TEST REPORT

Product Name:	Asset GPS Tracker
FCC ID:	2AUVX-KW06S
Trademark:	N/A
Model Number:	NT06EF, NT06E
Prepared For:	Shenzhen Kingwo IoT Co., Ltd.
Address:	Room 703, Block A, R&D Building, Tsinghua Information High-Tech Park, Nanshan, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Kingwo IoT Co., Ltd.
Address:	Room 703, Block A, R&D Building, Tsinghua Information High-Tech Park, Nanshan, Shenzhen, Guangdong, China
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China
Sample Received Date:	Apr. 20, 2020
Sample tested Date:	Apr. 20, 2020 to Apr. 28, 2020
Issue Date:	Apr. 28, 2020
Report No.:	CTB200429003RFX
Test Standards	47 CFR Part 2(2015) 47 CFR Part 24 subpart E(2015)
Test Results	PASS
Remark:	This is EMTC radio test report.

Compiled by:	Reviewed by:	Approved by:
Victory	Rita Xiao	Sherwin Qian/ Director

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

TABLE OF CONTENT

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
CTB200429003RFX	Apr. 28, 2020	Original	Valid

2. TEST SUMMARY

The Product has been tested according to the following specifications:

Test Item	Test Requirement	Test method	Result
Conducted output power	Part 2.1046(a) /Part 24.232(c)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Effective Radiated Power of Transmitter(EIRP)	Part 2.1046(a) / Part 24.232(c)	TIA-603-E-2016 & KDB 971168 D01v02r02 & KDB 412172 D01 v01r01	PASS
peak-to-average ratio	Part 24.232(d)	KDB 971168 D01v02r02	PASS
99% &26dBOccupied Bandwidth	Part 2.1049(h)	Part 24.238(b) & KDB 971168 D01v02r02	PASS
Band Edge at antenna terminals	Part 2.1051/ Part 24.238(a)	Part 24.238(b) & KDB 971168 D01v02r02	PASS
Spurious emissions at antenna terminals	Part 2.1051/ Part 2.1057/ Part 24.238(a)(b)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Field strength of spurious radiation	Part 2.1053 /Part 2.1057 / Part 24.238(a)(b)	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS
Frequency stability	Part 2.1055/Part 24.235	TIA-603-E-2016 & KDB 971168 D01v02r02	PASS

3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Occupancy bandwidth	U=±54.3Hz
Conducted output power Above 1G	U=±1.0dB
Conducted output power below 1G	U=±0.9dB
Power Spectral Density , Conduction	U=±1.0dB
Conduction spurious emissions	U=±2.8dB
Out of band emission	U=±54Hz
3m camber Radiated spurious emission(30MHz-1GHz)	U=±4.3dB
3m chamber Radiated spurious emission(1GHz-18GHz)	U=±4.5dB
humidity uncertainty	U=±5.3%
Temperature uncertainty	U=±0.59℃
Supply voltages	U=±3%
Time	U=±5%

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

Model(s):	NT06EF, NT06E
Model Description:	All model's the function, software and electric circuit are the same, only with the product Battery capacity and model named different. Test sample model: NT06EF
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	GPRS/EDGE 850: Tx:824.20 -848.80MHz; Rx: 869.20 – 893.80MHz GPRS/EDGE 1900: Tx:1850.20 – 1909.80MHz; Rx:1930.20 – 1989.80MHz eMTC Band 2: TX:1850 MHz to 1910 MHz, RX:1930 MHz to 1990 MHz. eMTC Band 4: TX:1710 MHz to 1755 MHz, RX:2110 MHz to 2170 MHz. eMTC band 12: TX: 699 MHz to 716 MHz, RX: 729 MHz to746 MHz. eMTC band 13: TX:777 MHz to 787 MHz, RX: 746 MHz to 756 MHz. GPS:1575.42MHz
GSM/GPRS Power Class:	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class:	EGPRS/GPRS: Multi-slot Class 12
GSM Release Version:	N/A
GPRS operation mode:	Class B
LTE Power Class:	Class 3
Type of Modulation:	GPRS Mode with GMSK Modulation EDGE Mode with 8PSK Modulation eMTC Mode with QPSK,16QAM Modulation
Antenna installation:	Internal antenna
Antenna Gain:	GSM 850: 1dBi, GSM 1900: 2.4dBi, eMTC Band 2: 2.5dBi, eMTC Band 4: 2.3dBi eMTC Band 12: 0.8dBi, eMTC Band 13: 0.9dBi
Ratings:	Battery AA 3.6V

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1	Laptop	DELL	Inspiron5570	JR4G1A00DPC	AE
2	AC Adaptor	DELL	HA45NM140	CN-00285K-CH200-88V-OEYC-A06	AE

Notes:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Test Frequency ID	Number [UL]	Frequency of Uplink(MHz)
GPRS/EGPRS 1900 Tx:1850.20–1909.80MHz; Rx:1930.20–1989.80MHz	Low Range	512	1850.2
	Mid Range	661	1880
	High Range	810	1909.8

Test Mode	Test Frequency ID	Bandwidth (MHz)	Number [UL]	Frequency of Uplink(MHz)	Number [DL]	Frequency of Downlink(MHz)
LTE band 2 TX:1850-1910MHz RX:1930–1990MHz	Low Range	1.4	18607	1850.7	607	1930.7
		3	18615	1851.5	615	1931.5
		5	18625	1852.5	625	1932.5
		10	18650	1855	650	1935
		15	18675	1857.5	675	1937.5
		20	18700	1860	700	1940
	Mid Range	1.4/3/5/10/15/20	18900	1880	900	1960
	High Range	1.4	19193	1909.3	1193	1989.3
		3	19185	1908.5	1185	1988.5
		5	19175	1907.5	1175	1987.5
		10	19150	1905	1150	1985
		15	19125	1902.5	1125	1982.5
		20	19100	1900	1100	1980

4.5 Test Environment

Humidity(%):	55
Atmospheric Pressure(kPa):	101.1
Normal Voltage(DC):	3.6
Low Voltage(DC):	3.24
High Voltage(DC):	3.96
Normal Temperature(℃)	25
Low Temperature(℃)	0
High Temperature(℃)	40

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

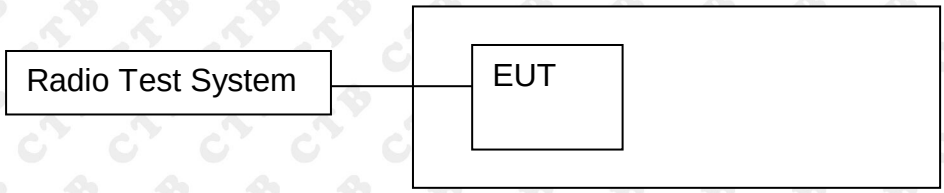
5.2 Test Instrument Used

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	Oct. 17, 2019	Oct. 16, 2020
2	Power Sensor	Agilent	U2021XA	MY56120032	Nov. 02, 2019	Nov. 01, 2020
3	Power Sensor	Agilent	U2021XA	MY56120034	Nov. 02, 2019	Nov. 01, 2020
4	Communication test set	R&S	CMW500	118735	Nov. 02, 2019	Nov. 01, 2020
5	Spectrum Analyzer	R&S	FSP40	100550	Nov. 02, 2019	Nov. 01, 2020
6	Signal Generator	Agilent	N5181A	MY49060920	Nov. 03, 2019	Nov. 02, 2020
7	Signal Generator	Agilent	N5182A	MY47420195	Nov. 03, 2019	Nov. 02, 2020
8	Communication test set	R&S	CMU200	119978	Nov. 02, 2019	Nov. 01, 2020
9	band rejection filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	Nov. 02, 2019	Nov. 01, 2020
10	band rejection filter	Shenxiang	MSF5150-5850MS-1155	20181015001	Nov. 02, 2019	Nov. 01, 2020
11	band rejection filter	Xingbo	XBLBQ-DZA120	190821-1-1	Nov. 02, 2019	Nov. 01, 2020
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	\	\
13	Rohde & Schwarz SFU Broadcast Test System	R&S	SFU	101017	Nov. 02, 2019	Nov. 01, 2020
14	Temperature humidity chamber	Hongjing	TH-80CH	DG-15174	Nov. 02, 2019	Nov. 01, 2020
15	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	\	\
16	966 chamber	C.R.T.	966 Room	966	Nov. 10, 2019	Nov. 09, 2020
17	Receiver	R&S	ESPI	100362	Nov. 02, 2019	Nov. 01, 2020

18	Amplifier	HP	8447E	2945A02747	Nov. 03, 2019	Nov. 02, 2020
19	Amplifier	Agilent	8449B	3008A01838	Nov. 03, 2019	Nov. 02, 2020
20	TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	869	Nov. 02, 2019	Nov. 01, 2020
21	Horn Antenna	Schwarzbeck	BBHA9120D	1911	Nov. 02, 2019	Nov. 01, 2020
22	Software	Fala	EZ-EMC	FA-03A2 RE	\	\
23	3-Loop Antenna	Daze	ZN30401	17014	Nov. 02, 2019	Nov. 01, 2020
24	loop antenna	ZHINAN	ZN30900A	/	Nov. 02, 2019	Nov. 01, 2020
25	Horn antenna	A/H/System	SAS-574	588	Nov. 02, 2019	Nov. 01, 2020
26	Amplifier	AEROFLEX	/	S/N/ 097	Nov. 02, 2019	Nov. 01, 2020

6. CONDUCTED OUTPUT POWER

6.1 Block Diagram Of Test Setup



6.2 Limit

Mode	LTE band 2
Limit	33.01dBm（2W）

6.3 Test procedure

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

6.4 Test Result

GSM1900		Conducted Power(dBm)		
		LCH	MCH	HCH
GPRS (GMSK)	1TXslot	29.04	29.76	29.96
	2TXslot	29.64	29.87	29.66
	3TXslot	29.45	29.06	29.53
	4TXslot	29.31	29.43	29.43
EGPRS (8PSK)	1TXslot	25.60	25.47	25.56
	2TXslot	25.04	25.02	25.41
	3TXslot	25.70	25.68	25.48
	4TXslot	25.62	25.77	25.26

Channel Bandwidth: 1.4 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	23.88	PASS
		1	3	24.13	PASS
		1	5	23.88	PASS
		3	0	23.08	PASS
		3	2	23.09	PASS
		3	3	23.31	PASS
		6	0	22.14	PASS
	MCH	1	0	23.93	PASS
		1	3	23.94	PASS
		1	5	23.82	PASS
		3	0	23.17	PASS
		3	2	22.78	PASS
		3	3	22.74	PASS
		6	0	22.89	PASS
	HCH	1	0	24.30	PASS
		1	3	24.23	PASS
		1	5	24.44	PASS
		3	0	23.62	PASS
		3	2	23.54	PASS
		3	3	23.27	PASS
		6	0	22.46	PASS
16QAM	LCH	1	0	24.17	PASS
		1	3	23.91	PASS
		1	5	23.98	PASS
		3	0	23.45	PASS
		3	2	23.31	PASS
		3	3	22.94	PASS
		5	0	22.37	PASS
	MCH	1	0	23.96	PASS
		1	3	24.23	PASS
		1	5	24.12	PASS
		3	0	23.16	PASS
		3	2	23.07	PASS
		3	3	22.78	PASS
		5	0	22.82	PASS
	HCH	1	0	24.65	PASS
		1	3	24.32	PASS
		1	5	24.46	PASS
		3	0	23.20	PASS
		3	2	23.33	PASS

		3	3	23.58	PASS
		5	0	22.58	PASS

Channel Bandwidth: 3 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.20	PASS
		1	3	23.87	PASS
		1	5	24.24	PASS
		3	0	23.42	PASS
		3	2	23.01	PASS
		3	3	23.11	PASS
		6	0	22.53	PASS
	MCH	1	0	23.95	PASS
		1	3	24.25	PASS
		1	5	24.02	PASS
		3	0	22.77	PASS
		3	2	23.18	PASS
		3	3	23.04	PASS
		6	0	22.89	PASS
	HCH	1	0	24.59	PASS
		1	3	24.62	PASS
		1	5	24.19	PASS
		3	0	23.60	PASS
		3	2	23.45	PASS
		3	3	23.33	PASS
		6	0	22.24	PASS
16QAM	LCH	1	0	24.13	PASS
		1	3	23.85	PASS
		1	5	23.96	PASS
		3	0	23.09	PASS
		3	2	23.07	PASS
		3	3	22.96	PASS
		5	0	22.27	PASS
	MCH	1	0	24.14	PASS
		1	3	23.96	PASS
		1	5	24.02	PASS
		3	0	22.76	PASS
		3	2	23.03	PASS
		3	3	22.84	PASS
		5	0	22.79	PASS
	HCH	1	0	24.33	PASS
		1	3	24.69	PASS
		1	5	24.25	PASS
		3	0	23.55	PASS
		3	2	23.64	PASS
		3	3	23.27	PASS
		5	0	22.61	PASS

