



RF TEST REPORT

Applicant Huawei Technologies Co., Ltd.
FCC ID QISE3619U-828
Product Huawei Locator
Model E3619U-828
Report No. R1812H0172-R4V1
Issue Date January 25, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR47 Part 27C (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051/27.53(h)	PASS
8	Radiates Spurious Emission	2.1053/27.53(h)	PASS
Date of Testing: January 8, 2019 ~ January 15, 2019			
Note: PASS: The EUT complies with the essential requirements in the standard. FAIL: The EUT does not comply with the essential requirements in the standard.			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.
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2 General Description of Equipment under Test

Client Information

Applicant	Huawei Technologies Co., Ltd.
Applicant address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.
Manufacturer	Huawei Technologies Co., Ltd.
Manufacturer address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.China.

General information

EUT Description			
Model	E3619U-828		
IMEI	/		
Hardware Version	IM1E3619UM VER.E		
Software Version	1.0.0.35(H126SP9C00)		
Power Supply	Battery		
Antenna Type	Internal Antenna		
Antenna Gain	eMTC Band 4:-1.6dBi		
Test Mode(s)	eMTC Band 4;		
Test Modulation	(eMTC)QPSK 16QAM;		
eMTC Category	M1		
Maximum E.I.R.P./ E.R.P.	eMTC Band 4:	20.09dBm	
Rated Power Supply Voltage:	3.82V		
Extreme Voltage	Minimum: 3.45V Maximum: 4.4V		
Extreme Temperature	Lowest: -15°C Highest: +55°C		
Operating Frequency Range(s)	Mode	Tx (MHz)	Rx (MHz)
	eMTC Band 4	1710 ~ 1755	2110 ~ 2155
EUT Accessory			
Battery 1	Manufacturer: Amperex Technology Limited Model: HB642735ECW		
Battery 2	Manufacturer: Tianjin Lishen Battery Joint-Stock Co., Ltd Model: HB642735ECW		
USB Cable 1	Manufacturer: HUIZHOU DEHONG TECHENOLGY CO., LTD 17cm, shielded		
USB Cable 2	Manufacturer: NINGBO BROAD TELECOMMUNICATION CO.,LTD 17cm, shielded		
USB Cable 3	Manufacturer: Luxshare Precision Industry Co., Ltd.		



	17cm, shielded
Ferrite core	Manufacturer: Prosperity Electronic Co., Limited. Model: A2 RC 103B
Note: 1. The information of the EUT is declared by the manufacturer. 2. There is more than one USB cable, one Battery, each one should be applied throughout the compliance test respectively, and however, only the worst case (USB cable 1 and Battery 1) will be recorded in this report.	

3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards

FCC CFR47 Part 2 (2018)

FCC CFR47 Part 27C (2018)

ANSI C63.26 (2015)

KDB 971168 D01 Power Meas License Digital Systems v03r01

4 Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, vertical polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

The following testing in eMTC is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detail in the following table:

Test modes are chosen to be reported as the worst case configuration below for eMTC Band 4:

Test items	Bandwidth (MHz)						Modulation		RB			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	O	O	O	O	O	O	O	O	-	-	O	-	O	-
Band Edge Compliance	O	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	O	O	O	O	O	O	O	O	-	-	O	-	O	-
Frequency Stability	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Spurious Emissions at Antenna Terminals	O	O	O	O	O	O	O	-	O	-	-	O	O	O
Radiates Spurious Emission	O	-	O	-	-	O	O	-	O	-	-	-	O	-
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing.													

5 Test Case Results

5.1 RF Power Output

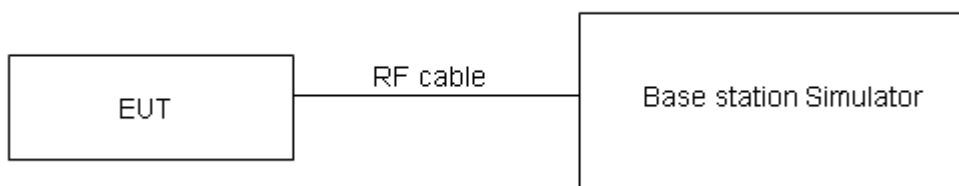
Ambient condition

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

Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

Limits

No specific RF power output requirements in part 2.1046.

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

eMTC Band 4	Channel/ Frequency(MHz)	Index	RB# RBstart	Conducted Power (dBm)	
				QPSK	16QAM
1.4MHz	19957 1710.7	0	1#0	23.56	22.02
		0	6#0	21.49	21.62
	20175/1732.5	0	1#0	23.55	21.90
		0	6#0	21.48	21.92
	20393/1754.3	0	1#5	23.57	22.32
		0	6#0	21.34	21.59
3MHz	19965/1711.5	0	1#0	23.12	22.77
		0	6#0	21.48	21.44
	20175/1732.5	0	1#0	23.61	21.95
		0	6#0	21.53	21.97
	20385/1753.5	1	1#5	23.50	21.95
		1	6#0	21.33	21.79
5MHz	19975/1712.5	0	1#0	23.60	23.32
		0	6#0	22.55	21.83
	20175/1732.5	0	1#0	23.58	23.42
		0	6#0	22.53	21.85
	20375/1752.5	3	1#5	23.48	23.17
		3	6#0	22.40	21.75
10MHz	20000/1715	0	1#0	23.08	23.80
		0	4#0	23.49	22.31
	20175/1732.5	0	1#0	23.53	23.03
		0	4#0	23.78	22.97
	20350/1750	7	1#5	23.44	23.05
		7	4#2	23.28	22.91
15MHz	20025/1717.5	0	1#0	23.14	23.86
		0	6#0	23.41	23.60
	20175/1732.5	0	1#0	23.67	23.31
		0	6#0	23.49	23.76
	20325/1747.5	11	1#5	23.44	23.25
		11	6#0	23.43	23.50
20MHz	20050/1720	0	1#0	23.55	23.10
		0	6#0	23.51	23.63
	20175/1732.5	0	1#0	23.80	23.66
		0	6#0	23.71	24.08
	20300/1745	15	1#5	23.53	23.29
		15	6#0	23.44	23.47

5.2 Effective Isotropic Radiated Power

Ambient condition

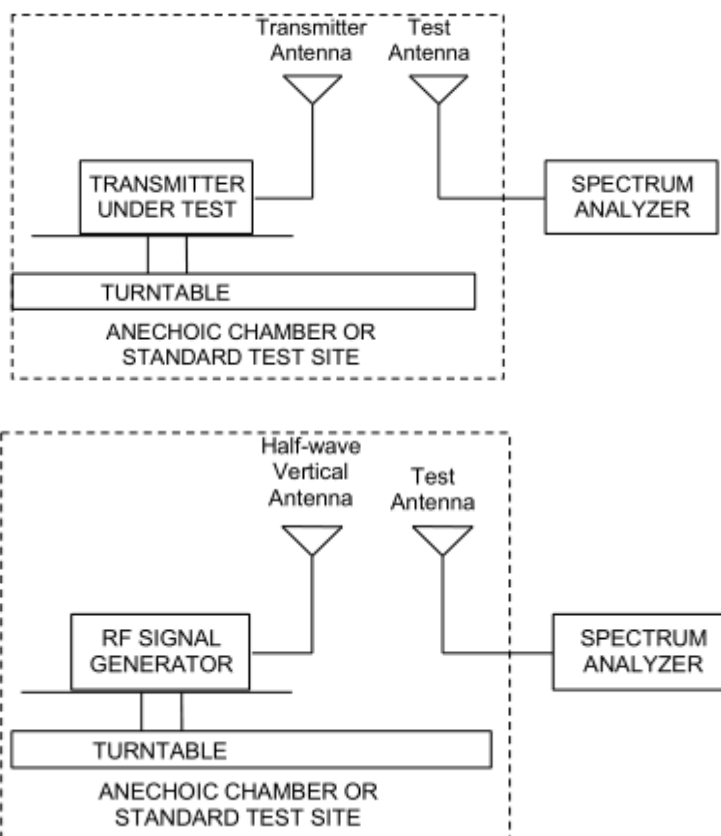
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
 - a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
 - b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
 - c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
 - d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
 - e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
 - f) The maximum ERP is the maximum value determined in the preceding step.
 - g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g. transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$
 where: dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

The RB allocation refers to section 5.1, using the maximum output power configuration.

Test setup



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Limits

Rule Part 27.50(d) (4) specifies that “Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP”

Part 27.50(d)(4)Limit	$\leq 1\text{ W}$ (30 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 $k = 2$, $U = 1.19\text{ dB}$

Test Results

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

eMTC Band 4							
Band width	Channel/ Frequency(MHz)	Polarization	RB	Index	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	19957/1710.7	vertical	1#0	0	18.10	30	Pass
	20175/1732.5	vertical	1#2	0	19.75	30	Pass
	20393/1754.3	vertical	1#5	0	20.09	30	Pass
3 MHz (QPSK)	19965/1711.5	vertical	1#0	0	18.12	30	Pass
	20175/1732.5	vertical	1#5	0	19.54	30	Pass
	20385/1753.5	vertical	1#5	1	20.04	30	Pass
5 MHz (QPSK)	19975/1712.5	vertical	1#0	0	18.13	30	Pass
	20175/1732.5	vertical	1#5	1	19.37	30	Pass
	20375/1752.5	vertical	1#5	3	19.85	30	Pass
10 MHz (QPSK)	20000/1715	vertical	4#0	0	18.06	30	Pass
	20175/1732.5	vertical	4#2	3	19.11	30	Pass
	20350/1750	vertical	4#2	7	20.00	30	Pass
15 MHz (QPSK)	20025/1717.5	vertical	1#0	0	18.05	30	Pass
	20175/1732.5	vertical	1#5	5	19.07	30	Pass
	20325/1747.5	vertical	1#5	11	19.99	30	Pass
20 MHz (QPSK)	20050/1720	vertical	6#0	0	18.11	30	Pass
	20175/1732.5	vertical	6#0	7	18.86	30	Pass
	20300/1745	vertical	6#0	15	19.78	30	Pass
1.4 MHz (16QAM)	19957 1710.7	vertical	1#0	0	17.68	30	Pass
	20175/1732.5	vertical	1#2	0	19.24	30	Pass
	20393/1754.3	vertical	1#5	0	19.68	30	Pass
3 MHz (16QAM)	19965/1711.5	vertical	1#0	0	17.59	30	Pass
	20175/1732.5	vertical	1#5	0	19.01	30	Pass
	20385/1753.5	vertical	1#5	1	19.47	30	Pass
5 MHz (16QAM)	19975/1712.5	vertical	1#0	0	17.73	30	Pass
	20175/1732.5	vertical	1#5	1	18.94	30	Pass
	20375/1752.5	vertical	1#5	3	19.23	30	Pass
10 MHz (16QAM)	20000/1715	vertical	4#0	0	17.69	30	Pass
	20175/1732.5	vertical	4#2	3	18.53	30	Pass
	20350/1750	vertical	4#2	7	19.42	30	Pass
15 MHz (16QAM)	20025/1717.5	vertical	1#0	0	17.44	30	Pass
	20175/1732.5	vertical	1#5	5	18.65	30	Pass
	20325/1747.5	vertical	1#5	11	19.52	30	Pass
20 MHz (16QAM)	20050/1720	vertical	6#0	0	17.73	30	Pass
	20175/1732.5	vertical	6#0	7	18.29	30	Pass
	20300/1745	vertical	6#0	15	19.17	30	Pass

5.3 Occupied Bandwidth

Ambient condition

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

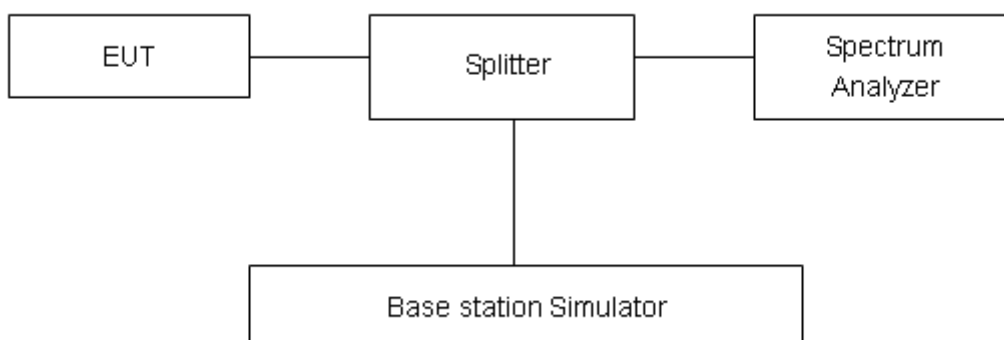
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51kHz, VBW is set to 160kHz for eMTC Band 4

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

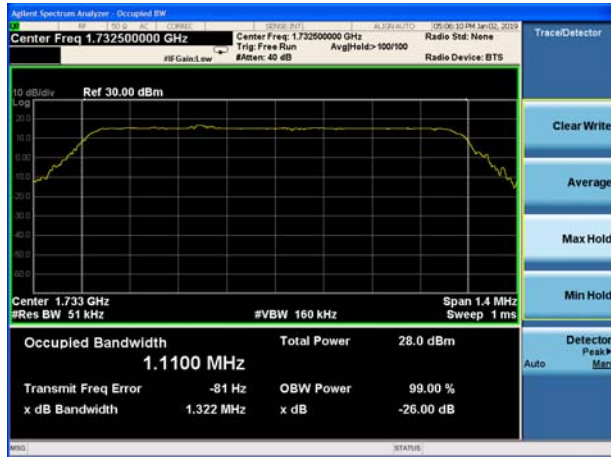
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U=624\text{Hz}$.

