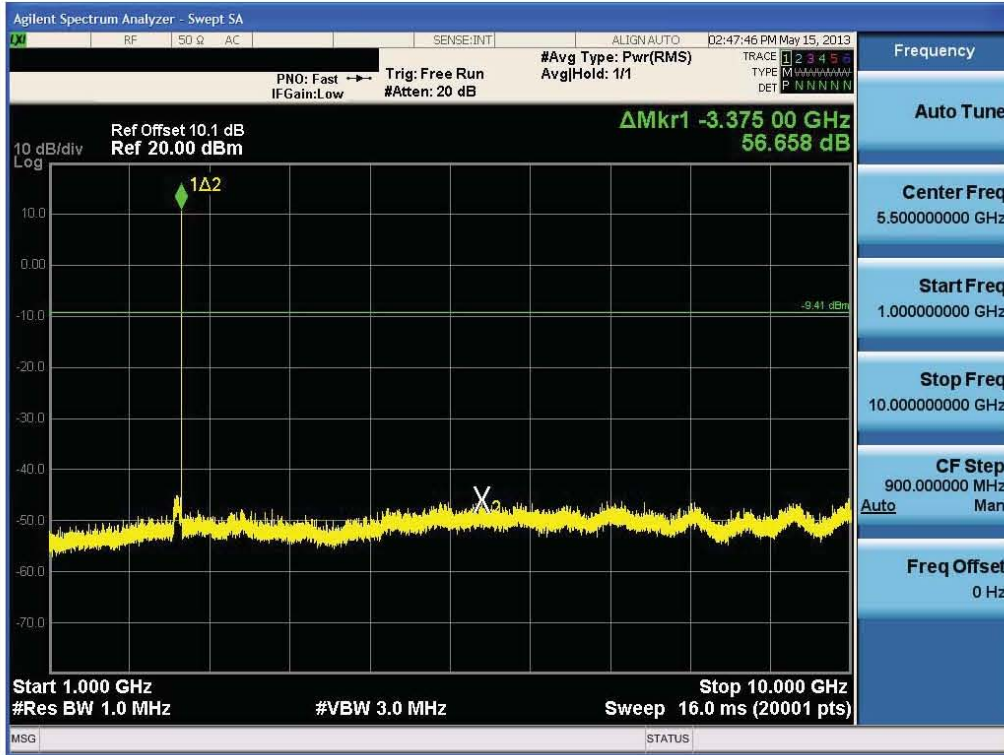


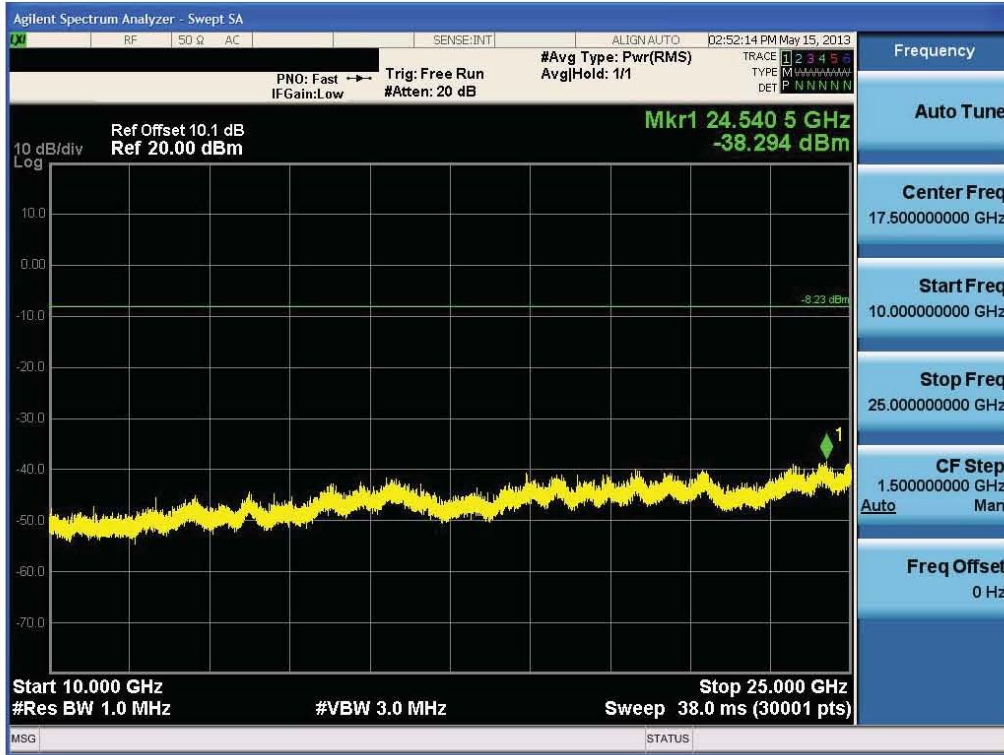


Test Plots ( $\pi/4$ DQPSK) - 1 GHz - 10 GHz (RBW:1 MHz, VBW: 3 MHz)  
 Spurious Emission (High-CH)