Channel Bandwidth: 5 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.28	PASS
		1	3	23.78	PASS
		1	5	24.40	PASS
		3	0	23.10	PASS
		3	2	23.30	PASS
		3	3	23.24	PASS
		6	0	23.23	PASS
	MCH	1	0	24.03	PASS
		1	3	23.78	PASS
		1	5	23.91	PASS
		3	0	22.72	PASS
		3	2	22.76	PASS
		3	3	22.86	PASS
		6	0	22.84	PASS
	HCH	1	0	24.13	PASS
		1	3	24.34	PASS
		1	5	24.43	PASS
		3	0	23.35	PASS
		3	2	23.27	PASS
		3	3	23.19	PASS
		6	0	23.44	PASS
16QAM	LCH	1	0	24.16	PASS
		1	3	23.77	PASS
		1	5	24.01	PASS
		3	0	23.40	PASS
		3	2	23.09	PASS
		3	3	23.24	PASS
		5	0	23.48	PASS
	MCH	1	0	24.01	PASS
		1	3	23.69	PASS
		1	5	24.23	PASS
		3	0	22.94	PASS
		3	2	22.92	PASS
		3	3	22.94	PASS
		5	0	23.01	PASS
	HCH	1	0	24.00	PASS
		1	3	24.03	PASS
		1	5	24.51	PASS
		3	0	23.19	PASS
		3	2	23.23	PASS
		3	3	23.36	PASS
		5	0	23.43	PASS

Channel Bandwidth: 10 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.24	PASS
		1	3	24.01	PASS
		1	5	24.01	PASS
		3	0	23.41	PASS
		3	2	23.32	PASS
		3	3	23.45	PASS
		6	0	23.48	PASS
	MCH	1	0	23.95	PASS
		1	3	23.79	PASS
		1	5	24.28	PASS
		3	0	22.89	PASS
		3	2	22.73	PASS
		3	3	22.77	PASS
		6	0	22.91	PASS
	HCH	1	0	24.12	PASS
		1	3	24.02	PASS
		1	5	24.64	PASS
		3	0	23.20	PASS
		3	2	23.59	PASS
		3	3	23.56	PASS
		6	0	23.38	PASS
16QAM	LCH	1	0	24.43	PASS
		1	3	23.85	PASS
		1	5	24.13	PASS
		3	0	23.43	PASS
		3	2	23.22	PASS
		3	3	23.48	PASS
		5	0	23.30	PASS
	MCH	1	0	24.03	PASS
		1	3	23.84	PASS
		1	5	23.98	PASS
		3	0	23.03	PASS
		3	2	22.87	PASS
		3	3	22.86	PASS
		5	0	23.11	PASS
	HCH	1	0	24.17	PASS
		1	3	24.37	PASS
		1	5	24.19	PASS
		3	0	23.40	PASS
		3	2	23.42	PASS
		3	3	23.57	PASS
		5	0	23.64	PASS

Channel Bandwidth: 15 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.28	PASS
		1	3	24.21	PASS
		1	5	24.23	PASS
		3	0	23.28	PASS
		3	2	23.43	PASS
		3	3	23.25	PASS
		6	0	23.06	PASS
	MCH	1	0	24.09	PASS
		1	3	23.85	PASS
		1	5	23.96	PASS
		3	0	23.00	PASS
		3	2	22.79	PASS
		3	3	23.10	PASS
		6	0	23.14	PASS
	HCH	1	0	23.83	PASS
		1	3	23.93	PASS
		1	5	24.45	PASS
		3	0	23.15	PASS
		3	2	23.62	PASS
		3	3	23.40	PASS
		6	0	23.53	PASS
16QAM	LCH	1	0	24.33	PASS
		1	3	24.05	PASS
		1	5	24.30	PASS
		3	0	23.21	PASS
		3	2	23.17	PASS
		3	3	23.08	PASS
		5	0	23.15	PASS
	MCH	1	0	24.04	PASS
		1	3	23.72	PASS
		1	5	23.95	PASS
		3	0	22.85	PASS
		3	2	22.90	PASS
		3	3	22.77	PASS
		5	0	23.22	PASS
	HCH	1	0	24.01	PASS
		1	3	24.16	PASS
		1	5	24.45	PASS
		3	0	23.43	PASS
		3	2	23.29	PASS
		3	3	23.58	PASS
		5	0	23.22	PASS

Channel Bandwidth: 20 MHz

Modulation	Channel	RB Configuration		Average Power [dBm]	Verdict
		Size	Offset		
QPSK	LCH	1	0	24.28	PASS
		1	3	23.87	PASS
		1	5	24.40	PASS
		3	0	23.20	PASS
		3	2	23.20	PASS
		3	3	23.41	PASS
		6	0	23.38	PASS
	MCH	1	0	23.97	PASS
		1	3	23.70	PASS
		1	5	24.17	PASS
		3	0	22.97	PASS
		3	2	22.72	PASS
		3	3	23.09	PASS
		6	0	22.90	PASS
	HCH	1	0	24.00	PASS
		1	3	24.30	PASS
		1	5	24.55	PASS
		3	0	23.48	PASS
		3	2	23.44	PASS
		3	3	23.57	PASS
		6	0	23.57	PASS
16QAM	LCH	1	0	24.42	PASS
		1	3	24.26	PASS
		1	5	24.33	PASS
		3	0	23.38	PASS
		3	2	23.48	PASS
		3	3	23.27	PASS
		5	0	23.37	PASS
	MCH	1	0	24.38	PASS
		1	3	23.83	PASS
		1	5	24.32	PASS
		3	0	23.18	PASS
		3	2	22.82	PASS
		3	3	22.74	PASS
		5	0	23.02	PASS
	HCH	1	0	23.82	PASS
		1	3	24.34	PASS
		1	5	24.22	PASS
		3	0	23.21	PASS
		3	2	23.40	PASS
		3	3	23.36	PASS
		5	0	23.47	PASS

7. EFFECTIVE RADIATED POWER OF TRANSMITTER

7.1 Block Diagram Of Test Setup

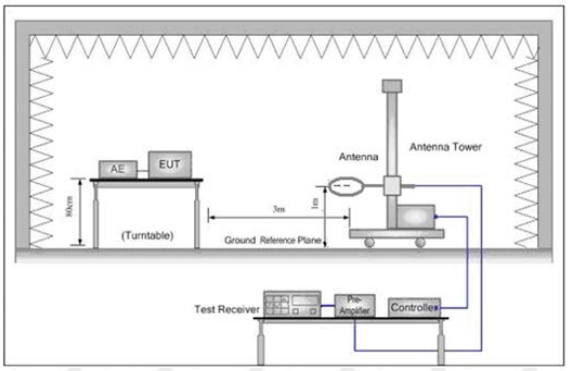


Figure 1. Below 30MHz

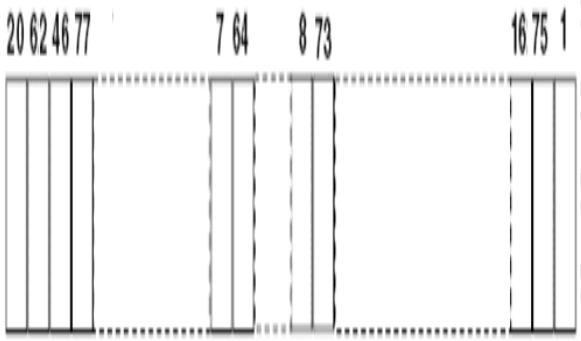


Figure 2. 30MHz to 1GHz

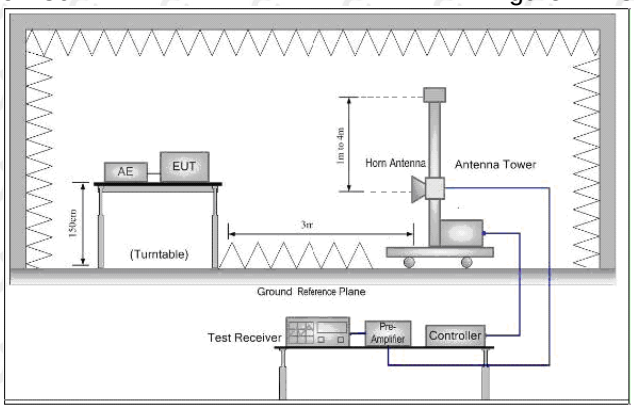


Figure 3. Above 1GHz

7.2 Limit

Rule Part 24.232(c) Mobile and portable stations are limited to 2 watts EIRP.
Rule Part 24.232(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.

Limit (EIRP)	≤ 2 W (33 dBm)

7.3 Test procedure

1. Scan up to 10th harmonic, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Test procedure as below:

1) The EUT was powered ON and placed on a 1.5m hight table at a 3 meter fully Anechoic Chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
2) The EUT was set 3 meters(above 18GHz the distance is 1 meter) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m the receive antenna and by rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
4) Steps 1) to 3) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.

5) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
6) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 3) is obtained for this set of conditions.
7) The output power into the substitution antenna was then measured.
8) Steps 6) and 7)were repeated with both antennas polarized.
9) Calculate power in dBm by the following formula:
ERP(dBm) = Pg(dBm) - cable loss (dB)- + antenna gain (dBd)
EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi)
EIRP=ERP+2.15dB
where:
Pg is the generator output power into the substitution antenna.
10) Test the EUT in the lowest channel, the middle channel the Highest channel
11) The radiation measurements are performed in X, Y, Z axis positioning for EUT operation mode,And found the X axis positioning which it is worse case.

Repeat above procedures until all frequencies measured was complete.

7.4 Test Result

GSM 1900 128 channel (lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1850.2	150	316	31.41	33	1.59	Pass	H
1880	152	96	31.15	33	1.85	Pass	H
1909.8	153	146	30.60	33	2.40	Pass	H
1850.2	151	234	29.99	33	3.01	Pass	V
1880	152	147	31.30	33	1.70	Pass	V
1909.8	150	25	30.99	33	2.01	Pass	V

Band2:

Channel Bandwidth: 1.4 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1850.7	150	316	25.73	33	7.27	Pass	H
1880	152	96	25.52	33	7.48	Pass	H
1909.3	153	146	26.05	33	6.95	Pass	H
1850.7	151	234	26.30	33	6.70	Pass	V
1880	152	147	25.71	33	7.29	Pass	V
1909.3	150	25	26.92	33	6.08	Pass	V

Channel Bandwidth: 3 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1851.5	150	316	25.73	33	7.27	Pass	H
1880	152	96	26.80	33	6.20	Pass	H
1908.5	153	146	25.20	33	7.80	Pass	H
1851.5	151	234	26.62	33	6.38	Pass	V
1880	152	147	26.64	33	6.36	Pass	V

1908.5	150	25	27.08	33	5.92	Pass	V

Channel Bandwidth: 5 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1852.2	150	316	24.99	33	8.01	Pass	H
1880	152	96	25.05	33	7.95	Pass	H
1907.5	153	146	25.89	33	7.11	Pass	H
1852.2	151	234	26.18	33	6.82	Pass	V
1880	152	147	25.45	33	7.55	Pass	V
1907.5	150	25	26.12	33	6.88	Pass	V

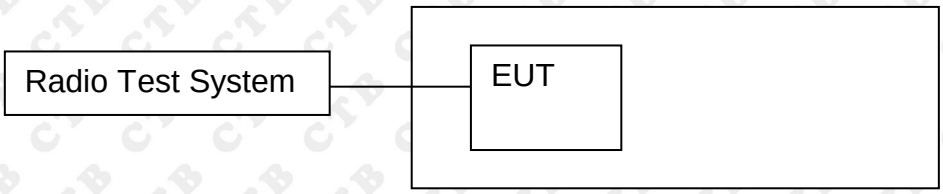
Channel Bandwidth: 10 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1855	150	316	26.42	33	6.58	Pass	H
1880	152	96	26.28	33	6.72	Pass	H
1905	153	146	25.45	33	7.55	Pass	H
1855	151	234	25.29	33	7.71	Pass	V
1880	152	147	24.96	33	8.04	Pass	V
1905	150	25	25.82	33	7.18	Pass	V

Channel Bandwidth: 15 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1857.5	150	316	24.73	33	8.27	Pass	H
1880	152	96	26.21	33	6.79	Pass	H
1902.5	153	146	25.48	33	7.52	Pass	H
1857.5	151	234	25.54	33	7.46	Pass	V
1880	152	147	24.74	33	8.26	Pass	V
1902.5	150	25	25.75	33	7.25	Pass	V

Channel Bandwidth: 20 MHz(lowest channel)							
Frequency (MHz)	Height (cm)	Azimuth (deg)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	Result	Antenna Polaxis.
1860	150	316	26.90	33	6.10	Pass	H
1880	152	96	26.67	33	6.33	Pass	H
1900	153	146	26.38	33	6.62	Pass	H
1860	151	234	27.62	33	5.38	Pass	V
1880	152	147	27.04	33	5.96	Pass	V
1900	150	25	25.30	33	7.70	Pass	V

8. PEAK-TO-AVERAGE RATIO

8.1 Block Diagram Of Test Setup



8.2 Limit

13dBm

8.3 Test procedure

Use one of the procedures to measure the total peak power and record as PPk. Use one of the applicable procedures to 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)

8.4 Test Result

Mode	Channel	Frequency (MHz)	Peak-to-Average Ratio (dB)	Limit(dB)	Conclusion
GPRS (GMSK)	LCH	1850.2	10.16	<13	PASS
	MCH	1880	9.78	<13	PASS
	HCH	1909.8	9.81	<13	PASS
EGPRS (8PSK)	LCH	1850.2	9.55	<13	PASS
	MCH	1880	9.67	<13	PASS
	HCH	1909.8	9.76	<13	PASS

