

8.6 SPURIOUS EMISSIONS

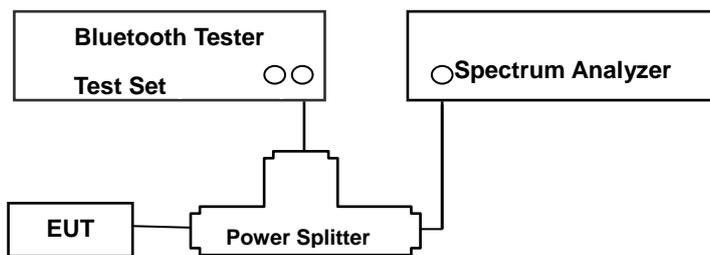
8.6.1 CONDUCTED SPURIOUS EMISSIONS

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

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to (DA 00-705)

1. Span = wide enough to capture the peak level of the in-band emission and all spurious emissions(e.g.,harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.
2. RBW = 100 kHz
3. VBW ≥ 300 kHz
4. Sweep = auto
5. Sweep point ≥ 2*span/RBW
5. Detector function = peak

6. Trace = max hold

Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

This test is performed with hopping off.

TEST RESULTS

No non-compliance noted.

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

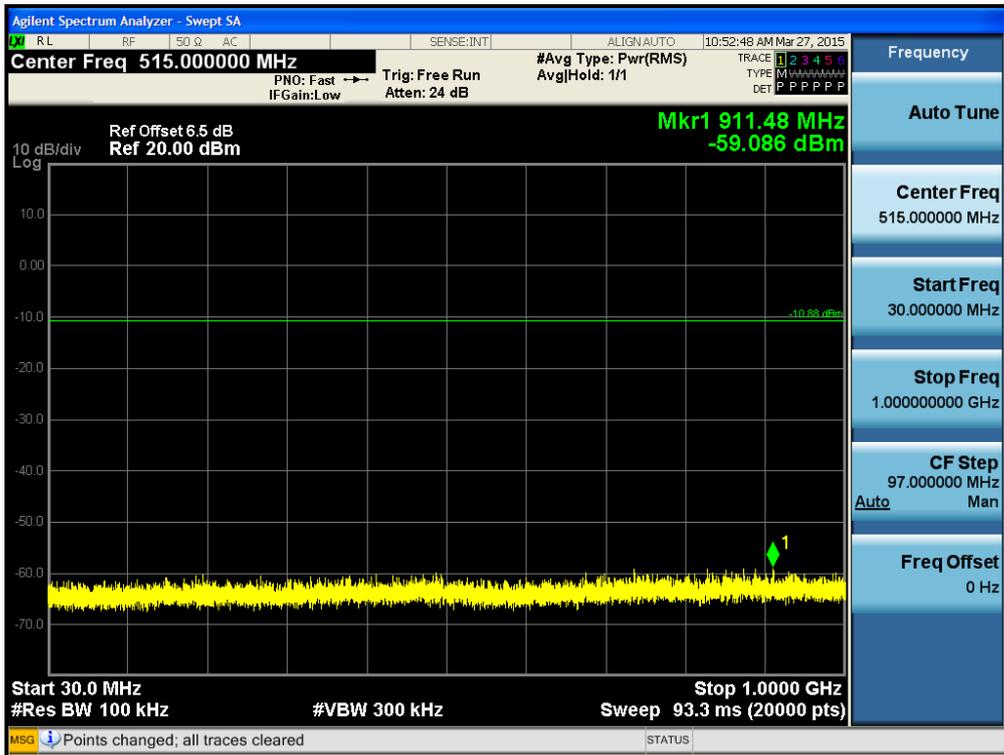
FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	10.01
100	10.02
200	10.10
300	10.09
400	10.13
500	10.21
600	10.13
700	10.31
800	10.18
900	10.30
1000	10.17
2000	8.53
2400*	6.51
2500*	6.54
3000	8.59
4000	10.02
5000	9.88
6000	5.70
7000	10.21
8000	6.13
9000	8.79
10000	12.46
11000	8.11
12000	9.52
13000	8.98
14000	8.13
15000	11.82
16000	6.92
17000	13.23
18000	10.25
19000	10.28
20000	9.10
21000	10.94
22000	11.54
23000	8.81
24000	11.71
25000	9.37
26000	9.34

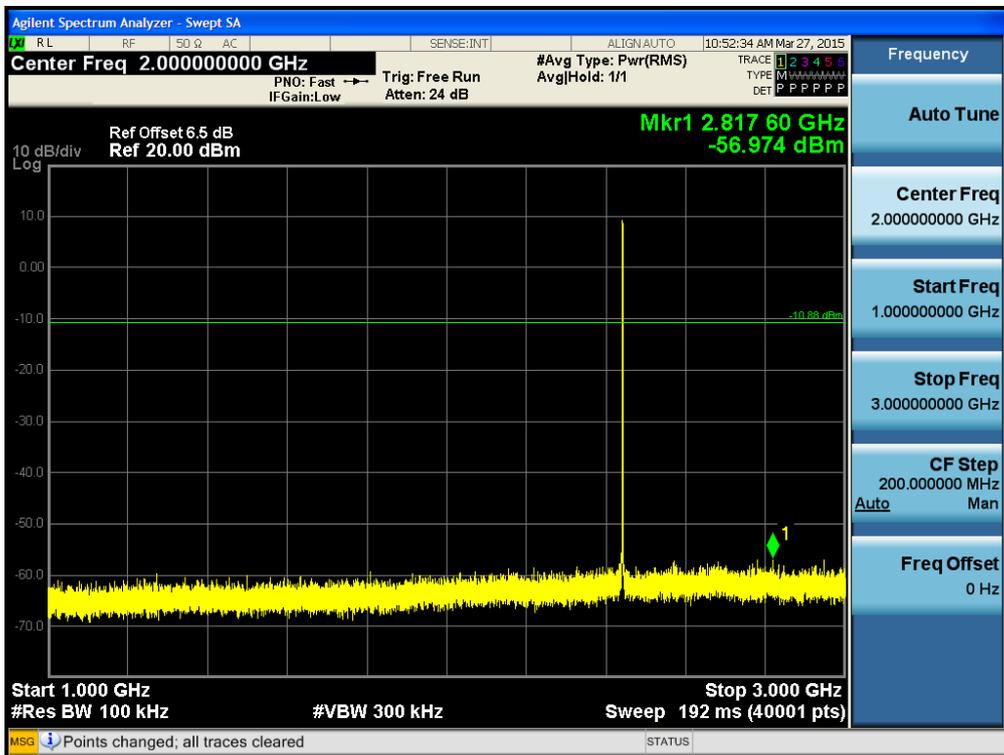
Note : 1. ** is fundamental frequency range.

2. Factor = Cable loss + Splitter loss

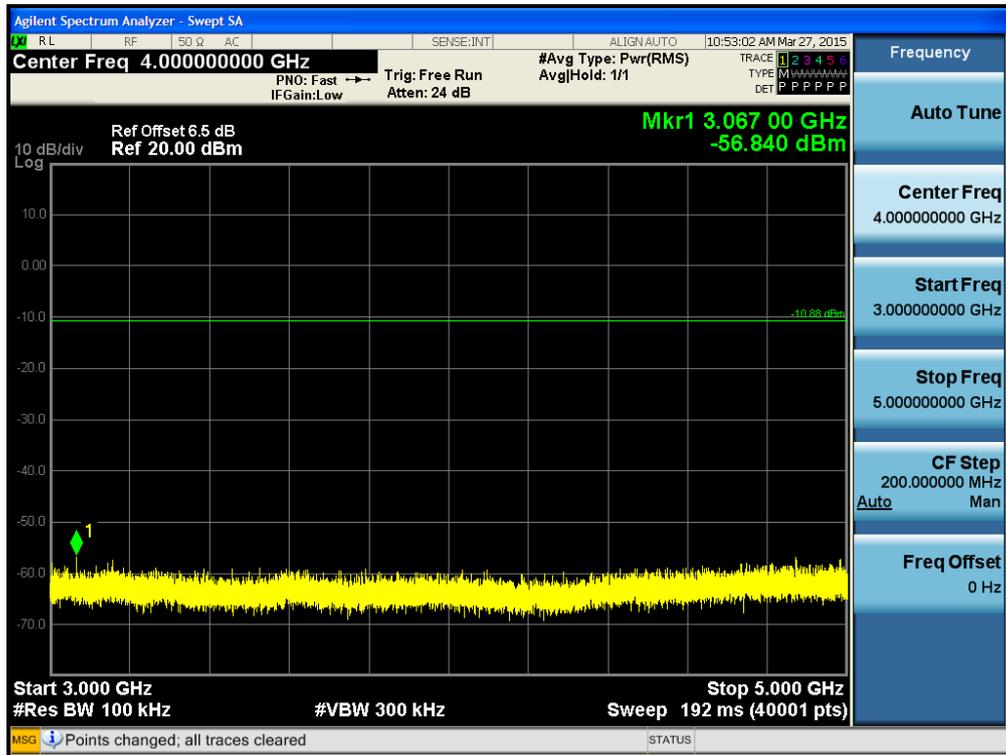
Test Plots (GFSK)- 30 MHz - 1 GHz
Spurious Emission (Mid-CH)



