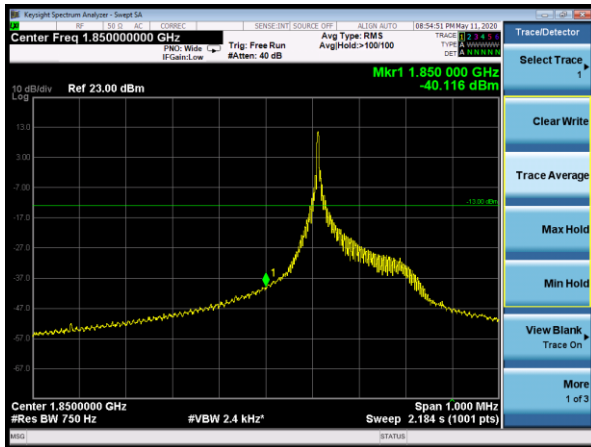
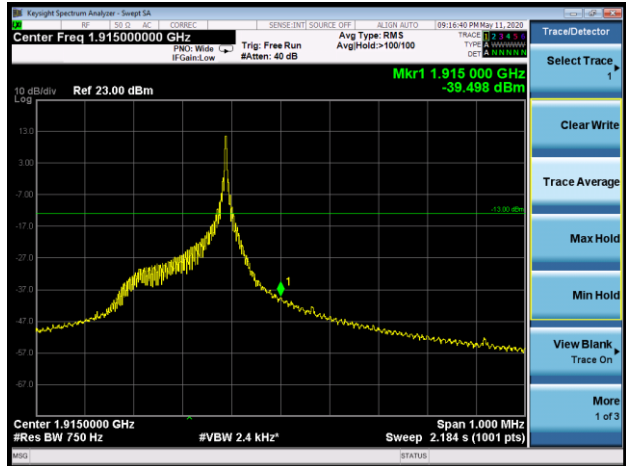




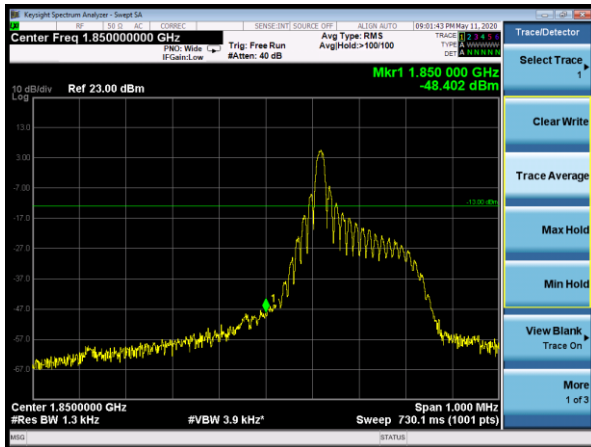
NB-IOT Band 25 BPSK 3.75kHz 1@0 CH-Low



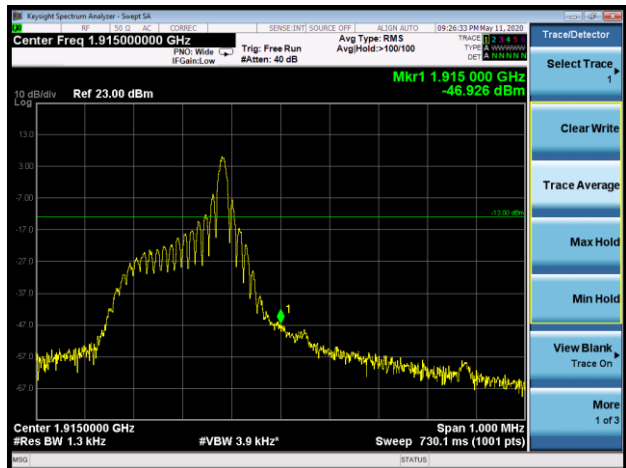
NB-IOT Band 25 BPSK 3.75kHz 1@47 CH-High