Test Result

Mode	Bandwidth	Modulation	Channel/ Frequency(MHz)	RB	Index	Bandwidth(MHz)	
						99% Power	-26dBc
eMTC Band 4	1.4MHz	QPSK	20175/1732.5	6#0	0	1.1100	1.322
		16QAM	20175/1732.5	6#0	0	0.9507	1.231
	3MHz	QPSK	20175/1732.5	6#0	0	1.1868	2.181
		16QAM	20175/1732.5	6#0	0	0.9830	1.340
	5MHz	QPSK	20175/1732.5	6#0	0	1.1888	2.109
		16QAM	20175/1732.5	6#0	0	1.1436	2.013
	10MHz	QPSK	20175/1732.5	6#0	0	1.2174	2.193
		16QAM	20175/1732.5	6#0	0	1.0838	1.889
	15MHz	QPSK	20175/1732.5	6#0	0	1.2398	2.025
		16QAM	20175/1732.5	6#0	0	1.1954	2.228
	20MHz	QPSK	20175/1732.5	6#0	0	1.2526	2.269
		16QAM	20175/1732.5	6#0	0	1.2010	2.273



eMTC Band 4 QPSK 1.4MHz CH-Middle



eMTC Band 4 QPSK 3MHz CH-Middle



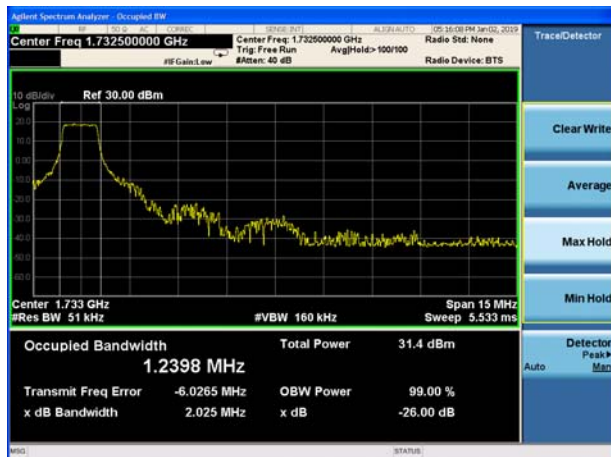
eMTC Band 4 QPSK 5MHz CH-Middle



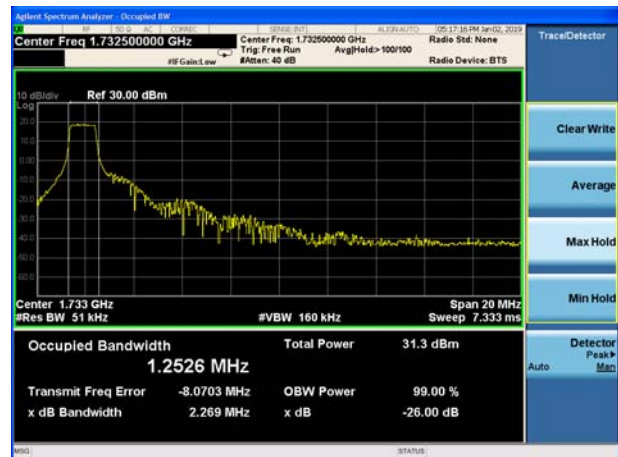
eMTC Band 4 QPSK 10MHz CH-Middle



eMTC Band 4 QPSK 15MHz CH-Middle



eMTC Band 4 QPSK 20MHz CH-Middle





eMTC Band 4 16QAM 1.4MHz CH-Middle



eMTC Band 4 16QAM 3MHz CH-Middle



eMTC Band 4 16QAM 5MHz CH-Middle



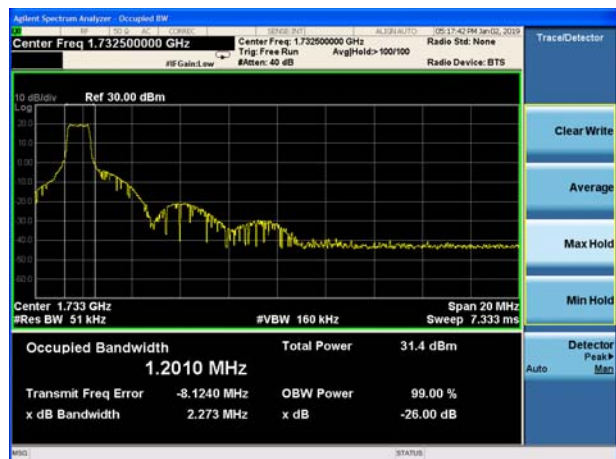
eMTC Band 4 16QAM 10MHz CH-Middle



eMTC Band 4 16QAM 15MHz CH-Middle



eMTC Band 4 16QAM 20MHz CH-Middle



5.4 Band Edge Compliance

Ambient condition

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

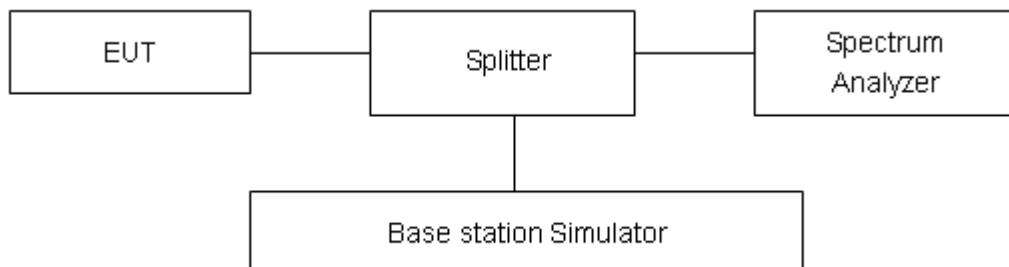
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.

The testing follows KDB 971168 D01 v03r01 Section 6.0

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. RBW is set to 51kHz, VBW is set to 160kHz for eMTC Band 4 on spectrum analyzer.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(h) specifies that “ for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee’s frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB”

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U=0.684$ dB.

Test Result

All the test traces in the plots shows the test results clearly.

