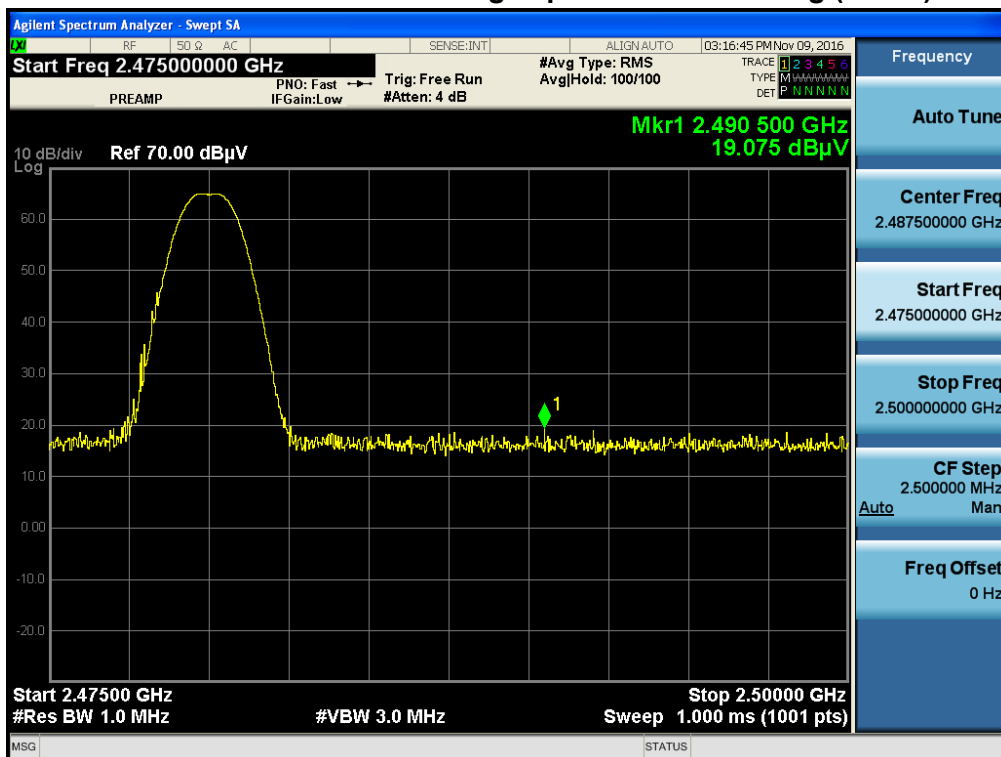
1. Frequency range of measurement = 2483.5 MHz ~ 2500 MHz
2. Total = Reading Value + Antenna Factor + Cable Loss + Duty Cycle Factor + Distance Factor
3. Distance extrapolation factor = $20 \log (\text{test distance} / \text{specific distance})$ (dB)
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

RESULT PLOTS_Data packet length (Min) (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Reading (Ch.39)



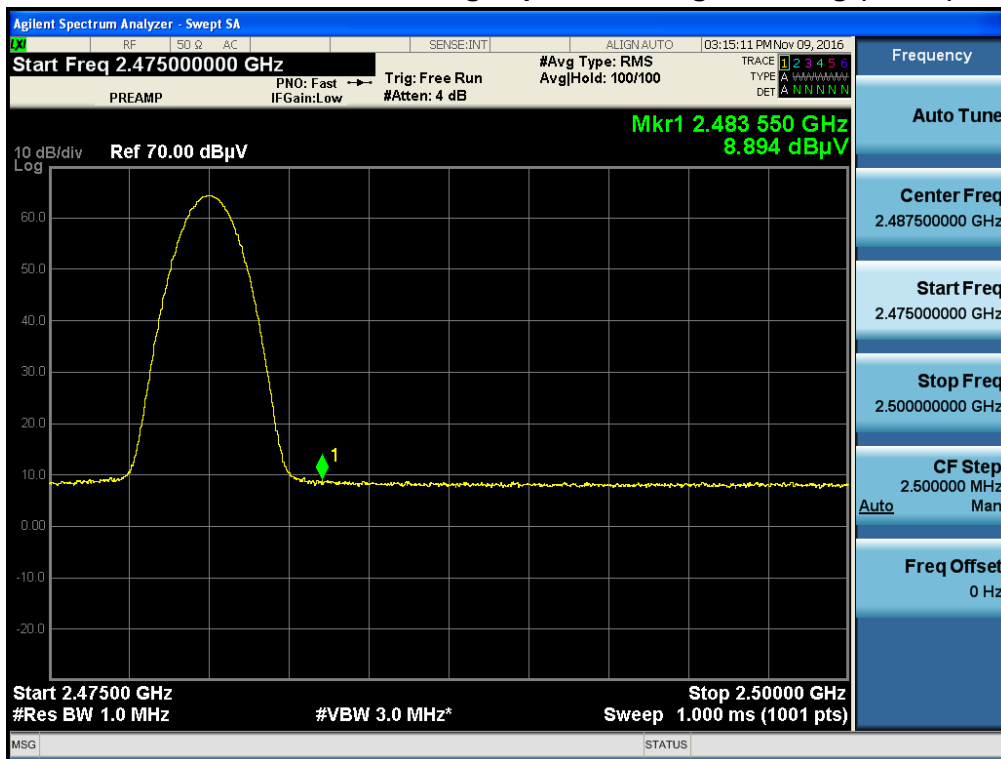
Radiated Restricted Band Edges plot – Peak Reading (Ch.39)