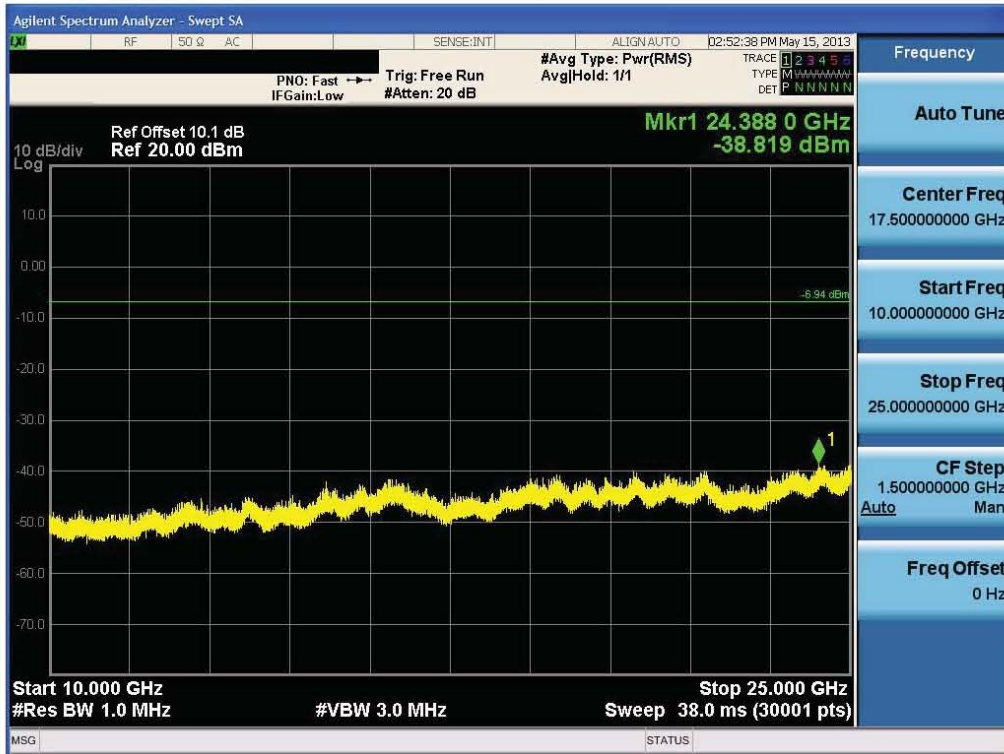


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WiFi802.11 a/b/g/n(2.4/5GHz)/NFC		FCC ID: ZNFE989

Test Plots (GFSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Low-CH)

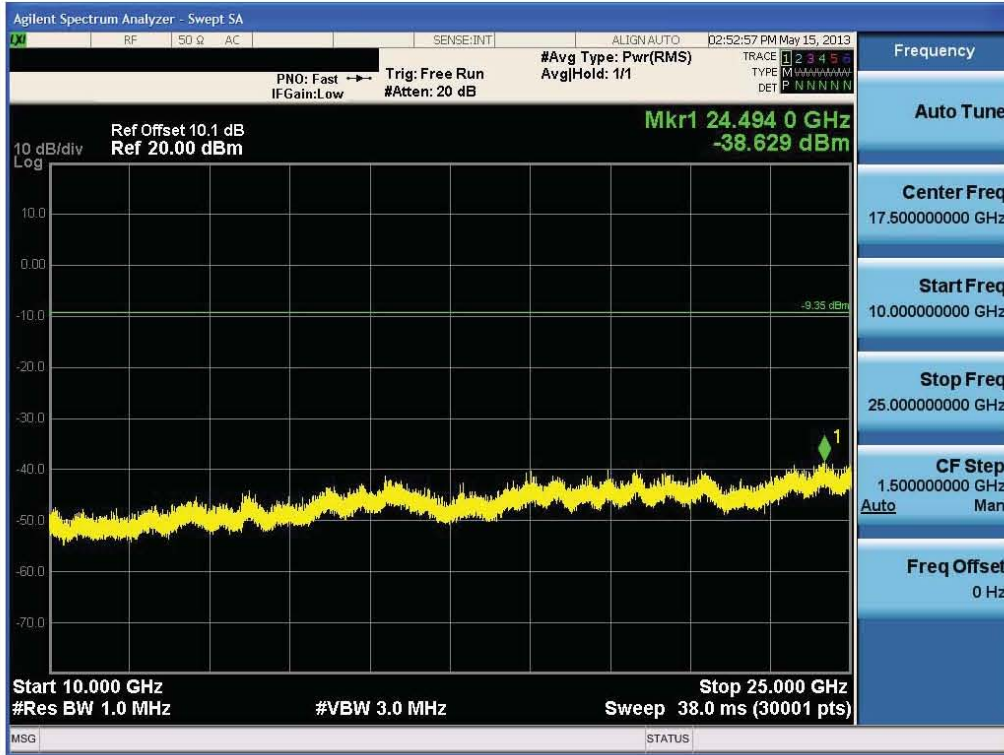


Test Plots (GFSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Mid-CH)

