



CERTIFICATION TEST REPORT

CLASS II PERMISSIVE CHANGE

Report Number. : 4789656068-E1V2

Applicant : SAMSUNG ELECTRONICS CO., LTD.
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,
GYEONGGI-DO, 16677, KOREA

Model : SM-G980F/DS, SM-G980F

FCC ID : A3LSMG980F

EUT Description : GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+,
NFC and WPT

Test Standard(s) : FCC CFR47 PART 27 SUBPART M

Date Of Issue:

November 17, 2020

Prepared by:

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ACCREDITED

Testing Laboratory

TL-637

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	10/30/20	Initial issue	Sungeun Lee
V2	11/17/20	Updated to address TCB's question	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+, NFC and WPT
MODEL NUMBER: SM-G980F/DS, SM-G980F
SERIAL NUMBER: RF8N9022Z3D (CONDUCTED);
DATE TESTED: OCT 12, 2020 ~ NOV 12, 2020

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 27M	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:



Junwhan Lee
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Sungeun Lee
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 27.
3. ANSI TIA-603-E, 2016
4. ANSI C63.26, 2015
5. KDB 971168 D01 Power Meas License Digital Systems v03r01

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
<input type="checkbox"/>	Chamber 1
<input type="checkbox"/>	Chamber 2
<input type="checkbox"/>	Chamber 3

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/wp-content/uploads/2017/05/TL-637.pdf>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.35 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.49 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.82 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.49 dB

Uncertainty figures are valid to a confidence level of 95%.

4.3. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 1, Clause 4.4.2 in IEC Guide 115:2007.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, ANT+, NFC and WPT. This test report addresses the WWAN operational mode.

This report covers the Samsung models SM-G980F/DS and SM-G980F. These models are identical in hardware except SM-G980F has single SIM tray. With some pre-scan, model SM-G980F/DS was set for final test.

- C2PC

This is no H/W change, and only EM and Power were tested because A-MPR was applied to low channel side.

5.2. WORST-CASE ORIENTATION

LTE Band 41 FCC were tested on HPUE mode since it is high power.(Power class 2)

A-MPR is implemented in this EUT when operating on HPUE per the A-MPR specification in 3GPP TS 36.101 (Table 6.2.4-4a). Conducted output power verification data are shown Appendix A. Also only Emission mask test item were performed A-MPR condition (Especially low channel side)

The worst-case scenario for all measurements is based on the average conducted output power measurement investigation results. Output power measurements were measured on QPSK, 16QAM, 64QAM and 256QAM modulations. It was found that QPSK and 16QAM results were worst case. All testing was performed using QPSK and 16QAM modulations to represent the worst case.

5.3. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37M5WSB411SE3	N/A
Data Cable	SAMSUNG	EP-DG977	N/A	N/A

