

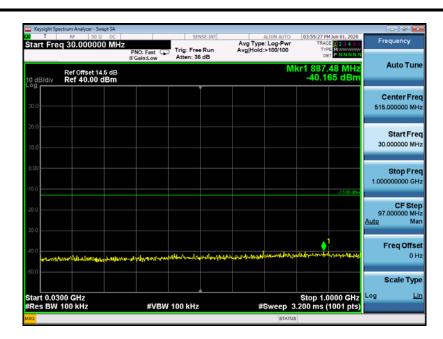
Start Fre		50 R DC 0000 MHz	PNO: Fast	Trig: Free Ru Atten: 36 dE	Avg un Avg	Type: Log-Pwr Hold:>100/100	TRAC	H Jun 01, 2020 E 1 2 3 4 5 6 E M	Frequency
10 dB/div		et 14.5 dB 00 dBm				M	kr2 942. -40.7	77 MHz 74 dBm	Auto Tu
20.0							\$ ¹		Center Fr 515.000000 M
0.00 -10.0 -20.0									Start Fr 30.000000 M
-30.0 -40.0 -50.0	had y le da say	(hengountererte	ر ار اور اور اور اور میکند. ار اور اور اور اور میکند و اور اور اور اور اور اور اور اور اور ا	~1,~,~,~,*.11,~,.4m,.e	have been all the sector	A	¢2	Stop Fr 1.000000000 G
Start 0.03 #Res BW	100 kHz	X	#VE	W 100 kHz	FUNCTION	#Sweep 3	.200 ms (0000 GHz 1001 pts)	CF St 97.000000 M Auto M
2 N 3 4 5	f		6.74 MHz 2.77 MHz	19.999 dBm -40.774 dBm					Freq Offs 0
6 7 8 9									Scale Ty
11				88				-	Log