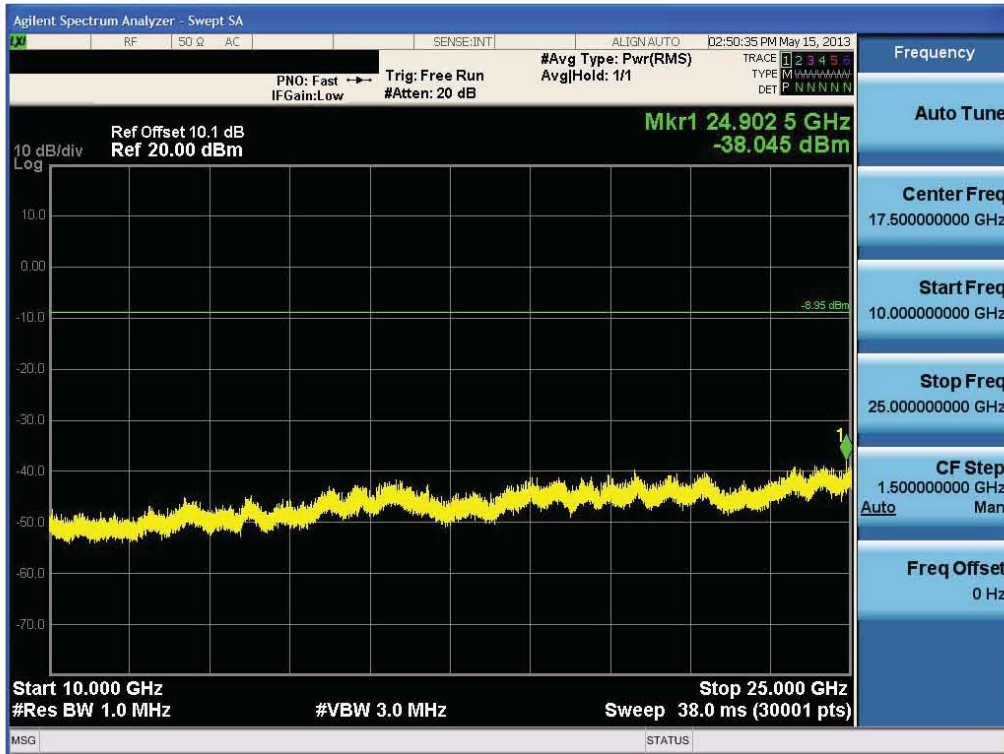


FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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Test Plots (GFSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (High-CH)

