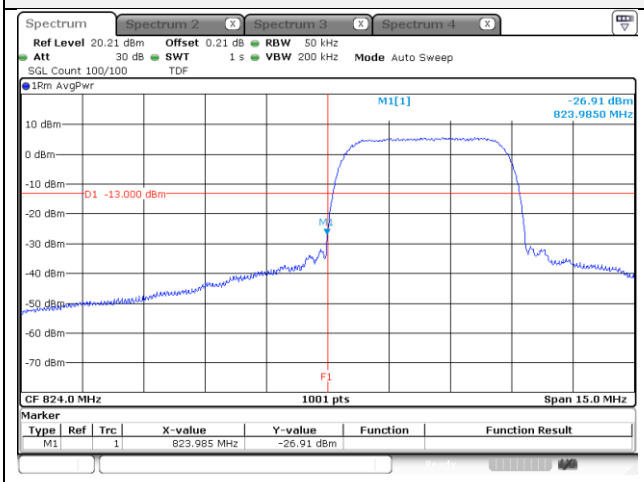
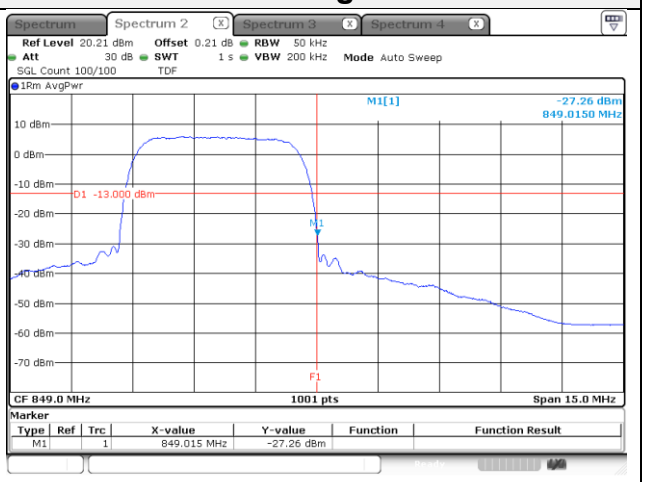
Test mode: WCDMA850

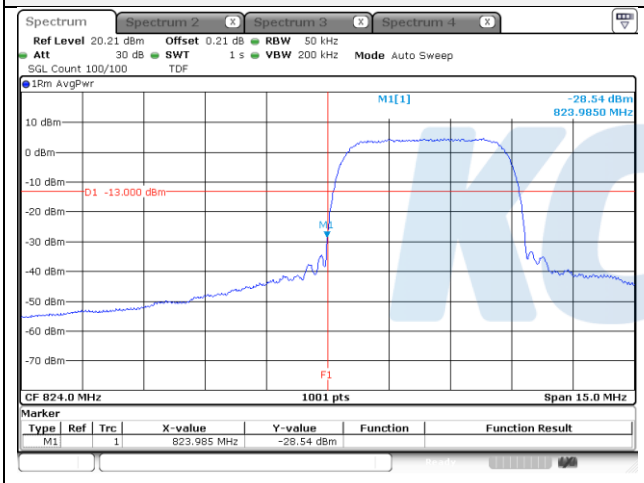
RMC / Low ch.



RMC / High ch.

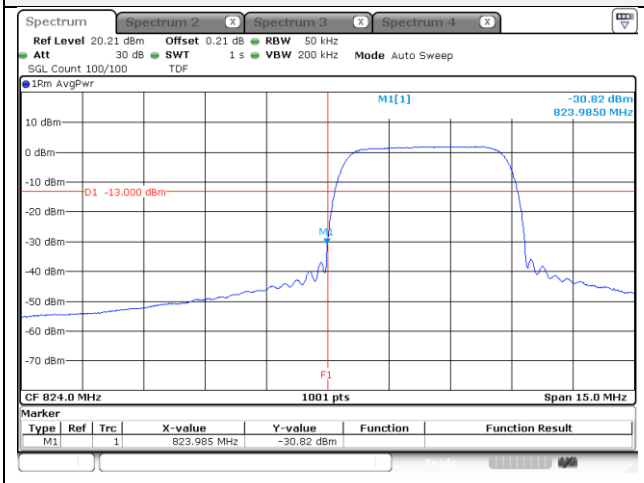


HSDPA / Low ch.

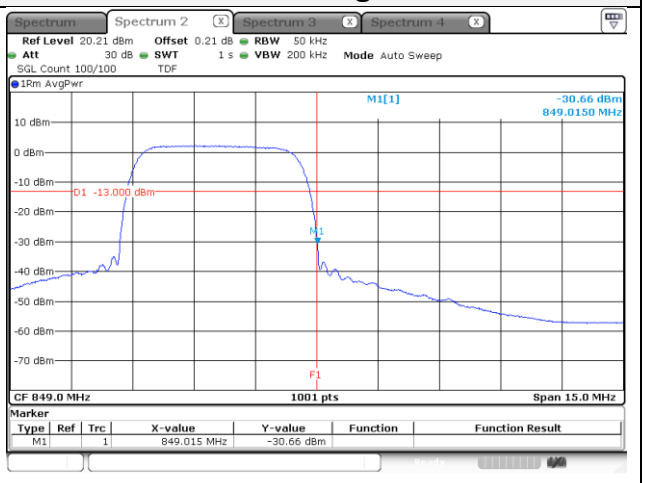


HSDPA / High ch.

HSUPA / Low ch.

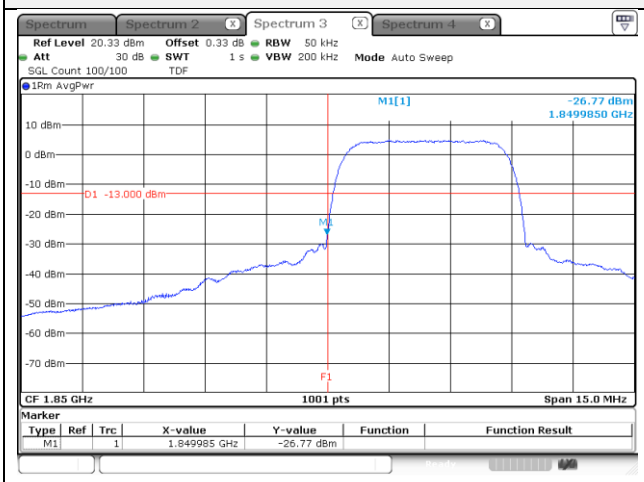


HSUPA / High ch.

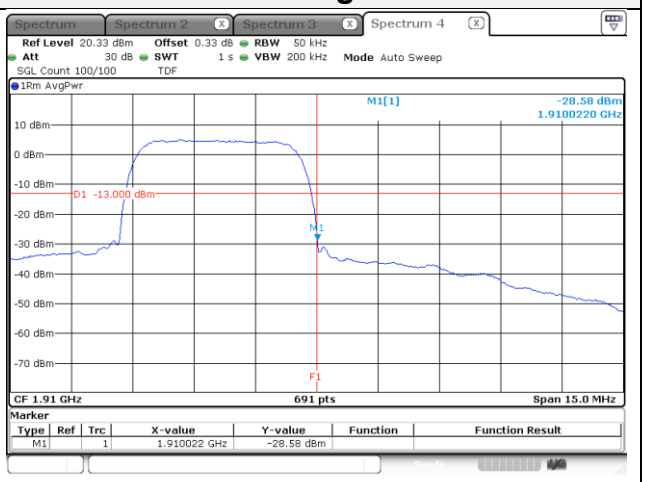


Test mode: WCDMA1900

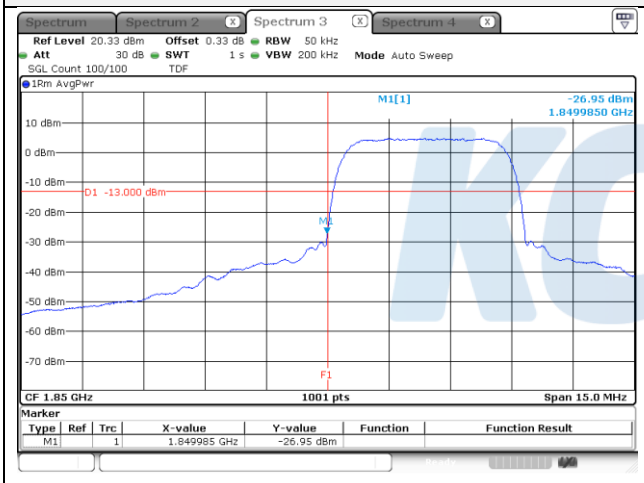
RMC / Low ch.



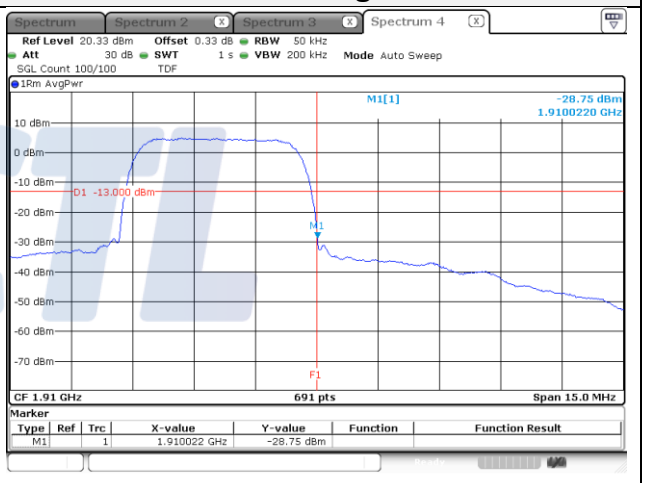
RMC / High ch.



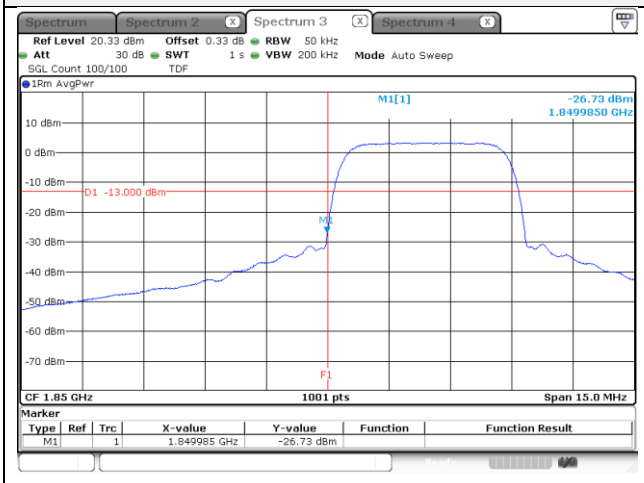
HSDPA / Low ch.



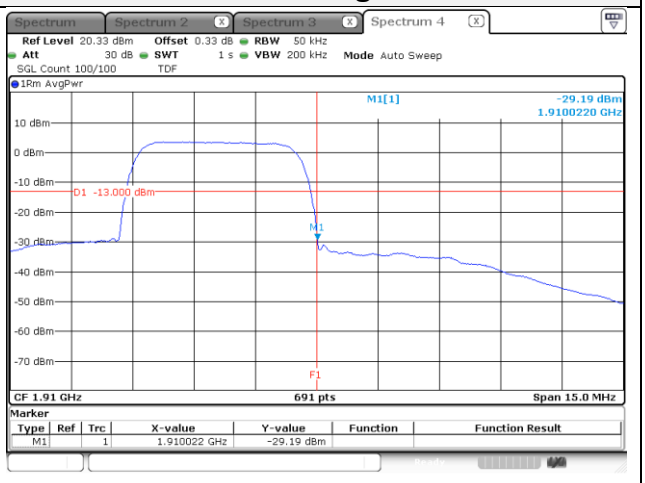
HSDPA / High ch.



HSUPA / Low ch.

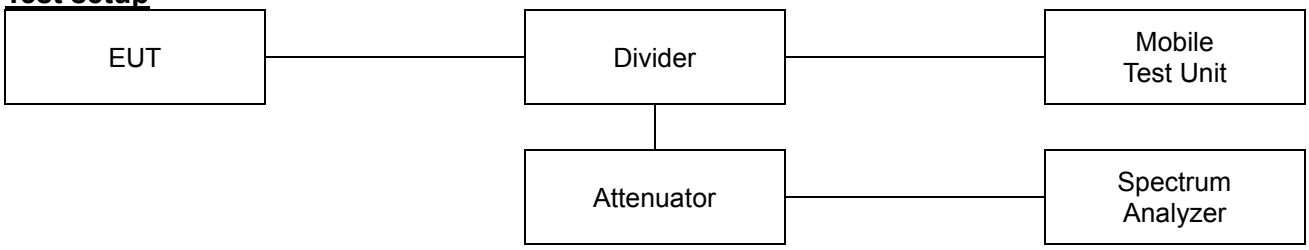


HSUPA / High ch.



7.5. Peak to Average Power Ratio (PAPR)

Test setup



Limit

According to §22.913(d), §24.232(d), the peak-to-average ratio(PAR) of the transmission must not exceed 13 ㏈.