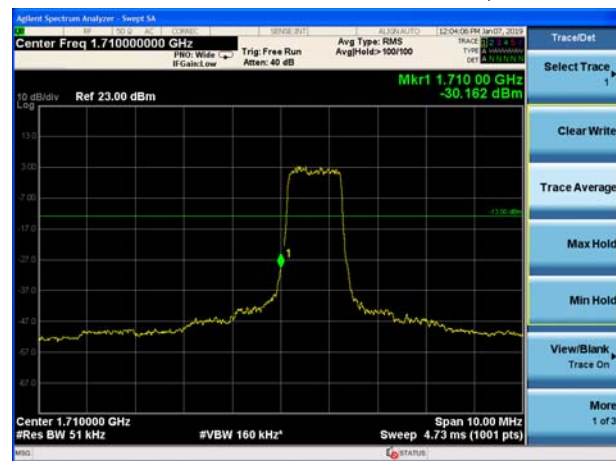
eMTC Band 4 QPSK 1.4MHz CH-Low, 1 RB



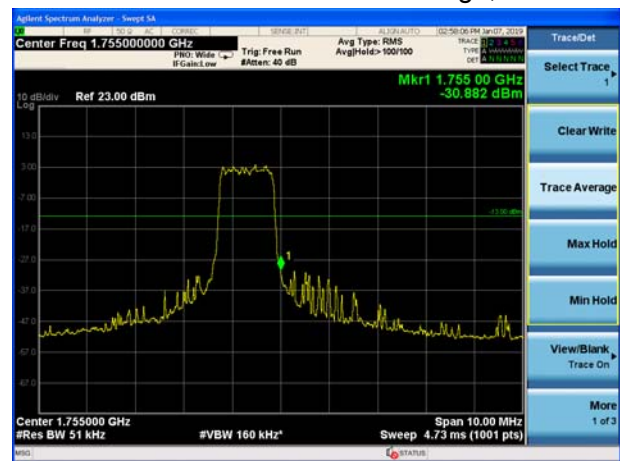
eMTC Band 4 QPSK 1.4MHz CH-High, 1 RB



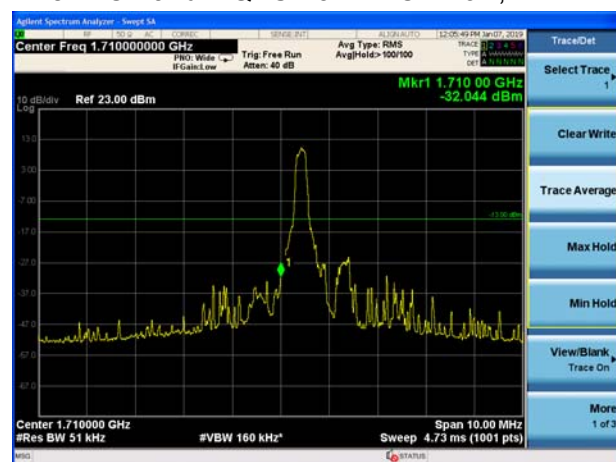
eMTC Band 4 QPSK 1.4MHz CH-Low, 100%RB



eMTC Band 4 QPSK 1.4MHz CH-High, 100%RB



eMTC Band 4 QPSK 3MHz CH-Low, 1 RB



eMTC Band 4 QPSK 3MHz CH-High, 1 RB

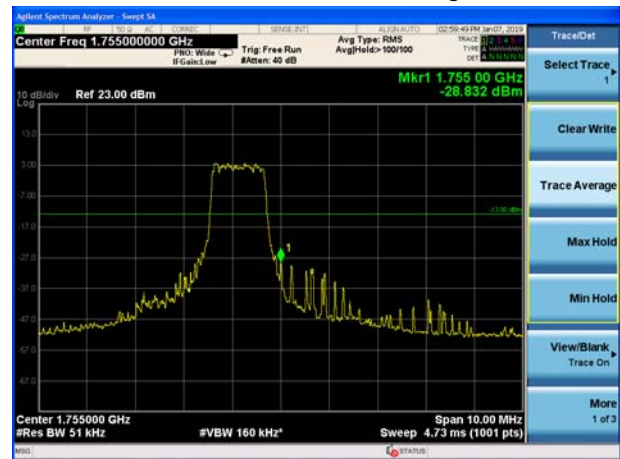




eMTC Band 4 QPSK 3MHz CH-Low, 100%RB



eMTC Band 4 QPSK 3MHz CH-High, 100%RB



eMTC Band 4 QPSK 5MHz CH-Low, 1 RB



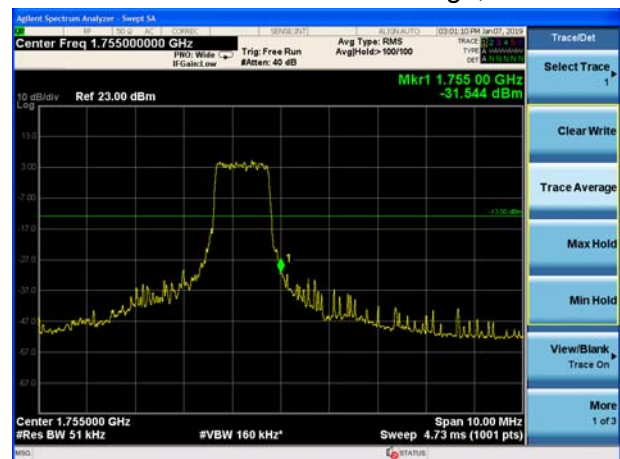
eMTC Band 4 QPSK 5MHz CH-High, 1 RB



eMTC Band 4 QPSK 5MHz CH-Low, 100%RB



eMTC Band 4 QPSK 5MHz CH-High, 100%RB





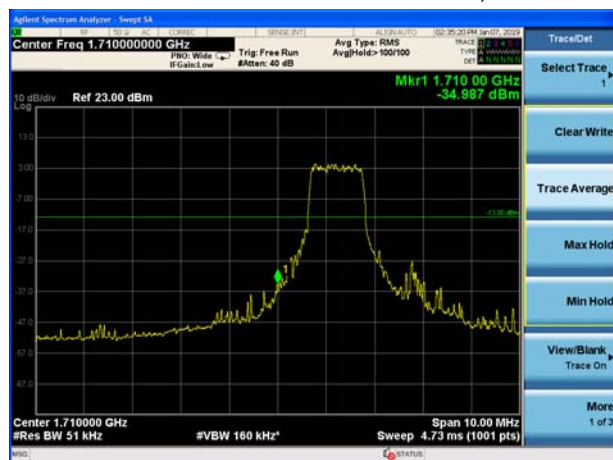
eMTC Band 4 QPSK 10MHz CH-Low, 1 RB



eMTC Band 4 QPSK 10MHz CH-High, 1 RB



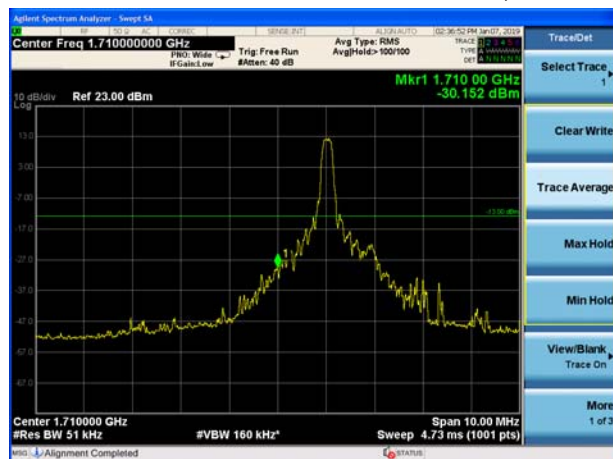
eMTC Band 4 QPSK 10MHz CH-Low, 100%RB



eMTC Band 4 QPSK 10MHz CH-High, 100%RB



eMTC Band 4 QPSK 15MHz CH-Low, 1 RB

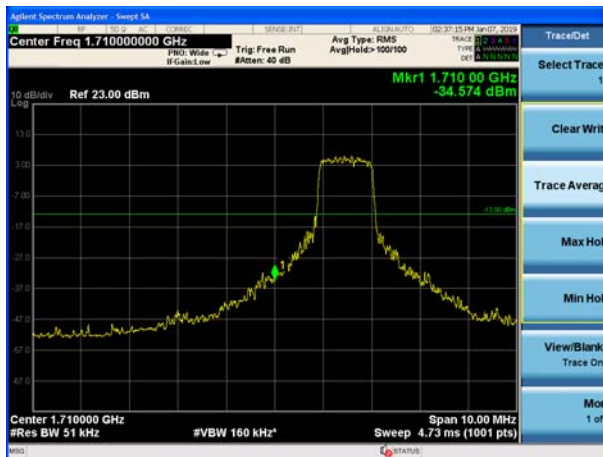


eMTC Band 4 QPSK 15MHz CH-High, 1 RB





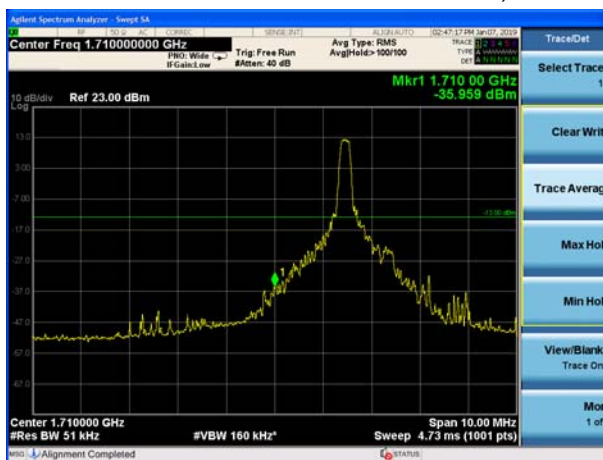
eMTC Band 4 QPSK 15MHz CH-Low, 100%RB



eMTC Band 4 QPSK 15MHz CH-High, 100%RB



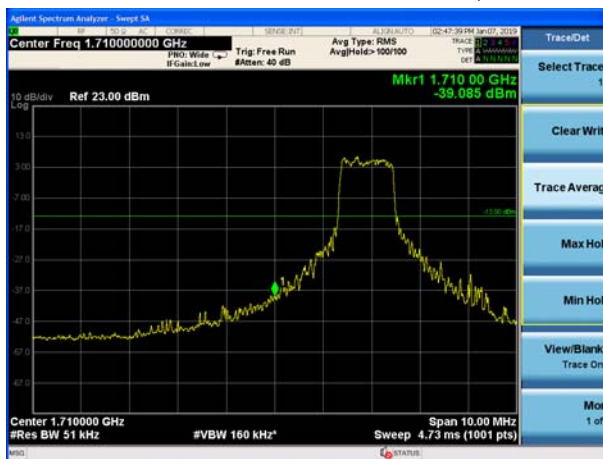
eMTC Band 4 QPSK 20MHz CH-Low, 1 RB



eMTC Band 4 QPSK 20MHz CH-High, 1 RB



eMTC Band 4 QPSK 20MHz CH-Low, 100%RB



eMTC Band 4 QPSK 20MHz CH-High, 100%RB





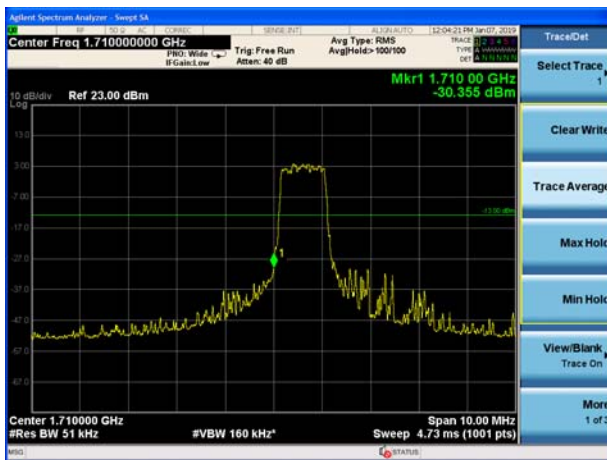
eMTC Band 4 16QAM 1.4MHz CH-Low, 1 RB



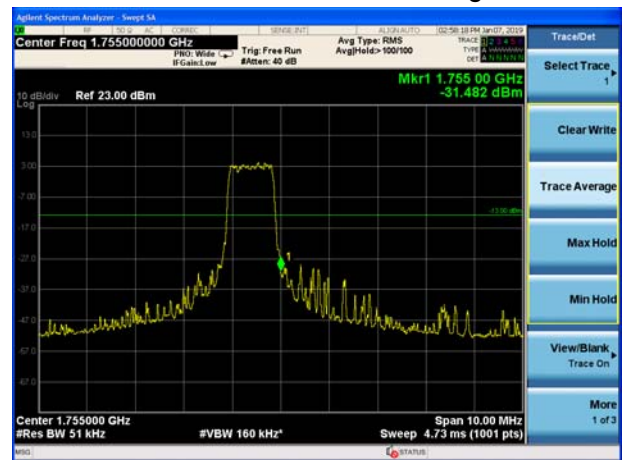
eMTC Band 4 16QAM 1.4MHz CH-High, 1 RB



eMTC Band 4 16QAM 1.4MHz CH-Low, 100%RB



eMTC Band 4 16QAM 1.4MHz CH-High, 100%RB



eMTC Band 4 16QAM 3MHz CH-Low, 1 RB

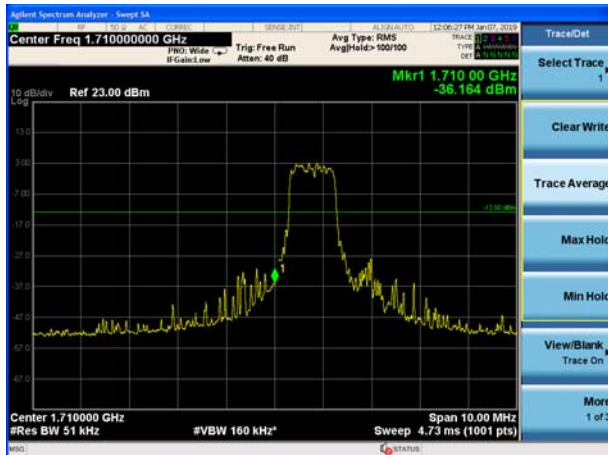


eMTC Band 4 16QAM 3MHz CH-High, 1 RB





eMTC Band 4 16QAM 3MHz CH-Low, 100%RB



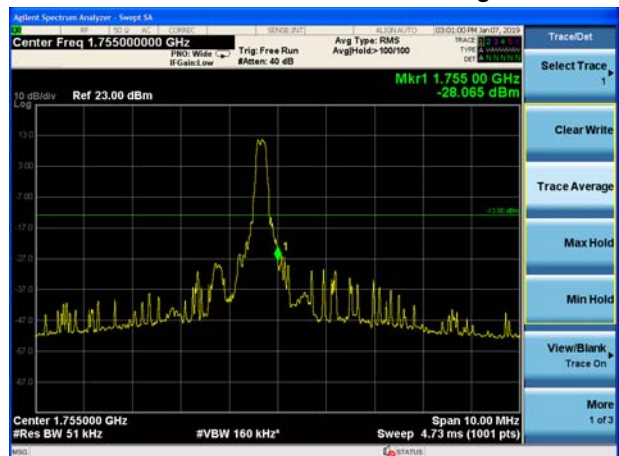
eMTC Band 4 16QAM 3MHz CH-High, 100%RB



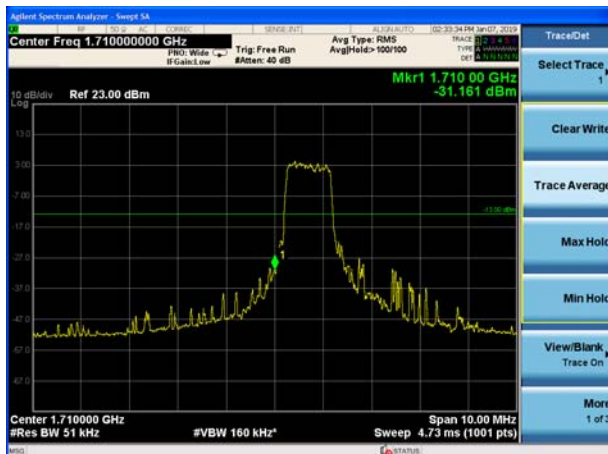
eMTC Band 4 16QAM 5MHz CH-Low, 1 RB



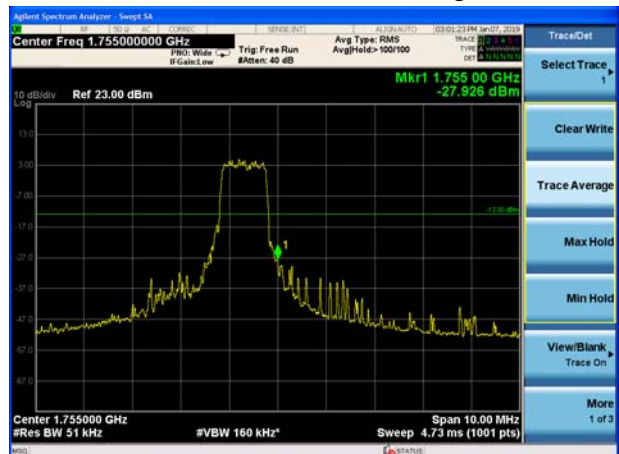
eMTC Band 4 16QAM 5MHz CH-High, 1 RB



eMTC Band 4 16QAM 5MHz CH-Low, 100%RB



eMTC Band 4 16QAM 5MHz CH-High, 100%RB





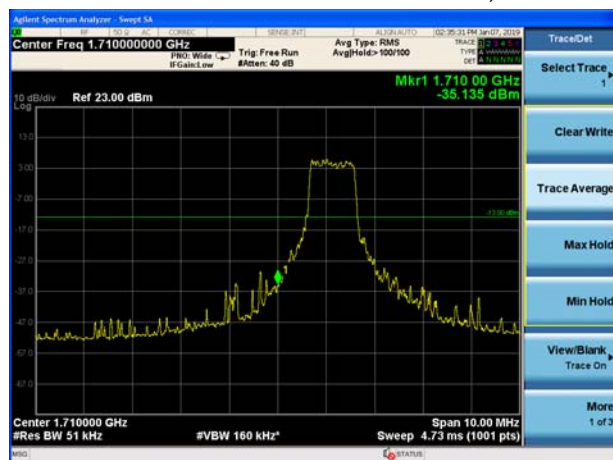
eMTC Band 4 16QAM 10MHz CH-Low, 1 RB



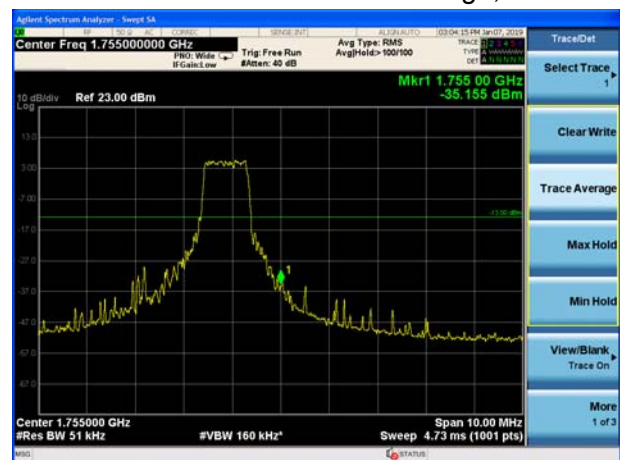
eMTC Band 4 16QAM 10MHz CH-High, 1 RB



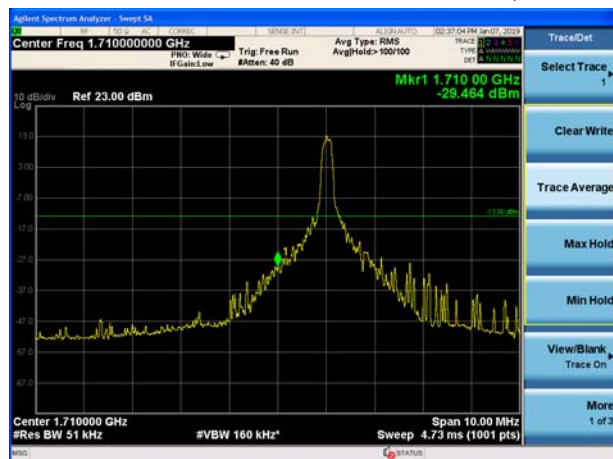
eMTC Band 4 16QAM 10MHz CH-Low, 100%RB



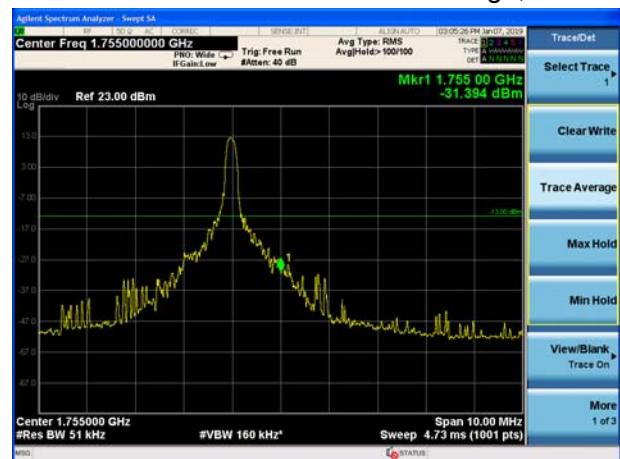
eMTC Band 4 16QAM 10MHz CH-High, 100%RB



eMTC Band 4 16QAM 15MHz CH-Low, 1 RB



eMTC Band 4 16QAM 15MHz CH-High, 1 RB





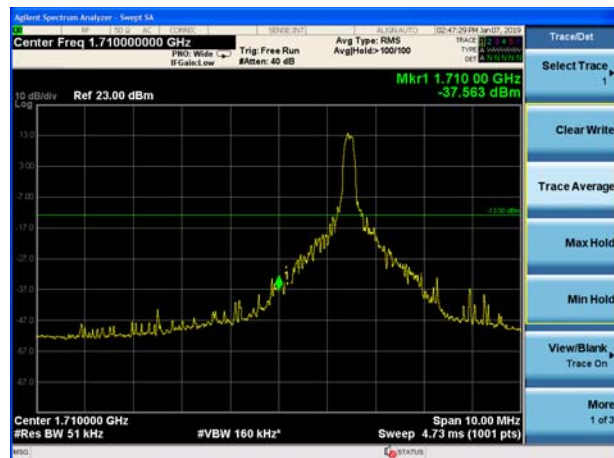
eMTC Band 4 16QAM 15MHz CH-Low, 100%RB



eMTC Band 4 16QAM 15MHz CH-High, 100%RB



eMTC Band 4 16QAM 20MHz CH-Low, 1 RB



eMTC Band 4 16QAM 20MHz CH-High, 1 RB



eMTC Band 4 16QAM 20MHz CH-Low, 100%RB



eMTC Band 4 16QAM 20MHz CH-High, 100%RB



5.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

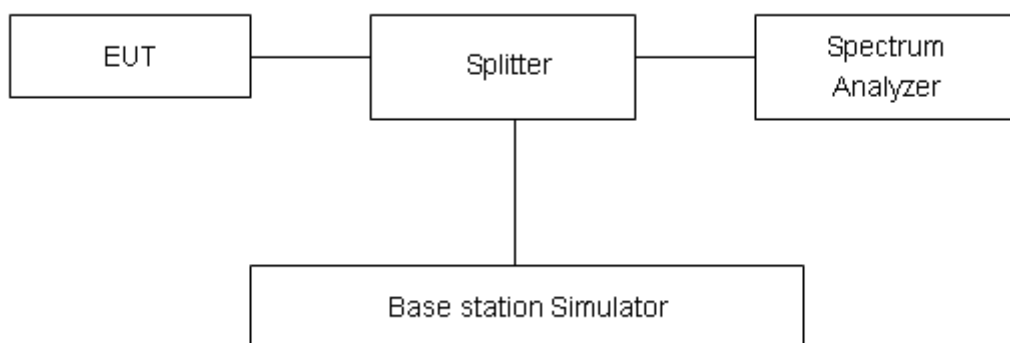
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

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:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. 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.

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	Bandwidth	Modulation	Channel/ Frequency (MHz)	Peak-to-Average Power Ratio (PAPR)			Limit (dB)	Conclusion
				Peak (dBm)	Avg (dBm)	PAPR (dB)		
eMTC Band4	1.4MHz	QPSK	20175/1732.5	27.13	17.18	9.95	≤13	PASS
		16QAM	20175/1732.5	27.75	16.76	10.99	≤13	PASS
	3MHz	QPSK	20175/1732.5	27.29	17.07	10.22	≤13	PASS
		16QAM	20175/1732.5	27.77	16.72	11.05	≤13	PASS
	5MHz	QPSK	20175/1732.5	27.37	17.38	9.99	≤13	PASS
		16QAM	20175/1732.5	28.83	17.61	11.22	≤13	PASS
	10MHz	QPSK	20175/1732.5	27.29	16.83	10.46	≤13	PASS
		16QAM	20175/1732.5	28.77	17.97	10.80	≤13	PASS
	15MHz	QPSK	20175/1732.5	27.18	17.84	9.34	≤13	PASS
		16QAM	20175/1732.5	28.72	18.42	10.30	≤13	PASS
	20MHz	QPSK	20175/1732.5	27.22	17.90	9.32	≤13	PASS
		16QAM	20175/1732.5	28.96	18.49	10.47	≤13	PASS

5.6 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 -30°C to +55°C in 10°C step size.

(1) With all power removed, the temperature was decreased to -10°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 -30°C to +55°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

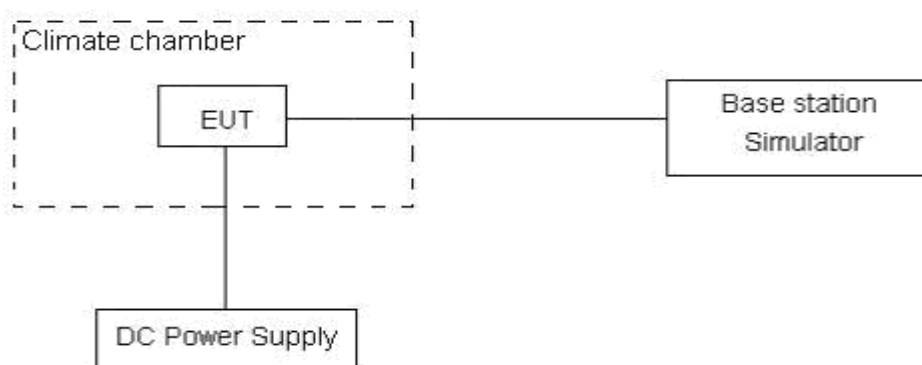
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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 3.45 V and 4.4 V, with a nominal voltage of 3.82V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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