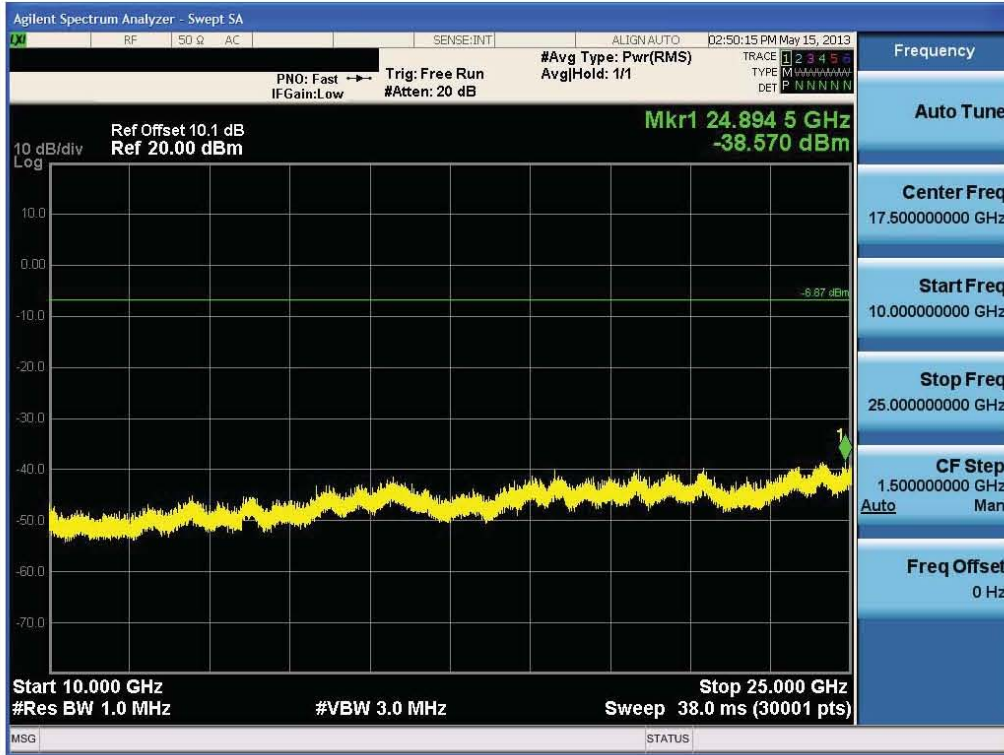


Test Plots (8DPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Low-CH)

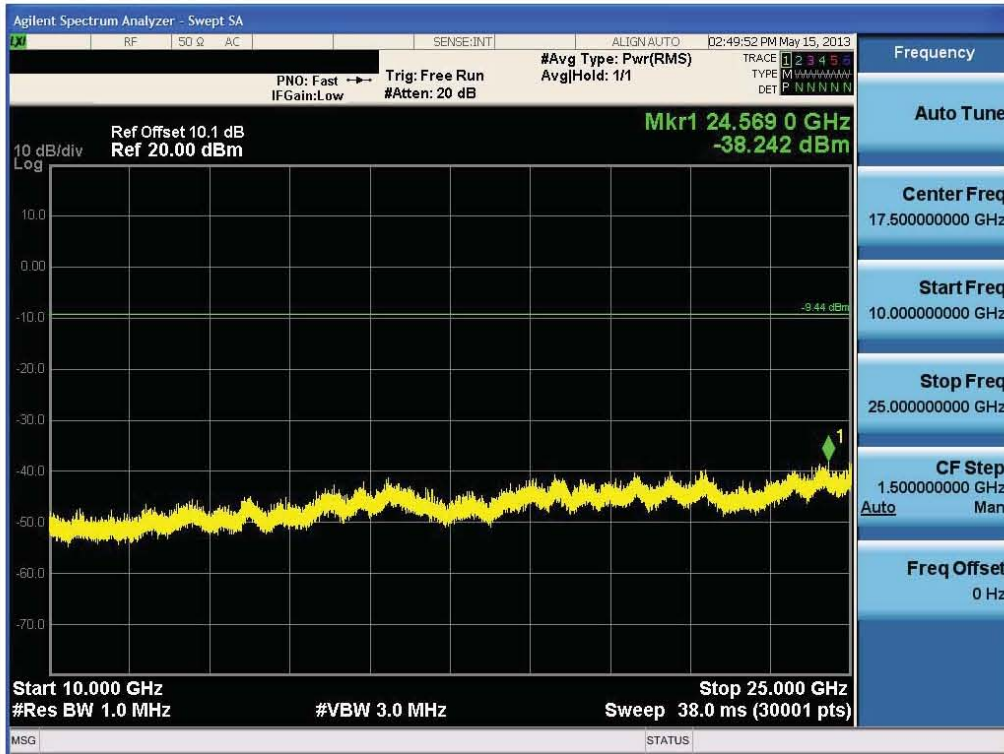


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WiFi802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989	

Test Plots (8DPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Mid-CH)