Test procedure

971168 D01 v03r01 - Section 5.7.2
ANSI 63.26-2015 – Section 5.2.3.4

Test settings

5.2.3.4 Measurement of peak power in a broadband noise-like signal using CCDF

1) Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth
2) Set the number of counts to a value that stabilizes the measured CCDF curve.
3) Set the measurement interval as follows:
   a) For continuous transmissions, set to the greater of [10 x (number of points in sweep) x (transmission symbol period)] or 1 ㎳.
   b) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement internal to a time that is less than or equal to the burst duration.
   c) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4) Record the maximum PAPR level associated with a probability of 0.1%

5.2.6 Peak-to-average power ratio

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as P_{PK}.
Use one of the applicable procedure presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{AG}. Determine the P.A.P.R from:

$$PAPR(dB) = P_{PK}(dBm \text{ or } dBW) - P_{AG}(dBm \text{ or } dBW)$$

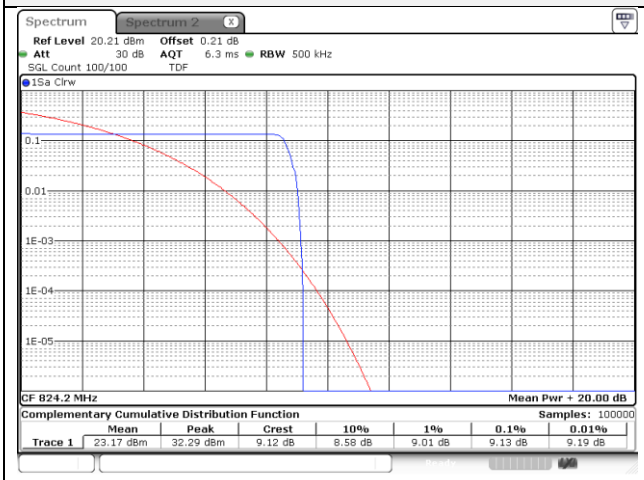
Notes:

1. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function. Please refer to the page 8.

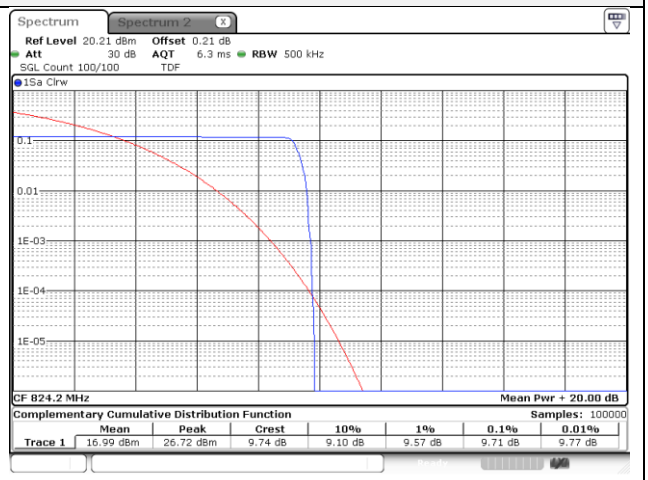
Test results

Test mode: GSM850

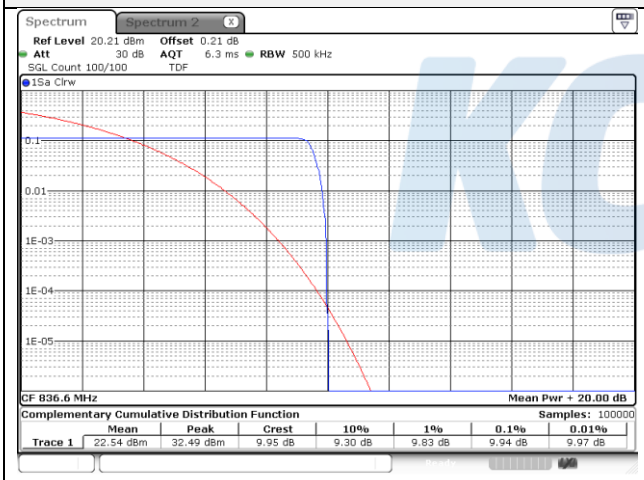
GPRS / Low ch.



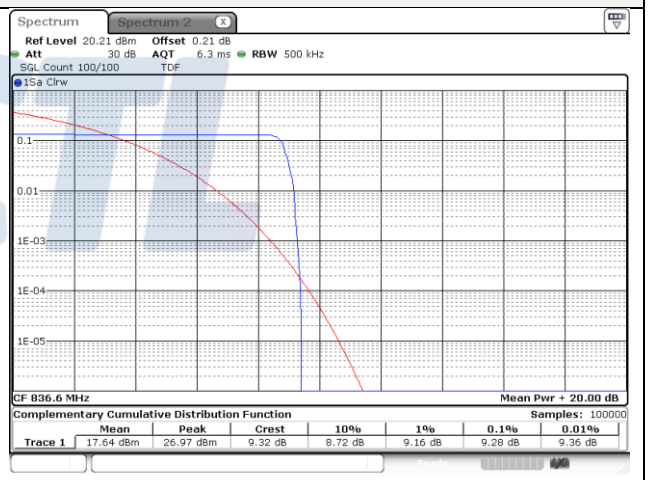
EDGE / Low ch.



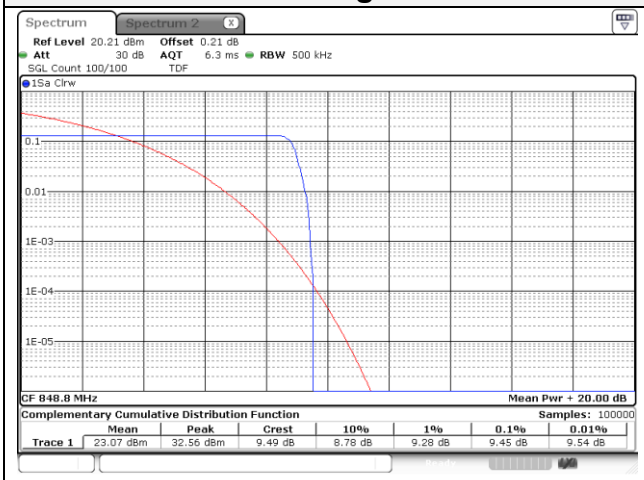
GPRS / Mid ch.



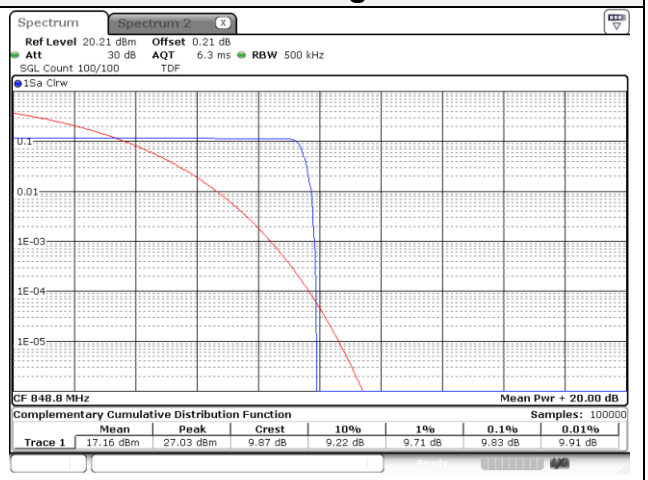
EDGE / Mid ch.



GPRS / High ch.

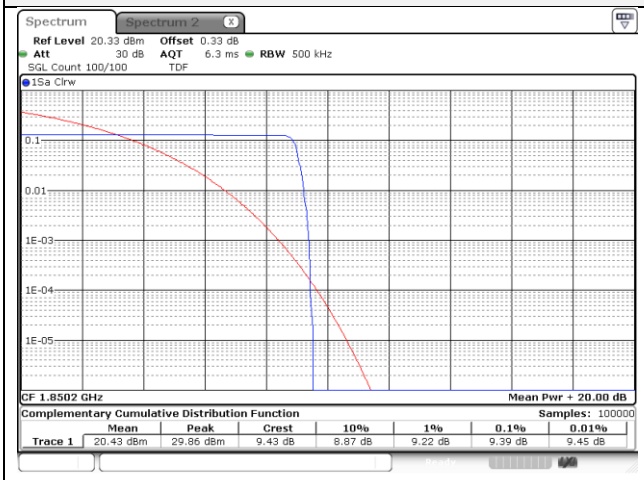


EDGE / High ch.

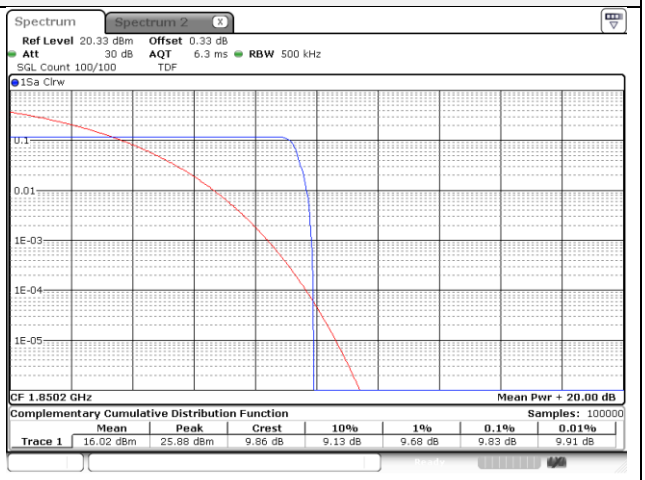


Test mode: GSM1900

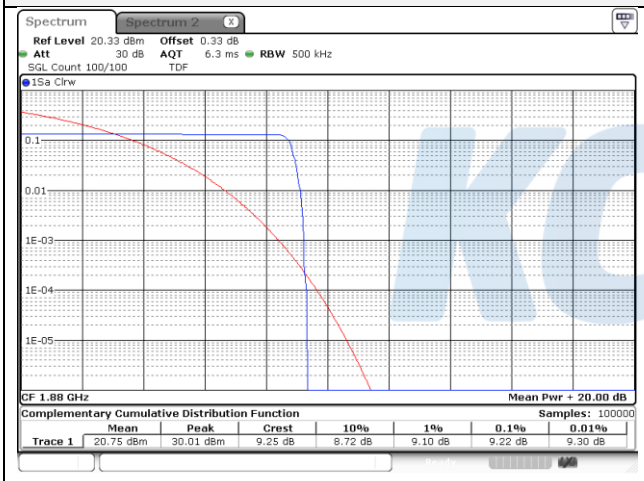
GPRS / Low ch.



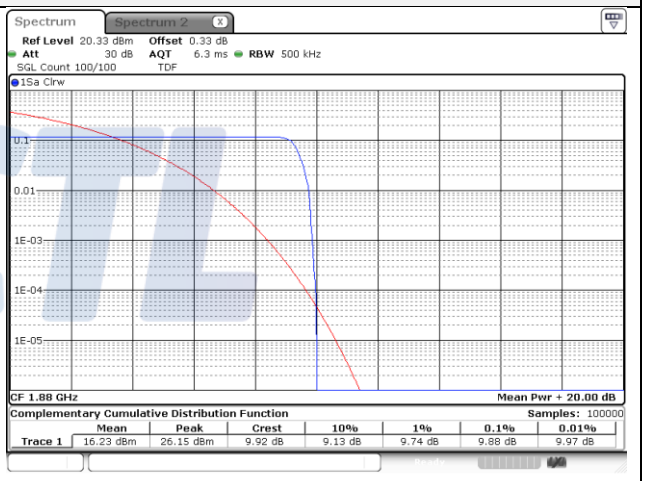
EDGE / Low ch.



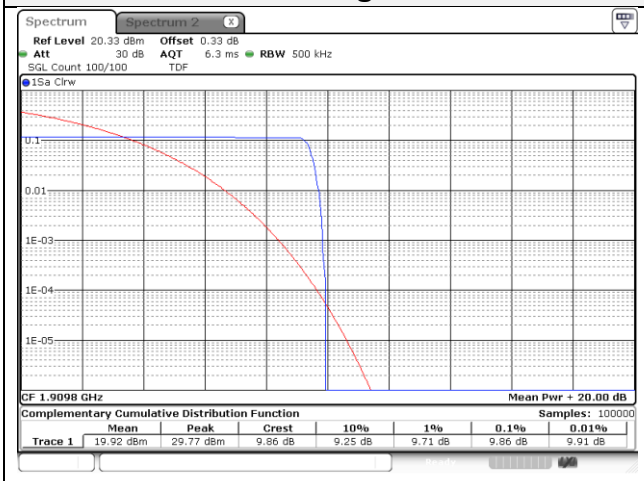
GPRS / Mid ch.



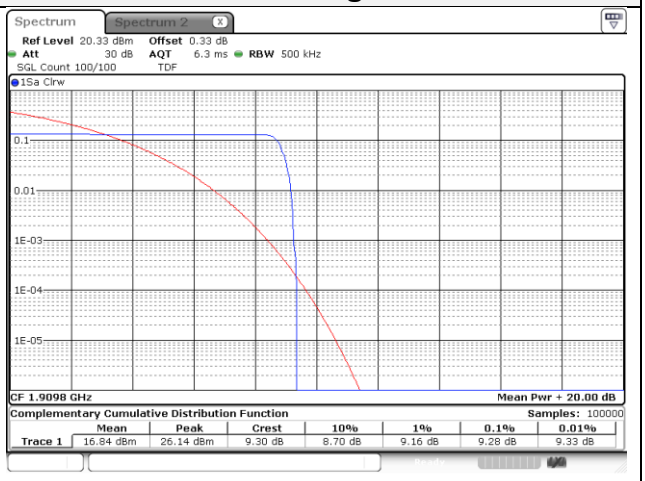
EDGE / Mid ch.



GPRS / High ch.