WCDMA850MHz Channel = 4233, 30MHz to 1GHz

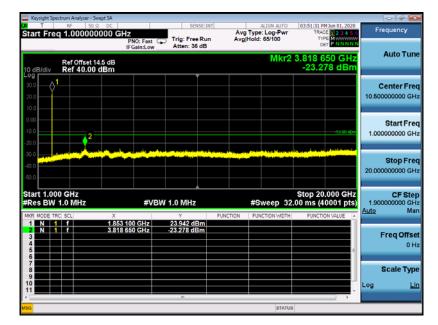


WCDMA850MHz Channel = 4233, 1GHz to 9GHz



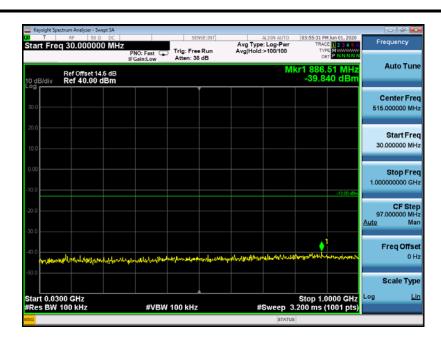


WCDMA1900MHz Channel = 9262, 30MHz to 1GHz

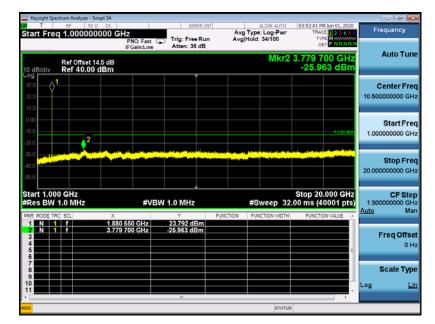


WCDMA1900MHz Channel = 9262, 1GHz to 20GHz



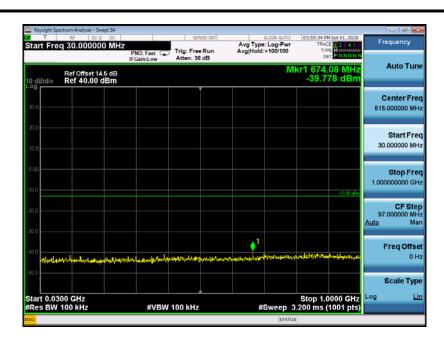


WCDMA1900MHz Channel = 9400, 30MHz to 1GHz

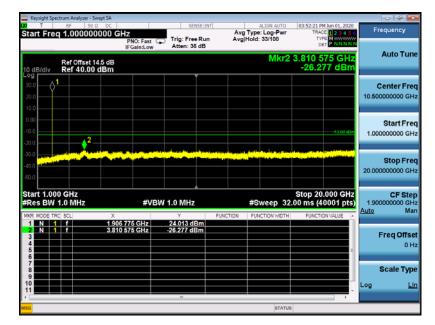


WCDMA1900MHz Channel = 9400, 1GHz to 20GHz





WCDMA1900MHz Channel = 9538, 30MHz to 1GHz

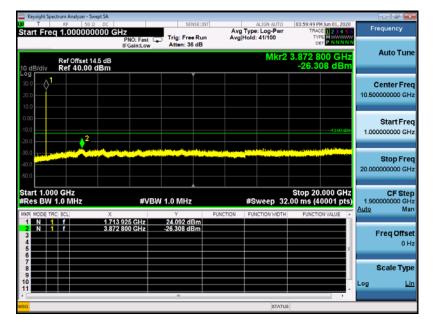


WCDMA1900MHz Channel = 9538 1GHz to 20GHz



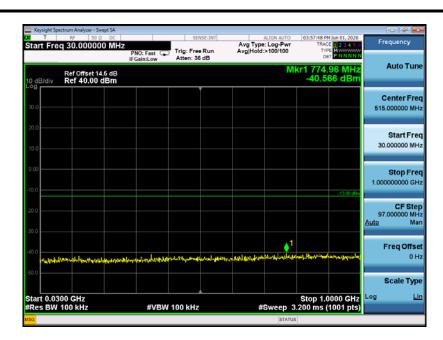
T	ectrum Analyzer - Swept SA RF 50 Q DC q 30.000000 MHz	PNO: Fast	SENSE:INT Trig: Free Run Atten: 36 dB	Avg Typ Avg Hold	ALIGN AUTO e: Log-Pwr d:>100/100	03:57:45 PM Jun 01, 2020 TRACE 1 2 3 4 5 6 TYPE M	Frequency
0 dB/div	Ref Offset 14.5 dB Ref 40.00 dBm	IF Gain:Low	Atten: 00 0D		M	kr1 965.08 MHz -40.527 dBm	Auto Tu
30.0							Center Fr 515.000000 M
10.0							Start Fr 30.000000 M
0.00						-13.00 dBm	Stop Fr 1.000000000 G
0.0							CF Si 97.000000 M Auto
10.0	Langer and a state		kaidennenskelengeneerne	lenningel with the second	www.	ן מעל איז אין איז	Freq Off: 0
50.0							Scale Ty
tart 0.03 Res BW	00 GHz 100 kHz	#VBW	100 kHz	#	≠Sweep 3	Stop 1.0000 GHz .200 ms (1001 pts)	Log