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio (dB)	Limit (dB)	Verdict
		Size	Offset			
QPSK	LCH	6	0	9.34	<13	PASS
	MCH	6	0	10.32	<13	PASS
	HCH	6	0	9.43	<13	PASS
16QAM	LCH	5	0	10.32	<13	PASS
	MCH	5	0	10.35	<13	PASS
	HCH	5	0	9.56	<13	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	11.84	<13	PASS
	MCH	6	0	10.71	<13	PASS
	HCH	6	0	10.25	<13	PASS
16QAM	LCH	5	0	11.43	<13	PASS
	MCH	5	0	10.54	<13	PASS
	HCH	5	0	9.41	<13	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	9.47	<13	PASS
	MCH	6	0	9.54	<13	PASS
	HCH	6	0	9.26	<13	PASS
16QAM	LCH	5	0	9.62	<13	PASS
	MCH	5	0	9.84	<13	PASS
	HCH	5	0	9.81	<13	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.53	<13	PASS
	MCH	6	0	10.54	<13	PASS
	HCH	6	0	9.23	<13	PASS
16QAM	LCH	5	0	9.54	<13	PASS
	MCH	5	0	10.83	<13	PASS
	HCH	5	0	9.96	<13	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.22	<13	PASS
	MCH	6	0	9.85	<13	PASS
	HCH	6	0	11.04	<13	PASS
16QAM	LCH	5	0	8.32	<13	PASS
	MCH	5	0	9.83	<13	PASS
	HCH	5	0	9.57	<13	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Peak-to-Average Ratio [dB]	Limit [dB]	Verdict
		Size	Offset			
QPSK	LCH	6	0	10.21	<13	PASS
	MCH	6	0	11.37	<13	PASS
	HCH	6	0	10.14	<13	PASS
16QAM	LCH	5	0	10.20	<13	PASS
	MCH	5	0	12.12	<13	PASS
	HCH	5	0	10.05	<13	PASS

Test Graphs
GSM 1900

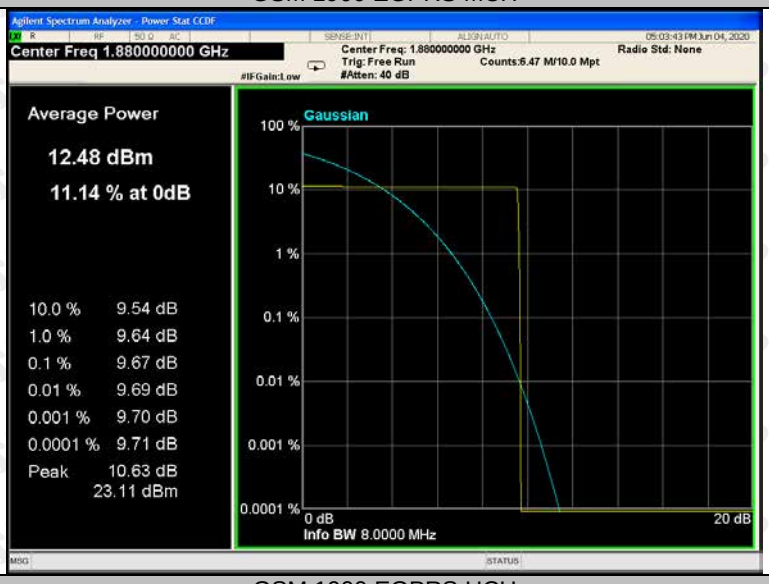
GSM 1900 GPRS LCH

GSM 1900 GPRS MCH

GSM 1900 GPRS HCH

GSM 1900 EGPRS LCH

GSM 1900 EGPRS MCH



GSM 1900 EGPRS HCH

Channel Bandwidth: 1.4 MHz

(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0

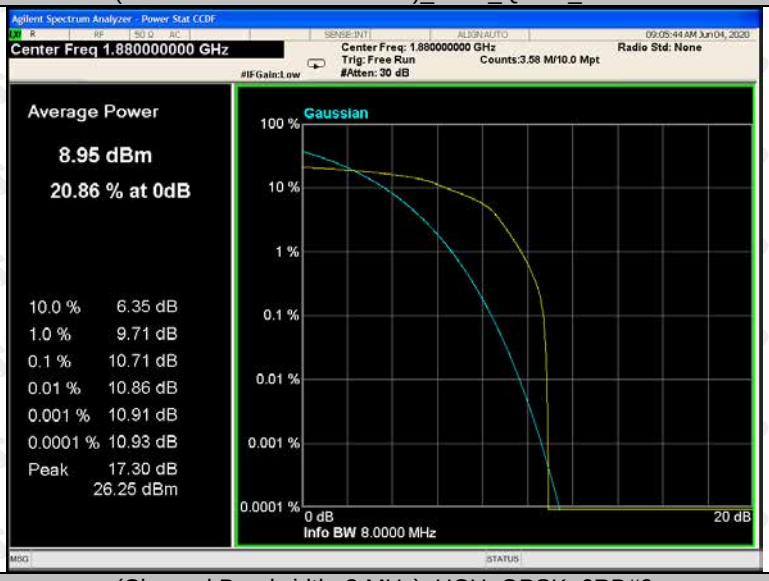
(Channel Bandwidth: 1.4 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 3 MHz

(Channel Bandwidth: 3 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 3 MHz)_MCH_QPSK_6RB#0



(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0

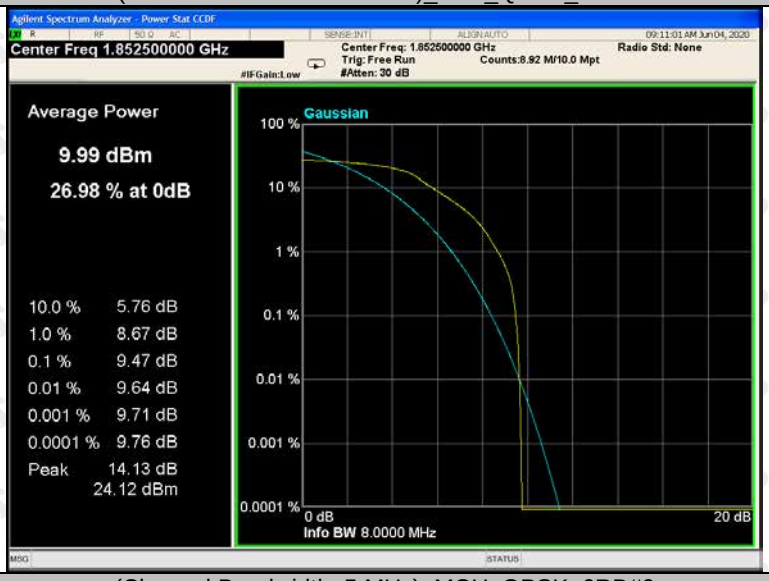
(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0

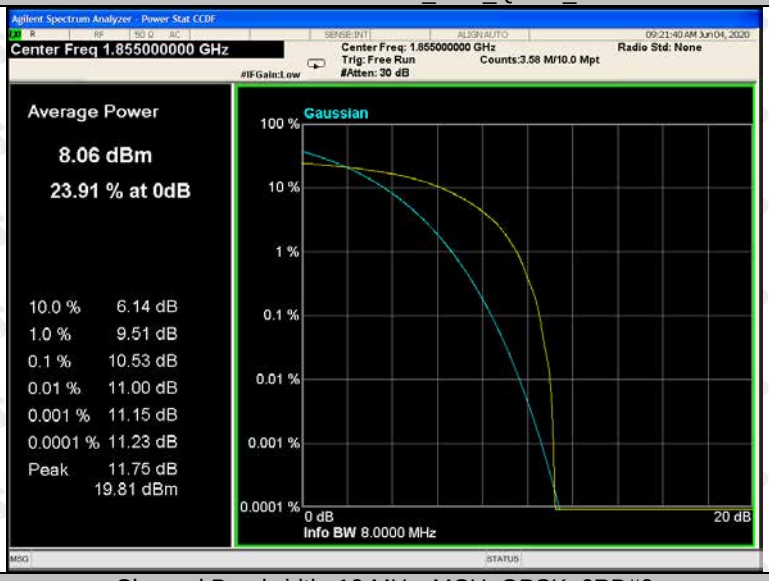
(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0



Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0

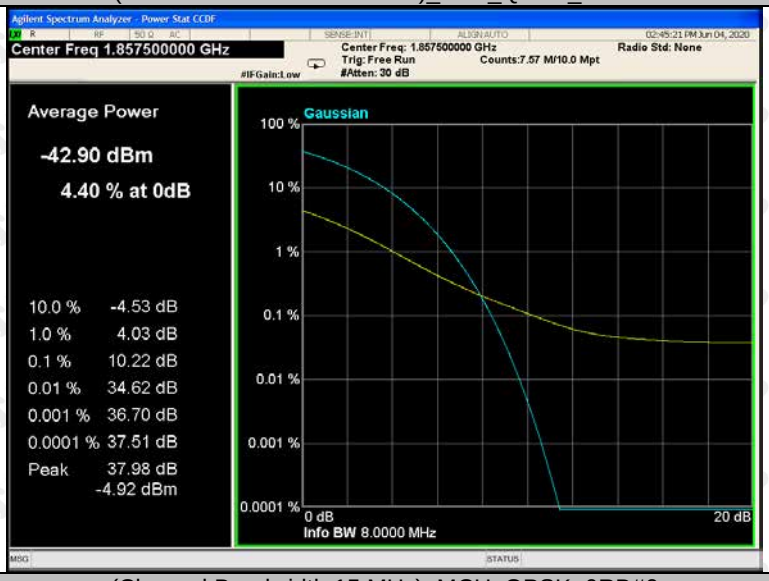
Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

Channel Bandwidth: 15 MHz

(Channel Bandwidth:15 MHz)_LCH_QPSK_6RB#0

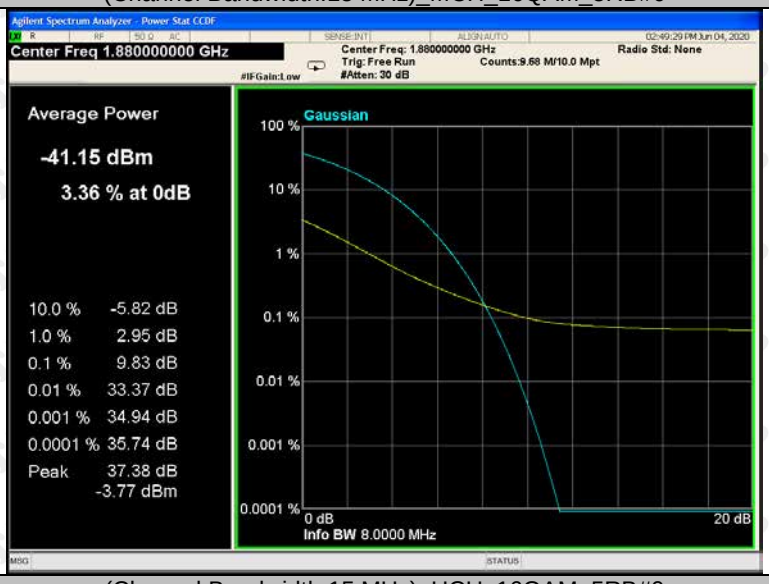


(Channel Bandwidth:15 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth:15 MHz)_HCH_QPSK_6RB#0

(Channel Bandwidth:15 MHz)_LCH_16QAM_5RB#0

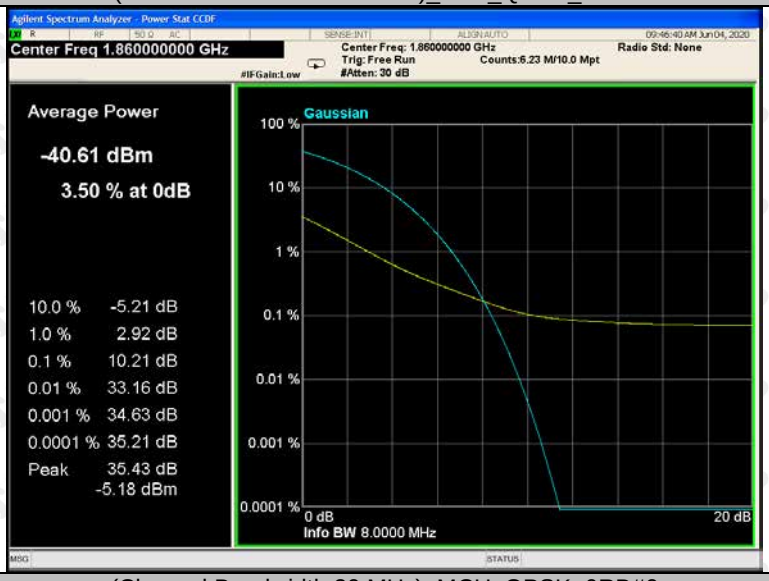
(Channel Bandwidth:15 MHz)_MCH_16QAM_5RB#0



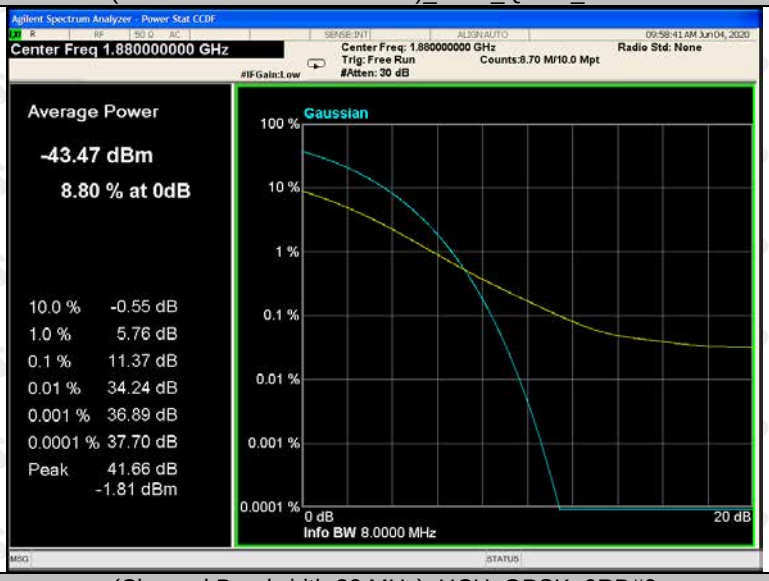
(Channel Bandwidth:15 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 20 MHz

(Channel Bandwidth:20 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth:20 MHz)_MCH_QPSK_6RB#0



(Channel Bandwidth:20 MHz)_HCH_QPSK_6RB#0

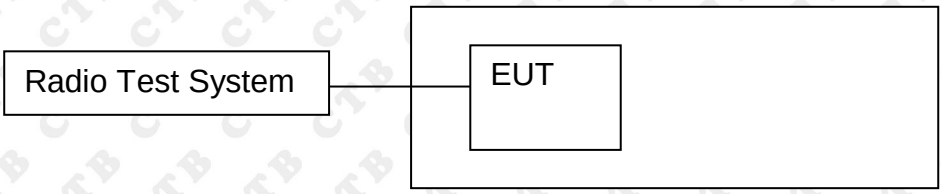
(Channel Bandwidth:20 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth:20 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth:20 MHz)_HCH_16QAM_5RB#0

9. 99% &26DBOCCUPIED BANDWIDTH

9.1 Block Diagram Of Test Setup



9.2 Limit

N/A

9.3 Test procedure

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.
RBW is set to 3kHz, VBW is set to 10kHz for GSM 1900,
RBW is set to 51kHz, VBW is set to 160kHz for LTE Band 2.
99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages..