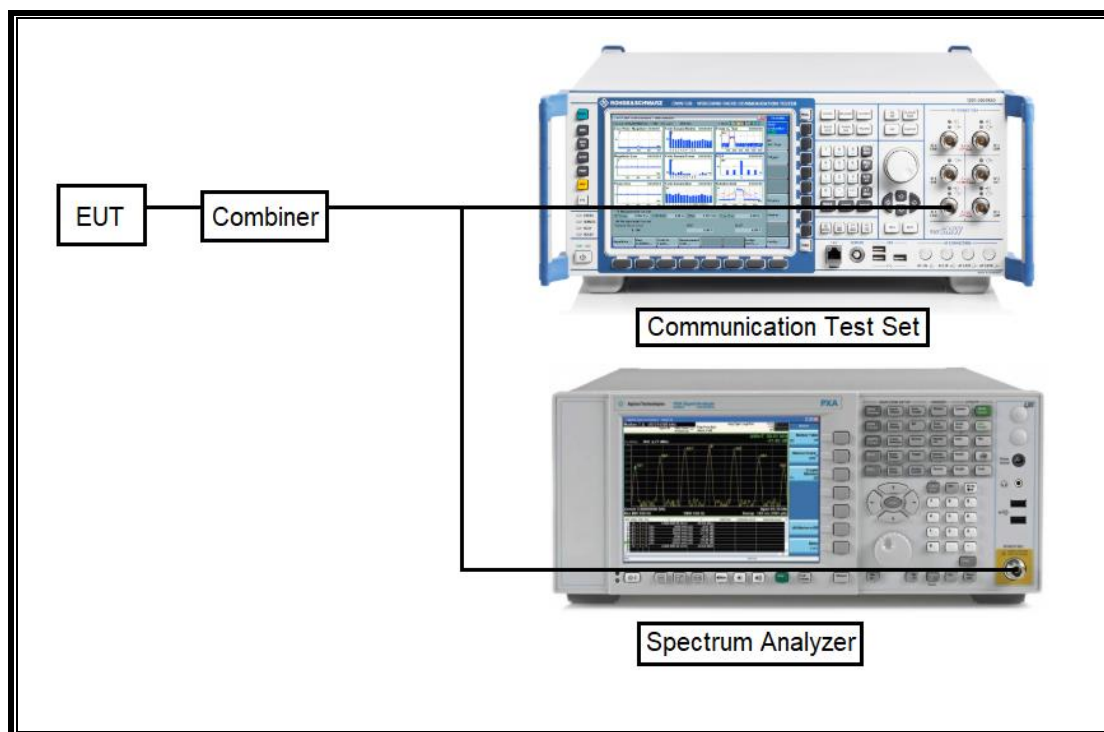
I/O CABLE

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0m	N/A

TEST SETUP

The EUT is continuously communicated with the call box during the tests.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Power Splitter	WEINSCHTEL	WA1534	UL001	02-05-21
Communications Test Set	R&S	CMW500	150313	08-05-21
DC Power Supply	AGILENT	E3640A	MY54226395	08-05-21
Spectrum Analyzer	AGILENT	N9030A	MY54490312	08-05-21
Attenuator	PASTERNAK	PE7395-10	A011	08-05-21
Temperature & Humidity Chamber	ESPEC	SH-642	93001109	08-04-21
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver2.5	

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
27.53(m)	Emission mask	Section 9.2	Conducted	Pass

8. LIMITS AND CONDUCTED RESULTS

8.1. EMISSION MASK

RULE PART(S)

FCC: §§27. 53 (m)

LIMITS

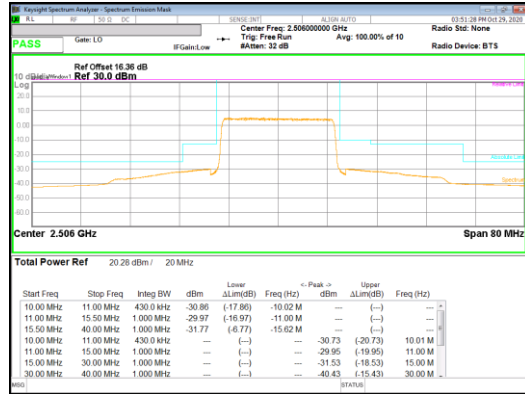
(m) (4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ 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 than $43 + 10 \log (P)$ 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.

RESULTS

See the following pages.

LTE Band 41(PC2)