eMTC Band 4						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	3.65	7.34	0.00194	0.00390	PASS
Extreme (55℃)		16.00	17.99	0.00851	0.00957	PASS
Extreme (50℃)		3.32	3.10	0.00177	0.00165	PASS
Extreme (40℃)		12.52	10.09	0.00666	0.00537	PASS
Extreme (30℃)		13.11	9.06	0.00697	0.00482	PASS
Extreme (20℃)		17.91	15.54	0.00953	0.00827	PASS
Extreme (10℃)		4.76	9.25	0.00253	0.00492	PASS
Extreme (0℃)		14.94	4.66	0.00795	0.00248	PASS
Extreme (-10℃)		15.47	1.38	0.00823	0.00073	PASS
Extreme (-20℃)		1.75	2.19	0.00093	0.00117	PASS
Extreme (-30℃)		16.42	15.69	0.00873	0.00835	PASS
25℃	LV	1.44	10.61	0.00077	0.00564	PASS
	HV	4.00	10.78	0.00213	0.00573	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	11.02	7.13	0.00586	0.00379	PASS
Extreme (55℃)		17.92	12.11	0.00953	0.00644	PASS
Extreme (50℃)		12.57	7.02	0.00669	0.00373	PASS
Extreme (40℃)		9.46	17.14	0.00503	0.00912	PASS
Extreme (30℃)		15.89	13.40	0.00845	0.00713	PASS
Extreme (20℃)		7.70	17.01	0.00410	0.00905	PASS
Extreme (10℃)		10.79	4.98	0.00574	0.00265	PASS
Extreme (0℃)		14.41	12.78	0.00767	0.00680	PASS
Extreme (-10℃)		8.75	10.83	0.00466	0.00576	PASS
Extreme (-20℃)		15.91	1.06	0.00846	0.00056	PASS
Extreme (-30℃)		13.78	4.78	0.00733	0.00254	PASS
25℃	LV	4.53	16.55	0.00241	0.00881	PASS
	HV	10.19	1.06	0.00542	0.00056	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	14.02	9.73	0.00746	0.00517	PASS
Extreme (55℃)		10.59	7.58	0.00563	0.00403	PASS



FCC RF Test Report			Report No: R1612H0172-R4v1			
Extreme (50℃)		4.00	11.29	0.00213	0.00601	PASS
Extreme (40℃)		2.47	16.21	0.00132	0.00862	PASS
Extreme (30℃)		11.41	12.72	0.00607	0.00676	PASS
Extreme (20℃)		16.25	10.27	0.00864	0.00546	PASS
Extreme (10℃)		3.18	13.17	0.00169	0.00700	PASS
Extreme (0℃)		16.70	3.31	0.00888	0.00176	PASS
Extreme (-10℃)		4.88	12.12	0.00260	0.00644	PASS
Extreme (-20℃)		11.59	4.13	0.00617	0.00220	PASS
Extreme (-30℃)		16.90	8.52	0.00899	0.00453	PASS
25℃		LV	8.14	5.71	0.00433	0.00304
	HV	11.38	17.91	0.00605	0.00953	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	2.34	9.94	0.00124	0.00529	PASS
Extreme (55℃)		13.32	13.45	0.00708	0.00715	PASS
Extreme (50℃)		3.73	12.21	0.00198	0.00649	PASS
Extreme (40℃)		11.74	15.67	0.00624	0.00834	PASS
Extreme (30℃)		9.22	4.38	0.00490	0.00233	PASS
Extreme (20℃)		17.85	8.92	0.00949	0.00475	PASS
Extreme (10℃)		13.80	4.18	0.00734	0.00222	PASS
Extreme (0℃)		2.79	8.61	0.00148	0.00458	PASS
Extreme (-10℃)		5.59	7.19	0.00297	0.00382	PASS
Extreme (-20℃)		12.10	16.15	0.00644	0.00859	PASS
Extreme (-30℃)	12.11	9.27	0.00644	0.00493	PASS	
25℃	LV	10.28	2.49	0.00547	0.00132	PASS
	HV	3.47	8.32	0.00185	0.00442	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	3.95	10.78	0.00210	0.00573	PASS
Extreme (55℃)		14.94	5.91	0.00794	0.00314	PASS
Extreme (50℃)		13.19	15.49	0.00702	0.00824	PASS
Extreme (40℃)		7.85	1.32	0.00417	0.00070	PASS
Extreme (30℃)		13.01	1.94	0.00692	0.00103	PASS
Extreme (20℃)		9.54	15.81	0.00508	0.00841	PASS
Extreme (10℃)		10.03	9.91	0.00533	0.00527	PASS
Extreme (0℃)		4.51	2.56	0.00240	0.00136	PASS
Extreme (-10℃)		10.54	3.29	0.00561	0.00175	PASS
Extreme (-20℃)		1.96	4.64	0.00104	0.00247	PASS



Extreme (-30℃)		14.45	11.32	0.00769	0.00602	PASS
25℃	LV	5.91	17.54	0.00315	0.00933	PASS
	HV	16.78	7.56	0.00893	0.00402	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz	16QAM	QPSK	16QAM	QPSK	
Temperature	Voltage			16QAM	QPSK	
Normal (25℃)	Normal	6.80	11.05	0.00362	0.00588	PASS
Extreme (55℃)		12.98	2.74	0.00690	0.00146	PASS
Extreme (50℃)		3.84	7.02	0.00204	0.00374	PASS
Extreme (40℃)		6.74	8.58	0.00359	0.00456	PASS
Extreme (30℃)		13.67	5.57	0.00727	0.00296	PASS
Extreme (20℃)		2.36	12.83	0.00125	0.00683	PASS
Extreme (10℃)		14.48	2.38	0.00770	0.00127	PASS
Extreme (0℃)		11.73	15.03	0.00624	0.00799	PASS
Extreme (-10℃)		4.16	12.16	0.00221	0.00647	PASS
Extreme (-20℃)		15.21	1.90	0.00809	0.00101	PASS
Extreme (-30℃)		4.13	13.95	0.00220	0.00742	PASS
25℃	LV	8.16	5.32	0.00434	0.00283	PASS
	HV	13.15	5.89	0.00699	0.00313	PASS

5.7 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.

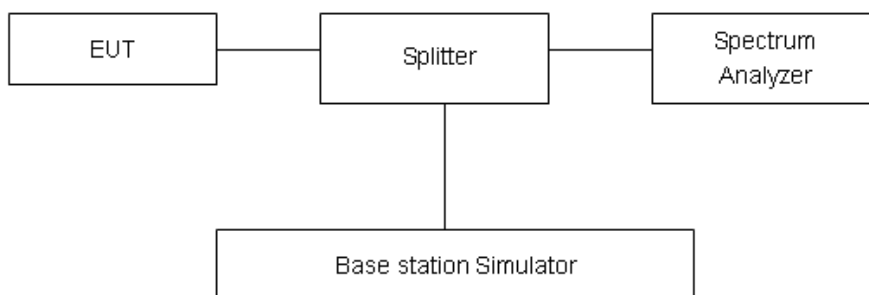
RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

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

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

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

Test setup



Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB..”

Part 27.53(h) 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
9kHz-1GHz	0.684 dB
1GHz-18GHz	1.407 dB

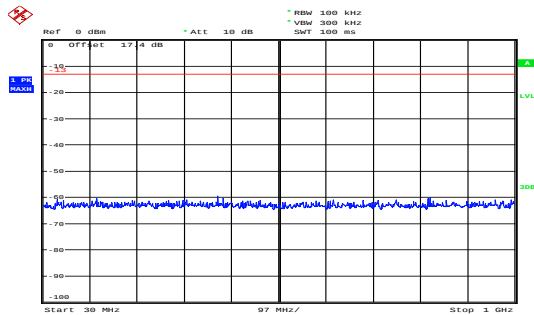


Test Result

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.