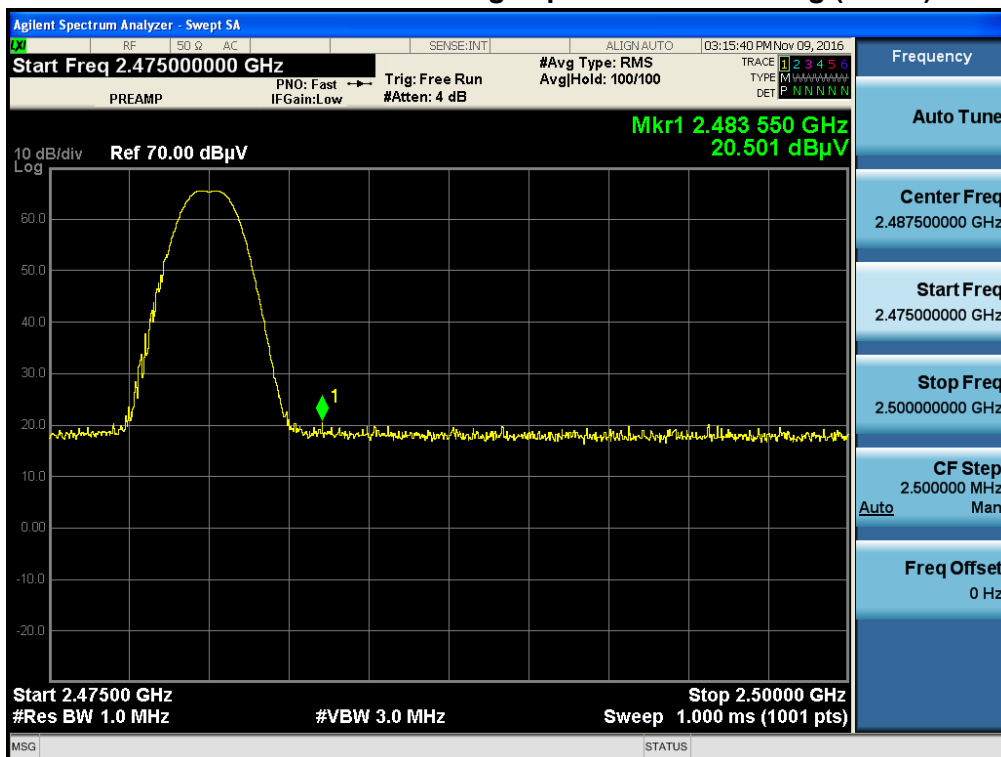
Note : Only the worst case plots for Radiated Restricted Band Edges.

RESULT PLOTS_Data packet length (Max) (Worst case : X-H)

Radiated Restricted Band Edges plot – Average Reading (Ch.39)



Radiated Restricted Band Edges plot – Peak Reading (Ch.39)



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

9.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

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 microvolts (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 (dBμV)	
	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)

EMI Auto Test(3)