WCDMA1700MHz Channel = 1312, 30MHz to 1GHz

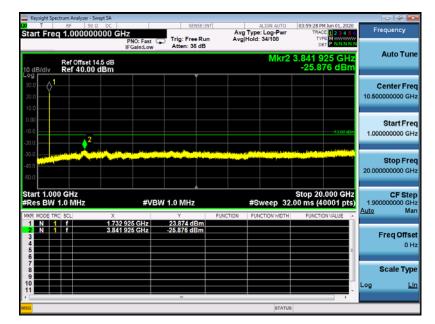


WCDMA1700MHz Channel = 1312, 1GHz to 18GHz



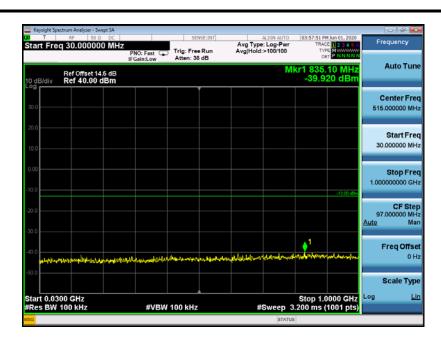


WCDMA1700MHz Channel = 1414, 30MHz to 1GHz

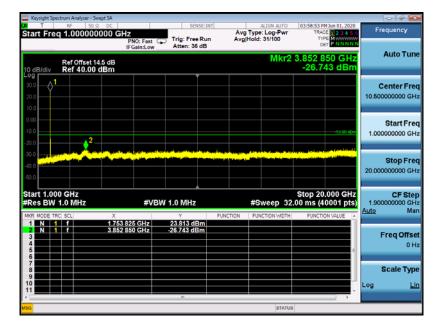


WCDMA1700MHz Channel = 1414, 1GHz to 18GHz





WCDMA1700MHz Channel = 1513, 30MHz to 1GHz



WCDMA1700MHz Channel = 1513, 1GHz to 18GHz



2.6 Bandedge

2.6.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P) dB$.

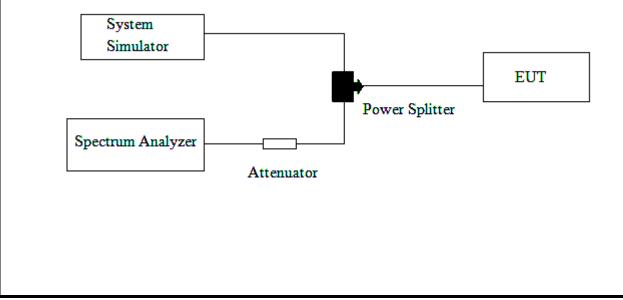
2.6.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.6.3 Test Procedures

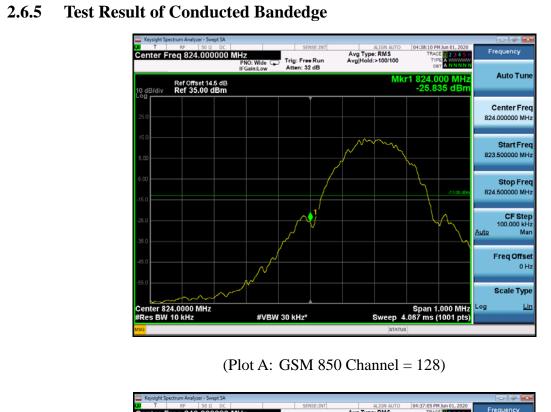
- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.
- 2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- 3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
- 4. The band GPRSs of low and high channels for the highest RF powers were measured.
- 5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 - = P(W) [43 + 10log(P)] (dB)
 - $= [30 + 10\log(P)] (dBm) [43 + 10\log(P)] (dB)$
 - = -13dBm.

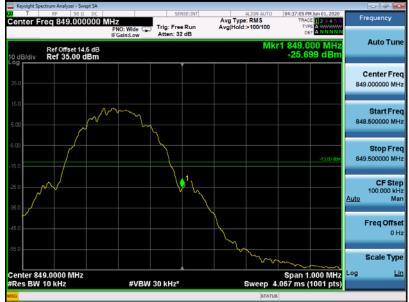
2.6.4 Test Setup

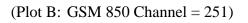








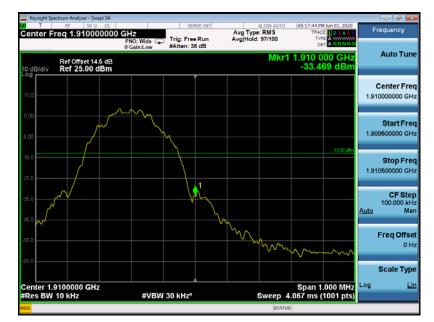








(Plot C:GSM 1900 Channel = 512)