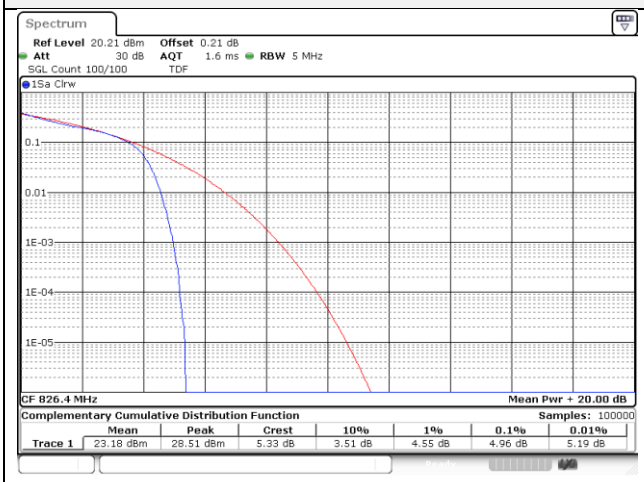


EDGE / High ch.

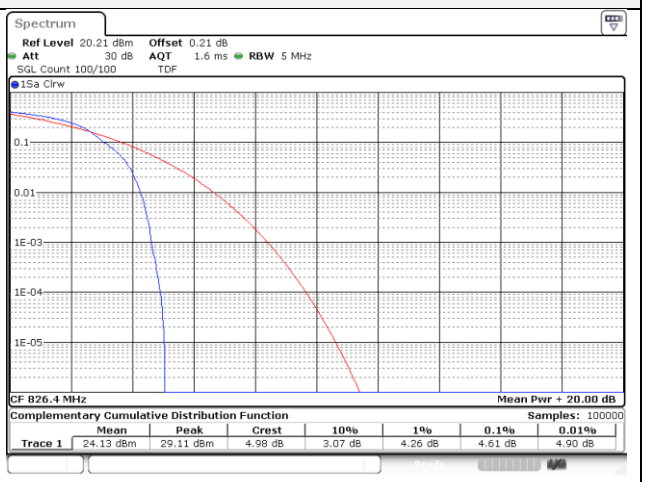


Test mode: WCDMA850

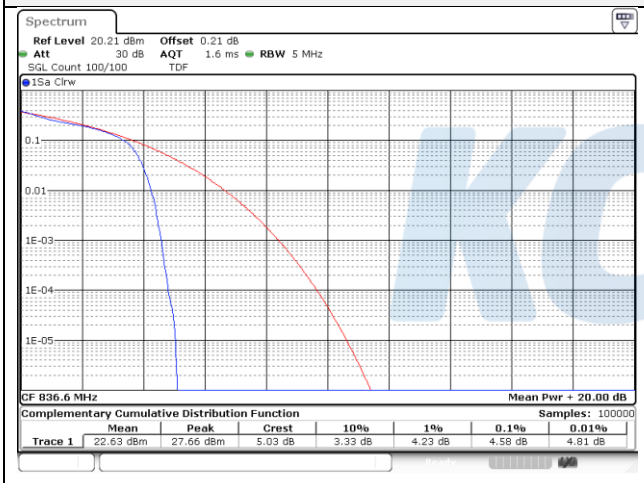
RMC / Low ch.



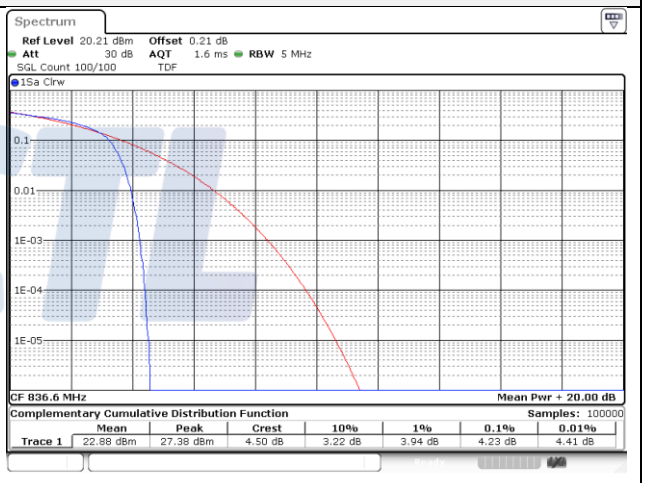
HSDPA / Low ch.



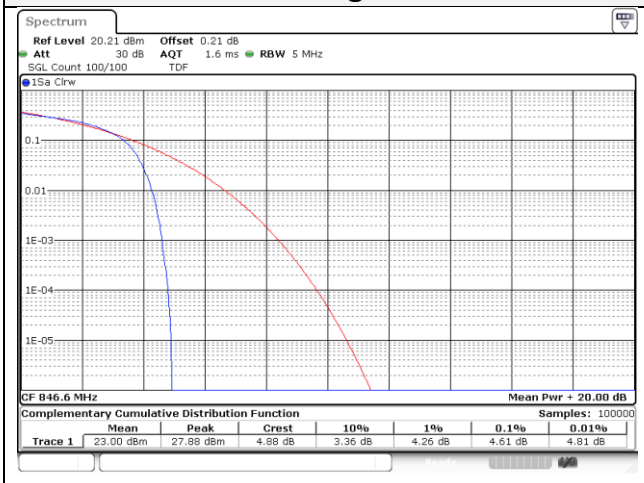
RMC / Mid ch.



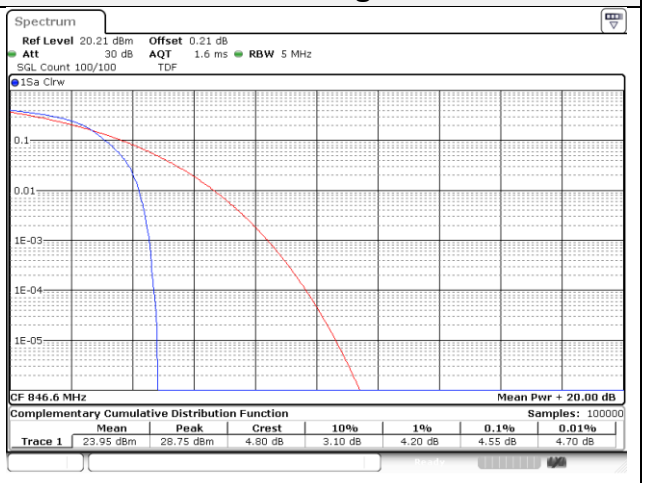
HSDPA / Mid ch.



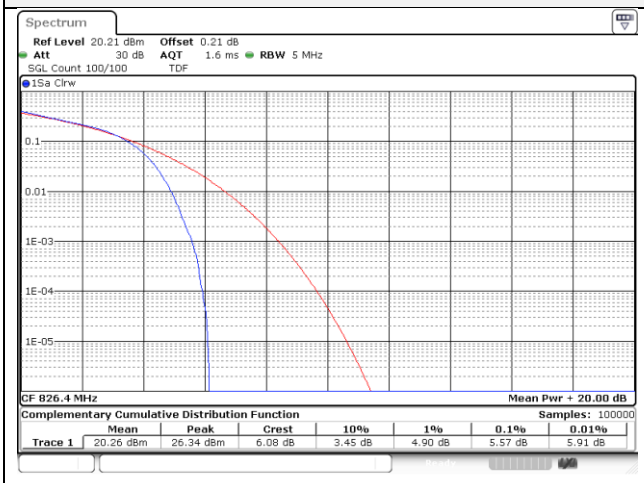
RMC / High ch.



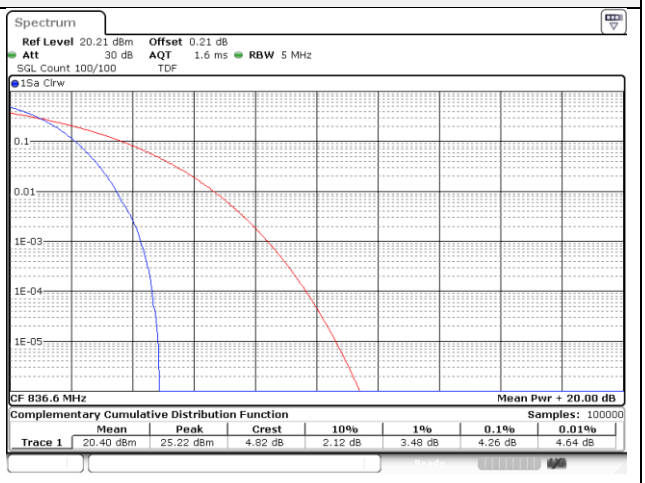
HSDPA / High ch.



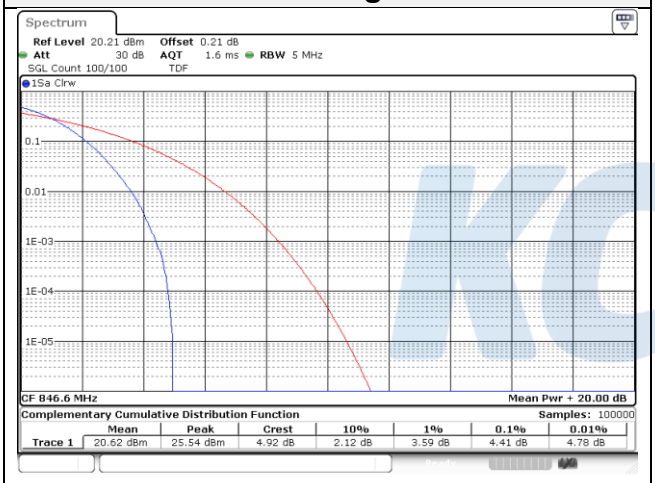
HSUPA / Low ch.



HSUPA / Mid ch.



HSUPA / High ch.



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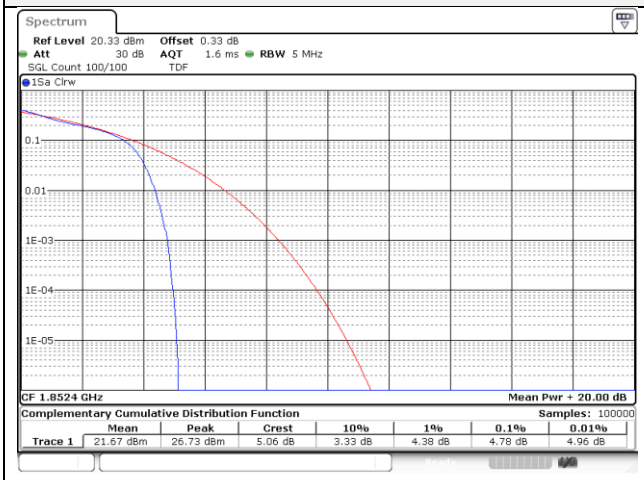
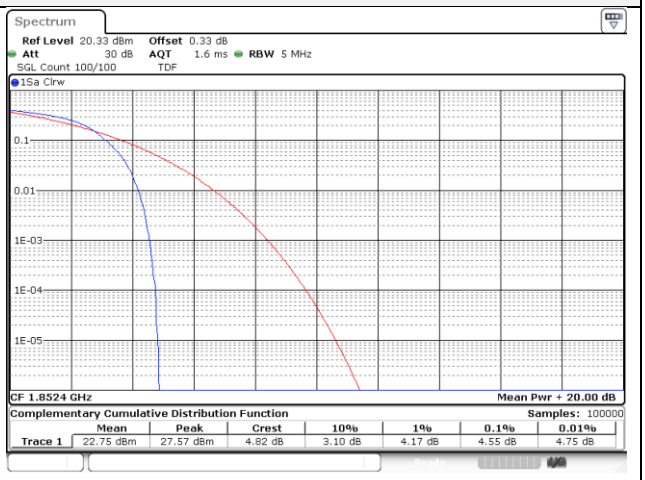
Test mode: WCDMA1900

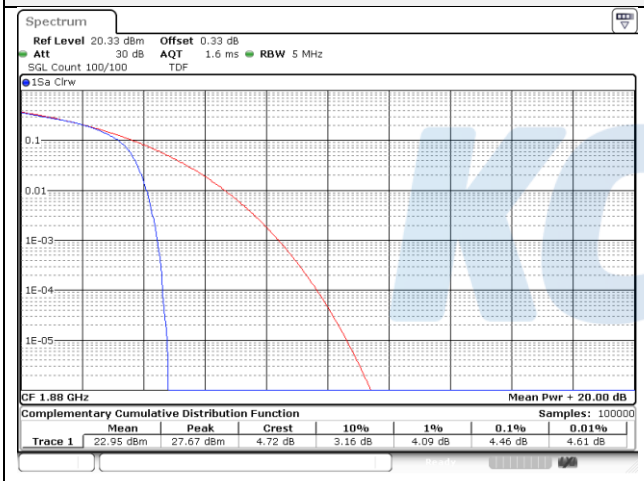
RMC / Low ch.



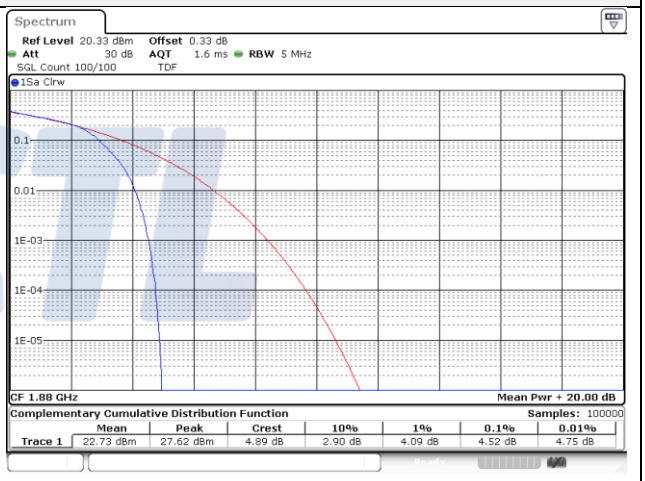
HSDPA / Low ch.