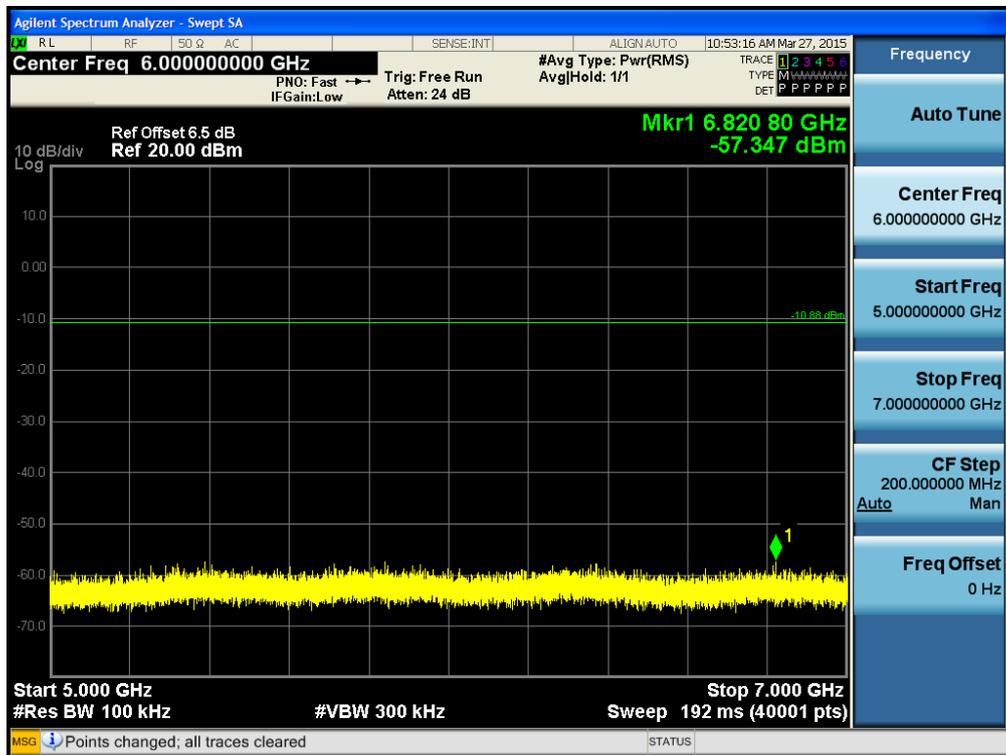
Test Plots (GFSK)- 1 GHz – 3 GHz
Spurious Emission (Mid-CH)



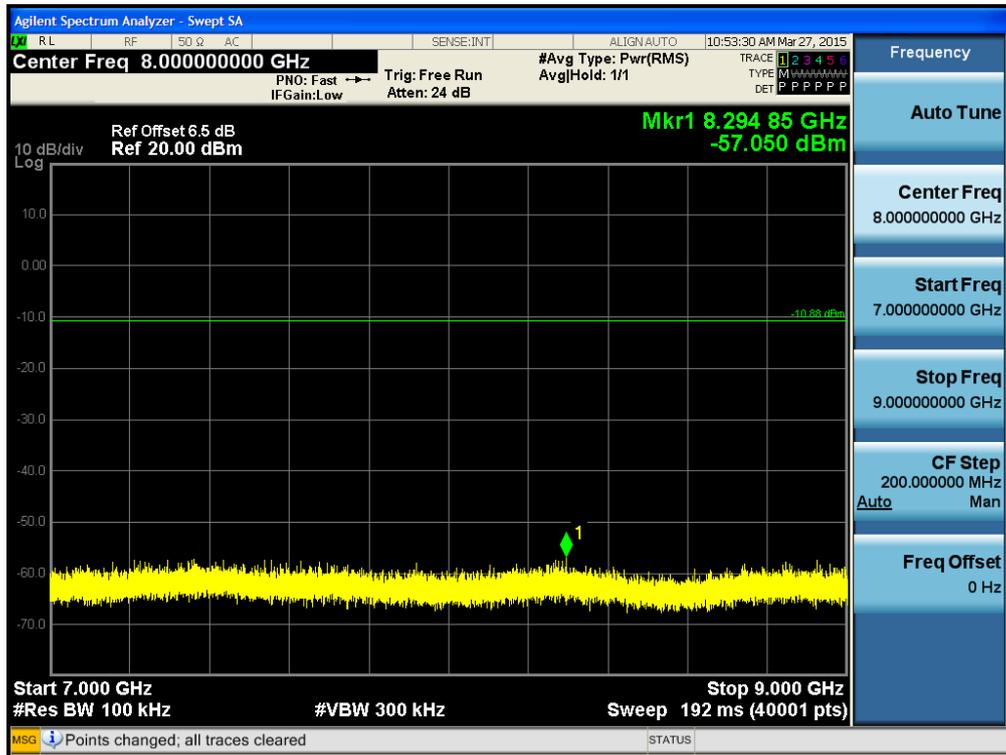
Test Plots (GFSK)- 3 GHz - 5 GHz
Spurious Emission (Mid-CH)



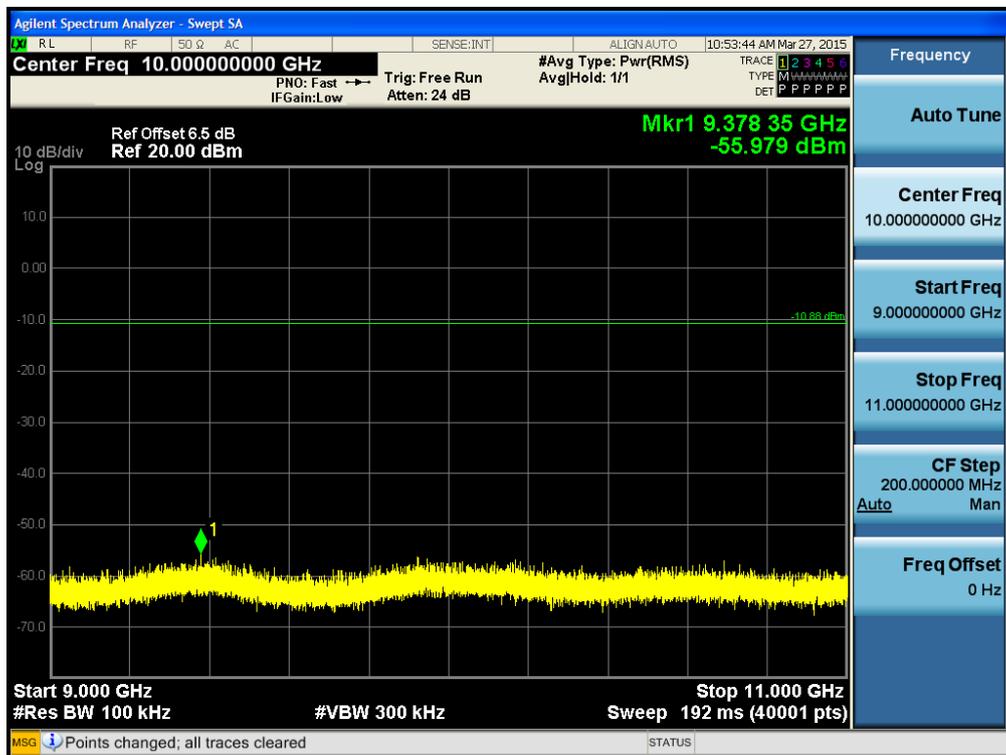
Test Plots (GFSK)- 5 GHz - 7 GHz
Spurious Emission (Mid-CH)



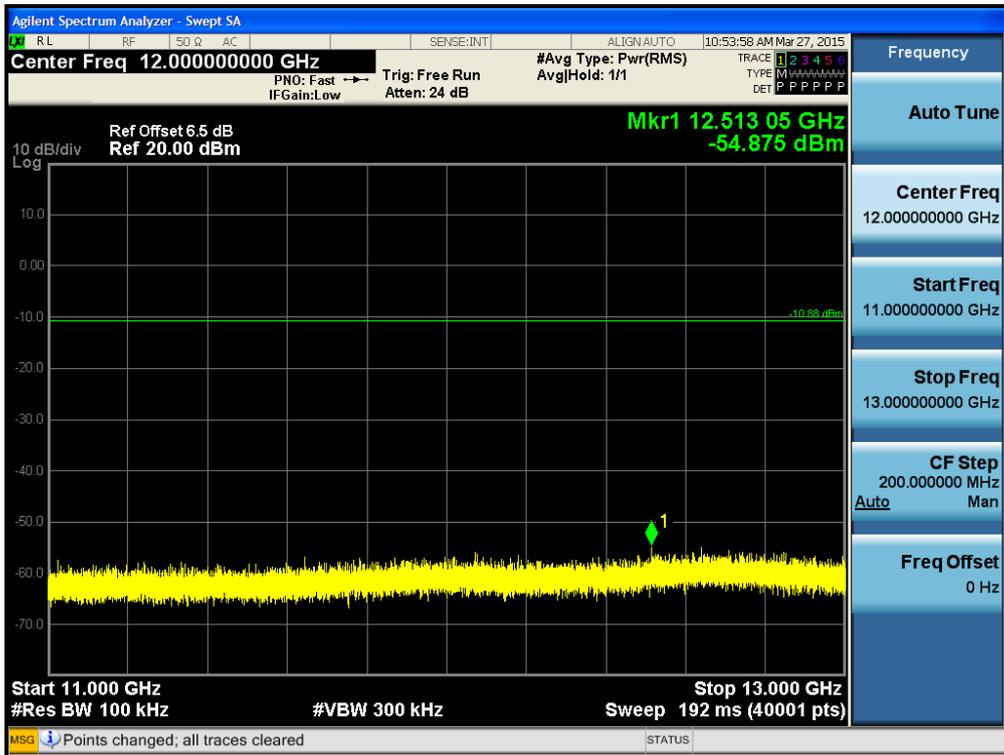
Test Plots (GFSK)- 7 GHz - 9 GHz
Spurious Emission (Mid-CH)