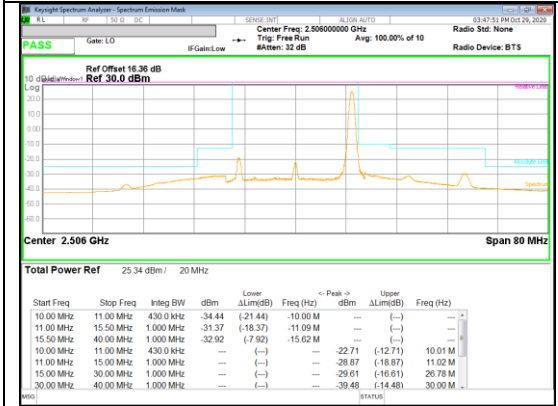
Band 41
 20MHz
 QPSK



QPSK Low channel FRB



QPSK Low channel 1RB_Offset Low

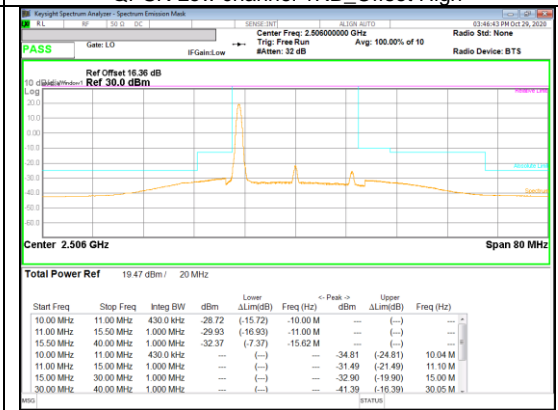


QPSK Low channel 1RB_Offset High

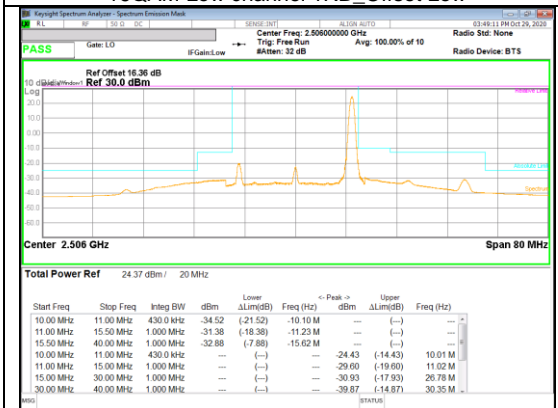
Band 41
 20MHz
 16QAM



16QAM Low channel FRB



16QAM Low channel 1RB_Offset Low

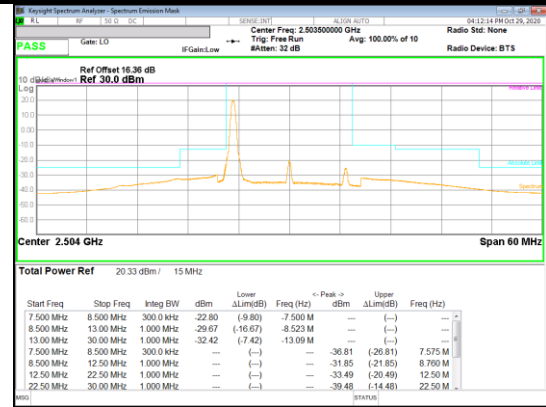


16QAM Low channel 1RB_Offset High

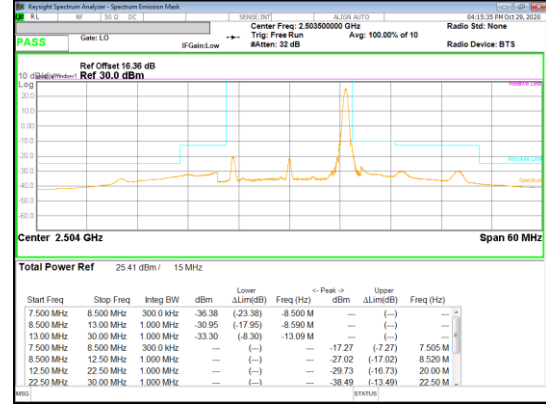
Band 41
 15MHz
 QPSK



QPSK Low channel FRB



QPSK Low channel 1RB_Offset Low

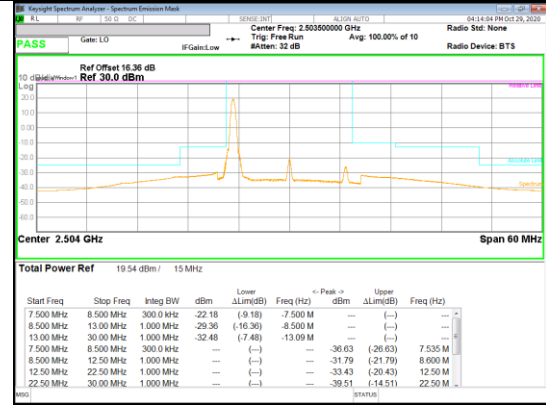


QPSK Low channel 1RB_Offset High

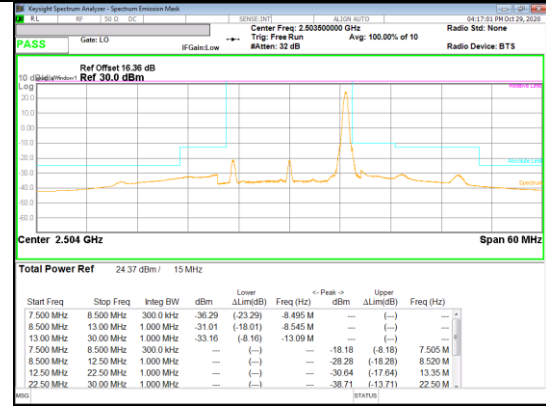
Band 41
 15MHz
 16QAM



16QAM Low channel FRB

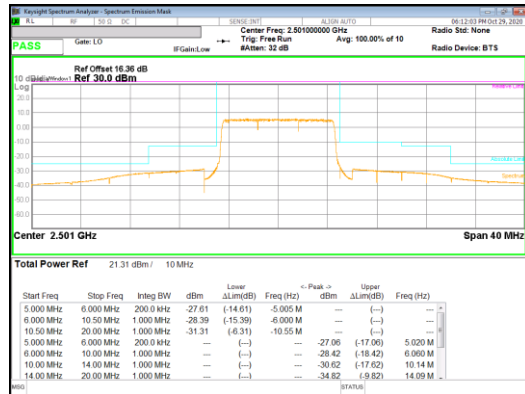


16QAM Low channel 1RB_Offset Low

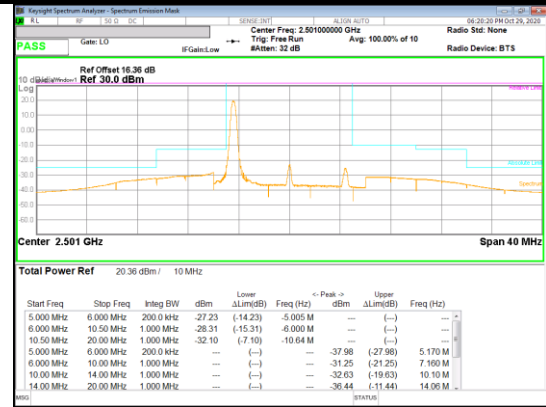


16QAM Low channel 1RB_Offset High

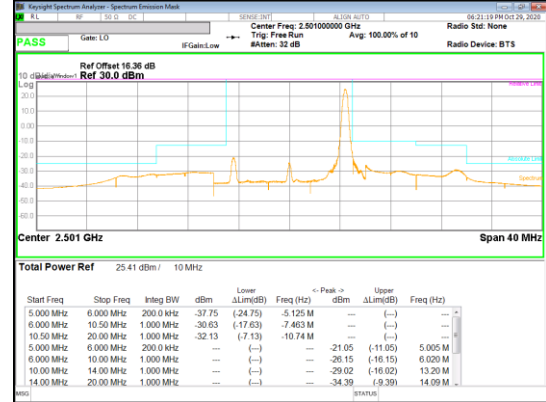
Band 41
 10MHz
 QPSK



QPSK Low channel FRB

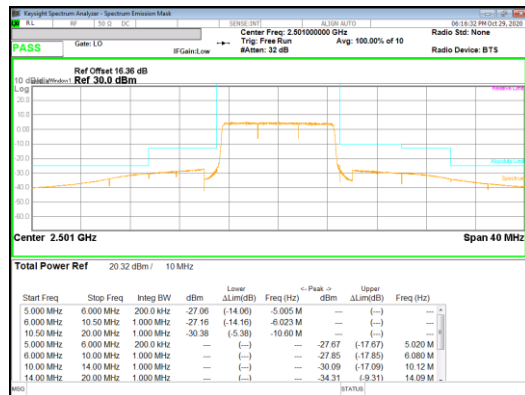


QPSK Low channel 1RB_Offset Low

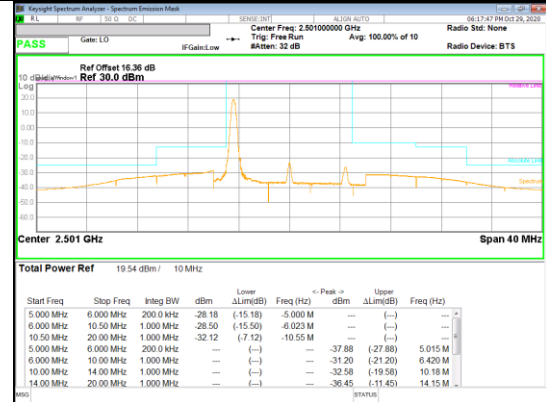


QPSK Low channel 1RB_Offset High