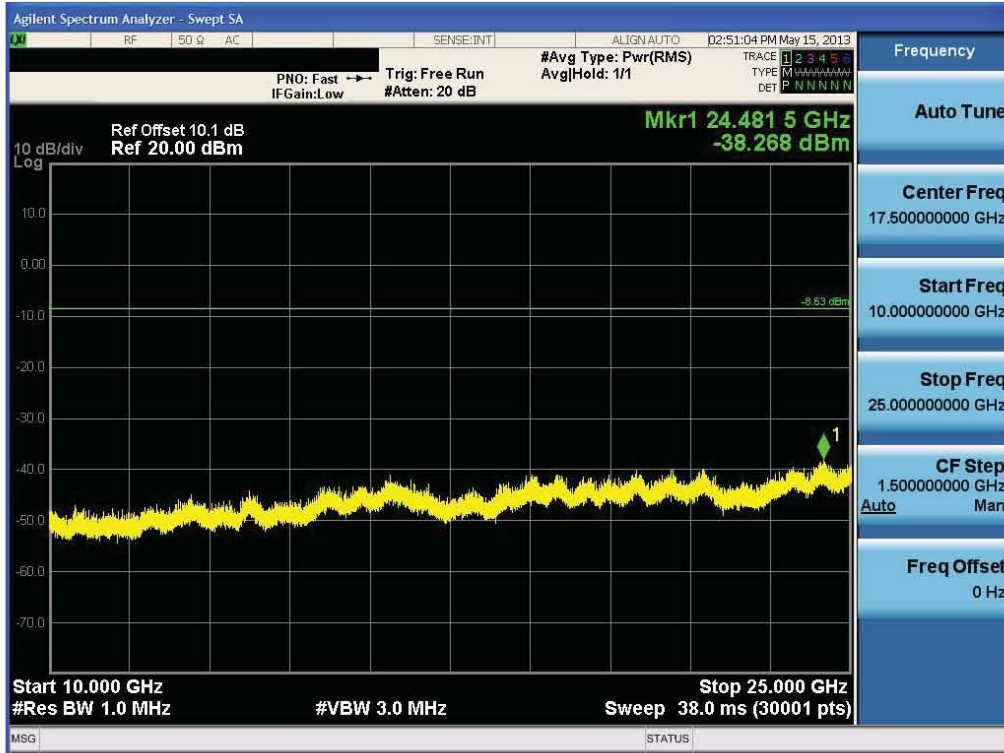


Test Plots (8DPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (High-CH)

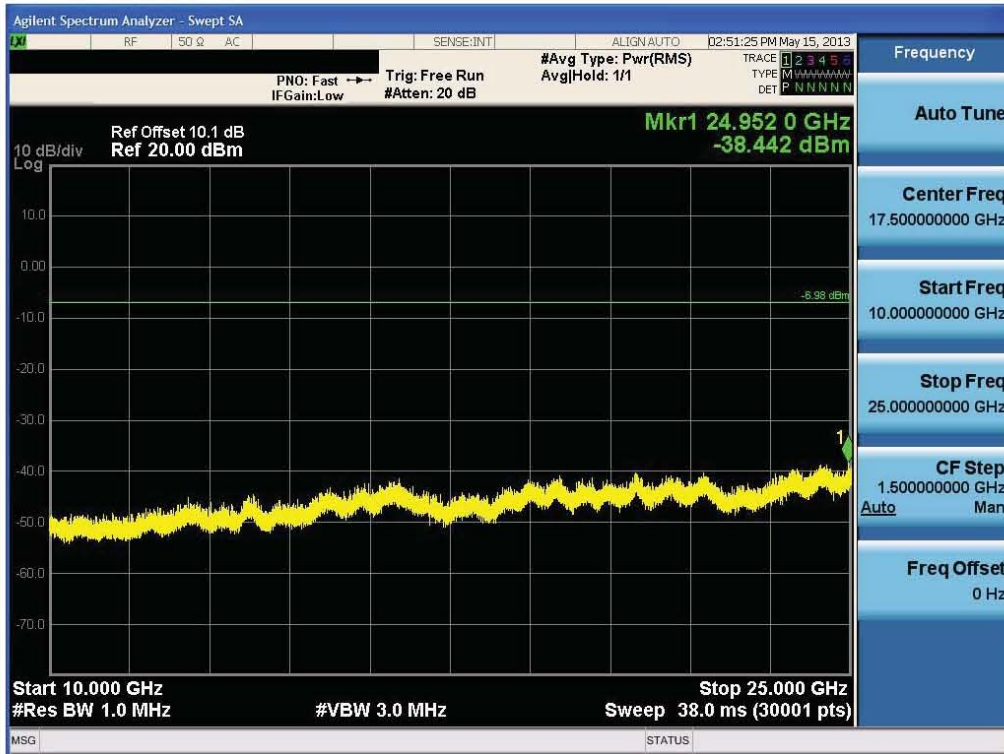


FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WiFi802.11 a/b/g/n(2.4/5GHz)/NFC		FCC ID: ZNFE989

Test Plots ( $\pi/4$ DQPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Low-CH)



Test Plots ( $\pi/4$ DQPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
Spurious Emission (Mid-CH)



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Test Plots ( $\pi/4$ DQPSK) - 10 GHz - 25 GHz (RBW:1 MHz, VBW: 3 MHz)  
 Spurious Emission (High-CH)



FCC PT.15.247 TEST REPORT		FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
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**8.6.2 RADIATED SPURIOUS EMISSIONS**