(Plot D: GSM 1900 Channel = 810)





(Plot E: EDGE 850 Channel = 128)

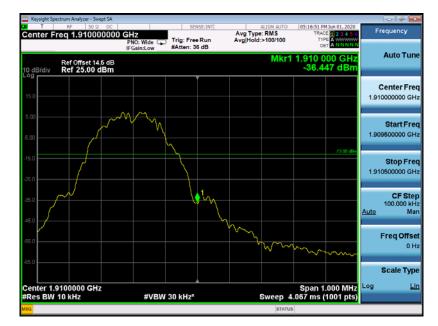


(Plot F: EDGE 850 Channel = 251)





(Plot G: EDGE 1900 Channel = 512)



(Plot H: EDGE 1900 Channel = 810)





(Plot I: WCDMA 850 Channel = 4132)



(Plot J: WCDMA 850 Channel = 4233)





(Plot K: WCDMA 1900 Channel = 9262)



(Plot L: WCDMA 1900 Channel = 9538)





(Plot M: WCDMA 1700 Channel = 1312)



(Plot N: WCDMA 1700 Channel = 1513)



2.7 Transmitter Radiated Power (EIRP/ERP)

2.7.1 Requirement

The substitution method, in ANSI C63.26:2015, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v03r01. The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

2.7.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GSM/GPRS) and ANSI / TIA-603-D-2010 Section 2.2.17.
- 2. The EUT was placed on a turntable 1.5 meters high in a fully anechoic chamber.
- 3. The EUT was placed 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;

UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01 v03r01.

- 5. The table was rotated 360 degrees to determine the position of the highest radiated power.
- 6. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
- 7. Taking the record of maximum ERP/EIRP.
- 8. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
- 9. The conducted power at the terminal of the dipole antenna is measured.



10. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.

11. ERP/EIRP = Ps + Et - Es + Gs = Ps + Rt - Rs + Gs

Ps (dBm): Input power to substitution antenna.

Gs (dBi or dBd): Substitution antenna Gain.

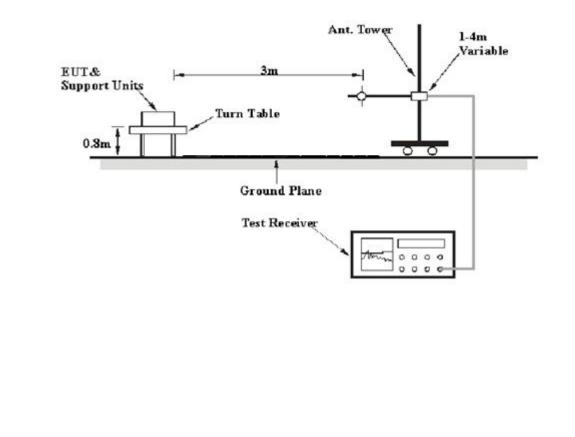
Et = Rt + AF Es = Rs + AF

AF (dB/m): Receive antenna factor

Rt: The highest received signal in spectrum analyzer for EUT.

Rs: The highest received signal in spectrum analyzer for substitution antenna.

2.7.4 Test Setup





2.7.5 Test Result of Transmitter Radiated Power

Test Notes:

1. This device employs GMSK technology with GSM capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.

2. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.

3. This unit was tested with its standard battery.

4. The worst case test configuration was found in the vertical positioning where the EUT is laying on its side. The data reported in the tables below were measured in this test setup.

Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured ERP dBm	Limit dBm	Verdict	
		(141112)		. ,		ubiii		
	128	824.20	5	Н	31.61		PASS	
	120	024.20	5	V	31.37	- 38.5	1792	
GSM	190	836.60	5	Н	31.46			
850MHz				V	31.15		PASS	
	251	848.80	5	Н	31.74		D. CC	
	251			V	31.15		PASS	

Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured EIRP dBm	Limit dBm	Verdict
	510	1850.2	0	Н	27.35		DAGG
	512	1630.2		V	27.13	- 33	PASS
GSM	661	1880.0	0	Н	27.94		DACC
1900MHz				V	27.64		PASS
	810	1909.8	0	Н	27.48		DAGG
				V	27.27		PASS



Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured ERP dBm	Limit dBm	Verdict
	128	824.20	5	Н	25.35		PASS
	120	024.20	5	V	25.71		1700
EDGE	100	836.60	5	Н	25.22	- 38.5	DASS
850MHz	190			V	25.61		PASS
	251	848.80	F	Н	25.47		DAGG
	251	040.00	5	V	25.13		PASS

Band	Channel	Frequency (MHz)	PCL	Antenna Pol (H/V)	Measured EIRP dBm	Limit dBm	Verdict
	512	1850.2	0	Н	24.91		DAGG
	312	1630.2		V	25.15	- 33	PASS
EDGE	661	1880.0	0	Н	25.36		PASS
1900MHz				V	25.11		FASS
	010	1909.8	0	Н	24.85		DAGG
	810			V	24.93		PASS

Band	Channel	Frequency (MHz)	Antenna Pol (H/V)	Measured ERP dBm	Limit dBm	Verdict	
	4132	926.4	Н	21.98		PASS	
	4152	826.4	V	22.51		PASS	
WCDMA	4175	835	Н 22.25		20 5	DACC	
850MHz			V	22.83	38.5	PASS	
	4000	046.6	Н	21.92		DA GG	
	4233	846.6	V	22.42		PASS	

Band	Channal	Frequency	Antenna Pol	Measured EIRP	Limit	Vardiat	
	Channel	(MHz)	(H/V)	dBm	dBm	Verdict	
	0262	1952 4	Н	21.84		D. CC	
	9262	1852.4	V	21.91		PASS	
WCDMA	0.400	1880	Н	21.92	22		
1900MHz	9400		V	22.06	33	PASS	
	0520	1007.6	Н	21.98		DAGG	
	9538	1907.6	V 22.02			PASS	



Band	Channel	Frequency	Antenna Pol	Measured EIRP	Limit	Verdict	
Danu	Channel	(MHz)	(H/V)	dBm	dBm	verticit	
	1210	1710 4	Н	22.01		D1 00	
	1312	1712.4	V	21.99		PASS	
WCDMA	1412	1700.4	Н	22.15	20	DAGG	
1700MHz	1413	1732.4	V	21.00	30	PASS	
	1512	1752.6	Н	21.92		DAGG	
	1513		V	21.62		PASS	



2.8 Radiated Spurious Emissions

2.8.1 Requirement

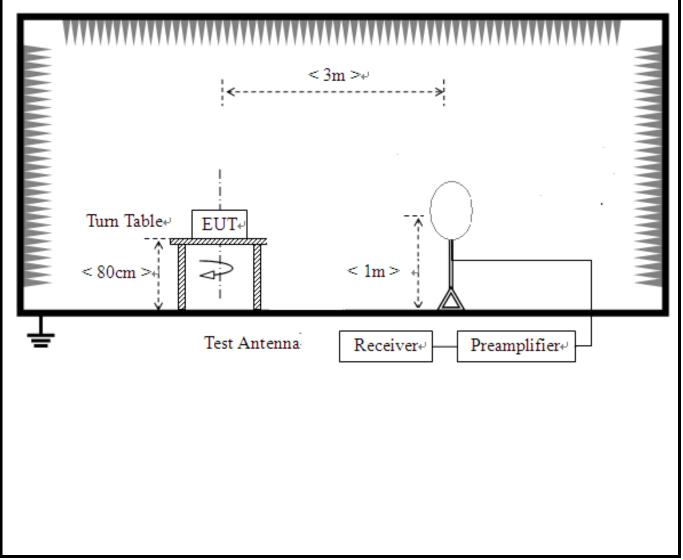
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P) dB$. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