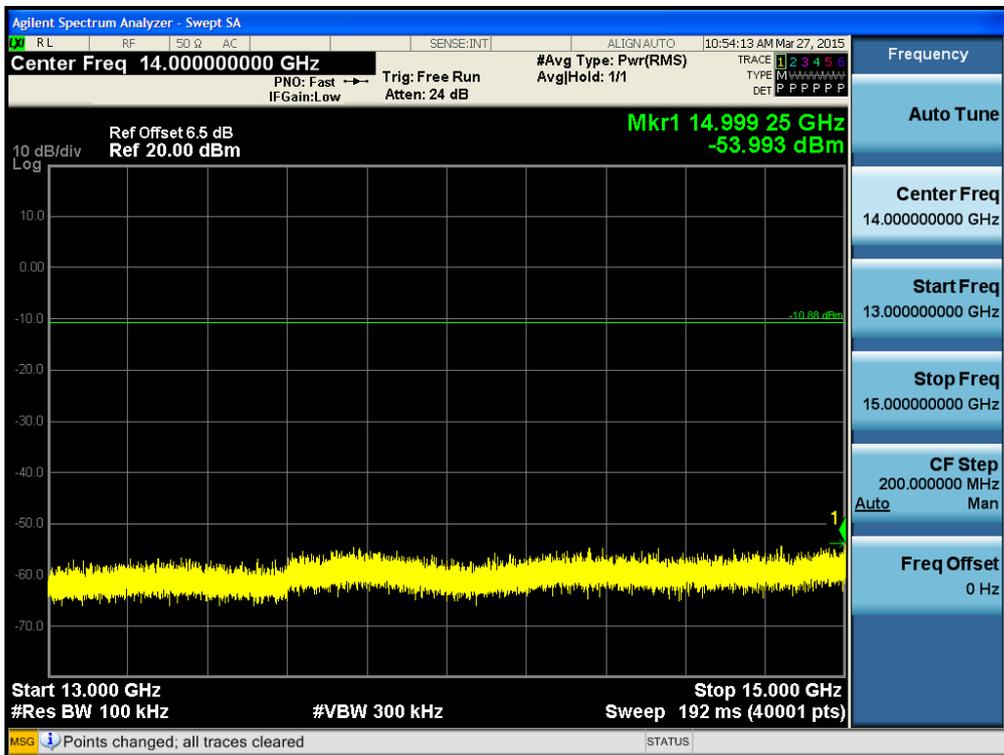
Test Plots (GFSK)- 9 GHz - 11 GHz
Spurious Emission (Mid-CH)



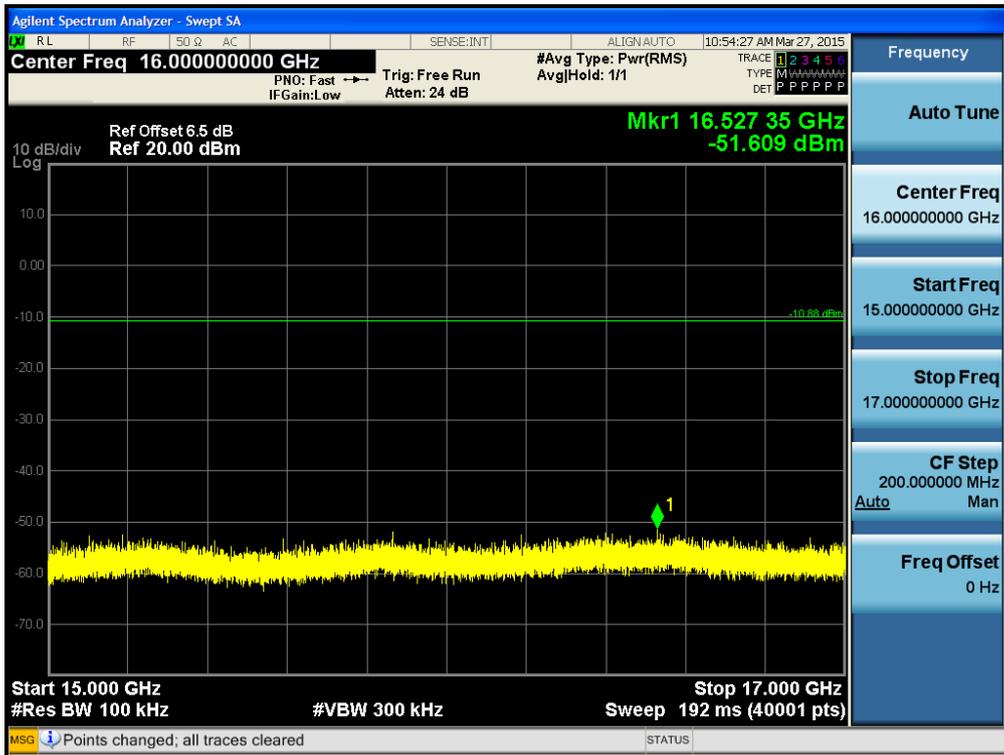
Test Plots (GFSK)- 11 GHz - 13 GHz
Spurious Emission (Mid-CH)



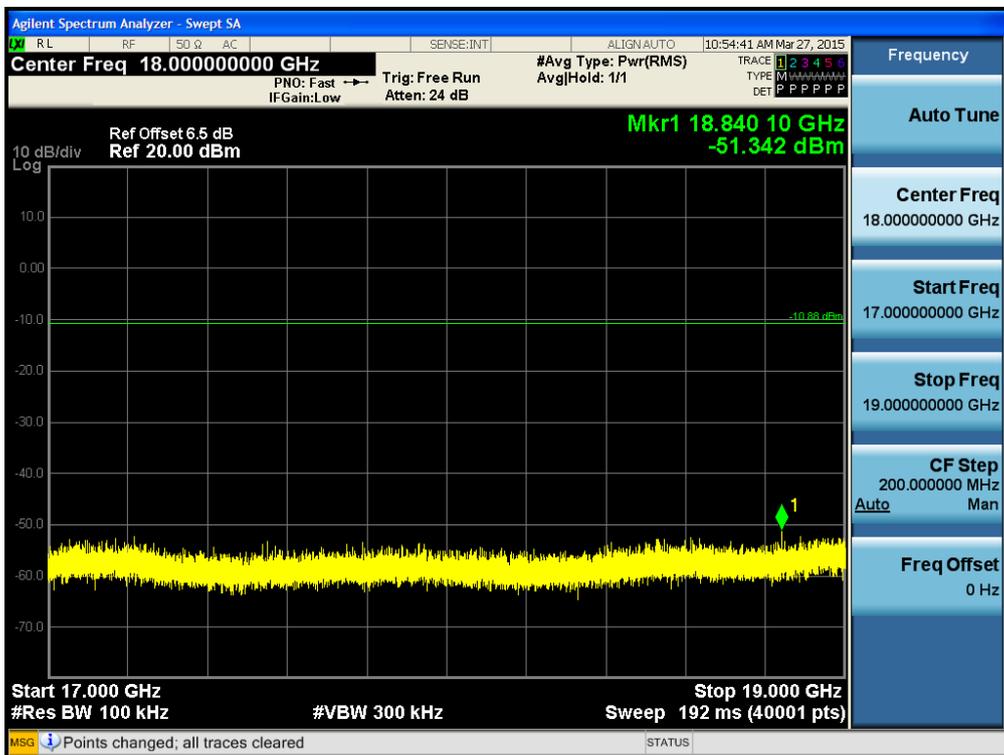
Test Plots (GFSK)- 13 GHz – 15 GHz
Spurious Emission (Mid-CH)



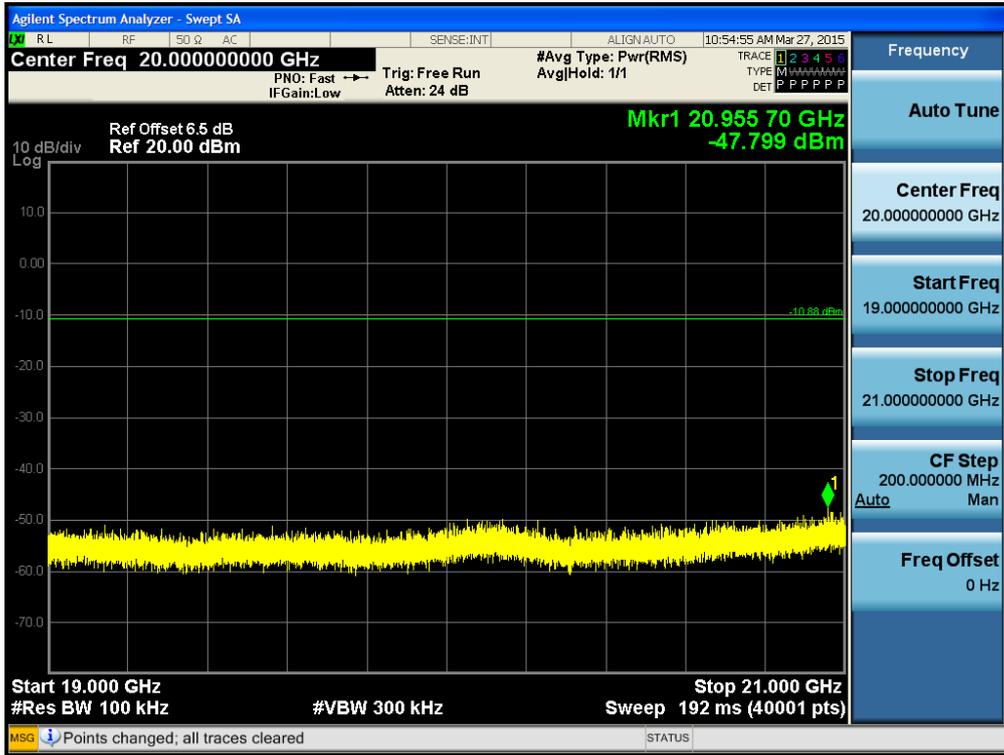
Test Plots (GFSK)- 15 GHz - 17 GHz
Spurious Emission (Mid-CH)