9.4 Test Result

Mode	Channel	Frequency(MHz)	99%Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
GPRS (GMSK)	LCH	1850.2	0.24256	0.3121
	MCH	1880	0.24350	0.3094
	HCH	1909.8	0.24350	0.3117
EGPRS (8PSK)	LCH	1850.2	0.24345	0.3119
	MCH	1880	0.24224	0.3110
	HCH	1909.8	0.24225	0.3127

Band2:
Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1085	1.367	PASS
	MCH	6	0	1.1063	1.360	PASS
	HCH	6	0	1.1082	1.363	PASS
16QAM	LCH	5	0	1.1080	1.310	PASS
	MCH	5	0	1.1019	1.358	PASS
	HCH	5	0	1.1095	1.362	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1448	1.824	PASS
	MCH	6	0	1.1547	1.873	PASS
	HCH	6	0	1.1516	1.689	PASS
16QAM	LCH	5	0	1.1558	1.754	PASS
	MCH	5	0	1.1592	1.893	PASS
	HCH	5	0	1.1266	1.464	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1511	1.712	PASS
	MCH	6	0	1.1359	1.855	PASS
	HCH	6	0	1.1408	1.575	PASS
16QAM	LCH	5	0	1.1492	1.580	PASS
	MCH	5	0	1.1450	1.860	PASS
	HCH	5	0	1.1408	1.575	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1640	1.745	PASS
	MCH	6	0	1.1481	1.718	PASS
	HCH	6	0	1.1558	1.756	PASS
16QAM	LCH	5	0	1.523	1.730	PASS
	MCH	5	0	1.1594	1.704	PASS
	HCH	5	0	1.1549	1.789	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1955	1.883	PASS
	MCH	6	0	1.2030	1.979	PASS
	HCH	6	0	1.1600	1.736	PASS
16QAM	LCH	5	0	1.963	1.850	PASS
	MCH	5	0	1.1777	1.871	PASS
	HCH	5	0	1.1879	1.816	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.1658	1.889	PASS
	MCH	6	0	1.1841	1.771	PASS
	HCH	6	0	1.1783	1.780	PASS
16QAM	LCH	5	0	1.0114	1.576	PASS
	MCH	5	0	1.0569	1.750	PASS
	HCH	5	0	1.0293	1.681	PASS

Test Graphs
GSM 1900

GSM 1900 GPRS LCH

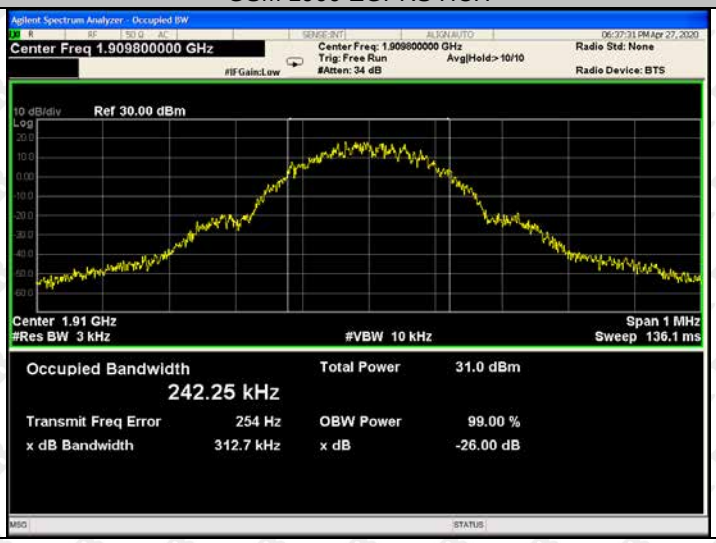
GSM 1900 GPRS MCH

GSM 1900 GPRS HCH


GSM 1900 EGPRS LCH

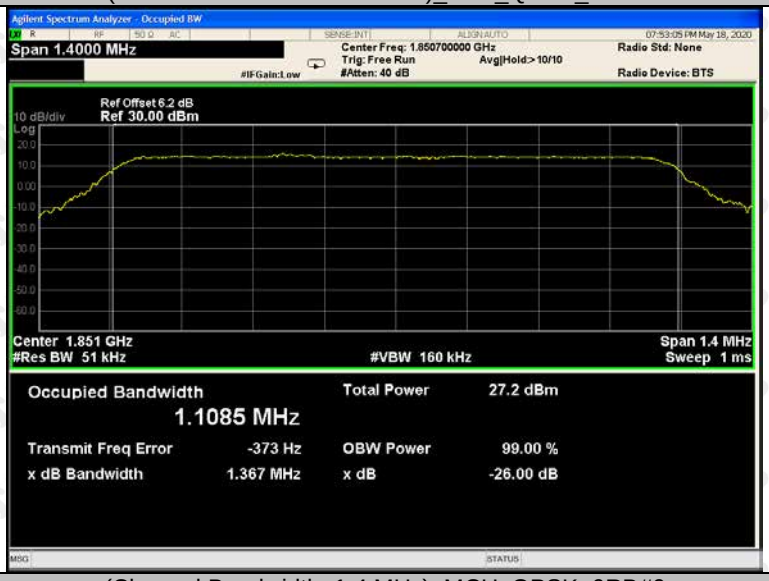
GSM 1900 EGPRS MCH

GSM 1900 EGPRS HCH



Channel Bandwidth: 1.4 MHz

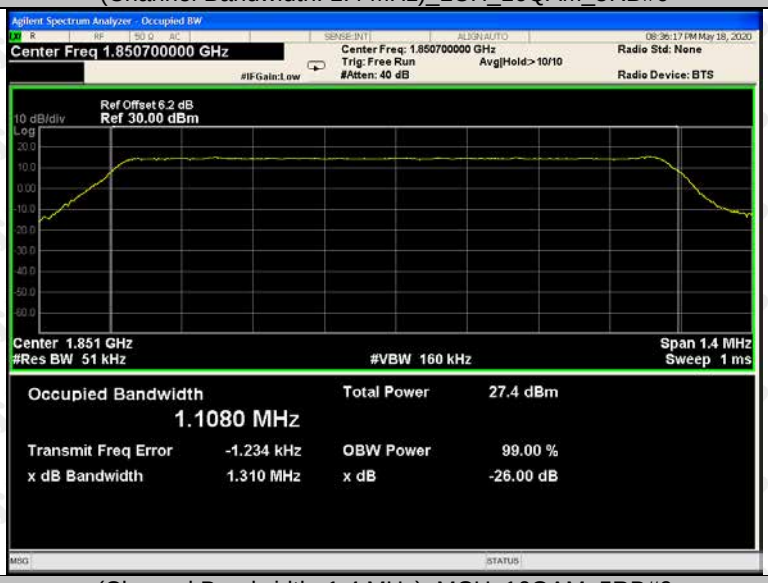
(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0



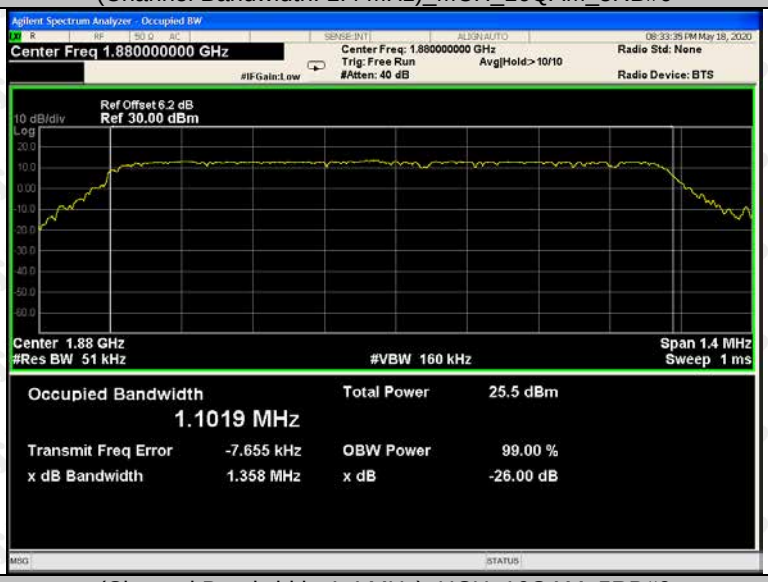
(Channel Bandwidth: 1.4 MHz)_MCH_QPSK_6RB#0

(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0

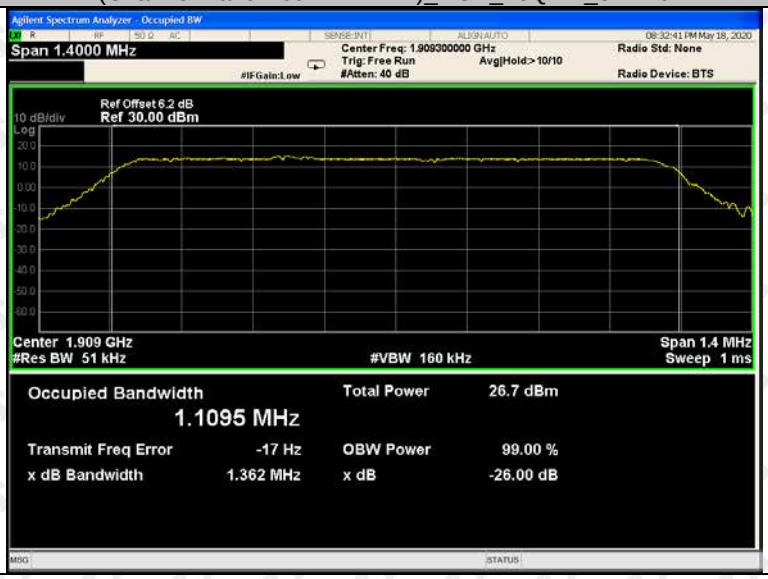
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0