2.8.2 Measuring Instruments

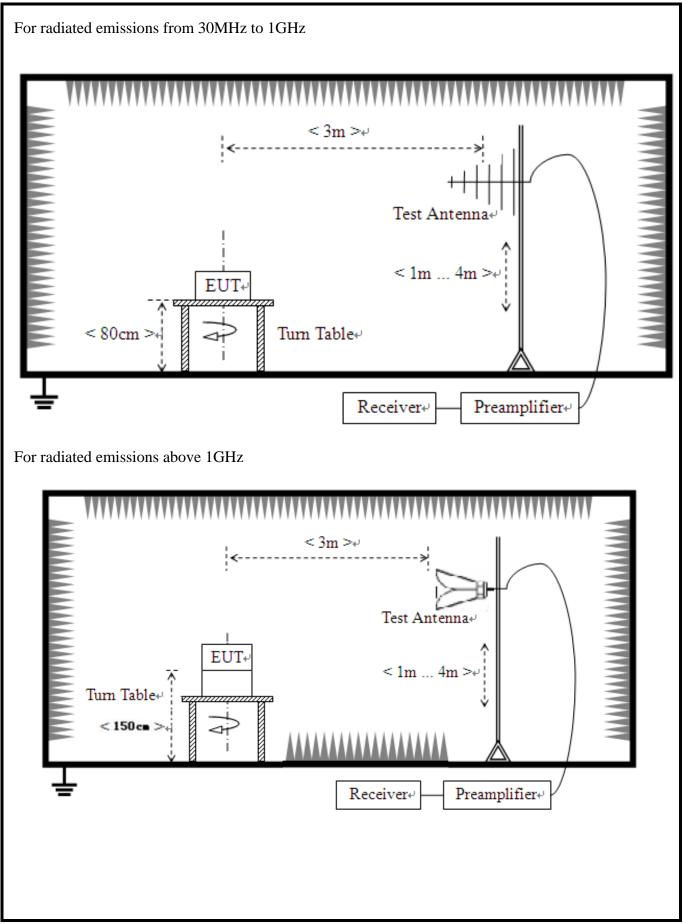
The measuring equipment is listed in the section 3 of this test report.

2.8.3 Test Setup

For radiated emissions from 9 kHz to 30MHz









2.8.4 Test Procedures

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8.
- 2. The EUT was placed on a rotatable wooden table 0.8/1.5 meters above the ground.
- 3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- 4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
- 6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
- 7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- 8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- 9. Taking the record of output power at antenna port.
- 10. Repeat step 7 to step 8 for another polarization.
- 11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- 12. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 - = P(W) [43 + 10log(P)] (dB)
 - = [30 + 10log(P)] (dBm) [43 + 10log(P)] (dB)
 - = -13dBm.
- 13. This device employs GMSK technology with GSM and GSM capabilities. All configurations were investigated and the worst case emissions were found in GSM mode.
- 14. This device employs UMTS technology with WCDMA (AMR/RMC), HSDPA, HSUPA capabilities. All configurations were investigated and the worst case UMTS emissions were found in RMC WCDMA mode at 12.2Kbps.
- 15. This unit was tested with its standard battery.
- 16. All Spurious Emission tests were performed in X, Y, Z axis direction and low, middle, high channel. And only the worst axis test condition was recorded in this test report.
- 17. The spectrum is measured from 9 KHz to the 10th harmonic of the fundamental frequency



of the transmitter using CISPR quasi peak detector below 1GHz. The worst case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.

 For 9KHz to 30MHz: the amplitude of spurious emissions are attenuated by more than 20dB below the permissible value has no need to be reported.