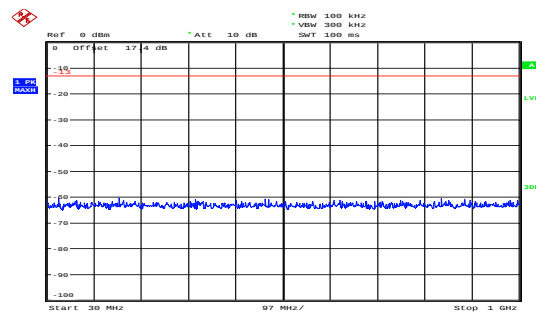
The signal beyond the limit is carrier.

eMTC Band 4 1.4MHz CH-Low 30MHz~1GHz



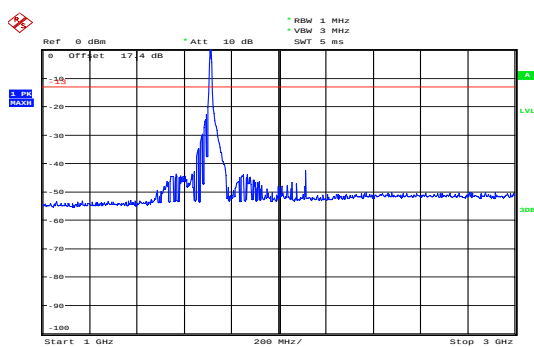
Date: 8.JAN.2019 16:39:57

eMTC Band 4 1.4MHz CH-Middle 30MHz~1GHz



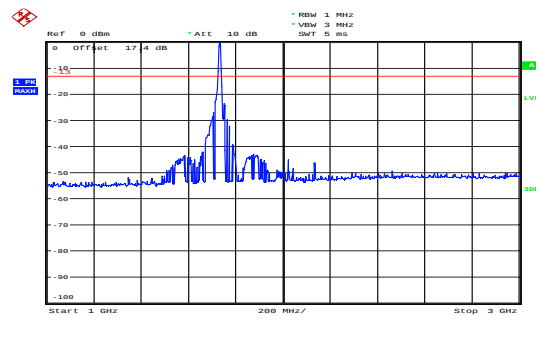
Date: 8.JAN.2019 16:52:41

eMTC Band 4 1.4MHz CH-Low 1GHz~3GHz



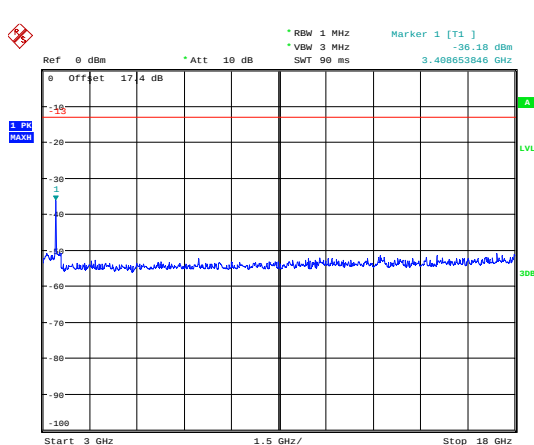
Date: 8.JAN.2019 16:42:02

eMTC Band 4 1.4MHz CH-Middle 1GHz~3GHz



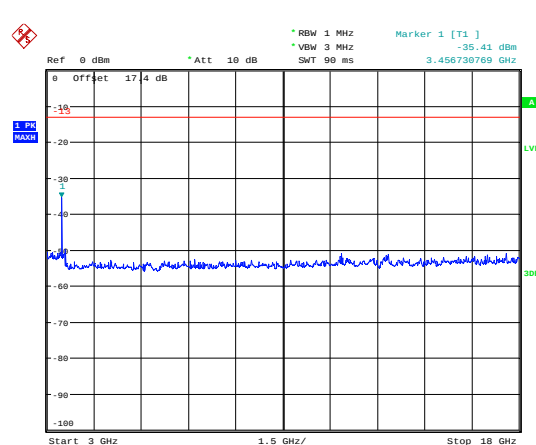
Date: 8.JAN.2019 16:52:17

eMTC Band 4 1.4MHz CH-Low 3GHz~18GHz



Date: 8.JAN.2019 16:42:23

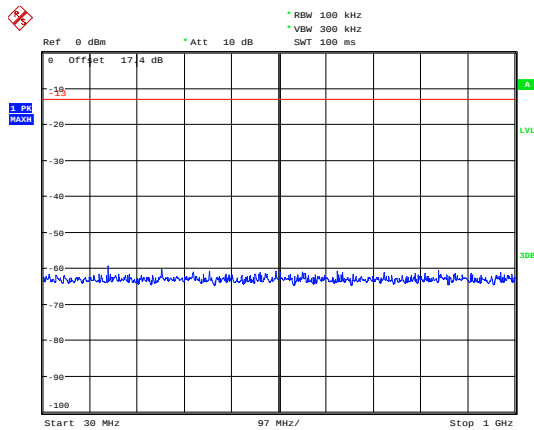
eMTC Band 4 1.4MHz CH-Middle 3GHz~18GHz



Date: 8.JAN.2019 16:50:45

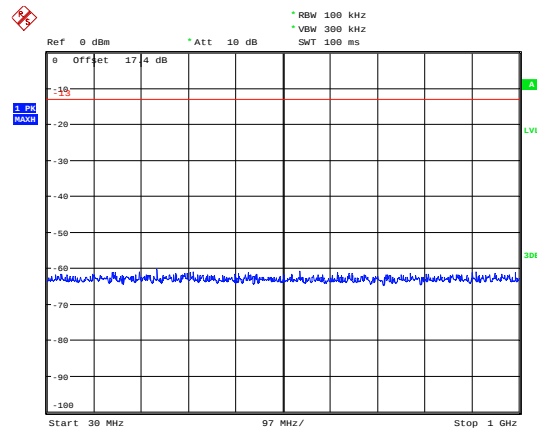


eMTC Band 4 1.4MHz CH-High 30MHz~1GHz



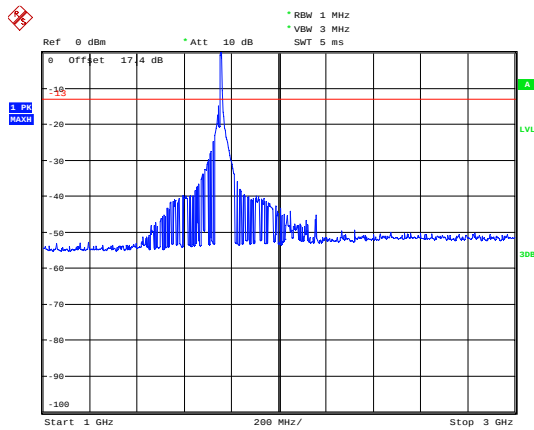
Date: 8.JAN.2019 17:27:41

eMTC Band 4 3MHz CH-Low 30MHz~1GHz



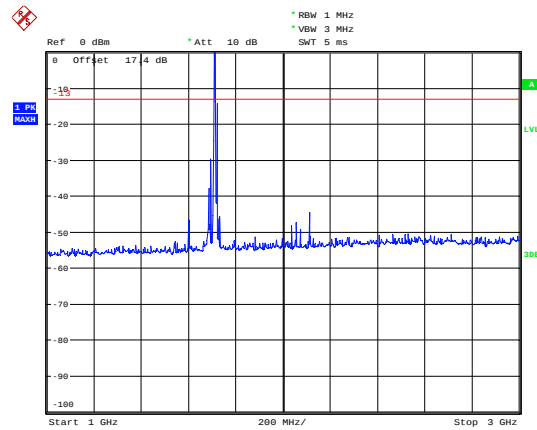
Date: 8.JAN.2019 17:42:00

eMTC Band 4 1.4MHz CH-High 1GHz~3GHz



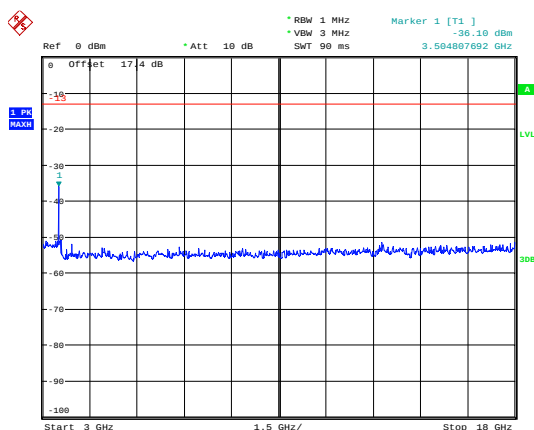
Date: 8.JAN.2019 17:29:02

eMTC Band 4 3MHz CH-Low 1GHz~3GHz



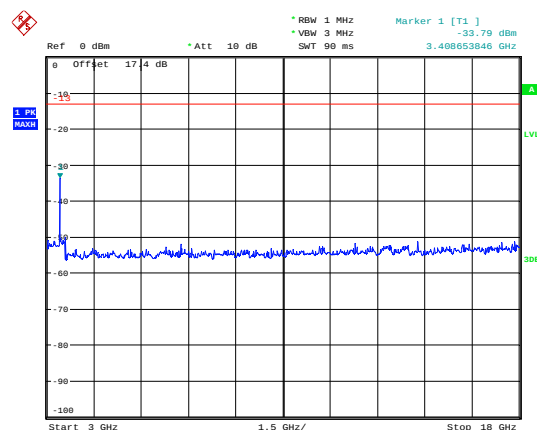
Date: 8.JAN.2019 17:41:06

eMTC Band 4 1.4MHz CH-High 3GHz~18GHz



Date: 8.JAN.2019 17:29:42

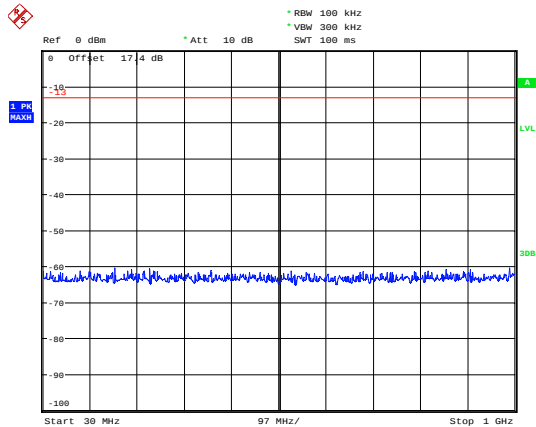
eMTC Band 4 3MHz CH-Low 3GHz~18GHz



Date: 8.JAN.2019 17:48:34

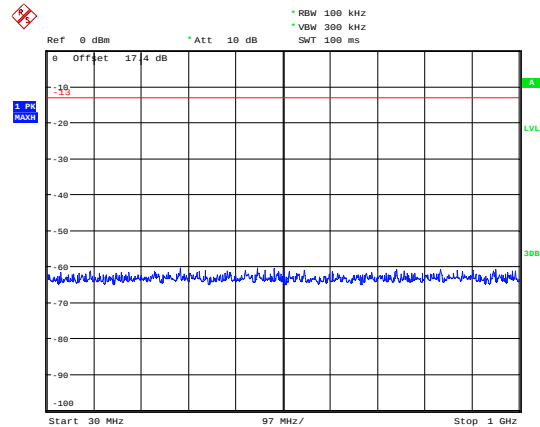


eMTC Band 4 3MHz CH-Middle 30MHz~1GHz



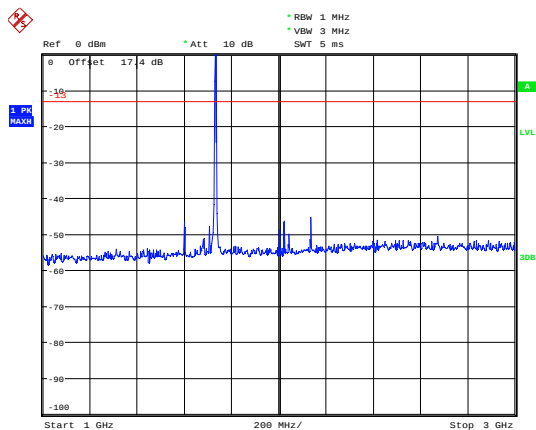
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eMTC Band 4 3MHz CH-High 30MHz~1GHz



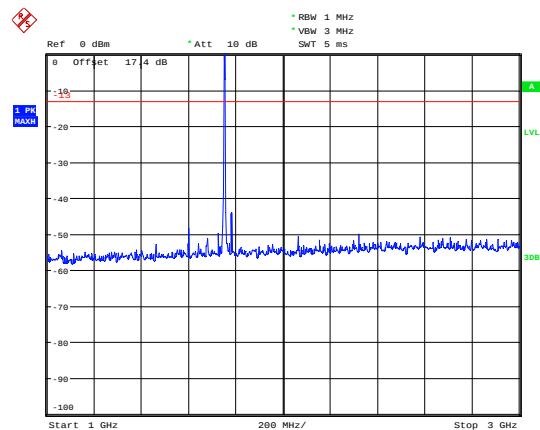
Date: 8.JAN.2019 17:53:34

eMTC Band 4 3MHz CH-Middle 1GHz~3GHz



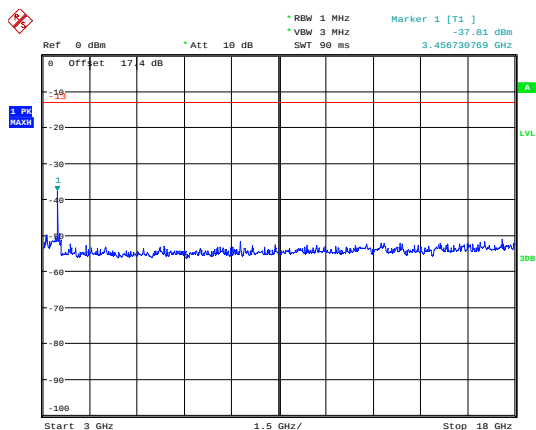
Date: 8.JAN.2019 17:44:05

eMTC Band 4 3MHz CH-High 1GHz~3GHz



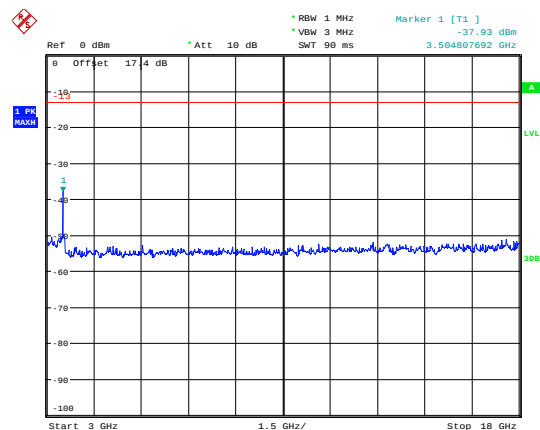
Date: 8.JAN.2019 17:53:16

eMTC Band 4 3MHz CH-Middle 3GHz~18GHz



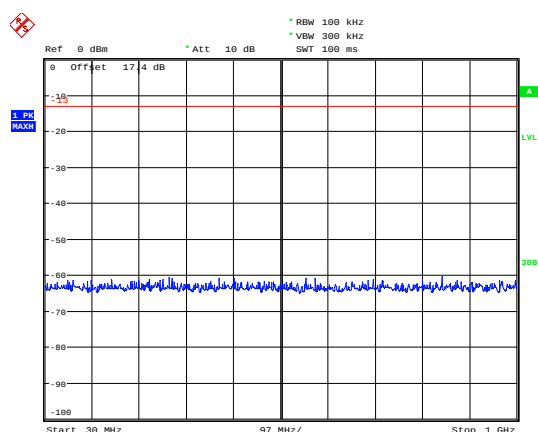
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eMTC Band 4 3MHz CH-High 3GHz~18GHz