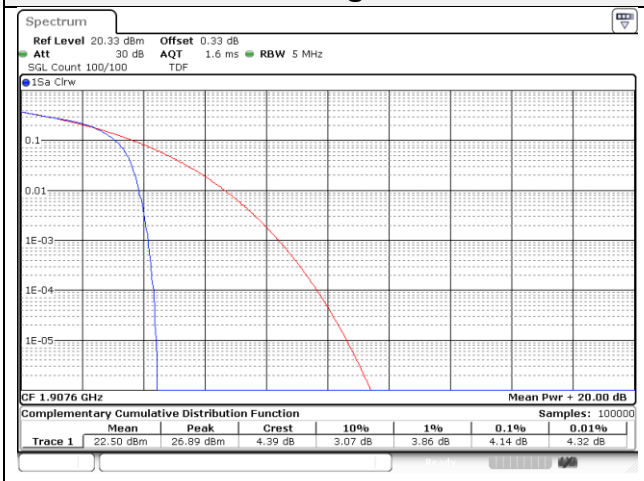
RMC / Mid ch.



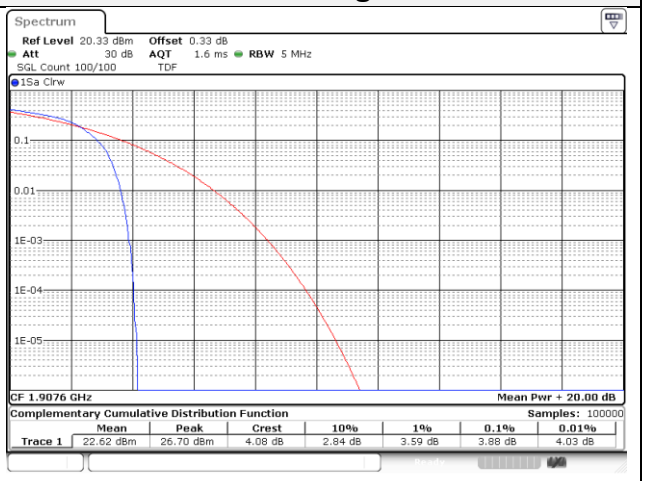
HSDPA / Mid ch.

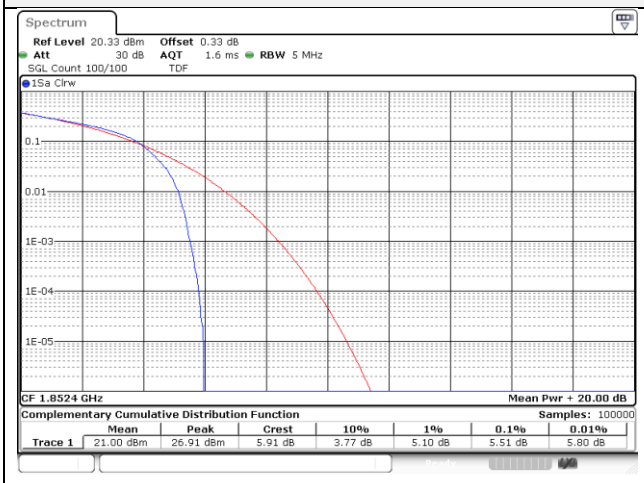
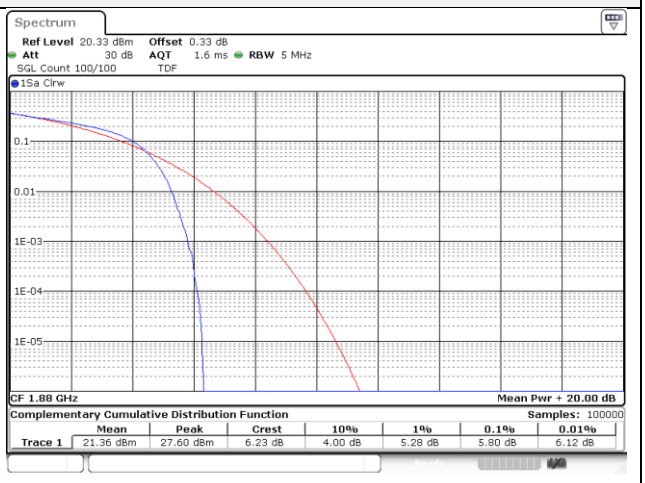
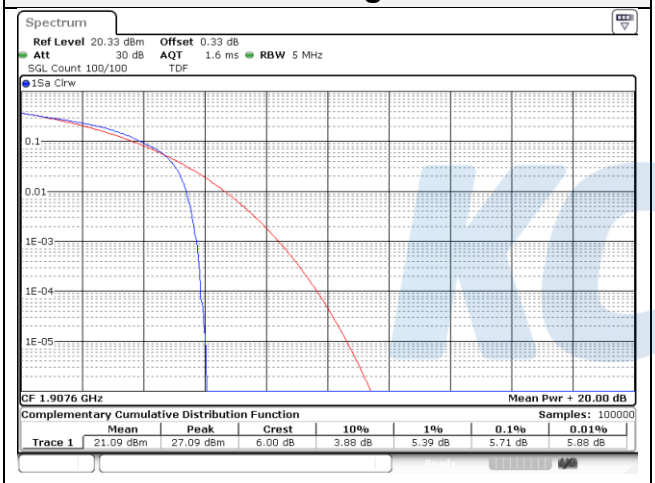


RMC / High ch.



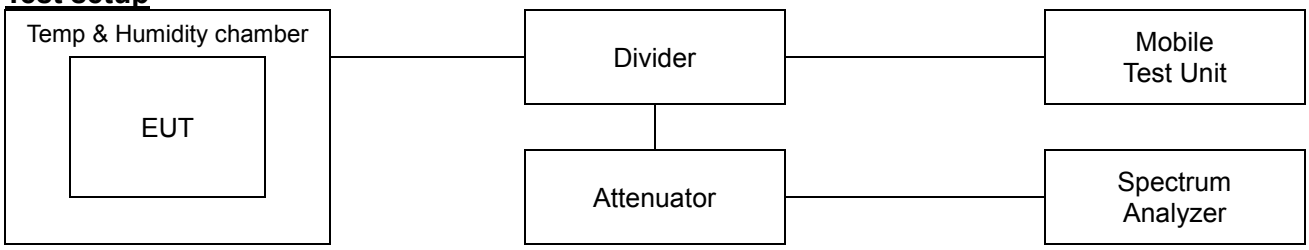
HSDPA / High ch.



HSUPA / Low ch.	HSUPA / Mid ch.
	
HSUPA / High ch.	
	Blank

7.6. Frequency stability

Test setup



Limit

According to §2.1055(a),

The frequency stability shall be measured with variation of ambient temperature as follows:

1) From -30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
2) From -20° to + 50° centigrade for equipment to be licensed for use in the maritime services under part 80 of this chapter, except for class A, B, and S emergency position indicating radiobeacons (EPIRBS), and equipment to be licensed for use above 952 ㎒ at operational fixed stations in all services, stations in the local television transmission service and point-to-point microwave radio service under part 21 of this chapter, equipment licensed for use aboard aircraft in the aviation services under part 87 of this chapter, and equipment authorized for use in the family radio service under part 95 of this chapter.
3) From 0° to + 50° centigrade for equipment to be licensed for use in the radio broadcast Services under part 73 of this chapter.

According to §2.1055(d),

The frequency stability shall be measured with variation of primary supply Voltage as follows:

1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacturer.
3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

According to §22.355,

The carrier frequency of each transmitter in the public mobile services must be maintained within the tolerances given in Table of this section.

For mobile devices operating in the 824 to 849 ㎒ band at a power level than or equal to 3 Watts, the limit specified in Table C-1 is ±2.5 ppm.

According to §24.235,

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test procedure

ANSI 63.26-2015 – Section 5.6

Test settings

1) The carrier frequency of the transmitter is measured at room temperature. (20°C to provide a reference
2) The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3) Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each Temperature level.

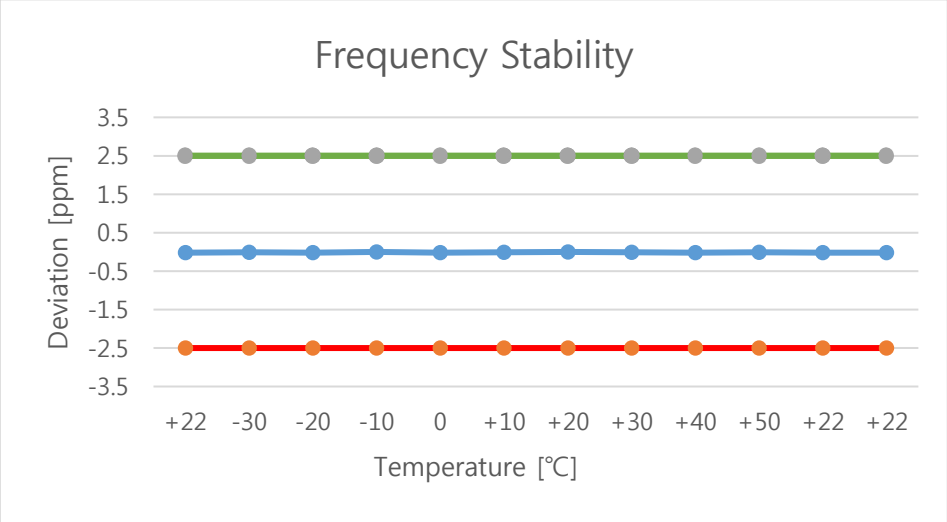
Notes:

1. All path loss of frequency range was investigated and compensated to spectrum analyzer as TDF function. Please refer to the page 8.

Test results

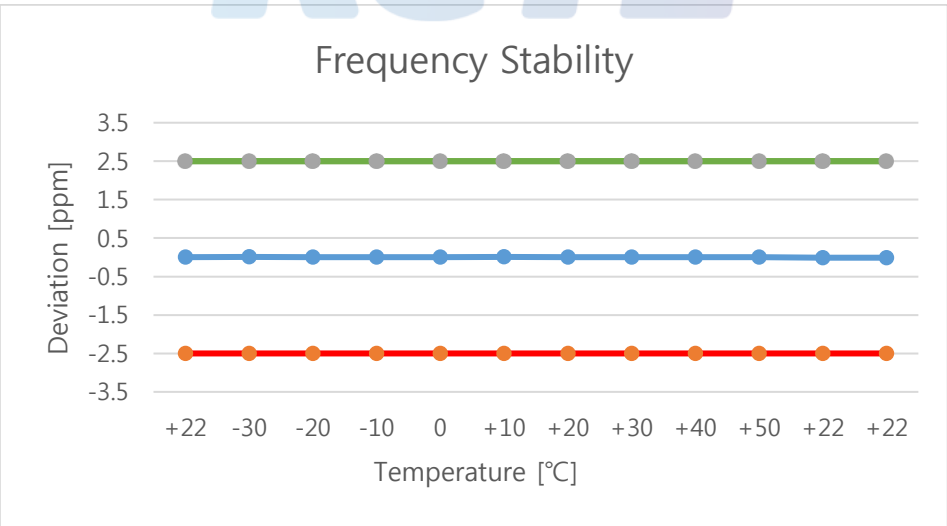
Test mode : GSM850
Frequency (㎐) : 836 600 000
Channel : 190
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+22(Ref)	836 599 986	-14.46	0.0	-0.000 002
		-30	836 599 989	-10.65	0.0	-0.000 001
		-20	836 599 982	-17.60	0.0	-0.000 002
		-10	836 599 997	-3.29	0.0	0.000 000
		0	836 599 985	-15.24	0.0	-0.000 002
		+10	836 599 996	-4.33	0.0	-0.000 001
		+20	836 599 998	-2.10	0.0	0.000 000
		+30	836 599 993	-6.62	0.0	-0.000 001
		+40	836 599 984	-15.98	0.0	-0.000 002
		+50	836 599 994	-5.65	0.0	-0.000 001
115%	4.43	+22(Ref)	836 599 984	-16.05	0.0	-0.000 002
End point	3.55	+22(Ref)	836 599 985	-15.37	0.0	-0.000 002