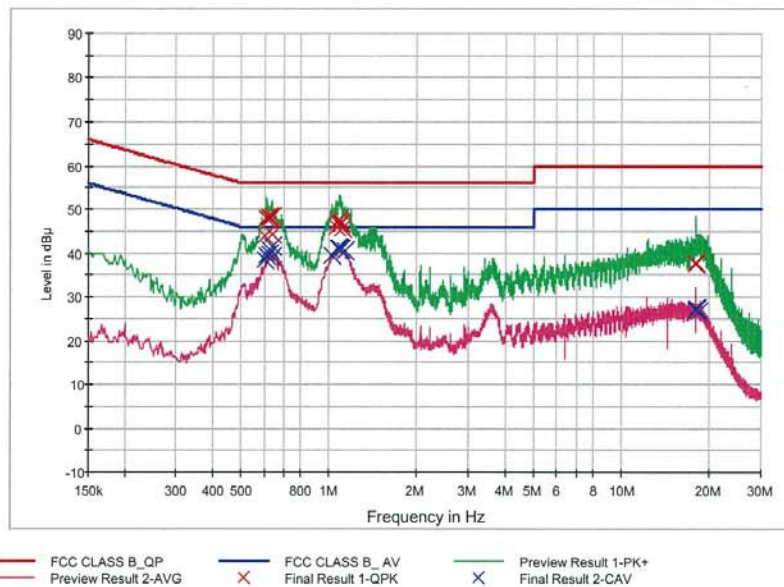
1 / 2

HCT TEST Report

Common Information

EUT: L-01J
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: BT LE MODE

FCC CLASS B



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.606000	44.0	9.000	Off	L1	9.7	12.0	56.0
0.614000	48.1	9.000	Off	L1	9.7	7.9	56.0
0.622000	48.0	9.000	Off	L1	9.7	8.0	56.0
0.626000	48.1	9.000	Off	L1	9.7	7.9	56.0
0.636000	48.3	9.000	Off	L1	9.7	7.7	56.0
0.642000	44.4	9.000	Off	L1	9.7	11.6	56.0
1.052000	46.1	9.000	Off	L1	9.8	9.9	56.0
1.076000	46.9	9.000	Off	L1	9.8	9.1	56.0
1.082000	47.7	9.000	Off	L1	9.8	8.3	56.0
1.090000	46.5	9.000	Off	L1	9.8	9.5	56.0
1.100000	46.9	9.000	Off	L1	9.8	9.1	56.0
1.110000	45.8	9.000	Off	L1	9.8	10.2	56.0
17.886000	37.7	9.000	Off	L1	10.3	22.3	60.0
17.890000	37.8	9.000	Off	L1	10.3	22.2	60.0
17.894000	37.7	9.000	Off	L1	10.3	22.3	60.0
17.900000	37.5	9.000	Off	L1	10.3	22.5	60.0
17.920000	37.8	9.000	Off	L1	10.3	22.2	60.0
18.028000	37.5	9.000	Off	L1	10.3	22.5	60.0

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EMI Auto Test(3)

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Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.602000	38.4	9.000	Off	L1	9.7	7.6	46.0
0.614000	39.6	9.000	Off	L1	9.7	6.4	46.0
0.622000	40.0	9.000	Off	L1	9.7	6.0	46.0
0.626000	40.8	9.000	Off	L1	9.7	5.2	46.0
0.636000	41.6	9.000	Off	L1	9.7	4.4	46.0
0.642000	39.3	9.000	Off	L1	9.7	6.7	46.0
1.020000	39.6	9.000	Off	L1	9.8	6.4	46.0
1.074000	41.0	9.000	Off	L1	9.8	5.0	46.0
1.082000	40.9	9.000	Off	L1	9.8	5.1	46.0
1.086000	41.1	9.000	Off	L1	9.8	4.9	46.0
1.090000	41.0	9.000	Off	L1	9.8	5.0	46.0
1.138000	40.6	9.000	Off	L1	9.8	5.4	46.0
17.890000	27.3	9.000	Off	L1	10.3	22.7	50.0
17.894000	27.1	9.000	Off	L1	10.3	22.9	50.0
17.918000	27.1	9.000	Off	L1	10.3	22.9	50.0
18.028000	26.8	9.000	Off	L1	10.3	23.2	50.0
18.144000	27.3	9.000	Off	L1	10.3	22.7	50.0
18.336000	26.7	9.000	Off	L1	10.3	23.3	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(3)