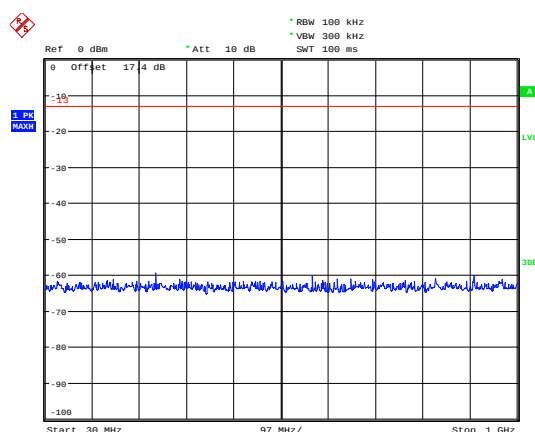
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eMTC Band 4 5MHz CH-Low 30MHz~1GHz



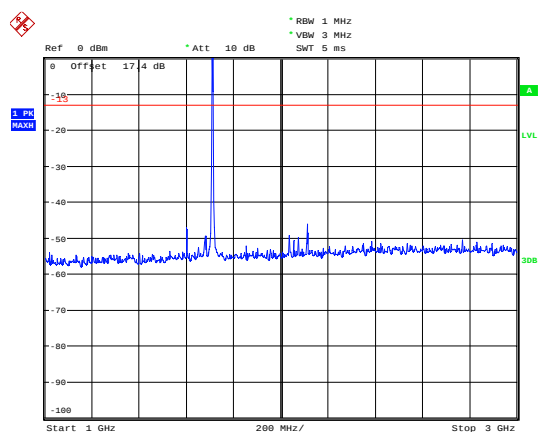
Date: 8 JAN 2019 18:01:20

eMTC Band 4 5MHz CH-Middle 30MHz~1GHz



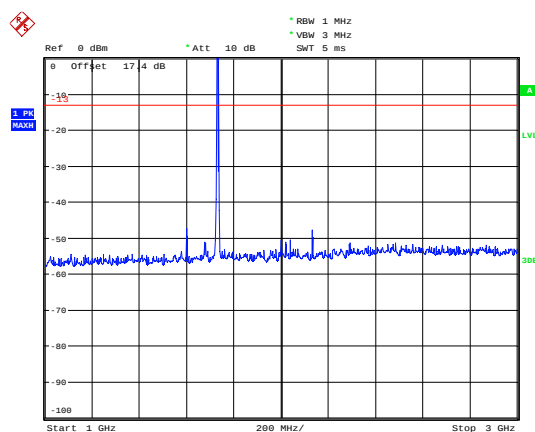
Date: 8 JAN 2019 18:04:17

eMTC Band 4 5MHz CH-Low 1GHz~3GHz



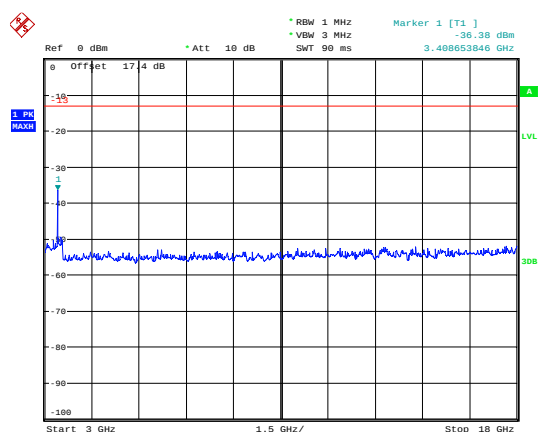
Date: 8.JAN.2019 18:01:36

eMTC Band 4 5MHz CH-Middle 1GHz~3GHz



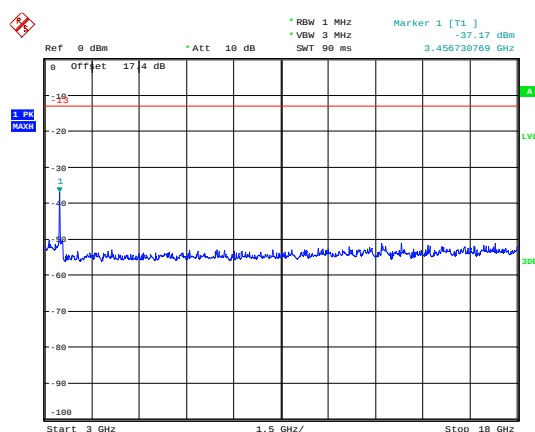
Date: 8.JAN.2019 18:03:54

eMTC Band 4 5MHz CH-Low 3GHz~18GHz



Date: 8 JAN 2019 18:01:50

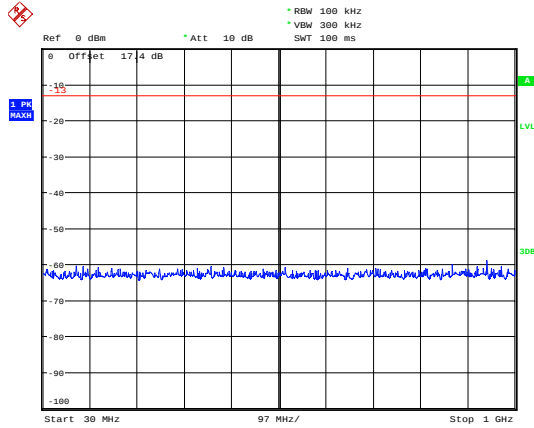
eMTC Band 4 5MHz CH-Middle 3GHz~18GHz



Date: 8 JAN 2019 18:03:41

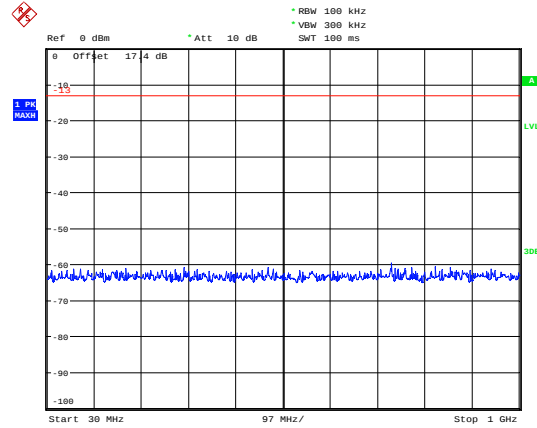


eMTC Band 4 5MHz CH-High 30MHz~1GHz



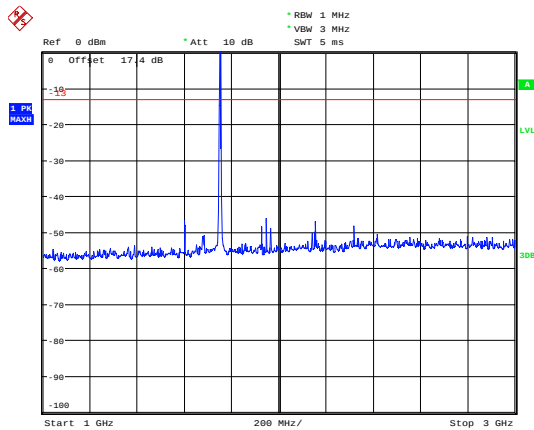
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eMTC Band 4 10MHz CH-Low 30MHz~1GHz