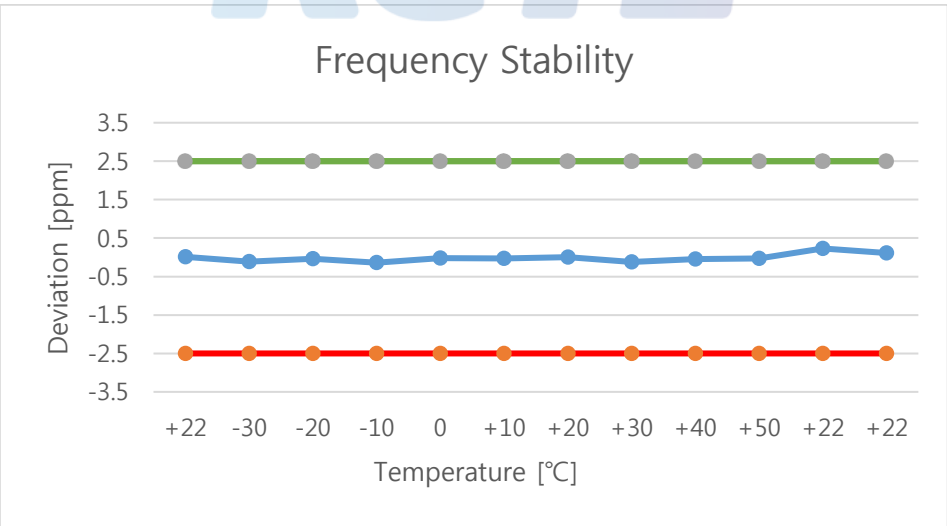
Test mode : GSM1900
Frequency (㎐) : 1 880 000 000
Channel : 661
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+22(Ref)	1 879 999 996	-3.81	0.0	0.000 000
		-30	1 880 000 018	17.72	0.0	0.000 001
		-20	1 879 999 993	-7.39	0.0	0.000 000
		-10	1 879 999 995	-5.23	0.0	0.000 000
		0	1 879 999 998	-1.87	0.0	0.000 000
		+10	1 880 000 019	19.37	0.0	0.000 001
		+20	1 880 000 003	3.20	0.0	0.000 000
		+30	1 880 000 007	6.97	0.0	0.000 000
		+40	1 879 999 993	-7.07	0.0	0.000 000
		+50	1 879 999 999	-0.52	0.0	0.000 000
115%	4.43	+22(Ref)	1 879 999 987	-12.75	0.0	-0.000 001
End point	3.55	+22(Ref)	1 879 999 987	-13.04	0.0	-0.000 001



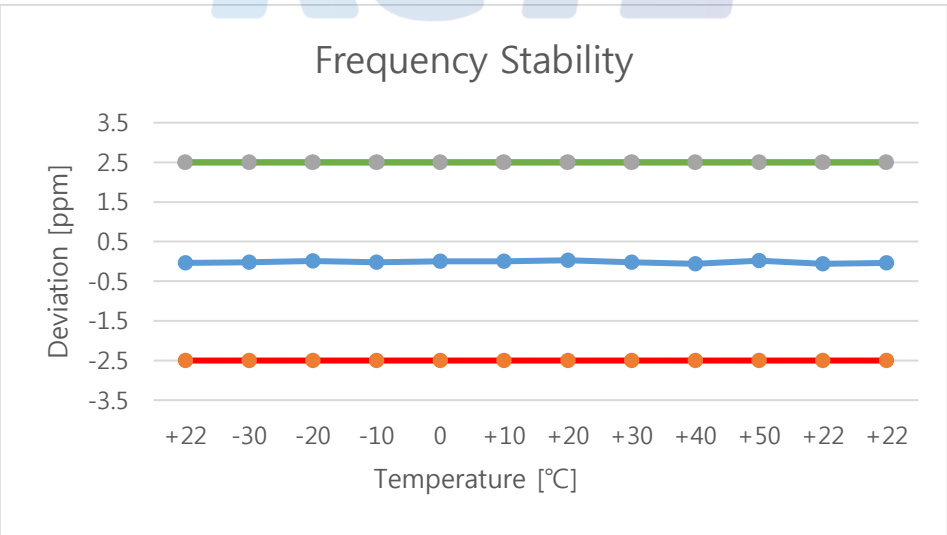
Test mode : WCDMA850
Frequency (㎐) : 836 600 000
Channel : 4183
Deviation limit : ±0.00025% or 2.5ppm

Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+22(Ref)	836 600 006	5.70	0.0	0.000 001
		-30	836 599 908	-92.20	-0.1	-0.000 011
		-20	836 599 969	-31.00	0.0	-0.000 004
		-10	836 599 880	-120.20	-0.1	-0.000 014
		0	836 599 983	-17.10	0.0	-0.000 002
		+10	836 599 977	-22.90	0.0	-0.000 003
		+20	836 599 997	-3.10	0.0	0.000 000
		+30	836 599 902	-97.80	-0.1	-0.000 012
		+40	836 599 958	-42.40	-0.1	-0.000 005
		+50	836 599 976	-24.20	0.0	-0.000 003
115%	4.43	+22(Ref)	836 600 193	192.60	0.2	0.000 023
End point	3.55	+22(Ref)	836 600 094	93.60	0.1	0.000 011



Test mode : WCDMA1900
Frequency (㎐) : 1 880 000 000
Channel : 9400
Deviation limit : ±0.00025% or 2.5ppm

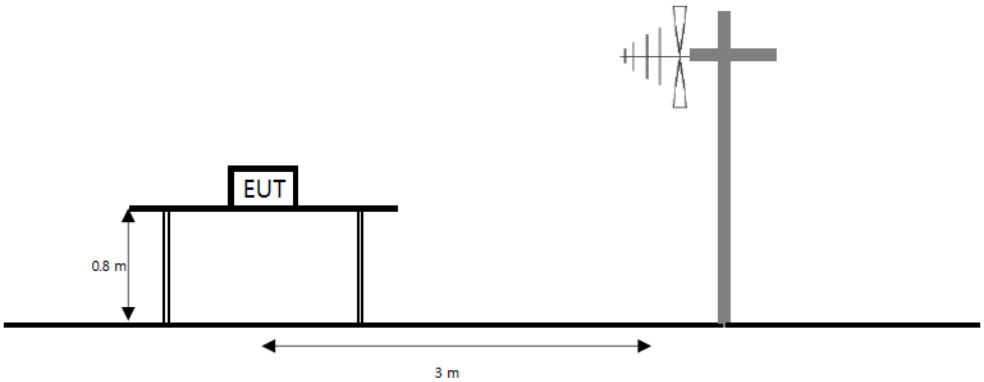
Voltage (%)	Power (V)	Temp. (°C)	Frequency (㎐)	Frequency error (㎐)	Deviation	
					(ppm)	(%)
100%	3.85	+22(Ref)	1 879 999 934	-66.10	0.0	-0.000 004
		-30	1 879 999 966	-33.90	0.0	-0.000 002
		-20	1 880 000 021	20.60	0.0	0.000 001
		-10	1 879 999 961	-38.80	0.0	-0.000 002
		0	1 880 000 000	-0.10	0.0	0.000 000
		+10	1 879 999 991	-9.00	0.0	0.000 000
		+20	1 880 000 058	58.40	0.0	0.000 003
		+30	1 879 999 961	-39.40	0.0	-0.000 002
		+40	1 879 999 889	-110.60	-0.1	-0.000 006
		+50	1 880 000 039	38.60	0.0	0.000 002
115%	4.43	+22(Ref)	1 879 999 881	-119.10	-0.1	-0.000 006
End point	3.55	+22(Ref)	1 879 999 920	-80.30	0.0	-0.000 004



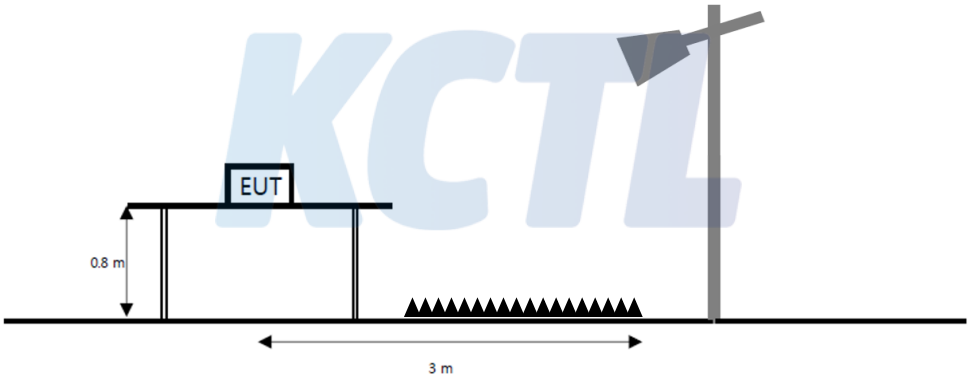
7.7. Radiated Power (ERP/EIRP)

Test setup

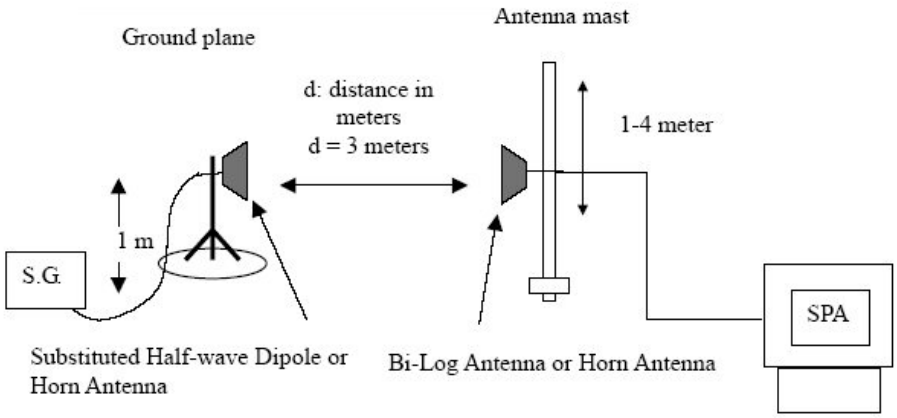
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §22.913(a)(5), the ERP of transmitters in the cellular radiotelephone service must not exceed the limits in this section. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to §24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

Test procedure

971168 D01 v03r01 - Section 5.2.2
ANSI 63.26-2015 – Section 5.2.4.4.1
ANSI/TIA-603-E-2016 - Section 2.2.17

Test settings

1) RBW = 1 % to 5 % of the OBW.
2) VBW ≥ 3 × RBW.
3) SPAN = 2 × to 3 × the OBW.
4) Number of measurement points in sweep ≥ 2 × span / RBW.
5) Sweep time :
   1) Auto couple, or
   2) ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6) Detector = RMS
7) If the EUT can be configured to transmit continuously, then set the trigger to free run.
8) If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full -power transmissions).
9) Trace mode = trace averaging (RMS) over 100 sweeps.
10) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
11) Allow trace to fully stabilize.

Notes:

1. On a test site, the EUT shall be placed at 80 cm height on a turn table, and in the position close To normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to Correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the Level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
   The power is calculated by the following formula;
   Pd(㏈m) = Pg(㏈m) – Cable loss (㏈) + Antenna gain (㏈)
   Note. Pd is the dipole equivalent power and Pg is the generator output power into the substitution antenna.
7. The test antenna shall be raised and lowered through the specified range of height to ensure that The maximum signal is received.
8. The input signal to the substitution antenna shall be adjusted to the level that produces a level Detected by the measuring corrected for the change of input attenuator setting of the measuring Receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for Any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna Orientated for horizontal polarization.

Test results

Test mode: GSM850

Mode	Channel	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBi]	[dB]	[dB m]	[dB m]	[W]
GPRS	128	824.2	H	-0.50	3.80	31.58	27.28	0.535
	190	836.6	H	-0.50	3.84	32.56	28.22	0.664
	251	848.8	H	-0.50	3.87	32.25	27.88	0.614
EDGE	128	824.2	H	-0.50	3.80	27.72	23.42	0.220
	190	836.6	H	-0.50	3.84	29.28	24.94	0.312
	251	848.8	H	-0.50	3.87	28.57	24.20	0.263

Test mode: GSM1900

Mode	Channel	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dB m]	[dB m]	[W]
GPRS	512	1 850.2	V	8.70	5.72	22.84	25.82	0.382
	661	1 880.0	V	8.70	5.80	22.27	25.17	0.329
	810	1 909.8	V	8.70	5.88	21.03	23.85	0.243
EDGE	512	1 850.2	V	8.70	5.72	22.65	25.63	0.366
	661	1 880.0	V	8.70	5.80	22.23	25.13	0.326
	810	1 909.8	V	8.70	5.88	19.95	22.77	0.189

Note.
1. E.R.P & E.I.R.P(dBm) = Substitute Level(dB) + Antenna gain(dBi) - C.L(Cable loss) (dB)

Test mode: WCDMA850

Mode	Channel	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	ERP	
		[㎒]	[V/H]	[dBi]	[dB]	[dB ㎷]	[dB ㎷]	[W]
RMC	4132	826.40	H	-0.50	3.80	23.82	19.52	0.090
	4183	836.60	H	-0.50	3.84	24.76	20.42	0.110
	4233	846.60	H	-0.50	3.87	24.62	20.25	0.106
HSDPA	4132	826.40	H	-0.50	3.80	24.15	19.85	0.097
	4183	836.60	H	-0.50	3.84	24.80	20.46	0.111
	4233	846.60	H	-0.50	3.87	24.72	20.35	0.108
HSUPA	4132	826.40	H	-0.50	3.80	22.57	18.27	0.067
	4183	836.60	H	-0.50	3.84	23.42	19.08	0.081
	4233	846.60	H	-0.50	3.87	23.53	19.16	0.082