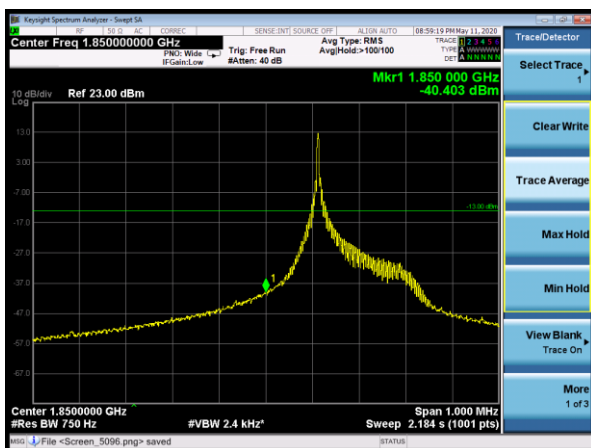
NB-IOT Band 25 BPSK 15kHz 1@0 CH-Low



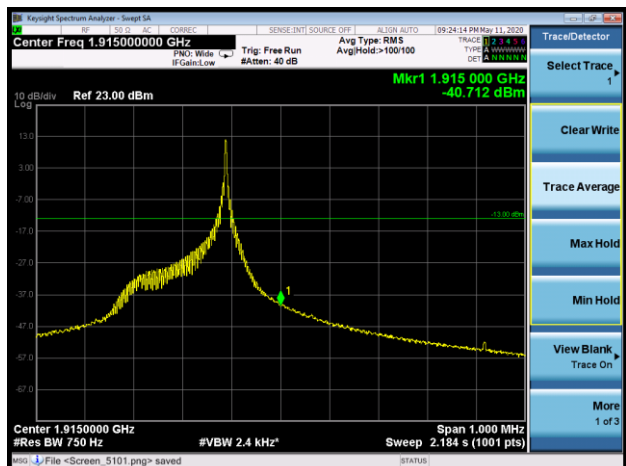
NB-IOT Band 25 BPSK 15kHz 1@11 CH-High

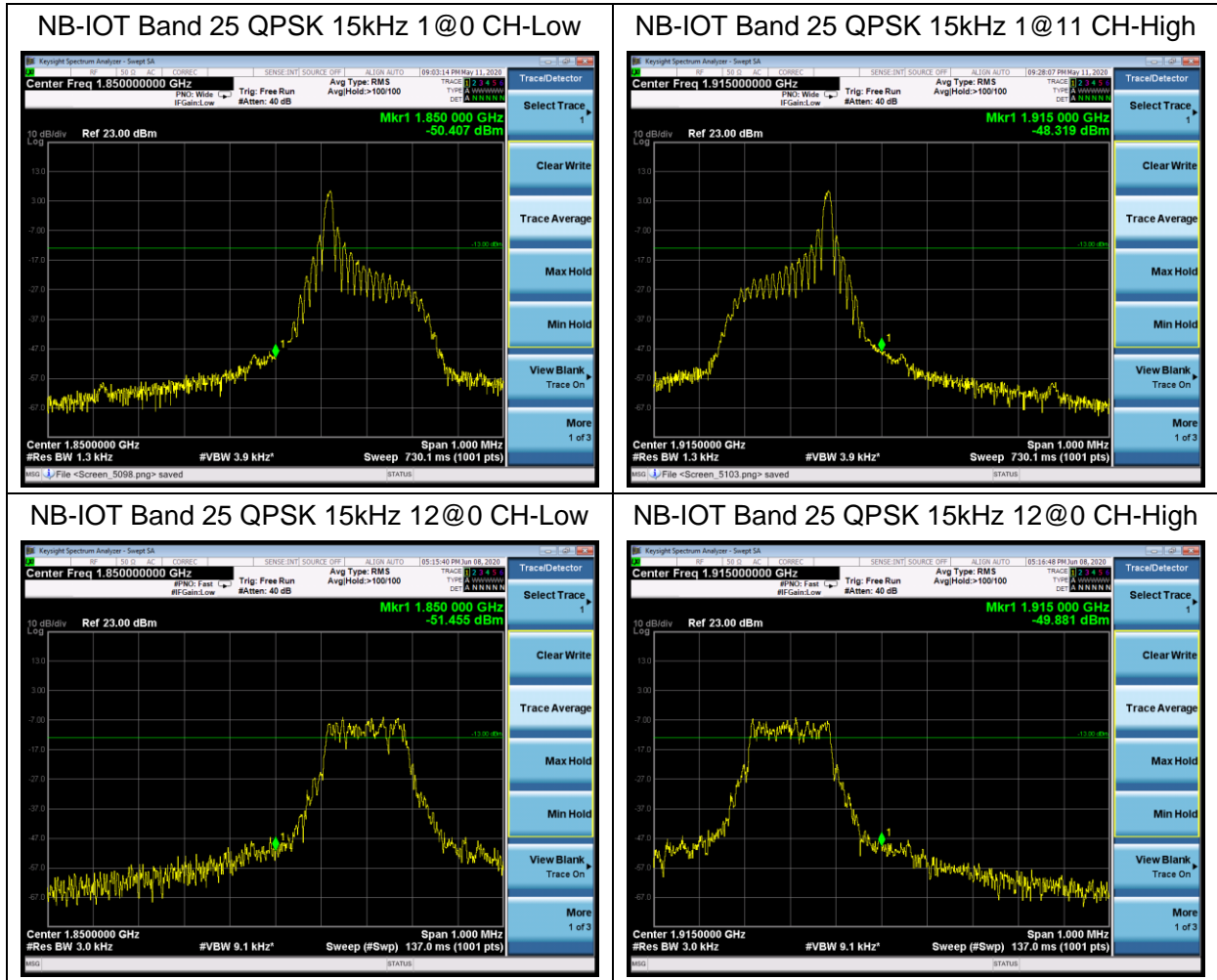


NB-IOT Band 25 QPSK 3.75kHz 1@0 CH-Low



NB-IOT Band 25 QPSK 3.75kHz 1@47 CH-High





5.4. Peak-to-Average Power Ratio (PAPR)

Ambient condition

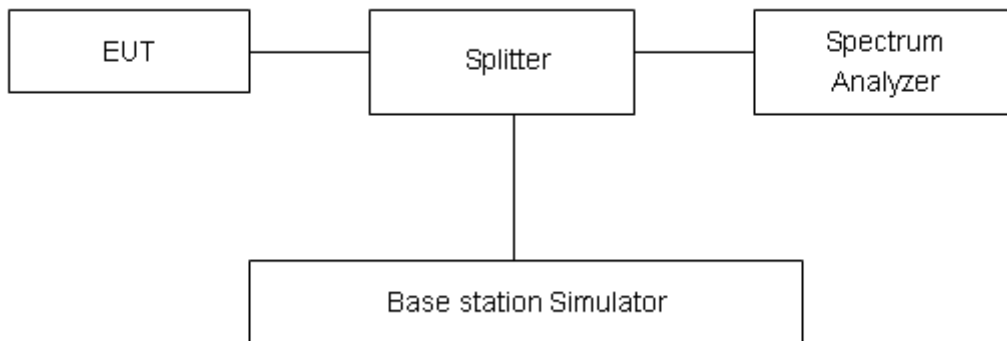
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$PAPR (dB) = PPk (dBm) - PAvg (dBm).$$

Test Setup



Limits

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB in 24.232(d).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.



Test Results

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GMSK)	512	1850.2	29.63	29.13	0.50	≤13	PASS
	661	1880	29.88	29.32	0.56	≤13	PASS
	810	1909.8	29.71	29.05	0.66	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	30.13	29.42	0.71	≤13	PASS
	661	1880	30.27	29.52	0.75	≤13	PASS
	810	1909.8	30.39	29.60	0.79	≤13	PASS
EGPRS 1900 (8PSK)	512	1850.2	27.71	26.31	1.40	≤13	PASS
	661	1880	27.62	26.21	1.41	≤13	PASS
	810	1909.8	27.56	26.04	1.52	≤13	PASS

Mode	Modulation	Sub-carrier spacing (KHz)	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)			Limit(dB)	Conclusion
				Peak(dBm)	Avg(dBm)	PAPR(dB)		
NB-IOT Band 2 Standalone	BPSK	3.75	18900/1880.0	22.51	17.68	4.83	≤13	PASS
	QPSK	3.75	18900/1880.0	21.82	17.64	4.18	≤13	PASS
	BPSK	15	18900/1880.0	21.99	14.74	7.25	≤13	PASS
	QPSK	15	18900/1880.0	21.62	14.71	6.91	≤13	PASS
Mode	Modulation	Sub-carrier spacing (KHz)	Channel/ Frequency(MHz)	Peak-to-Average Power Ratio (PAPR)			Limit(dB)	Conclusion
Peak(dBm)	Avg(dBm)	PAPR(dB)						
NB-IOT Band 25 Standalone	BPSK	3.75	26365/1882.5	22.41	17.56	4.85	≤13	PASS
	QPSK	3.75	26365/1882.5	21.69	17.51	4.18	≤13	PASS
	BPSK	15	26365/1882.5	22.02	14.77	7.25	≤13	PASS
	QPSK	15	26365/1882.5	21.67	14.79	6.88	≤13	PASS

5.5. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +85°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

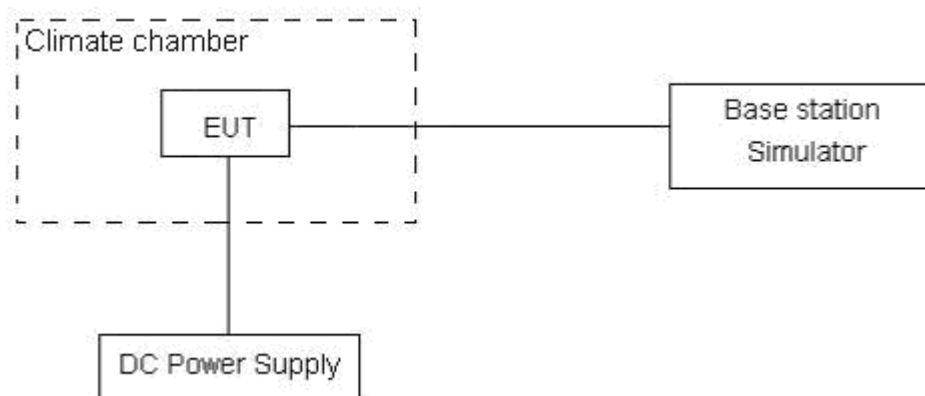
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.3 V and 4.3 V, with a nominal voltage of 3.8V.

Test setup



Limits

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

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3$, $U = 0.01\text{ppm}$.