(Channel Bandwidth: 1.4 MHz)_MCH_16QAM_5RB#0

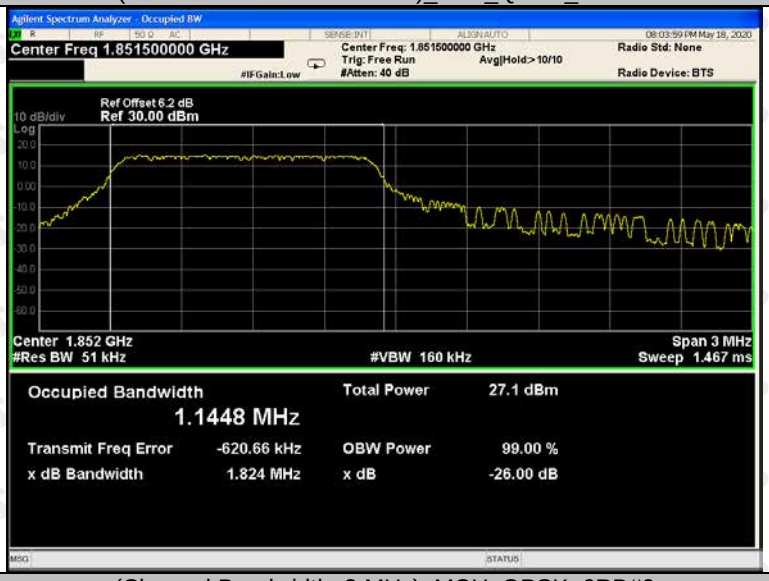


(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0

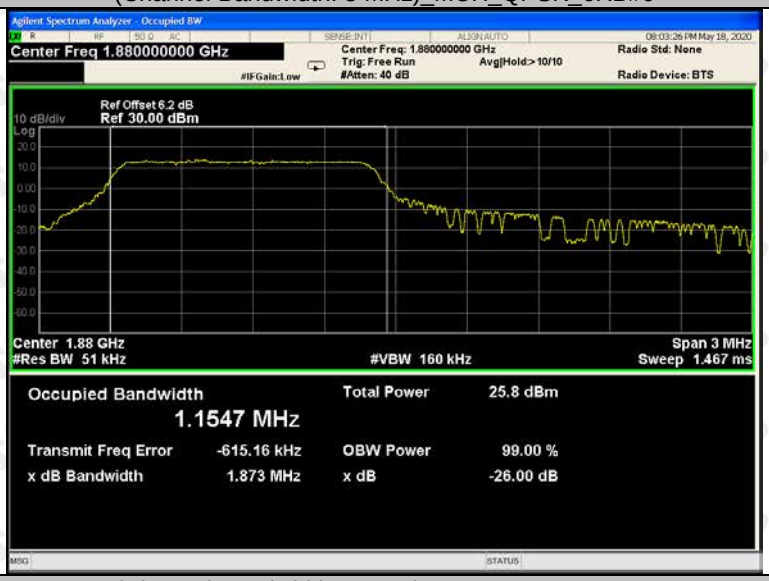


Channel Bandwidth: 3 MHz

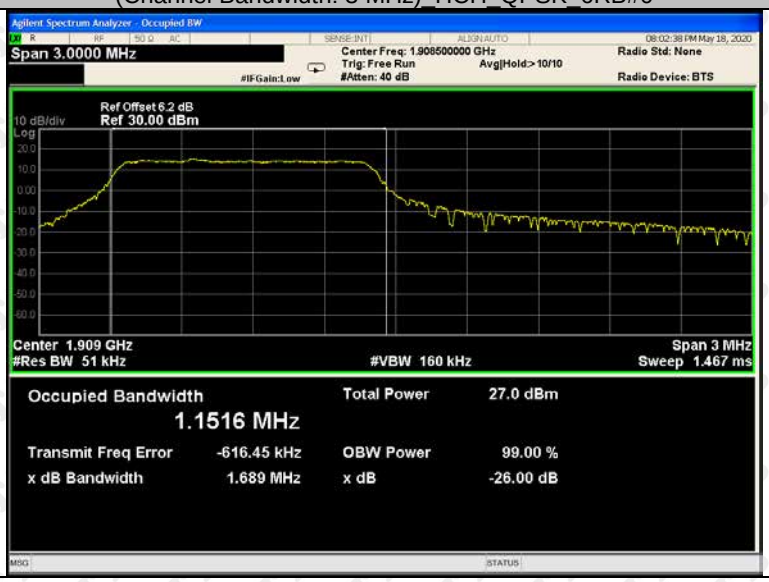
(Channel Bandwidth: 3 MHz)_LCH_QPSK_6RB#0



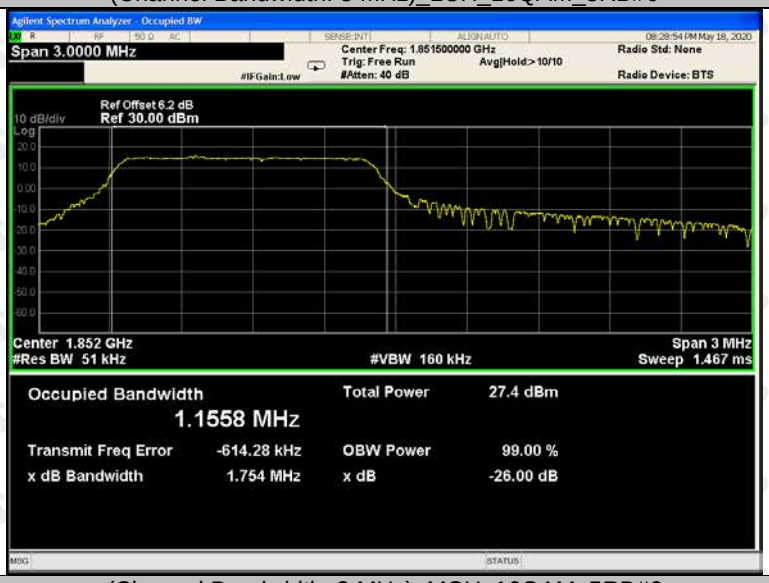
(Channel Bandwidth: 3 MHz)_MCH_QPSK_6RB#0



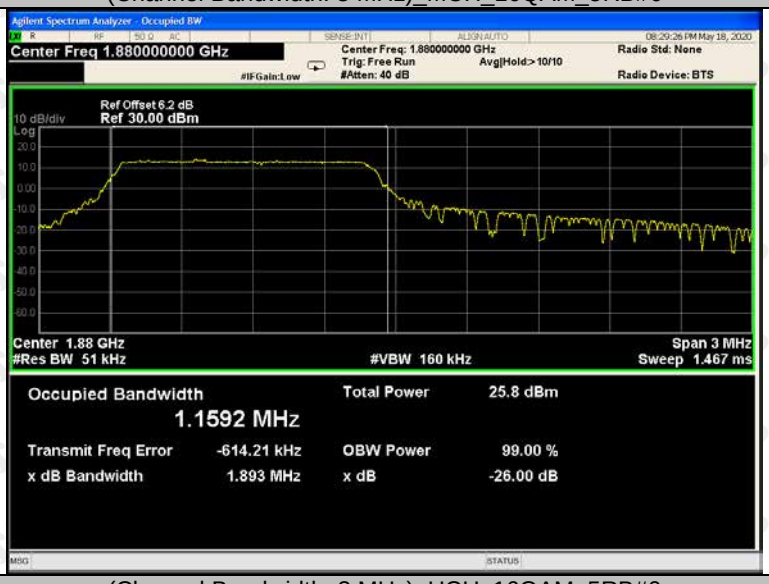
(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0



(Channel Bandwidth: 3 MHz)_MCH_16QAM_5RB#0

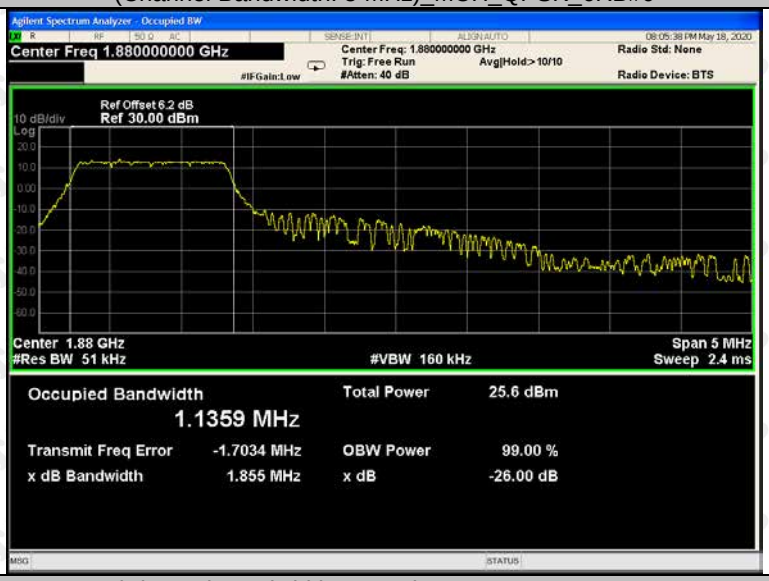


(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

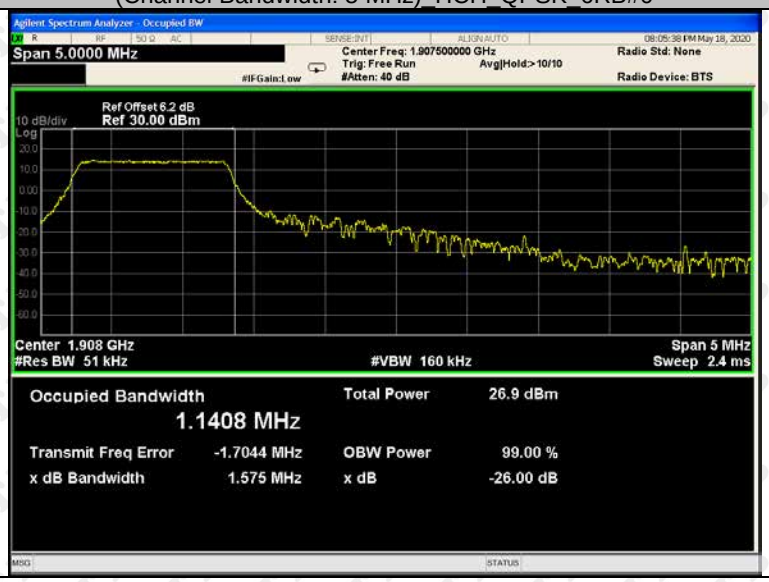
Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0

(Channel Bandwidth: 5 MHz)_MCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_LCH_16QAM_5RB#0

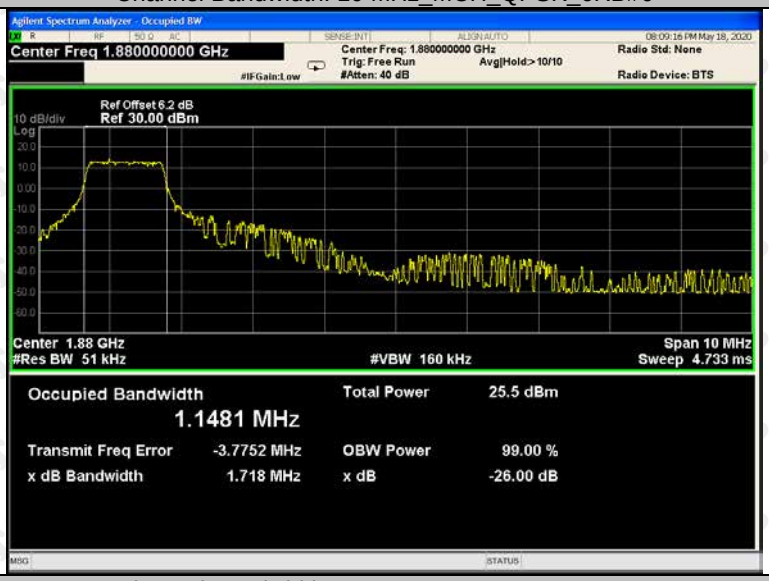
(Channel Bandwidth: 5 MHz)_MCH_16QAM_5RB#0

(Channel Bandwidth: 5 MHz)_HCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz

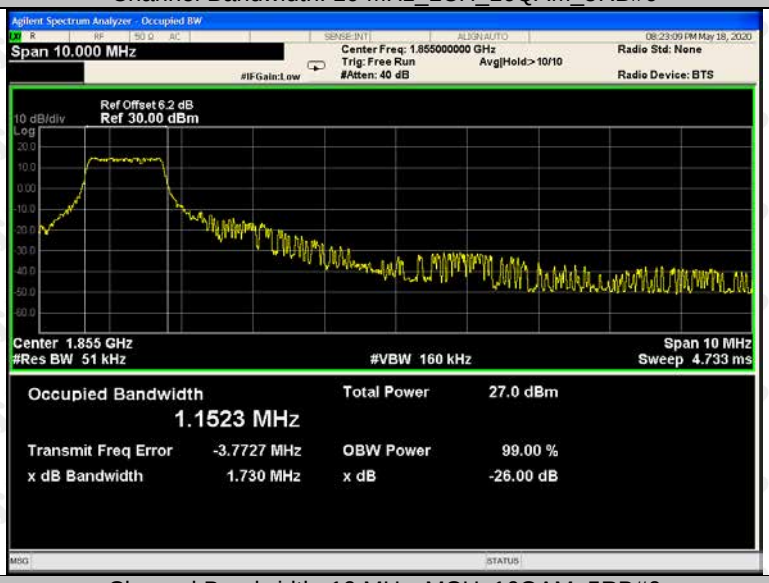
Channel Bandwidth: 10 MHz_LCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_MCH_QPSK_6RB#0