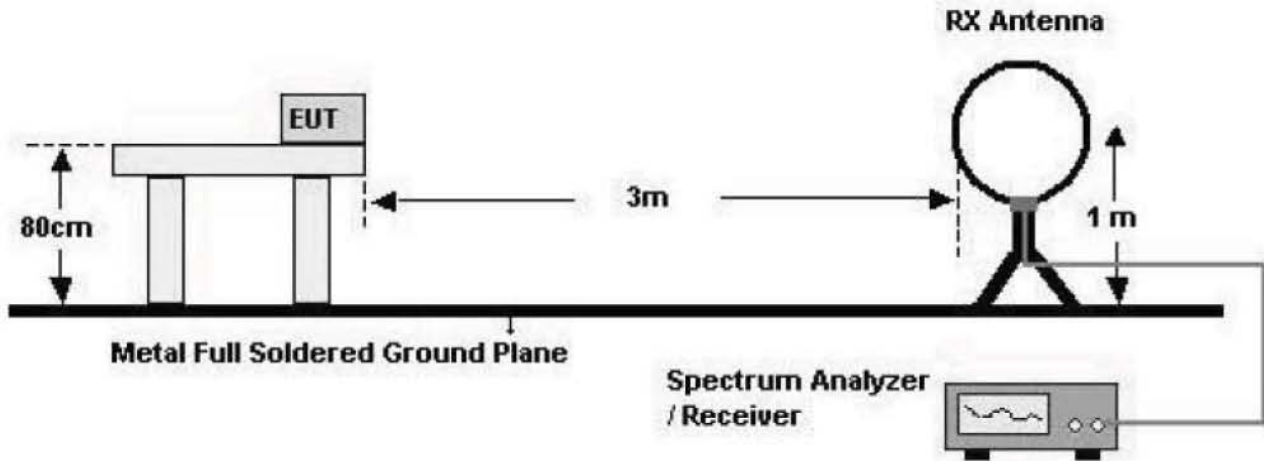
**LIMIT : §15.247(d), §15.205, §15.209**

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.

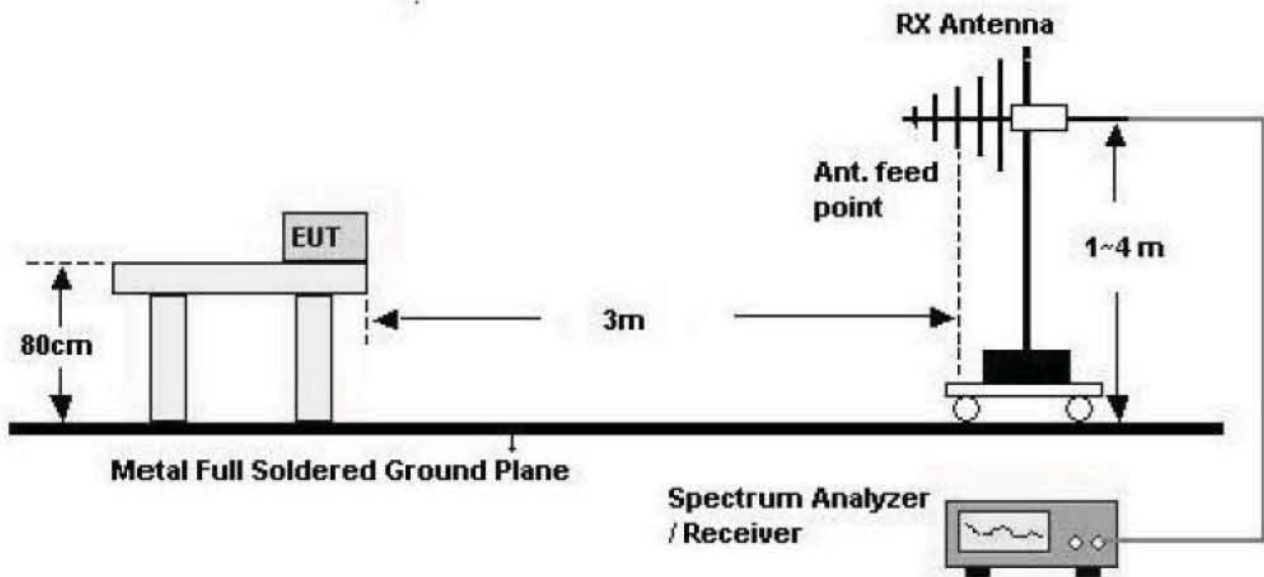
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