Test Result

GSM 1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal(25°C)	Normal	16.00	6.00	0.00851	0.00319	PASS
Extreme(85°C)		5.00	6.00	0.00266	0.00319	PASS
Extreme(80°C)		1.00	13.00	0.00053	0.00691	PASS
Extreme(70°C)		16.00	6.00	0.00851	0.00319	PASS
Extreme(60°C)		4.00	3.00	0.00213	0.00160	PASS
Extreme(50°C)		16.00	12.00	0.00851	0.00638	PASS
Extreme(40°C)		3.00	12.00	0.00160	0.00638	PASS
Extreme(30°C)		8.00	17.00	0.00426	0.00904	PASS
Extreme(20°C)		5.00	1.00	0.00266	0.00053	PASS
Extreme(10°C)		3.00	9.00	0.00160	0.00479	PASS
Extreme(0°C)		6.00	5.00	0.00319	0.00266	PASS
Extreme(-10°C)		4.00	6.00	0.00213	0.00319	PASS
Extreme(-20°C)		2.00	14.00	0.00106	0.00745	PASS
Extreme(-30°C)		15.00	3.00	0.00798	0.00160	PASS
Extreme(-40°C)		15.00	7.00	0.00798	0.00372	PASS
25°C	LV	9.00	5.00	0.00479	0.00266	PASS
	HV	13.00	15.00	0.00691	0.00798	PASS

NB-IOT Band 2						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	3.75					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25°C)	Normal	2.41	13.53	0.00128	0.00720	PASS
Extreme(85°C)		17.48	3.68	0.00930	0.00196	PASS
Extreme(80°C)		10.19	1.29	0.00542	0.00069	PASS
Extreme(70°C)		14.60	2.38	0.00777	0.00127	PASS
Extreme(60°C)		5.39	3.87	0.00286	0.00206	PASS
Extreme(50°C)		2.66	9.44	0.00141	0.00502	PASS
Extreme(40°C)		11.05	1.97	0.00588	0.00105	PASS
Extreme(30°C)		8.89	9.05	0.00473	0.00481	PASS
Extreme(20°C)		3.62	10.71	0.00193	0.00570	PASS
Extreme(10°C)		13.31	8.95	0.00708	0.00476	PASS
Extreme(0°C)		15.33	9.32	0.00816	0.00496	PASS



Extreme(-10°C)		17.95	12.10	0.00955	0.00644	PASS
Extreme(-20°C)		5.67	12.08	0.00302	0.00642	PASS
Extreme(-30°C)		4.52	17.94	0.00241	0.00954	PASS
Extreme(-40°C)		2.25	1.22	0.00120	0.00065	PASS
25°C	LV	4.51	9.73	0.00240	0.00518	PASS
	HV	5.34	8.22	0.00284	0.00437	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	15					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25°C)	Normal	16.17	4.63	0.00860	0.00246	PASS
Extreme(85°C)		9.58	15.37	0.00510	0.00817	PASS
Extreme(80°C)		10.26	15.84	0.00546	0.00842	PASS
Extreme(70°C)		15.25	6.33	0.00811	0.00337	PASS
Extreme(60°C)		8.45	9.74	0.00450	0.00518	PASS
Extreme(50°C)		15.86	11.36	0.00844	0.00605	PASS
Extreme(40°C)		12.24	5.05	0.00651	0.00269	PASS
Extreme(30°C)		8.90	9.36	0.00473	0.00498	PASS
Extreme(20°C)		14.62	16.78	0.00778	0.00892	PASS
Extreme(10°C)		8.09	14.91	0.00430	0.00793	PASS
Extreme(0°C)		15.62	5.85	0.00831	0.00311	PASS
Extreme(-10°C)		10.11	12.24	0.00538	0.00651	PASS
Extreme(-20°C)		4.79	17.95	0.00255	0.00955	PASS
Extreme(-30°C)		3.22	1.58	0.00171	0.00084	PASS
Extreme(-40°C)		11.04	12.53	0.00587	0.00666	PASS
25°C	LV	3.72	10.57	0.00198	0.00562	PASS
	HV	3.06	13.80	0.00163	0.00734	PASS

NB-IOT Band 25						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	3.75					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25°C)	Normal	9.34	9.49	0.00497	0.00505	PASS
Extreme(85°C)		11.20	16.29	0.00596	0.00866	PASS
Extreme(80°C)		13.05	17.12	0.00694	0.00911	PASS
Extreme(70°C)		16.70	8.00	0.00888	0.00425	PASS
Extreme(60°C)		7.45	16.93	0.00396	0.00901	PASS
Extreme(50°C)		5.29	16.17	0.00282	0.00860	PASS



Extreme(40°C)		10.99	14.43	0.00584	0.00768	PASS
Extreme(30°C)		8.42	9.22	0.00448	0.00490	PASS
Extreme(20°C)		2.09	1.79	0.00111	0.00095	PASS
Extreme(10°C)		10.26	12.64	0.00546	0.00672	PASS
Extreme(0°C)		2.68	7.08	0.00143	0.00377	PASS
Extreme(-10°C)		3.35	3.26	0.00178	0.00174	PASS
Extreme(-20°C)		14.02	11.90	0.00746	0.00633	PASS
Extreme(-30°C)		5.21	17.42	0.00277	0.00927	PASS
Extreme(-40°C)		9.08	15.70	0.00483	0.00835	PASS
25°C		LV	6.76	2.84	0.00359	0.00151
	HV	11.00	3.30	0.00585	0.00175	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability(ppm)	Frequency Stability(ppm)	Verdict
Sub-carrier spacing (KHz)	15					
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal(25°C)	Normal	5.65	4.89	0.00301	0.00260	
Extreme(85°C)		12.43	1.76	0.00661	0.00094	PASS
Extreme(80°C)		1.10	13.90	0.00059	0.00740	PASS
Extreme(70°C)		1.78	8.06	0.00095	0.00429	PASS
Extreme(60°C)		8.17	7.06	0.00434	0.00376	PASS
Extreme(50°C)		13.50	4.92	0.00718	0.00261	PASS
Extreme(40°C)		4.13	14.75	0.00220	0.00785	PASS
Extreme(30°C)		3.48	13.23	0.00185	0.00704	PASS
Extreme(20°C)		2.78	16.53	0.00148	0.00879	PASS
Extreme(10°C)		16.91	3.09	0.00899	0.00164	PASS
Extreme(0°C)		1.24	15.35	0.00066	0.00817	PASS
Extreme(-10°C)		17.54	17.20	0.00933	0.00915	PASS
Extreme(-20°C)		4.97	9.92	0.00264	0.00528	PASS
Extreme(-30°C)		12.28	16.67	0.00653	0.00887	PASS
Extreme(-40°C)		14.65	7.95	0.00779	0.00423	PASS
25°C		LV	12.58	9.33	0.00669	0.00496
	HV	15.31	8.84	0.00814	0.00470	PASS

5.6. Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

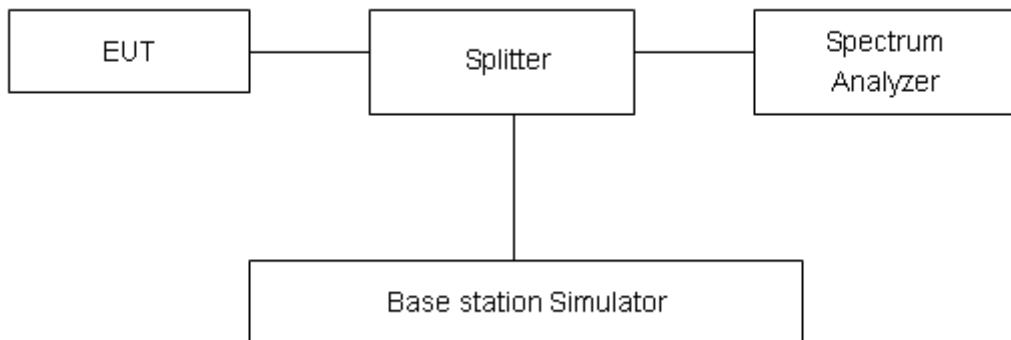
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log₁₀ (P) dB.”