Channel Bandwidth: 10 MHz_HCH_QPSK_6RB#0

Channel Bandwidth: 10 MHz_LCH_16QAM_5RB#0

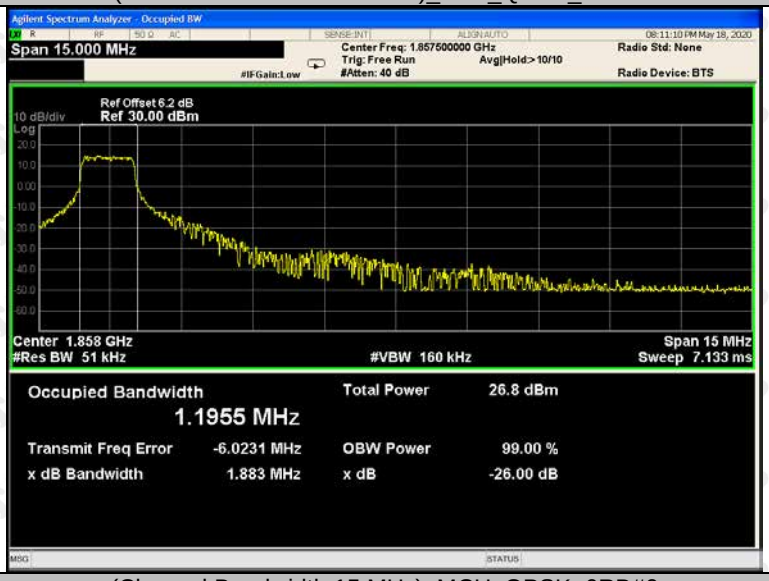


Channel Bandwidth: 10 MHz_MCH_16QAM_5RB#0

Channel Bandwidth: 10 MHz_HCH_16QAM_5RB#0

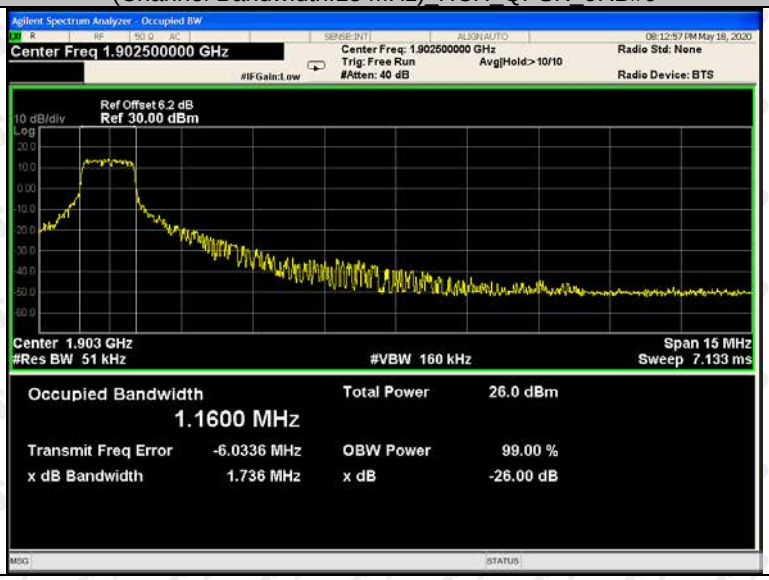
Channel Bandwidth: 15 MHz

(Channel Bandwidth:15 MHz)_LCH_QPSK_6RB#0

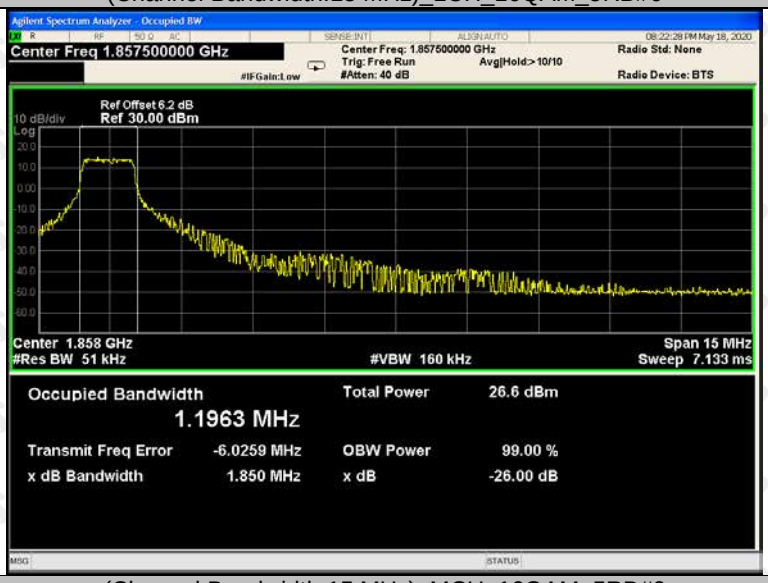


(Channel Bandwidth:15 MHz)_MCH_QPSK_6RB#0

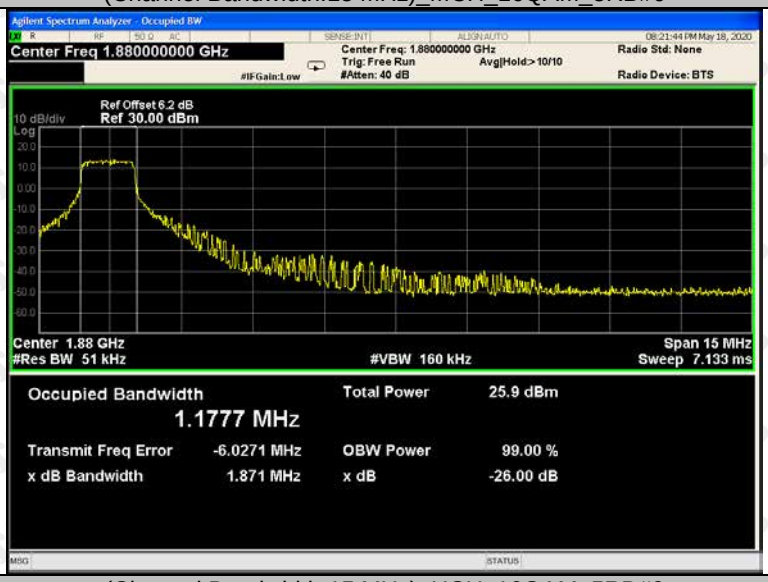
(Channel Bandwidth:15 MHz)_HCH_QPSK_6RB#0



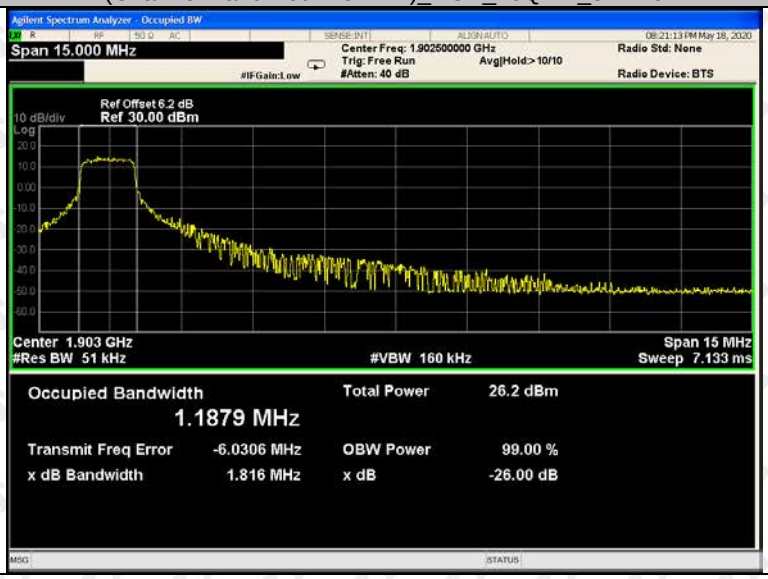
(Channel Bandwidth:15 MHz)_LCH_16QAM_5RB#0



(Channel Bandwidth:15 MHz)_MCH_16QAM_5RB#0

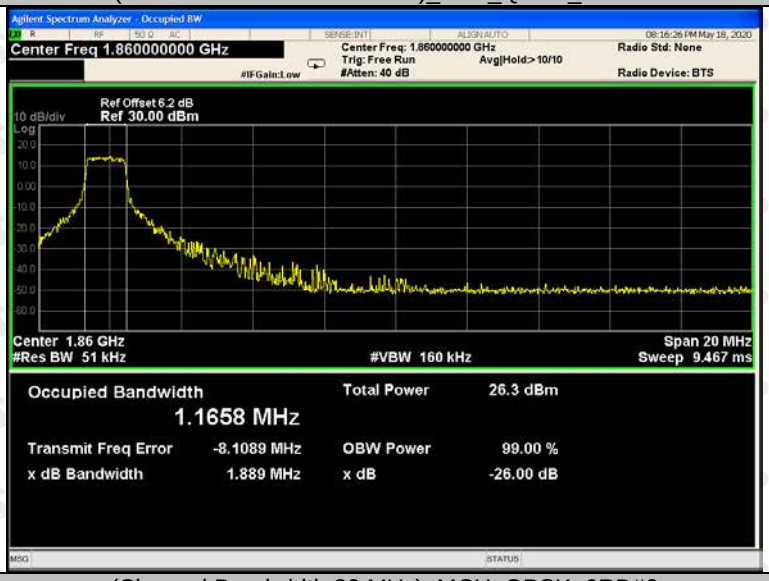


(Channel Bandwidth:15 MHz)_HCH_16QAM_5RB#0

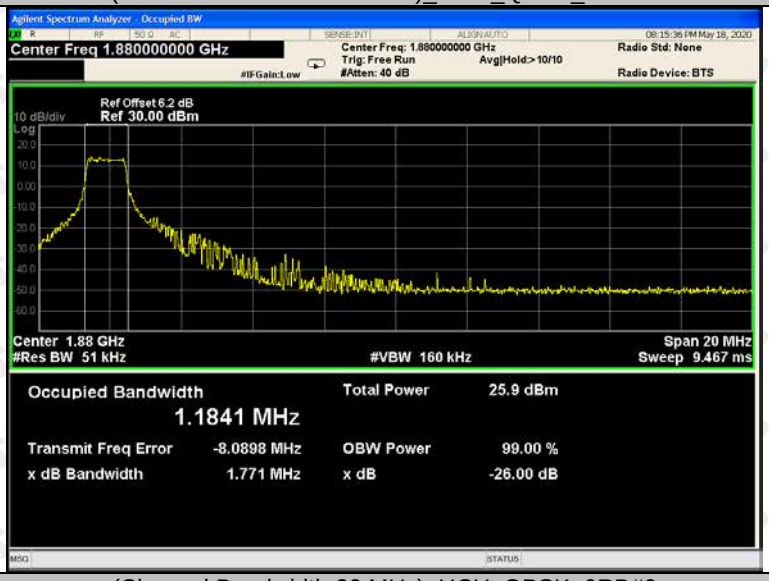


Channel Bandwidth: 20 MHz

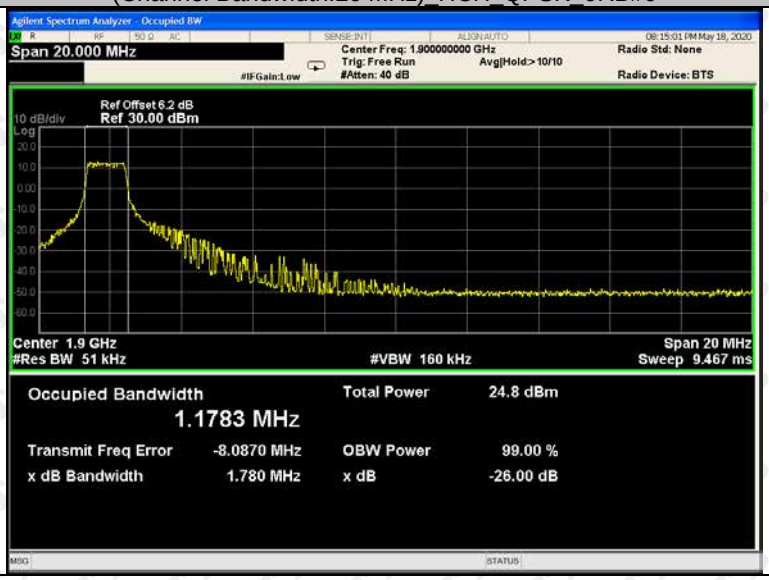
(Channel Bandwidth:20 MHz)_LCH_QPSK_6RB#0



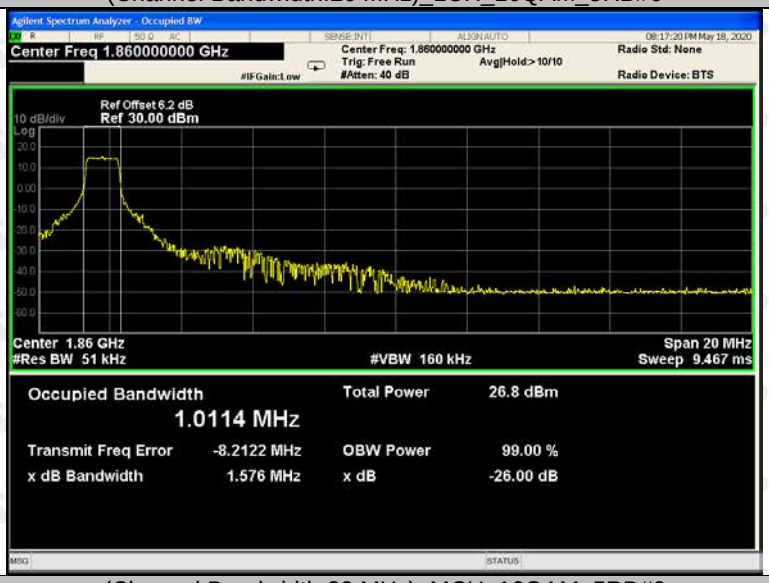
(Channel Bandwidth:20 MHz)_MCH_QPSK_6RB#0



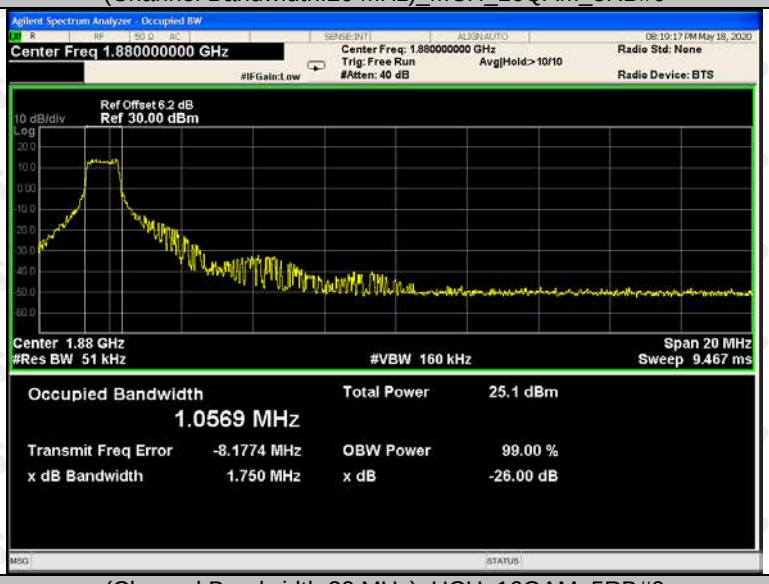
(Channel Bandwidth:20 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth:20 MHz)_LCH_16QAM_5RB#0



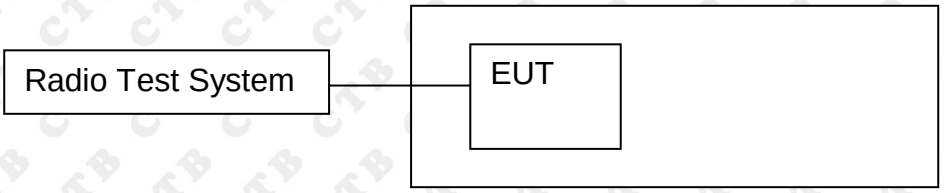
(Channel Bandwidth:20 MHz)_MCH_16QAM_5RB#0



(Channel Bandwidth:20 MHz)_HCH_16QAM_5RB#0

10. BAND EDGE AT ANTENNA TERMINALS

10.1 Block Diagram Of Test Setup



10.2 Limit

(4) For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Limit	-13 dBm

10.3 Test procedure

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The Average detector is used and RBW is set to 3kHz, VBW is set to 10kHz for GSM 1900,
RBW is set to 15kHz, VBW is set to 51kHz for LTE Band 2.
Spectrum analyzer plots are included on the following pages.