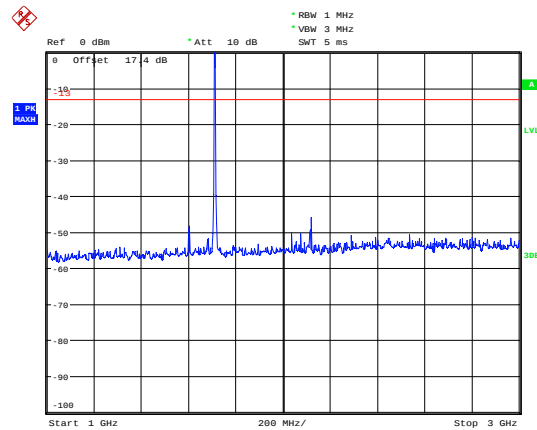
Date: 8.JAN.2019 19:40:41

eMTC Band 4 5MHz CH-High 1GHz~3GHz



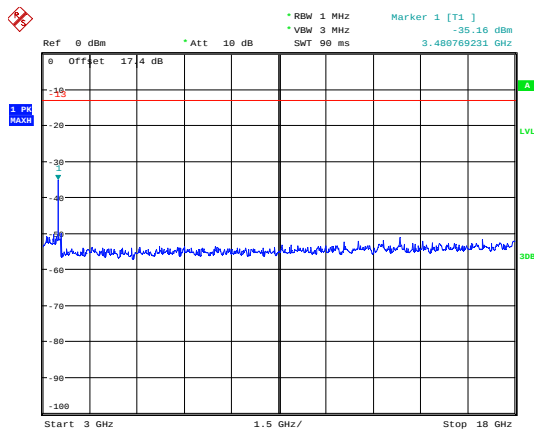
Date: 8.JAN.2019 19:23:47

eMTC Band 4 10MHz CH-Low 1GHz~3GHz



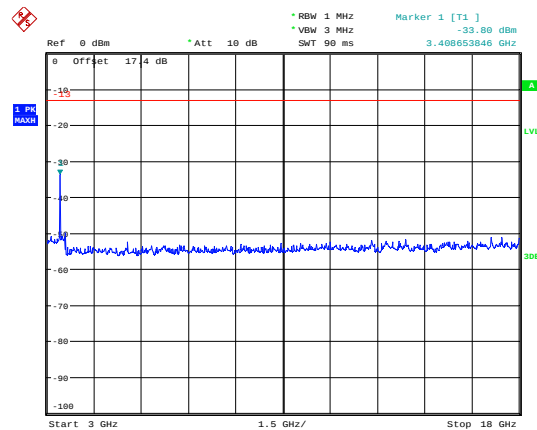
Date: 8.JAN.2019 19:40:26

eMTC Band 4 5MHz CH-High 3GHz~18GHz



Date: 8.JAN.2019 19:24:00

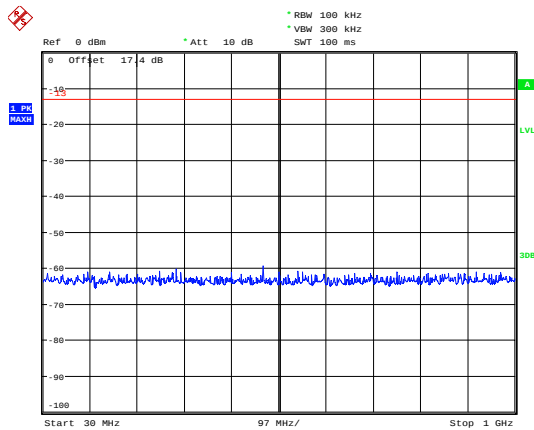
eMTC Band 4 10MHz CH-Low 3GHz~18GHz



Date: 8.JAN.2019 19:36:21

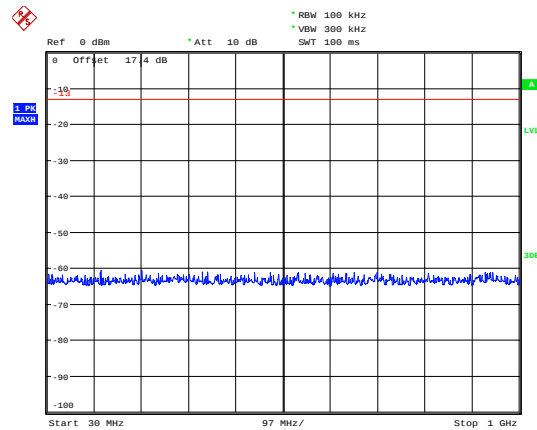


eMTC Band 4 10MHz CH-Middle 30MHz~1GHz



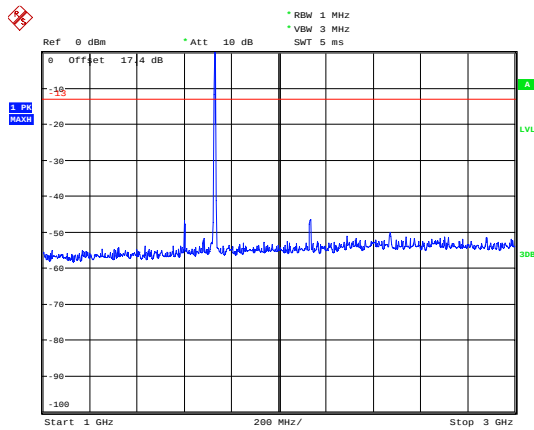
Date: 8.JAN.2019 19:39:32

eMTC Band 4 10MHz CH-High 30MHz~1GHz



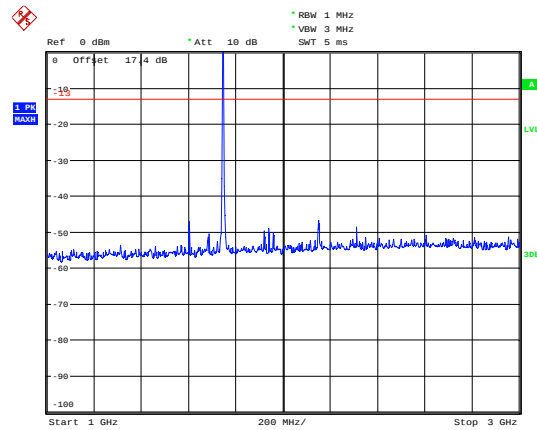
Date: 8.JAN.2019 19:38:59

eMTC Band 4 10MHz CH-Middle 1GHz~3GHz



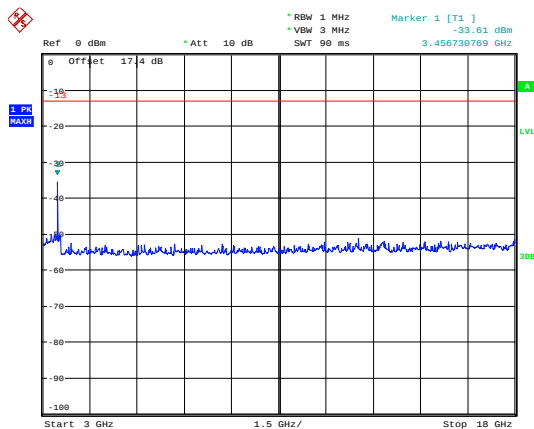
Date: 8.JAN.2019 19:39:54

eMTC Band 4 10MHz CH-High 1GHz~3GHz



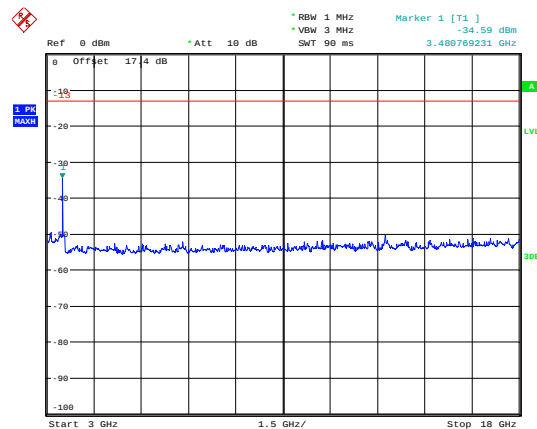
Date: 8.JAN.2019 19:38:41

eMTC Band 4 10MHz CH-Middle 3GHz~18GHz



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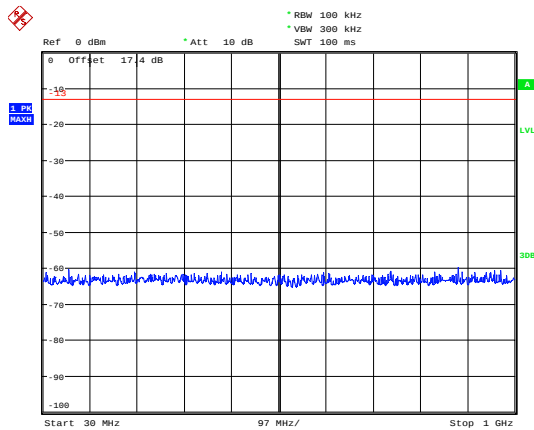
eMTC Band 4 10MHz CH-High 3GHz~18GHz