Limit	-13 dBm
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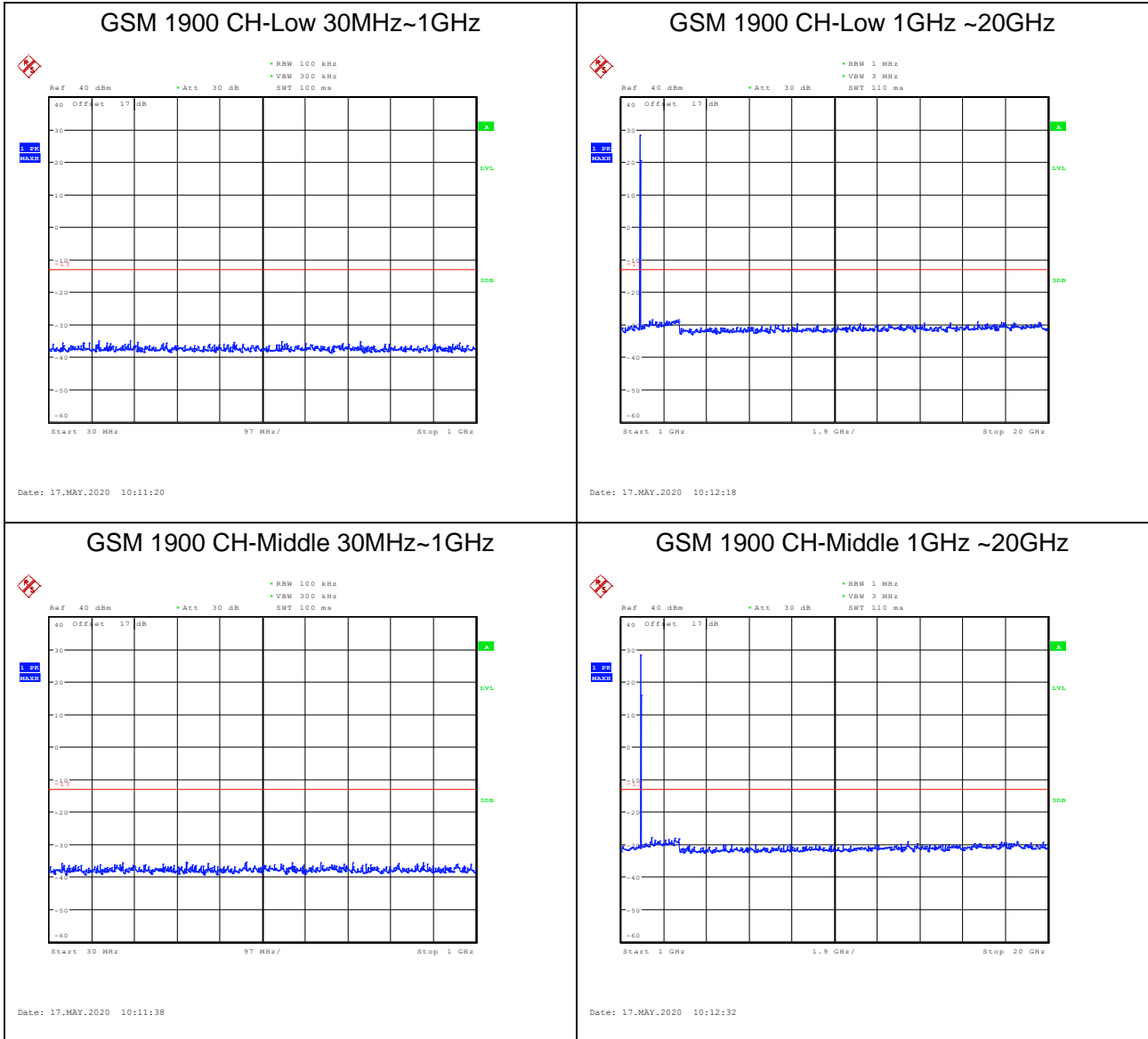
Measurement Uncertainty

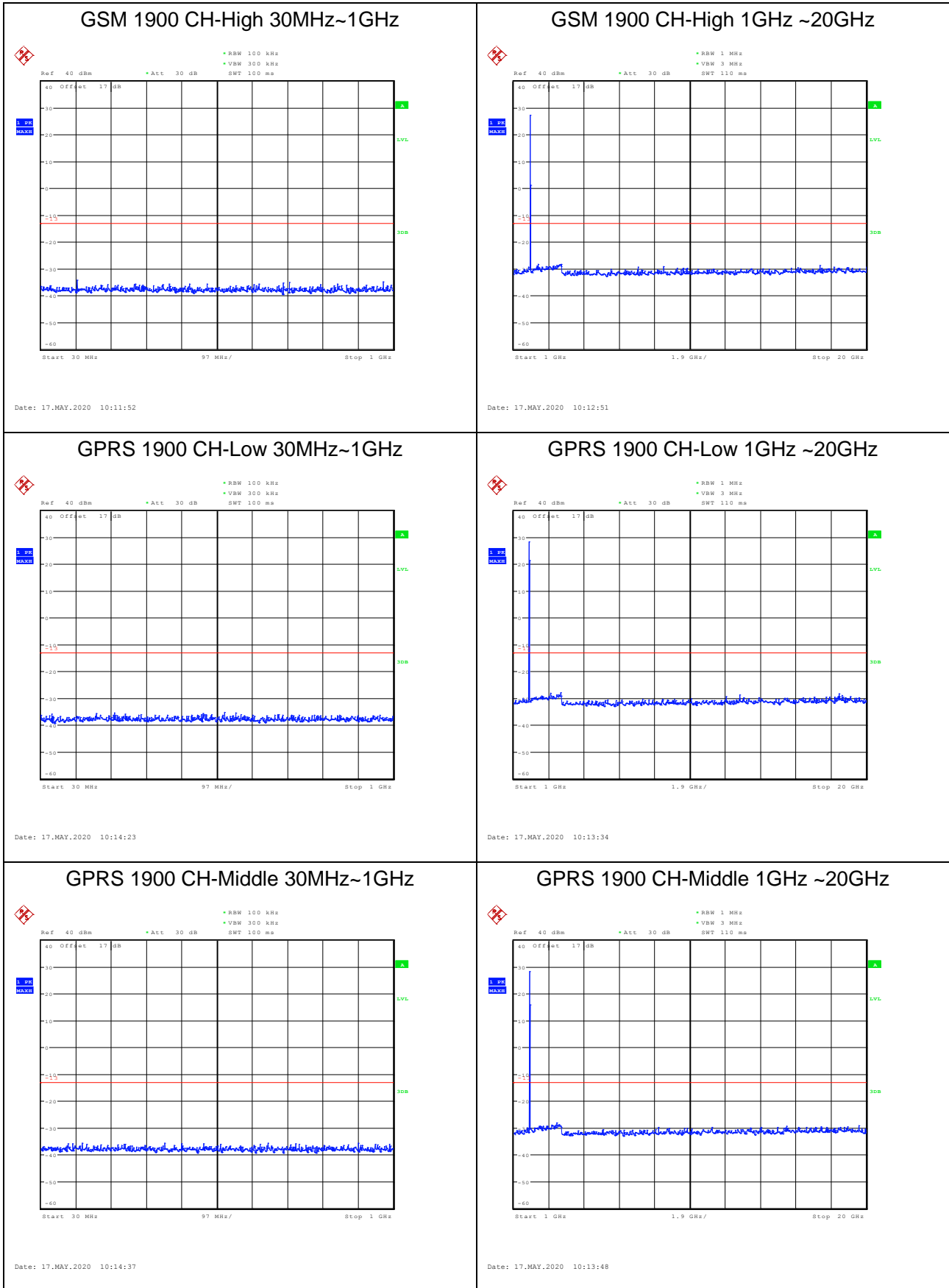
The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