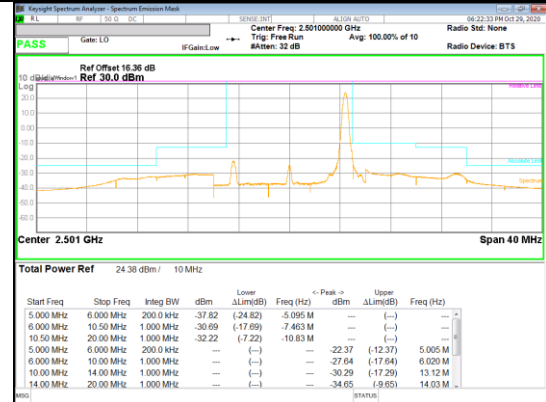
Band 41
 10MHz
 16QAM



16QAM Low channel FRB



16QAM Low channel 1RB_Offset Low

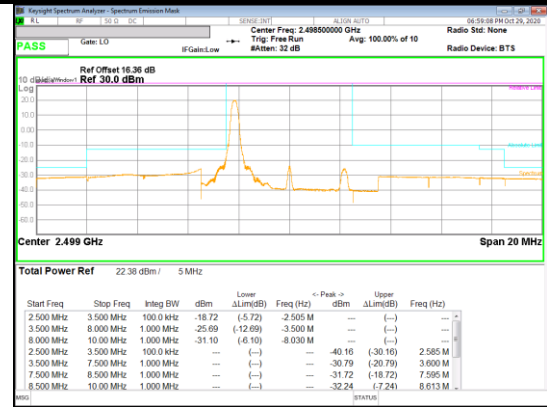


16QAM Low channel 1RB_Offset High

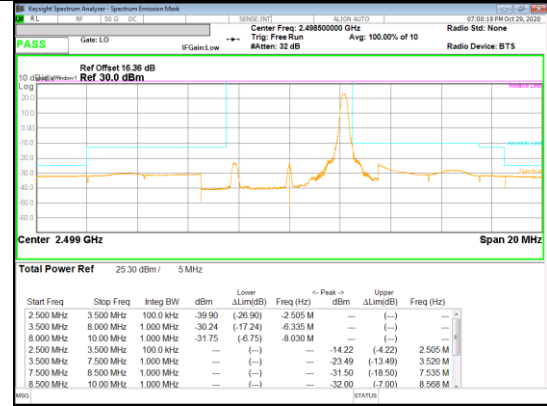
Band 41
 5MHz
 QPSK



QPSK Low channel FRB



QPSK Low channel 1RB_Offset Low

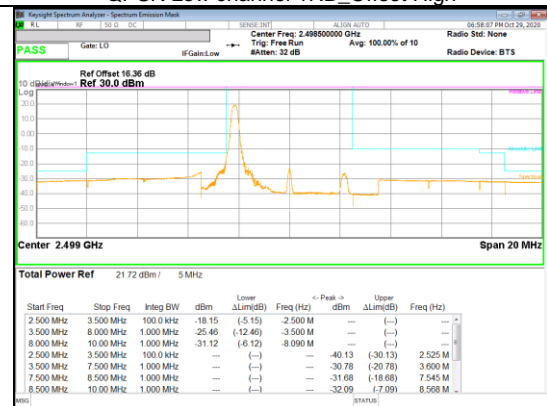


QPSK Low channel 1RB_Offset High

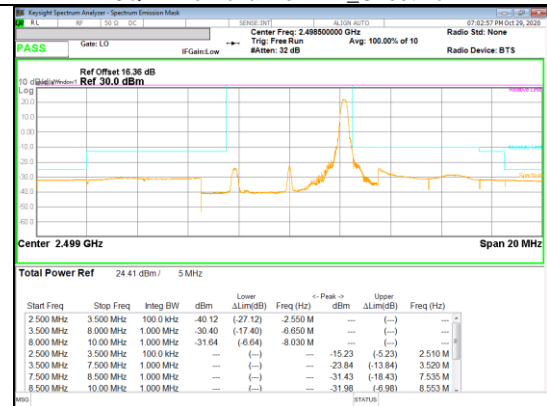
Band 41
 5MHz
 16QAM



16QAM Low channel FRB



16QAM Low channel 1RB_Offset Low



16QAM Low channel 1RB_Offset High

Appendix A

Additional Maximum Power Reduction (A-MPR)

Test case	NS	MCC	Bandwidth [MHz]	Frequency [MHz]	Modulation	RB Size	RB Offset	A-MPR [dB]	Output Power [dBm]		
1	01	311	5	2498.5	QPSK	1	0	≤3	22.28		
					16QAM				21.59		
					64QAM				20.48		
					256QAM				17.52		
2			5	2498.5	5	2498.5	QPSK	1	9	0	25.22
							16QAM				24.52
							64QAM				23.54
							256QAM				20.49
3			10	2501	10	2501	QPSK	1	0	≤5	20.41
							16QAM				19.42
							64QAM				18.53
							256QAM				15.07