10.4 Test Result

Test Graphs GSM 1900

GSM 1900 GPRS LCH

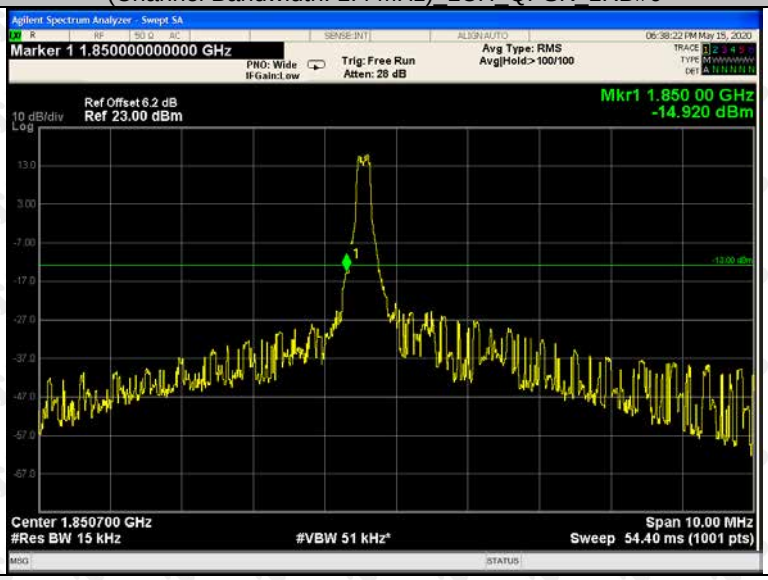
GSM 1900 GPRS HCH

GSM 1900 EGPRS LCH

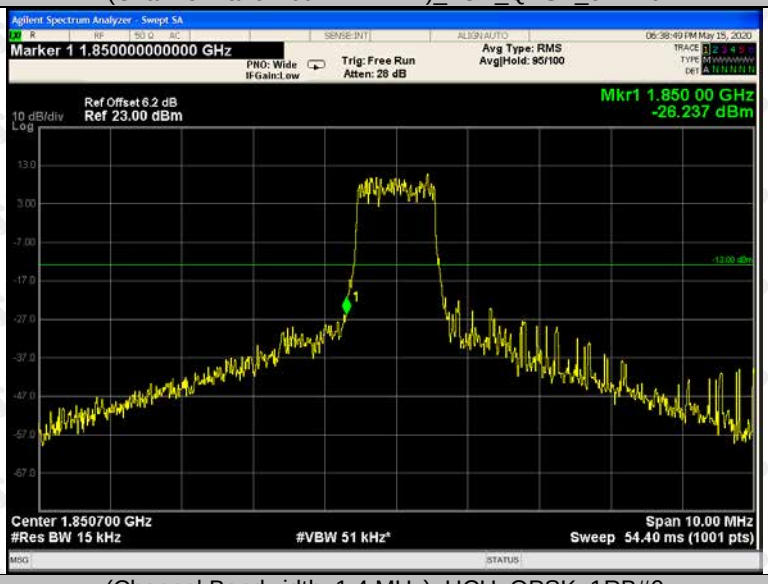
GSM 1900 EGPRS HCH

Channel Bandwidth: 1.4 MHz

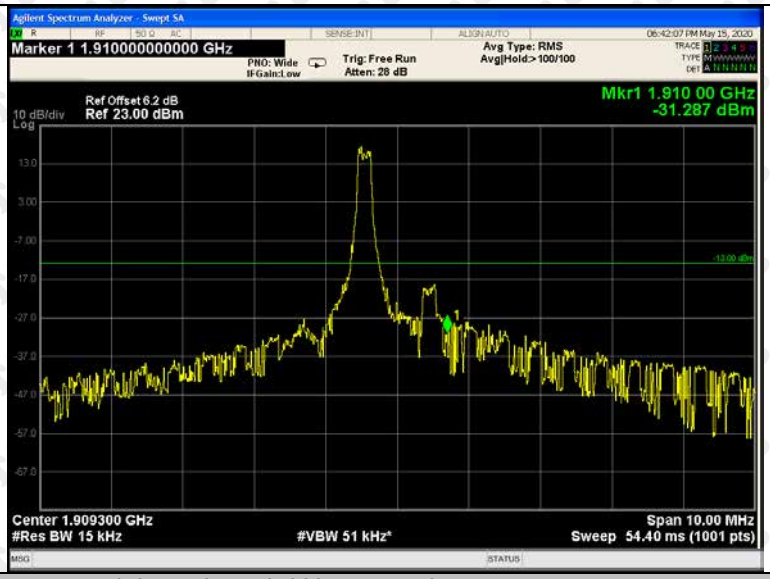
(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_1RB#0



(Channel Bandwidth: 1.4 MHz)_LCH_QPSK_6RB#0

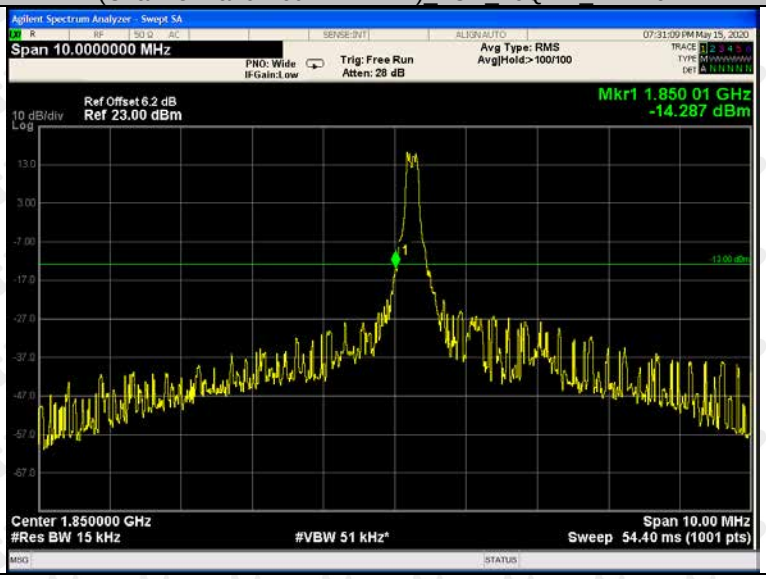


(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_1RB#0

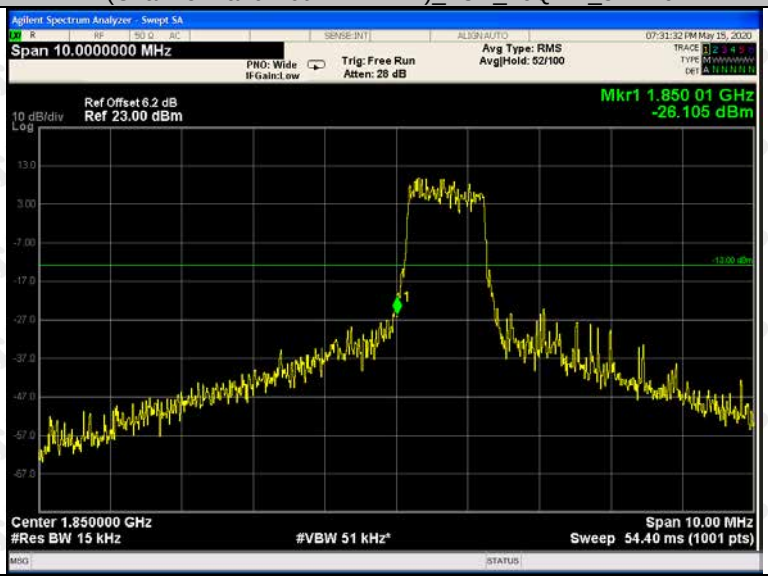


(Channel Bandwidth: 1.4 MHz)_HCH_QPSK_6RB#0

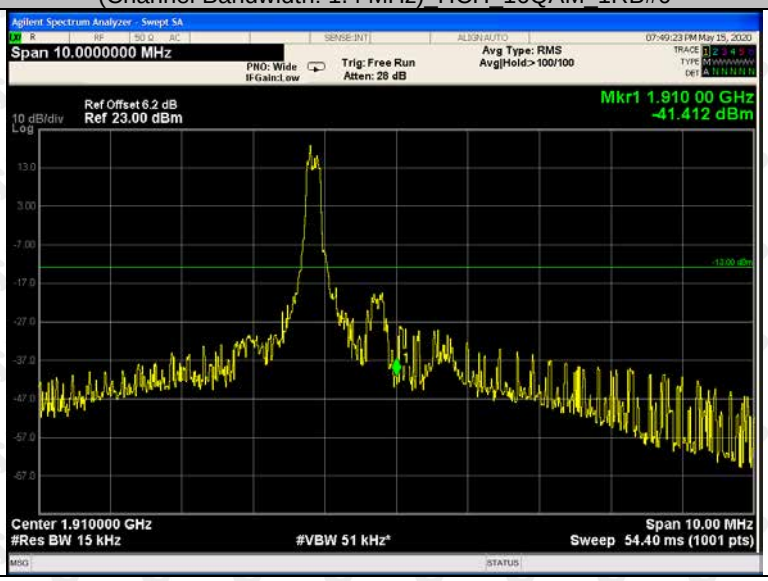
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_1RB#0



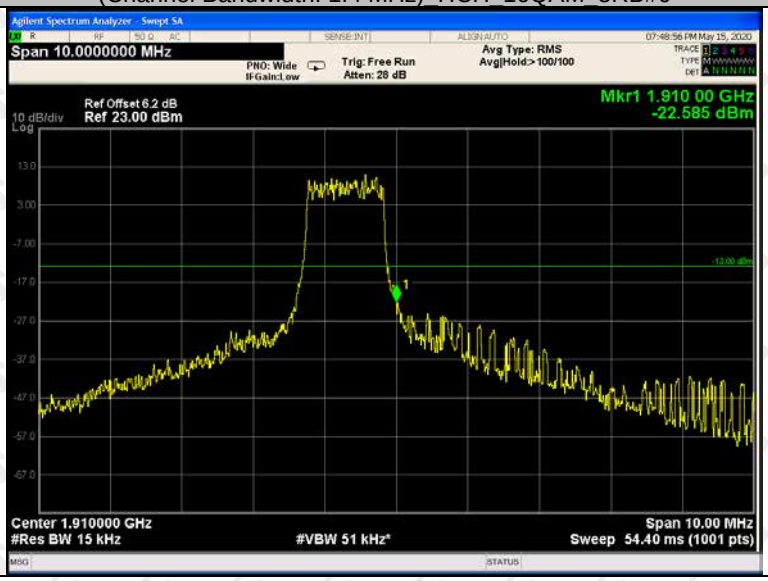
(Channel Bandwidth: 1.4 MHz)_LCH_16QAM_5RB#0