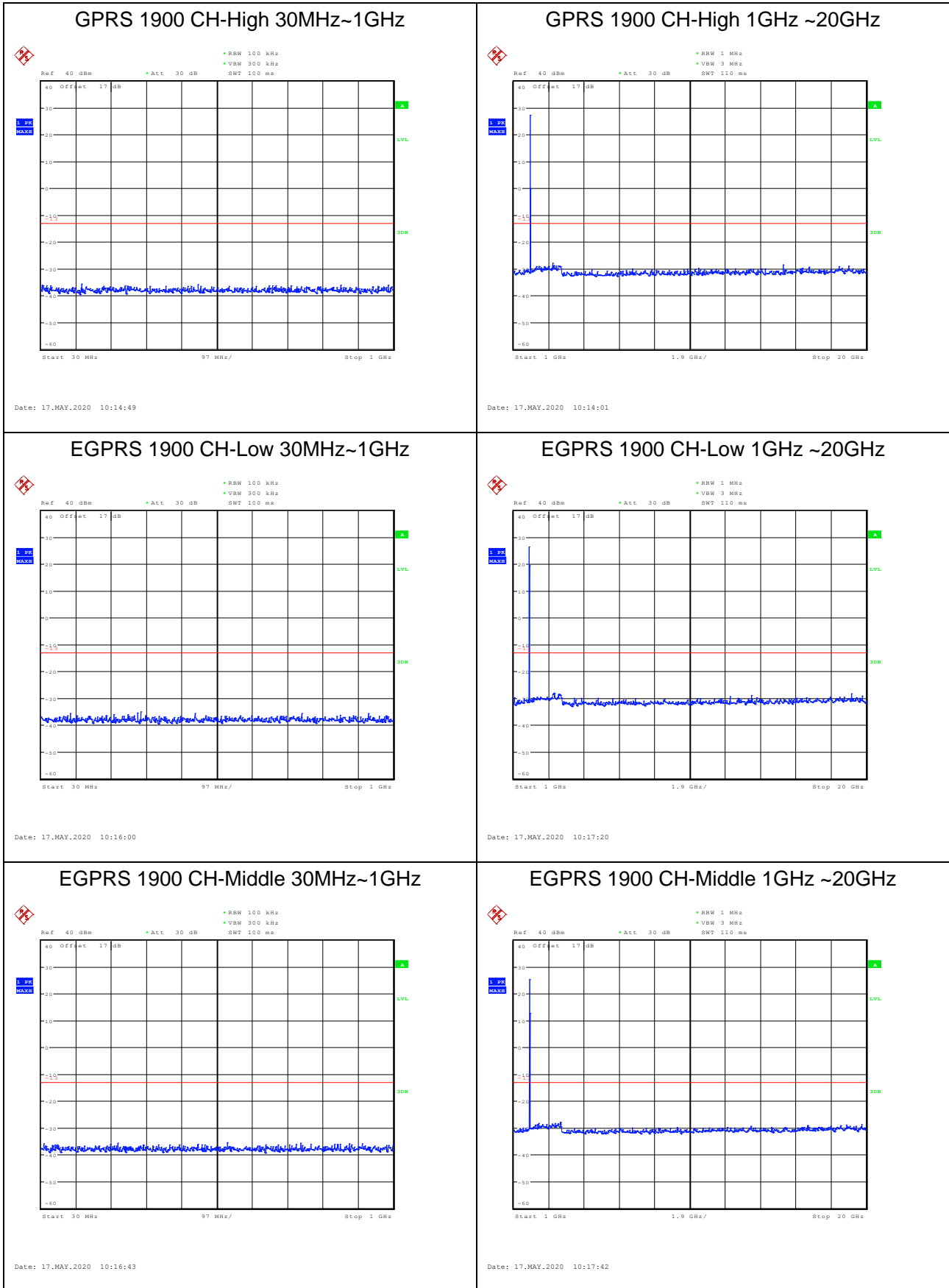
Frequency	Uncertainty
30MHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