4			10	2501	10	2501	QPSK	20	0	≤2	22.20
							16QAM				21.32
							64QAM				20.32
							256QAM				18.35
5			10	2501	10	2501	QPSK	50	0	≤3	21.34
	16QAM	20.25									
	64QAM	19.25									
	256QAM	17.06									
6	10	2501	10	2501	QPSK	25	20	≤1	23.25		
					16QAM				22.29		
					64QAM				21.23		
					256QAM				19.21		
7	10	2501	10	2501	QPSK	1	49	0	25.45		
					16QAM				24.41		
					64QAM				23.45		
					256QAM				20.40		
8	15	2503.5	15	2503.5	QPSK	1	0	≤5	20.26		
					16QAM				19.66		
					64QAM				18.53		
					256QAM				15.14		
9	15	2503.5	15	2503.5	QPSK	20	0	≤2	22.24		
					16QAM				21.13		
					64QAM				20.25		
					256QAM				18.30		
10	15	2503.5	15	2503.5	QPSK	75	0	≤4	20.20		
					16QAM				19.22		
					64QAM				18.17		
					256QAM				16.16		
11	15	2503.5	15	2503.5	QPSK	50	15	≤3	21.13		
					16QAM				20.13		
					64QAM				19.12		
					256QAM				17.04		
12	15	2503.5	15	2503.5	QPSK	1	74	0	25.24		
					16QAM				24.30		
					64QAM				23.27		
					256QAM				20.07		
13	20	2506	20	2506	QPSK	1	0	≤5	20.28		
					16QAM				19.79		
					64QAM				19.00		
					256QAM				15.39		