### Test Configuration

Below 30 MHz

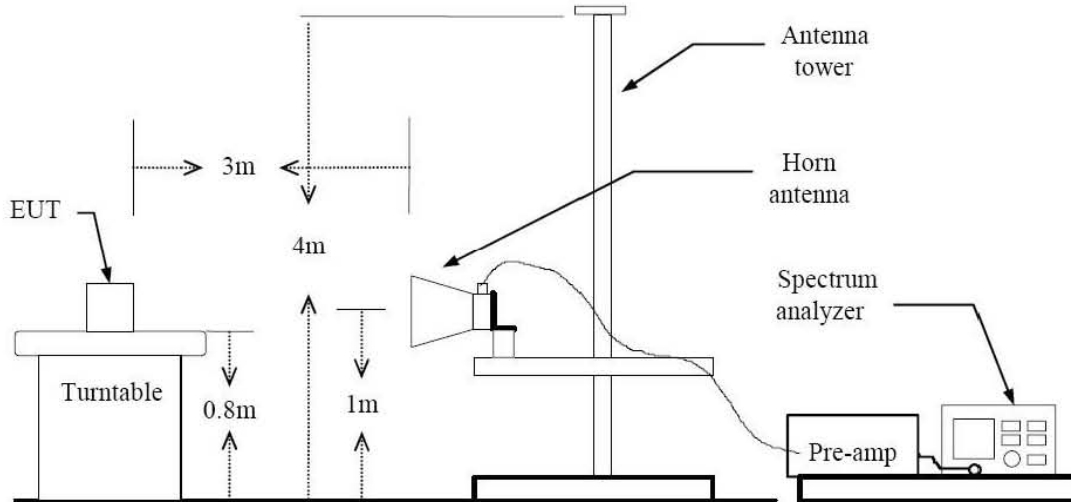


30 MHz - 1 GHz





## 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  $\tau$  = pulse width in seconds.

FCC PT.15.247 TEST REPORT	FCC CERTIFICATION REPORT		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
Test Report No. HCTR1306FR02	Date of Issue: June 05, 2013	EUT Type: GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	FCC ID: ZNFE989

**TEST RESULTS**

**9 kHz – 30MHz**

**Operation Mode:** Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dB $\mu$ V	dB /m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ 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 (dB $\mu$ V) + 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 $\mu$ V	dB /m	dB	(H/V)	dB $\mu$ V/m	dB $\mu$ 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.

**Above 1 GHz**

**Operation Mode: CH Low(GFSK)**

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	51.54	-0.84	V	0	50.70	74	23.30	PK
4804	37.90	-0.84	V	-24.76	12.30	54	41.70	AV
7206	52.10	9.15	V	0	61.25	74	12.75	PK
7206	41.69	9.15	V	-24.76	26.08	54	27.92	AV
4804	52.19	-0.84	H	0	51.35	74	22.65	PK
4804	37.76	-0.84	H	-24.76	12.16	54	41.84	AV
7206	52.66	9.15	H	0	61.81	74	12.19	PK
7206	42.99	9.15	H	-24.76	27.38	54	26.62	AV

**Operation Mode: CH Low(8DPSK)**

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	51.78	-0.84	V	0	50.94	74	23.06	PK
4804	37.82	-0.84	V	-24.76	12.22	54	41.78	AV
7206	50.17	9.15	V	0	59.32	74	14.68	PK
7206	36.30	9.15	V	-24.76	20.69	54	33.31	AV
4804	51.82	-0.84	H	0	50.98	74	23.02	PK
4804	37.71	-0.84	H	-24.76	12.11	54	41.89	AV
7206	50.49	9.15	H	0	59.64	74	14.36	PK
7206	37.47	9.15	H	-24.76	21.86	54	32.14	AV

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

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4804	51.63	-0.84	V	0	50.79	74	23.21	PK
4804	37.74	-0.84	V	-24.76	12.14	54	41.86	AV
7206	49.93	9.15	V	0	59.08	74	14.92	PK
7206	36.36	9.15	V	-24.76	20.75	54	33.25	AV
4804	51.96	-0.84	H	0	51.12	74	22.88	PK
4804	37.81	-0.84	H	-24.76	12.21	54	41.79	AV
7206	50.46	9.15	H	0	59.61	74	14.39	PK
7206	36.87	9.15	H	-24.76	21.26	54	32.74	AV

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

**Notes:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction Factor
- Spectrum setting:
  - Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz  $\geq 1/\tau$  Hz, where  $\tau$  = pulse width in seconds.  
 We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
  - Time to cycle through all channels=  $\Delta t = \tau$  [ms] x 79 channels = 228.468 ms, where  $\tau$  = pulse width
  - $100 \text{ ms} / \Delta t$  [ms] =  $H \rightarrow$  Round up to next highest integer,  $H' = 1$
  - Worst Case Dwell Time =  $\tau$  [ms] x  $H' = 2.892$  ms
  - Duty Cycle Correction =  $20 \log (\text{Worst Case Dwell Time} / 100\text{ms})$  dB = -30.776 dB
- Duty Cycle Correction Factor (AFH mode – minimum channel number case - 20 channels)
  - Time to cycle through all channels=  $\Delta t = \tau$  [ms] x 20 channels = 57.84 ms, where  $\tau$  = pulse width
  - $100 \text{ ms} / \Delta t$  [ms] =  $H \rightarrow$  Round up to next highest integer,  $H' = 2$
  - Worst Case Dwell Time =  $\tau$  [ms] x  $H' = 5.784$  ms
  - Duty Cycle Correction (AFH) =  $20 \log (\text{Worst Case Dwell Time} / 100\text{ms})$  dB = -24.7554 dB
  - DCCF = -24.76 dB