Test mode: WCDMA1900

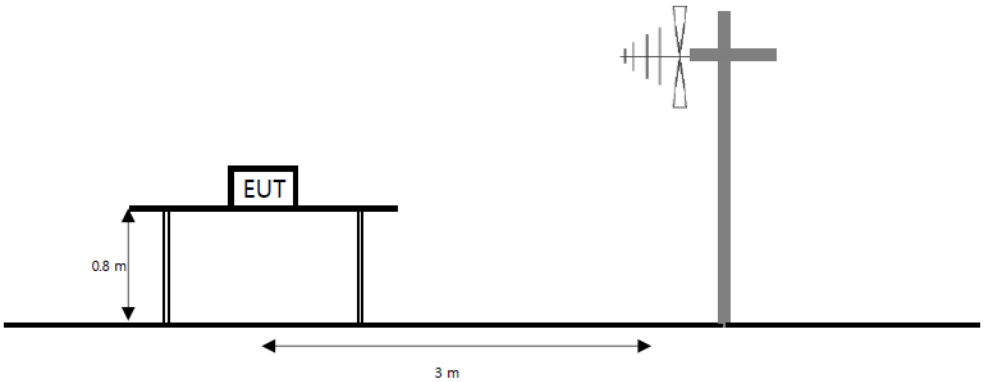
Mode	Channel	Frequency	Pol.	Antenna Gain	C.L	Substitute Level	EIRP	
		[㎒]	[V/H]	[dBi]	[dB]	[dB ㎷]	[dB ㎷]	[W]
RMC	9262	1 852.4	V	8.70	5.72	17.65	20.63	0.116
	9400	1 880.0	V	8.70	5.80	17.06	19.96	0.099
	9538	1 907.6	V	8.70	5.88	16.23	19.05	0.080
HSDPA	9262	1 852.4	V	8.70	5.72	17.23	20.21	0.105
	9400	1 880.0	V	8.70	5.80	16.84	19.74	0.094
	9538	1 907.6	V	8.70	5.88	16.14	18.96	0.079
HSUPA	9262	1 852.4	V	8.70	5.72	16.84	19.82	0.096
	9400	1 880.0	V	8.70	5.80	16.44	19.34	0.086
	9538	1 907.6	V	8.70	5.88	15.73	18.55	0.072

Note.
1. E.R.P & E.I.R.P(㏈m) = Substitute Level(㏈) + Antenna gain(㏈i) - C.L(Cable loss) (㏈)

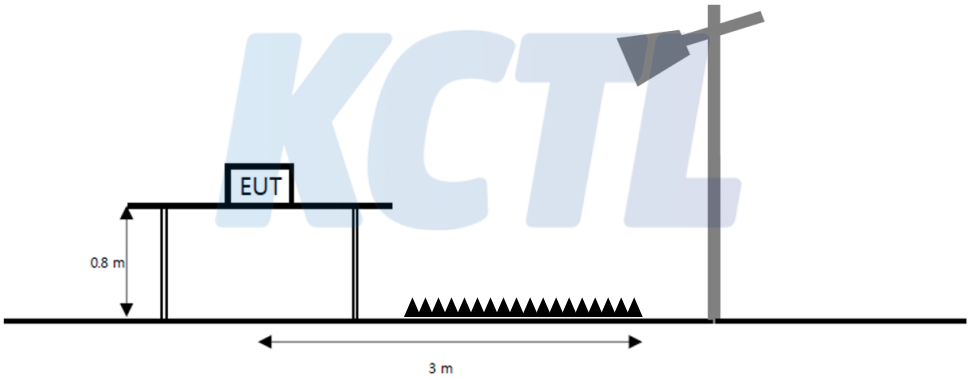
7.8. Radiated Spurious Emissions

Test setup

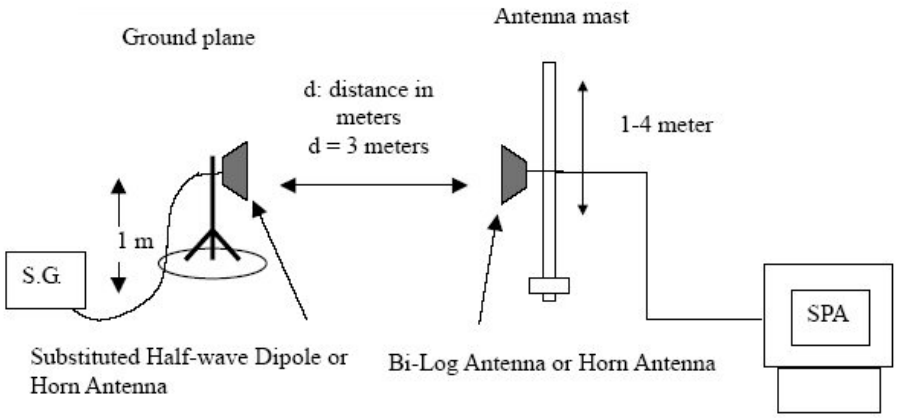
The diagram below shows the test setup that is utilized to make the measurements for emission from 30 ㎒ to 1 ㎓ emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 ㎓ to the tenth harmonic of the highest fundamental frequency or to 40 ㎓ emissions, whichever is lower.



The diagram below shows the test setup for substituted method.



Limit

According to §22.917(a), §24.238(a), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) ㏈.

Test procedure

971168 D01 v03r01 - Section 5.8
ANSI 63.26-2015 – Section 5.5
ANSI/TIA-603-E-2016 - Section 2.2.12

Test settings

1) RBW = 1 ㎑ for below 1 ㎓ and 1 ㎒ for above 1 ㎓.
2) VBW ≥ 3 × RBW.
3) Detector = RMS
4) Trace mode = Max hold
5) Sweep time = Auto couple
6) Number of sweep points ≥ 2 × span / RBW
7) Allow trace to fully stabilize.

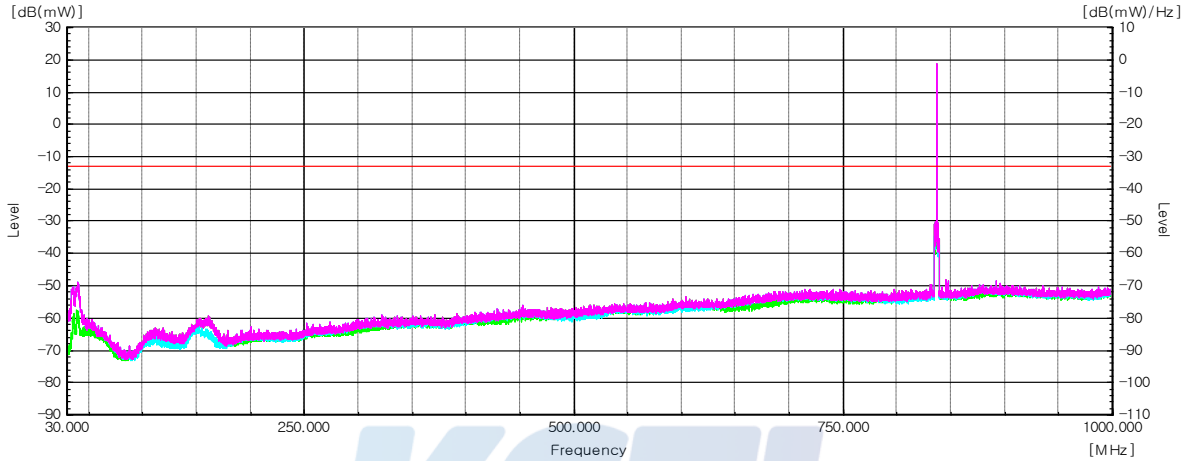
Notes:

1. On a test site, the EUT shall be placed at 80 cm height on a turn table, and in the position close To normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to Correspond to the fundamental frequency of the transmitter.
3. The turntable is rotated through 360°, and the receiving antenna scans in order to determine the Level of the maximized emission.
4. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
5. The maximum signal level detected by the measuring receiver shall be noted.
6. The EUT was replaced by half-wave dipole (1 ㎓ below) or horn antenna (1 ㎓ above) connected to a signal generator.
7. The test antenna shall be raised and lowered through the specified range of height to ensure that The maximum signal is received.
8. The input signal to the substitution antenna shall be adjusted to the level that produces a level Detected by the measuring corrected for the change of input attenuator setting of the measuring Receiver.
9. The input level to the substitution antenna shall be recorded as power level in ㏈m, corrected for Any change of input attenuator setting of the measuring receiver.
10. The measurement shall be repeated with the test antenna and the substitution antenna Orientated for horizontal polarization.

Test results (Below 1 000 ㎒) – Worst case

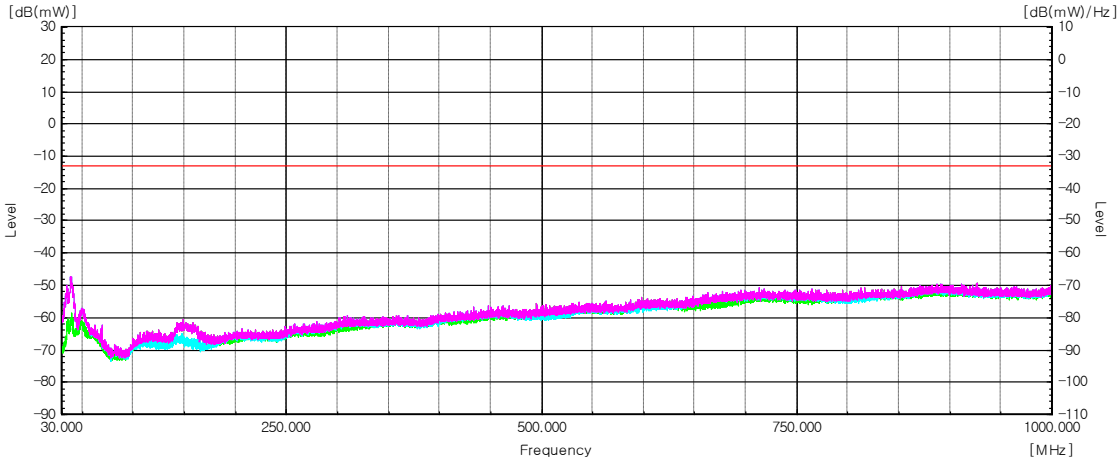
Test mode : GSM850
Frequency (㎒) : 836.6
Channel : 190

Horizontal/Vertical



Test mode : GSM1900
Frequency (㎒) : 1 850.2
Channel : 512

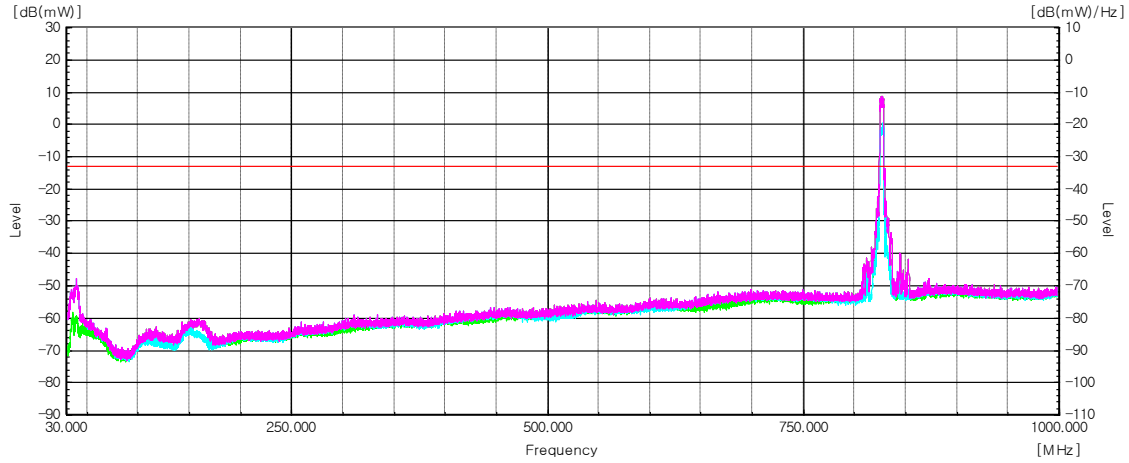
Horizontal/Vertical



Note.
1. No spurious emission were detected below 1 000 ㎒.

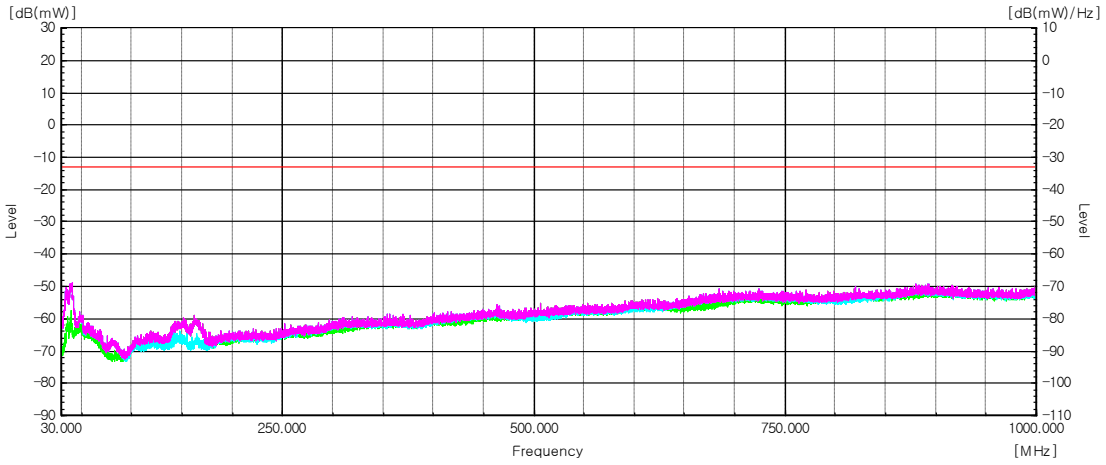
Test mode : WCDMA850
Frequency (㎒) : 836.6
Channel : 4183

Horizontal/Vertical



Test mode : WCDMA1900
Frequency (㎒) : 1 852.4
Channel : 9262

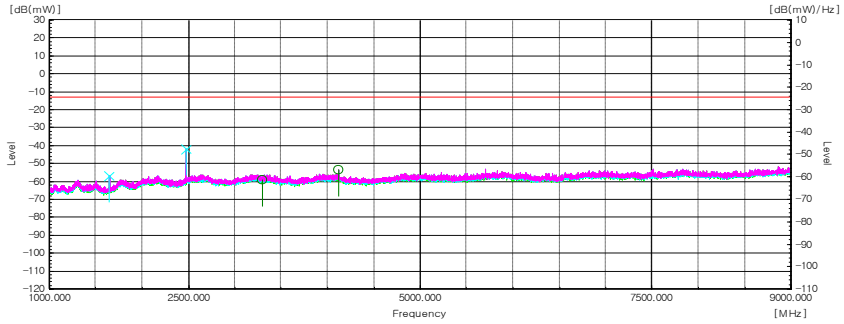
Horizontal/Vertical



Note.
1. No spurious emission were detected below 1 000 ㎒.