2.8.5 Test Results of Radiated Spurious Emissions

Note: 1. (Absolute)Level=Reading Level + Factor

Worst-Case test data provide as below:

GSM850 Middle Channel

30MHz~10GHz:

Susp	ected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-88.47	-64.11	-13.00	51.11	24.36	Horizontal
2	74.6423	-94.49	-73.24	-13.00	60.24	21.25	Horizontal
3	175.087	-100.71	-76.59	-13.00	63.59	24.12	Horizontal
4	326.968	-103.23	-74.30	-13.00	61.30	28.93	Horizontal
5	1803.40	-57.70	-55.94	-13.00	42.94	1.76	Horizontal
6	3990.49	-58.59	-49.76	-13.00	36.76	8.83	Horizontal
Susp	ected List						
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delority
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-87.30	-64.70	-13.00	51.70	22.60	Vertical
2	66.3932	-92.25	-69.51	-13.00	56.51	22.74	Vertical
3	272.136	-103.77	-77.46	-13.00	64.46	26.31	Vertical
4	519.124	-103.14	-71.01	-13.00	58.01	32.13	Vertical
5	3180.09	-59.10	-50.00	-13.00	37.00	9.10	Vertical
6	6309.15	-59.95	-44.87	-13.00	31.87	15.08	Vertical



GSM1900 Middle Channel

30MHz~20GHz:

Sus	pected List	:					
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Polarity
	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	,
1	36.7934	-87.38	-65.73	-13.00	52.73	21.65	Horizontal
2	74.1571	-89.00	-70.62	-13.00	57.62	18.38	Horizontal
3	175.572	-99.59	-78.68	-13.00	65.68	20.91	Horizontal
4	881.600	-97.18	-63.64	-13.00	50.64	33.54	Horizontal
5	2904.95	-58.16	-50.10	-13.00	37.10	8.06	Horizontal
6	5783.89	-59.65	-47.33	-13.00	34.33	12.32	Horizontal
Susp	ected List						
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-86.13	-66.24	-13.00	53.24	19.89	Vertical
2	70.2751	-92.82	-72.52	-13.00	59.52	20.30	Vertical
3	175.572	-99.93	-81.33	-13.00	68.33	18.60	Vertical
4	519.609	-103.96	-75.59	-13.00	62.59	28.37	Vertical
5	882.086	-96.41	-63.31	-13.00	50.31	33.10	Vertical
6	5633.81	-51.73	-39.10	-13.00	26.10	12.63	Vertical





WCDMA 850 Middle Channel

30MHz~10GHz:

Sus	Suspected List						
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-88.38	-64.02	-13.00	51.02	24.36	Horizontal
2	73.6718	-92.98	-71.72	-13.00	58.72	21.26	Horizontal
3	127.048	-92.91	-70.73	-13.00	57.73	22.18	Horizontal
4	215.847	-96.16	-71.53	-13.00	58.53	24.63	Horizontal
5	1799.39	-57.62	-55.79	-13.00	42.79	1.83	Horizontal
6	4898.44	-60.30	-49.78	-13.00	36.78	10.52	Horizontal
Susp	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-87.92	-65.32	-13.00	52.32	22.60	Vertical
2	74.1571	-92.96	-69.38	-13.00	56.38	23.58	Vertical
3	127.048	-93.01	-69.05	-13.00	56.05	23.96	Vertical
4	216.333	-95.58	-72.33	-13.00	59.33	23.25	Vertical
5	1791.39	-57.22	-56.36	-13.00	43.36	0.86	Vertical
6	5116.05	-58.85	-44.95	-13.00	31.95	13.90	Vertical





WCDMA 1900 Middle Channel

30MHz~20GHz:

Sus	Suspected List						
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-86.26	-64.61	-13.00	51.61	21.65	Horizontal
2	72.7014	-94.80	-76.40	-13.00	63.40	18.40	Horizontal
3	209.054	-100.85	-79.25	-13.00	66.25	21.60	Horizontal
4	655.963	-105.52	-73.58	-13.00	60.58	31.94	Horizontal
5	2739.86	-57.47	-50.18	-13.00	37.18	7.29	Horizontal
6	6181.59	-59.39	-45.27	-13.00	32.27	14.12	Horizontal
Susp	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-87.47	-67.58	-13.00	54.58	19.89	Vertical
2	74.6423	-95.30	-74.55	-13.00	61.55	20.75	Vertical
3	208.084	-101.54	-82.30	-13.00	69.30	19.24	Vertical
4	521.550	-104.52	-76.11	-13.00	63.11	28.41	Vertical
5	2687.84	-58.00	-49.77	-13.00	36.77	8.23	Vertical
6	4913.45	-58.66	-45.78	-13.00	32.78	12.88	Vertical