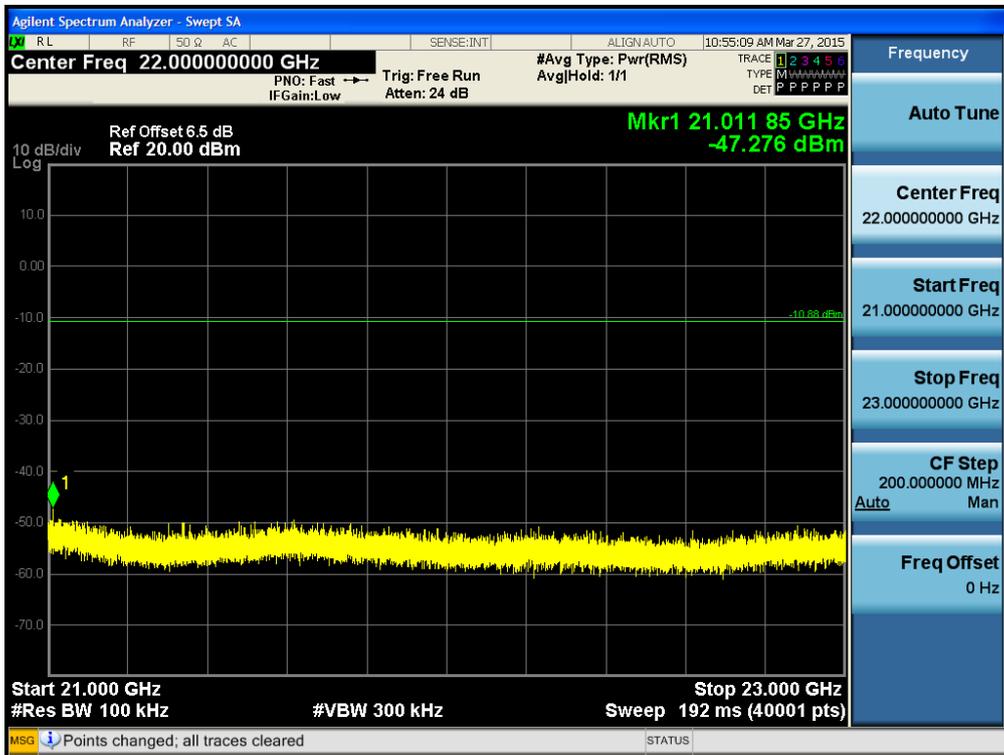
Test Plots (GFSK)- 17 GHz - 19 GHz
Spurious Emission (Mid-CH)



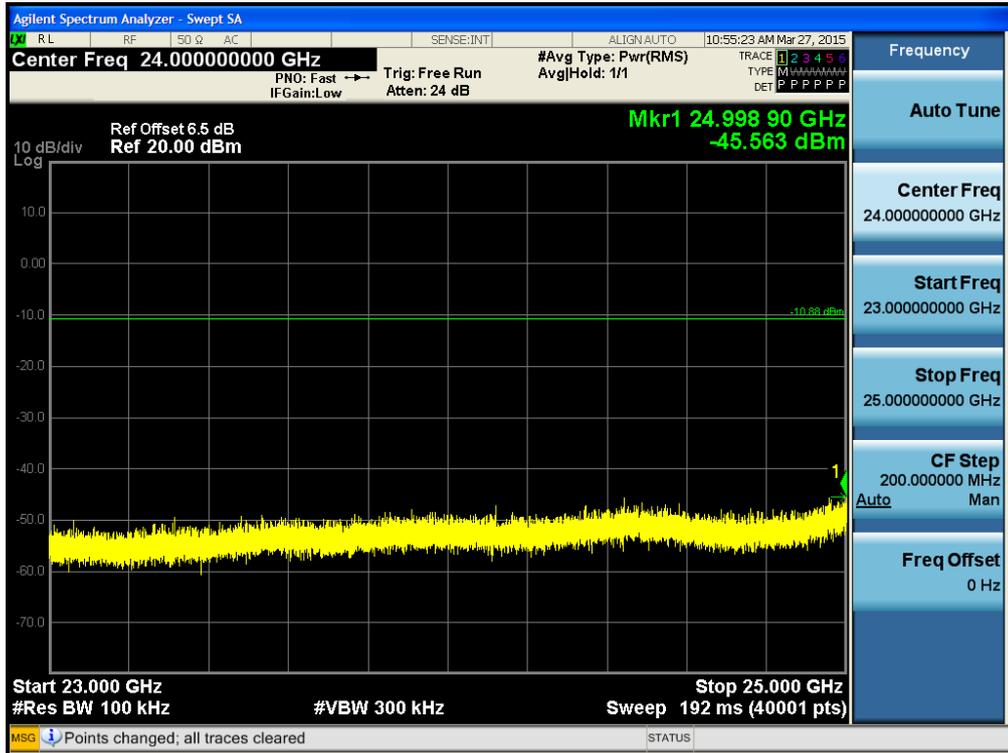
Test Plots (GFSK)- 19 GHz - 21 GHz
Spurious Emission (Mid-CH)



Test Plots (GFSK)- 21 GHz - 23 GHz
Spurious Emission (Mid-CH)



Test Plots (GFSK)- 23 GHz - 25 GHz
Spurious Emission (Mid-CH)



8.6.2 RADIATED SPURIOUS EMISSIONS

LIMIT : §15.247(d), §15.205, §15.209

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.

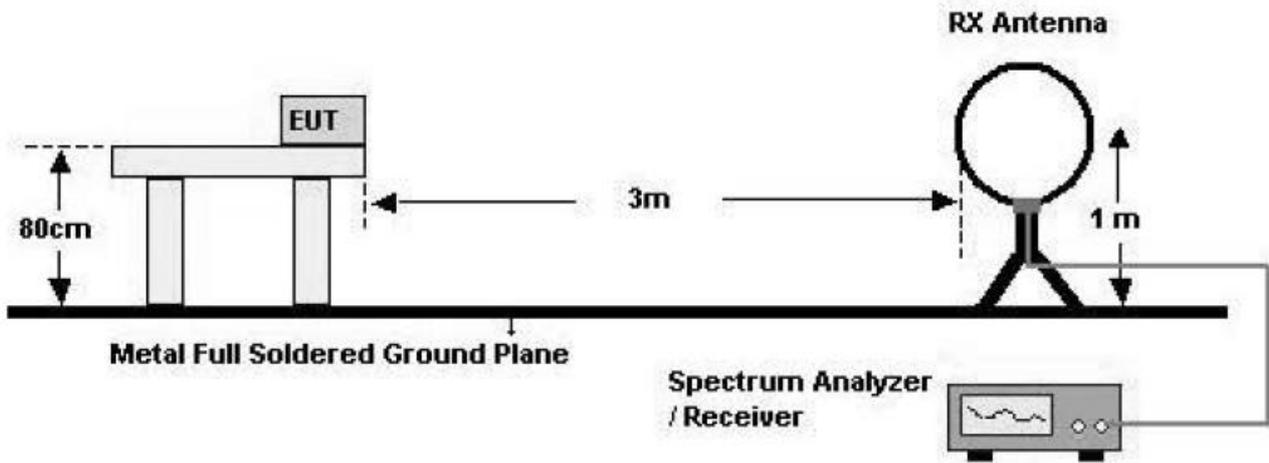
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Mode

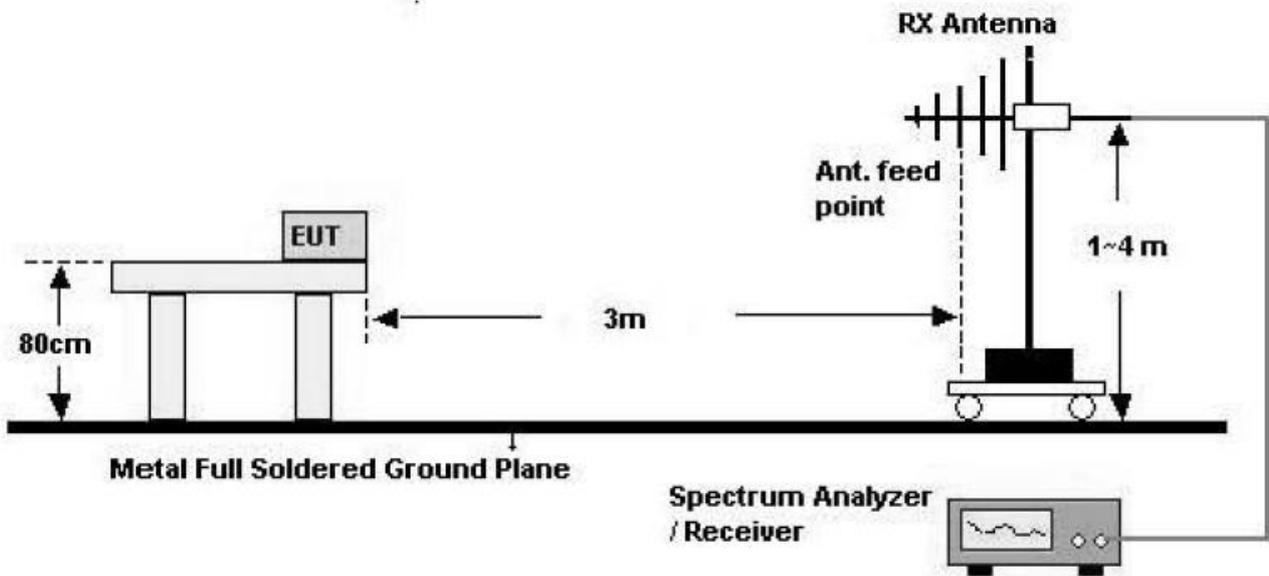
- Standalone with normal cover
- Standalone with wireless charging cover (open)
- Standalone with wireless charging cover (close)
- With wireless charging pad

Test Configuration

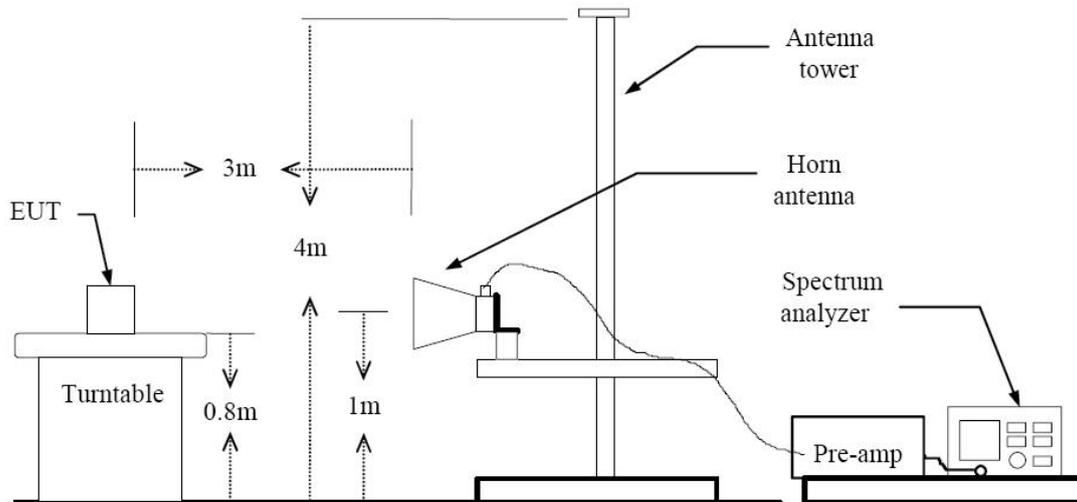
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8 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 Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.

TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

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							

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 (specific distance / 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	dB μ V	dB /m	dB	(H/V)	dB μ V/m	dB μ V/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.

Standalone with normal cover

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	52.03	-2.16	V	49.87	73.98	24.11	PK
4804	41.78	-2.16	V	39.62	53.98	14.36	AV
7206	47.76	7.31	V	55.07	73.98	18.91	PK
7206	34.49	7.31	V	41.80	53.98	12.18	AV
4804	50.58	-2.16	H	48.42	73.98	25.56	PK
4804	39.92	-2.16	H	37.76	53.98	16.22	AV
7206	47.32	7.31	H	54.63	73.98	19.35	PK
7206	34.21	7.31	H	41.52	53.98	12.46	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	50.22	-2.16	V	48.06	73.98	25.92	PK
4804	37.16	-2.16	V	35.00	53.98	18.98	AV
7206	46.79	7.31	V	54.10	73.98	19.88	PK
7206	32.51	7.31	V	39.82	53.98	14.16	AV
4804	50.23	-2.16	H	48.07	73.98	25.91	PK
4804	36.35	-2.16	H	34.19	53.98	19.79	AV
7206	46.97	7.31	H	54.28	73.98	19.70	PK
7206	32.54	7.31	H	39.85	53.98	14.13	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	50.15	-2.16	V	47.99	73.98	25.99	PK
4804	37.14	-2.16	V	34.98	53.98	19.00	AV
7206	46.80	7.31	V	54.11	73.98	19.87	PK
7206	32.49	7.31	V	39.80	53.98	14.18	AV
4804	50.26	-2.16	H	48.10	73.98	25.88	PK
4804	36.36	-2.16	H	34.20	53.98	19.78	AV
7206	46.18	7.31	H	53.49	73.98	20.49	PK
7206	32.52	7.31	H	39.83	53.98	14.15	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

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	52.32	-1.95	V	50.37	73.98	23.61	PK
4882	41.69	-1.95	V	39.74	53.98	14.24	AV
7323	47.11	7.34	V	54.45	73.98	19.53	PK
7323	33.02	7.34	V	40.36	53.98	13.62	AV
4882	51.77	-1.95	H	49.82	73.98	24.16	PK
4882	39.91	-1.95	H	37.96	53.98	16.02	AV
7323	47.28	7.34	H	54.62	73.98	19.36	PK
7323	32.99	7.34	H	40.33	53.98	13.65	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	51.88	-1.95	V	49.93	73.98	24.05	PK
4882	37.67	-1.95	V	35.72	53.98	18.26	AV
7323	46.99	7.34	V	54.33	73.98	19.65	PK
7323	33.02	7.34	V	40.36	53.98	13.62	AV
4882	51.87	-1.95	H	49.92	73.98	24.06	PK
4882	36.96	-1.95	H	35.01	53.98	18.97	AV
7323	47.33	7.34	H	54.67	73.98	19.31	PK
7323	32.97	7.34	H	40.31	53.98	13.67	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	51.76	-1.95	V	49.81	73.98	24.17	PK
4882	37.43	-1.95	V	35.48	53.98	18.50	AV
7323	46.97	7.34	V	54.31	73.98	19.67	PK
7323	33.00	7.34	V	40.34	53.98	13.64	AV
4882	51.39	-1.95	H	49.44	73.98	24.54	PK
4882	36.94	-1.95	H	34.99	53.98	18.99	AV
7323	47.48	7.34	H	54.82	73.98	19.16	PK
7323	33.01	7.34	H	40.35	53.98	13.63	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

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	52.53	-1.84	V	50.69	73.98	23.29	PK
4960	41.97	-1.84	V	40.13	53.98	13.85	AV
7440	46.22	7.13	V	53.35	73.98	20.63	PK
7440	32.63	7.13	V	39.76	53.98	14.22	AV
4960	52.35	-1.84	H	50.51	73.98	23.47	PK
4960	40.58	-1.84	H	38.74	53.98	15.24	AV
7440	46.38	7.13	H	53.51	73.98	20.47	PK
7440	32.62	7.13	H	39.75	53.98	14.23	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	50.97	-1.84	V	49.13	73.98	24.85	PK
4960	37.51	-1.84	V	35.67	53.98	18.31	AV
7440	46.67	7.13	V	53.80	73.98	20.18	PK
7440	32.80	7.13	V	39.93	53.98	14.05	AV
4960	50.34	-1.84	H	48.50	73.98	25.48	PK
4960	37.21	-1.84	H	35.37	53.98	18.61	AV
7440	46.21	7.13	H	53.34	73.98	20.64	PK
7440	32.72	7.13	H	39.85	53.98	14.13	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	50.87	-1.84	V	49.03	73.98	24.95	PK
4960	37.48	-1.84	V	35.64	53.98	18.34	AV
7440	47.01	7.13	V	54.14	73.98	19.84	PK
7440	32.76	7.13	V	39.89	53.98	14.09	AV
4960	50.16	-1.84	H	48.32	73.98	25.66	PK
4960	37.23	-1.84	H	35.39	53.98	18.59	AV
7440	46.32	7.13	H	53.45	73.98	20.53	PK
7440	32.74	7.13	H	39.87	53.98	14.11	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

Standalone with wireless charging cover (open)

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	50.78	-2.16	V	48.62	73.98	25.36	PK
4804	41.40	-2.16	V	39.24	53.98	14.74	AV
7206	46.81	7.31	V	54.12	73.98	19.86	PK
7206	35.12	7.31	V	42.43	53.98	11.55	AV
4804	51.68	-2.16	H	49.52	73.98	24.46	PK
4804	42.17	-2.16	H	40.01	53.98	13.97	AV
7206	46.40	7.31	H	53.71	73.98	20.27	PK
7206	32.30	7.31	H	39.61	53.98	14.37	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	50.21	-2.16	V	48.05	73.98	25.93	PK
4804	36.71	-2.16	V	34.55	53.98	19.43	AV
7206	46.42	7.31	V	53.73	73.98	20.25	PK
7206	32.44	7.31	V	39.75	53.98	14.23	AV
4804	50.44	-2.16	H	48.28	73.98	25.70	PK
4804	37.13	-2.16	H	34.97	53.98	19.01	AV
7206	46.22	7.31	H	53.53	73.98	20.45	PK
7206	32.35	7.31	H	39.66	53.98	14.32	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	50.32	-2.16	V	48.16	73.98	25.82	PK
4804	36.69	-2.16	V	34.53	53.98	19.45	AV
7206	46.21	7.31	V	53.52	73.98	20.46	PK
7206	32.42	7.31	V	39.73	53.98	14.25	AV
4804	50.76	-2.16	H	48.6	73.98	25.38	PK
4804	37.15	-2.16	H	34.99	53.98	18.99	AV
7206	46.41	7.31	H	53.72	73.98	20.26	PK
7206	32.33	7.31	H	39.64	53.98	14.34	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.
9. We were attached the results of standalone with wireless charging cover (open). Because the results of open condition is higher than close condition.

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	51.36	-1.95	V	49.41	73.98	24.57	PK
4882	40.84	-1.95	V	38.89	53.98	15.09	AV
7323	47.34	7.34	V	54.68	73.98	19.30	PK
7323	34.06	7.34	V	41.40	53.98	12.58	AV
4882	52.18	-1.95	H	50.23	73.98	23.75	PK
4882	42.22	-1.95	H	40.27	53.98	13.71	AV
7323	46.18	7.34	H	53.52	73.98	20.46	PK
7323	32.75	7.34	H	40.09	53.98	13.89	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	49.97	-1.95	V	48.02	73.98	25.96	PK
4882	37.22	-1.95	V	35.27	53.98	18.71	AV
7323	46.31	7.34	V	53.65	73.98	20.33	PK
7323	32.77	7.34	V	40.11	53.98	13.87	AV
4882	50.88	-1.95	H	48.93	73.98	25.05	PK
4882	37.93	-1.95	H	35.98	53.98	18.00	AV
7323	46.28	7.34	H	53.62	73.98	20.36	PK
7323	32.74	7.34	H	40.08	53.98	13.90	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	50.06	-1.95	V	48.11	73.98	25.87	PK
4882	37.24	-1.95	V	35.29	53.98	18.69	AV
7323	46.76	7.34	V	54.10	73.98	19.88	PK
7323	32.76	7.34	V	40.10	53.98	13.88	AV
4882	50.64	-1.95	H	48.69	73.98	25.29	PK
4882	37.91	-1.95	H	35.96	53.98	18.02	AV
7323	46.33	7.34	H	53.67	73.98	20.31	PK
7323	32.72	7.34	H	40.06	53.98	13.92	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.
9. We were attached the results of standalone with wireless charging cover (open). Because the results of open condition is higher than close condition.

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	51.49	-1.84	V	49.65	73.98	24.33	PK
4960	41.02	-1.84	V	39.18	53.98	14.80	AV
7440	46.22	7.13	V	53.35	73.98	20.63	PK
7440	32.56	7.13	V	39.69	53.98	14.29	AV
4960	51.92	-1.84	H	50.08	73.98	23.90	PK
4960	42.40	-1.84	H	40.56	53.98	13.42	AV
7440	46.41	7.13	H	53.54	73.98	20.44	PK
7440	32.56	7.13	H	39.69	53.98	14.29	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	50.21	-1.84	V	48.37	73.98	25.61	PK
4960	37.48	-1.84	V	35.64	53.98	18.34	AV
7440	46.44	7.13	V	53.57	73.98	20.41	PK
7440	32.42	7.13	V	39.55	53.98	14.43	AV
4960	50.81	-1.84	H	48.97	73.98	25.01	PK
4960	39.95	-1.84	H	38.11	53.98	15.87	AV
7440	46.37	7.13	H	53.5	73.98	20.48	PK
7440	32.51	7.13	H	39.64	53.98	14.34	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	50.41	-1.84	V	48.57	73.98	25.41	PK
4960	37.51	-1.84	V	35.67	53.98	18.31	AV
7440	46.19	7.13	V	53.32	73.98	20.66	PK
7440	32.41	7.13	V	39.54	53.98	14.44	AV
4960	50.89	-1.84	H	49.05	73.98	24.93	PK
4960	37.97	-1.84	H	36.13	53.98	17.85	AV
7440	46.49	7.13	H	53.62	73.98	20.36	PK
7440	32.50	7.13	H	39.63	53.98	14.35	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.
9. We were attached the results of standalone with wireless charging cover (open). Because the results of open condition is higher than close condition.