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- f. We applied DCCF in the test result which hopping channel number is 20.
- 8. We have done Normal Mode and EDR Mode test.
- 9. This test is performed with hopping off.
- 10. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

<b>FCC PT.15.247 TEST REPORT</b>	<b>FCC CERTIFICATION REPORT</b>		<a href="http://www.hct.co.kr">www.hct.co.kr</a>
<b>Test Report No.</b> HCTR1306FR02	<b>Date of Issue:</b> June 05, 2013	<b>EUT Type:</b> GSM/WCDMA Phone with Bluetooth4.0, WIFI802.11 a/b/g/n(2.4/5GHz)/NFC	<b>FCC ID:</b> ZNFE989

**Operation Mode: CH Mid(GFSK)**

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	50.66	-0.37	V	0	50.29	74	23.71	PK
4882	36.71	-0.37	V	-24.76	11.58	54	42.42	AV
7323	51.20	8.72	V	0	59.92	74	14.09	PK
7323	40.35	8.72	V	-24.76	24.31	54	29.69	AV
4882	50.93	-0.37	H	0	50.56	74	23.44	PK
4882	36.85	-0.37	H	-24.76	11.72	54	42.28	AV
7323	50.97	8.72	H	0	59.69	74	14.32	PK
7323	38.29	8.72	H	-24.76	22.25	54	31.75	AV

**Operation Mode: CH Mid(8DPSK)**

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	50.64	-0.37	V	0	50.27	74	23.73	PK
4882	36.80	-0.37	V	-24.76	11.67	54	42.33	AV
7323	49.67	8.72	V	0	58.39	74	15.62	PK
7323	37.01	8.72	V	-24.76	20.97	54	33.03	AV
4882	50.81	-0.37	H	0	50.44	74	23.56	PK
4882	36.71	-0.37	H	-24.76	11.58	54	42.42	AV
7323	49.61	8.72	H	0	58.33	74	15.68	PK
7323	35.80	8.72	H	-24.76	19.76	54	34.24	AV

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

Frequency [MHz]	Reading dBuV	※A.F+CL-AMP GAIN [dB]	ANT. POL [HV]	Duty Cycle Correction [dB]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Detect
4882	50.71	-0.37	V	0	50.34	74	23.66	PK
4882	36.72	-0.37	V	-24.76	11.59	54	42.41	AV
7323	49.96	8.72	V	0	58.68	74	15.33	PK
7323	36.29	8.72	V	-24.76	20.25	54	33.75	AV
4882	50.84	-0.37	H	0	50.47	74	23.53	PK
4882	36.84	-0.37	H	-24.76	11.71	54	42.29	AV
7323	49.56	8.72	H	0	58.28	74	15.73	PK
7323	35.86	8.72	H	-24.76	19.82	54	34.18	AV

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

**Notes:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- Total = Reading Value + Antenna Factor + Cable Loss - Amp Gain + Duty Cycle Correction Factor
- Spectrum setting:
  - Peak Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 MHz.
  - AV Setting 1 GHz – 26 GHz, RBW = 1 MHz, VBW = 1 kHz  $\geq 1/\tau$  Hz, where  $\tau$  = pulse width in seconds.  
 We performed using a reduced video BW method was done with the analyzer in linear mode.
- FYI : Duty Cycle Correction Factor (79 channel hopping)
  - Time to cycle through all channels=  $\Delta t = \tau$  [ms] x 79 channels = 228.468 ms, where  $\tau$  = pulse width
  - $100 \text{ ms} / \Delta t$  [ms] =  $H \rightarrow$  Round up to next highest integer,  $H' = 1$
  - Worst Case Dwell Time =  $\tau$  [ms] x  $H' = 2.892$  ms
  - Duty Cycle Correction =  $20\log(\text{Worst Case Dwell Time} / 100\text{ms})$  dB = -30.776 dB
- Duty Cycle Correction Factor(AFH mode – minimum channel number case - 20 channels)
  - Time to cycle through all channels=  $\Delta t = \tau$  [ms] x 20 channels = 57.84 ms, where  $\tau$  = pulse width
  - $100 \text{ ms} / \Delta t$  [ms] =  $H \rightarrow$  Round up to next highest integer,  $H' = 2$
  - Worst Case Dwell Time =  $\tau$  [ms] x  $H' = 5.784$  ms
  - Duty Cycle Correction(AFH) =  $20\log(\text{Worst Case Dwell Time} / 100\text{ms})$  dB = -24.7554 dB

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