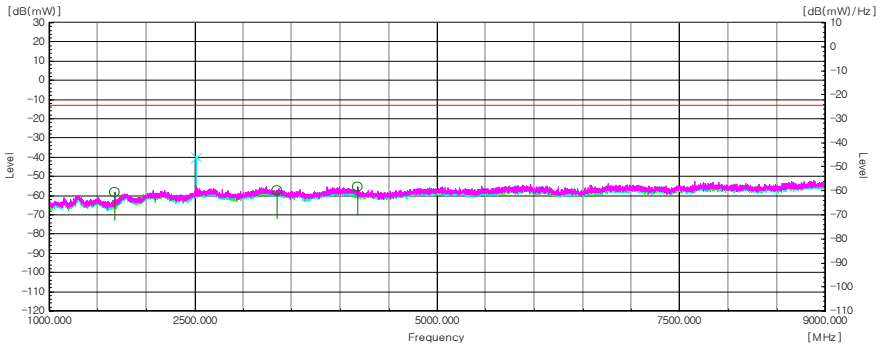
Test results (Above 1 000 ㎒)

Test mode : GSM850
Frequency(㎒) : 824.2
Channel : 128



Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	1 648.08	V	8.4	5.38	-59.92	-56.90	-13.00	43.90
	2 472.18	V	9.8	6.62	-44.98	-41.80	-13.00	28.80
	3 296.29	H	9.3	7.65	-60.65	-59.00	-13.00	46.00
	4 120.39	H	9.9	9.35	-54.25	-53.70	-13.00	40.70

Test mode : GSM850
Frequency(㎒) : 836.6
Channel : 190



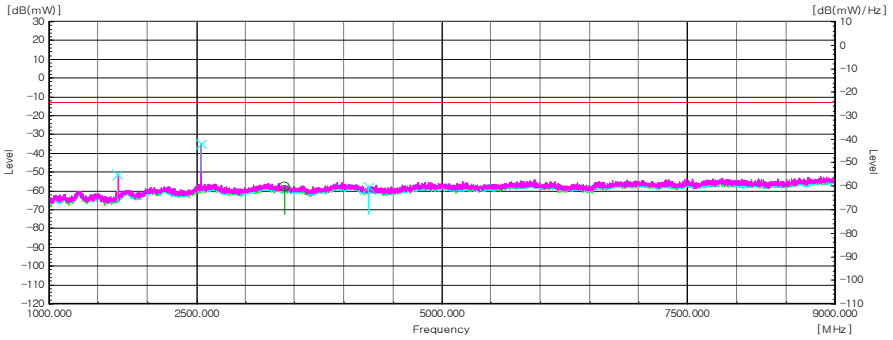
Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	1 673.08	H	8.5	5.45	-61.55	-58.50	-13.00	45.50
	2 510.19	V	9.8	6.74	-43.16	-40.10	-13.00	27.10
	3 346.29	H	9.3	7.78	-59.02	-57.50	-13.00	44.50
	4 182.40	H	10.1	9.35	-56.45	-55.70	-13.00	42.70

Note.
1. Limit Calculation(dBm)= 43 + 10log($P_{[Watts]}$) [dBc]

Test mode : GSM850

Frequency(㎒) : 848.8

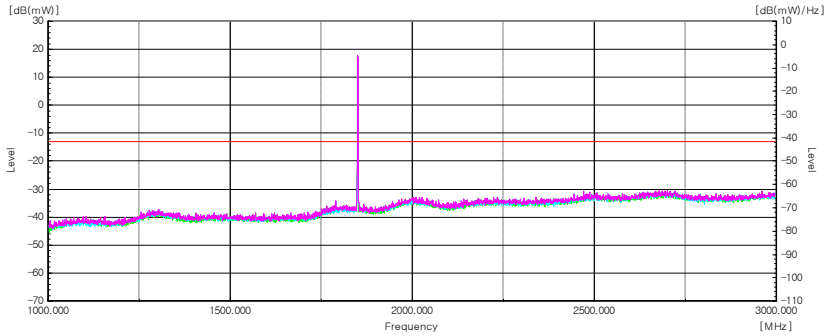
Channel : 251



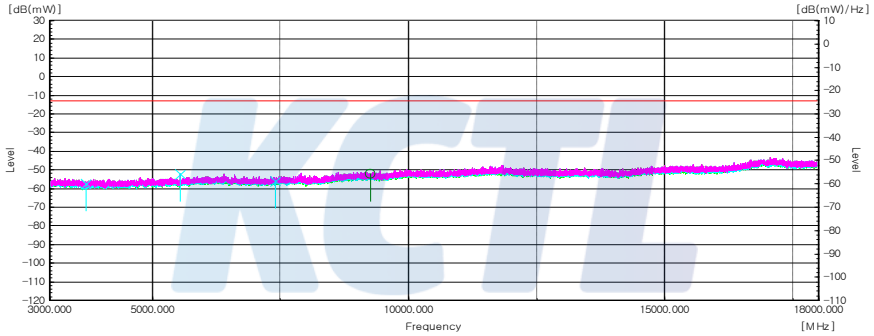
Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	1 697.09	V	8.6	5.51	-54.29	-51.20	-13.00	38.20
	2 546.19	V	9.7	6.74	-37.76	-34.80	-13.00	21.80
	3 396.30	H	9.2	7.78	-59.52	-58.10	-13.00	45.10
	4 244.41	V	10.3	9.61	-58.39	-57.70	-13.00	44.70

Test mode : GSM1900
Frequency(㎒) : 1 850.2
Channel : 512

1 000 ㎒ to 3 000 ㎒



Above 3 000 ㎒

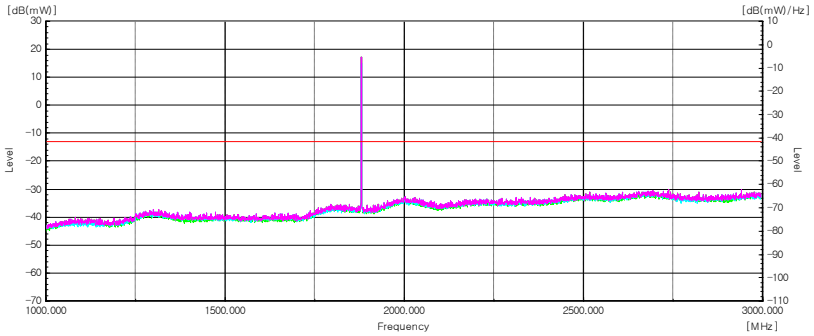


Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	3 700.05	V	9.6	8.92	-57.98	-57.30	-13.00	44.30
	5 550.17	V	10.8	11.20	-52.10	-52.50	-13.00	39.50
	7 400.29	V	10.8	13.24	-53.66	-56.10	-13.00	43.10
	9 251.42	H	11.9	14.41	-49.79	-52.30	-13.00	39.30

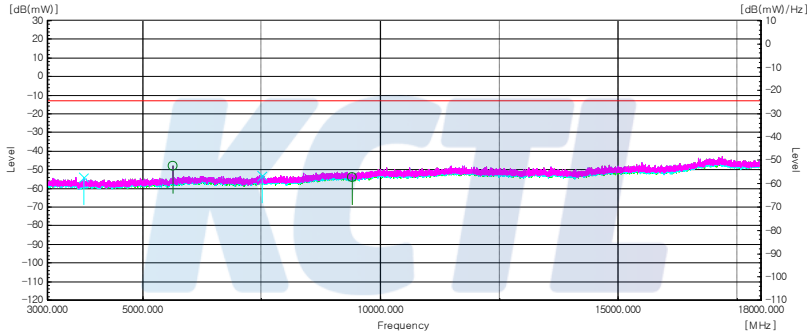
Note.
1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$) [㏈c]

Test mode : GSM1900
Frequency(㎒) : 1 880
Channel : 661

1 000 ㎒ to 3 000 ㎒



Above 3 000 ㎒

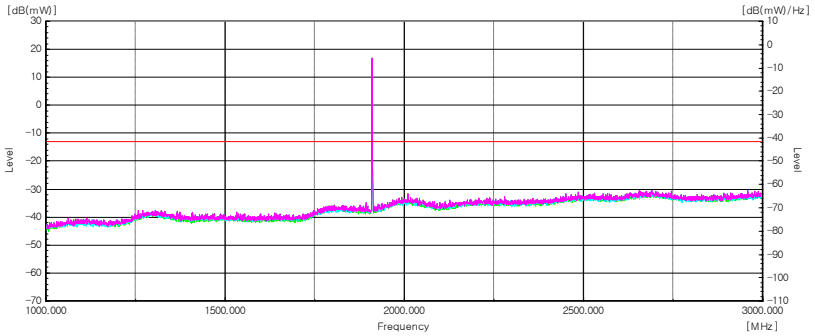


Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	3 760.05	V	9.3	8.92	-54.68	-54.30	-13.00	41.30
	5 639.18	H	10.9	11.27	-47.43	-47.80	-13.00	34.80
	7 517.30	V	11	13.24	-51.06	-53.30	-13.00	40.30
	9 400.43	H	12	14.50	-51.60	-54.10	-13.00	41.10

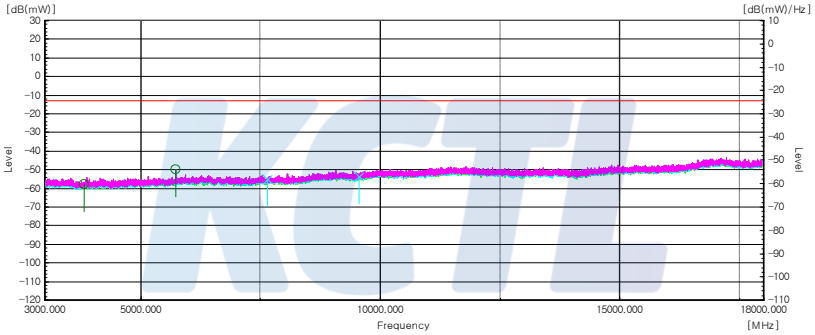
Note.
1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$) [㏈c]

Test mode : GSM1900
Frequency(㎒) : 1 909.8
Channel : 810

1 000 ㎒ to 3 000 ㎒



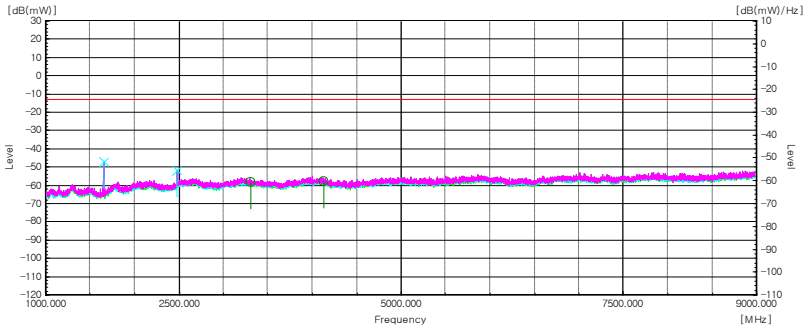
Above 3 000 ㎒



Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
GPRS	3 819.06	H	9.1	9.04	-58.06	-58.00	-13.00	45.00
	5 729.18	H	10.9	11.16	-49.64	-49.90	-13.00	36.90
	7 640.31	V	11.3	13.25	-53.25	-55.20	-13.00	42.20
	9 549.44	V	12.0	14.65	-50.85	-53.50	-13.00	40.50

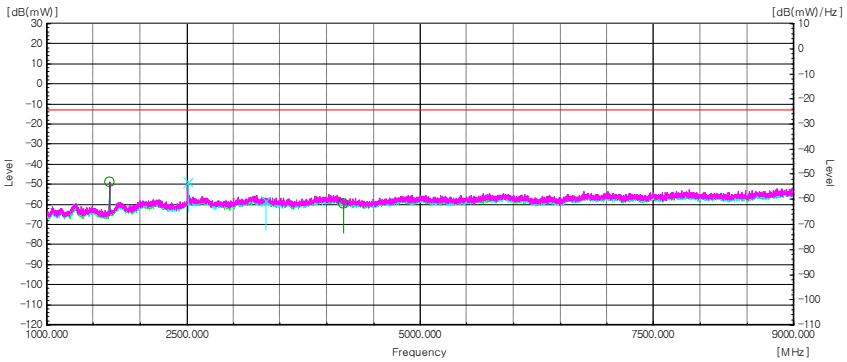
Note.
1. Limit Calculation(dBm)= 43 + 10log($P_{[Watts]}$) [dBc]