With wireless Charging Pad

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	50.44	-2.16	V	48.28	73.98	25.70	PK
4804	38.80	-2.16	V	36.64	53.98	17.34	AV
7206	47.30	7.31	V	54.61	73.98	19.37	PK
7206	34.03	7.31	V	41.34	53.98	12.64	AV
4804	51.13	-2.16	H	48.97	73.98	25.01	PK
4804	41.74	-2.16	H	39.58	53.98	14.40	AV
7206	47.20	7.31	H	54.51	73.98	19.47	PK
7206	34.51	7.31	H	41.82	53.98	12.16	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	49.56	-2.16	V	47.40	73.98	26.58	PK
4804	35.97	-2.16	V	33.81	53.98	20.17	AV
7206	47.06	7.31	V	54.37	73.98	19.61	PK
7206	32.81	7.31	V	40.12	53.98	13.86	AV
4804	49.87	-2.16	H	47.71	73.98	26.27	PK
4804	36.90	-2.16	H	34.74	53.98	19.24	AV
7206	46.34	7.31	H	53.65	73.98	20.33	PK
7206	32.84	7.31	H	40.15	53.98	13.83	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	49.79	-2.16	V	47.63	73.98	26.35	PK
4804	36.08	-2.16	V	33.92	53.98	20.06	AV
7206	47.07	7.31	V	54.38	73.98	19.60	PK
7206	32.78	7.31	V	40.09	53.98	13.89	AV
4804	50.02	-2.16	H	47.86	73.98	26.12	PK
4804	36.92	-2.16	H	34.76	53.98	19.22	AV
7206	46.33	7.31	H	53.64	73.98	20.34	PK
7206	32.84	7.31	H	40.15	53.98	13.83	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

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	50.12	-1.95	V	48.17	73.98	25.81	PK
4882	37.75	-1.95	V	35.8	53.98	18.18	AV
7323	46.81	7.34	V	54.15	73.98	19.83	PK
7323	33.35	7.34	V	40.69	53.98	13.29	AV
4882	51.62	-1.95	H	49.67	73.98	24.31	PK
4882	41.05	-1.95	H	39.1	53.98	14.88	AV
7323	47.56	7.34	H	54.9	73.98	19.08	PK
7323	33.61	7.34	H	40.95	53.98	13.03	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	50.41	-1.95	V	48.46	73.98	25.52	PK
4882	36.42	-1.95	V	34.47	53.98	19.51	AV
7323	47.09	7.34	V	54.43	73.98	19.55	PK
7323	32.89	7.34	V	40.23	53.98	13.75	AV
4882	50.61	-1.95	H	48.66	73.98	25.32	PK
4882	37.36	-1.95	H	35.41	53.98	18.57	AV
7323	46.39	7.34	H	53.73	73.98	20.25	PK
7323	32.93	7.34	H	40.27	53.98	13.71	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	50.02	-1.95	V	48.07	73.98	25.91	PK
4882	36.36	-1.95	V	34.41	53.98	19.57	AV
7323	46.63	7.34	V	53.97	73.98	20.01	PK
7323	32.80	7.34	V	40.14	53.98	13.84	AV
4882	50.38	-1.95	H	48.43	73.98	25.55	PK
4882	37.39	-1.95	H	35.44	53.98	18.54	AV
7323	46.76	7.34	H	54.1	73.98	19.88	PK
7323	32.84	7.34	H	40.18	53.98	13.80	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

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	51.31	-1.84	V	49.47	73.98	24.51	PK
4960	38.12	-1.84	V	36.28	53.98	17.70	AV
7440	46.01	7.13	V	53.14	73.98	20.84	PK
7440	32.74	7.13	V	39.87	53.98	14.11	AV
4960	51.88	-1.84	H	50.04	73.98	23.94	PK
4960	41.21	-1.84	H	39.37	53.98	14.61	AV
7440	46.45	7.13	H	53.58	73.98	20.40	PK
7440	32.81	7.13	H	39.94	53.98	14.04	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	50.08	-1.84	V	48.24	73.98	25.74	PK
4960	36.79	-1.84	V	34.95	53.98	19.03	AV
7440	47.04	7.13	V	54.17	73.98	19.81	PK
7440	32.54	7.13	V	39.67	53.98	14.31	AV
4960	50.18	-1.84	H	48.34	73.98	25.64	PK
4960	37.49	-1.84	H	35.65	53.98	18.33	AV
7440	46.97	7.13	H	54.10	73.98	19.88	PK
7440	32.59	7.13	H	39.72	53.98	14.26	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	50.43	-1.84	V	48.59	73.98	25.39	PK
4960	36.71	-1.84	V	34.87	53.98	19.11	AV
7440	46.59	7.13	V	53.72	73.98	20.26	PK
7440	32.57	7.13	V	39.70	53.98	14.28	AV
4960	50.46	-1.84	H	48.62	73.98	25.36	PK
4960	37.42	-1.84	H	35.58	53.98	18.40	AV
7440	46.68	7.13	H	53.81	73.98	20.17	PK
7440	32.59	7.13	H	39.72	53.98	14.26	AV

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

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
5. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds.
 We performed using a reduced video BW method was done with the analyzer in linear mode.
6. We have done Normal Mode and EDR Mode test.
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.

8.6.3 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)).

Standalone with normal cover

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	24.89	31.47	H	0	56.36	73.98	17.62	PK
2390.0	12.04	31.47	H	-24.73	18.77	53.98	35.21	AV
2390.0	25.03	31.47	V	0	56.50	73.98	17.48	PK
2390.0	12.29	31.47	V	-24.73	19.02	53.98	34.96	AV
2483.5	33.76	31.46	H	0	65.22	73.98	8.76	PK
2483.5	30.52	31.46	H	-24.73	37.25	53.98	16.73	AV
2483.5	33.84	31.46	V	0	65.30	73.98	8.68	PK
2483.5	30.94	31.46	V	-24.73	37.67	53.98	16.31	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	24.88	31.47	H	0	56.35	73.98	17.63	PK
2390.0	11.98	31.47	H	-24.73	18.71	53.98	35.27	AV
2390.0	25.78	31.47	V	0	57.25	73.98	16.73	PK
2390.0	12.32	31.47	V	-24.73	19.05	53.98	34.93	AV
2483.5	32.01	31.46	H	0	63.47	73.98	10.51	PK
2483.5	27.35	31.46	H	-24.73	34.08	53.98	19.90	AV
2483.5	32.18	31.46	V	0	63.64	73.98	10.34	PK
2483.5	27.70	31.46	V	-24.73	34.43	53.98	19.55	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	24.91	31.47	H	0	56.38	73.98	17.60	PK
2390.0	11.97	31.47	H	-24.73	18.70	53.98	35.28	AV
2390.0	25.23	31.47	V	0	56.70	73.98	17.28	PK
2390.0	12.19	31.47	V	-24.73	18.92	53.98	35.06	AV
2483.5	31.78	31.46	H	0	63.24	73.98	10.74	PK
2483.5	27.32	31.46	H	-24.73	34.05	53.98	19.93	AV
2483.5	32.10	31.46	V	0	63.56	73.98	10.42	PK
2483.5	27.61	31.46	V	-24.73	34.34	53.98	19.64	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 = Fundamental Reading Value + Antenna Factor + Cable Loss + Duty Cycle Correction Factor
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ 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 = $20\log$ (Worst Case Dwell Time/ 100ms) 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) = $20\log$ (Worst Case Dwell Time/ 100ms) 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.

Standalone with wireless charging cover (open)

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	25.27	31.47	H	0	56.74	73.98	17.24	PK
2390.0	12.31	31.47	H	-24.73	19.04	53.98	34.94	AV
2390.0	25.58	31.47	V	0	57.05	73.98	16.93	PK
2390.0	12.50	31.47	V	-24.73	19.23	53.98	34.75	AV
2483.5	36.13	31.46	H	0	67.59	73.98	6.39	PK
2483.5	33.80	31.46	H	-24.73	40.53	53.98	13.45	AV
2483.5	33.26	31.46	V	0	64.72	73.98	9.26	PK
2483.5	30.54	31.46	V	-24.73	37.27	53.98	16.71	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	25.21	31.47	H	0	56.68	73.98	17.30	PK
2390.0	12.33	31.47	H	-24.73	19.06	53.98	34.92	AV
2390.0	24.97	31.47	V	0	56.44	73.98	17.54	PK
2390.0	12.31	31.47	V	-24.73	19.04	53.98	34.94	AV
2483.5	34.59	31.46	H	0	66.05	73.98	7.93	PK
2483.5	30.40	31.46	H	-24.73	37.13	53.98	16.85	AV
2483.5	32.01	31.46	V	0	63.47	73.98	10.51	PK
2483.5	26.94	31.46	V	-24.73	33.67	53.98	20.31	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	25.47	31.47	H	0	56.94	73.98	17.04	PK
2390.0	12.32	31.47	H	-24.73	19.05	53.98	34.93	AV
2390.0	24.83	31.47	V	0	56.30	73.98	17.68	PK
2390.0	12.30	31.47	V	-24.73	19.03	53.98	34.95	AV
2483.5	34.52	31.46	H	0	65.98	73.98	8.00	PK
2483.5	30.42	31.46	H	-24.73	37.15	53.98	16.83	AV
2483.5	31.84	31.46	V	0	63.30	73.98	10.68	PK
2483.5	26.90	31.46	V	-24.73	33.63	53.98	20.35	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 = Fundamental Reading Value + Antenna Factor + Cable Loss + Duty Cycle Correction Factor
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ 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.
9. We were attached the results of standalone with wireless charging cover (open). Because the results of open condition is higher than close condition.