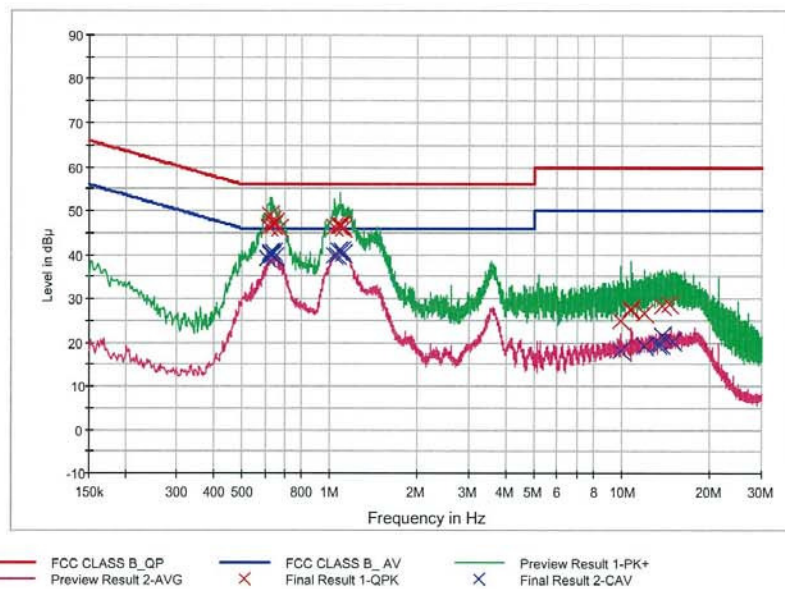
1 / 2

HCT TEST Report

Common Information

EUT: L-01J
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: BT LE MODE

FCC CLASS B



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.620000	46.2	9.000	Off	N	9.7	9.8	56.0
0.624000	49.1	9.000	Off	N	9.7	6.9	56.0
0.634000	47.7	9.000	Off	N	9.7	8.3	56.0
0.638000	46.8	9.000	Off	N	9.7	9.2	56.0
0.646000	47.2	9.000	Off	N	9.7	8.8	56.0
0.672000	46.0	9.000	Off	N	9.7	10.0	56.0
1.038000	46.1	9.000	Off	N	9.7	9.9	56.0
1.064000	46.7	9.000	Off	N	9.7	9.3	56.0
1.084000	46.6	9.000	Off	N	9.7	9.4	56.0
1.090000	46.7	9.000	Off	N	9.7	9.3	56.0
1.106000	45.9	9.000	Off	N	9.7	10.1	56.0
1.112000	46.0	9.000	Off	N	9.7	10.0	56.0
9.842000	24.9	9.000	Off	N	10.0	35.1	60.0
10.746000	27.1	9.000	Off	N	10.1	32.9	60.0
10.772000	27.6	9.000	Off	N	10.1	32.4	60.0
11.856000	26.5	9.000	Off	N	10.1	33.5	60.0
13.780000	28.4	9.000	Off	N	10.2	31.6	60.0
14.540000	28.6	9.000	Off	N	10.2	31.4	60.0

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EMI Auto Test(3)

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Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.614000	39.1	9.000	Off	N	9.7	6.9	46.0
0.622000	40.4	9.000	Off	N	9.7	5.6	46.0
0.626000	40.1	9.000	Off	N	9.7	5.9	46.0
0.634000	39.9	9.000	Off	N	9.7	6.1	46.0
0.638000	40.5	9.000	Off	N	9.7	5.5	46.0
0.646000	39.6	9.000	Off	N	9.7	6.4	46.0
1.038000	40.0	9.000	Off	N	9.7	6.0	46.0
1.054000	39.9	9.000	Off	N	9.7	6.1	46.0
1.070000	40.8	9.000	Off	N	9.7	5.2	46.0
1.090000	40.7	9.000	Off	N	9.7	5.3	46.0
1.094000	40.7	9.000	Off	N	9.7	5.3	46.0
1.112000	40.1	9.000	Off	N	9.7	5.9	46.0
9.842000	18.0	9.000	Off	N	10.0	32.0	50.0
11.856000	19.1	9.000	Off	N	10.1	30.9	50.0
13.192000	19.7	9.000	Off	N	10.1	30.3	50.0
13.550000	19.6	9.000	Off	N	10.1	30.4	50.0
13.738000	21.4	9.000	Off	N	10.2	28.6	50.0
14.932000	20.0	9.000	Off	N	10.2	30.0	50.0

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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	06/24/2016	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	11/24/2015	Annual	MY49431210
Agilent	N1911A / Power Meter	03/11/2016	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	06/14/2016	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	03/09/2016	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/15/2016	Annual	07560
Rohde & Schwarz	CBT / Bluetooth Tester	05/16/2016	Annual	100422

10.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Audix	AM4000 / Antenna Position Tower	N/A	N/A	N/A
Audix	Turn Table	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Rohde & Schwarz	Loop Antenna	02/23/2016	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	04/15/2015	Biennial	255
Schwarzbeck	BBHA 9120D / Horn Antenna	05/07/2015	Biennial	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	09/03/2015	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	09/10/2016	Annual	100688
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	09/23/2016	Annual	101068-SZ
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	06/24/2016	Annual	8
Wainwright Instruments	WHFX7.0/18G-8SS / High Pass Filter	05/13/2016	Annual	29
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	07/06/2016	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	01/26/2016	Annual	2
Agilent	8493C-10 / Attenuator(10 dB)	08/11/2016	Annual	76649
CERNEX	CBLU1183540 / Power Amplifier	07/15/2016	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	07/15/2016	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	07/11/2016	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	07/11/2016	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	04/01/2016	Annual	3000C000276