Test mode : WCDMA850
Frequency(㎒) : 826.4
Channel : 4132



Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
HSDPA	1 655.08	V	8.4	5.38	-50.12	-47.10	-13.00	34.10
	2 476.19	V	9.8	6.62	-55.08	-51.90	-13.00	38.90
	3 305.29	H	9.3	7.65	-59.75	-58.10	-13.00	45.10
	4 132.39	H	9.9	9.35	-58.15	-57.60	-13.00	44.60

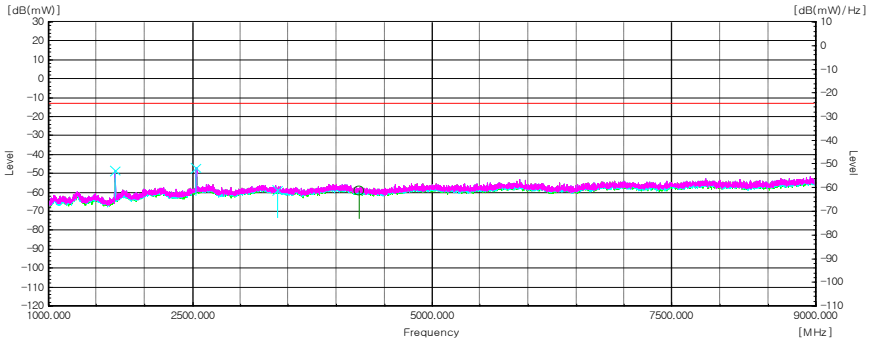
Test mode : WCDMA850
Frequency(㎒) : 836.4
Channel : 4182



Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
HSDPA	1 671.08	H	8.5	5.45	-51.95	-48.90	-13.00	35.90
	2 512.19	V	9.8	6.74	-52.26	-49.20	-13.00	36.20
	3 345.29	V	9.3	7.78	-60.02	-58.50	-13.00	45.50
	4 182.40	H	10.1	9.35	-60.35	-59.60	-13.00	46.60

Note.
1. Limit Calculation(dBm)= 43 + 10log($P_{[Watts]}$) [dBc]

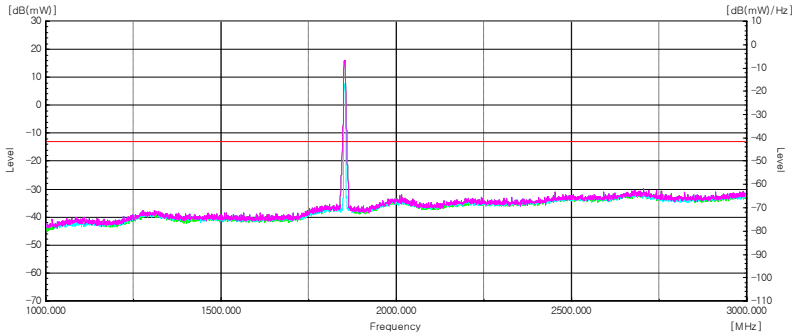
Test mode : WCDMA850
Frequency(㎒) : 846.6
Channel : 4233



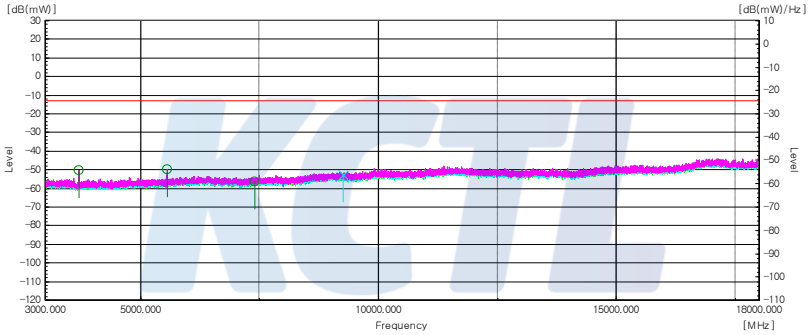
Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
HSDPA	1 695.09	V	8.6	5.51	-51.69	-48.60	-13.00	35.60
	2 536.19	V	9.7	6.74	-49.96	-47.00	-13.00	34.00
	3 386.30	V	9.2	7.78	-60.02	-58.60	-13.00	45.60
	4 233.40	H	10.3	9.61	-59.99	-59.30	-13.00	46.30

Test mode : WCDMA1900
Frequency(㎒) : 1 852.4
Channel : 9262

1 000 ㎒ to 3 000 ㎒



Above 3 000 ㎒

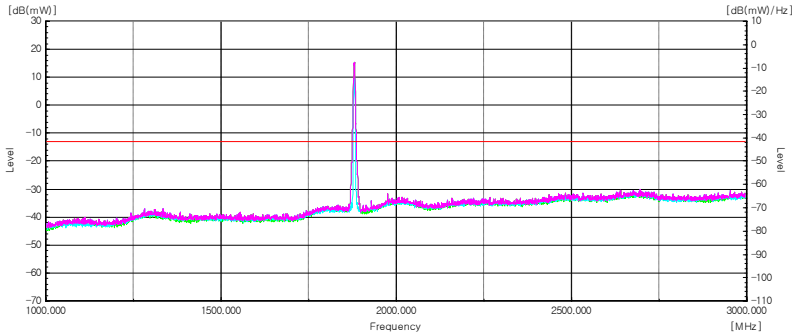


Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 707.05	H	9.6	8.92	-51.18	-50.50	-13.00	37.50
	5 555.17	H	10.8	11.20	-49.70	-50.10	-13.00	37.10
	7 399.29	H	10.8	13.24	-54.06	-56.50	-13.00	43.50
	9 251.42	V	11.9	14.41	-50.09	-52.60	-13.00	39.60

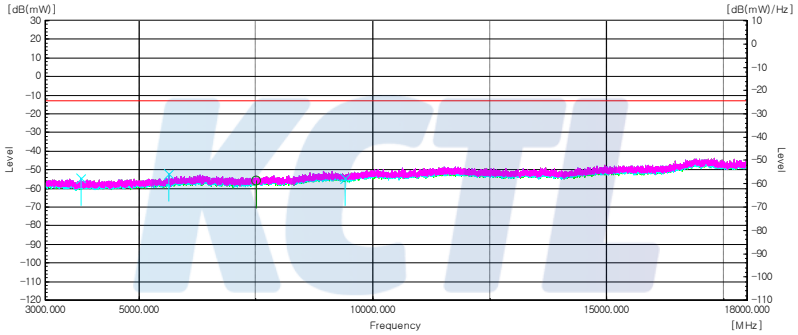
Note.
1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$) [㏈c]

Test mode : WCDMA1900
Frequency(㎒) : 1 880
Channel : 9400

1 000 ㎒ to 3 000 ㎒



Above 3 000 ㎒

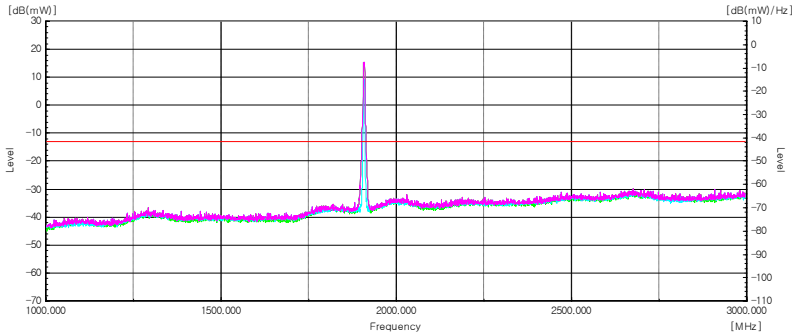


Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 763.05	V	9.3	8.92	-54.78	-54.40	-13.00	41.40
	5 642.18	V	10.9	11.27	-51.93	-52.30	-13.00	39.30
	7 520.30	H	11	13.24	-53.56	-55.80	-13.00	42.80
	9 400.43	V	12	14.50	-51.90	-54.40	-13.00	41.40

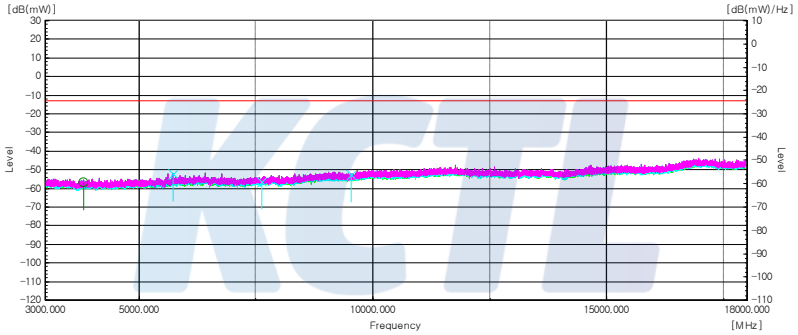
Note.
1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$) [㏈c]

Test mode : WCDMA1900
Frequency(㎒) : 1 907.6
Channel : 9538

1 000 ㎒ to 3 000 ㎒



Above 3 000 ㎒



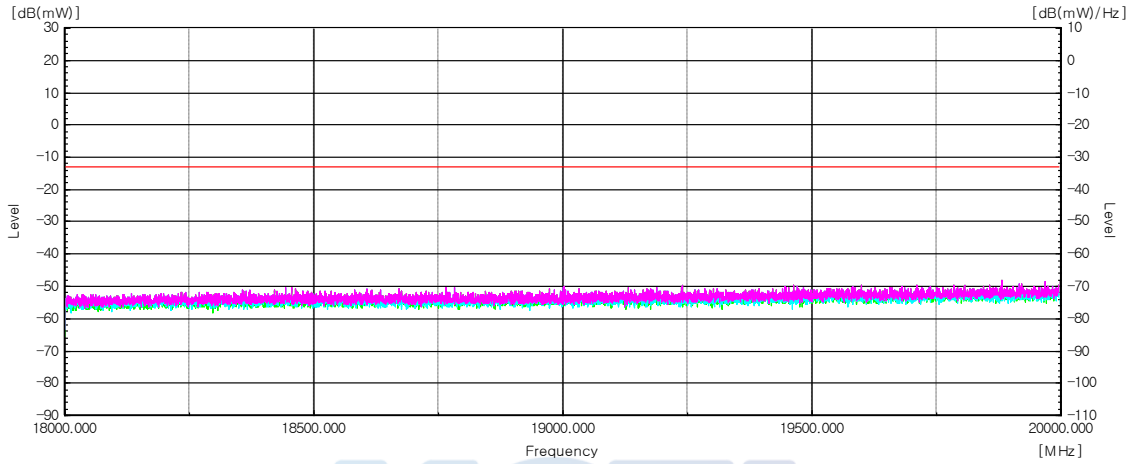
Mode	Frequency	Pol.	Antenna Gain	Cable loss	Substitute Level	Level	Limit	Margin
	[㎒]	[V/H]	[dBi]	[dB]	[dBm]	[dBm]	[dBm]	[dB]
RMC	3 815.05	H	9.1	9.04	-56.86	-56.80	-13.00	43.80
	5 725.18	V	10.9	11.16	-51.94	-52.20	-13.00	39.20
	7 630.31	V	11.3	13.25	-54.25	-56.20	-13.00	43.20
	9 538.44	V	12	14.65	-50.05	-52.70	-13.00	39.70

Note.
1. Limit Calculation(㏈m)= 43 + 10log($P_{[Watts]}$) [㏈c]

Test results (Above 18 ㎓ to 20 ㎓) – Worst case

Test mode	:	GSM1900
Frequency (㎒)	:	1 850.2
Channel	:	512

Horizontal/Vertical



Note.
1. No spurious emissions were detected above 18㎓.

8. Measurement equipment

Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
Spectrum Analyzer	R & S	FSV30	100810	19.08.01
Spectrum Analyzer	AGILENT	N9040B	MY57010132	19.10.12
Power Divider	Aeroflex/ Weinschel, Inc.	1580-1	NX380	19.08.02
DC Power Supply	Agilent	E3632A	MY40018781	19.05.14
Wideband Radio Communication Tester	R & S	CMW500	102159	19.08.08
Wideband Radio Communication Tester	R & S	CMW500	102572	19.09.21
Radio Communication Analyzer	Anritsu	MT8820C	6201010005	19.08.02
High pass Filter	Wainwright Instruments GmbH	WHKX3.0/18G-12SS	44	20.01.25
High pass Filter	Wainwright Instruments GmbH	WHKX1.0/1.5S-10SS	14	20.01.25
Attenuator	Weinschel ENGINEERING	10	AJ1239	19.05.14
ATTENUATOR	API Inmet	40AH2W-10	14	19.05.17
Biconical VHF-UHF Broadband Antenna	SCHWARZBECK	VUBA9117	275	20.04.13
Horn Antenna	ETS.lindgren	3115	62589	19.08.24
Bilog Antenna	Teseq GmbH	CBL 6143A	35039	19.05.19
Horn Antenna	ETS.lindgren	3117	161225	19.05.18
Amplifier	SONOMA INSTRUMENT	317	321041	20.01.04
Amplifier	L-3 Narda-MITEQ	AFS5-00101800-25-S-5	2054570	19.10.18
RF Selector	TOYO Corporation	NS5800	1003-010	N/A
Band Selector	TOYO Corporation	NS5800	1003-135	N/A
Band Selector	TOYO Corporation	NS5800	1003-320	N/A
Antenna Mast	MATURO	EAS 1.5	042/8941211	N/A
Antenna Mast	MATURO	EAS 1.5	043/8941211	N/A
Turn Table	MATURO	TT 0.8 PF	041/8941211	N/A
Cable Assembly	Radiall	R286303620	1649.241	N/A
Cable Assembly	Radiall	TESTPRO 3	-	N/A

End of test report