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	25.48	31.47	H	0	56.95	73.98	17.03	PK
2390.0	12.40	31.47	H	-24.73	19.13	53.98	34.85	AV
2390.0	25.63	31.47	V	0	57.10	73.98	16.88	PK
2390.0	12.27	31.47	V	-24.73	19.00	53.98	34.98	AV
2483.5	32.94	31.46	H	0	64.40	73.98	9.58	PK
2483.5	28.14	31.46	H	-24.73	34.87	53.98	19.11	AV
2483.5	28.76	31.46	V	0	60.22	73.98	13.76	PK
2483.5	22.93	31.46	V	-24.73	29.66	53.98	24.32	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	25.58	31.47	H	0	57.05	73.98	16.93	PK
2390.0	12.28	31.47	H	-24.73	19.01	53.98	34.97	AV
2390.0	25.74	31.47	V	0	57.21	73.98	16.77	PK
2390.0	12.29	31.47	V	-24.73	19.02	53.98	34.96	AV
2483.5	32.90	31.46	H	0	64.36	73.98	9.62	PK
2483.5	28.16	31.46	H	-24.73	34.89	53.98	19.09	AV
2483.5	28.66	31.46	V	0	60.12	73.98	13.86	PK
2483.5	22.91	31.46	V	-24.73	29.64	53.98	24.34	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 = Fundamental Reading Value + Antenna Factor + Cable Loss + Duty Cycle Correction Factor
3. Spectrum setting:
 - a. Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
 - b. AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz $\geq 1/\tau$ 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.

8.7 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.
5. This test is performed with hopping off and 1 Mbps (GFSK) data rate of No.39 channel.

Standalone

RESULT PLOTS

Conducted Emissions (Line 1)

EMI Auto Test(2)

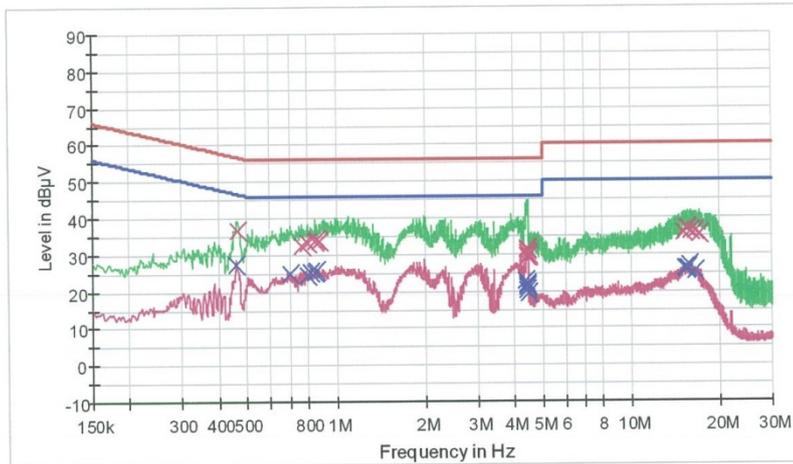
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HCT TEST Report

Common Information

EUT: LG-H815
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE
 Operator Name: KS KANG

FCC CLASS B



— FCCCLASS B_QP
 — FCCCLASS B_AV
 — Preview Result 1-PK+
— Preview Result 2-AVG
 x Final Result 1-CPK
 x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.466000	36.5	9.000	Off	N	9.7	20.1	56.6
0.766000	32.6	9.000	Off	N	9.7	23.4	56.0
0.798000	33.1	9.000	Off	N	9.7	22.9	56.0
0.848000	33.8	9.000	Off	N	9.7	22.2	56.0
0.862000	34.2	9.000	Off	N	9.7	21.8	56.0
0.876000	33.9	9.000	Off	N	9.7	22.1	56.0
4.408000	31.7	9.000	Off	N	9.9	24.3	56.0
4.420000	31.2	9.000	Off	N	9.9	24.8	56.0
4.442000	30.5	9.000	Off	N	9.9	25.5	56.0
4.446000	29.7	9.000	Off	N	9.9	26.3	56.0
4.456000	30.0	9.000	Off	N	9.9	26.0	56.0
4.476000	29.5	9.000	Off	N	9.9	26.5	56.0
15.024000	35.9	9.000	Off	N	10.2	24.1	60.0
15.372000	36.9	9.000	Off	N	10.2	23.1	60.0
15.576000	37.1	9.000	Off	N	10.2	22.9	60.0
15.942000	36.2	9.000	Off	N	10.2	23.8	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
16.546000	36.0	9.000	Off	N	10.2	24.0	60.0
17.038000	35.6	9.000	Off	N	10.2	24.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.462000	27.6	9.000	Off	N	9.7	19.1	46.7
0.700000	24.7	9.000	Off	N	9.7	21.3	46.0
0.798000	24.4	9.000	Off	N	9.7	21.6	46.0
0.818000	25.4	9.000	Off	N	9.7	20.6	46.0
0.852000	25.1	9.000	Off	N	9.7	20.9	46.0
0.862000	25.7	9.000	Off	N	9.7	20.3	46.0
4.402000	22.8	9.000	Off	N	9.9	23.2	46.0
4.410000	21.2	9.000	Off	N	9.9	24.8	46.0
4.420000	21.7	9.000	Off	N	9.9	24.3	46.0
4.442000	20.3	9.000	Off	N	9.9	25.7	46.0
4.446000	21.8	9.000	Off	N	9.9	24.2	46.0
4.456000	19.4	9.000	Off	N	9.9	26.6	46.0
15.140000	26.2	9.000	Off	N	10.2	23.8	50.0
15.372000	26.3	9.000	Off	N	10.2	23.7	50.0
15.410000	25.8	9.000	Off	N	10.2	24.2	50.0
15.572000	25.9	9.000	Off	N	10.2	24.1	50.0
15.764000	26.9	9.000	Off	N	10.2	23.1	50.0
16.474000	25.2	9.000	Off	N	10.2	24.8	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(2)

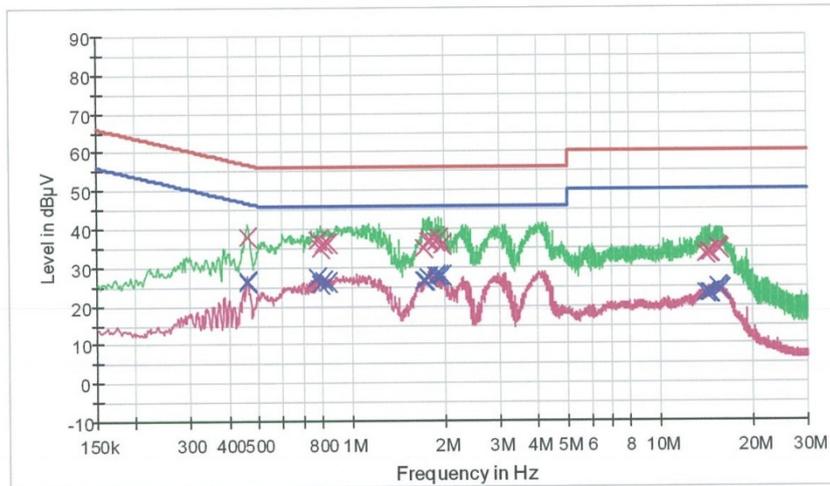
1 / 2

HCT TEST Report

Common Information

EUT: LG-H815
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE
 Operator Name: KS KANG

FCC CLASS B



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

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.458000	37.9	9.000	Off	L1	9.7	18.8	56.7
0.462000	37.7	9.000	Off	L1	9.7	19.0	56.7
0.776000	37.2	9.000	Off	L1	9.7	18.8	56.0
0.796000	34.9	9.000	Off	L1	9.7	21.1	56.0
0.806000	36.2	9.000	Off	L1	9.7	19.8	56.0
0.840000	36.1	9.000	Off	L1	9.7	19.9	56.0
1.716000	35.1	9.000	Off	L1	9.8	20.9	56.0
1.766000	36.5	9.000	Off	L1	9.8	19.5	56.0
1.798000	36.9	9.000	Off	L1	9.8	19.1	56.0
1.870000	36.7	9.000	Off	L1	9.8	19.3	56.0
1.918000	37.4	9.000	Off	L1	9.8	18.6	56.0
1.964000	35.9	9.000	Off	L1	9.8	20.1	56.0
14.000000	33.4	9.000	Off	L1	10.1	26.6	60.0
14.446000	33.7	9.000	Off	L1	10.2	26.3	60.0
14.460000	33.5	9.000	Off	L1	10.2	26.5	60.0
14.468000	33.5	9.000	Off	L1	10.2	26.5	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
15.406000	34.9	9.000	Off	L1	10.2	25.1	60.0
15.550000	34.6	9.000	Off	L1	10.2	25.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.458000	26.5	9.000	Off	L1	9.7	20.2	46.7
0.462000	26.0	9.000	Off	L1	9.7	20.7	46.7
0.776000	27.2	9.000	Off	L1	9.7	18.8	46.0
0.794000	25.8	9.000	Off	L1	9.7	20.2	46.0
0.806000	26.6	9.000	Off	L1	9.7	19.4	46.0
0.842000	26.0	9.000	Off	L1	9.7	20.0	46.0
1.716000	26.5	9.000	Off	L1	9.8	19.5	46.0
1.730000	26.7	9.000	Off	L1	9.8	19.3	46.0
1.772000	27.4	9.000	Off	L1	9.8	18.6	46.0
1.870000	27.9	9.000	Off	L1	9.8	18.1	46.0
1.918000	27.8	9.000	Off	L1	9.8	18.2	46.0
1.964000	27.7	9.000	Off	L1	9.8	18.3	46.0
14.090000	23.2	9.000	Off	L1	10.1	26.8	50.0
14.446000	23.4	9.000	Off	L1	10.2	26.6	50.0
14.460000	23.3	9.000	Off	L1	10.2	26.7	50.0
15.406000	24.7	9.000	Off	L1	10.2	25.3	50.0
15.500000	24.4	9.000	Off	L1	10.2	25.6	50.0
15.746000	24.2	9.000	Off	L1	10.2	25.8	50.0