Date: 8.JAN.2019 19:38:14

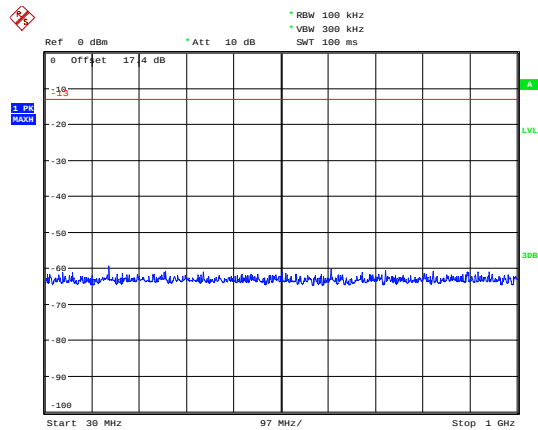


eMTC Band 4 15MHz CH-Low 30MHz~1GHz



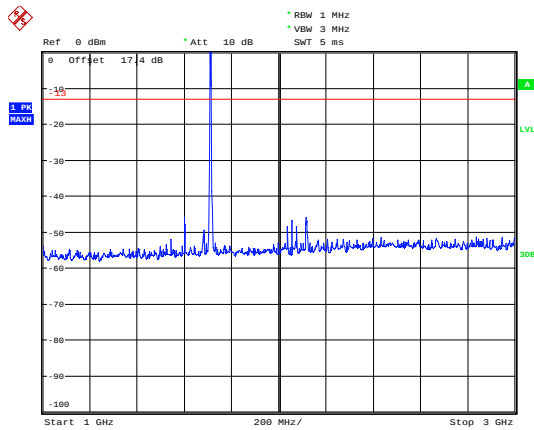
Date: 8.JAN.2019 19:42:09

eMTC Band 4 15MHz CH-Middle 30MHz~1GHz



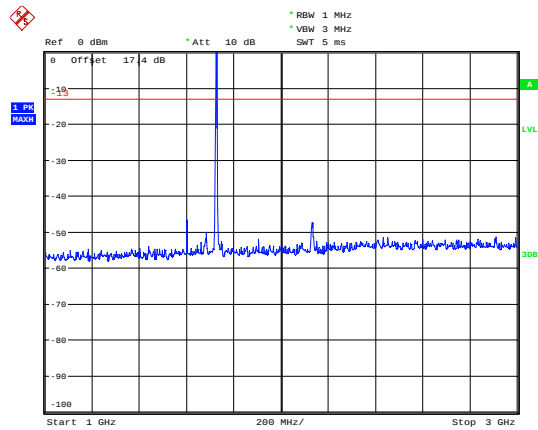
Date: 8.JAN.2019 19:44:07

eMTC Band 4 15MHz CH-Low 1GHz~3GHz



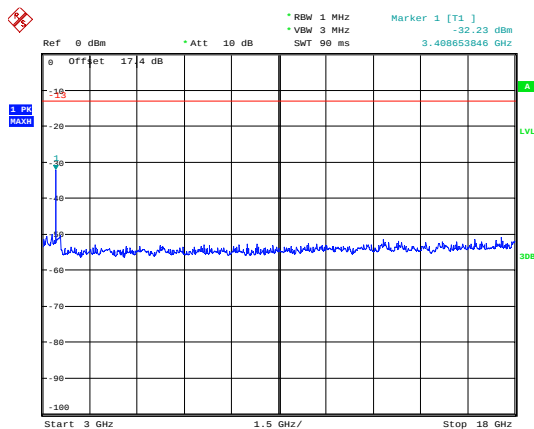
Date: 8.JAN.2019 19:42:27

eMTC Band 4 15MHz CH-Middle 1GHz~3GHz



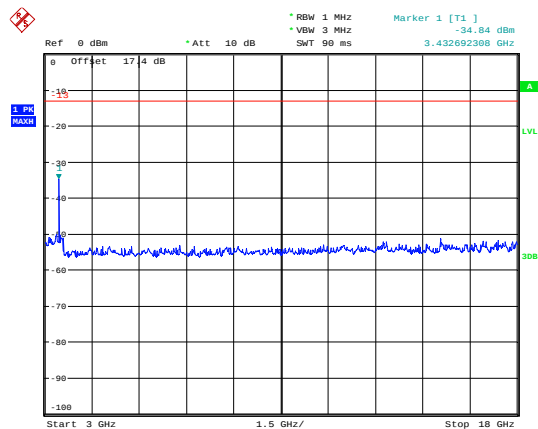
Date: 8.JAN.2019 19:43:51

eMTC Band 4 15MHz CH-Low 3GHz~18GHz



Date: 8.JAN.2019 19:42:50

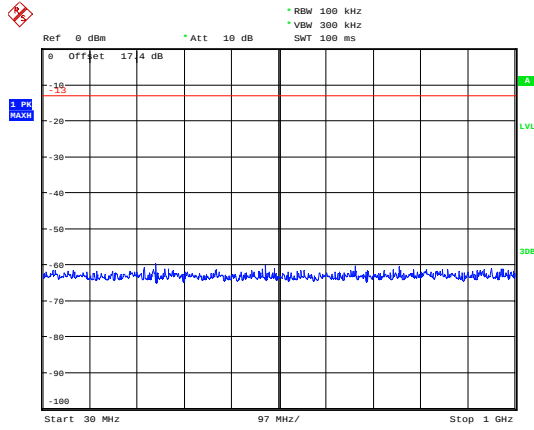
eMTC Band 4 15MHz CH-Middle 3GHz~18GHz



Date: 8.JAN.2019 19:43:37

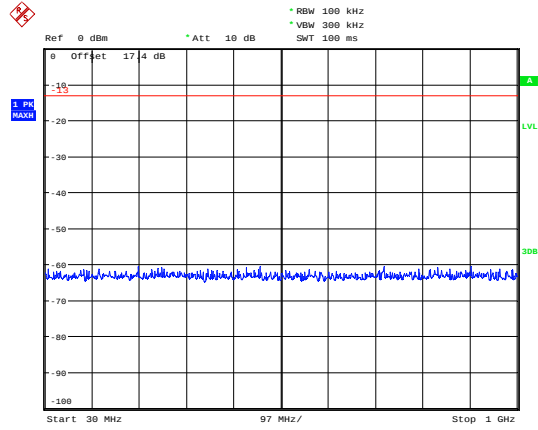


eMTC Band 4 15MHz CH-High 30MHz~1GHz



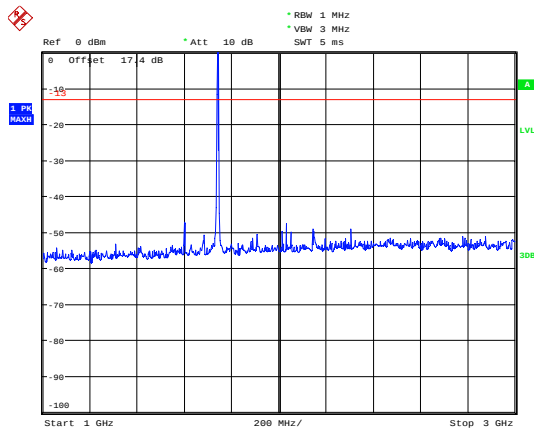
Date: 8.JAN.2019 19:44:29

eMTC Band 4 20MHz CH-Low 30MHz~1GHz



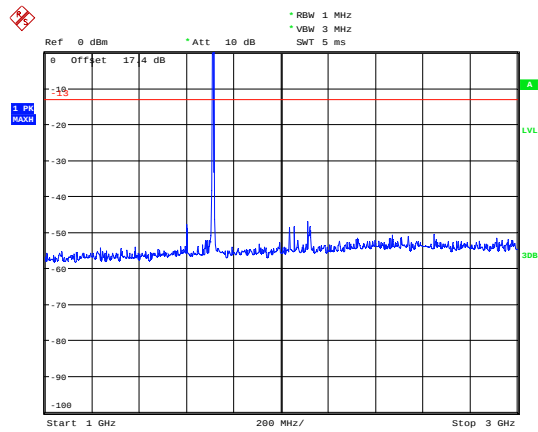
Date: 8.JAN.2019 19:48:10

eMTC Band 4 15MHz CH-High 1GHz~3GHz



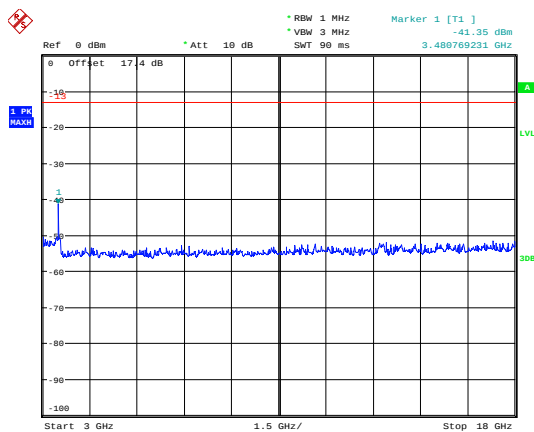
Date: 8.JAN.2019 19:44:47

eMTC Band 4 20MHz CH-Low 1GHz~3GHz



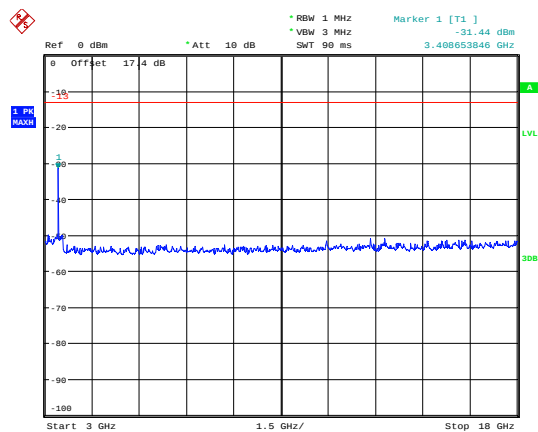
Date: 8.JAN.2019 19:46:36

eMTC Band 4 15MHz CH-High 3GHz~18GHz



Date: 8.JAN.2019 19:45:00

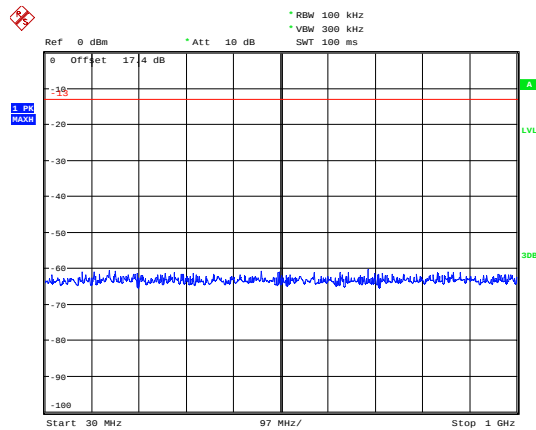
eMTC Band 4 20MHz CH-Low 3GHz~18GHz



Date: 8.JAN.2019 19:46:56

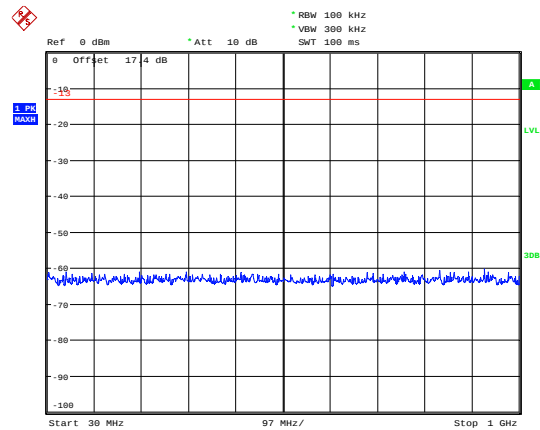


eMTC Band 4 20MHz CH- Middle 30MHz~1GHz



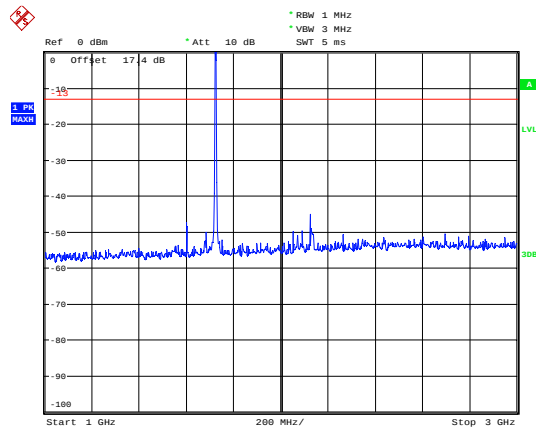
Date: 8.JAN.2019 19:48:34

eMTC Band 4 20MHz CH- High 30MHz~1GHz



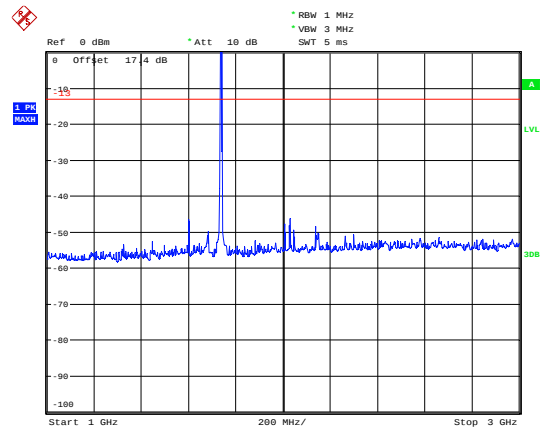
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eMTC Band 4 20MHz CH- Middle 1GHz~3GHz



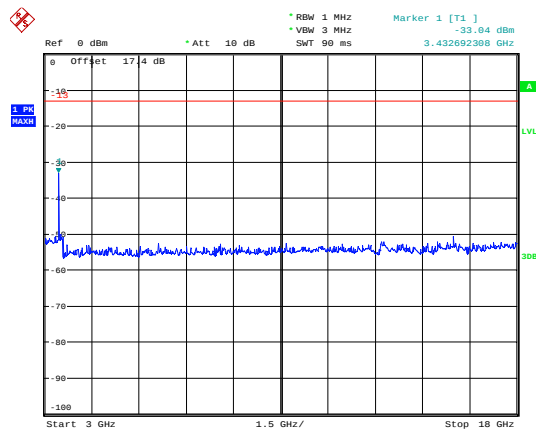
Date: 8.JAN.2019 19:48:47

eMTC Band 4 20MHz CH- High 1GHz~3GHz



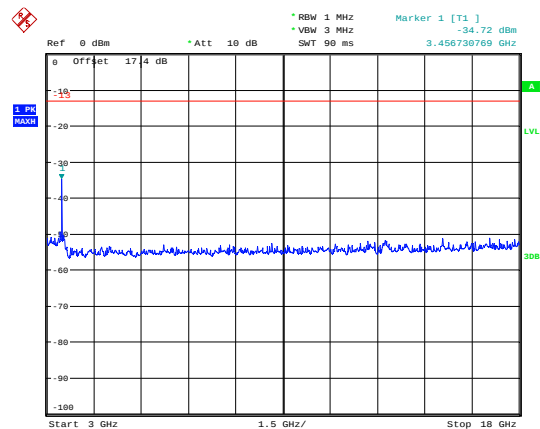
Date: 8.JAN.2019 19:50:02

eMTC Band 4 20MHz CH- Middle 3GHz~18GHz



Date: 8.JAN.2019 19:49:00

eMTC Band 4 20MHz CH- High 3GHz~18GHz



Date: 8.JAN.2019 19:49:47

5.8 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 D01 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:

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
The measurement results are amend as described below:

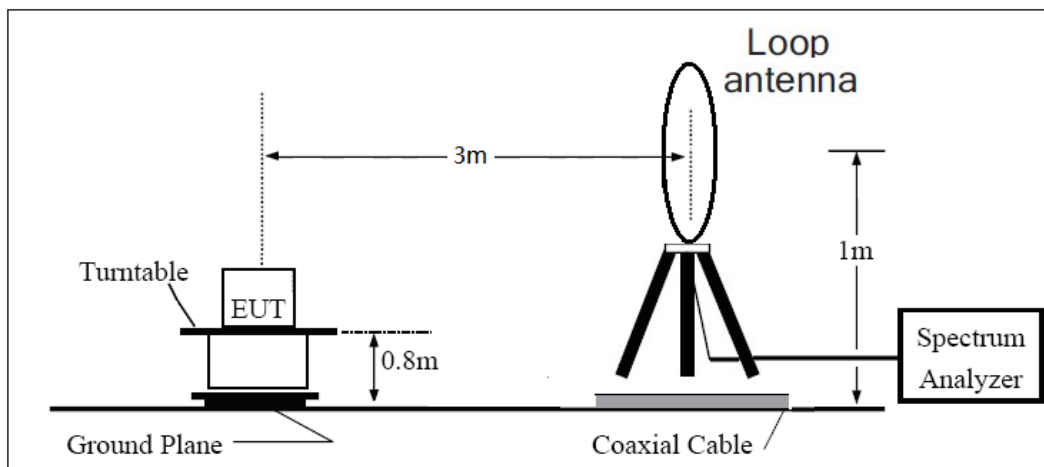
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

= EIRP-2.15dBi.

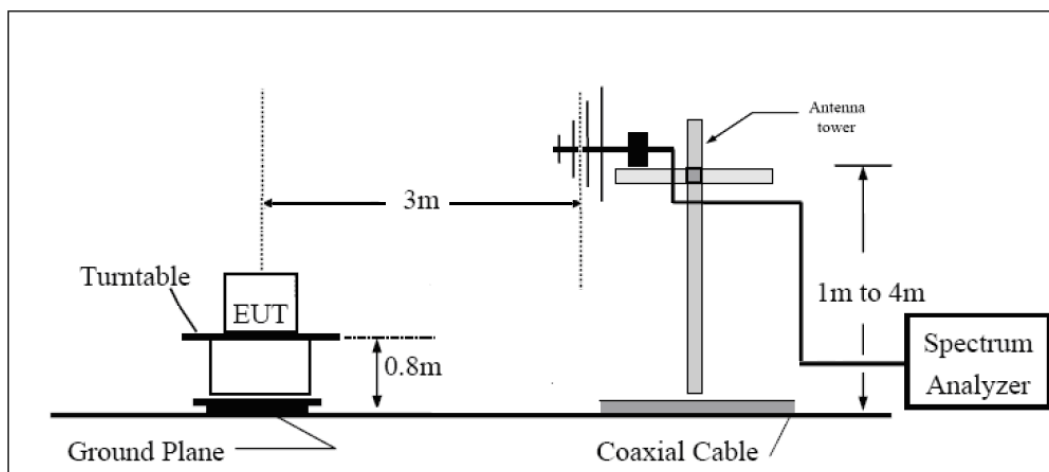
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

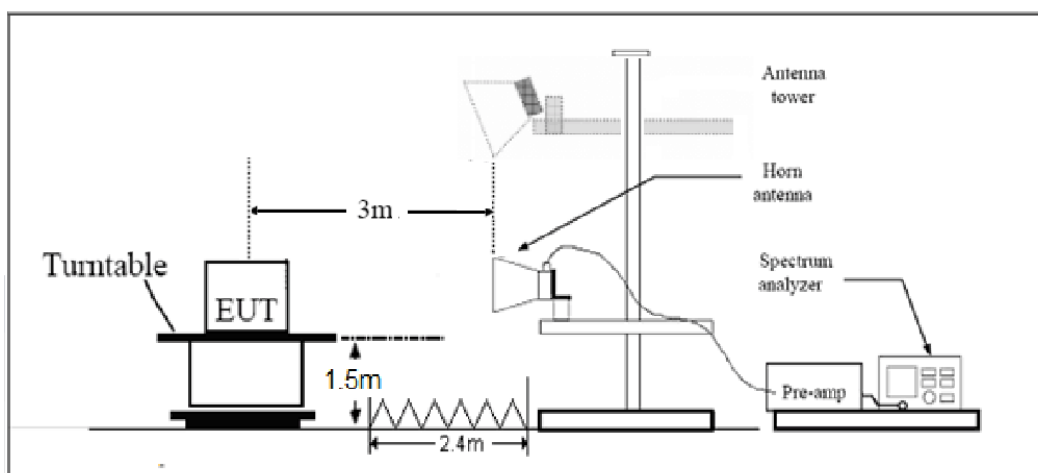
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m



Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.”

Part 27.53(h) 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 $k = \pm 1.96$, $U = \pm 3.55$ 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.

eMTC Band 4 QPSK 1.4MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3464.3	-54.13	2.6	10.75	Vertical	-45.98	-13.00	32.98	45
3	5197.5	-58.31	2.4	11.05	Vertical	-49.66	-13.00	36.66	315
4	6930.0	-57.34	4.5	11.15	Vertical	-50.69	-13.00	37.69	225
5	8662.5	-54.13	5.1	11.35	Vertical	-47.88	-13.00	34.88	90
6	10395.0	-51.97	5.3	11.95	Vertical	-45.32	-13.00	32.32	45
7	12127.5	-50.45	5.5	13.55	Vertical	-42.40	-13.00	29.40	0
8	13860.0	-49.09	6.3	13.75	Vertical	-41.64	-13.00	28.64	45
9	15592.5	-49.00	6.7	13.85	Vertical	-41.85	-13.00	28.85	0
10	17325.0	-50.79	6.8	14.25	Vertical	-43.34	-13.00	30.34	180

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 Vertical position.

eMTC Band 4 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3460.5	-55.95	2.6	10.75	Vertical	-47.80	-13.00	34.80	225
3	5191.5	-63.00	2.4	11.05	Vertical	-54.35	-13.00	41.35	90
4	6930.0	-56.40	4.5	11.15	Vertical	-49.75	-13.00	36.75	135
5	8662.5	-55.53	5.1	11.35	Vertical	-49.28	-13.00	36.28	90
6	10395.0	-52.27	5.3	11.95	Vertical	-45.62	-13.00	32.62	315
7	12127.5	-53.39	5.5	13.55	Vertical	-45.34	-13.00	32.34	225
8	13860.0	-51.41	6.3	13.75	Vertical	-43.96	-13.00	30.96	90
9	15592.5	-54.38	6.7	13.85	Vertical	-47.23	-13.00	34.23	45
10	17325.0	-51.67	6.8	14.25	Vertical	-44.22	-13.00	31.22	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 Vertical position.



eMTC Band 4 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3447.0	-56.45	2.6	10.75	Vertical	-48.30	-13.00	35.30	45
3	5170.5	-62.67	2.4	11.05	Vertical	-54.02	-13.00	41.02	0
4	6930.0	-56.64	4.5	11.15	Vertical	-49.99	-13.00	36.99	180
5	8662.5	-55.01	5.1	11.35	Vertical	-48.76	-13.00	35.76	225
6	10395.0	-53.03	5.3	11.95	Vertical	-46.38	-13.00	33.38	90
7	12127.5	-53.56	5.5	13.55	Vertical	-45.51	-13.00	32.51	45
8	13860.0	-52.45	6.3	13.75	Vertical	-45.00	-13.00	32.00	0
9	15592.5	-54.79	6.7	13.85	Vertical	-47.64	-13.00	34.64	180
10	17325.0	-50.66	6.8	14.25	Vertical	-43.21	-13.00	30.21	225

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 Vertical position.

6 Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2018-05-20	2019-05-19
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-21	2019-05-20
RF Cable	Agilent	SMA 15cm	0001	/	/
Software	R&S	EMC32	9.26.0	/	/

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