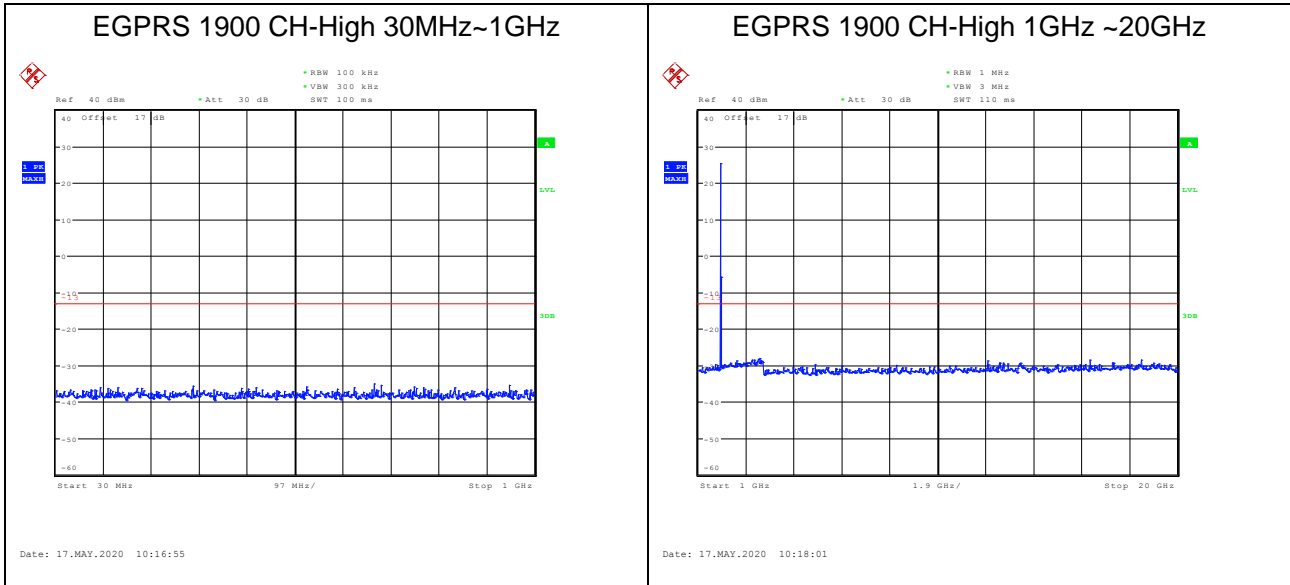
Test Result

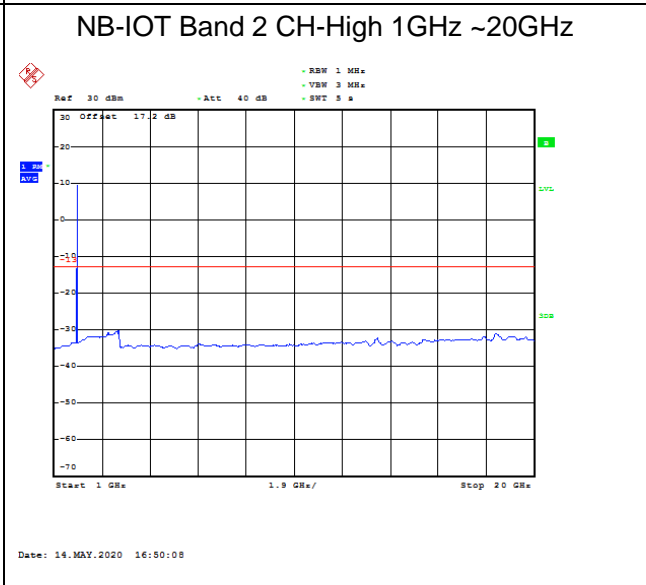
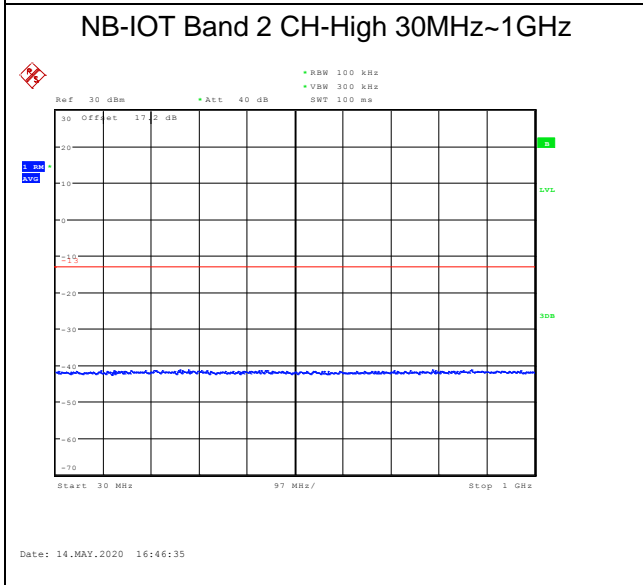
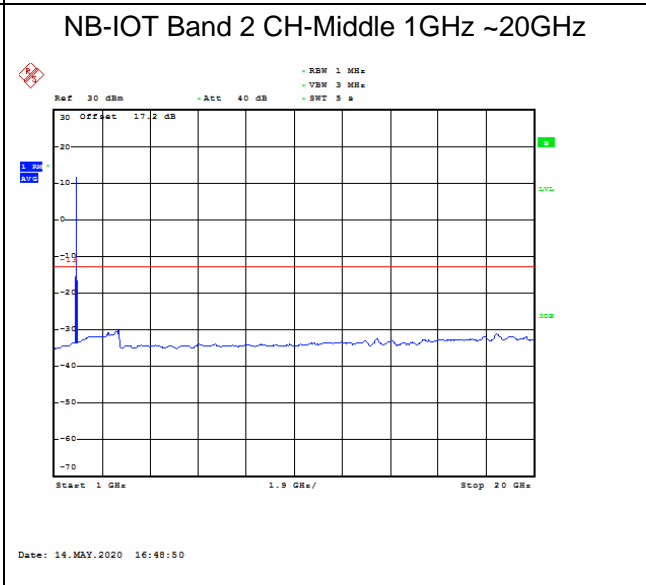
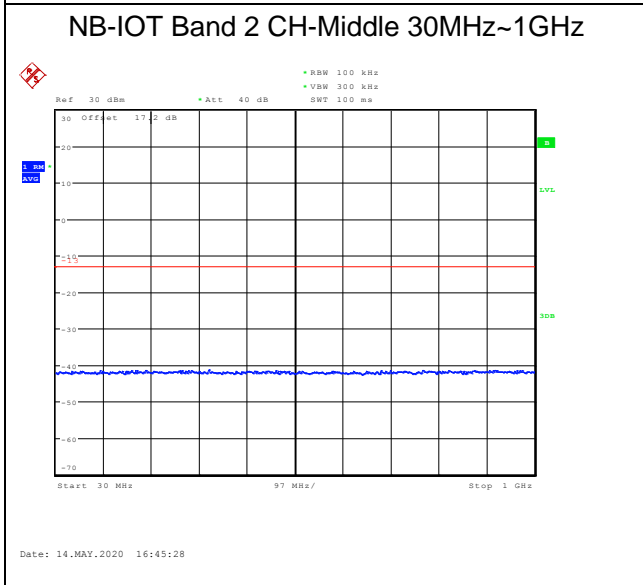
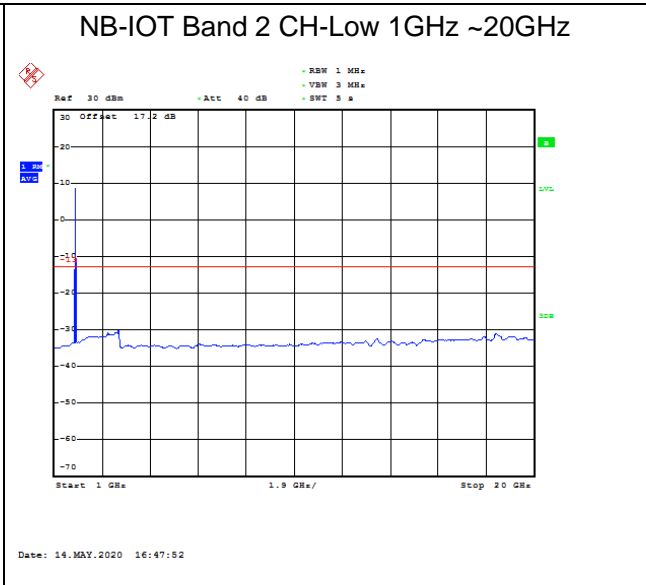
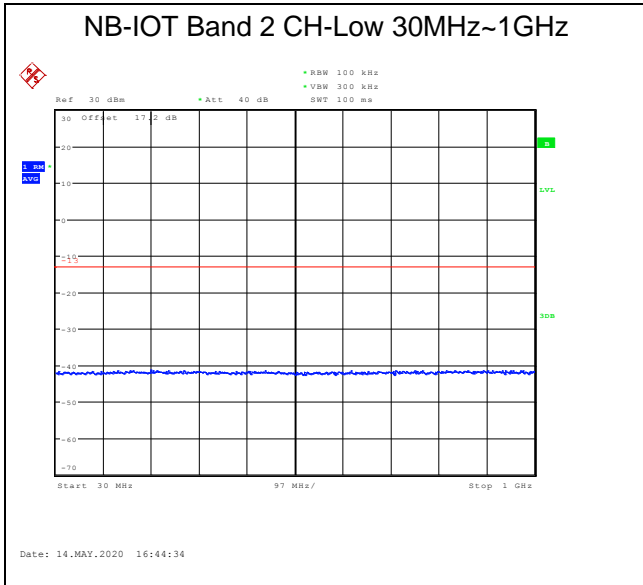
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported. The signal beyond the limit is carrier.