WCDMA 1700 Middle Channel

30MHz~20GHz:

Suspected List							
NO.	Freq.	Reading	Level	Limit	Margin	Factor	Delority
	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-87.14	-67.25	-13.00	54.25	19.89	Vertical
2	74.1571	-88.41	-67.71	-13.00	54.71	20.70	Vertical
3	214.392	-95.73	-75.94	-13.00	62.94	19.79	Vertical
4	555.032	-104.38	-75.48	-13.00	62.48	28.90	Vertical
5	2725.86	-58.43	-50.51	-13.00	37.51	7.92	Vertical
6	7172.08	-59.98	-43.42	-13.00	30.42	16.56	Vertical
Sus	Suspected List						
	Freq.	Reading	Level	Limit	Margin	Factor	Delerity
NO.	[MHz]	[dBm]	[dBm]	[dBm]	[dB]	[dB]	Polarity
1	36.7934	-86.63	-64.98	-13.00	51.98	21.65	Horizontal
2	127.533	-92.54	-73.50	-13.00	60.50	19.04	Horizontal
3	213.421	-95.48	-74.05	-13.00	61.05	21.43	Horizontal
4	523.977	-104.12	-74.47	-13.00	61.47	29.65	Horizontal
5	3202.60	-59.26	-50.09	-13.00	37.09	9.17	Horizontal
6	7202.10	-61.07	-44.07	-13.00	31.07	17.00	Horizontal



3. LIST OF MEASURING EQUIPMENT

Description	Manufactu rer	Model	Serial No.	Cal. Date	Due Date	Remark
EMI Test Receiver	R&S	ESIB7	A0501375	2019.07.30	2020.07.29	Radiation
Loop Antenna	Schwarz beck	HFH2-Z2	100047	2019.04.26	2022.04.25	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101341	2017.07.14	2020.07.13	Radiation
Broadband antenna (30MHz~1GHz)	R&S	HL562	101339	2017.07.14	2020.07.13	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100150	2019.04.27	2022.04.26	Radiation
Double ridge horn antenna (1GHz~18GHz)	R&S	HF906	100149	2019.04.17	2022.04.16	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4002A	305753	2017.07.12	2020.07.11	Radiation
Horn antenna (18GHz~26.5GHz)	AR	AT4003A	0329293	2018.09.17	2020.09.16	Radiation
Amplifier 1GHz-18GHz	AR	25S1G4AM1	22018	2018.09.17	2020.09.16	Radiation
Ampilier 20M~3GHz	MILMEGA	80RF1000-250	1064573	2017.10.09	2020.10.08	Radiation
Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2020.05.18	2021.05.17	Conducted
Test Receiver	R&S	ESCI	A0902601	2019.07.02	2020.07.01	Conducted
Temperature chamber	welissom Inc.	SU-642	A150802409	2019.07.18	2020.07.17	Conducted
Wideband Radio Communication tester	R&S	CMW500	A130101034	2019.07.30	2021.07.29	Conducted
Power Supply	R&S	NGMO1	101037	2019.08.03	2020.08.02	Conducted



4. UNCERTAINTY OF EVALUATION

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150KHz~30MHz)

Measuring Uncertainty for a level of	2 6 JD
confidence of 95%(U=2Uc(y))	2.6dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of	2.4dB
confidence of 95%(U=2Uc(y))	2.40D

Uncertainty of Radiated Emission Measurement (1GHz~40GHz)

Measuring Uncertainty for a level of	2.8dB
confidence of 95%(U=2Uc(y))	21002

** END OF REPORT **