(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_1RB#0

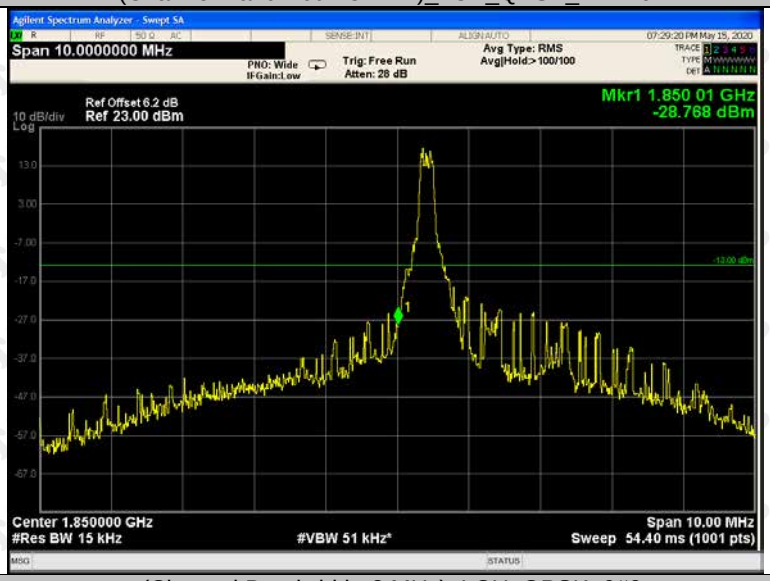


(Channel Bandwidth: 1.4 MHz)_HCH_16QAM_5RB#0



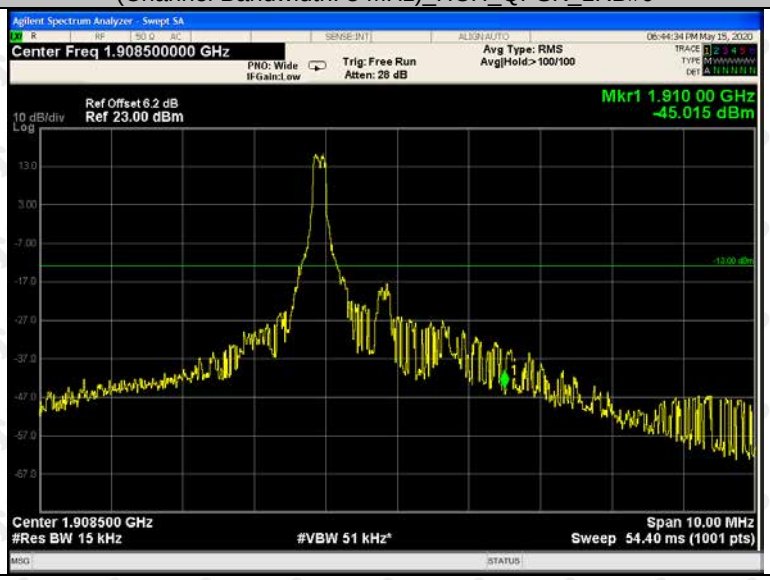
Channel Bandwidth: 3 MHz

(Channel Bandwidth: 3 MHz)_LCH_QPSK_1RB#0

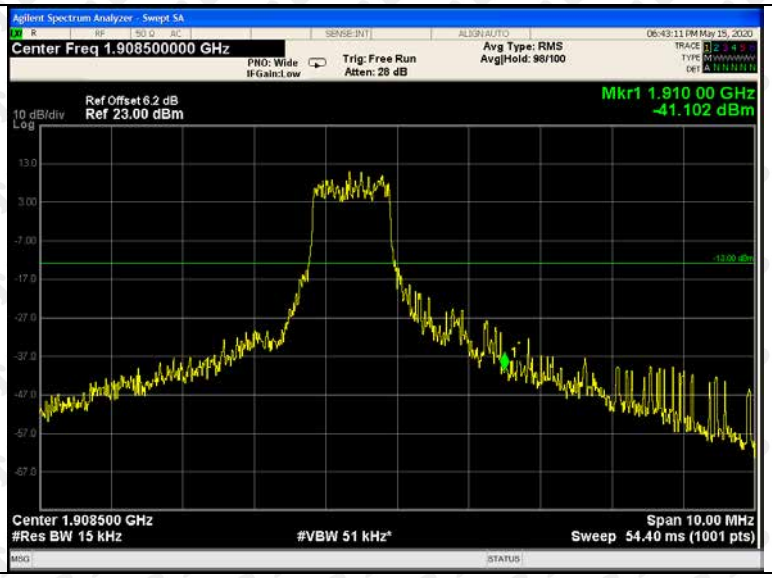


(Channel Bandwidth: 3 MHz)_LCH_QPSK_6#0

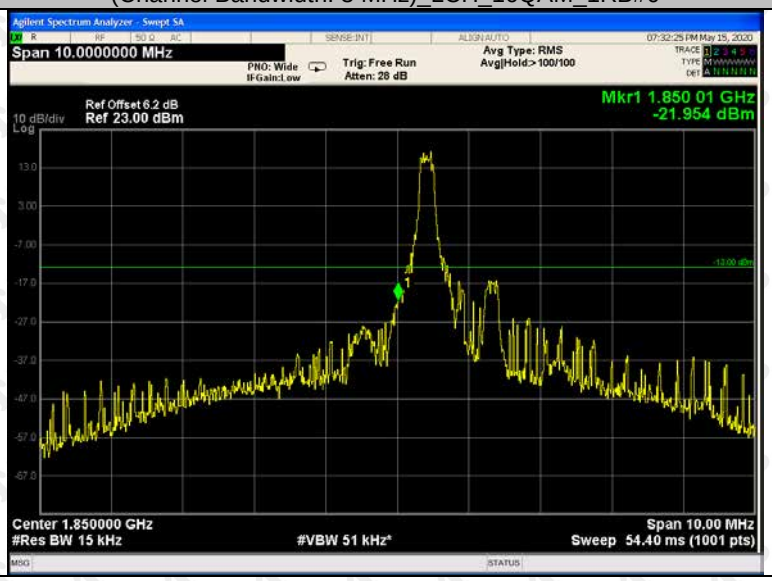
(Channel Bandwidth: 3 MHz)_HCH_QPSK_1RB#0



(Channel Bandwidth: 3 MHz)_HCH_QPSK_6RB#0

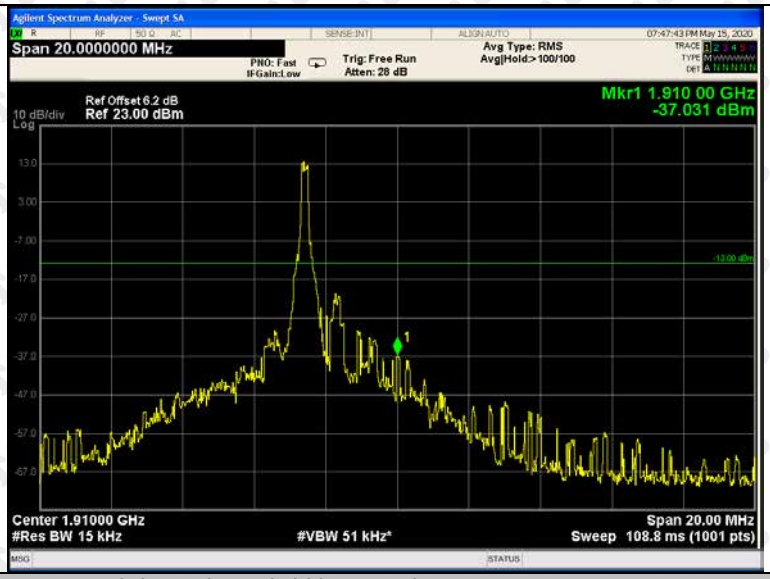


(Channel Bandwidth: 3 MHz)_LCH_16QAM_1RB#0

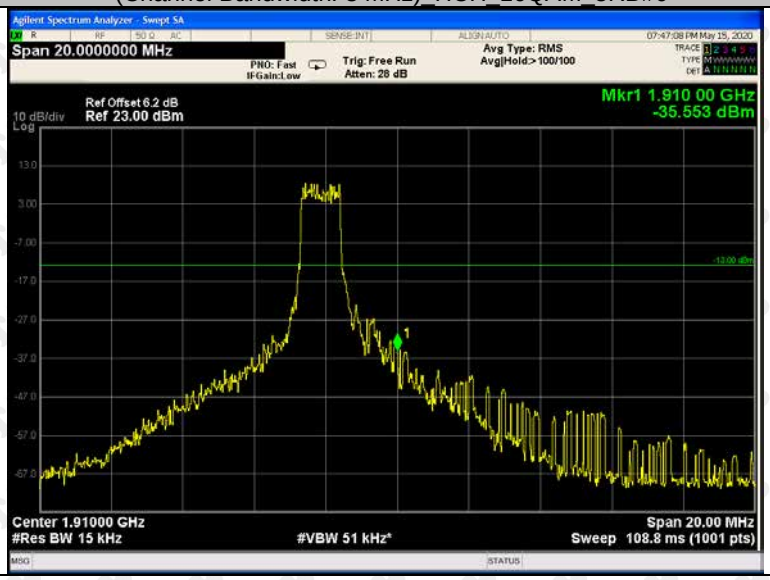


(Channel Bandwidth: 3 MHz)_LCH_16QAM_5RB#0

(Channel Bandwidth: 3 MHz)_HCH_16QAM_1RB#0

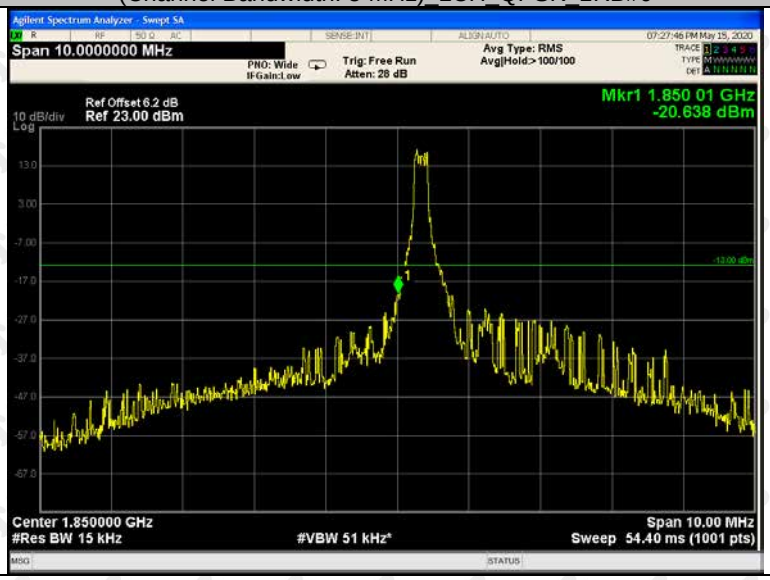


(Channel Bandwidth: 3 MHz)_HCH_16QAM_5RB#0

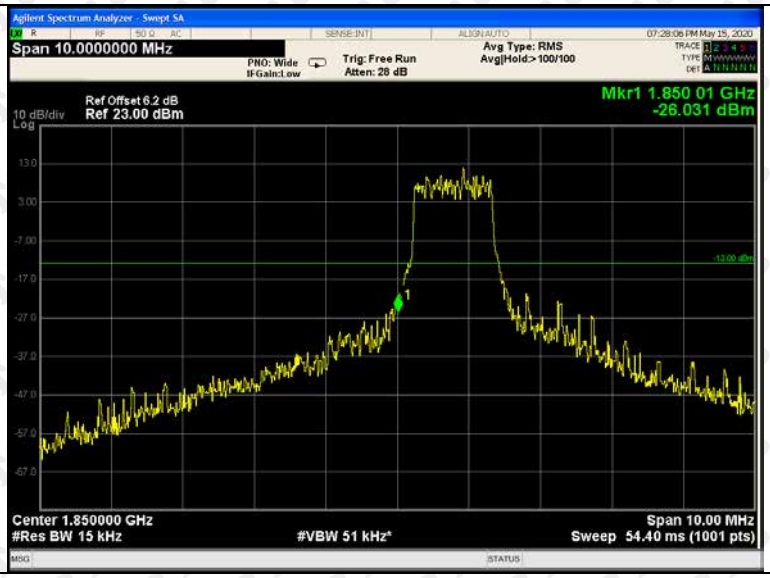


Channel Bandwidth: 5 MHz

(Channel Bandwidth: 5 MHz)_LCH_QPSK_1RB#0

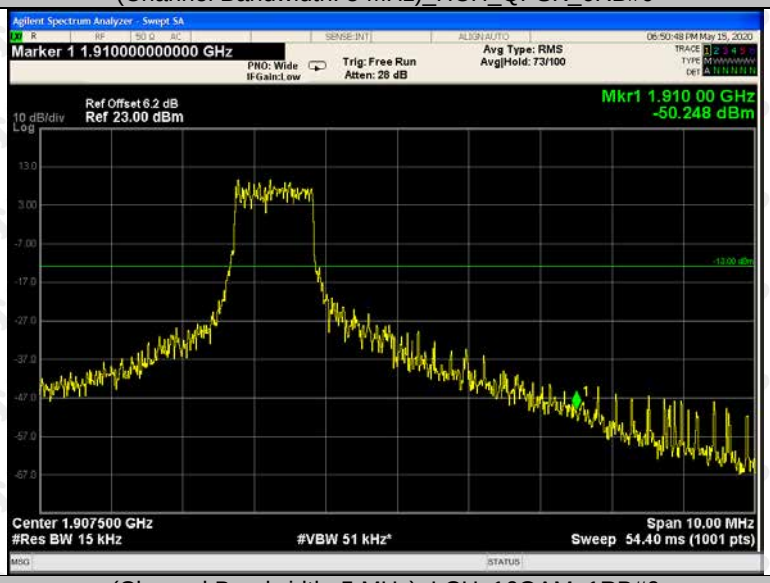


(Channel Bandwidth: 5 MHz)_LCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_HCH_QPSK_1RB#0

(Channel Bandwidth: 5 MHz)_HCH_QPSK_6RB#0



(Channel Bandwidth: 5 MHz)_LCH_16QAM_1RB#0