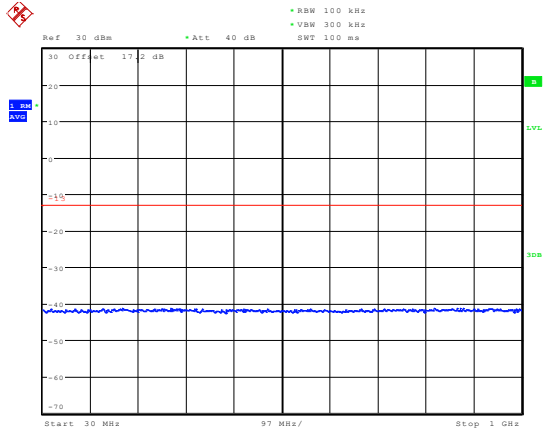






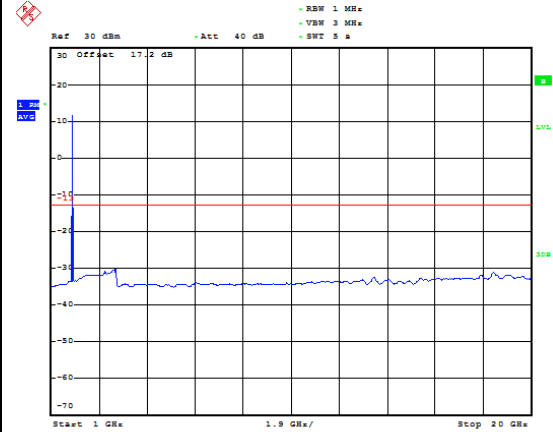


NB-IOT Band 25 CH-Low 30MHz~1GHz



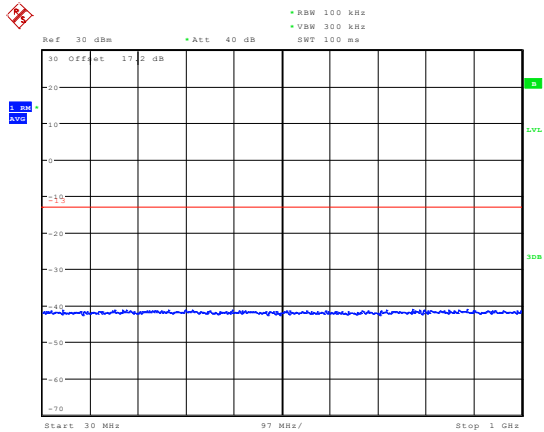
Date: 14.MAY.2020 17:31:07

NB-IOT Band 25 CH-Low 1GHz ~20GHz



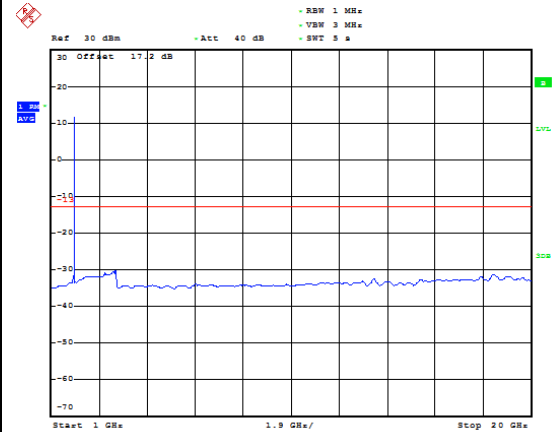
Date: 14.MAY.2020 17:31:59

NB-IOT Band 25 CH-Middle 30MHz~1GHz



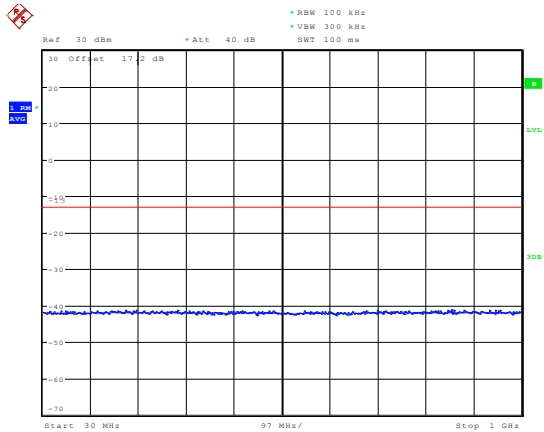
Date: 14.MAY.2020 17:31:17

NB-IOT Band 25 CH-Middle 1GHz ~20GHz



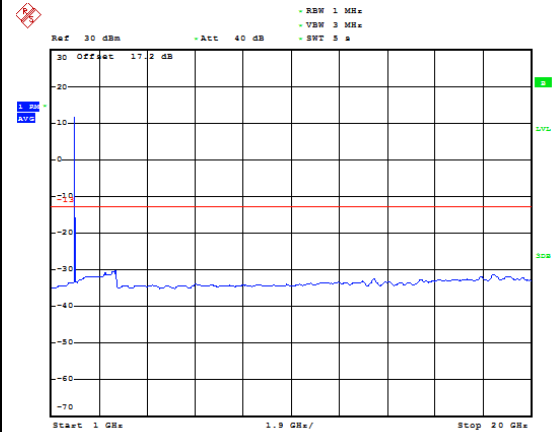
Date: 14.MAY.2020 17:32:56

NB-IOT Band 25 CH-High 30MHz~1GHz



Date: 14.MAY.2020 17:31:25

NB-IOT Band 25 CH-High 1GHz ~20GHz



Date: 14.MAY.2020 17:34:12

5.7. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

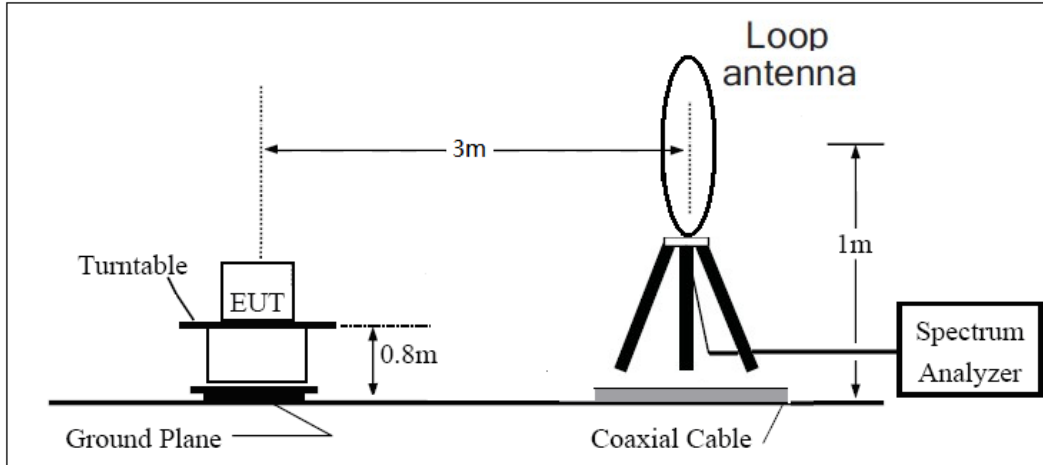
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:
Power(EIRP)=PMea- PAg - Pcl + Ga
The measurement results are amend as described below:
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $ERP = EIRP - 2.15\text{dBi}$.

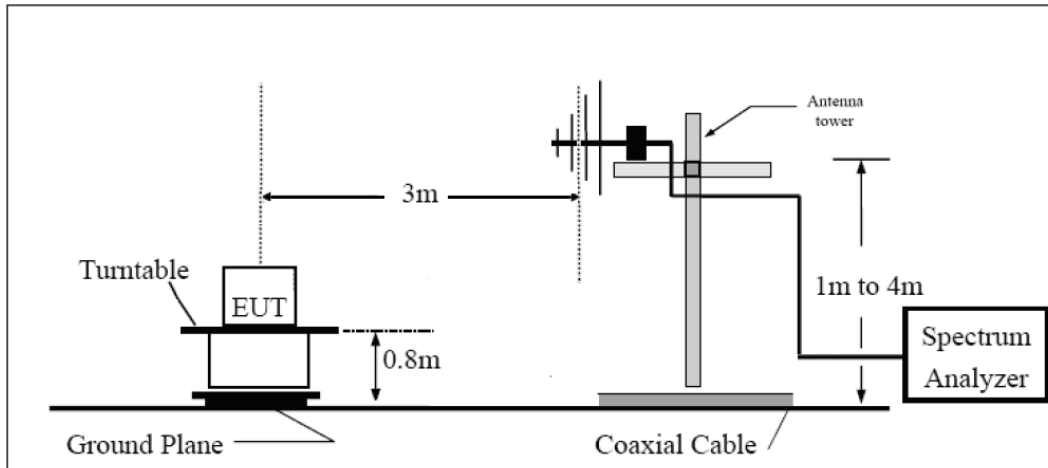
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

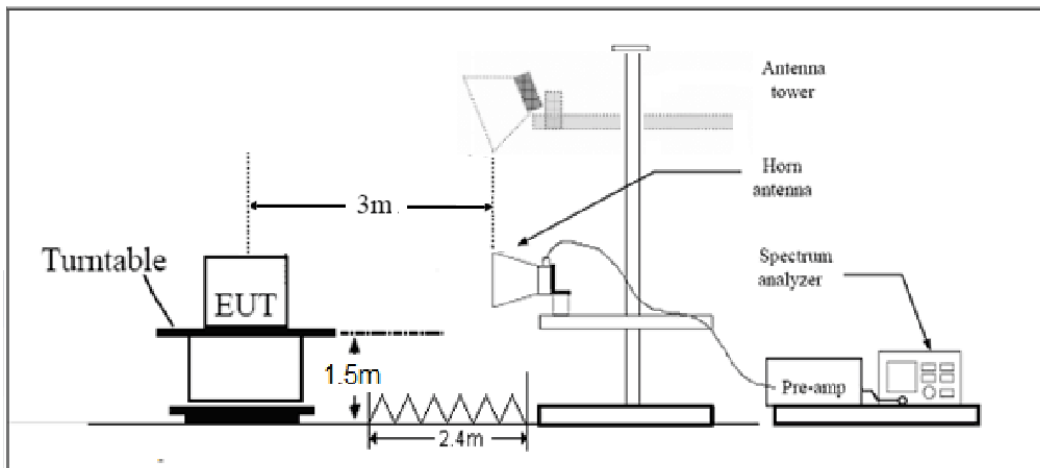
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz





Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-56.72	5.10	11.05	Horizontal	-50.77	-13.00	37.77	225
3	5640.0	-61.63	5.42	12.65	Horizontal	-54.40	-13.00	41.40	90
4	7520.0	-57.25	6.70	13.85	Horizontal	-50.10	-13.00	37.10	315
5	9400.0	-55.34	7.01	14.75	Horizontal	-47.60	-13.00	34.60	225
6	11280.0	-55.07	7.48	15.95	Horizontal	-46.60	-13.00	33.60	45
7	13160.0	-55.34	7.51	16.55	Horizontal	-46.30	-13.00	33.30	0
8	15040.0	-52.31	8.24	15.35	Horizontal	-45.20	-13.00	32.20	90
9	16920.0	-48.49	8.41	14.95	Horizontal	-41.95	-13.00	28.95	45
10	18800.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.

NB-IOT Band 2 15kHz QPSK CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.2	-62.23	5.10	11.05	Horizontal	-56.28	-13.00	43.28	90
3	5550.3	-61.68	5.42	12.65	Horizontal	-54.45	-13.00	41.45	270
4	7400.4	-57.51	6.70	13.85	Horizontal	-50.36	-13.00	37.36	45
5	9250.5	-56.43	7.01	14.75	Horizontal	-48.69	-13.00	35.69	315
6	11100.6	-55.24	7.48	15.95	Horizontal	-46.77	-13.00	33.77	0
7	12950.7	-54.18	7.51	16.55	Horizontal	-45.14	-13.00	32.14	45
8	14800.8	-50.82	8.24	15.35	Horizontal	-43.71	-13.00	30.71	45
9	16650.9	-51.44	8.41	14.95	Horizontal	-44.90	-13.00	31.90	270
10	18501.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.

NB-IOT Band 2 15kHz QPSK CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-62.33	5.10	11.05	Horizontal	-56.38	-13.00	43.38	90
3	5640.0	-62.76	5.42	12.65	Horizontal	-55.53	-13.00	42.53	45
4	7520.0	-58.84	6.70	13.85	Horizontal	-51.69	-13.00	38.69	270
5	9400.0	-55.70	7.01	14.75	Horizontal	-47.96	-13.00	34.96	0
6	11280.0	-54.39	7.48	15.95	Horizontal	-45.92	-13.00	32.92	0
7	13160.0	-55.19	7.51	16.55	Horizontal	-46.15	-13.00	33.15	315
8	15040.0	-53.06	8.24	15.35	Horizontal	-45.95	-13.00	32.95	135
9	16920.0	-51.60	8.41	14.95	Horizontal	-45.06	-13.00	32.06	45
10	18800.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.

NB-IOT Band 2 15kHz QPSK CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3819.8	-59.59	5.10	11.05	Horizontal	-53.64	-13.00	40.64	270
3	5729.7	-62.14	5.42	12.65	Horizontal	-54.91	-13.00	41.91	45
4	7639.6	-57.11	6.70	13.85	Horizontal	-49.96	-13.00	36.96	90
5	9549.5	-55.95	7.01	14.75	Horizontal	-48.21	-13.00	35.21	90
6	11459.4	-53.48	7.48	15.95	Horizontal	-45.01	-13.00	32.01	0
7	13369.3	-54.15	7.51	16.55	Horizontal	-45.11	-13.00	32.11	315
8	15279.2	-51.73	8.24	15.35	Horizontal	-44.62	-13.00	31.62	180
9	17189.1	-50.06	8.41	14.95	Horizontal	-43.52	-13.00	30.52	45
10	19099.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.

NB-IOT Band 25 15kHz QPSK CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3700.2	-63.38	5.10	11.05	Horizontal	-57.43	-13.00	44.43	90
3	5550.3	-62.84	5.42	12.65	Horizontal	-55.61	-13.00	42.61	135
4	7400.4	-57.85	6.70	13.85	Horizontal	-50.70	-13.00	37.70	180
5	9250.5	-56.41	7.01	14.75	Horizontal	-48.67	-13.00	35.67	315
6	11100.6	-56.78	7.48	15.95	Horizontal	-48.31	-13.00	35.31	45
7	12950.7	-54.14	7.51	16.55	Horizontal	-45.10	-13.00	32.10	270
8	14800.8	-52.34	8.24	15.35	Horizontal	-45.23	-13.00	32.23	180
9	16650.9	-51.03	8.41	14.95	Horizontal	-44.49	-13.00	31.49	225
10	18501.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.

NB-IOT Band 25 15kHz QPSK CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3765.0	-62.62	5.10	11.05	Horizontal	-56.67	-13.00	43.67	225
3	5647.5	-62.94	5.42	12.65	Horizontal	-55.71	-13.00	42.71	0
4	7530.0	-58.24	6.70	13.85	Horizontal	-51.09	-13.00	38.09	180
5	9412.5	-56.39	7.01	14.75	Horizontal	-48.65	-13.00	35.65	315
6	11295.0	-55.60	7.48	15.95	Horizontal	-47.13	-13.00	34.13	90
7	13177.5	-55.24	7.51	16.55	Horizontal	-46.20	-13.00	33.20	45
8	15060.0	-52.35	8.24	15.35	Horizontal	-45.24	-13.00	32.24	315
9	16942.5	-50.52	8.41	14.95	Horizontal	-43.98	-13.00	30.98	180
10	18825.0	-	-	-	-	-	-	-	-

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.
 2. The worst emission was found in the antenna is Horizontal position.



NB-IOT Band 25 15kHz QPSK CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3829.8	-58.86	5.10	11.05	Horizontal	-52.91	-13.00	39.91	135
3	5744.7	-62.31	5.42	12.65	Horizontal	-55.08	-13.00	42.08	45
4	7659.6	-57.29	6.70	13.85	Horizontal	-50.14	-13.00	37.14	0
5	9574.5	-57.04	7.01	14.75	Horizontal	-49.30	-13.00	36.30	90
6	11489.4	-54.56	7.48	15.95	Horizontal	-46.09	-13.00	33.09	180
7	13404.3	-54.41	7.51	16.55	Horizontal	-45.37	-13.00	32.37	315
8	15319.2	-53.88	8.24	15.35	Horizontal	-46.77	-13.00	33.77	270
9	17234.1	-50.82	8.41	14.95	Horizontal	-44.28	-13.00	31.28	225
10	19149.0	-	-	-	-	-	-	-	-

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2019-05-19	2020-05-18
Base Station Simulator	R&S	CMU200	118133	2020-05-18	2021-05-17
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Base Station Simulator	R&S	CMW500	113824	2020-05-18	2021-05-17
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-12-15	2020-12-14
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2019-05-19	2020-05-18
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2020-05-18	2021-05-17
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Signal generator	R&S	SMB 100A	102594	2020-05-18	2021-05-17
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preampflier	R&S	SCU18	102327	2019-05-19	2020-05-18
Preampflier	R&S	SCU18	102327	2020-05-18	2021-05-17
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2020-05-18	2021-05-17
RF Cable	Agilent	SMA 15cm	0001	2019-12-13	2020-06-12
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****