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

With wireless charging pad

RESULT PLOTS

Conducted Emissions (Line 1)

EMI Auto Test(2)

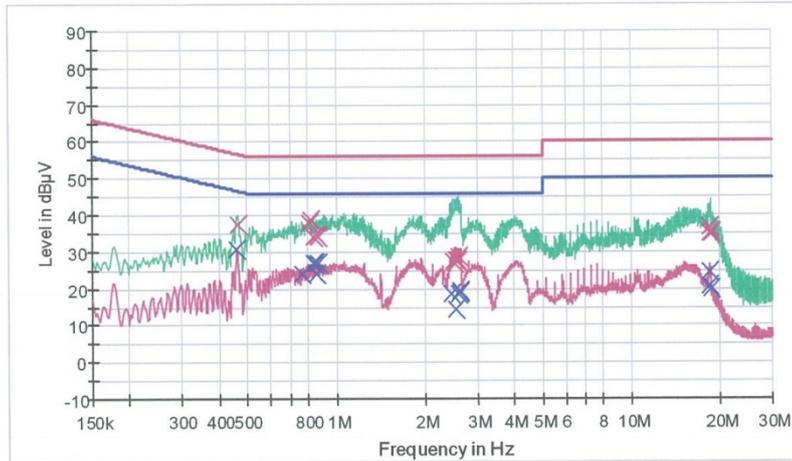
1 / 2

HCT TEST Report

Common Information

EUT: LG-H815
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE_WIRELESS CHARGING
 Operator Name: KS KANG

FCC CLASS B



— FCCCLASS_B_QP — FCCCLASS_B_AV — Preview Result 1-PK+
 — Preview Result 2-AVG x Final Result 1-CPK x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.464000	37.5	9.000	Off	N	9.7	19.1	56.6
0.812000	37.9	9.000	Off	N	9.7	18.1	56.0
0.824000	38.7	9.000	Off	N	9.7	17.3	56.0
0.840000	34.1	9.000	Off	N	9.7	21.9	56.0
0.854000	34.7	9.000	Off	N	9.7	21.3	56.0
0.870000	34.3	9.000	Off	N	9.7	21.7	56.0
2.494000	27.2	9.000	Off	N	9.8	28.8	56.0
2.520000	27.0	9.000	Off	N	9.8	29.0	56.0
2.546000	27.7	9.000	Off	N	9.8	28.3	56.0
2.574000	27.8	9.000	Off	N	9.8	28.2	56.0
2.580000	27.5	9.000	Off	N	9.8	28.5	56.0
2.604000	28.5	9.000	Off	N	9.8	27.5	56.0
18.468000	34.9	9.000	Off	N	10.3	25.1	60.0
18.524000	36.8	9.000	Off	N	10.3	23.2	60.0
18.572000	34.8	9.000	Off	N	10.3	25.2	60.0
18.606000	34.8	9.000	Off	N	10.3	25.2	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
18.616000	35.4	9.000	Off	N	10.3	24.6	60.0
18.628000	35.3	9.000	Off	N	10.3	24.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.462000	30.9	9.000	Off	N	9.7	15.8	46.7
0.764000	24.2	9.000	Off	N	9.7	21.8	46.0
0.836000	26.9	9.000	Off	N	9.7	19.1	46.0
0.850000	27.0	9.000	Off	N	9.7	19.0	46.0
0.858000	24.0	9.000	Off	N	9.7	22.0	46.0
0.864000	27.0	9.000	Off	N	9.7	19.0	46.0
2.460000	18.4	9.000	Off	N	9.8	27.6	46.0
2.540000	14.5	9.000	Off	N	9.8	31.5	46.0
2.548000	14.5	9.000	Off	N	9.8	31.5	46.0
2.604000	18.5	9.000	Off	N	9.8	27.5	46.0
2.616000	19.1	9.000	Off	N	9.8	26.9	46.0
2.626000	19.6	9.000	Off	N	9.8	26.4	46.0
18.468000	20.5	9.000	Off	N	10.3	29.5	50.0
18.538000	24.6	9.000	Off	N	10.3	25.4	50.0
18.606000	19.8	9.000	Off	N	10.3	30.2	50.0
18.612000	19.8	9.000	Off	N	10.3	30.2	50.0
18.616000	19.8	9.000	Off	N	10.3	30.2	50.0
18.628000	19.8	9.000	Off	N	10.3	30.2	50.0

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Conducted Emissions (Line 2)

EMI Auto Test(2)

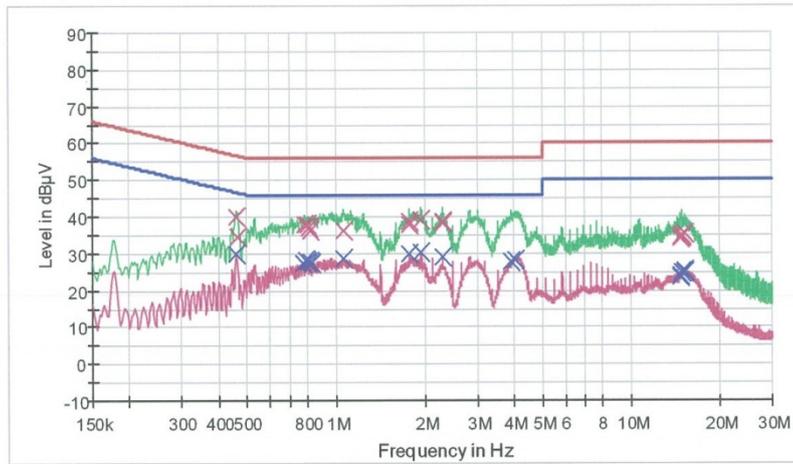
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HCT TEST Report

Common Information

EUT: LG-H815
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: BT MODE_WIRELESS CHARGING
 Operator Name: KS KANG

FCC CLASS B



— FCCCLASS B_QP — FCCCLASS B_AV — Preview Result 1-PK+
— Preview Result 2-AVG x Final Result 1-CPK x Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.460000	40.1	9.000	Off	L1	9.7	16.6	56.7
0.466000	34.5	9.000	Off	L1	9.7	22.1	56.6
0.786000	37.8	9.000	Off	L1	9.7	18.2	56.0
0.802000	37.8	9.000	Off	L1	9.7	18.2	56.0
0.814000	37.0	9.000	Off	L1	9.7	19.0	56.0
0.820000	36.0	9.000	Off	L1	9.7	20.0	56.0
1.060000	36.1	9.000	Off	L1	9.7	19.9	56.0
1.768000	38.6	9.000	Off	L1	9.8	17.4	56.0
1.772000	38.1	9.000	Off	L1	9.8	17.9	56.0
1.946000	39.2	9.000	Off	L1	9.8	16.8	56.0
2.300000	38.9	9.000	Off	L1	9.8	17.1	56.0
2.304000	38.3	9.000	Off	L1	9.8	17.7	56.0
14.736000	34.3	9.000	Off	L1	10.2	25.7	60.0
14.756000	34.2	9.000	Off	L1	10.2	25.8	60.0
14.760000	34.3	9.000	Off	L1	10.2	25.7	60.0
14.806000	34.5	9.000	Off	L1	10.2	25.5	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
14.814000	35.1	9.000	Off	L1	10.2	24.9	60.0
15.278000	35.6	9.000	Off	L1	10.2	24.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.460000	29.9	9.000	Off	L1	9.7	16.8	46.7
0.772000	27.6	9.000	Off	L1	9.7	18.4	46.0
0.788000	28.1	9.000	Off	L1	9.7	17.9	46.0
0.802000	27.8	9.000	Off	L1	9.7	18.2	46.0
0.818000	27.7	9.000	Off	L1	9.7	18.3	46.0
0.832000	27.5	9.000	Off	L1	9.7	18.5	46.0
1.064000	28.5	9.000	Off	L1	9.7	17.5	46.0
1.770000	30.0	9.000	Off	L1	9.8	16.0	46.0
1.948000	30.2	9.000	Off	L1	9.8	15.8	46.0
2.300000	29.2	9.000	Off	L1	9.8	16.8	46.0
3.892000	27.7	9.000	Off	L1	9.9	18.3	46.0
4.054000	28.4	9.000	Off	L1	9.9	17.6	46.0
14.688000	24.0	9.000	Off	L1	10.2	26.0	50.0
14.706000	23.8	9.000	Off	L1	10.2	26.2	50.0
14.742000	23.7	9.000	Off	L1	10.2	26.3	50.0
14.814000	24.8	9.000	Off	L1	10.2	25.2	50.0
15.134000	25.1	9.000	Off	L1	10.2	24.9	50.0
15.278000	25.2	9.000	Off	L1	10.2	24.8	50.0

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9. LIST OF TEST EQUIPMENT

9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216/ LISN	01/13/2015	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	03/18/2015	Annual	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	05/23/2014	Annual	MY51110063
Agilent	N1911A/Power Meter	01/15/2015	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2014	Annual	MY45241059
Agilent	87300B/Directional Coupler	12/08/2014	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/19/2014	Annual	11275
ITECH	IT6720 / DC POWER SUPPLY	11/04/2014	Annual	010002156287001199
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Agilent	8493C / Attenuator(10 dB)	07/21/2014	Annual	76649

9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	10/10/2014	Biennial	3368
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	09/04/2014	Annual	10094
CERNEX	CBL18265035 / POWER AMP	07/23/2014	Annual	22966
Schwarzbeck	BBHA 9120D/ Horn Antenna	07/05/2013	Biennial	1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	07/05/2013	Biennial	BBHA9170541
Rohde & Schwarz	FSP / Spectrum Analyzer	10/23/2014	Annual	836650/016
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	06/23/2014	Annual	8
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/17/2014	Annual	1
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	100422
Rohde & Schwarz	LOOP ANTENNA	09/03/2014	Biennial	1513-175
CERNEX	CBL06185030 / POWER AMP	07/21/2014	Annual	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2014	Annual	22964