14	20	2506	20	2506	QPSK	20	0	≤2	22.18		
					16QAM				21.24		
					64QAM				20.13		
					256QAM				18.28		
15	20	2506	20	2506	QPSK	100	0	≤4	20.14		
					16QAM				19.15		
					64QAM				18.21		
					256QAM				16.01		
16	20	2506	20	2506	QPSK	75	24	≤3	21.22		
					16QAM				20.21		
					64QAM				19.17		
					256QAM				17.14		
17	20	2506	20	2506	QPSK	1	99	0	25.36		
					16QAM				24.40		
					64QAM				22.84		
					256QAM				20.65		
18	01	312	5	2498.5	QPSK	1	0	≤3	22.28		
					16QAM				21.71		
					64QAM				20.80		
					256QAM				17.34		
19	01	1	5	2498.5	QPSK	1	0	0	25.33		
					16QAM				24.53		
					64QAM				23.33		
					256QAM				20.30		

Note1: A-MPR is applied to low channel side. Mid and high channels output power are not affected. Output power verification with mid and high channels are done and confirmed the power levels are same as the original filing when A-MPR mode was disabled.
Note2: Output power verification with other MCC codes, 310 and 312 have been checked and confirmed the power results are same as the level resulted at MCC code, 311.

END OF REPORT